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Responsible Financial Consumption Behavior of Young Adults

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Abstract

Responsible financial consumption behavior depicts person's self-control in spending, planning for the future, seeking information, education, rational decision- making and solvency. As surveys of financial literacy indicate worryingly low levels of financial skills and knowledge among young adults, the purpose of this paper is to investigate responsible consumption behavior of young adults. Also, the paper investigates the influence of, attitudes and self-efficacy on the responsible financial consumption behavior of young adults. The quantitative research was conducted on the sample of 483 young adults using convenience sample of economics students. The results were analyzed by structural equation modeling, cluster and ANOVA analysis. The PLS-SEM model proved the influence of attitudes, and self-efficacy on responsible behavior. Also, the results indicate that more financially responsible young adults are less financed by allowance and more by scholarship and seek more information on money related issues in media, from friends and in banks when compared to the ones that are less financially responsible.

Keywords: Responsible Financial Consumption Behavior, Self-Efficacy, Attitudes, Young Adults

Introduction

The focus of this paper is the concept of responsible financial consumption behavior that has developed as a way of problematizing personal finance consumption. The culture of consumption advocates that individuals are worthy proportionally to the extent of earning money and spending it on various goods and services. The "dark side" to such a value system, however, is that over-consumption is associated with serious long-term financial problems, lower well-being, poorer quality of life and even worse interpersonal relationships (Belk, 1985; Kasser & Ryan, 1996, Carver & Baird, 1998; Sirgy, 1998). Poor financial habits such as impulsive buying and over-consumption can have severe consequences and often result in over-indebtedness, poverty and financial and social exclusion of individuals and households.

The main purpose of this study was to investigate responsible financial consumption behavior of young adults. Also, the paper investigates the influence of, attitudes and self-efficacy on the responsible financial behavior of young adults. Up to now there are no known published sources that discuss RFCB and its predictors among young adults, therefore this research presents a unique opportunity to address this gap.

Responsible Financial Consumption Behavior Defined

The ability to control consumption significantly determines other dimensions of financial behavior as well as individuals' overall financial behavior. If a person manages money inadequately and spends beyond his or her means, he or she will be unable to participate in saving, investing or insurance (Kimball, 1990). Furthermore, if such behavior persists, a person might even be forced to ask for credit in order to reimburse for a budgetary deficit (Barbić et al. 2019).

The primary question that arises is what is the attribute of "responsible financial consumption behavior"? What are its dimensions, and in what ways can it be understood?

Financial behavior refers to human behavior applicable to money management (Xiao, 2008). Barbić, Lučić and Chen (2019) proposed a comprehensive measure of responsible financial consumption behavior. They defined it through six dimensions: (1) spending self-control, (2) spending self-predictions and planning for the future, (3) seeking consumer information, (4) taking part in consumer education, (5) rational consumer decision-making and (6) solvency. Their measure included responsible decision-making in everyday activities, not just behavior related to the usage of financial products and services. According to Barbić, Lučić and Chen (2019):

"Responsible financial consumption behavior is connected to the psychological theories of Albert Maslow and the related field of Maslowian portfolio theory. Therefore, one way for individuals to achieve responsible consumption and financial progress is to satisfy their needs gradually, starting from the most basic human needs (survival) and then continuing to the upper layers such as status, prestige, and self-actualization. Those who skip the basic layers and proceed immediately to self-gratification might be more susceptible to irresponsible consumption and poor financial performance."

Financial behavior of Young Adults

Desirable and responsible financial behavior may contribute to financial welfare. Previous research showed that responsible financial behaviors are associated with positive financial outcomes (Dew & Xiao, 2011; Xiao et al., 2014). Moreover, a study of credit counseling clients indicated that age is positively linked with many forms of desirable financial behaviors (Xiao et al. 2006).

The ability to make well-informed and operative financial decisions is essential for young. With increasing spending power, young attract the interest of merchants and credit card companies, but at the same time, they have inadequate knowledge about how to make intelligent consumption choices. Evidence suggests that many young lack the financial knowledge to make well-informed decisions, and engage in behaviors harmful to their financial health (Mottola, 2014). Many of them have accumulated substantial debt that may result in poor credit scores and potential economic failure (Todd, 2002; Norvilitis et al., 2003). Jorgensen & Savla (2010) study confirmed previous findings and revealed that many young adults have insufficient financial knowledge, attitudes, and behaviors.

According to Mottola (2014), younger generations are struggling more than older generations to pay their bills and make ends meet. 2012 National Financial Capability Study showed that 23 percent of millennials spend more than they earn, and 31 percent have unpaid debts. Millennials are also less likely to make long-term plans and 33 percent of millennials have rainy day funds and only about four in ten millennials are saving for retirement, also considerably lower than all the other generations (FINRA Investor Education Foundation, 2012).

These deficiencies may result in poor financial habits and undesirable behavior, affecting young's ability to grow into financially secure adults (Martin & Oliva, 2001). Many young people attain elementary financial knowledge through trial and error, yet this may not be sufficient for them to become informed consumers (Lachance & ChoquetteBerneir, 2004; Norvilitis et al., 2003). De Bassa

Scheresberg & Lusardi (2014) concluded that millennials are severely indebted and struggle to meet payments on both short-term and long-term obligations. They use credit cards heavily and expensively, blow their bank accounts and retirement accounts, and depend on alternative financial services. Most young feel good about their financial knowledge, yet data show that they consistently lack the basic skills needed to make savvy financial decisions. They argue that even more troubling fact is their high level of financial engagement which is not harmonized with a correspondingly high level of financial literacy (de Bassa Scheresberg & Lusardi, 2014).

The Role of Attitudes and Self-Efficacy in The Creation of Responsible Financial Consumption Behavior

Individual financial behavior and status are under the influence of various factors, out of which de Bassa Scheresberg & Lusardi (2014) outline preferences, willingness to take risks, and economic circumstances. Perceived financial capability can be observed as financial self-efficacy, an important psychological determinant that influences individuals' behavior (Xiao et al., 2015). The concept of self-efficacy is originated by Bandura (1982), explaining that "perceived self-efficacy is concerned with judgments of how well one can execute courses of action required to deal with prospective situations". Ajzen (1991) integrates self-efficacy is integrated into the theory of planned behavior as an important determinant of individuals' behavior. Self-efficacy is also referred to as confidence in the research literature. Regarding financial behaviour, financial self-efficacy is an important indicator of financial capability (Xiao et al., 2015). Furthermore, Xiao et al. (2015) outline that ageing should increase individuals' financial capability, and subsequently perceived financial self-efficacy or confidence should be improved.

The role of attitudes for financial behavior is investigated by Dowling et al. (2009) and Shime et al. (2009). Mien and Thao (2015) investigate factors affecting financial behavior in Vietnam and indicate that financial attitudes have significant positive impact on financial behavior. Ranta and Salmela-Aro (2018) also take account of self-efficacy as factor contributing to financial well-being.

Methodology and Sample

The research was undertaken on the sample of business economics students at the University of Zagreb Faculty of Economics and Business in April 2018. The questionnaire consisted of three parts: the first one consisted of questions relating to the attitudes towards responsible financial consumption behaviour developed according the Ajzen (1991) and included statements „I consider myself qualified to manage my financial situation and financial decision-making "; „I think it is extremely important to create a financial plan for the future."; „I think it is extremely important to adhere to personal financial budget." Self-efficacy or also referred to behavioural control was measured again with three items developed by Nysveen and others (2005): that included following" I feel free to make my own financial decisions"; „My financial situation is entirely within my control" and „I have the necessary resources and means to achieve financial success." Using the five-point Likert-type scale variable measures perceived control over the performance of financial tasks also known as self-efficacy. The second part consisted of questions related to the responsible financial consumption behaviour the scale developed by Barbić, Lučić & Chen (2019) that consists of following items I live in accordance with my financial possibilities", "I pay my monthly bills before on their due date", "I try to anticipate and plan future financial income and expenses", "In everyday purchases of consumer goods, I am informed to make rational decisions that are in line with my financial possibilities", "I try to be informed and educated in the field of successful management of personal finances" and "When buying an item, the first think I think about is whether I can afford it".The third part consisted of demographical measures. The data was analyzed using SPSS and PLS.-SEM.

The sample consists of 483 individuals out of which 63% were woman and 37% was man. 69% of the samples were 18 to 21 years of age and 25% 21 to 24, whereas the rest was 25-30. Most of the respondents came from Zagreb (43%) and the rest from Velika Gorica, Varaždin, Zadar, Zaprešić, Krapina, Samobor, Karlovac, Čakovec etc.

The sample is predominantly financed by allowance (43%), where only 18% of the sample up to 50% of their "income" receives from a student job. The greatest part of the sample originates from households from 3 to 4 members (56,55%). 16% households' income is from 6 401-11 400kn, 19% 11 401-16 400kn, 13% 16 401-21 400kn, 3% 21 401-26 400kn, 4% 26 401-31 400kn and the rest is either above or below.

78% of the respondents have stated that they inform themselves about financial issues. They were able to select various sources of information that they use and the information is given in the Table 1.

Table 1: Analysis of respondents according to the source of information about financial issues

Friends	Media	Bank	Internet	Other
212	170	74	298	79
44%	35%	15%	62%	16%

Results

The first step in the data analysis was the formation of clusters using a two-step cluster method based on the responsible financial consumption behavior six item scale developed by Barbić, Lučić & Chen (2019). The method produced two clusters – 1 – of more financially responsible respondents that consisted of 304 respondents and 2- less financially responsible respondents that consisted of 179. From the table 2 it can be seen that all six items have higher means in cluster 1 as opposed to cluster 2.

Table 2: The review of responsible financial consumption behavior items in clusters

Report							
Two Step Cluster Number		**Rcb1**	**Rcb2**	**Rcb3**	**Rcb4**	**Rcb5**	**Rcb6**
1	Mean	6,19	6,27	5,75	5,79	5,32	6,10
	N	305	305	305	305	305	305
	Std. Deviation	1,029	1,096	1,062	1,005	1,358	1,081
2	Mean	5,23	5,42	3,75	3,60	3,29	4,47
	N	171	171	171	171	171	171
	Std. Deviation	1,531	1,463	1,514	1,291	1,248	1,713
Total	Mean	5,85	5,96	5,03	5,00	4,59	5,51
	N	476	476	476	476	476	476
	Std. Deviation	1,315	1,304	1,569	1,533	1,642	1,551

ANOVA analysis of variance was performed in order to determine if there are significant differences between the two clusters. The results presented in the Table 3 reveal that Cluster of less financially responsible young adults spend predominantly from allowance, whereas the cluster of more financially responsible young adults have significantly more scholarship money available for

spending in their income. More financial responsible statistically significantly seek more information from friends, in media and banks in issues related to finance. Other reported variables did not show to be significantly different between the two groups.

Table 3: ANOVA table for variables Student Job, Allowance, Scholarship, Financial information, Total Income

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
StudJob	Between Groups	2467,532	1	2467,532	2,507	,114
	Within Groups	455699,362	463	984,232		
	Total	458166,895	464			
Allowance	Between Groups	6193,838	1	6193,838	4,208	,041
	Within Groups	681561,096	463	1472,054		
	Total	687754,933	464			
Scholarship	Between Groups	2888,525	1	2888,525	4,784	,029
	Within Groups	279573,570	463	603,831		
	Total	282462,095	464			
FinInf	Between Groups	,603	1	,603	2,457	,118
	Within Groups	115,549	471	,245		
	Total	116,152	472			
EduFriends	Between Groups	1,134	1	1,134	4,992	,026
	Within Groups	107,447	473	,227		
	Total	108,581	474			
EduMedia	Between Groups	,730	1	,730	5,540	,019
	Within Groups	62,453	474	,132		
	Total	63,183	475			
EduBank	Between Groups	3,163	1	3,163	13,725	,000
	Within Groups	109,248	474	,230		
	Total	112,412	475			
EduInternet	Between Groups	,430	1	,430	1,395	,238
	Within Groups	145,894	473	,308		
	Total	146,324	474			
TotalIncome	Between Groups	,385	1	,385	1,858	,174
	Within Groups	98,327	474	,207		
	Total	98,712	475			

After that we have performed the PLS-SEM structural equation modeling with the aim to investigate the influence of attitudes and self-efficacy on the Responsible financial consumption behavior of young adults.

The structural model is composed of three first order constructs, where two were reflexive and one formative (RFCB) as defined by the authors of the measures. Before the final results analysis, we need to evaluate the adequacy of the structural model (Hensler et al., 2009).

The analysis of factor loadings in the Figure 1 reveal that all of them are larger than 0,7 (Hair et al., 2014: 103), all average variances extracted are larger than 0.5 (Hair et al., 2014: 103), and all levels of composite reliability and Cronbach alpha are larger than 0.7 (Hensler et al., 2009), all of which indicates that variables in the model are valid and reliable. Moreover, the discriminant validity is proved by the Fornell and Larcker criterion (1981). To ensure the absence of multicollinearity of indicators of the model have VIF lower than 5 (Hair et al., 2014: 430). The model is also confirmed by the overall model fit R^2 for RFCB is 0.273 ensuring the medium strength of determination (Chin, 1998, p. 323).

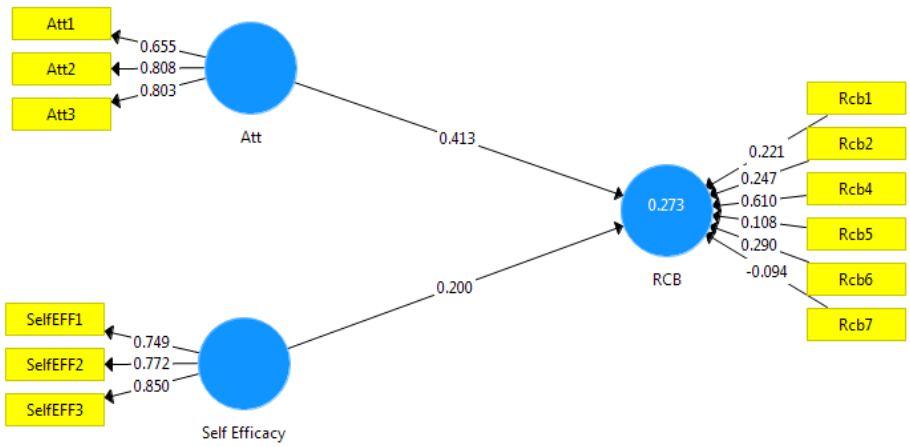

Fig. 1: PLS-SEM Structural model results

The results reveal that Both attitudes and Self-efficacy significantly predict Responsible financial consumption behaviour (Both p<0,000). Interestingly, attitudes contribute the RCFB more (0,413) when compared to Self-Efficacy (0,200).

Table 3: Statistical significance of PLS-SEM Structural model relations

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Attitudes-> RFCB	0.413	0.421	0.042	9.933	0.000
Self-Efficacy_ -> RFCB	0.200	0.203	0.047	4.298	0.000

Conclusion and Implications

Responsible financial consumption behavior of young adults presents a contribution to the societal welfare. If one develops poor financial habits such as impulse buying or over-consumption at a young adult age it will most definitely contribute to the creation of serious long-term financial problems later at life. This research contributes to the sources that investigate financial literacy of the young, especially young adults. As positive financial consumption behavior is linked to positive financial outcomes (Dew & Xiao, 2011; Xiao et al., 2014) this investigation represents implicit investigation of their financial well-being.

Unlike other available research (Todd, 2002; Norvilitis et al., 2003; Mottola, 2014), this research has shown that young adults report relatively good responsible financial consumption behavior. When divided into clusters, there are more than half of the sample is classified as more financially responsible. Evidence suggest that young adults that report responsible financial consumption behavior inform themselves more from friends, media and in banks. Also, their available income is comprised more from scholarship and less from parents' allowance than the ones that are considered to be less responsible.

In terms of the influence of attitudes and their self-efficacy. The research has confirmed the importance of plausible financial attitudes as a contributor to the responsible financial consumption behavior of young adults, as it is found in other research done on the sample of general public (Mien & Thao, 2015; Lučić, Barbić and Chen, 2019). Moreover, self-efficacy has also been distinguished as an important predictor of RFCB as found in other research (Xiao et al., 2015; Ranta and Salmela Aro (2018). When compared, attitudes contribute relatively more than self-efficacy. Such results imply that in order to build financial capacity young people should be directed towards building right set of attitudes towards saving and spending as well as their "self-esteem" related to executing responsible financial behavior.

This research contributes to the published literature for both academics and general public. The limitations of the quantitative research arise from the type of the sample and possible bias in self-reported data. The sample is based on economics students therefore biased in terms of knowledge and awareness of the researched subject therefore could be perceived as "more optimistic" than the average. Moreover, people have the tendency to give socially desirable answers when asked about their attitudes and behavior. Future research should be directed towards resolving these limitations.

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Sustainable Supply Chain: A Content Analysis Based on Published Case Studies

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Abstract

Industry is characterized by multilateral supply-production ties with other branches of the economy. As a result of the industry economic activity it affects spatial management and the social and environmental dimensions of sustainability. Therefore, it can be observed multilateral couplings with economic and social development as a result of its strong bonds with the development of science. The Industry development can improve human conditions, although it can has been degrading natural environment. Industry activity is also impacting the social dimension. Hence, it is necessary to strive for sustainable development, where economic development is met without compromising the ability of future generations to meet their environmental and social needs. In many cases, actions for sustainable development in business can bring new business opportunities and provide economic development without degrading the environmental and social dimensions. This study has the objective to present examples of effective implementation of sustainable development practices in the supply chain.

Keywords: Industry, Sustainability, Sustainable development, Logistics.

Introduction

The development of the global economy and people's activities in impacts the social and environmental dimensions of sustainability Considering that much of the unsustainable activity that occurs in the world can be traced to organisations and that most organisations are indifferent or in some cases even opposed (Etzion, 2018). This leads to significant impacts and their effects such as unpredictability of temperature and associated changes in the entire climate system. Raw measurement data also show an increase in the incidence of the strongest storms in most ocean basins.

Economic and technological conditions are also changing. Customers want to receive the ordered goods as soon as possible (Kowalski et al., 2019). The changes on the global economy has caused a significant increase in world production of goods, including food and services, and also a significant, even excessive, increase in consumption. Uncontrollable consumption leads to the necessity of more resources.

Increase in food production is clearly faster than a human population growth. However, improper distribution of products can lead to their waste in highly developed countries and shortages in less developed countries. Wasting food and resources is both an social and environmental problem.

When resources are wasted, they usually become more scarce, and hence the unavailability of non-renewable resources is growing.

The economy is changing. Those changes are being driven by digitization and integration of systems mainly based on the Industry 4.0 using intelligent factories 4.0 (Mrugalska & Wyrwicka, 2017). The idea of intelligent factories assumes that cyber-physical systems control physical processes, create virtual (digital) copies of the real world, and make decentralized decisions without human participation or Cyber Industry Networks (Saniuk et al., 2019).

Manufacturing is experiencing relevant changes under the challenges imposed by the sustainable economic development model (Jasiulewicz-Kaczmarek & Gola, 2019). Many countries have decided to prevent pollution by implementing environmentally friendly policies, for example, Remanufacturing (Saxena et al., 2020), Recycling (Merkisz-Guranowska, 2017), reverse logistics (Zarbakhshnia et al., 2020) or hybrid framework for the modelling and optimisation of decision problems in sustainable supply chain management (Sitek & Wikarek, 2015). Some of them include practices such as recycling, reduction of carbon dioxide or dust emissions into the atmosphere, reduction of fossil fuel extraction, promotion of the green economy, and introduction of closed circulation. The implementation of those practices can foster the creation of Sustainable Supply Chains (SSC).

Introducing a balanced and SSC into industrial activities seems difficult or even impossible. This publication aims to make it clear that, despite the difficulties, it is possible to implement sustainable development practices in supply chain structures. This study has the objective to present examples of effective implementation of sustainable development practices in the supply chain. To achieve the objective of this study we used a literature review of publications using the Web of Science and Scopus databases. The retrieved publications, provided the base fora bibliometric analysis and discussion of the practices.

The cognitive goal of the article is to identify global practical solutions in the context of sustainable supply chains and to present the most interesting solutions. The determined research goal of the work requires answering the following research questions: 1. What are the global experiences of implementing practical solutions based on sustainable development in supply chains over the years?; 2. What areas of knowledge relate to sustainable supply chains and practical solutions?; 3. Which research centers are leading in terms of the studied concept?; 4. What are the most interesting, cognitively, practical experiences of implementing the concept of sustainable development in supply chains?

The structure of work is as follows. Part one discusses the concept of a sustainable supply chain. Part two presents the research method used. The third part contains the results of the bibliometric analysis and examples of successful creation and implementation of Sustainable Supply Chains.

Literature Review

Supply Chain Management (SCM) has developed into a major conceptual approach inside management and business administration (Seuring, 2008). The topic of Sustainable Supply Chain has shown increasing interest in the last two decades both academia and practitioners'. Considering that much of the unsustainable activity that occurs in the world can be traced to organisations and that most organisations are indifferent or in some cases even opposed (Etzion, 2018). Some companies have adopted a certain level of commitment to sustainability practices. Some of these commitments are some-times superficial and non-compulsory, for example including the motto ''Think before you print'' in a company's electronic mail communications.

Sustainability in the Supply Chain is a key component of corporate sustainability – with focus on three aspects of sustainable development – environmental protection, economic growth, and social

equity (Souza & Alves, 2018). Sustainable Supply Chain is the management of raw materials and services from suppliers to manufacturer/service providers to customers and back with social and environmental impacts explicitly considered (Grzybowska, 2012).

In contrast to traditional Supply Chain Management, which typically focuses on economic and financial business performance, Sustainable Supply Chain Management (SSCM) is characterized by explicit integration of the triple-bottom-line with the integration of environmental and social objectives as an extension to the economic objectives (Seuring & Müller, 2008).

Research Methods

In order to accomplish with the objective of investigating examples of effective implementation of sustainable development practices in the supply chain this study used an initial search for relevant publications using a literature review. Two databases have been used: Web of Science and Scopus. This is commensurate with recommendations to use at least two databases (Green et al., 2006).

The literature review was carried out in three steps (Strozzi et al., 2017, 2-3): 1. identifying the scope of the analysis, 2. identifying and locating keywords, type and type of documents, language, databases, 3. selection, assessment and synthesis of the existing set of completed, reviewed and registered in the analysed base of scientific papers, developed by researchers, scientists and practitioners.

The retrieved publications provided the base for a bibliometric analysis and discussion of the practices. A bibliometric analysis was carried out for the purposes of the work. Bibliometric analysis allows observing the development of science on a national and international scale. It provides important information about the structure of science.

The purpose of bibliometric analysis is to answer research questions: 1. where is the source of the idea?; 2. which researchers are the most – scientifically influential – figures in relation to the examined idea?; 3. what areas of knowledge relate to the examined idea?; 4. which research centres are leading in terms of the examined idea?

The method of bibliometric analysis adopted was the Systematic Literature Network Analysis (SLNA) method introduced by Colicchia and Strozzi (2012), which combines Literature Review and analysis and visualization of a bibliographic network. Adopting this approach allows the identification of trends of key issues that affect the development of knowledge in a given field in a more scientific and objective way than descriptive reviews, which are based on subjective criteria for the selection of works and the classification of research input.

It can be observed that the amount of knowledge related to research on supply chains is significantly spreading (Fig. 1). The growing trend of publishing scientific papers can be observed, which indicates that research on the concept of supply chains is still in the spotlight of scientists and researchers.

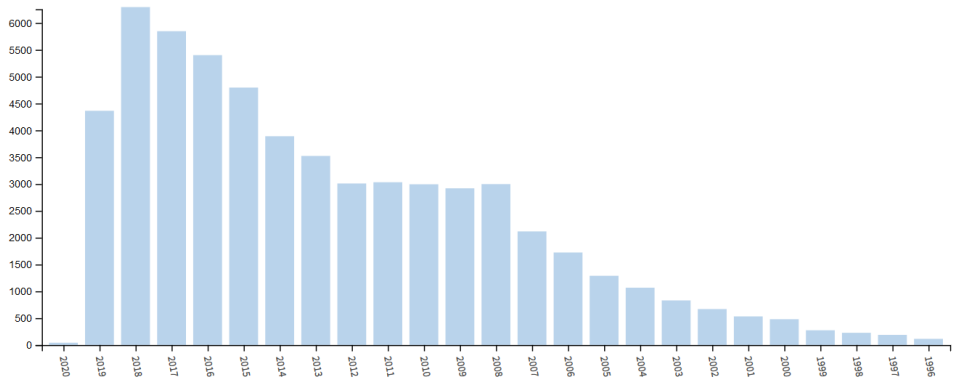

Fig. 1:Number of publications in the area of supply chain research; August 2019 (own work)

As a result of preliminary literature review, a set of keywords has been identified that were used to collect metadata from the selected scientific databases. As a result of this action, a set of concepts was identified. The basic term "Sustainable Supply Chain" (SSC) has been identified in the collection. A complementary keyword, 'case study' was also used. Keyword identification is a critical stage of the analysis. Its results may change if different keywords are used.

The final search was conducted on August 1, 2019 in the Web of Science database using selected keywords. Scientific publications from 1945–2019 were searched with the term 'Sustainable Supply Chain' in their title, abstract or keywords. The initial search for the defined basic concept of "Sustainable Supply Chain" included 1,114 references, not including supporting words, and identifying the type and type of publication. Then the search was narrowed down to the set of keywords indicated earlier. The total number of searched publications is 205. A local database was created, which was saved on an external computer storage medium and used for further analysis.

Further refinement of search results was narrowed down to selected types of scientific publications. For analysis were selected publications that were subject to the review process: (1) articles from scientific journals, (2) articles as part of conference proceedings and (3) chapters in edited books. Duplicates have also been removed. Subsequent search attempts yielded a total of 201 scientific publications.

Research Results

As a result of the conducted activities, basic statistics related to the created bibliometric database were presented. A total of 201 scientific publications authored by 542 scientists were selected for analysis. They were published in a total of 220 source titles – journal papers, papers in conference proceedings and chapters in edited books. The authors of identified and analysed scientific publications come from 46 countries and represent a total of 274 scientific units from around the world.

An evaluation of changes in researchers' interest was carried out for a set of "Sustainable Supply Chain" and "case study". 201 scientific publications were identified that contained in their title, abstract and / or keywords: "Sustainable Supply Chain" and "case study". As a result, publications on the practical aspect of the Sustainable Supply Chain concept have been identified. After organizing the collection, 172 scientific journal articles (85.57%), 31 publications published as conference materials (15.42%) and 7 chapters from monographic books (3.48%) were specified.

The scientific debate covered the beginning of the 21st century, and the oldest publication presenting a sustainable supply chain case study date back to 2000 (Fig. 2). Figure 2 shows the trend of

published scientific papers. Since 2010, there has been a gradual increase in the number of scientific publications issued on the topic under study. In 2018, 51 (25.37%) were already published and indexed scientific papers. And on the day of the analysis, in August 2019, 28 scientific publications were issued and indexed. The dynamics of published scientific papers from the research area indicates that research on the concept of a sustainable supply chain and presentation of specific cases is entering the stage of maturity. It also shows how important and pressing the problem researchers are trying to solve.

The first scientific publication in the study area was published in 2000. It was published in the conference materials of the 7th International Symposium on Process Systems Engineering. Its authors are: Zhou, Cheng & Hua (2000). Their concept described in the work titled Supply chain optimization of continuous process industries with sustainability considerations. In this study, goal programming (GP) model is proposed to address this multi-objective problem with the integration of non-relaxable constraints and relaxable constraints (Zhou, Cheng, Hua, 2000).

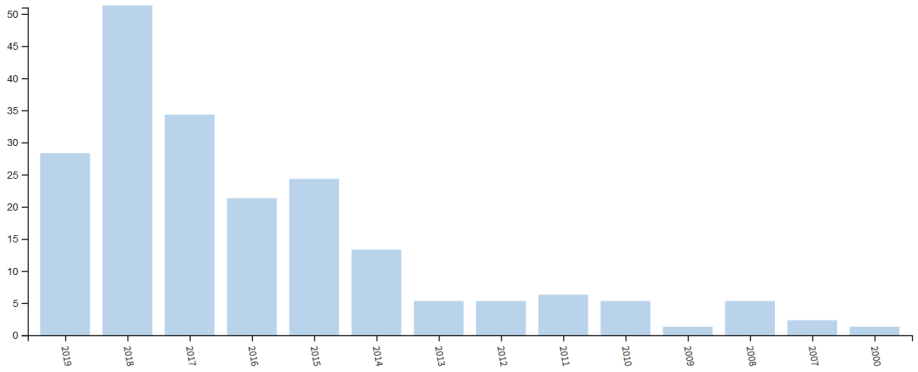

Fig. 2: Trend in publishing scientific papers in the field of supply chain research for the keywords "Sustainable Supply Chain" and "case study"; August 2019 (own work)

Statistics show that for the publication of 172 scientific articles published by scientific journals, six journals have contributed to the publication and attention to a given aspect of research, and one of them explicitly addresses the issue.

The dominant magazine is "Journal of Cleaner Production". A total of 32 found scientific publications were published as part of the journal. It is a prestigious scientific journal about the area of clean production and operations management. The next journal is "International Journal of Production Economics", in which 8 scientific publications were published.

Table 1 shows a list of three distinguished source titles, being a book series or conference materials, in which the identified works appeared. "Computer Aided Chemical Engineering" had the most to promote research on the researched area. A total of 6 scientific publications have been published in this title.

Table 1: Main of book series, which contributed to the publication of scientific papers in the field of supply chain research, for the keywords "Sustainable Supply Chain" and "case study"; August 2019 (own work)

Source Titles	Number of Publications Searched	% of 201
Computer Aided Chemical Engineering	6	2.98%
IFIP Advances in Information and Communication Technology	3	1.49%
International Conference on Industrial Engineering and Engineering Management IEEM	3	1.49%

From the data on the database, it was possible to extract a ranking of researchers, according to the number of published by them scientific papers indexed by the database. Considering the authors and co-authors and the number of their scientific publications, it should be emphasized that research on supply chains, for the keywords "Sustainable Supply Chain" and "case study" was carried out / done by a total of 532 scientists from around the world.

Due to the number of publications among researchers, attention is drawn by Reza Farzipoor Saen, whose scientific achievements include as many as 14 scientific publications from the studied area (Tab. 2). The number of prepared, published and indexed publications on a given topic constitutes 0.22% of the researched research community. His most frequently cited scientific work is "A new fuzzy DEA model for evaluation of efficiency and effectiveness of suppliers in sustainable supply chain management context" published in 2015, in collaboration with other researchers. This paper develops an integrated DEA enhanced Russell measure (ERM) model in fuzzy context to select the best sustainable suppliers. It shows that the proposed model aids decision makers to deal with economic, social, and environmental factors when selecting sustainable suppliers (Azadi et al.,2015). However, 482 scholars, which constitute 91% of the surveyed population, have in their achievements one scientific publication from the studied area.

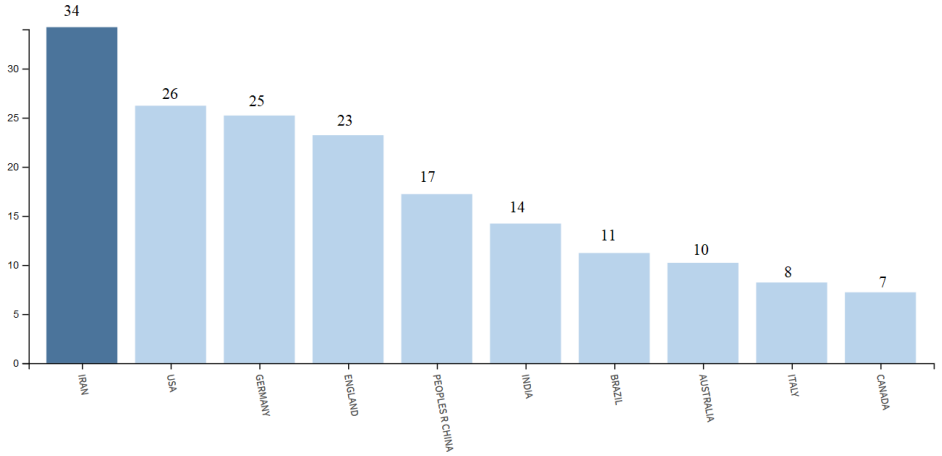

Fig. 3: Scientific contributions by country and geographical region, for the keywords "Sustainable Supply Chain" and "case study"; August 2019 (own work)

For the examined population of 201 identified scientific publications, statistics show that in the analysed set of scientific papers for the set of keywords "Sustainable Supply Chain" and "case study" dominate researchers from Iran and the United States. It is a leadership that significantly contributes to the development of practical aspects of the concept of Sustainable Supply Chain. They have published a total of 60 scientific papers. This gives a rate of 29.81%.

Table 2: The most popular areas of knowledge for identified scientific papers, for the keywords "Sustainable Supply Chain" and "case study"; August 2019

Areas of Knowledge	Summary number of publications	% of 201
Green Sustainable Science Technology	57	28.36%
Environmental Sciences	50	24.88%
Operations Research Management Science	44	21.89%
Management	41	20.40%
Engineering Environmental	39	19.40%
Engineering Industrial	37	18.41%
Engineering Manufacturing	25	12.44%

It was also possible to analyse the identified scientific publications in terms of types of fields of knowledge (Tab. 2). For the set of keywords "Sustainable Supply Chain" and "case study" a total of 43 areas of knowledge were specified. This shows that the studied topics are characterized by multidisciplinary specificity, which is related to the mutual complementation of issues and concepts from various areas of science. This approach allows you to get a comprehensive approach to research. The area under analysis also has a wide range of studies; draws knowledge about research methodologies, methods and tools from many sciences. Therefore, the studied area cannot be subordinated to any of the sciences according to the classification of sciences. No scientific publication or "one-family" scientific journal was found in the database. It becomes natural that disciplines that differ from each other approach each other. Thus, they create new fields and directions of interest, which can be observed in the case of the SSC concept.

Table 3: A list of selected research centres, including geographical location, for the keywords "Sustainable Supply Chain" and "case study"; August 2019

Name of the Scientific Center	Number of published Scientific works in accordance with affiliation	% of 201
Islamic Azad University; Iran	17	8.46%
Iran University of Science and Technology; Iran	7	3.48%
University of Tehran; Iran	7	3.48%
University of Sheffield; England	5	2.49%
University of Kassel; Germany	4	1.99%

The prepared statement shows that 5, including one significantly, are distinguished in the analysed set of selected scientific papers. These are scientific institutions whose scientists have published above 4 scientific papers indexed in the analysed database and affiliated with a given scientific unit (Tab. 3). It was found that scientists from these distinguished scientific centres published a total of 40 scientific papers, which is 20% of all published papers from the study area. The ranking shows that three of the five research centres are located in Iran.

First discussed article is Zhang et al. (2014) paper about sustainable supply chain optimization, which was made for the Dow Chemical Company. Authors described the mathematical model for the optimization of the tactical planning of a supply chain. They consider the optimization in three dimensions: economy, environmental and social. Authors in their case study consider the supply chain for The Dow Chemical Company. Analysed supply chain consists of: 17 raw material suppliers providing 11 raw materials, 7 production plants producing 270 products, and customers aggregated into 268 customer regions. Authors defined 3 objective functions, one for each of mentioned area in sustainable at supply chain. They defined accordingly performance indicator: for economy aspects – the total costs (including transportation costs, production costs, waste treatment and scale-up), for environmental aspects – the GHG emissions, for responsiveness – the total lead time. The lack of

information for GHG emissions, authors made some quantifications, what they exactly described in paper. They quantified GHG emissions associated with production, with energy consumption, with waste treatment, with transportation and combustion, landfill, wastewater. Treatment. For described case study Zhang and the other formulated MILP problem involving 533093 continuous variables and 529970 binary variables and 1125966 constraints. In first step authors minimise a cost, a GHG emission and a lead time separately. In next step authors made optimization for two and three objectives. For making these optimizations authors used a formal definition of Pareto optimality (which they also described in paper). When authors made a 2 objectives optimisation, they noticed that terms of one objective was optimal, and the rest had bed results. Authors made also solution in which they search optimal solution for 3 objectives simultaneously. For analyses case study, they noticed that "the total cost is slightly higher than the minimum value, but the other two objective functions have been decreased considerably" (Zhang et al, 2014). Authors investigated in their research for this real case, that decreasing a GHG emissions or lead time can be achieved by a small cost increasing. Moreover, authors extended their model and presented that it can be used to solve plant and network expansion problem.

Buyukozkan and Berkol (2011) in their article presents methodology, in which they integrate two decision making techniques for designing sustainable supply chain. In their described methodology they used analytic network process (ANP) integrated QFD, and zero one goal programming (ZOGP). This method is used for determination the design requirements, which are helped in designing the sustainable supply chain. Authors highlight in their consideration the fact that sustainable is interdisciplinary issue, which should be consider in three area: economic, environmental and social. To achieve sustainable development improvements in these three dimensions must be done. Buyukozkan and Berkol (2011) describing in detail their methodology (step by step). They defined nine customer requirements (CRs) and eighteen design requirements (DRs) of sustainable supply chain. Defined CRs: Total cost, Economic benefit, Equity use, Inventory management, Fuel usage, Emissions, Waste creates, Health and security, Laws and regulations. Examples of defined DRs: (DR1) Labour education in subjects like technology use and process, (DR2) Cooperation with suppliers, (DR3) Optimized workflow, (Dr9) Produce using minimum energy and materials, Dr12 (Integration of new technologies). Then the matrix with interdependencies among CRs and DRs was built. For building this matrix the ANP and QFD approaches were used. At the end the most suitable DRs for sustainable supply chain was defined, as results from ANP and zero-one goal programming approach. For describing fuel case study authors present completed HOQ with defined 9 CRs and 18 DRs, what is a step in this methodology. Buyukozkan and Berkol (2011) indicated, as a result of ANP analysis, that the most important design feature is the Labour education in subjects like technology use and process. Finally, based on the ZOGP solution, 11 DRs was selected, as requirements, which should be considered while striving for sustainable supply chain.

Next interesting article is the paper about sustainable supply chain performance measures and metrics (Hassini et al., 2012). Authors made a literature review about sustainable supply chain management research and focused on aspect of performance measures and metrics in this area. After research, they develop and proposed a composite index metric. They also present a case study of metrics for sustainability supply chain in the energy sector, for a major Canadian electric utility company. Hassini et al. (2012) also defined sustainability in supply chain in three dimensions: economy, environment and society. Authors mention 9 factors that influence the pursuit of sustainable development along the supply chain: market forces, policy and regulations, science and technology, product development, process capability, sourcing and operations, transport and logistics, marketing and PR, social issues. Authors pay attention to the fact that nowadays it is necessary for enterprises to make a comparison with other companies, make a benchmark. For making this the unified measures or indicators are necessary. Hassini and other (2012) notice a research gap – there is a scarce research about metrics in supply chain and in about sustainability aspect in SC. Hassini et al. (2012) in their article present a case study, in which company develop a system of metrics for sustainable supply chain. They consider all three dimensions: economic, environment and society. Stakeholders (customers and government) make a pressure for the company that they will take into account the environmental and social aspect during the decision-making process, what contributed to developing the indicators by this company. Finally, four indicators directly addressed supply chain issue were

defined, as: (1) percent of suppliers with an up-to-date sustainable development policy, (2) percent of contracts with Provincial suppliers, (3) percent of purchase orders placed with Aboriginal companies, (4) level of stake-holder trust by category.

Cases studies associated with aspect of sustainable supply chain in various branches of the economy were found in the literature review. Some examples of papers with case study for food supply chain are the papers from Rohmer et al. (2019), Thomas-Francois et al. (2018). Aspect of sustainable supply chain based on case studies on industry are presented on the following papers Kumar (2019), Resat & Unsal (2019), Sopadang et al. (2017).

Discussion of the Results

As a result of the conducted activities, 201 scientific publications from the studied area were identified analysed. They were published as journal papers, papers in conference proceedings and chapters in edited books, in a total of 220 source titles. Considering the authors and their scientific publications, it should be emphasized that research on the Sustainable Supply Chain concept and its practical aspects was carried out by a total of 542 scientists worldwide. The first publication on practical aspects of the Sustainable Supply Chain concept originates from two fields of science: Computer Science Interdisciplinary Applications and Engineering Chemical. However, the number and variety of disciplines indicates the multidisciplinary specificity of the subjects under discussion. As a result of the review in the studied area, it was possible to identify a number of examples of effective application of sustainable development practices in operations and supply chains.

Conclusions

Over the centuries, significant technology changes have been observed in the industry. The technology changes are considered indispensable to meet the humanity needs. Although there are positive impacts resulting in higher standards of living, although they can be also related to many negative impacts. The observed adverse impacts in the environment and social dimensions can take us to the conclusion that industry's development cannot be unconditional and must take into account its social environmental impacts. Considering the results of our theoretical study, it offered an overview of the current knowledge on concepts for a Sustainable Supply Chain. This overview covered also the evolution of state of the art and trends. The results may be available for voting on the subjects covered in technical and economic sciences. The overview can also help researchers to develop additional knowledge in the field of sustainable supply chains.

The topic of Sustainable Supply Chain is becoming more and more popular in the last years, which is confirmed by the evolution of numbers of publications. The theme is interesting for both academics and practitioners. to the description of the case studies on this paper which can help academics and practitioners on their strive for sustainable development and make a benchmark. It is expected a increasement on the impact, extension and pace of development of sustainability in different industries and supply chains. Nowadays, it is important to take into account not only economic aspects but also (or mainly) environmental and social aspects for companies and also for humanity. These three issues are always distinguished in aspects of supply chain sustainability. Future research ideas are the classify trends and development directions of sustainable supply chains. Research is necessary from academic perspective, not only to organize the knowledge but also to identify future research potential.

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Considerations on Improving the Ecological and Environmental Performance of Agriculture. The Active Role in Facilitating the Implementation of Organic Production Models in Reducing the Negative Effects Generated by Global Climate Change in Agriculture

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Abstract

The paper provides an overview of the agricultural economy regarding the development of agriculture and rural space. Prioritizing an action behavior in terms of vulnerabilities favors the orientation of agriculture through more environmentally responsible methods. One of the main objectives in the field of agriculture and rural development is to maintain a low level of greenhouse gas emissions generated by the agricultural sector. The role of research in the field and studies have shown an important factor in the fact that a reduction of the carbon footprint per ton of food produced from organic farming compared to conventional agriculture, in principle, due to the abandonment of the use of chemical fertilizers and pesticides. The purpose of the following . research is to collect data and information on the most efficient management models that will create the premises for the production of production models that will respond in the future to climate change challenges, especially from the perspective of reducing greenhouse gases, in depending on soil quality.During the research we tried to highlight issues that, in our opinion, are important for the development of the agricultural sector as part of the economy. An important role is played by the implementation of best practices in the proper management of the land and the promotion of organic production models can significantly contribute to increasing the carbon absorption in the soil and, at the same time, indicating the possible improvements in their performance.

Keywords: soil, environmental, carbon emissions, performance.

Introduction

The rural society, at the level of the whole country, is currently undergoing a transition process, a direct result of the socio-economic changes produced by the transition to the market economy. Thus, the rural environment knows a dynamic reality, constantly evolving and confronting the urban environment. The concept of "rural" defines the whole of the space in which villages or communes are located, the relations of interdependence created between them, the resident human communities and the related geographical, demographic, ecological and socio-cultural particularities. The rural area is characterized by a low density of housing and population, economic activities mainly carried out in the primary sector (agriculture, forestry, animal husbandry), a strong sense of belonging of the inhabitants to the community and the space of residence, a village cultural identity.

Research and development is important for all academic fields and industries. From this perspective, agriculture as a field is not an exception, having a special relevance starting from tradition article

points out that in scientific research, interdependence should be analyzed with other areas that have the role of improving the quality of research through innovation, so that the agricultural sector's research is complemented by various forms of academic knowledge that have proved to be vital, such as quality soil.

Approaching innovations in terms of methodologies applied in other sciences such as management, mathematics, even correlating soil degradation processes, determining the main pollutants, monitoring and controlling the soil, monitoring the soil quality status are relevant for agriculture. First, the dissemination of information from various fields can make information more efficient. The proper classification of these information resources may entail prioritizing the use of new information on detailed topics, such as performance in land / soil use, that is, which production would lead to higher long-term profit.

Considerations regarding improving the ecological performance of agriculture

Agriculture can significantly contribute to achieving the objectives of reducing the negative effects generated by climate change, not only from the perspective of ensuring the conservation of carbon reservoirs, which are still present in the soil, or by extending their size and favoring humus formation, as indicated. and in some specialized studies (Zhang et al., 2017; Adewale et al., 2019; Huang et al., 2019), but especially by reducing the energy consumption required in agricultural production and the supply of biomass needed for renewable energy production. , much more environmentally friendly. As it is argued in (CES, 2008), agriculture is not only a victim of climate change, but itself contributes to the emission of greenhouse gases. At the same time, (Agovino et al., 2019), they argue that agriculture and climate change are characterized by a complex cause-and-effect relationship and the agricultural sector generates significant amounts of climate-affecting gas emissions.

The change of agricultural paradigms, and the orientation of agriculture towards more environmentally responsible practices, is a current trend, with broad support within the Common Agricultural Policy (CAP). The introduction in 2013 of payments for greening, within the CAP, aimed both to improve the environmental and climate performance of this sector policy, and to provide the premises of a reward mechanism for public goods produced by farmers. Thus, as noted in (Westhoek et al., 2014; Andrei et al., 2015), the payment for greening promoted under the CAP achieves two distinct fundamental objectives: improving the ecological and environmental performance of agriculture, on the one hand. , and supporting the income of farmers, on the other.

Atmospheric greenhouse gas (GHG) emissions

A proper land management analysis can significantly contribute to the increase of soil carbon uptake and also indicate any potential improvements in their performance. As stated by (Yadav & Wang, 2017), agricultural land is a major source of atmospheric greenhouse gas (GHG) emissions and contributes majorly to global climate change, in the context of 20% of total GHGs. is issued from agricultural land.

Starting from these considerations we will analyze influences on soil carbon storage and the importance of nitrates. From this perspective, the promotion of an agricultural model capable of ensuring its own sustainability implies the existence of a set of common values and rules to which to purchase as many producers as possible, with a common objective, namely to reduce emissions effectively greenhouse and promoting an environmentally responsible production model. Although some significant progress has been made in promoting environmentally responsible agriculture, and conditions have been created for the transition to an efficient agrarian economy from the point of view of the use of available resources, the issue of greenhouse gas emissions from numerous agriculture has arisen. academic debates. The transition to a low carbon economy, more environmentally

responsible, in the national agricultural sector can contribute, both to the significant increase of food security, but also to the optimization of the agricultural production structures, which will thus conform much easy to environmental requirements.

The need to reduce carbon emissions and develop their level of absorption at the farm level acts, as noted in some specialized studies (Ramírez et al., 2019; Aznar-Sánchez et al., 2019) as an incentive in promoting the use of biomass as a raw material in the production of different categories of organic products, for the decarbonisation of agricultural production as a whole and the consolidation of carbon reservoirs. In this context, the assessment of the costs and the economic-financial impact of the sequestration of 4% / year of the carbon dioxide at the farm level is an important step in analyzing the possibilities of decarbonisation of agriculture and the promotion of the principles of bioeconomy in agriculture.

Greenhouse Gas Emissions Tend to Emit Forecasts and Targets For EU

Agriculture, in particular intensive farming, exerts a negative impact on the environment and climate. Agriculture, especially intensive agriculture, has a negative impact on the environment and climate. The EU's Common Agricultural Policy has introduced a number of support modalities for farmers to improve environmental and climate performance, such as greening. Introduced in 2015, greening represents a direct payment to farmers to use agricultural practices beneficial to soil quality. It is estimated that the greening policy implemented, however, has led to a change of agricultural practices around 5% of the total EU agricultural land after 2020.

In the literature, several studies have tried to make an assessment of the costs of reducing GHG emissions for different economies, as well as various estimates made in recent years, which vary significantly for example for the entire planet from 1% of GDP, and for the EU from 0.6% only for energy production, to 2.1% of GDP, and for the US from 1% to 4% of GDP, depending on the type of measures and the inclusion of financial costs, as well as of other economic assumptions.

The reduction of agricultural emissions at EU-28 level is mainly due to a decrease in the number of animals, improvements in the level of good agricultural practices, the lower use of nitrogen-based fertilizers, as well as a better management of natural soil fertilizers, the importance of the zootechnical sector and agricultural practices regarding biomassFormatting author affiliations.

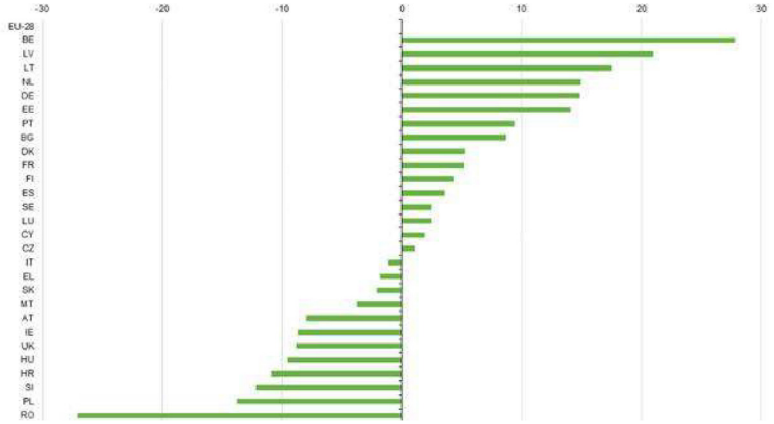

Figure 2: Modification of aggregate methane and nitrogen oxide emissions from agriculture (1990-2011)

Source: European Environment Agency

For Romania, the main sources of greenhouse gases are nitrous oxide (N2O) based on soil nitrification and management of natural fertilizers, the resulting methane (CH4) from enteric fermentation of herbivores, mainly cattle, and carbon dioxide (CO2) from from the energy / fuel used by buildings and machines. 50% of agricultural emissions are nitrogen oxide, followed by 45% methane, while only 5% of emissions are based on carbon dioxide.

Carbon sequestration contributes to the overall goal of lowering greenhouse gas concentrations in the atmosphere. The incorporation of the vegetal mass in the soil on the agricultural lands where green crops are established, contributes to carbon sequestration. But the result of this objective will be quantified by monitoring the surfaces on which green crops were established, as well as by quantifying the amount of plant biomass resulting from afforestation. ***Low Carbon Agriculture Sector Analysis***

Romanian farmers rely heavily on organic fertilizers, most of them coming from individual farms. Inadequate management of animal waste, especially in subsistence agriculture, together with the rare wastewater treatment facilities in rural areas contributes to this environmental impact.The process of land abandonment has accelerated in Romania in the past years, resulting in the loss of biodiversity. Uncultivated land has increased by 50% since 2005, and, at 952,000 ha, constitutes 7% of the total agricultural area of the country (2010). The abandonment of agricultural land has far-reaching effects on ecosystem services, such as increased carbon storage, lower soil erosion, better water quality, and loss of traditional cultural landscapes.

These effects often result in a decline in biodiversity. Also, the lack of appropriate knowledge, as a result of problems with the farm consulting system, results in often inadequate agricultural practices, with a negative influence on biodiversity. Even the relatively low yields of feed production, largely determined by improper pasture management, lead to erosion and loss of biodiversity. In the context of climate change, there is a need for a new activity in the agricultural field, which means using natural resources and good practice models to provide observation systems, information management understanding, modeling and analysis of environmental phenomena for evaluation, exploitation and management. natural resources (water soil, climate).In practice, specific environmental and climate practices can be addressed depending on the local agricultural areas.

The sector needs to consider adaptation to a changing and less favorable climate going forward, as well as mitigate Gree House Gas (GHG) emissions. The figure. 3 below shows the greenhouse gas emissions from EU28 in 2017, broken down by main source sectors. Energy accounts for 80.7% of greenhouse gas emissions in the EU28 in 2017, and transport accounts for about one third. Greenhouse gas emissions from agriculture contribute 8.72%, industrial processes and product use by 7.82%, and watse management by 2.75%.

Table 1: ***Greenhouse gas emissions in the EU by sector in 2017***

No	**Factor** of greenhouse gas emissions	**Per continent**
1.	industrial processes	7,82%
2.	agriculture	8.72%
3.	watse management	2.75%
4.	Energy accounts	80.70%

Source CE

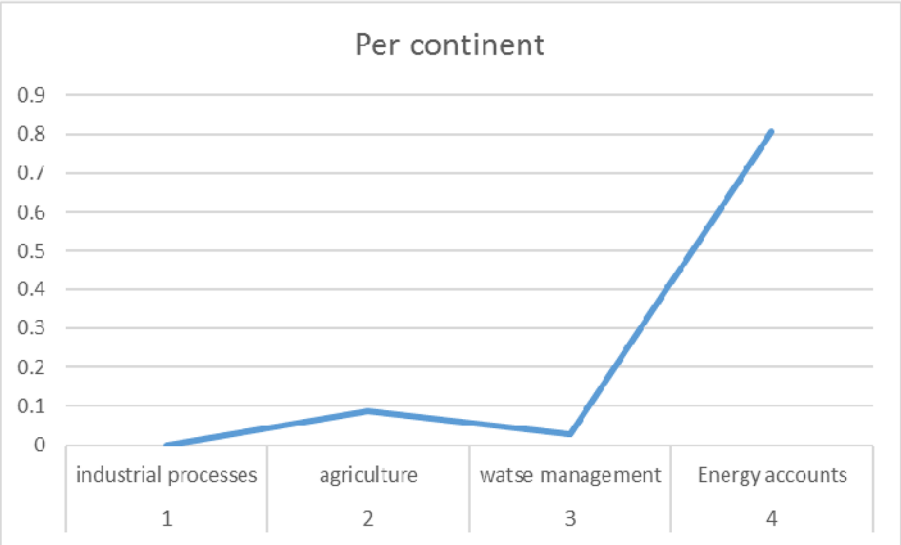

Figure 3: Greenhouse gas emissions in the EU by sector in 2017

The climatic changes faced by large commercial agricultural holdings being different from those of subsistence, of very small dimensions. Climate change is expected to affect farmers in the south and south-east region of Romania in general and individually. Given that large farms usually have very specialized production, such as cereals and oilseeds, they are particularly vulnerable to the impact of frequent and long-term droughts, which affect their production and profit. But they are well-informed professionals, have the necessary technical and financial resources and have more options to adapt their agricultural systems to climate change through new technologies and irrigation systems. Smallholder farms, which practice subsistence farming, are very socially and economically vulnerable to adverse climatic events, in agriculture working directly about one third of the population. In some individual cases, farmers are specialized in the production of specific crops, such as onions or potatoes, thus increasing their level of vulnerability. In other cases, some intrinsic resistance can be found in smallholder communities due to the practice of organic farming and resource recycling, low carbon economy, diversity of production, strong social relations and (in some regions) alternative sources of income.

Agricultural production has a positive impact on the environment, but there are other determinants that lead to soil degradation and GHG. The level of GHG emissions from agriculture has decreased by over 20% since 1990, reaching 12% of the total GHG emissions at EU level in 2016, due to the reduction of nitrogen oxide emissions from the management of agricultural soils (mainly the reduction of fertilizer use). and the reduction of enteric fermentation emissions as a result of the overall reduction of livestock.

Achieving the 4% / year carbon dioxide storage objectives at the farm level as well as the possibility of defining economic models for decarbonising agricultural production are issues to be tackled. From a methodological point of view, both descriptive analyzes will be applied to highlight the factual situation of sequestration of a certain percentage of carbon dioxide at the farm level, as well as the interactive method for identifying possible trends, evolutions and perspectives in applying their measures. It will also adapt, calibrate and run in the branch, several models already validated in the literature, which can complete the research, highlighting the role of nitrates in soil, fertilizers and the contribution of nitrogen from organic sources. the emission of greenhouse gases in agriculture.

In the evaluation of the carbon storage methods, on the one hand, an analysis of land use is very

important and on the other hand an analysis of the properties of the land. Therefore, in order to analyze the carbon dioxide storage at the farm level and the environmental requirements at the farm level, an analysis of the soil quality becomes important.

In the agricultural field a main objective of the development of the rural area is to maintain a low level of greenhouse gas emissions generated by the agricultural sector depending on the local characteristics. It is a priority for farmers to keep the soil covered, to use techniques for managing the environment of the land, for example, local agricultural production helps to maintain carbon in the soil.

As a rule, carbon stocks in agricultural soils can be increased by adapting certain agricultural activities. The research analyzes the fact that the carbon absorbers are as important as the emission reduction, being in close interdependence. Thus, a thorough knowledge of the quality of the soil with the maintenance and further improvement of the natural absorbents existing in the soils of agricultural lands may be essential. The analysis addresses the adaptation of fertilization mainly depending on the quality and texture of acid, neuter or alkaline soils. The importance of biologically

fixed nitrogen (Nb) is not revealed based on a predetermined study but by the method of case study by appreciation, thus the amount of nitrogen fixed biologically in the soil, mainly, following the symbiosis between Rhisobium and leguminous plants, depends very much on the species. cultivated, by the production and biomass incorporated in the soil, reaching up to hundreds of kg N / ha. The amount of nitrogen from the previous crops (Nr) assimilably provided by the residues of the previous crop depends on the quantity and its composition depending on the nitrogen content and on the degree of lignification. It also depends on how well they were incorporated into the soil, the time when it was made, and the time elapsed since incorporation.

Loss of nitrogen in the form of gases in the atmosphere (Ng) can occur through various mechanisms, in particular by denitrification and by volatilization of ammonia on the surface of alkaline soils.

In the calculation method regarding the nitrogen inputs from organic sources will be considered the studies that determines the type or types of soil within the farm, as well as the main ones morphological and physico-chemical properties relevant to providing a maximum fertilization efficiencies and to reduce the risk of pollution with nitrates (and possibly phosphorus) of groundwater (slope, texture and soil permeability, degree of saturation in bases). Based on this information correlated with those resulting from agrochemical mapping, the level of soil fertility, the need for possible improvement measures and can be established the most suitable cultivation technologies regarding soil works, date sowing, methods of applying organic and mineral fertilizers and so on. The specific nutrient consumption for each crop is quantified in the form of regression equations specific to culture, established in fields long - term experimental ones, on the basis of which exports of nutrients for each crop, relative to the surface unit. Prioritizing ensuring the conservation of carbon reservoirs, which are still present in the soil, leads to the need to orientate agriculture towards more environmentally responsible practices and why not to designate areas vulnerable to nitrate pollution from agricultural sources. Establishing the nutrition regime of the plants is a prerogative from the perspective of evaluating the doses of fertilizers to ensure an optimal nutrition, growth and development of cultivated plants.

Studying the evolution of policies on decarbonisation of agriculture

Evaluation of carbon storage and land use strategies in functional and competitive market economies.

The researches that will be carried out within this theme will focus on the description of factors through which to exploit the decarbonisation potential of agriculture and to promote an environmentally responsible agricultural model. At the same time, it is envisaged to improve the studies regarding the

interactions determined by promoting the carbon dioxide storage at the farm level and the environmental requirements at the farm level, while analyzing the soil quality.

(source MMAP and * Study "Elaboration of the elements of the report on the forecast progress, report under Article 3.2 of Decision 280/2004 / EC")

Table 1: Emissions from agriculture.

	The level	The weight of the functional surface from the viable surface and the economically viable margin for irrigation
2012	18299 Gg CO2	50%.
2020	29882*	70%
2030	20.000GgCO2	90% of the total viable infrastructure

The Impact of Climate Change from The Perspective of Reducing Greenhouse Gas Emissions

The climate characterized by successions of drought years followed by rainy years leads to, during the drought years, the accumulation of nitrates in the unsaturated area between the root layer and the groundwater aquifer, nitrates which are then transferred to the free water in the rainy years (piston effect). In this way, the annual losses of nitrates, even if they are small in the dry years, can lead, by accumulation, to great pollution of the groundwater aquifer in the years with excess precipitation.

Agriculture generates 14% of Romania's total GHG emissions in 2010, while the regional average, as well as the EU -15 and EU-27, was 10% Managing forests to combat climate change Protecting, restoring and promoting the sustainable use of terrestrial ecosystems, sustainable forest management, combating desertification, stopping and repairing soil degradation and stopping biodiversity loss .

The land management for carbon sequestration is highlighted by soil carbon inventory, especially by the form in which it is kept, the capacity, the persistence and bulk density, the textural class of the soil.

Changes in crop management practices that affect soil organic dynamics C are crop selection, high biomass crop rotation, crop residue management, nutrients and water management, use of organic fertilizers and management of organic soils and degraded land (Hutchinson et al., 2007; Petersen et al., 2013; Smith et al., 2012).

The research revealed a difference in soil carbon when the C factors had the effect of applying a management method based on the interdependence between production and crop rotation, soil quality, carbon uptake, climate. At the same time, soil carbon changes are caused by land use changes. The global average concentration of atmospheric CO2 shows a steady increase, and this trend, together with increases in other greenhouse gases (GHGs), such as N2O and CH4, is contributing to climate change, which is considered a major problem (Hartmann). et al., 2013; Petersen et al., 2013).

Globally, soil carbon sequestration could offset GHG emissions of 0.4, which is equivalent to 5% to 15% of global fossil fuel emissions crop residues management, nutrients and water management, use of organic fertilizers, and management of organic soils and degraded land (Hutchinson et al., 2007; Petersen et al., 2013; Smith et al., 2012). The management applied through the modification of some practices of crop management have first and foremost an impact on the organic texture of the soil through the rotation and selection of crops, which can produce biomass by managing crop residues.

Through nutrient and water management, the use of organic fertilizers and the management of organic soils and degraded land as studies have shown (Hutchinson et al., 2007; Petersen et al., 2013; Smith et al., 2012).

Agricultural Practice

It is considered as a good agricultural practice to adapt the fertilization and the timing of its fertilization to the type of agricultural crop and to the characteristics of the soil. The assessment of the nutrient requirement is made according to the nutrient reserve of the soil, the local climatic conditions, as well as the quantity and quality of the predicted production. The hypothesis of carbon storage in the soil could be an option to mitigate climate change for agriculture, by managing the land and changing its use. To estimate all greenhouse gas exchanges. In this study, we will consider the possibility of adapting the methods used to estimate carbon changes in the soil. For large-scale assessment, the schedule CO2 emissions from the soil should be taken into account. The land management for carbon sequestration is highlighted by soil carbon inventory, especially by the form in which it is kept, the capacity, the persistence and bulk density, the textural class of the soil. In certain areas, especially on soils with thin limestone substrate, there is an imminent danger of groundwater pollution. Depending on the local specificity, this danger should always be taken into account when applying organic fertilizers in such high risk areas. Any nitrogenous fertilizer in organic form is mineralized as a result of the activity of bacteria present in the soil, ultimately resulting in nitric and ammoniacal nitrogen. The main evolution factor towards mineral forms of nitrogen is the ratio between carbon and nitrogen in fertilizer (C / N). It may be more or less high and conditions the rate of mineralization. The transition from the organic to the mineral (ammoniacal or nitric) form depends on the value of the C / N ratio.It is difficult to estimate with minimum rigor what quantities of nitrogen or other nutrients from the previous crops can be taken into account in calculating fertilizer doses.In general, it is possible to estimate quantities of 5-10 kg of N per year, higher in situations with intensive industrial activities in the area.

The calculation method regarding the contribution of nitrogen from organic sources

The calculation method regarding the contribution of nitrogen from organic sources is important for the assessment of greenhouse gas emissions from agricultural activities.The nitrogen in the soil is found, almost entirely, in the organic matter, and only a small fraction of it is in an immediately assimilable form for plants. Organic nitrogen can be used by crops only after its passage into an inorganic form through mineralization or gradual decomposition of organic matter from the soil, first in ammoniacal nitrogen and then in nitric nitrogen.

Typically, soil organic matter is made up of fractions that differ by the value of the C / N ratio (carbon: nitrogen). When estimating the level of the planned (planned) crops, the climatic characteristics of the place (in particular the thermal regime and the precipitation, including their annual distribution) must be taken into consideration, considering that they are decisive in the dynamics of the fertilizing elements in the soil and in particular in mineralization of organic matter and in the movement of nutrients in the soil profile, under the rooting zone.

It is undeniable that nitrate losses from the soil are more intense in the seasons with more abundant rainfall, when, as a rule, the soil is deprived of vegetation. Under the specific conditions of our country, after the annual crops, more or less quantities of mineral nitrogen from the previous fertilization remain (about 50% of the applied nitrogen remains unconsumed by the crops) and from the mineralization of the organic matter from the soil.

Mineralization is more intense in autumn, when favorable conditions of temperature and humidity are encountered and when there is also an increased risk of nitrate water pollution. In counteracting this phenomenon, crop rotation plays an essential role. It is recommended to rotate with the main crop a

crop with rapid growth, capable of harnessing the residual nitrogen and that in spring can be used as green fertilizer for spring-summer culture.

Table 5 : The level of nutrients according to crops

Nr. crt.	*Specification of crops*	**N**	*P_2O_5*	*K_2O*
1.	*Autumn wheat straw 1: 1.3*	*26.5*	*13.7*	*16.4*
2.	*grain rye straw 1: 1*	27.5	10.8	22.5
3.	*grain oat straw 1: 1.5*	28.5	11	31.5
4.	*Corn grains: strain 1: 1.6*	27.5	12.5	16.5
5.	*Sugar beet roots: Leaves and parcels 1:1*	4.9	2.0	6.0
6.	*Pea berry berries: 1: 1.5 edges*	61.0	16.6	28.0
7.	*Soybean beans: 1: 1.5 rods*	70.0	22.5	34.0
8.	*natural grass grass fan*	24.0	5.6	18.0
9.	*Natural grassland grass*	6.5	1.4	4.5
10.	*Hemp stems*	10	8.5	17.5

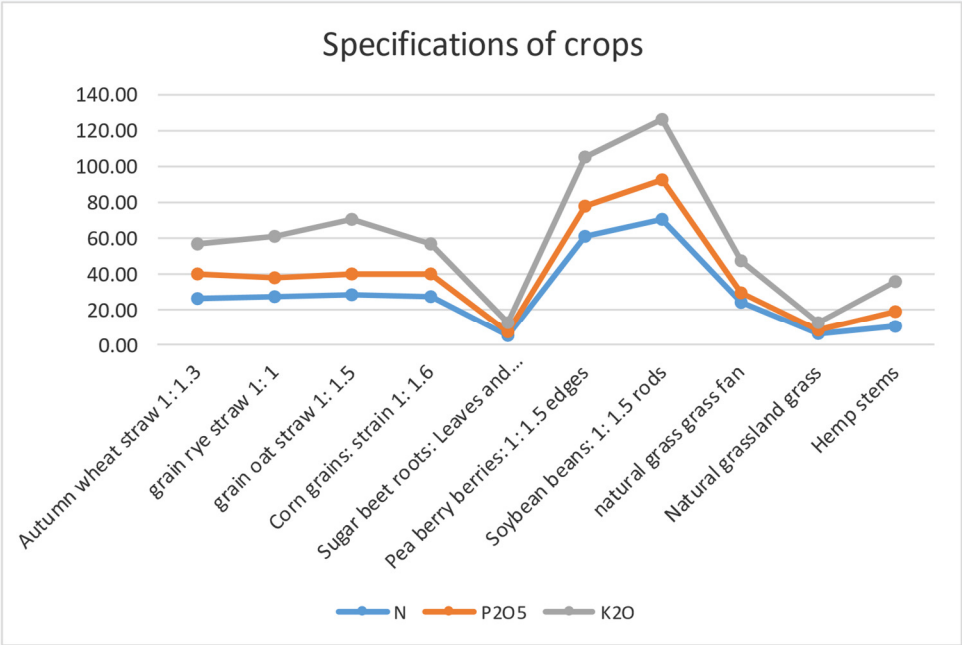

Figure 6 :Specifications of crops

The table above shows that the soil with the richest culture in N is the one with soy, while other relatively more frequent crops are located in the middle area with 1/3 of N, so that for each one the method will be applied of the appropriate nutrient, as in estimating the level of the planned (planned) crops, the climatic characteristics of the place must also be taken into account, since they are decisive in the dynamics of the fertilizing elements in the soil and especially in the mineralization of the organic matter and in the movement of nutrients in the soil. soil profile, below the rooting area. Soil carbon changes due to land use changes.

Captions Nitrogen (N) *

Phosphorus (P2O5)

Potassium (K2O)

The soil is a non-renewable resource that requires constant monitoring to prevent its degradation and to promote efficient management. The soil may degrade depending on many items. Of strategic importance is the type of fertilizer, the age and the technique of applying fertilizers with N, with the amount of nitric nitrogen resulting from mineralization of the organic matter from the soil and other organic residues incorporated into the soil as well as with the amount of nitrogen entering the soil on other ways.

Typically, soil organic matter is made up of fractions that differ by the value of the C / N ratio (carbon: nitrogen).

The fraction, with the value of the C / N ratio of order 8-11, called humus, is a stable fraction, which has reached equilibrium and therefore decomposes more slowly; other fractions with higher values of this ratio are decomposed faster than humus by soil microorganisms, whose activity is more or less intense, depending on the temperature and humidity conditions.

Solid fertilizers can produce pollution only in the case of heavy rains that occur immediately after application.

The prohibition periods for applying fertilizers on the ground are defined by the time interval when the average air temperature drops below 5^0C. This interval corresponds to the period when the requirements of the agricultural crop relative to the nutrients are reduced or when the risk of percolation / leakage to the surface is high.

When using nitrogen fertilizers in a predominantly organic form, it must be borne in mind that nitrogen, before being absorbed by plants, must undergo mineral form through a series of transformations they undergo in the soil. Therefore, these fertilizers are applied with sufficient time before the time of maximum absorption by the crops.

When applying chemical fertilizers it is necessary to take into account the crop specific requirements it is recommended to be applied according to the ratio between nutrients.

For example: those where P2O5 predominates are more suitable for pre-sown grain cereals, those with a nitrogen ratio are suitable for technical crops, etc. Soil properties influence the use of fertilizers: larger quantities of fertilizers can be administered on heavy soils than on light ones; fertilizers with alkaline physiological reaction will be applied on acid soils, and fertilizers with acid physiological reaction will be applied on alkaline soils.

The periods when applying organic fertilizers should be determined according to different conditions, as early as possible, during the crop growth period, to maximize crop nutrient uptake and minimize the risk of pollution.

The application of fertilizers to meadows leads to the following positive effects:

- the increase of production, especially considering the fact that the fields with meadows generally have a lower quality class;

- distribution of production on the seams - on permanent pastures, especially on degraded pastures, after the first harvest, which in some cases exceeds 80% of the annual production, the plants harden what it does to obtain a small number of crops per year and weak quantitative.

On the heavily degraded meadows, only one crop is obtained during the year, and in the case of other meadows two or three harvests, but with the highest weight at the first harvest.

The application of organic fertilizers on permanent pastures (pastures and meadows) is subject to the condition of not exceeding the dose of 170 Kg N ha-1 year-1 and not being applied during the prohibition periods.

For the establishment of the fertilization plan, the export of the elements for each plot according to its mode of operation is considered.

Thus, at a production of hay of 4 t / ha, under the conditions of exploitation as hay, the export of: 8085 Kg N, 25-32 Kg P2O5, 85-100 Kg K2O, 47-50 Kg CaO.

Fertilizers with secondary nutrients and, if the conditions provided for in Article 17 are met, from the fertilizers with main nutrients placed on their markets, shall be expressed as follows:

(a) in the form of oxide (CaO, MgO, Na2 O, SO3) or

(b) in elemental form (Ca, Mg, Na, S) or

(c) in both forms.

For the conversion of calcium oxide, magnesium oxide, sodium oxide and sulfuric anhydride content into calcium, magnesium, sodium and sulfur content, the following factors are used:

(a) calcium (Ca) = calcium oxide (CaO) × 0.715;

(b) magnesium (Mg) = magnesium oxide (MgO) × 0.603;

(c) sodium (Na) = sodium oxide (Na 2 O) × 0.742;

(d) sulfur (S) = sulfuric anhydride (SO3) × 0.400.

The value withheld for the declaration is the value rounded to the nearest decimal place both when the content is expressed as oxides and if it is expressed in elementary form.

acid soils with pH <6.5; • neutral

soils with pH = 6.5 - 7.5;

• alkaline soils with pH> 7.5.

Potentially accessible or mineralizable nitrogen comes from these less stable fractions. For soil conditions in Romania it represents between 1 and 2% of total nitrogen, both in soils. Many studies have evaluated cropland, grassland and marshland, while Schmidt (2008) evaluated the transition from natural land to agricultural land. For example some studies the fact that a change factors from permanent cover to an annual harvest, plus simultaneous factors for the changes of the crop management involves the achievement of a balance between the soil carbon and its kinematic function of the use and degradation of the soil. Not infrequently the concern is to follow the cyclicality of the crops used depending on the texture of the soil. But a technical formula cannot be validated precisely because depending on the periods of maintenance of the soil with fertilizers these techniques have to be controlled according to external factors.

Consideration of soil properties, climate and crop management are vital characteristics from the perspective of emissions. The following scenarios are aimed at the interaction between crop growth, soil carbon, nitrogen needs and climate.

Most agricultural soils contain too little natural nitrogen available to meet the crop requirement during the growing period. As a result, it is necessary to supplement the nitrogen naturally contained in the soil each year. Applying the right amount of nitrogen at the right time is the basic requirement of good

fertilizer management. Each agricultural producer must understand the need for accurate assessment and periodic monitoring of plant nutrient requirements based on realistic forecasts, depending on:

- local technological conditions, tradition ;
- Expected production yield
- sun;
- climate;

These corrections can be made using the following relationship:

$$DN = Nc - (Ns + Na + Nb + Nr) + (Ni + Ng + Nl)$$

in which:

DN is the nitrogen dose from fertilizer (organic + mineral) for the expected harvest, in kg / ha;

Nc is the nitrogen requirement for the expected harvest, in kg / ha;

Ns is the nitrogen available from the soil during the vegetation period, in kg / ha;

Na is nitrogen from irrigation water and from the atmosphere (powders, precipitation), in kg / ha;

Nb is nitrogen from biological fixation, in kg / ha;

There is no nitrogen from the mineralization of the plant residues of the previous crops, in kg / ha

Ni is nitrogen lost by immobilization by soil microorganisms, in kg / ha;

Ng is nitrogen lost through volatilization, including denitrification, in kg / ha;

Nl is nitrogen lost through surface runoff and leaching, in kg / ha.

Nitrate losses in the form of nitrates, with surface runoff and percolation water, are the main diffuse pollutant of the aquatic environment, arising from agricultural activities.

The nitrogen in the soil is found, almost entirely, in the organic matter, and only a small fraction of it is in an immediately assimilable form for plants.

Carbon sequencing is that storage function at the soil level, which highlighted the importance of determining soil quality and interdependence with the climate ecosystem. Soil is defined as a strategic carbon reservoir, which contains more carbon than is found in the atmosphere and in the terrestrial vegetation. These three carbon tanks are constantly changing. In many soils, soil organic matter, which contains about 55-60% carbon by mass, comprises most or all of the carbon stocks current knowledge - and knowledge gaps - about the role of soils in carbon, nitrogen and water cycles. The accumulation of stabilized carbon in the soil requires a control in terms of storage. The quantity and type of residues produced by plants are also influenced by the addition of fertilizers, which are indispensable for sustaining the productivity of plants in agricultural systems. In addition, by their effect on the microbial activity, the carbon contributions of the plants, the climatic factors, such as the temperature solution.

In order to reduce the negative effects of climate change on agriculture, risk management tools need to be implemented to limit the negative effects of natural disasters on agricultural production. Adapting to climate change is not just a challenge and a condition that, in the long term, new methods will be developed, planning new agricultural techniques more environmentally friendly to be applied by farmers in increasing numbers. Accounting for a concept of stepping up processes in the agrienvironment field in order to prefigure the application of greener models in agriculture, while reducing the level of GHG, is not to be neglected.

The quality of the soil is determined by the texture of the soil that must be maintained through the agricultural practices, in order to manage a possible degradation due to the climate or the vegetation. The calcium carbonate content is strongly correlated with the quality influenced by the distribution of clay in soils, the geographical area as well as perhaps the most important of the material residues. Thus, it can be seen that the distribution of nitrogen in the soil is closely related to the organic carbon, vegetation and climate as well as the texture of the soil. Therefore, the use of land, the use of innovative agricultural practices based on a management designed on the basis of local data and adapted to agricultural production can be a factor in improving soil performance.

Acknowledgment

In our opinion, the agricultural lands in general and especially those in Romania have considerable potential for carbon capture and storage. It is vital to have improved agricultural systems that efficiently utilize nutrient resources, increasing not only the amount of carbon in the soil, but also the biodiversity and resistance of agriculture even to climate change. As a rule, carbon stocks in agricultural soils can be increased by adapting certain agricultural activities. Research also shows that carbon absorbers are just as important as reducing emissions. Maintaining and further improving the natural absorbents represented by soils, agricultural land and coastal wetlands are essential. At same time, the paper shows the vital role of green manure can be applied on any type of soil, but they have a higher efficiency on podzolic and sandy soils. The technique is aimed at the depth of incorporation which is between 18-25 cm, depending on soil, humidity, volume of plant mass, etc. For ease of incorporation, the recommendation is when the crop is very rich and the stems are long. It is estimated that in a normal soil 10-15% of nitric nitrogen can be denitrified from the one produced annually by mineralizing the organic matter from the soil and from the one incorporated in the form of chemical fertilizers. These losses may be higher in soils with defective drainage, where the frequency and intensity of the phenomenon are higher.

Whether agriculture can contribute to reducing greenhouse gas emissions remains a question. That is why scientific research has shown that by achieving a successful management, adaptable solutions can be identified in practice on areas of interest, depending on the quality of the soil from the geographical environment. It is known that research and innovation activities and consultancy services can help farmers to adopt production systems that best meet local characteristics. Regarding land use changes and land management, research has revealed that there are uncertainties in the levels of carbon stock changes due to variations in local conditions and lack of reliable land data (Borjesson and Tufvesson, 2011). The role of research in the field and studies have shown an important factor in the fact that a reduction of the carbon footprint per ton of food produced from organic farming compared to conventional agriculture, in principle, due to the abandonment of the use of chemical fertilizers and pesticides. One of the main objectives in the field of agriculture is to maintain a low level of greenhouse gas emissions generated by the agricultural sector. Farmers must continually improve the techniques adapted to the new challenges of keeping the soil covered, to use techniques for managing the environment of the land to help maintain the carbon in the soil.

In conclusion, we can say that, conservation and improvement of the state of natural resources and habitats by encouraging the use of innovative, environmentally friendly agricultural production methods that come to protect the environment, biodiversity conservation and the improvement of water, soil and natural landscape quality are vital. In the field of rural development, agri-food economy, economic environment, we need a clean environment that is based on the rational use of natural resources, increasing competitiveness by identifying the best practices in the field. In part, the need for innovation in agriculture will contribute to the understanding of the economicfinancial impact of the storage of a percentage of carbon dioxide at the farm level and to the definition of the demands imposed by achieving a functional and highly competitive market economy. The role of the research is also the possibility of developing environmentally responsible agricultural production models that will significantly contribute to the decarbonisation of agriculture.

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Impact of cost of Funds on Community Banks Loan Portfolio (An Empirical Study of Illinois Community Banks)

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ABSTRACT

The paper aims to explore the relationship between the cost of funds and loan portfolio quality at US community banks. Data was collected from the call reports. It was concluded that: bank locations, assets size, number of employees, and loan quality have a minimal impact on the cost of funds. In addition, it was found that there's a positive relationship between the number of bank employees and total average assets. It was found that there's a negative relationship between loan quality and total average assets. On the other hand, there was an inverse relationship between loan quality and total average assets, which was a key finding of this study.

Keywords: Cost of funds, bank, loan portfolio, Illinois.

Introduction

Banks play an important role. They enable people to save deposits. They provide people with a payment system. They generate profit through charging borrowers (Sylla, 2010). During the last ten years, the number of community banks has been decreasing. 33 community banks in Illinois failed in 2013 (Federal Deposit Insurance Corporation [FDIC], 2013). That is attributed to the slow pace of the US economic recovery, and the rapid technological development (Stiroh & Rumble, 2006). That's also attributed to the great recession of 2008.

Before the financial recession, the lack of regulations at banks led some bankers to approve many loans that are associated with many risks. That led to the failure of many bank. Thus, recovery plans were developed at financial institutions and new acts were set, such as the Dodd Frank and the Consumer Protection Act of 2010 (Kennedy, 2012).

Under the latter act, lenders are obliged to provide the borrowers with a full description of the products being offered. Lenders are also obliged to examine the borrower's ability to repay the loan (The American Bankers Association, 2015). After issuing new acts, community banks increased their operating expenses (American Bankers Association, 2015).

Community banks can significantly affect the economic status of the US. For instance, they provide credit and loan services for small enterprises (FDIC, 2013). There are several factors affecting the

performance of community banks. Such factors include: the new legislations, technological developments, economic recession, and the threats of new entrants, and having substitutes.
Community banks generate profits through lending owners of small enterprises. However, lending is associated with risks (FDIC, 2013). "The *stability of a banking system crucially depends on the quality of its portfolio of loans*"(Ponce and Gomez, 2013.p. 21). There's a positive relationship between bad loans and the amount of non-performing assets. These assets don't generate any profit (www.FDIC.gov).
The number of community banks has been decreasing in the US (FDIC, 2013). Few studies were conducted about the strategies adopted by community banks to maximize their profits. The main objective of the present research to explore the relationship between the cost of funds and loan portfolio quality at US community banks in the state of Illinois. In 2013, 33 community banks failed in the state of Illinois, where the study took place. Illinois is the fourth largest state with number of community banks, according to Illinois Department of Professional Regulations. The study shed light on the important roles community banks play in the US economy and examined the strategies used by community banks to stay viable, and it shall enable banks to set effective short and long term pricing strategies. Which in turn help banks to improve their performance.

2 Review of Literature

Community banks are different from regional banks. The former banks have a lower asset size. The former banks focus on lending owners of small and local enterprises (Suter, 2007). The asset size of community banks enables these banks to achieve a competitive advantage (Suter, 2007). These banks provide financial benefits to the owners of small enterprises. These enterprises play an important role in improving the state's economic status (www.fdic.gov). They also provide twothird of the job opportunities in the market. Thus, the latter banks can affect the national economic status. They provide many job opportunities (Federal Reserve Bank of Kansas City, 2003, p. 25). The loan officers at community banks take several factors into consideration before approving a loan. For instance, they assess the borrower's personality (Federal Reserve Bank of Kansa City, 2003, p.35). However, lending the owners of small enterprises is risky because it requires monitoring their credit constantly (Berger and Udall, 2002).

2.1 Profitability in Community Banking

Due to the great recession in 2008, the performance and profits of community banks in the US declined. In addition, the number of failed banks increased significantly. However, their profits have increased during the past five years. Despite that, the quality of earnings hasn't increased. Banks must generate profits to survive in the business world. In this regard, interest income is a significant source of profits (Regehr and Morris, 2014). The factors affecting the interest rate include: the number of lending opportunities and government policies (Morris & Regehr, 2014). The profits all US banks - including community banks – was affected negatively by recession (Regehr and Morris, 2014).

2.2 Net Interest Incomes at Community Banks

Cash inflows and outflows at banks are affected directly by the interest rate on a loan (Morris & Regehr, 2014, p. 5). There are many factors that affect bank pricing strategies. Such factors include: the change in regulations (Morris & Regehr, 2014). Other factors include: the national economic status and the market rates (Morris & Regehr, 2014).
The impacts of changing the interest rates on the net interest income vary. Such variation is attributed to the pricing strategies (Morris & Regehr, 2014, p. 7). Some banks adopt a strict pricing

strategy (i.e. assets sensitive). Other banks are conservative (i.e. liability sensitive). If there's an increase in market rates, the interest income of the bank will increase. (Morris & Regehr, 2014).

2.3 The Factors influencing the Loan Pricing Strategy at Community Banks:

These factors include: macroeconomics factors, supervision, and regulations. Loan pricing strategy affects economic growth and market activities. Such factors include: regulatory requirements, management styles, taxation system, government policy, market structure, and macroeconomic factors. Other factors include: interest rate risk, deposit growth, loan quality, operating expenses, managerial efficiency, liquidity, bank size, and capitalization. Other factors include: regulatory and government policy, ownership, credit risk, risk aversion and non-interest incomes. The macroeconomic factors include: capital formation, investment, gross national savings, interest rate policies, exchange rate, GDP growth and inflation rate" (Dhal & Ansari, 2005). Many studies were conducted that researched the relationship between interest rates and bank size's. Schwaiger, (2007) study in Austria finds that there's a negative correlation between interest rates and the size of Austrian Banks Demirgüç-Kunt, (2004) study finds there's a positive correlation between interest income and bank size. If the bank has a high amount of capital, it will have a low cost of funds (Dahl & Ansari, 2005). It was found that there's a negative correlation between the interest income and the capitalization at banks. There are important factors that affect the loan pricing strategy, such as: the credit risk and interest rate risk. It was found that there's a negative correlation between profitability and credit risk at banks (Awadeh and Hamadi, 2012). On the other hand, some scholars find that there's a positive relationship between the loan pricing and credit risk (Maudos and Guveara, 2003) and Maudos and Solic, 2009). Loan quality, operational costs and risk aversion can positively affect net interest margin and the loan pricing (Ansari and Dhal, 2005; Doliente, 2003, Mannasoo, 2010 and Hossain, 2010). agreed in their studies that those factors have a positive effect on loan pricing. Liquidity requirements was found to be a major impact on loan pricing since their opportunity cost tend to be high, thus reducing the net interest margin and profitability. Many scholars wrote extensively on competition and their impact on loan pricing. (Ansari and Dhal, 2005). According to Schwaiger & Liebeg (2007), Guevara & Maudos (2003), and Solisc & Maudos (2006), competition positively affects loan pricing (Dhal & Ansari, 2005).
Macroeconomic factors positively affect loan pricing (Dhal & Ansari, 2005). Awadeh & Hamadi (2010), and Schwaiager & Liebeg (2006) suggest that there's a positive correlation between the net interest margin and GDP growth.
Awadeh & Hamadi (2012) suggest there is a negative correlation between profitability and credit risk at banks. Guveara & Maudos (2003) and Solic & Maudos (2009) found that there's a positive relationship between loan pricing & credit risk.

3 Methodology and Outcomes

Data was collected from: the Federal Financial Institutions Examination Council, Federal Deposit Insurance Corporation and the call reports. In addition, the UBPR was used to measure the adequacy of earnings, bank performance, capital, liquidity, growth and asset, & liability management (FFEIC.gov). The researchers shed a light on two fiscal years; 2015 and 2014.

3.1Sample and Population:

The population involves all the community banks located in Illinois which asset size is within the range of $10 and $250 million USD (based on the call report issued the December 31, 2015). Thus, the sample consists from 33 banks.

3.2 Data collection methods:

Secondary data was collected from documents published on several governmental websites.

3.3Validity

Validity was checked through checking the validity of the numbers in the UPPR based on the numbers of the call report.

3.4 Descriptive Statistics - 2015 Data

There are not many differences between the number of location in 2015 and the counterpart numbers in the years 2014 and 2015 jointly. The first location includes a little less than two-thirds of the banks. Based on figures 2 & 1, during the years 2015 and 2015, the distribution of the number of employees is positively skewed

Table (1): Frequency: The Number of Locations during 2015

	Frequency	Percent	Cumulative Percent
1.0	21	63.6	63.6
2.0	4	12.1	75.8
3.0	3	9.1	84.8
4.0	2	6.1	90.9
5.0	2	6.1	97.0
6.0	1	3.0	100.0
Total	33	100.0	

Based on table 1, more than six banks possess a single location only.

Table 2: ***Frequency: The Number of Locations during 2014 & 2015***

	Frequency	Percent	Cumulative Percent
1	42	63.6	63.6
2	9	13.6	77.3
3	6	9.1	86.4

4	5	7.6	93.9
5	2	3.0	97.0
6	2	3.0	100.0
Total	66		100.0

Based on table 2, there isn't any change in the percentages of banks.

Table 3: ***Descriptive Statistics: The Number of Employees during 2015***

N	Valid	33
	Missing	0
Mean		29.33
Median		25.00
Std. Deviation		21.02
Variance		442.04
Skewness		2.58
Kurtosis		9.33
Range		113.0
Minimum		5.0
Maximum		118.0

In in 2015, the average number of employees / per bank is 29. More than half of the bank have more than 25 employees. There's a high deviation in terms of employment during 2015 (*SD* 21). Based on table 3, the distribution of employment during 2015 is skewed to the right (skewness 2.6).

Table 4: ***Descriptive Statistics: Number of Employees during 2015 & 2014***

N	Valid	66
	Missing	0
Mean		29.53
Median		25.00
Std. Deviation		21.992
Variance		483.67
Skewness		2.608
Kurtosis		8.842
Range		123
Minimum		5
Maximum		128
Percentiles	25	16.00
	50	25.00
	75	36.50

The average number of employees / per bank is thirty during 2014 & 2015. One-half of the banks possess less than and one-half employed more than 25 employees. However, there is a high

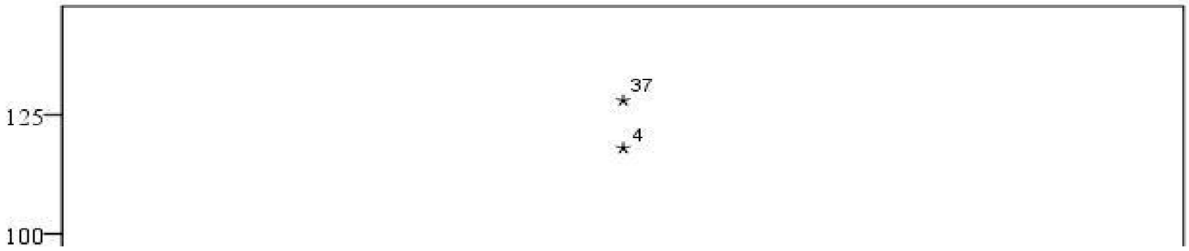

deviation in terms of employment during 2015. In 2015, the distribution of the number of employees is skewed to the right.

***Figure 1*. The Number of employees in 2014 & 2015**

Based on figure 1, the distribution of employees during 2014 & 2015 is normal. It's positively skewed.

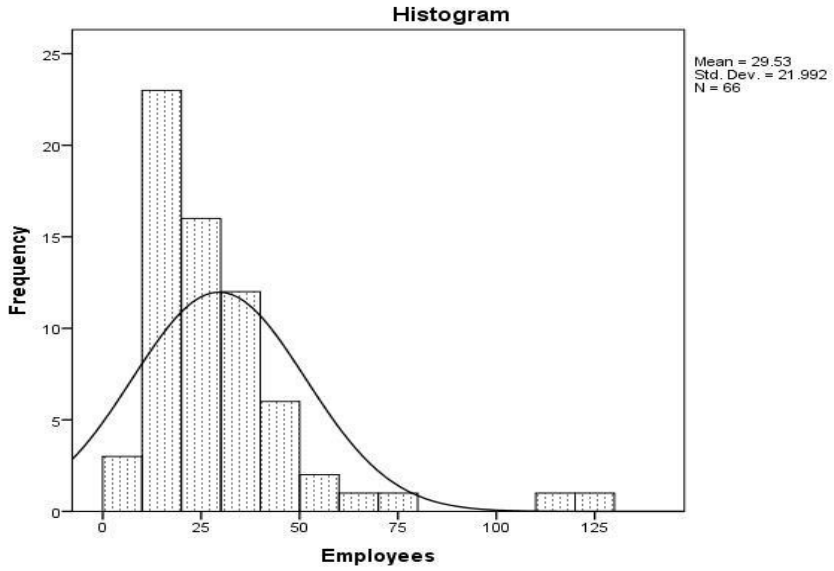

***Figure 2*. Histogram for the number of employees in 2014 & 2015.**

Figure 2 shows that the distribution the number of employees in 2014 and 2015. It's skewed to the right. In terms of the cost of funds' distribution in 2014 and 2015, its average is 0.48. The deviation of the cost of funds is significant (0.28). The total average assets is within the following rage 264,779 -37,322 in 2014& 2015. Table 8 shows that the average of assets in 2014&2015 is $126,525.50.

Based on table 10, the distribution of the data concerning the loan quality in 2014&2015 is highly skewed. The Std. (*SD*=4.047) is greater than the median (*Md*=2.26). Thus, there is a significant spread in the data concerning loan quality.

Table 5: ***Descriptive Statistics: Cost of Funds -2015***

N	Valid	33
	Missing	0
Mean		0.47
Median		0.49
Std. Deviation		0.29
Variance		0.08
Skewness		0.90
Kurtosis		0.47
Range		1.07
Minimum		0.12
Maximum		1.19

Based on table 5, the average cost of funds is 0.47 in 2015. Half of the banks have a cost of fund level, which is greater than .49. However, there is a high deviation in terms of the employment data in 2015.

Table 6 shows that the average cost of funds is 0.48 in 2014 and 2015. There's slightly less deviation in terms of the cost of funds in 2014,& 2015.

Table 6: ***Descriptive Statistics: Cost of Funds – 2014 & 2015***

N	Valid	66
	Missing	0
Mean		0.48
Median		0.49
Std. Deviation		0.282
Variance		0.080
Skewness		0.833
Kurtosis		0.442
Range		1
Minimum		0
Maximum		1
Percentiles	25	0.24
	50	0.49
	75	0.63

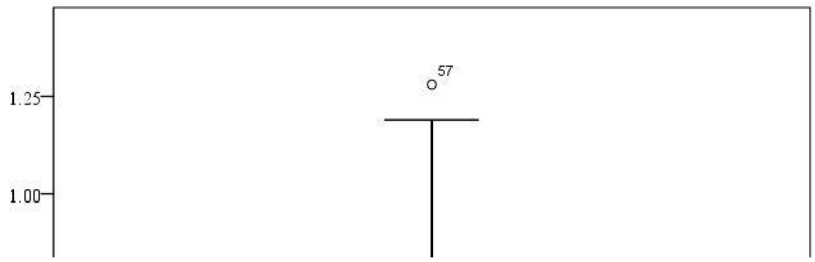

Figure 3. **The Cost of Funds in 2014& 2014**

Figure 3 shows that the data is distributed abnormally. The data is skewed to the right.

s

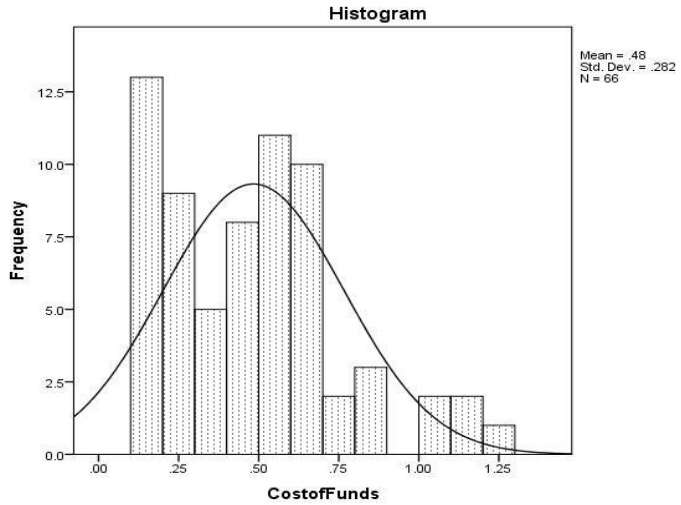

Figure 4*:* The Cost of Funds in 2014 & 2015

Figure 4 shows that the data is distributed abnormally. It's positively skewed in 2014& 2015.

Table 7 ***Descriptive Statistics: Total Average Assets – 2015***

N	Valid	33
	Missing	0
Mean		127006.00
Median		120529.00
Std. Deviation		64917.08
Variance		4214226497.438
Skewness		0.29
Kurtosis		-1.23
Range		207929
Minimum		37322
Maximum		245251

Table 7 demonstrates that the average amount of assets in 2015 is 127,000. However, there's a great deal of deviation in employment data (65,000) in 2015. Table 8 shows that the average amount of assets is 126,525 in 2015 & 2014. The median of the bank assets in 2015 is greater than the counterpart median in 2014.

Table 8: ***Descriptive Statistics: Total Average Assets – 2015 & 2014***

N	Valid	66
	Missing	0
Mean		126525.50
Median		121477.50
Std. Deviation		65325.54
Variance		4267426039.4
Skewness		0.40
Kurtosis		-1.04
Range		227457
Minimum		37322
Maximum		264779
Percen-tiles	25	66699.50
	50	121477.50
	75	182731.75

Figure 5. **The Total Average Assets in 2015 & 2014**

Figure 5 shows that the data is not normally distributed. However, they're positively skewed. This analysis is confirmed through figure 6.

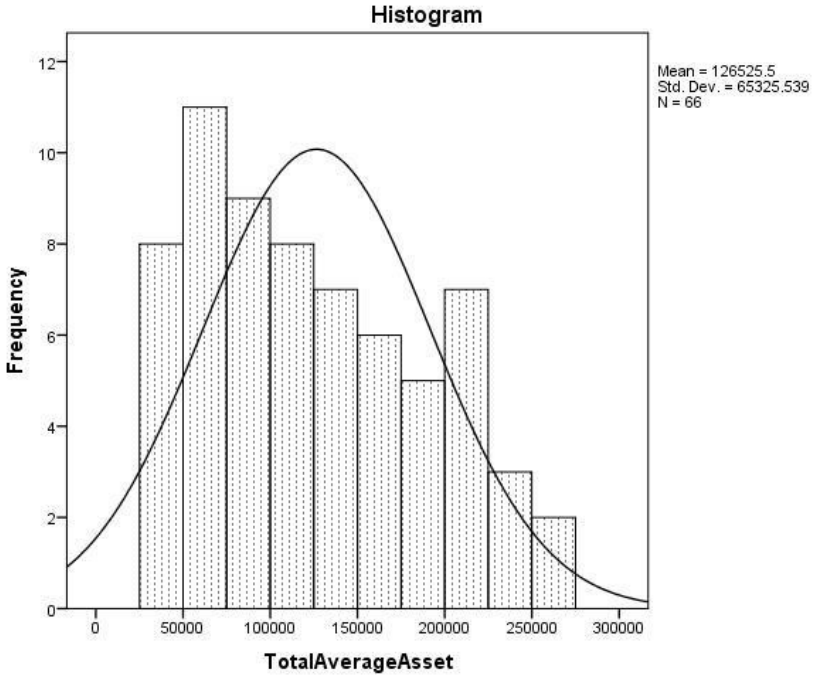

Figure 6. **The Total Average Assets in 2015& 2014 s**

Table 9 ***Descriptive Statistics: Loan Quality –2015***

N	Valid	32
	Missing	1
Mean		2.89
Median		1.77s
Std. Deviation		3.35
Variance		11.25
Skewness		2.18
Kurtosis		5.87
Range		15.59
Minimum		0.00
Maximum		15.59
Percentiles	25	0. 50
	50	1.77
	75	4.09

Table 9 shows that the average loan quality level in 2015 is 2.9. There's a substantial deviation (*SD* 3.4) in loan quality level during 2015. Table 10 shows that the average loan quality level is 3.6 in 2014 and 2015. There is a deviation in loan quality level in 2014 and 2015.

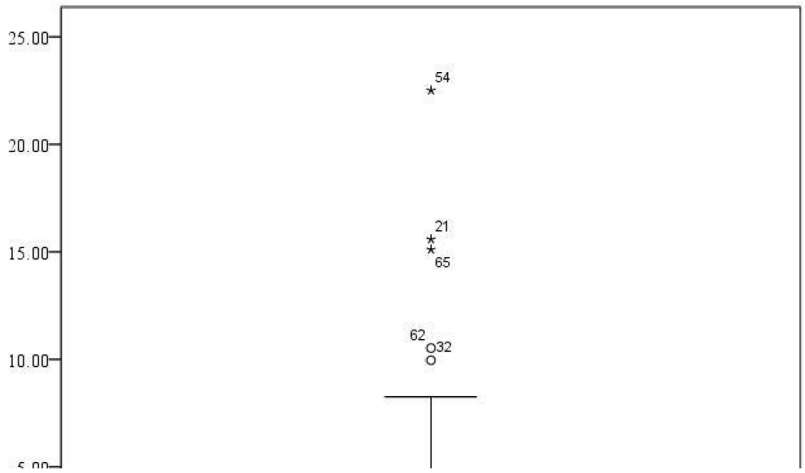

Table 10: *Descriptive Statistics: Loan Quality – 2014 & 2015*

N	Valid	64
	Missing	2
Mean		3.57
Median		2.26
Std. Deviation		4.047
Variance		16.38
Skewness		2.56
Kurtosis		8.21
Range		22.51
Minimum		0.00
Maximum		22.51
Percentiles	25	1.158
	50	2.26
	75	4.45

Figure 7. **The Loan Quality in 2014 & 2015.**

The deviation in terms of the level of loan quality is presented through figure 7.

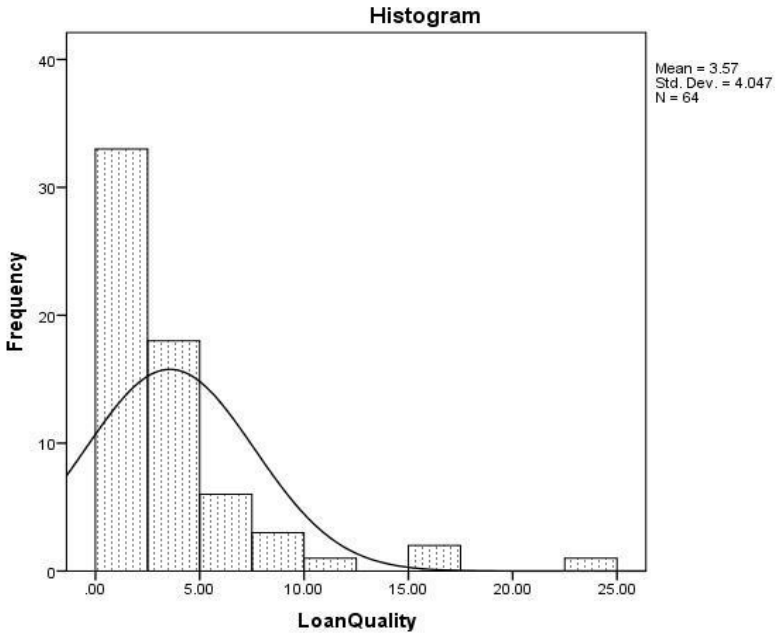

Figure 8. **The loan quality in 2015 & 2014**

Figure 8 presents the positive skewness in loan quality level in 2015 and 2014.

The 1st Research Question and the associated Hypotheses

1. a. Is there any statistically significant relationship between the cost of funds, number of employees, and loan quality and average assets in 2015?

H01a: In 2015, there isn't any statistically significant relationship between the cost of funds, number of employees, loan quality and total average assets.

H11a: In 2015, there is a statistically significant relationship between the cost of funds and number of bank employees, loan quality and total average assets.

Based on table (4), the null hypothesis is rejected. Thus, there is a statistically significant relationship in 2015 between the average amount of assets and the number of bank employees. There's a statistically significant relationship between loan quality and the average bank assets in 2015. A positive correlation exists between the total assets and the number of employees (see Fields, 2013, p. 82) (r = 0.551). A negative correlation exists between the total loan quality and the total average bank assets in 2015.

Table 11: *Correlation Matrix for 2015 Variables*

		Cost of Funds	Total Average Assets	Loan Quality
Employ-ees	Pearson Correlation	0.343	0.551**	-0.123
	Sig. (2-tailed)	0.051	0.001	0.503
	N	33	33	32
Cost of Funds	Pearson Correlation		-0.054	0.178
	Sig. (2-tailed)		0.765	0.329
	N		33	32
Total Average Assets	Pearson Correlation			-0.388*
	Sig. (2-tailed)			0.028
	N			32

1. b. Is any statistically significant relationship between cost of funds, number of employees, loan quality and total assets in 2015 and 2014?

H01b: In 2014 and 2015, there isn't any statistically significant relationship between cost of funds, number of employees, loan quality and total assets.
H11b: In 2014 and 2015, there is a statistically significant relationship between cost of funds, number of employees, loan quality and total average assets.
The researcher calculated the Pearson's *r* correlation coefficient for testing the hypothesis. The results are displayed in table 12 at Sig < 0.05 level. The null hypothesis was rejected. Thus, a statistically significant positive relationship exists between the cost of funds and number of employees in 2014 & 2015. There's a statistically significant positive relationship between the total average assets and number of employees. A statistically significant negative relationship exists between the total average bank assets and total loan quality.

Table 12: ***Correlation Matrix for 2014 & 2015 Variables***

		Cost of Funds	Total Average Asset	Loan Quality
Employees	Pearson Correlation	0.329**	0.475**	-0.067
	Sig. (2-tailed)	0.007	0.000	0.599
	N	66	66	64
Cost of Funds	Pearson Correlation		-0.090	0.140
	Sig. (2-tailed)		0.475	0.269
	N		66	64
Total Average Assets	Pearson Correlation			-0.338**
	Sig. (2-tailed)			0.006
	N		64	

The second Question and the associated Hypotheses

2. Is there any statistically significant difference between 2014 and 2015 in terms of the costs of funds, the number of bank employees, loan quality and total average assets?

H02a: There isn't any statistically significant difference between 2014 and 2015 in terms of the number of employees.
H12a: There is a statistically significant difference between 2014 and 2015 in terms of the number of employees.
H02b: There isn't any statistically significant difference between 2014 and 2015 in terms of the cost of funds.
H12b: There is a statistically significant difference between 2014 and 2015 in terms of the cost of funds.
H02c: There is isn't any statistically significant difference between 2014 and 2015 in terms of the total average assets
H12c: There is a statistically significant difference between 2014 and 2015 in terms of the total average assets.
H02d: There isn't any statistically significant difference between 2014 and 2015 in terms of the total loan quality
H12d: There is a statistically significant difference between 2014 and 2015 in terms of the total loan quality.

Figures 9 displays error bar plots of the *cost of* f*unds,* n*umber of employees, total average assets,* and *total average assets* for the *year* (2014/2015). An error bar plot was used prior to the independent samples t-test as a preliminary determination of whether there is no difference in the means and variances between the two groups or years. As for the x-axis, it represents the 2 groups from the independent variable (2014/2015). As for the y-axis, it represents the mean value of the dependent variable.

In each error bar, the dot stands for the mean of the concerned group. The mean is read by placing a horizontal line to the left of the y-axis to read the value of the concerned group. As for the vertical distance existing between the 2 horizontal lines in each error bar is the variance. The closer the means, the more likely the assumption of equal means will prove true when conducting the t-test. The more similar the vertical distance between the horizontal bars for each group, the more likely Levene's test of homogeneity of variance holds true. Based on the error bar plot, it appears that the means were not very different. *Total Loan Quality is excluded.* It also appears that there's a difference between 2014 and 2015 in terms of t*otal loan quality.* It's expected that the independent sample t-test shall indicate that significant differences exist between means and variances in terms of t*otal loan quality*.

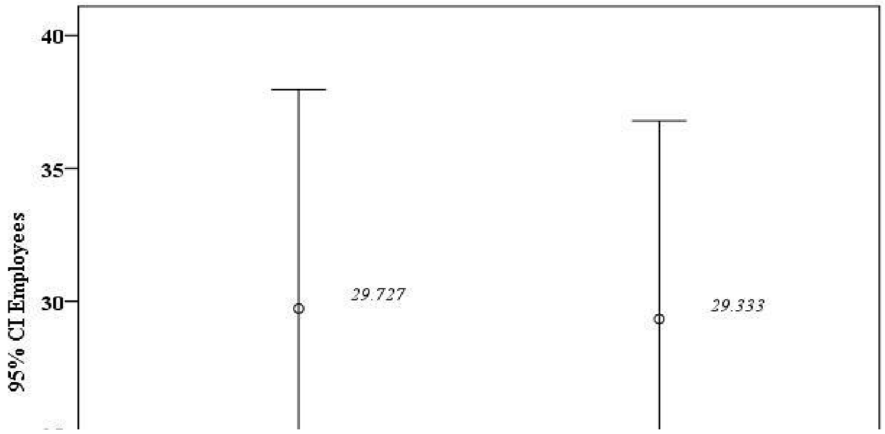

***Figure 9*. Error Bar Plot for the Number of Employees per Year.**

Figure 9 shows an error bar plot in terms of the means of the number of employees in 2014 and 2015. These means are similar.

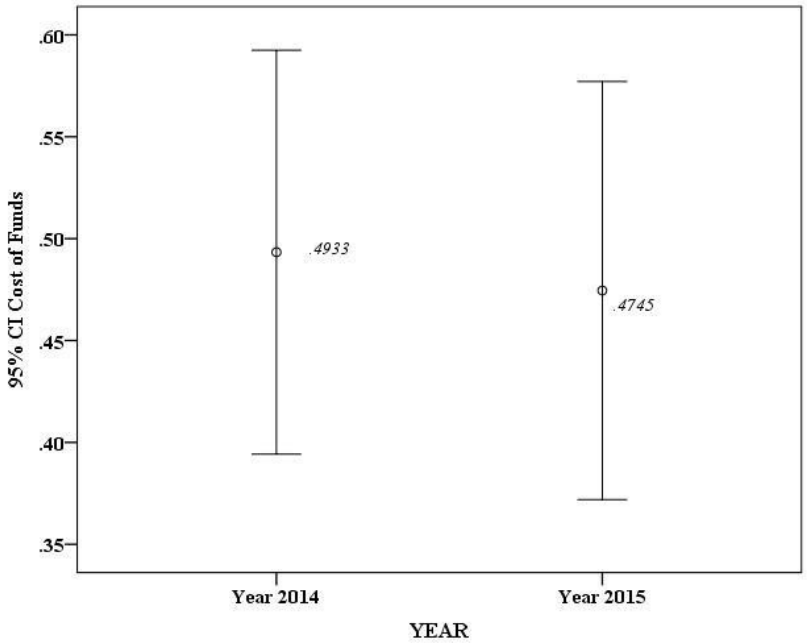

***Figure 10*. Error Bar Plot for Cost of Funds by Year.**

Figure 10 displays an error bar plot where it appears that the mean cost of funds for 2014 and 2015 were similar. The variance levels in cost of funds in 2014 and 2015 are similar..

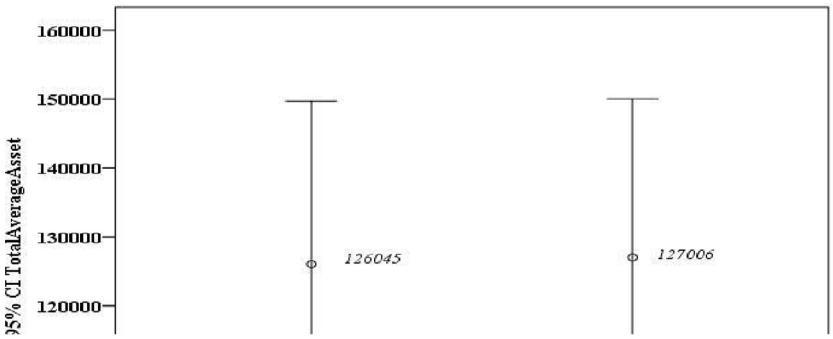

***Figure 11*. Error Bar Plot for Total Average Assets by Year.**

Figure 11 shows an error bar plot where it appears that the mean total assets for 2014 and 2015 were not very different. It also appeared that the variance in total bank assets for 2014 and 2015 were not different.

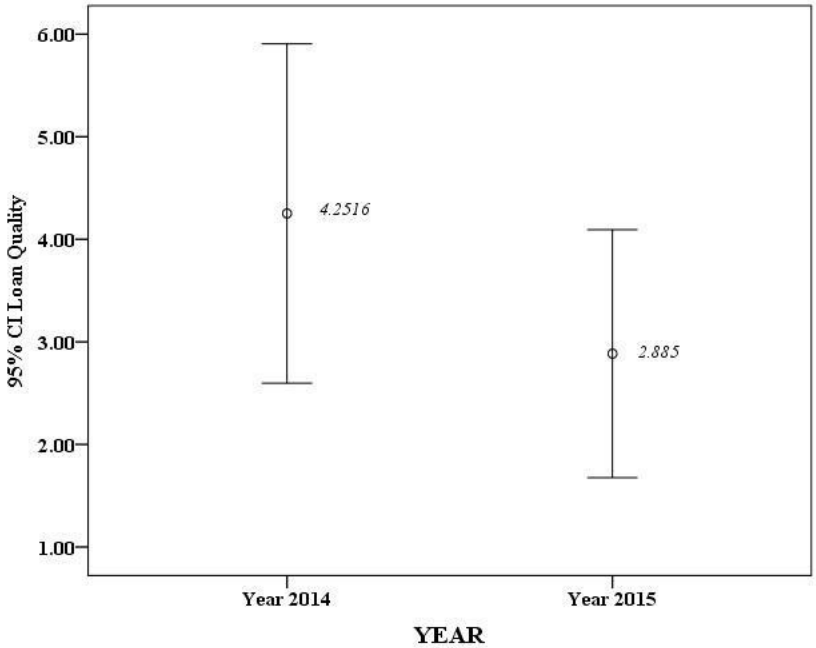

Figure 12. Error Bar Plot for Total Loan Quality by Year.

Based on figure 12, it appeared that the means were not very different. *Total Loan Quality* is excepted. It also appeared that the variance for 2014 *Total Loan Quality* might be different from 2015. It's expected that the independent samples t-test shall show significant differences in variances and means for *Total Loan Quality*.

Table 13

Group Descriptive Statistics for Employees, Cost of Funds, and Total Average Assets

YEAR		Employees	Cost of Funds	Total Average Assets
2014	Mean	29.727	0.493	126045.00
N=33	Std. Deviation	23.245	0.280	66734.597
2015	Mean	29.333	0.475	127006.00
N=33	Std. Deviation	21.025	0.289	64917.074
Total	Mean	29.530	0.484	126525.50
N=66	Std. Deviation	21.993	0.283	65325.539

Table 14 shows the results reached through the Levene's test of equal variances. It shows the results reached through the independent sample t-test for testing the null hypothesis. The Levene's test of homogeneity of variance shows that there isn't any significant difference between 2014 and 2015 in the level of variance in terms of the bank employees, the cost of funds and total average assets. Therefore, equal variances were assumed.

From Table 14, the null hypotheses for 2a, 2b, and 2c were accepted. There isn't any statistically significant difference between 2014 and 2015 in terms of the number of bank employees [t(64)=0.072, p=0.943], the cost of funds [t(64)=0.268, p=0.789], nor the total average assets of banks [t(64) =0.059, p=0.953]

Table 14 *Results of the Independent Samples t-Test and Levene's Test*[a]

Levene's Test for Equality of Variances	t-test for Equality of Means

		Sig.	T	Sig.	Mean	ror	Std. Erdf	
				two-tailed	ence	ence	Differ-	Differ-
	Equal variances assumed	0.799	0.072	64	0.943	0.39	5.46	
Employ-ees	Equal variances not assumed		0.072	63.37	0.943	0.39	5.46	
	Equal variances assumed	0.868	0.268	64	0.789	0.02	0.07	
Cost of Funds	Equal		0.268	63.92	0.789	0.02	0.07	

	variances not assumed						
	Equal variances assumed	0.918	0.059	64	0.953	-961.00	16206.75
Total Average Assets	Equal variances not assumed		0.059	63.95	0.953	-961.00	16206.75

Note. a. Dependent Variables: Employees, Cost of Funds, Total Average Assets (by Year)

A summary group descriptive statistics for *Loan Quality* for each year is listed in Table 15 below.

Table 15: ***Group Descriptive Statistics for Loan Quality 2014 and 2015***

	YEAR	N	Mean	Std. Deviation	Std. Error Mean
Loan Quality	2014	32	4.2516	4.58942	.81130
	2015	32	2.8850	3.35439	.59298

Table 16 presents the results from the Levene's test of equal variances and the independent sample t-test for testing the null hypothesis. The Levene's test of homogeneity of variance shows that there isn't any significant difference in terms of the variance level of the number of employees between 2014 and 2015. Therefore, equal variances were assumed.

Based on table 16, the null hypothesis 2d is accepted. There isn't any statistically significant difference between 2014 and 2015 in terms of the *Total Loan Quality*

Table 16: *Independent Samples t-Test and Levene's Test Results for Loan Quality 2014-2015*

		Levene's Test for Equality of Variances	t-test for Equality of Means				
		Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Loan Quality	Equal variances assumed	0.469	1.36	62	0.179	1.367	1.005
	Equal variances Not assumed		1.36	56.767	0.179	1.367	1.005

The third Research Question and the associated Hypotheses

3. Is there any statistically significant predictive relationship of cost of funds based on the number of bank employees, loan quality, number of bank locations and total average assets in 2015 and 2014?

H03: In 2015 and 2014, there isn't any statistically significant predictive relationship of cost of funds based on the number of bank employees, loan quality, number of bank locations, and total average assets.

H13. In 2015 and 2014, there is a statistically significant predictive relationship of cost of funds based on the number of bank employees, number of bank locations, loan quality, and total average assets.

To test the hypotheses in question 3, a multiple regression was performed to predict values on the dependent or criterion variable for the 2014 and 2015 cost of funds from a set of independent predictor variables for the number of bank locations, number of bank employees, total average assets, and loan quality.

Table 17: *Descriptive Statistics for Multiple Regression for 2014-2015 with Cost of Funds Dependent Variable*

		Mean	Std. Deviation	N
	Cost of Funds	0.48	0.287	64
	Employees	29.72	22.311	64
	Total Average Assets	128488.89	65356.494	64
	Loan Quality	3.57	4.047	64

The multiple regression model was built using the *Enter* method for entering and removing variables from the equation. The results of this method are displayed in table 18. Table 18: *Multiple Regression: Variables Entered/Removed 2014 through 2015*

Model	Variables Entered	Variables Removed	Method

		Enter
1	Loan Quality, Employees, YEAR, Locations, Total Average Assets[b]	

a. Dependent Variable: Cost of Funds

Table 18 indicates that all the independent variables were employed in the multiple regression model.

Table 19 indicates various diagnostic results for the multiple regression model including the coefficient of determination R^2. The coefficient of determination R^2 demonstrates that 27.6% of the change in the variance of the 2014-2015 cost of funds can be explained by the four 2014-2015 bank predictor variables. The scatter plot in Figure 13 visually demonstrates that the R^2 value is not high.

Table 19: *Multiple Regression Model Summary[b] 2014-2015*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics F Change	df1	df2	Sig. F Change
1	0.525[a]	0.276	0.213	0.254	0.276	4.413	5	58	0.002

a. Predictors: (Constant), Loan Quality, Employees, YEAR, Locations, Total Average Assets

b. Dependent Variable: Cost of Funds

Based on table 20, the regression model is considered significant. The null hypothesis is rejected.

Table 20: *Multiple Regression ANOVA Table Results[a] 2014-2015*

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	1.427	5	0.285	4.413	0.002[b]

1	Residual	3.750	58	0.065
	Total	5.177	63	

Dependent Variable: Cost of Funds

a. Predictors: (Constant), Loan Quality, Employees, YEAR, Locations, Total Average Assets Table 21 presents the significance level and model coefficients for each of the independent variables. The VIF and tolerance values are calculated to detect any multicollinearity problem. The tolerance values are close to 1. There aren't values that are less than 0.01. There wasn't any need to remove any variable from the equation because there isn't any multicollinearity problem. Based on table 21, the significant independent predictor variables are the number of locations and the number of bank employees.

The multiple regression model is:
The c*ost of Funds for 2014-2015* = - 0.065 *Number of Locations* + 0.007 *Number of Bank Employees* -1.158 x 10^{-6} *Total Average Assets* + 0.009 *Loan Quality* - 15.71.
The standardized regression coefficients were employed to represent the relationship existing between the dependent variable and each significant predictor variable. The *Number of Employees* is 0.538. That means that the change of one-unit in the number of employees in 2015 led to an increase of 0.538 units in the cost of funds. An increase in one bank location shall lead to a decrease of .305 units in the cost of funds.

Table 21: *Multiple Regression Coefficients and Multicollinearity Tests*[a] *2014-2015*

Model 1	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-15.710	130.638		0.120-	0.905		

Locations	-0.065	0.025	-0.305	-2.607	0.012	0.910	1.099
Employees	0.007	0.002	0.538	4.130	0.000	0.735	1.361
Total Average Assets	-1.158E-006	0.000	-0.264	-1.945	0.057	0.677	1.476
Loan Quality	0.009	0.009	0.132	1.071	0.289	0.819	1.221

a. Dependent Variable: Cost of Funds

Table 22 *Multiple Regression: Residuals Statistics for 2014-2015*[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	0.220	1.040	0.480	0.150	64
Residual	-0.390	0.670	0.000	0.244	64
Std. Predicted Value	-1.712	3.732	0.000	1.000	64
Std. Residual	-1.532	2.636	0.000	0.959	64

a. Dependent Variable: Cost of Funds

A summary of the residuals is presented in table 22 .The predicted value (*M*=0.480, *SD*=0.150) relates to the lower R^2 value and the lack of predictability of cost of funds from loan quality. In fact, the range of values predicted by the model is wide

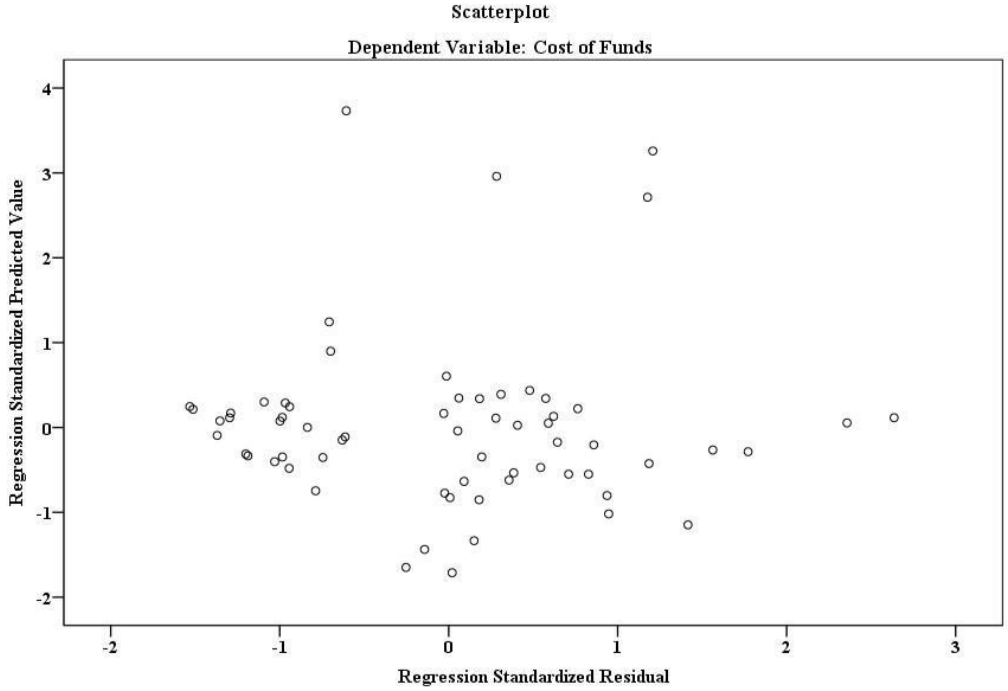

Figure 13. **Scatter plot of Regression Residuals by Predicted Values of Cost of Funds 2014 and 2015.**

4. Is there any statistically significant predictive relationship of loan quality based on the number of bank locations, cost of funds, number of employees and total average assets during 2014 and 2015?

H04: For the years 2014 and 2015, there isn't any statistically significant predictive relationship of loan quality based on the number of bank locations, total average assets, number of employees, and cost of funds, .

H14: In 2014 and 2015, there is a statistically significant predictive relationship of loan quality based on the number of employees, number of bank locations, total average assets and cost of funds

To test hypothesis 4, a multiple regression was conducted.

Table 23: Descriptive Statistics for Multiple Regression in 2014-2015 with considering the Loan Quality a Dependent Variable.

	Mean	Std. Deviation	N
Loan Quality	3.57	4.047	64
Locations	1.84	1.348	64
Employees	29.72	22.311	64
Cost of Funds	0.48	0.287	64
Total Average Assets	128488.89	65356.494	64

The multiple regression model was developed through the use of the *Enter* method. That latter method was used for removing and entering variables from the equation. The results obtained through this method can be seen through table 24.

Table 24: *Multiple Regression: Variables Removed- Entered*[a] *2014 through 2015*

Model	Variables Entered	Variables Removed	Method
1	Total Average Asset, Cost of Funds, Locations, Employees[b]	None	Enter

a. Dependent Variable: Loan Quality

b. All requested variables entered.

Table 25 presents diagnostic results for the multiple regression model. The coefficient of determination R^2 shows that 16.6% of the change in the variance of the cost of funds in 2014 and 2015 can be attributed to the four bank predictor variables. The scatter plot in figure 14 visually shows that the R^2 value is low.

Table 25: *Multiple Regression Model Summary*[b] *2014-2015*

Model	R	R Square	Adjusted R Square	Std. Error of The Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.408[a]	0.166	0.110	3.81803	0.166	2.942	4	59	0.028

a. Predictors: (Constant), Total Average Assets, Cost of Funds, Locations, Employees

b. Dependent Variable: Loan Quality

Table 26 shows that the regression model is considered significant. The null hypothesis is rejected. The independent variables can predict the levels of cost of funds in 2014 and 2015.

Table 26: *Multiple Regression ANOVA Table Results*[a] *2014-2015*

	Model	Sum of Squares	Df	Mean Square	F	Sig.
	Regression	171.572	4	42.893	2.942	0.028[b]
1	Residual	860.065	59	14.577		
	Total	1031.637	63			

a. Dependent Variable: Loan Quality

b. Predictors: (Constant), Total Average Assets, Cost of Funds, Locations, Employees

The significance level and model coefficients for each independent variable are presented in table 27. The VIF and tolerance values are employed as measures for multicollinearity. The values of tolerance are close to 1. Thus, there's no need to remove variables from the equation. That is because there's no multicollinearity problem. From Table 27, the significant independent predictor variables ($p<0.05$) are the total average assets. The model constant is significant

The multiple regression model in *2014/2015 is:*

Loan Quality = 0.610 *Number of Locations* + 0.0001 *Number of Bank Employees* -1.2142 x 10^{-5} *Total Average Assets* + 2.101 *Cost of Funds* + 4.187

The standardized regression coefficients reflects the relationship existing between each dependent variable and significant predictor variable. The beta value for *Total Average Assets* was -0.346 indicates that a one-unit change in the level of the total average assets in 2014 shall led to a decrease by 0.346 units in the overall loan quality.

Table 27: *Multiple Regression Coefficients and Multicollinearity Tests*[a] *2014-2015*

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	4.187	1.629		2.570	0.013		
Locations	0.610	0.386	0.203	1.582	0.119	0.855	1.169
Employees 1	0.000	0.029	-0.001	-0.006	0.995	0.568	1.760
Cost of Funds	2.101	1.952	0.149	1.076	0.286	0.739	1.354
Total Average Assets	-2.142E-005	0.000	-0.346	-2.438	0.018	0.702	1.425

a. Dependent Variable: Loan Quality

A summary of the residuals is presented through table 28. The value of the predicted value (*M*=3.568, *SD*=1.650) is linked to the lower R^2 value and the lack of predictability of loan quality from cost of funds. That's confirmed by the lack of predictability displayed in the scatter plot in Figure 14. In fact, the range of values that is predicted through the model is very wide.

Table 28: *Multiple Regression Residual Statistics Results*[a] *2014-2015*

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-0.039	7.066	3.568	1.650	64
Residual	-4.495	18.0392	0.000	3.695	64
Std. Predicted Value	-2.186	2.120	0.000	1.000	64
Std. Residual	-1.177	4.725	0.000	0.968	64

a. Dependent Variable: Loan Quality

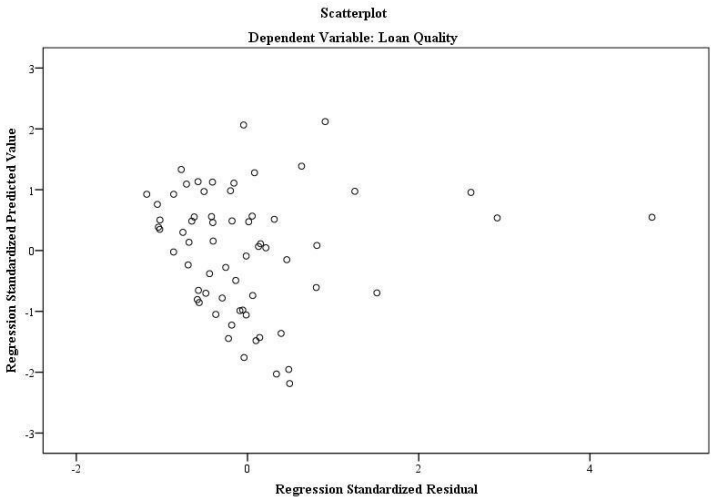

Figure 14. Scatter plot of Regression Residuals by Predicted Values of Loan Quality *(*2014 and 2015)

4 Conclusion

In the light of the aforementioned results, the researchers concluded the following:

1. Bank locations, assets size, number of employees, and loan quality have a minimal impact on the cost of funds.
2. There's a positive relationship between total average assets and the number of employees

3. Loan pricing is affected by several factors. These factors include: GDP growth, regulations, employment rates, capital position and liquidity
4. It was found that enacting legislations, economic status, and technological developments affect loan pricing
5. A statistically significant positive relationship exists between the total average assets and the number of employees
6. A statistically significant negative relationship exists between total loan quality and total average bank assets
7. A negative correlation exists between the total loan quality and total average bank assets in 2015.

Recommendations

In the light of the aforementioned results, the researchers recommend the following:

1. Conducting similar studies in other countries and US states
2. Conducting similar studies with shedding a light on other variables.
3. Conducting similar studies with shedding a light on other kinds of banks.
4. Conducting similar studies targeting banks with large assets
5. Conducting studies about the way of setting effective pricing strategies in banks
6. Conducting studies about the challenges facing community banks.
7. Improving the bank policies that concern loans and risks
8. Enacting laws that protect banks and ensure their survival

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Factors Influence on the Readiness of Academic Staffs for Industrial Revolution 4.0

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Abstract

Today's the implement of Industry Revolution 4.0 has given big effect towards learning institutions for sustaining and increasing the quality education system with usage of automation technologies. A successfully learning institutions was depended on academic staffs' readiness on skills and knowledge required for IR 4.0. It is showed that the academic staffs were played very important role in learning institutions to achieve the competitive advantage thereby increasing access towards higher tertiary education level. The purposed of this study is to explore the factors learning, knowledge management and innovation capability influence the readiness of academic staffs for Industrial Revolution 4.0. The quantitative research method has been used to collect the data among the respondents through the questionnaire. The respondents for this research are academic staffs those were Lecturer, Senior Lecturer, Associate Professor and Professor from three faculties at one of the public university in Malaysia. Besides, there is a total of 124 academic staffs with 89 per cent rate from three faculties were answered in this survey. Besides, the finding of research is shown that overall mean score value academic staffs' readiness and learning. Meanwhile, the knowledge management and innovation capability factors are showed average mean score values. Moreover, all the variables' hypothesis is accepted. There is a significant positive relationship between factors which is learning, knowledge management and innovation capability with academic staffs' readiness on IR4.0. Furthermore, the discussion, limitation of study, recommendation is critically discussed follow by conclusion in this study.

Keywords: Industrial Revolution, University, Academic Staff

Introduction

The readiness is about the attitudes, behaviors, beliefs and goals in which points make the employees to be ready and prepare by implementing of new skills and learning in environment of working Industrial Revolution 4.0 in future (Alfonsus Susanto, 2008; Rafferty & Simons, 2006). Moreover, it is also can be defined as a state of mind during process a changes that reflects readiness or acceptance with positive mind by employees in developing and sharpen the skills and knowledge for the expected future perspective in Technology 4.0 (Bernerth, 2004).

Besides, "the connectivity, big data, automation, agents of intelligent, new robotics technology, new learning of machine, artificial intelligence, block chains, sensors, virtual image, 3D printing and augmented reality," is known as mixture of formation on IR 4.0 (Lee et al., 2018). Therefore, it can be said that the advanced new Technology 4.0 is more concentrated on development towards physical world with the high-tech usage on internet of things.

Furthermore, the demand for highly educated workforce has prompted many countries to rethink their educational systems in line with the demands of technological advances so that competitive advantage can be sustained (Agboola, 2006). This may cause many learning institutions are started to focus on the readiness of academic staffs on new revolution 4.0. Therefore, the institutions are expected the academic staffs to be more professional and efficient in handling problem from cross- functional, cultural and ethical perspective and be ready to acquire with the skills and deal with an increasingly globalized, automatized, virtualized, networked and flexible world to sustain their employment in the changes and adaption of Industry Revolution 4.0 (Motyl, Baronio, Uberti, Speranza, & Filippi, 2017). A part from this, the new revolution of Industry 4.0 is created many opportunities by forming more new jobs and increasing growth of education level among institutions.

Problem Statement

The Industrial Revolution 4.0 has been increased the job opportunities but at the same time there is certain low- skilled jobs have been eliminated and required higher level of skill by the companies and learning institutions. (Berger, 2016). Therefore, the issue is needed to take into consideration about how many academic staffs from learning institutions have been prepared very well to overcome the development of new revolution 4.0 in learning, knowledge management, and innovation capability is still remain questionable until today.

Moreover, the previous studies have shown that most of researchers are focused on the readiness among graduate students in particular field of future studies in purpose to improved and developed the skills, explorers in adapting of new knowledge and gained a good job through higher quality of education at learning institution for preparing the adaption or adoption of IR 4.0. (Clark, 2013; Makki, Salleh, Memon, & Harun, 2015; Walker & Campbell, 2013). However, there are no significant statistical results are specified about the factors influence the academic staff's readiness on Revolution 4.0. Based on (Dwesini, 2015), the learning institutions over the world are encouraged rapid developments in new technology 4.0 and achieved their competitive advantage thereby increasing access towards higher tertiary education level. It is showed that the academic staffs as the part of members in an education institutions have to be ready with the learning, knowledge of management and innovation capability to adapt the changes of Industrial Revolution 4.0.

Overall, there are increased about six percent to 10 percent job opportunities over next ten years on Industry Revolution 4.0 in German country which showed (Rubmann et al., 2015) it has been given big challenges especially for low skill workers not only in German country but it is also affected the development country such as Malaysia which slowly adapting the implement of new revolution Industry 4.0. It is needed to consider that the measure of readiness among employees still needed to be evaluate by each of organizations included learning institutions for overcome the fully development of industrial 4.0. Thus, this research is attempted to explore the factors influence on the readiness of academic staffs for Industrial Revolution 4.0 and the future directions of the academic staffs in

institution will be critically analyzed.

Research Questions

1. Does the learning factor influence on the readiness of academic staffs for Industrial Revolution 4.0?
2. Does the knowledge management factor influence on the readiness of academic staffs for Industrial Revolution 4.0?
3. Does the innovation capability factor influence on the readiness of academic staffs for Industrial Revolution 4.0?

Research Objectives

1. To explore the learning factor influence on the readiness of academic staffs for Industrial Revolution 4.0.
2. To explore the knowledge management factor influence on the readiness of academic staffs for Industrial Revolution 4.0.
3. To explore the innovation capability factor influence on the readiness of academic staffs for Industrial Revolution 4.0.

Significance of Study

The significance of studies is divided into three dimension such as academician, industry and government from this research. Firstly, this study is created chances for the academician to improved their knowledge, skill and also created awareness on factors that helped to increase the level of academic staffs' readiness for Technology 4.0. This study is also helped the education industry especially the management of universities able to identify and improvise the academic staff's readiness in term of factors such as learning, knowledge management and innovation capability on Industrial Revolution 4.0. Lastly, this research is assistance government to acknowledge that employee readiness on IR 4.0 is needed in development of country and also able to increase the revenue of national economy.

Scope of the Study

This research aims to explore the factors influence on the readiness of academic staffs for Industrial Revolution 4.0 at learning institution in one of public university in Malaysia. Moreover, this study is attempted to prove the factors such as Learning, Knowledge Management and Innovation Capability influence the readiness of academic staffs on Industrial Revolution 4.0. Furthermore, this research is based on quantitative studies. Therefore, most of collected data has been relevant to the study and recommended is developed based on this research. It is helped the institutions to increase the readiness among academic staffs on Industrial Revolution 4.0.

Literature Review

The readiness theory is a revision and elaboration of Zartman's ripeness theory (Zartman, 2008) but it is different from ripeness theory because it uses variables rather than necessary situations and concentrations on a single party or both parties to a conflict (Cantekin, 2015). The readiness concept is about one party replicated the thoughtful of its leadership with reputed to conflict with the other party and its potency differ within a wide-ranging scale behavior of conciliatory (Pruitt, 2007)**.** The extension of ripeness is better to adjusted the historical cases and became more heuristic, with the ability to included more elements of conflict mediation results and for readiness Pruitt is divided into two components which association in a multiplicative approach: "Motivation to end the conflict and optimism about the outcome of conciliation and negotiation or mediation and Central Coalition

Theory", (Pruitt, 2007). This one of theory is used as readiness theory and implement by many researchers of past studies.

Conceptual Definition of Academic Staffs' Readiness

The readiness of academic staffs in ability to adopt innovative technologies with predictable as a variable, diverse, analytical of individual tendency and also showed an individual's capabilities to know how to use the innovative technology with proper way in management (Caison, Bulman, Pai, & Neville, 2008). On the other hand, academic staffs' readiness is about the extent to which staffs are ready or willing to adopted the changes towards new technology such Industrial 4.0 and at the same time the staffs have their own personal characteristics such ability, attitudes, belief and motivation which measure are they ready or not ready for adapt the changes (Sarina et al., 2016).

Every institution has the responsibility to focused on forming readiness for revolution by minimizing conflict, changing academic staffs by adapting the working environment while shaping a change message that facilitates the adoption of behaviors that are indispensable for the successful implementation for the change in Industrial 4.0 (Maheshwari & Janssen, 2012). Therefore, academic staffs are needed to visualize the current situation of their intuition's organization and compared with future development after adaption of new Technology 4.0 before they prepared themselves by improvising their learning, knowledge management and innovation factors.

Conceptual Definition of Readiness Factors (Learning, Knowledge Management and Innovation Capability)

Learning

The learning can be defined as a behavior changes according to experience or an experience that plans into function of actions (De Houwer, Barnes-Holmes, & Moors, 2013). Many academics have opposed by unsatisfying the definition of learning because the impact of experience on behavior is too wide and includes almost all behavior changes (De Houwer, 2011). On the other hand, the learning is not focused on the change of behavior only but it was included on changes of nervous system and other elements of system performance which can all be useful and practical experimental methods to evaluate whether learning has taken place and also evaluate the readiness among employees themselves (Barron et al., 2015).

Some staffs who do not required or accepted computer training at work which shows they are in threat of existence from the society with full information because every staff at workplaces supposed to master everything such as technical skills and knowledge needed through Industrial 4.0 by self-learning even the staffs do not have any technical background at all in institution (Gripenberg, 2011). It is proved that technical skills are comprised with new technology devices and internet of things which have the strongest connection with the readiness of academic staff in achievement and performance towards the Technology Revolution 4.0 in management(Harun & Mustafa, 2016). Therefore, many institutions are expected their staffs able to adapt the changes of working environment towards Industrial 4.0 through self- direct learning but at same time they still needed to evaluate the readiness of their staffs for achieving the target of their organization of institutions.

Knowledge Management

The knowledge management is known as a device for evaluating quality development and staff's disciplining or capital of organizational (Arab-Rahmatipour & Mohammad-Alipour, 2015; Shannak, Masa'deh, & Akour, 2012). Moreover, knowledge management processes are referred to organizational development that focuses on the enhancement of knowledge retention and reused of knowledge repositories such as in the development of methods, tools, techniques and organizational values that promote the flow of knowledge between individuals and recruitment, processing, and utilization of knowledge in activities of improvement and innovation (Valio Dominguez Gonzalez &

Fernando Martins, 2014). In this way, organizations of intuitions are needed to provide themselves internally so that knowledge can circulate among their academic staffs and can be used in actions that produce some kind of improvement in the organization (Gonzalez & Martins, 2017).

The successful application of knowledge management process readiness is exposed to the proper development of organizational institution' characteristics with the support development on four stages such as acquisition, storage, diffusion, and utilization of knowledge (Durst & Runar Edvardsson, 2012). In addition, the knowledge distribution in process of knowledge management is more about the new information from different sources that is shared which can promote the formation of new knowledge or information such as including the absorptive ability of the institution's organization, proficiency of staffs, aspects in term of motivations (Titi Amayah, 2013) and technology with the skills and knowledge provided for transfer process which ensures the readiness of the staffs in adaption of new technology 4.0 (Valio Dominguez Gonzalez & Fernando Martins, 2014; Yang, 2010). Therefore, most of the majority studies in the knowledge management literature show that knowledge management has a positive impact on performance in the learning readiness of institution organization but only a small number of studies show a negative relationship in which shows the knowledge management strategies readiness do not support competitive strategies meets a negative relationship between certain firm's knowledge and product development performance (Matusik, 2002) towards Industrial Revolution 4.0.

Innovation Capability

The "innovation" is defined as implication of newness in improvement, adaptation of an knowledge and innovative to the implementing organization in the direction of success while the "capabilities" are defines as highlights the strategic management's role in applicably adapting and reconfiguring organizational skills, possessions and functional capabilities to match the necessities of a changing in environment (Rahmani & Mousavi, 2011). The implementation of the innovation capability by the institutions are reacted even faster towards environmental challenges on Technology 4.0 compare to other institutes which is not implemented the innovation capability in their management (Ngamsutti, 2016). The innovation capability is mostly referred to the concept of technology development capability, operation capability, management capability and transaction capability in an organization (Zawislak, Alves, Tello-Gamarra, Barbieux, & Reichert, 2012).

The institutions are needed the ability of innovation to survive in an unpredictable environment by encouraging academic staffs to contribute knowledge within groups and organizations may generated new ideas and created a new approach to learn the skills and knowledge, facilitating innovation capabilities and activities to increase the readiness among staffs towards Industrial 4.0 (Hussein et al., 2016). Therefore, innovation capability readiness among academic staffs are needed to sustain the competency and achieve goals of organization towards New Technology 4.0.

Theoretical Framework

The research model is taken from previous studies about "examining the feasibilities of Industry 4.0 for the hospitality sector with the lens of management practice," which is focused on the exploring Industrial 4.0 issues in the services sector of the hospitality industry with challenges in term of learning, knowledge management and innovation capability to evaluate the management practices by facilitating the technology acceptance such as digital enhancements and implementation of cyber-physical systems (CPS) (Shamim, Cang, Yu, & Li, 2016; Shamim et al., 2017). Moreover, this past study is conducted by email to get permission letter for interview and personal visit with requested employees from 77 hotels as respondents of the research and the result of this study that learning, knowledge management and innovation capabilities are very important elements in management practices towards Industrial Revolution 4.0 (Shamim et al., 2017).

Methodology

This section emphasizes on the research method involved in the study which included research framework, research hypothesis, research design, target population, sampling size, data collection,

measurement of variables, data analysis and measurement model. Finally, it provides a summary of each method and approaches of statistical that has been implied to evaluate the hypotheses of in this research.

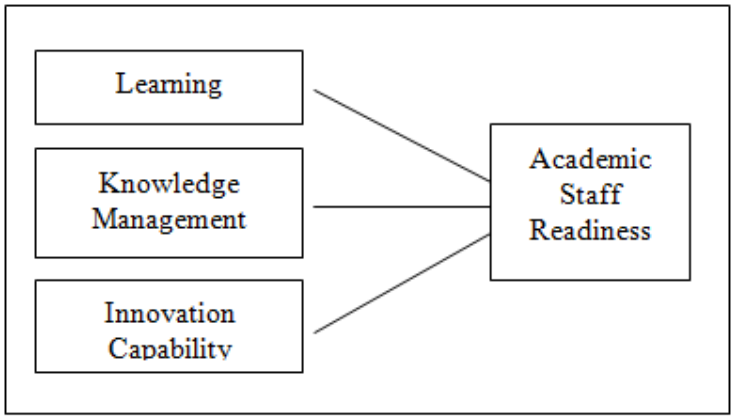

Figure 1: Conceptual Framework of the Study

The figure above has shown the conceptual research framework of study regarding topic about the factors influence on the readiness of academic staffs for Industrial Revolution 4.0. The dependent variable of this study is the academic staffs' readiness on Industrial Revolution 4.0. The learning, knowledge management and innovation capability are the factors as independent variable used for measuring the academic staffs' readiness on IR 4. 0.. The elements of "management practices such as organizational structure (Sluis, 2004), leadership style, human resource practices (Chang, Gong, & Shum, 2011) focusing short term innovation and long term capability (Lee & Kelley, 2008) and willingness to abandon investment and knowledge" (Saban, Lanasa, Lackman, & Peace, 2011; Shamim et al., 2017) are eliminated and not implemented in this conceptual framework because it is more related towards management practices needed by employees in organization.

Furthermore, the element of Industrial 4.0 is divided by "uncertain environment and unstable environment," (Shamim et al., 2016) is not implement in this research framework and replaced with academic staffs' readiness on Industrial Revolution 4.0. Besides, the technology acceptance is also excluded from this conceptual framework because it is more focus on "digital enhancements and implementations of Cyber-Physical Systems (CPS) and the learning, knowledge management and innovation capability," (Hwang & Yi, 2002; Shamim et al., 2016) is implemented as readiness factors to explore academic staffs' readiness on IR 4.0.

Research Design

The quantitative research method approach is chosen to collect data in this research because it is the best approach to use when explained the data that is collected among the respondents through questionnaire. Furthermore, the collected data from the questionnaires are analyzed through Statistical Package for the Social Sciences (SPSS) and the current versions is named as IBM SPSS for finding the relationship of predictor variables in this research (Awan, 2012). The SPSS analysis is included descriptive statistics and correlations test for analyzing the data in this study. The means, standard deviations, frequencies, median and mode are under descriptive statistics which used to describe the demographics such as age, gender and education background. Besides, this descriptive statistic able to clear problem statement, specific hypothesis and detailed body of knowledge in this research. Moreover, the reliability analysis, Pearson's correlation coefficient and regression are also applied to conclude the result of the study. Normally, Pearson's correlation is available to derive the relationship strength when the significance level at $p<0.0l$ and $p<0.05$ and the correlation between two random variables measures the degree of linear association between them (Awan, 2012).

Target Population

In this study, the target population is focused on three faculties from one of the public university in Malaysia with the total population of 216 academic staffs. A convenience sampling is utilized to collect the data in this research because this sampling is referred to nonprobability where respondents of the target population that meet certain practical criteria such as easy accessibility, obtainability at a given time, or the readiness to participate which able to access the population that is easily accessible (Etikan, 2016). This sampling technique eases the researcher's works in collecting data of respondents for this study.

The total sample size of this study is 140 respondents which is chosen from table scale of past researchers (Krejcie & Morgan, 1970) to determine the factors influence on the readiness of academic staffs for Industrial Revolution 4.0.

Data Collection

The questionnaire method as primary data is used in this study in order to gather the data with required input which is relatively easy to administer because they are standardized, free from error and efficient to collect data from large number of respondents. Therefore, total 140 sets of questionnaire have been distributed to the academic staffs which is equal with the sample size of respondents in this research. The respondents are required to complete all the questions on given time.

Measurement of Variables

The questionnaire is designed to explore factors influence the readiness of academic staffs on Industrial 4.0. The questionnaire is modified to suit the context of the research and the level of target researchers. The questionnaire consists of close-ended questions. This questionnaire is also used the Likert-Scale which is 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree.

The questions are divided into five sections. The information about the demographic such as gender, age (years old), race or ethnic group, marital status, education level, faculty, working experience and designation are mostly asked to respondents in Section A. Moreover, the questions are constructed into questionnaire for Section B is about the academic staffs' readiness on IR 4.0. as dependent variable has been constructed. While Section C is focused on the learning factor that influence the readiness of academic staff on Industrial Revolution 4.0. Next, Section D is focused on the knowledge management factor that influence the readiness of academic staff on Industrial Revolution 4.0. Lastly, Section E in questionnaire is focused on innovation capability factor that influence the readiness among academic staff on Industrial Revolution 4.0. Moreover, the mean score board of interpretation for attitude readiness is used to measure the factors influence the readiness of academic staffs on IR 4.0. So, the mean score gained from findings of descriptive analysis will be evaluate the level of readiness for academic staffs accordingly such as from 1.00 to 2.33 mean score shows the low level of readiness, 2.34 to 3.66 shows the average level of readiness and lastly 3.67 to 5.00 shows the high level of readiness. Moreover, the past studies in quantitative research especially in Likert Scale is used the mean score board to determine the level of readiness in research which is regarding about " the Teaching in a Digital Era: English Lecturers' Readiness toward the Internet Use in Teaching and Learning at Selected Higher Education Institutions in Indonesia" (Mukminin & Hidayat, 2013).

Table 1: Interpretation for Attitude Readiness

Mean Score	Interpretation
1.00 to 2.33	Low/Negative
2.34 to 3.66	Average/Neutral
3.67 to 5.00	High/ Positive

Data Analysis

Data analysis is about the way of creating differences between processing and cleaning of data which is essential when one needs to identify useful information and assistance in the decision-making process (Mhlanga, 2017). In this research, the Statistical Package for Social Sciences (SPSS) is used to analyze the data of survey from the questionnaire to get the result of the research. Furthermore, the data analysis in this study is used the frequency analysis, descriptive analysis and Pearson's correlation coefficient. Moreover, the descriptive statistics is to analyzed and simplified the larger amount of data in a sensible way and reduce a lots of data into a simpler in form of mode, median, mean, modal summary and frequency distribution (Loeb et al., 2017). The collection of the data is supported with the illustration of tables, and pie chart. Besides, the analysis of reliability is used to design reliable scales of measurement, to improve present scales, and to evaluate the scales in reliability. (Takaki, Taniguchi, & Fujii, 2014). The main objective of using this reliability study is to recognized the accurateness of the data which got from questionnaire that is conducted from the respondents. Therefore, reliability analysis has been presented through Cronbach's Alpha.

Results and Discussion

The data is collected from questionnaire has been discussed with the results from data analysis according to the research objective 1, 2 and 3 in this research. Furthermore, the data collected had been analyzed by Statistical Package for Social Science (SPSS) version 23 which is consists of Reliability Analysis, Demographic Analysis, Descriptive Analysis and Correlation for this study. In this survey, a sample of individuals are selected randomly as respondents rather than the populations of all the academic staffs because of time and cost constraint. The data is obtained from academic staffs in three faculties A sample of individuals are taken by selected randomly as respondents rather than the populations of all the academic staffs because of time and cost constraint. Moreover, the questionnaire is distributed and collected via hard copy questionnaire and Google form questionnaire. All the respondents are needed to answer all the question from Section A until Section E. There were total of 124 academic staffs completed this research survey from required 140 samples which making the rate of completion is 88.57%. At the first, the period of data collection is 2 weeks but it was extended another one more week with total 3 weeks in term to gained more respondents to response and answer the questionnaire.

Reliability Analysis

The result of variables in reliability testing from the actual study is measured with Cronbach' Alpha to know about the consistency of every items from the questionnaires in this study. Therefore, the data collected is used in reliability analysis to measure reliability in both independent variables and dependent variable of this study. Alpha Cronbach is the statistics used to establish data reliability which can be valued from 0 to 1. In addition, the Cronbach's Alpha values closer to 1 means that the reliability of internal consistency is higher.

Reliability Analysis of Independent Variables

The results are showed that the independent variables such as learning, the Cronbach Alpha shows the value of 0.778 which means it is an acceptable result for learning factor is influenced on the readiness of academic staffs for Industrial Revolution 4.0. In measuring knowledge Management, the Cronbach Alpha result is 0.917. It is an excellent result has been showed that the knowledge management factor is influenced the academic staffs' readiness on Industrial Revolution 4.0 compared to other independent variables in this study.

Table 2: The Reliability Coefficient Value of Independent Variables

Independent Variables	Cronbach's Alpha	N of Items
Learning	0.778	7
Knowledge Management	0.917	8
Innovation Capability	0.889	8

Furthermore, the Cronbach Alpha for innovation capability is 0.889 which means the result is good and influenced on the readiness of academic staffs for Industrial Revolution 4.0. The results from base on Cronbach Alpha of each independent variable in this study is still reliable and this statistics data is gathered from the actual test.

Reliability Analysis of Dependent Variable

In measuring the academic staffs' readiness, the dependent variable is influence them when the independent variable has been used. All the questions are used the Likert-Scale form for the question.

Table 3: Reliability Analysis of Academic Staffs' Readiness

Cronbach's Alpha	N of Items
0.895	6

The Cronbach Alpha result is 0.895 which showed the internal consistency is good. Therefore, coefficient obtained from the Likert-Scale is reliable based on coefficient obtained from the final or actual test. In order to know the academic staffs' readiness on industrial revolution 4.0 within themselves are strong or weak, 124 questionnaires are adapting and adopting to match the respondent understanding. This survey is done on the three faculties from one of the public university in Malaysia. Thus, the results gathered are getting impressive responds.

Demographic Analysis

There are out of 124 respondents, 37.1% which is 46 female academic staffs are answered the given survey. Furthermore, around 78 male academic staffs with 62.9% are answered all the questions in this research. The female respondents hold three-fifths of total 124 respondents mainly due to most of the females are worked as academic staffs compared with male academic staffs. Furthermore, there are 6 respondents and 4.8 % from age group in between 21-30 years are answered the questionnaire in this study. On the other hand, the age group from 31-40 years are the majority which are 59 respondents and consist 47.6%. This age group is suitable for time taken to became lecturer position in university. The ages between 41-50 years are total of 52 respondents and 41.9% is become second highest age group of respondents are answered the questionnaire of this research. Meanwhile, the respondents range 51 - 60 years old carry only 4.8 % which is 6 academic staffs were done answering this survey. Moreover, one academic staff who is in age group above 60 years old with 0.8 % are answered the questionnaire in this study. It has been least age group of respondents compared to other age group of respondents.

Table 4: Demographic Analysis

Demographic Profile	Frequency	Percent
Gender		
Male	46	37.1
Female	78	62.9
Age		
21 - 30 years old	6	4.8
31 - 40 years old	59	47.6
41 - 50 years old	52	41.9
51 - 60 years old	6	4.8
above 60 years old	1	.8
Designation		
Lecturer	73	58.9
Senior Lecturer	30	24.2
Associate Professor	19	15.3
Professor	2	1.6
Race or ethnic category		
Malay	114	91.9
Chinese	7	5.6
Indian	3	2.4
Working Experience		
Less than 2 years	16	12.9
2 - 5 years	9	7.3
6 - 10 years	40	32.3
11 - 15 years	46	37.1
More than 15 years	13	10.5

Moreover, there are divided the race or ethnic into three categories such as Malay, Chinese and Indians. In addition, there are 114 respondents are Malays and it is the almost 91.9%, Chinese contributed 7 respondents and it is 5.6% and Indian contributed 3 respondents which is 2.4% in this study. Malay ethnic respondents are majority answered the questionnaire from three faculties.

Moreover, 16 respondents with 12.9% are worked as academic staffs less than two years and around nine respondents with 7.3% in between working from 2- 5 years are answered questionnaire of this research. This is minority group of working from 2-5 years as academic staffs by respondents. Moreover, 40 respondents with 32.3% are worked as academic's staffs from 6- 10 years. There are total of 46 respondents are worked 11-15 years and it occupied 37.1%, which is highest group of working as academic staffs among the respondents. More than 15 years worked as academic staffs by total respondents is 13 with 10.5% in this study. academic staffs are divided by designation had answered the questionnaires which are Lecturer, Senior Lecturer, Associate Professor and Professor. There are highest total 73 Lecturers has been done this survey as respondents with 58.9% and continued by second highest of respondents are 30 Senior Lecturers with 24.2% done this survey from three faculties respectively. On the other hand, the respondents according of designation as Associate Professor are contributed 19 respondents and it consist 15.3%. Meanwhile, only two professors as respondents with 1.6% are answered questionnaire of this research.

Hypothesis Results

The present research is discussed of each variable's correlations with the academic staffs' readiness on IR 4.0 by using the rules of thumb for correlation coefficient size table. The coefficient of correlations is showed the strength of the relationship or direction of the linear relationship in between two variables.

Table below is showed the correlation relationship in between variables which is learning, knowledge management and innovation capability with academic staffs' readiness on IR 4.0.

Table 5: The relationship between academic staffs' readiness and learning

		Academic Staffs' Readiness	**Learning**
Academic Staffs' Readiness	Pearson Correlation	1	.562**
	Sig. (2-tailed)		.000
	N	124	124
Learning	Pearson Correlation	.562**	1
	Sig. (2-tailed)	.000	
	N	124	124
***. Correlation is significant at the 0.01 level (2-tailed).*			

The overall correlation coefficient is 0.562 and the significant figure is 0.00 which showed the academic staffs' readiness and learning factor has a significant positive relationship ($0.5 < r < 1$). So, the level of correlation in between academic staffs' readiness and learning is showed strong positive linear correlation. Hence, there has been a significant positive relationship between learning factor and academic staffs' readiness on IR4.0. with accepted of H_1 in this research.

Table 6: The relationship between academic staffs' readiness and knowledge management

		Academic Staffs' Readiness	Learning
Academic Staffs' Readiness	Pearson Correlation	1	.320**
	Sig. (2-tailed)		.000
	N	124	124
Knowledge Management	Pearson Correlation	.320**	1
	Sig. (2-tailed)	.000	
	N	124	124
**. Correlation is significant at the 0.01 level (2-tailed).			

The overall correlation coefficient is 0.320 and the significant figure is 0.00 which showed the academic staffs' readiness and knowledge management factor has a significant positive relationship ($0< r < 0.5$). However, the level of correlation in between academic staffs' readiness and knowledge management is showed weak positive linear correlation. Hence, there has been a significant positive relationship between knowledge management factor and academic staffs' readiness on IR4.0. with accepted of H_2 in this research.

Table 7: The relationship between academic staffs' readiness and innovation capability

		Academic Staffs' Readiness	Learning
Academic Staffs' Readiness	Pearson Correlation	1	.343**
	Sig. (2-tailed)		.000
	N	124	124
Innovation Capability	Pearson Correlation	.343**	1
	Sig. (2-tailed)	.000	
	N	124	124
**. Correlation is significant at the 0.01 level (2-tailed).			

The overall correlation coefficient is 0.343 and the significant figure is 0.00 which showed the academic staffs' readiness and innovation capability factor has been a significant positive relationship ($0< r < 0.5$). However, the level of correlation in between academic staffs' readiness and innovation capability is showed weak positive linear correlation. Hence, there has been a significant positive relationship between innovation capability factor and academic staffs' readiness on IR4.0. with accepted of H_3 in this research.

Discussion and Conclusions

Results indicated that there is relationship between learning factor and academic staff readiness which is highly specified both variables have a strong positive relationship. Besides, the positive relationships are obtained from this study indicates that the academic staffs are ready by learning the skills and knowledge required for Industrial Revolution 4.0. This findings are agreed with previous research that the learning is important factor to the improvement of the skills needed and prepared the academic staffs to meet the challenges associated with modern worldwide systems of Industrial Revolution 4.0 (Abuassi & Alkorashy, 2016). According to researcher (Saeid & Eslaminejad, 2016) in their past studies are concluded the fact that learning factors influenced the readiness of academic staff not only in the virtual environment but also in their personal achievement and work performance which are helped (Naghsh, 2016) the academic staffs able to meet their needs of learning and reach a point of understanding about Industrial Revolution 4.0. In addition, the learning factor is showed a positive effect towards academic staffs' readiness on Industrial Revolution 4.0 by increased their performance level and achieve the goal of their institutions in the future (Avdal, 2013). Therefore, the learning factor positively influenced the readiness of academic staffs for IR 4.0.

The knowledge management factor has been shown a significant weak positive relationship with 0.320 or 32% coefficient correlation with the academic staffs; readiness on Industrial Revolution 4.0. Thus, H0 (null hypothesis) is rejected and H1 (alternative hypothesis) is accepted even though the relationship is shown weak positive correlation in between the variables. This finding is agreed with previous research that the knowledge management helped improving the organizational functions for productive and beneficial implementation and influenced academic staffs' readiness towards industrial revolution 4.0 in institution (Shirazi, Mortazavi, & Azad, 2011). Moreover, the knowledge management supports educational institutions and make the academic staff to be ready with increasing their ability to collect and share information and knowledge to apply problem solving and support continuous research and improvement in their work towards advanced technology 4.0 (Sangeeta & Dhamdhere, 2015). In addition, some studies are mentioned that the knowledge management factor has been influenced increasing the level of readiness of academic staffs and produce effective management with the design and work of technical and structural procedures that focus on work processes and information processing in order to achieve true purpose of management towards the industrial revolution 4.0(Prieto & Revilla, 2004). Therefore, the knowledge management factor positively

influenced the readiness of academic staffs for Industrial Revolution 4.0.

Furthermore, there is significant positive relationship with weak correlation between innovation factor and the readiness of academic staffs for Industrial Revolution 4.0. The correlation coefficient in Pearson's Correlation analysis between for innovation capability factor and academic staffs' readiness is 0.343 or 34.3%. Even the findings are shown weak positive correlation but the past studies is mentioned that the innovation capabilities factor are influenced by institutional performance and enhance the readiness of academic staff who are able to exploit knowledge acquired and exchange knowledge or systems within the organization towards the Industrial Revolution 4.0 (Wu, 2013). In addition, the innovation capability positively encourage the academic staffs to prepare themselves by generating new ideas and creating a new approach to learn the skills and knowledge towards IR4.0 (Hussein et al., 2016). Therefore, the innovation capability factor positively influenced the readiness of academic staffs for Technology 4.0.

Research Limitation

The research limitation is known as constraint in a distribution of the survey based on correct respondents of academic staffs for this study. We are delivered the survey or questionnaires by printout and Google form. For the hard copy or printout questionnaire collection, we faced the problem to identify the right target respondents during distribution of questionnaire. The right target respondents according to designation such as Lecturer, Senior Lecturer, Associate Professor and Professor are supposed to answer the questionnaire. However, there are few academic staffs' rooms not label with name and also not much able to distribute the hard copy of the questionnaire by face to face for academic staffs due to time constraint. So, some of the questionnaire pinned it in front room of academic staffs which caused there are a few questionnaires are needed to reject due to wrong target respondents other than mention above in this research. This method able to help me to reach the target respondents in the university.

Moreover, this study was used a Likert scale which mean quantitative method to record the level of academic staffs' readiness. The respondents are only able to tick the answer such as strongly disagree, disagree, neutral, agree and strongly agree in the questionnaire. So, it was giving the respondents are only limited choices in term of choosing the answer and they were not able to express their opinion or recommendation regarding the study of topic which is the factors influence on the readiness of academic staffs for Industrial Revolution 4.0 in this study.

Recommendation

From the finding of this research, the academicians are recommended to extend their period of time in completion of study for gaining more target respondents in this research. It is helped the academician able to clarify and explained about the survey more with detail to the respondents while able to increase the validity and reliability of this study. Moreover, the qualitative research method is recommended for academician which may gained or identified other factors that influenced the academic staffs' readiness on IR 4.0 through interview with target respondents. Furthermore, there are some recommendation for education industry especially the management of universities to increase even more training programs and encourage more academic staffs to participate and learn the knowledge and skill required for Industrial Revolution 4.0. Thus, it has been increased the quality and professional academic staffs than quantity in learning institutions. Lastly. the government especially the Education Ministry should enforce the implement training program and exams regarding skills and knowledge of IR 4.0. in every institution by making sure every employee has to attend the program and exam before entering for new employment. It is increased the readiness level not to academic staffs only but also for all the employee in Malaysia. Thus, it can have helped the national economy also through creating a quality and qualify employee for the nation towards advanced technology 4.0.

Conclusions

As conclusion, this study was investigated the factors which are learning, knowledge management and innovation capability that influence on the readiness among academic staffs for Industrial Revolution 4.0. The conceptual framework had built and used it as the mechanisms to analyze from factors that influence the readiness among academic staffs for Industrial Revolution 4.0. Moreover, the research is conducted quantitative survey method and has been collected 124 units" data from the academic staffs from three faculties. Thus, all of these data collection had generated a useful data and information towards in this research study.

Besides, the findings show that the learning factor has a strong positively relationship while knowledge management and innovation capability factors had a weak positively relationship with academic staffs' readiness on IR 4.0. This means that there is a significant relationship between dependent and independent variables and the hypothesis can be accepted, these factors have influenced on the academic staffs' readiness for future advanced technology towards Industrial Revolution 4.0. In addition, there are a lot factors which may adapted or adopted readiness level of academic staffs towards Technology 4.0 and the survey may continue as references or guidance for further studies by the academician. At the same time, this research creates more changes for academician to gain more ideas and information for do further studies in topic which regarding about the academic staffs' readiness on IR 4.0. Moreover, the education industry especially the management of universities can able upgrade their academic staff's quality of work and provide more training and program for academic staffs to be ready in adapting of knowledge and skill required for Industry Revolution 4.0 from this study.

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Simulated-Based Approach to Analyse Sustainable Supply Chain in Pharmaceutical Company

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Abstract

Sustainable supply chain (SSC) management has improved company's competitive strategy during last decades. A lot of work has been done using mathematical models to optimise various criteria in the SSC. However, supply chain dynamics, such as uncertainty in production demand and transportation, are not present in most of them. In real systems the influence of random factors is significant. Therefore, the use of computer simulation can be an effective method of presenting various variants. This paper shows the application of a computational tool to support strategic decisions in the sustainable supply chain. The proposed approach combines the techniques of computer simulation modelling and Multiple Criteria Decision Analysis (MCDA) to analyse and evaluate the complex logistic problem. The research carried out allowed to create an accurate model of the real supply chain of a pharmaceutical company. It also identified what are the most important problems in the pharmaceutical chain and which performance criteria are considered to be critical for managers. The methodology used demonstrates the possibilities of creation various scenarios and allowing for their comparison and multi criteria evaluation.

Keywords: pharmaceutical supply chain, computer simulation, multiple criteria decision analysis, support decisions

Introduction

The pharmaceutical industry is one of the most important segments of developed countries' economies. Report (EFPIA, 2019) analysing this sector of the economy indicates that it is one of the main employers in the high-tech industry, generates three to four times more employment indirectly – upstream and downstream – than it does directly

The most frequently identified problems of the entire pharmaceutical supply chain are: outdated sales volume data (purchased from market research companies); demand uncertainty, periodic deliveries, high stock levels, wide and frequently changed assortment, top-down pricing or distribution methods, inconsistent information technology, high cost of inventory, low level of customer service, lack of information flow, lack of clear flow of information and data, bullwhip effect, lack of consistent measurement systems and models, need for environmental requirements, chain formation by legal requirements (DiMasi et al., 2016).

As a result, managing the supply chain in the pharmaceutical industry has become a very complex challenge, with a number of new possible decision-making problems that interact in a complex network of factors, and their relationships are not always obvious and easy to understand (Varma et al., 2007). One way to deal with the problem of management in such complex supply chains is to use simulation modeling that allows to analyse of large and complex stochastic systems. For many years the use of computer simulation has greatly increased, this can partly be attributed to increased competition and tool availability (Jahangirian et al., 2010). A key trend, is the increased use of hybrid modelling methods and optimization algorithms; these new links greatly increase the capability of

computer simulation and provide further benefits for manufacturers and supply chain managers (Negahban and Smith, 2014).

The article uses the results of research of two large pharmaceutical companies in Poland. The results of these studies were used: on the one hand to identify the problems that these companies face, their relationship in the supply chain, and on the other to build a simulation model of the production system and supply chain based on real data. Then authors show the application of a combined methodology of simulation modelling and Multiple Criteria Decision Analysis (MCDA) to support strategic decisions in the pharmaceutical supply chain. The methodology used demonstrates the possibilities of creation various scenarios and allowing for their comparison and multi criteria evaluation.

Theoretical background and Research Gaps

The industrial field of pharmaceutical products has developed at a very fast rate in the last decades. It is a rapidly growing market due to the increased rate of modern century diseases and the raised number of old-age nations. Likewise, the presence of pharmaceutical products as trace pollutants for environment has been firmly established (Weraikat, et al., 2016). The pharmaceutical industry is responsible for researching, developing, producing, and marketing pharmaceutical drugs, vaccines, and treatments for common and rare diseases (Milanesi et. al, 2020). Growing demand or creating demand for drugs and dietary supplements causes numerous problems in complex pharmaceutical supply chains. In recent years there is still a need to implement new strategies to the supply chains, including those based on sustainable development principles. It be defined as series of operations, processes and interaction between organizations in order to discover, develop and produce medications and drugs (Shah, 2004) A Pharmaceutical Supply Chain (PSC) is defined as a combination of processes, organizations and operations involved in the development, design and manufacturing of useful pharmaceutical drugs (Singh et. al, 2016).

An aging world population and improved healthcare systems are driving demand for a pharmaceutical industry that is increasingly aware of the need to pursue sustainable development while delivering a wider range of pharmaceutical products. Therefore, the pharmaceutical industry has been the subject of growing attention for the impact in terms of sustainability of its (Sarkis et. al, 2010). The supply chain of pharmaceutical products is characterized by high complexity, and supply and delivery channels to customers are limited and highly regulated (Merkuryeva et. al. 2019).

The problem of management and decision making in such chains is primarily the choice of the raw material producer and supplier. 80% of the excipients are produced in China and India, of which only 1% of the companies involved in the production of these components have GMP-compliant procedures in place (Saluja and Sekhon, 2016). The design and operation of such chains is also negatively affected by the reduction of production in Europe, due to stricter climate regulations, increased costs in this sector and low competitiveness in relation to companies from the USA or Asia. In such chains, unfortunately, not all logistics and distribution companies comply with good transport or distribution practice. There is no doubt that the main problems of pharmaceutical supply chains include the need to secure each stage of the activities and processes undertaken, the organisation and proper execution of transport processes, and control at each stage of the supply chain. Errors or deviations in transport or storage activities affect the quality and safety of the active substances or drugs themselves. The organisation of supply chains should take into account the specificities of products or raw materials, the need for specialised packaging and storage conditions. These supply chains need to demonstrate a high level of quality and efficiency, despite all the advances and improvements in production, storage, and distribution methods, many pharmaceutical companies are still struggling to satisfy market demand effectively and consistently (Zahiri et. al, 2018).

The specificity of the final product requires maximum availability on the shelves. Such an assumption requires improvement of the chain, and its transparency, as well as appropriate cooperation, as usually vendors or medical facilities do not have large storage space, and ensuring availability is possible by using information flow techniques and ensuring cooperation at a high quality level. In this respect, there is also a need for appropriate data accuracy and IT support, close cooperation between the links is necessary. This product specificity also requires the use of specialist

logistics operators for logistical processes. Statutory regulators play an important role (pharmaceutical law, requirements to be met in order to allow the product to be marketed in a given country). Collaboration in supply chains can be defined as a long-term relationship between entities through sharing resources and knowledge.

The main market stakeholders include: regulators, manufacturers, suppliers of raw material packaging, additives, wholesalers, retailers (pharmacies, hospitals, medical centres), doctors, patients, logistics operators and warehouse infrastructure managers, raw material producers, the pharmaceutical industry itself, distributors, health agents (hospitals, clinics, physicians, insurance health representatives), third party operators, retailers, and customers/patients (Viegas et. al, 2019). PSC brings together thousands of different stakeholders with diverse objectives (Halabi and Gostin, 2015).

The analysis of pharmaceutical supply chains is most often taken into account:

- Primary manufacturers,
- Secondary manufacturers,
- Distribution centres/wholesalers, and
- Retailers (i.e., pharmacies)/hospitals;

all of them have their own specifications, obligations and priorities. Primary manufacturers deal with the production of active ingredients, which will further be processed in downstream stages. Delivered active ingredients to the secondary manufacturers go through laboratory processes and are transformed into the ready-to-use drugs. These drugs are then transported to distribution centres and are distributed to the retailers (i.e., pharmacies) or hospitals. In general, a pharmaceutical supply chain is a 5-tier supply chain which includes primary manufacturers, secondary manufacturers, main and local distribution centres, and destination zones/demand points (e.g., pharmacies, hospitals, clinics, etc.) (Zahiri, et. al. 2017). The original model of the pharmaceutical supply chain is presented in Figure 1.

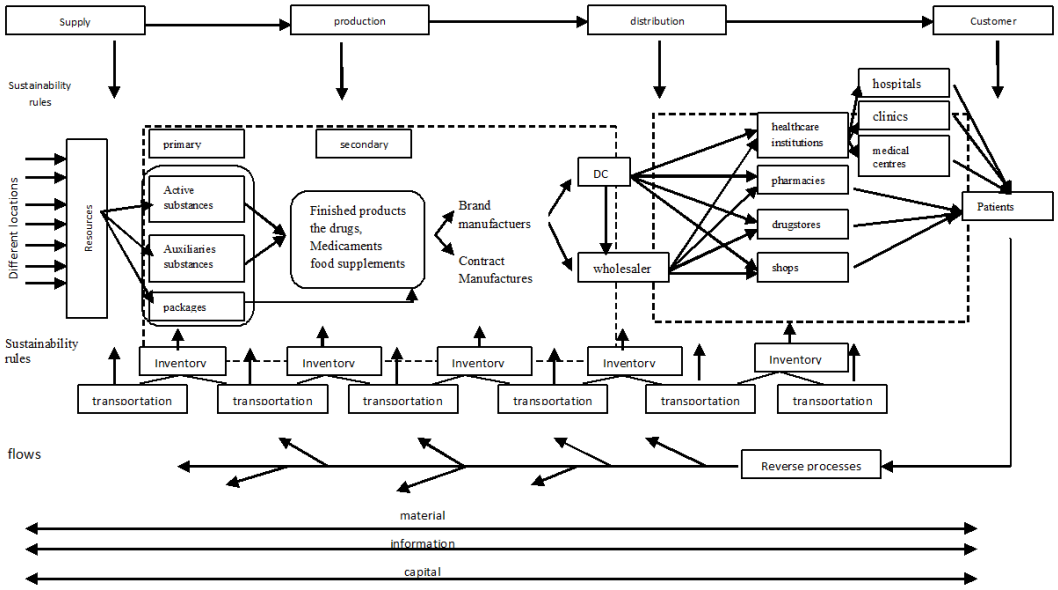

Fig. 1: Model of the pharmaceutical supply chain

Recent years have also seen new trends in whole processing industries, encouraging the transition from cost-based to sustainable development (Heintz et al., 2014). Supply chain management decisions take into account not only economic objectives but also environmental, security and social aspects (Barbosa-Povoa et al., 2012, Barbosa-Povoa and Pinto, 2018). There is no doubt that pharmaceutical companies and their supply chains have a negative impact on the environment, due to medical waste, which also includes excess drugs as well as inappropriate storage (e.g. overdue drugs) (Masoumi et al., 2012).

Methodology

Critical review of the literature provides a baseline for describing of the problem. The pharmaceutical industry is characterised by the complexity of supplying and distributing pharmaceutical products in both developed countries (Rossetti, Handfield, & Dooley, 2011), as well as developing countries (Prado et al., 2016) and the specific supply market (Brekke et al., 2007; Rossetti et al., 2011). The structure and type of pharmaceutical markets contribute to uncertainty on the demand side and inefficiencies on the supply side (Narayana i in, 2014), its degree depends on the country and market. In this study authors develop a hybrid methodology to answer the outlined logistical problems proposed by combining the techniques of simulation modelling and MCDA. The proposed methodology includes modeling of the entire logistics chain, from ordering, through suppliers, production and distribution to customers taking into account randomness that may interfere with the proper functioning of the chain.

The novelty of the study is the identification of problems in supply chains in the pharmaceutical companies and using of a simulation modelling with multi-criteria methods to test different scenarios and analyse performance of whole supply chain of these companies. The methodology used in the research is shown in Figure 2.

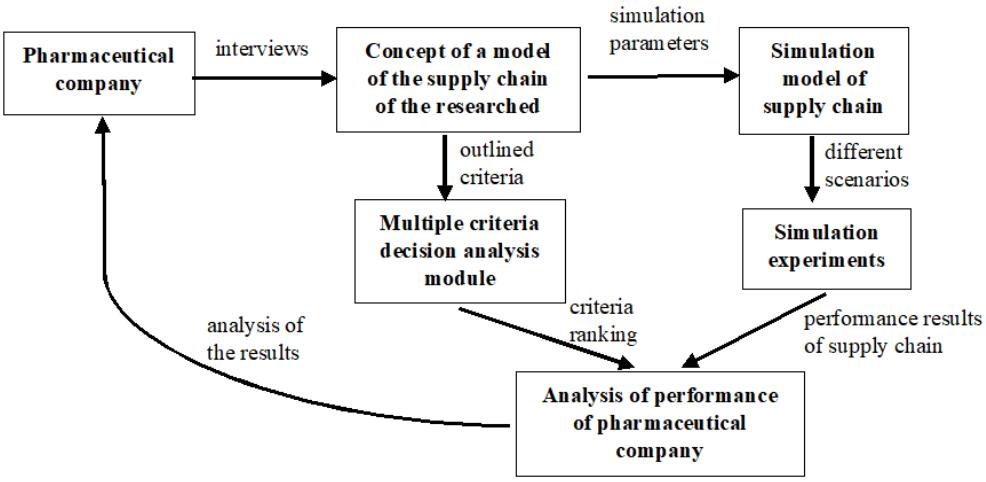

Fig. 2: Practical methodology to analyze performance in the supply chain of pharmaceutical company using simulation modelling and MCDA

The first step in the research presented in the article were in-depth interviews at two large pharmaceutical companies in Poland. The entire logistics chain was analyzed: from the suppliers, through the production to the customers of one dietary supplement, which was identified as key in the production of a given manufacturer. The interview also included the analysis of problems that occur

in such a chain and the most important criteria according to a given manufacturer in assessing the effectiveness of the entire chain. These interviews can be used to build the concept of the supply chain model of the enterprise being analyzed, and at a later stage to create a simulation model and a ranking of efficiency criteria that are most important for a given enterprise. Simulation experiments can test different decision-making alternatives upon more possible foreseeable scenarios, in order to ascertain in advance the level of optimality and robustness of a given strategy. The results of the simulation are then fed into the multi criteria analysis module and finally, as a result, the enterprise gets which strategies or which (random) elements of the supply chain most affect its efficiency.

Computer simulation study of pharmaceutical supply chain

Simulation is most certainly a very powerful approach for gaining insight into supply chain management systems (Thierry et al., 2010). Pharmaceutical supply chains are in need of efficient optimization techniques to improve their performances (Masoumi et al., 2012). There is a need to track and identify products throughout the entire supply chain. Among the techniques supporting a multi-decisional context, as a supply chain is, simulation can undoubtedly play an important role, above all for its main property to provide what-if analysis and to evaluate quantitatively benefits and issues deriving from operating in a co-operative environment rather than playing a pure transaction role with the upstream/downstream tiers (Terzi and Cavalierii, 2004). In this regard, simulation has appeared as a powerful method to investigate and design global strategies for the pharmaceutical companies. Barlas and Gunduz (2011) used simulation modelling with demand forecasting and sharing strategies to reduce fluctuations and the bullwhip effect in supply chains. Coyle et al. (2003) demonstrated that simulation is a strong tool for study both the flexibility and the reactivity of the supply chains in large scope under stochastic conditions. Ding et al. (2004) have developed a simulation-based and optimised tool to design, improve, and support supply chain decision making. There are also some works that associate simulation modeling with MCDA methods. Work Aickelin et al. (2018) present a case study demonstrating how dynamic and uncertain criteria can be incorporated into a multi-criteria analysis with the help of discrete event simulation. Paper Brito et al. (2011) shows usage of a computational tool (computer simulation with MCDA methods) to support strategic decisions about the planning and sizing of the logistics and production elements of a steel plant.
In this paper we use simulation modelling with multiple criteria decision analysis methods to analyse performance of pharmaceutical supply chain under different scenarios with some uncertainties that may interfere with its functioning.

Experimental design for the simulation study

ARENA simulation package from Rockwell Software (version 14.0) was used for modelling the manufacturing system. The experiment design is described in the following section preceding a discussion of results. A fragment of the tested model of supply chain in the Arena environment is shown in figure 3. This environment can simulate any complex system, taking into account the possible uncertainty.

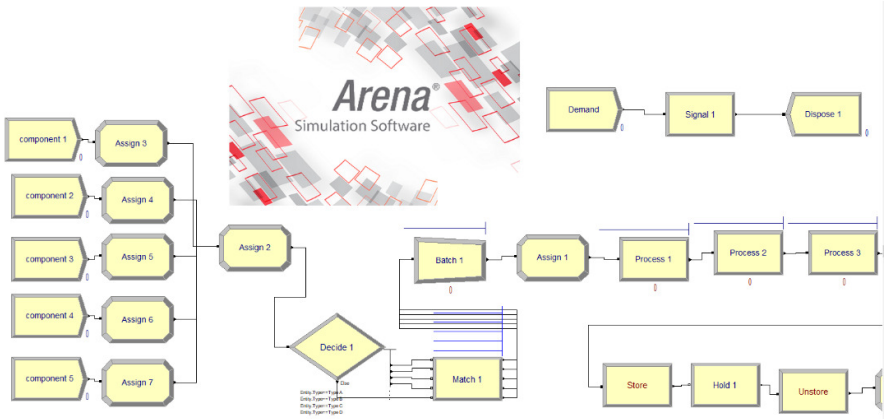

Fig. 3: A fragment of the analysed model of short food supply chain in Arena software

A model of supply chain was created from in-depth interview and analysis of the supply chain of a leading pharmaceutical company in Poland. The simulation model reflects the entire chain of one of the dietary supplement produced by this company. Fixed simulation model input parameters are shown in table 1.

Table 1: Simulation input parameters

Product	One dietary supplement
Number of components needed for the production of the supplement	10
Number of suppliers of components	6
Entrance warehouse	1
Number of processes needed to manufacture the product	8
Output warehouse	1
Number of supply chain links in delivery to the customer	3

In real supply chains, there are many stochastic components. Table 2 represents the scenarios analysed, which take into account random elements that may appear in different places throughout the chain.

Table 2: Simulation experiment - scenarios

	Occurrence of random factors			
Scenario No.	**Uncertainty of demand (L-Large, M-Medium, S-Small)**	**Delays from suppliers (Yes - 1/No -0)**	**Production failures (Yes -1/No - 0)**	**Delays in transport to customers (Yes - 1/No -0)**
1	S	0	0	0
2	S	1	0	0
3	S	0	1	0
4	S	0	0	1
5	S	1	1	0
6	S	1	0	1
7	S	0	1	1
8	S	1	1	1

9	M	0	0	0
10	M	1	0	0
11	M	0	1	0
12	M	0	0	1
13	M	1	1	0
14	M	1	0	1
15	M	0	1	1
16	M	1	1	1
17	L	0	0	0
18	L	1	0	0
19	L	0	1	0
20	L	0	0	1
21	L	1	1	0
22	L	1	0	1
23	L	0	1	1
24	L	1	1	1

In this case random probability distributions are used to represent uncertainty in demand, delays from suppliers and delays in transport to customers (normal and triangular distribution). Normal distribution is a good description of the distribution of demand for fast-selling items (Krzyżaniak, 2009).

According to the accepted parameters in the literature, which ensure reliable results the following simulation runs parameters were determined:

- Warm-up time = 7 days
- Replication length = 12 months
- Number of replications = 7

Model verification and validation

Model verification and validation is an important step in simulation modelling. However, validation of data collected from the interview is difficult. Several verification and validation techniques can be applied to the model, like: internal consistency checks, checking the correctness of the model (check errors), watching animation of process. In this study to validate the model ***a certain number of experiments*** was run with different set of inputs and the calculated output (number of products of a given type sold) was compared with output declared by analysed company.

Multiple Criteria Decision Analysis (MCDA)

The MCDA method involves mapping the different criteria scores onto a comparable scale and then calculates a single overall score based on a weighting scheme provided by the managers from the researched companies. The objective of any multi-criteria decision methodology is not to prescribe the "right" decision to be chosen, but to help decision makers find an alternative that best fits their needs and problem general understanding (Brito, 2011). The performance criteria, considered in this paper, for which managers of two major pharmaceutical companies in Poland were asked are:

- Number of products of a given type sold
- Usage/utilization of resources
- Minimizing inventory at the input warehouse
- Minimization of inventory at the output warehouse
- Short delivery time to the customer (from the moment of ordering)

Table 3 shows the importance classification of the performance criteria and the calculation of the normalized weights associated to each of them.

Table 3: Importance classification of the decision criteria and normalized weights

Performance criteria	Company 1 priority	Company 2 priority	Average value	Rank of criterium	Weight	Normalized weight
Number of products of a given type sold	1	1	1	1	100	0,375
Number of days / hours of production downtime	2	4	3	2	50	0,1875
Minimizing inventory at the entrance	5	3	4	3	33,33333	0,125
Minimization of inventory at the output	3	5	4	3	33,33333	0,125
Short delivery time to the customer (from the moment of ordering)	4	2	3	2	50	0,1875
				SUM	**266,6667**	**1**

Analysis of the Results

The results from all 24 scenarios of simulation experiments are presented in Table 4. It can be seen that random factors that disrupt the supply chain have a significant impact on all performance criteria indicated by the managers of the surveyed pharmaceutical companies.

Table 4: Results obtained from the simulation experiments

Scenario No.	Number of sold products	Utilization of resources (%)	Inventory at the input (average time in hours)	Inventory at the output (average time in hours)	Cycle time (average in hours)
1	174918	98.5%	491.7	22.3	549.6
2	174643	93.5%	1651.2	21.3	1692.1
3	174528	94.7%	491.7	19.0	549.0
4	174916	98.5%	491.7	22.3	50.6
5	174380	88.5%	1651.2	15.7	1690.8
6	174338	93.5%	1651.2	21.3	1692.3
7	174524	94.7%	491.7	14.0	551.6
8	174173	88.5%	1651.2	15.3	1693.4
9	166723	97.6%	491.7	22.3	550.7
10	166697	92.8%	1651.2	23.4	1692.8
11	167205	94.1%	491.7	14.4	550.6
12	166600	97.6%	491.7	22.3	551.5

13	166030	87.5%	1651.2	17.2	1693.3
14	166058	91.8%	1651.2	24.0	1693.5
15	166577	94.1%	491.7	21.2	552.4
16	165987	87.5%	1651.2	17.7	1695.4
17	153467	97.1%	491.7	22.3	553.5
18	151781	91.3%	1651.2	25.3	1694.2
19	152137	92.9%	491.7	14.0	554.9
20	152722	97.1%	491.7	22.3	553.9
21	151139	86.4%	1651.2	17.8	1694.2
22	151781	91.3%	1651.2	25.4	1696.0
23	151998	92.9%	491.7	13.9	555.0
24	150840	86.4%	1651.2	17.9	1696.6

From the results of the conducted experiments, it can be further concluded that the factor that most affects the smaller number of products sold (difference even 13% in the annual number of product units sold) is the uncertainty of demand. However, delays from the suppliers have a very large impact on the extension of the entire cycle time (from order to delivery to the customers). Delays in transport to the customers and breakdowns on the production line have much less impact.

Due to the fact that the results differ significantly for different levels of demand uncertainty, in the MCDA analysis it was decided to compare not all 24 scenarios together, but grouping 8 scenarios due to the level of demand randomness (small - scenarios 1-8, medium - scenarios 9-16, large - scenarios 17-24). The application of the normalized weights considered for each criterion (Table 3), results in a final score result for each scenario. Thus, the scenarios are ranked in Table 5.

Table 5: Scenarios final scores ranking

Scenario No.	Uncertainty of demand - Small	Scenario No.	Uncertainty of demand - Medium	Scenario No.	Uncertainty of demand - Large
1	0,962	9	0,962	17	0,975
2	0,731	10	0,731	18	0,693
3	0,881	11	0,981	19	0,944
4	0,962	12	0,900	20	0,937
5	0,662	13	0,662	21	0,662
6	0,656	14	0,656	22	0,693
7	0,906	15	0,881	23	0,906
8	0,625	16	0,625	24	0,625

Table 5 contains the results of assessments of the effectiveness of a given scenario. The given rating reflects the result of simulation experiments also taking into account the assessment of each criterion according to its importance determined by the managers of pharmaceutical companies.

The results from Table 5 show that the best scenarios are those where there are no random disturbances in the functioning of the chain. This is an obvious conclusion, but it can be seen that scenarios with no delays from suppliers are much better rated, e.g. scenarios 4 and 7 for small

uncertainty of demand. High scores of scenarios 19 and 20 for high uncertainty of demand can also be seen. Thanks to this combination of simulation modeling and the MCDA method, managers get a tool to look more effectively at the supply chain efficiency. As a result, they can focus on eliminating the effects of uncertainty in those areas that most affect the chain's efficiency as a multi-criteria decision.

Discussion and conclusion

Evaluation of supply chain performance is essential for operating and managing of supply chain. The complexity of pharmaceutical supply chains and their specificity, different from other industries, in particular taking into account random factors make it necessary to manage them efficiently.

The simulation modelling and MCDA combined methodology proved to be effective as a complex logistic problem decision-making support. In this paper we have presented theoretical assumptions of this methodology together with case study of supply chain of pharmaceutical company. This analysis tool (simulation modelling with MCDA), with some minor modifications, is applicable to other similar logistics systems evaluation. It can also be extended to other preference functions that can also be evaluated differently.

There is no doubt that the management of pharmaceutical supply chains is challenging. Market requirements and their specificities, but also new trends and the creation of new strategies, including sustainable development, make it necessary to use different methods of monitoring and assessing the chain itself. The complexity and length of chains is also a challenge for managers. Therefore, ways should be sought it is the chains that have been efficient and effective, which will consequently increase their efficiency and competitiveness.

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Determinants of profitability: Evidence of companies listed on Malta Stock Exchange

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Abstract

The article aims to ascertain the major factors or variables that affect the profitability of companies in Malta. This article will delve on three major performing companies in Malta. The specific objectives are to: 1) identify the five major variables or factors that could affect company's profit; independent variables; 2) assess each of the independent variables on the dependent variable individually; simple regression; and, 3) overall influence of the independent variables on the dependent variable; multiple regression. The research paper concludes with recommendations, which could increase the overall performance of companies in Malta. The research used data from about 80% or even more, of the total number of companies in Malta. Nevertheless, due to limited resources constraints, the researchers decided to limit the study to only three companies for a period of five accounting years.

Keywords: Determinants of Profitability, Company Performance, Stock Exchange, Factors Which Affect the Profit.

Introduction

The core mission of companies is to generate profits for its shareholders. Effective governance structures and flexible decision-making allow companies to create consistent profit margins. The yearly margins for successful companies are better to be compared favorably to their past outcomes and to business procedures. Profitable companies give attention to both revenue and expenditures. They fulfill consumer requirements and produce quality products or services consistently and promptly. From the word go, expenditures are considered actions that decrease profit of companies. However, there are some key expenditure, which are meant to have a long-lasting positive impact on the profit of a company, like research, advertising and other marketing activities.

The sustainable rate of growth is the rate of progress that every company need to pay critical attention to, whenever they consider generating profit in the long term. Being profitable, businesses stand a chance to remain in operation, face competition and enlarge its investments and activities.

Literature Review

In a competitive marketplace, to achieve a satisfactory level of profitability is better to go directly to business owners. The profitability of a company shows a company's ability to generate earnings for a certain period at a rate of sales, assets and certain of capital stock (Margaretha, Supartika, 2016). Profitability is the ratio to measure the performance of the company. Understanding the determinant profitability is the key factors that helps managers in developing an effective profitability strategy for their company (Gitman, Zutter, 2012). According to Yazdanfar (2013), one of the importance preconditions for long-term firm survival and success is firm profitability. The achievement and other financial goals of the firms are significantly affected by the profitability determinant of the firm

(Margaretha, Supartika, 2016). Bahyahi (2010) analyzed factors that influence the competitiveness of cement firms in India from 2001 to 2008. His findings showed that liquidity, operating ratio, inflation, company size and interested rate were the major determinants of cement companies in Indian. Boadi (2013) established a positive correlation between profitability and liquidity. Purcărea and Stancu (2008) revealed the existence of correlation between company performance and intangible assets using several models. Elsiefy (2013) and Moşteanu (2017, 2018) examined the determinants of profitability of industrial banks in Qatar and UAE, and determined evidence of a sturdy relationship between liquidity and profitability for Islamic banks. Innocent et al. (2013) investigated the profitability of companies in the pharmaceutical industry in Nigeria from a 10-year period. Their findings proved an inverse relationship between profitability and each of the independent variables used; total assets turnover ratio, creditor's velocity and debt turnover ratio. Al-Jafari and Alchami (2015) tested the profitability of Syrian banks and their findings showed a significant influence of credit risk, bank size and management efficiency on profitability of banks in Syria. A study by Zaid, Ibrahim and Zulqernain (2014) tested the profitability for companies in Malaysia. Based on their research, they came out with a positive relationship between profitability and liquidity but a negative relationship with capital structure. Al-Jafari and Samman (2015) tested the profitability of companies listed on the Muscat security market from 2006 to 2013. Their research concluded that efficiently managed assets have a positive relationship on profitability of growing firms.

Research Methodology

Theories propounded by researchers in the area of finance over the past years

In the specialized literature, there are five theories of profit. The present work paper will focus on two of them: Frictional Theory of Profit, and Managerial Efficiency Theory of Profits. According to the Frictional Theory of Profit explains the shocks which occurs in each economy where there is changes in product demands. According to this, there exists a normal rate of profit, which is a return on capital that must be paid to the owners, as a reward for saving and investment of their funds rather than to consume all their income or hoard them. In effect, companies in this economy may be faced with a positive or negative profit, as a result of disequilibrium condition. Managerial Efficiency Theory of Profits recognizes that some companies are more efficient than others are, in terms of productive operations management and effectively meeting the wants of consumers.

Methods used in Research Analyses

The research was centered on only three well-performing companies in Malta. The researchers used a 5-year financial data from these companies, which ranges from 2014 to 2018. These financial data were taken from the Malta Financial Services Authority (M.F.S.A), which was duly acknowledged by the researchers. The researchers also employed the use of Excel and Stata 14, which is one of the most powerful statistical software, for its analysis. Regression Analysis or Models were thoroughly used for this project. There were other descriptive statistical tools used to back our findings: Line Graph, Correlation Matrix, Correlation Coefficient and F-Statistics. This study employed the convenient sampling technique to gather data of a total observation of 60. There was a total of six variables executed by the researchers, one dependent variable: Net Profit Before Tax, and the other five independent variables: Revenue, Operational Expense and Sustainable Growth Rate, Retained Earnings and Stockholder's Equity. The authors employed the Regression to determine the influence the independent variables have on the dependent variable, as well as its magnitude in their impact.

The model is as following:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + ... + bnXn + e$$

Where:

Y = dependent variable, A = intercept e = error term
$b_1, b_2, b_3 ... bn$ = coefficients, $X_1, X_2, X_3, ..., Xn$ = independent variables

Hypotheses

In order to find out which factors have a significant impact on company's profitability, the research used the following hypotheses:

Ho: There is no significant difference between Net Profit and Revenue
Ha: There is significant difference between Net Profit and Revenue

Ho: There is no significant difference between Net Profit and Operational Expense
Ha: There is significant difference between Net Profit and Operational Expense

Ho: There is no significant difference between Net Profit and Sustainable Growth Rate
Ha: There is significant difference between Net Profit and Sustainable Growth Rate

Ho: There is no significant difference between Net Profit and Retained Earnings
Ha: There is significant difference between Net Profit and Retained Earnings

Ho: There is no significant difference between Net Profit and Stockholder's Equity
Ha: There is significant difference between Net Profit and Stockholder's Equity

Ho: There is no significant prediction of Net Profit by Revenue, Operational Expenses and Sustainable Growth Rate.

Ha: At least one of the predictive variables; Revenue, Operational Expenses, Retained Earnings or Sustainable Growth Rate, belongs to the model.

Data Analyses

This section thoroughly explores, analyses and reports the financial data collected from the Malta Financial Service Authority regarding three companies in Malta, namely GO Mobile, HSBC Bank and Farson Limited.

From Figure no.1, comparing the profit before tax of the three companies, it could be seen that HSBC Bank recorded the highest over the year followed by GO Mobile and Farson had the least. From 2014 to 2018, Revenue for HSBC Bank decrease consistently over the years whereas both GO Mobile and Farson constantly increased over the period as shown in Figure no.2. Operational Expense was extremely highly and hovered around Euro 12,000,000 for the given period. However, GO Mobile recorded the least among the three companies whereas Farson operational expense fell in between two companies as shown in Figure no.3.

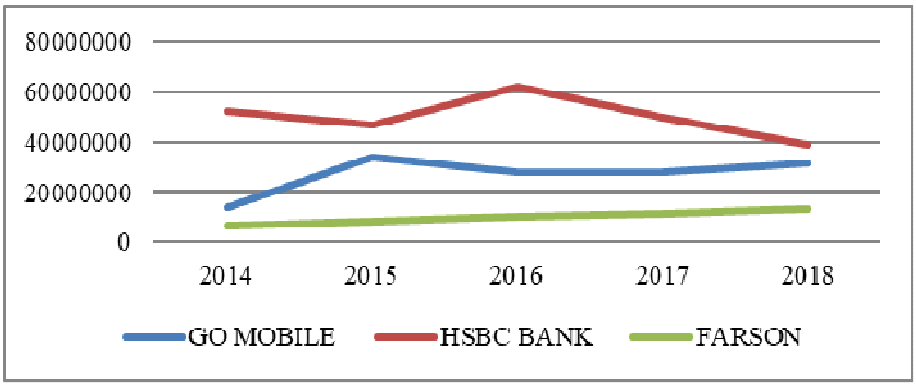

Figure 1: Profit before Tax, during the period 2014-2018, Source: Excel computing data

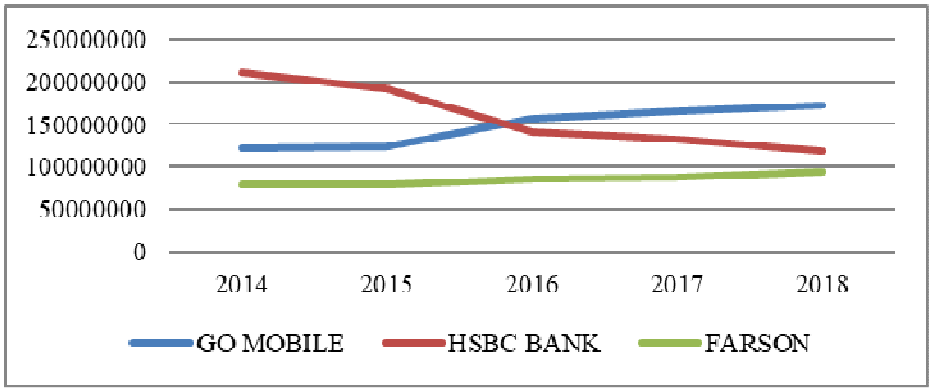

Figure 2: Revenue movements during the period 2014-2018, Source: Excel computing data

Retained Earnings for HSBC Bank was high as Euro 300,000,000 as at 2014 and maintained it over the four-year period. Meanwhile GO Mobile and Farson were both retained earnings as low as Euro 40,000,000 for the years analyzed, which can be seen in Figure no.4.

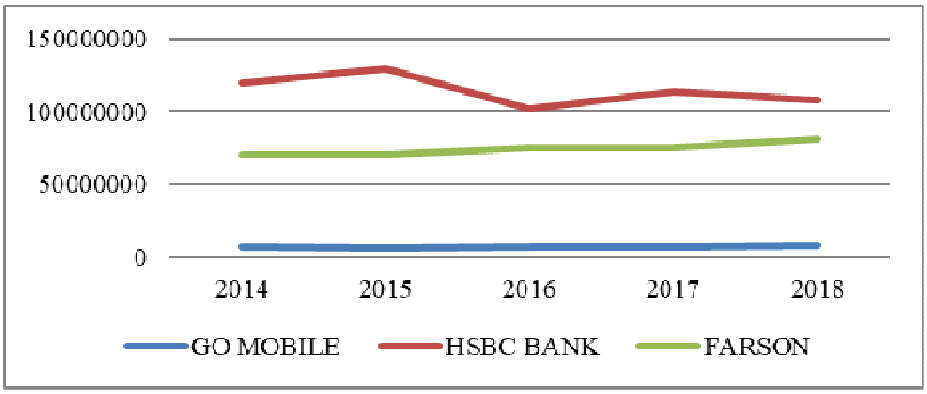

Figure 3: Operational expenses during the period 2014-2018, Source: Excel computing data

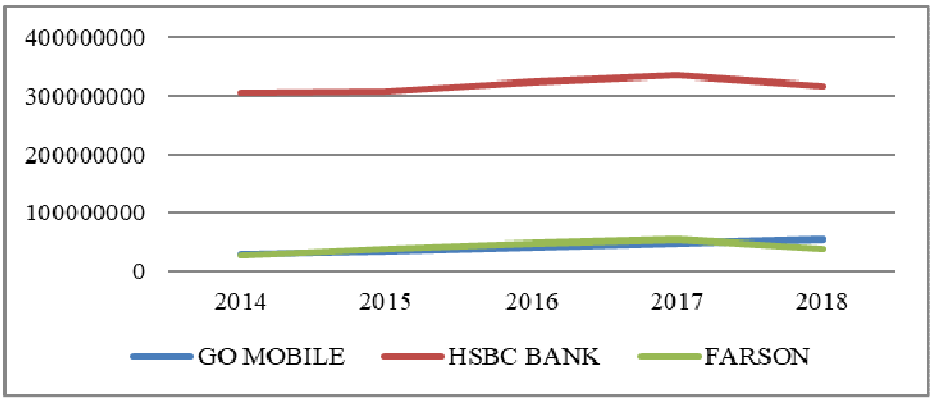

Figure 4: Retained earning registered during the period 2014-2018, Source: Excel computing data

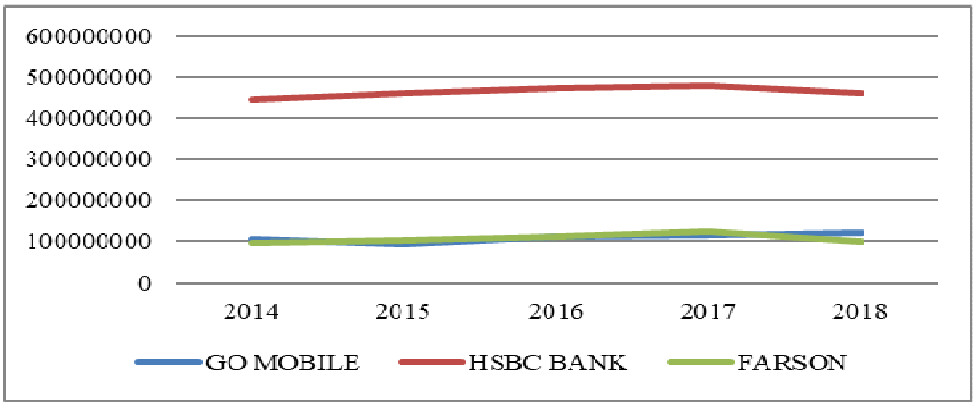

Figure 5: Stockholder's equity evolution during the period 2014-2018, Source: Excel computing data

HSBC Bank kept a Stockholder's Equity value around Euro 500,000,000 for the 4-year while GO Mobile and Farson both maintained a stockholder's equity around Euro 100,000,000 for the 4-year period from Figure no.5. From the table no.4.2, there is a high correlation between Stockholder's Equity and Retained Earnings. The researchers drop these two variables because of the assumption of multicollinearity when performing the ANOVA test.

Table 4.1: Summary of Descriptive Statistics

Variables	MEAN	MAX	MIN	S.D
Profit before tax	29008800	62221000	6875000	18082173
Revenue	130931200	210468000	78337000	41942692
Operational expenditure	65405000	129243000	6315000	46338211
Retained earnings	133550800	334516000	28155000	134946596
Stockholders' equity	225496267	479038000	92097000	174567472
Sustainable growth rate	0.4863439	0.6983079	0.278337	0.1534119

Source: Descriptive Statistics Results Using Excel

Table 4.2: Correlation Matrix

	profit~x	revenue	operat~p	retain~s	stockh~y	sustai~e
profitbefo~x	1.0000					
revenue	-0.7917	1.0000				
operationa~p	-0.5023	0.3344	1.0000			
retainedea~s	0.5914	-0.8573	-0.3655	1.0000		
stockholde~y	0.5988	-0.7593	-0.4320	0.9733	1.0000	
sustainabl~e	0.6311	-0.9637	-0.2093	0.9237	0.8200	1.0000

Source: Correlation Matrix Using STATA14

Table 4.3: Regression Analysis Profit before Tax and Revenue

```
. regress profitbeforetax revenue

      Source |       SS           df       MS      Number of obs   =         5
-------------+----------------------------------   F(1, 3)         =      5.04
       Model |  2.8143e+13         1  2.8143e+13   Prob > F        =    0.1105
    Residual |  1.6753e+13         3  5.5844e+12   R-squared       =    0.6268
-------------+----------------------------------   Adj R-squared   =    0.5025
       Total |  4.4897e+13         4  1.1224e+13   Root MSE        =    2.4e+06

------------------------------------------------------------------------------
profitbefo~x |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     revenue |   -.727968   .3242748    -2.24   0.110    -1.759955    .3040193
       _cons |   1.24e+08   4.25e+07     2.93   0.061    -1.08e+07    2.59e+08
------------------------------------------------------------------------------
```

Source: Linear Regression Using STATA14

Table 4.4: Regression Analysis for Profit before Tax and Operational Expense

```
. reg profitbeforetax operationalexp

      Source |       SS           df       MS      Number of obs   =         5
-------------+----------------------------------   F(1, 3)         =      1.01
       Model |  1.1326e+13         1  1.1326e+13   Prob > F        =    0.3885
    Residual |  3.3571e+13         3  1.1190e+13   R-squared       =    0.2523
-------------+----------------------------------   Adj R-squared   =    0.0030
       Total |  4.4897e+13         4  1.1224e+13   Root MSE        =    3.3e+06

------------------------------------------------------------------------------
profitbefore~x |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
operationalexp |  -.6604923   .6565398    -1.01   0.389    -2.749895     1.42891
         _cons |   7.22e+07   4.30e+07     1.68   0.191    -6.45e+07    2.09e+08
------------------------------------------------------------------------------
```

Source: Linear Regression Using STATA14

Table 4.5: Regression Analysis for Profit Before Tax and Retained Earnings

```
. reg profitbeforetax retainedearnings

      Source |       SS           df       MS      Number of obs   =         5
-------------+----------------------------------   F(1, 3)         =      1.61
       Model |  1.5705e+13         1  1.5705e+13   Prob > F        =    0.2935
    Residual |  2.9192e+13         3  9.7307e+12   R-squared       =    0.3498
-------------+----------------------------------   Adj R-squared   =    0.1331
       Total |  4.4897e+13         4  1.1224e+13   Root MSE        =    3.1e+06

------------------------------------------------------------------------------
 profitbeforetax |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-----------------+------------------------------------------------------------
retainedearnings |   .1988473   .1565228     1.27   0.294    -.2992781    .6969728
           _cons |    2452580   2.10e+07     0.12   0.914    -6.42e+07    6.91e+07
------------------------------------------------------------------------------
```

Source: Linear Regression Using STATA14

Table 4.6: Regression Analysis for Profit Before Tax and Stockholder's Equity

```
. reg profitbeforetax stockholderequity

      Source |       SS           df       MS      Number of obs   =         5
-------------+----------------------------------   F(1, 3)         =      1.68
       Model |  1.6096e+13         1  1.6096e+13   Prob > F        =    0.2860
    Residual |  2.8801e+13         3  9.6003e+12   R-squared       =    0.3585
-------------+----------------------------------   Adj R-squared   =    0.1447
       Total |  4.4897e+13         4  1.1224e+13   Root MSE        =    3.1e+06

------------------------------------------------------------------------------
 profitbeforetax |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-----------------+------------------------------------------------------------
stockholderequity |   .2028149   .1566343     1.29   0.286    -.2956652    .7012951
           _cons |  -1.67e+07   3.53e+07    -0.47   0.668    -1.29e+08    9.58e+07
------------------------------------------------------------------------------
```

Source: Linear Regression Using STATA14

Table 4.7: Regression Analysis Profit Before Tax and Sustainable Growth Rate

```
. reg profitbeforetax sustainablegrowthrate

      Source |       SS           df       MS      Number of obs   =         5
-------------+----------------------------------   F(1, 3)         =      1.99
       Model |  1.7881e+13         1  1.7881e+13   Prob > F        =    0.2536
    Residual |  2.7016e+13         3  9.0054e+12   R-squared       =    0.3983
-------------+----------------------------------   Adj R-squared   =    0.1977
       Total |  4.4897e+13         4  1.1224e+13   Root MSE        =    3.0e+06

------------------------------------------------------------------------------
      profitbeforetax |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
----------------------+-------------------------------------------------------
sustainablegrowthrate |   5.05e+07   3.59e+07     1.41   0.254    -6.36e+07    1.65e+08
                _cons |    4439141   1.75e+07     0.25   0.816    -5.12e+07    6.01e+07
------------------------------------------------------------------------------
```

Source: Linear Regression Using STATA14

Table 4.8: Multiple Regression for Profit before Tax, Revenue, Operational Expenses and Sustainable Growth Rate

```
. regress profitbeforetax revenue operationalexp sustainablegrowthrate

      Source |       SS           df       MS      Number of obs   =         5
-------------+----------------------------------   F(3, 1)         =      2.27
       Model |  3.9158e+13         3  1.3053e+13   Prob > F        =    0.4453
    Residual |  5.7389e+12         1  5.7389e+12   R-squared       =    0.8722
-------------+----------------------------------   Adj R-squared   =    0.4887
       Total |  4.4897e+13         4  1.1224e+13   Root MSE        =    2.4e+06

------------------------------------------------------------------------------
      profitbeforetax |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
----------------------+-------------------------------------------------------
              revenue |  -2.299732   1.429989    -1.61   0.354    -20.46946       15.87
       operationalexp |  -.0525342   .5583762    -0.09   0.940    -7.147376    7.042308
sustainablegrowthrate |  -1.43e+08   1.20e+08    -1.19   0.444    -1.67e+09    1.38e+09
                _cons |   4.03e+08   2.28e+08     1.77   0.328    -2.50e+09    3.30e+09
------------------------------------------------------------------------------
```

Source: ANOVA using STATA14

Findings and conclusions

The conducted analyze shows the regression result for Profit before Tax and Revenue (Table no.4.3). It has a p-value of 0.110 which is greater than 0.05 hence the Null Hypothesis failed to be rejected meaning there is no significant difference between Profit before Tax and Revenue. Furthermore, there results showed that there is a negative relationship between Profit Before Tax and Revenue, which means if companies in Malta concentrate on making huge revenue there is a corresponding negative impact (-0.727968) on their Profit Before Tax hence Revenue shouldn't be taken in consideration when a company would like to make profit in Maltese Economy.

Table no.4.4 demonstrates results of a linear regression between dependent variable Profit before Tax and independent variable Operational Expenses. According to the results, a p-value of 0.389 which is greater than 0.05 indicates that the Null Hypothesis failed to be rejected. Therefore, there is no significant difference between Profit before Tax and Operational Expenses. It further proved that there exists a negative relationship between Profit before Tax and Operational Expenses of (-0.6604923).

Table no.4.5 reveals the regression results for Profit before Tax and Retained Earnings. With 5 percent margin of error, there was a p-value of 0.2935 which is obviously greater than 0.05 and hence the Null Hypothesis failed to be rejected whereas the Alternative Hypothesis is rejected. In the results, there was a positive relationship between Profit before Tax and Retained Earnings. Which means that for every additional 1 Euro of Retained Earnings by companies in Malta, there exists an average increase of 0.1988473 of their Profit Before Tax.

Regression Analysis results for Profit before Tax and Stockholder's Equity can be referred to Table no.4.6 where p-value recorded 0.2860, which is greater than the usual 5 percent margin of error. Again, the Null Hypothesis failed to be rejected per the results and there exists a positive correlation between Profit before Tax and Stockholder's Equity.

Table no.4.7 also depicts regression analysis result for Profit before Tax and Sustainable Growth Rate. A p-value of 0.2536 was recorded and a coefficient of 5.05e+07. This result means there is no significant difference between Profit before Tax and Sustainable Growth Rate. However, for every additional unit of Sustainable Growth Rate, there will be 5.05e+07 increase in Profit before Tax.

Finally, Table no.4.8 shows the overall regression analysis with one dependent variable Profit before Tax and three independent variables: Revenue, Operational Expenses and Sustainable Growth Rate. Two of independent variables; Retained Earnings and Stockholder's equity, were eliminated due to multicollinearity.

After all analyses conducted, the research may conclude that, according to the regression analysis, among the six independent variables used, the Sustainable Growth Rate has a better impact on companies' profits in Malta.

Recommendations

After all research conducted and its findings, the authors come with recommendations which may be taken as possible solutions to improve the financial management in order to increase the company's profitability. In this respect, financial managers of Maltese companies are highly recommended to take up activities that will either maintain or expand their company's sustainable growth rate, if they really want to make profit. This is because of the positive relationship between Sustainable growth rate and profit before tax.

The following suggestions may lead to the improving Sustainable growth rate: 1) Maintaining a target capital structure without issuing new equity. Capital Structure is a careful balance between debt and equity which a business uses to finance its activities. Dilution of ownership is what investors dislike, on the other extreme; too much of borrowing also has implications on company's performance. The need to balance both equity and debt is very essential in improving Sustainable growth rate of companies. 2) Increase sales as rapidly as market conditions allow. Managements need to craft a sales strategy that would capitalize on any opportunity that emerges from that market. In effect, companies tend to be market leaders in their specific industries and hence profits are been generated since they then have less competitors. 3) Maintain a target dividend payment ratio. Dividend payment ratio provides a measure on how much money a company is giving to shareholders against amount retained by the company for reinvestment. Managements are supposed to maintain its target dividend payment ratio.

Being aware about the weight of sustainable growth rate is crucial for any financial management. Calculating the sustainable growth rate is important, it has a high impact on company's profitability, and it helps to make decisions regarding investments and the future of its business.

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Management Accounting Systems, Task Uncertainty and Managerial Performance in Small and Medium Enterprises

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Abstract

This research examined the mediating role of broad scope management accounting system (MAS) information usage on the direct association between task uncertainty and managerial performance in Jordanian small and medium enterprises (SMEs). Related literatures were reviewed to develop the theoretical framework. Data were collected using survey distributed to managers/owners of Small and Medium Jordanian Enterprises. The collected data were analysed using Smart-PLS to examine the validity and reliability first, then, to examine the research hypotheses. The results support the mediating effect of broad scope MAS information used, and results reported a negative effect for task uncertainty and a positive effect for MAS information usage on managers' performance. This study contributes to the body of knowledge in accounting in the context of developing countries.

Keywords: Management Accounting Systems, Task Uncertainty, Managerial Performance, Small and Medium Enterprises

JEL: M41

Introduction

Small and medium enterprises (SMEs) are currently a subject of interest among academicians and practitioners (Lind, 2013). Indeed, SMEs are increasingly viewed as significant contributors to the worldwide economy while also being significant creators of employment (Curado, 2018; Krishnan & Scullion, 2017). As reported by the SME survey in the UN Global Compact (2004), SMEs comprise more than 90% of businesses and on average account for 50–60% of national employment in the context of developing economies. SMEs in Jordan, for example, make up more than 85% of total firms and nearly three-quarters (76%) of overall employment in the country (USAID, 2017). However, in emerging countries, Tatoglu et al. (2016) stated that SMEs face obstacles in achieving a sustained competitive advantage. Furthermore, Lopez-Nicolas and Soto-Acosta (2010) reported that today's economic environment, which is characterized by competitive intensity, rapid technological change and globalization, has intensified the pressure on SMEs' management. The performance of SMEs is affected by the quality associated with managers' strategic decisions (Zacca, Dayan, & Elbanna, 2017). Meanwhile, the business environment today is dynamic in nature, compelling managers to use numerous instruments in an attempt to improve the performance and effectiveness of the organization (Bureš & Racz, 2016). As an indicator of managers' success in attaining goals, managerial performance is among the most prominent key performance indicators requiring improvement over time (Zenita et al., 2015). Improving managerial performance requires that a sophisticated information system that provides managers with sufficient and important business information be established and implemented (Bouwens & Abernethy, 2000; Chung & Su, 2012; Ghasemi et al., 2016). In this regard, MASs assist managers in their access to and use of the information needed to attain the firm's objectives, which in turn will improve their managerial performance

(Chung & Su, 2012). In general, MASs provide useful information to managers (Novas, Alves, & Sousa, 2017). MASs comprise reports, performance measurement indicators, and other information systems needed, for example, for budgeting, planning, forecasting, and the preparation and review of managerial accounting information (Heidmann, Schäffer, & Strahringer, 2008). As indicated in the work of Chong and Eggleton (2003), the information that MAS provides is of two types: narrow-scope information and broad scope information. Specifically, narrow-scope information comprises historical financial data that are primarily linked to matters within the organization. By contrast, broad scope information may comprise ex-post financial accounting data, market volume, economic indicators, costing data, pricing strategies, customer preferences, and customer levels of satisfaction. The provision of broad scope information commonly generates ex-ante information pertaining to future prospects, such as new technologies and customer needs, which, according to Cheng (2012), may generate a significant effect on the competitiveness of organization and eventually the organization's overall potential performance.

In contemporary business environments, managers need more strategic information; such information is generally ex-ante rather than ex-post (Ghorbel, 2017). In this regard, a number of researches have tested the association between MAS and corporate performance (e.g., Al-Mawali, 2013; Chenhall & Morris, 1986; Gordon & Narayanan, 1984; Mia & Chenhall, 1994). In this study, broad scope MAS has been chosen considering the potential importance reported in the work of Mia and Chenhall (1994, p. 2) of the breadth of the scope in the facilitation of the decision-making process (Chenhall & Morris, 1986; Gordon & Narayanan, 1984; Larcker, 1981; Nguyen et al., 2017). In fact, managers in contemporary business settings, which are usually characterized by levels of uncertainty and complex technology, need more information to grasp certain components of the operating context (Gordon & Narayanan, 1984). The majority of empirical works addressed only one characteristic of MAS, most often the broad scope. Ghasemi et al. (2016) argued that a broad scope was the most vital among the characteristics of MAS.

Furthermore, past works have discussed the primary role of MAS in supporting managerial growth, especially among SMEs, as shown in Garengo and Sharma (2014) and Jardioui, Garengo, and El Alami (2017). However, as reported in Bourne (2005), a considerable number of implementation initiatives have failed. Furthermore, Bouwens and Abernethy (2000) pointed to the inadequacy of awareness about the antecedent conditions impacting MAS information. This is an issue because an MAS requires awareness of the applicable antecedent variables that may lead to certain MAS information within an organization.

Pervious related studies have conceptualized MAS as either a predictor variable (Agbejule, 2005; Chong & Eggleton, 2003; Mia & Patiar, 2001) or a criterion variable (Emsley, 2005). Few studies have examined MAS in terms of its mediating role (Cheng, 2012; Ghasemi et al., 2016). It is thus important to focus on the mediating effect of MAS in more detail in a different context, specifically in the context of SMEs in developing countries. A pertinent question is whether MAS information in reality contributes to understanding the linkage between task uncertainty and managerial performance in SMEs in Jordan. This article progresses as follows. The next section highlights the hypotheses and theoretical framework developed within the context of SMEs. The three ensuing sections provide the details of the research methods. Then, the resulting analysis of the statistical tests is presented, and the findings are discussed. This study concludes by elaborating the implications of the findings. Directions for future research are also highlighted in the last section.

Literature Review and Hypotheses Development

Task Uncertainty, Broad Scope MAS Information and Managerial Performance

Galbraith (2007) noted the prominence of task uncertainty. Galbraith stated that a higher level of task uncertainty requires decision makers to process more information during the execution of a task to attain the sought-after performance level. The task uncertainty level comprises a mixture of output diversity, the

variety of capabilities, and the extent of the target obstacle. As the differing variables become more multifaceted, Dibrell and Miller (2002) mentioned the need to make the applicable information available to decision makers. In support of this, the empirical outcome of Specht (1986) proves that less analysable tasks that are complicated and non-routine require less detailed information and greater information processing (e.g., broad scope MAS information) unlike tasks that are simple and routine.

Bouwens and Abernethy (2000) mentioned the necessity of awareness of the pertinent antecedent variables that may have generated certain MAS information within an organization. Accordingly, there appears a solid relationship between task uncertainty and one dimension of MAS information "aggregation" (Soobaroyen & Poorundersing, 2008). As indicated in the work of Richards et al. (2017), the multifaceted processes with high task uncertainty lead to higher information needs. However, the current study considers task uncertainty to be an independent variable instead of a moderating variable and investigates the potential effects of the level of MAS information usage by managers/owners on the association between task uncertainty and managerial performance.

When managers face a low level of task uncertainty, they need less sophisticated management accounting information for decision-making (Chong, 2004), as the decision environment is fairly simple to interpret. Refined reports released by management accounting can reduce uncertainty and improve decisions, which, according to Gul (1991) and Chong (1996), will eventually improve their managerial performance. As argued in an earlier study by Tushman and Nadler (1978), it is possible to launch and utilize pre-set standards and policies for task execution when task uncertainty is relatively low. Then, through awareness of the set standards and policies, it becomes easier for managers to execute their tasks. In this situation, managers have a lower need to obtain and process extra information. By contrast, managers who utilize more strategic management accounting information such as broad scope MAS information when task uncertainty is relatively low may confront information overload (Zarzycka et al., 2017), which can eventually negatively affect their performance. As stated by many studies (e.g., Chong, 1996; Gul & Chia, 1994), information overload negatively affects managerial performance.

The impact of task uncertainty on performance is a popular management topic. In particular, Kim and Burton (2002) reported that almost all studies have been executed in accordance with contingency theory. As explained in the works of Donaldson (1999) and Lawrence and Lorsch (1986), contingency theory posits that the best manner for organizing hinges on factors including task uncertainty, environmental uncertainty, technology, and size. In regards to the association between task uncertainty and managerial performance, it is likely that managers who are unclear on their role expectations will be hesitant and will not take the initiative because they are uncertain and therefore demonstrate low performance (Kim & Burton, 2002). Thus, the hypotheses below are to be tested;

> **H1a**: A higher level of task uncertainty is positively linked to a higher utilization of broad scope MAS information by managers.
> **H1b**: Higher levels of task uncertainty are associated with declining levels of managerial performance.

Broad Scope MAS Information and Managerial Performance

Management accounting is a crucial area within the management process because it links to the provision and utilization of financial and operational information to the organization's managers for making decisions, planning, and control. MASs that are well constructed and fit help managers to become more effective by supporting decisions. The information provided by MASs helps the survival of organizations within a competitive environment, as the information can be used by the organization in planning, controlling, monitoring and making decisions. Information from MASs helps managers make more good decisions, and in turn, performance will improve (Mia, 1993). The extensive utilization of MAS improves performance, as confirmed by previous research (e.g., Chenhall & Morris, 1995; Ismail, Isa, & Mia, 2018).

The availability of expansive information encourages managers in extreme competition to apply this information to further intensify the ability of their respective organizations to seize on opportunities for success (Wang, 2003). Additionally, information that is fast and frequent facilitates the making of correct decisions by executives, allowing them to seize lucrative opportunities and improve the performance of their firm. The premise is that information that is all-encompassing, predicting, external, non-financial, fast and frequent contributes to the performance of those companies that operate in an environment that is competitive even if not turbulent (Gul, 1991; Mia, 1993; Daoud & Triki, 2013). Chia (1995) has confirmed the association between MAS information's characteristics (including broad scope, timeliness, aggregation, and integration) and managerial performance. This relationship was also investigated by Mia and Chenhall (1994). The proposition, in their study, was that activity differentiation into fields including marketing and production becomes the response of an organization in an uncertain business environment. Their study's results confirmed the impact of broad scope MAS information usage and performance for two groups of managers: marketing managers and production managers (Al-Mawali. 2015;Soobaroyen & Poorundersing, 2008).

As explained by several authors (e.g., Ansari, Bell, & Klammer, 2004; Gordon & Narayanan, 1984; Ismail et al., 2018), broad scope MAS entails ex-ante information with various characteristics including quantitative and qualitative, internal and external, historical and future-orientated, and financial and non-financial data. Among the examples are sales growth, revenues, revenue, cost, capacity usage, wastage, government policy, customer satisfaction, and product quality. Arguably, managers' use of MAS information has a positive linkage to their performance. The information's breadth can provide feedback on a multitude of factors, including wastage, costs, slack resources, set up and processing time, sales growth, and customer satisfaction. These types of data, as mentioned by Balakrishnan, Linsmeier, and Venkatachalam (1996), firms to reach their objectives. As argued by past works, managers utilize MAS information because it improves their decision quality, accelerates the learning process, helps with performance assessment, and helps with the monitoring of the operational environment (Mia, 1993; Mia & Winata, 2008). The core interest of the current research is broad scope MAS information, as it is important for governing and decision-making in SME settings. The business environment today is highly competitive and tumultuous. Hence, managers' performance is dictated by their capacity to make decisions that are both effective and timely. For such an environment, it is more useful to have MAS information with a broader scope. Nevertheless, limited studies have looked into the relationship between the level of usage of broad scope MAS information and manager's performance within the setting of SMEs in developing countries. Thus, hypothesis two addresses the abovementioned relationship.

> **H2**: The higher managers' usage of broad scope MAS information is, the better their managerial performance.

Task Uncertainty, Broad Scope MAS Information and Managerial Performance

High task uncertainty indicates that the information available to complete the task at hand is inadequate. In part, MASs can fill the gap between available and required information by providing information that allows managers to understand the present situation. In turn, managers could achieve the best decisions for the company. A review conducted on MAS shows that traditionally, the fit between task uncertainty and the usefulness of MAS (considering scope only) has a positive effect on performance (Mia & Chenhall, 1994; Chong, 1996, 2004; Chong & Eggleton, 2003). As evidenced by the results, high (low) task uncertainty has a correlation with high (low) scope, leading to better performance.

The direct association between task uncertainty and broad scope MAS and the positive impact of MAS on performance have been discussed earlier in this study. Relevantly, it has been theorised that if task uncertainty has a correlation with MAS, MAS also has a correlation with performance, and then, by way of MAS, task uncertainty impacts performance (Chang & Chang, 2003). Furthermore, Soobaroyen and Poorundersing (2008) reported the direct impact of task uncertainty on MAS and MAS on performance.

The authors also mentioned the presence of an indirect impact of task uncertainty on managerial performance by way of MAS. Additionally, when task uncertainty is high, managers should use more broad scope information as a way to address the complexities of the decision-making environment (Chong & Eggleton, 2003). Hence, based on the above discussion and supported by the assumptions of contingency theory, it can be assumed that the level of broad scope MAS information usage by managers/owners plays an intervening role in the linkage between task uncertainty and managerial performance. Accordingly, H3 is presented;

> **H3**: The level of broad scope MAS information usage mediates the association between task uncertainty and managerial performance.

Methodology

Sample

350 companies operating in Amman and Jordan were invited online to participate in the survey. Owners/managers of these companies were provided with the questionnaire via email, the addresses of these owners/managers having been obtained from the companies' homepages. After the initial email, reminder emails were sent. Ultimately, 129 usable questionnaires (36.8% response rate) were obtained. The questionnaire had a letter attached requiring that the survey be personally completed by the owner/manager only. In other words, no other person should answer it. To prepare the data for initial processing, first, an analysis of missing data was executed, resulting in the elimination of seven cases. In particular, some respondents did not respond to a substantial portion of the survey.

Measures

Task uncertainty: To measure task uncertainty, the current study applied a measurement developed and used by Daft and Macintosh (1981) containing 6 items. For each item, the participants were asked to evaluate the uncertainty level faced by their organizations when tasks are being executed. The scale used is a 7-point Likert scale ranging from 1, which implies "not at all", to 7, which implies "to a great extent". *Broad scope MAS information Usage:* To measure the level of MAS information usage, the current research used a measurement developed by Chenhall and Morris (1986) and Sharma, Jones, and Ratnatunga (2006) containing 6 items (see appendix A). The scale ranged from 1, which implies "never/seldom", to 7, which implies "usually/always".

Managerial performance: This measure is based on Mahoney, Jerdee, and Carroll (1965) and contains 8 sub-items as follows: coordinating, evaluating, investigating, negotiating, planning, representing, staffing, and supervising. The perceived performance of respondents is evaluated with this measure. A 7-point Likert scale is used that ranges from 1, which implies "well below average", to 7, which implies "well above average". In this context, the Cronbach's a value obtained for managerial performance was 0.945, which based on Sekaran and Bougie (2016) is well above the acceptable bound. Past accounting studies have extensively used this measure (Abernethy & Brownell, 1997; Sharma et al., 2006). This measure is thus used to improve the comparability of the outcomes of this study with previous works.

Results

The use of structural equation modelling (SEM) allows the empirical investigation of the associations between theoretical constructs. As explained by Nitzl and Chin (2017), SEM models and estimates the parameters for the linkages between theoretical constructs. In this context, SEM could be used to test theories relating to management accounting (e.g., Al-Mawali et al., 2018). With the use of SEM, it is possible to provide an intuitive graphical representation of theory. In addition, factor analysis, path analysis

and regression represent special cases of SEM (Hair et al., 2014). This study employed SEM to test the proposed research model. For this purpose, partial least squares (PLS) and SMART-PLS software version 3.2.7 were used.

Measurement Model

The measurement model was tested in order to determine the internal consistency reliability, convergent validity and discriminant validity of the constructs. Internal consistency reliability measures the level to which the items function as the measure of the latent constructs (Hair et al., 2014; Ramayah et al., 2016). Meanwhile, composite reliability was assessed as internal consistency measure (Hair et al., 2017). In order to be considered as satisfactory, the model of measurement with composite reliability should have value higher than the threshold value of 0.7, for each construct (Nunnally, 1978; Nunnally & Bernstein, 1994; Richter et al., 2016). Meanwhile, the results obtained in this study show that the composite reliability for each construct is greater than the cut-off value of 0.7. In particular, task uncertainty obtained a value of 0.913, broad scope MAS information obtained a value of 0.959, and managerial performance obtained a value of 0.957. All these values denote high internal consistency of the measures.

Meanwhile, convergent validity provides the measurement of the degree to which a measure is positively correlated with the alternate measures of the same construct (Hair et al., 2017). In convergent validity evaluation, outer loading of items and the average variance extracted (AVE) is checked. For the value of the outer loadings, Avkiran (2017) stated that it should be 0.70 at least, while the score of AVE should be 0.5 to be regarded as satisfactory. Furthermore, in the context of exploratory research, Hair et al. (2014, p. 101-102) stated that acceptable values range between 0.60 and 0.70, while satisfactory to good value ranges between 0.70 and 0.95.

According to Hair et al. (2017), indicators with weaker factor loadings should be retained if other indicators with high loadings can explain at minimum 50% of the variance (AVE=0.50). Accordingly, the outcomes obtained in this study demonstrate that except MP1 (*which was deleted*), the rest of the items demonstrated adequate outer loadings. Also, except MP1, the remainder of the constructs carry adequate AVE as follows: task uncertainty (0.637), broad scope MAS information (0.770) and managerial performance (0.786). All these values obtained confirm the convergent validity of the constructs. Table 1 presents the outcomes from internal consistency reliability and convergent validity tests.

Table 1: Measurement model

Construct	Items	Loadings	Cronbach's Alpha[a]	CR[a]	rho_A[b]	AVE[c]
Task Uncertainty	TU1	0.911	0.878	0.913	0.899	0.637
	TU2	0.903				
	TU3	0.888				
	TU4	0.919				
	TU5	0.895				
	TU6	0.800				
Broad Scope-MAS Information	BS-MAS1	0.851	0.950	0.959	0.958	0.770
	BS-MAS2	0.786				
	BS-MAS3	0.716				
	BS-MAS4	0.809				
	BS-MAS5	0.803				
	BS-MAS6	0.817				
Managerial Performance	MP2	0.894	0.945	0.957	0.955	0.786

	MP3	0.892				
	MP4	0.905				
	MP5	0.876				
	MP6	0.858				
	MP7	0.893				
	MP8	0.822				

Note: [a]CR and Cronbach's alpha values are greater than the recommended threshold value of 0.70 (Hair, Ringle, & Sarstedt, 2013; Henseler, Ringle, & Sinkovics, 2009; Wong, 2013).
rho_A = The most important reliability measure for PLS (Dijkstra & Henseler, 2015).
AVE = average variance extracted.

For the reflective constructs, the discriminant validity was determined using two criteria which are: the Fornell-Larcker criterion and the heterotrait-monotrait (HTMT) ratio (Henseler, Ringle, & Sarstedt, 2015; Voorhees et al., 2016). The criterion of Fornell-Larcker is fulfilled when the AVE square root of each LV is larger when compared to its correlation with other LVs (Hair et al., 2017). Table 2 presents the acceptable discriminant validity based on the Fornell-Larcker criterion. Also, in discriminant validity establishment, based on the suggestion by Henseler et al. (2015), the HTMT ratio should be 0.85 or 0.9 or less. As can be observed in Table 2, all LVs carry values of HTMT lower than 0.85. These demonstrate the tolerability of the constructs' discriminant validity.

Table 2: Discriminant validity based on Fornell-Larcker and HTMT criteria

Fornell-Larcker criterion			
	BS-MAS	MP	TU
BS-MAS	0.798		
MP	0.258	0.877	
TU	0.303	-0.193	0.887
HTMT criterion			
	BS-MAS	MP	TU
BS-MAS			
MP	0.275		
TU	0.303	0.198	

Note: BS-MAS = Broad scope MAS information, MP = Managerial performance, TU = Task uncertainty.

Structural Model

The evaluation of the structural model comprises the analysis of the predictive competencies of the model in addition to the associations between the constructs. In this regard, the structural model was assessed using the following: collinearity assessment, the algebraic symbol, the scale and significance of the structural path coefficients, R^2 values (variance explained), the f^2 effect size, and test of Q^2 (cross-validated redundancy) for predictive relevance (Hair et al., 2017; Roldán & Sanchez-Franco, 2012).

From the outcomes, broad scope MAS information and managerial performance carry significant R2 values of 0.192 and 0.248. The values of R^2 give support to the in-sample predictive power of the model (Sarstedt et al., 2014). Meanwhile, pertaining to the effect sizes f^2 for the relationship of structural model, task uncertainty highlights a respectively small and crucial effect size (0.101 and 0.095 respectively) on broad scope MAS information and managerial performance. Managerial performance shows a medium effect size of broad scope MAS information at 0.160.

In the model evaluation, blindfolding was also applied using the cross-validated redundancy index (Q^2) for the endogenous variables. Accordingly, Chin (2010) mentioned the aptness of this measure in scrutinizing the predictive relevance of a theoretical/structural model. According to Tenenhaus (1999), if Q^2 values obtained are greater than zero, it means that the model has predictive relevance. Accordingly, Table 3 shows that for each endogenous construct, the structural model demonstrates adequate predictive relevance.

The method of bootstrapping (5,000 subsamples, one-tailed significance) used in this study provides estimation of the parameter's statistical significance. Henseler et al. (2016) stated in producing 95% confidence interval, the percentile bootstrapping generated the exact result. Meanwhile, an interval without the value of zero means that its structural path coefficient is considerably distinct from zero, with the level of confidence of 95% (Castro & Roldán, 2015), which shows the significance of the path coefficient. As the results are demonstrating: task uncertainty (H1a, $\beta = 0.303$, $t = 2.869$, $p = 0.004$), and broad scope MAS information (H2, $\beta = 0.349$, $t = 3.399$, $p = 0.001$). These values demonstrate their significant positive linkage with managerial performance. In addition, for task uncertainty the values obtained (H1b, $\beta = -0.299$, $t = 4.484$, $p = 0.000$) shows its significant negative relation to managerial performance. Hence, H1a, H1b and H2 were supported.

Table 3: Hypotheses Testing (direct effects)

Structural path	Path coefficient and (T-Statistics)	Percentile 95% confidence intervals		P-Values (0.05)	Effect size (f^2)	Conclusion
		95% LL	95% UL			
H1a: TU -> MAS	0.303 (2.869)	(0.075 ; 0.480)		0.004	0.101	*Supported*
H1b: TU -> MP	-0.299 (4.484)	(-0.440 ;-0.175)		0.000	0.095	*Supported*
H2: MAS -> MP	0.349 (3.399)	(0.136 ; 0.520)		0.001	0.160	*Supported*
R^2 Broad scope MAS information = 0.192; **Q^2** Broad scope MAS information = 0.147 **R^2** Managerial performance = 0.248; **Q^2** Managerial performance = 0.201						

Mediation Effect

The role of mediating MAS tested via H3, for this purpose, a non-parametric bootstrapping Mediation analysis tested H3 (Broad scope MAS mediates the relationship between task uncertainty and managerial performance). For the purpose, a non-parametric bootstrapping method was applied in order to evaluate the mediating impact particularly with respect to its significance (Hair et al., 2016). Bootstrap confidence interval method was applied replacing the mediation tests of Baron and Kenny (1986) due to its superiority (see Cole, Walter, & Bruch, 2008; Preacher & Kelley, 2008, 2011). Under this approach, the mediated effect is statistically significant if the 95 % confidence intervals do not span zero (Williams et al., 2017). Bootstrapping is the most solid and reasonable method to attain the bounds of confidence for certain indirect effects under nearly all circumstances (Preacher & Kelley, 2008). At the same time, the outcomes generated by the additional analysis of PLS-SEM on the indirect effect of task uncertainty on managerial performance can be observed in Table 4. Nitzl et al. (2016) stated significant indirect effect $a \times b$ as the single mediation requirement. As can be construed by indirect effects outcomes: task uncertainty ($\beta = 0.106$, $t = 2.321$, $p = 0.021 < 0.05$, 95% confidence interval (CI): Lower Level (LL) = 0.012, Upper Level (UL) = -0.194) have significant indirect effects on managerial performance through broad scope MAS information. These attained values demonstrate support to H3.

Table 4: Test of mediation by bootstrapping approach

Hypothesis H3:	Path coeff. (a)	Path coeff. (b)	Path coeff. (a*b)	t-value	95% LL 95% UL	Path coeff.	VAF	Decision
TU->MAS->MP	0.303	0.349	0.106	2.321*	(0.012 ; 0.194)	-0.193	0.55	Partial mediation

Notes: *p < 0.05, TU= Task uncertainty, MAS= Broad scope MAS information, MP= Managerial performance.

VAF determines the extent to which the mediation process explains the dependent variable's variance (Cepeda, Nitzl, & Roldán, 2018).

Conclusion

The subject of management accounting has been popular among academics over the last few decades, but these studies only occasionally address transition economies. In particular, the majority of works focus on the financial accounting domain (Hopper, Tsamenyi, Uddin, & Wickramasinghe, 2009). Apart from that, MAS in the economies under study was less developed. Haldma and Lääts (2002) reported that MAS was still in its infancy at the start of the century, and there has not been much change. Hopper et al. (2009) added that within the context of transition economies as well as in less developed countries, MASs are still not adequately established.

For future work, the study framework can be applied to other domains, such as other companies, countries or even sectors. This will benefit decision makers at SMEs. Additionally, the relationships of the proposed model should be explored deeper. This will enrich understanding of the fundamentals that underpin these relationships while also bringing fresh insights into the knowledge reservoir. Although the current study has contributed to the management accounting area in developing countries, there are a number of limitations that need to be addressed in future research, the first being the survey's response rate, which was rather low. From a statistical perspective, the sample size seems adequate. However, taking into account the nature of the variables and the target respondents, there is an issue regarding generalization of the conclusions drawn. The second limitation pertains to the phenomenon under study; it is not fully or easily measurable even though this study has been able to accurately present the definition and construction of variables in accordance with the extant literature. This means that caution must be practised when making generalizations. Last, the focal point of this study was one aspect of MAS information, which was used to represent MAS information in the context of SMEs. However, it cannot be expected that this aspect represents the complexity of MAS information in its entirety. Hence, other aspects of MAS information should be analysed, as this could extend or relativize the findings of the study.

Nevertheless, despite the limitations discussed, through its scrutiny of the impact of task uncertainty and MAS information usage on managerial performance, the study enriches the present knowledge on MAS in Jordanian SMEs. There are crucial implications of this study for SME owners/managers; their approval of MASs in their firms will increase.

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Appendix A

MAS measurement:

Managers' use of broad scope MAS information measure.
The general managers were asked to indicate using the scale the extent to which they used the MAS information for their work-related decision-making.
Please cross one number on the scale below for your answer.
Not at all 1 2 3 4 5 6 7 To a great extent

1. To what extent do you use the MAS information (provided by your organisation's management accounting system) relating to your business unit's budgeted production, costs, wastage, defects, capacity utilisation, sales, inventory levels, and profits?

2- To what extent do you use the MAS information (provided by your organisation's management accounting system) on achievement of your business unit's budgeted production, costs, wastage, defects, capacity utilisation, market share, sales, inventory levels, and profits?

3. To what extent do you use the MAS information (provided by your organisation's management accounting system) related to your business unit's production activities such as output rates, scrap levels, machine efficiency?

4. To what extent do you use the MAS information (provided by your organisation's management accounting system) related to overall actual performance trend of your business unit and the industry?

5. To what extent do you use the MAS information (provided by your organisation's management accounting system) related to your business unit 's product markets such as customer preferences, market size, growth in market share, economic conditions, population growth, technological developments.

6. To what extent do you use the MAS information (provided by your organisation's management accounting system) related to your business unit's employee attitudes, labour relations, attitudes of government and consumer bodies, competitive threats.

The Relevance of Transport Infrastructure, Foreign Direct Investment, And Economic Growth. A Case from Tanzania

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Abstract

The paper investigated the relevance of transport infrastructure, foreign direct investment, and economic growth in Tanzania. Employing structural equation modeling (SEM), we observed transport infrastructure is correlated with both foreign direct investment and economic growth, while foreign direct investment is not associated with economic growth. This result implies the correlation between transport infrastructure and economic growth and transport infrastructure and foreign direct investment. Furthermore, the unidirectional rapport between foreign direct investment and economic growth was determined. Moreover, we suggested that for Tanzania to captivate more foreign direct investment and promote economic growth, the enormous development of transport infrastructure is required. Foreign direct investment influences the advancement of both transport infrastructure and economic growth. Likewise, an advanced economy promotes transport infrastructure and captivate extra foreign direct investment in Tanzania.

Keywords: Transport infrastructure; Foreign direct investment; Economic growth; Structural equation modeling (SEM).

Introduction

Infrastructure advancement is fundamental for economy advances. The chance of getting profit from infrastructure investment depends on the level of investment. Infrastructure is divided into two categories, soft infrastructure, and physical infrastructure. Transport infrastructure relies on the physical infrastructure category, which is the critical node of this study. Transport infrastructure like railway, port, airport, and road perform the essential function for the growth of the economy (Deng 2013).

For example, the studies by of Li, Liu, & Peng (2018); Arbués, Baños, & Mayor (2015); Iacono & Levinson (2016) and Lakshmanan (2011) show that road infrastructure is the stimulus for an economy increase and advancement of other social-economic sectors. In addition, the study by Pradhan & Bagchi (2013); Yu, Jiao, Houston, & Peng (2018); Yu et al. (2018) and Banister & Thurstain-Goodwin (2011), considered railway infrastructure to have a relationship with the economic improvement.

Moreover, in case of port infrastructure, studies by Deng, Lu, & Xiao, (2013); Song & Mi (2016); Bottasso, Conti, Costacurta, Porto, & Ferrari (2018), concluded that, port infrastructure support economic advancement, it generates employment and improve trade. Furthermore, the study by Button, Brugnoli, Martini, & Scotti (2015); Button & Yuan (2013); Hakim & Merkert (2016); Heinz & Connell (2013), observed that improved airport infrastructure facilitates air transportation which contributes to an economic growth, it promotes local and international business and grow of market accessibility.

In relating consequences of transport infrastructure on economic growth, previous researches (Song & van Geenhuizen 2014; Yu, Mi, & Walker 2013; Shi, Guo, & Sun, 2017; Fan & Chan-Kang 2008; Pradhan & Bagchi 2013a; Banister & Berechman 2001) concluded that the transport infrastructure, support the region's economic improvement, reduce poverty, support the propensity of industrial activities, generate employment and support economic agglomerations. Moreover, transport

infrastructure enables trade improvement, slash production expenses, improve the connection to the international and local markets, promote the transfer of technology, labor mobility, improve living standards, and increase accessibility. Transport infrastructure influences economic growth, mainly via direct and indirect avenue (Sue Wing, Anderson and Lakshmanan, 2007). The direct channel composes the effects of transport infrastructure over the GDP by giving access to raw materials, reducing the cost of production, and improving purchasing power. Indirect avenue, possess the effects of transport infrastructure by influencing the growth of other social and economic sector like Agriculture, education, and health. Moreover, advanced transport infrastructure ensures safe, reliable, cheap, and comfortable transportation amenities that can devote to industrial productivity (Beyazit, 2015).

In addition, the obligation of transport infrastructure on captivating FDI was discussed with different researchers. For instance, several studies (Pradhan, Norman, Badir, & Samadhan, 2013; Khadaroo & Seetanah, 2009; 2010; and Seetanah & Khadaroo 2009), observed that transport infrastructure attracted FDI in India, China, and Mauritius. They concluded that transport infrastructure is a vital factor for foreign investors to conduct their doings prosperously. Moreover, other studies (for example, Asiedu & Gyimah-brempong 2008; and Asiedu, 2006), found a significant tie between infrastructure and FDI in Africa. Foreign investors intend to maximize profit, and thus, focusing on producing goods at a minimum cost, hence having impoverished transport infrastructure diversely, may increase production cost. Transport infrastructure enhances investment conditions for FDI by reducing production expenses and increasing the rate of return. Thus, the area with improved transport infrastructure entices more FDI compared with other areas.

Moreover, the pertinence between FDI and economic growth was discussed in various studies (for example, Omri & kahouli 2014; Pradhan et al. 2013; Adams, 2009; and Zhao & Du 2007), they noted that FDI has the bidirectional pertinence with economic growth. They argued that FDI conveys new advanced technology, pays high wages, generates employment, and increasing the number of enterprises in local countries. Apart from researches whose results found the pertinence between FDI and economic growth, others researches identified negative linkages (Hermes and Lensink, 2003; Akinlo, 2004; Adamu, Idi and Hajara, 2015; Ahmed, 2016). On another hand, the study by (Hong, 2014; and Zhang, 2001) investigated the repercussion of FDI on promoting economic growth in China and Latin America. They concluded that FDI improves trade, capital formation, expands markets share, and thus promotes economic growth.

However, concentrating on the three last filaments of the research we discussed above, we can observe that the economy requires advanced transport infrastructure to grow. It has also been noted that transport infrastructure is a determinant factor of FDI. FDI is also promoting economic growth. Therefore, it is essential now to study the relevance of these three critical variables together. This study is amid the few studies which research the significance of transport infrastructure, FDI, and economic growth, respectively, and the first study to be conducted in Tanzania.

The linkage between these three variables in this study is very contemptuous. There is a testimony that advanced transport infrastructure, engage more FDI and hence attract FDI and promote economic growth. In addition, FDI depends on an improved transport infrastructure and steady economic growth. From this perspective, therefore, we want to respond to the subsequent research queries (a) Is there any real rapport between transport infrastructure, FDI, and economic growth? (b) Is there any casual pathway associated?. This study aims to investigate the relevance of transport infrastructure, FDI, and economic growth in Tanzania from 1995 to 2018 by using a structural equation modeling approach (SEM).

A review of studies concluded that while the relevance of transport infrastructure, FDI and economic growth has attracted interest from researchers currently, yet this studies put less attention to developing country like Tanzania and other African countries. Therefore, this study attempt to cover this intellectual gap by studying the relevance of transport infrastructure, FDI and economic growth in Tanzania. Tanzania has been selected because it serves as a sample or window to reflect African countries.

Conceptual Framework

Based on preceding literatures we propose the conceptual framework which expected to reveal possible relationship between transport infrastructures and foreign direct investment in relation to economic growth. The research model of this study is presented in Fig. 1. It indicates the relevance of the two variables (transport infrastructure and FDI) on the economic growth of Tanzania. The hobnob of the correlation among variables in the model and the justification for the proposed linkages are expounded below.

Fig. 1: Conceptual framework for the variables hypothesized to have relationship with economic growth.

Transport Infrastructure Has Direct Relationship with Economic Growth.

Many studies indicates that transport infrastructure has close relation with economic growth (Berechman, Ozmen and Ozbay, 2006; Chi, 2015), explained that transport infrastructure can influence the economic growth by switching total demand. For instance transport infrastructure influence trade, generate employment, reduce poverty, facilitate market accessibility, labor mobility, reducing transportation cost and improve living standard. In addition, (Rudra P. Pradhan and Bagchi, 2013), noted that transport infrastructure stimulate development of other economic sector which leads to multiplier effects on economic growth.

Transport Infrastructure in Relation to Foreign Direct Investment

Transport infrastructure is among of the major determinant of foreign direct investment. For example, (Lichao 2011; Pradhan *et al.* 2013; Wekesa, Wawire and Kosimbei 2016; Seetanah and Khadaroo 2009; Khadaroo and Seetanah 2010) investigate the effects of transport infrastructure in attracting foreign direct investment in China, Kenya, India and Africa. They concluded that, transport infrastructure playing the big role in attracting foreign direct investment in these countries. They adding that the area with improved transport infrastructure is more likely to attract more foreign direct investment compared to the area with poor transport infrastructure.

Foreign Direct Investment in Relation to Economic Growth

A number of previous studies assessed the contribution of foreign direct investment on economic growth of the region. Adamu, Idi and Hajara (2015), examine the impact of FDI on economic growth of Nigeria using time series data. They concluded that, FDI has direct relationship with economic growth. In addition, Hong, (2014), evaluated the effects of FDI on economic growth of China. The results found that, FDI exert positive relationship with economic development of China. Pegkas, (2015), found long-run relationship between FDI and economic growth. Cai *et al.* (2011), found that FDI contributed to the China economic growth particularly in industrial sector.

Foreign Direct Investment Trend

FDI is performing an essential function in global economies. In global economies, FDI is a crucial component of foreign flows. Many arguments have been raised with different authors on the significant of FDI inwards in host nations, including employment, trade, transfer of technology, capital formation and improve competitions between rivals (Pradhan et al. 2013; Omri & kahouli 2014; Halaszovich & Lundan 2016; Branstetter & Feenstra 2002). According to the WIR (2018), global FDI flows and outflows declines for 23% and 31.5% respectively in 2017 compared to 2016 (Table 1). Foreign trade investment flows declined to USD 1,429.8 billion in 2017 compared to USD 1867.5 billion detailed in 2016. Furthermore, the foreign direct outflows deteriorated to 1,009.2 billion from 1473.3 billion described in 2016. The deterioration is contrary to variables like Gross domestic product and trade, which showed some advancement in 2017. The decline of the rate of return on FDI for over five years is counted as the reason for the deterioration of global foreign direct investment.

Table 1: Global FDI flows, 2012-2017 (Millions of dollars)

	2012	2013	2014	2015	2016	2017
FDI Inflows (USD millions)	1574712	1425377	1338532	1921306	1867533	1429807
FDI outflows (USD million)	1369508	1380875	1262007	1621890	1473283	1429972
Change in FDI inflows (%)		-9.4	-6.1	43.5	-2.8	-23.4
Change FDI outflows (%)		0.8	-8.6	28.5	-9.2	-31.5

Source: World investment report (2018)

Moreover, FDI to Africa deteriorated from 53.2 billion in 2016 to 41.8 billion in 2017, which is a decrease of 21.5%. The decline is caused by the contrast of FDI inflows in South Africa, instability of oil price, and political instability in the region (Wir. 2018). For example, East Africa countries recorded the lowest FDI of 3.3% in 2017 compared to other African countries. However, FDI outflows increased by 8% to USD 12.1 billion. The increase is attributed to the escalation of FDI outwards/outflows to South Africa and Moroccan firms. Table 2 presents Africa FDI flows and outflow

Table 2: Africa's FDI flows 2012-2017 (millions of dollars)

	FDI inflows						FDI outflows					
Region	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Africa	51 985	50 790	52 440	56 633	53 190	41 772	12 393	16 072	13 598	10 844	11 234	12 078
North Africa	15 759	11 952	12 039	12 256	13 831	13 271	3 098	392	770	1364	1 514	1323
West Africa	16 874	14 480	12 148	10 179	12 694	11 307	3 537	1 757	2 193	2 224	2 188	1888
Central Africa	5 461	5 428	5 306	8 305	7 345	5 733	337	58	185	345	305	193
East Africa	6 561	7 253	6 578	6 865	7 883	7 625	398	280	157	110	82	174
Southern Africa	7330	11677	16370	19028	11437	3836	5024	13 585	10 294	6 801	7 146	8 500

Source: World investment report, 2018

According to WIR (2018), the FDI flows in Tanzania also declined to 1,180 million dollars from 1,365 million dollars recorded in 2016 in the global trend. However, Tanzania's share in global foreign investment flows endures consistent with 0.1% for five previous years (2012-2017). In the Africa context, Tanzania's shares of FDI inflows increased to 2.8% in 2017 compared to 2.5 recorded in 2016, an increase of 0.3%. This data revealed that despite the fall of FDI in Africa in 2017, Tanzania receives more FDI flows compared to other African nations. Table 3 presents Tanzania flows from 2012 to 2017.

Table 3: Tanzania FDI flows from 2012-2017 (Millions USD)

	2012	2013	2014	2015	2016	2017
Global(USD million)	1574712	1425377	1338532	1921306	1867533	1429807
Africa (USD million)	51 985	50 790	52 440	56 633	53 190	41 772
Tanzania(USD million)	1800	2087	1416	1561	1365	1180
Tanzania's share in Global (%)	0.1	0.1	0.1	0.1	0.1	0.1
Tanzania's share in Africa (%)	3.4	4.1	2.7	2.8	2.5	2.8

Source: World investment report, 2018

Data and Methodology

Data source and variables

The annual statistics from 1995 to 2018 was applied in this study. The statistics was gathered from UNCTAD, the Bank of Tanzania (BOT), the Tanzania national bureau of statistics reports (1976-2018), Africa development bank statistics (2012-2017), world development indicators and infrastructure statistics (1960-2018), Tanzania national accounts data, (1995-2018), and the Ministry of Works, communication and transportation in Tanzania. This study combined railway and road lengths to represent other modes of transport infrastructure, the same as what the previous researchers did (see Pradhan & Bagchi 2013a; and Pradhan et al.2013, for example). Moreover, in identifying the relationship between transport infrastructure, FDI and economic growth a number of variables were used; for transport infrastructure variables, passenger volume, freight volume, passenger turnover, freight turnover, rail length and road length were used; for FDI variables such as FDI inflows, FDI stock, real estate and FDI in % of GDP were applied and for economic growth, variables such as gross domestic product (GDP), gross domestic product per capita (GDP/CAP), gross capital formation (GCF) and urban population growth were used. A list of variables applied in this study is presented in Table 4.

Table 4: Descriptive statistics for selected variables.

Construct	N	Min	Max	Mean	Std
Passenger Volume (000 Pax)	24	244	6280	1872.79	1659.552
Freight Volume (000 tons)	24	138	2031	1027.75	556.012
Passengers turnover (000 PAX in Km)	24	244	7863	4015.13	2282.256
Freight turnover (000 tons in Km)	24	1073	9935	4750.21	3066.244
Rail length (km)	24	3682	4582	4323.79	381.673
Road length (km)	24	75645	108946	83418.92	8576.671
FDI inflows (USD)	24	149	4104	1248.42	1324.683
FDI stock	24	620	9712	2665.67	2438.542
Real estate	24	936	9205	2828.83	2390.766
FDI % of GDP	24	2	6	3.10	1.343
Gross domestic product (GDP)	24	124	3810	1612.08	1295.302
Gross domestic product per capita (GDP/CAP)	24	260	2971	812.88	855.039
Urban population growth	24	103	19022	1878.38	3764.198
Gross capital formation (GCF)	24	1421	16700	4163.96	3897.366
Valid N (listwise)	24				

N= Number of years

Methodology

The structural equation modeling (SEM) method was employed in this study. Structural equation modeling is essential in projecting the proposed hypothesis and identifying the level of the relationship among variables (Kumari and Sharma, 2017). Structural equation modeling acquires the following merits; (i) the structural equation modeling analyzes many constructs at once; (ii), structural equation modeling allows the combination of different variables, and (iii), the structural equation modeling includes measurement errors into the analysis (Asadi *et al.*, 2019). These merits encourage us to investigate the relevance of transport infrastructure, FDI, and economic growth using this method. In its application, the adopted method includes two stages; first it establishes a structural relationship model based on a hypothesis developed, and second, it checks the model performance vs. the discrepancy of analyzed information (Su *et al.*, 2016).

Furthermore, the estimation of the performance of the model fit indices is determined by using an analysis of the moment structures (AMOS23) program. In addition, the selection of the appropriate measurement is based on the review of Haier et al., who suggested accepted indicators of various levels (Hair et al., 2014). In addition, in estimating the model performance of constructs, we applied goodness–of –fit indices measure as recommended by Sharma et al. (2017); Deng et al. (2013); Kock (2019). The suggested model fit performance indicators are as described hereunder; chi-square (χ^2) statistics are accepted if the value is <0.05, the root mean squared error of approximation (RMSEA) is allowed if the value is <0.05- 0.08, goodness-of-fit index (GFI) is accepted if the value is >0.90. And also, the adjusted goodness -of- fit index (AGFI) is allowed if the value is > 0.90 (Su et al. 2016; Wu & Wang 2005). Moreover, Tucker-Lewis index (TLI), and comparative fit index (CFI) is the best if the value is >0.95 (Li et al. (2018a); Ouyang et al. (2017). Furthermore, Alvarez et al. (2016), suggested that item reliability and Critical ratio values should be greater than 0.5 and 0.7, respectively.

Results

Evaluation of Measurement Model Fit

The prospective study model was figured out by using structural equation modeling (SEM). The model involved 14 observed variables that rely on three latent constructs. Observed variables, passenger volume, fright volume, passenger turnover, freight turnover, railway length, and road length loaded under transport infrastructure constructs. In addition, items like FDI inflows, FDI stock, real estate, FDI % of GDP piled under FDI construct and GDP, GDP per capita, urban population growth, and GCF loaded under economy construct. The measurement model conferred the performance between the data and the projected measurement model.

In determining the performance model indices, we run our proposed model and plaid, the obtained results if it reaches the recommended values. The obtained initial findings are indicated hereunder; chi-square (χ^2/df = 2.627), goodness-of-fit indices (GFI) = 0.639, Adjusted goodness-of-fit indices (AGFI) = 0.448, Tucker-Lewis index (TLI) = 0.448, comparative fit index (CFI) = 0.573 and the root mean squared error of approximation (RMSEA) = 0.266. The obtained findings indicate that the model does not satisfy the recommended values as suggested with different authors because all values are below the thresholds level except the chi-square value. Therefore, based on this ground, the original model required to be improved to meet the accepted values. Squared multiple correlation values will be applied as the average value for item reliability. According to Lu, Lai, & Cheng (2007); MacCallum, Browne, & Sugawara (1996), recommended that squared multiple correlation threshold values should be greater than 0.05. Therefore, the value of the item in which its reliability is below 0.05 is not acceptable in the model. From the initial model variables like freight volume, railway length, and road length and passenger turnover did not meet the recommended value of 0.05.

In improving the initial model, we decided to remove all items, by which the squared multiple correlation values is less than 0.05 as recommended by Lu et al. (2007); Byrne (2001). Thus, an item like freight volume, rail length, road length, and passenger turnover were removed in the reviewed model. Improved structural equation modeling, conferred in Fig. 2 indicates that all constructs meet

the recommended model fit criteria. The result reveals that the given model is capable of demonstrating the relevance of transport infrastructure, FDI, and economic growth. The results described the model fit indices, where the tucker-Lewis index (TLI) = 0.990, comparative fit index (CFI) = 0.995, goodness-of-fit index (GFI) =0.910, and the root mean squared error of approximation (RMSEA) = 0.039. In addition, four correlated routes were determined by the model; transport infrastructure →economy, transport infrastructure → FDI, FDI →economy, and transport infrastructure → FDI →economy.

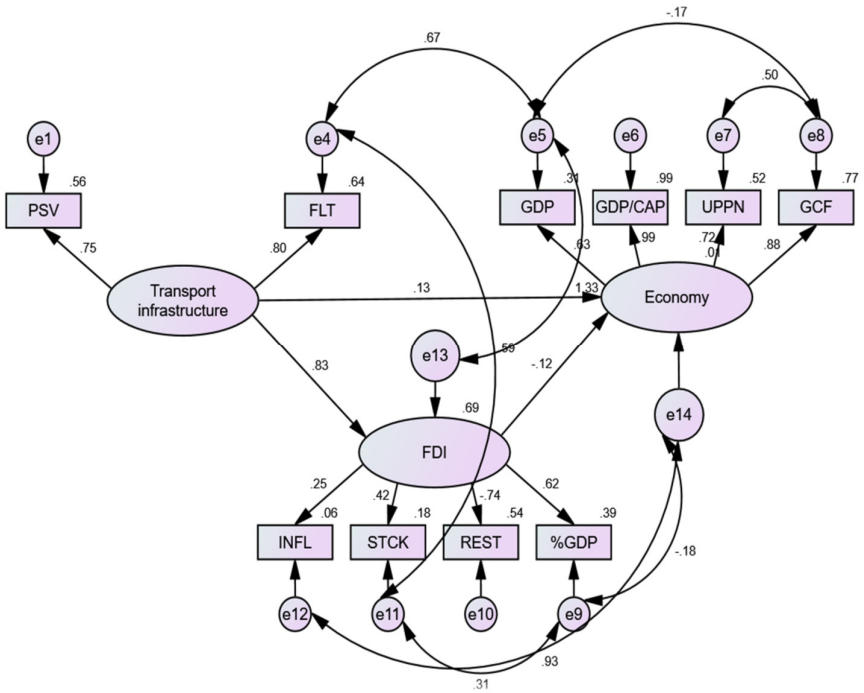

Fig. 2: The Final structural equation modeling

Table 5. Summarizes various recommended goodness-of-fit indices, where the normed Chi-square (χ^2/df) = 1.034. These estimates provide evidence for the model fit as where the accepted threshold is between 1 and 3. The goodness-of-fit indices (GFI) = 0.912, while adjusted goodness-of-fit indices (AGFI) = 0.90. Both provided an accepted model fit indices. The Tucker-Lewis index (TLI) = 0.990, while the comparative fit index (CFI) = 0.995, the two values exceed the suggested value of 0.95, thus yielding model performance. Moreover, the root means squared error of approximation (RMSEA) = 0.039.

Table 5: The Revised Model Results

Measure	Threshold	Estimate
Normed chi-square (χ^2/df)	Between 1 and 3	1.034
The goodness of fit indices (GFI)	>.90	0.910
Adjusted goodness of fit indices (AGFI)	>.90	0.900
Tucker Lewis index (TLI)	>.95	0.990
Comparative fit index (CFI)	>.95	0.995
The root mean squared error of approximation (RMSEA)	<0.05	0.039
PClose	>0.05	0.492

Convergent Efficacy and Item Accuracy

Convergent efficacy can be determined by evaluating the regression weight, and they're statistical essential via t-values (Lu et al. 2007)**.** The t-values are known as a critical ratio. The critical ratio is calculated by dividing specification estimation and its standard error. According to Shah & Goldstein (2006), recommended that, for the Critical ratio (CR) value to be accepted, it should obtain the value being more than 2.00 or less than -2.00. The bigger the factor loadings, as related to obtained standard errors, the higher the confidence that there is a correlation between observed variables and latent variables. Table 5 shows that all C.R values meet the needed criterion. Therefore, all indices were related to their described items. This shows the significant relationship between constructs and their latent variables (McDonald & Bollen 1990 and Koufteros 1999). In addition, item reliability (R^2), is applicable in measuring the values of observed variables (Koufteros, 1999). The R^2 values above 0.05 are regarded as acceptable reliability (McDonald and Bollen, 1990). Table 6 shows the item reliability of the variables whose value is >0.05 and hence meets the criterion.

Table 6: Factor loadings, critical ratio, and item reliability for the improved model.

Latent variable	Constructs	Unstandardized factor loadings	Standardized factor loading	Standard Error	C.R	R^2
Transport Infrastructure	PSV	1.000	.155	-[a]	-[a]	.524
	FVL	1.141	-.528	1.507	.757	.779
	PST	7.494	.845	9.644	.777	.714
	FLT	6.564	.551	8.639	.760	.503
FDI	INFL	458.525	.204	473.414	.969	.742
	STCK	2541.776	.614	1219.709	2.084	.377
	REST	-3043.968	-.750	1348.746	-2.257	.562
	%GDP	1.000	.438	-[a]	-[a]	.692
Economy	GDP	1.000	.657	-[a]	-[a]	.531
	GDP/CAP	.920	.915	.244	3.772	.837
	UPPN	3.608	.815	1.047	3.445	.665
	GCF	4.346	.949	1.126	3.859	.900

[a]n express the factors fixed at 1.0 at the initial results.

Obtained results: χ^2/df = 1.034, GFI = 0.910, TLI = 0.990 CFI = 0.995, RAMSEA= 0.039, Pclose 0.492

Moreover, Composite reliability is used to measure the interior stability and similarity of constructs. Several scholars (Byrne 2001; Steenkamp & Baumgartner 2000; Shah & Goldstein, 2006), recommended that the composite reliability is the best if the value is higher than 60%. Table. 7 summarizes the composite reliability of the variable, transport infrastructure, FDI, and economic growth. The findings indicate that composite reliability is greater than 0.6, which meets an acceptable recommendation.

Table 7: Illustrative variables and composite reliability for each construct

Variable	Mean	Std. Deviation	Composite reliability
Transport infrastructure	2916.47	1891.016	0.6
Foreign Direct Investment	1686.51	1538.834	0.7
Economic growth	2116.82	2452.976	0.9

Obtained results: χ^2/df = 1.034, GFI = 0.910, TLI = 0.990 CFI = 0.995, RAMSEA= 0.039, Pclose 0.492

Causal Relationship between variables

Table 8 summarizes the identified relationship between transport infrastructure, FDI, and economic growth. The rapport between transport infrastructure and economic growth was found significant, as shown by the Critical ratio (CR= 2.0, p=0.027). The C.R (t-values) is calculated by taking covariance

estimates over its standard error. The critical ratio value above 1.96 is regarded as the significance level of 0.05. In addition, the rapport between transport infrastructure and FDI was determined significant in this study (C.R= 2.522, p=0.012). Moreover, in this study the insignificant linkage between FDI and economic growth was also determined (CR. -0.442, p=0.658).

Table 8: The casual pathway between variables

Aisle	Measure	CR	P-Value	Assertion
Transport infrastructure →Foreign direct investment	0.001	2.522	0.012	Supported
Transport infrastructure →Economy	0.076	2.000	0.027	Supported
FDI→ Economy	-100.158	-0.442	0.658	Not supported

Obtained results: χ^2/df = 1.034, GFI = 0.910, TLI = 0.990 CFI = 0.995, RAMSEA= 0.039, Pclose 0.492

Discussion

With the fast advancement of the transportation industry, the importance of having improved transport infrastructure is increasing. Transport infrastructure performing an essential role in fascinating FDI and shielding economic development (Pradhan *et al.*, 2013). This general goal of this research was to establish the model which we will investigate the relevance of transport infrastructure, FDI, and economic growth, respectively, adopting structural equation modeling. The outcomes consequent from the study shepherded in Tanzania is briefly presented here below.

The correlation between transport infrastructure and economic growth was found significant in this study. These findings recommended that, if the transportation authorities enhance transport infrastructure, the economy will grow briskly. This result is in line with Zou, Zhang, Zhuang, & Song (2008) who they found the positive rapport between transport infrastructure and economic growth . They reported that better transport infrastructure found in East and Central China contributed to the economic advancement rate of the area. The findings indicated that all transport infrastructure components (roads, railway, port, and airport) were all crucial factors for economic growth. Thus, they suggest that, for better economic growth, transportation authorities should focus on improving transportation infrastructure.

The relevance of transport infrastructure and FDI was also determined in this study. These results implied that the advanced transport infrastructure is the primary cause of attracting FDI. The fact is, the area with advanced transport infrastructure is likely to attract more investors compared to the area with poor transport infrastructure. These findings are similar to the findings by Pradhan & Bagchi (2013a) and Khadaroo & Seetanah (2009, 2010). They indicated that transport infrastructure becomes a catalyst for attracting FDI in India and Africa, respectively. These findings provide a lesson to transportation authorities to invest more in transportation system infrastructure to connect all parts of the country to captivate FDI in all parts of the country.

The impact between FDI and economic growth was not supported in this study. These results show that the decline of FDI inflows affects the development of the national economy. FDI improves technology, generates employment, increase capital circulation, and increase the number of foreign enterprises. FDI stimulates innovation and creativity to domestic enterprises through competitions. Therefore, fallen of FDI reduces all the contributions and hence, leading to the decline of the host economy. These results are similar to those by Ahmed (2016) and Akinlo (2004). They identified that there is no correlation between FDI and economic growth. Although there are many economic growth determinants, the benefaction of FDI to the nation's economy is highly needed. Therefore, authorities responsible for investment should improve the investment environment, to fascinate more FDI and hence promoting economic prosperity, and

This study also determines the relevance of transportation infrastructure and economic growth moderated by FDI. These findings explain an interrelation between transport infrastructure, FDI, and economic growth. This study is similar to the study by Pradhan et al. (2013). They found integration rapport between transport infrastructure, FDI, and economic growth.

Conclusion and Policy Implication

The current study applied the structural equation modeling to investigate the relevance of transport infrastructure, FDI, and economic growth for the duration of 1995 to 2018. The obtained results explain the interrelation between transport infrastructure, FDI, and economic growth. In addition, the findings reveal the bidirectional relationship between transport infrastructure and economic growth. The two-way relationship between transport infrastructure and FDI was also determined in this study. Moreover, the unidirectional rapport between FDI and economic growth was defined. Generally, the linkage between transport infrastructure, FDI, and economic growth was found significant.

This study contributes to policy in the way that transport infrastructure can be treated as a significant catalyst for attracting FDI and economic growth in Tanzania. Therefore, policymakers and other authorities responsible for the transportation sector should focus on investing in transport infrastructure (building and maintenance) to enjoy its economic contributions including attracting foreign direct investment.

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The Moderating Role of Education to the Relationship between Insecticide Mosquito Nets and Malaria

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Abstract

Malaria is a major public health challenge that affects a wider population. The current vector control policies rely mostly on insecticide mosquito nets and indoor residual spray that can be achieved with proper education. This study demonstrates the moderating role of education in the relationship between insecticide mosquito nets and malaria. We used panel data from health-related indicators and malaria indicator survey-based Ethiopia from 2011 to 2015. We used the random effect model to explore the direct effect, and hierarchal regression analysis with model 1 under process macro employed for moderating effect. We analyzed quantitative data using Stata version 13.0. Accordingly, we found a positive relationship between insecticide mosquito nets and malaria ($\beta = 0.28$, $p < 0.05$). Similarly, the researchers reported a significant impact of education in strengthening the relationship between intervention methods and malaria ($\beta = 12$, $p < 0.05$). The findings are potentially useful for health program practitioners in charge of infectious disease prevention and control to incorporate education as vector control indicators for malaria to eliminating. Furthermore, our study concludes that for infectious disease prevention and control, educational attainment strengthened the relationship between strategic interventions and malaria and motivated the utilization of the communities.

Keywords: Malaria, Insecticide mosquito net, Education, Quantitative methods, Random effect model

Introduction

While everyone has the right to live healthy throughout their lifetime, providing adequate health care is a significant challenge (Dalgleish *et al.*, 2007). An estimated 216 million malaria cases occurred globally in 2016, where 90% is in the African region (World Health Organization, 2017). Ethiopia set an objective to have had a community with appropriate knowledge and health-seeking behaviors regarding malaria prevention and control by 2020 (Prevention *et al.*, 2020). Ownership and utilization of insecticide mosquito nets (ITNs), net care, and repair through demand creation and familiarity is the critical point to implement. The cumulative number of ITNs exceeded 65 million, and about 6 million households in malaria-prone areas are sprayed yearly with indoor residual sprays in 2015 (Federal Minstry of Health, 2015). However, malaria continued as a significant public health challenge in Ethiopia (Watiro1 and Awoke2, 2016). Besides, insecticide-treated nets approved as an effective malaria control strategy. But there have been many challenges to ITNs coverage, misconceptions concerning ITNs utilization, and inadequate knowledge when trying to implement large-scale ITN programs (Tayseir T. M. Masaad, Yousif M. Elmosaad, Abd Elbasit Elawad Mohammed, Ahmed Elnadif Elmanssury, Mahmoud Jaber, Mustafa M. Mustafa, 2017). Plasmodium falciparum is the most dominant anopheles borne parasites in Africa that attacks the red blood cells in humans (Liu, 2015).

Prior studies reported the relationship between ITN and malaria (Fuge, Ayanto and Gurmamo, 2015; Mayala *et al.*, 2015; Koenker and Yukich, 2017); however, none of these studies measures the role of education in the relationship. Therefore, the current paper addresses these shortcomings by investigating the moderating effect of education on the relationship between insecticide mosquito nets and malaria. Besides, the study uses national-level aggregate data to recommend the findings as representative as possible.

Research Framework

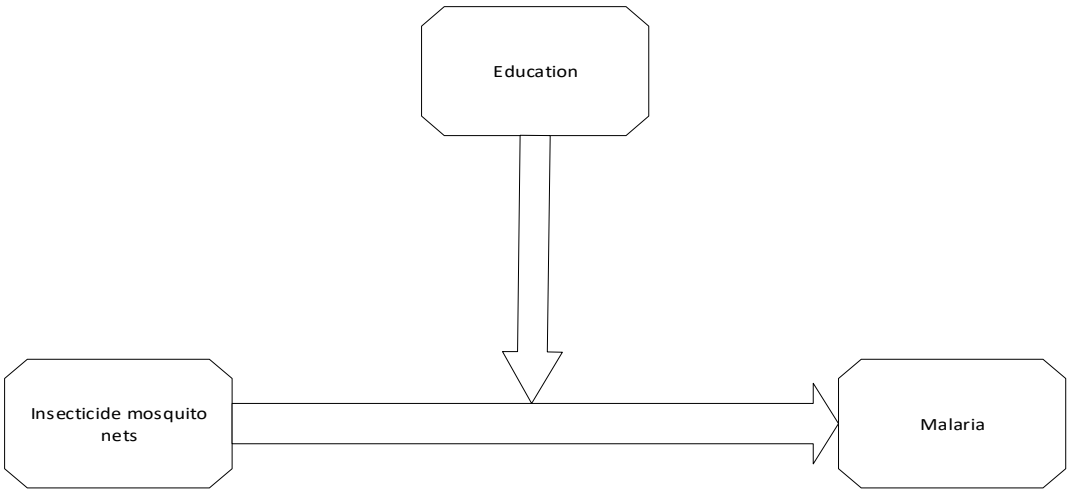

Fig. 1: Model 1 of moderation

Hypothesis Development

Insecticide-Treated Nets And Malaria

Net distribution is an integral part of a selective vector control strategy for malaria protection. Regular use of bed-net can reduce the overall risk of death for young children by 20% and the number of clinical malaria episodes in that age group by 50% (World health organisation, 2005). ITNs provide proper personal protection and also have a community preventive effect due to the benefits of malaria prevention to individuals beyond those using them (Deressa, Ali and Enqusellassie, 2003). The impressive decline in child mortality reported being due to the implementation of vector control methods use and distribution, such as ITN and IRS(Eckert *et al.*, 2017). For malaria control, ITN and IRS recommended by world health organization as the cornerstone of the strategy (World health organisation, 2015; World Health Organization, 2015). To fight against malaria, Ethiopia implemented selective vector control strategies, such as insecticide mosquito nets, indoor residual spraying, and environmental management (PMI, 2016). Accordingly, malaria morbidity and mortality declined due to the introduction of the vector control intervention method (Alemu *et al.*, 2012). However, malaria remains the leading health problem in the country (EHNRI/EPHI, 2015). Besides, the government works to eradicate malaria providing technical and material support for its protection. But malaria disease is still prevalent in every season of heavy rain relatively in lowland areas of Ethiopia (Dejene, 2016). The cited reasons in a different corner of malaria countries of sub-Saharan Africa mostly linked with a low level of knowledge about malaria and its prevention. This can be achieved with the provision of proper education, and if awareness creation programs implemented sustainably.

Inadequate knowledge about malaria and insecticide mosquito nets identified among participants of the study in different areas (State, Vol and Page, 2018) that challenged the programs' success towards prevention and its control. Though insecticide mosquito net responded as malaria prevention measures, the actual use challenged by a misconception about malaria transmission and its cause (Singh *et al.*, 2014). Regular use of insecticide mosquito nets reported preventing malaria (Alexander Suuk Laar,

Amos Kankponang Laar, 2013), also believed ITN prevents mosquito bites if used regularly. The study stated the use of ITN for other purposes in some study sites, though witnessed as prevention tools against malaria (Doda *et al.*, 2018), weak communication, education, and social support cited as a factor. Therefore, we hypothesized that:

Hypothesis $_1$: Insecticide mosquito nets are positively related to malaria.

Moderating Effect of Education

Effective preventive action is the outcome of public health programs, which resulted in the implementation of community-based health education. Awareness creation about the programs towards prevention and its control measures plays a critical role (Gorgui Diouf Department, Yihua Xu, 2010), which occurred through iterative actions to strengthen the awareness of the population for malaria prevention and control. Sustainable development goal set the objective of ensuring the inclusive and equitable quality of education and promote lifelong learning opportunities for all, to end the epidemic of HIV, TB, and Malaria by 2030 (World Health Organization, 2016). The gross-transformation plan (GTP), reinforces the government of Ethiopia (GOE's) pro-poor spending on essential services—such as education, that are fundamental to achieving SDG targets (Prevention *et al.*, 2020). The world focuses on education towards infectious disease protection since the most educated community can implement intervention methods to prevent and control the disease. However, to achieve the health program in broader society, appropriate education should be in place, which can be achieved if the health education program incorporated into education curricula. The study reported the relationship between education and the willingness to take up the IRS for malaria protection (Wadunde *et al.*, 2018), where the level of education positively impacted the use of the intervention (Boyce *et al.*, 2018). And the school can play a vital role in ensuring the importance and risk of malaria and its prevention for pupils (Nankabirwa *et al.*, 2014). The world health organization suggested increased access to better quality health services delivered by skilled healthcare providers has the potential to reduce maternal mortality ('Levels and Trends of Maternal mortality in the world', no date). The other study reported the positive influence of education on malaria knowledge, where higher school attendants have a better understanding than primary and lower level schooling (Khairy *et al.*, 2017). Besides, educational attainment reported as a factor for the success of the health care system (Nishijima *et al.*, 2018). The study also revealed the need for education regarding malaria(Sood, 2016). The other study reported inadequate knowledge regarding nutrition, even among medical students (Lauren E Ball, 2010). The finding of this study also supports how appropriate health education impacts health practices, particularly for infectious disease-related programs, and in need, focus on being incorporated with education curricula from early stages. The association between knowledge of favor as a sign of malaria and access to ITN and information reported with a level of education attained (Shimaponda-mataa, Tembo-mwase and Gebreslasie, 2017; Chukwuocha *et al.*, 2018). The other study also reported better malaria knowledge associated with education level (Dhawan *et al.*, 2014). The report also shows effective education can immunize young adults against tobacco (States, County and City, 2004). It expresses the idea that appropriate education is not only for malaria prevention, rather strengths the health issues in general. The other study also showed that the significant predictor variables for knowledge on malaria using IRS as a control tool were age, educational level, occupation, and income levels (Munga *et al.*, 2017). Negative attitudes for malaria prevention and control reported, which is maybe due to inadequate education among the study participants (Adibe *et al.*, 2017). Besides, a positive association between ITN ownership and education level testified (Shimaponda-Mataa *et al.*, 2017), where proper health education strengths the better practice. The other study also reported better knowledge of the facts than the myths of malaria among respondents of higher educational status (Su *et al.*, 2014). Therefore, we hypothesized that:

Hypothesis $_2$: Education moderates the strength of the direct relationship between Insecticide-treated nets and malaria. Such that the relationship will be stronger for an advanced community of educational attainment than for those who are low or none educated.

Methods

Data sources

This study based in Ethiopia, and we collected five years' worth of secondary data (2011 to 2015). The source of the data was the Ethiopian Malaria Indicator Survey (EMIS) and health-related indicators, that obtained from the Federal Ministry of Health, Ethiopia. The data contains extensive details about malaria and related indicators on an annual basis. Malaria epidemic regions of the country included in the study and the data are panel data containing 50 observations for final review after condensing as appropriate. All relevant variables for the current study identified. Accordingly, malaria (outcome variable), insecticide mosquito nets (independent variable), education (moderating variable) were selected. Also, household income used as a controlling factor for the current study.

Analysis

Data were analyzed via Stata 13.0 to test the direct relationship of study variables. Hierarchical regression analysis under process macro used to test the moderating effect. Using ITN as an intervention strategy for malaria protection such that education moderates the association, we evaluate malaria as an outcome effect. We followed a two-step approach to conduct the analysis and deduce results — the principal component analysis used to condense variables given by multiple indicators. We used model 1 under process-macro to test hypothesized relationships. Besides, we used a random-effect model to get the direct influence of ITN on malaria. The theoretical framework proved in two steps — first, the linear relationship of the study variables to investigate the immediate effect of the explanatory variable on the outcome variable. Second, the proposed moderator "education" was integrated into the model to test whether the direct and indirect relationship through moderator "education" between ITN and malaria varied accordingly.

Results

Descriptive Statistics

Descriptive details of the data, i.e., number of observations, sum, mean, median, standard deviation, minimum, and maximum, for all dependent, independent, and control variables, are listed in Table 1 as follows.

Table 1: Descriptive statistics of study variables

Variable		Mean	Std. Dev.	Min	Max	Observations
Malaria	overall	9.328151	2.553441	2.3979	13.7181	N = 50
	between		2.04277	5.566182	11.48004	n = 10
	within		1.639451	6.159869	12.62001	T = 5
ITN	overall	11.39936	3.790337	0	15.3455	N = 50
	between		2.938286	5.91212	14.39478	n = 10
	within		2.537303	5.122061	16.25176	T = 5
Household income	overall	2	1.000004	.602273	3.85159	N = 50
	between		.9534741	.8174786	3.30064	n = 10
	within		.4063343	1.15393	2.924026	T = 5
Education	overall	3	1.000002	.02065	3.966804	N = 50
	between		.5038649	2.419005	3.714446	n = 10
	within		.8756988	.4785106	3.903762	T = 5
Education*ITN	overall	35.13299	15.79192	0	57.0071	N = 50
	between		12.21106	17.0835	53.40813	n = 10
	within		10.60409	9.011958	48.85116	T = 5

Correlation Matrix

Correlation analysis measures multicollinearity among independent and control variables and the result provided in **Table 2.** The result shows the significant and positive correlation of ITN, household income, and the moderating value to the dependent variable. An insignificant relationship existed with the education, however, with a positive coefficient, which expresses the indirect relation rather. Our independent and control variables significantly correlated with each other, in such a way that not to cause multicollinearity problems.

Table 2: Correlation matrix

	Malaria	ITN	Household income	Education	Education*ITN
Malaria	1.0000				
ITN	0.5543*	1.0000			
Household income	0.6559*	0.4964*	1.0000		
Education	0.0655	0.2517*	0.4708*	1.0000	
Education-interaction	0.4090*	0.6914*	0.6461*	0.7858*	1.0000

Direct Relationship

The first step is to address the immediate effect of insecticide mosquito nets on malaria. The result provided in **Table 3**. Consistent with the researcher's anticipation of a positive relationship between ITN and malaria, the result found significant ($\beta = 0.28$, $p < 0.05$). The study concluded that ITN has a positive effect on malaria disease. Thus our 1st hypothesis was accepted, revealing a positive relationship between ITN and malaria. Moreover, the study shows a positive impact of the control variable in the relation.

Table 3: Results of a direct relationship

	(1) **Malaria**	(2) **Malaria**
ITN	0.278^{**} (0.0866)	0.205^{*} (0.0809)
Household income		1.255^{***} (0.347)
_cons	6.165^{***} (1.083)	4.481^{***} (1.016)
N	50	50

Standard errors in parentheses
* *p < 0.05,* ** *p < 0.01,* *** *p < 0.001*

Moderating Relationship

Once we found support for the direct effect, the second step was to test for the potential moderation impact. As seen in **Table 4,** the effect of the interaction between insecticide mosquito nets and education on malaria was positive and significant ($\beta = 0.125$, $P < .005$), indicating a moderating influence. The result shows the better outcome of our dependent variables with improved education, where the effect varies as the educational level changed. The finding supports our second hypothesis, which stated a positive impact of education to strengthen the relationship between ITN and malaria.

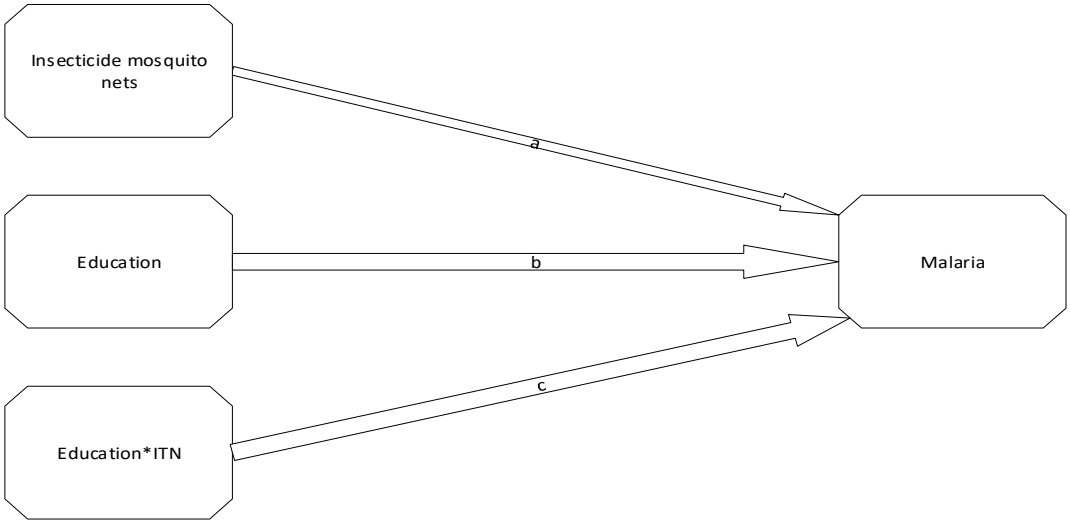

Fig. 2: Paths of a statistical diagram

Table 4: Results of Moderating relationship

Paths	Coefficient	Se	t	p	LLCI	ULCI
constant	7.7717	1.7513	4.4377	.0001	4.2465	11.2969
ITN ➔ malaria	.1189	.1506	.7891	.4341	-.1843	.4220
Education➔ malaria	-1.4050	.7359	-1.9094	.0625	-2.8863	.0762
Int_1➔malaria	.1245	.0595	2.0937	.0418	.0048	.2442

Discussion

The study proposed and empirically tested a theoretical framework to explain the relationship between insecticide mosquito nets and malaria, premising the positive effect of education on this relationship. The research finding contributes to the study on infectious disease prevention and control, particularly malaria, by proofing the moderating effect of education in strengthening the association between ITN as an intervention method and malaria. Accordingly, the research finding reports a positive and significant influence of ITN on malaria as a direct effect. The study also demonstrates the impact of educational attainment on improving the outcome of malaria disease. Likewise, the study revealed a significant impact of education in strengthening the relationship between ITN and malaria. Corroborated by a study (Kumar *et al.*, 2017), which reported improved use of insecticide mosquito nets among the communities of concurrent health education. Also supported by research (Attu and Adjei, 2018), which revealed the better implementation of intervention methods and identified causes of malaria among the societies with advanced education level. This study has empirically verified its role in investigating the moderating role of education to the relationship between insecticide mosquito nets and malaria supported by various related literature. Likewise, the study revealed the end-user directed education for prevention and control of maria through vector control intervention utilization (Taremwa *et al.*, 2017). Also, it is recommended to encourage health-education regarding the use of insecticide mosquito nets for malaria protection (Liu *et al.*, 2015).

Implications

Despite improving access towards malaria prevention and control methods, policymakers and health planners should recognize that proper education is a significant factor in strengthening the relationship. Furthermore, for infectious disease prevention and control programs to succeed, dimensional observation is crucial.

limitations

Our research has some limitations that offer opportunities for future studies. It would be of great importance to discover the changes to the outcome of malaria if proper health education provided to the public, mainly when it incorporated into the education curricula. Besides, future investigators interested in exploring the impact can discover the differences in the outcome.

Conflict of Interest

On behalf of all authors, I am declaring that authors have seen and approved the final version of the manuscript, and warrant that the article is original work.

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Concerning Risk Management within the Framework of its Implementation of Organizational and Managerial Innovations

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Abstract

The paper analyzes the basic aspects of improvement of entity's innovation potential within the framework of the development of risk management systems. The main peculiarities of the innovation potential of the Russian economy are described. Aspects of entity's innovation capacity building and related types of possessory risks are analyzed. Based on the analysis performed, a package of basic governing measures in the innovation capacity building of the Russian economy is suggested and the main components of systems for management of possessory risks related to development and implementation of organizational and managerial innovations.

Keywords: Issue, Development, System, Organizational and Managerial Innovations, Potential, Management, Possessory Risks, Improvement

Introduction

In the environment of changing the technological paradigm, innovations are the most powerful tool for entity's development and a key factor to increase its added value for its owner. However, many owners and managers are afraid of risks characteristic of the innovation development and implementation process, which may affect the success of innovative activities and reduce the entity's potential and prefer to update gradually the existing business processes of the entity instead of implementing radical innovations.

Most owners say that responsible possessory risk management requires a cautious approach to innovations. They say that in the modern context, only startups may afford taking high risks of failure of innovative solution implementation. Major and medium companies are complex structures and focus mostly on establishment and development of possessory risk management systems based on possessor control instruments. Loosening of such control measures to give innovative teams an opportunity of free management may result in unacceptable risks and costs not just for the company but also for different stakeholders.

In the modern context, it is obvious that the operation of any entity involves risks, regardless of place and time. Characteristic features of the place and time of entity's operation are the specificity of risk factors, risk levels and availability of tools to manage that risk.

The knowledge economy era that the world enters conducts to the emergence of many new factors and needs, which a modern entity should consider, and which should be managed if the owner of the entity is committed to the sustainable operation of the entity.

Key Risk Factors of Formation of Knowledge Economy

The knowledge economy era that the world enters conducts to the emergence of many new factors and needs, which a modern entity should consider, and which should be managed if the owner of the entity is committed to the sustainable operation of the entity.

A significant share of factors material for the development of the knowledge economy are united in the management science under the name of innovative activities [2]. It should be noted that the borders of innovative activities of any entity in the environment of changing the technological paradigm are limited only by an understanding of owners and managers of business ethics in a country.

Generally, it is obvious that in the environment of the knowledge economy establishment, the borders of entity's innovative activities may be limited from the perspective of two prerequisites:

- Actual needs of end users and, consequently, needs of companies taking part in such entities' customer value chain;
- Existing need of making profit by the owner from investments in the entity based on the customer value chain.

In view of these two prerequisites, the author finds it necessary to identify three fields of application of possessory risk management systems within the framework of the entity's innovative activities:

a) knowledge management and diagnostics of the entity's innovation potential;
b) innovative activity cost management;
c) innovation management with account of risks.

In the contemporary management science, innovation means any new management or production solution — which is based only to some extent on known models and tools in each of the areas — the implementation of which in business activities results in uncertainty of the internal and external environment [1].

Therefore, carrying out innovative activities should be preceded by an attempt to identify the risk factors that may help reduce the uncertainty of the entity's business environment.

Having determined the main risk factors, owners and managers have an opportunity to establish mechanisms to manage such risks, e.g., using preventive tools and solutions aimed at the identified risk factors due to which the potential of risk release is prevented, or the consequences of such release are mitigated.

Development and implementation of innovations presuppose that the entity has a system of creation of new knowledge and high organizational efficiency.

Evidently, such conditions are impossible without any mechanisms for identification and development of the entity's intellectual capital. Innovations are possible only in the companies where such capital exists and is reflected in competences of the management personnel.

In the current climate, one of the basic tools for development of the entity's intellectual capital and, therefore, of management of possessory risks related to the absence of such capital is the so-called knowledge engineering or data mining [3, 4]. This skill consists in the entity owner possessing tools enabling him to reveal the knowledge contained in different data sources, e.g. in databases, or through stimulating the innovative activities of managers and staff of the entity.

Mechanisms within the Entity Management Model

Evidently, availability of such mechanisms within the entity management model may have a great impact on the owner's decisions on performing the innovation process and determine the ways of its implementation.

Within the context of innovative activities, gaining new knowledge is just one of the aspects of knowledge management within the framework of development of possessory risk management systems. Another aspect to be considered is the ability to evaluate the efficiency of the knowledge through:

1) usefulness for the entity;
2) assessment of risk levels related to potential practical application of the knowledge;
3) evaluation of advantages resulting from the application of the knowledge.

It should be noted that the aforesaid package of skills is a starting point for the innovation process. In this respect, the owner's ability to build innovation capacity of the entity is of key importance, at least, within the framework of the said competences. It is a prerequisite for establishment and development of a system for innovation process management, which should consider that the process is characterized by uncertainty and various risk factors.

From the microeconomic perspective, in present-day conditions it's obvious that the efficiency of possessor management systems measured, say, through market value increase, may be achieved only by entities, which have knowledge management tools in their possessory risk management systems, therefore, the tools for innovation preparation and implementation. It should be noted, that a mere innovative idea is not enough for success, although it is the driver of any innovation project.

Implementation of innovations in practical results seems to be a probability category the same as release of the main types of related possessory risks. The process of innovation implementation involves significant costs. In this respect, one of the key aspects of possessory risk management is innovation cost management.

Discussion

About the entity's innovation cost management, the identification, analysis, estimation, and management of the basic types of possessory risks are performed in two areas:
a) based on the estimation of preliminary (planned) expenses;
b) based on the estimation of the expenses incurred.
To identify these factors, it is required to:
1) determine the cost object complying with the concept of innovation adopted in the entity;
2) determine the cost model that will characterize the informational structure of costs of the innovative enterprise;
3) establish a system for accounting of innovation costs and a system for their control;
4) establish a method for monitoring of innovative activities, its economic performance during the whole period of achievement and materialization of the innovative effect.
The cost object is determined based on:
1) corporate perception of innovations;
2) the ability of the entity management system to classify innovations by type;
3) mechanism for identifying the stages of the innovation process;
4) description of the structure of activities carried out at each stage of the innovation process.
From the microeconomic perspective, innovations are a solution that is suitable for the company and is new, at least, from the perspective of the company launching this solution [4].
The key component of the development of mechanisms for innovation cost management within the context of related possessory risk management is a determination of the distribution model and cost

calculation, through which it will be possible to estimate the cost volume (actual and supposed) allocated to the innovation process.

When considering the innovation cost estimation model, a decision should also be made as to if the expenses on measures implemented while the innovation process will be related to costs indirect for such activities, i.e. with expenses for other activities carried out beyond the innovation process, though their performance determines the entity's potential to perform the innovation process.

Currently, innovation cost management requires comprehensive information on both planned innovation costs and those incurred, just as for any costs in other areas. Besides, innovation cost management should be a continuous management process performed in respect of all activity types within the innovation process. It means that for each activity, it is required to:

1) classify, register, and calculate the expenses;
2) prepare reports on the expenses incurred;
3) identify the factor leading to expenses without added value;
4) develop a business process reengineering design aimed at removal of factors without any added value;
5) develop and implement control measures for economic performance management.
Under modern conditions, it is obvious that the establishment of efficient mechanisms for identification, analysis, assessment of risks related to innovation implementation is the main condition for entity's survival and development in mid-term and long-term.

Conclusion

It should be noted that there are many ways and approaches to innovation systematization and related possessory risk management in an entity. Although it is impossible to ensure the establishment of a uniform universal approach, the author believes it is required to identify the common components for establishment and development of efficient systems for management of possessory risks of entity's innovation programs. They include:

- processes of identification by the owner and the managers of key priority fields to engage ideas and establish mechanisms for interaction in their development and implementation that comply with the entity's strategic purposes, enable the most efficient use of the entity's basic competencies, and contribute significantly to the entity's capacity building;
- mechanisms for search, collection, and implementation of promising ideas, developments and cooperation areas to ensure efficiency of identification, analysis, and estimation of basic types of possessory risks and making management decision in risk management;
- development of a uniform model of the management process regarding possessory risks related to development and implementation of innovations enabling identification and management of risks and opportunities based on mechanisms for management of knowledge creating conditions for stimulation of manager and staff initiatives on formulation and development of management decisions in risk management;
- establishment and development of mechanisms for creation of innovative project teams gathered and guided by managers possessing all the skills required and striving to achieve practical results;
- clear and transparent measurement of costs and benefits related to innovative activities so that the prospective rate of return covered the investments.

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Features of Strategic Financial Innovation and Risk Management Systems in Russian Companies

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Abstract

In present-day realities, financial innovation is a key growth driver for businesses, regions, and the overall economy in Russia as a whole. In practice, innovation characteristics of business entities are described through multiple factors, both internal and external. Internal factors include, inter alia, management factors, managers' focus on current problems, cutting-edge management practices, especially, strategic management and management of financial innovation and risk related thereto.
The paper describes contemporary approaches to the strategic management of financial innovation and related risks and explores the essence and role of strategic financial innovation in the development of corporate management systems (CMS). It also formulates proposals that might contribute to improving decision-making processes in the selection of financial innovation strategies, making sound decisions on the time frame for a company to introduce strategic or enhancing financial innovation, and to applying good solutions based on the strategic financial innovation life cycle within the corporate management system.

Keywords: Features, Present Times, Strategy, Management, Financial Innovation, Risk

Introduction

The economic system in every country consists of a large and dynamically changing number of corporations that may differ in terms of goals and resources required to achieve the goal. Each of these companies operates in a specific external business environment that forms both the overall operating situation of a company in the economic, technology, sociocultural, political, legal, and international dimensions and the target environment covering specific companies or groups, such as competitors, customers, suppliers, strategic allies, or regulators who exert a direct impact on the company [1].

Managers in today's companies are expected to be aware of this business environment, its complexity and ambiguity, its impact on business and related implications produced by such an impact. Consequently, they should take actions aimed at maintaining equilibrium between the company and the business environment, manage all components of the business environment, while paying special attention to those of the most importance for the company's functioning and growth, and promptly respond to changes in any parameters of those components [2, 3].

One of the features of the present-day market economic system is its variability and, in this regard, a business should also change continuously. Changes cannot be random or intuitive, but they should be systemic. The ability and efficiency to elaborate and implement such changes, which are innovative in their nature, become a fundamental precondition for the creation of a present-day CMS. At the same time, while using CMSs, managers should be able to forecast, identify accurately, and even anticipate the slightest changes in the business environment [4, 5].

Therefore, companies should now make a shift from legacy methods of corporate management to cutting-edge techniques, including strategic management, innovation management, and introduction of financial innovation, in order to improve the efficiency of their management systems, because only these methods could ensure business growth, increase competitiveness, and drive value for customers. Systemic innovation and, above all, financial innovation, is critical to capitalizing on market opportunities through new products, innovative services, or process innovation relating to business process funding.

It is obvious that the inadequate pace of development and implementation of comprehensive financial innovation is one of the main reasons for the slow growth of the economy in Russia.

We argue that business revitalization and cooperation with major scientific centers with the view to acquiring, implementing, and integrating strategic financial innovation products into corporate strategic management systems in line with the development of financial innovation risk management systems could be the key financial innovation drivers for companies in Russia.

In this regard, this paper aims to discuss the following issues:

1) Essence of the contemporary strategic approach to financial innovation management in Russia;
2) Essence of strategic innovation and its role in the development of corporate management systems;
3) Characteristics of the financing strategy for innovation of Russian companies depending on their market position and market attractiveness;
4) Approaches to financial innovation risk management;
5) Risk management approach based on the analysis of the financial innovation life cycle.
It can be assumed that a change in the level of awareness of managers, wider use of advanced management techniques, including the innovation and strategic management as well as innovation in IT and decision-making processes, would enable a management system to ensure business sustainability and increase competitiveness through the development and implementation of financial innovation.

Strategic Approach to Financial Innovation and Related Risk Management in Russia

The emergence of the market economy in modern-day Russia was accompanied by three waves of transformations that have changed forever the way people work and live. They include:

- agricultural,
- industrial, and
- information revolutions.

The world has witnessed the origination of a new revolution in recent years, which is the innovation or digital revolution.
It is caused by several trends reshaping the world, business environment, and work ecosystem, such as:

- the globalization process and the following regionalization,
- an accelerated pace of technological progress,
- demographic transformations, and
- an increasing global role of emerging economies and their influence on the development of the new economic system.

In that context, the functioning and growth of businesses are increasingly dependent on the systematic creation and implementation of financial innovation. The establishment and maintenance of effective mechanisms for strategic financial innovation management become a key component to competitive success of a company, especially given that the development and implementation of

financial innovation is a long and capital-intensive process that requires better staff training and more effective use of corporate resources ensuring the implementation of the owner's business vision.

General issues of application of financial innovation and derivative financial instruments are discussed in publications by both Russian and foreign scholars, including A. Feldman, J. Finnerty, and J. Hull [6, 7, 8], while V. Antonov, R. Coase, B. Milner, Y. Mirkin, A. Radygin, D. North, O. Williamson, and R. Entov address CMS functioning, including the transaction expenses theory and the concept of conflicts of interest [9, 10, 11, 12, 13, 14, 15, 16].

A detailed examination of publications by the above-mentioned scholars proves that many of them discuss either general characteristics of financial innovation or individual applied issues related to risk modeling, derivative valuation, or the level of effectiveness of innovative tools applied. However, there are no studies, which would describe the specifics of financial innovation within a corporate management system or explore the role and position of financial innovation amongst corporate financial management tools.

The lack of well-elaborated theoretical ideas about mechanisms for the creation and use of financial innovation within a CMS prevents the development of a methodological framework that would help Russian companies to apply them in practice. Fragmentary information about financial innovation practices in Russia precludes highlighting limitations that prevent their widespread and makes it difficult to do financial engineering forecasting within corporate management systems in Russian companies.

Improving Approaches to Financial Innovation and Related Risk Management in Russia

Innovation strategies are a key tool in the present-day strategic management of financial innovation and related risks thereto. The following conditions should underlie these strategies:

1. A longer life cycle of a company's fundamental competitive advantages.
2. An accelerated turnover of product life cycles.
3. Relocation of business operations to lower-cost regions of the world.
4. Wider use of outsourcing modalities by the existing and newly created global companies in emerging countries.
5. More competitive advantages r=created through innovative proposals from employees and expanding the range of a company's competencies.
6. A wider range of new values for customers.
7. Better corporate reputation, in both national and global markets.

A detailed examination of theoretical and empirical literature has revealed the below specific characteristics of financial innovation, which are significant in relation to the goals and objectives of our research:

• Financial innovation has a reverse life cycle, i.e., there is an improvement in the characteristics of an existing service and the buyer demand is then further growing to result in the development of a new service;
• Financial innovation involves a high degree of buyers' engagement;
• Financial innovation is often initiated by users ('open innovation') and presupposes network effects;
• There are no intellectual property rights for financial services, and therefore, a financial innovation product may be potentially reproduced, which creates some challenges for higher innovation in the finance sector.

Owing to these features, a financial innovation product emerges after an increase in the supply efficiency and improvements in existing financial services. Innovative companies generally produce services at the first three stages of the financial innovation life cycle (i.e., implementation, growth, and maturity), while companies that reproduce a developed innovative product tend to enter the

market at the second or third stage of the financial innovation life cycle (i.e., growth and maturity). Therefore, depending on the life cycle stage, the intensity of competition among financial intermediaries' changes, and the share of buyers in the market at the first three stages of the life cycle will show whether the production of financial innovation products is successful or not as compared to financial innovation reproduction.

The innovation activity in Russian companies is attributable not only to supply characteristics but also to features of the demand structure, which may have implications for the comparative profitability of the innovation or imitation strategy in relation to financial innovation. In order to study the essence of the problem, we have built a theoretical model in which two financial intermediaries produce an innovative service, while Hotelling's approach [17] was used as the methodological framework. This approach involves two business entities positioned at the two ends of a unit length line (like the linear city), and the buyers are distributed along the line uniformly. In contrast to basic Hotelling's concept, ours is a dynamic four-period model, with the number of periods corresponding to the number of stages in the reverse financial innovation life cycle model.

The first financial intermediary is the Innovator and it is denoted as 0, while the other is the Imitator denoted as 1. The Innovator invents a new service and bears related costs. The Imitator reproduces this innovation with lower expenses, a slight loss in quality, and some delay in time. At the beginning of the first period, the Innovator incurs C0 costs associated with the creation of a new financial service. The expenses of creating financial innovation form a fixed value because the expenses are determined by factors that are exogenous to our model (e.g., the level of technology maturity and professional expertise of employees [Frame & White, 2009]). As soon as the Innovator has developed a new service, it offers the service to buyers and starts gaining nonnegative profits. Since no intellectual property rights exist in financial markets, every new service can be easily reproduced by the other company (the Imitator) within a fairly short period of time (in our model, it becomes possible in the second period). In this case, the Imitator is assumed to bear lower costs for this service than the Innovator did.

It is plausible to argue that C1 – reproduction costs incurred by the Imitator are quite low as compared with C0, i.e., $C0 > C1 > 0$.

In addition, innovative financial services provided by the companies under study differ in terms of their quality, with services offered by the Innovator being necessarily better, as compared to those by the Imitator.

Other things being equal, buyers prefer a provider who offers services with a higher quality level. The quality of the service provided by the financial intermediary i during the period t is denoted using the variable qit. The difference in the quality of the services provided by the Innovator and the Imitator during the period t will be $\Delta qt = q0t - q1t$ and we suggest that $q0t \geq q1t$ or $\Delta qt \geq 0$, which means that the Imitator will reproduce the service with some deterioration in the quality.

The initial quality of the service produced by the Innovator is $\tilde{q}00$. It is expected that this value is unknown to market participants (the only thing known is its mathematical expectation), and they understand the quality of the innovation not at once (not earlier than at the end of the second period). There are two possible states of the world during the zero period, depending on whether the innovation is successful or not. At the same time, it is still unknown during the zero period, which state of the world has been realized. The quality of financial services will be equal to qH00 if the state of the world is favorable, and not more than qL00 if it is unfavorable.

The maximization of profits is viewed as the core target function for both financial intermediaries in accordance with the idea generally accepted in literature. As a result, the total formula for the profits the financial intermediary i generates from its innovative service will be as follows:

$$\pi_{it} = (p_{it} - c)\, D_i(x;\, p_{0t};\, p_{1t};\, x;\, q_{0t};\, q_{1t};\, s;\, t), \text{– for } i = 0, 1, \qquad (1)$$

where pit is the price that buyers pay to the intermediary i during the period t, c is variable costs of innovation distribution (i.e., advertising, auxiliary services, etc.), and Di is the service demand.

The aggregate profit gained by the Innovator during the four periods of the financial innovation life cycle will be:

$$\Pi_0 = -C_0 + \sum_{t=0}^{3} \frac{1}{(1+r)^t} \pi_0(t), \qquad (2)$$

where $\pi_0(t)$ means the profit gained by the Innovator during the period t, and r is a discount rate.
The aggregate profit gained by the Imitator during the four periods of the financial innovation life cycle will be:

$$\Pi_1 = -\frac{C_1}{(1+r)} + \sum_{t=1}^{3} \frac{1}{(1+r)^t} \pi_1(t), \qquad (3)$$

where $\pi_1(t)$ means the profit gained by the Imitator during the period t, and r is a discount rate.
Let us then discuss the behavior of the buyer of the financial innovation product.

For the buyer at the point x, the usefulness (Uit) of the service is measured using the below formulas:

$U_0t(x) = q_0t - p_0t - sx;$ (4)
$U_1t(x) = q_1t - p_1t - s(1-x);$ (5)

where s denotes the individual buyers' choice of the innovative service provider (like transportation expenses in Hotelling's model).
We rank buyers according to their propensity to acquire innovative financial services, as follows:

Buyers with a high propensity to acquire innovative services
These are buyers (α) who prefer to buy all innovative services as soon as they appear. Our model shows that α <1/2, considering the empirical data obtained by E. Rodgers [E. Rogers, 2003].
Buyers with a moderate propensity to acquire innovative services
These are buyers (β) who would buy innovative services if there is a steady demand for this type of service among the α-buyers within one period.
Buyers with a low propensity to acquire innovative services

These are buyers (γ) who are highly conservative and who would not buy a service unless there is a strong demand among the above groups during the previous two periods.

The financial innovation life cycle within the proposed theoretical model looks as follows.

During the zero period, the Innovator enters the market with a new offering, and the service is being bought by the α-buyers, while the Imitator and the other buyer groups are watching what is happening in the market.

The Imitator arrives in the first period with the original innovation reproduction.

The Innovator and the Imitator begin to compete and there are now (α+β) buyers in the market. However, the buyers get a completely clear awareness of the quality of the financial innovation service not earlier than at the end of that period.

The service will be of lower quality – as compared with the mathematical expectation about the innovation quality by all the participants, with the probability φ in case of an unfavorable state of the world; and the service will be of higher quality in case of a favorable state of the world, which occurs with the probability (1-φ).

During the second period, the Innovator and the Imitator continue to compete. The β-buyers will leave the market if the state of the world is unfavorable and will remain – in a favorable state of the world. This period is crucial in determining whether the innovation or imitation strategy is successful or not, and its outcome will depend on who wins the struggle for the moderately conservative buyers (i.e., the β-buyers).

During the third period, the Innovator leaves the market in accordance with the life cycle model, and the Imitator will satisfy the residual demand among

the α-buyers or (α+β) buyers with a favorable state of the world or will have the entire market if the state of the world is unfavorable, depending on the behavior strategy the conservative buyers (γ) choose.

In general, the theoretical model explores how the demand for a financial innovation service is changing, depending on its structure, and proves that the success of the innovation strategy versus the imitation strategy is dependent on how the moderately conservative majority of buyers will behave at the second stage of the life cycle (maturity), which in turn depends on the initial characteristics of the service.

This leads to the conclusion that the structure of the buyer demand is an important determinant of the financial innovation success because it conditions a competitive advantage of the innovation or imitation strategy with the given characteristics of a service offer.

Conclusion

Thus, we can conclude that in the present-day context the owner and the senior management of a company should shift from legacy management models to strategic orientation, being a special management approach, which will enable them to build such innovative development models that would lead to the goal achievement in accordance with the owner's vision.

This strategic orientation is a general strategic development plan of a company, which must be enhanced with a detailed description of the strategy and implementation methods. The core components of the strategic orientation should include market orientation, entrepreneurial orientation, customer orientation, cost orientation, innovation orientation, competitive orientation, training orientation, employee orientation, and interaction orientation. The direct relationships between strategic orientation, market orientation, and innovation orientation cover three levels of the internal environment of a company, such as organizational culture (including innovation culture) and proactive customer orientation, which consists of strategic orientation on creation of the best value and tactical orientation as a set of cross-functional processes and activities that are also aimed at value creation and customer satisfaction.

In modern times, strategic success requires an efficient combination of management and both internal and external knowledge, including systematic arrangement, renovation, coordination, and socialization of that knowledge (tacit knowledge transferring), since innovation is a result of the mutual influence between tacit knowledge and explicit knowledge.

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Model Barriers to Implementation of The Simplified Strategic Cost Accounting in Micro-Entities

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Abstract

This article presents a practical approach to identification of the existing barriers to implementation of the simplified strategic cost accounting in Polish micro-entities. The identification of such barriers is an element of a broader research project addressing the micro-entity subset of the services sector in Poland and other countries of the Central and Eastern Europe (Romania, the Czech Republic, Slovakia, Hungary, Serbia, Slovenia, etc.). The task was executed on the basis of empirical findings obtained using the following research methods: questionnaire interview, questionnaire survey, semistructured interview. Some of the key findings allow for a formulation of new hypotheses for future exploration and research: (1) barriers to implementation are related to the awareness of entity owners; (2) knowledge of strategic cost accounting determines a positive approach to their implementation; (3) the specificity of the services sector is a barrier to implementation of strategic cost accounting.

Keywords: Target Costing, Strategic Costing, Strategic Accounting, Activity Based Costing

Introduction

Micro-entities, along with 'small' enterprises, play a key role in many economies. Their role is most pronounced in countries characterised by free-market structure, where this subset of economic entities is particularly well-developed, as evidence by their relative share in national economy. This type of structure offers a sizeable limitation of negative impacts from economic crises and helps boost the pace of economic growth.

The micro-entity segment is often associated with the development of advanced technologies, due to the relative ease in practical implementation of highly innovative solutions (Angowski, 2008, p.237).

In Poland, the development of the studied segment was initiated in the early 1990s, and the process has been linked to the nascent and gradual liberalization of the private sector of the economy. This trend not only improved the operating potential of this type of enterprises, but also stimulated the growing popularity of micro-entities as effective forms of economic involvement (Angowski, 2008, p.238).At present, the segment of micro-entities represents a 99.8% share in Polish enterprises, and the number of new entities grows steadily with time (Raport o stanie sektora małych i średnich…, 2018, p. 12). One of the most pronounced differences between micro-entities and larger companies is the specificity of operation. Owners of micro-entities are in principle more self-reliant and independent. In consequence, they are largely unrestrained in their decisions to introduce and implement innovative and non-conventional solutions, and are equally unconstrained in their choice of methods for testing the effects of such decisions in economic practice.

This article presents a practical approach to identification of the existing barriers to implementation of the simplified strategic cost accounting in Polish micro-entities.

Within the framework of a broader research project, the following research hypothesis was posed: barriers to implementation of the simplified strategic cost accounting in micro-entities of the services sector are only displayed in those entities which lack sufficient financial resources to implement such

solution. For the purpose of verifying the above hypothesis, two research questions were formulated as follows:

- Does the use of strategic cost accounting (be it exhaustive or simplified) bear any significant cost?
- What factors can be identified to further inhibit such entities from employing the strategic cost accounting solution in their practice?
- Are there any incentives that can be used to stimulate such entities to implement the strategic cost accounting solution?

Findings obtained in the course of this study represent a portion of a broader research project addressing the micro-entity subset of the services sector in Poland and other countries of the Central and Eastern Europe.

A Micro-Entrepreneur

National principles of classification of micro-entrepreneurs as economic entities vary from country to country and are founded on varied sets of criteria. For the EU Member States, criteria for the classification of economic entities have been set in the form of EC recommendations; this approach to classification has also been adopted for the purpose of this research.

Based on the above recommendations, a micro-entrepreneur is defined as an entity which – for the last fiscal year or the preceding reporting year – has not exceeded the limits of the following criteria:

- less than 10 employees,
- net turnover or balance sheet total of not more than 2 000 000 euro (Commission Recommendations of May 6, 2003…, art. 2);

In the calculation of the above values, a special attention should be placed upon the independence of the studied reporting entity, as values in this range are typically reported by independent entities but can also be found in affiliated entities and partnership-type entities.

An independent entity is defined as autonomous, i.e. without third-party shares and without shares issued to any such third party. In line with the Commission recommendations, the classification of micro-entities may include partner enterprises and linked enterprises, on the provision of not more than 25% of a) capital or b) voting rights of another enterprise (be it upstream or downstream), taking into consideration the larger of the two categories. In addition, the recommendations provide exceptions to the above rules, allowing for entity classification as autonomous regardless of the above limit values; these exceptions include: universities and non-profit research centres, local authorities with anannual budget of less than EUR 10 million and fewer than 5 000 inhabitants, and venture capital investments (Commission Recommendations of May 6, 2003…,art. 3).

Partner enterprises are all enterprises which are not classified as either linked or autonomous. The first criterion in this case is the value of capital or voting rights of another enterprise. The higher of the two criteria should be kept within the limits of 25% (lower) and 50% (upper). In addition, such entity should not be linked to another enterprise (User guide to the SME definition …, 2015, p.7).

In the recommendations of the European Commission, a linked enterprise is defined as an enterprise which satisfies at least one of the following criteria:

1) an enterprise has a majority of the shareholders' or members' voting rights in another enterprise,
2) an enterprise has the right to appoint or remove a majority of the members of the administrative, management or supervisory body of another enterprise,
3) anenterprisehastherighttoexerciseadominantinfluenceoveranotherenterprisepursuanttoacontractenteredinto withthat enterprise,

4) anenterprise,whichisashareholderinormemberofanotherenterprise,controlsalone,pursuanttoan agreementwithothershareholdersinormembersofthatenterprise,amajorityofshareholders'orme mbers'votingrightsinthatenterprise (User guide to the SME definition …, 2015, p.21).

Over the course of this research, it was assumed that micro-entities are, in their majority, representative of the 'autonomous' category of entities. Consequently, analytical evaluations were conducted with respect to this particular subset of the studied population.

Research of the Conducted Research

The study was conducted between January and July 2019 among micro-entities of the services sector of Polish economy, based on the use of the following research methods: questionnaire interview, questionnaire survey, semi structured interview. The research sample included a total of 1357 entities satisfying the EC criteria of micro-entity classification. Of these, 1249 entities (92%) were ultimately selected for evaluation in regard of their involvement in practical implementation of strategic cost accounting.

For the purpose of the study, it was assumed that strategic cost accounting represents:

- activity-based costing
- calculation of expenditure by type
- Kaizen costing
- life-cycle costing

In the context of strategic cost accounting, 'simplification' (abridgement) is defined as implementation of the basic principles of these models, without the need for any radical changes in the organizational structure or finance/bookkeeping systems.

Micro-entities declaring full implementation of strategic cost accounting (379entities, 30%) reported the following elements:

- simplified methods–370 entities(97%), including:
    - activity-based costing– 4 entities (1%)
    - calculation of expenditure by type – 366 entities (99%)
    - Kaizen costing–0 entities
    - life-cycle costing – 0 entities
- exhaustive methods–9 entities (3%), including:
    - activity-based costing – 3 entities (33%)
    - calculation of expenditure by type – 6 entities (66%)
    - Kaizen costing– 0 entities
    - life-cycle costing – 0 entities

This group was also a source of information on barriers faced by entities in practical implementation of strategic cost accounting:

- cost-intensive – 100 entities (26%)
- lack of sufficient specialist knowledge on the part of the owner – 10 entities (3%)
- lack of satisfactory IT support – 59 entities (14%)
- no barriers – 210 entities (57%)

As many as 870 micro-entities (70% of the studied population) had no strategic cost accounting model in use. In the study, this group of entities identified the following barriers to implementation of such strategic cost accounting solutions:

- lack of knowledge on the availability of such solutions- 700entities (80%),

- lack of awareness of the need to employ them– 800 entities (91%),
- steep cost of implementation - 870entities (100%),
- lack of sufficient knowledge on the part of employees - 870entities (100%),
- lack of awareness of the tangible effects offered by the introduction of such solutions- 803entities (92%),
- reluctance to face the associated challenge of structural reorganization - 870entities (100%).

Entities in this group were also queried with respect to the availability of resources required for the implementation of strategic cost accounting. 850 micro-entities (97%) reported having no resources available for the purpose, before even being aware of the volume of such expense. In a subsequent query, the respondents were asked to provide an estimate of cost involved in implementation of simplified strategic cost accounting:

- 0 – 2000 EUR –10 of 850 entities(1%)
- 2001 – 5000 EUR – 57 of 850 entities(7%)
- 5001 - …EUR – 803 of 850 entities (92%)

After being presented with expert estimates of the associated implementation expenses (in the range of 2001 – 5000 EUR, based on responses from recognized consulting agencies), the respondents were asked to revisit their decision. 560 entities (65%) were adamant in their view that such implementation will be put in effect, with 287 entities (33%) providing a distinctly negative view on the prospect; the remaining responses (3 entities, 2%) were undecided. Entities in this group were also asked if – knowing the realistic estimates – they were ready to reassess the availability of resources needed for the implementation of strategic cost accounting. 821entitiesconfirmed that expense in this range would be fairly acceptable to them.

Evaluation of the Findings

The research hypothesis formulated in the project was rejected in the course of research. As evidenced by the structure of responses, certain barriers to implementation of simplified strategic cost accounting solutions can be identified. These, however, can in no way be attributed to the scarcity of financial resources. Evaluation of the findings provides arguments for conclusion that more effective implementation of the studied solutions can be facilitated through proper education targeting this segment of entities. In particular, stimulation of the process can be effected by proper dissemination of expert knowledge on the estimated cost of such change as well as the specificity and benefits offered by this form of accounting. At the same time, the study revealed two most popular forms of simplified strategic cost accounting in Poland.

Conclusions

Analytical evaluation of findings and conclusions obtained in this stage of research offers prospect for formulation of additional hypotheses deserving our attention at later stages of this project: 1) barriers to implementation are largely related to knowledge and awareness of micro-entrepreneurs; (2) knowledge of strategic cost accounting determines the readiness to implement them in economic practice; (3) the specificity of the services sector constitutes barriers to implementation of strategic cost accounting. It must be emphasised that further research into the studied subject will also address barrier correlations to other countries of the region as well as potential incentives which can be used to stimulate effective implementation of simplified strategic cost accounting by micro-entities

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Price Relations between Individual Links in The Production and Distribution Channel of Cereals and Primary Processing Cereal Products on The Example of Poznanska Wheat Flour in Poland In the Years 2004 – 2018

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Abstract

The production and distribution of most food products with longer shelf life is often carried out in very complex and long marketing channels. The purpose of the study is to analyze and evaluate changes in price relations between individual links in the production and distribution channel of a selected primary processing cereal product. Data from 2004-2019 were taken from the studies of the Institute of Agricultural and Food Economics - National Research Institute - Agricultural Market. Analyses, Trends, Assessments. In the last years of the analysed period, there is a clear tendency to shape retail flour prices regardless of changing grain procurement price and flour sales prices. From 2011, retail prices of flour initially grew steadily and then were kept at a fairly stable level, which, with fluctuating prices at the previous two levels, contributed in total to the stability of achieving a high trading margin. This situation was slightly disturbed by the change in price formation policy of flour companies in 2018.

Keywords: Price Transmission, Wheat, Procurement Price, Producer's Prices, Retail Prices

Introduction

For food products to be on the market, they must go a longer or shorter path in the production and then distribution channel. As emphasized by Tłuczak (2015, 2019) the supply chain combines activities whose primary goal is to ensure buyer satisfaction and profit for enterprises participating in the flow of products and services. In the case of food, it is the supply chain from the sphere of primary agricultural production (farmer) to the consumer. It is characterized by a large diversity of its entities, i.e. producers, suppliers, transport companies, warehouses, wholesale and retailers, service organizations and consumers.

The product must be competitive to find a buyer on the market. As noted by Kowalska, Olszańska, Urban (2015) price is the most important tool for companies to influence the market. Price plays a particularly important role in consumer products of frequent purchase, especially food. As emphasized by Firlej, Kowalska, Piwowar, (2017), competitiveness at the enterprise level is the ability to cope with competition, maintain or increase market share and profits from business activities. Therefore, the competitiveness of the enterprise depends on the competitiveness of individual products and services produced and sold on the market.

The production and distribution of most food products with longer shelf life takes place in often very complex and long marketing channels, frequently covering more than one stage of production within primary and secondary processing. An example of this is the cereal market, where primary processing produces flours and cereals that can subsequently be sold or become a raw material in the bakery, confectionery or other industries as part of secondary processing. Starting from the primary raw material, which is cereal grain, we get a number of different end products at various stages of processing. In most food industries, the main cost is the purchase price of the raw material. Therefore, it should be expected that the prices of the finished product will be correlated with the purchase price

of the basic raw material. In this context, one can follow the price formation process from the supply side of the raw material and the finished product that goes to the market. As noted by Kowalska, Olszańska, Urban (2016), in addition to the element of production costs, when determining the price of a product, a number of other factors are also taken into account, e.g. the brand, competition and its prices, supply situation in the country and on foreign markets. On the other hand, the price of the finished product is influenced by a number of factors on the demand side, including demand for such products, complementary and substitution products, changes in customer preferences and tastes, the structure and types of wholesale and retail trade outlets and their sales and price formation strategies. The price of raw material and the product at various stages of its production is therefore the result of many elements and factors appearing on the market in a given place and time. Hence, the analysis of prices of selected cereal products and price relations between individual links of the marketing channel of their production and distribution seem to be interesting problems. Transferring prices between the various links of the marketing channel - purchase, sale and retail - is called price transmission. In a well-functioning market, it can be expected that the links between prices will occur at all analysed levels. According to the research study by Kettunen (1992) the price margins of individual links reflect the volume of processing and transaction costs, the profits obtained there, as well as the inefficiency of the market system. Research on price transmission was conducted, among others Morkis, Nosecka, Seremak-Bulge (2010), Krawczak (2017). The relationships between prices can be examined, among others, by calculating the correlation coefficients between prices on individual links of the marketing channel.

Purpose, Methods and Data Sources

The study presents data on an exemplary primary wheat processing product - Poznanska flour. For this product, links and relations between the average monthly wheat procurement prices and the sale price of Poznanska wheat flour (producer's price), producer's prices and retail prices as well as wheat procurement prices and Poznanska wheat flour retail prices were analysed using basic methods of statistical data analysis. Data on these products were taken from monthly publications of the Institute of Agricultural and Food Economics - National Research Institute - Agricultural Market. Analyses, Trends, Assessments. The data was collected from the beginning of 2004 to August 2019, hence the entire period of Poland's membership in the European Union was taken into account. The source of the data are the reports prepared for the needs of the Central Statistical Office. It can therefore be assumed that the methodology adopted for calculations was uniform. Due to the changing level of inflation, the proportions between prices were mainly expressed in the form of price relations.

The purpose of the study is to analyze and evaluate changes in price relations between individual links in the production and distribution channel of a selected primary processing cereal product.

Research Results and Discussion

In the years 2004 - 2018, the procurement of wheat in Poland, both for consumption and feed purposes, fluctuated considerably and ranged from 3 005.6 thousand tonnes in 2007 to 6,604.2 thousand tonnes in 2017 (Fig.1). In the analysed period, large purchase fluctuations were visible and three, 5-6-year periods of fluctuations in this phenomenon can be indicated. Assuming that the cycle will be the periods between the minimum purchase volumes, the first of them lasted until 2007, with the maximum volume in 2005. The next cycle took place until 2013 with the maximum volume of purchases in 2011 and 2012. During the subsequent cycle, the maximum was recorded in 2017. The cyclicality of purchase volume is associated with the wheat supply changing over time, but also with the market demand for animal feed purposes.

During this period, the production of Poznanska wheat flour was definitely more stable. The minimum production volume was recorded in 2008 (1,317.9 thousand tonnes) and the maximum in 2018 (1,769.7 thousand tonnes). In the period between 2004 and 2010, considerable fluctuations in production were visible. Since 2011, its gradual and quite systematic growth has been noticeable. Flour, unlike cereal grains, is a product with a limited storage time and its production is usually planned for specific market needs.

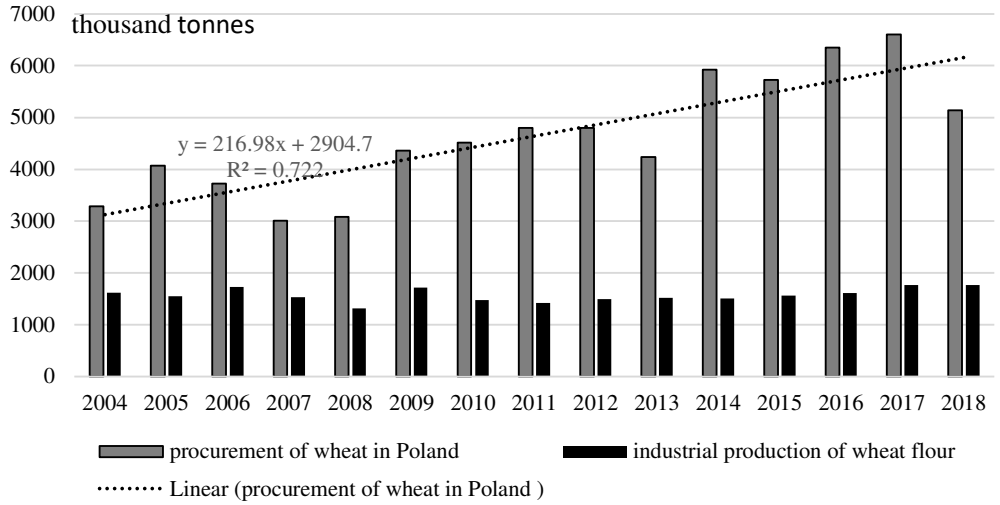

Fig. 1: Wheat procurement and industrial production of wheat flour in Poland in 2004-2018 (thousand tonnes); Source: own study based on: Agricultural Market. Analyses, Trends, Assessments. Monthly bulletins of IERiGŻ-PIB, 2004-2019

In turn, throughout the year, the purchase of wheat is subject to large seasonal fluctuations (Fig.2). The largest purchase is carried out, as expected, after the harvest in July and August, although its size in these months can be very different in relation to the volume of purchase in a given year. For example, an exceptionally high purchase after harvest was recorded in August 2017 and in the next two years it was more than a half smaller. Against this background, flour production is definitely more even throughout the year. However, also in this case, the periods of slightly larger and smaller production are noted. Over the course of the year, the flour production usually takes place from August to November (autumn season and pre-Christmas period) and around March (before Easter). Smaller flour production is recorded between April and June.

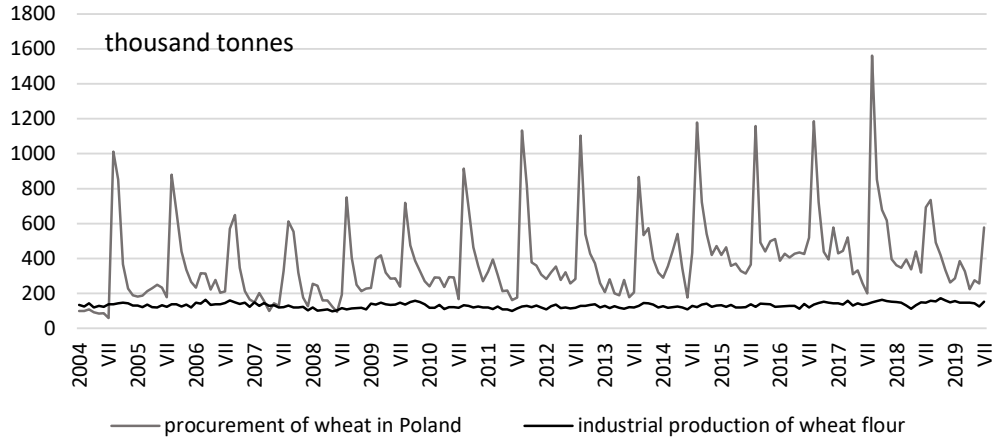

Fig. 2: Wheat procurement and industrial production of wheat flour in Poland in 2004-2018 (thousand tonnes, monthly data); Source: own study based on: Agricultural Market. Analyses, Trends, Assessments. Monthly bulletins of IERiGŻ-PIB, 2004-2019

Against this background, data on average procurement prices of wheat, producer's prices of Poznanska wheat flour and retail prices of this product are of particular interest (Fig. 3).

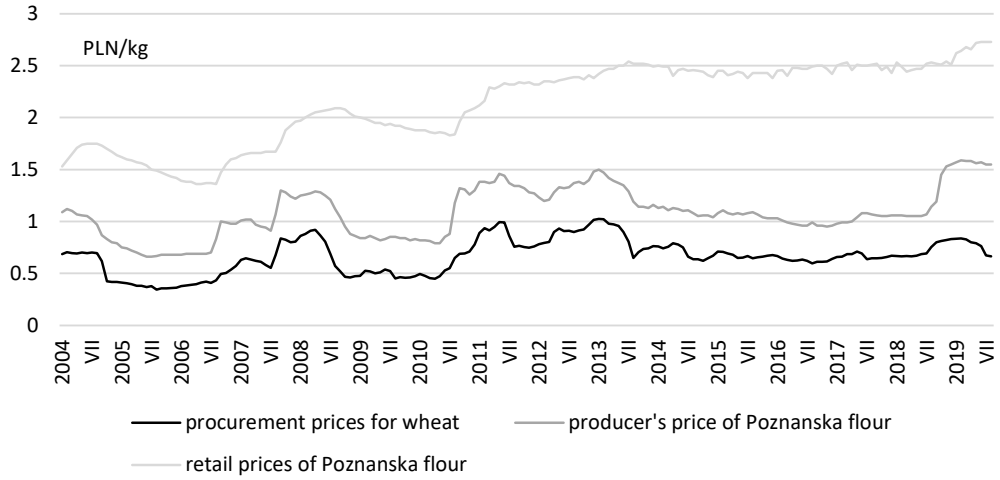

Fig. 3: Monthly wheat procurement prices, producer's prices and retail prices of Poznanska wheat flour in Poland in 2004-2019 (PLN / kg); Source: own study based on: Agricultural Market. Analyses, Trends, Assessments. Monthly bulletins of IERiGŻ-PIB, 2004-2019

When assessing these data, two significant periods can be distinguished. The first of them lasts from the beginning of the analysed period until the harvest in 2011. During this period, relatively comparable price trends on individual markets continued. The retail prices of flour fluctuated significantly, following the changing sales prices of flour and the procurement prices of wheat. At the end of this period, there was a visible tendency to increase the trade margin in the retail price of wheat flour.

From the fourth quarter of 2011 to the end of the third quarter of 2018, relatively stable and reasonably low levels of producer's margins were kept. Producers' prices would rise and fall along with the changing wheat procurement prices. The flour trade policy began to take shape in a different way. In the first months of this period, average retail prices began to increase, but this was "justified" by the increase in flour sales prices. At the same time, the trade margin for the product was gradually increasing. In the following months from August 2014, the retail prices of flour only slightly fluctuated, in the range of 2.48-2.53 PLN / kg. These fluctuations were observed on a much smaller scale than in the case of flour sales prices and wheat procurement prices, and the trade margins reached the highest levels in the entire analysed period.

Another change was visible from the fourth quarter of 2018, it is difficult, however, to judge on the basis of such a short period whether this will continue as a constant trend. It was a period when wheat purchasing prices initially increased significantly, and then, from the second quarter of 2019, they began to decline gradually. Initially, flour producers in the period significantly increased the selling prices of their product, to a greater extent than it would result from the increase in raw material prices, and then only slightly decreased them (despite a clear drop in the procurement prices of wheat during this period). Traders, on the other hand, reacted with an increase in the retail prices. It seems, therefore, that following a change in the policy of shaping trade margins for this relatively cheap product, also the producers decided to make the prices of their product independent from the raw material purchase prices. This applies especially to periods when the prices of the basic raw material fall. The growth periods of wheat prices are still used to increase producer's prices and retail prices of Poznanska wheat flour. Wheat procurement prices were the most variable (coefficient of variation 25.08%). The coefficient of variation of wheat flour sales prices was 21.86%. The lowest variation was recorded for retail prices of flour - 18.12%. This gives a certain picture of who has earned the most important

position, plays a decisive role and has the greatest freedom in shaping price policy throughout the marketing channel.

Fig. 4 presents the dynamics of the analysed prices. This is the dynamics with a fixed basis for which January 2004 was adopted. In addition to confirming previously made observations, it can be added that in several months the prices considered were unfavourable as despite the progressing, although relatively low inflation, the prices at individual links were lower than the price level at the beginning of the period under consideration. The least favourable situation was in the cereal market and in the case of flour producers. Until the harvest in 2011, only in the period between the harvest in 2007 and the next harvest in 2008, the purchase and sales prices of flour were higher than the prices from January 2004. However, the retail prices of flour were lower than those from January 2004 only in the marketing year 2006/2007.In the remaining months these prices were higher. After the harvest in 2011, for about two years, wheat and flour sale prices were at a higher level than in January 2004, but then there was a long period of their stabilization at the level from the beginning of the analysed period. The price situation for both links slightly improved after the 2018 harvest, but only in the case of flour producers it remained until the end of the discussed period. At that time, retail prices were initially rising and then, from 2013, they remained stable at the level of approximately 160% of the January 2004 price. The post-harvest period after 2018 was once again used by the trade entities to increase flour retail prices. The maximum level of retail prices of wheat flour was reached in the final months of the studied period when they reached 178.4% of the prices from January 2004. Therefore, there are numerous indications that in the case of the analysed products, the prices in the long term are most favourable for traders. Wheat procurement prices and the prices of flour producers are variable over time and in most months these products were relatively cheaper than at the beginning of the analysed period.

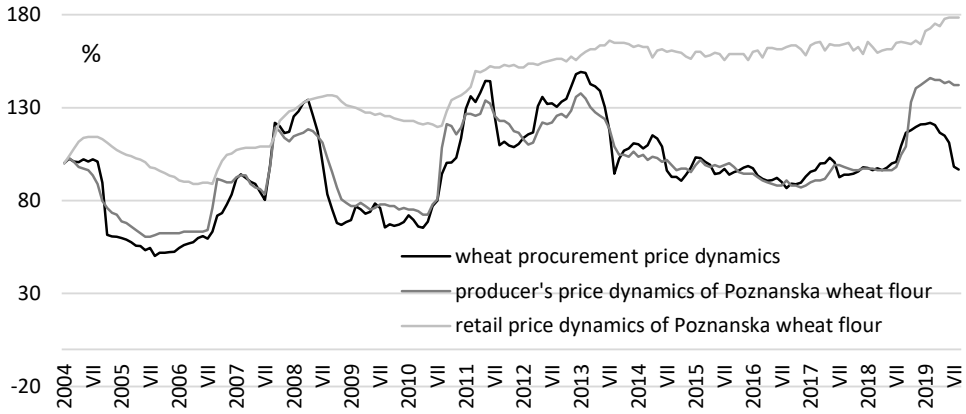

Fig. 4: Dynamics of monthly wheat procurement prices, producer's prices and retail prices of Poznanska wheat flour in Poland in 2004-2019 (%, January 2004 = 100); Source: own study based on: Agricultural Market. Analyses, Trends, Assessments. Monthly bulletins of IERiGŻ-PIB, 2004-2019

The next stage of the analysis was to indicate the share of individual links in shaping the retail price of wheat flour (Fig.5). The problem arises as how to analyze and calculate the level of margins at the individual stages of flour production. Economic practice and the data cited in subsequent publications by Jurga (1994), Jurga (2003)and Kołożyn-Krajewska, D. Sikora T. (1999) indicate that an average of 1.429 kg of grain is used to obtain 1 kg of flour. Grain is almost entirely processed in mills, except for the highest quality flour, other products of lower value are also obtained. Assuming that 1.429 kg of cereal grain is used to produce flour, flour producers' margins are significantly reduced. Incidentally, there were even months when raw material prices were higher than flour sales prices. In cereal processing, however, it is normal to stock up on raw materials, usually at times of more favourable prices. It is also difficult to estimate the value of other obtained products. Considering this, the prices

of 1 kg of wheat and 1 kg of other products were taken into account, but ultimately it should be assumed that the producers' margins were slightly lower.

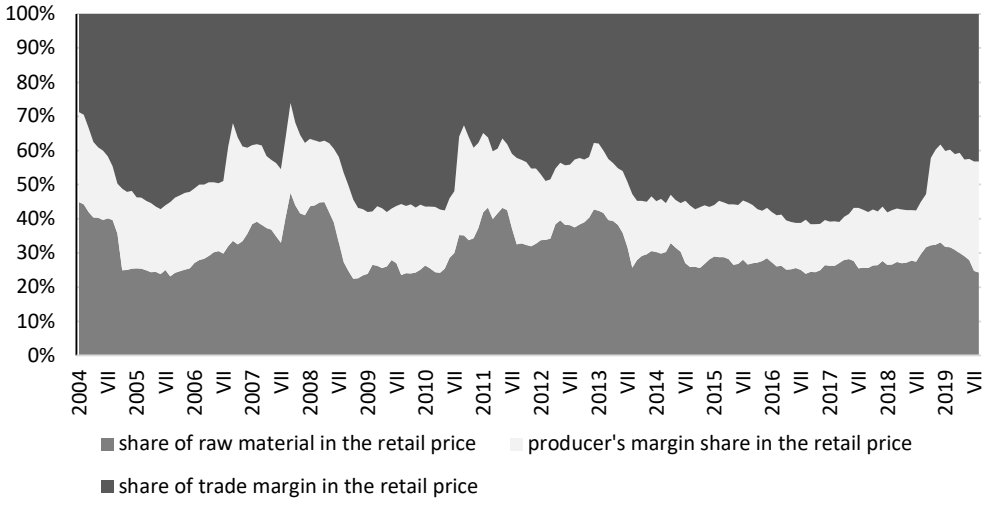

Fig. 5: Share of individual links in the Poznanska wheat flour production chain in the retail price of the finished product in the context of changes in wheat procurement prices (%, PLN / kg); Source: own study based on: Agricultural Market. Analyses, Trends, Assessments. Monthly bulletins of IERiGŻ-PIB, 2004-2019

The shares of the raw material in the retail price as well as the producer's and trade margins in the subsequent months of the researched period fluctuated significantly. In a changing market situation, individual links in the marketing channel increased or decreased their share in the retail price. The most stable situation regarding the share of the margin in the final price was recorded in the case of trade margins. Their share ranged from 26.14 to 61.6%. The trade sector undoubtedly had the largest share in the retail price of flour in most months, while in some cases the trade margin consisted of wholesale and retail margins. In the case of large retail chains, this margin entirely related to one economic entity. Trade margins decreased during periods of high cereal prices. These relations are shown in Fig. 6

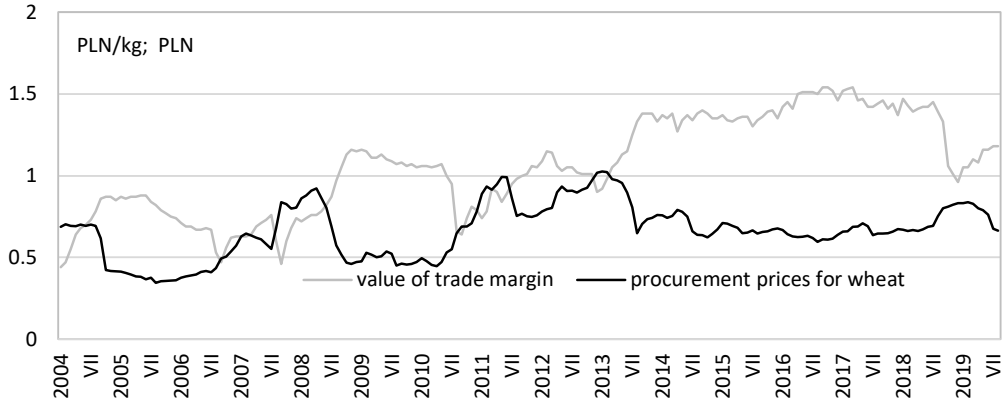

Fig. 6: The value of the trade margin and wheat procurement prices in Poland in 2004-2019 (PLN; PLN / kg); Source: own study based on: Agricultural Market. Analyses, Trends, Assessments. Monthly bulletins of IERiGŻ-PIB, 2004-2019

For cereal producers, these shares ranged from 22.46 to 47.57%. However, high shares in the retail price were only possible for a short time, usually in individual months. In most months they were between 20 and 30%. The share of producer's margins in the retail price reached the lowest levels - from 12 to 34.4%. Obviously, millers could buy grain earlier, at better prices. Flour is also not the only milling product.

An indication of the reaction to price changes on individual links of the marketing channel can be obtained by analysing the annual values of correlation coefficients (Table 1). The presented calculations indicate that in the considered years the strongest relationships occurred between wheat procurement prices and flour producers' prices. Such strong relationships can be indicated in most of the years from the 2004–2014 period. From 2015, these relationships were significantly weakening, and from 2017 a weak negative correlation appeared. But already in 2018, there was again a strong link between prices at this level. For the entire analysed period of fifteen years, only four years can be indicated as those of weaker relationships between cereal procurement prices and flour sales prices.
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Table 1: Annual correlation coefficients between individual price levels for the period 2004-2018

years	wheat procurement prices; prices of flour producers	prices of flour producers; retail prices of flour	wheat procurement prices; retail prices of flour
2004	*0.91*	-0.18	0.10
2005	*0.85*	*0.70*	*0.87*
2006	*0.93*	*0.88*	*0.94*
2007	*1.00*	*0.82*	*0.83*
2008	*0.94*	-0.12	-0.37
2009	0.11	0.37	*0.55*
2010	*0.97*	*0.80*	*0.82*
2011	*0.90*	-0.26	-0.38
2012	*0.94*	*0.77*	*0.71*
2013	*0.95*	**-0.77**	**-0.80**
2014	*0.81*	0.56	0.32
2015	0.21	0.38	0.12
2016	0.60	-0.28	-0.56
2017	-0.25	-0.19	-0.02
2018	0.91	0.50	0.61

Source: own study based on: Agricultural Market. Analyses, Trends, Assessments. Monthly bulletins of IERiGŻ-PIB, 2004-2019

When analysing the relationship between flour sales prices and its retail prices, the correlation coefficients are quite different. A high positive correlation between the prices of flour producers and its retail prices occurred only in five out of the fifteen discussed years. These were the years 2005-2007, 2010 and 2012. In the remaining years, there was a weak positive or negative correlation. In 2013, a high negative correlation was noted. In the same years, there were also relatively strong relationships between procurement prices of wheat and retail prices of the analysed flour. The occurrence of a strong negative correlation value is associated with its higher values than in the case of previously analysed relations. Significantly higher negative correlations can be found in the four of the years researched (2008, 2011, 2013 and 2016). The presented calculations show a progressive decrease in the strength of price relations between the sphere of production and trade and confirm the earlier observations.

Conclusion

The procurement of wheat for consumption and feed purposes in the analysed years changed cyclically with a general tendency to increase at a rate of approx. 217 thousand tonnes per year. In the case of wheat procurement, strong seasonal fluctuations are also typical. In the early years of the analysed period, flour production fluctuated. The growing production trend has been dominating since 2011. In this market, there are also noticeable slight seasonal fluctuations in the production volume, associated mainly with periodic fluctuations in demand.

The price of raw material and the price of finished products at various stages of its production and distribution result from numerous elements and factors appearing on the market in a given place and time. Purchase prices of wheat fluctuated significantly, often reaching the levels lower than at the beginning of the period under review. The sales prices of flour were most closely related to wheat procurement prices. In the last years of the analysed period, there was a clear tendency to shape retail flour prices regardless of changing cereal procurement price and flour sales prices. From 2011, retail prices of flour initially grew steadily and then were kept at a fairly stable level, which, with fluctuating prices at the previous two levels, contributed in total to the stability of achieving a high trading margin. This situation was slightly disturbed by the change in price formation policy of flour companies in 2018.
In the entire analysed period of fifteen years, it is possible to identify 11 years of very strong relationships between procurement prices of wheat and the prices of flour producers. Three years of weaker relationships were 2015-2017. There was a strong positive correlation between the flour producers' prices and their retail prices only in five years, mainly the initial ones. A similar situation occurred also in the case of correlation between retail prices of flour and wheat procurement prices. Noteworthy is the significant change in mutual relations in price formation policy that took place in 2013. It was the only year when there was such a strong negative correlation between retail prices of flour and the prices on other links in the marketing channel.

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Trends in Beef Production in Selected European Union in 2004-2018

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Abstract

The goal is to analyse changes in beef production in the European Union over a period of fifteen years (from 2004 to 2018). The analyses concern, inter alia, trends in production volume changes, cyclical and seasonal fluctuations. The study uses data from the Eurostat database and extensions of the Institute of Agricultural and Food Economics - National Research Institute. Detailed analysis looked into the data on the volume of production throughout the EU and in the areas of available solutions in this area. France, Germany, Great Britain and Poland were selected for analysis (first three and sixth place in terms of production volume in the EU). The share of these countries in the total volume of beef production in the EU-28 in 2018 was over 50%. In the analysed period, beef production in the EU fluctuated cyclically with a general downward trend. There were also significant changes in the structure of this production. Seasonal fluctuations (during a year) in the various categories studied are significantly different from the point of view of their use compatibility, hence their extraction across the EU is somewhat difficult. Analysis of monthly data on the volume of beef production in the analysed countries points to repeated systematically changes in these values on an annual scale.

Keywords: Beef Production, European Union, Seasonality.

Introduction

Agribusiness is the largest production sector in the European Union, taking into account both the value of turnover and the creation of added value, as well as the size of employment. In this context, according to Firlej, Kowalska, Piwowar, (2017) the food industry deserves special mention. A significant development impulse for the food industry in Poland was accession to the European Union in 2004. In particular, the first four years of membership in the European Union were a period of rapid growth in the turnover of Polish international trade in agricultural and food products. Kowalska (2014) emphasizes that the agricultural and food production sector is one of the few in the Polish national economy that has a positive balance in trade.

Alongside pork and poultry, beef is one of the basic types of meat consumed in the European Union. The European Union constitutes also an important part of the global beef market, both on the supply and demand side. Beef is considered to be one of the most valuable types of meat, valued due to its taste qualities. The price of good-quality beef is relatively high compared to other meat types. This is the reason for its low consumption, e.g. in Poland. In December 2018, the world's cattle population was estimated at 987 million heads. There are visible important structural changes occurring in this production sector. Brazil's cattle population is growing, strongly supported by government programs. In China is also increasing. As ASF disease develops in Asia, the demand for this type of meat will increase there. Cattle population in the United States is also growing. Against this background, the cattle heads in the Union slightly decreased, mainly among the largest producers in the EU-15 group.

Purpose, Methods and Data Sources

The aim of the study is to analyse changes occurring in beef production in the European Union over a period of fifteen years (from 2004 to 2018). The analyses concerned, inter alia, trends in the changes of production volume, cyclical and seasonal fluctuations. The study uses data from the Eurostat database and publications of the Institute of Agricultural and Food Economics - National Research

Institute. The data on the production volume in the entire Union and in the countries with the greatest potential in this respect were subjected to a detailed analysis. France, Germany, Great Britain and Poland (countries occupying respectively the first three and the seventh place in terms of EU production volume) were selected for detailed analysis. Their share in the overall volume of beef production in the EU-28 in 2018 was over 50%. The study uses a multiplicative analysis model of time series data analysis described by several authors, including Aczel (2000), Kowalewski (2005) and Lira (2011) . The attempts focused on isolating the component of seasonal fluctuations. The coefficients extracted in this way include seasonal and random fluctuations with lower potency. This method was described by Luszniewicz (1987) and Pułaska - Turyna (2008).

As described by Kamiński (1965) and Shepherd (1963) seasonality may be defined as fluctuations occurring and recurring as part of subsequent annual periods. As described by Roosen, Hennessy, Hennessy (2004) they occur under the influence of natural and social factors, technological and organizational progress. Seasonality is a relatively predictable phenomenon in terms of its course, but not the scale of fluctuations. It can be a negative phenomenon if it causes accumulation or shortages of supply in certain periods of the year, but it can also result from mutual adaptation of live cattle producers and processing plants to changing demand. Seasonality in the production of live bovine cattle results from the traditionally shaped production cycle (the most favourable breeding periods, the use of periods of abundance of green feed). These factors are important primarily for the small-scale economy. Large-scale farms distribute production more evenly throughout the year. According to the book Animal husbandry (1996) the sales of animals spread over the year, in addition to the benefits associated with the possibility of achieving higher revenues during periods of seasonal price increases (associated with a decrease in supply), also gives additional benefits associated with the rational use of infrastructure related to animal husbandry, an even distribution of labour demand, the rhythm of income and expenses on the farm, risk reduction.

Research Results and Discussion

Beef production in the European Union in the analysed period of fifteen years changed cyclically with the general tendency to decrease at an average rate of about 48,000 tonnes per year (Fig.1). The maximum production for this period was recorded in 2004 and it amounted to 8 349.76 thousand tonnes, while the minimum in 2013 - 7 267.96 thousand tonnes, i.e. it was lower by 13%. In 2018, beef production in the Union represented 95% of its volume from 2004. In subsequent years, when production reached maximum values in the production cycle, the production volumes were lower than in 2004. It can be assumed that this will be minor, but quite stable trend of reducing this production within the Union. Potential reasons include those related to the reduction in demand as well as the growing concern for the state of the environment.

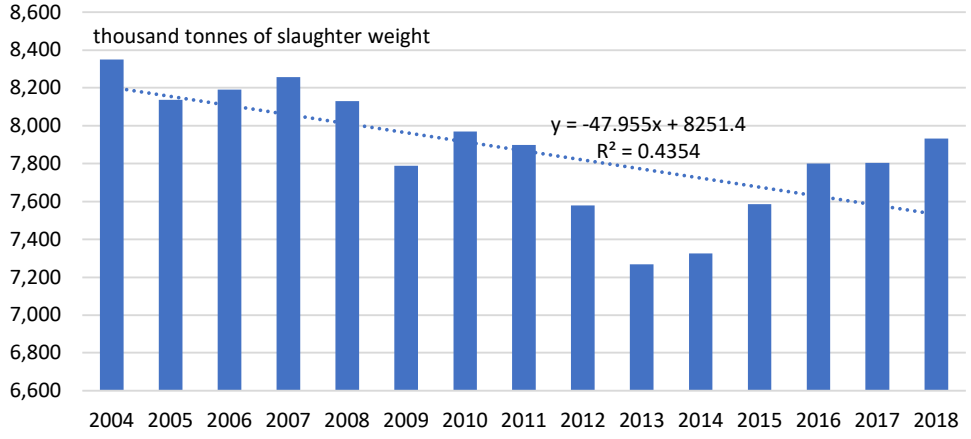

Fig.1: Beef production in the European Union in the years 2004 - 2018 (thousand tonnes of slaughter weight)

Source: study based on Eurostat database

France is the largest beef producer in the EU (Fig.2). Its share in the total beef production in the Union in 2004 was 18.9%. By 2018, this share had slightly decreased to 18.4%. In 2013, the year previously indicated as the period of minimum production, the share of France was higher and amounted to 19.3%. Another very large beef producer is Germany with a 13.9% share in 2018. The share of Germany in the analysed period decreased from 15.1% in 2004 and 15.2% in 2013. The next country in the ranking is Great Britain (with a growing share in the overall beef production, from 8.7 to 11.6%). Italy also has a significant position. The share of this country in subsequent years decreased and amounted to 13.8% in 2004, 11.8% in 2013 and 10.2% in the final year of the analysis. The next two places in the ranking were taken by Spain and Ireland (with shares in 2018 8.4 and 7.8%, respectively). Against this background, beef production in Poland was characterized by dynamic growth. The share of Poland in its overall EU volume increased from 3.6% in 2004 through 4.7% in 2013 to 7.1% in 2018. According to the research study by Olszańska (2012) in Poland, a new quality cattle herd with meat or milk-oriented breeds was still being built in this period. These activities were initiated after marketization of the economy and brought great benefits in the form of a significant increase in cow milk yield and a large improvement in meat quality.

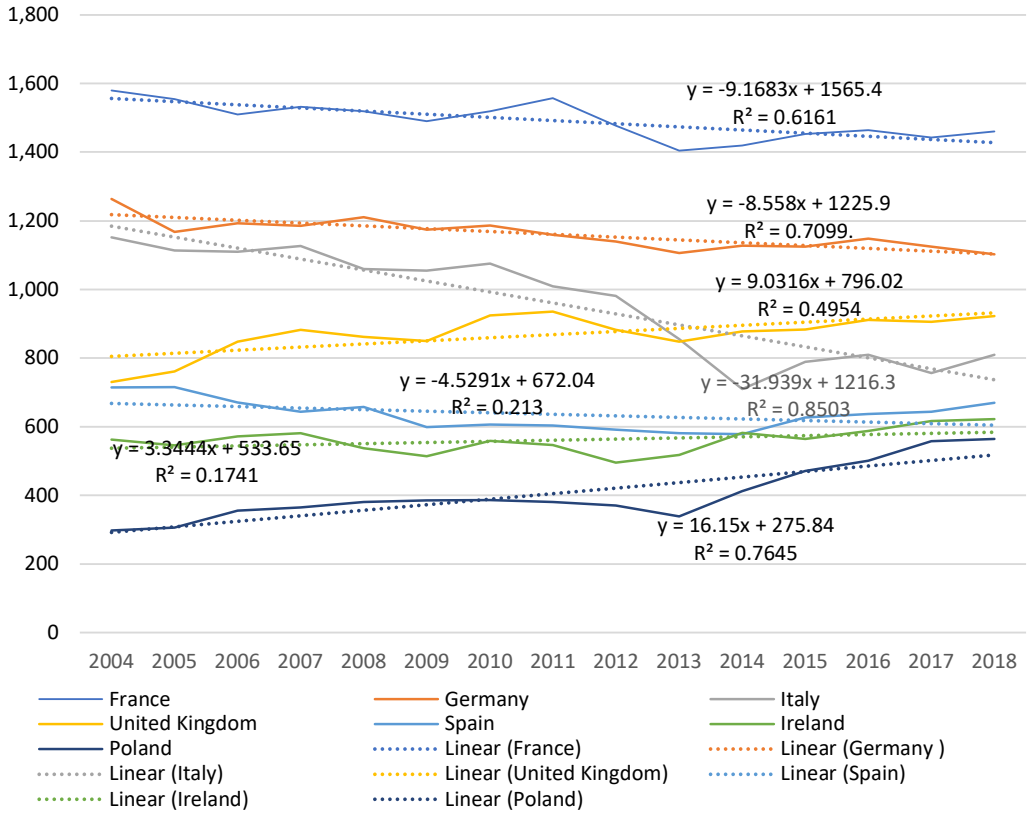

Fig.2: Production volume of major beef producers in the European Union in 2004-2018 (thousand tonnes of slaughter weight)

Source: study based on Eurostat database

The share of the first three countries (in 2018) in the total beef production in the EU in 2004 was 46.2%. In 2013, it increased to 46.2% and in 2018 it fell to 43.9%. Taking into account also the previously quoted data, it means that during periods of decreasing production, it usually decreased to a much greater extent in the countries with lower production. Considering the seven countries discussed earlier,

their share in the total beef production in the Union was respectively: in 2004 - 75.4%, in 2013 - 77.8%, in 2018 - 77.5%.

Fig.3 presents the dynamics of production volume of the seven largest beef producers in the EU. Dynamics based on a constant basis were calculated, taking as a starting point the volume of production in 2004. The presented calculations confirm previous general observations regarding changes in these volumes. Poland stands out from the rest of the countries. In 2013, the production volume accounted for 113.7% of the 2004 figure. After 2013, the volume of beef production definitely and systematically increased, to the level of 189.4% in 2018. Greater dynamics, as compared to other countries, was also found in the case of Great Britain. In 2007, it reached approximately 120.7% of the production volume from 2004. After a slight decrease, another local maximum was recorded in 2011 - 128.1%. In 2018, the level of this production reached 126.3% of the 2004 volume. The largest falls were recorded in Italy.

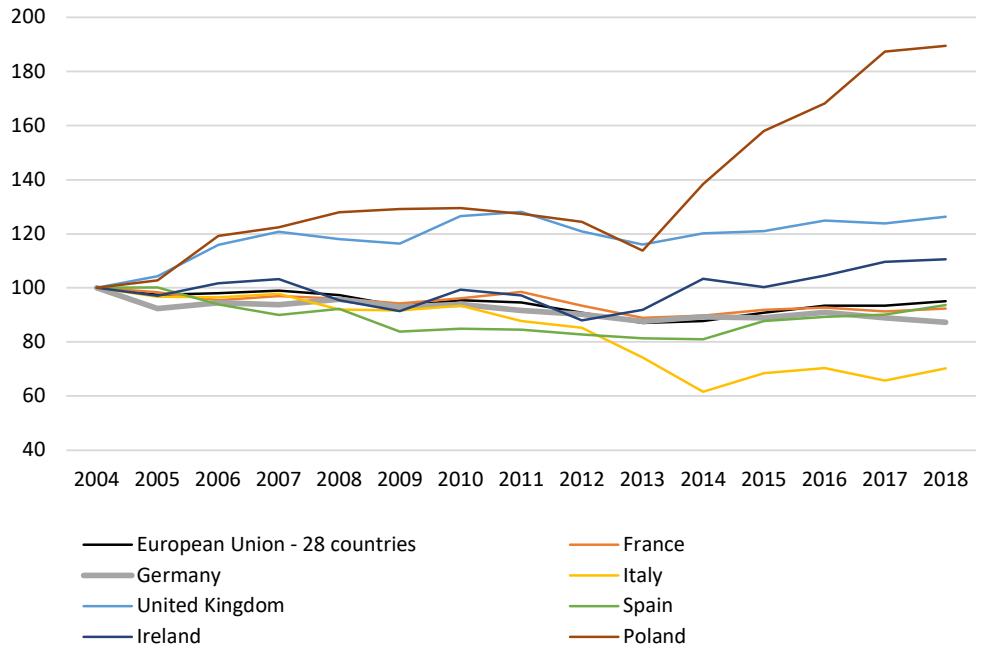

Fig. 3: Dynamics of beef production volume of the seven largest producers in the European Union (2004 = 100%)

Source: study based on Eurostat database

The remaining part of the study is limited to the analyses of four countries indicated in the introduction: France, Germany, Great Britain and Poland. From the time series containing monthly data for individual countries and the entire European Union covering 180 months from 2004-2018, seasonal components and random fluctuations with lower potency were separated. All of the drawings were consciously prepared in the same scale so that the differences in the scale of seasonality of the studied phenomenon between countries were visible. The results of the analyses are presented in the following figures (Fig.4 – 8).

Seasonal fluctuations in beef production throughout the Union are the resultant of the production levels achieved in individual countries (Fig.4). They are relatively small (only sporadically go beyond the range of +/- 10% and a number of irregularities of this phenomenon can be indicated during the analysed fifteen years. Such an equalization of production throughout the Union should be considered beneficial in terms of satisfying internal demand for beef and its products. In all the analysed years, production below the twelve-month centred moving average occurred in February. In most years, lower-than-average production also occurred in July and, on a much smaller scale, in June. In none of

the analysed months it can be indicated that beef production in each of the years was higher than the average, but most often it reached the highest levels in March. Generally, production levels higher than average occurred as well from August to January.

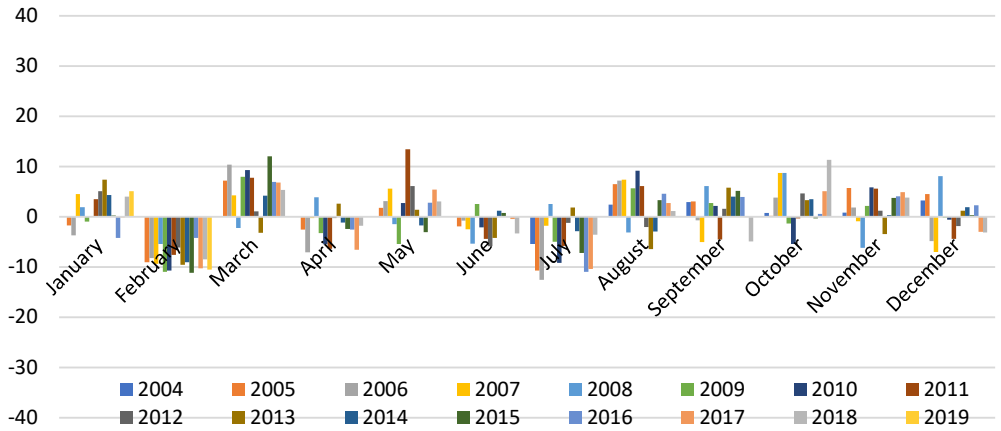

Fig. 4: Seasonal fluctuations and random fluctuations with smaller potency in beef production in the European Union in the years 2004 -2018 (%)

Source: own calculations based on Eurostat database

In the case of the largest beef producer - France, the scale of fluctuations was similar to that in the whole Union and the month when it was the smallest was also February (Fig. 5). However, greater regularity occurred in other months. From April to August, the volume of production was below the 12-month centred moving average and only sporadically the values higher than the average were achieved in these months. From September to November, the production was the highest in the year. There were many irregularities in December, January and March, but in most years production volume in March and December was above the average.

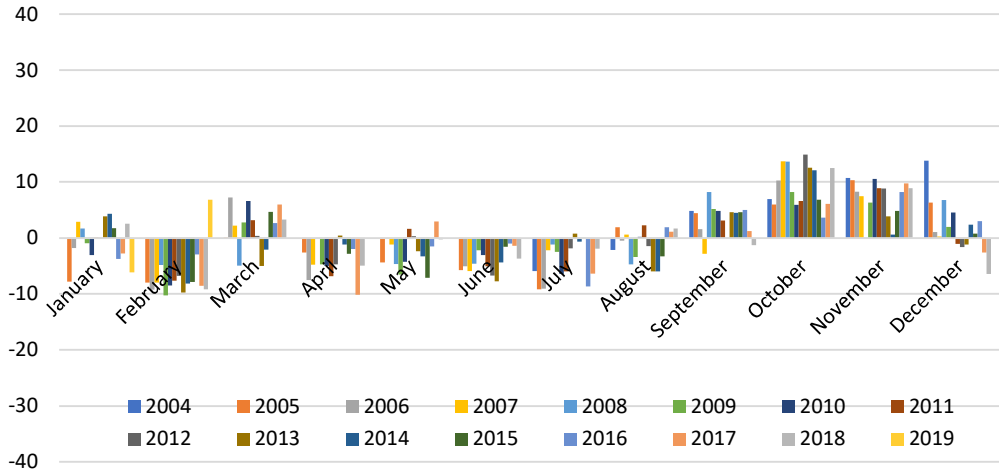

Fig. 5: Seasonal fluctuations and random fluctuations with smaller potency in beef production in France in the years 2004 -2018 (%)

Source: own calculations based on Eurostat database

Germany was the next market studied (Fig. 6). Deviations from the moving average centred on this market were definitely larger than in the case of France, occasionally reaching over twenty percent. Production reached its highest levels in November. From September to November it was higher than

average. High production was also usually recorded in March. From April to July and in February its volume was much lower than average. In most years, low values were also recorded in August. In December and January, production values in the following years were variable and no sustained trend of changes in these volumes relative to the moving average of 12 months could be indicated.

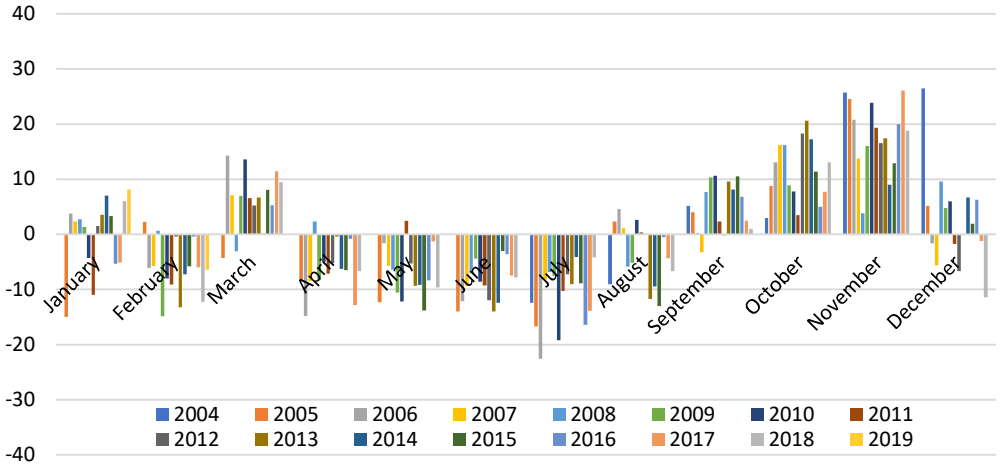

Fig. 6: Seasonal fluctuations and random fluctuations with smaller potency in beef production in Germany in the years 2004 -2018 (%)

Source: own calculations based on Eurostat database

The next analysed country was the United Kingdom (Fig.7). In this case, it can also be stated that the analysed seasonal fluctuations are significant, and simultaneously - that they recur in the subsequent years very systematically. Interestingly, the periods of high production occur very regularly every three months. A slight exception are the production volumes in November, when they are usually consistent with the level of the twelve-month moving average. Production values higher than the average occurred in January, April, July and October. Out of the analysed months, the highest level of production was recorded in October (in many years higher by over 20% than the average) while the lowest in July. In the remaining months (except November), the production volume was lower than the average, with the lowest values recorded in August.

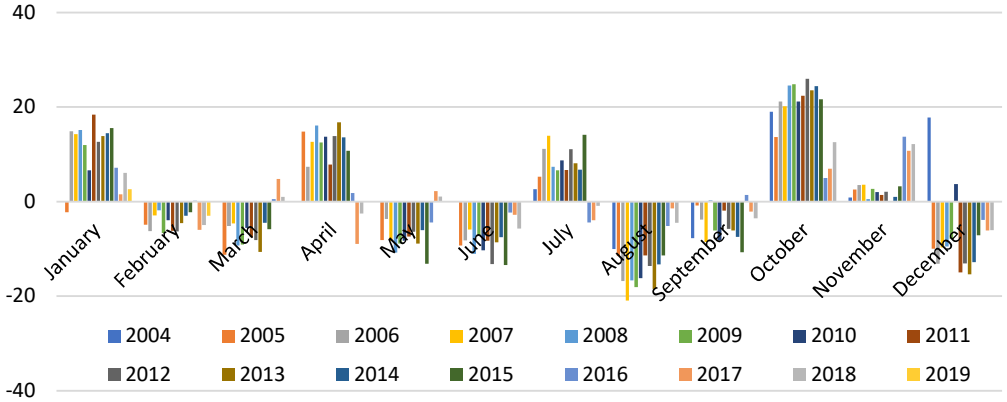

Fig. 7: Seasonal fluctuations and random fluctuations with smaller potency in beef production in the United Kingdom in the years 2004 -2018 (%)

Source: own calculations based on Eurostat database

Compared to the countries discussed earlier, the Polish market is very unstable (Fig.8). With few exceptional months, it has been difficult to indicate regular patterns. It is also a market with very high fluctuations in some years, reaching even +38.1% (March 2006) and on the other hand -25.8% in February 2012. Production lower than the average usually took place in January, February, August and

December while higher in March, May, September and October. In the remaining months, production volume fluctuated significantly in subsequent years, above and below the average value.

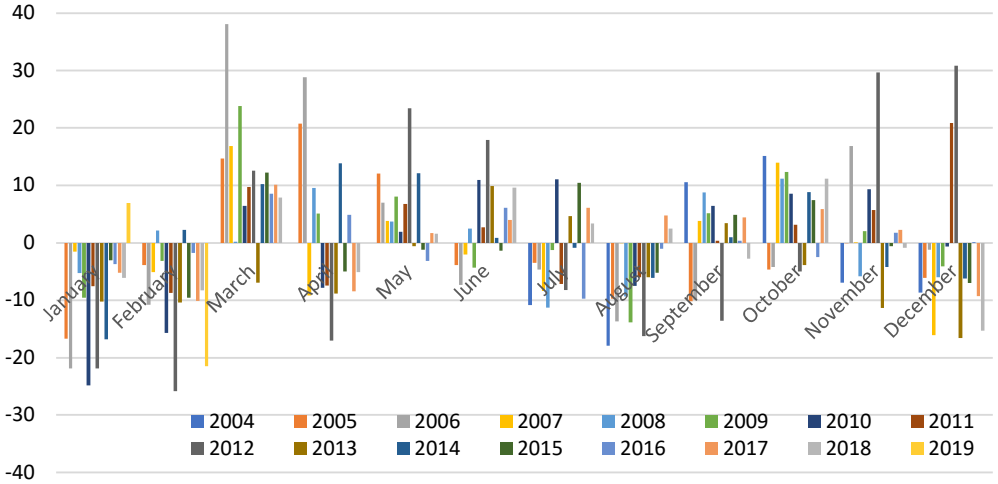

Fig. 8: Seasonal fluctuations and random fluctuations with smaller potency in beef production in Poland in the years 2004 -2018 (%)

Source: own calculations based on Eurostat database

Fig. 9 presents the so-called pure (cleared of random fluctuations) average seasonal fluctuations of beef production in the analysed countries and in general throughout the EU-28 for the entire analysed period of 15 years. Fluctuations in the EU-28, as previously noted, are usually lower, or on average, compared to the other countries studied. It should also be noted that due to the large share of the countries surveyed in the overall EU beef production, fluctuations in these countries had a large impact on the overall level of fluctuations. However, some regularities can be found in all analysed countries and throughout the EU-28. Production below the average occurred in all cases in February, August and December. In addition, in July only in the United Kingdom it was slightly higher than the average, while in other countries it was deviated by min. -5% from the average (in Germany up to 14%). In none of the months did the situation occur that the average deviations in all countries were simultaneously higher than the average, although in the entire Union such a situation took place in January, March, October and November. In January, the production lower than average occurred in Poland; in March the level of production slightly lower than the average occurred in the United Kingdom, in October in France and in November in France and Poland. In April, May, June and September, the production in the Union is close to the average which is the result of, sometimes even significant, fluctuations in production in individual countries.

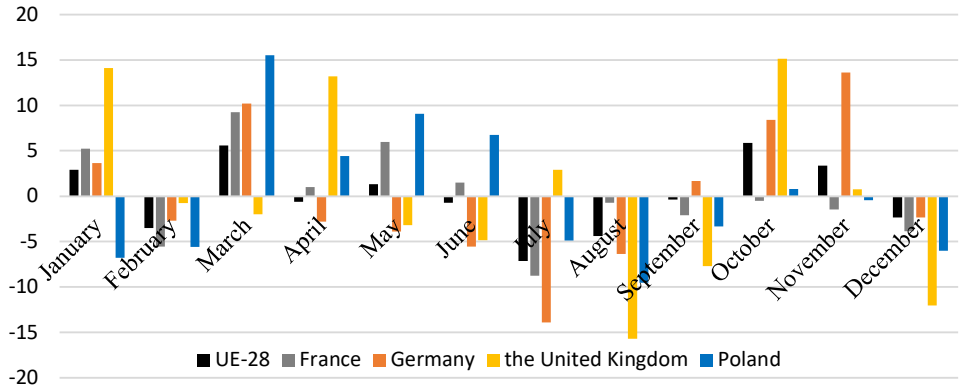

Fig. 9: Pure seasonal fluctuations in beef production in analysed countries in the years 2004 - 2018 (%)

Source: own calculations based on Eurostat database

Conclusions

In 2004-2018, beef production in the European Union was characterized by a slight downward trend. This state of affairs was caused by various trends of changes in these volumes among its largest producers: a slight decrease in production in France, Germany and Spain, a fairly significant decrease in Italy, a slight increase in Ireland, a slightly higher in Great Britain and a very fast increase in beef production in Poland after 2013.

Seasonality in agricultural production is an objectively occurring phenomenon. It can cause some problems with resource management during periods of abundance and the need for storage for periods when there are shortages. Climate diversity, as well as other factors shaping production in individual countries, mean that fluctuations between months across the EU are not large. They are also largely correlated with changes in demand for meat products (larger in the pre-Christmas periods, smaller in the summer and shortly after Christmas). The individually analysed countries differ in terms of periods of production higher and lower than average, but also of the scale of fluctuations and their regularity. The French market experiences the smallest fluctuations. In addition to the months when the production was constantly higher or lower than the average, there were also months when the situation changed in subsequent years. However, in the situation of small fluctuations in the market, these situations might be expected. Beef markets in Germany and the United Kingdom are very predictable, although they differ in terms of fluctuation distributions. These are also countries where seasonal fluctuations occur on a much larger scale. The Polish market is the least predictable, but it also shows some regularities. Incidentally, there were very high fluctuations in beef production on the Polish market.

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Organic Farming in the European Union Countries - Opportunities and Prospects

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Abstract

The article is devoted to the presentation of the state of organic farming in the enlarged EU. The study uses statistical materials published by FIBL, IFOAM and in the Eurostat database. The subject of the analysis were data on organic farming in the EU. The analysis was made both in terms of the division into the old and the new EU, as well as individual EU countries. The basic time range of data covers the years 2000-2017. The area under organic cultivation, the share of organic cultivation area in the total utilized agricultural area and the number of organic farms were analysed. The article uses the basic methods of statistical analysis of data, i.e. Pearson's correlation, trend lines, dynamics indicators, arithmetic mean, standard deviation and cluster analysis. Over the period under review, there were changes in the EU countries in both the area and the number of organic food producers. In 2017, Austria and Estonia had the largest share (over 20%) of the fully transformed ecological zone in the UAA in EU Member States. The share in these countries is as much as 3 standard deviations from the EU average. In 2000-2017, the number of organic farms in the 28 EU Member States doubled, their area increased almost three times, while the number of processors of this type of food increased over 55 times. There is a large variation in the size of organic utilised agricultural land and the number of organic farms in individual countries. In 2000-2017, the largest area of organic farming among EU countries was recorded in Spain, Italy, Germany and France. The article emphasizes also the dynamic development of this way of farming in the countries of the new EU. The directions of changes in organic farming in the new EU countries were presented, the impulse for which were the benefits of EU membership.

Keywords: Organic Farming, Organic Food, European Union, Development

Introduction

Agriculture, despite the fact that its share in the Gross Domestic Product (GDP) tends to decrease along with the economic development of the country, belongs to one of the most important sectors of the national economy. The share of agriculture in GDP in highly developed countries does not exceed 2%, while in developing countries it is at the level of 3-5%. Despite this, according to Ziętara (2008), its role as the most important element in the country's food chain is indisputable. Lockeretz (2007) emphasizes that the problems caused by industrial agriculture, i.e. deteriorating natural resources, reduced food quality and reduced viability of rural areas have contributed to a different view on agriculture, which resulted in the introduction of the principle of sustainable development by governments of many countries. According to Żelezik (2009), proceeding according to the assumptions developed then contributed to the emergence of new farming methods in agriculture, i.e. organic farming.

According to Kowalska (2015), organic farming aims at sustainable food, i.e. taking into account local ecological, social and economic conditions. Kowalska (2011) understands organic farming as an agricultural system that through activating natural mechanisms (the use of natural, technologically unprocessed natural resources) ensures sustainable soil fertility and animal health, does not poison the environment, and at the same time allows farmers to produce healthy, high-quality agricultural products - organic food. Organic farming includes the four principles of 'health', 'ecology', 'integrity' and 'care' expressing the contribution to sustainable development and underpinning its development. IFOAM (2014) and Brzezina, et al. (2017) emphasize in their studies that the principles mentioned above should be interpreted as follows: the environment is protected, farmers and employees have fair access to the means of production while receiving fair remuneration, while consumers have access to healthy diet consisting of high-quality food that they can trust and buy at attractive prices.

Due to the growing demand for organic products, especially among the richer part of the world, in the European Union countries, as well as all over the world, an interest in organic farming is growing despite increasingly restrictive requirements regarding running this type of business. Ligenzowska (2014) notes that this trend does not only apply to highly developed countries inhabited by wealthy societies, but also to many developing countries (in which favourable conditions for this type of crops are found), which perceive this industry as a prospect for development. As noted by Stolze and Lampkin (2009), in order to support the development of this way of farming, national and then EU policy makers have introduced a wide range of support measures. These include legislative instruments (e.g. EU Council Regulation 2092/91 and its subsequent versions), financial tools (e.g. Direct payments to conversions and recognized organic producers) and communication policy instruments (e.g. Information and research activities) as well as action plans for the development of organic farming. The purpose of this article is to present the results of a comparative analysis of changes in organic farming in 28 European Union countries.

Material and Methods

The study uses statistical materials published by FIBL, IFOAM and in the Eurostat database. The subject of the analysis were data on organic farming in all European Union countries. The analysis was made both in terms of the division into the old and the new EU, as well as regarding individual countries constituting the Community nowadays. The basic time range of data covers the years 2000-2017. The analysis covered the acreage of organic cultivation, an average size of an organic holding, the share of organic cultivation area in the total utilized agricultural area and the number of organic farms. The article uses the basic methods of statistical data analysis, i.e. Pearson's correlation, trend lines, dynamics indicators and cluster analysis. To compare changes over time, with a changing share of ecological area to the total utilised agricultural area and average crop area per farm, the article, after Olszańska (2012), uses standard deviation (S(x)) in relation to the average value ($\bar{x}$) as a measure of the diversity of the analyzed values between countries. The obtained results were sorted in order to identify the European Union countries that are distinguished by the largest and smallest share of organic farming area and significantly differ in the average area of farms throughout the entire analysed period. The number of separate groups in a given year depends on the variability of the studied phenomenon. To find similar countries in terms of the development of organic farming, agglomerative Ward's method using Euclidean distance, as in Kowalska and Tarnowska (2017; 2018), was used. In this method, variance analysis is used to estimate the distance between clusters.

Results and Discussion

Organic farming in the European Union develops dynamically. In 2017, the area of organic farming in the Community countries was 12.82 million ha, of which almost 80% (10.17 million ha) was located in the EU-15 countries, and only 20% (2.65 million ha) in EU-13 (Fig. 1). In the years 2000-2017, the area of organic farming in the European Union increased by over 8.43 million ha (from about 4.38 million ha to almost 12.82 million ha, i.e. two-fold), including the increase in the EU-15 by over 6.12 million ha (from almost 4.05 million ha to about 10.17 million ha, i.e. 1.5 times), and in the EU-13 by over 2.3 million ha (from over 0.33 million ha to almost 2.65 million ha, i.e. almost 7-fold).

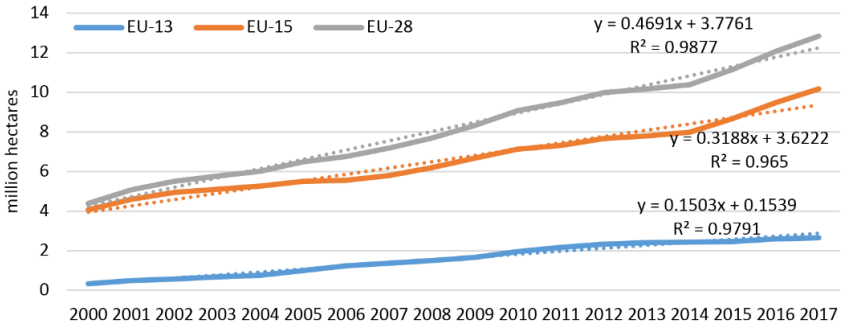

Fig.1: Changes in the area of organic farming in the European Union in total and divided into EU-15 and EU-13 (million ha); Source: own study based on https://statistics.fibl.org (12.12.2019)

The average annual increase in the area of organic farming in the Community countries in the period under consideration is almost 0.47 million ha, including 0.32 million ha in the EU-15 countries, and 0.15 million ha in the EU-13. For both the EU-28, EU-15 and EU-13 countries, the fit of the trend line was above 0.96. A very good fit and growing trend may indicate that this tendency will continue in the subsequent years.

Similarly to the area of organic farming, the number of organic farms in the European Union also increased. In 2017, there were over 343.3 thousand organic producers in the Community and over 2/3 of them were farms located in the old EU countries while less than 1/3 in the new Member States (Fig. 2). Over 18 years, the number of organic farms in the European Union increased by almost 170 thousand (that is, 1.25 times): in the EU-15 it was an increase by 85%, while in the EU-13 their number grew more than 5.5 times. In the case of both the entire Community and in the division into the countries of the old and the new European Union, the trend is positive, with a very good fit (R^2>0.91). In the European Union, during the period under review, ecological activities were undertaken by an annual average of almost 10.29 thousand new organic producers. In the EU-15 countries, as many as almost 6.06 thousand of them came every year, while in the EU-13 it was an increase by over 4.38 thousand.

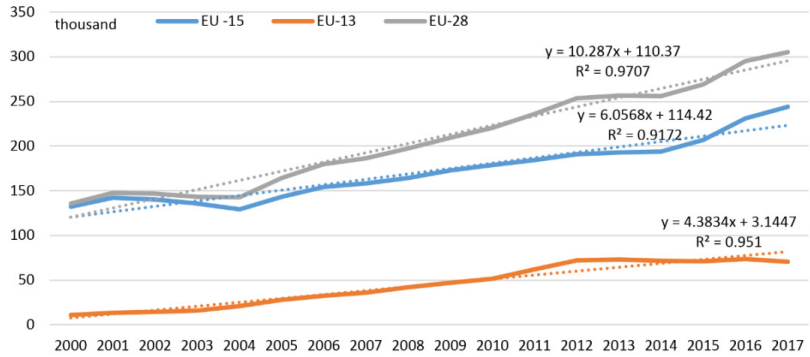

Fig. 2: Changes in the number of organic farms in the European Union and divided into EU-15 and EU-13 (thousand); Source: own study based on https://statistics.fibl.org (12.12.2019)

Analysis of data regarding the area of crops and the number of organic producers showed significant differences between individual EU countries (Table 1). In 2017, Spain (2.082 million ha), Italy (1.908 million ha), France (1.744 million ha) and Germany (1.373 million ha) had the largest areas of organic farming. Austria, Sweden, the Czech Republic, the United Kingdom and Poland also showed the utilised organic area above the European Union average, while the countries with the smallest organic cultivation area included Malta, Cyprus and Luxembourg. However, the largest dynamics of changes

during the period under review was recorded in Croatia, where the area increased over 74.3 thousand times over 18-year period, and the average annual growth rate in the studied period is 5437.5 ha, with the trend line fit at the level of 0.81. Great Britain was the only country that showed a negative growth rate (-14%) in the analysed years, the average annual of organic farming area in this period decreased by 10.686 thousand ha, (with an average trend line fit (R^2 =0.45).

The analysis of organic farms in individual EU countries showed that in 2017 Italy had the biggest number of them, as many as 66,773. A large number of farms were also found in Spain, France, Germany, Austria, Poland and Greece. Croatia showed the highest growth dynamics in the number of farms over 18 years, similarly as in the case of the area of organic crops. In this country, the number of organic producers increased almost 670 times. Every year, it was a growth by 216 organic producers (R2 = 0.83). The number of organic producers in the countries of the new European Union i.e. Bulgaria or Romania increased significantly. Malta and Luxembourg were the countries with the lowest number of organic producers in 2017. The countries that showed a negative dynamics of change in the examined years included Finland (-10.7%) and Great Britain (2.4%).

Table 1: The number of organic farms and the area of crops in individual European Union countries in the years 2000 - 2017 - dynamics of changes, average annual change, fit of the trend line

Country	Organic farming area					Number of organic farms				
	2000 (ha)	2017 (ha)	Change 2000-2017 (%)	Average annual change in years 2000-2017 (ha)	R^2	2000 (number)	2017 (number)	Change 2000-2017 (%)	Average annual change in years 2000-2017 (number)	R^2
Austria	496034	620764	25.1	6786.1	0.83	19025	24998	31.4	293.2	0.77
Belgium	20667	83510	304.1	3835.2	0.93	666	2105	216.1	85.0	0.91
Bulgaria	286	136629	47672.5	8204.7	0.74	50	6471	12842.0	405.3	0.77
Croatia	13	96618	743115.4	5437.5	0.81	6	4023	66950.0	216.0	0.83
Cyprus	52	5616	10699.6	342.0	0.97	15	1175	7733.3	71.0	0.93
Czechia	165699	520032	213.8	21040.0	0.95	563	5275	836.9	292.6	0.92
Denmark	157676	226307	43.5	2236.8	0.31	3466	3637	4.9	-30.1	0.16
Estonia	9872	196441	1889.9	10756.0	0.99	230	1888	720.9	85.5	0.94
Finland	147423	259451	76.0	5957.1	0.79	5225	4665	-10.7	-40.6	0.27
France	369933	1744420	371.6	70206.0	0.87	9283	36691	295.2	1546.1	0.90
Germany	546023	1373157	151.5	38491.0	0.95	12740	29764	133.6	834.1	0.96
Greece	26707	410140	1435.7	19462.0	0.69	5613	20197	259.8	945.4	0.52
Hungary	47221	199684	322.9	4816.5	0.61	471	3642	673.2	108.1	0.59
Ireland	27231	74336	173.0	2830.6	0.91	852	1725	102.5	53.3	0.85
Italy	1040377	1908653	83.5	35854.0	0.53	52796	66773	26.5	491.5	0.11
Latvia	4400	268870	6010.7	15738.0	0.94	78	4178	5256.4	232.3	0.62
Lithuania	4709	234134	4872.1	13934.0	0.97	230	2478	977.4	140.2	0.65
Luxembourg	1068	5444	409.7	161.3	0.81	31	103	232.3	3.1	0.72
Malta	1	43	4236.0	2.0	0.68	3	13	333.3	0.3	0.11
Netherlands	32331	56203	73.8	107613.0	0.97	1391	1696	21.9	8.4	0.26
Poland	22000	494979	2149.9	41407.0	0.84	1419	20257	1327.6	1626.1	0.86
Portugal	50001	253786	407.6	9253.1	0.65	763	4674	512.6	218.3	0.93
Romania	17388	258471	1386.5	16990.0	0.89	72	7908	10883.3	860.2	0.69
Slovakia	58458	189148	223.6	9489.9	0.90	88	439	398.9	24.0	0.90
Slovenia	5200	46222	788.9	2141.4	0.92	620	3627	485.0	168.4	0.98
Spain	380920	2082173	446.6	107613.0	0.97	13394	37712	181.6	1495.7	0.93
Sweden	174227	576845	231.1	25910.0	0.95	3329	5801	74.3	185.0	0.67
UK	578803	497742	-14.0	-10686.0	0.45	3563	3479	-2.4	-31.5	0.06

Source: own study based on https://statistics.fibl.org(12.12.2019)

The correlation coefficient of the area of organic crops and the number of producers, in 2000-2017, was the highest ($r \geq 0.99$) in the case of Germany, Poland, Croatia and France (Fig. 3).

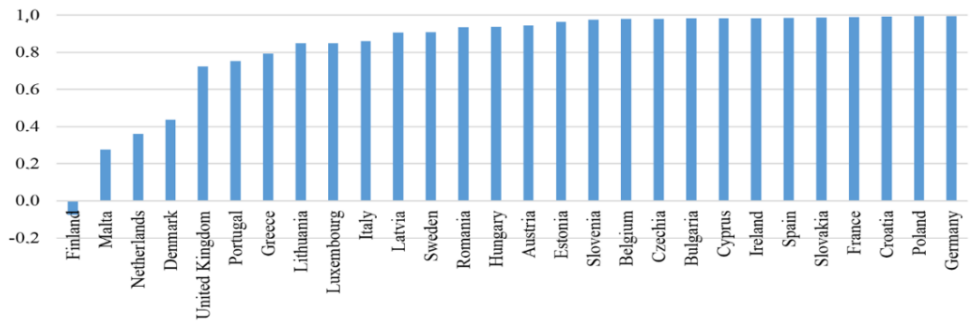

Fig. 3: Pearson's correlation coefficient between the number of organic farms and the area of crops in individual European Union countries in 2000-2017; Source: own study based on https://statistics.fibl.org (12.12.2019)

This means that in the case of these countries, the number of organic farms increased proportionally to the growing area of organic farming. Negative correlation, although weak, occurred in Finland. In this country, the growing number of organic farms was accompanied by a decreasing area of land utilised for organic farming.

The share of organic farming area in relation to the total utilised agricultural area was also considered. Similarly to the area of organic crops, the share of this area in relation to the total agricultural area also gradually increased (Fig. 4). In 2017, this share in the European Union represented 8.2% of the total utilised agricultural area, and over 18 years it increased by 5.8 pp.

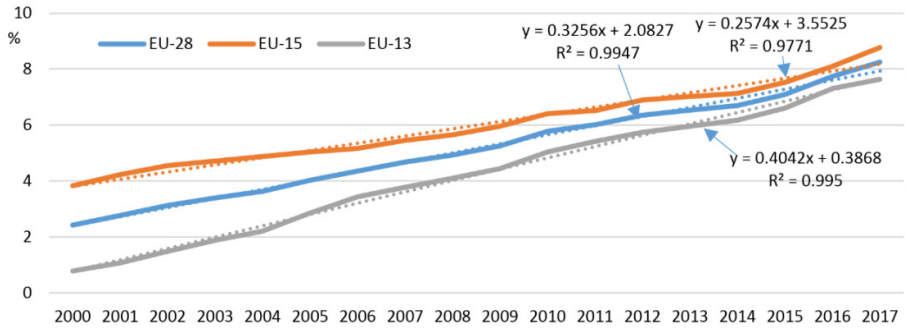

Fig. 4: Dynamics of changes in the share of the fully transformed ecological zone in the UAE in the EU Member States in 2000–2017, in total and by old and new Community countries (%); Source: own study based on https://statistics.fibl.org (12.12.2019)

On average, it was an annual increase of 0.32% with very good trend line fit ($R^2 = 0.995$). Countries of the old European Union showed a much larger share of organic farming area. In 2017, this share in the EU-15 was 8.8%, while in the EU-13 it was 7.6%.However, during the period under review, the growth dynamics was lower for EU-15 countries than for EU-13 countries. The share of ecological crops area in the EU-15 countries (in the years 2000-2017) increased by 5.0 pp, with an average annual increase by 0.26% (R^2 =0.98), while in the EU-13 by 6.8 pp, with annual average growth by 0.40% ($R^2 = 0.995$). The growing share of ecological area especially in the EU-13 countries was caused by the accession of these countries to the Community, and thus the possibility of obtaining subsidies that encouraged farmers in these countries to transform their farms to ecological holdings.

European Union countries where the share of organic farming area in 2017 was the largest were Austria (24.0%) and Estonia (20.5%) (Fig. 5). High share of ecological area in 2017, above the average in the

European Union, was also shown by: Sweden (18.8%), Italy (15.4%), Latvia (14.8%), Czech Republic (12.2%), Finland (11.4%), Slovakia (10%), Slovenia (9.5%), Spain (8.9%) and Denmark (8.7%), while the lowest was recorded in Malta (0.4%), Ireland (1.5%), Romania (2.0%) and the United Kingdom (2.9%). It is positively surprising that the large share of ecological space, above the EU average, is recorded in the new countries of the community. As many as 5 countries out of 11 whose share of ecological area in 2017 was above the average in the European Union, were the new Community countries, i.e. Estonia, Latvia, the Czech Republic, Slovakia and Slovenia.

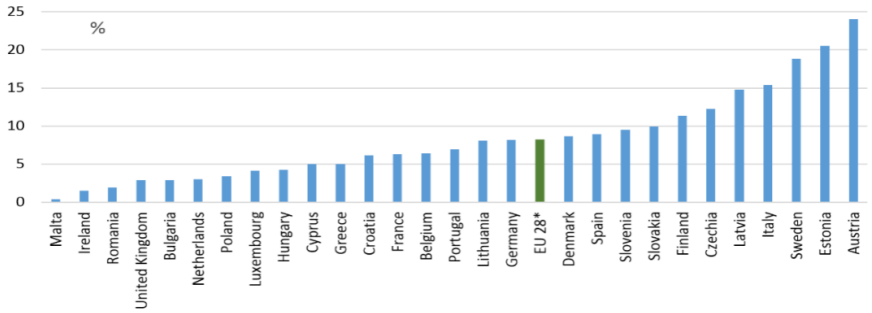

Fig. 5: Organic crop area in the EU Member States, 2017 (as % of total UAA); Source: own study based on https://statistics.fibl.org (12.12.2019)

In order to check how in individual countries, in the years 2000 - 2017, the share of the area designated for organic farming changed, the arithmetic average and standard deviation were used. The analysis showed significant discrepancies in this respect in individual EU countries (Table 2).

Table 2: Diversification of the share of ecological area in total agricultural land in EU countries in the years 2000 ÷ 2017

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Austria	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3
Estonia	-1	-1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3	3
Sweden	1	2	2	2	1	1	1	2	2	2	2	3	2	2	2	2	2	2
Italy	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2
Latvia	-1	-1	-1	-1	-1	1	1	1	1	1	1	1	1	1	1	2	2	2
Czechia	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1
Finland	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
Slovenia	-1	-1	-1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Slovakia	1	-1	-1	-1	-1	1	1	1	1	1	1	1	1	1	1	1	1	1
Spain	-1	-1	-1	-1	-1	-1	-1	-1	-1	1	1	1	1	1	1	1	1	1
Denmark	2	2	1	1	1	1	1	1	1	1	1	1	1	-1	-1	-1	-1	1
Germany	1	1	1	1	1	1	1	1	1	1	1	1	-1	-1	-1	-1	-1	-1
Portugal	-1	-1	-1	-1	1	1	1	1	1	-1	1	-1	-1	-1	-1	-1	-1	-1
UK	1	1	1	1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Lithuania	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	1	-1	-1
Belgium	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Cyprus	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
France	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Greece	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Hungary	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Luxembourg	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Netherlands	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Poland	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Croatia	-1	-1	-1	-1	-1	-2	-2	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1	-1
Bulgaria	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-1	-1	-1
Romania	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2
Ireland	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2
Malta	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2

Source: own study based onhttps://statistics.fibl.org (12.12.2019)

Over 18 years, there was a visible reduction in stratification between countries regarding the share of organic farming area in the total crop area (from 4 to -2). In the entire analysed period, the highest share of organic farming area, within the range of 3 or even 4 standard deviations from the average, was recorded in Austria. It was joined in 2016 by Estonia, gradually increasing the area for organic farming. This is especially visible after the country's accession to the European Union. The second group of countries in which the share of organic farming area, in a part of the examined period with an upward trend, was two standard deviations above the European Union average, consisted of Sweden and Italy. Latvia also joined this group, since it systematically develops its organic farming similarly to Estonia.

A very large number of Community countries were classified in the third group, in which the share of ecological area, in the majority of the discussed period, exceeded the European Union average by 1 standard deviation. These countries included: the Czech Republic, Finland, Slovakia, Slovenia, Spain, Denmark, and until 2011 also Germany, which since 2012 fell into the fourth group. Another group of countries in which the share of organic farming area in the entire analysed period was below the European Union average to -1 standard deviation were: Belgium, Cyprus, France, Greece, Hungary, Luxembourg, the Netherlands and Poland as well as the countries which in recent years fell into this group i.e. Lithuania, Germany, Portugal and Lithuania, Germany, Portugal and UK. Croatia promoted to this group in 2009, and Bulgaria in 2015. The last group of countries in which the share of organic farming area was, in the last considered years, two standard deviations below the average in the European Union (-2)consisted of: Malta, Ireland and Romania.

The average size of organic farms was also subject to analysis (Fig. 6). In the years 2000-2017, the average area of an organic farm increased by 9.7 ha (from over 32.5 ha to almost 42 ha), in the EU-15 it was an increase by over 11 ha, while in the case of EU-13 the average farm size decreased by over 44 ha, i.e. over 50% (from 87.2 ha to about 43 ha).

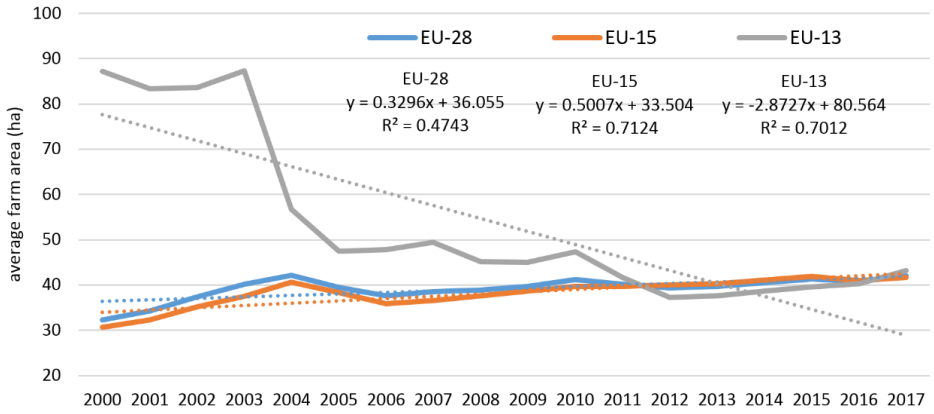

Fig. 6: Dynamics of changes in the average area of organic farms in the European Union in the years 2000–2017 and divided into countries of the old and new European Union (ha / farm); Source: own study based on https://statistics.fibl.org (12.12.2019)

In 2017, the largest organic farms were located in Slovakia (Fig. 7). Their average area was over 430 ha. Large farms (however much smaller than those in the case of Slovakia) were located in Great Britain (143.1 ha), Estonia (104 ha), Sweden (99.4 ha), Czech Republic (98.6 ha) and Lithuania (94.5 ha). The smallest ones were in Malta (3.34 ha) and Cyprus (4.78 ha).

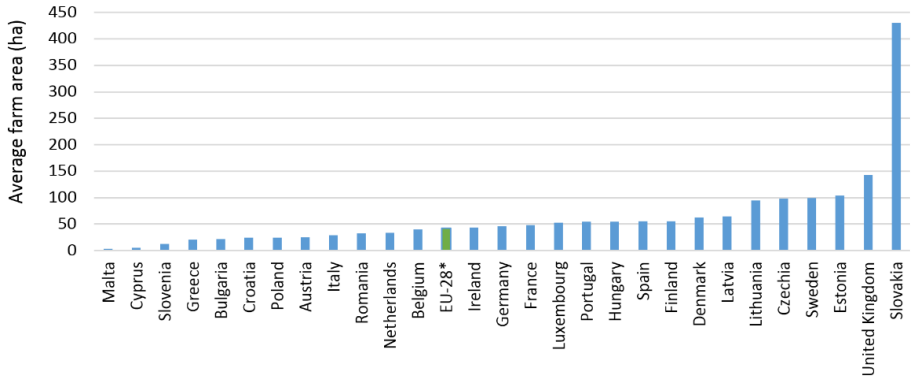

Fig. 7: Average area of an organic farm in individual EU countries in 2017 (ha); Source: own study based on https://statistics.fibl.org (12.12.2019)

An analysis of the average farm area in individual Member States using the arithmetic average and standard deviation showed that the largest areas of organic farms are in Slovakia (Table 3).

Table 3: Differentiation in the size of organic farms between EU-28 countries in the years 2000 ÷ 2017

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Slovakia	5	5	5	5	5	5	5	5	5	5	6	6	6	5	6	6	5	6
UK	2	1	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2
Czechia	3	3	3	3	3	3	3	3	2	2	1	1	1	2	2	1	1	1
Portugal	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1
Estonia	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Denmark	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Hungary	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Germany	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sweden	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
France	1	1	1	1	1	1	1	1	1	1	-1	1	1	1	1	1	1	1
Luxembourg	1	1	1	1	1	1	1	1	1	1	-1	-1	1	1	1	1	1	1
Spain	-1	-1	-1	-1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Lithuania	-1	-1	-1	1	-1	-1	1	1	1	1	1	1	1	1	1	1	1	1
Latvia	1	1	1	1	-1	-1	-1	-1	-1	1	1	1	1	1	1	1	1	1
Finland	-1	-1	-1	-1	-1	-1	-1	-1	-1	1	1	1	1	1	1	1	1	1
Ireland	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	1	1	1	1	1	1
Romania	2	2	3	2	1	-1	-1	1	1	1	1	-1	-1	-1	-1	-1	-1	-1
Belgium	-1	-1	1	-1	-1	-1	-1	-1	1	1	1	1	1	1	-1	-1	-1	-1
Bulgaria	-1	-1	-1	-1	-1	-1	-1	1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Netherlands	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Italy	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Austria	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Poland	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Croatia	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Greece	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Slovenia	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Cyprus	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Malta	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1

Source: own study based on https://statistics.fibl.org(12.12.2019)

In this country, in 2000-2017, the average farm area exceeded by 5 or even 6 standard deviations the EU -28 average. The second group included Great Britain, in which, in almost the entire period under

consideration, the average farm area was two standard deviations over the EU-28 average. The third group included the Czech Republic. In the case of this country, a gradual decrease in the average area of farms is visible - from 3 standard deviations (in 2000-2007) to one deviation above the EU-28 average (in 2010-2012 and 2015-2017). Another group of countries in which the average farm area was one standard deviation above the EU-28 average in most of the period studied included: Portugal, Estonia, Denmark, Hungary, Germany, Sweden, France, Luxembourg, Spain, Lithuania and Latvia, and since 2012 also Ireland. The last group included countries with the lowest average area of organic farms, i.e. by one standard deviation lower than the EU-28 average (in most of the analysed period). These countries included the Netherlands, Italy, Austria, Poland, Croatia, Greece, Slovenia, Cyprus and Malta. Romania, Belgium and Bulgaria belonged to this group as well.

Figure 8 presents a tree diagram showing four clusters of similar countries in terms of the development of organic farming (the analysis covered the size of the area for organic farming, average farm area, share of organic farming area to the total agricultural area and the number of organic producers). The first cluster consists of six European Union countries. In 2017, these countries showed, above all, a large share of ecological area to the utilised agricultural area and a large average farm area. The second group included Slovakia (which is the first to join the first group of countries. It stands out significantly among the other European Union countries with its average area of organic farms (over 430 ha).

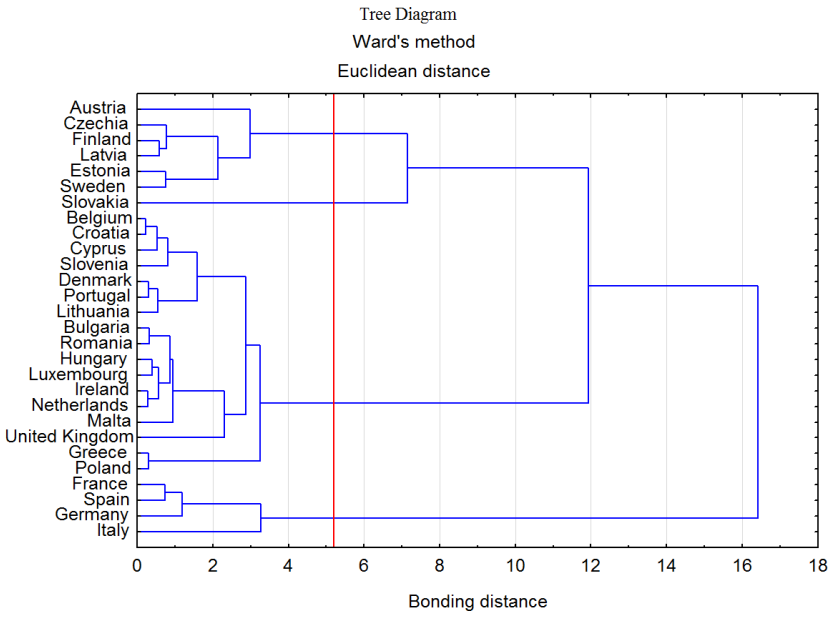

Fig. 8: Classification of EU-28 countries in terms of organic farming development in 2017; Source: own study based on https://statistics.fibl.org (12.12.2019)

The third group is the largest. It consists of 17 European Union countries. These countries, in contrast to the countries in the first group, showed a relatively small share of organic farming area. The Italy, Germany, Spain and France cluster was the last to join the rest. These four countries have the largest organic crop area (above 1.37 million ha) and the biggest number of organic producers (above 29.76 thousand entities).

Conclusions

Since the beginning of the 21st century, there has been a growing interest in organic farming in the world, also in the European Union. This is confirmed by both the growing area of organic utilised agricultural area and the increasing number of organic farms. Analysis of data on the level and dynamics of organic farming development in the enlarged European Union confirmed the growing

importance of this method of agricultural production in almost all its Member States. Particularly noteworthy is the great interest in this way of farming among new members of the Community.These countries, despite a small share in the European area of organic farming, were characterized by high growth dynamics in the area of organic farming and the number of organic farms, which weakens the level of organic farming concentration in the European Union. This result was influenced by both the administrative and political situation in these countries, high fragmentation of farms, favorable climate and growing global demand for organic crops. The huge potential for the implementation of organic crops on a mass scale was caused by aid programs in new EU countries and from the EU itself, which supported the transition to organic farming. Also the subsidization of farmers and producers of organic food increased the popularity of this type of farming. In addition, during the transition to organic farming, farmers receive financial support from specially prepared, i.e. SAPARD, RDP.

Changes also occurred in the size of organic farms. Large organic farms have decreased and the smallest have increased their area. In 2017, the average size of organic farms in the old and new EU countries was similar. The changes in the size of farms are supported by economic considerations. As Komorowska (2012) indicates, the smallest farms (up to 10 ha of UAA) show the highest level of productivity of land and capital resources. With the increase in the size of organic farms, their productivity (land and capital resources) deteriorates. It is related with organization of production (especially plant production), prices of organic products, as well as a decrease in production intensity (level of material costs per 1 ha of UAA). In smaller organic farms, the structure of arable land has a larger share of crops (i.e. vegetables, fruit, edible potatoes) for which farmers are able to obtain relatively higher prices compared to conventional products and this translates into the production and economic results of organic farms.

Clear advantage of the leaders i.e. Italy, Germany, Spain, and France, in the development of this mode of agricultural production over the remaining countries has decreased, especially in relation to newly admitted countries, whose membership in the Community guarantees more stable financial and legal conditions and provides new outlets.

Organic farming has great development opportunities in the new EU countries, including:

- low pollution level of natural environment,
- delay in relation to Western ways of farming (i.e. smaller specialization and concentration, traditional technologies),
- a large number of regions with conditions conducive to the development of organic farming (low level of industrialization),
- low consumption of chemicals (mineral fertilizers and pesticides).

The above-mentioned advantages give the EU-13 countries an advantage in the field of organic farming over the majority of EU-15 countries. Financial resources from the programs are an important stimulus encouraging farmers to switch their farms to organic. Despite this, in some EU-13 countries there is still a lack of a coherent development strategy and agricultural policy in the field of organic farming. For example, the NIK report (2019) shows that an inconsistent strategy and constant changes in regulations regarding procedures and rules for providing assistance to organic food producers, may cause delays in issuing decisions on granting subsidies (so-called ecological payments) and payments of money to producers, and in consequence contributed to the resignation of many farmers from running organic farms. Producers of organic products observe the changes in both subsidies and demand for individual products, adjusting production or introducing changes depending on the market situation and changing regulations and the amount of subsidies granted by the Institutions established in their countries.

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Development of Organic Farming in The Visegrad Group Countries After Accession to The European Union - Comparative Analysis

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Abstract

The aim of the study was to assess organic farming in the Visegrad Group countries after the accession of these countries to the European Union. Statistical materials published by FIBL and IFOAM and in the Eurostat database were used in the study. The subject of the analysis was the data on organic farming in the countries of the Visegrad Group. The basic time range of data covers the years 2004-2018.The article uses basic methods of statistical analysis of data, i.e. Pearson's correlation, trend lines and dynamics indicators. Analyses showed changes in both the area and the number of producers and processors of organic food in the countries of the Visegrad Group. However, these changes in individual countries of the Group were different. Despite a significant increase in the area of organic farming in Poland, the share of the area of these crops in relation to the total area of agricultural crops in the country is small. The country that develops very dynamically in this respect is the Czech Republic, where organic farming accounted for almost 15% of the arable land in 2018. A systematic decrease in the average area of organic farms is visible especially in the Czech Republic, but also in Slovakia. In the Czech Republic, the area of organic farms decreases annually by almost 14 ha. Poland is a country where the trend was different in this respect. In Poland, since 2014, a downward trend has been visible both in terms of crop area and the number of organic producers. On the other hand, organic food processing industry is developing, although for many years it was a bottleneck in the country's organic food distribution channel. In all countries of the Group, the first place takes the cultivation of organic cereals, followed by dry legumes and high-protein crops for the production of grain and oil seeds.

Keywords: Organic Farming; The Visegrad Group; Development;

Introduction

Agriculture has been the main source of livelihood for people over thousands of years. Nowadays the world is developing very rapidly. Population is increasing. According to the Food and Agriculture Organization (FAO), global food production should rise (Palaniappan, Annadurai, 2018). Otherwise we will have to face with a serious hunger problem. Therefore, such things as environmental safety and sustainable development are the subjects of research of scientists, politicians and environmentalists. They consider organic farming as a solution to prevent the disaster.

Organic farming is an agricultural system that through activating natural mechanisms, i.e. the use of natural, technologically unprocessed natural resources, ensures lasting soil fertility and animal health, does not poison the environment and at the same time allows farmers to produce high-quality, healthy agricultural products - organic food (Kowalska, 2011). Organic farming aims for sustainable food, i.e. taking into account local ecological, social and economic conditions (Kowalska, 2015). Conventional

agriculture can pose a significant burden to the environment, especially in a situation of increasing concentration as well as specialization and regionalization of production. Particular attention is paid to animal production (Olszańska, 2012). When it comes to plant production, there is an example of Polish potato. To improve the situation of this vegetable, the Ministry of Agriculture and Rural Development has developed a special Polish Potato Program. Its main goal is to help in the professionalization of this traditionally important in Poland, vegetable cultivation sector (Kowalska A.S., Gurkowa K., 2019).

Although there are many individual definitions of organic agriculture, the one seems to be the most comprehensive. The version given by Lampkin (1990) enclose all the important features. In reference to this description, organic agriculture is a specific system of production, which partly or even completely, avoids the use of pesticides, growth regulators and synthetic compound fertilisers. Moreover, organic farming does not involve substitutes of any chemical inputs with organic inputs.

However it is not easy to meet all conditions of organic farming, it is still worth to do it. The European Union requires quality, sanitary and veterinary standards to be done, so that the agri-food industry enterprises can be defined as ecology friendly. Aiming to maintain the balance of the ecosystem and minimize the negative impact on human health, the agri-food industry is one of the most important sectors of agribusiness in many countries. That kind of policy brings many advantages. It decides of a qualitative and quantitative volume of food production (Firlej, Kubala, 2018). Furthermore it helps to ensure food safety for all citizens. All things considered, organic farming is becoming more and more popular all around the world.

As an area of research the Visegrad Group countries were selected in the presented study. Also known as The Visegrad Four, it has been a regional form of co-operation of four of Central and Eastern Europe countries since 15 February 1991. Poland, Slovakia, Hungary and the Czech Republic as neighboring countries with the similar tradition, culture, values, geopolitical conditions and shared history work together in a number of fields of common interest within the all-European integration. These countries them were on the east side of the Iron Curtain, which means under the influence of the Soviet Union (Kowalska, Kovarnic, 2017). The encouragement for V4 was to intensify the co-operation in the common transformation (Ministry of Foreign Affairs, 2016). Moreover the development of free market economy as well as, in a longer term, partnership in a complex but progressive process of European integration.

There are plenty of research and analyses concerning the conditions, categories and level of value of agri-food products. All of them have been managed for a long period of time. In Poland we have detailed data from experts from the Institute of Agricultural Economics and Food Economy in Warsaw, National Research Institute and others. Among the authors we can cite: Urban and Mroczek (2011), Pawlak (2014), Kuźniar (2017), Firlej (2017), Bigos (2017), Kułyk and Gąsiorek- Kowalewicz (2018). The aim of the study was to assess organic farming in the Visegrad Group countries after their accession to the European Union.

Material and Methods

Statistical materials published in the form of FIBL and IFOAM reports were used in the study. Data from the FIBL and Eurostat database were also taken. The subject of the analysis included data on organic farming from Poland, the Czech Republic, Hungary and Slovakia. The basic time range of data covers the years 2004-2018 (some analyses, due to lack of data, end in 2017).The article uses the basic methods of statistical analysis of data, i.e. Pearson's correlation, trend lines and dynamics indicators. Time series of the number of organic farms, their area and the share of the area of organic farms to the total agricultural area were presented for the countries of the Visegrad Group. A trend function line and a determination coefficient R^2 were determined for them. It was assumed that for $R^2 \geq 0.70$ the fit of functions to empirical data is very strong.

Results and Discussion

Organic farming in the Visegrad countries, after their accession to the European Union, began to develop. However, in each of these countries this development was more or less intense. The analysis of the area of ecological crops indicates that it developed most dynamically in Poland, but the organic crop area was the largest (for the most part of the studied period) in the Czech Republic (Fig. 1).

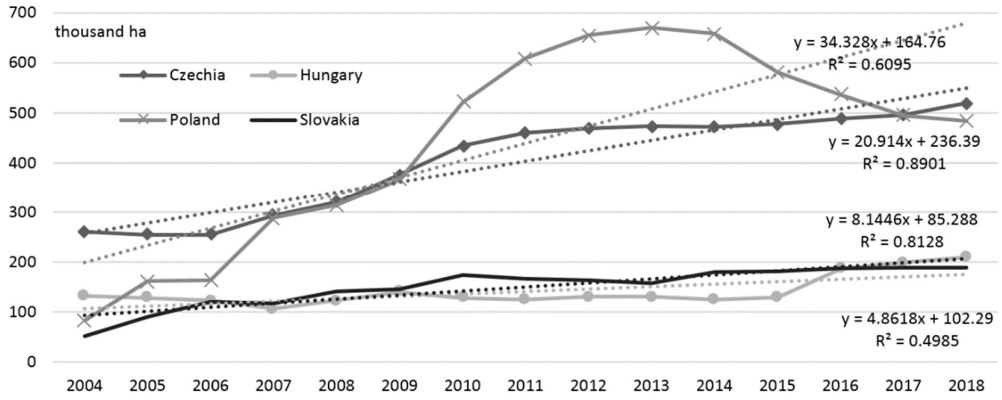

Fig.1: Area of organic farming in the Visegrad Group countries in the years 2004-2018 (thousand ha)

Source: own study based on https://www.fibl.org; https://ec.europa.eu/eurostat/data/database (14.11.2019)

In Poland, in 2004-2018, the area of organic farming increased by almost 486 thousand ha, however, the largest increase by almost 700% (from 82.7 thousand ha to almost 658 thousand ha) was recorded in the years 2004 - 2014. After this period, there was a decrease in the area of organic cultivation in Poland (by over 26% in the last 4 years, i.e. from 658 thousand to 485 thousand ha) and this trend continues. Despite the decrease in the area of organic farming in Poland after 2014, the average annual growth rate throughout the entire period studied was the highest compared to other countries of the Group. In Poland, on average, in 2004-2018 the area for organic farming increased annually by over 34 thousand ha, with a good fit at $R^2 = 0.61$.

Poland is the only country in the Group in which the crop area has decreased so much. Other countries of the Group recorded an increase or slight fluctuations in the area of organic crops throughout the entire period studied. The area of organic farming in the Czech Republic increased very intensively. During the analysed period, the area of organic farming in this country doubled (from 260 thousand ha to over 209 thousand ha). In the case of the Czech Republic, the average annual increase in area during the period under consideration is almost 21 thousand ha, with a very good fit ($R^2 = 0.89$).

Slovakia also showed a very good fit of the trend line (R2 = 0,81) over the period considered. In the case of this country, the area of organic farming has increased since 2004 by almost 270% (from over 51 thousand ha to almost 189 thousand ha). Despite the growing tendency, the average annual growth of organic farming area in Slovakia in 2004-2018 amounted to about 8.15 thousand ha. The area of organic farming in Slovakia was the lowest among the countries surveyed in both 2004 and 2018. Hungary was the country showing the lowest growth dynamics in organic farming. In the analysed period, the area of crops in this country increased by only 57.4% (from 133 thousand ha to over 209 thousand ha). The average annual growth rate was about 4.9 thousand ha, however, the trend line fit in this case was moderate (R 2 did not exceed 0.5).

The share of the area occupied by organic crops in the total agricultural area was also assessed (Fig. 2). The obtained data shows that Poland has the largest total agricultural area. In 2018, the area of arable

land in Poland was over 14.5 million ha, while in Hungary the area was three times smaller, in the Czech Republic five times smaller and in Slovakia over 7 times smaller. Although Poland has the largest total agricultural crop area, it had the lowest share of organic farming in the total crop area among the Visegrad countries in the last two years.

The Czech Republic had the largest share of the area used for organic farming in the entire period studied. In this country, in 2018, the area for organic farming accounted for almost 15% of the total crop area. During the analysed period, this share increased by 7.56 percentage points, and the average annual growth rate (in 2004-2018) of the ecological area was about 0.61%. The area of organic farming in Slovakia also increased intensively. In this country, during the examined period, its share in the total crop area increased to 7.25 percentage points and in 2018 it accounted for almost 10% of total arable land. The average annual growth rate of the share of ecological area in the total agricultural area in this country is 0.43%. In both the Czech Republic and Slovakia, the trend line fit was very good ($R^2 = 0.89$ and $R^2 = 0.82$ respectively). The share of organic farming area in the total agricultural area in Poland and Hungary was much lower. In these countries, the area for organic farming in 2018 amounted to 3.3 and 3.9% respectively. In the period under review, it increased in Poland by 2.8 pp, while in Hungary by 1.62 pp. The average annual growth rate for these countries (in 2004-2018) was respectively 0.25% and 0.11%, with a good fit of the trend line ($R^2 = 0.64$ and $R^2 = 0.62$).

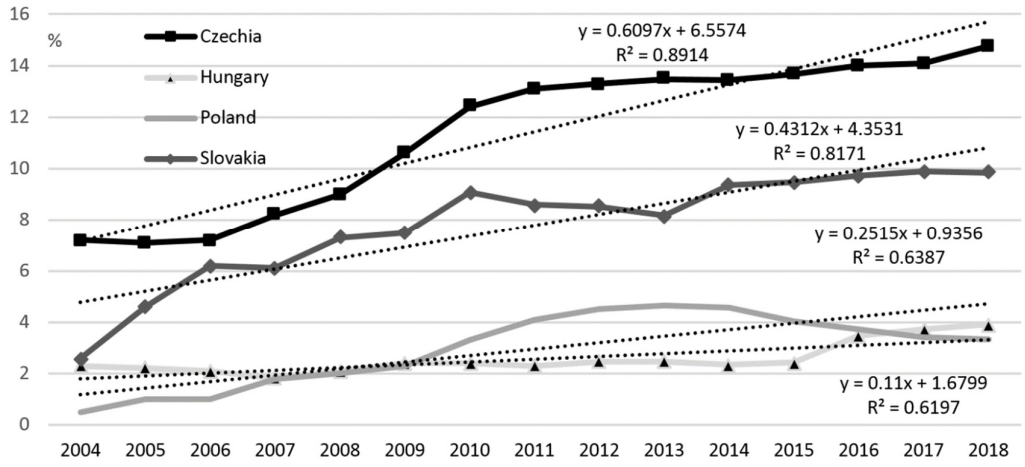

Fig. 2: Area under organic farming in the Visegrad Group countries in the years 2004-2018 (% of utilised agricultural area (UAA))

Source: own study based on https://statistics.fibl.org/europe.html; https://ec.europa.eu/ eurostat/data/database (14.11.2019)

The analysis of farms that undertook the cultivation of organic food in each of the countries discussed was varied (Fig. 3). The largest number of organic producers in the entire examined period was observed in Poland. In 2018, the country had 19,207 organic farms, while during the greatest popularity of converting farms to organic farming, the number of producers amounted to 26,598 (their number has decreased since 2013 by 7,391 farms). Since 2004, the number of organic farms in this country has increased four times. In the case of other countries, the number of organic producers was much lower than in Poland. In 2018, the number of organic farms in these countries was: 4,500 - Czech Republic, 3,929 - Hungary and 535 - Slovakia. The Czech Republic (among the countries of the Visegrad Group) showed the highest growth dynamics in the number of organic farms in the researched years. Their number in the Czech Republic has increased in recent 15 years by over 438% (annually, on average by almost 300 farms), in Poland by about 411% (annual average amounts to 1,245 farms), in Slovakia by over 357% (annually on average by about 142 farms) and in Hungary, by less than 127% (average

annual is around 21 farms). A very good trend line fit is visible in Slovakia and the Czech Republic, while in the case of Poland and Hungary it is good.

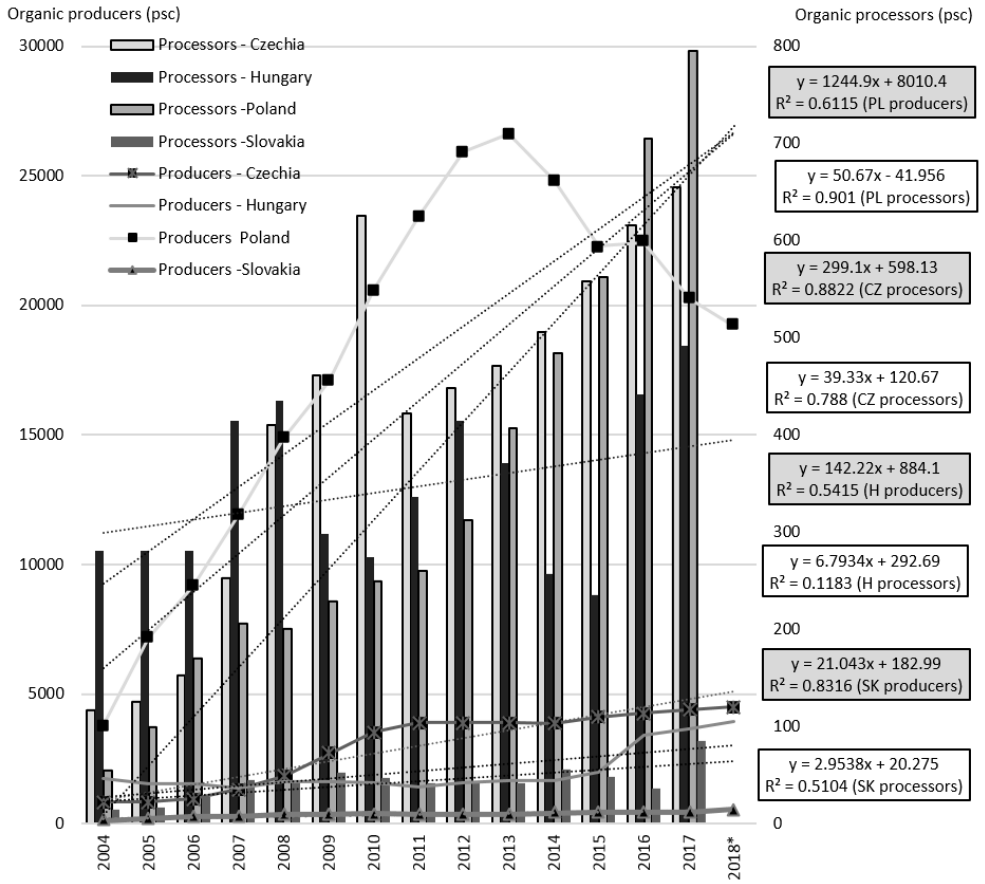

** no data on organic food processing product in 2018*

Fig. 3: Number of organic producers in the Visegrad Group countries in the years 2004-2018 (pcs)

Source: own study based on https://statistics.fibl.org/europe.html; https://ec.europa.eu/eurostat/data/ database (14.11.2019)

The subject of analysis covered also the changes in the number of processors of organic products in the countries discussed (Fig. 3). In the years 2004-2017, the number of organic processing plants in the Czech Republic and Poland increased significantly. During the period under review, their number increased almost 13.5 times in Poland (from 55 in 2004 to 795 in 2017) and in the Czech Republic more than 4.5 times (from 116 in 2004 to 539 in 2017). On average, their number increased annually in Poland by 50 processing plants ($R^2 = 0.90$), while in the Czech Republic by almost 40 ($R^2 = 0.79$). In Hungary, the number of organic processing plants fluctuated significantly over the period considered. Over the last 14 years, their number increased by 75%. Despite the upward trend, on average by about 7 processing plants on an annual basis, it cannot be assumed that this trend will continue, as the fit in this case was very weak. The increase in the number of processing plants is also visible in Slovakia. In this country, their number increased fivefold in 14 years, which means that three new organic processing plants were established there every year. The trend line fit in this case was on the moderate level.

An analysis of the average size of organic farm in the surveyed countries showed that Slovakia was the leader in this issue throughout the whole period (Fig. 4). In 2018, the average size of organic farms in this country was over 323 ha, they were over three times larger than in the Czech Republic (115.5 ha / farm), over 6.5 times larger than in Hungary (53.3 ha / farm) and almost 14 times larger than in Poland (25.2 ha / farm). The largest average area of an organic farm in Slovakia was over 460 ha / farm and it was recorded in 2005.

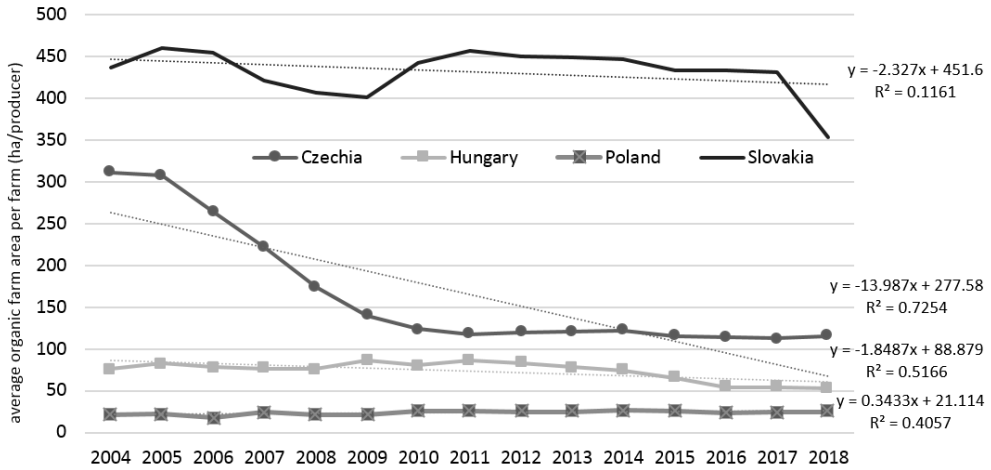

Fig. 4: Average organic farm area per farm in the Visegrad Group countries in the years 2004-2018 (ha/producer)

Source: own study based on https://statistics.fibl.org/europe.html, https://ec.europa.eu/ eurostat/data/database (14.11.2019)

Over the past 15 years, the average area of an organic farm in this country has decreased by 84.2 ha, annually on average by about 2.33 ha / farm (trend line fit was very weak $R^2 = 0.12$). The country where the average farm area decreased the most was the Czech Republic. In this country, in the15-year period, the average area of an organic farm decreased by almost 196 ha. On average, it was annually by almost 14 ha / farm, with a very good trend line fit at the level of $R^2 = 0.72$. The average area of an organic farm in Hungary also decreased, although not as much as in the case of the Czech Republic. In the analysed period, the average area of an organic farm decreased by over 23.5 ha, the average annual was 1.85 ha / farm ($R^2 = 0.52$). Poland is the only country in which the average farm area increased in the analysed period. This country had the smallest average area of farms in the whole period under study, compared to other countries of the Group. The average farm size in Poland ranged from 17.9 ha in 2006 to 26.5 ha in 2014. In 2004-2018, the average area of an organic farm in this country increased by 3.2 ha, which gives average annual growth by 0.34 ha ($R^2 = 0.41$).

Using the Pearson correlation coefficients, the average area of organic farming and the number of organic farms in the analysed countries were also assessed (Fig. 5). Analysis of the relationship between the average area of organic crops and the number of organic farms in 2004-2018 showed in Poland a strong positive correlation ($r = 0.72$). This indicates that both the average crop area and the number of organic farms are increasing. The opposite was true for the Czech Republic and Hungary, which showed a strong negative correlation during this period ($r > -0.92$). This means that in these countries the number of organic farms grew faster than their average area. From the above, it can be concluded that in Poland during the period under study new organic food farms were created and expanded their acreage. On the other hand, in the case of the Czech Republic and Hungary, the tendency to create farms with ever smaller organic farming area prevailed. Also in Slovakia ecological farms with smaller and smaller area are established; however, in this country, there was an average negative correlation between the analysed variables ($r = - 0.49$).

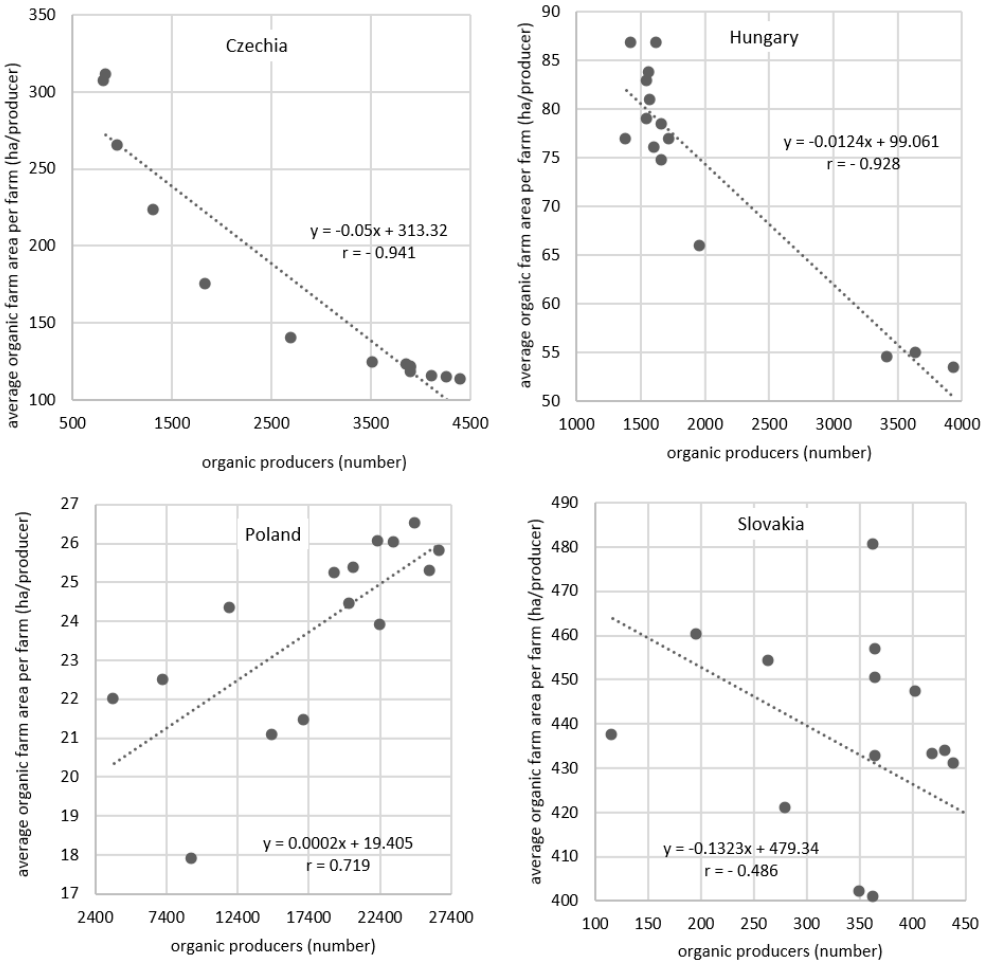

Fig. 5: Correlation between comprehensive ecological services and the area covering cultivation in the Visegrad Groups countries in 2004-2018 (number, ha/producer)

Source: own study based on https://statistics.fibl.org/europe.html; https://ec.europa.eu/eurostat/data/database (14.11.2019)

Analysis of data on organic crops cultivated in the Visegrad countries showed the leading position of cereals in terms of the crop area (Table 1). Poland had the largest area for cereal cultivation, both in 2009 and 2017. In Poland, there was also the largest increase in the area for cereal cultivation. Within 9 years, this area increased by almost 50% (from approx. 77.5 thousand ha to approx. 116.1 thousand ha). In the case of other countries, there was also an increase in the area for cereal cultivation, but it was not as significant as in the case of Poland.

Tab. 1: Organic area for selected crops in cultivation in the Visegrad Group countries in 2009-2017 (ha,%)

Selected crops	Czech Republik			Slovakia			Poland			Hungary		
	2009	2017	change	2009	2017	change	2009	2017	change	2009	2017	change
	ha	ha	%	ha	ha	%	ha	ha	%	ha	ha	%
Berries	342	323	-5.5	109	121	11.0	7930	14887	87.7	898	1322	47.2
Cereals	24535	29483	20.2	15907	18047	13.5	77473	116083	49.8	29505	32320	9.5

Pulses and protein crops*	1462	3455	136.3	157	1132	621.0	3993	43373	986.2	1463	2395	63.7
Fruit, temperate	3173	4435	39.8	705	548	-22.3	6709	10574	57.6	1366	4396	221.8
Grapes	645	788	22.2	52	124	138.5	14	289	1966.7	1208	1716	42.1
Nuts	57	189	231.3	88	843	858.0	16729	1204	-92.8	1141	2049	79.6
Oilseeds	1191	1322	11.0	3075	2966	-3.5	1465	4084	178.8	8685	9647	11.1
Root crops	256	286	11.6	80	77	-3.8	1969	1947	-1.1	94	203	116.0
Vegetables	501	248	-50.4	1464	199	-86.4	1132	10236	804.2	1742	3446	97.8

**for the production of grain*
Source: own study based on https://statistics.fibl.org/europe.html; https://ec.europa.eu/eurostat/data/ database (14.11.2019)

In Poland, there is also a visible increase in the area for growing grapes (by almost 1967%), legumes and high-protein crops for grain production (by over 986%) as well as vegetables (by over 804%). However, there was a decrease in the area of nut cultivation (by almost 93%) and root crops (-1.1%). In the Czech Republic, as in Slovakia, the area for nut cultivation increased significantly (by over 231% and 858%, respectively), similarly to legumes and high-protein crops for grain production (by over 136% and 621%, respectively) and decreased in the case of vegetable cultivation (by more than 50% and 86%, respectively). In the Czech Republic, the area for berry production has also decreased (5.5%) and in Slovakia there was a drop in the area for cultivation of temperate climate fruit (by over 22%), root crops (by 3.8%) and oil seeds (by 3.5%). Hungary is the only country in which the area of all these crops increased in the analysed period. The highest increase in the area of organic farming in this country occurred in the case of temperate climate fruit (by almost 222%) and root crops (by 116%), while the smallest in the case of cereals (9.5%) and oil seeds (by over 11%).

Conclusions

A number of detailed conclusions can be drawn from the analyses.

- The countries of the Visegrad Group have very good conditions for switching their farms to organic farming. Chemization and mechanization in rural areas of these countries took place to a much lesser extent in contrast to the countries of the old European Union. Therefore, most of the land available in these areas can be quickly and easily adapted to the requirements of organic farming.

- In the years analysed in the study, in the countries of the Visegrad Group, both the crop area and the number of organic producers and processors increased, while in Poland in 2014 both the area and the number of organic producers began to decrease systematically. This phenomenon should be perceived as a consequence of i.a. continuous changes in provisions on the procedure and rules for providing assistance to organic food producers (in 2014-2018 they were changed seven times, even without prior market analysis). Constant changes in the regulations, which contributed to delays in issuing decisions regarding the granting of subsidies (so-called ecological payments) and payment of money to producers, were one of the reasons why farmers resigned from running organic farms. Another problem was the requirement for yields obtained as part of the vegetable, herb and orchard agricultural packages, which obliged organic producers to sell or process at least 80% of what they produced. Such exorbitant obligations meant that, on the one hand, farmers had nothing to feed their own animals, and on the other hand, that lots of them had a problem with selling their products on the growing eco-food market.

- Despite a significant increase in the area of organic farming in Poland, the share of the area of these crops in relation to the total area of agricultural crops in the country is small. In this respect, organic farming is developing very dynamically in the Czech Republic, where organic farming accounted for almost 15% of the agricultural area in 2018.

- The calculated correlation between the number of organic producers and the average size of an organic farm has shown that countries with a large average farm area are gradually limiting it. The

largest farms (in 2018 that was on average 350 ha) were in Slovakia, but a significant reduction in the average size of a farm took place mainly in the Czech Republic. In the Czech Republic, the area of organic farms decreases annually by almost 14 ha. Due to the requirements for organic farms, among others regarding biodiversity, the right proportions between plant and animal production, as well as the lack of chemical fertilizers and limitation of mechanization makes smaller farms easier to manage.

- In Poland, however, since 2014, a downward trend has been visible both in terms of crop area and the number of organic producers. On the other hand, organic food processing industry is developing although for many years it was a bottleneck in the country's organic food distribution channel.

- Organic producers observe carefully the changes in demand for their products, as well as regulations and subsidies in their countries, and then adapt their production or introduce changes depending on the market situation. In the Visegrad countries, the largest areas of organic farming are covered by cereals, legumes and high-protein plants for grain production and oil seeds.

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Analysis of Changes in The Volume of Fish Production and Consumption in The World - Selected Problems

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Abstract

The dynamic increase in the production of fish and other aquatic organisms in the world, which occurred in the years 1950-2019, is positively correlated with the growth of the world's population. The changing consumption model has a large impact on the increase in the analysed production. Fish is an increasingly appreciated source of wholesome, easily digestible proteins, minerals and vitamins. However, a disturbing phenomenon is the fact that more and more global fish stocks are being overfished. In the context of these problems, attention should be paid to the role of sustainable fishing. In the analysed years, the structure of fish production in the world, considered according to various criteria, changed significantly. The share of fish and other aquatic organisms obtained from fishing decreased, while the share of fish produced in aquaculture increased. This should be assessed as a very favourable phenomenon in the context of sustainable production. In the geographical structure of fish production, the importance of the Indian Ocean as a source of fish is growing, while the significance of the Atlantic Ocean, especially the North East Atlantic Ocean, is decreasing. This is related to the introduction of increasingly stringent catch limits in the European Union. The world's largest producer of fish and other aquatic organisms is China. Indonesia and India also belong to the top three. The Asian region (Asian inland waters and the Northwest Pacific) has dominated the world fish and other aquatic organisms production. The production of aquaculture fish is becoming increasingly important there. In the situation of the further, expected by FAO, increase in the consumption of fish and other aquatic organisms, and the increasing risk of significant loss of stock of some fish species, it is necessary to extend the acquisition of fish and other aquatic organisms from aquaculture, tightening catch limits (European Union), greater control of catches, in order to eliminate illegal fishing.

Keywords: Fish Catches, Aquaculture, Sustainable Fishing, Fish Consumption.

Introduction

According to historical sources, people started fishing about 10-12 thousand years BC. At the same time, fish have been one of nutrients since the earliest times. The material evidence of this phenomenon, from different geological eras, is provided by numerous excavations. They are located on all continents and contain, among others, the remains of fishing gear and the eaten fish debris.

Fish is of great economic importance. They provide valuable and tasty meat and caviar. The nutritional value of meat of fish and slaughter animals is very similar. The content of full-value, easily digestible protein in fish meat ranges between 8-20% (in meat of slaughter animals, it is respectively 15-20%). Fish contain minerals important for the human body, such as phosphorus and calcium, as well as vitamins, including group B vitamins. In the meat of marine fish, iodine and fat-soluble vitamins A and D are also found. Fish are also a raw material for the production of medicinal products (e.g. fish oil), fertilizers, glues and animal feeds (Kurien, 2005; Carpenter, Kleinjans, 2017).

The global production of fish and other aquatic organisms includes their supply both from fishing (oceans, seas, rivers, lakes and other water reservoirs) and from aquaculture (both salt and fresh water). The global production of aquatic organisms obtained from aquaculture has been growing dynamically (FAO, 2016; FAO, 2017; FAO, 2018).

Climate warming becomes a growing threat to many species of fish and other aquatic organisms, according to the Report of the International Union for the Conservation of Nature (IUCN) presented at the UN Climate Summit in Madrid COP 25. The consequence of this warming and the penetration of waters by artificial fertilizers (excessive algae growth) is the progressive process of oxygen reduction in the oceans, by 2% in 1960-2010. There are currently 700 areas with oxygen deficiency in the Atlantic Ocean, while in the 1960s there were only 45 such places, which was observed by IUCN experts (Gazeta prawna pl., 2019).

The purpose of this study is to assess changes in the volume of fish production and consumption in the world. The time horizon of the research covers the years 2010-2019. In some cases, this horizon has a much wider range and concerns the years 1950-2019. To prepare this article, different descriptive, comparative, analytical, mathematical and statistical research methods were used.

Fish Production in the World

In the structure of the supply of fish and other marine organisms, the share of catches decreased in 2010-2019, and the acquisition of fish and other marine organisms from aquaculture is becoming more and more important (Fig. 1).

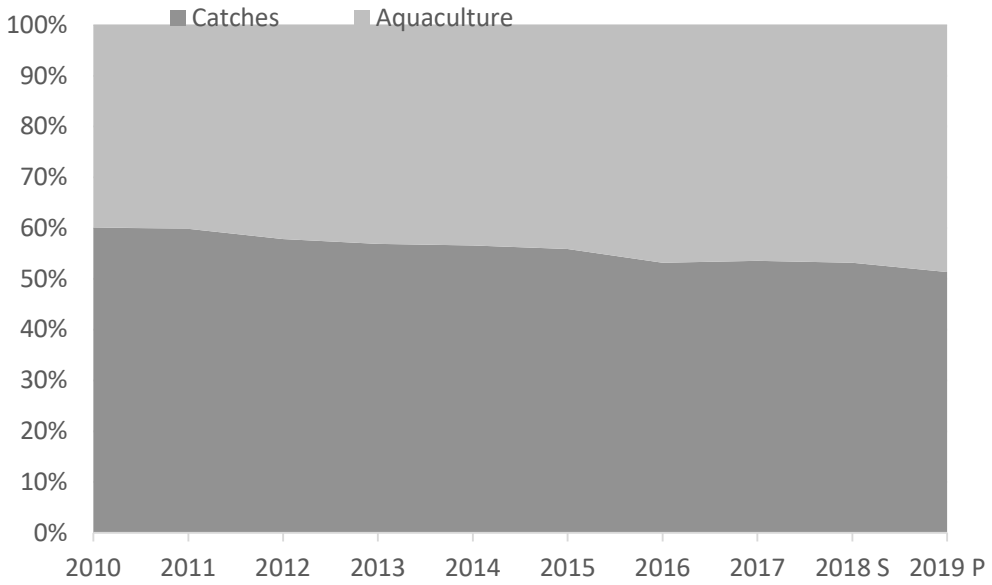

Fig. 1: Structure of fish and other marine organisms production (excluding aquatic plants, marine mammals, sponges, corals, etc.) in the world in 2010-2019 with the volume estimated for 2018 and the forecast volume for 2019 (%)

Source: own study based on: Fish market, 2014; Fish market, 2017; Fish market, 2018; Fish market, 2019.

According to the forecasts, the share of aquaculture in 2019 may amount to 48.7% of the total world supply of fish and other marine organisms (the remaining percentage will come from catches). For comparison, in the 1950s the share of aquaculture in the total production of fish and other marine organisms (excluding aquatic plants, marine mammals, sponges, corals, etc.) was only 4.4% (average annual for 1950-1959) and increased dynamically in subsequent periods, especially since the mid-1980s, according to FAO data (Fig. 2).

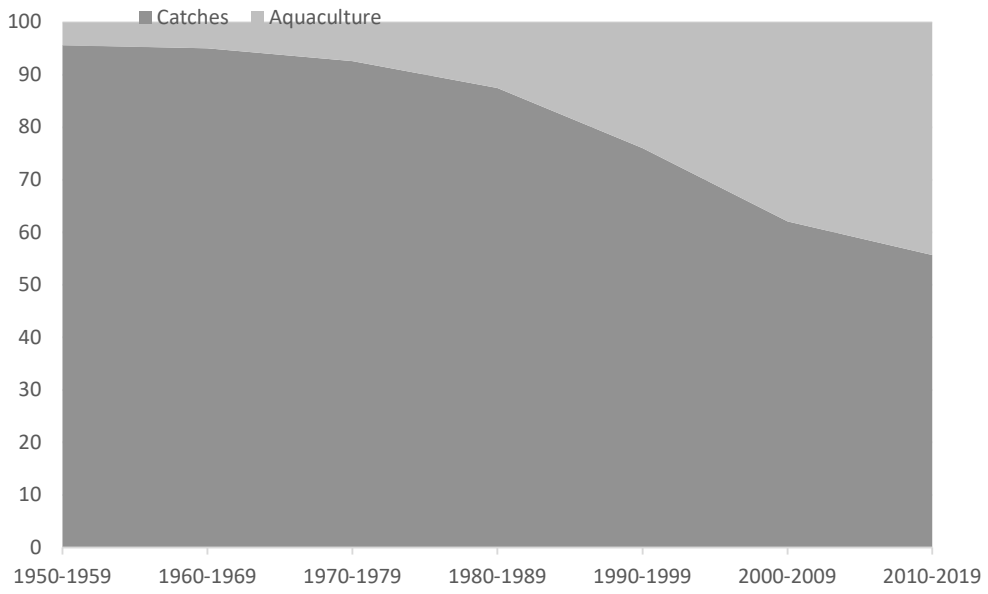

Fig. 2: Average annual structure of fish and other marine organisms production (excluding aquatic plants, marine mammals, sponges, corals, etc.) in the world in the years 1950-2019 (%)

Source: own study based on: Hryszko, Kuzebski, Lirski. 2014; Fish market, 2014; Fish market, 2017; Fish market, 2018; Fish market, 2019.

On average, in the years 1980–1989, aquaculture already accounted for 12.5% of the total supply. In the next decade, it was almost twice as much (24%), while in the last analysed years 2010-2019 (including the amounts forecast for 2019), the average annual share of aquaculture production may be slightly over 10 times higher than the corresponding share in 1950 -1959. Over the past two decades, global aquaculture production has increased dramatically and now exceeds beef production (Jennings et al., 2016).

In the context of this analysis, attention should be paid to the phenomenon of drop in deep-sea catches conducted by numerous countries around the world (in total, from 7-9 million tonnes in the 1970s and 1980s to 5 million tonnes in the mid-1990s). Initially, these catches were, in many cases, overexploitation (uncontrolled exploitation of fish resources by the countries that did not directly border with the fisheries used). In the subsequent decade, a global process of appropriation of fisheries by coastal states (protection of the own economic interests of coastal states) began, started in the 1970s and legally sanctioned by the Convention on the Law of the Sea (UNCLOS) in 1982. (protecting fish stocks and ensuring access to them for coastal states) (Fish market, 2004; Fish market, 2007; Portal INFOR pl., 2019).

Changes in the structure of fish and aquatic organisms production were accompanied by an increase in their global production volume, according to FAO estimates. In 2019, this production is forecast to amount to 177.8 million tonnes and is to be higher, by 20.1% than in 2010 (Fig. 3).

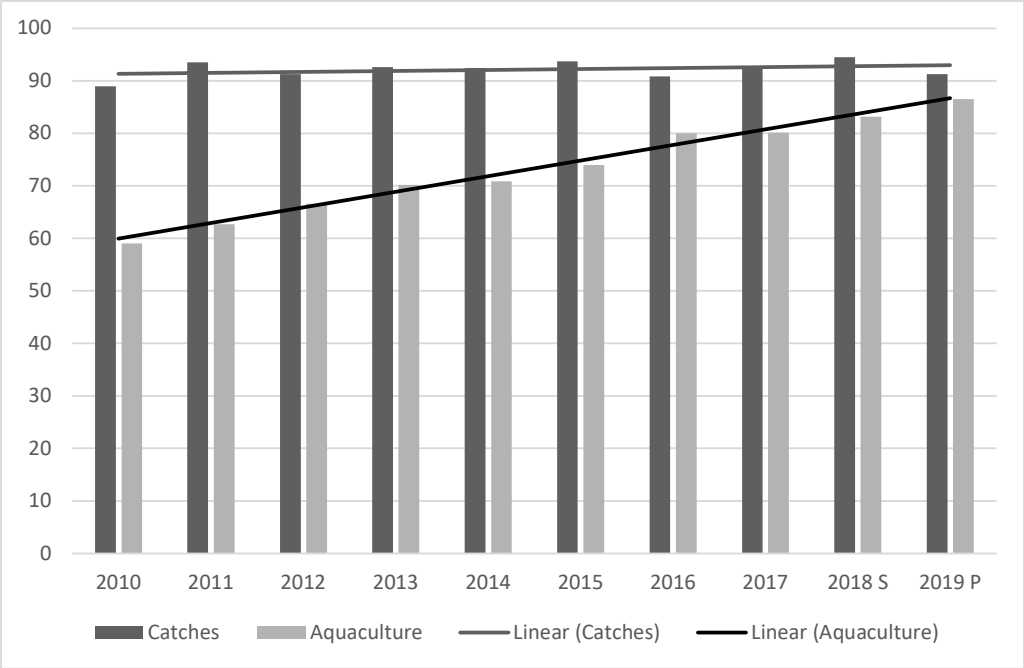

Fig.3: Structure of fish and other marine organisms production (excluding aquatic plants, marine mammals, sponges, corals, etc.) in the world in 2010-2019 with the volume estimated for 2018 and the forecast volume for 2019 (million tonnes)

Source: own study based on: Fish market, 2014; Fish market, 2017; Fish market, 2018; Fish market, 2019.

The shaped upward trend in the examined range (equation of the upward trend line: y = 3.157x + 1148.13) was affected by the increase in:

- catches, up to 91.3 million tonnes in 2019 (by 2.6% more than in 2010;
- aquaculture production, up to 86.5 million tonnes in 2019 (46.6% more than in 2010). Catches in 2010-2019 - the equation of the upward trend line: y = 0.1812x + 91.173. Aquaculture production in 2010-2019 - equation of the upward trend line: y = 2.9758x + 56.953.

The total global supply of fish and other marine organisms in 2019 may be 6.5 times higher than the average annual supply for 1950-1959, while the supply from catches alone is to increase 3.5 times, while from aquaculture as much as 72.1 fold.

As results from the calculations carried out, the increase in the volume of fish and other marine organisms production is positively correlated with the growth of the world population (correlation coefficient r = 0.9914 for 1950-2019) (Fig. 4).

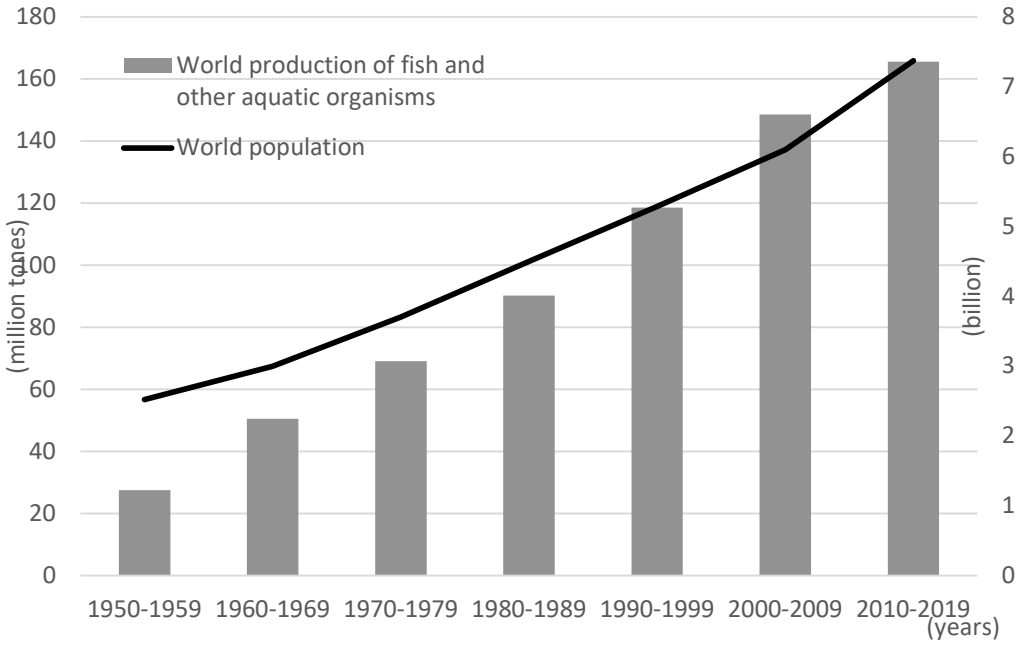

Fig. 4: Production of fish and other marine organisms (excluding aquatic plants, marine mammals, sponges, corals, etc.) in the world in 1950-2019 (million tonnes) and the world's population (billion)

Source: own study based on: Hryszko, Kuzebski, Lirski. 2014; Fish market, 2014; Fish market, 2017; Fish market, 2018; Fish market, 2019.

Analysing the structure of production of fish and other marine organisms in the world in 2010-2017, according to production areas, it should be stated that Asian inland waters have a relatively largest share in this production in quantitative terms (annual average 30.9%). The next position is occupied by the Northwest Pacific (23.2%, respectively). The list of top three largest producers of fish and other marine organisms in the world includes also the Midwestern Pacific (9.1%). A smaller share, ranked in descending order, have: Indian Ocean (7.6%), North-East Atlantic (6.5%), South-East Pacific (6.4%), Middle-East Atlantic and African inland waters (2,7% each). The remaining areas account for a total of 10.8% of the total production of fish and other marine organisms in the world (Fig. 5).

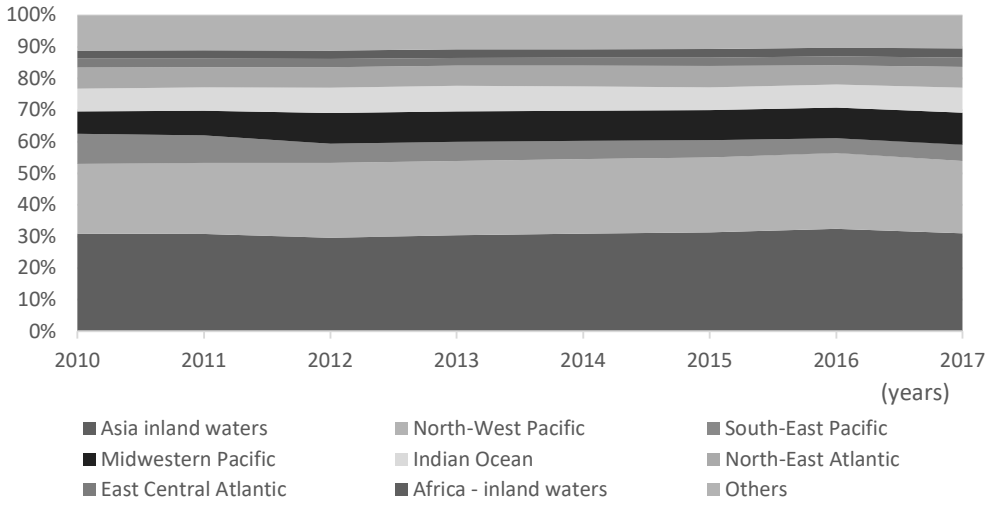

Fig. 5: Structure of fish and other aquatic organisms production in the world for 2010-2017 by areas of this production (%)

Source: own study based on: Fish market, 2014; Fish market, 2017; Fish market, 2018; Fish market, 2019.

The Asian region (Asian inland waters and the Northwest Pacific) has dominated the world fish and other aquatic organisms production. In the analysed years, the average annual share of this region, in quantitative terms, exceeded half of the production (54.2%).

However, a disturbing phenomenon is the fact that more and more global fish stocks are being overfished. This currently applies, according to the FAO report, to over 33% of fish stocks, which is 3 times more than in the 1970s. Overfishing occurs especially in the Mediterranean and Black Sea areas (62.2%), the Southeast Pacific (61.5%) and the Southwest Atlantic (58.8%). According to the World Wide Fund for Nature (WWF), overfishing is caused by excessively high catch limits set each year by EU fisheries ministers, overcapacity of the fishing fleet and illegal (unreported) fishing. According to WWF specialists, as much as 60% of the world's fish stocks are exploited at the highest possible level (WWF. pl., 2019). In the context of these problems, attention should be paid to the role played by sustainable fisheries (minimization of uncontrolled and accidental catches of aquatic organisms, i.e. minimization of by-catches, thus protecting not only fish stocks, but also protected species of birds and marine mammals). The Sustainable Fishing Certificate (MSC) is currently held by 35 countries in the world (320 fisheries), and over 80 countries have applied for this certificate and are in the process of evaluation (FAO, 2019).

Considering the type of aquatic environment from which the fish originate, it should be stated that the largest in the global production is the share of sea fish (annual average 42.3%). Freshwater and bi-environmental fish account for 35.2%, respectively. The share of molluscs (13.9%) and crustaceans (8.2%) is definitely smaller, and the smallest is the share of other organisms (0.4%) (Fig. 6).

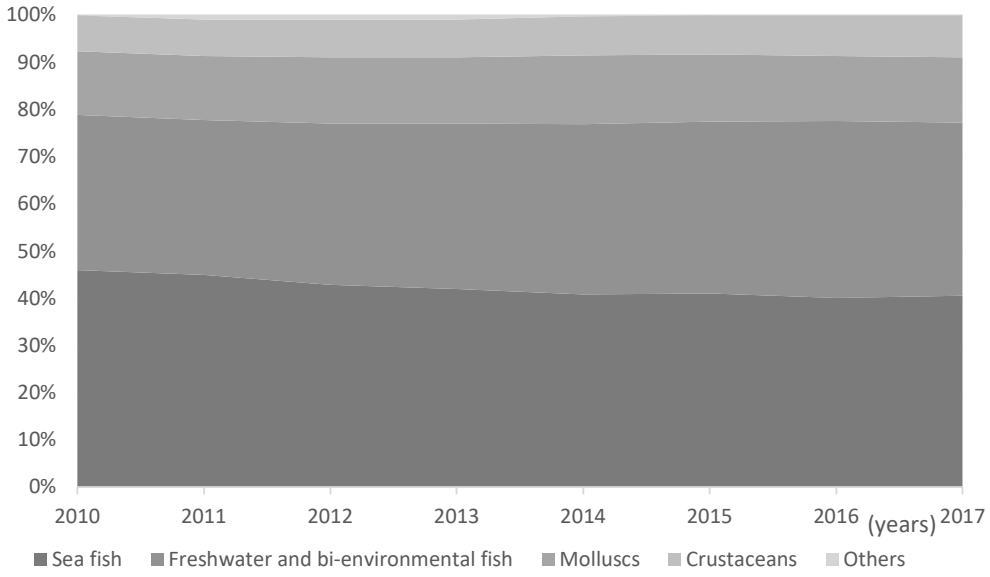

Fig. 6: Structure of fish production in the world in 2010-2017 by type of aquatic environment and other aquatic organisms (%)

Source: own study based on: Fish market, 2014; Fish market, 2017; Fish market, 2018; Fish market, 2019.

Over the years, the share of the production of marine fish in the total production of fish and other aquatic organisms in the world decreases, while the share of freshwater and bi-environmental fish in particular increases.

The analysis of catches of the most important fish species in the world indicates that the largest share in this production have Peruvian anchovies (annual average 5.1%), followed by pollock (3.5%) and striped tuna (bonito) (3.1%). The lower share have, ranging in descending order: Atlantic herring (1.9%), Pacific mackerel (1.7%), yellowfin tunas, silver scabbardfish and Atlantic cod (1.4% each) as well as European sardines (1.3%) (Fig. 7).

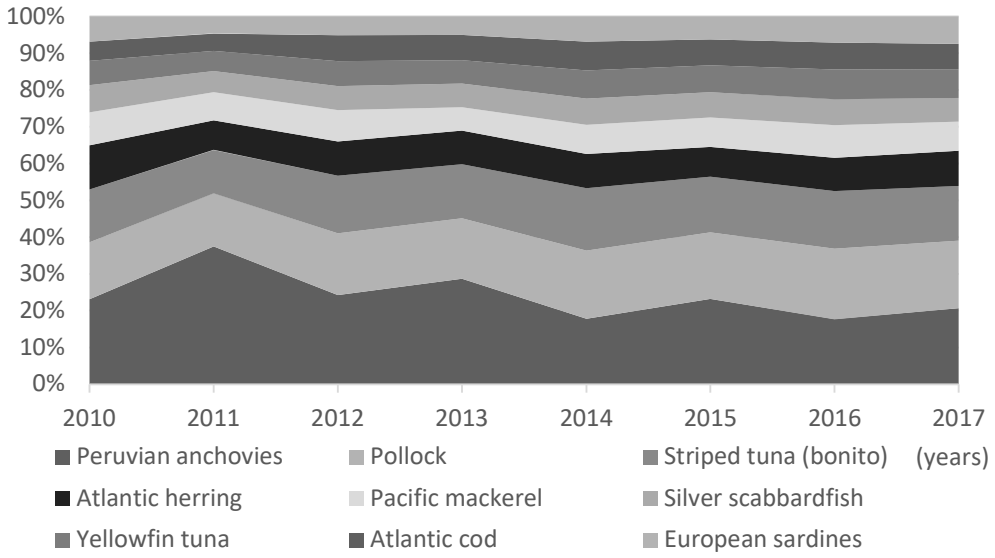

Fig. 7: Structure of catches of the most important fish species and aquatic organisms in the world in 2010-2017 (%)

Source: own study based on: Fish market, 2014; Fish market, 2017; Fish market, 2018; Fish market, 2019.

In the analysed years, there was an upward trend regarding the catches of the following fish species: pollock (increase to 3,488 thousand tonnes in 2017, by 23.3% compared to 2010), striped tuna (bonito) (increase to 2,828 thousand tonnes, by 8.6%), yellowfin tunas (increase to 1,477 thousand tonnes, by 21.5%), European sardines (increase to 1,428 thousand tonnes, by 14.6%), Atlantic cod (y = 44.119x + 1055.5; increase by 37%, to 1,304 thousand tonnes), Equations of the outlined upward trend line: pollock (y = 74.452x + 2932.2), striped tuna (bonito) (y = 25.19x + 2711.1), yellowfin tuna (y = 38.214x + 1161.5), European sardine (y = 38.369x + 999, 6), Atlantic cod (y = 44.119x + 1055.5). (Fig. 8).

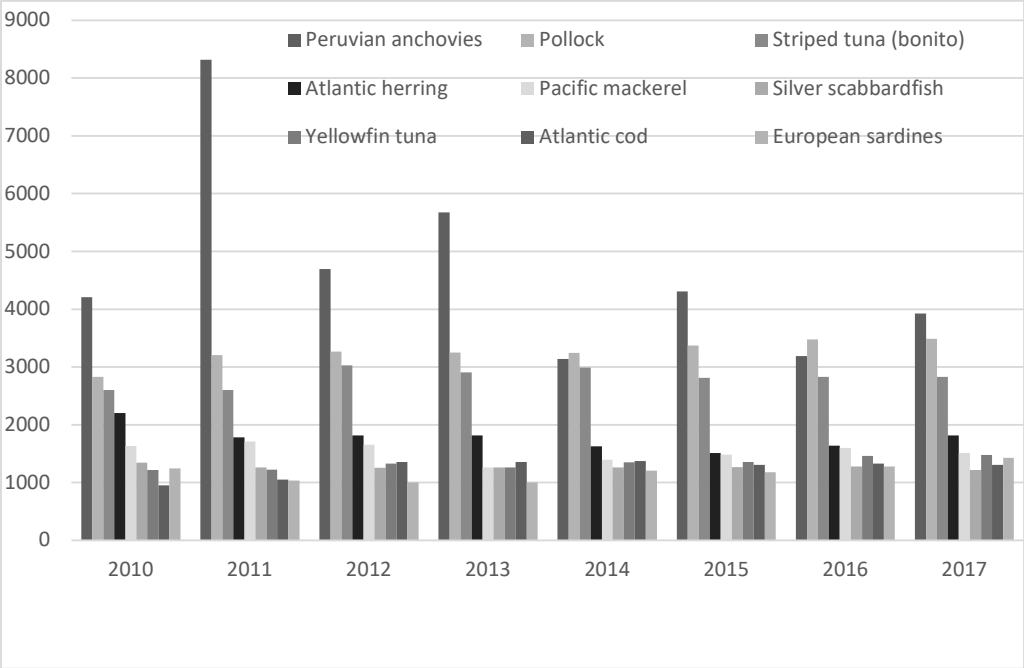

Fig. 8: Estimated catches of the most important fish and aquatic organisms worldwide in the years 2010-2017 (thousand tonnes)

Source: own study based on: Fish market, 2014; Fish market, 2017; Fish market, 2018; Fish market, 2019.

A downward trend was observed in the catches of fish species such as: Peruvian anchovies (decrease to 3923 thousand tonnes in 2017, by 6.7% compared to 2010), Atlantic herring (decrease to 1815 thousand tonnes, by 17, 6%), Pacific mackerel (decrease to 1511 thousand tonnes, by 7.5%), silver scabbardfish (decrease to 1217 thousand tonnes, by 9.3%). Equations of the outlined decreasing trend line: Peruvian anchovies ($y = - 372.67x + 6,359.3$), Atlantic herring ($y = - 53.738x + 2018.6$), Pacific mackerel ($y = - 21.512 + 1628.7$), silver scabbardfish ($y = - 8.6905x + 1306.9$).

Extremely dangerous phenomena sometimes occur in the population of certain fish species, belonging to the most important fish species caught in the world. This situation currently (2019) applies to Atlantic cod caught in the eastern Baltic Sea and largely concerns Polish fishermen. The increase in catches of this species of fish, and above all the pressure of the anthropogenic environment, have made the present situation of Atlantic cod critical as it may be concluded from the statement of the EU Commissioner for the Environment, Maritime Affairs and Fisheries. There was a loss of their stock in the eastern Baltic Sea, which should be considered a very worrying phenomenon. In mid-October 2019, EU ministers responsible for fisheries agreed almost a total ban on cod fishing in the eastern Baltic Sea, important for Polish fishermen. This is to help rebuild the cod stocks (Portalspozywczy. pl, 2019).

Due to the fact that Poland is a member of the European Union (since May 1, 2004), Polish fisheries are covered by the Common Fisheries Policy, just like other European Union countries. This policy aims to achieve sustainable exploitation of fisheries and stabilize the fish market, and consists in providing food products of the highest quality and at the right price, while simultaneously ensuring profits for producers, in accordance with the principle of maintaining a balance between fisheries resources and fishing potential. The problem areas of the Common Fisheries Policy included:

1. Conservation of fish stocks (the basic instrument for managing sea fisheries in the European Union are the annual catch limits (quotas) - Total Allowable Catches (TAC);

2. Structural policy (infrastructure adaptation: fleet, port facilities, factories and organization of the production process and management of their development in the fishing industry);
3. Common market organization (balancing the needs of the Community market and the interests of EU fishermen, and ensuring *fair play* competitiveness rules by creating a common market within the Community and matching production volume and demand;
4. External fisheries policy (obtaining rights to use non-European fisheries for EU trawlers) (EUR-Leks. eu., 2019; Szymańska, 2006; EC. Europa. eu., 2019; Szymańska, 2010; The European Union and fishing subsidies. Raport, 2019).

A contentious problem turned out to be the European Commission's proposal (December 2019) regarding financial aid for fishermen affected by the closure of fishing for Atlantic cod in the Eastern Baltic Sea. This financial support is intended for the permanent decommissioning of fishing vessels. The Commission is also proposing to tighten fishermen's controls. From 2020, vessels fishing for cod in the Eastern Baltic Sea are to be equipped with a satellite monitoring system or other electronic monitoring system. In addition, at least 20% of these vessels should take observers on board. However, as experts estimate, the eastern cod stock will not be able to rebuild before 2024, even in the total absence of catches, which should be considered a very unfavourable phenomenon (Portalspozywczy. pl, 2019).

The world's largest producer of fish and other aquatic organisms is China. In the analysed years, Chinese average annual share in this production was almost 37% (for comparison, the average annual in 1950-1959 was definitely smaller - 8%). Indonesia (6.2%, annual average in 1950-1959 - 2.2%) and India (5.9%, 3.3% respectively) are among the top three largest producers of fish and other aquatic organisms in the world. (Fig. 9).

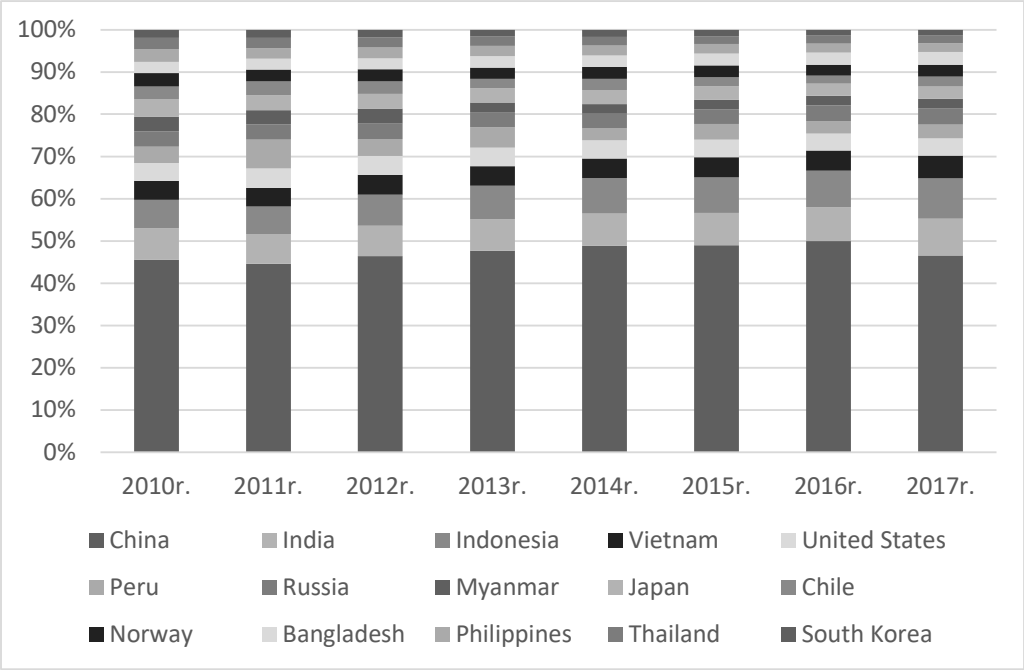

Fig. 9: Structure of fish and aquatic organisms production in the world in 2010-2017 by largest producers (%)

Source: own study based on: Fish market, 2014; Fish market, 2017; Fish market, 2018; Fish market, 2019.

Asian countries have dominated the production of fish and aquatic organisms worldwide. Their total average annual share (excluding Russia) exceeded 64% in the period considered. Russia accounted for

2.8% of the analysed production (while on average in the years 1950-1959 its share was definitely higher - 8.4%). The United States is a major global producer of fish and aquatic organisms (3.3%, with annual average much higher in 1950-1959 - 8.4%). This group also includes Peru (3.1%, annual average lower in 1950-1959 - 1,5%) and Chile (2%, in 1950-1959 the annual average was lower and amounted to 0,7%). The average annual share of Peru in the global production of fish and aquatic organisms, in the years 1960-1969, was 15.2% and was the highest among the largest producers of fish and aquatic organisms in the world. In the following decades, this share decreased. The average annual share of Chile in the global production of fish and aquatic organisms increased in the following decades (until 1999), then began to decrease (Hryszko, Kuzebski, Lirski, 2014). Among European countries (excluding Russia), Norway is an important global producer of fish and aquatic organisms (2.2%). In total, however, the remaining countries account for just over one-fifth of all the production.

In the analysed years 2010-2017, the total supply of fish and aquatic organisms in the world obtained from their largest producers increased (to 172.7 million tonnes in 2017, by 16.5% compared to 2010). The production of aquaculture fish is becoming increasingly important there.

An upward trend was recorded for the following countries, ranking the dynamics of change in decreasing order: Indonesia (up to 12.8 million tonnes, by 66.2%), Vietnam (up to 7.1 million tonnes, by 39.2%, respectively), Bangladesh (up to 4.1 million tonnes, by 36.7%), India (up to 11.6 million tonnes, by 36.5%), Russia (up to 5.1 million tonnes, by 21.4%), China (up to 62 , 2 million tonnes, by 19.2%) and the United States (up to 5.5 million tonnes, by 12.2%). Equations for the outlined upward trend lines: Indonesia (y = 0.7131x + 6.9036), Vietnam (y = 0.2429x + 4.8821), Bangladesh (y = 0.148 x + 2.8036), India (y = 0.4464x + 7.6786), Russia (y = 0.1071x + 4.0929), China (y = 1.8655x + 51.593), United States (y = 0.0357x + 5.2643). Equation for the outlined upward trend line for Norway (y = 0.0107x + 3.4893). Equations for the outlined upward trend lines: Indonesia (y = 0.7131x + 6.9036), Vietnam (y = 0.2429x + 4.8821), Bangladesh (y = 0.148 x + 2.8036), India (y = 0.4464x + 7.6786), Russia (y = 0.1071x + 4.0929), China (y = 1.8655x + 51.593), United States (y = 0.0357x + 5.2643) (Fig. 10).

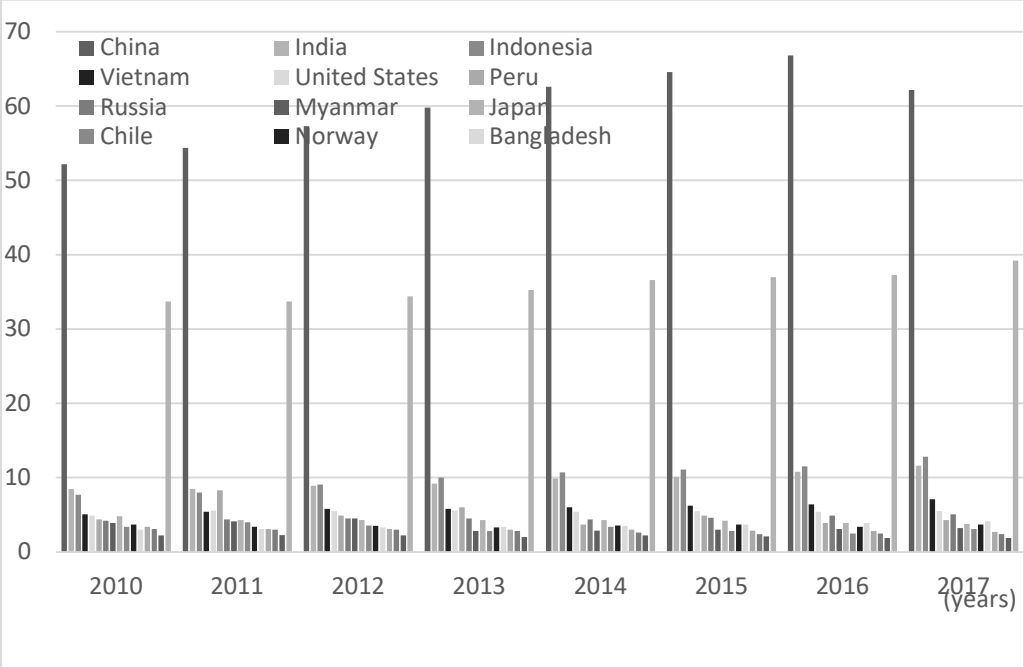

Fig. 10: Volume of fish and aquatic organisms production in the world in 2010-2017 by major producers (million tonnes)

Source: own study based on: Fish market, 2014; Fish market, 2017; Fish market, 2018; Fish market, 2019.

There was no change in production volume in the case of Norway, for which the upward trend in the examined respect developed also in the years 2010-2017. Equation for the outlined upward trend line for Norway (y = 0.0107x + 3.4893). The downward trend in the analysed range concerned such countries as: Peru (decrease to 4.3 million tonnes, by 2.3%), Chile (to 3.1 million tonnes, by 8.8%, respectively), South Korea (to 1.9 million tonnes, by 13.6%), Myanmar (up to 3.2 million tonnes, by 17.9%), Philippines (up to 2.7 million tonnes, by 20.6%), Japan (up to 3.8 million tonnes, by 20.8%), Thailand (up to 2.4 million tonnes, by 22.6%). Equations for the outlined downward trend lines: Peru (y = - 0.2976x + 6.3893), Chile (y = - 0.1357x + 3.8107), South Korea (y = - 0.05x + 2.325), Myanmar (y = - 0.1702x + 4.2036), Philippines (y = - 0.083x + 3.375), Japan (y = - 0.1107x + 4.7357), Thailand (y = - 0.11119x + 3.2286). For other countries, there was an upward trend (overall increase to 39.2 million tonnes, by 16.3%). Equation for the outlined upward trend line for all other countries y = 0.781x + 32.386. Very dynamic (upward) changes are noticed in the analysed range when the average annual production volume for 2010-2017 is compared with the corresponding values for 1950-1959 (Fig. 11).

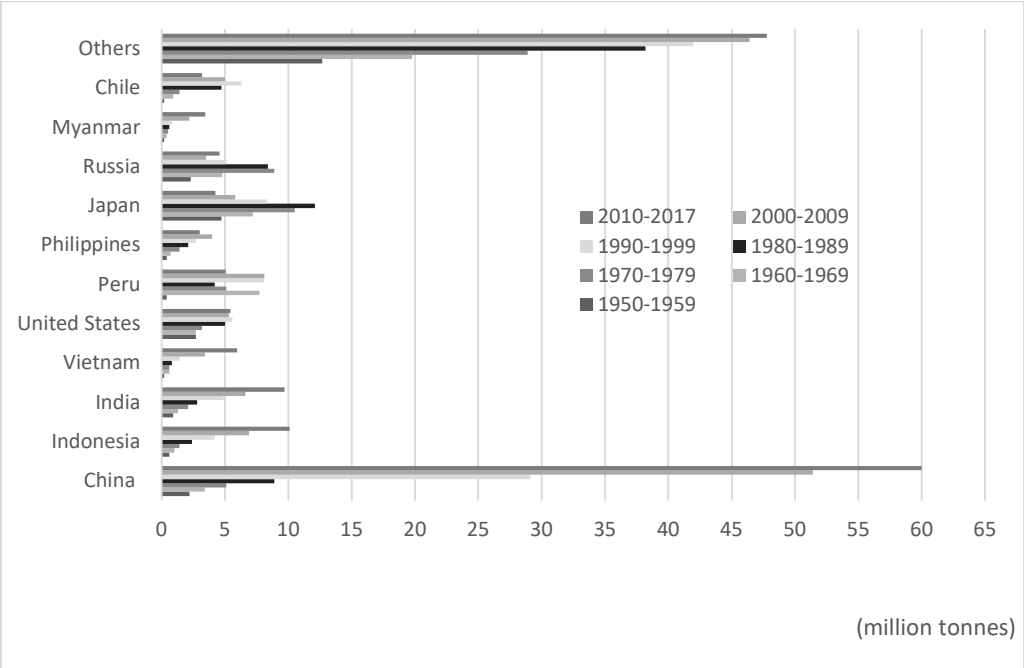

Fig. 11: Volume of fish and aquatic organisms production in the world in 1950-2017 by major producers (million tonnes)

Source: own study based on: Hryszko, Kuzebski, Lirski, 2014; Fish market, 2014; Fish market, 2017; Fish market, 2018; Fish market, 2019.

Considering the relative increase in the production volume of fish and aquatic organisms, according to the most important countries in the world in this respect, for the compared time intervals (average annual production volume in 2010-2017 compared to the corresponding values for 1950-1959), these countries can be ordered in the following series: Vietnam (29.9-fold increase, on average annually to 6 million tonnes in 2010-2017), China (27.3-fold, up to 60 million tonnes, respectively), Myanmar (17.2-fold, up to 3.4 million tonnes), Indonesia (16.9 times, up to 10.1 million tonnes), Chile (16 times, up to 3.2 million tonnes), Peru (12.6 times, up to 5.1 million tonnes), India (10.8 times, 9.7 million tonnes), Philippines (7.5 times up to 3 million tonnes), United States (2 times, up to 5.4 million tonnes), Russia (2 times, up to 4.6 million tonnes), Japan (0.9 times, up to 4.2 million tonnes). In total, for other countries, the volume of fish and aquatic organisms production annually averaged 47.8 million tonnes in 2010-2017 and increased 3.8-fold compared to the corresponding average annual for 1950-1959. In the analysed wide time horizon, Asian countries dominate in the production of fish and other aquatic organisms in the world. The supply of aquatic organisms obtained from aquaculture in these regions of

the world is especially high and constantly growing, which should be assessed favourably in the context of the idea of sustainable fishing.

Intended use of fish and marine organisms – for consumption and non-consumption purposes

The vast majority of fish and marine organisms caught in the world are intended for consumption. In the analysed 2010-2019 period, it was on average 87.4% (the remaining percentage is used for non-consumption purposes) (Fig. 12).

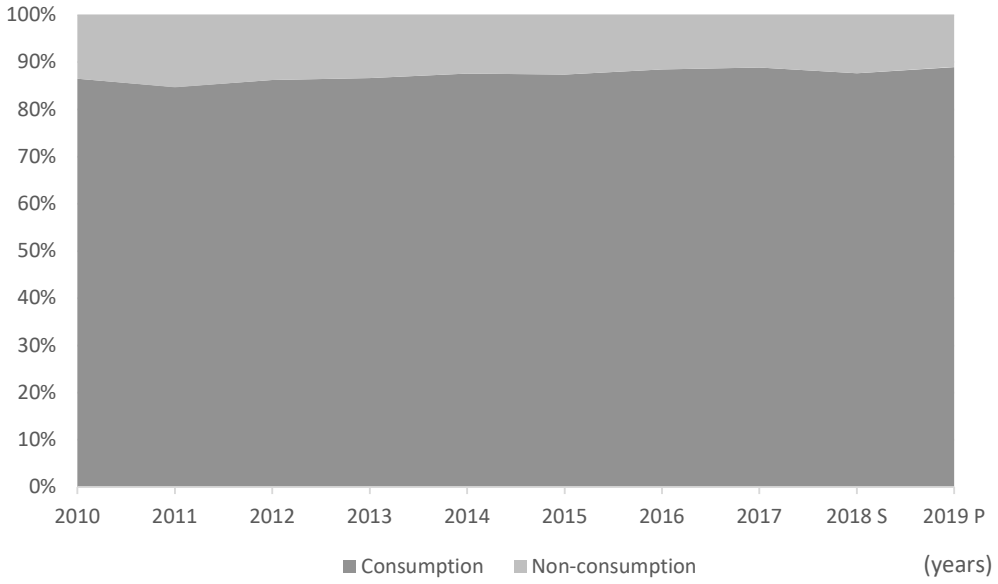

Fig. 12: The structure of use of fish and other marine organisms caught (without aquatic plants, marine mammals, sponges, corals, etc.) in the world in 2010-2019 with an estimated value for 2018 and forecast for 2019 (%)

Source: own study based on: Fish market, 2014; Fish market, 2017; Fish market, 2018; Fish market, 2019.

In the analysed years 2010-2019, the size of catches of fish and other marine organisms (excluding aquatic plants, marine mammals, sponges, corals, etc.) that were intended for consumption increased (there was an upward trend that can be described by the equation for the outlined upward trend line: $y = 3.3685 + 126.03$). According to forecasts, in 2019, 158.2 million fish and other marine organisms can be allocated for consumption purposes (Fig. 13).

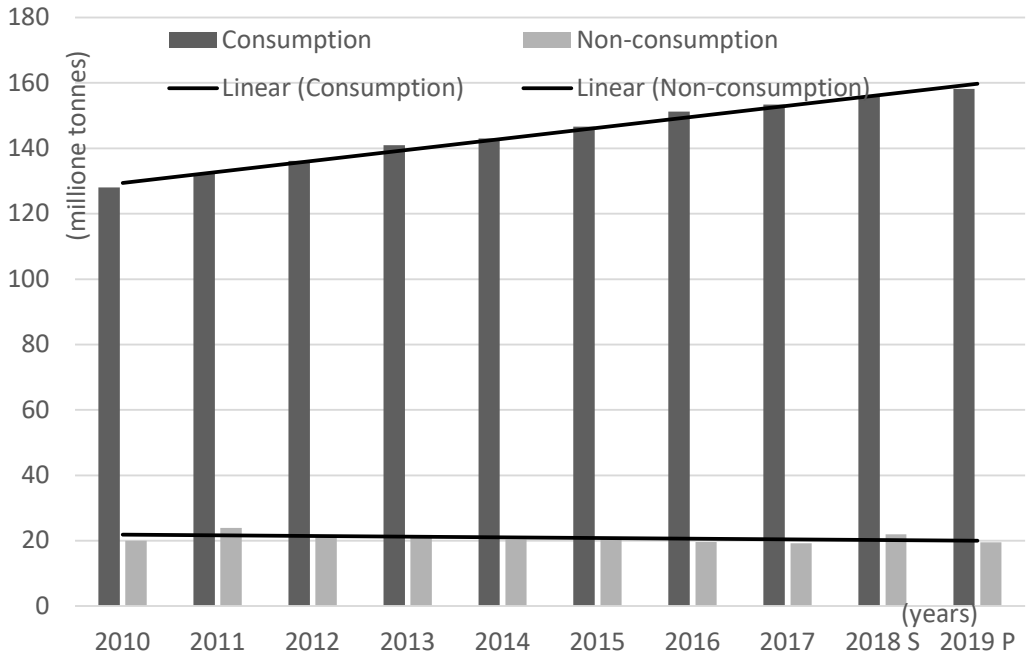

Fig. 13: The volume of fish and other marine organisms caught (without aquatic plants, marine mammals, sponges, corals, etc.) in the world in 2010-2019, taking into account the volume estimated for 2018 and forecast for 2019 by purpose (million tonnes)

Source: own study based on: Fish market, 2014; Fish market, 2017; Fish market, 2018; Fish market, 2019.

Compared to 2010 it will an increase by 23.6%. However, multidirectional fluctuations (increase-decrease type) occurred in terms of the volume of fish and other marine organisms caught for non-consumption purposes. In 2019, 19.6 million tonnes of fish and other marine organisms might be allocated for these purposes, i.e. 2% less than in 2010. As a result, a downward trend took place regarding the volume of fish and other marine organisms caught for non-consumption purposes (equation for the outlined trend line: $y = - 0.2115x + 22.093$).

The observed increase in the overall volume of fish and other marine organisms production is positively correlated with the increase in catches of those organisms intended for consumption (correlation coefficient $r = 0.99$), and negatively correlated with the volume of catches for non-consumption purposes (correlation coefficient $r = - 0.3164$).

According to the Marine Stewardship Council (MSC) report Working Together for Thriving Oceans 2018-2019, the demand for fish and seafood from sustainable fishing is increasing. Over the past 5 years, this was an increase by 34% (11.8 million tonnes of certified catches of aquatic organisms worldwide in 2018; 361 sustainable fisheries in 41 countries in 2019). MSC research also shows that 83% of global fish and seafood consumers agree that seas and oceans must be protected for future generations (MSC Annual Report 2018-2019, 2019). This should be assessed as a very favourable socio-economic and environmental (ecological) phenomenon.

It is estimated that the market for certified fish and seafood products (marked with the blue MSC sign). The MSC program is the only wild fisheries and eco-labeled program that meets the Food and Agriculture Organization of the United Nations (FAO) guidelines on the ecological labeling of fish and seafood products. As the only one, it is also compliant with the International Social and Environmental Accreditation and Labeling Alliance (ISEAL) of an independent global association that monitors the maintenance of best social, environmental and best practices as well as standards. It is also the world's first fish and seafood certification program that has been recognized by the Global Sustainable Seafood Initiative (GSSI) as meeting international credibility and rigor requirements is worth worldwide around $ 10 billion annually (MSC Annual Report 2018-2019, 2019).

The consumption share of fish and other marine organisms (excluding aquatic plants, marine mammals, sponges, corals, etc.) obtained from aquaculture increases worldwide, while the consumption share of these products from catches decreases. In 2019, according to FAO forecasts, the consumption of these organisms from aquaculture will account for 54.6% of the total consumption of fish and other marine organisms (by 8.4 pp more than in 2010) (Fig. 14).

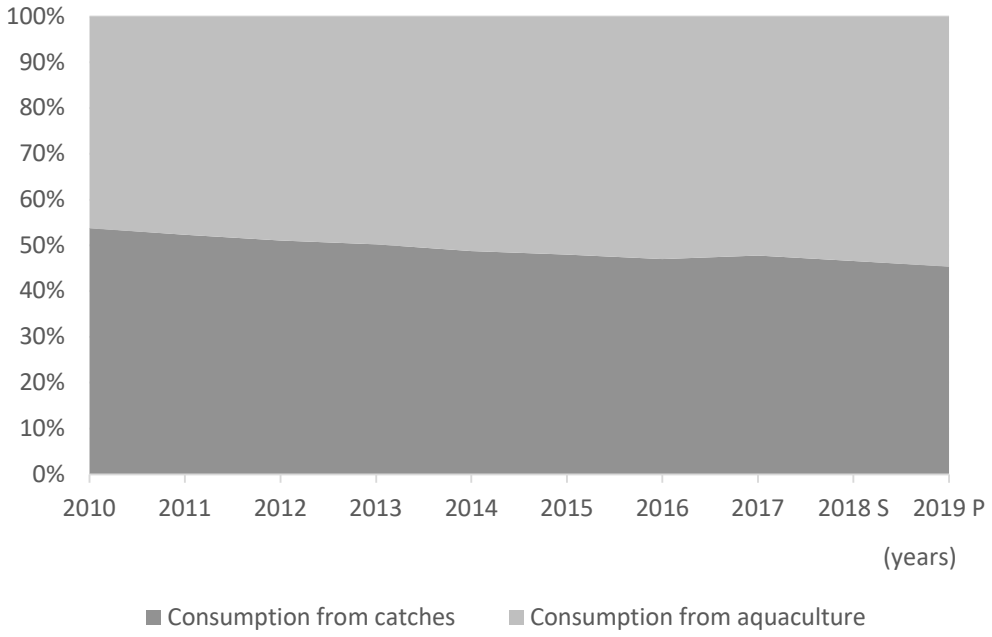

Fig. 14: The structure of consumption of fish and other marine organisms (without aquatic plants, marine mammals, sponges, corals, etc.) in the world in 2010-2019 with an estimated value for 2018 and forecast for 2019 (%)

Source: own study based on: Fish market, 2014; Fish market, 2017; Fish market, 2018; Fish market, 2019.

According to the MSC report Working Together for Thriving Oceans 2018-2019, the highest demand for fish and seafood from sustainable fisheries is recorded in Northern Europe (Germany, the Netherlands, the United Kingdom). However, a dynamic increase of this demand is observed in China, Japan and also in Poland.

The consumption of fish and other marine organisms in the world in the long term has increased (in relation to the average annual consumption for the analysed decades, an upward trend from 1960-1969 to 2010-2019, the equation for the outlined upward trend line: $y = 1.9657x + 7.1533$). On average, for 2010-2019, this consumption can reach the level of 19.8 kg per capita and increase by 10.1 kg per capita, compared to the corresponding consumption for 1960-1969. The upward trend in the consumption of fish and other marine organisms (excluding aquatic plants, marine mammals, sponges, corals, etc.) for 2010-2019 can be described by the following equation for the outlined trend line: $y = 0.2133x + 18.627$. According to FAO forecasts, in 2019 this consumption may amount to 20.5 kg per capita and may be higher by 10.2% than in 2010. (Fig. 15).

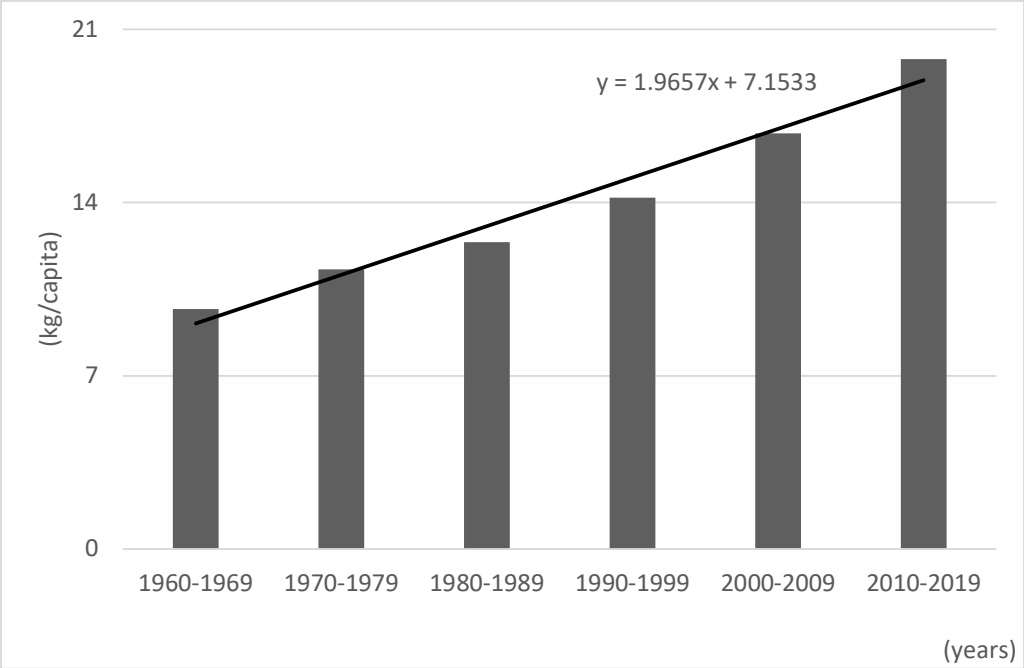

Fig. 15. The volume of consumption of fish and other marine organisms (without aquatic plants, marine mammals, sponges, corals, etc.) in the world in 1960-2019 with an estimated value for 2018 and forecast for 2019 (kg/person)

Source: own study based on: Hryszko, Kuzebski, Lirski, 2014; Fish market, 2014; Fish market, 2017; Fish market, 2018; Fish market, 2019.

The consumption of fish and other marine organisms in the world, which are obtained from aquaculture, increased relatively dynamically (up to 11.2 kg per capita, by 30.2% compared to 2010). The upward trend in this area can be described by the following equation for the outlined trend line: $y = 0.277x + 8.5667$ (Fig. 16).

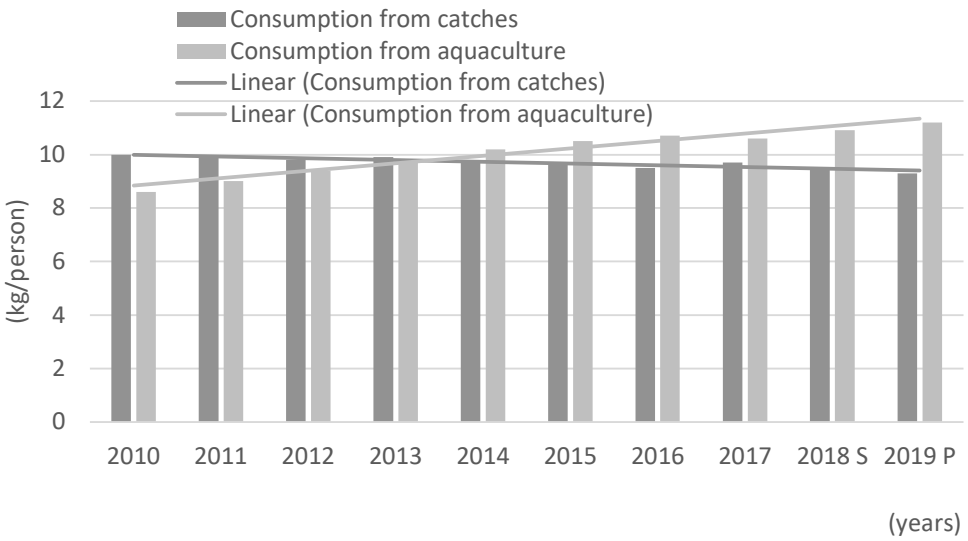

Fig. 16: The volume of consumption of fish and other marine organisms (without aquatic plants, marine mammals, sponges, corals, etc.) in the world in 2010-2019 with an estimated value for 2018 and forecast for 2019 (kg/person)

Source: own study based on: Fish market, 2014; Fish market, 2017; Fish market, 2018; Fish market, 2019.

However, the consumption of fish and other marine organisms from catches decreased globally to 9.3 kg per capita (by 7% compared to 2010) (FAO Newsroom, 2016). The downward trend in this range can be described by the following equation: $y = - 0.0655x + 10.06$.

According to the FAO report, the growth rate of global consumption of fish and seafood exceeds the growth rate of the world's population (FAO Newsroom 2016. Global per capita fish consumption rises above 20 kilograms a year, 2019).

According to the European Market Observatory for Fisheries and Aquaculture Products, an average European citizen consumes 22.7 kg of fish and other aquatic organisms per year, i.e. 16% less than the global average. From among the European Union countries, the consumption of fish is the highest in Portugal (55.3 kg), then in Spain (46.2 kg) and Lithuania (44.7 kg). In Poland, the consumption is definitely smaller and amounts to 13 kg. The smallest consumption of fish and other aquatic organisms is recorded in Hungary (3.6 kg) (Fig.17).

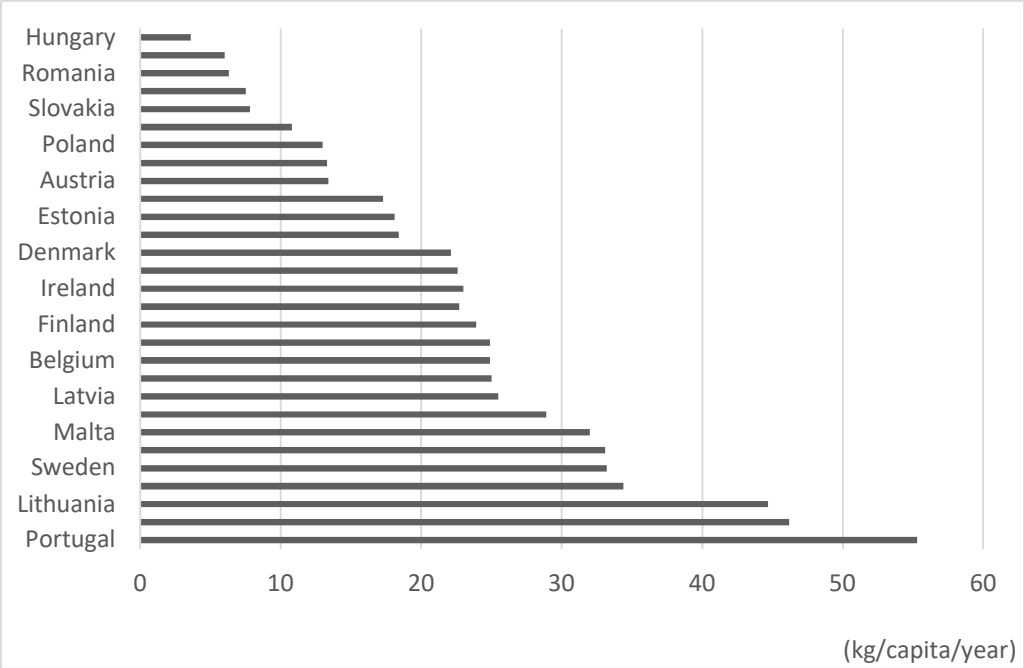

Fig. 17: Average annual consumption of fish and other aquatic organisms in the European Union (kg / capita / year) in 2014

Source: own study based on: European Market Observatory for Fisheries and Aquaculture Products, 2019.

However, relatively large disparities in fish consumption are observed worldwide. Two-thirds of the fish harvested are consumed in Asian countries, which is where they are obtained mostly from aquaculture. China is the leader in this region in terms of consumption of fish and other aquatic organisms. Europe accounts for over 12% of their world consumption, most of it in the European Union (Hryszko, Kuzebski, Lirski, 2014).

Fish is also of great non-consumption importance. They are a raw material for the production of medicines (e.g. fish oil), fertilizers, glues and animal feed (fishmeal), fish oils (compound feed used in aquaculture) (Kurien, 2005; Carpenter, G., Kleinjans, 2017).

Peru is the largest producer of fishmeal in the world (average annual share in total production for 2010-2018 - 21.5%). The top three list in this respect includes also the European Union (10.3%) and Chile (9.5% respectively). The subsequent places among the world's ten largest producers of fish meal are occupied by: China and Thailand (8.8% each), USA (6.3%), Japan (4%), Russia (3.2%), Iceland (2.9 %) and Ecuador (2.7%). The remaining countries together account for 22.1% (Fig. 18).

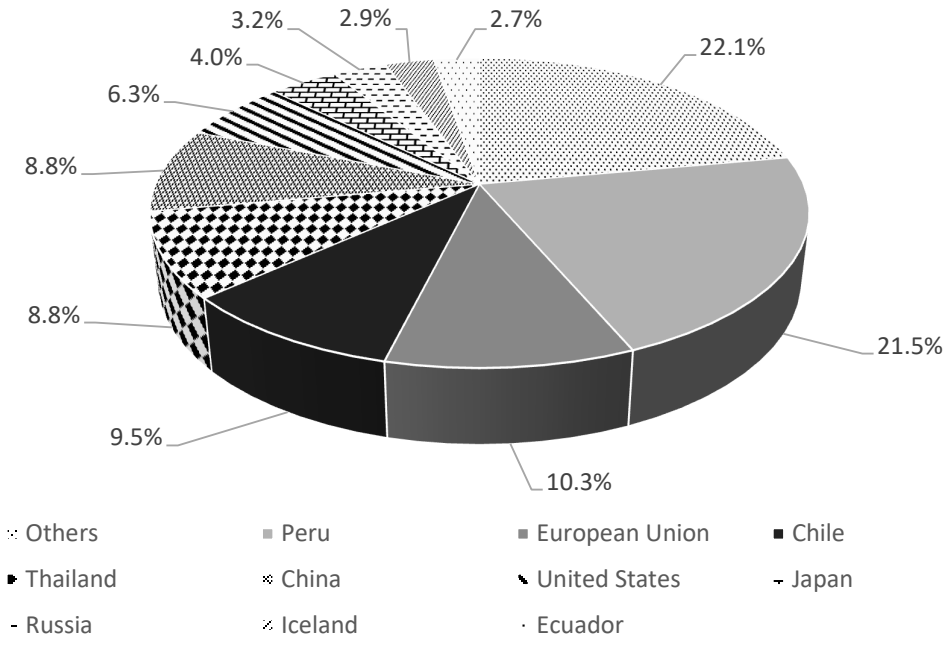

Fig. 18: Average annual structure of fishmeal production for 2010-2018 according to the largest producers in the world (%)

Source: own study based on: Fish market, 2014; Fish market, 2017; Fish market, 2018; Fish market, 2019.

The global production of fishmeal is decreasing. In 2018, its production was at the level of 4.928 million tonnes and was lower, by 18%, than in 2000 (Fig. 19).

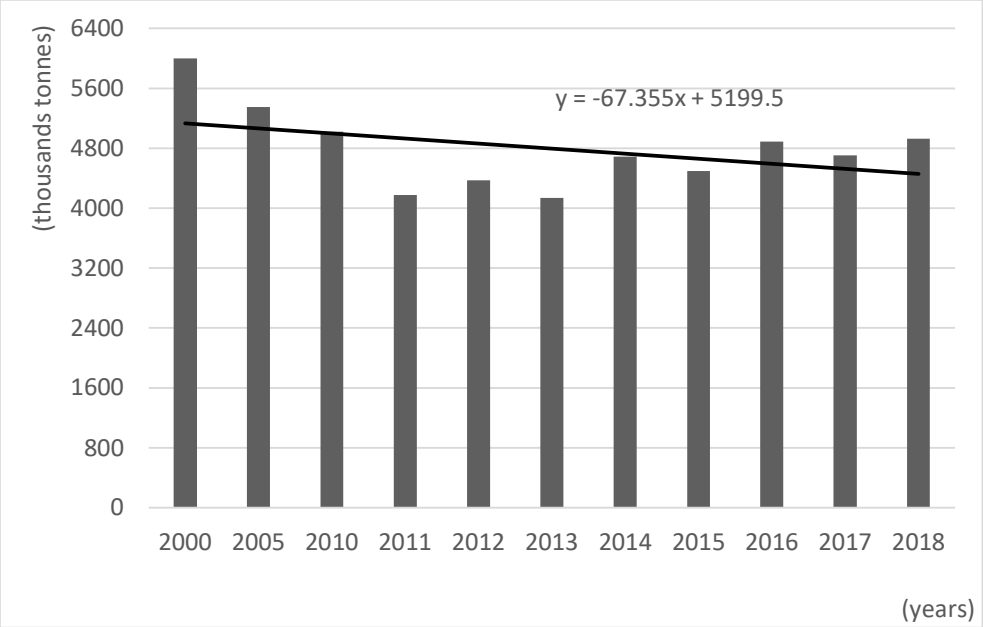

Fig. 19: Production of fishmeal in the world (thousand tonnes)

Source: own study based on: Fish market, 2014; Fish market, 2017; Fish market, 2018; Fish market, 2019.

In 2018, compared to 2000, the production of fish meal, in descending order, was as follows:

- decrease in: Thailand (to 280 thousand tonnes, by 41.3%), Peru (to 1120 thousand tonnes, by 36.7%), Chile (to 357 thousand tonnes, by 28.6%) and in the USA (to 258,000 tonnes, by 15.4%);
- growth in: China (up to 425 thousand tonnes, by 24.3%), Iceland (up to 145 thousand tonnes, by 18.5%), Russia (up to 160 thousand tonnes, by 18.5%), Ecuador (up to 115 thousand tonnes, by 4.5%), the European Union (up to 520 thousand tonnes, by 4%) and in Japan (up to 185 thousand tonnes, by 1.1%).

The dynamic increase in fishmeal production in total took place in other countries of the world (up to 1363 thousand tonnes, i.e. 2.3 times).

Water plants are also important in the non-consumption use of aquatic organisms (dyes, cosmetics and others) (Hryszko, Kuzebski, Lirski, 2014).

Conclusion

Based on the analysis carried out, it should be stated that in the examined years:

1. The production of fish and other aquatic organisms in the world has grown dynamically. This increase proved to be faster than the increase in the world's population. This should be associated with the growing demand for fish and fish products.
2. Aquaculture is becoming increasingly important in the global production of fish and other aquatic organisms. Currently, almost half of these organisms are obtained from this source.
3. More and more fish and other aquatic organisms in the world are currently being used for consumption purposes, while the volume used for non-consumption purposes is systematically decreasing.
4. The worldwide consumption of fish and other aquatic organisms, as a source of wholesome and easily digestible animal protein, increased. This is significantly influenced by the growing incomes of the population, in connection with the changing consumption model observed in many countries of the world (among others, the impact of global processes).
5. There are relatively large disparities in the consumption of fish and other aquatic organisms worldwide. They are observed between highly economically developed and developing countries. The relatively high consumption of these organisms in economically developed countries should be associated with the average high incomes of the population that inhabits them, the changing consumption pattern and the wide market availability of various species of fish and other aquatic organisms.
6. More than two-thirds of fish and other aquatic organisms are consumed in Asian countries, mostly in China. In Europe, the consumption amounts to 12% of the global volume, the majority of which is recorded European Union countries. However, there are quite significant disparities in the consumption of fish and other aquatic organisms between European Union countries. Most of them are consumed in Portugal, relatively much in Spain and Lithuania, and the smallest amounts in Hungary, which is associated with the consumption model.
7. The growing demand for fish and other aquatic organisms is conducive to the negative phenomenon of maximizing catches of certain species of fish and illegal fishing. In the absence of sustainable fishing, this threatens the population of these organisms. Countries belonging to the European Union are covered by a common fisheries policy that "protects" rational fishing, while in many other parts of the world there are no such solutions, which should be critically assessed. Although FAO developed (1995) The Code of Responsible Fisheries, it is based on voluntary principles. Lack of sanctions in the analysed area jeopardizes maintaining the balance.

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Diagnosis of Agricultural Land Resources in The European Union

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Abstract

Europe belongs to continents with relatively high agricultural land use. Agricultural land covers over half of the continent's area. Agricultural land resources in the Member States of the European Union are very diverse in terms of qualitative and quantitative features. The terrain relief, soil quality and agro-climatic conditions are different. The area of countries in the European Union, the place of agriculture in the economy of a given country, traditions or agricultural culture also differ. In the analysed years, the total area of agricultural utilised land in the European Union decreased. It was a consequence of allocating agricultural land to communication, housing estate, industrial or commercial and service purposes. Part of the farmland excluded from production consisted of the soils very good and good in terms of agriculture. Such a phenomenon should be critically assessed in relation to the relatively small resources of these soils. Afforestation of agriculturally weak soils is, in turn, a rational solution. This is conducive to the implementation of the idea of sustainable development of rural areas and multifunctionality of villages (Common Agricultural Policy of the European Union). As a result, the Common Agricultural Policy of the European Union indirectly affects the formation of agricultural land resources. National policies of the Member States of the European Union regulate the protection of agricultural land. There is no uniform model for shaping agricultural land resources in the European Union.

Keywords: Agricultural Land, Forests, European Union.

Introduction

Agricultural land covers over half of the Europe's area. However, European agriculture has worse natural and agroclimatic conditions for food production than its most important global competitors (Matuszczak, 2013).

The Common Agricultural Policy of the European Union influences the shaping of agricultural land resources in the member countries, but this is done indirectly (Szymańska, 2006; Rural development, 2019). The dual model of European agriculture includes both the intensive and sustainable agriculture model. The intensive agriculture model is closely related to the increase in labour productivity and the intensity of production resource management in agriculture. Soil quality and agro-climatic conditions are of crucial significance for this model as they determine yields, prices and income from land. The sustainable agriculture model takes into account environmental and health requirements to a greater extent than the intensive agriculture model. Soil quality and agro-climatic conditions are relatively insignificant in this model, because low-yielding lands can bring high income. This is related to the growing demand for "services" offered by these lands, namely: the use of a unique landscape, better residential and generally living conditions as well as better conditions for rest and recreation (Baldock, 2009; Baldock et.al., 2010; Cardwell, 2004; Cooper et al., 2009; Woś, 2005; Zegar, 2010). The author's own observations show that prices of real estate located in the vicinity of national parks and landscape parks, for example in Great Britain and Poland, are definitely higher than in rural areas which are not adjacent to such valuable natural and landscape areas.

It seems justified to agree with Matuszczak that land as the most immobile factor in agricultural production - which has virtually no other significant agricultural applications other than food production - compared to factors such as labour and capital, by creating demand for ecological and landscape "services", gains in mobility (Matuszczak, 2013). This means that there are alternative (new) uses for agricultural land that generate income.

The proposal for new solutions for the future CAP (CAP 2020+) has been submitted, among others, by one of the most influential think-tanks in the European Union - RISE Foundation, cooperating with the European Landowners Organization (ELO). The structure of CAP2020 + proposed by RISE consists of three components, focusing on financial support: holistic risk management in the agricultural sector, integrated management of agricultural land resources and support for investment in agriculture and for rural development. Integrated Land Management was proposed as a system to replace direct payments. The project is embedded in the theory of public goods, it is a concept of pro-environmental management of land resources. The essence of the proposed solution is a layered system, consisting of four types of payments for the delivery of public goods by farmers. These payments are proposed to be offered under co-financed multi-annual programs, prepared at regional level, focused on strategic goals and needs identified in the regions or at local level, compatible with the framework scope defined at EU level. Farmers could apply for payments under various titles on the basis of multi-annual contracts, which would significantly reduce transaction costs. Both on the farmers and administration side (Buckwell A., et.al., 2017; Future of CAP post 2020-Consilium, 2019).

The aim of this study is to assess the state of agricultural land resources in the member states of the European Union. The time horizon of the research covers the years 2005-2016. In some cases, this horizon has a slightly different scope due to the availability of statistical data. To prepare this article, different descriptive, comparative, analytical, mathematical and statistical research methods were used.

Share of utilised agricultural land and forests in the total area of the European Union countries

The share of forests in the total area of the European Union is growing. At the end of 2016, it was already slightly higher (41%) than the share of utilised agricultural land (40%) (Fig. 1). However, the structure of the use of the overall area in the European Union member states is very diverse.

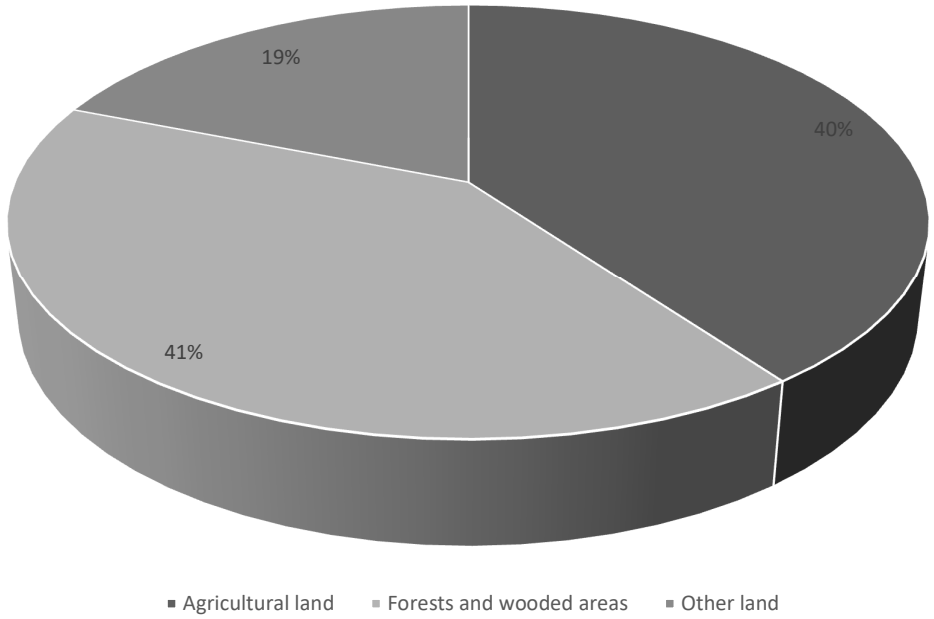

Fig. 1: Structure of the use of the total area of the European Union (EU-27) in 2016 (%); Source: own study based on: Environment, 2019; Eurostat, 2019

Among the European Union (EU-27) countries, the highest share of the arable land in the total area of the country is recorded in Great Britain (71.7%), and the lowest in Sweden (7.9%). The top five, ranked

in descending order, consists of: Ireland (64.3%), Denmark (62.8%), Romania (62.3%) and Hungary (60.9%).

A share of arable land in the total area of the country exceeding the average for the entire European Union (EU-27) have: Spain (59.1%), the Czech Republic (55%), the Netherlands (54.7%), France (53, 3%), Luxembourg (50.8%), Lithuania (49.4%), Germany (48.8%), Bulgaria (48.3%), Poland (47.4%), Italy (44.9%)), Bulgaria (44.2%), Portugal (44%) and Slovakia (40.8%). In other EU countries (Malta, Austria, Latvia, Slovenia, Estonia, Greece, Cyprus) the share of it is already smaller (Environmental, 2019; Eurostat, 2019).

An analysis of data for the years 2006-2015 revealed that in 2015, compared to 2006, the share of arable land in the total area increased in such European Union countries as: the Czech Republic (increase by 8.8 percentage points), Spain (respectively by 8.3 percentage points), Estonia (6.7 percentage points), Slovenia (6.3 percentage points), Lithuania (4.9 percentage points), Latvia (3.5 percentage points),Portugal (2.8 percentage points), Great Britain (2.1 percentage points), Ireland (1.8 percentage points), Finland (0.9 percentage points), Bulgaria, Luxembourg and Slovakia (0.5 pp each), Romania (0.3 pp) and Sweden (0.1 pp). The share of these lands in the geodetic area of Germany did not change. On the other hand, the share of arable land decreased in the total area of Austria (decrease by 5.8 percentage points), Italy (by 5.1 percentage point, respectively), Poland (5 percentage point), Hungary (4.1 percentage points), the Netherlands (2.2 percentage points), Cyprus (1.6 percentage points), Belgium (1.5 percentage points), Denmark (1.3 percentage points), France (1.2 percentage points) and Greece (0.3 percentage points) (Fig. 2).

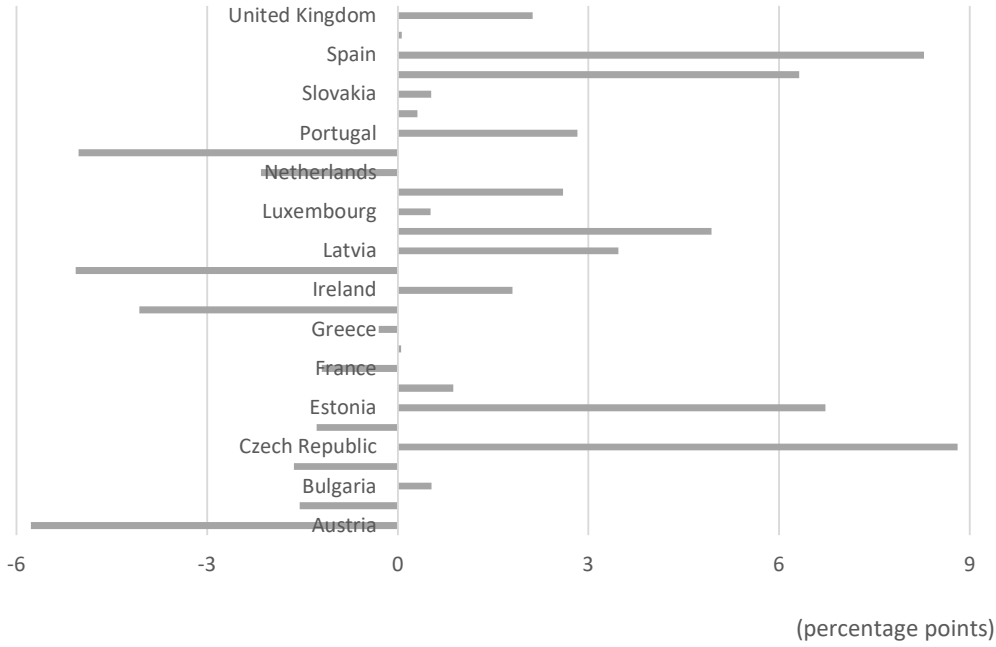

Fig. 2: Changes in the share of utilised agricultural land in the total land area of EU Member States (EU-27) in 2015 compared to 2006 (percentage points); Source: own study based on: Environment, 2019; Eurostat, 2019

Changes in the share of agricultural land area were caused by various factors. Afforestation of some of these lands continued, it concerned mainly low-quality agricultural soils. Such activities should be assessed as a favourable phenomenon for both ecological and economic reasons (effective management of agriculturally weak soils). Part of the arable land was also allocated for purposes other than agricultural or forestry. In Central European countries that accessed the European Union in 2004, built-up areas, housing, transport, and commercial and service infrastructure developed relatively intensively (Szymańska, 2012).

The observed changes in the share of agricultural land in the total area of certain European Union countries were accompanied by changes in the share of forests and forestry land in this area.

Finland (73.1%) has the largest share of forests and forestry land in its total area among the European Union countries, while in Malta this share is the lowest (1.1%). Sweden (68.4%) and Latvia (54%) are also classified among the top three. Estonia (49.3%) and Austria (46.9%) also have a larger share of forests and wooded areas than the average share for the European Union. In other EU-27 countries it is smaller, ranking in decreasing order: Slovakia (40.3%), Spain 36.9%, Portugal (35.3%), Bulgaria (35.2%), Lithuania (34.8%), Czech Republic (34.5%), Luxembourg (35.5%), Germany (32.8%), Italy (31.6%), France (31%), Poland (30.8%), Greece (30.3%), Romania (29.8%), Belgium (22.6%), Hungary (22.2%), Cyprus (18.7%), Denmark (14.4%), United Kingdom (13%), The Netherlands (11.1%), Ireland (10.9%) (Environment, 2018; Eurostat, 2019). In the analysed years 2005-2016, the share of forests and forestry land increased in the following countries, ranking in decreasing order: Sweden (increase by 10.9 percentage points), Latvia (by 7.4 percentage points, respectively), Austria (6.8 pp), Denmark (2.9 pp), Hungary (2.4 pp), France (2.3 pp), Belgium (2.2 pp), Lithuania (1.3 pp), Germany (1.2 pp), Ireland and Finland (1.1 pp each), Cyprus (0.9 pp), the Netherlands (0.8 pp), Bulgaria (0.7 pp), Poland (0.6 pp), Romania (0.5 pp), Great Britain (0.4 pp), the Czech Republic (0.3 pp) and Malta (0.1 pp). On the other hand, the share of forests and forestry land decreased in: Greece (decrease by 0.4 percentage point), Portugal (by 1 pp, respectively), Spain (1.1 pp), Slovakia (1.4 pp), Luxembourg (1.6 pp), Slovenia (1.7 pp), Italy (3 pp) and Estonia (4.6 pp) (Fig. 3).

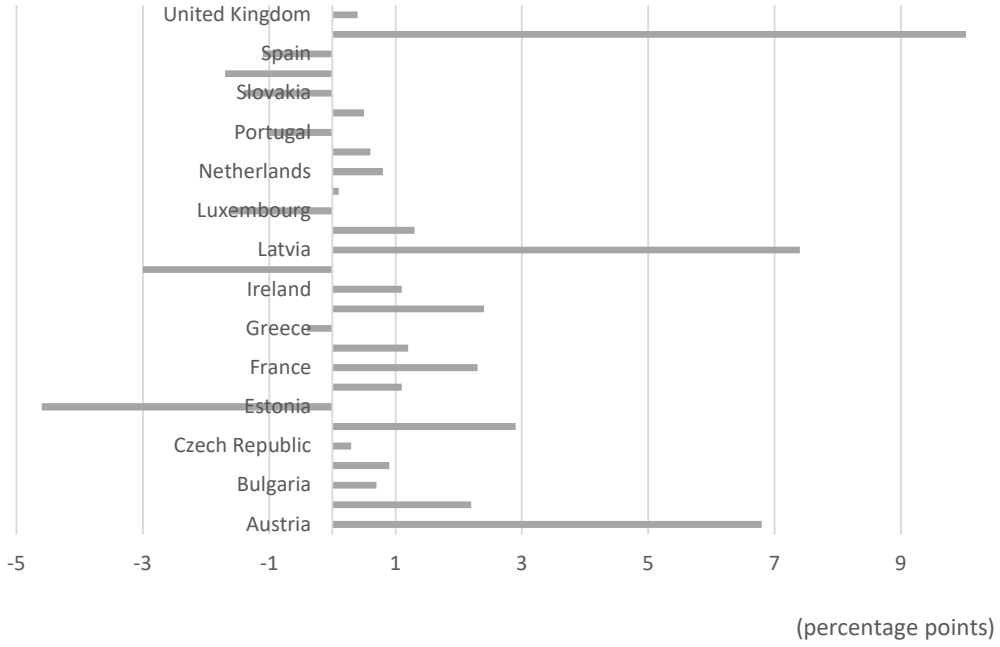

Fig. 3: Changes in the share of utilised agricultural land in the total land area of EU Member States (EU-27) in 2015 compared to 2006 (percentage points); Source: own study based on: Environment, 2019; Eurostat, 2019

Sweden has the largest share in the total forested area in the European Union (16.8% in 2015). The subsequent places are taken by Spain (15.2%, respectively) and Finland (12.7%). The share of other member countries is already significantly lower, one-digit (Agriculture, forestry and fishery statistics, 2018. Eurostat, 2019).

According to specialist analyses, the increase in forest cover in the European Union is more dynamic than the increase in excluded forest lands, which are then allocated to urban development and technical infrastructure (e.g. roads). The development of forest areas in many member states is the result of afforestation of agricultural land, earlier not cultivated. This applies to low-quality agricultural soils

(The EU Forest Action Plan 2007 – 2011, European Commission, Agriculture and Rural Development, 2019).

Such solutions should be assessed as a favourable phenomenon for the surrounding natural environment (especially, as an improvement of climatic conditions) and for socio-economic reasons (more friendly landscape, greater possibilities of obtaining additional income for the population living in such areas, e.g. through the development of agritourism or tourism and recreation).

Agricultural Land Quality

Land allocation for agricultural purposes is determined by many factors, among which the most important are: topography, location of areas associated with climatic properties and soil type.

Due to the land relief, in Europe, northern parts of the British Isles, the Iberian, Balkan and Apennine Peninsulas as well as the Alps and the Carpathians are used for agriculture only to a limited extent.

The location of parts of Europe in the polar and moderate cold climate zone (countries of the Scandinavian Peninsula) is not conducive to agricultural production, especially plant production. However, most of Europe is located in the temperate zone, with the following types of climate: distinct oceanic and oceanic, transitional, intermediate, continental and dry continental.

The types of soil in Europe are relatively diversified. They are characterized by a mosaic layout. There are four soil and climate zones on the European continent:

- Polar (occurs on a relatively small area of the northern coast of Europe and the Scandinavian Mountains with associating tundra soils).
- Boreal (characteristic for most of Northern Europe - the Scandinavian Peninsula, Russia, dominated by podzolic, turfy and grey forest soils).
- Subboreal (occurs in a humid part of western Europe, in the area from France to the Balkan Peninsula, with dominant brown soils; the eastern dry part extends through Ukraine, southern Russia and the Hungarian Plain, where very fertile chernozems occur). In Central Europe there are complex of podzolic and brown soils.
- Subtropical (covers the southern part of Europe, including the Mediterranean, mainly cinnamon soil) (Majchrzak, 2015).

In addition, there are astrephic soils in Europe, which are typical for the valleys of large rivers, coasts and mountainous areas (among others, such soils include marches, initial mountain soils, rendzinas).

While conducting a comparative analysis of the terrain, climatic conditions and soil types of the European Union member states, one should agree with Majchrzak that comparing the natural conditions of the agricultural sector between these countries proves to be very difficult (Majchrzak, 2015). It can be assumed after Matuszczak that in western Europe there are fertile brown soils, in the central part of this continent - weak podzolic soils, while eastern Europe is dominated by very fertile chernozems (Matuszczak, 2010). Soil quality in Europe shows relatively large variations.

Utilised Agricultural Area and its Changes

Europe belongs to continents with a relatively high agricultural land use. Agricultural land covers over half of the continent's area. Arable lands amount to two thirds of its acreage.

The utilized agricultural area of the individual countries making up the European Union is diversified. France has relatively the largest area (29.01 million hectares, annual average in 2005-2016). The top five, in the analysed respect, rank in descending order, include: Spain (27.39 million hectares, respectively), Great Britain (17.29 million hectares), Germany (16.8 million hectares) and Poland (14.94 million hectares) (Fig. 4).

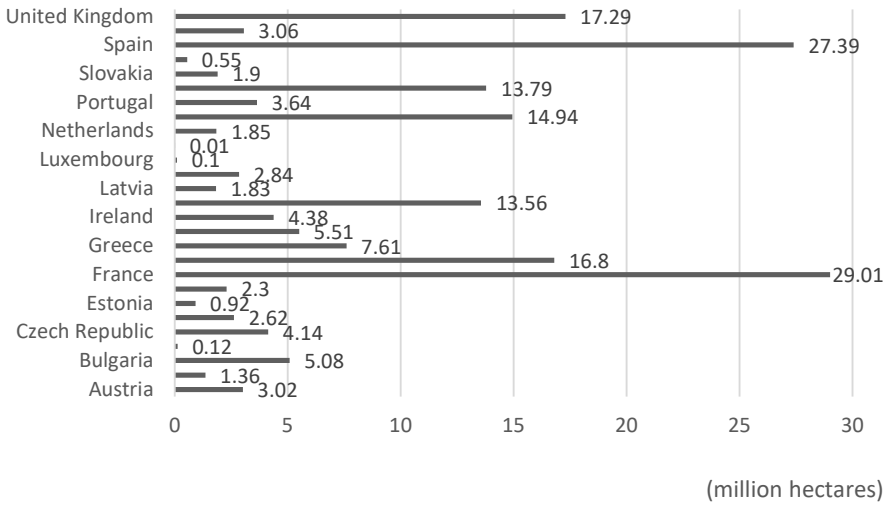

Fig. 4: Average annual utilised agricultural area in the European Union (EU 27) in 2005-2016 (million hectares); Source: own study based on: Environment, 2008; Environment, 2019; Eurostat, 2019

A relatively large area of utilised agricultural land is also available to Romania (13.79 million hectares, annual average in 2005-2016) and Italy (13.56 million hectares). In other European Union countries, the area of this land is definitely smaller, the smallest in Malta (0.01 million hectares).

In the analysed years 2005-2016, the area of utilised agricultural land in most EU-27 countries was subject to multidirectional changes. Its increase took place in: Great Britain (by 0.3 million ha), Ireland, Lithuania, Estonia and Latvia (0.2 million ha each) and Slovenia (0.1 million ha). The area of agricultural land h did not change in such member countries as: Belgium, Denmark, Finland, Luxemburg, Malta and Slovakia. On the other hand, their area decreased in the Netherlands, Cyprus and Portugal (0.1 million ha each), Sweden (0.2 million ha), Bulgaria and Germany (0.3 million ha each), Austria and Hungary (0.6 million ha each), the Czech Republic (by 0.8 million ha), France (0.9 million ha), Romania (1 million ha), Poland (1.5 million ha), Italy (2 million ha), Greece (2.3 million ha) and in Spain (2.7 million ha) (Fig. 5).

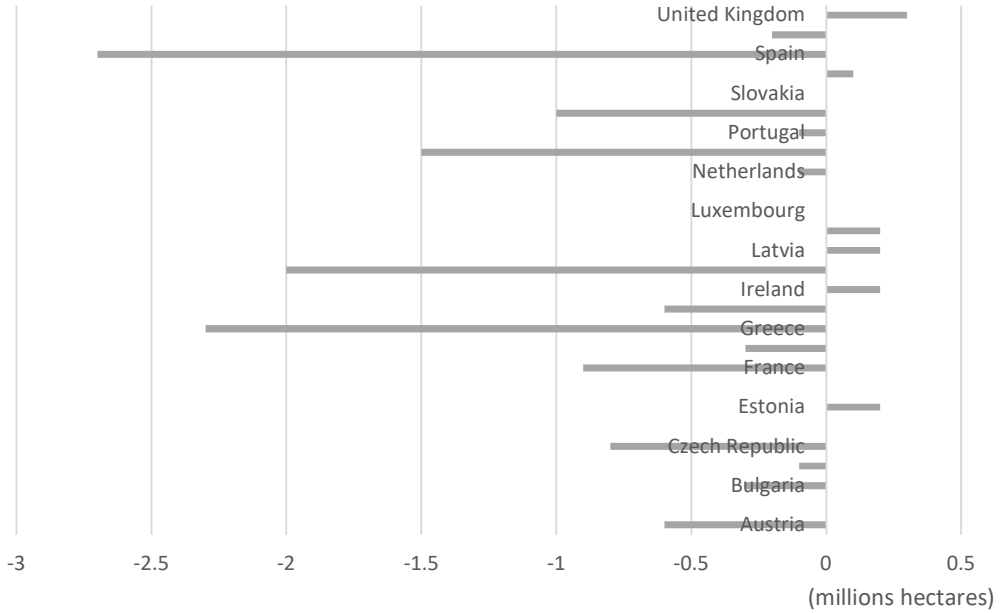

Fig. 5: Change in utilised agricultural area in the European Union (EU-27) countries in 2016 compared to 2005 (million ha); Source: own study based on: Environment, 2008; Environment, 2019; Eurostat, 2019

France has the largest share of agricultural land in the total area of these lands in the European Union (16%). In this respect, the top five, ranked in descending order, includes also: Spain (14.6%), Great Britain (9.6%), Germany (9.3%) and Poland (8%). Romania (7.5%) and Italy (7%) still have a relatively large area of this land. In other EU countries, this area is definitely smaller (Fig. 6).

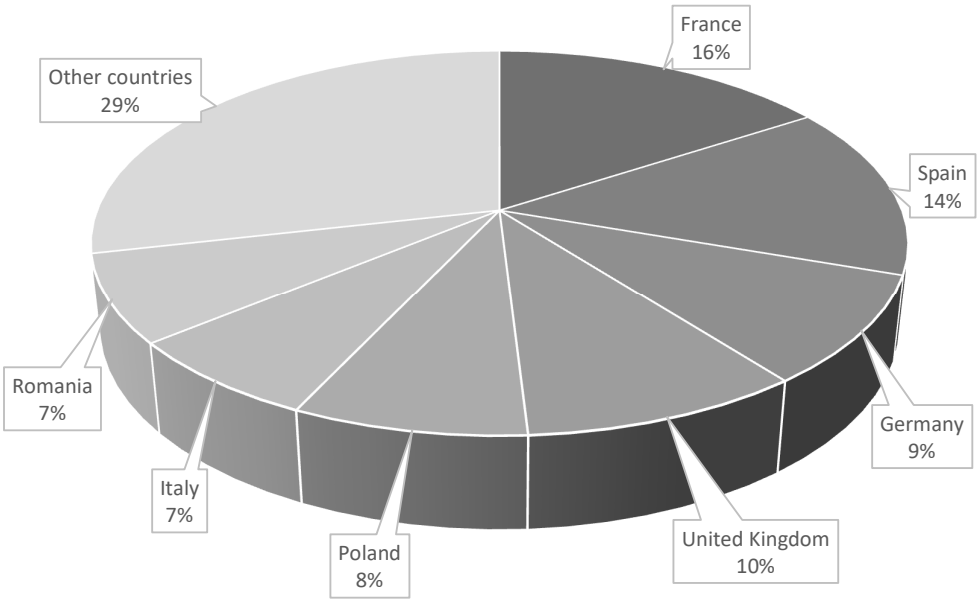

Fig. 6: Structure of utilization of agricultural area in the European Union by member countries (%); Source: own study based on: Environment, 2019; Eurostat, 2019

In the analysed years 2005-2016, there was a downward trend in the utilised agricultural area of lands that were used for agricultural purposes. This concerned both the countries where this area was the largest and large, as well as some other EU-27 countries. Trend lines in the analysed range for France, Spain, Great Britain, Germany and Poland, that is for the countries whose total area of utilised agricultural area accounts for more than half of the total area of these lands in the European Union, are presented in Fig. 7. Equations for these trend lines are also presented. Trend line equations for changes in utilized agricultural area in 2005-2016: France (y = - 0.086x +29.592), Spain (y = - 0.2343x +28.956), United Kingdom (y = - 0.0126x +17.365), Germany (y = - 0.0374x +17.068), Poland (y = - 0.15x +15.933). Trend line equations for changes in agricultural land used for agricultural purposes in 2005-2016: Austria (y = - 0.0505x +3.3545), Belgium (y = - 0.0087x +1.4152), Bulgaria (y = - 0.0231x +5.2333), Cyprus (y = - 0.0094x +0.1864), Czech Republic (y = - 0.0339x +4.3788), Denmark (y = - 0.0042x +2.6439), Greece (y = - 0.0458x +8.0061), Hungary (y = - 0.065x +5.9394), Italy (y = - 0.1402x +14.553), Netherlands (y = - 0.0126x +1.9318), Romania (y = - 0.029x +14.014), Sweden (y = - 0.0192x +3.2). Trend line equations for changes in utilized agricultural area in 2005-2016: France (y = - 0.086x +29.592), Spain (y = - 0.2343x +28.956), United Kingdom (y = - 0.0126x +17.365), Germany (y = - 0.0374x +17.068), Poland (y = - 0.15x +15.933). A downward trend in the area of utilised agricultural area in 2005-2016 occurred also in: Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Greece, Hungary, Italy, the Netherlands, Romania and Sweden. Trend line equations for changes in agricultural land used for agricultural purposes in 2005-2016: Austria (y = - 0.0505x +3.3545), Belgium (y = - 0.0087x +1.4152), Bulgaria (y = - 0.0231x +5.2333), Cyprus (y = - 0.0094x +0.1864), Czech Republic (y = - 0.0339x +4.3788), Denmark (y = - 0.0042x +2.6439), Greece (y = - 0.0458x +8.0061), Hungary (y = - 0.065x +5.9394), Italy (y = - 0.1402x +14.553), Netherlands (y = - 0.0126x +1.9318), Romania (y = - 0.029x +14.014), Sweden (y = - 0.0192x +3.2).

The utilised agricultural area did not change during the considered period in Finland, Luxembourg, Malta and Slovakia.

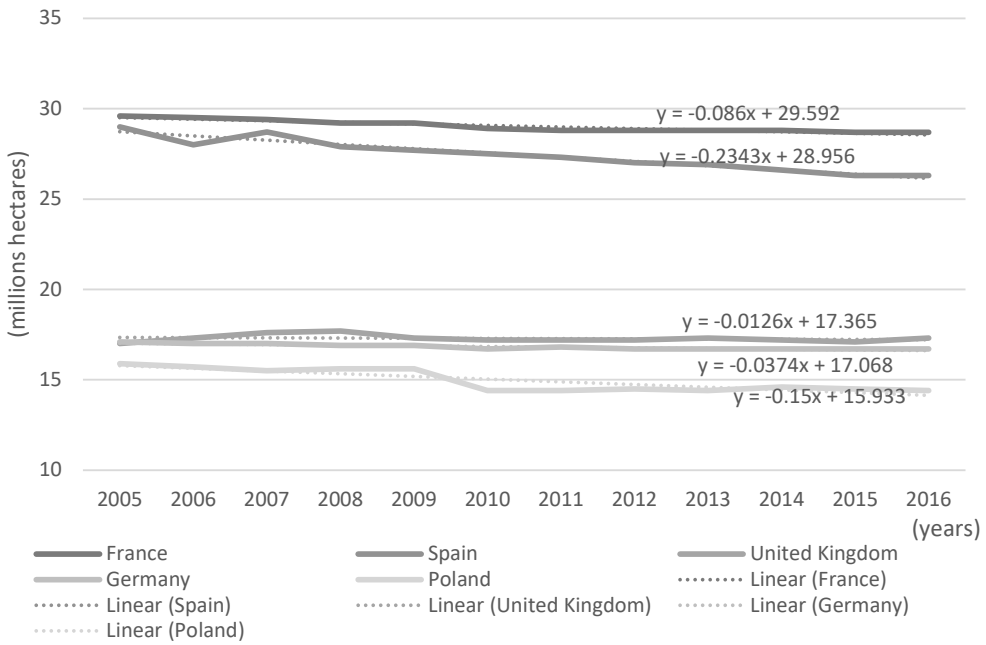

Fig. 7: Area of agricultural land used for agricultural purposes in France, Spain, Great Britain, Germany and Poland in 2005-2016 (million ha); Source: own study based on: Statistical Yearbook of Agriculture and Rural Areas, 2019; Statistical Yearbook of Agriculture, 2019.

An upward trend in the area of arable land used for agriculture was observed in Ireland, Lithuania, Latvia, Estonia, Portugal and Slovenia (Fig. 8). Changes in this area are described by given equations. Trend line equations for changes in utilized agricultural area in 2005-2016: Ireland (y = 0.0269x +4.2), Lithuania (y = 0.0255x +2.6591), Latvia (y = 0.015x +1.7273), Estonia (y = 0.0234x +0.7561), Portugal (y = 0.0063x +3.5924), Slovenia (y = 0.0112x +0.4773).

Upward trends in the area of utilised agricultural land concerned those countries that have a relatively minor and rather small utilised agricultural area (Slovenia, Estonia, Latvia, Lithuania, Portugal, Ireland).

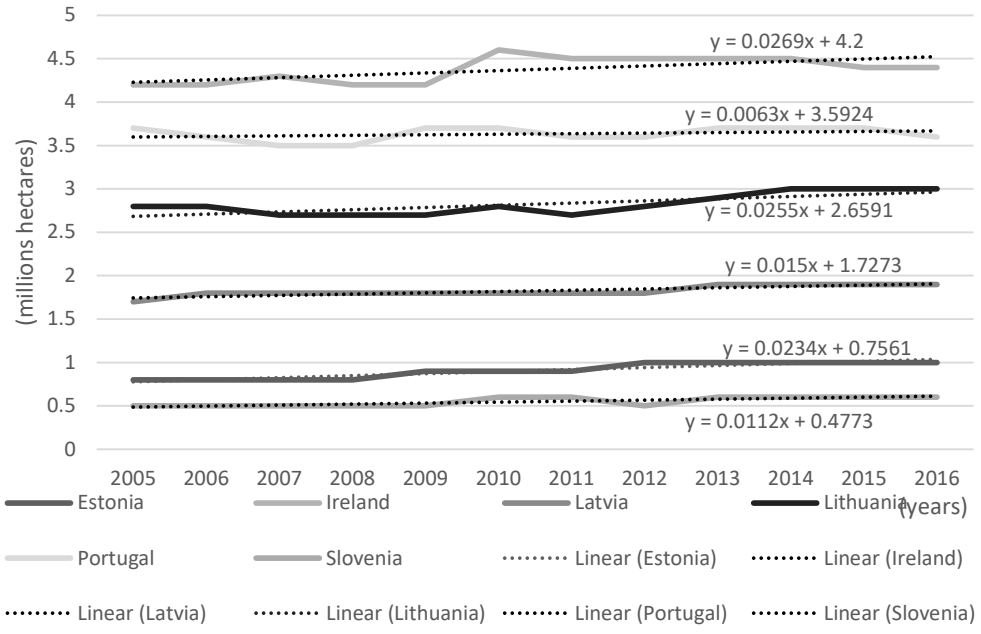

Fig. 8: Agricultural area utilized for farming purposes in Ireland, Lithuania, Latvia, Estonia, Portugal and Slovenia in 2005-2016 (million ha); Source: own study based on: Statistical Yearbook of Agriculture and Rural Areas, 2019; Statistical Yearbook of Agriculture, 2019.

As a consequence, the area of agricultural land per capita in most EU member states changed. This area increased, descending these changes, in the areas of: Lithuania (increase to 0.74 ha, by 0.19 ha), Latvia (to 0.65 ha, by 0.17 ha, respectively), Bulgaria (to 0.49 ha, by 0.08 ha), Estonia (to 0.53 ha, by 0.08 ha) and Denmark (to 0.42 ha, by 0.01 ha). It did not change in Germany, Ireland, Malta, the Netherlands, Romania and Great Britain (Fig. 9).

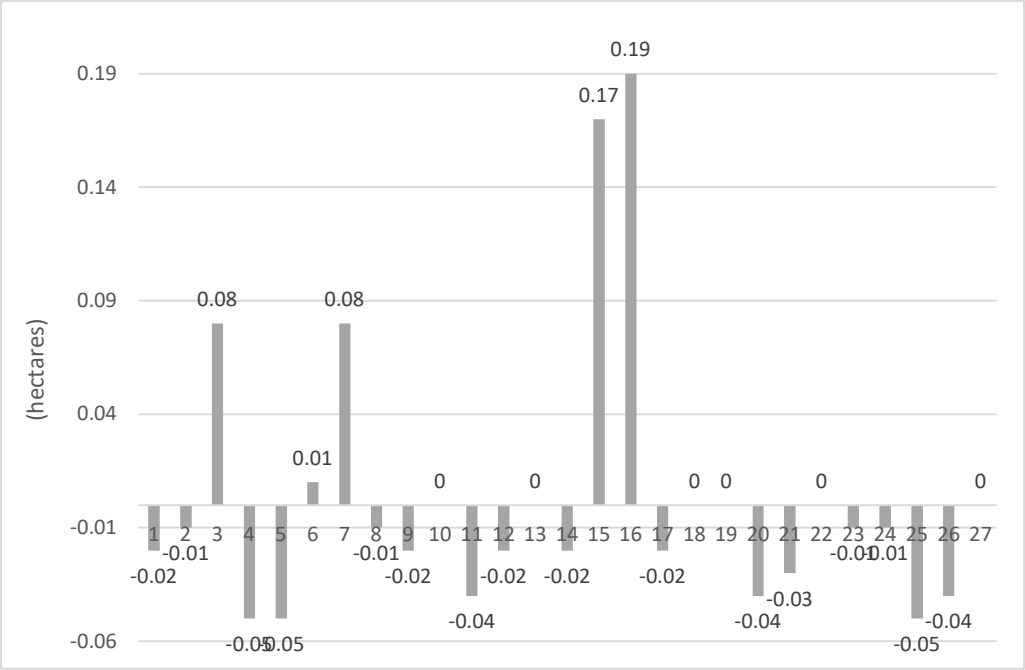

Legend: 1-Austria, 2-Belgium, 3-Bulgaria, 4-Cyprus, 5-Czech Republic, 6-Denmark, 7-Estonia, 8-Finland, 9-France, 10-Germany, 11-Greece, 12-Hungary, 13-Ireland, 14-Italy, 15-Latvia, 16-Lithuania, 17-Luxembourg, 18-Malta,19-Netherlands, 20-Poland, 21-Portugal, 22-Romania, 23-Slovakia, 24-Slovenia, 25-Spain, 26-Sweden, 27-United Kingdom.

Fig. 9: Change in agricultural land per capita in EU-27 countries in 2016 compared to 2005 (ha); Source: own study based on: Statistical Yearbook of Agriculture and Rural Areas, 2019; Statistical Yearbook of Agriculture, 2019.

On the other hand, the area of arable land per 1 inhabitant decreased, ranking these changes in descending order; in Cyprus (a decrease to 0.07 ha, by 0.05 ha), in the Czech Republic (to 0.24 ha, by 0.05 ha, respectively), Spain (to 0.27 ha, by 0.05 ha), Greece (to 0.19 ha, by 0.04 ha), Poland (to 0.28 ha, by 0.04 ha), Sweden (to 0.26 ha, by 0.04 ha), Portugal (up to 0.09 ha, by 0.03 ha), Austria (to 0.15 ha, by 0.02 ha), France (to 0.28 ha, by 0.02 ha), in Hungary (to 0.44 ha, by 0.02 ha), in Italy (to 0.11 ha, by 0.02 ha), in Luxembourg (to 0.11 ha, by 0, 02 ha), in Belgium (to 0.07 ha, by 0.01 ha), Finland (to 0.41 ha, by 0.01 ha), Slovakia (to 0.25 ha, by 0.01 ha) and Slovenia (to 0.09 ha, by 0.01 ha).

Changes in the analysed indicator were also affected by the growing population of Europe. This is caused, according to analysts, by the birth rate and net (positive) balance of net migration. At the same time, European society is aging due to the increase in life expectancy and fewer births (Eurostat, 2019).

Agricultural Land Turnover

Agricultural Holding Structure: Agricultural Land Prices

In the context of these changes, attention should be paid to legal provisions regarding agricultural land trade. There is no uniform model for shaping agricultural land resources in the European Union. The national policies of these countries regulate the protection of agricultural land. Germany and France, and from 1 May 2016 also Poland, are characterized by a relatively high degree of state interference in the trade in agricultural land. In France, such transactions are coordinated by local state-owned companies (*Societes d'Amenagement Forcier et d' Etablissement Rural - SAFER*). In Germany (within the former German Democratic Republic), *Bodenverwertungs und verwaltungs Gmbh (BVVG)* performs this function. The company deals in the distribution of agricultural land, which was previously

subject to collectivization. The owners of these lands have the right to buy it at preferential market prices. In addition, restrictions on the purchase of agricultural land apply in Hungary, Bulgaria and Lithuania, and from May 1, 2016. a relatively large degree of state interference in the trade in agricultural land began to apply in Poland (Agricultural Land Market, 2018).

According to Eurostat data, relatively small changes in the area of land that were used for agriculture in the European Union in 2005-2016 were accompanied by a deep decline in the number of farms (Eurostat, 2019).

In 2016, there were 10.33 million farms in the European Union (EU-27) in total. Most of these farms were in Romania (33%), relatively many in Poland (14%) and Italy (11%), and less in Spain (9%), Greece (7%) and other countries.

In the analysed years 2005-2016, the number of farms in the European Union decreased by 3.86 million. Apart from Ireland, where their number increased (to 137.6 thousand, by 3.5%) in other EU-27 countries a decrease was recorded (Table 1). The number of farms in Poland dropped most dynamically (to 1.41 million in 2016, by 1.06 million compared to 2005), i.e. where there were relatively many of them among the European Union countries (EU-27). In Romania, which is the leader in terms of the number of farms, this decline also proved to be relatively high (up to 3.42 million, by 0.70 million, respectively). In Italy, i.e. in the third EU country, due to the number of these holdings, a similar situation was recorded (decrease to 1.15 million, by 0.58 million) (Table 1).

Table 1: Number of agricultural holdings in the Member States of the European Union (EU-27) in 2005 and 2016 (thousand)

Specification	2005	2016	Difference	Specification	2005	2016	Difference
1	2	3	(3-2)	1	2	3	(3-2)
Austria	170	132,5	- 37,5	Latvia	128	69,9	-58,1
Blgium	50,6	36,9	-13,7	Lithuania	253	150,3	-102,7
Bulgaria	521	202,7	-318,3	Luxembourg	2,4	2	-0,4
Cyprus	44,9	34,9	-10	Malta	10,9	9,2	-1,7
Czech Republic	41,2	26,5	-14,7	Netherlands	80,4	55,7	-24,7
Denmark	51,3	35,1	-16,2	Poland	2466	1410,7	-1055,3
Estonia	27,7	16,7	-11	Portugal	323	259	-64
Finland	70,3	49,7	-20,6	Romania	4121	3422	-699
France	562	456,5	-105,5	Slovakia	66,4	25,7	-40,7
Germany	389	276,1	-112,9	Slovenia	77,1	69,9	-7,2
Greece	828	684,9	-143,1	Spain	1063	945	-118
Hungary	662	430	-232	Sweden	75	62,9	-12,1
Ireland	133	137,6	4,6	United Kingdom	248	185,1	-62,9
Italy	1726	1145,7	-580,3	**UE razem**	**14191,2**	**10333,2**	**-3858**

Source: own study based on: Statistical Yearbook of Agriculture, 2019; Eurostat, 2019

The three-digit decline in the number of farms took place, in descending order, in: Bulgaria (by 318.3 thousand), Hungary (232 thousand), Greece (143.1 thousand), Spain (118 thousand), Germany (112.9 thousand), France (105.5 thousand) and Lithuania (102.7 thousand).

A two-digit decrease in the number of analysed farms occurred in: Portugal (by 64 thousand), Great Britain (by 62.9 thousand), Latvia (58.1 thousand), Slovakia (40.7 thousand), Austria (37.5 thousand), the Netherlands (24.7 thousand), Finland (20.6 thousand), Denmark (16.2 thousand), Czech Republic

(14.7 thousand), Belgium (13.7 thousand), Sweden (12.1 thousand), Estonia (11 thousand) and Cyprus (10 thousand).

A one-digit decrease in the number of farms took place in Slovenia (by 7.2 thousand), Malta (1.7 thousand) and Luxembourg (0.4 thousand).

The consequence of the changes in the number of farms in the European Union in 2005-2016 turned out to be favourable transformations in the structure of these farms, due to the size of the agricultural area they have (Fig. 10).

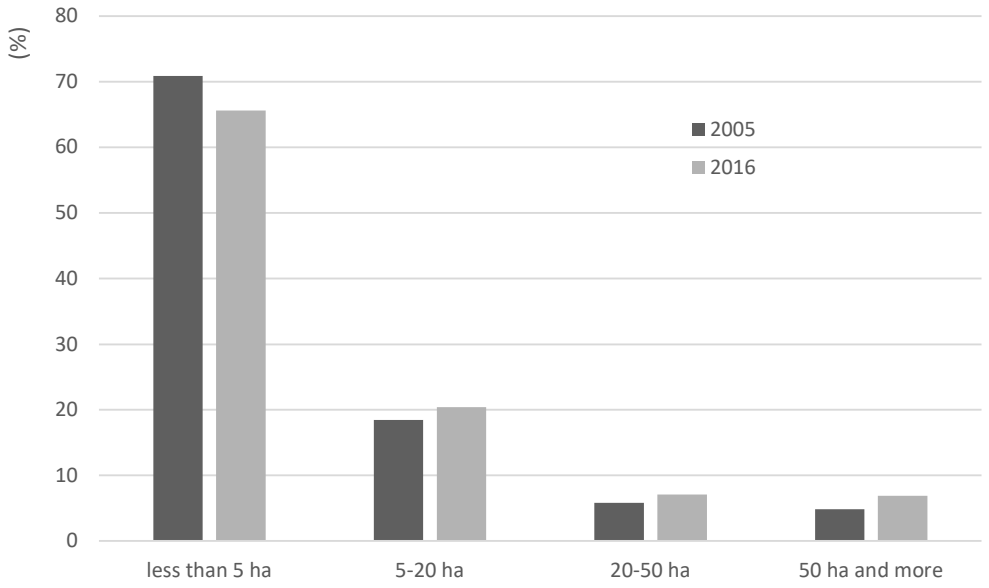

Fig. 10: Farm structure in the European Union in 2005 and in 2016 by farm size (%); Source: own study based on: Statistical Yearbook of Agriculture, 2019; Eurostat, 2019

The percentage of agricultural holdings with up to 5 ha of agricultural land decreased to 65.6% (a decrease by 5.3 percentage points). However, the percentage of farms that have agricultural land in the following ranges increased:

- from 5 ha to 20 ha - up to 20.4% (increase by 2 percentage points),
- from 20 ha to 50 ha - up to 7.1% (by 1.3 percentage points respectively),
- 50 ha and more - up to 6.9% (by 2 percentage points).

The observed changes should be considered a favourable phenomenon. Farmers strive to expand farms to maintain and improve market competitiveness.

At the same time, a rise in agricultural land prices is observed in most member countries. In the analysed years, relatively the most dynamically average prices of arable land increased in Slovakia (5.6 times). The top five in this respect included: the Czech Republic (a 5.4-fold increase), Estonia (4.7-fold, respectively), Bulgaria (4.4-fold) and Poland-the private market (4.1-fold). Organizing the analysed EU member states in a decreasing order, we receive the following series: Lithuania (3.9-fold increase in average agricultural land prices), Romania (3.7-fold, respectively), Hungary (2.8), Germany in total (2.7), Latvia (2.5), Netherlands (1.9), United Kingdom (1.6), France (1.5), Finland (1.4), Belgium and Italy (1.3 each), Denmark (1.0). Relatively the most dynamic price changes were observed in the countries of Central and Eastern Europe that joined the European Union structures only in the mid-2000s. A drop in the average prices of agricultural land was recorded, among the analysed countries, only in Ireland (by 62.6%) and a slight decrease in Spain (by 3.1%) (Fig. 11).

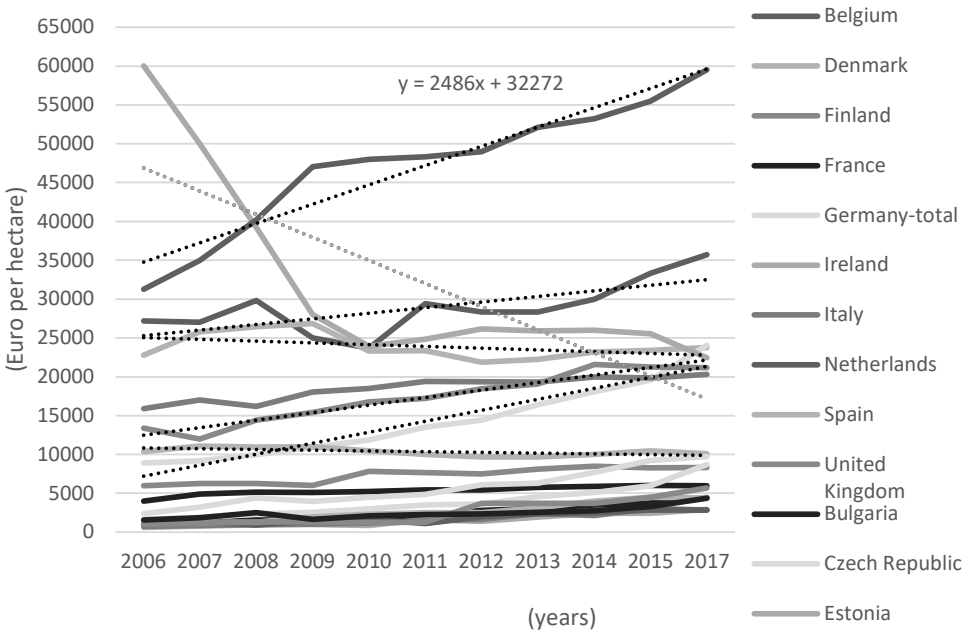

Fig. 11: Average prices of agricultural land in selected European Union countries in the years 2006-2017 (Euro per 1 hectare); Source: own study based on: database Eurostat, 2019; Agricultural Land Market, 2019.

Trend line equations for the analysed countries can be presented, with an upward trend in average agricultural land prices: Netherlands (y = 2486x + 32272), Germany in general (y = 1411x + 5794.6), Belgium (y = 722.53x + 24548), United Kingdom (y = 967.61x + 11518), Poland - private market (y = 674.34x + 982.11), Czech Republic (y = 539.98x + 192.86), Italy (y = 438.78x + 15899), Slovakia (y = 420.24x-265.05), Romania (y = 343.22x + 261.48), Bulgaria (y = 321.81x + 190.95), Finland (y = 274.68x + 5680), Estonia (y = 226.69x + 172.13), Hungary (y = 225.55x + 856.62), Lithuania (y = 223.55x + 116.68), France (y = 165.45x + 4,360), Latvia (y = 130.16x + 1018.2). The downward trend in the analysed range concerned average agricultural land prices in Ireland (y = - 2974.6x +49844), Denmark (y = - 226.6x +25266) and Spain (y = - 94.755x +1096). The increase in average agricultural land prices in the surveyed countries resulted from the current economic situation in agriculture and the impact of the mechanisms of the European Union's common agricultural policy (direct payments and other subsidies), in a situation of decreasing geodetic area of farmland, and completed, in some of these countries (the countries Central and Eastern Europe), grace periods for the sale of agricultural land to foreigners. The growing demand for land also has a definite impact on the increase in the prices, in the aspect of the progressing greening of agriculture, which makes it possible to predict a further increase in agricultural land prices in the European Union (Szymańska, 2019; Agricultural land market, 2018).

The prices of agricultural land in individual European Union countries, however, vary widely. The highest of them were recorded (2017) in the Netherlands (about 60,000 euros per hectare), and the lowest in Latvia and Lithuania (about 2,800 euros). Relatively high average prices of arable land were also observed, ranked in descending order, in: Belgium (35.7 thousand euros per 1 hectare), in total in Germany (24.1 thousand euros, respectively), Denmark (23.8 thousand euros), Ireland (22.4 thousand euros), Great Britain (21.1 thousand euros) and Italy (20.3 thousand euros). Lower prices occurred mainly in the countries of Central and Eastern Europe (average prices of agricultural land in the countries of Central and Eastern Europe that belong to the European Union: Poland - private market (EUR 9.7 thousand per hectare), Czech Republic (EUR 8.7 thousand, respectively), Slovakia (EUR 5.7 thousand), Bulgaria (EUR 4.5 thousand), Romania and Hungary (EUR 4.4 thousand each), Estonia

(EUR 2.9 thousand) and in Spain (EUR 10.1 thousand), Finland (EUR 8.3 thousand) and France (about EUR 6 thousand).

One should agree with Zadura (Zadura, 2005) that the relatively high level of agricultural land prices in the countries of the "old Union" reflected not only the productive value of land, but also its added value, which resulted from the very title of ownership and use of land. This title makes it possible to benefit from agricultural support instruments under the common agricultural policy of the European Union and annuity from investment in agricultural property.

Conclusion

The comparative analysis shows that:

- Europe belongs to continents with a relatively high agricultural land use. Agricultural land covers over half of the continent's area. Arable lands amount to two thirds of its acreage. Soil quality in Europe shows relatively large variations. As a result, comparing the natural conditions of the agricultural sector between EU Member States should be considered very difficult.
- The member states of the European Union (EU-27) differ significantly in the share of agricultural land in the total area. These utilised agricultural lands have the largest share in the total area of Great Britain (69.4%), relatively high in: Ireland, Denmark, Romania and Hungary, and small in Sweden and Finland (6.8%). Finland and Sweden are the only member countries dominated by wooded areas belonging to agricultural holdings.
- The area of agricultural land used for agricultural purposes in the European Union decreased relatively slightly in the years 2005-2016. This is a favourable phenomenon, both for socio-economic and ecological reasons.
- There is no common policy on agricultural land trading in the European Union. National policies are implemented in this respect, varying from relatively restrictive ones (Germany, France, Poland, Hungary, Bulgaria, Lithuania) to liberal (e.g. Denmark).
- The structure of farms in the European Union changed favourably. The number of larger and very large farms increased, while the number of the smallest farms, running their activities on agricultural area up to 5 ha decreased. This reflects the desire of agricultural producers to maintain competitiveness on the market.
- It can be expected that there will be a further increase in agricultural land prices in the European Union, especially in the countries of Central and Eastern Europe, in connection with the economic situation in agriculture and the impact of the mechanisms of the common agricultural policy of the European Union, associated with growing requirements in the field of land management, in terms of the progressing greening of European Union agriculture.

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User Interface Advances through the Ajax Javascript Framework

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Abstract

Modern web applications are now expected to provide a user experience as simple and efficient as desktoplike web interfaces. JavaScript frameworks emerged as front-end technology for advanced web application features. However, there is uncertainty on their complexity of development and maintenance. The aim of this design science study was to analyse the requirements of user interfaces in modern web applications and provide an evaluation of JavaScript frameworks to meet these requirements. The literature indicated JavaScript frameworks are necessary to simplify Ajax development due to the complexity of Ajax programming using JavaScript. We evaluated a number of open-source Javascript frameworks, and selected a framework for this study to prototype and analyse the outcome. We analysed how it improved development, maintenance efficiency and examined the ability to implement advanced web interfaces. Although the Javascript framework did not provide a performance improvement, the main outcome is that the prototyping showed JavaScript frameworks provide reduced complexity on Ajax application development and significantly increased ease of maintainability.

Keywords

User interfaces, Web applications, Design Science, Ajax, Javascript.

Introduction

The internet has matured and web applications are expected to provide advanced user interfaces that traditional web applications were unable to do. Ajax emerged as a working solution to implement rich internet applications (Domański, Domańska & Chmiel, 2014). However Ajax application implementation is relatively complex, as Ajax is a set of old technologies and requires a large amount of JavaScript coding. Usability is an output from good user interfaces, and user interfaces are important to build high-quality applications. In modern applications, close collaboration is required between user interface designers, architects and UI implementers for the realisation of applications (Cruz Segura *et al*., 2019; Tanikella *et al*., 2007). Desktop-like interfaces are a very common requirement in modern applications. Modern applications are expected to communicate with back-end applications without page reloading - the basic feature of Ajax applications. In a traditional web application, if users wish to perform any action on the screen, the application processes the request on the server and sends the result back to the browser. Therefore multiple pages were required for a single business function. However today a single page interface is common and popular.

Traditional internet applications require a page refresh for every user action; this results in much redundant data being passed, increasing wait times (Gaddale & Parimala, 2019; Shah, Shah & Irfan, 2018; Farrell & Nezlek, 2007). Application users did not appreciate this and the style was not acceptable to some timesensitive applications such as in the financial sector. As such the Rich Internet Approach (RIA) was introduced to resolve the problems mentioned above. RIA provides interaction features for example desktop applications, and is able to completely eliminate full page refreshing. Ajax is currently the most popular technical solution for RIA and relies in turn on JavaScript and XML. Developers used to place flow control into server applications but now flow control is placed in front-end applications using JavaScript. However, this trend makes development and maintenance difficult because of its unfamiliarity to developers.

Due to Ajax's complexity, developers wanted to simplify Ajax application development. JavaScript frameworks have been developed to reduce the amount of effort developers must spend for Ajax application development (Peguero, Zhang & Cheng, 2018). Here, we examine how a JavaScript framework assists coders reduce the amount of effort for Ajax application development. We will evaluate development efficiency by analysing a learning curve as well as code complexity. We will also see how JavaScript

frameworks provide desktop-like user interfaces through prototyping. We will also measure the response time improvement through performance testing.

User Advances in Modern Applications

As web technologies gain more advanced features, requirements that used to be hardly possible are now available to software developers and end users, such as conducting activities "in the cloud" (HosseinianFar, Ramachandran & Slack, 2017; Fisher, 2018; Rodden, Hutchinson, and Fu, 2010). Tanikella et al., (2007) concluded in their study that the user interface (UI) has a significant impact on the quality of applications. The importance of planning the UI architecture can be explained by the benefit of close collaboration between user interface designers, architects, and UI implementers in the realization of applications. Liu and Ma (2010) introduced the 7 Seconds Law, where users make the decision whether they like the interface within the first seven seconds upon seeing it, for the visual elements of the webpage interface determines the users' preferences. Therefore, visual design is a very important influencing factor in webpage interface design and naturally this trend continues in smartphone interface design today (Xu, 2020). Efficient interfaces are also able to reduce a learning curve for a new application and minimise navigation time to locate functions users wish to employ. Urbieta et al. (2007) suggest a design approach should deal with applications, combining navigation with advanced interface behaviours. Thus, the application should contain the basic information or behaviours of itself; this allows users to easily learn where to go and what to do through given navigations. Finally, in modern applications the latest features of Ajax technology enable users to experience desktop-like user interfaces and fast response times with a minimum number of clicks; which in turn minimises network traffic between web browsers and the server. The last point has the added benefit of helping enterprises with old network infrastructure reduce their network bottleneck problems.

Motivation and Method

The motivation for this project came from the development goal of a company (a car retailer, parts supplier and service provider). It has 21 branches throughout the greater Sydney area. There is a small IT department in the company with 30 staff. The IT section has a development team with application developers, business analysts and testers. There is also an IT support team who maintain old applications and support devices and network issues. The company was planning to train staff in IT support to be able to support new applications later. Therefore, the other critical factor of the development project was that the application architecture had to be simple with a minimal learning curve. The network infrastructure in some of branches is not as good as other branches. An upgrade to network infrastructure is planned, but some branches may suffer before the upgrade is done - if new applications generate heavy traffic. Therefore network traffic needs to be minimised. The company was also planning to upgrade its old mainframe-based applications to modern web-based applications. Current mainframe applications have relied on old technologies and have been operating for more than three decades. Terminal-based screens of mainframes are not user-friendly and unsuitable for modern user interface requirements. Additionally, end-users wish to improve current business processes through new web-based applications.

The methodology adopted for this project used a design science approach (Dresch, Lacerda & Antunes, 2015; Recker, 2013), where the key outcome was an 'instantiation', that is to say an implemented or prototyped system that could be put to use. In line with design science there was a focus on providing "novelty of the demonstrated utility of an artefact; a positive difference of the utility of an artefact in comparison to existing work; and a thorough evaluation that provides decisive evidence for superior utility of an artefact" (Recker, 2013 p. 108).

User Interface Technology Trends

Traditional internet applications relied on the server for processing, requiring a page refresh for every user action. This behaviour consumed more server resources and network bandwidth, as a result of much redundant data being passed with less than satisfactory wait times, particularly for time-critical financial and medical domains (Farrell & Nezlek, 2007). Web applications thus tended to have slower performance and limited interactivity, compared to typical desktop applications (Aljraiwi, 2017; Paulson, 2005). Bozzon et al., (2006) found in web applications less compatible with desktop interfaces, responsiveness was lower due to network overheads and unnecessary round-trip server access, while disconnected usage was not supported. As a result new technologies to address these issues emerged. According to Paulson (2005), the

internet matured with more responsive user interfaces from rich web applications. However, this added richness has not surprisingly made web interfaces more complex (Bardin et al., 2011).

Paulson (2005) suggested Ajax (a set of technologies mostly developed in the 1990s), could be a key technology for web applications, in order to look and act more like desktop applications. Rodden, Hutchinson and Fu (2010) also noted more recent user interface technologies mostly focused on web-based applications as further business applications are deployed on the web. Wright (2009) noted web developers routinely use sophisticated scripting languages and other active client-side technologies to provide users with rich experiences that approximate the performance of desktop applications, including features like drag and-drop, keyboard shortcuts, and other desktop-like affordances that have become commonplace.

Rich Internet Application (RIA) Technologies

Both the HyperText Transfer Protocol and Markup Language (HTTP/HTML) have been key technologies for web applications to communicate through user interfaces. In modern web applications however there are extra technologies to implement front-end user interfaces. Such technologies have different roles in web application development.

> In web development, a web page, whose layout is defined with HTML (Hyper Text Markup Language), is represented with the Document Object Model (DOM). All client-side interactions are realized with JavaScript modifications of the DOM and the presentation of the web page is usually defined with CSS (Cascading Style Sheets); HTML code that defines the structure and the layout of the page, CSS code that defines the style and the presentation; and JavaScript code that is responsible for executing client-side business logic and interactive layout manipulation. Based on their mutual interactions and resources such as images, the browser engine renders the web page (Maras, Štula and Carlson, 2010 p. 502-503).

Farrell and Nezlek (2007) proposed three distinct types of RIA. The *first* type is a plugin-based RIA which relies on a dedicated platform and environment and is deployed as an embedded solution or standalone application launched from the browser. Adobe's Flex is a good example of an embedded solution of the first type. Flex uses an XML-based mark-up language called MXML to declaratively create Flash based applications. These can then be embedded on HTML pages using standard HTML tags. Java Web Start is the stand-alone approach of this first type; it uses the Java Network Launch Protocol (JNLP) to launch a defined java application from the browser. By doing this from the browser, developers can ensure the specified version is always available. The approach of the first type provides the simplicity of development which is generally known as the Sandbox approach. The second type of RIA is an application based on Ajax technology. These applications employ a combination of technologies typically including XHTML/HTML, CSS, DOM, and JavaScript. The idea is to use CSS and HTML to style and present the interface, use JavaScript to make an asynchronous request to the server, and finally use DOM Scripting to perform 'on-the-fly' rendering. Ajax is a technology for a web application to be able to send or receive data asynchronously so the user can view or update live data with low latency (Dong, Cheng and Zhou, 2011). The third type of RIA is browser-based; this generally incorporates a user interface language such as XUL from the Mozilla Foundation (mozilla.org). The user interface language is mostly built on XML which is a platform independent standard supported by W3C, therefore this approach is available on most platforms.

As many researchers observed in their studies including Lawton (2008), RIAs feature responsive user interfaces and interactive capabilities; this makes Internet-based programs easier to use and more functional, and also overcomes problems with traditional web applications such as slow performance and limited interactivity. However, rich internet applications put pressure on designers to understand modern front-end technologies and often design work requires collaboration with web developers. Another early survey by Myers (2008) revealed 86% of web designers had difficulties prototyping the look of user interfaces and 78% of web designers needed collaboration with developers in order to design the behaviours. In spite of these issues in design and development, users today can experience impressive RIAs such as Google Maps (maps.google.com.au/) and Gmail (mail.google.com/). Among three types of RIA, Ajax became the most common technology to implement RIAs. At that time, Lawton (2008) reasoned that free development Ajax toolkits such as Google Web Toolkit (GWT gwtproject.org/) had influenced Ajax's popularity, which is still in use today.

Asynchronous JavaScript (Ajax) and eXtensible Markup Language (XML)

Ajax is a technology for a web application to be able to send or receive data asynchronously so users can view or update live data with low latency. "Ajax uses asynchronous JavaScript, which an HTML page can use to make calls asynchronously to the server from which it was loaded to fetch XML documents. This capability lets an application make a server call, retrieve new data, and simultaneously update the web page without having to reload all the contents, all while the user continues interacting with the program" (Paulson, 2005 p.15). Paulson (2005) further noted Ajax applications can update or retrieve data immediately allowing users to perform various behaviours without page reloading. AJAX enables web developers to create web applications based on a single-page interface model in which the client/server interaction is based merely on state changes. The communication between client and server can take place asynchronously, which substantially differs from the classic synchronous request-wait-for-a-response-andthen-continue model, changing the way developers develop the architecture of web design (Mesbah and van Deursen, 2007).

There are however several known problems with Ajax technology as it heavily relies on JavaScript running on a browser. Zhang (2012) explained that Ajax web applications mostly stay at the initially given URL, and this URL does not change until the user opens other pages. Mesbah, Bozdag and van Deursen (2008) pointed out that this particular property of Ajax causes the following problems: *searchability* - that is ensuring AJAX sites are indexed by the general search engines, instead of (as is currently often the case) being ignored by them because of the use of client-side scripting and dynamic state changes in the DOM; *testability* - in systematically exercising dynamic user interface (UI) elements and states of AJAX to find abnormalities and errors; and finally *accessibility* - in examining whether all states of an AJAX site meet certain accessibility requirements.

Research has been carried out into solutions. In order to make Ajax applications searchable, search engines must support the execution of a client-side scripting language such as JavaScript. However, most search engines including Google currently do not have support for JavaScript execution due to security issues. It is also believed that if a search engine has the ability to execute JavaScript "some websites may use dirty tricks like cloaking to try to rank higher" (Zhang, 2012 p. 1199). Salva and Laurencot (2009) proposed using automatic Ajax application testing by a random approach using some predefined values and also adopt purpose-based testing for verifying specific properties.

JavaScript frameworks

JavaScript became the most popular script language for front-end programming even though such applications incorporate a learning curve as developers adopt new development styles. A client-side languages survey showed 89.5% of websites used JavaScript as their front-end programming language (W3 Techs, 2013). Due to the complexity of Ajax programming using JavaScript, Farrell and Nezlek (2007) note the necessity of a JavaScript framework to simplify Ajax development, for which a number of JavaScript frameworks exist on the market. As such it is crucial for developers to choose the framework that better matches their needs, provides high maintainability and good performance (Gizas, Christodoulou, and Papatheodorou, 2012).

Javascript Framework Evaluation

In line with a design science approach, the question we sought to answer in this study was "how useful is a prototype of a JavaScript framework for AJAX application development and maintenance?" JavaScript framework evaluations were conducted through *prototyping* and *performance testing*. *Prototyping* was implemented to validate the efficiency and functionality of JavaScript frameworks. The main purpose of prototyping was to determine the extent of usability improvement through advanced user interface features mentioned in earlier sections. We also expected to be able to examine development efficiencies through this prototyping. *Performance testing* was performed to prove performance improvement compared to web applications implemented through traditional technologies such as JSP/Servlet. Apache JMeter (jmeter.apache.org) was adopted to load-test functional behaviour and measure performance. Currently available open source JavaScript frameworks were also examined, where AngularJS (angularjs.org) was ultimately chosen for this prototyping. AngularJS is widely used today due to its stable architecture and functionalities (it is managed by dedicated programmers from Google and has a large community which share developers' experiences and provide feedback to AngularJS).

Evaluation Factors and Methodology

There were three evaluation factors in this study; *development efficiency*, *functionality* and *performance improvement* (table 1 below). Even though there are a few other previous studies proposing software selection criteria, they are for specific commercial or product-based software. We found no studies suggesting the selection criteria of a software development framework. Belyk and Feist (2002) did however propose a selection criteria for software. As this previous study was also for product-based software and the main criteria chosen from the user's point of view, we added development efficiency as the main evaluation factor of this study. The main evaluation factor was *development efficiency* is the most important requirement from a developer's point of view. This evaluation factor is critical to judge whether the JavaScript framework is usable because developers will not use inefficient frameworks even if they provide standard usability. *Functionality* is also an important factor to see whether these frameworks are able to provide advanced user interface features for functional requirements such as auto-complete and drag & drop. *Performance* is the last evaluation factor which is especially important for business applications; it is measured to ensure web applications built on the JavaScript framework provide a fast response time.

Table. 1. JavaScript Framework Evaluation Factors

Factors	To be examined	Methodology
Development efficiency	Learning curve	• Analyse prerequisites • Examine how much time is required to produce an output for the first time
	Code complexity	• See how easy it is to understand the program • Compare the program to the one with the traditional ajax approach
Functionality	Ability to provide advanced features	• Include advanced user interfaces (e.g. auto complete) in the prototyping
Performance improvement	Response Time	• Measure response times of the prototyping and traditional approach using a testing tool

Functionality

The design of a user interface affects the amount of effort the user must expend to provide input for the system as well as to interpret the output of the system and how much effort it takes to learn how to do this, although findings in this regard can often be mixed (Longo and Dondio, 2015). Usability is the degree to which the design of a particular user interface considers the human psychology and physiology of the users, and makes the process of using the system effective, efficient and satisfying (Mishra and Mishra, 2007). We wished to know if the JavaScript framework easily supported the development of advanced user interface features. The following interface features were expected to be provided: an ability to exchange minimal data between the server and client; ability of data update or retrieval without page reloading; and whether advanced dynamic functionalities such as drag & drop and dynamic layout change (e.g. table row creation) existed.

Performance Improvement

The user interface provides users with a first impression and the response time lets users decide whether to use the application or not. This performance has to be reviewed to evaluate any types of software. In this study, we also measured the response time of the prototype application and compared the result to a traditional Ajax application.

Prototyping: JavaScript Framework Selection for prototyping

Considering 10 Javascript frameworks most commonly used in the market, we selected the top 3 frameworks (table 2). Eventually, we decided to use AngularJS (angularjs.org) for the prototyping. Again, AngularJS is a framework provided by Google, its architecture is stable and it supports many features. More importantly we were able to easily use plugins and built-in components.

Table 2: JavaScript Framework Comparison

Framework	Data Bindings	Composed Views	MVC	Plugins
AngularJS	✓	✓	✓	✓
EmberJS	✓	✓	✓	✓
KnockoutJS	✓		✓	✓
BackboneJS			✓	✓
GWT		✓		
D3JS	✓	✓		✓
SammyJS			✓	✓
SpineJS			✓	✓
Cappuccino	✓	✓		
BatmanJS	✓		✓	✓

In order to effectively compare a variety of frameworks, a few key criteria were used. *Data binding* is an established technique to couple user interface (UI) elements and data objects in back-end (Heinrich & Gaedke, 2011). When data is changed, the change will be reflected to the other side automatically; this requires configurations to pair user interfaces and the business logic, however generally the configuration requires relatively little effort. The *composed view* is an important feature to be able to re-use user interface components; this was originally an application design pattern but today it is widely used to create reusable user interface components. Apache Tiles (tiles.apache.org; Cosmina, 2015) is a very good example utilising this design approach exceptionally and is employed to create pages having a similar structure, however each section in the page could have a very different look and content. *Model-View-Controller* (MVC) represents a design approach widely used in modern web applications, where this allows applications to separate their view (representation of information) from their model (business data) and the controller (a user's interaction). One of the great advantages of the Model-View-Controller pattern, is the ability to reuse the application's logic (which is implemented in the model) when implementing a different view (WikiBooks, 2013). The easy utilisation of *plugins* or external components is also crucial for developers to re-use provided components without having to create their own components. These home-grown components often cause problems due to unproven functionalities.

Development scope and requirements

We implemented a simple business application prototype assisting business users to create orders and invoices (figure 1 below); this was chosen as the application requires simple data creation and retrieval as well as more advanced features such as auto-complete. Through this implementation, we were able to evaluate the development and maintenance efficiency. More importantly we intended to determine usability improvement through advanced user interfaces provided by the JavaScript framework.

Requirements

Users will use this application to view pending orders and finalise them. The application provides a function to help users search pending orders by customer name or order status. A simple parts enquiry function was also required as it is frequently used. We implemented the application with the following user requirements: see the active order list; filter active orders by status, customer name or sales person's name; search parts through typing partial part numbers (auto complete support); add line items and modify prices; and add extra information such as 'deposit', 'delivery' and 'insurance'.

Application Architecture

The prototyping application was developed on AngularJS using the Model-View-Controller (MVC) design pattern to decouple the code and to separate layers. In this prototyping, AngularJS was mostly used to build the user-interface layer and to communicate with back-end modules as shown in figure 2. The front-end and back-end applications communicate using JavaScript Object Notation (JSON) on RESTful services. We also intended to divide this application into the front-end and back-end; they run on different Java virtual machines, so that the back-end application was able to be reused by the traditional application in performance testing, which will be discussed shortly.

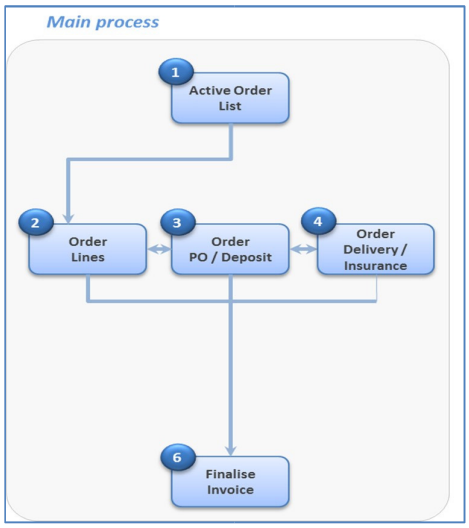

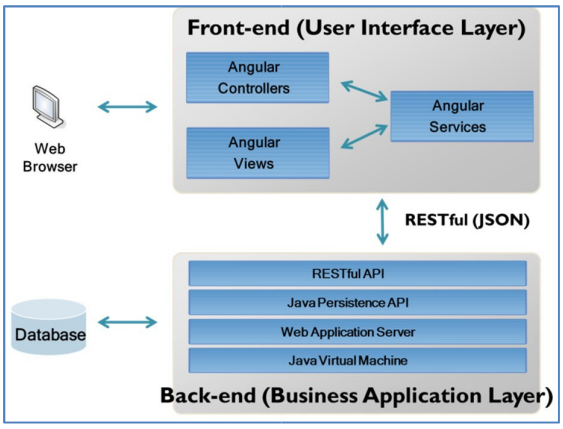

Fig. 1 Application scope and requirements **Fig. 2 Application architecture for prototyping.**

AngularJS supports the MVC model which is a very common application architecture. MVC allows developers separate the application's business flow from the screen and this JavaScript framework also supports two-way data binding. If a user updates data on the screen, AngularJS automatically updates the data model without extra effort. In the traditional approach this process requires excessive JavaScript code.

Development methodology

The incremental development methodology was used in the prototyping presented here to minimise development risk. In using such a methodology, we adopted an iterative [requirements analysis, application design, development and testing] development lifecycle. We then evaluated development outputs from each development cycle and used it to improve development in the next cycle. We focused on learning how to use AngularJS in the first iteration, rather than spending much time on details. Gradually the focus moved on to details, especially for the page design and quality of user interfaces. Three iterations to complete the development were planned where two weeks were allocated to each iteration, bringing the total development period to 6 weeks.

Performance Testing

Testing was performed using the prototyping implementation. In order to compare this to a traditional web application, we implemented a web application providing the same functions based on the jQuery library. This jQuery application shared the same back-end modules, for we had developed the back-end application to be a standalone application. Hence our jQuery application was used to build front-end modules only (figure 3 below); this allowed us to focus only on front-end modules (AngularJS vs. jQuery).

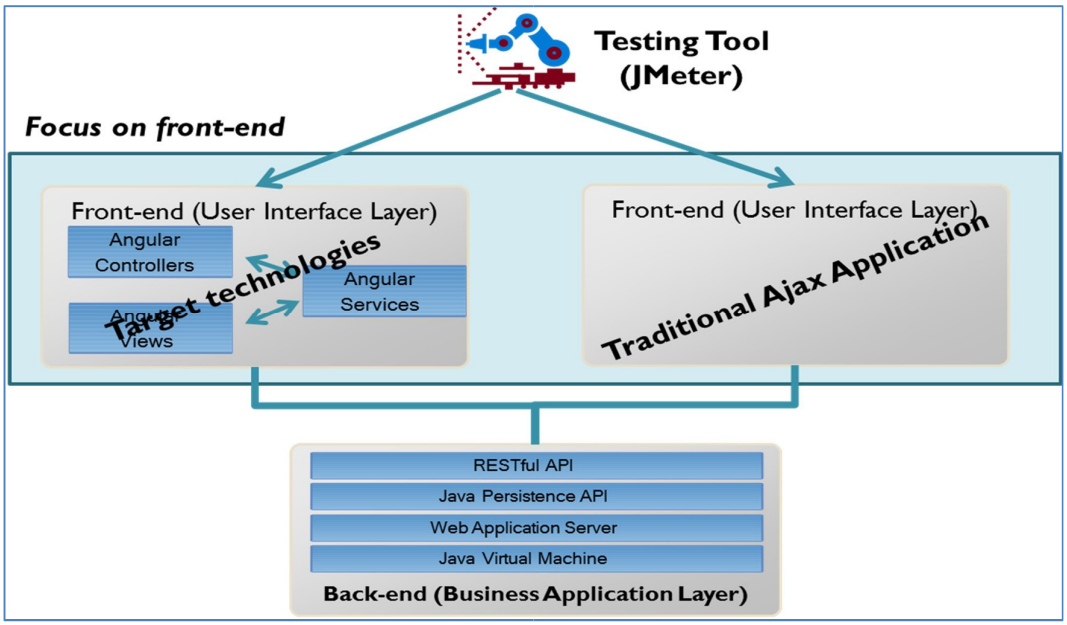

Fig. 3 Performance Testing Structure

JMeter (Jha & Popli, 2017) was used to produce massive concurrent requests to both applications. The number of thread and loop counts are configurable in JMeter. We created three test cases, which had different numbers of requests (table 3 and figure 4). We expected these cases would make the result more accurate because different thread counts and loop counts would produce results in various runtime environments.

Table. 3 Test cases

Configuration	1st Test	2nd Test	3rd Test
Number of Threads	100	200	300
Loop Count	10	20	30
Total Request	1000	4000	9000

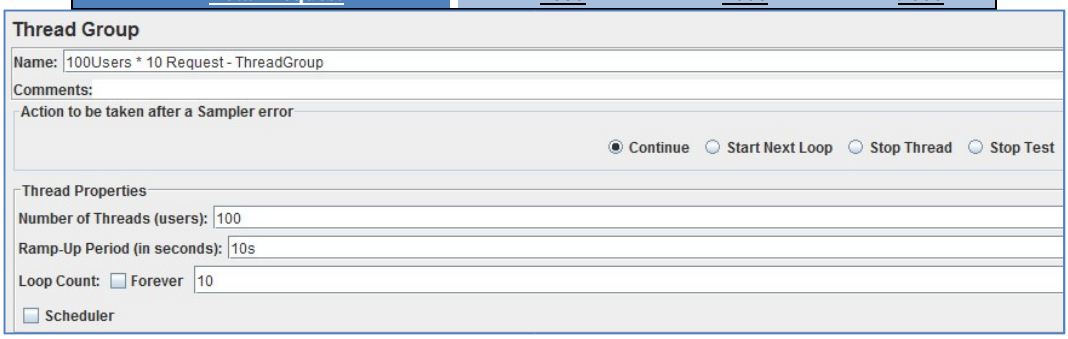

Fig. 4: Thread Group Configuration Example in JMeter

Results

A JavaScript frameworks evaluation was conducted by prototyping and performance testing. As expected, the selected JavaScript framework assisted us to reduce our effort on Ajax application development, and code produced in this prototype is much simpler than in the traditional Ajax development approach. However, the prototyping application's response time did not show any improvement compared to the traditional approach. Table 4 below shows a brief summary of the performance testing. One of the results is that developers do not have to understand how Ajax technology works, as JavaScript frameworks hide most of the complex logic from the implementation. However developers definitely should understand Ajax technology in order to utilise advanced Ajax features, but this is not required for basic Ajax features.

Table 4: Summary of performance testing results

Factors	Parameters	Results
Development efficiency	Learning curve	• Knowledge of HTML and JavaScript required • @12 hours to install to produce first interface
	Code complexity	• Program code very simple compared to JavaScript Ajax or jQuery
Functionality	Ability to provide advanced features	• Easy – many UI components provided.
Performance improvement	Response Time	• Not much difference in performance.

Roughly 12 hours was required to install the AngularJS framework, to experiment with samples, and then successfully produce the first interface using it. This is considered a relatively short period of time to produce an output using a new technology for developers.

Code complexity

Using a traditional Ajax application programming style produced a large amount of JavaScript code, which in turn included a lot of redundant code to send and receive requests from the back-end server. JavaScript frameworks provide a wrapper to make this simple and eliminate redundant and complex code from the program. The example program code below is an AngularJS Controller processing user interaction on the client-side and communicating with the back-end server to send user requests and receive data to display. This controller code processes all front-end logic for the Active Order page in the prototype. The controller sends a RESTful web service request to the back-end server and receives application data in JSON format; this also handles all filtering requests requiring communication between the browser and back-end application. Therefore, every user action on the browser is able to communicate with the back-end server and re-fresh data without having to reload the page.

```
function ActiveOrderCtrl($scope, $http) {
  $scope.status = 'all';
  $http.get('http://localhost:8080/restapi/activeOrder').success(function(data) {
    $scope.orders = data;
  });

  $scope.changeStatus = function (status) {
    $scope.status = status;
  };

  $scope.filterByText = function(order) {
if($scope.searchText == null) return true;            return
(order.customer.toUpperCase().indexOf($scope.searchText.toUpperCase()) > -1
          ||
order.salesPerson.toUpperCase().indexOf($scope.searchText.toUpperCase()) > -1);
};
}
```

Functionality

Most JavaScript frameworks allow developers to utilise external components and plugins. AngularJS also provides this utilisation (see: http://docs.angularjs.org/guide/bootstrap) with a number of components for advanced interface features such as on desktop applications, for example auto-complete, drag & drop, date picker and dynamic dropdown boxes. The benefit of these components is that developers are able to reduce the amount of time required to develop these advanced interfaces and they can use proven user interface components.

Response Time

As planned, three test cases (table 5) were used to send concurrent requests to both applications.

Table 5: Actual performance results

Application	(1K Requests)	(4K Requests)	(9K Requests)
AngularJS Framework	18,837tx/min Avg **7ms** Avg **10ms**	40,509tx/min Avg **79ms**	32,244tx/min With
With jQuery Library	18,662tx/min Avg **8ms**	43,907tx/min Avg **10ms**	36,458tx/min Avg **82ms**

JMeter showed results with various options. Initially, we expected performance benefits from an AngularJS approach, however as table 5 indicates there was no performance benefit. Even jQuery showed slightly better performance when it processed 9000 requests.

Discussion

After trialling the new look and feel over recent months, the dynamic interfaces were very appealing to the Sydney area staff and the amount of code to produce these advanced interfaces satisfied the IT team of 30 personnel. However, the development team was still concerned with the learning curve of the new technology and the stability of the open source framework, as they suffered from instability and inconsistency especially when the open source product is upgraded without providing backward compatibility. We decided to incrementally apply this technology to the company's new applications. The company was planning a number of projects to upgrade their old mainframe-based applications. They chose a simple application as the first candidate, but the first implementation would be a page requiring many dynamic interfaces according to user's requirements; this approach is expected to prove whether this technology is able to fulfil their user interface requirements. The company now understands such technology is clearly able to improve user interfaces, as they saw from the demonstration. However at this stage their greatest concerns are "how easily can users adapt to the new interfaces?" and "how easily can developers produce outputs utilising this new technology?"

Conclusion

We analysed the significance and characteristics of user interfaces in modern applications. The user interface has played a key role in modern applications and is becoming increasingly important as application user's expectations increase; it is also one of key elements of quality in an application. Ajax is regarded as a solution to resolving problems with regard to user interfaces of traditional web applications. However, due to its complexity, there have been limitations in widely using the Ajax development environment. A large number of Ajax JavaScript frameworks have been developed and are now available to developers to reduce such complexity. In this design science study, we evaluated JavaScript frameworks by conducting prototyping and performance testing. We concluded that Ajax application development requires great effort but the JavaScript framework is able to reduce the amount of effort developers must spend on it. The JavaScript framework hides the complexity of Ajax programming from developers and generally supports easy UI plugins for advanced features, nonetheless there is no performance benefit. JavaScript frameworks provide development and maintenance efficiency. Lastly utilisation of these frameworks allow developers to place much less effort on Ajax development, therefore we highly recommend utilising a JavaScript framework for Ajax application development.

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Executive Information System development for Aklan, Philippines

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Abstract

The Provincial Government of Aklan, aiming to improve rather than just maintain its active economy, has assigned its Management Information System Division to produce software solutions for process improvement to help uphold such goals. In addition, the analysis and design helps the division furnish a decision-making support tool fully meeting the requirements of the local chief executive. Since this project serves as groundwork for analysis and design, not all elements of the Structured Systems Analysis and Design Method were implemented. However vital parts of the model were covered to ensure a broad conceptualization of the projected information system for the intended user. A template based on the Bootstrap framework was used to build a web application interface for a prototype of the system. Different components of the application were imported through a text editor using HyperText Markup Language, Cascading Stylesheets and JavaScript. Along with the prototype, a fully-documented Systems Analysis and Design was generated as a foundation for implementation.

Keywords

Aklan, Philippines, EIS, Software Engineering, HTML, SSADM.

Introduction

The objective here of providing information systems is to permit government officials to generate appropriate, sensible and truthful reports which in turn equips them for appropriate planning and decisionmaking. The Executive Information System (EIS) is part of the list of information systems to be established for different Philippine government departments. This EIS affects the Provincial Development & Physical Framework Plan in many ways, such as efficient allocation of resources and effective governance empowered through transparency. Although EISs have lost some of their popularity in recent years, they are still considered valuable in certain domains (Anon., 2019). The establishment of an EIS will save much time and effort in the acquisition and preparation of reports from departments. Furthermore the Provincial Governor can not only keep an eye on where diverse projects stand but also track income gained by the province from its revenue-generating aspects. Generally speaking, Management Information Systems (MIS) were deemed to be integrated user machine systems providing relevant data through operations and management support, as well as decision support in an organization (Cooper, 1988). Such systems are still in use today in a variety of disciplines ranging from town planning (Grifoni, D'Onofrio & Sargolini, 2018), environmental management (Renatus & Gelderman, 2016), farming (Fountas et al., 2015) and so on.

Aklan, Philippines

The Provincial Government of Aklan (PGA) aims to improve the delivery of services to its clients especially to its people through more proficient operations under a supportive top management providing effective executive governance. The Philippines is classified into three main geographical divisions namely Luzon, Visayas and Mindanao (Roces, 2013). According to the National Statistical Coordination Board (2014), these islands are categorized into 17 regions, 81 provinces, 144 cities, 1,490 municipalities, and 42,029 barangays. The Province of Aklan is situated in the middle island of Visayas. Regarded as the country's oldest province, Aklan is believed to have been founded by foreigners from Borneo sometime in 1200's (Philippine Department of Tourism, 2015). The province has become famous for the exquisiteness nature has imparted to it and has made its mark in luring tourists. As noted by the Philippine Department of Tourism (2015), Aklan's claim to fame is Boracay - an island approximately one kilometre from the northwestern tip of the province (Anon., 2018).

Provincial Government of Aklan – Governor's Office

The Provincial Government of Aklan (hereafter PGA) constitutes 19 departments each with an appointed department head (Vargas, Rentillo & Rubio 2012). The entirety of the Provincial Government is administered by the Provincial Governor's Office (PGO) to which all departments are subordinate. The PGO's major function is the general management and jurisdiction over all programs, projects, services, ventures, plans and activities of the PGA. As outlined in the Information Systems Strategic Plan (ISSP), the Office of the Provincial Governor's critical management, operating and business systems include: ensuring the delivery of basic services, initiating and maximizing the generation of resources and revenues and applying the same to the implementation of development plans, program objectives and priorities; and enforcing all laws and ordinances relative to the governance of the province and the exercise of appropriate corporate powers (Vargas, Rentillo & Rubio, 2012). To uphold the aspirations of the governor for the provincial government to have well-developed income-generating means with seamless operation, the Management Information System Division (MISD) was and is assigned to build information systems for various government offices (Vargas, Rentillo & Rubio 2012). The division exists as a branch under the Provincial Governor's Office operates as the main provider of software solutions for PGA to continuously improve their processes. Several information systems were built in-house for some departments.

Approach

This project is deemed as an initial take on the systems analysis and design of one of the many information systems to be developed for PGA. The main features of the actual system will be simulated into a prototype to provide a preliminary look and feel. This Business Process Review (Lemańska-Majdzik & Okręglicka, 2015) has been developed for use in PGA for the Management Information System Division's efforts in developing an Executive Information System (EIS). The scope of the current process as well as its deficiencies are identified in table 1 and figure 1.

Table 1: Current business processes

System	Manual Business Process	
Purpose	How the agency operates as well as how the local chief executive performs specific functions is described. Problems associated with the current environment are identified and what the new system can resolve.	
Scope	The process here only encompasses an existing manual process with regard to how the local chief executive obtains reports necessary for decision-making.	
Preconditions	The process input is the governor's need for specific information from a particular department under his administration.	
Boundaries	The activities immediately following the process input and immediately preceding the process output define the boundaries here. The starting boundary is defined by the governor requesting a detailed report from the appropriate providing department reporting directly to him. The process's ending boundary is defined by the governor receiving the report asked for.	
End Conditions	The process output is the specific report for the governor, from a particular department under his administration.	
Process Flow	**Step**	**Action**
	1	The governor asks an assistant or available staff member to contact the department head for a report (perhaps through a phone call or sends someone to the department concerned).
	2	The assistant or staff member talks to the department head or a representative (asst. deputy head/acting deputy head) to take the call in case the department head is not available.
	3	On behalf of the governor, the assistant requests a certain report.
	4	The department head or representative agrees and proceeds with the preparation of the report.

	5	The department head or representative asks appropriate personnel to produce a report which are all paper-based. The reports will still be printed out for the governor.
	6	Once ready, the report will be brought to the governor's office either by the department head, assistant department head/acting department head or authorized personnel.
	7	The report is listed into the incoming documents logbook.
	8	The report is handed over to the governor or his assistant.
Alternative Flows	**Step**	**Branching Action**
	1	In some cases the Governor has access to the information systems of a few departments.
	7	In some cases, the report does not require being listed into the incoming documents log – in which case proceed directly to step 8.
	8	In some cases the report is not only handed to the Governor, but also explained in person.
Control Points and Measurements	**Step**	**Branching Action**
	6	The person delivering the report is aware of the sensitivity of the report requested.

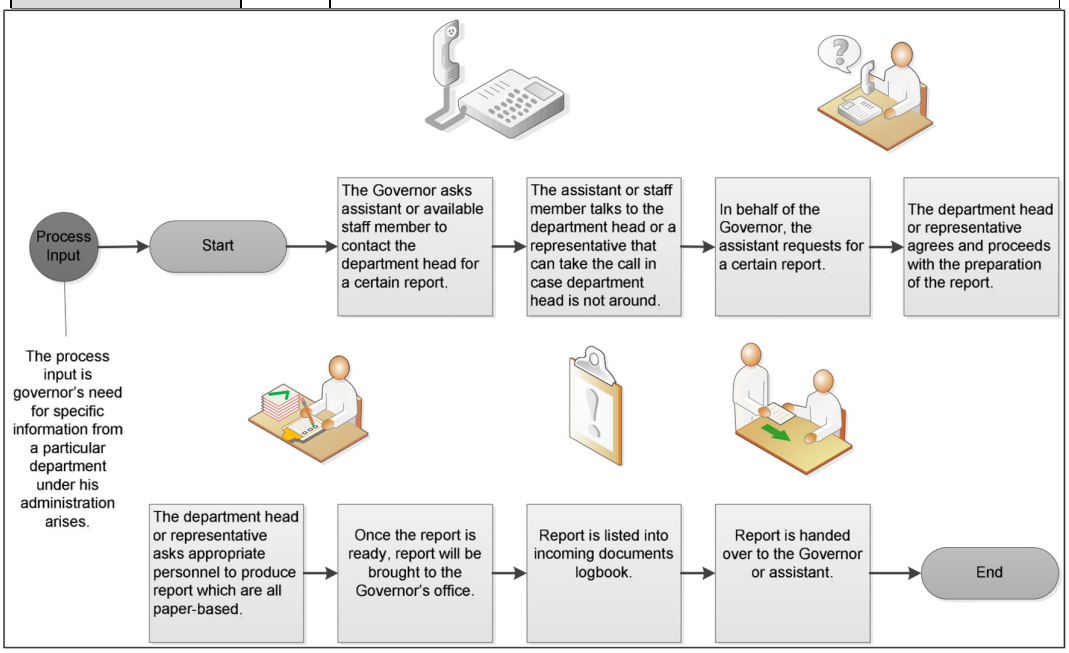

Figure 1: Business Process Flow Diagram

Reports are traditionally prepared manually and consolidation takes time and effort. The governor has to actively request preparation and submission of reports from appropriate departments. However for detailed and faster reports, he requests information directly from the centre responsible. The Provincial Governor uses reports from several information systems already in place to monitor the efficacy of operations and service-delivery. On the other hand it is impractical for reports to be generated by the governor personally, hence he may request someone else - perhaps an assistant of any available staff member, to print reports as required. It is proposed the EIS integrate established information systems for the purpose of acquiring necessary reports with appropriate user account permissions. This manual process basically applies to any report the governor requires from other departments, be it a map from the Geographical Information System (GIS) (Sexton, 2019) or Human Resource Management reports from HRMIS (Boon, den Hartog & Lepak, 2019). The EIS proposed will provide access to relevant information from various sources to provide

government officials with relevant, timely and accurate reports allowing them to make plans and decisions as appropriate.

The focus of the development of EIS is for the immediate information the governor requires which can be viewed immediately on the system. In cases when explanation is called for, the governor can communicate with the appropriate department heads after he has reviewed necessary information using the system. The EIS automates the sharing of information without having to rely on phone calls or face-to-face encounters, unnecessary paper-based reports and time-consuming processes of communication and report preparation.

With an EIS, the governor can check the system directly and reports are displayed as shown in figure 2. Printing hard copies may still be done according to the governor's preference or if the need arises. The proposed EIS will be primarily touch-based to provide easy navigation and a user-friendly interface to the Provincial Governor; it will also be intranet-enabled with an option for remote access.

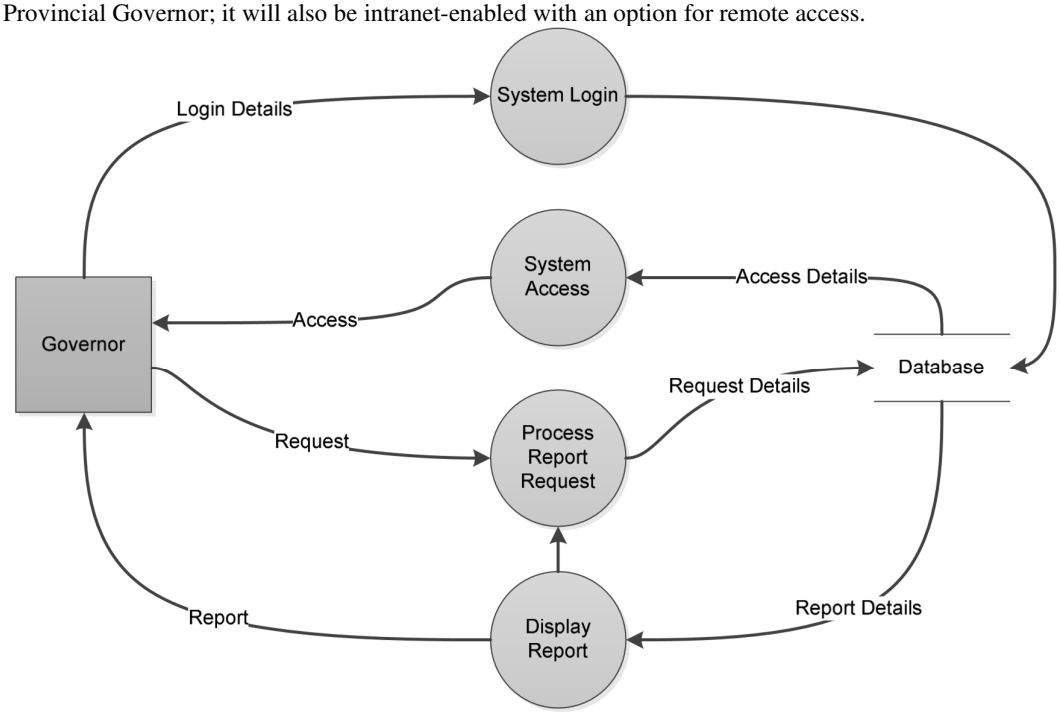

Figure 2. Required System Data Flow Model

The EIS will be a web application accessed by the governor via touch-screen desktop machine, which will aid with responsiveness and mobility. The web application contains various modules enabling connection to various databases (figure 3). The EIS will have no database of its own and no importing or extractions of tables will occur either - only linking. The EIS will be integrated into existing systems. Linking will be performed to a mirror database NOT the live database. Backup and restore scripts will run at 1:00am daily. There is no one to one relationship between the database tables and reports produced. The server will send a response and be rendered to the web page. Figures 3 and 4 below illustrate the different information systems of the Provincial Government of Aklan, including the Executive Information System to be developed.

The EIS will contain a custom-made GIS Web Application interface for project updates and geographical illustrations. The sole user will be the governor, thus session and authentication will be code-driven. Also, the EIS will strictly only have query or read access to the databases used by the relevant information systems. No `Create`, `Delete` and `Update` access are provided. An event in the dashboard will trigger a query request sent through http to the database server. The final form of the EIS is projected to be a web application interface using C#.NET. The in-house software developers use a licensed version of Visual Studio 2012. The backend will run on Microsoft Windows Server 2012 with an Open Government License. The web application will be hosted using the IIS7 Web Server; as this is a web application, data communication will be through http.

Document Tracking Reports

The Management Information System Division (MISD) was also tasked with developing a system of tracking purchase requests and disbursement vouchers as they pass through one department to another. Gathering inputs through interviews, experiences and existing procedures, the MISD developed the Document Tracking System (DTS) to address the tracking and monitoring requirements of Purchase Requests and Disbursement Vouchers. The Tracking of Purchase Requests (PR) and Disbursement Vouchers (DV) starts with the receipt of complete documents from their respective departments being the Provincial General Services Office (PGSO) for the PRs and Provincial Budget Office (PBO) for the DVs. The tracking system records the receipt and release of the documents as it goes through the transaction process. The duration is system measured and generated. Once a cheque is issued, the Provincial Treasurer's Office closes the transaction. The tracking shows the number of pending, processed, sent out, received and closed documents per department.

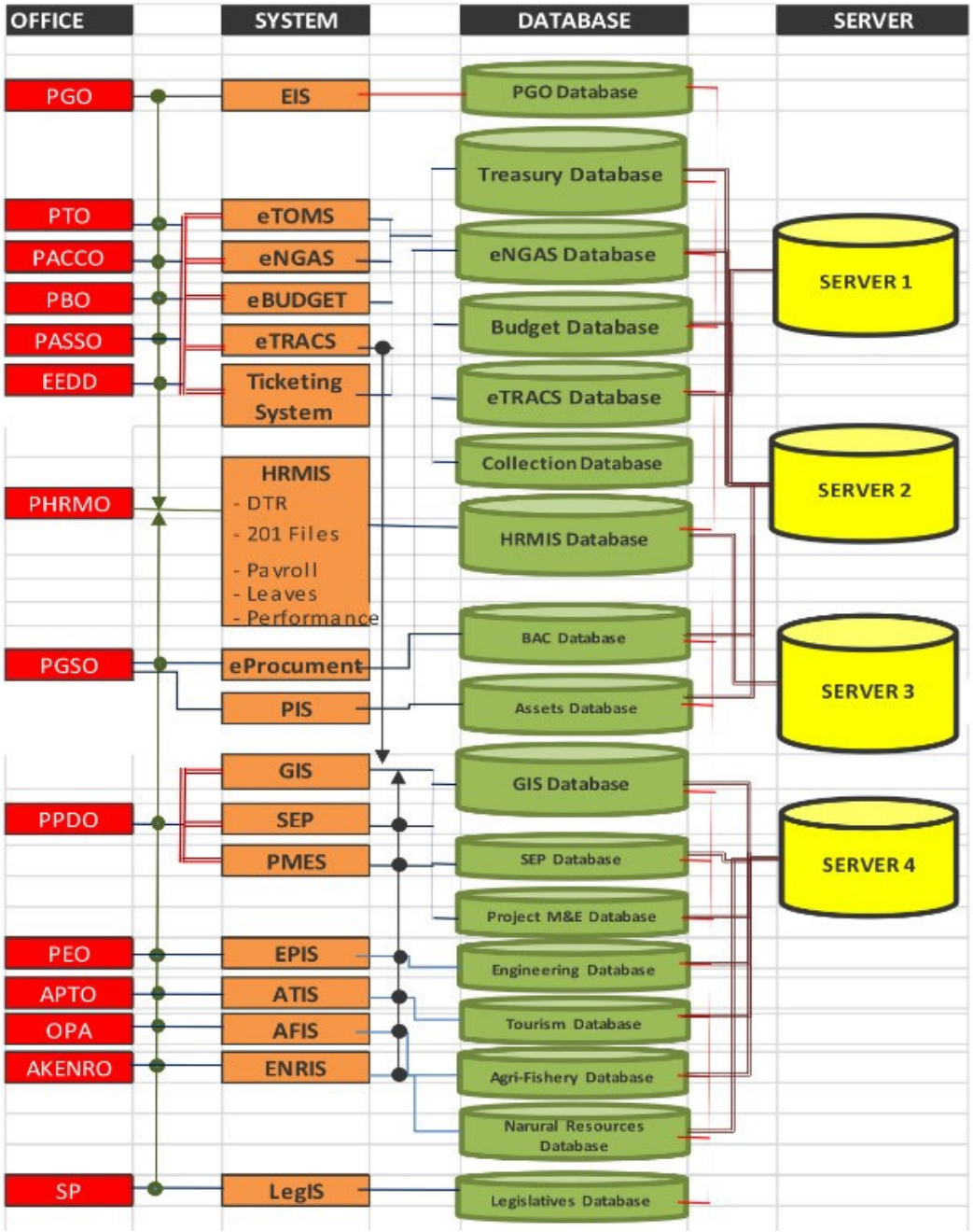

Figure 3. Conceptual Framework

(source: Vargas, Rentillo and Rubio, 2012 - permission granted to reproduce).

Revenue Collection Reports

The Provincial Government of Aklan maintains a plethora of enterprises such as government hospitals, ports and terminals, construction development and quarrying services, provincial tourism operations as well as academic centres. As such, the Economic Enterprise Development Department (EEDD) has legal authority to collect non-tax revenues such as regulatory fees and business and service income accruing; in addition it also collects tax and non-tax revenues such as that from real property tax accruing to the General Fund.

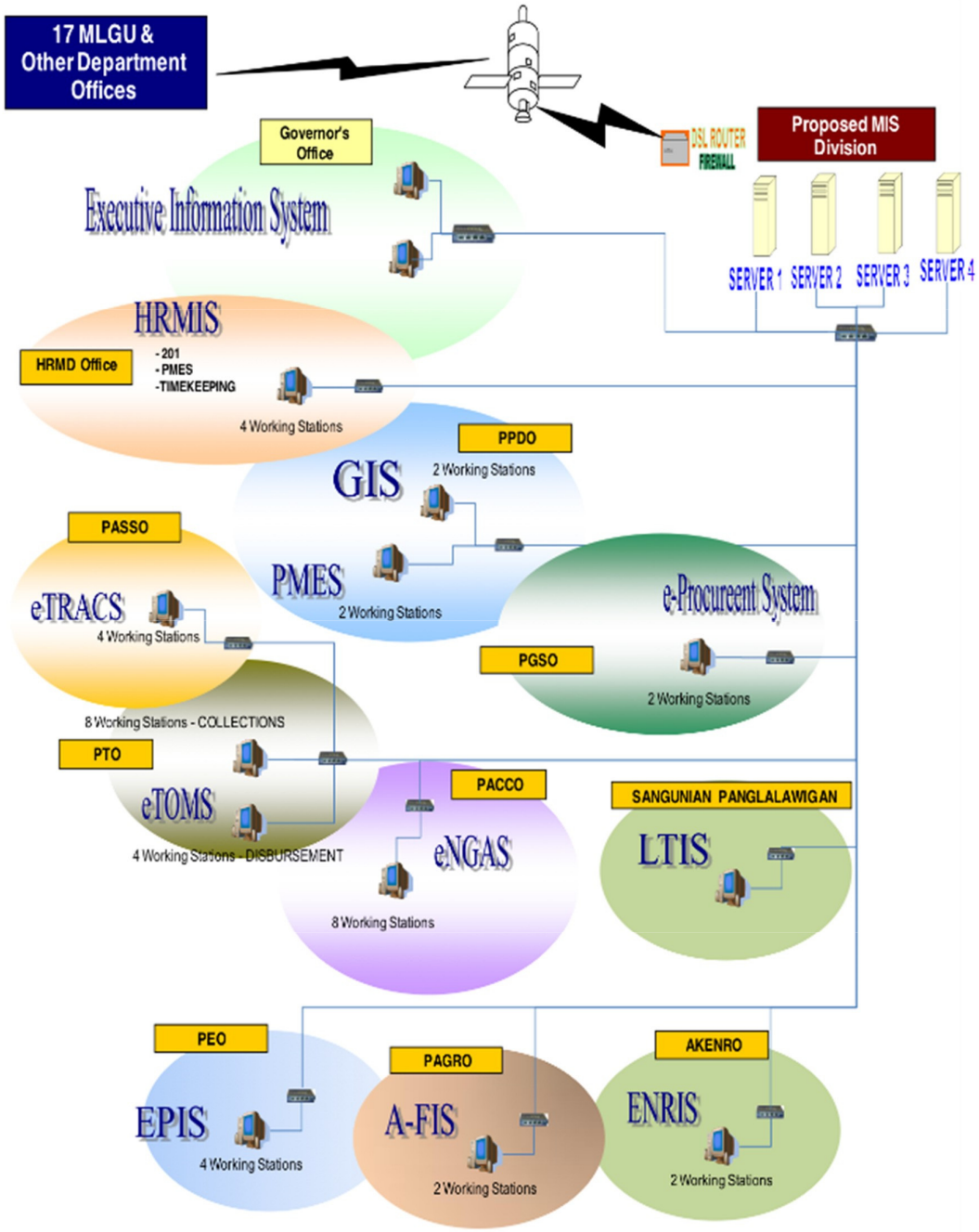

Figure 4. Information System Layout

(source: Vargas, Rentillo and Rubio, 2012 - permission granted to reproduce).

All EEDD local government revenues are collected at source while those accruing to the General Fund are collected through field collectors from the Collection Division of the Provincial Treasurer's office. All cash

and non-cash collections together with collection reports are remitted to the Treasurer's Office at least daily. Traditionally these are prepared manually and consolidation of such reports takes time and effort. The governor has to actively request preparation and submission of revenue collection reports from the Provincial Treasurer's Office (PTO). However for detailed and quickly-prepared reports, he requests information directly from the concerned responsibility centre.

The Provincial Government of Aklan adopted the Enhanced Tax Revenue Collection and Assessment System (ETRACS) in July 2014. ETRACS is a computerized system made for Local Government Units (LGU) to fully automate operations of and between Treasury and the Assessor, and is composed of three

(3) core modules: a Tax Collection Module, a Business Permit Assessment Module and a Real Property Assessment Module.

Human Resource Management Information

The Provincial Government of Aklan adopted the Human Resource Management Information System (HRMIS) from the Department of Science and Technology (DOST). Using LAMP (Linux, Apache, MySQL and PHP), the system was customized and tailored for use of the LGU. The HRMIS incorporates the following features: Attendance Monitoring, Leave Management, Personnel Information Management, and Certification Issuance.

Project Monitoring and Status Reports

The Provincial Government of Aklan implements (hard and soft) projects, which are funded from various sources. These include Local Funded Projects including the 20% Development Fund, National Funded Projects, Foreign-Funded Projects, and National Government Organisation-Funded Projects. Consequently, maps are also critical to the governor's decision-making as information on geographical location, land area and property accessibility are needed for particular projects. The Provincial Governor uses reports from the Document Tracking System to monitor the efficiency in document processing. However, it is impractical for him to generate the reports himself or request someone else to print the reports for his use. In addition, the knowledge that the governor has easy access to reports through a tabletop has a psychological effect for departments concerned, in as much as there is some increased pressure to perform. It is proposed the EIS integrate with the DTS to obtain such reports.

At present, ETRACS has been operational and implemented in the Office of the Treasurer, the Assessor's Office and the Dr. Rafael S. Tumbokon Memorial Hospital (DRSTMH). ETRACS will be rolled out to cover all revenue collection centres of the province in the future. One of the features of this system is automatic report generation along with online transaction capability. It is proposed the EIS will integrate with ETRACS to obtain these revenue reports. Human resources is most important asset of the LGU and also its greatest expense. It is important the governor have regular status updates on the quality of his or her workforce; this includes attendance levels, tardiness, age profiles, skill profiles, job status and gender. It is proposed the EIS will integrate in to the HRMIS to obtain such reports.

As the number of projects implemented is extensive, the governor faces difficulty keeping track of the status of these projects. The MISD proposes a solution based on a Geographical Information System (GIS) for accessibility and manageability. Project Monitoring Teams were established to gather status updates regularly. In order to provide an efficient reporting tool, it is proposed a web application where status reports will be developed, are encoded and linked to the ArcGIS Server of the PGA. Hence the EIS will include a customized GIS Web Application interface to provide project updates as well as make maps accessible to the governor. Session and authentication will be hard-coded as only the governor will have access. Furthermore the EIS will have query or read access to the ETRACS, DTS and HRMIS MySQL database. It will not incorporate `create`, `delete` and `update` access. Necessary user account permissions for the EIS will be provided, therefore the user will be unable to add new reports, nor modify or remove any existing reports on the system. The user will only be able to access and view the reports for his/her liking.

A prototype must be developed in accordance with expectations of users as determined in the systems analysis and design lifecycle (Dennis, Wixom & Roth, 2008; Shoval, 1995). Familiarity with tools was performed at this stage and these were accordingly employed. The prototype is seen to provide an initial conceptualization, thus the interface is designed with fixed content. For this reason a web application with static web pages was created, as the initial contents incorporated into the prototype need not be updated. The prototype developed incorporated static web pages, where each webpage was stationary using Bootstrap (getbootstrap.com) while the text editor utilized Sublime Text 2 (sublimetext.com). A free responsive multiple skin admin template with pre-designed webpage or set of HTML webpages was

downloaded. With the use of a website template, custom content such as text and images may be plugged in or imported.

Prototype Development

Bootstrap is the most popular HTML, CSS, and JS framework for developing responsive, mobile first projects on the web. Bootstrap enables quicker and easier front-end web development for developers of all skill levels, devices of all shapes and projects of all sizes. The values of the classes are all from the framework. A template was employed in order to minimize redundant work. The template used was a full scale, high quality, HTML5 backend based on Bootstrap 3. The template was already equipped with numerous plug-ins and elements for the user interface for a simpler development of the prototype. The template is compatible with all commonly used browsers and can be optimized in case of a change of platform to perhaps a tablet or a phone. This open source admin template can be downloaded for free and is licensed under Apache License V2.0. With the template, one need no longer build and edit the theme as it is already pre-coded with pre-compiled framework components. The relevant information to be shown on the application were incorporated in the template. For every webpage, the corresponding components are imported. There are several different themes to choose from to suit the required interface format for the intended user and for the type of application developed. JavaScript (Kienle, 2010; Martinsen, Grahn & Isberg, 2013) was used mainly for the login option for inputting the username and password, as well as the disclaimer in case the entered login information was invalid (figure 5).

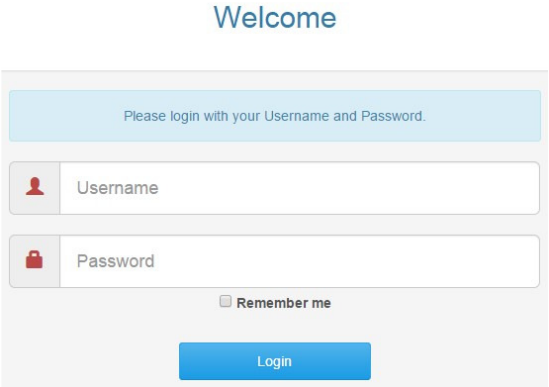

Figure 5. Login Option

Although it is only the governor who has access to the EIS, a login page is still necessary to restrict anyone from accessing the content of the system and to restrict other people from gaining access to the system and viewing reports not allowable to others. The governor may not always be on his or her workstation and if left open, the risk of illegal access is likely, thus a login page was setup for the system. The main homepage shows the different report categories available. The report categories are interactive when the mouse pointer hovers over their respective links before clicking to select; in this way the user is able to recognize which option is about to be chosen to ensure the correct option is clicked. This scenario is of minimal effect but can still yield shorter cycle times for the user to access and view reports.

Document Tracking Reports

The Document Tracking Reports include Purchase Requests and Disbursement Vouchers. Each report will show the department involved, date submitted, date required and its status.

Purchase Request

A Purchase Request is a document issued by a certain department to notify the purchasing department of items needed, along with corresponding quantities and estimated unit prices. The purchasing department for PGA is the Provincial Goods and Services Office. Such a document is intended to maintain internal financial controls within the organization. The Provincial Accounting Office (PACCO) established a purchase request process to effectively oversee requisitions for purchases. Requests to execute purchasing of goods and services are all put on record and cross-checked against internal departmental budgets before endorsement for approval within the organization which are then brought to PACCO. The accounting department usually has specific employees handling all purchase requests. The signatories for this document are only the head of the department filing the request and the governor approving requests.

Disbursement Voucher

A Disbursement Voucher is a form used to make payments to an individual, usually a non-employee or resident, a business establishment or private organization for merchandise sold or services rendered. For government employees or organizations, a disbursement voucher is generally used for expenses incurred during government functions. An unsigned disbursement voucher implies the check will also not be signed. There are a couple of signatories for this form. The respective heads of the Accounting and Treasurer's Office are to certify requests for payment before the governor grants approval. The recipient of the payment or an authorized representative can affix their signature, signifying acceptance of the check.

Revenue Collection Reports

Revenue Collection Reports are divided into three categories - namely Total Revenue, Tax and Non-Tax Revenue. The Total Revenue reports are laid out according to the Economic Enterprise that is the source of such revenues, while the Tax and Non-Tax revenues are laid our according to sub categories. The Economic Enterprises refer to the income-generating branches of government such as hospitals - both town and provincial, or tourism operations such as jetty ports and airports. Non-Tax Revenues are subcategorized between Regulatory Fees and Business and Service Income. On the other hand there are three subcategories for Tax Revenue sources, namely Real Property Tax, Special Education Tax and other Local Taxes.

Human Resource Management Information

Due to the lack of data, the specific HR reports are not incorporated into the EIS prototype; HR reports are however temporarily linked to the actual HRMIS.

Project Monitoring and Status Reports and Map

No specific reports on Project Monitoring and Project Status were acquired from the organization during the project. Thus the GIS Web Application interface to be created for the EIS is not included in the prototype.

Evaluation

Different phases and corresponding tasks were formulated based on structured systems analysis and design methodology (SSADM) principles (Ashworth, 1988; Verma, 2012). The feasibility study phase included investigation of the current environment concerning how the agency currently operates to formulate software requirements. The Systems Analysis and Design phase focused on establishing requirements for a new system addressing inadequacies uncovered in current business practices (Al-Hothali and Al-Zubaidi, 2012; Ishtiaq *et al.,* 2012). The Implementation Phase included building a prototype. The projected final form of the EIS is of a web application interface. A web application is perceived to be the best solution meeting user requirements, particularly through cross-platform capability. The prototype only includes static rather than dynamic pages, as static pages were adequate to depict the concept developed for the EIS.

Findings

There are many methods stated in the province's Information Systems Strategic Plan (ISSP) which are potentially chosen when developing information systems (Vargas, Rentillo & Rubio, 2012). However, the waterfall model was preferred as the guide for the entire software development process. As the waterfall model upholds administrative control, it was considered the most appropriate for a government organization. The objectives of the feasibility study were to identify not only the scope of the existing system but also its deficiencies. The Business Process Review detailed such information to establish an evaluation of a new system addressing the deficiencies of the current business process. For this evaluation, the Systems Analysis and Design phase focused on developing a new set of system specifications which were communicated through generating the Required System Description supported with a Data Flow Model as well as Functional and Non-functional Requirements. Furthermore, Logical System Specifications were embodied in the Technical System and Logical Design Descriptions while the Physical System Specifications included select content for the EIS. The Implementation Phase included building a prototype according to the existing government interface. The EIS envisioned is a web application with fixed content as a prototype.

A web application was agreed upon as government users may not always be at their workstations, rather underway as part of their day to day business. The technical capabilities of the average public sector employee were considered. Other assumptions were taken from the user's work dynamics. The local chief executive or governor is known to be very busy and not continually at his workstation. The creation of the EIS in itself is beneficial for saving time for those preparing requested reports. A non-complicated interface

is ideal to save much of the governor's time, better spent undertaking more pressing tasks. The interface is to be straightforward in that it will be easy for the user to navigate options quickly and seamlessly to locate whichever reports are needed. The local chief executive should be able to access the final EIS web application from any platform other than a desktop computer. The system may be via a phone, tablet or laptop to allow the user access to reports regardless of location. The governor may be in an important meeting in a venue away from his workstation when the need for a report arises. This multi-platform compatibility of a web application interface allows the governor to obtain such reports.

As the web application will include static web pages, only simple HTML, CSS and JavaScript need be employed. PHP and MySQL are to be employed as a backend for prototyping for eventual dynamic web application production. PHP is Open Source Software (OSS) (Noruzi, 2007; Tasić, Stanimirović & Pepić, 2011). MySQL has become the world's most popular open source database system due to its consistently fast performance, high reliability and ease of use. Besides being freeware, MySQL offers a wide range of possibilities (Tasić, Stanimirović & Pepić, 2011, p. 2429).

Conclusion

This Systems Analysis and Design project is intended for the Provincial Government of Aklan in the Philippines and is to start with the Executive Information System planned for the governor's use. The lack of documented analysis and design is one of the competency gaps of the MIS division, as there is no System Analyst on the roster; this project helps to fill that gap. To further understand the background of the project, the province of Aklan and its governing body was introduced. The province is rich in many aspects with many unique products. Business opportunities and tourist attractions are the underlying factors for the provincial government's desire to implement projects supporting improvements to income-generation.

The current business process was discovered to be manual using not only excessive paper but the cycle time is also long. Through requirements analysis, the required system to address deficiencies in existing processes is being produced (Ishtiaq *et al.*, 2012; Wellsandt, Hribernik & Thoben, 2014). The specific approaches into how the system will be developed were also provided. In addition, the logical designs of enquiry processing and system dialogues are laid out. A web application is the most ideal interface for EIS which will not have any database of its own. Instead the governor's workstation will have linking access to the databases used by the MIS Division. The physical data and process design are formulated. The governor will only have access to view reports needed from the EIS and will not be able to add new reports or modify or remove any reports. A prototype will be developed from the concept formed throughout the Feasibility and Systems Analysis and Design Phases. Similarly a web application is currently being built using an admin template adopting the Bootstrap framework. The Sublime Text 2 editor is being used to incorporate custom components into different pages. Languages used are HTML, CSS and JavaScript (Kienle, 2010; Martinsen, Grahn & Isberg, 2013).

Although it will only be the Governor who has access to the EIS, a Login Page is still necessary to restrict other people from gaining access to the system along with viewing reports otherwise not accessible. The content of the application is carefully selected according to what is primarily significant. Content selection is based on the most common reports requested by the user to effectively deliver services. The user interface is designed to be minimalistic and user-friendly to cater to the technical proficiency of the sole user - being the local chief executive. More so, the decision to make a web application for the EIS arises from users residing in different locations, perhaps attending meetings or public functions to which the cross-platform capability of a web application comes in handy. The automation of the reports request of the EIS in itself is beneficial to save time for those preparing reports. To yield greater productivity, an interface that is easy to navigate through touch screen compatibility of devices is deemed best for the user, which will in turn accumulate more savings on the governor's valuable time which can be disseminated to other important tasks.

Future Work

This project was deemed an initial software development attempt at an EIS. Prioritized tasks were taken to formulate a conceptualization and plan what the EIS could do, how it would look and what it could offer. Based on communication with users, stakeholders, sponsors and developers, the actual execution is expected to be two years to be fully accomplished. Other SAD methods will be explored in future. Joint Application Development (JAD), Rapid Application Development (RAD), the Spiral Model and the synch and stabilize approach are alternatives to the Waterfall Model, with the build and fix approach also

mentioned in the Provincial Government's ISSP. Hence there are other approaches to Systems Analysis and Design to be considered.

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Environmental Protection: The Method of Mineral Separation According to Useful Component Density

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Abstract

The implementation of the Smart City concept means creating a system including such basic elements as digital economy development, integrated breakthrough IT technologies, Smart human capital formation providing a fundamental merger of information, nano-, bio- and socio-humanistic technologies through the mediation of digital systems, as well as the presence and development of the Smart Ecology system based on the principles of natural resources saving and environmental improvement. In this context, the development of efficient methods to process technology-related materials is becoming all the more exigent. The article's author, building on the systematized experience, has conducted comprehensive scientific research and laboratory tests that led to the invention of a patented method of mineral separation according to useful component density, and of a plant unit to embody the invention. The conclusion has been made that the unit is highly efficient due to its continuous work, low metal content, minimal time and labor input needed for its assembling and disassembling; it also needs minimum time and labor input to prepare and equip a site for its operation, which may lead to economic effect and improved ecological situation in the area. The article may be of interest for government authority officials as well as for specialists implementing priority innovative environmental projects.

Keywords: Environmental Protection, Smart City, Mineral Components, Ecology, Efficiency

Introduction

Significant problems that create obstacles to the widespread use of Smart-technologies in the Russian Federation include the lack of investment in social and human capital, the gap in the socio-economic development of the Russian regions, the lack of the necessary resources, the presence of infrastructure problems, the emergence of unfair competition and company struggles for its special segment of the new market, identifying the problems of interaction between developers, municipal authorities, legislative structures, developers and other specialists, as well as serious environmental problems (Ruzheinikov, V., 2017; Velikiy, D., (2016).

The concept of "Smart City" should become an integral part of the innovation strategy of our state. This, in turn, requires the development, successful implementation and evaluation of the interaction of a whole range of priority investment projects aimed at the use of Smart-technologies. As a result, a significant synergistic effect is expected in all areas of the city's life and urban infrastructure, including improving the quality of life and the level of safety of citizens, the construction of educational and social centers, and solving environmental problems. (Schneps-Shneppe, M., 2016).

The Smart City concept is a global urban space management system based on an information approach and innovative technologies, the use of new nanotechnological materials, implementing the principles of energy saving and energy efficiency, which allows creating a comfortable living environment and infrastructure for residents. to increase the efficiency of the functioning of the city

as a whole, significantly improve the environmental situation, increase the efficiency of public and private transport, predict and minimize the negative consequences of risk events, and also obtain significant savings in resources, which will increase the investment attractiveness and competitiveness of the city. (Gomonov, K., Berezin, A., Matyushok, V., Balashova, S., 2017).

Timelyness. Statistically, 1 ton of coal, depending on the processing equipment, fuel preparation conditions and specific combustion modes, produces 140 to 25 kg of solid ash content. (Radomskaya, V., Yusupov, D., Pavlova and ets., 2018), Ash content is mineral stock rich in aluminum oxide (15-25%), ferrous oxide (6-15%), and silicon oxide (40-60%). It also contains, as microadditives, 50 elements of Mendeleevs' periodic table. (Glushkov, D., Zakharevich, A., Strizhak, P., Syrody, S., 2018; Prokhorov, K., Alexandrova, T., (2017).

Combined heat and power plants waste, as regards its complex and multicomponent material composition, equals to technology-related deposits, now possible to process using the accepted mineral separation methods allowing to extract valuable components and use the obtained products for the needs of national economy**.**

The main problem with CHP waste dumps reclamation is that Russia lacks advanced non-waste technologies of the kind used, for instance, in Germany where all plant ash and slag is 100% processed, which requires no additional areas for its storage.

In present-day Russia, there have been developed, however with limited use, such ash and slag processing technologies as wet magnetic separation and flotation. These technologies allow to efficiently extract aluminum oxides, ferrous oxides, and unburned carbon. This has led to ecology-and-economic effect due to the realization of additional marketable products and reducing solid waste placement costs amounting to 72 319,79 thousand rubles and 74 970, 10 thousand rubles annually (the data is for CHP-11 and N-Irkutsk CHP correspondingly).

Presently, there are 172 coal-fueled CHP-plants in Russia. Their waste dumps contain about 1.5bln tons of ash and slag (AaS) (Gorodnov, V. and ets. (2015).

According to the information from ZAO "APBE", ash and slag dumps' area is as large as 28 thousand hectares. Just up to 8% (1,5-2,1 million tons) of the annual yield (about 30 million tons) of ash and slag is utilized and used. If the trend persists, by 2020 the volume of the accumulated AaS may reach 1,8 bln tons.

According to expert estimation, the cost of storage of 1 ton of AaS is 400 to 700 rubles, or 5-7% of a coal-powered CHP energy and heat production costs. Investment needed to reconstruct one ash and slag dump may be up to 1bln rubles, while the construction costs of a new dump are 2-4bln rubles.

In 3 to 5 years the overfilling of AaS dumps will reach mass proportions, this process is already underway.

There looms a risk of coal generation losing its power and place in the energy balance. According to Russian Statistic Agency, Ekibastuz coal production costs are 410 rubles net of VAT, its ash content is 40-48%, while that of Kuznetsk coal is 15-40%. The Reftinskay Regional Power Plant has a closed-circuit hydraulic system of ash removal. The ash is stored at AaS dump 2, 4,5km off the plant, its area being 992 hectares. The plant's annual yield of ash and slag is 5 m tons. AaS dump 1, of 450 hectares, is filled to capacity and withdrawn from service. Works to reclaim it are underway. (Gudzenko, V., Varenichev, A., Gromova, M., 2018).

The main purposes of the development of a new method for mineral separation and a unit for its implementation are:

- the development of a mineral separation unit, simple in design and operation, with no stringent requirements for the purity of water;

- making it highly efficient through its continuous operation (minimum time and labor input for the withdrawal of the useful component as it must take place during the separation process, without having to stop the unit's operation);

- low metal content, minimal time and labor input needed for its assembling and disassembling, which gives more opportunities for a quick point-of-use change (mobility);

- minimum time and labor input to prepare and equip a site for the separation unit's assemblage, thereby increasing its economic effectiveness.

To achieve the abovementioned goals, the following tasks were set and completed in the course of the research:

- modern technologies and principles of mineral separation units' operation were systematized;

- the requirements for mineral stock preparation and its transportation to separation plants were studied;

- global experience in mineral separation was generalized;

- analysis was carried out of negative consequences inherent in mineral separation technologies and units, debugging of which may call for considerable changes to the design of a separation unit;

- analyzed was the specific nature of mineral deposits formation (precious metals, alluvial formations), as well river hydrography;

- studied were the specific nature of two-phase flows, as well as swash channels formation in rivers.

Within the scientific research conducted by the article's author, that resulted in the development of an innovative mineral separation unit (The method of mineral separation according to useful component density and a unit for its implementation. Gorodnov V. I., Gorodnova N. V., Berezin A. E, patent of invention RUS 2601791 25.08.2015) additional tasks were set, including the study of hydrotransport, hydraulic calculation of pressurized hydrotransport systems, and solid particles behavior within its curved sections.

Resulting from the study and analysis of the entire relevant information (Varenichev, A., Gromova, M., Potapov, I., 2017), delineated was the following way to attain the abovementioned goals:

To use the physical processes taking place in pressurized hydrotransport extensively employed in modern separation technologies to transport mineral raw materials, while paying special attention to the physical processes in pulp moving in its curved sections. In a pulp pipe's curved section, due to the presence of a secondary transverse flow, the trajectory of the pulp's solid particles changes so that they, depending on their density, move along the lateral surface of a given segment's inside radius.

Methodology

The method of mineral separation according to useful component density and a unit for its implementation

The method of mineral separation according to useful component density is based on the use on physical processes taking place in pulp flowing through a curved section of the pipe. (Prokhorov, K., Alexandrova, T., 2017).

The mechanism of the flow's action upon a solid-phase particle of pulp transported through a straight segment of the pulp pipe is as described below. With the flow acting upon a solid-phase particle, depending on its size, density and mean flow velocity higher than critical velocity, three types of this particle's movement are possible (Gorodnov, V., Gorodnova, N., Berezin, A., 2015):

- rolling or sliding (dragging) of the particle along the pulp pipe's lower wall;

- the particle's separation from the pulp line's lower wall – its suspension in reverse dip flow (leap transference);

- steady fluence of particles in suspended state.

This research focuses upon the first type of pulp's solid-phase particles movement that forms a moving bed of such particles upon the pulp pipe's lower wall. The height of this bed moving along the pipe line's lower wall depends on mean flow velocity, size and density of solid-phase particles, and on the pulp's thickness.

The carrying capacity of pressurized hydrotransport is connected with the notion of critical velocity. Pulp movement's critical velocity (Vcr[m/s]) is the lowest speed V of pulp which causes the flow along the pipe's bottom to stop, starting the precipitation of solid-phase particles from the flow body. This leads to the silting of the pulp pipe. To prevent (or minimize) silting, pressurized transport speed modes are set to be higher than critical velocity.

Proceeding from the granulometric analysis of pulp's solid-phase particles, they could be divided into two groups differing by near-mesh grain. One group of solid-phase particles smaller than near-mesh grain, mixed with water, form a suspended mixture that transports the particles of the other group, larger than near-mesh grain.

This is exemplified in Figure 1 presenting the segment of a pulp pipe featuring:

- the moving bed of solid-phase particles on the pipe's lower wall;

- the pulp velocity profile curve and its maximum velocity;

- the dynamic radius.

Fig. 1 shows a certain asymmetry of the pulp velocity curve. This asymmetry increases with the decrease of mean flow velocity and increase of pulp thickness. Mean velocity rate is the more important factor to influence the asymmetry of pulp flow. The asymmetry of the velocity field is best shown with pulp mean flow velocity approaching critical velocity.

The degree of asymmetry can be expresses as the exceedance of the flow's dynamical axis of the pipe's centerline. The dynamical axis of the flow is understood to be the locus of points within pulp flowing at maximum speed.

The dynamic radius is a distance from the pipe's lower wall to the dynamical axis of the flow.

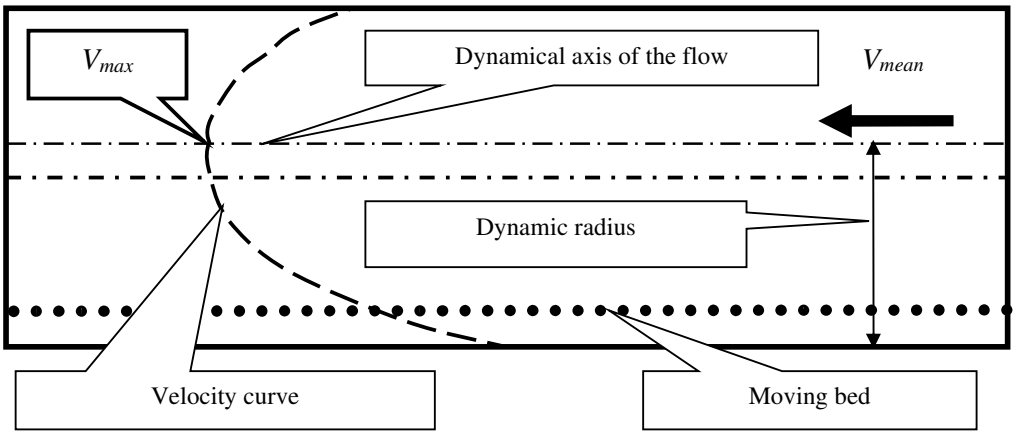

a) The pulp velocity curve, the moving bed of solid-phase particles and maximum velocity of the pulp along the dynamical axis of the flow

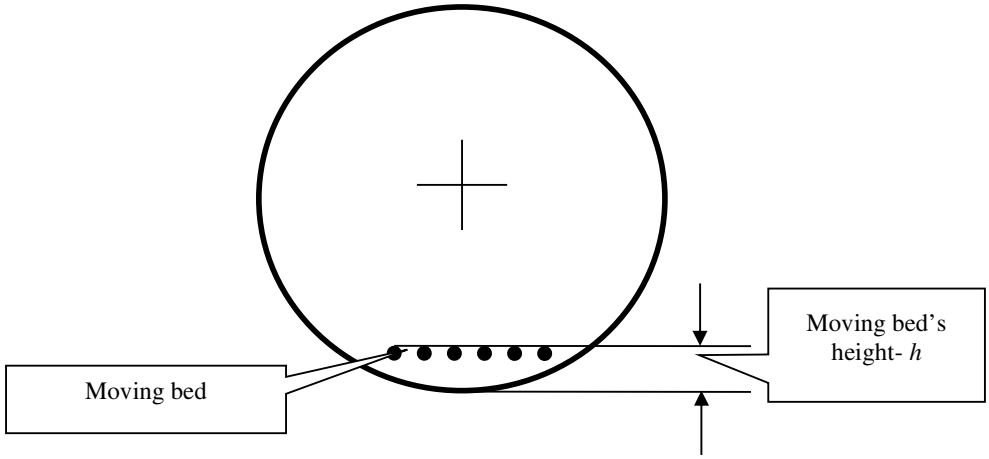

b) The moving bed on the pulp pipe's lower wall and its height

Fig. 1: The flow of pulp in the pipe

It is noteworthy that the higher the dynamical axis of the flow, the more upward-and-forward elongated becomes the mean velocity curve along the direction of the flow.

Lower, more saturated pulp layers moving at lower speed compared to that of the upper ones, decelerate movement in that area because of the presence of a moving bed of solid-phase particles upon the pipeline's lower wall.

Results of the Questionnaire Survey

In Table 1 below presented are figures for pulp mean velocity, maximum velocity, critical velocity, the dynamic radius and height of the solid-phase moving bed, for pulp pipes of various diameters. This data is obtained experimentally.

Table 1: Functional connection of pulp velocity and height of the moving bed of solid-phase particles

Mean velocity, V_{mean} m/sec	Maximum velocity, V_{max}, m/sec	Critical velocity, V_{cr}, m/sec	Dynamic radius size D, rd, m	Moving bed height, h, mm
D =100 mm, pulp thickness 1,2				
2,62	3,64	2,4	0,065	1,07
D = 200 mm, density pulp thickness 1,1				
3,28	4,40	2,60	0,126	3,56
D=300mm, /pulp thickness 1,1				
3,28	4,68	3,00	0,192	6,75

Specific properties of pulp flow in a pipeline's curved segment (analysis of physical processes)

In a pipeline's curved segment, the centrifugal force of inertia of a fluid's particles following curved trajectories cause velocity and pressure redistribution in flow sections: the velocity of the fluid's particles decreases with the increase of the dynamic radius according to the hyperbolic law, while the pressure grows (Fig. 2, a). The pressure at the pipeline's outer wall grows $p_{outer} - p > 0$, while that at the inner wall falls $p_{inner} - p < 0$.

Hence, when pulp enters a pipeline's curved segment it forms a converging area (velocity increase and pressure decrease) at its inner wall, and a diverging area at the outer one (velocity decrease and pressure increase). Vice versa, when pulp flow leaves a pipeline's curved segment to enter a straight one, a diverging area forms at its inner wall, and a converging area – at the outer wall. When pulp flows in a pipe's curved segment, the centrifugal force of inertia of the particles moving at high speed in the central part of the flow's normal section considerably exceed the centrifugal force of inertia of the particles moving at slow speed along the walls. Unbalanced centrifugal forces in the flow section plane cause secondary pulp flows with a spiral movement, directed in the section's central part from the inner towards the outer wall, while at the side walls – from the outer towards the inner wall. Thus, a vortex pair formed thereby, superimposed on the pulp linear motion, causes two spiral flows. (Osipov, D., Zhukov, V., 2017).

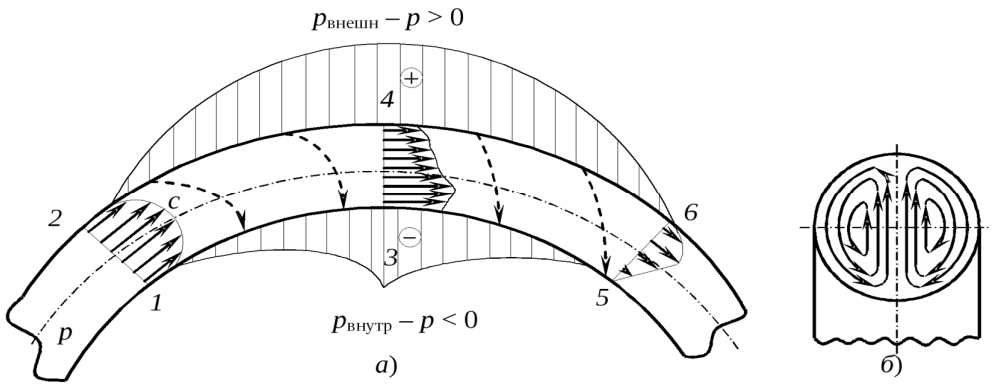

a) pressure and velocity curves; *b*) vortex pair
3 – low-pressure area; 4 – high-pressure area.

Fig. 2: Formation of a secondary flow (vortex pair) in pulp flowing through the pipe's curved segment: 1-2 and 5-6 are velocity curves, correspondingly at the points of entry and exit of a curved segment of the pipe

Through changing mean velocity of pulp flow in the pulp pipe and using the appropriate radius of curvature of its curved segment it becomes possible to adjust the separation unit's operation to specific densities of useful component contained in the pulp.

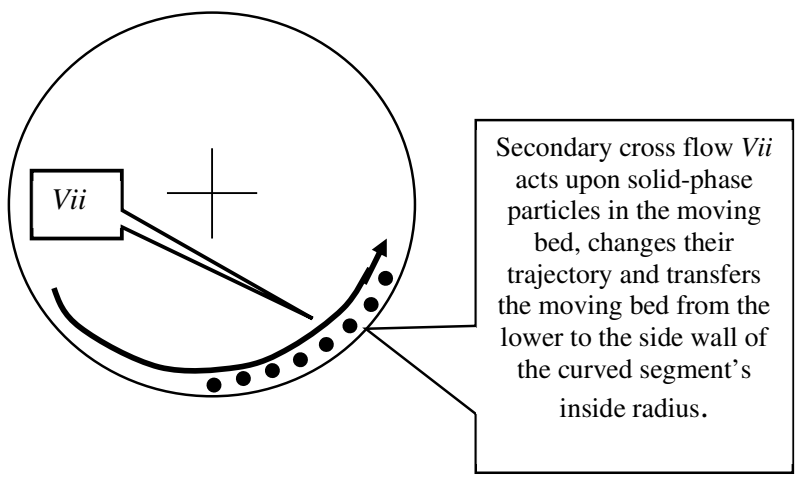

Fig. 3: Transference of the moving bed, acted upon by secondary flow, onto the side wall of the inside radius of the pipe's curved segment

In the pulp pipe's curved segment, due to secondary flow (pair vortex) superimposed upon the pulp's linear movement changing the trajectories of the moving bed's solid-phase particles, these particles, depending on their density, move in a specific way along the side wall of this pipeline segment's inside radius. Fig. 4 features symmetry axis vertical section of the pulp pipe's curved segment.

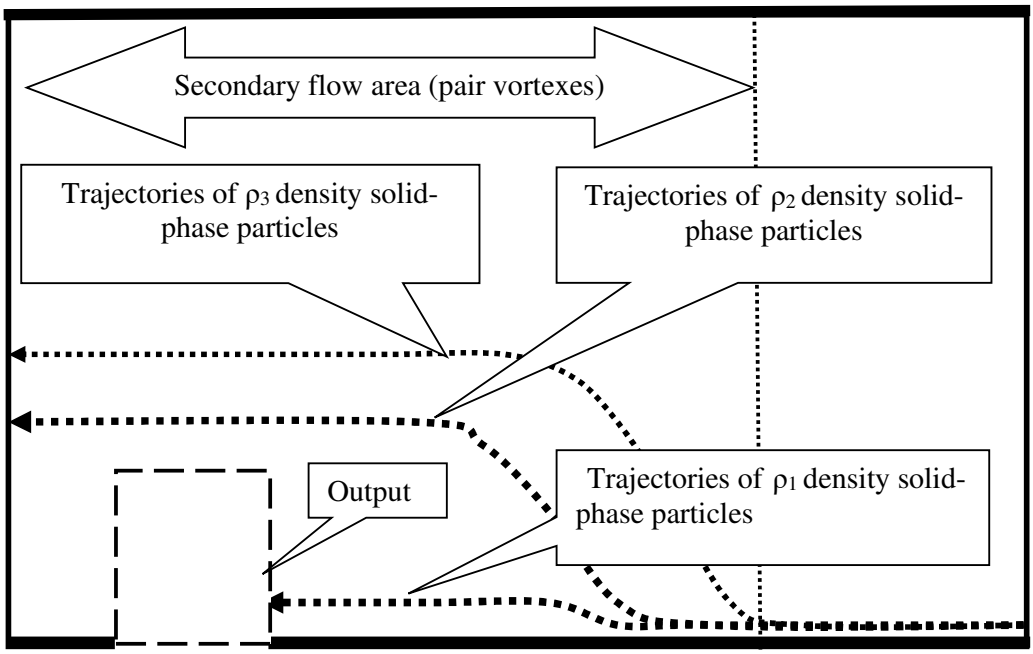

Fig. 4: Functional connection of trajectories and density of solid-phase particles resulting from secondary flow within the pulp pipe's curved segment (solid-phase particles' densities $\rho_1 >> \rho_2 > \rho_3$)

The trajectory type of solid-phase particles moving along the inner side of the pulp pipe's curved segment depends on their density, the lower the density of a particle, the higher its trajectory with respect to the pipe's lower wall.

Useful component's ρ_1 density solid-phase particles get into the receiving tank through the output slit (marked by a dot line in Fig. 4) in the inner side wall of the pulp pipe's curved segment.

Description of the Unit

The proposed method is embodied in a vortex turbulence concentrator having a pulp pressurizer-connected inlet pipe that feeds pulp into the pipe's curved segment that is in communication with a receiving tank for useful component's solid-phase particles of specified density separated from pulp (Gorodnov, V., and ets., 2015).

The unit's distinctive feature is that pulp is fed into a curved segment of the pipe. In the pulp pipe's curved segment, due to secondary flow acting upon the pulp's linear movement changing the trajectories of the moving bed's solid-phase particles, these particles, depending on their density, move in a specific way along the side wall of this pipeline segment's inside radius; the lower the density of a particle, the higher its trajectory with respect to the pipe's lower wall. The pipe's curved segment, through its outlet slit, is in communication with a receiving tank for useful component's solid-phase particles of specified density.

The design of the vortex turbulence concentrator and the principles of its operation are clarified in the following drawings:

Fig. 5 – general view of the vortex turbulence concentrator, Fig. 6 – a curved segment of the pipe,

The vortex turbulence concentrator has pressurizer 1 connected through inlet pipe 2 with the pulp pipe's curved segment 3, connected through output slit with sealed receiving tank 4 equipped with industrial water inlet pipe with tap and tap for air release.

The vortex turbulence concentrator operates in the following way:

Pulp 7, through pipe 6, is fed into pressurizer 1 that creates, within inlet pipe 2, the flow of pulp moving at a speed higher than critical velocity for hydrotransport. From inlet pipe 2, the pulp (moving bed) enters the pipe's curved segment 3 where, due to secondary flow, useful component's solid-phase particles change their trajectories and become separated according to density, then solid-phase particles of specified density move, through output slit), into sealed receiving tank 4. Stop valves 5 and 8 allow for the emptying of the receiving tank from useful component while the vortex turbulence concentrator keeps operating without stopping.

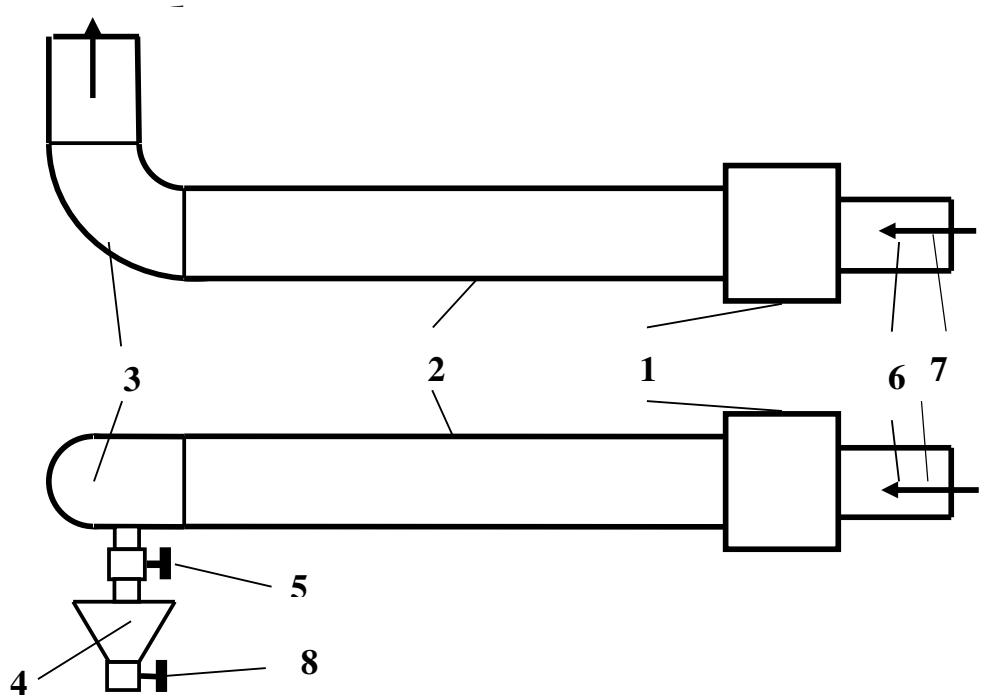

Fig. 5: General view of the vortex turbulence concentrator

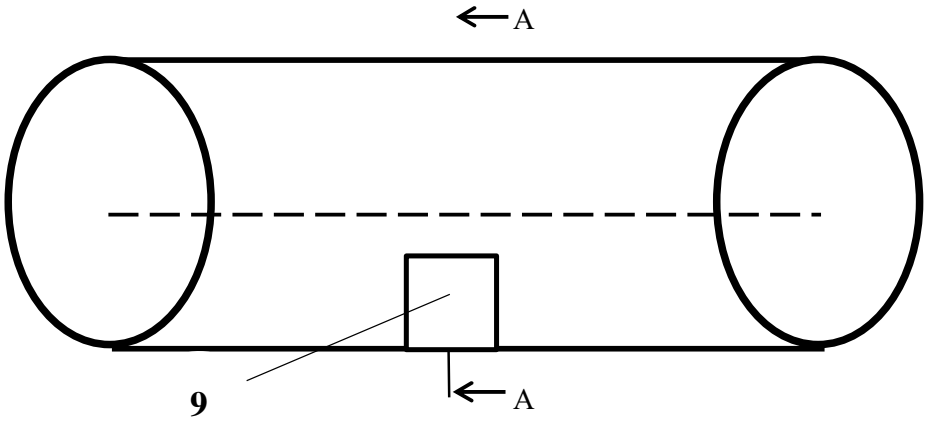

Fig. 6: Curved segment of the pipe

When the pulp flows through the pipe's curved segment 3, with stop valve 5 being open and stop valve 8 and taps and closed, useful component moves, through output slit, into receiving tank 4. Receiving tank 4 is prefilled with water.

The release of useful component from the receiving tank is performed with closed stop valve 5 and open stop valve 8. The release process does not require stopping the operation of the vortex turbulence concentrator.

After receiving tank is emptied, stop valve is closed, while taps and are opened to let water into the receiving tank; when water starts coming through tap, taps are closed. Receiving tank 4 is filled with water and ready to receive useful component. There are no stringent requirements for the purity of water to fill the receiving tank.

Conclusions

The analysis of the experience around the world shows that the problem of making the economy of a country or an industry more efficient is becoming even more exigent in the context of mineral-wealth depletion, the greenhouse effect and humanity's evergrowing need in energy supply. The expert community sees the integration of digital economy and information technology in the framework of the implementation of Smart City concept as one of the most exigent objectives for the Russian Federation among other countries.

The issue of processing and utilization of Russian industries' technology-related waste is not just that of environmental protection. The formation of this kind of waste is also indicative of inefficient use of natural resources being on the verge of exhaustion. In this respect, the problem of technology-related waste utilization is an important ecological-and-economic objective.

A set of innovative measures and actions proposed in the article makes it possible to reduce negative ecological impact with the use of new technologies and alternative methods. Its author's method allows to address the pressing issue of CHP-plants' waste dumps processing using a wasteless method.

The unit described in the article belongs to the group of inventions in the field of ore pulp minerals separation; it can be used to process and separate mineral raw materials containing nonferrous, rare and noble metals, non-metal materials, to purify effluent water from solid components, other heavy pollutants and oil. The mentioned designer technologies allow to efficiently extract aluminum oxide,

ferrous oxides, and unburned carbon. This has led to the ecological-and-economic effect through the realization of additional marketable products and reducing costs for solid waste placement.

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The Influence of Love of Money, Religiosity, and Pay Satisfaction on Ethical Behavior

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Abstract

Ethical behavior has been an important subject for business and has been studied in various fields. Due to the fact that banking sectors has recorded a high number of fraud makes studying ethical behavior is more important in this sector. This study aims to analyze the influence of love of money, religiosity, and pay satisfaction on ethical behavior. The study involved surveys to 300 Muslim employee respondents worked at banking sectors in Indonesia. Structural equation model (SEM) using LISREL 8.8 was used to analyze the data. This study found that love of money negatively influenced ethical behavior, while religiosity positively influenced ethical behavior. However, in this study it was discovered that pay satisfaction had no influence on ethical behavior.

Keywords: Love of money, religiosity, pay satisfaction, ethical behavior

Introduction

Ethical behavior has been discussed in various fields, for example in discussions on white-collar employees in Hong Kong (Tang & Chiu, 2003), marketing managers (Singhapakdi, Vitell, Lee, Nisius, & Yu, 2013), business and psychology students (Tang & Chen, 2008), and other fields. However, there is still very little research that examines the factors that influence ethical behavior in banking. In fact, the banking industry is the sector with the highest level of fraud in the world when compared to 22 other industry categories according to a study conducted by the Association of Certified Fraud Examiners in 2014, 2016, and 2018. As it occurs in other countries, the phenomenon of unethical behavior also occurs in banks in Indonesia. According to a press release from the Financial Services Authority (OJK) in November 2016, it was discovered that banking crimes in 2014 until the third quarter of 2016 reached 108 cases, which occurred in all types of banks, both conventional banking and Islamic banking. The press release also explained that based on the statistics of the banking crimes handled by the OJK, the types of banking criminal cases that occurred from 2014 to the third quarter of 2016 were credit cases (55%), engineering records (21%), fund embezzlement (15%), fund transfers (5%), and asset procurement (4%) (Financial Services Authority, 2016).

This needs to be a concern, because banking plays a large role for the community. Banking responsibility is not only to customers, but also to the government, shareholders, employees, and the community (Green, 1989). With the increasing number of unethical behaviors in the banking environment, the impact will be even greater. Unethical behaviors by employees can have material or non-material impacts detrimental to the company. Material impacts can be in the form of financial losses, while non-material impacts can, among others, include the damage to the company's reputation, the relationships with consumers and other stakeholders, and the company's sustainability (Singh & Twalo, 2015).

Based on these major impacts, the researchers tried to examine the root causes of ethical behavior in banking. Several previous studies which tried to examine ethical behavior from various fields found that love of money (Singhapakdi et al., 2013; Tang & Chen, 2008; Tang & Chiu, 2003), religiosity (de Soto, Tajalli, Pino, & Smith, 2018; Giorgi & Marsh, 1990; Singhapakdi et al., 2013), and pay satisfaction (Greenberg, 1993; Tang & Chiu, 2003) are factors that influence ethical behavior. To explain the variable of religiosity, the researchers do not use measures of religiosity in general, but focusing on just one religion (i.e. Islamic religiosity) because each religion must have teachings and commands that are not completely the same. Also, Indonesia's population was dominated by Muslims, around 87.18% of the total population according to the 2010 population census data conducted by the Central Statistics Agency. Therefore, focusing the study on Muslim employees seemed relevant to examine whether religiosity brought impact to their ethical behavior. The purpose of this research is to examine the influence of love of money, religiosity, and pay satisfaction towards ethical behavior of Muslim employees in the banking industry in Indonesia.

Literature Review

The Relationship between Love of Money and Ethical Behavior

The relationship between love of money and ethical behavior has been demonstrated by numerous previous research conducted across industries and countries. Tang and Chiu (2003) found that the root cause of unethical behavior that occurs in employees in Hong Kong is the employees' love of money. Tang and Chen (2008) also found that love of money has influences the unethical behavior of business school students. Singhapakdi, Vitell, Lee, Nisius, and Yu (2013) also conducted the same research on different subjects, namely the marketing department manager and found that when the level of love of money the marketing manager was high, the manager tended to behave unethically and have unethical intention. These studies indicate that love of money has a negative influence on ethical behavior, meaning that when someone has a high level of love of money, then that person tends to be less ethical in his behavior, and vice versa. Based on these arguments, we propose the following:

Hypothesis 1*: "Love of money has a negative influence on the ethical behavior of Muslim employees in the banking sector"*

The Relationship between Religiosity and Ethical Behavior

There are a number from previous studies showing the relationship between religiosity and ethical behavior. According to Giorgi and Marsh (1990) a person's level of religiosity has a positive influence on one's ethics at work. Weaver and Agle (2002) claims that each role of religiosity is expected to have a role in one or more ethical processes, ranging from the awareness towards ethics, judgment, intention, to ethical behavior. Singhapakdi et al. (2013) also found that religiosity has a positive influence on the ethical intentions of marketing managers. In addition, in de Soto, Tajalli, Pino, and Smith (2018), it was discovered that someone with a high level of religiosity would tend to have a higher level of ethical behavior.

In addition to these studies, in Islamic teachings, the relationship between religiosity and ethical behavior of a person has also been explained in the Koran in the 29th surah verse 45 and from the hadith quotation in Shahih al-Bukhori number 32. The 29th surah verse 45 is as follows: "Read what has been revealed to you, namely the Holy Book (Al-Qur'an) and establish prayer! In fact, the prayer prevents cruel and unjust (acts). And indeed remembrance of Allah is greater (superiority than other worship services). And Allah knows what you are doing. "In addition, there are also traditions that show the relationship of religiosity with ethical behavior in the form of maintaining trust, namely; "From Abu Hurairah from the Prophet *sallallaahu 'alaihi wa sallam*, he said," There are three hypocritical signs: if you speak a lie, if you deny a promise, and if betraying the mandate given."" (Shahih al-Bukhari no.32 quoted from Ath-Thaybi, 2011). Based on the verse in the Koran and the hadith quotation, Muslims are instructed to worship so that they can avoid bad deeds, and illustrates the negative relationship between religiosity and unethical behavior, which means the higher one's

religiosity, the more likely it is for that person to avoid unethical behavior, and vice versa. Based on these arguments, we propose the following:

***Hypothesis 2**: "Religiosity has a positive influence on the ethical behavior of Muslim employees in the banking sector."*

The Relationship between Pay Satisfaction and Ethical Behavior

The relationship between pay satisfaction and ethical behavior has been demonstrated by numerous studies conducted across industries and countries. According to Hollinger and Clark (1983) cited in Greenberg (1993) one form of reaction from low salaries and salary inequality can lead to deviant behavior such as vandalism and theft (Greenberg, 1993, p.82). Greenberg (1993) also said that it is very reasonable that dissatisfaction with salary can directly make someone take actions that are not in accordance with the applicable ethics. A few years later, Tang and Chiu (2003) later found that employees with high levels of pay satisfaction tended not to engage in vile and unethical behavior in organizations. These findings indicate that pay satisfaction has a positive influence on ethical behavior, which means that when the pay satisfaction of an employee rises, the employee will tend to behave more in accordance with ethics. Based on these arguments, we propose the following:

***Hypothesis 3**: "Satisfaction of salaries has a positive influence on ethical behavior in Muslim employees in the banking sector".*

Method

In this research, three main independent variables were used to measure ethical behavior, namely love of money, religiosity and pay satisfaction. Figure 1 draws the model used in this research.

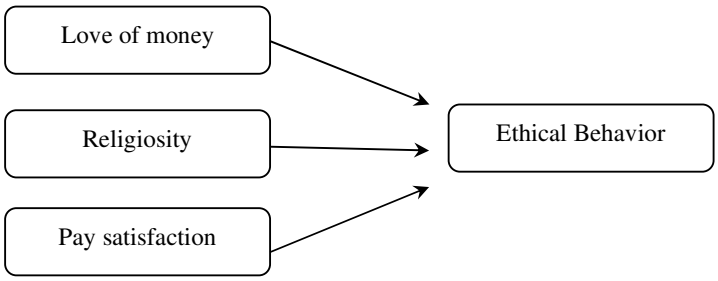

Figure 1: Conceptual model of this research

In a previous study conducted by Tang and Chiu (2003), it was learned that love of money had a positive influence on unethical behavior, while pay satisfaction had a negative effect on unethical behavior. In this study, religiosity was also used in explaining ethical behavior. Studies have found that religiosity was a factor that influenced ethical intention (e.g. Sinhapakdi et al, 2013)

Sample and procedure

In this research, the data were collected with purposive sampling method, from Muslim employees in banking sector. The survey was administered through papers and online questionnaire from February to March 2019. In total, 300 questionnaires were collected from Muslim employees in banking sector.

Survey Instrument

The survey instrument consisted of six parts: (1) screening questions; (2) love of money questionnaire; (3) religiosity questionnaire; (4) pay satisfaction questionnaire; (5) ethical behavior questionnaire; and (6) demographic information. All items for love of money, religiosity, pay satisfaction, and ethical

behavior were rated on seven-point Likert scales ranging from '1 = strongly disagree' to '7 = strongly agree'. Love of money was measured using the scale developed by Tang and Chiu (2003), religiosity was measured using the scale developed by Alam, Mohd, and Hisham (2011) and Khraim (2010) which specifically based on Islamic teaching, pay satisfaction was measured using the scale developed by Heneman and Schwab (1985), and ethical behavior was measured using the scale used by Fraedrich (1993).

Results

The respondents were dominated by women (53.67%), while the rest were men (46.33%). This study was dominated by respondents in the 26-35-year-old age group (67%), while the age group with the least percentage was the age group of 56 years old (0.67%). The majority of respondents are S1 graduates (80%). The percentage of respondents working in conventional banks and Islamic banks is the same, which is 50%, with the percentage of working time in the same bank that is mostly for 3-7 years (62.67%) and is dominated by employees who have never changed jobs before (40%). The most dominant respondent's income is in the salary range of IDR. 5,000,001 to IDR. 10,000,000 (40%).

Step 1: Confirmatory Factor Analysis of All Measures

Step 1: Confirmatory Factor Analysis of All Measures

Confirmatory factor analysis was used to evaluate the relationship between variable indicators and their constructs (Hair, Black, Babin, & Anderson, 2014). Table 1 explains the results of the confirmatory factor analysis test, which consists of a reliability test, a validity test, and a model compatibility test. Of the 47 statement indicators, there were 2 indicators (LOM14 and PE1) which were not valid because the SLF is less than 0.50 (Igrabia et al., 1998 in Wijanto, 2008) although the t-value is greater than 1.65 (Rigdon & Ferguson, 1991 in Wijanto, 2008). These two indicators were then removed from the model. In addition, the LOM and R variables have extracted variance (VE) values under the provisions based on Hair et al. (2014), which is 0.5. However, based on the criteria of Fornell and Larcker (1981), this condition was allowed, because the value of construct reliability (CR) on the LOM and R variables showed results above 0.6. Thus, all variables can be said to be reliable.

Table 1: Confirmatory factor analysis result

Variables' Indicator	T-value ≥1,65	SLF≥0,5	Error	CR≥0,7	VE≥ 50%	Conclusion
Love of Money (LOM)				0,93	46%	Reliable**
LOM1	10,54	0,58	0,66			Valid
LOM2	10,59	0,59	0,66			Valid
LOM3	6,96	0,41	0,83			Valid
LOM4	9,15	0,52	0,73			Valid
LOM5	11,10	0,61	0,63			Valid
LOM6	15,65	0,79	0,37			Valid
LOM7	15,45	0,79	0,38			Valid
LOM8	14,56	0,76	0,43			Valid
LOM9	12,08	0,66	0,57			Valid
LOM10	16,28	0,82	0,33			Valid
LOM11	16,35	0,82	0,32			Valid
LOM12	16,11	0,81	0,34			Valid
LOM13	16,13	0,81	0,34			Valid
LOM14	8,57	**0,49**	0,76			**Not Valid**

Variables' Indicator	T-value ≥1,65	SLF≥0,5	Error	CR≥0,7	VE≥ 50%	Conclusion
LOM15	11,29	0,62	0,62			Valid
LOM16	10,35	0,58	0,67			Valid
LOM17	13,45	0,71	0,50			Valid
Religiosity (R)				0,87	42%	Reliabel**
R1	14,06	0,76	0,42			Valid
R2	9,85	0,55	0,70			Valid
R3	8,89	0,50	0,75			Valid
R4	11,83	0,64	0,60			Valid
R5	15,04	0,76	0,41			Valid
R6	12,05	0,67	0,55			Valid
R7	11,05	0,60	0,64			Valid
R8	13,10	0,71	0,49			Valid
R9	10,80	0,62	0,61			Valid
Pay Satisfaction (PS)				0,96	62%	Reliabel
PS1	16,96	0,81	0,34			Valid
PS2	16,56	0,80	0,36			Valid
PS3	16,87	0,81	0,34			Valid
PS4	16,81	0,87	0,24			Valid
PS5	18,39	0,86	0,26			Valid
PS6	19,80	0,90	0,20			Valid
PS7	14,68	0,74	0,45			Valid
PS8	17,95	0,85	0,28			Valid
PS9	18,57	0,86	0,25			Valid
PS10	15,55	0,77	0,41			Valid
PS11	11,45	0,61	0,63			Valid
PS12	12,47	0,65	0,57			Valid
PS13	14,15	0,72	0,48			Valid
PS14	14,20	0,72	0,48			Valid
PS15	15,58	0,77	0,41			Valid
Ethical Behavior (EB)				0,88	58%	Reliabel
EB1	5,07	**0,29**	0,92			**Not Valid**
EB2	11,02	0,59	0,65			Valid
EB3	15,54	0,77	0,41			Valid
EB4	20,41	0,94	0,12			Valid
EB5	18,39	0,87	0,25			Valid
EB6	18,74	0,89	0,20			Valid
Good fit criterion : GFI = 0,59 ; RMR = 0,14; SRMR = 0,074; RMSEA = 0,11 ; NNFI = 0,88 ; NFI = 0,86 ; AGFI = 0,55; RFI = 0,85 ; IFI = 0,89; CFI = 0,89						
** Reliable based on Fornell and Larcker (1981)						

Step 2: Testing the Model using SEM

Structural model analysis is used to explain the relationships that exist between latent variables (Wijanto, 2008). In general, structural model fit test consists of two stages, namely structural model fit test and causal relationship analysis.

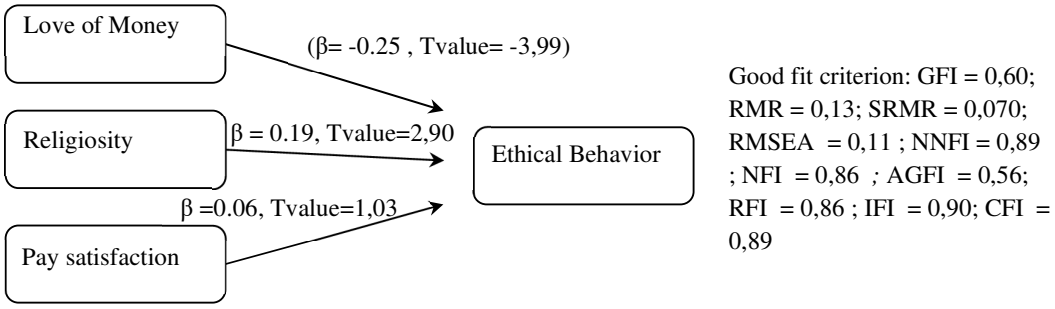

Figure 2: Structural model result

Figure 2 illustrates the t-value and structural model coefficient values, indicated by the left figure which is the t-value while the right handwritten number is the coefficient. Based on Figure 2, it is known that love of money (-3.99) and religiosity (2.90) significantly influenced ethical behavior because its t-value is $\leq$1.645 or $\geq$1.645, while pay satisfaction (1.03) did not significantly influence ethical behavior because the t-value did not meet the specified criteria. Love of money negatively affected ethical behavior, meaning that when the level of love of money of Muslim employees in the banking sector increased, the tendency for ethical behavior would decrease. On the other hand, religiosity positively influenced ethical behavior, meaning that when the level of religiosity increased, the tendency for ethical behavior would increased.

One interesting aspect that needs attention is the comparison of the magnitude of the significant coefficients of the variables that significantly influence ethical behavior which were love of money and religiosity. The coefficient of love of money (0.25) on ethical behavior is greater than the coefficient of religiosity (0.19) on ethical behavior, indicating that love of money had a greater role in influencing one's tendency to behave according to ethics than with religiosity.

Discussion

Love of money significantly influenced ethical behavior negatively. A high level of love of money would reduce the tendency to behave ethically. The results of this study was in accordance with Tang and Chiu (2003) who examined the effect of love of money on unethical behavior among employees in Hong Kong and Singhapakdi et al. (2013) who examined the influence of love of money on the intentions of ethical behavior in marketing managers. The results of this study were also similar to the results of previous studies conducted by Tang and Chen (2008) on business school students, who indicated that love of money had an influence on unethical behavior.

Religiosity had a significant and positive effect to Muslim employees in the banking sector. The results of this study was in line with one of the commands in the Koran *surah* (i.e. chapter) 29 *verse* 45, which contains instructions for Muslims to worship so that they can avoid themselves from bad deeds, which at the same time illustrates the positive relationship between religiosity and ethical behavior. The results of this study was similar to Singhapakdi et al. (2013) who found that intrinsic religiosity influenced the ethical intentions of marketing managers. In addition, the result of this study was similar to de Soto et Satisfaction of salary did not have a significant effect on ethical behavior, thus H3 is rejected. The result of this study was different from Tang and Chiu's study (2003) on white-collar employees in Hong Kong, which found that someone with a low level of pay satisfaction would tend to behave ethically or in other words pay satisfaction had a negative effect on ethical behavior. However, in research conducted by Vitell and Davis (1990) on professional information management systems, it was found that there was no relationship between pay satisfaction and ethical considerations.

Conclusion

Love of money and religiosity significantly influenced ethical behavior, while pay satisfaction is found to not influence ethical behavior. Love of money negatively influenced ethical behavior, meaning that when the level of love of money of Muslim employees in the banking sector increases, the tendency for ethical behavior would decrease. On the other hand, religiosity positively influenced ethical behavior, meaning that when the level of religiosity increased, the tendency for ethical behavior would increase. In this study sample, it is found that the contribution of love of money to ethical behavior is greater than religiosity.

Limitations and Suggestion for Future study

In this study, research respondents were limited to Muslim employees. Future studies can expand the scope of research subjects without restrictions on certain religions. For this reason, the religiosity variable used must be more general that can be used by all religions. In addition, another limitation is that the indicators of ethical behavior used in this study were consisted of general questions and not specifically for a study in banking sectors. In the future, researchers could develop specific measurements of ethical behavior that contained related aspects in the banking sectors. The measurement of ethical behavior also only reflects intentions, not actual behavior. This is because no individual would publicly indulge in unethical behavior that they do. Future study could use an experiment method using some scenarios or involve an in depth interview to capture specific unethical behavior and the reasons why an employee do such behavior.

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Are Romanian Schools Learning Organizations?

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Abstract

Following the model of school as leaning organization (SLO) proposed by Kools & Stoll and OECD – UNICEF, the paper explores and debates the extent to which the key features of learning organizations already exist at the Romanian pre-university education level. Theoretical researches showed that at schools' level there is a need for their re-conceptualization using the SLO model. The characterization of the SLO model dimensions for the case of Romanian schools was developed based on the identified national performance indicators and descriptors that have being correlated with dimensions and key characteristics of the considered SLO model. In this context, the presented approach based on a sample of 238 urban and rural schools highlights that the minimum levels of incidence of several key-characteristics of SLO's varying between 30.67% and 73.10%. Means that, without explicitly and intentionally introducing the SLO model, certain key-characteristics specific to it are identifiable at schools level.

Keywords: Pre-University Education, School, Learning Organization (LO), External - Internal Evaluation.

Introduction

In the early 1990s, there have been developed models to explain and support continuous learning (the continuous development of skills required in the labor market), among which the "learning organization" (LO). The concept has been widely recognized due to the reference work of Senge (1990). Recently, the concept has been strongly debated and it becomes more actual due to the last synthesis published by Baldwin (2016), Gould (2016) and Örtenblad (2018, 2019) that underlined the strong relation between learning organization and organizational learning, being agreed that the core value is human capital. Furthermore, as highlighted Longworth (2019), the concept becomes more valuable in the actual increasing importance of continuous learning and vocational learning and, as highlighted Snihur (2018) and Chou and Ramser (2019), the concept becomes more powerful not from the theoretical perspective, but mostly from the practical perspective. Thus, the model of the LO has known many applications for business organizations (public or private), non-profit organizations (health care organizations, public administration institutions, public schools and universities, libraries).

In the case of schools as LO, the recent approach of Kools and Stoll (2017) proposes a model for re-conceptualizing them as learning organizations based on seven action-oriented "dimensions": (1) developing and sharing a vision centered on the learning of all students; (2) creating and sustaining lifelong learning opportunities for all staff; (3) promoting team learning and collaboration among all staff; (4) establishing a culture of research, innovation and exploration; (5) systems of incorporation for the collection and exchange of knowledge and learning; (6) learning with and from the external environment and with a higher learning system; (7) shaping and increasing learning leadership. Their approach was supplemented with key features for each of the seven directions of action, as described

in the OECD-UNICEF Guide (2016). Thus, the model of Schools as Learning Organizations (SLO) complemented by the provisions of the guide offers the possibility of carrying out evaluations (measurements) to characterize the dynamics of these organizations.

To understand the context of the present research, it is useful to look at some phenomena that have occurred in the last 10 years in the case of Romania pre-university education. In general, there was a decrease in the school population (by 17% until 2016, compared to 2006), the transfer of the last year of kindergarten to primary education (along with reshaping both their curriculum) and the gradual transformation of the arts and crafts schools into the technological high schools, followed in 2014, by a strong return to the professional schools. The school network has been massively reorganized (many public schools lose their decision-making and administrative independence, being transformed into structures of other schools and destroying or changing the organizational culture) and on the background of the international economic crisis of 2008 – 2015 there was a constant decrease of public spending on education (from 5.76% of total expenditures in 2009, to 3.76% of total expenditures in 2017). The dynamics of the educational environment was described by "A study of the evolution of educational efficiency: the Romanian case" which targeted a representative sample of 2956 schools. The study developed by Paraschiva, Farkas, Jitarel and Draghici (2018) highlighted, among other things, that for the period 2014-2017, 64.7% of the schools in Romania registered a negative trend of evolution of the efficiency index, 15.6% had a constant evolution and only 19.7% had positive evolutions of efficiency index.

Furthermore, because in the last 10 years pressures on pre-university education organizations have been increasingly high, especially for correlating the expected learning outcomes with explicit labor market demands and with requirements that the companies are constantly and rapidly changing, initially proposed models for SLO (focused on mutual learning and collaboration between teachers in the same school) were expanded, including networking and collaboration across school boundaries, as well as the orientation towards strategic leadership as a condition for creating an organizational culture of learning and to encourage LO.

Therefore, finding solutions to help increase the efficiency of school organizations is more than needed at Romanian national level and we considered that the approach of SLO at the educational system is appropriate and represents a feasible solution. In the view of the SLO model proposed by Kools & Stoll (2017), this article presents the results of an experimental research developed on a sample of 238 rural and urban schools, in order to characterize these organizations as SLO. Some key features specific to the model will be highlighted as they are identified through the research carried out. Thus, the research demonstrates that the theoretical level on the SLO model is exceeded and establishes the existence of reliable starting points for its implementation in the case of the Romanian schools.

A Literature Review on Schools as Learning Organizations

Schools as Learning Organizations

Although the concept of the "learning organization" has been introduced by Bob Garratt since 1987 when he published the work "The Learning Organization and the Need for Directors Who Think", it is unanimously accepted that the concept (and model) gained widespread recognition in 1990 when Peter M. Senge published the work "The Fifth Discipline: The Art and Practice of the Learning Organization". Since the moment of widespread recognition, the evolution of the concept and model over the course of almost three decades undergoes developments, either in the direction of learning at all levels (individual, team, organizational), as suggested by Marsick and Watkins (2003), or in the direction of management practices and organizational policies in defining the learning strategy, such as those proposed by Goh (1998) and by Garvin, Edmondson and Gino (2008).

In Figure 1 there are presented the advantages for the implementation of LO concept and/or model, according to Sarder (2016, p. 10), together with relevant conclusions on causes of the modest progresses on implementation, considering both the theoretical and practical perspective.

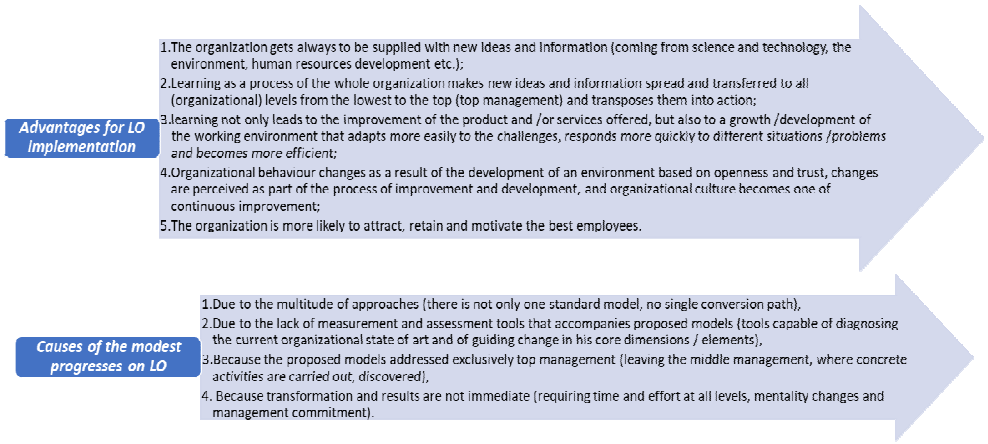

Fig. 1: Internet Usage & E-government access

However, in a society quite different from the one in which the initial concept was generated, is it still relevant and has a possible future? The current relevance of the concept, the level of interest and the need for its implementation are analyzed and discussed by Hoe (2019). Analyzing the views on the usefulness of the concept today, from critics' side and supporters' side, it is concluded that both categories recognize its relevance for improving organizational performance, organizational culture and innovation capacity, but enlargements/ developments/ improvements are necessary. The current level of interest identified remains strong in Europe, Asia and the Middle East, but is declining in North America, with a focus on medical and educational organizations (focus explained as being generated by the specific nature of these organizations, which requires individuals and groups to work together in a complex ecosystem, with a large number of stakeholders and for which profit is not the only indicator of success).

The researches and debates on SLO model have been of high intensity in the last 5 years, due to general concern on increasing the learning process efficiency and effectiveness; as could be seen to Baráth (2015), Wang (2016), Ertürk and Nartgün (2019) and Field (2019), the approaches have been related to educational organizations in order to generate continuous improvements of the teaching staff and to perform better schools' leadership; or, the approaches focused on educational effectiveness and improvement as presented by Chapman et al. (2015). Also, when reviewing the LO literature, whether in a school context or not, in many studies there have been recognized the importance of having a shared vision to shape the organization and give it a sense of direction; in this respect, we find useful for the present research on SLO the views of Senge et al. (2012).

Much more, from Kools and Stoll (2017) perspective, a focus on schools in general and on classroom management, in particular, could lead on increasing attendance and enhancing the learning of all students. That is way, they designed and integrated a SLO model based on the LO literature, but also from other fields of sciences like organizational behavior, knowledge management, learning sciences, school improvement and effectiveness, and professional learning literatures. Thus, a knowledge gap has been fulfilled towards a general understanding of the SLO by all actors (stakeholders) involved (e.g., education practitioners, school leaders, policy makers, parents etc.). The SLO integrated model proposed by Kools and Stoll (2017) defines a school as a LO in which the collective effort is focused on main dimensions as: the developing and sharing a vision centered on the learning of all students; the creation and sustaining lifelong learning opportunities for all staff; promoting team learning and collaboration among all staff; creating a culture of research, innovation and exploration; becoming a

system of incorporation for the collection and exchange of knowledge and learning; learning with and from the external environment and with a higher learning system; modeling and increasing learning leadership. Thus, a SLO will have the capacity to change and adapt continuously to the new generations of students and to the new demands of the external environment.

Details on Romanian Context of Appling SLO

In Romania, the debate on LO approaches have few applications that exceed the theoretical level, using a specific assessment methodology and measurement tools in order to determine incidence of certain key-characteristics, but none of them directed towards schools in pre-university level, but none of them have debate the state or the developments for schools in pre-university education level. Some relevant contributions to the Romanian are presented in the following.

An exploratory study developed by Giura (2012) on 26 County Councils (out of 41) for diagnosing the current state of art in relation to a LO, using the model and instrument proposed by Garvin, Edmondson and Gino (2008). According to the research results, the studied organizations are LO only in terms of leadership that encourages learning (for "learning environment" and "learning processes", the findings revealed that the County Councils act like learning organizations in a very small degree). Another study, developed by Bordeianu, Hapenciuc, Bejinaru, and Burciu (2014) was referred to business organizations. This was a survey on 20 large pharmaceutical companies controlling about 80% of the Romanian sales market and six small and medium size pharmaceutical enterprises (SMEs), over the elements (dimensions) that define a LO, using Senge's (2009) model and the instrument developed and improved by Marsick and Watkins (2003). The study results underlined that large companies achieved higher scores on most LO dimensions ("systems thinking", "shared vision", "organizational culture and learning environment" and "knowledge transfer") while some dimensions (such as "teamwork and collaboration" and "leadership and employee empowerment") have slightly higher scores in case of SMEs.

In case of applying the SLO model proposed by Kools & Stoll (2017) for Romania it was considered this an opportunity to put more emphasis on students and completing the national project CRED ("Relevant curriculum, open education for all" funded by the European Structural Funds to support the current school curricula reform). In addition, as Paraschiva, Draghici and Mihaila (2019) showed in their research, the application of the SLO model could be based on the existing database of national indicators and descriptors used to evaluate the schools' performance which have been identified as being correlated with the key dimensions and characteristics provided by the OECD - the UNICEF guide (2016). It should be noted that the 43 national performance indicators (including descriptors) for quality assessment and quality assurance in pre-university education are provided in the Romanian Government Decision no. 1534 (2008) and are used for both types of assessments, external and internal (self-evaluation).

Research Methodology

The Data Collection and the Research Sample

The data collection process relies in 238 public reports from the first semester of the 2018-2019 school year regarding the level of educational services provided and they could be analyzed at http://beta.aracip.eu/ , on section devoted to schools. The distribution of these 238 schools by type of services provided (post-secondary schools - 1, colleges and high schools -54, gymnasium schools - 139, primary schools - 2, kindergartens -30, school sports clubs -3, clubs for children -5 and education centers – 4) and by residence area (124 organizations being from the urban area and 114 organizations being from rural area) do not reflect the situation at national level, their list being generated by the County Schools Inspectorates (due to the fact that they never went through a regular external evaluation process).

The Measurement Process

Both types of assessments (external and internal) are carried out on the same descriptors and indicators and on the same five-steps orderly quality scale, in order to process the data being realized their equivalence on a quantitative scale, with points: 0-Unsatisfactory (means that the minimum/ basic requirements are not met), 1-Satisfactory (means that the minimum/ basic requirements are met), 2-Good (means that at least one performance descriptor is reached), 3-Very Good (means that all performance descriptors are reached), 4-Excellent (means that the organization has proven to achieve all performance descriptors and in addition has developed its own descriptors, in line with the context in which it operates and the specificity of its educational services, own descriptors which are shown to have been achieved).

For the first level of the analysis, they were determined for ten performance indicators developed at national level the following: (1) the average external assessment scores (as a simple arithmetic mean of the results obtained by the 238 schools in the external evaluation), (2) the average internal assessment scores (as a simple arithmetic mean of the results provided by the 238 schools in the external evaluation) and (3) the average score's differences between internal and external prospects, to see to what extent these two are close for the ten targeted performance indicators; positive values mean that the result of self-evaluation is higher than the external evaluation (so school organizations have been overrated) and negative values mean that the result of self-evaluation is lower than that of external evaluation (so school organizations have been underestimated).

In the second level of the analysis, were introduced: (1) the dispersion for each set of values (self-evaluation and external evaluation) and for each of performance indicators (as a synthetic indicator of variance, which provides information on the degree of scattering of the elements relative's to the average, considered as a central trend) and (2) the Z parameter test (two-tail) for comparing the averages of sample values (self-evaluation and external evaluation) per indicator. Therefore, parametric bilateral tests were performed to compare the means of the sample values (238 sample values for self-evaluation and 238 sample values for external evaluation), having as background: the hypothesis H0 (or the null hypothesis) - the values compared do not differ between them (in other words, the difference in the mean of the two sample values, internal and external evaluation, is not significantly different from zero); the H1 hypothesis (or the alternative hypothesis) - the values compared differ between them (in other words, the difference in the mean of the two sample values, internal and external evaluation, is significantly different from zero). In this way the reconciliation between the two evaluation processes (internal and external) can be considered and the results of the previous level of analysis can be validated.

The Research Results

Considering the previous quantitative scale (with points), were obtained average scores per indicator with values between 2 and 3 (Table 1 presents the results of the first level of the analysis) and a general over-valuation tendency on the part of school organizations (for a single descriptor the two perspectives - external and internal - are identical). The average scores show that the performance is situated between "good" and "very good".

Table 1: First level of the analysis - research results

Performance indicators	Average assessment score		
	external	internal	internal - external
I01 - The existence, the structure and the content of the projective documents (development plan and implementation plan)	2.550	2.689	+0.138655
I03 - The existence and functioning of the internal and external communication system	2.706	2.706	0.000000

I28 - Evaluation of pupils' school results	2.517	2.676	+0.159664
I30 - Scientific activity of teachers	2.340	2.361	+0.021008
I31 - Methodological activity of teachers	2.752	2.727	-0.025210
I32 - Setting up the school budget	2.677	2.727	+0.050420
I34 - Existence and implementation of institutional self-evaluation procedures	2.475	2.500	+0.025210
I36 - Professional development of staff	2.630	2.656	+0.025210
I37 - Revision of the educational offer and of the development plan	2.525	2.630	+0.105042
I39 - Teaching staff evaluation	2.689	2.710	+0.021008

Therefore, a second level of analysis is mandatory and the results of the bilateral parametric tests outlined in Table 2 led to the identification of two indicators for which the values of the parameters belong to the critical region (therefore, in their case, the null hypothesis is rejected), there being a significant difference between the average of the evaluation internal results and the average of the external evaluation results. These differences were expected, and they reflect a national reality.

Table 2: Second level of the analysis - research results

Performance indicators	Dispersion value		Z Test value
	external	internal	
I01 -The existence, the structure and the content of the projective documents (development plan and implementation plan)	0.390	0.281	-2.60
I28 - Evaluation of pupils' school results	0.309	0.295	-3.16
I30 - Scientific activity of teachers	0.577	0.449	-0.32
I31 - Methodological activity of teachers	0.271	0.257	0.53
I32 - Setting up the school budget	0.311	0.308	-0.99
I34 - Existence and implementation of institutional self-evaluation procedures	0.375	0.351	-0.45
I36 - Professional development of staff	0.300	0.276	-0.51
I37 - Revision of the educational offer and of the development plan	0.392	0.309	-1.93
I39 - Teaching staff evaluation	0.307	0.248	-0.43

As can be seen in Table 2, for the indicator I01, the differences are determined by different perspectives regarding the projective documents: (a) the external assessment (objective) analyzes the degree to which a school organization's plan is original (non-duplicated), adapted to the context in which it operates, responding to real community needs and realistic (having associated measurable indicators); (b) the internal assessment (subjective) is particularly concerned by the existence of the document itself (respecting a certain format), although the content (targets, indicators etc.) are not always realistic and / or adapted to the context in which the organization operates or the community it serves. For the indicator I28, the differences are determined by different perspectives regarding focus of the teaching path (design, realization, evaluation) on the development of the practical - applicative side of the competences, on the students (as subject of the educational approach) and on the learning outcomes: (a) the external assessment (objective) analyzes insurance / failure to develop the practical-applicative side of the competences (starting from the design of the curriculum, continuing with its realization - the development of the didactic activities - and ending with the assessment of the learning outcomes) and the systematic application / non-application of student-centered teaching methodologies; (b) the internal assessment (subjective) is particularly concerned by the designing of the new curriculum without taking into account that the overpopulation of certain student groups (as a result of the constant decrease of public expenditure in education) and the absence of new teaching practices (correlated with the new curricula) has led to an insufficient development of the practical -

applicative side of competences, with effects on the participation rate and on the national exam results. Consequently, due to the significant differences identified, these two performance indicators and their tracked descriptors were further excluded from the analysis.

However, it must be considered that in national standards each performance indicator has several subsequent descriptors and only some of them were find (at a theoretical level) as being correlated with key- characteristics of SLO's organizations. Therefore, at this time, with this kind of data and this type of analysis only the minimum level of incidence of the tracked issues can be determined, by calculating the percentage of schools that have met all the requirements (all descriptors), including those that are correlated with key characteristics of SLO's organizations. Table 3 presents for each performance indicator, the number of issues tracked by this research (out of the total number of issues tracked by the national standards) and the number of schools that have fulfilled all the descriptors in national standards. In this way, at sample level, the minimum levels of incidence of several key-characteristics of SLO's were determined, these varying between 30.67% and 73.10% as can be seen in Table 4.

Table 3: Number of issues tracked (out of the total number of issues tracked by the national standards) and number of schools that have fulfilled all the descriptors in national standards

Performance indicators	No. of tracked issues out of the total no. of descriptors in national standards	No. of schools that have fulfilled all the descriptors in national standards (percentage)
I03 - The existence and functioning of the internal and external communication system	1, out of 2	171 (71.84%)
I30 - Scientific activity of teachers	2, out of 2	110 (46.21%)
I31 - Methodological activity of teachers	2, out of 2	174 (73.10%)
I32 - Setting up the school budget	1, out of 2	171 (71.84%)
I34 - Existence and implementation of institutional self-evaluation procedures	2, out of 8	123 (51.68%)
I36 - Professional development of staff	3, out of 4	158 (66.38%)
I37 - Revision of the educational offer and of the development plan	2, out of 2	73 (30.67%)
I39 - Teaching staff evaluation	2, out of 4	171 (71.84%)

Table 4: The minimum levels of incidence of several key characteristics of Romanian SLO (a sample level analysis)

Key characteristics of 2nd dimension	Tracked issues (descriptors) in national standards and the minimum level of incidence
Professional learning connects work-based learning and external expertise	• Teachers participation in the scientific research activity carried out by the school or at local, regional, national or international level it has grown in number and percentage – 46.21% • Teachers participation in the methodological activities carried out at territorial level - with demonstration activities, presentations etc. - it has grown in number and percentage – 73.10% • The application in teaching activities of the participation's results in continuous training and professional development programs is systematically monitored – 66.38% • The application in teaching activities of the participation's results in methodological and scientific activities is systematically monitored – 66.38%
Professional learning is based on assessment and feedback	• Observing the current activity and the feedback received from the relevant beneficiaries are used for the review of the professional development plans -66.38% • The assessment of the teaching staff is based on feedback from relevant stakeholders and – 71.84% • The assessment of the teaching staff includes recommendations for further development – 71.84%
Key characteristics of 5th dimension	**Tracked issues (descriptors) in national standards and the minimum level of incidence**
The school development plan is evidence-informed, based on learning from self-assessment, and updated regularly	• The benchmarking is used to optimize the educational offer and the development plan – 30.67% • The staff and relevant stakeholders are involved in reviewing the educational offer and the development plan -30.67%
The school regularly evaluates its actions, amending and updating them as necessary	• The results of self-evaluation and external evaluation are used to plan, carry out and review the quality assurance and improvement activities and procedures – 51.68%
Key characteristics of 6th dimension	**Tracked issues (descriptors) in national standards and the minimum level of incidence**
The school is an open system, welcoming approaches for collaborations	• The school systematically communicates with parents and other stakeholders - 71.84%
The school collaborates with parents and the community	• The school ensures the involvement of community partners and relevant stakeholders in budget planning – 71.84% • The self-evaluation procedures are carried out with the participation of relevant stakeholders – 51.68%
Staff collaborate, learn and exchange knowledge with peers in other schools	• Teachers capitalize on teaching the results of the scientific research activity carried out at local, regional, national or international level – 46.21% • Teachers capitalize on teaching the results of the methodological activities carried out at local level -73.10%

Conclusions and Further Developments

This research provides a preliminary overview on the state of the Romanian educational system level from the perspective of the SLO model developed by Kools & Stoll (2017), together with the analysis of key – characteristics identified with the support of the OECD-UNICEF guide (2016).

From an experimental point of view, resulted that the minimum levels of incidence of several key characteristics of SLO could be identified, these varying between 30.67% and 73.10%, but only for three action-oriented dimensions – "creating and supporting continuous learning opportunities for all staff", "embedding systems for collecting and exchanging knowledge and learning" and "learning with and from the external environment and larger learning system". Means that, the organizational culture of schools in the considered sample develop an optimal climate only for cooperation and collaboration inside and outside their own boundaries and for supporting continuous learning opportunities for all staff. At this point, it cannot be determined whether these schools act fully or not as learning organizations, but the results highlight that in some respects they already develop key features of SLO; this exceeds the theoretical threshold and may be the foundation for a smooth implementation of the model at national level.

First of all, these results will be further used in order to deepen the analysis on technical and vocational education and training (TVET) schools, much more willing to collaborate and keen to learn and adapt, and therefore, more likely to develop elements specific to the concept of learning organizations. The minimum levels of incidence of several key-characteristics of SLO's at TVET schools will be determined and compared with those of general education schools.

Secondly, using Hofstede's cultural dimensions theory (2010) same issues will be followed, in order to correlate the national and organizational culture (defined through six dimensions - power distance, individualism/ collectivism, masculinity, uncertainty avoidance, long-term versus short-term orientation and indulgence versus restraint) and the learning organization characteristics.

The limitation of this paper is given by the fact that the data were collected from the external and internal evaluation of 238 schools (in order to determine the level of educational services offered), means not specifically devoted on identifying SLO characteristics. However, another in-depth analysis, staff dedicated and focused on all action-oriented "dimensions" is scheduled and will be provided in the next period.

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Penetration Strategies of Foreign Multinational Companies into the Russian Dairy Market

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Abstract

The article studies theory and practical implementation of strategies used by multinational companies (MNC) which invest in Russian milk processing sphere. Dairy business is socially important, and its development in Russia has good prospects. Per capita dairy under-consumption still persists in our country. Focus is made on conceptual comprehension of transnationalization process of economies with a developing market. The article has also studied the history of foreign direct investment in the country's dairy industry; penetration strategies used by PepsiCo and Danone companies; a framework of Russian business pre-market preparations; the changes in competitive environment of dairy industry, which is connected with MNC arrival. The research methodology is based on a synthesis of transnationalization theories and the practice of foreign companies' penetration into the economy of an emerging market country. The following methods were used: historical, comparative, statistical and content analysis. The academic novelty of the study is to identify the long-term effects of the penetration of MNC into the Russian dairy market. We made a conclusion about the realization of a glocalization paradigm and about the high effectiveness of marketing strategies, which are used by MNC on the Russian dairy market. Finally, their usage has led to the changes in effects of MNC presence: i.e., from national business supplement to its replacement. Anti-Russian sanctions, imposed in 2014, and ruble devaluation in general stimulate foreign industrial companies' localization on the territory of Russia.

Keywords: Transnationalization, Dairy Market, Multinational Companies, Implementation, International Trade

Introduction

For multinational companies (MNC) it's typical to expand their business through their industrial activity transferring in different countries. That is why, MNCs are the main actors of foreign direct investment (FDI). The most important reasons for capital transfer are: extending the life of a product, that was produced in a donor country (Vernon, 1979); economies achievement through the scale economies (Krugman, 1979); the wish to hand out the advantages which the company has to foreign markets; market control establishment in more than one country (Hymer, 1990); market risks decreasing through the commodity and geographical diversification; the search of costly effective geographical location and positive effects, caused by the innovations internationalization in one company frames; an establishment of controlled intra-corporate market, where transfer prices are used, intra-corporate loans and other tools, the price of which differs from external market level (Buckley and Casson, 2009) – internationalization concept. According to monopolistic advantages theory, all risks, that are caused by external investment, are compensated by the financial profitability.

According to Porter (Porter, 1987), the main determinants for the company competitive advantages achievement are: the corporate strategy, competitive structure and its level; industrial elements conditions (suggestion); demand conditions; the presence of accompanying and supporting industries (clusters); and also the state financial, fiscal, commercial, exchange-rate FDI-policies and unexpected

case factor. Geographically assembled companies' units "are looking for" the components of their competitive advantages in other countries (competitive advantages theory by M. Porter).

International trade geography is not identified by the institutional comparative advantage concept or the differences in supply of inputs, but the strategy is aimed at multinational corporations. "The new economic geography" (Krugman, 1991) and the global chains of added cost development take place (OECD, WTO, World Bank Group, 2014). Such aspects definitely decrease the national sovereignty of the recipient countries.

The main reasons for MNC involvement are: lack of internal investment in natural resources management and the maintaining of expanded reproduction; an access to the new techniques, technologies and knowledge, the transferring of which to the national industry stimulates the creation of the higher culture of production and the labor productivity, the new (for receptive countries) goods and branches, it stimulates employment, state taxes, export volumes and gold and currency incomes. In conditions of emerging economies such chain of positive consequences is only possible when the list of conditions is observed, where the most important one is the selective state FDI- policy (Ivanova, 2013).

The widespread forms of FDI advent are mergers and acquisitions (M&A - brownfield) and building from scratch (greenfield). M&A transactions are the way of unlimited company growth through integrations of different companies' capital (Ivanova, 2016). International M&A are a widespread MNC strategy, directed to increasing its market capitalization and total income. The cost for such strategy of investment realization is lower than the cost for realization of greenfield strategy. At the same time merging gives important industrial power (including infrastructure), and intangible assets (the brand of company), and the share on the market.

Since 1990s, the stimulation of the foreign direct investment flow (FDI) has become the global trend and the most important element of post-Soviet countries' policy. The core document in Russia that regulates foreign multinational companies' arrival is Federal law no. 160-FZ of July 9, 1999 on Foreign Investment in the Russian Federation (www.consultant.ru, 1999), that has been subject to certain amendments. According to this document, FDI is "direct foreign investment – acquisition by the investor of no less than 10 per cent of the share or shares (of deposit) in the registered (pooled) capital of a commercial organization, that was founded or is reestablished on the territory of the Russian Federation, having a business partnership or community format according to the Russian Federation civil law; investment of capital into major funds of foreign entity's affiliate, that has been founded on the territory of the Russian Federation; financial lease of equipment in the Russian Federation by a foreign investor as lessor, that was mentioned in chapters XVI and XVII of the unified Nomenclature of the foreign economic activities of the Customs Union within the EurAsEc (hereinafter referred to as "the Customs Union"), with the custom value of no less than 1 mln rubles" (Article 2).

The main FDI carriers are multinational companies (MNC). Active non-residents' arrival into "dairy" part of food industry was characterized by a number of features. Unlike foreign direct investment (FDI), that was made into the confectionery and brewery industries, the foreign "dairies" arrival occurred in the "greenfield" mode, i.e. as a rule, the new enterprises were constructed without investment or with fewer national capital. This is how the French multinational company Danone – Danone-Industries (Chekhov city, Moscow region, 2000) and Danone-Volga (Tolyatti city, Samara region, 1995) units appeared in the Russian dairy market, which have entered the dairy manufacturers top-group. In 2019 the company celebrated its 25th anniversary in Russia.

The history of global American company PepsiCo presence started in 1938, when Pepsi-Cola trade mark was registered. In 1974, the first franchising line of PepsiCo was opened (www.pepsico.ru, 2019).

The main aim of the article is to identify features of marketing strategies and positions of foreign MNC in the Russian dairy industry market, as a socially important part in the industrial society provision. The leading companies' strategies, the consequences and perspectives of their presence in the mentioned market are being analyzed for these purposes.

The research relevance is enhanced by the dairy under-consumption persisting among Russian inhabitants: 225.5 kg a year per person (2018), when the amount of 325 kg is recommended by the Russian Ministry of Health. Significant opportunities of dairy market expansion are limited by the raw milk level, the increasing dairy production cost and the decreasing real population income. In Russia, approximately 13% of population (19 mln inhabitants) have income lower than the cost of living.

Methodology

The author proceeded from the position that the logic of globalization of world economic relations leads to a gradual transition from a system of interconnected national economies to a system of interdependent cross-border business units and individuals, to a network economy. However, the peculiarity of the current situation is that large countries have their own concepts of national security and geopolitical interests.

The research methodology includes a synthesis of existing transnationalization theories. Despite a certain eclecticism of judgments, such a generalization allows us to understand the motivation and methods for achieving strategic competitive advantages at a global level.

The historical approach allowed us to trace the genesis of the arrival of Danone French company and PepsiCo American company on the Russian market.

The methods used comprised the study of changes in the competitive environment of the country receiving FDI, including the calculation of the shares of MNC unit products in the market of the recipient country. A content analysis of the media was conducted, in particular, magazines on business practices of transnational corporations, as well as corporate sites. The methods of comparative and statistical analysis are applied.

Results

M&A: Danone and UNIMILK

We can definitely say that Danone French global company is well-known all over the world. This is a global leader in yoghurt industry.

LLC UniMilk Company was established in 2002. It came from the food holding company, Management Planet, which was owned by Roman Abramovich. After the dairy holding's assets had been purchased by the company's management (MBO – management buy-out), UniMilk Company started to increase its presence on Russian and Ukrainian markets.

From 2002 to 2005, a dozen best enterprises of local level were combined into the "dairy" holding. The main goal is to achieve the logistical cover of the most populated regions in the country. In 2005 – 2007 the focus on brand portfolio optimization takes place as well as geographical presence expansion. In 2008, the main part of enterprises consolidated into the unified company, LLC UNIMILK, with its main owner being the Cyprus company UNIMILK HOLDINGS (CYPRUS) LIMITED - UNC). Establishment of this company in Cyprus makes it possible to minimize taxes and predicts undesirable company restructuring by the State and other third parties. In 2008, JSC UniMilk Company, which is the main structure of the eponymous holding company, increased the authorized capital by 47%, to complete the consolidation of its businesses and to raise funds for the promotion of brands. One of the purposes of the additional issue is reducing the company's debt burden. The ratio of debt/EBITDA is 7,6, while for the nearest competitor, WBD, it equals 1,5.

Successful operation of the milk processing plant is impossible without high-quality raw materials base. In 2003, Verbilovskoe dairy complex was annexed as part of the Lipetsk dairy plant acquisition. In 2009, this non-core agricultural asset (1500 heads of dairy cattle) was given to Russian Farms group of companies for the purpose of its further sale. It was supposed to join Verbilovskoe dairy complex and Belgorod Dairy Farms and to establish the management capacity of 8000 heads of dairy cattle on the area of 60 thousand hectares. The main form of Unimilk assistance to cattle breeding is to advance procurement of raw milk. In 2009, about 1 billion rubles was spent for this purpose.

By the beginning of 2010, the company was the second player by the volume of sales in the dairy market in Russia, Ukraine and Kazakhstan. The company has 32 production sites in its assets. The largest enterprises of the Holding are JSC Petmol (St. Petersburg). UniMilk product range features about 550 commodity items. In accordance with a rating of MPP Consulting Ukrainian consulting company, in 2010 Prostokvashino brand was the sixth on the list and the first by value among brands of dairy industry in the country. Its cost was estimated at 790 million dollars, Chudo brand's cost was 498 million dollars, Domik V Derevne cost – 422 million dollars.

In June 18, 2010, Danone and UniMilk representatives signed an agreement on the merger of the dairy business in Russia and the CIS. In the new company 57,5% of shares were under Danone control, and 42,5% of shares were under UniMilk. Transaction was carried out, mainly by bringing in assets. A part of the shares was purchased by Danone directly and paid for in cash. Another part was taken over by the French side gradually through the mechanism of "put", options granted to shareholders of UniMilk. Until 2012, this financial instrument let Danone enlarge its shares in the new company to 100%. In this case, Danone sold the previously bought stake for a total of 470 million dollars to WBD company, and completely left out the capital of this company.

On October 15, 2010 the Federal Antimonopoly Service (FAS) of the Russian Federation endorsed the consolidation of Danone and UniMilk. It was taken into account while making decision that UniMilk has an employment license for work with opportunistic pathogenic bacteria, such as fermented ones. Such specialization is taken into the Inventory of Activities, that have strategic significance (http://base.garant.ru, 2008). The merger is extended to companies' activity in Russia, Ukraine, Kazakhstan and Belarus.

Franck Riboud, Chairman of the Board and the President of Danone, and Andrey Beskhmelnitsky, General Director of UniMilk company emphasized the complementarity of companies, namely geography, product, sales, production (https://www.rbc.ru, 2010). Danone is moving to the east of Russia, expanding its product portfolio and branding, and is being complemented by the distribution in shops "within reach". All these factors let the new company extract the positive synergies effect of M&A.

Using the common M&A classification, the deal mentioned above can be characterized as the merger with further acquisitions by the French capital of the Russian company (with the Cypriot capital). The acquisition is international, friendly, industrial, horizontal with the extension of market. Despite the fact that the object of sale is a manufacturing business, the essence of the transaction is mainly financial incentives. Unimilk company owners resold the previously bought business as a bargain.

After the Deal, Danone strengthened its position in the global yogurt market, increasing its share to 17%. It is interesting that in the future, according to Euromonitor, the global demand for dairy yogurt will stabilize, and for dairy-free yogurt will grow by 5% per year and by 2027 will reach 7.4 billion dollars (www.vedomosti.ru, 2018). This is a prerequisite for the expansion of the Danone yogurt line in Russia with dairy-free products. In the first half of 2019, growth in sales of the main Danone dairy products in the CIS countries slowed down, due to a decrease in solvent demand. Consumption of baby products remained stable (www.danone.com, 2019).

In 2019, the nominees for the Best Brands Russia international award included Danone in the Best Foreign Corporate Brand category and Prostokvashino brand in the Best Russian Food Brand category (www.danone.ru, 2019)

M&A: PepsiCo and WBD

An American multinational company PepsiCo is a global player in the world beverage market. Its second activity is the production of food (snacks, nuts, dry cereal).

The main competitive advantages of the corporation are, first of all, the production and sales scale that gives market power, the go-to-market powerful system, whereby products are widely penetrating into retail channels; the different variety of goods – from premium brands to those that have affordable price; efficient raw materials (sugar, grain) that are increasing in price; strong brands and

advertisement; management united actions; the focus on further company development (Voronina, 2009).

JSC Wimm-Bill-Dann (WBD) was founded in 1992, when mass production of packaged juice was first started on the leased line technology at Lianozovo Dairy Plant, the largest in the USSR. In 1993, the company started yoghurt production, which was quite a new product for the Russian market which featured traditional kefir, soured milk and sour cream. Since 1998, WBD starts its movement into regions, absorbing the most liquid dairy assets. In 2000, the company business left Russian boundaries. In fact, WBD has become the Russian multinational company.

Despite the diversification, WBD retains priority for dairy, which takes 70% of all sales. In the Russian market of milk and dairy products WBD leads with a share of 28,2%.

The company produces 1100 types of dairy products and 150 types of drinks. The most famous federal brands of WBD are Domik V Derevne and Vesyoly Molochnik. About 70% of the revenue comes from milk and dairy products. The company had 38 manufacturing facilities in Russia, Ukraine and Central Asia.

In 2005, Wimm-Bill-Dann became the first company, that got the Resolution of the European Commission to export its products to the European Union. Wimm-Bill-Dann has built a strong distribution system of chilled products and a platform for the research, development and innovation. In 2010, Standard & Poor's confirmed GAMMA-7+ corporate governance rating of Wimm-Bill-Dann which is the highest rating among Russian companies and testifies to high standards of corporate governance.

In December 2010, PepsiCo reached an agreement with the major shareholders of Wimm-Bill-Dann, the leading Russian manufacturer of dairy products and beverages, to acquire the company, which was estimated at $5.8 billion. PepsiCo firstly acquired 66% of the shares of WBD in eight major shareholders and two subsidiaries of Russian companies for $ 3.8 billion, and after receiving the necessary approvals from the regulatory authorities and the closing of the transaction made an offer to buy out another 33% from the other shareholders. As a result, it will run six of the top 20 food brands of the country and 49 manufacturing plants, including 38 WBD factories. Such popular Wimm-Bill-Dann brands in the country, like Vesyoly Molochnik, Domik V Derevne, and others are preserved.

As a result of M&A, PepsiCo company has become the leader of three Russian markets: milk and dairy products, juices and baby food. It has a dominant position in the juices market. The last one was divided between the two American companies: PepsiCo and Coca-Cola (Ivanova, 2011).

In this regard, the Federal Antimonopoly Service of Russia has put forward a number of requirements to PepsiCo. In particular, to provide the FAS with information on the purchasing prices for raw and powdered milk every six months, and in the regions, where the structure of WBD accounts for more than 35% of the raw material procurement market, the service should be reported on changes in procurement prices of raw milk amounting to more than 7% from the average price for six months. WBD should inform the FAS in detail about selling prices for all dairy products. The failure to fulfill the requirements is the basis for the submission by the antimonopoly authority of a claim for recognition of the acquisition transaction invalid.

Note that PepsiCo modernized a number of purchased industries. In particular, in 2019, an investment project was completed at the site of the Rubtsovsky Dairy Plant (Altai Territory). It implements measures to increase the production of cheese (www.dairynews.ru, 2019) and the processing of whey (Coyne, 2018). The obtained whey protein concentrate can be used for the production of modern dairy and functional products. At the same time, this will contribute to the expansion of non-waste production.

Changes in Market Conditions

Prior to the international M&A transactions, products of three largest companies of the industry prevailed on the Russian federal dairy market: Wimm-Bill-Dann Foods (WBD), Unimilk and Danone

with the share of sales correspondingly: 22.4%, 15.1%, 11.5% (by the criteria of cost) and 22.1%, 16.0%, 5.3% (by the criteria of quantity.)

Table 1 demonstrates that 56.7% of the entire yoghurt production of Russian companies accounted for foreign capital, including Danone. As for the whole-milk products, Russian companies vastly prevailed.

Table 1: Share of company groups in the production of whole-milk products and yoghurt (by the criteria of cost), given in percentage, 2007.

	Whole-milk products		Yoghurt	
	In top 20	**In the Russian Federation**	**In top 20**	**In the Russian Federation**
Russian companies with foreign capital*	20.6	6.0	63.8	56.7
Wimm-Bill-Dann Foods	42.5	12.3	27.4	24.4
Unimilk	24.4	7.1	4.4	3.9
Others	12.4	3.6	4.4	3.9
Top 20	100	29.0	100.0	89.0

**given the share purchase of the open joint-stock company "Ostankino Dairy Plant" from a Ukranian company, a unit of a Dutch company Milkiland B.V.*
Source: data of Russian Union of Dairy Industry Enterprises. [Online], [Retrieved September 1, 2009], http://dairyunion.ru/

Starting from 1999, local holdings – WBD, followed by Unimilk – were aggressively purchasing more or less liquid production bases throughout Russia and partly in The Commonwealth of Independent States, underscoring the geographical diversification. The strategy for the further position reinforcement of the companies by the French capital was mostly based on adding new taste lines and sorts of yoghurt, yoghurt-based drinks, "tvorozhok" (cottage-cheese-based dessert), and other sweet dairy products. The companies conducted work on the product packaging and promotion on the Russian market. A portion of products was exported abroad. New enterprises were not created, old Soviet ones were not being purchased. Danone acquired 18.4% of WBD shares in 2002, which led to growth of its market capitalization – however, the crucial block of shares remained in the possession of WBD shareholders. Danone-WBD may be called a potential merger that did not take place as such, but it clearly indicated the direction in which French-capital-based companies were to move: purchasing fully formed local dairy productions with a wide geographical coverage (Ivanova, 2013).

By means of international M&A mechanisms hosted in Russian companies WBD and Unimilk in 2010, the previous strategy of TNC (transnational corporations) collapsed: from building new facilities for production of new, relatively exotic products for Russian market, to mass purchase of high-quality objects, producing wide range of traditional dairy products.

Importantly, milk industry is not a part of high-tech production processes, yet it plays a significant social role. The tendency to be noticed is the replacement of local capital with the foreign one, without substantial creation of new production facilities. By the year 2012, Danone-Unimilk became the largest acquirer of raw milk (1.7 million tons per year) and the leader of the dairy production in Russia, with an approximate 30% share (by the criteria of cost.) It is followed by the American company WBD, German Ehrmann and Dutch Campina. The total production share of foreign companies in Russia took no less than 60% of the Russian dairy production market.

According to the Dairy Intelligence Agency (DIA, 2020), in 2018 Danon and PepsiCo owned the largest milk processing plants in Russia. Their share in the total milk processed in Russia amounted to 7.48% and 7.23%, respectively. Compared to 2017, PepsiCo slightly reduced investments in the dairy section of its business. This is connected with a decrease in solvent demand for dairy products. Danone is more concentrated on the production of dairy products and their vegan alternatives. The new product lines take into account local tastes, traditions and raw materials. For example, Danon uses Siberian berries such as cranberries, cloudberries, sea buckthorn as yogurt additives.

Apart from Danone, a French company, Savencia Fromage & Dairy, has been introduced on the Russian market. This company is due to invest 3 billion rubles into the construction of a new cheese factory in Bashkiria in 2019. At the end of 2017 Belebeyevsky Dairy Plant' controlling interest of shares was purchased by them from a local group Neral (https://eadaily.com, 2019). The Vietnamese company TH True Milk, the main Asian investor in the Russian dairy product industry, plans the construction of milk-processing factories as well.

One of the factors in the consolidation of foreign capital in the dairy industry is the creation of vertically integrated industries. Thus, the largest producer of raw milk in Russia, EkoNiva - APK agricultural holding (a division of the German company Ekosem-agrar GmbH, CEO Stefan Dürr) plans to start milk processing by 2025-2030.

The highest concentration of dairy producers characterizes the Moscow Region (population of 6.7 million people). The quantity of milk processed in this area in 2016, by companies:

Lianozovsky dairy plant – 32.63%;

Danone industry Ltd. – 22.78%;

Ostankinsky dairy plant, open joint-stock company – 10.09%,

Campina Ltd. – 6.12%,

Others – 20.25%.

Accordingly, almost 80% of milk processed in Moscow Oblast accounts for foreign invested enterprises. This share did not decrease in 2019.

The priority investments of Danone in Russia remain focused on: expansion and renovation of the current production potentials; bringing them into line with high international standards of food quality and environmental safety of Danone brand; development of the product line and introduction of new products on the market.

Currently, PepsiCo continues the development strategy of the dairy division in Russia. It corresponds to the ideology of the transition from "products for pleasure" to products "for health".

It is important to note that, starting from 2014, Russia has experienced the policy of import substitution. Anti-Russian sanctions and ruble devaluation have been generally stimulating localization of foreign production companies. The revenue of Russian division of PepsiCo and Danone has been increasing. According to this criterion, PepsiCo has firmly held a position among top 10 foreign production companies in Russian Federation, Danone – among top 20 (www.forbes.ru, 2018).

Conclusion

In terms of interests of the studied multinational corporations, their investments in the Russian dairy industry must be recognized as effective. High business profitability has been achieved, its position has been reinforced on the growing Russian market and the market of The Commonwealth of Independent States, which is particularly relevant in the circumstances of "sanction war" between Russia on the one hand, and the European Union and the United States on the other.

Multinational companies have been emerging through both greenfield and brownfield investments. Initially, the effect of complementing Russian food market with new dairy products was achieved. The M&A value mechanism enabled the effect of substitution of the local processors with the foreign ones.

The acquired Russian private companies were those mostly formed as a result of privatization of large Soviet production units. Their further destiny was decided through steps directed towards creation of environment attractive for foreign investments. As for tax optimization – they opted for offshore accounts. Low-cost loan funds, among which those of foreign banks, enabled the production modernization, geographical and product diversification, as well as the opportunity to export branded goods. The consolidation of capital and IPO (Initial Public Offering) launch allowed the companies to acquire the status of backbone enterprises, entitled to governmental support. The business leading the

inner market became the goal of the foreign multinational corporations. Their acquisition led to increasing trend of market monopolization, and an increased dependency on foreign capital. Nevertheless, for the final consumer these changes have been latent due to preservation of familiar brands and the product line extension. The foreign multinational corporations introduced the Russian dairy market to the process of glocalization.

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Staff Recruitment in The Digital Age

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Abstract

Digital technologies are changing the methods of organizing work and managing human capital, which significantly improves the company's competitive position in the market, reduces the number of expenses and directly affects the amount of profit and the number of attracted customers. The formation of intelligent and digital network systems in the future will create self-organizing and self-governing organizations in which equipment, machines, employees and products interact and collaborate directly with each other. Such an intelligent connection will make management more flexible and efficient. Of great importance in the management of human capital begins to acquire "digital thinking." Enterprises around the world invest millions of rubles a year on the selection, development, and retention of personnel, assessment, and training. But the main attention is paid to the selection of personnel, which in the digital era can be called digital recruiting. Digital recruitment is the process of leveraging digital technology to the source, attraction, assess, select and hire candidates for vacant positions. This includes leveraging job boards, career websites, mobile recruiting, online assessments, and social recruiting. According to Forbes, about 40% of companies in the US use HCM, ERP, and other recruitment management cloud solutions.

Keywords: Digital Technologies, Human Capital Management, Digitalization, Digital Recruiting, Staff Selection.

Introduction

A fundamental factor in the success of digitalization is the availability of competent personnel capable of developing and implementing digital technologies. Digital skills are becoming critical (Sharipova 2019). This is recognized both at the business level and at the state level. For example, in Russia, the federal project “Personnel for the Digital Economy” is currently being actively implemented, which is being implemented as part of the national program “Digital Economy of the Russian Federation” (Masyuk, Zhao and Vasyukova 2019). The implementation of the project is transforming the labor market, which means that the tools and channels for finding candidates are changing. Now the recruiting system is undergoing automation as much as possible: there is a system for tracking resumes, evaluating applications online, chatbots for an initial interview, evaluating candidates through video interviews and more, and almost all digital products have mobile applications.

For many years, enterprises have increased their efficiency by hiring workers whose knowledge and experience have copied the most successful employees. Now the analytical capabilities of HR software give a clearer picture of the hidden potential of candidates, the systems help to find people with the required qualifications, assess their personality and development potential within the company, reveal the talents of current employees, etc. (Nonka, Borisova 2019). Top 20 software for recruitment is shown in table 1 (Recruitment Software 2018).

For companies that have thousands or even tens of thousands of employees, staffing is always an urgent problem (Applicant Tracking System 2020). 2017 was a breakthrough in this direction, thanks to the attraction of machine learning technologies, both in the field of recruitment and in the organization of its work. In recent years, software using artificial intelligence has become a key tool for the search and pre-selection of candidates (Lebedeva, Lazutina and Tsar'kov 2018). According to a Jobvite study, 43% of recruiters consider the contribution of artificial intelligence to their daily work to be significant. A recent Global Recruiting survey found that a US recruiter on average processes applications from 91 candidates daily. At the same time, the quantity/quality indicators of candidates remain stable over the past decade. But the involvement of machine learning technologies in the hiring process allowed for the first time in a long time to seriously improve the labor costs for attracting one new employee.

Table 1: TOP-20 software for staff recruitment

#	Name of HR Soft	#	Name of HR Soft
1	ZipRecruiter	11	Workday Human Capital
2	BambooHR	12	iCIMS Recruit
3	ApplicantStack	13	Lever
4	Breezy HR	14	ApplicantPro
5	Built for Teams	15	Bullhorn
6	JobDiva	16	Betterteam
7	Vincere	17	CEIPAL TalentHire
8	Zoho Recruit	18	Ultipro
9	LinkedIn	19	WebHR
10	Greenhouse	20	JazzHR

Intelligent automation can improve the efficiency of recruiters by taking on the functions of the pre-selection of candidates through a total database scan and selection of the necessary profiles according to specified criteria. Employment managers were able to pay less attention to working with the primary funnel, and more to optimize conversion rates and reduce hiring time (Kuznetsova 2019). The use of artificial intelligence is also positively evaluated by candidates. With large volumes of recruiting, candidates previously received a minimum of time for an interview, since managers were constantly in a time pressure state. The massive use of chatbots for initial contact allows you to make the interview more detailed and informative. Applicants can ask questions to the robot, and he will give them detailed answers, tell more about the tasks, position and rules of the company, career prospects and corporate culture of the company.

As Alexa, Siri, and Google Home, Chatbot's recruiting system uses artificial intelligence to understand questions and answer correctly. Companies can set up their chatbots to respond to emails or conduct conversations through instant messengers. At the same time, chatbots themselves analyze the answers of candidates, put up an assessment of their literacy, language proficiency, level of competencies and work experience, then to enter data into a common table for a comparative analysis of the candidate's potential.

According to a recent Allegis poll, most candidates are positive about talking with the bot in the early stages of the application process. 66% of the candidates noted that they had prepared in advance for

the interview with the chatbot, although most still prefer to work with a human recruiter (Matveeva and Zolotaryuk 2018).

Method and Methodology

The main digital recruiting method is the recruitment funnel, which came to HR from sales. This is an analytics tool that reflects the results of each stage of recruiting in quantitative terms. The model has stood the test of time but is still gradually becoming obsolete.

To begin with, we note that there is no single method for constructing a staffing funnel. The number and composition of stages depending on the industry of the company and the nature of the vacancy: for example, some employers separately pass the passage of the probationary period, while others have a special department open to adapt the staff, and therefore everything ends with hiring. Models will also vary greatly when looking for qualified personnel and mass selection.

However, a typical type of funnel still exists. We will consider it in more detail (Fig. 1). The selection of personnel begins with a preparatory, zero stage. It includes drawing up a portrait of the ideal candidate and determining the search sources, that is, the placements of the ads. Although the stage is not displayed in the classic funnel, it is an important part of the recruiting process. The first step to being included in the funnel is to attract candidates, and this is the widest part. Here the employer announces a vacancy, publishes a resume at various sites. The second stage is engagement, which includes the processing of incoming responses, the initial acquaintance of candidates with the company, corporate culture, and brand of the employer. The recruiter makes contact, talks about the benefits of work. This is a key point, because it “sells” vacancies, especially with spot selection. The third stage of the funnel is evaluation and selection. The HR manager works with the incoming "warm" stream of applicants who are already involved to some extent, are interested in the position. Screening is carried out based on the results of interviews and assignments, starting, for example, with small tests and ending with final interviews with experts or managers of the employing company. When evaluating and selecting, the main narrowing of the funnel occurs. Next, an offer is made to the final candidates. The last step is to get the final result: for most companies, this is hiring an employee. The final stage is the narrowest part of the funnel: you can see a hundred applicants, but more than three offers for one position are rarely put up. However, again, it all depends on the specifics of the vacancy, the company and the market as a whole.

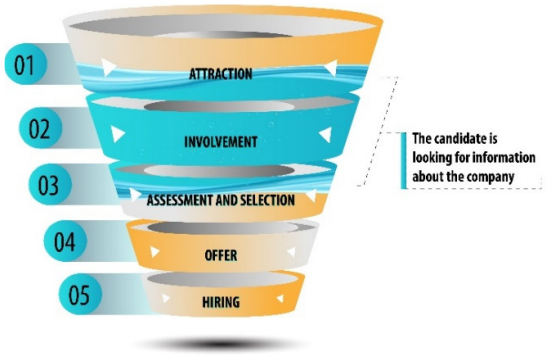

Fig. 1: Recruiting Funnel

The model of the “recruiting funnel” describes the stages of interaction between the recruiter and applicants when closing a vacancy, each of which is digitized and subsequently makes it possible to evaluate at what stage the potential candidate is screened out and where the malfunction occurs.

Results

Digitization of the funnel may look as follows (Fig. 2). The funnel is clear and transparent, it shows the conversion at each stage of selection, and allows you to formulate new solutions. From this figure, it can be seen that the largest conversion is observed at the first stage. Further, this indicator is significantly reduced. There is a misconception that with an artificial increase in the first stage of the funnel, that is, the incoming flow of applicants, the effectiveness of recruiting increases. In the case of mass selection, this can really work, but for a targeted qualified search, this method will not work - it will only lead to financial and temporary losses.

The HR brand has a positive effect on the effectiveness of the recruitment funnel, and the technology brand for the IT industry. There is another option - the creation of a corporate university. So the employer will be able to increase the initial pool of candidates and rely on individual qualities and soft skills, developing other competencies already in the process of work. Various metrics can be used to evaluate the effectiveness of the recruitment funnel. There are no unified indicators, but they often use the time of filling a vacancy, that is, the number of days required to close it, or the time of hiring - the number of days between the final approval of the candidate and his exit to work. An offer acceptance ratio may also be used. Another advantage of the funnel: it can be shown to the client or manager so that he sees how much work is really behind the selection (Tikhonov, Fedotov and Chekan 2019). It happens that the personnel selection system fails. Using a funnel, you can determine where the problem arose - for example, at the stage of involvement. But involvement is a lot of steps, and it is not clear what exactly to look for the cause. Maybe it's a matter of negative reputation and negative reviews of employees? Or the reason is an illiterate search map: the recruiter posted a vacancy for mass selection on LinkedIn. Perhaps the requirements for the applicant do not match the prevailing market? There may be many options.

This is the main drawback of the funnel: to solve the problem, it is not enough to detect it. The funnel is not able to help identify the causes. She misses the relationship with other business processes and only indicates the presence of a “bottleneck”, a clear discrepancy between the dry numbers and the expected intermediate results. This is a "litmus test" with which it is necessary to conduct further work.

There is another important problem: the funnel model does not take into account market changes. The funnel works only if we place ads in as many sources as possible, from which the stream of applicants comes to us. But the situation is changing: the candidate market is transforming into a job market. In pharmaceuticals, IT, and knowledge-intensive industries, more and more specialized specialists are required at the junction of professional fields. Companies are fighting for candidates who are not even in search. How to take all this into account in the funnel - is a big question (Nagibina 2017).

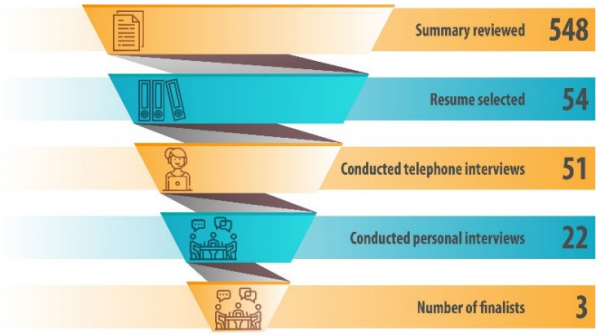

Fig.2 : Digitization of a recruiting funnel

Discussion

The main goal of the maximum automation of recruiting is to reduce the burden on HR specialists in the mass hiring and training of personnel, as well as a higher KPI. To achieve these goals, several HR digitalization tools were allocated: The Applicant Tracking System (ATS 2020) and the LMS Learning Management System (E-learning 2020). These systems interact with employees and candidates using mobile applications, social networks and cloud technologies (Kuprevich 2018). Before the interview, the applicant is asked to fill out not a paper form, but an electronic one. It is difficult and not habitual for a modern person to write a lot with a pen, it's much simpler, more familiar and faster to check and electronic questionnaire. The employer gets the opportunity to process the received data faster and more efficiently. Such automation is introduced at all stages of hiring and training:

- instead of a group presentation, a video presentation is being introduced;
- instead of numerous interviews, assessments and other assessments of competencies, the candidate is invited to go through a quest in which he has the opportunity to demonstrate his skills;
- all employees undergo training through special portals that systematize training (Sharapova, Sharapova and Shvetsova 2017).

The introduction of digitalization in HR technology gives good results. The load on recruiters and recruiters is reduced, the selection funnel is improved, and staff turnover is reduced. An international study by McKinsey consulting company, conducted at the end of 2018, revealed that the digitalization of recruiting processes allows 26% to increase the productivity of recruiters. The contribution of these measures to the financial performance of the company was also calculated - their profit increases by 14%. Using a chatbot (voice robot) for mass selection, which makes preliminary screening of inappropriate calls and applications, allows up to 30% of calls not to be brought to recruiters, thereby saving their time and reducing the cost of staff recruitment by two to three times (. Thanks to the automation of staff recruitment, the term for closing vacancies, including in remote territories, was reduced from 30-40 days to one week (Strelnikova and Lembrikova 2019).

Digital and economics analysts predict the enormous impact of digitalization on the labor market. McKinsey Global Institute estimates that up to 50% of workflows will be automated in the world by 2036. As a result, up to 12.5 million of the employed population can be freed up and jobs will be reduced. A trend will begin to increase the difference in wage levels, which will result from the stratification of society by income level, and unemployment will increase (Masyuk, Vasyukova and Kiryanov 2018). Existing jobs will be replaced by high-paying jobs that require the skills to create and apply digital technologies, and low-paying jobs in cases where automation is not economically feasible. Thus, the impact of digitalization will lead to the emergence of new professions, and, as a result, to a shortage of sought-after personnel. But at the same time, it can be assumed that a high level of income in scarce professions will provide an incentive for potential employees to learn new skills and competencies. As a result, digitalization can be seen both as a threat and as the emergence of new opportunities.

The key competency of the digital age is the ability to analyze a large array of data. The introduction of digital technology leads to changes in staffing requirements and professional requirements. More and more noticeably, we are seeing a decrease in demand for professions related to formalized, repetitive operations. The life cycle of professions is reduced due to the rapid change of technology (Avdeeva, Andreeva and Afanasyev 2019). There is a transformation of positions, there are risk analytics, HR analytics, marketing analysts in connection with the automation of business processes. New professions are emerging. The requirements for flexibility and adaptability of staff, for the manifestation of "soft skills" - "soft skills" associated with social and emotional intelligence that distinguish a person from a machine are increasing. There is a growing demand for specialists with "digital dexterity" - the ability to implement new technologies in order to increase the efficiency of enterprises and businesses as a whole.

One cannot but say that advanced digital technologies have a positive impact on the labor market. Firstly, the use of modern digital work portals enables potential candidates to expand their professional and career opportunities through wide access to the databases of current vacancies (Kostikova, Skiter and Tarasova 2019). For example, on the Russian platform hh.ru already posted more than 25 million resumes, the number of which is constantly growing. Secondly, digital platforms directly affect the increase in labor productivity, as they contribute to the selection of the most accurate profile of the applicant for the proposed vacancy. All this reduces unemployment. Thirdly, the digital revolution will contribute to the emergence of new professions and jobs that did not exist before. Fourth, thanks to modern technologies, it is possible to remotely work remotely, which makes it possible to increase the efficiency of employment of specialists from regions where there is a limited local demand for them. Finally, digital technologies enable workers to acquire new knowledge and skills using distance e-learning in order to improve their skills, master new professions or acquire new competencies. The widespread use of online education systems provides an opportunity for employees to develop additional competencies necessary for creating a career path in the digital era (Masyuk and Pankova 2019).

Conclusion

The era of digital technology transforms the minds of managers and dictates the need to search for new and adapt existing tools for managing human capital. Digitalization shows that a number of business processes are most efficiently done by the machine: conducting initial interviews and screenings that do not meet the requirements of candidates, psychometric characteristics of personnel recruiting according to his profiles and preferences in social networks, all this requires rapid changes in the HR field. Digital technologies increase the effectiveness of management decisions: automated recruiting, switching to virtual workplaces, personalization in management and creating for each employee a special environment for self-realization and development, engagement management, HR analytics, and performance management. However, no matter what digital technologies are used, it is human capital and its potential that is the main generator and manager of all changes.

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Searching for an Optimal MDS Procedure for Metric and Interval-Valued Data using mdsOpt R package

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Abstract

In multidimensional scaling (MDS) applied to a metric data matrix (interval, ratio) or interval-valued data table three approaches can be distinguished: classic-to-classic – for metric data, symbolic-to-classic) and symbolic-to-symbolic – for interval-valued data. The article presents the `mdsOpt` package, which helps to solve the problem of choosing the optimal MDS procedure. It uses two criteria for selecting the optimal MDS procedure: Kruskal's $Stress$-1 fit measure (I-$Stress$ in the case of the symbolic-to-symbolic approach) and Hirschman-Herfindahl HHI index, calculated using Stress per point values (interval stress per box in the case of the symbolic-to-symbolic approach). In the first part three possible approaches are described, including the theoretical background of the methods and the relationships between the `mdsOpt` package and existing `R` packages. The second part explains the procedure and criteria for selecting the optimal MDS procedure for metric and interval-valued data. The last part contains details on how to use the package and applications to real data sets.

Keywords: Multidimensional Scaling, Metric And Interval-Valued Data, Tourist Attractiveness, `Mdsopt`

Introduction

The article proposes a solution for choosing the optimal MDS procedure according to various scenarios. The novelty of the study presented in this article is related to a family of algorithms for selecting the optimal MDS procedure implemented in the `mdsOpt` package of the R program. The effectiveness of the algorithms is demonstrated using real data sets.

The Aim of Multidimensional Scaling

Classical MDS is a method that represents (dis)similarity in the data as distances in a low-dimensional space (typically 2 or 3 dimensions) in order to enable data exploration by means of visualization (Borg and Groenen (2005), p. 3). Classical MDS requires that each entry of dissimilarity matrix be a single numerical value. Dissimilarity between object i and object k can be fuzzy (Groenen *et al*. (2006)), p. 361). The fuzzy dissimilarity is represented by an interval and $n \times n$ dissimilarity matrix is an interval of values $[\delta_{ik}^{l}; \delta_{ik}^{u}]$, where δ_{ik}^{l} (δ_{ik}^{u}) denotes the lower (upper) bound of the dissimilarity of objects i and k in m-dimensional space. MDS of interval dissimilarities represents the lower and upper bounds of dissimilarities as distances between hypercubes (rectangles in a two-dimensional space and cubes in a three-dimensional space). The dimensions are not directly observable. They can be treated as latent variables. MDS makes it possible to explain the similarities and differences between the analyzed objects.

MDS is a widely used technique in many areas, including psychology (Takane (2007)), sociology (Pinkley *et al.* (2005)), linguistics (Embleton *et al.* (2013)), marketing research (Cooper (1983)), tourism (Marcussen (2014)), musicology (McAdams *et al.* (1995)).

The approaches in multidimensional scaling using the `mdsOpt` package

When MDS is applied to a metric data matrix (interval, ratio) or interval-valued data table by means of the `mdsOpt` package, three approaches can be distinguished:

1. Classic-to-classic – for metric data:

$$\mathbf{X} = \left[x_{ij}\right]_{n\times m} \rightarrow \mathbf{Z} = \left[z_{ij}\right]_{n\times m} \rightarrow [\delta_{ik}(\mathbf{Z})]_{nxn} \rightarrow \\ \rightarrow f\colon [\ \delta_{ik}(\mathbf{Z}) \rightarrow d_{ik}(\mathbf{V})] \rightarrow\ \mathbf{V} = [v_{ij}]_{nxq}, \tag{1}$$

where: x_{ij} (z_{ij}) – the value (the normalized value) of the *j*-th variable for the *i*-th object, $i, k = 1, \dots, n$ – the number of the object, $j = 1, \dots, m$ – the number of variable, $[\delta_{ik}(\mathbf{Z})]_{n\times m}$ – a distance matrix (dissimilarities) between objects in an *m*-dimensional space (distances are calculated using e.g. city-block, Euclidean, Chebyshev, squared Euclidean), $[d_{ik}(\mathbf{V})]$ – a distance matrix in a *q*-dimensional space $(q < m)$, f – function which maps distances in an *m*-dimensional space $\delta_{ik}(\mathbf{Z})$ into corresponding distances $d_{ik}(\mathbf{V})$ in a *q*-dimensional space, $\mathbf{V} = [v_{ij}]_{nxq}$ – data matrix in a *q*-dimensional space.

The starting point of MDS in the classic-to-classic approach is a metric data matrix $\mathbf{X} = \left[x_{ij}\right]_{n\times m}$, for which observations are obtained from secondary data sources. It is a typical situation in socio-economic research. Methods of determining the distance matrix $[\delta_{ik}]$ can be divided into direct methods (typically results from similarity ratings on pairs of objects, from rankings, or from card-sorting tasks) and indirect (see (1)) methods (see e.g. Borg and Groenen (2005), pp. 111-133).

2. Symbolic-to-classic – for interval-valued data:

$$\mathbf{X} = \left[x_{ij}^{l}, x_{ij}^{u}\right]_{n\times m} \rightarrow \mathbf{Z} = \left[z_{ij}^{l}, z_{ij}^{u}\right]_{n\times m} \rightarrow [\delta_{ik}(\mathbf{Z})]_{nxn} \rightarrow \\ \rightarrow f\colon [\ \delta_{ik}(\mathbf{Z}) \rightarrow d_{ik}(\mathbf{V})] \rightarrow\ \mathbf{V} = [v_{ij}]_{nxq}, \tag{2}$$

where: $[x_{ij}^{l}, x_{ij}^{u}]$ – the observation of the *j*-th interval-valued variable for the *i*-th object $(x_{ij}^{l} \leq x_{ij}^{u})$, x_{ij}^{l} (x_{ij}^{u}) – the lower (upper) bound of interval, $\mathbf{Z} = \left[z_{ij}^{l}, z_{ij}^{u}\right]$ – the normalized interval-valued data table in an *m*-dimensional space, $[\delta_{ik}(\mathbf{Z})]$ – a distance matrix (dissimilarities) in an *m*-dimensional space (distances are calculated using distance measures for interval-valued data – see Table 3).

3. Symbolic-to-symbolic – for interval-valued data:

$$\mathbf{X} = \left[x_{ij}^{l}, x_{ij}^{u}\right]_{n\times m} \rightarrow \mathbf{Z} = \left[z_{ij}^{l}, z_{ij}^{u}\right]_{n\times m} \rightarrow \left[\delta_{ik}^{l}, \delta_{ik}^{u}\right] \rightarrow \\ \rightarrow f\colon \left(\left[\delta_{ik}^{l}, \delta_{ik}^{u}\right] \rightarrow \left[d_{ik}^{l}, d_{ik}^{u}\right]\right) \rightarrow\ \mathbf{V} = [v_{ij}^{l}, v_{ij}^{u}]_{n\times q}, \tag{3}$$

where: δ_{ik}^{l} (δ_{ik}^{u}) $[d_{ik}^{l}$ $(d_{ik}^{u})]$ – the lower (upper) bound of the dissimilarity of objects *i* and *k* in an *m*-dimensional [*q*-dimensional] space, f – function which represents the lower and upper bounds of the dissimilarities by minimum and maximum distances between rectangles (cubes in a three-dimensional space) as well as possible distances in the sense of least-squares (Groenen *et al*. (2006), p. 363), $\mathbf{V} = [v_{ij}^{l}, v_{ij}^{u}]$ – an interval-valued data table in *q*-dimensional space.

In the symbolic-to-classic and symbolic-to-symbolic approaches the starting point of MDS is a data table $\mathbf{X} = \left[x_{ij}^{l}; x_{ij}^{u}\right]$ $(x_{ij}^{l} \leq x_{ij}^{u})$. Gioia and Lauro (2006, p. 344) provide different real examples of interval data:

- financial data (e.g. opening and closing value in a session),
- customer satisfaction data (expected or perceived characteristics of the quality of a product),
- tolerance limits in quality control,
- confidence intervals of estimates from sample surveys,
- database queries.

Additional examples of real life interval-valued data can be found in Brito *et al*. (2015):

- high–low intervals of financial prices,
- some questions in questionnaire surveys (e.g. age, income, time spent).

Interval-valued data can be obtained by generalizing classical single-valued variables into interval-valued variables (see e.g. Bock (2000), pp. 43-44).

The main idea of the `mdsOpt` package

The authors of the monograph (Borg *et al*. (2018), chapter 7) point out typical mistakes made by MDS users. One frequent mistake consists in evaluating Stress manually (rejecting an MDS solution on the grounds that its value seems "too high"). According to the authors (Borg *et al*. (2018), pp. 85-86), "The Stress value is, however, merely a technical index, a target criterion for an optimization algorithm. An MDS solution can be robust and replicable, even if its Stress value is high" and "Stress is a *summative* index for *all* proximities. It does not inform the user how well a *particular* proximity value is represented in the given MDS space (...) The least one can do is to take a look at the Stress-per-point values". Considering that we should take into account stress per point values (Borg and Mair (2017)) and Shepard diagram (Mair *et al*. (2016); De Leeuw and Mair (2015)) for classic-to-classic and symbolic-to-classic approaches or the $I\text{-}Stresss$ per box index (*ispb*) and the $I\text{-}dist$ diagram for the symbolic-to-symbolic approach.

Criteria for selecting the optimal MDS procedure

To solve the problem of choosing the optimal MDS procedure, two criteria are implemented in the `mdsOpt` package (Walesiak and Dudek (2019b)):

- in the classic-to-classic and symbolic-to-classic approaches: Kruskal's $Strees\text{-}1$ (standardized residual sum of squares) fit measure and the Hirschman-Herfindahl HHI index, calculated from Stress per point values (*spp*).
- in the symbolic-to-symbolic approach: $I\text{-}Stress$ fit measure and HHI index, calculated from $I\text{-}Stress$ per box index values (*ispb*).

Package `mdsOpt` versus other packages

The algorithms implemented in the `mdsOpt` package has not been used in other `R` packages so far and can be treated as a complementary package for well-known libraries `smacof` (Mair *et al*. (2019); De Leeuw and Mair (2009)) and `smds` (Terada and Groenen (2015)), extending theirs possibilities. The relationships between `mdsOpt` and other `R` packages are presented in Table 1.

Additionally, the `mdsOpt` package contains functions for calculating the $I\text{-}Stress$ per box index (*ispb*) and charting the $I\text{-}dist$ diagram for interval-valued data.

Selection of the optimal multidimensional scaling procedure

The article proposes a solution for selecting the optimal MDS procedure depending on whether metric and interval-valued data are used.

Basic Decision Problems

For the purpose of the classic-to-classic and symbolic-to-classic approaches exemplified in the study, the `smacofSym` function from the `smacof` package was used. In the `smacofSym` function, the user has to choose the following attributes:

– the normalization method (18 normalization methods are available – see Table 2),
– the distance measure: 5 for metric data (Manhattan, Euclidean, Chebyshev, squared Euclidean, GDM1 – see e.g. Everitt *et al*. (2011), pp. 49-50; Jajuga *et al.* (2003)) and 4 for interval-valued data (see Table 3),
– the MDS model (3 MDS models are available: ratio, interval, polynomial).

For the purpose of the symbolic-to-symbolic approach exemplified in the study, the `IMDS` function from the `smds` package was used. The following attributes need to be selected in the `IMDS` function:
– the normalization method – 18 normalization methods are available,
– the optimization method – 2 methods are available: the majorization-minimization algorithm "MM" (Groenen *et al.* (2006), p. 366); the quasi-Newton method "BFGS" (Nash (1990)).

Table 1: Relationships between `mdsOpt` and other `R` packages

MDS approach		
Classic-to-classic	Symbolic-to-classic	Symbolic-to-symbolic
Type of data		
metric	interval-valued	interval-valued
Functions of `mdsOpt` package		
`optSmacofSym_mMDS`	`optSmacofSymInterval`	`optIscalInterval`
Decision problem 1: normalization method		
`clusterSim` (`data.Normalization`); `base` (R Core Team 2019) (`scale`)	`clusterSim` (`interval_normalization`)	`clusterSim` (`interval_normalization`)
Decision problem 2: distance measure		
Manhattan, Euclidean, Chebyshev, squared Euclidean, GDM1	Ichino-Yaguchi, Euclidean Ichino-Yaguchi, Hausdorff, Euclidean Hausdorff	–
`stats` (R Core Team 2019) (`dist`); `clusterSim` (`dist.GDM`)	`clusterSim` (`dist.Symbolic`)	–
Decision problem 3: MDS model / optimization method		
ratio, interval, polynomial `smacof` (`smacofSym`)	ratio, interval, polynomial `smacof` (`smacofSym`)	majorization-minimization (MM), quasi-Newton (BFGS) `smds` (`IMDS`)

Table 2 presents normalization methods, given by linear formula (4), which were used to select the optimal MDS procedure (see Jajuga and Walesiak (2000), pp. 106-107):

$$z_{ij} = b_j x_{ij} + a_j = \frac{x_{ij} - A_j}{B_j} = \frac{1}{B_j} x_{ij} - \frac{A_j}{B_j} \, (b_j > 0), \tag{4}$$

where: x_{ij} (z_{ij}) – the value (the normalized value) of *j*-th variable for the *i*-th object, A_j – shift parameter to arbitrary zero, B_j – scale parameter.

The variables describing the analyzed objects are normalized when they are metric or interval-valued. The purpose of normalization is to achieve comparability of variables (Milligan and Cooper (1988)).

For classical metric data an observation on the *j*-th variable for the *i*-th object in a data matrix $\mathbf{X} = [x_{ij}]_{n \times m}$ is expressed as one real number. Column 1 in Table 2 presents the type of normalization method selected in the `data.Normalization` function from the `clusterSim` package (Walesiak and Dudek (2019a)). A similar data normalization procedure is available in the `scale` function of the `base` package. In this function the user defines parameters A_j and B_j.

For interval-valued variables each cell x_{ij} in a data table represents the interval $x_{ij} = [x_{ij}^l; x_{ij}^u]$ ($x_{ij}^l \leq x_{ij}^u$). Interval-valued data require a special normalization approach. The lower and upper bound of the interval of the *j*-th variable for n objects are combined into one vector containing $2n$ observations. This approach makes it possible to apply normalization methods used for classical metric data. After normalization, observations on each variable from 1 to n are the lower bounds of intervals while observations from $n + 1$ to $2n$ are the upper bounds. In the study the data were normalized using the `interval_normalization` function from the `clusterSim` package.

Table 2: Normalization methods

Type	Method	Parameter	
		B_j	A_j
n1	Standardization	s_j	$\bar{x}_j$
n2	Positional standardization	mad_j	med_j
n3	Unitization	r_j	$\bar{x}_j$
n3a	Positional unitization	r_j	med_j
n4	Unitization with zero minimum	r_j	$\min_i\{x_{ij}\}$
n5	Normalization in range [–1; 1]	$\max_i\lvert x_{ij}-\bar{x}_j\rvert$	$\bar{x}_j$
n5a	Positional normalization in range [–1; 1]	$\max_i\lvert x_{ij}-med_j\rvert$	med_j
n6	Quotient transformations	s_j	0
n6a		mad_j	0
n7		r_j	0
n8		$\max_i\{x_{ij}\}$	0
n9		$\bar{x}_j$	0
n9a		med_j	0
n10		$\sum_{i=1}^{n} x_{ij}$	0
n11		$\sqrt{\sum_{i=1}^{n} x_{ij}^2}$	0
n12	Normalization	$\sqrt{\sum_{i=1}^{n}\left(x_{ij}-\bar{x}_j\right)^2}$	$\bar{x}_j$
n12a	Positional normalization	$\sqrt{\sum_{i=1}^{n}\left(x_{ij}-med_j\right)^2}$	med_j
n13	Normalization with zero being the central point	$r_j/2$	m_j

$\bar{x}_j$ (s_j, r_j)– mean (standard deviation, range) for the *j*-th variable, $m_j = \left(\max_i\{x_{ij}\} + \min_i\{x_{ij}\}\right)/2$ – mid-range for the *j*-th variable, $med_j = \underset{i}{med}\left(x_{ij}\right)$ – median for the *j*-th variable, $mad_j = \underset{i}{mad}\left(x_{ij}\right)$ – median absolute deviation for the *j*-th variable.
Source: based on Jajuga and Walesiak (2000), Walesiak (2018).

Table 3: Distance measures for interval-valued data

Symbol	Name	Distance measure $\delta_{ik}(\mathbf{Z})$
U_2_q1	Ichino-Yaguchi $q = 1, \gamma = 0.5$	$\sum_{j=1}^{m}\varphi\left(z_{ij}, z_{kj}\right)$
U_2_q2	Euclidean Ichino-Yaguchi $q = 2, \gamma = 0.5$	$\sqrt{\sum_{j=1}^{m}\varphi\left(z_{ij}, z_{kj}\right)^2}$
H_q1	Hausdorff $q = 1$	$\sum_{j=1}^{m}\left[\max\left(\lvert z_{ij}^l - z_{kj}^l\rvert, \lvert z_{ij}^u - z_{kj}^u\rvert\right)\right]$
H_q2	Euclidean Hausdorff $q = 2$	$\left\{\sum_{j=1}^{m}\left[\max\left(\lvert z_{ij}^l - z_{kj}^l\rvert, \lvert z_{ij}^u - z_{kj}^u\rvert\right)\right]^2\right\}^{1/2}$

$\varphi(z_{ij}, z_{kj}) = |z_{ij} \oplus z_{kj}| - |z_{ij} \otimes z_{kj}| + \gamma(2 \cdot |z_{ij} \otimes z_{kj}| - |z_{ij}| - |z_{kj}|)$; $|\quad|$ – length of interval,
$z_{ij} \oplus z_{kj} = z_{ij} \cup z_{kj}$, $z_{ij} \otimes z_{kj} = z_{ij} \cap z_{kj}$
Source: based on Billard and Diday (2006), pp. 244-246; Esposito *et al*. (2000), pp. 165-185; Ichino and Yaguchi (1994).

Stages in selecting the optimal procedure for MDS

The starting point in applying the `smacofSym` function is to determine e.g. the following values of arguments (all parameters can be changed by the user):

- initial configuration ("torgerson" classical scaling starting solution),
- convergence criterion (eps=1e-06),
- maximum number of iterations (itmax=1000).

The first step in applying the `IMDS` function from the `smds` package is to determine e.g. the following values of arguments (all parameters can be changed by the user):

- initial configuration (the hyper-rectangles with centers assigned as a result of classical multi-dimensional scaling of primary space interval centers and vertices located at unit distance from the centers),
- convergence criterion (eps=1e-5),
- maximum number of iterations (maxit=1000).

Selecting the optimal procedure for MDS takes place in several stages:

1. Set the number of dimensions in MDS to two (ndim=2).

2. Take into account the following options, depending on the approach:

   - In the classic-to-classic approach – 10 normalization methods, 5 distance measures and 4 MDS models (mspline model – polynomial function of second and third degree), yield a total of 200 MDS procedures.

Since the normalization methods listed in groups A, B, C and D (see Table 4) yield identical MDS results, only the first method listed in each groups (n1, n2, n3, n9), plus the other methods (n5, n5a, n8, n9a, n11, n12a) are used in further analysis.

- In the symbolic-to-classic approach – 18 normalization methods, 4 distance measures for interval-valued data and 4 MDS models yield a total of 288 MDS procedures.
- In the symbolic-to-symbolic approach – 18 normalization methods and 2 optimization methods, yield a total of 36 MDS procedures.

Table 4: Groups of normalization methods resulting in identical distance matrices

Groups of normalization methods	Normalization methods	
	GDM1 distance	**Minkowski distances, squared Euclidean distance***
A	n1, n6, n12	n1, n6, n12
B	n2, n6a	n2, n6a
C	n3, n3a, n4, n7, n13	n3, n3a, n4, n7, n13
D	n9, n10	n9, n10

** after dividing distances in each distance matrix by the maximum value.*
Source: Walesiak and Dudek (2017).

3. Perform MDS for each procedure separately. The procedures are ordered by increasing values of:

   - $Stress\text{-}1$ fit measure in the classic-to-classic and symbolic-to-classic approaches (see e.g. Borg *et al*. (2018), p. 32):

$$Stress\text{-}1_p = \sqrt{\sum_{i<k}\left[d_{ik}(\mathbf{V}) - \hat{d}_{ik}\right]^2 / \sum_{i<k} d_{ik}^2(\mathbf{V})}, \tag{5}$$

where: p – MDS procedure number, $\hat{d}_{ik}$ – d-hats, disparities, target distances or pseudo distances (see Borg and Groenen (2005), p. 199), $\hat{d}_{ik} = f(\delta_{ik})$ by defining f in different ways (ratio, interval, polynomial MDS).

   - $I\text{-}Stress$ fit measure in the symbolic-to-symbolic approach (Groenen *et al.* 2006, p. 363):

$$I\text{-}Stress_p = \frac{\sum_{i<k}^{n} w_{ik}\left[\delta_{ik}^u - d_{ik}^u\right]^2 + \sum_{i<k}^{n} w_{ik}\left[\delta_{ik}^l - d_{ik}^l\right]^2}{\sum_{i<k}^{n} w_{ik}\left[\delta_{ik}^u\right]^2 + \sum_{i<k}^{n} w_{ik}\left[\delta_{ik}^l\right]^2}, \tag{6}$$

where: $\delta_{ik}^l, \delta_{ik}^u$ (d_{ik}^l, d_{ik}^u) – the lower and upper bound of the dissimilarity in *m*-dimensional space (*q*-dimensional space), w_{ik} – nonnegative weight (in general $w_{ik} = 1$).

4. Calculate the Hirschman-Herfindahl index (Herfindahl (1950); Hirschman (1964)) using Stress per point (*spp*) values (Stress contribution in percentages) in the classic-to-classic and symbolic-to-classic approaches:

$$HHI_p = \sum_{i=1}^{n} spp_{pi}^2, \tag{7}$$

where: $i, k = 1, \dots, n$ – object number.

In the symbolic-to-symbolic approach, the Hirschman-Herfindahl index is calculated on the basis of Interval stress per box (*ispb*) values (Interval Stress contribution in percentages),:

$$HHI_p = \sum_{i=1}^{n} ispb_{pi}^2, \tag{8}$$

where: $ispb_i = \frac{\left(\sum_{k=1}^{n} w_{ik}\left[\delta_{ik}^u - d_{ik}^u\right]^2 + \sum_{k=1}^{n} w_{ik}\left[\delta_{ik}^l - d_{ik}^l\right]^2\right)/n}{\sum_{i=1}^{n}\left[\left(\sum_{k=1}^{n} w_{ik}\left[\delta_{ik}^u - d_{ik}^u\right]^2 + \sum_{k=1}^{n} w_{ik}\left[\delta_{ik}^l - d_{ik}^l\right]^2\right)/n\right]} \cdot 100\%.$

The HHI_p index takes values in the interval $\left[\frac{10{,}000}{n}; 10{,}000\right]$. The value $\frac{10{,}000}{n}$ means that the distribution of errors for individual objects is uniform. The maximum value appears when the summary fit measure ($Stress\text{-}1$, $I\text{-}Stress$) is the result of loss assigned only to one object. For other objects, the loss function will be equal to zero. The optimal situation for an MDS procedure is the minimum value of the HHI_p index.

5. Draw a chart with $Stress\text{-}1_p$ ($I\text{-}Stress_p$) fit measure values on the *x*-axis and HHI_p index values on the *y*-axis for *p* procedures of MDS.

6. Use the maximum acceptable value of $Stress\text{-}1$ ($I\text{-}Stress$) as cs (it may be calculated as a mid-range or median of $Stress\text{-}1$ ($I\text{-}Stress$)). For all MDS, for which $Stress\text{-}1_p \leq cs$ ($I\text{-}Stress_p \leq cs$), we choose one where $\min_p\{HHI_p\}$.

7. Perform MDS for the selected procedure and check if interpretation results are acceptable. The correctness of the model scaling is evaluated using the Shepard diagram ($I\text{-}dist$ diagram) and $Stress$ ($I\text{-}Stress$) plot,. If the results are acceptable, the procedure ends, otherwise it returns to step 1 and MDS for three dimensions is performed (ndim=3).

Evaluation of tourism attractiveness of districts in Dolnoslaskie province (the classic-to-classic approach)

In the first application, we find the optimal solution for the classic-to-classic MDS approach. The `mdsOpt` package contains a dataset called `data_lower_silesian` containing 16 metric variables that describe tourism attractiveness of 31 objects (29 districts in Dolnoslaskie – Lower Silesia prov-

ince, plus the pattern and anti-pattern object). Variables x1-x3, x7, x8, x10-x16 are stimulants (where higher values are preferable), variables x4, x5 and x6 are destimulants (where lower values are preferable), and x9 is a nominant (preferable values lie within a certain range – 50% level was adopted as the optimal one). Variable x9 was transformed into a stimulant. The coordinates of the pattern object correspond to the most optimum values of the preference variable (the maximum for a stimulant, the minimum for a destimulant). The coordinates of the anti-pattern object correspond to the least optimum values of the preference variable (the minimum for a stimulant, the maximum for a destimulant).

Ten normalizations methods, five distance measures and 4 MDS models are used for selecting the optimal MDS procedure (see Script 1 in the Appendix).
Figure 1 shows the dependency between $Stress$-1 and HHI index with the best solution marked by the red circle. In the end we choose the MDS solution that satisfies condition $Stress$-1 $\leq cs$ and minimizes HHI.

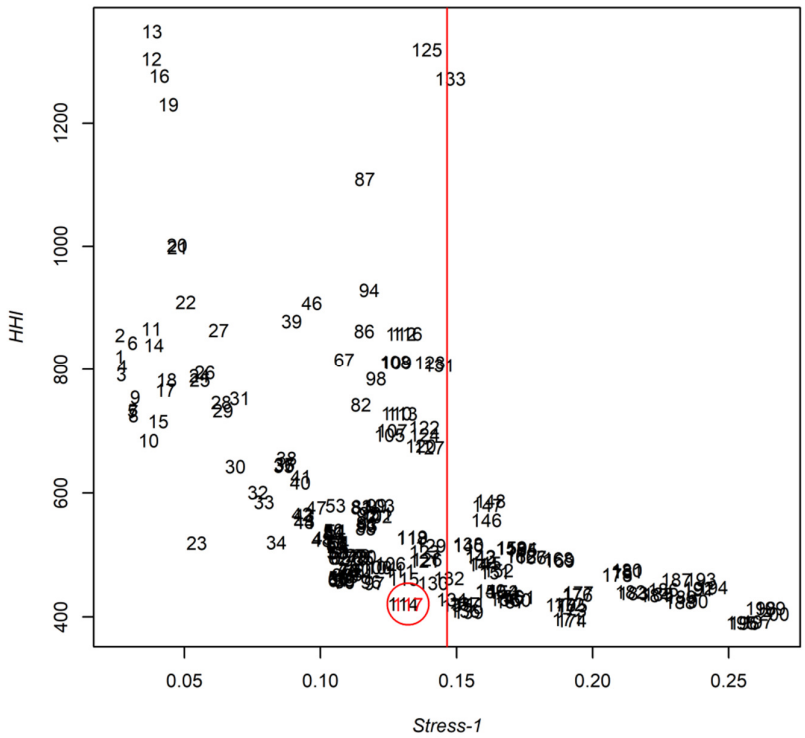

Fig. 1: The values of *Stress*-1 fit measure and *HHI* index for *p* MDS procedures (the best solution marked by the red circle)

The results of the optimal MDS procedure (117: n12a normalization method, Euclidean distance and interval MDS model), obtained by applying Script 2 from the Appendix, for 31 objects described in terms of tourism attractiveness are presented in Figure 2.

Figure 2 (a configuration plot with bubbles) shows the share of each object in total error, which is indicated by the radius of the circle around each object. The Shepard diagram and the Stress plot confirm the correctness of the selected scaling model. Figure 2 (a configuration plot with bubbles) includes the set axis, i.e. the shortest connection between the pattern and anti-pattern object. It indicates the level of tourism attractiveness of the districts. The objects located closer to the pattern object are rated higher in terms of tourism attractiveness.

For comparison with the best MDS procedure (117), we also include results from one of the worst procedures (13): n9a normalization method, mspline of third degree model, Chebyshev distance. These results can be obtained by running Script 3 from the Appendix, with changes in lines 3-5 in relation to script 2 and in the Shepard diagram.

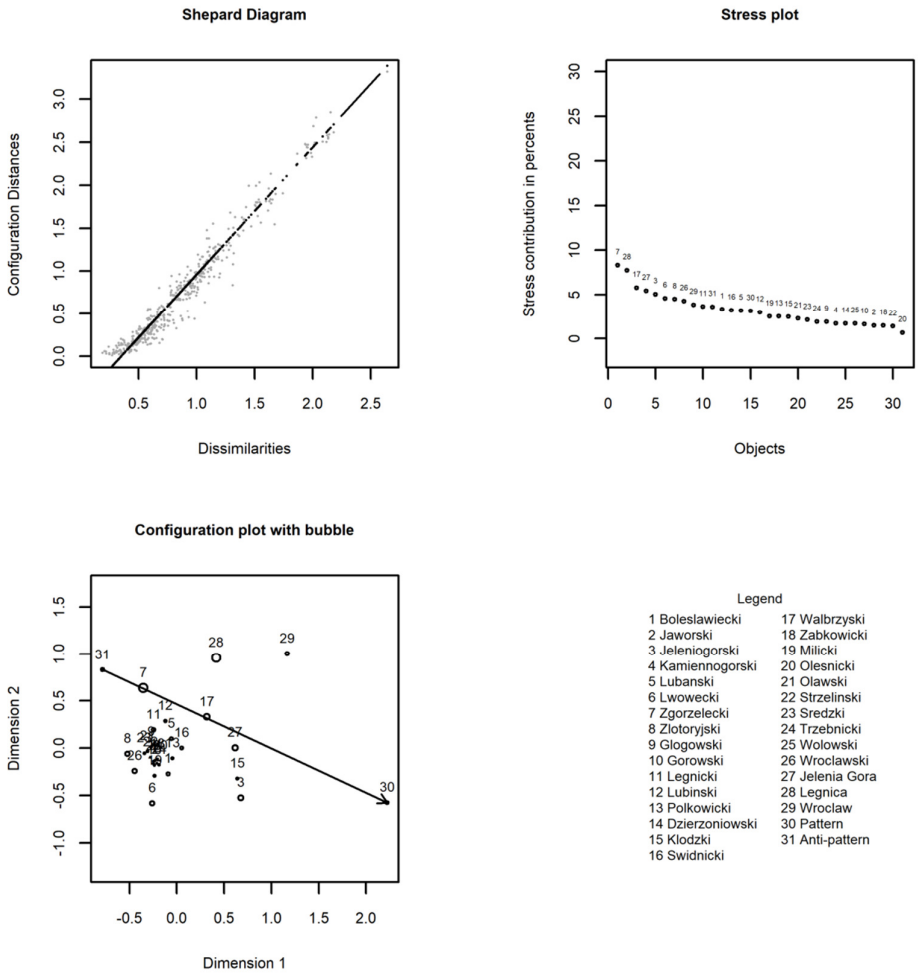

Fig. 2: The results of MDS (procedure 117) for 31 objects in terms of tourism attractiveness

The results of MDS for procedure 13 are presented in Figure 3.

Overall Stress for procedure 13 (0.0381) is much better than for procedure 117 (0.1322). Figure 3 (Stress plot) shows that objects Jeleniogorski (3), the anti-pattern (31) and Zgorzelecki (7) contribute most to the overall Stress (56.62%). It also shows (see the Shepard Diagram – in the lower left-hand corner) that two points (distance between Jeleniogorski (3) and the anti-pattern object (31); Jeleniogorski (3) and Zgorzelecki (7)) are outliers. These outliers contribute over-proportionally to total Stress. MDS configuration (Figure 3 – a configuration plot with bubbles) does not represent all proximities equally well. Jeleniogorski (3) is one of most highly rated districts in the province in terms of tourism attractiveness. In the configuration plot with bubbles, this district lies near the anti-pattern object (the worst object). As the value of the HHI_p index increases, the ability of multidimensional scaling to represent real relationships between objects deteriorates.

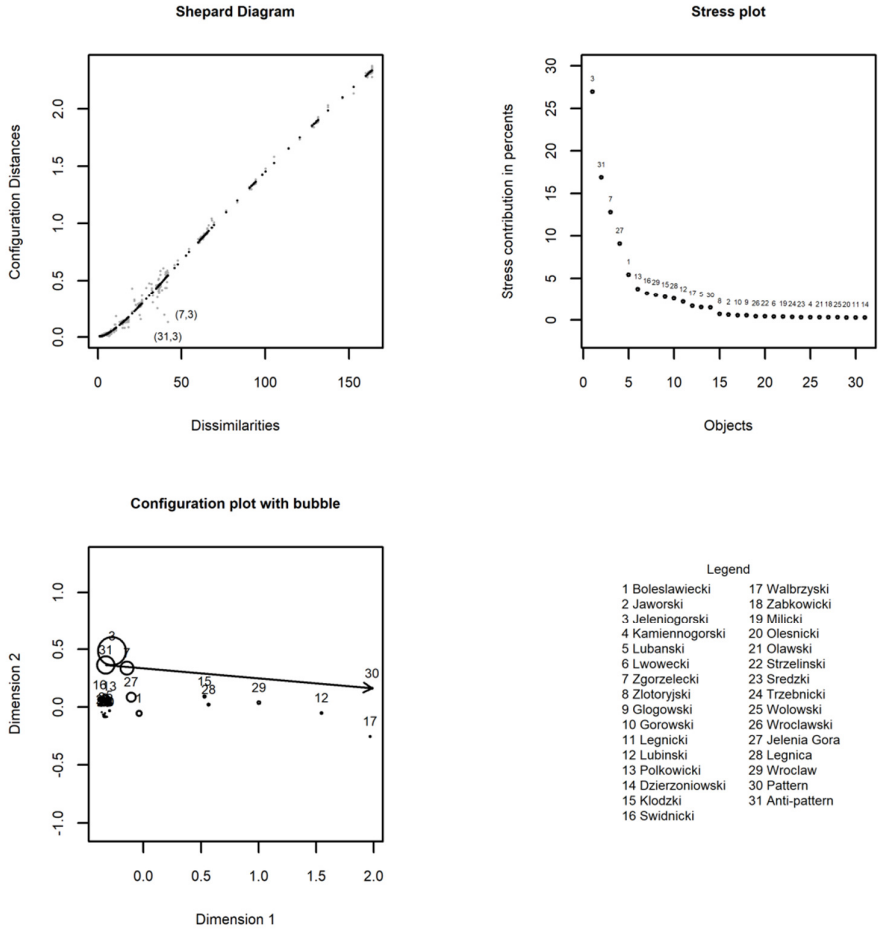

Fig. 3: The results of MDS (procedure 13) of 31 objects in terms of tourism attractiveness

Evaluation of tourism attractiveness of Polish provinces (symbolic-to-symbolic approach)

In the second application we find the optimal solution for the symbolic-to-symbolic MDS approach. The dataset `data_symbolic_interval_polish_voivodships` comes from the `clusterSim` package. Tourism attractiveness of Polish provinces in 2016 is evaluated using a dataset obtained in two steps.

Step 1. A dataset containing 9 metric variables describing tourism attractiveness for 380 districts was created. Three variables x4, x5 i x6 can be treated as destimulants. All other variables are stimulants.

Step 2. The data for districts were aggregated at province level yielding a set of interval-valued data. The lower bound of the interval for each variable was obtained by calculating the first quartile based on district data. The upper bound of the interval was calculating the third quartile. The final dataset contains data about 18 objects (16 provinces, plus the pattern and anti-pattern objects) described by 9 interval-valued variables.

18 normalizations methods (see Table 2) and two optimization methods (`"MM","BFGS"`) are used for selecting the optimal MDS procedure (with $I\text{-}scal$ algorithm). The results of the optimal MDS

procedure (5: n2 normalization method, "MM" optimization method), obtained by means of Script 4 from the Appendix, for 18 objects ranked in terms of tourism attractiveness are presented on Figure 4.

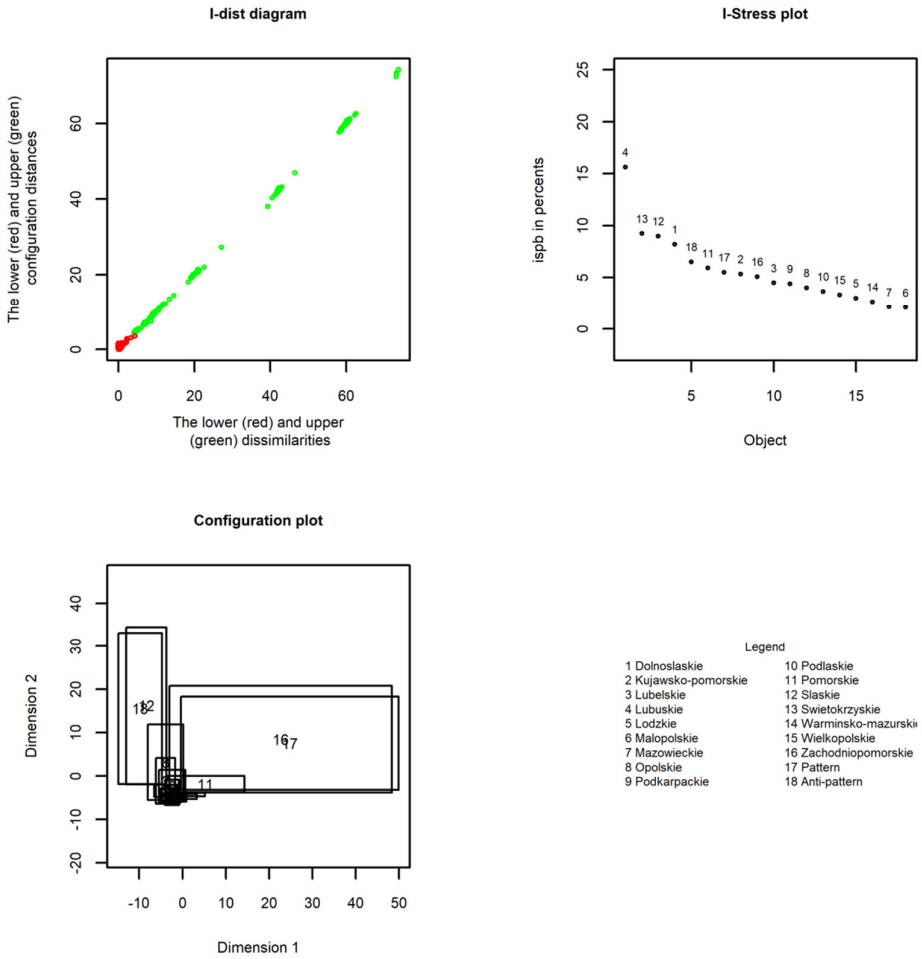

Fig. 4: The results of multidimensional scaling (procedure 5) of 18 objects in terms of tourism attractiveness

Figure 4 ($I\text{-}dist$ diagram and $I\text{-}Stress$ plot) confirms the correctness of the MDS results (Configuration plot). Objects located closer to the pattern of development are characterized by a higher level of tourism attractiveness.

For comparison with the best MDS procedure (5), we include the results from one of the worst procedures (12), in terms of the HHI index. These results can be obtained by running Script 5 from the Appendix, with changes in lines 3-5 in relation to script 4 and in the $I\text{-}dist$ diagram.

The results of multidimensional scaling for procedure 12 are presented in Figure 5.

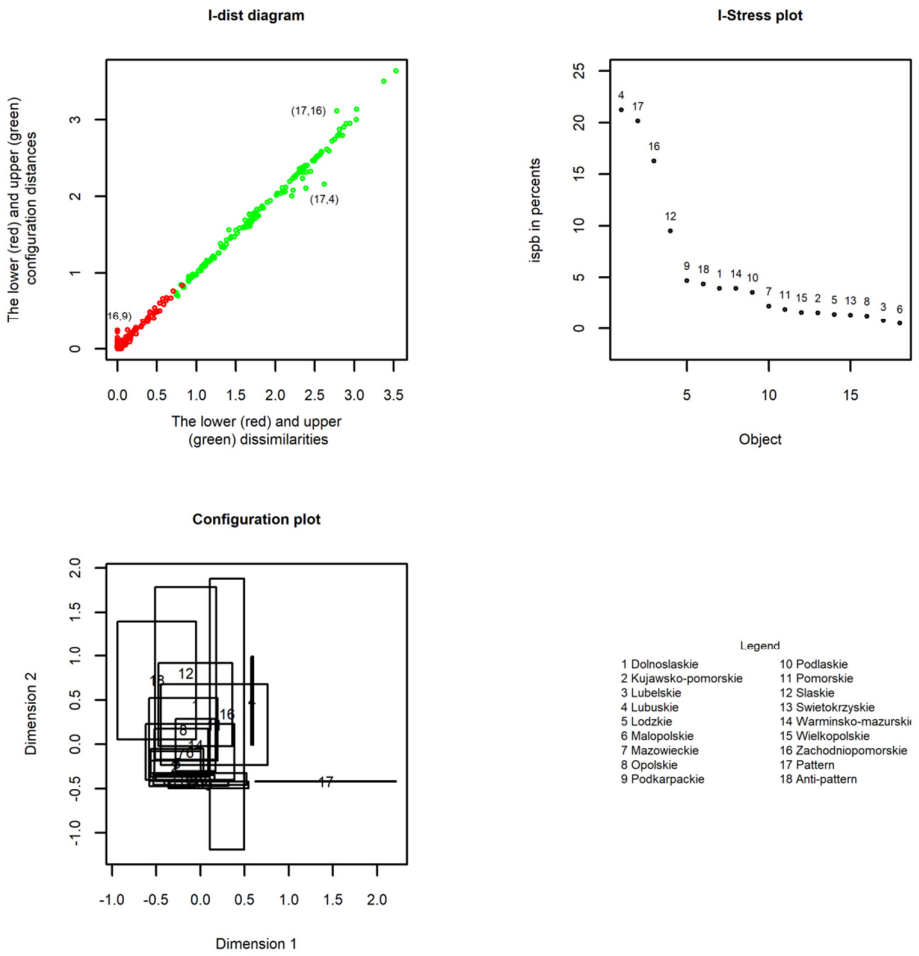

Fig. 5: The results of multidimensional scaling (procedure 5) of 18 objects in terms of tourism attractiveness

Figure 5 ($I\text{-}Stress$ plot) shows that Lubuskie (4), the pattern object (17) and Zachodniopomorskie (16) contribute most to overall $I\text{-}Stress$ (57.68%). It also shows (see Figure 5 – $I\text{-}dist$ diagram) that some points (upper distances between Zachodniopomorskie (16) and the pattern object (17); the pattern object (17) and Lubuskie (4); the lower distance between Zachodniopomorskie (16) and Podkarpackie (9)) are outliers. These outliers contribute over-proportionally to total $I\text{-}Stress$. MDS configuration (Figure 5 – Configuration plot) does not represent all proximities equally well. Zachodniopomorskie (16) is the most highly rated province in terms of tourist attractiveness. However, in Figure 5 (Configuration plot) it lies further away from the pattern object than Lubuskie (4). As the value of the HHI_p index increases, the ability of multidimensional scaling to represent real relationships between objects deteriorates.

Summary

The article proposes a method for selecting the optimal MDS procedure for classical metric and interval-valued data. In the classic-to-classic approach the best MDS procedure is selected by choosing an optimal combination of normalization methods, distance measures and scaling models based on the metric data matrix. In the symbolic-to-classic approach the best MDS procedure is selected by choosing an optimal combination of normalization methods, distance measures for interval-valued

data and scaling models based on an interval-valued data table. In the symbolic-to-symbolic approach the best MDS procedure is selected by choosing an optimal combination of normalization and optimization methods carried out on the basis of the interval-valued data table.

The optimal MDS procedure was selected by applying two criteria implemented in the `mdsOpt` package: Kruskal's $Stress$-1 fit measure and the Hirschman-Herfindahl HHI index (in the classic-to-classic and symbolic-to-classic approaches) and the $I\text{-}Stress$ fit measure and the HHI index (in the symbolic-to-symbolic approach).

In step 6 the maximum acceptable value of the fit measures $Stress$-1 and $I\text{-}Stress$ were arbitrarily chosen. It is not determined how much the error distribution for each object may deviate from the uniform distribution. In the case of MDS procedures for which $Stress\text{-}1 \leq cs$ ($I\text{-}Stress \leq cs$) the one with $min\{HHI_p\}$ is selected. This constraint does not essentially limit the presented proposal, as additional acceptability criteria, such as the Shepard diagram (De Leeuw and Mair (2015)) and Stress plot or $I\text{-}dist$ diagram and $I\text{-}Stress$ plot confirm the correctness of the MDS results.

Appendix

Script 1

```
library(mdsOpt)
data(data_lower_silesian)
metnor<-c("n1","n2","n3","n5","n5a","n8","n9","n9a","n11","n12a")
metscale<-c("ratio","interval","mspline")
metdist<-c("euclidean","manhattan","seuclidean","maximum","GDM1")
res<-optSmacofSym_mMDS(data_lower_silesian,normalizations=metnor,
  distances=metdist,mdsmodels=metscale,spline.degrees=c(2:3),outDec=".",
  stressDigits=6,HHIDigits=2)
options(max.print=1200)
stress<-as.numeric(res[,"STRESS 1"])
hhi<-as.numeric(res[,"HHI spp"])
cs<-(min(stress)+max(stress))/2
t<-findOptimalSmacofSym(res,cs)
plot(stress[-t$Nr],hhi[-t$Nr],
  xlab="Stress-1",ylab="HHI",type="n",font.lab=3)
text(stress[-t$Nr],hhi[-t$Nr],labels=(1:nrow(res))[-t$Nr])
abline(v=cs,col="red")
points(stress[t$Nr],hhi[t$Nr],cex=5,col="red")
text(stress[t$Nr],hhi[t$Nr],labels=(1:nrow(res))[t$Nr],col="red")
```

Script 2

```
library(mdsOpt)
data(data_lower_silesian)
z<-data.Normalization(data_lower_silesian,type="n12a")
d<-dist(z,method="euclidean")
res<-smacofSym(delta=d,ndim=2,type="interval")
par(mfrow=c(2,2),pty="s")
#Shepard Diagram
plot(res,plot.type="Shepard",cex.main=0.8,cex.lab=0.8,
  cex.axis=0.8,cex=0.2)
#Stress plot
spp<-sort(res$spp,decreasing=TRUE)
names(spp)<-order(res$spp,decreasing=TRUE)
plot(spp,main="Stress plot",ylab="Stress contribution in percents",
  xlab="Objects",ylim=c(-2,30),cex=0.4,cex.main=0.8,
  cex.lab=0.8,cex.axis=0.8)
```

```
text(spp,pos=3,names(spp),cex=0.4)
#Configuration plot with bubble
bubsize=res$spp/length(spp)*4
plot(res$conf,main="Configuration plot with bubble",xlab="Dimension 1",
  ylab="Dimension 2",cex=bubsize,cex.main=0.8,cex.lab=0.8,
  cex.axis=0.8,asp=1)
text(res$conf[,1],res$conf[,2],pos=3,1:nrow(res$conf),cex=0.7)
arrows(res$conf[nrow(z),1],res$conf[nrow(z),2],res$conf[nrow(z)-1,1],
  res$conf[nrow(z)-1,2],length=0.05,col="black")
plot.new()
legend("center",paste(1:nrow(res$conf),rownames(res$conf)),
  bty="n",cex=0.7,ncol=2,title="Legend")
```

Script 3

```
z<-data.Normalization(data_lower_silesian,type="n9a")
d<-dist(z,method="maximum")
res<-smacofSym(delta=d,ndim=2,type="mspline",spline.degree=3)
...
#Shepard Diagram
plot(res,plot.type="Shepard",cex.main=0.8,cex.lab=0.8,
  cex.axis=0.8,cex=0.2)
t1<-as.matrix(res$delta)
t2<-as.matrix(res$confdist)
text(t1[7,3],t2[7,3],pos=4,"(7,3)",cex=0.6)
text(t1[31,3],t2[31,3],pos=1,"(31,3)",cex=0.6)
```

Script 4

```
library(smds)
library(mdsOpt)
data("data_symbolic_interval_polish_voivodships")
data<-data_symbolic_interval_polish_voivodships
normalized<-interval_normalization(x=data,dataType="simple",type="n2")
x<-normalized$simple[,,1];y<-normalized$simple[,,2]
my.idiss<-idistBox(X=(x+y)/2,R=(y-x)/2)
cmat<-(my.idiss[2,,]+my.idiss[1,,])/2
iniX<-cmdscale(as.dist(cmat),k=2)
n=dim(my.idiss)[2]
iniR<-matrix(rep(1,n*2),nrow=n,ncol=2)
res.box<-IMDS(IDM=my.idiss,p=2,model="box",opt.method="MM",
  report=1001,ini=list(iniX,iniR))
y_l<-res.box$IDM[1,,];x_u<-res.box$IDM[2,,]
x_l<-res.box$EIDM[1,,];y_u<-res.box$EIDM[2,,]
spb<-ispb(res.box$EIDM,my.idiss)
HHI<-sum(spb^2)
par(mfrow=c(2,2),pty="s")
#I-dist diagram
plot(x_u,y_u, main="I-dist diagram",
  ylab="The lower (red) and upper (green)\n configuration distances",
  xlab="The lower (red) and upper\n (green) dissimilarities",
  col="green",cex.main=0.8,cex.lab=0.8,cex.axis=0.8,cex=0.5)
points(x_l,y_l,col="red",cex=0.5)
#I-Stress plot
w<-sort(spb,decreasing=TRUE)
names(w)<-order(spb,decreasing=TRUE)
plot(w,main="I-Stress plot",xlab="Object",ylab="ispb in percents",
```

```
  ylim=c(-2,25),cex=0.4,cex.main=0.8,cex.lab=0.8,cex.axis=0.8)
text(w,pos=3,names(w),cex=0.6)
#Configuration plot
x<-(res.box$X-res.box$R);y<-(res.box$X+res.box$R)
plot(NULL,xlim=c(min(x[,1]),max(y[,1])),ylim=c(min(x[,2]),max(y[,2])),
  pch=1,cex=0.4,main="Configuration plot",xlab="Dimension 1",
  ylab="Dimension 2",cex.main=0.8,cex.lab=0.8,asp=1,cex.axis=0.8)
rect(x[,1],x[,2],y[,1],y[,2])
text(res.box$X[,1],res.box$X[,2],labels=1:18,cex=0.8)
plot.new()
legend("center",legend=paste(1:dim(data)[[1]],attr(data,"row.names")),
  bty="n",ncol=2,cex=0.65,title="Legend")
```

Script 5

```
normalized<-interval_normalization(x=data,dataType="simple",type="n5a")
...
res.box<-IMDS(IDM=my.idiss,p=2,model="box",opt.method="BFGS",
  report=1001,ini=list(iniX,iniR))
...
#I-dist diagram
plot(x_u,y_u,main="I-dist diagram",
  ylab="The lower (red) and upper (green)\n configuration distances",
  xlab="The lower (red) and upper\n (green) dissimilarities",col="green",
  cex.main=0.8,cex.lab=0.8,cex.axis=0.8,cex=0.5)
points(x_l,y_l,col="red",cex=0.5)
text(x_u[17,16],y_u[17,16],pos=2,"(17,16)",cex=0.6)
text(x_u[17,4],y_u[17,4],pos=1,"(17,4)",cex=0.6)
text(x_l[16,9],y_l[16,9],pos=3,"(16,9)",cex=0.6)
```

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The Choice of Variable Normalization Method in Cluster Analysis

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Abstract

One of the stages in cluster analysis, carried out on the basis of metric data (interval, ratio), is the choice of variable normalization method. This paper presents the proposal of two procedures (for clustering algorithms based on distance matrix and data matrix), which allows for the isolation of the groups of normalization methods that lead to similar clustering results. The proposal can reduce the problem of choosing the normalization method in cluster analysis. The results are illustrated via simulation study and empirical example with application of clusterSim package and R program.

Keywords: Normalization of Variables, Cluster Analysis, Real Estate Market, Clustersim

Introduction

The normalization of variables in the statistical multivariate analysis is carried out when the variables describing the analyzed objects are measured on metric scales (interval or ratio). The characteristics of measurement scales were discussed e.g. in the studies by (Stevens (1946); Walesiak (2011), pp. 13-16). The purpose of normalization is to achieve the comparability of variables.

The comparison of normalization methods can be analyzed from the perspective of a particular statistical method application in a multivariate analysis. In a situation where methods of cluster analysis, multidimensional scaling, linear ordering based on aggregate measures are used in empirical studies, metric variables must be brought to comparability through normalization transformations. Other methods of statistical multivariate analysis do not require prior normalization transformation.

For the purposes of cluster analysis Milligan and Cooper (1988) conducted simulation studies discussing the influence of variable normalization method choice on exploring class structure (6 normalization methods from Table 1 were used: n1, n4, n6, n7, n8, n10). Similar studies, based on real data sets, were carried out by Schaffer and Green (1996).

The presented article follows a different approach. The study covers 18 variable normalization methods available in the `data.Normalization` function of `clusterSim` package (Walesiak and Dudek (2019)). The overview of variable normalization methods is presented in the study by Walesiak (2014). Two research procedures were suggested, which allows for the isolation of the groups of normalization methods that lead to similar clustering results. The presented proposals can reduce the problem of choosing the normalization method in cluster analysis.

Cluster Analysis For Metric Data – General Procedure

The general procedure used in cluster analysis of the set of objects is as follows (see e.g. Milligan (1996), pp. 342-343; Walesiak (2004)):

a) based on metric data and distance matrix:

$$P \rightarrow A \rightarrow X \rightarrow [x_{ij}] \rightarrow N \rightarrow D \rightarrow K \rightarrow NC \rightarrow V \rightarrow I, \quad (1)$$

where: P – choice of research problem in cluster analysis,
A – selection of objects to cluster,
X – selection of variables,
$[x_{ij}]$ – collecting data and the construction of data matrix (x_{ij} – value for *j*-th variable for *i*-th object),
N – choice of variable normalization method (z_{ij} – normalized value for *j*-th variable for *i*-th object),
D – selection of distance measure and the construction of distance matrix $[d_{ik}]$,
K – selection of clustering method,
NC – determining the number of clusters,
V – validation of clustering results,
I – interpretation and profiling of clusters.

b) based on metric data and normalized data matrix:

$$P \rightarrow A \rightarrow X \rightarrow [x_{ij}] \rightarrow N \rightarrow K \rightarrow NC \rightarrow V \rightarrow I, \quad (2)$$

Among the basic cluster analysis methods, based on distance matrix, the following are included: agglomerative and deglomerative hierarchical methods, *k*-medoids method (pam), spectral clustering method and *k*-means method for the data matrix based methods. The characteristics of the above-mentioned methods is provided e.g. in the studies by Anderberg (1973), Kaufman and Rousseeuw (1990), Gordon (1999), Ng, Jordan and Weiss (2002), Everitt *et al.* (2011). These methods are available in the following packages: `cluster` (Maechler *et al.* (2019)) – functions: `agnes`, `diana` and `pam`; `stats` (R Core Team (2019)) – functions `kmeans` and `hclust`; `clusterSim` (Walesiak and Dudek (2019)) – function `speccl`; `kernlab` (Karatzoglou, Smola and Hornik (2019)) – function `specc`.

Normalization of variables

The choice of variable normalization method remains one of the cluster analysis stages carried out based on metric data. The purpose of variable normalization is their comparability by means of depriving the measurement results of values and unifying their orders of magnitude. The first aim of normalization is unequivocal. It constitutes the sine qua non condition of normalization. The second aim is not unequivocal, hence it allows various solutions in this matter. The unification of magnitude orders is obtained e.g. by the unification of all variable values in terms of variability measured by standard deviation (median absolute deviation for positional measures) or by means of ensuring range stability for the normalized values of variables. In general terms, the unification of magnitude orders is obtained by introducing the uniformly specified zero value for all variables (A_j parameter in formula (3)), to be followed by rescaling variable values (B_j in formula (3)).

Table 1 presents the normalization methods of linear transformation (see e.g. Jajuga and Walesiak (2000), pp. 106-107; Zelias (2002), p. 792):

$$z_{ij} = b_j x_{ij} + a_j = \frac{x_{ij} - A_j}{B_j} \; (b_j > 0), \quad (3)$$

where: x_{ij} – value for *j*-th variable for *i*-th object, z_{ij} – normalized value for *j*-th variable for *i*-th object, A_j – shift parameter to arbitrary zero for *j*-th variable, B_j – scale parameter for *j*-th variable, $a_j = -A_j/B_j$, $b_j = 1/B_j$ – parameters for *j*-th variable presented in Table 1.

Column 1 in Table 1 presents the type of normalization method adopted as the function `data.Normalization` of `clusterSim` package (Walesiak and Dudek (2019)):

```
data.Normalization(x,type="n0",normalization="column")
```

where: `x` – vector, matrix or dataset,
`type` – type of normalization (see column 1 in Table 1),
`"n0"` – without normalization, `"column"` – normalization by variable, `"row"` – normalization by object.

Table 1: Normalization methods

Type	Method of normalization	Parameter		Measurement scale	
		b_j	a_j	before normalization	after normalization
n1	Standardization	$1/s_j$	$-\bar{x}_j/s_j$	ratio or interval	interval
n2	Positional standardization	$1/mad_j$	$-med_j/mad_j$	ratio or interval	interval
n3	Unitization	$1/r_j$	$-\bar{x}_j/r_j$	ratio or interval	interval
n3a	Positional unitization	$1/r_j$	$-med_j/r_j$	ratio or interval	interval
n4	Unitization with zero minimum	$1/r_j$	$\min_i\{x_{ij}\}/r_j$	ratio or interval	interval
n5	Normalization in range $[-1;1]$	$\frac{1}{\max_i\lvert x_{ij}-\bar{x}_j\rvert}$	$\frac{-\bar{x}_j}{\max_i\lvert x_{ij}-\bar{x}_j\rvert}$	ratio or interval	interval
n5a	Positional normalization in range $[-1;1]$	$\frac{1}{\max_i\lvert x_{ij}-med_j\rvert}$	$\frac{-med_j}{\max_i\lvert x_{ij}-med_j\rvert}$	ratio or interval	interval
n6	Quotient transformations	$1/s_j$	0	ratio	ratio
n6a		$1/mad_j$	0	ratio	ratio
n7		$1/r_j$	0	ratio	ratio
n8		$1/\max_i\{x_{ij}\}$	0	ratio	ratio
n9		$1/\bar{x}_j$	0	ratio	ratio
n9a		$1/med_j$	0	ratio	ratio
n10		$1\Big/\sum_{i=1}^{n} x_{ij}$	0	ratio	ratio
n11		$1\Big/\sqrt{\sum_{i=1}^{n} x_{ij}^2}$	0	ratio	ratio
n12	Normalization	$\frac{1}{\sqrt{\sum_{i=1}^{n}\left(x_{ij}-\bar{x}_j\right)^2}}$	$\frac{-\bar{x}_j}{\sqrt{\sum_{i=1}^{n}\left(x_{ij}-\bar{x}_j\right)^2}}$	ratio or interval	interval
n12a	Positional normalization	$\frac{1}{\sqrt{\sum_{i=1}^{n}\left(x_{ij}-med_j\right)^2}}$	$\frac{-med_j}{\sqrt{\sum_{i=1}^{n}\left(x_{ij}-med_j\right)^2}}$	ratio or interval	interval

`n13`	Normalization with zero being the central point	$\frac{1}{r_j/2}$	$-\frac{m_j}{r_j/2}$	ratio or interval	interval

$\bar{x}_j$ – mean for *j*-th variable, s_j – standard deviation for *j*-th variable, r_j – range for *j*-th variable, $m_j = \left(\max_i\{x_{ij}\} + \min_i\{x_{ij}\}\right)/2$ – mid-range for *j*-th variable, $med_j = \underset{i}{med}(x_{ij})$ – median for *j*-th variable, $mad_j = \underset{i}{mad}(x_{ij})$ – median absolute deviation for *j*-th variable.

Source: authors' compilation based on the studies by: Anderberg (1973); Borys (1978); Grabinski (1992), pp. 35-38; Jajuga (1981); Jajuga and Walesiak (2000); Milligan and Cooper (1988); Mlodak (2006); Rybaczuk (2002), p. 147; Walesiak (2002), p. 19; Walesiak (2014), pp. 364-365; Walesiak (2018).

Table 1 presents the normalization formulas according to variables. Analogical formulas can be presented for normalization by objects. Normalization by objects is founded when all variables are expressed in the same unit of measurement. It is true in case of e.g. structural studies. Further discussion will refer to the normalization by variables.

All the discussed normalization methods, being linear transformations of each variable (separately), retain the skewness and kurtosis of the distribution of variables. In addition, for each pair of variables all normalization methods retain the value of Pearson product-moment correlation coefficient (see Jajuga and Walesiak (2000), p. 111).

Research procedure allowing the isolation of the groups of normalization methods leading to similar clustering results of the set of objects

In the cluster analysis, carried out on the basis of distance matrix, the research procedure which allows isolating the groups of variable normalization methods that lead to similar clustering results of the set of objects covers the following steps:

1. The following stages are carried out in accordance with the general cluster analysis procedure $P \to A \to X \to [x_{ij}] \to N$. All acceptable methods presented in Table 1 are used in the normalization of variables (18 normalization methods are possible for ratio variables, whereas for interval variables – 10 normalization methods).

Table 2: Distance measures for metric (interval, ratio) data

Name	Distance d_{ik}	Range	Allowed normalization	Package (function)
Minkowski $p \geq 1$	$\sqrt[p]{\sum_{j=1}^{m} \lvert z_{ij} - z_{kj} \rvert^p}$	$[0; \infty]$	n1-n13	`stats` (`dist`)
Manhattan $p = 1$	$\sum_{j=1}^{m} \lvert z_{ij} - z_{kj} \rvert$	$[0; \infty]$	n1-n13	`stats` (`dist`)
Euclidean $p = 2$	$\sqrt{\sum_{j=1}^{m} (z_{ij} - z_{kj})^2}$	$[0; \infty]$	n1-n13	`stats` (`dist`)
Chebyshev (maximum) $p \to \infty$	$\max_j \lvert z_{ij} - z_{kj} \rvert$	$[0; \infty]$	n1-n13	`stats` (`dist`)
GDM1 Walesiak (2002); Jajuga, Walesiak and Bak (2003)	$\frac{1}{2} - \frac{\sum_{j=1}^{m} a_{ikj} b_{kij} + \sum_{j=1}^{m} \sum_{\substack{l=1 \\ l \neq i,k}}^{n} a_{ilj} b_{klj}}{2\left[\sum_{j=1}^{m} \sum_{l=1}^{n} a_{ilj}^2 \cdot \sum_{j=1}^{m} \sum_{l=1}^{n} b_{klj}^2\right]^{0,5}}$ $a_{ipj} = x_{ij} - x_{pj}$ for $p = k, l$ $b_{krj} = x_{kj} - x_{rj}$ for $r = i, l$	$[0; 1]$	n1-n13	`clusterSim` (`dist.GDM`)

Bray-Curtis Bray and Curtis (1957); Cormack (1971), p. 367	$\frac{\sum_{j=1}^{m}\lvert z_{ij}-z_{kj}\rvert}{\sum_{j=1}^{m}\lvert z_{ij}+z_{kj}\rvert}$	[0; 1]	n6-n11	`clusterSim` (`dist.BC`)
Canberra Lance and Williams (1966)	$\sum_{j=1}^{m}\frac{\lvert z_{ij}-z_{kj}\rvert}{\lvert z_{ij}+z_{kj}\rvert}=\sum_{j=1}^{m}\frac{\lvert x_{ij}-x_{kj}\rvert}{\lvert x_{ij}+x_{kj}\rvert}$	[0; 1]	n6-n11	`stats` (`dist`)

$i, k, l = 1 \dots, n$ – object number, n – number of objects, $j = 1, \dots, m$ – variable number, m – number of variables, $z_{ij}(z_{kj}, z_{lj})$ – normalized value for j-th variable for i-th (k-th, l-th) object.
Source: authors' compilation.

2. For all normalized data matrices $[z_{ij}^{r}]$ distances between objects are calculated (see e.g. distance measures in Table 2) and grouped in distance matrices $[d_{ik}^{r}]$ (r – number of normalization method). 18 distance matrices are obtained for ratio variables and 10 distance matrices for interval variables. Canberra distance measure does not depend on B_j scale parameter (Pawelek (2008), p. 94). Therefore, the acceptable normalization methods n6-n11 do not change this distance value. Canberra distance will not be discussed further in the article.

3. Cluster analysis is carried out for each distance matrix $[d_{ik}^{r}]$ in the clustering from 2 to u classes (maximum u is $n-1$). One of many classification methods based on distance matrix can be applied in this case (see e.g. Everitt *et al.* (2011)). Next the compatibility of clustering results, obtained for different normalization methods using the adjusted Rand index is compared in pairs for the same number of clusters (Hubert and Arabie (1985), p. 198):

$$R_{rs,c}=\frac{\sum_{p,q}\binom{n_{pq}}{2}-\sum_{p}\binom{n_{\cdot p}}{2}\sum_{q}\binom{n_{q\cdot}}{2}/\binom{n}{2}}{\frac{1}{2}\left[\sum_{p}\binom{n_{\cdot p}}{2}+\sum_{q}\binom{n_{q\cdot}}{2}\right]-\sum_{p}\binom{n_{\cdot p}}{2}\sum_{q}\binom{n_{q\cdot}}{2}/\binom{n}{2}} \tag{4}$$

where: r, s – numbers of normalization methods,

$c = 2, \dots, u$, c – number of classes, n – number of classified objects,
C_{rc}, C_{sc}– clustering of A set of objects into c classes for r and s normalization method,
$p = 1, \dots, c$ – class number in C_{rc} clustering, $q = 1, \dots, c$ – class number in C_{sc} clustering,
n_{pq} – number of objects covered by p and q classes simultaneously in C_{rc} and C_{sc} clusterings,
$n_{\cdot p}$ – number of objects in p class for C_{rc} clustering,
$n_{q\cdot}$ – number of objects in q class for C_{sc} clustering.

The adjusted Rand index $R_{rs,c}$ takes values in the interval $[-\infty; 1]$. The comparison results are averaged for the clustering results from 2 to u classes:

$$\bar{R}_{rs}=\frac{\sum_{c=2}^{u}R_{rs,c}}{u-1} \tag{5}$$

The adjusted Rand index is available in `classAgreement` function of `e1071` library (Meyer et al. (2019)).

4. For the cluster analysis purposes the averaged values of adjusted Rand index are transformed into distances:

$$d_{rs}=1-\bar{R}_{rs} \tag{6}$$

Cluster analysis (using the same classification method as in step 3) is carried out on the basis of distance matrix $[d_{rs}]$, which allows isolating the groups of variable normalization methods that lead to similar clustering results. Due to the possibility of graphic presentation of the normalization methods' classification results in a dendrogram form, agglomeration hierarchical methods are used in the article (`hclust` function of `stats` package).

The observations regarding normalization methods for GDM1 distance measure and Bray-Curtis distance are presented in Table 3.

Table 3: Groups of normalization methods resulting in identical distances in the distance matrix determined using GDM1 distance and Bray-Curtis distance

Groups of normalization methods	Normalization methods	
	GDM1 distance	Bray-Curtis distance
A	n1, n6, n12	–
B	n2, n6a	–
C	n3, n3a, n4, n7, n13	–
D	n9, n10	n9, n10

Source: authors' compilation.

The identical distance matrices for A, B, C and D groups of methods result from the fact that GDM1 measure does not depend on the shift parameter A_j applied in normalization methods. Moreover, multiplying the normalized values by the constant changes neither GDM1 nor Bray-Curtis distance.

It was demonstrated in the study of Pawelek (2008), p. 94 that the values of Minkowski distance measures (Manhattan, Euclidean, Chebyshev) do not depend on A_j shift parameter applied in the normalization methods. Therefore, identical distance matrices are obtained for the groups of normalization methods presented in Table 4.

Table 4: The groups of normalization methods resulting in identical distance matrices for Minkowski distances

Groups of normalization methods	Normalization methods	
	N1	N2
A	n1, n6	n1, n6, n12*
B	n2, n6a	n2, n6a
C	n3, n3a, n4, n7	n3, n3a, n4, n7, n13*
D	–	n9, n10*

** – for this normalization method distance matrix is multiplied by a constant.*
N2 – after dividing distances in each distance matrix by the maximum value.
Source: authors' compilation.

In the cluster analysis, carried out on the basis of distance matrix, the research procedure, which allows isolating the groups of variable normalization methods that lead to similar clustering results of the set of objects, covers the below presented steps:

1. The following stages are carried out in accordance with the general cluster analysis procedure $P \rightarrow A \rightarrow X \rightarrow [x_{ij}] \rightarrow N$. All acceptable methods presented in Table 1 are used in the normalization of variables (18 normalization methods are possible for ratio variables, whereas for interval variables – 10 normalization methods).

2. For each normalized data matrix $[z_{ij}^r]$ cluster analysis is carried out (e.g. using k-means method) from 2 to u classes (maximum u is $n-1$). Next the compatibility of classification results, obtained for different normalization methods using the adjusted Rand index $R_{rs,c}$, is compared in pairs according to formula (4). The comparison results are averaged for the clustering results from 2 to u classes in accordance with (5).

3. For the cluster analysis purposes the averaged values of adjusted Rand index are transformed into distances according to formula (6). Cluster analysis (using classification methods based on dis-

tance matrix) is conducted on the basis of distance matrix $[d_{rs}]$, which allows isolating the groups of variable normalization methods leading to similar clustering results of the set of objects. Due to the possibility of graphic presentation of the normalization method classification results in a dendrogram form the agglomeration hierarchical methods are used in the article.

For the *k*-means classification method the identical results of the clustering results of the set of objects are obtained for the groups of normalization methods presented in Table 5.

Table 5: Groups of normalization methods leading to identical clustering results of the set of objects for *k*-means method

Groups of normalization methods	Normalization methods
A	n1, n6, n12
B	n2, n6a
C	n3, n3a, n4, n7, n13
D	n9, n10

Source: authors' compilation.

In case of *k*-means method the identical clustering results of the set of objects for the groups of A, B, C and D normalization methods result from applying the criterion of minimizing the inter-class covariance matrix trace (see formula 5.9 in the study by Everitt *et al.* (2011), p. 114).

An application to Boston data

The set of data covering the real estate market in Boston is accessible at UCI Machine Learning Repository: Housing Data Set. Moreover, the set of data is available in `MASS` (Ripley (2019)) package. The set covers 14 variables. The study uses 12 metric variables. The left out variables are the second ZN (proportion of residential land zoned for lots over 25,000 sq. ft.) and the fourth one CHAS (Charles River dummy variable, 1 if tract bounds river; 0 otherwise):

CRIM – per capita crime rate by town,
INDUS – proportion of non-retail business acres per town,
NOX – nitric oxides concentration (parts per 10 million),
RM – average number of rooms per dwelling,
AGE – proportion of owner-occupied units built prior to 1940,
DIS – weighted distances to five Boston employment centers,
RAD – index of accessibility to radial highways,
TAX – full-value property-tax rate per $10,000,
PTRATIO – pupil-teacher ratio by town,
B – $1000(B_k - 0.63)^2$ where B_k is the proportion of blacks by town,
LSTAT – % lower status of the population,
MEDV – median value of owner-occupied homes in $1000's.

The research procedure from part 4 was used in the article (cluster analysis carried out based on the normalized data matrix using *k*-means method – see script from Appendix) allowing to isolate the groups of variable normalization methods leading to similar clustering results of the set of objects.

The measurement of variables on a ratio scale allows the application of all normalization methods (hence the study covered 18 methods). Due to the fact that the groups of A, B, C and D normalization methods give, for *k*-means method, identical clustering results of the set of objects (see Table 5) further analysis covers the first methods of the groups indicated (n1, n2, n3, n9), as well as the other methods (n5, n5a, n8, n9a, n11, n12a).

The groups of variable normalization methods leading to similar clustering results of the set of objects are presented by means of a dendrogram on Figure 1.

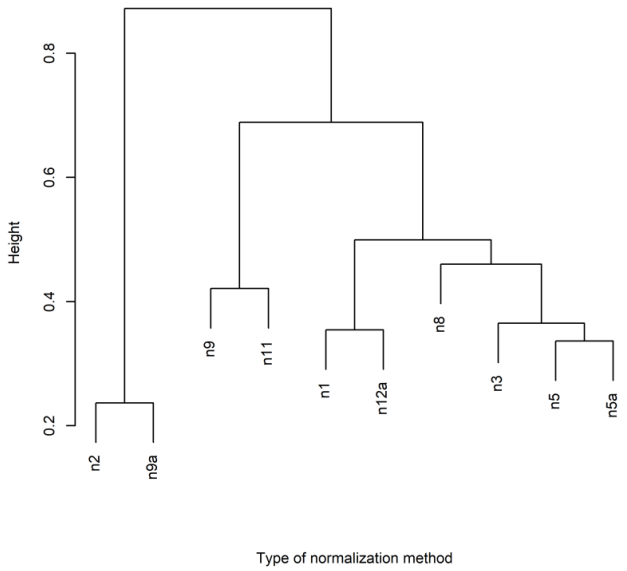

Fig. 1: The dendrogram of normalization methods similarity in cluster analysis of 506 real estates in Boston using *k*-means method

Source: authors' compilation using R program.

Five groups of normalization methods were isolated on the basis of the dendrogram, which lead to similar clustering results of the set of objects (normalization methods giving identical cluster analysis results are presented in brackets):

group 1 (3 methods): (n2, n6a), n9a
group 2 (3 methods): (n9, n10), n11
group 3 (4 methods): (n1, n6, n12), n12a
group 4 (1 method): n8
group 5 (7 methods): (n3, n3a, n4, n7, n13), n5, 5a

The indices for determining the relevant number of clusters in a data set presented in packages `nbClust` (Charrad *et al.* (2014); Charrad *et al.* (2015)) and `clusterSim` (Walesiak and Dudek (2019)) can be used in the selection of the number of clusters.

In the analyzed case the significant differences between cluster analysis results occur in case of normalization methods from different groups. The presented proposal allows reducing the problem of variable normalization method choice.

The results of simulation analyses

Data sets are generated in nine different scenarios (see Table 6) using R program and packages: `clusterSim` (Walesiak and Dudek (2019)), `clusterGeneration` (Qiu and Joe (2015)), `sn` (Azzalini (2019)), `cluster` (R Core Team (2019)). Simulation models differ in the number of clusters, the number of objects, the number of outliers, the number of variables, the number of noisy (irrelevant) variables, and the density and shape of clusters (data are generated from different distributions).

The research procedure discussed in section 4 (cluster analysis carried out based on the normalized data matrix using k-means method) was used in simulation analyses for each model from Table 6:

1. Normalization of variables was carried out using 10 methods: n1, n2, n3, n5, n5a, n8, n9, n9a, n11, n12a.

2. For each normalized data matrix $\left[z_{ij}^{r}\right]$ (r – the number of normalization method) cluster analysis is carried out using k-means method from 2 to u cluster ($u = 3\sqrt{n}$). Next the compatibility of clustering results, obtained for different normalization methods, using the adjusted Rand index $R_{rs,c}$ is compared in pairs according to formula (4). The comparison results are averaged for the clustering results from 2 to $u = 3\sqrt{n}$ clusters in accordance with (5).

3. For the cluster analysis purposes the averaged values of adjusted Rand index are transformed into distances according to formula (6).

4. Steps 1 – 3 are repeated 20 times (twenty realizations were generated from each model). Results of twenty matrices $[d_{rs}]$ are averaged $\left[\bar{d}_{rs}\right]$.

5. Cluster analysis (using the group average method) is carried out on the basis of distance matrix $\left[\bar{d}_{rs}\right]$, which allows for the isolation of the groups of variable normalization methods that lead to similar clustering results.

Table 6: Characteristics of data sets used in simulations

No.	Name	Distribution	*nc*	*no*	*o*	*v*	*nv*	Parameters	R package (function)
1	sM	Multivariate normal	5	*A*	0	2	1	Centroid of clusters: (10; 10), (10; 20), (15; 15), (20; 10), (20; 20), $\Sigma = \begin{bmatrix} 0.5 & 0.3 \\ 0.2 & 0.5 \end{bmatrix}$	clusterSim (cluster.Gen)
2	eM	Multivariate normal	3	*B*	10	3	1	Centroid of clusters: (1.5, 6; –3), (3; 12; –6), (4.5; 18; –9), Σ: $\sigma_{jj} = 1 (1 \leq j \leq 3)$ $\sigma_{12} = \sigma_{13} = -0.9$, $\sigma_{23} = 0.9$	clusterSim (cluster.Gen)
3	fM	Multivariate normal	4	*C*	20	2	1	Centroid of clusters: (10; 10), (15; 19), (25; 10), (15; 1), $\Sigma_1 = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, $\Sigma_2 = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$, $\Sigma_3 = \begin{bmatrix} 1 & 0.33 \\ 0.33 & 1 \end{bmatrix}$, $\Sigma_4 = \begin{bmatrix} 1 & 0.22 \\ 0.22 & 1 \end{bmatrix}$	clusterSim (cluster.Gen)
4	bDS	Multivariate normal	4	*D*	15	3	1	Degree of separation = 0.93 (Qiu and Joe (2006))	clusterGeneration (genRandomClust)
5	sDS	Multivariate normal	5	*E*	0	5	0	Degree of separation = 0.36 (Qiu and Joe (2006))	clusterGeneration (genRandomClust)
6	sT	Multivariate skew-*t* distribution	3	*F*	0	2	0	Ω ($\omega_{jj} = 1$, $\omega_{jl} = 0.5$), $\alpha = 0.5$, 6 degrees of freedom	sn (rmst)
7	sC	Skew Cauchy distribution	3	*G*	0	2	0	Ω ($\omega_{jj} = 1$, $\omega_{jl} = 0.3$), $\alpha = 0.2$, 7 degrees of freedom	sn (rmsc)
8	u	Uniform distribution	3	*H*	0	3	0	Uniform distribution in ranges (-3,-5,-6) ÷ (-2,-1,-4); (0,-3,1) ÷ (2,6,3); (3,2.5,2) ÷ (7, 4.5, 8)	stats (runif)
9	eC	Mixed distributions	11	*I*	0	2	0	Four clusters from multivariate normal distribution, two "bulls-eye", three elongated clusters from multivariate normal distribution, two "worms" clusters	clusterSim (cluster.Gen, shapes.bulls.eye, shapes.worms)

nc – the number of clusters, no – the number of objects, o – the number of outliers, v – the number of variables, nv – the number of noisy variables, Σ – covariance matrix, Ω – a symmetric positive-definite matrix of dimension (d, d)*;* α *– a numeric vector of length* d *which regulates the slant of the density,* $d = length(alpha)$*;* $A = (40, 40, 40, 40, 40)$*;* $B = (50, 50, 50)$*;* $C = (35, 40, 45, 50)$*;* $D = (20, 30, 40, 65)$*;* $E = (35, 35, 35, 35, 35)$*;* $F = (100, 100, 100)$*;* $G = H = (100, 100, 100)$*;* $I = (15, 15, 15, 15, 160, 160, 15, 15, 15, 40, 40)$*. Models: sM – simpleMultivariate, eM – elongatedMultivariate, fM – fancyMulivariate, bDS – bigDegreeOfSeparation, sDS – smallDegreeOfSeparation, sT – skewT, sC – skewCauchy, u – uniff, eC – elevenClusters.*
Source: authors' compilation.

The groups of variable normalization methods leading to similar clustering results of the set of objects are presented by dendrograms on Figures 2 and 3 (for data sets generated via nine models from Table 6 and average model).

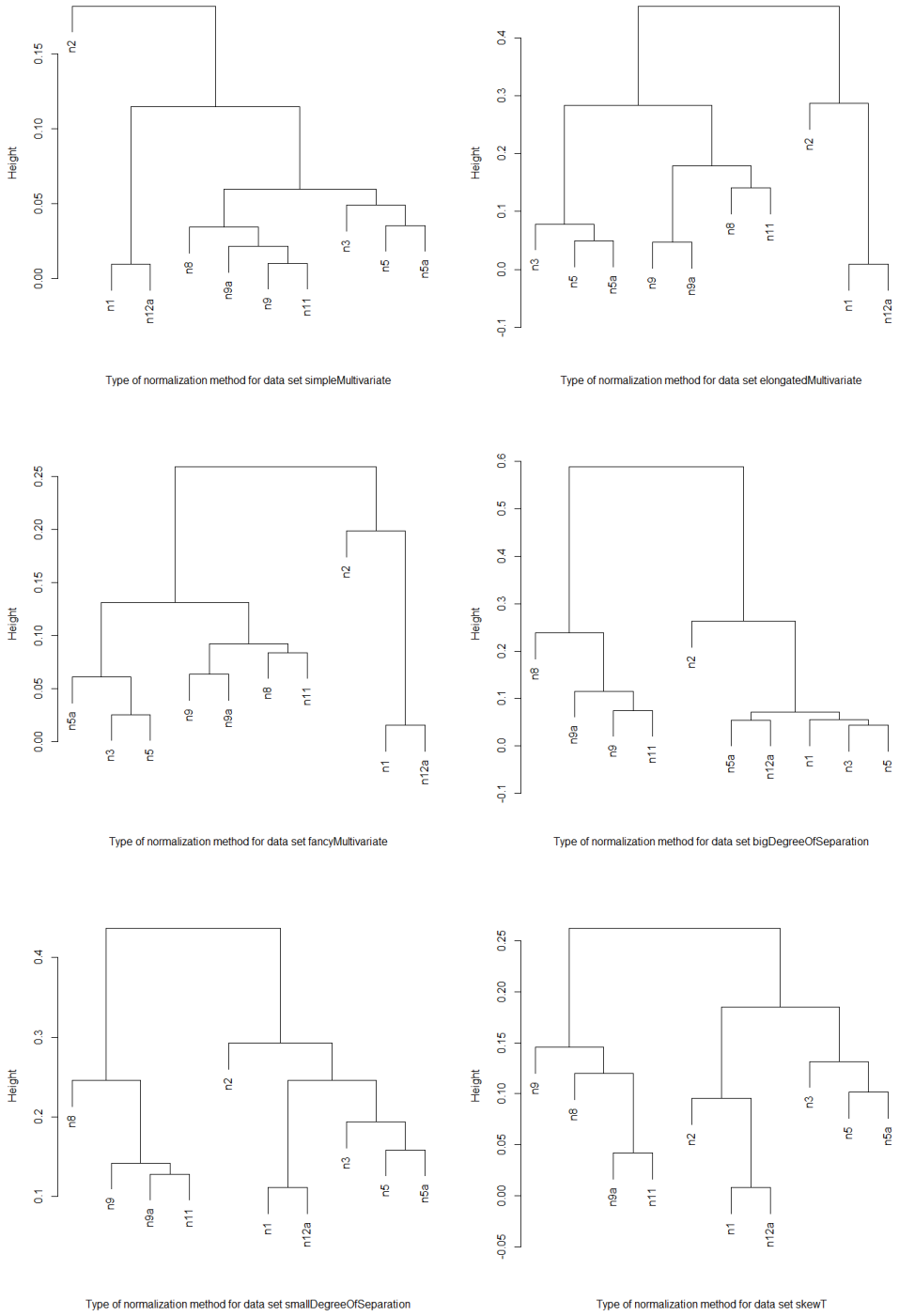

Fig. 2: Dendrograms of variable normalization methods leading to similar clustering results for data sets generated via models 1 6 from Table 6

Source: authors' compilation using R program

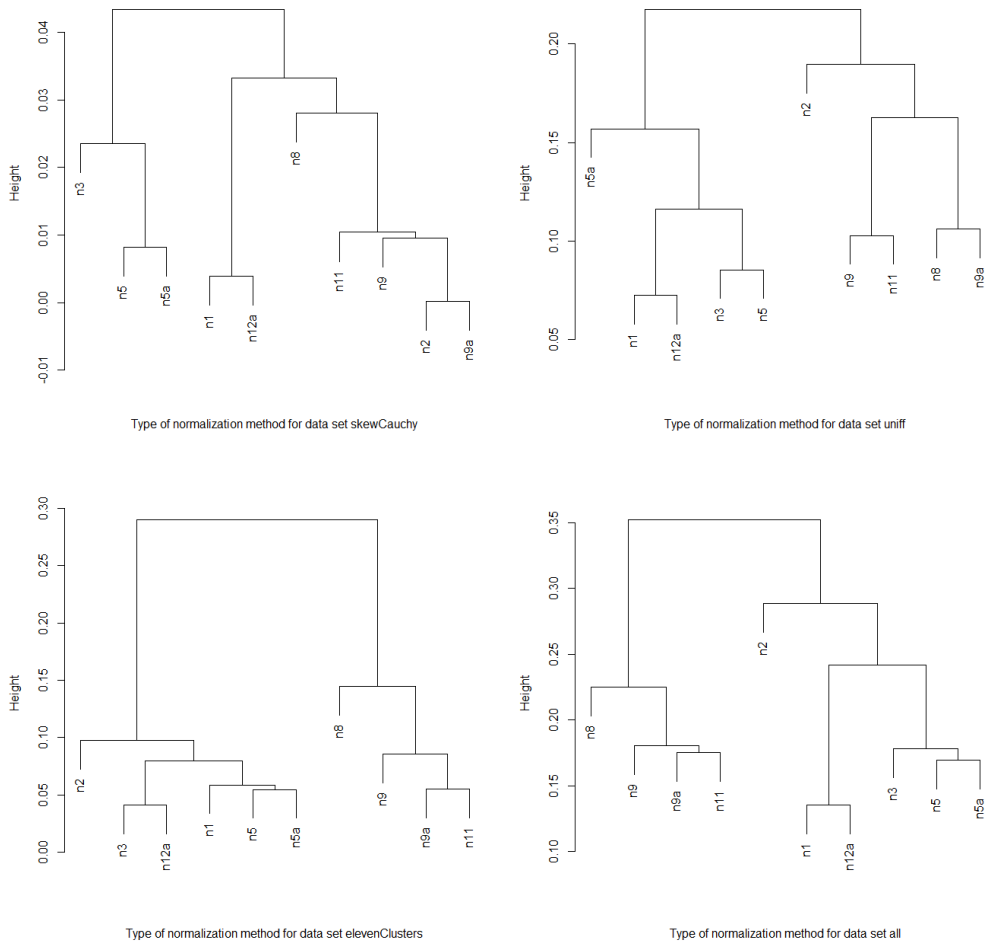

Fig. 3: Dendrograms of variable normalization methods leading to similar clustering results for data sets generated via models 7 9 from Table 6 and average model
Source: authors' compilation using R program

The following conclusions can be drawn from the results presented on Figures 2 and 3:

- we can isolate three groups of normalization methods, based on dendrogram for data set "all", which lead to similar clustering results of the set of objects: (n1, n3, n5, n5a, 12a); (n8, n9, n9a, n11); (n2),
- similar clustering results of the set of objects for data sets generated for nine models from Table 6 we receive for normalization methods n1 and n12a,
- similar clustering results of the set of objects for data sets generated for nine models from Table 6 we receive for normalization methods n3, n5 and n5a,
- for normalization method n2 we obtain significantly different cluster analysis results.

Final Remarks

The article presents the proposal of two research procedures which allow reducing the problem of variable normalization method choice in cluster analysis carried out on the basis of distance matrix and normalized data matrix.

The normalization methods were identified for GDM1 and Bray-Curtis distance measures, which give identical distance matrices and thus identical clustering results of the set of objects. Analogical observations were presented for Minkowski distance measures (Manhattan, Euclidean, Chebyshev).

The groups of normalization methods, leading to identical clustering results of the set of objects, were identified for the k-means method.

In practice, without taking into account the proposed procedures, making a choice of normalization method of variables in cluster analysis for metric data we had the list of 18 methods to choose from (see Table 1). Considerations included in Table 3, 4 and 5 reduce this number to 10 methods of normalization.

The choice still becomes arbitrary and difficult to justify. The proposed approach does not solve the problem completely, but it can reduce the possibilities of choosing the normalization method. De facto we can choose as many normalization methods, as there are separate groups of them (normalization methods located in the same groups give identical or similar clustering results).

The proposed reduction of normalization methods used in simulation studies could have large impact of complexity of simulations studies eliminating redundant paths. It also explains why sometimes for various normalization methods could give identical results

The research results were illustrated by simulation study and two empirical examples using the proposed R program scripts.

Appendix

Script (Boston data with 506 objects – cluster analysis based on metric data and normalized data matrix)

```
library(clusterSim)
data(Boston)
x<-Boston[,c(-2,-4)]
n<-nrow(x)
m<-ncol(x)
metnor<-c("n1","n2","n3","n5","n5a","n8","n9","n9a","n11","n12a")
mn<-length(metnor)
c<-30
maxNumberOfClasses<-c
resultsClusters<-array(0,c(mn,maxNumberOfClasses-1,n))
resultsRand<-array(0,c(mn,mn))
for(i in 1:mn){
  for(j in 2:maxNumberOfClasses){
    for(k in 1:m){
       nn<-as.matrix(data.Normalization(x,type=metnor[i]))
       clusters<-kmeans(nn, nn[initial.Centers(nn,j),])$cluster
       resultsClusters[i,j-1,]<-clusters
    }
  }
}
for(i in 1:mn){
  for(j in 1:mn){
   avgRand<-0
   for(k in 2:(maxNumberOfClasses)){
    avgRand<-avgRand+comparing.Partitions(cl1=resultsClusters[i,k-1,],
             cl2=resultsClusters[j,k-1,],type="crand");
    }
```

```
    resultsRand[i,j]<-avgRand/(maxNumberOfClasses-1)
  }
}
print("Matrix of average values of the adjusted Rand index")
rownames(resultsRand)<-metnor
colnames(resultsRand)<-metnor
print(round(resultsRand,3))
hc<-hclust(as.dist(1-resultsRand),method="complete")
plot(hc,labels=metnor,sub=NULL,ann=FALSE,axes=FALSE,main=NULL)
title(xlab="Type of normalization method",ylab="Height",font.main=1)
axis(2)
```

Acknowledgments

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Public Information Policy in Health Care Sector: Ukrainian Perspectives

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Abstract

This article substantiates importance of public health information policy in the conditions of forming and implementing the state information policy in the society through informatization of medical services. In addition, the need in reforming current health care system by introducing an effective information policy to improve the accessibility and quality of health care in Ukraine was proved. The purpose of the article is to determine the prospects for the development of public information policy in health care system of Ukraine through informatization. The methodological basis of the study is data obtained from the World Health Organization, Global Observatory on eHealth, Stanford University Medical Center, National Health Service of Ukraine, Ministry of Health of Ukraine, State Statistics Service of Ukraine. It was proved that Ukraine has one of the worst indicators among health care systems in the European region countries due to low life expectancy, high mortality rate, low GDP per capita, insufficient public funding for health care. The main targets of developing public information policy in health care of Ukraine were defined: electronic prescription, verification of the central database of the electronic health care system, online dashboard, visualized information, stats cards, electronic medical cards. The optimal ways of informing the Ukrainian healthcare sector were proposed: introduction of electronic patient register; equipping workplaces with electronic information systems, development of information technology infrastructure in medicine, organization of effective electronic data exchange, integration of information systems of health care facilities with each other, with other information products and systems, improving information support of management activities in health care facilities.

Keywords: Public Information Policy, Health Care Sector, Informatization, E-Medicine, Ehealth

Introduction

The peculiarities of social development in the conditions of globalization processes and features of the information space require the strengthening of the role of a state in providing objective, reliable information guaranteeing the protection of the national information space. The state provides these functions through the conduct of public information policy. The public information policy provides a reasonable conceptual framework for examining issues at the national and regional levels. The effectiveness of information policy depends on the determined strategic country goals; the political, economic and defence situation in countries depend on the system of public administration that manages the information space. Ukraine is in dire need of further reform of the health care system and the reorientation of approaches to public administration and industry funding in order to improve the accessibility and quality of health care in the country through the implementation of effective information policies.

Analysis of recent research and publications. The issue of information technologies in the health care system has been subject to reserch in the scientific works of foreign researchers such as: Nik Azliza Nik Ariffin, Alwi Mohd Yunus and Dr. Zuhaida Che Embi (Azliza, Ariffin, Alwi Mohd Yunus and Zuhaida Che Embi, 2008), AizhanTursunbayevaab, MassimoFrancoa, ClaudiaPagliarib (Tursunbayevaab, Francoa and Pagliarib, 2017), Chaban, O. and Boyko, O. A. (Chaban and Boyko, 2019), Stepanov, V. Yu. (Stepanov, 2016) and others. The role of effective investment in the economic development of the country and the health sector are in particular devoted to the works of Orlova N., Marukhlenko O. (Orlova and Marukhlenko, 2018, Orlova and Kharlamova, 2014).

Marius Schönberger and Andrejs Čirjevskis identify information technology and information systems as an important economic factor for health care and highlight the most important success factors for health information projects (Schönberger and Čirjevskis, 2017).

Muhammad Anshari and Mohammad Nabil Almunawar's research focuses on e-health relationship management strategies that will help healthcare organizations improve their engagement with customers, avoid potential conflicts, and promote healthcare (Anshari and Mohammad Nabil Almunawar, 2012).

Patrik Pucer, Boštjan Žvanut and Damjan Vavpotič analyse the use of information technology in healthcare curricula, including e-learning. The best practices presented in scientific research prove that the use of modern information and communication technologies should be considered in the future as an important component of health education curricula (Pucer, Žvanut and Damjan Vavpotič, 2016).

The main features of modern economic modelling of health care and assessment of information and communication technologies, prospects of their development are presented in the works of Janneke P.C. Grutters, Tim Govers, Jorte Nijboer, Marcia Tummers, Gert Jan van der Wilt, Maroeska M. Rovers (Grutters, Govers, Nijboer, Tummers, Gert Jan van der Wilt, Rovers, 2019).

However, a significant number of problems related to peculiarities of the national model of public health policy remain sufficiently uncovered and are of great importance for the sustainable development of the country.

The purpose of the article is to determine the prospects for the development of public information policy in health care system of Ukraine through informatization.

The methodological basis of the study is data from the World Health Organization, Global Observatory on eHealth, Stanford University Medical Center, National Health Service of Ukraine, Ministry of Health of Ukraine, State Statistics Service of Ukraine.

Main Part of Research

The public health information policy aims at shaping the absolute priority of the value of human health and life in society. The public health information policy is to promote: a healthy lifestyle; proactive information and communication support for the development and implementation of the public health policy, changes in health care; the availability of information on the activities of health care entities, except for information with restricted access (Steliga, Semchuk, Roshak, Semkiv, Lelyuk-Wind and Ivanulak, 2011). The public health policy is implemented on the basis of the following principles: legality, cooperation, parity, openness, publicity, transparency and public opinion, historical continuity, sustainable development, objectivity, efficiency, accountability.

The public health information policy provides for the implementation and appliance of mechanisms:

- placement in the media of materials on social promotion of health, healthy lifestyles, development and implementation of the government health policy;
- regulation of the promotion of goods, services and conduct that adversely affect health;
- observance of objectivity and impartiality of information on health care and medical care (Verkhovna Rada of Ukraine, 2019).

National Health System is a set of human, financial, logistical, informational, educational and scientific resources aimed at preserving, restoring and strengthening health and preventing diseases, as well as a system of measures implemented on the territory of Ukraine by health care entities in accordance with their competence and authorities, determined by law, with the aim of preserving and restoring physiological and psychological functions, optimal performance and social activity of a person with the maximum biologically possible individual life expectancy.

Ukraine has one of the worst health systems in the European region. Ukraine ranks second in the European region in terms of mortality, which increased by 12.7%, while in the European Union, this figure fell by 6.7%. One of the key factors in this situation is the low economic development of the country. Ukraine's GDP is much lower per capita than even the lowest in the European Union (Fig.1). Given the economic crisis and the military conflict, the situation in 2015-2018 worsened.

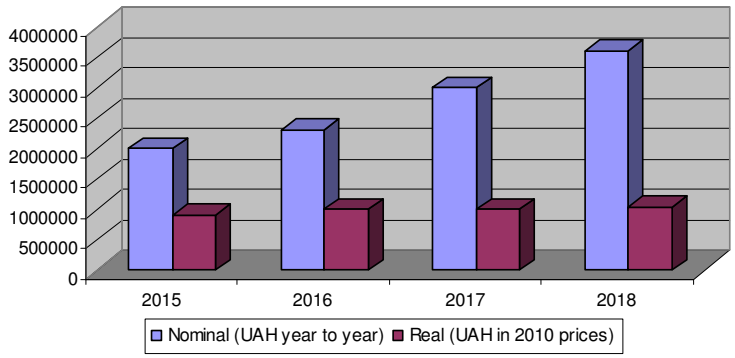

Fig.1: GDP of Ukraine in 2015-2018, UAH

Source: (State Statistics Service of Ukraine, 2019)

Another major cause of underperformance is the fundamental shortcomings accumulated in the healthcare system. Healthcare expenditures accounted for an average of 51% of the total (about 4% of GDP). Private health expenditures in Ukraine in relation to public health were one of the highest in the EU and in Eastern Europe. The overwhelming majority of these expenditures (95%) were paid by households, and only 5% were from insurance payments, donor and international assistance. Budget expenditures mainly consisted of health care expenditures on salaries and utilities (about 75%) (Fig.2).

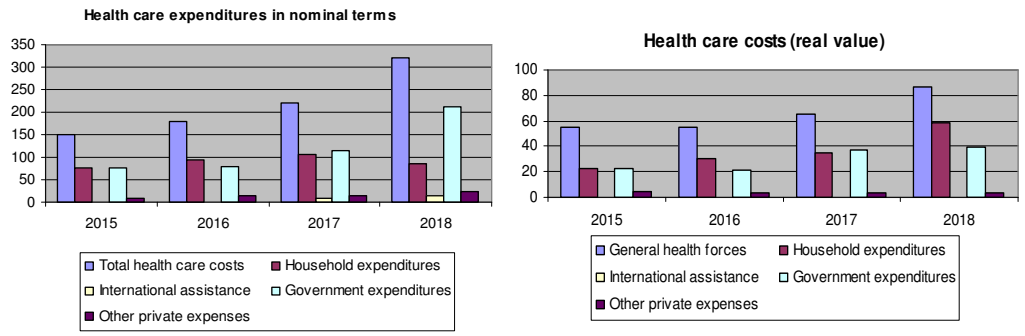

Fig.2: Health care expenditures in 2015-2018

Source: (Ministry of Health of Ukraine, 2019)

In such circumstances, there is very little financial capacity to actually provided services, that is, to treat patients, to purchase medicines and supplies, to upgrade technology funds, etc.

During 2015-2018, overall health care expenditures in Ukraine averaged 9% of GDP per year (approximately 5.9% from the state budget and about 2.4% from the private sector, mainly household expenditures), which is really not much different from the global and European trend. In the European region, overall health care spending is 8.9%, and in the world as a whole - 8.6%. However, due to low GDP, this per capita cost is only around US $ 200, which is significantly lower than the US average of US $ 3.340, which also includes Poland - US $ 809, Bulgaria - 612 US $ and Romania - US $ 476 (Ministry of Health of Ukraine, 2019).

The health budget is the lowest in comparison to other social sectors. The expenditures of the Ministry of Social Policy are two and a half times higher than the expenditures of the Ministry of Health (Fig. 3).

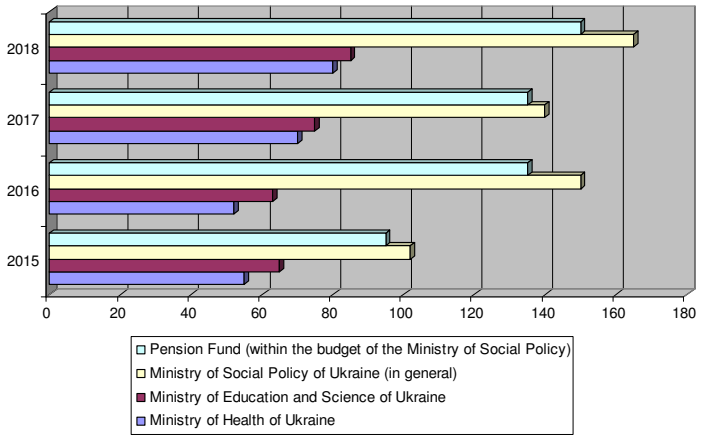

Fig. 3: Health expenditures in terms of other social spheres in 2015-2018, billion UAH

Source: (Ministry of Health of Ukraine, 2019)

Two-thirds of these expenditures are retirement benefits. The expenditures of the Ministry of Education and Science of Ukraine also exceed the expenditures of the Ministry of Health.

Thus, the Ukrainian health care system has the following characteristics:

- significant lag behind European countries in terms of life expectancy and mortality: in 2018, the difference in life expectancy in Ukraine and the European Union was almost ten years - 71.8 and 83.8, respectively;

- low GDP per capita, which does not provide the necessary level of health care expenditures and leaves patients without vital medical services and medicines;
- obsolescence and inefficiency of the health care system with rigid centralized management and funding procedures, which has led to a high level of corruption in all areas of the health care system, including procurement, education, attestation and employment of physicians, medical assistance for lack of a transparent state-guaranteed package of medical services.

International Experience in the Development of Health Information Policy

Developed countries (USA, Europe, Japan, Canada, and Australia) have integrated (nationwide) programs to inform their health systems. The main idea behind such programs is to integrate, in the final analysis, all of their components (information systems (ISs) of individual medical institutions, and further urban, district and regional - Regional Health Information Networks, Regional Health Information Organizations, Regional Health Information Management Systems) into a single IS of the whole country's health system, the so-called National Health Information Infrastructure, or the National Health Information Network. There are not many successful precedents of such IS in the world, because such a task is extremely difficult not only in technical, but also in organizational and financial terms, not to mention the complexity of creating medical information systems across the country.

Despite this, the number of projects in the field of Health Information Technologies (HIT) in the world is constantly increasing. In recent years, the field of development and implementation of IS medical facilities in the world has evolved. European organizations and commissions for information and communication technologies, which aim to integrate all national health information networks of EU countries and to provide for the population of these countries the action of a unified electronic health register (EHR) throughout the current European Union with national programs the only European Union e-health program that fulfils such priority tasks as standardization, provision of insurance coverage regardless of location, processing of medical information about the patient using information technology. EU investment in the e-health program, without relevant national programs, has already reached hundreds of millions of Euros (Chaban and Boyko, 2019).

A lot of work has been carried on creating common international standards in terms of storage, sharing and prompt access to medical data. ISO 13606-1: 2008 Health informatics has already been adopted: Electronic health record communication. Part 1: Reference model - Reference model for the transmission of electronic medical records. There is an active work on standardization of personal computer media of medical data (on smart cards, etc.). Therefore, medical information systems should also provide for the exchange of sensitive information using modern telecommunications.

An example of such a system, which accumulates modern IS design approaches and standards, is the Stanford Translational Research Integrated Database Environment (STRIDE) project, which aims to create a single centralized bank of biological and medical data used by physicians and researchers at Stanford University, its Stanford University Medical Center (SUMC), and the clinics and laboratories that are essential for its medical school (Eco Health of Ukraine, 2019). The project is based on current standards of modern IT. The main base of the project is the Stanford Center for Clinical Informatics, which belongs to the Stanford University School of Medicine's Office of Information Resources and Technology (IRT) (Chaban and Boyko, 2019).

In addition to building national information systems, the global community has experience in creating information systems internationally: Global Atlas and HealthMapper, which have been used by the World Health Organization (WHO) since the 1990s. The HealthMapper information system (containing demographic and health information, education data, community locations, roads, access to safe water) is used to monitor a range of infectious diseases in over 60 countries in all WHO regions.

WHO interprets e-Health as a cost-effective and reliable form of use of information and communication technologies in the interests of health and related industries, including health care

services, medical supervision, medical literature, medical education, health knowledge and research. E-Health will help address some of the important challenges facing health systems at national and regional levels due to demographic, epidemiological and socio-cultural changes.

Canadian health care system is one of the most effective in the world. The Canadian health care system requires that every Canadian, including children, have a special Health Card, which can at the same time be the identity card of their bearer. The introduction of a national electronic medical system involved the development of the Electronic Health Record - the process of collecting, storing and accessing an electronic patient card, in fact, the electronic health system of Canada. Citizens have a number of rights to receive information about any use of their data, the purpose of processing, and to challenge the methods of such processing.

Europe is the world leader in eHealth. Currently, almost all the EU Member States have developed eHealth strategies with defined goals and action plans, and there are already some developments in policy implementation. Leaders in the development of a regulatory framework adapted to the use of eHealth include such countries as the United Kingdom, Denmark, Estonia, Norway, Slovakia. Finland, France, Scotland, Sweden.

More than half of the UK clinics operate an electronic system that provides to any specialist within the system access to medical information. The Electronic Prescription Service in the UK is also being implemented as part of the Medicines Leave.

Denmark has developed an electronic patient record system. In France, a citizen's electronic medical card contains information about insurance and chronic illnesses. The patient's medical history and diagnostic results are stored in computer by the family doctor.

Health care in Sweden is decentralized, the laws are passed at the federal level, money is distributed only at the regional and municipal levels. Sweden spends only 2-3% of the budget allocated to health care to develop the IT solutions in medicine.

Since 2016, the introduction of electronic services in the medical field began in Germany. The patient records are stored electronically and in paper form. Family doctors have access to them. For these purposes, authorized persons (doctors) require secure access to patients' data, so they must be electronically identified using a special e-Arztausweis card.

The implementation of the national plan for the implementation of eHealth in Poland is vested in the Center for Health Information Systems, which reports to the Ministry of Health of Poland. All registers of existing health care establishments, pharmacies, laboratories, pharmaceutical companies, the central register of pharmacists, the register of doctors, nurses, other specialists in the medical field and medicines are collected on a single Platform of medical registers rejestrymedyczne.csioz.gov.pl

In most countries, it is possible to choose how to keep a record of your health (electronic or paper). Only in some countries, for example, in Finland, an electronic copy of the medical record is required. In Belgium, France, Italy, Spain, Switzerland the patient's consent to an electronic record of his or her health is required.

The analysis of the situation regarding confidentiality and protection of personal data in the EU countries and the European Economic Community concludes that in many countries the electronic health care system is managed by general law, including patient rights and data protection laws. Leaders who develop a regulatory framework adapted to the use of eHealth include the United Kingdom, Denmark, Estonia, Norway, Slovakia, Finland, France, Scotland, and Sweden (Stepanov, 2016).
In order to monitor the impact of IT on public health, WHO has initiated the creation of a Global Observatory on eHealth. One of its goals is to help improve healthcare by providing countries with strategic information on effective eHealth policies, organizations and standards, and promising investment directions. A series of publications by the Global Observatory address the question of

whether regulatory systems in the WHO Member States meet the requirements of protecting patient health information in the WHO.

According to the Global Observatory, 69% of countries have implemented, at least partially an electronic information system for registering births, deaths and causes of death: 58% of countries have initiated at least one eHealth initiative for monitoring and surveillance (using PS technology) of patients who require paediatric care; 42% of countries have developed a national health information policy or strategy (Stepanov, 2016).

Results

The main direction of modern information policy improvement in the context of integration into the world community is the transition of the state to online services, which will allow bringing services closer to the population, to ensure the democracy of the information society, to establish cooperation with electronic and print media. To achieve this goal, it is necessary to ensure efficient use of information resources in all spheres of activity, to modernize national information resources, to create the necessary conditions for the information and telecommunications infrastructure and technologies development.

At present, there is a set of issues to address the problems related to the implementation of information technology in medicine, which allows solving the most urgent ones concerning the practical medicine within the existing medical infrastructure and limited funding. Under current conditions, it is possible to use local medical informatics projects, and for a more global application, it is necessary to comply with unified requirements based on the application of world standards for the collection, storage, processing and exchange of the electronic version of medical information.

In order to keep up-to-date and accurate all the data stored in the central database of the electronic health care system, the National Health Service of Ukraine (NHSU) regularly takes steps to verify them. These processes are constantly being improved and new ones are being developed. In fact, the accuracy of the data in the system is a guarantee of the targeted use of public funds when paid to healthcare institutions under the contract with the NHSU. Regular verification of data is organized through several processes:

1. Deactivation of data on deceased patients, medical specialists, and other users in the system occurs according to the data of the State Register of Civil Status Acts of citizens in the last working week of each month. The Ministry of Justice's official data is uploaded to the electronic health system, verified with the CDB registry data and automatically deactivated according to a specific algorithm. As of 25.04.2019 191.595 such records were deactivated in the system according to this algorithm. Deactivation of data on medical specialists is made after approval by the Ministry of Health as the administrator of this register.

2. Online and offline deduplication prevents duplicate data from appearing in the system, detects and deactivates existing duplicate patient records, declarations, health professionals and specialists, as well as medical facilities. Online deduplication occurs in real time (24/7) when creating a new entry on the system. Offline deduplication of patient data and declarations is done using the automatic duplicate search and deactivation module. As of 25.04.2019, 450.537 such records were detected and deactivated in the electronic system. According to the results of the NHSU verification, the reports of medical providers and the recalculation of payments under the contract are refined.

3. Regularly, in accordance with the law, requests for action on the system data from identifiable applicants are reviewed. If necessary, data is deactivated, activated or deducted. Periodic decisions are also taken occasionally to take action on the data in the system based on the results of monitoring the implementation of contracts concluded with partner institutions. As of 25.04.2019, 2090 records have been deactivated in this electronic system. According to the verification results, payments were also recalculated (National Health Service of Ukraine, 2019).

Since April 2019, an updated API version 2.0, a system of interaction between the central database and medical information systems, to create a physician's electoral declaration has been functional. Advantages of API version 2.0 are the following:

- when creating and searching for a declaration, it is obligatory to indicate the individual tax number of the patient (if such a patient has a tax identification number (Individual tax ID);
- declarations for patients under 14 years old are optional, but may be specified for greater accuracy. If the Individual tax ID is not indicated, the appropriate marking (Individual tax ID is not indicated) is given and the series and number of the birth certificate are obligatory;
- for filing declarations of adults without Individual tax ID, an appropriate mark is affixed (Individual tax ID is missing) and it is obligatory to upload scanned documents with a mark that a person can take actions without Individual tax ID.

The list of data verification measures in the system is not exhaustive. At this time, the process of developing functionality to deactivate data created on the system during its testing, with errors, to prevent fraud (antifrod), etc., is on-going.

These measures are in the process of elaboration and are constantly being improved. Models and tools used for verification are also being reviewed.

Verification efforts are on-going to integrate the system with other state registers, which will allow data to be obtained from such registers.

The National Health Service of Ukraine pays great attention to the accuracy and relevance of all data in the system. An online dashboard has been launched by the National Health Service to help educate citizens about the scope of e-services to help analyse the dynamics of health care reform. The dashboard contains information about primary health care locations: an electronic location map with addresses and contact telephones, the distribution of facilities by region, the number of declarations of every physician in medical establishment, a distribution of declarations by age groups and doctor's specialties. Currently, the NHSU has 7 dashboards with real dynamic impersonal data, which are regularly updated and is a guarantee of transparency of the NHSU activities (National Health Service of Ukraine, 2019).

On September 25, 2015, the UN Member States approved at the UN Summit the Sustainable Development Goals 2016-2030, which are adhered to by all countries, setting their own development indicators. The document includes 17 goals and 169 specific objectives. One of the global development goals is "Strong health and well-being", aimed at ensuring a healthy lifestyle and promoting well-being for all at any age. E-medicine is a relatively new term for health care with the support of electronic processes and communications, which defines the activity of using electronic information resources in the field of health care and providing prompt access to healthcare professionals and patients.

The main areas of developing e-services in the field of health care include introduction of automated information industry systems, which, in particular, make it possible to switch to the electronic medical records; development of telemedicine; improving health monitoring system of the population; creation and introduction of new computer technologies of disease prevention, diagnostics, maintenance of medical processes; creation of publicly available electronic medical resources.

The key benefits of implementing e-medicine are improving the effectiveness and quality of treatment; speeding up the transfer of information on the results of examinations between different specialized clinics without transporting the patient (especially in critical situations); carrying out remote consultations by narrow specialists in territorially remote medical institutions; conducting medical consultations with specialists of medical institutions regardless of their location; reducing the time of patient examination.

E-medicine is relatively new term for Ukraine as well. On April 1, 2019, the government's Affordable Medicines Program was given to the National Health Service of Ukraine (NHSU). The NHSU concludes contracts with pharmacy establishments and is the sole payer of the program. During 2 years of the operation of the Affordable Medicines Program, over 35 million drug prescriptions were issued (for over 6.6 million people). Both communal and private pharmacies in the country have joined the project. As of April 8, 2019, 5383 pharmacies and chemists in Ukraine, both communal and private, took part in the government's Affordable Medicines program. The number of declarations stored in the eHealth system is to become 28.4 million. In 2018, the number of drugs prescriptions amounted to 18 million, for a sum of UAH 1 billion. In 2019, amount of prescriptions increased by 7 million, of which more than 80% (5.8 million) were received.

Electronic prescriptions are most actively prescribed for "Available medicines" in Dnipro (141.05 thousand), Kharkiv (82.3 thousand) and Kyiv (77.2 thousand) (National Health Service of Ukraine, 2019).

Modern information systems allow to simultaneously keep medical records, information sharing, in the process of analysing patient data included in personal electronic medical records, using formalized rules and algorithms based on evidence, and provide the healthcare worker with interactive guidance on follow-up, medical interventions, and warnings about critical factors (for example, individual intolerance or incompatibility of medicines). The main directions of informatization of the health care system are summarized in Table 1.

Table 1: Directions of public health information policy

Information technology	Description
An electronic prescription	Digital analogue of prescription on paper forms. The electronic prescription is intended to eliminate the need to prescribe to a doctor in written, to reduce the number of errors, to save working hours, to provide an opportunity to track medical prescriptions, the pass of patient's medications for treatment.
Verification of the central electronic health system database	In order to keep up-to-date and accurate all the data stored in the central database of the electronic health care system, the NHSU regularly takes steps to verify them. Regular verification of data occurs through several processes: deactivation of data on deceased patients, medical specialists, and other users in the system can be seen according to the data of the State Register of Civil Status Acts of citizens in the last working week of each month; online and offline deduplication prevents duplicate data from appearing in the system, detects and deactivates existing duplicate patient records, declarations, health professionals and specialists, as well as medical facilities; consideration of requests for action on system data from identifiable applicants.
Online dashboard	In order to raise awareness of the public in the field of e-services provision, the National Health Service has launched an online dashboard to help analyze the dynamics of medical reform, as well as outline measures to promote transparency in the activities of the National Health Service of Ukraine. The dashboard contains information about primary health care locations: an electronic location map with addresses and contact telephones, the distribution of facilities by region, the number of declarations of a physician at each medical institution.
Visualized information	Medical imaging is one of the areas for which, due to large amounts of data and specific quality requirements, interoperability standards have long been established, both at the hardware level and when integrated into an electronic health record or electronic medical record. Other types of specific medical data are at different stages of similar processes.
Statistical charts	Those "statistical charts" that do not carry the medical information, but are conducted for the sole purpose of calculating statistics, completely lose their meaning, provided that it can be automated on the basis of information available in the databases. The

	essence of filling in such forms - not so much duplication of medical information from primary medical forms, but its coding, classification (for example, a clinical diagnosis, which may comprise in the medical history half page of medical terms of arbitrary content when filling in the form 66 has to be formulated in terms ICD-10). When statistical charts are rejected, such encoding ha to be performed at another level (obviously presented in the corresponding Minimum data sets).
Electronic medical charts	Outpatient (inpatient) medical records are the most comprehensive, complex documents that have information (for the doctor) and even legal (for the prosecutor) consideration. Their modern duplicates are electronic medical (or health) records (EMR, EHR). EMR is usually understood as a local record at a healthcare institution; EHR means more generalized, aggregated information on patient that integrates different aspects and episodes of healthcare provision.

Ministry of Health plans to launch a patient's personal office in the future. The data on the electronic medical card are collected through the MIS established in healthcare institutions and sent to the Central database. With centralized data storage:

- the Ministry of Health of Ukraine and the NHSU can process impersonal data to effectively manage the health care system;
- the NHSU can analyse data to manage the quality of health care services;
- the data is guaranteed to be accessible to the patient and the physician who treats this person. Access to centralized data exists regardless of whether the servers, from which the information enters into the system, are in the medical establishment or if there is an Internet connection, etc;
- health care facilities can move from one MIS to another without losing key data, as these data are stored in a centralized system (Ministry of Health of Ukraine, 2019).

The need for health care reform is underlined on the one hand, by impossibility of ensuring adequate public funding of the system, under the current conditions, and, on the other, the introduction of effective schemes for full competition in healthcare market.

Structural reform of health financing provides an opportunity for rapid information as it involves the use of electronic tools (submission of declarations on the choice of primary care physicians; conclusion of contracts between healthcare institutions and the NHS; reporting; prescribing and redemption of electronic prescriptions; keeping electronic medical records; electronic referrals, etc.), i.e. healthcare institutions have effective financial incentives for the rapid implementation of information systems and investments it in the ICT.

Increasing government spending without changing infrastructure will not solve existing problems. Efforts must be made to reallocate existing resources and improve system efficiency. In order to overcome the economic crisis in the short term, the Government of Ukraine should propose a set of tough measures. This will have a significant impact on the availability of health care, so measures to increase budgetary efficiency should be at the heart of industry financing reform.

Additional funding sources and new organizational models of pooling of funds (such as insurance) should only be considered after the transition is properly prepared. The bulk of the funding should remain general tax revenue, with a gradual decrease in patients' cash payments. Targeted taxes on alcohol (tobacco) and health-threatening products should be offered as an additional source of cash, primarily for the reimbursement of medicines and the development of primary care.

The new financing model should be based on the following principles: financial protection, fair access to care, honesty, openness, transparency and accountability, efficiency, competition of providers, predictability of the funding for medical services in the state budget.

Therefore, when designing the healthcare information space of Ukraine, the question arises of the formation of a single electronic medical space, which must be solved by the intensive use of

information technologies. Along with this there is a problem of volumes growth of information flows. Therefore, it is necessary to improve public mechanisms for the acquisition and use of medical information, its rational collection and analysis (National Health Service of Ukraine, 2019).

Conclusions

In order to formulate a national eHealth action plan, it is necessary to: engage with stakeholders; develop eHealth activities and a comprehensive action plan; determine maximum resource requirements; adjust the plan in the light of financial constraints; determine the stages of implementation. Considering the international experience, it is possible to determine the optimal ways of informing the healthcare sector of Ukraine, namely:

- implementation of an electronic patient registry;
- equipping physicians' workplaces with electronic clinical decision support systems, means of generating and maintaining electronic case histories, and means of electronic medicine prescription;
- development of information technology infrastructure in medicine, including the interaction of health care facilities with regional and national data centers;
- organization of effective electronic data exchange at all levels – inside the medical establishment, between medical institutions on the one hand, and controlling bodies – on the other;
- integration of information systems of health care institutions with each other, with other information products and systems, as well as with information networks of other agencies and organizations;
- improving information support for management activities in health care settings, including quality control, statistics generation, information transfer and decision control.

The driving factors for active health informatization in this case will be to create a favourable investment climate, to make eHealth a priority area, and, as the next step, to provide legal and regulatory standards and to approve the necessary standards for eHealth services. Comprehensive information about healthcare facilities will allow to: provide quick access to current, most complete and accurate information; to improve the quality and accessibility of services provided by healthcare facilities to patients; reduce the time spent on patient care and health care management by completely automating operations.

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Emotional Intelligence of Entrepreneurs and Creativity, a Review

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Abstract

This research aimed to investigate emotional intelligence of entrepreneurs and creativity. This research consists of variables represented by emotional intelligence factors (self-awareness, self-regulation, self-motivation, social awareness, and social skills) and variables are represented by creativity. All Jordanian and non-Jordanian entrepreneurs' startups were targeted in this research. This research contributes to the academic and practical knowledge as being one of the first attempts to investigate the relationship of emotional intelligence factors and entrepreneurs' creativity. In addition to recognizing the emotional intelligence factors in entrepreneurship to improve the creativity, this research integrates, refines and extends the empirical work conducted in the field of entrepreneurial impact in Jordan. It raises many implications for startup founders, such as considering the importance of influence by emotional intelligence on creativity. This research provides useful guidelines for further and future research possibilities such as exploring why arts/humanities individuals don't become entrepreneurs, as they experience the world differently, in comparison to more scientifically-minded people, who tend to be more logical than those in humanities or arts for instance. The outcome of this study provides essential suggestions for policy-makers, entrepreneurs, and those wishing to support and enhance entrepreneurship in Jordan.

Keywords: Emotional Intelligence, Creativity, Entrepreneurship, Jordan.

Introduction

Entrepreneurship has been a critical topic in recent years, due to its importance to both academics and politicians, as it has been conclusively linked to both economic and personal growth. McGuire, (2003) stated that entrepreneurship is the conversion of innovation (no matter what the origin) into a new product, services, or business to take advantage of a market opportunity. Moreover, entrepreneurship has a prominent role in creating jobs that can develop economies (Prabhu, 2012). Jordan's economy has been affected in many different ways since the Arab Spring, and thus entrepreneurship, closely related to the economy, the environs, and the social makeup of the country, has also been affected (Abuhashesh, 2019a). Further, unemployment and low salaries have been increasingly problematic, and there is a need for this to change to avoid further social unrest. Furthermore, the economic ecosystem in Jordan has been structured in recent years to develop the entrepreneurial abilities of youths and policymakers, through improving the educational background, and training of individuals and businessmen. Shedding light on entrepreneurial factors, Emotional Intelligence (EI) is essential in linking to entrepreneurship and creativity. EI was first popularized by Daniel Goleman (1995), with the term EI referring to competencies related to self-awareness, self-management, social awareness, and relationship management (Brotheridge, 2002), EI enables people to understand and manage their

own and others' emotions in social interactions. These abilities are the basis for good leadership, creativity and, importantly, can also be learned (Mckee, 2008). These competencies help us create healthy working environments that support people in becoming their very best. EI is critical to creativity because emotions are linked to our ability to think clearly, make good decisions, and focus on tasks. This research focuses on the impact of EI on creativity among Jordanian entrepreneurs. In order to gain a research focus, this study chooses the individual entrepreneur as a unit of analysis. It seeks to offer a new perspective and a fresh insight on the matter in hand by looking at it from the standpoint of how EI inherently shapes individual entrepreneurial behaviors.

Importance of the Research

The research focused on the impact of EI on creativity of Jordanian entrepreneurs. It identified the factors affecting entrepreneurial performance, an important metric that shows the development of creativity and how it adds to entrepreneurs' success. A positive contribution introduced in understanding how EI factors influence the performance aspects is related to creativity. This work sought to overcome the limitations it encountered in the literature by soundly applying a new EI prism through which to analyze these issues as it relates to the Jordanian market. It is hoped that it will be a starting point for future research and discussion, over time encouraging other researchers to engage in more studies regarding EI factors in Jordanian entrepreneurship. It is also hoped that such efforts will improve the relationships between the political institutions, organizations, managers, and customers (Abuhashesh, 2019c). The aim was that a better understanding of EI and entrepreneurship in Jordan, will lead to enhanced support for entrepreneurship thus ultimately having a positive effect on the economy and social environment of Jordan.

Literature Review

There has been a growing recognition of the role of EI in entrepreneurship in recent years. This reflects on the previous studies that are related to entrepreneurship, EI and creativity.

Entrepreneurship

Many scholars (Luthje &Franke, 2004; Liñan & Chen, 2009) have investigated entrepreneurship as an essential factor in successfully leading businesses and have defined it as a driving force in developing the economy of a country, creating job vacancies in the labor market. Researchers agree about the critical role entrepreneurship plays in creating an innovative society, providing opportunities for personal development and fulfillment, and importantly, providing opportunities for social empowerment (Mehtap, S., 2014). Entrepreneurship is also related to the overall economic situation of the country, having an ability to stimulate and improve the economy. To power entrepreneurship, various factors are necessary, since initiating a business can be a risky endeavor. Potential entrepreneurs require education and training, mentors who can provide advice and guidance, financial or government incentives must be offered, they need the knowledge and skills to exploit a gap in the market (Mehtap, S., 2014). Most importantly, entrepreneurs need to be creative, to develop and to utilize an original idea for which there is a market demand.

In the last ten years, it is clear that policy planners and makers have concentrated on supporting ambitious projects in both developed and developing countries. At the same time, there has been an increase in academic studies focusing on the personal traits of businesspeople, goals, and aims of a business and its environment. With the current trend in support for entrepreneurs, there is an additional requirement for business education and training courses (European Commission, 2003, 2010). With the current state of the economy in the Arab World, many in politics and businesses emphasize that now is the time for an entrepreneurship revolution, to provide stimulus for the economy, and employment for the populace. The World Bank (2013) highlighted the case of Jordan, demonstrating how Jordan could overcome and whether the harsh political storm which

has shattered the surrounding Arab States, Syria in particular. Notably, Jordan is still suffering from challenges in population and environment both within and without the country. Suffering from a severe lack of natural resources, Jordan is used to depending on foreign grants and aid. The vast flow of refugees into Jordan recently, mainly as a result of the Syrian civil war, has been consuming the domestic resources of the country, with the resultant impact on the economy. Besides, there is growing public outrage with increasingly apparent corruption, economic austerity, and political reforms which are perceived to have done nothing to counter these issues. (World Bank, 2013). Facing the challenge of a rising young and dynamic generation, a significant target for the Kingdom of Jordan is to increase the availability of higher education and to create a nation that relies on knowledge bases. It is believed that the human capital of Jordan, united with businesses undertakings and activities will be the road to evolution and wealth in Jordan and the region overall. The information and communication technology sector and the business sector have allied to encourage and support start-ups and entrepreneurs, with initiatives such as the Zain Innovation Campus (ZINC). This can also be applied to other sectors, achieving success for all Jordanians.

Emotional Intelligence

The increasing academic knowledge of emotions and the developing understanding of the part they play in both businesses and life is due to ever more research into feelings and specifically (EI), over the last decade. The desire for knowledge of EI can be traced back to Binet and Charles Darwin, who noted the second type of insight, 'Social Knowledge' or 'Down to earth Knowledge' (Sternberg, 1985). Nonetheless, Edward Thorndike was the first to characterize social insight in 1920 (McCleskey, 2014). In 1983, Gardner discussed the interrelationship between various insights, two of which are the intrapersonal and relational insights. The term (EI) as presented by Salovey and Mayer in 1990, revolves around the ability to reason about feelings, and that feelings improve consideration ability and consciousness (Sadri, 2012). For them, EI is a mental capacity, which is the ability to comprehend, perceive and assess the importance of feelings to reason and tackle issues (Mayer et al., 1999). The idea of EI hypothesizes that the two various mental procedures, which are thinking and feeling, really cooperate (Kerr et al., 2006).

Salovey and Mayer's (1990) research developed the ability model, now widely acknowledged by scholars. It incorporates four unique abilities. Specifically, the ability to (1) perceive feelings or emotions, (2) use emotions to encourage contemplation, (3) understand emotions, and (4) manage emotions. EI was popularized when Daniel Goleman in 1995 distributed his book 'EI: why it can matter more than IQ.'

Goleman (1998) characterized passionate skill as "a scholarly ability dependent on an enthusiastic insight that becomes apparent in extraordinary execution at work" (p.4). His model is an execution based one, in light of five aptitudes: mindfulness, self-control, inspiration, compassion, and social abilities. The first three aptitudes identify with individual abilities and the last two to social ones. Another model fundamentally the same as Goleman's is Bar-On's model, known as the non-cognitive or emotional–social intelligence model. It covers five wide zones of capabilities: (1) the intrapersonal skills, (2) the interpersonal skills, (3) stress management, (4) adaptability and (5) general mood (Bar-On, 1997). The two models (Goleman's and Bar-On's) are known as the Mixed models since they incorporate a mix of mental capacities, identity, and character attitudes. Another imperative EI model is the appropriate methodology by Petrides. It is an emotion related disposition and self-learning strategy that centers around self-adequacy and self-recognition (Petrides et al., 2007). These various phases of our comprehension of EI are known as its three streams. The primary stream characterizes EI as many interrelated capacities, which are estimated through capacity, based tests (Mayer and Salovey, 1997). The second stream estimates EI through self-evaluations and reports on capacities and EI conduct (Mayer and Salovey, 1997). The third stream characterized EI as a variety of inclinations, skills, and observations on overseeing feelings (Bar-On, 2000; Goleman, 2000) which are estimated through the Passionate Fitness Stock and Enthusiastic Remainder Stock (Ashkanasy and Daus, 2005). In spite of the consideration and approving reactions it received from insightful sources, numerous

researchers question the passing of EI (Ashkanasy and Daus, 2005). In any case, as indicated by numerous researchers, it is essential to consider EI that it enhances individuals' abilities to execute activities (Berkovich and Eyal, 2017) and their dedication (Bhalerao and Kumar, 2016). Individuals that have high EI perform better in life over individuals with lower EI (Bar-On, 1997). They can better comprehend themselves and other individuals, mingle and impart more, and adapt to any troublesome evolving circumstances (Bar-On and Parker, 2000). When EI is high, it enhances the physical and mental strength of individuals, prompting better scholastic and work execution (Bar-On &Parker, 2000). Besides, EI connects negatively with work and work-related pressure (Nikolau and Tsaousis, 2002). Consequently, numerous researchers contend that EI is a crucial segment of effective leadership (Sadri, 2012) as "it speaks to a critical competency for compelling authority and group execution in associations today" (Melita Prati et al., 2003, p.21)

Theories of EI

In this section, we will briefly shed light on the three theories that have generated the most interest in terms of research and applications, specifically the hypotheses of Bar-On (1988, 2000), Salovey and Mayer (1997), and Goleman (1998).

The first of the three noteworthy speculations to rise was that of Bar-On (1988). He instituted the expression "emotional quotient" (EQ), as a comparison to the Intelligence Quotient (IQ). Bar-On (1997) characterized his model regarding five primary social and passionate capacities including intrapersonal skills, interpersonal skills, flexibility, stress management, and mood which together impact an individual's ability to adapt viably to ecological requirements. His model in this manner encircled EI with regards to identity hypothesis and is best seen as a general model of mental prosperity and adjustment (Goleman, 2000).

Salovey and Mayer (1997) then again farmed EI inside a model of intelligence. Their inspiration to build a hypothesis of EI originated from an acknowledgment that customary proportions of insight neglected to gauge singular contrasts in the capacity to see, process and viably oversee feelings. In like manner, they developed a model that has a psychological center, sketching out the explicit mental aptitudes for perceiving and marshaling feelings (Goleman, 2000).

What distinguishes Goleman's (1998) research from that of Bar-On (1988) and Salovey and Mayer (1997) is his endeavor to ground his hypothesis explicitly with regards to skills necessary for work execution.

Empirical studies of EI

There is a growing accumulation of data that document the importance of EI abilities for effective performance at work. McClelland (1998) discusses data from more than thirty different organizations, which demonstrated that those workers who performed best had a wide range of EI competencies relating to social awareness, social skills, and self-motivation, while those with poorer performance lacked EI abilities in these areas. Previous studies indicate that possessing EI abilities is associated with higher levels of satisfaction in work, more ability to deal with stress, better ability to deal with changes, and more significant commitment to the organization. EI to hold genuinely steady overall execution areas, including work, gathering and scholastic execution. (Vakola et al., 2004). These discoveries agree with those of (Watkin, 2000) whose exploration depicts EI as an essential factor for unrivaled execution at each dimension from section level employment to top official positions. Bar-On and Parker (2000) also discover EI capabilities as the basis for reliable performance in many jobs, and Goleman (1998) also notes that that 67 percent of the abilities which are fundamental for performing well at work are EI abilities. There are blended discoveries for instance concerning the connection between age and EI. While a few investigations propose that age does not significantly affect EI (Cakan, 2005), Bar-On (2000) found that more seasoned companions will in general score higher on his measure of EI, recommending that EI is learned through life experience. Fatt (2002) likewise recommends that EI

will, in general, obtain more significance as people advance in the organization. Also, (Goleman 1998) proposes that the higher the representative's situation in the company, the more EI is a vital component.

The connection between EI and gender has correspondingly received some consideration lately. Mandell and Pherwani (2003) for instance found a remarkable contrast in the EI scores of male and female supervisors where females scored higher overall than males. Their discoveries indicate that females possess greater EI strengths in some regards than do males. These discoveries support the results of (Mayer and Geher 1996), which revealed higher scores for females on various proportions of EI. This is as opposed to (Goleman, 1998) who hinted that there are no distinctions in the general EI scores of males and females. Another clarification for the contrasting discoveries relating to gender is that while both males and females may have a similar standard dimension of EI, they do vary for various EI abilities. Females may score higher on mindfulness (or self-awareness) and compassion while males may self-manage better. (The Bar-On 1997) Research demonstrates that females are increasingly mindful of feelings, exhibit more sympathy and relate better relationally while men are progressively skilled at overseeing and directing feelings. In an examination surveying EI factors of college undergraduates in Singapore, (Fatt, 2002) found that males scored higher on specific proportions of EI, for example, distinguishing and utilizing feelings while no distinction was observed in different estimates, for instance, comprehension and managing emotions. (Morand, 2001) Work demonstrated that females were bound to see diverse feelings (Petrides and Furnham, 2007), then again, found that there was no significant distinction between the aggregate score for estimated EI for the two genders, yet males were increasingly inclined to fall into self-serving inclinations in revealing higher EI scores, with a partner self-disdainful predisposition in ladies. Nikolaou and Tsaousis (2002) found no noteworthy contrasts among males and females as far as estimated by the overall EI score. Cakan, 2005 revealed a non-significant gender impact on EI scores in their example of Turkish adult teachers. We trust that these fundamental discoveries are to a significant degree fascinating and merit further consideration and have in this way interpreted our investigation to address the impacts of age, administrative dimension and gender on EI in the working environment and to draw critical business-related perceptions and suggestions.

There have been many studies which demonstrated that creative behavior is enhanced when employees are more motivated. Thus, without self-motivation, individuals are less confident, thus decreasing their levels of creativity. This information provides us with a solution for enhancing creativity and knowledge creation, since employees must be invested in the outcome they are working towards, enabling them to develop creative solutions to problems, and allowing them to achieve the results they are working towards. Thus, motivation serves to direct the attention that employees devote to the heuristic issues of creative tasks (Woodman et al., 1993). Additional studies have been demonstrated the effect of motivation on creativity. Motivation is conducive to creativity, while extrinsic motivation is in most cases harmful (Amabile, 1983). Intrinsically motivated employees tend to take higher risks. Other studies related to motivation and (indirectly) to creativity investigate the attention of control, constraints and goal establishment tasks. In the case of setting targets, it is assumed that more self-regulation results in more self-motivation and creativity (Kanfer & Ackerman, 1989; Amabile, 1983, 2001). Individuals who are extrinsically motivated find creative work more stressful than individuals who are intrinsically motivated find creativity as challenge and enjoyment (Ceci & Kumar, 2016).

Self-motivation directly enhances creativity (Griffin et al., 2007). Consequently, when employees are intrinsically motivated, they will be more excited and thus increase their creativity (Shalley et al., 2004)

Creativity

Creativity is inherent in all sectors and disciplines, from industry, business, trade, and commerce, to education, science, arts, engineering, including even areas such as international relations. Humans have always been passionate about pursuing creativity. Thus, there is a requirement for provision of methods or training which can provide individuals with the ability to solve problems more creatively. (Zhu et al., 2011). Since creativity is closely intertwined with the operations, functions, and mechanisms of the

mind, it has been the subject of extensive studies (Weisberg 2006). Researchers have investigated the factors which can contribute to creativity, since humans are considered as creative beings, and there is a desire to provide methods for developing creativity (Zhu et al., 2011). It can be challenging to predict the occurrence of creative ideas. However, three key components which are closely associated with human creativity have been identified by Teresa Amabile (Amabile 1998;). These include (1) expertise, (2) creative-thinking skills, and (3) motivation.

Expertise is defined as technical, procedural, and intellectual knowledge (Harvard Business School 2003), and plays a critical role in creativity. It is evident that those who are exceptionally creative, or who have a high level of creativity, such as artists, scientists, engineers, and others, have a great deal of knowledge of their specific fields. Creative thinking skills can be defined as the methods by which people deal with, and develop, creative solutions to problems. Specific essential thinking skills for creativity have been identified, such as combination (Boden, 2004; Kanaan et al., 2020), generalization (Yan 1998), analogy (Itkonen 2005; Gomes et al., 2006), divergent thinking (Csikszentmihalyi 1997; Simonton, 1999), and others. Motivation is identified as the passion, interest, or incentives which influence people, enabling them to be dedicated to developing and exploring highly creative solutions to address problems.

Relationship between EI and Creativity

There is an increasing desire to understanding the relationship between EI and work-related outcomes, such as motivation, organizational commitment and creativity, among others, particularly from both practitioners and academics (Weng et al., 2013).

Emotional expression has been examined by scholars of management, as being one component of the overall work experience, with the finding that emotions are significantly related to job satisfaction, job behavior and job resourcefulness (Dulewicz et al., 2005; Hayajneh et al., 2020). For this reason, it is critical to developing a greater understanding of how strong EI enables individuals to both controls and manage their emotions, and enable them to deal with others. Higher levels of EI provide an individual with a significant advantage, as it allows them to perform better in the decision-making process since it will enable them to understand better how others feel and behave. The study of EI has benefitted from literature and research on leadership and group dynamics (Taylor et al., 2008), while research in psychology has increasingly highlighted the importance of EI, and the effect it has on success in life (BarOn, 1997). Additional research indicates that individuals with high levels of EI tend to be more efficient and exhibit higher group performance (Rice, 1999).

A study by (Silva et al., 2018) focused on the impact of EI on creativity, the mediating role of worker attitudes and the moderating effects of individual success. The objective of this work was to understand the influence of EI on creativity, considering the mediating roles of job resourcefulness, self-motivation and organizational commitment moderated by individual success. Their investigation was based on data collected from 519 questionnaires from a sample of Portuguese workers. Structural equation modeling was used with multi-group analysis. The results of their work indicated that EI had a positive effect on creativity and other behavioral variables, and individual success appeared to moderate most of the presented relationships. The sample used in their study, however, made a generalization of the results difficult. Importantly, their study identified several work-related outcomes of EI, indicating new potential subjects for training programs, mainly related to soft skills. The research was innovative as it analyzed the mediating effects of different variables, like job resourcefulness, on emotional intelligence's relationship with creativity, moderated by individual success.

Oldham and Cummings (1996) argued that creativity involves associating creative ideas with practical implications. It has also been defined as 'the production, conceptualization, or development of novel and useful ideas, processes, or procedures' (Shalley et al., 2004, 215; Elsbach, 2006).

Today, creativity as a concept is viewed as an essential and valuable resource (O'Neill, 2011), which reflects varying characteristics concerning the environment in which it appears. Thus, academics

studying the relationship between emotional intelligence, leadership, and creativity argued that leaders feel EI as their primary source of leadership to awaken employees' creativity (Antonakis et al., 2009). 'A key determinant of creativity is personal style and individual preferences in processing information about [one's] environment. It can, therefore, be argued that individuals with high levels of creativity are a significant asset to any organization or endeavor, as creativity has been proven to aid performance. It is thus a skill with both relevance and importance at the individual in addition to the organizational level. Boren (2010) suggests 'EI promotes the integration rather than the separation of reasoning and logic to emotions and feelings.' EI allows cognitive ability to be improved through the use of emotional information, providing individuals with the ability to adjust inform their thoughts. Those who are more creative also tend to be more inherently motivated (Chang & Teng, 2017).

A study of the impact of EI on creativity revealed some of the outcomes that emotional strategies can have on stress at work, job satisfaction and service performance (Johnson & Spector, 2007; Groth et al., 2009; Abuhashesh, 2019b). The results show that EI positively affects employee creativity. According to Parke, Seo, and Sherf (2015), 'emotional intelligence can predict different markers of creativity.' 'Individuals with the aptitude to practice equally positive and negative emotions do account being extra creative. It has also been found that creativity is generated by emotions' (Boren, 2010). The investigation into the connection between EI and creativity was carried out by (Castro et al., 2012). The research was conducted by exploring an association between leaders' EI and their followers' creative output. Also, an association between six sub-dimensions of EI stated by (Rego et al., 2012); empathy and emotional contagion, understanding of other people's emotions, self-control against criticism, use of emotions (self-encouragement), emotional self-control (emotions regulation), and understanding of one's emotions and creativity, as well as a mediating role of climate in the link between EI and creativity, were explored. Two questionnaires, one for leaders and one for employees, were used to collect data in a hospital. Sixty-six usable leader-employee pairs were collected. The findings confirmed a positive relationship between leaders' EI and employees' creativity. At an EI's sub-dimensional level, an association between creativity on one hand and self-encouragement and understanding of one's own emotions, on the other hand, became apparent. Finally, no mediating effect coming from climate was observed. The absence of a mediating effect from this aspect is intriguing, since it suggests a direct link between leaders' EI and employees' creativity, regardless of the climate. This is important since it calls attention to the paramount role of leaders in shaping individual and organizational behaviors as far as creativity is concerned. The authors also discussed the implications for management and practice.

Moradpour et al., (2018) developed the idea of EI having a positive impact on frontline employees' creative performance, in which they examined the elements of EI on frontline employees' creativity and the mediating role of environmental uncertainty (EU) as an explanatory mechanism to understand the relationship between EI and creative performance (CP) relationship. Moreover, they tested for the interaction of the elements of EI and cultural intelligence (CI) on frontline employees' creativity. Their findings also confirmed the mediating role of (EU) in the relationship between EI and CP. Regression analyses showed that CI strengthens the impact of EI on CP, although in addition to a marginal increment in explanatory power.

Conclusions

This research has examined the relationship between EI and Creativity in entrepreneurs in Jordan. While many studies examining the impact between EI and creativity have been carried out, this is the first study of its kind to be conducted in Jordan.

EI is of vital importance, as it enquires into the deeper reasons for our choices. Taking any action requires an emotional and mental balance to ensure the correct decision is made at the right time. Possession of a high level of EI enables us to learn, consider, and understand clearly. Introspection and self-analysis require courage, yet doing so is highly beneficial, allowing us to understand our feelings and reactions when interacting with both the internal and external world.

As humans, our emotions can control us; scholars observed that the human mind is composed of two entities, the conscious mind, and the subconscious mind. The latter commands us more, as it is affected by our emotions, while the conscious mind understands logic. We react and are moved by our feelings more so than by logic, thus balancing both of these require us to be aware of and understand our emotions, in both our business and personal lives.

Having the capability and the tools to perform introspection and self-analysis can provide us with significant benefits, allowing us to know ourselves better, understand ourselves and others more deeply, thus enabling us to react more effectively.

Policy Implications and Recommendations

Many interesting avenues for further research are opened up due to the findings of this study. Likewise, there are many important implications for policymakers. This section will examine the opportunities for further research, before discussing the recommendations for policymakers.

Policy Implications

As the first study of this kind in Jordan, this research has raised many important issues which would benefit from consideration by policy-makers. Entrepreneurship can bring significant advantages to the economy, and the results of this study indicate various means by which policymakers could support entrepreneurs and promote entrepreneurship in Jordan.

Given the difficulties in reaching a broad cross-section of entrepreneurs, it is apparent that there is no centralized hub for entrepreneurs in Jordan. It is recommended that the provision of such a hub would enable entrepreneurs to network and exchange critical information and advice.

The results of the research indicated that entrepreneurs appear to have deficits in several leadership skills across several areas, including self-motivation (uncertainty, find ways to do better/set goals), self-awareness (reward people's strengths/understand needs), and social-skills (lead as needed). Since leadership skills are crucial to entrepreneurs, we would strongly recommend that policy-makers and incubators consider that provision of training in leadership skills and abilities would benefit entrepreneurs, assisting them to succeed in their endeavors. Additionally, the study results show that entrepreneurs do not consider themselves to have strengths in Self-Regulation. As a result, we would recommend that entrepreneurs could benefit from training and support to develop these skills.

The outcome of providing training and workshops for entrepreneurs to provide them with the skills they lack will be a net benefit for the economy, and for Jordan, as entrepreneurs with strong capabilities across all researched areas will have higher chances of being successful.

The profile of entrepreneurs reached by this study indicates that there appear to be more entrepreneurs from science/business backgrounds, and there appear to be more male entrepreneurs than female. It is recommended that policy-makers may wish to consider providing additional support to encourage women and those from a humanities/arts background to become entrepreneurs.

Recommendations for Further Research

There are many important questions raised for further research while conducting this study. It was noted that there were two biases in the study respondents; that is, a gender imbalance is apparent, and an imbalance in the educational background is also evident. Therefore, the author recommends that further research should be conducted into the relationship between gender and entrepreneurship in Jordan. It is necessary to identify whether this accurately reflects the gender balance of entrepreneurs in Jordan. If that is the case, research should be carried out into why more males than females become entrepreneurs. Additionally, there are many further relationships which should be investigated, including the relationships between gender, entrepreneurial success, creativity, and EI.

To further understand entrepreneurs and success in Jordan, it would be beneficial to understand the relationship between educational background (sciences/business versus arts/humanities) and the decision to become an entrepreneur, as well as the relationship between educational background and gender.

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GMOs and the Food Supply Chain in Republic of Moldova: National Food Policies and Consumer Perception

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Abstract

The paper proposes to present the legislative context of transgenic food production and consumer perception in the Republic of Moldova. In Moldova the status of genetically modified organisms is regulated by law no. 755/2001 on biosecurity, amended and supplemented by the law enforcement regulation 2003. The National Agency for Food Safety has the responsibility to control transgenic products, but the human and technical resources, equipment and control procedures of the agency are insufficient.The cultivation and use of GMOs in Moldova has been officially banned since 2003, but the authorities have not yet succeeded in developing a system for monitoring the import, production and distribution of GMOs in the country. According to local feed producers, 30 to 50% of total feed production imported from Turkey, Ukraine, Hungary, Romania and Slovakia contains GMOs. Although genetic crops are not allowed in Moldova, insufficient legislation, lack of specialized institutions or advanced technical means of border control could allow the importation, transit, cultivation or consumption of GMO foods on the national territory. The study shows that the authorities should take the necessary legislative measures to regulate these issues on the national food market.

Keywords: Republic of Moldova, GMOs, safety, control.

Introduction

The Republic of Moldova is a country with a long tradition of agriculture. The main natural resources of the country, with a significant agro-food potential, are fertile soils and aquatic basins for the fisheries sector. Approximately 75% of the land resources are used in agriculture. Of the crop plants, soybean seeds are some of the most concerned about genetic modification due to an optimal combination of valuable chemicals, justifying their use in human food or feeding animals. At the international level, much of the marketed soy is genetically modified, and it is estimated that about 82% of the 111 million hectares allocated to the soybean were occupied by transgenic tolerant herbicide varieties (Badea, 2016). In addition, soybean crops have positive environmental effects, crop rotation being an important practice for maintaining soil fertility with maximum production potential. At the national level, a number of livestock farmers have turned to importing soy or grain seed used as animal feed, given the registered demand and the shortage of the domestic production. In view of increasing the share of genetically modified agricultural products and the European policy, based on precaution in the cultivation of transgenic plants, a national legislative basis regulating this sector is strongly needed.

At present, the requirements for obtaining, testing and commercializing genetically modified organisms (GMOs) in the Republic of Moldova are regulated by Law 755/2001, on the biological safety of crops. According to this legal document, it is possible to foresee the ban on the import of plant organisms and the control of the authorities in the monitoring, surveillance and fight against genetically modified organisms. Legislation is strict, in line with European norms, but the qualifications of control bodies and the facilities of the GMO-specialized laboratories are precarious, indicating that a series of products, mainly imported from Ukraine, especially soybean, are suspected of genetic engineering (Agent Green., 2018).

The paper seeks to examine the impact of incidents of the occurrence of genetically modified organisms on the agricultural commercial flow, using both the international flow and the annual statistical data of the country.

Short literature Review

According to Sanchez (2014), the Moldovan legislation on GMOs is limited to the two stated legal acts mentioned earlier – the 2001 Law on Biological Security and Government Decision No. 1153 of 25 September 2003, regarding the approval of a Regulation on the authorization for obtaining, testing, use and marketing of genetically modified organisms. No other more specific provisions e.g.on the issue of threshold for the unavoidable presence of GMOs are at present in force in Moldova Republic. Genetically modified organisms can affect the natural ecosystems' biodiversity of The Republic of Moldova and is a potential threat for the ecosystems' stability. The risk of illicit penetration of genetically modified organisms into Moldova is quite highThe GMOs have already been found in agro-food products of soy-beans and corn (CBD/UNEP, 2016). Large quantities of food are imported into the Republic of Moldova from Ukraine, a country where cultivation is out of control, according to Agentgreen.ro (2018). Moldova takes one of the first places among the BSEC countries in terms of national bio-security framework development. In 2001 Moldova adopted a law on bio-security and ratified the Cartagena Protocol in 2002. Legislative framework of the Republic of Moldova on the regulation of import, export and cultivation of genetically modified organisms are mostly based on Seeds Law No 659 dated 29 October 1999 and the Law on Biosafety № 755 of December 21, 2000, with subsequent amendments. Furthermore, in 2003-2004, the government passed several resolutions and Minister of Environment issued an order, whereby provisions on risk assessment procedures were approved, National Committee for Biological Security established, and procedures for public involvement in decision-making in the field of GMO determined. National Committee for Biological Security set-up by the government of Moldova is authorized to take decisions and give permissions to the activities related to GMO utilization. Regulations for licensing activities related to testing, production, utilization and obtaining of genetically modified organisms were adopted by the government as a reference document for implementation of the national law on biosecurity. This legislation specifies rules for GMO utilization in closed systems, their propagation in the environment, and placing on the market, as well as GMO import and export. The National Test Center was established by mutual decision of the Ministry of Environment and Natural Resources and Ministry of Education. The Center's terms of reference cover determination of GMO in the samples, and, if necessary, running additional tests for biological security and assessment of the GMO risk for environment and human health. Republic of Moldova has not imported the seeds of genetically modified crops, therefore, they are not grown genetically (Goguadze, 2011). There are signals that almost 50% of Moldovan food contains GMOs. The development of soybean crops in the Republic of Moldova has already been over 100 years old (Dima, 2015). At the level of the Republic there are specialized structures for the creation and adaptation of a variety of plants adapted to local conditions. The research institutes Bălți (The research Institute of Field Crops "Selecția) and Chișinău (The Institute of Physiology), which tested more than 10 varieties of plants lately amid soaring European soybean demand.

Material and Methods

The research carried out in this paper has used relevant information from the national statistical database (National Bureau of Statistics) and international (FAO) database on the import of soy products. The data has been collected, worked and properly ordered. The obtained results were compared with information provided by the recognized scientific institutions (Ministry of Agriculture, Regional Development and Environment). This information was selected to complete the research.

Official data on the cultivation of the soy in the Republic of Moldova

Official data shows that genetically modified crops are not cultivated on the territory of the Republic of Moldova. Law no. 112 of 02.07.2014 establishes the powers of the authorities responsible for controlling the placing on the market of GMOs through the cross-border circuit at the stages of marketing of products, especially food and feed, which may have adverse effects on the conservation and the sustainable use of biological diversity and on the population health. There are no laboratories in the Republic of Moldova to determine the content of GMOs in food, and about half of the products could contain transgenic soy, corn and rape components (Sputnik.md, 2018).

According to the publication, in 2001, a rather progressive law was adopted in Moldova regulating the application of genetically modified organisms but it was not fully observed. Genetically modified and illegally harvested genetically modified seeds are mixed with local ones, and, at least half of the soybean is currently being modified in the fields, and at least half of the corn is modified due to pollination and pollution. As a result, in Moldova there are no laboratories that determine the content of GMOs in food, and almost half of the products could contain transgenic soy, corn and rapeseed components.

Commercial cultivation of Genetically Modified Crops

Biotechnology involves a wide range of technologies for improving and conserving the genetic resources of different plant varieties in order to increase the efficiency in various diseases and pests and to increase productivity. One of these biotechnologies is genetic modification, which is widely used throughout the globe to produce GMOs. The production of genetically modified crops is growing in both developed and developing countries. With the rapid advances in biotechnology, there have been a number of modified crops (soy, corn, cotton, fruit trees, potatoes, pumpkins, tomatoes) developed and launched for the commercial agricultural production. Food labels may include relative indicators that confirm the probability of GMO content in that product. If the product was produced in the US and includes soy, corn, rape or potato, it most likely contains genetically modified components. Most soy-based products can be transgenic. Soybeans is ranked first in total genetically modified crops, followed by corn and cotton. Soy is the most popular GMO, globally, due to the biotechnological properties it contains. The commercial cultivation of transgenic crops has begun since the 1990s with the aim of increasing crop resistance to herbicides. Among the largest genetically modified soy and corn producers are: USA, Brazil, Argentina, India, Canada, China (Figure 2). According to the FAO, 29 countries have planted soybeans, genetically modified corn, and 30 other countries have approved the import of these crops. Genetically modified plants are accepted for cultivation and import being used in animal feed in 59 countries of the world. Although genetically modified crops are not planted in the Republic of Moldova, herbicide-tolerant soybean (NK603) and insect-resistant corn (MON810) have been approved to be imported.

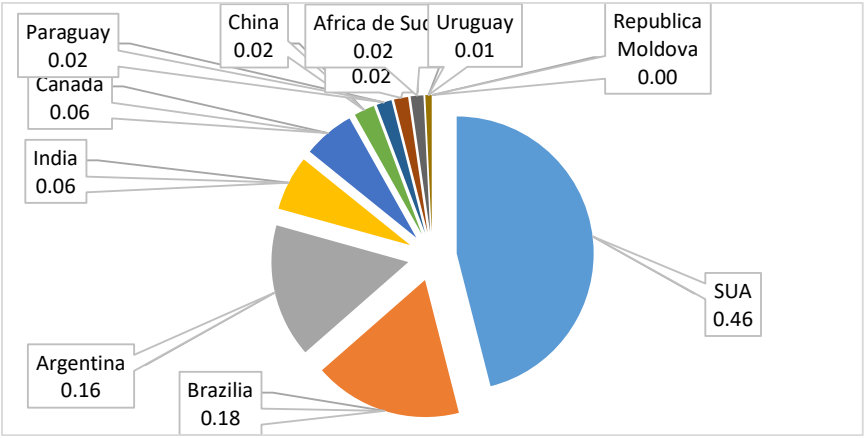

Fig. 1: GMOs crops by countries

Genetically Modified Organisms are a potential threat to the stability of the natural ecosystems of the Republic of Moldova. The risk of GMO penetration in the Republic of Moldova is quite high, especially since the GMOs have already been found in agri-food products obtained from soybeans and corn. Ensuring an effective biosecurity system in line with the international requirements requires a continued development of institutional capacity to prevent the adverse risks to the sustainable development of the natural biological resources and to human health. At present, GM plants are not officially cultivated in the Republic of Moldova. However, the introduction of these products on the Moldovan markets is inevitable due to the import transit routes from Ukraine and the European Union.

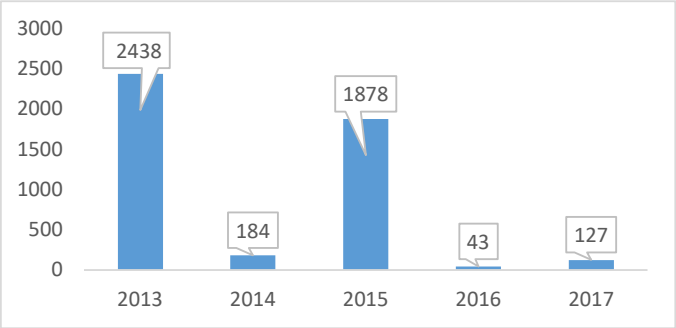

Fig. 2: Imported soy from Ukraine

In 9 out of the 25 regions of Ukraine, GMO-infested rape, soybean and corn field were found. At the same time, officially, neither on Moldovan lands nor in Ukraine are there and cannot be GMOs, because their import and growth are forbidden. The data we have show that, in reality, the ratio between infested and pure crops is 50:50. However, the weight shall be higher, because the lack of order in this field shall lead to a later crossing and infestation. Based on a lack of clear regulations and a weak control, many seed production farms are not checked, which may lead to wider contamination of other crops. For this, it is quite important to take into consideration a series of preventive measures for the economic and ecological security of the productions. Certified seed must be obtained, under the supervision of agricultural experts and legal authorities, through a series of inspections and controls during their production.

According to the law no. 96/2018, in the Republic of Moldova authorisation was received only for the import of genetically modified soybean meal for use as food and ingredients and as animal feed, by the Decisions of the European Union and for which there is a risk assessment carried out by the European Food Safety Agency (EFSA).

Importing soybean meal from soybeans with the genetically modified lines MON 40-3-2 (MON 04032-6), MON 89788 (89788-1) and MON 87701 (MON 87701-2) under strict compliance with the regulations of the National Food Safety Authority, which has determined that this type of imported variety does not affect human health, animals or the environment and are as safe as genetically unmodified soy. The detailed evaluation through a series of analyses of this production allows the import of soybean meal to poultry farms on the territory of the Republic of Moldova.

Table 1: Analysis of soy meal imported from the European Union

Parameter	Methods	Limits		Results
		Min.	Max	
Oil content	SR EN ISO 734-1	-	3.0	2.68
Protein	SR EN ISO 5983-2	-	-	47.19
Humidity	ISO 771	- 12.5		12.15
Fibre	NIR Method	-	7.0	2.95

Currently, the National Agency for Public Health of the Republic of Moldova does not have well-grounded scientific data on the impact of GMOs on human, animal and environmental health which would regulate the restriction of the use of genetically modified organisms. Due to the lack of legal rules governing the authorisation, testing and notification, Moldova approved Law 755/2001 concerning the biosafety in biotechnology that shall stop some research on the use of GMOs for scientific purposes. Moreover, the Law no. 1005/2003 on Consumer Protection, the Law no. 231/2010 on Domestic Trade and Customs Code 1149/2000 does not prohibit the import and trade of genetically modified products, crops and goods.

Results and Discussion

The potential GMO contamination of the food in the country, raised by environmental organizations and the media led to the study of the State University of Medicine and Pharmacy "Nicolae Testemițanu" in Chișinau (USMF) on GMO and on the biosecurity measures required in the country (survey and statistical processing, 2017). The research of the academics aimed at preparing questionnaires and enforcement scheme to assess the situation of GMOs at the national level, analysing the current information on the GMO creation, testing, cultivation and the legal framework and national biosecurity world. The results of the study should mention the risks and undesirable effects caused by transgenic organisms, such as:

- The actual inclusion of non-human DNA into the human one;
- Synthesis of new transgenic proteins that can be toxic and / or allergic to the human body;
- GMOs have marker genes that confer resistance to antibiotics in the human body;
- Genes of interest may attack the immune system;
- GMO - danger for damage to existing natural gene pool;
- GMO - impact "-" on the environment (insects, microflora of air and soil etc.)

The survey on the population's attitude towards GMO was conducted on a representative sample of 150 respondents, including students, medical staff or patients in university clinic (Figure 3) and included testing using a questionnaire composed of 30 questions regarding the consumption of GMOs, and the

health risks of GMO consumption. Of the 150 interviewees, 48% were women, the remaining 52% being men.

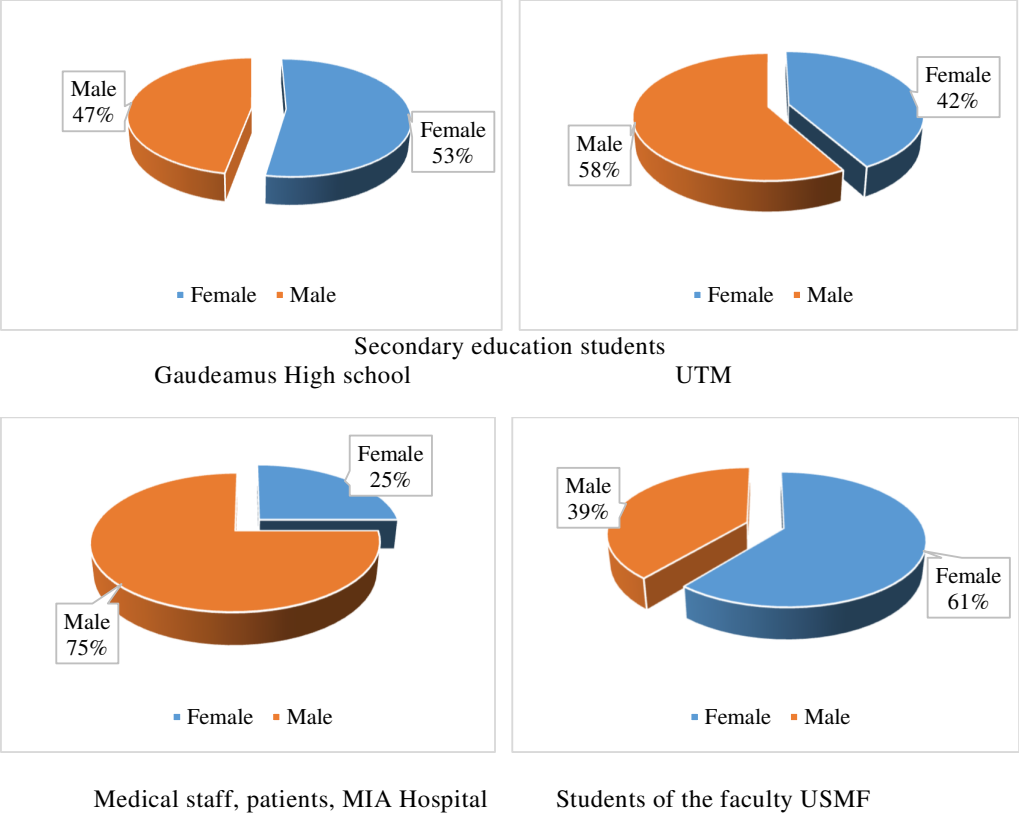

Fig. 3: Features of the batch of interviewees

Considering the age category, 18% of participants were students aged 15-19 years, 39% USMF students, aged 20-29 years, MIA patients aged 30-70 years (figure 5). For the category of education, more people with higher education (79%) participated in the survey, and 11% had uncompleted secondary education.

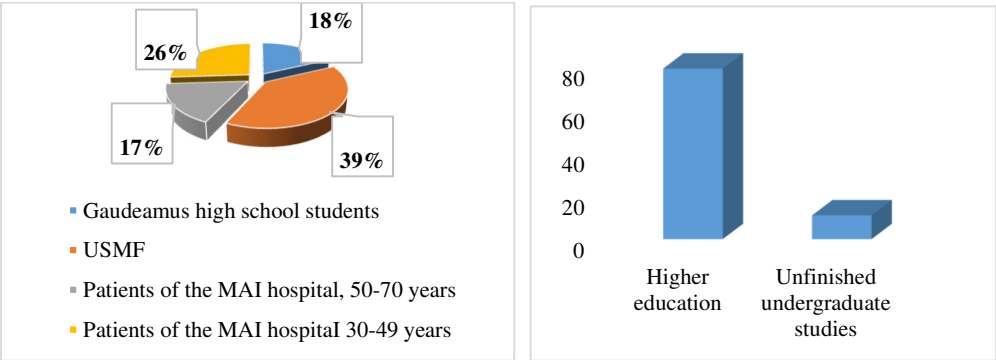

Fig. 4: Characteristic of the batch of interviewees by age and education category

Considering the content of the questionnaire (heard about GMO / know what GMO is), the respondents demonstrated that they know what the genetically modified products are, especially the students of USMF, where the percentage ratio represents 100/78%.

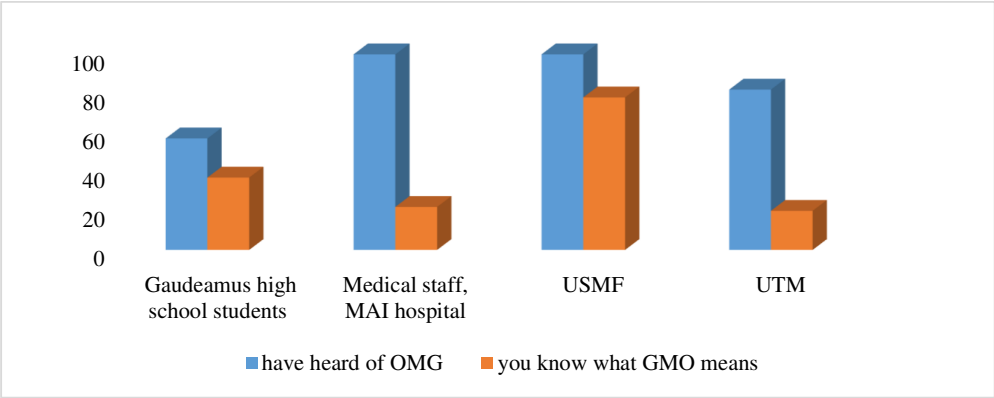

Fig. 5: Percentage share between heard what is GMO / I know what is GMO.

When questioned whether they are GMO consumers, in all the batches analysed, uncertainty prevails, except for the students of USMF.

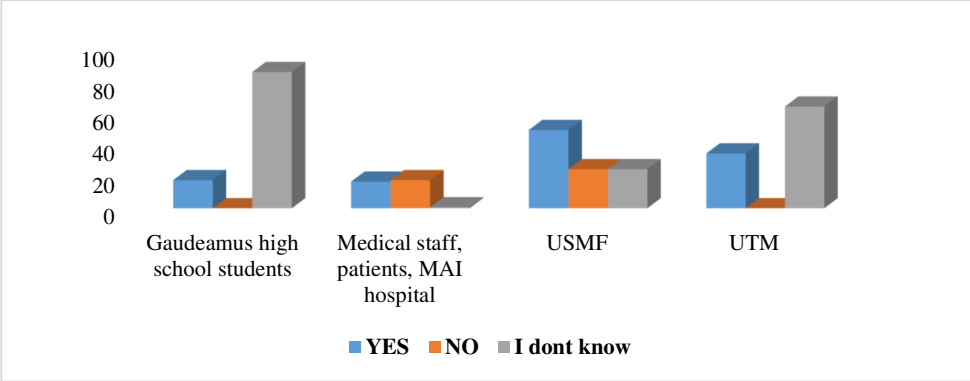

Fig. 6: Characteristic of batch of interviewees on GMO consumption.

Following the interview, many respondents are not aware of the risks and undesirable effects caused by GMOs. The batches analysed underlined that the USMF students (100%) know the risks of genetically modified products to human health.

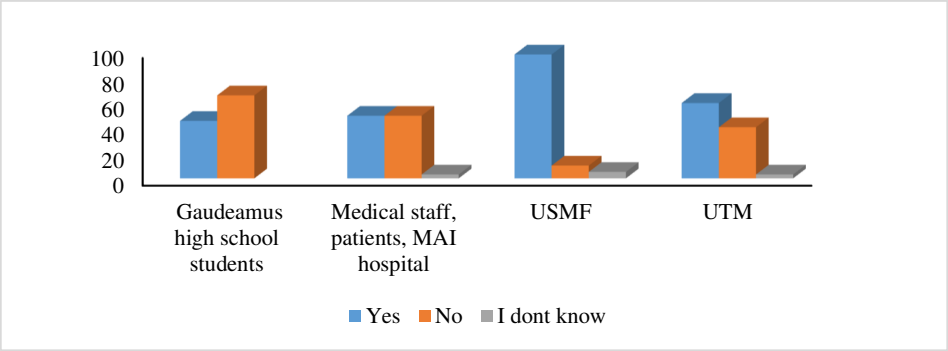

Fig.8: Health risks of GMO consumption

To the question "What should inform us about the nature of the product (presence or absence of GMO), the persons with higher education, the students of the USMF and the Medical staff of the MIA Hospital answered. They have presented the most answers about what GMOs are, and what risks they pose to humanity.

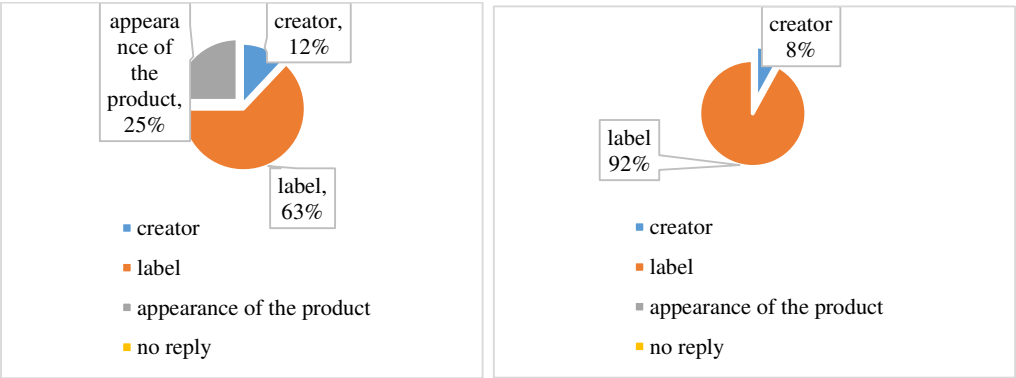

Fig. 9: The presence or absence of GMOs in a product

The survey has shown that many consumers do not know what GMOs are and what negative effects they could have on the natural environment and human health. Unfortunately, in the Republic of Moldova, there is no institution that can inform us about what we have on the shelves of the shops of the commercial networks. Consumers in the Republic of Moldova are not even in a position to choose a genetically modified product against an unmodified one. It is regrettable that 38% of the secondary education students, 20% of higher education students and 29% of the workers have shown indifference, considering that these issues should be handled by the competent bodies and institutions and the fifth part of the students (20%) and a third of the 39-70 year-olds (29%) do not have a concrete decision in this respect.

Conclusion

The industrial use of transgenic plants may offer additional competitiveness to the native agriculture, but the long-term effects on the human genome are not very clear. The lack of scientific arguments for genetically modified organisms slows agricultural progress and limits the cultivation of these crops, which favours national dependence on imports. Strict control of seed and food trade is necessary to protect the national food market from GMO foods. These problems can be solved, but national food policy measures from the Ministry of Agriculture and consumer education are needed.

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Strategy Characteristics and Implementation Obstacles in Creative Industries

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Abstract

Creative industries receive lot of growing attention from both – policy-makers and researchers due to special characteristics that are observed in that industry, but also the creative output that is provided. However, in most cases the macro perspective is introduced and the research focused on managerial practice is still scarce. To address this research gap this paper is aimed at investigating the differences between strategy characteristics and implementation obstacles between three different representatives of creative industries – informatics, media and telecommunications. The research results did not reveal significant differences but in case of telecommunication and technological companies, we may observe more stable environment. Therefore lower impact of strategy implementation obstacles was reported in that industry.

Keywords: Creative Industries, Strategy Implementation, Strategic Goals.

Introduction

As the creative industries are perceived as a tool that fosters the innovation development, an increased attention may be observed in national policies (Tafel-Viia et al., 2014) and research approaches (Rozentale, Lavanga, 2014). However, still the theoretical foundations and deep empirical research that would allow to identify the managerial practices in creative industries are scarce (Markusen & Gadwa, 2010). Having that in mind, this paper investigates the characteristics of enterprises that operate in this sector. As there is no universally accepted definition, companies, that are labelled as creative, may have totally different nature. Therefore, the main goal of this paper is the identify if we may provide any generalizations, or rather identify some idiosyncrasies that are specific for particular types of activity.

Theoretical Background

Although the theoretical perspective of creative industries definition is differentiated, the term is usually used to describe the traditional arts sectors, copyrightable cultural industries and new creative businesses (KEA, 2006; Throsby, 2008). Their competitive advantage is based on creativity, skill and talent delivered by their employees and therefore the intellectual capital is their primary production input (DCMS, 1998; Throsby, 2001). At the same time, the market conditions are specific as a higher demand uncertainty, strong volatility and higher risks are reported. (Townley, Beech, 2010). To deal with those tensions, it is required to constantly deliver high levels of novelty (Cooke & Lazzeretti, 2008). While analysing the industry specifics, we have to mention its structure which is considered as polarized, with a few large corporations (often multinational) but dominated by small and micro businesses with a high number of self-employed, one-person enterprises. It is called an example of a long-tale hypothesis (Brynjolfsson, Hu, & Simester, 2011). In case of the larger ones higher vertical integration and mass production involvement is observed (Caves, 2000; Scott, 2005; Towse, 2010). On the other hand, SMEs are more focused on specialisation on niche markets (Birch, 2008) instead of growing scale and scope (Hartley et al., 2013). Analyzing the strategies implemented by creative industries is crucial as their linkages to other industries result in contribution to innovation in the whole economy (Foord, 2009; Müller, Rammer, & Trüby, 2009; Potts, 2009).

Based on the industry characteristics provided, we may argue that the managerial practice and strategy characteristics are worth investigating. The challenges reported in managing creative employees are focused on dealing with the tensions that arise based on the dual goals of simultaneous profit and effectiveness increase and fostering the creativeness at the same time (De Fillippie et al. 2007). Therefore, the efficiency exploitation is contrasted with exploration and value capture (Eikhof, Haunschild, 2007). As revealed by Perretti and Negro (2007) some mangers both standardize and craft new practices rather than choosing one strategy.

Although we may find some results examining the influence of entrepreneurial orientation in creative industries on company's performance in terms of achieving competitive advantage (Parkman et al., 2012), deep research is still scarce. Most research on the creative industries are either exploring the micro-level of analysis, like the motivations of individual entrepreneurs (Fillis, 2002; de Bruin, 2005; Boorsma, 2006) or investigating the macro-level like the impact of the creative industries on local and regional development (Foord, 2009; Caves, 2002). Therefore, it is recommended that further research should be focused on the firm-level approach (Hill, 2001;Rentschler, 2001; Fillis and Rentschler, 2005). This is the research gap we want to address in this paper.

The research was aimed to answer the following research questions: are there any differences in strategy characteristics observed in creative industries? May we report any differences in strategy implementation obstacles observed in creative industries? To address the research questions, detailed analyses were performed aimed at comparing the constructs investigated in three groups of companies that are classified as creative.

Research Design

The main research sample contained 150 firms listed on the Warsaw Stock Exchange main market and on the alternative New Connect market. The entities differed in size and industry. This differentiated sample enabled us to investigate strategy characteristics that are observed among the companies representing creative industries. Therefore, for further analysis we have selected companies that are classified in media, informatics and technology industries. Finally, in our research sample we had 29 companies. The respondents (CEOs, owners, strategy managers and board members) were responsible for strategy formulation and execution. A stratified-random method was used to select the sample according to industry sector (defined according to the classification introduced at Warsaw Stock Exchange) and the company's size.

The study was conducted with a direct questionnaire interview, and the survey was carried out by using the paper-and-pencil interviewing method. The main part of the survey investigated the importance of given factors for the strategy execution process. A five-point Likert-type scale was used to measure the impact and probability of their occurrence - (1) very low (5%); (2) low (25%); (3) medium (50%); (4) high (75%); (5) very high (more than 90%). The data collection enabled the perception of respondents to be studied, which could be considered a limitation of the study. These latent variables represent qualities that are not directly measured (Tabachnick and Fidell, 2001) and the constructs according to the subjective perspective of individuals (Borsboom et al., 2003).

A new measurement scale was developed based on the EFQM concept (Fundamental Concepts of Excellence, 2013) - 6 areas of operational (intra-organizational) risk were identified – leadership, strategy, employees, resources, processes, and measures. Within those areas, the scale items were formulated based on the perspectives derived from the literature review and qualitative interviews with 10 experts (CEOs responsible for strategy execution). The list of scale items is presented in the appendix. Measurement reliability analysis was performed using Cronbach's alpha coefficient. Moreover, based on Reeves et al. (2015), a short self-assessment was used to assess the fit between company's environment, intended approach to strategy, and strategic practices.

Results and Discussion

As mentioned above, the first part of investigation was based on exploring the strategic approach that is observed among creative industries representatives. In the part based on investigating the current strategizing practices we may point two most popular environmental drivers – P2 (We strive to realize an imagined end state, and we react flexibly to obstacles that we encounter along the way), which is reported in majority of companies in telecommunication and technology (T) – 67%. Second driver was P3 (We identify opportunities to reduce costs and preserve capital, guided by detailed plans, so that we can eventually identify a new path to growth), observed in informatics (54%). What is interesting, in companies operating in media industry, both answers are observed. Other approaches were not highly ranked.

In the part aimed at investigating the perceived business environment, technological companies reported the answer P4 (Our industry has a stable, predictable pattern of demand and competitive structure) – 67%. Among media as well as informatics representatives, two answers were pointed - P2 (Our industry is ripe for disruption by an imaginative new player) and P3 (Our industry is marked by a high degree of dynamism and unpredictability, driven by shifting customer demand, technologies, or competitive structure). Therefore, we may observe some differences among the companies classified in the same creative industry but facing different environmental challenges.

Last part of the first investigation was aimed at exploring the intended approach to strategy. In that area, majority of companies from industries described, reported answer P1 (We continuously renew our competitive edge, leveraging our agility and flexibility) which confirms the high level of flexibility as the core basis of competitive advantage that is reported by other studies.

Analysing the financial data, we may find the common features, as more than half of companies from media, informatics and technology industries, reported similar results. The revenue dynamics is quite stable (between 3%-15%), the revenues are more than 0.5 billion PLN and the profit is reported. However, we may observe some differences in other strategic issues that were further investigated. In case of informatics and technology industries, the market share is low (less than 10%), however companies representing media are divided into smaller (less than 10%) and higher shares (more than 70%), which confirms the long tale hypothesis. That is also manifested by the level of strategic goals achievement which is lower in case of smaller companies (25-50%) and higher in case of larger organizations (50-74%). In the group of companies from informatics, 85% reports that level as higher than 50% (with 46% confirm even more than 75%). The same level may be observed in the telecommunication representatives. Large majority of companies from all industries investigated state that their strategic goals were only slightly modified compared to the basic strategic assumptions.

Further analysis was performed to investigate the differences between the three industries represented by different obstacles to strategy implementation. First analysis was aimed at exploring the probability of each obstacle. The results are presented in Table 1.

Table 1: Strategy implementation obstacles – probability

		Total			I			M			T		
		Mean	Median	SD	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
Probability	L1	1,71	1,00	,95	1,36	1,00	,75	1,80	2,00	,81	1,00	1,00	0,00
	L2	2,02	2,00	1,08	1,86	2,00	,95	1,80	2,00	,81	2,33	1,00	2,01
	L3	1,97	2,00	,95	1,79	1,50	,98	2,20	2,00	,81	1,67	1,00	1,01
	L4	2,07	2,00	1,18	1,57	1,00	,76	2,00	1,00	1,38	1,33	1,00	,50
	L5	2,06	2,00	1,28	1,50	1,00	,65	2,20	2,00	1,27	2,00	1,00	1,51
	S1	1,84	2,00	,94	1,57	1,00	,76	1,60	1,00	,87	1,67	1,00	1,01
	S2	1,98	2,00	,91	1,50	1,00	,65	2,40	2,00	1,11	1,67	2,00	,50
	S3	2,26	2,00	1,10	1,64	2,00	,64	1,40	1,00	,53	2,33	2,00	1,33
	S4	2,09	2,00	1,18	1,50	1,50	,52	1,40	1,00	,53	1,00	1,00	0,00
	S5	2,34	2,00	1,19	1,64	2,00	,64	1,60	1,00	,87	2,67	2,00	1,81
	E1	1,97	2,00	1,00	1,50	1,00	,94	2,20	1,00	1,60	2,67	3,00	,50
	E2	2,52	2,00	1,13	2,29	2,00	1,14	2,60	2,00	1,77	3,33	3,00	1,33
	E3	2,41	2,00	1,17	2,07	2,00	1,08	2,00	2,00	,97	3,33	4,00	1,01
	E4	2,39	2,00	1,07	1,86	2,00	,95	1,80	2,00	,81	2,33	2,00	,50
	E5	2,16	2,00	1,26	1,57	1,00	,94	1,80	1,00	1,07	1,00	1,00	0,00
	R1	2,30	2,00	1,19	1,86	1,00	1,24	1,80	1,00	1,07	3,00	3,00	1,74
	R2	1,97	2,00	,94	1,57	1,50	,65	1,20	1,00	,44	1,33	1,00	,50
	R3	2,25	2,00	1,05	2,00	2,00	,88	1,60	2,00	,53	1,67	2,00	,50
	R4	2,10	2,00	1,15	1,79	2,00	,70	1,80	1,00	1,07	2,33	2,00	1,33
	R5	2,26	2,00	1,12	1,57	1,00	,76	1,80	1,00	1,07	2,33	3,00	1,01
	P1	1,98	2,00	,93	1,36	1,00	,50	2,40	2,00	1,48	1,33	1,00	,50
	P2	2,13	2,00	,91	1,71	2,00	,61	2,60	2,00	1,31	1,67	2,00	,50
	P3	2,33	2,00	1,10	1,50	1,00	,86	1,80	1,00	1,07	2,33	2,00	1,33
	P4	2,22	2,00	1,12	1,79	2,00	,70	2,00	2,00	,97	2,33	1,00	2,01
	P5	2,35	2,00	1,26	1,71	1,50	,83	1,60	1,00	,87	2,00	2,00	,87
	M1	2,19	2,00	1,23	1,64	1,00	,93	2,20	3,00	1,07	2,33	3,00	1,01
	M2	2,12	2,00	,94	2,00	2,00	,96	2,60	3,00	1,11	1,33	1,00	,50
	M3	2,20	2,00	,98	1,64	1,50	,75	2,40	3,00	,87	2,00	1,00	1,51
	M4	2,17	2,00	1,14	1,71	2,00	,73	2,00	2,00	,97	2,67	2,00	1,81
	M5	2,27	2,00	1,18	1,71	1,00	1,00	2,00	2,00	,97	1,33	1,00	,50

As we can observe, no significant differences were reported between the companies representing informatics (I), media (M) or telecommunication and technology (T).

However, we may point some idiosyncrasies in case of representatives of telecommunication and technology when analysing the impact of particular obstacles on strategy implementation. Detailed results are presented in table 2.

Table 2: Strategy implementation obstacles – impact

		Total			I			M			T		
		Mean	Median	SD	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
Impact	L1	3,33	4,00	1,44	3,71	4,00	1,00	3,60	4,00	1,11	1,33	1,00	,50
	L2	3,47	4,00	1,29	4,14	4,50	1,17	3,80	4,00	1,27	1,33	1,00	,50
	L3	3,41	4,00	1,20	3,86	4,00	1,17	3,80	4,00	,44	1,67	1,00	1,01
	L4	3,64	4,00	1,24	4,07	4,50	1,15	3,00	3,00	,97	2,33	2,00	1,33
	L5	3,52	4,00	1,28	3,79	4,00	1,13	3,00	3,00	,97	2,33	1,00	2,01
	S1	3,52	4,00	1,33	3,71	4,00	1,21	3,80	4,00	,44	1,33	1,00	,50
	S2	3,48	4,00	1,22	3,50	4,00	1,29	4,20	4,00	,81	2,00	2,00	,87
	S3	3,31	4,00	1,25	3,79	4,00	1,19	3,00	3,00	,97	1,33	1,00	,50
	S4	3,35	4,00	1,18	4,00	4,00	,88	3,60	4,00	,53	2,67	2,00	1,81
	S5	3,45	4,00	1,22	3,57	4,00	1,02	3,60	4,00	,53	2,00	1,00	1,51
	E1	3,48	4,00	1,40	4,00	4,00	1,24	3,60	4,00	,53	2,67	2,00	1,81
	E2	3,55	4,00	1,07	3,93	4,00	,73	2,80	2,00	1,07	2,00	2,00	1,10
	E3	3,56	4,00	1,23	4,00	4,00	,88	3,40	4,00	1,31	2,00	1,00	1,51
	E4	3,56	4,00	1,14	3,93	4,00	1,00	3,80	4,00	,81	1,67	2,00	,50
	E5	3,47	4,00	1,27	3,71	4,00	1,27	3,80	4,00	,44	1,33	1,00	,50
	R1	3,49	4,00	1,17	3,50	4,00	1,29	3,40	4,00	,87	2,33	1,00	2,01
	R2	3,40	4,00	1,16	3,57	4,00	1,29	3,80	4,00	1,27	2,33	2,00	1,33
	R3	3,27	3,00	1,17	3,64	4,00	1,22	2,80	2,00	1,07	1,33	1,00	,50
	R4	3,30	3,00	1,17	3,36	4,00	1,22	3,80	4,00	,44	1,33	1,00	,50
	R5	3,57	4,00	1,20	3,57	4,00	1,16	4,20	4,00	,44	1,67	1,00	1,01
	P1	3,51	4,00	1,16	3,64	4,00	1,09	3,40	3,00	,53	2,33	2,00	1,33
	P2	3,30	3,00	1,17	3,86	4,00	1,03	3,80	4,00	,81	1,33	1,00	,50
	P3	3,39	3,00	1,26	3,71	4,00	1,27	3,80	4,00	,81	1,33	1,00	,50
	P4	3,47	4,00	1,18	3,64	4,00	,85	3,60	4,00	,53	2,33	1,00	2,01
	P5	3,52	4,00	1,17	3,64	4,00	,93	4,00	4,00	,69	1,67	1,00	1,01
	M1	3,61	4,00	1,08	3,57	4,00	1,40	3,60	4,00	1,11	2,00	2,00	,87
	M2	3,30	4,00	1,20	3,71	4,00	1,33	3,00	3,00	,69	1,00	1,00	0,00
	M3	3,27	3,00	1,17	3,43	4,00	,85	3,80	4,00	,81	1,67	2,00	,50
	M4	3,59	4,00	1,13	3,57	4,00	1,16	3,80	4,00	,44	2,33	1,00	2,01
	M5	3,51	4,00	1,26	3,50	4,00	,94	3,80	4,00	,44	2,33	2,00	1,33

As presented in the table, we may observe that in case of telecommunication and technological companies, the impact of particular obstacles is lower than in case of other creative industries. To check whether such idiosyncrasies are also observed in case of aggregated constructs, further analysis was performed. The details are presented in table 3.

Table 3: Strategy implementation obstacles (aggregated constructs) – probability and impact

		Total			I			M			T		
		Mean	Median	SD	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
Probability	Leadership	1,92	2,00	,87	1,57	1,00	,85	1,80	1,00	1,07	1,67	1,00	1,01
	Strategy content	2,06	2,00	,84	1,50	1,50	,52	1,40	1,00	,53	2,00	2,00	,87
	Employees	2,25	2,00	,93	1,79	1,50	1,05	1,80	1,00	1,07	2,33	2,00	,50
	Resources	2,15	2,00	,84	1,71	2,00	,73	1,60	1,00	,87	2,00	2,00	,87
	Processes	2,15	2,00	,89	1,64	1,50	,75	2,00	2,00	,97	2,00	2,00	,87
	Measures	2,22	2,00	,83	1,86	2,00	,87	2,20	3,00	1,07	2,00	2,00	,87
Impact	Leadership	3,44	3,00	1,13	3,86	4,00	1,03	3,20	3,00	,81	1,67	1,00	1,01
	Strategy content	3,37	3,00	1,01	3,57	4,00	1,02	3,60	4,00	,53	2,00	2,00	,87
	Employees	3,50	4,00	1,04	3,86	4,00	,95	3,60	4,00	,53	2,00	2,00	,87
	Resources	3,38	3,00	,93	3,50	4,00	1,10	3,60	4,00	,53	1,67	1,00	1,01
	Processes	3,37	3,00	,99	3,57	4,00	1,02	3,80	4,00	,44	1,67	1,00	1,01
	Measures	3,40	3,00	,82	3,29	4,00	1,00	3,60	4,00	,53	2,00	2,00	,87

Analysis performed on aggregated data revealed the same regularities. In case of impact of particular constructs, we may observe lower level in the sample of technological and telecommunication (T) companies.

Conclusions and Further Research

The research results did not reveal significant differences in the strategy characteristics observed in creative industries. However, in case of telecommunication and technological companies, the environment where they operate was reported as more stable with predictable pattern of demand and competitive structure. That may be reflected in different impact of strategy implementation obstacles observed in that industry which was reported as lower compared to the other two types. At the same time, the level of strategic goals achievement is high (more than 75%) which demonstrates that the lower level of environmental volatility reported positively influences the possibility of strategy execution. Further research could focus on other representatives of creative industries to explore whether any idiosyncrasies may also be observed. Moreover, further investigation could be aimed at exploring the differences between creative industries and other types of industries having different strategic characteristics and environmental challenges.

Appendix

Construct	Symbol	Items
Leadership	L1	Managers do not identify themselves with company's strategic goals.
	L2	Managers do not provide information about the strategy and the process of its execution to other employees.
	L3	Managers are not engaged in relations with company's stakeholders (employees, clients, suppliers, institutions, etc.).
	L4	Managers do not execute the tasks assigned.
	L5	Managers have a low tendency to modify the strategy developed.
Strategy content	S1	Strategy did not include the influence of external factors (changes in the industry, competitive situation, stakeholders' expectations).

	S2	Strategy did not include the strengths and weaknesses of the organization (mainly the performance results and development potential).
	S3	Strategy is not precise enough (it does not clearly describe development directions and strategic goals).
	S4	Strategy is excessively formalized or inflexible.
	S5	Strategy is difficult to measure and transpose for tactical and operational goals.
Employees	**E1**	Employees do not have knowledge about the strategy (vision / mission / strategic goals) and the process of its execution.
	E2	Employees do not understand the relationship between the strategy and their everyday activities.
	E3	Employees are not included in the strategy execution process (by having decision-making power and active participation).
	E4	Employees are not motivated to implement the strategy.
	E5	Employees do not have sufficient knowledge and competences to implement the strategy effectively.
Resources	**R1**	The organization has too small resource potential (human resources, materials, technology) to execute the strategic plans.
	R2	The organization has too small financial potential to execute the strategic plans.
	R3	The resources are hardly flexible and difficult to modify.
	R4	There are difficulties with obtaining the information and knowledge about the resources necessary to implement the strategy.
	R5	There are difficulties with increasing the available resource potential according to strategic intentions.
Processes	**P1**	The strategy communication process is ineffective.
	P2	The motivating process does not consider the effects of strategy execution.
	P3	The task delegating process is ineffective.
	P4	The process of controlling the level of strategy execution and identifying the deviations is ineffective.
	P5	The process of reaction to observed deviations (making necessary corrections and modifications) is ineffective.
Measures	**M1**	A set of specific financial and non-financial measures used to strategy execution measurement has not been created.
	M2	The measures of strategy execution process do not reflect all strategic goals.
	M3	Measures of strategy execution process are not related to other measures of company's performance.

	M4	There is no regular strategy execution measurement process.
	M5	The system of measures is not modified during the strategy execution (if necessary).

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The Impact of Intuition on the Effectiveness of Decision-Making Process

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Abstract

Empirical research proves that decision-makers are aware of the role of intuition in decision-making processes and, striving to make effective decisions, they try to combine rational and intuitive approaches. However, the question arises whether the use of intuition has a real impact on the effectiveness of the decision-making process.
This article aims at determining the relationship between the approach to decision making used in practice (proving that a certain degree of intuition is used) and the effectiveness, perceived by decision-makers, of decisions made in the professional sphere. The article consists of three parts. The first one is theoretical and attempts to define the concept of intuition and its role in management, especially in the decision-making process. Next, the research method of empirical research is presented. The last part of the article is devoted to the presentation of the cognitive results obtained by the author (quantitative surveys were carried out using the CATI method, which resulted in 300 correctly completed questionnaires).

Keywords: Intuition, Decision-Making Process, Effectiveness.

Introduction

Modern organisation and management sciences are interdisciplinary in nature. They use the achievements of many sciences, such as economics, computer science, cybernetics, statistics, finance, psychology, sociology, cognitive science, heuristics and neuroscience. Concepts that are currently characterized by the highest dynamics of development are those related to the behavioural trend. The behavioural trend affects both macroeconomic areas and the behaviour of enterprises, including their internal decision-making processes (Jędrzejczyk, 2013, p. 9). Due to the variability of the environment in which modern enterprises operate and more and more often the excess than lack of information, with which decision-makers deal, the rational process of cognition and decision-making is no longer the only and sufficient one. Managers are looking for new ways to obtain and interpret information. Intuition begins to play a significant role because not all phenomena and processes can be predicted and planned in a rational way by referring to logical thought processes and previous algorithms of operation (Goldberg, 2000, pp. 51-86).

The analysis of literature on management helps to reveal a specific paradox. The notion of intuition is often used in the theoretical approach when, for example, we define management, the theory of decision making, or paradigms of management. However, there is practically no research and analysis on intuition in organisational practice. The category of intuition is increasingly appreciated by management theoreticians, but its perception is still often pejorative.

Empirical research proves that decision-makers are aware of the role of intuition in decision-making processes and, striving to make effective decisions, they try to combine rational and intuitive

approaches (Malewska, 2018, pp. 189, 192). However, the question arises whether the use of intuition has a real impact on the effectiveness of the decision-making process.

This article aims at determining the relationship between the approach to decision making used in practice (proving that a certain degree of intuition is used1) and the effectiveness, perceived by decision-makers, of decisions made in the professional sphere. The article consists of three parts. The first one is theoretical and attempts to define the concept of intuition and its role in management, especially in the decision-making process. Next, the research method of empirical research is presented. The last part of the article is devoted to the presentation of the cognitive results obtained by the author.

The Concept of Intuition

Intuition is a concept that is not fully recognized and defined because it is one of the properties of the human mind, which still has many secrets concealed from researchers. Scientists agree that intuition exists and is an ability that plays an important role in the process of cognition and decision making. However, when it comes to its essence and its real influence on decision-making processes and practical usefulness, opinions differ (Fields, 2003).

Today's understanding of the word intuition comes from the Latin word "intuitio", meaning persuasion, a hunch. An analysis of dictionaries shows that intuition is most often defined as a hunch, brainwave, feeling, the process of direct acquisition of knowledge, confidence in a specific issue without conscious reasoning and inference (Kopaliński, 2001, p. 235). Intuition is therefore a way of acquiring knowledge and is at the same time the opposite of other types of cognition, especially discursive cognition. This understanding of intuition was advanced and popularised by H. Bergson, according to whom intuition meant the ability to present reality directly and comprehensively. According to the author, this is a more complex ability than thinking and perceiving. He described it as the so-called conscious instinct. It is assumed that the instinct acts unconsciously and is a natural biological phenomenon, and its level depends on a particular organism. According to H. Bergson, the opposite of intuition is the intellect. There is one main difference between intuition and the intellect, namely intuition represents reality as it is, while the intellect distorts it by translating it into its "language" (Dobrołowicz, 1995, pp. 46-47). It is worth noting that the author considered intuitive cognition to be more perfect than intellectual cognition, describing it as the only true cognition. C.G. Jung, who represented a similar view of intuition, understood it as an instinctive understanding of phenomena, things and processes without the need to explain them.

Representatives of management sciences disagree on the areas in which intuition operates. Some argue that intuition is an alogical thought process within the subconscious (Barnard, 1997; Goldberg, 2000; Hogarth, 2001). Others, however, regard intuition as a process of rational decision making (Agor, 1998; Westcott, 1968; Simon, 1987), while the final solution to a decision problem is generated on the basis of a relatively smaller amount of information than in the case of an analytical process. What distinguishes an intuitive decision-making process from a rational one is the assumption that the decision is based on objective data and information as well as on the feelings and emotions experienced by the decision-maker. Still another group of researchers is of the opinion that intuition is knowledge which is obtained in a direct way, without the involvement of the processes of reasoning and inference. However, they stress that it is not a denial of a rational process nor is it of a random character characteristic of guesswork (Sinclair, Ashkanasy, 2002).

[1] The present study assumed that five potential decision-making approaches are used in practice, indicating the relationship between intuitive and rational approaches, i.e. rational, quasi-rational, balanced, quasi-intuitive, and intuitive approaches.

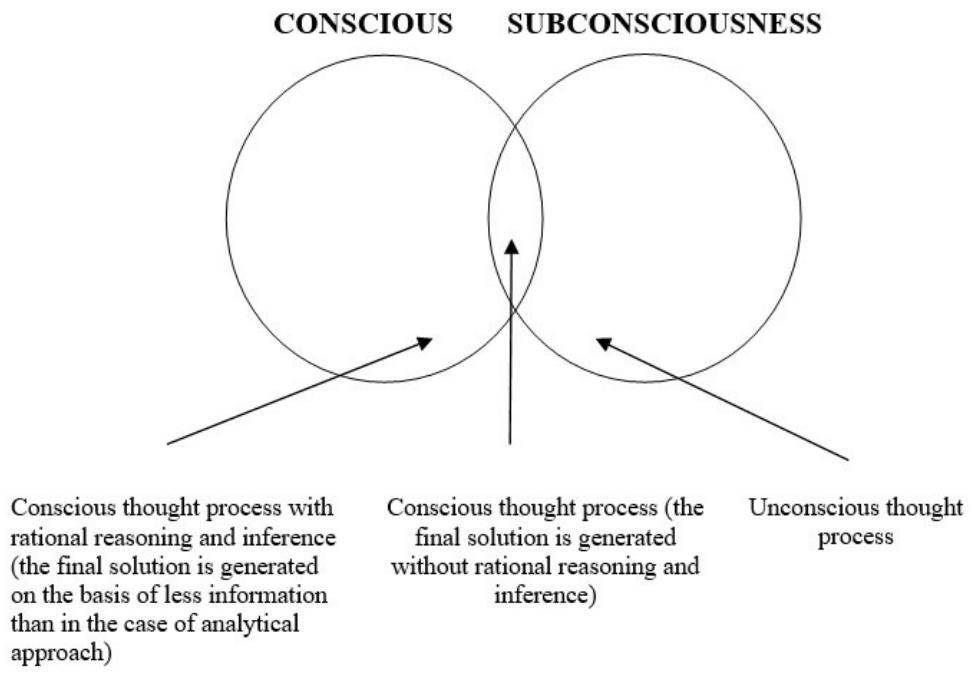

Fig. 1: Areas of intuition

However, authors who study intuition (Sinclair, Ashkanasy, 2005; Csikszentmihalyi, 1996; Klein, 2004) agree that it has several characteristics, namely it:

- is a derivative of the experience gained over many years of practice,
- is a complex phenomenon (it is not sequential),
- is based on a thorough understanding of the situation,
- it draws on classified information resources,
- is a thought process (the result of a sudden brainwave),
- is an unexpected process that cannot be controlled.

A decision-maker, using intuition, integrates a lot of information from different sources. It is both the information stemming from a specific decision situation and the feelings of the decision-maker and the reactions of his or her body. It should be stressed that all sources of information are considered by the decision-maker to be equivalent (Bechara, Damasio, Tranel & Damasio, 1997). Since intuitive decisions are generated on the borderline of consciousness and subconsciousness (Heintzelmann, Trent & King, 2013), the decision-maker is not able to logically justify his or her choice. This means that he or she has knowledge, but does not know where this knowledge comes from, and yet the basis for making a decision is his or her inner conviction as to the rightness of a given choice (Zander-Schellenberg, Remmers, Zimmermann, Thommen&Lieb, 2019).

Intuition is an ability that can and should be used in the organisation's decision-making processes. Assuming that the amount of information is a key factor in the effectiveness of a decision, it is right to say that the usefulness of intuition lies primarily in the fact that it activates the resources of latent knowledge stored in the brain of the decision-maker. This knowledge enriches the resources of information gathered in a rational way and gives a chance for a more effective solution to the problem which requires making a decision.

The Role of Intuition in The Decision-Making Process

Intuition is seen today as a mental ability that can be used in managing organizations, especially in the decision-making process. Many practitioners consider it an important source of cognition. Intuition helps not only to acquire, but also to create new knowledge. Researchers dealing with this issue postulate that it is not an irrational or illogical phenomenon, because it results from many years of practice and experience (Jędrzejczyk, 2013, p. 184). Many authors have proved that intuition is regularly used in business (Parikh, 1994; Agor, 1998; Fields, 2003; Jędrzejczyk, 2013; Malewska 2018).

Intuition is a mental ability that should be used with the greatest intensity by top managers because action at this level requires a response to complex, unique and inimitable situations. Factors taken into account in strategic decisions are very often immeasurable and qualitative. Additionally, the environment in which contemporary organizations operate is dynamic and unpredictable, which translates into a high level of uncertainty. The above factors make it difficult or even impossible to make decisions based on a rational approach where complete information must be taken into account (Buchanan, O'Connell, 2012; Hackbarth, 2008). Therefore, the rational approach is complemented by an intuitive approach. Among the situations in which intuition is most frequently used one can mention:

- a high degree of uncertainty,
- few or no previous precedents,
- many possible solutions to the decision-making problem without a clear selection criterion,
- the pressure of time,
- the variables analysed are poorly predictable in a scientific manner,
- the available data and facts are of little use.

(Agor 1998; Bieniok, Halama and Ingram, 2006, p. 92).

The results of empirical studies prove that the role of intuition in the decision-making process boils down to initiating and completing the decision-making process. In the first case, it involves the formulation of innovative solutions, the generation of which would not be possible with the use of analytical thinking or previously applied methods of action. The second one integrates intuition with rational analysis (Moxley, Ericsson, Charness, Krampe, 2012, pp. 72-78). Analysis enables identification of possible solutions, but its role is primarily to assign weights to decision criteria, while the use of intuition makes it possible to make the final choice. The awareness that intuition exists and is used is a necessary condition for the effective use of intuition. The decision-maker is then open to the possibilities offered by intuition, but also knows in what situations to limit its impact by using rational thinking. Only by juxtaposing intuition with acquired information and facts can the decision-maker act more effectively (Myers, 2004, p. 216-217).

To sum up, one can say that intuition is an essential element of the work of a modern manager, but it should not be the only basis for his or her choices. Management theorists show that decision-makers who manage solely on the basis of intuition make many wrong decisions. However, it should be emphasized that without the use of intuition it is impossible to generate a creative, abstract solution, but each such solution should be verified by making a rational assessment (Bolesta-Kukułka, 2003, p. 259).

Thus, the question arises whether the use of intuition translates into the effectiveness of decisions made. An analysis of the literature on management helps to notice a research gap in this area. Although first publications on the use of intuition in decision-making processes have been published in recent years, they lack systematization and a holistic approach to the issue of intuition in management. This situation suggests that research into the problem is presently at the initial stage. In the previous deliberations, attention of authors writing about the problem in question has focused primarily on defining the concept of intuition, identifying its use in decision-making processes, and defining its types, relations between intuition and experience, situations in which it is applied and the determinants of its effective use (Agor, 1984; Epstein, 1985, 1994; Parikh, 1994; Klein, 1998; Slovic,

2004; Lipshitz and Shulimovitz, 2007; Woiceshyn, 2009, 2011; Dane and Pratt, 2009; Kahneman and Klein, 2009; Salas, 2010; Hensman and Sadler-Smith, 2011; La Pira, 2011; Kowalewski, 2012; Jędrzejczyk, 2013; Malewska, 2018, s. 107). However, there is a cognitive gap in research on the impact of the use of intuition (as regards the diagnosis of the degree to which intuition is used) on the effectiveness of the decision-making process. Research on similar topics was conducted by N. Khatri and H.A. Ng (Khatri, Ng, 2000). The authors sought to determine the importance of intuition in making strategic decisions. This research was the first to investigate the relationship between the use of intuition and the efficiency of an organization's functioning. The key findings of the study on the effectiveness of intuition are as follows:

- intuitive decision making is effective in an unstable environment,
- intuitive decision making is ineffective in a stable environment.

However, the question arises as to the extent to which intuition is used with reference to which the above conclusions are true. Are they valid for both intuitive and quasi-intuitive and balanced decision-making processes? All of these decision-making methods are characterized by the use of intuition, with the difference that it (the intuition) is applied with different intensity.

S. Tokarski is another author dealing with the issue of intuition and its effectiveness. Within the framework of empirical research he aimed at identifying the relationship between economic results of an enterprise and intuitive decision-making (Tokarski, 2006, pp. 275-293). In his research, Tokarski proved the hypothesis that in enterprises achieving better economic results, managers more often admit to making intuitive decisions. There was one limitation of his study, namely it referred only to the respondents' opinions on the use of intuition. As in the case of the study carried out by N. Khatri's team, there was no diagnosis of the way in which decisions were made, proving a certain degree of using intuition and rational analysis. A similar study aimed at determining the impact of intuition on the functioning of organisations in various areas was also conducted by the following researchers: Sadler-Smith (2004) in the area of small enterprises; Houghl and Ogilvie (2005) in the area of preferences in strategic decision making; Leybourne and Sadler-Smith (2006) in the area of project management; Ritchie (2007) in the area of non-profit organisations; Elbane and Child (2007) in the area of effectiveness of strategic decisions (Malewska, 2018, p. 114). However, these studies did not address the issue of identifying the extent to which intuition is used and its impact on the effectiveness of decisions made.

The Research Method of The Empirical Study

The study assumed that intuitive potential and the use of intuition in the decision-making process are two separate concepts. The first one results from personality traits, abilities and predispositions predisposing the decision-maker to use the intuition in decision-making processes. The second one, on the other hand, shows the actual degree of using intuition in decision-making processes. This means that the decision-maker may have a high intuitive potential, but may not use it in practice. Ultimately, the level of intuition use in decision-making is determined by both internal (e.g. preferred way of obtaining and processing information, style of thinking, experience, type of personality) and external factors (e.g. structure of the decision-making problem, organizational culture of the organization or decision-making conditions) (Malewska, 2018, p. 148). Achieving the goal of determining the impact of intuitive decision-making on the effectiveness of decision-making processes required the author to develop a tool for determining the level of intuitive potential of the decision-maker and the extent to which intuition is used in the practice of decision making (questionnaire). The starting point for the formulation of a part of the questionnaire that aimed at diagnosing the level of intuitive potential was the description of an intuitive manager proposed in the literature, and the questions contained therein were intended to determine the degree to which the respondents possessed the features, abilities and predispositions attributed to an intuitive decision-maker. This part of the questionnaire included 12 closed questions. The respondents could choose between two potential answers, one of which testified to the superiority of the intuitive potential and the other to the superiority of the analytical potential. The part of the questionnaire which aimed at determining the level of intuition use in decision-making processes was formulated based on the

description of two extreme approaches used in decision-making: rational and intuitive. The analysis and critical evaluation of Polish and foreign studies allowed the author to identify aspects of the decision-making process that were taken into account in order to diagnose the extent to which intuition was used in decision-making (the relation between rational analysis and intuition). These aspects were at the same time the criteria for operationalisation and differentiation of intuition and rational analysis. They included location of the decision problem, the way of solving the problem, evaluation of other decision variants, approach to risk and uncertainty, use of information source, application of information processing procedures, documenting the decision process, involvement of the decision-maker in the decision process, logic of thinking, awareness in action, the ability to present the decision process. In this way, 12 closed questions were created, which the respondent could answer by choosing one of the two possible answers. This choice, in the case of each of the questions, clearly indicated the use of one of the two approaches to making decisions: rational (analytical) or intuitive in a given aspect of the decision-making process.

The research procedure was based on the cognitive theory of the continuum, according to which analytical and intuitive approaches to decision making coexist in management practice. These are two opposing approaches to making choices. In practice, there are rarely "pure" variations of these decision-making styles. Most often decision-makers represent combinations of these two ways of cognition and thinking, namely quasi-intuitive (the advantage of intuitive approach over analytical approach), balanced (balancing both approaches), or quasi-rational (again meaning the advantage of analytical approach over intuitive approach).

The classification of individual decision-making methods was based on the following assumptions:

- 11-12 answers given by the respondent for intuition meant using the intuitive approach,
- 8-10 answers given by the respondent for intuition meant using a quasi-intuitive approach,
- 6-7 responses given for analysis or intuition meant using a balanced approach,
- 8-10 responses given for analysis meant using a quasi-rational approach,
- 11-12 answers given by the respondent for analysis meant using a rational approach.

In order to measure the effectiveness of decisions made by the respondents, self-assessment was used. Respondents were asked to evaluate, on a scale from 1 to 5, the effectiveness of their professional decisions (1 meant ineffective decisions, 2 – little effective, 3 - average effective, 4 - effective, 5 - optimal). In the future, the author plans to use a more complex approach to the issue of the effectiveness of decision-making processes. It can be assumed that the application of the experiment technique would provide interesting information on the impact of intuition on the effectiveness of decision-making processes. However, the results obtained in this way would constitute only individual exemplifications. They would not be a basis for drawing general conclusions.

In order to identify the correctness between the decision-making approach used by the respondents and the assessment of the effectiveness of the decision-making process, a one-way analysis of variance for independent groups - the so-called Kruskal-Wallis test - was used. This decision was motivated by the fact that the use of this test does not require meeting a number of assumptions (compared to the ANOVA analysis). The only necessary conditions for its application are the following two assumptions:

- the dependent variable should be measured on at least an orderly scale (it can also be measured on a quantitative scale),
- observations in the analysed groups should be independent of each other, which means that a person in one group should not be a member of another group under comparison (King and Minium, 2009, p. 573).

The author is aware that the use of the questionnaire in an empirical study, especially in relation to such a complex phenomenon as intuition, has its limitations. The basic ones result from the fact that the answers obtained in this way are burdened with a certain degree of subjectivity of the respondents' assessments, which may represent their opinions to a greater extent than the reality

which they are supposed to describe. In order to reduce this risk, pilot studies were carried out and the reliability of the tool was analysed by verifying its internal consistency (the questions that significantly reduced its consistency were removed).

Quantitative surveys were carried out using the CATI method, which resulted in 300 correctly completed questionnaires.

Results of The Empirical Study

Table 1: Verification of the equality of the distribution of the variable "intuitive potential" depending on the self-assessment of the effectiveness of decisions taken in the professional sphere

Zero hypothesis	Test	Significance	Decision
Distribution: Level of intuitive potential - the values are the same for the variable category: evaluation of decision effectiveness (on a scale of 1-5)	Kruskal-Wallis test for independent samples	0.788	No grounds for rejection of the zero hypothesis
Asymptotic significance is presented. The level of significance is 0.05.			

The result of the test shows that there are no grounds for the rejection of the zero hypothesis, assuming no significant differences in the distribution of variables under analysis, in favour of an alternative hypothesis ($p>0.05$). This means that there are no differences in the distribution of the variable "level of intuitive potential depending on the assessment of decision effectiveness".
Despite the lack of statistically significant differences in the distribution of these variables, their analysis was carried out by comparing the size of the groups of decision-makers surveyed who were diagnosed as decision-makers with a predominance of intuitive, analytical or balanced potential with assessments of the effectiveness of their decisions. We see that the highest percentage of respondents (20%) who evaluated the effectiveness of their decisions came from a group of decision-makers who predominantly use the intuitive potential. Similarly, in a group which predominantly used the analytical potential, the percentage was 16%, whereas in a group with balanced intuitive and analytical potential it was only 4%.

Table 2: Structure of respondents characterized by the predominance of intuitive, balanced and analytical potential, including self-assessment of the effectiveness of decisions taken in the professional sphere

	Assessment of the effectiveness of decisions taken in the professional sphere					
Approach to decision making	Score 1 (number)	Score 2 (number)	Score 3 (number)	Score 4 (number)	Score 5 (number)	Total
Superiority of intuitive potential	-	-	8	75	21	104
Balancing the intuitive and analytical potential	-	2	5	39	2	48
Superiority of analytical potential	-	-	7	118	24	149

Table 3: Verification of the equality of the distribution of the variable "method of decision making" depending on the self-assessment of the effectiveness of decisions made in the professional sphere

Zero hypothesis	Test	Significance	Decision
Distribution: Method of decision making - values are the same for the variable category: evaluation of decision effectiveness (on a scale of 1-5)	Kruskal-Wallis test for independent samples	0.117	No grounds for the rejection of the zero hypothesis
Asymptotic significance is presented. The level of significance is 0.05.			

The test probability is greater than the standard value of 0.05 ($p > 0.05$). Therefore, it can be concluded that there are no grounds for the rejection of the zero hypothesis stating that there are no differences in the distribution of the variable "method of decision making" depending on the assessment of the effectiveness of decisions taken by decision-makers in the professional sphere.

Table 4 presents the results of the empirical study into the structure of respondents representing particular approaches to decision making, taking into account the level of effectiveness of decisions assessed by the decision-makers.

Table 4: Structure of respondents representing particular approaches to decision making including self-assessment of the effectiveness of decisions made in the professional sphere

	Assessment of the effectiveness of decisions taken in the professional sphere					
Approach to decision making	Score 1 (number)	Score 2 (number)	Score 3 (number)	Score 4 (number)	Score 5 (number)	Total
Intuitive and quasi-intuitive	-	2	2	28	15	47
Balanced	-	-	13	127	13	153
Rational and quasi-rational	-	-	4	77	19	100

On the basis of the data obtained, we can conclude that regardless of the approach to decision making used, the vast majority of the decision-makers surveyed assess their decisions as effective (77%) or even optimal (16%). Only 6% of the respondents assessed the level of effectiveness of their decisions as average. None of the analysed managers chose the "ineffective" option, and only 1% considered their decisions to be little effective. This may be caused by a phenomenon of succumbing to the factor of social approval (meaning a change of behaviour, opinion or feelings as a result of the influence of other people, in this case it may be manifested in the respondents' motivation to present correct, appropriate behaviour in the eyes of the researcher and to present a professional image of oneself (Tyszka, 2000)).

As regards the approach to decision making where the respondents treated the effectiveness of their decisions (optimal decisions) as most important, we see that the highest percentage of responses indicating the choice of the highest effectiveness rating (score 5) was observed in the case of decision-makers representing intuitive and quasi-intuitive styles (32%). The second place was taken by a group of decision-makers using a rational and quasi-rational approach. Out of this group, 19% of decision-makers assessed their decisions as optimal. In the case of decision-makers using the balanced style, the percentage of assessments with the highest effectiveness rating was only 9%.

Conclusion

Globalization, technical and technological changes, development of knowledge-based economy, high dynamics of changes, as well as economic and financial crises are the conditions for the functioning of modern enterprises. It is difficult to deal with these challenges in a rational way. That is why today's managers more and more often use their intuition in decision-making processes. On the one hand, intuition fills the information gap in case of the necessity to make decisions in conditions of insufficient information, on the other hand, it acts as a kind of filter in the situation of information noise. It is also an invaluable source of innovative and creative decision-making solutions. More and more often, intuition appears on the lists of desirable managerial competences. Unfortunately, the results of empirical research (Malewska, 2018) indicate that the dominant potential among managers is analytical potential (49% of managers surveyed). Intuitive potential outweighs analytical potential only in 35% of the decision-makers surveyed. Despite the predominance of analytical potential, the most frequently used approach to decision making is a balanced approach combining intuitive and analytical approach (51% of respondents). The second place was taken by a quasi-rational approach (29% of the managers analysed). In 15% of the management staff analysed, the use of a quasi-intuitive approach was identified. It can be noted that having a certain potential is not the same as using it in practice. This means that the use of intuition in decision-making depends not only on the potential (intuitive or analytical), but also on external factors related to the environment in which decisions are made and internal factors related to the characteristics of the decision-maker (his or her traits and personality type, predispositions, preferred way of obtaining and processing information, etc.). The fact that intuition is more and more often used in the practice of making business decisions, balancing, supplementing or dominating over rational analysis remains unchanged. This raises the question about the effectiveness of decisions made with the use of intuition. In the empirical studies conducted by us, it was not possible to prove the existence of statistically significant relationships between the potential of the decision-maker (intuitive, balanced or analytical) and the effectiveness of decisions made in the professional sphere. Similarly, there were statistically significant relationships between the approach to decision making used in practice and the evaluation of its effectiveness. This could have been caused by too small a research sample (300 top-level managers were surveyed). Despite the lack of differences in the distribution of variables analysed, certain tendencies can be observed, namely:

- the highest percentage of respondents (20%) who assessed the effectiveness of their decisions as most important came from the group of decision-makers who predominantly resorted to the intuitive potential,
- the highest percentage of responses indicating that effectiveness was chosen as most important (score 5) was recorded for decision-makers representing intuitive and quasi-intuitive styles (32%).

This means that decision-makers who predominantly use the intuitive potential and those who were diagnosed as using intuitive or quasi-intuitive approaches will give the highest ratings to the effectiveness of their business decisions.

In order to confirm the existence of statistically significant relationships between the use of intuition and the effectiveness of decisions taken, it seems justified to conduct a similar study on a larger sample. It is also desirable to develop an objective tool for measuring the effectiveness of decisions, as the presented surveys referred only to the subjective assessment of respondents. Interesting information could also be obtained by comparing the way in which decisions are made and their effectiveness with the factors determining the degree to which intuition is used.

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Dominant Logic in The Context of Shaping Dynamic Capabilities: Evidence from A Polish Regional Airport Case Study

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Abstract

The Dynamic Capabilities View considers the specific category of capabilities which enable companies to change their resource base aimed at adapting to business environment changes and achieving a long-term competitive advantage. In turn, dominant logic is perceived as the manner in which managers conceptualize business reality; thus it is connected with the issue of how organizations develop and choose their own path of development. The aim of this article is to discuss dominant logic as a micro-foundation of dynamic capabilities. The results presented are a part of a wider project on the dynamic capabilities of Polish enterprises. This study finds that regional airports differ in relation to their dominant logic and thereby attitudes to shaping dynamic capabilities. The research findings contribute to the scientific discussion on dynamic capabilities micro-foundations and the dominant logic concept. The results also give an overview on airport management issues.

Keywords: Dominant Logic, Dynamic Capabilities, Airport Management.

Introduction

The Dynamic Capabilities View introduced by the research team of Teece (1997; 1994) is discussed mainly in line with two fundamental articles: the work of Teece's team (1997) – cited according to the Scopus Database (accessed: 19.01.2020) more than 12,600 times; and an article by Eisenhardt and Martin (2000) – with more than 6,200 citations . The Dynamic Capabilities View acknowledges the significant role of combining both internal and external perspectives relating to a firm's performance: its resource-base and the environmental changes it copes with. 'Dynamic capabilities' are competences which enable organizations to modify their resource base over time since these shape an ability to face or even create a dynamically changing business environment (Helfat et al., 2007; Teece et al., 1997).

The research team of Teece (1997, 1994) distinguishes three categories of micro-foundations for dynamic capabilities: resources and skills, processes and procedures, and path dependency. This part of the research examines dominant logic as a micro-foundation; understood as a mind-set, an organizational filter that is used in the decision-making processes and which guides strategic action (Bettis and Prahalad, 1995; Obłój and Pratt, 2005). Dominant logic provides an overview of how managers/entrepreneurs think. Research on dominant logic suggests that it shapes the decision making processes and is built over time (Obloj et al., 2010).

Through conducting direct interviews with the top managers of four Polish regional airports, this qualitative study shows the dominant logic category to be one of the micro-foundations which constitute the process of shaping dynamic capabilities. The contribution of this article is not to recommend optimum resource reconfiguration, but to examine areas which could be considered

during a study on dominant logic as a crucial micro-foundation in the process of shaping dynamic capabilities.

The paper is organized as follows. Section 2 presents the theoretical framework of the Dynamic Capabilities View and the concept of dominant logic. Section 3 presents the research sample and methodology, and Section 4 presents the research findings. In the last section the research limitations and recommendations for further research are given.

Dynamic Capabilities and The Dominant Logic Concept

There is a scientific discussion regarding the influence of dynamic capabilities on company performance. On the one hand there is an assumption that competitive advantage should be considered through the dynamic capabilities perspective (Teece and Pisano, 1994), since dynamic capabilities can improve organizational effectiveness (Zollo and Winter, 2002) and enable a company to achieve excellent resource orchestration which, in turn, facilitates implementing innovations, capturing value and finally achieving long term financial profit (Teece, 2007). Thus the Dynamic Capabilities View perceives these competencies as factors of competitive advantage (Helfat and Peteraf, 2009).

But on the other hand there is a more sceptical point of view, with greater significance for company performance being ascribed to resource reconfiguration, not dynamic capabilities (Eisenhardt and Martin, 2000). Moreover, there is a criticism regarding the ambiguity and tautology of the dynamic capabilities category (Arend and Bromiley, 2009); however, these objections are considered and rebuffed by dynamic capabilities researchers (Helfat et al., 2007; Kuuluvainen, 2012).

Within the Dynamic Capabilities View it is highlighted that dynamic capabilities are embedded in organizational processes (Wang and Ahmed, 2007) and shaped by organizations (Makadok, 2001; Teece and Pisano, 1994). Teece (2007) disaggregates dynamic capabilities into three categories: sensing (and shaping) new opportunities, seizing opportunities, and reconfiguring capabilities; thanks to which an organization can build and maintain a competitive advantage. So far no appropriate methodology has been established for analysing dynamic capabilities. Nevertheless, researchers highlight that applying the dynamic capabilities perspective facilitates explanations of different business performances and therefore, more studies are necessary (Barreto, 2010).

Dynamic capabilities are analysed in the context of innovations capabilities (Ren et al., 2016; Wall et al., 2010; Zahra and George, 2002b); knowledge creation, including an absorptive capacity (Zahra and George, 2002a); and organizational routines (Zahra et al., 2006). The studies on dynamic capabilities are also related to dynamic managerial capabilities (Adner and Helfat, 2003; Martin, 2011), which are defined as 'the capabilities with which managers build, integrate and reconfigure organizational resources and competences' (Adner and Helfat, 2003, p. 1012). This line of analysis considers individuals in the perspective, which according to Felin and Foss (2005) is crucial in understanding organizational routines, capabilities and analysing the whole organization. Research on the Dynamic Capabilities View also comprises the concept of dominant logic (Kor and Mesko, 2013), which appears to provide interesting and important additional information regarding shaping dynamic capabilities and their nature.

Dominant logic is a construct which links the perspectives of diversification and business performance. It is argued that the success of business diversification rests in the quality of management. In particular, Bettis and Prahald note that abilities to learn and acquire new skills are crucial aspects in business success or failure (Prahalad and Bettis, 1986). Bettis and Prahald distinguish two types of 'logic' in organizations: the dominant general management logic, which they define as 'the way in which managers conceptualize the business and make critical resource allocation decision'; and dominant logic, perceived 'both as a knowledge structure and set of elicited management processes' (Prahalad and Bettis, 1986, p. 490).

During research deliberations Bettis and Prahald developed their thinking on dominant logic. They went from a diversification-oriented attitude to analysing dominant logic in terms of environmentally-driven changes (Bettis and Prahalad, 1995). Kor and Mesko suggest that at the very start of a business, the dominant logic of an organization is consistent with the dominant logic of its manager. They argue, in line with Felin and Foss (2005), that the perspective of individuals matters. The same assumption is made by Krogh and Roos (1996) who consider dominant logic as it relates to managers' perspectives as well.

Dominant logic is also related to knowledge management processes, and so the way managers perceive external changes (Brännback and Wiklund, 2001). The literature assumes that 'the manager's knowledge is closely related to his observations of a business environment' (Krogh and Roos, 1996, p. 732), therefore this highlights that a given manager's logic is developed through the interactions between a particular business and its environment (Kor and Mesko, 2013), which suggests that contextual aspects need to be considered when studying dominant logic.

Dominant logic is embedded in routines and organizational procedures as well as resources. It provides managers with certain mental schemas with which they monitor and interpret their business reality (Kor and Mesko, 2013). It is suggested that dominant logic delivers solutions to overcome the threat of information overload and ambiguity. But on the other hand it is pointed out that dominant logic can also supply a limited schema, within which organizational decisions and actions can get stuck.

Based on the concept of Adner and Helfat (2003), Kor and Mesko (2013) argue that a manager's dominant logic is shaped through the three constituencies of managerial capabilities: managerial cognition, social capital and human capital. Managerial cognition determines how a manager thinks, perceives and interprets the world in relation to his/her experience (successes as well as failures). The human capital of a manager relates to the heuristics and assumptions which he/she uses during the decision making process. These heuristics are shaped by specific knowledge and managerial skills, as well as by the business context. The networking of a manager defines his/her social capital. In turn, the relationships and interactions of colleague are used for filtering information and helping managers make assumptions.

The effect of the dominant logic that exists in a given organization is pervasive, as it permeates the whole organization (Bettis and Prahalad, 1995). This insight can lead to the conclusion that any certainty in pinpointing dominant logic can be difficult to achieve by a researcher. Dominant logic is criticized because of its limited applicability both in management practice and academic research (Grant, 1988). Therefore, it can be concluded that the concept of dominant logic should be enriched with the operationalization of its characteristics. The questions arises, how to operationalize the intangible 'resource' which permeates so many organizational phenomena. Obloj et al. (2010) propose an operationalization of dominant logic into four categories (proactiveness, external opportunities orientation, learning, and codification of routines). They suggest that dominant logic is a useful concept for examining the differences in firms' performance and success; however, more research is necessary to refine the dominant logic concept.

The Research Sample and Methodology

The air transport market is assumed to be important for the economic growth of a region and so of a country and its regional attractiveness (Huderek-Glapska, 2019). With a view to understanding the characteristics of the air transport sector one may note and take into consideration its highly regulated legal nature. In the case of Poland it is necessary to add that all airports are under public ownership, with the shares held by the Polish Airports State Enterprise or the local/regional authorities.

The air transport literature (Doganis, 2005; Graham, 2008) highlights that in recent years the way of perceiving an airport has evolved. An airport was traditionally seen as a public utility whose main goal was to serve society in providing transport for passengers and cargos, but nowadays the economic aspects of airport activities are emphasized. The process of liberalization and the increasing

activity of low cost carriers has forced airports to find new ways of competing to meet on the one hand, customers' needs; and on the other hand, to respect the legal regulations (Dobruszkes and Graham, 2016; Forsyth, 2012). Therefore, the research on capabilities which enable an airport to perform effectively in the market has gained the attention of airport researchers (Graham, 2008).

According to the data of the Polish Civil Aviation Authority in 2018 fourteen airports handled commercial passenger traffic, the total number carried (regular and charter, both national and international) being estimated at 45.7mln. Nevertheless, it should be highlighted that Warsaw Chopin Airport, which is the central airport of Poland, has about 29% (17.7mln) of this. The passenger traffic of other airports is much lower. Only six airports (Krakow, Gdansk, Katowice, Wroclaw, Warsaw/Modlin and Poznan) exceeded 1mln passengers (in fact each of them carried more than 2mln in 2018), while the other seven (Rzeszow, Szczecin, Lublin, Bydgoszcz, Lodz, Olsztyn and Zielona-Gora) handled less than 1mln. It should be highlighted that Radom Airport is also registered as a commercial airport, but in recent years it has met problems to find contractors – regular airlines to operate in market regularly. It should be mentioned that each Polish regional airport has its own characteristics, which are not discussed in this article. Because of its totally different scope of activity the central airport of Warsaw Chopin was excluded from the research procedure.

The research procedure is based on the assumptions of Cyfert and Krzakiewicz (2017), who indicate five phases in the dynamic capabilities shaping process: opportunities searching, learning, configuring and reconfiguring, coordinating, and adaptation. The aim of the research was to identify the dominant logic(s) of regional airports in Poland in the context of shaping the dynamic capabilities process. This aim was supported by two operational questions:

1) What are the differences in the dominant logic of regional airports from a shaping dynamic capabilities point of view?
2) How does dominant logic affect the process of shaping dynamic capabilities at regional airports?
The part of the research discussed comprises four in-depth interviews conducted in February 2019, with top managers (a director or a CEO) who were aware of the strategic management of an airport. Two interviews were carried out with the managers of small airports (having less than 1mln passengers yearly) and two with managers of large airports (having more than 1mln passengers yearly). The researchers have undertaken not to reveal the names of the airports examined, thus they are called as follows: the small as S1 and S2, and the large B1 and B2. The aspects considered regarding dominant logic are presented in Table 1.

Table 1: Aspects of dominant logic

Perspective	Characteristics
Openness to environment	-What are airports' attitudes to sensing new opportunities? -What kinds of activities are taken by airports to follow environmental changes? -How do airports perceive environmental dynamism? -How are airports engaged in shaping relationships with their stakeholders?
Internal circumstances	- What are the overall attitudes to implement new solutions? - What are the workers attitudes to changes?
Organizational structure	-What are the characteristics of organizational structure at an airport? - What kinds of communications exist at an airport? -How often do airports change their organizational structure?
Customer orientation	-Who are the customers of airports? -How do airports care for their customers? -How do airports follow their customers' needs?
Learning processes	-How do airports learn? -What are the organized learning processes at airports like? -What are the employees' attitudes to learning?

Safety and security vs. implementing new ideas	-What are airports' attitudes to implementing new ideas in term of safety and security regulations?
Business model	-How often do airports change their business model? -Why do airports change their business model?

Source: Authors' own work.

It should be noted that the airports chosen for interview have been operating in market for more than 10 years, so it can be assumed that their dominant logic has been established over the years, which is important for comparing individual dominant logics (Obloj, Obloj and Pratt 2010).

Results and Conclusions

The following Tables (2-7) present the result of this dominant logic case study. The data gathered cannot be generalized because of the small sample; however, they give a brief overview of the emerging dominant logics of regional airports.

Table 2: Perspective of the approach to environmental changes

Airport	Approach to environmental changes
S1	The airport is pro-activity oriented. In particular it focuses on scanning the environment. Most changes in an airport's environment are legally determined, which requires an ability to anticipate and interpret them. In addition, the airport attempts to follow the development of the region in which it operates. Airports seek business partners to deliver investments in the region and it takes an active part in shaping relationships with its stakeholders.
S2	The airport is highly opportunities-searching oriented and takes into consideration the external circumstances of the business environment. It is involved in cooperation with local entities. Each new idea undergoes comprehensive analysis, since all the time the must airport stay focused on sensing and seizing new opportunities which they can benefit from.
B1	The airport follows and even anticipates environmental changes and in the opinion of the CEO it succeeds. According to the CEO of the airport there is an atmosphere favourable to seeking and analysing new solutions. Opportunities searching as well as anticipating competitors' activities are vital for an airport's competitive advantage.
B2	The airport needs to be oriented in particular to observing and anticipating changes in the legal regulations, while they very often carry out the requirements of technological infrastructure adjustments. Most regulations deal with safety and security adjustments, so there is a need for planning and coordinating activities to meet all mandatory requirements.

Source: Authors' own work.

Table 3: Internal approach to implementing new ideas

Airport	Internal approach to implementing new ideas
S1	Implementing new ideas is greatly limited by legal regulations. Airport activities have to be documented and reported, thus it is hard to implement something new very quickly. The number of employees is purposely limited to optimize the fixed costs. In addition, the workers need to be multi-task oriented and have a wide knowledge regarding airport activities.
S2	All new ideas are welcome but undergo a more comprehensive analysis. The airport reduces the formalization of activities to the legally required level. Nevertheless, the airport suffers from shortages of financial and to some extent human resources, thus it attempts to optimize resource use.
B1	The safety and security dimension is highly formalized and standardized; however, the

	safety criteria should not be an excuse for seeking new solutions.
B2	The issue of safety in the passenger flow precedes most of the delivered changes. There is a little space for creativity and implementing an outstanding new idea.

Source: Authors' own work.

Table 4: Organizational structure

Airport	Internal approach to implementing new ideas
S1	The airport is relatively small, thus its organizational structure is quite simple though highly centralized. The airport CEO decides about the configuration of the organizational structure which is divided into two main perspectives: operational and administrative. The operational part comprises the majority of employees and its activities are more formalized than in the administrative part. The airport takes advantage of outsourcing HR services and other administrative tasks, which in the opinion of the CEO enables the fixed costs to be optimized.
S2	Since airport activities are greatly dependent on legal regulations, many activities need to be formalized; however, the airport attempts to reduce the level of bureaucracy. There are few organizational divisions; e.g. financial, commercial and operational; nevertheless there is an objective to improve internal flexibility.
B1	The organizational structure follows current needs and it is changed two or three times a year. Although the airport's activities are relatively formalized in nature, the CEO encourages employees to cooperate and communicate horizontally, and expects managers to take responsibility for their actions; however, they are not especially keen to fulfil these expectations.
B2	The organizational structure is highly rigid. Communication and performed activities are formalized. Some projects are delivered through project teams, but in general each organizational post has got its own set of duties and official channels of communication exist.

Source: Authors' own work.

Table 5: Orientation to customers' needs

Airport	Orientation to customers' needs
S1	The airport considers customer-passenger needs; however, customers are not only perceived as passengers, but also in terms of an airline or society in general. Thus the airport seeks new directions of development, such as involvement in new projects like cargo-based delivery. This activity is important not only for airlines which transport cargo, but also for society in the sense of e-commerce business development. As for passenger needs, a small airport that has low convenience for the business and tourist industry markets, is not an attractive partner for airlines. Therefore, the number of offered destinations is low which has an influence on passengers' opinions about the airport.
S2	The CEO of S2 declares a customer-oriented approach; however, a small airport offers a limited number of destinations and flights, therefore it can be assessed as not being attractive for some passengers. From a customer-airline approach, it attempts to be a flexible and active partner in shaping a connection network.
B1	In opinion of the CEO the airport meets and even anticipates passenger expectations, in particular from a resource-based point of view. The CEO encourages the workers to fly on business trips, to experience the role of a passenger and observe all the areas which require improvement. The airport is also active in meeting airlines' expectations.
B2	The CEO of B2 declares that the airport is focused on passenger needs. The airport attempts to meet all the requirements regarding passenger comfort and security. Therefore they endeavour to minimize and control inconveniencies. It is also focused on meeting the needs of airlines.

Source: Authors' own work.

Table 6: Orientation to learning

Airport	Orientation to learning
S1	The fundamental issue of learning is knowledge of the legal regulation. At the operational dimension knowledge regarding procedures is critical for safety and security, and know-how of airport operations. Each worker needs to meet the learning requirements (determined by law) as knowledge management is rather based on legal regulations. The crucial issue is employee awareness that learning matters. From an organizational viewpoint the airport is based on benchmarking, and seeking possibilities on how to earn apart from aeronautical activity.
S2	A relatively high level of awareness of learning processes exists within the airport. The workers are focused on learning and they eagerly participate in training. However, knowledge management and learning are generally rather intuitional. The airport uses some benchmarks, and observes its competitors. There is a lack of deeper cooperation in knowledge sharing within the sector because airports compete with each other, so 'know-how' is a strategic resource.
B1	The airport attempts to learn from others, but is relatively similar (regarding scale and business model) to its competitors. In general, learning processes are constituted by legal regulations. There is no internal system of learning, rather it is learning from current situations.
B2	Learning processes are not persistent in all dimensions of airport activity. As for technological solutions the airport managers participate in external training to familiarize themselves with a given functionality. There are no procedures for knowledge management. The airport observes its competitors using benchmarks, but it is hard to characterize the airport as a 'learning organization'.

Source: Authors' own work.

Table 7: Business model

Airport	Business model
S1	The business model of airport S1 has not changed significantly over time. The airport is focused on delivering safe and undisturbed passenger flow.
S2	The business model has not been changed significantly over the years; however, the airport attempts to anticipate and follow environmental changes.
B1	The business model of airport B1 follows environmental circumstances. The airport is focused on economic effectiveness.
B2	The airport attempts to adjust its business model to market circumstances. Since the air transport market is dominated by the activities of low cost carriers that generate passenger flow, the airport needs to follow such expectations.

Source: Authors' own work.

During the research it was observed that the regional airports analysed had certain commonalities in their dominant logic; however, different ways of thinking by managers was also noticed. The case study analysis suggests that dominant logic is embedded in organizational processes, which is highlighted in the literature (Obloj et al. 2010) and therefore it does not appear to be simply a metal schema of managers.

In all cases it is highlighted that learning processes are based on legal requirements which are then formalized. But learning as proactive attitude appears to be intuitional, dependent on individuals. The next commonality is the rigidity of organizational structure, which hinders vertical communication and organizational flexibility. Nevertheless, in two cases (B1 and S2) the respondent suggested efforts to reduce redundant (unnecessary) bureaucracy.

From a shaping dynamic capabilities perspective an observation can be formed that regional airports are oriented to searching for and anticipating opportunities; however, they meet external and internal

barriers that hinder their adjustment and development. The process of shaping dynamic capabilities requires an orientation to learning. This article suggests that airport managers should pay attention to internal processes, particularly learning processes and flexible attitudes to shaping the resource base of airports aimed at economic effectiveness and airport development from a long term perspective. Taking into consideration the dominant logic aspect this could be a useful tool for analysing airport business, including for practitioners.

Research limitations and further directions

A few research limitations should be mentioned. Firstly, dominant logic is an intangible asset, complex in nature (Bettis and Prahalad 1995), which makes it difficult to capture and characterize. Thus the analysis presented does not show all of its important constituents. Secondly, personal interviews are influenced by subjective opinions, and this presents the second limitation. On one hand respondents could decide not to share all the important information because of its strategic significance, on the other hand they could present a more positive depiction of their business reality. Thirdly, the sample was small and the results cannot be generalized; however, they can be a starting point for future research in the area of dominant logic.

In line with the assumption that dominant logic is determined by the environmental context (Kor and Mesko 2013), it should be mentioned that the dominant logic of Polish airports is influenced by local public-ownership strategies (regional, local authorities, Polish Airports Enterprise) as well as central government strategies and legal regulations, both national and international. This suggests that studies on dominant logic also need to include other stakeholders' points of view and more research is necessary.

Moreover, airport activities comprise different entities (such as holding agents), whose points of view have not been analysed during the research. Nevertheless, it could be an interesting area of research as to how the goals of different stakeholders shape dominant logic.

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Binomial Logit Models in The Assessment of The Manufacturing Enterprise Innovativeness

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Abstract

The innovativeness, as a characteristic of an innovative enterprise, has not, also, a synthetic indicator. In the references, there are many various approaches to the innovativeness measurement process. The objective of the paper is to present the logit models for assessment of the enterprise innovativeness.

Keywords: binomial logit model, innovation, level of innovation**,** manufacturing enterprise**.**

Introduction

The manufacturing enterprises, to survive, must develop uninterruptedly. The enterprise development is often connected with the innovativeness. "The innovativeness and innovations are the notions that are not equivalent by strictly interconnected with each other. It is since the innovativeness is measured by the number of created and implemented innovations and the outlays intended by the enterprise involved for this scope" [Gałganek-Napierała, 2011]. At the present state of the knowledge, there no systematised meters for assessment of the innovativeness level of the enterprises acting in the common market. The innovativeness, as a characteristic of an innovative enterprise, has not, also, a synthetic indicator. In the references, there are many various approaches to the innovativeness measurement process. The objective of the paper is to present the logit models for assessment of the enterprise innovativeness.

Innovation – a Definition

In the references of the subject matter, the best known definitions of the innovations have been worked out by J.A. Schumpeter and P.F. Drucker. The first of the creators has defined the innovations as "launching, into production, of the new products or improvement of the existing ones, improvement or implementation of a new production process (process innovation), development of a new product distribution way, opening of a new market, application of new materials, raw materials

for production, introduction of a new production organisation" [Schumpeter, 1960]. The other author, in 1992, defined the innovations as "systematic actions that consist in an active identification of changes in the surrounding and in a systematic analysis of their possibilities of use for creation of subsequent innovations" [Drucker, 1992]. The contemporary definitions of innovations, in the references, are described, in a narrow perspective, as a commercial launching of a novelty [Freeman, 1986], [Griffin, 1996], [Oslo Manual, 2005] or, widely, as a multistage, purposeful process or its effect, which is an advantageous change [Lee, Olson, Trimi, 2012], [Schippers, West, Dawson, 2012], [Tavassoli, Karlsson, 2015]. At this place, it should be agreed with the sentence presented by J. Robinson - "it is easier to show what an innovation is than to define it" [Robinson, 1983].

Innovative Enterprise

In the subject matter references, the innovative activity is defined as the entirety of the scientific, technical, organisational, financial and commercial actions that lead or have, in a further perspective, to lead to implementation of innovations. Into the innovative activity, the research and development (R + D) is also included, that is not directly connected with creation of a specific innovation [Oslo Manual, 2005], [Tiwari, 2008], [Statistics Finland, 2016]. In Poland, this definition is used by the Main Statistical Office (Główny Urząd Statystyczny) in their publications [GUS Szczecin, 2014]. Somewhat differently, the innovative activity problem is defined in the Polish legislation. In the article 2 of the Act dated 30 May 2008, concerning some forms of supporting of the innovative activity (Journal of Laws Dz.U. nr 116, poz. (item) 730), by an innovative activity, it is called "the activity consisting in development of a new technology and starting, on its basis, to manufacture new or significantly improved goods, processes or services" [Ustawa, 2008]. When analysing the innovative activity definitions occurring in the references, for the most important factor characterising the notion, it may be considered each activity of the enterprise that contributes to create the innovation. Basically, there are no big discrepancies between the definitions of the problem.

Contemporary enterprises develop through implementation of an innovation management model. The model is based on the delivery, to the market, an attractive offer that makes use of the qualitative development factors. The development is based, at a high degree, on the intellectual resources of the enterprise. The possession, by the firm, of the resources is one of the features of an innovative enterprise. „The basic definition of an innovative firm says that it is an enterprise that has implemented, in a given time, at least one innovation while an innovative firm in the product or technology sphere has been defined as a firm that has implemented an innovation within the scope of a product or within the scope of a technology. It may happen that, in the period under consideration, firms conduct the innovative activity but they do not do an actual implementation of innovations. Any and all activities connected with working out or implementation of innovations, including the implementations foreseen in the future, are encountered in the innovative activity" [Oslo Manual, 2005]. The innovative activity conducted in the period under investigation may be of the following character:

a) a successful activity, i.e. such finished with a success, a successful implementation of an innovation (there is no requirement that it is a commercial success at the same time),
b) an activity in progress, i.e. the activities pending, that have not resulted in implementation of the innovation yet,
c) an activity abandoned prior implementation of the innovation [Oslo Manual, 2005].

When analysing an innovative enterprise definition, an implementation of at least one innovation in a given time period may be assumed as the most important factor characterising this notion.

Logit Model

The logit models found their applications in, among others, banks, for the credit risk assessment. They are also one of the tools used for the insurance risk assessment. In the life insurances, the logit model makes it possible to evaluate the probability of death in dependence of the demographic characteristics or the medical questionnaire results, appended to the insurance request [Kowerski,

Bielak, Długosz, 2006]. In the present paper, an application of the logit models for evaluation of the innovativeness of a manufacturing enterprise has been proposed.

The logit models (logistic regression models) are applied for explanation of qualitative variables in dependence of the exogenous qualitative or quantitative variables [Gatnar, Walesiak, 2011], [Gruszczyński, 2012]. The logistic regression finds its important application in, among others, modelling the risk of assuming of a certain state by the unit under investigation. If the variable being explained accepts the two states: the phenomenon under investigation has happened or has not happened, than the model is called the binomial logit one. The logit model is a specific case of the generalised linear model [Gatnar, Walesiak, 2011], [Agresti, 2007].

In a binomial logit model, it is assumed that there is some hidden variable y^*, the value of which is not possible for observing. This, what may be observed, may be defined in the following way [Gatnar, Walesiak, 2011]:

$$y_i = \begin{cases} 1, & \text{if } y_i^* > 0 \\ 0, & \text{if } y_i^* \leq 0 \end{cases}, \tag{1}$$

where y_i is a binary response for i-th observation, $i = 1, 2, \dots, n$.

The variable y_i^* represents some type of inclination of the given observation unit to undertake decisions or accepting the state corresponding to the value $y_i = 1$. In the y^*model for y^*, the explanatory variables (predictors) $x_1, x_2, \dots, x_m$ should explain this inclination [Gatnar, Walesiak, 2011], [Gruszczyński, 2012]:

$$y_i^* = b_0 + b_1 x_{i1} + \cdots + b_m x_{im} + \varepsilon_i = x_i^T b + \varepsilon_i \tag{2}$$

where:

x_{ij} – j-th predictor variable measured for i-th observation;

$b = [b_0, b_1, \dots, b_m]^T$ – the parameter vector;

$x_i = [1, x_{i1}, \dots, x_{im}]^T$ – the vector of explanatory variables for i-th observation;

ε_i – i-th random error,

$i = 1, 2, \dots, n$ and $j = 1, 2, \dots, m$.

The main assumptions for the errors in the logistic regression model (2) is that the ε_i have the standard logistic distribution. Also the ε_i should be independent of each other.

In a logit model, the probability of accepting, by the variable y_i, one of the two possible values is a function of $x_i^T b$ [Gatnar, Walesiak, 2011], [Gruszczyński, 2012]:

$$P_i = P(y_i = 1) = F(x_i^T b) = \frac{1}{1 + \exp(-x_i^T b)} = \frac{\exp(x_i^T b)}{1 + \exp(x_i^T b)}, \tag{3}$$

where F – the cumulative distribution function for a logistic distribution. All values of P_i are included in the interval (0,1).

The values of the function inverse to F, for this model, are called logits. The logistic regression model has linear form for the logit of the probability of success for any given observation:

$$logit\ (P_i) = F^{-1}(P_i) = ln\frac{P_i}{1-P_i} = x_i^T b \tag{4}$$

The left hand side of the model is the logarithm of the quotient of the chances to accept or not to accept the value of 1 by the variable y_i. If the chances are the same, i.e. $P_i = 0{,}5$, then the logit equals to zero. For $P_i > 0{,}5$ ($P_i \leq 0{,}5$), the logit is negative (positive).

For interpretation of the logit model parameters, it should undergo after assessment of the parameters b_j. The estimators $\widehat{b_j}$ of unknown parameters are defined by the maximum likelihood method.

Then, it is to find an answer to the question in what way the explaining variable values have an effect upon the probability values of belonging to either of the groups. In the references of the subject matter, the two ways of interpretations that will make it possible to answer this question may be found [Gatnar, Walesiak, 2011], [Gruszczyński, 2012]:

a) the interpretation in the probability categories, where the logit model structural parameter interpretation is similar to the interpretation known for the linear model: the parameter sign determines the direction of the dependence between the variables under consideration,
b) the interpretation with use of the odds: $\frac{P_i}{1-P_i}$, or more often with use the odds ratio (OR) for comparing two subject (observations) one with explanatory vector parameters x_1 and second with x_2 then $OR = \exp\left((x_1 - x_2)^T b\right)$

After fitting model to data, it should be evaluate the goodness of fit. One possibility to evaluate a logit model is to determine the following fit measures:

a) R^2 – the square of the correlation coefficient between the empiric values, y_i, and the theoretical ones, $\widehat{y_i}$,
b) The R^2 measure of Efron,
c) The R^2 measure of Nagelkerke,
d) The R^2 measure of McFadden.

The problems were described more widely in the publications [McFadden, 1974], [Faraway, 2006], [Gatnar, Walesiak, 2011], [Gruszczyński, 2012], [Agresti, 2007].

The logit model has a wide application not only for binary variable modeling. The generalizations of these models are known in the literature for multinomial logit models in which the modeled explanatory variable can use more than 2 categories. A practical example of the use of a larger logit model in case there are interactions between explanatory variables can be found in the publication [Świadek, Wojciech, 2015].

The prediction on the basis of binomial models may refer to the following:

a) units (observations) located in the sample,
b) units outside the sample in the case that the numerical data concerning the explanatory variable is known.

On the basis of the models, the prediction may be determined:

a) of the probability of success P_i for any given observation (symbol: $\widehat{P_i}$) $\widehat{P_i} = \hat{P}(y_i = 1)$ – such predicted probability values may be determined when the vector x_i is given,
b) of the value y_i ($\widehat{y_i} = 1$ or $\widehat{y_i} = 0$) i.e. the prediction of the variable being explained for the i-th observation.
c) estimation of the odds ratio, when the explanatory variables x_j increase by unit (ceteris paribus) ($OR = \exp(\widehat{b_j})$) where $\widehat{b_j}$ is the maximum likelihood estimator for b_j.

In this case, described in section b, the following rule is applied commonly:

- $\widehat{y_i} = 1$, when $\widehat{P_i} > 0{,}5$ (5)
- $\widehat{y_i} = 0$, when $\widehat{P_i} \leq 0{,}5$.

The rule is a proper one in the case of a balanced sample. In the case of an unbalanced sample, the rule rises some reservations [Gatnar, Walesiak, 2011], [Gruszczyński, 2012]. Hence, in this case, the following rule should be applied:

- $\widehat{y_i} = 1$, when $\widehat{P_i} > \alpha$ (6)
- $\widehat{y_i} = 0$, when $\widehat{P_i} \leq \alpha$,

where α is a per cent of ones in the sample.

The Digit Model in The Enterprise Innovativeness Assessment

The manufacturing enterprise innovativeness assessment procedure based on the binomial logit models ($y_i = 1$ for innovation and $y_i = 0$ for non-innovation) should follow the 6 steps (Figure 1.

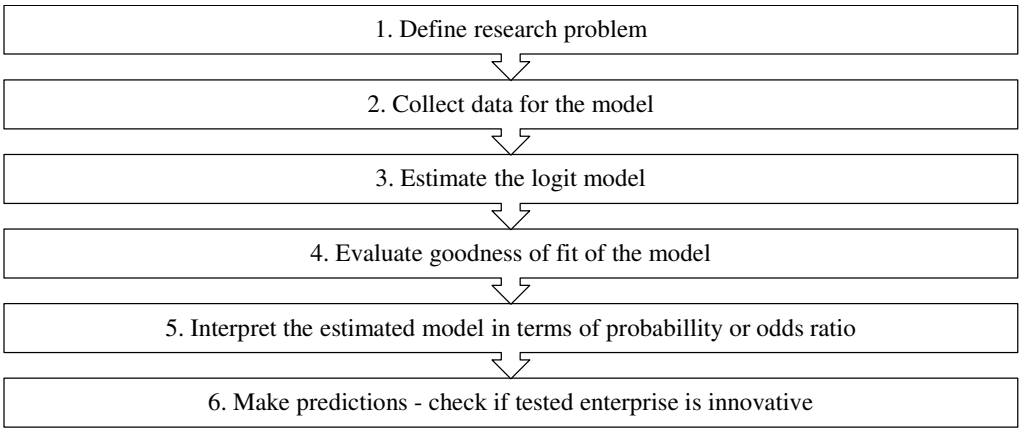

Figure 1: The manufacturing enterprise innovativeness assessment procedure based on the binomial logit model theory

(source: own work)

In step 1, necessary is define research problem to perform the questionnaire investigation in a representative group of the manufacturing enterprises similar e.g. due to the activity run. Next, in step 2, it's time to collect data for the model. The results should be analysed and the variable to be explained (the variable determining the innovativeness) should be defined, as well as the variables to be explained (the factors of influence upon the innovativeness). The selection should be done taking into consideration the statistic relationships, e.g. the correlations happening and, what is important, in agreement with your own experience. This means that, for the model, it is possible to select the variables that, from the point of view of the statistical point of view, are not significant but, for instance, the given parameter is commonly applied for assessment of enterprises of a given branch. In the next step, commence determination of the proper logit model. For the model parameter assessment, you may use the statistic package R which is distributed on the open source licence (GPL) [R Core Team, 2014]. Other applications of the package R for the statistical analysis are presented e.g. in the paper [Skrzypek, Dąbrowski, Wojciech, Kłos, 2016] [Świadek, Wojciech, 2015]. In step 4, you should check the logit model goodness of fit measures. The higher is the computed coefficient value, the model is better matched to the empiric data. In step 5, after determination of the appropriate model, you should pass to the model parameter interpretation, applying the interpretation in the probability categories or the interpretation with use of the chance quotient, respectively. In the

last step, you may make the predictions on the basis of the logit model being determined, i.e. check if the given manufacturing enterprise, in the sample or outside it, is an innovative one.

Conclusion and Future Work

The investigation of the manufacturing enterprise innovativeness becomes significant from the viewpoint of the strategic management and is determined by, among others, the recommendations of the European Commission in the context of granting funds for development. There is no one recommended methodology for calculation of the firm innovativeness level. The binomial logit models are used for computing the probability of occurrence of some phenomenon/state concerning the variable that is under observation. In this case, this is the innovativeness level. The authors of the paper indicated a procedure of proceeding how to assess the innovativeness level of the investigated manufacturing enterprise with use of the method indicated. An extension of the indicated procedure are the application possibilities, tested by the team of the authors, in determination of the firm innovativeness level, multinomial logit models, that will make it possible to obtain more precise data based on occurrence of intermediate states [Luce, 1959], [Hosmer, Leme, Show, Sturdivant, 2013]. By the intermediate states, it is understood the enterprise assessment not in the scale 0 or 1, where it is assumed that 0 means a non-innovative enterprise, and 0 – an innovative one. The surveyed firm can be rated as: moderate innovator, modest innovator or innovator.

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The Relationship Between Corporate Governance Principle and Corporate Strategy Implementation In Abu Dhabi Accountability And Authority

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Abstract

The purpose of this study is to examine the relationship between corporate governance principle and corporate strategy in Abu Dhabi Accountability and Authority. This research targeted executive managers, senior manager and strategic consultants in the UAE government organizations. The research was focused in Abu Dhabi Emirate; a sample size of 423 was selected to participate in this study using convenience sampling technique. A five-point Likert scale questionnaire was used to determine the relationship between corporate governance principle and corporate strategy. A two-step structural equation modelling (SEM) approach is followed in the present study. The results showed that there is a significant positive impact of Corporate Governance Principle (CGP) on Corporate Strategy (CS) ($p<0.05$), result also indicated that there is a significant positive impact of Organizational Culture (OC) on Corporate Strategy (CS) ($P<0.05$), and there is a significant positive impact of interaction of Corporate Governance Principle and Organization culture (CGP_OC) on Corporate Strategy (CS).

Keywords: Corporate Strategy, Abu Dhabi Accountability and Authority, Corporate Governance, Organizational Culture

Introduction

The Abu Dhabi Accountability Authority (ADAA) established in late 2008 as an independent body reporting to His Highness the Crown Prince of Abu Dhabi. ADAA is an independent body that responds to the Crown Prince is intended to perform the financial audit on public entity funds and have to make sure that the funds are managed efficiently and in compliance with investment guidelines. In this regard, the concept of corporate governance in developed countries has been explained using various perspectives. Similarly, the stakeholder theory which is based on this research also plays an essential role in explaining governance structures because companies are made aware of all stakeholders rather than only the shareholders. There is also a belief that the stakeholder theory can help to maximize firm performance and also the combined benefits of all stakeholders by considering the interests of all stakeholders, this view is supported by Donaldson and Preston (1995). The purpose of implementing corporate governance is to provide guidelines on the structure and processes that can be used on good corporate governance practices in business practices. Corporate governance codes are generally a set of voluntary principles, standards or best practices related to the internal governance of business (Adebayo et al, 2014). Indeed, the need for governance structure and transparency in the governance of corporate organizations has been one of the huge concerns for standard setters all over the world. This need spurred renewed interest in the corporate governance of modern corporations, particularly in relation to accountability and performance. On the other hand,

corporate strategy (CS) is the progressively most significant strategic plan arrangement of the organization, which characterizes the worldwide objectives and methods for their accomplishing within strategic management (Puranam, 2016). Corporate Strategy adopts a portfolio strategy to key basic decision making by viewing over the majority of organizations to decide how to make the greatest value to the organization (Ravi Fernando, 2012; Schmidt & Redler, 2018).

There are a few essential parts and tasks of corporate strategy that top management in organizations can take attention on, these task of CS are, allocation of resources (AR), organizational design (OD), portfolio management (PM), and Strategic trade-offs (ST) (Mendes & Santos, 2016). Strategic planning (SP) in government organization is an administration tool that assistances an organisation to concentrate in its liveliness, confirm that the organisation team are operational on the way to the same aims, and assist and change the organisation's route in reaction to a changing environment (Bryson, 2011). In short, strategic planning is a well-organized strength to create essential decisions and engagements that contour and monitor what an organisation is, what it does, and why it does it, with a concentration on the future (Bryson, 2011). Strategic planning (SP) has come to be dominant in all measures of the world; on the other hand, practices in the field show that the strategy development process itself has become frightening., by generating an unclear strategy, a government can end up wasting money and resources on an effort that will not provide anticipated results. Alternatively, if the government focuses on generating a more focused strategy; successive increases should result in stimulating and moving the organisation toward its mission goals, creating an integrated system by which the strategic plan becomes a reference to measure progress and a system of accountability. In this perception, we examine the effect of corporate governance principles and organizational culture on corporate strategy on Abu Dhabi Accountability Authority (ADAA). It provides an overview of how ADAA a government organisation in the Abu Dhabi Emirate developed its corporate strategy, and how corporate governance principles and organizational culture can affect its corporate strategy. The UAE has accomplished various extraordinary triumphs authorize by key worldwide reports and markers. The Country positioned 23rd universally in the Corruptions Perceptions Index issued by Transparency International in 2015 though it positioned 35th in 2008, which mirrors the incredible accomplishment in this regard. The UAE achieved the top four positionings in various markers in the Global Competitiveness Report issued by the World Economic Forum. The UAE has likewise positioned the most joyful Arab Country and the twentieth internationally in the World Happiness report distributed by the United Nations. Further, the Country was positioned first locally in the "Simplicity of working together" classification as indicated by a report issued by the World Bank.

The Relationship between Corporate Governance Principles and Corporate Strategy

This section seeks to explore the relationship if any between corporate governance and corporate strategy to analyse the impact or influence of corporate governance on a corporation's corporate strategy. In the context of the private sector, the strengthening of corporate governance and business ethic within global corporations will ensure that stakeholders' interests will be prioritized and simultaneously influencing the structure of corporate strategy by corporations (Said et al, 2008). Duh (2017:53) contextualizes in noting that *"numerous research studies in the corporate governance (CG) field are based on a universal model outlined by principal-agent theory where the central premise is that shareholders and managers have different objectives and different access to firm-specific information."* Implicit in Said et al (2008) and Duh (2017) articulations is the coalescing indirectly around nexus between how the OECD Principles of Corporate Governance and the universal construct of corporate strategy. Ndung'u (2015: 14; Ahmad *et al.,* 2009) remarked most appropriately that "research literature suggests that corporate governance improves corporate strategy, creates positive corporate reputation, results to competitive advantage and intensifies corporate performance."

Aoki (2017) in article Corporate Governance Affects Corporate Strategy on the Japanese Stewardship Code, which was released in 2014 as a code of conduct and the amendment of the Companies Act; cautiously reflects on how to strengthen corporate governance structures within Japanese companies in order to protect institutional investors has impacted positively on the corporate strategy. Similarly,

in Al-Azzam, Al-Qura'an and Al-Mohameed, (2015) publication on; How The Corporate Governance Affects Organizational Strategy: Lessons from Jordan Environment; the authors articulate make the link between corporate governance and corporate strategy or they called the governance-link strategy. Al-Azzam, Al-Qura'an, and Al-Mohameed, (2015) concluded that Once the governance-strategy is being recognized by the management the new possibilities open up for senior managers and boards to incorporate governance issues directly into corporate planning. Here, the corporate strategy is a fundamental point that will include all strategic initiatives with the core business that being delivered together. An effective collaborative management system will help the organization to determine and manage its core processes on all levels and divisions to meet requirements of disclosure, transparency and accountability, giving optimum consideration to the interest of all stakeholders (Al-Azzam, Al-Qura'an & Al-Mohameed, 2015:59). Existing corporate governance principles aimed at increasing shareholder value demand greater transparency and better public disclosure (Denoncourt, 2015). This is taken further by Ahmed and Gábor (2012) note that the corporate governance system will ensure that it is adequate and appropriate internal control systems operate in a company. This will ensure that the company is well managed for the interests of the shareholders and other stakeholders. Here, they need to balance corporate governance mechanisms with a performance by adopting strategic decision and risk management with the efficient utilization of the organization's resources.

Organizational culture will moderate the relationship between CGP and CS

A substantive body of corporate governance literature shows the pervasiveness or the appetite of scholars to confine their research on the relationship between corporate governance and the performance of the corporate entity. AL-Rashed (2010: 146) explains how most studies focus on one specific aspect of governance such as ownership structure, board composition or executive compensation, and relate this to performance. Other research publications include: Abadi (2012) investigated the relationship between corporate governance, organizational learning and strategic planning effectiveness. Adawi, & Rwegasira (2012) researched the Influence of Patterns of Ownership Structure on Transparency in Corporate Governance (Evidence From United Arab Emirates Listed Companies), Alqisie, (2014). ―Do Corporate Governance Indicators Lead the Firm to Adopt High/Low Level of Financial Leverage? However, there is a gap in research as it relates to the triangulation of organizational culture, corporate governance principles and corporate strategies. As noted in rubric 3.5 organizational culture is a pattern of basic assumptions that a group has invented, discounted, or developed (Pfister, 2009:2). Thus, this section explores the interactions/intertwining between organizational cultures; corporate governance principles and corporate strategy, how organizational culture moderates/influences or not the effectiveness of internal control and corporate strategy. This implies also that corporate governance principles and corporate strategy can moderate or influence organizational culture. It is in part that for this reason Pfisher (2009) indicates that there is a two-way relationship between control and culture and that the understanding of how all these concepts influence each other is of tremendous importance.

Methodology

A sample size of 423 was selected to participate in this study using a convenience sampling technique. A five-point Likert scale questionnaire was used to determine the relationship between corporate governance principle and corporate strategy. A two-step structural equation modeling (SEM) approach is followed in the present study. At first, relationships among latent constructs and indicators are validated using confirmatory factor analysis (CFA). Then, in the second step, the structural model is evaluated to test the direction and strength of hypothesized relationships among latent constructs.

The main objective of this study is to examine the relationship between corporate governance principle and corporate strategy in Abu Dhabi public organization. This study highlights the theoretical relationship between the corporate governance principle and corporate strategy. The sample of this research was collected from ADAA in Abu Dhabi Emirate; the research targeted

executive managers, senior managers and strategic consultants. The research was focused in ADAA government organizations, 423 samples have participated in this study, where 142 was completed the questionnaire giving a response rate of 86.1%. The structural equation modeling (SEM), AMOS, was used to test the hypotheses shown in the conceptual model of the study. In order to achieve our research objective a designed questionnaire was used as an instrument to measure the relationship between corporate governance principle and corporate strategy.

Result and Discussion

The measurement model derived from EFA comprised of 54 measurement items (indicators) related to eleven latent constructs which are: The role of Board (CG), The right of shareholders (RS), Disclosures and transparency (DT), The responsibility of the board of Directors (RB), Organizational culture (OC), Allocation of Resources (AOR), Strategic trade-offs (STO), Organizational Design (OD) and Portfolio Management (PFM) Figure 1.

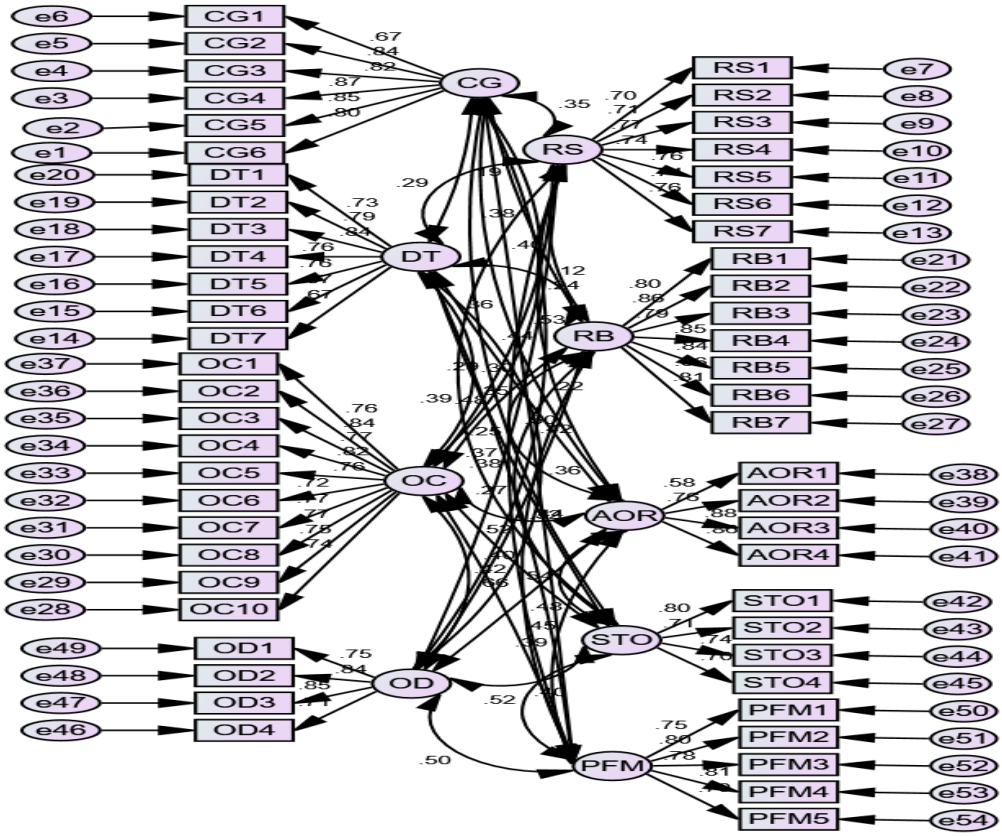

Figure 1: Measurement Model

Path Analysis (Null Hypothesis testing)

After establishing an acceptable structural model, the statistical significance of the parameter estimates from SEM is evaluated by examining path estimates and critical ratio (C.R) or t-value. The parameter estimate is considered statistically significant, only when the C.R value is greater than ±1.96 at 0.05 level of significance (Hair et al., 2013). Below this level, the parameter can be considered unimportant to the model. Furthermore, to determine the magnitude and type (positive or negative) of the hypothesized path effect, standardized path coefficients or standardized regression

weights (β)) are examined as per the recommendations of Cohen (1988). According to Cohen, a standardized path coefficient with an absolute value of less than 0.10 might indicate a small effect, a value around 0.30 a medium one, and a value around 0.50 indicates a large effect.

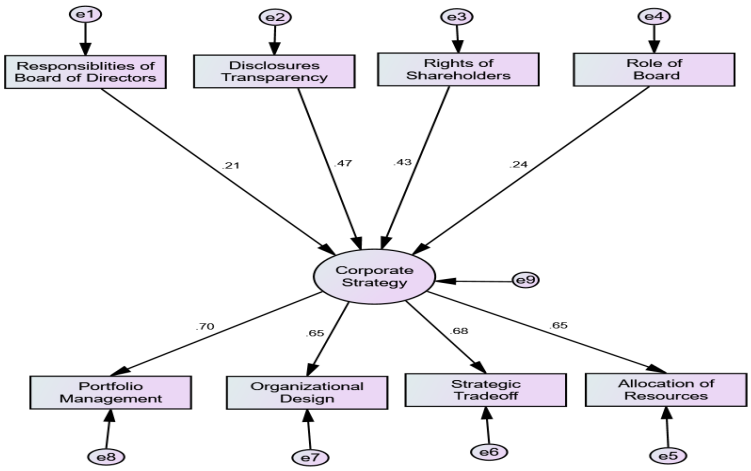

Figure 2: Path Analyses (Hypothesis Testing)

Hypothesis:

Hypothesis (H1)	There is a significant positive impact of Shareholders' rights (RS) on Corporate Strategy (CS).
Hypothesis (H2)	There is a significant positive impact of Disclosures and transparency (DT) on Corporate Strategy (CS)
Hypothesis (H3)	There is a significant positive impact of the Board of Director's responsibilities (RB) on Corporate Strategy (CS)
Hypothesis (H4)	There is a significant positive impact of the role of Board (CG) on Corporate Strategy (CS)

Table 1: Parameter value for model fit measures with SPSS Amos

Causal Path			Unstandardized Estimate	Standardized Estimate (β)	S.E.	C.R.	Sig (P)	Hypothesis validation
RS	→	CS	.205	.433	.024	8.575	***	Supported
DT	→	CS	.185	.469	.020	9.086	***	Supported
RB	→	CS	.059	.210	.013	4.642	***	Supported
CG	→	CS	.071	.243	.013	5.306	***	Supported

P-Value shows the significance of the estimation. If the P-value is less than 0.05 then, we support the hypothesis and we conclude there is a significant effect of the independent variable on the dependent variable. The P-Value *** indicates 0.000 which is less than 0.05. So, we support the hypothesis Table above. Hypothesis (H1) There is a significant positive impact on Shareholders' rights (RS) on Corporate Strategy (CS). The Critical Ratio (CR) is 8.575 which is greater than 1.96 and P-Value is less than 0.05. The Standardized estimation 0.433 is the impact of the Responsibilities of Board Directors on Corporate strategy. Hypothesis (H2) There is a significant positive impact of Disclosures and Transparency (DT) on Corporate Strategy (CS). The Critical Ratio (CR) is 9.086

which is greater than 1.96 and P-Value is less than 0.05. The Standardized estimation 0.469 is the impact of Disclosures and Transparency on Corporate strategy. Hypothesis (H3) There is a significant positive impact of the Rights of Share Holders (RS) on Corporate Strategy (CS). The Critical Ratio (CR) is 4.642 which is greater than 1.96 and P-Value is less than 0.05. The Standardized estimation 0.210 is the impact of the Rights of Share Holders on Corporate strategy.

Hypothesis (H4) There is a significant positive impact of the Role of Board (CG) on Corporate Strategy (CS). The Critical Ratio (CR) is 5.306 which is greater than 1.96 and P-Value is less than 0.05. The Standardized estimation 0.243 is the impact of the Role of the Board on Corporate strategy. Among the four factors Disclosures and Transparency has the highest impact of 0.469 on Corporate Strategy and Responsibilities of the Board of Directors has the least impact on 0.210 on Corporate Strategy.

Moderation Effect

A moderator is a variable either it is a qualitative or quantitative that can be used to find an affects into the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable (Baron, R. M., & Kenny, D. A. 1986). Moderator is also a variable that specifies conditions under which a given Independent variable (IV) Corporate Governance Principle is related to a Dependent variable (DV) Corporate Strategy. A moderation effect could be (a) Enhancing, where increasing the moderator would increase the effect of the Corporate Governance Principle (IV) on the Corporate Strategy (DV); (b) Buffering, where increasing the moderator would decrease the effect of the Corporate Governance Principle (IV) on the Corporate Strategy (DV); or (c) Antagonistic, where increasing the moderator would reverse the effect of the Corporate Governance Principle (IV) on the Corporate Strategy (DV). The Corporate Governance Principle (CGP) variable is computed using the mean of "the role of Board" (CG), "The rights of Shareholders" (RS), "Disclosures and transparency" (DT), "The responsibility of the board of Directors" (RB) variables. The "Corporate Strategy" (CS) variable is computed using the mean of "Allocation of Resources" (AOR), "Strategic trade-off" (STO), "Organization Design" (OD) and "Portfolio Management" (PFM) variables. The interaction of the Corporate Governance Principle & Organization culture (CGP_OC) variable is computed by multiplying the "Corporate Governance Principle" (CGP) and "Organizational Culture" (OC) variable using in SPSS statistics 25 version software. SPSS Amos is used to assessing the effects of a moderating variable Organizational Culture. To test moderation, we will in particular be looking at the interaction effect Corporate Governance Principle Organization Culture (CGP_OC) between Corporate Governance Principle (CGP) and Corporate Strategy (CS) and whether or not such an effect is significant in predicting Corporate Strategy Figure 3.

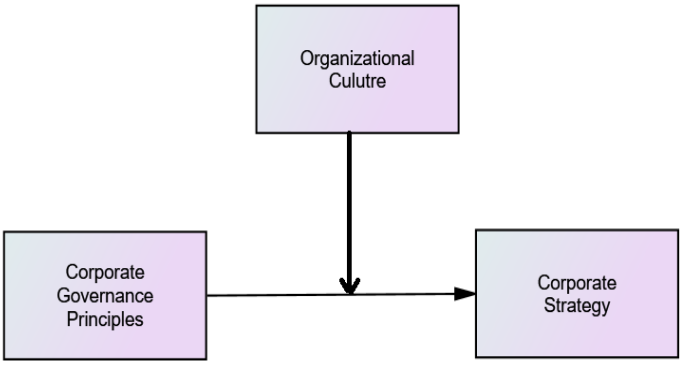

Figure 3: Moderating Effect (Hypothesis Testing)

The following hypothesis will be tested in Moderation effect Model:

Hypothesis (H5)	There is a significant positive impact on the Corporate Governance principle (CGP) on Corporate Strategy (CS).
Hypothesis (H6)	There is a significant positive impact on Organization culture (OC) on Corporate Strategy (CS).
Hypothesis (H7)	There is a significant positive impact of the interaction of Corporate Governance Principle and Organization culture (CGP_OC) on corporate strategy (CS).
Hypothesis (H8)	Organizational culture (OC) moderates the relationship between the Corporate Governance Principles (CGP) and the corporate strategy (CS)**.**

Table 2: Parameter value for model fit measures with SPSS Amos

Causal Path			Unstandardized Estimate	Standardized Estimate (β)	S.E.	C.R.	Sig (P)	Hypothesis validation
CGP	→	CS	.918	1.012	.143	6.427	***	Supported
OC	→	CS	.792	1.052	.124	6.378	***	Supported
CGP_OC	→	CS	.143	1.059	.038	3.777	***	Supported

The following Research Objectives will be achieved with the above Hypothesis:

1. To examine the relationship of corporate governance with the corporate strategy in Abu Dhabi public organization.
2. To examine the relationship between corporate culture with the corporate strategy in Abu Dhabi public organization.
3. To investigate the moderation effect of organization culture on the corporate governance principles with the corporate strategy in Abu Dhabi public organization.

P-Value shows the significance of the estimation. If the P-value is less than 0.05 then, we support the hypothesis and we conclude there is a significant effect of the independent variable on the dependent variable. The P-Value *** indicates 0.000 which is less than 0.05. So, we support the hypothesis.

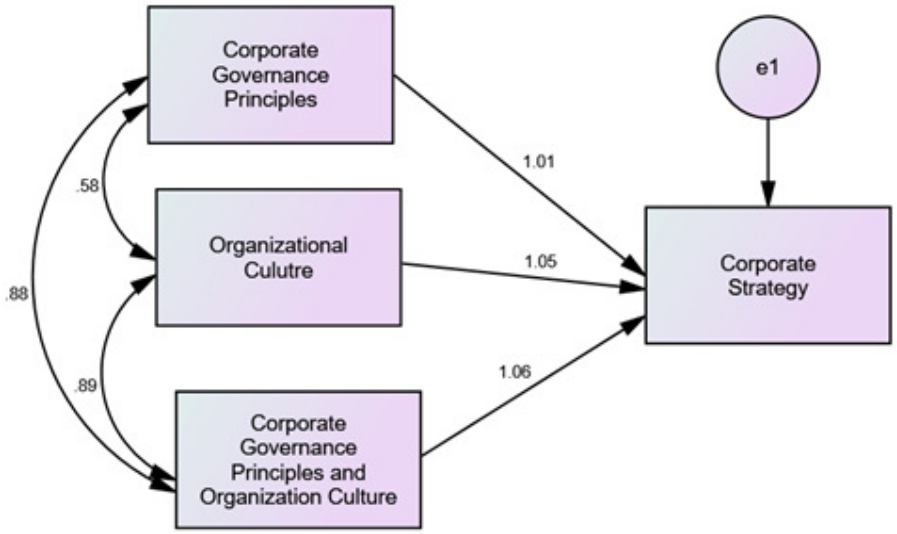

Figure 4: Moderating Effect (Hypothesis Testing)

Hypothesis (H5) There is a significant positive impact of the Corporate Governance Principle (CGP) on Corporate Strategy (CS). The Critical Ratio (CR) is 6.427 which is greater than 1.96 and P-Value is less than 0.05. The Standardized estimation 1.012 is the impact of the Corporate Governance Principle (CGP) on corporate strategy.

Hypothesis (H6) There is a significant positive impact of Organizational Culture (OC) on Corporate Strategy (CS). The Critical Ratio (CR) is 6.378 which is greater than 1.96 and P-Value is less than 0.05. The Standardized estimation 1.052 is the impact of Organizational Culture (OC) on corporate strategy. Hypothesis (H7) There is a significant positive impact of the interaction of Corporate Governance Principle and Organization culture (CGP_OC) on Corporate Strategy (CS). The Critical Ratio (CR) is 3.777 which is greater than 1.96 and P-Value is less than 0.05. The Standardized estimation 1.059 is the impact of the interaction of Corporate Governance Principle and Organization culture (CGP_OC) on corporate strategy. Hypothesis (H8): Organization culture (OC) moderates the relationship between the Corporate Governance Principles (CGP) and the corporate strategy (CS)

To test the hypothesis that the Organizational Culture Moderates the relationship between the Corporate Governance Principles and Corporate Strategy. The impact of Corporate Governance Principles, Corporate Strategy, and Interaction both on Corporate Strategy is studied in Figure 5. All three are having a significant positive impact on Corporate Strategy.

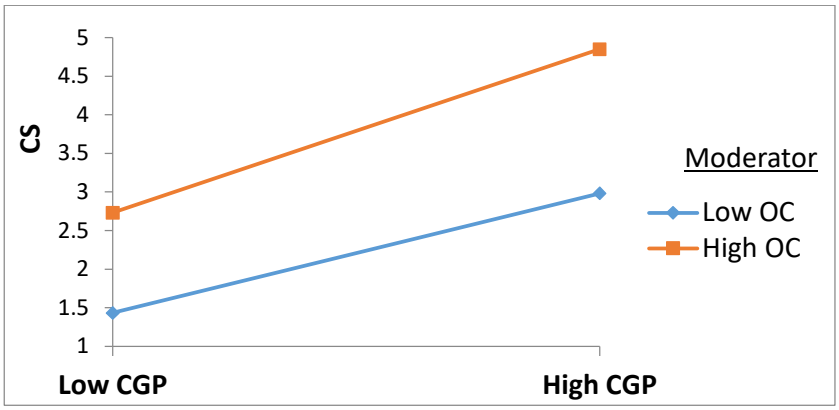

Figure 5: Interaction Plot

Figure 5 represents the examination of the interaction plot which is showed an enhancing effect that as Corporate Governance Principle and Organization Culture increased, Corporate Strategy increased. At low CGP, Low Organization Culture (OC) the Corporate Strategy (CS) is Low and as CGP and OC Increasing CS also increased. We can conclude that Organizational Culture strengthens the positive relationship between Corporate Governance Principles and Corporate Strategy.

Conclusion

This study has evaluated the relationship between corporate governance principle and corporate strategy in one of the UAE public organizations. The analysis has shown that there is a significant positive impact of Corporate Governance Principle (CGP) on Corporate Strategy (CS) ($p<0.05$), the result also indicated that there is a significant positive impact of Organizational Culture (OC) on Corporate Strategy (CS) ($P<0.05$), and there is a significant positive impact of the interaction of Corporate Governance Principle and Organization culture (CGP_OC) on Corporate Strategy (CS). In a recommendation to future research the study should include more sample size and more organizations should be included in the future study government and private and compare between them.

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Corporate Governance Quality and Earnings Management in Troubled Non-Listed Companies in Nigeria

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Abstract

Corporate governance has become a topical issue among the academics, analysts and accounting practitioners as a result of accounting scandals and business failures across the globe. The burning issue of bank loan defaulters in Nigerian banking system which led to the establishment of the asset management corporation of Nigeria (AMCON) afforded a unique opportunity to investigate the quality of corporate governance in troubled, non-listed companies in Nigeria. Our sample consists of eighty (80) non-listed firms drawn from the list of 98 non-listed firms (AMCON debtors), using Slovin 1960 sampling size formula. Copies of questionnaire were administered on 240 chief financial officers (CFOs) and other financial officers. Two hundred and four (204) copies of questionnaire representing 85.0% response rate were found suitable for data analysis. Exploring descriptive statistical tools (means and standard deviations) the study revealed executive and non-executive directors' imbalance, weakness in board financial expertise and gender imbalance. Weaknesses in the independence of audit committee and functioning of corporate governance committee were also observed. Using multiple linear regression analysis, further finding revealed a weak negative effect of corporate governance quality on earnings management. The study concludes that corporate governance quality in troubled, non-listed companies in Nigeria is very weak and needs to be enhanced. Consequently, a synergy between Financial Reporting Council of Nigeria (FRCN) and Security and other relevant regulatory agencies is recommended for synthesis of an abridged, east-to-implement corporate governance code for non-listed companies in Nigeria to curb fraudulent earnings management practices.

Keywords: Corporate governance quality; earnings management; troubled non-listed companies.

Introduction

Earnings management has received renewed attention in recent years from academics, analysts and regulators. This research attention continues due to the wave of corporate scandals across the globe. These scandals have made reliability and credibility of financial statements doubtful. Within the last twenty years, several shocking corporate scandals occurred around the world. In 2001, collapse of Enron in the United States (US) was traced to hidden of financial difficulties through off-balance sheet financing in multiple special purpose Entities (SPEs). In 2002, Worldcom in US also inflated its assets by 11 billion dollars. In 2009, Satyam in India boosted its revenues by 1.5 billion dollars (Tutino & Merlo, 2019). More recently, Security and Exchange Commission in US investigated aggressive accounting practices of General Electric in 2018 and its 22 billion dollar non-cash charge in connection with acquisitions came under searchlight. Empirically, Markmann and Ghanni (2019) documented positive discretionary accrual behaviour of General Electric. This empirical evidence may lend credence to the suspicion of fraudulent accounting practices in the company. From developing economies, Cadbury Nigeria Plc. overstated its assets by 13 billion naira and had to adjust

its accounts to reflect an operating loss of 2 billion naira in the year 2006 while African Petroleum (Now Zenon Oil) was alleged to be hiding a loss of 9.7 billion naira in 2009 (Chukwunedu & Okafor, 2011).

Moreover, aggressive earnings management in troubled companies should be of particular interest to all stakeholders that rely on firm's annual financial statements to make economic decisions. A troubled firm may progress into financial distress whereby it may be unable to meet its contractual obligations. In such a situation, the top management may put the managers under pressure to make decisions to avoid or postpone the impending bankruptcy. Such managers may resort to using tools such as earnings management techniques to disguise the actual financial performance of the company. Empirically, upward manipulation of financial statements with the aim of obtaining credit facilities from commercial banks by failing firms has been documented (Bisogno & De-Luca, 2015).

Research attention has been focused on corporate governance as a potent mechanism to constrain earnings management in quoted companies in both advanced and developing economies (Abbadi, Hijazi & Al-Rahahleh, 2016; Waweru & Riro, 2013). For an instance, Abbadi *et al.* (2016) observed that corporate governance quality has increased over time among Jordanian listed companies. However, in developing economies, private companies are usually higher in number than public companies. Private companies may also engage in earnings management more than public companies because they are less monitored by regulatory bodies. Therefore, more attention is needed in this research area in developing economies.

Literature Review and Hypothesis Development

Effects of corporate governance on earnings management have been presented in various forms; including negative (Bala & Kumai, 2015; Obigbemi, Omolehinwa, Mukoro and Obamiro, 2016; Shehu & Abubakar, 2012; Udiale, 2012; Usman & Yero, 2012; Uwuigbe, Peter & Oyeniyi, 2014), positive (Nofarah, 2017; Obigbemi, Omolehinwa, Mukoro, Ben-Caleb & Olusanmi, 2016) and neutral (Juhmani, 2017). Cornnet, Mcnutt and Tehranian (2009) explored a sample of large-scale listed banks in the United States to examine the link between corporate governance quality and earnings management and found out that more independent boards constraints earnings management. Moreover, other contemporary studies that revealed inverse relationships in this context include Abbadi *et al.* (2016) from Jordan; Abed, Al-Attar and Suwaidan (2012) also from Jordan; Bayk and Ramezanahmadi (2016) from Iran; Idris, Abu-Siam and Nassar (2017) from Jordan; Kang, Leung, Morris and Gray (2013) from Australia and Mahdi, Mahdi, Seyed and Masomeh (2012) from Iran.

In Nigeria, Udiale (2012) and Uwuigbe *et al.* (2014) employed different samples of listed firms from different sectors of the economy to advance knowledge on this research area. Udiale (2012) found that board composition significantly reduced earnings management practices. This is a negative relationship in which increase in corporate governance quality leads to a significance decrease in earnings management. In a similar vein, Uwuigbe *et al.* (2014) found that size and independence of the board exert significant negative effect. Nevertheless, Bala and Kumai (2015), Obigbemi *et al.* 2016), Shehu and Abubakar (2012) and Usman and Yero (2012) also documented significant negative effect. The implication of these findings is that corporate governance quality is effective in curbing earnings management among corporate entities in Nigeria.

However, the study of Nofarah (2017) from Malaysia on a sample of non-listed companies provided a contrary evidence of positive significant relationship. This outcome implies that board independence might not be effective in controlling earnings management in private companies. Similarly, Obigbemi *et al.* (2016), in a study of some listed companies from Nigeria, provided additional evidence of positive relationship. The study of Juhmani (2017) from Bahrain, on the other hand, revealed a non-significant relationship.

Moreover, firm size and firm leverage were considered as control variables in this study. Recent empirical studies on the relationships between these control variables and earnings management include Abubakar and Oladele (2018), Alareeni (2018), Ghani, Mohd-Azemi and Puspitasari (2019) and Uwuigbe, Uwuigbe and Okorie (2015). Ghani *et al.* (2019) examined the relationship between firm characteristics and earnings management practices in some selected listed firms in Malaysia.

The study revealed a significant positive effect of firm size. However, while Abubakar and Oladele (2018), Alareeni (2018) and Mahdi, Mahdi, Seyed and Masomeh (2012) reported no significant effect of firm size, Uwuigbe *et al.* (2015) revealed a significant positive impact. In an earlier study from Chile, Iturriaga and Hoffmann (2005) provided evidence that firm leverage reduces discretionary earnings management behaviour which is an indication of a negative relationship. Contemporary studies including Shahzad, Rauf, Rheman, Saeed and Al-Barghouthi (2017) and Vakilifard and Mortazavi (2016) also reinforced the evidence of this negative association. However, the study of Nikhil and Sunil (2018) from India revealed no significant effect of leverage. Consequent upon the mixed outcomes and concentration of previous studies on listed companies, the current study tested the following hypothesis stated in the null form:

Corporate governance quality has no significant effect on earnings management in troubled, non-listed companies in Nigeria.

Methodology

The study adopted descriptive research design, exploring survey methodology because the study involved obtaining subjective opinion of respondents on variables of interest in order to draw a conclusion on the entire population. It involved studying samples derived from the population using questionnaire (Table 5) as research instrument because secondary data of non-listed companies in Nigeria is not readily available. Population of the study consists of 98 non-listed companies described as chronic AMCON debtors as contained in the list of AMCON debtors published by the corporation. These debtors cut across all the sectors of the economy. Sample size was determined scientifically by exploring Slovin (1960) sampling size formula. The computation produced 79 non-listed firms as adequate sample size for the study. However, 80 non-listed firms (Table 6) were finally sampled to further enhance sufficient representation of the population of the study. The computation of the sample size is as shown below:

$$n = \frac{\mathrm{N}}{1 + \mathrm{Ne}^2}$$

Where: n = Sample Size; N = Study Population; e = Significant Level

$n = \frac{98}{1+(98 \text{ x } 0.05^2)}$ = 79 Firms

Subsequently, stratified sampling technique was adopted because there was a need to obtain proportional sample of troubled, non-listed firms across all the sectors of the economy. This was followed by simple random sampling technique by balloting to select samples from each sector. Primary data were collected by administering structured questionnaire to the CFOs and two other Financial Officers in each of the selected troubled, non-listed companies through referral approach. This approach was adopted to avoid resistance from the respondents that might be skeptical of giving information about their companies to an outsider. Section A covers the items on firm attributes namely profitability, firm size and firm leverage. Section B contains the self-developed corporate governance quality index derived from code of corporate governance for public companies in Nigeria. Section C comprises the items involving change of accounting methods and real operating activities explored for earnings management purposes as adapted from the study of King (2015). The questionnaire was administered on two hundred and forty (240) CFOs and other financial officers. Out of two hundred and forty (240) copies of questionnaire administered, two hundred and nineteen (219) copies were returned. Fifteen (15) copies were not completely filled and were excluded from data analysis. Two hundred and four (204) copies of the questionnaire were subsequently used for data analysis. Thus, a response rate of 85.00% was recorded.

Validity and reliability of research instrument were carried out by conducting confirmatory factor analysis (CFA) using AMOS SPSS. The benchmark for CFA loading as specified by Biggs, Brough, and Barbour (2014) was strictly observed in order to ensure the validity and reliability of the items on the research instrument. It was discovered that the factor loadings exceed the minimum 0.70

benchmark. Composite reliability and average variance extracted estimates (AVE) of all the constructs were above 0.80 and 0.50 benchmarks respectively (Tables 7a, 7b & 7c). The model of the study captured the effect of corporate governance quality on earning management from the combined data of change of accounting methods and real earnings management with firm size and financial leverage as control variables.

Model:

$$\mathbf{EM_{CAM,\ REM} = \alpha_0 + \alpha_1 CGQ + \alpha_2 FSIZE + \alpha 3 FLEV + \varepsilon} \quad \mathbf{(1)}$$

Where: EM - Earnings management (CAM & REM); CAM – Change of accounting methods (King, 2015); REM – Real earnings management (King, 2015); CGQ – Corporate governance quality index (self-developed from the provisions of Nigerian SEC Code of Corporate Governance for Public Companies (Security and Exchange Commission, 2014); FSIZE – Firm size (small, medium or large); FLEV – Firm leverage (low, moderate or high); α_0 – Intercept; α_1, α_2, α_3 – Coefficients; ε – Error term.

Findings and Discussion

Data analysis includes descriptive statistics and hypothesis testing. Descriptive statistics involves computation of means of responses on variables of the study. Hypothesis of the study was tested with multiple regression analysis.

Descriptive Statistics

Table 1 reveals that earnings management has a mean score of 3.81 while change of accounting methods and real earnings management have mean scores of 3.71 and 3.91 respectively. This outcome suggests that the CFOs in the sampled companies exhibit earnings management behaviour to a high extent. Corporate governance quality has a mean score of 2.23 which is an indication of weakness in corporate governance. However, separation of roles of chairman and CEO (mean = 3.13) as well as the regularity of board meeting (mean = 3.29) were moderate. Weaknesses were observed in executive and non-executive balance on the board (mean = 1.87), gender balance on the board (mean =1.92), presence of financial experts on the board (mean = 1.15), independence of audit committee (2.21) and functional corporate governance committee (mean = 2.01).

The control variables, firm size and firm leverage, have mean scores of 3.37 and 4.21 respectively. These findings suggest that the sampled non-listed companies are of medium size and are highly leveraged.

Table 1: Descriptive Statistics

Variables	Min.	Max.	Mean	Std. Deviation
Corporate Governance Quality:	1	5	2.2274	.88788
- Separation of roles of chairman and CEO	1	5	3.1275	.88874
- Executive and non-executive balance on the board	1	5	1.8714	.93742
- Gender balance on the board	1	5	1.9194	.78917
- Financial experts on the board	1	5	1.1524	.96169
- Independence of Audit Committee	1	5	2.2154	.98784
- Regularity of board meeting	1	5	3.2943	.87213
- Functional corporate governance committee	1	5	2.0117	.77818

Change of Accounting Methods	1	5	3.7120	.83767
Real Earnings Management	1	5	3.9103	.95906
Earnings Management	1	5	3.8112	.89837
Firm Size	1	5	3.3770	.78174
Firm Leverage	1	5	4.2105	.93125

Source: Field Survey (2019)

Test of Hypothesis

The regression output comprises of three tables: Model Summary (Table 2), Model Fitness/ANOVA (Table 3) and Model Coefficients (Table 4). Table 2 reveals a significant relationship (R = 0.768). The model also shows the R^2 value of 0.590 (59.0%). This is an indication that 59.0% of the variance in earnings management can be explained by the variance in corporate governance quality. This result reinforces that a significant relationship exist with the implication that a unit increase in corporate governance quality will lead to a significant change in earnings management.

Table 2: Model Summary

Model	R	R^2	Adj. R^2	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.768	.590	.581	.42425	.590	97.195	4	199	.002
a. Predictors: (Constant), CGQ, FSIZE, LEV; b. Dependent Variable: Earnings_Mgt									

Source: Field Survey (2019)

Table 3 contains the F-test output. Field (2000) advanced that a good model should have a large F-value. In this study, F value is 97.195 which is significant at $p<0.05$, Sig. = .002. Therefore, the F-Test is statistically significant and conclusion can be drawn that the fitness of the model is good.

Table 3: Model Fitness (ANOVA[a])

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	6.488	4	2.595	97.195	.002[b]
	Residual	14.255	199	.065		
	Total	20.743	203			
a. Dependent Variable: Earnings_Mgt; b. Predictors: (Constant), CGQ, FSIZE, LEV						

Source: Field Survey (2019)

Furthermore, multicollinearity problem among the variables was examined with variance inflation factor (VIF) and tolerance value. As displayed in Table 4, all the VIFs are less than 3 while all the tolerance values are greater than 0.4. It has been observed that VIF that is less than 10 (Belsely, 1991; Field, 2000) and tolerance value that is greater than 0.2 (Mernard, 1993) are indicators of no multicollinearity problem among the explanatory variables. Therefore, the outcomes of our study can be reliably interpreted. Moreover, the coefficients of the model and the t-value are also shown in Table 4. The regression coefficients reflected a positive significant effect of firm size (beta=.525, t =

12.529, P<.01, Sig=.000) and a positive but non-significant effect of firm leverage (beta=.087, t= .723, P>.05, Sig=.195). These findings imply that the larger the firm size, the higher the earnings management while the influence of firm leverage remains unclear. However, a weak negative effect of corporate governance quality, which needs to be strengthened, was discovered from the co-efficient table (beta=-.136, P<.10, Sig=.056). Hence, the null hypothesis was accepted and it can therefore be inferred that corporate governance quality has no significant effect on earnings management in troubled, non-listed companies in Nigeria. The model of the study can now be redefined as shown below:

$$\mathbf{EM_{(CAM,\ REM)} = 9.103 - .136CGQ + .525FSIZE + .087FLEV} \qquad \mathbf{(2)}$$

Table 4: Summary of Regression Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	VIF	Tolerance Value
		B	Std. Error	Beta				
1	(Constant)	9.103	.367		10.568	.000		
	CGQ	-.136	.105	-.149	-1.869	.056	2.153	.425
	FSIZE	.525	.137	.643	12.529	.000	2.235	.455
	FLEV	.087	.239	.103	0.723	.195	2.575	.478
a. Dependent Variable: Earnings_Mgt								

Source: Field Survey (2019)

Discussion of Results

The outcome of this study revealed negative, non-significant relationship between corporate governance quality and earnings management in the sampled non-listed companies. This outcome derived support from the findings of Juhmani (2017) which posited that earnings management was not significantly associated with audit committees' characteristics. Further support was derived from the findings of Obigbemi *et al.* (2016) which revealed positive, non-significant relationship. However, the outcome of this study is contrary to the findings of Abbadi *et al.* (2016), Abed *et al.* (2012), Bala and Kumai (2015), Mahdi et al. (2012), Shehu and Abubakar (2012) and Uwuigbe *et al.* (2014) that corporate governance characteristics have a significant negative relationship with earnings management. The difference between our outcome and the findings of this group of studies might be attributed to the fact that while we focused on non-listed companies with less regulatory monitoring, the other studies focused on listed companies that have robust corporate governance code to observe.

Conclusion and Recommendations

Conclusion

The main objective of this study is to examine the relationship between corporate governance quality and earnings management in troubled, non-listed companies in Nigeria. The study observed high level corporate earnings management as reflected by strong tendency for changing accounting methods to report earnings as well as high possibility of engaging in real earnings management. The outcome of the study also revealed weak negative relationship between corporate governance quality and earnings management. Consequently, we concluded that corporate governance quality has weak effect on earnings management in troubled, non-listed companies in Nigeria.

Recommendations and Suggestions for Further Studies

As a result of the observed weakness in corporate governance quality in the non-listed companies sampled for this study, a synergy between Financial Reporting Council of Nigeria (FRCN) and Security and Exchange Commission (SEC) is recommended for synthesis of an abridged, east-to-implement corporate governance code for non-listed companies in Nigeria. This would go a long way to curb fraudulent earnings management practices in non-listed companies in Nigeria. Future studies may make non-listed companies in the various states of the country their subjects of observation in order to extend the current study. Further studies may also consider other upper echelons in an organization such as board chairmen, audit committee's chairmen and chief executive officers (CEOs) as participants.

Appendixes

Table 5: Sample Questionnaire

Consent: Do you wish to participate voluntarily in this research work? Yes [ ] No [ ]

Section A: Firm Attributes
Instructions: Please tick (✓) the option that correctly depict your choice.

1. How would you rate your firm in relation to the following attributes in the last three years?

S/N	Item	Very Low				Very High
a	Leverage	1	2	3	4	5
b	Firm Size	1	2	3	4	5

Section B: Corporate Governance Quality
Instructions: Please tick (✓) the option that correctly depict your choice.

2. To what extent does your organization implement the following corporate governance mechanisms?

S/N	Elements	Very Low				Very High
A	Separation of the roles of board chairman and CEO	1	2	3	4	5
B	Executive and non-executive directors balance on the board of directors.	1	2	3	4	5
C	Gender balance on the board of directors.	1	2	3	4	5
d	Presence of financial experts on the board of directors	1	2	3	4	5
e	Independent Audit Committee	1	2	3	4	5
f	Regular board meeting	1	2	3	4	5
g	Functional Corporate Governance Committee	1	2	3	4	5

Section C: Corporate Financial Reporting Quality
Instructions: Please tick (✓) the option that correctly depict your choice.

3. To what extent do you agree that your firm would make the following accounting adjustments/choices to boost reported earnings given that each adjustment is in compliance with financial reporting regulations?

S/N	Item	Strongly Agree				Strongly Disagree
a	Modify bad debt expense projections	1	2	3	4	5
b	Adjust obsolescence estimates for inventories	1	2	3	4	5
c	Alter assets depreciation policy	1	2	3	4	5
d	Refine impairment measurement policy	1	2	3	4	5
e	Change estimates for deferred tax	1	2	3	4	5
f	Modify valuation of retirement plan liabilities	1	2	3	4	5
g	Change property, plant and equipment valuation model	1	2	3	4	5
h	Change financial assets valuation model	1	2	3	4	5
i	Change goodwill valuation model	1	2	3	4	5
j	Change software cost valuation model	1	2	3	4	5

4. To what extent would your firm carry out the following real operating activities to boost reported earnings, given that each activity is in compliance with financial reporting regulations?

S/N	Item	Very Unlikely				Very Likely
a	Ease payment terms for more sales	1	2	3	4	5
b	Offer price discount to attract more sales	1	2	3	4	5
c	Cut maintenance expenditures	1	2	3	4	5
d	Cut research and development expenditures	1	2	3	4	5
e	Cut advertising expenditures	1	2	3	4	5
f	Cut employees training budget	1	2	3	4	5
g	Cut travel and entertainment budget	1	2	3	4	5
h	Postpone new project	1	2	3	4	5
i	Increase production to lower cost of goods produced	1	2	3	4	5
j	Dispose old non-current assets	1	2	3	4	5

Table 6: List of Sampled Companies

Alminnur Resources Limited	Abasa Nigeria Enteprises Ltd.	Brila Energy Limited
Ofada Veetee Rice Ltd	Lawal Obelawo Plastic Ind.	Inter. Oilfield Services Ltd
Zarm Poultry and Feedmills	Pokat Nigeria Limited	Grand Petro - Chemical Co.
Global Haulage Resources	Tradjek Nigeria Limited	Sarki Surajo Petroleum Ltd.
Jag Global Resources	Gateway Portland Cement	Sunshine Oil and Chem. Dev.
Ayokunle Farms & Ind. Ltd	Gramet Group	Crystal Dynamics Energy Ltd
Osigwe Foods & Agro Ind	Dwc Drilling Limited	Nimex Petroleum Limited
Tuns Farms Nig Ltd.	Charlesco (WA) Ltd.	Nacoil International Limited
Workson Int. Ltd.	Street Fleet Inv. Ltd.	Capital Oil & Gas Ind. Ltd.
Global Formwork Nig.Ltd.	Resort International Limited	Tanzila Petroleum Ltd
Hosanna Properties Ltd.	Aframan Enterprises Nig. Ltd.	Extra Oil Limited
Roygate Properties	Genprogetti Nig. Ltd.	Beracah Lubrications Nig. Ltd
Woobs Resources Limited	Eres N V (Nig) Ltd	Petroleum Brokers Limited
Robo Michael Limited	Integrated Dev. & Inv.	Afrijet Airlines Limited
Rangk Ltd	Cinca Nigeria Limited	Mofas Shipping Line, Nig. Ltd
Sharon Properties Ltd.	Centage Savings & Loans Ltd	Victoria Continental Inter.
Index Dev. Company Ltd.	Reliance Telecom Ltd.	Timbuktu Media Limited
Claremount Management Ltd.	Avian Specfrontage Comm.	Ajoke Stores Limited
Venus Construction Company	Sammy Beth Interbiz Limited	Somerset Energy Services Ltd
Covenant Apartment Compl.	Cityscape International Ltd	Continental Aviation Services
Kroggar Investments Ltd.	VIVA wireless Ltd.	Al-Kahf Motorcycle Company
Ena-Bell Limited	Lorna Global Resources Ltd.	Timbuktu Media Limited
Limkers Nigeria Limited	Ziklagsis Network Ltd	Resort International Ltd
Home Trust Savings	Shoreline Power Company	Suru World Wide Ventures
Lexacap Partners	Suffolk Petroleum	Hotel De Island
Anyiam Osigwe Ltd	Seawolf Oilfield Services	Geedee Zulu Investment Co.
Arcturus Merchant Trust Ltd	Goldust Investment Co. Ltd.	

Source: AMCON (2016); Bloomberg website; Official websites of the Sampled Companies

Table 7a: Confirmatory Factor Analysis (Corporate Governance Quality)

	Loading	Indicator Reliability	Error Variance	Composite Reliability	AVE	Cronbach's Alpha	No. of Indicators
Indicators	**> 0.7**		**< 0.5**	**≥ 0.8**	**≥ 0.5**	**≥ 0.7**	
Corporate Governance Quality (CGQ)				0.9376	0.6825	0.760	7
CGQ1	0.799	0.6384	0.3616				
CGQ2	0.808	0.6529	0.3471				
CGQ3	0.864	0.7465	0.2535				
CGQ4	0.849	0.7208	0.2792				
CGQ5	0.781	0.6100	0.3900				
CGQ6	0.817	0.6675	0.3325				
CGQ7	0.860	0.7413	0.2587				

Source: Field Survey (2019)

Table 7b: Confirmatory Factor Analysis (Change of Accounting Methods)

	Loading	Indicator Reliability	Error Variance	Composite Reliability	AVE	Cronbach's Alpha	No. of Indicators
Indicators	**> 0.7**		**< 0.5**	**≥ 0.8**	**≥ 0.5**	**≥ 0.7**	
Change of Accounting Methods (CAM)				0.9803	0.8327	0.900	10
CAM1	0.914	0.8354	0.1646				
CAM2	0.892	0.7957	0.2043				
CAM3	0.888	0.7885	0.2115				
CAM4	0.887	0.7868	0.2132				
CAM5	0.921	0.8482	0.1518				
CAM6	0.956	0.9139	0.0861				
CAM7	0.916	0.8391	0.1609				
CAM8	0.878	0.7709	0.2291				
CAM9	0.977	0.9545	0.0455				
CAM10	0.891	0.7939	0.2061				

Source: Field Survey (2019)

Table 7c: Confirmatory Factor Analysis (Real Earnings Management)

	Loading	Indicator Reliability	Error Variance	Composite Reliability	AVE	Cronbach's Alpha	No. of Indicators
Indicators	**> 0.7**		**< 0.5**	**≥ 0.8**	**≥ 0.5**	**≥ 0.7**	
Real Earnings Management (REM)				0.9768	0.8080	0.909	10
REM1	0.909	0.8263	0.1737				
REM2	0.894	0.7992	0.2008				
REM3	0.878	0.7709	0.2291				
REM4	0.889	0.7903	0.2097				
REM5	0.889	0.7903	0.2097				
REM6	0.912	0.8317	0.1683				
REM7	0.897	0.8046	0.1954				
REM8	0.891	0.7939	0.2061				
REM9	0.893	0.7974	0.2026				
REM10	0.936	0.8761	0.1239				

Source: Field Survey (2019)

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Long Term Care - Challenges in Calculating The Sum Insured in Silver Insurance

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Abstract

The article discusses using long-term care insurance to valuate and finance the care needs of the elderly. Particular emphasis is placed on the cost of insurance protection, which considers both the point in life at which the decision was made and the sum insured. For this purpose, the following factors important in calculating the sum insured are discussed:

- The scenario of regarding the development of care needs (for instance, in relation to what the social security system provides, which determines whether the insurance product is to be alternative, substitute, or complementary)
- Life expectancy, which translates into technically used life tables.
- When there is awareness of the need to consider such protection, and whether this can be a silver insurance product
- The moment at which such insurance is purchased (risk-premium factors and household wealth level). The discussion is illustrated with numerical examples (analysis of various scenarios) from selected EU countries. The main findings show that:
- the problem is particularly important for women (feminisation in old-age) - the premium at 60 is higher than their income
- research indicates that the risk and premium allocation in insurance budgets increases between the ages of 35-45, and significantly increases from 45. The optimal time is between the ages of 25-35.
- the increased costs of care significantly increase the pension gap, which should be analysed as a variable over time and not just at the moment of retirement.

Keywords: Silver Insurance, Long-Term Care, Personal Finance Management, Insurance.

JEL codes: G22, G41, J14

Introduction and Motivation

An analysis of the economic circumstances of older people emphasises extended life expectancy, orphanhood due to the migration of adult children or the professional activation of women who traditionally take care of elderly family members, inadequate income to provide pension protection systems, and decreasing replacement rates in mandatory public pension in the context of rising maintenance costs, including care costs. Increased life expectancy and low fertility rates means that the old-age dependency ratio is currently extremely high in developed countries, including those in Europe.

An accurate picture of the aging population is given by the old-age-dependency ratio (proportion of those aged 65 or over per the working age population aged between 15 and 64). In 2018, this ratio was

31% in the EU, 32% in the Euro area, 28% in OECD countries, and 27% in high income countries (worldbank.org). Available forecasts indicate that in some countries it may double by 2060, including in Poland, and possibly reach as high as 70% (Błędowski et al., 2012). World Bank data show that global life expectancy at birth has risen from 52 in 1960 to 72 in 2017 (54 to 74 for women and 50 to 70 for men). For high income countries, life expectancy at birth in 2017 was over 80 (OECD 80, EU 81).

These demographic trends are crucial as functional limitations usually appear in old age. The results of the Polish survey "Polsenior", which was based on social and medical interviews with seniors aged 65+ from a representative sample of the older population, and the Survey of Health, Ageing and Retirement in Europe (SHARE) indicate a high level of functional restrictions among Polish older people, similar to those observed in south European countries such as Italy and Spain (Balzi, 2010) and in other Eastern European countries. Such functional limitations increase with age, especially for women. The critical age for significant change was 85 years as only around 20% of the 85+ seniors surveyed were fully dependent (Wizner et al., 2013).

Traditionally, care needs have been met by the family. However, research and market analysis indicate that socio-demographic changes are taking place, the crucial drivers of which are migration, increased professionalisation of women, decreasing fertility rates or even childless households, and the loosening of family ties (e.g., Eitner et. al. 2011; Błedowski et al., 2012). According to the Polish Central Statistical Office - almost half (49.3%) of all older people in Poland remain in single-generation households. The reality somewhat converges with the expectations of older people, 66% of whom are willing to live in their own house and only occasionally asking their family and friends for help (Błędowski et al., 2012). Such attitudes also corroborate research on the quality of life among older people (van Leeuwen et al., 2019) which shows that many older adults strive to live at home or in the community for as long as possible and prefer to adapt the home environment rather than move. Being single in old age was identified by Reinprecht and Rossbacher (2014) as a trend in developed countries (large cities). Based on an analysis of the older population in Wien from 2002-2014, they found that the absolute number and proportion of two-person households remain relatively constant, whereas singularisation (one-person households) increases rapidly in later stages of life, especially very old age, and in all social classes. This trend is independent of social status and education. The authors predict that the proportion of childless elderly will increase significantly in the next decades, forming a new category of singles. Being childless also means fewer resources with regard to care.

The above trends will increase the demand for external care services which, amplified by the need for specialised devices, will result in an increase in the costs of such care (Błedowski et al., 2012). These also need to be compared with the pension gap that will soon affect the level of funds available in elderly households and the fact that care services are not usually part of social security systems (private nursing insurance, for example, is compulsory in Germany). According to the McKinsey report (Binder et al., 2018) the net replacement rate for nonvoluntary pensions in large European countries decreased in 2005-2014 by 31% in France, 26% in Sweden, 16% in Poland, 9% in the UK, 10% in Switzerland, and 8% in Germany The average decrease for OECD countries in this period was 10%. Research on the gender pension gap confirms that the position is worse for women (Samek Lodovici, 2016, European Commission, 2013). It is therefore important find a means of financing external services or compensating for lost earnings to offset the reduced quality of life experienced by family members taking over these functions.

Against this background, problems arise when considering what form of product should be applied or proposed. To address this, the authors used the concept of LTC insurance as a product which is (or could be treated) as silver insurance in nature – dedicated to the special purpose of meeting old-age care needs. The main consideration is how needs shape over time and what the product structure should be - one-time or periodic payments (annuity), increasing or permanent, a lump sum according to needs (non-indemnity /indemnity), indexed/not indexed. For this purpose, the following factors relevant to calculating the sum insured are analysed:

1. Scenario of development of care needs (for instance, in relation to what the social security system provides, which determines whether the insurance product is to be alternative, substitute, or complementary)
2. The length of life, which translates into technically used life tables
3. Increasing awareness of the need for such security and whether this can be a silver insurance product
4. The point at which such insurance is purchased (risk-premium factors and the level of household wealth).

The discussion is illustrated by numerical examples (analysis of various scenarios) from selected EU countries.

Long Term Care (LTC) Insurance

Although numerous definitions of long-term care can be found in the literature, it is generally defined as the scope of services required by people with a reduced level of functional abilities (physical or cognitive) who are therefore dependent on long-term external help for basic everyday activities or so-called instrumental everyday activities (e.g., help at home or with organisation and administration) (see WHO, 2001; OECD, 2011; European Commission, 2015). It therefore pertains to the broad range of supportive medical, personal and social services needed by people who are unable to meet their basic living needs for an extended period of time due to accident, illness or frailty. According to the WHO (2002), the main goal of LTC systems is "to ensure that an individual who is not fully capable of long-term self-care can maintain the best possible quality of life, with the greatest possible degree of independence, autonomy, participation, personal fulfilment and human dignity".

LTC system solutions differ across countries. Private LTC services are part of the benefits received from social security systems, private solutions such as LTC insurance, or out-of-pocket financing. LTC insurance does not play an important role in financing long-term care in any OECD country. In most systems, own-pocket payments dominate (e.g. Switzerland - 60%, Portugal - 45%, Spain - 30%, the United States - 22%) (World Bank, 2015). In Central and Eastern Europe, private payment for long-term care services is common.

In Poland, the care of dependent people is enshrined in a variety of laws; thus, there are no uniform, comprehensive solutions. Although the authors in this research focus on LTC insurance, the results can also be interpreted in the context of system solutions (estimating the amount of necessary contributions depending on income and scope of care) and in estimating the amounts that need to be collected in the form of out-of-pocket payments as part of savings for future care. Different types of LTC insurance are therefore presented to further describe the chosen option, the assumptions made, and the methodology used.

There are two main types of LTC insurance:

- **non-indemnity insurance** - this consists of a strictly defined payment (benefits may take the form of single or repeated payments). The most common form is that of the pension, usually with an annual frequency; however, there are also products with built-in daily payments system Thus, insurance will not cover the direct costs of long-term care,
- **indemnity insurance** - this cover the actual costs of long-term care. To reduce the costs borne by the insurance, certain restrictions are used – such as the upper limit of the amount of benefits or a maximum period of benefit.

In LTC insurance, the insurance event is defined as multi-state according to selected scales, the two most common of which are ADL (Activities of Daily Living), and IADL (Instrumental Activities of Daily Living) – as described in Table 1. (for other scales used in determining the degree of disability and/or dependence see the Report "Definition of dependency, degrees of dependency evaluation criteria and standards of care and assistance services", 2017).

Table 1: ADL/IADL measures for assessing dependency

Activities of Daily Living (ADL)	Instrumental Activities of Daily Living (IADL)
• bathing, • dressing, • walking / moving assisted from bed to wheelchair • feeding • morbidity • continence	• housework • money management • medication adherence • shopping • getting around outside the house

Source: Sigma 5/2014 SwissRe

Multi-state models are used in risk modelling for the analysis and calculation of premiums and reserves for LTC insurance products. Unlike life insurance, where only 2 conditions are possible (1-live, 2-dead), and thus for calculation only information about the probability of death or survival is sufficient, in LTC there are a larger number of conditions and more complicated and demanding models are required to handle the amount of information. In LTC modelling, there are a minimum of 3 possible states: alive and not infirm, alive infirm, and dead. In many publications and data sets (Jacobzone et al, 2000, Eurostat data) 5 states exist due to the introduction of 3 degrees of infirmity: little, moderate and severe. These are based on a different number of activities in the ADL or IADL scales (or their combinations) for which the insured requires assistance. LTC modelling is usually based on Markov or semi Markov processes (see, e.g., Haberman & Pitacco, 1999; Pritchard, 2006; Brown & Warshawsky, 2013). For these it is necessary to use the probabilities of transition from state to state, which are dependent on age, sex, and time spent in a given state (e.g., Czado & Rudolph, 2002; Fuino & Wagner, 2018). This therefore requires the use of extremely detailed data.

Assumptions

In this article, a product is proposed based on scenarios for the development of assistance with the needs of older people. This is insurance for which coverage begins when the insured person reaches 65 years, while the scope of support is based on the health of the insured at a given moment and the scope of services assigned to that state. For our calculations we use economic and demographic data on Polish society and selected countries (Czech Republic, Germany, and Portugal).

The first factor needed to analyse the proposed product is probabilities of infirmity. Based on data from Synak (2002), the probability of being in one of three conditions related to infirmity depending on age and sex is determined (Figure 1).

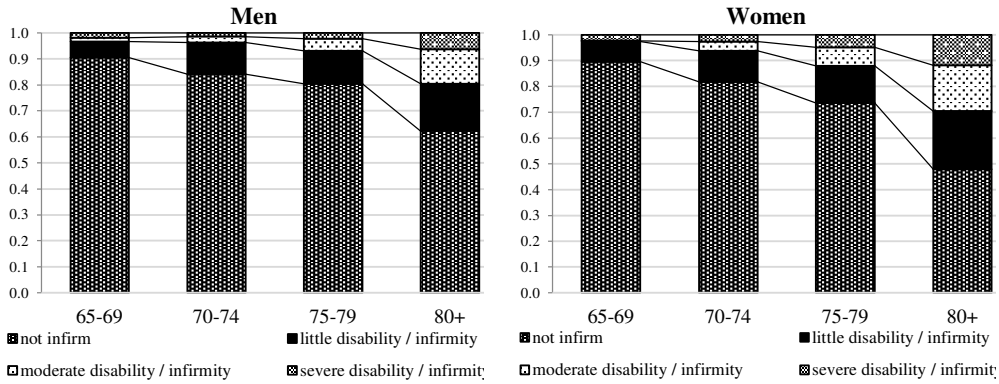

Figure 1: Probabilities of infirmity for people in Poland

Source: own work based on Synak (2002)

Another factor is the scenario of needs reported by people in individual states of dependence. Two scenarios are adopted: the first is based on the draft of the Commentary and explanations of the draft law on assistance to dependent persons (2013), which were designed to provide support to the elderly,

1) first degree dependence – the need to be looked after every day and assisted for a minimum of 6 hours (assistance in 5-6 types of activities – ADL)
2) second degree dependence – the need to receive care for a minimum of 4 hours day (3-4 types of activities – ADL)
3) third degree dependence – care is required at least once a day for 1-2 types of activities (ADL) for a minimum of 1.5 hours (according to the state of the project in May 2013, in later proposals third degree dependence is defined as "less than four hours").

In the opinion of the authors, this is a minimum project, which is why broader support has been proposed that, as the calculations illustrate, is more expensive (variant 2). These variants propose a higher number of hours of care per day depending on the needs of the elderly person (see Table 2).

Table 2 : The number of hours of medical care per day depending on the state of health of the elderly

	Severe infirmity	Moderate infirmity	Little infirmity	Not infirm
Variant 1 – minimum	6	4	1,5	0
Variant 2	8	6	4	0

Source: Commentary and explanations of the draft law on assistance to dependent persons (2013) Authors' own assumptions

It is also necessary to refer to assumptions regarding the form of assistance provided to the elderly by the product in question. For instance, Więckowska (2008) analysed the possibilities of using the insurance method to manage the risk of senile infirmity. However, this work focused on medical and nursing insurance in which help is provided by qualified medical personnel. By contrast, our approach focuses on insurance in the form of assistance, which is based on a demand for more logistic and organisational help and support with transport, shopping, and so on. Therefore, the average hourly rate for a person employed as an "elderly person's assistant" is adopted for the valuation (Table 3).

Table 3: Average rates per hour of work for an elderly assistant in selected countries

	Poland	Germany	Czech Republic	Portugal
Costs of care [EUR/h]	4,4	14	6,7	6

Source: https://www.salaryexpert.com/

This is insurance in the form of indemnity; thus, irrespective of whether the scope of the benefit is determined for a person in a specific condition, the benefit takes the form of an annuity with a fixed real value for a given state (indexed by inflation rate). By determining the scope of care needed and the costs of implementing such care, we obtain information about the sum insured (the proper policy limit). The annual premiums for such a product are then determined depending on the age of the insured person at the time the premiums begin. These premiums are also compared to the average wage in selected countries to show the amount of statistical income a resident requires to buy such a product. We calculate net single premium - present value (moment "0" = the age of 65) of the costs of care multiplied by the probabilities of being in a specific state in a different age category. We assume that these costs rise over time by inflation, that the discount rate = inflation rate, and we use life tables for each country (www.mortality.org). We then calculate the average total value of costs a 65-year-old needs for the rest of their life. Finally, we calculate net annual premium for 2 variants: constant nominal premium, constant real premium (inflation-indexed), for different age categories.

Results and Discussion

First, the amount of insurance sums in both variants are calculated separately for women and men depending on the country of origin. The authors are aware that in the EU there is no differentiation of insurance premiums based on sex allowed (The European Court of Justice ruled on 1 March 2011 that differences in insurance pricing based purely on a person's sex are discriminatory, MEMO/11/123). This distinction was therefore introduced simply to show the scale of the problem for women, and due to one possible interpretation of the results, which concerns the amounts that would have to be accumulated in the form of savings for future care expenses. The results are presented in Table 4. This shows that, due to their higher life expectancy, women must accumulate a higher amount to ensure they are provided with care in old age. In fact, the values for women are almost twice as high. This is also influenced by the fact that women not only live longer, they do so with worse health conditions (Eurostat, 2019) which means they are more likely to require additional support

Table 4 : Average total value of costs a 65-year-old needs for the rest of their life [in EUR]

Country	Variant 1		Variant 2	
	men	women	men	women
Poland	15 220	30 763	27 596	52 843
Germany	57 267	104 670	103 430	179 539
Czech Republic	23 357	44 694	42 404	76 921
Portugal	24 484	45 852	44 249	78 634

Source: own calculations

In the next step, net annual premiums are determined, the insurance sums for which are presented in Table 5 and are dependent on the age of the insured at the beginning of the premium payment. Life expectancy tables for each population from the countries concerned are used for this purpose (data for 2017 from mortality.org). These values to refer the average annual salary in individual countries. This comparison shows what percentage of average income should be allocated to the purchase of such insurance.

Table 5 : Net annual premium [in EUR] and mean annual net salaries for different age categories

Age	Annual premium - constant nominal value								1-st annual premium - constant real value							
	Variant 1				Variant 2				Variant 1				Variant 2			
	men		women		men		women		men		women		men		women	
	€	%	€	%	€	%	€	%	€	%	€	%	€	%	€	%
Poland																
20	145	*2*	337	*6*	263	*4*	578	*10*	90	*1*	207	*4*	163	*3*	356	*6*
25	177	*3*	408	*6*	321	*5*	701	*10*	116	*2*	264	*4*	210	*3*	454	*6*
30	219	*3*	503	*7*	398	*6*	863	*12*	151	*2*	343	*5*	273	*4*	588	*8*
35	278	*4*	632	*9*	504	*7*	1 085	*15*	201	*3*	454	*6*	365	*5*	780	*11*
40	363	*5*	816	*12*	658	*9*	1 402	*20*	277	*4*	619	*9*	502	*7*	1 064	*15*
45	494	*7*	1 100	*16*	897	*13*	1 889	*27*	398	*6*	882	*13*	722	*10*	1 514	*22*
50	722	*11*	1 582	*24*	1 309	*20*	2 717	*42*	614	*9*	1 341	*20*	1 114	*17*	2 304	*35*
55	1 193	*18*	2 564	*39*	2 164	*33*	4 404	*67*	1 074	*16*	2 303	*35*	1 947	*30*	3 956	*60*
60	2 651	*40*	5 559	*85*	4 806	*73*	9 549	*146*	2 527	*38*	5 296	*81*	4 581	*70*	9 098	*139*
Germany																
20	603	*3*	1 170	*6*	1 090	*5*	2 007	*10*	372	*2*	719	*4*	672	*3*	1 232	*6*
25	733	*3*	1 418	*6*	1 323	*5*	2 432	*10*	475	*2*	916	*4*	858	*3*	1 572	*7*
30	904	*4*	1 745	*7*	1 632	*7*	2 993	*13*	617	*2*	1 188	*5*	1 115	*5*	2 037	*9*
35	1 138	*5*	2 191	*9*	2 055	*8*	3 758	*16*	819	*3*	1 573	*7*	1 480	*6*	2 697	*11*
40	1 474	*6*	2 828	*12*	2 662	*11*	4 851	*20*	1 120	*5*	2 143	*9*	2 023	*8*	3 676	*15*
45	1 991	*8*	3 803	*16*	3 596	*15*	6 524	*27*	1 598	*6*	3 046	*13*	2 886	*12*	5 225	*22*

50	2 875	*11*	5 458	*23*	5 192	*20*	9 362	*39*	2 440	*9*	4 626	*19*	4 407	*17*	7 935	*33*
55	4 685	*18*	8 821	*37*	8 461	*33*	15 131	*63*	4 210	*16*	7 921	*33*	7 604	*30*	13 587	*57*
60	10 227	*40*	19 042	*80*	18 471	*72*	32 663	*137*	9 746	*38*	18 141	*76*	17 602	*69*	31 117	*130*
Czech Republic																
20	237	*3*	497	*5*	431	*5*	855	*9*	147	*2*	305	*3*	266	*3*	525	*6*
25	289	*3*	602	*6*	524	*5*	1 037	*11*	188	*2*	389	*4*	341	*3*	670	*7*
30	357	*3*	741	*8*	647	*6*	1 276	*13*	244	*2*	505	*5*	443	*4*	869	*9*
35	450	*4*	931	*10*	816	*8*	1 602	*16*	324	*3*	668	*7*	589	*6*	1 150	*12*
40	584	*6*	1 202	*12*	1 060	*10*	2 069	*21*	444	*4*	911	*9*	806	*8*	1 568	*16*
45	790	*8*	1 617	*17*	1 435	*14*	2 783	*29*	635	*6*	1295	*13*	1 153	*11*	2 230	*23*
50	1 145	*11*	2 322	*24*	2 079	*20*	3 996	*41*	973	*10*	1968	*20*	1 766	*17*	3 387	*35*
55	1 875	*18*	3 755	*39*	3 404	*33*	6 462	*67*	1 686	*17*	3 372	*35*	3 060	*30*	5 803	*60*
60	4 119	*40*	8 115	*84*	7 478	*73*	13 966	*145*	3 926	*39*	7 731	*80*	7 127	*70*	13 306	*138*
Portugal																
20	255	*3*	519	*6*	461	*5*	890	*10*	157	*2*	319	*4*	285	*3*	547	*6*
25	310	*3*	629	*6*	560	*6*	1 079	*11*	201	*2*	406	*4*	364	*4*	697	*7*
30	383	*4*	774	*8*	691	*7*	1 328	*14*	262	*3*	527	*5*	473	*5*	903	*9*
35	482	*5*	972	*10*	872	*9*	1 666	*17*	348	*3*	697	*7*	629	*6*	1 196	*12*
40	626	*6*	1 254	*13*	1 132	*11*	2 151	*22*	476	*5*	950	*10*	861	*9*	1 629	*17*
45	848	*8*	1 685	*17*	1 533	*15*	2 891	*30*	681	*7*	1 349	*14*	1 231	*12*	2 314	*24*
50	1 228	*13*	2 416	*25*	2 220	*23*	4 144	*43*	1 043	*11*	2 047	*21*	1 885	*19*	3 511	*36*
55	2 006	*21*	3 898	*40*	3 626	*37*	6 684	*69*	1 803	*19*	3 499	*36*	3 259	*34*	6 001	*62*
60	4 385	*45*	8 386	*86*	7 925	*82*	14 382	*148*	4 179	*43*	7 989	*82*	7 552	*78*	13 701	*141*

Source: own calculations

A comparison of the level of premium required based on the average annual salary shows that, after the age of 50, the premium increases drastically and it is too late to buy such insurance. In extreme cases it is not possible for a woman aged 60 to pay a premium for a fuller version (variant 2) because the premium exceeds the adopted income base (the average salary).

Conclusions

As shown by the results (Tables 5), it would be optimal for household finances to start paying premiums for private LTC insurance early; the optimal age is between 25-35. However, this is not the age when people think about retirement security - here it is worth referring to the results of the McKinsey (Binder et al., 2018) study, which shows that LTC insurance before 35 years of age is only considered by 60% of respondents. According to our calculations, the women's premium would be 7 and 10% in variant 1 and between 13 and 17% in variant 2, depending on the country. Among people aged 45, awareness of the need for such a product increases to over 80% but by then the contributions are already 16-17% for variant 1 and 27-30% for variant 2, depending on the country.

The prohibition on differentiating insurance premiums based on sex, currently in force in EU countries, means that insurers will compensate for the higher risk for women by applying higher than calculated from the insurance premiums for men. The authors intentionally conducted calculations by gender to show the significant risk of dependence for women. It is important to emphasise that the problem of providing care for old age is especially pertinent to women (feminisation of old age) due to their longer life span. It should also be noted that in extreme cases, when a woman waits to purchase LTC insurance (or the start of saving) up to 60 years of age, her theoretical premium at age 60 is higher than her income.

Longer life for women does not translate into a longer, healthy life. Therefore, women live longer as dependent people. Extra years of life spent in an unhealthy state (restrictions on functioning or disability) are likely to create additional needs for health care or long-term care services. Across the EU-28 in 2017, women aged 65 years, on average, could expect to live for 10.2 years (47.7%) of their remaining lifespan in a healthy condition (the comparable figure for older men was lower at 9.8 years -54.1 % of their remaining lifespan). Indeed, a Polish study on family care for the elderly - the AZER

study (Wóycicka & Rurarz, 2007) - shows that women not only constitute the majority of caregivers, they are also the main recipients of care.

The issues discussed also confirm the data on the use of institutionalised care. In 2011, 3.8 % of older women (aged 65 years or more) in the EU-28 were living in an institutional household. This was twice as high as the corresponding share for older men (1.9%) reflecting, at least in part, the increased longevity of women. The risk of dependence for women increases when an economic analysis of the level of pensions for women is added to demographic trends. In 2016, the average gender pay gap in the EU was 39.6%.

The consequences of lower earnings and shorter total seniority among women are lower pensions.
The very old are more likely to be frail and therefore require services such as those provided within institutional households. Although most healthcare costs in the EU are covered by social protection systems, long-term social care is usually treated differently. Consequently, this means that the responsibility for financing institutional care often resides with the older person needing such care, which may impose a burden on their family if they have insufficient funds.

Given the extent of family and society involvement in caring for older generations, it makes sense to discuss the introduction of compulsory LTC insurance as a supplement to social security systems, even at a minimum level. This is especially important now that social attitudes are changing and children are less likely to undertake independent care of their parents and instead assign this to institutions and commissioned care (Eitner et al., 2011, Błędowski et al, 2012). This is associated not only with weaker family ties but also with living in other cities – a result of emigration or staying in a larger city after studying and not returning to the hometown.

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Reporting Tax Schemes – A Need or A Policy According to Accountants?

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Abstract

The goal of this article is to present the impact of introducing the obligation to report tax schemes as an example of changes in tax law on the opinions and reactions of accountants. The intended goal was achieved as a result of research using the following research methods: a survey and an interview questionnaire. The research was conducted mainly among accountants employed in the accounting departments of enterprises and in accounting offices located throughout Poland. Key research results have allowed the formulation of new research hypotheses, which will be verified in subsequent stages of the research, namely as a result of introduced changes in tax law: (1) the desire to use aggressive and normal tax optimization, as well as the use of services of specialised entities; (2) on the tax and legal advisory market, the provision of services in the field of tax planning or support in creating structures increasing the level of effectiveness of tax settlements is being abandoned.

Keywords: MDR, tax reporting, tax law, tax optimisation

Introduction

Recent years have seen a number of activities of international organisations, mainly the Organization for Economic Cooperation and Development (OECD), aimed at combating the activities of entities benefiting from imperfections in tax law. One of the reasons for the activities of these organisations may be the fact that entities use gaps in agreements to avoid double taxation, in which case the above-mentioned entities tax their income not in the country where it was earned, but in which the conditions for its taxation are much more favourable. An element of the OECD's activities in this area was the creation of a plan consisting of 15 points as part of the *Base Erosion and Profit Shifting*.

The idea behind these activities is mainly to encourage Member States to apply consistent regulations on transactions between Member States and to improve the transparency and quality of tax law [BEPS]. The answer to these foundations was the creation of an obligatory system of informing tax authorities about tax planning mechanisms, the so-called *Mandatory Disclosure Rules* – MDR.

This article is an attempt to show the impact of introducing the obligation to report tax schemes as an example of changes in tax law on the opinions and reactions of accountants. It is a pilot study conducted in December 2019, i.e. almost one year after the introduction of extended MDR regulations in Poland.

As a hypothesis, it was assumed that the provisions introducing the reporting obligation and explanations to them are unclear and raise a number of interpretation doubts, causing fear and negative assessment of the legislator's actions by accountants. In order to verify the hypothesis, the following research questions were asked in the questionnaire sheet:

- Do you know the provisions of the so-called MDR directives introduced into the Tax Code?
- Do you know how to fulfil in practice the obligation to report the tax scheme in case it occurs?
- In your opinion, what is the purpose of introducing the obligation to report tax schemes?
- What is your attitude towards the recent and planned changes in Polish tax law?

The presented results form part of the research on the reactions of various types of entities in Poland towards changes in tax law introduced by the legislator.

Mandatory Disclosure Rules

The obligation to report information on tax schemes to tax authorities results from the implementation of the provisions of Council Directive (EU) 2018/822 of May 25, 2018, the so-called MDR directives. The Polish legislator, introducing the obligation to report cross-border schemes to the Tax Code as of January 1, 2019, extended it to include the obligation to report Polish national schemes and to include arrangements for VAT.

National arrangements concern taxpayers who meet the so-called qualified beneficiary criterion. The main assumption of the MDR directive was that taxpayers and the advisers supporting them were obliged to inform the national tax authorities about the development, access or implementation of arrangements aimed at obtaining tax benefits, having a specific set of so-called recognition features.

The obligation to provide information on tax schemes may apply to three categories of entities: promoter, beneficiary, and supporter. In order for this obligation to arise, the agreement must meet the definition of a tax scheme resulting from the Polish Tax Code, namely:

- must meet the main benefit criterion and have a general recognition feature,
- must possess a special distinctive feature, or
- must possess another special distinctive feature [Act of August 29, 1997 ...].

The entity responsible for reporting the provision or implementation of the tax scheme is, in the first place, the promoter. The relevant provisions specify the scope of information to be submitted to the Head of the National Tax Administration. This range varies depending on whether the scheme is standardised or non-standardised. Additionally, the Tax Code sets out the rules related to the mode of submitting information and regulates the manner of acting in this respect by the Head of the National Tax Administration.

According to the assumptions, the purpose of MDR is to provide the tax administration with information that will be used by tax authorities to improve the quality of the tax system. This information is supposed to enable a quick response in the form of possible legislative changes. These assumptions are also directed at enabling quick access of the tax administration to information on potentially aggressive planning or fraud related to tax planning, as well as information on promoters and those using tax schemes. To a certain extent, these provisions also discourage taxpayers and their advisers from implementing arrangements that may constitute tax avoidance.

Results of the Conducted Research

The pilot study was conducted in December 2019 among Polish accountants from around the country. The total research sample (based on the return of fully completed questionnaires) was 184 people. Almost half of the respondents (49.5%) were employed in accounting positions in accounting departments of enterprises. Another group of people surveyed were accountants employed in accounting offices (39.7%). The remaining surveyed group were also people professionally connected with accounting in various forms. The following research methods were used: survey questionnaire and interview questionnaire.

Based on the questionnaires completed by the surveyed group, and the answers obtained from the interview questionnaire. The following results were obtained:

Table 1: Results of the research

Do you know the provisions of the so-called MDR directives introduced into the Tax Code?			
• yes – 18.5%	• partly – 70.6%	• no – 10.9%	
At what level do you assess your knowledge about tax schemes?			
• very good – 6.5%	• good – 37.5%	• sufficient – 40.2%	• insufficient – 15.8%
Do you know how to fulfil in practice the obligation to report the tax scheme in the event of its occurrence?			
• yes – 9.2%	• partly – 56.0%	• no – 34.8%	
Do you intend to broaden your knowledge of tax schemes and their reporting?			
• yes – 81.5%	• no – 8.2%	• I have no opinion – 10.3%	
In your opinion, what is the purpose of introducing the obligation to report tax schemes?			
• improving the quality of the tax system - 8.2% • quick access of the tax administration to information on only aggressive tax optimisation - 15.0% • quick access to entities using tax schemes - 10.8% • discouraging taxpayers and their advisers from implementing arrangements that may constitute tax avoidance - 32.1% • limiting the use of normal tax optimization solutions by taxpayers - 33.9%			
What is your attitude towards the legislator's extension of EU regulations to include reporting on national schemes?			
• positive - 12.0%	• negative - 45.7%	• I have no opinion – 42.3%	
What is your attitude towards the recent and planned changes in Polish tax law?			
• positive - 7.6%	• negative - 82.6%	• I have no opinion – 9.8%	
How do you assess the impact of the legislator's actions on the possibilities for entrepreneurs to use normal tax optimisation?			
• positive - 10,9%	• negative - 52,7%	• I have no opinion – 36,4%	

Assessment of the Value of the Findings

The hypothesis has been positively verified in the course of the conducted research. The provisions introducing the reporting obligation and explanations to them are unclear and raise a number of interpretation doubts, causing fear and negative assessment of the legislator's actions by accountants.

The vast majority of the surveyed group negatively assess their knowledge of MDR regulations, tax schemes themselves, and fulfilling their reporting obligations in practice. The fact that accountants have a negative assessment of the legislator's activities is also important; only 7.6% of respondents positively assess the recent and planned changes in tax law. Similarly, the respondents assess the legislator's intentions in connection with the introduction of this reporting obligation negatively. In addition, the largest percentage of respondents indicates a limitation of taxpayers' use of normal tax optimisation solutions as the legislator's goal in this respect.

A significant number of respondents negatively assessed the legislative activities of the legislator. This is primarily due to the fact that national MDR regulations are, in the eyes of recipients, imprecise and unclear. At the moment, there is no practice nor even more official guidelines as to the practical application of MDR principles and reporting of national schemes. With the entry into force of the new provisions, there arose doubts and interpretation difficulties which, despite the provisions being in force for almost a year, have not gone away. In addition, the fact of not complying with obligations in the field of reporting tax schemes, which is associated with severe fines, and in extreme cases, where the court has the right to impose a criminal measure in the form of a ban on conducting specific business activities, additionally does not favour a positive reception of changes in tax law.

A measure of the legislative quality of tax law provisions is their development, adoption and publication in accordance with the principles of so-called decent legislation. If subsequent changes to

the regulations are ad hoc, occasional or accidental, their effect is the creation of tax law based on numerous normative acts, which are illegible and inconsistent and lack rationality in the eyes of the recipients of said regulations [*Polski system* ... 2010, p. 128-134].

Conclusion

As a consequence of the analysis of the first part of the obtained research results, and as a consequence of the conclusions drawn from it, it is possible to make further hypotheses that will be verified in the next stages of the research: (1) as a result of changes in tax law, the desire to use aggressive and normal tax optimisation significantly decreases, as does the use of services of specialised entities for this purpose; (2) as a result of introduced changes in tax law on the tax and legal advisory market, the provision of services in the field of tax planning or support in creating structures increasing the efficiency of tax settlements is being abandoned.

It should be emphasized that these results constitute only part of the research on the reactions of various types of entities to changes in tax law introduced by the legislator. At the stage of further research, individual research groups will be analysed separately, and more attention will be paid to the dependence of the responses of individual groups subject to the study on the duration of given provisions in tax law as well as their transparency or ease of interpretation in the eyes of the respondents.

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The Operating Procedure for Mass Customization Manufacturing in the Industry 4.0 Environment

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Abstract

Implementation of advanced technologies related to the Industry 4.0 concept, application of mobile networking and adjustment of the company offer to current customer's demands are necessary to gain a competitive advantage on the market. Currently, customers expect personalized products tailored to their individual needs, tastes and lifestyle. However, they want to pay a similar price to mass production. For these market trends, there is a growing need to introduce completely new approach that enable the implementation of mass customization. The reconciliation of conflicting low-price requirements and the rapid manufacturing of personalized products are possible only through the use of advanced digitization, wireless and mobile networking, ensuring rapid improvement of mobility, flexibility and efficiency. The article presents a new approach to mass customization manufacturing which bases on the results of research conducted in industrial enterprises. The main aim of research was to develop an operating procedure for mass customization. The implementation of the proposed approach in practice should allow the rapid manufacturing of personalized products using wireless and mobile networking that increases mobility, flexibility and production efficiency to be ensured. Particular attention has been paid to the benefits of modern mobile technologies and networking, digitization and advanced manufacturing systems.

Keywords: operation management, operating procedure, business model, Industry 4.0, mass customization strategy.

Introduction

Nowadays, advances in the areas of smart device-embedded systems and technological solutions is very high and leads to an inevitability of a development an appropriate level of digitalization (Modrak et al, 2017; Russo et al, 2015). Previously used business models are no longer staggering due to a need to apply the Internet of Things, digitalization and mobile networking, etc. (Dalenogare et al, 2018; Dregger et al, 2016; Wang et al, 2015; Lasi et al, 2014; Grabowska et al, 2020). Technological and financial resources are already insufficient for organizations to succeed on the market. Innovation advanced technologies create growing potential that can give groundbreaking changes in business models. New, innovative business models are needed which a reconciliation of conflicting low-price requirements and the rapid manufacturing of personalized products, and also allow new leadership and a new type of value to be built through rapid improvement of mobility, flexibility and efficiency (Dalenogare et al, 2018; Dregger et al, 2016; Wang, Törngren & Onori 2015).

Customers expect products that are unique, tailored to their personal preferences, tastes, needs and lifestyle. They want to configure the purchased products and also pay a price similar to mass products. Mass production does not fit turbulent markets, growing product variety and technological opportunities (Stojanova et al, 2013).The production paradigm is changed and manufacturing becomes closer, more responsive to customer requirements and faster (Wang et al, 2017). Strong

competition causes that production companies are still looking for new strategies and solutions to meet these challenges and gain a competitive advantage on the market and sustainable industrial development. These trends mean increased pressure on mass customization (MC) and has driven the new line of research which concentrates on introduce completely new business models (Moeuf et al, 2017), which enable a real transformation and the implementation of mass customization strategy and the Industry 4.0 in practice.

The article presents a new approach to mass customization manufacturing which bases on the results of research conducted in industrial enterprises. The main aim of research was to develop an operating procedure for mass customization strategy. The implementation of the proposed approach in practice should allow the rapid manufacturing of personalized products using wireless and mobile networking that increases significantly mobility, flexibility and production efficiency to be ensured.

Particular attention has been paid to the benefits of connection mobile technologies and networking, technologies of the Industry 4.0 with advanced manufacturing systems. The proposed operating procedure was developed on the basis of qualitative and quantitative research carried out in 12 medium and big production enterprises in Poland and among their customers.

Theoretical Framework

Mass Customization Production (MCP) and Mass Personalization Production (MPP)

A manufacturing strategy of mass customization (MC) is a combination of the features of two types of production: the production of engineering to order, which means adapting products to the individual customer's requirements, with features of mass production such as low price and short delivery cycle. MC means flexible production with large varieties, high productivity and low cost and began to gain popularity in the late 1980s (Wang et al, 2017; Pine, 1993).

The competitive advantage of an enterprise in mass customization strategy can be achieved on the basis of a cost-based competition strategy and a product differentiation strategy (Silveira et al, 2001).This strategy based on numerically controlled machines (NC), computer integrated systems (CIM), flexible manufacturing systems (FMS) and introduced manufacturing management systems such as enterprise resource planning (ERP), product life management (PLM) and manufacturing executive system (MES). According to this strategy, cheap mass-produced products, creating value from economies of scale were produced and more expensive customized products (Samolejova et al, 2012; Pine, 1993; Pine, Victor & Boynton, 1994; Gregor et al, 2017; Jakubowski & Wozniak, 2016).

The idea of delivering the customized products to customers within a very short time (e.g. a few days) turned out to be very difficult to implement in practice due to the high cost and organizational difficulties (Silveira et al, 2001,) and success depended on a type of product. For example, Toyota (car's manufacturer) has abandoned an ambitious car delivery plan with a set of options selected by the customer within 3 days. However, at Dell company (computer's manufacturer) this idea has been successfully implemented (Silveira et al, 2001).

In the 2010s customer's expectations were changed. The consumers want not only a product tailored to their needs, but at a price similar to a mass product and also to have influence to create product themselves. The production model has changed to the manufacturing model driven by the customer orders (Zhang et al, 2019). At the same time, many very advanced technologies have developed and a generation has appeared on the market, which commonly uses social networks as well as wireless and mobile networking. Communication and information technologies have influence on people life and business (Wang et al, 2017). In this situation, the Industry 4.0 concept has developed and a trend in which companies is focused on customer demand more than company's value (Martin, 2010; Grabowska et al, 2020).

These new technologies give possibilities to create new forms of MCP. Some authors called this strategy as a new form of mass customization and others as a mass personalization production (MPP). MPP allows a demand diversification, large-scale manufacturing with the advantages of quality, flexibility, cost, time, and variety (Wang et al, 2017) using wireless and mobile networking. The mass personalization production strategy is based on connections with the Industry 4.0 concept and related technologies using them together and connected with a global communication, wireless and mobile networks.

Types of Customization

There are four distinct approaches to customization depending on the scope of the customer's influence on the final product (Gilmore & Pine, 1997):

- collaborative - the most difficult to realize, changes are implemented based on conducted dialogue with the consumer to help him articulate his needs and concern the actual product, elements of the extended product or additional benefits that the customer obtains;
- adaptive - one standard, but customizable product which is designed in such a way that the user can alter it himself;
- cosmetic - standard product differently to different customers;
- transparent - changes in the product are introduced by the manufacturer based on observation of customer behavior and preferences.

A very important issue in the selection of applied customization type is the possibility of achieving production efficiency comparable to mass production. Another customization typology is connected with forms of modularity in various phases of value stream creation and the customer degree involvement. There are several kinds of collaborative customization (Duray, 2002; Bednarz, 2010):

- fabrications - the customer has an influence on the design and production of ingredients phase; it is possible to create new specific components compliant with the client's requirements;
- involvers - the customer has an influence on the design and production of ingredients phase, but without creation specific new components;
- assemblers - the product is assigned to the customer in the assembly phase and use of product, but it is possible only to add or replace common modules;
- modularizers - the product is assigned to the customer in the assembly phase and use of product and but it is possible to add new modules better to meet the specific requirements of the consumer.

Technological Challenges for Mass Customization in the Industry 4.0 Environment

One of the significant problem in mass customization is the level of product individualization. Mass customization can mean products in which the customer has a choice of several different variants, but also can mean customer co-design of product. The range in which products can be customized plays a key role (Stojanova et al, 2013). There are some key problems and limitations to mass customization:

- usually customers do not participate in the design phase, because it is time consuming, difficult to organize and difficult to return product;
- much easier is that potential combinations are determined by designers (Wang, Ma, Yang & Wang, 2017);
- short time of delivery and low cost is often more important for the consumer than a satisfaction from each individual requirement.

The Industry 4.0 standard gives new opportunity for mass customization connected with using many innovation technologies together such as: Cyber-Physical Systems (CPS) which integrated

networking, computing and physical processes, Internet of Things (IoT), Internet of Services (IoS), Big Data Analytics, Cloud Computing, Additive Manufacturing, Simulation, System Integration, Augmented Reality, etc. with industrial automation. This concept can allow manufacturing to a different dimension of mobility, flexibility and efficiency to be moved (Wan & Xia, 2017). The conflict between product diversification and large-scale manufacturing can be solved. It may be particularly useful to take advantage of the possibilities of using mobile and wireless networks whose number of users and availability is growing rapidly. New technologies will enable enterprises to manufacture customized products with shorter cycle-times and lower costs than mass production and standardization with the advantages of cost, quality, time, flexibility and variety (Wang et al, 2017; Jasiulewicz-Kaczmarek & Gola, 2019; Gregor et al, 2017).

The Internet of Things (IoT) is a network of machines, smart devices and physical objects connected to a central or a cloud-based server which have built-in wireless connectivity, sensors and other mechanism collected and transmitted information and have the capability to monitor and control all elements of the network (Shelby & Bormann, 2009; Caganova et al, 2017). They have their own unique Internet protocol (IP) addresses which helps them to communicate and exchange information (Bawa at al, 2015; Pawar, 2015). IoT connects devices, humans and systems to capture and monitor real-time object information and to achieve recognition, optimization and management in company (Liu et al., 2017). This technology is using to ensure a resource identification, communication, interaction, data fusion and integration. A development of IoT-based applications is also extremely important (Liu et al., 2017).The machine-to-machine (M2M) communication capability generates a more human free manufacturing environment (Oztemel & Gursev, 2018).

The decision about implementation of advanced IoT technology should be treated as a positive response to the changing environment and a trend towards to gain competitive advantage (Li, Hou, Liu & Liu, 2012). Electronic sensors, microchips can create today greater amounts of new types high-quality information and give completely new possibilities. Using sensors and software to feed into big data, machines, people, vehicles, production lines, logistics networks, etc. can be linked in real-time. Warehouses can be fully automatic, orders can be automatically pass to suppliers, etc. and enterprise receives new dimension of mobility, flexibility and efficiency (Russo et al, 2015).

Whereas Cyber-Physical Systems (CPS) are more self-behaving and give autonomy for production system. Sensors, actuators and other physical objects make easier communication capability between machines and brings more agile, robust and consistent manufacturing systems with intelligent capabilities (Oztemel & Gursev, 2018). CPS ingrate networking, computation and physical processes. A typical example of the CPS is RFID system. RFID technology helps data of manufacturing production processes such as material consumptions, machine statuses, order progress or workstation status to be sensed and captured in the real-time (Zhong, Dai, Qu, Hu & Huang, 2013). Then, the manufacturing data can be transferred to the Manufacturing Execution System (MES) for processing (Wang et al, 2017).

Due to rapidly growing an amount of data related to the IoT concept, Cloud Computing technology is gaining importance (Pape & Rannenberg, 2019). The Cloud Computing is a model in which servers, applications, networks and another elements are made available to IT and end users via the Internet. There are three types of cloud service: infrastructure as a service (IaaS), platform as a service (PaaS) and software as a service (SaaS). Cloud computing is computing model, not a technology.

The Big Data (BD) technology helps to analyze data from production and makes a production system flexible and self-controlling. This technology has the ability to collect, store and analyze a huge amount of data in real time. The Big Data analytics allow precisely expectations, needs and requirements of clients to be identified, customer's segments according to different criteria to be created, advertising and marketing activities much more effectively to be adjusted, and also much better conversion rate to be achieved. In the area of production, BD is used for device diagnostics, identification of inefficient resources and processes, production bottlenecks, optimization of production quality, energy saving, service improvement and after-sales services. In the context of the

Industry 4.0, collecting and comprehensively assessing data from a wide range of sources - devices and production systems, as well as enterprise and customer management systems - will become a standard to support real-time decision making (Meerja et al, 2019).

The clients' requirements are related to fast and high quality service. Customers want to have continuous access to information about the status of their orders. It is observed that the e-commerce platforms are increasingly used to conduct a professional customer service. The use of the e-commerce platform enables multi-level sales ensuring automatic generation of information about orders, returns, complaints and their status. The flow of information is very fast. A main benefit of using these platforms is a new order based on the Internet which becomes the main form of current economic activities (Wu et al, 2019; Saniuk & Grabowska, 2019; Akter & Wamba, 2016).

Research Aim and Methods

Research Aim

A new approach to mass customization manufacturing based on the results of research conducted in industrial enterprises is presented. The main aim of research was to develop an operating procedure for mass customization strategy (OPMC). This procedure contains a proposition of an organization of significant processes which allows the rapid manufacturing of personalized products using modern mobile technologies, digitalization, wireless and mobile networking. Otherwise, the implementation of this procedure in practice should help to increase a mobility, a flexibility and a production efficiency.

Literature Review

Based on the analysis of the literature, the main features of mass customization and personalization, the types of mass customization and the possibilities of its development in the Industry 4.0 environment related to the use of modern technologies were identified. The need to build new solutions which help to create new business models is highlighted.

Observations in Production Enterprises and Survey Research of their Customers

The research in the form of observations was conducted for a purposely selected group of medium and large production companies in Poland. The survey research was carried out among customers of intentionally selected enterprises. Based on the surveys, the following questions were sought:

- Which customer requirements should be included in the operating procedure for mass customization strategy?
- What should be the average maximum time from placing the order to delivering the product to the customer?

On the basis of the observations, the following questions were sought:

- What processes should involve the operating procedure?
- What Industry 4.0 technologies, solutions and systems should be used to ensure increase in mobility, and flexibility and a production efficiency and customers' requirements?
- What operating procedure could quickly produce personalized products and support the management of industrial enterprises in mass customization manufacturing?

Building the Operating Procedure for Mass Customization (OPMC)

Building an Operating Procedure for Mass Customization (OPMC), which allows the rapid manufacturing of personalized products using wireless and mobile networking and help to increase a mobility, flexibility and production efficiency.

Research Results

Results of Observations in Enterprises and Survey Research of their Customers

From among a group of randomly selected 120 medium and large production enterprises (MLE) which conduct business activity on Polish territory, a group of 12 companies was deliberately selected in which quality research was conducted. Then, a quantitative research was made among the clients of these companies in the form of questionnaire surveys. 296 people (24%) from 1232 clients of the surveyed companies took part. The main purposes of the survey research were:

1) to identify the needs and requirements of current clients of deliberately selected enterprises in the field of mass customization, which will help in the construction of an operating procedure for mass customization strategy;
2) determining the average maximum time from order submitting to delivering the product to the customer which is expected by the customers.

The results of quantitative research are presented in the Figure 1 and the Figure 2. The most important requirements and needs of customers which are the basis for building the operating procedure for mass customization strategy are presented in the Figure 1.

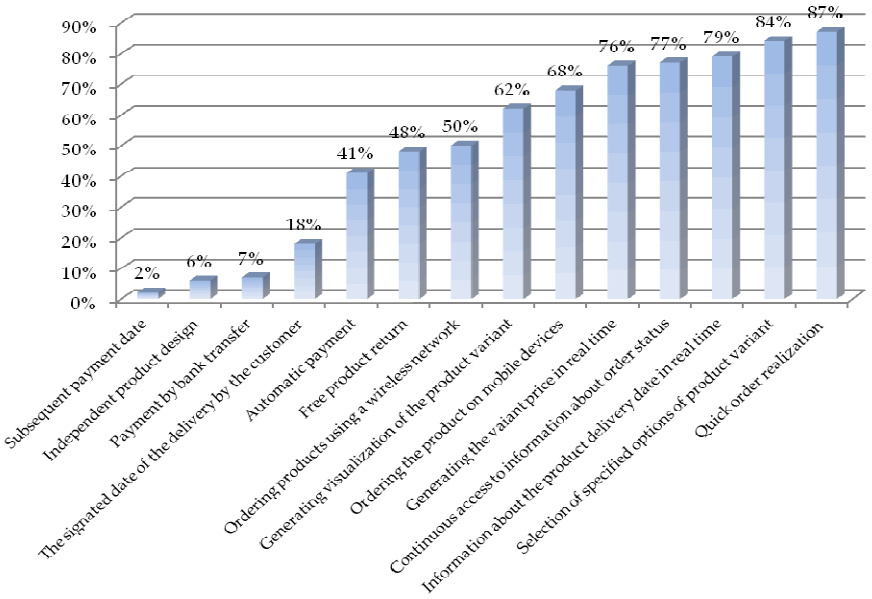

Fig. 1: Customer's requirements and needs - survey results

(source: own study)

The customers' expectations about the maximum length of time from order submitting to delivering the product to the customer are a key aspect in the building of the operating procedure for mass customization strategy. This information depends on what processes manufacturers are able to implement only after receiving the order and which they must prepare in advance. This information also affects the profitability of order fulfillment. Well-planned execution of orders can significantly reduce the costs of frozen capital. The customers' expectations about the average maximum time from order submitting to delivering the product to the customer are illustrated in the Figure 2.

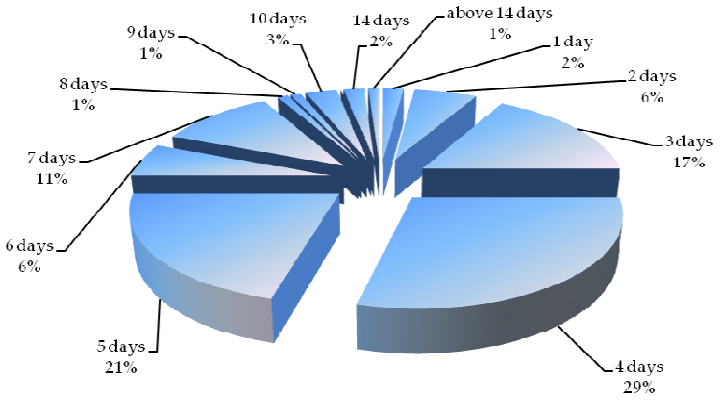

Fig. 2: The average maximum time from order submitting to delivering the product to the customer- survey research results

(source: own study)

The qualitative research was conducted in 2019 using the method of observation in deliberately selected 12 MLE in Poland. Their goal was to answer the following questions:

- What processes should involve the operating procedure?
- What Industry 4.0 technologies, solutions and systems should be used to ensure increase in mobility, and flexibility and a production efficiency and customers' requirements?
- What operating procedure could quickly manufacture personalized products and support the management of industrial enterprises in mass customization manufacturing?

Based on the research results observations and analysis, 6 main processes were identified whose organization must be changed using the mass customization strategy. The proposed operating procedure OPMC should contain a proposal of technologies, solutions and systems dedicated to the following processes: 1) Product Design, 2) Order Processing, 3) Production Planning, 4) Manufacturing and Assembly, 5) Quality Management, 6) Storing and Shipment. Then, the possibilities of new technologies, the benefits that can be obtained and the limitations of production systems were analyzed and technologies, solutions and systems were selected and proposed for the operating procedure for mass customization strategy.

The Operating Procedure for Mass Customization Strategy

On the basis of the qualitative and quantitative research, the Operating Procedure for Mass Customization (OPMC) is developed, the main task of which is to apply new Industry 4.0 solutions designed to manufacture products quickly and in accordance with the requirements and needs of customers, what is shown in the Figure 3.

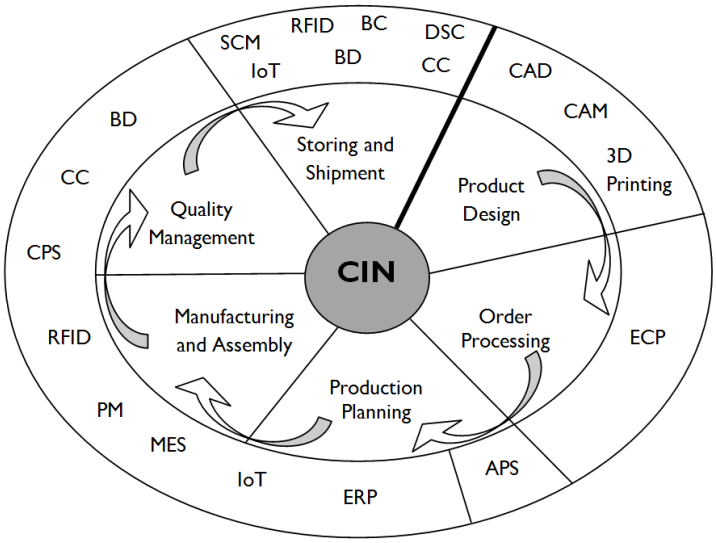

Fig. 3: The Operating Procedure for Mass Customization Strategy

(source: own study)

This is a solution for the B2B2C (Business-to-Business-to-Consumer) model. It is assumed that the network of manufacturing companies belonging to the Cyber Industry Network (CIN) jointly produces the product and delivers the product to the customer through distribution companies. The operating procedure defines the solutions and systems that are used to generate for mass customization strategy to facilitate the flow of information. The key issue in the construction of the operating procedure is the selection of solutions and technologies that will enable quick manufacturing and increase mobility, flexibility and efficiency. The proposed operating procedure consists of six stages.

The survey research has shown that as much as 84% of surveyed respondents prefer personalized product in which customer can select many options and determines a product variant (see the Figure 1), and only 6% respondents would like to design the product themselves. For this reason, an operating procedure is built for an adaptive type of mass customization. This means that the customer makes the product specification based on the available set of options. To shorten the delivery time, each product configuration with available options is previously designed by the manufacturer's employees. It is assumed that surveys are systematically conducted regarding changing customer needs and analyze sales data in order to add new options for product variants and remove or change existing ones.

Stage 1. Product Design. In the first stage, the employees of enterprises creating the Cyber Industry Network define a finite number of product variants that can be configured by customers based on cost analysis, material availability and time-consuming product manufacturing processes. Then every possible variant is designed. Such a solution significantly shortens the time of order fulfillment and facilitates a production organization. Unfortunately, it does not allow to produce a collaborative type of mass customization. Proposed technologies and solutions: Computer-Aided Design (CAD), Computer-Aided Manufacturing (CAM), 3D Printing, spatial scanning, modeling.

Stage 2. Order Processing. In the second stage, the customer configures a personalized product based on the options provided by the manufacturer. To increase the quality of customer service, e-commerce platform has been used that allows: quickly information about orders to be obtained, customer about the status of his order to be systematically informed, the variant of the product to be

visualized and the price to be calculated, and various promotional activities to specific customer segments to be applied. The use of e-commerce platform enables meeting several requirements and expectations of customers identified on the basis of surveys: continuous access to information about the order status, generating the variant price in real-time, generating visualization of the variant of the configured product, the possibility of automatic payment. Proposed technologies and solutions: E-commerce Platform (ECP).

Stage 3. Production Planning. In the third stage the Cyber Industry Network the load of partners' resources are planned. At this stage, the production process is generated and the required resources are determined. Planning and production of products is realized in the Cyber Industry Network (CIN) platform planning, which is a proprietary solution of the authors of the article and has been published among others in (Saniuk, Saniuk, & Caganova, 2019). Proposed technologies and solutions: Internet of Things (IoT), Big Data (BD), Manufacturing Execution System (MES), Advanced Planning and Scheduling (APS), Enterprise Resource Planning (ERP).

Stage 4. Manufacturing and Assembly. In the fourth stage, the order is completed - a personalized product is manufactured by companies belonging to the Cyber Industry Network. RFID sensors identify materials and products. Sensors, biosensors, actuators and other physical objects read information in the real time from machines, robots and devices, etc., using IoT technology and then transmit it to the Manufacturing Execution System (MES). Using Big Data technology, the collected data is analyzed to save energy, detect upcoming downtime, breakdowns, optimize bottlenecks, etc. Inspections are automated. Data is collected and stored using Cloud Computing (CC), which ensures the availability of data from various mobile devices in Anytime, Anywhere, Anydevice mode, free access to the data of authorized employees and the possibility of using remote work. The use of CC reduces the risk of data loss and lack of access to data caused by hardware failure. Proposed technologies and solutions: Cyber Physical System (CPS), RFID, Internet of Things (IoT), Big Data (BD), Manufacturing Execution System (MES), Enterprise Resource Planning (ERP), Predictive Maintenance (PM).

Stage 5. Quality Management. The fifth stage relies on quality management. The following activities are made in this stage: suppliers are assessed, the quality of raw materials and packaging is controlled, complaints are handled and analyzed, the correctness of processes, the quality of document flow, data archiving and access and secure data are controlled. Using RFID sensors, IoT technology and BD analytics, upcoming failures are detected and their causes automatically removed. This stage also examines the quality of customer service and after-sales services. Proposed technologies and solutions: Cyber Physical System (CPS), RFID, Internet of Things (IoT), Big Data (BD), Manufacturing Execution System (MES), Enterprise Resource Planning (ERP).

Stage 6. Storing and Shipment. The sixth stage involves processes related to storage, packaging, preparation of products for shipment and shipment of products to the customer. RFID sensors are also used here. An interesting solution is a blockchain technology (BC). This technology enables a very accurate and reliable tracking of the product route along the entire supply chain with the possibility to precisely determine the time of individual locations. It can be especially useful for products of high value. There is a possibility of using various sensors and biosensors to continuously measure various parameters during transport and storage in real time, which can significantly increase the quality of transported products. For professional process management, SCM and DSC are proposed to use at this stage to extend logistics efficiency (Hurka & Wyrwicka, 2019; Straka et al., 2017). Proposed technologies and solutions: Supply Chain Management (SCM), Digital Supply Chain (DSC), blockchains (BC), Cyber Physical System (CPS),RFID, Cloud Computing (CC), Internet of Things (IoT), Big Data (BD).

Conclusions and Future Research

As the main effect of the conducted research is an operating procedure for mass customization strategy dedicated for medium and large production enterprises. The quantitative research has shown

that the customer expects personalized products that he would like to configure himself/herself, but not necessarily design himself/herself. This means in practice that product design can be done even before the customer's order is submitted based on pre-defined options for selecting the defined product features, which significantly shortens the time of order completion and facilitates a production organization and planning. Also important for the customer is a short order processing time of 4-5 days and information about the date of product delivery, continuous access to information about order status and the possibility of purchasing products from mobile devices. On the basis of qualitative research in the form of observations conducted in manufacturing enterprises in Poland, six stages are identified that are important from the point of view of mass customization manufacturing. Based on analysis and many observations, technologies, solutions and systems have been proposed that increase mobility, flexibility and production efficiency.

The future research will be conducted in a form of the experiments. Moreover, it is planned to verify possibility to use in practice the proposed operating procedure OPMC in condition of specific industry.

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Conditioning of Entrepreneurial Attitudes in the Perception of Polish, Ukrainian and Belarusian Students

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Abstract

Entrepreneurship is a significant and still up-to-date research topic both because of its theoretical complexity and the importance for the social practice, especially the economic one. The authors assume that the study of entrepreneurship needs to take into consideration different perspectives: psychological, organisational, economic and cultural. The aim of the article is to diagnose the perception of entrepreneurship and its conditioning in the perception of Polish, Belarusian and Ukrainian students. The opinions of young people studying management - potential future entrepreneurs representing different national cultures - have been found cognitively interesting. The study involved a group of 312 students from Bialystok University of Technology, Grodno State University and the Poltava National Technical Yuri Kondratyuk University. With regard to a gradual character of evaluation (5-point Likert scale) and a large number of groups, the analysis of the obtained results was based on the Kruskal-Wallis test. The U Mann-Whitney test was used for identifying groups with considerable differences.

Keywords: Entrepreneurship; Diagnose the Perception of Entrepreneurship

Introduction

Entrepreneurial attitudes of young people are an important and current research topic both on account of its theoretical complexity as well as significance to economic practice (Veciana, Aponte and Urbano, 2005; Pruett and Şeşen, 2017; Fellnhofer, 2018; Shahid, Imran and Shehryar, 2018). The authors share the view that studies on attitudes towards entrepreneurship among young people require the consideration of numerous, differing perspectives: psychological, organisational, economic and cultural (Hockerts, 2018; Audretsch, 2007). Entrepreneurial attitudes have a greater chance for development in societies where entrepreneurship is anchored in the culture and is not only allowed but also socially supported (Fellnhofer and Mueller, 2018; Borasi and Finnigan, 2010). Appropriate legal regulations, access to technologies and resources needed to finance a business rarely suffice people to display entrepreneurial mindsets (activate their business competencies). The right cultural foundation, i.e. the one that allows people to perceive and take advantage of emerging opportunities, is also essential (Yemini and Oplatka, 2014).

The article aims to diagnose the manner in which entrepreneurship is perceived by students of Polish, Belarusian and Ukrainian universities. The comparison of opinions expressed by young business students (management or economics faculties) - potential future entrepreneurs representing varying national cultures - has been deemed to be cognitively interesting. Considering the fact that the respondents (312 people) represent only three universities (the Faculty of Engineering Management of

Bialystok University of Technology in Poland, the Faculty of Economics and Management of the Yanka Kupala State University of Grodno in Belarus and the Faculty of Technical Management of the Poltava National Technical Yuriy Kondratyuk University in Ukraine), the research is considered to be fragmentary. Any conclusions drawn from the results can become a starting point for the development of more detailed research hypotheses and a basis for further, more in-depth scientific studies.

Conditions of Entrepreneurship – Theoretical Background

Entrepreneurship is both an interdisciplinary as well as complex issue which results in varying manners of defining it and a differing distribution of emphasis concerning its conditions and expressions. The only element of entrepreneurship which is beyond question is its fundamental significance to economic and social development. Entrepreneurship can be considered, among other things, through the methodological perspective of economics, management sciences, legal theory, sociology or psychology (Carsrud, Brännback, Elfving and Brandt, 2009). It can be analysed as a process leading to the establishment of businesses and their development but also as a personality trait of a particular person (Littunen, 2000). It can be treated as an element of social capital with reference to the mentality and the resulting attitudes of a given group. It is also studied as an aspect of culture and civilization. At the same time, it is a dynamic category: the role of entrepreneurship within social life is changing, where such changes affect the philosophy of entrepreneurship as well as the notion of an entrepreneur itself (Zhao, Seibert and Lumpkin, 2010).

Studies into entrepreneurship are conventionally divided into two trends: psychological and economic (Gorgievski and Stephan, 2016). The former relates entrepreneurship to an entrepreneur or, more broadly, a man of business. It describes entrepreneurship as a set of character traits, skills and behaviours which are a form of expressing entrepreneurial traits and abilities (Leutner, Gorkan, Akhtar and Chamorro-Premuzic, 2014). The same approach was declared by Xenophon a long time ago. In portraying a good governor, a synonym of a contemporary businessman, he stressed the role of being engaged in and love toward one's work, judged to be more important than professional knowledge. In psychology, entrepreneurship is examined with the use of such categories as personality, talent, creativity, or even creative drive (Pinho, Sampaio de Sá, 2014). Such understood entrepreneurship is closely related to creativity, initiative, active mind, innovativeness and an expression of one's individuality (Baluku, Matagi, Musanje, Kikooma and Otto, 2019; Cardon, Wincent, Singh and Drnovsek, 2009). Nevertheless, there remains a question whether entrepreneurship is an inherited psychological predisposition or an attitude learned in the process of education and development (Schlaegel and Koenig, 2014). Advocates of an inherited character of entrepreneurship treat it as a critical talent which rarely occurs but, at the same time, seems to be of key significance with regard to the functioning of a given community. There is also a search for correlations between entrepreneurship and a genetically conditioned inclination toward "thrill seeking" (Nicolaou, Shane, Cherkas and Spector, 2008; Nicolaou and Shane, 2009).

Many contemporary studies and concepts of entrepreneurship often question genetic roots of entrepreneurship, highlighting a significant role of environmental factors, especially cultural, social, political and economic, in its development (Stephan and Uhlaner, 2010; Hartung, 2002; Wasilczuk and Zięba, 2008). The definition of entrepreneurship as a process dominates economic sciences (including management science). Economic perspective draws attention to the structural, legal and business conditions of entrepreneurship and the quantitative aspects of this phenomenon (Brazeal and Herbert, 1999). An entrepreneur searches for change, reacts to it and uses it as an opportunity, while entrepreneurship is an activity leading to the development and creation of a new value (Lee, Florida and Acs, 2004). If the identification of opportunities takes place on the path of discovery, it is dubbed "traditional entrepreneurship". However, if it occurs at the creation stage, it is termed "intellectual entrepreneurship". It is mainly incorporated in businesses, although it is worth mentioning that sometimes it does occur in various organisations or even households. In economic sciences, to display entrepreneurship means to have an idea, a concept, to recognise the opportunity in the course of its

execution, to foresee its results, assess the chances for the execution of an idea and, on this basis, formulate aims and tasks. The process is, therefore, dominated by a praxeological approach to an entrepreneur as a person who establishes goals and ensures that it is efficiently (and effectively) executed (Garcia-Cabrera and Garcia-Soto, 2008).

An attempt to combine the psychological and the organisational research perspectives is visible in the interpretation of the essence of entrepreneurship through the theory of competencies (Wasilczuk, 2000). Entrepreneurship is at times treated as a single skill belonging to the group of key competencies, or those which are the most important to a given organisation or a particular person (Scuotto and Morellato, 2013; Schmitt-Rodermund, 2004). However, on the basis of an analysis of factors conditioning entrepreneurial activity, one could risk a conclusion that defining entrepreneurship as a separate, single competency is a simplification that goes a bit too far (Schlaegel and Koenig, 2014). For this reason entrepreneurship is defined as a group of competencies affecting effective identification and achievement of organisational goals in conditions of risk or uncertainty (Pan, 2017). At the same time, it must also be stated that competencies are understood as all characteristics and rights of people and organisations which, utilised and developed, serve to achieve organisational aims as well as all personal employee goals which fit them. This definition allows for broad classification of competencies. It stresses the fact that they concern not only certain employees but the organisation as well. The characterisation of entrepreneurship as a group of competencies allows for accepting the fact that entrepreneurship can be used to describe a particular person, team or - if it is led by enterprising management - employees and contributors who support entrepreneurship, i.e. the entire organisation (Ismail and Zulihar, 2015).

Entrepreneurial attitudes – Bibliometric Analysis

The authors used a standard bibliometric analysis of scientific literature from Scopus database in order to characterise issues on entrepreneurship attitudes. Figure 1 illustrates the existence of key terms subject to a three-stage analysis.

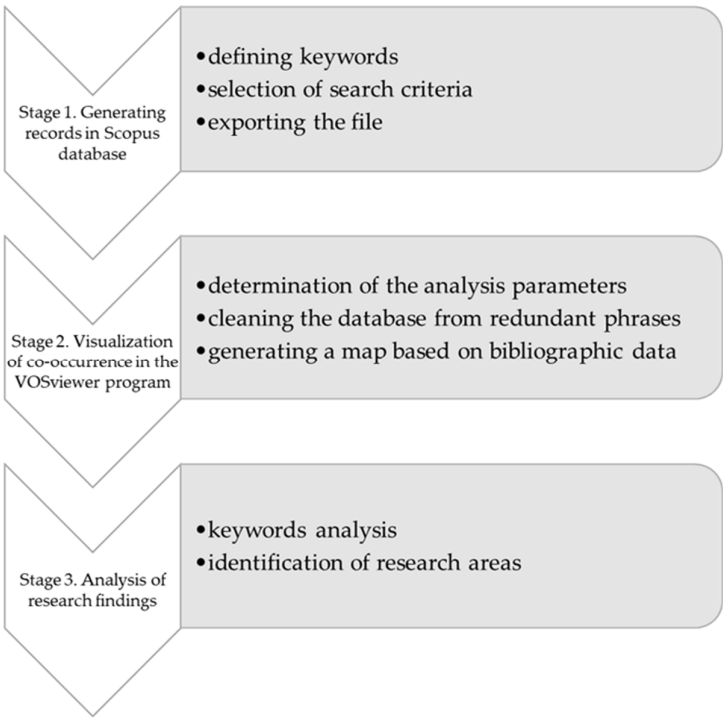

Figure 1: Stages of bibliometric analysis

In the course of the analysis the number of articles was reduced down to 429. The authors focused on such areas as: Business, Management and Accounting, Social Sciences, Economics, Econometrics and Finance, Decision Sciences, Psychology. A tool used in data ordering and presentation was VOSviewer programme. This software is particularly useful in working on extensive volume of data. It is a tool for creating and visualising bibliometric networks that use an advanced layout and clustering techniques in order to illustrate existing references between keywords characterising articles from scientific databases. The software draws attention to the frequency and co-existence of keywords that appear in the network (Gudanowska, 2017; Glińska, Siemieniako, 2018; Siderska, Jadda, 2018). In the second phase the authors determined such analysis parameters as a minimum number of keyword occurrences which equalled 5. As a result, the number of keywords to select from is 60. Cleaning the database from redundant phrases allowed for removing such repetitive words as names of countries and phrases that failed to be thematically coherent. This fostered the creation of a map of research trends on entrepreneurial attitudes (figure 2).

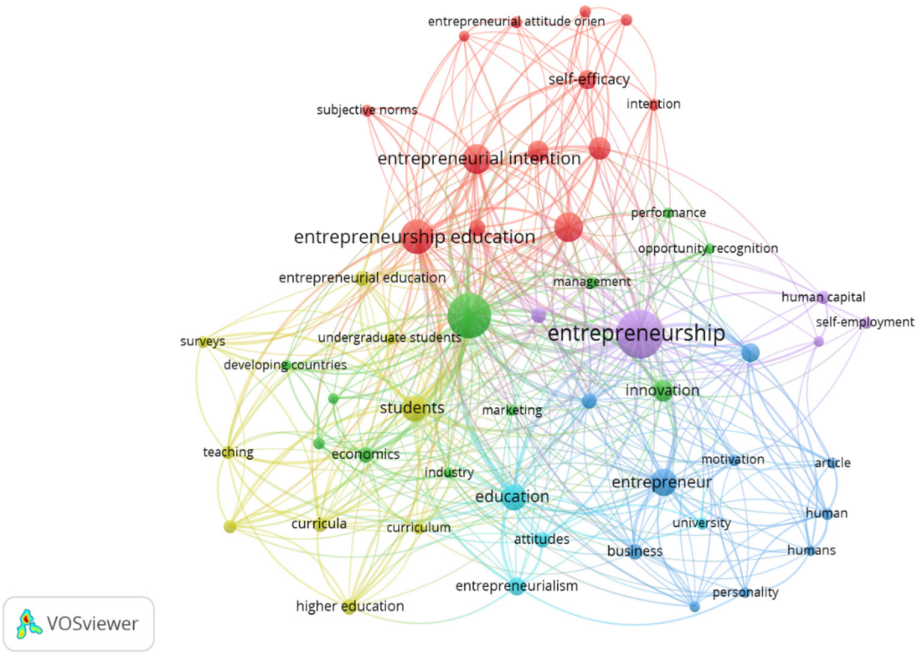

Figure 2: Map of research trends based on the co-occurrence of the authors' keywords in publications referring to entrepreneurial attitudes

(own study based on the VOSviewer software)

With regard to the areas of scientific research identified in Scopus database, it can be stated that entrepreneurial attitudes are associated with education, innovations, intentions, values, personality, industry, opportunities and development. There appear many interesting areas that deserve further exploration. The future direction of research might be broadening of bibliometric analysis through the use of other databases of scientific publications, such as Web of Science, Elsevier, Emerald or EBSCO.

Methodology of the Present Study

The study was conducted in 2018. It was executed with the use of the PAPI (Paper and Pen Personal Interview) method on a sample of 312 students: 112 from the Faculty of Management of Engineering of Bialystok University of Technology (constituting 36% of all respondents), 100 from the Faculty of

Economics and Management of the Yanka Kupala State University of Grodno in Belarus (32% of the sample) and 100 from the Faculty of Technical Management of the Poltava National Technical Yuriy Kondratyuk University in Ukraine (32% of all participants). Gender divisions within the group were as follows: the group of respondents from Poland was comprised of 61% women and 39% men, students from Belarus consisted of 59% women and 41% men, while the female / male percentage with regard to the group from Ukraine 62% and 38% respectively.

The following research problems were formulated:

- Are there differences (and if so, what are they) in the perception of the essence and conditionings of entrepreneurship of students from Poland, Belarus and Ukraine?
- What are the entrepreneurial plans and motivations of the participating students?
- How do the study's respondents perceive success factors and main obstacles to the development of entrepreneurship in their own countries?

A survey questionnaire prepared in the native languages of the participating students was a tool used to carry out the study. With regard to a gradual character of evaluation (5-point Likert scale) and a large number of groups, the analysis of the obtained results was based on the Kruskal-Wallis test. The U Mann-Whitney test was used for identifying groups with considerable differences.

Perception of Entrepreneurship by Polish, Belarussian and Ukrainian Students – Analysis of Study Results

The study was an attempt to discover the students' opinions regarding the conditionings of entrepreneurial attitudes with special focus on the role of innate and environmental factors in the shaping of entrepreneurial attitudes (see Table 1).

Table 1: Opinions of students with regard to personality and the environment as a determinant of entrepreneurship

Answer category	Answers submitted by Polish respondents	Answers submitted by Belarussian respondents	Answers submitted by Ukrainian respondents
No answer	13%	35%	14%
Entrepreneurship is equally dependent on innate and acquired characteristics	25%	15%	21%
Entrepreneurship is an attitude that can be learnt	61%	42%	66%
Entrepreneurship is a personality trait	1%	8%	0%

Nationality significantly differentiates the perception of the essence and conditionings of entrepreneurship of the participating students (see Table 1). There is greater similarity between Poles and Ukrainians and problems are seen differently by the citizens of Belarus. Belarussian students (35%) more often than those from the other two countries show a greater inclination to treat entrepreneurship as an innate personality trait. The difference in the assessment of entrepreneurship as an attitude which can be learned during one's education and at the university is also significant. The opinion that entrepreneurship is an attitude is supported by 25% of Polish, 21% of Ukrainian and only 15% of Belarussian respondents. It must also be emphasised that 8% of Belarussian students did not provide an answer to this question.

A critical assessment of being able to learn entrepreneurship skills expressed by students from Belarus correlates to their low opinion regarding their studies as an element of preparing them for the role of an entrepreneur (see Table 2).

Table 2: University's preparation of students for the role of an entrepreneur

Answer category	Answers submitted by Polish respondents	Answers submitted by Belarussian respondents	Answers submitted by Ukrainian respondents
Definitely yes	6%	5%	32%
Rather yes	54%	11%	30%
To an average degree	30%	43%	21%
Rather not	7%	19%	3%
Definitely not	0%	11%	14%
Difficult to judge	3%	11%	0%
Arithmetic mean	3.62	2.78	3.63
Standard deviation	0.5	0.9	1.3

The results of the Kruskal-Wallis test ($\chi 2 = 75.31$ df (3) < 0.01p) showed that in the evaluation of the university share in preparing students for the role of an entrepreneur there appear significant statistical discrepancies. These are differences between Ukrainians (M = 3.63; SD = 1.3) and Belarussians (M = 2.78; SD = 0.9), U = 267.5 $p < 0.01$, as well as Poles (M = 3.62; SD = 0.5) and Belarussians (M = 2.78; SD = 0.9), U = 258 $p< 0.01$.

Respondents from Poland and Ukraine positively assess their educational process with respect to preparing them to become businessmen. The difference involved greater determination of students from Ukraine, where 32% of them stated that the faculty chosen by them appropriately prepares them to become entrepreneurs, while only 6% of Polish participants were as certain. A positive answer to this question, although without the same degree of certainty, was also given by 54% of Polish students and 30% of Ukrainian respondents. Among Belarussian students, only 5% believed that the university appropriately shapes and develops their entrepreneurship skills, while another 11% evaluated this aspect as quite good. 30% of Polish, 21% of Ukrainian and as many as 43% of Belarussian students were satisfied with their education to an average degree. Lack of satisfaction was expressed by 7% of Polish, 3% of Ukrainian and as many as 30% of Belarussian students (with 11% marking a "very dissatisfied" option). Distinctive is the fact that a relatively large number of students from Ukraine and Belarus (14% and 11% respectively) - countries where the right to freely express one's opinions is limited - showed reluctance to assess their countries' educational system.

The result of an individual's education is arousing his/her motivation to undertake entrepreneurship measures, the emergence of entrepreneurial intentions as well as his/her perception of market opportunities, which determines the creation of a new enterprise in a form of sole proprietorship. Each country that wishes to develop dynamically must encourage its citizens to strengthen entrepreneurial attitudes as well as create proper conditions that allow them to behave in an entrepreneurial manner both in professional circumstances (expressed in an aptitude for establishing and conducting business activity) as well as a personal sphere. Expectations of some respondents are far from reality. Relevant statistical discrepancies may result from a diversified level of economic growth of a given country and the following system of education.

The shaping of a young person by the contents of specific subjects may lead to developing or limiting his/her aspirations. Educational processes should to a greater extent prepare young people to understand contemporary and future tendencies of civilizational development. In this scope one should create opportunities to arouse all the higher aspirations and constructing all the more ambitious plans for life that will allow for mastering skills of searching for their place in economic, social, cultural and political activity. Therefore, it became significant to explore whether the respondents perceive the

representatives of their nations as equipped with entrepreneurial skills. Their opinions are presented in Table 3.

Table 3: National traits and entrepreneurship

Answer category	Answers submitted by Polish respondents	Answers submitted by Belarussian respondents	Answers submitted by Ukrainian respondents
Definitely yes	13%	11%	12%
Rather yes	48%	15%	36%
To an average degree	39%	41%	47%
Rather not	0%	13%	3%
Definitely not	0%	10%	0%
I can't judge it	0%	10%	2%
Arithmetic mean	3.78	3.04	3.58
Standard deviation	0.7	1.1	0.8

The majority of participants ascertained that the representatives of their countries are average entrepreneurs. This opinion was expressed by 47% of Ukrainians, 41% of Belarussians and 39% of Poles. Most negative assessments regarding the entrepreneurship of their policy makers were provided by Belarussians (as high as 23% of which 10% were very negative). A significant difference also concerned the positive assessment of the entrepreneurship of citizens in a given country. Polish students were much more enthusiastic in relating national traits to entrepreneurship (48%) than respondents from Ukraine (36%) or Belarus (26%).

The assessment of the significance of national traits as entrepreneurship determinants is relevantly statistically different among the compared groups. This is confirmed by the results of the Kruskal-Wallis test ($\chi 2 = 58.09$ df (3) < 0.05p). These differences become visible when the comparison involves answers provided by students from Ukraine (M = 3.58; SD = 0.8) and Belarus (M = 3.04; SD = 1.1) U = 274 $p < 0.05$, as well as Polish (M = 3.78; SD = 0.7) and Belarussian students (M = 3.04; SD = 1.1), U = 246 $p < 0.05$.

One of the study's goals included the identification of traits and abilities which are associated with enterprising people by the representatives of nations participating in the research. Their freely given answers were mapped, which allowed for the identification of the most frequently used phrases (see Figures 3-5).

Figure 3: Characteristics of entrepreneurial people in the opinion of Polish students

Figure 4: Characteristics of entrepreneurial people in the opinion of students from Ukraine

Figure 5: Characteristics of entrepreneurial people in the opinion of students from Belarus

The respondents also defined the characteristics of entrepreneurial people. Students from Poland and Ukraine responded in a similar manner. They most often mentioned such features as ingenuity, courage, resourcefulness, consistency in achieving goals, charisma, intelligence, willingness to constantly improve, action, risk-taking, creativity, ease in establishing contacts. Students from Belarus claimed that the most important factor is resistance to stress and communicativeness. They also attached great importance to good organisation and business knowledge.

One of the key indications of entrepreneurship is the creation and management of a company. In terms of students this relates only to plans for developing their own business which in literature is defined as entrepreneurial intent (Fayolle and Gailly, 2013) or entrepreneurial intentions (Fellnhofer and Mueller, 2017).

Table 4: Entrepreneurial intentions of students participating in the study

Answer category	Answers submitted by Polish respondents	Answers submitted by Belarussian respondents	Answers submitted by Ukrainian respondents
Definitely yes	14%	7%	42%
Rather yes	36%	10%	30%
To an average degree	25%	25%	22%
Rather not	25%	31%	3%
Definitely not	0%	27%	0%
I can't judge it	0%	0%	3%
Arithmetic mean	3.62	2.78	3.63
Standard deviation	0.8	1.2	1.2

Study results (see Table 4) indicate that students from Belarus show the least interest in starting their own business (17% have such plans but only 7% declare them as definite). This results from numerous economic and political conditions. In Belarus a career at a state institution is considered to be the most valuable and research conducted by other authors (Kola-Bezka, 2015) shows a relatively low level of entrepreneurial climate within this country.

The analysis of the results with the uses of the Kruskal-Wallis test ($\chi 2 = 69.22$ df (3) < 0.001p) pointed to significant differences in the scope of students' entrepreneurial intentions. They appeared between Poles (M = 3.62; SD = 0.8) and Belarussians (M = 2.78; SD = 1.2), test U = 234 $p< 0.001$, as well as Poles (M= 3.62; SD = 0.8) and Ukrainians (M = 3.63; SD = 1.2), test U = 288.5 $p< 0.01$ and between Ukrainians (M = 3.63; SD = 1.2) and Belarussians (M = 2.78; SD = 1.2) test U = 246 $p< 0.001$.
The highest level of readiness to run their own business was declared by students from Ukraine (as many as 72% with 30% indicating strong intent). It also turned out that 3% of respondents from this country already run their own company. With respect to students from Poland, activity concerning running their own business in the future was declared by 50% of study participants, where 14.3% indicated a strong intent to do so. When asked about plans for their own business, similarly to students from Belarus, a significant share of respondents from Poland (25%) marked the "Not sure yet" response. One in four participating students from Poland as well as 58% of students from Belarus do not consider running their own business in the future.

The study concerned with entrepreneurial plans of students also involved the identification of the type of business being planned. The most popular types of businesses identified by Ukrainian students included: tourist services, farm tourism, food services, banking services, general sales, new or second-hand clothing sales, food and alcoholic beverages sales, a language school, a photography studio, a fitness club, a gym, a car wash, automotive services, furniture sales, cultivation of plants and herbs, a pharmacy, a widely understood field of commerce, radio and TV services, advertising and other (unspecified) services. Students from Poland associated their plans for future business activity mainly with services concerning: food, accounting, transport, construction and remodelling, security, computer, geodetic, senior (care). These were connected with organising events, cultural animation, culture-related workshops (music, dance, photo and film), training or translation. There were also ideas for opening a gym or a beauty salon, creating games, drawing portraits and producing logos. Students from Belarus declaring willingness to establish their own business mainly associated their plans with commerce (a store) or tourism (a travel office), food services, health and beauty services (hair, make-up or fashion) or computer services. They were also interested in running cleaning businesses and teaching foreign languages.

Students who were planning to open their own company were asked to define the conditions for the success of a business established by a young person in their country. Freely given answers to this question are categorised and presented in Table 5.

Table 5: Factors conditioning the success of an enterprise in the perception of students taking part in the study

Answer category	Answers submitted by Polish respondents	Answers submitted by Belarussian respondents	Answers submitted by Ukrainian respondents
Competencies of a young entrepreneur (knowledge and skills of the person establishing the business, personality traits such as passion, creativity, the ability to think rationally)	51.5%	64.7%	56.9%
Access to sources of financing	53.9%	58.8%	52.8%
The ability to see the market demand of a given product	37.9%	23.5%	20.8%
Assistance of family	16.7%	58.8%	26.4%
Economic and political situation of the country of residence	10.6%	47%	43.1%
Knowing influential people	7.6%	35.3%	30.5%
Assistance of the state	9.1%	17.6%	12.5%
Access to qualified employees	18.2%	5.8%	8.3%
Luck	5.5%	5.8%	6.9%

The majority of students participating in the study (over 50% regardless of the sub-group or nationality) who declared the intent to establish and run their own business point to the abilities of an entrepreneur as a key factor, with these competencies being understood by them as knowledge, skills and individual entrepreneurial predispositions. The participants also stress the importance of having access to sources of business financing. The nationality of the participating students is a variable which significantly impacts their perception of nearly all other factors conditioning the success of a business. Students from Poland mainly stress the ability to see and occupy a market niche as well as access to employees with the right professional qualifications. They rely on the assistance of state institutions, their families or influential backers to a significantly lower degree than students from Ukraine or Belarus. They also connect their potential success with the economic and political situation of their country to the smallest degree (10.6%), a factor which is strongly stressed by respondents from Belarus (47%) and Ukraine (43.1%). In comparison with their counterparts from Poland and Ukraine, students from Belarus strongly condition their business success on the help of their family (58/8%) and the state (17.6%). A quality which characterises both Ukrainians and Belarussians is their strong conviction (exceeding 30% in both of these groups) that knowing the right people is a determining factor in the success of a business.

Students declaring entrepreneurial intentions were also asked to identify potential barriers which could hinder the execution of their plans. Their answers are presented in Table 6.

Table 6: Barriers to the establishment and development of a business in the perception of students taking part in the study

Answer category	Answers submitted by Polish respondents	Answers submitted by Belarussian respondents	Answers submitted by Ukrainian respondents
Lack of initial capital	62.1%	58.8%	52.8%
Lack of entrepreneurial competencies (knowledge and skills as well as entrepreneurial predispositions)	45.4%	52.9%	50.0%
Lack of experience in running a company	28.8%	35.3%	40.3%
Unstable political situation	6.1%	70.6%	81.9%
Corruption	3.0%	18.2%	33.3%
Low earnings of potential customers	3.0%	76.5%	52.8%
High competition	33.3%	29.4%	33.3%
Bureaucracy related to opening a business	15.1%	52.9%	34.7%
Lack of necessary connections and influential backers	16.7%	47.0%	41.7%
Lack of state support for small and medium businesses	6.1%	52.9%	52.8%
Lack of equality in respect to opportunities available to men and women	0%	5.9%	2.8%

It was possible to identify universal barriers to the development of entrepreneurship seen by students from all participating countries. These include: lack of initial capital, lack of entrepreneurial competencies and lack of experience in running a company as well as a high level of competition. There were also significant differences in the opinions of respondents regarding potential barriers which could be encountered by beginning entrepreneurs of the subject countries with the level of development of the market economy as well as the political situation within the country where they live rather than their national affiliation being the differentiating variable. This means that there are significant similarities in the diagnoses of some barriers to entrepreneurship provided by students from Belarus and Ukraine. A vast majority of respondents from these two countries (Belarus – 70.6%, Ukraine – 81.9%) pointed to the instability of the political situation in their countries and its negative consequences to the development of business there.

More than half of respondents from Belarus and Ukraine also drew attention to the lack of state support for the small and medium business sector which is further complicated by extensive bureaucracy connected to establishing a company (Belarus 0 52.9%, Ukraine – 34.7%) and corruption (Belarus – 18.2%, Ukraine – 33.3%). Once again students from countries which were formerly republics of the Soviet Union stressed the importance of knowing the right people, the lack of which is treated as a significant barrier to the execution of their business plans. This confirms the fact that an active policy of state intervention into business is a problem in both Ukraine as well as Belarus. In literature this phenomenon has been dubbed "political entrepreneurship" (Chukhray, 2013). It occurs when entrepreneurs supported by the ruling party are given preferential treatment. Another problem is relative poverty of the society which translates into a potential lack of product demand. This barrier is expressed by as many as 76.5% of Belarussians and 52.8% of Ukrainians who declared their intent to start a business.

Summary

Studies involving students from Ukraine, Belarus and Poland have shown that nationality is a variable which significantly differentiates the understanding of the essence and conditionings of entrepreneurship as well as impacts entrepreneurial plans of young people. Belarussians connect entrepreneurship with a figure of an entrepreneur to the greatest extent and treat it mainly as a personality trait. They are sceptical towards the ability to learn "to be enterprising" and among the nationalities under study have the most critical attitude toward their system of education with regard to preparing students for the role of an entrepreneur. They assess the entrepreneurship of their compatriots much lower than Poles or Ukrainians and least often declare their own entrepreneurial intentions. Ukrainians most positively assess their education as an element of preparing them for the role of an entrepreneur and most often declare their readiness to establish their own business.

One thing which is common in the perception of entrepreneurship of all students participating in the study is a set of personality traits of an entrepreneur. Additionally, most students who declare having business plans (over 50% in all sub-groups regardless of nationality) name the competencies of an entrepreneur, them being knowledge, skills and psychological predispositions as well as access to sources of financing a business as key factors of success.

The analysis of the study's results also allows for the formulation of the conclusion that the greater the level of market economy development, the greater the focus of respondents on elements independent of a political situation. Ukrainians and Belarussians much more frequently than Poles connect the likelihood of their success with the socio-political situation within their country. Students from countries which are former Soviet Union republics point to the need of knowing the right people as one of the main factors affecting the success of a business. They also, much more often than students from Poland, consider corruption and extensive bureaucracy as well as lack of state support for the small and medium business sector to be real barriers to the development of entrepreneurship.

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"Employer Branding - Effective Building of The Employer Brand"

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Abstract

It is possible to successfully build a company's image as an attractive employer by implementing in the organisation coherent employer branding activities that are based on a common strategy. The aim of the paper is to present the subject of employer branding as a necessary tool for building a credible employer brand so the organisation can become more competitive in the dynamically developing labour market.

Keywords: Employer Branding, Corporate Image, Labour Market, Generations

Introduction

The aim of this paper is to present the essence of the concept of employer branding.

The paper will draw upon available sources that investigate the subject of successfully building an employer image in the labour market. By carefully analysing the available sources and studies, the subject will be presented in a thorough and reliable way. All the publications used in this paper are listed in the reference list.

The paper consists of three parts.

The first part introduces to and defines the concept of employer branding.

The second part is concerned with the needs and expectations of the generations that are currently present in the labour market. They include Baby Boomers, Generation X, Generation Y, and the youngest generation that is currently entering the labour market - Generation Z. With the dynamic technological development and changes occurring in the present labour markets, organisations become more interested in creating a credible corporate image.

The third part focuses on the division of employer branding into activities undertaken either within or outside of an organisation. These activities enhance the employer image and portray the organisation as a good place to work, in which employees can develop and their needs are listened to. The aim of such activities is to retain talented employees in the organisation.

The labour market has never been more challenging for employers. The ability to attract candidates' attention is becoming a key competitive advantage and a serious task for the marketing, human resource and communication areas. It is particularly important for organisations to increase their awareness and react quickly to the changing environment by implementing effective employer branding activities.

Defining Employer Branding

The idea of creating a desirable corporate image is not new. Nor was it born overnight. Employers had been building the image of their organisations as focused on highly qualified employees who would allow them to create their competitive advantage long before the term e*mployer branding* was introduced. Although the term is relatively new, the literature indicates at least several dates when it

originated. The forerunners of employer branding (EB) are thought to be Simon Barrow and Tim Ambler, who published the paper entitled "The Employer Brand" in 1996 (Ambler and Barrow,1996). The term is also credited to the company McKinsey and dated to 2001 (Filpkiewicz,2008). In his book, Kozłowski (2016) defines EB as "all the activities undertaken by a company and directed at its current and potential employees that are designed to build its image as an attractive employer and support its strategic business goals. Oleksyn (2017) notes that EB is building the image of an employer and organisation for which people want to work. In the book entitled Effective recruitment which is collective work, published by INFOR PL SA, 2019, the term is defined as "the activities undertaken by a company that seeks to be perceived as an attractive employer by its current and potential employees." Thus, the main aim of employer branding efforts is not to create a well-known brand, but an engaging brand. This is a brand "with which current and potential employees can identify, seeing in it an attractive environment for career development. It is also a brand that can respond to their expectations and aspirations." (Collective work, INFOR PL SA, 2019,p 34). Table 1 presents selected definitions of the employer branding concept.

Table 1: Selected definitions of the employer branding concept according own work based on: Lloyd (2002); Sullivan (http://www.ere.net/2004/02/23/the-8-elements-of-a successful-employment-brand(08.10.2010)); Backhaus, Tikoo (2004); Mayo (2001); Dell, Ainspan (2001); Minchington (2006); Rosethorn (2009)

Author	Date of creation	Employer branding is:
S. Lloyd	2002	Any communication activities that an organisation undertakes in the internal and external labour market to be perceived as a desirable workplace.
J. Sullivan	2004	Targeted, long-term strategy to manage the awareness and perceptions of employees, potential employees and other stakeholders.
K.Backhaus, S. Tikoo	2004	The process of building a recognisable and unique identity of an organisation as an employer which differentiates the company from its competitors.
A.Mayo	2001	All that is communicated (whether consciously or not) to all the current or potential employees.
D.Dell, N. Ainspan	2001	Defines the identity of a company as an employer.
B.Minchington	2006	The image of an organisation as a great workplace. This image is created by current employees and key external stakeholders.
H.Rosethorn	2009	A two-way deal between an organisation and its members; the reason the people choose to become members of an organisation and stay in it.

The employer branding term is increasingly used in the media today. In the Polish market, there is growing interest among organisations in building a good corporate image. However, in order to understand the popularity of this concept, it is necessary to look closely at the dynamically developing business environment as well as the needs and expectations of the generations currently present in the labour market. They include Baby Boomers, Generation X, Generation Y, and the youngest generation that is just entering the labour market - Generation Z. Thus, the increasing interest in the employer brand is simply an organisation's response to the changes that are currently occurring in the labour market. For an organisation to be effective, it needs to unite its employees representing different generations. Those employees differ in many ways, with the most important differences in professional experience and age. Employing people at different ages and with different experience is necessary for an organisation to achieve above average results. Every generation has different attitude to work and different expectations. As Kozłowski (2016) notes, the task of employer branding is thus to understand the needs, way of thinking and changes in society, which

sometimes occur over decades and sometimes over a few years. Such activities will enable effective communication and efficient actions aimed at building a company's image.

Characteristics of the Generations in the Labour Market

Baby boomers (BB)

Baby boomers (BB) - a group of people born between 1944 and 1964.Szymczyk(2018) notes that it is a generation with the biggest experience in the labour market. Such persons were born after World War II during the baby boom. In 2020, the eldest representatives of this group will reach the age of 74, while the youngest ones - 54. With experience gathered over a long period of time, they have become authority figures to the young generations. The most important thing for the representatives of BB is the sense of stability. People from this generation fear job loss, therefore they often work without complaining, even if the atmosphere at the company does not meet their expectations. Work is important to them. It makes them feel needed. They are committed, hard working and loyal towards the employer (Szymczyk, 2018). According to Kozłowski (2016), work is at the centre of this generation's value system, whereas other important elements of life such as family or friends are given less priority. This generation is motivated by finances and the fear of job loss.

Generation X

Generation X – is a group of people born during a period of demographic peak between 1965 and 1979. In Poland, it is accepted that these are people born in the period of the Polish People's Republic. In 2020, the eldest members of this group will reach the age of 55, while the youngest ones - 41. They are strongly represented in the current labour market. Szymczyk (2018) notes that Generation X members, especially those growing up in Poland, were brought up in a period of huge economic transformations which saw strikes, food shortages in shops, a change of the political system, overthrow of communism and the collapse of the USSR. This generation was characterised by uncertainty of future. That’s why it is referred to as X, which signifies an unknown. Typical of the representatives of this group is struggle and difficulty to find a job, find one's place in the new reality and fear of loneliness as well as questions about the sense of existence (Coupland,1998). For Generation X, stabilisation and security is important. Its members are loyal and show respect to their superiors. They are satisfied with non-financial benefits offered by their organisations, but the main incentive is money.

Generation Y

Generation Y – is a group of people born between 1980 and 1994. In 2020, the eldest representatives of this group will reach the age of 40, while the youngest ones - 26. It is a generation that entered adulthood at the turn of the century. Therefore another name for it is Millennium Generation, and its representatives are referred to as Millennials. In the English-language literature, for instance, generation Y members are characterised as rulers of the Internet and personal computers. They are also called: Generation WWW, Digital Generation, Nintendo Generation (Maddux and Johmson,2006,p176). Kozłowski (2016) notes that "it is the first generation whose representatives are similar across most countries. The reason for this similarity is wide access to the Internet and highly advanced communication network that allowed them to exchange their ideas and thoughts about the world in which they would like to live. Representatives of this generation are task-oriented. They like work that is challenging. They are mobile and ready to compete in the labour market. They are able to move from company to company, from city to city, or from country to country. Generation Y representatives are also less loyal to their employers than their older colleagues (Świątek-Barylska, 2008,p 553). They like working, but they are called whY not without a reason. Representatives of this generation engage in work only if they know why they do it. It is a very well-educated generation. Student exchange programmes enabled them to study abroad, and knowledge of foreign languages allowed them to work in the international arena. Most important for this generation is personal development. They value their time and don't like being bored. Work as a value in life does not

occupy the highest position in their hierarchy of values and is placed below social life (Chester,2006,p 44-45). Generation Y representatives do not live to work, but they work to live (Petroulas and Brown,2010,p 228). Changing a job is not a problem for them. Apart from challenges at work, they are also motivated by a good atmosphere at workplace. They appreciate work that offers them places where they can enjoy rest and entertainment during breaks. They use social media. It is a generation that expects constant praises, preferably public, and continuous feedback. Generation Y is usually ambitious, resourceful, objective- and teamwork-oriented, ethical and able to multitask. All these characteristics are desirable from the perspective of an employer (Remisiewicz,2008 ,no 5)

Generation Z

Generation Z - is a group of people born between 1995 and 2015. In 2020, the eldest representatives of this group will reach the age of 25, while the youngest ones - 5. It is a generation that is gradually entering the labour market. According to Kozłowski (2016), it is a generation for which staying in touch with friends was much easier thanks to access to the Internet via a range of modern devices such as notebooks, smartphones or iPads. This generation is also termed Digital Natives, as it was growing up in times of rapid technological advance (Schmidt and Hawkins,2008). Growing up in an environment dominated by technology, members of this generation developed multitasking and became focused on constant interaction. They watch TV while writing SMSs, are online and socialise on social media while talking to their friends in the real world at the same time. Generation Z wants to work in a place that will offer interesting tasks and continuous development. Unless an employer makes sure that a Generation Z employee can learn new things and move forward, it will be difficult to make him/her stay in one company (Szymczyk,2018). This generation is focused on challenges and continuous interaction. It is also important for Generation Z members to receive feedback. However, their lack of patience poses a huge challenge to today's enterprises. It is estimated that in 2020 this generation will make up one third of the workforce.

Table 2 presents a short description of the generations present in today's labour market.

Table 2: Characteristics of the generations that are present in today's labour market according own work

GENERATION	**BABY BOOMERS** - (generation of a double demographic peak)	**GENERATION X** - (dedicated to work)	**GENERATION Y** - (brought up in the affluence)	**GENERATION Z** - (generation of the virtual world)
BORN IN	1944	1965	1980	1995
	1964	1979	1994	2015
TECHNOLOGICAL PRODUCT	TV set	personal computer	Tablet	Smartphone
MEANS OF COMMUNICATION	Phone	e-mail/SMS	e-mail/SMS/social media	hand-held communication devices/social media
SHORT DESCRIPTION	stabilisation at work, loyalty	stabilisation, security, loyalty	task-orientation, work has to be a challenge,	generation focused on challenges, continuous

	towards the employer, an authority figure to young generations	towards the employer	well-educated, expecting feedback, mobile - changing a job is not a problem to them	interaction, multi-functional, expecting feedback, with little patience, flexible, mobile, changing a job is not a problem to them
MOTIVATION AT WORK	money/fear of losing a job	money/non-financial benefits	challenges/good atmosphere at workplace/praise	challenges/good atmosphere at workplace/praise

Division of Employer Branding

Employer branding is a result of the evolution of organisational and management studies. This concept draws upon findings in at least two disciplines: human resource management and marketing. The centre of interest of modern human resources management and marketing is a human being or, more precisely, all the stakeholders of an organisation. Human resource management and marketing are both oriented towards shaping long-term relations with the internal and external stakeholder. (Wojtaszczyk,2012). The main aim of employer branding is to build a coherent and positive image of a company as an employer in the minds of the company's employees, key candidates in the labour market as well as business partners and customers. Thus, employer branding efforts can be divided into two types depending on which group they are directed at: internal employer branding and external employer branding.

Internal Employer Branding

Internal employer branding is directed at an organisation's current employees. Its target group encompasses all those to whom the organisation is the employer (Wojtaszczyk, 2012). The main task of internal employer branding is to create a friendly atmosphere at workplace and to provide the company's employees with the possibility of development. Moreover, such activities are designed to integrate, engage and motivate employees in order to make them reluctant to leave the company (Collective work, INFOR PL SA ,2019,p 35). Motivating employees is crucial. Committed and motivated employees become the company's ambassadors. According to Kozłowski (2016), a loss of an employee costs the company an equivalent of his/her 12 to 24 salaries, if we take into account the period when the employee already lost his/her willingness to work, his/her payoff, the cost of onboarding of a new employee and, above all, negative opinions about the employer that could have appeared in the labour market. Employees' job satisfaction and positive opinions may increase the interest in the employer among potential candidates (Collective work, INFOR PL SA ,2019). A company's image is determined by how the employees perceive the company as the employer (Mosley, 2014,p.9).

A company needs to focus not only on its existing employees but also new hires. One of the activities that allow it to do so is onboarding. It is a practice of offering new hires a cycle of training courses and support at the start of their career in an organisation. An employee is under the care of a person who has been working in the company for a while and knows the corporate culture as well as its rules and atmosphere. Such induction of an employee into the organisation will reduce his/her stress and give him/her an opportunity to learn about the company and its principles and values (Kozłowski,2016). A large number of the leading employers understand that they will benefit more from onboarding an employee in a systematic way than from organising one-day, long and tedious training to quickly induct an employee into the organisation (Richard Mosley, 2014,p.250).

Internal employer branding efforts also include a recruitment process, healthcare, benefits offered by a company, organisation of team-building trips, publication of corporate magazines, brochures,

bulletins, newsletters and investment in human capital, e.g. by providing internal and external training courses.

The human capital of a given organisation is a key element of its competitiveness. Employees should be able to express their opinions. Thus, a company should take efforts to be perceived as an organisation to which not merely profits, but an individual, i.e. the employee, matters. It should introduce employee satisfaction surveys. By doing so, it will portray itself as a democratic and modern employer (Kozłowski,2016,p.54). One of the tasks of the people responsible for employer branding is to build an organisation's image as one that listens to its employees. Giving time and attention to employees leads to improvement in their engagement and performance. Engagement, in turn, is related to productivity and satisfaction level (Kozłowski,2016,p.64). An important part in the internal processes of employer branding in a company is also played by managers. They should regularly inform employees about the issues connected with the company. A good manager knows his/her team members and knows how to motivate them. He/she is a link that coordinates and co-creates activities; a key element in creating the image among new hires (Schwan and Seipel,1995). A good communication with the manager has a significant impact on employees' motivation.

External Employer Branding

External employer branding is directed at a company's potential employees. The main aim is to build the company's image as an attractive and credible employer, and to attract and retain talented employees in the organisation. A positive corporate image, strong brand and good reputation attract the best candidates-talents. Such employees determine a company's competitiveness in the market (Collective work,INFOR PL SA ,2019). External employer branding efforts can be divided into two categories: image- and recruitment-related. Image-related efforts are those that raise the awareness of the employer brand and inform the market about the benefits of working for it (Kozłowski,2016). They include, among other things, participation in job fairs, active promotion of the company at universities and active participation in social networking sites, e.g. on Facebook.

Recruitment-related efforts are designed to reach selected candidates, and their aim is to cause a candidate to apply for a job. They include, among other things, active promotion of the company in services for posting job ads and making sure that a job ad is effective and suited to the target group.

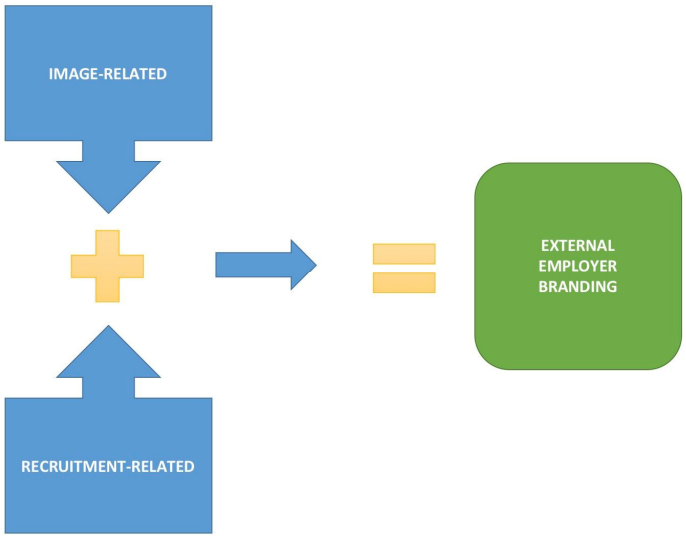

Figure 1: Division of external employer branding according own work

Conclusions

Nowadays, in the labour market there is growing interest in the subject of employer branding. This interest in building an image of a desirable, credible and attractive employer is not just a fad. Rather, it is an organisation's response to the changes that occur in the present labour market and are unavoidable. Of huge importance is here evaluation of a company's environment and fast reaction to the needs and expectations of different generations. The most represented generations are: Baby Boomers, Generation X, Generation Y, and the youngest generation that is currently entering the labour force - Generation Z. Any employer branding efforts also have to respond to continuously developing technology and the opportunities it creates.

Employer branding is vital and should play an important part in employers' activities. A robust and established image, friendly atmosphere at workplace as well as the possibilities of employee development will enable the achievement of the main aim, which is to attract talented employees to the organisation and retain them in it, and thereby enhance the company's competitiveness in the market.

As at the centre of interest of modern human resource management and marketing is a human being, an organisation that engages in employer branding activities should allow its employees to express their opinions. It should cultivate corporate image as an organisation to which not merely profits but an individual, i.e. the employee, matters. It is also important to bear in mind that building a company's image as an attractive employer is not a one-off project or activity with a specified time frame. It is a continuous and to a large extent a long-term process.

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Training Professional Competence of Physical Culture and Sports Managers

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Abstract

An important requirement for the development of professional competence of managers in the field of physical culture and sports is, first of all, the pedagogical principles of its formation. The analysed scientific researches in the field of physical culture and sports reveal and substantiate the generalization, specifics and certain subjectivism of each author, reflecting his/her philosophical position regarding the principles of forming the professional competence. The analysis of scientific papers made it possible to distinguish the following groups of principles: basic, regulating the adaptive process of managers study in higher educational institutions; key principles that facilitate the adaptation of these students to interpersonal, interactive, technology training in the context of personality-oriented adaptive learning; the principle of the determining role of self-adaptation; the principle of spiritual comfort in the conditions of open interaction among subjects of the educational process and general didactic principles, which regulate the educational process of an educational institution with the purpose to master disciplinary, interdisciplinary and general knowledge, skills and determine the abilities of professional managers in the field of sports to apply them in practice. It has been established that any of these principles becomes meaningful only in relation with others. A consistent and integral interaction of these principles at each stage of the learning process of future managers in the field of sports will guarantee the acquisition of professional competence, taking into account the needs of the labor market.

Keywords: Principles, Physical Culture, Sport, Manager, Professional Competence.

UDC: 005.336.2:796.075

JEL Classification: J24, M53

Introduction

The principles of professional training of managers of physical culture and sports is not a random set of wording, but a reflection of holistic functioning principles that influence the formation of professional competence of these specialists. The modern theory and practice of training managers in the field of sport is based on methodological, general pedagogical, didactic and psychological principles, depending on the directions, goals and tasks of their further activities. The set of principles, on which the professional competence of these specialists should be based, can be considered as a system. Taken together pedagogical principles should be seen as a methodological component in the process of training managers of physical culture and sports.

Various aspects of managers training for physical culture and sports field in the countries with highly developed market economies have been reflected in the researches of such scientists as M. Mamford (2006), D. Data (2006), Fr. Jacobs (2013), L. Ferkins (2012), M. Hughes, I. Franks. (2008), J. Maxcy (2013), Marcy R. Maurer, Pat J. Jordan (2006), Ebrahim Hasan Al Khajeh (2018), A. Munir, Nur Eli Shafira Fairuz and all (2018).

A number of problems related to the study of management theory, methodology, practice and development, in market conditions, were reflected in multiply scholars publications (Batishev, 1997; Kan'kovsky, 2015; Svatyev, 2011; Sushchenko, 2003; Maslov, 2007; Karpyuk, 2010; Yagupov,

2003, Protsenko U., 2016 and others). However, in our opinion, there is not yet a single approach to understanding the essence of pedagogical principles in the formation of professional competence of future managers, taking into account the specifics of the field of physical culture and sports. The current state of human resourcing in the field of physical culture and sports requires adoption of measures of regulatory, organizational and socio-economic nature, aimed at achieving structural changes, internal balance and optimization both in the this sphere as a whole and in its individual subsystems (O. Mozolev, 2019).

It should be also noted that in many countries, the models of the physical education and sports manager's professional competence development are interrelated and interdependent. Their most important points are as follow:

-university (academic) training of sports managers implies a combination of fundamental theoretical education and professional practice at different stages of studies;
-sports managers training is carried out with the priority of special humanities disciplines over the natural sciences ones;
- multilevel training of managers in physical culture and sports implies the presence of basic and specialized stages, the content of which differ methodologically and methodologically;
-basic training includes mastering the entire range of disciplines that are directly related to future professional activity, including the disciplines of organizational, managerial and economic;
- specialized training is free of auxiliary disciplines (not directly related to future professional activity) studies
-university (academic) training of sports managers implies a combination of fundamental theoretical education and professional practice at different stages of studies.

Purpose of the Research

To analyse scientists views and approaches regarding the understanding of pedagogical principles and to identify those that will contribute to the professional competence of future managers in the field of physical culture and sports.

Materials and Methods

To achieve this goal, theoretical methods of scientific research were used. With the help of empirical method, the analysis of theoretical positions regarding pedagogical principles in the field of physical culture and sports was conducted. Using content analysis, we managed to establish the semantic content of pedagogical principles with regards to the formation of professional competence of future specialists. Applying the logical method we found out that pedagogical principles can be classified into three groups: basic principles that regulate the adaptive learning process in higher educational establishments; key principles which facilitate adaptation of these students to interpersonal, interactive technologies of professional training; general-pedagogical principles that govern the educational process in sports educational institutions and form the ability to apply them in practice by sports managers.

Results

The acute necessity of sports management is determined by the peculiarities of the industry, for example, there is a need for a simultaneous solution of sports, financial, psychological issues during the sports process organisation, as well as the direct participation of subjects and objects in the sports industry. Sports management is a purposeful formation of relations between managers, subjects and objects of sports industry, using principles and methods of managerial nature, aimed at ensuring the organisational process to provide physical education and sports services. (N. Pavlenchyk, 2017). Management as a managerial activity is focused on improving economic relations on the basis of coordination, directing the employees, uses a system of tools and methods of economic, normative, regulatory and stimulating character.

The main task of sportsmen, judges, officials, physical educators is to carry out their professional activities according to high standards and the managers must administer and assist them, combining their actions with professional situation into single harmonious unit, using different methods and means. The complexity of solving this task is caused by the peculiarities of management in sport, connected with the flexibility and diversity of physical education forms, sports, physical training and physical recreation.

The scientific literature presents various variants of principles formulation, and their number is different. For some scholars, the main source of justification of pedagogical principles is the experience, and for others - either the theory of knowledge, or the patterns of learning. For instance, V. Maslov (2007) characterizes the definition of principles as a component of a holistic theory of competence-oriented management of professional training in higher educational institution, which provides the relationship between the theory and practice of managing the professional training of these specialists through the submission of requirements and rules for their adequate implementation. The system of principles outlined by the author reflects their basic properties, reveals the factors influencing the formation of professional competence of future high school students. Having analysed the formation process of the professional competence of future specialists were specifies the principles that ensure the balance in the development of modern education system, when the controllability of the system depends on the quality of an informational connection between its sources and the addressees in dialogical unity. The essence of such a process is to ensure optimal communication between the pedagogical leadership and future specialists S. Kryshtanovych (2017).

The classification of principles, presented E. Yakovlev (2002) in a study devoted to the quality management of education at a higher educational institution, deserves separate attention. According to the author, each of the identified approaches to the formation of the professional competence must comply with a set of principles. He distinguishes three subsystems for defining principles in accordance with systemic, synergistic and qualitative approaches. The first subsystem reflects a systematic approach and contains principles of integrity, purposefulness, stability, manageability. The second subsystem displays a synergistic approach and includes the principles of control parameters, self-organization, irreversibility, informational character and forward-looking response to information. The third subsystem reflects the qualimetric approach and includes the principles of informativity, optimality, accuracy, productivity, uniformity, accessibility.

Among the main pedagogical principles of forming the professional competence of future specialists defines humanization, differentiation, integration. Their realization is aimed at the formation of a creative person after completing the learning process. This process should create the most favourable conditions for the development of student abilities.

Among all pedagogical principles of forming the professional competence of future specialists, can be distinguishes the principle of modeling of professional activity in the educational process. Under activity simulation in the learning process he understands the identification of typical tasks, the choice of organizational forms of the educational process and teaching methods. With the help of this principle, you can get predictable information to substantiate the main goals, means and methods of teaching, to develop professionally-qualified characteristics of future specialists, curricula, programs and textbooks.

By justifying the principle of determinism in the educational process, Z. Razumovsky (2013), suggests multilevelness, multiprofile, multi-functionality in the work with future specialists. This principle, in his opinion, will further liberalize the process of maximum individualization of each person, increasing his/her opportunities for self-determination and self-realization.
The researchers pay close attention to the principle of determinism (Karpyuk, 2010). By defining the essence of this principle, the factors, that will promote the development of new models of educational process and improve the students training, are formed. The philosophical categories like "cause" and "consequences" are fundamental in implementing the principle of determinism.

The researchers suggest including the following principles of professional training that will form the competence of future professionals: scientific knowledge; humanization; vocational training; regularity and consistency; connection of theory with practice; differentiated learning; optimization; apparency (Zhyhir & Chernega, 2012).

The researcher I. Vasiliev (2005) offers to divide all formational principles of professional competence in the process of vocational training into two groups: general-didactic and specific. He refers to the following principles as general-didactic: scientific knowledge; regularity and consistency; connection of theory with practice; consciousness and creative activity; accessibility and appearance; taking into account individual peculiarities; development of thinking; strength of knowledge, skills and abilities acquisition. The group of specific principles includes the following notions: professional orientation of general education disciplines; technological sequence of teaching material; mobility and modularity of professional training; modeling of professional activity in the educational process. Applying these principles involves the use of psychological and educational achievements and experience, which is characterized by the objective character of the professional competence of a specialist. The realization of these principles makes it possible for students to develop new skills.

An application of scientific knowledge principle involves the study of scientific provisions and the use of methods, close to a certain branch science. It helps to reveal causal relationships of phenomena, events and processes; to demonstrate the achievements of science and human knowledge, to familiarize with the methods of knowledge; to penetrate the essence of events and phenomena; to focus on interdisciplinary scientific connections; to reveal the history of the science development, the struggle of contradictions. Therefore, the knowledge, facts, regulations and laws used in the learning process should be scientifically correct.

The principle of concreteness is based on deduction, induction, integration, syncretization methods. The principle of concreteness reflects the interrelation of all aspects of the professional training of future professionals and the formation of their professional competence; the selection of certain principles of the educational process, in particular, students level of professional training, the definition and implementation of special psychological and pedagogical conditions.

The principle of historicism allows us to move from the empirical description of the facts to their theoretical generalization and to reveal the evolution of scientific representations and views on the content and the essential characteristics of professional competence of future specialists.

The principle of integrity is a regular feature of teaching in higher education establishments. For example, the unified presentation of teaching material and its assimilation in the learning process is a characteristic of integrity. Finally, a combination of educational, developmental and educational functions is considered for a specific professional practice. Therefore, the principle of integrity should be regarded as the achievement of unity and interdependence of all components in the educational process.

The principle of integration is actively used in the educational process to establish links between certain disciplines and their assimilation. After all, interdisciplinary connections accelerate the assimilation, deepening, systematization and consolidation of knowledge. New integrated programs are developed, through which it is possible to combine different subjects and guarantee the versatile development of students. The training of a future specialist is guaranteed by a complex system, based on generally accepted principles, namely:

- ✓ integration (planning of a continuous training process);
- ✓ continuity of education (combining basic and further preparation for professional activity into a coherent process, which will contribute to the formation of motivation and improvement of skills and abilities);

- ✓ fundamentalization (the thoroughness and scale of subjects, which will promote the professional mobility of a specialist and extend his professional competence);
- ✓ humanization (not focusing on the means of vocational training, but on a subject of professional training - a student);
- ✓ taking into account personal goals of students (the application of effective forms and methods of learning, where knowledge is obtained through finding our the truth, expressing and discussing thoughts and views, critical attitude of the student to himself);
- ✓ independence (self-regulation of students in obtaining the profession).

Having analysed educational programs and teaching methods, our scientists (Kan'kovsky, 2015; Polyakova, 2010; Svatyev, 2011; Sushchenko, 2003) distinguish the following principles of formation of professional competence in preparing future professionals:

- the principle of combining training and practice, which enables future professionals to take an active part in professional activities;
- the principle of practice-oriented assessment, where student's activity is evaluated in real actions and projects;
- the principle of adapting the training process and curricula to the conditions and needs of the country, region, city;
- the principle of optimal use of educational institution's potential.

In practice identified such principles of learning: apparency; systematicity; consciousness; availability; sequence; the strength of the acquired knowledge; graduality; timeliness; organicity; stability of knowledge acquisition; constancy; independence; correctness; lack of excessive tension and excessive ease; consciousness and learning activity; strength of knowledge and skills; sequence; apparency. All of these principles are crucial in the process of forming the professional competence of future sports managers.

The pedagogical principles discussed above are, to some extent, realized in the process of preparing future managers of physical culture and sports. However, in our opinion, the decisive role is played by those pedagogical principles that directly determine the formation peculiarities of their professional competence.

Let us discuss in more detail the formation principles of professional competence of future managers of physical culture and sports. To distinguish these principles, we should consider them as fundamental, theoretically substantiated and practically verified, that have a real objective nature, and show steady trends and patterns in the educational process. In particular, the principle of objectivity is of utmost importance in principles hierarchy of forming professional competence of future managers of physical culture and sports. It is expressed in the consideration of the factors that determine the requirements for their formation of professional competence and development; an adequacy of research approaches and means.

In the study of future sports manager personality, an objectivity as a way of influencing it becomes one of the most important indicators. The principle of objectivity points out that the formation of the professional competence of future sports managers should be considered in the appropriate socio-cultural context, within certain ideological orientations. The organization of the professional competence forming process of these specialists should be carried out in accordance with the logic of students professional training at faculties of sporting profile.

The principle of scientific knowledge is important for the formation of professional competence of future managers of physical culture and sports, which involves the development of their skills and abilities in scientific research, continuous improvement of teaching methods and ways of their actualization, scientific substantiation of sports managers positions on the individual acquisition of professional knowledge.

The concept of training is quite broad as it includes the whole system of educational activities, which reflects everything that students and teachers are engaged into during the academic year (Fig. 1).

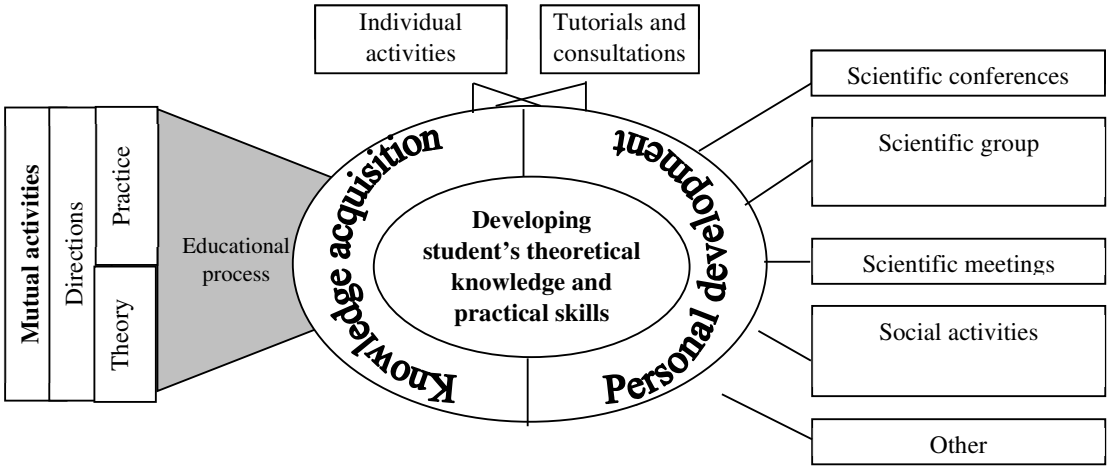

Fig.1: Directions and means of student's theoretical knowledge and practical skills developing

Based on the principle of determinism, the causal relationship between the application of an innovative methodology in the preparation of future sports managers and the formation of their professional competence is revealed. It involves the definition and implementation of well-defined psychological and pedagogical conditions that create the optimal learning environment for more effective training. The principle of historicism is used to determine the logical connections of the formation process and formation development of professional competence of sports managers, the systematization of scientific knowledge in retrospect.

We consider the following principles as important in the process of forming the professional competence of future managers of physical culture and sports:

- ✓ the principle of using the results of scientific research for the development and implementation of physical culture and sports program, and to identify and eliminate the main factors hindering the development of this process;
- ✓ the principle of improving the system of higher education in the preparation of future sports managers;
- ✓ the principle of an individual approach in the organization of the educational process, taking into account the future demand of a sports manager;
- ✓ the principle of consideration of sports interests of the population;
- ✓ the principle of using international cooperation experience in order to develop the best approaches to problem solving;
- ✓ the principle of professional orientation makes it possible to find out the content and methods of teaching disciplines, which should take into account everything that may be useful to the future sports manager. The essence of this principle is the use of pedagogical means, which provide students of higher educational sports institutions with the acquisition of knowledge, skills, experience of creative activity. As a result, they should find an interest in the chosen profession and the development of professional qualities.

The principle of availability of vocational training involves the organization of an educational process forming professional competence of future physical culture and sports managers so that they can easily learn the necessary training material. This principle is taken into account in determining the necessary knowledge obtained in the process of studying specialized disciplines, as well as the defining content of courses, the volume and complexity of the choice, the necessary teaching material and in general the training program for these specialists.

As a means of optimizing the educational process, which involves raising the competence of the sports manager, the principle of interdisciplinary connections in education is used, which enables, without additional time, to fulfil the tasks set for their professional competence. The principle of the implementation of interdisciplinary connections is aimed at using professional knowledge and experience, obtained during the learning process, the integration and continuity of knowledge and skills from different disciplines, and the formation of the harmonious personality of the future sports manager - a graduate of sports universities of Ukraine. The development of interpersonal relationships can enhance the motivation of these students, deepen and broaden their knowledge of future professional activities. The realization of this principle will undoubtedly help increase the level of their professional competence.

An important role in our study is devoted to the principle of interdisciplinarity, which is aimed at using facts and events from other subjects, which affects the intellectual and spiritual and moral development of sports manager personality. The use of professional knowledge and experience obtained during the training process, the integration and continuity of knowledge and skills from different disciplines will contribute to the formation of the harmonious personality of the future manager of physical culture and sports. During practical training students of sports universities will be able to use the knowledge acquired not only from humanitarian subjects, but also from special pedagogically oriented disciplines.

The principle of innovative training guarantees a high level of professional competence of future sports managers. Due to the innovative technologies used in the educational process, it motivates them to self-development and self-improvement.

The application of the principle of competence in the training of a future manager of physical culture and sport means identifying the competencies that he must possess. Its realization makes it possible to regulate the content of professional competence, methods of its formation, criteria and formation levels of professional competence of sports managers. The professional competence is a level of awareness, an authority of a manager of physical culture and sports, that allows him to solve professional tasks effectively. The use of this principle in the formation of professional competence is based on the awareness of an optional application of other universal principles to the training of various professionals, appropriate for their peculiar pedagogical situations. The psychological basis for the professional competence of sports managers is their willingness to continually improve their qualifications, mobility of professional functions, flexibility and critical thinking. As a result of the implementation of competence principle sports managers should become highly skilled and competitive, functionally prepared for constant changes in technology.

In the process of forming the professional competence of future managers of physical culture and sport an important role is played by the educational-information principle, aimed at forming: the ability to work independently with various sources of information; the ability to use modern technical means and communication technologies to receive and use information in their professional activities.

A successful solution to the formation of professional competence of sports managers is possible through a combination of methodological principles specific to them. In particular, the choice of optimal principles for the formation of their professional competence provides proper working conditions for teachers, giving them the opportunity to choose forms, methods and techniques of working with future managers of physical culture and sports.

In our opinion, it is advisable to distinguish the following groups of principles in forming the professional competence of future sports managers: basic, regulating the adaptive process of managers studies in higher educational institutions; key, facilitating the adaptation of these students to interpersonal, interactive, technology training; and general-didactic principles, which regulate the educational process of mastering the subject, interdisciplinary and general knowledge, skills and abilities and make it possible to apply them in practice.

It is important to classify these principles according to the following features. In particular, the basic principles include the principles of adaptive training for sports managers: the principle of an adaptive function of teaching professional disciplines; the principle of individualisation of an adaptive development of a student's personality when obtaining a sports manager's profession; the principle of adaptive-guided learning; the training principle aimed at developing the professional competence of the future manager of physical culture and sports.

Regarding the key principles of adaptive training of future managers of physical culture and sports, they include the principle of optimal combination of direct and indirect education; the principle of the priority use of methods and means of indirect interaction (student - content - teacher - student) in the context of personality-oriented adaptive learning; the principle of the determining role of self-adaptation; the principle of spiritual comfort in the conditions of open interaction among subjects of the educational process.

Among modern definitions of general-didactic principles of forming the professional competence of managers in the sports industry, we believe that the proposed by V. Yagupov (2003) directions about "regulatory requirements for the organization and conduct of the didactic process, which are characterised by general guidance, rules and norms" appear to be significant.

The analysis of pedagogical and scientific works allows us to highlight the general-pedagogical principles, that are guiding in forming professional competence of future managers of physical culture and sports in higher educational institutions, namely: scientific knowledge; systemicity; education; connection of learning process with the environment; reality; individualisation; activity; apparency. These principles are subordinated to goals and objectives of training managers in the field of sports, manage the process of developing methods, tools, techniques, forms of productive feedback communication between teachers and students as subjects of the educational process.

The specificity of the general-didactic principles of training future managers of physical culture and sports is determined by such dominant principles of studying at universities as: the formation of highly skilled, professionally mobile sports managers, which will be competitive in the labor market. The process of their training is concentrated on education, upbringing and personality development. According to these principles, professionally directed training, development and upbringing of future sports managers take place on the basis of knowledge and skills formed during their training.

Basic, key, and general-didactic principles of adaptive learning become a system if, on the one hand, serve as the basic requirements for an interaction between teachers and students. On the other hand, their adequate observance acquires the status of didactic and psychological conditions for qualitative implementation of adaptive functions in the process of professional training of future managers of physical culture and sports to their professional activities. The outlined general-didactic principles provide the opportunity to build the best system of traditional and innovative methods, tools, techniques and forms of organization, correction and realization of training and self-improvement of students in higher educational institutions.

Taking into the consideration aforementioned principles, favourable conditions are created for the organization of a scientific-knowledge array, which facilitates the consolidation and verification of acquired professional competence in the process of preparing students at universities that train specialists in the field of sports.

Conclusions

Thus, the pedagogical principles of forming the professional competence of future managers of physical culture and sports testify that in a real learning process they should interact with each other and function as an integral system of professional training. It should be emphasized that each of these principles acquires significance only in conjunction with others. This is characteristic for each stage of the educational process of future sports managers. We propose the following groups of principles that will ensure an effective process of forming the professional competence of future managers in

the field of physical culture and sports, namely: basic, regulating the adaptive process of managers study in higher educational institutions (the principle of an adaptive function of teaching professional disciplines; the principle of individualisation of an adaptive development of a student's personality when obtaining a sports manager's profession; the principle of adaptive-guided learning; the training principle aimed at developing the professional competence of the future manager of physical culture and sports); key principles that facilitate the adaptation of these students to interpersonal, interactive, technology training (the principle of optimal combination of direct and indirect education; the principle of the priority use of methods and means of indirect interaction (student - content - teacher - student) in the context of personality-oriented adaptive learning; the principle of the determining role of self-adaptation; the principle of spiritual comfort in the conditions of open interaction among subjects of the educational process) and general-didactic principles (scientific knowledge; systemicity; education; connection of learning process with the environment; reality; individualisation; activity; apparency).

It is worth pointing out that in a real pedagogical process the principles of professional competence formation are realized in close connection and are mutually interconnected; none of them can be involved separately. Only the cumulative influence of pedagogical principles in vocational training guarantees the correct definition of tasks, determines a proper selection of content and methods for forming the professional competence of managers in the field of sports. All this defines an objective need for further research into the efficiency of complex use of above-mentioned pedagogical principles, that will provide diversity, versatility and alternative ways of development and introduction of the author's concept in the process of professional training of future managers of physical culture and sports.

Using basic management principles such as systematicity, optimality, motivation, economy, satisfaction of the participants needs and interests, sports management will provide purposeful modernization and diversification of relations in physical education and sports field. All this leads to the objective need for further studies of management in sports based on generalized approach to evaluation and justification of its expediency, as a means of implementing management decisions aimed at regulating professional relationships.

Conflicts of Interest: No conflicts of interest exist.

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Empty Container Practice at off-Dock Depot and the Development of 3D Simulation Model: A Case Study

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Abstract

The management of empty container movement is a complex process that involves numerous containers coming in and going out of a terminal or off-dock depot sorted by different types of transport, such as trains or trucks. This study focuses mainly on the landside empty containers (off-dock depot/ODD), where the trucks represent the primary function in the container supply chain management. For this purpose, simulation models are widely used in the analysis and design of port operations, as it has been proven that the simulation model is a very practical and reliable decision medium in the port. This study presents empty container practice and develops 3D simulation model based on a case study at two ODD companies. It can be concluded that the proposed development model using a 3D platform provides better visibility of operational flow and can be used as a potential platform for achieving the desired improvement, especially in the context of bottlenecks in the future.

Keywords: Container Supply Chain Management, Off-Dock Depot, Simulation, Bottlenecks.

Introduction

In today's business, manufacturing execution cannot succeed without logistics support or activities. Moreover, the gradual increase in the manufacturing sector also induced the demand of empty containers for the purposes of goods movement. Lambert et al. (1998) noted that containers are widely used in international logistics, especially when waterways are part of the transport networks. As reported by Yun and Choi (1999), for global shipment, 90% of cargo is transported by ocean shipping, in which over 8% of cargo is shipped with containers. Accordingly, containers are moved between container depots, customers, ports and vessels (Gudelj, 2010). In 2013, world container port throughput increased by an estimated 5.6% to 651.1 million TEU (twenty-foot equivalent unit). The share of port throughput for developing countries increased by an estimated 7.2% in 2013, which is higher than the 5.2% increase estimated for the previous year. Asian ports also continue to dominate the league table for port throughput and terminal efficiency. In Malaysia, there is about 22.7 million TEU container throughput in 2014 (UNCTAD, 2015), and more than 80% of Malaysia's international trade is being carried through the oceans *via* its international seaports (the lifeblood of its economy). In addition, Malaysia's maritime economy contribution to the GDP is about 20%, especially since marine and coastal tourism has become a significant revenue earner (Tang et al., 2011). Owing to the rapid economic growth of economies, the demands of empty containers have tremendously increased (Rodrigue, 2017). Thus, many container depots in seaport and hinterland have been encouraged to grow (Zachrisson & Naperotti, 2017).

Dulebenets (2016) supports that the advanced simulation model serves as an efficient planning tool for operators at terminal containers and is able to improve equipment performance, including the container truck movements. Accordingly, a study by Dulebenets (2016) developed 3D simulation models that focus on operations at the seaports. Additionally, Yi (2017) conducts studies on the efficiency of truck

operations and container handling at port terminals. Doubtlessly, the smooth flow of supply chain and container logistics is a very important factor in providing high-quality service to customers (Kaleappan, 2006). Although container movements in terminals have been studied previously, only few studies focus on bottleneck issues at the off-dock depot (ODD), especially in Malaysia. Therefore, the development of simulation models focused on the ODD is also a major gap in this study. The situation will become more critical if the problem is not addressed as it may affect the depot industry. The failure of a depot to properly manage container operations will prevent Malaysian ports from operating efficiently. Hence, this study aims to investigate the empty container practice at ODD in Port Klang, Malaysia and visualise the bottleneck situation, thus affecting the container truck efficiency throughout several operations starting from the arrival at the main gate, to the pick-up or drop-off of containers, to the departure of truckers from the premise. Port Klang, comprising Northport and Westports, has become a logistics centre by providing more efficient transport links and extensive storage space (Idris, 2011). This study will focus more on the development model of the ODD practices as a way to increase awareness of the stakeholders regarding the truck bottleneck problem.

Research Methodology

This study focuses on the identification of the empty container practice at the ODD and the development of the 3D simulation model. A case study was conducted at two companies, namely, A and D, which involved depot owners, managers and executive as respondents (two respondents from company A, named as respondents R10 and R11, and two respondents from company D, named as respondents R9 and R25). Background information of the respondents is shown in Table 1.

Table 1: Background information of the respondents

Respondent ID	Position	Work Experience (Year)	Work field (party)
Company A			
R10	Managing director	> 20	Depot
R11	Manager	11-20	Depot
Company D			
R9	Executive	11-20	Haulier
R25	Executive	11-20	Shipping line

Qualitative case study methodology provides tools for researchers to study complex phenomena within their contexts (Baxter & Jack, 2008). Yin (2009) defines case study as an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident. To obtain this level of understanding, a researcher must collect various forms of data, such as interviews, observations, documents, artefacts or audio visual materials (Creswell, 2013). The semi-structured interview method was conducted during the site visit to obtain information regarding empty container practice. Evidently, majority of the respondents (see Table 1) have more than 10 years of experience in container management and are willing to share their information on container handling operations more deeply. In addition, observation method was also conducted by the researchers to see the movement of empty container trucks at the premises as well as the pick-up time of trucks and operations at each station. During the interview, the respondents further explained things related to empty container practices and other information that may help develop the bottleneck model of the depot. The respondents also provided an initial description of the depot layout. Observation was done to give the researchers a comprehensive idea about the container operation.

Practically, simulation is frequently used in solving landside problems, such as bottleneck, waiting time and idling resources. A previous DES (Discrete-Event Simulation) model to reduce empty truck trips by implementing coordinated truck appointments was proposed by Schulte et al. (2015). In this study, the methodology employed (to develop the simulation model) is based on the observation carried out at companies A and D. Furthermore, DES tool/software (FlexTerm CT) is employed to implement the model through simulation software. The motivation for adopting the simulation tool for the study is the distinct advantage of FlexTerm CT software that comes with a library specifically designed for simulation container yard operation. Nonetheless, it is difficult to predict the actual events, such as the arrival times of trucks and the actual number of arrivals. Remarkably, simulation is very effective in doing such predictions. The development of the simulation model in this study is expected to provide visuals or animations to the depot on the problem concerning empty container truck queue starting from the depot gate entry until out of the depot. However, this study does not reveal the performance analysis. The development of this model is an early platform, especially in the context of bottleneck occurring in the ODD. However, in the future, it is very important to study the 'what if' scenarios in order to make the right decisions in the short term and long term.

The basic function of container terminals is to provide berth facilities, planning area, storage planning and logistics planning in container operations (Ramani, 1996). Such operations are appropriately analysed using computer simulations. Progress in today's simulation technology has increased awareness among industry practitioners. The development of simulation models is outlined in Law and Kelton (1991), Chung (2003), Law (2007) and Banks et al. (2009), whereas:

a. Conceptualization: defining systems and objectives, modelling concepts and data collection;
b. Development of simulation, verification and validity models;
c. Analysis: run simulation and analysis.

This study focuses more on (a) and (b) to illustrate the development of virtual models (companies A and D) on empty container movement. The development of these models illustrates the overall process flow starting from the arrival of container trucks, the process of picking up or delivering the containers out of the premises. In addition, this simulation model proves the occurrence of bottleneck in the ODD. Thus, with the development of the model, the depot firms are expected to improve their performance in the future (to ensure efficiency and zero waiting time in the operation flow). In this phase, the 3D simulation model is developed through the FlexTerm CT version 2.5 simulation software. FlexTerm CT is an additional FlexSim software, which supplies additional items and functions to facilitate imitation and operational analysis for modern and traditional terminal containers. Through FlexTerm CT, terminal container simulation models can be developed quickly and easily in the Windows Graphic User Interface (GUI). The simulation model built into FlexTerm CT can be potentially used to improve many aspects of container terminal operations. In general, one of the advantages of FlexTerm CT is the ability to increase the utilization of equipment and reduce waiting time and turnaround time (Moghadam et al., 2011). Furthermore, through FlexTerm CT, users can analyse various operations at container terminals, for example, container arrangement and container segregation, crane allocation, terminal equipment allocation, ship scheduling and ship berth allocation and traffic bottleneck. Additionally, the results of each simulation can be analysed graphically through the 3D simulation model by providing statistical and graphical reports (FlexTerm User Manual, 2014). The process of the implementation of the 3D simulation model is based on the process flow set by companies A and D. The concept and development of 3D animation models will be described in more detail in the next section.

Research Findings

Empty container depot outside the seaport or the ODD is an important logistics chain for smoothing storage and delivering empty activities to the customers (consignees/manufacturers). The smooth flow of port operations depends on the efficiency of the depot or port. This is because the depot is the main hub for stakeholders before cargo delivery is carried out by the shipping side. Out of 30 ODD companies or depots near Port Klang, Malaysia, only two were selected for the development of the 3D simulation model. This section will describe in detail the company's background, including the ODD

practice, depot layout and development of the simulation model for the selected companies.

Company A

Company A, which was established in 2009, has a major mission of fulfilling customer requirements through various types of service offerings. The depot facility provided has a full concrete floor, and the space is around 10 acres (40468.56 square meters) with a capacity of 7500 TEU. It is also equipped with a safety system and operates seven days per week. The depot consists of five units of empty container handler (only two or three units can be used; the remaining unit is under maintenance) and one forklift unit to ensure the stacking or storage process runs smoothly. The main services offered by company A are storage of containers, pick-up and drop-off of containers, container inspection, maintenance, container delivery services to customer premises, container washing and others. Company A has an online depot management system to record and share container information with the shipping and port, so the container status can be known in real time.

Empty container practice at company A

Respondent R11 observed that the flow of the pick-up and delivery of containers between the depots is not much different, but it also depends on the planning of each company. From the container handling aspect, the driver will submit the consignment note and booking confirmation to the shipping counter. The depot workers will review all container information, cargo types and so on. All information will be input in the electronic system developed by company A. Upon confirmation of the document, the container will undergo maintenance service. Next, the driver will move to the recommended block for the container dropping process. Containers are classified according to the type of shipping operator, and damaged containers are stored in certain block storage. Container handling time at company A is estimated to not exceed 30 min, but if trucks are too many at a particular time, the process (container pick-up or drop-off) will exceed 30 min (respondent R10). Respondent R10 noted that, *"In fact, most drivers begin to arrive at nine or ten o'clock in the morning at depot, but during the off-peak hours, more than 40 container trucks arrive at the same time. So, the depot can be crowded and many drivers are still waiting out there."* Meanwhile, in the process of container pick-up, the driver will submit the document to the main counter. Upon obtaining document verification, the truck driver will proceed to the operating site through a specific driving lane/route. Forklift operators will also receive instructions regarding the container from the customer (according to grade, container serial number and type of shipping operator). Then, the forklift operator will locate the container to be lifted onto the truck. Containers will be taken to the inspection and cleaning site. In this situation, depot workers will physically inspect the container, and the status of the container will be recorded in the outgoing slip. Container grades and conditions will be checked, as well as whether perforation, leakage, damaged doors, oily and other problems have occurred. Finally, the driver will submit the slip to the outgoing counter before leaving the depot. Figure 1 briefly shows a developed depot layout at company A. In part A, the layout of the depot area consists of the container block storage and the vehicle lane separating the blocks. At least two container trucks can pass through the driving lane at the same time. Section B indicates the area for container maintenance, washing and inspection. A good practice of company A is washing the containers that have been delivered before being stored in blocks so that retrieval of containers would not take long. On average, the moving-in and moving-out of the container truck of company A is 200–500 units per day. However, the estimated movement of container trucks will increase during particular seasons (e.g. festive seasons). Respondent R11 supports that container operations in company A are running smoothly.

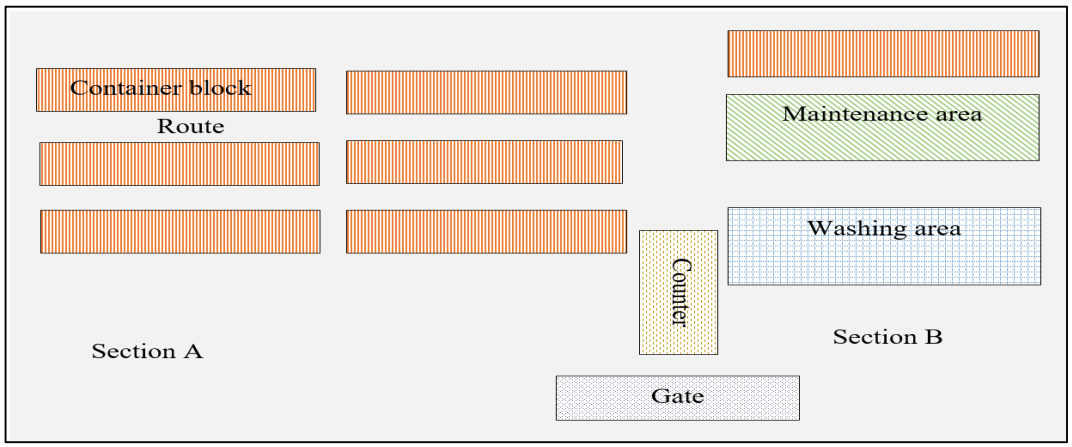

Figure 1: Layout Company A

Company D

Company D was established in 2010, and the main mission is to meet the current logistics requirements by providing fast response to customers. Company D aims to provide empty container storage, lift-on and lift-off of containers, normal or chemical liquid washing and container maintenance. The company is also located near Westports, Port Klang, Malaysia. The container capacity of company D is 10,000 units TEU with an area of 8 acres (32374.85 square meters). Company D has 20 employees and operates 6 days per week. Based on observation, this depot does not have concrete floors but has three container handling units and one forklift unit. The stacking of container as high as seven to eight levels or stacks, and the strategy of segregating is also not according to the type of shipping operator and container grade.

Empty container practice at Company D

According to respondent R25, for the container move-in process, the driver will submit the document or container information to the counter. The container will be checked and cleaned upon confirmation. The container is then dropped off by the forklift before the drivers leave the depot. Meanwhile, for the container pick-up process, the driver will submit the documents to the counter and then immediately proceed to the container block storage upon confirmation. Container loading operations will be carried out by depot operators. Container inspection will be conducted to repair minor damages, if any. The container will also undergo cleaning operations at the same time. Finally, final inspection of the container and the documents will be carried out before the driver leaves the depot. According to respondent R9, the minimum duration of container move-in and move-out process is estimated to not exceed 30 min, as stated by respondents from company A. Company D has a total of 15 shipping operators. Owing to the space limitation, the container yard is occupied with large container units. Additionally, the depot area is filled with truck drivers during peak times, which can cause bottleneck. Problems are increasingly difficult to handle if container specifications still do not meet customer requirements, and it needs to be changed or repaired by the depot. Therefore, the expected time for container delivery and pick-up may exceed 1 h (respondent R9). Respondent R25 claimed that, "*The standard pick-up process is 30 minutes, but in such cases it can take up to an hour. Therefore, the appropriate hours of operation have not been reached yet. Bottleneck is quite difficult to overcome if occurring frequently. Therefore, shipping companies and depots need to find solution to the problems.*"

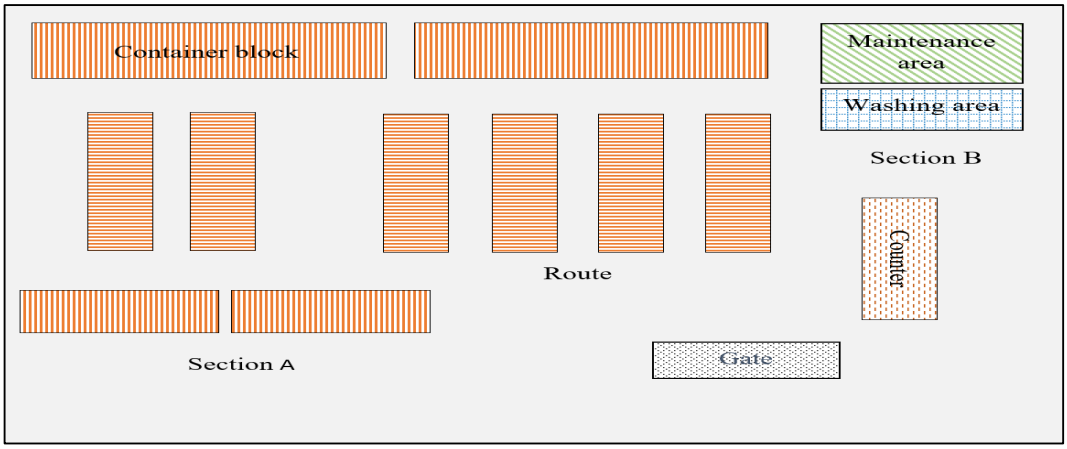

Figure 2: Layout Company D

Figure 2 briefly shows a developed depot layout at company D. Based on Fig. 2, Section A represents the container block storage and driving lanes between blocks, whereas Section B represents the washing space, container inspection site, counters and administrative offices. For the container handling process, the truck driver will go through the document review process at the counter and then proceed to the container cleaning operation. If truck queuing occurs at the counter and the washing area, the trucks will stay and wait in front of the entrance because there is no parking space available in the depot area. Since only one door/gate is available, the depot often experiences long truck queues.

Development of 3D Simulation Model

The development of the 3D simulation model (Figs. 3 and 4) illustrates the activities that occur in companies A and D. Meanwhile, the 3D simulation model in each substation is also shown clearly (Figs. 5 and 6), which represent all processes involved in the system. The model is developed based on the actual layout (Figs. 1 and 2) through interviews and observation approaches, and the flow of the container movement is almost the same for each selected company.

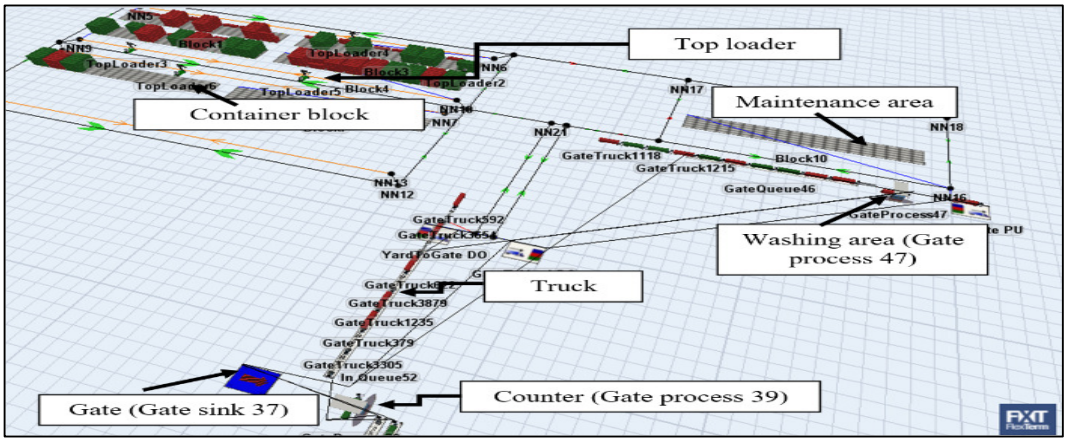

Figure 3: 3D Simulation model Company A

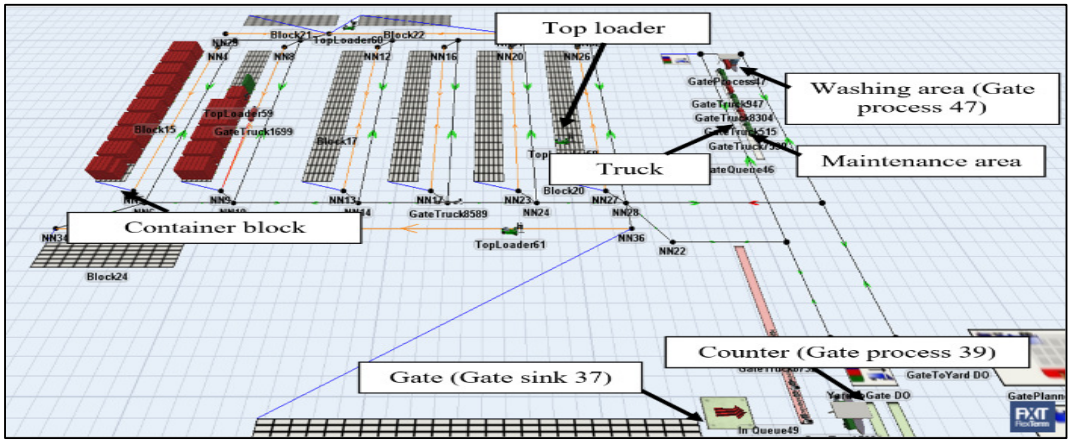

Figure 4: 3D Simulation model Company D

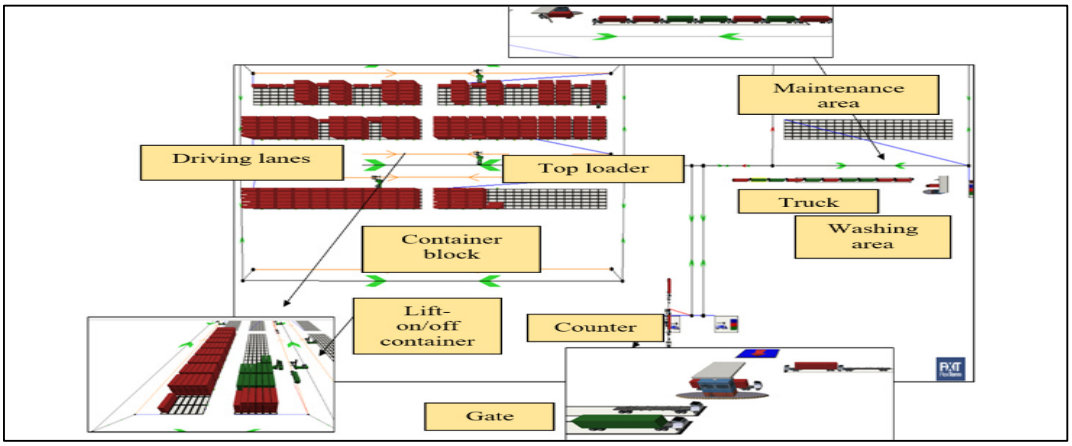

Figure 5: 3D Simulation model (sub-station) Company

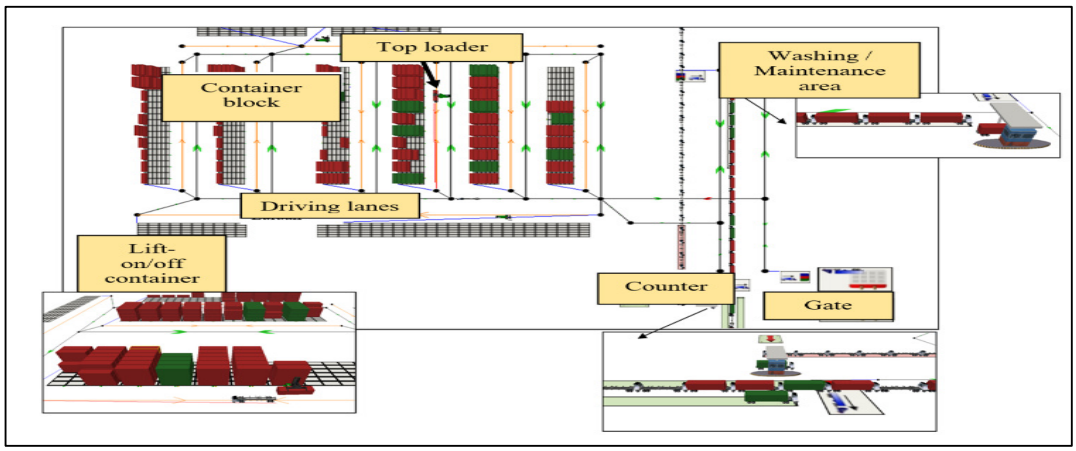

Figure 6: 3D Simulation model (sub-station) Company

In this study, observation (by researcher) approach also proves that company D is experiencing long truck queues due to the limited space and insufficient resources (especially during truck arrival at peak times). Based on the interview with respondent R10, company A has sufficient staff (3-4 people) for the processing of the document at the counter, resulting in a smooth-running process despite being busy during mid-morning and evening. However, company D only has one employee (at the counter) who handles the documentation process. Apart from machine breakdown and simultaneous arrival of trucks, there are some other conditions that cause the slow process of container pick-up and drop-off, such as truck drivers using the wrong lanes, reshuffle processes or containers needing to be located or repaired. Additionally, high container stacking (seven or eight levels) also caused delays in container handling at company D. In addition, company A practises a five-stacking containers compared with company D. Based on observation, company A is able to manage container pick-up more efficiently and securely than company D. In addition, company D does not practise the arrangement of containers according to grade and type of shipping operator, so the handling operations are slow in tracing the container needed by the customer. Furthermore, long waiting hours for inspection and cleaning activities are also influenced by the arrival of many trucks. Most containers will be cleaned before being kept in block storage and sorted according to grade or specification (this has been consistently practised by company A). Based on 3D animation movements, company D (Fig. 6) is exposed to long queues or longer waiting time, whereas company A has a smoother-running process. For the container move-in and move-out process, the final step is the submission of the document to the counter by the driver before leaving the depot. If the document is incomplete, the driver must return to the container block storage and do the needful (respondent R11).

In the case of container defect (newly identified by the manufacturer), the depot will offer a repair service at the manufacturer's premises, but if major problems occur after the container is received, the truck driver will return the original container to the depot and have it replaced with another one with a similar grade. For the drop-off process of used containers, the truck driver will proceed to the 'container delivery block' (after inspection and cleaning) and exit the depot upon completion of the operation. Based on the 3D simulation model (see Figs. 3 and 4), the truck check-in process takes place at the counter or in the FlexTerm CT called as gate process 39. The movement of pick-up and drop-off trucks can be seen at the node (node black point), which is used as a driving lane by the truck and forklift (top loader) to move towards the container. Subsequently, the trucks that will take the containers will pass through the driving lanes and move to the container block arrangement. Container inspection and cleaning operations are conducted at Gate Process 47, or the washing and inspection areas. Meanwhile, Gate Queue 46 is a container trucking queue, which refers to where the flow item is waiting to be processed by the processor. If there is no queue, then the trucks going towards the processor will be processed automatically. Top loader is the machine used in container handling to lift-on, lift-off and reshuffle the container. When the truck arrives at the container block storage, the top loader will lift off the container from the truck and stack it up the block. The container will remain in the block until it is picked up by another truck carrier. The operations in the ODD have been depicted in the depot area, which involves the process of check-in counters, container handling process (container lift-on and lift-off), container inspection and cleaning. In conclusion, most practices in container storage are the same in most ODDs in Malaysia. Further, the flow of container handling operations is also outlined by Yu et al. (2016). They focus more on the development of animation for container operations, i.e. loading, unloading, stacking and container reshuffling. Their models are not utilized with all operations as developed in this study, for example, inspection or container operation and process at the counter or gate. Potential models developed in their studies evaluate the effects of reshuffle operations, as well as the impact of the number of internal truck and yard cranes on terminal operating efficiency which become a major advantage in their study.

Equally important, Azab and Eltawil (2016) aim to study the waiting time of container trucks. Their study suggests how container operators can reduce queue times at the gate terminal without affecting productivity and suggests the arrival patterns of trucks at container terminals. Azab and Eltawil (2016) developed 3D models through the FlexTerm CT software at container terminals, such as quay ports, terminal areas and gates. A simple model (one gate, one container block, one yard crane and one vessel) was constructed to examine the impact of arrival patterns on the truck turnaround time and bottleneck at the gate. Their studies emphasize the truck pattern suitable for overcoming bottleneck or long queues

at the port gate. Huynh and Walton (2011) suggest that there are two main steps taken by terminal operators to reduce the truck's turnaround time at the terminal: increasing the number of yard crane and using an appointment system. The main issue in this study is whether it is appropriate or not to increase the number of cranes. As such, activities that occur in the system are modelled by the type of process and movement of the truck through the road network. Their studies put more emphasis on operation problems at port terminals compared with depots. Spoel et al. (2016) developed a simulation model based on bottleneck and data without bottleneck, modifying the number of trucks that arrived within a certain period of time. The terminal will be congested if one or more queues have a higher inflow than outflow. Given that the capacity (entrance and exit) can process about 20–25 trucks per hour, then for congested data sets, the number of trucks that arrive every hour must be greater than 25, and not exceeding 20 for a non-congested data set. The simulation will run for 1000 h to ensure the system reaches the bottleneck state. Esmer et al. (2010) conducted a study to determine the optimum number of trucks in the Turkish Port based on lean and green concepts (i.e. by minimizing environmental damage due to port operations). Their study found that truck reductions allocated from five to two were able to cope with environmental pollution without affecting Quay Crane's productivity.

This study focuses more on depots located outside of the Malaysian port. The 3D platforms that are visualized are more obvious to represent the real system, but it can also give stakeholders a serious picture regarding the bottleneck problem that occurs during the incoming or outgoing of empty container truck, and potentially to affect the inefficiency of the container supply chain. As a matter of fact, this 3D simulation model consists of several processes before the truck driver comes out of the depot in a practical context in Malaysia. The FlexTerm CT object is used to realize the depot operation or the complex problem of bottleneck in the ODD. FlexSim or FlexTerm CT is a specialized software for developing operations at port terminals. FlexTerm CT provides a complete object to enable the modeller to save time in building container terminal operations and to plan ahead (Azab & Eltawil, 2016). The 3D simulation model developed in this study looks at some aspects of the truck's movement at the terminal, as stated by Spoel et al. (2016), which are the start time, when the truck enters the first terminal queue; end time, when the truck leaves the last terminal queue; loads, whether the truck is loading or unloading; and bottleneck problems. Bottleneck illustrates how many truck queues along the driving lanes, and turnaround times will increase as traffic bottleneck increases (Spoel et al., 2016).

Finally, this study has examined every activity that took place at the beginning of the operation until the end. However, the 3D simulation model developed in this study is only utilized to demonstrate the ODD operations (in the context of bottleneck) without testing or analysing the model. Operational or bottleneck behaviours occurring in companies A and D are illustrated based on interviews and observation methods and existing data provided by the companies. Based on the case study, company A was found to have smoother-running operations than company D. Company D was described as having the worse performance or taking long processing time for container retrieval and delivery. In comparison with the 3D simulation model developed in this study, the illustration of operations in the most congested part can be clearly shown to the stakeholders. However, the main drawback of the 3D simulation model in this study is that it does not look at the overall container activity at the port and focuses only on the ODD. Finally, one of the valuable things of the 3D simulation model is the ability of FlexTerm CT to illustrate the operation flows, and it could indirectly indicate which processes or substation causes bottleneck. For example, idle time or busy counters and washing process can be viewed virtually in those models. In the future, if analysis of this simulation model is carried out, it could analyse bottleneck which is caused by inefficient or inadequate resources, and the average time of the truck movement can be measured for each process starting from the gate until the truck leaves the depot area. Consequently, processes which involve long service hours and long waiting time can be determined. Moreover, the number of successfully or unsuccessfully processed trucks in the system can also be determined, as well as which part of the substation or process needs to be developed to reduce bottleneck

Conclusions

Based on the case studies and the container movement practices, some of the major obstacles during the operations of selected ODD companies have been identified in this section. Case studies have

successfully illustrated the process behaviour in the context of bottleneck through the development of the 3D simulation model. This model has been successful compared with the models developed by previous researchers. This model is revised by experts in the logistics container field, including academicians to determine the 3D platform generated is similar to the behaviour of real systems. In the form of simple animation or model simulation, it is easy for depot planners to directly visualize the traffic bottleneck at the ODD. Apart from the animation, if this model is fully analysed, it will allow the depot to plan ahead to reduce waiting time or service time (empty container pick-up and transport by truck drivers). It is worth noting that the development of the 3D simulation model is the main contribution in this study. In conclusion, in order to meet the growing demand for empty containers with capacity constraints (e.g. limited land area and high-cost infrastructure and equipment), it is necessary to increase awareness of all stakeholders about the improvement of their performance at the ODD in Malaysia in the future.

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The Development of Telemedicine in the Context of Digitalization of the Russian Economy

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Abstract

The main directions of the social and economic state policy of Russia are enshrined in the May Decrees of the President of the Russian Federation that state that solving problems in the healthcare sector, along with education and demography in the context of the digital economy is one of the priority tasks. Particular emphasis is placed on developing IT and applying them in medicine, thus allowing to expand the possibility and accessibility of the medical services for the population of our country. In this regard, the problem of human health and its adaptation to the conditions of a rapidly changing environment becomes even more urgent in the digitized world. The use of IT and telemedicine is aimed at improving the quality of life of the population and the environmental situation in cities, which has a significant impact not only on the general level of health and life expectancy of citizens of the country but also on their psychological state. One of the positive consequences of including a person in the digital environment is the possibility of establishing communication with a medical institution, receiving medical advice in remote access, as well as using robots in diagnosing various diseases. The development of communication networks and the digitization of medical services have led to the emergence of cross-border medicine. All of the above indicates the relevance of the research. The purpose of the research is to identify the system of economic and legal problems of telemedicine regulation in the Russian Federation, as well as to develop practical proposals for its improvement. During the study, the authors reviewed the federal laws in the field of telemedicine, revealed the main problems of regulating telemedicine services, explored the prospects and opportunities for deep transformation of the healthcare sector and active longevity, studied the economic and legal risks of introducing telemedicine services, on the basis of which recommendations are developed to improve the provision of innovative medical services (telemedicine), which in the course of the study were brought to practical application. It is concluded that the obvious advantages of telemedicine are independence from the geographical location, time factor, and the ability to access remote information in real-time or promptly if necessary. The introduction of such type of medical service as telemedicine requires changes in the regulatory framework and in the practice of providing medical care in many states, including the Russian Federation. The main theoretical provisions and recommendations of practical importance have been brought to the level of specific proposals that can be implemented by medical institutions of the Russian Federation in order to increase the effectiveness of developing telemedicine and using intellectual property in their activities

Keywords: Digitalization, Medical Services, Innovations, Cross-Border Medicine, Telemedicine, Telepresence Systems, IT, Smart Technologies, Robots, Efficiency.

Introduction

The importance of the health of a citizen of the country, as well as the health of the whole society, cannot be overestimated. The current national and social strategy of our state is enshrined in the May Decrees of the President of the Russian Federation, where it is noted that solving problems in healthcare, education, and the environment in the framework of the digital economy is the primary task of the Russian state and society (Gnezdova, 2014).

Today, the state puts special emphasis on the development and application of IT in medicine, which makes it possible to expand the possibility and accessibility of medical services for the population of our country. In this regard, the problem of each person and society as a whole adapting to the conditions of a rapidly changing external world, uncertainty, and risk, becomes even more urgent in a digitized environment.

Implementing the digital economy concept and applying IT and telemedicine are aimed at improving the comfort of people's living environment, the quality of their life, and the efficient use of natural resources, which ultimately improves the environmental situation in cities significantly affecting not only the general level of health and life expectancy of citizens of the country but also the psychological state of a person (Servis press-relizov, 2012).

Introducing the new so-called smart and information technologies when implementing the strategy of the Russian state to digitize all the knowledge and information available to mankind allows expecting positive consequences, however, the problem of adapting certain sectors of the national economy (including medicine) in the context of digitalization economics is even more important.

The expected positive consequences include the wide possibilities of the population with access to a personal computer or a smartphone to establish contacts with any other individual on the planet, any organization, enterprise or medical institution, and also to receive almost any information that does not represent commercial, state, or personal secret, as well as to expect probable prospects for using robots and automated services and terminals in diagnosing various diseases.

The development of communication networks and the digitization of medical services delivery processes have led to the emergence of such a phenomenon as cross-border medicine. Cross-border medicine should be understood as a combination of medical services, the provision of which, the transfer of patient information, as well as the work of Internet providers, are carried out across the borders of several states . The experts note that in the global world, the volume of medical services provided cross-border will increase in an avalanche-like manner. For example, the global volumes of telemedicine and medical tourism services in 2019 are USD 33 billion and USD 36 billion, respectively .

The significant advantages of telemedicine are independence from the geographical location of patients and the medical institution, the time factor, and the ability to access remote information in real-time. The introduction of such type of medical services as telemedicine requires changes both in the regulatory framework and in the practice of providing medical care in many states, including the Russian Federation. Vivid examples are such areas as teleradiology, processing by international corporations of large databases of a particular country's medical data, and the possibility of holding international medical consultations. There are great opportunities and prospects for interaction with Russian medical organizations, corporations, clinicians, and IT professionals. Operational access to information, innovative technologies, experts and specialists on a global scale receives a new impetus for development in the form of cross-border telemedicine. At the same time, a real-time user system for managing the routes of global medicine users is created, and technologies for finding adequate solutions are implemented to provide high-tech services in comfortable conditions . In this regard, the Russian Federation adopted the Law on Telemedicine that became effective on January 1, 2018, and does not have a wide established practice of applying.

Analyzing the theoretical and applied value of currently available scientific research, it should be noted that scientific approaches and research relating to the provision of medical services using new technologies and innovations are not exhaustive and do not allow an objective assessment of the structure of the Russian market in terms of the volume of innovative medical services provided, their types or quality, with the use of intellectual property (telemedicine) (Primenko, 2017). Until now, questions of researching regional markets, in particular telemedicine, as well as evaluating the effectiveness of managing the intellectual property of a medical institution in terms of their qualitative characteristics, remain unexplored (Shulgin et al., 2016). The above circumstances make it relevant to study the main aspects of introducing telemedicine as an innovative sphere of providing medical services, which served as the basis for choosing the purpose and objectives of this research.

The purpose of the research is to identify the list of problems of economic and legal regulation of telemedicine in the Russian Federation and to develop practical proposals for its improvement.

To achieve this purpose, the following tasks were set and solved: the federal laws on telemedicine are reviewed; a list of economic and legal problems of introducing telemedicine in the conditions of cross-border relations is defined, and the recommendations are developed to improve the effectiveness of telemedicine in modern Russian conditions.

The methodological basis for writing the thesis is general scientific methods of cognition, in particular, methods of economic analysis of private law, logical analysis, a systematic approach, and a comparative legal method. The theoretical basis of the study was the scientific works of foreign and Russian authors on the current issues of telemedicine services.

The object of the research is social relations associated with the introduction of telemedicine in the process of providing medical services to citizens of the Russian Federation.

The subject of the research is medical services, the laws of the Russian Federation, and the practice of legal regulation of relations in the field of telemedicine.

The theoretical and practical significance of the research lies in the fact that the authors developed recommendations to improve the effectiveness of telemedicine regulation, and also developed an organizational and methodological mechanism for implementing practical recommendations.

The main theoretical provisions and recommendations of practical importance have been brought to the level of specific proposals that can be used by medical institutions of the Russian Federation in order to increase the effectiveness of introducing telemedicine and telepresence systems in their activities.

Deep Transformation of Medical Services in The Context of Digitalization of The Russian Economy

Providing medical services using innovative technologies (telemedicine) refers to the field of deep transformation services in the process of digitizing the socio-economic environment of Russian society (Fedkina, 2018). In this regard, the innovation of the healthcare sector and the implementation of the principles of active longevity is becoming one of the priority tasks of the Russian state, the solution of which will entail a profound transformation of both the healthcare system and related areas.

According to the authors of the research, the transformation of medical services and the introduction of an innovative strategy for the medical sector can be accelerated only in conditions of economic growth, macroeconomic stabilization, and commercialization of innovative technologies in the healthcare sector. Innovative solutions that are currently being implemented in the medical services sector allow personalizing and radically increasing the effectiveness of the proposed medical

treatment, minimizing the risks of deviating patients from their usual lifestyle, taking into account the efforts of patients, doctors who provide treatment, and patients' relatives in the system of a new paradigm for creating a comfortable "patient-oriented (friendly) environment ", as well as to develop an organizational and methodological mechanism for the effective management of innovations when providing medical services. For example, the implementation of the "Smart Region" concept (the "Public Health Protection" section) in the Urals Federal District will allow using such information technologies as the creation of an electronic registry, a patient's personal account, and the introduction of electronic medical records. These services should be implemented with the assistance of the administration of the region (a municipality).

As an example of applying innovative technologies for medical purposes, the information should also be given on the possibility of implementing an automated pre-trip medical examination should also be given (Fedkina, 2018). The main positive characteristics of such an inspection are the reliability of the results, the absence of queues, and a fairly low amount of capital investment when acquiring an automated terminal (about 60 thousand rubles), while the cost of one pre-trip inspection is thirty-five (35) rubles or more.

The table below shows the transformation of the medical services sector in the Russian Federation, the application of new management decisions, as well as business models implemented in the field of health and active longevity.

Table: Transformation of services in the field of public health and active longevity

New Management Technologies	New Business Models	New Market Leaders
1. Internet of Things Services; 2. Block-chain; 3. Artificial intelligence and context recognition algorithms (Rolinson et al., 2018); 4. Robots: adaptive, intelligent, and telepresence.	1. Online monitoring of the patient's condition and the quality of the doctor's prescription; 2. Online clinics and providers of information solutions for patients and clinics; 3. Companies that manage the treatment process, purchase of drugs and supplies; 4. Small network and franchised high-tech clinics.	Google, Avella, Sanofi, Doc +

It should be noted that robots are self-learning automatic devices that operate according to their program, receive information about the outside world from sensors, and perform independent operations complementing human actions.

Today, the following generations of robots are distinguished:

• Programmed robots are robots with a rigidly defined program of actions (cyclogram);

• Adaptive robots are robots that can be automatically reprogrammed (adapted) depending on the external conditions of activity and the environment. A basic program of action is initially installed in such robots.

• Intelligent robots are robots, the program of actions and tasks of which are carried out in a common (basic) form. A robot has the ability to plan its actions and make decisions in the uncertain conditions it recognizes.

• Telepresence robots are robots whose functional feature is to enable the device operator to receive various kinds of sensory information (in particular, video, sound, tactile and other information) from a remote point using installed sensors .

According to experts, the market share of telepresence robots is now rather small taking about USD 200 million. This allows healthcare companies to enter a market with a potential of over USD 4 billion .

In the field of telepresence robots, a number of legal issues related to the interaction of humans and robots must be solved (Lebedev et al., 2019). For example, in the United States, a telepresence robot operator must obtain a special license from the state (Trese, et al., 2014). Recently adopted legislation on cross-border medical licensing addresses this issue.

Overview of the Federal Telemedicine Laws

Experts note that the modern structures of contractual forms of regulating the relations on the provision of medical services using digital technologies for their remote provision and telemedicine services (Bazaron, Borbonov, 2016; Vladzimirskiy, Shaderkin, 2015) are very interesting to research. In the indicated aspect, the problems of contractual funds aimed at minimizing the risks of patients in connection with the receipt of such services deserve special attention. The economic and legal risks of participants in such medical services, of course, increase.

Remote provision of medical services is one of the fast-growing high-tech areas of healthcare. It is widely recognized and applied in the global healthcare industry and is gradually becoming a new model of medical care, where the legal regulation of distance healthcare is reflected in the regulatory acts of the Government and is recognized by the medical community and patients.

Let us analyze the main novelties of the mentioned Russian law on telemedicine. In particular, it is possible to provide medical care using “telemedicine” technologies through consultations and medical consultations, as well as remote medical monitoring of the patient’s health (Barwig, 2008). The use of consultations applying "telemedicine" technologies is a right of both the doctor and the patient, and should not limit patients to receive medical care in person. The procedure for the provision of medical care using telemedicine technologies has been determined (Repin, 2017).

In addition, the law provides for the possibility of issuing electronic prescriptions for medicines, including for those containing narcotic drugs or psychotropic substances from January 1, 2019. Electronic prescriptions will be sent directly to pharmacies.

The law allows the execution of a number of medical documents in electronic form, for example, consent to, or refusal from, a medical intervention, a medical assessment report, a certificate or an extract from medical records. At the same time, the procedure for information support has been improved, which provides for the creation of a Unified State Information System in the field of healthcare, which provides the opportunity to provide medical services to Russian citizens in electronic mode on a single portal of public services.

Economic and legal problems of introducing telemedicine in conditions of cross-border relations

The modern life of society is closely connected with the use of information technology, the movement of information affects all spheres of human activity, in particular, the medical services are undergoing major changes today (it also includes information and Smart technologies). According to the BBC Research, the current market for telemedicine services consumers in 2019 is about USD 43.400 billion (Vladzimirskiy, Shaderkin, 2015).

The main achievements of telemedicine today include increasing the availability of medical diagnostics (Baranov, 2015); increasing the efficiency of medical care; unloading of medical hospitals; solving the problem of the shortage of medical specialists; significant cost savings; reduction of time for medical diagnostics and assistance; the opportunity to consult with the best world experts (Zaytseva, Shiryaeva, 2016).

However, it should be noted that in the process of developing telemedicine in Russia a number of questions and problems arise that require immediate resolution, such as: who is the holder of the registry? who certifies the signature? who will confirm the credentials of the doctor? who will be responsible for the diagnosis?

In addition to the aforementioned federal law on telemedicine, the fundamental legislative acts should also include the Order of the Ministry of Health of the Russian Federation No. 344 signed in 2001, according to which the Concept for the Development of Telemedicine Technologies in the Russian Federation and its Implementation Plan has been developed.

According to experts, telemedicine is becoming a separate type of work in medical informatics (Panov, 2016). In this regard, the imperfection of the Russian legal framework may entail the following risks: inadequate technical equipment, which may lead to a distortion of the information received and transmitted; violation of confidentiality and disclosure of medical confidentiality; lack of direct examination of the patient, which may lead to an erroneous diagnosis; insufficient information; occurrence of false information; financial and economic problems associated with the current taxation of medical services; economic and other risks associated with liability for the provision of services outside the medical licensing facility; and the risk of providing services outside established medical facilities and standards.

By creating the Eurasian Economic Union, Russia has become a member of a large community where issues of cross-border interaction are especially relevant (Zaytseva, Shiryaeva, 2016). In this regard, by 2025, the Russian legislation should be brought into line with the legislative framework of the Eurasian Union (Panov, 2016). It should be noted that this is primarily due to the field of healthcare and the provision of medical care to the population of Russia. However, the legislation of the Eurasian Economic Union is at the formation stage. For this reason, Russia needs to take the initiative to create a unified Law on Telemedicine for the Eurasian Economic Union, taking into account national characteristics, problems, and difficulties of cross-border telemedicine.

Drawing up the recommendations for improving the development of telemedicine in Russia

The authors believe that special attention should be paid to economic and legal regulation of the following areas:

1. Improving the management of medical consultation on remote treatment. For example, in the People's Republic of China, on January 4, 1999, the Ministry of Health of the People's Republic of China published a "Notification of strengthening the management of the consilium for remote treatment". Remote treatment refers to a form of medical care that involves the use of electronic means of communication for medical consultations in other places, this is a medical action that must be carried out in a medical institution that has received a license from the state (Gzanka, 2006).

2. Developing guidelines for the promotion of telemedicine services (Shvets, 2017). For example, in the PRC on August 21, 2014, the National Health and Family Planning Commission adopted the "Recommendations on promoting the provision of remote treatment services by medical institutions". Medical institutions, using information technology in their activities, provide medical services to patients outside medical institutions (Shvets, 2017).

Remote patient care services include remote pathological diagnosis; remote diagnostics of medical imaging (including imaging, ultrasound, nuclear medicine, electrocardiogram, electromyogram, encephalogram, etc.); remote monitoring, remote medical consultation, remote ambulatory reception, distance discussions, etc. (Rogach, 2014).

3. Developing the federal legislation on the prevention of infectious diseases, the law on practicing doctors, the law on maternal and child health care, the law on liability for violation of the law, as well as the general norms of civil law, the rules for nurses, the rules for the formation of the medical history of medical institutions and other sources providing for the implementation of telemedicine standards on the confidentiality of information and personal data of patients. This means that patient confidentiality should be legally protected, including in the process of providing medical services using remote treatment, including the specifics of the patient's location and the location of the invited medical institution.

It should be noted that in the case of using electronic medical records and the diversity of informed subjects in the remote provision of medical services, "the risks of violating a patient's confidentiality and the difficulties of state supervision of privacy violations" increase. A generalization of the analysis of medical practice and social studies show that the violation of "patient confidentiality remains one of the issues that need to be urgently addressed".

Using a remote form of treating patients using telepresence robots requires an immediate discussion by an expert and professional community on establishing legal relations between the circle of subjects and the grounds for the emergence of these relations (Borisov, Ivanov, 2017). The specified form of treatment generates certain above-mentioned legal, economic, and other risks. In this regard, the legal mechanisms that are aimed at minimizing these risks must be elaborated. With remote treatment, there may be a case in which only one of the medical institutions provides remote services, while the other participants carry out traditional medical activities. Legal regulation of such a situation is quite simple, by analogy with the classical form of medical services. Meanwhile, remote diagnostics and treatment using providers or telepresence systems suggest the formation of two types of distance medical activity, namely, medical consultation of distance treatment and general distance treatment.

Covering the practice of applying new laws of the Russian Federation and the PRC on the remote provision of medical services (telemedicine services) indicates the duality of legal relations that may arise in the provision of such services. Using the terminology of the legislative practice of the PRC, it can be noted that telemedicine is the provision of medical services for general distance treatment and the holding of a consultation of distance treatment. Chinese medical practice of providing services in a remote format has faced the need to redistribute the burden of responsibility between the medical institutions participating in the consultation (inviting and invited medical institutions), in particular, for reasons of harm to the health of patients in the case of providing poor quality medical services.

In this regard, various scientific approaches to solving this problem have now been identified.

The first scientific approach assumes that the participants in the consultation (both inviting and invited medical institutions) are, in these cases, jointly responding to the patient. In our opinion, from the point of view of effective protection of the violated rights of patients in providing remote treatment consultation services such legal structure, in which the burden of responsibility rests with the medical institution that is in the binding relations with a patient and invites other medical institutions to conduct the consultation in remote form, is preferable.

However, the burden of responsibility may also be put on the invited medical institution in recourse, provided that the inviting medical institution bears the proof of guilt of this participant in the consultation. In this case, the guilt of the invited medical institution and the classification of medical risks within the standards of medical services acceptable by medical practice must be elaborated. In

addition, such a legal position is based on the judgment that the patient is the so-called “weak” side of legal relations.

Today, the legal regime for remote treatment and telemedicine services in the Russian Federation is at an early age and is likely to receive an impetus for further development. The process of providing services using remote technologies and telepresence systems requires the adoption of a number of special regulations and directives of the executive bodies of the Russian Federation aimed at minimizing legal risks for patients. Among the main problems of legal regulation of telemedicine services identified at present, the following areas for further legal research should be noted:

1. Creating a legal regime for the protection of confidential information about patients, their state of health, and other personal data. Information in the electronic interaction mode is circulating in nature, which, obviously, leads to its distribution among a wider range of participants compared to the traditional form of providing medical services (Tihon, 2017). For this reason, blocking the availability of patient information is one of the main tasks of developing telemedicine.

2. Elaborating contractual relationships between the inviting and invited medical institutions. There is currently no uniform scientific point of view on the issue of assessing the legal qualifications of these relations, which have already taken shape in Russian medical practice.

Based on the results of the research, in order to develop an organizational and methodological mechanism for implementing practical recommendations for introducing telemedicine services, the authors developed recommendations for the implementation of information and communication technologies in the healthcare sector.

During the writing of the article, the main theoretical and applied provisions and recommendations have been brought to the level of specific proposals that can be implemented in the activities of medical institutions in order to increase the effectiveness of the development of telemedicine.

The authors of the study provide the following statistical data (Telecomtimes, 2018):

From March to October 2018, residents from the Central Federal District most often resorted to telemedicine services – 25% of the total. The absolute leader in the number of applications to the Central Federal District was the Moscow region (Moscow and the Moscow region). The residents of the capital and the Moscow region accounted for 54% of the total number of applications in the district. Together with Moscow, the five regions where telemedicine was most in demand included: Lipetsk region (6% of calls), as well as Bryansk, Voronezh, Tula and Yaroslavl regions (4% of calls each).

In the Volga Federal District, experts recorded 20% of calls to online medicine. Telemedicine was most popular in the Volga Federal District with residents of the Perm Territory (21% of all applications from the district), Samara Region (14%), Nizhny Novgorod Region and the Republic of Bashkortostan (11% each), the Republic of Udmurtia (10%).

In another 16% of cases, users from the Siberian Federal District applied for telemedicine consultations. The most active were residents of the Irkutsk Region (30%), Krasnoyarsk Territory (15%), Altai Territory (14%), Novosibirsk (13%) and Kemerovo Regions (11%).

Conclusions

In conclusion, it should be noted that creating cross-border medical services and telemedicine can entail such positive effects as the provision of highly specialized medical care, medical services in border areas, and medical care for foreign patients.

Promising areas for further scientific research are as follows:

1. Based on the comparative legal analysis of the legislative framework of the two countries (the Russian Federation and the People's Republic of China) and law application practice in the field of telemedicine, a conclusion can be made that there are similar gaps in legal regulation, as well as identical trends in reforming the healthcare system at the present stage.

The main areas of solving systemic problems in the provision of telemedicine services include creating an effective legal regime aimed at ensuring the high quality of the services provided; building a legal model for implementing an independent assessment of the quality of services; optimizing a single information platform in this area; as well as the modernizing mechanisms for the economic and legal protection of patients.

2. Promising areas of further scientific research are the development of scientific and applied recommendations on the above problems at the level of integration associations of countries, as well as the creation of model options for legal regulation in the form of by-laws.

It is noted that the most obvious advantages of introducing telemedicine into the life of Russian society are its independence from the geographical location and time factor, the ability to access remote information in real-time or, if necessary, promptly. In addition, the inclusion of this type of medical services in medical practice in various countries, including Russia, requires immediate amendments to the regulatory framework for the regulation of the process of providing remote medical care.

The implementation of the telemedicine concept in Russia will be hampered by the following problems:

1) low availability of modern technologies to the population;

2) unresolved issues of security of the use of personal data;

3) the unwillingness of Russian doctors to work in the framework of telemedicine;

4) a low level of patient confidence in telemedicine.

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What Factors Affect the Intention to Borrow Through Peer to Peer Lending in Indonesia?

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Abstract

This research aims to investigate various intentions that influence borrowers in using a technology that focuses on the peer to peer lending platform as a growing financial services business in Indonesia. We use a survey by distributing online questionnaires and collect data from 183 borrower through peer to peer lending. The linear regression results that have been done show that trust, perceived risk, utilitarian value, and perceived cost have a significant effect on intention to borrow through peer to peer lending whereas ease of use shows insignificant results. The limitations of this study emphasize the first ten peer to peer lending companies registered with the OJK. Also, this study consisted of five factors measured against intention to borrow through peer to peer lending.

Keywords: Financial technology, Peer to peer lending, Technology acceptance model, Digital funding, Indonesia

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Abstract

This research aims to investigate various intentions that influence borrowers in using a technology that focuses on the peer to peer lending platform as a growing financial services business in Indonesia. We use a survey by distributing online questionnaires and collect data from 183 borrower through peer to peer lending. The linear regression results that have been done show that trust, perceived risk, utilitarian value, and perceived cost have a significant effect on intention to borrow through peer to peer lending whereas ease of use shows insignificant results. The limitations of this study emphasize the first ten peer to peer lending companies registered with the OJK. Also, this study consisted of five factors measured against intention to borrow through peer to peer lending.

Keywords: Financial technology, Peer to peer lending, Technology acceptance model, Digital funding, Indonesia

Introduction

The existence of a business with a financial technology (FinTech) model as a form of adaptation from a technology-based business. Romānova & Kudinska (2016), FinTech can be perceived as a form of integration between finance and technology where the process from the new technology base will replace traditional financial structures. This certainly presents its own important role in the field of financial services in Indonesia, where this business is a form of innovation in financial services that is

able to provide convenience and effectiveness in dealing with financial products and services. According to a summary of Bank Indonesia Regulation No.19 / 12 / PBI / 2017 concerning Financial Technology Implementation accessed from the website of Bank Indonesia (2017) FinTech consists of 5 categories. Through these regulations it is explained that the five categories of Financial Technology Organizers are payment systems; market support; investment management and risk management; loans, financing, and capital providers; and other financial services. Each of these categories has different uses of financial transactions according to the needs of the community. The first category, namely the payment system (payment, settlement, and clearing) includes authorization, clearing, final settlement, and payment execution. In addition, the second category is market support (market support or market aggregator) which is used in terms of providing information facilities to the public more quickly and cheaply about financial products or services such as investment, insurance, credit, deposits, or even savings products. The third category is investment and risk management where financial technology providers are able to provide forms of online investment products and online insurance. For the fourth category, namely loans (lending), financing (financing or funding), and capital providers (capital rising) as a financial technology management that provides information technology (peer to peer lending) and lending or fund-based services. And the latter category is another financial service which is the implementation of financial technology passed by the four categories described earlier.

Based on information obtained from the Lokadata website (2018), it is known that the types of FinTech that are widely registered with Bank Indonesia and the Financial Services Authority (Otoritas Jasa Keuangan, OJK) as of August 2018 are FinTech which provides services in the form of loans, financing, and provision with a total of 64 companies. Furthermore, as many as 24 registered companies offer FinTech types in the form of payment systems. For the types of Market Supporters and Supporting Organizers consisting of 7 and 3 companies that have been registered. This shows that the community's need for access to funding is in great demand, where the existence of this type of FinTech is able to reach the search for capital that can be used for business activities, especially for SMEs. Based on information obtained from the website (OJK, 2019) until February 1, 2019 there are 99 companies that have been registered with the OJK. FinTech, which is registered in the OJK, is experiencing annual growth. Where, in 2017 there were as many as 24 companies that had been registered with the OJK and in the following year increased to 64 companies.

FinTech can help in overcoming the problems that arise in buying and selling transaction activities and payments. The role of Fintech is in the payment system based on the presentation on the Bank Indonesia website (n.d.) which is providing the market for business actors; Become a tool for payment transactions, open / settlement and clearing; Helping in implementing more efficient investments; Risk mitigation for conventional payment systems; and Helping parties who need to save, borrow funds and invest in capital. Financial Technology is also able to provide benefits to consumers, namely allowing consumers to get better services and the availability of more choices; for FinTech players, namely helping in simplifying the transaction chain, being able to reduce operational costs, and capital costs; and for the State that can encourage the transmission of economic policy, help increase the speed of the velocity of money.

FinTech applications in Indonesia are also increasing, this can be seen by the increasing number of industries from Information Technology-Based Loan and Loan Services, commonly known as Peer-To-Peer Lending. Peer to peer lending as a technology-based innovation business that can bring together and facilitate online lending activities between lenders and loan recipients (borrowers). One company such as Investree seeks to attract prospective users to borrow online by offering lenders (lenders) some attractive returns, measurable risks, and ease of transactions. Also, the offer given to the borrower (the borrower) is an easy and fast process; there are transparent and cost-friendly transactions. The advantage obtained by the borrower is that it can facilitate the transaction process as revealed by Liebana-Cabanillas et al., 2014; Zhou, 2013a; Ondrus and Pigneur, (2009) in (Teo, Tan, Hew, & Yew, 2015) that cellular payment users can complete a payment transaction more safely, quickly, and comfortably because it can be accessed anytime and anywhere. So this makes it possible for borrowers to obtain funding which can later be used for business capital and various other investment needs.

OJK through its publication on its website (OJK, 2019) describes the total Fintech registered and licensed operators as 99 companies and there are 182 entities that are still not registered and without permission to operate in Indonesia. In this case, OJK acts as an institution that regulates transaction activities from information technology-based online loan services. With the small number of Fintech registered in OJK, it shows that there are still many companies that do not have permission to operate. So that it allows a high risk to use a peer to peer lending service in order to make loan transactions. Risk becomes an aspect that can influence the borrower's decision to use the peer to peer platform to find loan funds as stated on several platforms such as Modalku and Investree that attach information about risks that may be borne by the user.

The aim of this research is to analyze various determinations such as trust, perceived risk, utilitarian value, ease of use, and perceived cost that influence the intention to make loans for funding through peer to peer lending. Various previous studies also discussed the various motivations that underlie users to use online transactions such as cellular payments, one of which is to use the technology acceptance model or commonly called (technology acceptance model). Therefore, in this study we will discuss what will affect borrowers in conducting the intensity of borrowing through the peer to peer lending platform as a financial services business that has increased in Indonesia.

This research will be continued into several sections of the discussion consisting of literature reviews relating to this research, followed by the methodology section used to collect data, the fourth part will discuss the data obtained and analyze the results, and the last part will be completed with conclusions from the research.

Literature Review

FinTech and P2P Lending

FinTech is defined as the use of modern innovative technology software by a company which functions as a provider of financial services (Romānova & Kudinska, 2016). According to Arner, Barberis, & Buckley (2015) and Hochstein (2015) in Romānova & Kudinska (2016), FinTech can be perceived as a form of integration between finance and technology where the process from the new technology base will replace traditional financial structures. According to Stern, Makinen, & Qian (2017), peer to peer lending is a form of innovative loans offered by FinTech or often referred to as marketplace lending to interact with prospective borrowers who have the potential to conduct loan searches that apply using the peer platform to peer lending that is connected to an internet connection. In the research of Vives (2017), it is explained that the peer to peer lending (P2P) platform provides credit without bank intermediaries as a place for individuals and companies to invest in small businesses. Peer-to-peer lending activities can be carried out through non-profit online platforms for lending and borrowing activities where traditional financial institutions do not become intermediaries in the ongoing process as expressed by (Loureiro & Gonzalez, 2015).

TAM (Technology Acceptance Model)

Intention to Borrow

The intention of users to be able to continue using a mobile payment will be influenced by vulnerability to an increase in the perceived risk of the user and the uncertainty that arises after adopting it (Cao, Yu, Gong, & Adeel, 2018). Continuance intention is the intention of the user to continue using cellular payments after initial adoption (Bhattacherjee, 2001). Compared to offline and online payment methods, Mobile Payment involves large uncertainties and risks (Zhou T. , 2013). Research from Lu, Yang, Chau, & Cao, , (2011) shows that Mobile Payment services that create risk perceptions for users will negatively affect consumers' intentions to adopt and use these services (Lu, Yang, Chau, & Cao, 2011).

The model used in adopting technology proposed by Davis (1989) is the Technology Acceptance

Model or commonly referred to as TAM. The Technology Acceptance Model is one of the most widely used theories in conducting research on the information system Mortenson & Vidgen (2016) . The research conducted by Davis (1989) to test the variables in the form of perceived usefulness and variables perceived ease of use as a determining factor for a person's tendency to use or not even use information technology in the process of petrified work done. According to the article Davis (1989) the definition of Perceived usefulness (U) is the level of trust of someone that one's work performance will increase by utilizing a system or can be said to be able to use its benefits and Perceived ease of use (EOU) is the level of trust of a user that in using the system can be free from business as expected.

Trust to platform

According to Yousafzai et al. (2003), the involvement of the level of risk possessed on a financial transaction is a function that can describe the trust. Based on the presentation of previous research described in Teoh, Chong, Lin, & Chua (2013) explained that trust has a significant influence to lead to positive intentions to adopt online services. As stated (Zhou, 2011) that there is significance arising from the influence of the user's initial trust in his intention to use based on research from Chinese mobile phone users. Based on previous studies, we develop the following hypothesis:
(H1) : Trust to platform affect positively to intention to borrow through P2P lending

Perceived Risk

The results of the research conducted by Yang, Liu, Li, & Yu (2015) show that financial risk is the strongest factor in which the results of the tests conducted indicate that the relationship is significantly negative. According to Kovács & David (2016) ,with the advancing technology that is increasingly fast it can become a threat from the security side and also allows for fraud to occur which will affect users to use mobile payment. Some of the risks associated with mobile payment are the potential for errors in the payment transaction process, records of transactions and payments that are lacking, or that fraudulent transactions are disclosed by (Mallat, 2007) and (Hui et al., 2002) as quoted in (Ozturk, Bilgihan, Salehi-Esfahani, & Hua, 2017). Based on previous studies, we develop the following hypothesis:
H2: Perceived risk affect negatively to intention to borrow through P2P lending

Utilitarian Value

Utilitarian values have been defined as an assessment of the instrumental value of a functional attribute (Batra, 1991). In addition, Park and Yang (2006) as quoted in Ozturk, Bilgihan, Salehi-Esfahani, & Hua (2017) state that consumers will be directed to the utilitarian value that is felt in the context of using mobile devices because of the possibility of doing things quickly, anytime, anywhere, which in turn will reduce the effort needed. Also, in his research Arvidsson (2014) states that the benefits of a product or service can be felt when the user begins to compare a consideration as an important factor that can influence users to adopt a technology. This factor can be perceived usefulness consisting of quality and performance as expressed in research (Davis, 1989). Based on previous studies, we develop the following hypothesis:

H3: Utilitarian value affect positively to intention to borrow through P2P lending

Ease of Use

The ease will affect the tendency towards the use of the mobile payment service for its users Arvidsson (2014). Based on research from (Guriting and Ndubisi, 2006) as quoted in (Teoh, Chong, Lin, & Chua, 2013) found that user perceptions of convenience have a significant positive effect on the intention to use online banking services for Malaysia. Based on previous studies, we develop the following hypothesis:

H4: Ease of use affect positively to intention to borrow through P2P lending

Perceived Cost

The types of fees that will be charged to users in the form of fixed costs such as fees that will be charged

when installing software from mobile payment; and transaction costs which will be charged by the user every time they make a business transaction on mobile payment (Chou et al., 2004) as quoted in (Teoh, Chong, Lin, & Chua, 2013). Some studies state that the fees that will be charged by users will be taken into consideration for adopting or even using a mobile payment service. Based on previous studies, we develop the following hypothesis:

H5: Perceived cost affect negatively to intention to borrow through P2P lending

Methods

Data and Survey Instrument

This research will be conducted by collecting data to be obtained from questionnaire survey activities. The research uses survey data which consists of 32 statements on research variables consisting of trust to platform, perceived risk, utilitarian value, ease of use, perceived cost, and intention to borrow. Some questionnaire questions will be submitted to respondents using a 5-scale Likert scale which is from 1 which means strongly disagree to 5 which means strongly agree.

The population size (N) of respondents in this study is unknown. So this study will collect data from large research samples using the Lemeshow Formula. Using the formula above, the minimum number of samples obtained is that in this study 164 respondents who met the specifications made loans using the peer to peer lending platform.

Table 1: Survey Questionnaire

Items		Questions
Variables	Notation	
Trust to platform	TR1	I believe my personal data will not be submitted to other parties
	TR2	I believe the potential for fraudulent transactions is low.
	TR3	I believe the peer to peer lending platform will use my information wisely.
	TR4	I believe the peer to peer platform that has been registered with the OJK is safe from the possibility of fraud.
	TR5	I believe my important information such as credit history, KTP, KK, salary slips and others are not disseminated.
	TR6	I believe the peer to peer lending platform provides accurate loan information.
Percieved Risk	PR1	I can accept the loan interest rate
	PR2	Old loan period
	PR3	Low interest loans
	PR4	There is no guarantee that the loan funds that I submit will be fulfilled.
	PR5	The operational system works well.
	PR6	There were no charges that I did not know that were not informed beforehand.
	PR7	The risk of tapping personal data is low
Utilitarian Value	UV1	easy to get a loan source
	UV2	No guarantee required
	UV3	Submission of a loan does not go through a long process.
	UV4	Loan funds can be obtained in a short time.
	UV5	Does not require a complicated process
	UV6	The peer to peer lending platform makes me comfortable in making loans
Ease of Use	EU1	The peer to peer lending platform is easy to understand.
	EU2	The peer to peer lending platform is easy to use.
	EU3	Information on the loan approval process can be accessed at any time.
	EU4	The loan application procedure is very simple.
	EU5	Easy loan withdrawal.
	EU6	Easily check installment on loans that have been paid.
Percieved Cost	PC1	Low late fees
	PC2	Low administration costs
	PC3	Low interest fees charged
Intention to Borrow	IB1	I am interested in making loans through peer to peer lending
	IB2	I plan to make a loan on the peer to peer lending platform in the near future
	IB3	I will continue to use the peer to peer lending platform to borrow
	IB4	I consider all loan transactions I will use the peer to peer lending platform

Result and Discussion

Validity and Reliability Test Results
Validity and reliability test result provided in table 2 below.

Table 2: Validity and Reliability Test for Variables

Variables	Items	KMO	Conclusion	Cronbach's Alpha	Conclusion
Trust	6	0,886	Valid	0,898	Reliable
Perceived Risk	7	0.812	Valid	0.800	Reliable
Utilitarian Value	6	0.872	Valid	0.875	Reliable
Ease of Use	6	0.876	Valid	0.902	Reliable
Perceived Cost	3	0.746	Valid	0.921	Reliable
Intention to Borrow	4	0.783	Valid	0.866	Reliable

The results obtained as presented in Table 2 indicate that the KMO value is greater than 0.5 for each variables. Thus, we conclude that questionnaire used to measure variables of trusts, perceived risks, utilitarian values, ease of use, perceived costs, and intention to borrow are valid measurements. Then, reliability analysis of all variables show that the Cronbach's Alpha results exceed 0.5 for each. Thus we conclude that each variables are reliable or would have consistently high results if periodic measurements are made.

Goodness of Fit
It is necessary to test the classic assumption of ordinary least square (OLS) regression, consists of autocorrelation, heteroscedasticity, and multicollinearity tests. Table 3 shows the result of statistical and goodness of fit test for the regression model. We conclude that the model is able to use for analysis.

Table 3: Statistical test and goodness of fit

Type of test	
Multicollinearity	
Trust	VIF = 1.979
Perceived risk	VIF = 2.646
Utilitarian Value	VIF = 2.730
Ease of Use	VIF = 2.953
Percieved Cost	VIF = 1.892
Autocorrelation	DW = 2.004
Heteroscedasticity	Graph plot
Goodness of fit	
F-test	F-value = 25,910, sig = 0,000
R-squared	0.423
adj R-squared	0.406

Regression Results

From the five independent variables used in this regression, it can be seen that the ease of use variable is not significant, this can be seen from the probability of the significance obtained, which is 0.607, where the value is greater than 0.05 while other variables have significant positive values at 0.05. Thus, the values of 0.247, 0.283, 0.332, and 0.151 of the Trust variable, Perceived Risk, Utilitarian Value, Perceived Cost indicate that the greater the value of the significant variable it will increase the intention

to borrow using the peer to peer database peer lending for borrowers. In an effort to increase intention to borrow, these variables must be able to be improved by the peer to peer lending company platform.

Table 4: Regression Result

Model	Unstandardized Coefficients		t	Sig.	conclusion
	B	Std. Error			
(Constant)	-0.015	0.344	-0.044	0.965	
Trust	0.247	0.092	2.694	0.008	Accept H1
Perceived Risk	0.283	0.117	2.425	0.016	Accept H2
Utilitarian Value	0.332	0.123	2.708	0.007	Accept H3
Ease of Use	-0.073	0.141	-0.051	0.607	Do not reject H4
Perceived cost	0.151	0.070	2.156	0.032	Accept H5

Based on the table above, the results for the regression analysis of the five independent variables statistically significant at the 0.05 significance level. Thus obtained a hypothesis which explains that there are two hypotheses accepted namely H1 and H3. Where the other three hypotheses that are rejected are H2, H4, H5.

Based on research conducted by Zhou T. (2014) it is revealed that users will get a positive utility that will lead to the use of mobile payments in the future if they have trust; and Phonthanukitithaworn, Sellitto, & Fong (2016) also prove that trust is a factor that can affect the user's intention to adopt a mobile payment service. Both of these studies indicate that trusts have a significantly positive relationship with the intention to adopt. This significant relationship explains that when trusts from users who act as borrowers change, then intention to borrow through peer to peer LEDs will also change. The positive relationship of the results of this study explains that when the level of trust (trust) of the borrower on the peer to peer lending platform increases, the intention to borrow them will also increase. This very minimal trust can potentially influence basic things so that there can be a rejection in giving personal information and various other important information to the peer to peer lending service providers. Where with trust, users feel that risk can be minimized and can influence individuals to use a service (Phonthanukitithaworn, Sellitto, & Fong, 2016).

Perceived risk variables in this study show results in the opposite direction to the research conducted by Wu, Liu, & Huang (2017) wherein the study explained that the risk has a negative relationship with intention to receive WeChat payment. However, the regression results produced in this study show that perceived risk has a relationship with a positive direction towards intention to borrow through peer to peer lending. Borrowers who do not meet the criteria or due to incomplete requirements to do loans through the formal financial sector, can try alternative loans through peer to peer lending, which is able to offer benefits such as having a relatively simple registration process and risk not being a barrier for users to have the intention to be involved in making a loan.

The data shows that Utilitarian value has a significant relationship to intention to borrow through peer to peer lending. This is consistent with previous research conducted by Ozturk, Bilgihan, Salehi-Esfahani, & Hua (2017) where the findings related to the user's intention to use NFC-Mobile Payment are influenced by Utilitarian values that have a significant positive value As stated by Chiu (2014) the intention to do online shopping as a positive effect of perceived utilitarian value which will lead to repeat purchase transactions. The use of a peer to peer lending platform can provide benefits for its users because it will lead to a fast transaction loan settlement process.

Furthermore, the ease of use variable shows that there is no significant influence on intention to borrow through peer to peer lending. Based on research conducted by Phonthanukitithaworn, Sellitto, & Fong (2016). It is mentioned that there are reasons underlying the findings of the study, namely stating that payment using a mobile payment is not considered an easy-to-use payment method compared to other

payment methods in the form of cash or credit payments. The connection with this study is that users of the peer to peer lending platform assume that loan transactions carried out are not considered as a device that provides added value in terms of providing ease of use based on other types of loan transactions. So that it cannot be proven that there is a significant positive effect on intention to borrow through peer to peer lending.

The variable Perceived cost in this study shows that there is a significant positive relationship to intention to borrow through peer to peer lending. Perceived cost in peer to peer loan transactions is considered not to reduce the intention of the user in obtaining a loan. As explained by Phonthanukitithaworn, Sellitto, & Fong (2016) the involvement of the perceived cost of intention to use mobile payment is not a problem for service users in Thailand. According to Phonthanukitithaworn, Sellitto, & Fong (2016) this can be related to the demographic profile of the respondents used in the study. The job classification of respondents is dominated by private employees as much as 50.82%. This shows that the fees charged are not a barrier to their intention to make loans. Where in general, those who work as private employees have relatively more stable income every month. So that this makes users who borrow through peer to peer lending do not pay too much attention to the fees charged due to sufficient financial resources for the income received.

Building trust between non-users, prospective users, or even service users becomes a matter of concern to improve the experience of users. Greater insecurity will arise for individuals who do not have experience in using peer to peer lending services where the process of lending and borrowing transactions takes place online. This can include an entity in the process such as from financial institutions, as well as various parties that have a focus on security issues. In addition, financial institutions and peer to peer service providers need to take the role of initiative in developing and using policies on user privacy in the practice of their business performance (business code of ethics). This can be useful to strengthen the message as well as a step in introducing a modern and safe service from peer to peer lending. So that the impact will affect the increase of trust among peer to peer lending users in Indonesia.

Implications in developing peer to peer lending need to pay attention to the utilitarian aspects of the perceived value of the user. Where when a user feels a utilitarian value in using peer to peer lending as a platform for seeking funding, it will form a more practical achievement orientation perceived by the user. Based on perceived value as well as consideration of faster service and efficiency formation when using the peer to peer platform, it makes users interested and have the intention to use it. Users can take advantage of the use of peer to peer lending to obtain funding with minimal effort and a fast process.

Conclusion

This study explains the determination of the factors that influence intention to borrow through peer to peer lending so that the conclusion is that there are two factors that can affect the user's intention to use this loan service, namely trust and utilitarian value. Where Trust and utilitarian value have a significant positive effect on intention to borrow, it can be explained that the user's intention in terms of making loans through peer to peer lending has a relationship that is in harmony with perceived trust and utilitarian value. Perceived risk and perceived cost show a positive significant relationship to the intention of peer to peer lending users. This condition illustrates that users have a high tendency to make loans by utilizing peer to peer lending, even though there is a consequence of a high enough risk and the existence of a fee charged when making a loan transaction. Ease of use in this study shows a relationship that is not significant to the intention to borrow. Users of the peer to peer lending platform assume that this online loan service does not provide added value in terms of providing ease of use compared to other loan transactions.

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Does Trust in an Online Marketplace Means Trust in Online Investing?

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Abstract

In this study, we analyze factors influencing the intention to invest in mutual funds in e-commerce or online marketplace. We built a model based on the trust transfer theory to examine whether perceived similarity with other digital products – such as mobile payment product- affects investor's trust. This assists in investigating the investor's intention in mutual funds through an online marketplace using financial literacy as a mediating variable. Using Likert' scale to collect data and regression model for the analysis, we collect the sample of 195 Indonesian respondents, familiar with purchasing in the online marketplace. We found that similarity with other digital products and the inventors' trust in conventional mutual fund systems influence trust in e-commerce mutual fund and investor's intention in mutual fund through an online marketplace. However, we found that financial literacy is weak in these relationships.

Keywords: Fintech, e-investing, Trust Transfer Theory, Financial Literacy, Intention to Invest

1 Introduction

A rise in smartphones users in Indonesia recently boosts an online transaction in various markets, including financial technology market or fintech. In 2018, the Indonesian population was 265 million and people under 35 adopt technology than other age groups. Being ranked sixth in the world in term of internet usage, Indonesia is a big country for fintech market.

Fintech is a combination of financial services and technology, moderating a conventional business model and facilitate long-distance transactions within a short time. Currently, peer to peer financing leads in fintech market in Indonesia. However, the Financial Services Authority (OJK) data showed that fintech financing experienced a significant increase in bad loans ratio, from 0.99% in December 2017 to 1.28% in January 2019. The high risk of investing in fintech financing makes fintech mutual funds worth consideration for portfolio diversification.

Mutual funds recorded a good performance in 2018. Referring to OJK data, the net assets of the mutual fund industry rose from Rp 457.5 trillion at the end of 2017 to 9.2% to Rp 499.5 trillion in November 2018. Based on the OJK data, the number of mutual fund investors, on November 16, 2018, was over 930,000, up 50.15% higher than that of 619,380 in December 2017. However, mutual fund investors in Indonesia are still low when compared with the total population.

Initially, public access to mutual funds product is limited. In mutual funds, investors must visit investment companies or banks that have mutual fund investment products. In 2000, the minimum purchase and sale of mutual fund investments ranged from Rp. 25 M to Rp. 50 million (about USD 1.700-3.500), which was out of reach of middle-to-low income groups. With technological advancements, the mutual fund products are offered in online marketplace platforms and the minimum purchase and sale of mutual fund units reduce to approximately Rp 100,000-Rp 250,000 (USD 5-15) through online transaction. In 2018, DailySocial report showed that the popular investment platforms in mutual funds were BukaReksa (49%) owned by Bukalapak, Tokopedia Reksa Dana (44%), and followed by Bareksa (26%).

This study aims to analyze the factors influencing the intention of investors to invest in mutual funds. We follow the trust transfer theory previously conducted by Cao, et al. (2018) and Zhou, et al. (2018).

The rest of the paper is structured as follows: Section 2 presents the literature review focusing on mutual fund, e-commerce, and trust transfer theory, which is followed by hypothesis development. In Section 3, we describe the methods to generate and analyse the data. In Section 4, we provide results and discussion, and Section 5 concludes the paper.

2 Literature Review and Hypothesis Development

E-Commerce has a unique feature as compared with the traditional brick-and-mortar, namely technology-based strategic decisions, direct responses that increase competitiveness, 24-hour operating time, and users to control interaction through technology intermediaries (Rayport et al, 2001). E-commerce has three aspects that can influence the banking and financial sector, namely banks and financial companies can use technology and e-commerce to market their products, provide new products and services, and offer potential innovation in banking and financial institutions (Heng, 2001). The development of internet technology in finance facilitates online transactions (Sun et al., 2014). Online finance consists of third-party financial payments, peer-to-peer lending, crowdfunding, online financial portal/e-commerce finance, innovative online financial products, and other financial services (Xia & Hou, 2016).

2.1 Mutual Funds

Mutual funds are the alternative investment tailored for investors who do not have time and expertise to calculate the investment risks (Rustendi, 2017). Each mutual fund has different investment objectives, such as appreciation of asset value, more stable income, and income from money markets (Reilly & Brown, 2011). In essence, the mutual fund distribution channels are through salespeople (intermediary brokers, banks, and commission-based planners) and direct purchases from investment companies (Reilly & Brown, 2011). Investors are charged a fee to compensate the brokers, whereas the direct purchase is free or offers lower costs. Purchase of mutual funds can also be carried out directly through e-mail, telephone, or at investment company offices. Rajalakshmi (2018) stated that cooperation between e-commerce and the investment industry such as Alibaba facilitates mutual funds growth. Amazon has developed a business by attracting minority ownership to the bankbazaar.com company that provides financial products in India.

2.2 E-commerce

According to Rofiq and Mula (2010), e-commerce is the activity of buying and selling goods or services through the internet. In recent years, e-commerce has undergone a significant change, marked by an increase in the number of users and internet usage, increase sales profits owing to a rise in online transactions (Li et al, 2012). E-commerce is four types: First, business-to-business, which is that purchasing and procurement activities, inventory management, channel management, sales activities, management of payments that arise between two organizations. Second, business-to-consumer refers to transactions carried out between business and customers. Third, consumer-to-consumer is a type of e-commerce whose transactions occur between customers, with no third party involvement. Fourth, consumer-to-business refers to a business model in which customers provide products or services used by organizations (Rayport et al., 2001).

2.3 Trust

Trust is the willingness of someone to take risks for other parties because of the expectation that the parties will take certain actions if the trust is unfulfilled, regardless of the ability of the party to monitor and control the actions of trusted parties (Mayer, Davis, & Schoorman, 1995). Trust is an important variable in maintaining long-term relationships between business entities and their customers (Berry and Parasuraman, 2004) in (Zhou et al., 2018). Trust can increase efficiency in decision making through simplification of acquisition and interpretation of information (McEvily, Perrone, & Zaheer, 2003).

2.4 Trust Transfer Theory

Transfer theory is a cognitive process where a trustor (individual, group, or organization) transfers or shifts its trust to another entity (Stewart, 2003). The process of transferring trust is applicable in e-commerce, and the process involves three parties: trustor, trustee, and third parties (Chen, et al. 2015). Trustor is a party that assesses whether another party can be trusted; a trustee is a party valued by the trustor based on its past trust history, and a third party acts as an intermediary. The underlying logic is that when the trustor trusts a third party, the close relationship between the trustee, the third party, and the trustor's trust will be transferred to the trustee. Thus, third parties are the sources of transfer of trust and trustees as the targets of trust transfer (Wang et al., 2013). Based on

previous studies, perceived similarity and trust in cross-channel are two representative factors to determine the relationship between sources and targets (Cao et al., 2018).

2.4.1 Perceived Similarity

The perceived similarity (Cao et al., 2018) is defined as the degree of similarity between mobile and pc-based online payments observed from several dimensions, such as functions and operations. The anonymous nature of online identity causes users to face difficulty in assessing the quality of information and motives of the information providers listed for online reviews. As a result, users may look for similar social characteristics for evaluation (Racherla, Mandviwalla, & Connolly, 2012). In this study, the perceived similarity is the level of similarity perceived by users between the mutual fund investment products using a conventional system and e-commerce purchases. Perceived similarity can help users to identify goods or services personally, to reduce interpersonal barriers, increase comfort, and ultimately contribute to the trust formation (Coulter & Coulter, 2002).

Thus, variables perceived similarity is used to evaluate whether there are similarities between digital e-commerce product transactions and the purchase of mutual fund investment products online. When users have confidence in digital product transactions and perceive that mutual fund investment is similar, trust can be transferred to the mutual fund via e-commerce. However, people tend to believe in mobile payment because of their trust in online payments (Cao et al., 2018). A previous study on e-services and e-finance found that perceived similarity had a positive influence on the trust of e-retailing systems (Walczuch, Lundgren, & Management, 2004). We develop the following hypothesis:

H1: Perceived similarity has a positive influence on trust in e-commerce's mutual fund product

2.4.2 Trust in Direct Mutual Fund

Trust in investment companies has not received much attention in academic literature (Kostovetsky, 2015). Trust has a strong impact on investors and facilitates online trading. Ming-Chi (2009) in Abroud et al. (2013) states that trust affects investor behavior. In e-finance, trust is important because online applications and the nature of financial services carry some uncertainties and risks (Zhou et al., 2018). E-finance is defined as the provision of financial services and markets using electronic and computing communication (Allen, McAndrews, & Strahan, 2002). Thus, mutual funds marketed through e-commerce are categorized as e-finance (Zhou et al., 2018).

The trust in direct mutual fund variable is the willingness of investors to invest in mutual funds using conventional systems such as interacting directly with investment managers. Delgado-Baleester & Hernandez-Espallardo (2008) in Cao et al. (2018) states that trust initially formed through regular use of the previous system; then, this is used to evaluate the same services. We develop the following hypothesis:

H2: Trust in a direct mutual fund has a positive influence on trust in e-commerce's mutual fund.

2.4.3 Trust in e-commerce

According to Cao et al. (2018), trust in e-commerce is the willingness of users to conduct transactions through an e-commerce portal and expect the portal to fulfill its obligations, regardless of the user's ability to monitor and control e-commerce actions. Although e-commerce has emerged over the last 10 years, the characteristics of uncertainty in the online environment make many users reluctant to perform online transactions, especially by customers who are used to the conventional method. However, trust can mitigate this problem (Racherla et al., 2012). Trust performs an important role in the online system, given that start-up brands are relatively unfamiliar with many customers (Reynolds, 2000). Previous studies (Gefen, 2002; Lie et al, 2006; Lim et al., 2006; Fang et al., 2014) in Zhou et al. (2018) states that trust becomes a significant variable for online purchases, both the initial and subsequent purchases. In the context of e-finance, trust facilitates safe transactions between parties and prevent financial losses to users.

However, investors face risks and uncertainties using e-commerce for investment. To overcome this problem, e-commerce serves as an investment portal that builds trust to reduce investment risks, to facilitate long-term relationships, and to increase the willingness of investors to invest. Trust will use these features continuously rather than moving to other parties (Cao et al., 2018). We develop the following hypothesis:

H3: Trust in mutual fund product has a positive influence on the propensity to invest in a mutual fund through e-commerce

2.5 Financial Literacy

Financial literacy is the ability to use knowledge and expertise in managing financial resources for financial well-being or long-term financial security (Hsiao & Tsai, 2017). A study conducted by Van Rooij, Lusardi, & Alessie (2011) states that financial literacy influences financial decision. Contrarily, people with low financial literacy will be more dependent on family and friends as the main source of financial advice. Besides, this category of

people will desist from investing in the capital market. According to Lusardi (2019), universal concepts for making financial decisions are (1) numeracy skills related to interest rate calculations and compound interest, (2) understanding inflation, (3) understanding risk diversification. Lusardi & Mitchell (2014) offered four principles to measure financial literacy. First, simplicity, which involves exploring basic knowledge to make decisions. Second, the relevant relationship with financial decisions. Third, conciseness, where the number of questions must be concise and widely adopted. Fourth, the capacity to distinguish and the level of financial knowledge of each person.

Overall, financial literacy influences long-term financial decisions of individuals and organizations (Lusardi, 2019). Financial literacy can help investors reduce the costs of collection and processing of financial information. This information cost will influence the intention of investors to invest when compared to the benefits obtained from investing in risky financial products (Hsiao & Tsai, 2017). Regression results from Mouna & Anis (2017) study revealed that the financial literacy and economic education variables have a strong influence on investor behavior in making a financial decision. Conversely, low financial literacy makes investors reluctant to invest in the capital market. We develop the following hypothesis:

H4: Financial literacy moderates the relationship between trust in e-commerce's mutual fund product and intention to invest in the mutual fund using e-commerce platform

3 Methods

3.1 Research Framework

We divide the model into two parts: The first model consists of two exogenous variables with perceived similarity and trust in a direct mutual fund towards an endogenous variable trust in e-commerce's mutual fund. The second model is the trust in e-commerce mutual fund product, which is an exogenous variable towards the endogenous variable intention to invest in the mutual fund using e-commerce and moderated by financial literacy variables. Using SPSS version 22, we used the multivariate regression and path analysis to test the feasibility of the model. This method can capture the influence of each exogenous variable on endogenous variables and test whether the trust in e-commerce's mutual fund mediates the relationship of two exogenous variables. This shows the perceived similarity and trust in a direct mutual fund towards endogenous variables intention to invest in the mutual fund.

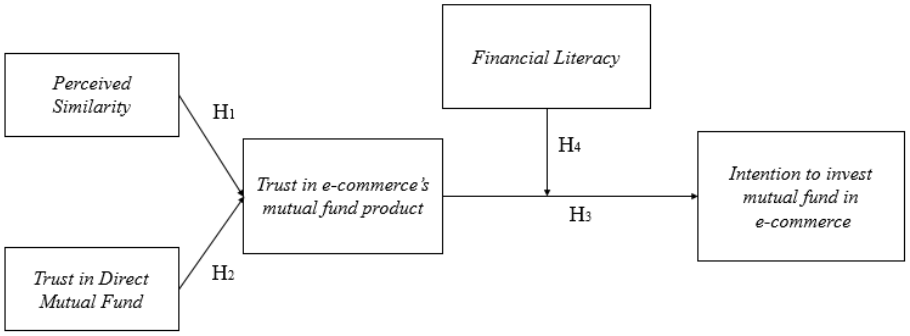

Figure 1. Research Framework

3.2 Data

In this study, we use the Google form to collect data and distribute the form through social media and e-mail. The criterion is that respondents must understand the investment features in e-commerce. Valid data collected from respondents were 195. A mutual fund offered through e-commerce is still relatively new in Indonesia. Therefore, the researchers selected respondents who were aware of mutual fund investments at Bukalapak and Tokopedia. This assists the researchers to capture the interest of investment through e-commerce, given that the average users of Bukalapak and Tokopedia in the first quarter of 2019 were 115.25 million visitors per month and 137.2 million visitors per month according to iPrice research in CNBC Indonesia news.

3.3. Questionnaire Instrument

We refer to Cao et al., (2018), Zhou et al., (2018), and (Mouna & Anis, 2017) to develop the questionnaire variables with a little adjustment to adapt Indonesian context. The designed questionnaire consisted of one variable

on perceived similarity, one variable on trust in a direct mutual fund, one variable on trust in e-commerce mutual fund product, one variable in financial literacy, and one variable on the intention to invest in the mutual fund in e-commerce. Each indicator except the indicator of the financial literacy variable has an interval data type, measured by a 6-interval Likert scale, namely 1 (Strongly Disagree), 2 (Disagree), 3 (Somewhat Disagree), 4 (Somewhat Agree), 5 (Agree), and 6 (Strongly Agree). Financial literacy variables use multiple choices that have true or false values, categorized as dichotomous data types.

4 Results and Discussion

4.1 Validity, Reliability and Statistical Test Results

The measurement model uses test reliability and validity. Reliability test was measured through Cronbach's Alpha coefficient with a value of ≥ 0.6, and the validity test was measured through Kaiser-Meyer-Olkin coefficient, factor loading (component matrix), and anti-image correlation matrix. Each with a criterion of ≥ 0.5 (Malhotra et al., 2010).

Table 1. Validity and Reliability Test

Construct	Item	Cronabach's Alpha	*Kaiser-Meyer-Olkin measures*	*Factor Loading*	*Anti-image Matrix*
Perceived Similarity	PS1	0,758	0,706	0,785	0,800
	PS2			0,882	0,653
	PS3			0,816	0,673
	PS4			0,558	0,807
Trust in Direct Mutual Fund	TDM1	0,818	0,706	0,884	0,668
	TDM2			0,860	0,701
	TDM3			0,827	0,763
Trust in E-commerce's Mutual Fund Product	TOM1	0,851	0,750	0,665	0,891
	TOM2			0,906	0,702
	TOM3			0,865	0,721
	TOM4			0,871	0,812
Intention to Invest Mutual Fund in E-commerce	INT1	0,865	0,795	0,908	0,728
	INT2			0,841	0,830
	INT3			0,769	0,896
	INT4			0,856	0,781

To determine that the model in the study has a correct estimator or Best Linear Unbiased Estimator (BLUE), we use to test the classic assumption of ordinary least square regression, consist of normality, autocorrelation, heteroscedasticity, and multicollinearity tests. Our test shows that both models are pass the BLUE test. Then we assess goodness of fit of models using F-test and adjusted r-squared.

The F test results show that the regression model, both model 1 and model 2, have a significant value of 0,000. This value is lower than 0.05, interpreted that the regression model is suitable and feasible for this study. Adjusted R^2 in model 1 is 0.449. This shows that exogenous variables perceived similarity and trust in direct mutual funds can explain the endogenous variable trust in e-commerce's mutual fund product by 44.9%, whereas the remaining 55.1% are influenced by other variables outside the research model. In model 2, its adjusted value of R^2 is 0.267 since the financial literacy variable acts as a moderator variable. This can be interpreted that the endogenous trust in e-commerce's mutual fund product variable influences the endogenous variable intention to invest in the mutual fund in e-commerce. This is moderated by the financial literacy variable of 26.7%, whereas the remaining 73.3% is the influence of other variables not included in the research model.

4.2. Regression Results

The following table summary the result of regression.

Table 2. Results of Regression

			Coefficient in regression					
			IV → DV	IV → M	IV + M → DV			
IV	M	DV			IV	M	Mediating	Moderating
PS	TOM	INT	0.257***	0.610***	0,266***	0,336***	Partial	
TDM	TOM	INT	0.022	0.112*	0.093	0.475***	Full	
FL		INT	-0.141*					Weakens
TOM		INT	0.608***					

Notes : PS (Perceived similarity), TDM (Trust in direct mutual fund), TOM (Trust in e-commerce's mutual fund product), FL (Financial literacy), INT (Intention to invest mutual fund in e-commerce). The mediating effects are tested by using Baron & Kenny (1986) regression method.

Model 1 which has a mediating relationship between TOM variables (trust in e-commerce's mutual fund product) and between exogenous variable PS (perceived similarity) and TDM (trust in a direct mutual fund) variables towards endogenous variable INT (intention to invest the mutual fund in e-commerce). This indicates that in the exogenous variable, PS has a significant value of 0,000, below 0.05 (5% confidence level). Therefore, H_1 is accepted, which means that PS has a positive influence on TOM with a 95% confidence level. While the TDM variable has a significant value of 0.022, which is above 0.10. Therefore, H_2 is accepted, which means that the TDM variable has a positive effect on TOM with a 90% confidence level. Positive influence is remarked from the positive beta coefficients of each variable.

Model 2: This is where the FL variable (financial literacy) acts as a variable that moderates the relationship between TOM variables (trust in e-commerce's mutual fund product) and INT variables (intention to invest the mutual fund in e-commerce). The regression results show that the TOM exogenous variable has a significance value of 0,000, below 0.05. Thus, H_3 is accepted, revealing that TOM has a positive influence on INT with a 95% confidence level. Since the influential FL variable, as a moderator variable, has a significance value of 0.090, H_4 is accepted, which means that FL has a moderating effect that weakens the relationship between TOM variables and INT with a 90% confidence level. The effect of moderation that weakens or strengthens the relationship is revealed if the beta value is negative. Thus, the effect is to weaken the relationship between exogenous variables and endogenous variables, and vice versa.

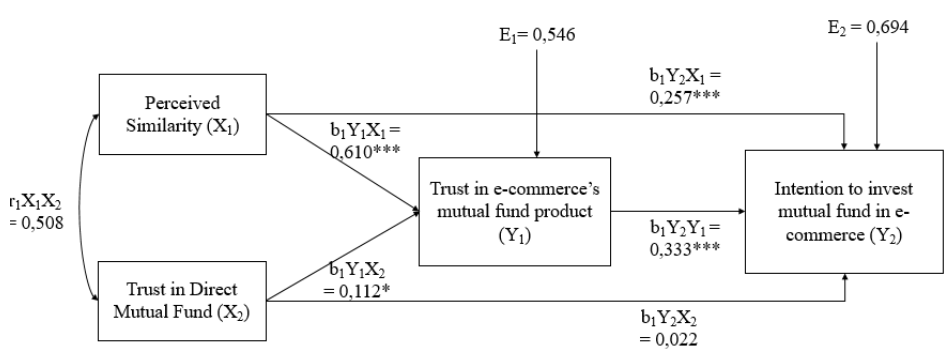

Figure 2. Results of Model Regression

4.3 Discussions

This research aims to find the empirical evidence behind the intention of investors to invest in mutual funds using the e-commerce platform and trust transfer theory for the analysis. We found several interesting findings. First, similarity perceptions have an influence on trust in mutual fund products in e-commerce, the result is consistent with Cao et al., (2018), Stewart and Zhang (2003), (Stewart, 2003) and (Wang et al., 2013). Second, trust in conventional mutual fund systems has an influence on trust in e-commerce mutual fund., the result is consistent with Cao et al., (2018), Lu et al., (2011), and Yang et al., (2008). Third, trust in e-commerce mutual fund influences an intention to invest in mutual funds, the result is consistent with Cao et al. (2018), Lu et al., (2011), Wang et al., (2013), and (Yang et al., 2008).

We also found that financial literacy has a moderating effect to weakens the relationship between trust in mutual fund products with the intention to invest in e-commerce mutual funds. This result supported Van Rooij et al., (2011) research, stating that many families with limited knowledge of stocks will avoid the capital market. Thus, they choose distribution channels that offer financial consulting services (Müller and Weber, 2010). Therefore, it is concluded that someone with higher financial literacy will participate in the capital market because this helps to minimize the cost of investment (Hsiao et al., 2018).

E-commerce companies are more flexible in presenting mutual fund investment features on their platforms owing to the regulation of Circular Letter of OJK No. 7 of 2014 concerning Receipt of Mutual Fund Securities Holders through Electronic Account Opening and Procedures for Electronic Subscription and Redemption of Investment Fund Securities. The implication of this research is that e-commerce players must be careful when choosing partner investment companies because the investor confidence in mutual funds is determined by the trust of conventional mutual fund systems. It is important for e-commerce players to work with reputable investment companies that have credibility and transparency, thereby increasing trust in e-commerce.

To regulators, we recommended regulating this market. The high number of e-commerce users in Indonesia has enhanced 78% growth in e-commerce trade value in 2019 based on the Ministry of Communication and Information. This is a great opportunity for investment companies to work with e-commerce and reach potential investors with low financial literacy. Many mutual fund products offered by e-commerce in Indonesia, namely Tokopedia and Bukalapak, only revolve around money market mutual funds. They provide digital features easier for people to invest with less risk. The implication of this study is that investment companies need to select e-commerce that has a large number of users and present a system familiar to potential investors. Thus, the perception of similarity plays an important role in the propensity of investors to invest in mutual funds via e-commerce.

5 Conclusion

In this research, we found that the trust transfer theory explains how an investor would behave regarding investment in an online mutual fund platform. Two aspects of trust transfer theory and trust in the original product (here conventional mutual fund product) are perceived similar. Similarity perception has a positive relationship to trust in an online mutual fund product, which effects investors intention to invest. We also found that financial literacy has a mediating effect on the relationship between trust in online mutual fund and intention to invest negatively, showing that an investor with low financial literacy is more likely to invest in an online mutual fund as compared with an investor with high financial literacy.

However, the literature on fintech investment is limited, especially on mutual funds offered through e-commerce since these features have recently been launched, namely Tokopedia in 2018 and Bukalapak in 2017. Thus, many respondents are unaware of these features. In addition, many respondents possess low financial literacy in the Indonesians capital market. Thus, they were unable to answer questionnaires with certainty, indicate that the financial literacy measure should be adjusted. Future research should be conducted to examine the comparability of other investment products, such as Gold, in e-commerce.

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Intrinsic Motivation to Learn Among Millennials in Malaysia: The Role of Passion and Self Efficacy

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Abstract

Intrinsic motivation to learn is a significant role for millennial on their accomplishment, proficiency and academic learning. Through intrinsic motivation to learn, it is involving an inherent gratification prompted by feeling that learning is interesting and enjoyable among millennial in educational sector. However, there are only a few studies that focus on millennial intrinsic motivation that can be found. Thus, this study aims to determine the relationship between harmonious passion, obsessive passion and self-efficacy towards intrinsic motivation to learn among millennial. Data collection was based on questionnaire. The sample size included 215 students from six faculties in Universiti Teknologi MARA (UiTM) Puncak Alam. All questions were designed to be close ended for easy analysis of the feedback and Likert scale was used to ascertain the level of agreement and disagreement. The replies have been analysed for reliability analysis, correlation analysis and regression analysis using IBM SPSS Version 23. The outcomes of this study indicated that harmonious passion, obsessive passion and self-efficacy show positive relationship with intrinsic motivation to learn among millennial.

Keywords: Intrinsic motivation to learn among millennial, harmonious passion, obsessive passion, self-efficacy.

Introduction

Millennials is generally describing a person who reaches adulthood in the early 21 st century and covers the generation of people born between 1980 and 2000. Millennial possess many characteristics that are unique in comparison to past generation. Millennial tend to be excited about their jobs, work hard and efficiently. Millennials comprise up to 25% workforce in Asia Pacific and the number is expected to grow continuously. It is estimated that millennials will make up 55% of global workforce by 2020 as reported Jobstreet.com. Hence, millennial is the largest generation in workplace, and they will give biggest influence on organizational performance and sustainability especially in Malaysia. This millennial plays an important role towards organizational performance. As millennial grow in the workforce, it will eventually replace the position of Generation X and Baby Boomers.

Intrinsic motivation is powerful element of human development and refer to doing activities doing activity for internal satisfaction rather than external intention (Ryan & Deci, 2000 and Vallerand, 2004). Intrinsic motivation to learn also helps individual develop their own objectives in achieving what they desire. When individuals have intrinsic motivation, they have the motivation to succeed and successfully achieved the desired objectives. In addition, positive attitudes will come out naturally throughout the learning process (Gamboa; Mauricio; Andres, 2013). Millennial are now

facing with the competitive environment and unrealistic expectation especially in education sector. In education sector, intrinsic motivation is the most important factor in helping students to improves learning of study and ability to manage difficulties (Endler, Rey & Butz, 2002). Banfield & Wilkerson (2014) believed that intrinsic motivation among millennial can be contributed to various factors such as job readiness, interest learning tasks, freedom of choice, level of involvement, and personality factors in educational sector. Since Millennial highly regard self-concept as important in life, this study aim to 1) determine the relationship between passion; obsessive and harmonious and intrinsic motivation to learn among millennial; 2) determine the relationship between self-efficacy and intrinsic motivation to learn among millennial.

Intrinsic Motivation

Intrinsic motivation in education expressed by Gottfried (1982), in general we have would neglect the subject of what keeps students inspired by the movement of learning, in the accomplishment of skill past minimum essential and first result. A developing number of specialists and educators concur that expanding student motivation is the way to upgrading learning and execution in school (Linnenbrink and Pintrinch, 2002). Motivation must be portrayed in a quantitative way between two endpoints on a continuum (Linnenbrink and Pintrinch, 2002). Lately, it has been acknowledged that motivation is not a stable characteristic of an individual, but instead a contextual and domain specific construct. Linnenbrink and Pintrinch (2002) have made wide explanation that took into consideration the advancement of different theories with respect to student motivation. According to Csiksezentmihalyi and Nakamura (1989), intrinsic motivation is a connected with mental and physical activities. They remain extremely attract through these exercises with characterized objectives, self-basic, self-think about their own behaviour and they are normally loose and not hesitant to failed in learning. Students that have high intrinsic motivation can adapt new ideas effectively and show better comprehension of the topic (Stipek, Salmon, Givvin, Kazemi, Sage and MacGravers, 1998).

Relationship between passions and intrinsic motivation to learn

Passion is a strong tendency toward a self-defining activity that one likes, find it crucial and meaningful and in which one invest time and energy (Vallerand 2003). The concept of passion has received a little attention in psychology. Psychologists who have looked at the concept have emphasized its motivational aspect. Passion has two dimensions which is harmonious passion and obsessive passion. Harmonious passion indicates a positive relationship to intrinsic motivation where a person will experience a positive cognitive, affective and behavioural consequence during and after activity commitment. Somehow, harmonious passion has a mediator to the intrinsic motivation which is mindfulness which harmonious passion helps a person obtain their self- esteem in their activities and be open; passionate engaged in the activities (Brown & Ryan, 2003). For the obsessive passion, is a result from a controlled internalization of the activity into one`s identity. Such internalization originates from intrapersonal or interpersonal pressure either because certain contingencies are attached to the activity such as feelings of social acceptance or self-esteem, or because the sense of excitement derived from activity engagement becomes uncontrollable.

Relationship between self-efficacy and intrinsic motivation to learn

Self-efficacy is the belief in one`s ability to influence events that effect one`s life and control over the way these events are experienced (Bandura 1994). Self-efficacy reflects confidence in the ability to exert control over one's own motivation, behaviour, and social environment. These cognitive self-evaluations influence all manner of human experience, including the goals for which people strive, the amount of energy expended toward goal achievement, and likelihood of attaining particular levels of behavioural performance. A study conducted by Lane, Andrew and Kyprianou (2015) investigated relationship between self efficacy and academic motivation performance among a sample of 205 postgraduates' students. Correlation result indicated significant relationship between self efficacy and achievement motivation. Kheirkhah (2017) who conducted a study on midwife students in Iran found positive relationship between self efficacy and motivation. Study by Laura (2012) had studied

about the relationship between self efficacy and managers' motivation. Positive relationship was found between self efficacy and manager motivation.

Research Methodology

The type of investigation is based on quantitative study. A total of 375 questionnaires distributed to the respondents. The population is referring all the student from six faculty in UiTM Puncak Alam that are Faculty of Business and Management, Faculty of Pharmacy, Faculty of Accountancy, Faculty of Hotel and Tourism, Faculty of Health and Science and Faculty of Education. The total of population in this study is approximately of 14,714 students which obtain by researcher. Based on simplified table in choosing the sample size done by Krejie and Morgan (1970) chose all 14,714 millennial students (N=15000) as the population size thus the sample size is 375. However, the researcher only received back 215 set of questionnaires and none of them are omissible. The time frame of this research is from early September to the end of December. This research will be using the non-probability sampling which is elements in the population will have any probabilities attached to being chosen as sample subject. The type of sampling used is purposive sampling technique. Purposive sampling is chosen to focus on the characteristics of millennial workers such as conscious about the environment. All primary data processed and analysed using Statistical Package for Social Science Version 23.

Questionnaires for this research were divided into three sections in order to study the intrinsic motivation to learn among millennial in Malaysia, the role of passion and self efficacy. The measurement were adopted from prominent researchers and the responses were standardised according to Likert Scale from 1 to 5 which valued 1= (Strongly Disagree), 2= (Disagree), 3= (Neither agree nor disagree) / (Undecided), 4= (Agree) until 5= (Strongly Agree). The measurement for intrinsic motivation was adopted from Musa (2012), passion from Vallerand, Blanchard, Mageau, Koestner, Ratelle, Leonard, Gagne, and Marsolais (2003) and self-efficacy from Chen, Gully and Eden (2001).

Result and Discussion

Table 1: Demographic Profile

Variable	Frequency	%
Gender		
Male	73	34
Female	142	66
Age		
20-24 years old	193	89.8
25-29 years old	21	9.8
30 years and above	1	5
Faculty		
Business and Management	156	72.6
Pharmacy	9	4.2
Accountancy	11	5.1
Hotel and Tourism	12	5.6
Health and Science	20	9.3
Education	7	3.3

CGPA		
1.50-1.99	1	5
2.00-2.49	7	3.3
2.50-2.99	29	13.5
3.00-3.49	125	58.1
3.50-4.00	53	42.7

The total numbers of respondents are 215. Based on the findings in Table 1, it shows 34 percent of the respondents are male and 66 percent are female respondents. 89.8 percent of respondents who participated in this research between 20-24 years old that makes up as majority. The larger propositions of respondents are from Business and Management Faculty with a percentage of 72.6. 3.00-3.49 CGPA makes up as majority with 58.1 percent.

Table 2: Reliability Analysis

Variable	Original Items	Items Dropped	Cronbach`s Alpha
Intrinsic Motivation	12	-	0.84
Harmonious Passion	6	-	0.69
Obsessive Passion	6	-	0.75
Self-efficacy	8	-	0.85

As shown in Table 2, the reliability test result revealed that all the 6 constructs are above satisfactory as their values are above 0.6. Reliability test such as internal consistency has been done in this study. This test is to determine the reliability of each variable. Table show the interpretation of reliability based on Cronbach Alpha for 215 respondents. Based on Cronbach Alpha result for intrinsic motivation the value is 0.84 which is good with 12 questions. Next, the value harmonious passion is 0.69 showing good result with 6 items. Followed by obsessive passion with 0.75 Cronbach Alpha and also give a good result with 6 questions. Lastly is self-efficacy which is Cronbach alpha value is 0.85 with a good result and 8 questions.

Table 3: Descriptive Analysis

Variable	Mean	Standard Deviation
Intrinsic Motivation	3.98	.45
Harmonious Passion	3.96	.47
Obsessive Passion	3.82	.55
Self-efficacy	3.89	.56

Table 3 shows that descriptive analysis consists of mean and standard deviation of the dependent variable and independent variable. Based on the score given, the highest mean is scored by intrinsic motivation while the lowest mean is by obsessive passion. Result shows that several score for every different variable, which is dependent variable for intrinsic motivation (M= 3.98, SD= .45.) This is followed by the two more independent variables which is harmonious passion (M= 3.96, SD= .47), obsessive passion (M= 3.82, SD= .55) and for self-efficacy it shows (M= 3.89, SD= .56).

Table 4: Correlation Analysis of Passion, Harmonious Passion, Obsessive Passion, Self-efficacy and Intrinsic Motivation

	HP	OP	SE	IM
Harmonious Passion	1	.57**	.45**	.48**
Obsessive Passion	.57**	1	.50**	.49**
Self-efficacy	.45**	.50**	1	.50**
Intrinsic motivation	.48**	.49**	.50**	1

Table 4 shows that the entire summary of findings. The result found the correlation between independent variables that is harmonious passion, obsessive passion and self efficacy at the 0.01 level (1-tailed) towards the dependent variable (intrinsic motivation). The correlation analysis between harmonious passion and intrinsic motivation shows a positive significant correlation with ($r = .48$, $p<0.01$) where it is a medium degree of harmonious passion with medium degree of intrinsic motivation. Moreover, correlation between obsessive passion and intrinsic motivation was also show a positive significant correlation with ($r = .49$, $p<0.01$) which it also shows a medium degree of obsessive passion with a medium degree of intrinsic motivation. There is no dimension for both self-efficacy and intrinsic motivation. Thus, the third correlation between self-efficacy and intrinsic motivation is ($r = .50$, $p<0.01$). This shows that there is a positive significant correlation which there is a large degree of self-efficacy with large degree of intrinsic motivation.

Table 5: Regression Analysis

	Dependent Variable: Intrinsic Motivation β
Independent Variable:	
Harmonious Passion	.23**
Obsessive Passion	.22**
Self-efficacy	.29**
F Value	40.02**
R^2	.36
Adjusted R^2	.35

Based on the result as stated in table 4.7, R^2 for the model between passion with two dimensions; harmonious passion and obsessive passion, self-efficacy and intrinsic motivation is .36. While the adjusted R^2 the value is .35. Therefore, the model explains 36 percent of variance in explaining intrinsic motivation. The other 64 percent were explained by other factors. The F value of the model is 40.02 and significant at ($p<0.01$), which indicate that the model is considerably fit. Harmonious passion and obsessive passion and self-efficacy have a positive significant relationship with intrinsic motivation. Thus, for harmonious passion, shows a positive significant relationship with intrinsic motivation ($\beta = .23$, $p<0.01$) obsessive passion, it makes contribution to intrinsic motivation with ($\beta = .22$, $p<0.01$). While for self-efficacy contribute with ($\beta = .29$, $p<0.01$).

Table 6: Summary of Hypotheses

	Hypothesis	Result
H1a	There is a positive significant relationship between harmonious passion and intrinsic motivation	Supported
H1b	There is a positive significant relationship between obsessive passion and intrinsic motivation	Supported
H2	There is a positive significant relationship between self-efficacy and intrinsic motivation	Supported

Table 6 shows the summary of hypotheses for this study from multiple regression analysis that has been done by the researcher. H1a indicate that there is a significant and positive relationship between harmonious passions with intrinsic motivation. While for H1b that represent also show a positive and significant relationship between obsessive passions with intrinsic motivation. H2 that represent the relationship between self-efficacy and intrinsic motivation also have a positive and significant relationship.

Conclusion and Recommendations

In conclusion, this research has successfully achieved the research objectives accordingly, which is to examine relationship between harmonious passion, obsessive passion and self efficacy towards intrinsic motivation to learn among millennial. All independent variables have a significant relationship with the dependent variable. Moreover, the entire tested hypothesis shows positive relationship between both variable. After completing this research, the researcher has gaining new knowledge and more ideas on how intrinsic motivation plays as a role and it is important towards an individual's life in a way to get their own self-satisfaction. According to the studies that have been conducted, researcher is aware about how the condition of surroundings can affected our motivation to learn. Researcher also gets the chances to know better how passion and self-efficacy emerges and influence factors of intrinsic motivation to learn. For the recommendation to the future researcher, it is good if the researcher use the longitudinal research design in the study because it would help the researcher to know about the people or phenomena in a long time of period in a way to meet the research objective. It may take more time, cost and effort to compare with cross-sectional studies for the time horizon. Next is, future researcher can make more sample for the study to get more accurate information towards the research findings. It is because when the researcher is using more samples to answer the questionnaire survey, the outcome that the researcher will get is high in term of its accuracy of the information.

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Towards Human-Machine Partnership in Strategic Management

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Abstract

Increasing capabilities of artificial intelligence and other cognitive technologies allow humans to collaborate with computers as associates on a scale never before. This, by contrast, implies a new level of challenge for the analysis of human-machine collaboration in various business domains. Despite a growing stream of literature on the cooperation between humans and AI, there are few academic research papers devoted to the question of cooperation among business executives and machines. Accordingly, this paper discusses the human-machine partnership in the process of strategic management. For this purpose, the author provides an in-depth analysis of the current and evolving capacities of AI. Additionally, a thorough review of existing research is conducted. The key findings of the study reveal that to embrace the promise of AI strategic management is to be redesigned around both humans as well as machines' capabilities. This requires human-machine integration that resembles a shifting division of work between business executives and artificial intelligence.

Keywords: artificial intelligence, cognitive computing, human-machine partnership, strategic management

Introduction

Artificial intelligence (AI) [1] has been in existence for over six decades and has gone through multiple boom and bust cycles. Nevertheless, at present, it has gained momentum. The flurry of AI's remarkable advances has been possible with the confluence of three factors: new algorithmic developments (Cheng and Yu, 2019), the significant increase in supercomputing power as well as the explosion of swathes of data (Duan, Edwards and Dwivedi, 2019). It has taken a long time for decades-old AI computation models to re-emerge. When chess champion Garry Kasparov was defeated by IBM's Deep Blue machine in 1997, its main advantages were in memory and computing. By contrast, machine learning (ML) algorithms have been the driving impetus behind many of the recent breakthroughs (Tegmark, 2017). The IBM Watson, the IBM Project Debater, and Alpha Go system gained their super efficiency with the use of deep learning (DL), a particular type of artificial neural network (ANN) and a subset of ML (Duan, Edwards and Dwivedi, 2019). DL is the characteristics of a broader trend: 'intelligent' technology that is capable of learning and improving (Reeves and Ueda, 2016). The self-learning capacities of algorithms make way for the rapid developments in cognitive computing [2] that bolsters 'thinking' and analytical capabilities of AI. As a result, in addition to executing well-defined tasks, repetitive activities and routine physical activities AI, and other cognitive technologies are beginning to handle more complex business tasks requiring cognitive skills (Davenport, 2019; Mahroof, 2019; Davenport and Ronanki, 2018; Jarrahi, 2018; Reeves and Ueda, 2016).

The evolving capabilities of AI shape the evolution of the collaborative practices between humans and machines in business practices (Malone, 2018). Ubiquitous technologies at workplaces, together with the ability to perform more complex tasks by machines, and computers translate into situations in which they support humans with their specific tasks becoming sort of 'partners' or 'teammates' rather than 'tools' (Wesche and Sonderegger, 2019). Going forward, Wilson and Daugherty (2019) posit that humans and machines are symbiotic partners, augmenting each other's strengths and compensating for one's weaknesses. With this mind, it is necessary to devise novel ways of involving business experts with the technology required to scale AI in organizations (Ransbotham et al., 2018) and balancing strengths and weaknesses of human and algorithmic intelligence (Günther et al., 2017).

This paper contributes to the emerging discussion on new forms of human-machine collaboration in corporate contexts. Accordingly, the ultimate goal of this paper is to explore the interplay of AI technologies and strategic management in the context of the human-AI partnership.

The structure of this paper is as follows. The next section gives a brief overview of AI's history, its capabilities relevant to strategic management as well as limits. In the following section of the paper, the author moves to discuss corporate strategy and then turns to consider AI's applications in strategic management. Finally, the author highlights the complementarity and collaboration between business executives and machines.

Artificial Intelligence - the background

AI is a relatively new field in science and engineering as the name itself was first coined in 1956 by John McCarthy, one of the founding fathers of AI. The symbolic victories, of IBM's Watson and Google DeepMind's Alpha Go over men, sparked the age of 'intelligent algorithms' and ushered in AI 'renaissance' - a new 'AI spring'. Along with many definitions of AI, one of the commonly-accepted textbook definition defines AI as "the designing and building of intelligent agents that receive percepts from the environment and take actions that affect that environment" (Norvig and Russell, 2016). This view of AI brings together a vast number of subfields, ranging from natural language processing to knowledge representation to automated reasoning to machine learning, and robotics to computer vision (Norvig and Russell, 2016).

The strengths of AI

Launching AI applications should be preceded by analyzing AI through the lens of business capabilities and comprehending its strengths and limitations (Davenport and Ronanki, 2018). In the context of strategic management, AI capabilities evolve around analytical, cognitive, and predictive competencies.

The world has now stepped into a new machine age triggered by AI-enabled automation as well as the convergence of AI abilities with a wide range of other evolving technologies (Brynjolfsson and McAfee, 2017). While automation, per se, has been in existence for years, it was very limited in intelligence as such and relatively inflexible (Miller, 2018). However, with the explosive development of ML techniques, AI is gaining more autonomy in simulating different aspects of human cognition, including self-learning (Zamora and Herrera, 2018). Given the increasing self-learning capacities of ML techniques that imitate human thought through data mining (Pah, Lazarowich and Snyder, 2019) and their ability to unravel 'model' out of 'data' (Krichevsky and Serova, 2019), machines exhibit more autonomy in the area 'thinking work' (Phan et al., 2017) than ever before. Thus the capability of AI is currently expanding beyond mechanical and repetitive to analytical and 'thinking'.

Modern AI is adept at processing enormous amounts of data with exceptional speed (Günther et al.,

2017). Needless to say that machines outperform humans on high combinational complexity (Bolander, 2019) and at various circumscribed tasks (Guszcza and Lewis, 2017). Prompted by high-advanced automated data analysis (AI is good at mass data interpretation) and the self-learning systems, analytical capabilities of machines evolved to the point that they are capable of providing cognitive insights (Kaur et al., 2019; Davenport, 2019; Davenport and Ronanki, 2018). Much more data-intensive cognitive analytics (Davenport and Ronanki, 2018) creates the exceptional opportunity of mass storage facilities for structured and semi-structured data (Williams, 2016) with extensive processing capabilities of mass data to generate relevant business insights (Kaur et al., 2019). The AI-based systems with growing degrees of cognitive analytical competencies and extracted knowledge from data enable enhanced information provisioning.

Moreover, with new methods of data processing, the predictive power of AI systems emerge on the horizon. Through analyzing and learning from a wide array of unstructured, complex, historical, and synthetic data, ML algorithms can create new information and make predictions from data (Cheng and Yu, 2019; Shrestha, Ben-Menahem and Krogh, 2019; Tegmark, 2017). A new stream of AI systems has increased the ability of an organization to use data to forecast, and dramatically reduced the cost of making predictions (Agrawal, Gans and Goldfrab, 2018). Malone (2019) points out the utility of another AI tool for automated predictions. With Bayesian Networks (the probabilistic technique used by ML), organizations have achieved the ability to simulate future incidents and developments (Malone, 2019).

The weakness of AI

Despite the increasing capabilities of AI, some major limits remain. First and foremost, Malone (2018) cites that contemporary intelligent systems such as ML and DL are characterized by specialized intelligence, which means they are capable of performing specific tasks. They lack human-typical intelligence. The IBM Watson program won in Jeopardy but can play neither TicTacToe nor chess since it is not taught to play the games (Malone, 2018). Computers drive cars, engage in conversations, diagnose cancers as a result of being programmed for the specific application (Bolander, 2019; Malone, 2018). Encoding all types of knowledge to increase general understanding competencies of machines is still many years away (Malone, 2018), which makes algorithmic intelligence limited. Narrow intelligence of AI imposes some constraints on business. Although organizations can benefit from AI-enabled systems for particular tasks, they would not implement them for broad problem solving and common-sense reasoning. Findings by Duan, Edwards, and Dwivedi (2019) reveal that the effectiveness of AI at all levels of decision making can be realized chiefly through human users. Machines do not match the rank of truly remarkable human capabilities: emotional, intuitive, reasoning, ethical, and creative.

On top of that, they lack big-picture, abstract and intuitive thinking as well as the exercise of imagination (Bolander, 2019; Daugherty and Wilson, 2018; Jarrahi, 2018; Martin and Golsby-Smith, 2017). Moreover, machines are not able to grasp human social and situational contexts, along with experiences (Miller, 2018). Automated simulations and predictions must be supplemented with humans assets that are hard to codify and capture by data: human experience, common sense, domain expertise, critical analysis, and contextual knowledge (Daugherty and Wilson, 2019; Günther et al., 2017). Also, many AI techniques suffer from weaknesses such as lack of transparency and explainability (Bolander, 2019). Algorithmic decision-making is much less trustworthy as machines are not capable of delivering comprehensive explanations about their reasoning and decisions (Bolander, 2019). It is not clear how algorithms arrive at specific results, patterns, and decisions. Accordingly, AI algorithms are frequently referred to as 'black box' models. In the neural network (considered as 'black box'), the inputs and outputs are known, but unknown are processes that are running inside (Krichevsky and Serova, 2019). The issue of 'black box' generates distrust in AI-based decision

outcomes (Shresthal, Ben-Menahem, and Krogh, 2019). Finally, learning systems creating own training data are confined in their scope (Zamora and Herrera, 2018).

Strategic management

A strategy is a management tool that serves as a guideline for organizational growth in terms of its position among competitors (Krichevsky and Serova, 2019). Rothaermel's definition is corroborated by Wheelend and Hunger (2012). They perceive strategic management as the combination of managerial decisions and actions that determine the company's performance in the long term, which includes: environmental mapping (both external and internal), strategy formulation, strategy implementation, and evaluation.

All strategic decisions rest upon information processing, and analytic capabilities of organizations (Dubey et al. 2017) as strategy grounds on the collection of information on market dynamics and competitors' activities extracted from data to provide predefined input to the decision-making process (Constantiou and Kallinikos, 2015). Organizations utilize different data collection methods to inform specific models to enhance the accuracy of future events predictions (Constantiou and Kallinikos, 2015). However, overreliance on models provided by computers may turn out a baleful consequence. Reeved and Ueda (2016) cite an example of LTCM that trusted in its predictive models on hedging against a potential Russian default (predictive systems did not figure out that it was under-hedged and exposed to liquidity risk) and lost $4.6 billion. This example illustrates that algorithmic processing of information should be accompanied by humans, who derive insights from the wide array of data. This is because strategic management addresses decisional situations about complex, ambiguous, unstructured problems often under the conditions of uncertainty (Agrawal, Gans and Goldfrab, 2019; Duan, Edwards and Dwivedi, 2019).

The imperative of a new strategic partnership

Drawing on the literature, Günther et al. (2017) underline the significance of human intelligence in handling problems for which the conditions are unknown and ambiguous. In line with this, Wilson and Daugherty (2018) posit that, regardless of state-of-the-art capabilities of machines, human intelligence remains in the loop on account of its unique features and abilities to extract and deploy insights. Therefore, it is better to leverage the use of AI as a means for augmentation rather than automation (Wilson and Daugherty, 2018).
As humans and machines have at their disposal a distinct set of assets, the combination of people and computers together can provide better service than either can alone. In light of the above, the scholars from the field highlight the integration of human and algorithmic intelligence into strategic management (Agrawal, Gans and Goldfrab, 2018; Davenport and Ronanki, 2018; Ferràs-Hernández 2018; Malone, 2019; Wilson and Daugherty, 2018; Davenport, 2016; Reeves and Ueda, 2016). The vision of human-machine partnership represents valuable enabler for executives. It drives the payoff for strategic management in the process of which humans and machines play their roles in an integrated manner.

The interplay of AI and strategic management

AI can gain significant traction in the process of strategic management since it holds promise for addressing many strategic needs. First fo all, AI-based systems can relieve managers from much of the quantitative work of strategic planning by running the numbers and data (Malone, 2019) and usher in enhanced productivity of executives taking away from them some tedious tasks. The province of machines could become sorting out and retrieving streams of data from an array of sources (Bolton et al., 2018), and generating specific business insights that are hard to capture through tra-

ditional data analysis. Davenport and Ronanki (2018) suggest that through ML, new data are accessible for better analytics as ML can detect probabilistic matches across databases. They bring an example of GE that took advantage of ML to automate supplier data, and in effect, eliminated redundancies and negotiating contracts previously supervised at the business unit level (Davenport and Ronanki, 2018). Given the analytic capacity of AI, the possibility arises for AI to step into the early phase of strategic planning that encompasses internal environment analysis, external environment analysis, and competitor analysis. This is in line with the studies of Constantiou and Kallinikos (2015), who underline the opportunity to integrate AI into the strategy development process to extend traditional information sources about the business environment. AI systems increase the variety of organizational knowledge as it can offer their support in analyzing customer, financial, and investment data, along with analyzing socio-economic, environmental data (Kaur et al., 2019). Thus, AI-supported automation may support managers with knowledge-intensive activities. On top of that Gupta et al. (2018) point out that contrary to present systems that can augment strategic planning by forecasting trends, cognitive versions of AI-enabled analytics can help human strategists identify new sources of growth and manage disruption as they hold the exponential potential for uncovering newer areas that may be completely unexpected and unexplored. Cognitive insights provided by AI may allow companies to develop new products and services or indicate new areas to explore. Extracted knowledge from data creates new expertise that can serve as a pillar for new business models. For example, Netflix Inc., based on advanced, analytics moved into the online streaming business even though their core business of mailing DVDs was going well. Coupling external and internal data sets to offer more sophisticated and richer insights can serve as a relevant input for strategy making. Cognitive insights provided by AI-generated analytics may help leaders visualize the future to pursue and specify actions that will help them to get there. Vendors such as Inspirient develops a cognitive analytics system that allows managers to obtain critical strategical insights upon which they can act. Inspirient utilizes methods from probabilistic reasoning to fully automate the data analysis process. Deloitte, the strategy consulting company, also moves into automating some aspects of strategy as it develops semi-automated sensing of an organization's external environment (Davenport, 2016).

In addition to cognitive analytics that enables new intangible assets (Constantiou and Kallinikos, 2015), AI systems provide data for automated simulations. With automated simulations accompanied by computational methods and models, scenario modeling, development of hypotheses, detailed knowledge of the connections between problem variables, AI can continually synthesize robust patterns from large data sets. On this basis, it creates predictions and makes choices (Malone, 2019; Shrestha, Ben-Menahem and Krogh, 2019). With automated predictions, managers can evaluate the present position of their organizations and forecast how it may change in the near future. They can also estimate the demand for the product, identify regions for expansion or specific sites for retail stores. Such forecasts can offer useful strategic guidelines and help to define strategic priorities. Netflix Inc. offers a case in point. It uses predictive analytics to help to decide what TV programs to produce. Hence prospects are pointing to the possibility of automating strategy evaluation (Malone, 2019).

Moreover predictions can assist in dealing with risks and uncertainty embedded among others in expansion strategies. IBM Corp., for instance, applies AI technologies to evaluate potential acquisition markets (Davenport, 2016). This is in line with Chui and Ip (2017) who suggest that that applying fuzzy logic (a powerful problem-solving technique of AI that determines the probability of different hazards) can provide insight into M&A evaluation and serve as indicators in M&A transactions. On top of that, AI, with its capabilities of predicting the proximity of the given outcome, can help handle complexity (Jarrahi, 2018), which is inherent to strategy formulation. Automated predictions, specifying the confidence of probability of an outcome and thereby reducing uncertainty, can serve as a significant input into decision making (Agrawal, Gans and Goldfrab, 2019), and underpin strategic decisions. Given the predictions and cognitive insights provided by

algorithms, executives can under certain circumstances take more nuanced and improved decisions and handle choice overload (Agrawal, Gans and Goldfrab, 2018) as well as high dimensional information (Miller, 2018). Moreover, Shrestha, Ben-Menahem and Krogh (2019) underline that algorithms may counterweight to biases and errors incorporated into human decision making.

A trade-off: Human-Machine collaboration

The information and predictions reported by the machines are not the only elements of decision making. Rigorous analysis of data cannot drive every business decision and action (Martin and Tony Golsby-Smith, 2017). An example cited by Martin and Golsby-Smith (2017) makes a case for it. When Jørgen Vig Knudstorp was the CEO of Lego company back in 2008, the data showed that girls were much less interested in their toy bricks than boys, which at first glance explained why 85 percent of the Lego players were boys. The information that girls are inherently less likely to play with the bricks did not convince Knudstrop. The question, he thought, was that Lego had not yet learned how to get girls to play with building toys. A few years later, Lego launched the successful Friends line (Martin and Tony Golsby-Smith, 2017). The Lego case illustrates that human insights empower the realm of possibilities and opportunities delivered by algorithms, and that data is not always logic (Martin and Tony Golsby-Smith, 2017). The interpretation of the world provided by AI systems is probabilistic, based on statistical learning. Therefore computer simulations and recommendations must be supported by skills that machine lack and which are a crucial success factor in business decision making: judgment, imagination, creativity, and intuition (Malone, 2019; Ferras-Hernandez, 2018). It is human strategists' role to associate toolkits of data and analytics with their expertise and skills to drive choices and possibilities and decide on a course of action. A human intermediary is required to evaluate the payoffs connected with different results (Agrawal, Gans, and Goldfarb, 2019). An example comes from Correlation Ventures. It runs the data through its predictive analytics algorithms to determine investment opportunities, and then managers conduct a more thorough analysis of the possibilities provided by algorithms (Reeves and Ueda, 2016). Given the above, the most promising opportunities for strategic management arise when human intelligence is put in the loop, enhanced and augmented by increasing intelligence of machines (Duan, Edwards and Dwivedi, 2019; Agrawal, Gans and Goldfrab, 2018; Jarrahi, 2018; Wilson and Daugherthy, 2018). Humans and machines taking advantage of their respective strengths emerge as a trade-off for strategic management.

Enriching this discussion, Reeves and Ueda (2016) have developed a concept of integrated strategy machine. They apply the term to the collection of technological and human resources that collaborate to develop and execute strategies. Davenport (2016), in turn, adopts 'integrated strategy approach' - the situation when the cognitive capabilities of machines are combined with the intelligence of human managers. In a similar vein, Malone (2019) calls the system in which machines and humans join forces in corporate strategic planning as 'cyber human-strategy machine'.

Conclusions

This paper contributes to the emerging discussion on AI deployment in strategic management by analyzing the scope of complementarity and collaboration between executives and machines. The findings reinforce the idea that human-machine powerful duets unleash. Executives and AI-enabled systems can work closely together to develop a strategy with new kinds of collaborative partnerships (Miller, 2018), each working to its strengths and compensating one's weaknesses. Such a partnership may result in a strategy that is much data-intensive, informative, and more intelligent (Malone, 2019). The analytical and predictive power of AI systems may greatly benefit board decision making and spark new dimensions of human-machine cooperation. Deep Knowledge Ventures, a firm that focuses on age-related disease drugs and regenerative medicine projects, makes a case for it. It has given a seat on a corporate board to an algorithm that is the member of DKV's board. The program,

called Vital, fed with the inputs from streaming data, gets to vote and makes investment recommendations about life sciences firms (Pagallo, 2018). Hence, the idea of integrated human-machine teams making critical strategic decisions does not seem inconceivable. However, AI-based decision making triggers challenges for established accountability, transparency, and, consequently, trust in AI-based decisions (Shrestha, Ben-Menahem and Krogh, 2019). Furthermore, AI, becoming increasingly capable of adding intelligence to strategic management, redefines the role executives have assumed in the process of strategy making (Constantiou and Kallinikos, 2015). With thriving cognitive and predictive capabilities of AI, executives can concentrate their skills on more complex issues that require domain knowledge and critical analysis (Wilson and Daugherty, 2019). Ongoing applications of AI-enabled systems in strategic management makes it necessary for managers to understand the full extent of what AI can do for them and what parameters they can set to ensure the use of the technology is ethical and responsible. The avenue for future research may encourage to explore a new set of skills on demand among business executives as well as strategic decision delegation to algorithms in corporate contexts. Empirical examination on the scope of the partnership between machines and human strategists in organizational settings would also benefit from further research.

Endnotes

[1] Throughout this paper, the term 'artificial intelligence' designates the broad suite of technologies (e.g., machine learning, deep learning, neural networks, natural language processing, expert systems, human-computer interaction) that allow machines and computers to simulate human intelligence.

[2] 'Cognitive computing' combines the spectrum of AI technologies to emulate the human brain's abilities for perception, action, and cognition.

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Development of Software Control System for Yield, Seeding Rates, Fertilizer Doses for Agricultural Enterprise as a Food Security Tool

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Abstract

This article discusses the development and creation of a computer software system designed to solve automation problems in agriculture and food security in the field of agriculture. The relevance of the article is due to the powerful development of the information-digital economy and its influence on all spheres of activity of the state economy. The purpose of the study is to present the development of a software system that allows the calculation of indicators of the yield of grain crops, the norms of sowing seeds of agricultural crops, doses of mineral fertilizers in crop rotation. Issues related to the design of a software control system in agricultural production using high-level programming methods are considered. A structural scheme of the software control system for the processes under consideration at an agricultural enterprise is presented. Further directions for the development of this topic may be related to the development of software tools that automate various tasks of agronomy using artificial intelligence technologies, the Internet of things, and UAVs.

Keywords: software system, yield calculation, fertilizer doses, agronomy, agriculture, agricultural enterprise, agricultural production, food security.

Introduction

Traditionally, when it comes to agricultural production, food security and crops, they primarily mean the role of agronomy. Its basis is many years of experience, enshrined in the laws and traditions of practical farming and summarized in numerous instructions, guidelines and technological maps. Modern agronomy involves, on the one hand, the development of ways to harvest, and on the other, a set of agrotechnological techniques carried out at different time levels in specific soil and climatic conditions that ensure the harvest. A set of such actions, differentiated by natural and economic parameters, contributes to the high productivity of crops and the stable functioning of production with simultaneous reproduction of soil fertility and ecological purity of agricultural products.

The development of software systems for agriculture and the control of ecologically harmonious agricultural technologies is an important task of today's agronomy, which requires solving with the help of modern tools [Thomas, F. et al., 2019; Díez, L. et al., 2018; Aksyonov, K. et al., 2015]. An effective solution to the problem under consideration is possible precisely with the help of computer technologies, since the adoption of optimal control decisions in agronomy is associated with the analysis and processing of a sufficiently large amount of knowledge and heterogeneous information, in which it is difficult for a specialist directly involved in the production of cultivated plants to fully evaluate them and therefore to develop an acceptable management strategy (Forecast of scientific and technological development of the agro-industrial complex of the Russian Federation for the period until 2030 , 2017).

The agro-industrial complex is one of the most dynamic and promising points of application of infocommunication technologies. Currently, there are various software systems for agriculture, ranging from electronic document management systems to business intelligence solutions (Fedorenko, 2017; Lutsenko, Pechurina, 2019; Ruzakova, Butsenko, Kurdyumov, 2019).

The main technological trend in agriculture is precision farming. Precision farming consists in the most efficient, from an economic and environmental point of view, use of each hectare of land, as well as seeds, fertilizers, fuels and lubricants, plant protection products (Schrijver, 2016). As a result, there is a reduction in the cost of producing one centner of production and an increase in yield (Truflyak, 2017).

First of all, the introduction of differentiated technologies that allow the use of certain resources in an optimal ratio based on the structure of the soil, its mineral composition, and so on, is aimed at improving the efficiency of the entire enterprise (Semin, Kibirov, Rassukhanov, 2018).

In connection with the above, the development of new software tools that contribute to increasing the profitability of agricultural production, strengthening stability and sustainable development of agriculture is an important task in the development of this field of activity.

Development of a software system for control crop production

Let us consider briefly the functional elements of the system and their purpose.

A calculator is a system that allows you to calculate the value of the following indicators of crop production in agriculture.

1. Productivity. The system allows you to calculate the amount of yield, centners / hectare. To do this, provide the information:
- the number of ears per $1m^2$;
- the number of grains in the ear;
- mass of a thousand grains, gram.

2. The rate of seeding. The system allows you to calculate the number of seeds cultivated per 1 hectare, which provide a full crop. To do this, you must provide:
- the number of germinating seeds per 1 hectare;
- mass of a thousand seeds, grams;
- seed purity, %;
- germination of seeds, %.

3. Calculation of doses of fertilizers. The system allows you to calculate the rate of application of mineral fertilizers: nitrogen, phosphorus and potassium. To do this, you must:
- choose a culture;
- choose the type of soil;
- indicate yield, centners / hectare;
- indicate the content of a particular nutrient in the soil, mg / kg.

The general scheme of this software system is shown in Fig. 1.

In this program, there are several modes for working with calculations.
Calculator operation mode number = 1 - yield calculation.
Calculator mode number = 2 - determination of the seeding rate.
Calculator mode number = 3 - calculation of fertilizer doses.

The software system has the following structure in a high-level programming language:

Crop - a class whose instance is a specific culture;
Soil - a class whose instance is a specific soil;
TYieldCalculatorForm - a class whose methods provide user interaction with the head of the calculator form;
TFormOfParameters is a class whose methods provide user interaction with the form of the calculator necessary to set parameters for crops and soils.

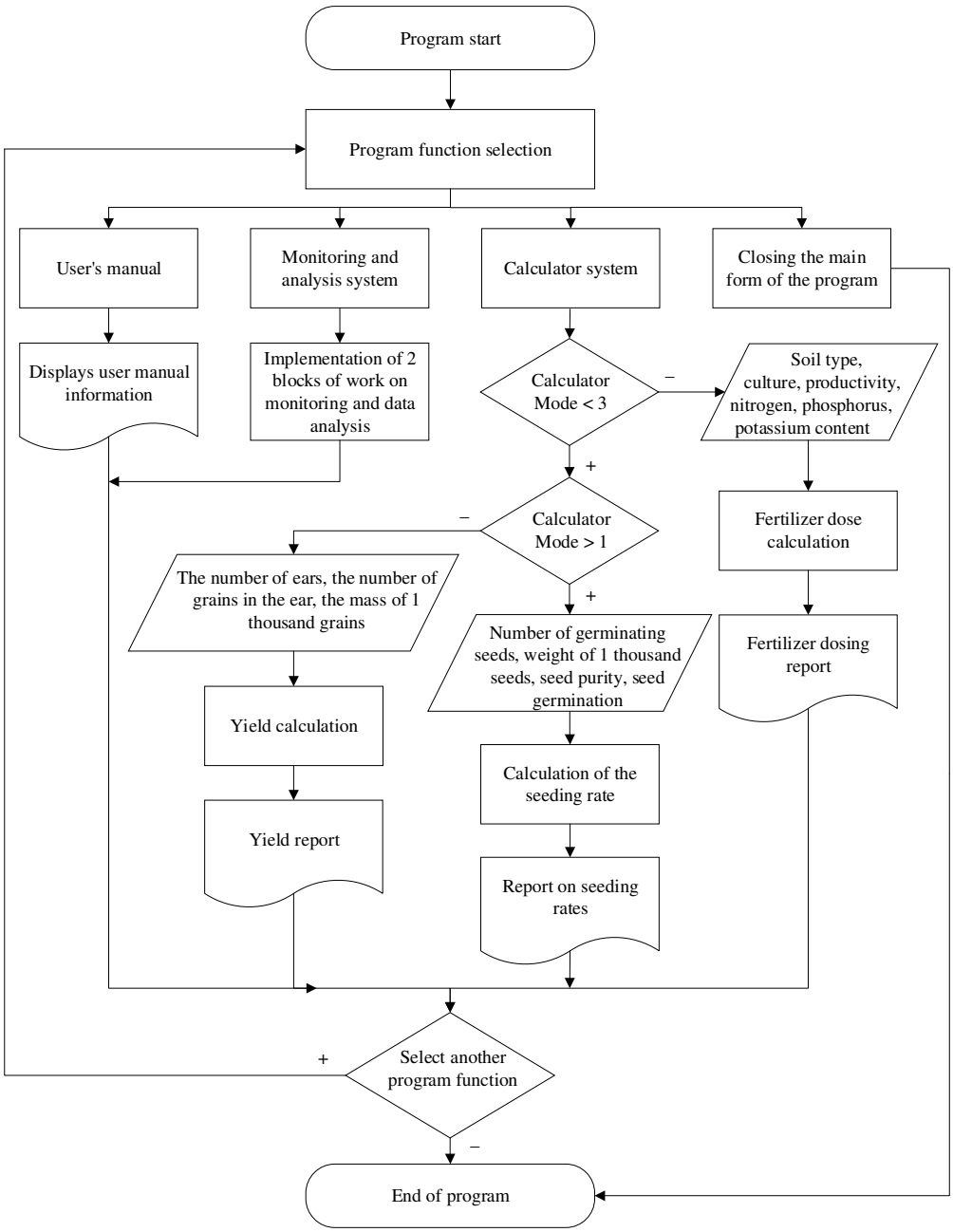

Fig. 1: The algorithm of the software system

The input variables of the calculator are:

PV - an array containing the values of the parameters of the formulas for calculations; type: array [1..4] of real;
Mode - calculator mode number; type: byte; possible values:
1 - yield calculation;
2 - calculation of the seeding rate;

3 - calculation of doses of fertilizers.
ListOfCrop - a list of objects of the *Crop* class representing certain cultures; type: TObjectList;
ListOfSoil - a list of Soil class objects representing certain soils; type: TObjectList;
NameOfCrop - field of a specific object of the *Crop* class that stores the name of a specific culture; type: string;
TakeAway - a field of a specific object of class *Crop*, which stores the take-out of each nutrient of a certain culture, kg / c; type: array [0..2] of real;
NameOfSoil - field of a specific object of the *Soil* class that stores the name of a specific soil; type: string;
Coefficient - the field of a particular object of the *Soil* class, representing the utilization rates of nutrients from the soil and fertilizers, %; type: array [0..1] of array [0..2] of real;
ConversionRate - field of a specific object of the *Soil* class, representing the conversion factor from mg / kg to kg / hectare; type: real.

The output variable is *y* - the value of the calculated yield indicator or the rate of seeding, depending on the mode; type: real. Fertilizer doses are calculated without storing its value in a separate variable.

The following is a list of the main software methods of the system:
procedure Calculate - a method within which calculations are made with respect to all calculator modes;
function CalculateDose (NumberOfIndicator: byte; Value, Yield: real): real - a method that calculates the dose of fertilizers and returns the value of the calculated dose of type real. The parameters are:
NumberOfIndicator - the number of the battery, where 0 is nitrogen, 1 is phosphorus, 2 is potassium;
Value - nutrient content in the soil, mg / kg;
Yield - productivity, centners / hectare.
procedure SetMode (NumberOfMode: byte) - a method that determines the calculator mode, where *NumberOfMode* is the new mode value;
procedure ModeSeedingRateClick (Sender: TObject) - the calculator mode change event handler in the main menu with the head of the calculator form;
procedure EdParam1Change (Sender: TObject) - the handler of the text change event in the input fields of the calculator main form;
procedure EdParam4KeyPress (Sender: TObject; var Key: Char) - an event handler for pressing keys that are responsible for a certain ASCII character in any input field of the calculator's main form;
procedure EdParam4KeyDown (Sender: TObject; var Key: Word; Shift: TShiftState) - an event handler for pressing and releasing keys that are responsible for any character in any input field of the calculator's main form. As part of the handler, it is checked whether the Shift keys are pressed;
procedure FilterEdit (Sender: TObject) - a method that removes forbidden characters from input fields. The method is launched in event handlers for changing the text of those input fields that can contain only numerical values;
procedure MenAddCropClick (Sender: TObject) - the event handler for clicking the left mouse button on the main menu of the calculator's main form. As part of the processor, the form required to add a new crop to the system is opened;
procedure MenAddSoilClick (Sender: TObject) - event handler for clicking the left mouse button on the main menu of the calculator main form. As part of the processor, the form required to add a new type of soil to the system is opened;
procedure MenChangeDelCropClick (Sender: TObject) - the event handler for clicking the left mouse button on the main menu of the calculator's main form. Within the framework of the processor, the opening of the form necessary for changing or removing any crop is performed;
procedure MenChangeDelSoilClick (Sender: TObject) - the event handler for clicking the left mouse button on the main menu of the calculator main form. As part of the processor, the form required to change or remove any type of soil is opened;
procedure BtSaveClick (Sender: TObject) - an event handler for a keystroke that saves information about a crop or soil. The key is on the form of a calculator, necessary for setting parameters for crops and soils;

procedure BtDelClick (Sender: TObject) - an event handler for a keystroke to delete all information about a particular crop or soil. The key is on the form of a calculator, necessary for setting parameters for crops and soils;
procedure ComCropChange (Sender: TObject) - an event handler for a change in crop or soil choice, part of the data of which acts as parameters when calculating fertilizer doses. The choice is made through the drop-down lists located on the main form of the calculator;
function PrintText (X, Y: integer; Text: string; Form: TForm; Formula: boolean; Print: boolean = true): integer is a method that:

writes the *Text* formula to the *Form* in the location with the coordinates *X* and *Y*, provided that the *Formula* and *Print* parameters are *true*;
calculates and returns the length of the *Text* text in pixels;
procedure UpdateLists - a method that updates the drop-down lists of soils and crops located on the main form of the calculator;

function EventOfPutInEdits (Sender: TObject; Key: Char; Form: TForm): char - a method that sets the focus to the next or previous component (input fields, drop-down lists). The parameters are:
Sender - the component on which focus is set;

Key - the pressed key that should correspond to the Enter key;
Form - the form on which the components are located;
procedure PrepareForm () - a method of the *TYieldCalculatorForm* class, in which the *ListOfCrop* and *ListOfSoil* are compiled according to the data of an external file;

procedure PrepareForm (TOO, NOI: integer) - a method of the *TFormOfParameters* class, within the framework of which the preparation of the form necessary for setting parameters for crops and soils takes place. The parameters are:

TOO - object type: 0 - work with crops, 1 - work with soils;
NOI - number of the selected object from the drop-down list of crops or soils located on the main form of the calculator;

procedure FormClose (Sender: TObject; var Action: TCloseAction) - the event handler for closing the main form of the calculator, in which the data on crops and soils are written to an external file.

Here is a description of the operation of the software system in question.

All calculated actions in the system in question occur in the two methods described above *procedure Calculate* and *function CalculateDose*.

The *Calculate* method is launched in any case, despite the operation mode, the value of which is stored in the *Mode* variable. If the value of the *Mode* variable is equal to 3, the *CalculateDose* method is launched, which calculates the dose of fertilizer according to the formula (1):

$$\frac{100*Yield*TakeAway[i]-ConversionRate*Value*Coefficient[0,i]}{Coefficient[1,i]}, \quad (1)$$

where *Yield* - productivity, centners / hectare; *TakeAway [i]* - take-out of each food item of an agricultural crop, kg / c, where *i* is the number of a food item that takes a value in the range [0..2]:
0 - nitrogen removal;

1 - phosphorus removal;
2 - removal of potassium;

ConversionRate - conversion factor from mg / kg to kg / hectare; *Value* - the content of a particular nutrient in the soil, mg / kg; *Coefficient* [0*, i*] is the coefficient of use of nutrients from the soil,%, where i is the number of nutrients;

Coefficient [1*, i*] coefficient of use of agricultural nutrient elements from fertilizers, %, where *i* is the number of agricultural nutrient element.

If the value of the variable *Mode* is not equal to the value 3, then the method calculates the yield according to the formula (2) or calculates the seeding rate according to the formula (3):

$$\frac{PV[1]*PV[2]*PV[3]}{10000}, \quad (2)$$

where *PV* [1] is the number of ears per 1 m^2; *PV* [2] is the number of grains in an ear; *PV* [3] - mass of a thousand grains, gram.

$$\frac{PV[1]*PV[2]*100}{\frac{PV[3]*PV[4]}{100}}, \quad (3)$$

where *PV* [1] - the number of germinating seeds per 1 hectare; *PV* [2] - mass of a thousand seeds, gram; *PV* [3] - seed purity, %; *PV* [4] - seed germination, %.

Conclusion

The above analysis and description of the software system as a new means of supporting control decision-making in agricultural technology indicates that at present, information technology is firmly integrated into the production processes of modern agricultural entities.

The development of modern tools for the automated control of various subsystems of an agricultural enterprise is a necessary process for its future development. By optimally managing its subsystems, the organization seeks to create and consolidate its competitive advantages.

The development of digital technologies and means of communication helps farmers to reduce costs, while increasing field productivity and ultimate business profitability.

Using the developed software to determine the yield, calculate the volume of sowing seeds and doses of mineral fertilizers in agriculture will allow the company to develop steadily, economically, which is a priority for any business entity in the current conditions of society.

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Are there differences in the bankruptcy risk of Indonesian's construction firm during different presidency regimes?

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Abstract

This study aims to analyze the bankruptcy risks among Indonesian construction firms during different presidency regimes. We use 50 construction firms listed on the Indonesian stock exchange based on three prediction measurements: Z-score, Z''-score, and S-score for the 2014 and 2018 periods, reflecting the end of President Susilo Bambang Yudhoyono's period and the end of the first President Jokowi's period. Regression analysis conducted and we found that bankruptcy prediction scores, Z-score and Z"-score, increased from 2014 to 2018. However, the S-score shows a different result. It is found from the regression analysis that there is a significant difference in the bankruptcy risk of construction firms in different presidency periods. This analysis has controlled for firms' size, business risk, and degree of financial leverage.

Keywords: Bankruptcy risk, Financial distress, Altman Z-score, Springate, bankruptcy prediction, Indonesia.

1 Introduction

The study of economic development has stated that to create and improve national economic activities in a country, adequate infrastructure is required for a country. The increasing number of infrastructure development projects has indirectly supported economic growth. This development has led the Indonesian government to provide a better framework for attracting investors to invest in Indonesia (Atmaja & Mahalli, 2014). Bank Indonesia reported that the performance of construction sector firms highly increased due to the positive impact of accelerated infrastructure development. Growth in 2017 was recorded at 6.79%, and is a higher yield compared to growth in 2016, which was 5.22% (Bank Indonesia, 2017).

Most infrastructure projects in Indonesia are private projects, including state-owned enterprises. Based on the analysis of the Standard & Poor's Global Rating institution, in 2018, there were 20 construction firms that had a 5 times increase in debt ratio against EBITDA (S&P Khawatirkan rasio utang BUMN, 2018). A company that has a very large debt will certainly become riskier to financial distress. Financial distress can be considered as a warning to the company to reorganize its financial condition because it provides the potential for bankruptcy (Ross, Westerfield, & Jaffe, 2010). Therefore, firms need to predict bankruptcy, for example, by using data from financial statements to find a ratio that can prove the potential for bankruptcy based on the bankruptcy prediction analysis model.

In the last two different presidency periods in Indonesia, there was a significant difference between their plans and targets concerning the state budget. The period of Jokowi's administration had a larger budget for infrastructure compared to the SBY administration. The addition of the infrastructure budget in Jokowi's period is allocation from the fuel subsidy funds, and during SBY's period, the fuel subsidies were a budget that continued to soar every year. The fuel subsidy budget cuts were then allocated to other sector budgets such as infrastructure, education, and health in Jokowi's period (Winati, 2016). Previous study conducted by Setiawan, et. al.(2020) shows that there is increasing in bankruptcy risks among Indonesian listed company during Jokowi's presidency period, but not specify for construction firms. This research conducted to fill the gap.

Various literature on bankruptcy prediction analysis has been published and used in various financial statement analyses. The Altman and Springate models are some examples of popular models (Altman E. , 2000). Research on similar topics about financial difficulties has also been carried out, such as research from Citrawati and Gede

(2014) and Setiawan et al (2020) by comparing the Altman, Springate, and Zmijewski models at food manufacturing firms. The results of the study using three methods showed that the company's performance, in general, was healthy or not in a potentially bankrupt condition.

Based on the problem stated above, the purposes of this research are as follows; first, classify which firm from construction sector in Indonesia that has been classified as healthy, a gray area, or bankrupt based on three models and between two different periods; and second, to understand the effect of different presidency periods on the condition of construction sector in Indonesia based on the bankruptcy prediction model.

2 Literature Review and Hypothesis Development

Financial distress prediction has become an important factor in conducting efficient development in every capital market. The problem of bankruptcy and financial distress has become a serious problem, since it could reflect a company's management performance and also critical condition. It is necessary to compare, evaluate, and analyze the financial distress and bankruptcy prediction to prevent investment loss.

2.1. Financial Distress

Financial difficulties are situations in which the operating cash flow of a company is unable to meet liability requirements (such as trade credit or interest costs), and the company will be forced to take action to improve it. Financial difficulties usually end in default, and the company will be asked to restructure its financial conditions both from internal firms, to creditors, and also to shareholders investors (Ross, Westerfield, & Jaffe, 2010).

2.2. Altman Z-Score Model

One of the bankruptcy prediction analysis models that is often used and still relevant today is the model made by Altman (Z-score). Altman used the multivariate discriminant analysis (MDA) model in his research. Altman's model is as follows (Altman E. , 2000)

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 0.99X_5 \quad (1)$$

Where each variable is X_1 is Working Capital / Total Assets; X_2 is Retained Earnings / Total Assets; X_3 is Earnings Before Interest & Tax / Total Assets; X_4 is Market Value of Equity / Total Liabilities, and; X_5 is Total Sales / Total Assets. Altman's model divides firms into three categories based on the Z-score obtained. When the Z-score is ≥ 2.9, it indicates the company is still in good health; Z-score from 2.9 to 1.81 indicates the company is in the gray area; and a Z-score of ≤ 1.81 indicates the company has the potential to go bankrupt.

2.3. Altman EMS Z"-Score Model

Altman's original model has limitations that only apply to manufacturing firms and are public property, so it is further analyzed using stock price data. In 1983, Altman made a new model with an adjustment for firms that were sampled as private firms by changing the market value in X_4 to the book value (Altman, Iwanicz-Drozdowska, Laitinen, & Suvas, 2014). The modified Altman model is as follows:

$$Z'' = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4 + 3.25 \quad (2)$$

Where each variable is X_1 for Working Capital / Total Assets; X_2 is for Retained Earnings / Total Assets; X_3 is for Earnings Before Interest & Tax / Total Assets, and; X_4 is for Book Value of Equity / Total Liabilities.

2.4. Springate Model

The Springate model was first developed by LV Springate Gorgon in 1978. This model is a ratio model that uses multiple discriminant analysis (MDA) to select four ratios from 19 financial ratios that are commonly used in the literature that can distinguish between bankrupt and healthy firms (Wulandari, DP, & Julita, 2014). The Springate model is as follows:

$$S = 1.03A + 3.07B + 0.66C + 0.4D \quad (3)$$

The financial ratio for variable A is Working Capital / Total Assets; B is Earnings Before Interest & Tax / Total Assets; C is Profit Before Tax / Current Liabilities, and; D is Sales / Total Assets. This model has a classification standard like the Altman model, where an S-score ≥ 0.862; indicates the company is still safe from bankruptcy, and an S-score <0.862; indicates the company has the potential to experience bankruptcy.

2.5. Degree of Financial Leverage (DFL)

A company is considered as leveraged if it has debt in its capital structure and thus giving the tax shield profit. But if the company decides to use debt in its capital structure, there will be a fixed cost required to be paid. Generally, a capital structure that required a higher level of debt will impact a bigger DFL. According to previous research, calculation of DFL consists of several method but in this research, the ratio of income before interest (EBIT) to income after interest (EBT) will be used. This calculation method has been widely used in previous studies and also provided explanation of interest cost's influence on a company's net income (Gatsie, Gadzo, & Akoto, 2013).

$$\mathrm{DFL} = \frac{\mathrm{EBIT}}{\mathrm{EBIT} - \mathrm{Interest}} \tag{4}$$

2.6. Revenue Volatility

Revenue volatility is often interpreted as the extent to which net income fluctuates during one business cycle. Volatility of revenue is a serious problem for management to assist the decision making process. Uncertainty in revenue estimates that will be obtained provides difficulties to make accurate forecasting for future cash flow and the formation of long-term financial plans for more stable operations (Kwak, 2011).

2.7. Firm Size

Firm size is the total number of data in the financial statements that describe the size of a company that is shown from the total assets account, amount, average sales, and the average total assets. Generally, the size of a company has an equivalent value to the amount of assets owned by the company (Mukaromah & Amboningtyas, 2018). There are some bankruptcy prediction models that used the firm size as a determinant or variable that could influences the value of bankruptcy predictions. Ohlson's research (1980) tested three models for predicting bankruptcy and the results of the study found that the three models had a significant effect on firm size. However, some previous studies also contradicted the results of Ohlson's (1980) study, According to Sun (2012), firm size does have a significant influence on the prediction of corporate bankruptcy, but some company-specific factors can result a negative or positive influence on bankruptcy predictions.

2.8. Previous Researches and Hypothesis Development

Marcinkevicius, et al (2014) has conducted bankruptcy prediction research of firms in construction sector in Lithuania. Taffler, Tishaw, Chesser, Altman, and Springate model was used in the research. The research had been conducted as an evaluation and comparison of before and after financial crisis that had happened few years back. The research has concluded that Springate, Altman, and Chesser model were the most accurate compared to Taffler and Tisshaw model. Thus, giving a conclusion that Springate, Altman, and Chesser model are appropriate to predict bankruptcy of construction firm.

Sun (2012) also has conducted an analysis of the effects of client's firm size and stress on bankruptcy prediction models. The result was that the firm size has a significant effect on the bankruptcy prediction model but under certain firm-specific condition, the result could differ. Meanwhile, Meeampol, et al. (2014) presented a research that compare Z-score and modified Z-score for developing countries (EMS) of listed companies in Thailand stock exchange. The research presented that both model has a legitimate ability to predict bankruptcy of the observed firms. To conduct the analysis, it is recommended to conduct the prediction two years prior to the bankruptcy. Karas and Režnáková (2014) conducted a research of bankruptcy prediction model from four different countries to compare the accuracy of bankruptcy prediction if used in a different environment. Due to the heterogeneity data, the accuracy of the prediction model may vary and could be improved by reducing the heterogeneity. This research proved possible to identify those macroeconomic factors that show similar correlation patterns between given environments as investigated by the accuracy of the bankruptcy model. These factors include the performance of the economy, inflation, and unemployment rate.

Asnudin (2008) has done research to describe how the business of construction firm work in Indonesia and what factors that each construction firm should be aware of due to the risk of construction business in Indonesia. This research describes how the government needs of infrastructure development could affect the relationship between the construction firm and the government. Based on the previous researches, this research aims to compare three different prediction bankruptcy model results with two different data period, specifically two different presidency regimes, and how the difference of the data period affects each bankruptcy prediction model's value. Thus, the development of hypotheses for this research will be based on:

- H_0: The difference between SBY and Jokowi's presidency period has no significant effect on the Altman Z-score model of construction firms in Indonesia.

- H_0: The difference between SBY and Jokowi's presidency period has no significant effect on the Altman Z-score EMS model of construction firms in Indonesia.
- H_0: The difference between SBY and Jokowi's presidency period has no significant effect on the Springate S-score model of construction firms in Indonesia.

3 Methods

This chapter provides the research methodology for the applicability of the bankruptcy prediction models in the construction sector. While organizing this research, the population, sampling, scope, screening, and method of sourcing the data was determined. The data used in this study is secondary data, namely data collected from other sources and already available through open media before conducting this research. The data were the financial ratios based on financial reports during 2012–-2014 and 2016–2018 and thus were adjusted to become the dependent variables in each of the Altman and Springate models. The data collection sources will be processed and analyzed in research obtained from the official website of the Indonesia Stock Exchange (IDX) and Thomson Reuters's Screeners.

This research conducted a sample population of firms listed in the IDX as construction, real estate, and property industries. The total number of firms acquired from this category was 79 firms, but due to the availability of the data, the final number of firms used for observation was 50 firms. Firms that were concluded as having financial distress were classified based on the condition of its current ratio under 1 and a profitability ratio that showed a negative value of growth each year (Kristanti, Rahayu, & Huda, 2016). Financial ratios data were collected and processed and then calculated to become dependent variables according to each model. Each model's score has a classification to decide whether the current firm-year observation was concluded as bankrupt.

Table 1: The cut-off point for each model conducted in the research

	Altman	**Altman EMS**	**Springate**
Healthy	$Z \geq 2.9$	$Z \geq 2.6$	$S \geq 0.862$
Gray Area	$1.81 < Z < 2.9$	$1.1 > Z > 2.9$	-
Bankrupt	$Z \leq 1.81$	$Z \leq 1.1$	$S < 0.862$

Each model will generate the value of each model, the independent variables, or the value as a "score" (Z-score for the Altman Model and Altman EMS, and S-score for the Springate model). The scores will then be classified based on the data in Table 1. After the score for each year and each firm were collected, the regression analysis was then initiated using the additional control variable firm size, the degree of financial ratio, and the revenue volatility. Revenue volatility is derived from the standard deviation of revenue from each observed firms in last three years before the end of each presidency's period. In this model, the presidency period is a dummy independent variable, in which the bankruptcy prediction score during the SBY period (2014) will have value of 0 and the bankruptcy prediction score during the Jokowi period (2018) will have a value of 1. The bankruptcy prediction score is considered as the dependent variable. Thus, the models that will be used in this research are:

$$Z_i = \alpha_1 + \beta_1\, dPRES_i + \beta_2 Ln(TA)_i + \beta_3 DFL_i + \beta_4 . RV_i + \varepsilon_1 \quad (5)$$

$$Z''_i = \alpha_2 + \beta_5\, dPRES_i + \beta_6 Ln(TA)_i + \beta_7 DFL_i + \beta_8 RV_i + \varepsilon_2 \quad (6)$$

$$S_i = \alpha_3 + \beta_9\, dPRES_{it} + \beta_{10} Ln(TA)_{it} + \beta_{13} DFL_{it} + \beta_{11} RV_{it} + \varepsilon_3 \quad (7)$$

Whereas:

Z_i = Z-score of firm i
Z''_i = Z-score EMS of firm i
S_i = S-score of firm i
$dPRES_i$ = *dummy* of firm i
$Ln(TA)_I$ = *firm size* of firm i
DFL_i = *degree of financial leverage* of firm i
RV_i = *revenue volatility* of firm i

4 Results and Discussion

According to the research conducted, the results of each model calculation are shown in Table 2.

Table 2: Number of firm classifications based on each model result

Condition	Z-score		Z”-score EMS		S-score	
	2014	2018	2014	2018	2014	2018
Healthy	21	10	32	29	24	34
Gray Area	13	12	13	14	-	-
Bankrupt	16	28	5	7	26	16
Total	50	50	50	50	50	50

Among the three prediction models used in this research, the S-score model gave the best results because the number of firms included in the healthy category increased from 2014 to 2018 compared to the other two models which both show a declining number of healthy firms from 2014 to 2018. As a comparison between the Z-score and Z”-score EMS models, even though both experienced a decline in the classification of healthy firms and an increase in the classification of bankrupt firms, the Z”–score EMS model provided better output because the number of firms classified as healthy in the year 2018 is higher than provided by the Z-score in 2018. This result is consistent with a statement by Altman where the Z”-score EMS model was indeed adjusted to the condition of business development in emerging countries. Moreover, the constants of each variable are also different when compared to Z-score (Altman E. , 2000).

The result of the regression analysis is shown below in Table 3:

Table 3: Regression result for Altman Z-score

Independent Variables	Coefficient	z	P>|z|
dPRES	-0.990	-3.20	0.001*
LNTA	-0.288	-1.52	0.129
RV	0.613	1.09	0.276
DFL	0.123	2.91	0.004*
C	11.295	2.07	0.039*
Firms Observed	100		
Cross-Section	50		
R-squared	19.20%		
Prob > chi2	0.000		

**Significant at 5%*

The dPRES variable had a significant effect on the value of Z-score for the construction sector. The effects of presidential differences on the value of bankruptcy predictions cannot just be reviewed using the policies made by each president. During Jokowi’s period, many macroeconomic factors affected the stability of Indonesia's economic growth, including the Fed's policy of raising interest rates in the US, natural disasters, and the trade wars between China and the US affecting the import–export policy in ASEAN countries (Asmara, 2018).

Speaking of policies between the two presidents, both of them had significant differences in planning the state budget and the target of development in economic sectors. During SBY's period, the state budget was allocated to short-term needs such as food and fuel subsidies, thus providing slow growth in sectors that are useful for the long term such as infrastructure. Meanwhile, for Jokowi's period, the state budget policy has been running well, with Jokowi cutting subsidies for fuel and allocating them to other long-term sectors such as infrastructure and education (Winati, 2016). A p-value below 0.05 proves the significant effect of the dPRES variable.

Meanwhile, the DFL also has a significant influence on the value of Z-score in the construction sector in Indonesia. The higher the DFL level, the greater the financial risk it offers (Luoma & Spiller Jr., 2001). In this study, the EBIT/EBT ratio was used as the DFL value. The interest payment is the main factor in the size of the DFL, where the larger the company’s interest payment cost, the greater the DFL. Therefore, firms with smaller DFL values will have lower financial risks. To anticipate the number of interest costs, firms must get greater profits to compensate for returns to shareholders for using too much debt (Gunarathna, 2016).
Regression result for Altman Z”-score EMS model is shown in Table 4. Similar to the Z-score model, the dPRES variable has a p-value of less than 0.05, meaning that the PRES variable has a significant effect on the Z”-Score EMS.

Besides the dPRES variable, other variables like firm size, revenue volatility, and degree of financial leverage have a significant effect on Z"-score EMS. Firms that have greater assets generally have more ability to generate greater revenue. This research is consistent with researches carried out by Gunarathna (2016) and Sun (2012), where the magnitude of total assets has a significant influence on financial risk and the bankruptcy prediction value. A relatively small sized firm, on the other hand, has a large financial risk because small firms frequently have high debt levels, thus, increasing the leverage value of the firm (Gunarathna, 2016).

Table 4: Regression result for Altman Z"-score EMS

Independent Variables	Coefficient	z	P>|z|
dPRES	1.989	4.42	0.000*
LNTA	-0.843	-4.94	0.000*
RV	6.419	2.50	0.013*
DFL	0.158	15.07	0.000*
C	29.228	6.55	0.000*
Firms Observed	100		
Cross-Section	50		
R-squared	9.43%		
Prob > chi2	0.0295		

**Significant at 5%*

The RV variable in this study is revenue volatility or based on previous research can be called volatility earnings. Revenue variability is also commonly called business risk. Revenue volatility is often associated with financial manager decisions in determining the use of debt or leverage from the firms. If volatility revenue of some project has a low value, then the firm has confidence in the revenue gained in the future, and the manager can determine the optimal level of debt usage based on the revenue they will gain. That way, revenue volatility has an influence on the potential bankruptcy or financial risk of the company (Alnajjar, 2015).

The Degree of Financial Leverage (DFL) has p-value under 0.05, therefore it also has a significant influence on the Z"-score EMS. Just like the Altman Z-Score, the DFL is influenced primarily by the level of debt or interest costs the company must incur. In this case, a greater interest rate will increase the DFL value so that as the DFL increased, financial risk will follow (Gunarathna, 2016).

Table 5: Regression result for Springate S-score

Independent Variables	Coefficient	z	P>|z|
dPRES	-0.307	-2.96	0.003*
LNTA	0.053	1.29	0.198
RV	0.009	0.06	0.953
DFL	0.017	1.38	0.169
C	-0.685	-0.57	0.570
Firms Observed	100		
Cross-Section	50		
R-squared	14.85%		
Prob > chi2	0.0000		

**Significant at 5%*

The regression result of Springate S-score model is shown in Table 5. The independent variable that affects the model is only the dPRES variable since it's p-value is below 0.05. Similar with the two previous models, the differences in the period of government did have a significant influence on the bankruptcy prediction values of firms in Indonesia. Not only multinational macroeconomic factors, such as foreign exchange or the China–US trade war, can affect the economy of an industry, but economic policy, or rather budgetary policies, for economic sector development are also able to influence the industrial sector. During Jokowi's period, the economic development mainly focused on the infrastructure and construction sectors (Winati, 2016). With the p-value of the dPRES variable less than 0.05.

5 Conclusion Result

With the observation data of 50 firms in the construction sector in Indonesia, the Altman Z-score model predicted that in 2014 there were 21 firms classified as healthy, 13 in the gray area, and 16 as bankrupt, while for 2018, there were firms classified as healthy, 12 in the gray area, and 28 as bankrupt. For the Z"-score EMS model, in 2014 there were 32 firms classified as healthy, 13 in the gray area, and 5 as the bankrupt, while for 2018, 29 firms were classified as healthy, 14 in the gray area, and 7 as bankrupt. Meanwhile, for the S-score model, in 2014, 24 firms were classified as healthy and 26 firms as bankrupt. In 2018, there were 34 classified as healthy, and 16 firms were classified as bankrupt.

Our research has shown that the different presidency periods in Indonesia, in this case SBY (2014) and Jokowi (2018), had an influence on the three bankruptcy prediction models used. In addition, the DFL variable also has a significant influence on the Altman Z-score model. For the Z"-score EMS model, every independent and control variable also had a significant influence. It is acceptable that the different period of presidency could affect the bankruptcy prediction model of construction firm in Indonesia. During Jokowi's period, the number of infrastructure project in Indonesia has risen due to the report published by the World Bank in 2014 that stated the economic development of Indonesia is slowly increasing compared to the other ASEAN countries (Bank Indonesia, 2017). Therefore, Jokowi in 2015 planned the state budget for that year would be more focused on infrastructure development.

However, this research has some limitations. The firms observed in the research were only construction firms because between the two periods, the number of construction projects in Indonesia rose. However, that doesn't mean that only the firms in the construction sector had a significant effect. Therefore, for future research, using different industries seems favorable for research to see whether the different presidency period also has a significant impact on different sectors or industries.

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Does Financial Leverage Mediate the Effect of Corporate Governance on a Firm's Performance: Indonesia Case

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Abstract

This research examines the relationship between corporate governance mechanisms, such as board size, board independence, female directorship, ownership concentration, director's ownership and audit reputation on firm performance and examines the effect of financial leverage in mediating corporate governance and firm performance. This research was conducted on 113 manufacturing companies listed on the Indonesia Stock Exchange during 2013-2017, with a total of 565 observations. A panel data regression using the STATA 15.0 program is done to test the hypothesis. We find that board size has a positive effect on firm performance, while female directorship and ownership concentration have a negative effect on firm performance. Financial leverage partially mediates the effect of board size on firm performance. This study contributes to corporate governance literature, especially factors that can mediate the relationship between corporate governance and firm performance.

Keywords: Corporate governance, Good corporate governance, Firm's performance, Financial leverage, Indonesia

Introduction

In this highly competitive era, almost all companies, especially public companies, are listing their shares on the stock exchange to get as much investment funding as possible from investors. This effort is carried out by companies in various ways, for example through developing or innovating products and/or business forms, reputation enhancement, education and information and even non-ethical ways, such as information blurring, which misguides investors and tempts them to invest. In fact, companies that are worth investing in are companies that truly have good performance and that also have the opportunity to continue to perform well in the future, which will increase the company's value. One reflection of a company's performance is the financial performance as shown in financial statements.

Not only are they detrimental to investors, but unethical business practices will also harm society and the state, because such practices can create a business environment that is not good for healthy market competition. If unethical practices continue to happen, this will, in the end, affect the investment climate in a country. In fact, this poor business practice can lead to economic crises, like those experienced by Indonesia a few years ago (Ariyanti, 2014). To avoid the occurrence of such business practices, after the crisis in 1997, the concept of Good Corporate Governance (GCG), which contains norms/principles for companies to manage their companies well, began to be widely discussed in Indonesia. In 2002, regulations concerning GCG began to be implemented in the form of regulations for state-owned companies. In 1999, the government also formed a committee specifically dealing with the implementation of GCG, called KNKG. KNKG issued guidance on GCG implementation in 2001 and was refined in 2006.

The drive to implement GCG comes not only from within the country but also from the world community. GCG is an important indicator, and in a report on one of the online news portals in 2017, the Financial Services Authority's Board of Commissioners stated that Indonesia was lagging behind

in implementing GCG when compared to countries in ASEAN, where only two Indonesian companies were included in the 50 best issuers listed by the ASEAN Capital Markets Forum (ACMF). That figure is far below other countries, especially Thailand, which had 23 companies on the list (Primadhyta, 2017). Based on the assessment conducted by ACMF in 2015 (Asian Development Bank, 2015), the following results were obtained.

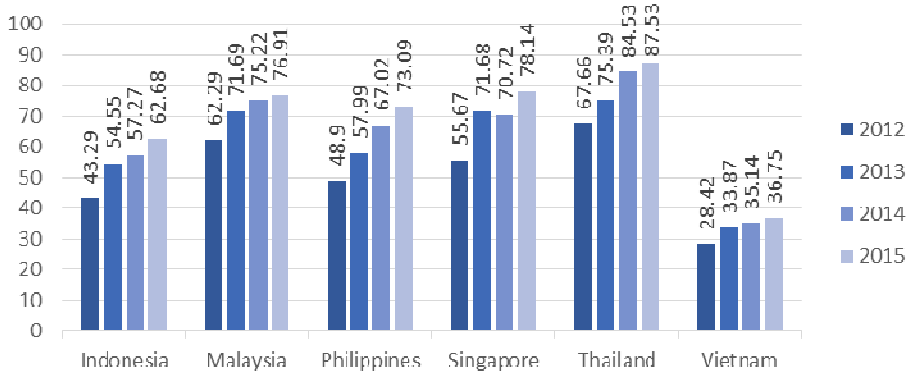

Figure 1. Corporate Governance Mean Scores by Country

Based on the information and the graph above, it seems clear that Indonesia must pursue the level of success achieved by other countries. Nevertheless, based on the graph, an increase in GCG continues to occur, which shows that companies and governments in Indonesia are concerned with continuing to increase the implementation of GCG.

Then what is the relationship between corporate governance and company performance? As previously described, in principle, GCG regulates companies to carry out their business practices properly. Therefore, when speaking of corporate governance, it cannot be separated from several theories relating to GCG. The principles contained in GCG encourage business people to overcome the problems that exist in their companies, such as the existence of information asymmetry and agency problems that indirectly affect the performance of a company. Some theories and previous research have proved this, including agency theory (Jensen & Meckling, 1976) and research conducted by Ciftci, Tatoglu, Wood, Demirbag, and Zaim (2019) and Esra and Hamdan (2015), which empirically required several corporate governance variables to affect company performance. However, that does not mean it is without debate. Some studies have seen different results, such as the research conducted by Chen, Cheung, Stouraitis, and Wong (2005) and Detthamrong, Chancharat, and Vithessonthi (2017), who found no link between corporate governance and company performance. Detthamrong et al. (2017) also tried to find factors that bridged the relationship between corporate governance and company performance (in this case using financial leverage as a mediator variable), but they did not get significant results.

Therefore, although there have been several previous studies that found evidence that corporate governance did not affect the company's performance, we were interested in conducting similar research by placing manufacturing companies listed on the Indonesia Stock Exchange in the 2013-2017 period as the research samples. Manufacturing companies were chosen because in Indonesia, most manufacturing companies have the characteristics of implementing corporate governance generally applied so that they can represent the entire company in Indonesia. Moreover, the research of Detthamrong et al. (2017) was carried out by taking samples from different countries, namely non-financial companies in Thailand that have relatively implemented GCG in their companies so that GCG might no longer be a competitive advantage in that country. We feel the need to carry out this research to assess the urgency of GCG implementation for companies and also to provide insight for investors and creditors in determining their investments.

This research will be continued into several sections of the discussion consisting of literature reviews relating to this research, followed by the methodology section used to collect data, the fourth part will discuss the data obtained and analyze the results, and the last part will be completed with conclusions from the research.

Literature Review

Agency theory identifies agency relationships where one party (principal) delegates work to other parties (agents) (Jensen & Meckling, 1976). In a company, principals and agents can be interpreted as company owners (shareholders) and management. This agency relationship can cause a number of problems where the agency relationship can cause harm to the principal because the agent has the opportunity to fulfill his own interests. This problem is called the *agency problem*. For example, a manager might not take a new project with risk because the bonus target has been met. This condition causes losses to the principal due to opportunity cost—in this case, the agent did not act to fulfill the principal's interests but rather saved his personal interests. Another example of an agency problem is the occurrence of information asymmetry between management and principals, where agents certainly have more information than the principal.

Managers should be agents of company owners, but managers must be monitored and institutional arrangements must provide checks and balances to ensure that the manager does not abuse his authority. Costs arising from managers misusing their positions, as well as the costs of monitoring and disciplining them to prevent abuse are called agency costs (Blair, 1996). However, this agency theory also has a weakness, where the delegation of duties from the principal to this agent is actually needed, regardless of the potential problems and costs described above. Syafrida, Latumeten, and Suryandono (2019) stated that shareholders who also act as directors can cause ultra vires behavior or actions that exceed authority limits, therefore not supporting GCG principles. In addition, the existence of this dual role can also result in ineffectiveness in carrying out the supervisory function. Moreover, in listed companies that have minority shareholders, the existence of a dual role of shareholders and management makes justice for minority shareholders not guaranteed, which violates GCG principles.

Corporate governance is the procedure and process of a directed and controlled organization. Corporate governance structures determine the distribution of rights and responsibilities among members in an organization, such as boards of directors, managers, shareholders, and other stakeholders, and establish rules and procedures for decision making (OECD, 2014). Corporate governance aims to help companies build trust, transparency, and accountability, which are needed to foster long-term investment, financial stability, and honesty/integrity in conducting business to support sustainable growth and a more inclusive society (OECD, 2015). In implementation of corporate governance, several studies have used multiple indicators in the area of corporate governance in a company.

Firm performance is a measure of how efficiently and effectively an organization or manager achieves adequate goals (Stoner et al., 1996). Company performance can be measured from various sides, though the easiest is based on financial performance. The company's financial performance can be obtained from the numbers on the company's financial statements.

Higgins, Koski, and Mitton (2012) stated that *financial leverage* is a tool to increase the rate of return expected by owners with higher risk. Financial leverage involves replacing a fixed loan cost for the owner's equity; financial leverage then increases returns to the owner. Therefore, financial leverage is like a double-edged sword that can increase the expected rate of return of the owner but also increase the risk.

Corporate Governance in Financial Leverage

Financial leverage increases with increasing board size. Companies with a small board size are advised to enlarge the board size to use more debt financing than equity financing (Jensen, 1986). Consistent with the literature, we suggest the following hypothesis:
H1.1 : There is a positive effect of board size on financial leverage.

Board independence is a board of directors who are not a majority shareholder or group of shareholders and executives of a company. Directors must have expertise that is in accordance with what is required by the board of directors, according to the unique nature of a company. As an independent director, a director must have knowledge and information that allows the company to get

a higher level of leverage, and the presence of independent directors is expected to get higher leverage (Berger, Ofek, & Yermack, 1997). Therefore we suggest the following hypothesis:
H1.2 : There is a positive effect of board independence on financial leverage.

Previous studies have shown that many companies in developed countries have low financial leverage. The presence of female directors in companies with low financial leverage can encourage these companies to increase leverage (Detthamrong et al., 2017). Because companies in developing countries are generally more constrained financially than those in developed countries, we believe that female directors will increase the company's financial leverage. Thus, our hypothesis is as follows:
H1.3 : There is a positive effect of female directorship on financial leverage.

Family companies with sole ownership are believed to have significantly higher debt (Detthamrong et al., 2017). Wiwattanakantang (1999) found that ownership concentration has a positive correlation with financial leverage. Paligorova and Xu (2012) found that companies with more concentrated ownership have higher financial leverage than companies with smaller concentration of ownership. His findings believe that ownership concentration can force managers to increase financial leverage in order to reduce managerial opportunism. Those literatures bring us to the next hypothesis:
H1.4 : There is a positive effect of ownership concentration on financial leverage.

Managerial shareholders can encourage managers to use the optimal amount of debt, because they will experience losses just as other shareholders will when using debt that is less than the optimal level for that company's capital structure (Abor, 2008). Previous research has found that the size of managerial shareholders is tied to a high debt policy. Kim and Sorensen (1986) showed that insider shareholders increase the company's financial leverage (Abobakr and Elgiziry, 2016). This positive effect was also obtained in the studies by Ooi (2000), Arko and Bokpin (2009), and Wellalage & Locke (2012). Therefore:
H1.5 : There is a positive effect of director's ownership on financial leverage.

The auditor’s reputation plays a significant role in reducing the risk of information obtained by investors, thereby reducing the cost of capital (Azizkhani et al., 2010). This condition allows companies to get more funding through financial leverage. Based on this, we suggest:
H1.6 : There is a positive effect of reputation audits on financial leverage.

Corporate Governance on Firm Performance

Some theories see that the number of directors in a company will affect the company's performance. This allows for constructive debates and effective decision making, and it ensures that the experience and capabilities of supervisory board members are in accordance with company requirements (Mallin, 2013).

A large board size provides a wider range of resources than a small board. Boards of directors with varying experience and knowledge will probably have more learning experience and are more careful in making decisions, resulting in a better company performance (Detthamrong et al., 2017).

The board of directors is one of the most important elements of the corporate governance mechanism in overseeing effective and efficient operations of a company. The board of directors plays an important role in mitigating the failure of a company (Chancharat et al., 2012).

Family effects can be reduced through increasing the number of councils. At least, consensus must be falsified first among the main family parts (Topak, 2011). Compliance will also increase along with the increase in the number of directors (Mallin & Ow-Yong, 2011). This brings us to the following hypothesis:
H2.1 : There is a positive effect of the board size on firm performance (ROE).

The representation of the independent director in board composition should be positively correlated with firm performance. If there is no correlation or the relationship turns out to be negative with the performance firm, then the performance of the independent director is in danger (Fuzi, Adliana Abdul Halim, & Julizaerma, 2016). In addition, based on the agency theory, the existence of an independent

director will indirectly improve the supervision function within the company. Consistent with the theory and research, we suggest:
H.2.2 : There is a positive effect of board independence on firm performance (ROE).

Differences produce innovation and creativity. Historically, most boards of directors consisted mostly of male directors. In recent years, there has been a strong argument that having female directors provide different points of view that can improve company performance (Detthamrong et al., 2017).

Female directors support company management by using their expertise and legal abilities, HR management, communication and public relations more than men (Zelechowski & Bilimoria, 2004). Other studies have found that female directorship significantly increases ROA and ROE (Bennouri, Chtioui, Nagati, & Nekhili, 2018). Thus, we suggest:
H2.3 : There is a positive effect of female directorship on firm performance (ROE).

Fragmented supervision and ownership provides opportunities for managers to take action that benefits themselves, which is dangerous for the company's performance (Detthamrong et al., 2017). The presence of controlling shareholders can provide a strong impetus in overseeing managers and maximizing company value. Ownership concentration can reduce the occurrence of agency problems between owners and managers (Maury, 2006). Concentrated ownership can improve managerial supervision so as to improve company performance (Agrawal & Knoeber, 1996). Consistent with the results of these studies, we present the following hypothesis:
H2.4 : There is a positive effect of ownership concentration on firm performance (ROE).

As has been explained above, agency theory has a weakness wherein shareholders who also play a role as management can reduce company performance. Although many results of the study stated that managerial ownership has a positive impact on company performance because it can reduce agency problems, we still believe that managerial ownership can have a negative effect on the company's performance with regard to its dual role, whereby it can lead to actions beyond authority (ultra vires) (Syafrida et al., 2019). Consistent with the literature, our hypothesis is therefore:
H2.5 : There is a negative effect of director's ownership on firm performance (ROE).

One of the things to be achieved by implementing GCG in a company is to minimize agency problems, one of which is information asymmetry between owners and agents. The recruitment of trusted external auditors (in this case the Big Four) will be able to overcome or reduce these problems. Thus, the company's performance can be improved. For this reason, we suggest:
H2.6 : There is a positive effect of reputation audit on firm performance (ROE).

Financial Leverage on Firm Performance

Referring to the Modigliani Miller Preposition II theory as outlined in the previous chapter, the effect of financial leverage on firm performance in terms of ROE should be positive, unless the risk level of the company's bankruptcy is within an alarming threshold (Ross, Westerfield, & Jaffe, 2013). Miller (2005) stated that firm leverage has a positive effect on the company's financial performance where the company gets incentives from the use of debt. Therefore, our hypothesis is:
H3 : There is a positive effect of financial leverage on firm performance (ROE).

Mediating Effect of Leverage on Financial Leverage to Firms Performance

The link between corporate governance and firm performance is still not very clear, in the sense that corporate governance does not directly affect a firm’s performance, so what variables are mediating variables needs to be examined; in this case, the mediator variable is financial leverage (Detthamrong et al., 2017). The choice of financial leverage as a mediator variable is because, based on previous research, financial leverage was found to affect corporate governance, and financial leverage affects firm performance. Thus, we suggest:
H4.1 : Financial leverage has a mediating effect on the relationship between board size and firm performance (ROE).
H4.2 : Financial leverage has a mediating effect on the relationship between board independence and firm performance (ROE).

H4.3 : Financial leverage has a mediating effect on the relationship between female directorship and firm performance (ROE).
H4.4 : Financial leverage has a mediating effect on the relationship between ownership concentration and firm performance (ROE).
H4.5 : Financial leverage has a mediating effect on the relationship between director's ownership and firm performance (ROE).
H4.6 : Financial leverage has a mediating effect on the relationship between audit reputation and firm performance (ROE).

Methods

In this study, data processing was performed using the program panel data regression STATA 15.0 with the Panel Corrected Standard Error (PCSE) model, because the classic assumption test showed that the data had problems with heteroscedasticity and autocorrelation.

Research Model

The model used in this research is in accordance with the hypotheses proposed. The model was previously used by Detthamrong et al. (2017) in his research. The research model consists of four equations in order to get results for testing hypotheses that have been developed previously.

Equation 1. Effects of Corporate Governance on Financial Leverage

$$LEV_{i,t} = \alpha + \beta CG_{i,t-1} + \gamma Z_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

Equation 2. Effect of Corporate Governance on Firm Performance

$$ROE_{i,t} = \alpha + \beta CG_{i,t-1} + \gamma Z_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

Equation 3. Effect of Financial Leverage on Firm Performance

$$ROE_{i,t} = \alpha + \beta LEV_{i,t-1} + \gamma Z_{i,t-1} + \varepsilon_{i,t} \quad (3)$$

Equation 4. Effect of Corporate Governance and Financial Leverage on Firm Performance

$$ROE_{i,t} = \alpha + \beta CG_{i,t-1} + \delta LEV_{i,t-1} + \gamma Z_{i,t-1} + \varepsilon_{i,t} \quad (4)$$

As for testing the effect of financial leverage as a mediator variable between corporate governance and firm performance, we used the causal step method developed by Baron and Kenny (1986).

Data and Sample

The sample of this research is manufacturing companies listed on the Indonesia Stock Exchange in the period of 2013–2017. Badan Pusat Statistik (2017) provided a definition of manufacturing companies, namely companies whose business activities change raw materials and/or semi-finished goods into goods through a process of steps to increase the value of the item. The determination of the company is carried out based on the classification of business sectors and sub-sectors found on the IDX. Based on the data collected from the Indonesia Stock Exchange, Eikon Thomson Reuters, and Yahoo Finance, taking into account the completeness of the data in the study period, 113 sample companies were established, with a total of 565 observations. To minimize outliers and possible data recording errors, we winsorized all variables at the 5th and 95th percentiles.

Variables

The dependent variable in this study is firm performance, which is measured by the company's Return on Equity (ROE). In this study, ROE is the proportion between net income to total equity and minority interest.

The independent variable in this study is the mechanism of corporate governance, including board size, which was measured by the number of board of commissioners and board of directors; board independence, which was measured by the ratio of the number of independent commissioners to the number of commissioners; female directorship, which was measured by the ratio of the number of female directors and commissioners to the number of directors and commissioners; ownership concentration, which was measured by the percentage of common stock held by shareholders of more

than 5% of the total common stock, in line with research conducted by Ciftci, Tatoglu, Wood, Demirbag, and Zaim (2019) and Nguyen, Locke, & Reddy (2014); director's ownership, which was measured by the proportion of common stock held by directors and/or commissioners; and audit reputation, which will be worth 1 if the company is audited by an audit company in the Big Four category (Deloitte, PWC, EY, and KPMG) and 0 otherwise.

In this study, the control variables used are market to book value, which was measured by the proportion between common stock market prices after adjustments and book value of common stock; firm size, which was measured by the natural logarithm of total assets; and firm age, which was measured by the natural logarithm of the number of years the company is listed on the stock. We used financial leverage as a mediator variable that will mediate the effect of corporate governance on firm performance. Besides being a mediator variable, financial leverage is also an independent variable in equation 1 and an independent variable in equation 3.

Result and Discussion

Descriptive Statistic

Table 1 presents the descriptive statistics of the variables used in this article for the final sample of 565 firm-year observations over the period 2013–2017.

Table 1: Descriptive Statistic

Variables	Mean	Median	St. Deviation	Minimum	Maximum
Board Size$_{(t-1)}$	9.4248	9.0000	3.8022	4.0000	23.0000
Board Independence$_{(t-1)}$	0.4003	0.3333	0.0991	0.2000	0.8000
Female Directorship$_{(t-1)}$	0.1207	0.1111	0.1243	0.0000	0.6250
Director's Ownership$_{(t-1)}$	0.0391	0.0001	0.1107	0.0000	0.7393
Ownership Concentration$_{(t-1)}$	0.7355	0.7693	0.1566	0.1316	0.9977
Audit Reputation$_{(t-1)}$	0.4248	0.0000	0.4943	0.0000	1.0000
ROE	0.0710	0.0566	0.2829	-2.5396	2.3502
Financial Leverage	0.2872	0.2497	0.4283	0.0000	4.7473
Financial Leverage$_{(t-1)}$	0.2788	0.2449	0.3965	0.0000	4.7473
Market to Book Value $_{(t-1)}$	2.0530	0.9363	5.0273	-2.9389	60.5308
Ln Firm Size$_{(t-1)}$	28.3883	28.1897	1.5987	25.2455	33.1988
Ln Firm Age$_{(t-1)}$	2.7812	3.0565	0.7584	-3.3377	3.6736

From Table 1 above, it can be seen that the board size has a mean value of 9.4248, board independence has a mean value of 0.4003, female directorship has a mean value of 0.1207, director's ownership has a mean value of 0.0391, ownership concentration has a mean value of 0.7355, and audit reputation has a mean value of 0.4248.

Regression Result

In this section, we present our empirical results regarding the effects of corporate governance on financial leverage. Table 2 and 3 present the goodness of fit of model and regression result, where the dependent variable is financial leverage as Eq. (1), and the dependent variable is firm performance as Eq. (2), (3), and (4).

Table 2: Goodness of Fit

	Eq. (1)	Eq. (2)	Eq. (3)	Eq. (4)
R-squared	0.2409	0.1288	0.1187	0.1464
Firms included	113	113	113	113
Observations	565	565	565	565
Prob (F-Statistic)	0.0000	0.0000	0.0000	0.0000
Method	PCSE	PCSE	PCSE	PCSE

Table 3: Regression Result

Variable	Coefficient (sig)			
	Eq. (1)	**Eq. (2)**	**Eq. (3)**	**Eq. (4)**
Board Size $_{(t-1)}$	-0.0052 (0.0445)	0.0067 (0.0010)		0.0061 (0.0015)
Board Independence $_{(t-1)}$	0.0895 (0.1135)	-0.0236 (0.3635)		-0.0029 (0.4825)
Female Directorship $_{(t-1)}$	-0.0323 (0.3275)	-0.1095 (0.0235)		-0.1082 (0.0210)
Ownership Concentration $_{(t-1)}$	-0.1200 (0.0220)	-0.0992 (0.0090)		-0.1079 (0.0040)
Director's Ownership $_{(t-1)}$	-0.1158 (0.1525)	-0.0734 (0.2020)		-0.0890 (0.1470)
Audit Reputation $_{(t-1)}$	-0.1106 (0.0000)	0.0186 (0.1170)		0.0087 (0.2930)
Market to Book Value $_{(t-1)}$	-0.0081 (0.0450)	0.0220 (0.0000)	0.0212 (0.0000)	0.0212 (0.0000)
Firm Size $_{(t-1)}$	0.0457 (0.0000)	-0.0162 (0.0035)	0.0038 (0.1550)	-0.0115 (0.0305)
Firm Age $_{(t-1)}$	-0.0268 (0.0275)	0.0295 (0.0015)	0.0327 (0.0005)	0.0275 (0.0020)
Leverage $_{(t-1)}$			-0.0976 (0.0035)	-0.0857 (0.0130)

The Effect of Corporate Governance on Financial Leverage

Based on the Eq. (1) the corporate governance variables that have a statistically significant effect on financial leverage (*p-value* below 0.05) are the board size, ownership concentration, and audit reputation, while other variables have no effect on financial leverage. However, even though the board size, ownership concentration, and audit reputation have a statistically significant effect on financial leverage, those three variables cannot support the hypothesis because it has a negative coefficient value. The coefficient of determination (R-squared) of 0.2409 indicates that variations in leverage can be explained by corporate governance variables of 24.09%.

The results are in line with the research of Bodaghi and Ahmadpour (2010) and Anderson, Mansi, and Reeb (2004), who found that board size and financial leverage were negatively correlated. The results are also in line with Farooq (2015), who found that high ownership concentration would actually make shareholders fear the risk of bankruptcy. While the results that show that board independence and female directorship do not affect financial leverage, they are in line with the research by Detthamrong et al. (2017).

The Effect of Corporate Governance on Firm Performance

Board size has a significant positive effect on ROE. These results support hypothesis 2.1, where the board size has a significant positive effect on firm performance. This result is consistent with Jackling and Johl (2009). In contrast to the research hypothesis, the regression results show that female directorship has a significant negative effect on ROE (coefficient -0.1095; *p-value* 0.0235). The

results are in line with the research conducted by Adams and Ferreira (2009) and Nguyen, Locke, and Reddy (2014), who found that the effect of gender diversity on firm performance was negative. Joecks, Pull, and Vetter (2013) found that gender diversity initially had a negative effect on firm performance and increased when "critical mass" (about 30%) for the proportion of women was achieved. Frink et al. (2003) stated that the business sector also was affected wherein women's performance will increase in the service sector/large trade/retail industry.

Variable ownership concentration has a significant negative effect (coefficient -0.0992; *p-value* 0.0090) on ROE. Bhaumik and Selarka (2012), in their research, gave reasons why ownership concentration can have a negative effect on firm performance, whereas ownership concentration indeed reduces agency conflict between owners but can cause conflicts between principals so that it can reduce company performance. The remaining factors, namely independent director, director's ownership, and audit reputation, have no effect on firm performance. The results are in line with research conducted by Haniffa and Hudaib (2006) in Malaysia, Hu and Izumida (2008) in Japan, and Chen et al. (2005) in Hong Kong where board independence does not affect company performance, along with the research conducted by Elewa and El-Haddad (2019) and Sayyar, Basiruddin, Rasid, and Elhabib (2015), who found that audit reputation did not affect ROE.

The Effect of Financial Leverage on Firm Performance

From the results of the research in Table 3 Eq. (3), it can be seen that financial leverage has a significant negative effect on ROE. The results of this study are in line with the results of the study of Antoniou, Guney, and Paudyal (2008) and Vithessonthi and Tongurai (2015), where financial leverage has a negative effect on company performance. Detthamrong et al. (2017) stated that the negative relationship between financial leverage and company performance is caused by the cost of financial distress greater than the profit of the funding itself.

The Mediating Effect of Financial Leverage

As previously described, the mediating effect of *financial leverage* was carried out using a causal step method developed by Baron and Kenny (1986). We found that the mediator variable is declared as full mediation if after entering the mediator variable in the equation, the effect of the independent variable on the dependent variable in Eq. (4) becomes insignificant. Mediator variables are expressed as partial mediation if after entering the mediator variable in the equation, the effect of the independent variable on the dependent variable in Eq. (4) is weaker than that in Eq. (2). Based on the test results in Table 3 Eq. (4), there is one variable that meets the requirements as described above: board size.

The financial leverage variable has a negative correlation (-0.0976) to the ROE variable with a *p-value* of 0.0035. The board size variable has a negative correlation (-0.0052) to the financial leverage variable with a *p-value* of 0.0445 and has a positive correlation (0.0067) to the ROE variable with a *p-value* of 0.0010. After including financial leverage variables in the equation, the significance of the board size variable to the ROE variable decreased to *p-value* of 0.0015.

Based on the description, because the effect of the one independent variable on the dependent variable in Eq. (4) is weaker than that in Eq. (2), it can be concluded that the financial leverage variable provides a partial mediation effect on the board size relationship to firm performance.

Conclusion

Based on the results, we can conclude that board size is the only variable that supports the research hypothesis where board size is positively correlated with firm performance. This means that the increase/increase in the size of the board of commissioners and/or directors will indirectly improve company performance, while female directorship and ownership concentration actually have a significant negative impact on performance firms. We also found the effect of corporate governance on financial leverage is reflected in board size, ownership concentration, and audit reputation

variables, where all three have a negative effect on financial leverage. Although significant, this result does not support the hypothesis because it has a negative correlation value. The negative effect of financial leverage on ROE shows that financial leverage in manufacturing companies has not been able to play its role as leverage or leverage of company returns. In this case, financial leverage actually appears to provide an additional burden for the company in the form of financing costs that have a negative impact on the company's ROE. Financial leverage has a partial mediation effect on the relationship between board size and firm performance. The existence of a negative effect of several corporate governance variables on financial leverage and the added negative effect of financial leverage on ROE provides the possibility that manufacturing companies in the study period are facing financial difficulties and the risk of bankruptcy.

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L'Intelligence Artificielle au Service de l'Évaluation Formative

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Résumé

Aujourd'hui, le numérique à très grande échelle accompagne les enseignants dans leurs activités, désormais des outils extrêmement variés pour renforcer leurs pratiques pédagogiques au quotidien et cela s'incarne dans l'évaluation. Dans l'ère de l'intelligence artificielle (IA) une évaluation formative est devenue un véritable moyen de prendre en compte le travail personnel de l'apprenant et soit lisible, transparente et partagée avec ses pairs. À cet égard, l'IA propose des environnements d'évaluation qui génèrent un ensemble d'informations et de conseils au cours de la formation. Dans la première partie, nous analysons un ensemble d'études et de techniques qui examinent le processus d'évaluation formative dans les domaines de formation suivants: Science, Technology, Engineering et Mathematics (STEM). Enfin, nous concluons ce papier par une démonstration analytique à quoi offert l'évaluation formative au profit de l'apprentissage en profondeur et vice-versa.

Mots-clés : L'intelligence artificielle (IA), L'apprentissage en profondeur, L'évaluation formative, STEM.

Introduction

Dans nos jours, les établissements d'enseignement supérieur exercent dans un environnement complexe et diversifié. Les solutions technologiques sont devenues plus sophistiqués avec l'arrivée de l'interaction homme-machine. Les interfaces homme-machine présentent le potentiel immédiat pour changer la façon dont nous apprenons, mémorisons, créons et valorisons nos connaissances Popenici et Kerr (2017). À cet égard, les méthodes d'évaluation évoluent afin de rassurer une meilleure production académique et scientifique. Selon Fu (2020), une évaluation formative devrait être effectuée pendant le processus d'apprentissage. Une évaluation instantanée devrait aider les enseignants et les apprenants à analyser la qualité de connaissances développées en temps réel et déterminer les lacunes existantes dans le processus d'apprentissage. D'après Han et Fan (2020) les méthodes d'évaluation formative permettant de générer des commentaires formatifs lors de l'apprentissage et de changer le comportement et l'attitude de l'apprenant, cela se répercute sur les pratiques pédagogiques de l'enseignant afin d'atteindre une meilleure performance académique.
Ce papier explore le rôle unique de certaines conceptions de l'évaluation formative destinée aux domaines de la formation STEM (Sciences, Technologie, Ingénierie, Mathématiques) Peterson et Hipple (2020). Ensuite, la dernière partie de ce papier est réservée à quoi, comment et pourquoi l'évaluation formative est utile pour surveiller régulièrement le processus d'apprentissage en profondeur et vice-versa.

Méthodologie

Cette étude suit une méthodologie d'analyse descriptive et analytique. D'abord, une présentation conceptuelle de la littérature sur la mise en œuvre des méthodes d'évaluation formative dans le champ de la formation STEM. Ensuite, une démonstration analytique sur le double intérêt qui rejoint l'évaluation formative et l'apprentissage en profondeur en faveur de la régularité et l'efficacité du processus d'apprentissage. Le diagramme suivant illustre le modèle conceptuel suivi au cours de cette étude.

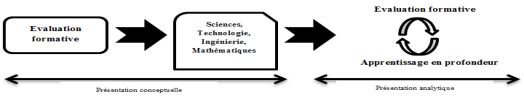

Fig. 1 : Cadre méthodologique

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Le développement d'une pensée complexe commence par des stratégies plus complètes en matière d'observation, d'interprétation et d'évaluation de résultats. Dans leurs études, Sugahara et Dellaportas (2018) ont montré que l'introduction des méthodes d'enseignement novatrices axées sur l'apprenant améliore les capacités de mémorisation et d'engagement des apprenants. Dans cette dynamique l'apprenant est favorablement motivé pour non seulement gérer une situation d'apprentissage mais gérer les différents niveaux d'abstraction d'une situation d'apprentissage. Dans ce contexte, l'apprentissage en profondeur a produit des résultats très prometteurs pour différents niveaux de compréhension, notamment la classification des sujets, l'analyse des sentiments et les réponses aux questions de Bordes et al (2014). A ce stade, des progrès significatifs ont été réalisés dans le champ de l'IA grâce à des systèmes qui combinent l'apprentissage par l'action avec une logique et un raisonnement complexe. Ce développement a conduit à l'émergence de méthodes d'évaluation qui pourrait rendre l'apprentissage avec ses différentes contraintes plus homogènes et plus valorisables.

L'évaluation formative, à quoi ça sert ?

Au 21e siècle, le développement des compétences s'est concentré sur des domaines spécifiques, notamment les disciplines appelées STEM (Science, Technology, Engineering and Mathematics Johnson et al (2016). Des domaines de formation très pointus qui nécessitent des moyens et des techniques d'évaluation avancées. Dans l'ère de la nouvelle technologie, les supports d'évaluation formative ont créé de nouvelles demandes de la rétroaction en temps opportun. L'évaluation constructive ou formative crée des opportunités de promouvoir le développement des compétences en matière d'explication, d'interprétation et de raisonnement Bulunuz et al (2016). Dans cette atmosphère, l'approche de l'évaluation formative consiste à déterminer comment le système d'IA peut prédire les situations les plus difficiles dans un processus de formation. Des situations qui nécessitent un feedback instantané à la fois directif et suggestif.

La voie de la rétroaction enseignant-apprenant n'est pas le seul moyen pour fournir un retour d'information efficace. Selon Spector et al (2016) l'autoévaluation et l'évaluation par les pairs peuvent être considérées comme une composition intéressante dans la voie de la rétroaction formative. Dans ce contexte, l'apprenant doit développer ses capacités de contrôler la qualité de son propre travail mettant des critères d'évaluation de son état d'avancement individuelle, afin de comparer son travail avec les normes et les standards de performance de haut niveau. Le tableau suivant présente les différents aspects de l'évaluation formative d'après Wiliam.

Table 1 : Les différentes formes d'évaluation formative

	Où les apprenants vont-ils ?	Où en sont-ils dans leurs apprentissages ?	Comment et par quelles étapes, peuvent-ils atteindre les buts visés ?
Enseignant	Clarifier, partager et faire comprendre les intentions d'apprentissage et les critères de réussite.	Organiser de véritables discussions, activités et taches qui produisent des preuves sur l'apprentissage.	Donner un feedback qui fait progresser les élèves.
Pairs		Inciter les apprenants à être des ressources pour leurs paires.	
Apprenant		Inciter les apprenants à être responsable de leurs apprentissages.	

Afin d'approuver l'apport de l'évaluation formative sur le processus du développement des connaissances, des études théoriques ont été menés selon le domaine de compétence STEM. Le tableau suivant illustre les différentes études réalisées sur l'approche d'évaluation formative en sein des institutions publiques (école, collège, université).

Table 2 : L'evaluations formative de point de vue théorique et pratique

Domaine	Type d'étude	Objectif	Catégories et tranche d'âge	Mesure de la population	Collecte de données	Compétences attendues	Auteurs
1) Mathématique	Qualitative : Méthode des cas	Résolution collective de problèmes mathématiques	6 ème primaire, 11-12 ans, 8 élèves partagés en deux groupes régulés par un enseignant.	S'exprimant facilement à l'oral	Enregistrements audio et vidéo ; une caméra, située au fond de la classe et centrée sur l'enseignante ; caméra fixe est centrée sur un groupe d'élèves.	Dévolution d'une responsabilité en mathématique, d'auto confrontation d'idées mathématique, évolution de la conceptualisation de l'enseignant.	Lepareur et al (2017)
2) Science Fondés sur l'Investigation (sciences mathématique, physiques et chimiques, sciences de la vie et de la terre)	Approche méthodologique mixte : qualitative : codage des données vidéo et catégorisation et quantitatives : L'analyse factorielle des correspondances multiples (AFCM)	Offrir une image plus conforme de l'activité scientifique. Et éveiller l'intérêt des élèves en mettant l'accent sur leur rôle actif dans le processus d'apprentissage.	**Enseignant** : Trois enseignants de mathématiques ; deux enseignants de sciences de la vie et de la terre (SVT) ; deux enseignants de sciences physiques et chimiques (SPC). **Élève** : Deux à quatre élèves selon les disciplines. **Groupe mathématique** : 6 ème primaire, 11-12 ans. ; **Groupe physiques**: 5ème (12-13 ans) et **Groupe sciences de la vie et de la terre :** 4ème (13-14 ans).	Un niveau scolaire moyen, ayant certaines affinités, ou ayant l'habitude de travailler ensemble, et s'exprimant facilement à l'oral.	Enregistrements vidéo et audio. Une grille d'indicateurs.	L'évaluation se fait en relation avec : ***Buts*** : L'enseignant explicite les buts de l'activité et les sous-buts intermédiaires ; **Critère** : L'enseignant explicite les critères de réussite, les compétences évaluées et les attentes ; **Avancée tâche** : L'enseignant prend des indices sur l'état d'avancée des élèves dans la tâche/ activité ; **Compréhension :** L'enseignant questionne les élèves sur leur compréhension de ce qui est demandé ; **Connaissances :** L'enseignant prend des indices sur les connaissances (préalables) des élèves ; **Autoévaluation** ; **Feedback** ; **Responsabilisation** ; **Echanges groupe** et **Echanges classe entière.**	Lepareur (2016).
3) Engineering	Qualitative : taxonomie de qualification	**Niveau** 1 : Savoir comprendre les compétences de rappel, de compréhension et d'application. **Niveau 2** : savoir analyser, synthétiser et évaluer vos connaissances. **Niveau 3** : Valider votre modèle d'ingénierie routière afin de formuler un équilibre entre : la valeur future + la valeur présente + la valeur résiduelle de la route.	Etudiants de maîtrise	Deuxième cycle universitaire	Questionnaire	Modèle RECAP (Recall, Comprehension, Application, Problem solving) Imrie (1995). L'étudiant doit se souvenir (se rappeler), comprendre (comprendre) et utiliser (appliquer) plusieurs concepts d'ingénierie enseignés en classe. L'étudiant doit associer ces concepts avec des formules économiques et des techniques mathématiques pour trouver la solution (résolution de problèmes).	Burrow et al (2005).
4) Technologie	Quantitative : Alpha Cronbach, test de la variance Anova one Way	Compléter et corriger le code source sous Fortran, ainsi que l'écriture de code Fortran à partir de zéro. Comparer la performance entre les étudiants qui travail via la version papier et la version informatique.	211 étudiants au niveau de l'École de génie chimique de l'Université technique nationale d'Athènes.	Premier cycle universitaire	Questionnaire	L'évaluation se fait en relation avec : La déclaration de données ; La références de données ; les calculs; les comparaisons; le contrôle de flux ; Les Entrées / Sorties ; L'interface de commentaire ; La Modularité et l'utilisation du stockage.	Kalogeropoulos et al (2013)

Evaluation formative et l'investigation mathématique

L'apprentissage n'est pas soumis un processus linéaire. L'étude de Lepareur et al (2017) confirme cela et sers à développer les compétences des élèves de 6e année primaire en mathématiques. Il ne s'agit donc pas de faire rechercher une réponse correcte unique, mais d'amener les élèves à interpréter le problème, identifier et évaluer les solutions possibles en faisant des essais et formuler des conclusions. La séance d'investigation retenue par l'équipe de recherche porte sur le nombre de diagonale d'un polygone. L'auto-évaluation a été utilisée comme un support d'évaluation formative. Les enseignants offrent au profit des étudiants une grille d'évaluation intégrée dans la feuille d'énoncer. Une telle démarche d'évaluation formative, change les modalités de la gestion et de l'organisation d'une classe. Des stratégies d'évaluation vers une plus grande valorisation des échanges et de la responsabilisation de l'élève. D'autant plus, la grille d'auto-évaluation présentée anticipe les difficultés des élèves a modifié l'avancée du savoir dans la classe et a permis de dégager suffisamment de temps d'échanges collectifs.

Evaluation formative fondée sur la Science de l'Investigation

L'enseignement scientifique fondé sur l'investigation vise à rendre l'apprenant plus conforme à l'activité scientifique. Dans ce contexte, le processus d'apprentissage de l'apprenant sera soumis à des pratiques d'investigation et de questionnement continus. L'étude de Lepareur et al (2016) vise à introduire la démarche d'investigation scientifique dans le contenu académique des sciences mathématiques, physiques et chimiques, sciences de la vie et de la terre. Une méthode d'investigation dans l'ordre : Raisonner, Rédiger, Communiquer par un schéma et S'informer a été mesuré via un barème graduel de 0 à 3. Afin d'analyser le degré de rétention du processus d'investigation, une étude expérimentale mixte a été menée auprès des apprenants 6 e, 5 e année du cycle primaire et 4 e année du cycle intermédiaire. À cet égard, deux situations ont été menées. La première correspondait aux évaluations formatives telles que les enseignants la mettent en œuvre dans leurs pratiques quotidiennes. La deuxième concernait les pratiques évaluatives mises en œuvre par les mêmes enseignants de l'année suivante, après qu'un retour réflexif sur leur séance ait été conduit. Après une deuxième situation, l'apprenant allant vers plus grande responsabilisation avec une autorégulation de leur comportement au profit du temps passé à produire des stratégies de résolution d'un meilleur engagement dans la tâche.

Evaluation formative aux services de l'ingénierie

L'étude de Burrow et al (2005) s'intéresse à produire une approche d'évaluation formative informatisée pour deux unités pédagogiques destinées aux étudiants de 1 ère année maitrise, à savoir la gestion routière et l'ingénierie. Pour ce besoin, une taxinomie appropriée a été choisie pour évaluer le niveau de la compréhension des étudiants. La taxinomie adoptée était le modèle RECAP (Recall, Comprehension, Application and Problem resolution). Le contenu de l'unité de l'évaluation est déterminé par la valeur monétaire d'une route dans 10 ans d'exploitation. Dans ce contexte, toutes les compétences de la taxinomie RECAP soumises à des tests selon la contrainte de 10 ans. Cela afin de répondre à la question, l'apprenant doit se rappeler, comprendre et utiliser plusieurs concepts d'ingénierie enseignés en classe. Enfin, l'étudiant doit associer ces concepts développés avec des formules économiques et des techniques mathématiques pour trouver la solution (résolution de problèmes). Cette rubrique ne s'affiche que si l'étudiant atteint le score minimal pour la question traitée. L'équation développée sera approuvée par une liste des références, des notes de cours et des textes complémentaires obtenus en cliquant sur le lien approprié.

Evaluation formative dans le domaine IT

Un programme informatique efficace ne consiste pas seulement à traiter les erreurs de syntaxe, mais aussi à diagnostiquer les erreurs sémantiques. Dans ce contexte, l'évaluation instantanée d'un code source peut dégager beaucoup du temps et d'information. L'étude de Kalogeropoulos et al (2013) cherche à étudier l'équivalence des scores d'un traitement de code source sous Fortran via l'approche d'évaluation informatisée par rapport à la version papier. Un échantillon d'étudiants de premier cycle de l'école de génie chimique de l'Université technique nationale d'Athènes a été examiné. Les deux types d'évaluation comprenaient les mêmes questions de type à choix multiples, complétant et corrigeant le code source, ainsi que l'écriture de code fortran à partir de zéro. Un ensemble de compétences au menu sont : savoir maitriser la déclaration de données, les références de données, les fonctions de calcul et de comparaison, les fonctions d'entrée sortie, les espaces de commentaire. Les résultats ont montré que, en général, les élèves réussissaient mieux et obtenu des scores plus élevés sous l'évaluation informatisée par rapport à la version papier.

Évaluation formative et l'apprentissage en profondeur : y a-t-il un conjoint d'intérêt ?

Selon Adnan et al, (2019), une mise en œuvre efficace et équitable de l'évaluation avec ses différentes alternatives est extrêmement impérative vers le changement du processus d'apprentissage. Dans ce contexte, l'évaluation formative augmente le pourcentage de la rétention du savoir. L'apprenant sait ce qui leur manque et où se concentrer à retenir les connaissances les plus profondes en termes d'importance et de liaison avec le domaine d'étude Jain et al (2014). En un mot, une évaluation formative efficace est celle introduite comme une pratique intégrée et alignée avec les objectifs éducatifs. À cet égard, une évaluation formative inviterait les apprenants à suivre leurs progrès d'apprentissage, réajuste la barre d'objectif très haute et déterminer les mesures à prendre et comment s'y prendre.

En conséquence, les données et les commentaires générés durant le processus d'apprentissage, transforme le rôle confié aux étudiants qui deviennent des apprenants profonds avec un grand potentiel et un engagement personnel lors de la formation. À cet égard, l'apprenant sera impliqué dans la réflexion de haut niveau et d'autres compétences supérieure au rendez-vous telle que la pensée cognitive, critique et créative Asikainen et Gijbels (2017). En plus, l'étude de Healy et al (2014) indique que l'évaluation formative efficace peut ressortir le besoin d'une collaboration en équipe qui convient parfaitement avec les difficultés liées au travail en équipe.

Selon Rothman (2018), la composante d'une situation d'apprentissage en profondeur impliquant le module d'évaluation formative est basée sur une rétroaction instantanée qui fournit des informations qui peuvent être utilisées pour changer les stratégies et le chemin d'exploration des connaissances. Le

module d'évaluation alerte les apprenants sur ce qu'ils doivent savoir et comment et par quelle mesure où les tâches sont comprises et exécutées. De plus, le module d'évaluation formative entre dans le corps du système d'apprentissage, nous lions la rétroaction des tâches qui ne sont pas efficaces avec la rétroaction du processus, afin de comprendre et d'exécuter efficacement les tâches planifiées. Une telle approche d'apprentissage en profondeur, peut déterminer non seulement si un apprenant a obtenu la bonne réponse, mais aussi comment le problème a été résolu.

L'apprentissage en profondeur de son propre sens nécessite des mesures d'évaluation très spécifiques. Les évaluations visent à mesurer ce que les apprenants ont appris (évaluation de l'apprentissage), à éclairer l'enseignement (évaluation pour l'apprentissage) et à fournir des tâches éducatives (évaluation en tant qu'apprentissage). De cette façon, les apprenants peuvent comprendre à quoi ressemble un travail plus complexe et les enseignants peuvent comprendre où les apprenants sont sur la voie de la compétence. Ces progressions d'apprentissage permettent d'identifier où se trouvent les apprenants le long de la trajectoire vers la finalité pédagogique, puis d'ajuster l'enseignement en fonction des résultats. Le schéma suivant présente un diagramme d'exécution du processus d'évaluation formative dans un contexte d'apprentissage en profondeur.

Fig. 2 : L'évaluation formative vis-à-vis l'apprentissage en profondeur, Source Rothman (2018)

Conclusion

La création du savoir est un processus très pointu et très sensible. Ce dernier nécessite des moyens techniques, humains et organisationnels très sophistiqués. Dans ce contexte, les études antérieures ont prouvées que la création d'une situation d'apprentissage efficace est celle qui valorise et prévoit toute source d'information pouvant être utilisée par l'apprenant au cours du processus d'apprentissage. En conséquence, avec l'avènement de l'IA et ses techniques d'apprentissage en profondeur, l'analyse et la valorisation des connaissances développées nécessitent des méthodes d'évaluation plus flexibles qui peuvent suivre la trajectoire de la connaissance développée, via des commentaires et des indications instantanés. Immédiatement, l'apprentissage en profondeur pourrait également servir le processus d'apprentissage, il dissèque le processus d'apprentissage en phases distinctes, cela facilitera la détermination des ressources dont ils auront besoin?, et par quels moyens auront évalué ?, dans le but d'atteindre les finalités pédagogiques souhaitées.

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Challenges in The Provision of Accounting Education to Generation Z Students in Poland

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Abstract

This paper presents approaches to accounting education displayed by Generation Z (Gen Z) students, analysed with the purpose of determining whether such changes may require a shift of accounting education methodology. The significance of this aspect of education is evidenced in the observation that methods poorly adjusted to the requirements of their recipients lead to ineffective and wasteful use of both the academic resources and the aptitudes of students. The study was conducted using CAWI technique addressed to those students and graduates of economic courses of studies involving accounting education who were born between the years 1990-2000. With 123 valid responses collected, the project may be regarded as a pilot study. The first section of this paper presents fundamental theoretical principles employed for the evaluation of cross-generational differences in the distribution of individual properties and traits. This is followed by presentation of research methods and findings obtained from the study. The last section provides analytical evaluations of the findings and a number of conclusions. As the aspect under study proved spacious enough to invite further studies, two research hypotheses were formulated as basis for the planned continuation of this project: (1) students seem to take preference in these forms of accounting education which involve computer programs and apps, (2) problem-based learning in accounting education offers more effective development of analytical skills, improving the employment potential of students.

Keywords: Generation Z, Accounting, Teaching Methods.

Introduction

Differences between generations can be attributed to varied conditions associated with their upbringing and education. Based on this assumption, representatives of each of the present generations (the silent generation; baby boomers; generations X, Y, and Z) display different attitudes, traits and, consequently, also outlooks and learning preferences. Gen Z is a generation immersed in technology. Their lives have always been accompanied by technological props: TVs, phones, computers, and the Web. To them, the ubiquitous flood of information is a natural phenomenon. However, an important question can be raised in this context: does this technological environment in any way affect the concentration and apprehension of Gen Z students and what methods of learning are most suitable for this group?

This study attempts to determine whether Gen Z students perceive the need for changes in the present methodological approach to accounting education. To address this question, the following research hypotheses were formulated: (1) in accounting education, Gen Z students display preference for Web sources, (2) Gen Z students are not disposed to verify their Web-based information against other sources, such as professional literature or acts of legislation, (3) Gen Z students perceive and voice the need for changes in the present methodological approach to accounting education.

The findings presented herein are the effect of surveys conducted among students and graduates of economic courses of studies involving accounting education.

Literature Studies

Each generation is born and raised under specific sets of conditions. Intergenerational differences have long been studied from the viewpoint of specific behaviours, personal traits, skills, abilities, and

outlooks. At least five distinct generations can be distinguished in human populations living at present [Zarządzanie różnorodnością… 2016]:

1) The silent generation, representing people born between the years 1928 and 1944 [Howe, 2014].
2) Baby Boomers, i.e. people born between 1945 and 1964 [The Baby… 2000].
3) Generation X, born between 1965 and 1979 [Zarządzanie różnorodnością… 2016].
4) Generation Y, born between 1980 and 1994 [Innowacyjne rozwiązania… 2015].
5) Generation Z, representing people born after 1995, i.e. [The challenge… 2017].

It may be useful to emphasise that the above time brackets are not definitive. Many authors provide different brackets in their descriptions of the modern generations. Thus, the term Generation Z may just as well represent a reference to persons born after the year 1990 [Pokolenie Z wkracza… 2016].

Gen Z representatives display a specific approach to learning and knowledge acquisition. They do not seem to condone with the traditional learning methods. Therefore, lectures and presentations are not the best way to approach this segment. Gen Z students show preference for shared projects, interactive gaming, and advanced challenges. Learning methods addressed to this segment should favour interactive and networking solutions. Students in this group are also quite partial to learning material provided in electronic form and to examinations held in a computer environment. At the same time, Gen Z is not quite ready for a full transition into a virtual environment; many of them are adamant in attaching great value to more direct and personal contacts with their tutors [The challenge of teaching…2017]

Research methods and study findings

The survey, in the form of a CAWI questionnaire, was performed in early December 2019 and was addressed to persons born between 1990 and 2000, namely: students and graduates of economic courses of studies involving tutorship in the subject of accounting. The survey for was published on Facebooks and disseminated among the associated user groups. A total of 123 valid responses to the survey were collected, with 89% representation of females and 11% of males. In terms of year representation, the largest groups were those of persons born in: 1998 (24%), 1999 (21%), 1996 (20%), and 1997 (15%).

The survey included 5 questions, each with a choice of three responses: “no”, “I don’t know/I have no opinion”, and “yes”:

- Do you find accounting an interesting subject of study?
    - no – 24%
    - I don’t know/I have no opinion – 20%
    - yes – 56%
- Are there any obstacles/problems in your learning of the subject of accounting?
    - no – 46%
    - I don’t know/I have no opinion – 18%
    - yes – 36%
- Are you able to remain focused and concentrated over the course of your classes in accounting?
    - no – 56%
    - I don’t know/I have no opinion – 12%
    - yes – 32%
- Do you reach for a phone during your accounting classes (for reasons other than those related to your present assignment)?
    - no – 50%
    - I don’t know/I have no opinion – 12%
    - yes – 38%
- Do you seek verification of your accounting knowledge gathered from the Web with other sources, such as professional literature and acts of legislation?
    - no – 42%
    - I don’t know/I have no opinion –17%
    - yes – 41%

In addition, the survey included a single-choice question on respondents' preferences for specific sources of information for purposes related to their learning of accounting. The responses were as follows:

- Internet – 69%
- Acts of legislation – 3%
- Professional literature – 28%

The last question in the survey was a multiple-choice query of the most effective (in respondents' opinion) methods of those used in the subject of accounting:

- Hand-down methods (informational lecture, speech, description, presentation) – 11%
- Problem-solving methods (such as case studies, didactic games, brainstorming) – 33%
- Exposition methods (film, exhibition, performance with experiential involvement) – 1%
- Algorithmic methods (software applications, guided handbooks) – 16%
- Practical methods (display, training exercise, project) – 40%

A marked majority of the respondents (56%) confirmed that the subject of accounting was of interest to them. Only 24% reported their clear lack of interest in the subject, and the remaining 20% provided a non-committed answer. 46% of the respondents reported no problems in their acquisition of accounting knowledge, with 36% confirming their difficulties, and 18% providing a non-committed answer. By juxtaposing the findings from the two sections, it may be concluded that, of all persons declaring no interest or indifference with respect to the subject under study, as many as 48% believed to have problems acquiring this particular set of knowledge, with 22% having no opinion in this respect, and further 30% confirming that their good understanding and facile acquisition of accounting is not reflected in their interest in the subject.

Students report problems keeping their focus and attention over the course of their accounting classes. This was confirmed by 56% of the respondent sample, with 12% providing no clear opinion, and 32% reporting no problems whatsoever. At the same time, 38% admitted to reaching for their phone during classes for reasons unrelated to the subject, with 12% providing a non-committing answer, and 50% declaring to refrain from such activities.

A decided majority (69%) use the Web as their main source of knowledge for purposes related to the study of accounting, with only 28% admitting on verifying their knowledge against that contained in professional literature, and only 3% were inclined to reach for current legislation as the principal source of subject knowledge. As many as 42% reported their complete disregard for confirmation of their Web-based information against more reliable sources, such as professional literature or current legislation. At the same time, 44% of those respondents who admitted to their use of the Web as the main source of their accounting knowledge were also disinclined to verify this type of information against other sources.

At present, universities and economic schools provide accounting education mostly through the use of hand-down methods (lectures), practical methods (training of skills), problem-solving methods (lectures and assignments) and algorithmic methods (laboratory assignments). Students, on the other hand, believe that the most effective of those are the practical (40%) and problem-solving methods (33%), with less regard for the utility of algorithmic (16%) and hand-down methods (11%), and only a marginal interest in exposition methods (1%).

Conclusions

Findings obtained in the course of this pilot study seem to confirm the hypothesis that, in their learning of the subject of accounting, students show strong preference for Web-based information. At the same time, and quite alarmingly, they tend to place unfounded trust in this type of content, to the effect of not being bothered with verification of such information against more reliable sources, such as professional literature or legislation – in confirmation of the second hypothesis. The last hypothesis (and the main research question of the study) was not confirmed by the findings. For the majority of

respondents, preferences for specific methods of education in accounting were fairly consistent with those presently on offer. However, educators should be aware of the fact that hand-down methods (such as lectures) are decidedly less effective compared to problem-solving approaches. This should form a basis for more informed analyses of methods employed in this segment of economic education. At the same time, it must be noted that students displaying lack of interest (appeal) in accounting are also quite often unable to comprehend it, as evidenced by reports of short attention span and frequent distractions (phone). It may be useful in this context to consider the use of more involving methods to stimulate student focus and interest on the subject, as opposed to the passive reception of hand-down information. Further analyses of methods and approaches to education in the subject of accounting are a rational continuation of this approach. For this purpose, the author formulated two additional hypotheses to be addressed in the future follow-up study: (1) students seem to take preference in these forms of accounting education which involve computer programs and apps, (2) problem-based learning in accounting education offers more effective development of analytical skills, improving the employment potential of students.

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L'intelligence Artificielle au Service des Bibliothèques

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Résumé

À l'ère de l'intelligence artificielle (IA), fournir une bonne documentation ciblée était la principale mission menée par les bibliothèques. Dans ce contexte, chacun est soucieux de connaître les répercussions de l'introduction de l'IA dans les pratiques de la gestion d'une bibliothèque. En conséquence, une étude comparative a été menée dans le but de présenter les changements fondamentaux prévus dans le système de gestion des bibliothèques par rapport aux approches de gestion traditionnelles. Les changements fondamentaux prévus affectent quatre niveaux de gestion: 1) l'accès à l'information, 2) l'interaction de la bibliothèque avec son environnement, 3) l'adaptation de la technologie en fonction de la tâche et 4) la reproduction d'une documentation spécialisée via des techniques d'apprentissage en profondeur.

Mots Clés : Approche IA, Approche Traditionnelle, Processus Bibliothécaire.

Introduction

À l'ère des nouvelles technologies, la production académique et scientifique ne cesse pas de ce développé. À cet égard, face au nombre croissant d'utilisateurs, le besoin d'information se développe de plus en plus en matière : de variétés et de transversalité de l'information envers les autres disciplines. Dans le but de valoriser l'activité académique et scientifique, la bibliothèque est devenue comme un agent du changement afin de rendre l'information accessible et plus valorisable. La bibliothéconomie, en tant que collection de techniques de gestion et d'organisation, ne sert qu'à justifier que la gestion d'une bibliothèque soit soumise à des approches scientifiques. Au monde, les bibliothèques reconnues par leurs lointaines de la vie numérique Wheatley et Hervieux (2019). Cette situation a entraîné un ralentissement vers le développement de pistes de recherche prometteuses qui garantissent le caractère interdisciplinaire de la recherche.

Afin de développer une source d'information cohérente et efficace, l'optimisation de la source d'information ciblée est fortement recommandée. L'optimisation à grande échelle nécessite une forte organisation et une structuration efficace des informations. Dans ce contexte, les nouvelles technologies offrent la possibilité d'accéder à des métas-données grâce à des techniques d'analyse approfondie. Néanmoins, malgré les modestes expériences à travers le monde, quelques associations et organisations ont déjà fait le pas pour reconnaitre le rôle de l'intelligence artificiel (IA) dans l'avenir de la bibliothéconomie, notamment la Fédération Internationale des Associations de Bibliothécaires et de Bibliothèques (IFLA), l'American Library Association (ALA) et la Fédération Canadienne des Associations de Bibliothèques (FCAB-CFLA).

Le but de ce papier est d'analyser les effets attendus suite à l'introduction de l'IA dans les pratiques de gestion des bibliothèques. À ce stade, un ensemble de questions seront abordés: comment pouvons-nous tirer parti de l'IA pour soutenir la mission des bibliothèques ? Et comment l'AI peut-elle aider les autres à améliorer le processus de gestion de la bibliothèque ?, Pour des raisons scientifiques, ce papier a été divisé en trois parties distinctes. La première partie a été consacrée à l'évolution du contexte en relation avec les TIC. Nous abordons cette partie par présenter les anciennes pratiques d'utilisation de la technologie dans la gestion des bibliothèques, jusqu'à l'apparition de l'IA comme une nouvelle approche de gestion. La deuxième partie est dédiée aux répercussions de l'approche d'IA sur le système de gestion de bibliothèque (voir Tableau 2). Enfin, la dernière partie nommée

discussion présente les études comparatives qui rejoignent les pratiques de gestion des bibliothèques, comparent l'approche de l'utilisation de l'IA à celle de l'approche traditionnelle.

Méthodologie Et Matériel

Cette étude suit une méthodologie d'analyse descriptive et analytique. Tout d'abord, une revue de la littérature qui présente les changements fondamentaux qui menacent les anciennes pratiques de la gestion des bibliothèques. Pour des raisons scientifiques, une vue d'ensemble décrit l'évolution de la gestion des bibliothèques depuis les années 80 à ce jour. Ensuite, une démonstration conceptuelle expose l'impact de l'IA sur le processus de gestion de bibliothèque. Enfin, une analyse comparative met en lumière la contribution de l'approche de la gestion traditionnelle par rapport à l'approche de l'IA. Le diagramme suivant illustre la méthodologie et le matériel de l'étude suivi au cours de cette étude.

Fig. 1 : Cadre méthodologique

L'IA Et Le Processus Bibliothécaire

Au début des années 80, la relation des bibliothèques avec la technologie a été réservée aux transactions quotidiennes, telles que l'acquisition, le catalogage et la circulation de l'information. Une bibliothèque automatisée apparait aux utilisateurs comme un catalogue d'accès public en ligne (OPAC), à travers lequel ils peuvent rapidement rechercher et obtenir les informations souhaitées Leeves (1994). Dans un système pareil, la recherche bibliographique se fait en fonction du nom de l'auteur, du titre de l'étude et de l'année de la publication.

Depuis les années 90, la recherche d'informations rejoindre la dimension linguistique de la source d'information. Dans ce contexte, d'après Michos et al (1999), la collecte efficace des informations se fera via un bon système de traduction. Un système qui déchiffre la demande via un système tripolaire. À cet égard, trois approches au programme, à savoir la traduction de termes basés sur un dictionnaire (DICT), la traduction de termes basés sur la translation de sens du mot (EBT) et la traduction de termes basés sur la translation de sens du mot dans la phrase (EBS) Yang et al (1997). Selon les résultats de cette enquête, l'accès multilingue aux catalogues en ligne peut améliorer remarquablement la qualité des services fournis. À ce stade, la bibliothèque nationale du Canada a été l'une des premières bibliothèques à offrir un accès multilingue à ses utilisateurs Buchinski et al (1976).

La gestion efficace du système de bibliothèque est basée sur l'utilisation optimale des ressources matérielles et immatérielles. Un système qui optimise l'accès à l'information pertinente via une approche beaucoup plus ciblée. Dans un premier temps, l'utilisateur interagit avec le système translateur en choisissant la langue et le modèle d'entrée et de sortie, ainsi que les zones de recherche, les rubriques clés de recherche et le type de recherche souhaité. Le système translateur combine toutes ces informations puis les transferts vers le gestionnaire du système de bibliothèque. Ce dernier est connecté à une base de données que ce soit à partir d'une base de données locale ou une base de données distante. Dans le cas où le translateur sélectionne et renvoie des requêtes vides, l'utilisateur peut répéter la recherche en utilisant des synonymes, des super-catégories ou des sous-catégories et des mots-clés de recherche différente.

À partir des années 2000, l'étude menée par Ex Libris Future Library Survey (2018) qui perçoit la bibliothèque comme un moyen qui soutient : la productivité des étudiants et des chercheurs, confirmer que la bibliothèque suit les dernières tendances et savoir offrir aux utilisateurs une nouvelle

expérience améliorée. À cet égard, afin d'accomplir les tâches de plus grandes valeurs, les bibliothèques doivent trouver un moyen d'automatiser ses activités, assister son personnel dans leurs opérations quotidiennes grâce à des technologies utiles et pratiques. Selon SCONUL Library Design Awards (2019) les gestionnaires de bibliothèque sont bien conscients de la nécessité d'offrir de nouveaux services. La plupart montrent leurs intentions et leurs confiances d'adopter de technologies avancées telles que l'impression 3D, la gamification, la reconnaissance vocale, l'intelligence artificielle, etc. Le tableau suivant montre le pourcentage d'adoption et de non-adoption de la technologie dans les bibliothèques britanniques.

Tableau 1 : La bibliothèque et la nouvelle technologie Sconul (2018)

	Déjà adopté	**Sera adopté**	**Sera partiellement adopté**	**Ne sera pas adopté**	**Totale**
Intelligence artificielle / Apprentissage automatique	10.88 %	35.37 %	35.37%	18.37%	147
Reconnaissance vocale	4.79%	38.36 %	34.93%	21.92%	146
Réalité augmentée	14.08 %	30.28 %	35.92%	19.72%	142
Réalité virtuelle	20.27 %	25.00 %	34.46%	20.27%	148
Impression en 3D	51.95 %	25.79 %	10.39%	11.69%	154
Automatisation de l'exécution via des kiosques / robots	40.79 %	26.97 %	19.74%	12.50%	152
Gamification / Living labs Technologies susceptibles d'améliorer l'enseignement et l'apprentissage	34.00 %	37.33 %	20.67%	8.00%	150
Autres technologies avancées	7.84%	25.49 %	17.65%	49.02%	51

Selon l'étude de Massis (2018), la bibliothèque en tant qu'espace de recherche d'informations interdisciplinaire valorise l'inclusion et offre la possibilité face aux utilisateurs d'apprendre de nouvelles compétences en matière de l'IA. L'enquête menée par Ex Libris a révélé que si près de 80% des bibliothèques de recherche explorent l'utilisation de l'IA et de l'apprentissage automatique, seuls 5% environ tirent actuellement parti de cette technologie. De là, nous explorons dans la section ci-dessous les effets de l'introduction de l'IA dans le processus de gestion des activités de la bibliothèque.

Tableau 2 : Avantages d'utilisation de l'IA sur le processus de gestion des activités de la bibliothèque

Mission Population	**Type d'étude Auteurs**	**Objectifs**		**Approche IA**	**Axe et les critères de l'approche**	**Catégories et Tranche**		**Collecte de données**
1) Accès à la documentation scientifique 2) Interaction via : Agents conversationnels	Qualitative	**Objectif principal** : Servir à promouvoir la recherche en IA appliquée à la documentation scientifique. **Objectifs partiels:** 1) Faire une exploration de données de documentation. 2) Créer et publier une base de données ouverte contenant les résultats de l'exploration de données. 3) Extraire les thèmes de recherche de la documentation scientifique disponible. 4) Tester l'ensemble de données grâce à un ensemble complet de méthodes de filtrage collaboratif et de mesures de qualité.	Recommander des recherches (RS)	Systèmes de recommandation de filtrage collaboratif (FC). **Critères** : 1) Précision : rappel et précision de la recommandation (Shani et Gunawardana, 2011). 2) Mesure de précision : nouveauté, diversité, fiabilité, sérendipité. de la documentation. (Han, Yamana, 2017). 3) Niveau de prédiction de la documentions. 4) Le rang de la recommandation.	Chercheurs et des doctorants	Provient des principaux éditeurs de recherche; ils fournissent une énorme quantité de papiers qui contiennent, essentiellement les informations suivantes: auteurs, affiliations, titre, résumé, mots-clés, contenu et références.	32 journals sélectionné avec un facteur d'impact entre [2.889-10.629]. Le nombre de papier est 14.143 papaiers en total tels que : -ACM Transaction on Intelligent Systems and Technology), NBR Paper: 157. - International Journal of Intelligent System. NBR Paper: 34. -IEEE Computational Intelligence Magazine). NBR Paper: 10 - Knowledge Based System. NBR Paper: 726. - Neural Networks. NBR Paper: 200. -Semantic Web. NBR Paper: 44.	Ortega, et al (2018).

3) Adaptation des paramètres du livre électronique	Qualitative	Concevoir et implémenter des agents conversationnels pour offrir une meilleure aventure de recherche et de la documentions.	Traitement automatique du langage naturel (PNL) artificiellement intelligent via : Chabots et des agents conversationnels	Une taxonomie illustrée dans le but d'évaluer l'interactivité en matière de : l'education ; l'information ; l'assistance et l'interactivité sociale.	Chercheurs et les navigateurs	Sites Web des plus grandes bibliothèques	20 bibliothèques comediennes tells que : University of Toronto, University of Alberta, University of Columbia; University of Calgary et McGill Library 'Collections….ect	Rubin, et al (2010).
4) Apprentissage via :	Quantitative : l'analyse factorielle exploratoire et l'analyse factorielle confirmatoire	Explorez la contribution des livres électroniques aux tâches académiques et les possibilités offertes par les lecteurs intelligents	Task-technology fit (TTF)	Adaptation de l'information aux taches. L'adéquation de la technologie aux tâches.	Enseignant universitaire	Une enquête en ligne, administrée à la faculté de médecine, de science et d'ingénierie de l'Université de Nouvelle-Galles du Sud.	4 383 universités partagées en trois facultés.	D'Ambra, et al (2013).
A) Deep Learning Optimization Library (DLOPT)	Qualitative	Cette technologie a pour but théorique : 1) L'optimisation des hyper-paramètres d'apprentissage en profondeur. 2) Trouver / sélectionner les paramètres de configuration les plus appropriés pour un problème spécifique. 3) Définissent un espace de recherche très pointu.	Deep neural networks (DNN) && Optimisation du Modèle problème et solution.	Des paramètres déterminent les fonctionnalités d'activation de la ressource (document), le nombre de couches cachées tels que (les informations endogènes cachées dans la documentation), la taille du noyau d'une couche.	Exécuteur de références, chargeur de données bibliothécaire, constructeurs et formateurs de réseaux de neurones.	Démonstration conceptuelle		Camero et al. (2018)
B) La technologie DLPaper2Code	Qualitative	Cette étude a pour but empirique : 1) Extraire et comprendre les organigrammes et les tableaux intégrer dans le document de recherche et les convertir en un graphique de calcul abstrait. 2) Générer automatiquement la conception de 5 000 papiers.	DLPaper2Code ;	1) Extraire toutes les figures et les tableaux d'un document de recherche (PDFFigures 2.05 ; PDFMiner6 et Popplerutils7) . 2) Classer chaque figure ou tableau. 3) Extraire le flux et les informations textuelles des figures et des tableaux. 4) Construire un graphique de calcul abstrait. 5) Générer du code source à partir du graphe de calcul.	Chercheurs et les doctorants universitaires	5 000 articles ont été téléchargés depuis arXiv.org en utilisant le «deep learning» comme requête d'entrée.	Plus de 30 000 images de documents de recherche sont traitées. Les tableaux peuvent avoir différentes structures et peuvent impliquer différents types d'informations.	Sethi, et al (2018)

Discussion

Compte tenu de la variété et la complexité de l'accès à l'information, les responsables chargés de bibliothèques rencontrent un nouveau contexte lié à de nouvelles techniques et de nouvelles approches de gestion. Face aux moyens et aux technologies avancées, la source d'information est mesurée en fonction du besoin de chaque utilisateur Ma et al (2020). Nous citions les travaux de Eybers et al (2019) qui ont évalué le besoin de l'utilisateur en fonction de trois tâches distinctes au qui sont : les tâches non-routinières, la tâche dépendante de l'autre et les tâches critiques temporelles. En contrepartie, les approches de recommandations traditionnelles s'incarnent dans la classification avec des outils de repérage (catalogues) et d'accès (cote, signalétique)... Selon Naak et al (2009) les systèmes de recommandations traditionnelles n'étaient pas suffisants car ils devaient prendre en compte le contexte de l'utilisateur. À ce stade, l'opérationnalisation de la technologie au profit des besoins de l'utilisateur qu'il soit enseignant-chercheur ou apprenant ne se limite pas à recevoir les informations génériques mais de capturer des informations les plus approfondies en fonction de son statut de recherche (débutant, intermédiaire, avancé et expert), son champ d'expertise, son degré de contribution académique et scientifique et sa relation envers les autres disciplines.

Dans les travaux de Shimmon (2004), les bibliothèques acquièrent traditionnellement des supports imprimés tels que des journaux, des cartes, des articles, des illustrations ainsi que diverses données parmi lesquelles des livres. Ce réservoir de documents a été associé à des services plus ou moins étendus assurés par le personnel tels que le: le repérage ou à la recherche d'information, aide au choix, consultation sur place, prêt et reproduction d'extraits…etc. De l'autre côté, l'exploitation des études préexistantes est considérée comme le point d'entrée pour développer et produire d'autres travaux académiques et scientifiques.

Dans ce contexte, et grâce à des techniques avancées telles que le Deep Learning, le chercheur peut extérioriser des connaissances qui optimisent les décisions et les moyens déployées. Cela contribuera non seulement à l'apparition de nouveaux modèles, mais développera d'autres pistes de recherche

prometteuse. À cet égard, les expériences des bibliothèques avec les techniques d'apprentissage en profondeur ont rendu la mission de l'utilisateur magique et stimulante. L'étude de Coleman (2017) considère les profonds changements que l'IA peut apporter en tant qu'outil puissant pour l'érudition et la recherche, elle permet à une vaste collection de bibliothèques d'être découvertes, consultables et analysables. En conséquence, et face à la diversité d'informations, comment pourrait mieux interagir les compétences et les connaissances du personnel de la bibliothèque avec les communautés académiques et scientifiques ?

Des développements reconnus dans le domaine de la technologie ont offert à l'académicien et au chercheur un nouvel espace de recherche avec un accès illimité à l'information. À ce niveau, l'utilisateur a besoin d'accéder à des informations à grande échelle. Contrairement aux approches traditionnelles, l'accès aux ressources est choisi selon une politique d'acquisition plus ou moins explicite Sutter (1998). L'approche contemporaine offre la possibilité de rechercher des informations en soi et de consulter et recevoir les informations en permanence Accart (2016). Dans ce contexte, les agents conventionnels peuvent jouer le rôle d'un service d'allocation d'informations. Les modèles de conception d'un agent conventionnel regroupent différentes dimensions, la dimension informative, d'assistance et d'interaction sociale sont souvent présentés dans les activités menées par les bibliothécaires. Dans le même temps, les travaux de Skov-Nielson (2008) indiquent que l'agent conventionnel génère du trafic vers le site Web de la bibliothèque et a donc accru la visibilité de la bibliothèque dans la communauté du campus. Cependant, les agents traditionnels sont plus étroits en matière d'interaction entre le prestataire de services et leurs usagers Gilbert (2010), Ainsi, dans l'étude de Brophy (2002), les agents traditionnels ont un contact direct avec le public, ce qui peut affecter la qualité des informations fournies à l'utilisateur. Cette situation est dûe aux manques d'informations la plus adéquate reliant avec le statut de l'utilisateur.

Dans ce cadre, l'existence des agents conversationnels peuvent servir tout le monde via des réponses moins répétitives et prédéterminées car les réponses peuvent être hautement contextualisées Heudin (2007). Pour l'utilisateur, les agents conversationnels réduisent la nécessité de parcourir des quantités d'informations écrasantes en format textuel, et créent des liens vers la section appropriée de la ressource où il peut fournir une réponse brévité.

Conclusion

Les bibliothèques sont au cœur de la ressource la plus riche pour le développement de l'économie et de la société. À ce jour, l'IA a offert aux utilisateurs la possibilité de découvrir et d'explorer de nouvelles voies de recherche. Dans ce contexte, le souci de l'utilisateur est comment tiré parti le maximum de ressources et s'intégrer dans ce nouveau mode artificiel.

Dans ce monde, l'accès à la documentation diffère par rapport aux méthodes traditionnelles. Un accès plus personnalisé et calculé en fonction du champ d'intérêt, de la nouveauté et de l'interdisciplinarité de la documentation,…etc. Avec l'IA la recherche et l'accès à documentation collaborative a pris un ascendant via l'approche de filtrage automatique, nous relions chaque document développé aux citations, aux références et aux listes de co-auteurs qui concernent la même thématique ou la même discipline de la recherche suggérée. De plus, l'exploitation de la ressource à grande échelle soit en fonction du temps ou de la quantité d'informations conservées, nécessite un privilège d'accès à l'information sur tous les services fournis par la bibliothèque, tout au long de la journée et de l'année sans interruption. Ceci via des agents numériques programmés avec les différents scénarios possibles. À ce niveau, l'utilisateur aura l'occasion d'accéder à l'information en fonction de sa position et son état d'avancement.

La gestion d'une bibliothèque est devenue un domaine très spécialisé. L'IA offre la possibilité d'accéder à des informations plus approfondies. À ce niveau, l'analyse de la documentation se traduit en fonction des objets et des entités où l'apprenant peut trouver d'autres informations plus précieuses. Avec des techniques d'analyse en profondeur, la source d'information retenue est le point de départ vers des recherches plus approfondies. Dans ce contexte, le diagnostic approfondi sur chaque section, chapitre, partie, sous-partie ou zone du document fournit aux utilisateurs une documentation

personnalisée selon la démarche de recherche suivie. La recherche par objet diffère par rapport à la recherche par domaine ou par discipline. À ce stade, le chercheur développera et enrichira la production scientifique et académique par des modèles et des approches à des fins plus expérimentales.

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Profiling Polish Retail Consumers of Major Engine Oil Brands

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Abstract

The objective of the research was to study five international and two domestic engine oil brands that compete in the Polish retail market. The study investigates the relationship between past customer's purchase decisions and the customer's characteristics. To this end, survey data were collected from 1060 Polish drivers. The obtained results suggest that the competition between engine oil brands is manifesting itself through attracting varying customer segments. The target customer group for Brand W and Brand X, are drivers up to 35 years of age (Brand W 80%, Brand X 92%). What is more, the users of Brand W clearly favor cars with high engine capacity - 90% of them declared driving cars with engine volume above 1.5 dm^3. The most differentiating criteria, which drivers usually consider when making their purchase decisions, are the OEM specifications, viscosity classification and oil price. From among five sources of recommendations included in the questionnaire, customers strongly rely on those given by car producers, authorized service stations as well as local garages/service stations.The study fills an important gap in empirical research in the context of non-technical properties of engine oils. The results may help researchers and marketers better understand the intricacies and complexities of brand competitiveness leading to consumers' purchase intentions and decisions.

Keywords: engine oil, consumer behavior, role of brands, purchase decisions, choice heterogeneity

Introduction

Producers develop brands as a way to attract and keep customers by promoting value, image, prestige, or lifestyle (Abd Rahman & Hairul Rizad, 2005; Piatkowski, 2012). Many consumers assign high quality to prestigious brands and such brands, therefore, enjoy greater credibility and ultimately greater value (Erdem, Swait, & Louviere, 2002). This is particularly important for the brands whose products have only slight physical differences. Such include a number of products in industrial markets (for example, engine oils) that have comparable physical specifications and performance; yet, some products successfully maintain a high market share, even at a premium price (Mudambi, Doyle, & Wong, 1997). That is why, in the close substitution setting, well-known brands can make products more recognizable for potential consumers (Keller, 2008). But still, the question arises as to what differentiates the successful brand from its competitors in the eyes of the customer. The basic explanation may lie with customer perception of value (Doyle, 1994). However, the processes involved in adding value are complex and interrelated (Porter, 1998). One element of the puzzle may be an effective brand name. Creating one, however, is a challenging task. In the industrial markets one strategy involves choosing a name that has a desirable phonetic symbolism. Also alpha-numeric names are more acceptable for technical products (Labahn & Chiranjeev, 1995). Another element of

the puzzle may be high brand awareness, which is defined in terms of the consumers' ability to associate a brand with its products category (Aeker, 1991). It refers to the strength of the brands' presence in the consumer's mind. Research by Hoyer & Brown (Hoyer & Brown, 1990) demonstrated that brand awareness is a prevalent choice tactic among inexperienced consumers facing a new decision task. This scenario may apply to many engine oil retail customers. This view is also supported by Aaker (Shocker & Aaker, 1993), who points out that when the industrial purchase decision is a "toss-up," the "decisive factor then can turn upon what a brand means to a buyer". This position is also shared by many producers, who believe brand name to be one of the most important factors influencing the success of the product. The opinion is also strengthened by Hoyer & Brown (1990), who argues that in a low involvement decision making settings, a minimum level of brand awareness may be sufficient for product purchase decision. The partially opposite view, however, is demonstrated by (Mudambi et al., 1997), who states that it may be true that "the intangible features of the brand play a less potent role in industrial purchase decisions than in the consumer sector". Consequently, price and hard, tangible attributes of the physical product may not fully explain purchase decisions and the resulting market share but may be more important in industrial than in the non-industrial markets.

The above findings seem to justify the need for more research on the role of brands in industrial products markets. The overall purpose of this article is to study five international and two domestic engine oil brands that compete in the Polish retail market. This study investigates the relationship between different components of brand competitiveness and past customer's purchase decisions. The results may help researchers and marketers better understand the intricacies and complexities of brand competitiveness that lead to consumers' purchase intentions and decisions. In general the subject of non-technical properties of engine oils is not prominently present in the scientific literature. Consequently, this research may partially improve this state of the matter.

Engine oils manufactured by the producers included in the study (Mobil, Shell, Castrol, Elf, Motul, Orlen, Lotos) could be considered part of an industrial products market and should be viewed as close substitutes. The first one is Mobil. Exxon Mobil is one of the largest integrated group of refiners, marketers of petroleum products and chemical manufacturers. Over a period of 125 years, Exxon Mobil has evolved from a regional marketer of kerosene in the United States to become the largest publicly traded integrated oil company in the world (Kumar, 2017). The study also includes engine oils from the second (Shell), third (Castrol) and fifth (Elf) largest petrochemical companies in the world. Shell is a Dutch-British oil and gas company headquartered in the Netherlands and incorporated in the United Kingdom. Castrol is a British company owned by the British Petroleum. Castrol was a longtime supporter of the professional motorsports, which helped to build its brand recognition. Elf is a French company and a part of the Total group. Motul is also an enterprise of French origin. It is a more specialized company focusing on producing lubricants for various kinds of motor engines. This contrasts with the rest of the companies mentioned here, whose main business is related to extracting, processing, transferring the natural gas and crude oil (Ermida, 2014). Motul, through its support of professional motorsports, has built its brand recognition. The last two engine oil producers are Orlen and Lotos. Both of them are the largest companies processing and selling oil and its derivatives in Poland. Orlen, which is a part of the PKN Orlen group, holds approximately 70% of processing capacities of Polish refineries. The company has the biggest network of filling stations in Central Europe, with stations located in Poland, Germany, the Czech Republic and Lithuania (Jonek-Kowalska, 2019). In turn Lotos Oil, which is a member of the Lotos Capital Group, operates in Poland, Norway and Lithuania.

The next sections of the article present literature review, methodology, materials and collected data, as well as the results of data analysis and the discussion.

Theoretical Background

The scientific literature on the economic and marketing aspects of engine oils is rather scarce. One possible reason for this paucity of scientific articles may be that such research is conducted mainly by the private for-profit companies that generally have little incentive to make their research freely available. An in-depth query of international and domestic literature yielded, nevertheless, a few worth mentioning positions.

Iranian engine oil market was studied by (Alavijeh, Fattahi, & Moshfegh, 2019). Their research was conducted to compare the effects of price and brand on the industrial lubricants customers' buying choices. The results indicated the significant effects of brand and price on buying choices. Further, the effect of perceived quality of the engine oil on buying choices was significant, but far less important as compared to that of price or brand. The authors, however, analyzed industrial buyers and as such their results may not be fully applicable for retail markets.

Indian engine oil market was studied by (Srivastava, 2016) and (Srivastava, 2018). The main finding was that the brand positioning of lubricant oils has a positive impact on consumers. Authors define brand positioning as "the act of designing the company's offer so that it occupies a distinct and valued place in the mind of the target customers". In their research, authors also constructed perceptual map using the MDS (multidimensional scaling) technique to map different brands of lubricant oils (Castrol, Servo, MAK Lubricant, HP Lube, Veedol, Superfleet) depending on two attributes - price and quality.

Nigerian engine oil market was studied by (Olanipekun, Rasheed, & Sydney, 2015). The study addressed the challenges of brand recognition as a determinant of customer impulse buying behavior in the automotive lubricant markets in Lagos. The results obtained by the authors imply that there is a significant relationship between brand recognition and customer buying behavior. However, their findings may be of limited general use due to the fact that Nigeria suffers from the influx of fake lubricants into the market and the uncontrolled importation of adulterated lubricants. These reasons may translate into local customers having completely different hierarchy of importance as compared to the customers that do not need to worry about the technical quality of engine oils.

Indian engine oil market was investigated by (Pawar & Khandelwal, 2011). They studied products of Indian Oil, Bharat Petroleum, Hindustan Petroleum and Castrol India. Through their research it was found that very few customers were aware of the changing technology and that customers were influenced by advertisement and information received from car mechanics.

Pakistani automobile lubricant market was studied by (Zakir, 2011). The authors motivated the need for their research by observing that "it is essential for organizations to understand a consumer behavior and attitude towards a particular product as the insights gained through these kinds of research help organizations customize and augment their offering". The authors found out that the important reason behind low customer ratings for some engine oil brands was the fact that the lubricants were quite new to the market, despite the fact that customers had no objections to their technical properties. Another interesting finding was a high importance of the word of mouth in building the trust towards the oil brand among new customers. The findings, however, may not be particularly useful for brands operating in countries (for example, European ones) with markedly different climate, as the authors stress that in Pakistan the diesel engine heavy-duty vehicles play an important role due to the need for traveling through "different climate, road, temperatures, dusty areas and weather conditions".

Research Objective, Methodology and Data

Research Hypotheses

As mentioned before, in the Introduction section, the competition among different brands of products that are close substitutes may manifest itself in many ways. Engine oil manufacturers, however, rarely disclose marketing strategies they undertake and even more rarely they provide any information regarding efficiencies of their marketing efforts. It is also unknown whether the engine oil manufacturers prefer to target broad populations or more focused segments. Consequently, due to the lack of reliable first-hand information, a direct comparison between competing oil brands is problematic. This research study takes an indirect observational approach. It is hypothesized that the competition between engine oil brands will manifest itself through attracting varying customer segments.

To examine the stated hypothesis, a preselected set of indicators was chosen, and the survey data was gathered. If the homogeneity of indicator distributions across brand strata is found, the main hypothesis will be rejected. However, if no such homogeneity is found, it will be taken as an evidence in favor of the hypothesis.

Data Analysis Methods

All variables analyzed in this study are categorical or categorized variables and as such are summarized using relative frequencies. An appropriate statistical method to investigate the presence of a relationships between two categorical variables is a contingency table accompanied by conditional distributions and Pearson chi-square test. Since multiple statistical null hypotheses are tested, the resulting p-values are corrected for multiplicity, which may cause untoward inflation of a false positive rate. Briefly, the more tests are carried out, the more likely erroneous inferences are to occur. In the literature, several statistical techniques have been developed to counteract this. These techniques generally require a stricter significance threshold for individual comparisons to compensate for the number of tests being made (Bretz, Hothorn, & Westfall, 2016). In this study, the Bonferroni method is employed. According to this method, a usual significance threshold of 0.05 should be divided by the number of statistical tests performed. The p-value correction (0.05 divided by 21 tests) yields a new threshold which equals to 0.00238.

Data and Survey Design

The study included a large group of 1060 drivers from Poland. The study was conducted between 1st January and 31st July 2018 and the questionnaire method was used. The questionnaires were submitted online and required providing answers to all questions, which helped to avoid the problem of incomplete or partial data. The questionnaire was addressed to drivers who use fully synthetic engine oils. It was completed by drivers who decide or co-decide about the oil change. The respondents were invited to participate in this study using the snowball sampling (chain-referral sampling). This is a non-probability sampling technique, where a pool of initial respondents nominated - through their social networks (both virtual and non-virtual) - other participants, who met the eligibility criteria and could potentially contribute to the study. This sampling technique is often used in hidden populations, which are difficult for researchers to access, due to the fact that there are no lists or other obvious sources for locating the members of the population.

The questionnaire comprised of three main groups of questions. The first one, the demographic section, allowed for identification of the respondents' sex, age, type of the place of residence they live in. The second group of questions was devoted to the technical properties of respondents' cars. The questions asked about engine type, engine capacity (measured in cubic decimetres, dm^3), year of car production and segment of vehicle. The definition of car segment will be provided in the next section. In the last group of questions, respondents were asked to evaluate the importance of 13 main criteria typically encountered during the process of deciding which engine oil to purchase. Respondents marked each criterion as either *important* or *not important*.

Beside the above-mentioned items, the last question required respondents to reveal the exact brand name of the engine oil they recently purchased to be applied in their car. This item constitutes the main stratifying variable in the statistical analysis. In the Introduction section, seven engine oil brands were briefly introduced. As this study's main purpose is strictly scientific (and not a commercial one), authors decided to partially mask the brand names when presenting the findings. To be more specific, a code name S, T is either Castrol or Mobil, U, V, W is either Shell, Elf or Motul, X, Y is either Orlen or Lotos.

Results and Discussion

Results

Tables 1 to 7 present the results of the data analysis. In each table, to save space, multiple variables are shown. At the bottom of each variable the p-value is placed. As described in the Data analysis methods section, the p-value less than 0.00238 indicates the statistically significant result of the Pearson chi-square test, which can be interpreted as evidence favoring the statistical hypothesis that conditional distributions across brand strata (rows in the tables) are not equal.

Table 1: Distribution of drivers' sex and age across oil brands. Source: own research

Oil brand	Females	Age			
		<25	<25;35)	<35;45)	>=45
Brand S	11%	22%	46%	15%	17%
Brand T	16%	30%	42%	16%	12%
Brand U	17%	11%	42%	33%	14%
Brand V	11%	19%	50%	19%	11%
Brand W	10%	27%	54%	10%	10%
Brand X	14%	35%	57%	5%	3%
Brand Y	27%	21%	46%	13%	19%
	p = 0.00189	p = 0.00001			

Table 1 shows that there is statistically significant relationship between engine oil brand and the sex of the oil buyers; for example, 27% of the Brand Y users declared being a woman. In the case of the remaining brands, women indicated them less frequently (10%-17%). There is also statistically significant relationship between engine oil brand and the age of the oil buyers. A clear outlier is the Brand X, which was strongly favored by the younger customers, as only 8% of its customers were older than 35. On the opposite end was the Brand U with the highest frequency of buyers above 35 y/o (47%). The remaining brands were more similar with regard to the customer age profiles.

Table 2 shows that there is statistically significant relationship between engine oil brand and both the place of residence and the education level. Brand U and Brand T users were most often the residents of large cities (67% and 63%). Drivers who chose any of the examined oil brands usually had a master's degree or high school education with the highest proportion of masters among Brand U and Brand S customers.

Table 2: Distribution of drivers' place of residence and education across oil brands.

Oil brand	Place of residence			Education			
	rural	urban (below 250K)	urban (above 250K)	primary or vocational	high school	bachelor	master
Brand S	19%	34%	47%	2%	24%	17%	57%
Brand T	15%	22%	63%	7%	22%	22%	49%
Brand U	19%	14%	67%	8%	22%	6%	64%
Brand V	11%	47%	42%	0%	39%	8%	53%
Brand W	20%	24%	56%	5%	39%	17%	39%
Brand X	14%	30%	57%	8%	30%	22%	41%
Brand Y	21%	38%	40%	8%	33%	13%	46%
	p = 0.00002			p = 0.00000			

Source: own research

Tables 3 and 4 describe the relationship between engine oil brand and, in succession, engine type, car production year, engine capacity and car segment. The Brand X users most frequently drove cars with the petrol engines (68%) and the Brand V users were the most diesel-oriented group (53%). The Brand U users were typically owners of the newer cars, whereas the Brand Y users typically owned older cars. However, in both cases, for the engine type and production year - the Bernoulli corrected p-value threshold for statistical significance of the relationship with the brand was not reached.

Table 3: Distribution of cars' engine type and production year across oil brands.

Oil brand	Engine type: petrol vs diesel	Production year			
		below 2000	2000-2005	2006-2010	above 2010
Brand S	50%	12%	31%	32%	24%
Brand T	57%	16%	34%	34%	16%
Brand U	61%	11%	22%	44%	22%
Brand V	47%	11%	39%	33%	17%
Brand W	61%	12%	46%	32%	10%
Brand X	68%	16%	30%	30%	24%
Brand Y	62%	23%	37%	21%	19%
	p = 0.01727	p = 0.00752			

Source: own research

The brand W (Table 4) users clearly favor cars with higher engine capacity, as 90% of its users declared driving cars with engine capacity above 1.5 dm^3. In contrast, the users of Brand T and Brand Y would rarely drive cars with engine capacity above 2.0 dm^3, 7% and 8% of the cases respectively. The users of the rest of brands were more, however not ideally, evenly distributed across the engine capacity categories.

The interpretation of the results for a car segment needs to be preceded by a short definition of this term, since it is a first non-self-explanatory variable to be discussed in this study. Typically, passenger cars are divided into 10 groups (segments). Segment A consists of city cars, which are predominantly small sized and require relatively modest maintenance costs. In Europe, good examples of the segment A cars are Citroen C1 and Toyota Aygo. Segment B (small cars, e.g. Citroen C2, Fiat Panda) cars in comparison to segment A have more cargo and passenger space. Segment C (lower-middle class cars, e.g. Citroen C4, Toyota Corolla) are designed to make them better suited for mixed usage (city vs out of the city driving). Segment D cars (middle class and family cars, e.g. Audi A4, Honda Accord) are designed to fully accommodate five adult passengers on the long-haul travel. Segment E (upper-middle class, e.g. Audi A6, BMW 5) cars are usually larger passenger vehicles equipped with non-standard accessories and with additional attention to visual appearance. Less represented in this study are sports cars (segment G), cabrio cars (segment H), off-road cars (segment I) and vans (segment K).

Table 4: Distribution of cars' engine capacity and segment across oil brands

Oil brand	Engine capacity [dm^3]			Segment			
	below 1.5	1.51 – 2.0	above 2.0	A, B	C	D	E, F, G, H, I, K
Brand S	22%	65%	12%	16%	48%	28%	8%
Brand T	31%	62%	7%	21%	50%	21%	9%
Brand U	39%	50%	11%	25%	50%	17%	8%
Brand V	31%	58%	11%	25%	44%	19%	11%
Brand W	10%	68%	22%	10%	41%	32%	17%
Brand X	41%	46%	14%	27%	51%	8%	14%
Brand Y	40%	52%	8%	33%	48%	15%	4%
	p = 0.00000			p = 0.00007			

Source: own research Source: own research

The Brand Y users (Table 4) have the largest subgroup of cars from segments A and B (33%) and the smallest from segments E-K (4%) in comparison to the other engine oil brands in those segments. The Brand W stands out from the rest of oil brands due to its higher presence in the D (32%) and E-K segments (17%) and lower in the A-B segment (10%).

Table 5: Distribution of drivers' perceived importance of various oil related characteristics across oil brands

Oil brand	Oil price	Brand familiarity	Brand loyalty	Radio and TV ads
Brand S	38%	67%	29%	6%
Brand T	39%	69%	35%	5%
Brand U	42%	56%	28%	14%
Brand V	36%	58%	19%	8%
Brand W	32%	63%	41%	5%
Brand X	59%	54%	27%	14%
Brand Y	65%	44%	29%	6%
	p = 0.00000	p = 0.00015	p = 0.05444	p = 0.02691

Source: own research

Customers for whom a low product price is important in the purchasing process dominated among buyers of Brand Y and Brand X oils (domestic oils, seen as cheaper) (tab. 5). Clearly, Brand W has not been built around the idea of a low-price product and among customers who choose it, almost 70% (the vast majority among the surveyed brands), do not attach importance to price. Other brands in this group include: Brand V, Brand S and Brand T. Above 60% of their buyers do not attach much importance to the price.

In the case of brand familiarity, it is interesting to note a particularly high importance of this criterion for users of almost all engine oil brands, except for Brand Y. This may be due to what has been pointed out in the previous paragraph, namely that Brand Y users tend to value competitive pricing above other factors.

In the context of brand loyalty, Brand W and Brand V are worth mentioning as two extreme cases. The first one strongly attracts the customers to its brand, while in the second case the customers are not particularly associated with the brand - only 19% of respondents choosing Brand V believe that brand attachment is an important criterion during the purchasing process. However, the relationship between oil brand and brand loyalty did not reach statistical significance threshold in this study. Another non-significant result was obtained for radio and TV ads (p=0.02691). Nevertheless, it is worth observing that consumers in general believe advertising to be of low importance in their purchase decisions.

Table 6: Distribution of drivers' perceived importance of various technical properties of oil across oil brands

Oil brand	OEM specifications (e.g. VW, MB, GM)	Classification		Scope of information provided on the oil label
		Qualitative (e.g. API, ACEA)	Viscosity grade (SAE J300, e.g. 5W-30)	
Brand S	51%	59%	73%	32%
Brand T	48%	56%	74%	37%
Brand U	36%	61%	78%	28%
Brand V	50%	44%	72%	25%
Brand W	71%	73%	90%	39%
Brand X	43%	49%	59%	43%
Brand Y	35%	56%	56%	23%
	p = 0.00003	p = 0.00992	p = 0.00000	p = 0.02705

Source: own research

Considering the technical aspects of engine oils, the users of Brand W oils stand out in a special way. Drivers choosing Brand W clearly more often than the users of other brands indicate a high importance of the OEM specifications (71%), quality classifications (73%) and SAE classifications (90%). This suggests that they have high expectations and at the same time extensive technical knowledge in the field of oil parameters. The opposite situation is observed for drivers choosing Brand X and Brand Y. In their case, the above-mentioned technical parameters count in the smallest degree (43/35%, 49/56%, 59/56%, respectively).

The results obtained for Brand V and Brand U suggest some inconsistency exhibited by their buyers. In the first case, despite attaching great importance to the OEM specifications and viscosity class, quality classification was rarely indicated as important. In the second case, despite viscosity grade and quality classification being assessed as very important, the OEM specifications were rarely indicated as such. Statistically non-significant result was obtained for the scope of information provided on the oil label (p=0.02705).

Table 7: Distribution of drivers' perceived importance of oil recommendations by various agents across oil brands.

Oil brand	Oil recommended by:				
	supplier	car manufacturer	authorized service station	local garage/car service station	family or friends
Brand S	25%	69%	53%	58%	30%
Brand T	29%	63%	48%	58%	39%
Brand U	33%	53%	56%	58%	44%
Brand V	8%	47%	28%	39%	31%
Brand W	20%	51%	32%	41%	24%
Brand X	38%	54%	32%	57%	49%
Brand Y	31%	50%	40%	48%	40%
	p = 0.00071	p = 0.00013	p = 0.00001	p = 0.00470	p = 0.00262

Source: own research

Of the five sources of recommendations available in the questionnaire (Table 7), those given by car manufacturers and authorized service stations, as well as those obtained at the local garage/car service station are the most important for customers of all analyzed brands. It also seems that Brand S, Brand T and Brand U have the strongest presence in garages and service stations (including authorized ones) among all of the brands examined. Drivers choosing Brand V, much less frequently than the users of other brands, point to the high importance of the recommendations of the oil seller (8%), authorized service stations (28%) and local garage/service stations (39%). This may suggest that in the indicated places, the oils of this brand are not as well perceived as the other brands investigated. Among drivers choosing Brand S, a considerable number (69%) indicated the importance of the car manufacturer recommendations, whereas only a quarter of them pointed to the seller's recommendations (25%). A similar situation was observed for Brand T (63% and 29%, respectively). A narrow range of indications was obtained for drivers using Brand Y and Brand X oils. In the first case (Brand Y), all five recommendations seem relevant to only 30-50% of respondents; whereas, in the case of Brand X, they are relevant to 38-57% of respondents. Among drivers using Brand V oils, the lowest hypothetical importance of the analyzed recommendations was found - more than 50% of respondents (53%-92%) considered that these recommendations were not significant in the purchasing process. On the other hand, among those choosing Brand U oils, between 53 and 58% are of the opinion that the recommendations coming from car manufacturer, authorized service stations and local garage/car service station are the most important ones. In turn, oil supplier recommendations as well as those coming from the family or friends are unimportant for 56-67% of respondents.

Discussion

The research outcomes provide many practical conclusions, directed mainly to marketing departments in companies that introduce new oils to the market or are developing strategies aimed at increasing the sales of oils already available on the market. Some of the petrochemical companies may be especially interested in them because, as Jonek-Kowalska (2019) indicates, even giants from the petrochemical market were systematically incurring losses in the years 2013-2015.

Brand X has a strong market position for spark-ignition cars, while the diesel car owners are in minority, when compared to Brand S and Brand V, where almost equal distribution was obtained for both engine types. Brand Y has a strong position among drivers of cars from the A + B segment. In terms of the E, F, G, H, I, K segments, Brand W seems to stand out. Brand W has built its recognition around sports cars with a focus on providing exceptional protection for the engine in difficult operating conditions. This study confirms that such marketing orientation has been the right choice, and it can serve as a valuable supporting point for competitors that are looking for proven ways to reach specific audiences. In somewhat disparate field similar conclusion was found by Baziana et al. who state that branding in the olive oil market is a key factor in boosting the competitiveness (Baziana & Tzimitra-Kalogianni, 2019). They established that the preference for an olive oil brand is associated with increased brand awareness and higher levels of loyalty.

Interestingly, owners of new cars mainly look for oils among brands such as Brand S, Brand X and Brand U, while owners of older vehicles mostly choose Brand Y. It can be also seen that brands such as Brand S, Brand T and Brand U have established a good cooperation with authorized service stations, local service stations and garages. Respondents indicate a large number of recommendations from these places. It seems that Brand V has yet the most to do in this area – merely a quarter of respondents (28%) make their purchase decision as a result of recommendations obtained from authorized service stations.

Among the information particularly valuable for companies selling engine oils may be the fact that radio and television commercials featuring such products are generally indicated by customers as a criterion very weakly affecting the purchasing process. Hence, other channels for reaching the customer are worth considering, e.g. establishing a closer cooperation with local service stations/garages, where customers change oils in their cars. However, there is a need for additional research to reveal if this is in fact true that radio and television commercials are ineffective or the real explanation is that they are effective but only customers do not realize they have a, possibly subconscious, impact. Similar issue that could be considered by those involved in the sales and marketing of car related products, was highlighted by (Murry, 2018), who found an evidence that dealer and manufacturer advertising are substitutes within the vertical channel. As dealers decrease their advertising budgets, manufacturers can make up for this with their own advertising strategies.

It was also found that Brand Y consumers are very price sensitive. One possible explanation can be found in Fornari et al. which studied inter-brand competition within the FMCG market and, in particular, the market share trade-off between leading national brands (LNB) and store brands (SB) (Fornari, Fornari, Grandi, & Menegatti, 2016). Their results show the existence of a relationship between the increase in the LNB-SB price gap and the switching of market share from the former towards the latter.

Conclusions

Summary of Findings

The research has shown that there is a large range of customer groups opting for individual oil brands. As such, the obtained results confirm the hypothesis presented in the article - the competition between engine oil brands will manifest itself through attracting varying customer segments. The Brand W and X target group of drivers are up to 35 years old (Brand W 80%, Brand X 92%); in contrast to Brand U, with almost 50% of customers being over the age of 35 years. Among the respondents who were below 25 years of age, the least popular is Brand U, whereas Brand X is by far

the most sought-after engine oil of all (it is 3 times more popular than Brand U). Drivers over 45 years of age mostly value Brand Y and Brand S, while they do not particularly trust Brand X. The majority of Brand X users would most frequently drive cars equipped with petrol engines (68%), and the Brand V users were the most diesel-oriented group (53%). Drivers who chose Brand S or Brand V oil had at least high school education. The users of Brand W clearly favored cars with high engine capacity - 90% of them declared driving cars with engine volume above 1.5 dm^3. In contrast, the users of Brand T and Brand Y would rarely drive cars with engine capacity above 2.0 dm^3 (7% and 8% of the cases, respectively). Moreover, Brand W stands out from the rest of oil brands due to its higher presence in the D (32%) and E-K segments (17%) and lower in the A-B segment (10%). Drivers choosing Brand W oils have clear expectations and show great knowledge in terms of the technical parameters that the oil should have. Moreover almost 70% of the respondents choosing Brand W (the majority among the surveyed brands) do not attach high importance to its price.

The most differentiating criteria, which drivers usually consider when making their purchase decisions, are the OEM specifications, viscosity classification and oil price. In all cases, the difference between extreme brands exceeded thirty percentage points. Importantly, the Brand W and Brand Y customer groups differed the most in each of the three cases. These two brands can be considered as the representatives of two different marketing strategies. Moreover, it is worth mentioning that in the case of brands such as Brand X and Brand Y, the above-mentioned technical parameters count the least.

From among five sources of recommendations included in the survey, customers strongly rely on those given by car manufacturers, authorized service stations as well as local garages/service stations. Of less importance were recommendations provided by oil suppliers and family members or friends.

Research limitations

Just like with any research, especially empirical in nature, the analysis presented in this article has its limitations. These are mainly conditioned by the method of the sample selection. Above all, the population was limited to customers buying engine oils in Poland. Another potential limitation of our research affecting the generalizability of the results are slight deviations in the distributions of drivers' place of residence and education from the expected population distributions. There is a slight overrepresentation of drivers from cities and drivers with higher education. The age structure did not cause any particular concerns. Yet, for the reason stated, it was not possible to widely generalize the results. Thus, further in-depth research on this topic (also in other countries) is still needed.

Suggestions for Future Research

An interesting direction of future research may be to focus on drivers who professionally use but also own the vehicle, e.g. taxi drivers, truck drivers or bus drivers. It would be interesting to investigate whether the professional drivers are more or less likely to pay additional attention to the quality of the services provided by the authorized service stations and the engine oils they use or recommend.

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The Age of Employees as A Determinant of Intergenerational Knowledge Transfer - Experience of Polish Enterprises

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Abstract

The purpose of the article is to find out the relationship between the age of employees and their perception of intergenerational knowledge transfer in an organization. The article is based on the assumption that effective knowledge management requires a flow of knowledge between employees. This applies especially to employees from different generational groups, i.e. people with varied professional and life experiences. The first part of this paper presents the importance and limitations of knowledge transfer in an organization. Next, various generations on the contemporary labour market were described. The survey research was conducted among 895 employees, representing 829 business entities. On this basis, the final conclusions were formulated which show that the age of respondents influences their perception of knowledge transfer in organizations. Significant differences in the assessment of knowledge exchange made by the representatives of different age groups based on a clear tendency to more positively assess own generation group have been noticed. The research presented in this article does not allow for a clear conclusion which generation is more involved in the intergenerational exchange of knowledge since the assessment of the openness of employees to share knowledge depends on the age of those who evaluate it. Representatives of the *baby boomers* generation highly assess their readiness to share knowledge, but the perception of younger age groups does not confirm this phenomenon. Due to the limitation of research to Polish enterprises, we treat their results as preliminary and requiring continuation.

Keywords: Knowledge Transfer, Generations, Generational Diversity.

Introduction

Preservation and development of organizational knowledge, which is the basis for shaping the competitive advantage of enterprises, constitutes, at the same time, one of the key challenges of contemporary management. Knowledge transfer is still not a solution commonly and effectively used in many organizations. It is also worth noting that the circumstances and conditions of this transfer are changing quite significantly due to the fact that four different generations of employees cooperating with each other are present on the current labour market.

This creates new opportunities, but also problems in the area of knowledge exchange within an organization. Difficulty of this task is raised by the fact that there are many antagonisms and prejudices based on established stereotypes between age-diverse employees (Amayah 2016, Kunze 2009). Representatives of particular generations are guided in their lives by different values, have different customs and habits, prefer different methods of learning and information exchange, and build their professional and social relationships in different ways. Understanding and intergenerational communication, including the transfer of knowledge, are becoming more and more difficult due to such differences.

Taking into account the value and importance of the above circumstances for development of enterprises, the aim of this work is to find out the relationship between the age of employees and their perception of intergenerational knowledge transfer in an organization. The research, which had the form of a survey, leads to the verification of a research hypothesis assuming that the perception of intergenerational transfer of knowledge depends on the age of the respondents and each age group positively assesses the openness of its own generation to share knowledge and critically evaluates other generation groups in this respect.

Intergenerational Knowledge Flow - Theoretical Analysis

The key role of knowledge in shaping the competitive advantage and development of an enterprise is highlighted by a great number of researchers, including P. Drucker (2002), R.J. Howlett (2012), K. Ichijo and I. Nonaka (2007). Knowledge enables an organization to survive in a turbulent environment; it allows the organization to make more effective decisions and predict their effects, implement innovations and streamline management processes (Krogh 2000).Therefore, it should not be surprising that enterprises more often implement knowledge management systems, which include processes of knowledge acquisition, multiplication, storage and usage (Paulin 2012). In this context, the importance of knowledge for the development of an organization is unquestionable.

However, it is worth noting that according to G. Probst, S. Raub and K. Romhardt knowledge is always associated with a specific person (2000). As a result, the level and usage of knowledge depends on actions undertaken by people, and therefore, is related to their experiences, emotions, motivation and intentions, that is mainly their mental sphere (Sharma 2012). On this basis, it can be stated that acquisition, accumulation and exchange of knowledge in an organization are relatively difficult processes to observe, measure and analyze.

The knowledge management process is determined by many factors, both internal and external to the organization (Harvey 2017, Ichijo 2007, Liebowitz 2019). An important advantage in this respect should be the fact of possessing by the enterprise the age-diverse staff, as it opens the possibility of an extremely valuable knowledge transfer between employees with different competencies and experiences. In this area, every employee can constantly deepen their practical knowledge and acquire new skills, which is a prerequisite for professional development, increase in creativity, flexibility and openness to new solutions (Sujansky 2009). This concerns both older and younger employees. Thus, it has an influence on their work results and, consequently, the results achieved by the entire enterprise (Sung 2012).

On the basis of numerous practical experiences, however, it can be noted that the effective intergenerational transfer of knowledge is a very difficult task to accomplish. It requires goodwill and commitment on the part of employees, their openness and mutual trust, yet these are not frequent phenomena in many organizations. When employees have to convey their knowledge to other employees, they come with great caution or even fear (Renz 2008).

The above restrictions in knowledge transfer result from both personal and organizational reasons (Ichijo 2007, Probst 2000, Renz 2008). The first group of barriers includes: fear of losing the current professional position at the expense of co-worker's development, lack of willingness to listen and respect people from other generations, prejudices as well as deficiencies in the area of knowledge transfer. Among the organizational obstacles to knowledge exchange are: lack of practices promoting work in multigenerational teams, approval of discriminatory behaviour on the grounds of age, failure to prepare older employees to take the role of mentors or lack of formal roles and tasks in the area of knowledge transfer assigned by the managerial staff (Paulin 2012).

The current personnel situation of the majority of organizations is characterized by a large age diversity of employees. This results from the fact that in enterprises can simultaneously work representatives of up to four generations: *baby boomers, generation X, generation Y and generation Z*. The high complexity of managing such diverse staff is influenced by the fact that each of these age groups has different needs, requirements, expectations and attitude to professional and private life. These differences result from both the period in which these people were born and educational

opportunities and socio-economic realities in which they were growing up (Amayah 2014, Becton 2014, Kirton 2010).

It is worth noting here that the division of society into generation groups in terms of the year of birth differs slightly in particular countries and geographic regions. This results from differences that characterize countries in the area of global demographic changes, economic crises or phases of the technological progress (Fishman 2016). *Baby boomers* are representatives of the population growth which followed the Second World War in the years 1945-1960. The motto of this generation is hard work and care not to lose it. *Baby boomers* live to work and are loyal to the employer (De Meuse 2010, Phillipson 2007).Therefore, they seldom change their workplace and position. They believe that only work is the path to the professional success. Representatives of this generation appreciate independence. Their strength at work is commitment, optimism and a global view of problems. *Baby boomers*, however, feel uncomfortable in a conflict situation and may be reluctant towards their peers (Phillipson 2007).

People from generation X were born between 1961 and 1983. They are mature and trustworthy employees. Like *baby boomers*, they are characterized by their loyalty to the employer. They appreciate the following values: personal development, independence, diversity and diligence. Although representatives of generation X use new technologies without any problems (computers, tablets, smart phones, etc.), they prefer direct contacts and paper archives, not the digital ones. They value the importance of good education and recognize it as a “pass” for a professional career. They are responsible and engaged employees, willing to cooperate with different people regardless of their way of work or communication. They appreciate the balance between work and personal life (Moczydłowska 2020, Murphy 2010, Sandeen 2008). However, they are relatively often sceptical and pessimistic. They are distrustful of their superiors and treat their mistakes as personal failures (Twenge 2010). In Polish conditions, in the image of an employee from the 55+ age group, the characteristic attributes of the so-called homo sovieticus: claim, that is, the independent heir to the worst features of a socialist system not adapted to work in free market conditions. The description of their professional attitudes on the Polish labor market uses the motto "I work to survive" (Moczydłowska 2020). They can avoid passing on their knowledge to other generations because they treat knowledge as the source of their strong position in the organization. In turn, the use of knowledge of younger employees is hindered by differences in the ways of communication.

People born between 1984 and 1995 belong to generation Y, often referred to as *Millenials*. People from this age group value partner relationships, tolerance, development opportunities as well as new challenges. They show high and unconventional life aspirations. They are able to actively use digital media almost in every area of their lives. They are perfectly prepared to work in realities of free market and globalization. They are usually well-educated and success oriented people, although work is not a priority for them, but rather a “tool” for self-realization (Sujansky 2009). They expect from their employers a satisfying salary and investment in their professional development. They are often regarded as disloyal employees because occupational stabilization is not the most important thing for them. They prefer task and design work with a great degree of freedom in its implementation and flexible working hours (Bolton 2013, Chillakuri 2018). According to research carried out by the University of New Hampshire, the representatives of generation Y are characterized by high self-confidence, high perception of their skills, conviction of their own uniqueness, high expectations and strong aversion to criticism (Iorgulescu 2016). They often avoid learning from other employees because they think that all professional questions will be answered online. Their task is the master-student relationship is a thing of the past. It was replaced by a student-technology relationship (Moczydłowska 2020).

The youngest people on the labour market belong to generation Z, that is people born after 1995. In most cases, it is a community of times of prosperity. They are people who do not know the world without internet and mobile phones. Therefore, they are perfectly aware of digital technologies. They also highly value the circle of close friends, like friends from social media sites. They care about everything what is “online.” As employees, they gained the name of creative and imaginative multi-taskers, but those who desire a high degree of flexibility and development opportunities leading to success, for which they expect an appropriate reward (Kirton 2010). For this reason, they usually

constitute a challenge for employers who are not always able to provide them with a suitably paid and interesting job. The weaknesses of this age group most often include deficiencies in social skills, problems with concentration and stabilization or superficial analysis and assessment of the situation (Kooij 2011).

Research Methodology

The aim of the study was to diagnose opinions of employees representing various generations on the flow of knowledge between different generation groups in their enterprises. The following hypothesis was formulated: the perception of intergenerational knowledge transfer depends on the age of the respondents. Each age group positively assesses the openness of its own generation to share knowledge and critically evaluates other generation groups in this respect.

The research was carried out in the 2019 year on a group of 997 full-time, part-time and post-graduate students from three universities in Białystok, Warsaw and Łomża. The availability of respondents and their diversity in terms of age, gender and place of residence constituted the selection criterion for the examined sample. Professional activity of students in the enterprise sector constituted the condition to be included in the examined sample. In order to limit the number of variables, owners, members of their families and co-owners of the enterprise as well as students of other nationalities and representatives of the managerial staff have been excluded. Therefore, 895 questionnaires were used for further analysis, including 490 completed by women and 405 by men. The respondents represented 829 business entities. The structure of their age is shown in Table 1.

Table 1: Age of the surveyed employees and age structure in Poland

age	women (n = 490)		men (n =405)		total (n = 895)		total in Poland	generation
	L	% for a group of women	L	%	L	% for a group of men	% (without younger than Z)	
20-25	151	30.9	146	36.0	297	33.2	8.3	Z
26-35	104	21.2	94	23.2	198	22.2	18.6	Y
36-45	97	19.8	66	16.3	163	18.2	19.9	X
46-55	67	13.7	45	11.1	112	12.5	15.4	X
56-60	60	12.2	37	9.1	97	10.8	8.3	BB
above 60	11	2.2	17	4.2	28	3.2	29.5	BB

Source: own elaboration

Analysis of Research Results

The analysis of data (see Table 2) on knowledge transfer between different generation groups in Polish organizations indicates several regularities. Significant differences in the assessment of the situation made by the representatives of different age groups are visible; these consist in a clear tendency to more positively assess own generation group. For employees aged 55+, the statement that in their workplaces "older people are usually reluctant to share their knowledge with younger employees" is false. The younger the responders are, the assessment of this sentence as true increases. Employees from generation Z assessed it as "rather real" with a large internal consistency of answers. A similar tendency, though not so unambiguous, can be seen in the assessment of the readiness of young people to share their knowledge with older colleagues. The respondents from the

55+ group assessed the statement that younger employees are reluctant to share their knowledge as "partly true, partly false" (the average 3.4, but with a large internal differentiation of answers). In the same range are the answers of all other age groups, but here the average is always below 3, and in the case of generation X and generation Z there is a great internal diversity of responses, which indicates large discrepancies in respondents' experiences and perceptions. It is interesting that the younger the responders are, the average assessment of the sentence "We are eager to learn from each other regardless of age." as true increases. The oldest employees assess it as "partly real, partly false" (the average 3.4), and the representatives of the youngest age group as "real" (the average 4.0 with a large internal consistency of answers). Statistically significant differences in assessments made by the surveyed women and men were not noticed.

Table 2: Intergenerational transfer of knowledge in the assessment of employees – the assessment of the truthfulness of the statements on a scale from 1 (definitely false) to 5 (definitely true)

Category of the answer	baby boomers (n = 125)		
	average	SD	SD^2
In our enterprise, older people are usually reluctant to share their knowledge with younger employees.	2.0	1.156	1.338
In our enterprise, young people are usually reluctant to share their knowledge with older employees.	3.4	1.216	1.480
In our company, people are reluctant to share their knowledge, regardless of age.	3.1	1.034	1.070
We are willing to learn from each other, regardless of age.	3.4	0.984	0.969

Category of the answer	generation X (n = 275)		
	average	SD	SD^2
In our enterprise, older people are usually reluctant to share their knowledge with younger employees.	3.3	0.930	0.865
In our enterprise, young people are usually reluctant to share their knowledge with older employees.	2.7	1.213	1.472
In our company, people are reluctant to share their knowledge, regardless of age.	2.9	0.995	0.991
We are willing to learn from each other, regardless of age.	3.5	0.993	0.986

Category of the answer	generation Y (n = 198)		
	average	SD	SD^2
In our enterprise, older people are usually reluctant to share their knowledge with younger employees.	3.8	0.995	0.991
In our enterprise, young people are usually reluctant to share their knowledge with older employees.	2.9	0.985	0.972
In our company, people are reluctant to share their knowledge, regardless of age.	3.0	0.808	0.654
We are willing to learn from each other, regardless of age.	3.4	0.902	0.815

Category of the answer	generation Z (n = 297)		
	average	SD	SD^2
In our enterprise, older people are usually reluctant to share their knowledge with younger employees.	3.9	0.693	0.481

In our enterprise, young people are usually reluctant to share their knowledge with older employees.	2.8	1.063	1.131
In our company, people are reluctant to share their knowledge, regardless of age.	3.2	1.024	1.050
We are willing to learn from each other, regardless of age.	4.0	0.402	0.162

SD – standard deviation, SD^2 – variance
Source: own elaboration based on the results of the survey

In the light of the research results, the hypothesis that the age of the respondents influences their perception of knowledge transfer in organizations has been confirmed. The tendency to more positively assess own generation group has been recognized.

Summary, Discussion of The Results

The research carried out by B.P. Sharma and M.D. Singh (2012) shows that knowledge sharing significantly limits the existence of competition between employees and their individualism, which may occur at different age; however, these tendencies are more often attributed to the representatives of generations Y and Z. The results published by Polish researchers are ambiguous (Moczydłowska 2020). On the one hand, the attention is paid to the fact that younger employees more often perceive their knowledge as a source of advantage over other employees and, in this situation, knowledge sharing weakens their position. In turn, older employees are less reluctant to share their knowledge. On the other hand, significant barriers of knowledge sharing by the oldest generation of employees and reluctance of this group to teach younger people have been indicated. The research presented in this article does not allow for a clear conclusion which generation is more involved in the intergenerational exchange of knowledge since the assessment of the openness of employees to share knowledge depends on the age of those who evaluate it. The representatives of the *baby boomers* generation highly assess their readiness to share their knowledge but the perception of the younger age groups does not confirm this phenomenon. Research requires continuation and consideration of other variables important in the context of knowledge transfer, especially cultural conditions.

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Sustainable Development in the Visegrad Countries: An Analysis of Decent Work and Economic Growth

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Abstract

The Visegrad Group is an alliance of the four countries: the Czech Republic, Hungary, Poland and Slovakia. This group focuses on cultural, economic, energy and military cooperation. These countries belong to the group of 193 United Nations countries that adopted the EU's 2030 Agenda for Sustainable Development in 2015. There are 17 Sustainable Development Goals and one of them is to provide decent work and economic growth. Since the Visegrad Group should enhance economic cooperation, it is vital to analyze what is the current situation of this particular Sustainable Development Goal in the Visegrad countries. This goal is measured by nine indicators, including: employment rate, inactive population due to caring responsibilities, involuntary temporary employment, long-term unemployment rate, people killed in accidents at work, real GDP per capita, resource productivity and domestic material consumption, and young people unemployment. Each of these measures are presented and then compared with the result of the EU's average. The Visegrad countries have been improving in these indicators, on average, however they still need to work on increasing real GDP per capita and resource productivity as well as decreasing inactive population due to caring responsibilities. This will lead them to catch up with the EU's average.

Keywords: Sustainable Development Goals (SDGs), economic growth, the Visegrad countries (V4).

JEL codes: F63, O11, Q01.

Introduction

The Sustainable Development Goals were presented in the so-called Agenda for Sustainable Development 2030, which was adopted by all 193 UN Member States in 2015. This Agenda includes 17 Sustainable Development Goals and 169 related targets to be achieved by the World by 2030. They deal with 5 areas '5xP': people, planet, prosperity, peace and partnership. Objectives cover a wide range of challenges such as poverty, hunger, health, education, gender equality, climate change, peace, and social justice. They replaced the Millennium Development Goals that were supposed to be implemented by 2015. There are, however, some words of criticism for the SDGs in general. Lomborg (2018) in his book about "prioritizing development" wonders which goals should be above others. Process of collecting data is also costly, even not to mention - analyzing it. Some researchers even question the concept of SDGs saying that it is problematic to achieve a sustainable economic system in Europe when there is an ongoing process of

globalization (Barry et al. 2004). However, the SDGs are widely applicable and standardized so it is very convenient and quite easy to compare performance of different countries.

The aim of the Visegrad Group is to advance cultural, economic, energy and military cooperation. In line with the EU's 2030 Agenda for Sustainable Development, it is vital to analyze the current situation of SDGs in the Visegrad countries (V4). This paper focuses on the analysis of SDG 8: decent work and economic growth. The main objective of this paper is to analyze the performance of the Visegrad countries in the SDG 8. Since one of the pillars of the Visegrad Group is economic cooperation, it is important to see if the Visegrad countries have the same direction in fulfilling the SDG 8. In case their results diverge, then the Visegrad Group should think of some common actions and activities that would get them on the fast track development, at least to catch up with the EU's average. The ongoing scientific discussion on SDGs is mainly devoted to its character and structure. This paper also offers the analysis of a selected SDG in the group of countries and some practical applications.

The paper starts with the description of the SDG 8: decent work and economic growth. It briefly presents some data on the SDG 8, the idea behind it and a short literature review on it. Next part of this paper is devoted to the Visegrad Group. It provides an overview of the Group: its origin and development. Part 4 presents the analysis of nine indicators of the SDG 8 in the Visegrad countries in comparison to the EU's average. In this way, it can be clearly seen in which areas of the SDG 8, the Visegrad countries need to improve in order to catch up with the EU's average. Section 5 includes the discussion of the results. The last part concludes and show some directions of further research on this topic.

Sustainable Development Goal 8: Decent Work and Economic Growth

Table 1 presents important facts and statistics about the SDG 8 in the global scope. Although it should be noted that the lowest results in the SDG 8 are recorded in the least developed countries in the World (and the EU economies are not in that group) the SDGs concept aims to improve sustainable economic growth worldwide. The United Nations (2015) imply that the aim of the SDG 8 is to: "promote sustained inclusive and sustainable economic growth, full and productive employment and decent work for all".

Table 1: Facts and statistics about issues concerning the SDG 8

The global unemployment rate in 2017 amounted to 5.6 %, while it reached 6.4 % in 2000.
Worldwide, 61% of all workers were informally employed in 2016. Besides the agricultural sector, 51% of all employees fell into this category of employment.
Men earn 12.5% more, on average, than women in 40 out of 45 countries with available data.
The global gender pay gap remains at 23 % around the world, and without decisive action, another 68 years are needed to achieve equal pay. The female economic activity rate is 63 %, while it is 94 % for men.
Despite the growing presence in public life, women continue to perform 2.6 times more, on average, unpaid care and homework than men do.
There are at least 470 million jobs needed globally for new labor market participants from 2016 to 2030.

Source: United Nations (n.d.)

The SDG 8 has been considered in many different ways. There is an interesting study on the SDG 8 in the context of gendered analysis. It implies that the SDG 8 does not address the value of social reproductive work. The SDG 8 does not take into account unpaid work, which is still largely done by women, it cannot deal with the decent work program in a comprehensive and gender-sensitive manner. This seems to cause two problems: (1) a significant proportion of social reproductive work remains unpaid and is therefore not

included in GDP; (2) even if paid, in the labour market - work is in general gender segregated: insecure and undervalued regarding the wages and working conditions (Rai et al. 2019).

Rosa (2017) underlines that approximately half of the world's population lives for the equivalent of about $1 to $2 per day. It affects men, women and children of all ages. This may be called as an endless cycle of poverty, in which finding a job may not mean being financially secured to survive, and available quality jobs require education and necessary qualifications that is very often unaffordable for many people. All these can have harmful and negative lifelong health implications. Other scholars confirm that people with a low socioeconomic status need to face with a higher level of both physical and mental challenges resulting in not meeting basic psychological needs. It then causes emotional exhaustion and a growing level of stress (González et al. 2016).

In addition, Poshen (2015) suggests that decent work should be connected with environmental and social development – which are the so-called green jobs. Jobs that produce green goods and services tend to involve higher qualifications, better work conditions in terms of safety and health at work and higher salary in comparison to other jobs (as evidenced from the US, China, Germany and Spain). However, the problem of greening economic activities needs to be addressed in: agriculture, building and construction, waste management and recycling. All these sectors are run by many employers but working conditions for workers are very often far from what it should be required. Apart from hazardous work conditions, workers need to face with a low level of salary that in some cases bring them to poverty.

Economic growth and sustainable development have been a subject of numerous scientific publications (e.g. Balisacan et al. 2014; Filho et al. 2016; Hess 2016; Higgins 2014). There has also been a discussion that achieving economic growth regardless the environmental concerns seems to be impossible. This is because, trying to achieve only the highest level of economic growth may end up with the lack of water, forest and land. On the other hand, trying to preserve the environment without paying attention to economic growth is considered as utopia. As population grows, there is also an increasing demand for a better living so more and more resources are used. Therefore, one should note that promoting economic growth should be in line with environmental concern (Munier 2006).

The Visegrad group: An Overview

The Visegrad Group was formed on February 15, 1991 by Poland, Hungary and Czechoslovakia under the name of the "Visegrad Triangle". As a result of the break-up of Czechoslovakia in 1993, the Czech Republic and Slovakia took its place, so the name changed from the Visegrad Triangle to the Visegrad Group. The initial goal of the Visegrad Group was to support the process of European integration through economic, social and political cooperation. Over the years, cooperation has been extended to include further areas of activity. Currently, the Visegrad Group has an established position in Europe, which has been achieved through a series of actions and aspirations based on mutual cooperation and implementation of the set goals. The Visegrad countries are situated in Central Europe. Interestingly, the very notion of "Central Europe" is not unequivocal, so the term itself cannot define a group of countries belonging to it. The concept of Central Europe is so controversial that the French political scientist of Czech origin, Jacques Rupnik, wrote the following statement: "Tell me where Central Europe is, and I can say who you are" (Johnson 1996). Le Rider (2008) believes that Central Europe is a term that does not directly correspond to any geographical reality, and in turn is a kind of "mental map". Many sources indicate that it is only the countries of the Visegrad Group that make up Central Europe (e.g. Gorzelak, 2012; Samson, 2009). As noted by Czyż (2018), in many documents of the World Bank and the Organization for Economic Cooperation and Development (OECD) Central Europe is considered as the countries of the Visegrad Group and Slovenia e.g. Borish (1996). Johnson (1996) adds that Central Europe is also sometimes extended to include Germany and Austria. In turn, according to Ágh (1998), Central Europe covers the following countries: the Czech Republic, Poland, Slovakia, Hungary, Slovenia, Croatia and Austria. Regardless of the perception of the concept of Central Europe, it can be assumed that the states in the Visegrad countries are in it.

In terms of real GDP per capita, the countries of the Visegrad Group fall behind the EU's average. Figure 1 clearly shows that the Czech Republic scored the highest value of GDP per capita from the Visegrad Countries, which accounted for 17 640 euros per capita in 2018, while the EU's average GDP per capita was 28 210 accordingly. Then, there was Slovakia with the GDP per capita 15 560 euros, and Hungary and Poland with the results: 12 560 and 12 430 euros per capita, respectively. That clearly shows that the V4 need to work on their economic growth so as to catch up with the EU's average.

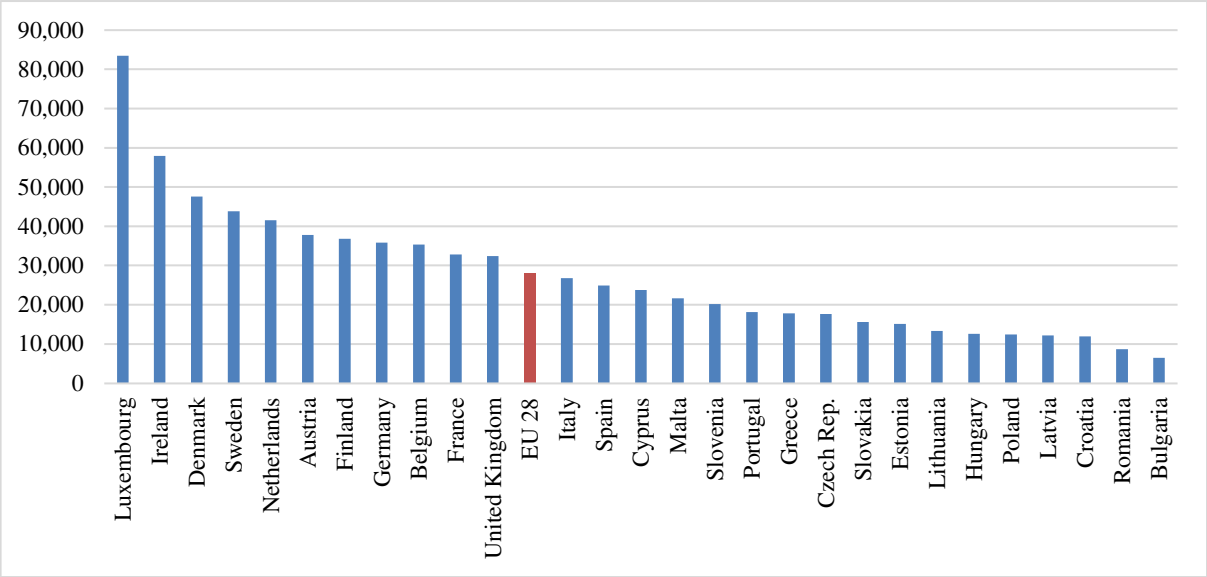

Figure 1: Real GDP per capita in the EU countries in euros, 2018

Source: Based on data from Eurostat

Decent Work and Economic Growth in The Visegrad Countries

The Eurostat has prepared a set of data for the EU countries in order to monitor the performance of each country in the 2030 Agenda for Sustainable Development. There are nine indicators of the SDG 8 and the data for them are very often incomplete. Therefore, some data for those indicators are estimated, provisional or not available (n/a). Below, there is a descriptive analysis of each indicator from the SDG 8.

Figure 2 presents real GDP per capita in the Visegrad countries. Out of all V4, the biggest economy is Poland in terms of real GDP, however, concerning real GDP per capita, the Czech Republic was a leader in this statistic from the V4, with the value of € 17200 per capita in 2017, which is still over € 10000 less than the EU average. Although, all V4 have improved their performance in real GDP per capita, they are still lagging behind the EU's average, Poland and Slovakia even more than two times in 2017. Here, all V4 might consider investing in human capital as its concept confirms a positive relationship between education and economic growth (Altinok, 2007). In addition, Kubík (2013) notes that the number of academic years done per capita has a greater positive impact on economic growth in countries with higher education quality.

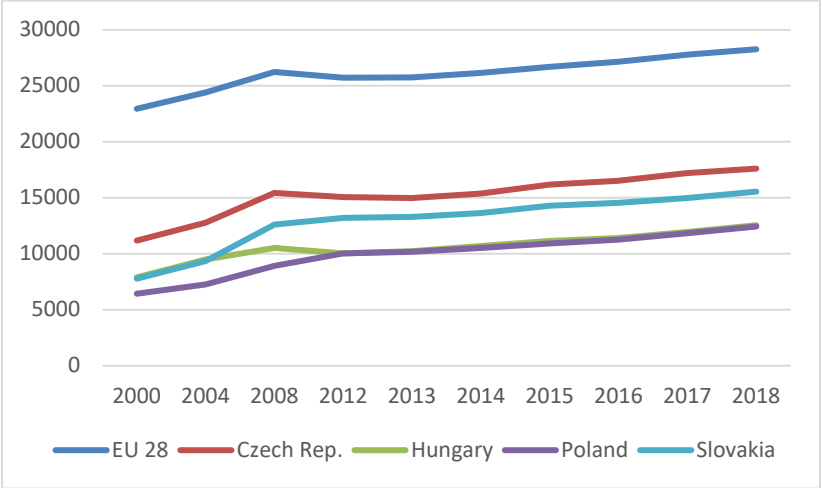

Figure 2: Real GDP per capita in the Visegrad countries, chain linked volumes (2010), euro per capita

Note: Since the data for Hungary overlap in most years with the data for Poland, full data for Hungary are presented below:

geo\time	2000	2004	2008	2012	2013	2014	2015	2016	2017	2018
Hungary	7900	9490	10500	10010	10230	10690	11130	11410	11930	12560

Source: Own elaboration based on Eurostat data

Another indicator of the SDG 8 is investment as a share of GDP and the data are presented in figure 3. All V4, except for Poland (data not available), had higher share of investment than the EU's average. Poland in the last five years when statistics were available noticed a lower level of investment than the EU's average. It is quite interesting that the Czech Republic spent as much as 30,59 % of its GDP for investment in 2000, and in 2017 it was 24,77 and remains as a leader in this indicator from all V4.

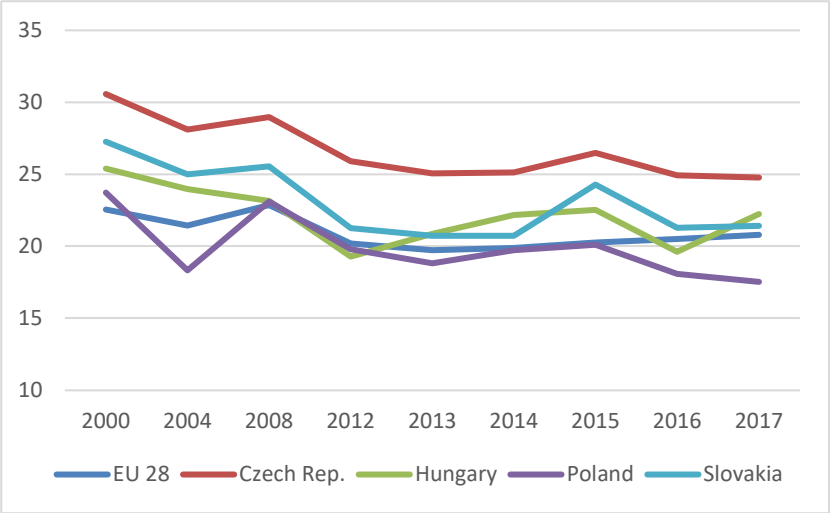

Figure 3: Investment share of GDP in the Visegrad countries, % of GDP

Source: Own elaboration based on Eurostat data

Resource productivity, shown in figure 4, is the next indicator of the SDG 8. It is measured in euro per kilogram in chain linked volumes (2010). The V4 need to work on this indicator since there are not even close to the EU average which is 2,04 euro per kilogram in 2017, while in the best-performing country of the V4 – the Czech Republic, it amounted to around 1,1 euro per kilogram. However, one should note that, in general, the V4 had improved in this indicator considering year 2000 and 2017, but it is still not enough to catch up the EU's average.

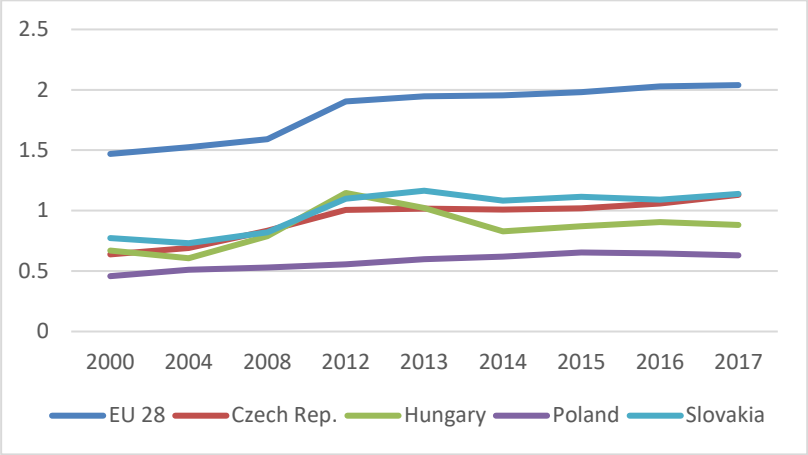

Figure 4: Resource productivity in the Visegrad countries, in euro per kilogram, chain linked volumes (2010)

Source: Own elaboration based on Eurostat data

Inactive population due to caring responsibilities as a percentage of inactive population aged 20 to 64, is also considered under the SDG 8 (figure 5). Among caring responsibilities, the United Nations perceive the following ones: looking after children, incapacitated adults as well as other family or personal responsibilities. Hungary with the score of 21,6 % had the lowest share in this indicator in 2017 out of all V4, however it was slightly higher than the EU's average. All V4 need to improve in this statistics, especially Poland with a result of 29 %. However, the trend for all V4 and the EU average is rising, what might be alarming, considering the fact that the Western EU countries scored much less, e.g. Denmark 5 %.

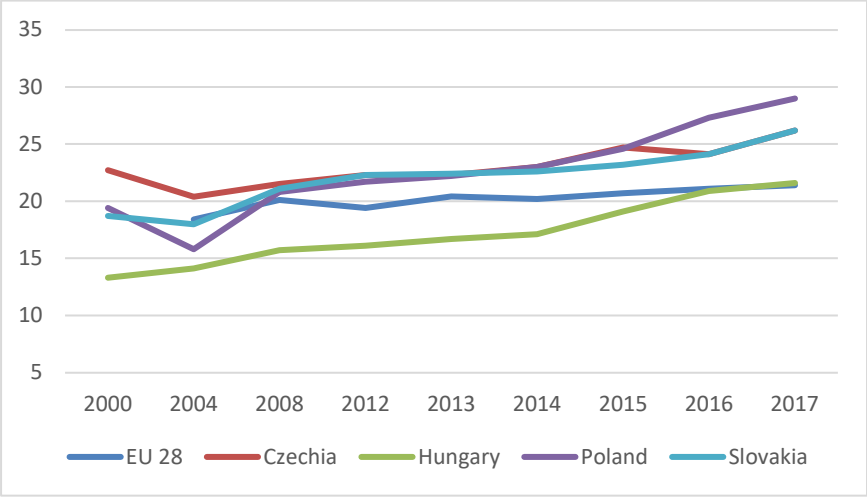

Figure 5: Inactive population due to caring responsibilities in the Visegrad countries, as a % of inactive population aged 20 to 64

Note: Data for the EU 28 in year 2000 are not available
Source: Own elaboration based on Eurostat data

Young people cannot be omitted when considering decent work and economic growth. Therefore, the SDG 8 measure the case of young people neither in employment nor in education and training as a percentage of population aged 15 to 29. Only Slovakia with the score of 16 % was behind the EU average (13,4 %). The leader from the V4 in this indicator is the Czech Republic with a score of 10 %. It is worth noting that the situation improved in all V4 considering year 2000 when some of those countries scored even more than 20 %.

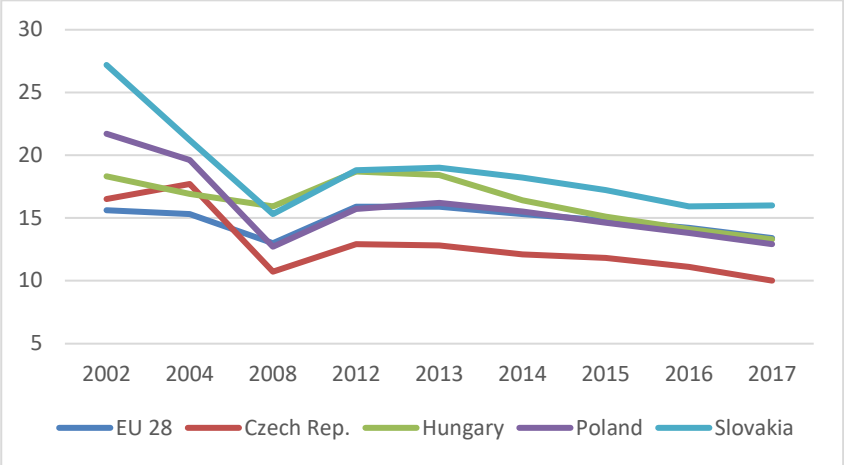

Figure 6: Young people neither in employment nor in education and training in the Visegrad countries, as a % of population aged 15 to 29

Note: Data for the EU 28 in year 2000 are not available
Source: Own elaboration based on Eurostat data

Employment rate in the V4 as a percentage of population aged 20 to 64 is shown in figure 7. All V4 have the employment rate above 70 %, the Czech Republic and Hungary scored 78,5 % and 73,3 % respectively, which was above the EU average (72,2 %) in 2017. Only Poland and Slovakia had a slightly lower share of employment than the EU average but the difference was not that high. All V4 improved their employment rate over time as from 2000 until 2017.

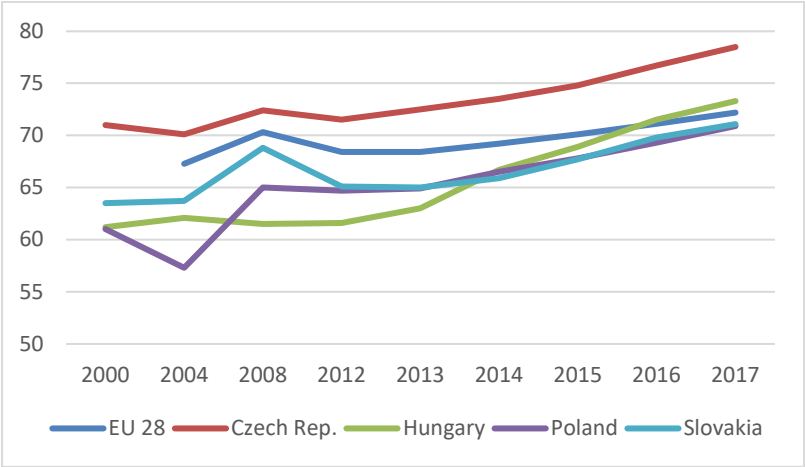

Figure 7: Employment rate in the Visegrad countries as a % of population aged 20 to 64
Note: Data for the EU 28 in year 2000 are not available
Source: Own elaboration based on Eurostat data

After analyzing employment, the SDG 8 continues with the data on long-term unemployment rate, which is shown in figure 8. When considering long-term unemployment rate in the V4, one can notice that the Czech Republic, Hungary and Poland are perfuming quite well in this measure, scoring not more than 1,7 % in 2017 while the EU average amounted to exactly 3,4 % in 2017. Only Slovakia has some issues with that aspect, however, the trend goes into a right direction. Slovakia manged to decrease its long-term unemployment from 10,1 % in 2000 up to 5,1 % in 2017. All the V4 has significantly improved in this measure over time.

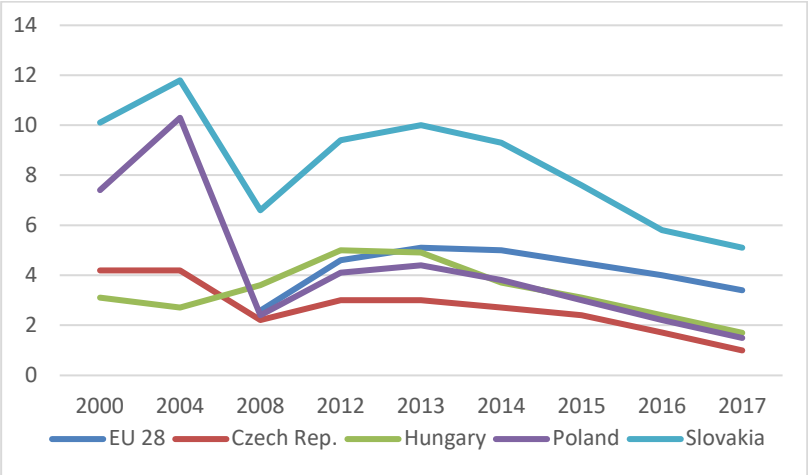

Figure 8: Long-term unemployment rate in the Visegrad countries, as a % of active population
Note: Data for the EU 28 in year 2000 and 2004 are not available
Source: Own elaboration based on Eurostat data

Next measure of the SDG 8 deals with people killed in accidents at work, calculated by 100 000 employees (figure 9). The safest country in the V4 in terms of the lowest number of people killed in accidents at work is Poland with a number of 1,54 in 2017 while the EU's average is 1,71. In the rest of the V4, this number was above 2,0 in 2017.

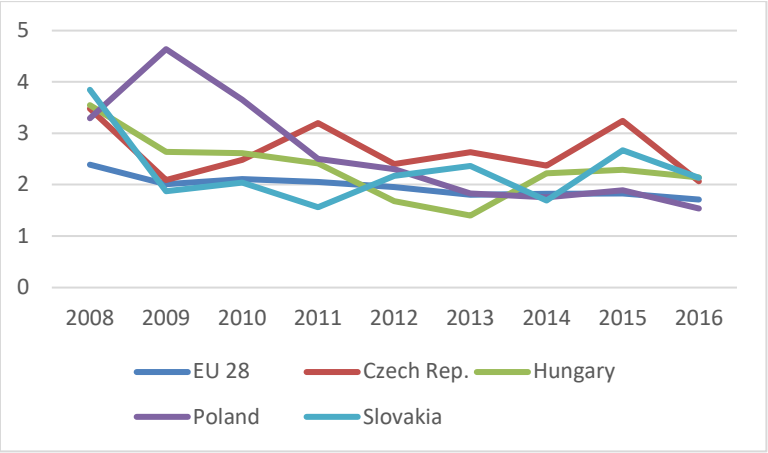

Figure 9: People killed in accidents at work in the Visegrad countries, in number per 100 000 employees

Source: Own elaboration based on Eurostat data

Last but not least measure of the SDG 8 concerns people that have jobs but their disposable income is below the risk-of-poverty threshold. Figure 10 presents data on people in such a situation as a percentage of employed persons aged 18 or over. The Czech Republic with a result of 3,5 % in 2017, had been dealing with this problem extremely well in comparison to other V4 and the EU average (9,4), and then there was Slovakia with a score of 6,3 %. Hungary and Poland had a slightly worse situation than the EU average. In Hungary, this problem arose from 8,7 % in 2000 up to 10,2 % in 2017, while the situation in Poland improved.

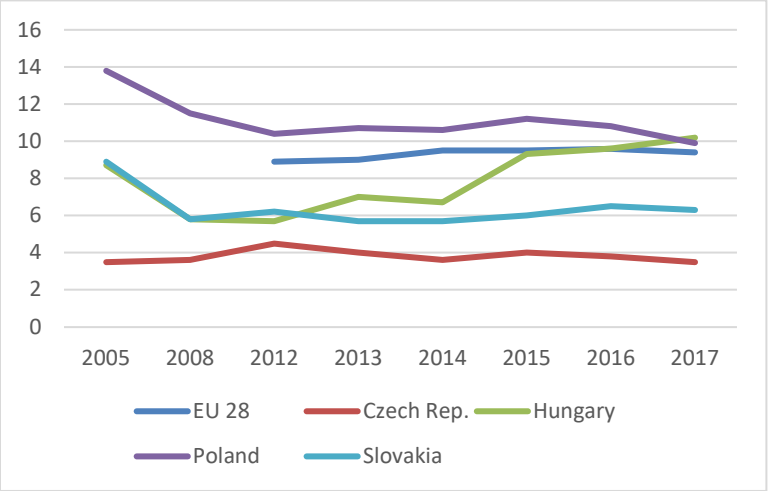

Figure 10: In work at-risk-of-poverty rate in the Visegrad countries, % of employed persons aged 18 or over

Note: Data for the EU 28 in year 2005 and 2008 are not available

Source: Own elaboration based on Eurostat data

There is a lack of common strategy of the V4 towards SDGs. Therefore, when analyzing the data of the V4 in the SDG 8, one may notice that sometimes there are quite large disparities in individual performances of the V4. Being under one umbrella called the Visegrad Group, these countries could join their forces and come up with a common action plan for tackling some of the "burning" problems of SDG 8.

Discussion

Although the Visegrad countries joined the EU in 2004, there are still considered as the new EU member states. They still need to make a significant progress to catch up with the old EU member states (as well as with the EU's average) in terms of economic growth. Although concepts of SDGs in general and the SDG 8 in particular are very problematic (since the indicators used to define them, are selected mainly based on data availability criterium) there is a need to take them for granted in the point of departure in this analysis. In total, there are nine indicators used to assess the SDG 8 and the situation in the V4 seems to be far from general expectations. They do seem to have an economic potential as there are more than 60 million people and more than € 900 thousand GDP. If the V4 were a single country, then it would be ranked as the 4th most populated EU country and the 6th wealthiest EU economy. However, the V4 do not seem to be successful in fulfilling the SDG 8 since they are lagging behind the EU's average in the following indicators: real GDP per capita, resource productivity, and inactive population due to caring responsibilities. In addition, some of the V4 need to improve, at least towards the EU's average, in employment, dealing with young people unemployment, and decreasing or even eliminating fatal accidents at work. There are only three indicators that the V4 are above the EU's average level: investment, dealing with long-term unemployment, and tackling the problem of employed people being at-risk-of-poverty. Having discussed an overview of the V4 performance in the context of the SDG 8, there is room for substantial improvement. Therefore, the V4 should join their forces and act together by establishing some common policy towards the 2030 Agenda and addressing problems connected with not only the SDG 8, but also other SDGs.

Conclusion

Although the concept of Sustainable Development Goals is criticised, it is still one of the complex and comprehensive tools for tackling the problem of sustainable development worldwide. It does concern more than 190 countries and has universal indicators and the way of measurement. The Visegrad countries are quite good at investment, tackling long-term unemployment, and the problem of employed people being at-risk-of-poverty. However, some of them need to improve in rising an employment level, deal with young people unemployment, and solve the problem with relatively high number of people killed by accidents at work. All the Visegrad countries do need to work on improving their real GDP per capita, resource productivity, and inactive population due to caring responsibilities.

The Visegrad Group should therefore focus on some common activities or tools that would allow them to improve their results in the SDG 8, at least, in the areas lagging behind, to catch up with the EU's average level. Having in mind all possible restrictions of the concept of SDGs, the future research on this topic might include a set of indicators composed to describe decent work and economic growth for the Visegrad countries, in addition to those which are included in the 2030 Agenda for Sustainable Development.

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Burnout – A Comparative Analysis of the Phenomenon on the Basis of Research Carried Out Among Healthcare, Education and Higher Education Professionals

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Abstract

The purpose of the paper is to measure the perception of the phenomenon of burnout among medical, educational and higher education workers in Poland. Professional burnout was treated as a psychological syndrome resulting from chronic stress experienced by employees, as a result of impaired balance between work environment and individual capabilities. The conceptualization of empirical research was based on the acceptance of the syndrome as a universal phenomenon, occurring among various professions, but above all in the field of professions related to helping others. Two types of questionnaires were used for the measurement. The first was the LBQ Professional Burnout Questionnaire, which is an adaptation of the Italian Link Burnout Questionnaire. This tool enables diagnosis of four aspects of burnout, i.e. psychophysical exhaustion, lack of involvement in client relationships, lack of professional effectiveness and disappointment professional. The second is an author`s questionnaire designed to assess the probability of the phenomenon among Polish workers. The study was conducted in June and July 2017 as part of the transnational cooperation project, which aims to develop an effective prevention tool for burnout. The article presents the results of using two methods of econometric modelling to identify differences between employees in terms of main predictors of occupational burnout (logistic regression) and to evaluate the level of experienced burnout symptoms (classification method - two-steps cluster analysis). The obtained results show that burnout is a problem in each of the occupational groups covered by the research, which is the justification for a deeper exploration of this phenomenon, especially in the sector of higher education. There are some universal predictors of burnout for all occupational groups, but some are specific to a given profession and burnout area.

Keywords: Professional Burnout, Predictors of Burnout, Econometric Modelling.

JEL Classification: C59, M54.

Introduction

The aim of this paper is to make an initial estimation of the perception of the phenomenon of burnout in Poland and to generate a discussion about an issue that is both important and difficult but often overlooked. The article provides insight into some of the research findings that are the result of the activities undertaken in an international research project dedicated to the prevention of burnout. The inspiration to undertake presented empirical research in the field of occupational burnout, with particular emphasis on professional groups such as teachers, academic teachers and healthcare representatives, was the analysis of the literature on the subject and the specific situation of these

professional groups in Poland. The authors of the publication have practical experience concerning cooperation with presented professional groups due to the implementation of an innovative EU project: Time2Grow (a transnational cooperation project POWR.04.03.00-00-W300/16, implementation period April 2017 – December 2019, cooperation between Belgium and Finland). It's worth to underline, that especially in Poland academic teachers are a professional group generally omitted in empirical research concerning organizational pathologies such as burnout (Lubrańska 2012, Majchrzak, 2011, Świętochowski 2011). In higher education, such factors as: experiencing role conflict, ambiguity of tasks, pressure to achieve scientific results, lack of greater support from universities are very common on the way of building career paths. A high level of expectations and a complicated and very often unclear procedure determining the promotion process influence the motivation of employees to invest in their professional development. Additionally academic teachers are working with very specific clients, representing various types of studies, which can generate a lot of challenges as well as professional burdens. Taking into account the burnout process among academic teachers, potential consequences have a negative impact on the quality of research and also influenced creativity of researchers and decrease the level of delivered teaching at universities. It can be explained though greater professional disappointment and lowered self-efficacy as well as lowered organizational engagement. Similar to the area of education and health care, relatively low salaries can generate additional frustration for employees. Among Polish teachers, apart from organizational factors (such as the level of salaries, difficult working conditions - overcrowded school classes, a lot of educational changes caused by the political reforms), very stressful factors are: relationships and contacts with students, their parents, guardians and colleagues. Despite the fact, that teachers are one of the best described professional group, when it comes to diagnose of occupational burn out process (Cherniss, 1980, Cherniss, 1995, Cieślik, 2012, Gavish, Friedman, 2010) there is still a gap concerning the practical, but empirically verified solutions of effective burnout prevention.

Health care employees have always been associated with emotional overload and high level of stressful situations at work. Predictors of burnout in this professional group are connected with direct contact with patients, their pain, emotions, and their general situation. Primary research carried out as part of the Time2Grow project confirmed, that Polish health care employees work in several places at the same time for financial reasons. The low level of salaries cause growing tendency to take up an additional part tome job, what definitely influence private social and family life. Lack of free time, psychophysical overload and generally permanent physical and emotional effort at work are additional factors burning this professional group. The course of building an accurate and useful model (which is to prevent burnout and minimize its effects), the authors have carried out a primary research which addressed the problem of how the phenomenon of burnout is perceived and how its symptoms are experienced among the representatives of three groups: healthcare professionals, education professionals and – what seems to be particularly innovative – higher education professionals (for the purpose of this article the aforementioned professional groups will also be referred to as "sectors"). To meet the objective of the research two research questions must have been asked:

1. Do the employees in Poland perceive (are aware of) the phenomenon of burnout (and to what extent)?
2. Are there any differences in the perception of burnout and its symptoms among the representatives of the three professional groups that, as the subject literature suggests, might be especially vulnerable to the syndrome?

The article presents the results of using two methods of econometric modelling to identify differences between employees in terms of main predictors of occupational burnout (logistic regression) and to evaluate the level of experienced burnout symptoms (classification method - two-steps cluster analysis). It should be pinpoint, that selected professional group were considered as those, where the risk of occupational burnout is the highest in comparison to other branches in Poland. For more than forty years the phenomenon of burnout has been generating a great interest among psychologists and management professionals. The literature concerning this subject delivers many studies and a lot of research concerning the diagnosis of burnout and its predictors, especially among the professionals who are engaged in helping relationships with their patients, clients or pupils. The contemporary theories of burnout define this phenomenon as a "disordered professional relationship" between an individual and his/her job, environment, external expectations etc. (Maslach, Leiter, 2007, 2008, 2010,

2011). What is more, the spectrum of the symptoms of burnout includes the understanding of work disappointment as an existential-axiological issue that embraces work dissatisfaction, lack of self-realization and failure in meeting one's expectations (Santinello, 2003, 2008, 2014). It is worth emphasizing that the problem of coping with the consequences of long-term occupational stress was brought to attention by a legislative action that had been taken by the European Union. The legal framework for the discussion about workers' health and safety (as well as about the possible prevention measures) was set by Council Directive 89/391/EWG of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work (Dz. U. L. 183 of 29 June 1989, hereafter referred to as Framework Directive), with the last modification dating 2008. In the Article 5 (1) the Directive defines a wide scope of employer's responsibility, who is excepted to "ensure the safety and health of workers in every aspect related to their work". Each member state of the European Union is responsible for setting its own "basic" framework for actions necessary to reduce psychosocial risk at work. The Belgian legislation remains an undisputed leader in this respect. Due to legal changes, in force from 1 September 2014, not only did it introduce a definition of psychosocial risk to the domestic legal system but also imposed a number of obligations on the Belgian employers which aim to prevent their occurrence.

The research material and analytical tools used during the research

The research was conducted on June and July 2017 on the group of 153 people working in the following areas: healthcare (mid-level staff, mostly nurses, 64 people), education (teachers, 46 people), higher education (academic teachers, 43 people). Table 1 groups the respondents on the basis of the survey demographic questions.

Table 1: The division of the sample by the characteristics included in the demographic questions

Workplace			
Healthcare	Education	Higher education	
64	46	43	
Place of residence			
Countryside	City of less than 50 000 inhabitants	City of 50 000 – 200 000 inhabitants	City of over 200 000 inhabitants
13	28	30	82
Type of institution			
Private sector	Public sector	Mixed capital	
36	112	5	
Sex			
Male	Female		
25	128		
Age			
35 years or less	36-45 years	46-55 years	56 years and more
20	46	67	20
Seniority			
Under 5 years	6-15 years	16-25 years	Over 25 years
8	42	51	52

Source: own calculations

Most of the respondents are residents of cities of more than 200 000 inhabitants. 112 people work in the public sector, 36 in the private sector and 5 in mixed enterprises. This structure derives from the fact that the considerable number of schools and bigger universities are public institutions. There was a significant prevalence of women over men in the sample (128 *versus* 25), which clearly reflects the extent to which the teaching and nursing profession are female-dominated. The sample is divided by age as follows: the respondents aged 46-55 (67 people) and those aged 36-45 (46 people) form the most numerous groups; the other two groups, i.e. "35 years and less" and "55 and more" involved 20 participants. 52 respondents have been working in their profession for over 25 years, 51 people have gained the seniority of 16 to 25 years, 42 respondents declared 5 to 15 years of professional experience and 8 people have been working in their profession less than 5 years. Most of the respondents – due to the formal requirements in the analysed professions – received higher education (115 people); others got secondary education (that includes 14 people who graduated from Further Education College). It should be underlined, that in this presented research authors didn't take into detailed analysis the seniority of researched groups. As it has been presented most of the researched group are very experienced professionals (about 145 people from the sample). Many research (Maslach, Leiter, 2010, 2011, Sęk, 2011) suggest that, paradoxically very often younger employees are experiencing higher level of burnout. It is caused by their approach to work, often it's not adequate to the real requirements of the job positon. Additionally they didn't gather as much experience to effectively deal with stress and difficult situations as older employees. Two types of questionnaires were used for the purpose of this research. The first was a LBQ Burnout Questionnaire, which is an adaptation of an Italian Link Burnout Questionnaire (Santinello, 2008, 2014), which enable to measure the level of experienced burnout and which has standardized normalization for Polish population of researched groups (made by Polish Psychological Association). In 2013 a team from the Psychological Test Laboratory of the Polish Psychological Association conducted standardization and validation studies among five professional groups who are engaged in helping other people (teachers, nurses, medical professionals, uniformed services, in total N=995 people with at least one year of seniority, aged 19-65, from all around Poland). The psychometric properties of the questionnaire for the Polish sample were characterised by high reliability. The estimated reliability of the measurement carried out with the use of Cronbach's alpha measure was sufficiently high, which proves the adequacy of the research tool to national conditions. We based the likelihood of our research in the field of a test assessing the level of occupational burnout on the results of reliability assessment conducted by the Polish Psychological Association. The other questionnaire has been originally devised by the authors to assess the perception of the phenomenon among Polish employees. The LBQ questionnaire allows to diagnose four key aspects of burnout, i.e. psycho-physical exhaustion, lack of involvement in relationships with clients (patients, pupils, etc.), lack of sense of professional self-efficacy (effectiveness) and career disappointment. The psycho-physical aspect includes the self-assessment of one's own psycho-physical resources like stress level, mental pressure and fatigue. The aspect concerning relationships with recipients raises the issue of the quality of the relationships (with patients, pupils, clients, etc.) and helps to study an individual and subjective attitude towards social environment at work. The aspect of professional effectiveness refers to how an individual assesses his/her professional competence, while the aspect regarding career disappointment concerns the existential expectations that an individual holds for their work, job satisfaction, enthusiasm for work and the sense of professional fulfilment. The tool possesses a satisfactory psychometric characteristics. It consists of 24 positions – statements that describe the feelings of a subject towards his/her work. Respondents answer the questions using the six-level frequency scale (the scope of which is: "never", "seldom", "once or a few times per week", "roughly once per week", "a few times per week", "everyday").

The original questionnaire was to assess the extent to which the phenomenon is recognized among the Polish employees. It comprised 26 questions, 22 of which were closed, 4 questions were open and 6 questions were demographic ones. The closed questions were twofold: they either determined the occurrence of a given factor (when a respondent answered one or more questions from the cafeteria) or assessed the level of occurrence of a given factor (on a 11- level scale, from 0 to 10). This measurement wasn't psychometrically tested yet. It's original scale, during the statistical description. The collected materials will be used to study the psychometric properties of the obtained results based on the factor analysis and reliability assessment, but this will be the topic of another article. In the presented article, we focus on individual questions and assessment of specific work and life characteristics as predictors of occupational burnout.

The part of the original questionnaire used in the article has been included in the appendix.

The results of the research with the use of LBQ Burnout Questionnaire

The results of the LBQ survey are presented as sten scores, which enables faster and more accurate interpretation for psychologists. The LBQ tool diagnoses the level of burnout in reference to three states experienced by subjects: low (1 – 3 scores), average (4 – 7 scores) and high (8 – 10 scores). It enables to analyze four aspects (dimensions) of burnout. If any of the dimensions of the questionnaire receives high scores it means – according to the subject matter – that there is a potential threat of burnout in this particular area. Nevertheless, it is important to stress that even average results are an alarming sign indicating problems with functioning at work. That originates, among others, from the dynamics of the burnout process which is known to intensify with time, together with its symptoms. The process deepens unless there have been some interventions or significant events in an individual's professional or private life (Cherniss, 1992, Golembiewski i in. 1993a, 1993b). The results of the conducted survey with the aid of LBQ questionnaire allow to confirm the hypothesis stating that the phenomenon of burnout is omnipresent among the Polish employees working in healthcare, education and higher education sector. From the perspective of emotional depletion (understood as psycho-physical and emotional fatigue, sense of helplessness, being overwhelmed with work) each of the three groups achieved similar results. In the healthcare sector 75% of subjects experience the average level of emotional exhaustion, while only 8% of them highly developed this symptom. Among the group of teachers 72% respondents report being moderately fatigued with their work and 13% declare that their level of fatigue is high, which suggests a very high level of stress and strain. Among the higher education professionals 77% is moderately affected and 14% is highly affected by exhaustion. Psychological studies confirm that emotional depletion, which is sometimes viewed as a consequence of excessive occupational stress, is the first and the most common symptom of burnout. It is those factors that discriminate between "healthy" occupational functioning and behaviours that are an imminent threat to the well-being of an individual and his/her closest socio-professional environment.

As much as 19% of academic teachers report that their involvement in occupational relationships is highly disordered, and 72% of them is declaring the average level of involvement, which is still an alarming figure bearing in mind how dangerous the issue in question is. This means that the professionals dissociate themselves from their working environment, draw away from social relations and let the quality of working relations deteriorate. Furthermore, this area of burnout clearly exposes a cynical and hostile attitude towards service recipients, which leads to difficulties in interaction between a subject and his/her working environment. The findings conclude that academic professionals who are expected to demonstrate professional and educational competences (thus expected to hold high educational standards and share their knowledge with students) are having serious problems with functioning in this area effectively. It is evident that this professional group could suffer from a deficiency in interpersonal skills, which would help them overcome challenging situations involving their students or co-workers. While healthcare workers and teachers attend trainings and seminars quite often, it is not so when it comes to higher education. There is still no qualitative support that would develop teaching and mentoring skills, which are essential to succeed as an academic teacher.

An interesting finding emerged while analysing the level of lowered professional self-efficacy, a combination of low self-confidence and a sense of effectiveness in handling day-to-day working obligations. Only 7% of the academic teachers report a high level of this indicator of burnout; 19% of the respondents declared a belief that their level of professional effectiveness is high. By comparison, 11% of the subjects from the healthcare sector received a high score and 20% received a low one. In the group of school teachers 13% is facing a high sense of ineffectiveness at work, while 24% reported being satisfied with their effectiveness and performance. One possible explanation is that, although they had been asked to assess their work in general, the surveyed academic teachers concentrated only on the effects of their research work (which seems quite implausible given their range of responsibilities). It may also be that the findings illustrate a narrow perspective of the academic teachers (when it comes to assessing professional effectiveness) and a tendency to overestimate one's results during the interview. The highest score according to the job satisfaction and the least positive results were observed among the higher education professionals. While as much as 93% of the academics are

disenchanted with their work at a moderate level (12% at a high level), the figure is lower among the healthcare workers (70%) and the school teachers (78%). This dimension of burnout puts emphasis on the negative feelings of subjects, which are closely related to their experiences and existential beliefs. These are aroused when a person experiences a dissonance between the realities of work and aspirations combined with values that simply cannot be satisfied in a particular workplace environment.

By using the results of LBQ Questionnaire an attempt was made to classify the homogenous groups on the basis of experiencing the phenomenon of burnout in the four analysed areas. In this regard a two-step cluster analysis was used. TwoStep Cluster Analysis is to be found, among others, in SPSS v. 24.0. On the one hand it is a method which allows to include categorical and continuous variables, on the other hand it is proof against not meeting the assumptions of normal distribution and the independence of the input data (Kwiatkowska, Załuska, Dziechciarz 2007, SPSS 1999). After applying a procedure with automatic selection of number of clusters, with a condition concerning changes in the likelihood ratio (BIC change), five groupings were filtered out (see Table 2). In the next sixth step, the change in the likelihood ratio was not significant (BIC change at the level – 15, BIC change ratio below 0,1). In the opinion of the authors a further analysis of the results reveals an interesting classification. The classification is statistically reliable due to the fact that the criteria of cohesion and separation are fulfilled. Figure 1 shows the results of the classification quality assessment. Using the thresholds adopted by the authors of this assessment method, it is assumed that up to 0.2 the classification is poor, from 0.2 to 0.5 it is medium, and above 0.5 - good. For the results presented in this article, one obtained the result of 0.58, indicating good quality classification.

Table 2: TwoStep Cluster Analysis – an evaluation of the quality of the classification

No. of clusters	Bayesian information criterion (BIC)	BIC change	BIC change ratio	Distance measure ratio
1	1050,145			
2	888,587	-161,558	1,000	1,230
3	764,760	-123,826	0,766	1,195
4	667,672	-97,088	0,601	1,491
5	615,838	-51,834	0,321	1,637

Source: own calculations

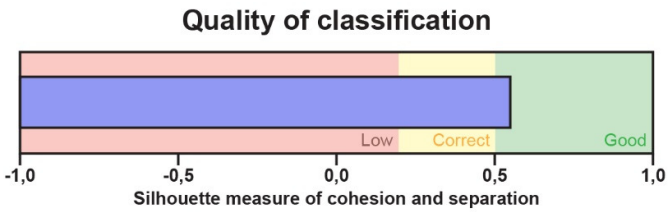

Fig. 1: Two-step Cluster Analysis – an evaluation of the quality of the classification
Source: own calculations

Three clusters out of five turned out be very cohesive (compare Figure 2): one of the clusters grouped the respondents with high scores in every area and virtually with no low scores (cluster no 1). Another cluster aggregated the respondents with mostly low scores and with no high scores (cluster no 4). There was also a cluster which grouped only the respondents with middle scores on the burnout scale. In order to verify whether there are some differences between the professional groups in terms of burnout further analysis included the respondents that had been classified to two very contrasting clusters (cluster no. 1 and no. 4). Figure 3 displays the deviations from the expected representation of respondents in particular professional groups. It has been assumed that the expected participation of the respondents in a cluster is proportional to its size and reflects the representation of a given cluster (value = 1). A

situation when there is more respondents from a given professional group than expected is called overrepresentation (value > 1). Underrepresentation is the exact opposite of overrepresentation (value < 1).

It is worth noting that there are significant deviations regarding the higher education sector professionals – the overrepresentation in the cluster no. 1 (+ 26%) and the underrepresentation in the cluster no. 4 (- 35%).

This means that the representatives of higher education participating in the study are more often exposed to occupational burnout than the representatives of other professions. At the same time, taking into account the results of the answers to the remaining questions, this occupational group find it most difficult to admit that they experience problems causing the risk of burnout and the first symptoms of this phenomenon. According to the authors of the study, this is a clear signal for deepening research in this occupational group in the field of burnout predictors, the possibility of counteracting this adverse phenomenon, as well as the dissemination of the topic of burnout in the group of decision-makers at universities.

At this stage, without conducting any detailed research, only preliminary hypotheses can be made concerning the reasons for such a high risk of burnout in the group of academic teachers. It seems that one of the reasons is the fact that they belong to the group of the so-called high-skilled occupations, where one has to perform several different types of activities. In Poland, the vast majority of academic teachers are employed in scientific and didactic positions, which means that they are evaluated for the results of their work in the area of didactics, scientific research and, additionally, organisational and management tasks. D. Prediger, researching various occupations and their specificity, formulated the concept of the World of Work Map (1993, 1999). The Map refers to two dimensions of occupational tasks: Data & Ideas and People & Things. According to its author, one dimension is sufficient for a good description of most occupations, e.g. social occupations (People). However, taking into consideration the assumptions of the Prediger concept and analysing the position of the academic teacher, one can assume that due to the complexity and specificity of the work they perform, this group can fall into the category of Ideas & Data (scientific activities requiring scientific research, data analysis, interpreting research materials) as well as the category of People, taking into account didactic duties, i.e. work in direct contact with students, mentoring and tutoring, conducting MA, doctoral and diploma seminars, etc. Due to their diversity and level of difficulty, the responsibilities and functions of academic teachers may result in experiencing a kind of “conflict of occupational roles” (Borucki 1988, 1994). According to Z. Borucki's approach, an employee experiences stress when he or she evaluates external requirements as exceeding their capabilities, whereas the environment (work environment) - as insufficient to meet the needs.

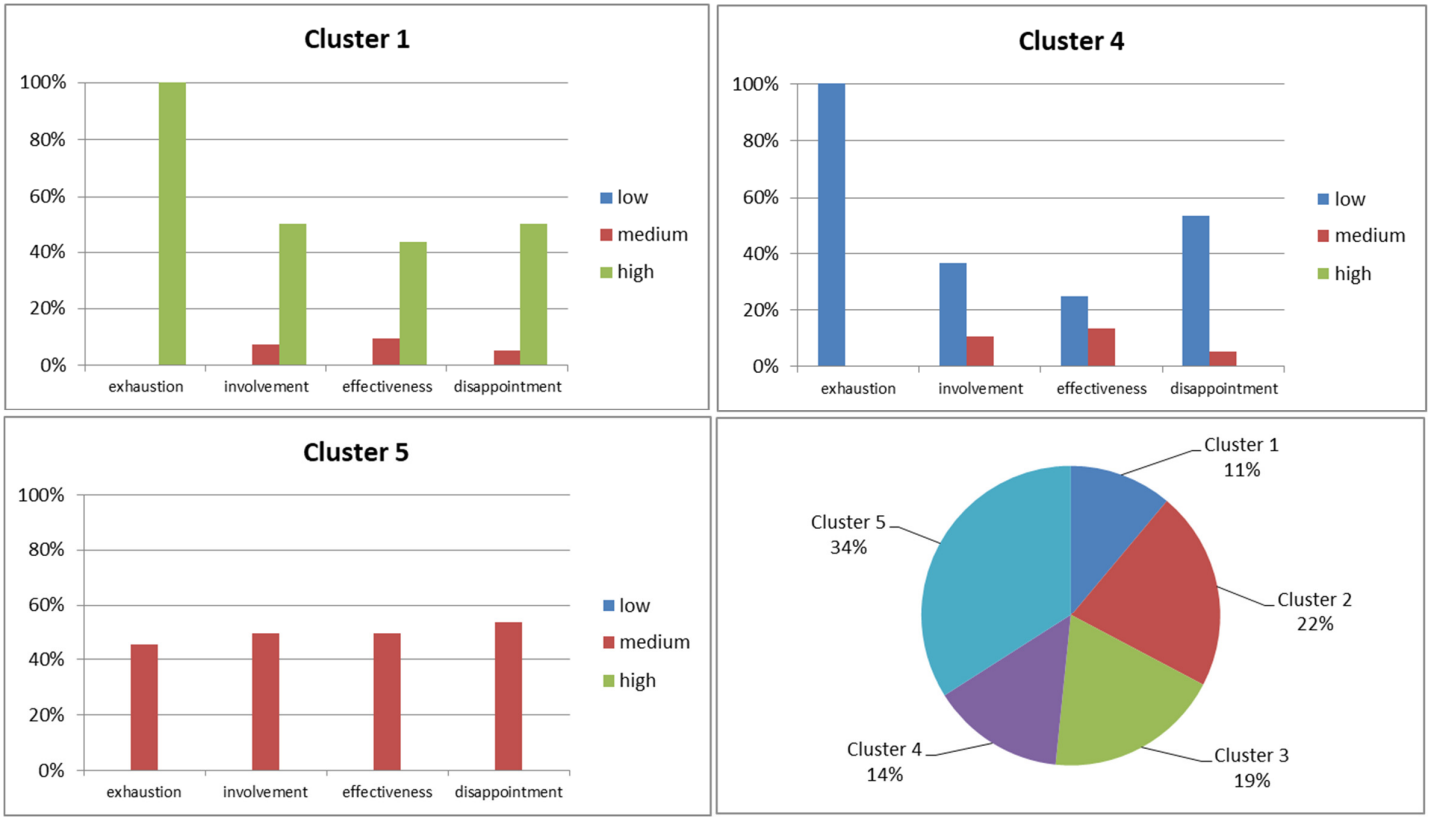

Fig 2. Characteristics of the clusters no. 1, 4 and 5 and their volumes

Source: own calculations

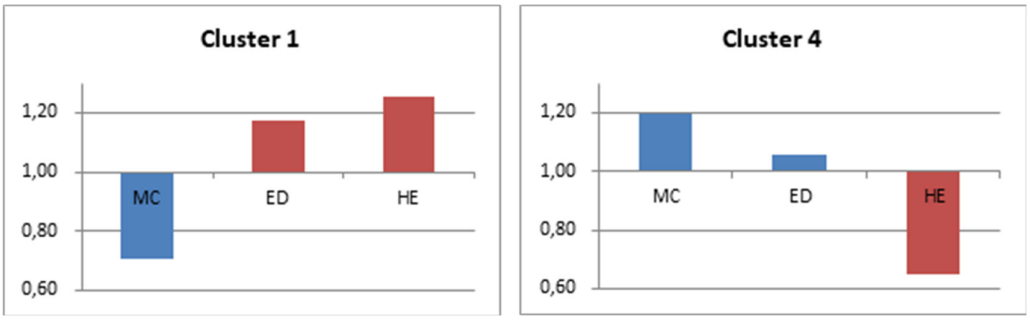

Fig. 3: Overrepresentation / underrepresentation of the professional groups in the cluster no. 1 and 4

Note: MC – medical care, ED – education, HE – higher education *Source: own calculations*

Main Predictors of Burnout

With an aim to identify the key factors that determine the level of burnout in its particular dimensions a logistic regression was used (SPSS, ver. 24.0). The results of the LBQ that were related to the level of burnout in a given dimension served as dependent variables. The results were aggregated into two categories: 0 – a respondent is characterized by a low level of burnout (scores 1-5), 1 – a respondent is characterized by a high level of burnout (scores 6- 10). The set of the potential explanatory variables included two demographic characteristics (namely age and seniority) and the answers to the questions from the original questionnaire (see Table 3).The demographic characteristic „sex" was not included in the analysis given the small number of men among the survey participants. The answers to question no. 5 were grouped into two categories: 0 – a respondent never or rarely engages in activities other than professional and domestic responsibilities, 1 – a respondent regularly engages in activities other than professional and domestic responsibilities. In order to find a model that would be significant in terms of F- statistics (the Wald test), the method of stepwise logistic regression was employed. The critical value of the F-statistics was at the significance level $\alpha = 0{,}05$ during forward selection, and $\alpha = 0{,}10$ during backward elimination. To validate the goodness of fit two tests were used: the Nagelkerke R^2 and the Hosmer-Lemeshow test. The latter compares the used model and the null model (with an intercept parameter only) in terms of the relevance of classification (cf. e.g. Gruszczyński, 2002; Heckman, Leamer, 2001).

Table 3: The selected questions of the original questionnaire

No.	Question
	Type of work
3a	High emotional stress
3b	Great physical strain
3c	I am mostly responsible for my work results
3d	My work involves contact with others
3e	A stressful relationship with a supervisor
3f	Stressful relationships with co-workers
3g	Too much bureaucracy
3h	A dynamic environment/ a necessity to adapt
3i	An adequate remuneration for work
3j	Little success at work
3k	I feel that my work suits me

3l	I maintain a work-life balance
3m	I am satisfied with my work
3n	I would like to change my job
3o	I wish I could take some time off work
3p	I can influence the way I do my work
Hobby	
5	Leisure and personal development activities (hobby)
A subjective assessment of the knowledge of burnout	
7a	I have sufficient understanding of burnout

Source: own

Figures 4 – 7 present the received models for the particular dimensions of burnout and for the professional groups in the form of graphs. The explanatory variables are displayed from top to bottom, in the order they were being added to the model. Under each graph, which represents a combination of a dimension of burnout and a factor (factors) that has (have) influence on it, there are two other parameters. The value of the parameter B is attributed to a given independent variable. The value of the parameter exp(B) measures how the increase of a predictor by one point will change the probability of transition from category 0 (a low level of burnout) to 1 (a high level of burnout).

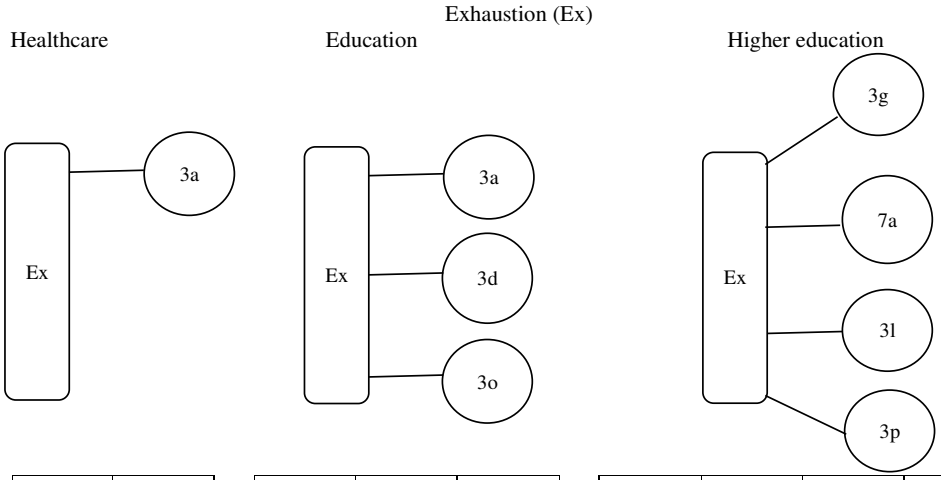

No.	3a
B	0,51
exp(B)	1,668

3a	3d	3o
0,69	-1,71	0,50
1,988	0,181	1,655

3g	7a	3l	3p
1,19	-0,84	-0,56	0,65
3,276	0,432	0,574	1,914

Fig. 4: The factors influencing the level of burnout - exhaustion

Source: own calculations

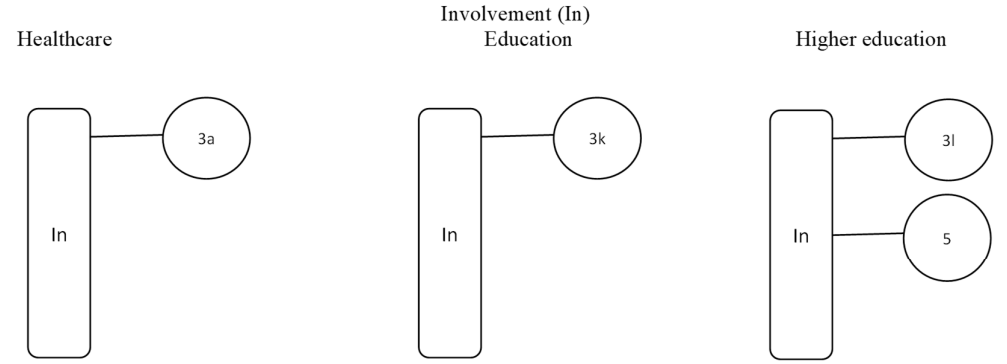

No.	3a
B	0,23
exp(B)	1,262

3k
-0,71
0,490

3l	5
-0,44	-2,20
0,646	0,111

Fig. 5: The factors influencing the level of burnout – involvement

Source: own calculations

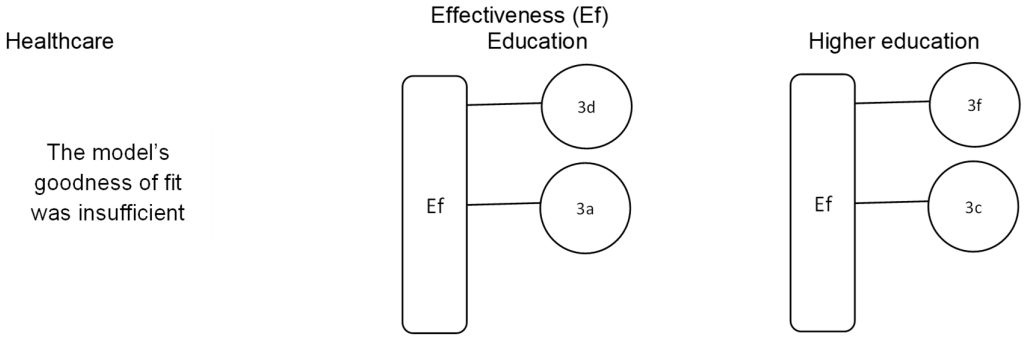

No.	3d	3a
B	-1,75	0,55
exp(B)	0,173	1,736

3f	3c
0,61	-0,38
1,843	0,685

Fig. 6: The factors influencing the level of burnout - effectiveness

Source: own calculations

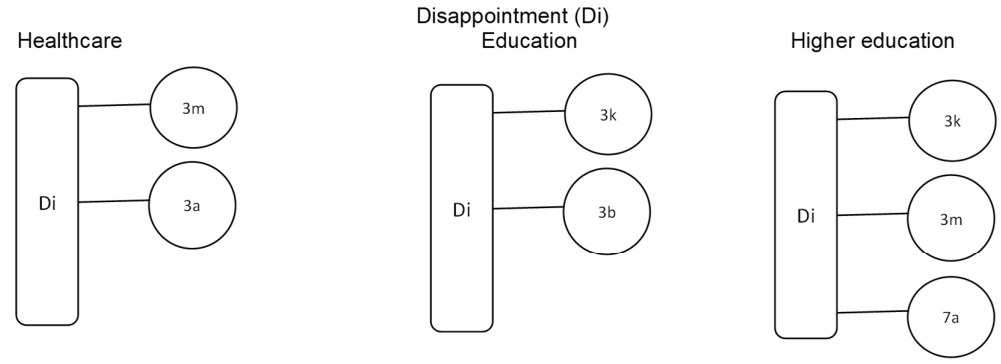

No.	3m	3a
B	-0,350	0,228
exp(B)	0,704	1,256

3k	3b
-1,005	0,322
0,366	1,380

3k	3m	7a
-0,719	-0,455	-0,399
0,487	0,635	0,671

Fig. 7:The factors influencing the level of burnout - disappointment

Source: own calculations

Stress was a factor that played the biggest role as a predictor in the logit models (question no. 3a). It occurred three times in healthcare and two times in education, whereas it did not occur in higher education at all. The model for disappointment in healthcare, apart from revealing a variable referring to high stress, also showed a variable that measures the level of work satisfaction (question no. 3m). An important factor in education was whether a respondent feels that his/her job suits him (question no. 3k). In higher education the highest importance was attributed to maintaining work-life balance (question no. 3l) and the level of understanding of burnout.

The measured parameters could be interpreted as follows: the dimension of exhaustion, the model for healthcare, question no. 3a: the values of B = 0,512 and exp(B) = 1,668 mean that a growth of the stress level by one measure results in 67% higher risk of transferring from the category of the low level of burnout to the category of the high level of burnout. The dimension of involvement, the model for higher education, question no. 5: the levels of parameter B = 2,199 and exp(B) = 0,111 mean that the probability of experiencing a high level of burnout is lower by 90% among the people who have got “a regular escape” from the daily work and domestic routine, i.e. hobby.

Concluding Remarks

The conducted research was of a pilot nature. The conclusions formulated below are a preliminary evaluation of the situation and constitute the basis for further research steps.

The present research on the phenomenon of burnout that has been simultaneously carried out in healthcare, education and higher education is an attempt to identify similarities and differences between three professional groups. It provides the answers to the initial research questions. The following points can be made:

— The phenomenon of burnout is widely perceived in all of the analysed professional groups. This claim is supported by the high LBQ Questionnaire results.
— The used of logit models worked well to determine the impact of various factors on individual areas of burnout. It should be emphasized that this method gave good effects differentiating the impact of factors depending on the industry and the area of burnout. It turned out that some of the factors are universal and strongly affect most burnout areas regardless of the occupation (e.g. stress), while some are specific to the industry or burnout area (e.g. work-life balance).
— In addition to the predictors listed above, it is worth paying attention to the fact that stress is the main and basically the only factor significantly affecting the level of occupational burnout in health care. In the group of teachers, apart from stress, the sense of being suitable for a

given profession and assessment of the need to remain in a professional relationship with other people also play a similar role. In the case of academic teachers, the main predictors of occupational burnout in individual areas are very diverse.

— The outcome of the two-step cluster analysis additionally support a conclusion that burnout is a common issue among the surveyed professionals and provides justification for deeper exploration of the phenomenon, especially in higher education. Academic professionals experience the typical symptoms of burnout. What is more, the results of the analyses demonstrate that the group is distinctly different from other groups. It achieved high scores in most of the areas (the LBQ Questionnaire).

— Despite the noticeable differences in the perception of burnout among the professional groups subjected to the survey, the adoption of the automatic selection procedure revealed three cohesive clusters that included respondents of diverse occupations. This means that the employees of the analysed professions probably share traits that influence the shape of the process of burnout in a similar way. Undoubtedly, a direct contact with another person is one of those shared traits. Given the aims of the international research project that has been a framework for this paper (building an useful model for the prevention of burnout) what seems to be particularly important is to conduct a longitudinal research that would illustrate the dynamics of the respondents burnout before and after taking the preventive action.

It should be underline, that despite the great amount of interesting research results, it's not possible to present all findings in this article. The authors decided to concentrate on particular aspects of their project, based on presented research questions. More demographical findings and their connections with burnout syndrome are presented in another publication (Załuska, Ślazyk-Sobol, Kwiatkowska-Ciotucha, 2018).

Acknowledgments

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- **Appendix. Selected questions from the original survey questionnaire.**

3 Firstly, let us ask you some general questions about your work. Please asses to what extent each of the questions describes your current job. Use the scale of 0 to 10, where 0 – definitely inadequate, while 10 – definitely adequate.	a. High emotional stress _____ b. Great physical strain _____ c. I am mostly responsible for my work results _____ d. My work involves contact with others _____ e. A stressful relationship with a supervisor _____ f. Stressful relationships with co-workers _____ g. Too much beaurocracy _____ h. A dynamic environment/ a necessity to adapt _____ i. An adequate remuneration for work _____ j. Little success at work _____ k. I feel that my work suits me _____ l. I maintain a work-life balance _____ m. I am satisfied with my work _____ n. I would like to change my job _____ o. I wish I could take some time off work _____ p. I can influence the way I do my work (e.g. way of working, selecting tasks) _____
5 Do you take part in any leisure or personal development activities, other than your professional and domestic duties?	Yes, regularly 1 Yes, although sporadically 2 No 3
7 Please think about „burnout" for a moment. How would you describe your level of understanding of this phenomenon? Please describe to what extent you agree with the following statements using a scale of 0 – I completely disagree to 10 – I completely agree. a. I have sufficient understanding of burnout _____ b. I could recognize the symptoms of burnout if they affect me personally _____ c. I am able to tell whether somebody else shows the symptoms of burnout _____	

Institutionalizing Strategic Communication through CSR Initiatives: The Effects on Corporate Reputation, Legitimacy, and Culture

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Abstract

Has strategic communication been institutionalized in Southeast Asia particularly in Malaysia? The purpose of this paper is to identify the importance of corporate social responsibility (CSR) initiatives as a projection of corporate identity of the organization. The study also aims to examine the impacts of CSR on corporate reputation, legitimacy and culture to the organization in building a favorable relationship between the organization and its environment. A survey questionnaire was administered to 285 practitioners in Malaysia. Results indicate that CSR initiatives are imperative in institutionalizing strategic communication. A greater focus on corporate reputation, legitimacy and culture can improve the favorable relationship between the organization and its environment. An empirical understanding of CSR initiatives as distinctive corporate identity projection is explicitly addressed by making reference to strategic communication literatures.

Keywords: Strategic communication**,** Corporate social responsibility, legitimacy, reputation & culture.

Introduction

The importance of professionalization and institutionalization of strategic communication has been debated vigorously since 1980s (Grunig & Hunt, 1984) and 1990s (Cameron, *et al*., 1996; Sallot, *et al.*, 1997 & 1998) predominantly in the US. In the early 2000s, more studies were conducted by Elmer (2000), Parkinson (2001) and Rawel (2002) to name a few to challenge the debates on public relations professionalism in the US and Europe. However, little relevant studies were conducted in an Asian country (see Chay-Nemeth, 2003; Park, 2003). Only after mid 2000s, the institutional theory has been substantially influenced a study of public relations profession or strategic communication predominantly in Europe (Tench, *et al*., 2009a; see Hallahan, *et al*., 2007). This becomes more interesting with the discussion from the outcomes of research projects such as EBOK and ECM (Tench, *et al.,* 2009b; Van Ruler & Vercic, 2004).

The term "institutionalization" is inspired us to look further the importance of emerging profession of strategic public relations or corporate communication in a Southeast Asian region particularly in Malaysia. Many scholars use the term "strategic public relations" as synonym to "strategic communication" or "communication management" to institutionalize the role of communication managers in managing formal communication activities to attain their organizational missions and visions (Tench, *et al*., 2009a; see Hallahan, *et al*., 2007). Although the use of terms suggests a fruitful meaning to the profession, changing terms may confuse practitioners and community at large. The term "corporate communication" is widely used in Malaysia when referring to institutionalizing strategic communication activities at the managerial level while "public relations" always refers to the specific technical tasks such as media relations and event management. In fact, there are

continuous debates to differentiate between corporate communication (strategic) and public relations in Southeast Asia.

Although the current practice of strategic communication is universally practiced in the US, Europe and Asia, there is lacking of empirical research in Southeast Asia with regards to institutionalizing strategic communication. Specifically, in practice, strategic communication always is related to corporate social responsibility (CSR) and corporate reputation (CR) in Southeast Asia. However, none or little empirical research have done to bridge a link between institutionalizing strategic communication and the key concepts of CSR, CR, legitimacy and culture in Southeast Asia. Thus, this study will close the gap. We aim to examine the relationship between aspects of CSR, CR, legitimacy and culture, and its importance to strategic communication.

One must see institutionalization as a process. Institutionalizing strategic communication requires a considerable attention to the strategic role of communication managers (Tench, *et al*., 2009a) such as public speaking skills, team's communication skills and so forth (Baninajarian and Abdullah, 2009). Importantly, projecting corporate identity of the organizations considers as strategic and managerial skills for competent managers. Selznick (1957, p. 16-17 in Scott, 2008, p. 22) argued that "to institutionalize is to *infuse with values* beyond the technical requirements of the task at hand". Scott (2008, p. 22) extended his argument by noting that "by embodying a particular set of values, the organization acquires a 'character structure', *a distinctive identity*". Thus, excellent organizations need to be infused with values to project a distinctive identity which lies in the strategic role of strategic communication. Thus, this paper aims to answer the question "can institutionalizing CSR initiatives be one of core roles of strategic communication to position the essential practice at the dominant coalition?". This work is supported by Abdullah and Seman (2018) that Korean companies perceived the importance of building a unique corporate identity virtually.

The concept of institution refers to a degree of normative structure within the societies (Parsons, 1960) which requires examining the relationship between the organization and its environment. Sandhu (2009, p. 87) argued that there is a dire need to emphasis on a wider lens of cultural and social embeddedness of all organizations rather than focusing on a single organization. This will lead us to study the reflection of the CSR initiatives to the notions of reputation, legitimacy, and culture.

The purpose of this paper is to identify to the importance of CSR initiatives as a projection of corporate identity of the organization. The study also aims to answer the importance of corporate reputation, legitimacy and culture to the organization in building a favorable relationship between the organization and its environment. In this paper, we aim to make two contributions to the literature on institutionalizing strategic communication in Malaysia. First, on the basis of an overview of the existing literature, we provide the empirical research in Malaysia to enrich the debates on institutionalizing strategic communication universally. Second, we argue the significant relationships between CSR, CR, legitimacy and culture will expand the role of strategic communication in strengthening its contribution to a societal environment.

The paper is structured by describing a broader perspective on CSR and Malaysian CSR scenarios to give an overview of strategic communication practice in Malaysia. Then, the notions of CSR, CR, legitimacy and culture are theoretically discussed in the context of institutionalization of strategic communication. Next, evidences from a survey on Malaysian companies are presented. Discussion and implications of study are addressed.

Literature Review

Perspectives on CSR

Previously, behaving irresponsibly is seen as harming the organizational performances, but now, ignoring environmental, social and governance issues can be very risky. With the recent development of CSR, today's organizations face several challenges to satisfy stakeholder's increasing expectations (Freeman, 1984; Beckman *et al.,* 2006; Jamali, 2008), society (Szekely & Knirsch,

2005) and public (Gower, 2006; Holshausen, 2000). This situation has led to the high adoption of CSR practices among multinational companies (Vives, & Peinado-Vara 2004). While the study done by Szekely and Knirsch (2005) revealed that, many large companies and small medium enterprises (SME) have ventured into entrepreneurship challenges (Ekpe et. al., 2015) and also have introduced numerous sustainable development initiatives to address the stakeholders' demands and expectations.

In broader perspectives, social responsibility is also regarded as how the economic and legal duties of the companies can be prolonged by certain responsibility to public (McGuire, 1963). Both Carroll (1999) and Wood (1991) agreed that, producing goods and services which has social impacts should be the main social responsibility of companies. McWilliams *et al.*, (2006, p. 4) pointed out that CSR ''should be considered as a form of strategic investment'' which ''can be viewed as a form of reputation building or maintenance". Brown and Dacin (1997) described CSR as a company's "status and activities with respect to its perceived societal or, at least, stakeholder obligations".

Despite gaining a greater attention from various groups of practitioners and academicians, the practice of CSR is much debated and criticized, especially on the CSR's relationship between purpose and nature of business as well as the motive for engaging in CSR (Friedman, 1970). Few Scholars have emphasized the need for a substitution, and the need for new critical CSR research agenda (Fox, 2004; Utting, 2003, 2005). Companies are continuously arguing the potential and restrictions of CSR efforts (Reed & Reed, 2004). Specifically, companies will also gain benefits from CSR initiatives financially, and the employees and communities enjoy great benefits socially and environmentally (Prieto-Carrón, *et al*., 2006). What is clear here is that, CSR becomes increasingly important and interesting in studying the CSR theory and practice (Visser, 2008). It also signifies a great prospect for researchers to enhance their knowledge and understanding about CSR rigorously.

Malaysian CSR Scenarios

Raslan (2007), chairman of CSR Malaysia was concerned with CSR noting firmly:

> "*On the 16th of November 2006, we saw the birth of CSR Malaysia, a unique network of corporate and academic institutions, committed to advancing responsible business strategy and practices that will have a triple bottom line impact - people, environment, and economies*".

Over the years, Malaysia suffers from severe environmental issues such as deforestation which triggered the loss of pollution, biodiversity, and erosion (Boon, 2007; Ahmed, 2008). This country has fought these great challenges of the increasingly needs of energy and managing fragile ecosystems (Yakcop, 2004). The awareness of social issues has also been growing up to various areas such as the needs for affordable housing, fair labour, employee safety, welfare, and access for the disabled as well as aboriginal people rights (Staples, 2004; Sen & Bhattacharya, 2001). Since then, Malaysian companies have expanded their annual reports by integrating the key aspects of social, environmental, product and workers information (Zulkifli & Amran, 2006).

Furthermore, based on the corporate governance studies, it is argued that there are plenty of opportunities for advancement for Malaysian companies in this CSR area (Salleh, 2009). In a Government Link Corporations (GLC) transformation program, Khazanah Nasional Berhad has released the Silver Book which contains CSR guidelines for GLCs in Malaysia. This "Silver Book provides a strategic framework for GLCs to establish effective contributions and mitigate the cost of any social obligations" (Silver Book, 2006, p. 15).

With the current development of CSR in Malaysia, there are tremendous contributions of CSR literatures from various aspects of social and environmental issues. According to Zulkifli and Amran, (2006), Teoh and Thong (1984) studied the early development of Malaysian CSR studies. Interestingly, they focused their study on three key issues of CSR which are the concept of CSR, the corporate involvement in CSR and finally, the corporate social reporting.

Recently, Amran and Siti-Nabiha (2009) indicated that there are substantial advancement in company reporting that indirectly may emulate the abundant enhancement in social performance.
While Newel and Manaf (2008) have proved the significance of sustainability practice by the Malaysian property investment companies, and Dusuki (2006) explained the importance or CSR practices in the Islamic banking institutions in Malaysia. Aini and Sayce (2010) examined a number of property investors who has implemented environmental and social practices. This rapid growth has raised the tremendous awareness amongst corporate Malaysia in improving its capacity and competent to fight against environmental and social issues. Seriously, it is dire needs for companies to prioritize social responsibilities towards society for the real solutions towards sustainable development. As such, this effort lies in the institutionalization of strategic communication through building a coherent and planned CSR initiative for an excellent organization.

Operational Definitions

Corporate Social Responsibility

Corporate Social Responsibility is "a commitment to improve community well-being through discretionary business practices and contributions of corporate resources" (Kotler & Lee, 2005). According to European Commission (2001), CSR is "a concept whereby companies integrate social and environmental concerns in their business operations", means that companies have a strategic focus on its contribution to public growth over the long terms. Robert (2003) pointed out that, economic, social and environmental issues are frequently referred to as "triple bottom line", and either by necessity or invention, CSR has become a form of ethical accountability. Hopkins (2003) added that, although the acronym CSR is now well established, what the term actually means remains a subject of much debate.

Established in the early 1950's and 1960's, CSR has become a popular topic to be discussed and numbers of publications pertaining to CSR issues in local and international journals are also high. However, Ebner and Baumgartner (2006) argued that, there is no common definition of CSR. Since then, there have been significant developments in the various fields and sub-topics of CSR, such as CSR effects on consumers (David *et al.,* 2005), accounting and financial sector (Dusuki, 2006; Gray *et al.,*1996), corporate brand (Urde, 2009), trust (Ingenhoff & Sommer, 2010; Balmer, 2009), reputation (David, 2009; Fombrun, 2005;), not least within the stakeholder approach (Freeman, 1984; Donaldson & Preston, 1995; Jamali, 2008).

As mentioned by Wood (1991: 695), "the basic idea of corporate social responsibility is that business and society are interwoven rather than distinct entities; therefore, society has certain expectations for appropriate business behavior and outcomes". However, each company has to decide which component to focus on in their social responsibilities such as economic, legal, ethical and discretionary expectations (Carroll, 1979). As a conclusion, CSR is an organizational
obligation and key duties for companies to run their business in sustainable manner economically, socially and environmentally. At the same time, the organization needs to balance their interest of various stakeholders. However, it is still desirable for every Malaysian organization to improve their corporate reputation across industries worldwide.

Reputation

Reputation is "the perception of an organization built over time" (Balmer, 1998), that is why it is frequently understood that reputation is significant and treasured because it may influence the organizational confidence and customers feel good about purchasing products and services. Since corporate reputation is able to provide information about an expected future behavior of a company (Alchian & Demzet, 1972), most of consumers nowadays are rely on firms' reputation since they have limited information than managers do about firms' promise to delivering necessary product features like reliability or quality (Grossman & Stiglitz, 1980; Stiglitz, 1989). Davies et al. (2001: 114) define reputation as "a collective term referring to all stakeholders' views' of corporate reputation including

identity and image", and one of the notable objectives of corporate identity management that mentioned by Van Riel and Balmer (1997) was the development of a desirable reputation among an organization's stakeholders.

Reputation provides a source of competitive advantages (Balmer, 2001). Fombrun notes that, "good reputations increase credibility, making us more confident that we'll really get what we're promised" (Fombrun, 1996, p. 3). Previous consumer marketing studies (Brickley *et al.,* 2002; Jones, 2005; Smith & Higgins, 2000; Varadarajan & Menon, 1988) have highlighted that the influence of CSR and corporate reputation may induce positive brand perceptions of company products.

Legitimacy

Legitimacy theory is the response to the environmental pressures involving social, political and economic forces. According to Patten (1991) the main argument in this theory is that the more social exposure a firm receives by being larger, the greater the need to legitimize its existence to its relevant publics. Based on Branco and Rodrigues's (2006) findings, a legitimacy threat occurs when a company's behavior is perceived as not in accordance with society's norms. Therefore, to be appearing 'legitimate' in the eyes of society, many companies resolve to indulge in 'good news' by reporting only on the positive impacts on society and choose not to disclose the bad news (Atan *et al.,* 2010).

Recent developments have created opportunities and brought legitimacy research into overlap with a variety of other ways of discussing the social assessment of organizations. (Deephouse & Suchman, 2008). Since then, much corporate management have established environmental management systems and progressively adopted environmental reporting within the annual report (Deegan & Gordon, 1996). Previous studies have proved that the legitimacy theory has been extensively applied to discuss the social and environmental disclosure by corporations focusing mainly on social and environmental reports (Suchman, 1995; Deegan, 2002, Gray *et al.,* 1995; Lindblom, 1994; Maignan & Ferrell, 2004). However, Deephouse and Suchman (2008) identified that much of this literature has been highly theoretical, invoking legitimacy as an explanatory concept rather than examining it as an empirical asset. Both Suchman (1995) and Deegan (2002) pointed out that, the perceptions of the society towards the organization are critical which may influence the existence of the business. While Gray *et al.,* (1995) argued that, the organization will only secure their existence if they are perceived as operating within the values and norms of the society.

Culture

Corporate culture has been highlighted in the last decade for the key important role that it can play in a firm's success. Cultural is now widely recognized as a component of corporate identity (Melewar, 2003), since then corporate culture is paramount topic in business and organization (Abdullah, 2010; Sadri & Lees, 2001). It is widely agreed that culture contribute significantly to productivity and performance as well as a company's ability to create sustained competitive advantages. A formal definition offered by Greenberg and Baron (2008, p. 544) includes "culture as a cognitive framework consisting of attitudes, values, behavioral norms, and expectations".

Within the cultural research, Schien's model of culture remains a pivotal influence (Hatch, 1993). According to Abratt (1989), Schien's model has also been the basis of most conceptualizations within corporate identity models to date. Schien (2004) assumes that culture is largely antecedent to behavior; however Hatch (1993) argues that not everything that happened within the organization can be contributed to culture. Rather, culture has significant effects on behavior and other sources of influence apply (Vella & Melewar, 2008).

Barney, 1986; Dutton *et al.,* (1994) described that managers' perceptions and motivations are influenced by corporate culture, that is why managers are required to be concerned about their organization's culture and its alignment with the corporate values. Ignoring this notion, they would

face inconsistent behavior and adversely affect stakeholders' perceptions of the organization. Furthermore, Bettencourt and Brown (1997) argued that, corporate culture can be representing a source of companies' competitive advantages, but the culture is required to be attentive, adaptive, and appropriate to the expectations of all stakeholders (Kotter & Heskett, 1992).

In relation with CSR and corporate culture, Haniffa and Cooke (2002) extended the literature by examining the impact on culture the structure of governance on CSR. Findings from the survey conducted by Adam (2002) also indicated that country of origin, corporate size and corporate culture are likely to have an impact on CSR. This reflects that managers should be focused in internalizing the CSR culture into the companies. In the section, research method is addressed to provide empirical data of this study.

Research Method

Research Objectives

This quantitative research project aims to achieve the following objectives:

RO1: to determine the importance of CSR initiatives to Malaysian companies.
RO2: to examine the importance of corporate reputation to Malaysian companies.
RO3: to identify the importance of culture and legitimacy to Malaysian companies.
RO4: to examine the correlations between CSR initiative dimensions and corporate reputation and its associated outcomes.

Sample and Procedures

We conducted a survey to identify to the importance of CSR initiatives as a projection of corporate identity of the organization. Empirical data were also collected to answer the importance of corporate reputation, legitimacy and culture to the organization with regards to favorable relationships between the organization and its environment.

Study respondents were 300 volunteered practitioners enrolled in the executive programs of Master of MBA and Corporate Communication at one reputable research Malaysian university. All respondents involved directly in implementing CSR initiatives in their respective companies. Out of 350 questionnaires distributed, only 300 questionnaires were usable. Due to missing values, 15 were eliminated. With a response rate of 95%, therefore, the final sample size is 285.

Measures

Based on the past studies, we obtained the multiple-item scales. Mainly, survey questionnaire was designed by adapting David *et al.*'s (2005) CSR initiatives which consist of three underlying constructs: discretionary practices, moral/ethical practices, and relational practices. Questionnaire items were also adapted from Helm's (2005) formative measure of corporate reputation. The data for this study were gathered using the structured questionnaire consisting of five parts covering underlying elements of CSR initiatives, reputation, legitimacy and culture.

Results and Discussion

Importance of CSR Initiatives

Table 1 discusses some respondents' perceptions about the CSR initiatives that include "*moral/ethical practices", "discretionary practices"* and, *"relational practices"* of the company. This section is crucial to the overall study as it provides important issues that respondents felt companies in this industry should be aware of, when dealing with their stakeholders.

The study reveals that, majority of the respondents agreed that "*moral practice*" is important for company CSR initiatives. This can be seen in the column 4 (important), where the score are given in between 54.7% to 56.5%. Most of the respondents are perceived that "my company compete fairly with its competitors" are important with the highest score of 56.5%, while "company treats employees fairly" and "my company honors human rights of those employed in foreign countries" were given 54.7% and 52.8% respectively.

Surprisingly, most of the respondents in the current study were not recognizing "responsibly toward the environment" and "being honest and upfront about telling the truth" as an important CSR initiative for the company since the score for both are given below 50%. Similarly, with regards to "*discretionary practices",* all four items were rated below 50%. This could be happened due to a lack of awareness level of art and cultural programs in the community, very low social awareness of issues such as domestic violence and hunger, not aware of family conflict and a lack of information about the supports through public health programs, such as the fight against AIDS, cancer and other severe diseases. Nevertheless, among 285 participants, there were 54% of respondents who believed that "company strives to build long-term relations with its consumers" and 56.1% of respondents supported the company strives to promote satisfactory relationships with its internal stakeholder are an important factor in CSR initiatives.

TABLE 1: Importance of Corporate Social Responsibility Initiatives

No	Construct/ Items	[1] Not at all Important	[2] Less Important	[3] Slightly Important	[4] Important	[5] Extremely Important
CSR INITIATIVES (%)						
CSR: Moral Practices						
1.	My company treats employees fairly	**0.7**	**3.9**	**19.3**	**54.7**	**21.4**
2.	My company honors human rights of those employed in foreign countries.	**1.4**	**4.2**	**28.8**	**52.8**	**13.0**
3.	My company competes fairly with its competitors.	**2.1**	**56.5**	**23.2**	**15.1**	**3.2**
4.	My company acts responsibly toward the environment.	**0.4**	**3.9**	**23.5**	**49.5**	**22.8**
5.	My company is honest and upfront about telling the truth when something goes wrong.	**1.8**	**3.9**	**31.2**	**43.5**	**19.6**
CSR: Discretionary Practices						
6.	My company contributes resources to the art and cultural programs in the community.	**3.2**	**9.5**	**30.9**	**41.8**	**14.7**
7.	My company contributes resources to raise social awareness of issues such as hunger and domestic violence.	**1.8**	**11.2**	**26.7**	**44.9**	**15.4**
8.	My company supports children and family issues, such as adoption and foster care.	**3.2**	**14.0**	**30.2**	**36.1**	**16.5**
9.	My company supports public health programs, such as the fight against AIDS, cancer and other diseases.	**3.5**	**8.1**	**33.3**	**40.0**	**15.1**
CSR: Relational Practices						
11.	My company strives to build long-term relations with its consumers.	**1.4**	**3.2**	**18.2**	**54.0**	**23.2**
12.	My company is willing to listen to its consumers and other stakeholders and is open to constructive criticism about its business practices.	**1.4**	**4.2**	**23.5**	**48.1**	**22.8**
13.	My company strives to promote favorable relationship with employees.	**2.1**	**4.2**	**20.0**	**56.1**	**17.5**
14.	My company appears to be trustworthy.	**1.1**	**3.2**	**23.5**	**49.8**	**22.5**
15.	My company is concerned with aligning its value and belief with the stakeholders' interest.	**2.1**	**4.2**	**26.0**	**48.8**	**18.9**

Importance of Corporate Reputation

Respondents were shown a list of benefits for having good corporate reputation. From that list, they were asked to rank those benefits according to their importance from the respondents' perspectives (1 = Not at all Important, 5 = Extremely Important). Table 2 shows the overall findings for this question.

By judging from the Table 2 particularly in "corporate reputation" section, it can be seen that different respondents have different sets of expectations and preferences. Therefore, the only way to rationalize this data is by looking from a wider perspective and thus, may derive some conclusions using the aggregated results. Referring to the scores column, as suggested by the majority of the respondents, the most extremely important influence of corporate reputation was "my company has the credibility of marketing communication claims (77.9%)". Interestingly, "my company strives for corporate success (57.9%)" only came second, then followed by "company focuses on customer oriented (52.3%)" and "my company is very well organized (51.2%)" being ranked third and fourth respectively. The importance of companies to be recognized in this list suggests an indication of how to make full use of their good corporate reputation, and from there they could achieve certain competitive advantages.

TABLE 2
Importance of Importance of Corporate Reputation

No	Construct/ Items	[1] Not at all Important	[2] Less Important	[3] Slightly Important	[4] Important	[5] Extremely Important
CORPORATE REPUTATION (%)						
1.	My company strives for corporate success.	**0.4**	**3.9**	**10.2**	**57.9**	**27.7**
2.	My company focuses on customer oriented.	**0.0**	**1.4**	**15.4**	**53.7**	**29.5**
3.	My company provides high quality products.	**0.4**	**1.8**	**14.4**	**49.8**	**33.7**
4.	My company provides value for money for its products and services.	**2.1**	**3.9**	**20.7**	**44.2**	**29.1**
5.	My company has the credibility of marketing communication claims.	**0.4**	**4.9**	**24.2**	**29.5**	**77.9**
6.	My company has a commitment to protect the environment.	**0.7**	**4.6**	**28.1**	**42.8**	**23.9**
7.	My company has a commitment to charitable causes.	**0.4**	**6.7**	**27.0**	**48.1**	**17.9**
8.	My company is very well organized.	**1.1**	**2.5**	**23.9**	**52.3**	**20.4**
9.	My company recruits top talents	**1.1**	**4.9**	**19.3**	**51.2**	**23.5**
10.	My company has a good standing financial performance.	**0.4**	**3.2**	**19.6**	**50.5**	**26.3**

Importance of Culture and Legitimacy

Both culture and legitimacy have becoming important and talked about. Culture is concerned with the impact of the employees' activities that related to value and beliefs, multi-ethnics and cultural sensitivity among diverse employees. While legitimacy tried to fulfill the legal principle and expectation.

In this section, all the respondents were asked to review, and provided feedbacks on the importance of culture and legitimacy. Based on the result in the Table 3, majority of the respondents agreed that all cultural issues are "important" to the company, where "multi-ethnic employees work in harmony in this company" represents the highest score of 56.1%. "company policy on equal opportunities among the diverse employees" is rated the second highest with total score of 55.8%. Furthermore, the perception on "company uses local values to articulate its company brand", and "employees share the same values and beliefs" are rated as third and fourth place with total score of 53.3% and 53.0% respectively. However, only 44.6% of the respondents gave a rating of 'important' for respecting cultural sensitivity among diverse employees.

Referring to the legitimacy score, 54.4% respondents gave a rating an "important" to "company always submits to the newest legal principle as soon as possible". Followed by 53.3% for "company products and services are compliant with the legal expectation". Under the same issues "company works with regulators to formulate and develop the regulatory standard" were rated as important with total score of 51.2%. Nonetheless, the rest of two items that related to law, social and environmental disclosure were rated below 50% (47.0% and 41.4%).

TABLE 3: Importance of Culture and Legitimacy

No	Construct/ Items	[1] Not at all Important	[2] Less Important	[3] Slightly Important	[4] Important	[5] Extremely Important
***CULTURE & LEGITEMACY* (%)**						
Culture						
1.	Multi-ethnic employees work in harmony in this company.	**0.7**	**2.1**	**13.0**	**56.1**	**28.1**
2.	My company is concerned about respect for cultural sensitivity among diverse employees.	**0.0**	**3.2**	**23.4**	**44.6**	**28.8**
3.	Employees share the same values and beliefs.	**0.4**	**3.2**	**21.4**	**53.0**	**22.1**
4.	My company has a policy on equal opportunities among the diverse employees.	**0.4**	**2.1**	**20.0**	**55.8**	**21.8**
5.	My company uses local values to articulate its company brand (e.g. HSBC local bank).	**2.1**	**4.1**	**22.5**	**53.3**	**17.9**
Legitimacy						
6.	My company products and services are compliant with the legal expectation.	**0.0**	**1.4**	**21.8**	**53.3**	**23.5**
7.	My company always submits to the newest legal principle as soon as possible.	**0.0**	**2.5**	**27.7**	**54.4**	**15.4**
8.	My company is only allowed to do what is explicitly permitted by law.	**0.0**	**1.8**	**23.9**	**47.0**	**27.4**
9.	My company works with regulators to formulate and develop the regulatory standard.	**0.0**	**3.2**	**22.1**	**51.2**	**23.5**
10.	My company emphasizes on voluntary social and environmental disclosure.	**1.1**	**3.9**	**32.3**	**41.4**	**21.4**

Correlation between CSR Initiative Dimensions and Corporate Reputation and its Associated Outcomes

Based on the Table 4, it is found that all variables are significantly correlated. There was a strong positive correlation between all CSR initiative dimensions with the CR construct where the ethical dimension shown the strongest correlation (*r=.604*), which then, followed by the relational dimension (*r=.590*), and the discretionary dimension (*r=.504*). Similarly, an inspection on the CSR initiative dimensions with culture also showed a significant positive correlation between all the dimensions. The ethical dimension reported the highest and strongest correlations among all dimensions. It is significantly correlated at .524. On the other hand, the discretionary dimension reported lower correlation at .391 suggested weaker relationships. Relational suggest a moderate correlation with culture at .474. It was also found that all the CSR initiative dimensions are significantly correlated with legitimacy where relational showed the highest impact at .551, then followed by ethical at .506 and relational at .495. An examination of correlation between corporate reputation and culture has evidence a strong positive correlation between the two constructs. It was found that corporate reputation and culture are significantly related at .624. Similarly, the Table 4 also suggests a strong positive relationship between corporate reputation and legitimacy at .686.

TABLE 4: Correlation between CSR Initiative Dimensions and Corporate Reputation and its Associated Outcomes

	TMoral	TDiscretionary	TRelational	TCR	TCulture	TLegitimacy
TMoral	1					
TDiscretionary	.527**	1				
	.000					
TRelational	.606**	.512**	1			
	.000	.000				
TCR	.604**	.504**	.590**	1		
	.000	.000	.000			
TCulture	.524**	.391**	.474**	.624**	1	
	.000	.000	.000	.000		
TLegitimacy	.506**	.495**	.551**	.631**	.686**	1
	.000	.000	.000	.000	.000	

**. Correlation is significant at the 0.01 level (2-tailed).

Overall, majority of the respondents confirmed that any corporate responsibility areas that have been classified as extremely important, very important or important, companies should be dealt with these items seriously. Any slackness could be harmful to their long-term corporate reputation. They should lead by practicing good ethics, assuring that explicit and implicit promises to stakeholders are met, setting directions for obtaining good corporate reputation in general, and being the first line of defense to protect the companies' reputation when challenged. Indeed, a strong positive relationship between all CSR initiative dimensions with the CR construct, and also with its related constructs shows there is a dire need to pay a greater attention to CSR initiatives for Malaysian companies.

Conclusion

The purpose of this paper is to identify to the importance of CSR initiatives as a projection of corporate identity of the organization. Thus, building distinctive corporate identity leads us to seek the importance of corporate reputation, legitimacy and culture to the organization in building a favorable relationship between the organization and its environment.

Despite enormous efforts from the US and European scholars to institutionalize strategic communication, the profession is still lacking recognition at the dominant coalition especially in Asian country in general and Southeast Asian country in particular. Findings of this study suggest that institutionalizing CSR is vital today in understanding the role and contribution of strategic communication to the organization, away from window dressing activities. The findings also suggest that a greater focus on corporate reputation, culture and legitimacy is central to today's organization. This implies that CSR initiatives as the projection of corporate identity of organization (a behavioral perspective) ties with the key concepts such as corporate reputation, culture and legitimacy in strengthening the favorable relationship between the organization and its environment.

Practical implications imply that competent strategic communication managers should capable of developing strategic planning and implementation based on CSR initiatives to look a broader aspect of macro-level analysis of environment in order to detect any issues and opportunities in the context of corporate reputation, culture, and legitimacy. This might create competitive advantages to project distinctive corporate identity of organization which is essential at the meso and micro levels of analysis as suggested by Sandhu (2009).

Furthermore, the notion of institutionalized strategic communication not only lies in discussion on established theories and renowned practices in Europe and the US but also should look at whether the profession is institutionalized worldwide in general and Southeast Asia in particular. Indeed, the paper contributes imperative evidences of institutionalized CSR within strategic communication in Malaysia.

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The Information and Communication Technologies in Tourism Degree Courses: The Iberian Peninsula Evolution

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Abstract

With the rapid expansion of Information and Communication Technologies (ICT) throughout almost all aspects of tourism and hospitality industries, the task of integrating technology into higher education curriculum is a need. This paper analyzes the relevance given by the various Portuguese and Spanish institutions of higher education to ICT in their degrees. The analysis carried out was done in degree courses operating in academic year 2018/2019, in Portuguese and Spanish universities and polytechnics. A comparison was also made with the reality of 2012/2013.

Keywords: Tourism, Information and Communication Technologies (ICT), Higher Education.

Introduction

The tourism sector is one of the most important economic sectors, both for the developed countries and developing countries. This sector has features such as globalization of tourism market, mobility of tourists and abundance of information. Also, all these features characterize an information society.

Tourists could be from all nations, social classes, and professions. The tourism sector is diverse, because the size of the companies that make up this sector ranges from micro, medium, to global companies (Buhalis & Jun, 2011).

Tourism is acknowledged to be very information intensive. Tourists need information before going on a trip to help them plan and choose between options, and also increasingly need information during the trip as the trend towards more independent travel increases. But for this it is necessary that the information be available and the tourism professionals with the capabilities to solve the problems.

Information and communication technologies (ICTs) have been transforming tourism globally. The ICT driven re-engineering has gradually generated a new paradigm-shift, altering the industry structure and developing a whole range of opportunities and threats.

The introduction and increased proliferation of technologies has had a significant impact on many industries, especially the tourism sector (Ukpabi & Karjaluoto, 2016); (Morais, et al., 2016). Technological advancements have impacted and disrupted all tourism organizations (Sigala, 2018). The increased awareness and use of innovative technologies, have changed travel behaviours, revolutionizing the way in which tourists search for information, make decisions (Wang, et al., 2016), purchase tourism products and services, find and explore reviews (Ukpabi & Karjaluoto, 2016). In addition, Sigala (2018) identified tourism technologies have had an impact on the way tourists select, evaluate, pay, share and experience tourism.

People, are a critical dimension within the successful delivery of tourism services. ‘‘The story of successful tourism enterprises is one that is largely about people - how they are recruited, how they

are managed, how they are trained and educated, how they are valued and rewarded, and how they are supported through a process of continuous learning and career development'' (Fáilte, 2005).

This paper aims to analyze the relevance given by the various Portuguese and Spanish institutions of higher education to ICT in their Tourism degrees. The analysis carried out was done in degree courses operating in the school year 2018/2019, in Portuguese and Spanish universities and polytechnics, public and private. It was made a comparison to a study carried out in the school year 2012/2013 (Morais, et al., 2013) in order to see the evolution.

Tourism Education and ICT

The adoption and diffusion of educational technologies that leverage ICT and the Internet has provided an unprecedented opportunity for improving higher education around the world (Davis & Wong, 2007). Educational technologies must become more popular among developing nations which seek economic improvement (Khasawneh, et al., 2011). In fact, the educational technology is becoming more universal at an increasing rate as most firms recognize the needs to prepare the ICT professionals for the global environment (Margavio, et al., 2005).

People are critical assets within the tourism industry for sustaining and enhancing competitiveness and quality. The involvement of the training and education sectors to industry is vital. Good management in service organizations and tourism enterprises certainly qualify as strategic success factors of the industry (Heskett, et al., 2008).

Higher education drives, and is driven by globalization. Higher education institutions train the highly skilled workforce and contribute to the research base and innovation capacity that increasingly determines competitiveness in a knowledge-based global economy. With their central role in cross-cultural encounters, Higher education institutions foster mutual understanding and helps to build global networks for the future. At the same time, cross-border flows of ideas, students, faculty and financing, coupled with developments in information and communication technologies, as well as the emergence of new players are changing the environment for higher education. Globalization implies both increased collaboration and competition between countries and institutions on a global scale (OCDE, 2009).

In all the discussion forums of tourism jobs, Informatics and use of Information Technology appears as one of the most desirable skills for the future professional. Ramos et al (2009) argues that competitiveness and exploitation of the tourism industry increasingly depends on the ability of professionals and managers take advantage of the emerging ICT to increase competitive benefits, since ICT allows adding value by facilitating the differentiation of the tourism product and increasing efficiency.

One of the fundamental challenges facing tourism professionals is the need for continuous adaptation to changes, due to the dynamism of the sector (Pilar, 2007). It is through the training of human resources in the tourism industry, especially in ICT, which improves their ability to adapt and consequently is increased flexibility and interactivity productive processes which result to be increasingly complex, due to the competitiveness and globalization currently existing (Buhalis & Law, 2008). The improvement in the training of professionals will greatly increase both the quality of services provided to customers, and the level of quality of information provided to customers.

At the present moment, the basic objective is the formation of a quality specialist in the field of tourism, able to adapt quickly to the environment changes, ready for practical activity, able to use modern technologies, to find flexible and optimal solutions, to identify influences of the external environment on the company's work and be able to forecast the demand (Lungu, 2017). We agree with this and also that without training in ICT these goals will be difficult to achieve.

Joaquim Majó (2004) does, for some time, highly relevant considerations regarding higher education in Tourism and particularly on ICT.

Even before the Bologna process there were authors who argued that degrees in tourism beyond the pure ICT content should contain other topics, such as: Information Systems; Database Systems; Use of CRS (Central Reservation System) and GDS (Global Distribution System); Systems to promote

tourism (multimedia environments); Telematics networks: Internet (both as a source of information as a mean of promotion and marketing through web pages); Local networks, use of intranets and extranets; Analysis of the main management programs of tourist companies (both at the front-office and back-office); Geographic Information Systems.

(Buhalis, 1998) and (Majó, 2004) argue that this type of training should cover between 15-30% of the dedication of the student.

People are often a critical dimension within the successful tourism service businesses. The history of successful businesses in the tourism sector resides above all about people, how they are recruited, how they are managed, trained, educated, the way they are valued and rewarded and how they will be supported through a process (Fáilte, 2005); (Baum, 2007).

The impact of ICT on tourism has altered the way tourist services are accessed and consumed. Thanks to increasingly ubiquitous and innovative ICT, new channels have been created for consumers (Liburd & Christensen, 2013). This new reality has made it much more demanding for tourism professionals to master the use of these new tools. Preparing students for trainings in the area of higher education tourism is, in our view, more and more important, as ICT innovation has increasingly technologically strengthened the profile of travelers. Projects such as INNOTUR and the use of Web 2.0 technologies are an example of a concern to prepare students, from training in the area of higher education tourism, to an increasingly global and technologically demanding work reality (Morais, et al., 2018).

Methodology

The nature of the objectives led to a methodology of quantitative research, descriptive and interpretative eminently possible that characterizes the object of study. The study focused on the analysis of ICT training courses in tourism, because we believe ICT, especially in the context of the Bologna process, as basilar course units in curriculum structure, and are fundamental to the development and innovation of tourism.

The research of the courses for this study was based on the website of the Directorate General of Higher Education (http://www.dges.gov.pt/) in the case of Portugal and the State Department of Education for Spain (http://www.mecd.gob.es). We considered only the courses that had “Tourism” or “Tourist” in their name or derived (e.g. “ecotourism”, “touristic”). After collecting the courses available in the academic year 2018/2019, the remaining data were obtained through the consultation of the information available on the websites of the different institutions. For each tourism course, we considered the course units with a name and/or content (the latter not always available) that suggested references to ICT, like “information systems”, “computer”, “technology”, “electronic”, “digital”, among others. We did not consider non-ICT related course units that, eventually, could promote the development of students’ ICT skills by indirect means, since the available data don’t allow inferring that.

It was also made a comparison with a similar study developed in 2012/2013.

Analysis of Data Obtained

From the analysis carried out it was found that exist in the Portuguese higher education 50 degrees in tourism (in 2012/2013 there were 39), with 16 different designations (in 2012/2013 there were 10), distributed by 36 higher education institutions (15 on Private Higher Education and 21 on Public Higher Education). In 2012/2013, of the 39 degrees, 3 were after working hours and the remaining 36 had normal arrangements. In 2018/2019, of the 50 degrees, 6 are after working hours.

When analyzed data from the Spanish higher education it was verified that there are 73 degrees in the area of tourism (in 2012/2013 there were 67), with 10 different designations, distributed by 50 Higher Education institutions. The term "Tourism" is predominantly utilized (there are 62 degrees with that designation). When analyzed the education subsystem in Spain it was found that 61 degrees are on the Public subsystem and 12 degrees are on the Private subsystem (in 2012/2013 there were 53 on the Public subsystem and 14 were on the Private subsystem).

The geographical distribution of courses by NUTS II, to Portugal, and communities, to Spain, are represented in Table 1 and Table 2, respectively.

We can verify that in Spain the changes were not significant. In Portugal there was an increase of degrees in the North region and in the Center region.

Table 1: Degrees distribution in Portugal, by NUTS II

	2012/2013	2018/2019
Azores archipelago	1	1
Algarve	5	2
Alentejo	3	3
Center Region	7	14
Lisbon and Tejo Valley	10	12
Madeira archipelago	1	0
North Region	12	17

Table 2: Degrees distribution in Spain, by communities

	2012/2013	2018/2019
Andalusia	9	9
Aragón	1	1
Asturias	2	2
Canarias	6	7
Cantabria	1	1
Castilla y León	5	6
Castilla-La Mancha	1	1
Cataluña	12	16
Extremadura	1	1
Galicia	2	2
Islas Baleares	3	3
La Rioja	1	1
Madrid	13	11
Murcia	3	4
País Vasco	2	2
Valenciana	5	6

Table 3 shows the different designations and number of respective degrees, for the school year 2012/2013 and 2018/2019 both for Spain and for Portugal.

It is interesting to note that Portugal, despite having fewer degrees, has more different designations. However, in both countries the predominant designation is "tourism", as it would be expected. In both countries there is a higher concentration of degrees in areas where the population is more abundant.

Table 3: Number of degrees in Tourism scientific area (2012/2013 and 2018/2019)

Degree	Number of Degrees in Spain		Number of Degrees in Portugal	
	2012/2013	2018/2019	2012/2013	2018/2019
Ecotourism	0	0	1	0
Entertainment Tourism and Heritage	0	0	1	0
Environmental Education and Nature Tourism	0	0	0	1
Hotel and Tourism Management	2	3	0	0
Information and Tourism Animation	0	0	1	0
International Business Management Tourism and Leisure	2	2	0	0
Leisure Management and Tourism Animation	1	0	1	2 (1 post-labour)
Management of Tourism Activities	0	1	0	4 (2 post-labour)
Nature and Active Tourism	0	0	0	1
Sustainable Tourism	0	0	1	0
Tourism	60	62	28	28 (2 post-labour)
Tourist and Cultural Management	0	0	0	1
Tourism and Hotel Management	1	2	0	1
Tourism and Hospitality Management	0	0	0	1
Tourism and Leisure	0	1	1	1
Tourism and Leisure Management	0	1	0	0
Tourism and Tourism Enterprises Management	0	0	1	1
Tourism Entertainment	0	0	1	1
Touristic Information	0	0	1	1
Tourist and Cultural Management	0	0	0	1

Tourism Management	1	1	2	4 (1 post-labour)
Tourism Management, Cultural and Heritage	0	0	0	1
Tourism, Territory and Heritage	0	0		0
Tourism (Tourist Information and Events)		0		1

In the Portuguese case, it has been verified that in a relatively short space of time there have been significant changes, particularly in degrees whose designation is not only "Tourism", which proves that it is a dynamic area, and intends to respond to a market that has come growing.

Figures 1, 2, 3 and 4 shows the number of ECTS (European Credit Transfer System) in the ICT area, and the number of degrees with the corresponding ECTS in Portugal and Spain for the school year 2012/2013 and 2018/2019.

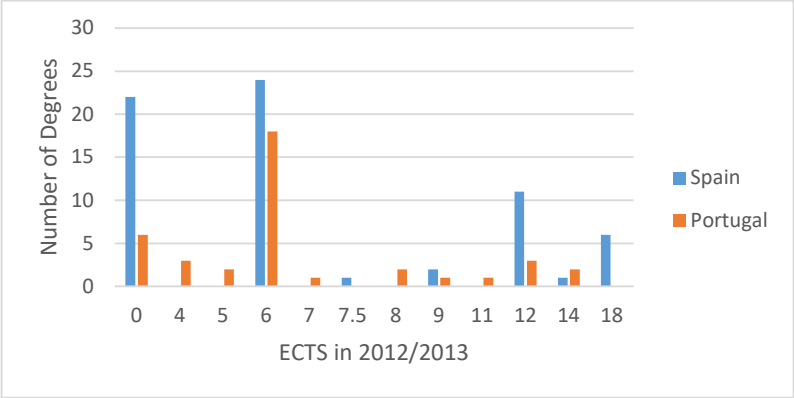

Figure 1: Comparison of Number of ECTS by Degree in Portugal and Spain (2012/2013)

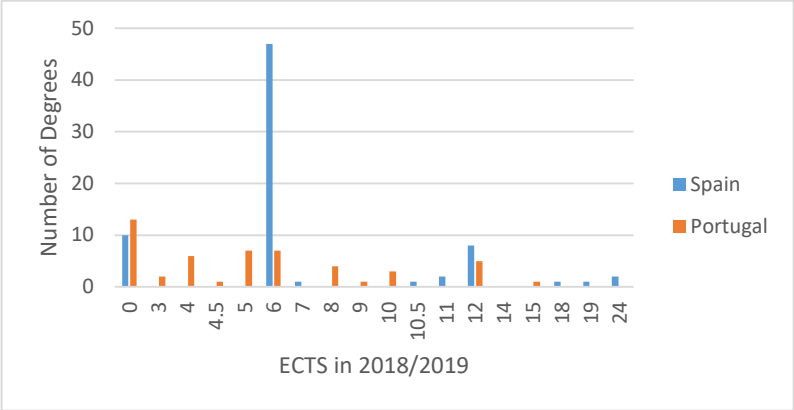

Figure 2: Comparison of Number of ECTS by Degree in Portugal and Spain (2018/2019)

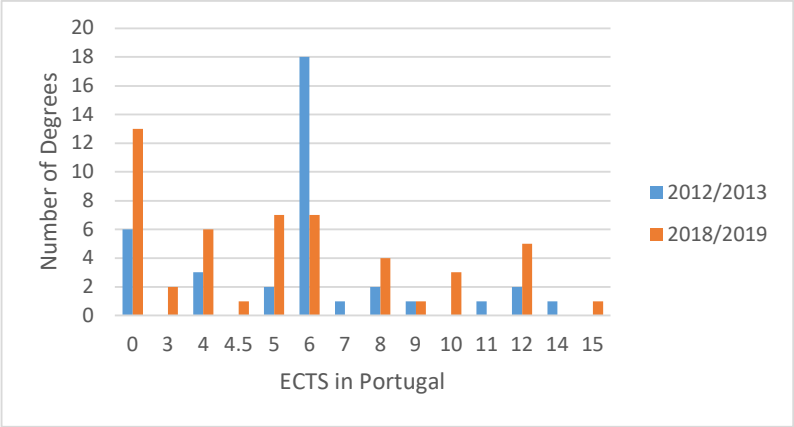

Figure 3: Evolution of Number of ECTS by Degree in Portugal between 2012/2013 and 2018/2019

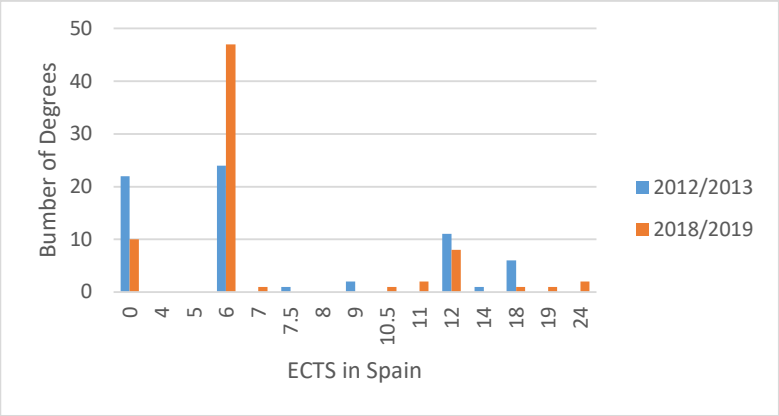

Figure 4: Evolution of Number of ECTS by Degree in Spain between 2012/2013 and 2018/2019

In 2012/2013 Spain had 22 degrees without any curricular unit of the ICT area, while Portugal had only 6. This trend has reversed in 2018/2019. Spain has reduced the number of degrees without ICT curricular units to 10, while Portugal has increased this number to 13. With 6 ECTS, Portugal had 18 degrees in 2012/2013, also decreasing this number to 7. In contrast, Spain had 23 degrees with 6 ECTS, increasing this value to 47. There is a positive trend in the adoption of curricular units of the ICT area in Spain, while in Portugal the number of ECTS in the area of ICT in the degrees of the Tourism area has been decreasing.

Tables 4 and 5 show the curricular units of the ICT area existing in the school years 2012/2013 and 2018/2019 for the two countries.

Table 4: Curricular Units in scientific area of ICT in 2012/2013

Curricular Units in Scientific area of ICT in Portugal	Curricular Units in Scientific area of ICT in Spain
Computer Applications in Tourism	Learning and Information Technology and Communication
Computers	Computer Management
Computers for Tourism	Computer Systems Applied to Tourism
Computing applied to tourism	Computer tourism management
Digital Technologies Applied to Tourism	Computing applied to the Tourism Enterprises Management
E-Communication and Multimedia	Computing applied to tourism I
General Principles of Informatics I	Computing applied to tourism II
General Principles of Informatics II	Computing applied to tourism management
Geographic Information Systems	eDistribution
ICT Applied to Tourism	Electronic Business
Information and Communication Technologies	Geographic Information Technology Oriented to Analysis and Diagnosis of Tourist Resources
Information Systems	Geographic Information Technology Oriented to Tourism Destination Management
Information Systems and Communication for Tourism	Global Distribution Systems in Travel Agencies
Information Systems Animation	Hotel Management Software Tools
Information Systems applied to Tourism	ICT and Tourism
Information Systems for Management	ICT applied to tourism
Information Systems in Tourism	Information and Knowledge Management
Information Systems Management	Information Systems and ICT I
Information Technology	Information Systems and ICT II
IT Management	Information Systems Applied to Tourism Management
Knowledge Management	Information systems for managing tourist company
Mathematics and Informatics	Information Technology and Communication
New Technologies in Tourism	Information Technology in Tourism
Reservation Systems and Information Flows	Introduction to ICT Skills
Technological Innovation in Tourism	IT applied to the hospitality
Technologies and Information Systems	Management Information Systems for Business Tourism

Technologies and Information Systems in Tourism	Management of hotel and facilities information systems
Technology and Information Systems I	Multimedia Tools
Technology and Information Systems II	New Technologies in the Field of Tourism
	Search and Information Management
	Search techniques and use of information
	Systems and technologies for information management
	Technology and Innovation in Tourist Firms
	Tourism and Electronic Business
	Tourism information systems
	Training in the Use of ICT

Table 5: Curricular Units in scientific area of ICT in 2018/2019

Curricular Units in Scientific area of ICT in Portugal	**Curricular Units in Scientific area of ICT in Spain**
Computer Applications in Tourism	Applied Computer for Hotel Industry
Computer Applications	Computer and Communication Techniques
Computers	Computer and Study Skills
Computers for Tourism	Computer management
Computing applied to tourism	Computer Systems Applied to Tourism
Computing from the User's Perspective	Computer Tools for the Study of the Tourist Market
Communication Techniques	Computerized Management of Accommodation Companies
Digital Technologies Applied to Tourism	Computerized Marketing
	Computing
ICT Applied to Tourism	Computing for Business Management
ICT in Tourism	Digital marketing
ICT and Software applied to Hospitality	Digital Marketing and Social Networks for Tourist Products
ICT and Software applied to Tourism	Electronic Marketing
Information Technology in Tourism	Electronic Marketing and Experiential Marketing
Image and Graphic Edition	Generate Audiovisual Productions: Digital Formats and Contents
Informatic Systems	ICT

Information and Communication Technologies	ICT applied to Tourism
Information and Knowledge Society	ICT Tools Applied to the Company
Information Society: Tourism and Culture	ICTs Applied to the Tourism Sector
Information Systems applied to Tourism	ICTs in Tourism
Information Systems for Management	Informatics Applied to Tourism
Information Systems in Tourism	Information and Communication Systems
Information Systems Management	Information and communication technologies
Information Technology	Information and Communication Technologies in the Tourism Sector
Information Technology I	Information and Knowledge Management
Information Technology II	Information System Applied in Tourism Management
Introduction to ICT	Information Systems and Tourism Research Techniques
Management Informatics	Information Systems for the Management of Tourist Companies
Multimedia Techniques in Tourism	Information Systems for Tourism Management
New Technologies in Tourism	Information Technology for Business
Software Applied to Hospitality	Internet Based Information Systems
Technological Innovation in Tourism	Internet Content Strategy
Technologies and Information Systems in Tourism	Internet Marketing
Technology and Information Systems I	Introduction to ICT Skills
Technology and Information Systems II	IT Applications of the Tourism Sector (Intermediation and Hotels)
Web Communication	IT Applied to Hospitality
	IT Applied to the Management of Tourist Companies
	IT Applied to Tourism Management
	IT for Business Management
	IT for Tourism
	IT for Tourism Management
	IT Systems in the Tourism Sector
	Management and Knowledge Computing
	Management Information Systems
	Management of Information Resources of the Tourist Company

	Management of Information Systems in Tourist Organizations
	Management of Tourism Databases
	Management of Tourist Information in Digital Environments
	New Information Technologies Applied to Marketing and Promotion of Tourism and Leisure Products
	New Models of Technological Leisure
	New Technologies and Tourism
	New Technologies Applied to Tourism
	New Technologies in the Management of Companies and Tourist Destinations
	New Technologies in the Tourism Field
	Search and Information Management
	Social Networks, Internet, Tourism and Leisure
	Spreadsheets. Intermediate level
	Systems and Information Technology for Tourism Management
	Techniques of Search and Use of Information
	Technologies Applied to Tourism
	Tourism and Electronic Business
	Tourism Information Systems
	Tourism Website Design
	Training in the Use of ICT
	Web Design and Management in Hotel Companies
	Web Technologies Applied to Tourism

It was verified that in Spain there were significant changes in the curricula with regard to ICT, and there was a concern with emerging issues in technology, namely in terms of digital promotion, digital marketing, Web, Internet and Social Networks. In Portugal there were no major changes in curricula since 2012/2013.

Institutions have their study plans available on their websites; however, when someone intends to analyze the detailed contents of the program curricular units that are part of the curriculum, in many cases the institutions do not have that information available. It was a problem detected in the analysis carried out in 2012/2013 and after six years this failure persists.

From the information we were able to collect from the institutional websites we could verify that, as expected, there is a great diversity of ICT contents in the courses, with different subjects addressed and with different levels of specialization. For example, there are courses with 18 ECTS of ICT curricular units, of which 12 are exclusively for Geographic Information Systems, while in other

courses with the same name (Tourism) that topic does not even seem to deserve a topic on the syllabus.

Some of the most frequent topics are related to the main management programs of tourist companies, like Central Reservation System (CRS), Global Distribution System (GDS) and Property Management Systems (PMS), as well as topics related to e-commerce and e-business.

Curiously, being the smartphones an essential tool of today tourists it is worthy to mention that mobile systems and technologies is not one of the most referenced topic.

The table 6 shows an overview of the ICT related topics found in the analysed tourism curses. The data is showed without any particular order and some of the topics are only mentioned in a few courses while others are more frequent.

Table 6: ICT related topics in tourism courses

ICT fundamentals	Hardware Software File handling and storage Operating Systems Mobile systems and technologies Communication networks
Internet	Internet architecture (including servers, DNS) WWW Online communication (including e-mail, instant messaging) Social Media (including blogs, wikis, podcasts) Online searching and information sources (including engines, tools, portals, databases) E-learning SaaS Online storage Security (including network security, digital certificates) Touristic portals
Information Systems	Business management systems (including EDI, ERP, CRM, PRM, SCM, BI) Central Reservation System (CRS) Global Distribution System (GDS) Property Management Systems (PMS) Travel Agency Information Systems Geographic Information System (GIS)
Database Systems	SGBD (Access) Database development Big data

	Data Analytics Data management Prediction and Simulation Knowledge Management Tools
E-commerce / E-business	E-commerce and e-business systems (including E-payment)
E-marketing	E-marketing tools Promotion (including Search Engine Optimization (SEO) and Search Engine Marketing (SEM)) Analytics tools
Websites	Content Management Systems (CMS) Development (including HTML, CSS, XML, CMS) Evaluation
Office tools	Word processors Spreadsheets Presentation tools Document Collaboration Tools Project planning E-Publishing (including content creation and dissemination) Concept mapping tools
Multimedia	Image edition Audio edition Video edition Multimedia tools
Gaming / Simulation	Business Game Hotel Simulation Virtual Worlds Augmented Reality

Discussion and Conclusions

This paper shows values related to ICT, and the weight that the curricular units of ICT have in the plans for undergraduate studies in the tourism sector in the Iberian Peninsula (Portugal and Spain), and concluded that on average, curricular units of ICT has an insignificant representation of the ECTS in Tourism degrees, and not 15% - 30% as some authors argue that it should be (Buhalis, 1998; Majó, 2004).

The maximum number of ECTS in Portugal was 14 in 2012/2013 and 15 in 2018/2019 (around 8%). In Spain in 2012/2013 it was 18 and 24 in 2018/2019. However, they are isolated cases and still far below desirable.

In most cases the courses have a curricular unit in the ICT area, where practically address office tools. In 2012/2013 some courses do not have any curricular unit of ICT area (6 in Portugal and 22 in Spain, which corresponds to 15% and 33%, respectively, of the courses). In the hope that the data for the 2018/2019 school year would be more prosperous with regard to ICT, we have seen that in Portugal the situation has not improved and it has also worsened. There were 13 degrees without any curricular unit of the ICT area, which corresponds to 26% of the total of degrees. Spain had 22 degrees without any UC for the school year 2012/2013 from the ICT area and decreased to 10 in 2018/2019, although the number of degrees has increased.

Increasingly ICT plays a critical role for the competitiveness of tourism organizations and destinations becoming a key factor (Bethapudi, 2013). "A profession, no less than a craft, is shaped by its tools" (Farkhondehzadeh , et al., 2013). When we find that the evolution of the tourism industry has been principally on the ICT, in our opinion, the courses should be redesigned in order to enhance professionals with more and better skills in ICT. According to Adeyinka-Ojo (2018), ICT skills are among the necessary skills to improve graduate employability. Also Kim et. al (2017) refers that specific competencies of the work indicate the student's ability to apply and use information in a specific context and their knowledge about ICT. This emphasizes the need to align the graduated ICT know-how with the increasing technology wave that is flowing into the tourism industry.

With ICT, it is possible to reduce the direct costs of operation, as well as to increase the flexibility, interactivity, efficiency, productivity and competitiveness of organizations, and this situation is valid both for companies and for tourist destinations. The advantages that ICT have brought to the area of Tourism are widely recognized. To train professionals in the area of Tourism with skills and abilities in the field of ICT, it seems to us urgent. However, due to the analysis of the degree programs in this area, we found that many institutions are not training professionals with these skills. This will conduct to ICT less prepared tourism-professionals, that will embrace the tourism industry, which is very demanding in the use of ICT and, in our opinion, even worst, will tendentiously lead to professionals less capable to create value through innovation in a very information demanding market, where the target (i.e. tourists) are requiring for new tools and innovative approaches in the before, during and after their trips process.

Most of the courses do not prepare their students in order to acquire skills in the area of Geographic Information Systems, Multimedia, Augmented Reality, Digital Marketing, Social Networks, among others, especially in Portugal. In Spain, emerging themes in the ICT area, began to be addressed in the degrees analyzed in school year 2018/2019.

Given to the recent, and expectable continuous, introduction of ICT on tourism industry, tourism related courses must improve their curricula on ICT skills. This can be achieved changing the current mandatory ICT curricular unities, increasing the optional ones related to ICT and even increasing the seminars dedicated to ICT and how can they boost graduated capabilities to improve organizations through their ability to manage information as organizational critical success factor.

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A Spatial Analysis of The Concentration of Population and Income Potential Using the Example of The Opolskie Voivodeship In the Years 2000-2018

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Abstract

The aim of the present study was to analyse and evaluate the concentration of income and population potential of communes (municipalities) in the Opolskie Voivodeship in the years 2000-2018. The study involved the application of the physical potential theory in a spatial study of territorial units on the commune level. Statistical spatial analysis tools used in the present work included the spatial autocorrelation coefficient and the related Global Moran's index as well as Local Indicators of Spatial Association (LISA). The analysis of the concentration of potential enabled the assessment of financial self-sufficiency of the communes of the Opolskie Voivodeship.

Keywords: population potential, income potential, potential concentration, Global Moran's, LISA - Local Indicators of Spatial Association, spatial analysis.

Introduction

Regional studies on the commune/municipality level (NUTS 5) are an important part of local analyses. The use of the potential theory coupled with the tools of spatial statistics offers a new perspective on the idea of the potential of the commune as a territorial unit. A total of 71 communes of the Opolskie Voivodeship were subjected to spatial analysis in the years 2000-2018. To determine distance between communes (objects), the study used straight line distance data (without taking the road network into consideration) between towns in which commune offices were located. Distance information was retrieved from the Office of the Marshal of the Opolskie Voivodeship, Department of Regional and Spatial Policy, Land Surveying and Cartography Office. Statistical data concerning the communes analysed in this study were retrieved from the Local Data Bank of the Statistical Office (www.stat.gov.pl). The data was analysed in the Open GeoDa software by Luc Anselin as well as the software Statistica PL 13.1.

Identifying spatial relations between investigated objects at any territorial level involves primarily the selection of the matrix of spatial weights. The matrix presents the internal structure of their mutual connections [Łaszkiewicz, 2014, Kuc, 2015], and such connections have a significant effect on the investigated phenomena [Klaassen, 1988]. At this point we should mention publications by Kooijman [1976] and Openshaw [1977], who regard Moran's measure as the criterion of weight matrix selection. Deriving from Griffith's work [1996], Getis and Altstadt [2010] claim that the adjacency matrix should result from the distance between analysed units or geographical adjacency. When weight matrices have been defined, global Moran's is applied to identify the overall nature of spatial relations [Sikora, 2009; Suchecki, 2010], while local indicators of spatial autocorrelation (LISA) statistics are used to evaluate the local character of the relationship of the phenomenon of interest [Anselin, 1995; Janc, 2006].

Applications of the model of potential in regional studies include: economic potential assessment of a selected voivodeship by Müller–Frączek, Pietrzak [2009], financial independence assessment of communes in studies by Głowicka-Wołoszyn, Wysocki [2014, 2015, 2016], financial independence assessment of local government in a study by Surówka [2013], and a measurement of unit's and

organisation's economic potential by Mastalerz- Kodzis [2018b]. Werner, Korcelli, Kozubek [2014] described changes in Poland's metropolitan areas through the use of the potential theory. Yang X, Cai, Wang [2015] discussed the potential of urban population in Jiangsu province in China, and Klobučník, Máliková [2016] analysed the potential of population in Stredne Povazie region in the Slovak Republic.

Methodology of the Study

As a category in this study, potential is defined as a measure of spatial availability of a specific territorial unit. Literature of the subject describes potential also as a measure of the effect of regions comprising a given territorial division system on the unit (Mastalerz-Kodzis, 2018a). Potential determines the intensity of the effect between regions, taking into account e.g. economic quantities as well as distances between them. Therefore, the assumption that spatial objects exert mutual influence on one another is the essence of the potential theory. This study utilises population potential and income potential categories based on the physical potential theory (Mastalerz-Kodzis, 2018b). These research categories are considered spatial distribution functions of every population unit in a given area (Chojnicki et al., 2011). The communes of the Opolskie Voivodeship are population units (objects) in the present study. The first category analysed is the population potential for a specific commune (object in space), which is given by equation (1). The i-th commune's own population potential corresponds to the amount of its inhabitants. The sum in equation (1) shows that the potential of a specific territorial unit is made up of its component potentials: the i-th object and all the remaining j-th spatial units (Müller-Frączek and Pietrzak 2009).

$$\text{The population potential of the i-th commune} = l_i + \sum_{j \neq i} \frac{l_j}{d_{ij}} \tag{1}$$

where:

l_i – the i-th commune's own population potential,
l_j – population of the j-th commune (from the surroundings of the i-th commune),
d_{ij}– distance between the i-th commune and the j-th commune.

Income potential is the second category subjected to spatial analysis (Chojnicki et al., 2011). The income potential of a given commune is a measure of available income in the system of communes as spatial objects. It is defined as a function of income generated in the commune (object) and income in other communes (objects), taking into account the distance between them. The income potential of the i-th communes is given by equation (2).

$$\text{Income potential of the i-th commune} = w_i + \sum_{j \neq i} \frac{w_j}{d_{ij}} \tag{2}$$

where:

w_i – i-th object's own income,
w_j – j-th object's own income (from the surroundings of the i-th object),
d_{ij}– distance between the i-th and the j-th object.
The third category in the analysis is the ratio of income potential to population potential of a specific commune defined by equation (3) or, after transformation, by equation (4):

$$\text{i-th commune's ratio of potentials} = \frac{\text{income potential}}{\text{population potential}} = \frac{w_i + \sum_{j \neq i} \frac{w_j}{d_{ij}}}{l_i + \sum_{j \neq i} \frac{l_j}{d_{ij}}} \tag{3}$$

$$\text{i-th commune's ratio of potentials} = \frac{w_i + \sum_{j \neq i} \frac{w_j}{d_{ij}}}{l_i + \sum_{j \neq i} \frac{l_j}{d_{ij}}} = \frac{1 + \frac{\sum_{j \neq i} \frac{w_j}{d_{ij}}}{w_i}}{1 + \frac{\sum_{j \neq i} \frac{l_j}{d_{ij}}}{l_i}} \cdot \frac{w_i}{l_i} \tag{4}$$

where: $\frac{w_i}{l_i}$ — own per capita income of the i-th commune

The ratio of income and population potentials corresponds to the per capita income quotient. Its advantage as a measure of the i-th object's development level is that it takes into account the effect of the relationship between objects on the level of development (Głowicka-Wołoszyn, 2017).

Equations (3) to (4) will be used later on in analysis of potentials. They demonstrate the relationship between the ratio of potentials and the concentration of potentials of the i-th commune, i.e. the fourth category analysed in the present study and given by equation (5):

$$\text{Concentration of potentials} = \frac{\text{ratio of potentials}}{\text{own per capita income}} \tag{5}$$

The value of the concentration of potentials in equation (5) is compared to 1 (Chojnicki et al., 2011). This provides the basis for the assessment of the role played by surroundings (i.e. communes which surround a specific commune) in generating its population or income potential. The assessment involves a diagnosis of the commune's financial self-sufficiency. A value lower than 1 for the commune (object) indicates a greater role played by its surroundings in creating its population rather than income potential. This means that income potential has a higher concentration than population potential, hence the greater financial self-sufficiency of the commune.

The present analysis also uses the spatial autocorrelation coefficient to determine the degree to which the value of the investigated variable in a specific location (commune) is correlated with its values in other locations (communes) (Sikora, 2009). The presence of a statistically significant autocorrelation enables us to capture the spatial correlation between objects (communes). The verification tool to test this relationship is Global Moran's I (Suchecki, 2010) provided by equation.

$$\mathrm{I} = \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} w_{ij} (x_i - \bar{x})(x_j - \bar{x})}{\sum_{i=1}^{n} (x_i - \bar{x})^2} \tag{6}$$

where:

$n -$ number of communes (objects),
$x_i, x_j -$ value of the analysed category of potential of communes (objects) in locations i, j,
$\bar{x} -$ mean value of the analysed category of potential x_i,
$w_{ij} -$ weight matrix element determined on the basis of the coordinates of the commune (object) on the basis of which the distance between them was calculated.

Selection of weight matrices can be defined e.g. on the basis of the neighbourhood criterion (Głowicka-Wołoszyn et al., 2017, Kopczewska, 2006) as in the case described. The presence of a statistically significant spatial correlation indicates clustering or dispersion of objects. Otherwise, we may speak of the lack of any significant spatial correlation. Local Indicators of Spatial Association - LISA (Suchecki, 2010, Anselin 1995) were also used, which helped determine whether a commune (object in space) was similar to other communes (objects) and assess the statistical significance of the relationship. The following items were identified in the procedure:

- ✓ hot spots (High-High) – communes with a high value in a particular category surrounded by communes with a high value in the same category,
- ✓ cold spots (Low-Low) – communes with a low value in a particular category surrounded by communes with a low value in the same category,
- ✓ outliers (Low-High) or (High-Low) – communes with a low value in a particular category surrounded by communes with a high value in the same category or vice versa,
- ✓ not significant – without statistical significance.

The present study assumed the level of statistical significance corresponding to $\alpha = 0.05$.

Research Results

The presentation of changes in investigated potentials and their concentration in the communes from 2000 to 2018 comprised the analysis of data from the years: 2000, 2010 and 2018. Chart 1 and Table 1 show changes in population potential of the communes of the Opolskie Voivodeship given by equation (1).

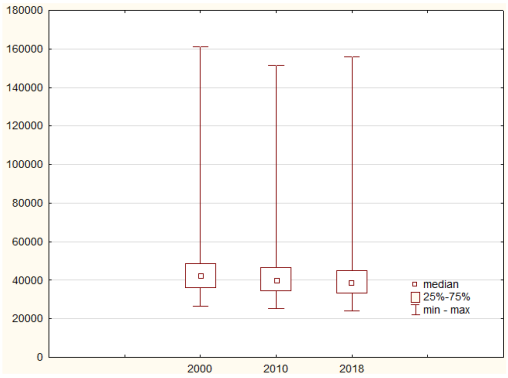

Chart 1: Changes in the distribution of population potential

Source: Author's own work

Table 1: Descriptive characteristics of communes' population potential

Years	Median	mean	minimum	maximum	lower quartile	upper quartile	standard deviation	coefficient of variation
2000	42063.8	45365.4	26726.2	161133.6	36104.8	48763.7	18605.5	41.01 %
2010	39797.3	43059.3	25333.7	151643.5	34548.7	46478.6	17554.3	40.77 %
2018	38728.6	41806.6	24072.3	155724.2	33342.9	44932.1	17756.8	42.47 %

Source: Author's own work

Looking at Chart 1 and data in Table 1, we may notice a decreasing population potential in communes of the Opolskie Voivodeship over the period investigated in this study. Both the median for the potential and the values of its quartiles have dropped relative to their level in the year 2000. This tendency demonstrates the decrease of the communes' own potential, i.e. their population, which is a symptom of depopulation (Dybowska et al., 2015), as well as the increasingly weaker mutual effect the communes exert on one another in creating population potential in each of them (the second part of the sum in equation 1).

Map 1 below shows spatial similarity of the communes of the Opolskie voivodeship in terms of population potential. Red colour signifies communes which have high population potential and which are surrounded by communes with a similar level in this category. This circle comprises the communes surrounding the capital of the voivodeship, i.e. Opole. They are the so-called 'hot spots' (High-High). Blue colour stands for communes with low population potential, surrounded by communes of equally low potential in this category, the so-called 'cold spots' (Low-Low). One of the communes is an outlier (High-Low), which means that it is has a high population potential, but it is surrounded by communes with a low level of such potential.

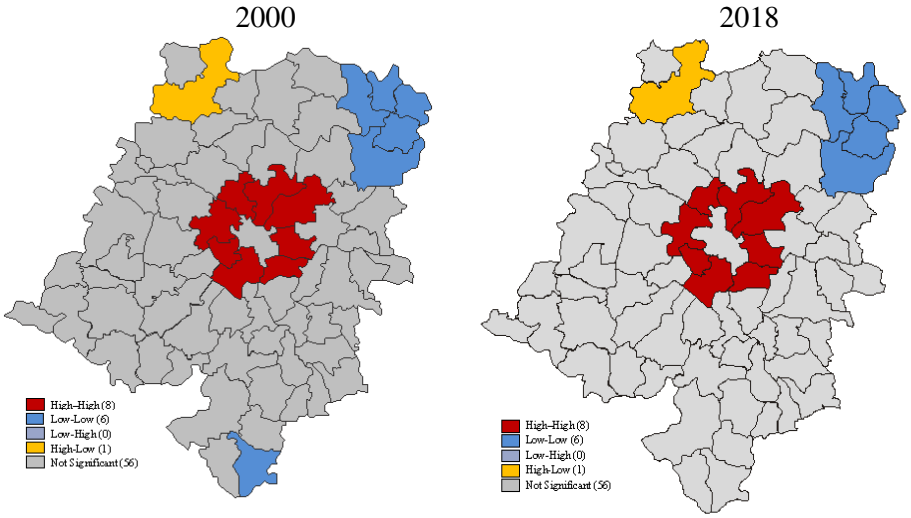

Map 1: Local similarity of communes' population potential

Source: Author's own work

Communes shown in grey did not display any statistically significant similarity to adjacent objects in terms of the level of the population potential category. The difference in the area of the voivodeship capital is due to the expansion of its administrative territory in the year 2017. The subsequent stage of the study included the analysis of changes in the category of income potential given by equation (2). Chart 2 and Table 2 show changes in the level of potential.

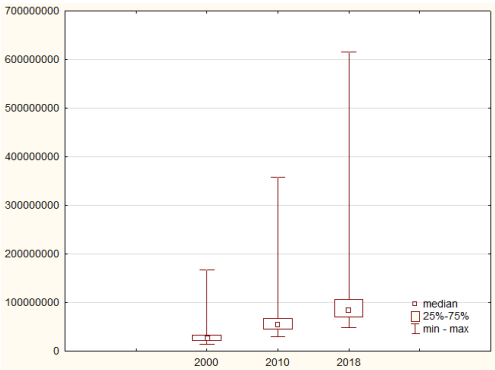

Chart 2: Communes' income potential

Source: Author's own work

Table 2: Descriptive characteristics of communes' income potential

Years	Median	mean	minimum	maximum	lower quartile	upper quartile	standard deviation	coefficient of variation
2000	27166217	31313973	14673642	167225041	22568668	33492767	19490593	62.24 %
2010	54732022	62792790	30493872	357228751	45470838	66598959	41488726	66.07 %
2018	84561807	98364427	48616708	616501056	71114413	106786109	69335357	70.49 %

Source: Author's own work

Chart 2 presents the increasing level of income potential in the communes. An analysis of Table 2 indicates an increase both in the median and quartiles but also greater diversification in the level of the category (the range of variability expands over the years). In subsequent years we can also see a growing spread of income potential values (the difference between the minimum and the maximum). Map 2 shows spatial similarity of income potential of the communes.

Red colour signifies hot spots – communes which have high population potential and which are surrounded by communes with a similar level in this category. The area is almost identical to the area of the similarity of the population potential presented in Map 1. A comparative analysis of the year 2000 and 2018 reveals changes in local similarity of income potential consisting in a statistically significant difference in income potential of two communes. The first one, marked with yellow, was a hot spot in 2000, whereas in 2018 its income potential fell radically and it was classified as an outlier (Low-High), a commune with a low income potential surrounded by communes with a high level in this category. Another commune, highlighted as orange, has undergone the opposite process: in 2000 it was a cold spot, and its income potential rose markedly in 2018, and it was classified as an outlier (High-Low).

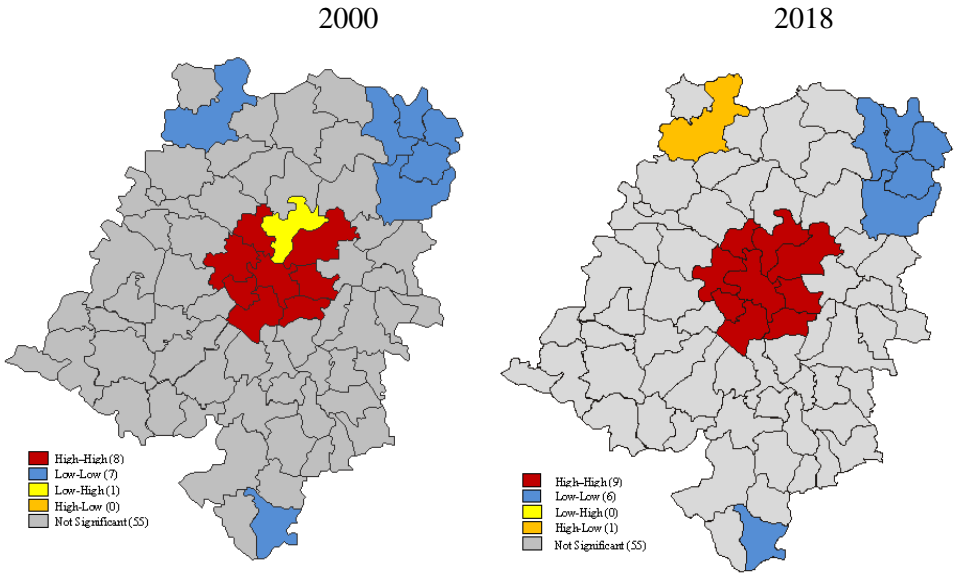

Map. 2: Local similarity of communes' income potential

Source: Author's own work

The next stage of the study involved a spatial analysis of the ratio of potentials given by equation (3). Chart 3 and Table 3 present significant changes in the level of the category over the investigated period.

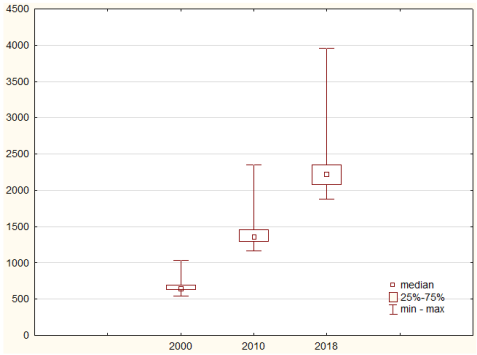

Chart 3: Population-to-income potential ratio

Source: Author's own work

Table 3: Quantitative characteristics of communes' ratio of potentials

Years	Median	mean	minimum	maximum	lower quartile	upper quartile	standard deviation	coefficient of variation
2000	646.3	667.6	541.4	1037.8	629.5	690.6	75.9	11.36 %
2010	1361.4	1402.9	1167.5	2355.7	1298.9	1458.2	179.3	12.78 %
2018	2216.3	2270.8	1878.5	3958.9	2075.8	2349.5	323.7	14.25 %

Source: Author's own work

Chart 3 presents the increasing level of income potential in the communes. An analysis of Table 3 indicates an increase in both median and quartile values, albeit in subsequent years the dispersion of the ratios of potentials (the difference between the maximum and the minimum) also rises. The category of the ratio of potentials of the objects (communes) will be used at a subsequent stage of the analysis of potentials.

The next step involved an analysis of a statistically significant spatial autocorrelation for the ratio of potentials and changes in the strength of the correlation. The presence of a statistically significant autocorrelation makes it possible to capture changes in the spatial distribution of the ratio of potentials. Chart 4 shows the dispersion of the ratio of potentials in the test for statistically significant spatial autocorrelation in subsequent years.

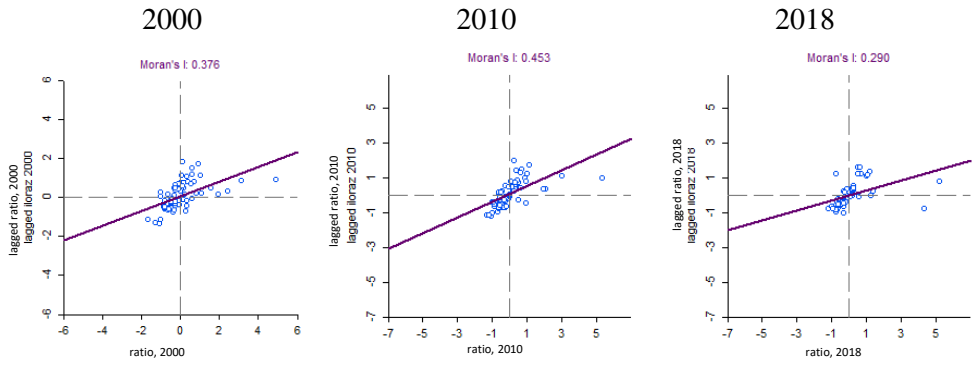

Chart 4: Dispersion of empirical points for the calculation of the coefficient of spatial autocorrelation for the ratio of potentials

Source: Author's own work

Table 4 contains values of Global Moran's (I) and values by means of which the presence of a statistically significant spatial autocorrelation was verified. All p-values were smaller than the significance level 0.05 assumed at the beginning of the test. Therefore, in the investigated period there was a statistically significant spatial autocorrelation between the levels of the ratio of potential of the analysed communes.

Table 4: Global Moran's I values and their verification

Variable	Moran's statistic (I)	E(I)	$\sqrt{Var(I)}$	Z(I)	p-value
Income potential / population potential (2000)	0.3764	-0.0143	0.0827	4.6415	< 0.05
Income potential / population potential (2010)	0.4530	-0.0143	0.0813	5.7125	< 0.05
Income potential / population potential (2018)	0.2897	-0.0143	0.0788	3.8872	< 0.05

Source: Author's own work

Statistical significance of Moran's I for the variable corresponding to the ratio of potentials in each selected year demonstrates a significant degree of correlation between the value of the ratio of potentials of a specific commune (object) and values of the same ratio in other locations (communes). An analysis of spatial autocorrelation revealed an increase of the autocorrelation coefficient value in the year 2010 over the year 2000. This is a symptom of progressing convergence in 2010. In terms of space, this signifies convergence (attraction) between communes with similar ratios of potentials. In contrast, lower autocorrelation coefficient value in the year 2018 relative to other years investigated in this study suggests divergence between the communes, i.e. a reverse process.

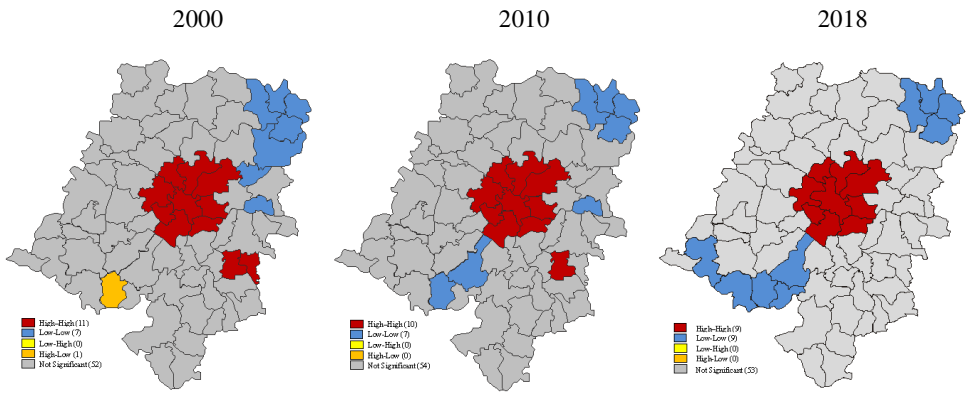

Map. 2: Spatial similarity of communes' ratio of population and income potentials

Source: Author's own work

The last stage of this study was the analysis of the concentration of communes' potential given by equation (5). Chart 4 and Table 5 present the distribution of the values of this category over the analysed period.

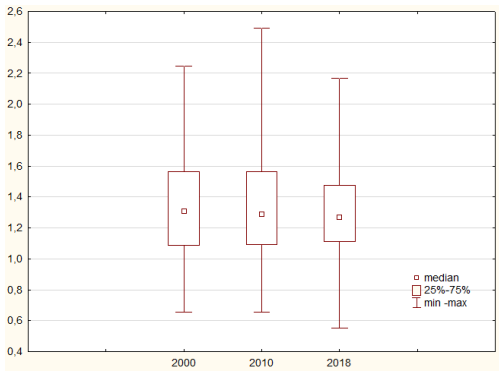

Chart 4: Concentration of potentials of the analysed communes

Source: Author's own work

Chart 4 displays slight alterations in the concentration of potential of investigated communes. This is confirmed by a test verifying the existence of statistically significant differences across the values in the category (Table 4).

Table 4: Results of Friedman's ANOVA, a non-parametric test

$\chi^2 ANOVA\ dla\ n = 71, df = 2$	p-v□lue
0.789	0.674 > 0.05

Source: Author's own work

The results of the above test indicate statistically insignificant differences over the investigated period, as p-v□lue equal to 0.6749 for the value of the test statistic $\chi^2 ANOVA$ equal to 0.789 was greater than the assumed level of significance.

Table 5: Descriptive characteristics of communes' concentration of potential

Years	median	mean	minimum	maximum	lower quartile	upper quartile	standard deviation	coefficient of variation
2000	1.308	1.320	0.658	2.245	1.086	1.564	0.337	25.50 %
2010	1.289	1.339	0.654	2.493	1.093	1.562	0.342	25.57 %
2018	1.271	1.300	0.552	2.167	1.113	1.474	0.286	22.03 %

Source: Author's own work

Table 5 presents values of descriptive characteristics which indicate that the values of potential concentration are decreasing. This shows a drop in the variability coefficient as well as decreasing values from the upper quartile, with a growing value in the lower quartile. The median displays a decline in the category over the investigated years.

Map 3 presents changes in the concentration of potentials in the communes in the analysed period.

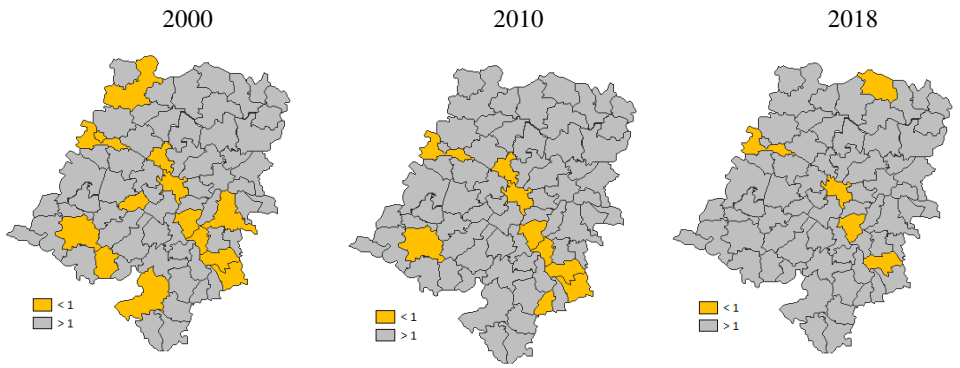

Map 3: Comparison of concentration of potentials in communes

Source: Author's own work

A concentration of potentials (5) higher than 1 means that the concentration of income potential is below that of population potential. This signifies a greater role of the commune's surroundings in creating its income potential than the population potential, and hence lower financial self-sufficiency of the commune. Otherwise, if the value of the concentration of potentials is lower than 1, the concentration of income potential is higher than population potential. Consequently, the surroundings of the commune have a greater role in creating its population potential rather than its income potential, which implies its greater financial self-sufficiency.

An analysis of Map 3 shows the direction of changes in the concentration of potentials in the communes of the Opolskie Voivodeship. The number of financially self-sufficient communes falls over consecutive years. In 2000 there were 14 of them, of which 8 are communes containing towns which are capitals of *poviat* (an administrative unit in Poland; the Opolskie Voivodeship has 11 *poviats*). In 2019 there were 9 such communes. The last year covered in the analysis saw the number of financially self-sufficient communes go down to a mere 5 (of which 2 *poviat* towns).

Table 6 below lists changes in the concentration of potentials by commune type, with figures indicating the number of financially self-sufficient communes. Values in parentheses stand for the number of all communes of a specific type.

Table 6: Changes in concentration of potentials in communes by commune type

Years	Urban Commune	Urban-Rural Commune	Rural Commune	Number of Communes
2000	3 (3)	7 (31)	4 (37)	14
2010	2 (3)	3 (32)	4 (36)	9
2018	2 (3)	1 (33)	2 (35)	5

Source: Author's own work

Conclusions and Discussion

A spatial analysis of the potential of the communes of the Opolskie Voivodeship in the years 2000-2018 revealed a decreasing population potential, which is a sign of the ongoing depopulation process affecting many regions. The next part of the study, in which communes' own income potential was analysed, showed the opposite tendency: the level of this category of potential increased over the investigated period. An increase in this category of potential expressed as the commune's own income as well as the income of ifs surroundings, given the decreasing population, indicates and improvement in this component determining the financial condition of communes. Global Moran's I statistical tool was subsequently applied to analyse whether the communes have a tendency to form groups with a similar level of investigated categories as well as to study changes in the process.

Last but not least, an analysis of the changes in the concentration of potentials was performed. This was the central part of the study, and its results demonstrate a growing number of communes with a higher concentration of population potential in comparison to their own income potential. This phenomenon leads to adverse changes in the communes' financial self-sufficiency, whereby the surroundings of a commune play a greater role in generating its income potential rather than its population potential. Therefore, there are fewer and fewer communes in which the concentration of own income potential is higher than that of population potential, i.e. communes' surroundings have a greater role in generating population potential than income potential. The conclusions of this study clearly indicate a drop in financial self-sufficiency in the communes of the Opolskie Voivodeship. Such adverse changes were reported for all types of communes: urban, rural and urban-rural (mixed).

An analysis of the potential of the Opolskie Voivodeship communes using the potential theory and spatial statistical analysis tools is an example of their application in regional research. The application of the physical potential theory in regional research made it possible to examine interactions between objects in spatial terms on the basis of mutual influence of the communes. Spatial statistical analysis tools enabled the assessment of statistical significance of relationship between selected categories. The relationship was investigated between the level of a given category and its level in other locations or only among the neighbours of commune.

The study reported spatial and temporal diversification of population potential, own income potential, ratio of potentials and consequently the concentration of such potentials across the communes of the Opolskie Voivodeship. The most important conclusions which can be drawn from the above analyses is the determination of the influence that the communes have on their surroundings or the influence that the surroundings may exert on the communes. The present work provides the basis for further regional analyses.

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Industry 4.0 Core Skills: A Research Report

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Abstract

We are witnessing a technology revolution (referred to as Industry 4.0 or I4.0) that has transformed the way we live, work and socialize. As a result, global labor markets have undergone major transformations that require different kinds of competencies and skill sets to work with complex, fast and smart machines. Several comprehensive studies have been published by leading think tanks and advocacy groups on future skills and competencies. The purpose of this paper is to identify the I4.0 core non-technical skills recommended by the leading think tanks and advocacy groups.
The research used suggested core skills by the International Labor Organization, reviewed all relevant reputable studies, and summarized them to identify the key core skills. Reports from McKinsey Global Institute, Deloitte, Boston Consulting Group, Ernst & Young, QS Intelligence Unit, Burning Glass Technologies, Pearson, PWC, World Economic Forum, Universities of the Future, OECD, LinkedIn, and Manpower Group were reviewed, a summary of key core skills were developed, and several practical recommendations were made to help higher education equip their graduates with these essential skills of the future.

Keywords: Industry 4.0, Think Tanks, Skills Gap, Transferable Skills, and Core Skills.

Introduction

The speed, size, and scale of Industry 4.0 have been quite profound, and we have not yet fully comprehended and harnessed its benefits. Deployment of Artificial Intelligence, Machine Learning, Interconnected Sensors, Internet of Things (IoT), Cloud Computing, Augmented Reality, and 3D Printing Technologies have had a tremendous impact on growth and productivity. It has not only released humans from repetitive jobs, but also helped organizations to be more efficient, expand quickly globally, and gain an exceptional competitive edge. Manyika et al. (2019), in a report published by the McKinsey Global Institute, estimated that the impact of the Internet of Things (IoT) applications on the global economy could be as high as $11.1 trillion per year by 2025 ().

However, while I4.0 has generated tremendous opportunities, it has also created new challenges, especially in terms of skills and competencies. I4.0 demands a trained, creative, and adaptable workforce which can deploy technology to improve productivity and competitiveness. Employees are now required to use complementary robotics in the workplace, interpret data collected by cameras and sensors to accurately forecast future demand, deploy machine learning mechanisms to optimize performance and plan predictive maintenance, utilize smart whiteboards to communicate with team members, and use augmented reality glasses to perform assigned tasks perfectly.

The Industry 4.0 revolution has broadened the present skills gaps in the workplace as it has required further upskilling and reskilling. After an extensive global survey of 20 countries and 30 industries, Manyika et al. (2017) in another McKinsey Global Institute report projected that by 2030 between 75 million to 375 million employees (depending on different possible scenarios) may need to change their occupational categories (). McKinsey also stated that even though only 5% of occupations will be eliminated due to automation, more than 30% of activities in 60% of occupations will be automated by 2030. This certainly would change the landscape of the workplace and should alarm businesses, policymakers, and higher education institutions to re-examine their workforce training and education systems.

McKinsey is not the only think tank that has tried to predict future skills requirements. There has been a wide range of studies conducted by other think tanks, leading international HR companies, and advocacy groups on I4.0 skills and its required competencies, where each suggested several skills. It would, however, be interesting to examine what has been recommended as the most common skills. Shortlisting necessary future skills would be beneficial to higher education in narrowing future skills gaps.

The main goal of this study is to list the core non-technical skills of the future as suggested by the 20 think tanks, HR and advocacy groups' reports. It should be noted that the technical skills were not included in this study as they are specifically industry-based.

Literature Review

Present Skills Gaps

Before reviewing future skills requirements, we need to have a thorough understanding of the present status of workforce skills. Unfortunately, the global economy in recent years has suffered from an increasing skills gap, a phenomenon that has had adverse effects and caused major financial loss. The Open University (2018) reported that the direct cost of skills gaps to the UK economy is $8.4 billion each year. The skills gap has been a global syndrome. In Europe, the European Centre for the Development of Vocational Training, Cedefop (2019) stated a skills mismatch that resulted in unemployment in several countries. In the USA, the National Network of Business and Industry Association (2019) that represents a wide range of business sectors including manufacturing, transportation, hospitality, construction, retail, information technology, and health care Claimed that 5 million jobs are not being filled due to skills gaps.

The alarming news is the gaps are getting wider. A 2018 global survey of 40,000 employers in 45 countries by the Manpower Group (2018) reported the skills shortage was at a 12- year. The main drivers of this skills shortage included the absence of applicants, lack of experience, and a shortage of hard and soft skills according to the Society for Human Resource Management (2018).

There has also been a new development in the job market. The traditional employer-employee system has been replaced with the gig economy which has an impact on the required skills. According to Deloitte (2018) Global more than 40% of the USA workers are now employed in part-time and freelance work arrangements. Mercer (2019) suggested that 79% of executives believe that freelance workers will replace full-time workers in the future.

Impact of Industry 4.0 on Future Skills Gaps

Adoption of I4.0 digital enablers such as the Internet of Things, Cloud Computing, and Big Data has already impacted the job market and will have further drastic effects. Korn Ferry (2018), a multinational human resource firm, predicted that by 2030 there will be a shortage of 50 million high-skilled laborers, yet at the same time, more than 200 million people globally continue to be out of a

job. The company also claimed there will be a shortage of 85.2 million workers globally, which is equivalent to $8.452 trillion in unrealized annual revenue. Thomas et al. (2018) in a report published by the Deloitte estimated from 2017 to 2028 the cost of unemployment and mismatched skills to the US economy will be $454 billion.

The nature of work is already changing. Deloitte reported that the workplace of the future demands diversity, collaboration, agility, innovation, creativity, and emotional and digital intelligence that are based on contingent labor (Thomas et al. 2017). McKinsey Global Institute stated that the major workplace changes are in tasks and roles and predicted that 30% of tasks in 60% of occupations will be automated (Manyika et al. 2017). Employees of the future should understand, monitor, and improve systems, learn quickly, and solve real-world problems.

A machine operator's role, for instance, will be different in the future. Currently, he presently needs to possess specific technical skills, works with a single machine, monitors machine performance, assures the quality of output, and adheres to the required standards and maintains the machine. However, in the future, his job will most likely involve the supervision of several machines, responding to the quality issues that digital monitors display, and deploying augmented reality technology to resolve issues. These changes call for flexibility, agility, independence, and digital literacy. Future jobs will be less about what people know and more about what they can do. In a nutshell, in the future "the science of the job" will be done by intelligent machines, but "the art of the job" will be performed by humans (Pring et al., 2019).

The Core Skills of the Future

The next obvious question is what kinds of skills are needed to be agile, flexible, and independent. What kinds of hard skills (technical skills) and non-technical (human skills, soft skills, or transferrable skills) are required? Although some technical skills are required for each specific occupational category, most published reports point to the importance of human and soft skills as the core skills of the future and rated soft skills as being much more significant than technical skills.

In its 2018 global survey, IBM suggested that top global executives believe behavioral skills are becoming more critical than technical skills (Fig. 1) (LaPrade et al., 2018). LinkedIn made the same observation in its survey of talent professionals where 92% stated that soft skills matter as much or more than technical skills. Besides, 80% stated that soft skills are increasingly important to the success of the company (Lobosco, 2019).

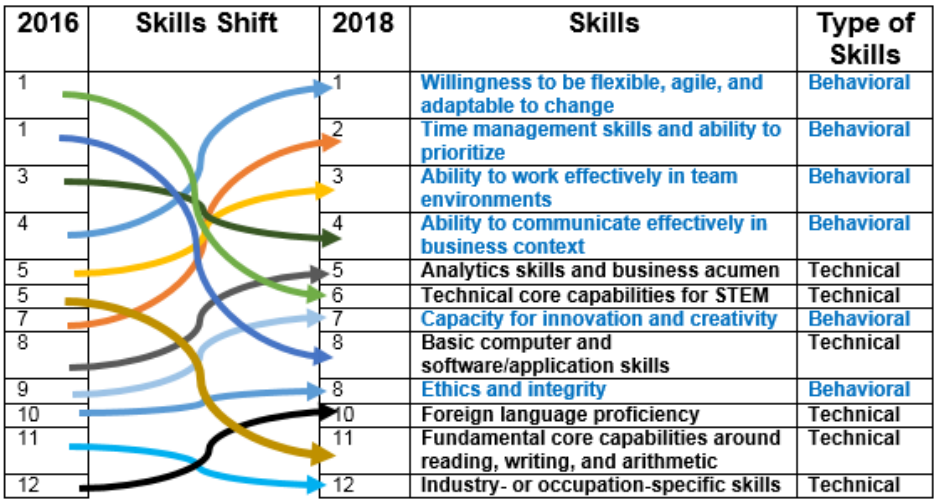

2016	Skills Shift	2018	Skills	Type of Skills
1		1	Willingness to be flexible, agile, and adaptable to change	Behavioral
1		2	Time management skills and ability to prioritize	Behavioral
3		3	Ability to work effectively in team environments	Behavioral
4		4	Ability to communicate effectively in business context	Behavioral
5		5	Analytics skills and business acumen	Technical
5		6	Technical core capabilities for STEM	Technical
7		7	Capacity for innovation and creativity	Behavioral
8		8	Basic computer and software/application skills	Technical
9		8	Ethics and integrity	Behavioral
10		10	Foreign language proficiency	Technical
11		11	Fundamental core capabilities around reading, writing, and arithmetic	Technical
12		12	Industry- or occupation-specific skills	Technical

Figure 1: Behavior Skills Become More Important - Inspired by IBM Global and Country Survey (Laprade et al., 2018)

Manpower Group has further supported this concept. They claimed that by 2030, the demand for human skills will grow by 22% and 26% in Europe and the U.S respectively (Manpower Group, 2019). Deloitte reported, as the future jobs will be augmented by technology, more human skills are needed (Schwartz et al., 2017). Ernst & Young stated in its report that adaptive learning and "human skills" are essential for future workforces (Ernst & Young, 2018).

A report published by the World Economic Forum in 2018 also rated transferable skills as the most essential skills of now and the future (Table 1) (World Economic Forum, 2018). McKinsey Global Institute listed transferable skills such as leadership, communication and negotiation, critical thinking, empathy, creativity, project management, entrepreneurship, adaptability, teaching and training, and digital literacy as the skills of the future (Bughin et al, 2018).

Table 1: Top Ten Skills Demand of 2018 versus 2022 (World Economic Forum, 2018)

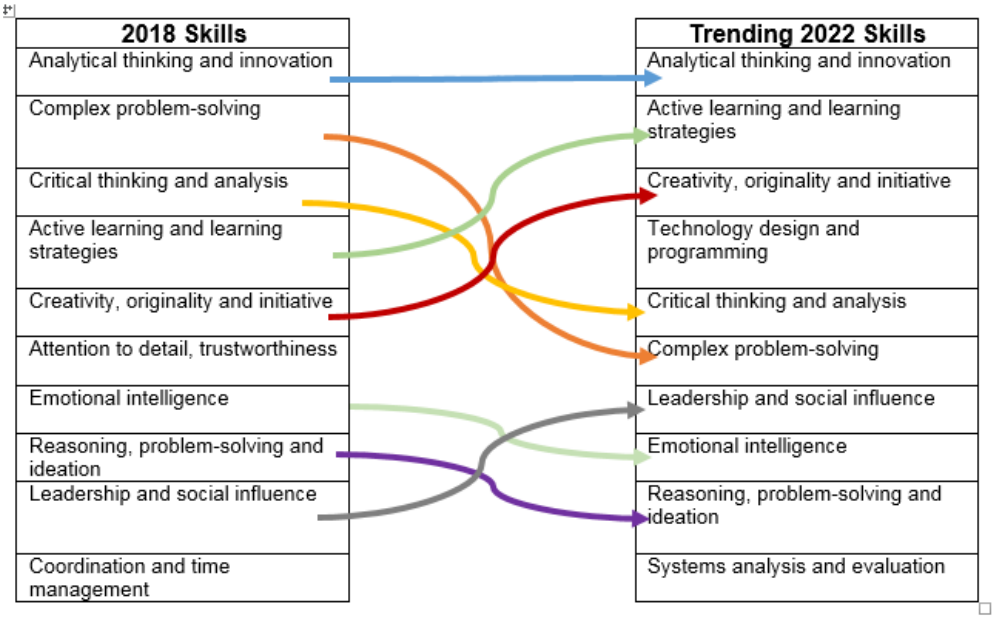

A leading HR company, Cognizant, echoed the same thing. They claimed 93% of senior executives believe interpersonal relationships will be needed and valued more senior executives believe as future tasks become more automated, work will become faster and more strategic. Greater technical expertise will be required, and skills will undergo significant change, but interpersonal relationships will be more valuable (Brown and Satyavolu 2019).

Other aspects of future jobs are that there will be more contracts and temporary jobs than permanent ones due to digital transformation, globalization and Millennials' approach to careers. According to the Foundation for Young Australians, Millennials will likely change between 17 employers across 5 different careers in their lifetime (Foundation for Young Australians 2017). Similar statistics are reported by others. Ernst & Young claimed that by age 38, the average college senior will have changed job 10-14 times (Ernst & Young, 2018). Visier, a company specialized in creating workforce analytics, reported in 2018 that Millennials resigned three times as often as non- Millennials and changed jobs inside the company twice as often (Visier, 2018). This makes transferable skills more important than technical skills for employees of the future.

Hybrid jobs are new and relevant development in the job market that amplifies the importance of transferable skills as core skills. It refers to possessing interdisciplinary skills in certain jobs. For instance, a sales manager is required to have expertise in CRM software; a technical recruiter must possess strong communication, interpersonal skills, data-mining skills, marketing abilities, and expertise in statistical analysis; or administrative staff not only need to answer calls and organize files

but also must be responsible for social media and web presence of companies. Burning Glass Technologies, a workforce analytics company that utilizes artificial intelligence to analyse one billion job advertisements from millions of companies, reported the importance of transferrable skills as essential skills for hybrid jobs (Sigelman, 2019).

In summary, digital transformation augments and automates workplace tasks and frees employees from repetitive tasks so they have more time to apply their human and behavioral skills such as collaboration and interactivity. Nurses, for instance, are expected to apply their soft skills such as empathy and emotional support as well as spend more time on patient care than on administrative tasks; researchers should possess better communication skills as they are expected to spend more time sharing and selling their research than in labs; and machine mechanics are expected to use their analytical skills and technology to predict future failures rather than fixing machines when they break down.

Methodology

Before reviewing the deployed methodology, we need to define core skills. The core skills include work readiness skills such as literacy, numeracy, and technology; conceptual skills such as collecting and organizing information; problem-solving; lifelong skills such as thinking innovatively and creatively; systematic thinking; and people skills including negotiation, teamwork, collaboration, etc. (International Labour Organization, 2015).

The criteria framework employed in this study adheres to the International Labor Organization Framework (International Labour Organization, 2015). They found that core skills should:

a. be non-technical
b. be learnable and assessable
c. be essential, especially for graduates to get entry-level positions irrespective of any specific occupation or industry
d. ease the effective participation of individuals in workplaces and adult life

To gather a comprehensive list of future core skills, an extensive search was conducted in four popular academic databases including Google Scholar, Elsevier's database (Scopus), Web of Science, and ERIC database. A conscious attempt was made to include only leading global organizations that published reports on future skills. Renowned think tanks include McKinsey, Deloitte, Boston Consulting Group, Ernst & Young, Brookings, Pew Research Center, Bricks, QS Intelligence Unit, Burning Glass Technologies, Pearson, Universities of Future, Accenture, and PWC, as well as not-for-profit international organizations including World Economic Forum, Universities of the Future, and OECD. In addition to the aforementioned think tanks, recent reports from the leading HR firms of LinkedIn, SHRM, Manpower, and Mercer were also reviewed and summarized in this study. Snowballing and qualitative exploration of citation networks were among strategies that were used to identify other relevant sources to core skills. As specific technical skills vary for different professions, only the core behavioral and transferable skills were included in this study.

Analysis

The review of more than 20 recent reports (within the 2016-2019 period) indicated that creativity, critical and analytical thinking, complex problem solving and communications (oral expression, reading comprehension, and writing expression) are by far the most significant skills of the future. The irony is that the same set of skills has been the root cause of skills gaps for more than two decades, yet the higher education system has not lived up to the task and has not made sure that their graduates possess these core skills.

Cognitive abilities such as creativity and cognitive adaptability are quite vital in the uncertain and complex workplace of the future. Creativity was recommended in 80% of the publications that were

reviewed in this study (Appendix 1). Most faculty members do not know how to promote creativity in their lessons. Drapeau (2014) suggested that to promote creativity in classrooms, faculty should provide a safe environment that encourages unusual ideas, offer learning alternatives, apply creative strategies and techniques, support multiple solutions, embed originality, and provide personal and constructive feedback.

According to Tempelaar (2006), critical thinking and solving complex problems are the other two significant core skills that many faculty struggle to practice in their lessons. The main hurdle, according to him, is the absence of focus in the learning process as the emphasis of most lesson delivery is on content which encourages memorization. This needs to be replaced by a system that focuses on the process of learning and assessments that measure students' intellectual abilities rather than their memory recall skills (Snyder and Synder, 2008).

Deploying project-based and case-based learning are among the possible approaches to enhance critical thinking and solving problem skills. Another suggestion is encouraging students to question assumptions and analyse situations from different perspectives. Other possibilities include cultivating decision making by practicing the path from awareness to making decisions independently or jointly and exposing students to other disciplines by offering interdisciplinary programs are some suggestions for achieving these ends.

Communication skills such as presentation skills, business writing, and reading skills usually are covered in universities but instead of being integrated across the curriculum, they are mostly being taught as a standalone course that is referred to as a bolt-on approach. Effective inclusion of communication skills and embedding communication skills across the curriculum is a daunting task that demands institutional approaches and collaboration between disciplinary academics and the general education department. Offering integrated and real-time projects where students are expected to apply their communication skills in their discipline-related courses should be a priority in higher education.

Assessing soft skills is also quite challenging as most higher education systems apply summative assessment to measure student's skills. Since interviews, group interactions, case studies, role plays, and presentations are popular methods of soft skills assessment by the employers (Cook, 2016), higher education should follow the same suit. It also should be noted that formative assessments should be the preferred mode of transferable skills assessments.

The importance of lifelong learning is among the findings of this study. As digital transformation evolves, there will be an increasing demand for employees who can develop new skills quickly and independently. One way to do this is through MOOCs and online courses where students could develop the skill of independent learning as well as a habit of learning continuously. Self-reflection should be an integral part of teaching and learning strategies as it ensures continuous development at the workplace.

Conclusion and Recommendations

Lack of collaboration and trust between the higher education system, employers, and policymakers is perhaps the main cause of the skills gap. Employers have repeatedly expressed their concerns about the failure of the higher education system in equipping students with the right workplace skillset. In addition, graduates have confessed that they are not confident about the suitability of their skills. Further, and policymakers have asked for drastic changes in the higher education system.

Close examination of the education system and workplace demonstrates how differently they define the same competencies. An OECD survey in 12 countries that include seven European countries and the United States disclosed that there are major differences between how the education system and employers interpret eight competencies (OECD, 2002). While the employers mainly defined competencies in the context of the workplace, the education sector trains and educates students on cognitive and theoretical levels. For instance, the self-management competency was defined by

educators as a learner being autonomous and having meta-cognitive competencies, whereas to employers, self-management means being an action-oriented, responsible individual who assesses the possible course of actions and the associated risks, has resource management skills and is flexible. This discrepancy is due to a lack of collaboration between education and industry. A good example of collaboration between employers and higher education is the Automotive Manufacturing Training and Education Collective (AMTEC) curriculum that was designed with 110 core competencies through input from high-performing technicians (Automotive Manufacturing Training and Education Collective).

The higher education sector around the world has to revisit its significant role in preparing students for the future workplace. Universities should place employability as a top priority.

The role of the career service department presently is limited to securing job placements and offering career counselling, but it has to be extended to what is defined by Dey and Cruzvergara (2014) as connected communities. They defined connected communities as communities that foster strong partnerships with employers in different sectors, promote experiential learning, industry mentoring, and establish a community of learners, alumni, and employers.

Developing a competency framework that assists higher education to minimize skills gaps and improve core employability skills is quite essential. Cole and Tibby (2013) suggested a four-step process that could help higher education institutes to design and deliver a curriculum that adheres to the world of work. The Business-Higher Education Forum (BHEF) recommended a systematic approach to establish a strategic alliance between higher education and industry. The approach includes analysing required jobs in the local market, developing a competency map that identifies the skills, knowledge, abilities, and attributes.

Another possible approach to prepare students for hybrid jobs is offering STEAM (Science Technology, Engineering, Art, and Mathematics) interdisciplinary programs that offer opportunities to develop STEM skills along with art and design which helps students to be more creative while analysing and resolving problems. A large number of universities, including Yale University, offer interdepartmental programs between computer science and art departments. For example, a computer major could be exposed to the challenge of creating a robotic conductor, while an art major gets a more comprehensive understanding of existing computing tools for artists (Yale University, 2019).

Assessing soft skills is another challenge for higher education, but recently a few innovative approaches have been introduced. One of the popular approaches in assessing soft skills is the Collegiate Learning Assessment (CLA) that has been endorsed by several national higher education systems. CLA is an open-ended computerized assessment that measures students' ability to think critically, solve problems, reason analytically, and communicate clearly (Council for Aid to Education, 2019). The criterion-sampling nature of the test, which is real-world scenario-based, assesses properly what a person knows and can do. Governments, too, should play their role. Creating an online knowledge base that provides insights and guidance on jobs could not only help job seekers, but also bring employers and the education system closer to each other.

The suggested core skills in this study are not region or country-specific. Perhaps a consortium of higher education, government authority, and business should be prioritized core skills in each country and ensure they are included in the curriculum and measured throughout the higher education system.

Appendix 1: Core Non-technical Skills Predicted by Advocacy Groups, Think Tanks and Leading HR Companies

Core Non-technical Skills		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Sum
Physical Abilities	Manual Dexterity & Precision		√															√				2
	Physical Strength		√															√				2
Content Skills	Active Learning	√	√										√	√		√		√	√		√	8
	Oral Expression		√	√	√				√	√	√			√			√		√	√	√	**11**
	Reading Comprehension	√	√	√	√				√	√	√						√		√		√	**10**
	Writing Expression	√	√	√	√				√	√	√						√		√		√	**10**
	ICT Literacy		√	√		√				√	√						√		√			7
Cognitive Abilities	Cognitive Flexibility/ Adaptability						√	√	√	√	√				√			√		√	√	**9**
	Creativity		√	√	√	√	√	√		√	√	√	√			√	√	√	√	√	√	**16**
	Logical Reasoning		√													√						2
	Problem Sensitivity		√																			1
	Mathematical Reasoning		√																			1
	Originality/Initiatives/Innovation					√						√		√		√				√	√	6
	Visualization		√																			1
Process Skills	Active Listening	√	√									√	√	√								5
	Critical / Analytical Thinking	√		√	√				√	√	√	√	√		√	√		√			√	**12**
	Monitoring self and Others		√											√	√							3
Problem Solving	Complex Problem Solving	√	√	√			√	√		√		√	√	√		√	√		√		√	**13**
Resource Management Skills	Guiding, Directing, Motivating Subordinates			√								√						√		√		4
	Leadership			√		√	√				√								√	√		6
	Entrepreneurship and Business Acumen										√								√		√	3
	People Management/ Monitoring	√		√					√			√						√				5
	Time Management	√	√	√					√											√		5
Social Skills	Social Perspectives												√	√					√			3
	Coordinating/Collaboration/ Teamwork		√	√	√	√	√	√		√				√					√			**9**
	Emotional Intelligence					√		√		√					√		√	√		√		7
	Negotiation									√	√		√		√	√		√				6
	Persuasion												√									1
	Agility					√														√		2
	Assisting/Caring for Others (Empathy)						√				√		√	√					√	√		6
	Resolving Conflicts								√	√					√					√		4
	Resilience																					1
	Training and Teaching Others										√			√	√							3
System Skills	Judgement and Decision Making	√												√					√			3

1. Accenture (2017)
2. Boston Consulting (Sirkin and Choraria 2017)
3. BRICS (2016)
4. Brookings (Care et al, 2018)
5. Burning Glass

Technologies (Markow et al. 2018)

6. Cognizant (Bahl, M. 2018)
7. Deloitte (Thomas et al., 2017)
8. Ernst & Young (2019)
9. LinkedIn (Petrone 2019)
10. Manpower Group (2019)
11. McKinsey (Bughin, et al, 2018
12. Mercer (2019)
13. 1OECD (2019)
14. Pearson (2019)
15. Pew Research Center (2017)
16. PWC (2018)
17. QS (2015)
18. QS Intelligence Unit (2018) Technologies (Markow et al. 2018)
19. Society for Human Resource Management (2019)
20. World Economic Forum (2018)

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Nominal Response - Based Conjoint Analysis of Banking Products

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Abstract.

The aim of the paper is application of Nominal Response IRT (NR-IRT) polytomous measurement model (Bock 1972) within the framework of conjoint analysis of banking product on Polish market. Proposed approach links the tradition of conjoint measurement of dominance structures in attitude measurement with the preference analysis. Incorporating the explicit measurement model within the conjoint analysis allows for error - in variables effect and controlling for downward bias in estimates of the parameters. Additionally, it combines the fundamental conjoint measurement of Rasch tradition with the preference - oriented conjoint analysis.

Keywords: conjoint analysis, nominal model, banking products, R software.

Introduction

Conjoint analysis and discrete choice models are well known method of preference measurement in marketing research (Szymańska 2007, Szymańska, Dziedzic 2005). Usually, in order to model part-worth utilities, the ordinary least-squares regression is used assuming the interval - level of measurement of overall preferences of product profiles. However, the ordinal categorical 1-5 or 1-7 point Likert-type scales are commonly used and no measurement model are incorporated within the framework of preference measurement (Walesiak 2000, Walesiak 2001). Also, in discrete choice models estimated by multinomial logistic regression, no measurement model is taking into account. This gap in conjoint analysis studies opens the opportunity to introduce IRT measurement models into the conjoint framework and utilize classic regression - based conjoint approach, without referring to ordinal MONANOVA and especially choice-based techniques in conjoint studies.

The lack of measurement models of stated (or revealed choice-based) overall preferences of products profiles in conjoint analysis implies the lack of knowledge concerning reliability of preference measurement and strength and direction of possible bias and attenuation of the estimated regression parameters. Additionally, in classic OLS conjoint analysis, the assumption of interval level of measurement of Likert-type scales are taken for granted.

The approach used in the paper is related to the integration of IRT-based measurement model (Nominal Response Model) of overall preferences of product profiles and classical regression-based conjoint analysis stemming from the fact, that conjoint measurement in IRT model and conjoint

analysis of the preferences are conceptually related. There is still limited number of research related to such integration (Neubauer 2003; Sagan, Rybicka and Brzezińska, 2017; Caughey, Katsumata and Yamamoto, 2018).

Conjoint Measurement and Conjoint Analysis

Conjoint Analysis in SDL

Marketing inherited a model of exchange from economics, which had a good dominant logic based on the exchange of goods, which usually are manufactured output. The good dominant logic focused on tangible resources, embedded value, and transactions. Over the past several decades, new perspectives have emerged that have a revised logic focused on intangible resources, the co-creation of value, and relationships. The new perspectives are converging to form a new dominant logic for marketing, one in which service provision rather than goods is fundamental to economic exchange.

Service Dominant Logic proposes that all exchange is the exchange of service and that products are simply mechanisms for service provision. A major implication is that the transfer of ownership may not be necessary, nor desired by consumers. Assumption in Service Dominant Logic (SDL) approach in marketing (Vargo, Lush 2004) says that product offer is evaluated by consumers perception and evaluation. Product value is always co-created and not simply delivered by the firm. It provides the This provides the rationale to include conjoint analysis and measurement studies in SDL approach.

Conjoint Measurement and Conjoint Analysis

Conjoint measurement is simultaneous scaling (transformation) of the two variables, together with the response variable to obtain an additive structure. Additive conjoint measurement in Rasch model assumes that an item response probability is an additive function of two independent variables - (1) person ability and (2) item difficulty. Specific objectivity is that person abilities do not depend on specific items and item difficulties do not depend on given persons. This property is given by logistic response function. When the data fits Rasch model, item difficulties and person abilities are weakly ordered and weakly canceled:

$$\Pr(X = x) = \phi(B_n, D_i), \tag{1}$$

where: B_n - ability of person n, D_i - difficulty of item i. Within Coombs theory (Coombs, Dawes, Tversky 1970) of data that is Object $\times$ Person comparison.

Conjoint measurement is a nominal-response based method in comparison to classical conjoint analysis. However, in conjoint analysis there is no measurement model for preferences.

Conjoint analysis originated in mathematical psychology and was developed since mid-sixties also by researchers in marketing and business. Conjoint analysis is a statistical method for finding out how consumers make trade-offs and choose among competing products or services. It is also used to predict (simulate) consumers choices for future products or services.

$$Y_{i,j} = \phi(C_i, D_j), \tag{2}$$

where: C_i - evaluation of attribute i, D_j - evaluation of attribute j.

According to Coombs theory of data that is Object $\times$ Object comparison. The problem that may occur is that Y_{ij} is often measured on ordinal scales (i.e. Likert - type) without any assumptions concerning measurement model.

IRT Models

Item Response Theory (IRT) is a statistical theory that distinguishes the latent trait (ability) of a participant from the difficulty of a set of item with well-correlated response patterns. It was formally presented by Lawley (1943) who introduced IRT as a measurement theory and later developed by Rasch (1960) to measure the ability and to devise tests for the military. Fumiko Samejima (1969) developed graded response models in IRT for polytomous IRT models that deal with Likert-scale data and other tests with ordered multiplie response option for each item (DeMars 2010). Gerhard Fischer extended Rasch`s binary or dichotomous model so as to handle with polytomous data in the linear logistic latent trait model. IRT models are often referred to as latent trait models. The term latent is used to emphasize that discrete item responses are taken to be observable manifestations of hypothesized traits, constructs, or attributes, not directly observed, but which must be inferred from the manifest responses. Latent trait models were developed in the field of sociology, but are virtually identical to IRT models.

IRT is a psychometric theory and family of associated mathematical models that relate latent trait of interest to the probability of responses to items on the assessment. It is very general method, permitting one or more traits, various (testable) model assumptions and the analysis of binary or polytomous data. The mechanism of IRT can be presented most easily in term of a dichotomous model, that is, a model for item with only two response alternatives. Such items require responses that are either correct or incorrect. In dichotomous IRT models, the item category that represents a positive response (and is subsequently coded 1) is described as indicating a correct response on an item; the alternative category, coded 0, indicates incorrect response. Moreover, the item location parameter is commonly referred to as the item difficulty parameter. The IRT function is a function reflecting probability of selecting a positive response on an item. The IRT function requires the estimation of two parameters. One is location parameter, which describes where along the trait continuum the function is centered. The second parameter is estimated to give an information on of how well an item discriminates among people along the trait continuum and shows how well an item can tell people apart with respect to the amount of a trait that they have.

Nominal Response Model

Assumptions of NRM

Nominal Response Model (NRM), also called the Nominal Categories Model (NCM), was introduced by Bock (1972) as a way to model responses to items with two or more nominal categories. A standard example of such an item is a multiple-choice item where the distractors are chosen with no particular order in mind in terms of the trait being measured. Clearly, there is explicit ordering with respect to the correct alternative in a multiple-choice item. This item category represents the highest category, in terms of the trait being measured, for the item.

NRM model is based on the following assumptions:

- modeling responses to items with two or more nominal categories (multiple-choice item's response alternatives),
- probability of responding in any given category is modeled directly by multivariate generalization of the logistic latent trait model,
- NRM is an extension of multinomial, fixed-effects, logit-linear models to the mixed-effects setting of IRT,
- the implicit purpose of the NRM is to find the unobserved ordering within unordered categorical data,
- all of the polytomous models for ordered data are special cases of the NRM,
- NRM is an approximation to Thurstone (normal) models, and the multivariate version of the BTL model,

- extension to multidimensional IRT (MIRT) model (Item Factor Analysis with Nominal Responses) is also possible.

NRM is ideal for items with no ordering of any kind. Response options don't have to be same across items. Such model is a direct model (probability of response given directly). In NRM we measure the probability of one response category against all others.

Model Parameters

Modeling responses to items with two or more nominal categories are multiple-choice item's response alternatives (Bock1972). Probability of responding in any given category is modeled directly by multivariate generalization of the logistic latent trait model. NRM is an extension of multinomial, fixed-effects, logit-linear models to the mixed-effects setting of IRT. The implicit purpose of the NRM is to find the unobserved ordering within unordered categorical data. All of the polytomous models for ordered data are special cases of the NRM. NRM is an approximation to Thurstone (normal) models, and the multivariate version of the BTL model. Extension to multidimensional IRT (MIRT) model (Item Factor Analysis with Nominal Responses) is also possible.

Conditional probability is given as (Bock 1972) :

$$P\left(Y_{ij} = k \middle| a_i, b_i, \theta_j\right) = \frac{e^{a_{ik}(\theta_j - b_{ik})}}{\sum_{h=1}^{K} e^{a_{ih}(\theta_j - b_{ih})}} . \tag{3}$$

Nominal response model reparametrization is given as:

$$P\left(Y_{ij} = k \middle| \lambda_i, \varsigma_i, \theta_j\right) = \frac{e^{\lambda_{ik}(\theta_j + \varsigma_{ik})}}{\sum_{h=1}^{K} e^{\lambda_{ih}(\theta_j + \varsigma_{ih})}} . \tag{4}$$

Model parameters are: ς_{ih} - intercept, overall popularity of alternative h ; $\frac{-\varsigma}{\lambda} = b$ is ratio of the slope and intercept parameters that is location of the item category response function (ICRF); $\lambda_{ih} = a$ - slope, item discrimination of ICRF. Identification constrains should be added (Bock 1972) : $\sum a_{ih}, b_{ih} = 0$ or $a_{i1} = 0$, $b_{i1} = 0$.

Conjoint Analysis of Banking Products with NR Measurement Model

Data File

The research on banking products and bank account preferences was conducted in cross-sectional studies in southern part of Poland. The product analyzed was bank account choices of bank customers. Attributes and levels were: (a) Yes, (b) No. The questionnaire consisted of the following questions:

1. Bank account access via mobile devices (X_1),
2. Bank account commission (X_2),
3. Credit card payment return (X_3),
4. Fee for withdrawal in foreign ATM machines (X_4),
5. Credit card free of charge (X_5).

Profiles: respondents were asked to make a choice between 28 pairs of profiles (fractional factorial design prepared with R software). Full factorial design contained 32 profiles, fractional factorial design was 8 profiles. In the research NMR model was built, as well as conjoint analysis of banking products.

NRM Measurement Model of Customer Preferences

The nominal response model (NRM) is the most general divide-by-total item response theory (IRT) model. It allows researchers to estimate a slope parameter for each response category within a polytomous item with ordered categories. The nominal response model is available if the data type is multiple choice or graded. Each option of each item has two parameters, the threshold and the slope, and no order is forced on the options. If the data type is graded, then the value of the options is used only for the initialisation and to compute the item characteristic curves. Nominal response models have received relatively limited application to real-world measures and applications.

In this article NRM measurement model will be applied for customer preferences based on own research. Item characteristic curves of NRM is presented in Fig. 1. Each category represents the ICC of particular profile of banking product. The greater increase in latent preferences (latent trait) the higher probability of choosing particular profiles, except profile 1, where the higher probability appears at lower score of the latent trait. The position of ICC curves reflects the "difficulty" of particular item (item location parameter) and therefore the preferences of particular profiles.

Estimated NRM model-based latent trait (latent preference scores - Theta) are treated as quantitative (metric) measure of overall consumer preferences of the profiles (as dependent variable) for regression-based conjoint analysis.

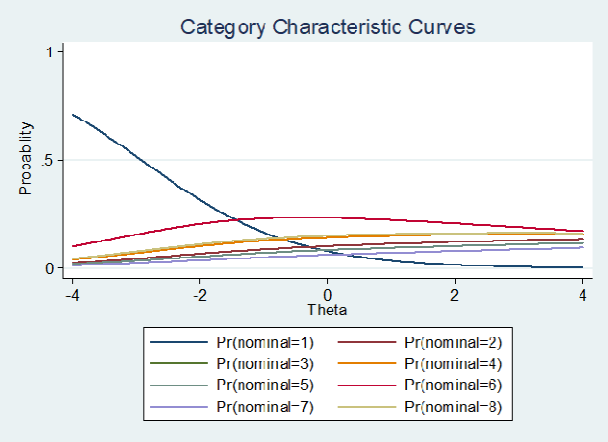

Fig. 1: Category characteristic curves of NRM

Source: Own calculations.

Having the model-based item characteristic curve parameters, the amount of information and thus standard error of measurement of measurement of overall preferences along the latent trait can be estimated. The non-linear item characteristics curves assumes also the non-constant standard error of measurement across latent trait continuum. The total information curve of the preference scale is depicted on Fig 2.

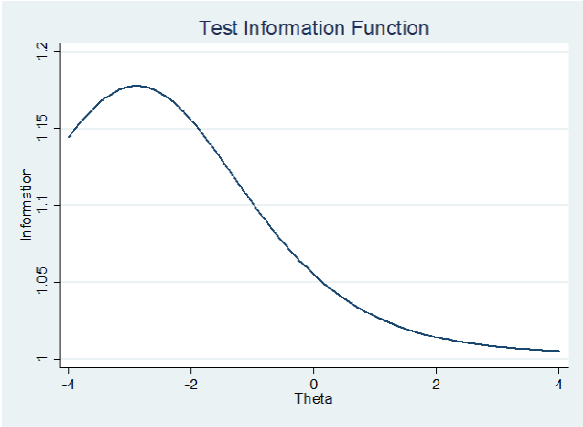

Fig. 2: Test information curve of NRM

Source: Own calculations.

Fig. 2. shows that the measurement of the latent preferences by NRM model is reliable (having high information and low standard error of measurement) in the area of weaker consumer preferences of banking product. The stronger overall preferences, the smaller value of information, and the higher standard error of measurement and thus lower reliability of measurement. Therefore the part-worth utilities in conjoint model may be strongly downwardly biased (attenuated) especially for the respondents with the higher overall preferences score.

Conjoint analysis of banking products

Conjoint analysis is a research technique developed in early 70s, first applied in psychology and marketing. The main aim of the conjoint measurement is to determine (measure) the influence of two or more independent variables (that are nominal) on one dependent variable (that can be ordinal, interval or ratio). Conjoint analysis is based on the following assumptions:

- the number of attributes taken into consideration in the research is usually limited to 6,
- profiles presented to respondents to assess are described by using all attributes,
- profiles are generated on the basis of orthogonal factor system,
- profiles generated on the basis of orthogonal systems which are maximally, mutually varied,
- main effects and also the effects of an attribute interaction can be incorporated into the conjoint analysis model,
- all respondents assess the same set of profiles,
- the conjoint analysis model represent so called decomposition approach, which means that on the basis of empirical usages of full profiles, it is possible to assess partial usages of attribute levels,
- different methods of gathering data from original, primitive sources can be used,
- each stage of conjoint analysis procedure is separated (namely: preparing profiles, gathering data, assessing parameters, simulating market shares).

Conjoint models with nominal dependent variable (consumer choices from the list of profiles) are usually estimated using discrete choice models. However, in this analysis the response variable is continuous as a result of NR preference model. Therefore, the classical conjoint analysis were adopted in part worth estimations.

Profiles importance ranking is presented in Table 1. The most attractive profile was the 6-th profile with the following characteristics: bank account with access via mobile devices, with some commission, but with returns for credit card usage. This account does not allow to withdraw money for free from foreign ATM machines and credit card is not free of charges.

Tab. 1: Profile importance ranking

Profile	Bank account access	Bank account commission	Payment return	Fee in foreign ATMs	Free of charge	Ranking
1	No	No	Yes	Yes	Yes	6
2	Yes	Yes	No	Yes	Yes	3
3	No	Yes	Yes	No	Yes	4
4	Yes	No	No	No	Yes	5
5	No	Yes	No	Yes	No	8
6	Yes	Yes	Yes	No	No	1
7	Yes	No	Yes	No	No	7
8	No	No	No	No	No	2

Source: own calculations.

Fig. 2 presents the attribute importance ranking. We can see that the greatest importance of attribute is achieved for factors: X_1 - bank account access via mobile devices (Access) and X_3 - credit card payment return (Return). The smallest importance can be observed for factors: X_5 - credit card free of charge (Cards) and X_4 - fee for withdrawal in foreign ATM machines (Fees). Last factor with average importance is X_3 - credit card payment return.

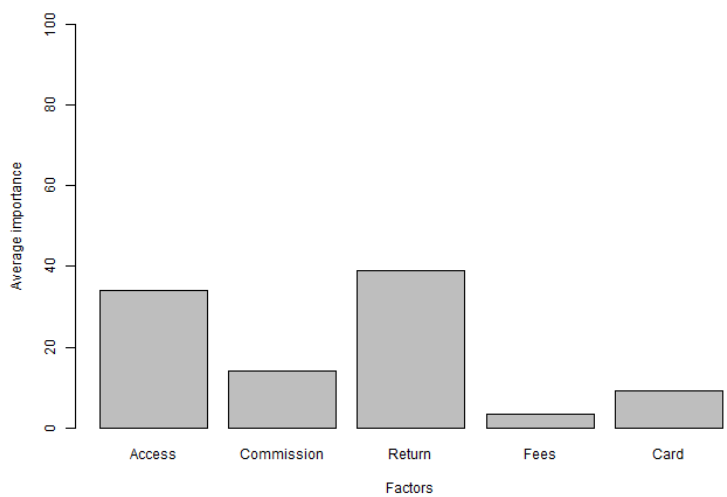

Fig. 3: Attribute importance ranking.

Source: own calculations.

For full profile generation the `AlgDesign` of **R** software is needed. Usually full profile design is not used in conjoint analysis due to high number of profiles. When the number of profiles is relatively small (up to 16) all profiles can be used in the conjoint analysis. Otherwise partial profile design has to be prepared.

Part worths utilities of attributes levels for whole sample are presented in table 2.

Tab. 2: Parth worths utilities of attributes levels for whole sample

No.	Attribute	Level	Parth worth utilities
1	Bank account access via mobile devices	Yes	-0.0272
		No	0.0272
2	Bank account commission	Yes	0.0117
		No	-0.0117
3	Credit card payment return	Yes	-0.0318
		No	0.0318
4	Fee in forting ATMs	Yes	-0.0017
		No	0.0017
5	Credit card fee of charge	Yes	-0.0073
		No	0.0073

Source: own calculations.

Evaluations were applied in package `conjoint` and part-worth utilities were estimated. Obtained part-worth utilities were used to calculate attractiveness (total utilities) of individual profile and average attribute importance.

Average importance of attributes are presented in table 3.

Tab. 3: Average importance of attributes for whole sample

Attributes	Parth worth utilities
Bank account access via mobile devices	34.05
Bank account commission	14.23
Credit cant payment return	39.07
Fee in forting ATMs	3.38
Credit card fee of charge	9.27

Source: own calculations.

Conclusions

The most important attribute is the access to bank account via mobile devices and the payment return. The most attractive profile was the 6th profile: bank account with access via mobile devices, with some commission, but with returns for credit card usage. This account does not allow to withdraw money for free from foreign ATM machines and credit card is not free of charges. Measurement models of consumer preferences (Rasch, PCM, RSM, NRM) may overcome the problems with evaluation of overall preferences for product's bundles (profiles). It possible also to introduce multidimensional preference vector as a dependent variable. Further comparative simulations between model-based and model-free conjoint analysis is needed to test the size of attenuation. The next research goal is to incorporate multilevel analysis (on households level).

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A Micro-Foundational Perspective of Entrepreneurial Orientation: Preliminary Findings

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Abstract

Purpose and research questions. Entrepreneurial orientation is typically analysed at the firm level, There is not much attention paid to analyse micro-foundations of the entrepreneurial orientation, that could act as explanation for the firm level of entrepreneurship. The purpose of this paper is to fill this gap by indicating that applying the micro-foundation perspective could broaden the understanding of strategic entrepreneurship processes. The aim has been realized by answering the following research question: How might the micro-foundations concept in strategic management develop the understanding of the entrepreneurial orientation? **Design/Methodology/Approach**. The method that has been used is a systematic and critical literature review of the entrepreneurial orientation concept as well as a critical literature review on the micro-foundations concept. **Findings.** The overarching findings are as follows. Firstly, the micro-foundational perspective significantly complements both OMT (organization and management theory) and the strategic management field. Secondly, considering the entrepreneurial orientation under a constructivist perspective enables to implement the micro-foundational programme in this field. Moreover, incorporating multi-level conceptualizations and multi-level methodology as well as the micro-foundational programme it might be possible to examine the following linkages: an individual entrepreneurial attitude determines individual entrepreneurial behaviour which as such influences organizational entrepreneurial orientation, which, as a result, has impact on organizational performance and growth. **Research implications**. The findings fill the research gap in the strategic management field concerning a lack of specific micro-foundations of the entrepreneurial orientation as an organizational (macro) phenomenon and revise the current knowledge in this realm.

Keywords: Strategic Entrepreneurship, Entrepreneurial Orientation, Micro-Foundations.

Introduction

One of the contemporarily explored research fields in strategic management is strategic entrepreneurship (e.g. Hitt *et al*., 2001). Many factors at micro and macro levels—including, amongst others, individual, organizational, and inter-organizational ones - facilitate activities that makes entrepreneurship strategic One of the most predominant construct of interest in strategic entrepreneurship research is entrepreneurial orientation comprehended as a firm's strategic posture towards entrepreneurship (Anderson *et al*., 2015). Notably, the entrepreneurial orientation is also considered as one of the strategic orientation types, besides market orientations and learning ones (Hakala 2011, Schweiger *et al*., 2019). However, despite the considerable growth of strategic entrepreneurship research over the past 30 years (since Miller's (1983) seminal paper), there is a need to develop the theoretical lens of this field by implementing new perspectives that allow a deeper understanding of how firm strategies are reflections of their managers. As such, a promising view emerges from the 'micro-foundations' concept (ontologically and epistemologically) and the micro-foundational analysis (methodologically).

Management literature indicates that here are various approaches to conceptualizing organizational entrepreneurship (Acs and Audretsch, 2003), but in significant number of research (e.g. Covin and Wales, 2012; Lumpkin and Dess, 1996) it is described as innovativeness, proactiveness, risk taking, competitive aggressiveness, and autonomy. Although the operationalization of entrepreneurial orientation is commonly used in management research, there is not much attention paid to exploring the micro level of entrepreneurial orientation which would act as an explaining power on the organizational and strategic levels. Our paper seeks to fill in this vein of reasoning, applying the idea of micro-foundations to the conceptualization of entrepreneurial orientation as a reflection of the firm's strategic entrepreneurship.

Entrepreneurial orientation is typically analysed at the firm level, as a strategic orientation of the firm. Some research presents the individual entrepreneurial orientation concept. However, there is not much attention paid to analyse micro-foundations of the entrepreneurial orientation, that could act as explanation for the firm level of entrepreneurship. The purpose of this paper is to fill this gap by indicating that applying the micro-foundation perspective could broaden the understanding of strategic entrepreneurship processes. Specifically, the following research question has been formulated: RQ. How might the micro-foundations concept in strategic management develop the understanding of the entrepreneurial orientation?.

The method that has been used is a systematic - critical literature review. First, the review was made with 'entrepreneurial orientation' keyword on the basis of 2 journals (excluding the date publication criterion): *Strategic Management Journal* and *Strategic Entrepreneurship Journal*. Second, after analysing seminal papers in the field of entrepreneurial orientation and implementing the snowball method, additional papers have been considered. Third, the seminal and overarching papers concerning the micro-foundations concept in strategic management have been added as well.

The structure of the paper is four-fold. The first section presents the micro-foundations concept in strategic management. The theoretical background of the entrepreneurial orientation concept has been presented in the next section. Then, the insights on a micro-foundational perspective of entrepreneurial orientation have been posed. Finally, the conclusions, encompassing the most salient findings, limitations and future research directions have been presented.

Micro-foundations – a Concept in Strategic Management

The 'microfoundations movement' (Winter, 2013) has appeared in the management theory landscape over the past decade (Foss and Linder, 2019). The micro-foundations project 'seeks to advance our understanding of phenomena by ensuring that analysis explicitly considers (…) multilevel nature by locating (theoretically and empirically) the proximate causes of the phenomenon one seeks to explain at one or more levels of analysis lower than that of the phenomenon itself' (Felin and Foss, 2019, p. 7). Selective and not exhaustive conceptualizations of the 'micro-foundations' have been presented in Table 1.

Table 1: Basic conceptualizations of the 'micro-foundations' concept

Conceptualization	References (selective, not exhaustive)
Micro-foundations of a given phenomenon constitute its main elements and processes.	Lippman and Rumelt (2003)
Micro-foundations refer to aggregated phenomena and/or relationships between aggregated variables.	Barney and Felin (2013)
A micro-foundational approach concern collective phenomena. Specifically, it refers to the processes of creating, developing, reproducing the phenomena analysed. As such, it requires explanation of lower level phenomena such individuals or processes in organizations as well as the interaction between them.	Felin *et al*. (2012)

Micro-foundations constitute cognitive fundamentals in strategic management rooted in individual actions and interactions between individuals.	Abell *et al*. (2008); Barney and Felin (2013)
An individual level (micro) is a key for explaining phenomena at the organizational level (macro) such as routines, capabilities, organizational performance.	Foss and Pedersen (2014)
The main aspect of the micro-foundations concept refers to consider the constructs at the individual level, collective constructs, and the constructs at strategic organizational level. Aggregation is not a primary premise of micro-foundations. It ought to just bond the constructs aforementioned.	Devinney (2013)
Micro-foundations are responsible for explaining a mediating character of influencing individual level (micro) phenomena and/or interactions between them on the relationships between organizational level variables.	Abell *et al*. (2008); Foss and Pedersen (2014)
A micro-foundational analysis is multilevel (ontologically, epistemologically, and methodologically).	Molina-Azorin (2014); Foss (2016)
The explanation how individual level factors as a result of aggregation contribute to occur collective phenomena and constitute *sine qua non* the micro-foundational analysis.	Barney and Felin (2013)
The 'micro-foundations' concept does not refer to individuals and theirs characteristics *per se*, but also to additive and emergent forms of aggregation.	Barney and Felin (2013); Felin *et al*. (2015)
The 'micro-foundations' concept refers to methodological individualism and the search for causality mechanisms (at the individual level) as well as it reflects how intentional activities and/or interactions between individuals constitute phenomena in the strategic management field.	Abell *et al*. (2014); Molina-Azorin (2014)
The purpose of micro-foundations is to explain (*via* seeking causality) how higher level constructs emerge from constructs that reside and interact at lower levels of analysis.	Devinney (2013); Felin *et al*. (2015); Molina-Azorin (2014)
Micro-foundations constitute a research programme with the main aim of understanding collective/aggregated macro level phenomena by means of actions of and/or interactions between lower level constructs (not necessarily concerning individuals).	Foss (2016)
'Microfoundations as a theoretical explanation, supported by empirical examination, of a phenomenon located at analytical level N at time *t* (N*t*). In the simplest sense, a baseline micro-foundation for level N*t* lies at level N - 1 at time *t* - 1, where the time dimension reflects a temporal ordering of relationships with phenomena at level N – 1predating phenomena at level N. Constituent actors, processes, and/or structures, at level N - 1*t*-1 may interact, or operate alone, to influence phenomena at level N*t*. Moreover, actors, processes, and/or structures at level N - 1*t*-1 also may *moderate* or *mediate* influences of phenomena located at level N*t* or at higher levels (e.g. N + 1*t*+1 to N + n*t*+*n*)'.	Felin *et al*. (2012, p. 1353)
A micro-foundational analysis needs specifying the components of the micro-foundational construct, interactions between those components, causative mechanisms contributing to emerge a collective phenomenon from micro-foundational components. The boundary conditions are necessary.	Felin *et al*. (2012)

Micro-foundational studies (mainly theoretical) have been evidenced in many research fields. Referring to the recently published systematic review on micro-foundations made by Foss and Linder (2019), besides such *explanandum* as, amongst others, dynamic capabilities, routines, value creation,

absorptive capacity, etc., which are present in the papers analysed, there is just one paper revealing a significant research gap in examining entrepreneurial orientation. Specifically, authors (Dai *et al*., 2016) consider and strongly call for the need of explaining organizational entrepreneurial orientation by means of implementing the micro-foundational programme what is in line with the recent studies on the entrepreneurial orientation concept (i.e. Wales *et al*., 2020).
Consequently, the following proposition have been formulated:

P1. The micro-foundational programme constitutes a significant premise for exploring the entrepreneurial orientation concept.

Entrepreneuarial Orientation – Theoretical Background

The entrepreneurial orientation involves 'strategy making practices, management philosophies, and firm-level behaviors that are entrepreneurial in nature' (Anderson *et al.,* 2009, p. 220; Anderson *et al.,* 2015). Moreover, the entrepreneurial orientation captures a firm-level strategic posture (Covin and Wales, 2012) / an organizational attribute (Wales *et al*. 2020) / a fundamental organizational orientation (Li *et al*. 2010, Wiklund and Shepherd, 2003; 2011) toward the pursuit of new opportunities for organizational growth and renewal (Covin and Wales, 2012).

There are three components of the entrepreneurial orientation the most frequently examined, namely innovativeness (the introduction of new products, processes, and business models, novelty, experimentation, and creative processes), proactiveness (actively entering new product/market spaces and seeking market leadership positions, creating a first-mover advantage), and risk taking (a willingness among strategic decision makers to contribute resources to projects with uncertain outcomes, a willingness to commit large amounts of resources to projects where the cost of failure may be high) (Anderson *et al*., 2009, Anderson *et al*., 2015, Baird and Thomas, 1985, Covin and Slevin, 1989, 1991, Lumpkin and Dess, 1996, Miller, 1983, Miller and Friesen, 1978, Wiklund, 1999, Wiklund and Shepherd, 2003).

Notably, there are slight conceptual differences between Miller / Covin and Slevin and Lumpkin and Dess in understanding the entrepreneurial orientation constituents and how each characterizes organizational entrepreneurship based upon a set of dimensions such as innovativeness, proactiveness, risk-taking, competitive aggressiveness, and autonomy. In the view of Miller / Covin and Slevin, a subset of three co-varying dimensions are critical for the entrepreneurial orientation to exist (innovation, proactiveness, and risk-taking), whereas Lumpkin and Dess emphasize the assumption of co-variance amongst a broader set of dimensions (introducing competitive aggressiveness and autonomy (Wales *et al*. 2020)[1]. The five-constituent conceptualization is also called strategic entrepreneurial orientation (McKenny *et al*., 2018).

Significantly, entrepreneurial behaviour and managerial attitude toward risk highlight the entrepreneurial orientation concept under a constructivist perspective (Anderson *et al.,* 2015, Eshima and Anderson, 2017). An advantage of this approach is to allow a potential antecedent to relate differentially to the entrepreneurial orientation's lower order dimensions, while still allowing the researcher to embed the antecedent within the entrepreneurial 's broader nomological network (Anderson *et al.*, 2015, Eshima and Anderson, 2017) what gives the green light to the micro-foundational exploration in this field.
Consequently, the following proposition have been formulated:

P2. Embedding the entrepreneurial orientation concept in the constructivist perspective (in terms of methodological issues) would enable to implement the micro-foundational programme in the research on entrepreneurial orientation.

[1] The specific differences between Miller / Covin & Slevin and Lumpkin & Dess have been widely presented in (Wales *et al*., 2020).

Insights on A Micro-Foundational Perspective of Entrepreneurial Orientation

While there are no doubts that the entrepreneurial orientation is depicted as an organizational-level phenomenon, there are still debates whether the entrepreneurial orientation is an attitudinal construct or a behavioural one, or both (Covin and Lumpkin, 2011; Miller, 2011) and what might constitute the antecedents of this phenomenon at lower epistemological levels. In general, the entrepreneurial orientation had been evidenced as a second-order, firm-level construct comprised of two lower-order dimensions, namely entrepreneurial behaviour (encompassing innovativeness and proactiveness) and managerial attitude towards risk, inherent managerial inclination (risk taking) (Anderson *et al.*, 2015, Eshima and Anderson, 2017). It is worth noting that "attitudes towards risk are usually pictured as stable properties of individuals, perhaps related to personality development or culture" (March and Shapira, 1987). Moreover, taking into account a top management style, Miller and Covin and Slevin regard risk-taking as "the degree to which managers are willing to make large and risky resource commitments" (Miller and Friesen, 1978, p. 923).

There are also no doubts that the entrepreneurial orientation relates to some extent to other macro level phenomena as entrepreneurial firms grow faster (Penrose, 1959, Rauch *et al.,* 2009) as well as behaving entrepreneurially places the firm in new domains that facilitate expansion – for instance, organizational performance (Anderson *et al.* ,2015, Balasubramanian *et al*., 2020, Gupta and Wales, 2017, Putninš and Sauka, 2019, Rauch *et al.,* 2009 (in this case the entrepreneurial orientation is treated as an advantage view), Schweiger *et al*., 2019, Wiklund and Shepherd, 2003) or firm growth (Eshima and Anderson, 2017, Miller, 1983, Wales *et al*., 2013). As Schweiger *et al*., 2019 state, prior research on the performance effects of the entrepreneurial orientation has yielded double-edged results: whereas most studies report positive effects, some have obtained negative or insignificant results (Rauch *et al*., 2009) - for example in terms of the entrepreneurial orientation as an experimentation view (Patel *et al*., 2015). Interestingly, researchers explain the variation in the entrepreneurial orientation - performance relationship by the moderating role of environment (e.g. Wiklund and Shepherd, 2005) or by the need to align the entrepreneurial orientation with other organizational capabilities (Schweiger *et al*., 2019)

The links between micro- and macro-level phenomena involved in the entrepreneurial orientation concept reveal the necessity of a multi-level conceptualization (see Wales *et al*., 2020). Wales *et al*. (2015) propose a new path that synthesizes the alternative Miller and Covin and Slevin and Lumpkin and Dess perspectives on the entrepreneurial orientation. They propose three distinct, yet complementary ways in which the entrepreneurial orientation is manifest as an organizational attribute at and across different levels of analysis: entrepreneurial top management / TMT style (an individual / team level), organizational configuration (an organizational level), and new entry initiatives (a market level). The entrepreneurial orientation as top management style captures the top managerial goals, beliefs, dominant logics, mindset decisions, and communications which demonstrate organizational commitment to the entrepreneurial orientation. They also convince that their proposal is consistent with upper echelons theory (Hambrick, 2007, Hambrick and Mason, 1984) since the entrepreneurial orientation as the top management style recognizes that organizations are often reflections of their top managers. Indeed, Covin and Slevin (1988, p. 218) observed early on that "entrepreneurial firms are those in which the top managers have entrepreneurial management styles, as evidenced by the firms' strategic decisions and operating management philosophies".

Therefore we propose to consider individual-level entrepreneurial orientation (see Hughes *et al.,* 2018, Kollmann *et al*., 2017) as the one of main individual level antecedents of the entrepreneurial orientation on the whole as it 'has never quite found a footing within research exploring entrepreneurial organizations. While it is generally recognized that individuals throughout organizations can be entrepreneurial actors, the concept of individual-level EO has not been widely embraced, largely because EO was introduced to the literature as a firm-level construct by definition' (Wales *et al*., 2020). Hence, the following proposition have been formulated:

P3. Incorporating multi-level conceptualizations and multi-level methodology as well as the micro-foundational programme it is proposed to examine the following relationships:

An individual entrepreneurial attitude determines individual entrepreneurial behaviour which as such influences organizational entrepreneurial orientation, which, as a result, has impact on organizational performance and growth.

Significantly, individual-level entrepreneurial orientation (both an attitude and behaviour) in terms of innovativeness, proactiveness, and top managerial preferences for risk-taking (Anderson *et al*., 2015) is dependent on lower order phenomena such as collective top managerial cognitions favouring entrepreneurial activity (Wales *et al*. 2020) and individual entrepreneurial proclivity (top managerial beliefs) (Matsuno *et al*. 2002), etc. Beliefs, cognitive maps and shared cognitive maps (Wales *et al*. 2020) develop a shared cognitive schema amongst top managers characterized by an enthusiastic support for the pursuit of new entry initiatives, innovations, and value creation opportunities, even when the outcomes of such experiments are unknown (Covin and Slevin, 2002; Wales *et al*. 2020)

Conclusion

The systematic and critical literature review allowed us to organize the current knowledge and findings referring to the micro-foundational perspective of the entrepreneurial orientation and present them in this paper. Specifically, it has been stated that the micro-foundational perspective significantly complements both OMT (organization and management theory) and the strategic management field. Secondly, considering the entrepreneurial orientation under a constructivist perspective enables to implement the micro-foundational programme in this field. Moreover, incorporating multi-level conceptualizations and multi-level methodology as well as the micro-foundational programme it might be possible to examine the following linkages: an individual entrepreneurial attitude determines individual entrepreneurial behaviour which as such influences organizational entrepreneurial orientation, which, as a result, has impact on organizational performance and growth

The research proposed is the answer for the Wales *et al*. (2020) call for "the need to consider top management style as a key phenomenon within the manifestation of entrepreneurial orientation. Viewing entrepreneurial orientation as a top management style provides a conceptual lens to develop theory pertaining to how and why organizations become entrepreneurial actors and with what effects". Our findings fill the research gap in the management science concerning the lack of investigating entrepreneurial orientation under multi-level studies and the micro-foundational programme.

Our paper is just the illustration of our research in progress and our next step will be connected with formulating research design. As well as this, we perceive a wide range of research directions and realms in that field. Certainly, besides managerial cognition and beliefs, it is necessary to take into account an adaptive capability (individual and organizational) as the predictor of entrepreneurial orientation as well. Eshima and Anderson (2017) proved that organizational growth influenced the adaptive capability that in turn had impact on entrepreneurial orientation. Moreover, it is proposed to examine the role of entrepreneurial orientation as a moderator in the relationship between absorptive capacity and firm performance (Wales *et al*. 2013) as well as in the relationship between a bundle of knowledge-based resources and firm performance (Wiklund and Shepherd, 2003). Prior research shows that absorptive capacity might be a moderator in the relationship between entrepreneurial orientation and sales growth with the mediator in the form of innovation variations (Patel *et al*., 2015). Furthermore, CEO core self-evaluation seems also to be a direction in exploring individual-level entrepreneurial orientation as a predictor of organizational-level entrepreneurial orientation (Simsek *et al*., 2010).

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Assessing the Eco-Innovation Performance By Means of Eco-Innovation Index: Case of Slovakia

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Abstract

Eco-innovation and green technologies are the key to Europe´s future and they are at the heart of the European Union (EU) policies. As the numerous practical examples demonstrate, eco-innovation is a powerful instrument that combines reduced negative impact on the environment and the positive impact on the economy and society. Emphasizing eco-innovation as a means for achieving sustainable development requires information on the performance of main actors, in particular, countries. Measuring country´s performance of eco-innovation has started via indices or scoreboards, which come with indicators and scores and help with benchmarks across countries. Policy and innovation actors can thus learn about diagnosing different areas of eco-innovation and drawing lessons about the strengths and weaknesses across countries. The aim of this paper is to assess the eco-innovation performance during the last three years in Slovakia by means of eco-innovation index, to analyse and assess the components and indicators of eco-innovation index for Slovakia in the year 2018 and to compare them with those of EU 28–average. Identified and discussed will be the areas in which the main weaknesses and strengths are evident. Based on the research results formulated will be the main implications for managers and policy makers in Slovakia to improve the state in mentioned area. Our study is qualitative and descriptive in nature and is based on secondary sources of data coming from the Eurostat and Eco-Innovation Observatory. The methods used in the paper are the method of casual analysis, deduction, abstraction, comparison as well as the synthesis.

Keywords: Eco-Innovation Index, Eco-Innovation Performance, Assessing Eco-Innovation Performance.

Introduction

Europe´s economic growth over many decades has been fuelled by the intensive use of resources. However today it faces multiple challenges of stimulating the growth, while ensuring that this growth is economically and ecologically sustainable. Energy use, water scarcity, land shortages, the depletion of materials and the management of waste are among the most discussed issues posing sustainability challenges.

The EU´s economic prosperity and well being is linked to its natural environment and the global demand for renewable energy and resource-efficient solutions will be a source of jobs and economic growth in the years to come. To secure (reaching) the environmental protection and economic growth, eco-innovations have a central role. Eco-innovation becomes an emerging priority of EU policy relating to different aspects of almost all industries.

A significant step forward for eco-innovation is the Eco-Innovation Action Plan (EcoAP) launched by the European Commission in December 2011. Eco-innovation Action Plan is an important element of the European policy framework for sustainable consumption and production. It aims to transfer Europe into a more competitive resource-efficient economy and acknowledges the key role of eco-innovation in the context of job creation, growth and competitiveness, as well as environmental protection.

At the macro level it is necessary to understand environmental, economic and social dimensions in which eco-innovation strategies may develop. The new global economy is not only a knowledge economy, but also an economy based on responsible behaviour. In the knowledge-based development, the key to growth and prosperity relies on the issues of acquiring, creating, developing, storing and applying knowledge for a sustainable economic, social and environmental development.

To step towards the sustainable economic growth, there is a need for much more eco-innovations to appear in all sectors of EU.

The aim of the article is to assess the eco-innovation performance in Slovakia by means of eco-innovation index. To fulfil the main aim of the paper we formulated three partial aims:

1. To assess the overall eco-innovation performance of Slovakia during the last 3 years, to analyse and assess all the components and indicators of eco-innovation index for Slovakia in the year 2018 and to compare them with those of EU 28 – average.
2. To identify main strengths and weaknesses of eco-innovation performance for Slovakia.
3. To formulate main implications for managers and policy makers in Slovakia to improve the state in mentioned area.

The methods used in the paper are the method of casual analysis, deduction, abstraction, comparison as well as the synthesis.

Theoretical Background

Eco-innovation is a concept that is difficult to define because of the complexity of the subject. Fussler and James (1996) define eco-innovation as “new products and processes which provide customer and business value but significantly decrease environmental impacts”. Hillebrand and Driessen (2002) state that green innovation “does not have to be developed with the goal of reducing the environmental burden” but it “does however, yield significant environmental benefits”. Kemp and Pearson (2007) extend the view on eco-innovation from products and processes to the “assimilation or exploitation of a (...) service or management or business method” and include the consideration of the life cycle aspects. Arundel and Kemp (2009) emphasize that eco-innovation “can be motivated by economic or environmental considerations”.

Rennings (2000) perceives eco-innovations as new approaches that help reduce environmental burdens or achieve ecological targets and differentiate between technological, organizational, social, and institutional ones.

Originally, the concept of eco-innovation focused on progress in the field of technology and processes, with an intention to reduce environmental impacts of economic activities (Terjesen and Patel, 2017; Del Rio Gonzales, 2009). In time, eco-innovation´s awareness has essentially broadened, particularly where the following aspects are concerned (Azevedo et al., 2014):

- Eco-innovation does not only apply to clean and resource-efficient technologies that are specifically aimed at reducing environmental harm (Horbach, 2008). Every product or service generating an environmental benefit (reduced use of natural resources and lower use of emissions and waste) in relation to relevant alternatives should be recognized as an eco-innovation (Kemp and Pearson, 2007).

- Eco-innovation encompasses all environmental improvements across the whole product life cycle, concerning the way they are designed, produced, used, reused, and recycled (Eco-innovation Observatory, 2011).
- Eco-innovation, in a broader perspective, also embraces environmentally oriented organizational and marketing approaches, including eco-innovative business models, which can have effects on the consumer behaviour (Eco-innovation Observatory, 2013).

Concentrating on most of these additional aspects, the expert group of the Eco-Innovation Observatory defines eco-innovation as the following. Eco-innovation is the introduction of any new or significantly improved product (good or service), process, organizational change or marketing solution, that reduces the use of natural resources (including materials, energy, water and land) and decreases the release of harmful substances across the whole life-cycle (Eco-innovation Observatory, 2011).

Emphasizing eco-innovation as a means for achieving sustainable development requires information on the performance of main actors, in particular, countries (Kemp, 2010; León-Ledesma and Satchi, 2019). Measuring country´s performance of eco-innovation has started via indices or scoreboards, which come with indicators and scores and help with benchmarks across countries. Policy and innovation actors can thus learn about diagnosing different areas of eco-innovation, monitoring trends and directions and drawing lessons about the strengths and weaknesses across countries (Park et al., 2017).

Measuring eco-innovation enables to assess the progress of the components of eco-innovation (Cheng and Shiu, 2012). In practice it helps policy makers to understand the overall trend of eco-innovation, its drivers and barriers and to design effective policies and framework conditions especially encouraging for companies to increase their eco-innovation efforts (Wagner, 2008).

Eco-innovation can be measured at different levels: firm, national, regional and international (Hammond, 1995). Measuring eco-innovation at the national level provides information on which countries are leaders, followers, loungers or laggards (Jang et al., 2015).

Various stakeholders including governments, enterprises, investors, NGOs, etc. exist in the field of eco-innovation. The results of measuring eco-innovation can be meaningful and useful to multiple stakeholders (Phillips, 2003). The role of the government is crucial for implementing and diffusing eco-innovation at the national level. Governments can develop a national system that enables the production of eco-friendly goods and services. Governments can establish and implement policy instruments for eco-innovation, such as environmental regulations, financial schemes and programs for supporting R&D and fostering eco-markets (Jang, 2015). Business and industry play a crucial role in reducing impacts on resource use and the environment, through more efficient production processes, preventive strategies and cleaner production technologies and procedures (Kogan et al., 2017; Wagner, 2008). Citizens as consumers have demands on eco-products, and may become involved in innovation activities. Consumer behaviour contributes to building green markets (Rogge, Reichardt, 2016). NGOs set the environmental issues in the society and collaborate with other actors to create sustainable life. Investors can influence eco-innovation through green investment (Inderst et al., 2012). Therefore, the eco-innovation index can be used by multiple stakeholders. It provides useful information for all stakeholders to encourage further actions.

Methodology of Research

To measure the eco-innovation performance in all EU member states the Eco-Innovation Observatory has developed a composite index, so called “Eco-innovation index” (EII). The Eco-innovation index demonstrates the eco-innovation performance of a country compared with the EU average and with the EU top performers. It is equated in scores and shows how well individual member states perform in different dimensions of eco-innovation compared to the EU average (EU EII is equated with 100, EU EII=100). Eco-innovation index is a composite index that is based on 16 indicators which are aggregated into five components: eco-innovation inputs, eco-innovation activities, eco-innovation

outputs, resource efficiency outcomes and socio-economic outcomes. The composition of eco-innovation index offers the insight in eco-innovation performance of a country and enables the eco-innovation assessment.

According to a technical note from the Eco-innovation Scoreboard (Giljum and Lieber, 2016), country-specific figures of the single indicator are weighted with the share of population to calculate an EU average which corrects for the bias of smaller member states. Therefore, the EU average of a sub-indicators presents the weighted mean of all country specific data of the EU member states. The EU average of indicators that display absolute numbers is built directly by summing up the underlying data.

The index presents the situation of eco-innovation at the national level. The value of the index can influence decision-making in the field of eco-innovation. Considering for applicability, the eco-innovation index helps to assess the status of eco-innovation performance, identify areas for improvement as needed, to facilitate comparison of countries´ eco-innovation performance over time and to motivate eco-innovation activities (Park et al., 2017).

The study is qualitative and descriptive in nature and most of the date is based on secondary sources of data coming from Eurostat and Eco-Innovation Observatory.

Results and Discussion

The Eco-Innovation Observatory is publishing (starting the year 2010) the eco-innovation index for all EU member states. In the year 2018 all EU countries were clustered into three groups (Eco-innovation Observatory, 2018a):

1. Eco-innovation leaders, with score significantly higher than the EU average (a score of > 114);
2. Average eco-innovation performers with scores around the EU average (a score between 85 and 114);
3. EU countries with performance around 85 % or less compared to the EU average (with a score < 85).

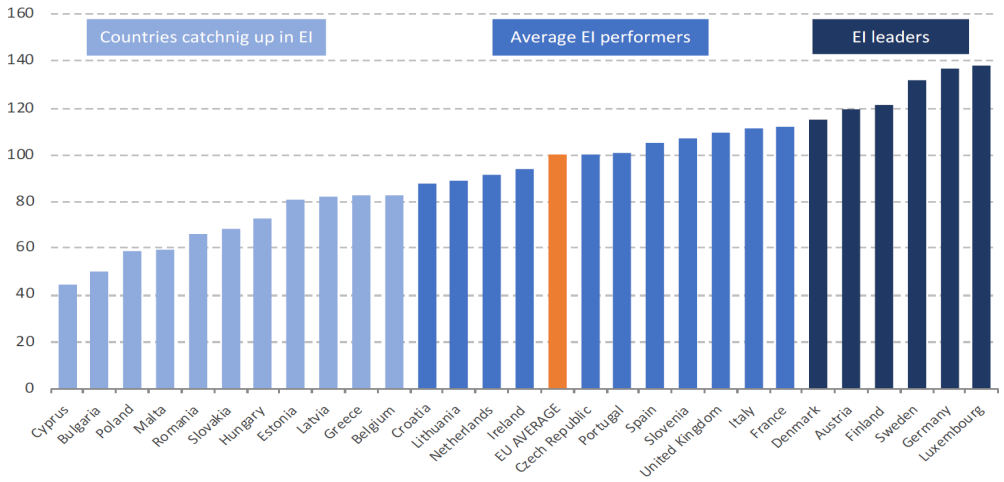

Fig. 1: EU 28 Eco-innovation index 2018, composite index.
Source: https://ec.europa.eu/environment/ecoap/scoreboard_en/

According to the Eco-Innovation Index in the year 2018, Luxembourg leads the ranking of all EU countries with an aggregated score of 138. Germany (137), Sweden (132) and Finland (121) follow the Luxembourg. Eleven EU member states obtained scores around the EU average of 100 and were labelled as average eco-innovation performers. The aggregated eco-innovation scores in this group

range from 112 (France and Italy) to 88 (Croatia). Eleven countries in the last group of countries represent countries catching up in eco-innovation. Aggregated scores in this group of countries range from 83 (Belgium) to 45 (Cyprus).

Slovakia with an overall score of 68 in 2018 is on the 23th place among 28 EU member states. The score of 68 means, that Slovakia´s overall eco-innovation performance is 32% below the EU average. The country´s performance has improved compared to 2010 when the overall score was only 43; in the year 2015 the eco-innovation index has increased to 72 and in the year 2016 was 85, but during the last three years the index has decreased every year and with the score 68 in 2018 Slovakia belongs to the last group of countries with low eco-innovation performance (Lesáková, 2018).

Tab. 1: Eco-innovation index (score) – Slovakia

	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
EU changing composition	100	100	100	100	100	100	100	100	100
Slovakia	43	49	50	42	61	72	85	74	68

Source: Eco-innovation Observatory. EU Eco-innovation Index.

The eco-innovation index is an aggregated index giving a general overview of the overall eco-innovation performance across the EU and it does not allow to identify strong or weak areas. It offers the disaggregation of the composite index into five components – sub-indices (Table 2).

Tab. 2: Scores in the five components of the eco-innovation index in Slovakia (2016-2018)

Year	Eco-innovation inputs	Eco-innovation activities	Eco-innovation outputs	Resource efficiency outcomes	Socio-economic outcomes	**Eco-innovation index**
2016	29	91	28	121	142	**85**
2017	27	90	33	87	124	**74**
2018	25	71	57	99	82	**68**

Source: Eco-innovation Observatory. EU Eco-Innovation Index.

Figure 2 illustrates scores of the five sub-indices (components) in the eco-innovation index 2018: eco-innovation inputs, eco-innovation activities, eco-innovation outputs, resource-efficiency outcomes and socio-economic outcomes.

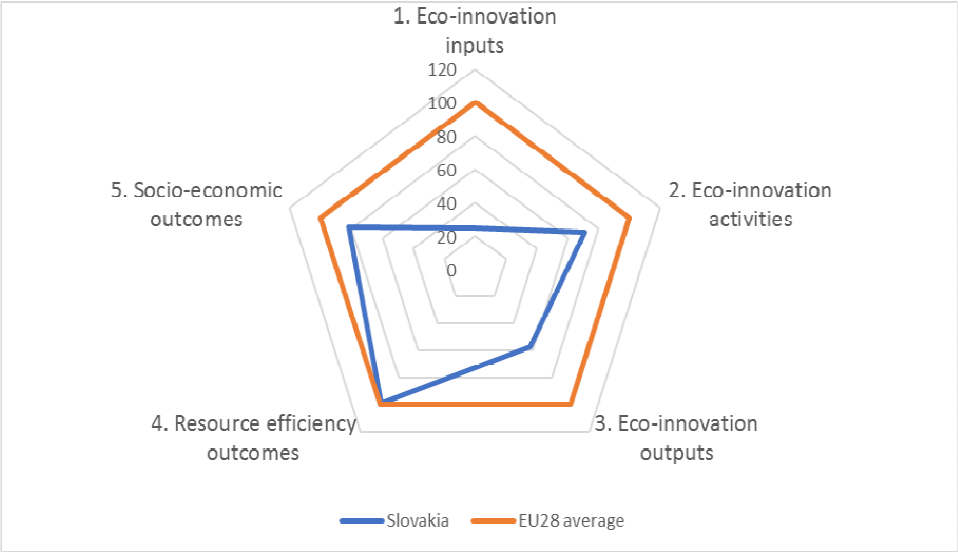

Fig. 2: Components of the Eco-innovation index for Slovakia 2018.
Source: Own elaborating based on EIO data.

Critical may be viewed that Slovakia is below the EU average in all components of eco-innovation index. In order to illustrate the diversity across the EU countries, the minimum and maximum scores as well as the overall score range is illustrated for each of the five components and also for the aggregated index (table 3).

Tab. 3: Scores in the five components of the Eco-Innovation Index 2018 Slovakia

	Eco-innovation inputs	Eco-innovation activities	Eco-innovation outputs	Resource efficiency outcomes	Socio-economic outcomes	**Eco-innovation index**
Slovakia	25	71	57	99	82	**68**
Minimum-EU	0	10	9	5	1	**45**
Maximum-EU	175	179	224	190	177	**138**
Range-EU	175	168	216	185	176	**94**

Source: Eco-innovation Observatory. EU Eco-Innovation Index 2018.

As the weakest component of the Eco-innovation index appear the *Eco-innovation inputs*. Eco-innovation inputs show to what extent the government gives the priority to investments in support of environmental and energy R&D. It also gives information about R&D human resources in this area. This component is composed of three sub-indices: government environmental and energy R&D appropriations and outlays (as share of GDP), total environmental and energy R&D personnel and researchers (as a share of total employment) and total value of green early-stage investments (in USD/capita).

The eco-innovation input component had a score of 25 in 2018 in Slovakia (compared to a score of 29 in 2016). Government environmental and energy R&D appropriations and outlays, as a share of GDP, were 0.01% in 2017 (compared to 0.04%, the EU average). The performance was slightly better for the share of R&D personnel and researchers out of total employment, with 0.72% in 2014 compared to an EU average of 1.32% (Eco-innovation Observatory, 2018b). The value for green early-stage investments was during the last three years very low (1 USD/capita) (SBA, 2018).

Eco-innovation activities include indicators to monitor the scope and scale of eco-innovation activities undertaken by companies. This component shows to what extent companies in Slovakia are involved in material and energy efficiency eco-innovation, as well as in observing environmental

management. The indicators include: a) enterprises that introduced an innovation with environmental benefits obtained within the enterprise (% of total firms); b) enterprises that introduced an innovation with environmental benefits obtained by the end user (% of total firms); c) ISO 14001 registered organisations (per mil. population).

Overall component index is 71 for the year 2018, which is the third highest (after resource efficiency outcomes and socio-economic outcomes) among the rest of the sub-indexes. Enterprises that introduced an innovation with environmental benefits obtained within the enterprise and those obtained environmental benefits by the end user are almost the same 0.23 and 0.22 (it is twice lower as EU average 0.53 and 0.50). The third indicator of this component is the number of ISO 14001-registered organisations per million inhabitants. Slovakia is doing well in this indicator. There were 427 ISO 14001 registered companies per million inhabitants in 2016, which gives an index score of 0.76, which is well above of EU average 0.30 (Eco-innovation Observatory, 2018b).

Eco-innovation outputs are used to monitor the extent to which knowledge outputs generated by businesses and researchers relate to eco-innovation. Eco-innovation outputs quantify the outputs of eco-innovation activities in terms of patents (per mln population), publications (per mln population) and media coverage (per numbers of electronic media).

Eco-innovation outputs reached an index score of 57. Slovakia´s low score in eco-innovation outputs is explained by the relatively low performance in all three dimensions of EI outputs (eco-patents, EI publications and EI media coverage). The number of eco-patents obtained in 2014 was 2.09 eco-patents per million people. In comparison to the EU average, number of EI patents obtained per million populations amounted to 15.34 in the same year (Eco-innovation Observatory, 2018b).

Resource-efficiency outcomes relate to wider effects of eco-innovation on improved resource productivity. This component measures material, water and energy productivity and greenhouse gas (GHG) emissions intensity.

The overall component score for Slovakia was 99 in 2018, what was a slight improvement since 2015 when it was 78, but it is a decrease to the year 2016, when it was 121. Material productivity amounts to 1.76 EUR/kg in 2015, which is below the EU average of 2.25 EUR/kg, while energy productivity is 7.85 Eur/toe (the EU average of 9.66 EUE/toe) in 2015 (SBA, 2018). The GHG emissions intensity is slightly higher in comparison to EU average, amounting to 0.34 CO2 emissions generated per unit of GDP.

Socio-economic outcomes of eco-innovation represent effects of eco-innovation activities for society and the economy. This includes changes in employment turnover or export that relate to broadly understood eco-innovation activities. The indicators for this component include: export of products from eco-industries (% of total exports); employment in eco-industries and circular economy (% of total employment); revenue in eco-industries and circular economy (% of total revenue across all companies).

The overall component score for socio-economic outcomes for Slovakia in 2018 is 82. This is a rapid decline since 2016, when Slovakia scored 142 for this component. Employment in eco and circular economy industries was at 2.93% of total employment in Slovakia in 2016 that is slightly above the EU average of 2.69%. Eco-industries´ revenue has achieved 4.73% of total revenue across sectors, which is higher in comparison to the EU- average 2.30%. The share of products from eco-industry in total export was 0.40% in 2016, which is below the EU average of 0.60% (Eco-innovation Observatory, 2018b).

It can be stated that the eco-innovation performance has decreased during the last three years and Slovakia faces many challenges from wide range of environmental and economic problems.

Eco-innovation inputs and outputs are *the weakest components* in overall eco-innovation index. Eco-innovation inputs account only 14.3% of EU average for 2018. This is mainly due to low public funding in environmental and energy R&D. Government budget appropriations and outlays for R&D

(usual public funding in Slovakia) lag far behind the EU´s average (they are twice lower than the EU average). The public funding is supplemented by the EU funds (mainly the European Structural Funds and Horizont 2020). There is also evident a lack of human resources in research and development. Highly educated persons in the field of engineering and science present a very low share in the national workforce of population, partly due to a tendency of a "brain-drain" in Slovakia (MŽP, 2019a). Better conditions, international exposure, and a creation of a more competitive environment could improve this situation. As the indicators show, the green early-stage investments are in Slovakia very low.

As the result of low financial support into the environmental and energy R&D as well as low percentage of workforce in research and development, the eco-innovation outputs related to eco-innovation (eco-patents, EI publications and EI media coverage) is very low (26% of EU average).

What concerns the resource-efficiency outcomes, there are many challenges for Slovakia. The big challenge is to increase the energy and material productivity as well as the green gas (GHG) emissions intensity. Slovakia is committed to the goals of the EU 2030 Agenda and to the 2020 climate and energy package. Share of renewable energy is coming closer to 14% target for the year 2020 and is mostly covered by Slovakia´s traditional clean energy sector based on large hydropower plants and supplemented by a small hydro power biomass and solar. Air protection represents one of the main challenges (the largest sources of such pollution are the transport sector and the residential heating) (MŽP, 2019b). In October 2017, an amendment to the Air Act was approved. This deals with specific measures to combat the air pollution such as reducing nitrogen oxide emissions to comply with currently applicable national emission ceilings reducing nitrogen dioxide and ozone concentrations as well as with reducing transport and energy related emissions.

The rapid decline is seen for the component socio-economic outcomes (it was 82 in the year 2018 to 142 in the year 2016). Employment in eco and circular economy industries was 9% more in 2016 than the EU average and what concerns the eco-industry´s revenue it was twice more than EU average; the decline of this component in the year 2018 is the result of decrease in employment in eco- and circular economy as well as in the decrease of total revenue across all sectors in the country.

At the same time there is only one *strength* to be mentioned; Slovakia outperforms many EU countries in a number of companies with ISO 14001 certification demonstrating aspiration to higher environmental standards in business sector (index Slovakia : EU average = 2.53) (SBA, 2018). This contributed positive to the average score in the Eco-innovation activities.

Thought Slovakia has implemented many of EU policies and measures in the area of environmental policy and eco-innovations to the SR legal system, the progress is slow (Lesáková, 2019). Insufficient approximation of the EU directives to the SR legal system in relation to environmental protection and eco-innovation has been criticized by the European Commission. Environmental policy stringency in Slovakia has been assessed as above average compared to OECD countries. According to the World Bank, we lag behind other countries in the quality or regulations and law enforcement.

The need for a new, modern environmental strategy which reflects the actual situation and urgent problems of the whole system of environment has resulted at the new "Envirostrategy 2030 for Slovakia" (MŽP 2019a), which was approved in February 2019. The strategy identifies basic system problems, sets 2030 targets, proposes framework measures to improve the current situation and contains also basic performance indicators for verification of achieved results. The strategy underlines the role of eco-innovations.

Conclusion

It can be stated that eco-innovations in Slovakia face many challenges. Based on the above analysis, the main implications for policy makers and managers in Slovakia may be formulated as follows.

Policy makers in Slovakia should place greater emphasis on sufficient approximation of EU directions to the legal system of the SR. They have to create effective policy programs and measures supporting eco-innovation and helping to establish a stable platform for eco-innovation´s development.

Public funding and expenditure in the eco-research and development is still low in Slovakia. To tackle with this issue both state as well as public and private institutions have to be more involved in the financial support.

It is necessary to raise firm´s awareness about eco-innovations and green business as business with a high added value in relation to the corporate responsibility concept as well as to raise firm´s awareness about the necessity to implement stabile and continual environmental business strategy.

In cooperation with central government authorities and professional organizations, academia and non-governmental organizations, the more efficient system of formal and informal environmental education and training for sustainable development has to be implemented.

Eco-innovations call attention to the positive contribution that the companies can make to sustainable development and a competitive economy (Jaffe et al., 2005). Hence, eco-innovation is understood as the combined improvement of economic and environmental performance of society.

The findings of our study contribute to the theory of using the eco-innovation index as a mean to assess the eco-innovation performance of the country. The results of this study give insights into the key areas of eco-innovation index and can help to understand the scope of eco-innovation performance. Measuring eco-innovation enables to monitor the changes in eco-innovation performance and helps with benchmarks across countries. Policy and eco-innovation actors can learn about diagnosing different areas of eco-innovation, monitoring trends and indicate strengths and weaknesses. The results of assessing eco-innovation can be thus a meaningful and useful to managers and policy makers to encourage further actions.

As the main limitation of this study may be viewed the absence of benchmarks in assessing the eco-innovation performance across EU countries. For the future we aim to spread our research also to benchmarks across some neighbouring countries (V4 countries). Despite the limitations, our paper contributes to extending the scope and scale of eco-innovation studies. It offers insights into the application of eco-innovation index.

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Multivariate Item Response Models in Questionnaire Research

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Abstract

Item response theory (IRT) is widely used in educational, psychological research to model how participants respond to test items in isolation and in bundles, however there is still existing gap in socio-economic area. Nowadays, due to availability of computer softare, we are able to analyse large datasets and it is possible to use multivariate IRT models as well. This study investigates the application of multidimensional item response theory (MIRT) models to validate test structure and dimensionality. When the items measure two or more latent traits, the test structure is referred to as multidimensional. Multidimensional item response theory provides an ideal foundation for modeling performance in complex domains, taking into account multiple basic abilities simultaneously, and representing different mixtures of the abilities required for different test items. In this paper we present the theory, application and the use of multivariate IRT models for the analysis of socio-economic phenomena. We also present model selection criteria and graphical presentation of results using Item Characteristic Surface (ICS) and Item Information Curve. All calculations will be conducted in R available from CRAN.

Keywords: item response model (IRT model), measurement theory, survey research, multidimensional IRT models, R software.

Introduction

The measurement of human properties has been a long-lasting quest that originated in the Ancient China and Zhou Dynasty. Chinese imperial examinations were a civil service examination system that enabled to select candidates for the state bureaucracy. Such way of examining potential candidates served to ensure a common knowledge of writing, literature, archery, horse riding, and diplomacy. Exams played a significant role in tempering the power of hereditary aristocracy, as well as military authority. It lasted for a very long time in unchanged form.

The second breakthrough was the 19th century, where the origin of psychological measurement called psychometry took place. In the beginning of the twentieth century Binet and Simon (1908), were the first to develop and use what we would nowadays call a standardized intelligence test, and in the same era Charles Spearman (1904) developed the concepts and methodology of what would later be called classical test theory (CTT) and factor analysis (FA).

The classical test theory and the item response theory (IRT) are two commonly used psychometric theories in conducting item selection and reduction for measures; however, these two theories work based on different assumptions and statistical approaches, and both have shortcomings. Although CTT was the dominant statistical test model in the first half of the 20th century (Guilford, 1936, Gulliksen, 1950), other developments were also taking place. In England, Walker (1931) set the stage for what later was to become known as Guttman (1944, 1950) scaling, by introducing the idea that if a respondent can answer a harder question correctly then he or she should be able to answer easier questions on the same topic correctly as well. Walker also introduced the idea of a quantitative index measuring deviation from this deterministic model in real data (Loevinger, 1948). This was a deterministic approach without a random error component to the analysis of data collected by a set of items that are assumed to measure one psychological property in common. A little earlier, in the 1920s, Thurstone (1928) developed his statistical measurement method of comparative judgment.

Thurstone's work may be viewed as the most important probabilistic predecessor of item response theory (IRT).

In the decade of the 1970s, item response theory became the dominant topic for study by measurement specialists. But, the genesis of item response theory (IRT) can be traced back to the mid-thirties and early forties. In fact, the term Item Characteristic Curve (ICC), which is one of the main IRT concepts, can be attributed to Ledyard Tucker in 1946. Despite these early research efforts, interest in item response theory lay dormant until the late 1960s and took a backseat to the emerging development of strong true score theory. While true score theory developed rapidly and drew the attention of leading psychometricians, the problems and weaknesses inherent in its formulation began to raise concerns. Such problems as the lack of invariance of item parameters across examinee groups, and the inadequacy of classical test procedures to detect item bias or to provide a sound basis for measurement in tailored testing, gave rise to a resurgence of interest in item response theory. Impetus for the development of item response theory as we now know it was provided by Frederic M. Lord through his pioneering works (Lord, 1952, 1953). The progress in the fifties was painstakingly slow due to the mathematical complexity of the topic and the nonexistence of computer programs. Interest in Lord's work spread quickly, as evidenced in the increase in publications in this area. Allen Birnbaum wrote a series of technical reports on logistic test models and model parameter estimation in 1957 and 1958. George Rasch (1960) published his book proposing several models for item responses. Nowadays, IRT models and procedures are no longer the main instruments only in the educational testing industry but are becoming increasingly popular in psychological testing as well. In addition, they have also become very popular and applicable in many scientific areas such as socio-economic research, medical diagnosis and marketing research.

According to Bartholomew (1987) there are different types of latent variable models, depending on the type of manifest (observed) variable and latent variable.

Table 1: Classification of latent variable models

Manifest variable	**Latent variable**	
	Continous	**Discrete**
Continous	Factor analysis	Latent profile analysis
Discrete	Item response theory models Latent trait analysis	Latent class analysis

Source: Bartholomew (1987).

In this paper we focus on the analysis for continuous latent variables and discrete manifest variable where latent variable is multidimensional. In multidimensional IRT, item characteristic surface (ICS) is used to represent the probability that an examinee with a given ability composite will correctly answer an item. This terminology is valid for two dimensional items only. The term of "item response hyper surface" should be used if more than two latent traits are necessary for an item. ICS is limited for two dimensions because of the graphical representation restrictions for more than two dimensions in multidimensional latent space (Ackerman, Gierl and Walker, 2003, Ackerman, 2005). Multidimensional IRT are models which explain the relationship between two or more unobservable variables, conceptualized as constructs or dimensions, and the probability of the examinee who is correctly answering any particular test item by the mathematical model (Ackerman, Gierl and Walker, 2003). Like unidimensional models, multidimensional models have some assumptions. These are monotonicity and local independence. Monotonicity means, as the examinee ability level increase, the probability of the examinee correctly answering any particular test item increase (Smith, 2009). Local independence is defined as the probability of solving any item i is independent of the outcome of any other item, controlling for person parameters and item parameters (Embretson and Reise, 2000).

Item Response Theory (ITR) is an extension of Classical Test Theory (CTT) (Lord and Novick 1968; Birnbaum 1968; Baker 1985; Bock and Lieberman 1970; Bock 1972; Lord 1980 and Wright 1992; 1997). The mathematical foundation of IRT is a function that relates the probability of a person

responding to an item in a specific manner to the standing of that person on the trait that the item is measuring. It means that the function describes, in probabilistic terms, how a person with a higher standing on a trait is likely to provide a response in a different category to a person with a low standing on the trait. This mathematical function has a pre-specified form (usually a logistic ogive) and is referred to as an item response function (IRF).

The main advantage of IRT models is the fact that the item location parameter (b) and the person trait level (θ) are indexed on the same metric. Therefore, when a person`s trait level is higher than the item location on the trait continuum, that person is more likely than not to provide a trait-indicating (positive or true) response. The converse is true when a person`s trait level is below the item location. IRT models are well suited to cope with dichotomous and polytomous responses, where the response categories may be unordered as well as ordered. The incorporation of linear structures allows for modeling the effects of covariates and enables the analysis of repeated categorical measurements.

In the literature the most common IRT models are models that are dichotomously scored. Test items have a polytomous format when the responses are scored in more than two categories. Such models have a response function for each different category. Although the response categories of dichotomous items typically have a fixed order (e.g., correct–incorrect; true–false), this does not necessarily hold for polytomous items. Polytomous items have a nominal response format if their response categories can be classified but an a priori order between them does not exist. The nominal response model below is appropriate for items with this format. If an a priori ordering of the categories does exist, a graded response model or partial-credit model should be chosen. The two models differ in the problem-solving process that is assumed to lead to the responses. Models for a graded-response format are more generally known as cumulative models in ordinal categorical data analysis. The partial-credit models below are known as adjacent-category models. These two options do not exhaust all possibilities, a more comprehensive review of different polytomous response formats and IRT models is given in Mellenbergh (1994).

Multivariate IRT Models

Unidimensional IRT models are appropriate for analyzing examinees' responses to items measuring a single latent trait or ability. However, for complex items that measure multiple latent traits simultaneously, item responses should not be modeled using a unidimensional IRT model because the probability of a correct response would not be a function of a single latent trait anymore. When item response data do not satisfy the unidimensionality assumption, multidimensional item response theory (MIRT) should be used to model the item-examinee interaction. MIRT enables one to model the interaction of items that are capable of discriminating between levels of several different abilities and examinees that vary in their proficiencies on these abilities. In this article graphical MIRT analyses designed to provide better insight into what individual items are measuring as well as what the test as a whole is assessing are presented and discussed.

Multidimensional item response theory (MIRT) provides an ideal foundation for modeling performance in complex domains, taking into account multiple basic abilities simultaneously, and representing different mixtures of the abilities required for different test items. MIRT models explain the probability of a correct response to a given item as a function of a vector of latent traits, instead of a single latent trait. Although MIRT can be used for various purposes, this modeling framework is particularly useful for modeling the item response data when one or more items measure multiple latent traits simultaneously (Reckase, 2009), and for improving measurement precision when there are individual tests or subtests measuring correlated latent traits (Wang, Chen, & Cheng, 2004). MIRT models can be categorized into two groups based on the test structure. These are between-item models and within-item MIRT models (Adams et al., 1997; Wang et al., 2004). In a between-item MIRT model, each latent trait is measured by a unique set of items. In other words, each item is associated with only one of the latent traits measured by the test. This type of test structure is also known as simple structure, as with a factor analytic solution where items load onto a single factor. Between-item MIRT models are typically used for estimating subscores from subtests measuring correlated latent traits (e.g., Bulut, Davison, & Rodriguez, 2017; de la Torre, Song, & Hong, 2011;

Wang et al., 2004). In a within-item MIRT model, each item can be associated with two or more latent traits measured by the test. This type of test structure is known as a nonsimple or complex structure. A good example of within-item multidimensionality is the bi-factor test structure from cognitive ability assessments, where all items are associated with a general latent trait (i.e., general intelligence) and each item is associated with a secondary latent trait (i.e., specific cognitive abilities).

Fig. 1 presents the between-item and within-item MIRS models for a measurement of two latent characteristics.

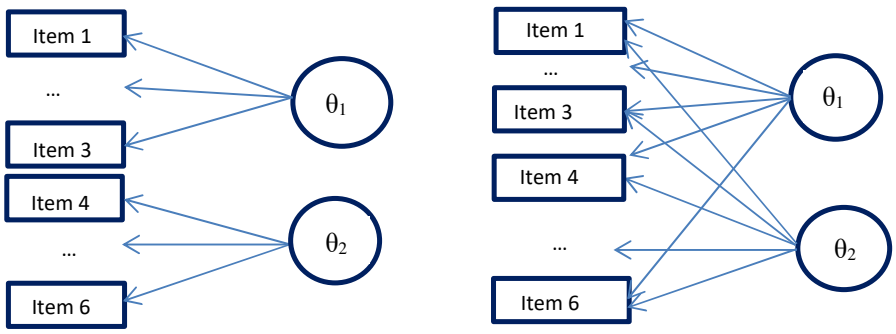

Figure 1: Between-item (left) and within-item (right) structure.
Source: own calculations.

Figure 2 illustrates the between-item and within-item MIRT models for a test measuring two latent traits. In the between-items item model, items from 1 to 3 are associated with the first latent trait θ_1, while items from 4 to 6 are associated with the second latent trait θ_2. Latent traits θ_1 and θ_1 are not correlated and do not share any common traits. The test structure becomes multidimensional, while each latent trait is defined by a set of unidimensional items while the overall structure becomes multidimensional. In the other type of MIRT, within-item model, the terms are associated with both θ_2 and θ_1 latent traits, and thus the test has a nonsimple structure. In MIRT models the correlation between the latent traits becomes larger, the estimation results are likely to become less reliable (Bulut et al., 2017). As in IRT analysis, there are several types of MIRT, depending on the number of parameters included in the model.

As we have discussed earlier, uni-dimensional IRT models are appropriate for analyzing examinees' responses to items measuring a single latent trait or construct. However, for complex items that measure multiple latent constructs simultaneously, item responses should be modeled using multi-dimensional approach, as the probability of a correct response would be a function of a multiple latent trait. MIRT models explain the probability of a correct response to a given item as a function of a vector of latent traits, instead of a single latent trait. Although MIRT can be used for various purposes, this modeling framework is particularly useful when we:

1. model the item response data when one or more items measure multiple latent traits simultaneously (Reckase, 2009),
2. want to improve measurement precision when there are individual tests or subtests measuring correlated latent traits (Wang, Chen, and Cheng, 2004).

Multidimensional Item Response models can be categorized in several ways. They can be categorized based on whether the weakness (or deficit) in one dimension (i.e., latent trait) can be compensated by the strength in another dimension. In addition, MIRT models can be grouped based on whether each

item is associated with a single latent trait or multiple latent traits.

Two-parameter multidimensional IRT model

First, we present the two-parameter multidimensional model (M2PL), which is an extension of the unidimensional Birnbaum model. This M2PL model is a compensatory MIRT model including item difficulty and item discrimination parameter from a multidimensional test. The M2PL model is defined as:

$$P\left(u_{ij}=1\middle|\boldsymbol{\theta}_{\mathbf{j}},\mathbf{a}_{\mathbf{i}},d_i\right)=\frac{\exp(\mathbf{a}_{\mathbf{i}}\boldsymbol{\theta}_{\mathbf{j}}^{`}-d_i)}{1+\exp(\mathbf{a}_{\mathbf{i}}\boldsymbol{\theta}_{\mathbf{j}}^{`}-d_i)}, \tag{1}$$

where: $\boldsymbol{\theta}_{\mathbf{j}}$ is a $1\times M$ vector of latent traits for examinee j $\left(\boldsymbol{\theta}_{\mathbf{j}}=\left(\theta_{j1},\theta_{j2},\ldots,\theta_{jM}\right)\right)$, $\mathbf{a}_{\mathbf{i}}$ is a $1\times M$ vector of slope (i.e., item discrimination) parameters for item i $\left(\mathbf{a}_{\mathbf{i}}=\left(a_{i1},a_{i2},\ldots,a_{iM}\right)\right)$, and d_i is the intercept term for item i. The intercept in M2PL model is not similar to the difficulty parameter in 2PL model, because it cannot be considered a unique indicator of the difficulty of the item (Reckase, 2009). To obtain a multidimensional difficulty parameter for item i we can use a transformation formula:

$$B_i=\frac{-d_i}{\sqrt{\sum_{m=1}^{M}a_{im}^2}}. \tag{2}$$

The higher the value of B_i gets, the more difficult the item becomes. Similarly, we can obtain the discrimination parameter using the transformation presented below:

$$A_i=\sqrt{\sum_{m=1}^{M}a_{im}^2}, \tag{3}$$

where A_i is the multidimensional discrimination parameter representing the overall discrimination power of a multidimensional item. For unidimensional IRT models with a single latent trait the difficulty parameter would contain only one non-zero element.

Multidimensional Rasch model

Multidimensional Rasch model was introduced by Adams (1997). This model can be used for estimating item parameters from a test measuring multiple latent traits. The general form of the Rasch model is (Adams 1997):

$$P\left(u_{ij}=1\middle|\boldsymbol{\xi},\boldsymbol{\theta}_{\mathbf{j}}\right)=\frac{\exp(\mathbf{b}_{\mathbf{ik}}^{`}\boldsymbol{\theta}_{\mathbf{j}}^{`}+\mathbf{a}_{\mathbf{ik}}^{`}\boldsymbol{\xi})}{\sum_{k=0}^{K}\exp(\mathbf{b}_{\mathbf{ik}}^{`}\boldsymbol{\theta}_{\mathbf{j}}^{`}+\mathbf{a}_{\mathbf{ik}}^{`}\boldsymbol{\xi})}, \tag{4}$$

where $\mathbf{b}_{\mathbf{ik}}$ is a score vector for category k of item i across the M dimensions, $\mathbf{a}_{\mathbf{ik}}$ is a design vector for score category k of item i across that defines the relationship between the item difficulty parameters, $\boldsymbol{\theta}_{\mathbf{j}}$ is a vector of latent traits $\left(\boldsymbol{\theta}_{\mathbf{j}}=\left(\theta_{j1},\theta_{j2},\ldots,\theta_{jM}\right)\right)$, and $\boldsymbol{\xi}$ is a vector of item difficulty parameters for item i. In multidimensional Rasch model presented above $\mathbf{a}_{\mathbf{ik}}$ and $\mathbf{b}_{\mathbf{ik}}$ do not refer to item discrimination and item difficulty parameters. In multidimensional case of Rasch model they refer to weights derived from the test structure based on the researcher`s hypothesis. Parameters that are estimated under multidimensional Rasch model are $\boldsymbol{\xi}$ and $\boldsymbol{\theta}_{\mathbf{j}}$.

Multidimensional Graded Response model

Now we present multidimensional IRT model that is used for polytomously scored items. This model is an extension of unidimensional Graded Response Model (GRM) and presents the probability of examinee j selecting response category k in item i:

$$P\left(u_{ij}=k\middle|\boldsymbol{\theta}_{\mathbf{j}},\mathbf{a}_{\mathbf{i}},\delta_{ik}\right)=\frac{1}{1+\exp\left[-\sum_{m=1}^{M}-\left[a_{im}\left(\theta_{jm}-\delta_{ik}\right)\right]\right]}, \tag{5}$$

where $\boldsymbol{\theta}_{\mathbf{j}}$ is a $1\times M$ vector of latent traits examinee j $\left(\boldsymbol{\theta}_{\mathbf{j}}=\left(\theta_{j1},\theta_{j2},\ldots,\theta_{jM}\right)\right)$, a_i is a $1\times M$ vector of slope (i.e., item discrimination) parameter for item i $\left(\mathbf{a}_{\mathbf{i}}=\left(a_{i1},a_{i2},\ldots,a_{iM}\right)\right)$, and δ_{ik} is the category boundary location for the response category k of item i. As we compute the probability of responding on the kth category of item i, $P\left(u_{ij}=0\middle|\boldsymbol{\theta}_{\mathbf{j}},\mathbf{a}_{\mathbf{i}},\delta_{ik}\right)=1$ and $P\left(u_{ij}=K+1\middle|\boldsymbol{\theta}_{\mathbf{j}},\mathbf{a}_{\mathbf{i}},\delta_{ik}\right)=0$.

In the further part of this paper we present the application on multidimensional item response models using R software.

Model Selection Methods

The goodness of fit of a given latent class model to the observed data can be assessed using a chi–square test based on observed and expected frequencies. We can use Pearson‘s χ^2 statistic based on the differences between observed and expected frequencies:

$$\chi^2=\sum_{s=1}^{2^v}\frac{\left(n_s-\hat{n}_s\right)}{\hat{n}_s}. \tag{6}$$

Another widely used test is likelihood ratio G^2 based on the logarithm of the ratio of observed and expected frequencies (Agresti 2002):

$$G^2=2\sum_{s=1}^{2^v}n_s\cdot\ln\left(\frac{n_s}{\hat{n}_s}\right). \tag{7}$$

When $\hat{n}_s=0$, the corresponding term in G^2 is set equal to 0. The degrees of freedom (df) for both of statistics are equal to 2^v-m-1, where m is the number of independent parameters. When expected cell frequencies are small (smaller than 5), both statistics χ^2 and G^2 tend to be distorted and may fail to follow appropriate chi–square distribution. When the difference between the computed values of χ^2 and G^2 are large, there are often one or two response vectors where small expected frequencies are causing the discrepancy.

There is a wide range of another criteria for model selection called information criteria. The Akaike information criterion (AIC) (Akaike 1973) is a measure of model fit based on concepts derived from information theory. There are two equivalent ways to implement the AIC for a set of competing latent class models. As originally proposed by Akaike, the AIC is defined as:

$$\ln\left(L_h\right)=\sum_{s=1}^{2^v}n_s\ln\left[P_h\left(\mathbf{Y}_s\right)\right], \tag{8}$$

where: $P_h\left(\mathbf{Y}_s\right)$ is the probability for an observed response vector based on maximum-likelihood estimates for the h–th model.

Another Akaike information criterion is defined as:

$$AIC_h = -2\ln(L_h) + 2m_h, \tag{9}$$

where: m_h is the number of independent parameters that are estimated when fitting the h–th model to the data. For model selection we can also apply Bayesian information criterion (BIC) (Schwarz 1978):

$$BIC_h = -2\ln(L_h) + \ln(N) \cdot m_h. \tag{10}$$

The AIC and BIC are mostly used for comparison across several plausible models where the lowest value of a given information criterion indicates the best fitting model.

Applications in R

Mirt package of R

A common characteristic of the IRT models are well known and used in education and psychology research, where there is a single latent trait underlying the items. In other words, the test structure is assumed to be unidimensional. However, most educational and psychological assessments tend to measure two or more latent traits or dimensions. When the items measure two or more latent traits, the test structure is referred to as multidimensional. To estimate item parameters and latent trait levels from multidimensional assessments, multidimensional IRT (MIRT) models should be used.

Now we present the application of multidimensional IRT models in R using mirt package. The mirt package is capable of estimating various MIRT models, although there are other R packages available for estimating some MIRT models, such as flirt (Jeon, Rijmen, and Rabe-Hesketh, 2014), TAM (Kiefer et al., 2016), eRm (Mair and Hatzinger, 2007), and sirt (Robitzsch, 2017).

Using the mirt package there are many flexible parameter estimation features:

- Mixe ed (dichotomous and polytomous) IRT model estimation with flexible specifications for uni-dimensional and multidimensional patterns,
- linear and nonlinear parameter constraints and bounds,
- prior parameter distributions,
- item- and group-level covariates,
- user defined item types for on the fly estimation,
- nonlinear latent traits and interaction term.

The mirt package contains five primary estimation functions, all of which support mixed item formats for multidimensional response models, and each with their own special purpose. They are:

- mirt() - single group estimation using quadrature (EM) and stochastic MML (MH-RM) estimation,
- bfactor() - single/multiple group bi-factor or two-tier estimation by using a dimensional reduction EM algorithm, useful when there are multiple packets of independent specific factors (e.g., testlets, longitudinal models),
- mdirt() - latent class model estimation (fairly experimental, as there are better packages for such procedures).

Multidimensional IRT analysis for the dataset from R

Now we apply mirt{mirt} function for the analysis of Science dataset from mirt package (Chalmers 2012) 4 items: Comfort Work Future Benefit, and 392 respondents. First, we compute parameters for items and we compute 1 and 2 factor models. Using coef() function extracts the maximum-

likelihood parameters and item facilities (i.e., average number of correct responses). We build uni-dimensional and two-dimensional IRT model and then we compare goodness of fit using information criteria (AIC and BIC statistics).

Descriptive statistics present proportions for each level of response (categories) for all variables on the sample 392 respondents. We also obtain frequencies of total scores for all responses, as well as Cronbach`s alpha value for items.

Sample:
7 items and 392 sample units; 0 missing values

Proportions for each level of response:

	strongly disagree	disagree	agree	strongly agree
Comfort	0.0128	0.0816	0.6786	0.2270
Environment	0.0740	0.2296	0.3699	0.3265
Work	0.0842	0.2500	0.5255	0.1403
Future	0.0357	0.1837	0.5357	0.2449
Technology	0.0459	0.2321	0.4005	0.3214
Industry	0.0255	0.1199	0.4413	0.4133
Benefit	0.0536	0.2551	0.4923	0.1990

Frequencies of total scores:

	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Freq	0	0	0	1	0	0	1	0	5	13	24	38	43	43	70	56	28	27	21	15	4	3

Cronbach's alpha:

	value
All Items	0.5082
Excluding Comfort	0.4467
Excluding Environment	0.4880
Excluding Work	0.5129
Excluding Future	0.4474
Excluding Technology	0.4791
Excluding Industry	0.4394
Excluding Benefit	0.4726

Now we run item response analysis for one latent dimension. Results of the analysis for uni-dimensional model are presented below.

Log-likelihood = -1608.87
Estimated parameters: 16
AIC = 3249.739; AICc = 3251.19
BIC = 3313.279; SABIC = 3262.512
G2 (239) = 213.56, p = 0.8804
RMSEA = 0, CFI = NaN, TLI = NaN

Residuals of uni-diemensional IRT model are as follows:

	Comfort	Work	Future	Benefit
Comfort	NA	-0.147	-0.101	0.152
Work	-25.512	NA	0.088	-0.141
Future	-12.002	9.208	NA	-0.122
Benefit	27.321	-23.235	-17.461	NA

From the analysis we can see, that information criteria for uni-dimensional IRT model are: AIC=3249.739, and BIC=3313.279. Now we present results for two-dimensional model.

Log-likelihood = -1601.969
Estimated parameters: 19
AIC = 3241.938; AICc = 3243.981
BIC = 3317.392; SABIC = 3257.106
G2 (236) = 199.76, p = 0.9583
RMSEA = 0, CFI = NaN, TLI = NaN

Residuals of two-dimensional IRT model are as follows:

	Comfort	Work	Future	Benefit
Comfort	NA	-0.143	-0.096	-0.116
Work	-23.892	NA	-0.087	-0.131
Future	-10.943	-8.899	NA	-0.121
Benefit	-15.793	-20.286	-17.157	NA

From the analysis we can see, that information criteria for uni-dimensional IRT model are: AIC=3241.938, and BIC=3317.392.

Using plot() function we can present graph of expected total score for uni- (left, fig. 1) and two-dimensional model (right, fig. 1).

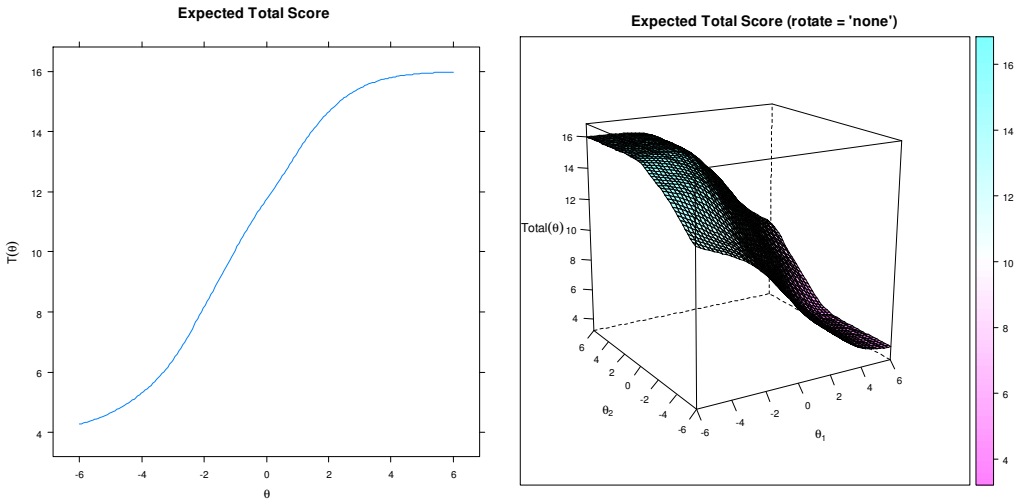

Fig. 1: Graphical presentation of expected total score for uni- and two-dimensional IRT model

Source: own calculations using R.

As one-dimensional model is presented for one latent variable, the plot presents relation between latent construct (θ) and the total score (T(θ)). For two-dimensional latent space we obtain plot in three dimensions: for two latent constructs (θ_1 and θ_2) and for the total score (T(θ)).

To compare one and two-factor IRT model we can use anova() function. We obtain statistics of goodness-of-fit for models that are compared (uni- and two-dimensional).

	AIC	AICc	SABIC	HQ	BIC	logLik	X2	df	p
1	3249.739	3251.190	3262.512	3274.922	3313.279	-1608.870	NaN	NaN	NaN
2	3241.938	3243.981	3257.106	3271.843	3317.392	-1601.969	13.801	3	0.003

In the summary we obtain all possible statistics of goodness-of-fit based on the chi-square statistics, as well as information criteria. The smaller information criterion, the better model, however the differences between one and two-factor model are very little. From the study of goodness of fit statistics we choose model 2 as fitting best. The BIC criterion BIC=

We can also present test information function graph, as well as test standard errors for two latent traits using two-dimensional latent space. We present graphically test information function (left) and plot for the test standard error function (right) (Fig. 2).

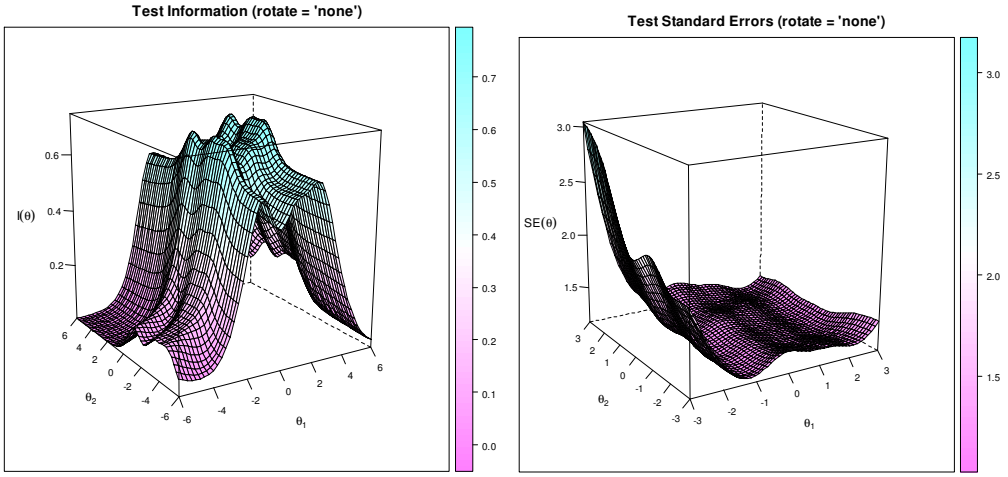

Fig. 2: Test information function (left) and plot for the test standard error function (right) for two-dimensional IRT model
Source: own calculations using R.

Having chosen two-dimensional IRT model we can provide great visualizing tools in three dimensional space.

Using plot() function we can present graphically information in different intervals of latent variables.

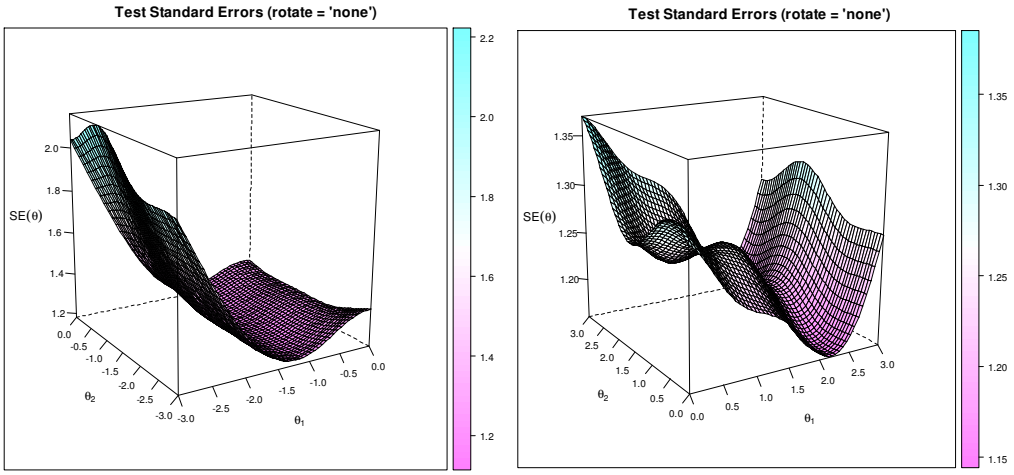

Fig. 3: Test information function (left) and plot for the test standard error function (right) for two-dimensional IRT model in interval (-3,0) (left) and (0,3) (right)
Source: own calculations using R.

Fig 3. presents the surface of information values for two intervals: (-3,0) and (0,3). We observe the values and changes of information depending on the values of two latent constructs (θ_1 and θ_2).

Summary

Item response models are widely used in assessment and evaluation research to explain how participants respond to item level stimuli. Several R packages can be used to estimate the parameters in various IRT models, however these packages have limitations because they can focus on one-dimensional latent space only. In this paper we present the theory, methodology and application of IRT models for multidimensional latent space.

We presented the mirt package of R software. This package was created for estimating multidimensional item response theory parameters for exploratory and confirmatory models by using maximum-likelihood method. The analysis conducted on real-life data based on Science dataset provides parameter estimates, residuals and graphical presentation of multidimensional IRT model. Using multidimensional latent space we prove that there is a great advantage of additional latent space in describing latent variable.

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The Importance of Economic Socialisation in The Process of Developing Economic Culture

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Abstract

The article focuses on the importance of economic socialisation with particular emphasis on its impact on the processes of developing a proper model of economic culture conducive to economic growth. In the first, theoretical part of the article, selected concepts relating to the subject of socialisation are presented, including the issue of economic socialisation and its significance for economic culture as well as the related categories. The second part reviews the research conducted on the discussed issues. The research results obtained thereby enabled laying down guidelines for selected initiatives that may stimulate the process of economic socialisation in order to strengthen and develop such a model of economic culture that fosters economic growth. The main research objective was to examine and determine the current level of awareness concerning economic life and how it affects the respondents' behaviour.

Keywords: Creativity, Economic Socialisation, Economic Culture

Introduction

The interest in culture as the primary source of changes taking place in the world is becoming the basis for explaining and interpreting the phenomena occurring in the socio-economic space. Its importance was particularly emphasised as one of the factors contributing to the economic success of Asian countries considerably different from European countries in terms of culture. The intensification of this phenomenon was first observed in the last decade of the 19th century, when as a result of second industrial revolution, urbanisation and the emergence of mass society it was necessary to find conceptual categories that would describe the meaning of the changes taking place (precursors M. Weber, A. de Tocqueville, E. Banfield, K. E. Boulding (Michalski, 2014). As a result of these processes, economic culture is gaining in significance and is increasingly perceived by economists as an important aspect affecting numerous phenomena occurring in the domain of economics. Therefore, in order to present a certain research area and analyse it, the article distinguishes two trends. The first one is of cognitive nature and focuses on the analysis of the source literature. The study investigated foreign and Polish literature which provided the basis for the critical analysis and the research framework. It concerned concepts related to economic socialisation and its significance for the process of creating economic culture. The descriptive and cognitive considerations formed the basis for the analytical considerations. The second, research-oriented, trend focuses on the research conducted in the form of focus group interviews concerning the impact of economic socialisation on the process of economic culture formation. The interviews were carried out with working young students of the Institute of Management, Faculty of Economics, Finance and Management, University of Szczecin. The main research objective was to: examine and determine the current level of awareness concerning economic life and how it affects the behaviour of the respondents, using research procedures and appropriate methodology. The considerations provided the basis for the formulation of the research hypothesis: *The higher the level of the respondents' awareness of economic life, the more correct the model of economic culture conducive to economic development*.

The Concept of Economic Socialisation

Socialisation (*Latin socialis – social*) is a process of change which consists in the acquisition by an individual of knowledge, communication competences, psychosocial skills and a system of values, norms and patterns of behaviour resulting from the influence of the social environment (Encyclopedia PWN, 2020). In other words, it is a process in which an individual adapts themselves to life in society. Hence, it is so important in the formation of culture.

Traditionally, the basis of socialisation was the family and the process itself meant inheritance of a stable hierarchy of values and was functional under conditions of stability of cultural values and invariability of norms and principles of social life. Such an understanding of socialisation lasted until the mid-18th century. Subsequently, the industrial revolution contributed to rapid social change. The inevitable technological changes that accompany contemporary social and cultural conditions may undermine the individual's belief in the traditional hierarchy of values (Juszczyk-Rygałło, 2016). In recent years, the issue of social maladjustment has become particularly important. This is due to the faulty process of socialisation and the greater prevalence of social problems (Skuza, 2011).

Socialisation, due to the influence of social factors on people at every stage of their lives, lasts from birth to death (Checkel, 2017). This process reaches its peak at the stage of early childhood, as this is when life in society begins. Through the social and cultural processes taking place in the child's environment, elements of their personality and value system are formed. The changes also concern the problems of economic life. The turbulent economic environment significantly influences the socialisation process. The process of acquiring knowledge, skills, behaviours and values leading to the comprehension of the principles governing the economic system and taking actions in the surrounding economic reality is defined as economic socialisation.

The history of economic socialisation, which is a part of economic psychology and combines psychology, sociology and behavioural economics, dates back to the 1950s. Research in this area was carried out by Strauss (1952), who distinguished the stages of growing understanding of the concept of money, and Danzinger (1958), who conducted research on a sample of 41 Australian children aged 5-8 years involving a questionnaire of 10 standard questions about various economic processes. The 1980s saw a boom in research on economic socialisation (e.g. research of Berti and Bombi (1988) on the sources of money). In Poland, research on economic socialisation began with the transformation of the economy, when a period of rapid adjustment shock was followed by stabilisation in new economic, political and social conditions (Trzecińska 2012; Harmacińska, Szmelter, 2015).

Economic socialisation concerns both children, youth and adults. However, in the source literature it is predominantly discussed in the context of the childhood period. The concept of economic socialisation includes all the processes by which a child acquires the ability to understand the economic world that surrounds them (Roland-Lévy, 2004; Zaeri, 2016, Otto, Serido, 2017). In sociology, this process is divided into two stages which differ in terms of the intensity of socialisation. The first one, referred to as primary or early, includes infancy and early childhood. The second (secondary, permanent) extends to further years of life (Giddens, 2006). As a result of economic socialisation, the child gains the ability to understand the surrounding world of economy and to function in it (Trzcińska, 2012). In the mind of children and young people, in response to objectively existing phenomena, processes and economic institutions, a subjective image of the world of economics is created, influencing their emotions and behaviour (Goszczyńska, Kołodziej, Trzcińska, 2012). The analysis of economic socialisation of children cannot be considered without reference to Piaget's theory of cognitive development (1966) and Bandra's theory of social learning.

Contemporary economic changes strongly affect the process of economic socialisation of children and youth, including financial (Piageta, 1966) and consumer socialisation (Kołodziejczyk, 2020). However, economic socialisation applies to adults as well. For example, the studies of Moreno, Salcedo, Rebellon, Anzelin (2018) deal with the use and importance of money in students' lives. Its importance is growing especially in the process of developing economic culture.

Children's knowledge of the economic world has a great influence on their perception of the world and the hierarchy of values also when they enter into adult life. Therefore, the role of education (economic socialisation) of children and young people will be crucial as well as the role of school and family to provide children with such knowledge of economics which will allow them to find their place in everyday reality of the modern economy and acquire the ability to understand the economy in its various dimensions. It should be kept in mind that a properly conducted process of economic socialisation creates such a model of economic culture that fosters the development of the country.

Economic socialisation as a component of economic culture

Economic culture as a concept was developed in the early 1980s by P. Berger. The author was inspired by works of G.A. Almond and S. Verby who described civil culture. According to P. Berger, the concept of economic culture does not ultimately include a unidirectional causal relationship. This is to say that it does not assume that culture determines the economy, just as it does not assume that economic factors are always determinants of culture (Berger 1986). In his opinion and in the opinion of the authors of this article the concept of economic culture only directs attention to the existence of such relationships.

According to M. Marody and J. Kochanowicz (2007), economic culture is understood as a system of values, cognitive schemas and patterns of behaviour that are associated with business management. Value systems define what is perceived as good or bad, desirable or undesirable, acceptable or unacceptable, beautiful or repulsive in a society. Cognitive schemas include the categories through which people interpret reality (especially economic reality) and its causal relationships. Behavioural patterns are a set of internalised norms and habits that structure human behaviour. Furthermore, “the concept of economic culture does not include any unidirectional causality, that is to say, it does not assume that culture determines the economy or, vice versa, that economic factors always determine culture. These specific causal relationships may be subject to empirical research in each individual case” (Kochanowicz 2012).

In addition, broadly interpreted economic culture is a part of culture, encompassing behaviours, actions and attitudes related to economic life and human material existence. Economic culture is sometimes understood as the result of actions related to natural phenomena, however somehow contrary to nature, i.e. as an order imposed by man, and simultaneously as a tool for satisfying human needs and a method of achieving goals in the area of material existence (Kozera, 2007).

According to A. Sokół (2018), economic culture is one that refers to the national context in which value systems, patterns of behaviour (not necessarily conscious) of social groups or individuals relevant for their economic activity are characteristic, taking into account their cognitive and adaptive abilities in this respect. It individualises the characteristics of those nations which use this cultural category effectively enough as to create added value in the economy, thus contributing to economic growth. Therefore, the analysis of economic culture conducted in this article allows the identification of two intertwining areas that produce value as a result of mutual interaction. These include the general dimension of national culture and economic culture. Thus, the proposed research category is primarily a broadly defined interdependence at the level of the nation, including economic aspects, which by means of appropriate tools influences the behaviour of all business entities (figure 1).

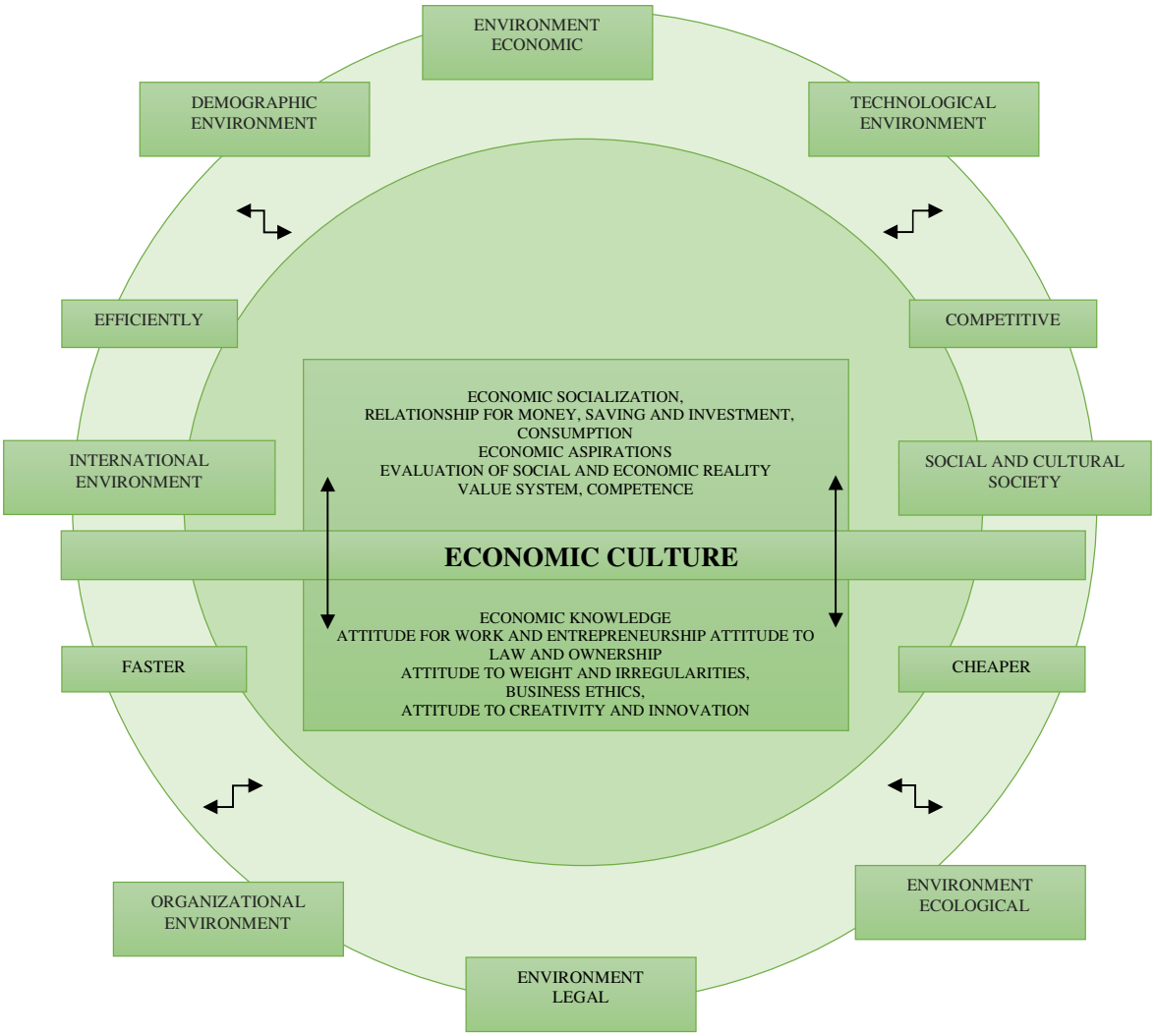

Figure 1: Elements of national economic culture

Source: The author's own work.

To sum up, economic culture may be defined as a category of phenomena related to the economy, specific values, cognitive schemas and patterns of behaviour, as well as views on how economic life should be organised (Krzeminiewska, 2013). Economic culture may be interpreted from two angles. The first one refers to a catalogue of all these values, cognitive schemas and behaviour patterns relevant to economic activity. The second one distinguishes the main factors affecting the evolution of cultures, standardising them on several dimensions or around the central points of analysis, each of which may be crystallized in terms of more concrete problems or questions (Marody, Kochanowicz, 2007 after: Krzeminiewska, 2013).

Therefore, in the light of the discussion above, it seems appropriate to include certain areas in the definition of economic culture. The aim of the applied concept is to seek appropriate representations of the cultural context relating to economic characteristics, also allowing research of a nomothetic nature as well as the inclusion of cultural "multidimensionality" – a simultaneous analysis of many cultural characteristics.

The analysis of the components affecting the model of economic culture included the following categories: economic socialisation, attitude to money and saving, consumption, economic aspirations, evaluation of social reality, value system, skills, economic knowledge, attitude to work and entrepreneurship (Krzeminiewska, 2010). On the basis of the already existing papers on the subject and by modifying the above model, the following components will be taken into account in this article: economic socialisation, attitude to money, saving and investment, consumption, economic aspirations, evaluation of social and economic reality, value system, competences, economic knowledge, attitude to work and entrepreneurship, attitude to law and property, attitude to wealth and inequality, business ethics, attitude to creativity and innovation. Having regard to the aim of the article, it seems interesting to indicate the importance of economic socialisation in the development of economic culture.

Material and Method

The empirical verification of the hypothesis formulated in the article about the level of the respondents' awareness of economic life and its influence on the proper model of economic culture conducive to economic development. This phenomenon is definitely of a qualitative nature and therefore difficult to measure. In addition, any attempt to assess it is (or may be) subjective, depending on the degree of maturity and the ability of participants to objectively assess the phenomenon. Despite these limitations, an attempt was made to study the respondents' awareness of economic life in relation to the phenomenon of economic culture on the basis of focus group interviews. The interviews were carried out with working young students of the Institute of Management, Faculty of Economics, Finance and Management, University of Szczecin.

Research Results

The article presents the scope of issues related to own research. The area of research on the presented subject matter includes the analysis of the discussed issues both on the theoretical (literature studies) and empirical (focus group interviews) basis (figure 2).

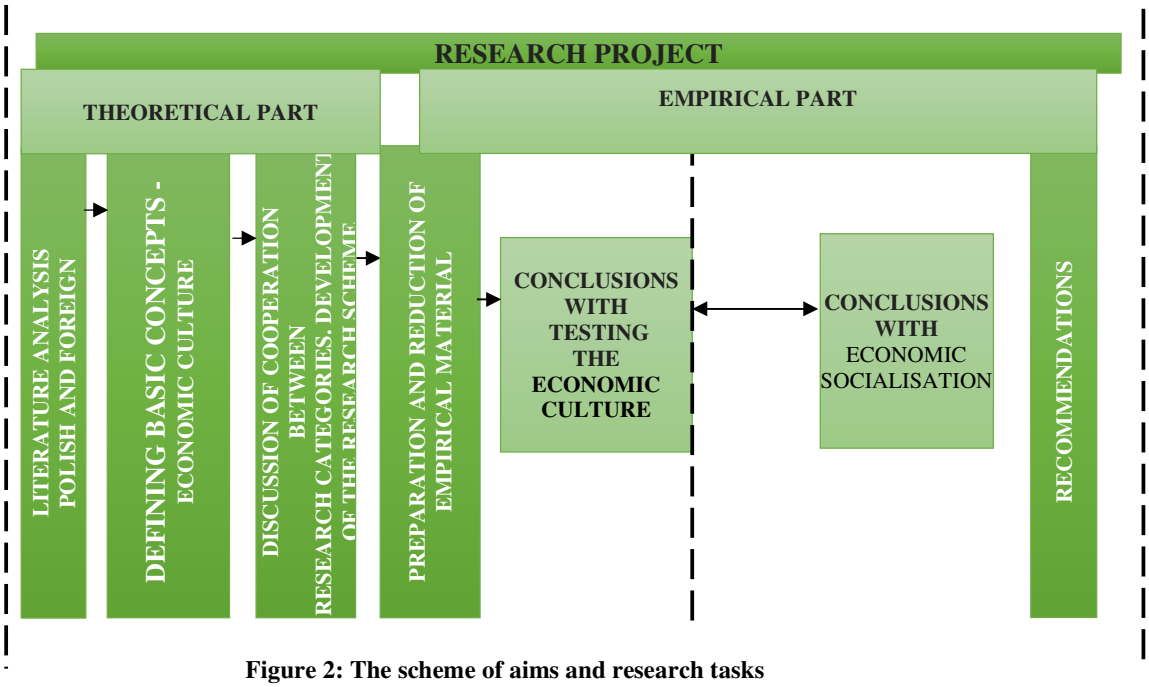

Figure 2: The scheme of aims and research tasks

Source: The author's own overview.

Based on the application of appropriate research methods and procedures, the concept of economic socialisation and its impact on the model of economic culture was defined. This means that specific

methods were used in the research: analysis, synthesis, induction and deduction. The answer to the following research questions will conclude the conducted research: *does, in the opinion of the respondents, economic socialisation affect the formation of a proper model of economic culture? What improvements should be made if economic socialisation were to support the process of development of economic culture in Poland?*

Therefore, the following hypothesis has been formulated: *The higher the level of the respondents' awareness of economic life, the more correct the model of economic culture conducive to economic development.*

As part of qualitative research, focus group interviews (FGI) were conducted. A discussion was held in which phenomena related to the issue of economic socialisation and its impact on developing processes were analysed. Focus group interviews were conducted in a group of working young students in December 2019. The group consisted of participants between 19 and 30 years of age. The group consisted of 8 people (6 of whom were women).

As part of the focus study, at the beginning of the discussion participants were asked about the definition and role of economic socialisation in the process of developing economic awareness of citizens. Unfortunately, only 3 respondents were able to indicate what socialisation, including economic socialisation, is associated with. One of them believed (they gave the most precise answer) that "it includes different kinds of processes taking place in an individual's environment which make it easier for them to understand and navigate through the economic space. This makes such a person more or less susceptible to influence, especially an adverse influence in this area". This particular person was then asked how they learned about the concept of socialisation, including economic socialisation. It turned out that this person graduated in sociology and is interested in psychology, currently is attending studies in the field of economics. The remaining two persons who also answered the question about the concept of economic socialisation, defined it as a process of adaptation of an individual to the surrounding conditions. Taking into account the above answers, it may be concluded that, unfortunately, the remaining participants have not often come across this concept or considered aspects related to these terms. It is difficult to assess this situation as negative or positive for Polish society. However, it is worth noting that these were students in the fields related to economics. This indicates that Polish higher education institutions fail to provide complete knowledge about economic socialisation.

Then, after the respondents were informed how to understand the concept of economic socialisation, they were asked who in the society, in their opinion, affects the understanding of economic life to the greatest extent. They were requested to include the period of early childhood (up to 5 years) and the current period. The answers obtained indicated that the economic attitudes and perception of economic life by the respondents in the early years of their lives I predominately determined by the family. Thus, this space influences the life goals and level of aspirations and values of the individual in the future. The level of economic socialisation at this stage takes place rather unconsciously, according to the respondents, the child, observing the behaviour of those around them, attempts to adopt the models considered by the family as appropriate. However, in the later and current period, the media, school and friends are of particular importance to the respondents. In particular, the respondents pointed to the high position of the media which affect current attitudes towards economic life and its related processes.

Then the participants were asked *where they obtain their economic information from and what economic topics they are especially interested in.* The answers included: economic websites, newspapers, conversations with family and friends, including information derived from work (this source of information was indicated by 4 respondents). Then, to further explore the topic, the respondents were asked *what economic issues are important to them.* Three persons indicated that they were primarily interested in financial information, two persons were interested in economic trends and the remaining persons stated that they looked for economic information when they needed it to carry out their official tasks. Moreover, the respondents are particularly interested in foreign exchange markets and economic trends in Poland.

The participants were also asked *if, in their opinion, the process of economic socialisation during childhood and later period was conducted properly and if economic issues were frequently discussed in their families.* Only 2 respondents out of 8 considered that they could discuss the topic of economic socialisation in their families. Their interests and current activities in the family, especially in the financial sphere, have allowed them to have greater knowledge of the economy.

Therefore, another aspect addressed in the discussion related to the factors that the respondents would include among the most important determinants of economic socialisation. According to the respondents, one of the factors that could particularly raise the economic awareness is the introduction of classes on economic basics and entrepreneurship regardless of the field of study. This, in their opinion, would contribute to a more informed society that understands these kinds of processes taking place in the country.

When asked *whether, in their opinion, economic socialisation influences the model of economic culture,* the majority of respondents replied that economic socialisation determines the model of economic culture. The respondents were asked to justify this opinion. They responded that economic socialisation forms the basis for many other factors that affect the model of culture (the respondents were provided with the definition of the components of economic culture adopted by the authors of this article and the meaning of these terms). Namely, it is closely related to and significantly affects, according to the respondents, economic knowledge, attitude to money, saving and investment, consumption, economic aspirations, assessment of social and economic reality, the system of adopted values, competences, attitude to work and entrepreneurship, attitude to wealth and inequality, business ethics, attitude to creativity and innovation.

In the summary of the study, the participants noted that the analysis of and discussion about the phenomenon allowed them to recognise diversified aspects of economic culture as one of the most important distinguishing features of its development in economic socialisation. Therefore, the panel participants (8 persons) had no doubt that economic socialisation exerts a significant impact on the proper model of economic culture. Thus they support the hypothesis that *the higher the level of the respondents' awareness of economic life, the more correct the model of economic culture conducive to economic development*.

Summary

Economic socialisation as a research category is becoming increasingly popular. There are more and more studies presenting the new context of the issue. In spite of that, the concept is still poorly recognised in economic sciences in the theoretical and empirical terms. Detailed analyses which examine the impact of economic socialisation on the model of economic culture are rare. The conclusions reached in this study allow the authors to indicated and support the hypothesis that *the higher the level of the respondents' awareness of economic life, the more correct the model of economic culture conducive to economic development*. It should be noted that socialisation is achieved through specific social teaching which engages the individual in a culture of work based on economic knowledge and its technical and technological forms in the professional environment and everyday life. In addition, the study showed that a modern educational institution, which is the carrier of economic socialisation, is able to realise the idea of a learning economic community in which every student represents fairly well what they do, how to do it and why.

Considering the development of economic socialisation and its impact on economic culture in a given space, whether urban or regional, local authorities should pay particular attention to the aspects mentioned above, as they form important components contributing to the development of a proper economic culture model that promotes economic growth. Attention to the development of these key aspects also leads to the improvement in the life of the inhabitants of a given territory. By intensifying the process of economic socialisation through various initiatives, the authorities ensure long-term economic development.

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Researches on The Recovery of Aquatic Productivity in The Basins Located in The Southern Region of Moldova

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Abstract

This paper presents research regarding the exploitation of the fishing potential in the Southern region of the Republic of Moldova. The aim of this document is to assess the productivity of five ponds from the Southern region of the country, namely the determination of phytoplankton, zooplankton biomass and the evolution of growth and development of fish species. An important task for increasing the productivity of fish farms, is to populate the pond with broods of fish species of high economic value, to provide the pond with generations of breeders of these species, as well as to maintain the highly productive characteristics of the pond, (detritus, phytoplankton, zooplankton), essential food for indigenous fish species. Fish production in natural reservoirs is an essential part of the biological productivity related to the formation and maintenance of the aquatic biomass. Therefore, the issues affecting the effectiveness of aquaculture development in the Republic of Moldova can be conditionally grouped into external and internal factors. External factors include low investments, insufficient level of technical material and scientific support. The internal factors depend directly on: the level of the anthropogenic damage to the pond, the optimal use of the material to populate, water resources and the natural reserves of the pond.

Keywords*:* Productivity, Republic of Moldova, ponds.

Introduction

The efficient development of fisheries in the southern region of the Republic of Moldova, ensures the achievement of a quality production, indigenous and safe products for the population of this region. The productivity of a pond is often hampered by pollution due to the uncontrolled entry of manure, pesticides, fertilizers from the agricultural land, as well as of the industrial wastes, where the insufficient self-cleaning leads to a negative impact as well as to risk factors over the reservoir ecosystem. In this respect, it is relevant to apply and improve a systematic water control, taking into account the rules and requirements of worldwide standards. In the last decades, due to the anthropogenic factors that influenced directly and indirectly the ichthyofauna, related to which, there have been significant changes in the structure of ichthyocenosis, the proportion of species such as carp, avat, bream, has decreased significantly, and the dominant species are the mullet, Aspius and the crucian carp. By the end of the 70s of the last century, the ponds represented 55-65% of the surface, at the end of the 90s it decreased to 30-40%, and in 2005 the surface of the ponds from the southern region of the Republic represents 15-20%. Due to the drought from the last years for which many ponds have dried up or are used for other uses (agricultural land), or have been abandoned, where no measures have been taken in order to rehabilitate the wetlands in the area.

Short Literature Review

A feature that represents damage to the "pond" is the intensive development of algae *(Aphanizomenon flos-aquae)*, causing "water bloom". Algae decomposition causes significant fish death and inhibition of zooplankton development, essential feed for carp *(Cyprinus carpio)*, Bighead carp *(Aristichthys nobilis),* and other indigenous fish species, leading to decreased productivity or extinction of the wetland for fish recovery - sloughing, (Prusevich, Egorov, 2013). The most significant factors hindering the development of aquaculture in the Republic of Moldova include: reduced investments

and insufficient level of technical material and scientific support (Condition and perspectives of freshwater aquaculture development, 2013). Certain individual characteristics are significant for each hydrobiont, which allows us to assess the ecosystem to the extent that it has been directly or indirectly affected by anthropogenic pollution. In order to assess the ecological status of the natural aquatic ecosystems in the southern area of the Republic of Moldova, analysis is being carried out annually, in order to determine the status of each ecosystem. This step is carried out by the National Integrated Water Monitoring System, in accordance with the provisions of the Water Framework Directive 2000/60 / EC and other water directives (Annual Report, 2015).

Material and Methods

This paper was drafted based on a research of the functional state of the natural reservoirs (ponds), of production, growth, capitalization and potential, in the southern region of the Republic of Moldova. The objects of study of this paper consisted in the research and differentiation of the productivity of ponds located in different localities (Taraclia, Pelinei, Taraclia de Salcie, Libidenco, Bucuria) of the Southern region of the Republic of Moldova. Some data were collected from books and specialized papers and compared with real data (research) for a proper interpretation. Data collected were sorted, differentiated and statistically processed.

Productivity of ponds in the Southern Region of the Republic of Moldova

In the Republic of Moldova most of the aquaculture production (over 85%) is destined for ponds, with the growth of several species of fish (polyculture). Fish production in natural reservoirs is an essential part of the biological productivity related to the formation and maintenance of the aquatic biomass. The qualitative and quantitative aspects of this process depend on the characteristics of the reservoir, including the behavior and structure of the ichthiocenoses. Out of the total number of ponds in the Republic of Moldova, the eutrophic type predominates, where the ichthyofauna is dominated by cyprinids (crucian carp, silver carp, Bighead carp, carp, bream, mullet). In terms of nutrition for fish in the natural environment, benthos and zooplankton predominate, which are a specific food for young brood (until passing to the specific feed). The zoobentos resources (oligochaetes, chironomid larvae and some insects) are consumed completely by the indigenous fish. The main natural reserves represented by macrophytes, debris and phytoplankton allow to increase the productivity of a pond with 25%. The case study proposes the assessment of 5 fishing ponds, located in the southern region of the Republic of Moldova.

For pond 1 (Taraclia) the average annual fish production varies 50 tons fish / 50 ha
For the pond 2 (Pelinei) the annual fish production varies 10 tons fish / 2ha
For pond 3 (Libidenco) the average annual fish production varies 800 kg fish / 1.2 ha
For pond 4 (Taraclia de Salcie) the average annual fish production varies 8 tons fish / 6 ha
For pond 5 (Bucuria) the average annual fish production varies 700 kg fish / 0.43 ha

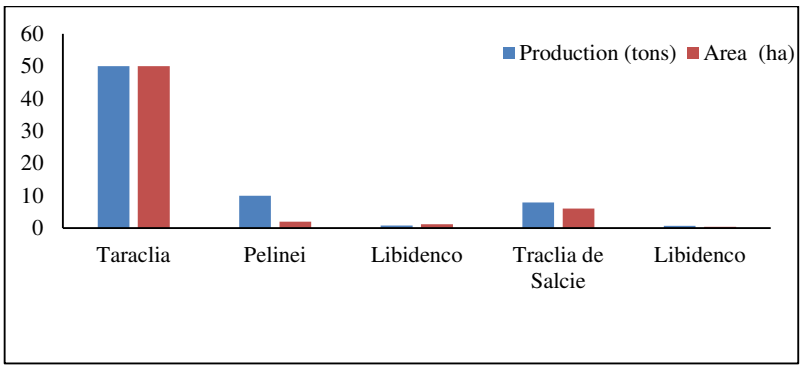

Fig. 1: Productivity of each pond in the southern region of the Republic of Moldova.
Source: Own research

The catch structure of each fish pond is made up of 5-7 species of fish from the Cyprinids family. Of the fish species the carp *(Cyprinus carpio)* 11%, the mullet *(Rutilus rutilus)* 6.2%, the silver carp *(Hypophthalmichthys molitrix)* 27%, the bighead carp *(Aristichthys nobilis)* 23%, the crucian carp *(Carassius gibelio)* 12%, the bream *(Abramis brama)* 1.7%, and the Aspius *(Aspius aspius)* 1.2% (figure 2).

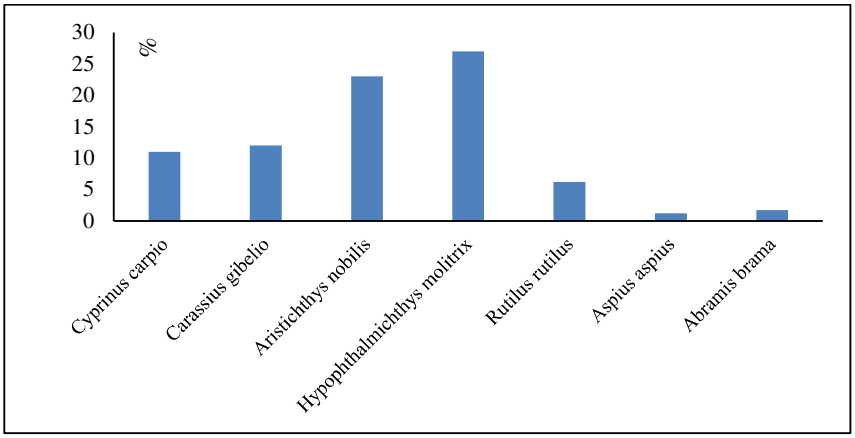

Fig. 2: Types of catch fish from ponds in the southern area of the Republic of Moldova
Source: Own research

In the ichtyofauna of the ponds where the bream *(Abramis brama)* predominates, a species of fish from the Cyprinids family, and the bentofag proportion fluctuates between 57.9% and 88.4%, with an average of about 72%. This suggests that in some ponds from the Republic of Moldova zoobentos from the natural environment is very necessary for many species of fish, since many ponds are foddered in a smaller proportion or the abandoned ones do not fodder at all.

Currently, the increase in the costs related to feed, vitamins, the maintenance of filtration and water supply systems, amendments to capitalize the pond potential limit the possibility of increasing the large volumes of fish production through traditional methods of growth. As a result, the fish farm cannot provide, upon the consumers'request, quality fish for a low price.

One of the real ways to increase productivity in ponds is the annual popularizations with fish species, usually being used grass carp, bighead carp, carp. In addition to achieving a valuable production, herbivorous fish fulfill a significant function of pond recovery, using as food phytoplankton (bighead carp) and macrophytes (grass carp).

The phytoplankton biomass in some ponds from the southern region of the Republic of Moldova, such as those from the city of Taraclia, is quite high, which means a significant reserve that can be used as food for growing the grass carp. On average, in the research area, the phytoplankton biomass during the spring period can reach up to 3.81 g / m3 with fluctuations between ± 0.72 - 3.24 g / m3. In summer, biomass and abundance of phytoplankton, as a rule, grows: as part of the increase in phytocenosis, namely blue-green algae. During the period July-August, the phytoplankton biomass reaches the maximum values, in an average value of 3.86 g / m3 (determined by analysis in 2018, by the Water Quality Monitoring Directorate, Cahul), represented in figure 3.

As a result, the complete use of phytoplankton in natural reservoirs can ensure fish productivity of the grass carp up to 21- 99 kg / ha.

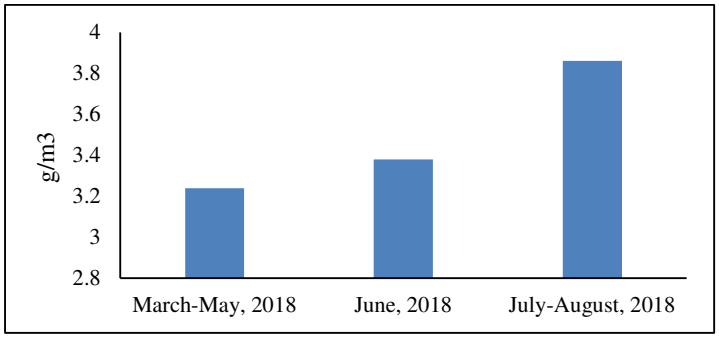

Fig. 3: Phytoplankton biomass determined in the pond from Taraclia locality.
Source: Own research

In this sense, the introduction of the grass carp in the pond represents a significant ecological function for the ecosystem. The natural nutrition of this fish determines a high trophic plasticity, namely the ability to restore the trophic chain in the ecosystem. This property, which is significant from the improvement point of view, allows the growth and use of this species in order to clean the ponds, water self-filtration mechanism, and a positive process for the growth of other valuable fish species.

Research on some eutrophic ponds in the southern region of the Republic of Moldova, (pond from Bucuria, Libidenco and pond from Pelinei), on biological production and the level of development of fish farming has determined a minimum or practically absent nature reserve, which determines the use of higher costs for feed (for herbivorous species).

The pond from Bucuria locality, at certain times of the year, cannot intervene independently, namely in the years with low humidity it has led to the overcrowding of its upper level with aquatic (harmful to fish) vegetation, reporting that the pond has an area of 0 ,43 ha, which led to the decrease in oxygen, light, and volume of water mass, which leads to the superficial and almost complete drying of the area. In recent years (2017-2019), zooplankton and phytoplankton biomass from the pond, from March to the middle of June does not usually exceed 1.0 g / m3, which does not cover the vital needs of the fish, which has led to a low fish surviving population in this area.

Especially for the use of fish farming in several natural water bodies examined, where pond feeding is essential, the coefficient of feed consumption for the pond is achieved by determining the surface area of water and the production we have in the pond, by daily assessing the dynamics of the positive factor of the food ration over each species in the pond, related to the net final product that we want to obtain. A well-developed pond is considered valuable if its aquatic fauna represents a variety for fish breeding. Of which in the water mass the zooplankton should represent 72-100% and the zoobenthos 50-100%. Another significant factor for capitalizing the productivity in the ponds of the country, may be the replacement of species with low economic value, (as for example: mullet) with more productive fish (Aspius, bream, carp).

Because the additional introduction of bentophages with the purpose to increase the productivity of the pond, without a suitable decrease in fish population (with low economic value) will not provide a favorable result. That is why, often in the ponds of the country, the carp is found in smaller quantities. Because not taking into account these factors will give a negative result to the repeated introduction of this species. This process has been proved by (Costousov V, 2013) by the fact that the proper removal of a species of indigenous (non-valuable) fish will decrease the feeding rate of a valuable fish and thus the pond will be considered unproductive.

Conclusion

In the Republic of Moldova most of the aquaculture production (over 85%) is destined for ponds, for polyculture growing of indigenous fish species. The qualitative and quantitative aspects of this process depend on the characteristics of the reservoir, including the behavior and structure of the

ichthiocenoses. The prospect of restoring and developing productivity is determined by the state of the pond, and the level to which it was affected anthropically. decreasing the density of development of harmful algae for fish is possible by: introducing organic and mineral fertilizers, aerating as much as possible the pond (pond bottom), periodically discharging the pond for breeding purposes. In order to capitalize on the productivity of ponds in the southern region of the Republic of Moldova, it is essential to replace species with low economic value, (mullet) with more productive fish (Aspius, bream, carp), as well as the growth of herbivorous fish (considered natural water filters) for plasticity. high trophics, and additional cleaning of the pond.

Acknowledgements

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The EU Enlargement Policy – the EU-28 Extra Trade Issues

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Abstract

Today's European Union, with its 28 Member States (27 nowadays – author.) and a population of approx. 500 million, is the result of an integration and enlargement process of more than half a century, which is continuously evolving. The EU's enlargement policy deals with the countries currently aspiring to become members of the European Union. The European Union's enlargement policy has traditionally been described as the EU's most successful foreign policy. Extra-EU refers to transactions with all countries outside of the EU: the rest of the world except for the European Union Member States. International trade - especially the size and evolution of imports and exports - is an important indicator of the performance of the EU economy, showing how it interacts with other countries and its position. The structure of the EU trade in goods by top 5 partners both in terms of imports and exports was analyzed in the article. The dynamics of the EU-28 extra total trade turnover was analyzed and the trend line of it was built using one of the functions available for the purpose, taking into account the R^2 value. The dynamics of such constituents of the EU-28 extra trade as exports, imports, trade balance and exports to imports ratio were analyzed by the author. The trend lines were built using the appropriate functions, taking into account the R^2 coefficient value. Two periods of time (years) were taken for the projection of the trend line direction of each component of the EU-28 extra trade under analysis.

Keywords: enlargement policy, the European Union, extra trade, total trade turnover.

Introduction.

The European Community for Coal and Steel, the European Economic Community and Euratom, founded in 1951 and 1957 respectively, are at the origin of the European Union. The European Union was founded with the aim to promote peace, security and prosperity throughout Europe and is based on a commitment to common values such as democracy, the rule of law, freedom and human rights and the single market. The enlargement process goes hand in hand with the deepening of the cooperation between the Member States. Successive enlargements have shaped the history of the European Union. Up to now, seven enlargement rounds have taken place: 1973 (Denmark, Great Britain, Ireland), 1981 (Greece), 1986 (Portugal, Spain), 1995 (Austria, Finland, Sweden), 2004 (Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia), 2007 (Bulgaria, Romania) and 2013 (Croatia) (Austrian Embassy in the US, 2020).

The EU's enlargement policy deals with the countries currently aspiring to become members of the European Union. There are strict conditions for membership to ensure that new members are admitted only when they are fully able to take on the obligations of EU membership. This includes compliance with all the EU's standards and rules. For the purpose of accession negotiations, these are divided into 35 different policy fields (chapters) (European Commission, 2020).

Extra-EU refers to transactions with all countries outside of the EU: the rest of the world except for the European Union (EU) Member States. The term is used in the context of external trade, balance of payments, foreign direct investment, migration, transport, tourism and similar statistical areas where goods, capital or people moving in and out of the EU are being measured and where the EU as a whole is considered in relationship to the rest of the world. Extra-EU transactions of the EU as a whole are the sum of the extra-EU transactions of the EU Member States. …the EU has not always had the same composition, due to consecutive enlargements. For this reason, both terms (extra-EU

and intra-EU – author.) are sometimes further qualified as 'extra-EU-15', 'intra-EU-25' etc.; 'extra-EU-15', for instance, refers to the rest of the world apart from the 15 Member States that in the past made up EU-15 (Eurostat, 2020 (1)). International trade - especially the size and evolution of imports and exports - is an important indicator of the performance of the European Union (EU) economy, showing how it interacts with other countries and its position (Eurostat, 2019).

The aims of the paper are: 1) to describe the main stones of the EU enlargement policy; 2) to analyze the structure of the EU trade in goods in 2018 by top 5 partners both in terms of imports and exports; 3) to analyze the dynamics of the EU-28 extra total trade turnover and to build the trend line of it using one of the functions available for the purpose, taking into account the R^2 value. The list of functions to choose from in order to build the trend line of the data mentioned above comprise the exponential, linear, logarithmic, polynomial and power ones. Among the aims of the paper one should state the dynamics of such constituents of the EU-28 extra trade as exports, imports, trade balance and exports to imports ratio analysis. The trend lines of the data mentioned above were built using the appropriate functions, taking into account the R^2 coefficient value. Two periods of time (years) will be taken for the projection of the trend line direction of each component of the EU-28 extra trade under analysis as the EU budget covers a period of 7 years (the Multiannual Financial Framework - MFF) and the most recently approved Multiannual Financial Framework covers the period of 2014 to 2020. Though the United Kingdom of Great Britain and Northern Ireland ceased its membership in the EU at the beginning of the year 2020, the negotiations on the major number of the trade contracts are to be held through the whole year 2020 and the possibility of the negotiations continuation in the following year as well still exists.. More than that, under the given circumstances of nowadays, it is not considered to be scientifically sound to take a longer time frame for making predictions than two periods.

Problem Solution.

Today's European Union, with its 28 Member States (27 nowadays – author.) and a population of approx. 500 million, is the result of an integration and enlargement process of more than half a century, which is continuously evolving (Ministry for Foreign Affairs of Romania, 2020). The European Union's enlargement policy has traditionally been described as the EU's most successful foreign policy because it has managed to trigger the expansion of the democratic ideal across the European continent. The EU's ability to peacefully spread these ideals derives from the political conditionality that defines the accession of any country to the EU, which requires any candidate to converge towards the EU's principles of democracy, open market and protection of human rights (Pérez-Solórzano N., 2015). Candidate countries must prove they will be able to fully assume the role of Members of the Union. To this end, they must obtain citizens' support and meet strict European standards and rules of a political, legal and technical nature. Countries wishing to join the EU can cover the various stages of the integration process only when all conditions for each stage have been met. The complex procedures for being admitted into the EU guarantee that the new Member States only join the Union when they fulfill all requirements and when all EU institutions, the governments of Member States and their own governments have actively expressed their consent. The prospect of integration therefore serves as an incentive to promote reforms. The EU's enlargement policy guarantees that this process is thoroughly managed so that accession can be beneficial to both parties involved, the EU and the acceding countries (Ministry for Foreign Affairs of Romania, 2020).

Europe is the world's largest exporter of manufactured goods and services, and is itself the biggest export market for around 80 countries. Trade is an important indicator of Europe's prosperity and place in the world, and the bloc has become deeply integrated into global markets both for the products it sources and the exports it sells. Because the 28 Member States of the European Union (27 nowadays – author.) share a single market and a single external border, they also have a single trade policy. Both in the World Trade Organization, where the rules of international trade are agreed and enforced, and with individual trading partners, EU Member States speak and negotiate collectively (Eurostat, 2019). For example, in 2018, the United States (€674 billion, or 17.1% of total extra-EU trade in goods, i.e. the sum of exports and imports) and China (€605 bn, or 15.4%) continued to be the two main goods trading partners of the European Union (EU), well ahead of Switzerland (€265

bn, or 6.7%), Russia (€254 bn, or 6.4%), Turkey (€153 bn, or 3.9%) and Japan (€135 bn, or 3.4%) (Eurostat Newsrelease, 2019). To illustrate the last paragraph, let's follow the structure of the EU trade in goods by top 5 partners in terms of imports in Figure 1.

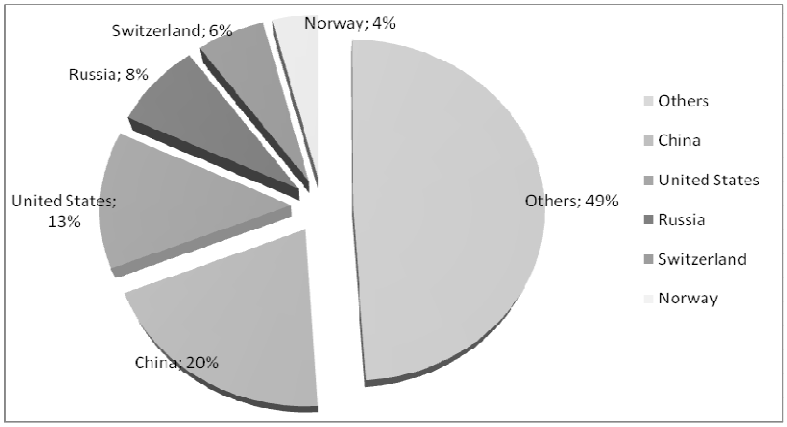

Source: based on the data from Eurostat (Eurostat, 2020) (1).

Figure 1. The EU Trade in Goods (Imports) by Top 5 Partners in 2018, %

As we see from the figure given above, the main trade partner of the European Union in terms of goods imports in 2018 was China, which accounted for about 20% of the overall amount of the goods imported into the EU. The second place was taken by the United States of America with their 13% and the third place was taken by Russia, from which the European Union imported 8% of the goods. The forth and the fifth places, in terms of the amount of goods imported into the EU, were taken by Switzerland and Norway respectively. To proceed with the research, the structure of the EU trade in goods by top 5 partners in terms of exports can be followed in Figure 2.

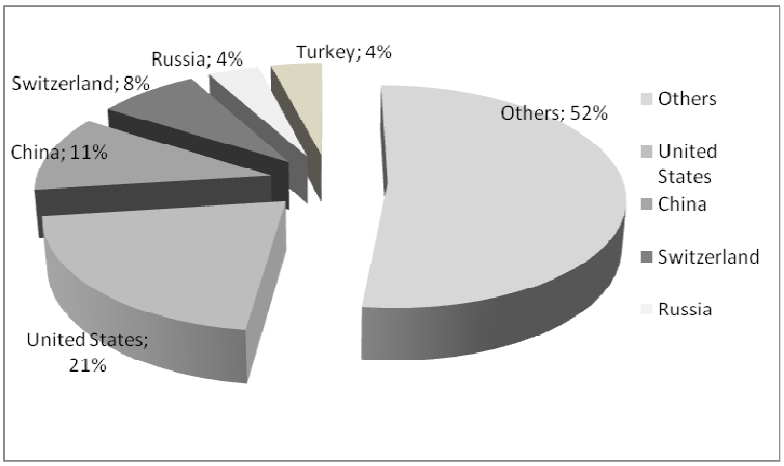

Source: based on the data from Eurostat (Eurostat, 2020 (1)) .

Figure 2. The EU Trade in Goods (Exports) by Top 5 Partners in 2018, %

As it can be seen from the figure given above, the main partner of the European Union in terms of the goods exports in 2018 was the United States (21%). After the US, China (11%) and Switzerland (8%) came followed by Russia and Turkey (4% each). The analysis of two figures given above confirms once more the statement that China and the US were the most important trade partners of the European Union in 2018 in terms of the international trade. What is also worth paying attention at is Turkey – though it comprises "only" 4% of all the goods exported from the EU, its aspirations to become the EU-member could benefit the EU in the direction of the continuing enlargement of the

goods exports thanks to the economic benefits of being inside the EU market, meaning – the simplification of the border crossing, customs clearance, currency exchange and payments procedures, etc.

If we look at the main destinations of the EU exports in terms of the continents, we'll see, that the main destination for the EU exports in 2018 was Asia accounting for about one third of the total, followed by North America (28 %) and other European countries (22 %) (Eurostat, 2020 (1)) .

To see how the EU enlargement policy influenced the EU-28 extra trade, let's follow the data in figures given below as well as their analysis presented. The dynamics of the EU-28 extra total trade turnover can be followed in Figure 3.

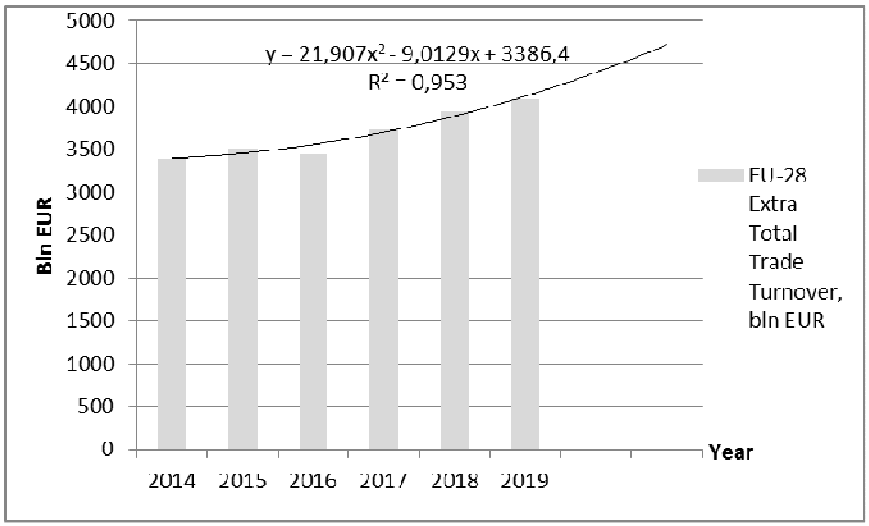

Source: author's own elaboration on the basis of the data from the (Eurostat, 2020 (2)).

Figure 3. The EU-28 Extra Total Trade Turnover, bln EUR

The data in Figure 3 point to the fact that the largest amount of the EU-28 extra total trade turnover can be observed in 2019 and the smallest – in 2014. The biggest increase of the said total trade turnover is observed in 2018 and the biggest decrease – in 2016. There is no one clear trend in the said trade turnover either as we can see the increase of the trade turnover mentioned above in 2015 followed by the decrease in the amount of the total trade turnover of the EU-28 in the next year. The downward tendency didn't last during the next year and was changed with the upward one in 2017, which, in turn, last till the end of the time frame under analysis. The trend line was built using the polynomial function, taking into account the R^2 value. The said line is upward during the whole time frame under research and continues to be of the kind during two more periods of time, that is years, taken for the projection. As the beginning of the time frame under analysis is the year 2014, that is the first year after the last EU enlargement, the dynamics of the data under analysis shows us the impact of the EU enlargement policy on the trade relations and the result of the said relations, that is the amount of the total trade turnover of the extra-EU trade. The upward trend of the total trade turnover mentioned above testifies to the fact that the EU enlargement policy has a positive economic impact on the EU as a whole and its extra trade turnover in particular. To continue the research, let's follow the dynamics of the EU-28 extra trade (exports) in Figure 4.

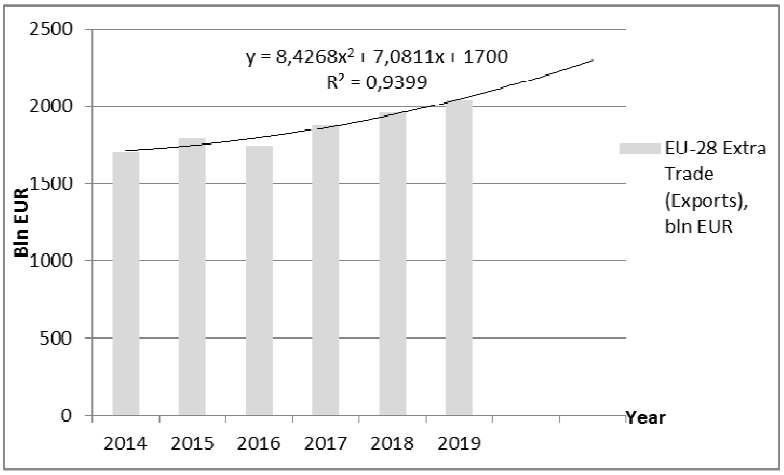

Source: author's own elaboration on the basis of the data from the (Eurostat, 2020 (2)) .

Figure 4. The EU-28 Extra Trade (Exports), bln EUR

The dynamics of the exports in the EU-28 extra trade is very much like the one of the EU-28 total trade turnover, that is an increase in 2015, followed by the decrease in the next year plus the increase of the exports amount in 2017 continued during the whole time frame under analysis. The biggest increase of the amount of exports in the EU-28 extra trade can be observed in 2017 and the biggest decrease (and the only one) – in 2016. The trend line of the dynamics of the said exports was built using the polynomial function, taking into account the value of the R^2 coefficient. The trend line is upward during the whole period of time under analysis and continues to be like that during two periods of time, that is years, taken for the projection. The next step of the research is the analysis of the EU-28 extra trade in terms of the imports, which can be followed in Figure 5.

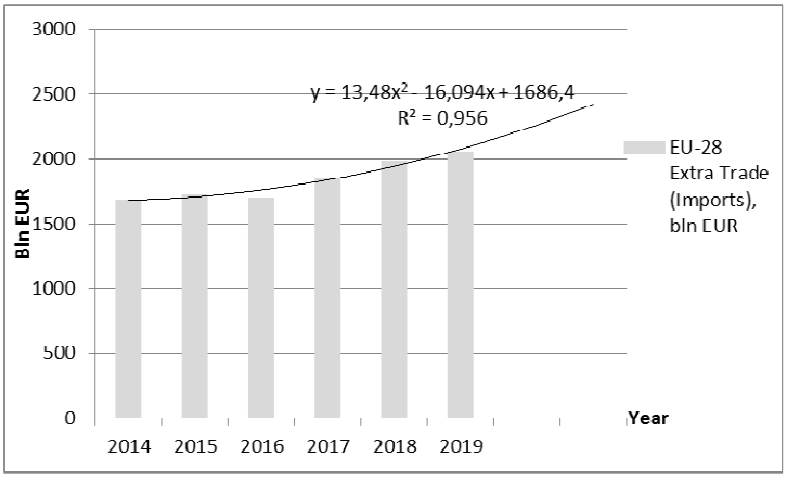

Source: author's own elaboration on the basis of the data from the (Eurostat, 2020 (2)).

Figure 5. The EU-28 Extra Trade (Imports), bln EUR

As we see from the data depicted in Figure 5, the general dynamics of the EU-28 extra trade (imports) is not homogeneous, that is there is an increase in the amount of imports mentioned above in 2015 which was substituted by the decrease in the next year, that, in turn, was changed in 2017 with another increase and the latter tendency continued till the end of the time frame under analysis. The biggest increase in the amount of the EU-28 extra trade (imports) can be observed in 2017 and the biggest (and the only) decrease – in 2015. So, we see that the general dynamics of the EU-28 extra trade in terms of imports is like the ones of the total trade turnover and of the exports mentioned

above. The trend line of the imports amount dynamics mentioned above is built using the polynomial function taking into consideration the R^2 value. The trend line built is upward during the whole period of time under analysis and continues to be of the kind for two periods of time, that is years, taken for the projection. As we see, thanks to the EU enlargement policy with the establishment of the new commercial, trade, logistics, etc. relations and the expansion of the existing ones, the general trend of the EU-28 extra trade in terms of imports through the whole time frame under analysis is upward showing us the positive impact of the said policy on the EU benefits from the trade relations.

The dynamics of the EU-28 extra trade balance can be followed in Figure 6.

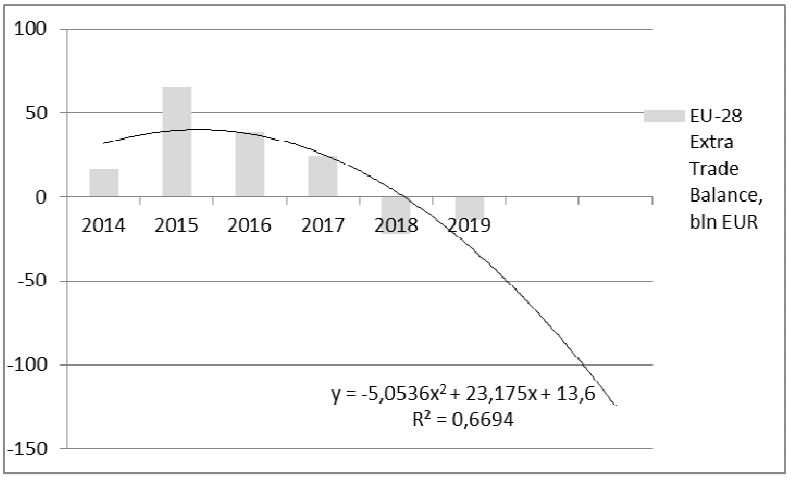

Source: author's own elaboration on the basis of the data from the (Eurostat, 2020 (2)).

Figure 6. The EU-28 Extra Trade Balance, bln EUR

When we cast a look at the figure given above, we'll see that the dynamics of the said trade balance is not one and the same during the time frame under research, that is we see the increase of the balance mentioned above in 2015, followed by the decrease in the year 2016, which continued til the end of the time frame under research. The biggest decrease of the said balance can be observed in 2018, that is in this year there was the biggest difference between the exports and the imports of the trade under analysis. The only increase of the said balanc can be seen in 2015. The trend line was built using the polynomial function. It should be added here that there was not such a big number of functions avalable for the trend line building in this case as two values are negative. The trend line is downward and continues to be of this kind during two more time period of time (years) taken for the projection. This fact can be explained in the following way – the difference between the exports and the imports of the EU-28 extra trade would be decresing to the direction of the imports prevailing over the exports. The dynamics of the exports to imports ratio of the EU-28 extra trade can be followed in Figure 7.

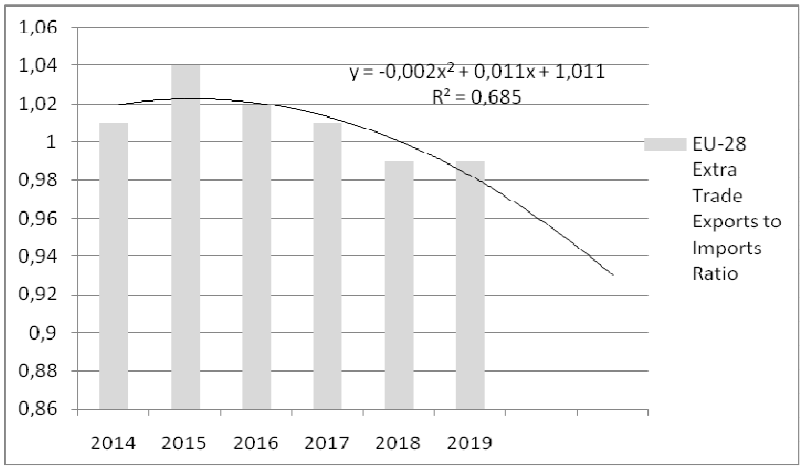

Source: author's own elaboration on the basis of the data from the (Eurostat, 2020 (2)).

Figure 7. The EU-28 Extra Trade Exports to Imports Ratio

If we look at the figure given above, we won't observe one clear tendency in the EU-28 extra trade exports to imports ratio – it increased 0.03 points in 2015 but in the next year we can see the decrease of the said ratio of 0.02 points. The downward tendency, written about in the latter sentence, continued during two following years as well being changed only in 2019 as in this year the said ratio had the same value as in the previous year. The biggest decrease of the ratio mentioned above is obseerved in 2016 and 2018 and the only increase was in 2015. The trend line of the data dynamics depicted in Figure 7 was built using the ploynomial function taking into account the value of the R^2 coefficient. The said trend line is downward after the year 2016 and remains of the kind during two time periods, that is years, taken for the projection.

Conclusions.

European integration has been one of the fundamental goals of the European Union since its establishment (Ministry for Foreign Affairs of Finland, 2020). Enlargement is widely hailed as the EU's most successful foreign policy tool. Over the past four decades, the European Community (which became the European Union in 1993) managed to transform itself from a club of six Western European democracies to the world's largest economy, encompassing 28 countries (27 nowadays – author.) and half a billion people (Brunet L.A., 2013). Legal matters and fighting organised crime and corruption must remain at the core of the EU's enlargement policy. Economic matters, such as growth, competitiveness, and management of general government finances as well as a well-functioning public administration belong to the three pillars of the enlargement process (Ministry for Foreign Affairs of Finland, 2020).

Europe is the world's largest exporter of manufactured goods and services, and is itself the biggest export market for around 80 countries. Trade is an important indicator of Europe's prosperity and place in the world, and the bloc has become deeply integrated into global markets both for the products it sources and the exports it sells. Because the 28 Member States of the European Union (27 nowadays – author.) share a single market and a single external border, they also have a single trade policy (Eurostat, 2019).

If we talk about the EU-28 extra trade, then it should be pointed out that there is no one clear trend in the EU-28 extra trade turnover as we can see the increase of the total trade turnover mentioned above in 2015 followed by the decrease in the amount of the total trade turnover of the EU-28 in the next year. The downward tendency didn't last during the next year and was changed with the upward one in 2017, which, in turn, last till the end of the time frame under analysis. The trend line was built using the polynomial function, taking into account the R^2 value. The said line is upward during the whole time frame under research and continues to be of the kind during two more periods of time,

that is years, taken for the projection. As the beginning of the time frame under analysis is the year 2014, that is the first year after the last EU enlargement, the dynamics of the data under analysis shows us the impact of the EU enlargement policy on the trade relations and the result of the said relations, that is the amount of the total trade turnover of the extra-EU trade. The upward trend of the total trade turnover mentioned above testifies to the fact that the EU enlargement policy has a positive economic impact on the EU as a whole and its extra trade turnover in particular.

The dynamics of the exports in the EU-28 extra trade is very much like the one of the EU-28 total trade turnover, that is an increase in 2015, followed by the decrease in the next year plus the increase of the exports amount in 2017 continued during the whole time frame under analysis. The trend line of the dynamics of the said exports was built using the polynomial function, taking into account the value of the R^2 coefficient. The trend line is upward during the whole period of time under analysis and continues to be like that during two periods of time, that is years, taken for the projection. The further enlargement of the EU either in the Balkan or East direction will benefit the EU extra trade in terms of its goods exports thanks to the acquirement of the new markets for goods exports as well as the simplification of the logistics, customs and currency exchange and payments procedures. Among the greatest beneficiaries of the further EU enlargement in terms of the goods exports one should mention such export oriented EU members as Germany, the Netherlands and France.

The general dynamics of the EU-28 extra trade (imports) is not homogeneous, that is there is an increase in the amount of imports mentioned above in 2015 which was substituted by the decrease in the next year, that, in turn, was changed in 2017 with another increase and the latter tendency continued till the end of the time frame under analysis. The trend line of the imports amount dynamics mentioned above is built using the polynomial function taking into consideration the R^2 value. The trend line built is upward during the whole period of time under analysis and continues to be of the kind for two periods of time, that is years, taken for the projection. The major beneficiaries of the further EU enlargement in terms of the goods imports are supposed to be the countries which took the first three places concerning the amount of the imported goods in 2018, namely – Germany, the United Kingdom and France. The fact that those countries are placed among the major beneficiaries of the EU enlargement in terms of the goods exports as well means that those countries are the EU's major players in international trade.

The dynamics of the EU-28 extra trade balance is not one and the same during the time frame under research, that is we see the increase of the balance mentioned above in 2015, followed by the decrease in the year 2016, which continued til the end of the time frame under research. The trend line was built using the polynomial function. The trend line is downward and continues to be of this kind during two more time period of time (years) taken for the projection.

We don't observe one clear tendency in the EU-28 extra trade exports to imports ratio – it increased 0.03 points in 2015 but in the next year we can see the decrease of the said ratio of 0.02 points. The said downward tendency continued during two following years as well, being changed only in 2019 as in this year the said ratio had the same value as in the previous year. The trend line of the EU-28 extra trade exports to imports ratio was built using the ploynomial function taking into account the value of the R^2 coefficient. The said trend line is downward after the year 2016 and remains of the kind during two time periods, that is years, taken for the projection.

The European Union (EU) today stands at a crossroad. Recent times have been difficult for the EU, where member states have been facing challenging situations and questions regarding European integration. These challenges have arisen in many fields and policies, with one of them being the enlargement policy. Consequently, views of not expanding the EU borders further have been growing, and enlargement fatigue has been used to describe the current situation towards further expansion (Jónsson S. D., 2019).

Some specialists in politics think, that " Enlargement should remain an active element of the future of European integration. The EU is not only about free trade; it is a community of values for establishing democracy and the rule of law in a growing number of European countries" (Ministry for

Foreign Affairs of Finland, 2020). Though, the others "As N. Piers Ludlow explains, enlargement was never part of the initial European project when it began in the 1950s, yet it eventually became one of the EU's most important and successful policies. While the first enlargement of 1973 welcomed other Western European democracies (the UK, Ireland and Denmark), no long-term strategy for enlargement was developed. Only with the Greek accession in 1981 did the strategy of democratisation enter into the enlargement process" (Brunet L.A., 2013).
To fix the problem of dysfunctional enlargement, the EU should make the process political and reversible. As Macron mentioned in his recent Economist interview, the EU has to remember that it is, most of all, a community rather than an ever-expanding market. France's new approach to the EU accession process is largely based on the so-called horizontal method: candidates would make reforms in various areas, gaining access to select EU programmes and gatherings along the way, before attaining full membership. By reforming enlargement methodology in this way, the EU would also help address democratic backsliding and rule of law problems in Western Balkans countries (ECFR.EU, 2020).

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Applying IRIS Attendance Management System (AMS) on college of Shareeah and Islamic studies in Ahsa, Kingdom of Saudi Arabia

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Abstract

Education is one of the most important aspects of daily lives to many countries around the world. For the students who attend the classes full or even part time, attendance is an important measurement that shows the student's care in gaining the highest knowledge and highest marks in courses, as well. This paper will represent some problems associated with current attendance systems in College of Shareeah and Islamic Studies in Ahsa city at the eastern province of the Kingdom Saudi Arabia and suggest a solution to it. This will assist in improving the college performance to the level that supports the achievement of Saudi Arabia 2030 vision(Web Ref).

Keywords: Student, Attendance, Iris, Database.

Introduction

It is strongly recommended to illustrate the importance of attendance system in general. It is stated that the attendance process is vital for clarifying the organization's overall performance. (Kadry and Smaili, (2007), Khatun et al (2015)).

Discussion about the aimed organization

The college of Shareeah and Islamic studies has been established at First of February 1981 and it is a branch of Imam Mohammad Bin Saud Islamic University, which is one of the first and oldest universities in Kingdom of Saudi Arabia. It was established with five basic Departments: Shareeah(Islamic Law), Religion Principles, Arabic Language, Geography, and Management. In 2009, another two departments were opened, which are English Language and Computer sciences.

Numbers about the organizations

Number of current students: 7723 (including 5937 males and 1786 females)

Number of academic staff: 310

Number of classrooms: 145

Literature Review

Some reasons behind the iris method proposal for some organizations.

Khatun et al(2015) claimed that the iris identification method is introduced in order to eliminate the time spent on calling the students' names or writing each student's name when marking the attendance in any educational firm.

It is claimed that the iris technology can be easily integrated into other systems. 'IrisAccess system incorporates other system-designed elements. 'The IrisAccess system offers integration flexibility found in few other biometrics. Designed for easy integration with standard security infrastructure, the IrisAccess has been successfully integrated to most of the leading access control panels as well' (Web ref). Khaw (2002) stated that the iris system is useful for organizations where the systems are manually programmed with financial identifications, like credit card number, which can be stolen. The iris replacement of these cards will minimise these cases(Web ref).

Khatun et al (2015) stated that the Eye Recognition (Iris) identification method is considered one of the best biometric realization systems because it has the advantages of distinction, stability, unchanged through the time. 'The iris is a circular diaphragm which is punctured by the pupil and lies between the cornea and lens'. Iris identification was an alternative approach to fingerprints due to the advantage of its uniqueness. This means that it is impossible for two people to have the same iris. Moreover, each person's iris identity can be taken from either the left or the right eye, unlike the fingerprint where there are ten fingers for taking fingerprints. With the iris identity, it will be faster for large database searches to keep accurate results. In addition, the accuracy of the iris is because it deals with 240 reference points for matching. Such biometric systems will be used in large percentages by organizations in the future, because it is the only method for ensuring the presence of employees.

How the Iris Recognition System Work

Segmentation step

Abo Zanona and El-Zaghmouri (2013) argued that after capturing the IRIS, first thing to do is to specify the iris region as the main focus. This region, can be identical to two circles, interior and exterior. The 'eyelids and eyelashes' usually close the top and bottom areas of the iris region. The accuracy of iris dividing depends on imaging quality and the early processing of the eye image. The best type of database that does not have any effect of regularly reflection is the one that uses the infrared light. Moreover, persons with dark painted iris (Usually those who use lenses) will cause more difficulty in the iris segmentation. The segmentation step is vital for the success of iris identification system because any error in data representation will lead to corrupted biometric template generation which will, in turn, cause the poor recognition average.

Morphology

The operation that effects the image is called morphology. These 'morphological operation applies a structure element to the image, the output resulted image will be the same size. Each pixel' value in the output image is based on a comparison of the corresponding pixel in the input image with its neighbors'.

The basic morphological operations are opening in and closing. These two operations change the pixel set identification based on the neighborhoods pixels and structure element. The most basic operation are 'dialation and erosion'. The first one put on pixels to the objects limits in an image, while erosion deletes pixels on these limits.

Captured Image pixels role

The pixels' numbers that are edited in the image depends on the structuring element size and shape that is used to make the image processing. To clarify more about structure elements, it is helpful to know that they are the basics of any operation in the morphological system. Two types of them are called liner and disk. The liner type is similar to the sequence of zeros and ones in the following example:

0 0 0 0 0 0 0 1

0 0 0 0 0 0 1 0

0 0 0 0 0 1
0 0

And so on.

Radom or Hough transform

Inside the image, there is further consideration for the projections of cycles and lines through a specific algorithm called Radon transform or sometimes Hough transform. It is used to identify the shadows and centres of the circular or bend areas which make it vital in line detection. The Hough algorithm is used in calculating two dimensional gradient mathematical equation.

$$\lim_{h \to 0} \frac{\|f(x+h) - f(x) - \nabla f(x) \cdot h\|}{\|h\|} = 0$$

System Working Modes

Such system is working in two modes; enrolment mode and identification mode. In the first one, the 'templates will be taking and the iris copies are stored in the database' while the second one runs normally to get the recognition. Both modes will run as a serious of similar steps except in one step where the database is used in the enrolment mode only. Otherwise, the stages will be:'eye image input, segmentation, normalization, feature encoding, iris code and noise mask, and the matching step in which the match can or cannot be found'.

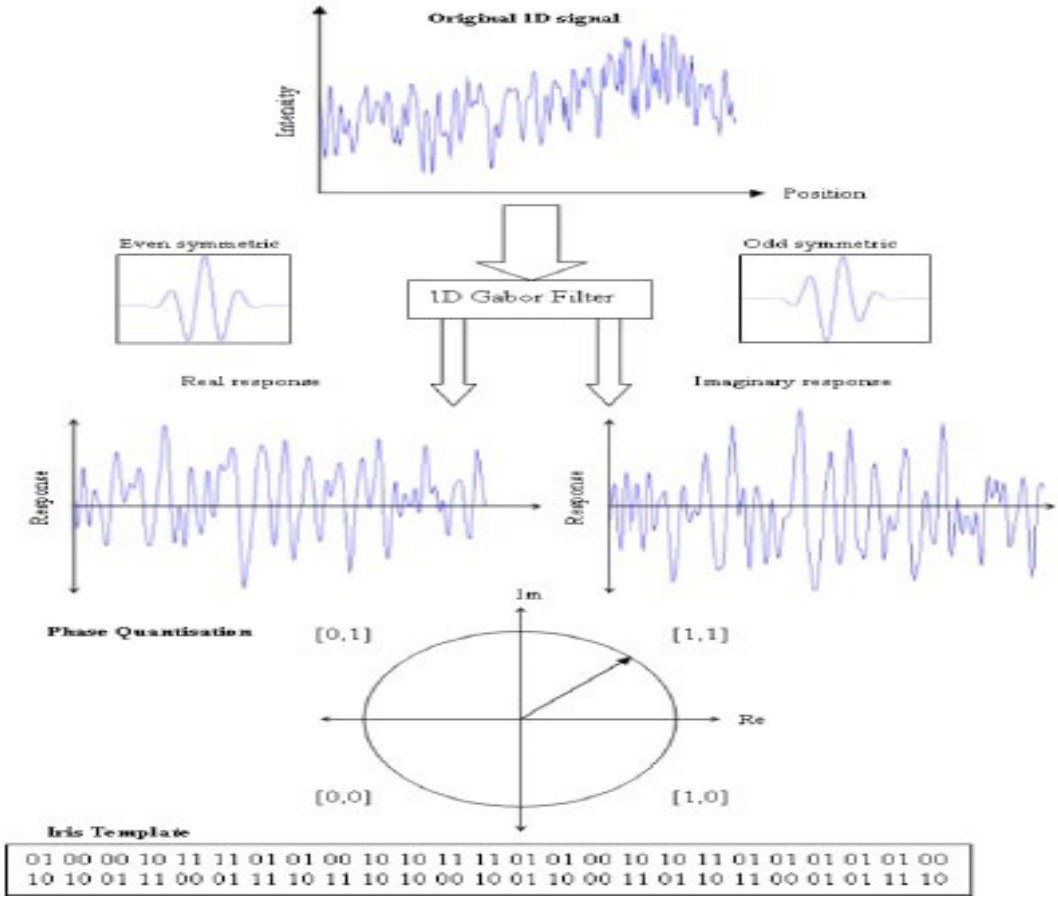

IRIS Code:

To talk a bit about the iris code, the process is considered a template of the encoding process and will be divided into multiple phases. Generally speaking, the template contains the bit number that carry the iris information with the noise mask areas that are considered corrupt in the template. The areas of zero amplitude are meaningless to the information phase and mask noise as well.

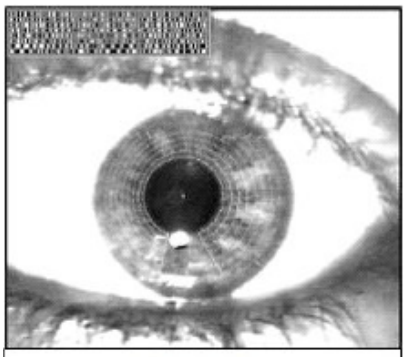

Demarcated zones of analysis and illustration of a computed iris code.

Matching Step

In the matching step, there is depending on a form of calculation aimed to find the number of similar bits between two patterns of bits. This calculation will lead to a decision whether two patterns were extracted from different irises or from the same one. This calculation form is called Hamming Distance(HD).

Steps summarizing

To summary, the process flow will be clarified from iris image till pattern isolation. The original iris image must be gray or transferred to gray image.

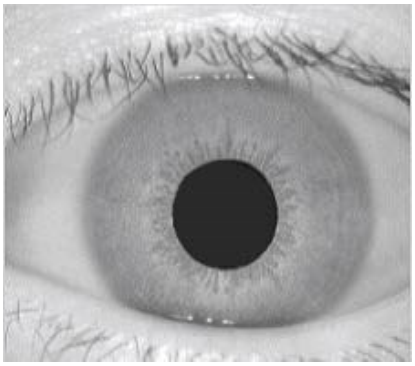

The first pre-processing is the extraction of edge map that aimed to identify the pupil and its centre that can be used in gradient calculation at later steps.

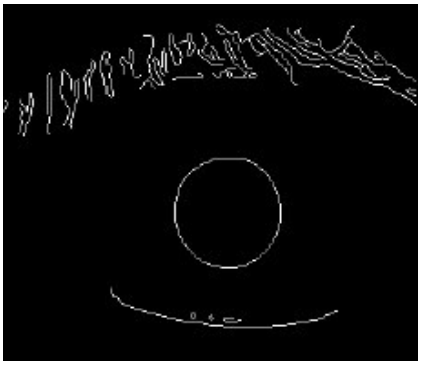

The radon transfer projection representation is not enough for isolating the pupil due to the consistent effect of eyelashes.

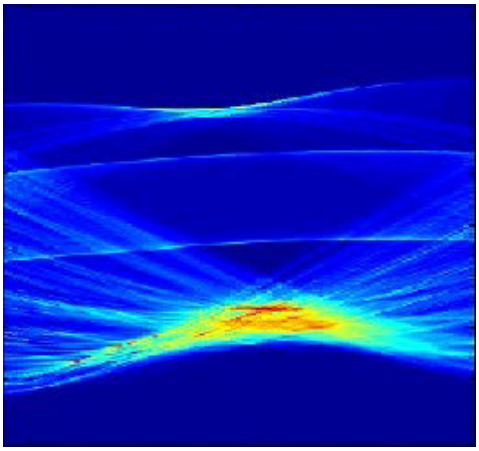

Rebuilding the image after conversion will lead to an image with clear position of eyelashes. So, the cooperation between Hough transform, morphology, and mathematical calculations will localize the IRIS in the best way.

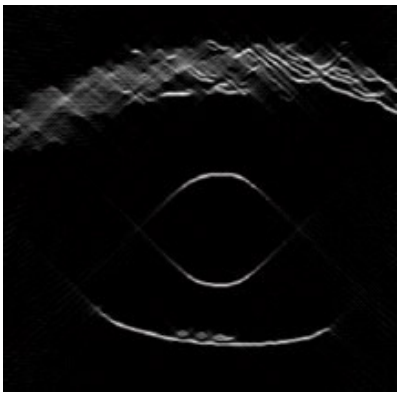

The morphology will lead to a dilated image.

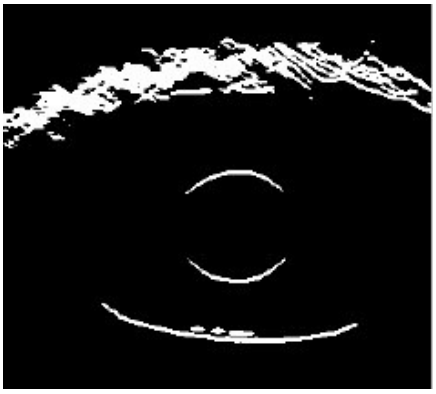

After that, a process is done to identify the centre of the pupil. This is usually done through centralizing the pupil as rigid object so that the vertical gradient will be easy to measure.

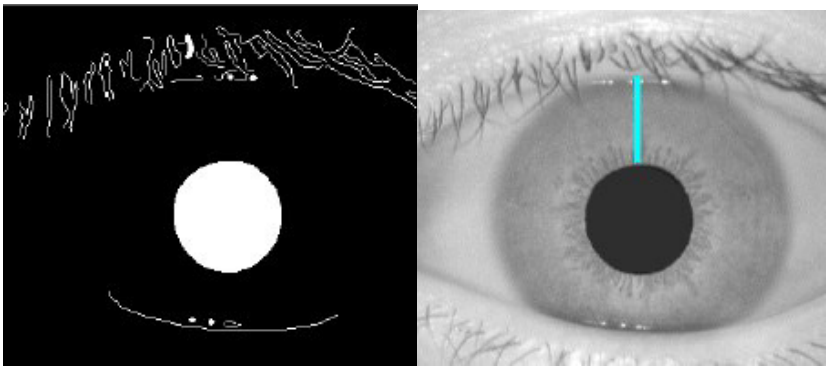

After that, there is a try to identify the iris through Hough conversion and gradient to replace its error. The Hough conversion will be a red colour surrounding the iris radius. Next, the morphology will calculate the gradient initially from centre of the pupil to its boundary. After that, a further calculation of gradient will be between the pupil limit to the eye end. Such cooperation is aiming to minimize the error or Hough conversion. This gradient calculation is shown in blue and green circles.

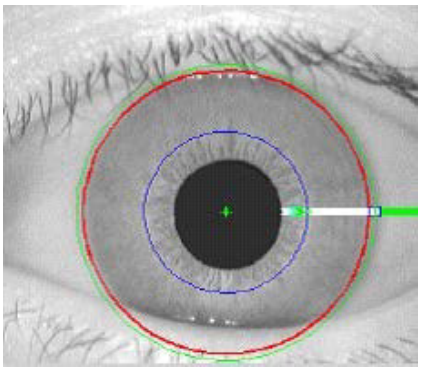

After locating the iris, the process of isolating it is done through a Mathematical circle equation in geometry. This equation is aiming to return every pixel that is out of the iris circle to the zero value. A further morphological operation will be taken place to clarify the limits of eyelashes and eyelids.

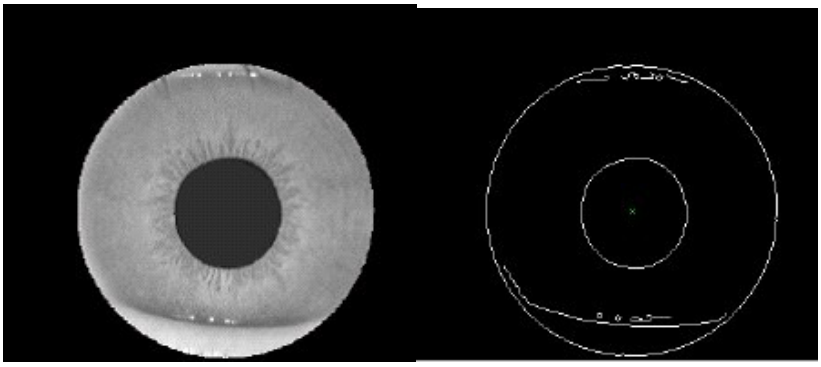

Finally, the step of complete isolation of the iris and determining of pupil centre and boundary is taken place.

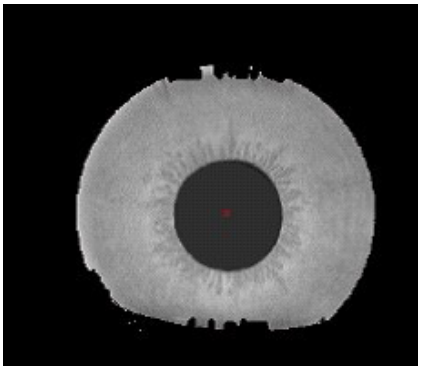

Daugman has added a methodology of taking 2048 pixel from any part of the circle of the iris as the initial reorganization part.

How to try to Implement an IRIS Recognition System

Khatun et al (2015) claimed that a proposed system will use the MATLAB software for calculating the radius of the iris by using specific code algorithm, and match each person's iris with the stored data. It is argued that the proposed system will send the attendance report to an email without human intervention using 'SMTP (Simple Mail Transfer Protocol)' which is an Internet principle offered by Gmail to 'send emails from any network to an email address'. This principle is accessed in MATLAB through one of its built-in functions (Web ref).

Analysis Phase of current system

This phase will describe the current system and its problems in order to suggest a proposal to them. Moreover, it aims to analyze, specify, and define the system to be built.

Current IT (Information Technology) systems

The main system that formulates the IT work is the banner system: it is an online system with three sub-systems. This proposal is related and integrated in-scope with two of these sub-systems and out-of-scope with the third one.

Project Scope

Development of an attendance system which will help in managing and controlling the database for storing and retrieving required information on students' attendance actions, and to manage courses' scheduled plan during each semester. The system will have a friendly user interface, which will make the database management system easy to use by common users.

Motivation

Attendance system is the Link between the student and the collage. The attendance system can understand all the problems that face its user and solve these problems to give them better services using the internet that is now the link between the whole worlds.

In-scope subsystems

Student Registration sub-system

Here, the IT department registers the data of the newly-accepted students and assigns them to each department that the students were accepted at. I refer this system in the database as the Student and Major entities.

Course Schedule Registration Sub-System

In this sub-system each department creates the schedule for its courses (including sections), arranges and sends it (as an MS Word printed copy) physically to the IT department. Currently, each department has its own classrooms for different levels of the degree according to the level, the year and the semester that the student is studying. After that, the IT staff inserts these course sections into the system. Then, the students register their courses through the website with their credentials. Normally, the students register for their courses at the first week of the academic year. Registration is done by inserting the section number in the system.

When the minimum number of students needed in each section registers, the IT will send the attendance sheets (printed from the system) to the departments' heads and their assistances. This step is a formal confirmation for the department that the section of each course has opened and that this course will be taught. Otherwise, the section closes and gets deleted from the system. I refer this system in the database as the Registration, Section, Course, PreRequirement, Room, Department, and Lecturer entities.

Entity Relationship Model (ERM) for current system.

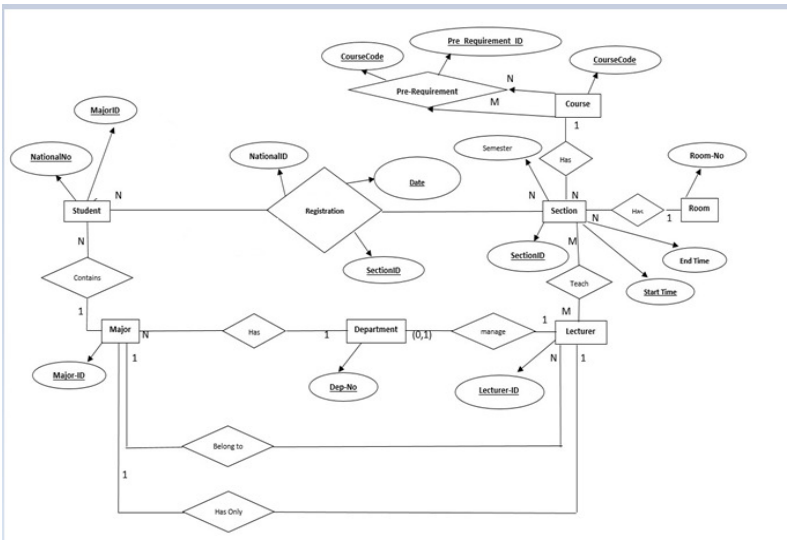

Figure 1 : ERD for current system

Entities Definitions

The current database diagram shows that it holds entities of all the data that are in the student registration sub-system and the course schedule registration sub-system. These data are presented as entities and attributes for each entity (object). We have the following entities:

Student Entity

Because all the students are Saudis in the college, I assumed that each student's national identity number is enough to be the primary key.

Table 1: Student entity

Column Name	Data Type	Constraint	Note
NationalNo	Char(10)	Primary Key	10 Digits
Surname	varchar(30)		
Midname	varchar(30)		
FirstName	varchar(30)		
Gender	varchar(6)	Male or Female	Restricted by special SQL
City	varchar(40)		
P.O.Box	Char(4)		
Street	Varchar(20)		
Mobile	Char(10)		
Major-ID	Number	Foreign Key	From Major Table

Course Entity

This is a subject that is taught throughout the semester. Credit hours are the quantity of the course worth in the overall scale for the required degree.

Table 2: Course entity

Column Name	Data Type	Constraint	Note
CourseCode	Char(6)	Primary Key	
CourseName	varchar(50)		
Credit Hours	Tinyint		Between 2 and 3

Lecturer Entity

This is the person who is teaching the courses to the students.

Table 3: Lecturer entity

Column Name	Data Type	Constraint	Note
Lecturer-ID	Char(4)	Primary Key	
FullName	varchar(50)		
Gender	varchar(6)	Male or Female	Restricted by special SQL
City	varchar(40)		
P.O.Box	Char(4)		
Street	varchar(20)		
Mobile	Char(10)		
Email	varchar(50)		
Start Date	Date		
Qualification	Varchar(40)		
Experience	Varchar(40)		
Major-ID	Char(2)	Foreign Key	From Major Table

Room Entity

This is the place where the lectures will be taught.

Table 4: Room entity

Column Name	Data Type	Constraint	Note
RoomID	Char(4)	Primary Key	
RoomLocation	Varchar(50)		
RoomSize	Varchar(50)		

Section Entity

This is the group of a course. In many college, there are courses that have a high number of students, which should be divided into many groups. Section opening date means the date when the section was announced to the students.

Table 5: Section entity

Column Name	Data Type	Constraint	Note
SectionID	Char(5)	Primary Key	Primary Key
Semester	Varchar(6)		
StartTime	Time(7)		
EndTime	Time(7)		
SectionOpenningDate	Date		
CourseCode	Char(6)	Foreign Key	From Course Table
RoomID	Char(4)	Foreign Key	From Room Table
Lecturer-ID	Char(4)	Foreign Key	From Lecturer Table

Department Entity

This is like the (school) that contains many majors in each one.

Table 6: Department entity

Column Name	Data Type	Constraint	Note
DepartmentID	Char(4)	Primary Key	
DepartmentName	Varchar(50)		
DepartmentHead	Char(4)	Foreign Key	From: Lecturer table

Major Entity

This is the specialty of each department just like the majors of information systems abd data studies in computer science department.

Table 7: Major entity

Column Name	Data Type	Constraint	Note
MajorID	Char(2)	Primary Key	
MajorName	varchar(50)		
DepartmentID	Char(4)	Foreign Key	From Department table

Pre-Requirement Entity

(Combined Primary Key): These are the courses where students should have pass or study other courses previously in order to enroll in them.

Table 8: Pre-requirement entity

Column Name	Data Type	Constraint	Note
[Pre-Requirement-ID]	Char(6)	Primary Key	Combined PK(one of them is the FK)
CourseCode	Char(6)	Foreign Key	From Course Table

Users Entity

These are all the people who will use the system through the credentials. Username and password means that they are not including students. In this case, users are lecturers assuming that there is only one system administrator.

Table 9: Users entity

Column Name	Data Type	Constraint	Note
UserID	Char(6)	P.K	No need to relate it to any table
Password	Varchar(15)		
Type	Varchar(40)		

Registration Entity

This entity has the combined primary key from the Student and the Section entities beside the date. It is clearly stating the date that each student registers in the sections during the registration week.

Table 10: Registration entity

Column Name	Data Type	Constraint	Note
SectionID	Char(5)	Foreign Key	From Section Table

NationalID	Char(10)	Foreign Key	From Student table
Date	Date	Primary Key	

Current Data Model Missing Part

It is clear that the current system is missing an important part and further attribute. They are the attendance entity and student iris in the database.

Current Attendance System Problems

The current process of attendance has many disadvantages. Reading the students' names and checking attendance, can be exhausting for the lecturer's eyes and mind, as it takes time, especially for the courses that have high number of students and are taught in large classrooms. Sometimes, the students are changing their voice or raising hand when their absent friends' names are called which is difficult to distinguish or remember by lecturer. Moreover, there is a possibility of losing or damaging the attendance sheet. In such case, then the lecturer will face problems as he or she will be unable to know who has exceeded the maximum attendance percentage. Sometimes lecturers with a high number of students in their classes are distributing blank pages to students to write their names and signatures. This saves some time for explaining the lesson instead of checking attendance. In these cases, some students write also their absent friends' name and signature in order to help them maintain the minimum percentage of presence. Then, the paper is given back to the lecturer before the end of the lecture. Following this, the lecturer has to write the names of all the attending students at the official attendance sheet.

Another serious problem can occur when a student enters accidentally the wrong classroom during an exam, and find out later that he / she is in the wrong classroom throughout the attendance process.

At the end of the semester and before the final exams, students who fail to meet at least 75% of their attendances rate and provide absence excuses for some of these absences, will be prevented from attending the final exams. This decision is made manually and posted at the advertisement board.

Activity Diagrams

Bell (2003) claimed that activity diagrams illustrate procedural control flow among two or more class objects within activity processing.

Table 11: Activity Diagram for write student attendance (First Scenario)

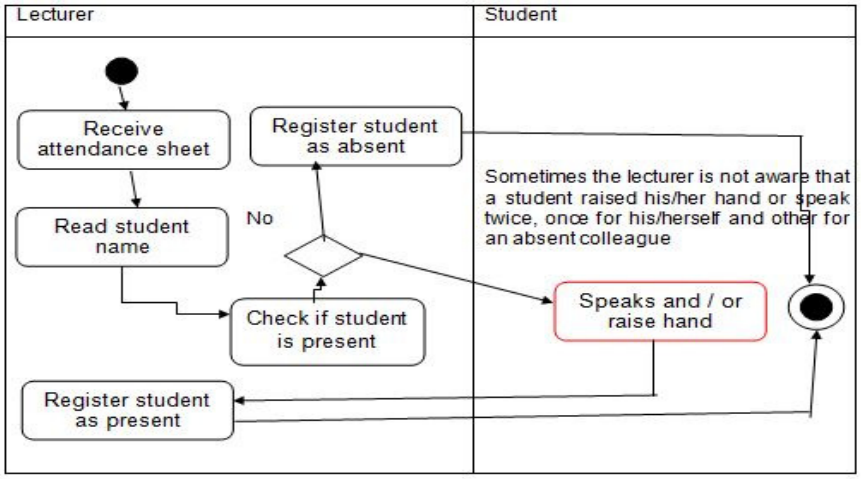

Table 12: Activity Diagram for write student attendance (Second Scenario)

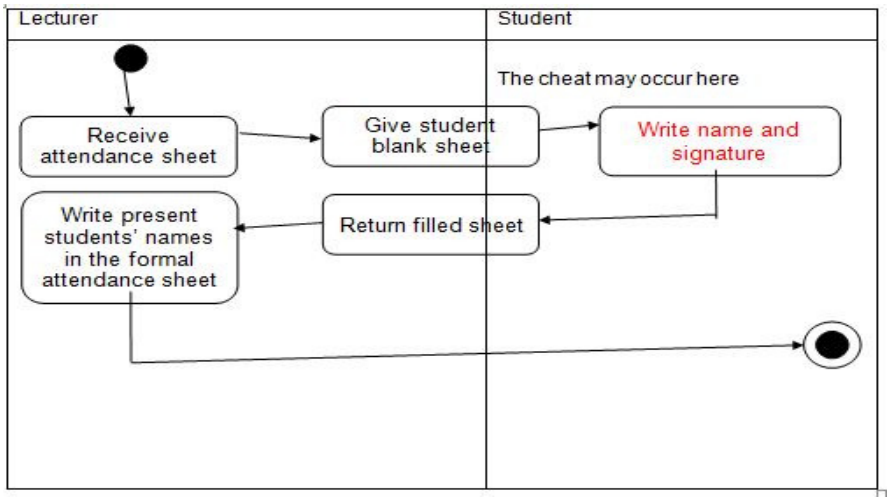

Table 13: Activity Diagram for updating attendance information with proof of absence

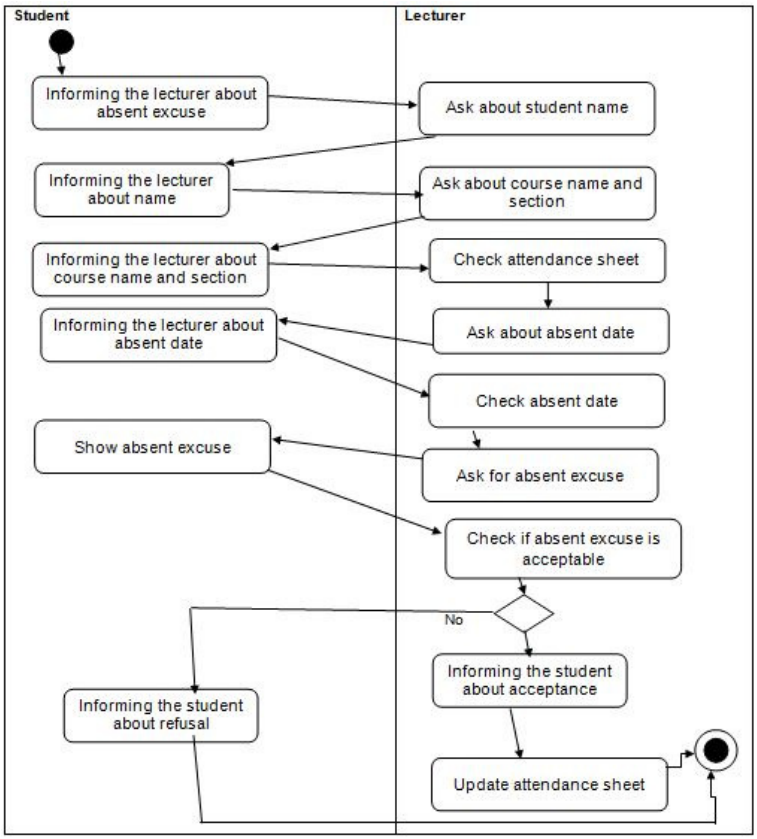

The previous process takes longer time and can be exhausted for the lecturers.

Research Questions

Due to these mentioned problems, this paper aims to answer the following questions:

1- What is the solution to the current attendance system problems?
2- Does the solution include enhancing the existing attendance processes? Or Launching a new idea?
3- Is the solution will work independent? Or through linking with current system?
4- What are the costs for the solution implementation? Is there any competition in applying the solution?
5-Is the solution aims only to minimize the time that the attendance take? Or there are further objectives?
6-Does the solution work for the students only? Or there are other stakeholders will be affected by the solution?
7- Is there any future suggestions in case of achieving the solution objectives?

Research Methodology

Wahyuni (2013) claimed that the methodology means a model to execute a research within a context of specific model. It consists of sets of beliefs that guide the researcher to choose certain research methods among others. So, it can be imagined that the methodology is a map and a method is a group of steps to travel between two places on it. Based on the research questions mentioned above, I will proposed that the research method will be a mixed method that combine both qualitative and quantitative methods This is because it focuses in numbers in some areas and the quality of output on

other areas. It have been gone through measurements like interview in some areas and focus group in other areas. Mixed research methods is growing in popularity as claimed by Heyvaert et al(2013).

Feasibility Phase

Problem Solution

All the above mentioned disadvantages led me to make this proposal for the iris attendance management system. The problems will be solved by keeping the attendance process electronically instead of manually.

After mentioning the ERM and the current attendance system problems, the system will be created, updated and improved in order for it to become more efficient, easier and accurate.

Solution Objectives

1. The system allows the students to check-in at the eye scanner system in any classroom they are assigned for and in proper time.
2. The system allows the Lecturer and administrator to view all students' information (attendance date and time, status)
3. The system allows the administrator to manage and control the schedules of each room, lecturer and the student.
4. The system allows the lecturer to produce several reports on his or her students.

Hardware and Software Requirements

SQL Server Management Studio, IRIS Scanner.

Requirements Definition

The first step in capturing the requirement is to specify the type of requirements (functional or non-functioning requirements). (Web Ref)

Functional And Non-FunctionRequirements.

Functional Requirements

A. Student requirements

- Check-in (create an attendance record) at the eye scanner machine.

B. Administrator requirements

- The administrator can add new user information, update, and delete user information.
- The administrator can view, or delete student attendance information.
- The administrator can view course's information.
- The administrator can search courses, and students.
- The administrator can generate reports (attendance report).

C. Lecturer requirements

- The lecturer can view all student attendance information at his or her class.
- The lecturer can update, delete any student attendance information in his or her class (there will be a choice to give the absent student an excuse for emergency cases, always agreed with the lecturer).

- The lecturer can view several attendance reports related to his or her students in each classroom.
- Lecturers must be able to view the students' final exam elimination list at the end of the semester.

D. System requirements

- The system provides several attendance reports.
- The system is integrated with a student registration sub-system and a courses schedule plan sub-system. Each iris scanner must be programmed to a specific classroom, courses, lecturers, and students who are registered in these courses. This means that the functions of each device will more complicated than the default specifications it came with. The specifications of the scanner's functions are demonstrated in the process of identifying each student's irises and detect if the specific student was scanned on the right day, time, classroom, and course followed by the confirming step in which the student's attendance is added to the course's electronic attendance table in the database. Otherwise, then the whole proposal idea will be useless, since it will only detect student's irises and give it an identification code. Furthermore, there must be an ability to reprogram the device in case of changing the class for a different course.

- The system will affect the student registration sub-system by adding student eye scanning information. To clarify it more, the iris scanner comes with a software. This software is the process of identifying any iris that is detected and recognized. When recognising the iris, the software process it and gives it an ID (digitalized form). Then, the system administrator adds this ID to the related student record in existing database where all students' information is kept.

- The system will provide the lecturers with sufficient time to make sure that every student absence had no excuse.

Non-Functional Requirements

These requirements deal with the attributes that are not described specifically in the functional requirements but recognized as properties of any system. (Web Ref)

A. Usability
The AMS provides the student and the lecturer with easy use, consistent and friendly interface, and coherent user documentation.

B. Reliability
The AMS is able to address frequency and severity of failure, recoverability, predictability and accuracy.

C. Performance
The AMS must implement the system with high performance on functional requirements such as the transaction rate, the speed, the availability, and the accuracy of information.

D . Supportability
The AMS will support maintainability[1], testability, and the other qualities to keep the System up-to-date after its release.

E. Security:
The AMS has to be secured from being physically damaged or electronically hacked by hackers. This involve credentials for lecturers and administrator for giving accesses only to the authorized persons
.

Important Features Definition

Here, and based on my reading of each device, the most important selection features are summarized in the table below except about API (Application Programming Interface).The API each device come with is an important factor effect the implementation of each selection. Sometimes it is mentioned generally as SDK. 'SDK is a ('Software Development Kit) that provides several commands that allow the developer to operate the iris scanner for capturing or matching iris images. Set of those commands is call API of the SDK. Basically, API is the interface that the developer can communicate with Iris scanner SDK and device'(Web ref).

Features Table:

Table 14: Features summary for selective IRIS machines

Brand	***Model***	***Response Time (For student check in)***	***Users storage (How many IRISes)***	***Capturing distance***	***Health Assurance***	***Is it movable? (For different student heights)***	***API***	***Cost***
Panasonic **(Web ref)**	*BM-ET200*	*0.3 Second (less than a second)*	*10.000*	*0.508 Meter*	*A laser that does not affect the eyes at all*	*No*	*No*	*£ 2050*
IRIS ID (Web ref)	*iCAM D1000*	*Less than 3 Seconds*	*32GB*	*1 Meter*	*Certified for eye safety and ISO standards*	*Yes, the camera is movable between 1.5 and 2 Metres height*	*Yes (As SDK)*	*£ 20000*
IriShield **(Web ref)**	*BK2121U*	*0.750 second (less than a second)*	*1000 and can be extended till 10000*	*0.14 Meter*	*Eye safety standard (IEC 62471:2006-07)*	*No*	*Yes*	*£385*
Aditech *(Web ref)*	*Iris ID iCam7000*	*Less than a second*	*100.000*	*0.355 Meter*	*IEC 62471 certified*	*No*	*Yes*	*£ 2000*

Best Recommendation

In this study, I will provide a recommendation for the "best solution" in terms of the best business process and associated technology implementation taking relevant costs into account.

If I would like to choose the best solution, I will find that the selection of IriShield will cost £55825 only (multiplying the device cost into rooms number). This machine comes with a basic data security infrastructure that minimizes any further costs for security software. It support the API as needed.

This selection API is provided in 'C++. .NET or Java languages'(Web ref) Such diversity in programming languages options offered for API add simplicity in the implementation step. 'When building computer applications, an API allows a software developer to perform basic functions and define the proper way for programs to interact'(Web ref).

Software architecture applicable styles and the selected style

The solution can be applied in several different styles. The most efficient, cost effective, and time consuming one is through linking each device to the existing database: This means that all the devices will be connected to the attendance management system, which is an addition linked to the overall university students' system. With this solution, any change in the scanners positions will be automatically changed in the database and this will save a lot of time and budget.

It is important to mention that when the student is trying to attend a class, the iris scanners are only linked to the database and the comparison process will be done in the database. Based on the comparison results, the device will give the acceptance or refusal message to the student. Then, the result of this check will be sent back to that scanner in order to give the student the acceptance or refusal message.

Required System Specification

Activity Diagrams

Add New User

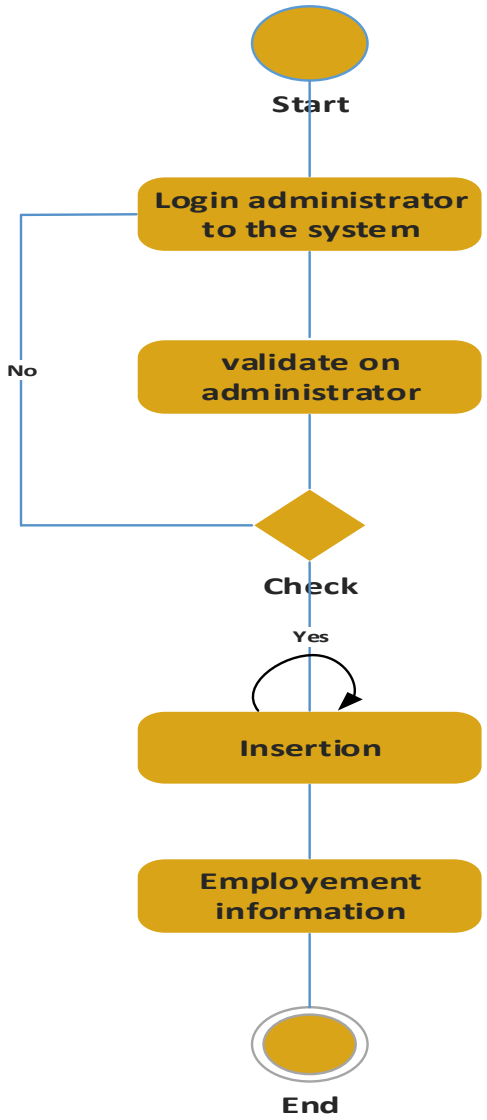

Figure 2: Activity Diagram for insert user by Administrator

Add and Update users

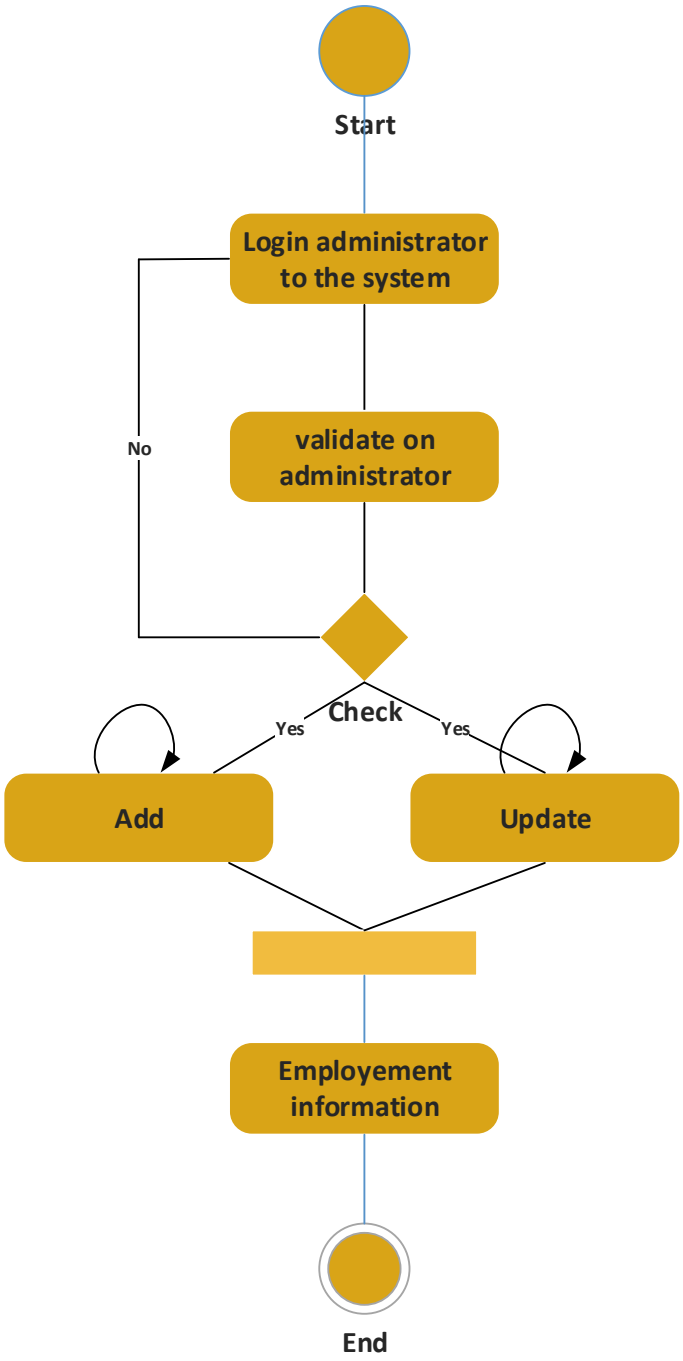

Figure 3: Activity Diagram for Add and update users Operation by Administrator.

Create Attendance Record

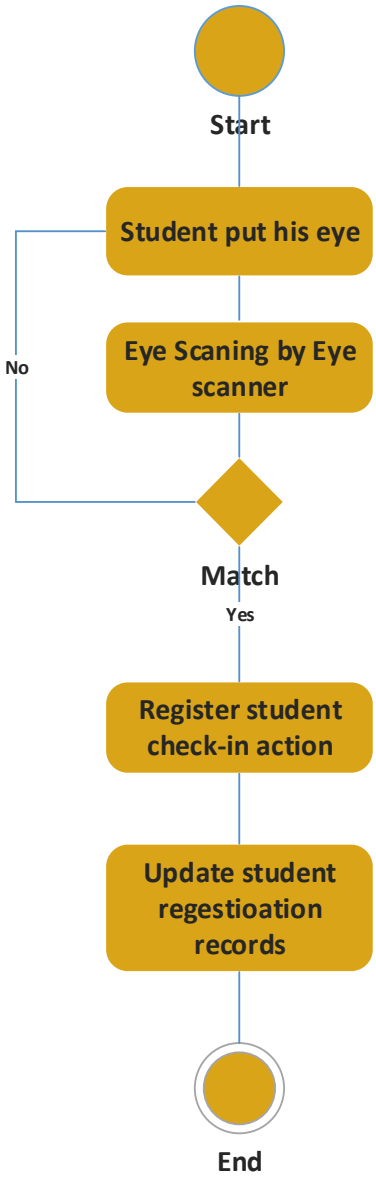

Figure 4: Activity Diagram for Create attendance record

Update attendance information:

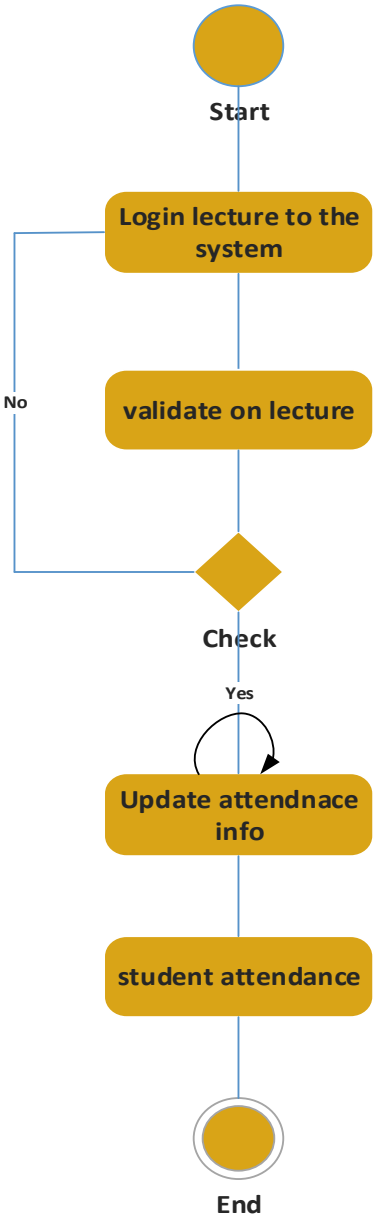

Figure 5: Activity Diagram for update student attendance information by the Lecturer

Delete Attendance Information

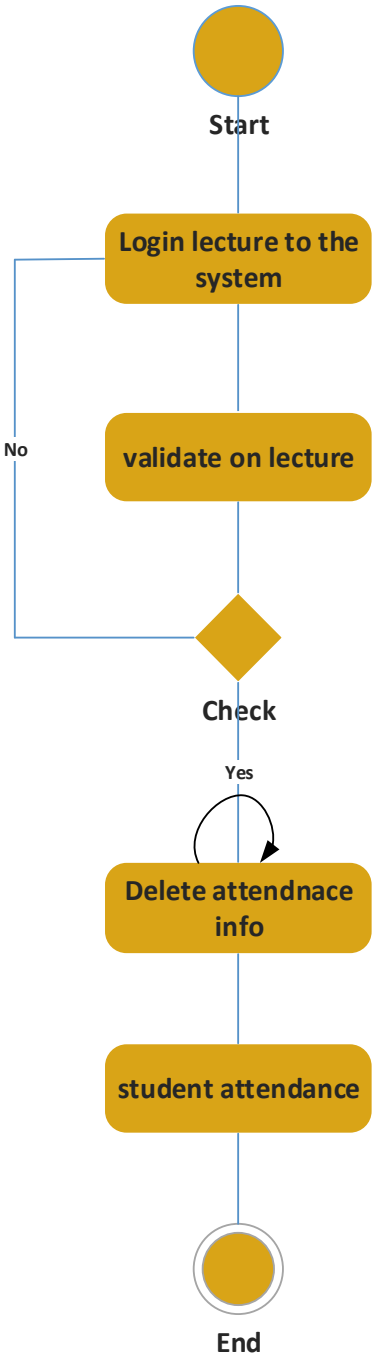

Figure 6: Activity Diagram for Delete student attendance information by the Lecturer

Update User Information

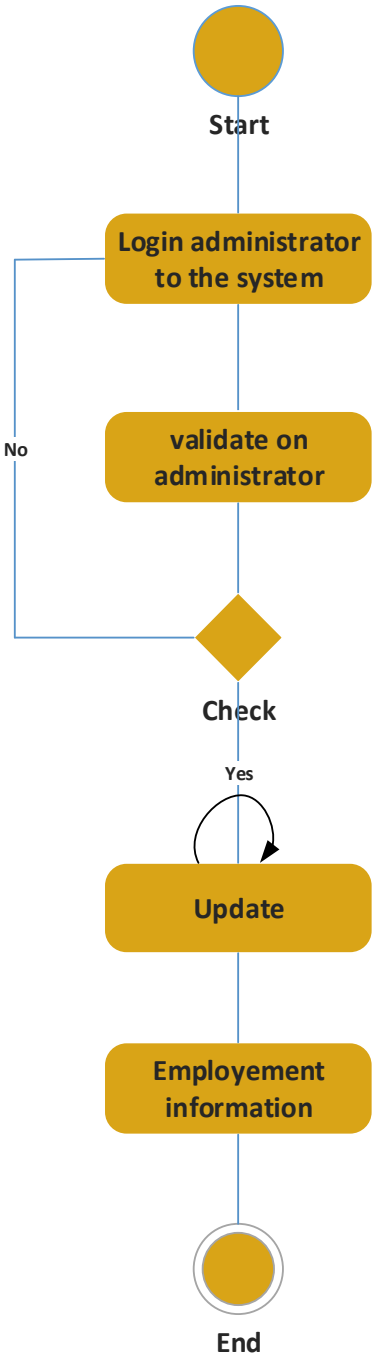

Figure 7: Activity Diagram for Update user information by the administrator

Generating Registration Report

Table 15: Activity diagram for generating registration report

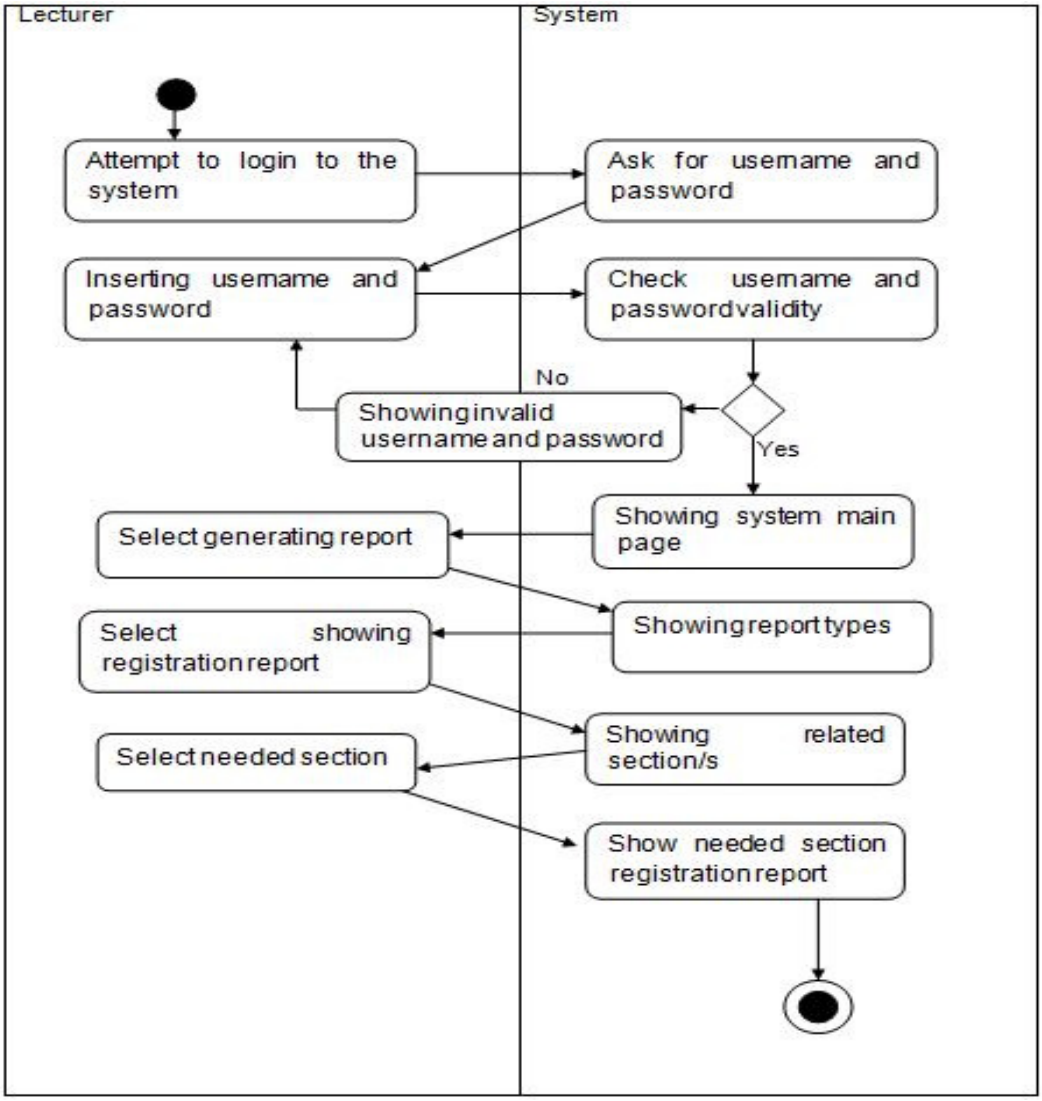

Generating Attendance Report:

Table 16: Activity diagram for Generating Attendance Report

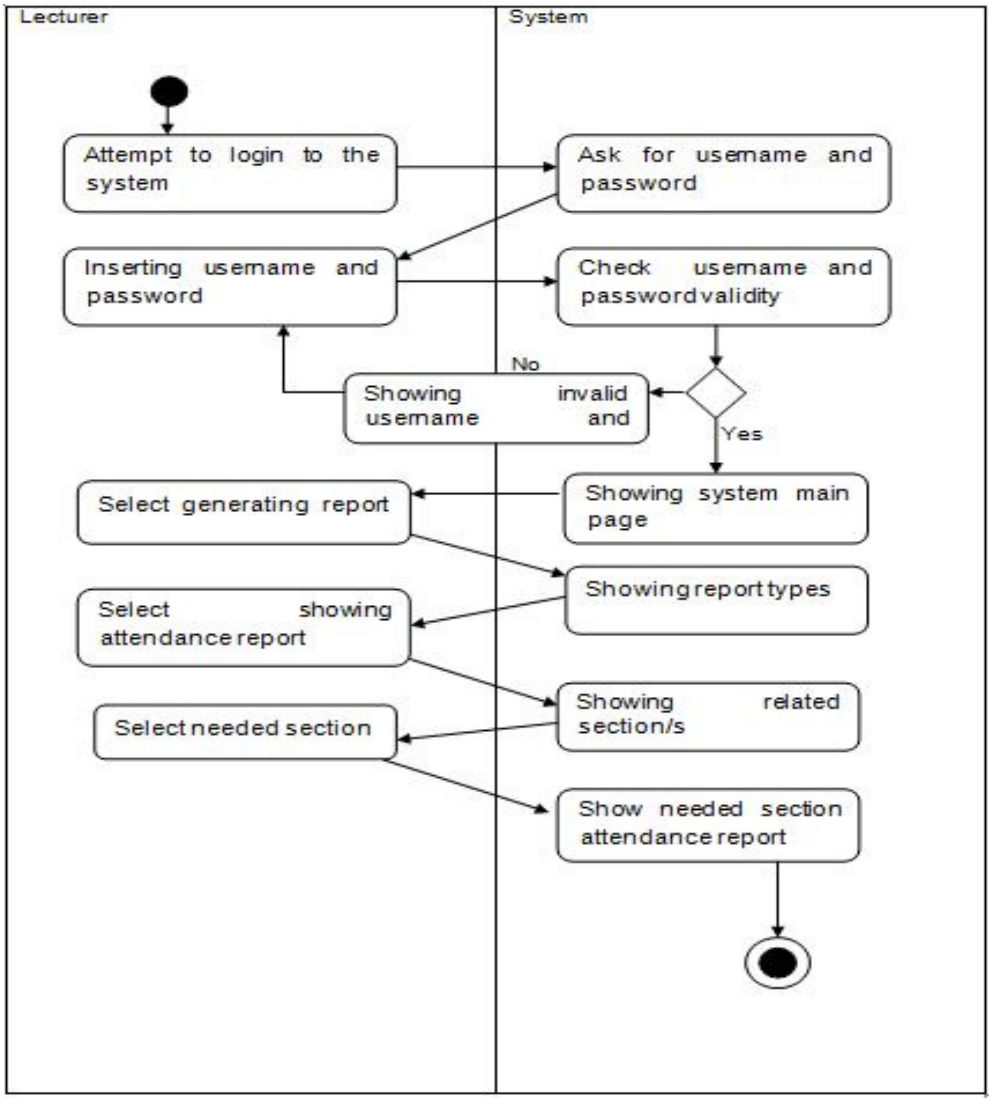

Generating Final Exam Entry Student Elimination Report

Table 17: Activity diagram for final exam entry student elimination report

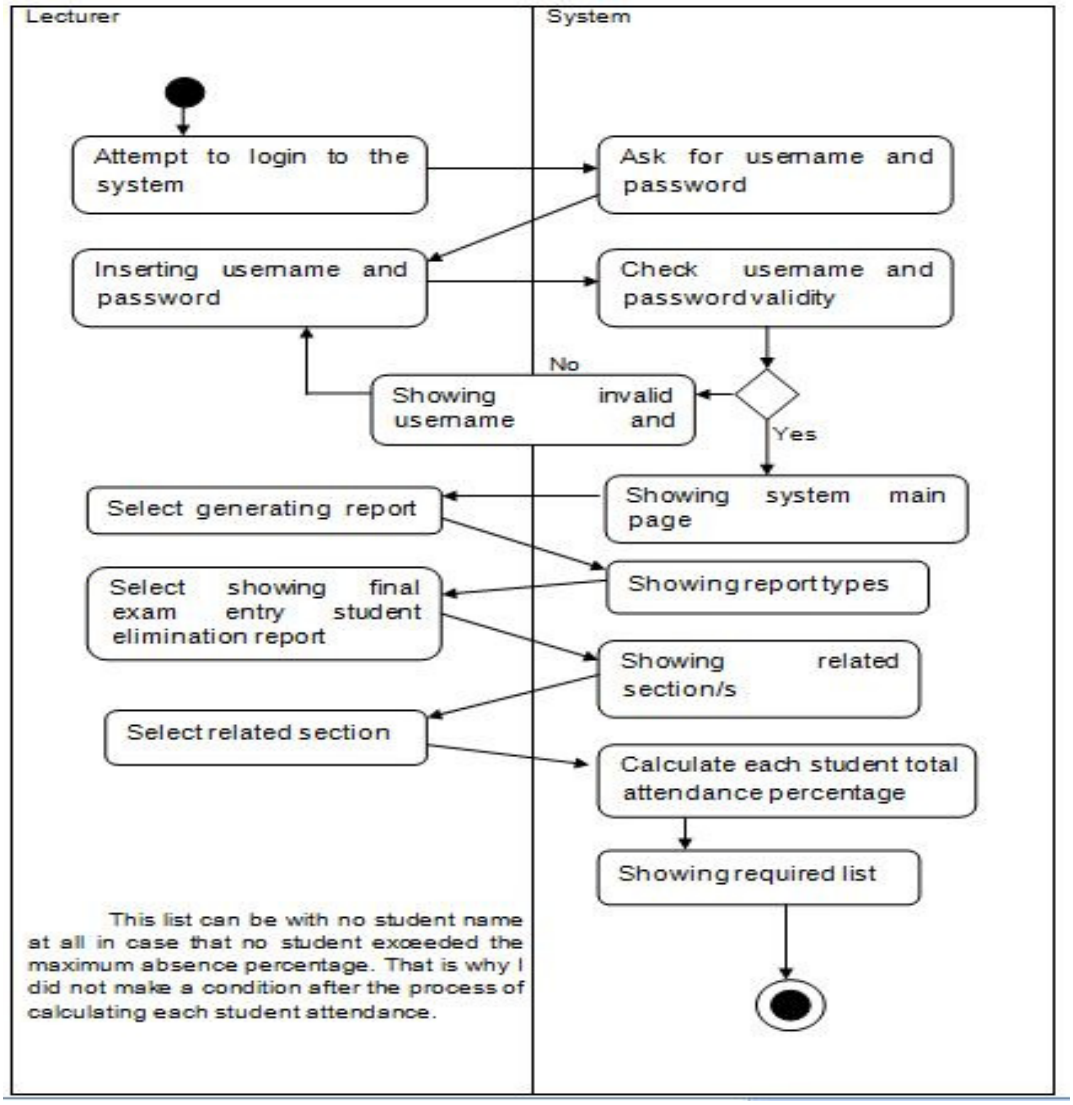

Register IRIS

Table 18: Activity diagram for registering student IRIS

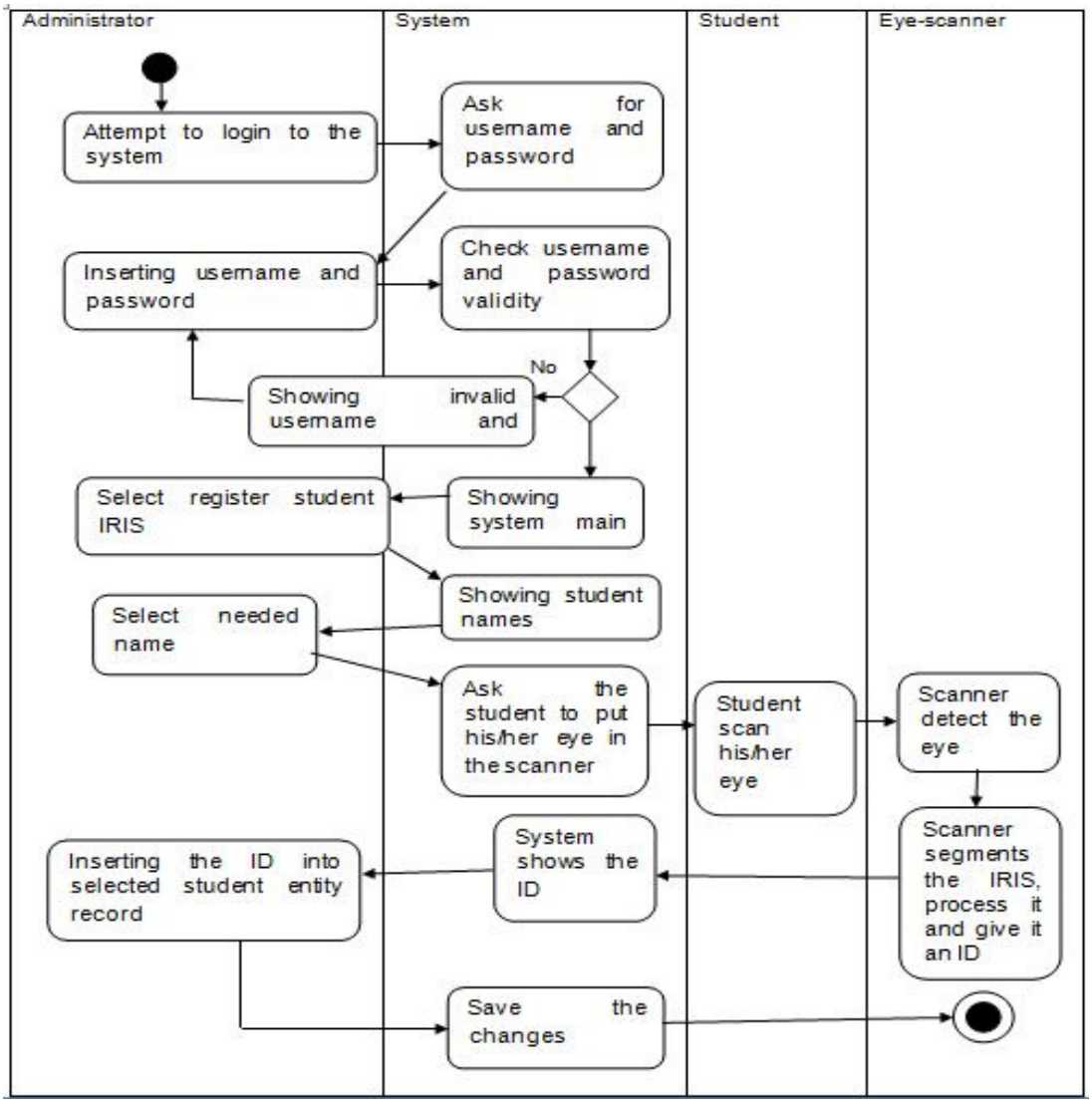

Proposal Data Model

Proposed System Entity Relationship Model(ERM):

Bellow, the added entities and attributes are shown in the ERM:

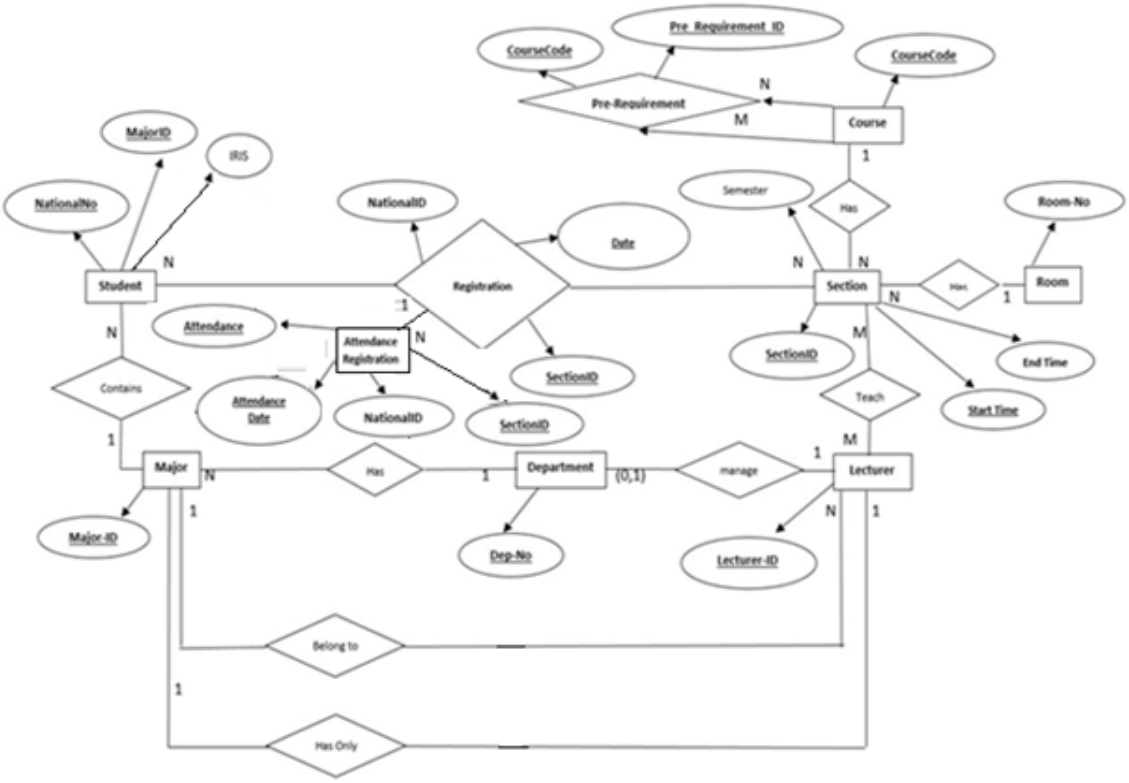

Figure 8: ERM- Diagram for Proposed AMS

Proposal Entities and Attributes Definition

At this point, the proposal will update the student entity with the IRIS attribute.

Table 19: Proposed entity attributes

Column Name	Data Type	Constraint	Note
NationalNo	Char(10)	Primary Key	10 Digits
IRIS	Varchar(5000)		
Surname	varchar(30)		
Midname	varchar(30)		
FirstName	varchar(30)		
Gender	varchar(6)	Male or Female	Restricted by special SQL
City	varchar(40)		
P.O.Box	Char(4)		

Street	Characters		
Mobile	Char(10)		
Major-ID	Number	Foreign Key	From Major Table

Added Proposed Entity: Attendance Registration Entity

This table has combined primary key. It is come from the section table (where the sectionID, and NationalID are combined primary keys), besides having the attendance date, attendance (either 0 or 1 based on attendance).

This is the most important entity in the database once the attendance management system mainly exist, attendance actions are recorded, and several reports will be taken from. That's why the following attributes are combined primary key.

Table 20: Attendance Registration entity

Column Name	Data Type	Constraint	Note
SectionID	Char(5)	Foreign Key	From Registration Table
NationalID	Char(10)	Foreign Key	From Registration Table
AttendanceDateandTime	DateandTime	Primary Key	This table has combined PK
Attendance	Char(1)	Primary Key	Either 0 or 1

Results

In case of successful implementation of this project, we will obtain the following benefits:

1-Minimise the time that attendance take.

2-Eliminate the cases of attending the absent students by their presence colleagues.

3-Encourage the students to attend the classes regularly and not exceeding the maximum absence percentage.

4-By attending more, the students will be able to gain more knowledge and understanding about the courses they are learning. This assists in gaining higher marks at college as argued by Newman et al (2008).

5-Prevent the lecturers from being responsible of the attendance sheet once it will be in an electronic form.

6-Allow the lecturers to view several reports about the course easily.

7- Allow the administrator to create, update, or delete information regarding courses, students, classes, or even lecturers.

Future Suggestions

Further ideas and research can be done based on this project are:

1- Linking the IRIS machines to doors of classes where door opens when recognizing the proper student IRIS and closed after it.

2- Adding further privilege to the lecturer in order to set up the time that students are allowed to register their attendance from the start time of the lecture and refuse any attempt after it.

3- Linking the final exams classes to the AMS.

4- Extending the AMS to the employees in the university for a better employee attendance management.

5-Giving the lecturer privilege to make some students who are not able to use the IRIS machine (like blind students) present based on their physical existence.

6- If the solution is implemented and works in the best scenario, it can be further implemented to all the other branches and institutes of the same university which are now 18(Web ref). Further extension may be executed to all state universities in the country which reaches now 30 universities(Web ref).

7-Implementing such technology in all the organizations that focus on attendance and eliminating the need for paper attendance sheet. This is importance because in these organizations , the attendance sheet is importance in annual and urgent vacations beside the monitoring departments work whether within the organization or from outside it.

[1]Maintainability: Software Maintenance is the modification of a software product after delivery to correct faults, to improve performance or other attributes, or to adopt the product to a modified environment. [IEE 1993]

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For all whom stand beside me and for all whom gave me the hope, for everyone feel my fear and remove our tears.

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Sustainable Agriculture Management in European Union Countries

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Abstract

The contemporary agriculture facing not only challenges in the form of higher efficiency, productivity or consolidation, but also it should fulfill certain criteria, related to sustainable development concept. In these days the management of agriculture sector should take into account, not only the economic, but also the ecological aspects. Taking account that agriculture is one of the most important activities in EU countries, the purpose of the article was to outline the present management of agriculture from sustainable development point of view. The methodology used adopted the form of comparative analysis conducted for chosen agri-environmental indicators. Based on Eurostat statistics and own calculations, it can be concluded that the level of agriculture sustainable if very differentiated between selected countries in EU.

Keywords: Agriculture, Sustainable Development, Management, Sustainable Agriculture.

Introduction

Agriculture in EU countries continues to be a very important sector of the economy, next to the food, fisheries and forestry industries, it is one of the most important elements of broadly understood agribusiness (Skowron-Grabowska, 2010). Agriculture and rural areas play a key role in the economic and social development of developing countries (Brzozowska, 2014). The basic task of agriculture is to provide food for worldwide population, but in present times, reducing the environmental impact and preserving natural resource for the future generation also is a major task (OECD, 2020). Consequently, there is a need for a conscious agricultural policy aimed not only at the further development of agriculture, ensuring the continuity of food supply, but also guaranteeing adequate financial profits for farmers, reducing poverty but also ensuring food security (Wspólna polityka rolna…, 2014). However, in agriculture, not only food production is important. In all EU Member countries, there are farmers who care about rural areas and traditional lifestyles. Farmers need equipment, energy and fuel, buildings, fertilizers and veterinary care for animals (Kalinichenko, Havrysh, Perebyynis 2016). And the competitiveness of agricultural enterprises management is inextricably linked to the state of the other agribusiness links and the level of development and modernization of the economy (Starostka-Patyk, 2016).

In Poland, until 1989, agriculture management was completely incapacitated by full dependence on the state, in terms of production, supply and disposal and on social grounds as well. This caused that the collision with the realities of the market economy become a challenge to which Polish farmers

were completely unprepared, and the state policy in fact hindered their adjustment process of proper management.

The principle of sustainable development was adopted during the Earth Summit in Rio de Janeiro in 1992, under the most well-known definition: „Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Our common future, 1992). Since then, it has been incorporated into all EU policies, including agriculture, which meant new obligations for farmers to provide public goods in the interests of all of us, in the form of well-maintained rural areas, high biodiversity, wise use of natural resources and cultural objects (Fidlerova et al., 2014). This concept is even more important for agriculture and rural areas that directly affect the natural environment (Adamowicz, 2000), as today the concept of sustainable development has strongly affected the agriculture sector (Latruffe et al., 2016). Agriculture has a great impact on the natural environment – its negative effects increase the pollution and lead to soil's, water's and air's degradation, but its positive effects can cause greenhouse gases decrease or mitigate the flood risks by the adoption of certain practices (OECD, 2020).

Due to the close link between the agriculture development and the development of rural areas, it is impossible to talk about the sustainable development of these areas without sustainable agriculture (Żmija, 2011). Sustainable agriculture development, which is a key element of sustainable rural development, as defined by the FAO Food and Agriculture United Nations in 1987, is the use and conservation of natural resources and the orientation of technology and institutions to meet human needs and future generations (Sydorovych and Wossink, 2008).

Awareness of the close development of agriculture with the concept of sustainable development manifests itself in emphasizing the essence of this concept in many documents related to the development of agriculture and rural areas (Velten et al., 2015). Reference to the concept of sustainable development can be found in the CAP (Common Agriculture Policy) (Wspólna polityka rolna…, 2012). Sustainability appeared in the Agenda 2000 reform, which established the second pillar of the CAP and formulated agri-environmental programs and started to support sustainable development activities (Jambor, 2011). The present CAPis structured around two pillars: first pillar focuses on greening and a more equal distribution of support, while second pillar focuses on competitiveness, innovation, climate change and the environment (Dunay, 2011). The Europe 2020 Strategy document, which also includes references to the concept of sustainable development, in one of its headline targets: sustainable growth (A European strategy…, 2020) . The main goals of "Sustainable growth" are connected to climate, energy and efficiency targets, such as using renewable energy, building low carbon economy, improving energy efficiency (Vida and Illes, 2014). In, 2019, a new document "Annual Sustainable Growth Strategy 2020" has been released with the new term "European Green Deal" as a new growth strategy for all UE countries (Annual Sustainable…, 2020).

Sustainable agriculture as one of the fields of sustainable rural development and an alternative to intensive industrial farming, should rationally manage the land resources, so that they can benefit from it and meet their needs for future generations of producers and consumers as well (Marsden and Sonnino, 2009). Its essence is to strive for a stable and, at the same time, economically viable and socially acceptable production in a way that does not harm the natural environment (Pretty, 2008).

Sustainable agriculture in European Union Countries – the purpose of the research

Bearing in mind all of the above, an analysis, which outcomes may be response to the extent to which agriculture of EU countries is sustainable, have been conducted. To find an answer, the values of selected agri-environmental indicators were measured. To perform an analysis, chosen Eurostat statistics have been used and own calculations as well. The selected indicators were adopted to the study as its volumes present the actual level of sustainability in agriculture. The obtained data and

appropriate calculations made it possible to present the current state of agriculture in the aspect of sustainable development. The following issues have been analyzed:

- Basic information regarding the agriculture in EU including: the number of farms, their total area, the amount of income earned, the number of employees and the level of production (crops, milk and meat) in order to present the current state of agriculture in EU countries,
- then, the overall farms' efficiency was calculated based on the chosen indicators,
- productivity: the income generated by single farm, the production level generated by single farm, the income generated by farm's single employee, the average size of farm and the income generated by 1 hectare. These indicators were chosen as the production is one of the four major components of sustainable agriculture,
- the values of adopted agri-environmental indicators for agriculture in all EU countries such as: the share of UAA under agri-environmental measure, the average annual expenditure on agri-environmental measures per hectare, the total public expenditures for environmental trainings, information and advisory services and the total public expenditures for environmental trainings, information and advisory services in 2010 per employee in agriculture.

The conducted analysis present the state from the year 2016, as the most current year, because the majority of statistical data obtained for the analysis came from this year as the most up-to-date.

The Research Results

General Data

The first stage of the analysis was the presentation of basic figures characterizing agriculture in all EU countries. These values were: the number of farms, their total area, the amount of income earned, the number of employees and the level of production (crops, milk and meat) presented in Table 1.

The yellow fields indicate the first five countries with the highest values for a given category, and the countries are being sorted by the number of farms. As shown in the table above, the first five countries with the largest number of farms are: Romania (3.6 mln), Poland (1.4 mln), Italy (1.0 mln), Spain (0.9 mln) and Greece (0.7 mln). For the total area of agricultural land, Spain is on the 1st place, with more than 30 million hectares of agricultural land, on the second is France, with less than 30 million hectares of agricultural land. On further places, the following countries have been found: Poland (16.4 mln ha), Germany (18.3 mln ha) and United Kingdom (18.6 mln ha), in which the area of agriculture land is similar. In the case of revenues generated by farms, France is on 1st place, when in 2013 farms generated a total of more than 56 billion Euros. On the further places are Germany (46 billion Euros), Italy (43 billion Euros), Spain (35 billion Euros) and United Kingdom (21 billion Euros). It is worth to add that, right after the United Kingdom, Poland was located, whose farms in 2013 generated over 21 billion euro revenue. In the case of number of employees in agriculture, on the first four places are the countries with the largest number of farms: Romania (1.5 mln employees), Poland (1.9 mln employees), Italy (0.8 mln employees) and Spain (0.8 mln employees). Whereas France is on the last place (0.7 million employees). But, in contrast, France is on the 1st place in the case of total production, being an undisputed leader, since French farms in 2013 have produced over 75 million tons of products. Germany, which produced nearly 20 million tons less – 57 million tons of products, are on 2nd place. Poland is on the 3rd place, whose production is less than half of the French farms production – 31 million tons. The next is Spain, whose production is one third the size of French farms and is hovering around 25 million.

Table 1: The main volumes of EU agriculture

Country	Number of farms	Total farms' area (ha)	Standard output (euro)	Labour force directly employed (per person)	Total production of crops, milk and meat (in tons)
Romania	3 629 660	14 661 380	11 989 578 640	1 552 630	20 926 360
Poland	1 429 010	16 487 480	21 797 461 420	1 918 550	31 379 860
Italy	1 010 330	15 933 790	43 793 881 650	816 920	22 125 610
Spain	965 000	30 042 210	35 978 946 920	813 550	25 954 280
Greece	709 500	5 062 500	8 103 007 120	463 860	4 670 360
Hungary	491 330	7 048 760	5 577 723 710	433 700	13 632 550
France	472 210	29 264 400	56 914 191 760	724 690	75 214 700
Germany	285 030	18 305 150	46 252 042 690	522 730	57 491 100
Portugal	264 420	4 625 700	4 509 024 200	323 470	1 447 650
Bulgaria	254 410	5 608 980	3 335 670 170	320 230	9 368 190
United Kingdom	183 040	18 663 950	21 818 581 460	274 520	28941060
Lithuania	171 800	3 125 370	1 919 223 290	144 770	4 511 570
Croatia	157 440	1 728 100	2 029 135 280	175 050	3 661 050
Austria	140 430	5 815 840	5 671 213 540	111 160	5 978 050
Ireland	139 600	5 277 990	5 012 538 820	163 690	3 457 890
Latvia	81 800	3 058 780	990 012 640	82 090	1 964 370
Slovenia	72 380	902 160	1 009 230 010	82 450	489 440
Netherlands	67 480	2 008 870	20 498 061 340	153 310	2 202 100
Sweden	67 150	6 424 370	4 678 580 280	59 320	6 349 460
Finland	54 400	5 786 690	3 398 060 700	57 550	4 143 220
Norway	43 270	5 372 090	3 410 100 700	44 000	965 000
Denmark	38 280	2 920 610	9 580 213 710	53 170	9 943 600
Belgium	37 760	1 350 200	8 406 674 190	56 730	4 909 470
Cyprus	35 380	123 810	495 411 360	16 550	140 600
Czech Republic	26 250	5 076 430	4 446 963 820	105 080	8 433 760
Slovakia	23 570	3 067 090	1 812 222 660	50 600	3 421 490
Estonia	19 190	1 229 420	676 317 090	22 060	1 149 360
Malta	9 360	11 980	96 790 090	4 450	11 300
Luxembourg	2 080	137 790	313 811 850	3 530	181 250

Table 2: Overall farms' efficiency in relations to chosen indicators

Country	The income generated by single farm (in euro)	The production level generated by single farm (in tons/farm)	The income generated by farm's single employee (in euro/farm)	The average size of farm (in ha/farm)	The income generated by 1 hectar (in euro/hectar)
Romania	3 303.22	5.77	7 722.11	4.04	817.77
Poland	15 253.54	21.96	11 361.42	11.54	1 322.06
Italy	43 346.12	21.90	53 608.53	15.77	2 748.49
Spain	37 283.88	26.90	44 224.63	31.13	1 197.61
Greece	11 420.73	6.58	17 468.65	7.14	1 600.59
Hungary	11 352.30	27.75	12 860.79	14.35	791.31
France	120 527.29	159.28	78 535.91	61.97	1 944.83
Germany	162 270.79	201.70	88 481.71	64.22	2 526.72
Portugal	17 052.51	5.47	13 939.54	17.49	974.78
Bulgaria	13 111.40	36.82	10 416.48	22.05	594.70
United Kingdom	119 201.17	158.11	79 479.02	101.97	1 169.02
Lithuania	11 171.26	26.26	13 257.05	18.19	614.08
Croatia	12 888.31	23.25	11 591.75	10.98	1 174.20
Austria	40 384.63	42.57	51 018.47	41.41	975.13
Ireland	35 906.44	24.77	30 622.14	37.81	949.71
Latvia	12 102.84	24.01	12 060.09	37.39	323.66
Slovenia	13 943.49	6.76	12 240.51	12.46	1 118.68
Netherlands	303 764.99	32.63	133 703.35	29.77	10 203.78
Sweden	69 673.57	94.56	78 870.20	95.67	728.26
Finland	62 464.35	76.16	59 045.36	106.37	587.22
Norway	78 809.82	22.30	77 502.29	124.15	634.78
Denmark	250 266.82	259.76	180 180.81	76.30	3 280.21
Belgium	222 634.38	130.02	148 187.45	35.76	6 226.24
Cyprus	14 002.58	3.97	29 934.22	3.50	4 001.38
Czech Republic	169 408.15	321.29	42 319.79	193.39	876.00
Slovakia	76 886.83	145.16	35 814.68	130.13	590.86
Estonia	35 243.20	59.89	30 658.07	64.07	550.11
Malta	10 340.82	1.21	21 750.58	1.28	8 079.31
Luxembourg	150 871.08	87.14	88 898.54	66.25	2 277.46

In general, looking at the tables 1, 2, it is clearly visible that Romania, Poland, Italy, Spain, France, Germany and United Kingdom are characterized by the largest values. On the other hand, Greece is on the 5th place in terms of the number of farms, but the remaining values are far from the first five. Based on the calculations, to the most efficient agricultures the following countries can be selected: Netherlands, Denmark, Belgium, Czech Republic, Germany and United Kingdom. The following

conclusions can be drawn for the individual indicators:

1. The income generated by single farm (in euro) – In this case, farms in the Netherlands were the most efficient, one farm from 67 000 was able to generate revenues of more than 300 000 Euros. The next two places included farms from Denmark and Belgium, generating 250 000 euro and 222 000 euro respectively. On the last two places Czech Republic and Germany have been found, with the 169 000 euro and 162 000 Euro generated revenues. While among all these countries, this is Germany with the largest amount of farms – over 285 thousand so four times more than Netherlands.
2. The production level generated by single farm (in tons) – here farms from Czech Republic are on the first place, when in the years 2013 the production volume per one farm estimated around 321 tons per farm. The next is Denmark, with a production of 259 tons per farm, and Germany – 201 tons per farm. On the last places are France and United Kingdom, whose production volume per one farm was 159 tons and 158 tons respectively.
3. The income generated by farm's single employee (in euro) - on the basis of the calculations, it is clear that Denmark is the leader - the work of one employee in agriculture brought the effect of 180 thousand euro. On the 2nd place was Belgium, where the work of a single employee translated into 148 thousand euro revenue. In this set up, again the Netherlands, with the income generated by a single employee at 133 thousand euro has appeared. On the last place is Germany again and Luxembourg, where the work of one employee brought the effect of 88 thousand euro. But in Germany, 522 thousand people are employed in agriculture, and in Luxembourg - 3,500 employees only.
4. The income generated by 1 hectare (in euro) – again Holland is on 1st place - where revenues from one hectare in 2013 amounted to 10 thousand euro. Malta ranked second, for the first time in this ranking, with a revenue of one hectare of 8,000 euro. While Netherlands has more than 2 million hectares of agricultural land and Malta has 11,000 hectares only. On the further place are Belgium, Cyprus and Denmark, with the revenues: 6 thousand euro, 4 thousand euro and 3 thousand euro. While Denmark has 3 mln hectares of agricultural land and Belgium 1,3 mln hectares, the area of agricultural land on Cyprus does not exceed 125 thousand hectares.

Thus, it can be concluded that the number of farms, the area of agricultural land, the volume of production and employment, and the volume of revenue generated is practically unimportant in terms of agricultural efficiency. While in the case of basic volumes, where the following countries have been characterized by the highest values: Romania, Poland, Italy, Spain, France, Germany, United Kingdom, in the case of the indicators above, the highest volumes were noted for the countries such as: Netherlands, Denmark, Belgium, Czech Republic and Germany and Malta, Cyprus, Luxembourg, France and United Kingdom as well. Only Germany, France and United Kingdom are present in both groups. But none of these countries in efficiency analysis got the first three places.

In addition, based on the calculations made in relation to the analysis of the level of efficiency of individual agricultural economies, it was also possible to identify countries where the level of efficiency of agriculture is similar to Polish agriculture (figure 1).

Fig. 1: The graphic presentation of similar values for selected countries

In terms of indicators such as:

- the income generated by single farm,
- the production level generated by single farm,
- the income generated by farm's single employee,
- the income generated by 1 hectare.

we may assume that agriculture in Italy, Portugal, Croatia and Slovenia in quite similar to Poland. That is why in the further analysis, in regards to describe the sustainability level in polish agriculture, for these countries calculations will be conducted as well.

Agri-Environmental Indicators

Having in mind that almost 40% of the EU's land area being farmed, can be concluded that agriculture has a very important impact on the natural environment.

The above and the Common Agriculture Policy's adoption caused that new indicators, called Agri-environmental indicators (AEI's) have been developed, in order to track and measure the integration of environmental concerns into the Common Agricultural Policy (CAP) at EU, national and regional levels (ES, 2017). According to data from Eurostat, unfortunately the year 2009 is the latest year, no further statistics are available, the following can be concluded (in division to chosen sub-indicators):

1. Expenditures on agri-environmental measures -the differences in the agri-environmental expenditure per hectare among various countries, give indication of the importance they attach to the implementation of agri-environmental measures across their own agricultural area (table 3).

Table 3: Average annual expenditure on agri-environmental measures per hectare of UAA supported (EUR per ha)

Country	Average annual expenditure on agri-environmental measures per hectare of UAA supported (EUR per ha)	Country	Average annual expenditure on agri-environmental measures per hectare of UAA supported (EUR per ha)
Malta	615	Czech Republic	190
Cyprus	610	Italy	190
Netherlands	460	Germany	180
Estonia	375	Lithuania	140
Austria	350	Denmark	130
Luxembourg	330	Belgium	120
Slovenia	275	Ireland	115
Hungary	210	Latvia	110
Sweden	205	Romania	90
Portugal	202	Spain	80
Slovakia	200	Poland	75
		France	60
		Bulgaria	50
		United Kingdom	45
		Finland	10

As we can see from the table above Malta is on the first place with average annual expenditure on agri-environmental measures per hectare with 615 euro. On the second place is Cyprus, whose average annual expenditure on agri-environmental measures per hectare, was 610 euro in the year 2009. But it is worth to bear in mind, that Malta and Cyprus are characterized by the smallest area of agriculture land, 11 980 hectares and 123 810 hectares respectively. Thus, it can be assumed that even a little area of agriculture land makes it possible for such a high expenditure to be made by both countries. But on the 3rd place is Netherlands, whose average annual expenditure on agri-environmental measures per hectare was 460 euro, but total farms area is more than 2 mln hectares. Poland, on the other hand, is in the final part of the statement, amounting to 75 Euros, which accounts for only one-eighth of the expenditure incurred by Malta and Cyprus. Also among countries like Italy, Slovenia, Hungary and Croatia, Poland has the lowest level of average annual expenditure on agri-environmental measures per hectare. And on the first place is Slovenia with 275 euro. In the remaining, selected, countries – the level of these expenditures is far above 150 euro, Only in Poland, the level of these expenditures is below 100 euro. While lowers expenditures of average annual expenditure on agri-environmental measures per hectare have the following countries: France, Bulgaria, United Kingdom and Finland, while in Finland the expenditure level in the year 2009, was 10 euro only.

2. Total public expenditures for environmental trainings, information and advisory services – according to the data from Eurostat for 2010, Sweden, Ireland, Spain, France and Austria had the highest number of participants to environmental training, and Sweden represents more than 50% of

the total participants among all UE countries (Kalinichenko and Chekhlatyi 2017). The highest numbers of applications for environmental advisory services were registered in Italy, Hungary and the Czech Republic – these three countries were accounted for 79% of the total number of applications. In relations to public expenditures the most important sub-indicator was number and share of participants in vocational trainings sub-indicator (table 5).

The above table presents the outcomes of expenditures of vocational trainings, applications for advisory services and economic actors in trainings. The unquestioned leader of this list is Sweden, whose spending in 2010 amounted to over 36 635 thousand euro, and 92% of that expenditure was related to the vocational trainings. On the 2nd place is Austria, which in the year 2010, spent 6 882 thousand euro on this kinds of trainings, and 5 392 thousand euro on economic actors in trainings (78%) only. On the 3rd place in France, which spent 4 506 thousand euro on that purpose, almost all expenses went on vocational trainings. On a further place Belgium can be found, with the expenditure level of 4 132 thousand euro and with the significant share of vocational trainings (68%). Poland, allocating 34 thousand euro on this kinds of trainings in the year 2010, is located on the one of the latest places. But at the very end, Slovenia can be found, which designated only 1 thousand euro for vocational trainings in the year 2010 (table 4).

Table 4: Average annual expenditure on agri-environmental measures per hectare of UAA supported (EUR per ha)

Country	Number and share of participants in vocational trainings (thousand Euro)	Number and share of applications for advisory services (thousand Euro)	Number and share of economic actors in trainings (thousand Euro)	*TOTAL*
Austria	1 490	0	5 392	**6 882**
Belgium	2 810	967	355	**4 132**
Czech Republic	408	867	423	**1 698**
Denmark	898	0	116	**1 014**
Estonia	23	32	0	**55**
Finland	244	0	338	**582**
France	4 486	0	20	**4 506**
Germany	660	30	302	**992**
Hungary	147	909	0	**1 056**
Ireland	1 449	0	295	**1 744**
Italy	1 967	1 291	0	**3 258**
Latvia	107	0	0	**107**
Lithuania	775	0	0	**775**
Luxembourg	10	0	0	**10**
Poland	0	34	0	**34**
Slovakia	933	0	0	**933**
Slovenia	1	0	0	**1**
Spain	1 789	0	0	**1 789**
Sweden	33 763	0	2 872	**36 635**
United Kingdom	585	41	183	**809**
TOTAL	**52 545**	**4 171**	**10 296**	**67 012**

Checking the level of expenditure on environmental training per capita in agriculture, we will get slightly different results. In this case, Sweden is on the 1st place, where the level of expenditure per employee in 2010 amounted to 617 Euros. Belgium, on the 2nd place in the list above, and fourth in previous ones, in the year 2010 allocated 70 Euros for training courses. Austria, which in the first ranking, was on the 2nd, occupies the 3rd place, but the difference in spending is huge - because the level of expenditure per employee in Austria is almost 10 times lower than in Sweden.

Table 5: Average annual expenditure on agri-environmental measures per hectare of UAA supported (EUR per ha)

Country	*TOTAL*	Country	*TOTAL*
Sweden	617.58	Italy	3.99
Belgium	72.84	United Kingdom	2.95
Austria	61.91	Luxembourg	2.83
Denmark	19.07	Estonia	2.49
Slovakia	18.44	Hungary	2.43
Czech Republic	16.16	Spain	2.20
Ireland	10.65	Germany	1.90
Finland	10.11	Latvia	1.30
France	6.22	Poland	0.02
Lithuania	5.35	Slovenia	0.01

The biggest difference, however, is in the case of France, where in the first ranking it was third in the list with expenditure of EUR 4 506 thousand, in the case of the amount of expenditure per employee in 2010 - amounted to 6 Euros only. This is due to the fact that among the countries mentioned earlier, France has the highest amount of employees in agriculture – more than 700 thousand. Poland, again, can be found on the further place, with the expenditures level per employee 2 eurocents only. Such a low cost level is connected with the fact, that in the year 2010, Poland allocated 34 thousand euro on trainings only but the number of employees in agriculture is more than 2 mln people.

Conclusion

Based on the conducted analysis one major assumption can be made - the number of farms, the area of agricultural land, the volume of production and employment, and the volume of revenue generated is practically unimportant in terms of agricultural efficiency. For example, in Poland the agriculture sector plays a major role in the national economy, because Poland has the highest values for the number of farms, total farm's area, standard output, people working in agriculture and the total production of crops, milk and meat. But taking account the indicators such as: the income generated by single farm, the production level generated by single farm, the income generated by farm's single employee, the average size of farm and the income generated by 1 hectar, it is clearly visible that polish agriculture has one of the last places. Thus, it can be concluded that the efficiency of polish agriculture, being the determinants and major element of sustainable agriculture, is at a very low level. But having in mind that the main purpose of this article was to check the level of sustainability of EU countries agriculture, it is possible to assume that:

- In case of agricultural area enrolled in agri-environmental measures - Luxembourg, Finland, Sweden and Austria more than two-thirds of the UAA were enrolled in agri-environmental commitments, while in countries such as: Portugal, Cyprus, Malta, Romania, Lithuania, the Netherlands, Poland, Bulgaria this share was below 10%,

- In case of expenditures on agri-environmental measures - Malta is on the first place with average annual expenditure on agri-environmental measures per hectare with 615 euro. On the second place is Cyprus, whose average annual expenditure on agri-environmental measures per hectare, was 610 euro in the year 2009,

- In case of total public expenditures for environmental trainings, information and advisory services - the unquestioned leader of this list is Sweden, whose spending in 2010 amounted to over 36 635 thousand euro, and 92% of that expenditure was related to the vocational trainings. On the 2nd place is Austria, which in the year 2010, spent 6 882 thousand euro on this kinds of trainings, and 5 392 thousand euro on economic actors in trainings (78%) only. On the 3rd place in France, which spent 4 506 thousand euro on that purpose, almost all expenses went on vocational trainings,

- In case of the level of expenditure on environmental training per capita in agriculture - Sweden is on the 1st place, where the level of expenditure per employee in 2010 amounted to 617 Euros. Belgium, on the 2nd place in the list above, and fourth in previous ones, in the year 2010 allocated 70 Euros for training courses. Austria, which in the first ranking, was on the 2nd, occupies the 3rdplace, but the difference in spending is huge - because the level of expenditure per employee in Austria is almost 10 times lower than in Sweden.

Based on the above we can conclude that the sustainability level in agriculture is the highest for Sweden – taking account the above indicators, Sweden has the highest places in three of them. We can also conclude that agriculture in Austria and France is characterized by quite high level of sustainability. Unfortunately polish agriculture is quite far away for the "sustainable agriculture" description. But in comparison to selected countries (Italy, Hungary, Croatia and Slovenia), polish agriculture seems to be more sustainable. On the other hand, in this paper, the size of the indicators for only one group defining the level of sustainability was examined. It would be useful to also examine the levels of environmental spending, environmental taxes, innovation expenditure, as well as the level and type of waste and greenhouse gas emissions and pollutants generated by UE countries agriculture, in order to fully assess which agriculture of UE countries is a sustainable agriculture. Therefore the above issues will be the subject of further research in this field.

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Financial Resources of Agricultural Manufacturers in Ukraine – Historical Experience and Its Modern Role in Enterprise Management

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Abstract

The use of historical experience is an important component of the modern economy reforming in Ukraine. The reforms of the second half of the 19th to early 20th century are of particular importance. As their immediate result was the creation of an extensive credit system for agricultural producers, which was very effective at that time. The article describes the main types of financial resources used by agricultural producers in Ukraine at the turn of the 19th and 20th century. The analysis of statistical data confirms the idea of the extraordinary vitality of small family-owned agricultural enterprises. In such places there has always been the possibility of replenishing a modest budget through both economic activity and handicraft industries, as well as loans of different origins. The use of historical experience can be extremely useful for increasing the competitiveness in both domestic and foreign markets.

Keywords: Agricultural Sector, Agricultural Goods Producers, Budget, Financial Resources.

Introduction

The era of deep and comprehensive economic reforms in Russia, the beginning of which goes back to the period of the abolition of serfdom in 1861 is of considerable public interest. At least, because that's when these elements of market relations, without which it is difficult to imagine any modern, improved in every respect country, began to function successfully. This includes wage labour, extensive system of credit relations, and diverse State support for agricultural producers and many other activities of central and local authorities. These activities are aimed at improving the competitiveness of the country's agricultural sector in both the domestic and foreign goods and services markets.

In the works of domestic and foreign researchers socio-economic standards of life for agricultural producers of Ukraine during the period of capitalism are very widely represented. There is every reason to call this period the era of free enterprise. Another matter is the coverage of the problem related with analysis of the financial resources of business entities of Ukraine's agricultural sector in the aforementioned historical period. From this point of view, we should recall the fundamental work by P. Kovanko, professor at Kyiv University, which was published in 1914 (Kovanko 1914, pp.1-77). It dealt with the performed detailed analysis of the financial aspects connected to the form and content of the production relations between the State, landowners and former serfs in accordance with the Tsarist Manifesto of February 19th, 1861. However, the specificities of the Ukrainian area in general and the state of finances of its agricultural producers in particular are not reflected in the mentioned research. Characteristics of the peasantry's redemption payments at State level are found in the works of P. Golubev (1905), A. Lositsky (1906), N. P. Oganovsky (1917) and some other authors from the late 19th and early 20th century. Soviet researchers paid much more attention to the financial aspects of the

Emancipation reform of 1861 in the context of specific regions including the Ukrainian provinces of the Russian Empire. First of all, the authors of the article consider the works of such agrarian historians as P.A. Zaionchkovsky (1958, 1968), P.A. Teplytsky (1959) and A.V. Bondarevsky (1961). In those works not only the content of the redemption operation was analyzed, but also its consequences, including Ukraine as its constituent part. Anglo-American researchers such as H. Rogger (1983), D. Macey (1984), S. Hamburg (1984) and a number of other, less outstanding authors roughly described the financial aspects of the farms of Ukraine's landowners and peasants in their works. Meanwhile, the present-day historians have an appropriate documentary base at their disposal. It enables them to disclose the main sources of financing for business entities in the agricultural sector of Ukraine with sufficient completeness. At the end of the 19th and the beginning of the 20th century those business entities mainly consisted of the so-called unprivileged estates of the realm – peasants of all categories and the so-called MaloRussian Cossacks[1]. From this point of view, the most valuable group of sources consists of various statistical compendiums on both the All-Russian (1866, 1907) and regional (1916, 1917) scales. It also includes the documents of the Russian State Historical Archive (holding No. 577 – Main Redemption Board).

The aim of this study is to analyze the financial resources of business entities in the agricultural sector of Ukraine at the turn of the 20th century, which in some cases ensured the sustainable and progressive development of the corresponding farm business and in others – did not.

The Findings of the Study

Both privileged and unprivileged segments of the population took part in agricultural production within the territory of the Ukrainian governorates of the Russian Empire in the second half of the 19th and early 20th century. While the State and local statistics gathered a huge information base regarding the latter ones, the agricultural activity of the former feudalist landowners at the turn of the century was much less covered. This is evidenced, in particular, by the currently most comprehensive study by N.R. Temirova. She has never been able to establish the total number of landed estates in any given region of Ukraine due to the lack of necessary information in the relevant sources (Temirova 2003, pp. 26-211). The statistics of 1905 well-known to researchers of the agrarian history of Russia reports the total number of private landowners. About 90% of them belonged to the privileged categories of the population. Based on this, it is possible to establish an approximate number of farms within 32 thousand, with a total land area of about 16 mln dess.[2] (Statistics of land ownership in 1905, p. 12). In the historical literature there is a perception that land tenure by nobles was large as a rule. The fact that this was not the case is evidenced, in particular, by the materials of the 1910 household census in the Poltava Governorate. Out of 1,458 farms of privileged classes: 15.8% had less than 3 dess. of land; 15.4% – from 3 to 6 dess.; 1.2% – from 6 to 9 dess.; 12.6% – from 9 to 15 dess.; 10.6% – from 15 to 25 dess.; 11.5% – from 25 to 50 dess. and, finally, only 23,1 % of farms of this agricultural producers category had 50 or more dess. of land (Statistical yearbook of the Poltava 2012, p. 47). On the other hand, we acknowledge that there were the nobles who had dozens (dukes Sanguszko, Romanovs, Kochubey) and even hundreds (counts Branicki and Potocki) thousand dess.of land in the Ukrainian governorates after 1861. Although about half of the agricultural land of Ukraine was in the hands of the privileged classes after the agrarian reforms of the 1860s, not them, as some authors believe (Zhuk 2005, p. 120), but the rural inhabitants produced the lion's share of agricultural products. It was due to the fact that the noble landlords in most cases did not keep their own farms. They considered it more profitable to lease the land possessed by them to the mentioned peasants or Cossacks. According to the official statistics, there were 5,401,277 former state peasants in Ukraine in 1866. They included the above mentioned "Little Russian" Cossacks of the Poltava and Chernigov Governorates (the former Hetmanate). Another 4,231,579 people, or 40.93%, previously belonged to landlords' peasants, and 705,436 (6.83%) were under the jurisdiction of the specific department. That is, they were the property of the royal family until 1863 (Statistical Timeline of the Russian Empire 1866, p. 50-51). The first to feel the change in their financial situation were the landlords' peasants, whose situation reforming

[1] Cossack – historical terms, (formerly) any of the free warrior-peasants of chiefly East Slavonic descent who lived in communes, esp, in Ukraine, and served as cavalry under the tsars

[2] A *dessiatin* or *desyatina* (dess.) is an archaic land measurement used in tsarist Russia. A dessiatin is equal to 2400 square sazhens and is approximately equivalent to 2.702 English acres or 10,926.512 square metres

began in accordance with the same Manifesto of February 19, 1861. The specific conditions for the release of this agricultural producers category in Ukraine were governed by three laws. Each of them concerned correspondingly: Chernihiv, Poltava and partly Kharkov Governorates; Kiev, Podolian and Volhynian Governorates; Yekaterinoslav, Kherson and Taurida Governorates. The three groups had their regional specificities. In general, the content of the 1861 legislation came down to the fact that the peasants who received land for permanent use, were obliged to buy out their land for the price set without their consent. The basis for the relevant calculations were not the market prices of land or its profitability, but the size of overall monetary obligations. The appropriate amount was set for each governorate separately, and its size was determined by the annual quitrent multiplied by $16^2/_3$. Such an approach of the tsarist bureaucrats made it possible to significantly exceed the real market price in the left-bank and steppe governorates of the South by 84.7%. Whereas in the Right-Bank Ukraine[3] the amount calculated in accordance to the mentioned above formula was reduced by 20% under the influence of the Polish uprising of 1863. To ensure the practical implementation of the plans outlined by the legislation of 1861, the State granted a loan up to 80% of the redemption amount to the peasants. It was given not to them, but to the landlords in the form of securities (Kovanko 1914, p. 479). The peasants were supposed to repay this loan in the next 49 years, together with the traditional for the State Bank 6% per annum. The peasants had to pay the remaining redemption amount in person or work off for the same landowner for 9 years (Russian State Historical Archive, sheet 6). As of January 1, 1907, the day the redemption payments were canceled under the influence of the revolution, the former serfs in the Ukrainian governorates paid to the state not only the loan amount (166.8 million rubles[4]). They also paid 215.2 million rubles of interest for it (Agriculture, factory industry … 1918, p. 508). The total amount is 382 million rubles, which is more than twice the real value received by the peasants as a result of land reform in 1861. No wonder that the redemption payments were financially unbearable for the majority of former landowners' peasants. As so-called Valuev Commission officially recognized in the early 70s of the 19th century, it was because they exceeded the incomes of peasant farms. Therefore the rural classes were forced to seek additional resources outside their own farms (Kaufman 1873, p. 4).

In the 1860s, the financial condition of not only former landlord peasants, but also of a number of other rural groups deteriorated significantly. And if the redemption of land tenure by former landowners and crown peasants could somehow be explained, the requirement for the redemption of land to the State peasants cannot be called anything other than legalized State robbery. It was not by chance that some contemporary public figures spoke quite frankly about this, as far as the tsar's censorship allowed. In 1905 in "State peasants" P. Golubev, well known a lawyer, wrote: "There have always been free, people everywhere who have lived on the lands brought to the desired level by their own hands and means. These lands could be considered the property of the Russian state on the same basis as all the other landlords' or crown lands, like any other real estate within Russia" (Golubev 1905, p. 37). V. Boiko investigated the course of issuing the so-called "owner's records", a receipt which the tsarist government demanded from the former State peasants. He made a reasonable, from our point of view, conclusion of increase in the State peasants' payments for the use of their own land due to that measure, which caused their natural resistance (Boiko 1999, p. 69).

A lot of generations of professional historians had performed the analysis of the essence of the 1860s agrarian reforms. It gives us every reason to state the obvious, as we see it, fact of their direct influence on the acceleration of the development of commodity and money relations in the Russian Empire in the following decades up to the well-known social upheavals of 1917. The part of population mostly in the need of finance ware, of course, the underprivileged classes who were forced to redouble their efforts in the search for the vital financial resources. As evidenced by the relevant statistical data collected by economists of the Poltava governorate zemstvo[5] during the household survey of 1910, these were revenues not only from their own households, but also funds earned outside (tab. 1). An analysis of relevant statistics enables to trace certain regularity in the formation of the budget of the peasant and Cossack farms: the smaller the arable land the farm had, the higher was the percentage of

[3] Right-bank Ukraine is a historical and territorial name for a part of Ukraine on the right (west) bank of the Dnipro River

[4] *Ruble* or *rouble* – monetary unit in old and modern Russia

[5] *Zemstvo* was an institution of local government set up during the great emancipation reform of 1861 carried out in Imperial Russia by Emperor Alexander II of Russia

their income from outside earnings (local, seasonal and handicrafts). It is quite natural that among those who had arable land, the income from a personally cultivated land included 68% of financial revenues, whereas livestock raising was slightly less than 30%. The leased land brought only about 2% of the profits. As for the receipt of money from other sources, almost half (48%) of the profits came from crafts and artisanal products. The second place in this list was occupied by local earnings (40%), while seasonal ones gave a little more than 11%. As we see from table 1, there was a direct dependence of the landholding area on the corresponding profit. In the farms, where the size of land did not exceed 3 dess., the profit from local handicrafts and seasonal works exceeded the amount the householder received from crop production and animal husbandry by almost 40%. As for middle-income peasants (6–9 dess.), the profit from agriculture was almost ten times higher than the income from cottage industries and seasonal works. The relevant indicators of the well-to-do farms (25-50 dess.) engaging in no seasonal work and handicrafts (pottery, wood or iron processing, as well as basket weaving) for obvious reasons stand out. Revenues from the so-called local earnings meant profits from the mills or small enterprises to manufacture building materials.

Table 1: Sources of financial income into the peasant and Cossack farms of Poltava region at the beginning of the 20th century

Farms with arable land	**Earnings per household (RUB)**							
	From agriculture				From cottage industries and seasonal work			
	From the personally cultivated land	From the land leased	From livestock and poultry	Total	Local handicrafts	Seasonal works	Cottage industries	Total
under 1 dess.	28.90	0.04	19.83	48.77	48.81	32.22	107.50	188.53
1 to 3 dess.	97.29	9.17	80.04	186.65	39.58	6.53	213.92	260.03
3 to 6 dess.	215.24	16.13	132.86	364.23	47.30	10.43	43.14	100.87
6 to 9 dess.	374.89	23.55	221.42	619.86	37.99	13.03	13.56	64.58
9 to 12 dess.	419.01	10.47	276.24	705.72	54.96	15.16	14.60	84.72
12 to 25 dess.	741.94	11.62	339.58	1,093.14	42.73	19.57	9.65	71.95
25 to 50 dess.	1,690.09	29.02	482.88	2,201.99	64.86	–	–	64.36
Percentage	3,567.0	100.0	1,534.8	5,220.36	335.7	97.1	402.4	835.0
	68.62	1.92	29.46	100	40.34	11.38	48.28	100

Based on Statistical yearbook of the Poltava governorate zemstvo for 1915, p. 107

Sales of the goods resulting from agricultural activities took place, as a rule, at local marketplaces, fairs or agricultural exhibitions. They were organized by the local agricultural societies with the assistance of zemstvos and the government. For instance, it was possible to earn 81 to 86 kopecks[6] for a pood[7] of rye, 100 to 107 kopecks for a pood of wheat, 64 to 68 kopecks for a pood of barley, 53 to 57 kopecks for a pood of oats, 66 to 76 kopecks for a pood of millet; 77 to 83 kopecks for a pood of buckwheat, and only 14-17 kopecks for a pood of potatoes in Kharkiv region in the autumn period during 1906-1910 (Agriculture, factory industry … 1918, p. 63). The prices of the main crops in Chernihiv region, Poltava region and Right-Bank Ukraine were approximately the same in the aforementioned period

[6] *Kopeck* (*copeck*, *kopek*) – monetary unit in old and modern Russia (100 kopecks equal 1 ruble)
[7] *Pood* – unit of weight, used in Russia, equal to 36.1 pounds or 16.39 kilograms

(Agriculture of Ukraine 1923, Table 11-12). If the above prices in 1881-1885 are taken to mean 100 %, than they accounted for 71% in 1886-1890 (period of agrarian crisis) and for 84% in 1901-1905. They certainly grew significantly during World War I (Agriculture of Ukraine 1923, p. 224). Let's assume that the average yields of rye within Ukraine in 1907-1914 were 58 poods per dessiatin (Agriculture of Ukraine 1923, p. 168). Then it turns out that the seller could get 46 rubles for it and at least 58 rubles for the same amount of wheat from each sown area of the respective crop. We should not forget about the possibility to receive profits from other, less common types of crop production by the both privileged and unprivileged estates. For example, one pound of straw could be paid with a certain amount of money in 1909-1910, namely: a pood of oat straw cost an average of 8 kopecks; barley – 9 kopecks; wheat – 7 kopecks; millet – 10 kopecks; rye – 6 kopecks; buckwheat – 7 kopecks. 18 kopecks were paid for a pood of buckwheat chaff and 14 kopecks for a pood of chaff of other cereals (Review of agriculture … 1913, p. 65).

At the turn of the 20th century, the agricultural commodity producer in Ukraine could also obtain certain financial resources from an industry such as animal husbandry. For instance, the cost of a working horse within Ukraine was on average 37 rubles in the autumn during 1881–1885, 51 rubles during 1901-1905, 69 rubles in 1909-1913. The cost of a cow was about the same: 29 rubles in 1881-1885 and 62 rubles in 1909-1913 (Agriculture, factory industry … 2018, p. 225-226). One sheep could be sold for 3 rubles in the autumn of 1913 (Agriculture of Ukraine 1923, pp. 123-124). On average, 166 kopecks were given for a well-fed gander, 60 kopecks for a duck and 55 kopecks for a chicken. A dozen of eggs could be sold for 20 kopecks (Review of agriculture 1913, pp. 166–167). And yet, overall, the livestock industry was unprofitable in financial terms even in medium-income farmsteads. It is evidenced by quite convincing budget surveys carried out by A. Matisen, a member of the Poltava Agricultural Society, on behalf of the zemstvo (Matisen 1914, p. 14). However, not only small but also large farms of local landowners could only dream of great profits from animal husbandry. For example, in the Karlivka estate of counts Mecklenburg-Strelitz with the land area of 54 thousand dess., the profit from crop production was up to 675,854 rubles on average over five years (1906-1913). On the other hand, livestock production gave only 5,796 rubles, or 0.8% of the total amount. A similar situation could be seen in Duke L.V. Kochubey's estate (2,700 dess.) in village of Zhuky, in landowner A.M. Varshavsky's estate in Pavlivka village (4,105 dess.) of the Poltava Governorate (Poltava Society of Agriculture 1883, pp. 107, 133).

Analyzing the financial resources of business entities of the agricultural sector of the economy of Ukraine in the late 19th and early 20th centuries, it should not be forgotten about the loans, the amount, forms and origin of which were very diverse (Brzozowska et al. 2017). Only limited amounts of loans from the fellow villagers were available to the farms run by peasantry for a long time. They were usurious in its form, as the annual interest on it often reached a giant 1,200% (Katajew 1902, p. 1). In an effort to rid the peasants of this kind of enslaving loan conditions, in 1840 the tsarist government decided to open the so-called "volost[8] auxiliary funds" and "rural banks" in some localities. They existed in a somewhat reformed form until 1917 inclusive. The next step in this respect was the permission to start savings and credit cooperative-type partnerships at the request of the local population. Banks were approved somewhat later, in the 1870s and 1880s: joint-stock banks (Kharkov, Poltava, Kiev and Bessarabia-Taurida Land Banks) and then state-run Peasants' Land Bank (1882) and Nobles' Land Bank (1885). However, it soon became clear that the aforesaid institutions did not meet the needs of population in credits. It resulted in the extension of the related rights of the State Bank in 1894 that was established as early as 1860. And then, in 1904, the extension of the population's rights to receive credit from the Zemstvo budget was legalized. In general, as of 1909, there were about 1.5 thousand institutions that somehow lent money to agricultural producers in Ukraine. The generalized data on financial resources of the privileged and unprivileged classes to be used by representatives of the agricultural sector of Ukraine at the turn of the 20th century are shown in Table 2.

The most active institutions in terms of lending to agriculture in Ukraine were joint-stock land banks; the specific weight of their loans was in general 38%. The 2th place on this list belonged to the Nobles' Land Bank that, as we know, credited the nobles exclusively. The periodic benefits provided by the bank to that population category sometimes reached even the full debt forgiveness. This gave grounds for Witte, former finance minister, to qualify the above bank as a "semi-charitable institution"

[8] *Volost* was a traditional administrative subdivision in Eastern Europe

(Remarks by Witte … 1957, p. 155). The Peasant Bank that, as of 1909, provided its clients from the unprivileged classes with loans totaling 128,620 thousand rubles, remained on the 3th place in the list of creditors.

Table 2: Financing the agricultural sector of Ukraine by various credit institutions at the turn of the 19th - 20th century

Number	Governorates of Ukraine	Credit issued (mln RUB)								
		Mutual loan partnership	Savings and credit partnerships	Credit societies	Volost funds	Zemstvo funds	Joint-stock banks	Nobles' Bank	Peasants' Land Bank	State loans
1	Kharkov	7,627.6	626.9	311.5	2,201.6	18.6	17,981.4	35,783	12,454	12,410.6
2	Poltava	4,364.9	840.8	1,377.4	7,855.6	12.5	23,935.3	47,428	21,394	5,349.1
3	Chernigov	1,434.9	858.9	259.6	1,988.1	53.8	8,339.2	16,151	15,161	3,642.1
4	Kiev	23,018.5	1,590.2	218.4	2,279.1	–	36,902.1	43,170	13,366	49,670.1
5	Podolian	1,799.8	1,018.2	133.9	6,844.9	–	42,804.5	35,207	14,400	2,776.7
6	Volhynian	919.9	378.6	94.7	2,575.2	–	36,325.1	24,855	7,613	1,921.8
7	Kherson	10,445.6	730.0	2,147.5	1,798.0	–	109,825.7	39,564	13,378	13,657.0
8	Taurida	8,502.7	4,452.7	2,048.5	773.7	–	54,587.0	11,017	8,732	6,863.6
9	Yekaterinoslav	6,488.7	616.3	922.5	1,366.2	45.0	51,539.1	36,889	22,122	8,002.6
Total: 1,008,606		556,950	11,113	7,514	27,682	129.9	382,239	290,064	128,620	10,429
Percentage		0.56	1.10	0.74	2.74	0.02	38.00	28.75	12.75	10.34

Based on Statistical Yearbook for the South of Russia. Poltava, 1910, pp. 17-18, 37-38, 42.

As for the State Bank that received the right to grant loans including the rural classes in 1894, it occupied only fourth place in this rating. Though it should be noted that with the entire amount of loans of 104,293.6 million rubles issued by this bank, as of 1909, most of the funds were directed not to the agrarian, but to the industrial sector of the country's economy (State Bank 1916, p. 264).

Conclusions

1. At the turn of the 20th century, Ukraine's agricultural producers were not economically in equal conditions. It was due to the traditional for the Russian Empire division of the population into privileged and non-privileged categories, the latter being defined by the legislation as "rural classes". They were the ones who constituted the bulk of the business entities in the agricultural sector of the country. The peasant and Cossack farmsteads set in an exceptionally difficult financial position by the government during the 1860s agrarian reforms persistently searched for and in most cases found sources of financing for their needs. This once again confirms the idea of the extreme survivability of the peasant economy, regardless of the area of its land.

2. Government support of an extensive system of crediting the agricultural goods producers played a significant, and in some cases decisive, role in the successful functioning of both large and small business entities in the agricultural sector of the country's economy at the turn of the century. Whereby over one billion rubles were channeled to the agricultural sector. It was a huge amount of funds at that time, which certainly contributed to the intensification of both crop production and livestock production.

3. The conclusion about the crucial significance of private capital in the form of joint-stock land banks in financing the agricultural sector of Ukraine within the period under study is of the utmost importance, both in purely theoretical and practical terms. While bearing in mind that the banks can successfully develop, as domestic historical experience has shown, only if there is a market land, which many Ukrainian (and not only) politicians unfortunately oppose today.

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Participatory Budget at The Regional Self-Government. Participation of Citizens as An Element of Intraregional Policy of Voivodeships In Poland

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Abstract

The article addresses the issue of regional participatory budgets in Poland. Despite the functioning of the PB in Poland for several years, participatory budgets are not common at the regional level and the adopted solutions are not uniform. The analysis was to identify the most commonly used solutions, which may lead to the unification of future regional PBs in Poland, and be a comparative material for researchers analysing the possibility of introducing regional PBs in other countries. The results of the analysis clearly indicate that regional PBs can complement the activities of lower-level local governments. It is important to indicate a number of restrictions resulting from the scope of competences (including regional self-government subsidiarity), financial conditions (low-income potential) and the specifics of the participatory budget (local nature of activities).

Keywords: Participatory Budgeting, Regional Self-Government, Public Services

Introduction

The participatory budget (referred to as civic in Poland) is becoming a more widely used innovative solution of the citizens' consultation process all over the world (Dias, 2018). Among the benefits resulting from its use, the most frequently mentioned ones in the literature are the improvement in efficiency and transparency of public money spending, adjustment of the goods and public services provided to the requirements of residents, activation of the society and strengthening of social ties(Cabannes, 2004; Sintomer, Herzberg and Rocke, 2008, p.174; Sintomer et al., 2010; Yang and Pandey, 2011; Speer, 2012; Mkude, Pérez-Espés and Wimmer, 2014; Cabannes and Lipietz, 2018). On the other hand, there are also pointed disadvantages and weaknesses of the use of mechanism of citizen participation in the activities of local authorities who point to flaws and imperfections in the processes of citizen engagement (Irvin and Stansbury, 2004; Filner, 2006; Papadopoulos and Warin, 2007; Fuji-Johnson, 2015, p.120). Nevertheless, both individual countries and international organisations, such as the World Bank(Mansuri and Rao, 2013), European Union(European Parliment, 2016), OECD(OECD, 2011) or United Nations (UNDP and UN Habitat, 2016) indicate the need to involve local communities and citizens in the actions of the authorities. While such activities occur at the local level in many countries, they are mostly absent at the regional level. The few countries where the occurrence of the participatory budget (PB) at the supralocal level can be noted include Peru, Ivory Coast, Russia, Poland, Portugal, Colombia, Ecuador and several other countries with isolated cases of such solutions (Dias, Enriquez and Julio, 2019). The question, therefore, arises as to the reasons for such significant differences in the use of the PB at the regional level. In addition to such obvious reasons as, for example, the lack of a regional level of local government or the scope of competence of regional authorities in individual countries, associated with the inability to use the PB, it should be also noted that there is the existence of the political will of regional authorities and the possibility of cooperation with governments of lower levels. This article will present the operating conditions and adopted solutions

in PBs implemented in local government regions in Poland. The approximation of these conditions and the solutions used should be important for future decisions of regional governments in other countries, constituting a significant contribution to the analysis of the PB development opportunities at the regional level, primarily in unitary countries.

Objective and Research Methods

The main purpose of the work was to analyse and evaluate the manner and scope of use of the participatory budget by voivodeship (regional) self-governments in Poland. Based on the results of the research, the areas and forms most often used by regional self-governments will be identified, which will enable determination whether evolution has developed a homogeneous PB model at the regional level in Poland. This analysis is also aimed at showing researchers and practitioners from other countries acceptable (after taking into account the specificities of individual countries) solutions in the field of regional PBs. The analysis will cover 5+1 out of 16 regions of Poland, i.e. all five regions that employed solutions with features similar to those of the PB in 2018. Regions in which the full PB procedure was not carried out or where the procedure was of a pilot nature were omitted, excluding the Silesian Voivodeship, as an example of a PB deriving from the solutions used in individual voivodeships. The analysis covered ten main issues determining the shape of a PB. The following were included to them on the basis of an analysis of resolutions: the method of defining the amount of expenditure (source of law), main and optional financing objectives under a PB, the structure of the distribution of funds in the region (division into pools), funding limits for individual tasks and areas, restrictions in scope/specificity of the tasks, rules for submitting task proposals to a PB, existence of relations between the applicant and contractor, method of substantive supervision over projects, rules for the selection of tasks (voting), selection of the contractor. As it can be seen, some of the issues mentioned will determine the transition between the regional level and the local dimension of the task. By its nature, the participatory budget is local, which means that its implementation by the regions will face the indicated divergence. Therefore, regions will be forced to use various tools/solutions adapting their PB to the local dimension.

Self-Government in Poland

The structure of public administration in Poland is characterised by high complexity since it includes central (government) administration, units of central government administration at the regional level, and three-level of self-government administration – i.e. regional(voivodeship), supralocal(poviat) and local government administration(gmina). As it can be seen, regional self-government operates independently of the government administration. This structure of public administration in Poland is a consequence of the system reform of 1998 and the assignment to local governments of 16 new voivodeships of competences and own tasks in the field of intra and interregional policy. Self-government at the voivodeship level is elected, like other supralocal and local self-governments, by way of general and direct elections by the inhabitants of a given region. Self-government voivodeship means a self-government unit created by law by the inhabitants of the voivodeship. It is the largest unit of the main territorial division of the country for the purpose of performing public administration (Act of 5 June 1998 on voivodeship government - Journal of Laws of 2013, item 596). The voivodeship self-government performs voivodeship public tasks that have not been assigned by law to other government administration units. It does not have a superior and control function in relation to the supralocal and local (municipality) government. The basic tasks of the voivodeship self-government include matters in the field of:

1) public education, including higher education;
2) health promotion and protection;
3) culture and protection of monuments and care for monuments;
4) social assistance;
5) supporting the family and foster custody system;
6) family-friendly policy;
7) modernisation of rural areas;

8) spatial development;
9) environmental protection;
10) public transport and public roads;
11) physical culture and tourism;
12) protection of consumer rights;
13) defence;
14) public safety;
15) counteracting unemployment and activating the local labour market;
16) activities in the field of telecommunications;
17) protection of employee claims in the event of the insolvency of the employer.

It is indicated in the literature that the types and categories of tasks assigned to the self-government voivodeship in many points overlap with the tasks of the municipality and poviat. The basic criterion distinguishing what belongs to the tasks of a municipality, poviat, and voivodeship is most often the territorial scope of tasks – local, supralocal or regional (Dolnicki, B., 2012). Therefore, it can be seen in the tasks of the voivodeship self-government that there is room for using a PB formula in relation to similar tasks taken up by the PB in local governments. It should also be noted that the voivodeship self-government carries out a voivodeship development policy, which consists of:

1) creating conditions for economic development, including creating the labour market;
2) maintenance and development of social and technical infrastructure of voivodeship importance;
3) acquiring and combining funds: public and private, in order to implement tasks in the field of public interest;
4) supporting and conducting activities aimed at raising the level of citizens' education;
5) rational use of natural resources and shaping the natural environment in accordance with the principle of sustainable development;
6) supporting the development of science and cooperation between the area of science and the economy, supporting technological progress and innovation;
7) supporting the development of culture and the care of cultural heritage and its rational use;
8) promotion of values and development opportunities of the voivodeship;
9) supporting and conducting activities for social integration and combating social exclusion.

Thus, from the point of view of the objectives of PB implementation, most areas of the strategy may also be areas of citizen participation within the PB, in particular the area of infrastructure, natural environment, culture or social integration.

Participatory (civic) budget at the Regional Level

The first forms of participatory budget in Poland appeared before 2010 and concerned the participation of rural residents in planning budget expenditure under village funds. At the same time, it should be pointed out that the possibility of the existence of forms of consultations with residents in local governments similar to the PB functioned in Poland since the 90s(Wójcik, 2014; Olejniczak and Bednarska-Olejniczak, 2019; Feltynowski and Rzeńca, 2019). The next stage of PB development in Poland was the introduction of the first PB in Sopot in 2011(Kębłowski and Van Criekingen, 2014), which initiated an avalanche increase in interest in the PB in cities and contributed to discussions on the scope and forms of PB that could be used in Poland (Bednarska-Olejniczak, Olejniczak and Svobodova, 2019; Bednarska-Olejniczak and Olejniczak, 2018). Due to the lack of detailed legal regulations, the PB in Poland has evolved adequately to the needs of residents or authorities of individual local governments, which resulted in a significant diversity of the scope, scale and form of a PB in individual local governments(Bednarska-Olejniczak and Olejniczak, 2017). The changes in the regulations regarding municipalities, poviats and voivodeships, introduced by the Act of January 31, 2018, refer to the civic budget as a "special

form of public consultation."(Local Government Act, 1990) Pursuant to the provisions of the Act, as part of the civic budget, the inhabitants of a given local government unit may directly vote in order to decide about a part of the budget's expenses. The tasks selected under the civic budget are included in the budget resolution of the local government unit. A very important issue ensuring the credibility of the process is the regulation that in the course of work on the draft budget resolution, the tasks selected within the civic budget cannot be removed or significantly changed. This means that selected projects should be implemented. In addition, regulations for large cities (with poviat rights), where the creation of a civic budget is mandatory, were introduced. The guaranteed minimum amount of funds to be spent under the PB should not be less than 0.5% of the municipality's expenses included in the last budget implementation report submitted. It is left to the powers legislative bodies of local governments to determine by a resolution the requirements to be met by a draft civic budget. This means that it is the local government authorities that determine the formal requirements to be met by submitted projects; the required number of signatures of residents supporting the project, rules for assessing submitted projects as to their compliance with the law, technical feasibility, compliance with formal requirements and the procedure for appealing against decisions of not allowing the project to voting, as well as rules for voting, determining results and making them public, given that voting rules must ensure equality and directness of voting.

In recent years, five regions have implemented participatory budgets in various forms (usually self-developed) in Poland. It should be noted that as a result of the abovementioned lack of legal regulations there was a relatively large freedom as to the scope and form of the PB in the regions. The analysis of resolutions establishing participatory budget mechanisms indicates that an analogous form to the one used in cities - consultation with residents - was adopted as a basis. Thus, it can be stated that in the absence of mandatory requirements for the existence of the PB, only a relatively small part of voivodeship governments decided to allow residents to participate in the choice of the spending direction. These are voivodeships in which GDP per capita ranges from 80% of the national average (Opole Voivodeship, West Pomeranian Voivodeship) to over 100% (Lower Silesian Voivodeship, Silesian Voivodeship). The spatial arrangement is dominated by the voivodeships of western and southern Poland (bordering Germany, the Czech Republic and Slovakia). The exception here is the Łódź Voivodeship in the central part of Poland. It is difficult to indicate significant similarities between individual regions because both their size, specialisation, structure, scale of income as well as the structure of the population are varied.

Analysis of differences in the construction of the participatory budget at the regional level

The previously mentioned main issues determining the differences between the regionals' participatory budgets are shown below (fig. 1).

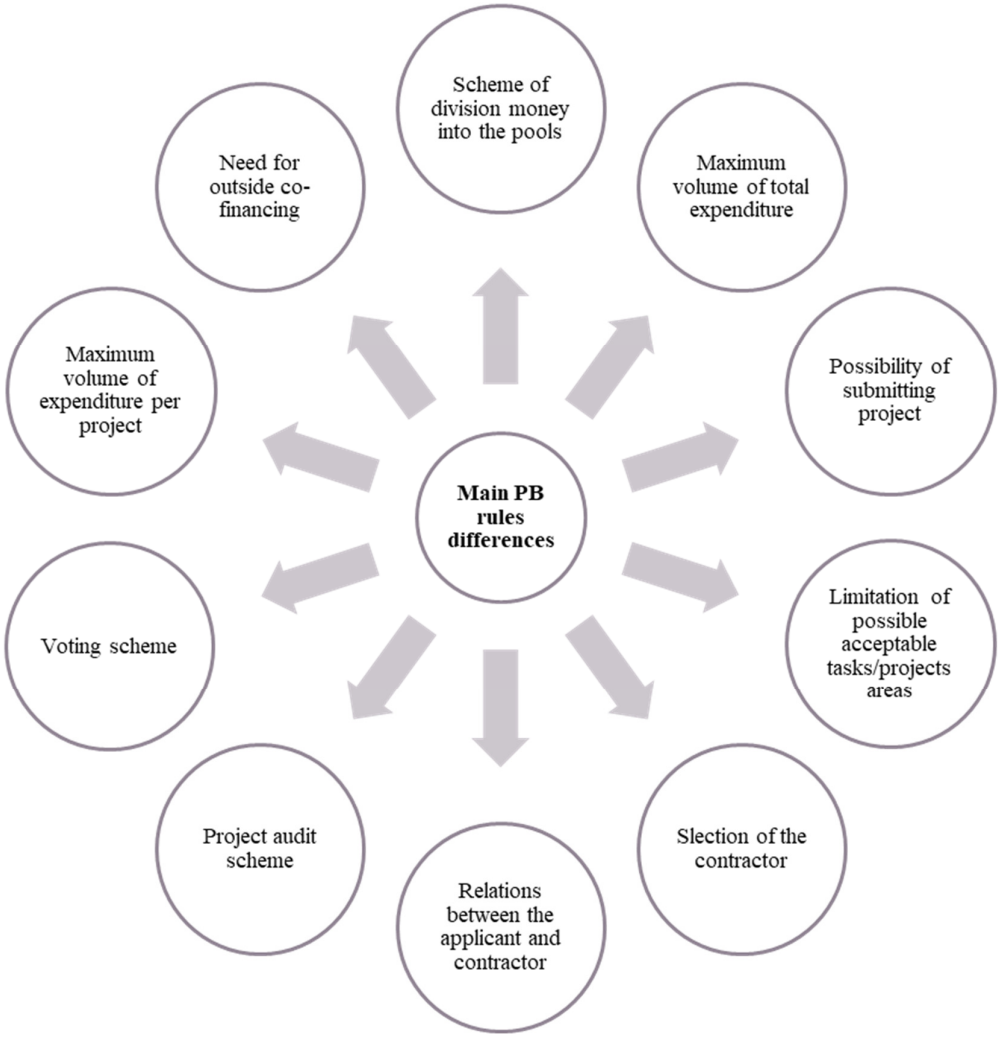

Fig. 1: Differences in regional PB regulations in Poland

The first area analysed is the definition of the amount of funds allocated to the PB by individual voivodeship self-governments. As the funds allocated to the PB constitute an integral part of the budget of individual voivodeship self-governments, it is important to include them in the financial plans for subsequent years - which results in a provision indicating the need to specify them in the budget resolution. At the same time, only in one voivodeship (West Pomeranian Voivodeship) the level of these funds was defined in advance for subsequent years. This means that in most voivodeships, the size of the PB may depend on the financial liquidity of the voivodeship in the following year.

However, a very diverse category is the purpose of spending funds under the PB. While in most voivodeships, "a project submitted under the Budget may be a regional citizens' initiative that will contribute to the development of the voivodeship" the specification of this goal varies significantly in different units. In the Lower Silesian Voivodeship, the PB areas are usually established every year, in the Opole Voivodeship, the implementation of, in particular, a civic, health, cultural,

educational, sports or tourist task can be a citizens' initiative, and in the Lesser Poland Voivodeship it can be also an ecological task. In the West Pomeranian Voivodeship, "the main goal is to build the identity and cohesion of the region by supporting and promoting the initiatives of the inhabitants of West Pomerania, strengthening trust and ties between citizens (social capital), the ability to cooperate in the immediate environment to achieve common goals and strengthen convergent values," while in the Łódź Voivodeship, for general-regional tasks there is no defined scope, and poviat tasks can only be allocated to the implementation of "non-investment" tasks of a sports nature, regarding public safety, tourism, ecological education, protection environment, health-related rehabilitation, the dissemination of folklore related to the Voivodeship, disseminating culture in relation to the history of the voivodeship and historical memory. As it can be seen, this is a closed catalogue of tasks, in contrast to the first group of listed voivodeships.

There is also the problem of the territorial scope of financed tasks. In addition to the presented division into regional and poviat (also occurring in the West Pomeranian Voivodeship), voivodeship governments accept, as an alternative to poviat division, the division into subregions (covering several poviats) as a criterion for the distribution of funds. This is primarily caused by the desire to maintain balanced distribution funds within the voivodeship (regardless of the number of inhabitants) while enabling communities to cooperate across the administrative boundaries of municipalities and poviats in order to implement joint ventures relevant to residents.

To ensure that the desired number of tasks within the civic budget is implemented, local governments set funding limits, with funding limits for regional projects typically up to 50% higher than for other projects. In addition, it should be noted that there was a large variation in the value of funding limits (even a tenfold difference) and in the case of the West Pomeranian Voivodeship the own contribution of the entity obtaining funding was required. In some cases, the funding restriction concerned the maximum number of projects under the civic budget in individual poviats.

At the same time, each of the voivodeship governments indicated a list of activities that cannot be financed from the civic budget. The most common provision was the inability to finance as a task consisting only in the preparation of project documentation, financing the implementation of a task already financed from the funds of the voivodeship government, organisation of mass events and tasks involving the purchase of land.

The above restrictions are important as the framework within which the participatory budget projects will be created and implemented, however, for the participation of residents, the following elements of the resolution on the participatory budget are important: specification of the applicant, the formal form of the application and accompanying documents, as well as persons entitled to vote. The essence of the participatory budget is the active participation of residents in as much of the works on it as possible. Thus, by nature, the most favourable situation would be the one in which both at the stage of coming up with ideas and preparing proposals, voting and partly implementing the idea (e.g. through participation or supervision), the inhabitants would actively participate in it. It can be pointed out that the Polish village fund is the solution which is the closest to this concept. In the case of Polish regions, we deal with a very diverse approach to the issues discussed. In most voivodeships, the inhabitants of a given region or a subregion/poviat have the exclusive right to submit projects. This means that they are required to prepare the project together with the cost estimate and to promote the project before voting. More importantly, at this stage there is usually no possibility to indicate the entity to implement the project, as in the case of most non-infrastructural or non-investment activities of the contractor, the winning projects will be implemented by non-governmental organisations as part of open competitive tenders for public tasks announced on the basis of the Act of April 24, 2003 on public benefit activities and volunteering. Thus, even the applicant related to a given social organisation wishing to implement a given project does not guarantee the implementation of a given project to that organisation. In turn, in the West Pomeranian Voivodeship, the applicant may be, apart from a natural person (informal group) represented by the Guardian (usually an NGO entity), also an entity having its registered office/branch in a given voivodeship/subregion. In this case, the applicant is not

separated from the implementer and the participatory budget itself takes the form of a grant competition for the creation of a concept and implementation of public tasks. Residents, like in other voivodeships, are entitled to vote for projects located in the area adequate to their place of residence. It is worth noting that in the case of projects submitted by residents, the voivodeship offers support in project preparation.

In most voivodeships, "lists of support" are required which show residents' interest in a given idea; however, the limits set by individual voivodeships are often very low compared to the number of inhabitants of a poviat, subregion or region, and range from 50 to 150 signatures. Also the minimum support limits during voting at the level of 200 votes as qualification for possible implementation are very low. This demonstrates the expected low interest of residents in this form of participatory budget.

Conclusions - participatory budget model at the regional level - an attempt to synthesise experiences

Based on the analysis of existing solutions, an attempt can be made to define the general framework for the construction of regional participatory budgets in Poland. The solutions that allow the greatest involvement of citizens in the processes of co-governance have been chosen. It is worth noting that in the case of one of the analysed regions, there are significant differences in some areas, while these differences may reduce the importance of citizen participation in creating the civic budget. So in the synthesis of solutions they were omitted. This framework covers the following issues:

First of all - the main determinant of the regional PB will be the scope of competences of a given region and the subsidiarity of its activities with local and supra-local governments. Thus, it should be assumed that the regional PB will be a complement to the lower-level local governments.

Second of all - the scope of the PB will be determined by the development strategy of a given region in close relation to the strategy of the state and the strategies of other local governments within a given region. Therefore this means a restriction of freedom in terms of submitted and implemented initiatives of residents.

Third of all - the projected financial stability of the voivodeship and the existence of free funds possible to be allocated to the PB in the region will be a significant limitation here. This is a significant limitation because in Polish conditions regional governments have a significantly limited income base, which affects the relatively low possibilities of financing optional tasks, which include the regional PB.

Fourth of all - the choice of task areas is a consequence of the three points mentioned above. Limited resources, subsidiarity and being part of strategies determine the preference for "soft" (non-investment, non-infrastructure) projects. Therefore, it seems that pro-social activities will be prioritised here.

Fifth of all - despite the regional nature of the voivodeship participatory budget, the allocation of funds takes place mainly at the local level - which reflects the idea of a participatory budget as a budget for the local community. This results in the need to allocate funds and select projects in the layout of individual subregions/poviats and a significant deviation from general regional tasks.

Sixth of all - both the submission of projects by residents, their support (list of support) and voting for them, mainly become actions of local/supra-local nature, as the people entitled to participate must be residents of a given area (poviat/subregion). It can therefore be concluded that the use of the regional participatory budget formula will be more justified for projects covering the area of more than one lower-level administrative unit. Otherwise, it will only complement the activities of individual units.

Seventh of all – the dominant solution in the selection of the entity implementing projects that won the vote is a competitive tender for the implementation of a public task by NGOs, but the requirement to provide "own contribution" as a supplement to the project funds by these entities seems to be problematic. Another issue is the fact that we may often be dealing with a situation when the applicant is also a person closely related to the entity that is applying for the opportunity to complete the task.

The above studies also encountered significant limitations. It should be noted that due to the differences between the regions in Poland it is hard to unify the regional PBs. The research did not use methods of statistical analysis because it was not intended to indicate the factors determining the use of PB institutions but only to discover and underline possible main directions of creating PB at the regional level. Yet another important limitation in the analysis is the lack of qualitative research – interviews with the regional authorities representatives who implement PBs in their regions. Such interviews would allow assessing the premises and barriers in making decisions about the introduction of regional PBs.

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Personal and Contextual Factors Affecting The Intentions of Commercialization of Research Results Among Academic Teachers of Technical Universities - Concept of Model and Research Process

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Abstract

The article presents the issues of the entrepreneurial intentions of scientists and includes such elements as: literature review, research assumptions, a proposal for a model of intention of commercialization of knowledge by scientists and the method of its verification. In addition, a discussion of the usefulness of the model for University leaders and scientists is undertaken.The main goal of this paper is to develop a new model of causal shaping the intention to commercialize knowledge and its empirical verification among scientists. Using the methodology of structural equation modeling (PLS), the results will verify which personal variables (i.e. professed beliefs, values, etc.) initiate a chain of effects affecting variable activities (i.e. self-confidence, self-efficacy, etc.) and to what extent the context affects for such behavior (i.e. completed training, support ecosystem, quality of inter-organizational relationships, etc.).

Keywords: Academic Entrepreneurship, Personal And Contextual Factors, Entrepreneurship Intention, Theory Of Planned Behavior (TPB)

Introduction

To understand what mechanisms govern the entrepreneurial intentions of individuals, usually different researchers use a well-established psychological concept, initiated in the mid -1980s - namely the Theory of Planned Behavior (TPB) developed by Ajzen (1987, 2011). According to this theory, entrepreneurial intentions depend on three predictors i.e.: (i) attitudes, (ii) perceived control of one's behavior and (iii) social norms that shape the perception of such behavior. Entrepreneurial intentions largely determine entrepreneurial behavior, so studying these intentions and the factors that affect them is an important area of research. Insofar as entrepreneurial intentions are the subject of research of many groups of respondents (i.e. youth, students, immigrants, the unemployed, women, etc.) or interest in them touches the context of research (research at local, regional, international level, in developed and developing economies) little is in the literature on the subject of research results analyzing the intentions of scientists in the commercialization of the results of their research (de facto entrepreneurial intentions). Intentions and, as a result, entrepreneurial behavior of academic teachers can be equated with the intention of their commercialization of their research results, and consequently specific entrepreneurial behavior manifested in varying degrees of involvement in business activities (in the form of: spin-offs or spin-outs, sold licenses, involvement in the sale and transfer of technology, in the development of patents, utility models, consultations, commissioned works, reports, etc.). In this paper, the author assumed that the entrepreneurial intentions of scientists are synonymous with the intention of commercializing the knowledge they create. Research into the entrepreneurial intentions of scientists in this paper is justified due to the fact that there is still a gap in the literature on the subject in explaining individual and contextual conditions affecting the entrepreneurial attitudes of this group of respondents and their exemplification in the form of commercialization of research results. The mechanisms that stimulate scientists to engage in commercialization of research results are still not explained. In particular, we feel unsatisfied in comprehensive national surveys, which are simply not on this subject on such a large scale. The article addresses this gap and, based on theoretical considerations, own empirical research and

available foreign research results, an identification of the model for measuring these intentions was identified, which is the subject of verification.

The theoretical analysis in this paper has been limited to the level of groups of factors recognized in the literature of the subject as important for the development of academic entrepreneurship, while not being explored on a large scale in national studies.

The goal of this paper is to develop a new model of causal shaping the intention to commercialize knowledge and its empirical verification among scientists. Using the methodology of structural equation modeling (PLS), the results will verify which personal variables (i.e. professed beliefs, values, etc.) initiate a chain of effects affecting variable activities (i.e. self-confidence, self-efficacy, etc.) and to what extent the context affects for such behavior (i.e. completed training, support ecosystem, quality of inter-organizational relationships, etc.).

An analysis of foreign and domestic literature in the field of management sciences indicates the lack of a clear concept and model explaining the determinants and predictors of the intention to commercialize research results in the activities undertaken by academic entrepreneurs. The author believe that statistical verification of the intention model for commercializing research results is a contribution to the development of management and quality sciences, and will contribute to national policy makers to develop effective strategies to stimulate entrepreneurship among researchers. The developed model will be verified in terms of the importance of individual (personal) or contextual variables in the intention to commercialize knowledge.

The results of research will have several implications for both the academic community and university managers. First of all, this project contributes to the literature on intentions in the commercialization of scientists' knowledge, because the research covers the academic context and enriches the existing model of entrepreneurial behavior (TPB) with new factors, both individual and contextual. Secondly, it shows the particular importance of predictors of entrepreneurial attitudes of scientists (i.e. values, creativity) and environmental factors (quality of relationships in the ecosystem of entrepreneur support, contact with the business environment, previous experience in commercialization).

The proposed model takes into account and complements previous constructs described in the literature. It will be able to be verified in various areas of the higher education sector and by institutions involved in supporting academic entrepreneurship.

Theoretical Background

The concept of academic entrepreneurship has been making a career all over the world in recent years - also under other names, including technological, innovative and intellectual entrepreneurship, and technostarters. The term "academic entrepreneurship" was originally conceived as referring to the extension of business entrepreneurship towards the academic environment and only to distinguish enterprises based on academic knowledge from others (Obschonka 2015, p. 687). The dominant definitions in English-language literature then changed from the idea of creating profit-oriented enterprises at universities and focused on the fundamental role of university spin-offs (Shane 2005; Wright et al. 2017). Later, other authors promoted the views of academic entrepreneurship as a way of transferring knowledge from the university environment to the market. This broader interpretation of academic entrepreneurship encompassed all academic contacts with business entities that underpin the creation of market value. In a different approach, academic entrepreneurship is presented as: all activities that go beyond the traditional academic roles of teaching and / or research, are innovative, carry a risk element and lead to financial benefits for individual academic employees or their institutions (Abreu, Grinevich 2013). Finally, some authors consider academic entrepreneurship to be focused on creating social value (Botes, 2005). In simpler terms, academic entrepreneurship is defined as the synthesis and integration of scientific, academic and commercial activities (Botes 2005, Kingma 2011). It is often

characterized by formal arrangements for the commercialization of intellectual academic property through knowledge (e.g. consultation or contracted research), technology transfer (e.g. patent or licensing), and transfer of products or services, e.g. spin offs. Academic entrepreneurship occurs at the level of individuals or groups operating independently or as part of faculties or other university units that create new organizations or initiate innovation inside or outside the university (Tijssen, 2006).

Academic entrepreneurship in Poland, as in foreign literature, is interpreted very differently. In the national literature, the most common approaches define it as "all kinds of involvement of scientific institutions, academics, support and administration staff, doctoral students and students in business activity". In a different approach, also as: "business activity of people from the academic community, which consists in the establishment by academics, PhD students and students of activity at or around the university" (Guliński, Wajda 2005, pp. 77-78). In a narrower sense, academic entrepreneurship is limited to the involvement of researchers in the creation of new enterprises, the so-called spin-out or spin-off (Szara, Pierścieniak 2015, pp. 32-33). Is also identified, among other as educating students for entrepreneurship and promoting entrepreneurship; with support for entrepreneurs who are students, PhD students and academics; with support for the transfer of knowledge and new technologies to the economy (Development of the model ... 2006, p. 61). The Polish legal system even imposes on universities the obligation to educate all students of social studies in such a way that they are ready to "think and act in an entrepreneurial manner" (Moczydłowska 2017, p. 50). In addition to the traditional teaching and research functions, universities are increasingly involved in technology transfer, establish contacts with industry and engage in the creation of innovative infrastructure, i.e. research laboratories, science parks and industrial clusters (Bednarczyk 2013; Plawgo 2011, Szara, Pierścieniak 2011). There is no consensus in the literature on the definition of an academic entrepreneur (Plawgo, 2011). It was assumed in this project that an academic entrepreneur is a person (student, graduate, doctoral student, research, teaching, research and teaching, administrative university): engaged in business activities or creating new enterprises, the so-called spin-out or spin-off, or commercializing knowledge in the form of patents, licenses, utility models, consultations, commissioned works, reports, or involved in the sale and transfer of technology or being the author of innovative works for public use, where the university and its nearest sphere the environment is the territorial area of entrepreneurial initiatives (Kobylińska, 2019). This definition is crucial from the point of view of subsequent analysis of research results carried out among the respondents of the project, which will take into account such control variables of the respondents (academic teachers) as academic entrepreneur (scientist with experience in commercializing their research results) and scientist (without experience in commercialization).

Efforts to promote academic entrepreneurship have already been the subject of empirical and theoretical research, recognizing the high potential of academic entrepreneurship mechanisms as beneficial to both the economy and society (Feldman and Desrochers 2004; Shane 2004; O'Shea et al., 2005; Wright et al. ., 2007). The undertaken research in the discussed issues most often focus on the best practices in public support of academic entrepreneurship (Rothaermel et al., 2007), analyze factors facilitating the commercialization of research results in the form of external and internal support (Perkmann et al., 2013) or relate to specific mechanisms / forms of transfer, such as spin-off or spin-out companies (Djokovic, Souitaris, 2008). The literature on the subject also includes several literature reviews: Feliu and Rodriguez (2014), Mustar et al. (2006), Rothaermel et al. (2007), Djokovic and Souitaris (2008), Mars & Rios-Aguilar (2010) and Yusof & Jain (2010). While early work in this area focused on measuring the university's knowledge transfer activity (licenses, spin-offs) and analysis of initiatives that could affect the effectiveness of this activity (Siegel & Wright, 2015), in recent years the number of publications analyzing factors that lead scientists to entrepreneurial behavior (Nyeko, Sing 2015, pp. 1050-1055). In literature, mainly in English, one can find publications with research results that approximate the empirical analysis of individual factors influencing the intentions of entrepreneurial activities (Obschonka et al. 2012; Goethner et al. 2012, Huyghe, Knockaert and Obschonka, 2012) and contextual (see e.g. Moog et al. 2015, Obschonka et al. 2015; Guerrero & Urbano, 2014), however, none of these studies were conducted on a large scale in the academic world. Among other studies, there are those that are

focused on academic promotion (Foo, Knockaert, Chan and Erikson, 2016), the entrepreneurial identity of scientists (Obschonka, Silbereisen, Cantner and Goethner, 2015), scientific productivity (Erikson, Knockaert and Der Foo, 2015) and social identity in the academic community (Obschonka, Goethner, Silbereisen and Cantner, 2012).

Entrepreneurial behavior is a type of planned behavior (Miranda et al. 2017). Intention models are most appropriate for explaining and predicting this behavior. Various models have been developed to analyze the factors influencing the decision to start an entrepreneurial career. Examples are the entrepreneurial event model (Shapero, 1982), planned behavior theory (TPB) (Ajzen 1991, Ajzen 2001) and the entrepreneurial potential model (Krueger and Brazeal, 1994). Entrepreneurial intentions are the key to understanding the entrepreneurial process and can be considered as the first step in a long and complex process of understanding academic entrepreneurship. If entrepreneurial intention models are the strongest predictor of entrepreneurial behavior, studying their determinants is particularly important for understanding entrepreneurship among academic teachers. As the theoretical basis of study, the TPB model was chosen because of the advantages that have been demonstrated in using this concept in the academic environment (Goethner et al., 2012, Obschonka et al., 2012, Obschonka et al., 2015). In short, in the TPB model, a person's behavior is immediately determined by the person's intention (or not). In turn, the intention to behave depends on three basic elements: first, entrepreneurial attitude (EA); secondly, subjective norms (SN), which are the most social component of the model, and thirdly, perceived behavioral control (PC) in a situation in which they have to make decisions and act. Earlier applications of TPB in the entrepreneurial literature suggest that (EA), (SN) and (PC) usually explain 30-45% of the variance of intentions (Miranda et al. 2017). Unlike previous studies, proposed research assumes that a deeper look at the individual characteristics of academic entrepreneurs (professed values, creativity, etc.) and explanation of the importance of relationship quality in the academic support ecosystem (and within it such variables as trust, commitment, no conflict of interest, etc.), affecting the explanation of this area supporting entrepreneurial intentions. The support environment recently referred to as the university's ecosystem also plays an influential role, but there is a lack of in-depth research in this area to confront and statistically explain its importance in the entrepreneurial intentions of scientists. Therefore, the research indicates the need for further analysis of entrepreneurial intentions in the context of technical universities, especially in the national field, where there are no models explaining such behavior. It is important in this project to combine in the model the intrapersonal features of scientists and contextual factors of the work environment (Foo et al., 2016, Miranda et al., 2017), with particular emphasis on the support University ecosystem.

Model Proposal and Research Methodology

Methodological assumptions of the entire research process are as follows:

1. updating and systematizing knowledge about determinants, predictors and forms of commercialization of research results among scientists and networks of entities supporting them in Poland and in the world;
2. adaptation and modification of the TPB model (Theory of Planned Behavior) for the purposes of researching the intention of commercializing research results among technical university teachers;
3. systematization and description of model variables, including personal and contextual factors;
4. development and validation of theorems for independent and dependent model variables (factors);
5. determining base variables (factors) and strengthening the intention to commercialize research results;
6. identifying the strength and direction of the impact of individual personal and contextual variables (factors) on the intention to commercialize research results among technical university teachers.

Based on the literature review (described in the previous section) and previous own research, main research hypothesis was developed that will be verified in the research process:

H: PERSONAL AND CONTEXTUAL FACTORS POSITIVELY AFFECT THE INTENTION OF COMMERCIALIZATION OF RESEARCH RESULTS AMONG ACADEMIC TEACHERS FROM TECHNICAL UNIVERSITIES

Eleven specific hypotheses were also developed and will be verified during the research (Fig. 1).

Realization of the main goal requires answering research questions: What are the relationships between the intention to commercialize research results and individual (personal) and contextual factors of teachers of technical universities? Which factors have a stronger impact on the entrepreneurial intentions (in terms of commercializing research results) of scientists? What are the differences in the perception of personal and contextual factors among academic entrepreneurs and scientists of technical universities who have not yet commercialized research results?

In connection with the main theoretical and empirical currents discussed in intorduction taking into account the literature review on the intentions of academic entrepreneurship, we propose a model explaining the intentions of commercializing research results of teachers of technical universities in Poland based on three main explanatory factors (Fig. 1):

- entrepreneurial attitude of scientists (EA),
- perceived control of entrepreneurial behavior (PC) and
- subjective norms.

The general assumption we made in the project is that: the intentions of commercialization of research results by scientists are influenced by both personal (EA), (C), (V), (SC), (PU), (CE) and contextual (PC), (SN), (QRE), (T), (BE) verified in the literature on the subject (e.g. Obschonka et al. 2012; Obschonka 2016; Goethner et al. 2012; Alonso-Galicia et al. 2015; Erikson et al. 2015; Foo et al. 2016; Huyghe and Knockaert 2015; Guerrero and Urbano 2014; Moog et al. 2016; D'Este et al. 2011; Miranda et al. 2017).
Based on the review of the literature, the results of the available empirical research we consider 4 personal variables of the unit - creativity of academic entrepreneurs (C), professed values (V), perceived usefulness as the basis for constructing entrepreneurial attitudes of researchers in the direction of commercialization of research results (EA). The other two elements of the construct are (PU) and self-confidence (SELF).

As the background to the variable Perceived control of behavior (PC), we adopted factors such as: completed entrepreneurship training (T), Previous experience in business (BE) and Quality of relations in the ecosystem of support entities (QR), as well as previous experience in the field of commercialization of knowledge (CE).

The model has also been supplemented with the inclusion of several variables as predictors of (PC) design: previous experience in business (BE) and three context variables: training in academic entrepreneurship (T), favorable entrepreneurial environment (ENV) and quality of relationships in the support ecosystem entrepreneurs (QR).

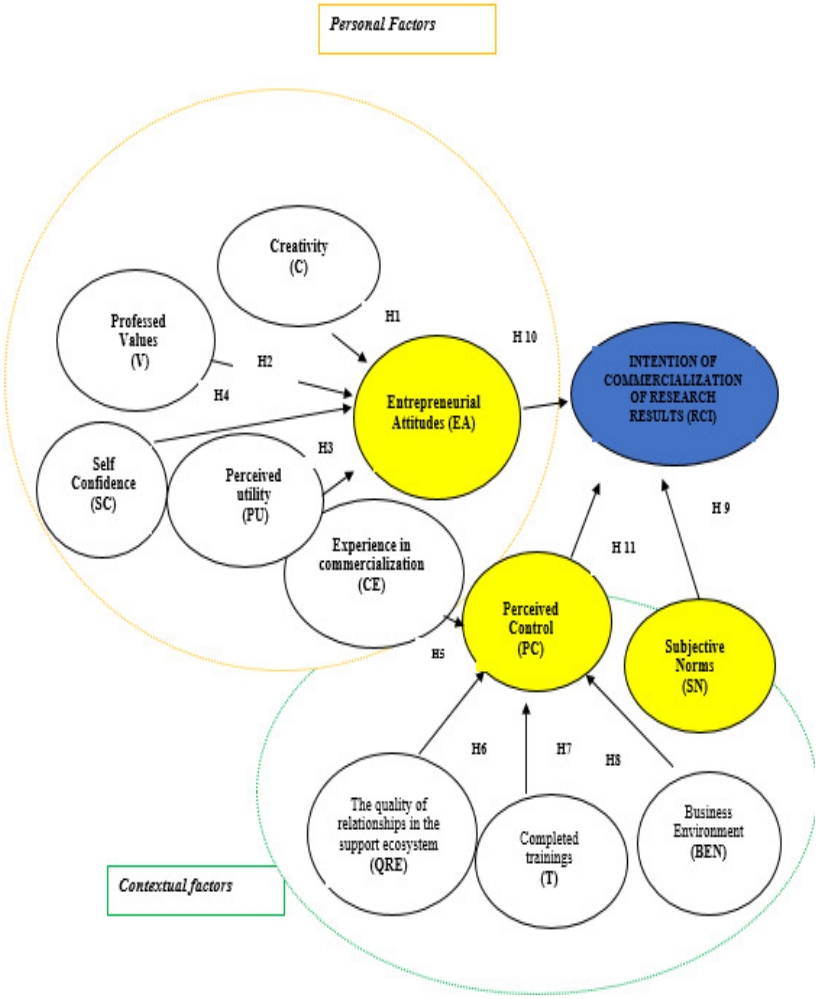

Figure 1: Model of intention to commercialize research results among technical university academic teachers

Source*: own study*

Modeling using structural models will adopted as the main method of hypothesis verification. Modeling is to help fill the scientific cognitive gap in terms of key variables in the entrepreneurial intentions of scientists. The project plans to use statistical techniques such as descriptive statistics, discriminant analysis and AMS analysis for many groups.

Based on the concept of planned behavior theory (TPB), model will enrich the literature related to the entrepreneurial intentions of academic teachers with such aspects as:

- extension of predictors included in individual and contextual factors affecting intentions;
- demonstrating the special importance of entrepreneurial attitudes (AE) of academic teachers (individual factors) and their relationship with the following predictors: values, creativity and self-confidence;

- demonstrating the importance of perceived control (PC) (contextual factor) and its relationship to the quality of relationships in the support ecosystem, as well as training policies and previous business experiences of researchers.

Discussion and Conclusions

The planned study is innovative due to the context of its implementation. There are no national studies available to verify the entrepreneurial attitudes and behavior of technical university teachers. Technical universities in Poland employ a considerable number of academic teachers (almost 19 thousand) with a high potential for commercializing research results, covering the disciplines of technical, natural and social sciences. Most domestic universities, especially technical universities, have in their structure Technology Transfer Centers that can support the process of commercialization of research results. The way from the results of scientific research to their practical application, and therefore commercialization, is quite complicated. It requires not only time and resources, but also knowledge of the economy and its needs. A very important condition of success is also a very good knowledge of the realities of scientific work, as well as the determinants of the entrepreneurial intentions of scientists referred to in this project.

The research will also have important implications for practitioners. First, for policy makers who, in addition to incorporating results commercialization into many of their assessment processes, should also promote entrepreneurial culture creation at the university and shape high-quality relationships across the entire academic entrepreneurial support system. Therefore, the author believe that it is worth comprehensively identifying the main determinants of the intention to commercialize knowledge among teachers of technical universities in the context of Polish conditions. Secondly, the model suggests that managers of technical universities must be aware that the best way to promote entrepreneurship in their institutions is to create the conditions necessary to increase the entrepreneurial attitudes of their employees through various projects (training, study, cultural) aimed at strengthening creativity and shaping entrepreneurial values.

Completed research will contribute to the development of the knowledge for Univeristy leaders - regarding key factors affecting the entrepreneurial intentions of technical university teachers. The theoretical model developed shows the key elements shaping the entrepreneurial intentions of scientists and explains the relationship between personal and contextual variables important for the intention of commercializing research results. From the research point of view, it will be important to identify key factors shaping entrepreneurial attitudes to the greatest extent.

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Analysis of Factors Influencing the Risk of Poverty for Elderly People in Europe

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Abstract

The paper addresses the problems related to financial stability and exposure to poverty risk of senior citizens in European countries. The aging population trend is now becoming a global challenge, which is being made worse by the inevitable retirement of the so-called baby boom generation over the coming decades. The development of aging population will cause a series of problems to the elderly, including increasing instability of financial situation of elderly households. The budgets of senior citizens may considerably shrink because of low disposable incomes and overburden expenditures (e.g. expenses on health care services). The purpose of the paper is to identify and evaluate the main factors affecting the financial situation of elderly households, especially in the context of their exposure to poverty risk. In the analysis the selected external variables, such as: GDP, inflation index, saving rate, unemployment rate and old-age dependency ratio were included, in order to indicate the impact of economic environment, demographic trends and the existing pension schemes on the elderly financial stability. Moreover, specific variables corresponding to income and expenses of seniors were also examined. With the use of multiple regression analysis an attempt of comparison and evaluation of the poverty risk of elderly households in the selected European countries in 2007-2017 was made. The obtained results may be useful for policymakers in the area of pension systems and they indicate the need for the further analysis of detailed reasons for similarities and differences in the seniors' financial stability across Europe.

Keywords: Elderly Household, Poverty Risk, Europe, Multiple Regression.

Introduction

Despite the great progress in reducing financial inequities in populations, made in the past few decades, poverty still remains a broad and comprehensive global problem. Nowadays, more than 700 million people subsist on extremely low incomes, therefore research focused on the measurement of poverty and identification of possible ways of reducing it in the long run often represents a direct response to practical challenges of national, regional and local policymakers, especially in developing countries.

The importance of the problem of poverty and how to deal with it, is evidenced by the fact that the 2019 Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel has been awarded to Abhijit Banerjee, Esther Duflo and Michael Kremer "for their experimental approach to alleviating global poverty". The above-mentioned researchers have introduced a new approach to obtaining reliable answers about the best ways to fight global poverty by dividing this issue into smaller, more manageable questions, e.g. the most effective interventions for improving child health. It is worth mentioning that the research conducted by the 2019 Economic Sciences laureates has considerably improved the ability to fight global poverty. In just two decades, their new experiment-based

approach has transformed development economics, which is now a flourishing field of research (more in: Nobel Prize Committee (2019)).

With respect to elderly people the risk of poverty is of particular importance. Many countries have experienced aging population trend causing that the poverty among the elderly has remain a global concern (Khan et al. 2017). Also in Europe, an increasing lifetime in combination with relatively low replacement rate from the public pension systems and little pension savings or even a lack of them are the main factors causing that a growing number of senior citizens in European countries can be exposed to the risk of poverty. According to Eurostat (2019), in 2017 in the EU member states people aged 65 and over were faced relatively lower risk of poverty or social exclusion than the overall population with 18.2% compared to 22.4% for the whole population. However, significant differences can be observed among the share of older people exposed to the risk of poverty in particular European countries. The share of seniors being at risk of poverty was the highest in Bulgaria, Estonia, Latvia and Lithuania (more than 40% of 65+ age group). These differences depend on a number of factors, including above all, the characteristics of pension schemes for current pensioners as well as the age and gender structure of the population of older people in a given country.

It is important to emphasize that for the elderly households specific changes in consumption and savings profile can be observed, typical for this stage of a household financial life cycle. In European countries, the amount of pension benefits received from the public systems usually constitutes the main component of an individual's income, possibly supplemented by an additional private income available at retirement period. With respect to the senior citizens, a characteristic change in the consumption structure can be noted. Elderly people usually spend relatively more money on health care, long-term care services and rehabilitation services. Moreover, they usually use savings accumulated earlier, so they are less likely to accumulate new savings. All the above-mentioned aspects contributing to the potential exposure of elderly people to the risk of poverty require examination from both the social policy and market perspective.

The purpose of the paper is to identify and compare the main factors influencing the financial stability of elderly households in selected European countries, in the context of their exposure to the risk of poverty, with the application of multiple regression. The conducted analysis was aimed at answering the following research problems:

- What are the main factors affecting the poverty risk for the elderly?
- What are the differences in these factors and their impact among the examined European countries?

In the study selected external variables, such as: GDP, unemployment rate, inflation rate, old-age dependency ratio and the share of expenditure on pensions in GDP, were included in order to indicate the impact of economic environment, demographic trends and the existing pension schemes on the elderly financial stability in terms of their exposure to poverty risk. Moreover, specific variables corresponding to the seniors' budgets main components were also examined.

The main contribution of the paper is that we not only tried to measure and compare the exposure to poverty risk among elderly people in European countries, but we also made an attempt to identify the main factors causing the poverty of seniors in the examined states. This study contributes to the development of the silver economy and constitutes a part of a greater research on the financial standing of elderly people in Europe. We do hope that the results of the research can be useful for both scientists and practitioners interested in the implementation of social policy solutions as well as financial services addressed to the elderly.

The remainder of the paper is organized in the following way. Section 2 briefly reviews the literature on the poverty meanings, its indicators as well as the previous research concerning the trends and determinants of poverty among elderly people. In section 3 results of correlation analysis as well as multiple regression analysis are presented. Section 4 draws some concluding remarks.

Literature Review

Living in poverty can be defined in a number of ways. In simple words, a household is being in poverty when its resources are insufficient to meet the household's members basic needs (risk of poverty) and also to allow them to take part in the society (risk of social exclusion) (Joseph Rowntree Foundation 2016). As Drewnowski (1977) points out, poverty occurs when it is not possible to meet the needs at a level deemed satisfactory. This definition of poverty is ambiguous, because the feeling of satisfaction in meeting the needs is subjective and it is very difficult to determine what the desired level of satisfying these needs should be. In the scientific literature, in general two ways of understanding poverty are distinguished, i.e. absolute poverty (also called extreme poverty) and relative poverty. The first one – absolute poverty – occurs when the satisfaction of living and consumption needs is at a very low level, while consumption below this level leads to biological destruction of a human being. With respect to relative poverty, the level of satisfaction of needs of individuals (or households) refers to the level of satisfaction of these needs by other members of the society. This type of poverty is identified with excessive spreads in the level of meeting the needs in society and it is not possible to eliminate it entirely, but only to reduce it by limiting inequalities in the level of covering the needs. It is worth mentioning that in the case of the poor, there is often a limited possibility of their participation in economic, social and cultural activities, what can lead to social exclusion.

Poverty and low income can be measured in various ways. For the purpose of scientific research the indicators of poverty and social exclusion are applied. These indicators are designed to monitor the phenomenon of poverty and can be used in comparable household surveys conducted around the world. In Europe, the most commonly used approach uses poverty indicators which are one-dimensional (monetary) and relative (based on a threshold defined in relation to the distribution of income within each country) (Khan et al 2017). According to the widely-used concept, individuals being at risk of poverty are those living in households where equivalised disposable income is below the risk-of-poverty threshold, which is set at 60% of the national median equivalised disposable income after social transfers. (Antczak and Zaidi 2016; Eurostat 2019). The equivalised income is calculated by dividing the total household income by its size determined after applying the following weights: 1.0 to the first adult, 0.5 to each other household members aged 14 or over and 0.3 to each household member aged less than 14 years old (Eurostat 2019). This relative poverty measure enables comparisons between examined countries, however it has limitations related to the fact that the thresholds as defined above are country-specific (Zaidi 2010).

It is worth mentioning that there are also other ways to measure the risk of poverty based on the following main concepts (see more in e.g.: Eurostat 2019; Joseph Rowntree Foundation 2016):

- material deprivation – indicating if people lack access to certain goods or services, such as being able to pay regular bills, to face unexpected expenses or to keep their home adequately warm;
- minimum income standards – this approach focuses on the costs of goods and services required by different households in order to achieve acceptable standard of living;
- self-reported measures – in this approach people are asked how well off they evaluate themselves.

Recently, research problems related to the financial stability of senior citizens and their exposure to risk of poverty are getting more and more attention. One can distinguish the different directions of conducted research. From a household perspective issues related to income level and possibilities of accumulation of savings during retirement period were examined, among others, by De Nardi, French, and Jones (2010), Ishikawa and Haji (2009), Jin (2009), Palumbo (1999), Rank et al (2014). For example, Jin (2009) investigated the impact of out-of-pocket health care expenses on elderly household allocation decisions in the U.S. and found that because of volatility of the health care expenses elderly households were less likely to invest in risky financial assets. In turn, in the study written by Rank et. al. (2014) the life course approach was applied in order to understanding poverty among American elderly. Next, Khan et. al (2017) consider poverty as multidimensional issue

depending not only on income, but also other factors, such as health, education and labor market opportunities. They indicated the general causes of poverty at old age in the following areas: financial planning (income, savings), social demographic (employment, education), government support (retirement age, social security benefits) and social support (family and community support).

There are also comprehensive studies in the area of household financial situation comprising states from different European regions. Tai and Treas (2009) conducted cross-national research comprising 22 countries (Southern European, post-communist European and East Asian states) in order to examine the exposure to the risk of poverty from both the macro-level state approach and micro-level composition of households. The risk of poverty among elderly people in European Union countries was broadly investigated by Zaidi (2010), who distinguished the profiles of poverty among senior citizens in European countries and analyzed the trends in elderly people poverty risk in 2004-2008. In the next study Antczak and Zaidi (2016) examined the stability of elderly pension benefits taking into account the negative impact of the financial crisis. Moreover, Perek-Białas (2012) in her research discussed possibilities and limitations of the analysis of the elderly households material situation in Central and Eastern European (CEE) countries based on data from the EU-SILC (European Union – Survey of Income and Living Conditions). Borda and Kowalczyk-Rólczyńska (2018) examined the similarities in financial situation of elderly households in CEE states with the application of classification methods. The challenges for the economic situation of elderly people living in different European countries were also investigated by Buber et al. (2010) and Stula (2012). Another important issue is the relatively higher exposure of older women to the risk of poverty with their markedly higher longevity projections and notably lower average pension benefits compared to men. Ahonen and Bach-Othman (2010) analyzed differences in the poverty rate among elderly men and women in eight EU countries, with the objective of finding explanations for why the poverty risk of women is considerably higher than that of men in some countries but not in others. In the above-mentioned studies, one dominant research method can not be identified. Various research methods were used depending on the type and availability of data as well as the assumed research goals and hypotheses.

Summarizing, the provided literature review shows that although many researchers deal with problems related to the financial situation of elderly people (households) and their exposure to the risk of poverty, comprehensive studies on the identification and comparison of the factors affecting the financial situation of elderly households living in different European countries are still missing. In view of the demographic trends (aging societies), observed in practically all European countries, one can expect that further changes in the age structure of populations will lead to an increasing number of elderly households. Ageing society and related problems, such as poverty and social exclusion of the elderly, require continuous examination from both the social policy and market perspective.

Research and Results

The deterioration of the financial situation of the elderly, which, as a consequence, can lead to life in poverty, has been influenced by many factors. The literature survey has resulted in a list of variables that can be deemed potentially significant in the context of poverty risk in elderly households (see Table 1).

Table 1: Variables representing selected factors in the context of poverty risk in elderly households

Symbol of variable	Variable
Y	At risk of poverty or social exclusion rate for elderly (65+) (in %)
X_1	GDP per capita (in PPS)
X_2	Median equivalised net income 65+ (in PPS)
X_3	Housing cost overburden rate 65+ (in %)
X_4	Household saving rate (in %)

X_5	Old age dependency ratio (per 100 person of working age (15-64))
X_6	Inflation rate (in %)
X_7	Unemployment rate (in %)
X_8	Expenditure on pensions (as % of GDP)

Source: own study.

The study was conducted based on data from Eurostat for the period of 2007-2017, for the eight European countries: Germany, France, Spain, Italy, Poland, Romania, Hungary, Latvia. These countries represent both Western European countries (developed countries) and Eastern European countries (developing countries). The period selected for the study is dictated by the availability of comparable data. The objective of the study was to identify and verify whether the same factors significantly affect the risk of poverty rate for elderly in the different countries. Of the selected countries, the highest values of risk of poverty rate were registered in Latvia and Romania, the lowest – in France, in whole analysed period (see Appendix 1). Furthermore, median equivalised net incomes of elderly people in Western European countries were definitely higher than in Central and Eastern European countries. The highest value of housing cost overburden rate were noticed in case of elderly households in Germany, the lowest values for elderly who live in Spain. Values of this factor decreased between 2007 and 2017 in almost all countries, except for Germany (here similar level of this factor was observed).

In this study, for every country, the dependent variable is at the risk of poverty or social exclusion rate for elderly, and the potential independent variables are X_1 to X_8, that were submitted for verifications. At the risk of poverty or social exclusion rate for elderly is defined as the sum of elderly (65+) who are: at-risk-of-poverty or severely materially deprived or living in (quasi-)jobless households (i.e. with very low work intensity) as a share of the total population in the same age group.

In the first step, a variation coefficient was calculated for every independent variable in order to reject these variables for which $V < 0.1$ (see Appendix 2). Next, correlation coefficients were calculated between independent variables and the dependent variable; and a significance evaluation of the correlation coefficients was carried out, using a non-parametrical test for *p-value* 0.05. The statistically significant correlation coefficients that were obtained; were also exposed to substantive evaluation, which allowed for identification of these correlation coefficients for which the sign was illogical. Results of this part of the study are presented in Table 2, where statistically significant level of correlation coefficients was marked in bold type.

Table 2: Correlation coefficients of the risk of poverty or social exclusion rate for elderly and eights independent variables

Symbol of variable	Germany	France	Spain	Italy	Poland	Romania	Hungary	Latvia
X_1	0.441	0.508	**0.942***	**0.629***	**-0.866**	**-0.842**	-0.313	-0.215
X_2	**0.664***	**-0.955**	**-0.812**	-0.405	**-0.975**	**-0.918**	-0.405	-0.547
X_3	0.513	**0.801**	0.489	0.564	**0.835**	**0.906**	**0.770**	**0.693**
X_4	0.564	0.505	0.115	0.370	0.417	n.a.	-0.320	**0.788***
X_5	0.447	**-0.855***	**-0.876***	-0.491	**-0.909***	**-0.831***	-0.497	-0.402
X_6	-0.442	0.463	0.588	**0.675**	**0.883**	**0.641**	0.479	**0.708**
X_7	-0.570	**-0.902***	**-0.795***	**-0.607***	0.466	-0.046	0.496	-0.425
X_8	-0.516	**-0.947**	**-0.988**	**-0.668**	0.254	**-0.875**	0.162	**-0.662**

** - illogical sign of correlation coefficient*
grey colour - variation coefficient less than 10%
Source: own study using Statistica software.

The correlation results suggest that, for all Central and Eastern European countries under study and for France, a significant impact of the housing cost overburden rate upon at the risk of poverty and social exclusion rate can be observed. The remaining variables – depending on the country – were found to be either significant or non-significant. It should be noted that:

- median equivalised net income is found to significantly affect at the risk of poverty and social exclusion rate in France, Poland and Romania,
- inflation rate is significantly correlated with at the risk of poverty and social exclusion rate in Italy, Poland, Latvia and Romania,
- expenditure of pensions is found to be significantly correlated with at the risk of poverty and social exclusion rate in Spain and Latvia.

It is worth pointing out that in the majority of countries under study, a statistically significant relationship between household saving rate and at the risk of poverty and social exclusion rate has not been found. Moreover, in case of Germany, almost all variables under study turned out to be statistically insignificant in correlation with at the risk of poverty and social exclusion rate.
Following of the correlation analysis, variables for further research for each country are presented in Table 3.

Table 3: A list of potential variables

Country	Germany	France	Spain	Italy	Poland	Romania	Hungary	Latvia
Symbol of variable	no variables	X_2, X_3	X_8	X_6	X_2,X_3,X_6	X_2,X_3,X_6	X_3	X_3,X_6,X_8

Source: own study.

In the next step, the variables listed in Table 3 were used to build multiple regression models. The general form of the linear multiple regression function for k independent variables X_1, X_2,…,X_k is (Hamburg 1970; McClave et al 2008):

$$Y = a_0 + a_1X_1 + a_2X_2 + \cdots + a_kX_k$$

$a_0, a_1, \ldots, a_k$ – coefficients.

Next, some variables were eliminated using the backward elimination method (Kotu and Deshpande 2015), until models with only statistically significant variables remained. For every regression model a determination coefficient was calculated; also the normality of the residual distribution, using the Shapiro-Wilk model, was verified (with *p-value* 0.05). The final forms of every model are presented in Table 4.

Table 4: The final form of regression models

Country	Variable	coefficient	p-value	Adjusted R^2	p for Shapiro-Wilk test
Germany	no model				
France	*constant*	27.368	0.000	0.913	0.415
	X_2	-0.001	0.000		
Spain	*constant*	62.210	0.000	0.973	0.307
	X_8	-3.792	0.000		
Italy	*constant*	21.099	0.000	0.395	0.641
	X_6	1.019	0.023		
Poland	*constant*	35.881	0.000	0.996	0.939
	X_2	-0.002	0.000		

	X_6	0.778	0.000		
Romania	*constant*	45.724	0.002	0.899	0.528
	X_2	-0.005	0.014		
	X_3	0.692	0.025		
Hungary	*constant*	11.072	0.000	0.548	0.331
	X_3	0.814	0.006		
Latvia	*constant*	16.235	0.122	0.422	0.306
	X_3	2.212	0.018		

Source: own study using Statistica software.

Results of multiple regression allow to indicate that in case of Germany no variable affects poverty in the elderly group. Moreover:

- in France, Poland and Romania: the level of income affects poverty in the elderly group,
- in Spain: the level of expenditure on pensions affects poverty in the elderly group,
- in Italy and Poland: the level of inflation affects poverty in the elderly group,
- in Romania, Hungary and Latvia: the level of housing cost affect poverty in the elderly group.

It is worth pointing out that the level of housing costs play important role in the case of elderly who live Eastern European countries.

Conclusions

The problem of poverty in elderly households is a multifaceted problem requiring continuous examination from both practical and theoretical sides. The level of poverty depends on many factors, both measurable and difficult to measure. In the study we took an attempt to identify quantitative factors that affect the risk of poverty in the case of elderly living in selected European countries. We found that among the analysed countries, Latvia and Romania were characterized by the highest values of at risk of poverty rate, the lowest level of this measure was noted in France.

Moreover, the results of multiple regression analysis indicate that the main factors causing the poverty of the elderly in the examined countries are: level of income, expenditure on pensions, inflation rate as well as housing costs. One can observe the essential role of variables corresponding to the seniors' budgets main components – income and costs. It is also worth emphasising that the level of housing costs mainly affects the risk of poverty of seniors in Romania and Latvia, these are countries in which the elderly exposure to the risk of poverty is much higher compared to other examined countries. Future directions of research on factors leading to poverty of elderly people should be extended taking into account intrafamily relationship as well as sociological factors, as they may play an increasingly crucial role. In the further research, depending on the type and quality of data, more advanced research methods can be implemented.

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Appendix 1

Table 5: Values of dependent variable

At risk of poverty or social exclusion rate for elderly (in %)								
Year	**Germany**	**France**	**Spain**	**Italy**	**Poland**	**Romania**	**Hungary**	**Latvia**
2007	16.8	15.2	27.8	25.5	27.3	57.9	21.1	51.4
2008	15.5	14.1	26.2	24.4	26.9	49.4	17.5	58.8
2009	16	13.4	24.9	22.9	25.8	43.3	17.5	55.5
2010	14.8	11.8	22.9	20.4	24.4	40.1	16.8	36.8
2011	15.3	11.5	21.2	24	24.7	36.2	19	33
2012	15.8	11.1	16.5	24.7	23.4	35.4	22	33.7
2013	16	10.8	14.5	22	19.7	35.8	20.2	36.1
2014	17.4	10.1	12.9	20.2	18.2	35	19	39.3
2015	17.2	9.3	13.7	19.9	17	33.3	17.1	42.1
2016	18.3	10	14.4	23.2	16.1	34	15.1	43.1
2017	17.7	9.5	16.4	22	17.4	33.2	16.8	43.9

Source: own study based on Eurostat.

Appendix 2

Table 6: Statistical characteristic of independent variables

Germany								
	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8
mean	121.82	17 221.36	20.98	16.80	31.35	1.48	5.90	12.00
standard deviation	3.4005	1 107.8886	1.2544	0.3276	0.7244	0.8976	1.6162	0.3225
variation coefficient	0.0279	0.0643	0.0598	0.0195	0.0231	0.6057	0.2739	0.0269

France								
	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8
mean	106.7273	18 602.4545	4.0273	14.5836	27.2545	1.3000	9.1545	14.5273
standard deviation	1.5551	2 182.4233	1.0910	0.7832	2.0685	1.0070	1.0568	0.7226
variation coefficient	0.0146	0.1173	0.2709	0.0537	0.0759	0.7746	0.1154	0.0497
Spain								
	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8
mean	94.1818	13 824.0909	3.8091	8.8982	25.9818	1.5000	19.3636	11.3364
standard deviation	4.9562	1 374.9141	0.2508	2.1927	1.8126	1.5950	5.5657	1.4348
variation coefficient	0.0526	0.0995	0.0658	0.2464	0.0698	1.0633	0.2874	0.1266
Italy								
	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8
mean	100.9091	14 832.4545	6.1909	11.4409	32.2909	1.5273	9.8000	15.6727
standard deviation	4.6358	1 114.0104	1.0830	1.5955	1.5189	1.2760	2.3702	0.8510
variation coefficient	0.0459	0.0751	0.1749	0.1395	0.0470	0.8355	0.2419	0.0543
Poland								
	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8
mean	63.8182	8 347.2727	9.8909	3.1927	20.5273	2.0545	8.3909	11.5818
standard deviation	5.7934	1 648.4608	1.9445	1.4998	1.8911	1.8267	1.7694	0.3430
variation coefficient	0.0908	0.1975	0.1966	0.4697	0.0921	0.8891	0.2109	0.0296
Romania								
	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8
mean	53.6364	3 751.6364	18.3091	n.a.	24.0818	3.4455	6.5091	14.2000
standard deviation	5.0650	836.7912	5.3700	n.a.	1.4469	2.9049	0.7035	1.0890
variation coefficient	0.0944	0.2230	0.2933	n.a.	0.0601	0.8431	0.1081	0.0767
Hungary								
	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8
mean	65.6364	7 360.4545	8.9727	11.3636	25.1091	3.3455	8.4000	9.6636
standard deviation	2.5009	674.0595	1.9754	1.3034	1.5527	2.6440	2.4515	1.0003
variation coefficient	0.0381	0.0916	0.2202	0.1147	0.0618	0.7903	0.2918	0.1035
Latvia								

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8
mean	59.8182	5 166.9091	12.1273	2.6509	27.8455	3.4455	12.0818	7.6909
standard deviation	4.7501	802.7972	2.7394	6.2456	1.8124	4.9973	4.3460	1.3932
variation coefficient	0.0794	0.1554	0.2259	2.3560	0.0651	1.4504	0.3597	0.1811

Source: own study based on Eurostat.

A Comparative Study of Social Representations on Euthanasia in Medical Students of Two Different Cultures

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Abstract

The paper presents the results of comparative study of social representations on euthanasia in 140 medical students from Russia and Uzbekistan. Social perceptions of euthanasia were studied using the 19-point Attitude to Euthanasia Questionnaire (Nikolaev, 2017). The key differences are determined by legal, ethical and spiritual representations. There are trends towards differences, related to gender, age, faith, level of urbanization. The study establishes the closeness of social representations on euthanasia of Russian and Uzbek students in medical, sociocultural and personal aspects of their attitude to euthanasia.

Keywords: Medical Students, Social Representations, Euthanasia, Russia, Uzbekistan.

Introduction

The topic of conscious death in a situation of a serious incurable disease, designated in the modern world as euthanasia, is one of the main problems of bioethics (Thomas, 2017; Burger et al., 2018). Medical students in the years of study at the university should form an adequate attitude to the problem of death, since its immaturity can reduce their psychological well-being (Chistopolskaya et al., 2017) and directly affect the effectiveness of their future professional activity. Issues related to the attitude of medical students to death and suicide are the subject of cross-cultural research (Chistopolskaya et al., 2016), which helps to better understand the sources of social representations of tomorrow's specialists and to influence them. Comparative studies of social representations on euthanasia are no less relevant. Today social representations of euthanasia are used in medical and religious practice to protect professional identities and to justify their expert knowledge of death and dying (Jylhänkangas et al., 2014). It is important that new experience in the study of social representations of medical students' on euthanasia already exists both in Russia (Nikolaev et al., 2018) and in other countries with a predominant Christian culture (Pomfret et al., 2018; Santos et al., 2019). Religious beliefs are known to play an important role in shaping attitudes toward euthanasia (Zaccaria et al., 2019). In this connection, it seems to us important to compare social representations of the Russian medical students on euthanasia with similar views of their peers of a different culture, in particular, Muslim. A reasonable platform for such a study could be Uzbekistan, which has a modern level of education and medicine development, as well as rich historical experience of bioethical doctrines (Mukhamedova, 2014; Mukhamedova, 2015).

Method

The survey involved 140 medical students studying at universities in Russia and Uzbekistan. The Russian sample is represented by 84 students of Ulianov Chuvash State University (mean age 19.10±1.98; 58.33% women), the Uzbek sample - 56 students of Bukhara State Medical Institute (mean age 20.11±1.63; 57.14 % women). These groups did not differ in age and gender, but they

differed in cultural status (language, religion, traditions). Among Russian students Orthodox Christians predominated (89.29%), among Uzbek students, Sunni Muslims (96.30%).

Social perceptions of euthanasia were studied using the 19-point Attitude to Euthanasia Questionnaire (Nikolaev, 2017) which was structured into five modes (medical, legal, ethical, sociocultural, spiritual and personal) to reveal specifics of social representations on euthanasia.

Statistical processing was carried out by calculating basic statistics, comparison of means and standard deviations, comparison of rates, correlation analysis at significance level of $p < 0.05$.

Results

At the first stage of the study, the characteristics of the respondents were compared by faith factor, which to a greater degree reflects not professional, but cultural representations about death and dying. Thus, among Uzbek students, significantly more ($p=0.02$) believers were identified (92.86%) than among Russian students (76.19%). There were no atheists or non-believers among Uzbek students. Among Russian students there were 4.76% and 7.14% of such respondents respectively. The self-esteem of faith in Uzbek medical students (93.39%) is one third higher ($p = 0.0001$) than that among Russian students (62.55%).

At the second stage, the attitude of medical students of two cultural groups to various aspects of euthanasia was evaluated. As the analysis showed, Russian and Uzbek students have both similar social representations on euthanasia ($p < 0.05$) and significantly different ($p > 0.05$).

The similarity of attitudes toward euthanasia is determined at the level of medical, socio-cultural and personal representations. Half of Russian and Uzbek medical students are equally often sure that euthanasia is more a medical problem (46.43% and 60.00%), and their countries are not ready for euthanasia legalization due to organizational specifics of healthcare system (44, 05% and 50.94%).

As part of sociocultural perceptions, two-thirds of Russian and Uzbek students have a similar opinion on fear of possible abuse if euthanasia is legalized (76.19% and 69.23%). Two-thirds of respondents believe that such a risk may arise due to possible insufficient control over the implementation of the law in their countries (30.96% and 39.62%).

In the personality context of social representations of euthanasia, one in ten Russian and Uzbek students report that they already have experience of situations in which euthanasia could be used (10.71% and 9.09%). Every third is ready to apply it to himself /herself (32.15% and 42.31%), a slightly smaller number of those who allow euthanasia in relation to their loved ones (29.76% and 28.85%).

According to the survey, if in Russia the share of opponents of euthanasia (58.33%) significantly ($p=0.045$) exceeds the share of its supporters (41.67%), then in Uzbekistan the share of opponents (51.85%) and supporters (48.15) %) are statistically indistinguishable ($p=0.84$).

Significant differences are observed at the legal level of social perceptions of E. Uzbek students to a greater extent ($p=0.0001$) consider E. as a legal problem (64.81%), unlike their Russian peers (28.53%).

Russian students see the problem of euthanasia to a greater extent (70.24%) than Uzbek students (50.00%), moral content, which corresponds to differences in social representations at the ethical level ($p=0.025$).

Differences are also identified on the spiritual level of euthanasia representations. Medical students from Uzbekistan are significantly more likely (76.47%) than Russian peers (57.14%) to believe that a person should not die at will, because comes to this world not of his own free will (p=0,030).

At the third stage, the correlation relationships between the obtained parameters were studied. The following reliable relationships were obtained in the Russian sample. Men are more likely to agree with the legalization of euthanasia (r=0.26), relating it with the humanization of society (r=0.25). The willingness to legalize euthanasia increases with the age of the respondents (r=0.21) and with the increasing degree of urbanization of the settlement in which they live (r=0.29). Urban residents are more likely to associate euthanasia practice with a high level of humanism in society (r=0.24), less prone to abuse opportunities (r=-0.21), and they also more welcome the experience of countries that have already legalized euthanasia (r=0.28).

More religious Russian students do not see euthanasia as a legal problem (r=-0.19) and as a manifestation of humanism (r=-0.22), and more as a violation of the fundamental divine order (r=0.24).

Russian medical students, who are more inclined to rely on their own strength in difficult situations than to turn to others for help, are less afraid of the risk of abuse during euthanasia (r=-0.20). Persons who prefer less frequent use of official medicine more often agree to the hypothetical use of euthanasia in relation to themselves (r=0.21). Students who are more approving of suicide practice have a more positive attitude to legalizing euthanasia (r=0.19), recognizing it as one of the manifestations of high humanism (r=0.19).

In the Uzbek sample, other relationships are identified. Men are more likely to consider euthanasia as a legal problem (r=0.30) and to a greater extent agree with the use of euthanasia in relation to themselves (r=0.29). Older students are less likely to support euthanasia legalization (r=0.29).

Believing students do not consider euthanasia as a sign of humanism in society (r=-0.31), but rather as a contradiction of the divine essence of man (r=-0.29). The more faithful Uzbek students consider themselves to be believers, the more they consider euthanasia a question of moral character (r=0.27), the legalization of which indicates a high level of spirituality of society (r =0.23).

Uzbek medical students, who mostly rely on their own strengths in difficult situations, are sure that everyone has the right to make decisions regarding his/her own life only (r=-0.40). The less healthy the respondent considers himself/herself, the less likely he/she is to blame the low moral level of medical professionals (r=-0.32). Students who are more likely to seek help from official medicine are less likely to find an imperfect legal framework in connection with euthanasia (r=-0.31).

Conclusion

In this research, a comparative analysis of social representations of medical students from universities in Russia and Uzbekistan, presenting differing in language, religion and traditions cultures, is carried out. It is revealed that the key differences in attitudes toward euthanasia between Russian and Uzbek students are determined at the level of legal, ethical and spiritual representations. There are certain trends towards differences between the two groups of students, related to their gender, age, faith, level of urbanization, and other factors. The study establishes the closeness of social representations on euthanasia of future Russian and Uzbek medical doctors in context of medical, sociocultural and personal aspects of their attitude to euthanasia. The sources of these similarities and differences should be the subject of a new larger study.

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Multi-Criteria Decision-Making using an Extended Gale and Shapley (E-GS) Algorithm

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Abstract

Matching and multi-criteria multi-alternative problems are two well-known problems in decision science. Over the years, many solutions, tools, and techniques have been developed to solve each problem. When a situation arises where both problems intersect, then one may use approaches developed for each to tackle it. Given the competitive and dynamic business environment, problems with such attributes are bound to take place. Hence, this research paper extends the Gale-Shapley algorithm, which is a well-known algorithm that solves matching problems with the analytic hierarchy process (AHP), weighted-product model (WPM), and weighted-sum model (WSM). The extended Gale-Shapley algorithm is dubbed the Extended-GS (E-GS) algorithm and is referred to as E-GS. The basic idea of the E-GS algorithm is feeding the preference lists to the Gale-Shapley algorithm to produce an optimum match using the WSM, WPM, and AHP models. E-GS combines the powers of all four algorithms to provide an optimum solution.

Keywords: Gale-Shapley, Analytic Hierarchy Process, Weighted-sum Model, Weighted-product Model, Multi-criteria Decision-making, Operations Research, Decision Support Systems.

Introduction

A matching problem is a well-known problem in decision-making. The idea is to match two sets in an ideal manner; hence, the solution was nicknamed a “stable marriage” by the mathematicians D. Gale and L. Shapley. As the name suggests, a stable marriage is one where none of the two partners want out of the relationship. A multi-criteria multi-alternative problem is also a well-known problem in decision-making. Multi-criteria decision-making (MCDM) is a discipline that addresses problems in decision-making that involve selecting the best alternative for a decision from multiple potential candidates using multiple criteria or attributes that may be concrete or ambiguous (Pavan & Todeschini, 2009). Such problems have many suggested solutions, such as the analytic hierarchy process (AHP), weighted-product model (WPM), and weighted-sum model (WSM).

Decision-makers (DMs) should always try to select the optimal solution when making decisions. Unfortunately, an optimal solution exists only in cases with a single criterion, whereas decisions almost always involve some conflicts or dissatisfaction in real decision-making situations (Asghar, 2009). A decision problem is typically a situation in which an individual must select one of a number of alternative courses of action without prior knowledge of which one is the best (Abbas Mardani, et al., 2015). The decision process can be organized into three phases: problem identification and structuring, model development and use, and the development of action plans. The first step consists of defining the aims of the decision, recognizing the issue to be solved, diagnosing the cause-effect relationships for the situation of the decision, and determining the criteria of the judgment. The

second phase is comprised of the development of the DM preferences, formal models, trade-offs, values, and the objectives for comparing the alternatives or actions being considered with each other transparently and systematically. The third phase includes the development of action plans since the decision is not reached by analysis (Pavan & Todeschini, 2009). The decision-making process results in the selection of the best solution and is considered effective if the solution procedure is optimal in that the positive results outweigh possible losses (Asghar, 2009). The decision process aims at generating information on the decision problem from the available data, developing effective solutions, and providing a good understanding of the nature of a decision problem (Brans, et al., 1986).

The MCDM methods that support DMs in making the best decisions are multi-criteria decision analysis (MCDA), but they cannot make the final decisions themselves. MCDA's primary goal is to help DMs in synthesizing the information to feel confident and comfortable about making a decision. MCDA integrates objective measurements with value judgments and makes subjectivity explicit (Løken, 2007).

Several MCDM methods have been suggested over the years. These methods have been in various fields with different theoretical contexts and have been faced with multiple types of questions and various types of results. While some of these methods have been designed to address the need for specific problems, there are other methods that are more general for use in different areas. MCDM methods are similar in their goal of creating a formalized and better-informed decision-making process, the need to identify alternatives to be considered, the criteria to guide the assessment, and the relative importance of the various criteria. However, MCDM methods are distinguished from each other by the model's nature, the information required, and how the model is used.

This research paper proposes an optimum solution for multi-criteria multi alternative problems. Problems with many alternatives are not as simple as one may imagine. Carrying out the responsibility of comparing alternatives is a difficult task. Hence, "criteria" comes into play, where one is seeking justice in evaluating all the alternatives (according to one criterion or many criteria). Actually, building a scenario with alternatives and criteria to reach a sound and realistic decision is time-consuming and consequently, costly. Another type of problem involves matching different alternatives, for example, matching the right project manager with the right project or matching the right car to the right buyer. The suggested solution marries three methods analytic hierarchy process (AHP), weighted-product model (WPM), and weighted-sum model (WSM) to the Gale–Shapley algorithm, also known as the deferred-acceptance algorithm. Such a marriage will allow the AHP, WPM, and WSM to calculate alternatives according to criteria (a preference list) then feed these results to the Gale–Shapley algorithm, therefore, producing an optimum match. Hence, the major contribution of the E-GS is to automate the development of the preference list then use the list in the Gale–Shapley algorithm, producing an optimum match. Furthermore, E-GS creates an interface between methods that develop a preference list (WSM, WPM, AHP) on the one side and the Gale–Shapley algorithm on the other side.

The paper presents the suggested E-GS method in six sections as follows: In Section **Error! Reference source not found.**, a literature review is presented about MCDM. In Section 0, AHP is reviewed. First, AHP and ExpertChoice are discussed, then the process of AHP, pair-wise comparison in AHP, and finally, the AHP algorithm. In Section 0, WSM and WPM are presented and reviewed. Both WSM and WPM are outlined mathematically, and their respective algorithms are presented. Next, all three models (AHP, WSM, and WPM) are compared in accordance with six axioms. In Section 0, the original Gale-Shapley algorithm is presented. First, an abstract view of the Gale-Shapley algorithm is presented, then the pseudo-code of the algorithm is discussed. In Section 0, E-GS, the suggested extended Gale-Shapley algorithm is discussed. In Section 0, the implementation of E-GS on Projects-PM is presented along with a basic data structure to be used in the implementation.

Literature Review

MCDM is one of the most important and fastest-growing subfields of operations research (OR) science since it started in the 1970s (Koksalan, et al., 2011). MCDM provides strong decision making in areas where it is highly complex to select the best alternative (Koksalan, et al., 2011). The main

concern of MCDM is structuring and solving planning and decision problems in the existence of multiple conflicting criteria. "Solving" can be interpreted in various ways: one interpretation corresponds to the selection of "best" alternative from a set of available alternatives." Another interpretation could be the selection of a small set of good alternatives. An interpretation could be to find all "efficient" or "non-dominated" alternatives. A large number of decision-makers use MCDM in conjunction with decision support systems (DSS) in various fields, such as flood risk management, financial analysis, customer relationship management, disaster management, and housing evaluation (Asghar, 2009).

The aim of the MCDM methods is to help a decision-maker in selecting the most suitable alternative from many alternatives, considering a multitude of criteria characterizing the acceptability of individual variants of the decision. The criterion can also determine the quality of the variants when all choices are available, and the challenge is to select the best one subjectively. In this case, subjectivity refers to the value of specific criteria, as some factors are generally more relevant for decision-makers than others. Also, the inaccuracy and uncertainty of the data identifying alternatives influence the subjectivity of the evaluation (Roy, 2005).

The MCDM method generally involves doing the same set of steps that can be expanded or reduced depending on the size of the projects. These steps are not necessarily done in a fixed order. According to Roy, the decision-making process consists of four steps (Roy, 1996): (I) defining the subject-matter of the decision and the set of potential alternatives for the decision, as well as deciding the reference problems; (II) the analysis of consequences and the development of a coherent set of criteria; (III) modeling comprehensive preferences and aggregating performances operationally; (IV) developing and investigating the recommendation. Roy argues that the steps are not serial. For example, some of the step I elements can involve performing elements of step II. Similarly, one cannot simplify the decision-making process by removing individual steps. In addition, one must apply a properly chosen method to achieve a "good" solution to the problem.

Interest in MCDM has led to the development of many methods of MCDM within the operations research field. According to (McGinley, 2012) (Weistroffer, et al., 2005) (Rezaei, 2015) (Sałabun & Piegat, 2016) and (Buckshaw, 2010), there are more than 40 methods of MCDM in the literature. These methods are broadly classified into three groups: outranking models, value measurement models, and goal, aspiration, or reference level models (Løken, 2007). Choosing the best MCDM method varies depending on the source and nature of the information used to inform decision making and, on the model, the decision-makers believe match their ability. A general feature of any MCDM is a performance matrix or consequence table, which is comprised of rows describing options and columns describing the performance of the options against each criterion (Adunlin, et al., 2015).

MCDM methods have been applied to diverse applications. The widely used MCDM methods have been described in Table I. Apart from the MCDM methods which are listed, many other MCDM methods are available in the literature.

Table 1: Summary of MCDM methods

Abbreviation	Method	Description	Ref.
AIRM	Aggregated Indices Randomization Method	AIRM solves the complex problem where uncertainty occurs, which has incomplete information for the problem to be addressed.	(Aruldoss, et al., 2013)
AHP	Analytic Hierarchy Process	This method uses pair-wise comparisons, which are used to compare the alternatives and to estimate criteria weights.	(Saaty, 1980)
ANP	Analytic Network Process	The general form of AHP and is more concerned with network structure.	(Horenbeek, 2014)
BJT	Bayesian Junction Tree	A decision framework based on Bayesian networks (BN) and influence diagram (ID).	(Watthayu, 2004)
CBR	Case-Based Reasoning	A new method for predicting financial distress in companies one year before	(Li, 2008)

		actual distress using case-based reasoning.	
DEA	Data Envelopment Analysis	This method is used to find the efficiency of the combination of multi inputs and multi outputs of the problem	(Hermans, 2009)
FST	Fuzzy Set Theory	The fuzzy set theory allows using uncertain data as trapezoidal fuzzy numbers or fuzzy triangular numbers.	(Khadam, 2003)
ELECTRE	Elimination and Choice Translating Reality	An outranking method based on concordance analysis.	(Roy, 1968)
GP	Goal Programming	GP is a division where it has more than one objective conflicts with each other, and by arranging the goals have to be achieved by minimizing the irrelevant information.	(Mukherjee & Bera, 1995)
GRA	Grey Relational Analysis	The multi-criteria weighted average is proposed in the DM process to rank the materials with respect to several criteria.	(Chan & Tong, 2007)
MAUT	Multi-Attribute Utility Theory	An expected utility theory that decides best course of action in a problem by assigning a utility to all possible consequence.	(Fishburn, 1967)
PROMETHEE	Preference Ranking Organisation Method for Enrichment Evaluation	PROMETHEE is like ELECTRE in that it also has several iterations and is also an outranking method.	(Brans, et al., 1986)
SAW	Simple Additive Weighting	A function is established based on a simple addition of scores that represent the goal achievement, multiplied by the weights	(Qin, et al., 2008)
SMART	Simple Multi-Attribute Rating Technique	This method requires two assumptions: utility and preferential independence.	(Chen, 2010)
TOPSIS	Technique for Order of Prioritization by Similarity to Ideal Solution	An approach to identify an alternative which is closest to the ideal solution and farthest to the negative ideal solution in a multi-dimensional computing space.	(Qin, et al., 2008)
WPM	Weighted Product Model	Alternatives are compared by the weights and ratio of one for each criterion.	(Miller & Starr, 1963)
WSM	Weighted Sum Model	Evaluating several alternatives in accordance with the different criteria which are expressed in the same unit	(Miller & Starr, 1963)

In recent years several studies have employed MCDM tools and applications to solve area problems (Abbas Mardani, et al., 2015). Up to now, there are 36 software packed to automate the work of such algorithms & methods: @RISK, 1000Minds, PEERForecaster Excel Add-in, AgenaRisk, Analytica 4.2, Promax 2010 Standard, DecideIT, Decision Advisor¬Æ, RICH Decisions Decision Explorer, DecisionTools Suite, RPM-Decisions Doctus, DPL, TreePlan, DTrio, Equity3, Vanguard Business Analytics Suite, ForeTell-DSS, Frontier Analyst 4, GoldSim, Portfolio NavigatorÀô Value Optimization Software, IDS (Intelligent Decision System), QMms (Quantitative Methods for Management Science), Logical Decisions Portfolio, HiPriority 3 SE, RiskSim, Logical Decisions for Windows v6.2, Hiview3 v6.2, SensIt, MakeItRational, MindDecider, TreeTop, OnBalance 3 SE, OWL, Vanguard System.

In the following sections, Analytic Hierarchy Process (AHP), Weighted Sum Model (WSM), Weighted Product Model (WPM), and Gale-Shapley Algorithm will be explained in detail in their respective sections. In section 0, AHP is reviewed. First, AHP and ExpertChoice are discussed, then the process of AHP, next pair-wise comparison in AHP, and finally, the AHP algorithm. In 0 4, WSM and WPM are presented and reviewed. Both WSM and WPM are outlined mathematically, and their respective algorithms are presented. Next, all three models, AHP, WSM, WPM, are compared in accordance with six axioms. In section 0, the original Gale-Shapley algorithm is

presented. First and abstract view of the Gale-Shapley algorithm, then the pseudo-code of the algorithm is discussed. In section 0, E-GS, the suggested Extend Gale-Shapley algorithm is discussed. In part 7, the implementations of E-GS are discussed with a Projects-PM is presented along with a basic data structure to be used in the implementation.

Analytical Hiearchy Process (AHP)

The Analytic Hierarchy Process (AHP) was developed in the 1970s by Dr. Thomas L. Saaty and defined as a decision based on mathematics and human psychology algorithm (Chauhan, et al., 2008), (Saaty, 2004).

AHP process is used when a decision is to be taken based on multi-criteria with many alternatives. Thomas Saaty defined AHP "The Analytic Hierarchy Process (AHP) is a theory of measurement through pairwise comparisons and relies on the judgments of experts to derive priority scales" (Saaty, 2008).

Based on AHP, the software was developed named ExpertChoice (ExpertChoice, 2012). ExpertChoice was developed in 1983 by Dr. Saaty and Dr. Ernest Forman. In China alone, more than 900 papers were released on AHP (Sun, 2005).

The AHP and ExpertChoice software help decision-makers in structuring a decision into smaller parts, proceeding from the goal to objectives to sub-objectives down to the alternative courses of action. Decision-makers then make simple, pair-wise comparative judgments across the hierarchy to arrive at overall alternatives priorities. The decision problem may involve social, political, technical, and economic factors.

Analytical Hierarchy Process (AHP) Process

The process of conducting AHP is straightforward and explained in (Saaty, 2008) as follows:

1. Define the problem and determine the kind of knowledge sought.
2. Structure the decision hierarchy from the top with the goal of the decision, then the objectives from a broad perspective, through the intermediate levels (criteria on which subsequent elements depend) to the lowest level (which usually is a set of the alternatives).
3. Construct a set of pair-wise comparison matrices. Each element in an upper level is used to compare the elements in the level immediately below with respect to it.
4. Use the priorities obtained from the comparisons to weigh the priorities in the level immediately below. Do this for every element. Then for each element in the level below, add its weighted values and obtain its overall or global priority. Continue this process of weighing and adding until the final priorities of the alternatives at the bottom-most level are obtained.

AHP Pair-wise Comparison

The pair-wise relative importance allows the user to compare each criterion to the other without looking at the importance of the rest of the criteria. Pair-wise relative importance is interpreted as [1: Equal, 3: Moderate, 5: Strong, 7: Very strong, 9: Extreme]. According to Saaty (Saaty, 2008) the importance and ranking to scale is the Scale of Relative Importance, where the intensity of importance ranges from 1 to 9, 1 is of Equal importance, and 9 is absolute importance. The fundamental scale is shown in table 2.

Table 2: The fundamental scale of absolute numbers (Saaty, 2008)

Intensity of Importance	Definition	Explanation
1	Equal importance	Two activities contribute equally to the objective
3	Weak importance of one over another	Experience and judgment slightly favor one activity over another
5	Essential or strong importance	Experience and judgment strongly favor one activity over another
7	Demonstrated importance	Activity is strongly favored, and its dominance demonstrated in practice
9	Absolute importance	The evidence favoring one activity over another is of the highest possible order of affirmation
2,4,6,8	Intermediate values between the two adjacent judgments	When compromise is needed

AHP Algorithms

The AHP algorithm is composed of two functions 1) Eigenvector 2) AHP. The first function Eigenvector, figure 1, will be called with AHP. Eigenvector successively squares a matrix and then normalized its rows. In figure 2, The AHP is carried out: first, compare each criterion to another, then call the Eigenvector. Next, compare all alternatives to each other according to each criterion and call the Eigenvector for each matrix. After, multiply the alternatives matrix with the criteria vector, as shown in figure 2.

```
Function Eigenvector (input M: Matrix NXN, output Vector N X 1)
        Iterate
                Take successive squared powers of a matrix
                Normalize the row sums
        Until the difference between consecutive row sums is less than a pre-specified value
```

Fig. 1: The function Eigenvector.

```
Function Build AHP_preference-list (input: Criterion, alternatives; output: ordered-
preference)
        Build a pair-wise comparison matrix of Criterion
        call Eigenvector (Criterion Matrix, Criteria-Vector)
        Build comparison matrix alternatives according to each criterion
        For each c in Criterion
                call Eigenvector (Alternative matrix of criteria, Alternative Vectors)
        Build Alternative matrix according to criteria using Alternative Vectors
        Alternatives Vector=Multiply Alternatives matrix (NXN) by Criteria-Vector
        ordered-preference =Sort Alternatives Vector in descending order
```

Fig. 2: The suggested Algorithm AHP.

Weighted Sum Model (WSM) and Weighted Product Model (WPM)

In this section, WSM and WPM are presented and reviewed. Both WSM and WPM are outlined mathematically, and their respective algorithms are presented. The Weighted Sum Model (WSM) is similar to Weighted Product Model (WPM); the only difference is that the WSM adds the products while WPM multiplies the products. Both models relatively weigh the criterion such that, given m alternatives and n criterion. The sum of all weight must add up to 100%, as shown in (1).

$$\sum_{j=1}^{n} weight\ of\ C_j = 1, where\ n\ is\ the\ number\ of\ criteria \quad (1)$$

WSM calculates the alternative Aj, as shown in (2):

$$A_i = \sum_{i=1}^{m} W_j a_{ij}\ for\ i = 1\ to\ m\ \ number\ of\ alternatives\ \ \&\ j\ is\ the\ index\ of\ criterion \quad (2)$$

WPM calculates alternative Ak, as shown in (3):

$$A_k = \prod_{i=1}^{m} a_{kj}^{w_j}\ \ for\ k = 1\ to\ m\ of\ alternatives\ \&\ j\ is\ the\ index\ of\ criterion \quad (3)$$

When comparing an alternative to another AK & AL, the calculation is conducted, as shown in (4):

$$P(_{A_K/A_L}) = \prod_{j=1}^{n} (a_{Kj}\ /a_{Lj})\quad ^{wj}\ for\ K, L = 1\ to\ m \quad (4)$$

In both WSM and WPM the best alternative is the one with maximum Ai.

WSM & WPM Algorithms

In this section, the paper presents the algorithms of WSM and WPM. In figure 3 the WSM algorithm is shown with two nested loops. In the first loop, the user enters the weights of criteria, and in the second nested loop, the user enters the weights of the alternatives. In 5th line of the algorithm, the score of the alternatives is calculated. The algorithm returns a list of alternatives where the head of the list is the best option, according to WSM.

In figure 4, WPM algorithm is presented. The algorithm is similar to WSM with one difference in 5th line. In WSM the score is summed, while the score in figure 4 is multiplied, and the weight of alternative is raised to the power of weight of criteria.

```
For j=1 to n (n: number of criterion)
        Enter w[j] (w: is weight of criteria)
        For i=1 to m (m: number of alternatives)
            Enter a[i,j] ‘ value of alternative
            A_ WSM _score[i]=w[j]*a[i,j]+ A_ WSM_score[i]
Return Sort A_ WSM _score[i] descending ‘highest score is best
```

Fig. 3: Weighted Sum Model (WSM) Algorithm.

```
For j=1 to n (n: number of criterion)
        Enter W[j] (w: is weight of criteria)
        For i=1 to m (m: number of alternatives)
            Enter A[i,j] ‘ value of alternative
            A_ WPM _score[i]= a[i,j] ^ w[j] * A_ WPM_score[i]
Return Sort A_ WPM _score[i] descending ‘highest score is best
```

Fig. 4: Weighted Product Model (WPM) Algorithm.

Compare AHP, WSM, WPM

To further explain, all three methods AHP, WSM, WPM, are compared in this section. The three methods are compared according to 6 axioms, seen in table III: all three have the same goal, which is ranking alternatives according to criteria. Second, running time (RT) where both WSM and WPM have M * N running time where N is the number of Criteria, and M is the number of alternatives. Regarding the implementation complexity, WPM uses Powers while WSM is only addition and AHP relays on matrix multiplication. The fourth axiom of comparison is the criteria. The criteria in AHP can be multiuser; on the other hand, in WSM and WPM can be single user. Criteria pair-wise comparison is available only in AHP, while WSM and WPM lack such a trait. The 6th axiom of comparison is available on all three AHP, WSM, and WPM.

Table 3: Comparison of AHP, WSM, WPM

Comparison Criteria	AHP	WSM	WPM
1. Goal: Rank alternatives according to criteria	Yes	Yes	Yes
2. Run Time	M X N	M X N	M X N
3. Implementation complexity	Matrix multiplication	Straight forward sum	Multiplication and use of power
4. Criteria	Many Users	static	static
5. Criteria Pair-wise comparison	Yes	No	No
6. Alternatives pairwise comparison according to criteria	Yes	Yes	Yes

Gale and Shapley Algorithm

In this section, The Gale–Shapley algorithm is discussed with detail. First, an overview is given about the algorithm, and the algorithm is shown and explained. The Gale–Shapley algorithm(Deferred Acceptance algorithm) is to solve a matching problem named the stable marriage problem (stable matching problem or SMP). The SMP is to find a stable match between two sets that are equal in size, and each set ordered their preference to the opposite set. The match is stable if the following two conditions:

1. There is an element A of the first matched set which prefers some given element B of the second matched set over the element to which A is already matched, and
2. B also prefers A over the element to which B is already matched.

In other words," Given n men and n women, where each person has ranked all members of the opposite sex in order of preference, marry the men and women together such that there are no two people of the opposite sex who would both rather have each other than their current partners. When there are no such pairs of people, the set of marriages is deemed stable" (Gale & Shapley, 1962), (Cseh & Heeger, 2019). The runtime complexity of the Gale–Shapley algorithm is O(n2), where n is the number of men or women.

In figure 5 and abstract view of the Gale–Shapley algorithm environment. Matching between two sets of men and women are being matched according to their preferences to each other. Each woman and man each have a preference list; further women "a" is to be matched with man 'B" according to her preference list. When a match is challenged, if two women matched to the same man, then the man's preference list is used to either approve or disapprove the match. In figure 6, the original algorithm suggested by Gale–Shapley is presented.

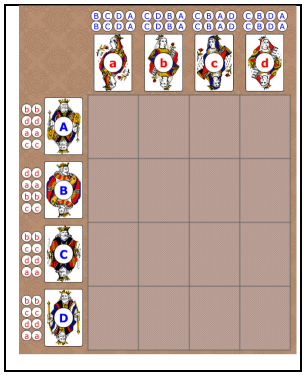

Fig. 5: an abstract view of Gale and Shapley

Function stableMatching (input m,w; output: matched-pairs)
Initialize all m ∈ M and w ∈ W to free
while ∃ free man m who still has a woman w to propose to
*w = first woman on **m's list** to whom m has not yet proposed*
if w is free
(m, w) become engaged- add to matched-pairs
else some pair (m', w) already exists
*if w **prefers** m to m'*
m' becomes free
(m, w) become engaged – add to matched-pairs
else
(m', w) remain engaged

Fig. 6: Original Gale and Shapley algorithm.

(Berkeley, 2019).

Uses of Gale- Shapley Algorithm

The algorithm of (Gale & Shapley, 1962) was introduced to solve a matching problem abstracted as a stable marriage problem, to solve College admissions. The algorithm was published by the researchers in Journal named The American Mathematical Monthly. The algorithm stresses the stability condition "A matching is stable if there is no pair of agents who would be mutually better off by forming a new pair, perhaps after abandoning their previous partners." The algorithm was applied in many variations and forms to solve the matching problem. The same algorithm in the year 2012 was awarded by the Royal Swedish Academy of Sciences, the Nobel prize of economics for Lloyd Shapley and Alvin Roth (NobelPrize, 2012). (Biró, 2017) listed more than 25 applications for the algorithm; all applications were related to matching two entities: student-college, doctors-hospitals, teacher-school, lawyer-firm, project-supervisor, refugees-camps, dating, dormitory-match, course-teacher, paper-reviewer, and contract-contractors. In the next section 0, E-GS, the suggested Extend Gale-Shapley algorithm is discussed.

The Suggested Algorithm Extended-GS (E-GS)

The suggested algorithm is based on WSM, WPM, AHP, and Gale-Shapley Algorithms hence named Extended-GS (E-GS) for short. E-GS is shown in figures 7 and figure 8. In figure 7 the E-GS is written in pseudo-code, and in figure 8 the algorithm is shown in the flowchart.

The first section of the E-GS is called Build-WSM_WPM_preference-list; the function's input is alternatives and criteria, and the output is ordered-preference-list-WPM and ordered-preference-list-WSM. The function has two nested loops that calculate the scores of each alternative, according to criteria. The calculations are conducted in lines 5-6.

The second section of E-GS is a function that produces a preference list according to the AHP method named Build-AHP-preference-list. The input of the function are alternatives and criteria, and the output is the ordered preference list. Function first builds a pair-wise comparison of the criterion matrix and conduct Eigenvector, explained in figure 1. Then the function builds a comparison matrix for alternatives according to criterion. Again, calls Eigenvector. Then produces an alternatives vector, which is multiplying an alternative matrix with criterion vector. The function returns a list of alternatives ordered in accordance with criteria.

The third function inputs are two preference lists applied to projects and project managers, and the output is a matched pair of projects to project managers. This section behaves like the Gale-Shapley algorithm of matching the project to the project manager according to criteria. In the main body of the E-GS, the functions are called, first three preference lists are built for projects according to criteria: list using WSM, list using WPM, and a list using AHP. Next, three preference lists are built for managers: one list for managers using WSM, a list using WPM, and a list using AHP. The last step is to call E-GS and conduct the matching using Automated preference stableMatching.

In the next section, the implementation of E-GS on Projects-PM is presented along with a basic data structure to be used in the implementation.

Implementation of E-GS

There are many implementations of E-GS. In fact, wherever there is a matching problem, E-GS can perform. As discussed before, the uses of the original GS student-college, doctors-hospitals, teacher-school, lawyer-firm, project-supervisor, refugees-camps, dating, dormitory-match, course-teacher, paper-reviewer, and contract-contractors. In the next section, E-GS is implemented on Assigning Project Manager (PM) to an IT project is presented.

Implementing E-GS On It Project Management Problem

Assigning the right personnel to an IT project is an art rather than science; the idea depends on the competence and skills of the personnel and the needs of the project itself. To match the right workers

with the right project is the essence of this problem. Personnel may have many skills required for a project; hence each personnel is related to a list of skills of knowledge: programming, security, hardware, operating system. The IT project, on the other hand, also requires skills of knowledge. Which makes matching the right skills of personnel with the needed skills of IT project a dilemma. Mismatching causes delays, frustration, over cost. Hence, the process of assigning the right project to the right person relay on the wets of the manager and how much does s/he knows about the different needs of the IT project and on how much s/he knows about the personnel.

Basic Data Structure

The data structure of the solution is composed of 4 suggested tables (table 4). The first table is for all criteria a manager will work with, as suggested in a database table named Criterion. The second table suggested is the preference's database table that holds all preferences codes with preferences name. The third table is the database table named personnel, which a database table that holds all data about the employee with the preference list. The fourth table is the project database table, which is a table that holds a project ID and name with a preference list pertaining to the project.

Table 4: Data structure of the solution

Criterion	Data Type
Criteria Code	Number
Criteria Name	string

Preferences	Data Type
Preference Code	Number
Preference Name	string

Personnel	Data Type
Emp. No	Number
Emp. Name	string
List of preferences	list
Projects Assigned limit	Number

Project	Data Type
Project ID	Number
Project Name	string
List of preferences	list

The Gale–Shapley algorithm requires that both matching sets are equal in numbers, as shown previously. Hence the number of women must equal the number of men, as shown in figures 5 and 6. Thus in the project management example, the number of projects must equal the number of project managers (personnel). To rectify such a dilemma, the structure above was suggested. The structure suggests having multiple copies of project managers (personnel). Hence the field Emp_No is not a primary key in the database.

Contribution and Analysis

The contribution of E-GS is to interlink two sides of decision making. The first side is the Gale–Shapley algorithm which, when given a preference list, will produce an optimum match between two sets. The second side is methods that build a preference list of alternatives, according to criteria. In Gale–Shapley algorithm preference list is the most critical element and is developed according to the user's feelings mostly. Hence, the preference-list is generated by the user without any criteria. The criterion in decision making is essential and structures the decision-making process. Having the preference-list built around criterion-alternative methods like WSM, WPM, AHP is more structured, fair, and logical. Henceforth, the researchers used the models WSM, WPM, AHP to build a preference-list made of alternatives in accordance with criterion. E-GS utilized the work of both sides and developed a much-needed step that liaison between the two sides.

Conclusion

E-GS is a proposed multi-criteria & multi-alternative algorithm that automates the process of building preference lists using three methods Analytic Hierarchy Process (AHP), Weighted Product Model (WPM), Weighted Sum Model (WSM). Then, E-GS feeds the preference lists to the Gale-Shapley algorithm to produce an optimum match. The automation process will save time, money, and effort.

Hence, a user can examine many scenarios before deciding. No known study has previously interlinked AHP, WSM, WPM methods with the Gale-Shapley algorithm to produce an optimum match. This study, therefore, contributes to the literature by interlinking two sides of decision making. The first side is the Gale–Shapley algorithm which, when given a preference list, will produce an optimum match between two sets. The second side is methods that build a preference list of alternatives, according to criteria. E-GS has been implemented on assigning a project manager to an IT project problem.

Function Build WSM_WPM_preference-list (input: Criterion, alternatives; output: ordered-preference-WPM, ordered-preference-WSM)

```
For j=1 to n (n: number of criterion)
        Enter w[j] (w: is weight of criteria)
        For i=1 to m (m: number of alternatives)
                Enter a[i,j] ‘ value of alternative
                A_ WSM _score[i]=w[j]*a[i,j]+ A_ WSM_score[i]
                A_ WPM _score[i]= a[i,j] ^ w[j] * A_ WPM_score[i]
Return Sort A_ WSM _score[i] descending ‘ordered-preference-WSM
Return Sort A_ WPM _score[i] descending ‘ordered-preference-WPM

Function Build-AHP-preference-list (input: Criterion, alternatives; output: ordered-preference-AHP)
        Build a pair-wise comparison matrix of Criterion
        call Eigenvector(Criterion Matrix, Criteria-Vector)
        Build comparison matrix alternatives according to each criterion
        For each c in Criterion
                call Eigenvector (Alternative matrix of criteria, Alternative Vectors)
        Build Alternative matrix according to criteria using Alternative Vectors
        Alternatives Vector=Multiply Alternatives matrix (NXN) by Criteria-Vector
Return ordered-preference-AHP =Sort Alternatives Vector in descending order

Function Automated preference StableMatching (p: projects, Emp: personnel, matched-pairs:p-emp)
        Initialize all p ∈ projects and Emp ∈ personnel to free
        while ∃ free project who still has a Personnel to propose to
                emp = first Emp on p's list to whom p has not yet proposed
                if emp is free
                        (p,emp)become matched – add to matched pairs
                else some pair (p', emp) already exists
                if emp prefers p to p'
                        emp' becomes free
                        (p, emp) become matched – add to matched pairs
                else
                        (p', emp) stay matched
%Build the Preferences list of the Project according to criterion
        Call Build WSM_WPM_preference-list (Criterion, personnel-alternatives-WPM, personnel-
alternatives-WSM)
        Call Build AHP_preference-list (Criterion, Personnel-alternatives-AHP)
%Build Preferences list of the Personnel according to criterion
        Call Build WSM_WPM_preference-list (Criterion, Project-alternatives-WPM, Project-alternatives-
WSM)
        Call Build AHP_preference-list (Criterion, Project -alternatives-AHP)
%Apply E-GS
        Call Automated preference stableMatching (Project-alternatives-WPM, personnel-alternatives-WPM,
return matched pair-WPM)
        Call Automated preference stableMatching (Project-alternatives-WSM, personnel-alternatives-WSM,
return matched pair-WSM)
        Call Automated preference stableMatching (Project-alternatives-AHP, personnel-alternatives-AHP,
return matched pair-AHP)
```

Fig. 7: The suggested algorithm E-GS pseudo code.

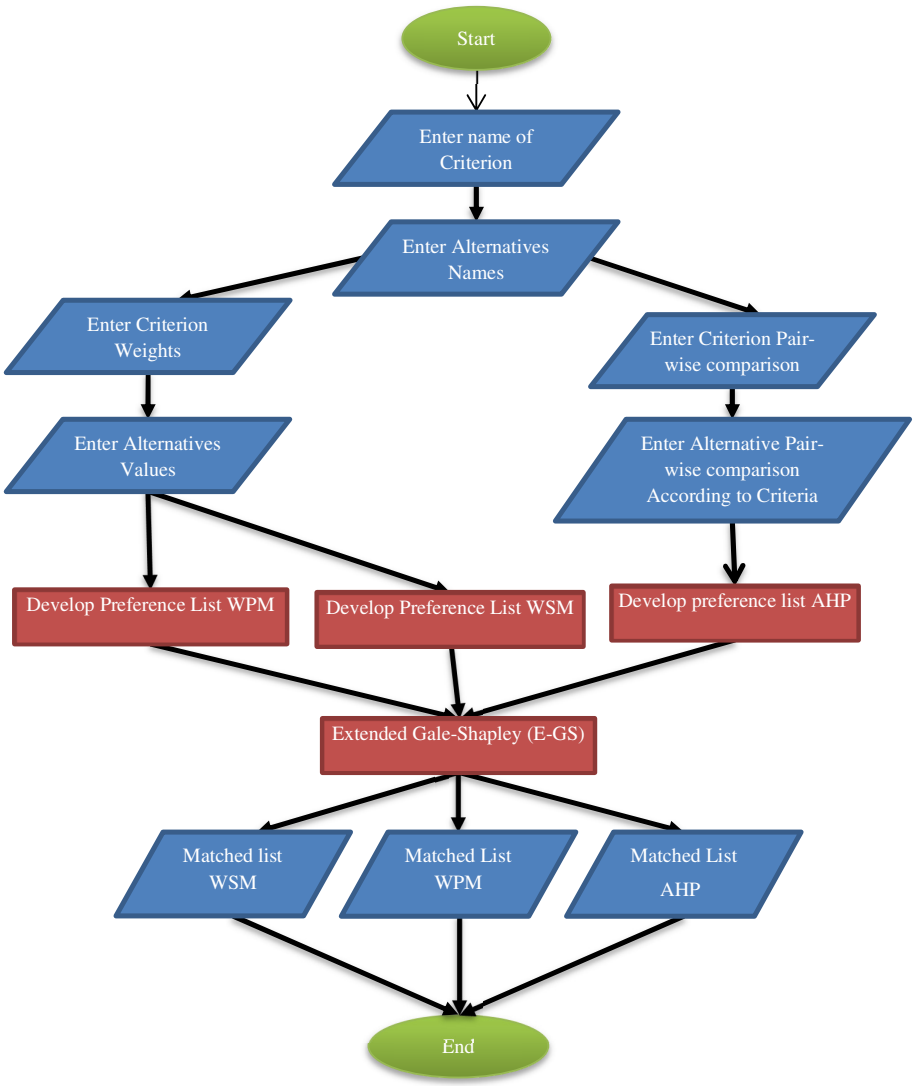

Fig. 8: Flowchart of E-GS.

Acknowledgment

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Financial and Non-Financial Information in Integrated Reports: Evidence from Poland

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Abstract

The aim of the article is to identify the information content, being the product of the accounting system, of the integrated report with a division into financial and non-financial information. The aim of the study was realized on the basis of an analysis of integrated reports published in 2013-2018 by companies listed on the Warsaw Stock Exchange. In 2013-2016, the number of companies publishing integrated reports both in traditional (in pdf) and interactive form increased. The number of companies publishing integrated reports decreased in 2017. The integrated reports contained mainly non-financial information. In most cases, the share of financial information in the integrated report did not exceed 20% of the total report length.

Keywords: Integrated Report, Financial Information, Non-Financial Information, Accounting System

Introduction

Information is an essential resource in an organisation that needs to be identified, processed and delivered in an appropriate form and on time to specific recipients. Information together with other elements, for example technology, form the so-called information system. The key information system used in business is accounting. Modern accounting system processes both financial and non-financial data and enables their presentation, and thus communication in the form of reports. A special form of reporting has recently been integrated reporting, which mainly refers to large organisations. The aim of the article is to identify the information content of the integrated report (IR), which is the product of the accounting system, with a division into financial and non-financial information. Discourse on the IR is conducted in science all over the world and it is essential also for business practice. Therefore, it is worthwhile to introduce this subject on the basis of the practice of a specific country, for example Poland, whose economy is relatively young, which is the contribution of knowledge to the studied issues.

Information as an essential resource of the organisation

Information is an important foundation of societies, economy, and therefore business. It should be treated as a resource that creates a dimension of the organization and shapes the course of its activities in the present and future (Adeoti-Adekey, 1997). Information, like other resources, requires appropriate registration, processing, storage, distribution and use. Therefore, information should be properly managed in order to benefit the business. However, it is not easy to define 'information'. It is indicated that it is an abstract phenomenon that is revealed between material objects. In such an approach, information can be treated as an idea analyzing it under various contexts, i.e. concepts related to: data, human understanding, communication, decision-making and human behavior, moreover to content and interpretation of information, and document and message for its

transmission (Palmius, 2005). A similar view is presented by Zorkoczy (1981), who perceives information "as the meaning that a human expresses by, or extracts from, representations of facts and ideas, by means of the known conventions of the representations used". In business, information is considered as a specific commodity most often in the form of reports. The content of this ‘intangible commodity’ is differentiated by certain criteria (e.g. expressed by source: internal and external information or by form: numeric and nonnumeric information) (Adeoti-Adekey, 1997). Information can have different meanings depending on its place in the organisation and the individual's function. Therefore specialists (e.g. bookkeepers and management accountants) will perceive information as data and managers as reports, and in both dimensions there is a third perspective on information, i.e. technology. These areas form a comprehensive information system. It consists of elements capable of obtaining and storing information (financial and non-financial), channels (IT systems) that disseminate it and units operating according to the information provided to them and responding to it taking into account the operational and strategic perspective of the organisation's functioning (Leek, 1997).

Accounting as an information system in an organization

Accounting can be defined as a subsystem of an information system covering the process of creating a specific range of information (Andrzejewski, 2006). Another definition that reflects more clearly the information function of accounting in business indicates that it is a system that provides quantifiable information, i.e. financial information about business units that serve to make decisions, including rational choices between alternative directions of action (Belkaoui, 2004). The indicated explanation mainly emphasizes the essence of financial information, which, taking into account economic trends (social and environmental responsibility), is not sufficient to manage modern business. Accounting is not only financial accounting, but also management accounting, which creates and provides non-financial information alongside financial information. In this connection, the so-called unity of the accounting system is emphasised. It is particularly visible in large organisations, which are often obliged to comply with International Financial Reporting Standards and have management accounting systems in place (Sobańska, 2012). Such a state of the art means the extension or integration of tasks for accounting professionals, including those typically of an operational nature and focusing on financial data processing and reporting, with activities of a strategic nature that take into account qualitative data and translate into integrated reports (Belfo and Trigo, 2013). Therefore, the modern accounting system differentiates between financial and non-financial information, which is created for specific needs of its users and then integrated into reports. Financial information is slightly easier to define than non-financial information, although sometimes the boundary between them is blurred. The former includes 'information in verbal or numerical form that presents the process, the economic phenomenon, including information necessary for an understanding, the process, the economic phenomenon and any other information in the financial statements about the reporting entity, its environment, the facts and factors affecting the reporting entity and its operations'. (Błażyńska, 2015). Non-financial information, on the other hand, is any information - descriptive or numerical, not necessarily expressed in a monetary measure - published (whether mandatory or voluntary) as part of the company's annual report, other than the financial statements and the auditor's opinion and report (Krasodomska, 2014).

Reporting as a part of communication of information from the accounting system

Reporting is the most frequent activity carried out by accounting specialists. They have to not only prepare reports in real time but also interactively. Reporting information as a form of communication of the accounting information system in an organization is becoming more and more important but also a complex task (Belfo and Trigo, 2013). So far, financial (external) reporting has been identified as an effect of financial accounting and internal reporting, the so-called management reports for internal needs of the organisation (Nita, 2015). In recent years, however, the organisation's reporting has become more complicated - both financial and non-financial. There has been a proposal to combine some social and environmental disclosures with financial disclosures in the form of collective reports, so-called integrated reporting. It is defined as "a process that ultimately ensures

maximum transparency in the organisation's communication in the form of a periodically published IR (...); the IR therefore provides a concise communication on the company's strategy, corporate governance, business performance and development prospects, in the context of the external environment, to create value in the short, medium and long term" (The International <IR> Framework, 2013).

Research Methodology

The IRs of 12 companies (for 2013-2016) and 10 companies (for 2017-2018), which are listed on the Warsaw Stock Exchange (WSE) in Poland, were studied. The companies under analysis operate mainly in the energy and mining sector, but also in the fuel and gas, banking, telecommunications and construction sectors. The research process included the following stages: (1) identification of the form of IRs and guidelines, constituting the basis for their preparation in 2013-2016 and 2017-2018, (2) verification of the information content (financial - non-financial information) of traditional IRs (in pdf) in 2013-2018.

Presentation of Findings

In 2013-2016, IRs were prepared by 12 companies listed on the WSE and in 2017-2018, 10 companies respectively. In 2013-2016, 27 IRs were published, including 19 in the traditional version (in pdf) and 20 in the interactive version. Moreover, 12 IRs were presented in both versions, while 8 reports were available only in an interactive version (Walińska et al., 2018). Between 2017 and 2018, 19 IRs were published, including 15 in the traditional (in pdf) and 17 in the interactive version. In both approaches, the IR appeared 13 times, and only 4 times in the interactive version. The IRs may be published by the analysed companies in Polish (according to the Global Reporting Initiative - GRI standards: most often G4 standard, while in individual cases they were G.3.1. or G5 standards) and English (according to the guidelines of the International Integrated Reporting Council - IIRC). In 2013-2016, the analysed companies published 23 IRs in both languages, while only 4 reports were available in Polish. In turn, between 2017-2018, 17 IRs in both languages (Polish and English) were separated, and 2 reports were presented only in English. In the next stage of the study, due to difficulties related to the analysis of the information content of IRs prepared in an interactive form, only reports prepared in a traditional form, i.e. pdf (if researchers also had access to these reports) were taken into account. In terms of report structure, i.e. identification of financial and non-financial information, 20 IRs for the years 2013-2016 and 13 IRs for the years 2017-2018 were analysed. Three models were distinguished in this respect, i.e. model 1 - (integrated report as a place of presentation of non-financial information, up to 20% of financial information), model 2 - (integrated report as a place of presentation in a similar proportion of financial and non-financial information, over 20% share of financial information), model 3 - (integrated report as an information area containing only non-financial information, from 0 to 3% share of financial information) (see Table 1).

Table 1: Three models of the Integrated Report of companies listed on the WSE in 2013-2018

Year	***Financial information - financial statements (full or simplified) and financial data prepared on its basis*** *in pages*	***Non-financial information*** *in pages*	***Total information*** *in pages*
Model 1. Integrated report as a place of presentation of non-financial information (up to 20% of financial information)			
LOTOS (A)			
2015	12	260	272
2016	10	174	184
2018	28	174	204
KGHM POLSKA MIEDŹ			
2013	24	282	306
2014	16	142	158
2015	19	156	175

Year	*Financial information - financial statements (full or simplified) and financial data prepared on its basis* *in pages*	*Non-financial information* *in pages*	*Total information* *in pages*
2016	15	199	214
2017	39	157	196
2018	19	185	204
AZOTY			
2013	16	152	168
2014	14	134	148
2015	12	130	142
2016	14	167	181
2017	14	167	181
LW BOGDANKA			
2014	14	130	144
2015	15	126	141
2016	19	191	210
2017	12	113	125
2018	11	118	129
BUDIMEX			
2016	9	113	122
2017	8	98	106
2018	6	98	104
ORANGE			
2017	13	147	160
2018	11	153	164
Tauron			
2018	23	286	309
Model 2. Integrated Report as a place of presentation in a similar proportion of financial and non-financial information (over 20% share of financial information)			
LOTOS (B)			
2013	107	362	469
2014	155	313	468
2018	71	121	192
ORLEN			
2015	103	248	351
2016	148	373	521
2017	93	227	320
2018	135	307	442
ORANGE			
2016	32	81	113
Integrated Report as an information area containing only non-financial information (0 to 3% share of financial information)			
ING BANK ŚLĄSKI			
2016	0 stron	215 stron	215 stron

Verifying the structure of IRs published by the surveyed companies for the analysed period, it can be pointed out that, from the point of view of their information structure, there were most reports compliant with model 1, i.e. an advantage in their structure of non-financial information over financial information. Separated model 2 of integrated reporting occurred less frequently in business practice, while model 3 of the integrated report appeared only in one case.

Conclusions

The analysis of the collected data indicates that from 2013 to 2016 the number of companies publishing the IR has been growing. A significant change occurred in 2017, when the number of

companies publishing the IR decreased. A vast majority of companies published the IR in two language versions - Polish and English. In 2018, two companies only published the IR in English. The reports were prepared according to GRI and IIRC guidelines. Most of the surveyed companies prepared their IR both in traditional (in pdf) and interactive form. Moreover, the reporting practice of companies listed on the WSE indicates that the IR is primarily a non-financial report. The financial information presented in the reports includes only fragments of the financial report and additional financial data prepared on its basis. In 2017-2018, there is a clear change in the information structure and reporting form. The IR becomes a report in which the share of financial information is significantly reduced - only in two companies (three reports) do they account for more than 20% of the total report content. Moreover, the results of study indicate that the reporting practice in the area of publication of the IRs in Poland was significantly influenced by Directive 2014/95/EU of the European Parliament and of the Council amending Directive 2013/34/EU as regards the disclosure of non-financial information and diversity information by certain large entities and groups. In the case of some companies, the IRs were replaced by a statement on non-financial information, less extensive as compared to the IR. Thus, the literature's predictions as to the direction of changes in integrated reporting were confirmed (e.g. Walińska et al., 2016).

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The Analysis of Electric Car Purchasing Intentions: an Empirical Research in Croatia

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Abstract

The aim of this paper is to analyze the influence of brand and ecological awareness on electric car purchasing intentions and to determine whether there are differences in ecological awareness and brand importance according to the different consumers' characteristics. Correlation analysis shows strong correlation between brand and ecological awareness in the process of purchasing the electric car in Croatia. Therefore, if customer has the higher level of ecological awareness then the car brand will have more impact on electric car purchasing process. On the other side, the regression analysis concluded that none of independent variables are significant for the customer when purchasing an electric car. That means neither brand nor ecological awareness has a significant impact on the customer when purchasing an electric car in Croatia. Considering that the research sample was relatively small, results of this research can be viewed only as an indicative. Recommendations for future researches should include the price, risk and value as variables, since it could potentially be the crucial aspect in electric car purchase decision making.

Keywords: Ecological Awareness, Brand Influence, Purchasing Intention, Electric Car.

Introduction

Today's consumers are increasingly aware that their buying behavior can greatly affect the environment (Wahid et al., 2011), so it is important to explore the impact of ecological awareness on consumer buying behavior regarding different product categories. Last couple of years, more and more authors have been writing about and analyzing consumer ecological awareness and its influence on purchase decision-making. The results of some research have shown that an eco-conscious customer is more likely to purchase environmentally-friendly products and that price and brand awareness image significantly impacts their decision to purchase environmentally-friendly products (Hussain et al., 2014). Lesser number of research focuses on understanding the customer awareness of environmental initiatives in the automotive industry and their perception toward buying environmentally friendly cars (Sharma and Maheshwari, 2014). The results of these surveys show that most of customers are familiar with the benefits of environmentally friendly cars and that the level of ecological awareness affects their car purchase. In addition to ecological awareness, the car brand is also significant determinant of

the car purchase decision-making. In various researches, it was concluded that the car purchase decision is strongly impacted by the car origin country (Wu, 2011), the brand of the manufacturer (Anisimova and Mavendo, 2010), and the attractiveness of the car brand as well as the level of loyalty of the car brand (Muhammad and Butt, 2012).

In this paper, research focus is finding out, how much car brand and ecological awareness impact on electric car purchase decision making in Republic of Croatia. Correlation analysis of customers' ecological awareness and car brand has been conducted. Following, it was analyzed the impact of car brand and the ecological awareness on car purchase.

Theoretical Framework

Analysis of brand impact on customer during the car purchase

The brand represents a key element that characteristically wise differentiates the product, whether it is the quality that characterizes that brand, some specific features which brand possesses, or perhaps connectivity or familiarity with that brand. According to Shamsudin et al., (2016), brand of the car plays a key role in the automotive industry and thus becomes the subject of numerous academic and professional researches. Despite the conducted researches, Wu (2011) concluded that customers make the ultimate purchase decision based on their own opinion, choice, preference, taste and personal demands. The same author raises the question of whether the brand is actually the decisive factor during the car purchase process.

Wu (2011), in his paper, emphasizes country origin of the brand and collectivism, that is, individualism as well as the car brand itself as an extremely important and significant factor when purchasing a car. Yet the results have shown that the car brand and brand loyalty do not present a decisive factor during car purchase process in the United States of America. By contrast, the research conducted in Japan and in Europe has shown that customers perceive brand loyalty highly during car purchase process. According to Narteh et al. (2012), automotive industry researches have shown that brand awareness, brand identity, brand image, availability, emotional link toward the brand, price, quality and brand relationships and ratios and car features have a significant impact on car purchase and a positive correlation with the customer car purchase intention as well. The results also suggest that consumers are willing to pay for the car brand where there is a certain level of familiarity present and when they have specific information and knowledge about the car, compared to the cars they do not know, or are unfamiliar with. The general conclusion is that the car brand, as well as everything that determines it, like brand image, country origin image, car quality, impacts costumers' car purchase. Setting up a positive relationship between customer and the car brand depends on the positioning the car brand deep into the consciousness of the customer. In a way, it is like trying to link customers' lifestyle with the brand identity and brand meaning (Nareth et al., 2012).

According to research conducted by Benoit-Moreau and Parguel (2011), ecologically themed communication, involving some brand cars, had positive impact within the automotive industry. Joining the car brand and ecological awareness strengthens the value of the car brand, but also customers' propensity toward the car brand. Following, Letchumanan and Sam (2016), conclude, that the customers will show higher level of propensity toward a more familiar car brand if there is a higher level of brand awareness and enterprise reputation connected to the observed car.

Analysis of the ecological awareness impact on the customer car purchase

According to Carrigan and Attalla (2001), ecologically aware customers, are mostly educated customers, which, from the beginning emphasizes their awareness in comparison to less educated customers. The common assumption is that without necessary awareness level, customers do not possess enough motivation for purchase of ecologically acceptable products. Because of that exact reason, authors such as Ginsberg and Bloom (2004), Meyer (2007) and Ottman (2008), think that companies should inform their customers and keep them aware of market trends through their own practices, which would automatically impact customer awareness level, and therefore purchasing intention. Sharma & Maheshwari (2014), consider Indian automotive industry to be one of the most

promising global automotive industries when it comes to ecological awareness. Accepting and adopting the ecologically labeled technology, as one of many marketing strategies Indian automotive industry managed to scale up their numbers which still grow on daily basis. Main cause of this results is differentiation and filtering of ecologically aware customers.

Previously mentioned authors came to conclusion that 15% of customers are willing to purchase ecologically acceptable car, and they are also willing to pay more for purposes of ecological contributions. Also, they discovered that 52% of customers declared themselves as ecologically aware and friendly oriented toward the environment. Those 52% would be ready to purchase ecologically acceptable car, but they simply lack the purchasing power. On the other hand, 25% of participants already owns ecologically acceptable car. Those 25% of participants have already paid for additional costs as an ecological contribution. Customers, expectedly, consider the ecologically acceptable car price to be the biggest issue and barrier when intending to purchase a car. Following, there are some other barriers involved, such as lack of critical infrastructure, unattractive car design, lack of ecologically acceptable products information and lack of service centers. Sharma and Sharma (2013) conclude that ecologically aware customers consider important ecological questions when making a car purchasing decision. Their criteria during decision-making process is based on ecological and natural sustainability. Results, also support hypothesis that ecologically aware customers have higher level of propensity toward electric car purchase. Sharma and Kesherwani (2016), emphasize that ecological awareness can be strengthen through educations, intrinsic motivation, change of attitude and customers' value perception. Also, customers that possess previously mentioned characteristics have positive electric car intentions, as well as other ecologically acceptable products. Research conducted by Suki (2013) shows that great responsibility lies in building a positive and ecologically aware corporate image, which should make customers to behave ecologically and environmentally responsible. Same author also believes that customers prefer ecologically acceptable product purchase if they are familiar with the company that offers those products. Fine example is Toyota where the company launched various series of ecologically acceptable cars using their environmentally friendly technology, which resulted in production of hybrid, electric and plug in electric vehicles (Delafrooz et al., 2014).

Higher level of ecological awareness and knowledge of ecological and environmental issues have direct influence on purchase intention, and ecologically acceptable car purchase as well (Afroz et al.,2015). Previous findings were confirmed in research conducted by Cheah and Phau (2011), where it was emphasized how important behavior of every individual is when it comes to resolving ecological and environmental issues, and how awareness and consciousness influences on willingness to pay and purchase intention of ecologically acceptable products. Research conducted by Afroz et al. (2015) imply that customers with high level of ecological awareness possess higher intention of purchasing the ecologically acceptable car, in comparison with customers which had low level of ecological awareness. Results provided in research by Egbue and Long (2012) show that electric car perception is correlated with the gender, age and education level of a customer. Same authors conclude that ecological sustainability and environmental preservation have strong impact on acceptability of electric cars, right after price and car performance constructs, which were perceived as most impacted variables. Also, the electric car batteries technology and energy source sustainability are considered to be biggest barriers and challenges toward electric car usage.

Lane and Poter (2006) analyzed two research projects which identify customers' behavioral issues toward ecologically 'pure' cars. First project was 'The Low Carbon Vehicle Partnership by Ecolane Transport Consultancy' which observed behavior and attitudes of customers toward cars with low CO2 emission, and the authors found that customers have low knowledge level of new technologies, environment impact and costs of owning such car. 'Open University's Design Innovation Group' researched key factors which impact customers' adjustments on 'pure' cars. Contrary to other researches, results of this study showed that environmental preservation issues had small impact on both B2B and B2C segment during car purchase decision making.

Research of car brand and ecological awareness influence on electric car purchasing intentions

Research Goals and Methodology

Goal of this research paper was to determine the influence of car brand and ecological awareness on electric car purchasing intention in Republic of Croatia, and analyze if there were any statistically significant differences in ecological awareness and car brand importance between various characteristic of research participants.

In order to achieve previously mentioned goals, quantitative research using questionnaire instrument was conducted. Questionnaire was distributed through various channels such as e-mails and social networks. Some of e-mail addresses was gathered from car saloons in Zagreb. Beside demographic information, other information such as hybrid and electric car usage experience, electric car purchases intention, ecological awareness and car brand toward car purchase (car brand on social status impact and car brand on car purchase impact) were collected.

Questionnaire used in this research was constructed using other relevant literature. For assessing ecological awareness of customers, Sharma and Mahesmaris' (2014) and Hussain et al. (2015) researches were used. Car brand impact on customers was taken and adjusted from researches conducted by Shamsudin at al. (2016) and Wu (2011), and determination of ecologically acceptable car purchase intention was taken from Henning and Karlsson (2011). Five degrees Likert scale was used to evaluate participants' level of agreement and disagreement with statements regarding car brand influence, ecological awareness and electric car purchase intention. The questionnaire was divided in four sections. First section contains socio-demographic aspects (gender, age range, education level, region, household size) and financial aspects (monthly household income and potential electric car purchase budget). Second section of research addressed statements regarding ecological awareness influence, while the third section include the influence of car brand during car purchase process. The fourth section examined the car purchase intention perception.

Data normalization was conducted using Levine test and graphical data, as well as skewness and kurtosis check, to insure the usage of parametric tests in data analysis process. All variables performed within allowed deviation limit, which provided enough support for conducting parametric tests according to Byrne (2016).

Sample

In this research participated 105 people from Croatia. There were 60,4% of female and 39,6% of male participants in the sample. The most participants were under 30-year-old, with income between 1.000-2.000 EUR and the budget for electric car 10.000-20.000 EUR (Table 1.)

Table 1: Socio-demographic sample characteristics

Gender	**Percentages**	**Cumulative %**
Male	40,0	40,0
Female	60,0	100,0
Age	Percentages	Cumulative %
Less and equal to 25	38,1	38,1
25 – 30	29,5	67,6
30 – 40	17,1	84,7
40 – 50	8,6	93,3
50 and more	6,7	100
Education	Percentages	Cumulative %
High school	31,4	31,4

Higher expertise	16,2	47,6
University education	37,2	84,8
MBA/PhD	15,2	100,0
Household budget	Percentages	Cumulative %
Less and equal to 1000 EUR	19,0	19,0
1000 – 1500 EUR	23,8	42,9
1500 – 2000 EUR	21,9	64,8
2000 – 2500 EUR	17,1	81,9
More than 25000 EUR	18,1	100,0
Electric car budget	Percentages	Cumulative %
Less and equal to 10000€	19,0	19,0
10000 - 15000€	30,5	49,5
15000 - 20000€	30,5	80,0
20000 - 30000€	17,1	97,1
More than 30000€	2,9	100,0

Research Results

Factor Analysis

The factor analysis was conducted to determine and define validity and reliability of observed constructs. Following, the reliability of ecological awareness scale was highly supported by *Cronbach alpha* coefficient level of 0,932 (eliability coefficient of 0,70 or higher is considered to be acceptable in most social science research) (Table 2). To conclude, the factor analysis of the ecological awareness construct was formed without first item, due to low saturation level on observed factor (0,375), and such construct was used in further data analysis.

Table 2: Factor analysis of ecological awareness construct

Item	**Factor saturation**	
	% variance extracted = 60,01	**Cronbach α= 0,932**
Ecological awareness of individual can highly contribute to environment preservation	0,375	
In general, I take care of environmental issues and energy preservation	0,624	
I am often worried about ecological issues	0,823	
I consider myself quite ecologically aware person and buy only ecologically acceptable products	0,683	
I consider myself ecologically aware person because of my own attitudes and believes	0,865	
I consider myself ecologically aware person because it makes me feel useful and satisfied	0,833	
I rather buy products which are known to be ecologically acceptable	0,575	
I often discuss ecological problems with my friends	0,614	
I support solving ecological problems, even if I have to give up some traditional daily activities	0,478	
I consider usage of electric cars is able to contribute environmental preservation	0,466	

During conducting factor analysis of brand impact construct, two factor structure was formed. Saturation of items, after first rotation points out the necessity of two factors existence. Therefore, items saturated on first factor indicate that newly formed construct measures brand influence on car purchase, and second factors' items measure car brand as a social status symbol. After first construct measurement, reliability score of *Cronbach alpha* coefficient was high (α=0,906) (Table 3). Similar results were present during reliability measurement of second construct (α=0,898) (Table 4).

Table 3: Factor analysis of car brand influence construct

Item	Factor saturation	
	% variance extracted = 52,98	**Cronbach α= 0,906**
I always purchase well known car brand	0,651	
It is important that I own a car which country of origin is well known for elite car production	0,650	
During car purchase I always look for car country origin	0,651	
I intend to buy only specific car brands	0,665	
I actively search specific car brands during car purchase	0,647	

Table 4: Factor analysis of car brand as a social status symbol construct

Item	Factor saturation	
	% variance extracted = 56,87	**Cronbach α= 0,895**
Extremely famous car brand represents a symbol of social status	0,677	
Owning a famous car brand improves my social status	0,747	
Car brand logo represents who I am	0,526	
Car brand ensures the quality of car itself	0,433	
Well known and expensive brand represents symbol of status for me	0,822	

After analyzing validity and reliability of purchase intention construct, results show one factor structure with 62,30% of variance explained. Reliability analysis of purchase intention construct resulted in high *Cronbach alpha* coefficient (α=0,934) (Table 5). To conclude, during data analysis process, all construct items were used.

Table 5: Factor analysis of electric car purchase intention construct

Item	Factor saturation	
	% variance extracted = 62,30	**Cronbach α= 0,934**
There is a high probability that I'll purchase an electric car in the future	0,752	
I would purchase an electric car if its' price would be the same as traditional car prices	0,483	
In comparison with other (traditional) cars, there is a higher probability that I will purchase an electric car	0,780	
I would purchase an electric car even if its' price is higher than traditional car price	0,676	

I would purchase an electric well known car brand even if its' performances were not as good as traditional cars' performances	0,655
I would purchase an electric well known car brand even if its' design isn't as attractive as traditional car design attractiveness	0,641
I intend to purchase electric car	0,721
It is very certain that I will search for information regarding electric cars during my next car purchase	0,625
I will probably support a friend and recommend him to purchase an electric car	0,587

Analysis of ecological awareness and car brand impact on electric car purchase

In order to determine correlation between observed variables, correlation analysis was conducted (Table 6). Correlation analysis points out that the strongest correlation is between ecological awareness and car brand influence (r=0,95; p<0,05). Correlations between other variables vary around moderate and weak intensity. Electric car purchase intention will be higher for the participants who perceive car brand as an extremely important factor during car purchase. Car brand as a social symbol will have moderate correlation with electric car purchase intention (r=0,46; p<0,05). Participants who have higher ecological awareness will also have higher car purchase intention level (r=0,44; p<0,05). Participant who expressed high level of ecological awareness will have less interest in purchasing car just as social status symbol (r=-0,27; p<0,05), which means that high ecological awareness correlates negatively and linearly with car brand as a social status symbol. Participant which perceive car brand as a social status symbol will correlate negatively with electric car purchase intention, which indicates that those participants won't be interested in electric car purchase.

Table 6: Correlation matrix of observed variables (p<0,05; **p<0,01)***

	Ecological awareness	**Car brand as a social status symbol**	**Car brand impact**	**Electric car purchase intention**
Ecological awareness	1	-,268**	,945**	,439**
Car brand as a social status symbol		1	-,295**	-,201*
Car brand influence			1	,461**
Electric car purchase intention				1

After the correlation analysis, the regression analysis was conducted (Table 7 and Table 8), which came up with the conclusion that there were not statistically significant impacts detected on electric car purchasing intention.

Table 7: Regression analysis of the electric car purchase model

Regression summary				
Model	*Multiple R*	*R-Square*	*Adj R-Square*	*Standard Error*
1	,467[a]	0,22	0,19	7,56

According regression summary analysis, it is concluded that electric car purchase model is not representative (*Adj R-Sq*<0,9), which points out that it is not possible to predict electric car purchasing intention using observed independent variables (Table 8).

Table 8: Regression coefficient table and coefficient significance

Regression coefficient table						
Model		Unstandardized coefficients		Standardized coefficients	*T*	*P*
		Beta	*SE*	*Beta*		
1	(Constant)	15,95	4,12		3,87	
	Ecological awareness	0,04	0,24	0,04	0,16	1,002
	Car brand as a social status symbol	-0,13	0,16	-0,08	-0,81	0,103
	Car brand influence	0,73	0,50	0,40	1,46	0,670

Testing the independent variables in the electric car purchase intention model resulted in insignificant impact of all independent variables.

Analysis of subsample differences regarding the ecological awareness level and car brand perception level

Additionally, analysis regarding various subsample differences were conducted. Participants' intentions, ecological awareness and car brand preferences were tested between gender, potential electric car budget and previous electric car experience. Series of *F-tests* and *Scheffe tests* were conducted. Testing results point out that women have higher average ecological perception than men, while men are more likely to show higher average brand importance perception than women, which means that brand car impacts more on man's car purchase intention than woman's. Mean scores also indicate that women have higher average purchase intention level than men. Statistically significant differences were found at construct of economical awareness, which concludes that women are statistically significant more aware when it comes to ecological issues than men (Md=-8,09; t=-4,59; p<0,05). Also, other empirical researches show that women are more sensitive on environmental issues and tend to support ecological problems in comparison to men (Ahmad et al., 2012).

Discussion and Conclusion

Conducted research has shown that there is a strong correlation between ecological awareness and car brand influence on purchasing intentions. Also, there is moderate correlation between car brand and electric car purchasing intention. These findings indicate that if customers with higher level of ecological awareness purchase car according to their beliefs (ecologically aware), it is more likely that these customers will also perceive a car brand as a very important factor during car purchase intention. Also, can be concluded that purchase intention will be more emphasized within customers which consider car brand very important. Correlation analysis detected moderately strong correlation between ecological awareness and electric car purchase intention constructs, which means that higher level of ecological awareness among customers could affect higher level of electric car purchase intention. To conclude, customers that consider brand as a social status symbol will consequently have lower level of ecological awareness, and therefore lower electric car purchase intention. The analysis of differences in ecological awareness and brand importance according to the different consumers' characteristics

point out that women have higher average ecological awareness than men, while men are more likely to show higher average brand importance perception than women, which means that brand car influence more on man's car purchase intention than woman's.

Regression analysis detected no significant influences of independent variables toward electric car purchase intention. Even though this analysis did not provide positive results, most of other relevant literature indicate that there is positive correlation between ecological awareness, car brand importance and car purchase intention. Following, some research conclude that high level of ecological awareness indicate ecologically acceptable car purchase, and also ecologically aware customers have higher chances of purchasing ecologically acceptable cars in comparison to those customers that are not ecologically aware (Afroz et al., 2015). Sharma and Mashesmari (2014) conclude that customers with high ecological awareness during purchase decision making process think about environmental issues and their purchasing criteria is based on ecology and natural sustainability. Thogersen and Ebsen (2019) find out that Danish car owners' intention to buy an electric cars increases with their attitude towards those cars and felt moral obligation to buy an eco-friendly car and decreases with increased perceived difficulty in use and feeling uncertain about electric cars.

Considering other product categories, it can be concluded that higher customer ecological awareness will impact to more positive environment oriented behavior in general (Gadenne et al., 2011). One of the most important challenges within customers' perception, when considering ecologically acceptable products is higher product price range. Marketing experts claim that the customers are, despite their beliefs and level of ecological awareness, still very sensitive when purchasing ecological products (Čut and Pandža Bajs, 2016). Previously mentioned authors (2016) conclude that customers' key criteria when purchasing ecological products is price, which is compared with similar and marginally satisfying brands. The study of Tarigan (2019) shows that individuals tend to support the eco-friendly cars when the technologies meet their expectations towards cost and safety, but the cost expectation is the most significant factor that results in the decision to purchase the eco-friendly cars. Also, some of the recent studies (Sefora et all, 2019) showed that the intentions to use electric cars were influenced by perceived usefulness, risk and value.

Cross branding and ecological awareness strengthens the values of brand itself and customers' loyalty toward that same brand as well, which can be partially linked with this research, where higher ecological awareness level within customer has positive correlation with brand importance and car purchase intention. This research emphasizes the importance of price sensitivity within customers during car purchasing process. Participants claim that they would be interested in electric car purchase if there was a significant price decrease. Following, they would purchase electric car if the price range was in the domain of traditional car price. Conclusion could be made, that electric car purchasing price and expected costs potentially have more influence on electric car purchase decision making than ecological awareness and car brand.

Considering that the research sample was relatively small, results of this research can be viewed only as an indicative. Recommendations for future researches should include pricing and costs variable, perceived risk and value, since it could potentially be the crucial aspect in electric car purchase decision making. Research conducted in other sectors indicate on price importance as one of the key factors influencing decision making. Those research also support ecological awareness and brand influence to have significant but not crucial impact on purchasing behavior.

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Rating Methodology for Kazakhstan's Energy Efficiency Projects

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Abstract

The level of requirements for thermal resistance of structures in Kazakhstan is significantly lower than the requirements imposed in EU countries with similar climatic conditions. The average data on heat consumption in the residential sector in Central Asia countries (230-270 kW * h / m^2) exceed this indicator in Europe (100-120 kW * h / m^2) and are comparable with Russia (210 kW * h / m^2). In general, the level of our lag in the degree of thermal protection of newly constructed buildings is 15-20 years. It is important to use the correct rating to obtain a complete and objective picture of energy efficiency indicators in the field of buildings and structures. This article provides an overview of indicators and rating categories for energy efficiency projects. Based on a study of best practices, the authors propose common and relevant rating assessment techniques that can be successfully applied in the economy of Kazakhstan. Assessment is based on rating systems, of which the following are most known: LEED (USA); BREEAM (UK); DGNB (Germany), each of which has a specific specificity and identifies various priorities.

Keywords: Energy Efficiency, Rating, Energy Savings, Environmental Management.

Introduction

In conditions of fierce competition in the world market, any country aimed at economic growth and development should take thoughtful and consistent steps to create optimal conditions for the development of the industrial sector. As the experience of developed countries shows, for the harmonious development of industry it is necessary to take into account energy efficiency indicators. Today, the energy intensity of industry in Kazakhstan is 4-5 times higher than in European countries. The energy intensity index of Kazakhstan's GDP in the world ranking is 1.9, while the indicator of Japan, for example, is 0.1, and that of Germany is 0.16.

As you know, to reduce the energy intensity of GDP of the Republic of Kazakhstan by 40% by 2020, a comprehensive energy efficiency plan was developed and adopted. The implementation of this plan will make it possible to obtain positive shifts in this area and obtain additional advantages and benefits in the form of financial resources due to more efficient use of energy in industry. The potential is comparable to the increase in production of all primary energy resources and is estimated at 20-30% reduction in energy demand in Kazakhstan and 35-40% in Kyrgyzstan.

An important part of this plan is the implementation of standards for assessing energy efficiency of projects, including in the field of construction. Such a measure is necessary because the concept of energy efficiency is associated with a large number of diverse and rather complex factors and processes, which determines the need for analysis of the definition itself, which could fully reflect all the necessary aspects of this phenomenon. It is important to distinguish between the concepts of energy efficiency and energy conservation, which are often mistakenly identified.

According to the Law of the Republic of Kazakhstan "On Energy Saving and Energy Efficiency Improvement" dated January 13, 2012 No. 541-IV ЗРК, these concepts indicate:

- energy efficiency (energy efficiency) - characteristics that reflect the ratio of the beneficial effect of the use of energy resources to the costs of energy resources produced in order to obtain such an effect;

- energy saving - the implementation of organizational, technical, technological, economic and other measures aimed at reducing the amount of energy resources used.

The creation of a better regulatory framework for energy conservation is one of the main mechanisms for improving energy efficiency. At present, Kazakhstan has several dozen state standards for industrial equipment, machinery, and appliances that can be attributed to energy efficiency standards. A number of regulatory documents on energy audits and energy certification have been developed, which reflect energy performance indicators.

In Kazakhstan, energy saving and improving energy efficiency in all sectors of the economy are currently a priority task, the solution of which will solve a complex of problems - energy, environmental, economic and social.

On January 13, 2012, No. 541-IV ЗРК, a new Law of the Republic of Kazakhstan "On Energy Saving and Improving Energy Efficiency" was adopted. The law was adopted in place of the previous Law on Energy Saving. The new law defines the concept of the State Energy Register - a systematic collection of information on business entities consuming more than 1,500 tons of fuel equivalent per year, or 2 MW of installed capacity.

So, following the global socio-economic trends, Kazakhstan, like many countries of the West and East, has joined the international environmental movement and is now taking its first steps on the road to sustainable development. Confirmation of this is the Strategic Development Plan of the Republic of Kazakhstan until 2020. According to this document, which as a whole does not change the general trend, Kazakhstan seeks to reduce the energy intensity of the economy (according to the Strategic Plan by 25%) and carbon emissions (in accordance with the obligations under the Kyoto Protocol - by 15% by 2025 and by 25% by 2050).

Today, the energy intensity of Kazakhstan's industry is 4–5 times higher than in European countries. The energy intensity index of Kazakhstan's GDP in the world ranking is 1.9, while Japan's indicator, for example, is 0.1, and Germany's is 0.16. In this direction, the experience of developed countries, that already have positive experience in energy efficiency management, is very interesting.

We believe that Central Asia countries need to adopt a national standard in the field of energy efficiency. As example, the countries of the Eurasian Economic Union adopted a technical regulation on energy efficiency of energy-consuming devices in 2019. A national standard for energy efficiency is necessary to establish a universally recognized scheme for integrating energy conservation into their management practices for organizations and it can be based on a number of standards from different countries.

In the field of energy saving and energy efficiency in buildings, the republican building standards "Energy Consumption and Thermal Protection of Civil Buildings" are in force SN RK 2.04-21-2004, SN RK 2.04-04-2011 "Thermal Protection of Buildings".

The classification and standard values of the specific characteristics of the consumption of thermal energy for heating for residential and public buildings, the form of the energy passport of the building in SN RK 2.04-04-2011 are identical to Russian standards.

The European Union is a leader in environmental standards applicable in Kazakhstan. In the practice of technical regulation of energy efficiency in the EU, two main methods are used - labeling energy efficiency and establishing requirements for eco-design of products (environmentally-friendly design).

On the basis of financial, technical, environmental and social indicators, methodologies for environmental assessment of building construction have been developed in various countries, of which the following are best known: LEED - a guide to energy and environmental design (USA); BREEAM - environmental impact assessment method (United Kingdom); DGNB - certificate of sustainable construction (Germany), Standard STO NOSTROY 2.35.4-2011 - Residential and public buildings. Rating system for assessing the sustainability of the environment (Russia) and others. The financial indicators for assessing the construction of a building are described in the cost-optimal methodology concept, which became widely used after the adoption of Directive 2010/31 / EC on the energy performance of buildings. This methodology is discussed in various studies: Araujo et al. (2016), Ascione et al. (2016), Atanasiu et al. (2013), Ballarini et al. (2017), Becchio et al. (2015), Hamdy et al. (2017), Hamilton B. A (2010), Enseling and Loga (2013), Gurgun A.P. and Arditi D. (2018), Leutgöb and Rammerstorfer (2013), Miller (2014), Ortiz et al. (2016), Pikas et al. (2015), Tadeu et al. (2016), Tabunshchikov et al.(2013), Tleppayev (2019). Based on previous standards and studies, a rating metodology for Kazakhstan's practice was developed to assess the attractiveness of energy efficiency projects.

Materials and Methods

As a study of the best practices in the field of improving energy efficiency shows, the investment attractiveness of energy efficiency projects depends on the use of various assessment tools that contribute to the formation of objective and relevant forecasts for investors. The current practice of development of the economy of Kazakhstan indicates the need to develop this issue and apply project evaluation methods that take into account the particular development.

In world and Russian practice, several methods and indicators of economic and financial evaluation of energy efficiency projects in buildings are widely used: simple payback period or rarely used inverse of the average annual income per unit of capital investment; an indicator of the net present value and its derivative characteristics: profitability index, internal rate of return, payback period simple when discounting costs, etc .; energy saving cost; life cycle cost of a building. Each of these indicators has its own advantages and limitations on its use. The first two indicators are widely known and are often used to justify measures to improve energy efficiency, including and in buildings.

The life cycle cost of a building is the total discounted cost of owning, operating, repairing and disposing of a building or complex of buildings over a period of time. The concept of life cycle costs has been known for a long time. However, in relation to buildings, it has become actively used relatively recently - after the adoption of the EU Directive 2010/31 / EC on the energy performance of buildings, which requires EU members to set energy efficiency requirements not lower than economically optimal levels. To determine such levels, states are obliged to use a framework methodology that is fully based on the concept of the costs of the building's life cycle.

In addition to assessing the initial costs of building the building, all future costs associated with its operation, repair and subsequent demolition are taken into account. The sum of all costs associated with the construction and operation of buildings is "the cost of the building's life cycle". Optimization is carried out according to the criterion of minimizing the total life cycle costs of the building for the builder, owner and society, including the requirements to reduce environmental damage and reduce greenhouse gas emissions. Analysis of the life cycle cost of a building can be carried out for buildings of any type - existing and new, residential and public, individual and multi-unit.

The discount factor significantly affects the indicators of economic efficiency of projects. Its high value leads to a rapid depreciation of future income and underestimates the positive cash flow, and hence the economic effect of the project. A package of measures is cost effective if the net present value of the revenue stream calculated with a given discount factor is greater than zero, or the discounted income is greater than the discounted cost. In substantiating investment projects, two approaches are used: calculating cash flow at current prices and at comparable prices. In the first case, the refinancing rate is often used as a discount coefficient in economic analysis, and in the financial analysis, the market interest rate on long-term loans. In comparable prices - the interest rate taking into account the level of inflation.

Along with financial indicators, many non-economic variables are used in assessing the construction of a building. So, the green building assessment is based on rating systems, of which the following are best known: green building certification programs LEED - The Leadership in Energy & Environmental Design (USA); BREEAM - Building Research Establishment Environmental Assessment Method (United Kingdom); DGNB - certificate of sustainable building (Germany), etc.

Results

The methods LEED, BREEAM, DGNB are based on a rating system and are applicable to various types of buildings. Certification by this system allows you to evaluate and determine the "rating of environmental friendliness and energy efficiency." As you know, with a rating score, points are summed up subject to certain engineering and organizational as well as organizational measures, while points are grouped into certain sections.

BREEAM evaluation includes the following criteria:

- management (construction process management, building management after commissioning, etc.);
- energy (reduction of CO2 emissions, use of renewable energy sources, etc.);
- water efficiency (use of gray and rainwater, meters, leakage control, etc.);
- efficient use of the building site and the environment (taking into account the ecological value of the territory, the use of previously contaminated lands, etc.);
- health and environmental well-being (natural ventilation, comfortable thermal conditions, etc.).

The following categories are subject to LEED assessment:
- sustainable development of the territory,
- water efficiency
- energy and atmosphere,
- materials and resources,
- the quality of the internal environment,
- application of innovations in design.

Summarizing the above, we can describe characteristics of the green building assessment system, which is shown in the table 1 below.

Table 1: Example of assessment according to the system of green standards

Element	Content
Sections	Adjacent territory, Water use efficiency, Energy and microclimate of the building, Materials and resource base, Indoor air quality, New project strategies and innovations
Evaluation Techniques	Sections contain a different number of requirements - according to compliance with these requirements, the evaluated project receives credit points. The system is designed so that even one missed requirement does not allow certification of the object. The final certificate is determined by the total amount of these points on a flexible certification scale and has several gradations.
Evaluation Schemes	New construction; Maintenance of already constructed buildings; Commercial space Interior design; Fine finishing of buildings; Schools Trading areas; Healthcare facilities; Residential Properties; Development of suburban housing construction (cottage villages); Offices Integrated Residential Areas
Categories	Ensuring environmental sustainability of projects; Efficient use of water; Energy and the impact of energy use on the atmosphere; Materials and resources; Creating a favorable atmosphere inside the building; Application of innovation in design

Source: Gurgun A.P., Arditi D. (2018), Hamilton B. (2010)

When evaluating energy efficiency, rating categories are also taken into account, which allows a more complete and objective assessment of the energy efficiency of projects: “Energy Saving and Energy Efficiency”, “Alternative and Renewable Energy”, "Economic efficiency".

Table 2 shows a comprehensive approach to assessing energy efficiency of Kazakhstan’s projects, which allows to obtain significant cost savings when implementing a whole set of measures aimed at improving the identified indicators. As can be seen from the table, an integrated approach to assessing energy efficiency allows you to get positive results, which vary significantly depending on the parameters and evaluation criteria.

Table 2: Rating criteria for evaluating energy efficiency projects

Criterion	Parameter
Energy Saving and Energy Efficiency	
Thermal energy consumption for heating and ventilation of building	Saving thermal energy is achieved through energy-saving measures in the heating system.
Power consumption	Specific energy consumption for lighting common areas relative to the standard indicator and the use of energy-efficient lighting
Primary energy consumption for engineering systems	Energy efficiency of equipment according to EU standards
Consumption control	Availability of an automatic heat station and individual control and regulation of heat consumption
Sustainable and ecological development	
Use of recycled resources	Use of recycling systems (ventilation with heat recovery, etc.)
Use of renewable resources	Application of a heat transfer system for hot water supply
Automation of flow control processes	Application of automatic lighting, humidity and air exchange control systems
Conformity to norms of light comfort (building insolation) and humidity	Conformity of insolation to normative coefficients of natural light and observance of distance between buildings according to Kazakhstan's standards
Quality of waste collection and recycling organization	Availability of separate waste points within a quarter
Cost effectiveness	
Life cycle cost of the building per m^2 of the building at NPV>0	Total discounted cost of ownership, operation, repair and disposal of the building over a period of time to the corresponding value for the analogue or benchmark facility
Cost per annum operating costs per m^2 of building	Ratio of the average annual cost of a residential building operation to the cost of a similar object or benchmark
Payback period	Comparison of the payback period in relation to an object-analogue or benchmark

Source: Authors research based by Miller (2014), Tabunshchikov et al.(2013), Standard STO NOSTROY 2.35.4-2011

According methodology, great weight should be given to energy efficiency indicators, since they are directly related to environmental criteria, since saving heat and electricity leads to a reduction in emissions of combustion products into the atmosphere. Depending on the number of points summarized in the analysis of the project, it should be assigned a class of energy and environmental efficiency by analogy with the European energy efficiency labeling system for buildings A – G.

This methodology can defines a rating system for assessing the sustainability of the human environment that meets the goals of the present generation in meeting its needs in a comfortable living environment and performing public functions through the use of residential and public buildings without reducing the level of such an opportunity for future generations. The requirements of the rating system are aimed at reducing the consumption of energy resources, the use of non-traditional, renewable and secondary energy resources, rational water use, reducing harmful environmental impacts during the construction and operation of the building, including the local area, while ensuring a comfortable human environment and adequate economic profitability of architectural , design and engineering solutions.

The requirements of national standards, construction and sanitary norms, rules and methodological documents, as well as the main provisions of foreign rating systems for evaluating LEED (USA), BREEAM (Great Britain), DGNB (Germany) and HQE (France) should be also considered.

Conclusions

A rating methodology allows to:

1) Allow, based on the data obtained, to plan measures to eliminate the most inefficient indicators;

2) Reflects the multidimensionality of the measurement of the project energy efficiency indicator

The use of an integrated approach in matters of rating assessment of energy efficiency indicators is based on the following provisions:

- at the present stage, considerable foreign experience has been accumulated in the development and practical use of rating systems for energy efficiency of projects, which allow taking into account features and specifics, based on a complete and relevant assessment;

- assessment of green construction is based on rating systems, of which the following are most known: LEED (USA); BREEAM (UK); (Germany), each of which has a specific specificity and identifies various priorities. That is why it is important to fully understand the specifics of the application, as well as the results that can be obtained and used in the future to achieve the set goals depending on the project.

At the present stage, there is a large list of energy efficiency indicators for buildings, which includes 5 main groups, within which indicators are distributed into subgroups.

Using an integrated approach to assessing energy efficiency allows you to get significant returns in accordance with a variety of parameters and criteria. What is especially important in conditions when obtaining some data may be difficult or distorted as a result of various phenomena and circumstances.

With the harmonization of various standards, as in the case of this study, it is justified to use an integrated approach, which allows, in the absence of some data, to vary and get the big picture, in which you can compare rating indicators by common standards.

In Kazakhstan, the relevance of the proposed approach is especially felt when working with residential facilities. This is due to the fact that usually such buildings have a large number of owners, and decisions are taken for a sufficiently long period.

The authors see the solution of issues and problem situations in the field of housing in an effective rating system, which could clearly show the main problems in terms of indicators. And this in the future allows us to offer effective solutions with an optimal price-quality ratio to increase the energy efficiency of a residential property. This can be the basis for the development of project work that is fully justified and has evidence of high economic return.

The economic return on projects in existing and new buildings, in our opinion, depends on the creation of energy efficiency programs for overhaul and subsidies from the budget for the overhaul of energy-efficient projects; creation of revolving funds for energy conservation and business development of energy service companies; developing standardized banking products to finance energy efficiency programs.

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Institutional Option Concept in Assessing Quality of Institutions

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Abstract

We suggest a new approach to assessment of institutional quality - the institutional option concept. It's based on modern institutional theory principles and new problem-oriented research paradigm. This viewpoint reveals the role of institutions in decision making of economic actors. We assume that institutions help actors to find different de jure or de facto variants of problem solving. It allows us to implement problem-oriented approach to institutions quality assessing. We develop new quantitative assessing model, based on matrix methods and conclude with practical value of the concept to show its advantages.

Keywords: Institutions; Institutions Quality; Institutional Option; Institutional Environment; Institutions Assessment.

Introduction

Currently, a quantitative assessment of the institutions quality is one of the most methodologically complex problems in the institutional economy. At the same time, the significance of such assessments cannot be overestimated; the institutional factor is recognized as key in the development system of both national economies in general and individual sectors. The existing gap between the methodological capabilities of modern institutional research and the objective requirements of the economic reality determines the high relevance of the search for possible solutions to this problem.

As you know, sociologists are of the opinion that institutions are stable patterns of social interactions that structure a society, they determine the behavior of individuals, and in terms of philosophy they are identified with necessity (Kirdina, 2001, 2008). Economists, on the contrary, adhering to the principle of methodological individualism, believe that the whole owes all its properties and patterns of behavior to its parts (individuals), and does not have any independent properties (Platonov, 1997; Olejnik, 2005; Nureev, 2010; North, 2010). From this point of view, institutions are the result of free choice of an individual or freedom in terms of philosophy. In this light, the conclusions of scientific studies made by the famous Nobel Laureate Huerta de Soto (2008) are interesting in which he claims that the principle of objectivity is limited, since economic phenomena do not exist outside the subjective interpretation and subjective knowledge of specific individuals. The theory of institutional

coercion proposed by him reflects the presence of institutional aggression against individual freedom in scientific research.

An attempt of a scientific search for a compromise between the identified opposing principles of the modern institutional research was the original concept of an institutional option, proposed by us to the scientific community in (Podshivalova, 2014a, 2014b). This article presents its economic and mathematical modeling, which allows attributing this concept to empirically feasible.

Problem Formulation

The purpose of this study is the development of methodological tools for assessing the institutions quality and the institutional environment of various carriers, based on the original concept of an institutional option. Let us briefly outline its main points.

1) The concept is based on a problem-oriented research paradigm, which suggests that the analysis of the institutional environment of a carrier is carried out through the prism of the problems it faces. Institutions and tasks relate to each other as plurality to plurality - one institution for many tasks and one task can be solved using several institutional technologies. An institutional option manifests itself in the second case.

2) Along with the institution, there is an opposite technology for solving the task - non-institutional behavior. Therefore, methods for solving tasks by individuals are institutional by nature and non-institutional. In the case of an institutional option, we mean only the first type. The second technology for solving the problem - non-institutional behavior. It is due to the fact that along with the necessity (in our context, institutions), there is always freedom of choice at the individual level. And this freedom can ultimately lead to the emergence of new institutions through evolutionary means.

3) The concept is based on two main categories, i.e. “institutional option”. This is a set of alternative options for the institutional solution of the task that are available to the economic agent and used by him to coordinate his actions. “Institutional link” is a set of interconnected formal and informal institutions, which is used by economic agents to solve a specific task, achieve a specific goal. In other words, an institutional option characterizes the possibility of a choice for an economic agent from a variety of options for institutional links.

We are going to define the initial limitations of the mathematical modeling of an institutional option.

1) The setting of a carrier task affects the breadth of the option. The wider the task is, the wider the option is. This dependence must be taken into account during the initial “tuning” of the mathematical model.

2) To expand the possibilities of a mathematical modeling of the option, we introduce the concept of a homogeneous link into the model. A homogeneous institutional link consists of one institution, and includes cases when actors use the “clean” version of the institution without combining it with other formal or informal rules.

3) Institutions cannot be analyzed without semantic content, thus it complicates the process of their quantitative assessment. Despite this, the mathematical model of the option cannot ignore the semantics of the original institutions-elements.

4) When assessing the quality of an option, it is also necessary to consider its sufficiency. It is important to separate the de jure sufficiency of the option from the de facto sufficiency. The latter is the actual choice of actors, realistically observed behavior, reflecting the significance of existing institutional links for the environment carrier. The de jure sufficiency of an option describes the demand for institutional links expected by lawmakers, which they put into the established formal institutions. If we are talking about links with the participation of informal institutions, then the de

jure sufficiency of an option will reflect the demand for such links, which legislators would like to see.

5) The hierarchy of institutional systems imposes one more requirement on the mathematical model of an institutional option. It should include links consisting of institutions of the same order. For example, the institution of tax regulation is an institution of the first order, specific tax regimes and benefits are of the second order.

Thus, a mathematical model that takes into account all the basic properties of the option — breadth, hierarchy, relevance (sufficiency) and semantics — can quantify its quality as a whole.

Economic and Mathematical Model of An Institutional Option

An institutional option as a structural element of the institutional environment cannot be described in isolation from its carrier; therefore, we define small firms as an example of this.

Mathematical modeling of an institutional option taking into account the presented requirements is possible in the categories of linear algebra. This implies the construction of the matrix S of the size mxn, where m is the number of possible links from n institutions-fillers. Each element of the institutional option matrix s_{ij}, i=$\overline{1, n}$; j=$\overline{1,m}$ can take only two possible values: in the absence of the institution i in the link j - 0, in the presence - 1.

Then the j institutional link, subject to the given order of numbering of institutions, can be written by the vector s_j:

$$s_j = \begin{cases} 1, \text{if i institution is present in the link} \\ 0, \text{if i institution is absent in the link} \end{cases}$$

Accordingly, the institutional option S can be described by the matrix:

$$S_{m\times n} = (s_{ij}), \tag{1}$$

where $s_{ij} = \begin{cases} 1, \text{if i institution is present in the j link;} \\ 0, \text{if i institution is absent in the j link.} \end{cases}$

The number of possible links m for the case of coherent institutions - there are no restrictions on the combination of institutions among themselves - is determined by the formula (2):

$$m = 2^n - 1 \tag{2}$$

A graphic and tabular version of the option description is possible if it is described by the distribution law of a discrete random variable, because the number of links m is finite and can be predetermined according to (2). For this, it is necessary to determine the distribution of small enterprises among m possible institutional links that they used to solve a specific task. In this case, the option can be described by the tabular method, in which the frequency $p_j$of the institutional link $s_j$is determined according to (3). And the resulting vector $P_m = \{p_1;\ p_2; p_3 \dots p_m\}$ is a quantitative description of the *de facto option sufficiency*.

$$\mathrm{p_j}=\frac{\mathrm{W_j}}{\mathrm{W}},\ \ \sum_j^m p_j = 1,\ \ 0 \le p_j \le 1 \tag{3}$$

where w_j is the number of small firms that use the j link to solve the problem,
W is the number of surveyed small firms that are solving this problem.

To describe the *de jure option sufficiency* mentioned above, we propose using the vector of significance assessments (expected demand) of the institutional links of the option from the position

of public authorities - $V_m = \{v_1;\ v_2; v_3 \dots v_m\}$, with $\sum_j^m v_j = 1,\ 0 \le v_j \le 1$, the limit on the bit depth of the vector elements is up to thousandths.

The specific values of the de jure option sufficiency depend on the goals of the state policy in the area under study or the strategic objectives set for the near future. From our point of view, they can be determined by expert assessment method. The role of experts may be taken by civil servants of ministries and departments directly in contact with the problematic "field" of the option in question. The establishment of zero significance is permissible (for example, for links with institutions of a shadow orientation).

Assessment of the quality of institutions and institutional environment

Knowing the matrix of the institutional option of the studied problematic "field" described in accordance with (1), as well as the vectors of two types of sufficiency $V_m = \{v_1;\ v_2; v_3 \dots v_m\}$ and $P_m = \{p_1;\ p_2; p_3 \dots p_m\}$, you can solve the problem of assessing the quality of specific institutions, the option as a whole and the institutional environment of a particular carrier. We propose to consider a measure of quality the degree of the gap between the de facto sufficiency and de jure one of the corresponding level of analysis object - the element institution, option, institutional environment.

To assess the quality of the institution, it is necessary to "switch" the level of analysis from the institutional link to its constituent elements, as the elements of each of the vectors $V_m = \{v_1;\ v_2; v_3 \dots v_m\}$ and $P_m = \{p_1;\ p_2; p_3 \dots p_m\}$ describe the significance of the option link rather than a separate institution. For this purpose we propose to form new matrices $Q_{m\times n}$and $U_{m\times n}$ based on the original matrix of the institutional option $S_{m\times n}$ and the vectors $V_m$and P_m. The first matrix $Q_{m\times n}$ should reflect the demand for the de facto institution. Its elements are determined by the formula (4) for the cases when the absolute number of small firms using the j link is known:

$$q_{ij} = \frac{s_{ij} \cdot w_j}{\sum_j^m s_{ij} \cdot w_j} \tag{4}$$

or (5) - for the cases where the frequencies of links use are known:

$$q_{ij} = \frac{s_{ij} \cdot p_j}{\sum_j^m s_{ij} \cdot p_j} \tag{5}$$

An important addition to the elements definition of the matrix $Q_{m\times n}$ is the restriction on bit depth: the elements q_{ij} must be rounded to the hundredths, so that using the institution in a link of less than 5 cases per 1000 is logically considered to be zero.

The second matrix $U_{m\times n}$ is designed to take into account the de jure sufficiency of the institution. The de jure elements of the matrix $U_{m\times n}$are determined by the formula (6):

$$u_{ij} = \frac{s_{ij} \cdot v_j}{\sum_j^m s_{ij} \cdot v_j} \tag{6}$$

It should be noted that for the formation of the matrix $U_{m\times n}$ it is necessary to comply with the condition of the denominator of formula (6) inequality to zero. This means that when determining de jure demand for institutional links, experts need to use values less than 0.005 for situations of undesirable combinations of institutions.

One of the options for the mathematical assessment of quality, both of a separate institution and of the option as a whole, can be a measure of the gap between the two types of sufficiency described by the de facto $Q_{m\times n}$ and de jure $U_{m\times n}$. matrices. To measure the gap measure, we suggest constructing a new matrix $R_{m\times n}$ according to (7):

$$R_{m\times n} = (r_{ij}), \text{ where } r_{ij} = \begin{cases} \left(1 - \frac{q_{ij}}{u_{ij}}\right), u_{ij} \neq 0; \\ 0,\ u_{ij} = q_{ij} = 0; \\ q_{ij},\ u_{ij} = 0, q_{ij} \neq 0. \end{cases} \tag{7}$$

Based on the obtained gap matrix R, one can calculate the quality coefficient of an individual institution QI_i according to (8):

$$QI_i = \frac{\sum_j^m r_{ij}}{m} \quad (8)$$

As it can be seen from the formula, this coefficient measures the average value of the gap between de jure and de facto demand for a particular institution-element of the option.

To assess the quality of an institutional option, we propose using the QIO coefficient, which shows the average measure of the gap between the sufficiency of the de jure and de facto option according to (9):

$$QIO = \frac{\sum_j^m \sum_i^n r_{ij}}{m \cdot n} \quad (9)$$

Both quality coefficients - QI_i and QIO can take any values in the range from – ∞ to + ∞. Moreover, 0 is a critical value, because it means no gap. The measure of removal from zero is a measure of the gap, respectively, the higher the value of the coefficient to modulo is, the lower the quality of an individual institution or an option as a whole is. We offer the following gradation of the institutional option quality assessments according to the values of both coefficients, which is valid in the model limitations indicated above:

a) from 0 to 1 - high quality, as the gap measure of de jure and de facto is minimal or absent, the existing institutional links are in demand by business according to their significance for the government, the state of “synergy”;

b) from 1 to 3 - satisfactory quality, in particular, typical for the situations when the gap in the option is significant, but the number of such links is less than 30%;

c) from 3 and above - low quality, for example - a significant gap of de jure and de facto, observed in most links and the higher the measure of discrepancy is, the lower the quality of the option is, the state of "destruction".

The problem-oriented paradigm laid in the basis of the assessment approach assumes that the assessment of the institutional environment quality is determined within the framework of a specific problem “field” of a particular environment carrier. Accordingly, this allows you to:

1) compare in time the quality of various institutional options, the composition of which changes over time due to the natural evolution of the institutional environment - the emergence of new institutional technologies for solving problems on the background of the old ones’ withering away;

2) evaluate the quality of the whole set of institutions through the quality of individual institutional options corresponding to the key problems of the research object development - a specific environment carrier.

According to this logic, the quality of the institutional environment of a particular research object can be described mathematically: a) through a vector which elements reflect the quality of institutional options of a finite number M of an environment carrier problems: $QIE_m = \{QIO_1; QIO_2; \dots QIO_m\}$, where QIO is the quality coefficient of the institutional option of the i problem “field” of the M studied according to (9); b) through a change in the QIE vector in time $\overrightarrow{QIE = \{m; t\}}$. Moreover, the quality of the institutional environment is determined by the quality of individual institutional options - the higher the proportion of quality options is (such as “synergy”), the higher the quality of the environment as a whole is. Conversely, with the predominance of destructive options, the institutional environment as a whole should be recognized as low-quality or destructive.

Testing the Institutional Option Model

Consider conditional examples of the links formation from three coherent institutions to explain the method of assessing the quality of individual institutions, institutional options and the institutional environment as a whole.

According to formula (2), the total number of an institutional option links from three coherent institutions is seven options. Assuming that the results of a survey of 1000 small firms on the use of links (w_j) are known, we compiled the vector $p = \{p_1; p_2; p_3 \dots p_m\}$ according to formula (3). As a result, the initial data are the matrix S and the vector P of the following form, to the left of which the numbers of option s_j links are indicated:

	I_1	I_2	I_3	P_j
s_1	1	0	0	0,05
s_2	0	1	0	0,05
s_3	0	0	1	0,30
s_4	1	1	0	0,05
s_5	0	1	1	0,20
s_6	1	0	1	0,15
s_7	1	1	1	0,20

Using formula (5) and taking into account the limitation on bit depth, we obtained the de facto matrix $Q_{m\times n}$:

	I_1	I_2	I_3
s_1	0,11	0,00	0,00
s_2	0,00	0,10	0,00
s_3	0,00	0,00	0,35
s_4	0,11	0,10	0,00
s_5	0,00	0,40	0,24
s_6	0,33	0,00	0,18
s_7	0,44	0,40	0,24

Having assumed the expert assessments condition of being known of the importance of institutional links – the vector $V_m = \{v_1;\ v_2;\ v_3 \dots v_m\}$, using formula (6), we calculate the de jure matrix $U_{m\times n}$ for three different cases.

Variant 1. Weak measure of the gap in the option sufficiency of de jure and de facto. To the right of the matrix $U_{m\times n}$ the conditional values of the vector V_j for this case are shown.

	I_1	I_2	I_3	V_j
s_1	0,20	0,00	0,00	0,10
s_2	0,00	0,13	0,00	0,06
s_3	0,00	0,00	0,30	0,25
s_4	0,02	0,02	0,00	0,01
s_5	0,00	0,38	0,22	0,18
s_6	0,33	0,00	0,20	0,17
s_7	0,45	0,48	0,28	0,23

According to the formula (7), the gap matrix $R_{m\times n}$ is determined:

	I_1	I_2	I_3
s_1	0,43	0,00	0,00
s_2	0,00	0,20	0,00
s_3	0,00	0,00	-0,17
s_4	-4,67	-3,80	0,00
s_5	0,00	-0,07	-0,08
s_6	0,00	0,00	0,14
s_7	0,01	0,17	0,15

Knowing the elements of the gap matrix $R_{m\times n}$, we can determine the quality of individual institutions and the option as a whole, according to formulas (8) and (9):

	I_1	I_2	I_3
QI_i	-0,6027	-0,5002	0,0046
QIO	- 0,37		

In accordance with the assessment scale described above, this case of an institutional option can be recognized as high-quality or synergetic. Moreover, all three institutions-elements are of equally high quality (have values close to zero) with minimal discrepancies of the de jure and de facto demand.

Variant 2. A significant gap in the option sufficiency of de jure and de facto. To the right of the matrix $U_{m\times n}$ the conditional values of the vector V_j for this case are shown.

	I_1	I_2	I_3	V_j
s_1	0,09	0,00	0,00	0,06
s_2	0,00	0,13	0,00	0,06
s_3	0,00	0,00	0,41	0,29
s_4	0,28	0,38	0,00	0,18
s_5	0,00	0,02	0,01	0,01
s_6	0,27	0,00	0,24	0,17
s_7	0,36	0,48	0,33	0,23

According to the formula (7), the gap matrix $R_{m\times n}$ is determined:

	I_1	I_2	I_3
s_1	-0,19	0,00	0,00
s_2	0,00	0,20	0,00
s_3	0,00	0,00	0,15
s_4	0,60	0,73	0,00
s_5	0,00	-18,20	-15,47
s_6	-0,25	0,00	0,27
s_7	-0,24	0,17	0,28

Knowing the elements of the gap matrix $R_{m\times n}$, we can determine the quality of individual institutions and the option as a whole, according to formulas (8) and (9):

	I_1	I_2	I_3
QI_i	-0,07	-17,10	-14,77
QIO	- 1,52		

This variant of an institutional option, as it can be seen, can serve as an example of satisfactory quality, with the smallest gap of de jure and de facto demand, and therefore the institution I_1 possesses the highest quality, the other two have a significant gap in one of the links and can be characterized in general, as institutions of satisfactory quality.

Variant 3. A significant gap in the option sufficiency of de jure and de facto in most links. To the right of the matrix $U_{m\times n}$ the conditional values of the vector V_j for this case are shown.

	I_1	I_2	I_3	V_j
s_1	0,41	0,00	0,00	0,400
s_2	0,00	0,01	0,00	0,004
s_3	0,00	0,00	0,14	0,004
s_4	0,58	0,97	0,00	0,568
s_5	0,00	0,02	0,36	0,010
s_6	0,01	0,00	0,36	0,010
s_7	0,00	0,01	0,14	0,004

According to the formula (7), the gap matrix $R_{m\times n}$ is determined:

	I_1	I_2	I_3
s_1	0,73	0,00	0,00
s_2	0,00	-13,65	0,00
s_3	0,00	0,00	-1,47
s_4	0,81	0,90	0,00
s_5	0,00	-22,44	0,34
s_6	-31,73	0,00	0,51
s_7	-108,11	-57,60	-0,65

Knowing the elements of the gap matrix $R_{m\times n}$, we can determine the quality of individual institutions and the option as a whole, according to formulas (8) and (9):

	I_1	I_2	I_3
QI_i	-138,3	-92,79	-1,27
QIO	- 11,07		

This variant gives an example of a low-quality (destructive) institutional option, as the gap measure is significantly larger than the borderline value - 3. Moreover, as you can see, two of the three institutions can be characterized as low-quality due to a significant gap of de jure and de facto demand.

Results and their Discussion

Let us define some features of the mathematical model for assessing an institutional option:

1) the significance of a particular link directly affects the significance of a particular institution for an option: it will be higher for those institutions of which these links consist;

2) the higher the gap measure, and hence the level of the QIO coefficient to modulo, will be, the higher the average level of excess of values for two de facto and de jure sufficiency assessment vectors is, not only the excess level itself is significant, but also the number of links according to which there is a gap;

3) there may be situations in which options different in strength of the gap and the number of links with the gap will have the same QIO coefficients, which means the same level of quality; in such cases the assessment may be supplemented by expert assessments;

4) the matrix $S_{m\times n}$ changes its quantitative and qualitative composition over time, therefore a systematic assessment of the option in dynamics is necessary.

The scientific value of the mathematical model of an institutional option proposed by the author is as follows.

1) The method provides a quantitative assessment of the quality of institutional support for tasks relevant to any carrier of the institutional environment, which characterizes the model as universal.

2) A quantitative assessment of the quality of a particular option institution allows to isolate the institutions, the adjustment of which is necessary in the first place, as they have a significant impact on the solution of the problem under study. Changing these institutions-elements will improve the quality of the institutional option and the environment as a whole. The method also allows you to identify the so-called "institutional traps", first identified by D. North (1997).

3) The model takes into account the gap between de facto institutions - the real institutional choice of actors and de jure institutions - the value of institutional links for authorities (expected, desired significance). This makes it possible, firstly, to take into account the semantics of the option, and secondly, to determine institutional quality in terms of a synergetic approach: “synergy” - “destruction”.

4) The comparability in time of options that are different in semantics is observed due to the problem-oriented analysis paradigm, when the option is considered as an instrument for solving a specific problem of an environment carrier.

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Insurance English Course: Evidence from MGIMO-University

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Abstract

Being the most commonly used language, English has impact on almost every field of work. More and more universities value the practicability of English incorporating courses of English for Specific purposes in their educational programmes. The purpose of this paper is to study the efficiency of the Insurance English course delivered at Moscow State Institute of International Relations in order to gain some insights into the possible gaps in the current syllabus which may contribute to future modifications and higher quality of the course. To collect data, the study used an anonymous questionnaire distributed among the alumni and current students doing a Master's degree course in International Insurance and Risk Management. The findings have revealed that most respondents are satisfied with the quality of the course, but they consider it necessary to study more practical materials, which would enable them to practice Insurance English terms in authentic contexts. The results suggest that the course extension will give the teachers more room for maneuver granting an opportunity to choose more specific emphasis and focus on learning pathways tailored to students' needs.

Keywords: Insurance English, ESP, Foreign Languages, Risk Management.

Introduction

In our increasingly globalized and internationalized world, the knowledge of foreign languages has become a crucial competitive advantage when applying for a job and seeking career progression. The status of English as a global language has been firmly established, and English as a foreign or second language is a core aspect of education in the majority of non-English speaking countries. However, as Bracaj (2014) emphasizes, education in general English may often be too general.

Undoubtedly, knowledge of English is determined by the opportunities of its study and the frequency of its application in practice, which is often connected with a profession or field of expertise. Over the years, various industries have demonstrated a growing need for specialists who do not just possess a good command of English, but also have in-depth knowledge of collocations and co-occurrence patterns as well as appropriate terminology, in some studies referred to as phraseological competence (Grabowski, 2015), which allows participating in negotiations, conducting business correspondence and drawing up contracts.

English for Specific Purposes (ESP), as a sub-field of English language education, has evolved to address this concern (Hyland, 2007). Following the Second World War, when English became the international language of technology and commerce, the demand for English courses tailored to specific needs has been on the rise (Hutchinson and Waters, 1987).

ESP is focused on meeting the needs of a group of learners who require English skills related to a specific non-language discipline (Dudley-Evans and St. John, 1998).

Since early 1960s, there have been developed such ESP courses as English for Engineers, English for Aviation, English for Advertising, Legal English, and Medical English to name just a few. The language used by specific professional groups has become of critical importance, with Business English being a recognized area of ESP (Bargiela-Chiappini and Zhang, 2013).

Higher education undergoes continuous transformation in most countries (Tikhonova and Raitskaya, 2018).

In an attempt to study the development of language for specific purposes (LSP) in Russia, Zakharova, Bogdanova and Netesova (2018) have revealed that the concept of LSP is relatively new in this country. Nevertheless, the status of LSP is gradually increasing, with a wider range of universities complementing their syllabus by LSP courses.

Among the leaders in developing and teaching ESP courses in Russia, there is Moscow State Institute of International Relations (MGIMO-University) whose undergraduate and postgraduate degree programmes include ESP. The presence of many large international insurance groups in Russia and the need to purchase additional reinsurance capacities abroad increase the need for insurance specialists who have advanced Insurance English skills. This paper is focused on an innovative module on Insurance English introduced within the compulsory ESP course aimed at students of MGIMO-University doing a Master's degree course in International Insurance and Risk Management.

This course was first introduced in 2013, and since then it has been delivered in 1-2 groups of no more than 9 students during 17 weeks of the spring semester of the first year of a Master's degree course in International Insurance and Risk Management. The course is designed to develop the communicative performance of future insurance professionals in their dealings with clients, other insurers and other contacts in the insurance industry, in an international context. The course is intended to enable students to use standard insurance terminology with appropriateness of linguistic context and style.

The course is based on the textbook "English for Insurance Business" produced by the author of the article and published by MGIMO-University publishing house in 2015. The textbook includes mostly authentic materials published in contexts designed specifically for native-speaker consumption. Such materials have rich cultural and linguistic components that the average native speaker uses (Jernigan, 2017), which increases student's motivation.

The textbook consists of 7 sections, revealing the role, functions and types of insurance:

1. History and basic principles of insurance.
2. Classification of insurance risks.
3. Intermediaries of the insurance market.
4. Types of insurance.
5. Insurance claims.
6. Reinsurance and retrocession.
7. Solvency.

Each section is accompanied by a list of active vocabulary, exercises, and role-play tasks aimed at enhancing the development of professionally significant competencies, including communicative, analytical and socio-cultural competencies.

The methodology underlying the Insurance English course is Content and language integrated learning (CLIL), which is content-based language teaching (Wolff, 2003) referring to "any educational situation in which an additional language and therefore not the most widely used language of the environment is used for the teaching and learning of subjects other than language itself" (Marsh and Langé, 2000).

The term "CLIL" was coined in the 1990s in Europe for programmes that require teaching of non-linguistic subjects through the medium of a foreign language, which implies integrating both content and language in the curriculum (Ruiz de Zarobe, 2017).

Every year, the Insurance English course is updated by means of including mainstream articles, analytical reports and research papers on topical issues in insurance and risk-management.

The research topic under consideration is the field of teaching a foreign language in higher professional institutions.

The aim of this paper is to obtain a retrospective feedback on the Insurance English course delivered at MGIMO-University with the view of revealing the encountered problems and improving teaching effectiveness.
The paper is arranged as follows. The following section describes data and research methodology. The major results are revealed and discussed in section 3 which is then followed by conclusions and suggestions in the final section.

Data and Methodology

The data were collected using an anonymous questionnaire survey conducted during the last week of the spring semester of 2019 with first- and second-year students doing a Master's degree course in International Insurance and Risk Management as well as alumnus. The questionnaire was to be completed on paper or online. In accordance with ethical considerations in collecting research data, confidentiality of the research data was maintained (Seliger and Shohamy, 1989).

The questionnaire included 10 questions which mainly focused on a wide range of aspects of the Insurance English course offered at the University: they enquired whether the contents, length, and the structure of the course met the participants' needs and requirements, whether the skills acquired were used in practice, what skills the participants consider to be lacking and would like to practise to a higher extent.

The first three questions were rather general asking about participant's gender, field of expertise and year of study. The answers are required to see the differences in results for female vs. male respondents; their occupation; current students and alumni. The analysis is conducted by comparing basic statistics: minimum, maximum, median, mean, and standard deviation. The 4-5th questions aimed at figuring out whether there is a need to have an Insurance English course at the end of the BA and MA studies. The 6th question asked to specify what the course is necessary for. The 7th question sought the participant's opinion on the advantages of the course compared with other English courses. The 8-9th questions were focused on revealing whether the course matched students' expectations and was relevant for their further career development. The questionnaire was concluded with the open question asking the respondents to evaluate the course, provide their comments and recommendations for future implications.

In total, 56 respondents took part in the survey. Participants of the present study consisted of 9 first-year students (in the spring semester of 2019 there was just one group as fewer students enrolled in the Master's degree course in International Insurance and Risk Management), 10 second-year students and 37 alumni.

Results and Discussion

The findings of the first three questions are as follows: there are 31 females (55%) and 25 males (45%) among the respondents. The major share of the respondents is alumni (66%), with first- and second-year students accounting for 16% and 18% respectively. As demonstrated by Figure 1, most respondents (71%) are involved in their degree field, i.e. Insurance/Reinsurance (39%) or Risk Management (32%), with a smaller share specializing in Audit (4%), Equity Trading (5%), and Banking and Finance (20%).

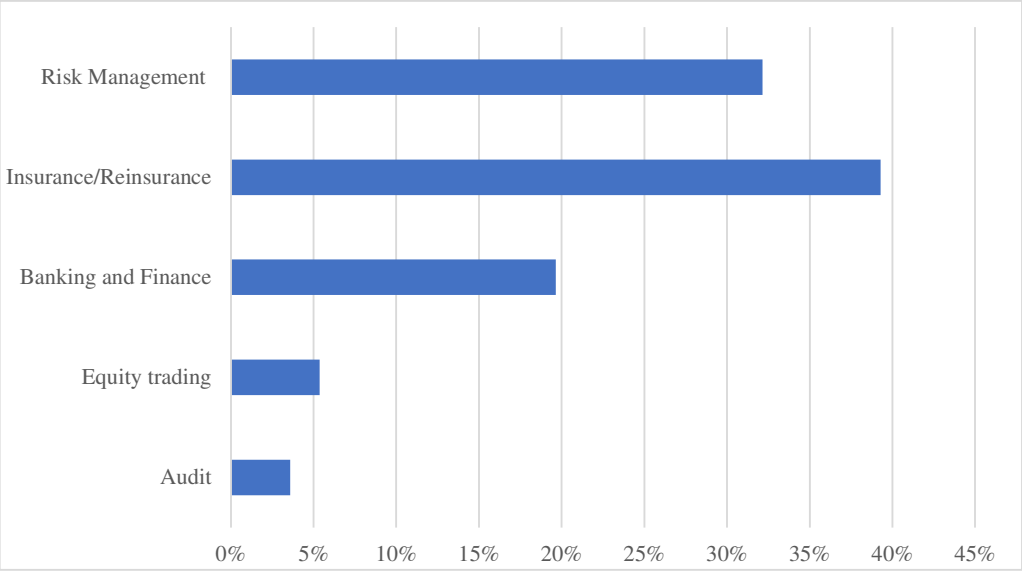

Fig. 1: Field of study or work.

Source: compiled by the author on the basis of survey results.

The result of question 4 (*In your opinion, is there a need to have an Insurance English course at the end of the BA studies?*) shows that most participants consider that the course would be useful at the end of their bachelor degree studies, whereas a fifth expressed some doubt answering "perhaps", and 13% of the respondents gave a negative answer.

Compared to this, the results of question 5 (*In your opinion, is there a need to have an Insurance English course at the end of the MA studies?*) are significantly different (Table 1). The majority of the participants believe that MA programme should include Insurance English course, with 14% expressing doubt and only 5% answering negatively.

Table 1: Questions 4-5: In your opinion, is there a need to have an Insurance English course at the end of the BA/MA studies?

Option	Number		Percent	
	BA	MA	BA	MA
Yes	38	45	68%	80%
Perhaps	11	8	20%	14%
No	7	3	13%	5%
Total	**56**	**56**	**100%**	**100%**

Source: compiled by the author on the basis of survey results.

These findings prove that the respondents adhere to the opinion that students doing their master's degree course may have gained work-related experience, participated in in-depth research projects, demonstrate increases in confidence and knowledge of subjects of their field of expertise; therefore, it would be more beneficial to include Insurance English course in the postgraduate programme rather than in the undergraduate programme.

The 6th question (*What is the Insurance English course necessary for?*) provided a list of 8 options (Figure 2). More than 80% of the respondents suppose that the course of Insurance English is of critical importance for reading professional literature (86%) and conducting insurance market research (84%). Almost 70% of the survey participants believe that the course may contribute to getting further education in insurance and risk management (68%) and speaking with confidence in face-to-face and telephone conversations (68%). 64% of the respondents consider the course to be vital for drafting insurance and general documents, followed by 63% of those who think that the course enhances their skills of writing business e-mails. Half of the respondents opted for the advantage of dealing with claims, with just 18% choosing job interviews. The results let us assume that the majority of the survey participants are convinced that the Insurance English course is essential for future studies and career development in insurance and risk management.

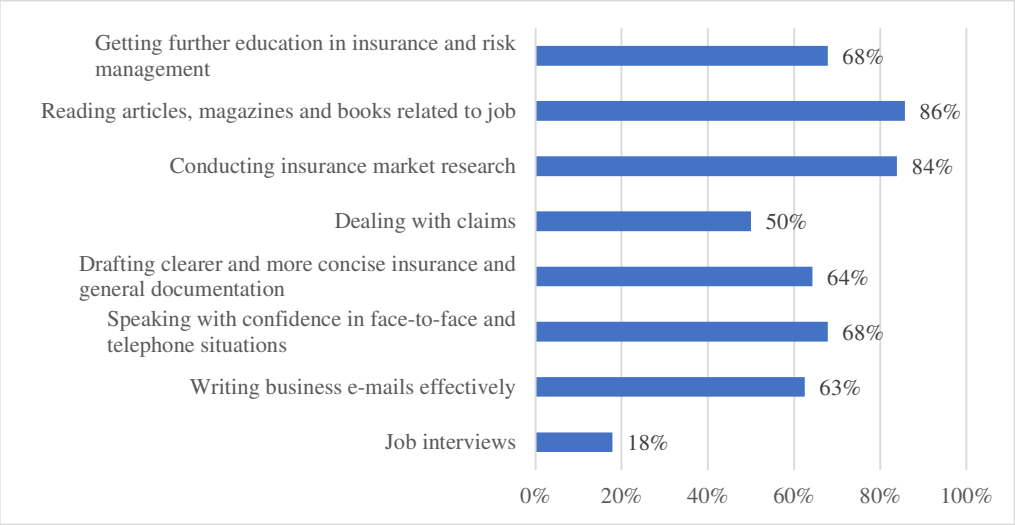

Fig. 2: What is the Insurance English course necessary for?

Source: compiled by the author on the basis of survey results.

The result of question 7 (*Compared with other language-related major, what do you think the advantage of Insurance English course is*?) demonstrated in Figure 3 below shows that most respondents (89%) believe that the primary benefit of the course lies in combination of language and business knowledge, whereas 9% hold the opinion that the course has international strategic vision. Only 1 respondent (2%) sees no obvious advantage in the course.

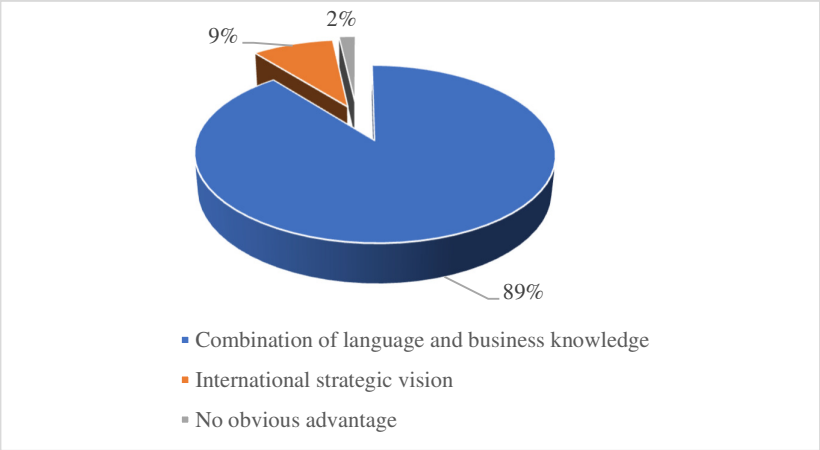

Fig. 3: Compared with other language-related major, what do you think the advantage of Insurance English course is?

Source: compiled by the author on the basis of survey results.

Similarly to question 6, answering question 8 (*Did the course match your expectations?*), the respondents were expected to select one or more than one option from the multiple answer options (Figure 4). 42 survey participants (75%) share the opinion that the course should be prolonged throughout the studies or later. The course completely met the expectations of 23 respondents (41%). More than one third of the participants (34%) expected to practise more insurance and risk management vocabulary. 5 respondents (9%) would like the course to include more interactive materials. Only 1 person (2%) considered the course to be rather complicated, whereas 3 individuals (5%) think it is too easy.

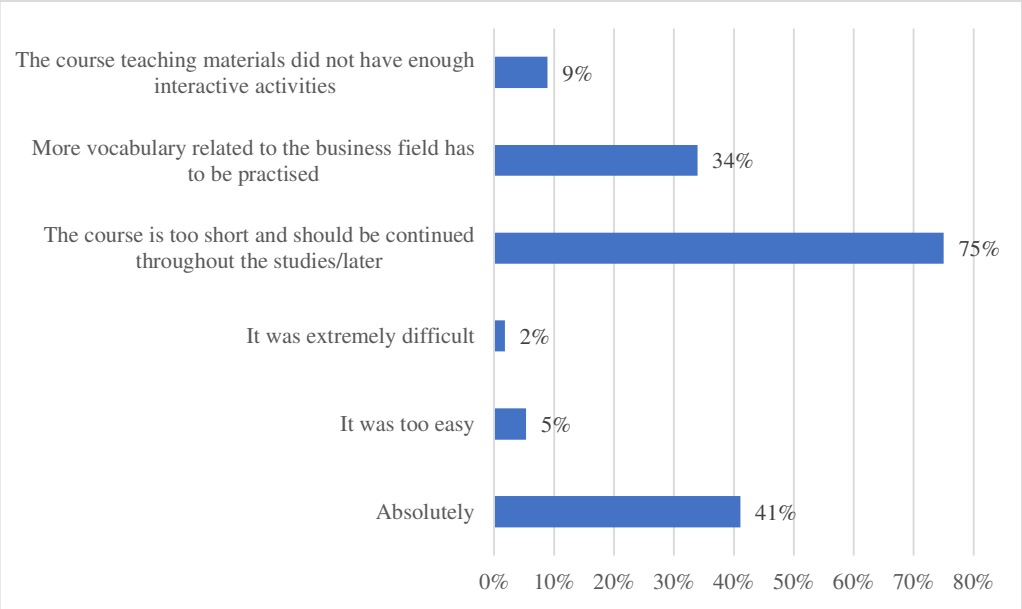

Fig. 4: Did the course match your expectations?

Source: compiled by the author on the basis of survey results.

Question 9 (*Do you think the current teaching materials match with your career development?*) investigates participants' overall satisfaction with the provided materials based on a Likert (Likert, 1932) 5 Scale (Table 2). Most respondents (54%) replied that the course materials fully met their expectations in respect to career advancement, followed by 30% considering that they are significantly satisfied with the teaching resources. 7 respondents (13%) expressed slight dissatisfaction with the materials, while 2 persons (4%) think that the materials barely matched their career development. As demonstrated by basic statistics in Table 2, the survey revealed no respondents who consider that the materials completely mismatched their career progress. The median, which is the number located directly in the center of the data set, is equal to 5. The mean is slightly lower and amounts to 4.34, which shows that the 'average' respondent thinks that the materials completely match his/her career development, which demonstrates high quality of the textbook and extra materials.

In order to reveal how much, on average, each of the values in the distribution deviates from the mean of the distribution, it is necessary to calculate standard deviation. According to the three-sigma rule (Cornejo, 2018), the value of 0.83 means that 68% of the responses are plus or minus 0.83 from the mean. With a small standard deviation which we have, most responses are clustered around the mean.

Table 2: Question 9: Do you think the current teaching materials match with your career development?

Answer Choices	Responses	
	Number	**Percent**
Completely match – 5	30	54%
Significantly match – 4	17	30%
Moderately match – 3	7	13%
Hardly match – 2	2	4%
Completely mismatch – 1	0	0%
	56	**100%**
Basic statistics		
Minimum	2	
Maximum	5	
Median	5	
Mean	4.34	
Standard Deviation	0.83	

Source: compiled by the author on the basis of survey results.

For more in-depth analysis of the questionnaire results, I decided to study the differences in results for respondents of different genders, years of study, and fields of study/work. As evidenced in Table 3, there was no significant difference in responses of their respondents and both their gender and year of study. However, the mean for the first-year students doing a Master's degree course (1MA) is slightly higher than that for the second-year students (2MA) and almost equal to the mean for the alumni, which demonstrates that on average 1MA and alumni have given preference to option "Completely match", while 2MA have ticked "Significantly match". The value of standard deviation highlights that the responses of 2MA were spread more to the extremes of the answer options.

As for the field of study or work, the divergence in the results is more obvious. The mean value is higher for those involved in Insurance/Reinsurance or Risk Management, which is sufficient proof of the fact that on average the course almost completely matches the needs of students working in the field of their studies. Judging by the standard deviation values, the responses were all bunched around

the mean responses with some slightly higher variation for equity trading, banking and finance, and risk management.

Table 3: Question 9: divergence in respect to gender, year of study and field of study/work

Gender	**Basic statistics**				
Female	*Minimum*	*Maximum*	*Median*	*Mean*	*Standard Deviation*
Male	2	5	5	4.29	0.85
	2	5	5	4.40	0.80
Year of study	*Minimum*	*Maximum*	*Median*	*Mean*	*Standard Deviation*
1MA	3	5	5	4.44	0.68
2MA	2	5	4	4.00	1.00
Alumni	2	5	5	4.41	0.79
Field of study or work	*Minimum*	*Maximum*	*Median*	*Mean*	*Standard Deviation*
Audit	3	4	3,5	3,50	0.50
Equity trading	2	4	3,0	3,00	0.82
Banking and Finance	3	5	4,0	3,91	0.79
Insurance/Reinsurance	3	5	5,0	4,68	0.55
Risk Management	2	5	5,0	4,50	0.76

Source: author's estimates.

The final question given in the questionnaire was open (*What would you suggest in order to enhance the efficiency of the course?*). This type of open question was not used any more as its interpretation requires more complex analysis. To improve the course, a large number of students asked to increase an interaction between the course and practical issues by means of adding more real insurance related documents/articles/research brochures and best practices. Almost 70% of the respondents suggest increasing the number of hours for the course, extending it for at least to 2 terms. If these suggestions were followed, teachers would have an opportunity to cover a wider range of types of insurance, provide more detailed feedback on students' questions, and arrange business simulation games so that students could learn more about real business processes.

Conclusion

The conducted research is the first attempt to explore the efficiency of the major ESP course developed and delivered at MGIMO-University within the Master's degree programme in International Insurance and Risk Management. The study complements earlier literature by considering both students and alumni who have gained enough professional experience to be able to provide unbiased evaluation of the course. The survey conducted by means of an anonymous questionnaire has revealed the weaknesses and strengths of the current Insurance English course.

First, it is shown that most respondents consider the course should be included both in their bachelor and master degree studies.

Second, the majority of the survey participants think that the Insurance English course is beneficial for their current and future studies as well as career advancement in the industry of insurance and risk management.

Third, almost 90% of the respondents have replied that the course is advantageous in comparison to other language-related university courses thanks to well-balanced combination of language and business knowledge.

Fourth, according to the questionnaire results, the course absolutely met the expectations of 45% of the respondents, with 75% of the survey participants suggesting extending it for two semesters.

Fifth, it is revealed that 84% of the respondents find the course appropriate to either completely or significantly match with their career development expectations. The additional study on the influence of gender or year of study on the obtained results has found no significant difference, whereas the similar study on the impact of the field of study or work has demonstrated that the course almost completely matches the needs of students working in the field of Insurance and Risk Management rather than audit, equity trading, banking and finance.

Finally, the findings of the research prove that more practical materials and real-life business situations should be incorporated in the course, which will improve the students' acquisition of knowledge of the subject. Such course modifications can be possible and would be more ambitious provided that the course is prolonged up to 2 semesters. This would enable the teacher to facilitate learning process by means of vocabulary extension, role-plays, case studies, and simulations; therefore, give ground to further research.

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Foreign Trade of Venezuela: Gravity Model Approach

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Abstract

This paper examines structure and geographical distribution of Venezuela's international trade by means of applying basic and extended gravity models to the country's exports to 35 partners in 2000-2018. Model testing revealed that better performance of the extended gravity model was achieved thanks to higher qualitative characteristics secured by additional variables. GDP, participation in the same integration block, membership in Petrocaribe program, and import of crude oil made positive contribution to bilateral trade. Whereas, distance, access to the open sea, the economic policy of developed countries, and sanctions had negative impact. It is assumed that trade flows were affected by dire economic crisis and western sanctions, which led to a sharp decrease both in exports and imports in 2014-2018. Owing to strong influence of political factors, the models failed to perform effectively. Finally, the study provides some suggestions on measures which could benefit Venezuela's foreign trade given the circumstances.

Keywords: gravity model, bilateral trade, exports, sanctions.

Introduction

Venezuela is a one of the typical monocultural Latin-American countries, developing on the periphery of the global capitalism. Possessing the richest oil reserves in the world, it is highly dependent on oil exports revenues. Crude and its derivatives, which predominate in the trade basket, only enforced their positions in the first two decades of the XXI century, which gives evidence of the progressing "Dutch disease". Apart from oil products, the country supplies the global market with iron ores, concentrates, ferrous products, fertilizers, and fish. Its top imports are basic foodstuffs, medicaments, light crude, and equipment. In 2018, export and import quotas were equal to 19.8% and 7.8% respectively. These figures prove the vital role of external trade for the country's economy, developing on the basis of rent-seeking and export-oriented model. Given these facts, the objective of this study is to investigate external trade policy of Venezuela by applying a trade gravity model.

Since 2003, trade volumes were gradually growing and reached their pick in 2008 (USD 149 billion) when the upward trend was interrupted by the global financial crisis resulting in a slump in oil prices. In 2010, foreign trade turnover rebounded reaching all-time high in 2012 (USD 157 billion). However, due to severe economic crisis and external factors, Venezuela's volumes of foreign trade have been decreasing since 2012. The country experienced a sharp drop in foreign trade in 2014-2018, with exports and imports declining by 57% and 76% respectively (Figure 1).

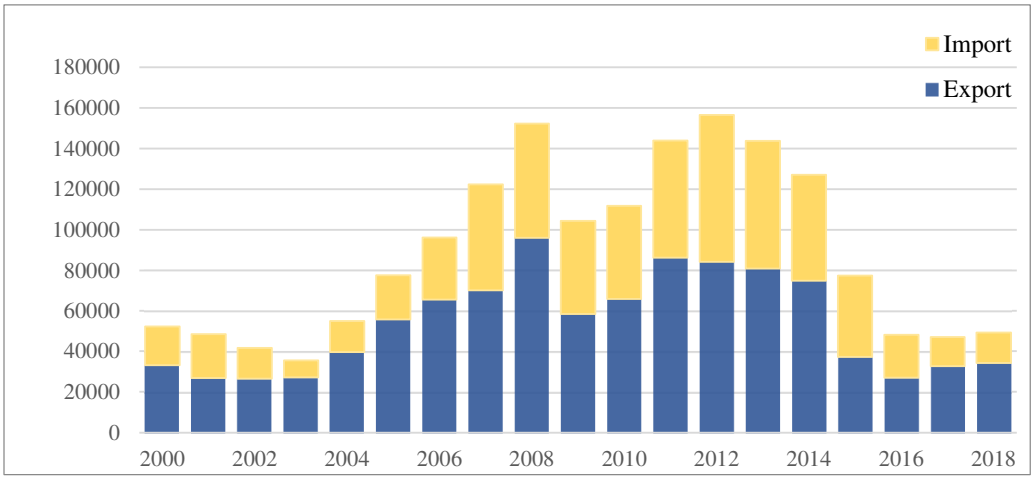

Fig. 1: Dynamics of Venezuela's Foreign Trade in 2000-2018, USD millions

Source: compiled by the authors on the basis of IMF Direction of Trade Statistics

Trade exchange plays a key role in a small open economy, serving as an instrument for national industrial development and sustainable economic growth (Chen, Yang and Liu, 2008). Since 1960s, the trade gravity model has gained its popularity, and it has been considered as a leading empirical tool implemented to analyze commercial exchange on the international scale (Anderson, 2011). Further studies largely contributed to improving the model's performance, which was mainly achieved by introducing additional exogenous and dummy variables, representing integration blocks (Shi, Gu and Qin, 2005), cultural factors (Kogut and Singh, 1998), exchange rates, and time effects (Stender, 2018), trade facilitation (Batra, Kaufmann and Stone, 2003; Wilson, Man and Otsuki, 2003; Engman, 2005), policy influence on trade (Srivastava and Green, 1986) and others.

In recent years, there has been an increase in the number of studies dedicated to trade potential within integration blocks in Latin America. The majority of them dealt with the Southern Common Market (Mercosur), with Venezuela participating therein in 2012-2017. Ghosh and Yamarick (2004), Moncarz and Vaillant (2010), Urata and Okabe (2014), Martin-Mayoral, Morán Carofilis and Cajas Guijarro (2016) are among the authors who examined tariff eliminations and trade potential of the customs union. As for the studies dedicated to particular Latin-American economies, Cáceres (1995) investigated Panama's membership in Central American economic integration. Chili's trade liberalization effects were considered by Fuenzalida-O'Shee, Valenzuela-Klagges and Corvalán-Quiroz (2018). Ahcar Olmos (2018) studied Colombia's potential to trade with the European Union and found that it could bring mutually beneficial results. This study compliments the previous literature by analyzing Venezuela's foreign trade pattern by means of combining quantitative and qualitative research techniques and approaches.

The structure of the paper is as follows. Section II presents data analysis and explains methodology of the mathematical model. Section III describes and discusses the obtained results; final conclusions are given in Section IV.

Data and Methodology

Trade Statistics Analysis

The study covers the period 2000-2018. The bilateral trade data was taken from the IMF Direction of Trade Statistics (DOTS) (Direction of Trade Statistics, 2019), GDP figures come from the World Economic Outlook Database (2019) and World Bank (Open Data, 2019).

The geographical structure of trade has changed dramatically for the past 20 years. In unfavourable conditions, the country was forced to accelerate diversification of its export destinations. Although the USA has topped the ranking for the whole studied period, their share has significantly decreased from 55% in 2000 to 35% in 2018 (Table 1). The main factor which contributed to this reduction was aggressive politics of the American administration towards its much weaker trade partner. Big businesses from the USA could not resign themselves to the lost access to the lucrative oil sector they controlled before 1999. External pressure started to aggravate since 2014 when the USA imposed economic sanctions on Venezuela. After being toughened, the sanctions currently include a large variety of measures from personal sanctions to temporary embargos, arrest of assets on foreign banks' accounts and prohibition to use the dollar. Meanwhile, trade relations have intensified with China, Russia and India as these economies approve of the current political regime in the country. In early 2000s, China was only the 34th Venezuela's trade partner in exports but in mid-2010s it occupied 2d or 3d position on the list. India increased its share from 4% in 2008 to 20% by the end of the period. As of the end of 2018, the Russian Federation was in top 50.

Table 1: Venezuela's main export partners in 2000, 2008, 2012, 2018, %

	2000		2008		2012		2018	
1	USA	55.1	USA	53.7	USA	44.7	USA	35.1
2	Netherlands	13.5	Netherlands	9.0	China	16.4	India	20.1
3	Brazil	3.9	Cuba	4.6	India	16.2	China	15.2
4	Dominic. Rep.	2.9	India	4.2	Cuba	4.8	Netherlands	8.7
5	Cuba	2.9	China	3.9	Spain	2.5	Cuba	4.5
6	Colombia	2.7	Singapore	2.9	Brazil	2.4	Singapore	3.2
7	Trinidad y Tobago	1.9	Bahamas	2.7	Dominic. Rep.	1.5	UAE	2.3

Source: compiled by the authors on the basis of IMF Direction of Trade Statistics

The commercial exchange with Latin-American countries was on the rise during the first decade owing to economic and social integration development in the region. Being the spearhead of a new stage of cooperation development, Venezuela managed to create Bolivian Alliance for the Peoples of our America (ALBA), a left-wing block based on the principals of solidarity and mutual assistance. Furthermore, during the hike of oil prices, the country supplied poor Central American and the Caribbean countries with fossil fuels with a significant reduction in the cost and even financed their social development programs, but amid Venezuela's crisis these processes have slowed down. The share of interregional trade reduced by 15% amounting to only 10% by the end of the period.

As a sample of the geographical trade pattern, we selected 41 countries among 50 main export partners that accounted for 84% of total exports in 2018. The choice of countries was largely motivated by data availability.

These economies are Antigua and Barbuda, Argentina, Belgium, Belize, Chile, Hong Kong, China, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, France, Germany, Greece, Guatemala, Haiti, India, Italy, Jamaica, Japan, Korea, Malaysia, Mexico, Netherlands, Nicaragua, Nigeria, Panama, Peru, Poland, Portugal, Russia, Singapore, Spain, Saint Lucia, Sweden, Switzerland, Trinidad and Tobago, Turkey, the United Arab Emirates and the USA.

The descriptive statistics are presented in Table 2. Exports, the variable to be explained, appeared to have quite a high level of correlation with GDP (0.77), but it was insignificant with the rest of the variables, which may result in poor performance of the model. No notable correlation of the exogenous factors was detected. The regional structure of the series was as follows: Latin America – 18 countries, Europe – 12, Asia – 9, with North America and Africa being represented by one country each. The obtained data was used to compute a gravity model of external trade.

Table 2: Descriptive statistics

	Exports*	GDP*	Distance**	GDP Venezuela*
Min	0.013001	798	618	83670
Max	48238.05	20580250	18348	334272
Mean	1312.695	1253595	6297.802	202895.6
Stand. dev.	4868.334	2867264	5090.469	85598.44

** millions of dollars*
*** km*

Source: authors' estimations

Model Specification

The first authors to apply Newton's "Law of Universal Gravitation" to the analysis of trade flows were Tinbergen (1962), Poyhonen (1963) and Linnemann (1966). These early studies were enhanced by Anderson (1979), Helpman and Krugman (1985) who introduced the terms of economy of scale and product differentiation providing strong theoretical grounds for the equations. According to the model, bilateral trade should be characterized by a positive influence of partners' economy size; distance, on the contrary, should be an obstacle in international commercial exchange.

For this panel data study, a basic gravity model in a natural logarithm form was specified by the following equation:

$$\ln(E_{ij}) = \alpha_0 + \beta_1 lnGDP_i + \beta_2 lnGDP_j + \beta_3 lnD_{ij} + \varepsilon_{ij}$$

where E_{ij} is exports of country *i* to country *j*; GDP_i and GDP_j are nominal gross domestic products of counties i and j respectively; D_{ij} is a geographical distance between the capitals of countries i and j; ε_{ij} is a random error; β_1, β_2, β_3 are coefficients.

Traditional log-linear formula of the gravity model is unable to consider zero observations in bilateral trade as the logarithm of zero is undefined. However, our dataset is characterized by zero or missing values. Small economies are expected to have low volumes of trade, especially when trading with remoted partners (Frankel 1997). If zero flows do not occur randomly, disregarding them can result in biased empirical estimation of the coefficients. Omitting zero observations leads to lost information on low flow cases. Santos Silva and Tenreyro (2006) argued traditional specification as well as fixed effects approach are subjects to the presence of biases. To tackle this problem, they suggested that a Pseudo Poisson Maximum Likelihood (PPML) method should be used. PPML estimator has been adopted in various studies and seems to be an extremely strong tool for analysis in models where zero values are frequent (Martin and Pham 2008). As often lost data represents zero or close to zero values and in order to take into account the information from missing observations, we replaced them by zeros in our study. Therefore, Maximum Likelihood function could determine the potential size of bilateral trade.

Anomalies in the time series were revealed with the help of Irving criteria and replaced by the mean of the previous and the next numbers in order to smooth highly volatile trade data.

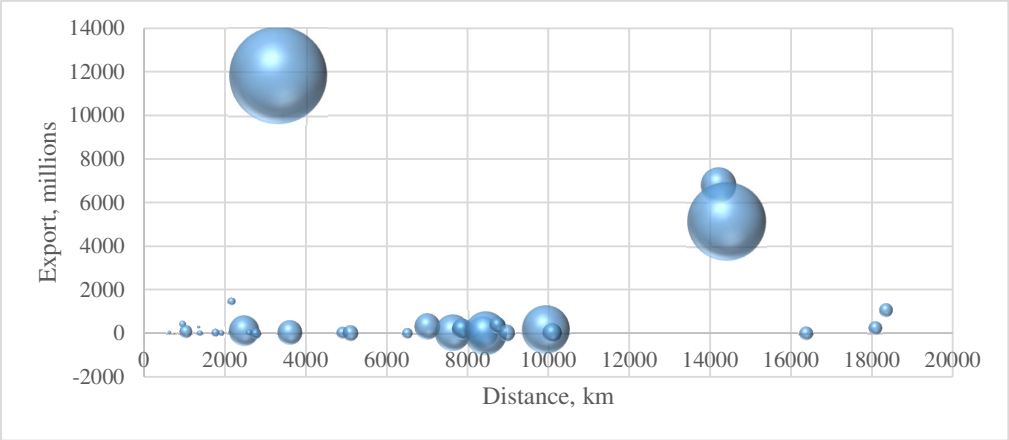

Fig. 2: Exports' dependence on the distance and GDP size in 2018

Source: authors' estimations

As it is demonstrated in Figure 2, the countries were ranged in accordance with the distance which separates a pair of countries, the size of a bubble is the volume of a country's GDP. The graphical analysis of trade partners' distribution shows that the USA (the biggest bubble) is the most evident market for the country's exports as it overweighs all smaller economies that lie on a considerably short distance. Most exports' destinations are located at a distance of 6,000-10,000 km. However, the second and the third counterparts are rather remoted countries (India and China), with more than 14,000 km separating them from Venezuela.

In reality, not only economic power and cost of transportation determine geographical distribution of a country's trade. Far more factors could have a significant impact, with real GDP, administrative procedures, tariffs and taxes, exchange rate, historical ties, common borders and language, access to the open sea, participation in the same trade union, political and economic barriers being among them. These qualitative variables were considered by Chen, Yang and Liu (2008), Fuenzalida-O'Shee Valenzuela-Klagges and Corvalán-Quiroz (2018), with models also containing diverse time variables.

Venezuela has developed close economic relations with the neighbouring counties, especially those with similar political regimes, and small Caribbean states. Until 2017, it was a member of Mercosur that unites the most developed economies in the continent, but the country was expelled from the customs union due to its internal policy-related reasons. A sharp shift to the right of the Latin-American political landscape since mid-2010s resulted in the deterioration of the countries' relations with Venezuela. However, the most powerful external factors were economic sanctions imposed by the main trade partner and oil prices slump in 2014-2017. Rapid decline in exports in the recent years is also explained by severe economic crisis the country has faced since 2014. It has led to nominal GDP dropping by almost 70% by the end of 2019 as a consequence of a high level of unemployment (34% in 2018), decrease in manufacturing output and problems with electricity supply.

In an attempt to consider the influence of the factors mentioned above dummy variables were added to the basic gravity model. The updated gravity equation is the following:

$$\begin{aligned}\ln(E_{ij}) = {} & \alpha_0 + \beta_1 lnGDP_i + \beta_2 lnGDP_j + \beta_3 lnD_{ij} + \beta_4 Devel_j + \beta_5 Ocean_j + \beta_6 ALBA_j \\ & + \beta_7 Petrocaribe_j + \beta_8 Mercosur_j + \beta_9 Union_j + \beta_{10} Ally_j + \beta_{11} OilImp_j \\ & + \beta_{12} Lang_j + \beta_{13} Crisis_t + \beta_{14} Price_t + \beta_{15} Sanc_t + \varepsilon_{ij}\end{aligned}$$

where E_{ij} is exports of country i to country *j*; GDP_i and GDP_j are nominal gross domestic product of counties i and j respectively; D_{ij} is a geographical distance between the capitals of countries i and j; Develj is true if country *j* is developed; $Ocean_j$ is an access to the open sea; *ALBAj* is true if country *j*

is a member of the ALBA alliance; $Petrocaribe_j$ is true if country j is a member of the Petrocaribe program; $Mercosur_j$ is true if country j is a member of Mercosur; $Union_j$ is true if country j is a member of any integration block where country i participates; $Ally_j$ is true if country j supports country i on the international stage; $OilImp_j$ is true if country j imports crude; $Lang_j$ is true if the spoken languages coincide in countries j and i; $Crisis_t$ is a time variable that represents years 2002-2003, 2009, 2014-2018 (the GDP of country i drops); $Price_t$ is a time variable that accounts for years 2008, 2015-2017 (a slope in oil prices or much lower prices than in previous several years); $Sanc_t$ is a time variable representing 2014-2018 when sanctions against country i were in force; ε_{ij} is a random error; β_1, β_2, β_3 are coefficients.

The variables GDP_i, GDP_j, $Ocean_i$, $ALBA_i$, $Petrocaribe_i$, $Mercosur_i$, $Union_i$, $Ally_i$, $OilImp_i$ and $Lang_j$ are expected to have positive signs, whereas D_{ij}, $Crisis_t$, $Price_t$ and $Sanc_t$ are expected to have a negative impact.

Results and Discussion

Statistics data processing program R was used to compute the coefficients. Table 3 presents the obtained results of equations (1) and (2). The goodness of fit of the basic model appeared to be rather high with an adjusted R^2 of 0.632. All the variables are highly significant. The Durbin-Watson test (Durbin and Watson, 1950) showed no evidence of autocorrelation. The results of Breusch-Pagan test (Breusch and Pagan, 1979) proved heteroscedasticity of the time series. The signs of equation coefficients are the same as expected. However, the model failed to accurately describe the external trade of Venezuela.

Table 3: Correlation matrix

	Exports	GDP	Distance	GDP Venezuela
Exports	1			
GDP	0.77	1		
Distance	0.00	0.10	1	
GDP Venezuela	0.10	0.00	0.00	1

Source: authors' estimations

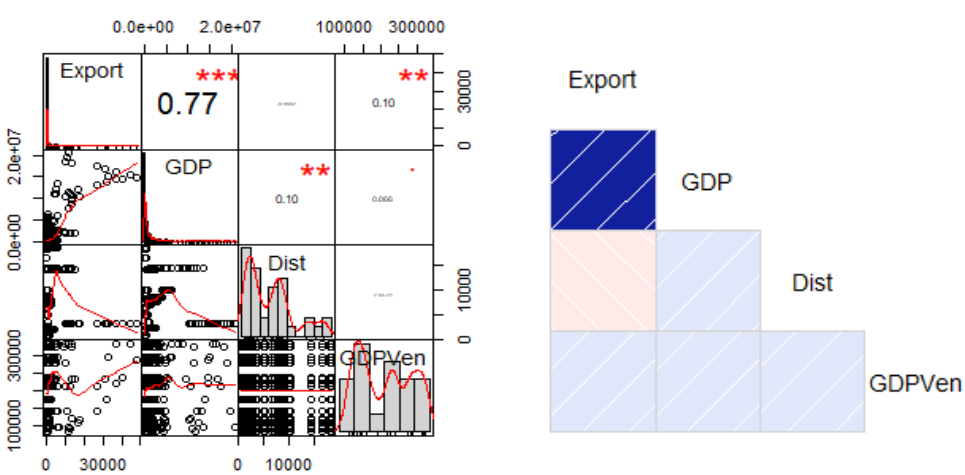

Fig. 3: Graphic Interpretation of Data and Correlation Matrix

Source: authors' estimations

To illustrate the quality of the basic model before applying the Maximum Likelihood function to the data set, we have built Figure 3. The graph on the right-hand side is a correlation matrix that highlights the lack of correlation between the explanatory variable Exports and two exogenous parameters: Distance and GDP of Venezuela. If there is no strong correlation between them, the model will not be able to fit the variation of the time series. The top-right part of the graph on the left-hand side shows to what level the correlation is significant. As we can see, if zero and missing observations were not considered, the model would fail to describe the dynamics of Venezuela's foreign trade. The lower left-hand corner of the graph represents graphical interpretation of mutual dependence in pairs of variables. At least one structural breakthrough was visible in the first column. Therefore, introduction of dummy variables could make the model more well-balanced so that it could better account for the data set behaviour over the defined period of time.

Table 4: Regression results for a basic gravity model and an extended one

	Model 1	Model 2
(Intercept)	-2.2700	5.7201***
GDP	0.8052***	2.1062***
GDPVen	1.2900***	1.1938**
Dist	-0.8052***	-1.7281***
Devel		-2.9894***
Ocean		1.4813***
Lang		1.3372**
Ally		-1.7520***
Union		-0.9140**
ALBA		3.9072***
CELAC		-3.8273***
OilImp		1.5640***
Sanc		-0.6097***

Source: authors' estimations

The extended model reported advanced results (Table 4). All the variables included in the final equation were of high significance level. Homoscedasticity and autocorrelation were rejected. However, not all the signs of the coefficients met the expectations. The variables $Devel_j$, $Ally_j$, $Union_j$ and $CELAC_j$ had negative effect. The $Union_j$ and $CELAC_j$ variables were introduced to our model in order to take into account privileged trade within integration blocks. The negative coefficient which was obtained could be explained by the fact that Venezuela's exports destinations mainly depend on oil demand from these countries, and lower barriers in trade hardly can change the situation. The variable $Ally_j$ is an example of the same case. For decades, the USA were the key trade partner of Venezuela despite political and even economic tensions between the two countries. Meanwhile, $ALBA_j$ had a strong positive impact due to the fact that during the period of high oil prices Venezuela suppled the members of the union with cheap crude in exchange for agricultural products as the country has unfavourable natural conditions for developing such economic activities.

We supposed that developed countries consume more oil and as a consequence they are likely to be interested in the country's exports. However, throughout the studied period among top 10 trade partners there were mostly representatives of the developing world, which corresponds with the country's government policy targeted at strengthening 'South-South cooperation'. Another important fact to be mentioned in this regard is that China is considered to be a developing economy. Meanwhile, the variable, that represented the importers of crude, had a very strong positive influence on Venezuela's exports. The sanctions limited the number of the country's exports destinations and led to degradation of traditional trade ties. The variables $Mercosur_j$, $Petroj$, $Crisis_t$, $Price_t$, proved to be insignificant.

When measuring the fit of the logistic regression, different approaches to calculate R^2 can be used and there is no consensus on the best option. Following suggestions on the matter proposed in Allison (2014), in our study we chose McFadden R^2 to estimate the predictive power of the model (McFadden

1974). The basic model appeared to have a lower level of the coefficient (0.632) in comparison with the extended equation (0.828), which makes us prefer the second one.

The improved performance of the model was obtained by means of adding dummy and time variables. The larger number of the variables in the equation is bound to increase R^2, but at the same time they often make a model more complex. Therefore, the aim is to achieve a balance between the model fit and its complexity as stated in Babri, Joernste and Viertel (2017). Other commonly used measures of a model quality were implemented in this study to compare the basic and extended models as demonstrated in Table 5.

Table 5: Quality comparison of models

	Model 1	**Model 2**
Alderich- Nelson R-squared	0.724	0.790
McFadden R-squared	0.632	0.828
Cox-Snell R-squared	0.943	0.977
Nagelkerke R-squared	0.953	0.987
p	0.000	0.000
Likelihood-ratio	2234.725	2925.452
Deviance	1299.006	608.278

Source: authors' estimations

As the deviance of the second model was lower, this model should be chosen. The likelihood ratio also proved better performance of the extended equation. Extra dummy and time variables contributed to better quality of our model. The measures taken managed to increase the quality of the model and helped to obtain a trust worthy estimation. These results are explained by a range of external and internal factors.

Traditionally, economic relations between the United States and Venezuela were characterized by intense trade in goods that goes in line with the gravity model theory. Nevertheless, in 2010s its share was plummeting owing to the trade war campaign the US waged against the current political regime in the country. The variable representing sanctions reflected the changes. Dire political, social and economic crisis almost stopped shipments of subsidized oil to the regional partners and hampered integration promotion in Latin America. Although leading economies in the continent could develop mutually beneficial commercial ties, there are some obstacles to the process. The representatives of Brazil's establishment are well-known for their hostility to Venezuela's president Nicolas Maduro. The confrontation intensified so greatly that a neighboring country planned a military invasion at the beginning of 2019. Argentina's leaders also expressed their support for the opposition. To a great extent, this situation resulted in Venezuela's strengthening commercial relations with remoted China, India and Russia. Russia not only became one of the main destinations of the country's oil exports in 2019 but also provided Venezuela with highly necessary humanitarian assistance, supplied with wheat and medicaments, which allows us to predict further growth in bilateral trade. Given the circumstances, the gravity model may need further adjustments to forecast changes in Venezuelan exports' geographical distribution.

Conclusions

In this study, we used panel data, representing Venezuela's exports dynamics in 2000-2018, to estimate the coefficients of the country's bilateral trade gravity model via Pseudo Poisson Maximum Likelihood function. First, we applied a basic equation. All parameters were significant and the model demonstrated a rather good performance. Then considering severe economic crisis and western sanctions, we extended our model so that it included such parameters as participation in the same integration block, membership in Petrocaribe program, access to the open sea, level of a country's development, oil import and the influence of economic sanctions imposed in 2014. To compare the two equations, R^2, deviance and likelihood ratio were used. We revealed that the extended model was

characterized by improved quality. The second model proved to be an effective tool for description of Venezuela's export flows with R^2 equal to 0.828.

Overall, the findings of the paper provided evidence that economic crisis distorted the geographical structure of the country's exports. As a result, complicated political issues that strongly effected trade dynamics required introduction of dummy variables to reflect the real state of affairs. In the study, we tried to handle limitations to the gravity model caused by the impact of non-economic factors that are highly difficult to predict and estimate. More profound analysis of the findings may give ground to further research.

Meanwhile, the country struggles with a range of serious problems: 1) downward trend of exports and imports due to external economic pressure and a plunge in manufacturing output and crude extraction; 2) deterioration of exports structure with increasing share of commodities; 3) heavy dependence on the conjuncture of the global crude market, which is highly volatile; 4) strong reliance on commercial exchange with the USA; 5) a small share of trade with regional partners.

In order to alleviate these negative factors, Venezuela needs to accelerate the pace of imports substitution, mainly in foods and essential goods, so that it could achieve at least pre-crisis volumes of production. By doing so, the country could enhance its national security. Export diversification would enable it to offer manufactured products with a higher value-added cost. At the same time, freed up foreign exchange resources could be used for purchasing foreign technology being an integral part of industrial modernization which is impossible without higher investment in fixed capital. These measures could reduce dependence on crude prices and oil revenues, make trade benefits more predictable and stabilize external trade dynamics. Economic sanctions are still a very powerful negative factor, contributing to the worsening distribution of trade flows from the theoretical perspective. Venezuela is currently unable to influence the situation, it is only capable of adapting. Nevertheless, the political initiative of the country's government could play a vital role in the relations with intraregional trade partners. To improve the situation, the country needs to revive its industrial output potential and to mitigate the consequences of the devastating economic crisis. Stronger cooperation with Latin-American countries and such big economies as China and India could harmonize Venezuela's external trade and bring it into closer conformity with the traditional gravity theory of trade.

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Seemingly Acceptance of Data Processing Agreement In the Context of Regulations Regarding Their Security - Outline of The Problem

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Abstract

This article covers reflection in the area of protection and data security and processing - in particular with regard to new related regulations with their protection. The main purpose of the considerations is to indicate the threat of "apparent consent" to the processing of data due to the mechanism in which only the prior agreement allows the use of services (e.g. installation of applications / software). Selected services and provisions of regulation Directive (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data by competent authorities for the purposes of the prevention, investigation, detection or prosecution of criminal offences or the execution of criminal penalties, and on the free movement of such data, and repealing Council Framework Decision 2008/977/JHA. In the research process, was made extensive use of qualitative research methods, including in the form of analyses (e.g.: legal and institutional analysis, comparative analysis, system analysis and methods: analysis and logical construction), generalization and implication. The empirical stage of the research also consisted in the assessment of the legal status. The cognitive and utilitarian premises of the problems are the implementation of the adopted hypothesis: existing solutions have been shaped in a way that provides protection only in the processing of *ex post* information, because only materialization of threats even in the form of incidents related to their processing is able to verify the level of security in this respect.

Keywords: Security, Data Protection, Data Processing

Introduction - services

The objective to the deliberations covered by the subject are not only the more frequent events (incidents) related to the transfer and use of user data without their consent and knowledge, or illegal processing of these data, but in particular the implication of these events in the form of a Regulation of the European Parliament and Council (EU) 2016/679 of April 27, 2016 on *the protection of individuals with regard to the processing of personal data and on the free flow of such data and the repeal of the Directive 95/46/EC (general regulation on data protection).*

The analysis of the issue of data transmission is worth starting with the initial comments related primarily to the type of network services (e-services) that the user can use.

The following service groups can be accepted as the general classification:

- searching for information (e.g. websites),
- direct communication – active (Internet communicators),
- indirect communication – passive (discussion groups, forums, lists),
- transfer, exchange or downloading of files,
- digital mass media,

- e-services (banking, shopping, etc.),
- strictly entertainment (e.g. online games),
- processing in the *cloud* [1].

Currently, a special type of network services are those referred to as: *SaaS* (*software as a service*), constituting one of the so-called computational cloud models. Their essence is to offer certain services (programs/applications) by the service provide, run on user devices as pointed out Szyłkowska and Kaczmarek (2017) via a web browser, which eliminates the need to install separate software (e.g. Google application package) in order to use their full functionality. The unquestionable convenience in using such services, however, brings a certain risk: as Richard M. Stallman explicitly stated: *we have no control, we deprive ourselves of freedom using the service on the web. And both in the scope of data entrusted to service providers, but also this freedom provided to the users by the truly free software* [1]. In addition to the lack of control over the data, the functional scope and the way the users use the shared software depend on the service provider.

Lack of control

The issue of control and its lack on the data not only concerns services processed in the *cloud,* but all types of services and applications – in particular, installed on mobile devices, e.g. mobile phones. It is worth paying attention to the latter here. The operating system installed in devices of this type to "provide" the functionality of some (or most) applications, *widgets* (graphic link that, when launched /clicked by the user, provides the assigned functionalities) and services requires providing data – including an e-mail address. The fact whether these data will be partial or fictious is not important, because each device has its own individual number, e.g. IMEI for mobile phones, which after installing the SIM card, enables unambiguous identification of the person using it, taking into account the requirement of registering each type of SIM card. However, when you start using the device, you must first go through the installation process and related declarations (consent). The first one is the software licence agreement attached to the device – consent to its registration is a prerequisite for further processing.

The next stage is the possibility of consenting to sending the device diagnostic data to the manufacturer, e.g. in the form of data from the error log (optional). The next part is giving your name and surname, which allows you to "personalize some applications on your phone" and configure your e-mail account. In this case, the user usually has only three options to choose from: provide a private address, provide a business address or add a postal address later, but already in the dedicated application (e.g. Gmail). The next stage concerns related services, including the location that the user can turn on or off at any time. It is worth noting that if you select the location option – your data will be "anonymously" sent to the service provider. In this set of services, there is also the possibility of allowing applications and services to look for wireless signals even when they are turned off (sic!). However, in the case of consent to the automatic sending of diagnostic data and regarding the use of the device and application – the user allows full profiling of his/her behaviour, despite the manufacturer's assurance of *anonymization* (however, there is no information about the mechanisms of such action). In the last stage, the user is provided with "general information" and the possibility of using the information collected by the manufacturer's partners, but again there are no precise markings, out of which information and to what extent it takes place.

In addition, the manufacturer reserves that the disabling of the indicated function "does not affect the ability of the device to send information needed for the operation of important services, such as operating system updates or security".

In practice, the lack of accurate records means that the manufacturer can freely recognize and assess information as "important" or "crucial" that the device can send. In conclusion of the indicated principles and the mechanism described, it should be stated that the user has absolutely no control over his device. He is also not able to determine at what moment and which data is transmitted by the device he owns and uses. Thus, he only seemingly expresses his *consents* at individual stages of the process, because in their absence – he will not be able to use the device.

Liability for the software

Currently there are no legal solutions in the indicated scope – in particular those related to software responsibility – and *de facto* for its "hidden functionalities" or – installation procedures described above, depriving the end user of knowledge and the ability to disable individual functions. The existing regulations now apply only to the area of copyright and legal protection of software, including in the Council Directive of May 14, 1991 on the *legal protection of computer programs (91/250/EEC)*. Even the recognition of software as a commercial product (digital) and the related manufacturer responsibility are subject – in accordance with the regulations – to the significant restrictions raised by the Council Directive of July 25, 1985 *on the approximation of the laws, regulations and administrative provisions of the Member States concerning the responsibility for defective products* (85/374/EEC). The indicated provisions leave no doubt as to the burden of proof on the user, because in the event of any damage – the aggrieved party must prove its loss, the product defect and the causal link between the defect and the damage. As a rule, it is assumed that the aggrieved party is not burdened by the obligation to show "dangerous features of the product or its defects, i.e. the causes resulting from the dangerous product, which normally resulted in damage". However, the logical consequence is *de facto* the lack of possibilities for the use to identify the undesired sending of information, since he has no knowledge in this respect provided by the manufacturer. This should include both the potential danger and the "dangerous property" of the product. In the case of "digital" devices with a multitude of types of installed software – identifying the one that caused the damage in practice could prove not only extremely difficult for the average user, but in fact – virtually impossible. Nevertheless, the provision of art. 8 par. 2 of the Council Directive of July 25, 1985 (85/374/EEC) quoted allows to limit or exclude the manufacturer's liability: *if, taking into account all circumstances, the damage is caused by both a defect in the product and the fault of the injured person or other person for whom the injured person is responsible.* However, apart from the issue of product liability, the challenge and urgent necessity for legislators, both at the European Union and national level, should be to define the requirements for precisely informing the user about data transmitted from his/her device without his/her knowledge – or legal prohibition of such practices by manufacturers. This fact will be confirmed by the following essential considerations, covered by the regulations on data processing – introduced by the Regulation of the European Parliament and of the Council (EU) 2016/679 of April 27, 2016 on the *protection of individuals with regard to data processing on the free flow of such data and the repeal of Directive 95/46/EC (general data protection regulation).* It is not difficult to notice that the consents granted by the user in the software installation process will fit in and thus be subject to these provisions. In turn, point 7. emphasizes that: *Individuals should have control over their own personal data. Individuals, business entities and public authorities should gain a greater sense of legal certainty and its application in practice,* which is directly related – in accordance with the regulations indicated – to the need not only to strengthen and clarify the rights of data subject, but also – or most of all – obligations of entities processing such data, including provisions related to liability in this respect. In accordance with Article 4: personal data is information about an identified or identifiable natural person. This type of data is information that allows you to identify a person either directly or indirectly. These include:

a.) all information on *identified or identifiable natural persons*,
b.) pseudonymised personal data that can be attributed to a natural person using additional information.

In particular, the identification will concern identifiers, such as: *name and surname, identification number, location data, Internet identifier or one or more specific factors determining the physical, physiological, genetic, psychological, economic, cultural or social identity of a natural person.* In turn, indirect identification takes into account the justified probability of its performance. In this case, the provisions require that any objective factors, such as the costs and time needed for identification, and the available technology. Taking into account the above, it should be assumed that there is a probability bordering with certainty that each user of the software can be identified by the manufacturer of the device, and the lack of precise information contained in the use agreement only confirms the presumption. In the same article, *processing* was defined as automated or non-automated operations or their set *performed on personal data or sets of personal data.* According to the rules included in Regulation of the European Parliament and Council (EU) 2016/679 of April 27 these activities include: *collecting, saving, organizing, ordering, storing, adapting or modifying, downloading, browsing, using, disclosing by sending, distributing or otherwise sharing, matching or combining, limiting, deleting or destroying.*

Returning to the issue of a *declaration of will* in the form of consent it should be pointed out that the provisions in question require the necessity of consenting to the processing of data in the form of an unambiguous confirmation action. The user's behaviour is of key importance, which will unequivocally indicate his acceptance of the data processing and this consent should apply to all processing activities (processing purpose). At the same time, the legislator emphasized that both: *silence, default windows or no action should not mean consent.* And moreover in Point (32): an electronic request for consent should be: *clear, concise and not unnecessarily interfere with the use of the service it concerns.*

Anonymous Information

Another point of the regulation indicates that the adopted protection principles should not apply to anonymous information, i.e. those that *do not involve the possibility of direct or indirect identification of a natural person or personal data that are anonymised in such a way that the persons to whom the data relates, s/he cannot be identified at all or cannot be identified anymore.* However, the greatest danger lies in the sentence stating that the protection rules do not concern the *processing of anonymous information, including processing for statistical or scientific purposes.* It is not difficult to predict that the consequence of such accepted provisions may be the updating of licence agreements, which emphasize not only the fact of full anonymisation, but also the indication of purposes: *scientific and statistical.* The procedure of installing software enabling the use of mobile devices, during which an individual identifier of the device can be clearly identified. Due to the lack of possibility to determine which information is sent when you start using a device – it is difficult to state clearly that such data are not transferred and at what point they are subject to anonymisation.

Conclusions

Concluding the considerations outlined in the subject, it should be stated that despite progress in the area of data processing protection – there is still a very high risk of apparent acceptance by users. This means that existing solutions have been shaped in a way that provides protection only in the processing of *ex post* information, because only materialization of threats even in the form of incidents related to their processing is able to verify the level of security in this respect. An additional effect may be the profiling effect even before the data is anonymised, which no user is able to state at the initial stage of the process. At the technical level, in turn – in particular in the field of software – the problem of the liability of suppliers/service providers/manufacturers still remains. This leads to the conclusion that the identified regulatory gap is similar to the gaps in programs that have "vulnerabilities" that allow their

use, resulting in potential user exposure to damage. In the case of software, the only effective tools is its update. The same type of action should be taken in the case of legal regulations – updating through amendment.

[1] Futher developed in: Szyłkowska M. (2019), *The fifth dimension of security-cyberspace: implications, threats, challenges,* Publ. Sine qua non, Cracow.

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Abbreviations

EU – European Union

IMEI - The International Mobile Equipment Identity

SIM (card)- subscriber identity module or subscriber identification module

Exploring the Antecedents of Employee Engagement Strategies on Migration Intention of Health Workers in Nigeria: A Conceptual Approach

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Abstract

Health care worker's migration to other countries has both short and long-term effect on the adequate health care delivery of the affected countries. Several contemporary issues are confronting Nigeria health sector like work overload, inadequate training and the high rate of migration intention of Nigeria health workers to developed western nations. Recently, it has been acknowledged that the sector is experiencing a shortage of medical doctors, nurses and midwives. The non-availability of adequate health workforce in any country will undoubtedly lead to negative health outcomes as adequate and qualitative health workforce is *sine qua non* to a qualitative healthcare delivery. Extant studies in this context mostly analysed factors accountable for the low level of qualitative health care delivery in Nigeria but limited studies proffered mitigating factors in addressing it in human resource context. This study through the review of extant studies identified the antecedents of employee engagement as a strategy that can propitiate Nigeria health workers to have good behavioural dispositions. To this end, this review looks at the relationship between employee engagement and migration intention of health workers. At the end of the review, a model was developed that can be empirically investigated to determine the extent at which the antecedents of employee engagement influences migration intention of health workers in Nigeria.

Keywords: Employee Engagement, Behavioural Dispositions, Migration, Qualitative Health Care Delivery

Introduction

Recent researchers in Nigeria health context observed that the sector has been characterized by instability, unproductivity and inadequate manpower (Court, Emmanuel, Ann & Nwadukwe, 2018; Oleribe, Udofia, Oladipo, Ishola & Robinson, 2018). The high dearth of health workers in Nigeria is caused by poor remuneration, poor working environment, job related stress and lack of career growth (Butawa, asule, Omole, Yere, Dogo and Gyuro, 2013). For instance, Vanguard (2019) assert that the inadequacy of health workers in Nigeria is so alarming as one doctor is to a population of 5000 Nigerians which is against one doctor to 600 people as suggested by World Health Organisation (WHO).

In a related perspective, Uneke, Ogbonna, Ezeoha, Oyibo, Onwe, & Ngwu (2007) observed that the Nigeria's health sector is in a deplorable condition due to dearth of trained medical workers. Moreso, Nigeria according to Uneke et al (2007) is known to be one a major health-worker exporting nation in Africa due to insufficient health amenities and pitiable compensation packages which makes a sizeable number of health workers migrate to advanced nations in search of sustaining and worthwhile jobs. Oleribe et al, (2018) assert that the consequences of inadequate health workforce cannot be over emphasized as it would negatively impact the health status in the society in terms of ineffectual tackling of infectious endemics, emergence of non-communicable diseases (NCDs), increase maternal mortality and non-achievement of Millennium Development Goals (MDGs) as corroborated by Adebayo, Labiran, Emerenini & Omoruyi (2016). In addition, Adebayo et al, (2016) assert that out of forty-nine nations identified by WHO to be having insufficient healthcare workers, Nigeria is in sixth position.

This challenge of dearth of health workers might also add to the present high infant mortality rate in Nigeria (Adetoro & Amoo, 2014). It is opined that the strength of any country is dependent on the reasonable degree on its efficiency, which is reliant on the welfare of the population (Misua, Al-Sadat & Gerel, 2010). This implies that the well-being of the citizens of a nation is sine qua non to national productivity.

On a broader perspective, the Nigerian public sector is bedeviled with low productivity because of socio-economic management and technological factors (Oshilim & Akpesiri, 2015). However, for this study, emphasis will be on the management factor as scholars believe that the failure or success of any organization hinges to a large extent on the management (Alkhazali & Halim, 2015; Henntschel, Muehlheusser & Sliwka, 2014). Several authors on Nigeria health sector have explored how the sector can be revived through the economic, sociological and technological approach, but limited research has been done on the management approach specifically through the engagement of the health workforce (Osain, 2011; Eme, 2014; Omoleke & Taleat, 2017; Eme, Uche & Uche, 2014).

To this end, the importance of this research work emerges from its objectives which are to:

a) identify the factors responsible for the consistent increase of Nigeria health worker's migration intention to other nations
b) explore the influence of employee engagement on Nigeria health worker's migration intention
c) ascertain the precursors of employee engagement and its strategies
d) Access the theoretical underpinnings of employee engagement and the managerial strategic approach to curb health worker's migration.

Literature Review

Workers Migration

Health worker's migration is the movement of health workers from inadequate income level countries to higher income level countries (Adeloye, David, Olaogun, Auta, Adesokan, Gadanya, Opele, Owagbemi & Iseolorunkanmi, 2017; Misua, *et al,*2010; Ogbuabor, *et al;* 2016; Adeloye *et* al; 2017).

Causes of Nigeria Health Worker's Migration

Misua, et al, (2010) posit that migration of health workforce can also be referred to as brain drain which is the movement of health worker's in quest of an improved standard of living and life value, better earnings, access to innovative know-how and more secured socio-economic environment globally. The rate at which Nigeria health workers migrate to other countries which is an aspect of global mobility is so alarming as over 35,000 doctors out of the 72,000 registered are practicing abroad (Vanguard, 2017). The movement of Nigeria health workers to other countries are occasioned by several factors which are hindering efficient healthcare delivery. It has been observed that the inadequacy of human resources in Nigeria health sector is significantly responsible for the poor population health in the country (Salami, Dada and Adelakun, 2016; International Organisation for Migration, 2014).

WHO (2014) and Stilwell, Diallo, Zurn, Vujicic, Adams & Poz (2004) observed that the movement of health workers around the world is motivated by migrants seeking better working conditions in other countries. The decision of health worker's migration is based on personal circumstances coupled with economic and social circumstances as well as state interventions. (Stilwell et al, 2004). Economic issues in this context underscores good wages and working conditions, social context emphasizes issues like social unrest and deprivations while state interventions like placement of international vacancies, flexible issuance of visas and work permits to intending migrants have a significant influence on health worker's intention to migrate (Stilwell, et al, 2004).

In addition, Medic West Africa (2019) posit that a good number of health workforce are faced with several backlogs of salaries, pitiable welfare, inadequate health facilities and work overload. Moreso, the main factors responsible for human resources inadequacy in Nigeria according to Eriki, Oyo-Ita, Odebo, Udoh, Omaswa & Kadama, (2015) include inadequate personnel planning and management

practices, long working hours, unsafe workplaces, inadequate compensation, and limited access to professional development opportunities. Also, Uneka, et al (2007) posit that Nigeria Health workers earn meager salaries, work in unsafe areas, have substantial workloads and lack the most basic health facilities to work and low prospect for career advancement. Nevertheless, Bello, Ajayi & Asuzu (2015) observed that organisational factors like authoritarian leadership style, lack of goal and role clarity as well as poor remuneration constitute push factors that motivate health workers migrate to developed nations. It also being observed that health workers experience low pay, irregular promotion, abusive supervision, unfriendly job attributes and stress on the job which influence their intention to migrate (Ogbuabor, Okoronkwo, Uzochukwu & Onwujekwe, 2016).

Influence of Employee Engagement on Migration Intention

Ibidunni, Osibanjo, Adeniji, Salau & Falola (2016) assert that success of any firm is reliant on workers' role and commitment which can be fostered through employee engagement. The importance of employee engagement cannot be over emphasized as organisational success depends on employee's productivity which is fostered through employee's commitment and involvement towards his/her organisation (Pratima & Bhagirathi, 2016). Employee engagement is an inevitable managerial tool that management uses to foster productivity, performance and retention as engagement ensures an exploratory state that enables organisation members to involve deeply on their individual selves in role performances (Lailah, Christo & Christoff, 2014).

Organisations today have come to realise that not all personnel are devoted and productive but engaged workers who are mentally and emotionally attached to the organisation, are obligated to achieve its objectives and dedicated towards its values like going extra mile beyond their basic work obligation (Bhavani, Sharavan & Arpitha, 2015). Falola, Oludayo, Igbinoba, Salau & Borishade (2018) opine that engagement entails passion and the disposition of an employee to invest own self and extend his extra effort to assist his organisation accomplish its goals, which is beyond ordinary satisfaction with the employment contract. Thus, employee engagement is the level of commitment and participation a worker invests towards their organisation and its success (Syed, Hussain, Abdul, Zamir & Ali, 2019). The survival of an organisation is dependent on how leaders of firm work hard to engage workers because the sustainability of any organisation is dependent on its workforce (Schrita & Mohamad, 2017).

Engaging employees is now an emerging organisational concept and it has been recognised as one of the major primacies of human resource administrators in any work environment (Bhatla, 2011). The term employee engagement refers to the level of loyalty and engrossment of the employees in an effort to achieve organizational goals. Shuck & Reio (2014) further viewed employee engagement as a holistic motivational theory reflecting the concurrent investment of an individual's behavioural, rational, and emotive energy in productive performance. Thakur (2014) further emphasised the advantage of organisations engaging their employees has it can significantly affect worker retention, efficiency, and dependability as well as positively impact organisation repute and overall stakeholder assessment.

According to Nada & Singh (2016) employee engagement is defined as an employees' sagacity of persistence and intensive vigor that involves the display of personal ingenuity, flexibility, energy, and diligence directed toward the realisation of organization's goals. More so, employee engagement can be described as a discrete and distinctive concept that involves intellectual, emotive, and behavioural components related with individual role performance (Marcus & Namitha, 2017). Passanan, Waiphot, Kwanta, Thaywuse and Patipol (2018) also referred to employee engagement as the extra resources like time, brainpower, and energy employees invest in their work that result in discretionary effort. Shuck and Reio (2014) further term employee engagement as the mental, passionate, and developmental energy an employee display toward positive organisational outcomes. In addition, Wang & Tseng (2019) posit employee engagement the psychosomatic state where workers have a vested concern in the organization's success and achieve to a high level that may exceed the specified requirements of the job. Nevertheless, Deepika & Sampurna (2018) added that employee engagement is the substantial degree of passionate and logical link that an employee has for his/her work, organization, colleagues and superiors which empowers him/her to put in additional extra effort to

his/her work. Additional known outcomes of employee engagement according to Falola, et al (2018) include low workforce turnover, enhanced employee productivity, improved support of the organization, positive influences on health and welfare, increased self-efficiency and receptiveness to innovative dynamism.

It is imperative for hospitals management and administrators to know how to drive employees towards being engaged in their work. It has been observed that health managers are deficient in the motivation and management of health workers, (Adeloye, et al, 2017). This suggest that hospitals or health facilities managers should go for human resources management trainings. How can health workers be engaged and committed? How can they be retained in the health sector? How can be motivated to go the extra mile beyond their employer expectations? This questions if addressed can mitigate the challenge of Nigeria health worker's migration to other countries.

Drivers and Strategies of Employee Engagement

Omer, Qaisar, Talat, Khalil & Aamer (2011) assert that when managers appropriately utilize employee engagement strategies like profession prospects, organisational support, investment on employees, employees' involvement in decision making, recognition and reward, fair treatment and equality and transformational leadership style, employees will be enthused to his organisation. Dorothea (2013) also posit that employee engagement motivations are driven both financially and non-financially as workers are not inspired by money alone as corroborated by Safaa (2018) that employees can be motivated to be engaged intrinsically and extrinsically.

Organisation Reputation

Nigeria health sector is currently challenge with issues that are detrimental to the sector image before its stakeholders, (Adeloye, et al, 2017). Extant studies on employee engagement and corporate reputation shows that both constructs are cyclically linked as one can potentially influence the other. Employee behaviour can drive corporate reputation according to (Friedman, 2009; Helm, 2011 & John, Ogunnaike & Osibanjo, 2014) and also corporate reputation influences how employees behave and perform as posited by (Davies, Chun, Da Silva & Roper, 2004; Helm, 2011). However, in this context, we are concerned with how organisation reputation can motivate employee engagement.

One of the leading researchers on company reputation Fombrun (1996) defined it as a constant depiction of an organisation previous activities and upcoming prospects that describes the firm's whole appeal to all of its main stakeholders when compared with other organisations. This implies that reputation is a replication or an appraisal observed by stakeholders including their employees in the past. Men (2012) also described corporate reputation as the totality of an organisation stakeholder's perception of how sensitive an organisational activities are satisfying the demand and hopes of many organisational stakeholders. In a related context, Gotsi & Wilson (2001) succinctly define organisation reputation as a stakeholder's overall valuation of an organisation over time and this assessment is based on the stakeholder's personal experiences with the organisation, their means of communication that gives information about the organisation actions and/or an evaluation with the activities of other organisations. This definition suggests that when an employee perceives that his organisation is better compared to other competitors, he tends to be engaged.

Job Designing

Job design according to Beliasi & Sklikas (2013) is the means of organizing task and duties into an organizational division of work. Job design always start with a breakdown of task requirements like what should be done? what are the motivating characteristics such as independence, responsibility, freedom of choice and self-control. Garg & Rastogi, (2006) observe that well designed jobs can have a positive influence on employee satisfaction and employee productivity as well designed task will foster motivation, fulfilment and performance of the employees. Osibanjo, Salau, Falola & Oyewunmi (2016) also affirm that it is imperative to design jobs in order to minimize and foster satisfaction of employees because job not properly designed can trigger stress. One of the identified factors pushing

Nigeria health workers to migrate according to (Ogbuabor, *et al,* 2016) is stress. Thus, health regulators and administrators can use job design as a mitigating strategy to minimize stress.

Career Development Opportunities

According to Mutunga (2009) employees' career advancement is process which is a formal, systematized and planned effort to achieve the balance between requirement of organisation's workers and individual career desires. When management provides sufficient prospect for training and support regarding career development, they help foster employee advancement and motivate employees to be engaged. Career advancement opportunities according to Hughes & Rog (2008) is the degree to which workers have the prospects for career growth and advancement. This implies that when workers are satisfied with their prospect for career advancement, the more they are willing to be engaged. Mone & London (2010) also observe that employees will feel more involved if organisations provide motivating job with prospects for career growth. According to Mutunga, (2009) when an organisation ensures that the job given to the employees complements with their career goals, it ensures effective employee engagement and retention. This is also corroborated by Vazirani (2007) that career growth influences engagement and retention of workers. Organisations that engages its workers provide them with prospects to develop their talents, acquire new skills, gain new knowledge and maximize their potential.

Investment on Employees

Perceived investment in employee development according to Omer, Qaisar, Talat, Khalil & Aamer (2011) refers to employee's valuation of their organisations' effort to assist them learn to recognize and get new skills and proficiencies that will allow them attain new and challenging positions. Erasmus, Loedolff, Mda & Nel (2011) further posit that when organisations train their workers, they are modifying their skill, knowledge and behaviour in other to increase their productivity and ability to accomplish organisational aims and objectives. The tangible work experiences acquired during this process build employee's capacity which significantly impacts productivity and fosters commitment (Kai, Altman & Roussel, 2008).

As a result, employees are indebted to show gratefulness for the employer's investment in their growth, showing that they do earn value from the process which will make them more motivated, committed and loyal (Alexandros & Bouris, 2008). This means that the organisation appreciate employees' contributions, care about their relevance and as a result they return back to the organisation in positive ways by exhibiting positive behavioural dispositions that proportionate with the extent they feel the organisation have invested in them (Omer, *et al,* 2011).

Work Environment

One of the core elements in the notion of employee engagement is the strong affective commitment of engaged workers and high involvement in their work. Employee involvement ensures a high degree of affection to the organisation which brings about connectivity and subsequently engagement (Lailah, Christo & Christoff, 2014). In addition, Chitra & Munivenkatappa (2017) assert that giving adequate opportunities for development and advancement to employees and ensuring that they have everything they need to do their jobs including physical or material and information resources foster employee engagement. In another context, Chandrasekhar (2011) assert that most workers spend substantial amount of their time within the internal environment which impacts their mental and emotional states, focus, behaviour, abilities and performance at work. In essence, the nature and value of the physical work environment is assumed to influence how workers interact, execute their roles as well as their mental, physical and emotional states (Oyetunji, 2014).

Compensation

Bibi, Pangil, Johari & Ahmad (2017) opine that employees are the most valuable asset of an organisation and retaining these employees is inevitable for the success of the organizations. Compensation packages entails salaries, bonuses and incentives and these have significant impact on employee satisfaction (Chiekezie, Emejulu & Nwanneka, 2017). According to Ldama & Peter (2017) compensation refers to monetary benefits that accrue to workers both intrinsically and extrinsically like

health care, vacation and leave grant, total salary package and other financial benefits. Extant literature on Nigeria health worker's migration to other countries emphasised inadequate compensation as the major factor for migration (Misua, *et al,*2010; Ogbuabor, *et al;*2016; Adeloye *et* al; 2017). According to Bibi, *et al* (2017) compensation is regarded to be one of the core essentials in workers' retention. Though it is expensive to retain experienced and skilled employees, it is more expensive to let them leave because failure to retain them has serious financial implications on the organisation like recruitment and training cost including the long period to acclimatize (Ldama & Peter, 2017).

Nevertheless, nonfinancial rewards such as recognition and other inherent rewards are unavoidable for job satisfaction which can also lead to high level of employee engagement and satisfaction and retention (Tessema, Kathryn & Abel, 2013). Leadership which is the capability to influence and inspire the actions of subordinates in an inspiring and motivating manner which fosters the achievement of objectives of both the team and the organisation is also intrinsically motivated (Alexandra and Maria, 2015). Alexandra & Maria (2015) further opine that leadership must be able to drive worker's engagement by giving primacy to the personal needs of their subordinates and inspire them to put the collective interests first over the individual interests as a means to accomplish the organizational goals.

This is because one of the main characteristics of effective leadership is the ability to increase the level of subordinate motivation in exhibiting good behavioral dispositions (Alexandra and Maria, 2015). These behaviours when exhibited highlight the principle of reciprocity which influence the subordinates to engage in a process of social exchange with their leaders. This implies that leadership style of the organisation like transformational leadership can motivate workers to be loyal to the organisation as a way to return the favourable treatment received from their leaders (Boerner, Eisenbeiss & Griesser, 2007). Thus, subordinates under a transformation leader will be motivated to reciprocate because of the motivation and self-esteem they might have received from their superiors.

Theoretical Underpinnings of Employee Engagement and the Managerial Strategic Approach

A theory is a form of a notion that explicitly explains a particular concept or phenomenon. Some theories have been developed to provide understanding into what employee engagement is all about. For instance, social exchange theory is among the most influential theoretical models for understanding good employees behavioural dispositions which entails series of interactions that generate obligations (Cropanzano & Mitchell, 2005). Social exchange contextually is a process of social interaction by showing how and someone (employer) behaviour reinforced the other behaviour (employee) and vice versa. Cook & Rice (2003) succinctly describe it as a process that involves the norm that when a party does another a favour, there is a general expectation of some future return and its exact nature is not stipulated in advance. For instance, this implies that when a party like the employer does a favour to the employee, such worker will also reciprocate in positive return and vice versa. It is expected for employees who receive an adequate or satisfactory level of most of all the precursors identified in Fig 1.1 not to reciprocate in good return to their employers including having a negative intention to migrate.

In addition, perceived organisation support theory (OST) according to Baran, Shanock & Miller (2011) is the positive perception by the employee that his/her effort is being appreciated as a result of his/her contributions to the organization. This implies that when the perception is positive, the intention to remain with the organisation will be high (Baran, Shanock & Miller, 2011). Eisenberger, Malone & Presson (2016) opine that it is important for firms to value their committed workers because employee's perception that the organization values their contributions and cares about their well-being will have substantial benefits for both parties. As observed by Colakoglu, Culha & Atay (2010) on of the most important predictors of organisational commitment is job satisfaction which has a positive effect on the dimensions of organisational commitment. If workers perceived organisational support to be positive, they tend to be satisfied on the job. This is further corroborated by Colakoglu, et al, (2010) that one of the most important predictors of job satisfaction is organisational support.

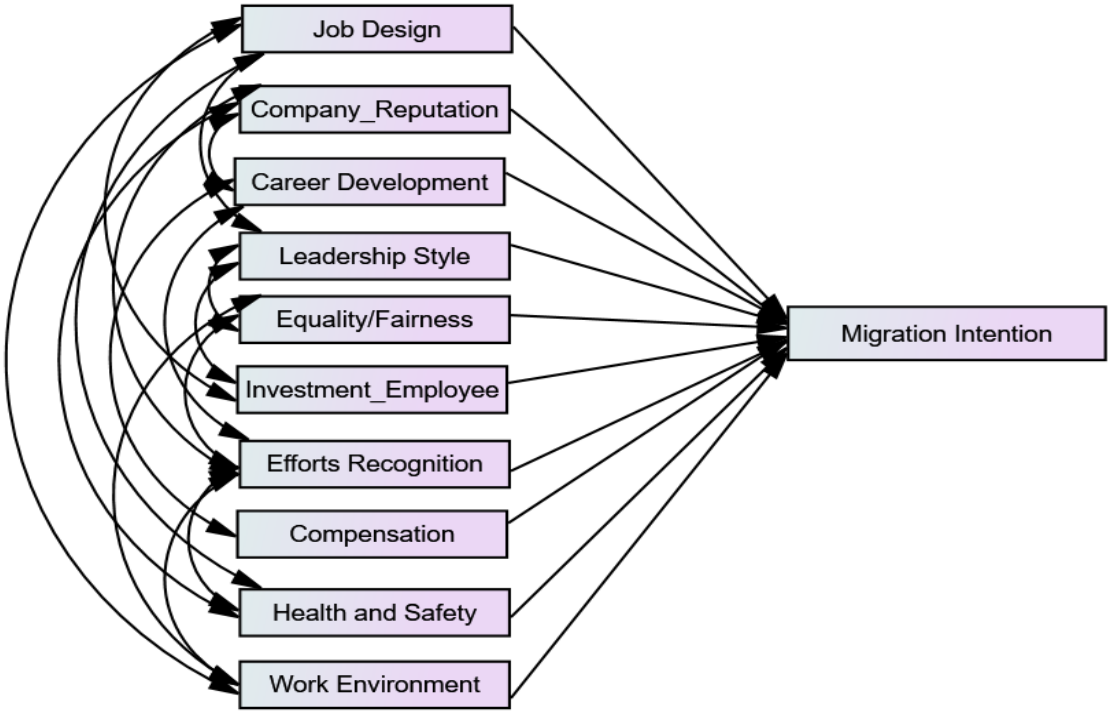

Figure 1: Proposed employee engagement Strategies and Retention Model

As depicted in Figure 1, it is observable that some precursors of employee engagement as identified are what health managers should do to motivate health worker's satisfaction. Extant literature on the challenge of health worker's migration in Nigeria identified inadequate poor human resources planning and management practices. Healthcare administrators and managers both at the private and public sector focus more on motivating their workers to be committed. Policy makers and managers must imbibe 21st century human resources management practices to health administration. Also, measures to retain health workers, encourage the return of migrated ones and ensuring their integration upon arrival is inevitable for adequate healthcare delivery in Nigeria. It is therefore inevitable to empirically investigate the proposed model in Figure 1.1.

Conclusion and Managerial Implication

The behavioural outcomes relating to withdrawal process from an organisation are; absenteeism, unpunctuality, citizenship fatigue and eventually turnover including counterproductive behaviour. It is however assumed that, if an employee receives a favourable treatment from his/her employer, he/she tends to reciprocate in likely manner and vice versa. However, employees should be engaged in order to have a feeling of being valued which will foster their commitment and retention. Nigeria health sector stakeholder are however expected to apply employee engagement as a tool to mitigating the menace of health worker's migration.

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Evaluating Factors affecting sentences similarity and paraphrasing identification Using K-means clustering

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Abstract

This research considers Arabic Paraphrasing Benchmark for identifying similar and paraphrased sentences using k-means clustering. The benchmark is constructed based on Arabic transformation rules for sentences and provided by labels for similar/not similar and paraphrased/not paraphrased sentences. K-means clustering is applied to partition the dataset into clusters with similar sentence pairs. Three factors that affect the distribution of similar and paraphrased sentences are tested by conducting several experiments with K-means clustering. By analyzing the resulted clusters, paraphrased sentences achieve a recall of 0.81 with the pre-trained embeddings and a recall of 0.78 with introducing words' weight while labeling by majority provides better recall than labeling with a threshold of similarity score.

Keywords

paraphrasing, sentence similarity, K-means, clustering.

1. Introduction

Paraphrasing identification refers to reframing a sentence using different words and structures to produce a new sentence with the same meaning (Fernando, 2008). Semantic similarity has an important role in detecting paraphrases, as it allows the process to compute the similarity score between texts in order to identify whether they are similar in meaning or not (Srivastava and Govilkar, 2017) (Alian and Awajan, 2018). The approaches to measure semantic similarity between sentences can be categorized into four groups, namely, co-occurrence–based approach, statistical corpus-based approach, feature-based approach, and word embedding-based approach. The co-occurrence–based approach represents texts as a bag of words vector while the statistical corpus-based approach uses Latent Semantic Analysis, which represents texts as vectors in a reduced-dimension space. The feature-based approach focuses on the similarity of words and the order between texts where words that have the same part of speech are aligned. The Word-Net based measure is used to compute semantic similarity between words and overlapping word orders in the two texts. Finally, the word embedding approach has the ability to consider the context of the words when representing words in a distributed space (Alian and Awajan, 2018).

For the purpose of analyzing paraphrased sentences in Arabic, we built a paraphrasing benchmark which consists of Arabic sentence pairs; part of these pairs is collected from Arabic books and lexicons while the other is constructed by experts using words form Arabic lexicons and AWSS dataset. Then, six transformation rules are utilized to generate the transformed form of the collected sentences. The dataset is labeled by Arabic specialists with different levels from Art College from Hashemite University (Alian et al., 2019).

The aim of this research is to analyze the constructed paraphrasing benchmark and use the K-means clustering to analyze and study the factors that affect the results of similarity and the distribution of sentences.

The K-means is considered as the simplest method used for partitioning a dataset into clusters of similar objects. Therefore, it is applied to the dataset after representing the sentences as vectors in a continuous vector space using wrod2vec model.

The main factors that will be studied to show their impact are: embedding method, weight of words and labeling dataset. Two ways are considered to implement the word2vec embeddings; the first one is achieved by training word2vec on the dataset and the second one by using pre-trained embeddings. Introducing the weight that represents the importance of words in a sentence is tested using Tf-idf. The way of labeling the dataset for similarity is another factor that may affects the results of similarity and paraphrasing which is tested through experiment.

This paper is organized as follows: section 2 describes the structure of the Arabic paraphrasing benchmark. Section 3 explains K-means clustering algorithm while in Section 4, we experiment k-means clustering on the benchmark. Finally we conclude in Section 5.

2. Arabic Paraphrasing Benchmark

This benchmark is constructed from Arabic sentences that are collected from several books used for teaching Arabic language such as Jordanian curriculums for Arabic language and other books (Jarim and Ali, 2004) (Omar, 1998) (Omar, 1420 - 1999) (Alkholi, 2001). In addition, Experts in Arabic language create a number of sentences based on words from some Arabic lexicons and words from Arabic Word Semantic Similarity (AWSS) dataset (Almarsoomi et al., 2013).

Arabic Paraphrasing can be reached by two methods; the first is based on paraphrasing hypothesis “two sentences are paraphrased if they consist of identical words except one word in the first sentence and its synonym in the second one”. The second method is based on the language transformation rules (Al-Kholi, 1999). Therefore, the collected and created sentences are transformed into other sentences based on the transformation rules for Arabic sentences. The applied transformations are reflected in a set of rules referred to as “transformation rules” that were constructed by Chomsky (Chomsky, 1957); the creator of the constructional and transformational school.

The transformation rules can be categorized into a number of patterns; permutation, deletion, addition, reduction, expansion, and replacement. Permutation is the process of reordering words in the first sentence to get the new sentence while deletion is removing one item from the sentence. It is also the inverse of the addition rule which adds an item to the structure of the sentence. The expansion is the process of replacing a word by two different words that provide the same meaning while reduction is to represent two words by one word with the same meaning (Alian et al., 2019).

The transformation rules were applied on the collected sentences by two experts in Arabic language to produce the transformed sentences. Both experts have the degree of philosophy in Arabic where they collect and transform the sentences in three months.

Let A, B, and C are words or phrases in the sentence. Then, the transformation rules can be symbolized as in Table 1 as described by Al-kholi (Al-Kholi, 1999). Furthermore, the transformation is a description of the relationship between the deep structure of the sentence and the surface structure of the sentence.

Table 1: Transformation rules **(Alian et al., 2019)**

Transformation rule	Representation by symbols	Example
Permutation	A+B = B+A	تسلم الفائز الجائزة تسلم الجائزة الفائز
Deletion	A + B = […] + B A + B = A + […]	اسألوا أهل القرية عن اللص اسألوا القرية عن اللص
Addition	A=A+B	السماء صافية إن السماء صافية
Expansion	A = B+C	وددت نزول المطر وددت لو ينزل المطر
Reduction	A + B = C	الجو حار بارد الجو معتدل
Replacement	A = B	شارك الأستاذ في الأمسية الأدبية شارك الأستاذ في الأمسية الشعرية

3. Background

3.1. K-means

K-means is a non-hierarchical clustering algorithm which was introduced by Hartigan and Wong (1979) (Hartigan, 1979). It is considered as the most popular and simple approach used for partitioning a dataset (Steinley, 2007) or a number of observations in order to produce k clusters such that the total variation of within-cluster is minimized.

In this algorithm, the data is partitioned into k clusters where each cluster is represented by the mean of its content points and this is where the name of K-means comes from (Berkhin, 2002). However, there is no special equation for determining the number of clusters (k). It is specified by the problem domain or the application Data (Parsian, 2015).

K-means clustering can be used in many scientific and industrial applications (Berkhin, 2002). For example, it can be used in clustering documents into groups according to their content similarity or grouping customers into clusters according to their behavior (Parsian, 2015). It is a prototype-based partitioning clustering technique that attempts to find a user specified number of clusters (K) presented by their centroid (Tan, 2014).

K-means clustering technique is used in partitioning data into K classes (C1,C2,…,Ck) where K is the number of clusters and it is a predefined parameter while Ck is the group of nk objects in cluster k . The data consists of N objects where each object has P features. If Xnxp denotes NxP matrix, K-means generates k clusters by selecting k centroids then starts an iterative procedure by computing the squared Euclidean distance between any object vector and the centroids vectors. Euclidean distance is computed as in Equation (1)

$$d^2(i,k) = \sum_{j=1}^{P} (x_{ij} - s_j^{(k)})^2 \qquad (1)$$

Where
$d^2(i,k)$ is the squared Euclidean distance
i is the ith object
k is the *kth* centroid vector represented by $(s_1^{(k)}, \dots, s_P^{(k)})$.

Then an object is assigned to the cluster with the closest centroid to that object. The centroid is a point in the P-dimensional space which is selected randomly at the beginning then it is updated by computing the mean of the values on each feature over all objects in the corresponding cluster. The centroid for the jth feature in cluster Ck is found by Equation (2) (Steinley, 2006) (Steinley, 2007)

$$\bar{x}_j^{(k)} = \frac{1}{n} \sum_{i \in C_k} x_{ij} \qquad (2)$$

And the centroid vector for the cluster Ck will be:

$$\bar{x}^{(k)} = (\bar{x}_1^{(k)}, \bar{x}_2^{(k)}, \dots, \bar{x}_P^{(k)})' \qquad (3)$$

K-means attempts to find good partitioning by minimizing the error sum of squares (SSE) in the constructed clusters. It is considered as a loss criterion and calculated as in Equation (4):

$$SEE = \sum_{j=1}^{P} \sum_{k=1}^{K} \sum_{i \in C_k} (x_{ij} - \bar{x}_j^{(k)})^2 \qquad (4)$$

3.2. Aravec

AraVec (Mohammad, Eissa and El-Beltagy, 2017) is an Arabic language pre-trained distributed word embedding model where it was produced using the Word2Vec skip-gram technique trained on World Wide Web pages Arabic content with a vector dimension of 300 and a vocabulary size of 145,428. The Aravec

models have been built based on three domains: Web pages, Arabic tweets and Wikipedia with articles of Arabic content. These domains provide building the models with more than 3.3 billion tokens.

3.3. Evaluation measures

Precession and recall are commonly used as measures for evaluating the results in Information Retrieval and Machine Learning experiments (Powers, 2007). In information retrieval, they are used for measuring how well the system retrieves relevant items requested by the user (K.M., 2011).
Recall is called sensitivity and it is defined as the percentage of positive items that are predicted correctly positive as in formula (4) (K.M., 2011):

$$Recall = \frac{TP}{(TP+FN)} \qquad (1)$$

Where
TP is the true positives (items that are positive and they are correctly identified positive)
FN is the false negatives (items that are incorrectly identified as negative)
(TP+FN) is the total number of actual positives.

While Precision is called confidence and it is defined as the percentage of predicted positives that are real positives as in formula (2) (K.M., 2011):

$$Precision = \frac{TP}{(TP+FP)} \qquad (2)$$

Where
TP is the true positive
FP is the false positive (items that are negative but falsely identified as positive)
(TP+FP) is the total number of positives predicted

3.4. Term frequency-inverse document frequency

Term frequency-inverse document frequency (TF-IDF) is considered as a numerical and statistical approach that takes into consideration the importance of a term within a group of documents. As the frequency of a word occurrence increased in a document, TF-IDF is proportionally increased but inversely proportional to the word's frequency in all documents or corpus (Mohsen et al., 2018). The TF-IDF is computed as in the following formula:

$$TFIDF = \frac{n_t}{N_d} \times \log\left(\frac{N_j}{n_j}\right) \qquad (3)$$

Where
N_j is the total number of documents in the corpus
n_j is the number of documents that contain term t.
n_t is the number of times where word t appears in the document.
N_d is the total number of terms in the document d.

4. Experiment and Results

Three factors that affect sentences similarity and paraphrasing identification are evaluated using Kmeans clustering. The first factor is the approach used for providing sentence's embeddings; trained and pre-trained embeddings while the second factor is introducing the weight of words. The third factor is the way of labeling the dataset; by majority or by similarity score threshold. The resulted clusters that contain similar sentences are compared with the labeled dataset using recall and precision measures.

4.1 Self-trained Word2Vec word embeddings vs pre-trained Word2Vec

In evaluating the approach used for representing sentences in the distributional space, two experiments are conducted; the first experiment is based on self-trained of word2vec on the dataset that consists of 2020 sentences with 3145 vocabulary while the second experiment is conducted on pre-trained embeddings using

Aravec that utilizes 77,600,000 Arabic tweets, gathered from different locations, in the training of word2vec. The vector that represents a sentence in both experiments has constructed as the mean of its content words' vectors. Then, K-means is applied to partition the dataset into clusters of similar sentences. The number of clusters (K) is chosen as half the number of sentences which is equal to 1010 clusters. Since we compare each pair of sentences if they are similar, paraphrased or not. Table 2 and Table 3 show the confusion matrix for both experiments for the similarity detection.

Table 2: Similarity confusion matrix for self-trained

Training on the dataset	**Labeled**	
	Similar	not similar
Similar	638	95
not similar	226	51

Table 3: Similarity confusion matrix for the Aravec training embeddings

Aravec training	**Labeled**	
	Similar	not similar
Similar	682	102
not similar	182	44

In Table 4 and Table 5, the confusion matrices for paraphrasing test are shown for dataset training embeddings and Aravec embeddings, consequently.

Table 4: The confusion matrix for paraphrasing identification with self-trained embeddings

	paraphrased	**not paraphrased**
paraphrased	576	157
not paraphrased	188	89

Table 5: The confusion matrix for paraphrasing identification with Aravec embeddings

	Paraphrased	**not paraphrased**
paraphrased	611	173
not paraphrased	148	78

Accordingly the recall will be computed as in as in Formula (1) as (in section 3.3) where the true positive is the paraphrased sentences correctly identified while the false negative is the paraphrased incorrectly labeled as not paraphrased.

While the precision will be calculated as formula (2) as previously mentioned in section 3.3 where the true positive represents the paraphrased sentences correctly identified while the false positive represents the sentences that incorrectly labeled as paraphrased.

The results of recall and precision for detecting similar sentences are shown in Fig.1 while the results for paraphrasing identification are shown in Fig.2.

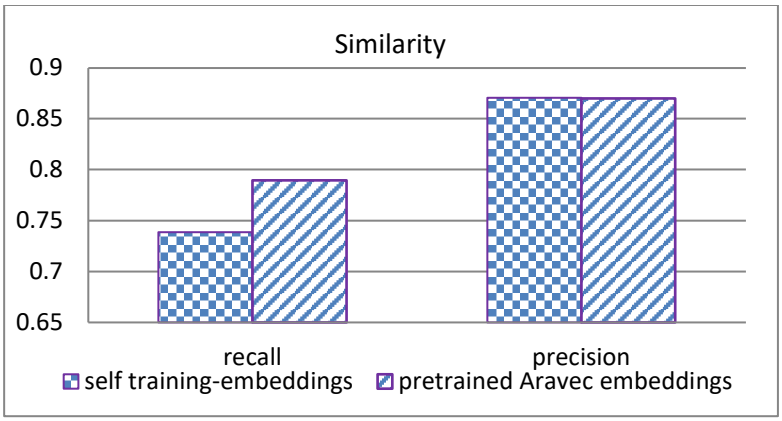

Fig 1. Recall and precision for both dataset and Aravec embeddings for similarity.

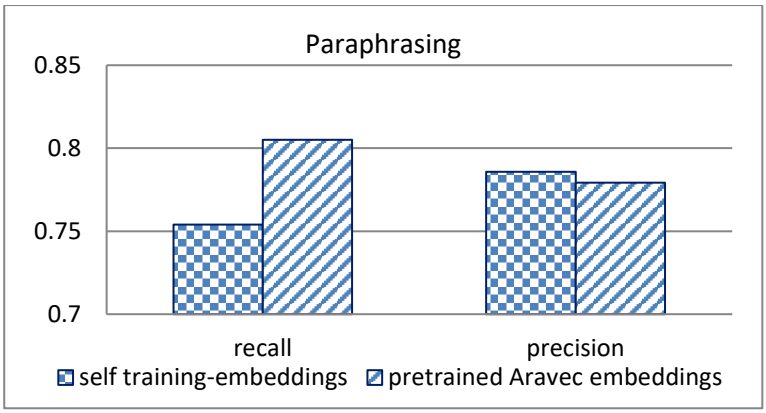

Fig.2. Recall and Precision for both dataset and Aravec for paraphrasing.

The recall achieves better values with the pre-trained Aravec embeddings in similarity detection and paraphrasing identification while the precision with the dataset training embeddings provide better value for paraphrasing identification.

4.2 TF-IDF weight

Each word in the structure of the sentence has its significant importance. In this research, word's importance is expressed as the weight which is computed as the Tf-idf as in formula (3) as in section 3.4.

When we include the weight for each word to produce the embedding of a sentence, the results for paraphrasing identification is little better than the results without taking the weight into consideration. As shown in Table 6.

Table 6: comparing paraphrasing identification results

Experiment	recall	precision	F1 score
K-means TfIDF	0.785166	0.808959	0.796885
K-means	0.779337	0.805007	0.791964

4.3 Labeling Dataset

We used two methods to provide the final label to the dataset. In the first method, we used the label of each sentence pair for similarity by majority of experts' decision about similarity. If more than three experts give a decision of similarity for a sentence pair then this pair is labeled as similar. In the second method, we compute the average of the score of similarity provided by the experts. A sentence pair is labeled as similar if the score average is greater than or equal to 0.50, otherwise the sentence pair is labeled as non-similar.

To evaluate the effect of these two methods on the similarity of sentences, we conduct an experiment by applying the two methods of labeling the dataset with K-means and weighted embeddings. The results of labeling by majority are shown in Table 7 while the results of labeling based on the score of similarity are represented in Table 8. It is shown that choosing the method of labeling a sentence pair has affected the precision and recall measures. From Table 7, it is shown that labeling by majority provides better recall for K-means with Tf-idf weighted embeddings.

Table 7: labeling by majority results

Experiment	Recall	Precision	F1 score
K-means TfIDF	0.87468	0.790751	0.830601
K-means	0.789352	0.869898	0.82767

Table 8: the results of labeling by score >=50%

Experiment	Recall	Precision	F1 score
K-means TfIDF	0.748082	0.80137	0.77381
K-means	0.79863	0.743622	0.770145

5. Conclusion

In this research, k-means clustering is applied for Arabic paraphrasing benchmark that consists of pairs of Arabic sentences with two labels: one for similarity and the other for paraphrasing. K-means is used to explore the dataset as clusters of similar sentences and experiment which pairs are paraphrased and allocated in the same cluster. The experiment includes two ways for producing sentences' embeddings: one way is constructing embeddings by training word2vec on the dataset and the other utilizes the embeddings of Aravec model which provides a pre-trained embeddings. The results for pre-trained embeddings produce a better recall in detecting similar and paraphrased sentences. Applying K-means with introducing Tf-idf weighting for words provides a recall of 0.78 while labeling the dataset for similarity by majority of experts provides a recall of 0.87 which is better than the recall achieved with labeling by similarity score threshold with Tf-idf weighting.

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Development of Hunting Tourism in Ukraine: Organizational, Economic and Legal Aspects

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Abstract

Modern approaches to the definition of "hunting tourism" are analyzed in the article. It is proposed to consider hunting tourism as an organized paid trip aimed on satisfying the needs of consumers (hunters) in services of extreme, sports & recreational or cognitive character in the process of their staying in the natural habitat of hunting animals. The main problems of organizational, economic and orientation legal, which hinder the development of hunting tourism in Ukraine, are considered. The resource support of hunting tourism development in Ukraine is analyzed. Organizational and management aspects of hunting economy in European Countries (Germany, Sweden, Finland, Hungary, Czech Republic and Poland) are investigated. The directions for solving of basic problems of organizational and legal support, as well as incentives for further development of hunting tourism in Ukraine are offered. The basic principles on which hunting tourism should be based are formed, in particular: the principle of preservation of biodiversity in the animal and plant life of hunting grounds; the principle of sustainable ecologically balanced of using the hunting resources for tourism purposes; the principle of observance of ethical norms and national traditions in the process of organizing hunting tourism; the principle of preservation of the cultural heritage in the areas, which are reserved for the organization of hunting tourism; the principle of promoting the development of alternative types of hunting tourism; the principle of integration of hunting tourism with hunting, forestry and agrarian enterprises; the principle of state support in the development of hunting tourism.

Keywords: Tourism, Hunting Tourism, Hunting Economy, Hunting Industry.

Introduction

The process of Ukraine's integration with the European community involves conducting a series of political, economic and social measures. Reformation of the national economy is possible only by reviewing existing approaches to the process of using and reproducing the country's resource and raw material potential, as well as finding new ideas for the development of entrepreneurial activity. Formation of regulatory and legal support, stimulation of the development of new areas of entrepreneurship in Ukraine should be reflected in the list of main tasks of the state policy on the development of small and medium-sized businesses (SMBs).

In developed countries, SMBs are considered as the subjects, which are forming the basis for the establishment of democratic relations; it's simultaneously aimed at solving the social employment policy. Significant potential for economic and social growth through the development of SMBs is hidden in one of the priority sectors of the national economy – tourism industry, which was repeatedly noted and considered in various regulatory and legal documents both nationally and internationally levels.

Inherently, modern tourism is defined as a multifaceted phenomenon, which is closely related with economics, history, culture, geography, medicine, ecology etc. In addition, tourism is largely characterized as one of the traditional forms of nature use, which is manifested in the using of natural resources for recreational purposes, including using the resources of hunting fauna.

Insufficient attention of scientists, business entities, governmental and non-governmental organizations to the problems of involvement of hunting fauna resources for tourist purposes is determined the relevance of this scientific research.

Literature Review

Organizational and economic aspects, analysis of foreign and domestic experience of organization, management and development of hunting tourism are highlighted in the scientific works of many scientists. Organizational basis of formation and development of international hunting tourism in the independent Ukraine and in conditions of a market economy are covered in the science works of Bondarenko V. (Bondarenko, 1993). Delehan I. is one of the first scientists who distinguished the hunting tourism as a profitable component of the tourism industry in Ukraine; in particular, based on foreign experience, he indicated that hunting tourism can gives such profits, which in magnitude will be higher than the cost of annual allowable cut wood at the average European prices (Delehan, 1994). The analysis of the main ecological and economic trends in the development of hunting tourism in developed countries, the typical forms of hunting tourism in these countries and their economic role in the national and regional context are reflected in the science work of Kulchytska E. (Kulchytska, 2014).

The main directions of development of hunting tourism at the regional level in Ukraine, the current state of hunting tours and trends in tourism industry are considered in the science works of Banderych V. (Banderych, Pryndak & Khoietskyi, 2011) and Yachniuk M. (Yachniuk, 2010). The main provisions of the ecological and economic assessment and economic incentives for the using, protection and reproduction of hunting fauna resources, as well as the determination of payment standards for the special using of resources of the hunting economy are disclosed in the works of Vovchenko V. (Vovchenko, Malevanova & Domnich, 2005), Dynka P. (Dynka, 1992), Koval Ya. (Koval, Antonenko, & Shadura, 2000), Muraviov Yu. (Muraviov, 2001), Syniakevych I. (Syniakevych, 2000) etc.

The grounded analysis of environmental legislation, studying the problem issues of the property right on the resources of the animal world, their rational using, protection, reproduction, regulation of hunting and the development of hunting tourism at different time periods were researched by such scientists as Muntian V. (Muntian, 1982), Tomyn O. (Tomyn, 2009), Klapchuk V. and Protsiv O. (Klapchuk & Protsiv, 2011), Cherkashyna M. (Cherkashyna, 2011), Tykhyj V. (Tykhyj, 2000) and others.

The international aspects of the sustainable development of hunting tourism in the European countries are reflected in the "European Charter on Hunting and Biodiversity" (Strasbourg, 2007), which was approved at the 27th meeting of the Standing Committee of the Bern Convention. This document combines the main aspects of European and international policy on sustainable realization of hunting, ecotourism, biodiversity conservation in the context of ecological, economic and socio-cultural problems of sustainable development; also it provides three main interrelated directions for the development of hunting economy (http://www.cic-wildlife.org/uploads/media/Hunting_Charter_EN.pdf.): 1) the development of principles and practical

recommendations for the sustainable using of wildlife resources and biodiversity in Europe, especially through hunting; 2) the development of principles and practical recommendations for sustainable hunting tourism in Europe; 3) the assistance in raising awareness of the hunter in the issues of weapons handling, safety and adherence of ethical standards in the hunting process.

Also, the "European Charter on Hunting and Biodiversity" contains 12 principles, 47 practical guidelines for natural resource management bodies and 59 practical recommendations for hunters and tour operators, which take into account existing works in this area, in particular the principles and recommendations adopted in Berne (1979), Rio de Janeiro (1992), Malawi (1998), Addis Ababa (2004).

Using of hunting fauna resources as an object of tourism activity is a fairly widespread phenomenon in developed countries. At the same time, the specificity and individual approaches to the using of hunting fauna resources determine hunting tourism as one of the most expensive and elite types of tourism. Hunting tourism in Ukraine is on the formation stage and requires a grounded scientific substantiation in the order to determine the effective organizational, economic and legal mechanism for its functioning. The issues of definition, economic and legislative regulation of hunting tourism in Ukraine still are unresolved and open.

Materials and Methods

The theoretical basis of this research are the fundamental provisions of tourism science, economics of hunting, tourism and nature management, ecological economics, the theory of sustainable development, normative and legal support of activities in the field of hunting tourism. The methodological basis of the study consists of a set of such methods and techniques: induction and deduction – to generalize the basic theoretical principles of the study, as well as the formulation of conclusions and recommendations; monographic – for studying and generalization of scientific approaches to the definition of "hunting tourism"; institutional analysis, comparative analysis, generalization and abstraction – for studying foreign experience of hunting industry and hunting tourism development; integrated and systematic approaches – for the formation of principles of hunting tourism; economic and statistical methods for analysis the potential of hunting fauna resources, hunting production markets, ecological and economic efficiency of reproduction and using of hunting resources for tourist purposes in the European countries and Ukraine.

The information basis for this research were legal and normative acts: the Constitution of Ukraine, Laws of Ukraine, Decrees of the President of Ukraine, resolutions of the Government of Ukraine, normative acts of the Ministry of Ecology and Natural Resources of Ukraine, State Agency of Forest Resources of Ukraine, international legal documents in the field of environmental policy and environmental protection, adopted at international conferences and laid down in international agreements. The official statistics and information from the State Statistics Service of Ukraine, the Ministry of Ecology and Natural Resources of Ukraine, the State Agency of Forest Resources of Ukraine were used in the work.

The aim of this article is to substantiate scientifically the definition and essence of "hunting tourism" and make an assessment of legal, organizational and economic provision for its development in Ukraine.

To achieve the aim we have solved the following *tasks:*

1. to analyze modern approaches to the definition of "hunting tourism" on the basis of foreign and domestic scientific works, legal & normative support;
2. to investigate organizational and management aspects of hunting economy in European Countries (Germany, Sweden, Finland, Hungary, Czech Republic and Poland);
3. to determine the organizational, economic and legal problems of the formation and development of hunting tourism in Ukraine;
4. to offer the incentives for further development of hunting tourism in Ukraine;

5. to form the basic principles on which hunting tourism should be based.

Results

The hunting tourism originated at the first half of the XIX century. It is the time, when traveling related to the hunting on African exotic animals in the order to receive their trophies become very popular among the wealthy European nobles. The most prestigious in the world, even nowadays, are trophies of the so-called "African Five" (elephant tusks, lion fangs, buffalo horns, leopard skin, rhinoceros horns etc.). Subsequently, this type of trips got the name "safari", and the desire of hunters to get the best trophy formed the basis for the development of international hunting tourism, despite the rather high cost of such events.

Let's consider the most famous approaches to the definition of "hunting tourism" (Table 1).

Table 1: Definitions of hunting tourism

Balysheva (2007)	Hunting tourism: an organized paid trip for trophy hunting, which is provided by a set of specific services
"European Charter on Hunting and Biodiversity" (2007)	Hunting tourism is defined as a form of tourism that is carried out by hunters, who can traveling sometimes at significant distances from their permanent homes and/or from their own hunting grounds for hunting (This definition includes both domestic and international hunting trips. In this case, the destination of hunting is more exotic and unusual)
Shandor & Kliap (2011)	Hunting tourism (outfitter tour): a kind of tourism, the purpose of which is searching, tracing, prosecuting and prey some species of wild animals
World practice	Hunting tourism is considered as one of the directions of international tourism, whose purpose is to satisfy the needs of foreign hunters-tourists

In our opinion, the note of "hunting tourism" (which is followed by the vast majority of scientists) is an integral part of the note of "hunting", which involves a special using of the animal world by obtaining hunting animals that are in a state of natural freedom or are kept in semi-free conditions within hunting grounds; and hunting as a branch of the national economy includes the process of providing services in the conduct of hunting (http://zakon.rada.gov.ua).

As we can conclude, the basis of the above definitions of hunting tourism is the consumer direction of the using the objects of animal world, by the extraction of wild game animals with the help of small arms in the order to obtain a trophy. It is impossible to disagree with this, because in countries with long hunting traditions, the quality and quantity of trophies obtained during the hunting process are the most important indicators for assessing the level of development of both hunting tourism and hunting economy as a whole. But still there is a certain contradiction, which is that in itself trophy hunting can't be laid as a basis for increasing the number of wild game animals and lead to increasing the quality of their population, however, it can stimulate hunting economy in the direction of increasing economic and environmental efficiency of their work (Danylkyn, 2010).

In a broader sense, hunting tourism is both craft and entertainment. This approach determines hunting tourism as one of the most profitable modern types of tourism. Hunters consider hunting as one of the types of leisure or recreation, as a way for communicating with nature, which is based on the process of wild game extraction.

In our opinion, in addition to extreme (extraction of hunting animals, obtaining a trophy), it is possible to identify other alternative types of hunting tourism, namely sports & recreational and

cognitive. These should include the following forms of hunting tourism: walks in the woods for monitoring wildlife, photo and video hunting, trophy case, hunting dog breeding, taxidermy (making stuffed of animals) etc. Thus, hunting tourism should be considered not only from the standpoint of consumption, but also as an activity aimed at satisfying the needs of hunters in the services of aesthetic, moral, recreational and cultural character in the process of their staying in the natural habitat of hunting animals. It should be noted that exactly the alternative types of hunting tourism are becoming more and more popular in the countries of Central and South Africa and in the future can completely replace the traditional safari.

Taking into account the above statements, authors' propose the following definition of hunting tourism: an organized paid trip aimed on satisfying the needs of consumers (hunters) in services of extreme, sports & recreational or cognitive character in the process of their staying in the natural habitat of hunting animals.

Organizational and economic provision of hunting tours in the territory of Ukraine for both foreigners and citizens of Ukraine involves solving a sufficiently large number of problem tasks. Hunting tourism is at the junction of hunting, forest, agriculture, water and tourism industries in general. It is obvious that the closest and interconnected relationship is between hunting tourism and hunting economy, which in perspective may lead to conflict of interests between hunters, users of hunting grounds, the state and private landowners. This is confirmed by the fact that in accordance with the National Classifier of Ukraine DK 009: 2010 "Classification of Types of Economic Activities", tourist and hunting activities are classified in different sections, in particular: hunting industry - section A "Agriculture, Forestry and Fishing Industry", issue 01 "Agriculture, hunting and related services"; tourist activities - section N "Activities in the field of administrative and support services", issue 79 "Activities of travel agencies, tour operators, provision of other reservation services and related activities".

However, it should not be forgotten that hunting tourism for hunters, tourist enterprises (tour operators, travel agencies) is primarily an economic activity related to the provision of services to hunters-tourists in the order to generate income and increase the efficiency of hunting activities. Such an approach was formed due to connection with the specific features of hunting tourism, which unites, on the one hand, the hunting industry features of the organization, management, using, reproduction and protection of hunter's resources, and, on the other, the constituent elements of tourism activity (formation of tourist product, search, reception, transfer and placement of customers and other related services).

Like any industrial or commercial activity that is connected to several branches of the national economy, hunting industry should be regulated by relevant related legal norms. Organizational, legal and economic relations in the field of hunting industry and tourism activities in Ukraine are regulated by a number of legislative acts, the main of which are: the Law of Ukraine "On Environmental Protection", the Law of Ukraine "On the Fauna", the Law of Ukraine "On Hunting Economy and hunting", the Forestry Code of Ukraine, the Law of Ukraine "On the Red Book of Ukraine", the Law of Ukraine "On Tourism" etc.

The analysis of regulatory and legal support in the field of hunting industry and tourism in Ukraine confirms the existence of unresolved and problematic issues regarding the functioning and development of hunting tourism. In particular, in the Law of Ukraine "On Tourism" (1995) (http://zakon.rada.gov.ua), such a notion as "hunting tourism" occurs only in the list as one of the types of tourism. In the Law of Ukraine "On Hunting Economy and Hunting" (2000) (http://zakon.rada.gov.ua), hunting tourism even isn't mentioned in general as a promising area of economic activity, which contradicts the main international agreements in the field of protection, reproduction and using of hunting fauna resources.

Although some normative legal acts in Ukraine operate on this notion, they don't give it a legal definition, since hunting tourism has specific features that distinguish it from other types of tourism. Unlike Ukraine, the economic activity related to the provision of tourist services in the field of

hunting is reflected in the legislation of developed countries and is regulated by a number of subordinate legal acts. For example, you can refer to the experience of Poland. In the Polish Law "On Hunting" (1995) (http://isap.sejm.gov.pl) hunting tourism takes a whole section. According to Polish law, hunting activities related to the provision of tourist services include: 1) hunting conducted by foreigners in the territory of Poland; 2) hunting abroad.

Over the last few years, Ukraine has been intensifying the efforts of academics and NGOs for improving regulatory and legal support and effective management in the area of protection, reproduction and using of hunting economy resources. In particular, problems of state regulation and enforcement, increasing the economic efficiency of hunting economy, including hunting tourism, as well as proposals for their solution were discussed and published in the framework of the Regional Program "European Neighborhood and Partnership Instrument East Countries Forest Law Enforcement and Governance II Program" (FLEG II 2014-2017), which the co-authored of this research was participated in (Myronenko, 2015).

Since the foreign hunters-tourists become as a basis for the development of hunting tourism, another legal problem there is – the regulation of documentary support of foreign citizens in Ukraine. Article 13 the Law of Ukraine "On Hunting Economy and Hunting" (http://zakon.rada.gov.ua). allows foreigners to hunt in Ukraine due to hunting rights documents (hunter's certificate, corresponding permission for using the firearms, passport for dogs hunting breeds etc.) issued by appropriate authorities of other states. However, the norms for determining the equivalence of documents for the right to hunt abroad, which citizens of Ukraine must obtain, are not fully defined. One of the objectives of the adopted resolution of Regional Program FLEG II was to develop measures for the development of foreign hunting tourism, minimizing the number of bureaucratic procedures for the admission of foreign hunters, in particular (Myronenko, 2015):

- to grant the right to the user of hunting grounds independently, without intermediaries, to accept hunters from abroad;
- to eliminate the corruption of users from all kinds of permits from other departments (permissive system of the Ministry of Interior of Ukraine, veterinary service);
- to simplify customs procedures for the export/import of legally acquired trophies and hunting weapons (excessive and unreasonable requirements for the list of documents for customs clearance);
- to streamline and improve licensing systems for foreign hunters in Ukraine: the registration of license for trophies, the lease of local weapons etc.

We should note that except this initiative, significant progress hasn't taken place in this direction over the past few years.

The success in the development of hunting tourism directly depends on the level of organization and management of hunting economy. The centuries-old culture of hunting and forestry management in the European Union countries allows not only effectively protect forest, field and wetlands, but also increase the livestock of hunting fauna and biodiversity as an integral part of improving the wildlife habitat. According to various data, the prices for hunting tours in different countries fluctuate within the limits (Table 2):

Table 2: Prices for hunting tours

Wildlife	Price, USD
Mountain ram	12000-50000
Snow ram	7000-15000
Mountain goat	up to 5000
Chamois	1500-2500
Noble deer	2000-8000
Spotted deer	up to 4000
Wild reindeer	up to 2000
Elk	1000-5000
European roe deer	500-2500
Wild boar	400-2000
Brown bear	1500-8000
Lynx	1500-3000
Wolf	200-1500

**Source: (Danylkyn, 2010).*

Hunting tourism in Europe is particularly popular among hunters in Germany. There are 369 300 hunters in Germany, and it's of the lowest indicator in Europe in terms of population. Despite the fair amount of wild game and the high quality of related services, almost half (48.7%) of German hunters used international hunting tourism services, while 38% use these services once a year or several times a year (Haakana, 2007). In the 2017/2018 season, hunters in Germany gained 1948.95 thousands heads of small wild game and 2182.1 thousands heads of hoof wild game, which is almost in 8 times more than total number and in 140 times more than number of hoofed animals in Ukraine. Basically, hunters in Germany gain: roe deer – 1 199 000 heads, wild boar 837 000 heads, noble deer – 77 000 heads, fallow deer – 63 000 heads, moufflon – 7 200 heads, chamois – 4 900 heads, spotted deer – 2 400 heads. It should be noted that the amount of hunting livestock in Germany is high and grows by 5-10% each year (http://www.jagdverband.de). But, in most European countries, the hunter owns only trophies (horns, skin, fangs), and other hunting products are the property of the hunting economy, the owner of the hunting grounds or local people. From hunting products sales (meat, leather, down) 266.39 million EUR was received in 2018, which is on 47.45 million EUR more than in 2014 (218.94 million EUR) and on 88.59 million EUR more than in 2010 (177.8 million EUR). The largest revenues were getting from sales meat and skin of ungulates – 251.71 million EUR (94%) (http://www.jagdverband.de). We should pay attention on the fact that the cost of meat and skin of ungulates and the cost of small wild game is unchanged over the past ten years, which indicates the stability of the industry and the economy as a whole.

The experience of organizing of hunting tourism in the northern European countries (Sweden, Finland) shows that: the system of hunting management is mainly based on a private ownership form; a rental income from hunting grounds and the organization of hunting tourism are the main part of the income of most landowners (Urszula, Törmä, Kinnunen & Rautiainen, 2015). 37 species of animals and birds are the objects of hunting in Finland. In general, hunters are hunted ungulates animals (elk, roe deer, and white - tailed deer) and a variety of small wild game. The average annual extraction of elk is 38 000 heads, deer – more than 12 000 heads, and roe deer – more than 90 000. In a small amount, they hunt fallow deer, wild pig and moufflon (Khoietskyi & Pokhaliuk, 2014). The fee for the right to hunt small wild game varies from 5 EUR/day to 170 EUR/year. For foreign hunters, the cost can be revised and varies from 7 to 400 EUR (Matilainen & Keskinarkaus, 2010). This money (about 5.5 million EUR per year) is accumulated by the state and is used to prevent the negative impact of hunting animals on the environment and to compensate the damage done by them to forestry and agriculture (Matilainen & Keskinarkaus, 2010).

Almost identical system of organization and management of hunting economy is used in Sweden. The main licensed species of animals are elk and noble deer. Most of all, in Sweden, they hunt such

ungulates animals as a roe deer and elk. In modern conditions, more than 100 000 specimens of elk and about 200 000 individuals of roe deer are extracted in Sweden (Khoietskyi & Pokhaliuk, 2014).

For considering the organizational aspects of organizing hunting tourism and hunting economy, the most interesting for Ukraine is the experience of Hungary, Czech Republic and Poland. Despite the fact that the area of hunting grounds of Hungary is in six times smaller than the Ukrainian ones, annually there are hunting over 250 000 heads of ungulates animals and 800 000 heads of small wild game (http://www.menr.gov.ua). Hunting tourism in Hungary (according to various estimates) brings near 60 million EUR to the state budget every year (Danylkyn, 2010). In the Czech Republic, hunters annually obtain about 300 000 heads of ungulates animals and about 1 million heads of small wild game (http://www.czso.cz). Every year, Polish hunters obtain more than 100 000 wild boars, 30 000-40 000 deer, 120 000-160 000 European chamois (Delehan & Shpilchak, 2008).
The main problem of hunting tourism in the organizational and economic direction in Ukraine is its resource support. Forest-game zoning of the territory of Ukraine is divided into five natural zones (http://zakon.rada.gov.ua/cgi-bin/laws/main.cgi?page=1&nreg=z0771-01):

1. Polissya Zone (Volyn Region, Zhytomyr Region, Kyiv Region, Lviv Region, Rivne Region, Sumy Region, Khmelnytskyi Region and Chernihiv Regions);
2. Forest-steppe Zone: right-bank (Vinnytsia Region, Volyn Region, Zhytomyr Region, Ivano-Frankivsk Region, Kyiv Region, Kropyvnytskyi Region, Lviv Region, Odessa Region, Rivne Region, Ternopil Region, Khmelnytskyi Region, Cherkasy and Chernivtsi Regions); left-bank (Kyiv Region, Poltava Region, Sumy Region, Kharkiv Region, Cherkasy and Chernihiv Regions);
3. Steppe Zone: northern (Dnipro Region, Donetsk Region, Zaporizhya Region, Kropyvnytskyi Region, Lugansk Region, Mykolayiv Region, Odessa and Kharkiv Regions); Southern (Crimea, Zaporizhya Region, Mykolayiv Region, Odessa and Kherson Regions);
4. Carpathian (Zakarpattia Region, Ivano-Frankivsk Region, Lviv and Chernivtsi Regions);
5. Crimean Mountains (Crimea).

According to the statistical data, the area of hunting grounds in Ukraine is 38 779.9 thousands of hectares. The largest part in the structure of Ukrainian hunting grounds is occupied by field lands – 28721.0 thousands of hectares (74.1%), as well as forest lands – 7931.9 thousands of hectares (20.4%) and wetlands – 1796.2 thousands of hectares (4.6%). 1077 users work in the management of hunting industry. There are about 780 000 hunters in Ukraine, but only 300 000-350 000 annually participate in the hunt (http://www.ukrstat.gov.ua/druk/publicat/kat_u/publ7_u.htm). Total expenses from hunting in 2017 amounted 360.75 million UAH and the revenues 160.68 million UAH (http://www.ukrstat.gov.ua/druk/publicat/kat_u/publ7_u.htm). Proceeds from hunting economy are mainly formed due to the implementation by the users of hunting grounds of licenses, shooting cards, products obtained from the extraction of hunting animals (meat, leather, trophies) and the provision of services to hunters in the process of obtaining hunting animals.

One of the main factors in the successful development of hunting tourism is the availability of a sufficient amount of hunting resources. In the category of hunting animals in Ukraine are classified 34 species of mammals, 25 of them are found in the Carpathian forests (Bondarenko, 2011).

The end of XX – beginning of XXI century, is characterized by a steady tendency to reduce the number of most valuable hunting species of animals. 217.1 thousands of heads of ungulates animals, 1716.6 thousands of fur animals and 10388.2 thousands of birds were registered in hunting grounds of Ukraine (http://www.ukrstat.gov.ua/druk/publicat/kat_u/publ7_u.htm). The main indicators of the total number of wild game animals is presented in Table 3 and the dynamics of their extraction are shown the Figure 1.

Table 3: The number of hunting animals and harvested hunting animals in Ukraine, thousands of heads

Years	Number of hunting animals			Number of harvested (removed) hunting animals		
	Ungulates animals	Fur animals	Birds	Ungulates animals	Fur animals	Birds
2011	244,4	2189,2	10592,0	13,3	288,9	1914,0
2012	239,6	2070,8	10523,5	12,8	273,7	1827,7
2013	238,3	1944,2	10202,9	12,8	244,8	1912,7
2014 *	233,6	1747,5	9169,3	13,9	207,6	1479,1
2015 *	231,3	1705,5	9756,2	18,6	198,8	1513,0
2016 *	220,2	1675,4	9888,4	14,7	211,7	1595,3
2017 *	221,0	1728,1	9982,0	13,3	219,0	1627,6
2018 *	217,1	1716,6	10388,2	13,0	213,6	1702,5

* *Data exclude the temporarily occupied territory of the Autonomous Republic of Crimea, the city of Sevastopol and a part of temporarily occupied territories in the Donetsk and Luhansk regions.*

Despite the implementation of some biotechnical and organizational measures, the number of certain types of hunting animals remains without significant changes, the volumes of rendered services by hunting farms is not enough for the fulfilling the needs of the hunters market. Ukraine stands on the one of the last places in Europe in terms of production of hunting products, but has an extremely high potential for the development of hunting tourism, since the density of wild animals in hunting grounds is significantly lower than scientifically based indicators of their optimal capacity. If we compare the indicators of the number and, especially, the extraction of game in Ukraine with the indicators of developed countries, we can state that these indicators are tens, and sometimes hundreds of times larger.

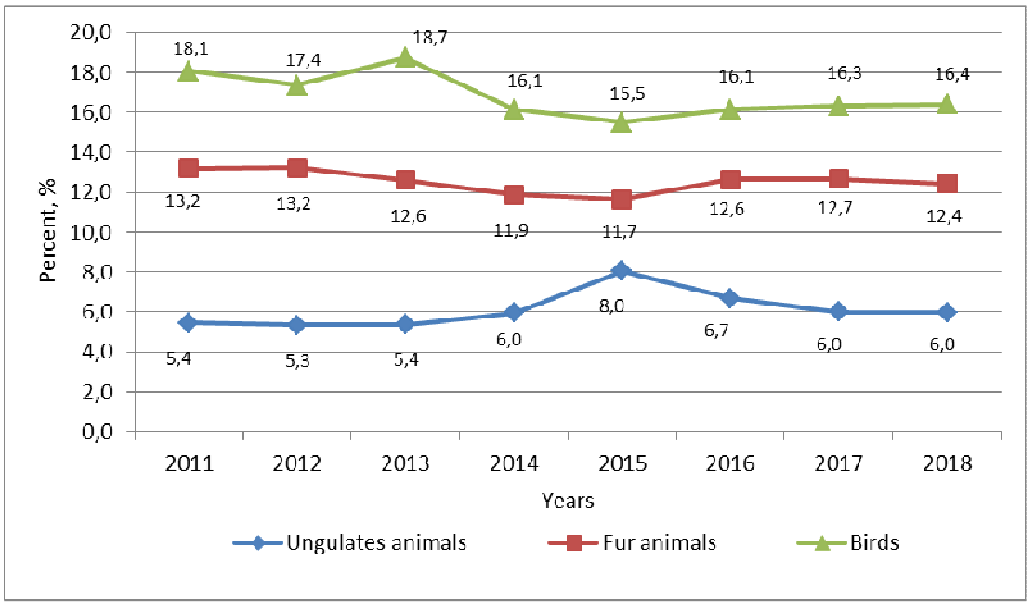

Fig. 1: Dynamics of extraction of hunting animals in relation to their total number

We must admit, that large ecological and economic losses of hunting farms are caused by poaching, which slow down development of hunting tourism. In European countries poaching is considered as a major crime. The detection of cases of violation of the legislation in the field of hunting industry and hunting in Ukraine remains at a rather low level, namely poaching has become a common and

everyday occurrence and doesn't encounter any particular resistance from both law enforcement and society.

As you can see, the development of hunting tourism mainly depends on the effectiveness of hunting. In Ukraine, hunting industry is unprofitable and needs fundamental changes. The ineffective using of the potential hunting grounds, which are not able even for the simple reproduction of wild animals, confirms the neediness of a new model of hunting management that would function on the basis of a market economy.

These and many others organizational and legal problems create obstacles for the successful development of hunting tourism in Ukraine, as it falls into the sphere of regulation of a large number of legal acts and administrative structures.

Despite the existence of a sufficient number of problems, which require immediate solution, hunting tourism has a number of advantages and incentives for Ukraine and especially for the rural population, in particular:

- conservation of biodiversity and natural ecosystems;
- income generation and job creation in poor and deprived regions;
- replacement of potentially devastating forms of nature management on the management of hunting fauna resources, using of which is less environmentally harmful form of nature management;
- cost-effective using of unsustainable natural resources for agriculture or conventional tourism;
- raising the environmental awareness of the local population about the value of the fauna, as a hunting tourism is associated with harm, problems and costs;
- decreasing the level of poaching, thanks to the joint efforts of all sides interested in obtaining incomes from hunting tourism.

Conclusions

Leaving aside the controversy, hunting tourism remains a little investigated, but a perspective area of tourism activity. Despite the great popularity and level of hunting tourism development in the European Union countries, Ukraine possesses a wide array of competitive advantages that can be effectively used in the conditions of modern European integration changes. The problems of the Ukrainian services market in the field of hunting tourism are manifested in the imperfection of environmental protection, hunting and tourism regulatory and law enforcement, as well as in the absence of a clear state policy in this area. For developing effective legal rules in the field of hunting tourism, it is necessary to consider an international experience and historical features of national hunting, taking into account also the principles of sustainable ecologically balanced development.

As a result of our research the basic principles on which hunting tourism should be based are formed, in particular: the principle of preservation of biodiversity in the animal and plant life of hunting grounds; the principle of sustainable ecologically balanced of using the hunting resources for tourism purposes; the principle of observance of ethical norms and national traditions in the process of organizing hunting tourism; the principle of preservation of the cultural heritage in the areas, which are reserved for the organization of hunting tourism; the principle of promoting the development of alternative types of hunting tourism; the principle of integration of hunting tourism with hunting, forestry and agrarian enterprises; the principle of state support in the development of hunting tourism.

The prospects for the further investigations are in the creation of economic instruments and incentives for the effective development of hunting tourism on a market basis in the process of decentralization of the Ukrainian economy.

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The Effectiveness of Logistic Processes in Military Supply Chains

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Abstract

Armed forces functioning in contemporary conditions require effective and efficient logistic support. Both during the implementation of tasks in garrisons as well as during peace support operations or a crisis response operation, forces must be supplied at the right time with materiel in the right quantity and quality and at the right price. Modern military supply chains consist of many elements, both military and civil, implementing logistic processes to meet the needs of the forces and provide them conditions for their tasks. The article, based on performed researches has identified the specifics of military supply chains and characterized the key dimensions of their effectiveness. On the basis of the conducted research categorization and priorities of effectiveness in the military logistic system were determined.

Keywords: Effectiveness, Supply Chain, Armed Forces, Logistic Support, Military Logistics

Introduction

Proper functioning of the armed forces and the level of their implementation of training and operational tasks at the required level is the result of many factors. Of these, operational, technological, social and economic factors certainly play a key role. In addition, it should be noted that the military logistic system responsible for meeting the needs of troops during peace, crisis and war has a major impact on all areas of the operation of the armed forces.

In the process of perfecting the functioning of the logistics system of the armed forces, it is necessary to guarantee the conditions for a comprehensive measurement and a reliable evaluation of the implemented solutions. In the past, the reform of the military logistics support system did not always have a clearly defined purpose, and the nature of the changes prevented them from being transparently verified.

Today, according to doctrinal documents, the main task for all elements of the military logistics system is to ensure maximum effectiveness of logistic support in national, allied and multinational operations. Among the twelve principles (shared responsibility, competence, priority of operations, cooperation, coordination, support, sufficiency, effectiveness, flexibility, transparency of the logistics situation, simplicity, multinationality) (*Bi-SC Joint Operational Guidelines for Logistics*, 2013, p. 2-1), according to which the logistic support of troops in national, allied and multinational operations is currently being implemented, one of the key roles is played by the principle of effectiveness, which states that Logistic resources and capabilities should be used effectively and efficiently. Requirements must be identified and addressed in a timely manner to optimize the efficient provision and effective use of such resources and capabilities (*AJP 4B*, 2018, p. 1-2), what could be understand that:

- the logistic resources collected in the area of operations should be optimized for operational requirements and used in the most efficient and economic manner;
- in order to ensure the continuity of logistic support, the logistic needs should be identified and secured on time;
- cost-effective solutions should be used when implementing logistic support tasks.

The above-mentioned general range of the effectiveness of military logistic processes, determined mainly on the theoretical level, is not entirely satisfactory in practical terms. This is primarily due to the specifics of the military environment, where an economic approach (cost minimization) may not always be a superior value. In many cases, other dimensions of effectiveness (operational, systemic, substantive, etc.) play a dominant role as a guarantee of achieving training and operational objectives by military subunits and units. It should be emphasized that, for example, the increased effectiveness of logistic support of troops assigned to participation in modern operations is achieved primarily through (*Logistic doctrine*, 2014, p. 17-18):

- separation of forces and resources and the support of the Multinational Integrated Logistics Unit (MILU), the Multinational Integrated Medical Unit (MIMU), the Multinational Logistic Unit (MLU), the Multinational Medical Unit (MMU); Multinational Logistics Command (Maritime) - MNLC (M), Joint Logistics Support Group (JLSG);
- taking on the role or using the support of: Host Nation – HN, Logistic Lead Nation – LLN, Logistic Role Specialist Nation - LRSN;
- using support from NATO agencies competent to support allied actions;
- using Contractor Support to Operations (CSO);
- using support from other countries.

In logistic activities carried out to the benefit of the armed forces in all conditions of the state, the most important objective is to guarantee the conditions for carrying out training, operational and combat tasks at the expected level. Achievement of this status is largely determined by the human and material resources available to the armed forces, or those which the armed forces are able to gain. Skilful management of resources does not apply solely to the civilian sphere, but rather to the military environment. The armed forces have specific human and material resources that serve to train and fight. They are used in a specific way, appropriate to the nature and scale of their tasks. It is worth emphasizing that housekeeping in management theory is primarily the well-thought-out (calculated) use of limited resources (so-called rational management, as opposed to customary and traditional) to achieve various competing goals.

The aim of the paper is identification and assessment of key factors and levels of effectiveness of contemporary military supply chains. The material used theoretical studies and the results of empirical studies carried out using expert studies. Supplementing the theoretical research with empirical research allowed to general conclusions indicating the essence of the problem.

Theoretical Aspects of The Effectiveness in Military Logistic Systems

One of the key words in modern management is undoubtedly the term "effectiveness". In the literature of the subject it is defined ambiguously due to its multidimensional nature. In addition, the problem with unambiguous definition of the term "effectiveness" is related to the existence of many synonyms of this term, especially in English-language literature (eg effectiveness, efficiency, efficacy, performance). It is also worth noting that the perception of effectiveness is also dependent directly on the environment in which it is determined. It is under-stood slightly different by economists than managers, or politicians (Jałowiec, 2017, p. 24).

In the theory of organization and management, the effectiveness is considered as the basic condition for the functioning of the entity on the market. There is often used the term economic effectiveness, in which the financial perspective is only one of the planes, in addition to operational, market, dynamic and organizational effectiveness (Kachniarz, 2012, p. 61). It is worth noting, however, that in the traditional view of management sciences (represented by, among others, Frederick W. Taylor and Frank and Lillian Gilberth), the term effectiveness primarily means efforts focused on cost reduction, including reduction of loss and waste of production factors (materials, labour force), as well as activities related to the improvement of technology and better use of time factor (which is achieved mainly through detailed analysis of the system of individual tasks and their components). Consequently, the ultimate goal of the organization tasks is to reduce the consumption of production factors at the input of the production system or to contribute to the increase in results at the output – or to achieve both

goals at the same time . In alternative holistic terms, effectiveness is perceived as a natural feature of an organization. The main attention is directed to achieving goals, assuming that, under favourable conditions, a flexible adjustment effect of rationalization of action will be achieved. It is worth to emphasize a recommendation of not attaching too much importance to enforcing only the effectiveness of individual parts, but creating conditions conducive to the effectiveness of the organization as a whole (M. Witzem, 2002, p. 38–47).

In the literature on the subject there exists many definitions and interpretations of the term "effectiveness" (Blaik, 2015, p. 15–16). In further deliberations, effectiveness will be treated as an expression of the ratio of the obtained effects to the expenditures incurred. Such a general approach allows us to refer it to many planes of contemporary organizations, giving an image of the correctness of its functioning in both a partial and a whole sense. It should be also noted that the effectiveness applies to each case where any expenditures have been incurred, which has resulted in effects, whether they were intended or not. Regardless of the present context of the term "effectiveness", two terms: effects and expenditures play a key role in it.

In the literature on organization and management theory, effects are defined as the result of a deliberate, but not necessarily effective action, deviating more or less from accepted assumptions (expectations, effects of undertaken actions) (Matwiejczuk, 2006, p. 82).

The measurement of effectiveness is a prerequisite for describing and evaluating the state of functioning and development opportunities of various types of organizations, including hierarchical organizations whose specific form is the armed forces. The studies on effectiveness involve a great number of areas that follows directly from the nature of the activity of a particular entity. This certainly implies the need for an interdisciplinary approach to defining and measuring efficiency. This approach is of particular importance today, in times of high dynamics of changes, both within the majority of entities and in their surroundings. It must be borne in mind that effectiveness, which is the basic concept in economics and management, is a measure of activity not only at the level of the whole organization but also in its individual areas.

Defining and measuring logistics effectiveness in the armed forces, due to the specificity of the military sector, and the multiplicity and complexity of the factors affecting the functioning of the military logistics system, are extremely difficult but not impossible tasks. The difficulties encountered by many military logisticians in measuring the effectiveness of tasks carried out as part of the logistic support of troops were the reason for the study of theoretical and practical problems of measuring logistics effectiveness in the armed forces.

In the process of integrated management of elements of the military logistics system, precise goal setting is not only the first task in the planning process of logistic support of troops, but is also a prerequisite for their effective operation.

The clear definition of what we should do (achieve), under certain conditions, and how to select resources, is the basis for defining, measuring and evaluating effectiveness in the military logistics system. It should be emphasized that the special importance in the complex process of determining the effectiveness in the analyzed area is applied to its determination on many different levels. The limitation of effectiveness in the military logistics system only to the economic level (economy) distorts its dimension in a specific military environment in many respects (Jałowiec, 2017, p. 34).

In view of the general theory of effectiveness of processes in the organization, it seems reasonable to consider effectiveness in the military logistics system at least on several levels, ie operational, systemic, material, technological, economic, allied, dynamic (evolutional), social and ecological (Fig. 1.1).

Fig. 1: Essential levels of effectiveness in the military logistics system

Taking into account the specificities of the armed forces and their role in ensuring the security of the state, as well as the nature of the logistic support tasks of the armed forces, the **operational level** should be considered as a priority effectiveness level in the military logistics system. It refers to logistic conditions that guarantee the execution of training, operational or combat tasks by military subunits and units at the expected level.

The **systemic level**, directly associated with the operational level, refers to the state of the organic logistic potential as a system or its subsystems with respect to the long-term goals of the national and allied forces.

The **material level** refers to the genotype function of the logistics system in the armed forces - the effectiveness of the military logistics system is expressed in satisfaction of the specific logistics needs of troops. In this area, it is important to refer the scope of tasks to the tactical, operational and strategic level of the logistics system of the armed forces.

The **technological level** appears very important today. It refers to analyses in terms of the number, the degree of modernity necessary to accomplish logistic tasks of hardware units, equipment, resources. Very important in this respect is the issue of the implementation of innovative solutions in the military sector which are becoming a "driving force" for the development of many armies in the world.

The **dynamic (development) level** is connected with the ability to provide new/innovative logistic services and acquire new skills. Today, innovation is a measure of the level of modernity in societies, economies and the armed forces.

Another area of effectiveness in the military logistics system is the **economic level**. In army, unlike the civilian sector, it should not play a key role in assessing the effectiveness of the tasks. Nevertheless, in today's conditions of functioning of the armed forces which in the economic dimension are one of the subjects of the national economy, it is worth to evaluate the economy of the tasks. In relation to the military logistics system, the so-called "logistics costs" are of particular importance. It should be recalled that the costs, as defined, are the specific expenditures (Tkaczuk, 2001, p. 101), expressed in monetary units, incurred by specific entities, while each expenditure in the general economic sense is any cash outflow.

In the contemporary conditions of the functioning of the Polish Armed Forces, the **allied level** will be of incredible importance in the evaluation of the effectiveness of the military logistic system. It refers to relations between the armed forces and other entities in the framework of partnership or alliance. Its measurable effect in the military logistics system is the level of the so-called logistic interoperability. Interoperability is a feature of a product or a system whose inter-faces work in full compatibility with other products or systems that already exist or may exist in the future, without any access limitation or limited implementation possibilities. Improved logistic interoperability is achieved through established synergies that are a prerequisite for effective, integrated multinational logistics, which requires the use of standard practices, procedures, techniques and common language.

In the light of the deliberations carried out, the particular attention is paid to the fact that the use of the armed forces for providing civilian authorities with support in order to ensure the security of citizens of the state is one of the essential elements of national security organization. In this context, it is worth pointing to the **social level** of the effectiveness of the military logistics system. It refers to the attainment of social objectives by taking into account the social costs of their implementation.

The 21st century brings the growing importance of ecology in the activities of many organizations, including the armed forces. This implies: paying particular attention to the impact of military activities on the environment, and the actions undertaken in this regard are referred to the **ecological level** in the military logistics system.

The indicated areas may serve as a starting point for a large-scale activity aimed at credible (complex) parameterization of logistic tasks in favor of troops during their day-to-day operations or during the implementation of training, operational or combat tasks. They may also be used for evaluation of the effectiveness of the military supply chains.

Current dimensions of military supply chains

Correct implementation of the tasks assigned to the armed forces in all functioning conditions of the state (peace, crisis, war) requires the delivery of a wide range of material supplies. Proper realization of tasks that are imposed today on the armed forces requires providing them with a wide range of material means. Their scale and scope depend primarily on the level of involvement of the Armed Forces to provide the security and territorial integrity of the country, the European Union (EU) and the Euro-Atlantic area (NATO Alliance), as well as keeping peace and stability on the international arena. The material needs of soldiers, units and military institutions are fulfilled by the material subsystem of the military logistic system.

The material subsystem is intended for the planning, organization and implementation of material support projects, including the provision of services, and consists in providing all supplies to the troops on a regular basis – in cooperation with other subsystems of the logistics system. In carrying out the supply tasks, both the use of military and civilian resources are taken into account.

The basic goal of the material subsystem is to meet the needs of troops in the required means of supply and specialized material services, in a place and time that enables the armed forces to function properly, during peace, crisis and war. Material supply tasks are carried out according to the possibilities resulting from structures at all organizational levels for armed forces (tactical, operational and strategic) (Zabezpieczenie materiałowe, 2012, p. 8). In the Polish Armed Forces the elements of material subsystem responsible for direct supply of military units are Regional Logistic Bases (RLB) and Garrison Logistic Units (GLU) and their subordinated units. These is another subsystem: Polish Armed Forces Territorial Logistic Support System (Gromek, 2018, p. 14.).

Means of supply can be delivered by transport from the superior level or can be picked up by the user from the indicated sources (*Logistic doctrine*, 2014, p. 103-104):

- **during peace time and crisis** the supplies are realized in the supply chain of material subsystem, according to the supply plan (distribution board) or *ad hoc* based on reported needs;
- **during war time** the supplies are carried out from stocks gathered at the tactical level, then from stationary depots of a stationary logistic unit responsible for purchase (RLB, GLU), maintaining

and distributing the supply means and performing maintenance tasks in the regional area of responsibility (operating stocks and strategic stocks), as well as from the national economy.

It should be pointed out that in the Polish Armed Forces there are five classes of supply, similarly to NATO: Class I - items of subsistence, e.g. food and forage, which are consumed by personnel or animals at an approximately uniform rate, irrespective of local changes in combat or terrain conditions; Class II - supplies for which allowances are established by tables of organization and equipment, e.g. clothing, weapons, tools, spare parts, vehicles; Class III - petroleum, oil and lubricants (POL) for all purposes, except for operating aircraft or for use in weapons such as flamethrowers, e.g. gasoline, fuel oil, greases, coal and coke. Class IIIa - aviation fuel and lubricants); Class IV - supplies for which initial issue allowances are not prescribed by approved issue tables. Normally includes fortification and construction materials, as well as additional quantities of items identical to those authorized for initial issue (Class II) such as additional vehicles; Class V - Ammunition, explosives and chemical agents of all types (NATO Logistic Handbook, 2012).

The basic requirement for a military logistic system is to secure the needs of the armed forces in the material, technical, transport and movement of troops, military and medical infrastructure during peace, crisis and war. According to the theory and practice of management, the proper organization (including organizational structures, division of competences, etc.) directly affects the proper functioning of each complex mechanism, which is undoubtedly the military logistics system. It is worth noting that its operation is subject to continuous improvement in recent years in accordance with the directions of transformation developed at the central level based on national and allied requirements and experience.

In order to properly implement material security tasks, military logistic chains are created, which in the subjective dimension should be understood as a set of cooperating, structural internal and external elements that meet the logistics needs of troops by providing them with the goods necessary to carry out training, operational and combat tasks. The conducted research indicates that they are characterized by a different specificity than supply chains functioning in a civil environment. Table 2.1 presents key parameters characterizing contemporary military supply chains.

Table 2: Key parameters characterizing contemporary military supply chains

PARAMETER	CHARACTERISTIC
AIM	unambiguously defined - securing the material needs of the troops to the extent that guarantees their current operation, and, above all, the implementation of training, operational and combat tasks for military units and institutions
RESOURCES	repeatedly insufficient; difficulties in obtaining them in the area of operations; very difficult to forecast due to the volatility of the demand and the formalized, extended in time process of their demand
EXTENT MEET OF NEEDS	wide; all means of supply conditioning the correct implementation of training, operational and combat tasks; repeatedly difficult long-term planning regarding the place, type and size of necessary material resources
ENTITIES OF REALIZING THE TASKS	military forces supported by civilian entities; national forces supported by allied and multinational potential
TIME OF OPERATION	time pressure; repeatedly a very short time resulting from dynamic changes in the course of operations and operations
INFORMATION	a significant part of the secret; often insufficient, inaccurate; difficult of using IT systems
CONFIGURATION AND COORDINATION OF SUPPLY CHAIN	complex; difficult to monitor as a result of the presence of many variables and unknowns at every stage of delivery for the troops; high dynamics of changes during the course; difficult coordination due to the large diversity of individual chains
COOPERATION IN THE SUPPLY CHAIN	formalized, regulated by many external and internal rules and procedures

PARAMETER	CHARACTERISTIC
FINANCING ACTIONS	country budget
ORIENTATION OF THE SUPPLY CHAIN	clear priorities; focus on training tasks and operational in peacetime, operational and combat during a crisis or war;
CONTROL AND EVALUATION OF EFFECTIVENESS	Limited; limited possibilities of control and assessment of effectiveness resulting to a large extent from many nonparametric characteristics of the activity of the armed forces

Referring to the specificity of military supply chains included in table 2.1, it should be noted that it is fundamentally different from supply chains operating in the civil sphere. This is mainly due to the nature of the tasks carried out by the Polish Armed Forces and their role in the defence system of the state. In this regard, it should be emphasized that for example the Polish Armed Forces of the maintain their readiness to carry out tasks related to (Jasińska, 2012, p. 90-91):

- Guaranteeing state defence and opposing aggression (defence and protection of the inviolability of Polish borders, participation in anti-terrorism activities in the country and beyond, participation in solving a local or regional armed conflict in the area of NATO responsibility or outside it, participating in a defence operation outside the country in accordance with allied commitments under Article 5 of the North Atlantic Treaty, conducting a strategic defence operation on the territory of the Republic of Poland).
- Participation in the process of stabilizing the international situation and in crisis and humanitarian response operations (participation in peace and crisis response operations conducted by NATO, EU, UN and other operations under international agreements, participation in humanitarian operations conducted by international, governmental and other organizations military cooperation in the area of development and application of confidence and security building measures.
- Supporting internal security and helping the public (monitoring and protection of airspace, supporting land and territorial water protection, conducting reconnaissance and intelligence activities, monitoring of radioactive, chemical and biological contamination in the territory of the country, cleaning the area of explosives and dangerous objects of military origin conducting search and rescue activities, assistance to state authorities, public administration and the public in responding to threats).

It should be noted that today's military supply chains are undergoing major transformations. Due to the dynamics of changes taking place within the armed forces as well as in their surroundings, it is necessary to constantly improve them in terms of improving the relation of the obtained effects to the incurred expenditures. This is particularly important in the international cooperation of armed forces during the implementation of training and operational tasks, which changes the nature of contemporary supply chains from national to multinational.

Management of military supply chains

Supply chain management (SCM) is a broadened management focus that considers the combined impact of all the companies involved in the production of goods and services, from suppliers to manufacturers to wholesalers to retailers to final consumers and beyond to disposal and recycling. The goal of SCM is to seamlessly link all of the activities responsible for bringing goods and services to the market and efficiently manage the flow from start to finish. Basically, no matter how many companies are involved, this process should take place as though there were only one, very well managed company performing the activities. All companies in the supply chain can benefit from sharing information and working closely with the other companies that are within their supply chain. SCM affects all aspects of business. Accounting, inventory control, marketing and ultimately a company’s revenues are all intimately linked to and dependent upon efficient management of their supply chain. Supply chains are systems with a flow of goods from supplier to consumer, made up of

many facilities where communication and intensive coordination are a necessity. As with any system, one malfunctioning node can have major effects on all congruent and subsequent actions along the chain. This being said, supply chain management is perhaps the one area of business where creativity and flexibility are most necessary (Tae, Young, Rajath, 2012, p. 64-65).

The relationships described above are also characteristic for military supply chains. The extremely broad spectrum of tasks carried out by modern armed forces in all states of the state's functioning (peace, crisis, war) directly translates into the structure of military supply chains, each of which may have a different degree of complexity. It results mainly from the functional structure of the military logistic system, including directly from: the number of levels, the type of relationships being formed, the diversity of the entities making up the chain, and in many cases the necessity to involve additional participants, including civil enterprises. Management of such a complex organism is an element of the system of managing the entire armed forces. In this dimension, the management of military supply chains is understood as integrated planning, preparation and use of supplies, as well as the provision of specialized services to keep troops in proper combat readiness in their area as well as functioning of troops performing tasks outside the country. These activities are carried out in a multidimensional way: design and development work, acquisition, storage, transport, distribution, as well as the withdrawal of supplies; transport of personnel and means of supply; acquisition, construction, operation and development work in the field of military infrastructure; acquisition and provision of services; medical logistics (the process of acquiring, collecting, distributing, maintaining and rotating medicinal products, medical devices and medical equipment in order to ensure optimal level of health services during peace, crisis and war).

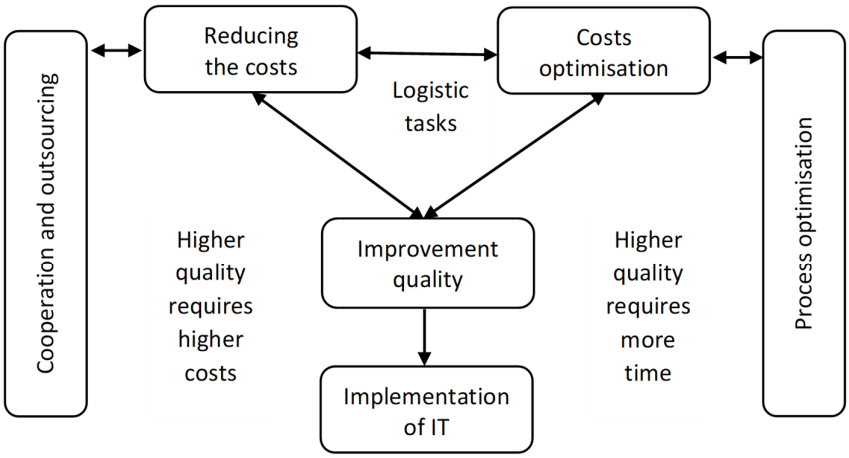

Figure 2: Dependencies in the supply chain (Dulinger, 2002).

Management of military supply chains is directly related to key decisions concerning logistics, which are (Skoglund, 2012, p. 23):

- The basic supply decision: Where to get the needed products?;
- The stockpile decision: What and how much to stockpile and what to postpone until needed?
- The balance decision between being efficient or effective: How flexible the supply chain needs to be to meet changes in the demands.
- The sourcing decision: How to source the needed products?

In an open systems perspective, one acknowledges that supply chain output depends on all participants directly or indirectly controlling activities and resources necessary for the supply chain (Tore, 2018, p. 512-513).

One of the supply chain strategy is SCM efficiency aimed at creating the highest possible cost efficiency by eliminating non-value added activities, pursuing economies of scale, and optimizing capacity utilization in production and distribution (Parlier, 2011, p. 22).

The big challenge for managing military logistic chains is a specific approach to the perception of effectiveness in the military sector. Characteristic for processes and activities in the military environment is a very wide assessment of effectiveness, in which the economic plane is not a priority. It gives way to other dimensions of effectiveness, determining the fulfillment of conditions for the proper implementation of tasks by the army.

Evaluation of Effectiveness of Military Supply Chains

There are many methods for measuring the effectiveness of supply chains described in the literature. As a supply chain performance measurement (SCPM) (Agami, Saleh, Rasmy, 2012). However, the specificity of MSC described above requires the definition of a new measurement methodology appropriate for their processes.

In order to solve the problem defined in the introduction, apart from theoretical studies, empirical research proved necessary. For this purpose, the method of a diagnostic poll conducted using the expert interview method was used. The research covered 23 experts who are professionally responsible for the functioning of military supply chains at various levels of the Polish Armed Forces logistics system.

As a result of the research, research material was obtained containing expert opinions on planes, which in the opinion of the investigated officers should be a priority in assessing the effectiveness of military supply chains. Obtained expert positions of experts can be generalized for the purposes of this article, indicating that in the opinion of the majority of experts, this hierarchy should look as follows for the three most important areas: operational, systemic, financial.

As the most important level of effectiveness in the military chains, the respondents unanimously recognized the operational plane, referring it directly to the logistic conditions guaranteeing the performance of a training, operational or combat task by sub-units and military units at the level expected from them. Such a position is part of the Strategy for the Development of the National Security System of the Republic of Poland 2022, according to which the armed forces should have operational capabilities for autonomous operation in any fighting environment. The main determinant of operational needs is the possession of weapons and military equipment capable of detecting, identifying, tracking and destroying the opponent's resources. Achieving the assumed operational abilities while providing the necessary (optimal) conditions for survival on the battlefield requires a systemic approach, reflected in five basic systems: command, reconnaissance, destruction, survival and protection of troops, and logistic security of operations. Operational capacity is understood in this case as a potential efficiency, the entity's ability resulting from its characteristics and properties, allowing action to be taken to achieve the desired effects. The functional components of operational capabilities are: doctrine, organization, training, military equipment, personnel resources, leadership, infrastructure and interoperability. With regard to the Polish Armed Forces, operational capabilities define the possibilities of accomplishing their missions and tasks.

The systemic plane directly related to the operational plane has been referred to the status of the organic logistic potential as a system or its subsystems in relation to the long-term goals of the operation of the armed forces in the national and allied dimension and the so-called characteristics of potential systems, such as innovation - is the expression of "system health". It should be noted that the functional system of the Polish Armed Forces' logistics is dynamically evolving in accordance with the adopted development directions, allied requirements and changes in the tasks and organizational structures of the armed forces. Expectations towards him boil down to being characterized by: mobility, flexibility, simplicity and the ability to respond quickly to the changing operational situation. In addition, according to the doctrinal records, the manner of its organization should provide the army with combat capability and the ability to maintain it, and thus the conditions to perform tasks during peace, crisis and war. In this dimension, organizational development of the armed forces logistics system against

the background of the development of the entire army, improvement of relations between all elements of the system and cooperating entities of other functional systems, as well as improvement of the efficiency of the management system of all links of the military supply chains can be considered as crucial.

Another, included in the three most important areas of effectiveness of military supply chains is the economic plane. In the military environment, unlike in the civil sector, it should not, in experts' opinion, play a priority role in assessing the effectiveness of tasks. In their opinion, such a position results directly from the most important task for the Polish Armed Forces in accordance with art. 26. The Constitution of the Republic of Poland is to protect the independence of the state and the indivisibility of its territory and to ensure the security and inviolability of its borders. Nevertheless, the respondents indicated that in the contemporary conditions of the functioning of armed forces, which in the economic dimension are one of the entities of the national economy, it is always worth assessing the economics of the tasks. In this respect, in the case of military supply chains, a special role belongs to the so-called logistics costs. It should be emphasized that from the perspective of public institutions (including in the entire extent of the Polish Armed Forces), expenditures are one of the main instruments of the country's economic and social policy in the phase of distribution of financial resources subject to redistribution made through public finance systems, primarily budget systems. The issues of efficiency measurement outlined by experts in the military logistic system at the economic level (economy) clearly indicate the multidimensional character of this extremely complex phenomenon and the great difficulties in defining and calculating it, which results from the specificity of the economic account in the military sector. In addition, during the research it was repeatedly pointed out that the nature of the tasks faced by the armed forces does not allow to include their dimension and, consequently, to assess them only in economic terms.

In conclusion, the empirical part of the article should be noted that measuring the effectiveness of military supply chains, in the absence of formal methodologies for its assessment, is still more discretionary. The opinions presented in this part of the material constitute only a part of this extremely complex and multifaceted phenomenon, and the presented views can only serve as a contribution to further, extended research. It should be noted, however, that the measurement of the effectiveness of military supply chains is a necessary condition, in many aspects, to improve the process of the physical flow of goods that guarantees the implementation of a wide range of tasks by armed forces during peace, crisis and war.

Conclusions

The results obtained in the research process authorize the following general conclusions.

Firstly. On the one hand, military supply chains show some features similar to supply chains from the civil sphere, and on the other hand they have a number of distinctive features directly resulting from the specificity and nature of tasks assigned to the armed forces during peace, crisis and war.

Secondly. The effectiveness of military supply chains is determined largely by the dynamics and a wide range of tasks carried out by the armed forces in all states of the state's functioning.

Thirdly. The most important plane in measuring the effectiveness of military supply chains seems to be the operational level related to the military sector to the logistic conditions guaranteeing the performance of a training, operational or combat task by sub-units and military units at the level expected from them.

Fourthly. There is a real need to develop in the military sector a methodology for assessing the effectiveness of military supply chains, which will be fully adapted to the specifics of the military environment.

The material outlines only selected aspects of the effectiveness of military supply chains. The adopted restrictions made it possible to achieve the assumed goal, at the same time indicating the directions of further research.

Summing up, with all the firmness, attention should be paid to the need to continue scientific research aimed at solving the problems outlined in the paper. Such actions may contribute to the improvement of the effectiveness of military supply chains, and thus translate into the level of training, operational and combat tasks by military units and institutions.

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A Profitability Prediction Model for High-Tech Startups In Kerala, India

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Abstract

India, the rising economic power, and the second largest country in the world in terms of population, is new to the startup scene. As of 2018, out of 29 states and 7 Union Territories, 21 have created a startup policy to support the entrepreneurial ecosystem and attract more youngsters to take up entrepreneurship. Kerala, in the southern part of the country, is the first state to create its own startup policy in the year 2014. According to the Kerala startup ecosystem report (2019), the state is home to more than 2200 startups and has raised $ 44 million as funding in the year 2019. The purpose of this study is to determine the factors affecting the profitability of the startups in Kerala, India. A personal interview with the founders of 201 startup companies were adopted to collect required information. Following Lussier Model an exploratory model was introduced. Using logistics regression analysis, it is found that the model ($p = 0.000$) is a significant predictor of profitability of the business. The model accurately predicted 74 per cent of the surveyed firms and explained 47 percent of the variance of contributing factors to profitability of the business.

Keywords: Entrepreneurship, Startups, Profitability, Prediction Model.

Introduction

The startup wave has hit almost all parts of the world. According to the latest Global startup ecosystem report (2019), the startup sector across the globe has contributed $2.8 trillion in the period between 2016 -2018, which is double than what it was 5 years ago. Recognizing the contribution made by the sector to the economic growth and the example set by Silicon Valley in the USA, many countries have undertaken reform measures to create a startup ecosystem. India, the rising economic power, and the second largest country in the world in terms of population, is new to the scene. Even though the concept of entrepreneurship was not new to the country, the years 2005-2010 witnessed the startup boom and the birth of the current unicorns from India. Later, the Startup India, Make in India initiatives of the central government have sowed the seeds to create a vibrant startup ecosystem in the country. According to the Ministry of Commerce and Industry, a startup in India is any company which was incorporated in India in less than 10 years and has an annual turnover of less than 100 crore. The state government has caught up with the central government in setting up policy measures to foster the startup culture in the region. As of 2019, out of 29 states and 7 Union Territories, 21 have created a startup policy to support the entrepreneurial ecosystem and attract more youngsters to take up entrepreneurship. Kerala is one such state in the southern part of the country to create its own startup policy in the year 2014. The government has created a nodal agency, Kerala Startup Mission (KSUM) to coordinate the entrepreneurship development activities of the state. The state has also set apart 1 per cent of its annual budget for entrepreneurship development activities. Since then, the state has witnessed an increase in the number of startups incorporated.

Startups In Kerala

Kerala was ranked as the top performer of the country in the State Startup Ranking Exercise 2018 by the Department of Industrial Policy and Promotion, Ministry of Commerce and Industry, Government of India. According to the Kerala Startup Ecosystem Report (2019), the state is home to more than 2200 startups and has raised $44 million as funding in the year 2018-19. The state has also set up 40+ incubators and 10 accelerators to support the startups in the state. This has led to a reverse migration of skilled entrepreneurs to Kerala. The government has earmarked 1 per cent of its annual budget for entrepreneurship development activities of the state.

The government through its entrepreneurship development programs are trying to convert job seekers to job creators. The state provides infrastructural support to startups through incubators in tier II cities. This helps in creating more enterprises and job opportunities for skilled youngsters in tier II cities. This could be a revolution which can change the face of the state gradually. The number of startups registered in the state has increased from 299 in 2015 to 2200+ in 2019.The rapid upsurge, in the number of startups being registered, can be due to the high human development index, entrepreneurial quality possessed by the founders and measures taken by the state government. A few of the startups are already acquired by corporates from other countries. Many of them have scaled up and become profitable within a few years of incorporation. Creating and supporting profitable ventures will contribute to the economic development of the state. Attracting youngsters to entrepreneurship also helps in increasing the job opportunities available in the state. There are a few literature available related to the startups in Kerala. This was the motivation behind doing a research on identifying the factors impacting the profitability of high- tech startup ventures in Kerala, India. Given the importance of startups and the boom in the number of startups registered in the state, research on the factors impacting the profitability of startups will benefit policymakers, budding entrepreneurs, venture capitalists and other stakeholders. Understanding the factors impacting the profitability of the firm helps the prospective entrepreneurs in taking planned risk before starting the business.

Theoretical Background

A startup goes through various stages in the life cycle of the business. The entrepreneurs have to prioritize and give importance to factors that make the business into a scalable venture. Picken (2017) has identified eight steps – "Setting a direction and maintaining focus, Positioning products/services in an expanded market, maintaining a customer/market focus, building an organization and management team, developing effective processes and infrastructures, building financial capability, Developing and nurturing a culture, Managing risks and vulnerabilities"- to transform a startup into a scalable business. To analyse the factors affecting the profitability of a business many researchers has introduced both financial and non-financial methods. Researchers measure the performance and critical success factors of a business using Return on Investment, sales, profit earned etc. But it is difficult to measure the performance of a startup business using these financial outcomes as the data are widely not available. Apart from that, many researchers have criticized the usage of financial models as they turned out poor predictors of success or failure (Gilbert et al, 1990).

Cherukara (2015) has identified the factors leading to entrepreneurial success in Kerala. Demographic factors like formal education and location of the business has an effect on the success of an enterprise. He found that the capital invested in the business influences the organisational success. The competitive aggressiveness of the entrepreneur was also found to be contributing factor to the success of a business. Along with the internal factors, external factors like employee loyalty, availability of finance and dynamic market conditions also influences the success of an enterprise in Kerala. The state provides entrepreneurship development programs to educate and promote entrepreneurship. Prasanth (2018) observed that entrepreneurship development programs are helping the entrepreneurs to develop the personal factors like marketing skills, financial literacy etc. Philip (2008) concluded in his study, educational qualification, size of the enterprise, growth phase and R&D capability influences the performance of enterprises in Kerala. Saleem (2012) identified in his study, experience, business profile, investment and culture influence the profitability of the small business. Broers (2016) identified organizational and operational principles that classifies fast growing startups. Staffing, access to technology and asset management were found to be characteristics of a fast growing startup. Network,

managerial skill, experience, and expertise possessed by the entrepreneur contributes to the profitability and growth of a startup enterprise (Huang et al, 2012).

Lussier (1995) has proposed a success Versus failure prediction model to test whether successful and failed business start with equal resources. He identified 20 journal articles and examined the variables considered by the authors, as the factors contributing to the success or failure of a firm. He identified 15 major variables, after comparing the articles, which includes Capital, Record keeping and financial control, Industry experience, Management experience, Business Planning, Professional advice, Educational qualification, Employee retention, Product/ service timing, Economic timing, Age of the entrepreneur, Number of partners, parents owning business, ethnic minority and Marketing skills possessed by the entrepreneur. He found that there was significant difference among successful and failed enterprises for the variables planning, professional advice, education and staffing. Lussier (1996), then used the model to predict the success or failure of startup business in the retail industry. It was observed that the model could explain 67 per cent of the variance in the outcome variable. Later Lussier and Corman (1996), used the same model to predict the success or failure for entrepreneurs with 0-10 employees. The model showed an overall accuracy rate of 75 per cent. Teng *et al* (2011) has adopted the model and tested it in Singapore. Apart from the 15 variables introduced by Lussier, he also introduced 11 other variables which includes relationship with customers, Niche product/ service area, Cost of running business, technology edge, competition from rivals, leadership of senior management, people bonding in firm, organizational capability, broad access to resources, local knowledge of market and good government policy. Availability of high-quality staff working in the company, good product timings, good relationship with customers and good top management staff were found to be significant among the variables. A three- country comparison using the same model was done by Lussier and Halabi (2010) in United States, Croatia and Chile. Although there is wide geographical and cultural disparity among the three nations, it was observed that the success or failure variables are similar in the three countries. Halabi and Lussier (2014) improves the Lussier 15 variables by adding internet and removing highly correlated variables and tested eight variables - internet, starting with adequate working capital, managing good financial and accounting records, planning, owner formal education, professional advice, having partners, parents owning a business, and marketing efforts to predict the entrepreneurial success in Chile. Except planning and formal education all other variables were found to be significant. Marom and Lussier (2014) tested the validity of the model with small business in Israel. The model was found to be statistically significant and the variables in the model could explain 66 per cent of the variance in success versus failure of a business. The model could correctly classify 85 per cent of the time a business in Israel as successful or failed enterprise. Hyder and Lussier (2015) conducted a study on the small businesses in Pakistan and examined the validity of the model in Pakistan. It was found that 82 per cent of the time the model could correctly classify the business as successful or failed enterprise. The research done on different parts of the world prove the global validity of the model. Thus, variables considered in the Lussier model is considered in this study to examine the factors contributing to the profitability of a startup company in Kerala, India.

Methodology

This section includes the methodology adopted to conduct this study. A structured questionnaire was developed to collect information from the respondents. The information about the startups were collected from the website of Kerala Startup Mission. Out of 2200 startups in Kerala, 565 startups were registered under KSUM in Kerala. The scope of this study was the startups registered under KSUM. Stratified random sampling technique was used in this study. The entire state of Kerala was divided into three regions viz., Northern, Central and Southern. The northern region consists of 6 districts, the central region consists of 4 districts and the southern region consists of 4 districts. From each region one district is selected which has the greatest number of registered startups under KSUM. Calicut district from northern region, Ernakulam district from Central region and Trivandrum district from southern region of the state were considered for data collection. Majority of the startups in Kerala are located in Trivandrum, Ernakulam and Calicut districts due to the availability of infrastructure, human resources and a conducive environment for doing business. In total, there are 53 startups in Calicut, 200 startups in Ernakulam and 194 startups in Trivandrum. 250 entrepreneurs were contacted via email and telephone in the first round to get their consent in the month of April 2019. Startups which has

surpassed the ideation stage were only contacted considering their ability to respond to all the questions. Data was collected by conducting a personal interview in the next round from those respondents who were willing to participate in the research. The time period of data collection was 1 May 2019 to 31 October 2019. Data was collected proportionately from 24 startups in Calicut, 90 startups in Ernakulam and 87 startups in Trivandrum district. 201 useful responses were received which was compiled and analysed in the later stages. The variables considered for analysis includes:

i. Age of the Business (Number of years) – "Younger business have a greater chance of failure than older business". (Reynolds, P. and B. Miller, 1989)
ii. Number of employees- Businesses that cannot employee adequate number of employees has a greater chance of failure than firms that do.
iii. Industry Experience (Number of years) – "Businesses managed by people without prior industry experience have a greater chance of failure than firms managed by people with prior industry experience." (Lussier, 1995)
iv. Management Experience (Number of years) – "Businesses managed by people without prior management experience have a greater chance of failure than firms that are managed by people with prior management experience." (Lussier, 1995)
v. Planning (1 no plan – 7 specific) – "Businesses that do not develop specific business plans have a greater chance of failure than firms that do." (Lussier, 1995)
vi. Professional Advice (1 Not used – 7 Used) – "Businesses that do not use professional advisors have a greater chance of failure than firms using professional advisors." (Lussier, 1995)
vii. Employee retention (1 Difficult – 7 Easy)- "Businesses that cannot attract and retain quality employees have a greater chance of failure than firms that can." (Lussier, 1995)
viii. Customer service (1 Poor – 7 Excellent) – "Businesses that do not provide good customer service have a greater chance of failure than firms that do." (Benzing et al., 2005)
ix. Marketing Skills (1 unskilled - 7 skilled) – "Business owners without marketing skills have a greater chance of failure than owners with marketing skills." (Lussier, 1995)
x. Product Innovation (1 Traditional -7 Innovative)- "Businesses that select products/services that are not innovative have a greater chance of failure than firms that select innovative products/services."
xi. Financial account maintenance and control (1 poor - 7 good)- "Businesses that do not keep updated and accurate records and do not use adequate financial controls have a greater chance of failure than firms that do." (Lussier, 1995)
xii. Capital (1 inadequate – 7 adequate)- "Businesses that start undercapitalized have a greater chance of failure than firms that start with adequate capital." (Lussier, 1995)

Following Lussier (1995), Logistics Regression Analysis was performed using SPSS to identify the factors contributing to the two possible outcomes Viz., Business is profitable or not profitable. Profitability is defined as the business is profitable in any of the previous three years of operation and not profitable is defined as the business not making profit in the last three years.

Non- Response Bias

The non-response bias was tested by comparing response of early respondents with the response of late respondents using t- test following Teng *et al* (2011). There was no statistically significant difference in the response of early respondents and late respondents.

Results

The results of the data analysis are presented in this section. Table 1 shows that, out of the total respondents, 44 per cent have started making profit and 56 per cent are in the early stages of revenue generation and are still on loss.

Table 1: Profitability of the Business

	Frequency	Percent
Profitable	88	43.8
Not profitable	113	56.2
Total	201	100.0

Source: Primary Data

As the data are significantly different from the normal population, Mann Whitney U Test is done to check whether there is significant difference in the mean ranks of profitable and non-profitable organisations for all the variables considered. The hypothesis developed is:

H_1: There is no significant difference in the mean ranks of Profitable and Non- Profitable startups.

Table 2: Mann Whitney U Test Ranks

Variables	P/ N	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Age	P	88	112.65	9913.50	3946.500	10387.500	-2.689	.007
	N	113	91.92	10387.50				
	Total	201						
Staffing	P	88	124.02	10914.00	2946.000	9387.000	-4.961	.000
	N	113	83.07	9387.00				
	Total	201						
Industry experience	P	88	101.89	8966.50	4893.500	11334.500	-.193	.847
	N	113	100.31	11334.50				
	Total	201						
Management experience	P	88	107.75	9482.00	4378.000	10819.000	-1.468	.142
	N	113	95.74	10819.00				
	Total	201						
Planning	P	88	110.60	9732.50	4127.500	10568.500	-2.350	.019
	N	113	93.53	10568.50				
	Total	201						
Professional advice	P	88	107.83	9489.00	4371.000	10812.000	-1.521	.128
	N	113	95.68	10812.00				
	Total	201						
Employee retention	P	88	119.78	10541.00	3319.000	9760.000	-4.298	.000
	N	113	86.37	9760.00				
	Total	201						
Customer service	P	88	127.45	11216.00	2644.000	9085.000	-6.056	.000
	N	113	80.40	9085.00				
	Total	201						
Marketing	P	88	130.61	11494.00	2366.000	8807.000	-6.701	.000
	N	113	77.94	8807.00				
	Total	201						
Product Innovation	P	88	119.02	10474.00	3386.000	9827.000	-4.254	.000
	N	113	86.96	9827.00				
	Total	201						
Financial account	P	88	111.14	9780.50	4079.500	10520.500	-2.407	.016
	N	113	93.10	10520.50				

maintenance and control	Total	201						
Capital	P	88	87.60	7709.00	3793.000	7709.000	-2.983	.003
	N	113	111.43	12592.00				
	Total	201						

P- Profitable; N- Not Profitable
Source: Primary Data

It can be inferred from table 2, that except for the variables Industry experience, Management experience, Professional advice, the Significance value is less than 0.05 for all other variables considered. Therefore, it can be concluded that, there is significant difference in the mean ranks of 9 out of 12 variables of profitable and non-profitable startups.

Table 3 shows the list of the 12 variables and the results of logistics regression analysis conducted on them.

Table 3: Logistics Regression Analysis

	B	S.E.	Wald	df	Sig.	Exp(B)
Age	-.065	.210	.095	1	.757	.937
Staffing	-.038	.016	5.780	1	.016	.963
Industry experience	.123	.065	3.538	1	.060	1.131
Management experience	-.121	.074	2.722	1	.099	.886
Planning	.149	.233	.410	1	.522	1.161
Professional advice	.052	.104	.250	1	.617	1.053
Customer service	-.478	.259	3.401	1	.065	.620
Marketing	-.895	.290	9.532	1	.002	.408
Financial account maintenance and control	.323	.279	1.342	1	.247	1.381
Capital	.002	.173	.000	1	.989	1.002
Product innovation	-.840	.293	8.217	1	.004	.432
Employee retention	-.347	.235	2.175	1	.140	.707
Constant	8.725	2.292	14.487	1	.000	6152.274

Source: Primary Data

Table 4: Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	85.895	12	.000
	Block	85.895	12	.000
	Model	85.895	12	.000

Source: Primary Data

The Omnibus Tests of Model Coefficients table shows that the model is statistically significant at less than 0.01 (p= 0.000) for Chi-square value 85.895 at 12 Degrees of Freedom. Thus, the model has empirical validity as 99% of the time it will be more accurate than random guessing of which businesses are profitable and established.

Hosmer and Lemeshow Test was done to check whether the model is significant. The hypothesis is

H_2: The model adequately fits the data

Table 5: Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	3.343	8	.911

Source: Primary Data

From table 5, Hosmer and Lemeshow Test, Significance value of 0.911 is greater than 0.05, which implies that the null hypothesis is accepted, which means the model is statistically significant.

The Nagelkerke R Square from table 6 shows what percentage of the dependent variable may be accounted for by all included predictor variables. From the table, it is concluded that the model is good and can account 47 per cent variation in the dependent variable by all predictor variables.

Table 6 : Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	189.633[a]	.348	.466

Source: Primary Data

The classification table shows that the model predicts 68.2 per cent of the profitable startups and 78.8 per cent of the non-profitable startups correctly. In 74 per cent of the cases the model classifies correctly a firm as Profitable or Not Profitable. It is concluded that the model is 24 per cent more accurate than a random guess of producing 50 per cent correct classification of a firm as profitable and not profitable.

Table 7 : Classification Table[a]

Observed		Predicted		
		Profitable or Not Profitable		Percentage Correct
		Profitable	Not profitable	
Profitable or not profitable	Profitable	60	28	68.2
	Not profitable	24	89	78.8
Overall Percentage				74.1
a. The cut value is .500				

At the 5 percent significance level, the statistical outcome of the exploratory model in table 3 suggests that, the factors impacting the profitabilty of startups in Kerala are number of employees in the firm (p= 0.016), Product innovation (p= 0.004) and the Marketing skills (p= 0.002). Human resources are the backbone of any organization. It can be concluded that the firms, especially startups, must take utmost care while hiring a person as it has direct effect on the profitability of the firm. Hiring employees increases the fixed expenses of the firm, in the form of salary. Inadequate availability of suitable labour affects the performance which in turn affects the profitability of the business. It was also found that introducing innovative product by the firm also plays a significant role in the profit-making ability of the firm. Firms making profit were found to have diversified their product portfolio to increase the returns from business rather than concentrating on a single product. The respondents also engage in service projects apart from developing products to meet the working capital requirements of the firm. Marketing skill possessed by the business owner is another significant factor affecting the profitability of the firm.

At 10 per cent level of significance, the statistical outcome of the exploratory model in table 3 suggests that, the factors affecting profitability of startups in Kerala are Industry experience (p=0.06), Management experience (p=0.099) and Customer service (p= 0.065). The experience possessed by the business owner has significant effect on the profitability of the business. Providing good service can add to the expenses incurred by the firm. But it is important for any firm to provide good services to

retain existing customers and attract new customers. Therefore, experience of an entrepreneur and providing good service have an impact on the profitability of the business.

Conclusion

Policymakers in Kerala, India has identified the importance of entrepreneurship and introduced many schemes to support the existing entrepreneurs and attract youngsters to entrepreneurship. Infrastructural and financial support are provided to startups through various schemes which were not available in the state a few years back. This has led to an increase in the number of startups registered in the state. Many of the startups has already become profitable and many haven't attained profitability. Creating more profitable enterprises helps in the economic development of the region. The research conducted on 201 startup entrepreneurs from Kerala, India shows that, the model developed can predict the profitability of an enterprise. It was seen that; the model could predict a firm profitable or not with 74 per cent accuracy level. Number of employees in the firm, product innovation, marketing skills, industry experience, management experience and customer service were found to be the significant factors impacting the profitability of the startup. The entrepreneurs should be given non- fiscal support free of cost via incubators to assist them in decision making. It was seen that the experience of the entrepreneur and marketing skills has significant effect on the profitability of the enterprise. Through business incubators the entrepreneurs must be given training on how to market their product or service, how to attract and retain customers, employee retention techniques and state of the art technology in producing innovative product and services. The government through its nodal agency KSUM, should appoint industry experts as mentors. The entrepreneurs without experience could benefit if the mentors could bring in their experience. Number of employees is another significant factor impacting the profitability of the business. Startups in general finds it difficult to attract and retain qualified employees due to the competition from established enterprises. The government could provide a tax waiver for the employees working in a startup. This might attract talented people to work for startups. Although capital was not found to be a significant factor, availability of finance is a major factor for running a business. New funding schemes can be introduced to help the entrepreneurs in starting the business with enough capital. The authorities must follow up to check whether the existing funding opportunities are reaching the deserved people.

Although there are social, cultural, political and geographical differences among countries, the Lussier model was tested to be significant in United States, Croatia, Chile, Israel, Pakistan. Considering many variables from the Lussier model, the model suggested in the present study were also found to be significant. Thus, it can be concluded that, the variables contributing to the performance of an enterprise are similar regardless of the country in which the business is. As opined by Marom and Lussier (2014), the similarity can be due to the effect of globalization and thus research on global Success Versus Failure Prediction model are important in the current scenario.

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Some Aspects of Digital Literacy in The Context of Higher Education

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Abstract

The phenomenon of digital literacy, or literacies, has been the focus of research for already several decades. However, it is still unclear whether the competence of operating and creating in the virtual reality should be mastered individually or formed with the assistance of academics. Moreover, the integral components of digital literacy are still subject to discussion. These aspects motivated the author to seek the students' understanding of the notion and the degree of responsibility they believe should be applied when using the materials obtained in the internet. As the initial step in the research that is to be developed further, a group of students, as well as a limited group of teachers, were given a discourse literacies test checking their understanding of the notion and conscientious use of online resources. The results confirmed the author's hypothesis that, firstly, definitions of digital literacy vary from person to person, and, secondly, digital competence for both advanced and medium users mostly implies being able to process the data obtained in the digital area and neglecting the skill of being critical and cautious with regard to online resources. Thus, the problem remains to determine who should make young people aware of online etiquette and how it should be done in the context of higher education, if we presume that growing a fully fledged specialist is the responsibility of an educational institution. This constitutes both food for thought and an incentive for further research.

Keywords: Digital Literacy; Individual/ Social Skills; Competences; Responsible Use.

Introduction

Digital literacy as a concept relevant in the educational process appeared relatively recently and has been causing multiple discussions concerning components that make it up, as well as whether it should be taught at educational institutions or it is a skill that is inherent for the modern youth. In the beginning digital literacy was often equated with computer literacy, thus focusing on IT skills (e.g. in a research study by Williams & Minnian), or, later, network literacy, bringing to the fore effective use of internet resources (e.g. research studies by Hargittai or Kauhanen-Simanainen). The first definition of digital literacy was given as far back as 1997 by Gilster in his book "Digital Literacy", where he describes it as "the ability to understand and use information in multiple formats from a wide variety of sources when it is presented via computers". Actually in the same book he distinguishes four core competences of digital literacy, those of Internet searching, hypertext navigation, knowledge assembly, and content evaluation. Since that time a plethora of meanings have been put into the notion, as it evolved from the ability to use computer into a combination of various skills that cover human activities in the digital environment (visual, cognitive, reproductive, emotional, social, etc.).

What interested us at the initial stage of our study was what components adult students distinguish in the phenomenon of digital literacy. Thus, the aim of the current research is to find out whether students are aware of the variety of indicators that make up the notion of 'digital literacy' and help them operate in the digital sphere conscientiously, make full use of digital resources and not breach the laws that regulate their activity in the digital environment of their country and in the global space.

Before we present the results of the survey, we contend it to be vital to review the existing interpretations of digital literacy. First of all, it should be noted that modern researchers prefer the term 'digital literacies'. Dudeney et al. maintain that these constitute a combination of individual and social skills that help effectively interpret, share and create meaningful material in various communication channels. These literacies are more social practices than individual characteristics as they are in larger part necessary to establish communication and collaboration across social, economic, political and cultural boundaries. In modern literature devoted to this problem the concept of digital literacy has evolved from being a functional characteristic into a general competence. According to Bawden, this general competence embraces the ability to assemble knowledge from various internet sources and to assess it critically, analyse for credibility and follow etiquette patterns accepted in the online community. Researchers generally agree that central to the notion of digital literacy is the ability to synthesize and integrate information from various sources; other components added by different specialists vary. However, Bawden, along with some others, believes that we should not limit the number of its components or devise one fixed model of digital literacy for all, as the digital environment constantly develops and it brings about changes in people's individual competences. Wan NG from University of New South Wales, Australia, also believes that digital literacy as a multiplicity of literacies develops while a person adapts to new and emerging technologies.

Another interesting interpretation of digital literacy is presented in the article of David Buckingham "Defining Digital Literacy". He also views it as a form of education about the media, not as a functional or technical skill or competence, and argues that it includes, besides functional skills, conscious use of software: databases, search tools, etc. But Buckingham stresses the point that is generally neglected: the importance of online safety: users, especially young ones, should be able to protect themselves against harmful content. Furthermore, it is necessary to assess the information not only in the terms of factual accuracy, but also in the terms of bias, purposes underlying the context. We believe these aspects of digital literacy to be vital, especially in the context of education, so his definition of digital literacy looks to us quite comprehensive, and can be accepted for the use of teachers and methodologists.

It should be noted that the concept has also been approached by European educational organizations. For instance, in the British Futurelab's handbook on Digital Literacy Across the Curriculum Hague and Payton define digital literacy as the ability to access various practices and resources, make and share meaning, communicate effectively and make correct choices of digital technologies to support these processes. Another broad definition of digital literacy has been formulated by the European Information Society. In their report Martin states that digital literacy enables individuals to be aware of various digital tools and facilities, form corresponding attitude to them and use them with the aim of identifying, managing, evaluating, synthesizing digital resources, constructing new knowledge, communicating and reflecting upon the process. Summing up all the above-mentioned definitions, it can be said that different specialists regard digital literacies from different perspectives, that is why a universal definition of this phenomenon has not been suggested yet. Still, it is obvious that, first of all, we should regard the notion as 'digital literacies', not 'literacy'; second, the components that are inalienable to the phenomenon are individual skills of processing information and creating new data; social skills of managing online communication; functional competence of being able to master new programs and platforms; responsible behavior in the digital world; knowledge of online etiquette.

It has already been mentioned that the study of existing works on the topic of digital literacy reveals variations in the number of components that researchers outline in the structure of digital literacy. For instance, Bawden in his article "Origins and Concepts of Digital Literacy", basing on the studies of digital literacy conducted by a number of scientists, singles out 4 major components: underpinnings, or literacy in the traditional sense (ability to function in society); background knowledge (understanding of new forms of information and how they correlate with each other); central competences (a vast list of basic competences necessary in the digital environment) and attitudes and perspectives (independent learning and moral, or social literacy), or what is necessary to behave responsibly in the digital environment, being aware of issues of privacy and security. Buckingham, in his turn, defines the field of study of digital literacy in four respective areas: representation, or motivations of those creating material online, bias and ideology; language,

understood as analytical skills, systematic awareness of how digital media are constructed; production, or commercial influence, and, finally, audience, or understanding how media are targeted and diverse ways of utilizing them. The list of components composed by these two scientists seems to us most complete as compared to others as it embraces the areas that are often omitted, those of copyright, evaluation of information found on the internet and understanding that one should always be critical while choosing material as no author can actually be completely unbiased.

One more interpretation of digital literacy is suggested by Dudeney, Hockney & Pegrum, who divide digital skills into four areas with connection to the focus points: language (everything that is connected with text, understanding information, operating it and communicating); information (tagging, using search engines and services, evaluating and analysing material, reducing information overload); connections (shaping online identity, developing reputation, building connections, contributing to collective intelligence etc) and (re-)design, or remix (creating new meanings, or interpreting and building on others' remixes). In another classification given by Eshet-Alkalai, five types of digital literacy are singled out, which give a slightly different picture of the same concept. The first component is photovisual literacy, or ability to use intuitive graphic interfaces; second is reproduction, or ability to create meaningful and authentic pieces; third is information, or critical thinking; fourth is branching, or a sense of multidimensional environment; fifth is socio-emotional, or ability to be analytical, willingness to share knowledge and collaborate. Wan Ng distinguishes three intersecting dimensions of digital literacy: technical (operational skills); cognitive (critical thinking) and socio-emotional (responsible use of Internet).

It should be noted that, along with technical skills of being able to use digital technologies, all definitions of digital literacy, or literacies, comprise the ability to work with the information conscientiously, applying critical approach and creating original product. However, what is generally overlooked is conscious and careful attitude to other people's intellectual property, ethical use of data, respect for copyright. Maggie Fieldhouse and David Nicholas in their article 'Digital Literacy as Information Savvy' call it 'being information wise' as opposed to being 'information savvy', the latter implying just being able to locate and choose information in accordance with your purposes. They consider it important that students be taught to be information wise: learn to acquire and apply critical and analytical skills, discriminate between reputable and misleading data, meet existing information standards.

Likewise, Dudeney, Hockney & Pegrum pose a question of digital copyright, understanding of which has been changing in the times of expanding web 2.0 culture, that is growing blogs and social-networking sites, where users communicate actively and jointly create new culture. In fact, they call digital copyright 'a grey area' as, on the one hand, copyright regulations are being constantly revised and adapted to the changing reality of the virtual environment, but, on the other hand, creativity on-line is developing and transforming into a new culture, and the existing rules often hamper and even stifle this process. It cannot be denied that digital etiquette does exist, and most countries have their own codes regulating authors' rights in the digital sphere. There are also creative environments where both students and educators can make use of various materials, for instance, Creative Commons. But the point here is whether all users realize when they actually breach the rules or can be accused of plagiarism, since such cases are not always as obvious as copying of printed material or oral reproduction of other people's works.

Methodology

Research Design and Procedure

Our study of the students' understanding of digital literacy might be the initial step in the long-term research, so at this stage we set ourselves the goal of finding out what components students generally include into the notion. We also asked some English language teachers to complete the same questionnaire in order to compare the answers and get a general idea of whose understanding of the notion is more profound. This survey was carried out in 2019, and involved fourth-year students (bachelors' program) and first- and second-year students (masters' program) from the Department of

International Economy of the Moscow State Institute of International Relations (MGIMO University), and a limited number of English language teachers of the same department. The overall number of the students – participants in the study was 78; teachers – 17. The average age of teachers was 37 years old, meaning that these should be people belonging to the generation proficient in their use of digital devices and mostly familiar with the new technologies being used by their students. The respondents were to answer the questionnaire, which consisted of two parts. The first part was an open question in which they were asked to continue the list of indicators that make up the notion of digital literacy. They were given one indicator as an example (understanding and using information in different formats) and they were not limited in the number of indicators that they could specify. The second part of the questionnaire constituted four multiple-choice questions where they were to choose one answer out of four. The questions concerned the importance of digital literacy, where it can be acquired, whether copyright should be considered when using digital resources and, finally, in what way they make use of digital materials while doing creative assignments.

The participants' free answers and choice of options allowed us to draw conclusions on whether their use of digital environment is responsible or intuitive and whether the young people who believe to be internet-savvy realize the full implications of communicating, cooperating and creating in the digital world.

Results and Discussion

The results of the survey were processed and systematized and the following considerations can be stated.

First, we would like to present the analysis of the answers given by students to the open question. Actually, the survey revealed rather vague understanding of digital literacy both by students and teachers, so it is impossible to refer their answers to the four areas outlined in the works of Bawden and Buckingham, which we consider to be quite exhaustive. The indicators outlined by students can roughly be subdivided into three major areas: information, or cognitive dimension, also embracing communication; technical dimension; and socio-emotional dimension. It should be noted that the first area, with a varying focus, was mentioned by all the participants of the survey. 42% of the respondents maintain that digital literacy is mainly effective search for necessary information; 24% also include analysis of information from various sources; 20% just claim that this is about using the Internet whenever possible and for various purposes; 15% assert that digital literacy is about knowing where to get the information you need. Some students also single out such indicators as setting connections between different ideas and types of information, mixing various sources of information, communicating and sharing digital content and knowing how to apply the obtained information. Judging by the given definitions, the topic seems rather vague for the participants, as some of the indicators in essence reflect the same idea, hence the total percentage constitutes more than 100%.

The second most popular area mentioned by students was technical. Almost 22% of the participants state that understanding the programs used and the way they might help you with research is a necessary component of digital literacy; 18% mention versatility with different gadgets; 15% include keeping up with the news in the digital sphere; 14% consider ability to use various platforms and systems part of digital literacy; 11% are sure that competent users should be familiar with information theory and coding.

The socio-emotional dimension was mentioned less often than the previous two. The majority of those who distinguish this dimension point out that it is important for a digitally literate person to distinguish between reliable and unreliable sources (15%) or between relevant and irrelevant information (9%) and to know how to protect personal data (10%). Probably, the first two indicators might be referred to the information area, but as they involve conscious use of resources, we decided to refer them to this part of the results. 8% of respondents consider making references to the original source of information as relevant; 7% mention responsible use of digital resources and ability to do your own research based on various sources of information. It should be added that more than 6% specify such an indicator as 'digital hygiene', which is also about critical thinking and respect for copyright. It is interesting to mention that one of the participants gives such a component as

'distinguishing acceptable piracy from unacceptable'; another ingenious indicator – 'teaching other people to be digitally literate'.

Comparing the answers given by teachers, it should be noted that the latter are not so varied in view of the dimensions of digital literacy as those of the students. Mostly respondents of this group outline cognitive skills connected with obtaining information: 52% state that digital literacy is about finding, evaluating and composing information (and doing it fast); 29% point out using various media on different digital platforms. Other components pertaining to the sphere of information and operating with it are: effective use of digital devices, communicating via them, creating material using the Internet, navigating the digital world, knowing how to find reliable sources of information etc. We have to admit that students showed a far more conscientious approach to the survey, and the teachers' answers are rather general and not reflecting any specific skills a digitally literate person should possess.

As far as the technical dimension is concerned, teachers do not take it into consideration, the only indicator approaching it being 'learning fast how to use new devices'.

Responsible behaviour and copyright were mentioned by some respondents in a generalized form of online etiquette, critical evaluation of online resources, respect for IP rights of writers and awareness of cybersecurity.

The second part of our research concerned students' and teachers' answers to multiple choice questions.

According to the results obtained in the survey, 57% of the students who participated in the survey believe that digital literacy is a must in modern society, while 36% are sure that it is as important as other literacies. Although it might look ridiculous, there is a small number of students who believe that digital literacy is not necessary or is only necessary if you work in IT sphere (both choices amount to 3.5%). As for the answers given by teachers, they are divided between digital literacy being a must nowadays (50%) and being as important as reading or writing (46%), with 4% considering it unnecessary.

Furthermore, most students confirm that they can learn digital literacy on special sites in the Internet (46%) or themselves by trial and error (41%). Still, 8% of them think that friends can help them in this, and 5% will seek their university professors for help. As for the teachers, the answers to this question are mostly divided between asking professors for help (47%) and learning themselves by trial and error (43%). The rest will either ask friends or try to find help in the Internet.

As for the issue of copyright, both students and teachers would rather use licensed sources (40 and 50% respectively) or be creative so as not to be liable for breaking copyright (37 and 40% respectively). 12% of students and 0% of teachers wouldn't worry about copyright at all, and 11% of students and 10% of teachers admit that piracy is acceptable if it is for educational purposes.

Finally, when doing a creative task, such as an essay, presentation or research, 58% of students and 50% of teachers will process the materials they find on the net and develop them using their own ideas; 21% of students will make a mix of materials from the Internet; 13% of students and 43% of teachers always give references to materials taken from the net; and 8% of students and 7% of teachers will mostly use their own ideas.

As can be seen from the participants' answers to this part of the questionnaire, they are on the whole aware of the importance of digital literacy, but neither do they realize what competences make up the phenomenon of digital literacy nor have an established opinion concerning where these skills should be obtained and who should teach them. We would consider it a good sign that practically half of both students and teachers are aware of copyright and respect it. However, when performing creative activities, teachers appear to behave more responsibly than students, which could be explained by their experience in carrying out scientific research.

Conclusion

It is obvious that nowadays, with new digital technologies, sophisticated devices and ubiquitous on-line communication pervading all spheres of modern life, educational sphere included, the process of acquiring digital competency cannot be neglected and be left in the care of the users of on-line resources. First of all, state educational programs with no regard to the specialization should include competences in the digital sphere. As of now, Federal Educational Standards of the Russian Federation include the general professional competence of being able to use modern information technologies and software to solve professional tasks; professional standards devised by MGIMO University also comprise the general professional competence of being able to tackle standard problems of professional activity by using information communication technologies with the consideration of information security rules. These competences do reflect the major provisions of digital literacy, but they seem to be rather vague as they do not embrace all the aspects of it discussed above. At the same time, the laws regulating people's activities in the digital sphere in many countries are tightening, and the consequences for irresponsible users might be quite serious, up to a jail sentence. The earlier young people, who are most frequent users of digital technologies, realize it, the better, and it is logical that educators both in the spheres of high school and higher institutions should provide them with this knowledge and teach them to behave responsibly in the virtual world. At the same time, teachers' objective, especially in humanities, is to teach their students creative activities, which, in the age of digital communication, invariably involves re-mix of other people's ideas, and that might turn out to be illegal. As Lessig in his book "Free Culture: The Nature and Future of Creativity" states, "As educators we can't promote products and technology that engage in this form of community expression because, increasingly, to deploy products that enable people to engage in something called copyright violation is to make your own organization liable for a copyright violation." This poses a big problem for all educators, and to solve it educators themselves have to become proficient in the digital environment, which might also present a multitude of problems, as these are in a large part people advanced in age and thus struggling to feel at ease in this fast-changing new reality. As we see it, the only option that remains is continuous process of education for both teachers and students, or life-long learning as the main principle of active life. Besides, higher educational institutions should consider including and developing the program of digital literacy (or literacies) education into their syllabi for all professions as one more mandatory literacy along with reading, writing and doing arithmetic.

Still, these tasks are not easy to approach and demand more research and discussion by the professional community.

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Polish Tourism Managers Facing the Phenomenon of *Halal Tourism*- Results of Pilot Studies

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Abstract

The currently experienced dynamic development of Halal tourism (HT), measured e.g. by the growing number of Muslim tourists and the value of expenses they incur, has its implications for both the global tourism market and also for the local markets. Taking advantage of the potential benefits resulting from this growth by tourism managers operating outside the Islamic world, including Poland, forces them to recognize, understand and accept the expectations presented by Muslim tourists regarding the consumed services and desiring to observe the principles of their religion. The purpose of the article was *to present the opinions of the local tourism sector representatives about the possibilities and determinants of HT development*. Based on the results of pilot surveys, the research hypothesis was falsified as follows: *domestic tourism managers perceive HT as their development niche*. Rejecting the adopted hypothesis was based on the identification of factors/characteristics referring to the managers themselves, their attitudes and activities (internal premises) and also the ones describing space (economic and socio-cultural) in which they pursue their business objectives (external premises).

Keywords: Tourism, Halal Tourism, Local Tourism Market

Halal Tourism – The Essence

It is estimated that at the end of the 5th decade of the 21st century, Muslims will constitute 31% of the world's population (*The Future of* ..., 2015, p. 8). The increase in the number of Muslims and their income is becoming, among others, the driving force of changes at the global and local tourism markets. The dynamically growing number of Muslims traveling for leisure, business, health and religious purposes resulted in the tourism segment, covering their travelling, become one of the fastest growing components of the global tourism industry.

According to the *State of the global Islamic economy report 2019/2020* (2019, p. 76), Muslim spending related to their travelling in 2018 reached 189 billion USD, with the estimated increase in 2024 to 274 billion USD. This amount, in 2018, accounted for approx. 12% of the global expenses incurred by travellers. According to the *Global Muslim Travel Index 2019* report (2019, p. 18), 140 million Muslims made international trips in 2018, with an estimated 230 million travellers in 2026. These figures indicate a certain phenomenon, both in economic and socio-cultural dimensions. On the one hand, the growing importance of the Halal tourism sector (HT) in both the so-called *Halal* economy and global tourism is recorded and, on the other, dynamic changes in the behaviour of Muslims are observed, who following their religion rules, are increasingly active as tourists. Understanding this phenomenon, in the authors' opinion, allows approaching this type of tourism through the prism of its premises, nature and characteristics determining its specificity and place in the modern world.

The idea of HT appeared in the Islamic world as a consequence of the need to define and develop the processes and conditions related to the sphere of this religion members' travelling. Its expression, feature and simultaneously the challenge faced is to create the conditions for implementing the tourist

service (including its elements) remaining in line with the religious and moral imperatives regulating its Muslim consumers' behaviour.

HT and its rules are deeply rooted in Islamic origins (the Koran, Sharia and Sunnah of the Prophet) where the religious rules focused on the Muslims' pilgrimage to Mecca[1] are described (as part of the major pilgrimage – *Hajj*, constituting one of the five pillars of this denomination and the minor pilgrimage – *Umrah*) and to the graves of Muslim saints (*ziyara*) (e.g. Jafari and Scott, 2014; Haq and Wong, 2010; Eid, 2013; Kovjanic, 2014; Zamani-Farahani and Eid 2016). There are also recommendations regarding Muslim tourists' behaviour related to: the migration to imitate the Prophet's life – *Hirja* (Henderson 2003), travel to acquire knowledge, skills or for commercial/economic purposes – *rihla* (Zamani-Farahani and Henderson, 2010), to visit relatives and "admire the beauty of this world" (e.g. Al-Munajjid, 2015; Hussain, 2015). This tourism, like other Muslim activities, subject to the overarching condition of their purposefulness and benefits of their implementation, is perceived as an instrument for realizing and maintaining the value of Islam and a tool for gaining benefits in line with their faith and moral imperatives (e.g. Saad et al, 2010; Scott and Jafari, 2010).

Recognizing the essence of HT is somewhat hampered by the definition and conceptual chaos of this activity type. It is a function of nature description perspective and tourism phenomenon analysis of the Islamic world representatives (e.g. perspective of: motivations, needs and services based on religion, teaching Islam) (e.g. Duman, 2011; Akyol and Kilinc, 2014; Sureerat 2015) and the elements emphasized in these definitions (e.g. Sharia, target customer, location, offered product, destination) (e.g. Carboni et al., 2014; Zamani-Farahani and Henderson, 2010; Al-Hamarneh and Steiner, 2004). Table 1 presents diverse approaches to defining the tourism phenomenon in the Islamic world.

Table 1: Halal tourism definitions - diversity of approaches

Definition	***Source***
Type of religious tourism following the permissible in Islamic teachings: actions, behaviour, dressing code, diet.	(WTM, 2007)
Term for marking and describing tourism products and/or activities fully complying with the principles and guidelines of *Halal* and Sharia concepts.	(El-Gohary and Boğan, 2015)
Tourist facility or activity permitted or used according to Islam by Muslims in tourism industry.	(Battour and Ismail, 2015)
Muslims' trips to places where Islam is the dominating religion. Religious goals constitute the majority of Muslim tourists' intentions.	(OIC, 2008)
Any activity, event, experience or meeting the needs while travelling, in accordance with Islam.	(ITC, 2013)
Islamic tourism, involving Muslims interested in maintaining their personal religious habits while traveling.	(Carboni et al., 2014)
Tourist activity motivated by travelling in line with Islam, focused on spiritual and social goals.	(Din, 1989)

Source: authors' compilation based on; (Battour and Ismail, 2015, p. 2), (Boğan and Sariişik, 2019, p. 89)

In public space, the terms *Islamic tourism* and *Halal tourism* are used independently and interchangeably. The description of such tourism is also supported by the slogans: *Islamic travel, Halal travel, Muslim-friendly travel, Shari'ah travel* (e.g. Vargas-Sánchez and Moral-Moral, 2019; El-Gohary, 2016). Leaving aside the considerations regarding the differences between these terms and the grounds for using them, following their classification adopted by CrescentRating, the publisher of *Muslim Travel Index* reports, the concepts used in this area can be organized according to their content below (*Muslim/Halal travel*…, 2015 p. 7-8);

[1] About 10 million pilgrims visit Saudi Arabia annually. By 2030, this number is expected to increase to 30 million) (*State of the global* ... 2019, p. 75).

- *Muslim travel* – Muslims travelling for any purpose.
- *Muslim tourism* – Muslims travelling for tourism.
- *Halal travel* – Muslims travellers, not wishing to compromise their faith based needs while travelling for a purpose, which is permissible. It can also be defined as Halal conscious travellers, travelling for any purpose, which is Halal (permissible). Halal travel is a subset of Muslim travel. However, since the vast majority of Muslims will at least have some form of a faith-based need while travelling, the majority of Muslim travel will fall into the category of Halal travel.
- *Halal tourism* – Halal travel undertaken for tourism. Halal tourism is a subset of Halal travel.
- *Islamic travel* – Muslims travelling mainly for religious reasons and/or to visit Islamic religious sites. Islamic travel is a subset of Halal travel.
- *Hajj & Umrah travel* – Muslims travelling for performing Hajj or Umrah, Hajj & Umrah travel is a subset of Islamic travel.

The article authors, following the approaches adopted by the selected researchers (e.g. El-Gohary, 2016; Battour and Ismail, 2016; Battour, 2017), present the position that, in practice, the discussed tourism type, including its characteristics and nature, can be referred to using the term – *Halal tourism* – as the brand name and the name of tourist products complying with the principles and guidelines arising from the concept of *Halal* and Sharia. It is worth highlighting that this compliance takes the form of prohibitions and imperatives formulated regarding, e.g.: accommodation, equipment, meals and drinks consumed, principles of organizing recreation, staff providing services, destinations, related services, dress code or, e.g., consumer behaviour (e.g. Henderson, 2010; Battour et al., 2010; El-Gohary, 2015; (*Muslim/Halal travel*…, 2015)

Halal Tourism in Poland

Until quite recently, Poland was absent in numerous Muslim-friendly tourist locations (so-called *Muslim Travel Friendly*). This situation changes gradually[2]. Małopolska, including Cracow and Zakopane, is increasingly frequently visited by Muslim tourists. The main reason for this phenomenon is the daily flight connection between Dubai and Cracow (Łazarczyk, 2018), offered by *Flydubai* since April 2018 (Ziomek, 2018). On the occasion of this connection opening Arab journalists arrived in Cracow and after visiting the city and its surroundings prepared reports praising the former capital of Poland. The Arab influencers, who published films about their stay in Poland, also disseminated a positive image of this region. The presence of tourism industry representatives at the Dubai tourist fairs, supported by the Local Tourist Organization *Made in Zakopane*, was also the tool for Małopolska promotion (Swoboda, 2018). It is interesting that a decade ago the newspaper *Gazeta Wyborcza* published an article entitled *Arab Emirates the example for Cracow*?, comparing Dubai and Cracow in terms of the city marketing effectiveness. It recommended following Dubai in tourism development through implementing effective marketing and using air connections (Romanowski, 2009). Cracow used these hints and as a result of good air communication and efficient marketing, Muslim tourists visit the city increasingly often. R. Rostek, the ambassador of the Republic of Poland to the United Arab Emirates, also informs that an important determinant of Cracow's popularity among Arab tourists is not only the short flight but also the absence of visa requirements (Hajnoś and Kursa, 2018).

A. Swoboda (2018) estimates that approx. 13 million tourists visit Małopolska annually, including 3 million foreign tourists. Muslim tourists constitute less than 1% of this group. They mainly arrive from the Arabian Peninsula: United Arab Emirates, Kuwait, Saudi Arabia, Yemen, Qatar and Oman (Mateusiak, 2019).

When characterizing Muslim clients, Małopolska tourist sector representatives indicate that they require greater attention and care than other guests, however, this approach is reflected in their

[2] See e.g. https://mekher.wordpress.com/, https://www.havehalalwilltravel.com/10-amazingly-affordable-eastern-european-destinations-for-your-next-big-adventure, https://www.halalzilla.com/muslim-friendly-destinations-2020/90954

gratitude, also shown by leaving behind considerable amounts of money (these tourists often manifest their material status by giving high tips) (Osowski, 2018). The discussed clients are not characterized by openness in contacts with the local community and value privacy. Muslims prefer staying in high standard accommodation. They rent luxury apartments or live in reputable hotels. Many of them are very wealthy and perceive Poland as a relatively cheap country providing good standard of services (Swoboda, 2018). It is also recognized as a safe, still undiscovered destination offering an interesting tourist experience. They additionally value local weather, fauna and flora. The country offering four seasons, snowfalls, the abundance of forests and lakes including vast green areas is highly appreciated. These elements are a natural contrast to the desert landscape of the Middle East. Despite no universal access to *Halal* food, these guests praise Polish food products and fruits, which are considered tasty in their culture.

The offer of one of Cracow's hotels, addressed to groups of Dubai clients, is an interesting example of meeting the expectations of Muslim tourists (*Cultural differences* ... 2019). It is for them that the hotel prepared a special menu including *hummus* and Arabic bread, as well as dishes including spices commonly used in the Middle East. Names of pork dishes, apart from English, have their Arabic equivalents. The rooms welcome Muslim guests with a special complementary note and apples, for them an exotic fruit. In addition, following cultural preferences, the drinking water available in the rooms was changed to non-carbonated and non-mineral one. The information about the geographical direction of Mecca and the number of kilometres separating it from the hotel is also provided. All of the above was consulted with the *Guest Experience Manager* employed in Dubai, whose opinion and knowledge of Muslim culture resulted in their proper choice and character.

The increasing number of Muslim tourists in Małopolska has various consequences. It provides the tourism sector with the successively growing revenues, but also increases the costs for other tourists (e.g. in Zakopane the average accommodation price in 2018 increased by approx. 75% against the previous year). According to D. Różańska (2019), this increase also contributes to a certain degradation of the natural and architectural environment (e.g. Zakopane developers taking advantage of the tourism sector prosperity implement many construction projects without respecting the local spatial development plan, which results in the appearance of "architectural horrors").

As reported by podhale24.pl (*Halal na* ... 2018), the inhabitants of Zakopane are appalled by the frequent purchase of live lambs by Arab tourists and their ritual slaughter in a nearby forest. The website informs that Arabs do not pay attention to people witnessing such activities, as they do not find them particularly shocking (in their homelands it is nothing special). It, however, raises concerns and fear among local communities and tourists. In contrast to these events, resulting from cultural differences, M. Klara (2019) reports Muslim tourists' behaviour who, during the Festival of Sacrifice *Id Al Adha* (*Kurban Bajram*), were giving money to children in the streets of Zakopane, which baffled Polish tourists.

Method and Research Results

In the context of the above considerations, the article purpose was to *present the opinions of the local tourism sector representatives about the possibilities and determinants of HT development*. This purpose has become the basis for formulating the following research hypothesis: *domestic tourism managers perceive HT as their development niche*. The survey method, based on a standardized questionnaire containing 32 questions, was used to identify the opinions on HT developmental potential. Its content concerned the essence of HT and the respective attitudes, including the assessment of a Muslim tourist from the perspective of his characteristics and expectations addressed to the local tourism managers and their offer. The survey was conducted in a group of 71 tourism sector employees responsible for managing hospitality facilities (hotels, guesthouses and apartments) located in such tourist resorts as Karpacz, Szklarska Poręba and Świeradów Zdrój. It covered owners, managers, supervisors and employees of these facilities responsible for marketing and customer relations. The interviews were conducted in July 2019. Table 2 shows the research group characteristics.

Table 2: The research group characteristics

Gender (%)					
Women – 69%			Men - 31%		
Age (years) / (%)					
18-25 / 3%	26-35 / 18%	36-45 / 37%	46-55 / 31%	56-65 / 11%	
Education (%)					
Secondary – 37%		BA studies – 11%		MA studies – 52%	
Function					
Owner 13%	Manager 44%	Supervisor 28%	Other employees 15%		
Experience in truism sector (years / %)					
0-4 / 6%	5-9 / 30%	10-14 / 26%	15-19 / 21%	20-25 / 14%	>25 / 3%
Surveyed entities (%)					
Hotel 3* 31%	Hotel 4* 13%	Hotel 5* 3%	Guest house (including Lux) 34 % (17%)	Apartment (including Lux) 20% (17%)	
Location of entities (%)					
Świeradów Zdrój – 35%		Szklarska Poręba – 34%		Karpacz – 31%	

Source: author's compilation based on surveys.

The presented data indicate that the respondents are professionally experienced in tourism industry (almost 80% are 36 or older and 64% have at least 10 years of experience in this sector). The majority hold managerial positions (72%) and are well educated (63% – university graduates). They represent diversified standard tourist facilities (50% represented hotels, guesthouses and high standard apartments).

The first survey part covered HT essence, its perception and the respondents' opinions about Muslim tourists visiting the analysed facilities, located in the most popular tourist destinations of the Karkonosze and Jizera Mountains.
Only 15% of the respondents stated they had knowledge about HT essence and its distinguishing features, whereas 73% had no idea of this tourism form and its attributes. Interestingly, 45% of the practitioners previously indicating their knowledge of HT essence identify this phenomenon on Polish tourism market along with the accompanying service portfolio (see Table 3).

Table 3. Knowledge about: HT essence and attributes and also HT phenomenon of the local market of tourist services

Do you have knowledge about HT essence and attributes		
Yes – 15%	No – 73%	Hard to say – 12%
Do you notice the appearance of HT phenomenon on the domestic tourism market including the accompanying service portfolio or its components? *(the question addressed to persons indication the knowledge of HT essence)*		
Yes – 45%	No – 36%	Hard to say – 3%

Source: author's compilation based on surveys.

The opinion about HT phenomenon perception on the domestic tourism market was supplemented by assessing its market significance. In this case, all the respondents indicated that HT could represent a potentially profitable and promising market niche. Moreover, they observed it as a demanding and problematic type of tourism. Simultaneously, only 6% perceived it as an actual chance for this tourism form emergence and development on the domestic tourism market and as many as 54% have no opinion in this matter.

The natural consequence of assessing HT's development capacity on the domestic tourism market was the desire to recognize individual opinions on the premises allowing such development and/or support (see Table 4).

Table 4: Premises supporting HT development on the domestic tourism market

Premise	***Share of indications (%)***
More Muslim tourists visiting Poland	25
Changed image of Muslims in Poland	25
Cooperation with Islamic tourist organizations	20
Developing an offer dedicated to Muslim clients	17
Certification of tourist services respecting *Halal* rules	4
Other (e.g. more Muslim students, cultural education)	9

Source: author's compilation based on surveys.

The surveyed tourism managers identify three leading factors of HT development: quantitative categories (e.g. more Muslim tourists visiting Poland), qualitative categories (e.g. changed image of Muslims functioning in public space and also strengthening cooperation with Islamic tourist organizations).

An assessment of the potential propensity to develop an offer respecting the requirements of this tourism type or introducing selected facilities to their businesses, supporting this offer selection by Muslim tourists, has become a specific contribution to the analysis of the respondents' attitudes regarding HT phenomenon. In this case, as many as 48% of them declined the possibility of introducing a service package dedicated to such tourists only, whereas 1/3 of the respondents recognize the possibility of adjusting some components to such expectations. The most frequently indicated facilities could include: adequate accommodation equipment, prayer room, *Halal* certified food.

Another area of questions focused on assessing HT development opportunities was analysing the conclusions of the surveyed tourism managers resulting from their contacts with Muslim tourists. It should be emphasized that:

- the opinions expressed result from the relationships with a limited number of such tourists visiting the analysed entities and
- the statistics regarding the religion practised by tourists are not available in the surveyed entities.

In the analysed period (first half of 2019), the surveyed businesses hosted Muslim tourists from: UAE, Egypt, Kuwait, Israel and Albania. Their stay was predominantly organized individually. They were mainly young people, up to 36 years of age, who indicated leisure and sightseeing as the primary reason of their visit. Their visit length ranged from 8-10 days.

Focusing on the subjective assessment of Muslim tourists' characteristics and their requirements regarding the services offered by the surveyed entities, certain findings deserve highlighting. Firstly, in the respondents' opinion such guests manifest their religion and culture, respect nature and care for the natural environment. Secondly, Muslim tourists are mostly determined in their choices, demanding and presenting high self-esteem, however, behaving modestly. They are also reticent and characterized by low communication skills. Thirdly, the majority of surveyed practitioners (57%) indicated that Muslim guests presented specific needs related to the required tourist services, e.g.: separate rooms for men and women, separate swimming pool, covered Jacuzzi or the appropriate gender of staff performing SPA treatments. Fourthly, 45% of the respondents were unable to determine clearly which components of their offer were particularly popular among these tourists. The responses provided by tourism managers, emphasizing, e.g., the relaxing atmosphere, the service

quality or the individualized approach to the client are, according to the authors, too general and protecting the business reputation rather than expressing individualized, objective opinions about Muslim tourists. Fifthly, the final assessment of the discussed tourists, expressed by the respondents, is not unambiguous. After adopting a five-grade rating scale, the distribution of these grades shows a strong polarization of opinions on the studied problem (see Table 5).

Table 5: Assessment of a Muslim tourist by the respondents

Assessment of a Muslim tourist				
Negative	Rather negative	Neutral	Rather positive	Positive
29%	14%	14%	43%	0%

Source: author's compilation based on surveys.

Research conclusions

The conducted studies provided a diversified picture of the HT phenomenon perception and its development determinants. Although they were of pilot nature, the conclusions resulting from their interpretation may identify certain states and processes describing space for the domestic tourist offer development, which meets Muslim customers' expectations. In the authors' opinion, there are no objective grounds to confirm the adopted research hypothesis that HT is perceived by Polish tourism managers as a development niche.

Rejecting this hypothesis is determined by various premises, including those related to tourism managers, their attitudes, activities (internal premises) and the ones describing (economic or socio-cultural) space for their business goals (external premises) implementation.

Regarding the group of internal determinants, it is noteworthy that despite high education level and relatively extensive professional experience, the analysed population showed limited knowledge about the essence and attributes of HT. Interestingly, the respondents do not notice this phenomenon emergence on the domestic market. It results from poor knowledge of the global economic structure, co-created, e.g., by the *Halal* economy and its HT component, and also the consequence of Muslims' minor participation in the structure of tourists visiting Poland. This statement is also supported by the limited knowledge of Islamic culture, religion and adopting Islamophobic attitudes, so common for the members of Polish society, for whom Islam and Muslims are rather associated with threats, poverty and migrations than, e.g., with tourists seeking interesting destinations meeting their preferences.[3]

Rejecting the adopted research hypothesis can also be supported by the respondents' strong polarization in Muslim tourists' assessment. It seems to result from a diversified approach to meeting their specific requirements (the aforementioned limited readiness to cover the individualized needs voiced by Muslim tourist) and the characteristics assigned to them resulting, e.g., from the environment in which they function (e.g. emphasized religiousness, self-esteem, extensive demands, etc.).

Negation of the adopted research hypothesis is also a consequence of interpreting the external factors' impact, determining the possibility of HT development on the domestic tourism market. Although the respondents considered HT sector as a potentially profitable and prospective market niche, they do not actually notice opportunities for this tourism form emergence and development on the domestic market. It is determined, in its external (environmental) dimension, by various factors including: a/limited relations with the Islamic world representing a potential platform for promoting

[3] In the group of fourteen most frequently indicated by Poles connotations with the word "Islam" six were negative, e.g., terrorism, war fanaticism, jihad, assassination and violence. Apart from them the following categories were listed: religion, Koran, Muslim, Allah, Muhammad, mosque or burqa. There is no positive concept in this group (Stefaniak, 2015 p.14).

Poland as a tourist destination, b/our country image functioning in international space, indicating xenophobia and low tolerance towards all differences, c/cultural and mental barrier, which in the respondents' opinions creates space for potential conflicts between tourists from different cultural backgrounds, d/focus of the domestic tourism market representatives on customers from other, than Muslim tourists, target groups.

Conclusion

The development of HT is undoubtedly a global phenomenon. Its understanding and benefiting from its opportunities require, from tourism practitioners, operating outside the Islamic world, to identify the expectations expressed by Muslim tourists observing their religion imperatives. In the case of Polish tourism managers, the above challenge takes on a special significance in view of an increased interest in our country presented by this group of tourists[4]. In the authors' opinion, this fact naturally determines the need to conduct research covering the determinants, possibilities and manifestations of adapting HT and/or its elements on the domestic tourism market.

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Technology Impact of Customer Relationship Management Performance Characteristic among Logistic Operators SME's

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Abstract

Today's business environment is an unavoidable challenge. Small business success is therefore vital to maintaining the Malaysian economy and the world economy. In addition, Entrepreneurship is a driving force in bringing innovation to the market and creating credible firms that can deliver high growth in the economy. Objective of this study is to investigate relationship customer satisfaction and loyalty in delivery industries. Furthermore, this study to describe the characteristic of customer and to determine the degree to which marketing variables associated and significant relationship. The dimensions for customer relationship management performance factors are technology strategy. The method of this study are applied research and respondent is individual customer from a logistic company. According to finding, the result showed that survey by questionnaire on Likert scale is significant to the study. Lastly this study also conducts by SEM analysis. Measurement for technology strategy on this study about the attitude of customer toward the initiative taken by Logistic service provider on Support information system and information sharing, usefulness, care and help, ease of use, service portfolio, security and update System offered by logistic service provider. However, the emergence of new entrepreneurship initiatives especially small enterprises to create innovative ideas can have an impact on the growth and prosperity of the organization and subsequently transport in SMEs. Through this strategic technology, entrepreneurship can create innovations that provide new businesses, products, technologies, markets, good quality and more to an economy that can improve Gross Domestic Product and the standard of living of the people.

Keywords: Customer Relationship Management, technology strategy, SEM analysis, SME's.

Introduction

Customer service is one of the most important parts of marketing for a product or service. High quality customer service can help build customer loyalty and build trust in new customers. It will also create customer chains when loyal customers themselves promote products or services to their peers (Shah et al., 2018; Shah et al., 2019). Customers today are not only interested in the products or services offered but all the additional elements of service they receive from the speech they receive when entering the market until after-sales service. Customers will be satisfied if the service provided is fast, error-free, easy-to-find, non-burdensome and accompanied by friendly and courteous service and reasonable cost. Unidha (2017) reported that friendly relationships between customers and organizations are essential in providing improved input to provide the quality of the desired product or service. To ensure that an organization is able to maintain its competitive edge and lead the way, technology quality and survival factors are crucial to moving forward. The product or service provided will reflect the quality of an organization, the higher the quality of the product or service

provided, the higher the trust level (Jung and Seock 2017). Efficient and effective Customer Relationship Management will ensure the delivery of services that are responsive to customer needs and requirements. The standard of service offered to the customer should be of high value to the customer's expectations in line with the delighting approach of the customer in technology. In addition to identifying their customers and their needs, Organizations must also identify their target customers, whether internal or external. The Customer Relationship Management guide and understand their needs and requirements can be further enhanced with fifth-generation technology. This is to ensure that the services offered can meet their needs. In this regard, customer feedback and feedback should be taken into account by the organization. Therefore, the core services of the organization need to be identified based on their roles and functions. It can also be determined based on the current focus area. The CRM can also be defined as the standard of service quality. In addition, Raji et al. (2017) observed the identified customer requirements must be translated into a realistic service technology quality standard to ensure that the promise is fulfilled. The best possible service quality technology standards can be measured for example in terms of timeliness or number of outputs. In addition, qualitative features of customer service that cannot be measured such as friendly, considerate, easy-to-understand, secure and so on can also be standardized. Service recovery plan should be provided to ensure the implementation of the mechanism to the customer. Therefore, service recovery can be implemented efficiently and effectively in the event of failure to deliver the service as promised. In fact, the service recovery plan is a plan that contains carefully planned actions to restore service and maintain customer confidence in the service provided.

Literature Review

The business world is closely linked to creativity and innovation. Without creativity and innovation, the business world will remain static without any changes and changes. Thus, entrepreneurs who inculcate creativity and innovation in their business models will be more progressive and successful than entrepreneurs who remain in the traditional business model who are only interested in sales. Creativity and innovation refer to doing something out of the ordinary. Singh (2015) and Raji et al. (2017) highlighted creativity and innovation can also be associated with innovation, improvement, creation and discovery. The concept of creativity and innovation is broad and can be applied in a variety of areas and circumstances, except for business. Customer management planning is crucial to strengthening the organization's ability to understand customer needs and expectations so that the services offered can meet their needs as a whole. Technology strategy in customer focus the customer focus needs to be incorporated into the organization's strategic plan in order to work effectively on customer relationship-based services. Organizational top management needs to define the customer service mission in the form of a specific statement and publicize it so that it becomes a commitment that all managers, owners and shareholders will share in the organization's customer service excellence. Hence, definitely target their customers so that their needs and expectations can be more accurately determined. This is to ensure that the standard service technology offered meets customer satisfaction and is of high value to the customer's expectations (Shah et al.,2016; Shah et al.,2017). The provision of customer service standard technology needs to be set and implemented to ensure consistent service quality to be effective and efficient. This is in line with the efforts to enhance the excellence of the service delivery system. Suki (2014) and Soh et al. (2017) found connections between the service offerings that are intended to be delivered to customers must be through efficient working procedures and delivery processes to ensure fast, easy and convenient service quality. Organization in SME's needs to enhance customer service delivery through strengthening its organizational structure and providing facilities that enhance service offerings. Moreover, technology is a tool used to convey the delights necessary to keep up with current developments. Consequently, Abhishek et al. (2018) also found that careful planning needs to be done to identify the customer's need for the service can be offered through the use of the latest tools and technologies can meet customer requirements. Organizations with numbers high customer service transactions should always be explored fifth-generation new technology in Customer Relationship Management. Therefore, here is aimed at strengthening the internal operations that it offers efficient service through a service-oriented structure (big data). Last but not least premise management is just as important to improve service delivery efficiency and guarantee customer comfort, convenience and office layout

customer-friendly including amenities for the less fortunate efforts should be made to enable them to share their experiences.

Customer Relationship Management Performance

Customer relationship service is one of the most important parts of marketing for a product or service. High quality customer relationship services can help build customer loyalty and build trust in new customers. Shah et al. (2018) and Wahab et al. (2017) identified that the creates a customer chain when the loyal customer itself promotes the product or service to the surrounding consumer. Friendly relationships between customers and organizations are essential in providing improved input to provide the quality of the desired product or service. Customer service is often faced with a wide variety of customers out there. Therefore, it is important for each organization to ensure that they have good skills to ensure that they are always keeping in touch with the customers who come to use the services provided. Moreover, good SMEs are the ones who know and want to impress their customers. It is important for the organization to provide the best service to its customers so that they are happy and comfortable. Moreover, Shah et al., (2016); Shah et al., (2017) defined one of the things SME's can do is create a lightweight organization. If employees often provide the best service for them, it will indirectly make their customers feel valued. The needs of customers need to be met to make them feel valued. In addition to ensuring employees understand and meet the needs of existing customers, the relevant parties must always provide VIP offers for their customers to make them happier and more rewarding. In addition, managers can also conduct surveys to come up with ideas and improve if there are some things that need improvement. No matter how productive a business is, feedback should be given to customers so that they are always rewarded (Zuraimi et al., 2013; Ali et al.,2018).

Technology Strategy

Customer relationship service is one of the most important parts of marketing for a product or service. High quality customer service can help build customer loyalty and build trust in new customers. It will also create a customer chain when the loyal customer itself promotes the product or service to another chain. Customers today are not only interested in the product or service offered but all the added value of the service they receive from the speech they receive upon entering until the after-sale service. Therefore, customers will be satisfied if the service provided is effective and efficient. Friendly relationships between customers and organizations are essential in providing improved input to provide the quality of the desired product or service. While, information technology plays a vital role as supporting tool to the organization (Norsyafiqah Filzah Mohamad Saodi et al, 2018). Lariviere B et al. (2017) and Soh et al. (2017) stated that the tools and technologies used to deliver the services need to adapt to current developments. Careful planning is needed to identify customer needs so that services can be offered through the use of the latest tools and technologies that meet customer needs. Organizations that have a high number of customer service transactions should constantly explore new technologies in Customer Relationship Management. This is aimed at strengthening internal operations and offering efficient services through the appropriate technology-based service-oriented structure. Moreover, Paddeu at al. (2017) and Shah et al. (2017) in another study reported that integral to the magic behind our ability to provide quality products and review-worthy experiences is technology. Some may argue that technology can be a barrier to great customer service, however, behind the scenes, technology is driving efficiencies in SME's operations which assisting communications, providing ongoing training, managing quality assurance and more. For SMEs, the right balance of technology and implementation can help improve operations and development, as well as quantify and create a cohesive brand experience, no matter which location a customer visit. In their study, Thammawimutti et al (2018); Slater, and Shah et al., (2019) examined with technology, logistic provider can quantify the customer experience and provide data on what may be missing. Technology helps to ensure that logistic operations are running smoothly and that SME's can communicate with a customer through a centralized platform regarding questions or actions. Flawless execution can be tough to manage for a logistic that may not be located physically near every single logistic location and a centralized

management platform helps to bridge any communication gaps and set SME's up for success. In another study Zhou et al. (2019) and Miroslava (2013) reported that to ensure all locations are providing the best brand-consistent experience possible, logistic provider should consider an effective field team or solution. If a technology solution is utilized, it should be mobile-centric and include brand-specific surveys with visual documentation capabilities, corporate and franchisee feedback and critical action notification and automated corrective action plans with required follow-up. The most effective review tools will compile historical and trending reports to identify locations heading too strongly off a path of success. Similar to managing logistic provider operations, technology can also be used to capture, qualify and convert SME's leads into sales. Technology can help grow a business by reaching new customers through text messaging, digital signage and social media campaigns (Jamaludin et al.,2017.; Shah et al.,2018)

Customer Relationship Management Performance and Technology Strategy

Managing customer experience can also be referred to as assessing a customer's understanding or perception of a product or service that has been offered or the future that will be offered to customers. Moreover, customer knowledge in evaluating or looking at a product can provide transportation services an opportunity to improve a product in the future. Customer Relationship Management is introduced to enhance organizational and customer relationships and thus meet the increasing demands and expectations of customers. However, Paddeu et al. (2017) and Hazee et al. (2017) points out that Customer Relationship Management is a holistic approach to service delivery through effective management of interactions and relationships between organizations and customers. This approach focuses on delivering service technology that is based on customer needs where customers are treated as individuals rather than as a component of the service delivery process. Other authors Liu et al., (2017) mentioned that customer engagement is also taken into account in designing the services so that the services offered can meet their needs and satisfy them. Furthermore, Customer Relationship Management (CRM) are holistic approach to providing services that meet customer needs and expectations through managing effective interactions and relationships between organizations and customers. Organizations need to identify their target customers so that their needs and expectations can be better defined. This is to ensure that the standard of service technology offered is as high as customer's expectations and high value to exceed customer expectations. Perfecting in terms of facilities, technology, logistics and other relevant and relevant products is essential to enable the organization to implement customer service mission (Shah et al.,2016.; Shah et al.,2017). Customer service is the ability of the organization to improve the delivery of products to the customer, and it is the responsibility of all units in the organization. Leaders and managers can determine the organization's pattern and direction. In order to succeed in the mission of customer service, organizational leaders must be those who understand and practice customer-value-oriented leadership and administration than they need (Shah et al.,2018.; Shah et al.,2019).

Objectives of the study

The objectives of this study are as follow:

1. To investigate the impact of technology strategy in customer relationship management performance of SME's logistic provider.

Methodology

This research is empirical test as well as correlational research in nature. According to Hair et al (2010), the number of respondents in pilot test should be at more than thirty as well as appropriate and acceptable for analyses which are greater than 100 samples as suggested by (Hair, et al. 2010; Sekaran and Bougie 2013).Questionnaire survey was carried out for this research and distributed to the respondents that consume logistic service provider as well as Likert scale questionnaire were apply in this study. Population is a target groups whichever the individual person or the customer on

the logistic service provider. The target population of this study were three hundred and ninety-one respondent from Johor Bharu, Selangor and Pulau Pinang on X, Y, and Z organization company.

Theoretical Background for the Models

Logistic service business is considered as a way of expanding business faster and cheaper. This is because the logistic business is all managed by a systematic automation. It will be affected the customer in their benefit. Logistic service business allows transfer of technology and expertise between companies and local customer (Paddeu et al.,2017). This can be realized when a logistic service provider appoints a local company as the technology strategy for a particular area. So that, Chen and Popovich (2003) proposed the perfect underneath to present and support the impression of numerous authors on the significant of technology strategy in realizing Customer Relationship Management Performance in the organization.

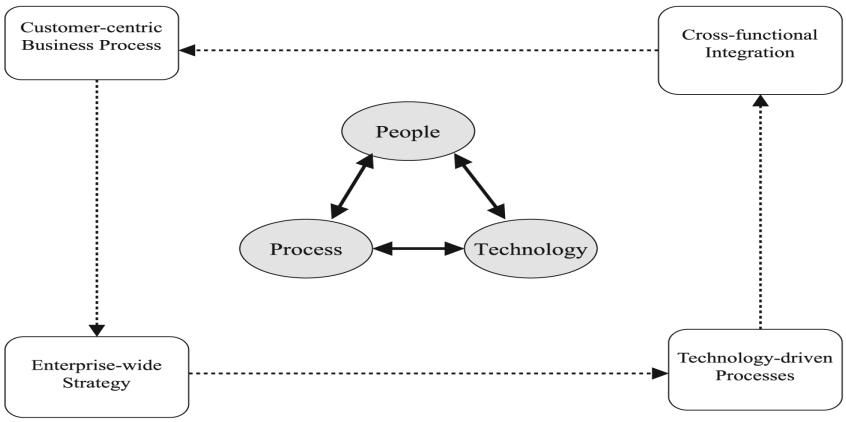

Fig. 1: A CRM implementation model Chen and Popovich (2003)

Theoretical Framework

For this study, prototypical proposed that present research a technology strategy as the determination of Customer Relationship Management Performance models for SMEs in Malaysia. The complete models proposed are as follows.

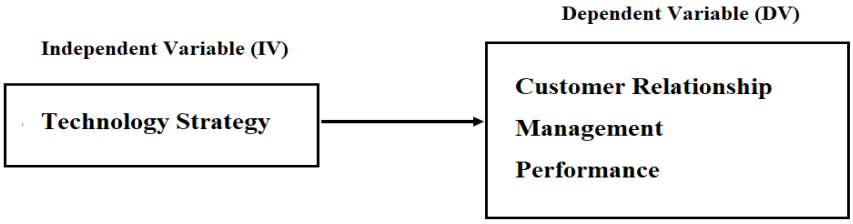

Fig. 2: Theoretical Framework

Hypotheses Development

Paddeu et al.,(2017), Soh et al.,(2017); Shah et al.; (2019); Shah, et al.,(2018); Shah et al., (2017) and Shah et al., (2016) at past research was investigated the character of provider value in technology strategy. Around is a positive significant relationship between technology strategy and customer relationship management performance. Therefore, we hypothesized that:

Hypothesis

There is a significant relationship between technology strategy factor and Customer Relationship Management Performance.

Result

The SEM model and relevant data are shown in Exhibits Table 1, Table 2 and Figure 3. The model fit parameters were similar to previous SEM analyses. These were considered minimally acceptable for exploratory research focused on scale development (Hair et al., 2010.; Anderson, 1988). Analysis of the data was using SEM analysis which is previously tested for validity and reliability. Results of the examination of goodness is fit for overall model and was in accordance with the analysis result of SEM, in order to determine whether the hypothetical model is supported by empirical data, This section gifts the particulars of data analysis to assess measurement model and structural model concurrently by using SEM analysis. Moreover, measurement instrument are evaluated via CFA dimensionality, reliability and validity of model where indicators are measured by multiple items (Crockett 2012). In this scenario given in Figure 3 as such extended analysis of SEM independent variable model. Numerous knowledgeable specialists thought these results and decided the results were rational, mainly since table regression weight and standard regression weight in this same research confirmed that the relationship is positive and significant. One clarification for the illogical finding of there is relationship between technology strategy and customer relationship management performance was the option of a suppressor effect due to interactive effects of multicollinearity in the SEM analysis. Thus, partial model independent variable is demonstrated and Hypothesis H4 is accepted. Nunnaly (1994) suggest that all of the variables in the model estimated to fulfill the criteria of discriminant validity. Then it can be concluded that all of the variables have a good reliability. Below is analysis for regression weight and standard regression weight.

Table 1: Regression Weights

			Estimate	S.E.	C.R.	P
CRMP	<---	TS	0.036	0.063	0.577	0.564
ts2	<---	TS	1			
ts1	<---	TS	0.796	0.069	11.535	***
ts3	<---	TS	0.853	0.066	12.905	***
ts4	<---	TS	0.902	0.069	13.167	***
ts5	<---	TS	0.975	0.072	13.48	***
ts6	<---	TS	0.819	0.069	11.955	***
ts7	<---	TS	0.85	0.067	12.641	***
crmp6	<---	CRMP	1			
crmp8	<---	CRMP	0.898	0.07	12.833	***
crmp5	<---	CRMP	0.987	0.071	13.925	***
crmp3	<---	CRMP	0.972	0.07	13.842	***
crmp2	<---	CRMP	1.087	0.067	16.306	***
crmp1	<---	CRMP	1.076	0.068	15.71	***

Table 1: Regression Weights

			Estimate
CRMP	<---	TS	0.038
ts2	<---	TS	0.728
ts1	<---	TS	0.618
ts3	<---	TS	0.69
ts4	<---	TS	0.704
ts5	<---	TS	0.721
ts6	<---	TS	0.64
ts7	<---	TS	0.676
crmp6	<---	CRMP	0.73
crmp8	<---	CRMP	0.657
crmp5	<---	CRMP	0.708
crmp3	<---	CRMP	0.705
crmp2	<---	CRMP	0.818
crmp1	<---	CRMP	0.791

Based on the results above are providing added predictive validation for the relationship between technology strategy and customer relationship management performance. As discussed in the theoretical framework, technology strategy is viewed as integral to firm performance (FP). Thus, technology strategy is likely to impact firm performance positively. A model representing the relationship between technology strategy and firm performance using SEM-based path analysis was tested next.

Research Findings

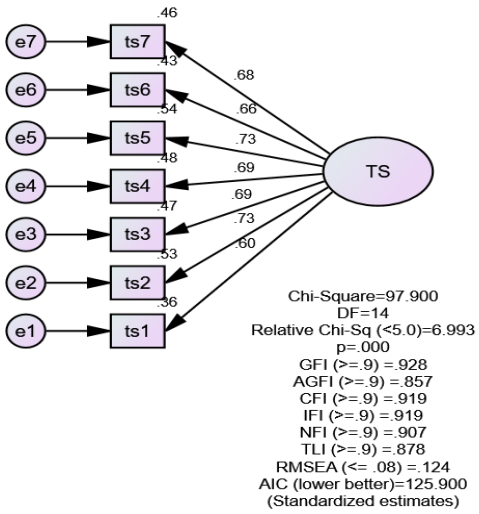

Fig. 3: SEM Technology Strategy

According to Figure 3 the outcomes presented that the technology strategy is a leading feature of improving performance straight. Result of confirming analysis of variables showed that measurement model if variables are proper and all numbers and parameters of model is meaningful. Measurements of the highest in reflecting customer relationship management are the reward, followed by technology strategy and customer relationship management performance. The SEM path analysis resulted in a chi-square of 97.900, DF of 14. The relative chi-square was 6.993. Furthermore Good fit Index was .928. More over AGFI was .857. The comparative fit index was .919 and the IFI was .919.NFI was .907.TLI was .878 and last but not least RMSEA was .124 with 80 percent confidence level.AIC was 125.

The outcomes of this study exemplify that the improved technology strategy of customer relationship management performance industries is most significant relationship by how the capability of management to deliver product and service to customers. Application of customer priority also played a role in increasing the customer relationship marketing.

Discussion

In conclusion, customer relationships need to be managed as a whole and integrated as a step towards meeting customer needs and requirements. This Customer Relationship Management guide details the quality of customer service and details the steps that need to be taken under the core of customer relationship management to help organizations improve their customer relationship management. This study emphasizes that customer engagement as a receiving service is a key factor in shaping the organization's form, method and level of service delivery. In addition, customer service performance management is an important component of ensuring that the best services are delivered to customers consistently and in line with the customer's transform approach. An organization with high quality customer service depends on satisfied customers and thus provides support for the organization. It is not solely the responsibility of one section to attract customers but the other part of the organization is also responsible for quality customer service. In addition, customers' perceptions of organizational productivity and services need to be constantly reviewed so that feedback on organizational performance can be obtained to enable institutions to find ways to improve their performance. The services or products provided should be as much as possible based on customer demand and requirements and not solely on the part of the management. In essence, no organization can achieve success without building good relationships with customers. Increasing customer satisfaction by understanding customer requirements is one way to gain customer loyalty and customer retention.

Conclusion

Due to globally technological change with including economic and business conditions such as technological advances. It is essential to implementation of information system throughout organization (Asyraf Mohd Bakri et al, 2017). The need to modify the information system or change of management requirements it may be necessary to change the information system. Technology it plays an important role in Technopreneurship. It is an essential tool for enhancing organizational performance. In order to be flexible in the management of the system quickly and save time. With the evolution of data communications networks through computer systems. This is a system that connects a large structure that can exchange information even if it is located in the opposite hemisphere. Organizations need to set standards, processes, procedures, directives and work culture that ensure excellent customer service in order to achieve and maintain a high level of product delivery) is sufficient for all activities to be carried out in the most efficient manner. Regardless of the processes, procedures, facilities and resources provided, but if the attitude and commitment of the employee is not customer-driven, the organization will not reach the customer service level quality. Furthermore organizations need to adopt an effective monitoring system for every activity in the preparation and delivery of products to customers (Brdiger & Wood, 2017; Shah et al. 2018). Through monitoring of internal processes and activities and external interactions with customers, the organization will always be prepared to correct any shortcomings and errors. Last but not least, innovation is the

specific tool of entrepreneurs, the means by which they exploits change as an opportunity for a different business or a different service.

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Earned Duration Management (EDM) Analysis of Duration Control Process: A Case of Telecommunication Infrastructure Development Project

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Abstract

Project control is an essential task for a project manager. Project control is carried out by comparing the actual project performance in terms of time and cost with the project implementation plan. A typical project control method is the Earned Value Method (EVM). Previous research, overemphasis on EVM and using cost component for schedule performance, could provide misleading information in assessing the schedule. Based on data from one of the largest telecommunication providers in Indonesia, many projects suffer a late completion and have proposed a time extension. The penalty for the project's late completion is a percentage of the project's amount. So in this research, three projects with the most significant amount from a telco company as one of the company's clients are selected. The result of this analysis is a preventive and corrective action to control the project duration.

Keywords: Earn Duration Management (EDM), Project Performance Measurement

Introduction

Project monitoring and controlling are critical for the success of project implementation. It is not an easy task wherein this task contains a process of an observation of risk and uncertainty, which has the potential of becoming a problem and will disturb project objectives to take corrective action when necessary (Arviansyah, Spil, van Hillegersberg, 2013). This risk and uncertainty can cause a delay and budget overrun in project execution. Therefore, project forecasting is a crucial phase in project monitoring and controlling to predict the cost and final duration of the project.

(Patel and Kashiyani, 2017) The earned value management (EVM) technique has been widely used to monitor and control the performance of a project up to a reporting date and forecasting the project's final duration. Earned value management (EVM) and similar techniques help managers to focus on projects or work packages that need the most attention, by measuring and highlighting possible future deviations.

Forecasting using these techniques provides a reasonable and uniform approach for project tracking and control. EVM provides a performance metric of cost and schedule performance based on the cost. Three key metrics used in EVM to measure the project progress is Planned Value (PV), Earn Value (EV), and Actual Cost (AC). Earn Duration Management (EDM) developed by Khamooshi and Golashani to overcome the drawback of EVM that assessed to be not reliable to measure project performance. EDM is a technique that provides a performance metric to measure a project performance base on the duration. The key metrics of EDM are the total planned duration (TPD), total earned duration (TED), and the earned duration (ED), which are all time-based.

Literature Review

Every project needs proper control tools and, therefore, every project manager would use it. (Gershon, 2013) Earned Value Analysis considers as a control tool for managing projects during the execution phase and keeping the project on track, including on the right path. Earned Value considered as an ideal tool that would summarize the project's status with two main components, one for schedule (on-time delivery) and one for cost (over or under budget) status. Besides that, Earn Value also provide a measurement. Earn Value provides a forecast, update in real-time, to predict the eventual cost of the project and delivery date. (Mareels and Martens, 2018) Overview of the different forecasting techniques in project management as given.

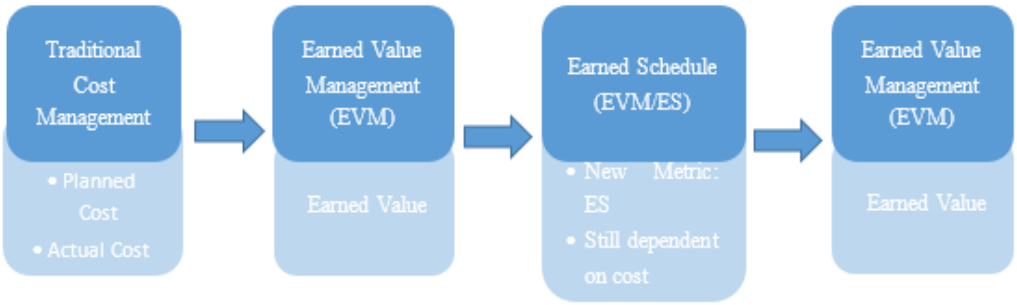

Fig.1 : Evolution of different forecasting technique

EVM is an established methodology to monitor projects during execution that uses three key metrics to measure the progress of projects, namely the Planned Value (PV), the Earned Value (EV), and the Actual Cost (AC) (de Andrade, Martens, and Vanhoucke, 2019). EVM defines the Planned Value (PV) (previously known as Budgeted Cost of Work Scheduled (BCWS)), i.e., the planned value that will be spent on executing the work based on the original schedule at any point in time (Wilkens, Tammo T, 1999). EV, previously known as Budgeted Cost of Work Performed (BCWP), defines as progress made (work completed) in terms of the monetary value at a certain point in time (Wilkens, Tammo T, 1999). AC was known as ACWP or Actual Cost of Work Performed formerly; it represents the monetary value of what has been expensed to achieve the progress made at a certain point in time (Khamooshi and Golafshani, 2014). EVM provides various performance measurements that are designed to assist the

project's monitoring and controlling activity depends on the type of information needed. Cost Variance (CV) denotes the difference between how much was actually spent and the value earned (EV) across the work performed (Jack R. Meredith, Samuel J. Mantel Jr, 2011). In that case, CV is defined as below:

$$CV = EV - AV$$

A negative value point means the project has spent more on the executed activities than what it is worth (de Andrade, Martens, and Vanhoucke, 2019). On the contrary, a positive value indicates that the project has spent less to gain the value of the executed work. More specifically, two schedule performance indicators can be constructed using the PV and EV, namely the Schedule Variance

$$SV = EV - PV$$

Schedule Performance Indicator,

$$SPI = \frac{EV}{AC}$$

and the Cost Performance Index

$$CPI = \frac{EV}{PV}$$

Consequently, when the value earned is lower than planned and the project suffers from a delay, the SV and SPI will be lower than 0 and lower than 1, respectively. While the ES is expressed in time units, it is calculated based on the EV and PV and, therefore, still depends on the cost structure of the project. EDM has been developed by Khamooshi and Golafshani (Khamooshi and Golafshani, 2014) to resolve this issue. The key metrics of EDM are the total planned duration (TPD), total earned duration (TED), and the earned duration (ED), which are all time-based metrics. Rather than considering the value of project activities in monetary units, the value of the activities is expressed in work periods. Total planned duration (TPD) represents the cumulative number of planned work periods throughout the project makespan and should thus not be confused with the project planned duration or baseline planned duration (BPD).

$$TPD = \sum_{i=1}^{n} PD_i$$

where PD_i is the portion of the planned duration for activity i that occurs up to the current date, and n is the number of completed or in-progress activities up to the current date. For in-progress activities, only the duration of the activity to the left of the current date counts to determine the TPD. Hence, the TPD can be seen as the time-based equivalent of the PV. Total earned duration (TED) represents the cumulative number of working periods earned throughout the project makespan and is calculated using the following equation:

$$TED = \sum_{i=1}^{n} ED_i$$

where ED_i is the earned duration for activity i up to current date and n the number of completed or in-progress activities up to current date. Thus, the TED is the time-based equivalent of the EV. Earned duration (ED) informs the time at which the current total planned duration (TPD at current date) was planned to be earned and can be considered to be the EDM equivalent of the ES. The ED is calculated using the following equation:

$$ED(t) = t + \frac{TED - TPD_t}{TPD_{t+1} - TPD_t} \times 1$$

where t is the number of integer periods for which TED≥TPDt and TED≤TPDt+1. Using the EDM key metrics, schedule performance indicators can be constructed. The Earned Duration Index (EDI). At any point in time, EDI is a measure of duration earned compared to what was planned to be done up to that point in time.

$$EDI = \frac{TED}{TPD}$$

At any point in time, the project might achieve more, less, or the same amount of work compared with the work planned to be achieved at that time. Thus this measurement can have a value higher than one, less than on, or equal to one, respectively. Duration Performance Index (DPI) are respectively the EDM equivalents for the SPI and SPI(t). DPI represents the overall schedule progress performance in delivering projects compared to the plan toward the completion of the project.

$$DPI = \frac{ED(t)}{AD}$$

The value of DPI will be less than one and perceived as behind schedule, more than one perceived that project being ahead of schedule, and equal to one perceived that project is performing at the same level as planned. Project Performance Index (PPI), at any point in time, is a measure of the overall duration progress of the project. It measures ED(t) against the baseline planned duration.

$$PPI = \frac{ED(t)}{AD}$$

The value of PPI will always be less than or equal to one. PPI's value starts from zero, and as the project nears completion, the value of PPI will approaching one. PPI value will be one upon completion of the project. Adapting directly from EVM, Cost Performance Index (CPI) as:

$$CPI = \frac{EV}{PV}$$

The value of CPI will be less than one if the project is over budget, equal to one when the project is on budget, and greater than one fi the project is under budget. One other potential usage of the progress performance measurement is forecasting the future state of the project. In EDM, one can use an equation formulation to forecast the project's future. The equation defines as Estimated Duration at Completion (EDAC)

$$EDAC = \frac{BPD}{DPI}$$

And, one can use the following formula to estimate the duration to complete: Estimated Duration to Complete (EDTC)

$$EDTC = \frac{BPD}{DPI} - AD$$

Research Method

The EDM in this study will be applied in three telecommunication infrastructure projects in a telecommunication company, which is one of the biggest suppliers in the Indonesian telecommunication technology company. The three projects in this research are the Dense Wavelength Division Multiplexing (DWDM) project, Metro Ethernet (Metro) project, and Optical Line Termination (OLT) project. These three projects are related to the network topology. DWDM is used to connect between METRO. Meanwhile, OLT is below METRO. It receives logical data from METRO to distribute service to customers.

This study utilizes both quantitative and qualitative methods. EDM cover the quantitative part. Based on EDM results, interview with project manager held as qualitative part. Mathematical calculations are done using the EDM method. This research employs an interview as primary data. The progress report also budgets and report data as secondary data. For mathematical calculation, secondary data will be used to get a measurement indicator value. Based on the measurement indicator, a semi-structured interview with each project management had been done. The cut-off date for data used in this research is 28 February 2019. Each project will have five milestones upon the project completion. The milestones are, Material On-Site (MOS), Installation, Integration, Commissioning Test (Commtest), and Acceptance Test Procedure (ATP).

The budgeting process in the company is confidential, so the researchers cannot get the detail process of making the budget. The budget for all projects in the client company accounts is collected in one project code and used together for all projects. Each budget for the project is obtained by using a baseline from the finance department that also confidential. So the finance department can only give the total budget without detail information for each project.

EDM Applied In DWDM Project

DWDM project supposed to be done in 107 days (16 weeks), and 73 days have passed since this project officially begins. Which means the AD is 73 days. This project has a total of 152 sites to complete until ATP. All five milestones in a site can progress parallels with other sites. TPD is a sum of each activity's planned duration. TPD for this project is 292 days. The earned duration is known to calculate how many days are needed for each site to finish each milestone. TED is a sum of the earned duration of each activity. The TED at the current state is 287 days, and TAD at the current state is 339 days. The project was planned to earn this duration on day 72. Thus ED(t) is 72 days. Detail duration of the DWDM project can be seen in the following table.

Table 1: EDM Result for DWDM Project at the status date

Week	TPD	TAD	TED
1	28	28	153
2	56	61	170

3	84	96	170
4	112	131	171
5	140	166	178
6	168	201	186
7	196	236	219
8	224	271	237
9	252	306	254
10	280	333	266
11	304	339	287
12	324		
13	338		
14	351		
15	358		
16	360		

Using information from Table 1, DPI and EDI can be calculated as follows:

$$DPI = \frac{ED(t)}{AD} = \frac{72}{73} = 0.986$$

$$EDI = \frac{TED}{TPD} = \frac{287}{292} = 0.984$$

The result of DPI and EDI show that the project is behind schedule and achieve less than planned. In the first week of project implementation, the project achieves quiet a lot. A pre-sale contract causes this fact, and the results are acknowledged within the project contract's release date. Based on the interview with the project manager, there are several reasons why the project is behind schedule. First, there is an Out Side Plant (OSP) that is not ready, the location is not ready, and the lack of subcontractor's team. The budget for this project is Rp 59.123.769.295,00 and the actual cost until the current date is Rp 3.600.100.945,00. The earned value is known by dividing the budget to all sites equally and then multiply it with total sites that already finish all the milestones. For this project, total sites with five milestones are 760 sites. At the current date, 606 sites are finished all the milestones. Therefore CPI will be calculated as follows:

$$EV = \frac{59.123.769.295}{760} \times 606 = 47.143.419.393$$

$$CPI = \frac{EV}{AC} = \frac{47.143.419.393}{3.600.100.945} = 13.10$$

The CPI value shows that the project way under budget. The project manager believes that a sharing resource with other projects causes this considerable gap, whereas the project manager makes a budget

for a dedicated resource in project budget planning. Considering that AD is 73 days, PPI will be calculated as follows:

$$PPI = \frac{ED(t)}{BPD} = \frac{72}{107} = 0.673$$

This PPI's value shows that the project is 67% nearly a project completion. Have known the current project performance, the project manager can use the forecast equation to estimate the project's future.
Estimated Duration at Completion (EDAC).

$$EDAC = \frac{BPD}{DPI} = \frac{107}{0.986} = 108$$

Moreover, we use the calculation as below to estimate the duration to complete:
Estimated Duration to Complete (EDTC)

$$EDTC = \frac{BPD}{DPI} - AD = 108 - 73 = 35$$

By using the above formula, this project estimated to complete on day 108, 1 day late than the project supposed to be done. To avoid this late project completion estimation, the project manager decides to add more workforce to push the progress. Also, try to finish some milestones together in one day in order to accelerate the project progress and avoid late completion.

EDM Applied in Metro Project

Metro project supposed to be done in 210 days (30 weeks), and 74 days have passed since this project officially begins. Which means the AD is 74 days. This project has a total of 121 sites to complete until ATP.

Table 2: EDM Result for Metro Project at the status date

Week	TPD	TAD	TED
1	5	16	3
2	14	44	3
3	28	72	15
4	48	100	119
5	72	128	216
6	100	163	262
7	128	198	264
8	160	228	276
9	195	256	281
10	226	284	284
11	253	300	284
12	274		
13	290		
14	302		
15	309		
16	316		
17	321		
18	321		
19	321		
20	321		
21	321		
22	321		
23	321		
24	321		
25	321		
26	321		
27	321		
28	321		
29	321		
30	321		

TPD for all activity in this project is 242 days with TED in the current state of 284 days. The project was planned to earn this duration on day 88. Thus ED(t) is 88 days. Thus, we can calculate DPI and EDI as follows:

$$DPI = \frac{ED(t)}{AD} = \frac{88}{74} = 1.189$$

$$EDI = \frac{TED}{TPD} = \frac{284}{242} = 1.175$$

From DPI and EDI value, this project is ahead of schedule and achieved more than planned. These causes of this achievement are that this project is an only insert and expanding module. So there are not many issues in this project implementation. All the capacity of an existing device can be monitored using a network system before doing all the work. The issue of implementing this project is permitted for reengineering; this needs a strict schedule and method of a procedure before executing the planned work. Also, the reengineering needs to be handled by the company's engineer resource. This impact on the cost, since the engineer's cost, is different from the cost when using a subcontractor. The budget for this project is Rp 33.461.287.500,00. The actual cost until the current date is Rp 3.798.043.924,00, and 536 sites for all milestones are finished. Therefore, the CPI can be calculated as follows:

$$EV = \frac{33.461.287.500}{605} \times 536 = 29.645.041.487$$

$$CPI = \frac{EV}{AC} = \frac{29.645.041.487}{3.798.043.924} = 7.81$$

Looking at the CPI value, the project is still under budget. Same as the DWDM project, the reason behind the massive gap between budget and cost is because of the resource allocation with other projects.

Considering that AD is 74 days, the project is 42% toward completion; this is known through PPI calculation as below:

$$PPI = \frac{ED_t}{BPD} = \frac{88}{210} = 0.419$$

If the project performance remains the same, this project estimated will be finished at 177 days, which is 103 days to go from the current date and faster than planned.

EDM Applied in OLT Project

OLT project's BPD is 249 days; this means that the project supposed to finish within 249 days (37 weeks). At the current date, 297 days already passed since this project officially begins. Knowing that the current date already passing the BPD, the project supposed to finish all the work already.

Table 3: EDM Result for OLT Project at the status date

Week	TPD	TAD	TED
1	11	15	107
2	42	43	122
3	77	71	126
4	112	99	134
5	147	127	142
6	182	155	180
7	217	183	199
8	252	211	199
9	287	239	199
10	322	267	206
11	357	295	216
12	392	323	275
13	427	351	349
14	462	379	379
15	497	407	396
16	532	439	451
17	567	474	509
18	602	509	772
19	637	544	857
20	672	579	895
21	707	614	911
22	742	649	943

Week	TPD	TAD	TED
23	777	684	962
24	812	719	962
25	841	749	972
26	869	777	973
27	897	805	975
28	909	817	976
29	937	845	976
30	963	871	977
31	976	892	978
32	983	913	978
33	990	934	996
34	997	955	1001
35	1004	976	1001
36	1007	985	1001
37	1012	1006	1002
38	1012	1027	1006
39	1012	1048	1007
40	1012	1069	1008
41	1012	1090	1010
42	1012	1111	1010
43	1012	1124	1011
44	1012	1128	1012

TPD for this project is 1012, and the TED for the current date is also 1012; this means that the project is already finished. With that purpose, DPI and EDI then calculated.

$$DPI = \frac{ED(t)}{AD} = \frac{249}{297} = 0.83$$

$$EDI = \frac{TED}{TPD} = \frac{1012}{1012} = 1$$

The DPI value is less than one, which shows that the project is behind schedule; this also means that the project has a late project completion than it should be. EDI value is one since the TED value is similar to TPD, and all works are achieved as much as planned.

Based on the interview with the project manager, the causes behind the project's late completion mostly are from external. The location and allocation are not precise since the beginning. So there are many changes during the project implementation impact in the project delayed. Unready sites also the reason why the project cannot be done on time. Sites in some severe geographic conditions make teams have difficult access to reach the sites. Other than that, subcontractor quality also needs to be improved.

Conclusion

This study shows that the result from EDM can help the project manager know the project status and performance at any time. For any distortion of actual condition from the plan, the project manager can take preventive action to make the project back in track. Two factors affect the project's late completion; these are the internal factor and the external factor. Internal factor is a factor that comes from the company's side while the external factor is a factor that comes from the user and also geographic condition. For the external factor, the cause for late completion mainly because of site readiness, geographic situation, and change in scope of work by the customer. For the internal factor, the cause of late completion is an inadequate number of subcontractor teams and long lead time of material manufacture. Based on the interview with the project manager of each project, these projects constitute of different products and have different users; this is related to how project managers and users can collaborate to solve the problem that occurred during the project implementation. Project managers and users ought to agree on the scope first, i.e., have reasonably similar perceptions and expectations, so there will be fewer changes during the implementation. Finally, the project manager can use the agreement to continue planning the project and achieve the project objective.

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Economic Security and Contemporary Trade Policy: A Contribution to Discussion

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Abstract

The concept of economic security is not new. Knowledge of the fact that the economic factor affects or even constitutes an inseparable element of security has been accompanying the evolution of international relations throughout the entire history. The research aim of this article is to explain the need for analysing the phenomenon of economic security in correlation with the implemented trade policy. The authors adopted, among others, method of critical analysis of the available literature and the method of comparative analysis. The importance of global market shares was stressed as determinant of country's competitiveness which, in turn, confirms the role of export in shaping economic security.

Keywords: Economic Security, Trade Policy, International Relations, Development Dilemmas

Introduction

The issue of security has nowadays become the focus of attention for politicians and scientists alike. This results both from the dynamics of changes in the system of international relations as well as the emergence of new economic powers. The Copenhagen school headed by B. Buzan lists five main areas of contemporary security: economic, social, ecological, political, and military (Leszczyński 2016, 83).

At this time of dynamic changes connected with the construction of the new international order in conditions of hyper-globalisation, it is important to examine both the economic security and one of the factors shaping it, namely trade policy. Yet at present it is difficult to answer the question as to what kind of trade policy should be implemented by countries in order to draw benefits from their economic growth, while at the same time avoiding the risk adherent to that process, and the resulting decline in their economic security.

The research aim of this article is to explain the need for analysing the phenomenon of economic security in correlation with the implemented trade policy. In the article is also focused on accomplishing cognitive and methodological aims. The cognitive aim means defining the position and the significance of trade policy in shaping the new international order in the era of the progressing globalisation processes. The methodological aim is realised with the use of: (1) a method compatible with systemic approach to research and verification of descriptive and statistical material, and (2) procedure of ordering the process of examining the features and determinants of a trade policy and their influence on the issues of growth and economic security. The authors also used the method of critical analysis of the available literature and the method of comparative analysis of trade policies adopted in various countries at their diverse levels of development.

Security and Its Models in Contemporary International Relations

The modern concept of economic security is defined in a variety of ways, although there exists a common conviction that the economic factor determines the possibilities of social and economic growth in conditions of globalisation (Skulska 2010, 145-146). Following on from Stachowiak (2012, 4), it can be said that these are: the resultant of the factors of economic growth and its limitations; the state of the economy and its structure and also economic relations enabling an effective counteraction against negative external actions able to affect the stability of state system, disrupt economic growth or lower its defence potential; a general state of economic dependence defining the degree of effectiveness of external economic interference in internal economic growth; the reflection of the degree to which a given state is prone to the transference through the economic sphere – mostly through the channels and mechanisms of economic dependences – actions of a political nature aimed at weakening state security (energy-supply blackmail, speculation on the currency market and money market); balancing development needs and the possibilities of their satisfaction.

Kłosiński (2006, 41) defines economic security as "the entirety of factors and conditions protecting the independence of national economy, its stability and equilibrium, and also ensuring its capability for constant renewal and self-improvement". The above definition directs attention to the three-element structure of economic security:

- independence of economy;
- stability and equilibrium in economy;
- capability for constant renewal and self-improvement.

On the other hand, the development of globalisation and the deeping interdependences between countries have led to a phenomenon in which concern for sovereignty is delegated to the international level and described as *pooling sovereignty* (Żukrowska 2003, 188-189). An example of this phenomenon can be seen in individual EU member countries which have ceded a part of their prerogatives onto the level of central authority. Legislative acts in the individual countries have to be adapted to EU laws based on the principle of precedence of the Community laws. The phenomenon of *pooling sovereignty* is also connected with the participation of individual countries in international organizations. A transfer of responsibility for one's sovereignty to the international level is, on the one hand, something positive which allows for the acceleration in making difficult decisions, and also advantageous in the long term. On the other hand, it leads to the restriction of the decision-making field for individual countries, which in certain circumstances may bring disadvantages for individual entities. Decisions made on the international level are not always beneficial to all the interested parties. From the viewpoint of a country's economic security, an equilibrium should be maintained between leaving decision-making competences at the level of a given country and delegating them to international bodies. There are several international organisations whose scope of activity is providing economic security in diverse areas, e.g. the IMF, the World Bank Group, the WTO and the OECD (Marzec 2006, 69-83).

The question of what constitutes the model for the formation of security is in fact a question about the existence of the paradigm of international security in the current international relations. The universal paradigm of international security is normally defined as a set of features which are recognised as common in the context of international security, due to the fact that they describe relations between the entities constituting the international community (Gryz 2006, 15-17). This allows for indicating a group of characteristics existing in the field of international security based on which, and in relations to which, the research model is constructed. These include:

- anarchy of international environment which results from changes in the balance of power between the growth-oriented entities, usually as a result of political, economic, socio-cultural and military rivalry (Buzan 1984, 19);
- turbulence in the environment of international security resulting from the evolving nature of threats which, in conditions of deep interdependency, take on political, economic, socio-cultural as well as a military character. Their existence prompts those entities to seek new

forms of relationships, thanks to which they can – in a less or more formalised way – counteract these threats by increasing their own security;
- sensitivity and susceptibility of entities to the negative impulses originating from the international environment result from the growing processes of international influences and interdependences. That sensitivity and susceptibility on the part of the entity are also usually expressed by the ability to adapt, or not, to disadvantageous changes taking place in the international environment;
- normativity of international relations which defines the forms of the activity of entities, including the ways of ensuring their security;
- institutionalisation of international relations which involves all the spheres of activities by entities (usually states and organisations of international stature): political, economic, socio-cultural and security. In effect the institutionalised model of cooperation becomes a particular example for the activity of those entities.

This model can be also accepted as one appropriate for the study of economic security, with a particular consideration for the influence of trade policy on that matter.

The place of trade policy and the world trade system in the theory of international relations and in shaping economic security

The theory of international relations does not provide a clear interpretation of the role played by the world trade system. According to the realistic vision of these relations (Cini 2003, 94-95), foreign policy is an outcome of interaction between states, each of whom is focused on its own interests in the anarchical international environment, which lacks the generally accepted rules of conduct, as well as authority to enforce elementary rule of law. In these conditions, states determine their own goals in a rational way, based on their military and economic position achieved in the world. Their most important goal is to survive in spite of the continuous rivalry in which there is no place for common interests. In its turn, neorealism represents the view that states, even when functioning in such conditions, can be interested in international cooperation and ordering of their mutual relations as far as this will allow them to strengthen the position among their rivals. To this end, the existence of regimes is useful because they facilitate the achievement of international agreements. These are games with a zero outcome, in which a division of the jointly accomplished benefits depends on the strength of individual countries. Due to those clashing interests, it is difficult for them when faced with the need to conduct their own foreign policy and act under the pressure exerted by internal groups of interests, to construct healthy compromises in international relations (Świerkocki 2007, 232-235).

The crises experienced in recent years, especially the last financial and economic crisis, clearly indicate the weakness of public institutions and effective mechanisms of prognosis and control, which leads one to reflect on effective economic policies, and a new interpretation of the relationship between the state and the market. This is especially important when creating the new, or reorganising the already existing, institutions responsible for shaping economic security, that they are equipped with the appropriate functions. Those particularly important include: regulating human behaviour in a way which does not result in mutual damage or at least compensates for it; lowering the cost of transactions through simplifying contract procedures and access to the commodity market, organising the process of information transfer and facilitating a learning process (Stachowiak 2012, 108). Regarding the issue of the role of the state and the relation of state-market, it should be stressed that high mobility of transnational capital imposes a reorientation of the role and functions of the traditionally interpreted nation-state which is gradually evolving into a 'neoliberal' state, while losing its attributes of real influence on economic processes. At the same time, one can notice a paradox based, on the one hand, on the fact that a growing importance of economic security is a result of the ever more widespread rules of the liberal order in the world economy, and on the other, that the liberal economic doctrine and the world order created on its basis are themselves a source of numerous threats to economic security (Haliżak 2005a, 88). The principle of competitiveness is the condition of the market's effectiveness, and at the same time a constant threat to all entities operating in that market. Thus efficiency and effectiveness become the fundamental criteria of survival, and

neglecting them poses a threat of failure by those entities and entire economies. Yet economic security can be achieved as a result of state intervention and the policy of protectionism – in direct opposition to the theory and practice of liberalism. In international relations this is represented by the fact that threats to economic security do not result from the shortcomings of the liberal order but from its development and success, which lead to the growing inequalities in development. Therefore they are the threats which are brought on by the market and free trade (Haliżak 2005b, 78). Thus a particular dichotomy of opinions arises in the current scientific discourse. One group of researchers sees a connection between economic liberalisation and the international order as positive, since in conditions of liberalism there is a smaller number of conflicts occurring between states and it is possible to see the positive effects of globalisation in individual countries, measured with the Globalisation Index (Tures 2004, 423-431). The second group of researchers is critical in regard of the practical implementation of the liberal order such as the functioning of the World Trade Organisation. In their opinion, the international trade system which followed the creation of the WTO, instead of bringing benefits to everyone, in fact has led to the petrification of the differences in development between states, mostly due to the unequal distribution of benefits created by international trade (Stiglitz 2004, 52-55).

The economic security means, above all, the degree of influence on other foreign entities through economic activities which result from the character of the implemented policy, and whose purpose is to weaken the economy and the whole system of national security (Perczyński 1985, 95). This thesis is correct yet it lacks the points of reference to activities carried out by the state in its own territory and within its own socio-economic system. Threats to economic security do not always arise due to external aggression. Frequently, erroneous decisions regarding a location of capital or trade policy lead to the weakening of the economy or its destabilisation. Another element of a state's economic security is shaping the relations with other entities in the international arena and entering into trade relations both with countries and other entities in the international markets. On the one hand, expanding business ties with foreign entities creates new possibilities, and opens up the existing ones for the economic growth through accessing new markets as well as various forms of capital, but on the other, results in the threat of the occurrence of external factors which may have a negative impact on economic security (Sojka and Waloszczyk 2008, 82-83). With a highly developed network of business ties, there is an increased risk of the lack of total control over them, the loss of control over the flow of resources and the imprecise absorption of information about the potential threats or attacks against a given community or economic system. There also arises a problem of an excessive dependence on a single trade partner or a supplier in the case of purchasing raw materials and energy. The unforeseen actions on the part of such an entity may pose a serious threat to the state's security. In the literature on this subject, the problem of an effective impact on the socio-economic sphere of the state from the outside, has been acknowledged as one of the most urgent (Księżopolski 2004, 51).

The place of trade policy in building the competitiveness of economies and their security

In light of the changing conditions in international competition there is a growing importance of policies supporting internal adjustment of national economies to the requirements of the global economy. Tools of the adaptation policy include the macroeconomic, microeconomic and structural tools, which belong to different types of government policies and can be divided into: instruments of trade, industrial and regional policies, and of competition.

The policy of adjustment requires building a comprehensive economic strategy with a high degree of cohesion between the individual types of policies. Some of them can be treated as substitutive (e.g. trade and industrial policies), while others as complementary (policy of positive adjustment and policy of competition). The nature of interdependences between the policies should be decided by the objectives directing the whole strategy. If the strategic aim is the integration with a specific regional grouping, a special importance is given to the set comprising trade policy, industrial policy and policy of competition. When the superior objective is of a social nature, such as fighting unemployment, improvement of the environment, or reducing regional disparities, a decisive set of policies consists in: trade policy, industrial policy, regional policy, and policy of environmental protection. For the

government activity aimed at improving international competitiveness, a dominating set of policies is made up of trade policy, industrial policy, and microeconomic policy, in particular the rate of exchange (Domiter 2008, 79-84).

These three sets of policies overlap if the country realises concurrently all the above mentioned goals. Poland and Hungary provide an example of economies which during the period of market transformation simultaneously liberalised trade and investment, and aimed at EU integration. These objectives in a way imposed a parallel realisation of broadly interpreted social aims, especially the reduction of regional differences, improvement in the condition of the natural environment and raising international competitiveness.

Model assumptions of a pro-export development and its influence on economic security of countries' economies

A pro-export concept of growth can be realised with the use of one of the two possible directions: opening an economy to external influences (adjustment integration) and external expansion of domestic entities (active integration).

A liberal model of the pro-export economic development is based on the reform of trade policy and exchange rate, as well as liberalising the import of capital. In this model, the basis for activating an effective allocation of production factors which then determine the direction of structural changes, is removing distortions from the economy, in particular those of an economic and domestic nature. However, the distortions resulting from the underdevelopment and functioning of market mechanisms are being ignored, while for the countries which are liberalising ties with abroad this also leaves out the results of distortions of an international nature linked to the functioning of the global economy and policies of other countries. Yet it is worth stressing that development trends and the condition of the world economy are of great importance for the effectiveness of the pro-export reorientation in a development strategy. In this way liberalisation tendencies facilitate a clear reorientation of development (e.g. the pro-export type of development in Hong Kong, Singapore, South Korea and Taiwan in the 1960s) (Wziątek-Kubiak 1984, 150-155).

The basis of the liberal model is external liberalisation, above all of the imports of goods. Increased competition on the internal markets leads to the weakening of national monopolies, improves effectiveness and competitiveness of production, and favours developing specialisation. Removing import restrictions brings quick effects in the economy, and results in development of the export sector, mainly through absorbing production factors freed from other sectors. Liberalising imports is also demonstrated by lowering production costs in sectors which were protected in the past, whereas it has an indirect influence on the growth of exports. Its weak influence on the development of this sector can be explained mainly by the creation of the effect of 'pushing out' production from the domestic market abroad, which is not sufficient to trigger a dynamic mechanism of structural changes. Hence the complementary functions in this model are taken over by the exchange rate policy (Rosati 1990, 208-254).

The liberal model of pro-export development takes on two forms:

- ultraliberal, i.e. devoid of direct support for export. Export stimuli are contained exclusively in the policy of liberalising imports and devaluing the real exchange rate. This form of model was temporarily realised by countries in Latin and South Americas (Krugman and Obstfeld 2007, 363-374),
- moderate, involving different forms of active pro-export policy (Wziątek-Kubiak 1996, 69-73).

The basic assumption of the interventionist model of the pro-export strategy is acknowledgement of the structural heterogeneity of weakly developed economies and of the global market, and their poor integration as well as the fact that market mechanisms alone, in the conditions of underdevelopment and distortions, do not ensure the effective allocation of production factors.

The interventionist model underlines the need to protect domestic commodity markets in the period of redirecting their development strategy. The functioning of these markets can be gradually liberalised. These assumptions originate from the acceptance of the thesis about the imperfect functioning of international markets. In effect the international market does not generate strong mechanism of 'suction' of the production in weakly developed countries, and its distortions disturb the functioning of such economies. Their pace of external liberalisation of these countries, slower than in the liberal model, is explained by the existence of distortions in competition in the world markets. The pro-export policy is meant to neutralise the consequences negative for the development of exports, protection of their own and foreign markets.

Moreover, in this model there are strong arguments for the need of developing the newly created production. In the conditions of strong international competition and weak domestic production there are only slim chances for the creation of new, effective (in terms of international standards) types of production. This leads to the demand for conducting industrial policy which is supposed to stimulate accumulation, induce the improvement of quality and availability of production factors, and channel the available means to achieve the intended aims. In this model a significant role is played by the policy of stimulating savings both at home and internationally, policy of investment including technological and educational; administrative means of control are also applied (Acocella 2002, 286-288).

In the liberal model, the quick external liberalisation of the commodity markets means that only the most effective segments of the economy are able to survive. As a result, the companies that were growing due to the state protection, go bankrupt, and thus the domestic sector shrinks both in the relative and absolute approach, while at the same time exports are growing. Thus the liberal model is also the model of drastic selection on the micro level. The effectiveness of its functioning has its origin in microeconomics.

In the interventionist model, development of the export sector is not accompanied by the falling volume of production of the domestic sector. Its production is also growing, although not as fast as that of the export sector. The pro-export restructuring is an outcome of the differentiation of the dynamics of growth between these sectors (Wziątek-Kubiak 1996, 108). The general principles of the interventionist model were realised, albeit somewhat differently, by South Korea and Brazil. The differences were mostly connected with the policy regarding production factors, especially the import of capital. In South Korea the market of production factors was controlled by the state, and there was also the anticipation of the liberalisation of the commodity markets, in particular the import of foreign capital, in relation to which a selective policy was conducted. In Brazil there prevailed a liberal approach to importing foreign capital which was treated as an element of realisation of the externally-oriented option of development, as well as a source of capital and technology. Moreover, foreign companies were the direct beneficiaries of the export policy because they obtained export subsidies. The interventionist pro-export model was realised starting from the 1960s, i.e. during the time of favourable international conditions (Kim 1991, 33; Coes 1991, 20; Stiglitz and Charlton 2007, 35-37).

In reference to the eternal discussion on the advantages of the liberal concepts over the interventionist ones, and vice versa, one should mention those economists who in the theoretical framework of international economic policies rejected the assumption of the advantages of free market available to all subjects of the global economy. R. Prebisch thought that international trade is the outcome of trade policies pursued by the most developed countries, defined as the centre, and in his opinion two processes are potentially possible. In the first one, the countries of the centre, through the high level of their own imports create a high import demand for their own products among the other subjects in the world economy. This brings an increase in trade links between countries which remain outside the centre. In another, diverse situation, when countries of the centre demonstrate low import indicators, it is the countries from outside the centre which have to restrict their own imports from there and reduce its volume in their mutual relations.

Prebisch also rejected the thesis about benefits from free trade for all subjects in the world economy. In his opinion, the theory formulated by D. Ricardo restricts the possibilities of obtaining benefits from technological progress by less developed countries. In effect, within the centre-periphery system there exists unequal trade exchange, which in the periphery countries results in structural unemployment, lower domestic revenues, lack of equilibrium in the balance of trade and worsening of the terms of trade (Prebisch 1959, 266).

The concept of Prebisch contributed to the still ongoing discussion which searches for an answer to the question whether in fact developing countries are losing the basis for their own economic security as a consequence of the world trade and the current form of the global economy. This discussion also concerns justification for the policy of protectionism or liberalism. The neoliberal paradigm has become the main ideological force for managers and economists in the global economy, and also for politicians in the centre countries, yet it turned out to be unable to solve the economic and social problems of peripheral economies (Stiglitz 2004, 23-32).

Conclusions

This article showed the relations between trade policy and security of a country. The concern about the shortage of goods, or in other words the psychosis of the fear about the lack of goods, have always constituted the premise for seeking to ensure economic security for countries and for individuals. These factors made the entities in the world market determined to strive for obtaining benefits from trade exchange, and thus for the best possible access to the structures of the global market. This, in turn, is linked to the comparative advantages which define the competitive position of individual countries in respect of other entities in the global market. International competitiveness of a country signifies its ability to defeat competitors not only abroad but also in the domestic market. Market shares which describe the participation of a country in the global export market provide a synthetic measure of competitiveness. This is the reason why countries attach (or should do) such great importance to exports and factors of its growth as to the factors which create their development and shape their economic security.

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Treasury Bond Yield Curve as Verification Tool for Equity Us Market Bubbles Valuation Before Recessions

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Abstract

The concept of a price bubble in the financial market is rather complex and contains many nuances. Measuring of price bubbles and identification of market tops is very sophisticated activity even for professional portfolio managers. Methodology of measuring bubbles contains plenty of various indicators, ratios and statistical models, but nonetheless it is still difficult to forecast timing of equity market top. In this work, we review and classify the definition of a financial market bubble and research its nature via specific financial metrics. Valuation metrics show that at the start of US recession equity markets are not extremely overvalued, that is why according to our research and calculations price bubbles usually start deflating before a recession. During this research we found that yield curve could be a useful methodological support tool for US equity market bubbles identification.

Keywords: Equity Market, Recession, Price Bubble, Financial Bubble, Treasury Bond Yield, Yield Curve, SPX500.

Introduction

The modern market economy develops in a cyclical manner. During periods of economic growth are followed by declines in business activity and financial crises with sharp declines of stock market prices and macroeconomic indicators (GDP, unemployment industrial production). Rather often stock market creates a price bubble, before long-term financial crisis, and economy falls into recession after the bursting of this bubble.

The nature of a price bubble is closely related to the hypothesis of financial markets informational efficiency, formulated by E. Fama (1970). The content of the efficient-market hypothesis lies in the fact that on an efficient market asset prices instantly and completely assimilate all available information, reaching a state of equilibrium over time. The consequence of the information cascade leads to specific collective behavior of market participants and make the prices deviate from their fair value. Determination of this particular fair value and concrete timing of market top formation is a rather complicated task.

In this paper, we exploit the prospective of treasury bond yield as a tool for identifying market tops and as a filter to potential equity market bubbles. To do so, we analyzed NBER recessions data for USA, historical pool of SPX500 traditional valuation metrics (such as D/P, P/E, CAPE10 etc.) and compared them to the data with US treasury bond yield inversion facts.

Literature Review

One group of authors believes that the bubble is an unnatural and irrational phenomenon, mainly associated with a sharp increase in asset prices and having negative consequences for the economy and financial markets (Dorofeev M. and Samarskiy G., 2016; An J., Dorofeev M., 2019; An J. et al, 2019a; Mikhaylov A. et al, 2018). Two subgroups can also be classified in this group: authors who do not have clear criteria for “sharp price increases” and authors who recommend to use different specific financial indicators concerning with the price growth rate and indicating the presence of a price bubble and risks

for an economy. Basing on the first group of authors we conclude that the overall idea of a financial bubble is the following “The financial bubble is a sharp and irrational increase in prices, followed by the collapse of the market and the economy”.

The other group basically interprets the financial bubble as a natural regularity, which is part of the economic system and does not always lead to destructive consequences, i.e. relatively neutral phenomenon for the economy (Garber P., 2001). Some authors from this group suppose that the bubble is a rational phenomenon, and some even believe that such a concept does not exist (Fama E, 1970). Consider each group of "financial bubble" definitions in details. According to our research data we found that second group of authors define financial bubble as a “Rational and natural economic and behavioral phenomenon that is an inseparable part of the financial system and is not always accompanied by devastating consequences for the economic system” (Sornette, 2003; Blanchard et al, 1982; Detken and Smets, 2004).

To summarize our review of the scientific sources about financial bubbles, we must admit that we did not find a comprehensive, concise and universal definition of this term. Firstly, because from a practical point of view, it is not so easy to identify the top of bubble. Secondly, it is also difficult to predict the duration of price bubble development stages. Thirdly, we found different opinions concerning the degree and economic nature of financial bubbles impact on the real economy and financial markets. One group of authors, apparently, connects the concept of a bubble with large-scale phenomena that affect the state of the economy as a whole. Another group considers this concept more broadly and notes that price bubbles are not always a negative phenomenon with devastating consequences for the economy. In addition, there are also opinions that financial bubbles do not exist at all.

There are many approaches to identification of a financial bubble regarding to equity markets. All methods are concentrating on assessments of valuation fundamentals via use of different ratios and financial indicators to measure the fairness of current market price levels (Garber P., 2001; Dorofeev M. and Samarskiy G., 2016; An J. and Dorofeev M., 2019; An J. et al, 2019a; Alwaelya S. et al, 2020; Dayong N. et al, 2020).

Also, there is a group of authors, who use intermarket analysis and measure bubbles in oil prices, implying that energy markets participate in creation of financial market bubble for last turn (An J. et al, 2020; An J. et al, 2019a; An J. et al, 2019b; Mikhaylov M., 2018; Mikhaylov M., 2019; Meynkhard A., 2020; Nyangarika A. et al, 2018; Nyangarika A. et al, 2019a; Nyangarika A. et al, 2019b).

With the development of cryptocurrency markets researches got rather interesting and promising datasets for research the nature of price bubbles. Most methods there are upbuild on modern economic and mathematical models and mainly statistical approaches to identification of bubbles, because there are certain problems with valuation of cryptocurrencies via, for example, DCF-methods are inapplicable in such case (Denisova V. et al, 2019; Dorofeyev M. et al, 2018; Meynkhard A., 2019a; Meynkhard A., 2019b; Mikhaylov A. et al, 2019).

Concept Headings

In our work, we applied methods of traditional fundamental valuation and measurement of equity markets. We used economic database of Federal Reserve Bank of St Louis to give specific financial characteristics for a typical equity market bubble. To make the picture clear enough we took the official dates of recessions in USA (version of NBER) and collected commonly used financial ratios for these particular dates. In our research, we used the following indicators: Dividend-to-Price (D/P); Price/Earnings (P/E) and the reverse ratio (E/P); R. Shiller Price/Earnings ratio (CAPE 10).
Particularities of usage treasury yield curve as special tool for finding equity market bubbles is basing on the following principles.

1. We used three types of curve spreads: 10-year treasury constant maturity minus 3-month treasury constant maturity (T10Y3M), 10-year treasury constant maturity minus 1-year treasury constant

maturity (T10Y1Y) and 10-year treasury constant maturity minus 2-year treasury constant maturity (T10Y2Y).
2. Each curve spread moves in a cyclical manner, according to the certain phase of US credit cycle, and also has its own typical upper and lower boundary, reflecting changes of term premiums for US treasures investors. For T10Y3M yield spread this range is [0%; 3.5%]. For T10Y2Y yield spread the range was set as [0%; 1.6%]. Finally, the range for T10Y2Y the range was set as [0%; 1.5%]. Reaching the lower boundary corresponds with a peak of FED's interest rate normalization policy (rate hiking). When spreads intersect their upper boundary, the picture becomes the opposite – easing phase of monetary policy comes to the end and finishes there.

Calculations of equity valuation metrics are made with the use of SnP500 index open monthly prices for the starting date of a recession and close prices for the its ending date.

Discussion

We understand financial bubble as a sharp, steady and rapid increase in the asset price (over 10%, depending on the type of the market) over a certain period of time. It develops from one to three years in equity market in conditions without adequate and proportional change of asset fundamental metrics and in most cases caused by irrationality of investors' behavior or by specific monetary policy of a country. In all cases price usually reverses on the top of financial bubble and market makes a meteoric decline to the price levels where this bubble starts.

Table 1 contains information with calculations of key statistics for SnP500 equity index valuation financial metrics averages and extremums, produced with the use of data of the 1873Y-2019Y period.

Table 1: Key statistics for SnP500 equity index valuation financial metrics in 1873-2019 YY

	D/P	E/P	P/E	CAPE10
Maximum	13,84%	18,82%	123,73	44,20
3-rd quartile	5,38%	8,73%	18,07	20,56
Average	4,33%	7,35%	15,76	16,99
Mean	4,27%	6,77%	14,77	16,22
3-st quartile	3,14%	5,53%	11,45	11,84
Minimum	1,11%	0,81%	5,31	4,78
Standard deviation	1,71%	2,70%	8,39	6,83

Our own calculations based on monthly data from https://fred.stlouisfed.org and http://www.econ.yale.edu/~shiller/data.htm

This information is useful for valuation and measurement of SnP500 bubbles. According to basic rules of asset valuation, long term mean or average reflects the level of fair market value. Potential price bubbles usually occur in higher than the 3-rd quartile range of metrics.

Table 2 shows the picture of SnP500 equity index financial metrics only during the periods of US recessions from 1873Y till 2009Y.

Table 2: Statistics for SnP500 equity index financial metrics during US recessions. The period of observation is 1873-2009 YY

Start of a recession						End of a recession						Change in SPX 500 during a recession (%)
Dates	D/P (%)	E/P (%)	P/E	CAPE 10	SPX 500	Dates	D/P (%)	E/P (%)	P/E	CAPE 10	SPX 500	
Oct. 1873	7,56	10,58	9,5	-	4,3	Mar. 1879	4,87	8,62	11,6	-	3,8	-11,63
Mar. 1882	5,42	7,42	13,5	15,4	5,9	May 1885	6,38	6,67	15,0	14,0	4,4	-25,42
Mar. 1887	3,92	5,82	17,2	17,9	5,8	Apr. 1888	4,59	6,16	16,2	15,6	5,3	-8,62
Jul. 1890	4,00	5,35	18,7	17,5	5,5	May 1891	4,40	6,22	16,1	15,7	5,0	-9,09
Jan. 1893	4,30	6,44	15,5	17,6	5,6	Jun. 1894	5,35	4,88	20,5	16,5	4,3	-23,21
Dec. 1895	4,04	5,32	18,8	18,0	4,7	Jun. 1897	4,29	6,19	16,2	17,6	4,2	-10,64
Jun. 1899	3,31	6,69	14,9	21,7	6,2	Dec. 1900	5,00	8,00	12,5	18,1	6,0	-3,23
Sep. 1902	3,64	6,64	15,1	23,2	9,0	Aug. 1904	4,62	7,19	13,9	16,3	7,0	-22,22
May 1907	5,08	8,76	11,4	14,0	8,2	Jun. 1908	5,53	8,16	12,3	13,0	7,6	-7,32
Jan. 1910	4,25	7,28	13,7	15,0	10,4	Jan. 1912	5,41	6,89	14,5	13,2	8,7	-16,35
Jan. 1913	5,11	7,39	13,5	13,3	9,4	Dec. 1914	5,68	7,03	14,2	10,2	7,4	-21,28
Aug. 1918	7,92	14,12	7,1	6,4	7,7	Mar. 1919	6,67	11,61	8,6	6,6	8,4	9,09
Jan. 1920	6,00	10,45	9,6	6,0	8,8	Jul. 1921	7,40	7,73	12,9	5,2	6,5	-26,14
May 1923	5,89	9,21	10,9	8,1	8,8	Jul. 1924	6,37	11,19	8,9	7,9	8,5	-3,41
Oct. 1926	5,15	9,48	10,5	12,5	13,1	Nov. 1927	4,36	6,41	15,6	18,6	17,5	33,59
Aug. 1929	3,08	5,08	19,7	31,6	30,2	Mar. 1933	7,82	6,73	14,9	7,8	6,2	-79,47
May 1937	5,33	7,57	13,2	18,2	15,2	Jun. 1938	7,25	7,55	13,2	12,3	10,2	-32,89
February 1945	4,62	6,79	14,7	12,4	14,0	Oct. 1945	4,00	5,94	16,8	14,4	16,5	17,86
Nov. 1948	5,91	14,39	6,9	10,3	15,4	Oct. 1949	6,67	14,70	6,8	10,3	16,1	4,55
Jul. 1953	5,73	10,17	9,8	12,0	24,8	May 1954	5,42	9,65	10,4	12,5	26,9	8,47
August 1957	3,68	7,27	13,8	16,4	47,5	Apr. 1958	4,21	7,36	13,6	13,7	41,7	-12,21
April 1960	3,50	6,03	16,6	17,4	55,5	Feb. 1961	3,07	4,97	20,1	19,6	63,4	14,23
Dec. 1969	3,37	6,16	16,2	17,9	93,9	Nov. 1970	3,62	5,97	16,7	15,5	87,2	-7,14
Nov. 1973	3,49	8,35	12,0	13,8	95,9	Mar. 1975	4,40	10,13	9,9	10,1	83,4	-13,03
Jan. 1980	5,35	14,07	7,1	8,5	106,6	Jul. 1980	4,83	11,98	8,3	9,2	123,9	16,23
Jul. 1981	4,90	11,52	8,7	8,6	130,3	Nov. 1982	4,96	9,35	10,7	8,4	138,5	6,29
July 1990	3,27	5,98	16,7	17,7	358,1	Mar. 1991	3,23	5,58	17,9	18,0	375,2	4,78
Mar. 2001	1,29	3,67	27,2	33,7	1 237,5	Nov. 2001	1,38	2,27	44,0	30,3	1 139,5	-7,92

Start of a recession						End of a recession						Change in SPX 500 during a recession (%)
Dates	**D/P (%)**	**E/P (%)**	**P/E**	**CAPE 10**	**SPX 500**	**Dates**	**D/P (%)**	**E/P (%)**	**P/E**	**CAPE 10**	**SPX 500**	
Dec. 2007	1,87	4,47	22,4	26,0	1 479,7	Jun. 2009	2,78	0,82	122,4	16,3	919,3	-37,87
Max	7,92	14,39	27,2	33,7		Max	7,82	14,70	122,4	30,3		33,59
3-rd quartile	5,35	9,48	16,6	17,9		3-rd quartile	5,68	8,61	6,22	16,3		5,68
Average	4,52	8,02	14,0	16,1		Average	4,98	7,45	18,4	13,8		-9,10
Mean	4,30	7,28	13,7	15,9		Mean	4,87	7,03	14,2	13,8		-8,62
1-st quartile	3,50	6,03	10,5	12,3		1-st quartile	4,29	6,16	11,6	10,2		-21,28
Min	1,29	3,67	6,9	6,0		Min	1,38	0,82	6,8	5,2		-79,47
Standard deviation	1,46	2,86	4,7	6,7		Standard deviation	1,46	2,81	21	5,1		21,19

Our own calculations based on https://fred.stlouisfed.org and http://www.econ.yale.edu/~shiller/data.htm

We measured out that US recessions timing is usually suits the occasion when yield spreads move from the lower to the higher boundary and cross its middle. US economy overcomes a recession before yield spreads come to their higher boundaries.

Visualization of SnP500 bubbles valuation metrics is shown on figure 1. We can see there, that treasury yield inversions precede recessions in US economy, at the same time they arise at local tops of CAPE10 chart and in most cases before SnP500 tops before recessions.
The key finding of this work is that the idea of the usage yield spreads in combination with SnP500 valuation metrics is an effective filter of identification price bubbles, giving rather accurate timing for long-term investors and monetary authorities.

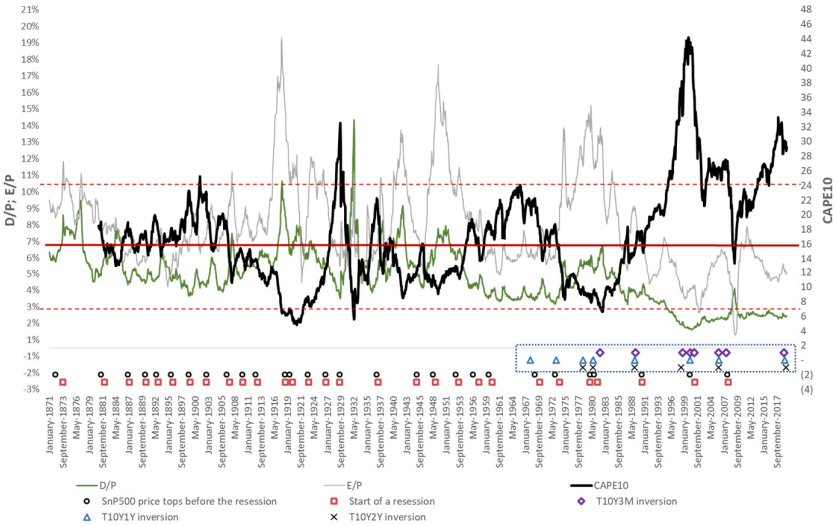

Fig. 1: SnP500 valuation metrics; dates of recessions start, SnP500 tops; yield curve inversions. Monthly data for the period of 1873-2020 YY.

Our own calculations based on https://fred.stlouisfed.org, http://www.econ.yale.edu/~shiller/data.htm and https://www.gurufocus.com/yield_curve.php

Results

Stock market price bubble is rather complex matter. It is difficult to make at the same time laconic and comprehensive definition for this phenomenon. The key feature of a bubble is the speed of movement and a significant change in price and fundamental metrics of a particular asset.

The comparison of the SnP500 statistics for equity index financial metrics at the start of a recession with averages and extremums calculated for the general sample of monthly data of the period 1873-2019 shows that equity market is usually in a relatively adequate valuation levels at the start of a recession.

The use of treasury yeild curve in pair with a number of commonly-known valuation financial metrics is useful methodological support tool for identification equity market bubbles.

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Impact of Urban Transport Innovation on The Quality of Life: What Do Passengers Say?

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Abstract

City authorities are taking action to increase public transport attractiveness. More and more innovative solutions are being introduced. Therefore, the research was aimed at answering the question: have innovations improved residents' quality of life in their opinion. The research was conducted in one of the Polish cities due to the number of introduced innovations. Surveys were carried out, which showed that the introduced innovations improve the quality of life of residents. In their opinion, innovations most influencing their quality of life are connected with security and travel comfort. Innovations connected with the environment and availability of information play also an important role.

Keywords: Quality Of Life (QOL); Public Transport; Innovations; Management.

Introduction

The literature indicates that the increase in the wealth of the Polish society affects the greater accessibility of individual transport to the users. Thus, the demand for public transport services is decreasing. Cities are becoming increasingly crowded with cars, which may lead to their transport paralysis. At the same time, the inhabitants bear the costs related to the negative impact on their health and natural environment (Barcik and Jakubiec, 2014), (Proost and Van Dender, 2012). The key to reversing this trend may be the introduction of innovative services and solutions that meet the needs of public transport passengers (Tsafarakis *et al.*, 2019), (Trippner-Hrabi and Podgórniak-Krzykacz, 2018). It should be emphasized that the improvement of the residents' quality of life may be the consequence of reversing the trend of increasing the share of individual transport in mobility within cities.

The issue of quality of life is widely discussed in the literature on the subject (Pukeliene and Starkauskiene, 2011). Some researchers express the opinion that no other topic is so frequently discussed (Shek, Chan and Lee, 2005). This concept is considered from the perspective of various sciences (Shek, Chan and Lee, 2005), e.g. medicine (Kane, 2003), ecology (Ims, 2018), or economic sciences (Vargas-Hernández, 2016). Moreover, specialised journals are dealing with the quality of life, such as "Quality of Life Research" or "Applied Research in Quality of Life". Due to the differences between scientific disciplines, it is not possible to develop a commonly accepted definition of quality of life. However, there is a consensus in the literature on the subject, with some reservations (Shek and Lee, 2007), that quality of life can be understood as “as the set of factors which contribute to the general well-being of people in terms of personal satisfaction with happiness, health, safety, intellectual and cultural preferences, financial security, family life, job satisfaction, etc. Quality of life has been defined as the level of satisfaction with an individual´s conditions,

relationships, and surroundings relative to the available alternatives" (McGregor and Goldsmith, 1998), (Wallander, Schmitt and Koot, 2001).

Quality of life is also important from the perspective of sustainable development (Eusuf *et al.*, 2014). By integrating the natural environment into the socio-economic development of a region, country, or in the global perspective, the whole world, it is possible to improve its condition and thus the quality of life of people (Skowroński, 2006). The quality of human life cannot be considered in isolation from the quality of the natural environment in which humans live (Khasaev *et al.*, 2019).

Within the framework of European Union policy, the importance of improving quality of life and pursuing sustainable development can also be noticed. This is expressed, inter alia, through the European Mobility Week campaign. In fact, "since 2002 it has sought to improve public health and quality of life through promoting clean mobility and sustainable urban transport. The campaign gives people the chance to explore the role of city streets and to experiment with practical solutions to tackle urban challenges, such as air pollution"(*The campaign*, 2019). Moreover, at the strategic level, there are documents such as the Europe 2020 Strategy, which in its assumptions determines the need to support innovation, intelligent and sustainable development and counteracting social exclusion (*EUROPE 2020 A European strategy for smart, sustainable and inclusive growth*, 2010).

Schumpeter pointed out that innovation affects the quality of life. There are publications confirming the opinion of that author (Woodside, Bernal and Coduras, 2017). Therefore, it can be presumed that innovations related to sustainable urban transport can also improve the quality of life.

In the literature, studies are linking the quality of life to transport, e.g. on transport policy in ageing society (Metz, 2003), or generally on the impact of urban public transport on the quality of life of urban residents (Ciobanu, Bugheanu and Ciobanu, 2015), (Wann-Ming, 2019), (Ismail *et al.*, 2012). It is indicated that appropriate solutions in public transport, responding to the needs of residents, may contribute to the improvement of their quality of life (Przybyła, Kulczyk-Dynowska and Kachniarz, 2014). So, we should know the importance of innovation for residents (Tsafarakis *et al.*, 2019). At the same time, it should be emphasized that the comprehensive improvement of the quality of life only through the development of sustainable transport is insufficient (Wann-Ming, 2019).

In the authors' view, the impact of public transport innovation on the quality of life of passengers should be investigated, as it is an area that requires in-depth analysis. There are papers which try to rank innovation in public transport (Nalmpantis *et al.*, 2019), (Tsafarakis *et al.*, 2019), and are based on people's opinions. However, they are not investigating the quality of life and are not focused on passengers who are using those innovations on an everyday basis. This paper closes this research gap.

The results of the local government elections in Poland in 2018 proved that issues related to public transport are important for voters. They occupied the central positions in the programs of candidates for mayors. Those of them, including the former mayors, who cared about systematic and planned development of urban transport, usually either won in the first round or were elected in the second round (Gromadzki, 2018).

There are examples of cities in Poland where efforts have been undertaken to make public transport more attractive. For example, 198 electric buses were registered in Poland in July 2019. Most of them were registered in the following cities: Zielona Góra 43 buses, Warsaw 31 buses, Kraków 26 buses, Jaworzno 24 buses, Inowrocław 10 buses, Stalowa Wola 10 buses, Szczecinek 10 buses, Rzeszów 10 buses ("E-bus counter in Poland" 2019). Electromobility is, at present, a subject of particular interest among leading world economies (Altenburg, Bhasin and Fischer, 2012). Therefore, it is not surprising that also in Poland, steps are being taken to increase the share of electromobility in urban transport.

Zielona Góra may be considered the city with the highest number of introduced innovations in the context of urban transport and sustainable development.

The electronic boards informing about the actual departure time of buses were introduced in 2005. It was the first city in the country where this solution was applied. The interchange station was opened in 2019. The first electric buses appeared in Zielona Góra in 2018. From amongst the fleet of 100 vehicles in Zielona Góra, 43 buses are electric. They performed about half of the transport work in August 2019. 2018 was also the first year when free rides for students up to 20 years of age were introduced. Furthermore, the buses are equipped with video monitoring and some of them with defibrillators. Passengers can also use an interactive map indicating the position of the vehicles, the type of vehicle (electric) and the availability of a defibrillator on the bus. Additionally, it is possible to purchase tickets via mobile applications. The residents have also been provided with an option if an electronic ticket, the so-called e-card. All of the above changes are innovative solutions in the area of public transport in Zielona Góra.

The aim of the research was to identify, analyse and evaluate the impact of the introduced innovative public transport solutions on the passengers' quality of life. The research was conducted in Zielona Góra due to the diversity and number of introduced innovations.

Materials and Methods

Based on the analysis of the literature, the factors which theoretically influence the quality of life in the context of urban transport innovation were identified. The factors were also selected on the basis of the objectives to be achieved by the introduced innovations in urban transport in Zielona Góra. The analysis of the documents related to the introduced innovations showed that the undertaken actions were to reduce the noise level, to improve the air quality, to improve the safety and to facilitate the use of public transport. The list of factors was supplemented by the following elements related to the quality of life:

- safety (Pukeliene and Starkauskiene, 2011), (Cummins, 2000);
- material well-being (Pukeliene and Starkauskiene, 2011);
- accessibility of urban transport information for older adults (Hounsell et al., 2016);
- reduction of the negative impact of transport on the environment (Nosal and Starowicz, 2010);
- noise (Duarte and Tamez, 2009);
- comfort (Fellesson and Friman, 2012), (Putra and Sitanggang, 2016).

Due to the similarity criterion, it is possible to combine noise and reduction of the negative environmental impact of transport into one factor, which has been done.

As it was mentioned in the introduction section, there are nine types of innovation in the analysed city.

The survey was conducted among public transport passengers between 21.08 and 07.09.2019. The information about the survey was published on the website of the Municipal Department of Communication (MZK) in Zielona Góra and in the social media of the carrier. The respondents filled in an online form. The formulas in the questionnaire were consulted during trial tests. As a result, the decision was made to change the content of some of the questions in order to make them more understandable for the recipients.

The questionnaire consisted of 23 research questions covering factors influencing the quality of passengers' lives. A metric examining demographic data was also included. In the first part, the respondents were asked about the impact of introduced innovations on their quality of life. The 5-point Lickert scale was applied, where 1 meant a very negative impact on the quality of life, whereas 5 meant a very positive impact on the quality of life. For example, passengers were asked about the impact of electric buses on their quality of life. In the second part, the respondents were asked to link an appropriate statement relating to a given factor (eg. safety). For example, they were asked do the bus defibrillator affect their safety? The 5-point Lickert scale was also used here, where 1 meant that it did not improve at all, and 5 meant that it improved to a very large extent.

More than 400 people took part in the survey. If we take as our confidence level 95%, with unknown faction size (assuming 0.5) and a maximum error of 5%, knowing the population size - 60,000 users of public transport per day, then the minimum number of people in the study should be 382. Therefore, it should be assumed that the research sample, with the given assumptions, is representative, and the results obtained on the sample can be extended to the whole population. It should also be emphasized that only questionnaires completed in full and correctly were accepted, those with gaps or errors were rejected. We gained 400 questionnaires and used IBM SPSS to all statistical analysis.

Since the questionnaire was the researchers' original concept, its reliability was analysed by calculating the coefficient alpha. The questionnaire consisted of two types of scales. Scale1 included questions concerning the impact of the applied innovations on the quality of life, Scale2 measured the change in the level of quality of life indicators after the introduction of innovative changes in urban transport.

Table 1: Cronbach's Alpha for Sale 1 and Scale 2

Scale	Cronbach's Alpha	Number of items
Scale 1	.740	7
Scale 2	.740	7

Source: own work.

Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability. The results presented in Table 1 indicate that an acceptable level of statistics of Cronbach's Alpha was obtained (reliability coefficient of .70 or higher is considered "acceptable" in most social science research situations), and therefore the questionnaire can be considered reliable.

The study involved 231 women and 169 men, whose age ranged from 18 to over 65 years, as shown in Table 2.

Table 2: Age of the respondents

Age	Number of respondents
18-30	230
31-45	94
46-65	59
over 65	17

Source: own work.

The majority of respondents, 343 out of 400, indicated Zielona Góra as their place of residence. The level of education is presented in Table 3.

Table 3: Level of education of respondents

Level of education	Number of respondents
Elementary	3
Lower secondary	26
Vocational	22
Secondary	171

Source: own work.

Results

Literature studies have indicated that there are factors linked to innovation in urban transport that can improve the quality of life of the users. The performed theoretical analysis resulted in the formulation of the main research hypothesis: H1: *There are statistically significant relationships between groups of innovative factors and measures of the quality of life of urban transport users*.

We have nine introduced innovations: 1. electric buses, 2. integrated interchange station, 3. surveillance system on city buses, 4. availability of a defibrillator during travel, 5. option to buy tickets through mobile applications, 6. free rides for students up to 20 years of age, 7. information about current GPS positions of buses via the website, 8. electronic bus stop boards, 9. introduction of an electronic ticket (e-card).

Aggregation of these innovations (factors) using factorial analysis with Varimax rotation was proposed. So there is need to check if conditions for factors analysis are fulfilled. Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's test of sphericity should be done.

Table 4: Kaiser-Mayer-Olkin's and Bartlett's tests

KMO measurement of sample selection adequacy		.794
Bartlett's test for sphericity	Approximate chi-square	551.138
	Df	36
	Relevance	.000

Source: own work.

The Kaiser-Mayer-Olkin's test with high values (close to 1.0) indicates that factor analysis may be useful with provided data. If the value is less than 0.50, the results of the factor analysis probably won't be beneficial. Bartlett's tests with small values (less than 0.05) of the significance level indicate that factor analysis may be useful with provided data. Results in Table 4 show that conditions for factorial analysis are fulfilled.

Factor analysis is used to identify variables called factors that explain correlation patterns that occur within sets of observed variables. Factor analysis is often used in data reduction to identify a small number of factors explaining most of the variance observed in a large number of variables. Varimax method allows minimizing the number of variables with high factor loadings by orthogonal rotation. This simplifies the interpretation of the factors.

The applied factor analysis with Varimax rotation showed the existence of 2 new bundles of factors. The first bundle of factors include: the surveillance system introduced on the buses, availability of a defibrillator, introduction of electronic tickets (e-card), electronic bus stop boards and the possibility to buy tickets through mobile applications. The second bundle of factors is burdened with the following variables: the integrated interchange centre, electric buses, free rides for students, information about the current GPS position of buses via a website.

In conclusion, the conducted factor analysis with Varimax rotation resulted in the aggregation of nine factors into two factor beams. According to the method of main-factors components identification, the first one consists of 5 factors, and the second one consists of 4 factors. The statistical analysis and the results of Kolmogorov-Smirnov's test with Lilliefors correction for n=400 amounted to 0.161 and 0.111 for Component1 and Component2, respectively. The α value in both cases was lower than 0.05. That indicates that the distribution of new variables is not similar to the regular distribution.

In order to verify the primary research hypothesis H1: *There are statistically significant relationships between groups of innovative factors and measures of the quality of life of urban transport users*, four auxiliary hypotheses were formulated and then subjected to statistical tests. The first and second auxiliary hypotheses referred to the relationship between Component1 and the quality of life aspects

studied: HpP1: *There is a relationship between Component1 and the improvement of the quality of life of the population*, HpP2: *There is a relationship between Component1 and the improvement of the quality of life in the four areas of the standard of living*. The results of the rho-Spearman correlation test for an alternative hypothesis to the studied hypothesis indicate that there are statistically significant monotonous relationships between all the variables studied. The values of correlation coefficients are shown in Table 5.

Table 5: Correlation test for Component1

	Value R	Relevance at the level of 0.01	Interpretation
Component1 Level of security improvement	0.613	0.000	Correlation high-dependence high
Component1 Level of environment improvement	0.371	0.000	Low correlation - clear dependence
Component1 Level of availability of information improvement	0.424	0.000	Moderate correlation - significant dependence
Component1 Level of travel comfort improvement	0.370	0.000	Low correlation - clear dependence
Component1 Level of quality of life improvement	0.558	0.000	Moderate correlation - significant dependence

Source: own work.

When interpreting the rho-Spearman ranks' correlation coefficients, it should be noted that the strongest correlation occurs between Component1 and the level of safety improvement. The relationship between Component1 and the general level of improvement in the quality of life of the inhabitants is considered to be significant. The second and third auxiliary hypotheses referred to the relationship between Component2 and the quality of life aspects studied: HpP3: *There is a relationship between Component2 and improving the quality of life of the population*, HpP4: *There is a relationship between Component2 and improving the quality of life in four areas of the living standard*. The results of the rho-Spearman correlation test for the alternative hypothesis with respect to the hypothesis under investigation indicate that there are statistically significant monotonic relationships among all the variables studied. The values of correlation coefficients are shown in Table 6.

Table 6: Correlation test for Component2

	Value R	Relevance at the level of 0.01	Interpretation
Component2 Level of security improvement	0.319	0.000	Low correlation - clear dependence
Component2 Level of environment improvement	0.501	0.000	Moderate correlation - significant dependence
Component2 Level of availability of information improvement	0.524	0.000	Moderate correlation - significant dependence

Component2 Level of travel comfort improvement	0.576	0.000	Moderate correlation - significant dependence
Component2 Level of quality of life improvement	0.670	0.000	Correlation high-dependence high

Source: own work.

When interpreting the rho-Spearman ranks' correlation coefficients, it should be noted that the strongest correlation occurs between the Component2 and the level of improvement in the quality of life in general. The relationship between Component2 and the level of safety improvement is considered to have a low degree of correlation. The link between the examined component and the other measures of improvement in the standard of living level is considered a significant relationship.

In the course of the survey, the respondents were asked to determine the degree of improvement in the quality of life in the following areas: the improvement of the security level, the improvement of the environmental conditions level (natural environment), the improvement of the availability of information level, the improvement of the travel comfort level. The appropriate measures were assigned to the above mentioned areas. The respondents were asked to assign an appropriate statement to a given measure in a particular area. Answers were marked on the 5-point Likert scale.

Table 7: Scale

Answer code	Meaning
1	Has not improved in any way
2	Has slightly improved
3	Has moderately improved
4	Has improved to a large extent
5	Has improved to a very large extent

Source: own work.

Surveys showed that the highest average value was achieved in the level of improvement in the travellers' safety. The average of the responses amounted to 4.45, which means that safety had improved significantly since the introduction of the innovations in public transport. The area of the improvement in a natural environment, at the time of the survey, was determined at the level of 3.14, which implies that respondents moderately feel the level of improvement in air quality or noise reduction. After the introduction of innovative solutions in the field of transport services, the level of accessibility to information improved significantly, which was estimated at the level of 4.27. The level of travel comfort, according to the respondents, improved on average at the level of 3.58. The analysis of the obtained answers indicates that in general the level of improvement in the quality of life of the inhabitants after the introduced changes was estimated to be 3.93, which means that the users of public transport experienced improvement in the quality of life level to a large extent.

Discussion

There are other studies that assess innovations in public transport. For example, (Tsafarakis et al., 2019) show that the most important innovation is “Real-time travel information at Public Transport stops”. In turn, (Nalmpantis et al., 2019) show that “enabling a seamless journey, using the best possible connections and the most suitable transport modes, provided through one interface, such as a platform that brings together different types of transport options and the provision of real-time transport information” has the highest score in terms of utility. In our research “availability of information” is also significant. Passengers in Zielona Gora are happy with electronic boards

informing about the actual departure time of buses. In their opinion, it is one of the most important innovations.

There are other similarities too. One of the most important innovation is connected with tickets. People appreciate special prices for commuters (in our research: free rides for students) and advanced e-ticket system.

We have found additional innovations connected with the environment and with safety. Respondents say that the surveillance system and defibrillator have a positive impact on their quality of life. They think electric buses reduce noise and increase travel comfort.

It seems that other cities authorities when buying new buses should focus on buying electric ones with the surveillance system and provided with a defibrillator. That will increase the quality of life. In their mind should be advanced e-ticket system, with the possibility of mobile payments. Passengers will appreciate real time traffic information at bus stops too.

Further research should focus on conducting it on a larger sample, e.g. national or in comparison with other countries. This may be problematic as different cities have implemented different numbers of innovations in public transport. Other factors, i.e. those not examined by the authors of this article, may also be taken into account.

It should be noticed that the survey was based on the opinions of respondents. So there are some limitations. Hence, it is possible that respondents could give opinions without thinking more deeply about the questions. It is also essential that the respondents may not have had the same experience level as the introduced innovations. For example, some use them every day, others occasionally. The circumstances in which the subjects filled in the form were also significant.

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Allocative Efficiency of Dairy Farms: A Stochastic Cost Function Application on Dairy Farms in Kerala, India

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Abstract

India is the largest milk producer in the world, but faces a lot of challenges in the form of dropouts from the farming activity, high cost of milk production and meagre returns. All this is due to the inefficient use of the inputs. Efficiency signifies a level of performance that describes using the minimal values of input to achieve the highest amount of output. The study was conducted to estimate the allocative efficiency of dairy farms in Kerala, India, by applying stochastic cost function methodology. Allocative efficiency estimates are generated for 300 dairy farms in Kerala. The results of the study communicates the allocative efficiency of milk production by the dairy farms in Kerala is between 70-79 per cent levels of efficiency. The mean efficiency is only 61.3 per cent, where the farms could increase efficiency by 51.3 per cent. There is a statistically significant difference between the farm sizes concerning allocative efficiency. To enhance farm efficiency, there should be a proper awareness and education regarding how to reduce the cost of production

Keywords: Milk production, dairy farms, Allocative efficiency, stochastic cost functions, Kerala India.

Introduction

Dairying is an essential activity in the Indian economy, contributing to 4.6 per cent of the national Gross domestic product (GDP) by Datta (2018). The Milk production in India has increased from 55.6 million tones (1991-92) of output per year (1991-92) to 176.3 million tones (2017-18) of production per year (Basic Animal Husbandry Statistics-2019). The country is now self-sufficient in milk and exports dairy products. The dairy sector has a very crucial role in ensuring food security by reducing poverty at the same time and involvement in dairying activities creates many employment opportunities. The Indian economic survey for the financial year 2017-2018 showed the fall in the growth rate of agriculture and its allied sectors by 2.1 from 4.1 per cent by Datta (2018). This is because many farmers exit from this sector, due to the high cost of production. Kerala is a state in India, famous for its eco tourism and back waters. It's situated to the west of Arabian Sea.

The Cooperative systems in India have a long history. They have been supported majorly by the government and international donor agencies as a way to improve the income of the farmers. Especially Dairy Cooperative Societies (DCS) have been promoted by the Government of India (GOI) since the 1960s. The dairy cooperative in India is known as the Anand Pattern Co-operative society, which is popularly known as APCOS. It functions mainly as a collection point of milk produced in villages (National Dairy Development Board, 2017). At the DCS level, the milk poured by the farmer is tested for fat percentage and payment is made accordingly at a weekly or fortnightly basis through bank transfer, which was a recent development as part of Digital India. At the second tier, DCS are linked to district cooperative unions which are engaged in processing of milk and packaging of final products. The cooperative society usually provides subsidy services to the

producers, such as cattle feed, artificial insemination and veterinary services (Department of Dairy development Kerala)

The liquid milk represents the most prominent product segment in Kerala, accounting for more than 71 per cent of the entire market share. (Dairy Industry in Kerala: Market Size ,2020). The milk production in Kerala is not showing a static growth; it's increasing in a very slow phase. In 2006-2007, the production was 21.9 million metric tons per year, and in 2017-2018 it rose to 25.70 million metric tons. (Basic Animal Husbandry Department, 2019). The cost of milk production in Kerala is very high compared to other states of India, mainly due to non-availability of feed, high price for feed and non-availability of hired labours for engaging in this activity. This affects milk productivity. The annual hike in feed, animal health issues and weak and inefficient marketing systems are contributing to these productivity problems.

In developing countries like India, it is useful for policymakers to estimate the efficiency of agricultural production. The notion of economic efficiency brings out a theoretical base for such estimations (Russel & Young, 1983). Measurement of efficiency in any industry is to analyse the relative performance of plants or firms within the industry and thereby to give a structural picture of the sector (Farrell, 1956). An inefficient firm is one which is not reducing its average cost and misusing all the inputs, because it is not producing the maximum attainable output from the given quantity of inputs by Bauer et al (1998).

Frontier cost functions have been applied to farm level in many developing countries, to estimate their cost efficiency of milk production. These results have yielded many useful results and suggestions for improvement (Coelli, 1996).

The stochastic cost function is a parametric stochastic approach, which is used to measure allocative efficiency.

In spite of the efforts made by the Kerala Government and Kerala Dairy Development Board for the improvement of milk production in the country, the dairy farmers still face high input cost in the milk production coupled with low milk procurement price offered by the dairy cooperative society. The problems mentioned above will reduce profit margins. There is a need to estimate the allocative efficiency of milk production in Kerala.

The primary purpose of this study is to estimate the allocative efficiency of milk production in Kerala by applying the stochastic frontier methodology. The study aims to test the following hypothesis

H1= Allocative efficiency is the same across the different farm sizes.

Materials and Methods

The study is conducted among the Kerala dairy farmers, who are registered under Kerala Co-Operative Milk Marketing Federation (MILMA). A sample survey of 300 commercially dairy producers was selected. Out of 14 districts in Kerala, six districts were selected randomly. From each district, 50 dairy farmers were interviewed. The farmers were divided into small (1 to 4 milch animal) medium (5 to 6 milch animal) and large (greater than six milch animals) farmers based on a number of milch animal holdings by Binita et al 2016). Following table shows the number of dairy farmers interviewed for the study based on their milch animal holding.

Table 1: Farm groups depending on the number of milch animals

Farmer Group	Number of Milch Animal	Number of Sampled Framers
Small Farmer	1 – 4	273
Medium Farmer	5-6	9
Large Farmer	Greater than 6	18
Total		**300**

Source: Prepared by the author

The survey was conducted during the month of September to December 2019. Through personal interviews, data's were collected. For the collection of socio-economic characteristics, input prices, amount of milk produced and other related aspects, a structured questionnaire was designed.

Based on Farrell's theory, there are two methods to use for the estimation of efficiency; one is stochastic production frontier method (Meeuseen and van den Broeck, 1977) and the data envelopment analysis by Charnes et al (1978). The paper has used stochastic cost function and one way ANOVA tests to run the hypotheses.

Theoretical Framework

The efficiency is considered as one of the most critical issues in agricultural production economics. It is always measured by comparing the actually attained production value against what is attainable at the production frontier. The economic efficiency or overall efficiency is divided into two forms technical and allocative efficiency (Farrell, 1957). Technical efficiency is considered as the production function, in terms of maximum output that can be obtained from a specified set of inputs using the existing technology available to the farm by Battese et al. (1995). Allocative efficiency is the ability of the firm to allocate its input bundle at a given level of output in the most cost minimizing way. Thus an allocatively efficient level of production is where the farm functions at the least cost combination of inputs. Estimation of allocative efficiency is fundamental due to the increasing cost of production. This has been estimated using a Cobb-Douglas stochastic cost function. The study considers the value of milk produced as the dependent variable and all other inputs as the independent variables which work for the production of milk.

The model specified in this study is expressed as

$C = f(X_1, X_2, X_3, X_4, X_5)$

The empirical form of the model was expressed as:

$C = f\,(X_{green\ feed\ costs}, X_{dry\ feed\ costs}, X_{concentrates\ costs}, X_{labour\ \mathrm{cost}}, X_{veterinary\ cost})$

The Cobb-Douglas stochastic cost function was elucidated as follows:

$C = \beta 0 X_1^{\beta 1} X_2^{\beta 2} X_3^{\beta 3} X_4^{\beta 4}\ X_5^{\beta 5}\ e^{v-u}$

Taking the natural logarithms of both sides, the log linear form of the cost function used becomes:

$\ln C = \beta 0 + \beta 1 \ln X1 + \beta 2 \ln X2 + \beta 3 \ln X3 + \beta 4 \ln X4 + X5\beta 5 + (vi - ui)$

Where:

lnC = natural logarithm of the value of milk production

lnX1 = natural logarithm of the total cost of green fodder used in each farm

lnX2 = natural logarithm of total cost of dry fodder used in each farm

lnX3 = natural logarithm of total cost of concentrates used in each farm

lnX4 = natural logarithm of total cost of labours

lnX5 = natural logarithm of total veterinary cost

($\beta 0$, $\beta 1$, $\beta 2$, $\beta 3$, $\beta 4$and $\beta 5$= are unknown parameters to be estimated

(vi - ui) = e = stochastic error term

Results and Discussion

The main characteristics of the sampled dairy farms average characteristics shown in Table No 2.

Table 2: Average statistics of the characteristics of sampled dairy farms

Variables	N	Minimum	Maximum	Mean	Standard Deviation
Value of milk production	300	21.54	10440	940.2911	1174.20
Milch Animal (Number)	300	1	18	2.58	2.492
Experience of farmer (years)	300	1	50	17.31	10.360
Age of Farmer (Years)	300	27	80	55.37	9.344
Education of farmer(Years)	300	0	17	9.35	4.18
Green fodder Cost	300	0	3600	120.40	281.23
Dry Fodder Cost	300	0	1450	60.68	122.47
Concentrates cost	300	0	16915	499.46	1112.94
Veterinary Cost	300	1500	51500	7918.4	4932.71

Source: Computed from primary data

The average age of the sampled farmer is 55 years with average education is nine years and of 17.31 years of experience. The average value of green fodder, dry fodder, concentrates and veterinary cost are 120.40, 60.68, 499.46 and 7918 Indian rupees per day.

Maximum likelihood estimates of the Cobb Douglas cost functions.

The Table No. 3 (shown below) depicts the maximum likelihood estimates of allocative efficiency, where the value of green fodder, the value of concentrates and veterinary cost shows a positive and statistically significant, which implies it has a direct relationship with the value of milk production. Any 1 per cent increase in the independent variables, will give rise to .27 per cent, .34 per cent and .25per cent increase in the value of milk production. This is the situation of relatively inelastic. The value of dry fodder and labour cost shows a negative sign, which implies that there is an indirect relationship between independent variables and the value of milk production. Any 1 per cent increase in these variables reduces the value of milk production by .46 per cent and .44 per cent and proves statistically insignificant at 0.05. The mean efficiency is only 61.3 per cent with a minimum of

11.9 per cent and a maximum of 91.5 per cent level of allocative efficiency. The variance ratio is .81, which implies 81 per cent of the variations (difference between observed and maximum attainable value of milk production) in the model is under the control of farmers, rest all relates to the random error. So this implies that there exists an allocative inefficiency in the model that is more of under the control of farmers.

Table 3: Maximum likelihood estimates of cob Douglas cost function of the sampled dairy farmers

Variable	Parameters	Co-efficient	Standard Error	t-value
Constant	B0	.1814	.7011	.258
Green Fodder cost	β1	.2756	.4266	.6460**
Dry Fodder Cost	β2	.4643	.24739	.187
Concentrates Cost	β3	.3460	.3769	.918**
Labour cost	β4	-.44899	.7610	-.580
Veterinary cost	β5	.2566	.683	.375**
Variance ratio	.81			

*Source: Computed from primary data, **significant at 5 percent level*

Distribution of Farm Level Allocative Efficiency

Table 4: Distribution of the farm level measures of allocative efficiency.

Allocative Efficiency percentage	Number of farmers	Percentage
Less than 20	5	1.67
20-29	9	3
30-39	22	7.33
40-49	33	11
50-59	57	19
60-69	62	20.67
70-79	85	28.33
80-89	24	8
90-99	2	1
Total	**300**	**100**

Source: Computed from primary data

28.33 per cent of farmers having their allocative efficiency level between 70-79 per cent, followed by 20.67 per cent of farmers having efficiency level of 60-69. Only 1 per cent of the entire samples have an efficiency level of 90-99. That implies that only 1 per cent of the entire sample is working or functioning closer to the cost frontier.

The above table is shown as graph here

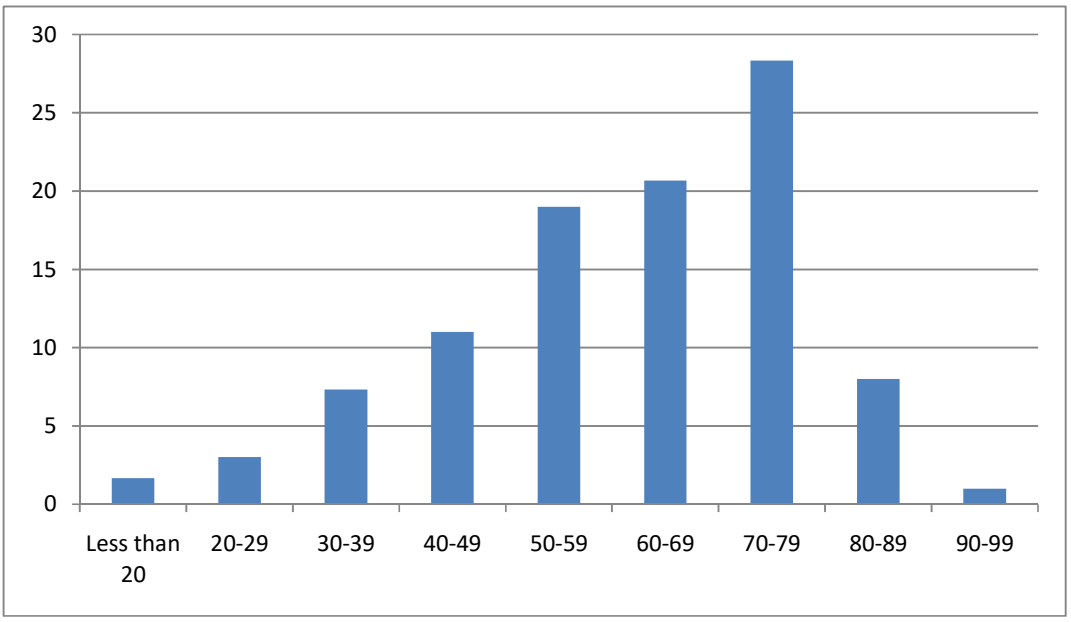

Source: Computed from Table No 4

Graph 1: Allocative Efficiency scores of the sampled dairy farmers

Hypothesis Testing

Hypothesis 1

H0= Allocative efficiency is same across the farm sizes

Table 5: ANOVA Results

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3419.162	2	1709.581	6.693	.001**
Within Groups	75864.855	297	255.437		
Total	79284.016	299			

Source: Primary Data

A statistically significant difference between the groups is proven by one way Anova. The p value is less than 0.05. The allocative efficiency is not same across the farm sizes. The null hypothesis is rejected, stating that the allocative efficiency is different across the sample districts. The larger farmers are more allocatively efficient than small and medium farmers. When the amount production is large, the cost of production will come down.

Conclusion

The study estimates the allocative efficiency of dairy farmers in Kerala state of India using stochastic cost functions. It indicated that the allocative efficiency of milk production is very low. The mean efficiency was estimated to be 61.3 per cent. Dairy farms have the potential to increase their efficiency by 38.7 per cent. It's also revealed that allocative efficiency differs across the farm sizes. Through proper education and training, the cost of production can be reduced; therefore, allocative efficiency can be achieved. The dairy farmers should minimise the use of labour cost and dry fodder.

The allocative efficiency is not the same across the farm sizes. The small farmer can be more efficient than medium and large farmers due to the less cost of production compared with medium and large farmers. There should be a proper education and training should be given concerning the use of inputs for the production.

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The Role of Case Technology in Training Graduates with Modern Competences

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Abstract

In the article the authors point out the difficulty in developing cases in natural sciences, in particular in chemistry. The proposed case "The Problem of Water in the River" is one of the first developed cases on analytical chemistry in the Uzbek language. Case was tested in analytical chemistry classes. During the work, an increase in students' interest in completing assignments on the case was observed. The importance of the developed case in the acquisition of modern knowledge, skills and abilities of graduates is analyzed. A survey of students shows that students are more inclined to perform the experiments described in the cases than traditional laboratory experiments.

Keywords: Case Study, Analytical Chemistry, Education, Graduate, Knowledge, Skills, Competence.

Introduction

It is well known that employers now impose requirements on higher education institutions on how graduates can be effectively trained and adaptable in the rapidly changing world (Aleksandrov et al., 2015; Zakharova et al., 2019). These include communication skills, teamwork, the use of information and communication technology (ICT), and the ability to work independently on their own (Morova, 2017). In this context, it is important to apply cases in analytical chemistry to graduates of educational fields, including chemistry, chemical technology, oil and gas processing technology, food industry technology, petrochemical industry, ecology, biology. This is due to the fact that graduates of this field must possess the necessary knowledge, skills and competence (KSC) for conducting theoretical and laboratory experiments in order to solve practical problems. The ability to work in a team and with clients is defined as a key factor in hiring.

Therefore, we need to go deeper into the issue of training graduates who will work at a professional level (Erdyneeva et al., 2016; Drovnikov et al., 2016). To do this, we need not only to teach them basic chemical knowledge, relevant practical skills and skills for solving elementary problems. We need to train graduates in analytical and critical thinking skills, apply knowledge and information in the field of chemistry to solve unusual or multiple problems. In addition, a modern graduate must possess KSCs of teamwork, time and information management, independently acquire knowledge and apply ICT.

Method

It is well known that in many disciplines, cases are used to achieve the aforementioned KSCs. For the first time in the 1970s, the medical department of McMaster University began to use case technology in teaching medicine. The method is to group students into small groups and instruct them. Students were given very little information from the patient's medical history, and based on the information provided, it was necessary to determine what they know and what they don't know. Students then worked with literature to find the answer. After exchanging their ideas, they was sent back to work with literature. Next time, students draw conclusions on the case, and the work on the cases was continued (Herreid, 1997).

Since the mid-1990s, the University of Delaware introduced problem solving methods for graduates, and faculty members at Buffalo University began to design and use case studies in rigorous selection.

According to Herreid et al. studies 90% of teachers who use cases in the process of teaching biology and biomedicine, the rest are physics, geology, engineering and chemistry (Herreid et al., 2011). In our opinion, the limited use of cases in chemistry can be explained by the fact that it is difficult to create cases in general chemistry, as well as the difficulty of using cases to explain chemical laws.

As it is known, the intensive use of cases in chemistry began after the 2000s. So far, examples in chemistry and other natural sciences can be found in several Internet resources (National Center; PBL Clearinghouse; CASES Online). Among them – Buffalo University is one of the first institutions in the chemical sector, which first developed and implemented cases in the educational process.

However, it should be noted that chemistry has specific points in the development of cases. Nevertheless, for the development of cases, one can use interdisciplinary relations with such subjects as ecology, manufacturing, pharmaceuticals, medicine and etc. In our opinion the science that covers all this subjects is analytical chemistry or methods of analysis.

We have developed a case (Niyazov, 2017a; Niyazov, 2017b) that has aspects and components of analytical chemistry that are closer to real life, combining ecology, biology, and medical sciences. The case is called "The Problem of Water in the River". It describes the fictitious situation of an environmental disaster in the river with the mass extinction of fish in the winter. For this, each group of students is tasked with "investigating" the same "incident". In the process of solving the case, students were provided with additional information on specific issues (Niyazov, 2017a; Niyazov, 2017b). Corresponding reports and statements of various organizations and authorities were attached to the cases we developed. KSCs related to analytical chemistry and analysis methods were evaluated: sampling procedure, methodology for working with samples and in the area; identification of experimental errors; analysis methods; determination of the cause of fish extinction.

The case was provided to students in parts, 2-4 hours to complete each stage, depending on the degree of difficulty. For independent performance of experiments under the supervision of a laboratory assistant, it took about 3-4 hours. When dividing into groups, students distributed responsibilities among themselves to the leader of the group, who is responsible for collecting additional information necessary to solve the case and prepares the presentation of the case. The remaining members choose features such as speaker, critic, etc. Necessary experiments and analyzes are carried out by all students.

In the first stage of the case, students are provided with a map which shows where the fish was found. In addition, there are interviews of journalists with fishermen and the local population. At the same time, students must report where and how they will take samples and the number of samples based on the

information received (the number of samples is limited) and their assumptions in the form of reports. After writing the reports, students are given a description of the samples taken by environmental experts.

In the second stage, students discuss the results of their experiments. Groups should draw appropriate conclusions from the analysis. In the third stage, students are given another opportunity to obtain additional samples, and they will be presented with the results of a chemical analysis of the requested samples. Based on the information received, they must draw final conclusions.

At the final stage, students will make a brief presentation of all the information and conclusions that should be based on evidence and examples. The presentation should explain the group's chosen strategy, actions, causes of the environmental incident, and the functions of the group members.

Results

Evaluation of the results: a) experimental methods - 30%; answer to the questions of the case - 30%; oral presentation - 30%; question and answer 10%; b) conducting the experiment - 30%; writing a one-page report - 40%; oral presentation - 30%.

Previously, we developed a mini-case "Highlands" on analytical chemistry, which was tested during practical and laboratory studies of second-year students in the areas of "Chemical Technology" and "Professional Education: Chemical Technology". The case was tested in for 4 hours.

This method was considered new to both students and teachers. Students were asked to compare case study method with traditional practical and laboratory exercises and to answer the questions, taking into account the relevance, interest and educational aspects of the case and evaluate them on a scale of 1 to five: agree (5), partially agree (4), neutral (3), partially disagree (2) and disagree (1). A total of 122 students took part in the survey.

The conducted survey shows the following indicators on the questions asked, respectively, 1) Case study helped to better understand the work experience compared to traditional laboratory classes - 4.8; 2) Case has made the experimental work more "fun" than traditional lab classes – 4.5; 3) Case showed that chemical experiments are associated with real life compared to traditional laboratory activities - 4.7; 4) Case helped me learn more - 4.3; 5) I was very impressed with the new method and nontraditional analysis - 4.4.

The survey results show that most students prefer to conduct case experiments than standard and traditional laboratory experiment methods.

Conclusion

The purpose of this study was to facilitate students' understanding of analytical chemistry of various topics and to relate them to practice. In this case, students will have the opportunity to practice what they learn, which will motivate them. The presentation and storytelling of real-life situations encourages students to solve new and unusual problems, in contrast to traditional issues. In the future, the graduate will have the opportunity to easily apply the skills that he acquired during the course of work in case of unusual problems.

Thus, cases in analytical chemistry allows students to work independently, develop analytical methods, make decisions in unusual situations, develop analytical thinking, work with literature, process data and information; identification of errors in the analysis, as well as stimulating research.

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The Use of Kano Model During The E-Shop Service Design - Case Study

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Abstract

Now it is something normal to shop online. People can do it from any place, at any time they want. They can check opinions of other customers or competitive e-shops and their products. There is a lot of competition on the e-commerce market. New e-shops appear practically every day. To gain customers and be competitive on the market, a new e-shop must design its services in proper way. One of the tools that can be used in this case is the Kano model. This method helps to classify attributes into groups, e.g. indicate the features that must be considered to convince a customer to buy in a given e-shop or those which can affect his satisfaction. The purpose of the paper was to use the Kano model to classify the e-bookstore's features, in particular the website's features and the sales process through this website. The research part of the paper presents a practical example of using Kano models - case study of the e-bookstore.

Keywords: Kano Model, Customers' Satisfaction, Service Design, E-Commerce.

Introduction

More and more often customers choose to shop without leaving home. In the market of online shops there is a lot of competition, but also customer requirements for the operation in such e-shops are completely different from the traditional one. Therefore, before to open such an e-shop, it is necessary to know both of these elements.

It should be remembered that in order to follow the global trend of satisfying the needs of customers in e-commerce, enterprises must provide high-quality services over the Internet. Knowledge about how to build good relationships and get customer loyalty through the Internet has become an important problem in e-commerce between businesses (Wu, 2010, Klimecka-Tatar, 2018).

The first stage of the pre-production phase of the product is its design. This is an important stage from the point of view of both the enterprise and the customer. Customers' requirements are the ones that should decide on the parameters of products. It should be emphasized that customers' requirements are constantly changing (Pacana and Ulewicz, 2017; Pietraszek, 2013; Kadłubek, 2016) which means that potential future demands should also be predicted and considered. The design phase allows determining the level of product quality which can cause that the customer will buy the product and then will be satisfied with it (Fiorenzo et al., 2017; Kowalik and Klimecka-Tatar, 2018; Violante and Vezzetti, 2017; Knop, 2019).

A specific situation is the opening of an e-shop. Legal provisions relating to online shopping differ from the provisions relating to the traditional one due to the fact that the customer is unable, watching

product only online, to evaluate its quality, and the quality of the sales service. Therefore, the customer of the e-shop has e.g. an extended deadline for return of the product in case if it does not fit or does not meet his requirements. Customers often seek for information, comments on shopping in a specific e-shop. A satisfied customer can share his opinion about shopping, but also can again buy something from the same e-shop. Therefore, for the seller's of the e-shop, quality of the services it provides should be important (Ingaldi and Ulewicz, 2018).

There are different methods and tools, that can be used to understand customers' requirements and asses services quality. Most of them are base on surveys or direct interviews. The Kano model is very specific method because it can be used not only to assess the quality of product, but also to design it. What is more, the Kano model corrects for customer experience bias and computes the non-linear impact of service elements on customer satisfaction. It is to find out the customers' affection towards products and services through questionnaire and then based on the information as references to improve the customers' satisfaction (Kano et al., 1984; Chen, al., 2015).

The purpose of the paper was to use the Kano model to classify the e-bookstore's features, in particular the website's features and the sales process through this website. This study made possible to indicate what attributes should be included so the research e-bookstore will become competitive in the market. The research object is a family enterprise which headquarter is located in the south of Poland, and which is organizing its services and designing a website through which it will sell books and magazines.

The survey presented in the paper is universal tool that allows to design, but also assess the level of quality of the chosen e-shop, and thus customers' satisfaction. Without problem it can be used or modified by other scientists for similar researches and be used in case of other types of e-shops.

Literature Review

Quality of the E-Commerce

Along with social progress and an increase in consumption, people look for personalized products and services, various e-commerce elements for this purpose have been created. According to Michałowska et al. (2015) the existence within the Internet has become a necessity. With the development of the Internet the importance of electronic commerce (e-commerce) has grown. Lots of Internet shops appeared, almost every enterprise has own website. But also there is a change from the side of customers, they often decide to make shopping online.

E-commerce is a way of modern business, which addresses the requirements of business organizations. It can be broadly defined as the process of buying or selling products with use of an electronic medium such as the Internet (E-commerce. Electronic Commerce Approach; Ingaldi and Ulewicz, 2018). E-Commerce includes a number of innovations that make life easier (Kaya and Aydin, 2019). The better data security increases customer's trust in e-commerce transactions (Purnamasari et al., 2019). The most important e-commerce enterprises are: amazon.com, ebay.com, alibaba.com, Netflix.com, dell.com, staples.com, betbuy.com, apple.com, groupon.com, snapdeal.com, flipkart.com, grofers.com, and makemytrip.com.

E-commerce gives customers a lot of freedom and privacy, because they use the Internet to shop for products, agree on different product models, evaluate prices, and compare satisfactory comments of other customers (Sarker, 2016). The trade ban on Sunday had a major impact on increasing online commerce in Poland. Due to the Internet, the customer can shop at any time of the day, every day of the week, from any place with access to the Internet, without a queue. The customer can use the services of companies that are very far away, which means that e-commerce can cross the borders, so the customer has a greater choice and access to a wider range of products.

What's more, the Internet also gives greater trade opportunities to enterprise. An e-shop can refer its services to customers from various countries, including those furthest. The world has no limits when it comes to e-commerce, it can affect the price and shipping cost. The only problem is the language barrier but with different translators available online easy to omit.

E-service quality is a fundamental determinant that affects enterprises' long-term success (Bressolles et al., 2015; Carlson and O'Cass, 2011). As mentioned earlier, thanks to the Internet, customers have easy access to information and opinions of other customers about a given e-shop, as well as to services and products of competitors. That is why the e-service quality is so important. An enterprise that decides to use the online shopping channel must carefully examine the customers' requirements for its operations, take them into account when designing the services it offers, but also must follow the opinions and assessments of the customers who have used its services to constantly improve itself.

Kim (2019) collected information on the characteristics determining the quality level in e-commerce, analyzing the rich literature of the subject. An example of a list of features according to different authors is presented in Table 1. Among the authors, it is possible to find both similarities and differences.

Table 1: Features that determine quality in e-commerce (Kim, 2019)

Authors	Features
Bauer et al. (2006)	Functionality / design, joy, process, reliability, speed of reaction
Collier and Bienstock (2006)	Process dimension (functionality, information accuracy, design, privacy, ease of use); result size (order accuracy, order status, timeliness); dimension of recovery (interactive fairness, procedural honesty, fairness of results)
Ghosh (2018)	Efficiency; system availability; fulfillment; privacy
Francis (2007)	Transaction on the website; supply; customer service; security
Kim et al. (2011)	Convenience; customization; protection and privacy; website look; the value of entertainment
Mummalaneni et al. (2016)	Efficiency; system availability; fulfillment; privacy
Parasuraman et al. (2005	Efficiency; system availability; fulfillment; privacy; responsibility; compensation; contact
Piercy (2014)	Trust; company interface; fulfillment of the service
Prateek (2017)	Protection and privacy; website design; reliability; responsibility; information
Swaid and Wigand (2009)	Quality of information; website usability; reliability; responsibility; certainty; personalization
Wiedmann et al. (2009)	Website design; fulfillment / reliability; privacy / security; customer service
Zhang et al. (2015)	Convenience; accuracy of information; security; functionality

Kano Model

There are many features that can affect the quality of product or service and that result from the customers' requirements. Meeting these requirements is very important element of the quality management (Kotus et al., 2013; Kardas et al., 2017; Pribulova et al., 2011). The enterprise must identify the most important features according to customers and make sure that they are included in the product or service.

One of the tools that can be used to design products and services and assess their quality is the Kano model. It allows for the examination of relationships between the attributes of products or services

and the level of customers' satisfaction. The Kano model was created by a Japanese professor Noriaki Kano in 1980. He proposed the Attractive Quality theory, with its major assumption being the concept of the division of attributes or features of products and services that are perceived and appreciated by the customer (Conti, 2004; Kano et al., 1984; Ingaldi et al., 2018).

There are attributes that the customer considers necessary, as well as not expected. The Kano model proved to be extremely useful, as it allows understanding better the concept of quality. It also helps to find the source of customers' satisfaction (Ulewicz, 2016; Berger, 1993). It should be underlined that the Kano model can be used in case of products and services, but also during design stage and to assess the quality of the produced products and services.

The starting point in the Kano method is skillful management of features that evoke specific emotions in such a way as to meet the expectations and needs of the customers in a way that is adequate to these needs and expectations. Quality is rooted in the emotions of the person who ordered the product or service and expects proper results of work.

The Kano model predicts that each customer should be treated very individually, and satisfying his needs will be assessed subjectively. Everyone has different expectations, different needs, and draws attention to the aame factors. When designing new products or services, it is necessary to understand the essence of quality that is perceived by customers. It turns out that often external features do not have much in common with objective quality (Brajer-Marczak, 2015).

With the Kano model, it is possible to show that not all components of products are similarly important from the customers' point of view. Noriaki Kano categorized attributes into five groups (Lampa, Mazur, 1996; Antony, Preece, 2002; Webber, Wallace, 2007; Ingaldi et al., 2018):

- "Must-be" attributes, which must be contained in the product and service as a standard. Lack of these features can lead to losing the customer. Example of the "must-be" feature in case of the e-commerce and bookstore can be information about the enterprise. Every customer wants to know who the service provider is.

- "One-dimensional" attributes have the greatest importance to customer satisfaction from a product or service. It is critical that meeting this type of attributes is almost proportional with the level of customers' satisfaction, which can translate into the frequency of purchasing the products or using the services. Problems with meeting "one-dimensional" attributes reduce customers' satisfaction. However, this does not progress as fast as in case of the "must-be's". In case of "one dimensional" attributes the assortment diversity can be mentioned. The bigger assortment is, the wilder choice the customers have which influence their satisfaction.

- "Attractive" attributes have to attract the customer to a product or service. Popularity of these attributes is short-term and can be turned into the "must-be's" or disappear. Improperly designed "attractive" attributes can pass unnoticed. Their lack does not have an effect on customers' satisfaction but it may lead to the lack of his or her interest (if the customer is susceptible to continuous making the offer attractive). Here we can mention discounts and promotions. Customers often search for cheaper product.

- "Reverse" attributes occur when the customer prefers absence of the attribute and does not like its presence. More such attributes in the service or product leads to a greater customer dissatisfaction. Many customers do not want to pay before the packs arrive to them. So "payment before delivery" can be treated as "reverse" by many customers.

- "Indifferent" attributes do not impact on customer satisfaction. The color of the website or its style for many customers can be indifferent.

- Contradiction: occurs in the case of the Kano method. It is the attribute which was assessed as functional or non-functional in both forms of questions.

Therefore, the analysis should be conducted to indicate the attributes of a product or service which are important for customers, can cause their satisfaction or dissatisfaction and are neutral. A traditional approach to quality used to assume that customers' satisfaction is directly proportional to product functionality, i.e. the less functional the product, the more satisfied the customer and, the more functional product, the less satisfied the customer. This characteristic is one-dimensional. The "must-be" attributes point to the aspects where the customer is more dissatisfied if the product is less functional but when the customers' satisfaction never increases above neutral, regardless of how the product functions. In case of "attractive" attributes it is indicated that the customer is more satisfied if the product has a particular characteristic but is not dissatisfied if the product lacks an attribute (Keshavarz, 1993; Ingaldi et al., 2018; Shen et al., 2000; Sauerwein et al., 1996; Basfirinci and Mitra, 2015).

The Kano method is used in the form of a special type of the questionnaire. This questionnaire contains positive and negative versions of statements/questions that refer to the attributes of a specific product (Wolniak, Skotnicka, 2008; Velikova et al., 2017). Evaluations of these statements (answers if these questions) are based on the following scale: a) "I like it", b) "That's the way it has to be", c) "I don't mind it", d) "I can put up with it", e) "I don't like it". Analysis of the results is based on the individual types of attributes contained in the questionnaire using the comparison presented in Table 2.

Table 2: Type of attribute in the Kano method (Wolniak, Skotnicka B, 2008; Bakhitar et al., 2015)

		Negative				
Positive		I like it	That's the way it has to be	I don't mind	I can put up with it	I don't like it
	I like it	Q	A	A	A	O
	That's the way it has to be	R	I	I	I	M
	I don't mind	R	I	I	I	M
	I can put up with it	R	I	I	I	M
	I don't like it	R	R	R	R	Q

Notes: A – attractive; O – one-dimensional; M – must-be; I – customer was indifferent to the attribute; R – customer did not like the attribute; Q – there was a contradiction: customers both wanted the attribute to occur and not to occur.

The Kano survey is based on marking the features perceived now and in the future. The customers' task is to determine their attitude to the occurrence, as well as to the absence of a given feature. There is a very big difference between these two variants. In the first, the attribute is present in the service (positive version), in the second - is no included (negative version). The collected information creates a peculiar combination that allows the results to be interpreted.

It is claimed that the Kano model is dynamic, thus not subjected to the continuous evolution while this concerns in particular the "attractive" attributes as they become a standard after some time (Nilsson-Witell and Fundin, 2005). Customers tend to get accustomed to good products and their attributes. Therefore, it is necessary that the enterprise should invest in research and development so that innovative solutions will endear the enterprise to loyal customers.

The customers' assessments, that were given in the Kano questionnaire, are helpful in calculating two important indicators, i.e. customer satisfaction and dissatisfaction indexes (Keshavarz, 1993):

$$satisfaction\ index = \frac{A + O}{A + O + M + I} \quad (1)$$

$$dissatisfaction\ index = -\frac{O + M}{(A + O + M + I)} \quad (2)$$

The minus sign is added to the dissatisfaction index (equation 2) in order to emphasize the negative effect on customer perception if the product quality is not met. The satisfaction index is in the range of (0; 1). If the value is close to 1, customer satisfaction is very high. It is also important that negative values of satisfaction (dissatisfaction index) should be examined. If the value is close to -1, customer dissatisfaction is very high (Ingaldi et al., 2018).

If the positive factor is higher, this means situation when customer satisfaction increases due to the "attractive" and "one-dimensional" attributes. If the negative factor is higher, this means the situation when customer satisfaction decreases (dissatisfaction increases) due to "one-dimensional" and "must-be" attributes. This interpretation is used in the case of product design (Keshavarz, 1993).

Methodology

The research was carried out with use of the previously described Kano questionnaire. Due to this, it will be possible to divide into groups the all characteristics that the e-bookstore should characterize according to the opinion of potential customers. The survey was created on the basis of previous studies presented in many scientific papers. A list of features that were taken into account when developing the action plan of the research facility is presented in Table 3. The set of features has already been selected and used on the occasion of other researches (Ingaldi and Ulewicz, 2018; Ingaldi et al., 2018; Ingaldi and Ulewicz, 2019).

Table 3: Part of the Kano questionnaire for the research e-bookstore - positive version of the features (own study)

No.	**Positive statement**
1	The website of the e-bookstore is well-organized and legible.
2	The information on individual books is current and comprehensive.
3	The Internet data of the e-bookstore is detailed.
4	The offer of the e-bookstore is current.
5	The offer of the e-bookstore is divided into logical categories.
6	The pictures of books have good quality.
7	The e-bookstore regulations is understandable and accessible.
8	The purchase process in the e-bookstore is detailed described.
9	The search engine is easy to use.
10	There is option to filter results.
11	There is option to remember the basket.
12	The ordering options are clear and easy to use.
13	The registration to complete purchases is required.
14	A customer can choose different payment methods.
15	A customer can choose different purchase methods.
16	It is easy to contact the e-bookstore in order to obtain additional information about the products.
17	It is easy to contact the e-bookstore in order to explain any inconsistencies.
18	It is possible to resign from the transaction before its implementation.
19	Delivery of goods is in accordance with the dates indicated on the website.
20	Tracking the shipment is possible.
21	Delivery of goods is at times convenient for the customer.

22	It is possible to refuse the parcel in case of any inaccuracies.
23	The financial transactions is effortless.
24	There is an opportunity to add an opinion about the e- bookstore.
25	The e-bookstore gathers information on the implementation of orders.
26	It is possible to return goods that do not meet the requirements.
27	It is possible to return goods damaged in transport.

The Kano questionnaire was sent to potential customers and made available in various social media. It was decided that min. 200 correctly completed surveys should be analyzed. The research was conducted in January - April 2019. 293 people took part. Respondents were asked to assess features of the research e-bookstore using scale of answers presented in Table 2. They had to do it twice: once when the feature is present (positive version) and once when it was not included (negative version). 257 completed surveys were taken into account for further analysis, the remaining ones were rejected because they were not completed properly (some answers were missing).

On the basis of the obtained responses, the number of answers of particular categories was checked for each features, taking into account the categories presented in Table 1. Then, for each feature, the most frequent category was indicated. Satisfaction and dissatisfaction indexes were also calculated and later located on map of the attribute, where the X axis is the absolute value of the dissatisfaction index, and the Y axis is the satisfaction index. Interpretation of the map is based on Table 4.

Table 4: Interpretation method (Keshavarz, 1993)

Distribution of response	XY Pair	Location on the graph of the point
All attractive	0;1	Top left corner
All one-dimensional	1;1	Top right corner
Evenly split between attractive and one-dimensional	0.5;1	Middle of the top, halfway between attractive and one-dimensional - point A
All must-be	1;0	Bottom right corner
Evenly split between one-dimensional and must-be	1;0.5	Middle of right edge, halfway between one-dimensional and must-be - point B
All indifferent	0;0	Bottom left corner
Evenly split between must-be and indifferent	0.5;0	Middle of bottom edge, halfway between must-be and indifferent - point C
Evenly split between indifferent and attractive	0;0.5	Middle of left edge, halfway between indifferent and attractive - point D
Evenly split among attractive, one-dimensional, must-be and indifferent	0.5;0.5	Exact middle of graph - point E
Evenly split between attractive and must-be	0.5;0.5	Exact middle of graph, halfway between attractive and must-be, without an influence of one-dimensional or indifferent - point E
Evenly split among attractive, one-dimensional and must-be	0.67;0.67	Equally spaced between attractive and must-be, but influenced by one-dimensional - point F

Results and Discussion

In Table 5 the main results obtained with use of the Kano questionnaire are presented. The type of features and satisfaction and dissatisfaction indexes were determined.

Table 5: Kano questionnaire results for the research e-bookstore (own study)

No	Number of answers in the category						Assessment of the attribute	Satisfaction index	Dissatisfaction index
	A	M	O	I	Q	R			
1	27	121	89	18	2	0	M	0.45	-0.82
2	23	76	142	16	0	0	O	0.64	-0.85
3	17	173	45	21	0	1	M	0.24	-0.85
4	51	71	119	13	2	1	O	0.67	-0.75
5	19	21	152	65	0	0	O	0.67	-0.67
6	47	36	101	72	1	0	O	0.58	-0.54
7	19	83	113	41	0	1	O	0.52	-0.77
8	96	16	24	121	0	0	I	0.47	-0.16
9	45	124	65	22	1	0	M	0.43	-0.74
10	22	89	44	102	0	0	I	0.26	-0.52
11	17	113	93	34	0	0	M	0.43	-0.80
12	91	24	136	5	1	0	O	0.89	-0.63
13	6	9	8	34	2	198	R	0.25	-0.30
14	45	111	98	3	0	0	M	0.56	-0.81
15	46	76	121	14	0	0	O	0.65	-0.77
16	23	134	86	13	1	0	M	0.43	-0.86
17	19	165	54	18	1	0	M	0.29	-0.86
18	81	9	119	48	0	0	O	0.78	-0.50
19	49	68	123	7	0	0	O	0.70	-0.77
20	123	44	76	14	0	0	A	0.77	-0.47
21	76	121	46	3	1	0	M	0.50	-0.68
22	82	53	103	9	0	0	O	0.75	-0.63
23	32	145	68	1	1	0	M	0.41	-0.87
24	22	25	86	124	0	0	I	0.42	-0.43
25	19	9	58	164	2	5	I	0.31	-0.27
26	21	156	69	11	0	0	M	0.35	-0.88
27	17	196	36	7	1	0	M	0.21	-0.91

Analyzing the results of the research presented in Table 5, it can be seen that customer responses were very diverse. It should be emphasized that in case of the e-bookstore, potential customers are a very wide group of people, regardless of gender, age or education. Many people buy books, it is often dictated by their profession, education, or just their way of spending free time.

Among the features there should be distinguished 11 "must-be" features, 10 "one-dimensional", 4 "indifferent", 1 "reverse" and 1 "attractive". When preparing the website of the e-bookstore and organizing the functioning of this enterprise, it should be remembered that all features that have been marked as "must-be" have to be considered in the final service. They should be treated as a standard. On the other hand, meeting the requirements defined as "one-dimensional" causes high customers' satisfaction. The greater their fulfillment will be, the more satisfied customers will be.

Potential customers indicated 4 features as neutral ("indifferent") attributes during the research. They were: the purchase process in the e-bookstore is detailed described; there is option to filter results; there is an opportunity to add an opinion about the e- bookstore.; the e-bookstore gathers information on the implementation of orders. It should be remembered that it is not worth investing too much in these features, because their occurrence and fulfillment will not affect too much customers' satisfaction. In this group of features, the presence of the feature: the purchase process in the e-bookstore is detailed described, is surprising. Everyone should know exactly how to shop in a given

e-store. Perhaps this is dictated by the fact that more and more people, more and more often use such way of shopping and do it automatically, without thinking. So they do not need explanation how to do it.

The feature: the registration to complete purchases is required, is reverse feature, that is, potential customers mostly do not want this feature in the case of the research e-bookstore. Customers often make singular orders, they do not want to create accounts, register, because it requires additional time and more customers' data.

As an "attractive" feature of the researched e-bookstore, potential customers have indicated feature: tracking the shipment is possible. This will be an additional advantage for customers, it may cause that a larger group of customers may decide to choose the service of the research e-bookstore. However, it should be remembered that this feature is available in the case of a supplier, not straight in case of the e-bookstore, i.e. it should be taken into account when deciding on a courier enterprise.

When analyzing satisfaction and dissatisfaction indexes, it can be seen that the dissatisfaction index in many cases assumed a value from the range (-0.8, -0.9). In the majority of cases such situation was noted in the case of "must-be" features. The highest value of this index was noted in the case of the feature: the purchase process in the e-bookstore is detailed described, i.e. the "indifferent" attribute.

In case of the satisfaction index, the highest value was noted for the feature: the ordering options are clear and easy to use. The lowest value was noted for the feature: it is possible to return goods damaged in transport, but also in the case of many other characteristics, this value was low.

In Figure 1 the map of attributes according to the Kano questionnaire was presented. This map was created on the basis of satisfaction and dissatisfaction indexes.

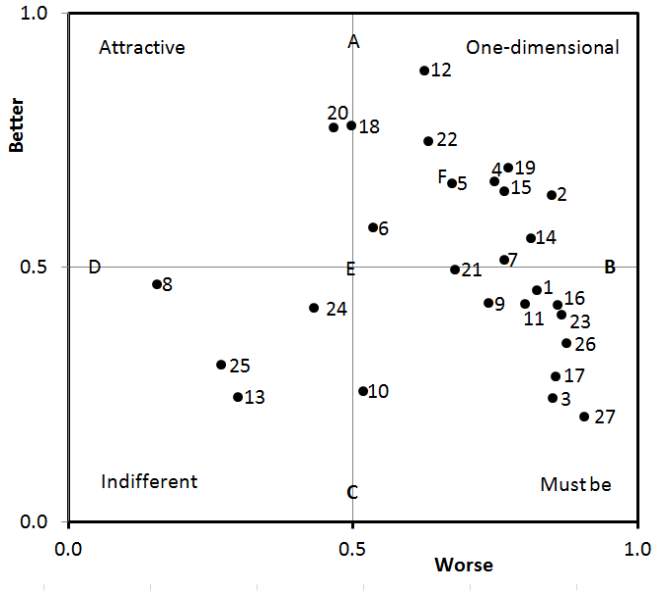

Fig. 1: Map of attributes according to the Kano questionnaire for the research e-bookstore (own study)

When analyzing Figure 1, it can be seen that the features are very scattered over the map of attribute. The left upper field of the map is almost empty, only point 20 (the feature tracking the shipment is possible) is in this field, and point 18 (feature it is possible to resign from the transaction before its

implementation) is located on the border of this field. Among all the features, it is impossible to find the one that a clear type of features (a very large predominance of the answer) would indicate a specific type of feature (map corners). This means a large diversity of responses among potential customers. Even if some points clearly moved towards points described in Table 4. Many points are located on the right side of the map (high dissatisfaction index).

Summary

Before opening business, any store, including an e-bookstore, managers should know the customers' opinion and ask them what features should characterize the products and service. This will allow precisely defining customers' requirements, and thus determine the quality of offered services. There are many methods that can be used in such situation. One of them is the Kano model. This method allows indicating which features must included in the service, which will cause customers' satisfaction, and which characteristics customers do not want. This method can also be used at a later stage of the service, to assess its quality level, to improve it, so it can be treated as a universal instrument.

In the case of the researched e-bookstore it was possible to indicate 11 "must-be" features, 10 "one-dimensional", 4 "indifferent", 1 "reverse" and 1 "attractive". Features marked as "must be" have to be included in the service as a standard, one-dimensional and attractive features will result in customers' satisfaction. However, 1 reverse feature, according to customers, should not be taken into account in the case of the research e-bookstore.

The research is not without limitations. The survey was created on the basis of the authors' experience and found references. Some important factors could be omitted due to the subjectivity of authors. Survey itself was quite long so some respondents could feel bored and filled it up without any will or at random. All results, despite their averaging, should be considered as subjective and with a wide range of tolerances (even in the case of the research e-bookstore).

This research contributes to the existing literature on service quality but at the same time it adds value because it offers a simple methodology that can be used in any type of e-shops. It should be emphasized that the survey may be modified for the needs of other type of e-shops as well as for the needs of various type or products. This paper shows that Kano model is quite easy but the same time very useful method that can be used by other scientist but also directly by different type of enterprises in similar research.

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Better Management of Rabies Using Innovative Statistical Tools

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Abstract

The aim of this paper is to illustrate how statistical tools can benefit healthcare policy makers specialised in the rabies management. Understanding the prevalence of such a disease is crucial for management teams. Seasonality may be a salient feature of data series provided by medical units, that is why the use of an innovative tool for seasonal adjustment is needed. For this paper the data series (number of person examined for rabies, by age and residency) were provided by one single health care unit – *The National Institute of Infectious Diseases "Matei Bals"*. Methodologically, the graphs of both series were analyzed in order to indicate the type of transformation needed: seasonality test and outlier detection. When seasonality detected, the data series were seasonally adjusted using JDemetra+ 2.2.2, a software recommended by Eurostat which incorporates TRAMO-SEATS and X13 procedure specifications. Following Hungarian Central Statistics Office's guidelines (2007), if seasonal variation is not changing along with the trend, then no transformation is needed; however if the seasonal variation is changing along with the trend, a log-transformation is necessary. The results of the analysis show that all the series display clear seasonal patterns and that should be log-transformed prior to seasonal adjustment. The only series that displayed outliers is the number of persons examined for rabies from Bucharest. JDemetra+ offers not only seasonality tests and an automatic procedure for seasonal

adjustment, but also a very useful tool for policy makers, the outlier detection tool, which could be used to evaluate in time different policies.

Keywords: seasonality adjusted data, outlier detection, JDemetra+, log transformation

Introduction

In the last 30 years, due to technological progress, the focus of development has been concentrated on the development of innovative tools for public health (Bos, L. and Blobel, B., 2007; Friede, A. et al. 1995; Baker, E.L. et al. 1995; Khan, A.S. et al. 2010). For this reason, investments in statistics tools for public health have also appeared, these being done by researches organizations or state governments (Lauren, N. Carroll et al. 2014; Driedger, S.M. et al. 2007; Kothari, A. et al. 2008; Robertson, C. and Nelson, T.A., 2010). One of the most widespread research topics has been in the surveillance and management of infectious diseases, mostly on pandemic risk cases (Hills, R.A. et al. 2008; Reis, B. et al. 2007; Chen, H. et al. 2010). One of the most important tools is to view the map or network through which an infection can be transmitted. In the 19th century, John Snow made the first map of London with cholera cases, but nowadays this task is for the computer science, according to Koch, T. and Denike, K. and Chen, H. et al. (2010). One such example is the dashboard created by John Hopkins University (2020). The usefulness of these technologies is also suggested by the significant increase in the last years on all PubMed articles of terms such as "GIS" (Geographic Information System) or "social network analysis" (Lauren, N. Carroll et al. 2014). In general, data are used to identify diseases clusters, how diseases are spread and predict the other outbreaks (AvRuskin, G.A. et al. 2004; Castronovo, D.A et al. 2009; Dominkovics, P. et al. 2011).

With the diversification of data, intelligent management is also needed. It raises the issue of integrating data from several sources, for example about mortality, clinical data (what vaccines a population has, their health status, etc.), geographic, relationships (name of family, name of students in a school, friends etc.), travel plans etc. (Gao, S. et al. 2008; Basta, N.E. et al. 2009; Polgreen, P.M. et al. 2010; O'Carroll, P.W. et al. 1998). Another important aspect is the legality of obtaining and processing this data (Lauren, N. Carroll et al. 2014).

According to World Health Organization (2020) a death caused by infection with rabies virus, transmitted in 99% of the cases by dog bite, occurs every 9 minutes, going up to more than 59,000 deaths annually, an estimation subjected to underreporting and uncertainty, and with 40% of the victims being children bellow age 15, predominantly in rural areas. The same organization claims that rabies is 100% preventable, if at least 70% of the dogs in a region are vaccinated against the virus, the transmission cycle is broken. Hampson et al. (2015) provided valuable insights, that due to national markets inefficiencies in promoting canine vaccination and post-exposure prophylaxis, by providing an estimation on the worldwide economic burden of contracting and treatment of rabies, incurring a direct loss of productivity, and death by rabies infection to 8.6 billion dollars, at 95% confidence interval: 2.9-21.5 billion dollars. This argument contradicts the 100% rabies preventability claimed by WHO. The same authors point out that the most affected regions are those subjected to extreme poverty, like those in rural India, which account for nearly 35% of the global death toll. A 2017-2018 study (Sreenivasan et al. 2019) across 23 Asian and African poorest countries which account for more than 90% of deaths by rabies infection, identified the main factors affecting access to post-exposure prophylaxis, from which we enumerate: limited availability at lower administrative levels, patients are required to pay, although the medical procedures are theoretically free, the lack of funds for a state-level prevention strategy for rabies infections and the lack of effective monitoring tools of potentially infected patients. To enhance national initiatives, WHO with the Food and Agriculture Organization and the World Organization for Animal Health made a commitment in 2015 to globally eradicate dog-mediated human rabies (2015). This initiative, along with all other public policies targeted at rabies prevention, make use of statistical tools ranging from simple descriptive statistics, like those used by WHO (2020), to raise awareness in among general public and for setting the public policy agenda, to more sophisticated instruments, such as decision trees (Anothaisintawee et al. 2018) or simulation models, providing a more robust decision support in selecting the optimal intervention route (Rattanavipapong, 2018). Based on these arguments, in this paper we propose a novel statistical approach in the statistical treatment of data pertaining to this subject-matter.

Broadly, the aim of this paper is to illustrate how statistical tools can benefit healthcare policy makers specialised in the rabies management. Managing such a disease means ensuring enough personnel, equipment, spaces dedicated to treatment as well as current supplies. In this respect, it is crucial for management teams of medical facilities to understand the patterns of the prevalence of such a disease. A critical component in understanding patterns in a data series with a frequency less than a year is exploring seasonality (Mirica et. al. 2019). Seasonally adjusted data are used in order to calculate growth rates between consecutive sub-periods of a year, therefore choosing the suitable techniques and tools for this process is extremely important (Mirica et al. 2016). In this respect, the specific objective of this paper is to analyse whether or not the number of persons examined for rabies present a seasonal component and, if seasonality is indeed present, to demonstrate the use of an innovative, easy to use tool for seasonal adjustment.

Methodology

For the purpose of this paper data on the number of persons examined for rabies at the National Institute of Infectious Diseases "Matei Bals" – Centre against rabies will be used. One should note that Toma and Mirica (2018) pointed out that the lower the aggregation level, the more statistically relevant is. In this respect, we consider that analysing seasonal patterns in the number of persons examined for rabies should be performed for data at health care unit. The data can be found at https://www.mateibals.ro/index.php/component/content/category/13-antirabic-statistici?layout=blog (accessed February 3, 2020) and resent the total number of persons examined for rabies, as well as by age (children and adults) and residency (Bucharest or not) from January 2015 to May 2019.

In order to seasonally adjust these series, the methodology proposed by Andrei et. al. (2019) will be used: the graph of each series will be analysed in order to have some insights with regard to the appropriate type of transformation; seasonality tests and outlier detection techniques will be performed for each series; in case seasonality is present, each series will be seasonally adjusted using TRAMO-SEATS and X13 procedure. In order to apply this methodology as efficiently as possible, JDemetra+ 2.2.2, software officially recommended by Eurostat will be used as it incorporates several seasonality tests, an outlier detection tool, a calendar tool as well as predefined specifications for both X13 and TRAMO_SEATS (Grudkowska, 2015). Moreover, JDemetra+ provides an automatic procedure for choosing the ARIMA model as well as other specifications of the seasonal adjustment model (Grudkowska, 2015). The appropriate transformation for the time series will be decided based on the guidelines of the Hungarian Central Statistical Office (2007) as follows: if seasonal variation is not changing along with the trend, then no transformation will be applied; however if the seasonal variation is changing along with the trend, a log-transformation with be performed. If the automatic procedure will select an different transformation compared to the decision taken based on the graphical inspection, the respective time series will be seasonally adjusted manually. With regard to seasonality tests, both for the initial series as well as for residuals, all tests available in JDemetra+ will be considered. However, when conflicting results occur, the autocorrelation at seasonal lags will be used (Mirica et al. 2016). Considering the time series length, each series will be tested as it is, as well as for the last 3 years (as suggested by UNECE (2012) to be the minimum length). In order to choose from TRAMO-SEATS and X-13 as well as from different series spans, the AIC will be used (as suggested by Andrei et al. 2019). Moreover, we will use a similar template for reporting the results as Andrei et el. (2019).

Results

Figure 1 displays the evolution of the total number of persons examined for rabies as well by age and area of residency. As one can observe, all the series display clear seasonal patterns. Also, one can observe that all series present a relatively constant trend with small changes in the magnitudes of the seasonal variations. Therefore, all series should be log-transformed prior seasonal adjustment.

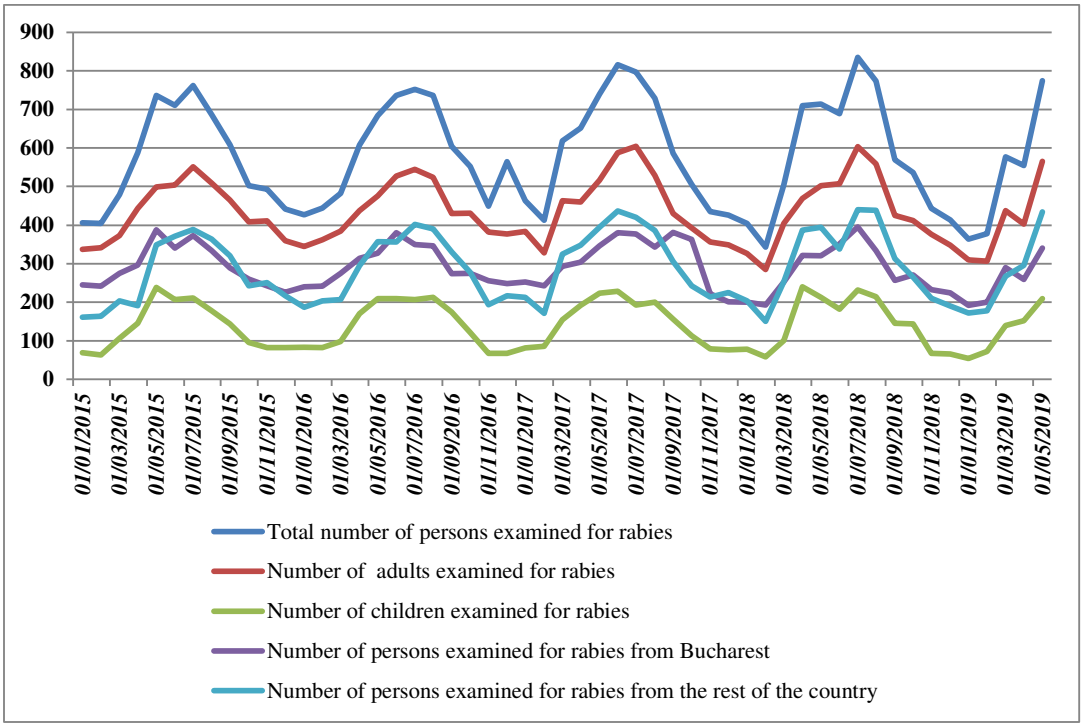

Figure 1: Total number of persons examined for rabies, by age and area of residency at the National Institute of Infectious Diseases "Matei Bals" – Centre against rabies, source: designed by the authors based on data available at: https://www.mateibals.ro/index.php/component/content/category/13-antirabic-statistici?layout=blog (accessed February 3, 2020)

Table 1 presents the results of the seasonality tests applied to the selected time series. As one can observe, all the tests showed significant results at 5% threshold. Therefore, there is clear evidence that seasonality is present within all the time series.

Table 1: Results of the seasonality tests (values), source: designed by the authors

	Total number of persons examined for rabies	**Number of adults examined for rabies**	**Number of children examined for rabies**	**Number of persons examined for rabies from Bucharest**	**Number of persons examined for rabies from the rest of the country**
Auto-correlations at seasonal lags	26.9616*	30.5531*	24.4507*	9.8962*	22.6700*
Friedman (non parametric)	34.0385*	32.3648*	30.2741*	23.1923*	31.0560*
Kruskall-Wallis (non parametric)	37.4222*	38.1203*	35.7401*	27.5289*	35.4409*
Periodogram	7.1820*	8.7425*	6.3620*	3.4066*	6.8584*
Seasonal dummies	39.8493*	34.3587*	39.7627*	16.7055*	15.3209*

**P-Value lower than 5%*

Next, all the series were analysed using the outlier detection tool in JDemetra+. The only series that displayed outliers is number of persons examined for rabies from Bucharest. Thus, the tool detected a

transitory change outlier in September 2017 (381 persons), a level shift outlier in November 2017 (222 persons) and another level shift outlier in April 2018). This outlier in September 2017 could be explained that in the long run, the series returned to its usual level, even if in the short, starting October 2017 and culminating in November 2017, a sharp decrease can be observed. The return of the series to its original level prior August 2017 happens following the second level shift outlier.

Table 2 presents the results of the automatic procedure implemented in JDemetra+ 2.2.2 for TRAMO-SEATS and X13 used in order to seasonally adjust the five series. As one can observe, for the total number of persons examined for rabies, the number of adults examined for rabies, the number of children examined for rabies and the number of persons examined for rabies from Bucharest the lowest AIC was obtained using X13 on a three years length. In the case of the number of persons examined for rabies from the rest of the country. The lowest AIC was obtained using TRAMO-SEATS on a three years length. Moreover, one can observe a negative Easter Effect in the case of the first three series. This means that the total number of persons, adults and children may decrease before Easter.

Table 2: Results of the seasonal adjustment process of the entire series

	Length	**Procedure**	**Series Transformation**	**Calendar effect**	**Outliers**	**Residual seasonality**	**Quality**	**AIC**
Total number of persons examined for rabies	Entire series	X13	Log-transformed	Julian Easter (15) = -0.2891*	none	Not present	good	446.5
		TRAMO SEATS	Log-transformed	none	none	Not present	good	446.2
	3 years	X13	Log-transformed	Julian Easter (15) = -0.304*	none	Not present	good	253.7
		TRAMO SEATS	Log-transformed	none	none	Not present	good	262.9
Number of adults examined for rabies	Entire series	X13	Log-transformed	Julian Easter (15) = -0.174*	none	Not present	good	394.0
		TRAMO SEATS	Log-transformed	none	none	Not present	good	404.2
	3 years	X13	Log-transformed	Julian Easter (15) = -0.1786*	none	Not present	good	228.9
		TRAMO SEATS	Log-transformed	none	none	Not present	good	235.6
Number of children examined for rabies	Entire series	X13	Log-transformed	Julian Easter (8) = -2.4673*	none	Not present	good	370.7
		TRAMO SEATS	Log-transformed	none	none	Not present	good	375.3
	3 years	X13	Log-transformed	Julian Easter (8) = -2.8695*	none	Not present	good	216.1
		TRAMO SEATS	Log-transformed	none	none	Not present	good	219.5
Number of persons examined for rabies from Bucharest	Entire series	X13	Log-transformed	none	none	Not present	good	403.9
		TRAMO SEATS	Log-transformed	none	none	Not present	good	403.9
	3 years	X13	Log-transformed	none	none	Not present	good	243.2

		TRAMO SEATS	Log-transformed	none	none	Not present	good	243.4
Number of persons examined for rabies from the rest of the country	Entire series	X13	Log-transformed	Julian Easter (1) = coef. < 0.0000	1 outlier (april 2015)	Not present	good	420.0
		TRAMO SEATS	Log-transformed	none	none	Not present	good	421.3
	3 years	X13	Log-transformed	Julian Easter (8) = -1.2055*	none	Not present	good	381.4
		TRAMO SEATS	Log-transformed	none	none	Not present	good	236.5

*P-Value lower than 5%

source: designed by the authors

Conclusions

This study was based on researching the effect, that it might have on the seasonal component of people examined for rabies, of using an easy to use and innovative tool for seasonal adjustments. This research contributes to the existing literature illustrate how statistical tools can benefit healthcare policy makers specialised in the rabies management in two ways: firstly, to our knowledge, the National Institute of Infectious Diseases "Matei Bals" – Centre against rabies is the only entity that publicly discloses monthly data on examinations on rabies in Romania, permitting an analysis at the lowest aggregation level possible, that of healthcare unit; secondly, the paper proposes the use of JDemetra+ an open source software, easy to use for non-statisticians. The seasonally adjusted data can be used by decision makers to compare consecutive months within a year so that they can better allocate resources.

In order to seasonally adjust data regarding the rabies examinations, one should be careful when choosing the series span, the series transformation as well as the procedure. With regard to the series span, best results were obtained with 3 years series. The automatic procedure implemented in JDemetra+ chooses whether or not the series should be log-transformed. However, the user should endorse the choice based on graphical examination. Finally, the X13 procedure proved to be the best option when choosing the procedure.

Besides seasonality tests and an automatic procedure for seasonal adjustment JDemetra+ offers a very useful tool for policy makers, the outlier detection tool. This tool can be used to identify abnormal values within the time series (whether very low or very high) and hence evaluate in time different policies.

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The Influence of Family Firms on Corporate Tax Avoidance after the Indonesian Tax Amnesty Program

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Abstract

This paper analyzes the effect of family ownership on company's tax avoidance practices in Indonesia. This study also analyse whether there is change in tax avoidance practice after the tax amnesty program implemented on 2015-2016. We used three measurements to capture tax avoidance practices, (a) effective tax rate, (b) cash effective tax rate, and (c) book-tax difference. Our sample for this study is forty-nine non-state owned non-financial private Indonesian firms who participated in the tax amnesty program 2015-2016. This study covered data for 2013 to 2017 period divided into before tax amnesty and post-tax amnesty program. We found that family ownership has a positive impact on tax avoidance practice. In other word, family-own companies avoid tax payment more aggressively compared to non-family own companies. However, despite regulator expected the tax amnesty program to reduce company's tax avoidance practice, we found different results. Company's tax avoidance behaviour does not change even when tax authorities have implemented a tax amnesty program.

Introduction

Tax plays an essential role in the running of the government and the development of almost every country in the world, including Indonesia. The Indonesian government recorded that the portion of tax revenue in the national budget increases each year. Unfortunately, the degree of tax compliance in Indonesia is no better than that of other regional countries. One of the tools that represents the degree of tax compliance in a country is the tax ratio. Until 2016, Indonesia's tax ratio was only 10.33%. This was much lower than that in Singapore (14.29%), Malaysia (13.76%), Thailand (15.69%), and even Cambodia (15.26%) (Direktorat Jenderal Pajak, 2016).

One of the reasons behind low tax compliance is the large amount of tax companies must pay. Through taxes, the government takes a significant share of a firm's revenue. This substantial tax becomes a considerable cost that must firms and shareholders must endure, directly and indirectly. This burden encourages firms to engage in corporate tax avoidance activities (Chen, Chen, Cheng, & Shevlin, 2010). The preferences regarding involvement in tax avoidance activities may be different for each firm since tax avoidance activities are considered risky (Armstrong, Blouin, Jagolinzer, & Larcker, 2015). Companies must consider the tradeoff between the marginal benefits and marginal cost of managing taxes. Such examples of the marginal benefits include smaller tax payments, and the marginal cost consists of the potential penalty enforced by the tax authority, time/effort and transaction cost of implementing tax avoidance, and agency costs accompanying these activities (Chen et al., 2010).

Several studies have investigated the determinants of corporate tax avoidance practices. Size, leverage, profitability, and corporate governance can drive companies to avoid taxes. Furthermore, family ownership is also believed to be a determinant that encourages companies in practicing tax avoidance, since companies owned by a family are recognized as a new set of economic organizations (Gaaya,

Lakhal, & Lakhal, 2017). Two opposing results from numerous studies may explain the effect of family ownership on tax avoidance activities. Using a sample of 1,003 companies from the S&P 1500 index, Chen et al. (2010) found that the tax aggressiveness of family firms are less than that of non-family firms. This means there is a negative relationship between family ownership and corporate tax avoidance. Family owners are considered to be more aware of the potential conviction imposed by the tax authority and the damage to the family's reputation (Chen et al., 2010). In contrast, Gaaya et al. (2017) concluded that family ownership has a positive relationship with corporate tax avoidance in Tunisian companies. This conclusion is in alignment with Annuar, Salihu, & Obid (2014), who found that family ownership is a potential determinant that encourages a company to implement corporate tax avoidance in Malaysia. This result suggests that the protection of minority shareholders in less developed countries is weak. This inadequate protection will lead family owners to expropriate minority shareholders by extracting high rent from tax-saving positions (Gaaya et al., 2017).

The purpose of this study is to enrich literature about tax avoidance practiced by family firms, especially in Indonesia. We try to examine the influence of family ownership on tax avoidance activities and to depict the impact of the Indonesian tax amnesty program on corporate tax avoidance. We use a sample of 49 listed companies in the Indonesian Stock Exchange from 2015 to 2016. These companies participated in the tax amnesty program offered by the Indonesian government. To examine the firms' tax avoidance aggressiveness, we used three measurements: effective tax rate, cash effective tax rate, and book-tax difference. The lower effective tax rate and higher book-tax difference shows that one firm's aggressiveness in practicing tax avoidance is more than that of other firms (Chen et al., 2010).

This paper's outline is as follows: Section 2 develops the literature review and hypothesis on the relationship between family ownership and corporate tax avoidance; Section 3 presents the study's research sample, data, and methodology; Section 4 discusses the results of the study; and Section 5 consists of conclusion and recommendation.

Literature Review

Corporate tax avoidance

Many companies apply earning management for tax savings since tax is defined as an obligatory contribution to the government without any direct reciprocity to the taxpayers (Zeng, 2014). Ideal taxation treats all taxpayers equally. Furthermore, tax must also be efficient and easy for all taxpayers. Companies treat tax liabilities as costs that must be highly considered since tax takes a significant portion of a company's profit. More than one-third of a company's is profit distributed to the government through tax payments (Chen et al., 2010). Therefore, many managers try to reduce the company's tax liabilities. One activity that can minimize tax payments and increase income after tax is corporate tax avoidance (Gaaya et al., 2017).

The definition of tax avoidance is the distribution of resources or values from government to company owners (Desai & Dharmapala, 2005). Moreover, tax avoidance can also be defined as a set of company activities in arranging and rationalizing the tax burden through evaluating all potential benefits and costs of avoiding taxes (Dyreng, Hanlon, & Maydew, 2008). These company activities in managing revenue to avoid taxes could be categorized as legal or illegal practices, or lie in between (Steijvers & Niskanen, 2014).

When companies practice tax avoidance, there is a tradeoff between the benefits and the costs. The most obvious benefit of being tax aggressive is the higher profit generated from more significant tax savings. Shareholders and the managers obtain these benefits if they are compensated for their efforts in managing tax payments. Another potential benefit of corporate tax avoidance is rent extraction (Chen et al., 2010). Along with the profits generated by tax avoidance, however, there are some potential costs that companies will have to bear. One of the most obvious burdens of practicing corporate tax avoidance is the likely punishment imposed by the tax authorities. When the practice of tax aggressiveness is detected, the tax authority will audit the compliance of companies' tax liabilities and

impose significant fines as a penalty (Chen et al., 2010). Another cost of being tax aggressive is the potential price discount forced by other shareholders if they perceive that decision-makers use tax avoidance to increase rent extraction (Desai & Dharmapala, 2005).

Among these costs, Sánchez-Marín, Portillo-Navarro, & Clavel (2016) say that there are three risk factors that companies must consider in practicing tax avoidance: economic, reputational, and transactional factors. Concerning economic and reputational factors, companies tend to be more conservative in avoiding taxes since there is the potential for damage to a company reputation even though the tax burden that must be carried by companies will increase. Regarding the transactional factor, companies will calculate their tax complexity before deciding to apply tax avoidance practices. The decision will depend on the company's experiences and capabilities in managing taxes (Sánchez-Marín et al., 2016).

Family ownership and corporate tax avoidance

More than half of the companies in East Asia are owned and controlled by family members. The family ownership of these companies' assets are very significant. Claessens, Djankov, & Lang (2000) find that the ten most prominent families in Indonesia, the Philippines, and Thailand control half of the total assets of all companies in those countries. Family firms are not only prevalent in East Asia, but also in the most developed countries where 75%of companies are family firms. Moreover, these companies have a substantial proportion of global wealth production (Nicholson, 2008).

Anderson & Reeb (2003) defines a company as a family firm if the founders or their family members occupy crucial positions in the company such as executives, directors, and primary block holders. Furthermore, companies may be categorized as a family firm if those companies have unique properties such as genetic identity, intergenerational transmission, and wildcard inheritance (Nicholson, 2008).

Besides that, family firms also have several unique characteristics in terms of an agency relationship compared to non-family firms. Companies with high family ownership have a relatively well-aligned relationship between owners and managers. This minimizes the occurrence of agency conflict and agency cost that must a firm carries (Jensen & Meckling, 1976). However, Schulze, Lubatkin, Dino, & Buchholtz (2001) say that agency conflicts in family firms are precisely more challenging to solve than in non-family firms due to the existence of altruism. Indeed, family firms have lower agency conflict between owners and managers, but greater potential for agency conflict between majority shareholders and minority shareholders (Chen et al., 2010).

Along with these unique traits, high involvement of family in company management may their corporate decisions, including the corporate tax policy (Gaaya et al., 2017). Traditionally, family firms tend to be more conservative in avoiding taxes. There is high concentration of ownership and low diversification of investment. Hence, reputation becomes essential for family firms (Sánchez-Marín et al., 2016). Nevertheless, there are two conflicting results regarding the influence of family ownership on corporate tax avoidance.

Chen et al. (2010) found that companies owned by families are less aggressive in practicing tax avoidance than non-family firms. Family firms are more aware of the potential penalty imposed by tax authorities and the damage to their reputation. Thus, the incentives from tax avoidance activities are less than the potential risk that a company will. This result is supported by Steijvers & Niskanen (2014) and Sánchez-Marín et al. (2016), who find that the high involvement of family members in ownership and management has a negative relation on corporate tax avoidance.

In contrast, different results were generated from several studies. Bauweraerts & Julien (2013) find that family involvement in a company's business has a positive relation on corporate tax avoidance. Furthermore, Gaaya et al. (2017) found that Tunisian family firms avoid tax obligation more aggressively than non-family firms to minimize their tax liability, since inadequate protection of investors' rights encourages family firms to use tax avoidance activities to escalate their benefits at the expense of minority shareholders. Annuar et al. (2014) found that family ownership is one of the

potential determinants that encourage companies to implement corporate tax avoidance in Malaysia. Meanwhile, Sari & Martani (2010) found that Indonesian family firms tend to be more aggressive in avoiding taxes than non-family firms. Thus, our first hypothesis is as follows:

H1: there is a positive relationship between family ownership and corporate tax avoidance.

Tax amnesty and corporate tax avoidance

Andreoni (1991) defines tax amnesty as a program that is held by the government that forgives penalties owed by taxpayers if they repay their malicious taxes voluntarily. Tax amnesty was designed as a one-time opportunity for taxpayers to be free from any tax penalties through participation in this program (Alm & Beck, 1993). Furthermore, tax amnesty must be coupled with tax reform to discourage former amnesty participants from backsliding (Parle, Hirlinger, & Parle, 1986). Many countries offer tax amnesty programs for three reasons. First, they are designed to generate additional tax revenue in the short term to cover budget shortfalls. Second, they can increase future collection of tax revenue. Third, they can improve the tax compliance rate overall (Tilman, 2006).

There are two different perspectives on the importance tax amnesty programs. Proponents of such programs assert tax amnesty could increase compliance in the long run if the program is followed by better law enforcement efforts and better services to taxpayers. Moreover, the amnesty program could generate tax compliance if the government can get those who did not file tax returns to do so with the tax authorities (Alm & Beck, 1993).

However, different opinions come from the opponents. They argue that compliance after tax amnesty is far more likely to decline. Obedient taxpayers will consider tax amnesty as an unfair program. The program gives advantages only to those individuals who cheated. Furthermore, the tax cheaters may expect another amnesty program to be offered in the future. Thus, the tax amnesty program may make taxpayers aware of the widespread presence of noncompliance (Alm & Beck, 1993).

One of the few countries that have executed a tax amnesty program is Indonesia. Utilizing Law Number 11 Year 2016 about tax amnesty, the Indonesian government ran a tax amnesty program for all taxpayers who did not disclose their assets correctly from 1985 to 2015. The participants of this program were forgiven for their tax evasion at all times until 2015 if they repay some ransom for all of their undisclosed assets to the government. One of the purposes of the Indonesian government enacting this program is to increase taxpayers' awareness and compliance. As stated in the introduction above, the level of tax compliance in Indonesia based on the tax ratio measurement is still worse than other countries in this region, such as Singapore, Malaysia, Thailand, and even Cambodia (Direktorat Jenderal Pajak, 2016). Thus, our second hypothesis is as follows:

H2: there is a negative relationship between a tax amnesty program and corporate tax avoidance.

Methods

Sample Selection and Data Collection

The sample of this study includes listed companies on the Indonesian Stock Exchange (IDX) that participated in the tax amnesty program held by the Indonesian government. Financial companies and state-owned companies are excluded from the sample of this study. The period of this study is from 2013 to 2017. Tax data and firm characteristics are generated from financial statements and annual reports of listed companies that were available either on firm websites or on the Indonesian Stock Exchange website. This study excludes firms with negative tax expense and negative taxable income. Firms whose financial statements are not stated in Indonesian Rupiah also excluded from the sample.

Corporate Tax Avoidance Measures

Gaaya et al. (2017) stated that corporate tax avoidance activities are so various and comprehensive, it is impossible to measure corporate tax avoidance only with a single measurement. Thus, three kinds of corporate tax avoidance a used in this study.

The first measurement of corporate tax avoidance is Effective Tax Rate (ETR), which refers to total tax expense scaled by pre-tax income. Dyreng, Hanlon, & Maydew (2008) says that ETR could represent many forms of tax avoidance practices through tax shelters and loopholes in tax regulations. Moreover, ETR is also able to depict tax planning activities through permanent book-tax differences, such as investing in a tax paradise country or investing on free-taxed assets (Chen et al., 2010).

$$ETR_{i,t} = \text{total tax expense}_{i,t} \,/\, \text{pre-tax income}_{i,t} \tag{1}$$

The second measurement of corporate tax avoidance is cash effective tax rate (CETR). CETR refers to

$$CETR_{i,t} = \text{cash tax paid}_{i,t} \,/\, \text{pre-tax income}_{i,t} \tag{2}$$

cash taxes paid scaled by pre-tax income. Chen et al. (2010) said that CETR could reflect a company's tax planning activities through permanent and temporary book-tax differences. CETR is also able to exclude the impact of earning management. ETR and CETR are inverse functions of tax avoidance. Lower values of ETR and CETR represent greater aggressiveness in corporate tax avoidance (Chen et al., 2010).

The last measurement of corporate tax avoidance is book-tax difference (BTD). BTD refers to pre-tax book income minus estimated taxable income scaled by total assets. We calculate the estimated taxable income based on the current tax expense divided by the statutory tax rate. Companies that have higher BTD tend to be more aggressive in practicing corporate tax avoidance (Gaaya et al., 2017).

$$TD_{i,t} = (\text{pre-tax book income}_{i,t} - \text{taxable income}_{i,t}) \,/\, \text{total assets}_{i,t} \tag{3}$$

Models

To examine the relationship between family ownership and corporate tax avoidance, as stated in the first hypothesis of this study, we estimate the following regression:

$$TaxAvo_{i,t} = \alpha_{0t} + \alpha_1 FAMILY_{it} + \alpha_2 SIZE_{it} + \alpha_3 ROA_{it} + \alpha_4 LEV_{it} + \varepsilon_{it} \tag{4}$$

Where $TaxAvo_{i,t}$ is the corporate tax avoidance measure, either ETR, CETR, or BTD. $FAMILY_{it}$ refers to family ownership that is measured as 1 (one) if family ownership is more than 50%, and 0 (zero) if otherwise. Meanwhile, to examine the relation between tax avoidance and corporate tax avoidance, as stated in the second hypothesis, we estimate the following regression:

$$TaxAvo_{i,t} = \alpha_{0t} + \alpha_1 TaxAmn_{it} + \alpha_2 SIZE_{it} + \alpha_3 ROA_{it} + \alpha_4 LEV_{it} + \varepsilon_{it} \tag{5}$$

$TaxAmn_{it}$ refers to the research period, which measured as 1 (one) for the post-tax amnesty period (2016 to 2017), and 0 (zero) if otherwise (2013 to 2015). We also include a set of control variables in our regression models referring to firm characteristics that may affect tax avoidance behavior. $SIZE_{it}$ is firm size measured by the natural logarithm of total assets. More prominent companies tend to be more tax aggressive since larger companies have more economic and social power than smaller companies (Lin, Tong, & Tucker, 2014). ROA_{it} is the ratio of return on assets for a firm which is measured as net profit scaled by total assets. Companies with higher profitability tend to be more encouraged to apply corporate tax avoidance (Lanis & Richardson, 2012). LEV_{it} is measured by the overall long term debt

scaled by total assets. Companies with higher leverage tend to be more tax aggressive because the interest payments generated by the firm's debt are tax-deductible (Richardson, Taylor, & Lanis, 2015).

Result and Discussion

Descriptive Statistics

Table 1 below summarizes the descriptive statistics of all variables used in this study. To measure corporate tax avoidance, this study uses three measurements. They are ETR (effective tax rate), CETR (cash effective tax rate), and BTD (book-tax difference). The mean values of ETR and CETR are 21.62% and 26.14%. These two mean values show that firms included in the observation have an average effective tax rate which is not different from the statutory tax rate. The statutory tax rate for corporations based on tax regulation in Indonesia is 25%. Meanwhile, the mean value of BTD is 1.87%. This means that pre-tax book income on average is still greater than taxable income based on tax regulation.

Table 1: Descriptive statistics of all variables

Variable	Mean	Maximum	Minimum	Std. Dev.	Observations
BTD	0.0187	0.2239	-0.0834	0.0409	245
CETR	0.2614	0.8645	0.0010	0.1406	245
ETR	0.2162	0.8513	0.0001	0.1103	245
LEV	0.1537	0.6224	0.0062	0.1239	245
ROA	0.0896	0.4578	0.0012	0.0763	245
SIZE	12.3630	13.7541	9.7117	0.6484	245

Moreover, table 1 shows that the aggressiveness of corporate tax avoidance varies in each company. The minimum value of ETR (0.01%) and CETR (0.1%) depict that the companies' tax payments are much lower than the statutory tax rate, 25%. Moreover, the minimum value of BTD (-8.34%) shows that pre-tax book income base is much smaller than taxable income based on tax regulation. Meanwhile, the maximum value of ETR (85.13%) and CETR (86.45%), which are much greater than the statutory tax rate, could be caused by the company's industry which has particular tax characteristics different from other common sectors.

This study also compares the mean value of ETR, CETR, and BTD between family firms and non-family firms, as stated in Table 2 below. Table 2 shows that the mean value of CETR is significantly different between family firms and non-family firms. The CETR mean amount of family firms (15.64%) is lower than non-family firms (26.83%). This means that family firms tend to be more aggressive in implementing corporate tax avoidance than non-family firms.

Table 2: Mean value of family firms and non-family firms

	ETR	CETR	BTD
Family firms	0,2003	0,1564	0,0225
Non-family firms	0,2172	0,2683	0,0184
sig. (2 Tailed)	0,568	0,003	0,710

Meanwhile, this study also compares the mean value of ETR, CETR, and BTD between the pre-tax amnesty period and the period after the tax amnesty program is performed, as stated in Table 3 below. From Table 3, we find that there is no significant difference of mean value (ETR, CETR, and BTD) after the tax amnesty program is performed compared to the pre-tax amnesty period. This indicates that both family firms and non-family firms do not change their behavior in avoiding taxes even if they participated in the amnesty program.

Table 3: Mean value comparison (pre-amnesty and post-amnesty).

		ETR	CETR	BTD
Family firms	Pre-amnesty	0,2026	0,1501	0,0127
	Post-amnesty	0,1969	0,1657	0,0372
	sig. (2 Tailed)	0,894	0,790	0,274
Non-family firms	Pre-amnesty	0,2144	0,2643	0,0181
	Post-amnesty	0,2214	0,1552	0,0189
	sig. (2 Tailed)	0,642	0,599	0,890

This finding is interesting since one of the government's purposes in offering a tax amnesty program is to improve compliance of overall taxpayers in addition to increasing the collection of tax revenue.

Regression Analysis

Table 4 below presents the regression results that examine the relationship between family ownership and corporate tax avoidance. Table 4 shows that the FAMILY variable has a negative coefficient of CETR with a significance below 1%. The results of this test reflect that family ownership has a positive influence on the tax avoidance rate of a company because the aggressiveness of the company against tax evasion is inversely proportional to the value of CETR. Meanwhile, the relationship of the FAMILY variable to BTD and ETR has no significant correlation.

Table 4: Regression result (family ownership and corporate tax avoidance)

VARIABLE	ETR		CETR		BTD	
	Coef	Prob.	Coef	Prob.	Coef	Prob.
FAMILY	-0.0082	0.8676	-0.1088***	0.0090	0.0020	0.8907
LEV	0.0424	0.5537	-0.0227	0.7816	0.0032	0.9128
ROA	-0.4491***	0.0004	-0.5835***	0.0000	0.4013***	0.0000
SIZE	-0.0106	0.5081	-0.0036	0.8933	0.0040	0.4904
C	0.3955	0.0463	0.3690	0.2566	-0.0676	0.3458
Adjusted R-squared	0.0366		0.0807		0.2701	
Prob (F-statistic)	0.0114		0.0004		0.0000	

These results support the first hypothesis of this study that family ownership has a positive influence on corporate tax avoidance. These findings are in line with Bauweraerts & Julien (2013), Annuar et al. (2014), and Gaaya et al. (2017), who find a positive relationship between family ownership and corporate tax avoidance. The high aggressiveness of family firms in avoiding taxes is driven by the lack of protection against minority shareholders so that minority shareholders will see the profits derived from tax avoidance (Gaaya et al., 2017). Moreover, the transfer of control in family firms to the next generation will also encourage increased aggressiveness in tax avoidance efforts. The successor generation of a family firm is considered to have experience and knowledge in managing more complicated tax issues so that they will be better able to practice tax evasion (Bjuggren & Sund, 2005).

However, the results of this study contrast with Chen et al. (2010), Steijvers & Niskanen (2014), and Sánchez-Marín et al. (2016), who find a negative relationship between family ownership and corporate

tax avoidance. Chen et al. (2010) say that family firms are less aggressive in avoiding taxes because they are very concerned about sanctions imposed by the tax authorities as well as damage to the company's reputation as a result. Furthermore, Gedajlovic & Carney (2010) argue that family firms have a broader business horizon and are more concerned about the company's good name. This situation indicates that financial gain is not the only goal held by a family company.

Table 5 below presents the regression results that examine the relationship between tax amnesty and corporate tax avoidance. The regression test results show that the TaxAmn variable has no significant effect on corporate tax avoidance, whether it is measured by ETR, CETR, or BTD. The finding indicates that a company's tax avoidance behavior is not affected by the implementation of a tax amnesty program. This result does not support our second hypothesis that tax amnesty has a negative influence on corporate tax avoidance.

Table 5: Regression results (tax amnesty and corporate tax avoidance)

VARIABLE	ETR		CETR		BTD	
	Coef	Prob.	Coef	Prob.	Coef	Prob.
TaxAmn	-0.0054	0.7309	-0.0116	0.4757	0.0105	0.1435
LEV	-0.0544	0.1665	0.0246	0.8593	-0.0227	0.3331
ROA	-0.8106***	0.0000	-1.4931***	0.0000	0.6397***	0.0000
SIZE	0.0314	0.1133	0.0627	0.1700	-0.0174	0.2289
C	-0.0892	0.7025	-0.3798	0.5041	0.1765	0.3194
Adjusted R-squared	0.4738		0.3039		0.6934	
Prob (F-statistic)	0.0000		0.0000		0.0000	

This finding is in line with the research of Alm & Beck (1993), who find that a tax amnesty program does not have an impact on increasing tax revenue or compliance in the long term. A tax amnesty program is precisely considered to reduce compliance in the long run. Taxpayers who have adhered to laws and regulations will judge tax amnesty as unfair because it only benefits those who have been disobedient in carrying out their tax obligations. Meanwhile, those who engaged in tax evasion will assume that there will be another similar tax amnesty program in the future. Therefore, there is a fear that non-compliance would increase with the implementation of the tax amnesty program (Alm & Beck, 1993).

Meanwhile, to improve long-term compliance, the tax amnesty program is followed by improved law enforcement and service to taxpayers (Alm & Beck, 1993). Furthermore, tax amnesty must be coupled with tax reform to discourage backsliding on by former amnesty participants (Parle et al., 1986).

Conclusion

This study examines the tax aggressiveness to avoid tax payment of family firms relative to their non-family counterparts. We used three measurements to capture tax aggressiveness. They are effective tax rate, cash effective tax rate, and book-tax difference. The observation was conducted from 2013 through 2017 of all non-financial public companies which were not state-owned. These companies also participated in the tax amnesty program. The results of this study prove that family firms have a significant positive effect on corporate tax avoidance, using cash effective tax rate as a proxy of corporate tax avoidance. From this finding, it can be interpreted that the higher the family ownership in a company, the more it will be encouraged to increase corporate tax avoidance activities. Also, there is a tendency for firms to be more aggressive in tax avoidance, as presented by the significant difference in the mean value of the family firm's cash effective rate compared to the mean value of the same variable in non-family firms. However, this study does not provide empirical evidence regarding the effect of tax amnesty on tax avoidance activities and found no significant difference in the mean value of each tax avoidance measurement between the pro-amnesty period and the post-amnesty period, both in family firms and non-family firms. This finding indicates that a company's tax avoidance behavior does not change even when tax authorities have implemented a tax amnesty program. Finally, some

limitations need to be considered for following research. First, future research may classify companies included in the study based on their industry sectors since the tax characteristics for each industry may be different. Second, future research may consider extending the period of study, especially the period of post-tax amnesty program, to capture the effect of the tax amnesty program on tax aggressiveness in the long run.

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Entrepreneurial Competencies and the Factors Determining the Success of an Entrepreneurs in the Market

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Abstract

Purpose: The aim of the paper is to identify the key range of entrepreneurial competencies. The article seeks to answer the question: What factors have a significant impact on the success of entrepreneurs in the market? Is it necessary to have adequate predispositions? Which abilities does an entrepreneur need to possess to run a successful business? What is more, are these innate features? Or quite the contrary, features and entrepreneurial abilities, shaped and strengthened through various educational programmes? **Design/Methodology/Approach:** The data collection process consisted of two steps. First of all, desk research and the review of the Internet sources were applied. Secondly, there were conducted national qualitative research: 10 in-depth expert interviews. The recipients of the study are: scientists, business psychologists, certified business coaches, experts with several years of experience in advising small and medium-sized enterprises and business environment institutions in the field of business incubation and innovation. The qualitative study took part recognized experts from various universities and institutions in Poland: University of Warsaw, Poznan University of Economics and Business, SGH Warsaw School of Economics, Polish Business and Innovation Centers Association, University Technology Transfer Center at University of Warsaw. **Findings:** The results indicate, that in the opinion of the experts studied, the entrepreneur's success in the market is determined by a synergic combination of: (1) innate entrepreneurial aptitude, (2) sociological conditions, and (3) educational programmes (including training and courses). The lack of any component, in their views, limits the individual potential of an entrepreneur. **Originality/Value:** The paper provides the knowledge in the range of the key entrepreneurial competencies that enable to set up, survival and development of a business ventures. The paper might be valuable to scholars who wish to understand the key range of entrepreneurial competencies.

Keywords : Entrepreneurial Competence, Entrepreneurial Orientation, Entrepreneurs, Entrepreneurial Skills.

Introduction

Entrepreneurial competence is an important factor that determines the success or failure of the organizations. In general, competencies have been defined as "(…) combined and integrated components of knowledge, skills, and attitudes." (Kyndt & Baert, 2015, p. 14). Entrepreneurial behaviour is a key factor of employment creation, wealth creation, and expansion. The companies must behave entrepreneurially in order to have a competitive advantage over competitors. Therefore entrepreneurial behaviours are a critical success factor to sustain competitive advantage on the market. (Nwachukwu, Chládková, & Žufan, 2017, p. 3–5).

The aim of this paper is to identify the entrepreneurial competency and establish which competencies are the key. The study allows to identify the key factors having a significant impact on the success of entrepreneurs in the market. The paper is structured as follows: section two presents a literature review about the role and importance of the entrepreneurial competencies. Section three describes and explains the methodology of own research. Section four presents the results of the data analysis; and provides an interpretation of the findings.

The Range of Entrepreneurial Competencies

The factors determining the entrepreneur's success in the market include personality features, knowledge, motivations, cognitive mechanisms and self-efficacy. (Figure 1.)

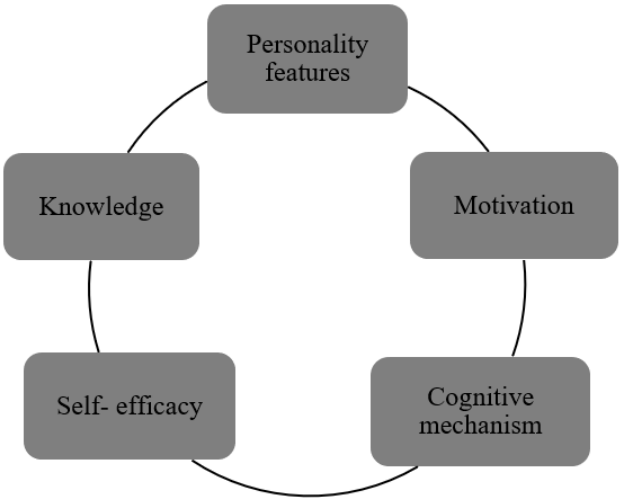

Fig. 1: Entrepreneurial competencies
Source: own work based on (Glinka & Gudkova, 2011, p. 123) and (Urbaniec, 2016, p. 81–82).

These are the characteristics of an entrepreneur, referred to as entrepreneurial competences, which enable the establishment, survival and development of a business enterprise. These elements of competence are subject to varying degrees of change. The easiest ones are subject to modifications of knowledge resources, while the most difficult ones are personal features, which usually have an inborn character. The interaction between the individual elements of an entrepreneur's competence and the actions undertaken by the entrepreneur takes place. The effectiveness of the undertaken entrepreneurial activities depends on the competences, while competences are changed under the influence of feedback concerning the results of undertaken actions. Therefore, the entrepreneur is constantly in an active interaction with the environment, which is a source of market opportunities and necessary resources for him.(Glinka & Gudkova, 2011, p. 122–123).

The results of many years of research carried out in the field of entrepreneurial personality features have so far not led to the creation of a consolidated concept, explaining the conditions for making decisions on setting up one's own company and achieving success on the market by entrepreneurs.

One of the reasons for this may be the specific nature of the entrepreneurial process, which is characterized by high risk and uncertainty. However, in the literature there are several personality features characterizing entrepreneurial persons. These are: motivation of achievements, placing a sense of control and risk-taking. (Glinka & Gudkova, 2011, p. 124) (Pokrajčić, 2004, p. 26–40). (Figure 2.)

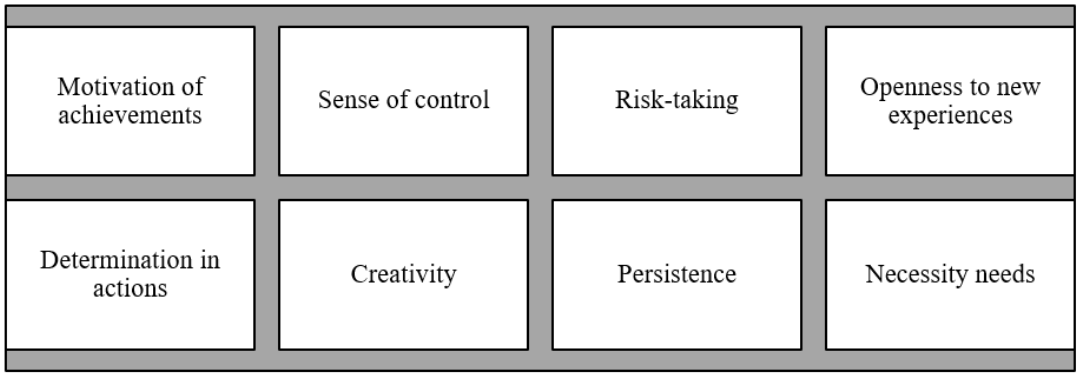

Fig. 2: Characteristics of personalities identifying entrepreneurs

Source: own work based on (Glinka & Gudkova, 2011, p. 124–127) and (Pokrajčić, 2004, p. 26–40).

The motivation of achievements is a feature that shows the entrepreneur's desire for permanent improvement in order to improve the quality of his own activities. McClelland's research has shown that highly motivated individuals have set themselves ambitious goals and pursue them (McClelland, 1961, p. 261, 360–361). Davidsson, on the other hand, has shown that the company's founders are more likely to be motivated than those who inherited the company. His research has also shown that entrepreneurs with higher potential for motivating their achievements have more often led their companies to advanced stages of development. (Davidsson, 1991, p. 405–429).

Locus of control is "(....) an individual characteristic reflecting the degree of control over own destiny". (Davidsson, 1991, pp. 394). Rotter identifies the external and internal location of the control. Persons with an external control location are looking for reasons for their successes and market failures in external factors. However, entrepreneurs usually have an internal sense of control. They take responsibility for their own actions and are convinced that they can control the progress of the market.

The next feature connected with entrepreneurship is risk-taking ability. (Khedhaouria, Gurău, & Torrès, 2015, p. 485). Many of authors indicate that - taking risks seems to be an inherent and very important part of the life and success of an entrepreneur. (Kyndt & Baert, 2015, p. 14). Risk propensity refers to willingness to commit to sources of opportunity when there is possibility of failure. However, there is a lack of incontestable empirical proofs that people running their own business distinguish acceptance of a higher level of risk. Some studies have found that "(…) persons who create a new enterprise and fight to make it successful may perceive and react to risk in a different way." (Sánchez, 2013, p. 451). Entrepreneurs view business risks as controlled rather than random risks. However, taking risks can bind to setbacks and it is important that entrepreneurs possess the competencies that allow them to deal with these risks and possible consequences. "Hence a first competency that has been identified is perseverance." (Kyndt & Baert, 2015, p. 14). However, successful entrepreneurs also seek to reduce risks when planning for the future.

Other distinguishing features of entrepreneurs are also mentioned in the literature. Among them: the need for independence, creativity, determination in action, openness to new experiences, perseverance in pursuing the goal. However, it should be remembered that having the aforementioned individual personality features does not affect the decision of entrepreneurs to start a business or guarantee their success in business (Man, Lau, & Snape, 2008, p. 257–275).

Entrepreneurship motivation is defined as the state of human readiness to take actions leading to starting business. Carter et al., based on the analysis of the survey results, identified six basic categories of motivation for starting up a business. (Carter, Gartner, Shaver, & Gatewood, 2003, p. 17–19). (Table 1.).

Table 1: Categories, motivation factors for establishing a new business

No.	Categories	Motivation factors
1.	Innovation	A willingness to do something new, the necessity of personal development, the needs to learn.
2.	Independence	Control over the use of one's own time, independence in decision-making, flexibility
3.	Recognition	A need for achievements and acceptance (achievement of social position)
4.	Roles	Personal patterns, social relations, contacts of entrepreneurs with: family, other entrepreneurs, customers
5.	Financial success	A willingness to obtain financial benefits, maximize the company's growth rate
6.	Self-realization	A desire to check out and realize your vision for the future

Source: own work based on (Carter et al., 2003, p. 20).

The research on the cognitive mechanisms of entrepreneurs was conducted in the late 1990s. One of the first researchers who made an attempt to relate the achievements of cognitive psychology to the entrepreneurial process was Baron. He has distinguished the basic properties of human cognitive systems, which may determine the existence of differences between entrepreneurs and other people. These include: limited human capabilities in processing new information and a tendency to limit cognitive effort. (Baron, 1998, p. 275–278).

Cognitive mechanisms, as emphasized by Baron and Shane are shaped under the influence of individual life experiences of each person. It is a typical "research tool" that enables people to see concrete market opportunities in the environment. (Baron & Shane, 2007).

Another component of entrepreneurial competence is self-efficacy. On the basis of entrepreneurship, they are defined as the belief of the entrepreneur in the possibility to perform a specific task in business conditions with the use of accessible or available resources and entrepreneurial competences. (Glinka & Gudkova, 2011, p. 134). The sense of own effectiveness is not only related to the entrepreneur's decision to set up a company, but also to subsequent actions undertaken by him/her. Bandura stresses that the higher this feeling, the more active a potential entrepreneur can be involved in exploiting market opportunities with high development potential. He also points out that individuals with a high level of self-efficacy have higher ambitions and are willing to pursue more ambitious strategic objectives. (Bandura, 2006). Factors shaping the entrepreneur's own effectiveness are divided into two groups:

- internal factors based on own entrepreneurial experience, as exemplified by the following: first attempts of entrepreneurs to execute market transactions, take actions by them and observe their effects,
- external factors, in connection with the mechanism of influence of social relations (personal contacts) through the influence of: experiences and opinions of other entrepreneurial persons.

Knowledge is the last component of entrepreneurial competences, enabling entrepreneurs to make rational decisions and effective management. It is a key resource, creating a competitive advantage and undertaking undertakings aimed at knowledge management. (Kochmańska, 2008, p. 36). Compared with other elements: personality traits, motives for action, self-efficacy knowledge has a dynamic character. J. Cope has identified the main areas of knowledge that an entrepreneur should have. These include self-knowledge, business knowledge, knowledge of the environment and networks, knowledge of managing small enterprises, knowledge of the nature of relations and their management capabilities. (Hrehová & Ilecko, 2016, p. 227–232). The basic sources of knowledge necessary for entrepreneurs to start and conduct business activity are their own experiences and social relations. Entrepreneurs learn from their mistakes, and through actions and observation of their effects they gain experience, which is then transformed into knowledge. Learning by contact, on the other hand, creates a social dimension to learning. (Nastase, Dobrea, & Valimareanu, 2016, p. 5–7).

However, it should be remembered that the intensities of using both knowledge sources vary depending on the degree of maturity of the entrepreneur and the stage of development of his company. (Glinka & Gudkova, 2011, p. 139–140).

Ideas and opportunities	Resources	Into action
• spotting opportunities, • creative, • vision, • valuing ideas, • ethical and sustainable thinking.	• self-awareness and self-efficacy, • motivation and perseverance, • mobilising resources, • financial and economic literacy, • mobilising others.	• taking the initiative, • planning and management, • coping with ambiguity, uncertainty and risk, • working with others, • learning through experience.

Fig. 3: The Framework of entrepreneurs competency
Source: own work based on (Nwachukwu et al., 2017, p. 6) and (Krečar & Lukić, 2016, p. 528–538).

Bacigalupo et al. (2016) indicate three competency areas and fifteen competencies which are the most critical success factors for entrepreneurs. To three main competence areas there belong: 'Ideas and opportunities', 'Resources', and 'Into action'. Each area includes five competencies, which together represent the core of entrepreneurship and develop the fifteen competencies. (Nwachukwu et al., 2017, p. 6–7). For an entrepreneur it is important to think ahead, to be creative and have a vision for the mid- term or even long-term goals. In addition, successful entrepreneurs become successful when they have the ability and wish to keep on learning to deal with new challenges. "(…) an orientation towards learning refers to the fact that successful entrepreneurs search for new knowledge and skills in order to develop themselves." (Kyndt & Baert, 2015, p. 14). Besides identifying and evaluating opportunities and risks, an entrepreneur should also be able to make important and clear decisions. Making decision and independence is an essential asset for entrepreneurs in order to move ahead and refers to the ability to decide what to do.

According to Driessen there are ten basic competencies that must be owned by an entrepreneur. For those competencies belong: need of achievement, need of autonomy, need of power, social orientation, self-efficacy, endurance; dan risk taking propensity. The skill components, such as: market awareness, creativity, and flexibility. (Ismail, Zain, & Zulihar, 2015, p. 179) and (Bagheri & Pihie, 2014, p. 4–6). Entrepreneurial self-efficacy is defined as "(...) a person's belief in his/her ability to successfully launch an entrepreneurial venture." (Khedhaouria et al., 2015, p. 487). In turn, entrepreneurial creativity is defined as "(...) the generation and implementation of novel, appropriate ideas to establish a new venture." (Khedhaouria et al., 2015, p. 488).

According to Paiva Júnior, Leão and Mello there are six entrepreneurial competencies: opportunity competencies, relationship competencies, conceptual competencies, administrative competencies, strategic competencies and commitment competency. (Minello, Scherer, & da Costa Alves, 2014, p. 5).

Other competencies mentioned in the literature that are considered important and influential for achieving entrepreneurship effectiveness, are the following: troubleshooting, negotiation skills, leadership, self-control, innovation, dynamism, self- confidence, ability to create and develop social networks, teamwork, responsibility, engagement and compromise. (Robles & Zárraga-Rodríguez, 2015, p. 829). Dornelas expands these competencies adding future view, coherent decision, opportunity exploration, determination, dedication, optimism and passion, good relationships, organization, planning, acceptation of calculated risks and value creation to society. (Minello et al., 2014, p. 3).

Methodology of Own Research

Expert research was conducted in four voivodships, mainly in central Poland, as seven out of ten interviews were conducted with experts from the mazowieckie and łódzkie voivodships. In the northern and north-western regions, three interviews were carried out. (Figure 4.)

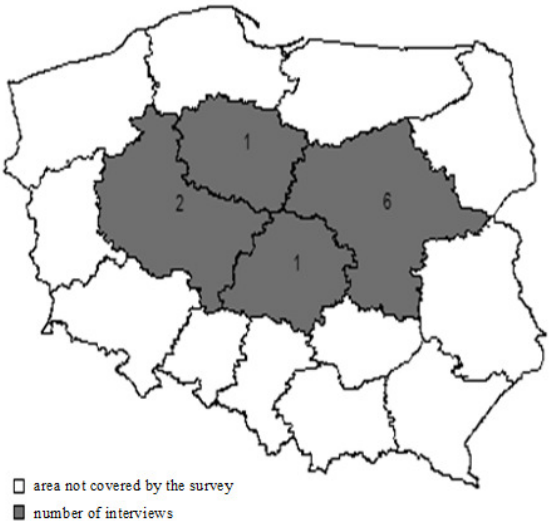

Fig. 4: Area of expert research realization

Source: own work.

Expert interviews were conducted in the form of individual in-depth interviews (60.00%) and telephone in-depth interviews (40.00%). The duration of one IDI interview lasted on average 80 minutes, while TDI - about 50 minutes. The universities and institutions represented in the expert study included: University of Warsaw, Poznan University of Economics and Business, SGH Warsaw School of Economics, Polish Business and Innovation Centers Association, University Technology Transfer Center at University of Warsaw. (Table 2.)

Table 2: List of nationwide expert research

No.	Gender	Represented University / Education Institution / Position	Location	Research technique	Duration of the interview	Total work experience (in years)
1.	M	University Technology Transfer Center at University of Warsaw	Warsaw	Individual in-depth Interview (IDI)	1h	over 20
2.	F	University of Warsaw	Warsaw	Individual in-depth Interview (IDI)	45 min.	17
3.	M	Personal coach, Lecturer	Grudziądz	Individual in-depth Interview (IDI)	1h 15 min	over 20
4.	M	Poznań University of Economics and Business	Poznan	Telephone in- depth Interview (TDI)	50 min	10
5.	F	Business psychologist, Managerial Trainer, Coach, International Coaching Community (ICC)	Warsaw	Individual in-depth Interview (IDI)	1h 30 min	13
6.	M	SGH Warsaw School of Economics	Warsaw	Telephone in- depth Interview (TDI)	1h	10
7.	M	Lodz University of Technology	Łódź	Telephone in- depth Interview (TDI)	1h	13
8.	F	Polish Business and Innovation Centers Association	Warsaw	Individual in-depth Interview (IDI)	1h 30 min	over 20
9.	M	Poznań University of Economics and Business	Poznan	Individual in-depth Interview (IDI)	2h	11
10.	M	Certified business coach	Warsaw	Telephone in- depth Interview (TDI)	45 min	over 20

Source: own work.

Two methods of data collection were used in empirical research: direct and indirect survey measurements. In order to conduct nationwide expert studies two research techniques were used: individual in-depth interview and telephone in-depth interview. (Maison, 2010, p. 61-62). Table. 3 presents data collection methods, research techniques, and applied research tools in implementation of nationwide empirical research. The interview questionnaire consisted of six open-ended questions.

Table 3: Type of data collection methods, research techniques and research tools

Expert research			
Type of data collection methods	**Research techniques**	**Research tool**	**Number of interviews**
Direct survey measurements	Individual in-depth Interview (IDI)	The interview questionnaire	6
Indirect survey measurements	Telephone in- depth Interview (TDI)	The interview questionnaire	4

Source: own work based on (Kaczmarczyk, 2006, p. 124) and (Kaczmarczyk, 2014, p. 57-59).

The first phase of the analysis of qualitative data was to prepare the transcription of the whole collected material. As a tool supporting the process of qualitative data analysis was applied MAXQDA program, from CAQDAS family - Computer-Assisted Qualitative Data Analysis Software. (Silverman & Konecki, 2012, p. 179-184, 234–235). MAXQDA is a software package that supports qualitative data analysis. (MacMillan, 2005, p. 1-2), (Niedbalski, 2013, p. 197). The last step of the research procedure was the interpreting of the interviews content and the processing of results.

Research Results

At the individual and telephone in-depth interviews, a group of experts, representing the scientific and business community, were asked about the profile of an entrepreneurial person, if in their opinion there is a set of necessary characteristics/qualities desirable when it concerns to start and run a business. Respondents concordantly claimed that if one wants to set up and run a business it is necessary to have the appropriate predispositions. To be an entrepreneurial person, according to the recipients, one must certainly to have the following characteristics: (1) internal obstinacy ("(…) if we cannot feel this enthusiasm at all and that is not a passion, later on it is difficult to find themselves and upon first failure, the willingness to run a company somewhere disappears."), (2) determination in actions - that is a characteristic that is downright essential to running a business and, (3) perseverance to pursue a goal. ("(…) the winners are those who are persistent, determined and able to go through with the worst stages of business. This is the key to achieve a success."), "(…) endurance of failure is important, mainly in the first stage and the ability to analyze their acts in categories: what is my plan, what I do to produce effects, what can I improve. When the results are different than the planned, the entrepreneurs treat it as information that there is need to be change, and they do not perceive it as a failure."). Besides the mentioned traits, the participants also point out the (4) courage, (5) willingness to learn and to act, (6) orderliness, and (7) the ability to work hard. Moreover, an entrepreneur has to be (8) consistent, (9) not be afraid of responsibility, (10) be highly motivated to action The relevant features of the entrepreneurial person that have been emphasized in the survey are the (11) communicativeness, (12) ability to pursue opportunity and tools that are offered to entrepreneurs. A further essential set of entrepreneurial qualities required for the success of a business are: (13) open-mindedness to new ideas, (14) decision-making ability, (15) risk-taking ability, (16) stress tolerance, (17) optimism, (18) flexibility, and (19) aptitude of adapting to different situations. In addition, an entrepreneurial person is (20) ambitious, (21) creative, (22) amenable to cooperate with other individuals - partners, contractors, employees, subcontractors, as well as (23) strongly future-oriented manner, (24) who has a vision and tries to realize it consistently, taking advantage of the opportunities. According to half of the respondents upon running a company, it is necessary to correct their actions repeatedly, in their opinion "(…) those who believe in being infallible - forfeit". In the opinion of the studied scientists, business psychologists, certified business coaches, experts with several years of experience in advising small and medium-sized enterprises and business environment institutions in the field of business incubation and innovation, to the personal characteristics (predisposition) for run own business should be primarily include: high self-esteem, imagination, capacity to convince, high conviction in the control of their own destiny, and need for achievement. Obviously, these are only examples of the most important features, but in the opinion of experts, listed characteristics are a wider universal significance for entrepreneurial people. The respondents pointed out that in the event of run their own company it is also very important to consider entrepreneurship through the prism of so-called managerial behaviors, which include: strategic orientation, oriented at opportunities, ability to utilize specialists knowledge, direct contact with the environment, or similar.

The conducted research allowed also to assess the factors that in the interviewees opinion are the most important in business and determining the entrepreneur's success in the market. Most of the responders pointed to several factors. The most important of them is to find an innovative product/service that that has not already been on the market, or to find such an offer or idea that will meets the customers and contractors expectations. The promotion and suitable highlighting of the product/service is the second factor, in the opinion of the respondents, has a significant impact of entrepreneurial success in the market. Among the characteristics of an entrepreneur, which in their

views are the most important in business, they listed: (1) determination, (2) self-belief, (3) perseverance and (4) creativity. The respondents admitted that in order to succeed, especially as an entrepreneur, and to realize their ambitions and to reach his/her goal, a set of key factors is needed, such as: personal characteristics, systematic and consistent work, knowledge, ability to use opportunities in the environment and motivation. Talent and idea are also a component of this success.

Nevertheless, the respondents emphasize that the most successful in the business activity are people with appropriate inborn characteristics, positively shaped by the local environment and enhanced by relevant educational programmes. In their opinion, entrepreneurial success is therefore determined by a synergic combination of: (1) innate entrepreneurial aptitude, (2) sociological conditions, and (3) educational programmes (including training and courses). The lack of any component limits the entrepreneurial an individual potential, because even a person with high predispositions without knowledge and skills (acquired in the course of educational programmes) will not be able to completely develop "entrepreneurial wings".

Additionally, during in-depth interviews, the participants were asked if imitating of other well-known entrepreneurs and their achievements is well perceived in business, and whether it is worth to be inspired by someone's entrepreneurship or, better that beginner entrepreneurs to find own original path. The respondents indicated that obviously one can be inspired the experiences of people who have already been successful in business, observe, analyze, gain knowledge from other entrepreneurs, but most of all in order to find their individual path. As they stressed, the path of other entrepreneurs should not be copied and never imitated because such actions often lead to failure of everyone’s who doing that.

Conclusions

Summing up, the study showed that to run their own business requires certain predispositions, which could be defined as "entrepreneurial aptitude". The literature proposes many combinations of universal features, aptitudes, skills and/or competences that are desired in the running a business. Those sets are highly valued and it is worth to base theoretical studies as well as empirical research on them. However, it should also be noted that the characteristics useful for running their own business change over time and actually, it changes with the growth of the company. For example, insofar as the first period of a company's existence, the initiative and the ability to work hard becomes paramount, it with the growth number of employees the role of leadership and managerial skills (including planning and control) increases.

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Annex

Interview Questionnaire - Module Related To Define The Profile Of An Entrepreneur And The Determinants Of Entrepreneurial Success In The Market

1. Let's start with a question about the profile of an entrepreneurial person. In your opinion, is there a set of necessary characteristics/qualities, desirable when you want to start and run a business? Is it necessary to have appropriate predispositions?
2. What do you think can be learned by run their own businesses?
3. In your opinion, what is the most important in business? What factors have a significant impact of entrepreneurial success in the market?
4. How to succeed, especially as an entrepreneur? What should be done to fulfill ambitions and achieve your goal? Is it enough to be highly motivated? Great talent? Or maybe you need to have luck or the opposite - to choose to work above your strength?
5. In your opinion, what are the key factors that determine entrepreneurial success? Are these primarily inborn/natural characteristics? Or, quite the opposite are they entrepreneurial traits and predispositions, formed and enhanced by various educational programmes?
6. Beginning entrepreneurs frequently concentrate on imitating well-known entrepreneurs and their achievements. In your opinion it would be useful to imitate others? Is imitating the behavior of other entrepreneurs well perceived in business? Whether to be inspired by someone's entrepreneurship or, beginner entrepreneurs should find their own original path?

Demographics

Age structure:

€ 18-24 years
€ 25-30 years
€ 31-35 years
€ 36-40 years
€ 41-50 years
€ Over 50 years

Total work experience (in years) …….....

Represented University / Education institution / Position: ……...

City: ……...

Determining the Effective Factors on Affective Money Behaviors of Academic Staff: Comparison of Turkey and Romania

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Abstract

A new provocation regarding the knowledge of the financial environment a good financial health and the abilities to manage money are essential in a economic systems in continuing changing. Today the ability and financial skills allow people to allocate their financial resources throughout their lives in a life of uncertainty and imperfection. The lack of healthy financial education leads to inequalities between customers and consumers. Without a general understanding of financial concepts, we cannot make wise choices in financial terms we are not open to saving and we do not know how this behavior can help us in the future. We do not know how to make investments, we do not understand how and when we can access a loan, we do not understand the financial terms present in a contract of a financial entity. The Klontz Money Behavior Inventory present in this study examined the internal consistency and convergent validity of the KMBI, through comparison with similar measures, among a sample of 472 academic staff from AKU Turkey and Cluj Napoca University Romania, 232 academic staff. The multi-scale measure the presence of eight distinct money disorders and establish relationship between mental health and financial behaviors, results which can be used to obtain a professionals and financial planners for different culture and behavior. The results indicate that culture has no influence in financial health behavior and give an image about the new profile of consumer in a global market. These findings highlight a need for literature and assessments to identify and describe disordered money behaviors with specific tradition and culture and adapt the economical strategies.

Keywords: Affective Money Behavior, Comparison Study, Statistical Analysis, Financial education

Introduction

Today, more than ever, any person needs basic financial knowledge to understand how society works and how to make the best decisions for its future. Knowledge of the financial environment and the abilities to manage money are essential to tackle the complex economic systems of the present. Why it is important to have a financial health education? Because education improves management costs, balance and reduces the probability of declaring bankruptcy or survives during the financial crisis.

Shawn et.al (2012) examining mechanisms of financial education they observed that financial education increases people's financial participation and behavior and decision making through: attitudes, borrowing behavior, discount rates, risk-aversion, and influence also co-workers and families environment. Yamauchi and Templer (1982) established that money is not only an instrument of commerce; it also has a multidimensional psychological meaning which also can be treated as a symbol of status, prestige, power and value. The attitudes towards use of money may be influenced by demographic factors such as age, gender, income, education, cultural background, etc.

Lochner and Moretti (2004) measure the effect on financial market taking in consideration the age, education and gender but not correlated with the ability, parental characteristics or other factors.

Shawn et al. (2012) in their research, introduce a new concept as smart money as effect of education on financial behavior has a smaller impact on financial market participation but statistically and economically has significant effect.

An academic interest in the psychological beliefs and behaviors related to financial outcomes dates back to the early 1970's of Furnham (1996), Klontz, B. and Klontz, T. (2009) were designed a model to assess for the presence of disordered money behaviors, taking in consideration the systemic changing on life quality as a feedback Klontz et al.(2012) adapted and developed a new model to identify the behavior money inventory KMBI.

The Klontz Money Behavior Inventory (2012) and Taylor et al (2016) used the KMBI scale to be a standalone, multi-scale measure than can screen for the presence of eight distinct money disorders. Given the well-established relationship between mental health and financial behaviors, results from the KMBI can be used to inform both mental health care professionals and financial planners. Klontz, B. et al. (2011) identify eight behavioral patterns that have been noted in the literature relating to money disorders behaviors: compulsive buying, pathological gambling, compulsive hoarding, workaholism, financial dependence, financial enabling, financial denial and financial enmeshment. The patterns were measured by Klontz et al.(2009, 2012) using the KMBI model and they associate money behaviour with poor financial health (Taylor et al, 2016).

Benson and Silver (2015) sustain in their article regarding the connection between hoarding and money attitude that individuals who resonate with the money status belief pretend to have more money than they actually do and use credit cards as a means to purchase status-enhancing goods from designer or luxury-related brands.

Yeong Nain Chi and Gaurango Banerjee (2013), study the money attitude but bicultural, where a growing number of individuals are taking responsibility for their own financial security, they are faced with increasingly more complex financial instruments, and there are still many who are ill-prepared for making sound savings decisions.

Brief review of the literature

Roberts and Sepulveda (2013) investigate the consumer culture and money attitude between Mexican and US peoples. Their conclusion was that the common language of the consumer culture is money. Money attitude influence all areas of persons life. In the mean time it is important to take in consideration the negative part of consumer culture regarding the financial health which is compulsive buying which becomes a primary response to negative evens and feelings. Gallen (2002) suggested that money disorders are problematic financial behaviors that people engage in to attempt to avoid emotional pain. Taking in consideration that money attitude dimension are power-prestige, retention –time, consumer competency and anxiety (Roberts and Sepulveda 2013).

Benson-Townsend and Silver (2013) mention compulsive hoarding as a function of money attitude. Money attitude dimension are power-prestige, retention–time, consumer competency and anxiety. Klontz, B. et al (2016).When family financial structures become so intertwined that the traditional roles of parents and their children become blurred. On the other position Klontz et al (2011) consider family as a very important and the perfect environment for children to learn about money having a good example parent's behavior example. Jorgensen and Savla (2014) establish a direct relationship between parent and children attitude and behavior upon money and also parental financial socialization of their children. Kemitz et al. (2016) establish an area of concern in parent – child relationships are the impact of boundaries and roles. Parents whose boundaries with their children are rigid and inflexible do not prepare their children to effectively deal with stress in their lives. Similarly, parents whose boundaries are too flexible may impede their children's ability to develop appropriate coping skills.

On the other hand Danes and Dunrud (1993) conclude the importance from earlier age of children to be taught by their parents about finance. In the same time Danes and Dunrud (1993) and Toraman et al (2016) consider credit cards a source for advertising and appropriate financial behavior in family which create a dynamic environment for financial enmeshment. Segrin et al. (2013) suggest another new concept of helicopter parents and their narcissism and their selfish motivation and divorce couple and the negative environment for the young and future adult in financial health. According to Wąsowicz- Kirylo (2008) the attention paid to money shown by the parents, as well as their ways of coping with financial matters, play a significant role in how their children find their way in the world of finance.

According to Kowalczyk and Chudzian (2015) the results of the research, individuals who in their youthful age benefited from banking products, are the more consistent with the characteristics of a rationalist's person. This situation can be explained by the fact that people who used to use banking products (e-banking, card, e-commerce, transfer of money) treat them as a tool a fast and safe instrument and rapid solution for their financial health. Also children who had their own money better deal in financial problems in their adulthood and managing the financial situation better. Hoarders save items for reasons related to sentimental attachment, usefulness, and aesthetic qualities, and possessions become an extension of the self as Belk (1998) for the first time in his studies have shown that hoarding develops as a result of conditional emotional responses to various thoughts and beliefs concept used also by Klontz et al (2011), Grisham and Barlow (2005), Trachtman (1999) and Lowrance (2011) considered that money has been argued to be one of the most neglected topics in psychological research and practice. Kershaw (2008) identified hoarding as a problem financial behavior and the desire for money is related to the desire for the things it can buy, but like Lea and Webley (2006) mention the two are logically distinct.

Taking into account the literature of the field and the results obtained from national or cross-cultural studies, the authors have established a map of the consumer's behavior and the financial education required and the factors or barriers identified as having a positive or negative influence on the behavior financial.

In 2014, Canale and Klontz (2014) transfer the notion of hoarding disorder from psychological disorder, to the money as management disorder from financial health point of view. In conclusion in the new society peoples must to spend the money in order to live life and those that save money to the point of ignoring leisure, medical care, personal hygiene, or creating dangerous situations from clutter, need to develop a healthy relationship with money and to find ways to use money successfully with the help of financial education help.

Consumers save and borrow to have enough money left for retirement, to make stable and expensive purchases and to protect themselves against unforeseen expenses Bucciol and Veronesi (2014). It is therefore useful to research whether parental financial teaching can lead to specific consumer saving and borrowing behavior.

Many previous studies of Bucks and Pence (2006) and Simkiv (2013) have discussed the role that financial education plays in relation to financial behavior and whether financial education is relevant to increasing financial knowledge.

Research results show that people from Ukrain who work in state institutions are more meticulous about planning their budget, projecting all income and expenses, they try to pay all the bills on time to avoid financial punishment and generally are more prudent and careful about spending money. In the United States of America, the 2018 United States Study (2018) shows that economic education has grown insignificant and that there has been no growth in personal finance.

Last but not least, there is a need for financial education, which is an important pillar of economic sustainable thinking like in Fig 1.

Money management skills in an ever-changing economy of adapting to a modern market have become an essential and important element and most states have not yet prioritized the development of a personal financial culture since the school's banks. Financial inclusion and financial health are the solutions that can solve the problems of individual life if the current causes and challenges of the economy are understood and the existing gaps in the traditional financial system are being remedied like Dan Schulman the CEO of PayPal (2016) sustain that issue even the study was realized in a country very well know as an economical power.

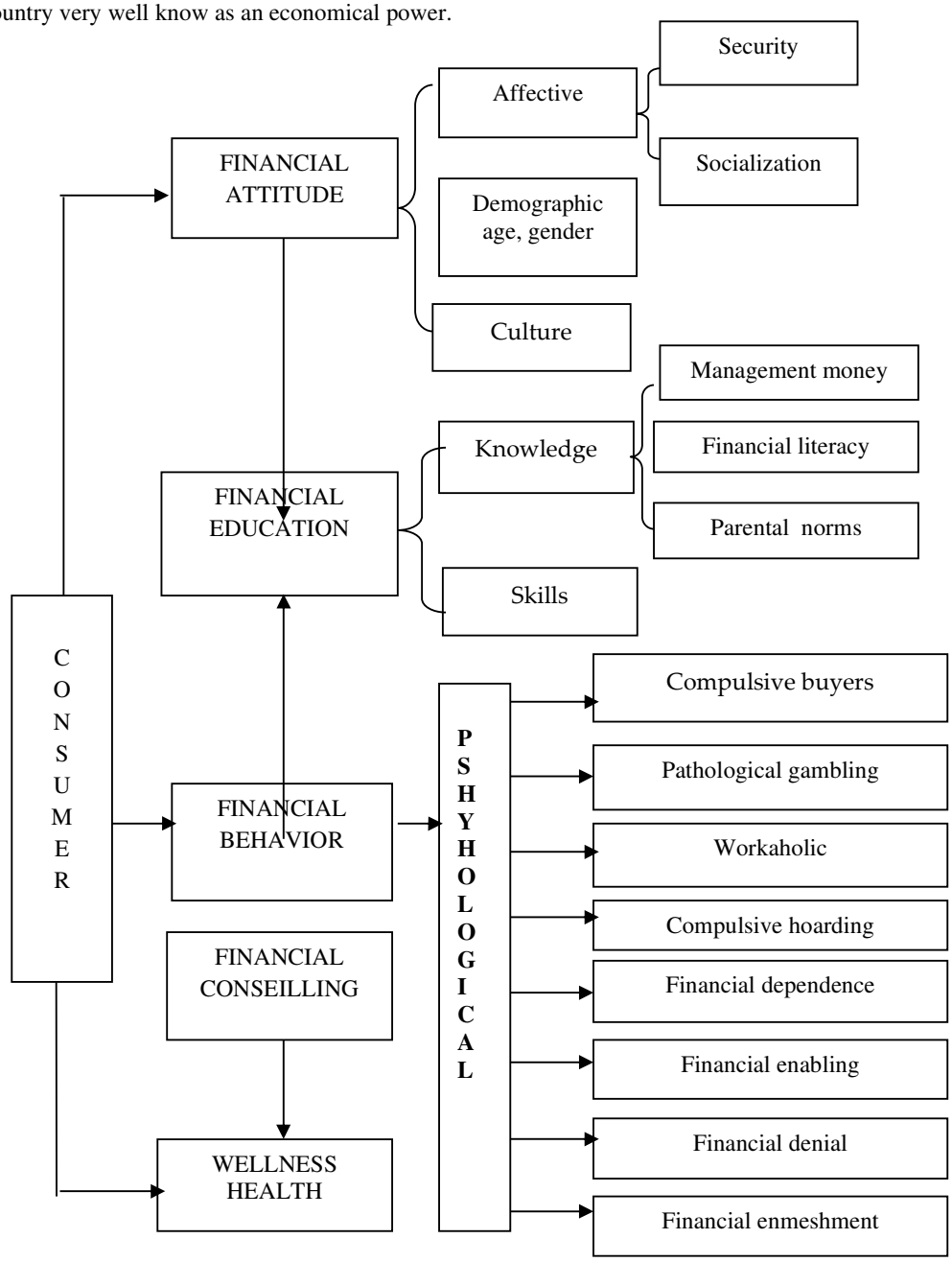

Fig. 1: A Map of Effective factors influencing the financial behavior

Source: By authors

Table 1: summarize the money systemic evolution and financial attitude and behavior of consumer in researcher's definition

Table 1: Dimension of money disorder

Authors	Dimension of money disorder
Yamauchi and Templer, 1982	Money is not only a instrument of commerce it is also a multidimensional psychological meaning
Trachman, 1999, Lowrance, 2011, Koltz Bives 2008	Money is the most neglected topic in psychological research and practice
Jorgensen and Savla, 2010	Direct relationship between parent and children attitude and behavior upon money
Klontz et al. 2011	Money behavior is associated with poor financial health
Shawn and Paulson, 2012	Smart money as effect of education on financial behavior
Gallen, 2012	Money disorders are problematic financial behaviors to avoid emotional pain
Yeong, et al. 2013	Money attitude responsibility for their own financial security
Candle rand Klontz, 2013	Money are associated with management disorder
Benson and Silver 2015	Connection between hoarding and money attitude

Source: By authors

Hogarth (2006) in his paper provides also a picture of financial education in the USA because it refers to the development of the community and the economy. He answer to the major W's ''why it is necessary to analyze? why financial education is important? and what is "financial education?" In the actual global market of the 21st century financial education differ from previous epochs.

From individual financial education perception differ from a person to another, Hilgert et al (2003) have demonstrated that the higher consumer-based level financial knowledge shows that the consumer has undertaken several positive financial management behaviors and has used several financial products and services. In change they (Hilgert et al.2003) establish and have underlined that financial knowledge can be statistically linked to credit-related financial practices as well as cash flow management, savings and investment.

Hanushek and Woessmann (2008) also analyzed and demonstrated a very close link between the cognitive abilities of a country's population and the country's economic growth rate. Hanushek (2008) carried out an analysis of all teachers, so improving the quality and efficiency of teachers is directly related to strengthening students' financial literacy. Hanushek et al (2008) present the impact of good training increases as the student advances to a higher level, but the teachers rely on average performance in students and set their instructions accordingly.

Swinton et.al (2007) in their study in Georgia as ex-communist country with different behavior and mentality, discover and have shown that high school students are required to pursue a course of economics before graduation.

This attitude it is necessary especially now when the global economy it is in a dynamic changing and we have to prepare the new citizens of tomorrow. In addition, they require students to undergo a state level state-level test at the end of the high-school economics course.

This test is calculated for 15% of the final grade during the high school. For these reasons, Georgia is uniquely suited to analyzing whether personal training for high school economics teachers improves pupils' learning.

In conclusion the situation from Georgia, like in Romania and other countries from East Block communist countries, we can make a difference by building deeper links between the public, private and social sectors to develop new curricula and educational models that encourage and encourage knowledge and financial understanding from a young age.

Most empirical and theoretical literature suggest that there is a relationship between social indicators and economic growth, therefore human capital has been subjected to research by Mohun et al (2010) as it is and will remain a great unknown. In their study in Mauritius, they tried to identify the determinants of economic development.

They viewed education as an investment in human capital because the benefits belong to an educated individual during a lifetime. To test this hypothesis, human capital has been considered as an important role in economic growth, mainly as an engine for improving production and society through sound financial education.

The money behavior of people and question of money attitudes was explored and described by Kowalczyk and Chudzian (2015), in their article about money attitudes and economic socialization in Poland.In their research implications arising from the awareness of the existence and operation of specific factors affecting attitudes towards material values.

Not at last Ünal and Düger (2015) in Turkey also applied an empirical analysis on the relation between academics financial well-being and financial behavior. In addition, it was found that people with higher education comes a better ability to refrain from spending money.

Taking in consideration that factor in their research Kowalczyk and Chudzian (2015), Roberts and Sepulveda (1999), Tang (2007), Tang and Gilbert (1995), Tang and Chiu (2003) found that people with higher incomes are likely to evaluate the money as a good thing, a proof of the successes.

Yoko Mochizuki and Audrey Bryan (2015) bring an important contribution through the concept of climate change in education in the context of sustainable development education and especially for financial education.

In the final document entitled "The Future We Want", participants from all countries have renewed their commitment to "ensure the promotion of an economically, socially and environmentally sustainable future for our planet and for present and future generations" from United Nation UN, 2012, p. 1, (2012). Financial education is a life cycle that sometimes requires adaptation and harmonization with the new conditions imposed by time and space. The paper presents the importance and role of financial education in modern society when the dynamics of turbulent factors often lead to economic and financial changes. The paper presents the advantages and the current importance of financial education for the young generation and for individuals as well as for economic units and last but not least for the whole society as we share the same economic space. The article follows the position of financial education in two countries with different traditions and cultures, as well as the need to inform the public about the financial education needed at European level in a dynamic and global society.

The conclusion is that it is necessary to prepare a national financial education so Starček and Trunk (2015) have noticed that economic changes, demographic problems, the dynamic evolution of technology and the other in Europe lead to a delegation of responsibility in the field of financial activities and security of individuals. The purpose of this study is to examine and determine the effective factors on affective money behaviors of academic staff via statistical techniques and compare the results of Turkish and Romanian academic staff simultaneously.

The article may provide a boost to help realize that currently often ignored issue of the existence of shaped money attitudes is often a source of social as well as economic problems from market and give a complete image of financial health.

Materials and Methods

Purpose of the Study

The paper and research done until now in literature confirms that the profession of professor is more popular as income increases and therefore attracts more motivated and skilled people. For that reason the study want to identify the academic staff behavior upon the money behavior and identify the level of financial education between two countries with different culture and perception. The participants of this study is composed of 472 academic staff working at Afyon Kocatepe University and Technical University of Cluj Napoca between the dates 15 March -15 April 2019. To measure the effective factors which influences the financial behavior of academic staff, a Likert scale type questionnaire, ranging from 1 to 5, from strongly disagree to strongly agree is applied on a face-to-face individual questionnares for each academic staff from university. The questionnare is Klontz's (2012) money behavior inventory has commonly formed this questionnaire (KMBI). The questionnaire was composed of 60 questions. Seven of them were related with demographic characteristics (age, living place, gender, education level, marital status) and 53 of them were related with their the financial behavior, because of some unfilled and wrong filled questionnaires, the statistical analyses are applied over 472 questionnaires.

Sample and Measurement Tool

Explanatory Factor Analysis (EFA) is applied first to data set to determine the dimensions of the scale. Then, by independent samples *t* test the hypothesis whether the obtained dimensions' means differ according to country is tested. Finally, regression analysis applied to determine the effective of other variables (which are obtained from the results of EFA) on the Affective money Behaviors of academic staff. SPSS software is used to perform these statistical analyses.

Reliability and Validity of Scales

As a result of Explanatory Factor Analysis (EFA) 23 items have subtracted from the scale because of getting loadings in a wrong factor and forming a separate factor combining with wrong items theoretically. Finally, analyses are applied over 30 items for six factors named as:

1. Affective Behavior (AB1-AB11);
2. Pathological Gambling (PG1-PG5);
3. Compulsive Buying (CB1-CB4);
4. Financial Enabling (FE1-FE4);
5. Financial Enmeshment Family (FEF1-FEF3);
6. Compulsive Hoarding (CH1-CH3).

These six factors also explained the 58.266% of total variance. The factor loadings, Eigen values and Cronbach's Alpha values of each factor are given in Table 1. The total Cronbach's Alpha value of the scale which consists of 30 items is calculated as 0.884 which is statistically one of the indicators that the reliability of the scale is well enough.

Results

This paper attempts to bring to the existing literature new evidence on the relationship between education and economic growth, but also to investigate, if the formal models so far are valid from the point of view of culture, a cross cultural model of the traditions and the mentality of the money people behavior and attitude.

The study also highlights the statement that education plays a central role in economic growth regardless of country and level of economic development. The role of education in universities through their staff can provide the theoretical economic conditions needed in the formation of the next generation of consumers, tomorrow's entrepreneurs.

The patterns developed in each country through the growth effects of education as presented in today's literature are presented in the study carried out in Turkey and Romania universities with different culture and traditions and also people mentality.

The authors consider that financial education is very important and teachers are, in turn, models that shape tomorrow's generations that's why the target was selected from academic universities staff.

The results are presented and organized so as to bring a contribution through:

1- Short analysis and the effects of the prospects of the economic growth theory for each country and separately following the application of the KMBI questionnaire;
2- Provides the interconnection between education, financial education and economic growth for sustainable education;
3- Develops and present a possible cross cultural model from financial education point of view;
4- Describes behavioral analyzes in relation with individual and family affairs money and activities for educated peoples;
5- Explains the relationship between education and economic growth;
5-Also highlights the negative money transformations behavior and attitude in financial behavior and gives information about them.

As we can see from Table 2 the results are establish for academic staff from both countries and their behavior the maximum value of 7.894 was obtain for affective behavior (AB) sentimental behavior it is similar for both countries the responsibilities of educated people in front of themselves and their families, the maximum score was obtain by the item AB1 *''I often return items because I feel bad about buying them''*.

Table 2: Results of Explanatory Factor Analysis for academic staff behavior

Factors		Loadings	Eigen values	% of Variance	α
AB	**Affective Behavior**		7,894	12,621	0.835
AB1	I often return items because I feel bad about buying them.	.634			
AB2	I have made promises to myself or others to work less but have had trouble keeping them.	.610			
AB3	I feel anxious or panicky if I am unable to shop.	.580			
AB4	I have hid my gambling from people close to me.	.578			
AB5	I hide my spending from my partner/family.	.567			
AB6	I hide my need to hold on to items from others.	.543			
AB7	I often find myself feeling resentment or anger after giving money to others.	.529			
AB8	I feel guilt and/or shame after making purchases.	.514			
AB9	I feel irresponsible if I get rid of an item.	.501			

AB10	Shopping interferes with my work or relationships.	.478			
AB11	I have tried to reduce my spending but have had trouble doing so.	.433			
PG	**Pathological Gambling**		3.276	12.075	0.859
PG1	I have to gamble with more and more money to keep it exciting.	.829			
PG2	I have committed an illegal act to get money for gambling.	.791			
PG3	I have borrowed money for gambling or have gambled on credit.	.761			
PG4	I gamble to relieve stress or make myself feel better.	.752			
PG5	I have trouble controlling my gambling.	.679			
CB	**Compulsive Buying**		2.246	11.164	0.831
CB1	I feel irresistible urges to shop.	.817			
CB2	I shop to forget about my problems and make myself feel better.	.792			
CB3	I buy more things than I need or can afford.	.756			
CB4	I obsess about shopping.	.732			
FE	**Financial Enabling**		1.764	8.819	0.682
FE1	I sacrifice my financial wellbeing for the sake of others.	.727			
FE2	I give money to others even though I can't afford it.	.704			
FE3	I have trouble saying "no" to requests for money from family or friends.	.642			
FE4	I lend money without making clear arrangements for repayment.	.627			
FEF	**Financial Enmeshment Family**		1.223	7.155	0.764
FEF1	I ask my children (under 18) to pass on financial messages to other adults.	.810			
FEF2	I talk to my children (under 18) about my financial stress.	.739			
FEF3	I feel better after I talk to my children (under 18) about my financial stress.	.730			
CH	**Compulsive Hoarding**		1.078	6.432	0.629
CH1	I have trouble throwing things away, even if they aren't worth much.	.750			
CH2	Throwing something away makes me feel like I am losing a part of myself.	.708			
CH3	My living space is cluttered with things I don't use.	.425			

As Klontz establish in his scale of measure of behavior on money we identify also another factor pathological gambling (PG) which obtain a value of 3. 276 and situate the behavior on second place for entire target which present the hidden part of people and also the feeling of power for a moment. The maximum score was obtain by the item PG1 *''I have to gamble with more and more money to keep it exciting'' s*o extra activities of spending time and be relax in each country it is important, it is

necessary to view the positive part of situation on one site gambling help to develop the creativity and ability and also to assume the risk in different situations in individual or family life style.

For the other factors as we can see from Table 2 the values are lower for example compulsive behavior (CB) obtain a value of 2.246 but the item with significant importance it is CB1 '' I feel irresistible urges to shop'' which reflect exactly the actual society when shopping became a routine in people life style.

The financial enabling (FE) has a value of 1.764, and the important item it is ''I sacrifice my financial wellbeing for the sake of others''. The role of financial education it is important for the financial health of family situation. Even we are in a consumerism society the family still represent the base of society so the culture cannot influence yet the family relation between members and involving also the children it is important because they can get the significant information's and parents behavior from an early child age and they can be model future situation.

For financial enmeshment (FEF) from Table 2 using the data base a value of 1.223 was obtain and the most significant score was for item FEF 1 '' I ask my children (under 18) to pass on financial messages to other adults'' from here we can observed that traditional relations between family members remains in each countries.

The low value as minimum value for compulsive hoarding (CH) of 1.078 item CH1 ''I have trouble throwing things away, even if they aren't worth much'' for both country it is important because they are feeling attaché of the objects, situations and moments from their daily life and give them memories of childhood and youth.

Correlation between Turkey and Romania academic staff behavior and financial education

To test whether Affective Behavior (AB), Pathological Gambling (PG), Compulsive Buying (CB), Financial Enabling (FE), Financial Enmeshment Family (FEF), and Compulsive Hoarding (CH), score means differ according to country variable, the study hypothesis are as below in Fig. 2.

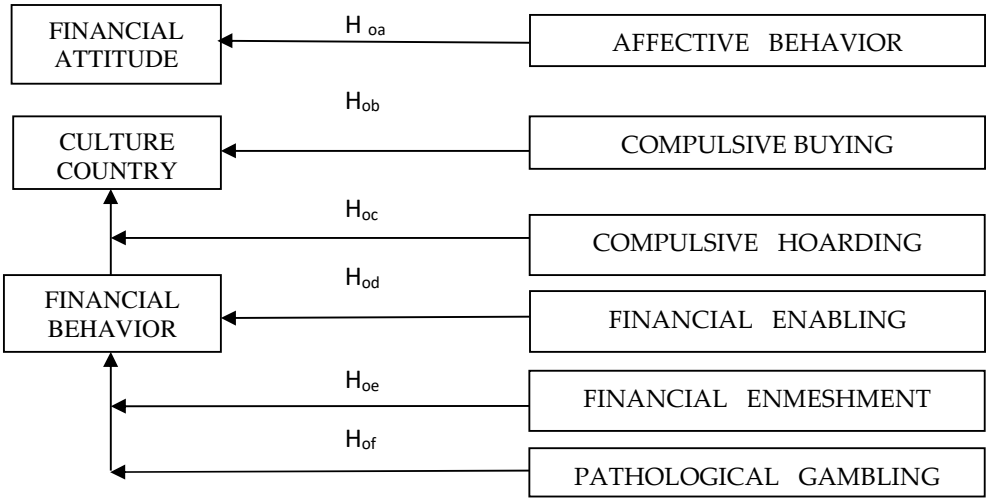

Fig.2: Research model hypothesis

Source: By authors

The hypotheses are:

H_{0a}: There is no difference between Turkish and Romanian academic staff's Affective Behavior means;

H_{0b}: There is no difference between Turkish and Romanian academic staff's Compulsive Buying means;

H_{0c}: There is no difference between Turkish and Romanian academic staff's Compulsive Hoarding means;

H_{0d}: There is no difference between Turkish and Romanian academic staff's Financial Enabling means;

H_{0e}: There is no difference between Turkish and Romanian academic staff's Financial Enmeshment means;

H_{0f}: There is no difference between Turkish and Romanian academic staff's Pathological Gambling means.

After determining the dimensions of the related scale, for each dimension, mean and the standard deviations, we calculated for both countries Turkey and Romania like in Table 3 the values for each country and establish which factor has big influence in academic staff money behavior.

Table3: Means and Standard deviations of the sub factor related with each country

Country	Statistics	AB	CB	CH	FE	FEF	PG
Turkey (n=300)	Mean	2,069	2,232	2,316	3,063	2,502	1,401
	S.Dev.	0,595	0,919	0,865	0,921	0,834	0,673
Romania (n=172)	Mean	1,740	2,350	2,058	1,616	1,424	1,188
	S.Dev.	0,461	0,717	0,547	0,740	0,638	0,428

Turkey has bigger values for financial enabling a value of 3.036, and for FEF financial enmeshment a value of 2.502 in comparison with Romania which obtain bigger values only for compulsive behavior CB= 2.350 and compulsive hoarding CH=2.058. In conclusion Turkey has a different perception in money behavior in comparison with Romanians academic staff. But in both countries pathological gambling (PG) obtains low score that's mean that people don't like to assume risk especially financial or losing money just for fun.

The results of independent samples *t* tests are given in Table 4 and indicates that there is a statistically significant ($p<0.05$) difference between the means of Affective Behavior (AB), Pathological Gambling (PG), Compulsive Buying (CB), Financial Enabling (FE), Financial Enmeshment Family (FEF), and Compulsive Hoarding (CH) scores of academicians.

Table 4: Results of independent samples *t* tests for Turkey and Romania

Variable	*t* value	Degrees of Freedom	*p*
AB	-6.250	470	0.000
CB	1.446	470	0.149
CH	-3.532	470	0.000
FE	-18.648	470	0.000
FEF	-14.649	470	0.037
PG	-3.735	470	0.000

Consumption has led to the emergence of the new fashionable term for today's consumerism. The compulsive hoarding problems arise as Jefferys and Moore (2008) sustain when negative attitudes arise in the relationship of consumption - the economy or in the relationship of acquiring and throwing the goods without suffering.

This process is well managed most of the time, but for those who hide compulsively, this process has a negative effect does not resist the need to acquire goods, which are sometimes valuable and unable to discard even in the excess point that leads to crowded living spaces.

For both countries a low value -18.648 was obtain for Financial Enabling (FE) followed by the value of -14.649 for (FEF) Financial Enmeshment Family. A positive value the biggest score 1.466 was obtain for compulsive buying (CB). To be able to identify the influence of each factor for academic staff from each country, and to be capable to determine the effects of CH, FE, FEF, PG on Affective behavior (AB), regression analysis applied to related data set and the results are given in Table 5 and Table 6.

Table 5 indicates that the regression models for Turkey and Romania are statistically significant.

Table 5: ANOVA Results of the Regression Analysis

Country	Source	Sum of Square	df	Mean Square	F	*p*
Turkey	Regression	42.759	5	8.552	39.732	.000
	Residual	63.28	294	0.215		
	Total	106.039	299			
Romania	Regression	22.8061	5	4.561	55.486	.000
	Residual	13.646	166	0.082		
	Total	36.452	171			

Table 6 also indicates that while for Turkish academicians, the effect of financial enabling (FE) is not statistically significant, for Romanian academician's compulsive hoarding (CH) and financial enabling (FE) is not statistically significant on their Affective Behaviors.

Table 6: Coefficients of the Regression model for both countries

Country		Constant	CB	CH	FE	FEF	PG
Turkey	β	0.755	0.169	0.266	-0.025	0.091	0.121
	t value	5.714	5.108	7.715	-0.835	2.786	2.762
	p	0.000	0.000	0.000	0.404	0.006	0.006
Romania	β	0.190	0.224	0.096	0.009	0.127	0.532
	t value	1.804	5.665	1.975	0.220	3.170	7.982
	p	0.073	0.000	0.050	0.826	0.002	0.000

As we can see from Table 6 academic staff from Turkey obtains a maximum value for t value of 7.715 for compulsive hoarding (CH) and an insignificant value of -0.835 for financial enabling. For Romania the results are different the maximum values of 7.982 it is for pathological gambling (PG) and the minimum score of 0,220 was obtain for financial enabling (FE). We have to mention that for pathological gambling (PG) we take in consideration also the virtual games and play station games which is very familiar especially now and when the parents spend more time with their kids and play on computer games very attractive and a way to spend free time in and with family. The low score for financial enabling (FE) present the same problem faced by both countries even they have different culture and perception, that's mean that the people interact yet with others needs and desire and the

feeling of doing well for others or making sacrifices for family and assurance a financial health still remain a mentality and also a duty for both culture.

Regression model for Turkey and Romania

Related with Table 5 the regression model for Turkey (1) and Romania (2) is as below:

$$\acute{Y}_{Turkey} = 0.755+0,169CB + 0.266\ CH - 0.025FE + 0.091FEF + 0.121PG \quad (1)$$
$$\acute{Y}_{Romania} = 0.190 + 0,224CB + 0.096\ CH + 0.009FE + 0.127FEF + 0.532\ PG \quad (2)$$

The differences for each country are for compulsive buying point of view (CB), for Romania it is 0.224 bigger than the Turkey values which is 0.169 maybe because Romanians are spending more time for shopping as a way to spend the weekend with family and enjoy together movies on cinema mall's giving them the feeling of spending time together and adapting step by step with the new brand for consumerism society.

Also Romanians academic staff obtain bigger values score for financial enmeshment (FEF) of 0.127 in comparison with Turkeys academic staff with a value of 0.091 which present again some differences of culture and behavior but here we must to take in consideration also the mother status in some Romanians family where the responsibilities are equal and share with entire family.

Turkey academic staff obtains good score of 0.266 for compulsive buying (CB) which present an oriental behavior specific for traditional family, to be dependent of family things and memories, a sentimental and sensitive behavior of Turkey culture in comparison with Romanians who obtain a value of 0.009 because the modern society model and transform the traditional concept of old Romanians family.

Discussion

According to t test results Turkey and Romania differs by Affective Behavior (AB), Pathological Gambling (PG), Compulsive Buying (CB), Financial Enabling (FE), Financial Enmeshment Family (FEF), and Compulsive Hoarding (CH) when we examine the means of these behaviors, Turkish academicians AB, CH, FE, FEF are greater than Romanians which means that they more return items because they feel bad about buying them, they have much trouble throwing things away, even if they aren't worth much. They sacrifice their financial wellbeing for the sake of others, and they ask their children (under 18) to pass on financial messages to other adults then Romanians.

On the other hand even if there is no statistically difference for the Turkish and Romanian academicians' compulsive buying (CB) means, Romanian academicians much feel irresistible urges to shop than Turkish. Another cultural difference it is between Romanians pathological gambling perception (PG) means are greater than Turkish ones, which mean that, they have to gamble with more and more money to keep it exciting and a way to spend free time. Regression analysis indicate that on Affective Money Behaviors while CB, CH, FEF and PG are statistically effective on Turkish academicians, on Romanians' CB, FEF and PG found statistically significant. The regression coefficients also indicate that while CH is the most effective factor on Turkish academicians' Affective Money Behaviors, PG is the most effective factor on Romanian academicians' Affective Money Behaviors. It's known that legally it's forbidden to gamble in Turkey, however in recent years by the developing internet technology, it's a known fact that Turkish people play gambling via internet. On the other hand, they play sportive gambling with an increasing numbers. However, it's free to play gambling in Romania.

Psychologically Romanians like much exciting activities and they consider winning extra money for their family. Even if they think like that, they consider remaining in this virtual world (gambling, sport bets, video games, card games) following the rule that always the casa wins, but they lose much and much. Because of the earlier regime restrictions in Romania, the new type of the society create a new type of consumer changing their behavior and became much compulsive for buying items.

Because of Turkish people are more emotional, they make much connections with the old (memorize) things and they feel trouble to put them away. On the other hand again Turkish are used to thing the other people much then themselves, they are able to sacrifice their financial wellbeing for the sake of others, and they consider the opinions of their children, related with their culture.

Conclusion

By the purpose of determining and comparing, the effective factors on affective money behaviors of academic staff at Turkey and Romania, the study present that Romania is adapted to the new global situations regarding the effect of the past and current. In Turkey, related with the traditional, family and effect of earlier money behaviors, there are significant differences between Romania and Turkey are presented in this study.

As a final conclusion the changing of money attitude can be examined with the help of certain available instruments or a new instrument can be developed to measure attitude towards money social, cultural and economic settings that are different from the one for which the tools have been developed already.

The study shows that there are still cultural influences in the way of thinking due to the peculiarities and traditions specific to each country. These furtive influences also manifest in relation to financial education. As society is in constant change, initiation in financial education since high school could help develop the abilities of the young generation to inform it about how to invest and equalize money. These abilities will also contribute to shaping the future citizen the consumer of a society subject to constant change. Financial education in Romania has become a need, recognizing that economic and financial education helps young people to better manage their personal finances. Young people who have received information and have notions of an economic nature are more confident in themselves, are able to make better financial decisions and act responsibly as informed citizens. Financial education is based on basic economic concepts and a way of thinking economically and is conceived as a genuine program of financial knowledge. Basic knowledge education is needed to manage daily finances; the rest of the specialized areas, such as investment or retirement planning, should be left by professionals. Certain research studies have shown that there is a relationship between financial knowledge and financial behavior, but causality is not clear. Financial education plays an important role in guiding individuals to achieve their financial goals and to contribute to the economic well-being of society as a whole (Jefferys and Moore ,2008).

The content of educational programs should focus on actions that effectively use the available social resources and setting goals and planning to reach life goals. Assessing the effectiveness of financial education for low-income consumers should not only increase knowledge acquisition but also financial confidence and improvements in financial behaviors and results. Information provided only by traditional financial education is likely to be insufficient to improve the economic well-being of consumers, especially those with low incomes, in the absence of financial integration. Low-income consumers are more likely to need additional support for actions such as financial products that support specific behavior, counseling, coaching or mutual support, access to language services, child care, transport, etc.

It is therefore necessary to recognize the significant barriers faced by the population in terms of financial soundness or anticipated financial behaviors so that public systems, legal processes and public policies can help by creating additional barriers to certain financial behaviors.

On the basis of literature, Suciu and Lacatus (2013) the study work has also identified the most important principles of financial education that are illustrated by long-term active learning;

- orientation towards individual financial education;
- getting information on early economic education provided by both (schools) and non-formal and informal training programs such as those offered by NGOs;
- identification and recognition of risks and financial problems.

This type of financial education can be done through different forms of financial education in formal, non-formal, and developing to critical thinking, and comparative cultural analyzes being chaired beneficial. In Romania, financial education is, in most cases, part of the school curriculum, and other social partners are interested, so banks are also interested in contributes to financial education and a society with stable financial health. Universities and staff could help schools carry out financial activities, and curricula can also help develop their own financial education through various programs.

At regional level, local and regional institutions as well as universities as important pillars in financial education through the long-term perspective could make a difference for sustainable development and develop a strategy of development in which investment in lifelong learning, business and financial education have a crucial role to play.

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Role of Capital Markets in The Post-Crisis Economic Recovery

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Abstract

Researchers have studied the role of capital markets in the economic development of a country for more than 100 years. They have unanimously agreed that capital markets have a positive influence on the economies. When analyzing capital markets, we refer to a framework where capital or resources are exchanged and reallocated, from those who have an excess to those who are in demand of it. We analyze a database of 50 stock markets from 47 countries around the world during the 2008-2017 in order to find out the role of capital markets in the economic recovery post-crisis.

Keywords: Stock Markets, Capital Market Development, Post-Crisis

Introduction

The correlation between the development of the capital market and economic growth of a country has been intensively studied by researchers and professionals in the financial-banking area during the last 100 years. Among the first to analyze this topic, more than 100 years ago, was Joseph Schumpeter in 1911. He supported the importance and positive impact of financial institutions and their development on economic growth (Schumpeter, 1911). Levine and Zervos (1996) further argue that the development of the capital market is positively associated with long-term economic growth, based on an analysis of 41 countries from 1986 to 1993. In the same vein, Beck et al. (2000) highlights the impact that a developed financial system has on the evolution of the Gross Domestic Product (GDP) per capita and on the productivity growth, noting that country specific elements are of great importance. Looking closer to a vast database for almost 10 years is intended to highlight determinants and role of capital markets in the economic growth.

Dimension and Size Indicators

In this analysis we will use the Gross Domestic Product (GDP) as an indicator of the size of the economy and of the population income. A higher GDP means higher incomes, more business opportunities, better education, so the expected impact is a positive one. For the capital markets indicators, we will analyze the market capitalization of all listed companies, the indicator most often used by analysts to estimate the capital market size. The main disadvantage relates to the moments when the value of this indicator is distorted by excessive stock price increases of some companies, without them being the result of market operations and that finally, have no impact on market development. Another dimension of the market is given by the number of listed companies, which is not influenced by price fluctuations. The number of companies indicates a market's ability to attract and maintain listed companies. The traded value is used by analysts to describe the ability to sell and buy shares, often used to measure market liquidity. The Initial Public Offering (IPO) or a primary share sale by a company for listing purposes, is the fundamental

instrument by which stock exchanges mediate the financing of the economy and directs the available investor funds to profitable investment projects.

Data and Methodology

Database

The data collected in this study characterizes the 50 most important stock exchanges, from 47 countries, in the period 2008-2017, using the databases of the World Federation of Exchanges, Federation of European Securities Exchanges (FESE). Regarding the Japanese stock exchanges, until 2012 two stock exchanges operated, one in Tokyo and one in Osaka, for this study the data of the two being aggregated. In analyzing the size of capital markets, the first indicator is market capitalization.

The economies of the 47 countries have generally increased in the analyzed period. The largest increases were recorded in: China (the leader also in terms of market capitalization increase), India and Sri Lanka. In the top 10, GDP growth exceeds 60% in 10 years, while market capitalization growth exceeds 115%. Generally, the GDP growth was doubled by more accentuated market capitalization increases, with one exception. Jordan is the only country in top 10 that had economic growth and at the same time recorded a decrease of market capitalization, as it had a small stock market and registered a decrease of almost one third of the number of companies listed in the analyzed period.

Among the largest economies in the world - the US - registered a GDP increase of 32% and an average increase of 243% of the market capitalization of the two stock exchanges operating in the country - NYSE and NASDAQ. China - the second largest economy in the world, by GDP, in 2017, registered the largest GDP growth, of 166% and had the largest increase in stock market capitalization, of 591% on average, for the two-local operating exchanges, Shanghai Stock Exchange and Shenzhen Stock Exchange. The following economies of the world - Japan, Germany and the United Kingdom registered decreases in GDP (in $, at current prices), but doubled their capital markets' sizes. Of the 47 economies analyzed, 13 recorded GDP decreases and only 6 recorded decreases in market capitalization.

The economies with the biggest GDP decreases were Greece (-43%), Cyprus (-22%) and Spain (-20%), doubled also by decreases in stock market capitalization. The Greek stock market experienced accelerated growth rates during the 1980s and 1990s, but the country's economic and debt crisis caused a sharp slowdown of market development, massive capital outflows, as well as a market status downgrade from developed to emerging, since 2013. Italy's economy contracted by 19% in 2008-2017, with an increase of the Italian Stock Exchange market cap of 35%. A similar situation is found in Norway, with a 14% drop in GDP and a 97% increase in stock market capitalization.

Stock exchanges around the world have not only recovered from the economic crisis of 2008-2009, but experienced strong development during the analysed period. Analysing the indicators chronologically, although in the first years the market capitalization registered decreases, many exchanges in the 10-year period, experienced an average increase of the capitalization of 151%, to USD 79,820 billion, while the average GDP growth was 32%, to USD 67,093.7 billion.

For example, at the end of 2017, on the 50 stock exchanges that were analysed there were almost 46 thousand listed companies and over 12,600 Initial Public Offers (IPOs) took place in the analysed period. On average, the total number of listed companies rose by 15% in the period 2008-2017, the differences from the number of IPOs being given by delistings. Most of the stock exchanges (37) have less than 1,000 listed companies. The stock exchanges with most companies listed at the end of 2017 were: BSE India Limited with 5,616, followed by Japan Exchange Group Inc. with 3,604, TMX Group and BME Spanish Exchanges with more than 3,000 companies. Regarding the analysed IPO value, in the 10 years it

was of USD 1,823 billion or 2% of the total market capitalization. Almost 80% of this value was concentrated among the top 10 stock exchanges.

Methodology

In order to analyze the influence relations between GDP and Market Cap we will use the vector autoregression (VAR) model. The VAR model is one of the most popular and flexible models used in time series analysis. Being a natural extension of univariate autoregressive models, it is largely used in dynamics analysis and forecasting. The model was developed by Sims (1980) and popularized in the financial area by Hamilton (1994) and Tsay (2001).

The mathematical form of a model with p lags is:

$$Y_t = c + \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \cdots + \beta_p Y_{t-p} + \epsilon_p$$

Where $Y_t = (y_{1t}, y_{2t}, \ldots, y_{nt})'$ is a $(nx1)$ vector of time variables, β_i is a (nxn) matrix of dimension coefficients, and ϵ_t is a white noise vector.

The data series will be made stationary at the first difference. Stationarity will be tested using the ADF test.

Intermediate Results

From the impulse response function graph, we can deduce that a 1% shock applied to the Market Cap will cause an almost 2% GDP growth, after almost 2 years, and that the shock will be amortized by the economy after about 6 years. On the contrary, the GDP does not statistically significantly influence the market capitalization, the growth shock determining both the increase and the decrease of the market value.

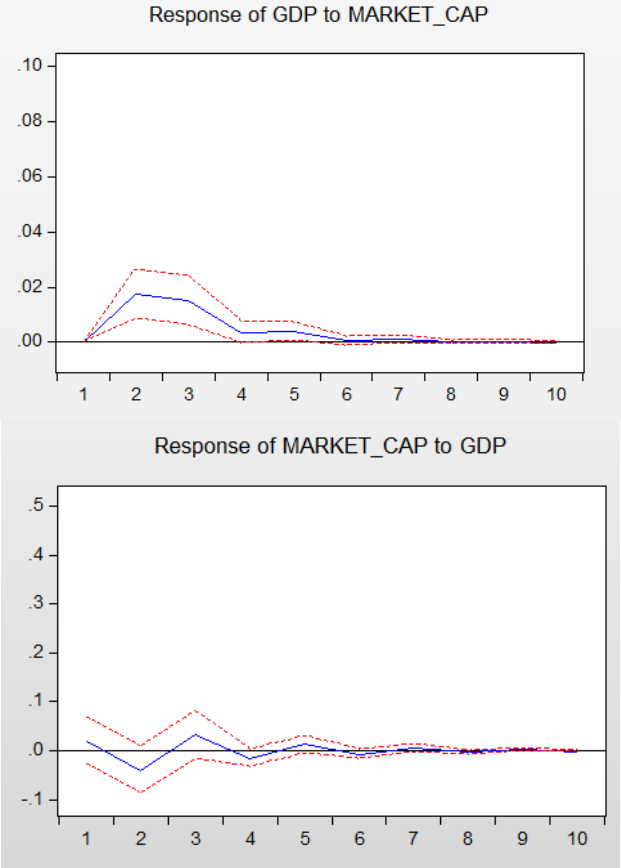

Preliminary Conclusion

The economic recovery was driven by capital markets during the post-crisis timeframe, mainly after 2009. In general capital markets had large increases in 10 years in the leading countries, in many cases doubled by significant GDP growth. The lag of the impact may explain the difference in recovery path. Other determinants than market capitalization to be analyses in conjunction with GDP – the number of listed companies, IPO number and value, and traded value.

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Prospects for Promoting of Russian Educational Services' Export in the Latin America

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Abstract

The article analyzes the trends in the export of higher education services from Russia to Latin America. Based on the data obtained during the statistical analysis, a sociological research technique was designed and a pilot study was conducted. Based on the results of the pilot study, conclusions and recommendations were formulated regarding the prospects for the development of the export of educational services to Peru, and the methodology was tested. In particular, it was concluded that Latin American students are interested in getting education in Russia, and the main problem for the promotion of educational services is the lack of awareness of the possibilities of Russian universities and the lack of necessary institutional support in terms of inter-university agreements. A further task is to validate the methodology on a larger sample and on different types of universities in the leading countries of Latin America. The analysis presented in the article may be useful to management when choosing tools to accelerate university changes in terms of the development of the export of educational services.

Keywords: Higher Education, Latin America, Republic of Peru, Export of Russian Federation's Educational Services.

Introduction

The practice of attracting foreign students to study in Russian institutions was developed in pre-revolutionary Russia in the second half of the 19th century. In the Soviet period, the export of educational services was traditionally considered not so much from an economic perspective, but from the perspective of political interaction with the USSR-friendly countries of Asia, Africa, Latin America and Eastern Europe. Moreover, by 1990, the country occupied the 3rd place in the world after the United States and France in the total number of foreign students. For modern Russia, the educational services export is again gaining relevance in the context of global trends in the education internationalization, as well as in the formation of a national vector for the non-resource of the economy. The modern world market places a demand on the most competitive national higher education systems, which, in turn, gives states an impetus to improve the quality of education, search for effective educational technologies and ways to attract foreign students. It should be noted that the expansion of the educational services export has a certain impact on the economies development of the host countries in the form of social, demographic, economic and political effects (Falchenko, O.D., Savelyeva, I.N. and Maydanik, V.I. (2017)). For example, in the United States, where the

number of foreign students exceeds 1 million, the income from the educational services export is more than $ 30 billion. In Russia, the number of foreign students reaches 230 thousand, 60% study on a contract basis bring about $ 1 billion to the national budget.

In this regard, it seems relevant to assess the prospects for the development of the export of educational services of the Russian Federation to Latin American countries based on an analysis of the position of the Russian Federation as an exporter in the world market of educational services in order to determine the directions of export of higher education services to Latin American countries that contribute to the formation of positive effects of internationalization of education.

Literature Review

The market of educational services has been considered as an object of research by international organizations since 1919. Thus, the International Institute of Education analyzes and evaluates the mobility indicators of foreign students, as well as educational services provided by both state organizations and private and non-commercial representatives of the educational sector. In the mid-1970s the first official classification of international education standards appeared, developed by the United Nations Educational, Scientific and Cultural Organization (UNESCO). Today, UNESCO continues to carry out active work in the field of popularization of education, analysis of problems arising in this field, upholding the idea of the central role of education in the development of human potential, society and the economy.

The internationalization of education continues to be a subject of considerable interest from foreign and Russian researchers. Among researchers in the problems of the market of educational services, strategies and trends of internationalization in the modern educational space, we can distinguish authors such as Altbach (2006), Abbott (2009), Neumann and Terosky (2007), de Wit and Hunter (2015), Kulen, R. (2016), Hudzik, J. (2015), Borjas (1994), Ivakhnyuk (2016), Aleshkovsky and Iontsev (2008), Ledeneva and Tyuryukanova (2002; 2005), Massey (1999), Mukomel, V.I. (2005), Duleep, Reget and Sanders (1999), Falchenko, Savelyeva and Maydanik (2017), and others. The influence of internationalization on the innovative development of universities is devoted to the scientific paper by Bednyy, A. B. and Grudzinskiy, A.O. (2014), Savelyeva, I., Falchenko, O., Kovalev, V. and Pliusnina, O. (2018), and others. The problem of export of educational services is studied by Larsen, Martin and Morris, R. (2002), Chadee and Naidoo (2009) , Amirov (2018), Arzhanova and Vorov (2016), Sheregi, Dmitriev and Arefyev (2002), Risin (2009), Torkunov (2017), and others.

Speaking about the internationalization of education, we join the position of Knight (2011), defining internationalization as the process of purposefully giving higher education an international, intercultural or global dimension with the aim of improving the quality of education and science for all students and university staff, as well as making a significant contribution to society. De Wit and Hunter (2015) emphasize that the internationalization of higher education is not an end in itself, but a mechanism for improving the quality of education, which is based not only on economic factors. According to Risin (2009), when analyzing the foreign practice of developing the export of educational services, a number of factors are identified to have a positive impact on the national educational system, which increases the priority of higher education for the state and allows the formation of an appropriate effective state policy, which ultimately contributes to the country's international image improvement. In this context, the processes of internationalization of education have an impact not only on the quality of education, but also on the competitiveness of a country in world markets of goods and services.

Problem statement and Research Methods

Based on the existing theoretical and methodological approaches to the development of the higher education export, as well as being guided by the current problems of the development of the educational services export in Russian universities, the authors formulated the goal of this article: to assess the position of the Russian Federation as an exporter in the world market of educational services and determine directions of higher education services export contributing to the formation of internationalization of education positive effects. As an goal of study, the educational services export of Russia to the countries of Latin America (in particular, to Peru) was selected.

The hypothesis of the study is that the Russian Federation is considered as a promising exporter of educational services to Latin America (on the example of a sociological survey of universities in Peru).

In accordance with the goal of this study, the authors identified the main stages and identified the main methods of this study.

The first stage of this study involves determining the position of Russia in the educational services export by the example of key Latin American countries and substantiating the attractiveness of Russian universities for foreign students based on methods of analysis and synthesis of statistical information relating to this area of research. As the information base of the first stage of the study, statistical and analytical materials of the UNESCO Institute for Statistics and the Ministry of Science and Higher Education of the Russian Federation were used.

The second stage is devoted to a sociological study of the opinion of students from Peru on the question of the choice of education in the Russian higher educational institutions. As the main method of the second stage of this research, the sociological method was used - the survey. The authors developed an electronic questionnaire, including 41 questions. It should be noted that the research methodology was not a product of the subjective opinion of researchers, but was the result of a synthesis of existing and approved methods. Based on the analysis of modern questionnaire practices, the authors formed a construct of a sociological survey for this study, which includes three blocks: 1) a block of general questions regarding the analysis of a survey audience; 2) a value-motivational block dedicated to the selection by Peruvian students of Russian universities as a platform for higher education; 3) the resulting block devoted to the analysis of future career paths of students after receiving education in Russia. The respondents were students (Public Institute of Higher Technological Education “Simon Bolivar” was chosen as the information base for this stage of the study due to inter-university cooperation agreements).

Results

The first stage of the study is to determine the place of Russia in the export of educational services by the example of key countries in Latin America and justify the attractiveness of Russian universities for foreign students.

According to UNESCO, the Russian Federation, in comparison with the key countries of Latin America, occupies a leading position in the admission of foreign students, showing a positive migration balance, indicating that the number of accepted foreign students is 4 times higher than the number of Russian students graduating abroad (Table 1). For comparison, the migration balance of key Latin American countries is negative, i.e. they are net importers of educational services in the global market.

Table 1: Global Flow of Tertiary-Level Students, 2018

Key indicators	Russia	Peru	Argentina	Bolivia	Brazil	Venezuela	Colombia	Cuba	Chile	Ecuador
Students abroad:										
Total number of mobile students abroad	56,659	32,508	9,021	20,233	58,841	20,724	44,423	2,495	15,982	22,309
% of total mobile students	1.1	0.6	0.2	0.4	1.1	0.4	0.8	0.0	0.3	0.4
Outbound mobility ratio	1.0	1.7	0.3	...	0.7	...	1.8	0.9	1.3	2.6
Gross outbound enrolment ratio	0.8	1.2	0.3	1.8	0.3	0.4	1.0	0.3	1.1	1.2
Students hosted:										
Total number of mobile students hosted	250,658	...	88,873	...	20,671	...	4,764	...	4,708	6,942
(% of total mobile students)	4.7	...	1.7	...	0.4	...	0.1	...	0.1	0.1
Inbound mobility rate	4.3	...	2.8	...	0.2	...	0.2	...	0.4	0.8
Migration balance:										
Migration balance of mobile students	+193,999	...	+79,852	...	-38,170	...	-39,659	...	-11,274	-15367
Source: compiled and calculated by the authors on [Global Flow of Tertiary-Level Students . [Online]. UNESCO Institute of Statistics. [Retrieved January 13, 2020], http://uis.unesco.org/en/uis-student-flow]										

Table 2 presents the dynamics of the total number of foreign citizens studying at the universities of the RSFSR / RF in the academic years 1950 / 1951–2016 / 2017 in full-time and part-time study programs. We note that the dynamics of attracting foreign citizens in general for the period under review is positive; the proportion of foreign students in the total number of students in Russian higher education institutions is relatively small, but tends to increase. So, in 2000/2001 this share was 1.53%, and in 2016/2017 - 7.11%.

Table 2: Dynamics of foreign students' number enrolled in full-time and part-time study programs in RSFSR / Russian Federation higher education institutions in 1950/1951–2016/2017 academic years and its change in the structure of all Russian higher educational institutions population

Academic Years	The number of foreign citizens studying at universities of the RSFSR / RF, thousand people	The total number of students in universities of the RSFSR / RF, thousand people	The share of foreign citizens in all students of Russian universities,%
1950/1951	5.2	796.7	0.65
1960/1961	10.9	1496.7	0.73
1970/1971	20.7	2671.7	0.77
1980/1981	64.5	3045.8	2.12
1990/1991	89.6	2824.5	3.17
2000/2001	72.4	4741.4	1.53
2005/2006	113.8	7064.6	1.61
2009/2010	175.6	7419.0	2.36
2010/2011	187.3	7049.8	2.65
2011/2012	198.5	6490.0	3.05
2012/2013	225.0	6075.0	3.70
2013/2014	250.2	5647.0	4.43
2014/2015	282.9	5209.0	5.42
2015/2016	296.2	4766.5	6.21
2016/2017	313.1	4399.5	7.11

Source: Export of Russian educational services: Statistical Collection (2018). Issue 8. [Online]. Ministry of Science and Higher Education of the Russian Federation, Center for Social Forecast and Marketing, Moscow. [Retrieved January 13, 2020], http://socioprognoz-ru.1gb.ru/files/File/2018/Arefiev_Sbornik_8_001_536_2018_ispr8_15_11_18.pdf

Despite the fact that the Russian Federation is only just beginning to be actively involved in the internationalization of higher education, it is possible to assess the opportunities this process provides to donor countries of educational services. After the collapse of the Soviet state, the Russian Federation, as the successor of the USSR, did not pay enough attention to this problem for a long time, which led to a deterioration in Russia's position in the educational services market. They started talking about this problem relatively recently, only in the early 2000s. To date, Russia has developed a priority project "Development of the export potential of the Russian education system", approved by the Presidential Council for Strategic Development and Priority Projects. The key objective of the project is to increase the attractiveness and competitiveness of Russian education in the international market for educational services and, thus, increase non-resource exports. The main indicators of this project are presented in table 3.

Table 3: Key indicators of the priority project "Development of the export potential of Russian education" for the period 2017-2025

Base value	2017	2018	2019	2020	2021	2022	2023	2024	2025
1. The number of foreign citizens studying full-time in Russian educational institutions of secondary vocational and higher education, thousand people (main indicator)									
200.0 thousand	220.0	240.0	260.0	310.0	400.0	450.0	520.0	600.0	710.0
State scholarships 15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Additional Educational programs 70.0	70.0	90.0	100.0	120.0	145.0	175.0	210.0	245.0	290.0
By the contract 135.0	135.0	135.0	145.0	175.0	240.0	260.0	295.0	340.0	405.0
2. Extrabudgetary funds received from the export of Russian education, million rubles (core indicator)									

70000	84744	96203	107824	135370	182423	211461	252858	303011	373147
3. Increase in the number of foreign schoolchildren trained in the framework of additional education programs,% (second level indicator)									
100	100	110	120	130	140	150	160	180	200
4. The number of foreign students of online courses, including in Russian, offered by Russian educational organizations, million people (second-level indicator)									
1.0	1.1	1.3	1.6	1.9	2.2	2.5	2.8	3.1	3.5
Source: Passport of the priority project "Development of the export potential of the Russian education system": approved. by the Presidium of the Presidential Council for Strategic Development and Priority Projects (Minutes No. 6 dated May 30, 2017). [Online]. Russian Government. [Retrieved November 11, 2017, January 13, 2020], http://static.government.ru/media/files/DkOXerfvAnLv0vFKJ59ZeqTC7ycla5HV.pdf									

Table 4 shows the official statistics of Russia on the cost of education for foreign citizens. For example, in 2019/2020 getting an education at a prestigious Russian university costs an average of 250 thousand rubles. For example, a master's study for a foreign student will cost 240-260 thousand rubles (or 3690-4000 thousand dollars), while the minimum cost of training is 127 thousand rubles, and the maximum is 450 thousand rubles. Compared to the 2017/2018 academic year, prices for tuition of foreign students increased by 1/3 in ruble terms.

Table 4: The cost of education for foreign citizens in Russian higher education institutions

Indicator	2016/2017		2019/2020	
	Cost, thousand rubles per year	Cost, dollars per year	Cost, thousand rubles per year	Cost, dollars per year
Full-time undergraduate studies for foreign students				
Average cost	120-140	2100-2400	220-240	3385-3690
Minimum cost	67	1200	121	1860
Maximum cost	380	6600	770	11846
Education of foreign students in full-time magistracy				
Average cost	160-180	2700-3000	240-260	3690-4000
Minimum cost	82	1400	127	1950
Maximum cost	450	7800	450	6920
Full-time postgraduate study for foreign students				
Average cost	200-220	3440-3800	260-280	4000-4370
Minimum cost	72	1240	112	1723
Maximum cost	250	4300	413	6350
Source: The cost of education in Russia (2017-2019) . [Online]. Stydy in Russia. Website of the Ministry of Science and Higher Education of the Russian Federation . [Retrieved November 11, 2017, January 13, 2020], http://studyinrussia.ru/study-in-russia/cost-of-education-in-russia/				

According to official Russian statistics, the majority of foreign consumers of various Russian educational services are citizens of the CIS countries (Fig.1). The share of Latin American countries remains at the level of 1.1%, which is also explained by the remoteness and isolation of this continent from the Russian Federation.

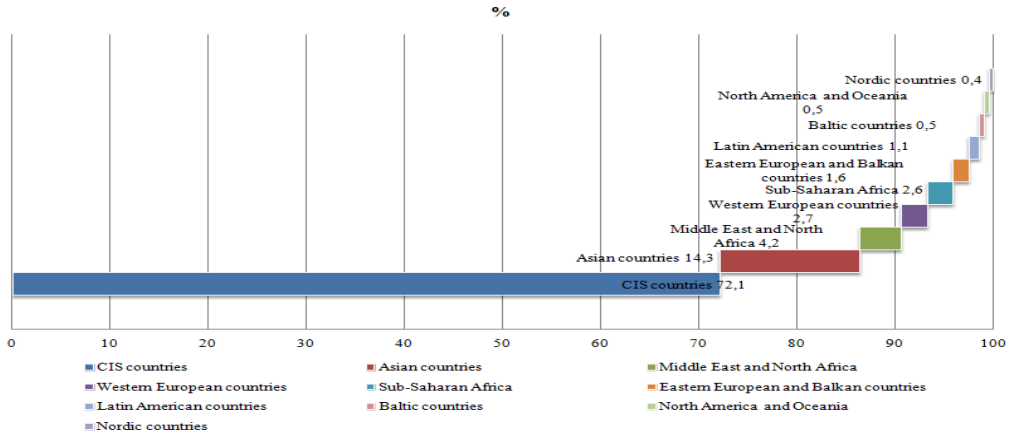

Fig. 1: The proportion of foreign citizens from various countries who studied at various types of Russian educational institutions in the 2016/2017 academic year,%

Source: Export of Russian educational services: Statistical Collection (2018). Issue 8. [Online]. Ministry of Science and Higher Education of the Russian Federation, Center for Social Forecast and Marketing, Moscow. [Retrieved January 13, 2020], http://socioprognoz-ru.1gb.ru/files/File/2018/Arefiev_Sbornik_8_001_536_2018_ispr8_15_11_18.pdf

Analyzing the demand from Latin American countries for various educational programs at Russian universities, note that the demand for educational institutions increased by 288% in 2016/2017 compared to 2006/2007 (table 5).

Table 5: The number of foreign citizens studying in Russian universities in the 2006/2007 - 2016/2017 academic years, in Latin America, people

Indicators	Academic year		Growth 2016/2017 to 2006/2007, people
	2006/2007	2016/2017	
Total for Latin America,	1526	4402	2876,0
Including:			
Antigua and Barbuda	0	8	+8,0
Argentina	8	70	+62,0
Barbados	1	0	-1,0
Belize	0	1	1,0
Bolivia	42	293	+251,0
Brazil	157	844	+687,0
Venezuela	37	198	+161,0
Haiti	75	48	-27,0
Guyana	73	12	-61,0
Guatemala	32	39	+7,0
Honduras	0	10	+10,0
Grenada	0	9	+9,0
Guam	0	0	0,0
Dominica	3	4	+1,0
Dominican Republic	9	27	+18,0
Colombia	153	846	+693,0
Costa Rica	20	38	+18,0
Cuba	196	315	+119,0
Mexico	131	346	+215,0

Indicators	Academic year		Growth 2016/2017 to 2006/2007, people
	2006/2007	2016/2017	
Nauru	0	0	0
Netherlands Antilles	0	1	+1,0
Nicaragua	8	19	+11,0
Panama	33	11	-22,0
Paraguay	0	19	+19,0
Peru	298	171	-127,0
Puerto rico	0	1	+1,0
Salvador	1	57	+56,0
Saint Vincent and the Grenadines	0	15	+15,0
Saint Kitts and Nevis	0	3	+3,0
Commonwealth of the Bahamas	1	0	-1,0
Trinidad and Tobago	0	1	+1,0
Uruguay	6	9	+3,0
Chile	15	32	+17,0
Ecuador	209	883	+674,0
Jamaica	18	72	+54,0

Source: compiled by the authors on [Export of Russian educational services: Statistical Collection (2018). Issue 8. [Online]. Ministry of Science and Higher Education of the Russian Federation, Center for Social Forecast and Marketing, Moscow. [Retrieved January 13, 2020], http://socioprognoz-ru.1gb.ru/files/File/2018/Arefiev_Sbornik_8_001_536_2018_ispr8_15_11_18.pdf]

The total share of the top 10 Latin American countries among consumers of educational services of Russian universities is 91.7% in 2016/2017. Ecuador, Colombia, Brazil, Mexico, Cuba, Bolivia, Venezuela, Peru, Jamaica, Argentina stand out among the top 10 countries in Latin America (table 6).

Table 6: Top 10 Latin American countries by the percentage of students in Russian universities in 2016/2017,%

Position	Country	Share, %
1	Ecuador	20.06
2	Colombia	19.22
3	Brazil	19.17
4	Mexico	7.86
5	Cuba	7.16
6	Bolivia	6.66
7	Venezuela	4.50
8	Peru	3.88
9	Jamaica	1.64
10	Argentina	1.59
	Other countries in Latin America	8.3
	Total	100.0

Source: compiled by the authors on [Export of Russian educational services: Statistical Collection (2018). Issue 8. [Online]. Ministry of Science and Higher Education of the Russian Federation, Center for Social Forecast and Marketing, Moscow. [Retrieved January 13, 2020], http://socioprognoz-ru.1gb.ru/files/File/2018/Arefiev_Sbornik_8_001_536_2018_ispr8_15_11_18.pdf]

Thus, we can conclude that Russia is a net exporter of educational services. However, the proportion of individual regions of the world is not large enough. This also applies to Latin America. In this regard, it is of interest to study factors that influence students in Latin America to choose higher education in the Russian Federation.

The second stage of the study is a sociological survey of students from Peru regarding the choice of education in higher educational institutions of the Russian Federation.

1) Target audience. 324 respondents took part in the survey, including 46% men and 54% women. According to the age parameter, the survey is dominated by people aged 17-27 years (80% of respondents), including 17-20 years (39%), 21-23 years (24%) and 24-27 years (17%). The other age categories of respondents occupy an insignificant share of 20% of the total target audience, including 28-31 years old (10% of respondents), 32-35 years old (4%) and over 35 years old (6%). The level of education is dominated by undergraduate students who are currently studying in Peru (95%), and the remaining 5% are those who are currently completing their studies at a Peruvian university (2%), having an academic degree (2%), having completed higher education in undergraduate and / or graduate studies (1%). Most of the respondents have (are getting) education in enterprise management programs (40.2%), accounting (20.8%) and industrial electronics (15.8%).

2) Value-motivational component of the Russian universities students' choice process and the features of education in Russia from the point of view of foreign students. 86% respondents clearly expressed a desire to get higher education in Russia. Among the motivational factors that influence the decision to study in Russia are the student's own decision (65%) and the influence of parents on this decision (21%). It can be noted that respondents rated the degree of interest in studying in Russia as very high (29%) and high (31%). Analyzing the attitude to the quality of education in Russian universities, more than half of the respondents (51%) say that studying at Russian universities is more difficult than in Peru. Among the difficulties of studying in Russia are mentioned such as speaking the Russian language (68%) and studying special disciplines (27%) (Figure 2).

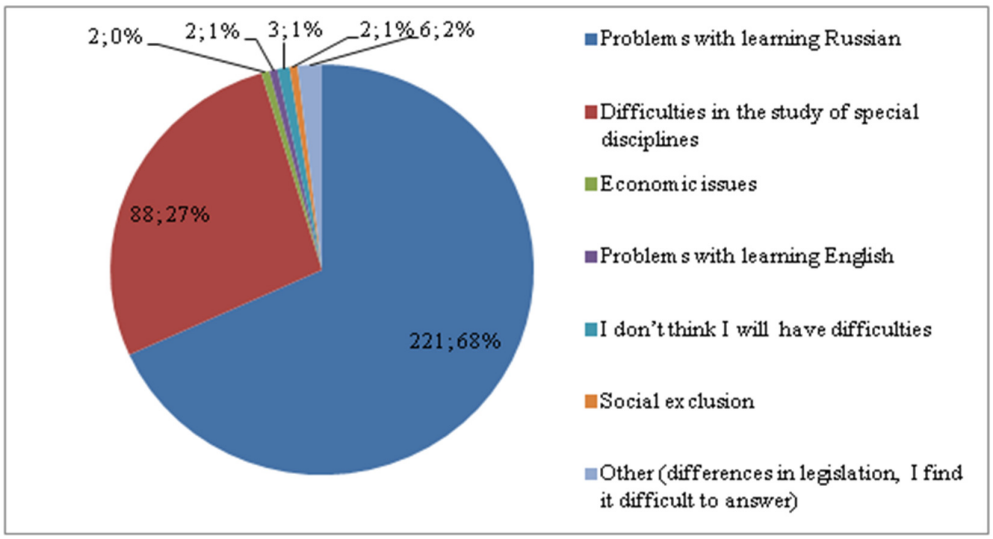

Fig. 2: Difficulties of studying in Russia, pers. and %

Source: compiled by the authors based on sociological survey of Peruvian students

Among the factors for choosing Russian universities, Peruvian students noted the existence of cooperation agreements with Russian universities (47%) and the quality of Russian education programs (12%) (Figure 3).

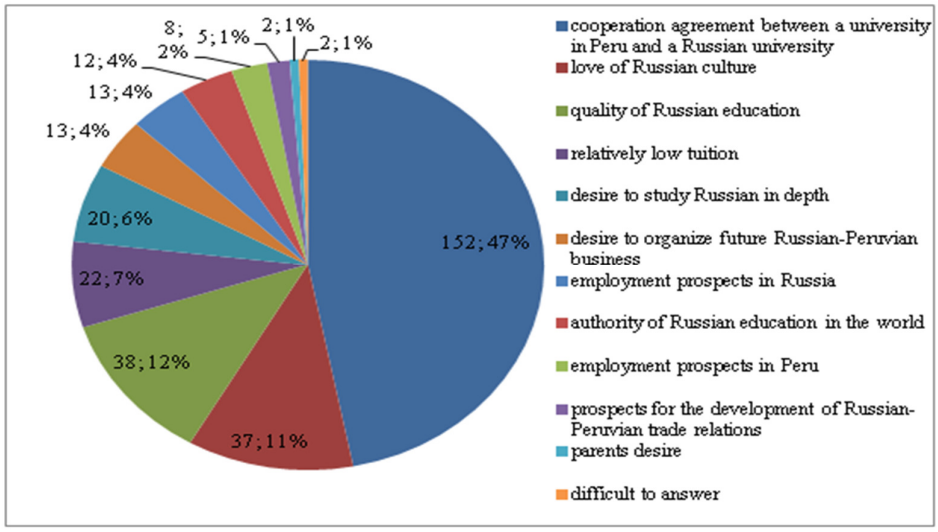

Fig. 3: Factors in favor of choosing a study in Russia, pers. and %

Source: compiled by the authors based on sociological survey of Peruvian students

3) Future career paths of students after receiving education in Russia. The survey showed that Russian education is very much appreciated in Peru: 88% of respondents see the value in getting an education in Russia with their future employment (Figure 4).

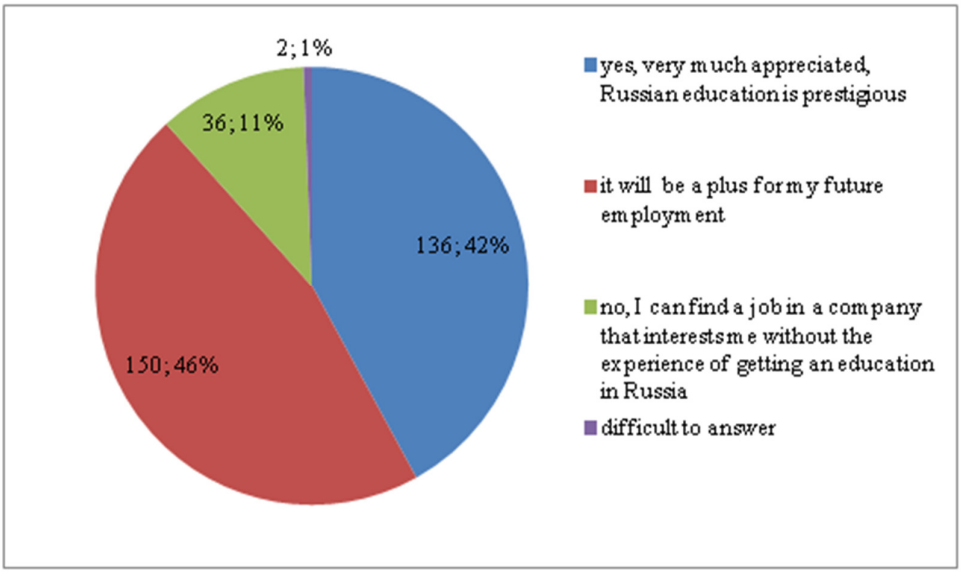

Fig. 4: Opinions on the value of education / internship in Russia for employment opportunities in Peru, pers. and %

Source: compiled by the authors based on sociological survey of Peruvian students

Among the most attractive employment areas after graduating in Russia the leaders are: industry (37%), public service (33%) and services (20%). According to respondents, getting an education in Russia will help to find jobs in large companies (41%) or open their own business in Peru (35%). After receiving education in Russia, the majority of respondents plan to find a job in Peru (56%) in order to put the acquired knowledge into practice, or in Russia (35%), taking advantage of the knowledge of Russian and Spanish.

In the course of the study, it turned out that Peruvian students are not sufficiently informed about educational opportunities in Russia: 66% of respondents do not have information about training programs. Among the problems (barriers) associated with their stay in Russia, respondents noted a language barrier (43%) and climate (17%), but migration legislation, in their opinion, was not a significant obstacle (5%) (Figure 5).

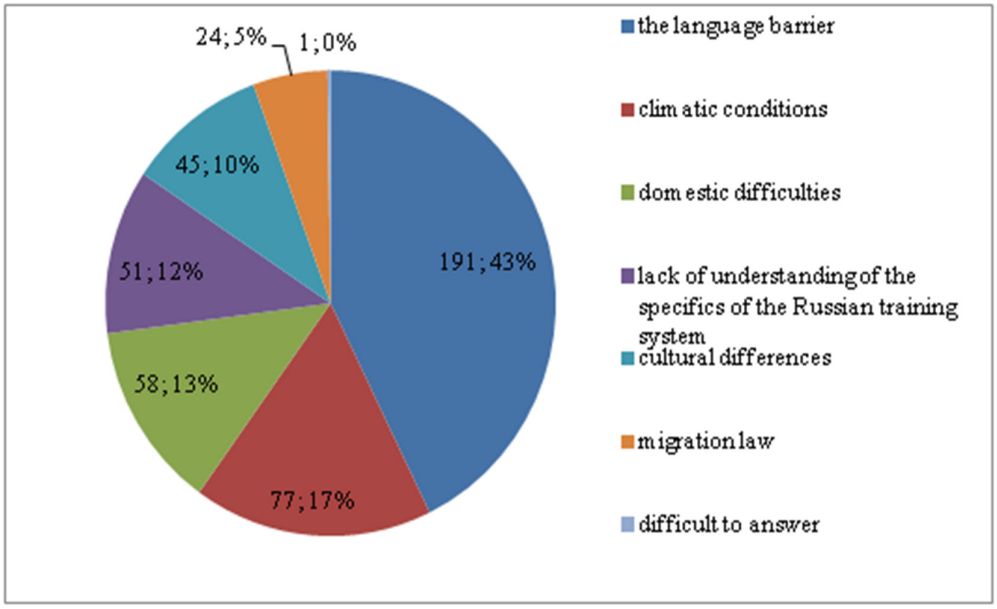

Fig. 5: Factors (barriers) associated with the stay of Russia, pers. and %

Source: compiled by the authors based on sociological survey of Peruvian students

Thus, we note that Peruvian students are interested in receiving education in Russia, highly appreciate the quality of Russian education and the possibility of applying the acquired knowledge in future employment. However, a constraining factor is the lack of awareness of students about study programs in Russia.

Conclusion

1) In the course of the study, a hypothesis was discovered that, being a net exporter in the global educational services market, the Russian Federation remains a promising exporter of educational services to developing countries in Latin America. Despite the fact that the share of Latin American countries in the export of educational services is currently small, historical experience, the potential for political and socio-economic cooperation between the countries of the Russian Federation and Latin America allow us to conclude that there is a great prospect for such interaction.

2) A pilot case study based on an analysis of the factors by which Peruvian students choose Russian universities for higher education allows us to conclude that there is a high potential for exporting Russian higher education to the Latin American market.

3) The main reasons for choosing Peruvian students of Russian universities (including regional ones) are the quality of Russian education, which is highly valued in Latin America, as well as the prospects for further employment of graduates.

4) From the point of view of Peruvian respondents, the language barriers, climatic conditions and intercultural characteristics, which, nevertheless, do not reduce the motivational component and interest in receiving education in Russia, are the constraining factors for obtaining education in Russia.

5) The main obstacles to the development of the export of educational services to Latin American countries, according to the data obtained during the pilot study, are insufficient awareness of educational opportunities in Russia and the lack of cooperation agreements between Peruvian and Russian universities.

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Choice of Profession and Academic Satisfaction in Undergraduate Economics Students

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Abstract

The paper presents the results of an empirical study aimed at identifying students' choice of profession and satisfaction with the quality of training at the university. The study revealed the motivation of students to enter economic specialties, their assessment of the quality of theoretical, practical and socio-psychological training, views on job prospects, students' opinions on the importance for employers of various aspects of the quality for training and personal characteristics of graduates. It was found that most students do not appreciate the level of their practical training and take into account the prospects for further employment in their specialty upon admission.

Keywords: Choice of Profession, Academic Satisfaction, Economics Students, Requirements of Employers, Employment Prospects.

Introduction

The goal of any university is to meet the needs of society and the state in qualified specialists with higher education (Aleksandrov et al., 2015; Yepaneshnikov et al., 2017). In accordance with this goal, activities to meet the needs of students in education and development can be considered a key element of the educational activities of the university (Morova et al., 2017). Given the current trends and requirements for universities in the framework of ensuring the effectiveness of the functioning of the higher education system (Leonteva, 2010), these activities to meet the needs of students in education and development should be considered as a system of interrelated processes: from career guidance activities of the university among applicants to promoting the employment of graduates. Among them, undoubtedly, the most important element is the satisfaction of students with the quality of the educational activity of the university, which contributes to the growth of confidence of future graduates in successful employment (Golushko, 2016; Nikolaev, 2019).

In order to assess their activities and identify deficiencies in the functioning of universities (Kurbanov et al, 2017), periodically, or on a regular basis conduct research on student satisfaction with the educational activities of the university (Obraztsov, Polovnev, 2017). The results of such studies allow the university to timely identify shortcomings in its activities and make effective management decisions to develop and improve its activities (Leonteva et al., 2019; Zakharova et al., 2019).

The purpose of the study was to analyze the reasons for profession choice in economics students and their academic satisfaction in the quality of education and expectations in the field of their future employment.

Method

During the study, methods of scientific analysis were used (generalization and systematization, analysis and synthesis), as well as the collection, processing and interpretation of empirical data using a specially designed 18-point questionnaire.

The study included several stages:

1. Development of the questionnaire. The questionnaire contains several blocks of questions reflecting the motivation for higher education, an assessment of various aspects of the quality of training, employment prospects, and an assessment of the expected needs of employers.

2. Definition of a representative sample. In order to test the questionnaire, three academic groups consisting of 63 undergraduate students of the Faculty of Economics of Ulianov Chuvash State University were involved. They were aged from 18 to 23, 18 males (28%) and 45 females (72%).

3. Determining the procedure for filling out and collecting questionnaires. For the convenience of students, questionnaires were developed in the Google Forms service, which made it possible to quickly fill out questionnaires and get partially processed results.

4. Processing the information collected. The data obtained in the course of the questionnaire in tabular form made it possible to identify the structure of the respondents' answers, including those grouped according to various criteria.

Questioning, as a form of collecting information, was chosen in connection with a large number of respondents, convenience for respondents, the need to obtain generalized information about the problem being studied, and to ensure anonymity for respondents.

Results

Identification of the reasons why respondents decided to get higher education at the Faculty of Economics shows that the most popular motive is the desire to get a prestigious profession. The second most popular reason was the ease of learning. A more detailed study of the reasons for entering the Faculty of Economics shows that 40% of respondents' answers relate to reasons related to successful employment opportunities: a prestigious profession, the prospect of receiving a high salary, the possibility of employment abroad and the ease of employment. 30% of the answers are related to the reasons for the ease and comfort of learning: easy to learn and convenient location of the institution. When asked about whether higher education is a prerequisite for a decent and prosperous life, only 14% of respondents expressed full agreement with this statement. 57% of respondents believe that the presence of higher education can significantly affect the achievement of social success, and 24% of the respondents expressed doubts about this dependence.

It is known that university graduates are not always employed in their specialty. The reasons for this may be a lot. According to the survey the most compelling reasons for refusing to work in a specialty are the lack of acceptable demand (35% of answers), the low level of salaries of specialists (23%), and the not interesting content of work (17%). Five people indicated that they did not want to work in their specialty. Among the motives for higher education, the most significant for the economics students was the acquisition of professional knowledge and skills - 28% of the responses. Second in importance were the opportunity to get a well-paid job and the prestige of higher education in society,

which scored 20% of the responses. Fifteen students indicated that the decision to receive higher education was influenced by their parents and relatives.

When deciding whether to enter university, 59% of respondents took into account the prospects for further employment, and 25% of respondents focused only on the need for higher education. Six people regretted entering the Faculty of Economics. It is worth noting that those who regretted choosing the Faculty of Economics as the reasons for admission indicated a low competition for admission, advice from parents / friends and ease of training. Among the 37 people who, upon entering the university, hoped to find a job in the specialty, 24 people (65%) indicated the prestige of the profession as the main reason for receiving an economic education.

To identify the quality of training perceived by students, we compared the students opinions on the importance for employers of various components of the quality of students' training with the level of student satisfaction with the quality of training. Such components of the quality of student training as theoretical training, which assumes the possession of basic and special knowledge, practical skills consisting in the ability to put theoretical knowledge into practice, as well as socio-psychological training, which implies the ability to build communication with colleagues and work in a team, were examined. Based on the comparison, we determined the level of students 'satisfaction with the quality of training, which was calculated as the ratio of students' assessment of the quality of training and their opinion about the needs of employers. The assessment was carried out on a 5-point scale, where 1 point corresponded to a low rating, 5 - a high one.

Students rated their socio-psychological preparation above all - the average rating was 3.54. The level of theoretical training was estimated at 3.41, and practical - only 2.94. An assessment of students' satisfaction with the quality of training shows that students rated only the quality of their theoretical training higher than its estimated importance for employers. According to students, their quality of socio-psychological training was lower than the expected value for employers - the satisfaction level was 80%. With regard to practical training, the students who took part in the study believe that the quality of their training was significantly lower than what employers expect from them - the satisfaction level is only 64%.

A more detailed study of students' opinions on the characteristics of graduates who were most interested in employers showed that students consider working ability, responsibility and organization as the most important characteristics for employers. Least of all, according to students, employers are interested in the desire for continuous development, the presence of leadership qualities and the willingness to work regardless of wages. In turn, students, when choosing a place of employment, were also guided by a number of requirements that they impose on employers. The most significant factors that can influence the choice of a job were pleasant management, material well-being and good working conditions. The data obtained indicate that students are more interested in the issues of fulfilling their professional duties in favorable working conditions than the need for self-realization.

Conclusion

Based on the results of the study, the following conclusions can be drawn. Students receiving higher education at the Faculty of Economics are dictated by the desire to receive a prestigious profession that can provide a decent life. When entering an educational institution, most students take into account the prospects for further employment and after graduation expect to find a job in their specialty. Economics students evaluate the level of their theoretical training at a good level compared to their ideas about the needs of employers. The level of satisfaction of economics students with socio-psychological and practical training is insufficient in comparison with their ideas about the needs of employers. The results should be the basis for adjusting educational programs to strengthen the practical orientation of training future economists and deepen the university’s interaction with employers.

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Impact of Unbundling Distribution System Operators on the Financial Potential of Polish Energy Capital Groups

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Abstract

Energy capital groups in Poland will need significant additional capital influx to develop further. At present, the majority shareholding is held by the State which does not agree to the reduction of its shares. This means that it is not possible to raise funds through emission of shares. Enterprises of this kind will have to obtain debt financing, which requires maintaining an EBIDTA index at the appropriate level. Currently, transmission system operators make a significant contribution in capital groups. In 2019, the Energy Regulatory Office obliged operators to comply with European Union regulations regarding the clear separation of their activities from the capital group actions.
This article performs a synthetic analysis of the impact of the above decisions on the value of energy groups and thus their ability to obtain debt financing.

Keywords: Energy Policy, Power Engineering, Financial Potential.

Introduction

In Poland, the energy sector is dominated by four capital groups (PGE, TAURON, ENEA and ENERGA), which have in their structures the segment of generation, distribution, trading in electricity and, with the exception of ENERGA, coal mines. In this process chain, transmission system operators (TSOs) are important players from the point of view of the possibility of generating cash and debt within the energy capital group. This is possible due to stable revenues they receive. TSOs are natural monopolies, therefore their revenues are regulated. The Energy Regulatory Office (ERO), when approving the prices of their services, takes into account the level of investment and operating costs. TSOs operate within capital groups, which can be used to "shift" the costs of other entities within the group. Cross-subsidization would lead to potentially uncontrolled price increase, which violates the operating principles of a regulated market.

Therefore, regulations are being introduced at EU and national level to ensure TSOs unbundling. In 2019, ERO obliged TSO to develop and submit programs for approval that would ensure effective separation of operators' activities from those of the remaining entities within the capital group (URE, 2019).

The purpose of the article is a synthetic analysis of the impact of the above decisions on the value of energy groups (Panfil, Szablewski, 2011 and Chomać 2004), and thus their ability to obtain debt financing.

Main directions of changes in the functioning of TSOs outlined by the Energy Regulatory Office

In February 2019, the Energy Regulatory Office implemented guidelines for TSOs that oblige these entities to take actions to obtain full independence from other enterprises within the capital group. These documents define the conditions that must be met by operators to perform their functions without hindrance. The developed guidelines result from EU regulations that refer to TSOs. The most important of them are:

- "Directive 2009/72 / EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC" (Journal L 211 dated 14.08.2009).
- "Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC" (Journal L 211 dated 14.08.2009).
- "Act of 10 April 1997 - Energy Law" (Journal dated 2018, item 755 amend.).
- "Note of the Directorate-General for Energy and Transport on Directives 2003/54 / EC and 2003/55 / EC concerning the internal market in electricity and natural gas - Business separation system" (16.01.2004).
- "Interpretative note on Directive 2009/72/EC concerning common rules for the internal market in electricity and Directive 2009/73/EC concerning common rules for the internal market in natural gas - Retail market" (22.01.2010).
- "Guidelines for Good Practice on Functional and Informational Unbundling for Distribution System Operators. Ref: C06-CUB-12-04b" (15.07.2008).
- "Status Review of DSO Unbundling with Reference to Guidelines of Good Practice on Functional and Informational Unbundling for Distribution System Operators. Ref: E09-URB-20-05" (09.09.2009).
- "Status Review on the Transposition of Unbundling Requirements for DSOs and Closed Distribution System Operators. Ref: C12-UR-47-03" (16.04.2013).
- "The Future Role of DSOs - A CEER Conclusion Paper Ref: C15-DSO-16-03" (13.07.2015).
- "Status Review on the Implementation of Distribution System Operators' Unbundling Provisions of the 3rd Energy Package. Ref: C15-LTF-43-03" (1.04.2016).

At the beginning, the regulator notes that the operator's independence requires that both the brand and its logo are different from other entities within the capital group. Currently, the largest TSOs operating within energy groups have their 'personal details' starting from the name, through email addresses and ending with the web domain – shared within the group domain. Often, they rent premises to other, unrelated, companies.

The TSO management must be able to make independent decisions. All activities related to the current situation, capital expenditure, structure of assets and liabilities, or documents related to management (e.g. various types of policies, procedures, regulations) must result from an objective situation and be an independent decision of the TSO. Therefore, no body from within the capital group may, directly or indirectly, issue orders or even opinions to the company in question. This applies to both the management board and individual employees. The role of another body from the capital group may only consist in supervising the implementation of the approved financial plan or other equivalent document. On the other hand, TSO employees cannot participate "in the management structures of a vertically integrated enterprise or an energy enterprise dealing with transmission, production, generation or trade of electricity or be responsible, directly or indirectly for ongoing operations in this field" (URE, 2019). It also means that the operator's personnel willing to change job/ career moving to other enterprises belonging to the energy group cannot use sensitive information and other important data obtained at the TSO – in the new workplace.

An independent employee remuneration and motivation systems, which must be based solely on the decisions of the operator's board and the employee achievements is also a valid question. Therefore, the assessment of individual work effects cannot be made conditional on capital group standing.

In the guidelines, the ERO reminds that TSOs are to independently decide on the outsourcing of areas within their activities. They may not be obliged to access a shared service center in a vertically integrated enterprise. Possible separation of some functions carried out independently from the structure and their transfer to other entities should be performed with utmost transparency to select the service provider. The minimum condition for TSOs to outsource services is to prove the market and non-discriminatory nature of centralization decisions and the transparency of the process of concluding contracts for the provision of services and purchases. In the energetic capital groups operating in Poland, the standard procedure is to separate some functions and transfer them for implementation to the chosen enterprise. The company acting as a shared services center (SSC) usually deals with financial and accounting services, IT and human resources. Changing the approach will make it necessary to verify the operation of SSCs and reorient the entire system. For example, the operator will not be able to use IT solutions that do not provide unbundling. Therefore, it is not possible to create integrated systems located on a shared server with an internal flow of information or to share IT solutions with a selected marketing company. ERO also considers it unacceptable that the systems supporting the TSO's operational activity (e.g. in the area of asset or network management), investment management, development, connection of customers, material management, distribution services and customer service, physically existed in another enterprise within the capital group or were managed by services other than those directly subordinate to the operator.

The guidelines presented above indicate the desired direction of changes in the functioning of operators. They fundamentally change cooperation within vertically integrated energy companies. Generally, operators are to become entities operating next to capital groups. At the same time, the President of the Energy Regulatory Office expects that TSOs will implement these principles by the end of 2019.

Changes in the functioning of TSOs and the value of energy capital groups

The energy sector is currently facing challenges. First of all, it must restore decapitalized asset-generating wealth, which would allow to maintain electricity production at the current level (owing to the age, by 2030 all units of joint power over 16 GW must be shut down) in the future and adapt power plants to the EU's stringent environmental regulations (demanding, among others, a significant reduction in harmful gas emissions for which it bears responsibility). Moreover, it requires, for example investments in renewable energy (Jankiewicz, 2017a). In addition, the increase in their production potential will contribute to the even and balanced development of the Country, due to the mostly local nature of this type of units (Jankiewicz, Grądzik, 2016).

Secondly, modernization of energy networks is necessary due to their decapitalisation and maladaptation to scattered power engineering(Jankiewicz, 2016). The development of the country also requires an increase in network density (in Poland there are 41 km of network per 1000 km2, while e.g. in Switzerland it is 161 km, Greece - about 120 km, Germany - 100 km, France - 90 km, Netherlands - 80 km (Kleiber, Steinhoff, Żmijewski, 2015; Maciejewski 2011, Stankowska 2009). In addition, there is need to gradually increase the number of underground-laid lines, which will reduce their failure rate. All this adds up to the large investment outlays that energy groups will have to incur. However, not having high enough profitability to finance such ventures independently, they require significant debt capital. Financial entities will only be willing to borrow money if enterprises in question have a good rating. Until now, TSOs were an important asset that positively influenced the assessment of energy groups on the financial market (among others due to the stable EBITDA value and the ability to generate cash). The regulated activity carried out by this type of enterprise allows for stable revenues, because the Energy Regulatory Office sets distribution fees at a level covering running costs and return on capital employed in the activity (Jankiewicz, Ziółkowska, Golej, 2016). The regulator's

guidelines change this situation. Their implementation may cause separation of TSOs from energy capital groups, which means that the latter will not be able to use the operator's financial leverage. As a result, the price of vertically integrated energy businesses will be reduced and they may have their EBITDA not sufficient to obtain the necessary debt financing and thus will be forced to reduce the pace of change.

In addition, without TSOs, the investment risk will expand, as the remaining enterprises are characterized by greater variability in operation. The value of their assets may fluctuate significantly depending on the market situation, and thus the likelihood of the capital group defaulting.

The solutions proposed in the guidelines will also increase legal risk. At the end of 2018, the Government "froze" electricity prices. This situation caused confusion on the market because the legal changes occurred unexpectedly and no implementation rules were in force to realize them. The document issued by the Energy Regulatory Office in 2019 seems to be another law interpretation – again, unexpected by the market. In addition, it is not precise in terms of provisions. The result is that it is not clear what is consistent with and what violates the unbundling principle. The volatility of regulations and their low transparency mean that the entities do not know how to proceed and, as a result, make wrong decisions (Jankiewicz, 2017b). This strengthens the legal system based on discretion, i.e. the one we are dealing with in Poland (see also the statement by the Polish Committee for Electric Power on the expected trends in the update of Po-land's Energy Policy, PKEE 2013). This has a negative impact on the valuation of energy groups.

Another factor negatively affecting the valuation of the energy sector is the risk related to the costs of compliance with the guidelines and the height of possible fines for their violation, which is difficult to predict, if the Energy Regulatory Office considers that the industry has not complied with them.

Difficulties for capital groups also result from the lack of comprehensive solutions proposed by the Energy Regulatory Office that does not seem to perceive interdependence in the functioning of vertically integrated enterprises. In order to protect customers against excessive cost increases, which ERO, as a monopolist, may impose on TSOs, an index of acceptable changes in prices and rates of charges in subsequent years has been introduced in Poland. It is based on changes in the basic economic parameters (i.e. inflation and an increase in the level of selected prices and rates). However, the restrictiveness of this indicator was limited, so it did not force TSOs to minimize costs. In this respect, the ERO did not accomplish its control role well. Despite the powers it enjoyed, ERO could not force operators to significantly improve efficiency (including cost-effectiveness). The parent company from the capital group may be able to perform better its control functions. It can enforce a much greater increase in TSO's operations optimization than the regulatory body in question. Depriving the owner of full control over the operator may result in a loosening of the cost policy. This will reduce the profitability of such entities and result in increased costs that society will have to bear. This is another risk factor that will cause a decrease in the value of energy capital groups and increase the cost of obtaining debt capital.

Summary

The synthetic analysis of the proposal presented by the Energy Regulatory Office in relation to the independence of DSOs carried out above shows that the proposed solutions do not serve the development of the energy sector in Poland. The operator's lack of cooperation with other vertically integrated companies will negatively affect energy capital groups. It will reduce their effectiveness and increase the risk of conducted operations. This will reduce the value of Polish vertically integrated energy groups and reduce their debt potential. In addition, the guidelines change the concept of DSO functioning, which means they must focus on developing new operating strategies instead of development, which would also negatively affect their value.

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Types of Organizational Culture in the context of Project Management Methodologies

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Abstract

The aim of the study is to present the relationships between organizational culture and project management methodologies. In the first section of the paper, on the basis of literature studies, the characteristics of so-called "project management culture" and hypothetical linkage between types of organizational culture and types of project management methodologies are presented. This was the basis for preparing research questions. The second section, i.e. the empirical part of the paper, presents original research using the case study method and aiming to verify the relationships. The paper contributes to knowledge about cultural aspects of project management and delivers future directions for researchers.

Keywords: Project Management, Organizational Culture, project Management Culture, Project Team Culture, Typology by Cameron and Quinn.

Introduction

The interest of researchers and practitioners in intangible management factors increased in the 1980s. Other types of non-economic reasons which affect the success or failure of an enterprise were investigated. Among these factors, organizational culture was of particular interest. It has been studied from a variety of perspectives ranging from disciplines such as anthropology, sociology, organizational behavior and management sciences.

Organizational culture represents the collection of dominant values, norms, beliefs, attitudes and assumptions in a company. These elements may not have been articulated but shape the ways in which people in organizations behave and things get done. "Values" refer to what is believed to be important about how people and organizations behave. "Norms" are the unwritten rules of behavior (Armstrong and Tylor, 2014, p. 120). The culture connecting people in an organization remains very closely linked to the organization's performance. Modern human resource management (HRM) – which is one of many subdisciplines of management sciences – promotes the use of human resource policies to reinforce an appropriate (or change an inappropriate) organizational culture and underlines that human resources are valuable as a source of competitive advantage. These resources they may be tapped most effectively by mutually consistent policies that promote commitment and which, as a consequence, foster a willingness in employees to act flexibly in the interests of the "adaptive organization's" pursuit of excellence (Legge, 1989, p. 25).

Simultaneously, radical changes in the functioning of an organization have occurred in the last several decades. The increasingly uncertain environment, competition activities and short life cycle of many products and the growing expectations of customers and employees have forced companies to introduce

changes. Repetitive, routine operations are gradually losing importance in favor of unique and complex activities – i.e. projects.

A project can be defined as an "endeavor in which human, material and financial resources are organized in an innovative way to carry out an extraordinary scope of work, in line with the defined specification, within cost and time constraints, to achieve a positive change determined by quantitative and qualitative goals" (Turner, 1993, p. 8). Project management, in turn, is the application of knowledge, skills, tools and techniques, in relation to project activities, in order to meet or exceed the needs and expectations of stakeholders associated with the project (Ward, 2000, p. 168).

Projects can be managed in accordance with guidelines presented in project management methodologies. These methodologies are referred to as guides to the types of documentation and entitlements necessary to complete the particular project stages. The subject literature offers two general approaches towards running projects: traditional (managerial) and modern (agile, adaptive, dynamic, light). The traditional approach has its roots in 1950s, while the modern one is from the 1990s. The main difference between those two methodologies lies in the fact that – in case of the first one - it is not important to perform initial planning since the actions are adapted on an ongoing basis. The differences between these two approaches to project management should be also expressed in organizational culture because one of the main causes of project failure presented in the subject literature is that the organizational culture in which projects have to be delivered is not suitable for projects (Gray and Larson, 2003).

The aim of the study is to present the relationships between organizational culture and project management methodologies. In the first section of the paper, on the basis of literature studies, the characteristics of so-called “project management culture” and hypothetical linkage between types of organizational culture and types of project management methodologies are presented. This was the basis for preparing research questions. The second section, i.e. the empirical part of the paper, presents original research using the case study method and aiming to verify the relationship. The research project is financed by the Ministry of Science and Higher Education in Poland under the program "Regional Initiative of Excellence" 2019 - 2022 project number 015/RID/2018/19 total funding amount 10 721 040,00 PLN.

Literature Background

Project Management Culture as A Construct in The Subject Literature

Returning to the issue of organizational culture, it should be stated that organizational “project management culture” has been described in the subject literature discussing project management (e.g. Henrie and Sousa-Poza, 2005; Shore, 2008; Stare, 2011). It consists of strictly defined features supporting both the introduction of changes in an organization and teamwork.

A project can also be defined as an organization, which can be said to be the pattern of interrelationships, authority and responsibility that is established between the contributors (i.e., client, supervisor and contractor) to achieve the client’s objectives (Walker, 2015). Therefore, in the subject literature one can also find such terms as “organizational culture of a project” or “project team culture”, which is associated with the way people in a specific project think and apply their values. It impacts their behavior and how they perform their responsibilities during the project life cycle. The team culture affects the team’s productivity, work attitudes and overall commitment to the project (Billows, 2016).

There is a mutual relationship between project team culture and organizational culture of a company (see Figure 1). In the organizational culture there is specified how valuable projects and working in projects are.

In turn, norms and rules of working in project teams resulted from project management methodology and jargon can be transferred into the organizational culture of a whole company.

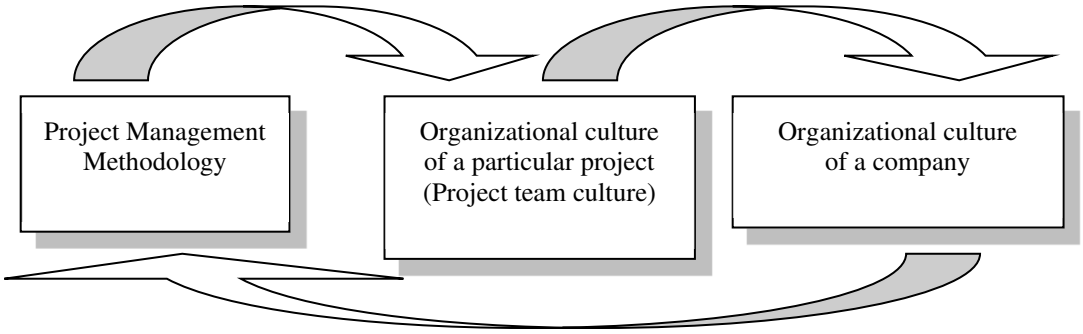

Figure 1: Relationship between project management methodology, project team culture and organizational culture of a company (Piwowar-Sulej, 2012)

For example, Graham and Englund (1997) identified eight factors that directly influence project success. These include strategic emphasis of projects, upper management support, project planning support, customer/end-user input, project team development, project execution support, communication and information systems and organizational systems support. In such an environment teamwork and cross-functional operation are the norm, conflict is recognized and dealt with and excellence is the driver (Billows, 2016). The research conducted by Doolen, Hacker and Van Aken (2003) shows that the organizational culture promoting communication and cooperation between teams influences team members' satisfaction and the effectiveness of team management. It can be related to project management, which depends on teamwork. Taking into consideration the different characteristics of organizational culture, one can create a list of features (norms or values) of project management culture. Speaking about values it should be noted that the most important elements are: mutual trust, respect, open communication, helpfulness, fairness and ethical behavior. These values are treated as predictors of a project success (Young, 2000, pp. 40-41; Morrison, Brown and Smit, 2008, p. 32; Du Plessis and Hoole, 2006, pp. 36-43). In terms of cultural artefacts it should be mentioned that in "project management culture" English language prevails regardless of the official language which is used in a company.

The literature studies show that the relationship between the characteristics of organizational culture and types of organizational culture with the standards entered into project management methodology, which are adopted in an organization, has not been fully studied so far. Piwowar-Sulej (2012) made some attempts to combine the characteristics of project management methodologies with the types of culture distinguished by Cameron and Quinn (The Competing Values Framework – CVF; Cameron and Quinn, 2011). The concept hasn't been empirically proven so far.

A hypothetical linkage between characteristics of project management methodologies and types of organizational culture

As mentioned above there are two main types of project management methodologies, i.e. the traditional one (which includes a set of developed techniques used for planning, estimating, and controlling activities, e.g. PMBoK - Project Management Body of Knowledge or Prince2) and the modern/agile one (which is

more flexible, e.g. Scrum). There are some differences between these approaches in how tasks are performed and project teams are managed (see Table 1).

Table 1: Cultural artefacts – differences between traditional and modern project management methodologies (own study based on Piwowar-Sulej 2012, Špundak , 2014)

Traditional approach	Agile approach
The way of acting	The way of acting
▪ General task: carrying out project management processes in a given order ▪ Accomplishing tasks: the use of defined tools in above-mentioned processes ▪ Waterfall approach ▪ End-users are not involved in further project stages	▪ General task: simplifying processes and procedures, sequential actions ▪ Accomplishing tasks: more flexible ▪ Iterative approach End-users are involved in further project stages
Role of project manager	Role of project manager
▪ formal manager, coordinator	▪ moderator, coach, mentor
The value of knowledge	The value of knowledge
▪ formal knowledge (codified, explicit) ▪ completed documentation is required	▪ tacit knowledge as a source of innovation
Specific language	Specific language
• basic project management terms, e.g. milestones, Triple Constraint, WBS (Work Breakdown Structure)	▪ E.g. time box, sprint, back log

The traditional approach involves the mechanistic division of work, with an underlying assumption of manageability and predictability (Saynisch, 2010). It is highly structured and is referred to as “waterfall” as the work of one phase continues downstream into the next stage. The initial phases of the project are intended to set the stage for all project work, including establishing the project’s scope and the requirements that are necessary to deliver that scope (Thomas and Fernandez, 2008). The traditional approach takes the perspective that a rigorous, hierarchical control best manages complexity.

Agile is a term, which stems from Agile Manifesto and the phrase was coined in the context of projects in February 2001 in Snowbird (Utah, USA) during a meeting of 17 major players of new software development methodologies. The term Agile has at least two definitions. According to the first definition Agile is a way of thinking (mindset) about complex tasks management (from projects to entire organizations). Main characteristic traits of this philosophy are:

- close cooperation among the parties;
- iterative and incremental way of delivering results,
- openness towards changes and flexible adaptation changing circumstances.

The second definition of Agile is an umbrella term for all agile project management methodologies (e.g. Scrum, Extreme Programming, Dynamic Systems Development Method), which are based on principles outlined in the Agile Manifesto (Agilemanifesto.org, 2019).

The reason for declaring Agile Manifesto was an increasing number of failed software development projects which were based on waterfall approach. Inefficiency of the waterfall approach was and is connected with one of the basic assumptions of this model, i.e. focus on delivering IT project in the form which was specified in the first stage. Moreover, a project is carrying out in organized, distinct and in most cases lengthy stages which makes it difficult to verify results in the course of the project. Such way of working doesn't contribute to a culture of cooperation and ongoing communication and it has the negative impact of the end result of a project.

For example, Scrum methodology emphasizes working in sprints of 30 days and also focuses heavily on daily meetings. The strict role of the project manager does not exist. One interesting aspect is the way project teams are defined. There is no formal hierarchy in the teams; job titles are not given either. The team should be self-organized and self0-managed. Team members choose by themselves the project tasks according to collective agreements, their skills and other factors (e.g. time). People who work in one team cannot be involved in other projects.

Jovanović and Berić (2018) found that general characteristics of traditional methodologies (e.g., PMI, IPMA) make them more adequate to be implemented in larger and more complex projects such as: investment, military, manufacturing or overhaul. On the other hand, general characteristics of agile methodologies lead to a conclusion that these methodologies are more suitable to use for IT projects as well as for some smaller and less complex projects, such as devising various studies, project reports, etc. However, Pace (2019) indicated that project management methodology has a weak correlation with reported project success, and this correlation is moderated neither by industry nor by project manager experience. His results did not align with previously conducted studies.

The relationship of organizational culture features with the project management methodology is an interesting research problem. The above-mentioned features of "project management culture" such as, e.g., trust are so general that they will stimulate projects regardless of project management methodology used. Trying to assess a correlation between a culture and a methodology it is worth taking into account cultural differences which are highlighted in organizational culture typologies.

One can form the detailed hypothesis that the features of Agile project management are similar to so-called "clan culture" while the features of traditional project management are similar to "hierarchy culture" (Cameron and Quinn, 2011). Clan culture (CC) is connected with a friendly, almost family-like atmosphere. A manager is treated as a mentor. The glue of an organization is loyalty and tradition. The key to success is usually taking care of the needs of clients and employees. The values are teamwork, participation and consensus. Hierarchy culture (CCH) means a working environment which is structured and formalized. Employees use defined procedures in carrying out their everyday tasks. The values are effective coordination and order. The primary goal is to maintain effective functioning and stability, and the results are achieved through performing tasks efficiently. Success is defined by good planning and low costs. It seems that these culture types (CC and CCH) should remain the dominant types in the cultures of organizations managing projects in different ways (i.e. using traditional and Agile approach).

This leads to formulating the following research questions:

RQ1: What type of culture dominates in an organization which adopts a traditional approach to project management?

RQ2: What type of culture dominates in an organization which adopts a modern approach to project management?

At this point, it is worth noting the fact that in 2017, along with the new edition of PBOK, Agile became an essential element of traditional project management. PMI, in cooperation with Agile Alliance, developed the Agile Practice Guide to encourage a hybrid approach to project management (combining traditional and Agile approaches). Moreover, Andersen (2006) states that an organization should apply methodologies assigned to specific types of projects – i.e. different in the case of IT projects and different in the case of business projects (e.g. organization of employee training). Hence, the next question arises:

RQ3: What type of organizational culture occurs in the situation of hybrid or mixed project management methodologies?

Research Methodology and Results

As little is known about the relationship between cultural types and project management methodologies, a qualitative approach based on the case study method was chosen as an appropriate way of studying this phenomenon. The use of case studies to trigger new empirical and theoretical insights is a popular approach in the literature (see Mintzberg, 1979; Yin, 1981; Eisenhardt, 1991; Cepeda and Martin, 2005; Eisenhardt and Graebner, 2007; Siggelkow, 2007).

The empirical investigation is based on semi-structured interviews and conducted with project managers working in organizations which use different project management methodologies. Of a total of 6 semi-structured interviews (2 respondents from each organization), all were in-depth and in-person. They lasted about 2 hours. This is considered acceptable for the purpose of the present work (see, for example, Mintzberg, 1979; Guest et al., 2006; Eisenhardt and Graebner, 2007; Siggelkow, 2007). The term "organizational culture" was defined and the typology of cultures by Cameron and Quinn became the focus of the interviews. The interview questionnaire included The Organizational Culture Assessment Instrument based on the CVF. A description of the cases is presented below.

Case A

The company operates in the construction industry. The main business is residential housing, which includes single-family, multi-family and high-rise housing. The projects in residential construction are predominantly designed by architects and engineers, whereas their construction is carried out by the specialized construction companies which employ subcontractors to perform the construction, technical, electrical and other works (Hendrickson and Au, 2003). The number of people engaged in projects carried out by the company is more than 50. The timeframe for construction projects is about 2 years on average, and the scope of cooperation with external partners is huge.

Construction projects require large financial, material and personnel expenditures; therefore, almost every construction project is of a highly complex nature. Projects are delivered with the use of traditional methodologies. At the beginning, a detailed scope of the project is developed. Each project stage is divided into tasks with an assigned project team coordinator.

Construction projects consist of three general and four or five detailed phases. In the first case there are three phases: pre-investment, investment and liquidation. The second case includes a preparation phase, design phase and obtaining the necessary administrative permits and decisions, project implementation phase, as well as an investment settlement and commissioning phase. The third approach covers zero phase (the analysis of needs), feasibility study, designing, implementation and potential decommissioning (along with demolition and the subsequent recycling or environmentally friendly decommissioning of the building materials and reclamation of building plots).

Construction projects are burdened with high risk. Project success depends on external environmental conditions (e.g. weather). In construction project management, attention should also be paid to such factors as market behavior (e.g. the suppliers of equipment or construction materials), the condition of the national economy, the economic situation in the region and the availability of employees, which is usually problematic. All the above-mentioned factors result in the fact that the initial assumptions of a construction project frequently do not work in the course of its implementation, thus generating high financial costs as well as a delay in the implementation of the project. Finally, a construction project is standardized at every stage by the respective legal provisions and specific formal and administrative requirements. This standardization aims at implementing the project in accordance with construction law and, above all, delivering safety for its users. Special institutions are appointed to supervise the projects implemented in this industry.

The hierarchy culture dominates in the organization under analysis. This type of culture can be also identified as a type which fits the industry. The values are: effective coordination and organization. The primary goal is to maintain effective functioning and stability, and the results are achieved through performing tasks efficiently. Success is defined by good planning and low costs.

Case B

The company is relatively young; it operates in the IT industry and employs about 50 people. The Agile approach is used in software development projects. The company offers, e.g., accounting software, comprehensive systems for running online stores and auction services, and runs industry portals. Approximately 15 people are involved in projects carried out in the company. The timeframe for IT projects is about 6 months on average. The company do not cooperate with external partners in order to deliver project results.

The company represents a “Wholeness Teal Organization” (Laloux, 2014). It forms self-organizing project teams. The values typical for “Teal” are as follows: synthesis, collective individualism, collective consciousness and changes. The company employees jointly formulated such organizational values as openness, respect, trust, equality, cooperation, innovation. In addition, they defined behavioral patterns which correspond to these values. The organizational structure is based on a network of commitments and correlations.

Employees make collective decisions. A job candidate is always invited to meet the team he/she will be working with in the future. It is the team that decides if the candidate has the right skills and can be hired. More experienced members of the organization take on more significant roles which require greater responsibility, leaving simpler tasks to less experienced individuals. The remuneration rules and the related path of development were defined in the company by the employees themselves. In addition, many employees work on a teleworking basis. The money which in traditional organizations is used to maintain the headquarters (rental costs, office equipment, and electricity costs) in this case is spent on teambuilding.

The internal organizational culture is referred to as a process and quality culture. Bearing in mind the typology by Cameron and Quinn, it should be noted that clan culture is the dominant one in the organization. Some elements of adhocracy culture can also be noticed.

Case C

The organization represents a large bank. About 20 people are engaged in projects carried out in the company. The timeframe for projects is about 6 months on average. The scope of cooperation with external partners depends on the goal of a given project (e.g. the marketing department usually cooperates with

external suppliers, while IT projects are carried out with the use of internal human resources). Initially, the Waterfall approach was used in project management. In recent years it has changed – primarily in the methods of IT project development. The Agile approach has been implemented. However, numerous barriers have been noticed in the successful development of projects. Despite many years of working together, the employees had significant problems in carrying out their new roles, or even problems with transferring their current roles to the new model. Another barrier was the unavailability or insufficient availability of the internal clients, as well as communication problems. The dominant position of traditional methodologies in the organization is associated with certain employee habits. The implementation of novelty in the form of Agile moved them out of their comfort zone.

In addition, the organization had to meet the challenges in terms of ensuring the Agile model's compliance with the legal requirements applicable to bank operations. For example, the legal provisions (of the Polish Financial Supervision Authority) emphasize a strong and active role of the bank's management board in the decision-making process and in the organization of day-to-day operations. The Agile model assumes a limited role of the managing body. The management board is supposed to set the strategic goals, but without interfering or supervising e.g. the manner of their implementation. This raises the risk of considering the role and activity of the Management Board in the Agile model as both insufficient and failing to meet the supervision expectations. An obligatory element of implementing an effective bank management system by the bank's management board is ensuring the organizational structure adapted to the size and profile of the risk incurred and allowing the effective performance of tasks. An unbalanced and unstable structure may be considered as failing to comply with this requirement and hampering internal audits.

Currently, some of the projects implemented in the organization are based on the traditional project management methodologies, some are based on the Agile methodologies and others – in a hybrid manner. This approach results in organizational chaos. However, the hierarchical type still dominates in the bank culture. The cultural type identified as a second in this organization is the "market culture".

Discussion

As results from the above-presented cases, the traditional project management methodology is accompanied by hierarchical culture, while Agile approach is accompanied by clan culture. In the organization with hybrid and mixed project management methodologies, hierarchy is the dominat type of culture.

Construction projects integrate a large number of materials, raw materials and semi-finished goods which are processed using many different technologies, and serviced by many specialists and employees using various tools, machines and devices (Levy, 2002). As indicated earlier, such projects are burdened with high risk. In addition, their result affects not only the overall customer satisfaction but, above all, the safety of their users. The hierarchy culture supports the implementation of complex projects. Employees use the defined procedures in the course of performing their tasks – often resulting from the construction law regulations.

The analyzed IT company operates in a dynamic and creative sector. At the same time, a dynamic and creative approach is expected internally, i.e. from the employees. These characteristics are consistent with "adhocracy culture". However, the values of team work and participation in the decision-making process result in the dominating, in this case, "clan culture". Experiments and innovations allow development, but the entire team celebrates the success in the form of project completion. The presented features and types of cultures are consistent with the assumptions of the Agile manifesto, according to which:

- people and interaction should be favored over processes and tools,

- working software over extensive documentation,
- cooperation with a client over formal arrangements,
- responding to changes over following the plan.

Case A shows the relationship between the traditional project management approach and hierarchy culture while Case B shows the relationship between the Agile approach and clan culture (with added adhocracy culture). These cases allow the researcher to formulate a hypothesis: Hierarchy culture exists in organizations which use traditional project management methodologies. However, regarding the last company (Case C), despite a mixed approach to project management, there is no mixed culture consisting of hierarchy culture and clan culture. The hierarchy culture prevails in this organization. This company operates in the financial industry, which, similarly, to the construction industry, is characterized by numerous detailed legal provisions that have to be complied with (e.g. the Act on Banks or Loan Products). The hierarchy facilitates control, including the one carried out by the external supervisory institutions. At the same time, the organization focuses on financial results. Gaining a larger market share is considered success, which corresponds to "market culture". As indicated in the description of Case C, such culture has become an obstacle in the implementation of Agile project management methodologies and still remains the dominant one in the organization. Case C results in the following hypothesis: Industry is a mediating variable between project management methodology and the type of organizational culture.

Conclusions, limitations and directions for Further Research

This study investigates a subject that is rooted in two or three different disciplines: human resources management/organizational behavior and project management. This research contributes to knowledge by showing linkage between the type of organizational culture and the type of project management methodology.

At this point it is worth highlighting the limitations of the research process, which simultaneously provide indications for further research. The aim of the qualitative research approach is to "simplify, reconnect and redirect theory and practice" and accordingly provide new impulses (Lee, 1999, p. 166).

Firstly, only three case studies were presented. Two respondents participated in each study. Therefore, it is worth conducting in-depth research – also based on case studies, but covering a larger number of respondents (and addressing the question about culture to those who do not work in projects).

Secondly, the analyzed organizations function in various industries and each industry has unique features which affect the organizational culture. Therefore, a quantitative research, focused on a specific industry (e.g. construction), can be taken up. The author formulated two hypotheses which can be verified in further studies. Taking into account the identified impact of the industry on the type of culture in the last company under study, it is worth carrying out further research with the use of the industry as a mediating variable.

Thirdly, the research results identify the culture type which dominate in the course of conducting the research. Culture is subject to continuous changes. Perhaps in a year other culture types will dominate in the analyzed organizations. In addition, it is emphasized in the subject literature that the dominance of one culture type may prove to be a factor which negatively affect the business. Leaders should be able to balance inconsistent and competing demands, suggesting that high performance requires concurrent mastery of seemingly contradictory or paradoxical abilities (Yu and Wu, 2009). In contrast, cultures which are considered "imbalanced" tend to highlight values linked with rational goals (market) and internal process (hierarchy) cultures at the expense of values that characterize other cultures, thereby resulting in comparatively poor organizational performance (Denison and Spreitzer, 1991). Therefore, it is worth conducting long-term research covering many years of a given organization's operations.

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Analysis and Evaluation of Education Costs in Romania - Methods and Techniques

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Abstract

The cost of education may be the smallest monetary value belonging to the system inputs needed to reach a certain level of outputs. In order to understand the concept of cost of education, the notion of suitability of education must be understood in advance. There are two fundamental questions related to the educational adequacy concept: what is the amount of money that allows a school to provide its students with an adequate education and how the resources available in schools can be distributed so that all students receive an adequate education regardless of the circumstances in which the education process takes place.

Keywords: Cost, Education, Cost Analysis, Cost Evaluation, Quality Standards

JEL Classification: I_2, I_{25}

Introduction

The Romanian educational system is financed from public funds which determines the acceptance of more responsibilities. It is impetuous to keep track of data that will allow performance evaluation from a managerial point of view as well as from the point of view of system outputs in society.

The outputs of the system are difficult to quantify financially because most of the time the evaluation is done from the perspective of the knowledge acquired by the student evaluated through national exams and not necessarily from the point of view of its integration in production on the labor market.

The present paper presents the theoretical part and the functioning of the system.

The cost of education and the specific costs of education

At a very general level, the cost of education represents the minimum amount of expenditures needed to provide the student society with a certain level of theoretical and practical training, considered appropriate (Andrews, M., Duncombe, W., Yinger, J. (2002) Revisiting economies of size in American education: are we any closer to a consensus? Economics of Education Review, no. 21, pp. 245-262).

The cost of education may be the smallest monetary value belonging to the system inputs needed to reach a certain level of outputs. In order to understand the concept of cost of education, the notion of suitability of education must be understood in advance.

The adequacy of education can be seen as an absolute measure of how sufficient funding levels can be offered to enable students to learn at a higher quality level (Picus, LO (2000) Adequate Funding, in About School Spending: American School Board Journal , p. 34). Taking into account the above, one can observe the difference between the suitability and the equity characteristics, which are concentrated on the relative levels of distribution of funds. The existence of an adequate funding system should allow the identification of the resources necessary for schools to ensure equal

opportunities for students in achieving the quality standards existing at national level. Suitability should not be confused with equality, as students with special needs, for example, may need additional funds to reach the set quality level.

The adequacy of education has several definitions. From the point of view of system inputs, suitability refers to the number of teachers required to perform a certain task or to the skills that can be performed using specific resources (Myers, J., Silverstein, J. (2002) calculation of the cost of a suitable education in Montana in 2001-2002 using the Professional Judgment Approach, available at http://www.mtsba.org/study/Final%20Report.pdf, accessed 20.01.2020). Another definition regards adequacy as achieving a certain level of student performance in standardized national assessments (Haveman, M. (2004) Determining the Cost of an Adequate Education in Minnesota: Implications for the Minessota Education Finance System, available at http: / /www.mntax.org/cpfr/education.pdf,).

From the perspective of suitability, a model that identifies a certain required level of the amounts with which the education is funded offers only a starting point or a lower limit on the value of these funds.

Research (Norman, J. (2002) Funding our Future - An Adequacy Model for Wisconsin School Finance, Institute for Wisconsin Future, p. 26) has identified a number of steps that need to be taken to determine the need for funding from the perspective of adequacy, namely:

- Setting quality standards
- Determining the resources needed for schools to meet the previously established standards
- The monetary quantification of resources for determining the need for budgeted expenses
- Establishing the ratio between the level of expenditures and the available funds: in case the level of necessary expenditures is much higher than the available funds, it is necessary either to revise the standards or to adjust the level of expenditures in time to support the appropriate level of rewards.

There are two fundamental questions related to the conceptual adequacy of education: what is the amount of money that allows a school to provide its students with an adequate education and how the resources available in schools can be distributed so that all students receive an adequate education regardless of the circumstances in which the education process takes place.

Two categories of costs can be identified: costs related to the provision of educational services in order to meet the educational needs of the population (both general and specific) and costs related to increasing the performance level of students at a certain level, which vary according to the specific needs. students, and depending on the context in which the educational process takes place (Baker, J., Green, D. (2010) Politics, Empirical evidence and policy design, in Handbook of Education Politics and Policy. ed. Bruce S. Cooper, James G. Cibulka, Lance D. Fusarelli, pp. 311-337). It can be considered that the two categories of costs represent: costs related to the provision of educational services in order to meet the educational needs of the population (both general and specific), these may be related to the system inputs and the costs related to the increase of the performance level of the students at a certain level, which varies according to the specific needs of the students and depending on the context in which the educational process takes place may be related to the outputs of the system.

The factors that influence the structure of the specific costs of education are represented by the needs of the students, the size of the school or the territorial administrative units but also the geographical characteristics of the area in which the educational unit is located.

Difficulties in learning and low results in assessments may be associated with not meeting the needs of students. The needs of students can be differentiated into two categories: basic needs in terms of the educational process and special needs for minorities, students with disabilities or those from poor families.

Costs must identify needs as closely as possible and relate them to the resources needed to meet them.

An example of such special needs of students is that of students from poor families, who do not have access to the same learning experiences or resources that allow them to make the most of what is offered in the school. Under these conditions, the school together with local administrations must provide additional resources to compensate for these differences. A solution would be to employ more qualified staff, smaller school groups, extra-curricular programs financially supported by the Ministry of National Education or by local administrations. There may also be additional costs related to student mobility that may affect the total costs.

Students with disabilities are another example of students with special needs. Differences from a mental, physical or emotional point of view must be eliminated or diminished. Additional funds are needed to reduce or eliminate these differences. The size of the school units is also an important factor in the evaluation of costs. As long as an education unit operates below the optimum level in terms of number of students and the funds allocated to it are reduced. These aspects can be identified in rural areas where the number of students is low.

The geographical characteristics of the area in which the schools are located can cause differences in costs both in the costs associated with the teaching staff and in the costs associated with the expenses with the goods and services needed for the good educational instruction for each beneficiary of the education.

Concerns can be identified about determining cost estimation models since the 1970s when trying to estimate costs using a cost regression model of educational system outputs based on estimating the specific costs of reaching a specific level of student performance in reading and mathematics *(Garms , WI, Smith, MC (1970) Educational need and its application to state school finance, The Journal of Human Resources, vol. 5, no.3, summer, pp. 304-317)*. At the same time, equal opportunities in education is defined as the permission granted to all schools to provide at least a minimum educational standard with reasonable financial effort (*Garms, WI, Smith, MC (1970), op.cit. ,, page 304)*.

Methods of General Cost Analysis

Cost analysis has become an important tool in both performance evaluation and decision making in the education system in the context where the staff in the education system must have an increasing degree of performance with less funds, and at the same time need to provide as much tangible evidence as possible of the effectiveness of educational programs.

We can identify two rational reasons for using cost analysis. On the one hand, the existing budgetary constraints on the other, the educational policy makers and the leaders of the school units that face limited resources.

There are several approaches to cost analysis that answer different types of questions. A cost feasibility analysis can provide useful results when it is necessary to know the cost of a certain educational program or the possibility of implementing it in the context of a budget constraint.

To determine the usefulness or effectiveness of some programs, it is useful to use a cost-benefit analysis, or cost effectiveness or cost utility.

The multitude of terms associated with cost analysis (cost effectiveness analysis, cost benefit analysis, cost utility analysis, etc.) are used as synonyms in specialized literature even though each term represents a different method of analyzing economic information. Even if in practice the differences between the methods of cost analysis can be considered small, the assumptions from which each method starts are different (qualitative or quantitative) and the results are different.

The main steps required to perform a cost analysis within an educational program are presented in figure 1.1.

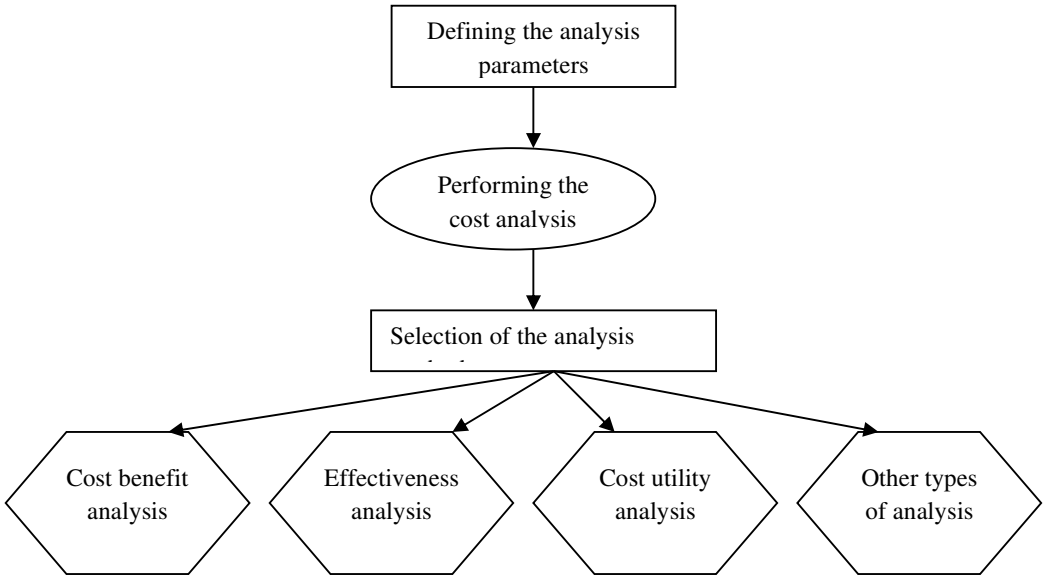

Figure 1.1 - Cost analysis steps
Sursa: Jennifer L. White, Craig A. Albers, James C. DiPerna, Stephen N. Elliott, Thomas R. Kratochwill, and Andrew T. Roach, Cost Analysis in Educational Decision Making: Approaches, procedures and Case Examples, p.3

Cost Effectiveness Analysis

In order to elaborate decisions, the cost effectiveness analysis is based on a systematic approach to the costs and consequences of their production. As HMLevin exemplifies, there are several ways of approaching how the goals of increasing student performance in math and reading can be achieved, for example, such as adopting a new curriculum, additional teacher training, computer-assisted instruction, diminishing the number of students in classes, etc. The cost-effective solution is to identify the costs and effects that their production has on increasing student performance for each chosen alternative, and ultimately choosing which alternative has the greatest impact on increasing student results in standardized tests *(Levin , HM (1995) Cost-effectivness Anaysis, International Encyclopedia of Economics of Education, 2nd ed. Oxford: Pergamon, pp. 381-386).*

Both cost-effectiveness and cost-benefit analysis are methods of evaluating the resources used in some alternatives, and quantifying costs. However, unlike the cost and benefit analysis method, only alternatives whose outputs can be quantified monetarily are considered in the cost effectiveness analysis.

The purpose of practicing cost effectiveness analysis is to determine the minimum cost at which an educational program can achieve its objectives and the hypothesis from which the method development started is that each alternative is associated with both different costs and different outcomes. Moreover, cost minimization results in a more efficient use of society resources, which allows the development of other aspects of education.

Prior to carrying out the cost analysis, it is necessary to know the problem for which it is necessary to elaborate a decision, the alternatives considered as well as their potential effects. After the problem is formulated, it is necessary to evaluate the effectiveness of the considered alternatives, in this sense being needed concrete dimensions and measures of the effectiveness. (Table 2.1) Then, formulating alternative programs is the next step that opens the way for evaluating the effectiveness of these alternatives. As a methodology, standard methods of evaluation, or previous results of similar evaluations, can be used. What is important to keep in mind is that efficiency assessment is not synonymous with cost evaluation *(T.D., Campbell, D.T. (1979) Quasi-Experimentation. Houghton Mifflin, Boston, Massachusetts).*

By definition, the cost of an alternative represents the value of the resources that the company gives up for the alternative to become possible. Thus, the total cost is the representation of social value, and this total cost is subsequently broken down and distributed over the entities that make up the educational system.

Table 2.1.: Measures of effectiveness

The objectives of the program	Measures of effectiveness
Program completion by students	The number of students completing the program
Reducing the number of students who drop out of the program	The potential number of dropouts that do not occur
Employing graduates	The number of graduates employed
Student learning	The results of standardized tests
Student Satisfaction	Program evaluation is for students
Physical performance	Assessment of the physical condition of the students
Continuation of university studies	Number of students enrolled in the university cycle

Source: Levin, H.M. (1995) Cost-effectivness Anaysis, International Encyclopedia of Economics of Education, 2 ed. Oxford:Pergamon, p. 383

Cost estimation can be done by analyzing the component elements of the considered alternatives, which involves identifying these components, determining their cost and total cost and analyzing these costs by following a certain decision-oriented evaluation framework. Most alternatives include as workforce components, equipment, materials, deployment areas, etc. The level of detail of these components must be adequate to guarantee the inclusion of all necessary resources and their value. As sources of data for this stage are used interviews, observations or different existing reports.

The effectiveness analysis that follows the previous step must take into account the suitability of the unit of cost expression and the cost payers. Generally, the effectiveness in education is evaluated in relation to the sizes associated with the students (the number of students who…) which naturally leads to the determination of a cost per student, obtained by dividing the total cost by the number of students. Another way to evaluate the effectiveness of education is the effectiveness rates that are based on the average effects of the analyzed programs and on the cost per student, or the use of the marginal cost. The most widely used measure of cost effectiveness is the efficiency rate obtained by reporting cost effectiveness.

The final stage of the effectiveness analysis is that of comparing the alternatives in terms of cost intensity, separated into fixed costs and variable costs, intensity which differs significantly depending on the number of students enrolled in the programs.

The content of the education program is one of the most frequently analyzed areas in terms of effectiveness, followed by the additional training of teachers.

Cost-Benefit Analysis

Cost-benefit analysis has been defined as a practical way of assessing the desirability of projects, where a long-term and broad vision is needed which involves listing and evaluating all relevant costs and benefits *(Perst, AR, Turvey, R. (1965) Cost-benefit analysis: A survey, The Economic Journal, 75, pp. 683-735)*. The method dates from the early 20th century, and has been extended over time to all areas of public sector investment and beyond. In the area of education, the method was applied to investments in education where it became known as the rate of return analysis *(Cohn, E., Geske, T. (1990) The economics of education, Pergamon Press)*

The cost-benefit analysis must adhere to a number of principles, namely:

- The existence of a common unit of measure
- The assessment of costs and benefits must present consumer or producer assessments that reflect their current behavior
- The measurement of benefits is made through market options
- The gross benefit of increasing consumption is below the demand curve
- Certain measures of benefits require the evaluation of some component elements of human life
- Avoid double-suming of costs or benefits
- Establishing some decision criteria for projects

If in terms of costs these can be relatively easily identified, the same cannot be said about benefits. Determining the benefits of education starts from a philosophical approach to the purpose of education and the ways in which it can be achieved. Since Greek antiquity, education has been considered as centered on the moral fulfillment of individuals and the welfare of the society in which they live. Recent studies have shown that education contributes both to better performance of individuals in the labor market but also to improving their health, promoting an active civic attitude and reducing violence. It has been shown that educated people tend to live longer, the data revealing a strong association between life expectancy and education level. Educated people tend to be more involved in civic activities just as they tend to be happier.

The main output of the educational system is the information and skills transmitted to students, which they will use throughout their life. School is the place where students learn what adults already know, and is the place where knowledge transfer takes place. The content of the learning is determined by the specialized research, the practical needs and the experience of the teachers. Learning and skills development takes place by gathering and evaluating new information that is transmitted to students, which leads to an increase in their intellectual capacity resulting in an improvement in the intelligence level of the population *(Husen, T., Tuijnman, A. (1991) The Contribution of Formal Schooling to the Increase in Intellectual Capital, Educational Researcher, 20 (7), pp. 17-25)*. Through the school, the differences between the different categories of students considered disadvantaged and those who do not fall in this category are reduced.

One child's education contributes to the well-being of others by ensuring a stable and democratic society *(Husen, T., Tuijnman, A. (1991) The Contribution of Formal Schooling to the Increase in Intellectual Capital, Educational Researcher, 2007, pp. 17-25)* . This is why governments invest considerable amounts in education because of the responsibility that the school has for the individual development of students but also for economic and social well-being *(Feinstein, L., et al. (2006) What has the Effects of Education on Health ?, in Measuring the Effects of Education on Health and Civic Engagement: Proceedings of the Copenhagen Symposium, R. Desjardins and T. Schuller, Eds, OECD, Paris, France, pp. 171-353).*

An educational system with a high level of quality and efficiency offers significant benefits to individuals who are aggregated within communities and which in turn generate major social and economic benefits. The dropout rate affects the unemployment and implicitly the consumption of social assistance funds, the crime rate is low among the educated people, as well as the mortality rate.

The synthesis of the main characteristics and particularities of the methods of cost analysis are presented in table 2.2.

Table 2.2: Particularities of the methods of cost analysis

Analysis method	Main features
Basic cost analysis	- answers questions about the financial viability of a program in terms of overall costs -It is used to describe economic data - describes distributions to both real and adjusted costs that are necessary for the implementation of a particular program - is the most limited form of cost analysis - does not take into account the benefits of the program - it is useful in the planning phase of a project but does not allow comparisons between programs
Cost feasibility analysis	- answers questions about the financial viability of a program - is useful in the elaboration of the decisions regarding the described economic data - is used to determine the extent to which a program can be successfully implemented under the conditions of budgetary constraints - allows the evaluation in non-monetary terms (decrease of the instructional time, increase of the number of students of a class, etc.)
Cost effectiveness analysis	- answers the questions related to the effectiveness of a particular program compared to other programs - allows comparisons between programs especially when the comparison is made according to a single criterion such as progress in the results of national assessments on a particular subject
Cost-benefit analysis	- is used to compare programs that may have different purposes or structure - Cost is defined in monetary terms
Cost utility analysis	- allows comparisons between educational programs with different measures of outputs, using conceptual utility - the cost is not necessarily defined in monetary terms - the definition and operationalization of the notion of utility is made in relation to the beneficiaries of the information provided - is a subjective method of evaluation

Source: own systematization

Methodology specific to the analysis of costs in education

The analysis of the costs generated by the educational system implies the completion of a series of stages that we present in the following:

a – Defining the specific parameters of the evaluation

When evaluating an educational program, evaluators should consider the level at which the program is feasible and ensure that the assessment is conducted in a prudent and realistic manner. For this purpose it is necessary to define the parameters of the evaluation taking into account the available resources, the information needs as well as the nature and number of outputs related to the program. Depending on these parameters it can be determined which method of cost analysis is appropriate. Determining the appropriate method must go through the following steps *(Levin, H.M., McEwan, P.J.*

(2001) Cost-effectiveness analysis: Methods and applications, Thousand Oaks, Ca, Sage Publications):

- Formulate specific questions for evaluation
- Determining the suitability of an economic evaluation
- Selection of alternative evaluation programs
- Identification of the beneficiaries of the evaluation results and their informational needs
- Selecting the most appropriate cost analysis method

b. Formulation of research-specific questions

In order to determine the cost analysis form, it is necessary to clearly formulate the questions to which the research undertaken must provide an answer. In this way, it is possible to effectively plan the collection of the data needed for the study, and depending on the nature of these questions, the most appropriate form of cost analysis can be determined which can answer these questions.

Table 2.3 presents some specific questions for the evaluation of the educational programs as well as the methods of analyzing the most appropriate costs.

Table 2.3: Choosing cost analysis methods in relation to research questions

Evaluation / research questions	Forms of cost analysis
What is the cost of the program and what is the cost distribution	Fundamental cost analysis
Can the program be implemented under budgetary constraints?	Cost feasibility analysis
Which program offers the highest efficiency at the lowest costs?	Cost effectiveness analysis
Which program offers the most benefits at the lowest costs?	Cost-benefit analysis
What is the program with the highest utility and lowest costs?	Cost utility analysis

Source: own systematization

c. Determining the adequacy of the economic evaluation of the educational programs

The adequacy of the economic evaluation of the educational programs must be interpreted in terms of feasibility and usefulness. Even if any educational program can be subjected to a cost analysis, it is not always appropriate to evaluate the economic edicacity of program outputs. Evaluation may not find its usefulness when its likely outcomes are no greater than the costs of performing that evaluation *(Scriven, M. (1974). Evaluation perspectives and procedures. In JW Popham (Ed.), Evaluation in education: Current applications Berkeley, CA: McCutchan).*

d. Selection of alternative programs used in the evaluation

After formulating questions and choosing the most appropriate method of cost analysis, it is necessary to identify a benchmark for comparing the results of the evaluation. Thus, it is necessary to identify a large number of programs from which a reasonable subset will be chosen for analysis *(Hopfenberg, W.S., Levin, H.M., Chase, C., Christensen, S.G., Moore, M., Soler, P.L., et al. (1993). The accelerated schools resource guide. San Francisco: Jossey-Bass).*

e. Determining the limits of the evaluation

The limits or boundaries of the evaluation can be identified considering the nature of the program or the nature of the policies related to it, determined by the initiator of the program (the ministry of

education, the school inspectorate, the municipality, etc.). The main limits can be imposed by time, context and the group of beneficiaries of the evaluation.

f. Identification of the beneficiaries of the evaluation results

Identifying the beneficiaries of the evaluation is one of the most important steps in defining the purpose of performing a cost analysis. Depending on the number of these beneficiaries and their decision-making power, the depth of the resource evaluation is established, which may vary depending on different parameters.

g. The actual cost analysis

After defining the parameters of the evaluation, the analysis of the costs represents the process of collecting and organizing the information about the resources necessary for the implementation of an educational program or an educational policy *(Barnett, WS, & Escobar, CM (1990). Economic costs and benefits of early intervention. In SJ Meisels & JP Shonkoff (Eds.), Handbook of early childhood intervention, New York: Cambridge University Press, pp. 560-582). Cost is defined as the value of all the resources to be used by a program and which can be allocated to it (Levin, H.M., McEwan, P.J. (2001) op.cit).*

Regardless of the form of cost analysis used, it involves more than just cost accounting or budget analysis. Performing a simple budget analysis is not appropriate for the cost analysis because within the budgets all the information regarding the total costs involved by a program, such as donations, volunteering services, etc. is not specified. Also, the budgets are made up of a period of one year, which may be shorter than the period of the development of an educational program and most often reflects the way of the distribution of expenses, at the expense of highlighting the way of spending the available funds.

Conclusion

The reporting of the expenses in education is carried out by categories of expenses.

A traditional approach to the way in which education expenses are reported is by category of expenses: expenses with staff in education, expenses with auxiliary staff, material expenses, etc. This type of approach can be considered effective when it comes to a simple entity, and it has been used until the role of education has been extended from providing simple instruction to providing social services. Thus, there was born the need to report expenses by functional categories: instruction, educational support, administration, other operations, etc. Another cause that led to the need to differentiate the expenditure by certain categories in order to understand them was the recognition of certain categories of population with special needs, such as students with deficiencies, students from economically or socially disadvantaged families, minorities. and so on Thus, the users of financial information specific to the pre-university education system (directors of educational units, persons involved in the elaboration of educational policies, taxpayers, parents) have focused their attention on understanding how the amounts allocated to education are spent on general educational activities, special education, vocational education, education of children with special abilities or primary education. The interest of these users of information is also related to the benefits generated by spending the amounts allocated to education, reflected in the students' performances or social benefits.

Reporting the data related to the specific expenses of the pre-university education system on objects was thus useful until the complexity of the educational and social policies increased. At present, the reporting of expenses by categories of objects (salaries and related contributions, suppliers, materials) is important only in the context of the functions served (educational, administrative, support activities). In order to evaluate the performance or productivity of the pre-university education system, however, it is necessary to establish how the allocated resources are organized to ensure the provision of specific services.

The determination of a model for the allocation of resources on educational areas must start from useful and consistent data. One of their main dimensions has to be the comparability of the data, a unitary reporting system that is based on common standards and definitions consistent in time and space. Also, in order to ensure the usefulness of the information, the data related to the resource allocation templates must contain useful information to the social and educational policy makers whose task is to determine new ways to improve the performance and productivity of the education system. All these arguments justify the need to classify, organize and measure resources in a way that helps to understand the impact they have on the outputs related to the education system.

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The Identification of Changes in Employment Shares in The Sections of Knowledge-Intensive Services – Dynamic Classification of The European Union Regions

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Abstract

Service sector is an important component of the global economy – a complex and dynamically evolving entity. In the globalizing economy, including the European Union countries and regions, the service sector importance in creating GDP or value added is growing. The employment number is increasing, however, this increase presents a different dynamics in the individual sections identified in this sector. The pace and direction of these changes result from many factors including economic, social, cultural and historical ones. A special role, due to the growing importance of knowledge in the economy, is played by the sections in which knowledge is intensely used.
The purpose of the research carried out within this study was to identify and assess the changes in employment shares in the sections of knowledge-intensive services. The research procedure was based on the dynamic classification method. The studied objects were the European Union regions at NUTS 2 level. Due to the current availability of complete data, the analysis period covers the years 2008-2018.

Keywords: dynamic classifications, European Union, employment, knowledge-intensive services, NUTS 2

Introduction

The European Union is a complex socio-political structure which, at the regional level, consists of almost 300 NUTS 2 units, presenting extensive diversity in terms of population, area, location, history and culture as well as the level and pace of changes in economic structures. The regional economy consists of economic entities and the network of correlations and mutual connections between them. The entities constituting the regional economy, i.e. enterprises, organizations, institutions and other units conduct business activities or are involved in developing economic relations and, at the same time, operate at higher than local levels, i.e.: countries, continents, regions of the world or at the global level. The dynamics of the regional economy and the system of structural correlations are of significant importance. The occurring changes result in permanent evolution. The pace and direction of changes is influenced by the initial status – historical conditions allowing the development of the components within economic structures.

In 2018, almost 230 million people were employed in the European Union. The increase in total employment (from 222.8 million in 2008) was accompanied by the employment decrease in most sectors – excluding services. In 2008 the service sector employed 149.4 million people (67.0% of the total number), and 164.1 million (71.4%) in 2018. The years 2008-2018 were also characterized by higher employment shares in individual service sections identified based on the intensity of knowledge used: in knowledge-intensive high-technology services from 2.6 to 3.0%, in knowledge-intensive market services (except financial intermediation and high-technology services) from 5.6 to 6.5%, and in other knowledge-intensive services from 25.7 to 27.8% (Eurostat, 2020). The diversification of employment shares in service sections is significant – and changes over the years – in the European Union countries, this also applies to the EU regions at NUTS 2 level. It seems interesting to focus on identifying the groups of regions similar in terms of the level of employment shares and the scale of percentage changes using the dynamic approach.

The purpose of the research was to identify and assess the changes in employment shares, in the sections of knowledge-intensive services, in the European Union regions at NUTS 2 level using the dynamic classification method. Such a aim makes possible to answer the question whether we can identify groups of regions similar from the point of view of starting level and changes in employment shares in high knowledge intensive services, in the analysed period.

Brief Research Survey

The importance of service sector in the economy is undeniable. In addition to higher number and percentage of employment in services, also an increase in this sector efficiency and GDP share in the global economy can be observed (Buckley and Majumdar, 2018; Attiah, 2019). The service sector and the individual sections identified within this sector represent the dynamically developing elements of the economy. Therefore, they constitute an important segment of interest for the researchers. Textbooks and their subsequent volumes are published, such as the Handbook of Service Science (Maglio et al., 2019). The book edited by P. Wood (2004a) assesses the national context, structure and trends, restructuring processes and impact on the development of knowledge-intensive services (KIS) based on the example of historical data for such countries as e.g.: France (Farcy, Moulaert and Gallouj, 2004), Germany (Strambach, 2004), Italy (Cavola and Martinelli, 2004), United Kingdom (Wood, 2004b), Spain (Rubalcaba-Bormejo and Cuadrado-Roura, 2004). The addressed problems also include: the diversity of processes and policies (Wood, 2004c), spatial divisions of knowledge-intensive business services (KIBS) and regional development (Bryson and Rusten, 2005), the organizational and territorial changes of services (Hermelin and Rusten, 2007), the service industry research imperative (Beyers, 2012). Additionally, the typologies of services are an important element of the conducted research (Glückler and Hammer, 2011, 2013). In the perspective of the EU regions, the research covers, e.g.: the determinants of market extension in KIBS (Bettiol at al., 2015), localization of business services (stand out large urban areas) (Camacho-Ballesta, Melikhova, Hernández-Peinado, 2014), specialization in KIBS across Europe and permanent co-localization (Gallego and Maroto, 2015), regional significance of knowledge-intensive business services (Wood, 2006), geographical distribution and regional specialization (Delgado-Márquez and García-Velasco, 2013). From the short literature review – limited by the size of the paper – of the research approaches, we can see the multi-aspect treatment of employment structure changes, and the sector of high-intensive knowledge services as the important subject of these research.

Method: Dynamic Classification

The research conducted within the framework of the study – spatio-temporal cluster analysis – was carried out using the following scheme (Markowska, 2012):

1/ determining the set of diagnostic variables, the analysed objects and time range based on the subject literature,;
2/ collecting data and (possibly) supplementing the missing data;
3/ preliminary analysis of the set of variables;
4/ ensuring comparability of the variables, if necessary (the data presented as shares do not require normalization);
5/ global standardization using the arithmetic mean and standard deviation determined for each variable from all analysed periods;
6/ using Ward's method (Ward, 1963) to determine the number of clusters;
7/ applying k-means method (Steinhaus, 1957; MacQueen, 1967) in the classification of objects;
8/ assessing the composition and changes within the groups,
9/ estimating the group centre based on dynamic data – to determine the objects typical for individual clusters.

The objects stand for the operational taxonomic units (OTUs) in the proposed [YT,Z] system. It means that each object, in each unit of time is approached separately, and their configuration is subject to assessment in the space defined by the selected characteristics.

Variables, Countries, Regions and Research Period

The following variables were used in the assessment of changes in employment structure in the sections of knowledge-intensive services (htec_emp_reg2) (Eurostat, 2020):

S_1 – employment in knowledge-intensive high-technology services (percentage of total employment),
S_2 – employment in knowledge-intensive market services (except financial intermediation and high-technology services) (percentage of total employment),
S_3 – employment in other knowledge-intensive services (percentage of total employment).

The initial assessment, constituting the background of the conducted analyses, used the data referring to 28 countries of the European Union, and the detailed study covered 272 out of 281 EU regions at NUTS level 2 (96.8%) – excluding two Spanish (Ciudad Autónoma de Ceuta, Ciudad Autónoma de Melilla) and Portuguese (Região Autónoma dos Açores, Região Autónoma da Madeira) and also five French (Guadeloupe, Martinique, Guyane, La Réunion, Mayotte) regions due to no available data (Regions, 2018). The summary of basic characteristics covering the analysed countries and for regions is presented in Table 1.

Table 1: Basic statistics of variables – EU countries and regions

Specification	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Countries											
S_1											
EU 28	2.6	2.6	2.7	2.7	2.8	2.8	2.9	2.9	2.9	3.0	3.0
Max	4.1	4.3	4.5	4.8	5.1	4.9	5.0	5.1	5.2	5.4	5.3
Min	1.2	1.3	1.2	1.4	1.5	1.6	1.6	1.9	1.9	2.0	2.2
Median	2.5	2.6	2.7	2.7	2.6	2.8	2.9	2.9	3.0	3.0	3.2
Standard deviation	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8
Coefficient of variance	30.5	29.4	29.8	29.6	30.7	28.0	27.0	26.4	25.6	26.3	23.9
Max/min	3.4	3.3	3.8	3.4	3.4	3.1	3.1	2.7	2.7	2.7	2.4
S_2											
EU 28	5.6	5.8	5.9	6.0	6.1	6.1	6.2	6.3	6.4	6.5	6.5
Max	8.6	8.5	8.8	9.2	9.5	9.6	9.9	10.3	10.6	10.5	10.4
Min	2.4	2.6	2.6	2.9	3.1	3.2	3.6	3.8	3.9	3.9	3.9
Median	5.5	5.7	5.7	5.8	6.0	5.8	6.0	6.0	5.9	6.2	6.3
Standard deviation	1.5	1.4	1.3	1.3	1.4	1.5	1.6	1.5	1.5	1.5	1.6
Coefficient of variance	27.2	24.9	23.6	22.6	22.9	25.1	25.3	24.3	23.9	23.3	24.7
Max/min	3.6	3.3	3.4	3.2	3.1	3.0	2.8	2.7	2.7	2.7	2.7
S_3											
EU 28	25.7	26.6	27.2	27.3	27.4	27.5	27.7	27.8	27.7	27.7	27.8
Max	35.0	35.6	36.6	36.5	36.5	36.7	36.7	36.3	36.4	36.8	36.9
Min	14.2	14.7	14.5	14.8	14.3	14.0	13.5	14.9	14.9	14.9	14.7
Median	23.8	25.1	25.7	25.2	25.4	25.4	25.5	26.2	25.8	25.8	25.9
Standard deviation	5.2	5.2	5.2	5.3	5.3	5.1	5.1	4.9	4.9	4.9	5.0
Coefficient of variance	21.0	20.3	19.8	20.0	20.0	19.1	19.1	18.3	18.2	18.5	18.4
Max/min	2.5	2.4	2.5	2.5	2.6	2.6	2.7	2.4	2.4	2.5	2.5
Regions											

Specification	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
S_1											
Max	7.8	8.2	7.8	8.3	8.4	8.2	8.6	8.7	9.4	9.7	9.6
Min	0.4	0.4	0.6	0.5	0.5	0.5	0.6	0.7	0.6	0.7	0.7
Median	2.0	1.9	1.9	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2
Standard deviation	1.53	1.49	1.54	1.6	1.57	1.57	1.59	1.63	1.64	1.68	1.69
Coefficient of variance	63.4	62.4	63.4	64.0	62.1	61.6	61.9	62.1	62.4	63.2	61.6
Max/min	19.5	20.5	13.0	16.6	16.8	16.4	14.3	12.4	15.7	13.9	13.7
S_2											
Max	19.7	21.1	19.7	20.1	20.1	19.9	19.2	16.6	18.0	20.1	17.0
Min	1.0	1.0	1.0	1.1	1.2	1.5	1.5	1.3	1.6	1.7	1.4
Median	4.9	5.1	5.0	5.3	5.4	5.4	5.5	5.4	5.4	5.6	5.7
Standard deviation	2.3	2.43	2.35	2.31	2.41	2.44	2.43	2.41	2.46	2.52	2.5
Coefficient of variance	43.8	43.8	42.3	40.8	41.7	41.7	41.0	40.5	40.6	41.4	40.8
Max/min	19.7	21.1	19.7	18.3	16.8	13.3	12.8	12.8	11.3	11.8	12.1
S_3											
Max	41.2	45.2	41.8	43.2	43.6	42.3	44.8	42.9	44.2	44.5	42.9
Min	11.7	11.9	10.8	11.3	11.5	10.8	10.7	10.6	10.1	10.0	10.7
Median	26.8	27.6	28.1	27.9	28.4	28.2	28.4	28.7	28.7	28.2	28.7
Standard deviation	6.1	6.2	6.1	6.0	5.96	5.75	5.84	5.9	5.86	5.89	5.87
Coefficient of variance	22.9	22.5	21.9	21.6	21.3	20.5	20.8	20.8	20.8	20.9	20.8
Max/min	3.5	3.8	3.9	3.8	3.8	3.9	4.2	4.0	4.4	4.5	4.0

Source: author's calculations based on Eurostat data

The overview of data referring to the employment shares in the assessed sections shows as follows:

– the highest share of employment in knowledge-intensive high-technology services in 2008 referred to Sweden and Finland, and in subsequent years to Ireland;
– the lowest share of employment in section S_1 was recorded in Romania in 2008-2014 and in 2018, whereas in 2015-2017 and in 2018 in Greece;
– the highest share of employment in knowledge-intensive market services was observed in Sweden in 2009-2018 and in Luxembourg only in 2008;
– the lowest share of employment in sections S_2 and S_3 occurred in Romania
– the highest share of employment in other knowledge-intensive services in 2008 and in 2015-2018 took place in Sweden and in 2009-2014 in Denmark;
– standard deviation is almost always present for the variables identifying the use of knowledge – at country level;
– declining diversification at the country level – assessed using the coefficient of variation and the correlation of outliers.

In terms of the changes in the diversity of employment shares in knowledge-intensive sections, the standard deviation (as opposed to the correlation of outliers) increased in the first two sections, and dropped in the third one, while the coefficient of variation (determining the diversification) decreased in each of the analysed sections. Regarding the outliers, the highest employment shares, in the case of the analysed sections, refer to:

– S_1 – British regions: in the years 2008-2010 and 2013-2014 Berkshire, Buckinghamshire and Oxfordshire, in 2011 and in the years 2015-2017 Inner London – West, in 2012 Outer London - West and North West, and in 2018 the region of Bratislavský kraj,
– S_2 – in the years 2008-2014 and 2016-2018 in Inner London – West, and in 2015 in Stockholm

– S_3 – Prov. Namur (2008-2012, 2014, 2016-2017) in the years 2013 and 2018 of Övre Norrland region, and in 2015 in Limousin.

In turn, the lowest employment shares were recorded for (the years are presented in brackets):

– employment in knowledge-intensive high-technology services (percentage of total employment), in the Greek region of Thessalia (2008-2009 and 2015), French Franche-Comté (2011-2013), Romanian Nord-Est (2010), Hungarian Észak-Magyarország (2014 and 2016), and in the last two years of the assessment in the Greek Anatoliki Makedonia, Thraki,
– employment in knowledge-intensive market services (except financial intermediation and high-technology services) (percentage of total employment), w Romanian regions: in 2008 in Nord-Vest, and in the years 2009-2018 the region of Nord-Est,
– employment in other knowledge-intensive services in the following Romanian regions: Sud – Muntenia (2008), Sud-Vest Oltenia (2009-2011), Nord-Est (2012 and 2015-2018), Vest (2013-2014).

Results of Spatio-Temporal Cluster Analysis

In order to carry out the above described "research path", the variables were standardized and the taxonomic units were analysed. Ward's method was used to determine the number of groups – the full dendrogram is shown in Fig. 1a, and its "lower part" – which allowed better assessment and visualization of the groups' number selection, in Fig. 1b.

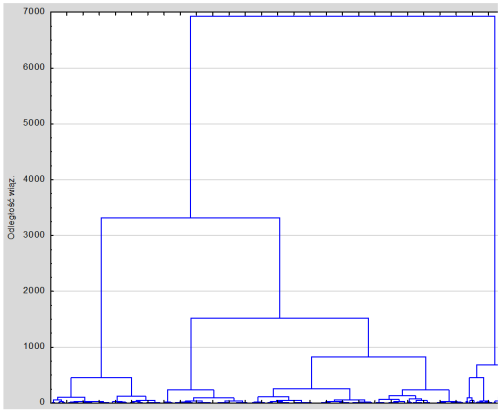

Fig. 1a: Ward's full dendrogram for EU regions

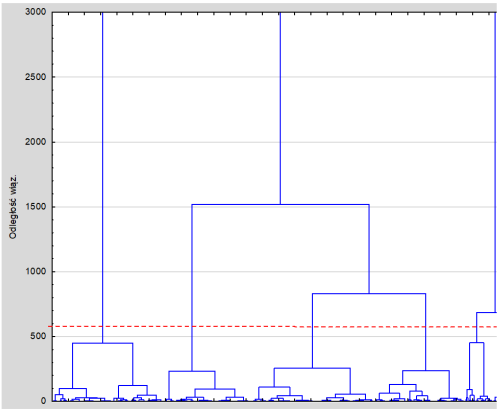

Fig. 1b: Ward's lower part of dendrogram for EU regions

Source: author's compilation based on Eurostat data

The preliminary assessment shows that the most accurate number of subgroups is 6 – although the reduction in the critical agglomeration distance would already result in eight groups, of which two (the ones on the right side of the dendrogram would be small).

The final division of regions was performed using the k-means method, and the number of groups (the classification covers taxonomic units, hence such large numbers) is shown in Table 2.

Next part of the study – Table 3 – presents acronyms and names of the regions included in the given group for at least 10 years (i.e. over 90% of the studied period) and average distances from the centre of the group, calculated based on the years in which the region was in the group. The regions including the capital or being the capital are marked in bold and the regions from Central and Eastern European countries are shown in grey boxes.

Table 2: Characteristics of clusters of EU regions

Group	Number of taxonomic units	Percentage of all	Number of regions 10 or more times in a group (core)	Percentage of core regions in a group
1	526	17.58	26	4.94
2	386	12.90	25	6.48
3	682	22.79	36	5.28
4	668	22.33	37	5.54
5	561	18.75	36	6.42
6	169	5.65	12	7.10

Source: author's compilation.

Groups 3 and 4 are the most numerous – regarding OTUs they include, followed by groups 5 and 1. However, in terms of the share of taxonomic units present relatively the longest in the group in relation to the number of OTUs in the group, the groups 6, 5 and 2 were indicated.

Table 3: Regions present in cluster at least for 10 years, and mean distance to the cluster centroid

Region's name and code	Average distance to cluster centroid	Number of years in cluster	Region's name and code	Average distance to cluster centroid	Number of years in cluster
Cluster 1					
DE11 Stuttgart	0.182	11	ITF3 Campania	0.404	11
PL63 Pomorskie	0.229	10	**CY00 Kypros**	0.412	11
AT32 Salzburg	0.245	11	AT12 Niederösterreich	0.412	11
ITH4 Friuli-Venezia Giulia	0.255	11	ITI1 Toscana	0.419	11
LV00 Latvija	0.308	11	ITF1 Abruzzo	0.420	11
ES21 País Vasco	0.319	11	**EE00 Eesti**	0.429	11
DE25 Mittelfranken	0.321	11	HR03 Jadranska Hrvatska	0.436	10
HU12 Pest	0.335	11	ITC3 Liguria	0.447	11
ITI2 Umbria	0.360	11	ITF4 Puglia	0.448	11
EL52 Kentriki Makedonia	0.365	11	IE05 Southern	0.450	11
DEA1 Düsseldorf	0.377	11	CZ02 Strední Cechy	0.479	10
ITC1 Piemonte	0.381	11	ITH5 Emilia-Romagna	0.487	11
ES51 Cataluña	0.400	11	ITC4 Lombardia	0.735	11
Cluster 2					
UKD6 Cheshire	0.321	10	**UKI5 Outer London – East and North East**	0.493	11
LU00 Luxembourg	0.335	11	DE21 Oberbayern	0.531	11
UKK1 Gloucestershire, Wiltshire and Bristol	0.362	10	DEA2 Köln	0.536	11
NL23 Flevoland	0.372	11	SE22 Sydsverige	0.549	11
PT17 Área Metropolitana de Lisboa	0.380	10	SE23 Västsverige	0.557	11

Region's name and code	Average distance to cluster centroid	Number of years in cluster	Region's name and code	Average distance to cluster centroid	Number of years in cluster
UKJ3 Hampshire and Isle of Wight	0.422	10	DE60 Hamburg	0.595	11
UKH2 Bedfordshire and Hertfordshire	0.440	11	**DE30 Berlin**	0.600	11
NL33 Zuid-Holland	0.442	11	**NL32 Noord-Holland**	0.611	11
NL31 Utrecht	0.463	11	DE71 Darmstadt	0.621	11
BE10 Région de Bruxelles-Capitale	0.465	10	BE31 Prov. Brabant Wallon	0.637	11
AT13 Wien	0.472	11	**ITI4 Lazio**	0.652	11
UKJ2 Surrey, East and West Sussex	0.484	11	**DK01 Hovedstaden**	0.935	10
BE24 Prov. Vlaams-Brabant	0.491	11			
Cluster 3					
DEA5 Arnsberg	0.142	11	FRF1 Alsace	0.290	10
DEA4 Detmold	0.150	11	DE23 Oberpfalz	0.294	10
DEG0 Thüringen	0.172	11	ES42 Castilla y León	0.313	10
DEA3 Münster	0.183	11	DE92 Hannover	0.326	10
DE13 Freiburg	0.184	11	FRD2 Haute-Normandie	0.330	10
DEE0 Sachsen-Anhalt	0.190	11	AT21 Kärnten	0.335	10
DE26 Unterfranken	0.207	10	FRI3 Poitou-Charentes	0.341	10
DEB1 Koblenz	0.216	11	DEB2 Trier	0.344	11
DE14 Tübingen	0.222	11	ES43 Extremadura	0.353	11
DE80 Mecklenburg-Vorpommern	0.222	11	ITH1 Provincia Autonoma di Bolzano	0.354	10
DED4 Chemnitz	0.235	11	PT18 Alentejo	0.370	11
DEC0 Saarland	0.267	11	HU23 Dél-Dunántúl	0.404	11
ES41 Castilla y León	0.270	10	HU33 Dél-Alföld	0.475	10
DE94 Weser-Ems	0.272	11	HU32 Észak-Alföld	0.476	11
DE73 Kassel	0.273	11	FRF2 Champagne-Ardenne	0.493	11
DE91 Braunschweig	0.273	11	HU31 Észak-Magyarország	0.498	10
DE24 Oberfranken	0.276	11	FRC2 Franche-Comté	0.523	11
DE93 Lüneburg	0.289	10	IE04 Northern and Western	0.553	10
Cluster 4					
UKD4 Lancashire	0.194	11	BE23 Prov. Oost-Vlaanderen	0.342	11
UKF1 Derbyshire and Nottinghamshire	0.219	11	DK05 Nordjylland	0.346	11
FRI1 Aquitaine	0.235	10	UKM8 West Central Scotland	0.348	11
FRL0 Provence-Alpes-Côte d'Azur	0.266	11	FRE1 Nord-Pas de Calais	0.365	11
UKE3 South	0.272	11	UKG3 West	0.374	11

Region's name and code	Average distance to cluster centroid	Number of years in cluster	Region's name and code	Average distance to cluster centroid	Number of years in cluster
Yorkshire			Midlands		
DK02 Sjælland	0.284	11	UKN0 Northern Ireland	0.390	11
UKE2 North Yorkshire	0.288	11	NL13 Drenthe	0.393	11
UKC1 Tees Valley and Durham	0.290	11	UKE4 West Yorkshire	0.399	11
UKC2 Northumberland and Tyne and Wear	0.295	11	SE31 Norra Mellansverige	0.402	11
BE34 Prov. Luxembourg	0.299	11	NL21 Overijssel	0.426	11
FRH0 Bretagne	0.302	11	UKM6 Highlands and Islands	0.487	10
UKK2 Dorset and Somerset	0.304	11	UKD7 Eastern Scotland	0.502	11
DK04 Midtjylland	0.311	11	BE33 Prov. Liège	0.516	11
FRJ1 Languedoc-Roussillon	0.315	11	UKL1 West Wales and The Valleys	0.540	11
DEF0 Schleswig-Holstein	0.315	10	BE32 Prov. Hainaut	0.579	11
SE21 Småland med öarna	0.322	11	SE32 Mellersta Norrland	0.611	11
UKG2 Shropshire and Staffordshire	0.324	10	SE33 Övre Norrland	0.685	11
UKK4 Devon	0.333	11	BE35 Prov. Namur	0.950	11
UKM9 Southern Scotland	0.338	11			
Cluster 5					
SK02 Západné Slovensko	0.144	11	ES62 Región de Murcia	0.281	11
PL52 Opolskie	0.176	11	EL65 Peloponnisos	0.283	11
CZ07 Strední Morava	0.177	11	EL64 Sterea Ellada	0.295	11
PL61 Kujawsko-Pomorskie	0.186	11	PL82 Podkarpackie	0.308	11
BG34 Yugoiztochen	0.190	11	SI03 Vzhodna Slovenija	0.320	11
HU22 Nyugat-Dunántúl	0.191	11	PL22 Slaskie	0.333	11
BG32 Severen tsentralen	0.192	11	PL43 Lubuskie	0.351	11
PL92 Mazowiecki regionalny	0.195	11	EL63 Dytiki Ellada	0.368	10
HU21 Közép-Dunántúl	0.195	11	PL81 Lubelskie	0.374	11
CZ03 Jihozápad	0.196	11	BG31 Prov. Brabant Wallon	0.379	11
CZ04 Severozápad	0.212	11	PL84 Podlaskie	0.387	11
BG42 Yuzhen tsentralen	0.213	11	RO22 Sud-Est	0.506	11

Region's name and code	Average distance to cluster centroid	Number of years in cluster	Region's name and code	Average distance to cluster centroid	Number of years in cluster
PT11 Norte	0.247	11	RO12 Centru	0.544	11
PL41 Wielkopolskie	0.252	11	RO11 Nord-Vest	0.681	11
CZ05 Severovýchod	0.256	11	RO42 Vest	0.741	11
PL71 Lódzkie	0.263	11	RO31 Sud – Muntenia	0.760	11
EL43 Kriti	0.278	11	RO41 Sud-Vest Oltenia	0.807	11
PL72 Swietokrzyskie	0.279	11	RO21 Nord-Est	1.020	11
Cluster 6					
UKI7 Outer London – West and North West	0.264	11	**ES30 Comunidad de Madrid**	0.666	11
PL91 Warszawski stołeczny	0.422	11	UKJ1 Berkshire, Buckinghamshire and Oxfordshire	0.677	11
HU11 Budapest	0.451	11	**SE11 Stockholm**	0.972	11
FI1B Helsinki-Uusimaa	0.517	11	**UKI4 Inner London – East**	1.121	11
CZ01 Praha	0.551	11	FI20 Åland	1.141	10
IE06 Eastern and Midland	0.555	11	**UKI3 Inner London – West**	1.921	11

Source: author's compilation.

In the first five clusters there are between 25-37 core regions, and in the sixth group there are only twelve of them.

Discussion

All three variables selected for the analysis present a very good discriminatory capacity. While comparing average groups, in the analysis of variance all *p* values equal 0.0000. Mean values of W for groups is presented in Table 4.

Table 4: Mean values in clusters

Group	Mean values		
	S_1	S_2	S_3
1	2.39	6.16	23.63
2	4.40	8.67	31.26
3	1.64	4.36	28.72
4	2.40	5.76	34.60
5	1.33	3.58	20.06
6	7.10	11.51	29.11

Source: author's compilation.

Certain outliers are present in the last three groups of regions. The fifth group is particularly unfavourable in this case – all shares in the analysed sections are the lowest. The fourth group is distinguished by the highest share of employment in other knowledge-intensive services, whereas the sixth group by the highest share of employment in knowledge-intensive high-technology services and in employment in knowledge-intensive market services. Among the first three groups of regions, the

second group stands out – the highest share of employment in the assessed sections. The third group is characterized by the smallest share of employment S_1 and S_2 (out of the three groups). Figure 2 can be helpful for interpretation purposes.

The list presenting core regions assigned to groups divided into countries is shown in Table 5. And so:

1/ in the first group, out of 26 core regions there are ten Italian, three German and two Spanish and Austrian regions,
2/ out of 25 regions included for ten or more years in group two, it covers six British regions, five German, four Dutch, three Belgian and two Swedish ones,
3/ the core of the third group consists of 20 German, five French, four Hungarian and three Spanish regions,
4/ in the fourth group (the highest average level of variable S_3) out of 37 regions included in it for at least 10 years there were 17 British, five Belgian and French, four Swedish and three Danish regions,
5/ among 36 core regions in the fifth group (the lowest average levels of each variable) there were as many as 30 regions from Central and Eastern European countries (11 Polish, seven Romanian, four Bulgarian and Czech, two Hungarian and one from Slovakia and Slovenia). Additionally, four Greek and Spanish and Portuguese regions also belong to the core regions in this group.

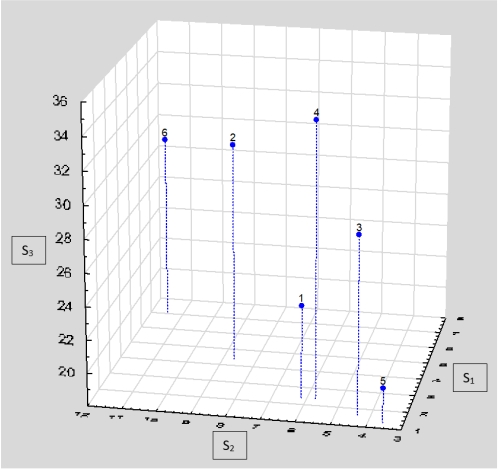

Fig. 2: 3D scatter diagram for cluster centres

Source: author's compilation.

Table 5: Number of core regions in EU countries

Country	Code	Number of NUTS 2 regions	At least 10 years in cluster					
			1	2	3	4	5	6
Belgium	BE	11		3		5		
Bulgaria	BG	6					4	
Czechia	CZ	8	1				4	1
Denmark	DK	5		1		3		
Germany	DE	38	3	5	20	1		
Estonia	EE	1	1					
Ireland	IE	3	1		1			1
Greece	EL	13	1				4	
Spain	ES	17	2		3		1	1
France	FR	22			5	5		

Croatia	HR	2	1					
Italy	IT	21	10	1	1			
Cyprus	CY	1	1					
Latvia	LV	1	1					
Lithuania	LT	2						
Luxembourg	LU	1		1				
Hungary	HU	8	1		4		2	1
Malta	MT	1						
Netherland	NL	12		4		2		
Austria	AT	9	2	1	1			
Poland	PL	17	1				11	1
Portugal	PT	5		1	1		1	
Romania	RO	8					7	
Slovenia	SI	2					1	
Slovakia	SK	4					1	
Finland	FI	5						2
Sweden	SE	8		2		4		1
United Kingdom	UK	41		6		17		4
Total		**272**	**26**	**25**	**36**	**37**	**36**	**12**

Source: author's compilation.

In the least numerous sixth group (169 OTUs) every twentieth EU region at NUTS 2 level was listed, including 12 regions present in this group for at least 10 years, out of which ten are the capital regions (including some of the capitals – London: UKI3, UKI4 and UKI7) or including the capital. Central and Eastern European countries were represented by Polish, Czech and Hungarian regions. In this group the average level of S_1 and S_2 variable was the highest and the third highest regarding the value of S_3 variable.

Conclusions

Based on the conducted research, the following conclusions can be formulated. It was possible to conduct the research for the majority of the EU NUTS 2 level regions (272 out of 281) – the availability of complete or possible to supplement missing statistical data. Correlations of outliers decrease for employment shares in knowledge-intensive high-technology services and in knowledge-intensive market services in the EU countries and regions. In the EU countries and regions, the coefficient of variation (determining diversification) decreased in each of the analysed sections, and variables selected for grouping are highly discriminatory. In the identified six groups of regions, the core regions amounted to 172 out of 272 (63.3% of the assessed regions), i.e. the ones which remained in the same group for at least 10 years. In many cases half or almost half of the regions in a given country are included in the same group: Italian in the first; German in the third; Swedish, Belgian, British and Danish in the fourth; Polish, Bulgarian and Czech in the fifth, which may confirm either well-established or changing in a similar way employment structures in knowledge-intensive sections.
Regarding the regions from post-socialist countries, the impact of many years outside the sphere of market economy is still visible (historical determinants).

The proposed research procedure, applying global standardization (i.e. using the arithmetic mean and standard deviation defined jointly for each variable from all analysed periods) allowed identifying the groups of EU regions at NUTS 2 level characterized by: 1/ similar initial level of employment share in the analysed service sections presenting different knowledge intensity; 2/ similar changes of share in the discussed sections in the assessed period.

Results of this research, including the identified groups of regions with similar employment structures in the analysed sections – especially with low shares – are important tips for decision makers in the field of regional policy. They can be used also as a tool for evaluation of EU cohesion policy – cluster

membership and regions' movement between clusters. The further research should concentrate on finding the relations between employment shares in KIBS and foreign investments, measuring economic potential in identified groups of regions, and comparing employment structural transformations in selected groups. The results could be compared with findings from some recent papers (Koutský, et al. 2014; Hlaváček, 2015; Hlaváček, et al. 2019).

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Calidad De Vida Laboral Y Tipos De Contratación En El Sector Financiero De Barranquilla (Colombia)

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Resumen

Esta investigación analizó la influencia del tipo de contrato en los factores que determinan la Calidad de Vida Laboral (CVL) percibida por los empleados del sector financiero en Barranquilla - Colombia. 249 empleados fueron encuestados para evaluar su percepción sobre las condiciones físicas, salariales, subjetivas y vocacionales del trabajo. A partir de la validación del instrumento y el análisis factorial exploratorio por componentes principales y rotación VARIMAX, se obtuvo una estructura de 76 elementos en 11 factores. El análisis discriminante mostró que los factores individuales, del ambiente de trabajo, del trabajo en sí y del entorno socio laboral, determinan la CVL en el sector. Se obtuvo un alto CVL cuando el salario, el contrato y el entorno físico del trabajo generan satisfacción, seguridad y comodidad, respectivamente. Dependiendo del tipo de contrato, la estabilidad y el salario se perciben de manera diferente.

Palabras clave: Calidad de Vida Laboral, contrato laboral, estabilidad laboral, análisis discriminante, satisfacción laboral.

Abstract

This research analyzed the influence of the type of employment contract on the factors that determine Quality of Work Life (QWL) perceived by employees of the financial sector in Barranquilla - Colombia. 249 employees were surveyed to evaluate their perceptions about physical, salary, subjective and vocational conditions of the work. From the validation of the instrument and the exploratory factor analysis by principal components and VARIMAX rotation, a structure of 76 staggered items in 11 factors was obtained. The discriminant analysis shown that individual factors, work environment, work itself and socio-labor environment, determine QWL in the sector. The group of employees studied perceived a high QWL when salary, contract and work's physical environment, generate satisfaction, safety and comfort, respectively. Depending on the type of employment contract, stability and salary are perceived differently.

Keywords*:* Quality of Work Life, Employment Contract, Employment Stability, Discriminant Analysis, Satisfaction.

Introducción

La Calidad de Vida Laboral (CVL) es un término acuñado en la década de los setenta para exigir la mejora de las condiciones que ofrecían los centros de trabajo en Estados Unidos y Europa (Silva, 2006). Este concepto está asociado con la percepción del empleado sobre indicadores individuales, del ambiente de trabajo, de la organización y del entorno socio laboral (Patlán Pérez & J., 2016). Por lo tanto, la CVL es un constructo multidimensional y multifactorial y además, varía en sus dimensiones y factores de acuerdo con el contexto (Kandasamy & Ancheri, 2009). La CVL se refiere a la evaluación que hace cada empleado de su trabajo, del entorno laboral, y del nivel de satisfacción que tiene al respecto (Taher, 2013). Como consecuencia, la variedad de enfoques, cuestionarios y metodologías para determinar la CVL como índice, variable o constructo, es amplia y se ajusta según las necesidades del entorno en el cual se quiera estudiar (Bagtasos, 2011).

Particularmente, son reconocidos dos enfoques para referirse al movimiento de CVL, uno orientado al trabajador y el otro, orientado a la organización (Segurado Torres & Agulló Tomás, 2002). En el primero se busca la humanización del entorno de trabajo abogando por el bienestar y la salud de los trabajadores. En este enfoque toman especial importancia los aspectos psicosociales del trabajo, ya que previniendo los factores de riesgo psicosocial y promocionando la salud es posible aumentar el bienestar y desarrollo integral del trabajador y progresivamente, generar satisfacción laboral en los individuos de la organización (Garrido-Pinzón, Uribe-Rodríguez, & Blanch, 2011; Martínez Gamarra & Ros Mar, 2010). El segundo enfoque tiene que ver con la productividad que logra la empresa al promover que los trabajadores se apropien de los objetivos institucionales y mantener altos sus niveles de satisfacción con las condiciones de trabajo. La CVL es importante de determinar cuando los empleadores o administradores están interesados en lograr que sus empleados se sientan más satisfechos y comprometidos con el trabajo (Argüelles Ma, Garcia, Fajardo, Medina, & Maldonado, 2013; Taher, 2013). En este sentido, estudiar y cuantificar la CVL permite idear políticas de gestión que logren dos objetivos esenciales: incrementar la productividad y mejorar la satisfacción de los empleados (Cruz Velazco, 2018). Se ha encontrado que aquellas empresas con niveles de CVL buenos tienen mayor posibilidad de atraer y mantener empleados cualificados, comprometidos y motivados (Mejbel & Almsafir, 2013).

Ambos enfoques circunscriben diversas variables subjetivas y objetivas para determinar los niveles de CVL experimentados por los empleados. Sin embargo, una variable que se ubica en la interface de ambos enfoques es el contrato laboral, pues a partir de este inicia y termina la relación empleado-organización. La mayoría de los estudios sobre CVL han promulgado la prominente necesidad de intervenir las condiciones salariales que las empresas disponen para sus empleados. Según Mostafizur Rahman (2014), el salario y otras remuneraciones son el primer y más importante requisito para cualquier trabajo, por lo tanto, dicha compensación debe ser apropiada y justa en relación con los requerimientos de desempeño laboral. Adicionalmente, Garrido-Pinzón et al. (2011), reportó que las condiciones laborales de la actualidad no ofrecen beneficios a sus trabajadores de la misma forma en la que las instituciones reciben beneficios de ellos y que, entre otras cosas, la realidad laboral está asociada a un marco de incertidumbre, inestabilidad e injusticia. Lo anterior es similar a las conclusiones de Jairo Guillermo Isaza (2005) en cuanto a que los empresarios colombianos recurren a tres estrategias para enfrentar los costos laborales: (i) aumento de la contratación temporal para sustituir empleados con contrato a término indefinido; (ii) eliminación de beneficios económicos no contemplados en la ley y (iii) estímulos a la productividad laboral.

Garrido-Pinzón et al. (2011), encontraron que anteriormente la sociedad del empleo estaba constituida por la duración de la relación contractual de tipo indefinido, la jornada tiempo completo, la subordinación del empleado, la remuneración fija y sus prestaciones sociales totales; reconfigurándose a otra caracterizada por condiciones precarias para los trabajadores, ingreso masivo de jóvenes y mujeres, flexibilidad laboral y abolición de tipos de contratación estable, originando inestabilidad contractual y baja remuneración.

En este sentido, el trabajador colombiano se enfrenta a un fenómeno de flexibilización laboral en el que priman el trabajo individualizado y sectorizado, la subcontratación y el trabajo temporal, nuevas

normas en el horario laboral, entre otros aspectos (Uribe-Rodríguez, Garrido-Pinzón, & Rodríguez, 2011). Es común en las organizaciones colombianas, mantener un grupo de trabajadores permanentes y un grupo de trabajadores contingentes, como estrategia de contratación (Vesga Rodríguez, 2011). Estos comportamientos organizacionales tienen efectos negativos en la percepción de los empleados sobre los aspectos psicosociales del trabajo, y como resultado afectan la gestión organizacional. El trabajo tiene la posibilidad de ser percibido como positivo o negativo para los empleados a partir de las experiencias que viven en su entorno laboral, entre las que se encuentran las condiciones contractuales y laborales (Vesga Rodríguez, 2011).

Para efectos del presente estudio, es importante definir los tipos de contratación existente en Colombia. La modalidad de contratación según su duración puede ser de tres clases: por obra o labor contratada, a término fijo o a término indefinido. El contrato por obra se pacta de acuerdo con la duración de la labor contratada. El contrato a término fijo debe celebrarse por escrito y su duración no puede ser superior a tres (3) años, aunque son renovables indefinidamente, sin que exista la obligación de convertirlos a término indefinido. Por último, el contrato a término indefinido se produce cuando las partes no especifican una fecha de caducidad en la relación laboral (Legis, 2013). El empleador se obliga a pagar un sueldo, prestaciones sociales legales y hacer los respectivos aportes al Sistema General de Seguridad Social.

Al apuntar a un sistema que brinde calidad de servicio, el talento humano de la organización juega un rol fundamental al crear las estrategias que lograrán crear esa ventaja competitiva a través de una relación personalizada con el cliente por parte de las sociedades financieras, sobre todo en corporaciones bancarias (Brenner & Östberg, 1995), implicando que los directivos propicien condiciones laborales en los que la motivación, personalidad y habilidades de los empleados satisfagan las necesidades de los clientes a favor de los objetivos organizacionales (Argüelles Ma et al., 2013).
Mostafizur Rahman (2014) determinó que factores como la seguridad laboral, claridad del rol de trabajo, comprensión de los supervisores, estrés laboral, acceso a información relevante e instalaciones sociales y de bienestar son adecuados para medir la CVL de trabajadores vinculados a bancos privados y públicos en Bangladesh. También se deben considerar aspectos intrínsecos y extrínsecos de los empleados (Argüelles Ma et al., 2013; Casas, Repullo, Lorenzo, & Cañas, 2002). En virtud de dichos factores, el sector financiero resulta ser llamativo pues el nivel de CVL queda determinado por factores ambientales, sociales, psicológicos y vocacionales del trabajo.

Estos antecedentes ponen en evidencia la necesidad de verificar si existe diferencia en los factores que determinan la CVL según el tipo de contratación en el sector financiero en Barranquilla - Colombia, lo que permitirá comprender un poco más el fenómeno estudiado, establecer mecanismos de planificación y organización del talento humano en el sector y generar propuestas que propendan a optimizar dichas condiciones en las organizaciones.

Metodología

Hipótesis

De acuerdo con los objetivos que persigue esta investigación, se pretende responder a la siguiente pregunta: ¿Existe alguna diferencia entre los factores que determinan la CVL de los trabajadores del sector financiero según su tipo de contratación?

Las hipótesis formuladas para tal fin son:

> **H1:** No existe diferencia significativa en los factores que determinan la CVL entre los trabajadores contratados a término indefinido u otro tipo de contratación (término fijo, por prestación de servicios, ocasional/transitorio o sin contrato).
> **H2:** Existe diferencia significativa en los factores que determinan la CVL entre los trabajadores contratados a término indefinido u otro tipo de contratación (término fijo, por prestación de servicios, ocasional/transitorio o sin contrato).

Se planteó la pregunta y las hipótesis de investigación a partir de los hallazgos de la revisión de literatura, pues no se encontró mayor evidencia teórica o empírica sobre las variaciones que se pueden presentar en los factores determinantes de la CVL de acuerdo con el tipo de contratación. De forma general, se tuvo en cuenta la metodología propuesta por autores como (Jorde Bloom, 1996; Taher, 2013), permitiendo evidenciar diferencias significativas entre grupos categóricos con respecto a la CVL.

Participantes

La Tabla 1 presenta las características demográficas de los participantes. Un total de 249 encuestas se realizaron a empleados vinculados a empresas del sector financiero de la ciudad de Barranquilla - Colombia. Se utilizó un muestreo accidental para la aplicación del cuestionario y se contó con el consentimiento informado de los participantes. La distribución de trabajadores con respecto al sexo fue de 61.4% mujeres y 38.6% hombres. La mayoría de estos trabajadores llevan un tiempo promedio de permanencia en la organización de más de 10 años (28.1%), contratados a término indefinido (73.1%) y en empresas grandes (88.8%).

Tabla 1: Análisis Descriptivo

Variable	*Categoría*	*Frecuencia*	*Porcentaje*
Género	Masculino	96	38,6
	Femenino	153	61,4
Tiempo de servicio	Menos de 1 año	51	20,5
	1-3 años	52	20,9
	3-5 años	29	11,6
	5-10 años	47	18,9
	Más de 10 años	70	28,1
Tipo de contratación	Término Indefinido	182	73,1
	Otro tipo	67	26,9
Tamaño de la empresa	Pyme	6	2,4
	Mediana	22	8,8
	Grande	221	88,8

Instrumento

Se aplicó el instrumento de Condiciones de Trabajo y Calidad de Vida diseñado el cual fue diseñado y validado por Martínez-Buelvas, Oviedo-Trespalacios, & Luna-Amaya (2015), excluyendo la sub-dimensión "Carga Física" dado que no se considera pertinente en el contexto de las empresas del sector financiero.

El cuestionario aplicado tiene cinco secciones, a saber: (i) datos demográficos del encuestado; (ii) Condiciones de Trabajo; (iii) Condiciones Salariales; (iv) Desarrollo Vocacional; y (v) Condiciones Subjetivas. Dentro de cada una de estas secciones se presentaron preguntas agrupadas en categorías, las cuales fueron contestadas por el trabajador a partir de una escala de Likert de 10 niveles. La escala evalúa el grado de acuerdo o desacuerdo que tiene el trabajador, siendo 1 muy en desacuerdo y 10 muy de acuerdo.

Variables De Estudio

El Cuestionario de Condiciones de Trabajo y Calidad de Vida Laboral utilizado en esta investigación permite obtener la percepción de los trabajadores frente a 136 preguntas relacionadas con las condiciones de trabajo y la calidad de vida laboral. Estas preguntas fueron agrupadas en las siguientes categorías:

- Condiciones de Trabajo, la cual permite conocer la percepción del trabajador con respecto a las condiciones ambientales del trabajo, lo que puede sentir y ver, así como las medidas de seguridad y los aspectos psicosociales del trabajo. Esta categoría contiene 38 ítems escalonados en 7 factores: ambiente térmico, ruido, iluminación, carga mental, aspectos psicosociales, seguridad en el trabajo y riesgos laborales.
- Condiciones Salariales. Esta permite centrar la atención en la valoración que hace el empleado frente a la remuneración, estabilidad, y dedicación contractual. Para este estudio, las condiciones salariales son el elemento transversal y contiene 20 ítems distribuidos en 3 factores: salario, estabilidad laboral y horarios.
- Desarrollo vocacional, entendido como las oportunidades que tiene el empleado para aprender y crecer en la organización. Esta categoría determina la percepción del trabajador frente a 14 ítems relacionados con 3 factores: habilidad mental, promoción y carrera, formación e investigación.
- Condiciones subjetivas, las cuales apuntan a aspectos que relacionan al trabajador con la estructura de relaciones interpersonales en la organización. También, toma cuenta de su vida privada y familiar, y su satisfacción con el trabajo. Esta categoría consiste en 64 ítems escalonados en 9 factores: esfera privada y mundo laboral, individuo y actividad laboral, plano organizativo, plano jerárquico, plano técnico, plano social, apoyo y colaboración, función directiva, satisfacción laboral.

Análisis de los datos

Para esta investigación, se llevó a cabo un análisis de fiabilidad para validar la consistencia interna de los datos obtenidos. El análisis tomó como criterio el valor del alfa de Cronbach, que se basa en la correlación entre elementos promedio. Luego, dada la extensión del instrumento aplicado, fue necesario realizar un análisis factorial por componentes principales y rotación VARIMAX. La reducción factorial se llevó a cabo considerando todas las variables, utilizando el criterio del auto valor mayor a uno para la extracción de factores, ya que esto permite asegurar que cada factor considerado aporta varianza significativa a la estructura factorial final (Hair, 2010). Además, se tuvo en cuenta eliminar factores que tuvieran dos variables o menos y aquellas variables con baja carga factorial (menor que 0.5). Las variables latentes resultantes para cada grupo fueron nombradas a criterio de los investigadores a la luz de los ítems contenidos en cada una.

Posteriormente, se llevó a cabo un análisis discriminante para establecer la pertenencia del grupo a dos niveles de CVL (alta o baja). Este análisis determina la pertinencia de cada uno de los factores para

definir el constructo CVL en el sector, mediante el método "Introducir factores por cada paso" considerando el estadístico F de Fisher para la entrada y salida de factores de la función de pertenencia. Finalmente, se hizo el contraste de hipótesis de investigación tomando en cuenta la prueba de hipótesis de diferencia de medias muestrales con el estadístico de t-student. Los análisis mencionados se realizaron con el Paquete Estadístico para Ciencias Sociales (SPSS), versión 24.0 para Windows.

Resultados

Análisis de Fiabilidad

Como resultado del análisis de fiabilidad se encontró que el coeficiente alfa de Cronbach toma un valor de 0,78. Este resultado indica que es buena la consistencia interna de los ítems considerados.

La medida de Kaiser-Meyer-Olkin (KMO) se conoce como un buen criterio para evaluar la adecuación de la muestra (Taher, 2013). En la presente investigación se observó un valor de KMO de 0.931, por lo cual la adecuación de la muestra se considera excelente de acuerdo con el valor admisible (0.60). Además, el test de esfericidad de Bartlett tuvo como resultado un valor de Chi-cuadrado de 15570.021 a un nivel de significancia inferior a 0.05, por lo que la data se considera estadísticamente significativa y adecuada.

Análisis Factorial

El análisis factorial reconoce 72 ítems (de los 136 iniciales) escalonados en 11 factores. De acuerdo con Taher (2013), la pertinencia del análisis factorial depende del tamaño de la muestra, por lo cual, a medida que las comunalidades son mayores a 0,5, son admisibles tamaños de muestra pequeños (inferiores a 300). En la presente investigación se utilizó un tamaño de muestra de 249 y las comunalidades de las variables del análisis factorial son superiores a 0,5 como se muestra en la tercera columna de las Tablas 2 a la 12.

El porcentaje acumulado de varianza explicada es un indicador de monitoreo del sesgo común del método, para el presente análisis, puede no ser un problema debido a que el porcentaje de varianza acumulada fue de 73.512%.

A cada factor que resultó le fue asignado un nombre de acuerdo con los ítems que agrupaba. A continuación, se presentan los factores y su respectiva interpretación:

- F1 - Relación con el jefe: Este factor se compone de 12 preguntas relacionadas con las condiciones subjetivas del entorno laboral. Se observa que el factor se refiere al acompañamiento y retroalimentación permanente hacia el empleado, comunicación clara y abierta al momento de impartir instrucciones y al apoyo irrestricto que el empleado percibe frente al desempeño de sus funciones. En la Tabla 2 se presentan los ítems con las cargas y comunalidades respectivas.
- F2 - Equipo de trabajo: El factor comprende 13 preguntas orientadas a la percepción del empleado sobre el equipo de trabajo; el apoyo y la cooperación en la realización de las tareas, la interacción permanente con los compañeros, la generación de confianza, la participación en la toma de decisiones grupales y el reconocimiento de las habilidades del equipo (ver Tabla 3).
- F3 – Salario: El factor tiene 6 preguntas que hacen alusión a la percepción del empleado sobre el equilibrio que existe entre el salario recibido y el cargo, las funciones, el perfil y el esfuerzo ejecutado. Su suficiencia, pertinencia y competitividad con lo que se paga en el mercado laboral (ver Tabla 4).
- F4 - Estabilidad laboral: El factor contiene 4 preguntas y se refieren a la percepción del empleado sobre la seguridad de su permanencia en la empresa y la tranquilidad y satisfacción que ello le otorga (ver Tabla 5).
- F5 - Salud y seguridad: El factor registra 4 preguntas e indican la percepción del empleado sobre la existencia, aplicación y atención de las normas de higiene y seguridad laboral.

Existencia de instalaciones confortables, seguras e higiénicas, herramientas de trabajo adecuadas y programas de promoción y prevención de salud y seguridad en el trabajo (ver Tabla 6).

- F6 - Equilibrio trabajo y familia: El factor incluye 4 preguntas que señalan la percepción del empleado de que los roles desempeñados en el trabajo no afectan la relación con su familia y del apoyo recibido por parte de esta para el ejercicio de su cargo (ver Tabla 7).
- F7 - Horario: El factor posee 3 preguntas que contemplan la percepción del empleado sobre la pertinencia, razonabilidad y eficacia del horario de trabajo (ver Tabla 8).
- F8 – Ruido: El factor tiene 3 preguntas y establece la percepción del empleado sobre la existencia de fuentes de ruido en su puesto de trabajo y el impacto que generan en su comodidad, bienestar físico-psicosocial y la productividad (ver Tabla 9).
- F9 - Riesgo personal: El factor consta de 3 preguntas que hacen referencia a la percepción del empleado sobre el riesgo físico, ergonómico, psicosocial y demás a los cuales puede enfrentarse en su trabajo (ver Tabla 10).
- Factor 10 - Motivación: El factor está compuesto de 4 preguntas que hacen referencia a la percepción del empleado sobre la motivación con la que lleva a cabo su trabajo, el orgullo, la felicidad y el reconocimiento por hacer lo que le corresponde (ver Tabla 11).
- Factor 11 - Ambiente térmico: El factor se compone de 3 preguntas que hacen referencia a la percepción del empleado sobre las condiciones térmicas de su puesto y entorno de trabajo, así como la interacción con ellas (ver Tabla 12).

Tabla 2: Factor 1 - Relación con el jefe

Pregunta	Carga	Comunalidad
Mi jefe me motiva para hacer mejor mi trabajo.	0,816	0,812
Soy escuchado por mi jefe en un eventual problema laboral.	0,784	0,833
Mi jefe me permite ser proactivo.	0,763	0,807
Tengo comunicación abierta con mi jefe inmediato.	0,756	0,833
Mi jefe tiene en cuenta las sugerencias e ideas innovadoras que tengo sobre el desarrollo de mi trabajo.	0,748	0,782
Siento apoyo y solidaridad por parte de mi jefe.	0,74	0,776
Mi jefe comparte con el equipo los logros de su gestión.	0,737	0,747
Mi jefe me da retroalimentación de las actividades realizadas.	0,736	0,735
Mi jefe inmediato es competente en su trabajo.	0,694	0,685
Conozco claramente la planificación de gestión de mi jefe.	0,637	0,688
La supervisión e instrucciones diarias de mi jefe inmediato me permiten realizar mejor mis actividades.	0,597	0,531
Cuando hago un buen trabajo, recibo el reconocimiento respectivo.	0,58	0,619

Tabla 3: Factor 2 - Relación con los compañeros

Pregunta	Carga	Comunalidad
Existe colaboración entre los miembros del equipo.	0,783	0,838
Siento apoyo y confianza por parte de los compañeros de trabajo	0,767	0,822
Consulto las diferentes opiniones del grupo de trabajo para tomar decisiones.	0,741	0,635
En la organización somos capaces de resolver los problemas en equipos de trabajo.	0,723	0,822
Establezco el compañerismo, la cooperación y la solidaridad con mis compañeros.	0,705	0,723
Reconozco los logros que alcanzan mis compañeros dentro de la empresa.	0,685	0,743
Participo en la toma de decisiones del grupo de trabajo.	0,677	0,687
Me expreso bien de mis compañeros de trabajo.	0,675	0,771
Disfruto de mis compañeros de trabajo.	0,624	0,647

Estoy dispuesto a escuchar y colaborar con cualquier miembro del equipo cuando lo requiera.	0,574	0,721
Existe apoyo de las otras dependencias para la consecución de los objetivos de la organización.	0,56	0,58
Conozco a quién acudir para la solución de conflictos.	0,529	0,635
Siento que me desarrollo como persona en el trabajo.	0,503	0,751

Tabla 4: Factor 3 - Salario

Pregunta	Carga	Comunalidad
Siento que mi salario está acorde a mis responsabilidades laborales.	0,829	0,843
Siento que mi salario está ajustado a mi perfil profesional.	0,787	0,761
Considero que mi salario es suficiente para satisfacer mis necesidades básicas	0,758	0,723
Mi salario es competitivo en el sector.	0,745	0,803
Los incentivos económicos que recibo motivan mi desempeño laboral.	0,565	0,717
Me siento satisfecho con las posibilidades de incrementos salariales.	0,543	0,661

Tabla 5: Factor 4 - Estabilidad laboral

Pregunta	Carga	Comunalidad
Mi tipo de vinculación con la empresa me brinda estabilidad.	0,829	0,829
Siento estabilidad en el cargo que desempeño actualmente.	0,724	0,756
La estabilidad laboral es mi puesto de trabajo es motivo de satisfacción con mi empleo.	0,669	0,777
Recibo beneficios, incentivos o recompensas por el trabajo realizado.	0,553	0,68

Tabla 6: Factor 5 - Salud y seguridad

Pregunta	Carga	Comunalidad
En la empresa existe el reglamento de higiene y seguridad laboral y éste se aplica conforme a lo establecido por Ley.	0,78	0,724
La empresa cuenta con programas de promoción y prevención en temas referentes a seguridad e higiene laboral.	0,749	0,754
Constantemente presto atención a las normas de seguridad establecidas por la empresa.	0,739	0,757
Presto atención a las normas de seguridad y las aplico según lo establecido por la empresa.	0,667	0,73

Tabla 7: Factor 6 - Equilibrio trabajo y familia

Pregunta	Carga	Comunalidad
Tengo buenas relaciones con mi familia.	0,632	0,652
Genero confianza dentro de la organización por las funciones que realizo.	0,628	0,683
Conozco los resultados que debo lograr con mi trabajo.	0,521	0,714
Cuento con el apoyo de mi familia para ejercer mi cargo dentro de la organización.	0,519	0,578

Tabla 8: Factor 7 - Horario		
Pregunta	**Carga**	**Comunalidad**
Los turnos de trabajo programados están dentro de lo establecido por la Ley.	0,779	0,818
Los turnos de trabajo programados son los adecuados.	0,775	0,822
Durante mi horario de trabajo, puedo realizar todas las actividades asignadas sin ninguna presión.	0,589	0,526

Tabla 9: Factor 8 - Ruido		
Pregunta	**Carga**	**Comunalidad**
El ruido generado en el área de trabajo me obliga a mantener niveles de concentración por encima de lo que normalmente requiere el puesto.	0,899	0,855
El ruido generado en el área de trabajo me produce dolores de cabeza, estrés u otras molestias.	0,888	0,845
En mi puesto de trabajo, existen fuentes de ruido, continuas o variables, que me obligan a levantar la voz durante una conversación.	0,842	0,764

Tabla 10: Factor 9 - Riesgo personal		
Pregunta	**Carga**	**Comunalidad**
Mi trabajo es arriesgado.	0,896	0,838
Estoy expuesto a riesgos en el puesto de trabajo.	0,802	0,683
Mi trabajo es peligroso.	0,801	0,744

Tabla 11: Factor 10 - Motivación		
Pregunta	**Carga**	**Comunalidad**
Soy capaz de mantener durante todo el día el entusiasmo con el que inicié las labores.	0,668	0,755
Me siento orgulloso de mi trabajo.	0,544	0,756
Me siento feliz al realizar las actividades que me encomiendan.	0,534	0,776
Me siento cómodo y escuchado cuando expongo mis puntos de vista dentro de la empresa.	0,502	0,704

Tabla 12: Factor 11 - Ambiente térmico		
Pregunta	**Carga**	**Comunalidad**
La temperatura en el área de trabajo es agradable.	0,792	0,756
Los equipos de ventilación y acondicionamiento del aire en el puesto de trabajo son suficientes.	0,787	0,728
La vestimenta que utilizo es adecuada, con relación a la temperatura existente en el puesto de trabajo.	0,737	0,632

Análisis Discriminante

Posterior al análisis factorial, se calculó una variable CVL como la sumatoria de los factores para cada observación. Estos valores fueron agrupados visualmente estableciendo un punto de corte con percentiles iguales de casos explorados, con el fin de obtener una escala de dos niveles. Por lo tanto, para cada sujeto se obtiene un nivel empírico de CVL: alto o bajo, luego se aplicó el método de "Introducir factores por cada paso" para llevar a cabo el análisis discriminante, tomando como variable de clasificación la CVL agrupada y como variables independientes los resultados de los once factores que conforman la estructura factorial presentada anteriormente. Se utilizó el Método de Lambda de Wilks para la inclusión por pasos tomando como criterio el valor F para la entrada (3.84) y salida (2.71) de las variables independientes para la función discriminante.

A partir de un auto valor de 1.360 y una correlación canónica de 0.810 se dice que existe una sola función discriminante que permite de forma significativa (sig. 0,000) clasificar a los sujetos en los dos grupos: CVL alta o CVL baja. Esta función explica el 100% de la varianza de los datos estudiados y el valor lambda de Wilks asociado a la función discriminante es de 0.424 señalando que los factores son significativos y discriminantes (Chi cuadrado: 207.338. gl. 11).

Se presentan los porcentajes de clasificación del análisis discriminante. El 92.0% de los casos originales fueron agrupados correctamente. Además, mediante la validación cruzada se obtuvo un 91.2% de los casos agrupados correctamente. De acuerdo con estos resultados, la validez del análisis discriminante se considera significativa (Ver Tabla 13).

Tabla 13: Resultados de clasificación

			Pertenencia a grupos pronosticada		
		CVL	*Baja*	*Alta*	*Total*
Original	Recuento	Baja	107	17	124
		Alta	3	122	125
	%	Baja	86,3	13,7	100
		Alta	2,4	97,6	100

La función discriminante canónica para determinar el nivel de CVL de los empleados vinculados a empresas del sector financiero en Barranquilla, Colombia; es como sigue:

$$CVL=0{,}473F_1+0{,}279F_2+0{,}551F_3+0{,}635F_4+0{,}394F_5+0{,}253F_6+0{,}348F_7+0{,}511F_8+0{,}498F_9+0{,}489F_10+0{,}502F_11 \quad (1)$$

Dónde: Relación con el jefe (F_1), Equipo de trabajo (F_2), Salario (F_3), Estabilidad laboral (F_4), Salud y seguridad (F_5), Equilibrio trabajo y familia (F_6), Horario (F_7), Ruido (F_8), Riesgo personal (F_9), Motivación (F_10), y Ambiente térmico (F_11). Se evidencia que los factores estabilidad, salario, ruido y ambiente térmico presentan los coeficientes más altos, por lo tanto, los esfuerzos por mejorar la CVL deben atender los requerimientos que estos factores contienen: tipo de contratación, modelo de compensación, temperatura y fuentes de ruido en el puesto de trabajo.

Prueba de hipótesis de diferencias de medias para muestras independientes

De acuerdo con el enunciado de las hipótesis, se tiene que:

$$H_1: \mu_(i,k)=\mu_(i,(k+1)) \quad (2)$$
$$H_2: \mu_(i,k) \neq 〖\mu〗_(i,(k+1)) \quad (3)$$

Dónde: i=1, 2, 3,…, 11, es el indicador de los factores; y k=1 o 0; representa el tipo de contrato de cada empleado que se ha codificado como 1 (contrato indefinido), o 0 (otro tipo de contratación). Por tanto, para cada factor se valida la hipótesis de que la media que toma para el grupo de empleados contratados de manera indefinida es igual a la media que toma el mismo factor para el grupo de empleados contratado de otra forma (término fijo, prestación de servicios, ocasional/transitorio, sin contrato). La hipótesis alternativa comprueba lo contrario.

Se plantea entonces un procedimiento para la prueba de hipótesis de dos muestras independientes donde el estadístico de la prueba se calcula a partir de la distribución de t-student. La prueba t-student es robusta frente a comparaciones de las medias de muestras independientes cuando se cumplen los supuestos de normalidad y homocedasticidad. En el caso de esta investigación, el tamaño de la muestra permite considerar estos supuestos y proceder a analizar los resultados. Se estableció un nivel de significancia de 0.95 para validar la hipótesis nula de dos colas, por lo que el área de rechazo es de 0.25.

Los resultados del contraste F de Snedecor de la prueba de Levene comprueba la hipótesis de la homogeneidad de la varianza considerando la diferencia de medias para cada factor. Además, los resultados de la prueba de t-student para la comparación de medias señala la significancia bilateral para la prueba de hipótesis de que las medias muestrales son diferentes, bien sea con varianza homogénea (prueba de Levene) o varianza no homogénea.

Las Tablas 14 y 15 presentan los hallazgos para el caso de estudio, en donde se puede concluir que no hay asociación entre los factores: Relación con el jefe, Equipo de trabajo, Salud y seguridad, Equilibrio trabajo y familia, Horario, Ruido, Riesgos personales, Motivación y Ambiente térmico con el tipo de contratación, dado que la media de cada uno de estos factores para los empleados contratados a término fijo u otro tipo de contratación no son estadísticamente diferentes a un nivel de significación de 0.05. Adicionalmente, sí existe diferencia significativa entre los factores: Estabilidad laboral y Salario con respecto al tipo de contratación, debido a que las medias de cada uno de estos factores para los empleados contratados a término fijo u otro tipo de contratación son estadísticamente diferentes a un nivel de significación de 0.05, Por lo tanto, se asume que los factores que determinan la CVL de los empleados del sector financiero y muestran diferencias significativas según el tipo de contratación son las condiciones salariales y la estabilidad laboral.

Tabla 14: Resultado de la prueba de muestras independientes

		Prueba de Levene de calidad de varianzas		**prueba t para la igualdad de medias**		
Factor	**Supuesto**	*F*	*Sig.*	*t*	*gl*	*Sig.(bilateral)*
Salario	Se asumen varianzas iguales	0,055	0,814	2,438	247	0,015
	No se asumen varianzas iguales			2,454	119,218	0,016
Estabilidad	Se asumen varianzas iguales	0,374	0,541	-4,027	247	0,000
	No se asumen varianzas iguales			-4,032	118,048	0,000

Tabla 15: Variación de las estadísticas del factor según tipo de contrato				
		Tipo de contrato		***Variación porcentual***
Factor	***Estadístico***	*Indefinido*	*Otro*	
Salario	*Media*	3,82	4,51	8,28
	D.S.	1,985	1,989	
Estabilidad	*Media*	4,30	3,18	14,97
	D.S.	1,944	1,938	

Discusión

Esta investigación analizó la influencia del tipo de contratación en los factores que determinan la Calidad de Vida Laboral (CVL) percibida por los trabajadores de las empresas del sector financiero en Barranquilla, Colombia. Para ello se aplicó un cuestionario a 249 empleados, se analizó la confiabilidad del instrumento, se llevó a cabo un escalamiento factorial, se determinó una función de pertenencia para discriminar los empleados con CVL alta percibida y CVL baja percibida; y se estableció una prueba de hipótesis para muestras independientes según el nivel de CVL y su relación con los factores.

En las primeras fases de la metodología se encontró que el cuestionario de Condiciones de trabajo y Calidad de Vida (Martínez-Buelvas et al., 2015) es adecuado para ser aplicado en el sector financiero. El escalamiento factorial condujo a definir la CVL en el sector como un constructo multidimensional y multifactorial (Patlán Pérez & J., 2016). Los factores que determinaron el constructo fueron 11 y tienen relación con los aspectos individuales, aspectos del ambiente de trabajo, aspectos del contenido del trabajo, aspectos organizacionales y aspectos socio laborales (Patlán Pérez & J., 2016).

Del análisis discriminante es pertinente mencionar otro hallazgo relacionado con los coeficientes de la función de pertenencia. La estabilidad laboral, el salario, el ruido y el ambiente térmico son los factores que influyen con mayor fuerza en la percepción del nivel de CVL para los empleados del sector. En este sentido, se evidencian dos grandes categorías empíricas para aproximarse al concepto de CVL en el sector financiero: los factores contractuales y los factores ambientales (Chiang Vega & Martínez, 2009; Martínez-Buelvas, Oviedo-Trespalacios, & Luna-Amaya, 2019; Uribe-Rodríguez et al., 2011). No obstante, a partir de la prueba de hipótesis, se encontró que sólo la estabilidad laboral y los salarios tienen puntuaciones promedio diferentes de acuerdo al tipo de contratación de los individuos encuestados.

La estabilidad laboral es un factor importante en aquellas personas contratadas a término indefinido por cuanto el mismo contrato determina, en aquellos que lo poseen, la plena certeza de su vinculación formal a la empresa. Lo anterior atado a resultados, cumplimiento de metas, competencias demostradas y actitudes favorables frente al trabajo. Al identificar la estabilidad laboral como un elemento fundamental de la CVL, el tipo de contratación es un controlador de la percepción que tiene el empleado sobre su nivel de CVL, pues este puede ir en beneficio o detrimento y determina en gran medida las condiciones de trabajo y el trabajo en sí del empleado. La investigación de Uribe-Rodríguez et al. (2011) ratifica estas interpretaciones, pues a mayor estabilidad en el contrato (indefinido), existen mejores condiciones laborales, ambiente social de trabajo y menos efectos colaterales producto de su actividad laboral, para los empleados. En virtud de esto, Herrera-Amaya & Manrique-Abril (2008) comentan que hay mayor promedio de satisfacción en la población contratada a término indefinido que los contratados por tiempo definido. La percepción de estabilidad laboral cambia en los empleados con contratación diferente, sea a término fijo, labor u obra, prestación de servicios o aprendizaje; ya que los empleados están sujetos a un tiempo establecido en su cargo y no hay plena certeza de su permanencia o duración en la compañía.

El derecho a la estabilidad laboral es indispensable para los trabajadores y es uno de los derechos subjetivos públicos (Santos Azuela, 2012) sobre todo en el sector financiero que es determinante para la economía del país y donde los brotes de inestabilidad laboral son cada vez más severos. El sentimiento de inestabilidad y de incertidumbre incide en la percepción de la calidad de vida laboral (Cañón Buitrago

& Galeano Martinez, 2011), afectando al trabajador en su proyecto de vida de mediano y largo plazo, lo que incurre de manera directa en los planes y proyectos que desee emprender y en la misma economía.

El siguiente factor a analizar dados los resultados de la investigación es el salario. Aunque existen autores que consideran que el salario ya no es determinante, ni es el motivo de retención (Argüelles Ma et al., 2013), se observa que los empleados del sector financiero en Barranquilla dan un peso importante a este factor. Se encontró que la valoración que hacen los empleados sobre su salario cambia con los tipos de contratación. Los contratados de forma indefinida valoran el salario asignado por la compañía, porque pueden considerar que es mejor a no obtener ningún tipo de remuneración. Mientras tanto, los contratados a término indefinido no demostraron estar satisfechos con la asignación salarial. Aunque el énfasis en el primero está en la estabilidad, y en los segundos está en el salario recibido; investigaciones relacionadas con satisfacción laboral, demuestran lo contrario. Herrera-Amaya & Manrique-Abril (2008) encontraron que hay mayor satisfacción con el salario o remuneración en empleados contratados indefinidamente, que en otro tipo de contratos. Sin embargo, se consideran convincentes los resultados de la presente investigación debido a las condiciones salariales de los empleados del sector, pues la compensación está ligada al logro de metas personales y organizacionales. Si los empleados sienten que el salario no va a acorde con el esfuerzo que hacen por lograr superarse y hacer que la organización genere ganancias, se puede producir insatisfacción, absentismo, deseos de abandonar la empresa, bajo rendimiento, falta de dedicación, conflicto de intereses, entre otros (Granados, 2014).

Por último, se sugiere realizar investigaciones que apunten a identificar la calidad de vida laboral de acuerdo con diferentes variables demográficas (género, estado civil, años de permanencia en la empresa, nivel de formación de los empleados, entre otros), hacer estudios comparativos entre otras ciudades del Caribe, lo que fortalecería el nivel de conocimiento de dicho fenómeno y su comportamiento lo cual permitirá traducir los resultados de investigación en estrategias de mejoramiento. Además, determinar qué rangos salariales de acuerdo al tipo de contrato influyen positivamente la CVL con el fin de apalancar esta variable a través de un modelo de compensación.

Conclusiones Y Recomendaciones

Los resultados de la investigación sometidos a discusión ponen de manifiesto las principales características de la CVL en el sector financiero, a saber: es un constructo multidimensional y multifactorial que incluye las condiciones físicas, salariales, vocacionales y subjetivas del trabajo.

La estabilidad laboral, los salarios, el entorno térmico y el ruido son los factores que tienen un mayor impacto en el QWL. Los empleados del sector financiero en Barranquilla perciben un alto CVL cuando el salario y las condiciones contractuales generan satisfacción y estabilidad, y las condiciones físicas del ambiente de trabajo son cómodas. Prefieren un contrato de trabajo indefinido y un ambiente de trabajo con temperatura agradable, equipo de ventilación suficiente y código de vestimenta apropiado para el clima tropical de la ciudad de Barranquilla.

De acuerdo con su tipo de contrato de trabajo, los empleados perciben la estabilidad y el salario de manera diferente, aunque esto no necesariamente tiene un impacto negativo en la calidad de su vida laboral. Aun cuando no es posible establecer una correlación directa entre el nivel de CVL y el tipo de contrato, se evidenció que es posible cambiar los niveles de CVL interviniendo los aspectos contractuales como el salario y la estabilidad (duración). Por ejemplo, el tipo de contrato indefinido cambia la percepción de CVL de los empleados por cuanto sienten mayor estabilidad, aunque esto no genere satisfacción con el salario recibido. Mientras tanto, otros tipos de contratación (fijo, obra labor, prestación de servicios, etc.) influyen en que el trabajador se sienta satisfecho con su salario, pero inseguro con su continuidad en la empresa.

Adicionalmente, las siguientes son recomendaciones para las empresas del sector financiero en la ciudad de Barranquilla: (1) Es prioritario reconocer el papel de la gestión de la CVL, dado que es un proceso mediante el cual una organización responde a las necesidades de los empleados mediante el desarrollo de mecanismos que les permitan tomar decisiones en el diseño de sus vidas (Wageeh, 2016). Asimismo, si la CVL es baja habrá insatisfacción, reducción de la productividad, ausentismo, rotación, entre otros

aspectos negativos; mientras que, si la CVL es alta, habrá mayor productividad, sentido de pertenencia, motivación, retención del personal, etc., (Argüelles Ma et al., 2013); (2) Establecer políticas de remuneración e incentivos, claras, justas y equitativas de acuerdo con las responsabilidades, la complejidad, el perfil y las competencias de los trabajadores. Los salarios deben ser competitivos en el sector, tanto para los empleados contratados con contrato de trabajo indefinido, como para aquellos con otros tipos de contratos. Además, el confort térmico en el trabajo debe ser imperativo y estar relacionado con la seguridad laboral.

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Monitoring the Efficiency of Financing Higher Education Institutions as a Necessary Requirement for the Implementation of their Competitiveness

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Abstract

The financial mechanism of higher educational institutions of Ukraine is an important component of state policy, therefore, a comprehensive analysis of its effectiveness in order to identify negative trends and determine the direction of overcoming them is of particular importance.
Given the importance of the problem that is being studied, the article proposes a new approach to the quantitative measurement and comprehensive assessment of the effectiveness of the financial mechanism of higher educational institutions in Ukraine to assess the situation in this area.
The monitoring of the effectiveness of the financial mechanism of higher education institutions in Ukraine was made, which allows assessing the rationality of the reforms being implemented in this area. The conducted analysis shows that the obtained values of the assessments under all characteristics are decreasing (only the effectiveness of educational services remains at the same level with minor fluctuations). The developed system of indicators for evaluating the efficiency of the financial mechanism of higher education institutions in Ukraine allows to create a mechanism that would provide a constant monitoring of the current situation in Ukraine and serve as a basis for a thorough analysis of changes, and would allow to develop appropriate sound measures to correct deformities in education financing.

Keywords: higher education institutions, financing, competitiveness.

Introduction

Having regard to the significance of the financial mechanism of higher education institutions in Ukraine as an important component of the state's policy, a comprehensive analysis of its effectiveness is of particular importance, as it will allow to identify and monitor the negative tendencies and determine the directions of overcoming them.
Taking into account the importance of the studied issue, the article offers a new approach to quantitative measurement and comprehensive assessment of the effectiveness of the financial mechanism of higher education institutions in Ukraine to assess the situation in this area.

The calculated estimates for the groups of characteristics are shown in Table 1.

Table 1: Assessment of the effectiveness of the financial mechanism of higher education institutions in Ukraine by the characteristics of the third level of the hierarchical model

Characteristic	Years						
	2012	2013	2014	2015	2016	2017	2018
Productivity							
Formation of educational potential	1,000	0,925	0,880	0,841	0,776	0,695	0,658
Rationality	1,000	0,948	0,865	0,867	0,703	0,482	0,387
Economy							
Cost of educational services	0,926	0,934	0,923	0,928	0,826	0,693	0,665
Development costs	0,787	0,802	0,756	0,797	0,771	0,876	0,909
Efficiency							
Educational services efficiency	0,898	0,889	0,984	0,997	0,906	0,964	0,929
Realization of educational potential	1,000	0,976	0,923	0,900	0,904	0,904	0,963

Source: compiled according to the authors' calculations

The productivity indices of the studied mechanism show a negative tendency over the last decade. From the point of view of its cost effectiveness, the following situation is observed: along with the rapid deterioration of the situation regarding the educational services cost, there is also a noticeable increase in development costs. It should be noted that development costs play a decisive role in creating favorable conditions for stimulating development and improving the quality of educational services over the medium and long term.

Efficiency characteristics that reflect the situation regarding the educational services efficiency and the realization of educational potential outline better perspectives. The first of these in 2018 shows a significant index increase compared to 2012, due to an increase in professional academic staff. Since 2016, the growth of the sub-index of educational potential efficiency has resumed as a result of the breaking of negative tendencies in this sphere and the emergence of the first signs of improvement.

The results of calculations of the second hierarchy level show a change in the effectiveness of the current financial mechanism during 2012–2018 in terms of its productivity, economy and efficiency (Fig. 2).

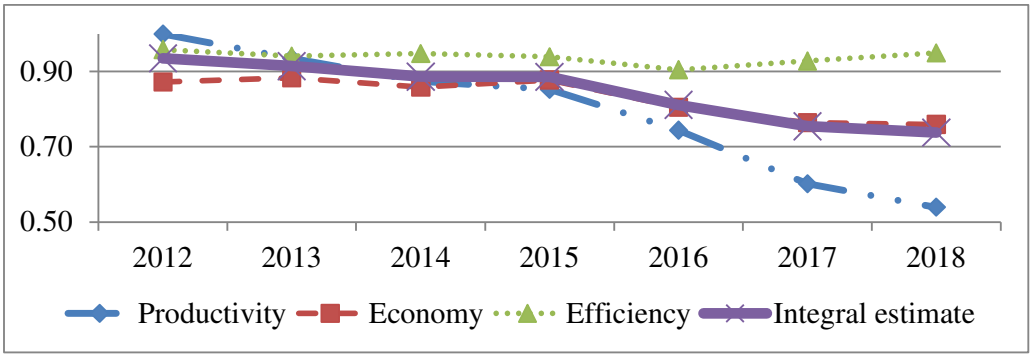

Fig. 2: Integral estimate of the effectiveness of the financial mechanism of higher education institutions of Ukraine in 2012–2018

Source: compiled according to the authors' calculations

In a research study by Kalenyuk (2017) in order to determine the influence of the formation and implementation factors of the financial mechanism of higher education institutions, the PEST analysis was performed. PEST analysis is used to evaluate the impact of various aspects on the study area, including political (P – political), economic (E – economic), social (S – social) and technological (T – technological) factors. This takes into account both the degree of factors' influence of and the probability of change in their effect.

Oharenko (2014) the PEST analysis procedure is conventionally divided into stages:

1. Determination of the list of influence factors.
2. Expert assessment of the degree of factors' influence (scale 1-3) and the probability of change in their effect (scale 1-5). Increasing of index under the scale in both cases means an increase in the impact and the probability of change, respectively.
3. Processing of expert assessments of the degree of influence of factors, including:

– calculation of the arithmetic mean value of the i-*th* factor weight (i = 1,…, n):

$$V_i = \frac{\sum_j^m e_j}{m},$$

where e_j is the estimate of the factor' influence on the *j-th* expert (j = 1,…,m);
normalization of the obtained estimates on the scale [0, 1]:

$$W_i = \frac{V_i}{\sum_i^n V_i}$$

4. Generalization of expert estimates of the probability of changes in the factors' effect, which involves the calculation of the arithmetic mean of the obtained expert estimates for each factor:
5.

$$X_i = \frac{\sum_j^m o_j}{m},$$

where o_j is the estimate of the probability of the factor' influence on the *j-th* expert (j = 1,…, m).

5. The calculation of the real values of the influence of factors as a weighted average:

$$X_i = \frac{\sum_j^m o_j}{m},$$

6. PEST-table construction.

Thus, the calculation of estimates is performed in two stages:

– on the first stage the degree of factors' influence in the form of relatively normalized weighing coefficients is determined;

– on the second stage, the estimation of the probability of changes in the factors' effect is weighted by the weighing coefficients obtained.

Lukianenko and Horodnichenko (2002) mentioned that the obtained overall estimates make it possible to compare factors by their level of importance for the formation and implementation of the financial mechanism of higher education institutions.

The results of the PEST analysis of the formation and implementation of the financial mechanism of higher education institutions of Ukraine are shown in Table 2.

Table 2: PEST-analysis of factors of formation and realization of financial mechanism of higher education institutions of Ukraine

Political		**Economic**	
The success of educational integration projects in Ukraine	0,1834	Favorable economic conditions	0,0705
Political stability in the country	0,0705	The level of economic integration of the state into world society	0,1481
Educational reform	0,1270	Stability of the financial system	0,0952
International mobility in higher education	0,1975	Investment attractiveness of the educational industry	0,0617
Competitiveness of the educational sphere	0,0564	Credit sector development	0,0441
Image on the world markets	0,0423	The level of public funding for the education sector	0,0564
Institutional support for industry development	0,0988	Jobs Creation Policy	0,0494
		Employers' involvement in training	0,1270
Social		**Technological**	
The level of remuneration in the industry	0,0423	Innovative development level	0,0794
Population Solvency	0,0635	Innovative activity of the manufacturing sector	0,0564
The prestige of higher education	0,1146	Public expenditures on development and research	0,0741
First job availability	0,0353	International cooperation in the field of innovation	0,0882
Quality educational services	0,1411	Introduction of new educational technologies	0,1376
Effectiveness of decent work policies	0,0952	Demand for labor in the field of high-tech productionвиробництва	0,0635
Effectiveness of motivational mechanisms of realization of educational potential	0,0952		

Source: compiled according to the authors' calculations

According to the results of calculations made on the basis of expert assessments, the most influential among the political factors of formation and implementation of the financial mechanism of higher

education institutions are the international mobility in higher education (with a score of 0.1975), the success of educational integration projects in Ukraine (with a score of 0.1834) and education reform (with a score of 0.1270).

Among the economic factors, the most influential are the level of economic integration of the state into the world society (0.1481), the participation of employers in personnel training (0.1270), the financial system stability of the state (0.0952).

Among the social factors, the most important is the quality of educational services (0.1411) and the prestige of higher education (0.1146). In technological aspect, the issues of introduction of new educational technologies (0,1376), international cooperation in the field of innovations (0.0882) and the level of innovative development (0.0794) enter into the foreground.

Thus, the monitoring of the effectiveness of the financial mechanism of higher education institutions in Ukraine was made, which allows assessing the rationality of the reforms being implemented in this area. The conducted analysis shows that the obtained values of the assessments under all characteristics are decreasing (only the effectiveness of educational services remains at the same level with minor fluctuations). Thus, a comparison of tendencies that demonstrate the summarizing indices of the second level of the hierarchical scheme confirms the lack of stability of the existing financial mechanism functioning and positive changes in this area in the period from 2012 to 2018.

The developed system of indicators for evaluating the efficiency of the financial mechanism of higher education institutions in Ukraine allows to create a mechanism that would provide a constant monitoring of the current situation in Ukraine and serve as a basis for a thorough analysis of changes, and would allow to develop appropriate sound measures to correct deformities in education financing.

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Ensuring the Efficiency of Energy Companies in Ukraine In the Context of European Integration Processes

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Abstract

Existing approaches to estimation the efficiency of investment projects of companies of energy industry are presented. On the basis of modern data, an analysis of the investment program of the energy enterprise "Lvivoblenergo" was researched with the help of qualitative analysis of project risks. The feasibility of implementing the project is substantiated by net present value and internal rate of return. The main directions of cooperation between Ukraine and the EU in the field of energy efficiency are considered. Using the method of fuzzy logic, the importance of separate economic indicators of the activity of energy companies in different regions of Ukraine was evaluated to achieve a high level of efficiency.

Keywords: Project Risk, Qualitative Analysis, Investment Project, Capital Investment, Discounted Cash Flows , Energy Efficiency, Energy Saving.

Introduction

Estimation the efficiency of energy companies is an extremely important task, first of all, given the need to provide the development of the energy sector as a component of national economics of Ukraine and the importance of the successful implementation of the Association Agreement between Ukraine and the EU, which contains provisions on the development of the energy sector, in particular energy efficiency and energy saving. We think that the providing the high level of efficiency of activity of energy enterprises is one of the directions of achievement of the set goals of economics of the country and its regions in the process of European integration. Our research is dedicated to realization of estimation of their functioning based on the use of information from open-sources industry different regions of Ukraine, and the interpretation of the most important economic indicators.

Existing views of representatives of the scientific sphere and business environment on the question defined above do not differ cardinally, especially with respect to basic positions. However, in most contemporary publications, the authors do not always pay close attention to the analysis and evaluation of investment projects that will be realized by the enterprises of the industry, which further results in the fuzzy adaptation to the real conditions of activity of the enterprises and hinders the process of adaptation of best practices that have proved their rationality in the countries-members of EU. The priority direction for providing of efficiency of activity of enterprises of industry is

realization of acceptable investment projects aimed at achieving high parameters of energy efficiency and energy saving.

Research Results

The important condition of increase of efficiency of activity of enterprises in the modern market economics is to decide on the feasibility of investing investment based on their justification using economic and mathematical models and applying modern methods of evaluating the effeciency of investment projects. Research on the topic of evaluating the efficiency of investment projects was initiated by foreign and Ukrainian scientists [1, p. 52].

The active Agreement "About an Association EU-Ukraine", which lays the legal basis for systemic reforms in various fields, includes Article 388 "Objectives and Directions of Ukraine-EU Cooperation in the Energy Sector", which provides for measures to promote energy efficiency and energy efficiency, development and support for renewable energy, approximation of national energy legislation to EU norms, scientific and technical cooperation and exchange of information with a view to improving technologies in the field of production, transportation and energy consumption [2]. It should be noted that separate positions of energy cooperation are related to other areas such as industrial policy, technical regulation, steady development, etc. The importance and priority of the achievement of the national economics of the above requirements is especially relevant in the context of European integration of our country and implementation of the relevant EU directives. At the regional level, the implementation of investment projects by energy companies is a top step in the direction of achieving these goals.

Development of investment projects is carried out under indefiniteness, which is primarily due to the incompleteness of the information on which the investment project is based. This problem is partially eliminated in the process of working on the project by obtaining additional information and making changes to the investment documentation. Accordingly, as long as the investment calculations are made in the conditions of indefiniteness, there is a likelihood of adverse situations that could lead to a decrease in project efficiency or to additional unforeseen costs.

Therefore, in order to make the right investment decision, it is necessary not only to determine the amount of expected profit, but also to assess the risk of investment decisions by identifying and quantifying project risk, the nature of its impact on the results of implementation of investment projects and the degree of coverage of expected profit anticipated risk. Project risk is associated with the risk that the results of the investment project will be unprofitable and that the investment objective will not be fully achieved [3]. Other scientists under a risk understand an economic category, which may or may not be based on the indefiniteness of a particular economic or other situation and which is caused by the lack of complete information [4, p. 278]. Therefore, the effectiveness of the implementation of investment projects is inextricably linked with the implementation of a comprehensive analysis and justification of management decisions, systematic assessment of the economic benefits and viability of the project, the application of the main ways of comparing the costs and benefits of the project, as well as determining the most optimal investment project on the basis of comparison of its alternatives.

The main task of evaluating the effectiveness of an investment project is to determine its value, which is determined by the difference between positive results and negative consequences. An important stage of economic work is to find out the costs of the project and to determine the results from different positions: the interests of the shareholders (owners); organizations involved in the implementation of the investment project; the external environment in which the project will be realized; economics in general. In calculating the main indicators of project effectiveness, a prerequisite for economic feasibility of its implementation is a positive present value, exceeding the internal rate of return over the project discount rate, and the benefit/cost ratio should be greater than one.

We will consider investment projects on the example of the most illustrative energy supply enterprise of the Western region of Ukraine "Lvivoblenergo", a company that supplies electricity to consumers in the Lviv region and transfers electricity to regional (local) power grids. We take into account that electricity is a special type of product whose properties are determined by physical characteristics, technical characteristics of supply to a certain group of consumers, as well as features related to changes of loading of electroconsumption during the day.

The activity of the researched enterprise was characterized by the following components:

1. Types of sales: sale of electricity to consumers; provision of electricity transit services to electricity suppliers at unregulated tariff; other services.
2. Organization of sales, which occurred in accordance with the geographical location of the corresponding subdivisions [5].

In 2018, Lvivoblenergo sold 3 903 368 thousand kWh to its own customers, electricity in the amount of 7 596 977 thousand UAH (including VAT). As of 01.01.2019, the number of consumers of PRJSC "Lvivoblenergo" was 964 496, including legal entities – 36 412, household consumers – 928 084. In 2018 in the general structure of sale the volume of electricity sold to legal entities (industrial and non-industrial consumers) was 55%, to household consumers – 45% [6].

The investment program of energy enterprise provides for:

- development of applications (mobile applications) for inputting meter readings;
- installation of burglar alarm systems on separate energy objects;
- increase of reliability and capacity of power grids;
- introduction of new transformer capacities to increase the reliability of electricity supply and ensure the annual growth of electricity consumption;
- replacement of technologically outdated meters;
- major overhaul of power grids;
- increasing the reliability of power supply within the program "Safety above all!" (removal of power lines from the territories of schools, kindergartens and hospitals).

The main directions of investment are as follows:

- construction, modernization and reconstruction of electrical networks and equipment - 181 632,49 thousand UAH (70,00% of the total volume);
- measures to reduce non-technical electricity costs – 38 919,30 thousand UAH (15,00%);
- introduction and development of automated systems of dispatching and technological control – 10 015,23 thousand UAH (3,86%);
- introduction and development of information technologies – 5 837,38 thousand UAH (2,25%);
- implementation and development of communication systems – 3 580,57 thousand UAH (1,38%);
- modernization and purchase of wheeled vehicles – 18 776,82 thousand UAH (7,24%).

The discounted cash flows method is used to estimate the effectiveness of cash projects. This method has become widespread in the West because it can take into account future development prospects. In general, cash flow is equal to the amount of net income and amortization minus the increase in net working capital and capital investments. The method is used in cases where it is expected that future levels of cash flow will differ materially from current ones and where the company is a large multifunctional commercial entity. The discounted cash flows method is the best, however, it is very labor-consuming.

The advantages of estimating a business by cash flows discounting are as follows. First, future business profits directly account only for the expected operating costs of production and sale of products, while future investments in maintaining and expanding the production or trading capacity of the business are only partially reflected in the profit forecast due to their current depreciation. Second, the lack of profit (loss) as an indicator in the investment calculations of a business valuation

is also explained by the fact that profit, being an accounting reporting indicator, is prone to considerable manipulation. The declared value depends on the chosen method of accounting for the cost of purchasing resources in the cost of goods sold from the method of accelerated depreciation, on the criterion for the inclusion of products in sales, etc. The obtained results are given in Table 1 and Table 2.

Table 1: capital investment for capital repairs

Cash flows	Initial investment	Years				
		2016	2017	2018	2019	2020
Free cash flows	200000000	199201470	130720850	151158440	17995688	25946200
Discounted cash flows	200000000	168814805	93881679,1	91999693	9281976	11341323

Table 2: integral indicators

Indicator	Indicator Value
Discount Rate (r)%	18
PayBack Period (t), years	1 year
Net Present Value (NPV), thousand UAH.	175319476
Internal Rate of Return (IRR), %	69%
Profitability Index (PI), fractions of units	1,876597381

If the value of the net present value of the NPV is > 0 for the individual project, then the project should be accepted or else rejected. If the internal rate of return of IRR exceeds the discount rate r, then the project is accepted. If the project profitability index is greater than one, then the project is effective and acceptable. Investment investments are considered appropriate if the auxiliary cash flow from the project implementation is sufficient to return the initial amount of capital investment and provide the required return on invested capital [7]. An important criterion for the adoption of this project within the region is the presence of a social component. The enterprise policy is aimed at ensuring the production processes by skilled employees, implementation of the investment project should not lead to job cuts. The analyzed investment project is a clear example of real conditions of functioning of the energy enterprise “Lvivoblenergo”. The calculations show that the project under consideration is appropriate for practical use, as evidenced by the values of the main indicators (NPV and IRR). The profit generated from the implementation of the investment project will be directed to the modernization and re-equipment of the enterprise, as well as to the preparation and implementation of innovations, without which energy efficiency and energy saving cannot be achieved.

For a more detailed consideration of the peculiarities of the functioning of the enterprises of the energy industry (in terms of achievement of efficiency of activity) we have selected ten regional institutions representing the western, eastern, southern and central regions of our country and used the method of fuzzy logic, taking into account the complexity of detection of cause and effect relationships uncertainty (in quality and time) of the results of activity [8].

The input variables are non-current assets (y_1), current assets (y_2), equity (y_3), average number of employees (y_4), output – activity (z), calculated as the arithmetic mean of the cumulative income (y_6), net income from sales of products and services (y_5), net profit (y_7), quantity of sales (y_8). The identified cause and effect relationships between the input and output variables reflect the “tree” of logical inferences (Fig. 1).

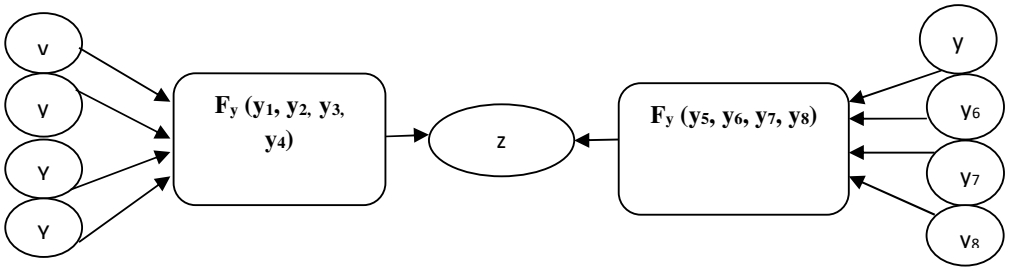

Fig. 1: Tree of logical conclusions

The results show that, in order to achieve a high level of performance, priority has a certain basic value of current assets, as opposed to non-current assets. Also, the number of employees to some extent is not as important for the achievement of efficiency as the size of fixed capital, preference is given to medium-high or high quantitative measurement.

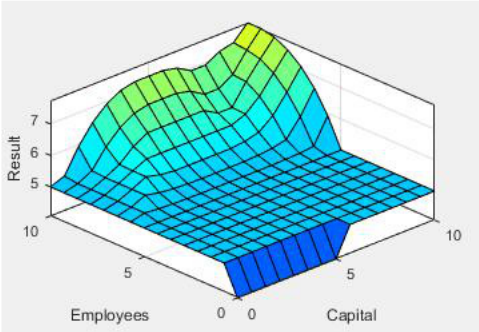

Fig. 2: The dependence of the performance of energy companies on the number of employees and the volume of fixed capital

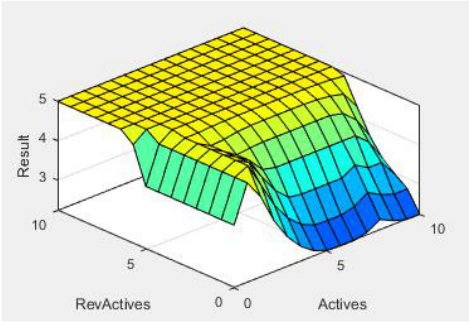

Fig. 3: The dependence of the performance of energy companies on the volume of current and current assets

The analytical results prove the importance of introducing European financial security practices and timely use of the various sources of financial resources available for: 1) updating of current assets that are in constant circulation and are intended for industrial use (sales or consumption), which allows to increase the agility of the enterprise in achieving the set goals; 2) replenishment of fixed capital, which is the long-term fixed assets of the company. Taking into account the identified trends will allow enterprises to successfully use financial resources to achieve their goals, including in the process of implementation of investment projects aimed at improving energy efficiency, energy-savings, providing of steady development.

Conclusions

The approximation of the activities of native energy companies to European standards implies the formation of an effective investment policy, substantiation of a comprehensive approach to the selection of priority and most acceptable investment projects, the formation of a capital budget, which aims not only to maximize profits and reduce investment risk, but also to achieve efficiency criteria and energy savings. The investment policy of energy companies should take into account and reflect the European practice of sector reform, the use of steady development approaches in the context of the further implementation of the provisions of the economic block of the EU-Ukraine Association Agreement.

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Educación Financiera En MIPYMES: Percepciones Y Comportamientos De Empresarios De Una Localidad De Bogotá

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Resumen

Se realizó investigación mixta de tipo trasversal con el objetivo de identificar precepciones y comportamientos relacionados con la educación económica y financiera en MiPyMEs. La población participante se compuso por un grupo de 12 administradores de MiPyMEs de una localidad de Bogotá, los cuales respondieron una entrevista semi estructurada. La muestra de la población se seleccionó a conveniencia del investigador. Los resultados muestran que la mayoría de los administradores tienen la percepción de tener un bajo conocimiento de temas relacionados con la educación económica y financiera. La mayor fuente de financiación de las MiPyMEs son los bancos, seguido de los recursos familiares y propios. Buena parte de los participantes identifican a los bancos como única fuente externa de financiamiento (con diversos productos) a pesar de ser una opción costosa y de alto riego. La mayoría de los entrevistados consideran que realizan aportes al desarrollo económico y social de su localidad al pagar impuesto y generar empleo. Se concluye que, si bien algunos administradores dan cuenta de un buen manejo de los recursos dentro de la empresa, más de la mitad no ha recibido ningún tipo de educación económica o financiera y esto se refleja en las percepciones y comportamientos manifestados. Los resultados invitan a realizar más acciones en pro de la educación económica y financiera en las MiPyMEs para garantizar su permanencia en el mercado en el largo plazo.

Palabras clave: Educación financiera, educación económica, MiPyMEs, comportamientos financieros

Introducción

La educación económica y financiera, en adelante EEF, se considera un aspecto fundamental para el desarrollo económico de los países por estar relacionado con la bancarización y con la buena evaluación financiera de las personas y las empresas. Por su lado, las MiPyMEs, al ser la cara visible del emprendimiento, se han concebido como una excelsa posibilidad y se han incentivado de diversas maneras. De esta manera, la EEF juega un papel fundamental en el desarrollo y mantenimiento en el largo plazo de las MiPyMEs.

La EEF se identifica como uno de los pilares de desarrollo económico de los países, y se le da mayor importancia en los países en vía de desarrollo, por su incidencia sobre la pobreza. Así, se considera que "una política de EEF articulada y bien dirigida facilita la reducción de la pobreza y la desigualdad, permite una mayor efectividad en las acciones de inclusión financiera y de protección al consumidor financiero y contribuye al desarrollo de los sistemas financieros" (Comisión Intersectorial para la Educación Económica y Financiera, 2017), mientras que una baja inclusión financiera implica retrasos en el crecimiento y desarrollo económico, así como afectar los niveles de ahorro y crédito (Cano, et al., 2014).

En Colombia EEF es asumida como principio de protección, derecho del consumidor, práctica de protección, obligación especial de las entidades y como objetivo e instrumento de la intervención del Estado, lo cual advierte la importancia de una información calificada y con componente pedagógico para lograr efectos en el comportamiento de las personas, como base del equilibrio de las relaciones existentes entre los consumidores financieros y las entidades vigiladas y como herramienta para promover el crecimiento económico de los países, así como la estabilidad y la confianza en las

economías nacionales (Arrubla, 2016), teniendo así una amplia responsabilidad tanto con las personas y la sociedad como con las entidades públicas y privadas.

Contando con los avances realizados en relación a la EEF, "las mediciones en la materia evidencian que la población aún carece de los conocimientos y habilidades financieras mínimos requeridos para la toma de decisiones económicas y financieras responsables" (Comisión Intersectorial para la Educación Económica y Financiera, 2017). Por este motivo, existe un consenso sobre la importancia de centrar las acciones y esfuerzos en audiencias o poblaciones específicas, siendo una de estas los microempresarios, para los cuales se determinó como prioritaria la enseñanza en 1) administración de los recursos del hogar y la empresa, 2) el manejo responsable de los préstamos, 3) las condiciones y herramientas para acceder a productos financieros, y 4) la gestión del emprendimiento (Comisión Intersectorial para la Educación Económica y Financiera, 2017).

Un estudio realizado en el año 2015 muestra que "El 67% de las personas y el 55% de los microempresarios tienen al menos un producto financiero. En ambos segmentos, la tenencia de al menos un producto financiero es mayor en los niveles socioeconómicos más altos y en las ciudades" (Banca de las Oportunidades; Superintendencia Financiera de Colombia, 2015). Otro estudio realizado en el 2018 evidenció que la falta de EEF de los microempresarios, "genera la toma de decisiones con enfoque de corto plazo que carece del sustento necesario para minimizar los riesgos y generar valor" (Bravo Geney, 2018). Teniendo en cuenta estos aspectos, se realizó una investigación para estudiar el conocimiento que tienen los dueños o administradores de algunas MiPyMEs sobre temas financieros, dándole prioridad a la autopercepción de conocimiento y a los comportamientos de estas personas frente al sistema financiero.

Metodología

Se realizó un estudio mixto de corte transversal con el objetivo de identificar precepciones y comportamientos relacionados con la educación económica y financiera en MiPyMEs. La muestra seleccionada está compuesta por 12 administradores o empresarios de una localidad de Bogotá, seleccionados a conveniencia de la investigación. La participación de estos fue libre, voluntaria y anónima, procedimiento que se garantizó a través de la firma de un consentimiento informado.

Se aplicó una entrevista semiestructurada a cada uno de los participantes de manera presencial en un punto de venta o vía telefónica en el caso en el que no fuese posible encontrarlos en el punto de venta. Las entrevistas fueron realizadas a lo largo de un mes. Para el análisis de datos se utilizó herramientas de procesamiento de datos cuantitativos y cualitativos.

El análisis de la información recolectada contiene una caracterización de la muestra, tanto de personas como de empresas, una presentación de la autopercepción del conocimiento frente a temas relacionados con EEF, un análisis sobre el manejo de los recursos por parte de los empresarios y por último una sección de opinión sobre el aporte que cada una de estas empresas realiza al desarrollo económico y social. Cada una de los participantes tuvieron la libertad de responder o no las preguntas realizadas, por lo que no todos los análisis cuentan con la misma cantidad de datos.

Resultados

Caracterización de la muestra

Los participantes tienen una distribución similar en sexo y edad. El nivel educativo evidencia que el 58% de los participantes tienen nivel técnico o tecnológico, el 25% completaron la primaria y el porcentaje restante se divide entre una mujer que manifestó no haber finalizado el bachillerato y un hombre que manifestó haber cursado una carrera profesional pero no haberla finalizado.

A pesar de que todas las personas afirmaron ser administradoras, en el desarrollo de la entrevista fueron claras las diferencias entre las funciones de cada uno, pasando de un extremo de ser gerente, fundador

y administrador de una empresa, a ser administrador de un punto de venta porque es la única persona disponible en un punto de venta, quien cumple con todas las labores requeridas dentro de este punto de venta, sin implicar tener un cierto nivel de conocimiento o formación.

Las empresas analizadas son MiPyMEs con menos de 10 empleados en un 83%, el 8,3% corresponde a empresas de entre 11 y 50 empleados, y el restante 8,3% corresponde a una empresa que tiene cerca de 62 empleados. El tiempo que llevan funcionando en el mercado contrasta con las expectativas del estudio, pues 7 de las empresas seleccionadas tienen más de 8 años en el mercado, 3 tienen entre 6 y 8 años y solamente 2 cuentan con menos de dos años de existencia.

La gran mayoría de empresas pertenecen a la categoría de comercio al por mayor y al por menor. En relación al peligro de cierre por quiebra o embargo, solo una de las empresas reconoció haber estado en riesgo, dos han estado en peligro de quiebra, pero no de embargo y 9 no han estado o no manifiesta haber estado en peligro de quiebra o embargo.

Percepción del conocimiento frente a temas relacionados con EEF

Para evaluar la percepción de conocimiento de los participantes sobre educación financiera se le preguntó a cada uno cuánto sabía de ciertos temas evaluando su conocimiento de uno a diez, siendo uno no saber nada y 10 tener un conocimiento suficiente. Los resultados muestran que los aspectos en los que se considera tener más conocimiento son mercadeo con un promedio ponderado de 7,2 seguido por administración e impuestos con 6,3. El promedio ponderado de percepción de conocimiento individual oscila entre 8,1 y 1,6, con una media de 4,8, mostrando una amplia fluctuación que se explica por la variedad de perfiles que fueron entrevistados.

La gráfica radial (Fig. 1) muestra que los demás términos utilizados para medir la percepción de conocimiento económico y financiero tienen una distribución similar, siendo estos: finanzas personales, contabilidad, finanzas empresariales, economía y aspectos jurídicos y legales. Llama la atención que la percepción frente a los conocimientos relacionados con las finanzas empresariales, que podría ser alto dados los cargos entrevistados, tiene uno de los más bajos puntajes, lo que puede indicar que buena parte de las personas que se encargan de administrar MiPyMEs no saben o no creen tener los conocimientos suficientes para llevar un negocio en los relativo a las finanzas.

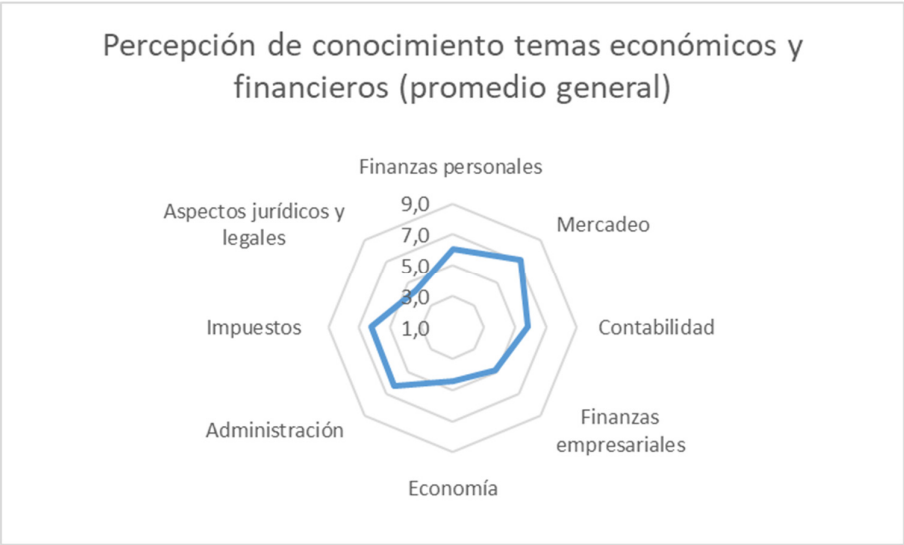

Fig .1: Percepción de conocimiento en temas económicos y financieros (promedio general)

Frente a esta perspectiva se les preguntó a los participantes si habían recibido, alguna vez, al menos una capacitación sobre EEF y si consideraban necesaria la implementación de un programa de EEF para los trabajadores de la empresa. Casi la totalidad de los empresarios consideran necesaria la implementación de un proceso de capacitación en EEF, y de estos, solamente 4 han recibido capacitaciones relacionadas.

En estos casos, quienes han brindado la capacitación son Instituciones de educación superior (3), entidades estatales (2), y familiares (1). De las personas que no consideran necesario algún tipo de capacitación financiera lo justifican mencionando que por las funciones que cumplen sus empleados no requieren ningún tipo de conocimiento financiero.

Manejo de los recursos por parte de los empresarios

Las fuentes de financiamiento son parte esencial del mantenimiento y crecimiento de una MiPyMEs. Se buscó indagar sobre las fuentes de financiación a las que acuden las empresas cuando requieren recursos adicionales, sin importar si en el momento de la entrevista tuvieran (o no) un crédito vigente. Se encontró que la principal fuente de financiación son los bancos, dato que se contradice con la aversión que mostraron frente a los bancos como se verá más adelante. La suma de los recursos propios y familiares casi equipara los recursos bancarios.

La distribución de rectángulo o treemap (Fig. 3) muestra la repartición de las fuentes de recursos mencionadas por las personas entrevistadas, mostrando que la táctica de búsqueda de recursos menos mencionada son las estrategias de mercadeo y la presión a los empleados. Uno de los empresarios manifestó que cuando necesitaba recursos acudía a sus empleados, impulsándonos a trabajar más o a atraer más clientes, a riesgo de perder sus puestos de trabajo por falta de liquidez de la empresa.

Fig. 2: Fuentes de recursos adicionales

En cuanto a las fuentes actuales de financiación, se encontró que los bancos son la principal fuente de financiación seguida por las cooperativas, que es utilizada por solo uno de los empresarios. Al indagar por las causas del uso de las cooperativas se descubrió que el empresario tenía sus préstamos en una cooperativa financiera que se convirtió en un banco, por lo que los costos aumentaron significativamente y decidió trasladar sus productos financieros a otra cooperativa con costos más bajos y un mejor servicio.

Se les preguntó a los participantes si tenían conocimiento de ciertos productos financieros a los que una MiPyMEs podría acceder. El 33% reconoció no conocer ninguno de los productos mencionados. De los restantes 8 participantes, todos aceptaron conocer los microcréditos y las tarjetas de crédito empresariales, mientras que solamente uno mencionó que conoce los créditos de redescuento. La figura 3 permite ver la especificidad de las respuestas por producto financiero.

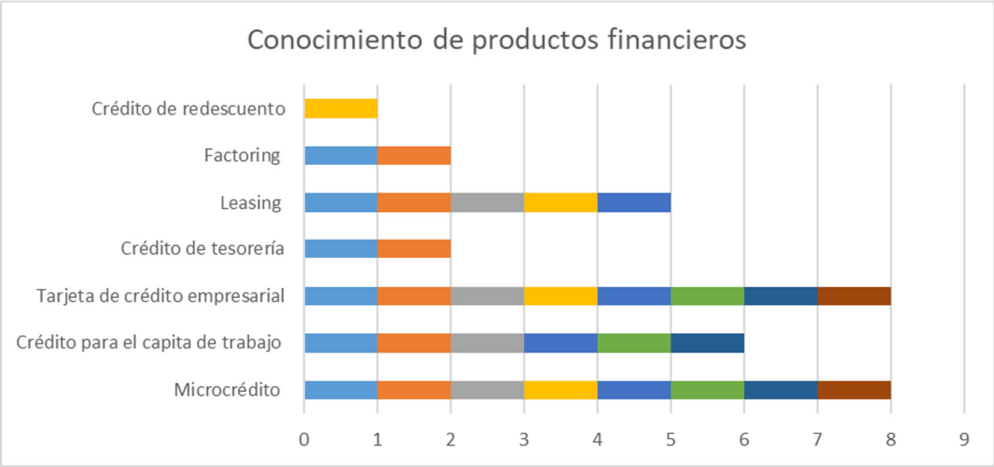

Fig. 3: Conocimiento de productos financieros

Casi la totalidad de los participantes manifestaron su temor a los créditos, las tarjetas de crédito y en general a las entidades bancarias, explicado por los altos costos, la facilidad con la que se pueden adquirir estos productos, la rapidez con la que se gasta el dinero y las dificultades que luego se pueden presentar para pagarlos.

De la totalidad de las empresas, la mitad afirmaron tener un préstamo vigente. De estos, el 83% conocen el plazo del crédito (2 a 5 años), afirma conocer los costos adicionales de tomar un crédito y los beneficios de pagar en un tiempo menor del acordado. El 50% conoce la tasa de interés del crédito y el 100% afirman que se encuentran al día en las obligaciones relacionadas con el préstamo. Únicamente el 50% de estas empresas cuent con un profesional especializado en el manejo de los recursos financieros.

Al revisar los resultados de la totalidad de las empresas, el 92% tienen un presupuesto mensual o semanal, conoce los costos adicionales de toma un crédito y conoce el beneficio de pagar en un menor plazo una responsabilidad financiera (en caso de requerirla). El 67% cuentan con un profesional especializados en el manejo de recursos financieros. Al indagar sobre las inversiones que realizan las empresas, solamente el 25% de las empresas mencionaron que realizan inversiones, dirigidas estas a la modernización, mantenimiento o compra de planta y equipo.

La barrera principal que encuentran las empresas a la hora de financiarse es el temor a no tener recursos con los cuales pagar las responsabilidades financieras adquiridas y el temor al poder de los bancos, que incluye los reportes en las centrales financieras y lo que esto significa para futuras financiaciones de la empresa. Otras barreras mencionadas son los altos costos de los productos financieros, la falta de información, la fluctuación de la economía colombiana, los cambios en el valor del dólar y los largos periodos de recesión. El 42% de los participantes no consideran tener barreras para acceder al sistema financiero, de estos, el 60% ya tienen por lo menos una deuda con el sector financiero.

Aporte Al Desarrollo Económico Y Social

Se les preguntó a los participantes si consideraban que sus empresas aportaban al desarrollo económico y social de la localidad. Solamente uno de los participantes consideró que no genera aportes a la

localidad. De una lista de posibles aportes, los empresarios seleccionaron el pago de impuestos y la generación de empleo, a pesar de reconocer que los impuestos para las MiPyMEs son muy altos y que algunos de sus empleados no son personas de nacionalidad colombiana.

Uno de los empresarios manifestó que había decidido, dado el contexto nacional actual[1], contratar únicamente a colombianos. A pesar de considerar el empleo como un aporte significativo, solamente se encontró una empresa que paga a sus empleados más del salario mínimo legal vigente (254,7[2] dólares a octubre del 2019). Las demás empresas pagan a sus empleados el salario mínimo incluyendo (o no) presentaciones sociales.

Las importaciones, la responsabilidad empresarial y la inclusión de personas en condición de discapacidad fueron también seleccionados, y se mencionaron asuntos como la compra de insumos nacionales exclusivamente y la venta a precios bajos como aspectos que aportan al crecimiento económico y social de la localidad, por ejemplo, a través de ventas de productos de obra a precios bajos para la construcción de un parque en la localidad.

Conclusiones

Las personas participantes mencionaron tener cargo de administradores, sin embargo, sus funciones, capacidades y conocimientos varían ampliamente. Estos consideran tener más conocimientos en mercadeo, seguido de administración general e impuestos. La mayoría de participantes considera como un aspecto favorable para la empresa que sus empleados reciban capacitaciones relacionadas con EEF.

En relación a las fuentes de financiación, se observó que la mayoría de empresas no han estado en riesgo de quiebra o embargo, y la mitad tienen actualmente un préstamo al día con conocimiento de los costos adicionales conexos. La mayoría de empresas tienen un presupuesto mensual o semanal y el 67% cuentan con por lo menos un profesional especializado para el manejo de los recursos financieros.

Se observa que pocas empresas conocen otras formas de financiarse diferentes a los bancos, como por ejemplo las cooperativas y otras entidades del sector solidario que pueden impulsar las empresas de maneras diversas, no solo a través del otorgamiento de créditos a un costo más bajo que el de los bancos, sino también dando capacitaciones, soporte y en general, educación financiera que les permite a las MiPyMEs gestionar de manera más adecuada sus recursos.

La mayoría de empresas consideran que su aporte en términos de pago de impuestos y generación de empleo es significativo para el desarrollo de la localidad. Es cuestionable la posición de las empresas ya que, en la mayoría de los casos, generan empleo no calificado sin posibilidades de ascenso social a través del estudio o económico a través de mejores salarios. Sin embargo, esto no demerita que, a diferencia de otras empresas, las MiPyMEs crean empleos, que se pueden mantener a lo largo del tiempo mientras la empresa guarde vigencia.

Los resultados encontrados a partir de una muestra pequeña de empresas pueden ser validados con otras empresas y localidades. Los resultados pueden variar de acuerdo a las personas y las empresas seleccionadas más allá del cargo que ostentan o el tipo de empresas seleccionadas, por las condiciones particulares de cada empresa y las condiciones macroeconómicas que sobrepasan a la capacidad de control de cada una de estas.

Agradecimientos

Se presenta agradecimiento a la Corporación Universitaria Minuto de Dios UNIMINUTO quien financió el proyecto de investigación “Medición de indicadores de la educación financiera como parte del desarrollo socio económico de las pymes en la localidad de Antonio Nariño en la ciudad de Bogotá” del cual se deriva el presente artículo. A las MiPyMEs de la localidad de Antonio Nariño en la ciudad de Bogotá, quienes participaron activamente en la investigación. A mi familia y amigas, por su apoyo incondicional.

[1]Se ha reportado un aumento de la migración de ciudadanos venezolanos a Colombia. Ver por ejemplo (EL TIEMPO Casa Editorial, 2017)
[2]Cálculos propios de promedio TRM de lo corrido del año 2019 a partir de datos de (Ministerio de Tecnologías de la Información y las Comunicaciones, 2019)

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Application of Financial Education In SMES In Bogotá

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A financial crisis is an awkward situation that no person or company wants to face. In Colombia, it is common to find people and companies that have had financial crises given the low level of financial education.

Most countries implement financial education programs to improve the living conditions of the population and contribute to the nation's economic growth. Government economic policies and economic conditions influence the behavior and financial results of the industry including SMEs.

A quantitative investigation was carried out in small and medium enterprises located in Bogotá. The selected SMEs responded to a survey through their owners or administrators.

The main objective of this study was to evaluate the level of financial knowledge and its correspondence with the current state of SMEs in Bogotá.

The companies that participated in the study are 90% small companies, 41% have more than 8 years in the market, 19% have between 6 and 8 years, 26% have between 3 and 5 years and 14% have less than two years. 62% of Companies correspond to wholesale and retail trade.

The people surveyed are 30% professionals, 32% are technicians and 38% attended high school. 54% are women and 46% are men.

Regarding financial education, 39% of respondents had participated in a financial education program and 81% considered it necessary to implement a financial education program in their companies.

Concerning financial education, 39% of respondents had participated in a financial education program and 81% considered it necessary to implement a financial education program in their companies. Those who received financial education have received it mainly in institutions of higher education followed by colleges and government entities.

Regarding financial knowledge, the participants showed average knowledge in all aspects evaluated, finding the highest score in the category "administration" and the lowest in the categories "economy" and "legal aspects".

Likewise, 30% of the companies have external financing, 95% of the cases with banks, 74% know the credit interest rate, 84% know the credit financing term and 84% are up to date in the Loan payment. The additional bank loan costs are known by 74% of respondents and only 54% of companies have an accountant.

It is concluded that the SMEs of Bogotá have a low knowledge of financial aspects. Although many businesses do not have debts, those who do, have acquired long-term bank commitments without being clear about the costs involved and without having professionals that allow them to a better administration. Finally, it was observed that the financial education received by the participants is low and limits their business.

Acknowledgment

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How Insurance Companies Meet Solvency II Requirements? Evidence from The Polish Non-Life Insurance Market

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Abstract

In the European insurance market, according to Solvency II system, the insurers are obliged to disclose the Solvency and Financial Condition Reports (SFCR), including some Quantitative Reporting Templates (QRT). In the paper, an analysis and evaluation of solvency adequacy for non-life insurance companies operating in Poland is presented. The selected measures such as the Solvency Capital Requirement (SCR) ratio and the Minimum Capital Requirement (MCR) ratio as well as the components of the Solvency Capital Requirement were examined in order to evaluate the solvency positions of the analysed insurers. The conducted research showed that almost all non-life insurance companies in Poland met the obligatory requirements and have had the required coverage of capital requirements by their own funds. It also highlighted the importance of underwriting risk and market risk for non-life insurance sector. The obtained results may be useful for insurance market entities, researchers as well as for customers seeking transparency in the solvency of insurance companies, in particular those whose policy they already have as well as those in which insurance purchases they are considering.

Keywords: Solvency II, non-life insurance, Solvency Capital Requirement (SCR), Minimum Capital Requirement (MCR), Poland

Introduction

Solvency is considered as one of the fundamental principles of the financial management of an insurance company, closely related to the specificity of an insurance service. Insurance business is based on confidence that in the case of a random insurance event an insurer will cover claims, in accordance with the terms of the insurance contract. In other words, the insurer should be solvent at any time. Consequently, the solvency problems are essential not only for the insurance companies, but also for customers and other market participants.

In accordance with the new Solvency II system, implemented on January 1, 2016 in European Union countries, insurance and reinsurance companies are obliged to comply with new capital requirements and to maintain adequate coverage with their own funds. In addition, the new solvency system imposes new, more detailed reporting obligations on solvency and financial condition of insurers. As Rae et al. (2018) note, Solvency II represents one of the most sophisticated insurance regulatory regimes in the world. It is built around the principles of market consistency and embedding strong risk management and governance within insurance companies. As a result, insurance companies face new challenges in developing regulatory financial security measures.

In order to focus on the solvency problem of insurance companies, it is important to mention the evolution and the selected approaches to the solvency concept. In 1984-1985 the Faculty of Actuaries defined the term *solvency* as meeting the obligations that have arisen or may arise in the future, taking into account possible assumptions and a certain degree of probability (Hardie et al 1984-1986).

Benjamin also points out obligations covering, claiming that solvency means "having sufficient financial resources to cover all financial obligations" (Kastelijn 1986). The International Association of Insurance Supervisors (IAIS) calls solvency the ability of insurance companies to fulfil their obligations resulting from all contracts at all times (IAIS 2000). Next, Bijak (2003) formulated the concept of solvency as "the value of assets free from any liabilities towards the insured, defined as a safety buffer". Afterwards, in 2009, this concept was developed as: "the state of dynamic balance between the assets of the insurance company and liabilities resulting from insurance contracts and cash flows generated by assets and liabilities" (Bijak 2009). Supposing that it is a state that guarantees the insurance company with a high probability of liabilities towards insured persons, policyholders or beneficiaries under insurance contracts in changing natural, economic and social conditions. It is a state in which the internal resources, structures and processes of the insurance company and external structures in which the company is located do not systematically affect the decrease in the likelihood of the undertaking fulfilling its obligations (Bijak 2009). Lisowski (2010) drew attention to a different solvency dimension, i.e. from the point of view of the client, the solvency of an insurance company can be considered in two aspects. First, as the ability to meet liabilities, and hence the financial situation, and secondly – as readiness and, therefore, the will to meet them. The legal regulations give the insured the right to pursue claims from an insurance company through legal means – legal guarantees of the feasibility of insurance protection.

In the last few years, the issues related to Solvency II requirements, their practical implementations as well as the models that can be used in risk assessment for the purpose of solvency assessment have been considered broadly in the international scientific literature. Problems related to new solvency capital requirements and risk measures in the solvency assessment were examined, among others, by: Christiansen and Niemeyer (2014), Eling and Pankoke (2014) and Wagner (2014). The analysis of the first effects of Solvency II on the European insurers' balance sheets and solvency, based on the published statistical data, was presented by Kočović et al (2017). With regard to life insurance companies, the components of SCR calibrated based on expected shortfall were examined by Boonen (2017). In the case on non-life insurers, risk modelling and risk allocation from Solvency II perspective have been examined, among others, by: Asimit et al (2016) and Hürlimann (2010).

The purpose of the paper it to analyse and evaluate the selected solvency measures of the non-life insurance companies operating on the Polish market. The analysis included in particular the solvency ratios – the Solvency Capital Requirement ratio (SCR ratio), the Minimum Capital Requirement ratio (MCR ratio) as well as the components of SCR. In the study the following research questions (hypotheses) are examined:

1) Do the insurers operating in non-life sector meet the obligatory solvency requirements and have sufficient own funds to cover the capital requirements?
2) What category of risk is crucial in non-life insurance industry in the context of Solvency II regime?

Analysis of SCR ratio and MCR ratio

The analysis of the solvency ratios of non-life insurance companies operating in Poland was based on published QRT (quantitative data) for 2016 and 2017. The analysis included all active insurers, conducting activity in the form of a joint-stock company or a mutual society. The QRT templates were the main source of data, however for more details the information provided in SFCR reports was also used. The data collection process is time consuming and requires SFCR and QRT analysis for each of the insurance companies separately. At the time of conducting this research, data for 2018 and 2019 has been not compiled yet, so the authors decided to provide an analysis of the 2016 and 2017 data.

At the end of 2016, in Poland there were 34 active non-life insurance companies. Among the domestic insurers, the insurance business was conducted by 33 personal and property insurance companies and 1 reinsurance company. Nationale-Nederlanden TU S.A. obtained the Polish Financial Supervision Authority authorization, but by December 31, 2016, it has not started yet

activity, hence they did not publish Solvency and Financial Condition Report, so it was not included in the study. At the end of 2017, also 33 insurance companies in non-life sector (other personal and property insurance) and 1 reinsurance company were licensed and operating, so they all were included into the analysis.

The Solvency Capital Requirement (SCR), in accordance with the article 103 of Solvency II Directive (RADA, 2009), is calculated as the sum of the following components: the Basic Solvency Capital Requirement (BSCR), the capital requirement for operational risk, adjustments for the capacity of technical provisions and deferred taxes to absorbing losses. The Basic Solvency Capital Requirement (BSCR) consists of the following risk modules: market risk, health underwriting risk, counterparty default risk, life underwriting risk, non-life underwriting risk and intangible assets risk. The SCR ratio can be expressed as the value of covering the SCR requirement by means of own funds, according to the following formula:

$$SCR\ Ratio = \frac{Eligible\ Own\ Funds\ for\ SCR}{SCR}. \quad (1)$$

Insurance companies in the EU member states are obliged to cover their solvency capital requirements, meaning the required by directive level of 100% of SCR ratio. In a situation, that an insurance company do not comply with the coverage requirements, the supervisory authority accepts the action plan of this company in order to restore the level of the own finds to cover the solvency capital requirement or to reduce the risk profile in order to comply with the solvency capital requirement. Every 3 months the insurer submits a report to the supervisory authority which indicates the action taken and the progress made to restore the own funds level or reduce the risk profile to ensure the compliance. In the event of non-compliance with the solvency capital requirement within the period agreed with supervisory authority, the supervisor shall withdraw the insurance or reinsurance authorization to carry out business activity.

In order to have the coverage and be compliant with the requirements, insurance companies have to prepare the projections of MCR and SCR coverage by the own funds in Own Risk and Solvency Assessment (ORSA) report, aiming prove the continuous compliance with solvency capital requirement and minimum capital requirement. The ORSA report is on a yearly basis delivered to the supervisory authority. In Poland, local regulator requires also quarterly reporting on capital requirements in order to monitor the solvency position of all entities.

The MCR (Minimum Capital Requirement), in accordance with Solvency II Directive (RADA, 2009), should guarantee a minimum level, below which insurer`s funds should not decrease. The Minimum Capital Requirement is calculated as follows:

$$MCR = \max(MCR_{combined}; AMCR), \quad (2)$$

where: $MCR_{combined}$ – Minimum Capital Requirement, $AMCR$ - the absolute limit for MCR.

The value of the absolute limit for MCR (AMCR) threshold is established as:

a) EUR 2 200 000 for non-life insurance companies, including related insurance companies, except for taking risks from groups 10-15 (i.e. liability insurance for the use of motor vehicles, third party liability insurance for aircraft, liability insurance for the use of vessels operating in sea and inland navigation, general liability insurance, credit insurance, insurance of sureties), then this threshold amounts to EUR 3 200 000;
b) EUR 3 200 000 for life insurance companies, including related insurance companies;
c) EUR 3 200 000 for reinsurance companies, with the exception of captive reinsurers for which the MCR is at least EUR 1 000 000.

The sum of the amounts listed in a) and b) is considered for insurance companies that simultaneously conduct life insurance and non-life insurance activities.

In Poland, according to new insurance market law regulations the requirements for domestic insurance companies are even more severe (see Act of September 11th, 2015 on insurance and reinsurance activity). The absolute limits for Minimum Capital Requirement are as follows: a) 2 500 000 EUR for non-life insurance companies, which carry out business in 1-9 and 16-18 insurance groups, b) 3 700 000 EUR for non-life companies, which carry out business activity in 10-15 insurance groups (TPL insurance), c) 3 700 000 EUR for life companies and d) 3 600 000 EUR for reinsurance companies.

The MCR ratio is calculated as the value of coverage of the MCR requirement by own funds, what expresses the following formula:

$$MCR\ Ratio = \frac{Eligible\ Own\ Funds\ for\ MCR}{MCR}. \quad (3)$$

Similarly to SCR, according to Solvency II Directive insurers have to cover their minimum capital requirements in 100%. In the event of non-compliance with the minimum capital requirement within the period agreed with supervisory authority, the supervisor shall withdraw the insurance or reinsurance authorization to carry out business activity.

In the first step of the analysis the international comparison of SCR ratio and MCR ratio calculated for the European countries in 2017 and 2018 is presented in Table 1.

Table 1: Solvency ratios for the European countries in 2017 and 2018

Country	Weighted average of SCR ratio in 2017 (in %)	Weighted average of SCR ratio in 2018 (in %)	Weighted average of MCR ratio in 2017 (in %)	Weighted average of MCR ratio in 2018 (in %)
Austria	283	299	896	895
Belgium	192	219	421	501
Bulgaria	217	202	480	476
Croatia	241	229	664	644
Cyprus	255	271	689	702
Czech Republic	229	225	657	646
Denmark	289	282	743	708
Estonia	192	180	555	518
Finland	206	221	702	722
France	238	240	594	595
Germany	345	352	958	971
Greece	173	174	452	434
Hungary	225	218	587	578
Iceland	150	159	366	352
Ireland	176	187	489	528
Italy	241	222	608	551
Latvia	134	126	282	259
Liechtenstein	213	217	612	634
Lithuania	186	300	461	446
Luxemburg	216	195	628	647
Malta	329	216	791	741
Netherlands	183	195	433	462
Norway	210	216	525	510
Poland	256	238	734	678
Portugal	175	180	533	513

Country	Weighted average of SCR ratio in 2017 (in %)	Weighted average of SCR ratio in 2018 (in %)	Weighted average of MCR ratio in 2017 (in %)	Weighted average of MCR ratio in 2018 (in %)
Romania	178	171	412	396
Slovakia	196	187	518	477
Slovenia	238	235	739	720
Spain	236	235	608	613
Sweden	254	273	904	954
United Kingdom	155	154	453	438
TOTAL	239	242	648	648

Source: EIOPA Statistics (2018). Solo/Annual/Published 20181113/Data extraction completed 20191108; EIOPA Statistics (2019). Solo/Annual/Published 20190924/Data extracted 20190919.

The weighted average in Table 1 represents the aggregate own funds (sum for all insurers) divided by aggregate SCR or MRC respectively. Data presented in Table 1 shows that in the examined European countries the insurance industry is well capitalized. According to the data published by EIOPA, in 2017 the average value of SCR ratio for all European countries was 239% and average MCR ratio was equal to 648% (EIOPA Statistics, 2018). To compare the results to 2018 data, the average SCR ratio was equal 242% (3% increase since 2017) and average MCR equals 648% (EIOPA Statistics, 2019). The highest values of SCR ratio was recorded in Germany, followed by Malta, Denmark and Austria. In the case of MCR ratio, Germany, Sweden and Austria noted the highest levels in 2017 and 2018. In 2018 the highest SCR ratio level was maintained by above mentioned countries i.e. Germany, followed by Malta, Denmark and Austria.

Figures 1 and 2 present the value of SCR and MCR ratios for the non-life insurers operating in Poland in 2016–2017, respectively. The average value of SCR ratio amounted to 227% in 2017, compared to 200% in the previous year, while MCR ratio in 2017 was 442%, compared to 438% in 2016. It indicates that in general, the examined non-life insurers were sufficiently capitalised. The Polish insurance sector is still dominated by PZU, however SCR and MCR ratios calculated without PZU share would be: SCR – 197% in 2016 and 225% in 2017, and MCR – 414% in 2016 and 422% in 2017, respectively. As comes to the solvency evaluation of individual insurers, in 2016 only one company – TUZ TUW had not enough own funds to cover the Solvency Capital Requirement, having the solvency ratio at the level of 73.60%. The analysis of its SFCR report showed that the company is covered by the Polish Financial Supervision Authority recovery plan to achieve full coverage. In terms of MCR coverage, another company did not meet the capital requirements for MCR - TUW MEDICUM, having only 90.37% of coverage. In 2017 all of the Polish non-life insurers had coverage of the Solvency Capital Requirement and Minimum Capital Requirement above 100%. In particular, mentioned before TUZ TUW's SCR ratio was equal 134% and MCR ratio for TUW MEDICUM was 109%.

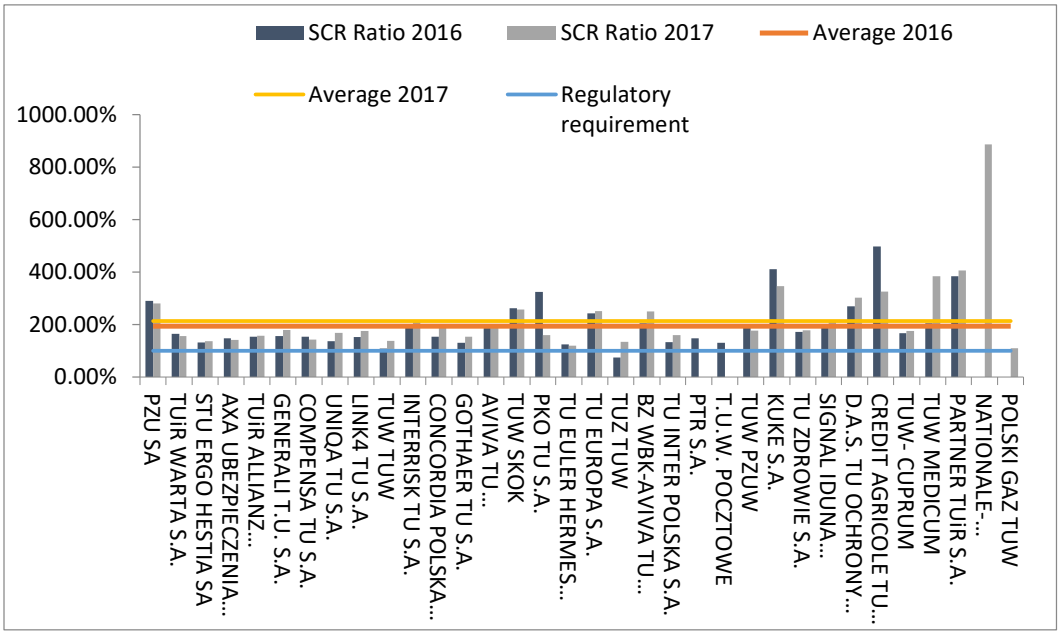

Fig. 1: SCR ratio for non-life insurance companies in Poland in 2016-2017

Source: authors' calculations based on Solvency and Financial Conditions Reports.

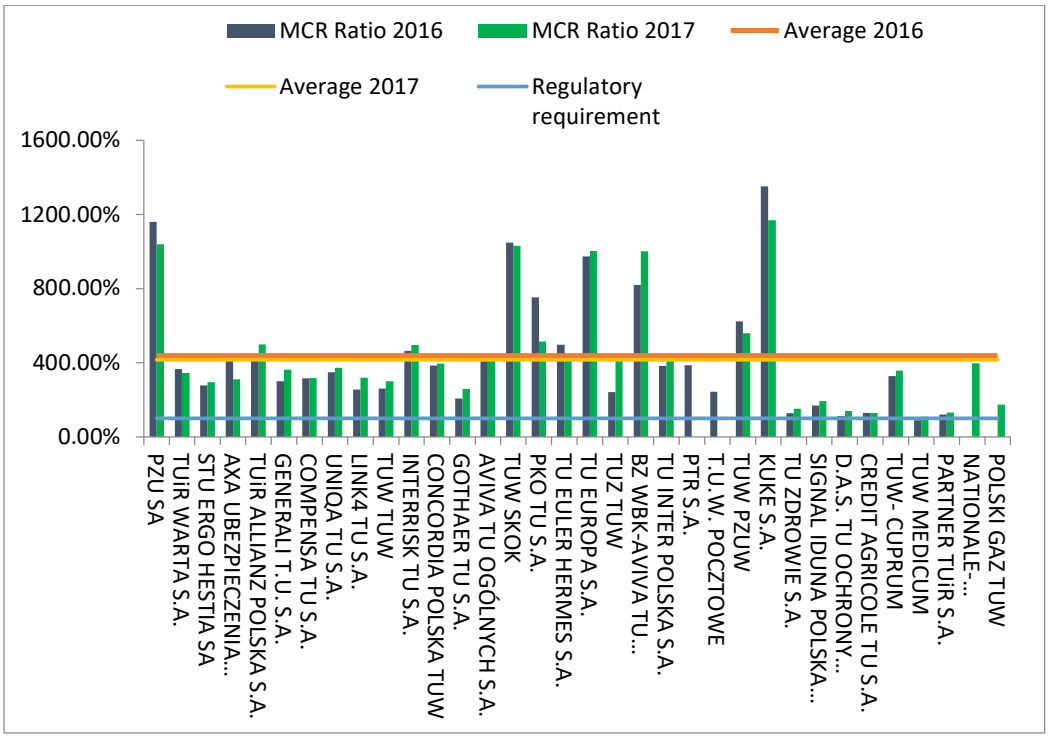

Fig. 2: MCR ratio for non-life insurance companies in Poland in 2016-2017

Source: authors' calculations based on Solvency and Financial Conditions Reports.

During the analysed period, most insurance companies have a higher MCR ratio than SCR ratio, however there were 6 entities in 2016 and 7 entities in 2017 with a reverse situation compared to

others. These companies have a higher SCR ratio than the MCR ratio. It means those insurers have higher MCR requirement than SCR requirement. The results are summarised in Tables 2 and 3.

Table 2: Solvency ratios for the selected non-life insurance companies in 2016

Insurance Company	SCR [in thousands PLN]	SCR ratio [in %]	MCR [in thousands PLN]	MCR ratio [in %]
TU ZDROWIE S.A.	8 033	171	10 817	127
SIGNAL IDUNA POLSKA TU S.A.	14 022	194	16 009	170
D.A.S. TU OCHRONY PRAWNEJ S.A.	4 615	269	10 817	112
CREDIT AGRISOLE TU S.A.	4 153	497	16 009	129
TUW MEDICUM	7 067	205	16 009	90
PARTNER TUiR S.A.	5 082	384	16 009	122

Source: authors' calculations based on Solvency and Financial Conditions Reports.

Table 3: Solvency ratios for the selected non-life insurance companies in 2017

Insurance Company	SCR [in thousands PLN]	SCR ratio [in %]	MCR [in thousands PLN]	MCR ratio [in %]
TU ZDROWIE S.A.	9 011	179	10 625	152
SIGNAL IDUNA POLSKA TU S.A.	14 449	209	15 724	192
D.A.S. TU OCHRONY PRAWNEJ S.A.	4 960	302	10 625	141
CREDIT AGRISOLE TU S.A.	6 281	325	15 724	130
TUW MEDICUM	4 476	383	15 724	109
PARTNER TUiR S.A.	5 132	406	15 724	132
NATIONALE-NEDERLANDEN TU S.A.	7 080	886	15 724	396

Source: authors' calculations based on Solvency and Financial Conditions Reports.

As one could observe, in terms of Minimum Capital Requirement we are dealing with repeated values. And in fact, value of 10 817 thousands of PLN in 2016 and 10 625 thousands of PLN in 2017 represents AMCR threshold of 2 500 thousands of EUR. Similarly, value of 16 009 thousands of PLN in 2016 and 15 724 thousands of PLN constitutes 3 700 thousand EUR expressed in thousands of PLN.

Analysis of Solvency Capital Requirement components

As mentioned above, the Solvency Capital Requirement (SCR), specifically BSCR, includes the following modules: market risk, insurance risk in health insurance, counterparty default risk, insurance risk in life insurance, insurance risk in other insurance than life and the risk of intangible assets. The comparison of SCR components shows that underwriting risk in non-life insurance is an important component of the capital requirements of all examined companies. From the practical perspective, it is worth mentioning that none of the non-life insurers used the internal model to calculate the capital requirements. All insurance companies have used the standard formula.

As expected, underwriting risk in non-life insurance is the highest risk, amounting to 63.14% in 2017 (increased by 0.74 % in comparison to 2016). However, market risk is strongly represented with 55.33% of overall SCR in 2017. The non-life underwriting risk is the largest module in overall SCR

for all the companies, except PZU, TUW SKOK and TUW ZROWIE. For PZU the highest capital requirement is generated by market risk, while for TUW SKOK and TUW ZROWIE the risk profile is dominated by health underwriting risk. Market risk is the second highest risk for most of the entities. The business model in the non-life insurance sector is short-term, which contributes low interest rate risk. At the same time, market risk is also an important factor in capital requirements. As presented on Fig. 3, insurers with a high SCR ratio also tend to have a higher market risk requirement.

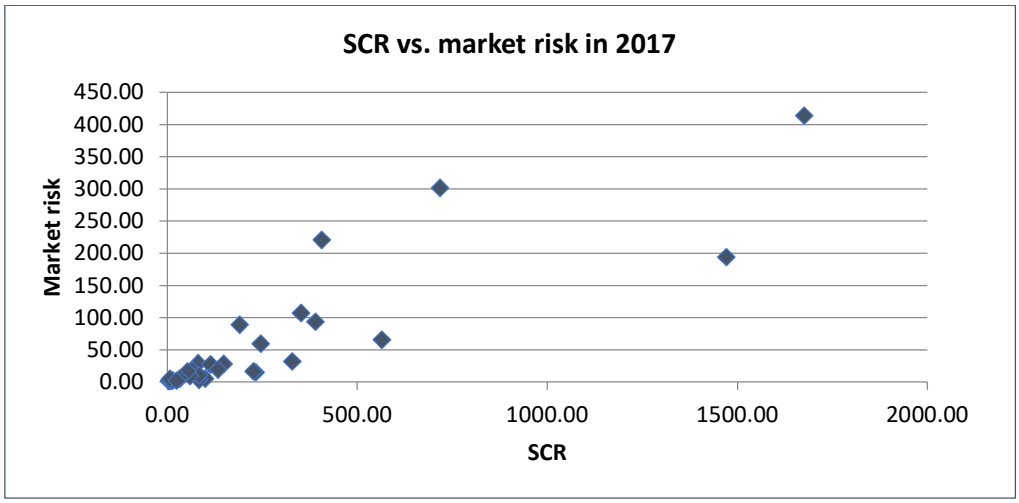

Fig. 3: SCR versus market risk in 2017 in thousand PLN.
Source: authors' calculations based on Solvency and Financial Conditions Reports.

Conclusions

The research aim of the conducted analysis was to provide a clear picture of the solvency positions of all non-life insurance companies operating in Poland in years 2016-2017. The literature review and ratio analysis were used based on quantitative data of the insurance companies provided in QRT templates as well as the information provided in SFCR reports.

The main findings resulted from the study can be formulated as follows:

- All examined insurance companies set the Solvency Capital Requirement using the standard formula.
- In 2016, one insurance company did not have SCR cover with eligible own funds and one insurance company did not have coverage of the MCR with eligible own funds. In 2017 the situation improved and all non-life insurers had SCR and MCR coverage.
- In the analysed period in Poland, there were insurance companies, for which the capital requirement MCR was higher than the level of SCR.
- In non-life insurance sector underwriting risk has the largest impact on the amount of the capital adequacy requirement representing 63.14% of SCR in 2017 (increase by 0.74% since 2016), the next is market risk constituting 55.33% of SCR in 2017 (decrease by 2.13 % since 2016).
- To cover the capital requirements non-life insurers had high-quality own funds in terms of liquidity and the ability to absorb future losses.

Summarizing, the conducted analysis showed that almost all non-life insurance companies in Poland were able to satisfy the new capital requirements resulted from the implementation of Solvency II system and they had the required coverage of capital requirements by the own funds. It also confirmed the fact that in non-life insurance business the underwriting risk and the market risk should be considered as the most important components influencing the solvency level of an insurer.

The directions of further research could include the analysis of the standard formula, identification of factors affecting the increasing or decreasing of capital requirements as well as the possibility of estimating capital requirements. Another interesting issue is an analysis of changes in the standard formula in accordance with Commission Delegated Regulation (EU) 2019/981 of 8 March 2019. The authors also plan to extend the set of data on Polish insurance companies in order to obtain the comprehensive picture of the solvency level of insurance sector in Poland.

Acknowledgment

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The Concentration of The Financial Audit Market in Poland

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Abstract

The paper aim is to assess the concentration level of financial audit market in Poland. Our sample consists of 375 public companies disclosing statutory auditor's report on financial statement for 2018, listed on the Main Market in the Warsaw Stock Exchange (WSE). We have measured the audit market concentration by means of the 4-firm concentration ratio CR_4, Herfindahl-Hirschman index, 'Big Four' and '10KAP' indicators. The research findings reveal that the audit market concentration in Poland is much lower than in other European states. The share of the Big 4 firms in the entire market is close to 35%, and of the 10 most important audit firms - to 53%. The audit firm with the greatest share of the market for statutory audits of annual financial statements of WSE-listed companies is Ernst & Young, which audited 12% enterprises. It is followed by Deloitte, BDO, PricewaterhouseCoopers, UHY ECA, Grant Thornton and KPMG, none of which has a market share greater than 10%. An analysis of the concentration levels in major sectors allows auditors specialising in certain industries to be identified.

Keywords: Audit Market Concentration, Big 4, Financial Auditing, Herfindahl-Hirschman Index

Introduction

Major changes are taking place on the European market for services provided by statutory auditors. They are mainly due to the implementation of new EU regulations which significantly affect the formal aspects of practising the profession, particularly Directive 2014/56/EU and Regulation 537/2014. These texts define, among other things, the role of the statutory auditor, effectively prevent conflicts of interest in the provision of various services and restrict market concentration. The rules of reporting audit work results have also undergone notable changes. In this regard, there has always been a significant problem with the relatively high concentration of the market which inhibits its competitiveness. The dominance of Big 4 firms materially restricts an unbiased selection of an auditor and leads to a systemic risk. It is also a direct driver of the prices of services provided by statutory auditors and the quality of their work. This is because an excessively long relationship between an auditor and their client may limit the objectivity and the professional scepticism of the statutory auditor. This is why new EU regulations have introduced a mandatory rotation of audit firms auditing the financial statements of key operators in every member state. Other new rules require joint audits, which force statutory auditors to cooperate, and ban the provision of certain services to the audited economic operators. All these steps are to make the market more competitive. The above regulations were adopted in June 2016 and each state had the time to transpose them in its national law. In Poland, this was done by the Act of 11 May 2017 on statutory auditors, audit firms and public supervision which came into effect in June 2017.

In the light of the above, the main purpose of this article is to identify the degree of concentration of the audit service market in Poland and assess it with regard to systemic changes introduced by EU regulations. Statutory auditor reports issued about annual financial statements for 2018 executed by companies listed on the main market of the Warsaw Stock Exchange were analysed in detail. Data was

collected manually, and the final sample consists of 375 public companies. The following research questions were formulated:

- Which audit firms conduct the greatest share of audits of annual financial statements of companies listed on the Polish stock exchange?
- What is the concentration level of the market for audit services provided to public companies?
- Which auditors audit the statements of the largest companies on the Polish regulated market?
- Is there any sector specialisation of auditors and what is the concentration level in main industries?

In the Polish context, various analyses have so far suggested a relatively low market concentration compared to other states, but with a growing trend. However, all that research concerned the period prior to the implementation of regulatory changes presented above. The analysis presented here covers the year 2018, i.e. the first whole reporting period in which the new rules applied.

Background and Literature Review

The concentration of the audit services market has been the subject of legal regulations and scientific research for many years. It particularly applies to the services provided to the largest economic operators in each state (Simunic, 1980, pp. 161-190). The market is significantly dominated by the Big 4 audit firms. It is worth noting that significant mergers and acquisitions have occurred in the group of the largest global audit companies, which exacerbated this unfavourable development further. This has been confirmed in the research of, among others, Minyard and Tabor (1991, pp. 79-90), Wootton et al. (1994, pp. 58-74), Choi and Zéghal (1999, pp. 1-21) and Pong (1999, pp. 451-475). First, Peat Marwick Mitchell merged with KMG in 1987. This was followed in 1989 by the Ernst & Whiney merger with Arthur Young and Coopers & Lybrand merger with PriceWaterhouse in 1998. Thus the eight largest global audit companies became the Big 5, and after Arthur Andersen collapsed in 2002, the Big 4. According to global financial figures for 2018, Deloitte has maintained its pole position since 2013, earning a record-breaking $43.2 billion in revenue. PriceWaterhouseCoopers comes second with $41.3 billion of revenue. The following positions are taken by Ernst & Young and KPMG, which generated $34.8 billion and $29.0 billion in revenue, respectively. Next to Big 4, BDO is the fifth largest accounting firm in the world with the revenue of $8.99 billion (Raza et al., 2019, pp. 135–144).

Institutions responsible for the safety of trade have been warning for years that this high concentration may have a negative impact on price competition, the unbiased choice of an auditor and the quality of statutory auditors' work (FRC, 2006; Oxera, 2006, 2007; OECD, 2009). These warnings were particularly loud at the beginning of this century, right after a series of spectacular company collapses initiated by the bankruptcy of Enron in 2001. However, the reforms to the audit services market made then turned out to be ineffectual, as the very same problem reappeared during the 2008 financial crisis. Analyses continued confirming the high concentration of the statutory auditor market and associating it directly with the systemic risk of the financial sector (European Commission, 2010; Oxera, 2011; Treasury Committee, 2008). It was shown that in the United States, the Big 4 firms audited approx. 82% of the overall value of the regulated market calculated as the total capitalisation of companies (US Government Accountability Office, 2008). In the UK, in turn, research showed that the Big 4 audited 99% of FTSE 100 companies and 94% of FTSE 250 ones in 2009.

The most recent figures from the European market show that after the systemic changes made, the aggregated concentration level for the entire EU has not markedly improved. However, changes have been observed in individual states. In those which adopted a rather strict policy on the mandatory auditor rotation, the market share of the Big 4 dropped, particularly in the financial sector. On the contrary, no such trend was observed in countries with a laxer policy. The current research covered the regulated market of all EU member states in 2013–2017, which was overwhelmingly subject to the most recent legislative changes. The concentration level was found to have fallen in over a dozen

member states, but there were also significant rises in some. Generally speaking, relatively low concentration ratios were observed, regardless of the method of their calculation, in Poland, France and Austria. The highest concentration level measured by the Big 4's market share was seen in Italy, Lithuania and Slovakia (European Parliament, 2019).

With regard to Poland, it is worth noting that hitherto analyses have demonstrated a level of concentration definitely lower than in other states, but with a growing trend. The 'Big 4' indicator rose from 34.05% in 2011 to 42.61% in 2016. The '10KAP' indicator, in turn, went up from 53.00% to 57.60% in the same period (Gad, 2018). This is also confirmed by the Herfindahl-Hirschman index (HHI), which grew from 1731 in 2013 to 1875 in 2017 (European Parliament, 2019). However, all the above figures describe the period prior to the regulatory changes. The new law came into effect in June 2017, so the first full period in which the possible effects of the reform could be observed was the year 2018.

In previous scientific research, the concentration of the audit services market was mainly studied from the perspective of various competition factors. In particular, its impact on the price of financial statement audits and the quality of statutory auditors' work was analysed. However, the results of these studies are not unambiguous.

With regard to the changes in auditors' fees, a positive relationship between the value of these fees and the market concentration degree was found (US Government Accountability Office, 2008). Feldman has proven that since the collapse of Arthur Andersen linked to the Enron bankruptcy, both the concentration and the fee level on the American audit market have significantly increased (2006, pp. 193-212). Others have noted higher fees depending on the specialisation of the auditor and high market concentration (Casterella et al., 2014, pp. 123-140) or in the context of different market structures (Eshleman & Lawson, 2017, pp. 57-81). In some studies, however, a negative dependency was found between the concentration level and the prices of audit services (Pearson & Trompeter, 1994, pp. 115-135). This suggests that large audit firms are benefiting from economies of scale while competition simultaneously intensifies in the remaining part of the market, ultimately leading to a price reduction.

Other divergent research results concern the dependence of the service quality on market concentration. In the majority of cases they confirm that as the market gets concentrated, the quality of services provided improves (Francis et al., 2013, pp. 325-355; Huang et al., 2016, pp. 121-145; Eshleman & Lawson, 2017, pp. 57-810). This is because the position of auditors vis-à-vis clients strengthens and they are not afraid of losing orders. This ultimately allows the statutory auditor to focus on the quality of their work. On the other hand, some analyses point to a number of factors causing this quality to deteriorate. The client's limited choice of audit firms makes statutory auditors more confident. This, in turn, may lead to the opposite behaviour, i.e. a less robust approach to the work they do lowering its quality (Boone et al., 2012, pp. 1171-1203).

It is also worth noting that some researchers question the reliability of using classical measures of audit market concentration to assess its competitiveness and employ other tools to analyse this problem (Numann & Willekens, 2012, pp. 450-465). Other publications, in turn, describe barriers to entering this market (Le Vourc'h & Morand, 2011, pp. 131). These mainly include the impossibility of a broad international expansion, poorer reputation of small audit firms than of the Big 4, insufficient knowledge and experience of specific sectors, inability to provide specialists in selected topics, namely complex financial instruments, asset pricing, actuarial estimates and transfer pricing in global transactions. Research also demonstrates unambiguously that companies planning to expand internationally choose one of the Big 4 as their auditors (Carson & Fargher, 2007, pp. 423-446, Maijoor & Schaen, 1997, pp. 155).

Research Method

The aim of the paper is to assess the concentration level of financial audit market in Poland. We have measured the market concentration by means of the four following indicators:

- the 4-firm concentration ratio CR_4,
- the Herfindahl-Hirschman index (HHI),
- the 'Big 4' indicator,
- the '10KAP' indicator.

The first two indicators are the most widely used measures of any market concentration and the last two ones are intended specially for audit market analysis. The m-firm concentration ratio CR_m is defined as the combined market share of the *m* largest firms within the market (Kvålseth, 2018, p. 2) thus CR_4 refers to the four largest audit firms. The Herfindahl-Hirschman index is calculated as the sum of the squared market shares of all firms in the market (Kwiatkowska, 2014, p. 191-192):

$$HHI = \sum_{i=1}^{N} u_i^2$$

where u_i is the market share percentage of audit firm *i* expressed as a whole number, and N is the number of audit firms.

The HHI can range from close to zero (indicating the perfect competition with a great number of very small firms) to 10,000 (indicating the single monopolist).

The 'Big 4' indicator equals the consolidated market share of the Big 4 accounting firms (Deloitee, Ernst & Young, KPMG and PricewaterhouseCoopers) whereas the '10KAP' indicator is calculated as the consolidated market share of the 10 key audit players, i.e. Baker Tilly; BDO; Ernst&Young; Deloitte; Grant Thornton; KPMG; Mazars; Moore Stephens; Nexia, and PricewaterhouseCoopers. The list of 10 key audit players has been identified by the European Audit Inspection Group (European Commission, 2017).

In our study the market share of each audit firm is calculated based on the number of statutory audits of financial statement performed for Polish companies listed on the Main Market of the Warsaw Stock Exchange (WSE). We have taken into account audits of financial statements for 2018 (consolidated if applicable). The data was hand collected from the auditor reports posted on companies'websites.

We have excluded from our initial sample (i.e. active companies listed on the Main Market of the WSE as of 8 January 2020) firms with foreign headquarters (47 companies) and those not having disclosed the auditor report despite the legal obligation (6 companies). The final sample consists of 375 public companies.

In our analysis we have focused on the total sample as well as on the 10 subsamples:
- companies from the WIG20 and WIG30 indices,
- companies from the selected sectors: banking, clothes & cosmetics, construction, energy, IT, machinery, real estate and video games.

WIG20 and WIG30 are price indices of 20 and 30 major and most liquid companies respectively in the WSE Main List. Due to the exclusion of companies with foreign headquarters and ones not having disclosed the auditor report from our initial sample, we have taken into account 19 companies when calculating the audit firms' market shares in the WIG20 subsample and 27 companies when calculating them in the WIG30 one.

Research Results

In total, 56 audit firms provided their services to companies listed on the Polish capital market (cf. Table 1). Among them there are Big 4 accounting firms, eight key audit players (all except Baker Tilly

and Nexia), other auditors belonging to global networks of advisory and accounting firms and smaller domestic audit firms. In Poland there are about 1,600 registered audit firms (European Commission, 2017) thus only a small percentage of them carry out statutory audits for public firms.

The audit firms are diversified in terms of number of audits performed for the sample companies. The average number of audits per audit firm is 6.7 whereas the standard deviation totals 10.2. The coefficient ratio (i.e. the ratio of the standard deviation to the mean) equal to 152% is indicative of significant variability of audit firms. About 44 per cent of analyzed firms provided audit services for solely one company in the sample and only 10 out of 56 firms made auditor report on financial statements for at least ten companies.

Ernst & Young with 46 audits has the largest market share of 12.3 %. This firm dominates not only in the whole Main Market but in the construction, WIG20 and WIG30 subsamples as well with the market shares of 15%, 42% and 41% respectively. Deloitte takes second place (with the market share of 8.27%) slightly outrunning BDO and PricewaterhouseCoopers (both with the market share of 8%). The last of the Big 4 accounting firms – KPMG – holds only seventh position after UHY ECA and Grant Thornton.

Table 1: Market shares of audit firms providing services to Polish listed companies in 2018

Audit firm no.	Audit firm name	No. of audited companies	Market share (%)
1	Ernst & Young Audyt Polska Sp. z o.o. sp. k.	46	12.27
2	Deloitte Audyt Sp. z o.o. sp. k	31	8.27
3	BDO Sp. z o.o. sp. k.	30	8.00
4	PricewaterhouseCoopers Polska Sp. z o.o. Audyt Sp. k.	30	8.00
5	UHY ECA Audyt Sp. z o.o. sp. k.	29	7.73
6	Grant Thornton Polska Sp. z o.o. sp. k.	27	7.20
7	KPMG Audyt Sp. z o.o. sp. k.	25	6.67
8	PKF Consult Sp. z o.o. sp. k	18	4.80
9	Misters Audytor Adviser Sp. z o.o.	14	3.73
10	4Audyt Sp. z o.o.	10	2.67
11	B-think Audit Sp. z o.o.	8	2.13
12	Mazars Audyt Sp. z o.o.	8	2.13
13	HLB M2 AUDIT PIE Sp. z o.o.	7	1.87
14	Kancelaria Porad Finansowo-Księgowych dr Piotr Rojek Sp. z o.o.	7	1.87
15	CSWP Audyt Sp. z o.o. sp. k.	6	1.60
16	Polscy Biegli Sp. z o.o.	6	1.60
17	PRO AUDYT Sp. z o.o.	6	1.60
18	Firma Audytorska INTERFIN Sp. z o.o.	5	1.33
19	Grupa Gumułka Audyt Sp. z o.o. sp. k.	4	1.07
20	Polska Grupa Audytorska Sp. z o.o. sp. k.	4	1.07
21	REWIT Księgowi i Biegli Rewidenci Sp. z o.o.	4	1.07
22	WBS Audyt Sp. z o.o.	4	1.07
23	ISP Modzelewski i Wspólnicy Sp. z o.o.	3	0.80
24	PRO-AUDIT Kancelaria Biegłych Rewidentów Sp. z o.o.	3	0.80
25	REVISION-RZESZÓW Józef Król Sp. z o.o.	3	0.80
26	DORADCA Auditors Sp. z o.o.	2	0.53
27	Moore Stephens Central Audit Sp. z o.o.	2	0.53
28	Morison Audit Sp. z o.o.	2	0.53

29	Morison Finansista Audit Sp. z o. o.	2	0.53
30	KPW Audyt Sp. z o.o.	2	0.53
31	Polinvest-Audit Sp. z o.o.	2	0.53
32	Advantim Sp. z o.o.	1	0.27
33	AMZ Sp. z o.o.	1	0.27
34	ATAC Audytorzy i Partnerzy Sp. z o.o.	1	0.27
35	BGGM Audyt Sp. z o.o.	1	0.27
36	CNKP Audyt Sp. z o.o.	1	0.27
37	ECDDP Audyt Sp. z o.o	1	0.27
38	Ecovis System Rewident Sp. z o.o.	1	0.27
39	Expance Audit & Finance Sp. z o.o.	1	0.27
40	„ForBiznes Audyt – Libsz Kępka Zielińska – biegli rewidenci" Sp. p.	1	0.27
41	Global Audit Partner Sp. z o.o. sp. k	1	0.27
42	Grupa Audyt i Podatki Sp. z o.o.	1	0.27
43	Kancelaria Biegłych Rewidentów „Czupryniak i Wspólnicy" Sp. z o.o.	1	0.27
44	Kancelaria Biegłych Rewidentów „Konto" Sp. z o.o.	1	0.27
45	Mac Auditor Sp. z o.o.	1	0.27
46	Marcin Grzywacz Audyt Doradztwo Szkolenia	1	0.27
47	Okulscy Audyt Sp. z o.o.	1	0.27
48	Poland Audit Services Sp. z o.o.	1	0.27
49	Polaudit Sp. z o.o.	1	0.27
50	Primefields Sp. z o.o.	1	0.27
51	Profit-Tax Audit Sp. z o.o.	1	0.27
52	P.U. „Book-Keeper" Kancelaria Biegłych Rewidentów Sp. z o.o.	1	0.27
53	Robert Meller	1	0.27
54	Roedl Audit Sp. z o.o.	1	0.27
55	RSM Poland S.A.	1	0.27
56	Strategia Audit Sp. z o.o.	1	0.27

As far as sector analysis is concerned, we have found UHY ECA to be the largest audit firm in the clothes & cosmetics sector (market share of 21 %) as well as in the machinery sector (26%), Grant Thornton - in the real estate sector (22%) and KPMG - in the banking sector (46%).

A more detailed analysis of the breakdown of firms auditing the financial statements of the largest companies listed on the Warsaw Stock Exchange, i.e. those included in the WIG20 index, shows that the greatest share is held by Ernst & Young (42%), followed by KPMG and Deloitte (21% each), PricewaterhouseCoopers (11%) and Grant Thornton (5%). The same group of firms also audit the statements of WIG30 companies.

Table 2 presents the values of the four concentration market indicators calculated for the Main Market and ten submarkets. In general, financial audit market in Poland is not dominated by the Big 4 as is the case with most Member States. The Big 4 combined market share in the number of statutory audits of public companies listed on the Main Market equals only 35% and is much lower than the figure from the years before the regulations changed. In 2016 this value was for example 43% (Gad, 2018). However 10 key audit players' market position is more noticeable as they account for a little more than a half of performed audits in the Main Market. According to the interpretation of the concentration ratio CR_4 provided in the EC's report (European Commission, 2017, p. 7) the financial audit market is between perfect competition and oligopoly, being placed nearer the latter. Taken into account not only

the largest firms but also all companies, we can conclude, based on the Herfindahl-Hirschman index of 582, that the financial audit market in Poland is rather a competitive marketplace.

Table 2: Concentration market indicators for the audit firms providing services to Polish listed companies in 2018

Sample	Big 4	CR_4	10KAP	HHI
Total	35.21	36.54	53.07	582
Companies from WIG20 index	94.74	94.74	100.00	2 798
Companies from WIG30 index	96.30	96.30	100.00	2 894
Companies from banking sector	92.31	84.62*	100.00	3 018
Companies from clothes & cosmetics sector	15.79	42.11*	31.58	969
Companies from construction sector	39.13	34.78*	52.17	756
Companies from energy sector	88.89	100.00	88.89	2 839
Companies from IT sector	16.00	44.00	32.00	720
Companies from machinery sector	21.74	30.43	60.87	1 304
Companies from real estate sector	31.25	68.75**	68.75	1 035
Companies from video games sector	20.00	60.00*	30.00	1 600

*CR_3 **CR_6

The analysis of the audit market concentration in the selected sectors reveals that there are some differences among them. In five cases due to some firms with the same market share the concentration ratio C_4 has been replaced by CR_3 or CR_6 (cf. Table 2). The Big 4 hold a concentrated oligopoly in the WIG20, WIG30, banking and energy subsamples whereas in the IT, clothes & cosmetics, video games and machinery sectors their consolidated market share ranges from only 15.8% to 21.7%. Audit services for all companies included in the WIG20 and WIG30 indices and commercial banks were provided by the largest audit firms belonging to the group of the '10 key audit players'. Thus these audit firms monopolized three submarkets. In the energy sector the concentration level of the 10KAP is close to 90% and in the real estate sector approaches 70%. In the clothes & cosmetics, IT and video games sectors the firms from the group of 10 key audit players have the much lower consolidated market share of 30%-32%.

The values of the concentration ratio CR_4 (alternatively CR_3 or CR_6) indicate:

- a monopoly in case of the energy sector,
- a market ranging from concentrated oligopoly to monopoly in case of WIG20 and WIG30 indices and the banking sector,
- a oligopoly in case of the video games sector,
- a market ranging from perfect competition to oligopoly in case of IT and machinery sectors.

Based on the values of the Herfindahl-Hirschman index we can distinguish submarkets with:

- low concentration, i.e. clothes & cosmetics, construction and IT sectors,
- moderate concentration, i.e. machinery, real estate and video games sectors,
- very high concentration close to the oligopoly, i.e. WIG20 and WIG30 indices, banking and energy sectors.

Conclusions

The research results presented above answer the key research questions asked in the introduction to this article. The audit firm with the greatest share of the market for statutory audits of annual financial statements of WSE-listed companies is Ernst & Young, which audited 46 enterprises (12%). It is followed by Deloitte, BDO, PricewaterhouseCoopers, UHY ECA, Grant Thornton and KPMG, none of which has a market share greater than 10%. In 2018, the entire aforementioned market was served by altogether 56 audit firms, 25 of which fulfilled only one order. The following four most popular indicators were used to measure the market concentration level: the 4-firm concentration ratio CR4, the Herfindahl-Hirschman index (HHI), the 'Big 4' indicator and the '10KAP' indicator. All indicators have shown that the concentration in Poland is much lower than in other European states and, in addition, fell in 2018 compared to previous years' research results published in the literature. The share of the Big 4 firms in the entire market is close to 35%, and of the 10 most important audit firms - to 53%. The Herfindahl-Hirschman index calculated globally for the research sample also points to relatively good conditions for the competition. An analysis of audits completed for the largest Polish listed companies included in the WIG20 and WIG30 shows a clear dominance of the Big 4 companies, of which Ernst & Young is in the best position. An in-depth analysis of the concentration levels in major sectors allows auditors specialising in certain industries to be identified. The best example here is the banking sector, in which the concentration measured by the Herfindahl-Hirschman index is definitely the greatest, with one undisputed leader - KPMG.

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Review and Analysis of Cluster Development Theories as An Economic and Managerial Phenomenon

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Annotation

It is proved that clusters, regardless of their occurrence circumstances, are an economic and managerial phenomenon. The motivating factors for this phenomenon occurrence, as well as the cyclical and conjunctural ones determining the intensity of cluster development are different. It is proved that public policy can positively or negatively affect the clusters development, but it rarely affects the origin of clusters. It is argued that, despite this, the examples of successful cluster development encourage governments to create clusters. Depending on the approaches used by governments, business activity often begins to take the form of business incubators, technoparks, technopolises and other organizational forms of innovative entrepreneurship, which have certain differences from clusters. The scientific novelty of the study is to identify the features that characterize clusters as an economic and managerial phenomenon. The practical significance of the study's results is the possibility of taking these features into account when making a decision about choosing an innovative entrepreneurship form for a particular region. In future studies, these features

may serve as the basis for designing the multi-criteria optimization models that will allow algorithmizing the decisions related to the choice.

Keywords: cluster, development, entrepreneurship, geographical location, innovation.

Purpose of Research

The study's aim is to identify the main cluster development stages and identify the features that characterize innovative clusters as an economic and managerial phenomenon.

Introduction

There are examples of economically successful cluster development in countries of different continents, what has prompted many scientists to investigate the circumstances of their origin and development. The scientific discussion in which the object of research is the economic category, "cluster" is usually acute and controversial. The reason is in the clusters heterogeneity, and, accordingly, in the variety of the factors determining the effectiveness of their functioning. Up to now, conceptual and analytical attempts to develop a fundamental philosophy that would be equally fair for all clusters without exception have been unsuccessful. This is probably due to the fact that each of the clusters is a phenomenon. Despite this, it should be recognized that a number of world-famous scientists have made a significant contribution to the explanation of the economic and managerial essence of the cluster phenomenon based on a deep analysis of empirical data. These studies may not have reduced the number of the discussion issues in this area, but they clearly confirmed the phenomenality of clusters and strengthened the analytical base for further research of trends and phenomena of the cluster development. This is important from the point of view of designing a science-based cluster paradigm.

Research Results

Clustering as a phenomenon of spontaneous development of entrepreneurship was first noticed in 1980 by A. Marshal. He noted that in some countries, unique business associations of the competing companies located in a certain geographical location have been formed. These companies compete with each other, but this does not prevent them from sharing experience, knowledge, and working together on some projects. A. Marshal argued that these business associations mainly consist of small companies that arose spontaneously and should be studied, since they are one of the significant reasons that explain the the population welfare of a certain geographical location [1]. The experience and knowledge transfer provides companies with sufficient advantages for joint competition in international markets, turns them into strong players, creates jobs and improves the financial condition of the region's population [2]. Moreover, companies that are rapidly developing provide for developing the related industries and are often a part of the same value chain.

The idea of business associations consisting of the companies that are competitors on the domestic market, but have compete together on foreign markets since the 90s, has become a topic of active scientific discussion. The concept of economic clusters is popularized by M. Porter, who transformed it into a scientific one, has been the subject of scientific research and government and private initiatives for two decades. M. Porter's model (also known as "Porter's Diamond") is based on four main factors that contribute to the clusters' emergence and development, namely: available resources, individual company strategies, market conditions, and the availability of related and supporting industries [3]. The first factor takes into account the surplus presence of certain resources, and that creates entrepreneurial advantages and allows young companies to compete on foreign markets. After gaining experience and reputation, the cluster members improve their own strategies by focusing on individual niches and jointly constructing value chains for highly specialized services or products. However, according to M. Porter these processes should take place under certain market circumstances and the presence of supporting industries that create favorable conditions for business activity inside the cluster. M. Porter argued that usually the cluster participants are concentrated on a

certain territory, which allows them jointly to lobby for their own interests, affect the development of infrastructure and communications [4].

Thus, in the early 90's, economists took the cluster as a certain phenomenon inherent in a certain geographical location and a consequence of the presence of favorable economic conditions. A. Marshal and M. Porter consider the environment, in which companies operate, as the basis for the cluster development. Accordingly, entrepreneurial initiative, science, cultural traditions, and religion are ignored. The wrongness of such conclusions logically follows from the fact that there are examples of clusters whose main development drivers are not available resources or government initiatives, namely cultural traditions and entrepreneurial activity of the population. They include textile clusters in Italy (the area of Bologna and Milan) and the United States (Georgia, Dalton), which were not promoted by government programs or the cheap resources availability. The main driving force was the historical traditions inherent in these regions, and they were implemented in a new way, subject to the stability of the economic and political environment.

Since clusters are an example of economic prosperity independent of the government decisions, they have begun to be seen as a basis for improving the people's lives in certain regions. Therefore, the problem of forming a cluster development model has been actively discussed in the scientific literature. The obvious drawbacks of M. Porter's model were generalized and reinterpreted by H. Etzkowitz, who proposed a model of abstracted interaction of three key factors (another name is "Triple Helix Model"): business environment, science and education, and government initiatives. H. Etzkowitz was the first to put forward the idea that an important factor in the clusters emergence and successful development is the support of educational and scientific organizations training skilled staff and delivering knowledge and technology inside the cluster. According to H. Etzkowitz, entrepreneurial environment is conditions of running business without the personal entrepreneurial activity of population in a certain geographical location on whose territory the cluster is located. H. Etzkowitz assigned an important role to government initiatives that aim at financing innovative projects, supporting and developing infrastructure, simplifying business conditions, promoting the development of science and education, and so on. H. Etzkowitz, like his predecessors, denies the historical and cultural circumstances of individual entrepreneurship of the region's population. H. Etzkowitz's achievement is that he concretized the supporting industries, reducing them to the sphere of public administration and scientific and educational centers [5].

The need for detailed scientific ideas and public recognition of the world economic system's shortcomings through the crisis of 2007-2008, leads to the desire to seek new solutions for developing the clusters scientific theory in order to use it for developing economically lagging regions and preserving the market positions of leading industries. The period since 2008 is characterized by the migration of capital, labor, and production capacity from the developed countries to the liberalized depressive centers with cheap labor and cost-effective logistics [6].

According to A. T. Kearney's international research organization's study, in the global equivalent, the share of foreign direct investment falling on the countries of North Africa and the Middle East is more than 50 % [7]. The capital migration process, which began actively in 2008 and was characterized by the movement of business centers from the developed countries to the East Asian ones, has changed the direction due to the economic growth of the latter and the cost rise of labor on their territory. According to this study, the share of investment for other continents is as follows: Asia-19 %, Europe-17 %, America-10 %. Industry (38 %), information technology (9 %), media (9%), and so on are the leading sectors in attracting foreign direct investment. Thus, current trends in capital migration prove that it is possible to create artificial temporary industrial clusters based on foreign investment and import of technologies and production capacities. However, such clusters are not the product of entrepreneurial activity of the region's residents and its cultural and religious traditions, and therefore, cannot be considered as a long-term economic phenomenon.

The change in the vectors of global capital transfer over less than a decade has helped to review the experience of forming clusters and monitoring their development, and has allowed supplying the existing theoretical assumptions with new models. One of them is "the Cluster Initiative Performance

Model (CIPM)" [8], which considers a cluster not as a phenomenon, but as a process of activity in order to ensure its own economic growth, based on correct forming tasks and a favorable environment (social, political, economic). The authors of the model focus on the environment stability as an important factor of the cluster growth. It is difficult to disagree with that. Indeed, the region destabilization (political, economic, or military) leads to changing market conditions that create opportunities for the clusters growth with a different specialization vector. For example, in war conditions, the products of the defense, telecommunications, textile, and food industries, etc., can be characterized by great demand, which contributes to the appropriate clusters' emergence and development.

Model CIPM is based on the following main principles:

- a cluster is characterized by a large number of links between business and the science and education sphere;
- a weight growth on an international scale;
- a high level of achieved goals in the field of new technologies development;
- the cluster development is accompanied by involving other industries and promoting their development;
- a level of business goals' achievement.

Thus, clusters after 2008 are beginning to be considered as one of the ways to ensure safe economic growth. Therefore, scientists ' attention to the causes of their occurrence and growth remains. The model presented above does not take into account the cultural characteristics and the propensity for entrepreneurial activity of the residents of the geographical location where the cluster member enterprises are concentrated. The main driving factors of A. Solvel's model are government initiatives, promotion of business development in the territory, links with the science and education sphere, the level of the financial sector development, interaction with organizations of marketing promotion and media activity [9]. According to this model, ensuring the cluster development is implemented through effective interaction with industries that contribute to strengthening market competitive advantages, and help in finding new markets, improving business processes, and simplifying business conditions. Since 2008, the cluster has no longer been considered as a natural phenomenon, but as a project of a enterprises group or a government program focused on business development in a certain region. The scientific theory of clusters has improved the current government programs for local business development by complementing them with improved strategies of narrowly specialized focus and step-by-step financing for business creation. Model CIPM considers the clusters development not only at the micro level, but also at the macro level, that is, the scientific theory of clusters becomes an element of public administration. This model also highlights the so-called "Porter's Diamond" as a theoretical basis for the scientific explanation of the clusters occurrence and the formation of methods due to their detection.

The above model has found wide support in the scientific community. Thus, one of the well-known researchers of the cluster theory is K. Ketels, comments the model in this way:"...clusters develop over time; they are not a phenomenon that just appears or disappears overnight ... ." K. Ketels defends the position that clusters can be created artificially, for this purpose it is necessary to form a single model that is superimposed on all possible examples of their origin and development. The scientific discussion on this topic is still open [8]. These models contradict each other in many ways, in particular, they exclude or add some of the factors (government initiatives, scientific and educational organizations), the role of cultural and historical circumstances in the clusters' origin and development is controversial. Modern scientific problems in this issue are similar in essence to the search for a "unified theory" or "theory of everything" in physics, which would allow reconciling the existing knowledge of quantum physics and relativity of A. Einstein. Inconsistency of scientific models of the cluster formation and development indicates the need for scientific formalizing the cluster formation process, which does not allow taking into account cultural circumstances and other irrational factors. Therefore, the problem of the cluster formation remains open at the conceptual level. The proposed models reveal the problem under study only at the general level, they do not

delve into the specifics of the origin of individual clusters, which proves that they are not implicit in practice.

In parallel with studying the determinant of the cluster origin, scientists focus on analyzing the process of the cluster formation and development. The scientific research actively begins in the second half of the 90s. Modern trends in economic, social, and demographic development, globalization, increasing social inequality, and the emergence of the theory of creative cities, industries, and class allow reviewing the ideas of M. Porter from a different point of view. Thus, in 1996. A. Malvel, O. Solvel and E. Zander describes the clusters development based on the model of economic agglomeration (accumulation of resources in a certain territory or among a group of economic entities), which occurs in a certain territory and leads to urbanization, the industrial areas formation, the cluster development and innovation [9]. The uniqueness of the economic agglomeration model is that it reflects the process of development of economic relations from innovation to the development of reserves to increase economic efficiency and increase the flexibility of business structures. Urbanization is a logical consequence of the innovations introduction and the entrepreneurial activity growth in the region. However, the model does not take into account the fact that large urban centers of global importance were not created due to innovation. They are mainly formed by historical circumstances and are tied to territories rich in resources. Artificial urbanization of a geographical location is more an exception than a logical and popular process (known in history as the foundation of the city of Constantinople (Istanbul)), which was created artificially and was able to function only under the condition of constructing a system of aqueducts that supplied fresh water). It is also important that the model contrasts the processes of clustering and urbanizing. These processes run in parallel, and clusters acting as a catalyst for innovation, which makes it possible to form industrial areas that cause increased urbanization.

The assumptions made in this theory do not take into account the aspect of the creative economy [10], since its existence was theoretically proved, until 2003, while R. Florida does not begin to promote the ideas of the creative class, creative cities and industries. The theory was finally formed in 2008 [11].

Urbanized economic centers are not always the centers of well-being for their residents. The creative sector of the economy requires certain knowledge and skills, which are not always possible for a part of the population. Hence, the privileged "caste of sorcerers from the valley" (many clusters by analogy to Silicon Valley, also called valleys: Fiber-optic valley in Sweden, Motorsports valley in England, Multimedia valley of Flanders in Belgium, the valley of materials in Germany (the area near the city of Frankfurt am Main)) is characterized by a significantly higher standard of living than the other members of society. This position is key in the criticism of the urbanization and creative economy theories. Clusters among these assumptions should be considered as one of the tools for technological development of the region and its dominance in the global segment. Therefore, the formation of the latter is updated by government programs and international investment projects. The dependence of the dynamics of the clusters' origin and development on investment logically follows from the fact that in the modern world, available finance is a rational substitute for the absence of certain types of resources on a certain territory. This assumption was proved in a study by A. T. Kearney [6], which also provides a forecast of a slowdown in the growth rate of global foreign direct investment in the period 2017-2019, followed by a decrease of 40-50 %. Accordingly, the dynamics of the formation and development of some artificial clusters, for example, "Egypt's Smart Village" or the defense cluster in Saudi Arabia created exclusively with the assistance of the government and international technological and financial investments. From this point of view, the autonomous clusters, originated through the population's entrepreneurial activity and the region cultural characteristics in the conditions of investment activity decline, are characterized by certain competitive advantages.

The dynamics of cluster functioning, the transition from the innovative development to the formation of industrial agglomerations are due to various types of internal and external interaction of the cluster elements. This problem was highlighted in the models of A. Markusen [12]:

1."Marshall" cluster model characterizes the clusters consisting of a large number of similar-sized companies that jointly develop a product, often being part of the same value chain. All these companies compete with each other at each stage of the value chain. It creates a sharp, highly specialized competition inside the cluster and makes its participants more competitive on foreign markets.

2. The model of "hub and speaker". The cluster consists of a large number of small companies and one large one. Most customers and suppliers interact with the cluster through a large company. Small companies are mainly links in the value chain of a large company. This model is also called the "Scottish cluster model".

3. Satellite cluster model. The cluster is an artificial entity consisting mainly of companies of the same specialization and size that compete with each other on foreign markets. Usually these companies are subsidiaries, hence the name of the model. All the companies in this type of cluster have unique value chains that do not overlap.

4. State-centralized cluster model. The cluster consists of a large number of small companies and one large company, which is fully or partially owned by the state. An example of such clusters is the defense sector in the United States, where state-owned enterprises have the majority of manufacturing contracts, but private companies are subcontractors. A similar model can be implemented in Ukraine. "Ukroboronprom" can act as a large state defense concern, and private companies can act as executors. If they are concentrated on a certain geographical location, we can talk about the origin of the cluster.

Models of A. Markusen are an attempt of the detailed description of the dynamics of cluster development. The scientist uses not one, but several models, which means that the cluster formation process is still not fully understandable. All the models describe different scenarios of the cluster origin and development at different concentrations and characteristics of its participants. It is interesting that these models generalize the experience of empirical research of the mentioned scientist, they reflect the solution of the problem as it was observed in one of the several studied clusters. Moreover, the models of A. Markusen are rather a mechanism of interaction between the cluster members, they do not characterize the real reasons for their formation and prosperity.

Therefore, the scientific works that should be recognized as the fundamental ones in studying clusters can be divided into two groups-those that try to explain the nature of the clustering phenomenon in the economy, and those that focus on the cluster development process. This division is conditional, since both the first and second groups identify factors that have a determining influence on clusters. The analysis of these factors is a way to identify the fundamental essential features of clusters. One of them, which is not objectionable, is the geographical location of business activity of entities that are independent economic entities. The other signs for today are debatable. This is due to the phenomenality of the each of the clusters' emergence and development. In the above-analyzed scientific works, almost all the researchers note that the clusters' origin and prosperity occur when favorable conditions arise. The concept "favorable conditions" is interpreted by scientists in different ways, as a combination of all together or separately taken conditions such as: natural features of the region, features of historical circumstances and traditions, the exclusive policy of government, and so on. It should be noted that more and more scientists are focusing on the fact that favorable conditions for the clusters' origin and development can and should form governments, but not all of these scientists have an adequate vision of the common and distinctive features between clusters and other forms of innovative entrepreneurship.

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Managing the Competitiveness of Innovation Clusters

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Abstract

Innovative clusters are considered as a dynamic environment in the competitiveness management system. It is proved that this environment creates certain competitive advantages for business entities. Based on the results of the study, the sources of innovative clusters competitiveness are identified and grouped by factors of direct and indirect impact. It is proved that some of them have a particularly significant impact on certain stages of forming and developing innovative clusters. The presented results form a theoretical basis for modeling the competitiveness management system of innovative clusters in order to determine the vectors of its improvement in the future.

Keyword: Innovation Cluster, Competitiveness, Management, Development

Introduction

The companies competing on their own are characterized by less stable market positions than a group of companies in the long term. Entrepreneurship is a natural process, a kind of symbiosis of communication and transfer, which ensures the distribution of resources between market participants. Accordingly, IC is one of the entrepreneurial interaction forms that is characterized by an improved mechanism of market expansion in the global economy. Given this, it is relevant to manage the development of innovative clusters that would be sensitive to the factors affecting the innovative clusters' competitiveness.

The emergence of innovation clusters (IC) is one of the natural economic phenomena formed due to the presence of appropriate circumstances. The main circumstances of increasing the concentration of a certain type enterprises on a certain territory is usually associated with cultural, historical and geographical features and is based on high entrepreneurial activity. The government decisions to a certain extent can only influence the long-term historical process of forming an entrepreneurial culture in the region, since most economic strategies of regional development are focused on a period of up to 5 years, while forming IC can last for decades. An example of the historical circumstances of IC origin is the clusters of the textile industry in Italy (the districts of Bologna and Milan), in which this industry has been dominant for a long time due to its historical and cultural characteristics. As a result, the concentration of entrepreneurs working in this market grew rapidly, which contributed to IC origin. Another example is Silicon valley (a district in California, USA) formed under the influence of new technologies origin and the enthusiasm of young entrepreneurs who were the first to understand the market potential of new technologies. IC is nothing more than a competition evolution product, as the economic development dominant factor, which requires the management on a systematic basis.

Review of previous studies

In the scientific literature, there are quite a lot of studies devoted to analyzing the prerequisites [1] and the emergence features [2] and [3] clusters' development. A number of scientists studied the role of public administration in forming innovative structures [4], by approaches to assessing economic efficiency [5], [6] and the clusters competitiveness level [7]. Despite the large number of scientific papers devoted to the innovative clusters' development, there are still issues that are a constant subject of the discussion, namely the sources and factors for ensuring the innovative clusters' competitiveness, as well as the stages of forming and developing innovative clusters. These issues are crucial in building rational systems for managing the innovation clusters' competitiveness.

Research Results

The scientific world considers the problem of IC development in managing this process as a phenomenon that occurs when several important factors, the list of which is still debatable, interact. It is worth noting that most of the presented models and theories have already been created by IC, so they are more likely to answer the question of the reasons for their successful development than the question of how they were created. These points of view are a generalization of empirical factor analysis. They are versatile, inconsistent, and reflect individual ICs, but do not characterize them as an economic phenomenon in general.

It is almost impossible to apply the above mentioned models in implementing various government and private initiatives, since all these models reflect the main features of the interaction of already the formed system of economic relations inside IC and outside. None of them demonstrates the origin of IC and does not reveal the features of this process. Therefore, designing artificial ICs by copying the" interaction "theoretically described in the models presented above, is nothing more than a "fake" of specific ICs in a certain territory. It seems more likely that the government can create economic zones promoting the high business activity, and then forming ICs will be possible if there are appropriate historical and cultural characteristics, a high level of the local population entrepreneurial activity, and the necessary resources' availability [13]. Artificial forming ICs is a complex, individually creative process that cannot be fully based on one of the existing theories. Therefore, the government initiatives should be aimed at supporting the development of already existing ICs rather than forming them.

Based on the lack of a sufficiently detailed interpretation of the sources of IC competitiveness, it is advisable to present own understanding of what factors play a decisive role in forming ICs, which of them contribute to forming a certain specialization business and increasing its concentration on a certain geographical location. Based on an empirical analysis of the textile cluster emergence in Italy, Silicon valley in the United States, and IT clusters in some cities in Central-Eastern Europe and South Asia, we can say that the origin of ICs is not a random process that depends entirely on historical,

cultural, and political circumstances, since some of the ICs were originated in a not too "friendly" economic and political environment. Most of them were formed due to the development of the latest technologies and unique traditions of a particular region, which explains their location and success, moreover, it also explains the high level of enterprises specialization in ICs.

The local population entrepreneurial activity plays a significant role, since it determines whether the residents of a particular region are able to convert the advantages of their region into wealth. The most important element of small and medium-sized businesses are business founders who believe in the success of their own business, have a significant experience in manufacturing this or that product and have the appropriate skills to sell it. A high proportion of people with these skills is one of the significant competitive advantages of ICs, as it demonstrates whether IC can grow by attracting investment and opening new businesses that will bring new experience, technologies and customers to IC.

In addition to these factors, the state authorities' assistance is also important. The significance of this factor is not decisive, since even in the absence of economic advantages for the enterprises of a certain IC type, its successful economic development is still possible. Analysis of some ICs formation and development experience proves that the indifferent attitude of state regulators usually even more favorably affects the economic state of ICs than the interference in its functioning. However, in conditions of political and economic instability, the economic IC may lose market positions, as the best specialists leave their companies in search for more stable working conditions, companies change their location, and so on. In conditions of acute regulating, the origin of ICs is complicated and the one which will not be characterized by significant competitive advantages in the long term [14]. However, the above done analysis proves that the state regulators' assistance is not decisive in the ICs success, since in the history of economic relations, the formation of globally successful ICs from small and medium-sized businesses is possible only if there are appropriate features of a particular region. The exception is direct investments of the international multinational giants in a certain region with cheap resources. Despite this, such ICs mainly consist of large enterprises that do not contact each other in any way, and therefore, it is unlikely that such economic entities can be called full-fledged ICs. Benefits from their formation are usually received by a small group of people, large investors having sufficient resources to lobby their own interests in public authorities, which creates deficit zones on the territory of a certain country, deepens inequality and leads to the depreciation of the labor force.

Infrastructure also has an important influence on the formation of ICs. Its presence simplifies the business environment and contributes to the entrepreneurial activity growth. Therefore, the access to high-speed Internet, high-quality roads and other factors simplifies the running of small and medium-sized businesses, contributes to its birth and development. An IC with a developed infrastructure is significantly more competitive than a similar IC without it.

It is also worth mentioning that the development of ICs usually takes place in a territory that is characterized by favorable climatic and natural conditions. The example can be a technological IC in Silicon valley located in California (USA), a textile IC in Italy (areas of Bologna and Milan), and many others. Many companies and freelancers working in the field of high technology are moving their own business to Thailand. The communication with the companies' employees of the Lviv IT-cluster shows that some companies from Lviv are planning to move to the " hot lands " (for example, the Ukrainian company" PIPL", the manufacturer of the world-famous Ajax alarm system, have moved some of their offices from Kiev to California (USA)), most of them work in the field of crypto currency. The emergence of some tourist ICs is often based on appropriate natural conditions, which contributes to the ICs promotion and business development on its territory. It is interesting that most economic theories are based on scientific empirical observations, whose authors are business representatives, thus, many factors, whose impact can not be directly analyzed, are often omitted. Therefore, the fact that weather in new York influences on the dynamics of prices on international speculative markets can be considered comical, but this influence exists, although it is not significant, since the person psychological dependence on the weather is scientifically proven. The high psychological state contributes to the risk growth, the depressed state reduces the person activity,

makes it less risky, which affects the investors' decisions, and therefore, affects short-term price fluctuations. The exceptional development of philosophy and science in Ancient Greece was not accidental. One of the reasons was the favorable natural and climatic conditions that allowed the ancient Greeks to focus on their own intellectual development. Human behavior is subject to nature laws, and therefore, it depends on its natural environment, which should be taken into account when conducting scientific research on the IC exceptional success in a particular region.

The generalization of these factors' influence and the process of IC formation and development allows dividing them into certain groups, when analyzing their influence weight and specificity (Fig. 1).

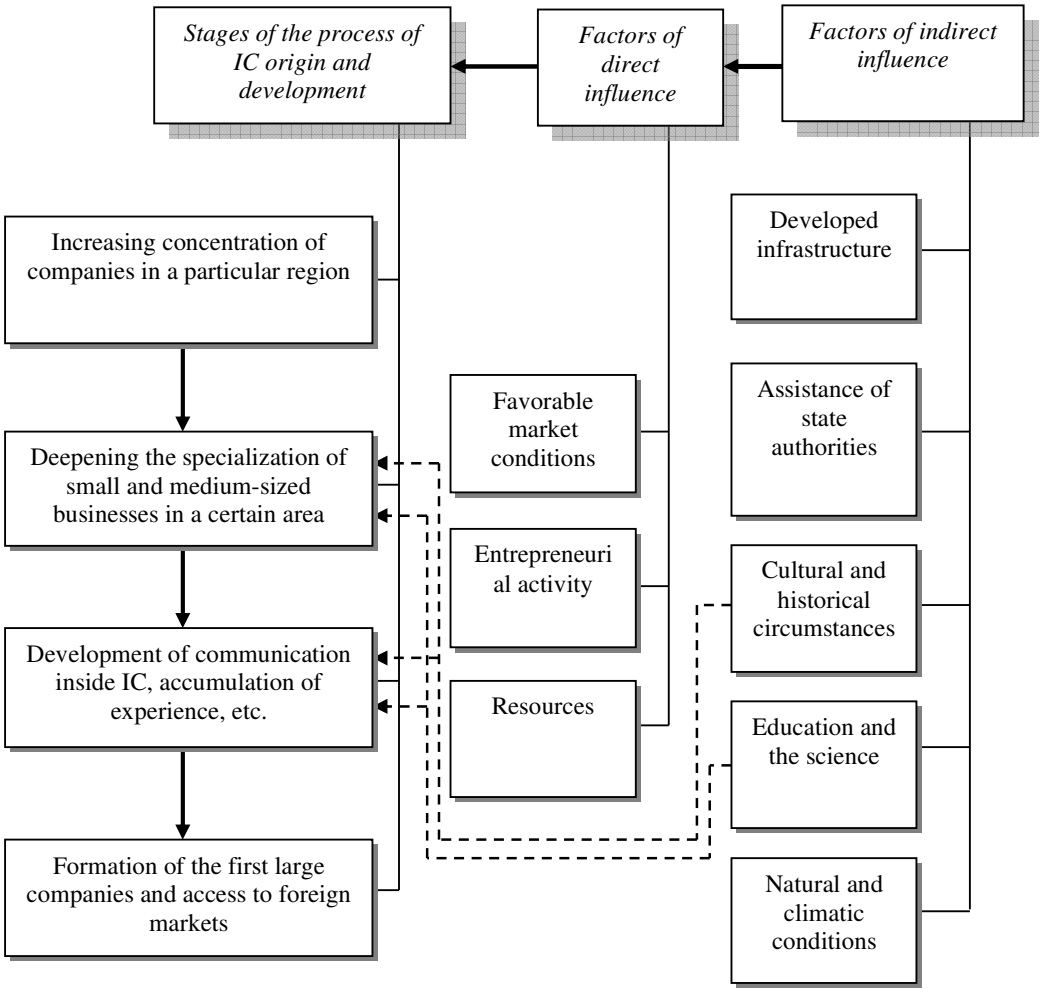

Fig. 1: Factors of direct and indirect influence as sources of IC competitiveness

Symbols: arrows indicate the transition between links of a certain group or process stages, lines indicate that elements belong to a certain logical group; a dashed arrow indicates the special influence of certain factors on some stages of cluster development.

All the identified factors should be divided into factors of direct and indirect influence. This allows explaining the interaction between them and their role in the IC formation. In addition, this allows dividing the tools for regulating the IC development by weight. This approach is especially valuable when analyzing the IC competitiveness, since it indicates the directions of scientific research, allows focusing on certain factors, and forms a theoretical basis for further scientific research. All the

selected factors should not be considered as a system of a single whole, the presence of some can also serve as a sufficient reason for the IC formation and its successful economic development, but if there are similar IC competitors, the advantage is of the one who has a full set of these factors. This approach assumes that the IC formation occurs gradually, and not under the condition of artificial mass concentration of a certain type enterprises on a certain geographical location, which is characterized by cheap resources. Among the process stages of the IC formation and development, first of all, it is necessary to distinguish the growth stage of the small and medium-sized businesses concentration in a certain territory, provided that there are cultural, educational and scientific opportunities for a certain specialization. This contributes to the accumulation of unique experience, knowledge and skills and deepens interaction with educational and scientific institutions, promotes communication inside IC, and forms the basis for the emergence of large companies having sufficient competitive advantages to further enter international markets.

At the stage of increasing the small and medium-sized businesses concentration in a certain territory, the IC is already becoming a strong player in the international arena, there is an abnormal increase in wages for a geographical location, there is a specialization deepening, and business activity increasing. IC begins to attract resources, labor, and technologies, whose cost begins to grow inside IC. Each of the stages of the IC development is the basis for further acceleration of exponential growth. With the transition from one stage to another, the level of competitiveness increases, the weight in the international arena increases, and the market positions of its participants increase. The process of the IC development and formation is a natural exponential process, which organically reflects the nature and society laws in the economy and is the next milestone in the competitiveness growth of its individual players, who gain competitive advantages from interaction with medium and small businesses. IC acquires the features of a revolutionary new link in the structure of global competitiveness enhancement, technology development, narrow specialized products improvement, obtaining new experience and supplying high-quality personnel for the further industry development and its entry to a new level of improving its own competitiveness. It is important that the exponentially growing processes in the economy are characterized by a high risk of "bubbles" and financial crashes [15], [16], however, most ICs compete not by increasing the value of their own assets, but by creating a qualitatively new competitive product that the company cannot generate individually. One feature of the given list of the IC competitiveness sources is the allocation of some factors' significant influence on the stages of its formation and development [17]. These factors include cultural and historical circumstances, as well as education and science. Thus, the inheritance of the developed technical school of the Soviet Union contributed to the IC development in Ukraine, Russia, and Azerbaijan. Cultural and historical circumstances contributed to the textile industry development in Italy. Therefore, it should be noted that the presence of certain cultural and educational features contributes to deepening specialization of enterprises in a particular region [6]. This proves that the presence of these factors is necessary for the IC origin, because if there is no narrow specialization, territories with a high concentration of small and medium-sized businesses can be considered exclusively as an economically developed region, but not as an IC. In this case, it is important to distinguish the IR concept in astronomy and in economics.

Conclusion

It is proved that the classification of innovative clusters' competitiveness sources should take into account all the success factors of clusters by the nature of the impact and the significance level depending on the stage of the cluster's life cycle. Based on the conducted critical analysis, the classification takes into account the factors that were not reflected in the existing models describing the origin and development of innovative clusters. We are talking about cultural, historical, natural and climatic circumstances. These factors should be taken into account, as they affect the development of clusters in the textile industry, tourism, and extractive industries.

Scientific novelty of the study is as follows: allocating the process stages of the emergence and development of innovation clusters; identifying the factors of the direct and indirect influence on the innovative clusters' competitiveness in the context of individual stages of their origin and development.

The future research should be carried out in the direction of building a system-functional model for managing the innovative clusters' competitiveness, which would allow quantitatively parameterizing the values' nature of the identified factors and provide for the choice of alternative solutions to influence these factors and adapt to them.

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Learning from Mistakes.
A Study on Maturity and Adaptability to Change

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Abstract

Learning culture matters; company culture must support continuous improvement. Organizational learning is a process of identifying and modifying mistakes that result from interactions between co-workers. The article aims to explore the learning power via errors, using the level of organizational maturity as a moderator. Companies need to know how organizational maturity may moderate the adaptability to change via the acceptance of their mistakes. Based on 380 samples gathered from November to December 2019 among Polish employees working in knowledge-driven organizations across various industries, and analyzing the data using PROCESS software, the authors established that employees working in young organizations adapt to changes better than those who work in mature companies. On the other hand, the acceptance of mistakes by mature organizations significantly improves their adaptability to change. The study shows that mature organizations achieve better change adaptability than young organizations when accepting mistakes. The conclusion is that mature organizations may adapt to changes only if they accept errors (learn from their errors). Concerning young organizations' mistakes, their effect on adaptability to change is not significant.

Keywords: Constant Learning Culture, Hierarchy, Organizational Development, Mistakes Acceptance, Change Adaptability, Organizational Learning

Introduction

Peter Senge (2006) claimed that if somebody wants to learn, then he must be ready to be wrong. However, the fact that organizations want to learn does not mean that they accept that their employees make mistakes. It is one of the biggest paradoxes of "learning organizations today." Inspired by this paradox, the authors decided to investigate the learning from errors by organizations in the light of their maturity level. Does experience matter for the acceptance of mistakes and adaptability to change?

The value of learning via mistakes has been lately highlighted by Kucharska and Bedford (2019), but also in earlier works by Anselmann and Mulder (2018), and Debowski, (2001). It is worth noticing that organizational learning is even defined as a process of identifying and modifying mistakes resulting from interactions between co-workers (Argyris and Schön, 1997). Mistakes are controversial. They are invaluable for those who want to improve, but their effectiveness in the learning process is subject to discussion. Some lessons learned from mistakes can be very costly. It is probably the reason why they are not welcome by organizations. This study aims to compare the influence of acceptance of mistakes on the adaptability to change in conditions of low, medium, and high maturity level.

If organizations want to grow, they need to learn and change. Change is not only a major characteristic of today's business environment, but it is also a chief result of learning. That is why making mistakes can foster the adaptability to change. When we learn, we change the perception of things by knowing more. It works for individuals and organizations. Organizational learning and change are interconnected (Argyris, 1982; Watad, 2019). Nadim and Singh (2019) pointed out that change as a phenomenon is tied with continuous learning. Moreover, Garvin et al. (2008) stressed that being a learning organization characterizes openness to make changes when needed, and errors are the essence of organizational learning (Zappa and Robins, 2016). Hence it is good to know how strongly mistakes acceptance fosters change adaptability.

The maturity level combined with experience is expected to be an advantage of any organization involved in business projects (Mullaly, 2014). The latest studies (e.g., Kumar and Shushil, 2020; Marques et al., 2019; Andreasen and Gammelgaard, 2018; Grossman, 2018; Johansson et al., 2019; Muszynska, 2018; Uskarci and Demirors, 2017) and the majority of existing organizational maturity models (e.g., Paulk, 1993; Fischer, 2004; Harmon, 2004; Rosemann and de Bruin, 2005; Gunsberg et al., 2018) focus on communication, knowledge management, technology development, and processes which, if constantly optimized, enable mature organizations to grow. The current study focuses on mistakes as a source of new knowledge, which is desired if an organization wants to learn, improve, and grow. The key question of the study is whether the maturity level moderates the ability to adapt to changes driven by the acceptance of mistakes? The study aims to address this problem.

Conceptual Framework

Company culture matters for learning (Rebelo and Gomes, 2011; 2017) and knowledge sharing (Kucharska, & Bedford, 2019). Knowledge creation is an intense process of human imagination, finding solutions, and learning from errors (Jakubik, 2008). Argyris and Schön (1997), Debowski (2001), Senge (2006), Garvin et al. (2008), and Rebelo and Gomes (2011; 2017) also highlighted that a learning culture must include the acceptance of mistakes to enable people to leave their comfort zone and solve problems by developing new approaches. Hind and Koenigsberger (2008) and Thomas and Brown (2011) also followed this line of thinking and stressed that a higher level of acceptance of mistakes fosters a learning process reflected in the level of the adoption of the inevitable change. Organizational maturity and agility promote adaptability (Gunsberg, 2018). Mainga (2017). Kucharska and Bedford (2020) stressed that constant learning culture must be composed not only of the learning environment but must also accept mistakes. Hence, based on the above the following hypothesis has been formulated:

H1: Maturity level moderates the relationship between the acceptance of mistakes and adaptability to change.

The figure 1 below visualizes the theoretical assumptions.

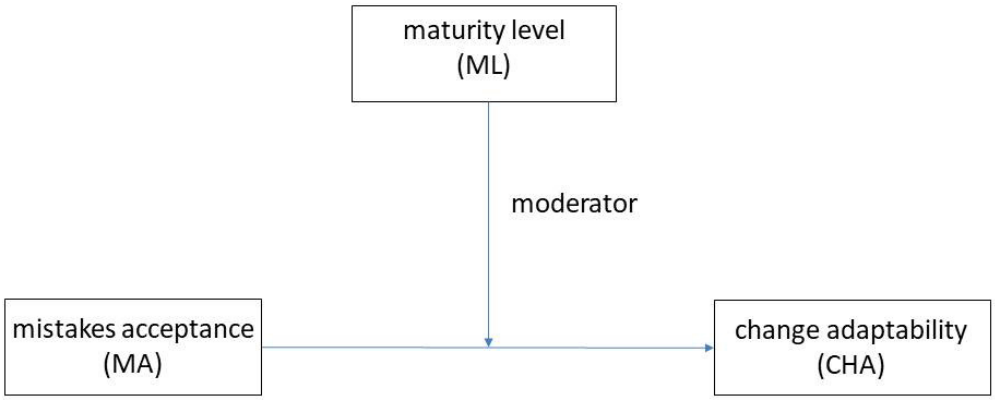

Fig 1. Theoretical framework

Method

The study used a sample consisted of 380 cases. Respondents were recruited among Polish employees working in knowledge-driven organizations across industries, via a research panel recruited by answeo.com. (Appendix A). The majority of the sample is represented by men (50%) aged 25-34 (43%), working in small and medium companies (56%), in the IT (30%), Sales (12%), Finance (11%), and Production (9%) industry. Data were collected from November to December 2019. To enable the measurement of the level of mistake acceptance and change adaptability, respondents answered questions using a 7-point Likert scales that came from Kucharska & Bedford's (2020) earlier study. After the positive sample and scales assessment, composite variables were created to analyze all the above-hypothesized relationships using the regression PROCESS procedure for SPSS version 3.4 (Hayes, 2018). The maturity level was measured by a declaration to be low, medium, and high at the time of its existence.

Results

The results indicate that young organizations are characterized by high adaptability to change, even with the low level of mistake acceptance. Whereas for organizations with medium and high levels of maturity, the change adaptability grows with the mistake acceptance. However, this effect is significant only for high-mature organizations (p=.0111). In the case of young organizations and organizations with medium maturity levels, the influence of the mistake acceptance on change adaptability is not statistically significant (for more information go to Appendix 1). Figure 2 below illustrates all the above-described effects. Table 1 presents hypothesis verification, and Appendix 1 shows all PROCESS software output details.

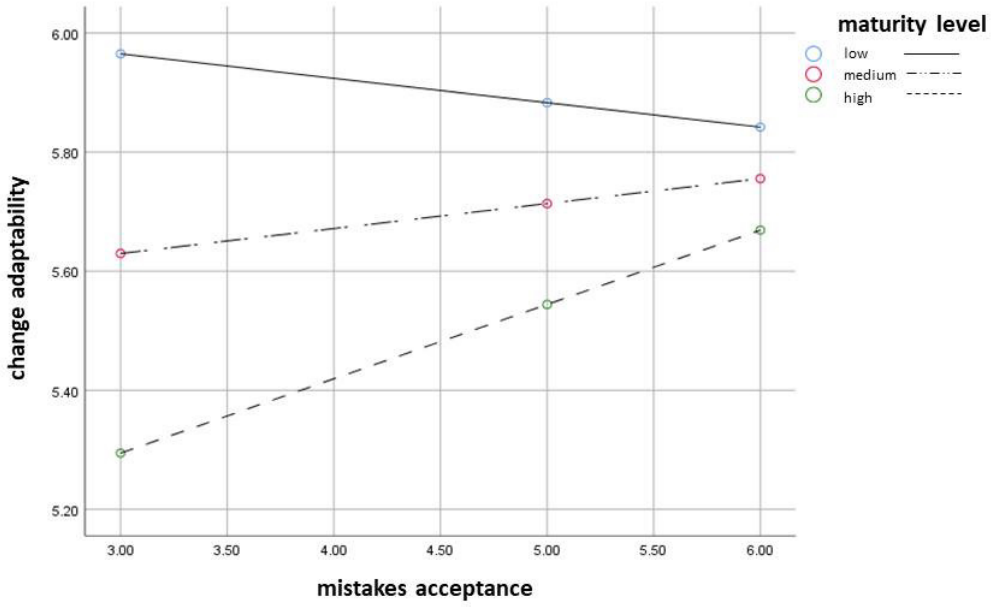

Fig. 2: Moderated effect of hierarchy on change adaptability driven by mistakes acceptance
Note: Level of confidence for all confidence intervals in output: 95.0000; effects not standardized.

Table 1: Results

Hypothesis	β	t-value	p-value	verification
H1	.0829	2.34	.0196	supported

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p	
X*W	.0139	5.4982	1.0000	376.0000	.0196	
	coeffi	se	t	p	LLCI	ULCI
Int_1:	.0829	.0354	2.3448	.0196	.0134	.1525

Int_1: mistakes acceptance (MA) x maturity level (ML)

Note: Level of confidence for all confidence intervals in output: 95.0000; effects not standardized. PROCESS Procedure for SPSS Version 3.4 output details available in Appendix 1.

Discussion

Referring to Paulk et al.'s (1993) and Terouhid and Ries's (2016) model, optimization is the highest level of maturity that leads to a continuous improvement of processes. Hence, the above findings perfectly respond to these models. Mature organizations develop through constant improvement and, therefore, constant learning from mistakes is a great way to optimize and change. Terouhid and Ries (2016) stressed that organizational maturity concentrates on organizational processes, and organizations with top maturity level may achieve sustainability and leadership. Therefore, it seems vital that mature organizations that want to learn from mistakes need to develop appropriate mechanisms to do so. De Boer et al. (2015) also emphasized that mature organizations usually operate within a complex environment and continuous improvement of operations is the best method for them to grow. A complex environment requires

complex monitoring. In light of what has been said, new errors may be treated as a valuable symptom of change. Namely, in a well-known business environment of a given branch or industry, each new error may be a warning signal that something has changed or is worthy of change. Farnese et al. (2019) stressed that authentic leaders could foster policies and practices to manage errors proactively.

Limitations & implications

One of the limitations of the current study is linking the measurement of a maturity level to the time of its existence. Kumar et al. (2013) proposed a more refined method which, if applied, could have led to more accurate results. Another limitation is the fact that learning from mistakes is a rather non-formal and, therefore, subconscious phenomenon. Consequently, the low R-sq=0.0486 obtained for the entire model does not surprise. Since the process is so specific, perhaps choosing a method different than "a self-report questionnaire" will be better for further exploration of this problem. Moreover, the findings demonstrate the importance of studies on the topic of mistake acceptance as vital for learning organizations and one which should be investigated in more depth. The results of this study are based on a Polish sample, therefore, additional national studies are needed. As Kucharska & Bedford (2019) noted, national culture is vital for knowledge sharing and job satisfaction.

Practical Implications

The most important practical implication from the presented study applies to mature organizations. The acceptance of mistakes allows them to adapt to changes more effectively. Hence, mature organizations need to create mechanisms that support learning from mistakes. As it was noted in the introduction section, errors are commonly perceived as a phenomenon that should be eliminated, and that is why employees often conceal their mistakes. Since everybody makes mistakes, and everybody covers them, it contributes to creating a sort of illusion. The findings of the study encourage mature organizations to "be mature" and develop internal mechanisms that will help them take advantage of the mistakes employees make to transform them through "lessons learned." Mistakes are the best source of new knowledge, which is important if we want to achieve better adaptability to change. The organizations with a low maturity level characterize a high level of change adaptability. It is because they develop mainly by the adaptation to the particular market rules and standards imposed by market leaders (mature organizations). If they want to win the market, they need to offer standards as a minimum and something above these standards. It is why mistakes acceptance gives them the opposite effect on mature organizations. The early stage of development is not a good time to learn via mistakes. It is better to learn by adaptation. It is opposite to mature enterprises. They can't develop by the adjustment to standards they create themselves. They can adapt to business environment changes via learning from mistakes. Summarizing, young organizations develop by adaptation, mature organizations learn from anomalies identified thanks to noted errors.

Conclusions

This article, similarly to Kucharska and Bedford (2020) and Kucharska (2020), exposes the paradox of ignoring mistakes by present-day "learning organizations." The findings show that mature organizations might adapt to changing environments significantly better when learning from mistakes. Also, if they do not accept mistakes, the observed adaptation level is low. It explains why mature (often big and with strong hierarchies) organizations are slower and less agile than non-hierarchical organizations. This study demonstrates that for young organizations to survive and advance in a particular industry, they must adapt quickly, and therefore they must not allow for mistakes to happen. On the other hand, mature organizations, a long time in the game, can only grow by learning from their errors because they set business standards for the whole branch or even industry. The most significant player always dictates terms to its followers. Of course, both young and mature organizations need to adapt to constant technological, societal, cultural, political, and other environmental changes if they want to grow.

However, in the case of mature and experienced organizations, new errors may be a valuable symptom that in a well-known business branch or industry, something has changed or is worth changing.

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Appendix 1

```
***************** PROCESS Procedure for SPSS Version 3.4 *****************
Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
Documentation available in Hayes (2018). www.guilford.com/p/hayes3
**************************************************************************
Model  : 1
    Y  : CHA
    X  : MA
    W  : Maturity
Sample
Size:  380
**************************************************************************
OUTCOME VARIABLE:
CHA
Model Summary
        R         R-sq       MSE       F          df1      df2          p
      .2204      .0486     1.1595     6.3968     3.0000   376.0000   .0003
Model
              coeff         se          t         p       LLCI       ULCI
constant     6.6723      .3976    16.7819      .0000     5.8905     7.4540
MA           -.1240      .0805    -1.5402      .1244     -.2822      .0343
Maturity     -.5841      .1743    -3.3508      .0009     -.9269     -.2414
Int_1         .0829      .0354     2.3448      .0196      .0134      .1525
Product terms key:
 Int_1    :        MA     x        Maturity
Test(s) of highest order unconditional interaction(s):
         R2-chng      F        df1        df2          p
X*W      .0139     5.4982     1.0000   376.0000      .0196
----------
    Focal predict: MA       (X)
    Mod var: Maturity       (W)
Conditional effects of the focal predictor at values of the moderator(s):

   Maturity      Effect        se          t          p        LLCI       ULCI
    low         -.0410      .0511     -.8022      .4229     -.1416      .0595
    medium       .0419      .0354     1.1837      .2373     -.0277      .1116
    high         .1249      .0489     2.5508      .0111      .0286      .2211
********************** ANALYSIS NOTES AND ERRORS *******************
Level of confidence for all confidence intervals in output:  95.0000
W values in conditional tables are the 16th, 50th, and 84th percentiles.
```

Typology of the European Union Countries in Terms of Barriers Hampering Innovation Activities – the Perspective of Innovative Enterprises

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Abstract

The enterprises undertaking innovation activities in the European Union countries operate in a diverse environment, not always friendly to innovation processes. They are influenced by a number of internal and external factors constituting barriers for the implementation of innovations. As a result of diverse conditions for the development of innovation in the EU countries, the individual barriers to innovation processes may be of different significance for enterprises. The first part of the study presents an overview of the subject literature output focused on the systematics of key factors hampering or preventing the activities aimed at the implementation of innovation (e.g. deterrent and disclosed barriers, internal and external and also economic, knowledge-related, market and institutional ones). The second part discusses the results of empirical research focused on verifying the adopted hypothesis – the key barriers to innovation activities of enterprises in the EU countries create cost factors and their disclosure, along with other barriers, results in the interruption of innovation processes in their implementation phase (high intensity of obstacles to innovation activities is manifested in low values of the aggregate innovation indicator). The European Innovation Scoreboard data and the research results covering innovative enterprises as part of the last edition of the Community Innovation Survey constituted the information basis of the conducted analyses. The research used multi-dimensional statistical analysis methods, with particular emphasis on the classification methods.

Keywords: Innovation Activities, Innovative Enterprises, Barriers to Innovation Processes

Introduction

Technological progress, the dynamically developing international competition and shorter product life cycles exert pressure on enterprises to implement innovations (Ajagbe and Ismail 2014). The capacity for creating and implementing innovations has become the essential success factor, determining the competitive position on the market (Calantone, Cavusgil and Zhao 2002; Jin, Hewitt-Dundas and Thompson 2004; Hult, Hurley and Knight 2004). The enterprises implementing new or significantly improved solutions – product, process, organizational and marketing oriented – achieve better results than the entities not involved in such activities (Crepon, Duguet and Mairesse 1998; Miozzo and Walsh 2006).

The need to intensify innovation activities seems undebatable, however, the research in this area does not follow a clearly defined path. Approaching the achievements of the subject literature in general terms, the factors facilitating and strengthening innovation processes, as well as the ones preventing or hampering these activities, i.e. barriers to innovation, can be analysed. The identification of innovation determinants was attempted in many studies (Montoya-Weiss and Calantone 1994; Cohen 1995; Henard and Szymanski 2001) to specify the driving forces responsible for the intensification of innovation processes and also to discover the existing correlations between them and, e.g., enterprise performance results. Much less attention was paid to the factors which either prevent or hamper innovation activities (Baldwin and Lin 2002; Silva, Leitão and Raposo 2007; Iammarino, Sanna-Randaccio and Savona 2007, Mohnen, Palm, Schim van der Loeff and Tiwari 2008). Such disproportion does not seem

justified. The intensification of innovation oriented processes cannot be limited to seeking innovation-friendly factors or identifying barriers to innovation. The complementarity of these approaches is demonstrated by, e.g., the research results indicating that a barrier for one company can simultaneously turn out an opportunity for another company (Duarte, Madeira, Moura, Carvalho and Moreira 2017).

The presented analyses and considerations address innovation barriers and put forward the following research hypothesis – the key barriers to innovation activities of enterprises in the EU countries create cost factors and their disclosure, along with other barriers, results in the interruption of innovation processes in their implementation phase (high intensity of obstacles to innovation activities is manifested in low values of the aggregate innovation indicator).

Barriers to innovation activities – the subject literature

Any factor resulting in abandoning the innovation oriented processes as well as delaying or distorting their results remains a barrier to innovation activities (Mirow, Hölzle and Gemünden, 2007). It is clear from this definition that barriers to innovations can have different effects. In a positive case, their consequence is a delay in the implementation of innovation, whereas in a negative one – abandoning an innovation activity prior to its commencement, the interruption of an innovation process in its implementation phase, or an incomplete implementation of a new or a significantly improved solution. The spectrum of the aforementioned consequences does not take into account the possibility of overcoming barriers to innovation activities without some detrimental impact on this process (timely and full implementation of innovations despite the existing impediments), which seems to be a serious shortcoming. For this reason, it is worth adopting that barriers to innovations are created by the factors either hampering or preventing the activities aimed at implementing innovations.

The factors hampering or preventing the activities focused on implementing new or significantly improved solutions can be classified in different ways. If the decisions made by enterprises, regarding the implementation of innovation activities, are adopted as the basis for their identification, the deterring and revealed barriers are distinguished (D'Este, Iammarino, Savona and Tunzelmann 2012). The first of them discourage enterprises from engaging in innovation processes. The absence of activities in this area may result from, e.g.: excessive costs of innovations in relation to the financial resources at the disposal and no possibility of obtaining them from external sources, insufficient qualifications of the enterprise employees, difficulties in attracting cooperation partners, or uncertain demand for innovative products or services. It is worth highlighting that these impediments are identified ex ante, prior to commencing the innovation activity and determine its abandoning (Ee Shiang and Nagaraj 2007). The enterprises involved in innovation activities have a different view on barriers to innovation. Among them there are entities identifying and solving specific problems (so-called revealed barriers). Recognizing barriers in due time increases the chance of facing them and overcoming the existing difficulties (Hueske, Endrikat and Guenther 2015). Following an optimistic scenario, one can assume that identifying specific barriers to innovations simultaneously determines the ways of overcoming them (Chen and Hove 2011).

The distinction between the revealed and deterring barriers to innovations is of utmost importance, because the innovating and non-innovating enterprises perceive the importance of individual impediments differently (Arundel 1997, Baldwin and Lin 2002; Galia and Legros 2004). Taking up actions aimed at implementing innovations increases the awareness of impediments that may either hamper or prevent the implementation of new or significantly improved solutions (Galia and Legros 2004). This knowledge is absent in the enterprises deterred by the barriers to innovation activities.

The location of factors hampering or preventing innovations remains yet another criterion for the division of barriers to innovation activities. These factors can be located in an enterprise itself or in its environment, which results in distinguishing internal and external impediments (Hadjimanolis 1999; Mohnen and Rosa 2002; Tourigny and Le 2004; Duarte, Madeira, Moura, Carvalho and Moreira 2017). Enterprises experience internal barriers when, e.g., their own funds for innovation activities are unavailable, they lack adequately qualified personnel or struggle with the organizational rigidities (negative attitude of the management and/or staff to changes). External barriers arise when enterprises

face problems in accessing external finance (bank loans, venture capital, public funding or subsidies), technological information, potential cooperation partners, etc. (Segarra-Blasco, García-Quevedo and Teruel-Carrizosa 2007).

The above mentioned division of barriers to innovations is supplemented by the classifications focused on a comprehensive systematics of the factors hampering or preventing innovation activities. An interesting proposal in this respect was presented by Szultka (2008, pp. 23-24) who identified the factors related to:

- funding innovation activities,
- internal potential of an enterprise,
- investment risk in new technologies,
- demand for new or improved products,
- information flow,
- R&D sphere potential,
- intermediary infrastructure,
- legal provisions and administrative procedures,
- public support.

These factors are substantiated by the, located within them, barriers to innovations. For example, the factors related to the internal potential of an enterprise include as follows: resistance of employees to changes, absence of the adequately qualified staff, insufficient qualifications of the management, lack of strategic planning, etc.

Another, generally known proposal for the systematics of barriers to innovations is presented in the Oslo Manual [OECD/European Communities 2005], which constitutes, among others, the basis for conducting research addressing the factors hampering and preventing innovation activities within the framework of the Community Innovation Survey (CIS). CIS results are presented in the EUROSTAT statistical data resources. According to the statistical nomenclature, the cost barriers (lack of internal finance, lack of external finance – credit or private equity, high costs, difficulties in obtaining public grants or subsidies), the knowledge-related ones (lack of qualified employees within enterprise, lack of cooperating partners) and also the market barriers (uncertain market demand, high competition) are listed among the potential barriers to innovation activities faced by the enterprises involved in the discussed processes.

Information Basis, Research Scope and Method

The statistical data from the latest edition of the Community Innovation Survey (CIS 2016) constitute the information basis of the presented research. The Survey results were provided as part of the official statistics (Eurostat 2019; retrieved on November 29, 2019) and the European Innovation Scoreboard 2017 (The European Innovation Scoreboard 2017 provides statistical information covering 2016).

The comparative analysis of the European Union countries, in terms of barriers to innovation activities, was based on 6 indicators determining the percentage of innovative enterprises indicating high importance of (in a four-point grading scale: 1 – high, 2 – medium, 3 – low, 4 – irrelevant):

– cost barriers (% of innovative enterprises):
–
C_1 – lack of internal finance,
C_2 – lack of external finance (credit or private equity),
C_3 – high costs,
C_4 – difficulties in obtaining public grants or subsidies;
– knowledge-related barriers (% of innovative enterprises):
K_1 – lack of qualified employees within enterprise,
K_2 – lack of collaboration partners;
– market barriers (% of innovative enterprises):

M_1 – uncertain market demand,
M_2 – high competition.

To determine the profiles of developed classes covering the EU countries, the Summary Innovation Index (SII) and 10 indicators describing the dimensions of innovation processes according to the European Innovation Scoreboard 2017 were used: Human resources, Research systems, Innovation-friendly environment, Finance and support, Firm investments, Innovators, Linkages, Intellectual assets, Employment impacts and Sales impacts (*European..., 2017*).

The time range of the research covers 2016 and the spatial scope includes 22 countries of the European Union. Denmark, Ireland, United Kingdom, Sweden, Netherlands, Spain are not included in the research due to the total unavailability of statistical information. In the case of Czechia and France the data were partially unavailable, which was supplemented using the step regression method.

The research was carried out in accordance with the adopted research scheme:
Stage I of the research – detailed analysis of barriers to innovation activities in the individual EU countries.

1. Identification of 3 key barriers to innovation activities within the individual EU countries and seeking general regularities in this respect.
2. Identification of the dominant indications identifying barriers to innovation activities in the cross-section of the EU countries (analysis of the distribution of indicator values regarding the "difficulties" in innovation development).
3. Identification of outliers among the EU countries in terms of the indicated barriers to innovation activities using box plot.

Stage II of the research – identification of the EU countries with similar indications of the innovative enterprises for barriers to innovation activities of high importance.

1. Classification of the EU countries in terms of the revealed barriers to innovation activities. The output statistical information regarding barriers to innovation processes was subjected to classical standardization, the distances between countries were determined using the Euclidean squared distance, then Ward's hierarchical agglomerative clustering method. The criterion of the first clear increase in agglomeration distance was used to determine the number of classes by analysing the dendrogram of connections, the integration distances and the classification stages. The description of classification methods is presented in the following studies: Ward (1963), Johnson (1967), Anderberg (1973), Hartigan (1975), Sneath, Sokal (1973), Aldefender Blashfield (1984), Basiura, Sokołowski (2007).
2. Typology of the developed classes covering the EU countries using the *Summary Innovation Index* (SII) and the indicators representing 10 dimensions of innovation in accordance with the European Innovation Scoreboard 2017 (European ..., 2017) as the profile variables.

Results of Empirical Research

The leading, peripheral and key barriers to innovation activities in the environment of innovative enterprises

Table 1 presents the key barriers to innovation activities, listed at three initial positions, in terms of the highest percentage of indications related to high importance of a specific factor in a given country. In 8 countries only cost barriers were indicated in all positions. In the next group (10 countries), two cost factors were included among the key barriers. In Luxembourg and Malta, among the key barriers only one cost factor was identified, in the second and third position, respectively – lack of internal finance (C_1) and high costs (C_3). In Italy and Lithuania, none of the cost barriers were listed among the three most frequently identified obstacles to innovation activities. Italian enterprises were mainly struggling with external barriers (2 market factors). In turn, in Lithuania, the biggest concerns are raised by the knowledge-related factors (K_1 and K_2).

Table 1: Key factors hampering enterprise innovation activities in the individual EU countries

No.	Types of key barriers to innovation activities	Countries	Ranking position of the key barriers (% of innovative enterprises' indications)		
			1	2	3
1.	Three cost barriers (8 countries)	Bulgaria	C_3 (27,0)	C_4 (23,0)	C_1 (21,1)
		Greece	C_1 (35,9)	C_4 (34,0)	C_2 (32,0)
		France	C_1 (24,7)	C_4 (21,5)	C_3 (18,1)
		Croatia	C_1 (35,5)	C_3 (31,1)	C_4 (29,4)
		Latvia	C_3 (30,0)	C_1 (23,8)	C_4 (21,6)
		Poland	C_3 (26,3)	C_1 (19,3)	C_4 (18,4)
		Romania	C_3 (28,6)	C_1 (24,8)	C_4 (21,6)
		Slovakia	C_1 (29,0)	C_3 (25,9)	C_4 (22,1)
2.	Two cost barriers (10 countries)	Belgium	C_3 (14,1)	K_1 (13,3)	C_1 (11,6)
		Czechia	C_3 (21,3)	C_1 (20,0)	M_2 (17,1)
		Germany	C_3 (19,9)	K_1 (14,2)	C_1 (12,1)
		Estonia	C_3 (19,9)	C_1 (16,5)	K_1 (15,9)
		Cyprus	M_2 (47,3)	C_3 (36,1)	C_1 (35,2)
		Hungary	C_3 (26,8)	C_4 (24,1)	K_1 (22,0)
		Austria	K_1 (25,2)	C_4 (20,4)	C_1 (20,2)
		Portugal	C_3 (30,8)	M_2 (25,3)	C_1 (23,8)
		Slovenia	C_1 (40,1)	K_1 (33,1)	C_3 (30,3)
		Finland	C_1 (14,3)	C_3 (12,2)	K_1 (12,0)
3.	One cost barrier (2 countries)	Luxembourg	M_2 (14,0)	C_1 (12,6)	K_1 (12,5)
		Malta	M_2 (19,8)	K_1 (16,6)	C_3 (14,9)
4.	Non-cost barriers (2 countries)	Italy	M_1 (26,7)	K_1 (21,2)	M_2 (20,2)
		Lithuania	K_2 (30,9)	K_1 (26,6)	M_1 (26,4)

Source: authors' compilation based on the Eurostat database.

Table 2 and Fig. 1 present the distribution of indications identified by the innovative enterprises regarding the individual barriers hampering innovation activity in the EU countries. Their analysis shows that a very high percentage of enterprises – [36,05%; 47,30%) – indicating the same significant barriers refers to individual countries. A different situation is observed in the case of high percentage of indications – [24,8%; 36,05%) – which groups as many as 10 countries under the high costs factor (C_3). In this perspective, it can be adopted that the extensively high costs of innovation activities are – in general – the most often recognized obstacle to innovation in the EU countries.

The identification of outliers among the EU countries regarding the indicated barriers to innovation activities using box plot was the next step of the conducted analysis. Fig. 2 presents the descriptive parameter values of individual indicators determining the percentage of enterprises' indications identifying particular barriers to innovation processes. Lithuania and Cyprus turned out to be the outliers, definitely standing out from the others. As many as 30,90% of the Lithuanian innovative enterprises point to the lack of collaboration partners (K_2) as a highly significant barrier, whereas the median of indications to this factor in the EU countries is only 6,2%, and the minimum value amounts to 2,30% (Finland). In the case of Cyprus, an unusually high percentage of responses (47,30) refers to high competition (M_2). The median for this innovation barrier in the EU countries reaches 19,30% and the minimum value presents the level of 7,60% (Belgium).

Table 2: The distribution of indications to barriers hampering innovation activities of enterprises in the European Union (number and percentage of countries)

No.	% of innovative enterprises' indications	Barriers to innovation activities							
		C_1	C_2	C_3	C_4	K_1	K_2	M_1	M_2
1.	Low [2,3; 13,55)	3 (13,6%)	14 (63,6%)	4 (18,2%)	7 (31,8%)	6 (27,3%)	21 (95,5%)	12 (54,5%)	5 (22,7%)
2.	Medium [13,55; 24,80)	13 (59,1%)	6 (27,3%)	7 (31,8%)	11 (50%)	13 (59,1%)	0 (0%)	8 (36,4%)	13 (59,1%)
3.	High [24,80; 36,05)	5 (22,7%)	2 (9,1%)	10 (45,5%)	4 (18,2%)	3 (13,6%)	1 (4,5%)	2 (9,1%)	3 (13,6%)
4.	Very high [36,05; 47,3]	1 (4,5%)	0 (0%)	1 (4,5%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (4,5%)
Total		22 (100%)	22 (100%)	22 (100%)	22 (100%)	22 (100%)	22 (100%)	22 (100%)	22 (100%)

Source: authors' compilation based on the Eurostat database.

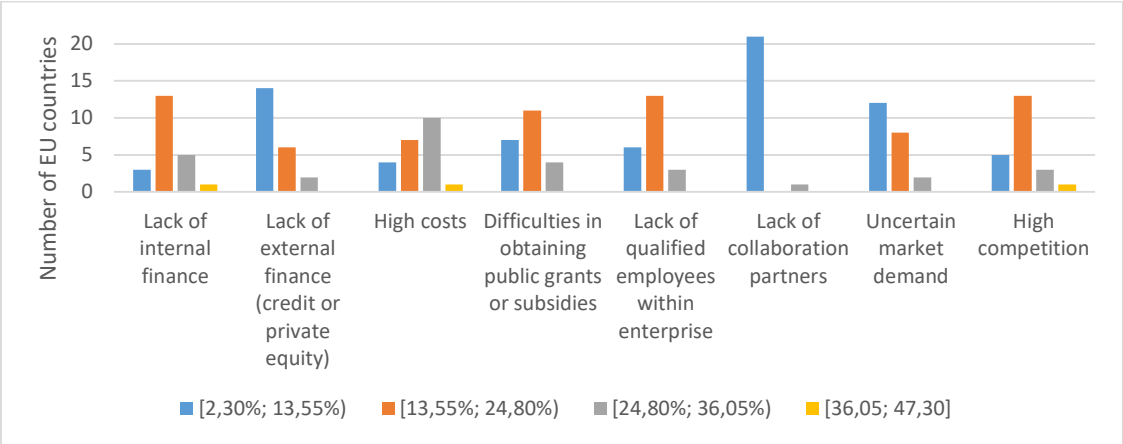

Fig. 1: The histograms of innovative enterprises' indications identifying significant barriers to innovation activities in the European Union countries

Source: authors' compilation based on the Eurostat database.

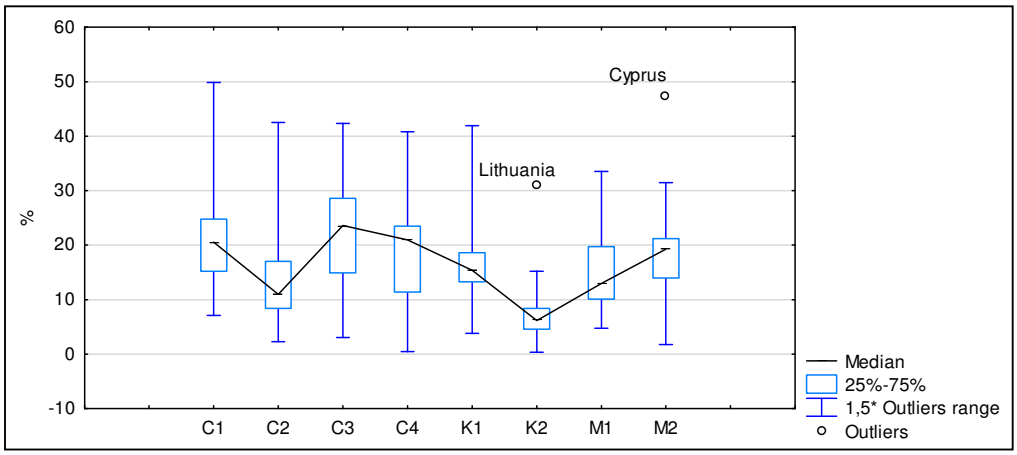

Fig. 2: Box plot for barriers hampering innovation activities (% of indications to a given barrier by innovative enterprises)

Source: authors' compilation based on the Eurostat database.

The identification of outliers completes the first research stage, simultaneously commencing further analyses addressing the separation of the relatively homogeneous classes covering the EU countries in terms of barriers to innovation activities indicated by the innovative enterprises.

Classification of the European Union countries in terms of barriers to innovation activities of high importance for innovative enterprises

As a result of identifying the outliers regarding the indicated barriers to innovation activities by the innovative enterprises, it was decided that Cyprus and Lithuania will constitute specific one-element classes. Other European Union countries were subject to Ward's classification. Fig. 3 illustrates the results of the hierarchical classification covering 20 EU countries using spanning trees and integration distance diagrams with regard to classification stages. On its basis, a decision was made to separate 3 relatively homogeneous classes of countries.

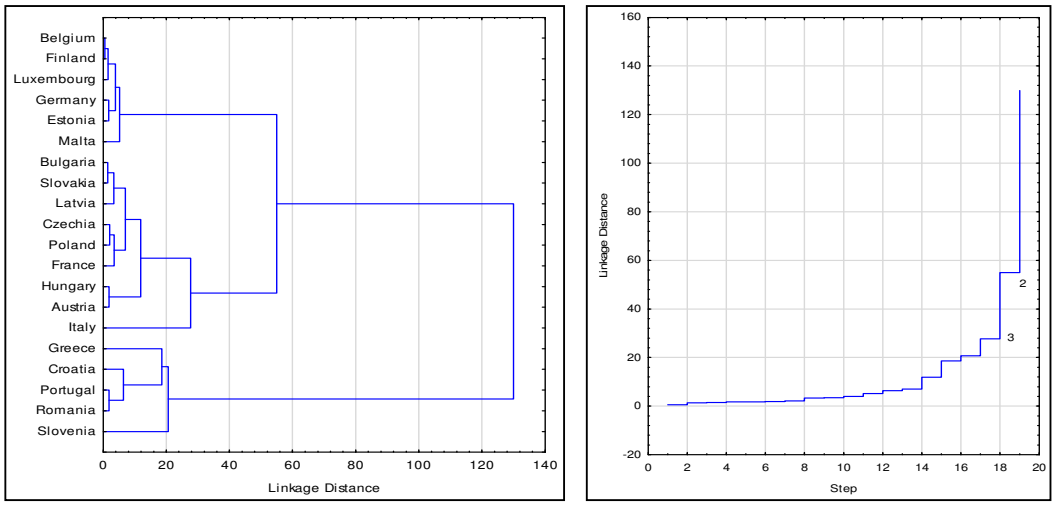

Fig. 3: Dendrogram of connections, integration distances and classification stages using Ward's method for the EU countries

Source: authors' compilation based on the Eurostat database using STATISTICA 13.1 statistical package

Fig. 4 presents the average values of innovative enterprises' indications as barriers to innovation activities, and Fig. 5 the average values of the Summary Innovation Index and the dimensions of innovation in accordance with EIS 2017 for each of the identified classes of the European Union countries. Table 3 presents the composition and profiles of the received classes.

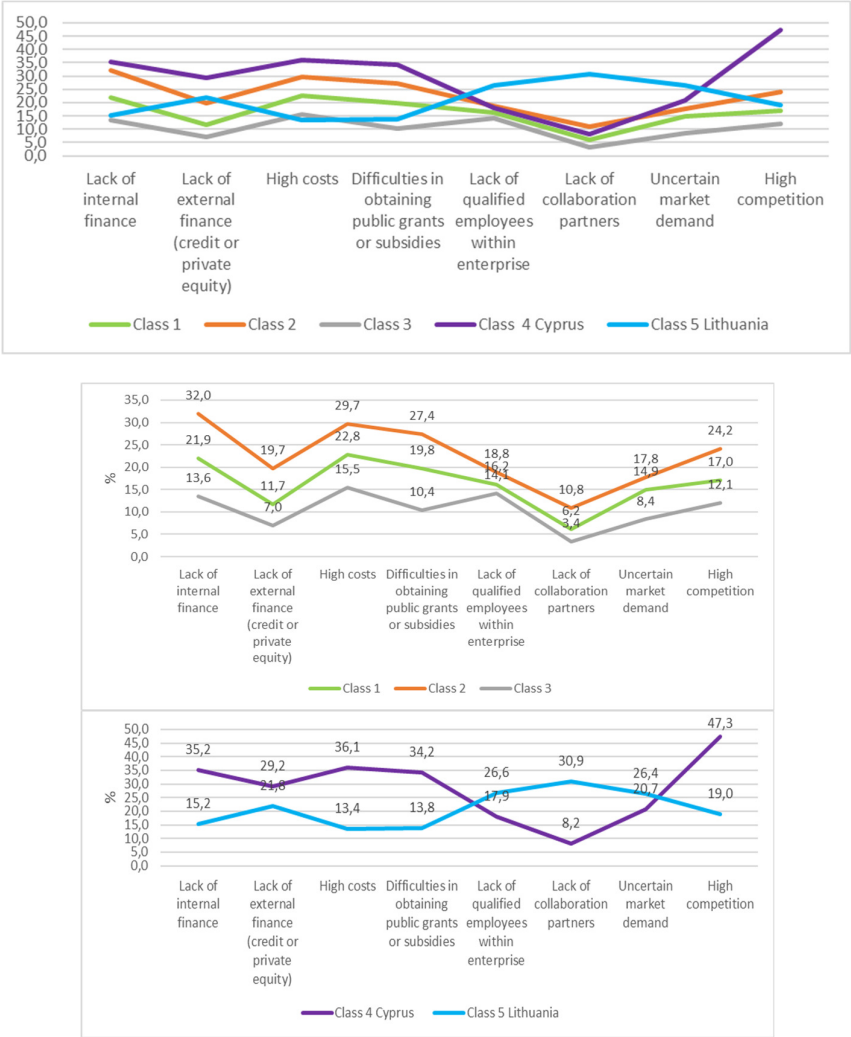

Fig. 4: Average values of innovative enterprises' indications to barriers of innovation activities in the individual classes of European Union countries

Source: authors' compilation based on the Eurostat database

Fig. 5: Class profiles of the EU countries according to the Summary Innovation Index and the innovation dimensions in line with EIS 2017 (average values in individual classes of the European Union countries).

Source: authors' compilation based on the Eurostat database

Table 3: Classification of the European Union countries in terms of the intensity of barriers to innovation activities and class profiles according to the Summary Innovation Index and the dimensions of innovation

Class number	Class characteristics (intensity of barriers to innovation activities)	Class composition	Class profile
1.	Average	Bulgaria, Czechia, France, Italy, Latvia, Hungary, Austria, Poland, Slovakia	The lowest values in Human Resources and Innovators dimensions
2.	High	Greece, Croatia, Slovenia, Portugal, Romania	The lowest value of the Summary Innovation Index (SII)
3.	Low	Belgium, Germany, Estonia, Luxembourg, Malta, Finland	The highest values in all innovation dimensions (except Linkages)
4.	Very high for barriers:	Cyprus	The lowest values in the following

	high competition (M_2) and cost (C_1, C_2, C_3, C_4)		dimensions: Innovation-friendly environment, Finance and support, Firm investments, Linkages, Employment impact
5.	Very high for barriers: lack of collaboration partners (K_2) and lack of qualified employees within enterprise (K_1)	Lithuania	The lowest values in the following dimensions: Research system, Intellectual Assets, Sales impact

Source: authors' compilation based on the Eurostat database.

The intensity of barriers to innovation activities, measured by the percentage of enterprises' indications identifying barriers to high-profile innovation processes, distinguishes three relatively homogeneous classes of countries and two outlier one-element classes. Within the framework of multi-element classes, the best climate for innovation is present in Belgium, Germany, Estonia, Luxembourg, Malta and Finland. The enterprises operating in these countries (class 3) are the least likely to encounter cost, market and knowledge-related difficulties in their activities focused on implementing innovations (reference base – classes 1 and 2; Fig. 4). This situation translates into the highest average value of the Summary Innovation Index in class 3, as well as the components of this indicator (the highest values in all dimensions of innovation in classes 1– 3, and also 1– 5 except Linkages; Fig. 5). Completely different observations refer to Greece, Croatia, Slovenia, Portugal and Romania (class 2). A group of these countries is assigned the lowest average value of the Summary Innovation Index (Fig. 5), and their enterprises most often face the analysed difficulties (reference base – classes 1 and 3, Fig. 4). It can be adopted that these difficulties result in an incomplete implementation of the new or significantly improved solutions, which explains low SII value. The second position in terms of the average Summary Innovation Index value is taken by the countries grouped in class 1 (Bulgaria, Czechia, France, Italy, Latvia, Hungary, Austria, Poland, Slovakia), which seems to result from the average intensity of barriers to innovation activities (Fig. 5) . In this class profile, the lowest values of both Human Resources and Innovators dimensions – SII components are worth highlighting. Cyprus and Lithuania were outside the identified classes (1–3). The specificity of Cyprus (class 4) is manifested in the highest percentage of indications – against the background of other classes (1–3 and 5) – to the factors hampering innovation activities of cost nature and also to high competition barriers (Fig. 4). The aforementioned obstacles definitely have impact on such SII components as innovation-friendly environment as well as finance and support (the lowest values in 1–5 classes). Another peculiarity can be observed in the case of Lithuania (class 5). An unusually high percentage of enterprises indicating knowledge-related barriers to innovation activities should be noted (Fig. 4) while referring Lithuania to other classes, which seems to correlate with the lowest, among the distinguished classes, values of SII components in the dimensions of research system and intellectual assets.

Discussion and conclusions

Summing up the conducted research, it is worth noting that:

- the key barriers to innovation activities, identified based on the percentage of innovative enterprises' indications to high importance of specific barriers (top 3 positions), are associated with cost factors; among the 3 most important barriers to innovation activities, 3 or 2 cost barriers are listed in 8 and 10 EU countries, respectively, and, in addition, the high costs barrier groups as many as 10 countries presenting high indication percentage of all enterprises in the range [24,8%; 36,05%],
- the intensity of revealed barriers to innovation activities, measured by the percentage of enterprises' indications to the specific types of obstacles, translates into the value of the Summary Innovation Index and its components; in general, it can be adopted that the smaller the percentage of enterprises indicating difficulties in innovation activities of cost, market or knowledge-related nature, the higher the value of SII and its components,
- among the EU countries covered by the analysis, in terms of SII, the leading position is taken by the countries grouped in class 1 (Belgium, Germany, Estonia, Luxembourg, Malta, Finland), where the enterprises – generalizing – come across the difficulties in innovation processes the least often,

- the outliers in terms of the distribution of the indications' percentage to individual barriers of innovation activities (Cyprus, Lithuania) are characterised by a similar level of SII as the ones grouped in class 1 (average intensity of difficulties in innovation activities), which seems to be confirmed by their effectiveness in overcoming the revealed barriers to innovations.

The conducted research should be taken into account in the future assumptions of the European Union innovation policy. Their results reveal the key directions of the actions aimed at improving the climate for innovation. The need to reduce the impact of cost factors is of particular importance. Solving this problem may result in the intensification of innovation oriented processes.

Acknowledgements

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Barriers to Innovation Activities from the Perspective of Non-Innovative Enterprises in The European Union Countries

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Abstract

The identification of barriers to innovation activities is of significant importance in the proper climate development for innovation. In the course of this process, it should be remembered that the perception of factors hampering or preventing the implementation of innovation activities depends on the characteristics of enterprises. The heterogeneity of perception is influenced by, e.g., enterprise size, the history of its operations, development strategy, the entrepreneur's country of origin, the degree of innovation as well as the division into innovative and non-innovative entities. The latter should remain the subject of special interest, because the identified barriers determine their resignation from innovation activities. Therefore, the adopted research goals focused on identifying the key barriers to innovation activities among non-innovative enterprises in the European Union, the classification of countries regarding the similarities of factors determining the resignation from such activities and determining correlations between the indications to these factors and innovation activities in individual countries. This study was focused on verifying the hypothesis adopting that the perception of significant barriers to innovative activity by a wide range of non-innovative enterprises translates into the low intensity of innovative processes. The research results from the Community Innovation Survey (2016) and the European Innovation Scoreboard 2017 served as the information basis for the conducted analyses. The multi-dimensional statistical analysis methods, including data classification methods were used in the research.

Keywords: Innovation Activities, Non-Innovative Enterprises, Barriers to Innovation Processes.

Introduction

Recognizing barriers to innovation activities is of significant importance. Their identification and in-depth analysis allows determining the nature of factors which either hamper or prevent undertaking actions aimed at the implementation of new or significantly improved solutions. Acquiring knowledge about the essence of barriers to innovations helps in defining the group of actions which eliminate or reduce the extent of their impact. Chen and Hove (2011) have adopted that by identifying specific barriers to innovations one can simultaneously learn about the ways to overcome them, however, the potential difficulties have to be recognized in due time in order to increase the chances for solving the occurring problems (Hueske, Endrikat and Guenther 2015).

The activities focused on eliminating or reducing factors preventing or hampering innovation processes should be undertaken by the enterprises and entities responsible for developing the appropriate climate for innovations. This postulate results from the division of barriers – for new or significantly improved solutions – into internal and external ones (Hadjimanolis 1999; Mohnen and Rosa 2002; Tourigny and Le 2004; Duarte, Madeira, Moura, Carvalho and Moreira 2017). The first of them remain within the enterprises themselves and require undertaking appropriate corrective or improving actions (e.g. organisational rigidities within the enterprise: attitude of personnel towards change, attitude of managers towards change). The situation is different in the case of external barriers. Enterprises are not capable of solving problems related to e.g. lack of external finance – credit or private equity, lack of infrastructure or the weakness of property rights. It also happens that joint actions (of enterprises and entities from

their environment) turn out indispensable to overcome certain barriers (e.g. lack qualified personnel: within the enterprise, in the labour market). It should also be remembered that many barriers are of complementary nature (Mohnen and Roller 2005; Galia and Legros 2004). It means that their influence is simultaneous (e.g., insufficiently qualified enterprise staff and internal resistance to change; Mohnen and Rosa 2002), whereas their impact power is not a simple sum, but a synergy of negative factors (Shiang and Nagaraj 2011). In such circumstances, eliminating or reducing individual barriers seems pointless. Systemic actions are required (Mohnen and Roller 2005), because it is only them that can create a favorable climate for innovations. It is also worth highlighting that irrespective of the barrier type, the actual process of their impact elimination or reduction begins with the identification of factors hampering or preventing innovative processes. The experience gained by enterprises remains an invaluable source of information in this respect.

The perception of barriers is correlated – as many studies show – with enterprise characteristics. Among the factors influencing this perception the following, among others, are listed and analyzed:

- enterprise size; e.g. Hyytinen and Toivanen (2005) found that small businesses indicate cost barriers more often than large enterprises; the contrary findings in this regard were presented by Tourigny and Lee (2004) and Iammarino, Sanna-Randaccio and Savona (2007). Their research shows that along with the enterprise size the feeling of financial constraints declines;
- the history of business activity; e.g. Schneider and Veugelers (2008) showed that the enterprises featuring a short history of business activity are more likely to encounter financial barriers than the ones with a longer market presence,
- development strategy; e.g. the companies involved in internal research and development work focused on radical technological innovations usually experience cost barriers which do not pose significant limitations to innovation activities in the case of export-oriented enterprises (Galia and Legros 2004),
- the entrepreneur's country of origin; e.g. Immmarino, Sanna-Randaccio and Savona (2007) noted that foreign corporations (operating in Italy), unlike the Italian ones, are more aware of the encountered barriers,
- the degree of company innovation; e.g. Pihkala, Ylinenpaa and Vesalainen (2002) observed that the companies presenting high innovation level consider market conditions a significant barrier to innovation activity, whereas the companies characterised by low innovation activity point to barriers taking the form of internal knowledge and access to information.

Heterogeneous perception of barriers to innovations – as noted by Hölzl, Janger, Stadler, Reinstaller, Unterlass, Daimer and Stehnken (2010) – is observed among the innovative enterprises, disregarding the non-innovative ones in the research as well as the factors they identify as preventing them from implementing innovative activities. This approach does not seem justified. The need to distinguish between innovative and non-innovative enterprises is highlighted by many authors (Arundel 1997; Baldwin and Lin 2002; Galia and Legros 2004; Hoffman, Parejo and Bessant 1998; Keizer, Dijkstra and Halman 2002; Radas and Božič 2009; Szczepańska-Woszczyna 2014), because the first of them attribute larger importance to the factors hampering innovation activity, whereas the latter show a greater tendency towards pointing to the complementarity of individual impediments (Shiang and Nagaraj, 2011).

These observations seem natural, because overcoming the revealed barriers – as opposed to the deterrents[1]– results in obtaining full knowledge about their nature and impact. It does not mean, however, that the research should focus on the innovative enterprises, which empirically verify the importance of obstacles to innovation. Among them, only the barriers hampering innovation processes can be found, whereas full recognition of the impediments to innovations is also associated with the need to identify factors preventing innovation activities. In other words, among the innovators, the factors impeding success are analyzed, while in the environment of non-innovators, the factors determining failure are investigated. It is also worth remembering that in the future the enterprises and countries capable of breaking conventional solutions will be successful (Lesáková, Gundová, Kráľ, Ondrušová 2017). Therefore, it is necessary to transform the non-innovative enterprises into innovative[2] ones, which cannot be done without identifying factors determining the resignation from innovation activities. The presented

article constitutes a part of this research, focused on identifying the key barriers to innovation activities among non-innovative enterprises in the European Union countries, classifying countries regarding the similarities of factors determining the resignation from innovation activities and identifying correlations between indications to these factors and the innovation activities in individual countries. Two questions were raised within the framework of the aforementioned research goals:

- are the most important barriers to innovation activities, experienced by the non-innovative enterprises, the same or similar in the EU countries or are they diversified (e.g. in some countries the most significant barriers are ingrained in the factors related to knowledge, whereas in others to the market)?
- is there any correlation between the high percentage of non-innovative enterprises' indications to barriers of innovation activities and the actual innovation activities implemented in the analysed countries?

In the light of these questions, a hypothesis was put forward that the perception of significant barriers to innovative activity by a wide range of non-innovative enterprises translates into the low intensity of innovative processes.

Barriers to enterprise innovation activities in the EU countries

Data and Research Method

In the conducted research:

- the statistical data from the latest edition of the Community Innovation Survey (2016) were used, the results of which were provided as part of the official statistics (Eurostat 2019; retrieved on November 29, 2019) as well as the statistical information from the European Innovation Scoreboard 2017 (The European Innovation Scoreboard 2017 provides statistical information covering 2016),
- these European Union countries were included for which either complete or possible to supplement data – using a stepwise regression method – are available in terms of barriers to innovation activities,
- the most important barriers to innovation activities were taken into account (the percentage of enterprises indicating "high" importance of a given barrier in the four-level scale of assessments determining the importance of individual barriers as: 1 - high, 2 - medium, 3 - low, 4 - irrelevant),
- non-innovative enterprises and the potential barriers to their innovation activities identified under CIS and presented in EUROSTAT were taken into consideration, i.e.:
  - cost factors:
    C_1 – lack of internal finance (% of non-innovative enterprises),
    C_2 – lack of external finance – credit or private equity (% of non-innovative enterprises),
    C_3 – high costs (% of non-innovative enterprises),
    C_4 – difficulties in obtaining public grants or subsidies (% of non-innovative enterprises),
  - knowledge-related factors:
    K_1 – lack of qualified employees within enterprise (% of non-innovative enterprises),
    K_2 – lack of collaboration partners (% of non-innovative enterprises),
  - market factors:
    M_1 – uncertain market demand (% of non-innovative enterprises),
    M_2 – high competition (% of non-innovative enterprises),
    M_3 – low market demand (% of non-innovative enterprises),
    M_4 – little market competition (% of non-innovative enterprises),
  - factors related to other reasons for failures in implementing innovation processes:
    O_1 – lack of good ideas (% of non-innovative enterprises),
    O_2 – previous innovations (% of non-innovative enterprises).

The study covered 21 European Union countries. Belgium, Denmark, Ireland, United Kingdom, Netherlands, Spain and Finland were not included due to the total unavailability of data. Statistical information

about France and the Czech Republic was only partly unavailable. In this case, information gaps were filled in using the stepwise regression method.

The following research procedure was used in the study:

1. Selection of the key barriers discouraging or preventing innovation activities of non-innovative enterprises in the individual EU countries. The identified key deterring factors from innovation activities were considered the first three positions with the highest percentage of indications by non-innovative enterprises.
2. Graphic analysis and presentation of the indications' value distribution of non-innovative enterprises regarding barriers to innovation activities.
3. Identification of outliers among the EU countries, based on atypical indications of non-innovative enterprises to barriers deterring innovation activities using box plot.
4. Identification of relatively homogeneous classes of the EU countries in terms of the similar importance of individual barriers deterring enterprises from innovation activities using cluster analysis methods. The classification methods were addressed by, e.g., Ward (1963), Johnson (1967), Anderberg (1973), Hartigan (1975), Sneath, Sokal (1973), Aldefender Blashfield (1984), Basiura, Sokołowski (2007).
   The classification of the EU countries was carried out following the below research steps:
   - classical standardization of variables (barriers C_1- C_4, K_1-K_2, M_1-M_4, O_1-O_2);
   - determining the distance between countries resulting from barriers to innovation activities indicated by enterprises as important, using squared Euclidean distance;
   - separate classification of the EU countries using the hierarchical Ward's method, allowing homogeneity within the identified classes and heterogeneity between classes. The final number of classes was determined using the criterion of the first significant increase in agglomeration distance. For this purpose, the dendrogram of connections, integration distances and classification stages were analysed.
5. Characteristics and presentation of the identified classes of countries using average values of enterprises' indications to barriers acting as deterrents to innovation activities.
6. Defining the profiles of obtained classes for the EU countries. To achieve this goal, the Summary Innovation Index (SII) and the indicators representing all innovation dimensions specified in the European Innovation Scoreboard 2017 (European ..., 2017) were analysed.

Results of Empirical Research

Barriers to innovation process identified by non-innovative enterprises should be perceived in the category of deterrents to the activities aimed at the implementation of new or significantly improved solutions, or factors preventing this activity.

Table 1 lists the deterring barriers – resulting in the resignation from innovation activity even before commencing it – indicated by the largest part of enterprises (three fist positions in terms of the highest percentage of indications) in at least two EU countries.

Table 1: Key factors preventing enterprise innovation activities in the individual EU countries indicated by the non-innovative enterprises

No.	Countries	Barriers (C_1,C_2, …, O_2) and their ranking position (L = 1,2,3) including the percentage of indications by non-innovative enterprises (%)									
		C_1		C_3		M_3		O_1		O_2	
		L	%	L	%	L	%	L	%	L	%
1.	Bulgaria	3	8,4	2	9,4	1	12,0	-	-	-	-
2.	Czechia	1	17,3	3	13,1	2	15,4	-	-	-	-
3.	Germany	-	-	2	12,6	1	17,1	-	-	3	9,1
4.	Estonia	-	-	3	9,4	1	12,7	-	-	2	9,6
5.	Greece	2	17,0	-	-	1	21,1	-	-	-	-
6.	France	1	14,3	2	13,8	3	12,8	-	-	-	-
7.	Croatia	2	9,1	2	8,1	1	9,4	-	-	-	-
8.	Italy	2	14,5	-	-	1	17,5	-	-	-	-
9.	Cyprus	-	-	-	-	1	37,6	-	-	2	30,0
10.	Latvia	-	-	-	-	1	13,6	3	10,4	2	12,3
11.	Lithuania	-	-	-	-	-	-	-	-	1	22,7
12.	Luxembourg	-	-	-	-	1	17,2	3	5,0	2	9,6
13.	Hungary	-	-	3	7,3	1	18,2	-	-	2	7,6
14.	Malta	-	-	3	2,0	1	7,5	-	-	2	5,5
15.	Austria	-	-	-	-	1	17,1	3	7,5	2	12,1
16.	Poland	3	7,0	2	8,0	-	-	1	8,9	-	-
17.	Portugal	-	-	3	9,2	1	13,5	-	-	2	12,7
18.	Romania	-	-	3	6,5	1	9,9	-	-	2	7,7
19.	Slovenia	3	8,0	-	-	1	14,7	-	-	2	9,1
20.	Slovakia	1	14,4	3	12,8	2	12,9	-	-	-	-
21.	Sweden	3	8,1	-	-	1	11,6	-	-	2	10,5

Source: authors' compilation based on the Eurostat database.

Low market demand is the key deterrent barrier to innovation activity. Non-innovative enterprises from 16 EU countries ranked this factor as first among barriers to innovations, in the next three countries it was ranked the second (Czechia, Slovakia) or third (France) in terms of the highest percentage of indications (Tab. 1). Previous innovations were recognized as another significant limitation to the innovation activity. Enterprises from 13 countries identified them as the reason for giving up actions to implement new or significantly improved solutions (2nd place in terms of the highest percentage of indications in 11 EU countries; 1st place – Lithuania; 3rd place – Germany). The list of key deterrents to innovation activities is closed by economic factors – high costs and lack of internal finance, indicated by the enterprises from 12 and 10 countries, respectively. Surprisingly, they are not the top ranked barriers (usually 3rd or 2nd position in terms of the percentage of the total number of enterprises).

The distribution of indications made by non-innovative enterprises into individual barriers to innovation activities of a deterrent nature seems to show a fairly positive picture (Fig. 1). High – [18,8; 28,2) – or very high – [28,2; 36,7] – percentage of the total number of enterprises is grouped by a few factors in individual countries. Usually, a small fraction of non-innovative production or service entities (low percentage of responses) recognize deterrent barriers. Low market demand is the only barrier that clearly stands out from the picture. This factor is indicated by 9,4% up to 18,8% enterprises from 16 countries.

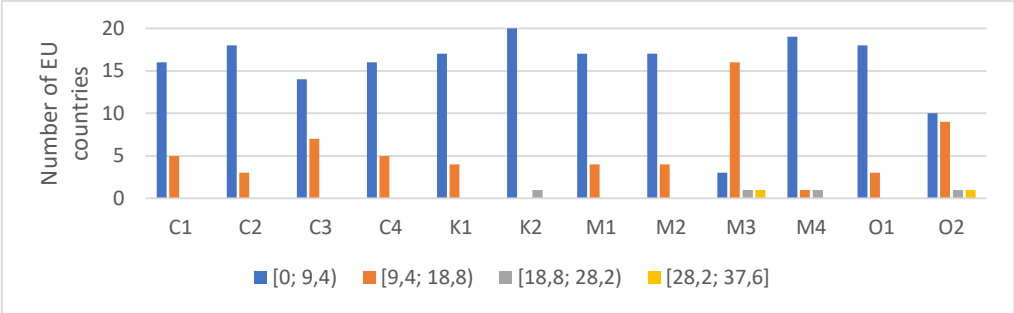

Fig. 1: The histograms of non-innovative enterprises' indications identifying significant barriers to innovation activities in the European Union countries

Source: authors' compilation based on the Eurostat database.

Fig. 2 presents the characteristics of individual indicators determining the percentage of non-innovative enterprises' indications to individual barriers hampering innovation processes. Atypically high indications of barriers deterring innovation activities were recorded in the case of Lithuania and Cyprus. Almost 20% of non-innovative enterprises in Lithuania identified the lack of collaboration partners as the barrier to innovations (K_2). The median of indications to this factor, among the analysed EU countries, was only 3,2%, and the minimum value recorded by Luxembourg enterprises was 0,4%. The enterprises from Cyprus pointed, with an unusually high frequency (24%), to the barrier little market competition (M_4). The median of indications to this market factor in the analysed countries is as low as 4,8%, whereas the minimum value is 1,7% (Malta).

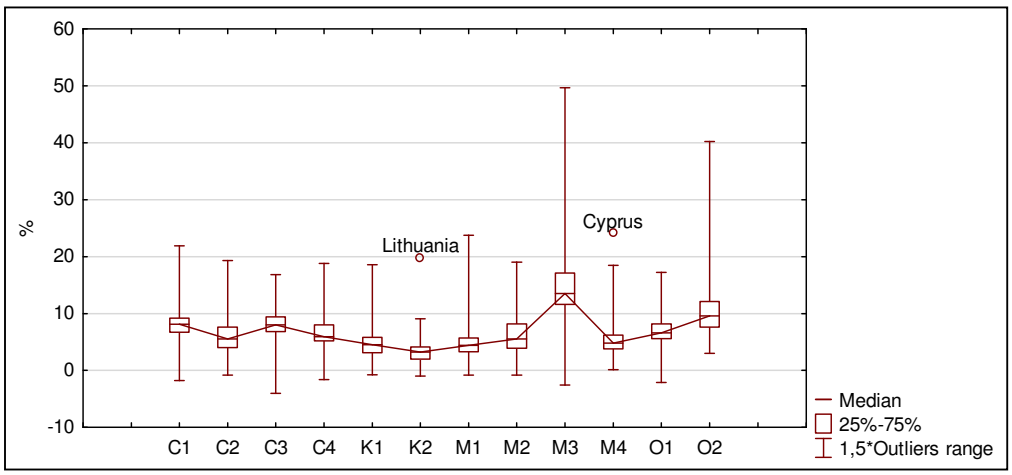

Fig. 2: Box plot for barriers preventing or deterring innovation activities (% of indications to a given barrier by non-innovative enterprises)

Source: authors' compilation based on the Eurostat database.

The next step of the research procedure was the classification of the EU countries using Ward's method. Fig. 3 illustrates the results of the hierarchical classification covering 21 EU countries using spanning trees and integration distance diagrams with regard to classification stages. Based on his analysis, the decision was made to separate five relatively homogeneous classes of the EU countries in terms of 12 deterrents to innovation activities, indicated by the non-innovative enterprises.

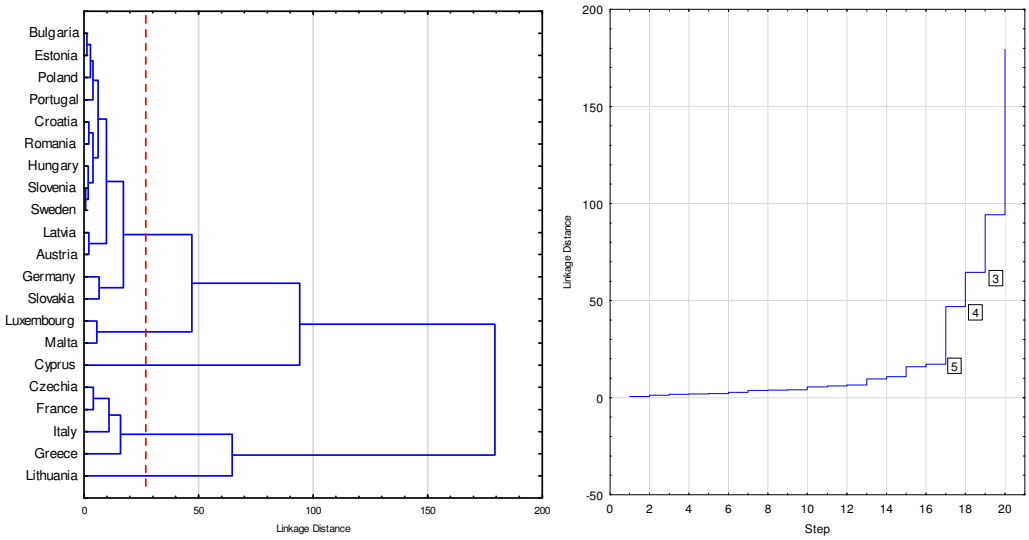

Fig. 3: Dendrogram of connections, integration distances and classification stages using Ward method for EU countries

Source: authors compilation based on Eurostat data by applying STATISTICA 13.1 statistical package

Fig. 4 presents the average values of non-innovative enterprises' indications as barriers to innovation activities in the identified classes of countries constituting the basis for their detailed analysis.

Fig. 5 presents the profiles of classes for the EU countries identified based on the average class values of the Summary Innovation Index and the indicators describing the dimensions of innovations in accordance with EIS 2017.

Table 2, which presents the results of the EU countries' classification, as well as the characteristics and profiles of the received classes, summarizes the conducted research and performed analyses.

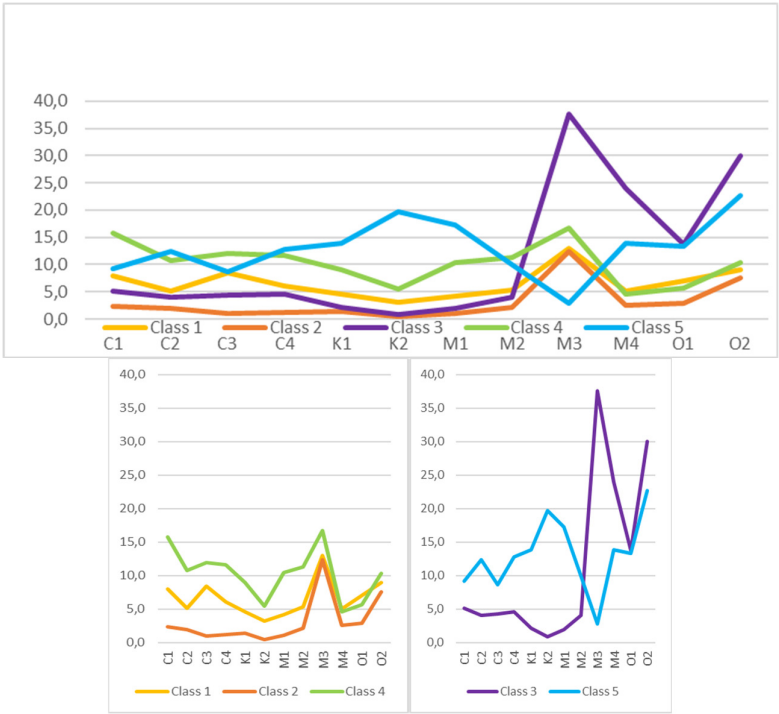

Fig. 4: Average values of non-innovative enterprises' indications to barriers of innovation activities in the individual classes of European Union countries

Source: authors' compilation based on the Eurostat database

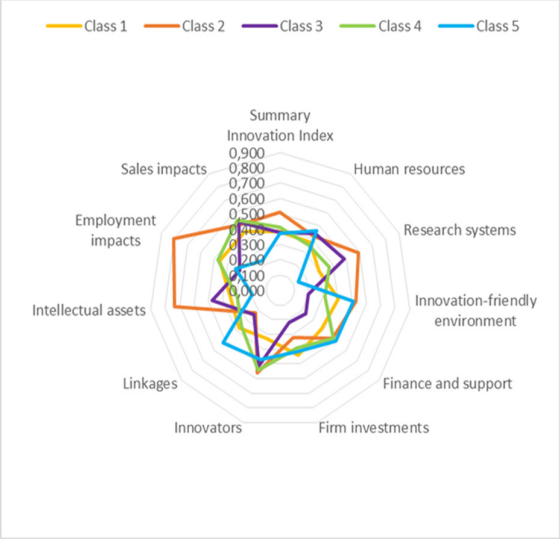

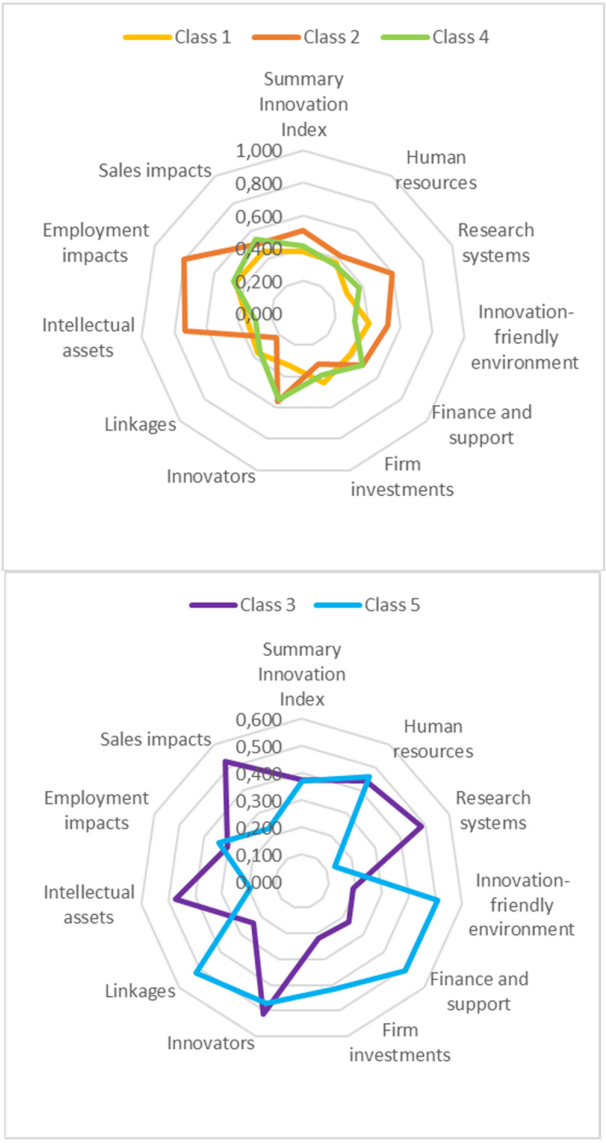

Fig. 5: Class profiles of the EU countries according to the Summary Innovation Index and the innovation dimensions in line with EIS 2017 (average values in individual classes of the European Union countries).

Source: authors' compilation based on the Eurostat database

Table 2: Classification of the European Union countries in terms of the intensity of barriers deterring innovation activities and class profiles according to the Summary Innovation Index and the dimensions of innovation

Class number	Class characteristics (intensity of barriers deterring innovation activities)	Class composition	Class profile
1.	Average	Bulgaria, Germany, Estonia, Croatia, Latvia, Hungary, Austria, Poland, Portugal, Romania Slovenia, Slovakia, Sweden	Maximum value in the dimension of Firm investments and minimum value in the dimension of Innovators
2.	Low	Luxembourg, Malta,	Maximum value of the Summary Innovation Index (SII) and Research system, Innovation-friendly environment, Innovators, Intellectual Assets and Employment impact
3.	Very low in terms of cost and knowledge-related barriers, and very high regarding low market demand (M_3) and previous innovations (O_2)	Cyprus	Minimum values in the following dimensions: Innovation-friendly environment, Finance and support, Firm investments and Employment impact
4.	High	Czechia, Greece, France, Italy,	The lowest values in Human resources and the highest in Sales impacts
5.	Very high in terms of knowledge-related, high competition (M_2) and previous innovations (O_2) barriers	Lithuania	Minimum values of the Summary Innovation Index (SII) and Research system, Intellectual Assets and Sales impact, and simultaneously maximum values in Human Resources, Innovation-friendly environment and Linkages

Source: authors compilation based on Eurostat data

The intensity of barriers deterring innovation activities – measured by the percentage of non-innovative enterprises' indications to factors discouraging or preventing the activities aimed at implementing innovations – results in identifying three relatively homogeneous classes of countries and two outliers – one-element classes (classes 3 and 5; Tab. 2, Fig. 4). Luxembourg and Malta, co-creating the second class, group the non-innovative enterprises which rarely see barriers to innovation activities of a deterrent nature (except M_3 – the lowest value in Lithuania). This leadership is justified by the highest average value of the Summary Innovation Index (SII), as well as its components in terms of the research system, innovation-friendly environment, innovators, intellectual assets and employment impact (Fig. 5). Class 4 (Czechia, Greece, France, Italy) is at the opposite end. It shows – apart from one-element classes – the highest average values of non-innovative enterprises' indications to barriers hampering innovation activity (except: M_4, O_1; the highest values in class 1), as well as the lowest value referring to human resources and the highest one in sales impacts (SII components). Class 1is characterised by the average intensity of barriers deterring innovation activities (Bulgaria, Germany, Estonia, Croatia, Latvia, Hungary, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Sweden; Fig. 4). In this case, the average of indications to individual deterrents remains below 10% (except: M_3). In addition, it is distinguished by the maximum value referring to

investment companies and the minimum one in the dimension of innovators (SII components). Cyprus and Lithuania form unusual, one-element classes. The specificity of Cyprus (class 3) is manifested in a very low percentage of indications of non-innovative enterprises to cost and knowledge-related factors (class 2 is the only one with a lower percentage), and also in the highest perception of low market demand and previous innovations as deterrent barriers, comparing to other classes. These observations are surprising against the background of this class profile (e.g. minimum values in the dimensions: innovation-friendly environment and finance and support). Lithuania (class 5), unlike Cyprus and other classes, is characterised by very high indications of knowledge barriers, and also high competition and previous innovations. Some of these barriers seem to be perfectly combined with the profile of this class (Tab. 2).

Discussion and conclusions

The conducted research allows concluding as follows:

- key factors discouraging or preventing innovation activities in the EU countries, identified based on the percentage of indications made by the non-innovative enterprises pointing to high importance of the specific barriers (top 3 positions), include low market demand (first place), previous innovations (second place) and economic factors (high costs and lack of internal finance; third place),
- high – [18,8; 28,2) – or very high – [28,2; 36,7] – percentage of the total number of enterprises are grouped by few deterring barriers in individual countries,
- the lowest frequency of barriers deterring innovation activities, measured by the percentage of non-innovative enterprises' indications to factors either discouraging or preventing actions aimed at implementing innovations, is recorded in Luxembourg and Malta (the class of countries presenting the highest average value of the Summary Innovation Index).
- the majority of the EU countries is characterised by an average intensity of the deterring barriers occurrence, which hamper innovation activities (Bulgaria, Germany, Estonia, Croatia, Latvia, Hungary, Austria, Poland, Portugal, Romania Slovenia, Slovakia, Sweden).

The results of the conducted research prove that the perception of significant barriers to innovative activity by a wide group of non-innovative enterprises translates into the low intensity of innovative processes (Lithuania, Czechia, Greece, France, Italy; Tab. 2).

Summarising the results of the conducted research, it should be highlighted that the vast majority of non-innovative enterprises either do not notice or ignore the barriers to innovation activities (low percentage of indications to highly important deterrents), which may result from their lack of experience. Many factors hampering the efforts aimed at implementing new or significantly improved solutions are detected only in the course of innovation processes. Overcoming them results in gaining full knowledge about various obstacles to innovations. In addition, the experience of running an innovative business can change the approach to the importance of individual barriers. For example, it can be expected that cost barriers will be recognized as the leading ones, and lower weight will be assigned to such factors as low market demand or previous innovations. However, these observations do not undermine the validity of conducting the research focused on identifying barriers to innovation activities among the non-innovative enterprises, because – as it has already been emphasized – among innovators the factors hindering success are investigated, whereas in the environment of non-innovators the factors which determine the failure.

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[1] Deterring barriers, unlike the revealed ones, determine refraining from undertaking innovation activities (D'Este, Iammarino, Savona and Tunzelmann 2012).

[2] This process is very difficult, because innovation oriented activities are always associated with risk, high costs and no guarantee of the incurred expenditure recover (Koellinger 2008; Ceccagnoli 2009).

Human Capital Development in The Process of The Use and Provision of Electronic Services in Ukraine

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Abstract

The purpose of the article is to study the role of human capital in the development of the electronic services system in Ukraine in order to increase the level of information and communication technologies and implementation of e-governance tasks in Ukraine. There are following methods used in the article: dialectical method - understanding the role of capital in the transition from post-industrial society to information society; scientific abstraction - defining the nature of the interdependence between the human capital and process of the provision of electronic services; systemic analysis - establishing a structural link between executive authorities and enterprises, institutions and organizations operating in human capital sectors; statistical methods (grouping, comparison) - used in the comparative analysis of ranking indicators of innovation activities in Ukraine in terms of human capital compared to the top ten foreign countries in the Global Innovation Index in 2019. Analysis of Ukraine's innovation activities showed that the main problems of the human capital development in Ukraine are related to lax regulatory policies, low level of scientific development and lack of knowledge of the majority of public authorities' staff due to the poor awareness on how to use information and communication technologies. Solving these problems is to level up civil servants' ability to use electronic systems in the structural units regulating the human capital sectors, during the interaction with sectoral public and private institutions in order to control the provision of electronic services. It will provide an opportunity to increase the number of new jobs created, labour productivity and significantly improve living standards of the population.

Keywords: Human Capital, Electronic Services, Information And Communication Technologies, Innovations, Investments

Introduction

In Ukraine the information society development is based on increasing public electronic services, which can be both administrative (registration, licensing, certification, verification, nostrification, legalization, establishing a status) and non-administrative (introduction of information and communication technologies – ICTs in science, education, culture, health care, environmental protection; information security). However, the problem of ICTs development has, to a large extent, the typical problems of a shortage of qualified personnel in public authorities or reporting institutions, who could properly use the certain general (electronic document management system – EDMS, electronic taxpayer office, etc.) or specialized (sectoral) information systems (eHealth, environmental monitoring system, shared environmental information system – SEIS, etc.).

Thus, during the period of the development of legal democratic states, the various governments of the country took steps to create the certain national or local information systems for providing electronic services. Since late 2014, the new Government of Ukraine has been actively pursuing a program of reforms guiding the country through the European integration to an open and transparent democracy. The e-governance has been identified as one of the most important tools for achieving these goals, which is also indicated by the creation of a State Agency for E-Governance of Ukraine under the Ministry of Regional Development, Construction, Housing and Communal Services of Ukraine. However, despite the significant impetus in the development of e-governance and provision of electronic services, the problem has remained an issue for using modern ICTs and would require further clarification.

Analysis of recent research and publications. Recently, there were published research papers by Ukrainian scholars, in particular Panchyshyn, T. V. (Panchyshyn, 2017), Sakhnenko, O. I., Sakhno, I. V. (Sakhnenko and Sakhno, 2019) and foreign researchers, in particular Calkin, S. (Calkin, 2018), Pease, G., Beresford, B., Walker, L (Pease, Beresford and Walker, 2014) trying to place great emphasis on the development of human capital in order to improve the investment climate in the country. These researchers identify the necessity to develop the key sectors of activities, such as social protection, education, culture, health, sports, providing an opportunity to increase the flow of national and foreign investment through investors' awareness of the low level of investment risk which consists in human labor efficiency in relevant sectors and, therefore, responsibility of the recipients for fulfilling all the necessary conditions of the investment contract. However, the question of determining the main impacts on the employee efficiency in public and private enterprises, institutions and organizations operating in the human capital sectors remains to be resolved.

Other Ukrainian researchers such as Vasyltsiv, T. G., Lupak, R. L., Rudkovskyi, O. V. (Vasyltsiv, Lupak and Rudkovskyi, 2019), Kokhan, V. P., Egorova-Lutcenko, T. P. (Kokhan, Egorova-Lutcenko, 2018), Orlova, N., Mokhova, I., Diegtiar, O., Khomutenko, O. (Orlova, Mokhova, Diegtiar and Khomutenko, 2019), and foreign scholars such as Sridhar, V. (Sridhar, 2019), Susanto, H, Leu, F. Y., Chen, C. K., Mohiddin, F. (Susanto, Leu, Chen and Mohiddin, 2019) dedicate their work to the importance of ICTs development in public administration, considering the various electronic systems that should be used by the specialists of public authorities, accountable public institutions and organizations and also private enterprises, performing their official powers in a particular sectoral direction. However, the study of investment in human capital as a major impact on the development of ICTs as the main part of innovation infrastructure in a particular sector of activity was neglected by the scholars.

As for EU countries' experience, some researchers, such as Culpepper, P. D. (Culpepper, 2003) and Feldmann, H. (Feldmann, 2017), have come to the conclusion, that the investment support from foreign countries, in particular the USA, plays a very important role in the formation of any human capital sector, for which due to the investments in innovations there are no defects in the innovation infrastructure development. At their discretion, the state should only act as a supporter of the economic freedom on human capital investment. But, nevertheless, such scholars as Angelopoulos, K., Malley, J. and Philippopoulos, A. (Angelopoulos, Malley and Philippopoulos, 2017), Dukes, R. (Dukes, 2014), Triantafillidou, E. (Triantafillidou, 2020) have made in their researchers a number of

suggestions on how to increase the role of the state as a regulator of the creation of new jobs, having specific features for both high-skilled and low-skilled personnel, while investment should only be made to improve the skills of the workforce. This, in turn, will help the public and private institutions to gain an economic benefit in the future and, therefore, invest large sums of money in the development of innovation infrastructure in human capital sectors.

Thus, taking into account Ukraine's European integration aspirations, the relevance of the research topic reinforces the necessity of using the foreign experience in the development of human capital and ICTs, which will help us to find the middle ground between job growth and skilled workforce increase in sectors whose service to the population has a significant impact on their standard of living. This requires to reform the Ukraine's economic development in terms of investment in human capital and ICTs within the framework of the implementation of the Association Agreement between the European Union and the European Atomic Energy Community and their Member States, of the one part, and Ukraine, of the other part (Supreme Council of Ukraine, 2017).

The purpose of the article is to study the role of human capital in the development of the electronic services system in Ukraine in order to increase the level of ICTs and implementation of e-governance tasks in Ukraine.

The methodological basis of the study is data obtained from the Ministry of Social Policy of Ukraine, Ministry of Education and Science of Ukraine, Ministry of Culture of Ukraine, Ministry of Health of Ukraine, Ministry of Youth and Sports of Ukraine, Analysis: Explore Economy Reports (Global Innovation Index, 2019).

Main Part of Research

As the human capital is an awareness of the crucial role of people in the economic system of social relations, it is increased through the investment by limiting current consumption and has a lasting economic impact. In other words, the investment capital is a set of measures aimed at enhancing human professional competence and work potential to fulfillment of his / her professional duties. Thus, the investment in human capital is an investment in improvement of human labor. This implies that the primary source of investment in human capital is investment in education, as during the study in educational institutions, people begin to realize their role in society and how important is to conduct research activities for making the research and development (R&D) of technical and technological infrastructure, keeping traditions in country of residence for the sake of preserving moral and cultural values, maintaining a healthy lifestyle and sports activities for the sake of maintaining a good health, and adhering to laws in public relations to prevent social imbalances in society.

Based on the above, let us analyze Ukraine's ranking in the Global Innovation Index (2019) by major components of human capital in comparison with the top ten countries of the world (Table 1).

Table 1: Ukraine's ranking in the Global Innovation Index in 2019 in terms of human capital, compared to the top ten countries

No	Country	Innovation level, score/rank								
		Regulatory environment	Institutions	Education	Tertiary education	R&D	Human capital and research	ICTs	Infrastructure	Overall
1	Switzerland	95.9/6	89.1/12	58.8/30	49.2/17	77.9/4	61.9/7	86.5/19	68.2/3	67.2/1
2	Sweden	92.0/13	90.1/9	67.8/6	43.1/28	75.3/6	62.1/6	89.5/12	69.1/2	63.7/2
3	USA	93.9/9	89.7/11	54.5/45	34.6/53	77.9/3	55.7/12	89.7/8	59.2/23	61.7/3
4	Netherlands	91.9/14	90.9/8	60.1/23	32.8/59	64.4/12	52.4/17	91.1/4	61.8/14	61.4/4
5	United	93.7/11	87.1/14	57.7/34	52.4/11	67.8/9	59.3/9	93.0/3	64.4/8	61.3/5

	Kingdom									
6	Finland	96.1/5	93.6/3	69.9/4	53.0/10	67.3/10	63.4/2	87.5/16	62.1/12	59.8/6
7	Denmark	95.3/7	91.7/6	73.5/2	42.6/29	73.3/8	63.1/4	93.1/2	65.8/6	58.4/7
8	Singapore	98.3/2	94.9/1	50.3/57	77.1/1	61.6/13	63.0/5	89.6/11	65.4/7	58.4/8
9	Germany	84.4/23	86.4/16	57.8/33	58.6/5	73.4/7	63.2/3	88.2/15	62.0/13	58.2/9
10	Israel	72.6/44	77.9/31	55.6/42	29.7/72	78.2/2	54.5/14	80.6/31	56.1/33	57.4/10
11	Ukraine	61.4/78	53.9/96	55.1/43	40.6/37	11.2/54	35.6/51	58.0/81	36.0/97	37.4/47

Source: author's development according to: (Analysis: Explore Economy Reports from the GII, 2019)

Indeed, considering the situation illustrated in Table 1, in 2019 Ukraine ranked 47th and is far behind the top ten most developed countries in the overall index. If Israel ranked 10th and achieved 57.4% of innovation performance, Ukraine fulfilled 37.4% of the innovation plan.

Analyzing each country, it can be seen that in almost all top ten countries, the innovation plan development of regulatory environment, human capital and ICTs had a positive impact on the overall ranking and index of the innovation plan performance. Switzerland ranked in first place with the greatest influence factor in the huge intensity in R&D (4th place), the plan performance of which was 77.9%, that also played a significant role in the formation of the overall ranking of the human capital index (7th place - 61.9%). The main impacts on ranking the 2nd by Sweden were the introduction of innovations in education (6th place - 67.8%) and R&D (6th place - 75.3%), which also took its place in the production of the human capital indicator in a positive direction (6th place - 62.1%). Like Switzerland, Sweden is also proud of the innovation infrastructure development. However, in both countries, the development of ICTs has not proved to be a positive influence on this indicator.

As for such countries as the United States of America, Netherlands, United Kingdom and Denmark, each of them has succeeded in ICTs development, whose indicators have had a significant impact on the corresponding indicators of innovation infrastructure development, and, therefore, the overall ranking and innovation index. Moreover, among all the top ten countries, Denmark is the most harmonious country in human capital and ICTs development, as in innovation plan development of regulatory environment (7th place - 95.3%), the indicator of which significantly influenced the overall index of institutions (6th place - 91.7%), and development of human capital (4th place - 63.1%) and ICTs (2nd place - 93.1%), which significantly influenced the index of innovation infrastructure development (6th place - 65.8%), owing to these results the country achieved great success, ranking 7th and performing 58.4% of innovation plan. At the same time, the rankings of Finland, Singapore and Germany were significantly influenced by the indicators of the innovation plan performance in the field of human capital.

Speaking of Israel, ranked 10th (57.4%), given that by individual components of human capital, including education, which is ahead of Ukraine only by 1 position, and tertiary education, even behind Ukraine by 35 positions, the most impact on the overall ranking of the country was an indicator of R&D (2nd place - 78.2%), becoming a significant factor influencing the ranking of human capital (14th place - 54.5%).

Considering Ukraine's ranking, among all indicators of human capital, the most positive one was the tertiary education, after which the country ranked 37th, fulfilling 40.6% of the innovation plan with a significant lead in the ranking of USA (53th place - 34.6%), Netherlands (59th place - 32.8%) and Israel (72nd place - 29.7%). According to the data of the Global Innovation Index (2019), the country's greatest success in implementing innovation methods of tertiary enrolment was the biggest contributor, ranking 14th with the performance of 65.8% of the innovation plan. The relatively good indicator was also in innovation development in the sector of education (43 positions - 55,1%), which Ukraine ranked ahead of the USA (45th positions - 54,5%) and Singapore (57th place - 50,3%). Here a significant impact was the pupil-teacher ratio, secondary (3rd position - 98.6%). At the same time, Ukraine's ranking of 54th with the performance of 11.2% of the innovation plan in the sector of R&D has spoiled the ranking of the human capital index, by which the country reached only 51st place, fulfilling 35.6% of the innovation plan, while the top ten countries significantly exceed Ukraine by

this index. This situation was most affected by the country's ranking of 67th in gross expenditure on R&D (GERD) in the amount of only 9.5%.

The country's situation with regard to ICTs development leaves much to be desired. Considering the fact that in the innovation infrastructure development Ukraine ranked 97th, fulfilling 36.0% of the corresponding plan, in the ICTs development the country ranked 81st performing 58.0% of the innovation plan, far behind the top ten countries. Here the most negative impact on the situation was the country's ranking of 92nd in government's online service with the performance of 56.9% of the corresponding plan. In addition, Ukraine is also far behind the leading countries in regulatory environment, ranking 78th with the performance of 61.4% of the innovation plan. The most significant factor influencing the situation was the country's ranking of 107th in establishing the rule of law in public and private institutions (Orlova, Mokhova, Diegtiar and Khomutenko, 2019).

Results

The human capital plays a major role in public and social development as one of the main factors in the innovation and knowledge economy development, where the basis of everything is the digital economy. The human capital development in the process of provision of electronic services in Ukraine is shown in Fig. 1.

As can be seen from Fig. 1, the volume of investment in human capital also depends on the effectiveness of qualified personnel in human capital sectors, the development of which has also a significant impact on the volume of investment in these sectors. It provides an opportunity, firstly, to invest in the development of new / improvement of existing electronic systems allowing qualified personnel to provide electronic services to meet the population's needs in their corresponding sectors of activities; secondly, to invest in staff training to use the developed / improved electronic systems, which will allow to receive electronic services at a faster and higher quality level in the future.

Considering the main sectors of human capital, in this case, the comparison with the level of quality of electronic services is an investment in the development of social protection, education, culture, health and sports through the development of ICTs in corresponding sectors.

Indeed, the Ministry of Social Policy, responsible for investing budgetary funds in social protection, contributes to the increase of local budgets aimed at the development of social sphere at the local (district / city / regional) level, and, therefore, improvement of the work of Administrative Services Centers (ASCs), providing state administrative services (the issuance and registration of certificates, licenses; provision of the social assistance, issue of personal documents, registration of legal entities, etc.). In this case, the more citizens will receive the convenient administrative services without a personal visit to the authorities, the more they will have the chance to unite in certain public organizations that would contribute to the investment in the development of social sphere, including the creation of various electronic systems and / or improving existing ones. These are, for example, the products of the state-owned enterprise "Information and Computing Center", with which the executive body, by concluding an agreement, can work on a partnership basis, constantly improving the performance of social workers in corresponding electronic systems, namely: AIS "Processing of pension documentation based on computer technologies", AIS "Our Family", AIS "Unified State Register of Persons Eligible for Benefits", PC "Housing Subsidies", PC "Statistical Monitoring of Poverty", PTC "Keeping a Single Application". At the same time, the more legal entities will receive administrative services (business start-ups, certification and licensing, citizen associations, regulatory policies), the greater will be an opportunity for the population to receive properly non-administrative services (services of education, culture, health care, sports) by increasing the number of public and private enterprises, institutions and organizations and improving the efficiency (pursuit of profit) and effectiveness (level of the population' satisfaction from receiving the services) of their activities.

The Ministry of Education and Science, investing budget funds in the development of education and science, managed by the separate structural units of local executive authorities in the sector of education (departments, divisions), thanks to their efforts in the investment support increases the

amount of local budgets aimed at the development of education and science at the local (district / city / regional) level, and, therefore, improvement of the work of institutions of public and private pre-school, secondary and higher education, investing in the development of distance learning systems (Moodle, Office 365, etc.) through public-private partnerships.

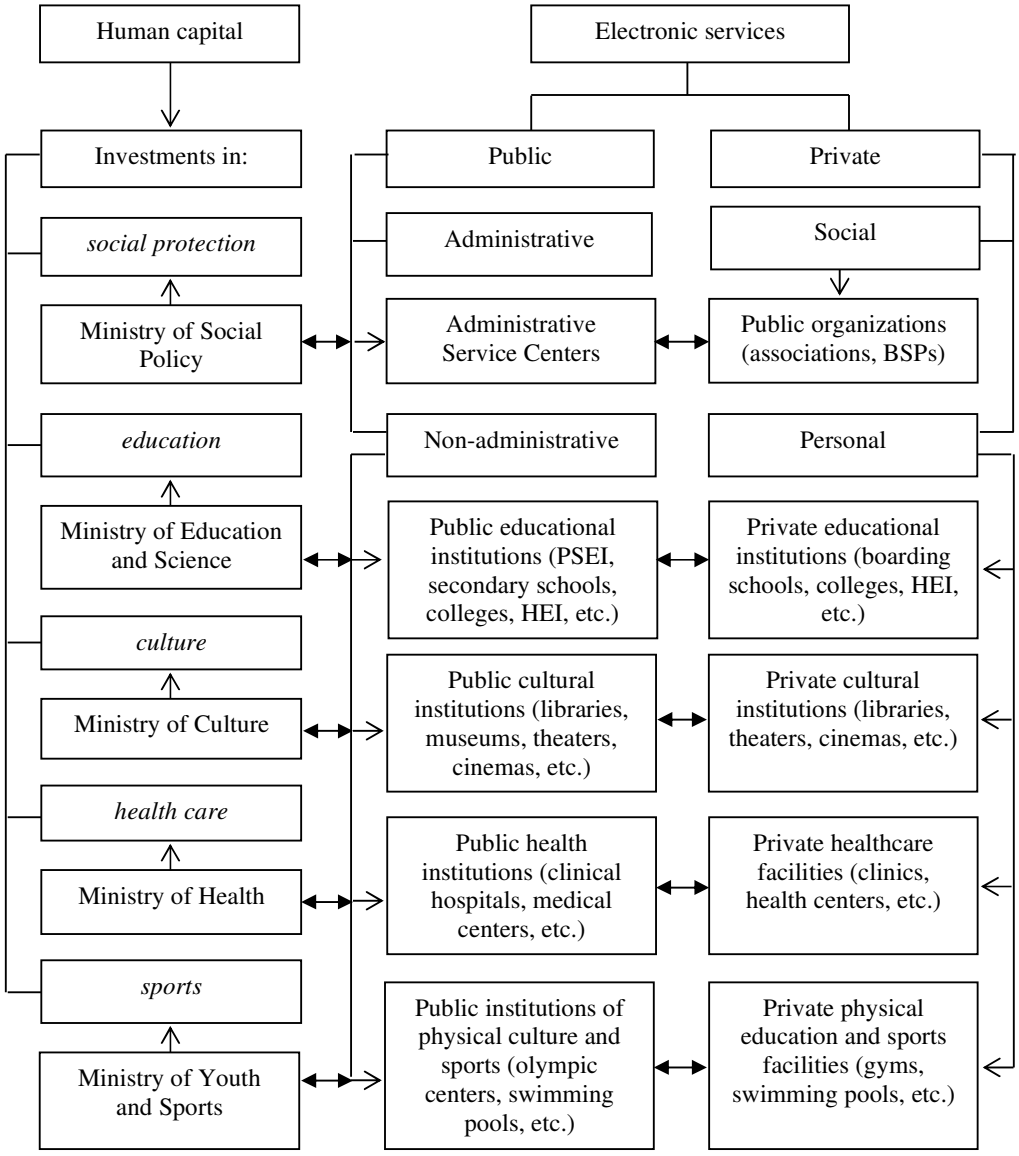

Fig. 1: The development of human capital in the process of provision of electronic services in Ukraine

Source: author's development according to: (Ministry of Culture, 2019; Ministry of Education and Science, 2019; Ministry of Health, 2018; Ministry of Social Policy, 2019; Ministry of Youth and Sports, 2018)

This makes it easier for pupils / students to improve their knowledge while learning a particular discipline, save time while the relevant curriculum, giving the teacher more opportunities to engage in interactive teaching methods (role-playing games, debates, moderation, etc.), and, therefore, improve the quality management system of education in the country.

The Ministry of Culture, investing budget funds in the development of culture in the country, encourages an increase in the volume of local budgets, managed by the separate structural units of

local executive bodies in the sector of culture (departments, divisions). Thanks to their investment support, the accountable public institutions and organizations (libraries, philharmonic societies, theaters, etc.) and private ones investing in the development of ICTs through public-private partnerships, that promote the preservation of cultural and moral values, patriotism and humanism traditions among the population of the country, provide the opportunities to receive high-quality information services through the creation of specialized electronic systems, including a unified information library system "Library-XXI". This system, in turn, covers the whole spectrum of national information resources in economic, scientific, technical, social and national-cultural spheres, aimed at the implementation of the pilot project "Unified Information System of Documentary Heritage" in the future.

The Ministry of Health invests budgetary funds in the development of health care in the country, whereby the separate structural units of local executive bodies in the field of health care (departments, divisions) provide an investment support to the accountable public institutions and organizations (clinical hospitals, clinics, medical centers, polyclinics, etc.) in the health care development. In turn, these institutions cooperating with private ones through public-private partnerships provide for the development of ICTs in the sector of health at creating the new (in particular, the National Health Information Infrastructure – NHII) and improving the existing electronic systems (in particular, eHealth, on the basis of which integrated medical information systems operate to automate the basic processes of health care institutions: Helsi, Medstar, MedCard Plus, Askep.net, Health24, nHealth, Rising Increment, etc.). All of this enables, firstly, to register the patient for medical advice without a prescribed queue; secondly, to receive round-the-clock medical services which the patient is entitled (opening and closing a hospital letter, receiving the medications, maintaining an outpatient card, etc.) from a family physician on the basis of an appeal through the electronic system without an obligatory presence; thirdly, obtaining by a doctor round-the-clock access to a patient's data at any health care facility in the country, which will save time for the transfer of medical data if a person needs medical attention elsewhere.

The Ministry of Youth and Sports, investing budget funds in the development of physical culture and sports, has a huge impact on the volume of the investment support from managed separate structural units of local executive bodies in the sector of physical culture and sports (departments, divisions) to the accountable public institutions and organizations whose activities are aimed at providing the services in physical culture and sports (Olympic centers, gyms, swimming pools, etc.). Cooperating with private ones through public-private partnerships they will contribute to the development of ICTs in the sector of physical culture and sports, namely the creation of information systems that would allow the population to register at sports facilities without having a special queue, obtain a range of physical exercises through the electronic system based on video tutorials, get an information about the free time of a personal trainer, which is fixed in the electronic system, and also interact with other specialized systems, including eHealth, getting an information about the physical health of a person, according to which the provision of services of therapeutic physical training is adjusted.

Based on the above, Ukraine has a number of problems that hinder the pace of innovation development in the human capital sectors and use of ICTs, whose solutions will help public authorities to improve the quality and efficiency of providing the necessary services to the population (Fig. 2).

As illustrates Fig. 2, in Ukraine, firstly, there are no laws, the provisions of which would regulate the activity of public authorities and local self-government bodies, including the subordinate public enterprises, institutions and organizations, jointly with legal entities, natural persons - entrepreneurs and individuals. Here, an enormous role is played by amending the Law of Ukraine "On Administrative Services" regarding the introduction of a provision for the obligatory establishment of the electronic system that would provide prompt servicing of ASCs by the population during the provision of administrative services. If the formation of a physical queue does not allow the needy persons to receive administrative services at their convenient time, then the work in the electronic system will provide the provision of services to a large number of persons under the conditions of establishment of the electronic queue and will allow them to immediately receive the corresponding

result of service. Thus, increasing the level of quality of service, the number of served individuals and legal entities will contribute to increase the number of registered public and private enterprises, institutions and organizations, which will be a significant impact on the increase in the number of new jobs created and, consequently, standard of living of the population.

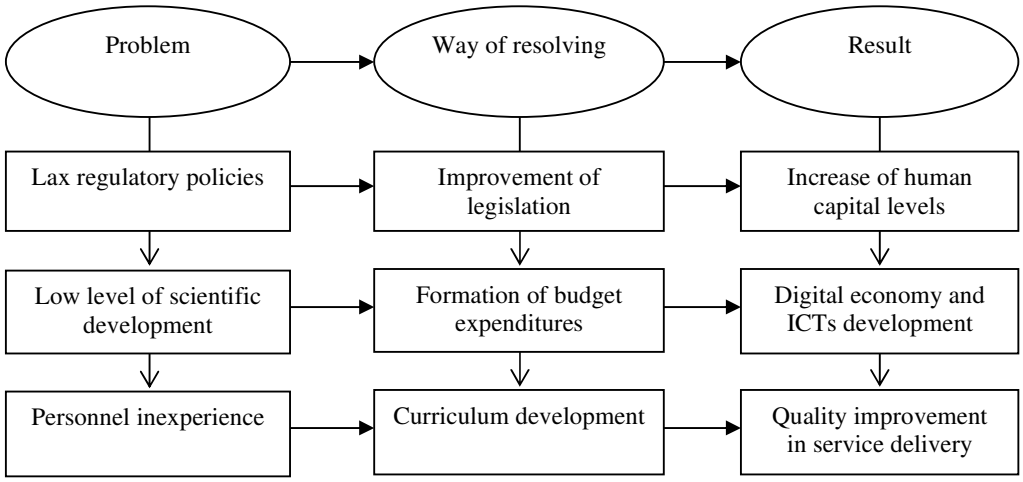

Fig. 2: Problems of the human capital development in Ukraine and ways of their resolving
Source: author's development

Secondly, Ukraine has recently been focusing a lot on improvement of the quality management system of higher education, and also trying to improve the educational process in secondary education institutions by developing new teaching methods, including subjects related to the country's cultural development and physical education. However, despite the enormous educational potential, the development of science in the country remains rather slow due to the small amount of R&D costs. And this, in turn, has a rather negative impact on the development of human capital due to the lack of electronic education systems in the vast majority of educational, cultural, health and physical education institutions, which would allow them to operate more effectively and efficiently, and, accordingly, it will reflect positively on the standard of living of the population. In this case, during the formation of the state budget for the respective year country's government should pay a special attention to the formation of the state budget expenditures for R&D. This, in turn, will allow central and local executive authorities to develop and approve state / local targeted programs aimed at researching and developing technical products with a view to implementing them into sectoral structural units for use in collaboration with public and private enterprises, institutions and organizations through public-private partnerships (Orlova, Mokhova, Diegtiar and Khomutenko, 2019).

Thirdly, the low level of ICTs development in Ukraine is caused by the low level of the provision of electronic services by the executive authorities. This problem concerns not only the lack of budget resources for ICTs development, but also the unwillingness of employees of these authorities to use them. This is indicated by Ukraine's 90th ranking in the use of ICTs with the performance of 39.9% of its innovation plan. Thus, the main disincentives to introduce ICTs into the work process are the low level of awareness of civil servants of pre-retirement age on how to use ICTs and also the unwillingness of newly admitted civil servants to learn to use them. This is indicated by the rather law ranking of Ukraine in establishing access to ICTs (65th place - 66.5%) and the newest ways of online e-participation (73rd place - 68.5%). All of this has a negative impact on the effectiveness of civil servants' performance of their powers, as indicated by Ukraine's low position in the development of general infrastructure (95th place - 26.2%), where the main negative impact was Ukraine's ranking of 99th in gross capital formation with the performance of 28.1% of the respective innovation plan. In addition, Ukraine occupied a very low position in ecological sustainability (120th

place - 23.9%), which was largely influenced by the country's 115th ranking in GDP per unit of energy use with a relatively small percentage of implementation of its innovation plan (4.7%). And this, in turn, is negatively reflected in the standard of living of the population due to the inability to provide the public authorities with quality and prompt service in the absence of sufficient fixed assets and special electronic systems.

The specific training / retraining / advanced training programs for civil servants should include a set of measures aimed at dispelling their doubts about the complexity of the use of ICTs, and also applying to the process of learning effective methods of rapid mastery of common (collectively) and specialized electronic systems (individually). Developing and approving the appropriate programs will enable civil servants to learn how to use ICTs, which will in the long run interact with representatives of other structural units / public authorities / local self-government bodies / private enterprises and citizens through the use of electronic systems, and, therefore, fulfill their official authority in the field of provision of electronic services in more operative, effective and efficient way.

Thus, the novelty of the received results consists in the developed model of human capital development in the process of provision electronic services. It can be applied in central executive bodies, as well as separate structural units of central and local executive bodies regulating the human capital sectors in the process of cooperation with sectoral public and private institutions in order to monitor the provision of the required electronic services to the population in the areas of social protection, education, health care, culture and sports.

Conclusions

Based on the analysis of Ukraine's innovation activity in the context of human capital compared with the top ten countries, the main problems of its development are, firstly, a lax regulatory policies, which consists in the weakness of the legislative framework regulating administrative services; secondly, the low level of scientific development, which is due to the insufficient number of software products related to the work of one or another electronic system implemented in the workflow; thirdly, the vast majority of public authorities are inexperienced due to their lack of awareness on how to use ICTs.

In this case, the improvement of the legal framework governing the provision of administrative services, in terms of the development and implementation of special electronic systems in ASCs, will lead to an increase in the population' living standards, including through the new jobs creation and increased productivity, based on the speed and quality of electronic services. This, in turn, will be an incentive for the state to form expenditures on R&D of quality software products, which will eventually accelerate the development of ICTs, and thus will lead to introduce specific training programs in the process of training / retraining / upgrading the qualifications of civil servants who work in structural units governing the human capital sectors, that would enable civil servants to learn how to own electronic systems and provide effective electronic services to representatives of public authorities / private business and citizens.

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Socio - Ethical Basis of Justice in The Context of Redistribution of Economic Goods

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Abstract

Justice is a value inherent in all human cultures. Nevertheless, justice is the most debated issue in the redistribution of economic goods and in law. Fair assessment is one of the basic value-based approaches of man to social reality, human behavior, social relations, processes and institutions. One perceives these connections through a culture-shaped sense of justice, which has not only a rational but also a cultural and emotional component. The aim of our paper is to examine the development of justice in the perspective of important legal theorists and philosophers. When processing the paper, the historical method was primarily used. In addition, other scientific research methods such as analysis, synthesis, induction, and transcription have been applied. The main result of this paper is to identify justice within the law. Another result is the confirmation or rejection of the established hypothesis that the historical development has unified the views on justice in the social and ethical aspects.

Keywords: Economic Goods, Ethics, Justice, Law

Introduction

Justice, according to Večeřa (2008), is a tool to satisfy the needs of social subjects without conflicting coexistence and the creation of cooperative social relationships. According to him, justice in the law can be divided into two groups, both as legal justice, and justice under law, where the criterion is law as a measure of justice. The second criterion is the fairness of the law itself, representing the quality of law and the presumption that the material (content) aspect of the legality of the law is fulfilled. For natural law-based concepts of law, the fundamental issue to which the issue of justice in law relates by determining what is a fair law, remains. The result of the answer to this question is then the basis for assessing legal justice. Natural maxims in this sense say that “lex injusta non est lex” (unjust law is not law), or conversely, law is just (fair) law (Burda and Trellova, 2019).

Aim of The Contribution and Methodology

The main aim of our contribution is to examine the historical evolution of justice of law from the perspective of important legal theorists and philosophers. In addition to the main objective, we have also set partial goals as follows:

- identify justice in the law,
- accept or reject the hypothesis that historical evolution has united the views on justice in the law and its social ethical aspects.

Due to the nature of the paper, we apply several scientific methods of knowledge as immanent science, which represents a highly qualified human activity aimed at obtaining scientific knowledge, penetrating from phenomenon to essence. In order to get to know justice in law, it is appropriate to use methods of the science of logic that can be used in all sciences. Furthermore, we will also focus on the use of the logical method, which lays down certain rules of human reasoning, which were created by years of experience. Their observance guarantees the order of thought, its correctness and, under certain conditions, its truthfulness. A necessary method for successful processing of the issue is also a method of logical analysis of and synthesis, which consists of dividing the whole into individual parts and their subsequent connection.

Legal positivism

Consistent legal positivism, based on the principle of legality, has in general considered the question of legal justice as justice on the basis of law and similar to law as a matter of fact. Legal justice laid on the edge of interest. At the same time, it a priori ruled out aspects of fair evaluation other than legalistic in relation to reports. In this respect, Hans Kelsen - a representative of Vienna's Legal Legal Science - characterised legal justice as a positive legality, meaning the procedure in accordance with the allegation of allegation of justice was thus just another expression for legality.

According to Fábry (2007), the law determines what is fair and just is another word for legal or legitimate. Kelsen considered it legally unfair to use a norm in one case and reject it in a completely analogous case. The issue of justice was addressed, among others, by John Rawls (1995, 1997). His theory belongs to the stream of liberal-oriented philosophical tradition and, from the outset, formed a definite framework of moral and political thinking. It is a theory that follows the tradition of Lock, Rousseau and Kant.

Justice is a value inherent to all human cultures that underlies fair assessment, and creates one of man's main attitudes towards social reality, human behaviour, social relations, processes, and institutions. One perceives these connections through a culture-shaped sense of justice, which has not only a rational but also an intuitive and emotional component.

The need for a fair order of things is one of the essential individual needs and it is possible to discover in this need the individual roots of the law. The righteous arguments according to Tomeš (2002) are more convincing. All wars or political upheavals, as well as many personal disputes or hostilities, were waged in exchange for justice and for the unjust. Thus, justice is a tool to satisfy the needs of social subjects implementing social policy.

Harvánek et al. (1995) argue that the reason why fairness in the classification of formal sources of law ranks to the very end is primarily its subjective character. While objectivity is the defining feature of law,

fair assessment is always based on subjective reasoning. Logically, there is a situation where a solution to a legal question is judged fair by someone, while another (usually the one who is in opposition) considers it to be manifestly unfair.

The binding nature of the principles of justice is argumentative. It can be stated that the argument of justice, in terms of its relevance, is disproportionately weaker in comparison with the legal argument or principle of law. It misses not only the support of formal certainty, but mostly also of objectivity. Some authors (Dudic et al., 2018) rightly believe that some principles of fair evaluation can be stated by the majority of society. In some circumstances, these principles can have the attributes of objective nature. The argument based on them can be an essential argument. In general, however, it is not possible to attribute objectivity and not even a high degree of reasoning to justification with some exceptions (Harvánek et al., 2008).

In spite of the weak argument, we can still meet the principles of justice in the law here. They are also referred to as aequitas ie equality, justice and decency. In the definitions of justice, the notion of equality has always been implied in one way or another. This is evidenced by the Irish definition of law as 'ars boni et aegui' t. j. the art of goodness and justice, the Latin word aeguitas, which means equality and justice. At the same time, the perception of justice as equality raises criticism, which can be expressed by the aforementioned words by the prominent German lawyer R. von Ihering (2009), that “equality can be an irregularity of poverty. This means that justice in justice can itself be an expression of social injustice and, possibly, a defence of social injustice.

Socialist view of justice in the law

According to the literature from the socialism, until 1989, the classics of Marxism-Leninism, consistently rejected the idealistic notion of justice, placed justice on a materialistic basis, and did not provide a basis for addressing the question of the nature of the and quality of its relationship to justice. Revealing the patterns of development of society, Marx and Engels explained the conditionality of moral ideas of people in practical relations in which social production takes place, but the exchange for them was a historically conditioned category with two sides; sociological and ethic (Dojčák, 1976).

According to Srebalová et al. (2019), justice, in its sociological sense, is a characteristic of social relations - their compliance with the regularities of social development, their conformity with the development of society. It is then fair to organise social phenomena that aim at maximally satisfying the scientifically justified needs of the further development of productive forces, thus also satisfying the social needs based on the existential needs of a particular person.

According to Dudic et al. (2018) the roles and ideals of a given class can be considered fair only if they express a progressive tendency of social development. The Communist idea of justice was classy in its content. However, due to the fact that the interests of the working class were coincident with the fundamental interests of all workers, coincidentally the self-evident patterns of the development of society, classroom content was associated with omnipotence in this notion. Satisfying human needs was only the starting point for a materialistic solution to the issue of justice. Its basis and essence was the uniform satisfaction of these needs, their distribution according to the principle of true equality.

Essentially, the basic criterion of justice as the value of ideal - justice from an ethical point of view is therefore a criterion of equality. In its ethical aspect, justice appears to be a principle of equally distributing social needs, material ideals and values between subjects who are equal in a certain angle of view. As a constant element of justice, equality can be interpreted in a very diverse way - on the basis of what criteria people understand as equal; which differences between them or the circumstances in which

justice is applied are considered relevant (Fuller, 1998).

According to Kryvinska (2012) the realisation of justice in the life of society was understood by Marxism-Leninism as a process whose every stage is necessary and paves the way for a higher stage. The realisation of the communist ideal of justice is also linked to the realisation of socialist transformations, by its development towards communism. The transition from the first phase of communism to its second phase is a continuous process, in which elements of labor distribution and merit intersect with elements of needs distribution (e.g., health care).

In the field of law, justice is a category of legal consciousness, which is one of the criteria for evaluating the organisation of social relations through the law and the evaluation of the law itself. Justice is facing the creation of the non-realisation of law as an objective, the achievement of which is part of the mission of that right in its sociological and ethical conceptual determination, and is also a criterion for assessing its norms (Kaczor and Kryvinska, 2013).

Justice from the ethical perspective is an ideal based on the principle of equality of all people, it is reflected in the legal consciousness as a criterion for immediate evaluation of the law. It finds its expression as an ideal of the relationship of law and justice, on the basis of which the requirement of equality lies (Rentkova et al. 2018).

Current views on the value of justice

At present, we find different approaches to equality and justice in law. The notion of justice evokes in us the idea formulated by Weinberger (1995) that there is no timeless and absolutely valid content principle of justice. The pursuit of justice is the task of seeking, the task of reason and heart. The need for searching is the need to seek to find the carrier systems for the tolerant coexistence of different human communities, to penetrate the mechanisms of functioning of justice (Fábry, 2003). In the words of Aristoteles (1986), righteousness is a state whereby people are able to do justice, and indeed they do justice, and want what is fair.

As Gluchman (1994) claims, in recent ethics and justice, interest in justice issues has been renewed. This trend is also confirmed by the 20th World Philosophical Congress held in Boston on 10-16 August 1998. The speech by Appel shows the constant relevance and timeliness of justice in law. This is also true at a time when one really stands on the threshold of deep economic problems, which include unemployment in particular Kočišová et al. (2018). Unemployment as an economic phenomenon is profoundly contradictory to our most basic notions of justice, because unemployment means social exclusion even though the unemployed do not starve due to support (Fobel and Fobelová, 1999).

The problem of misery and hunger as a result of the slope between economic areas, but to a rather drastic extent, also occurs within some of the affluent societies. The almost unbounded power of wealth represented by big corporations and other multinational and global economic power holders trampled the value of justice (Močarníková et al. 2018). Ethics, however, in the words of Fobel (2008) must not only be a reflection of the crisis, but should be, above all, an ethics of prevention, prophylaxis of crises. As Novosad (1993) suggests, it is necessary to agree on justice.

According to Gahér et al. (2019), the question of how to approach justice in relation to the economic environment, and which ways of establishing justice are becoming optimal, is coming to the forefront. Is the original state a state in which the true principles of justice would be chosen? To what extent can people realise their role in their original state in a relative and dynamic economic environment? Which principles of justice should be preferred in a market economy and so on. The answers to each of these

questions can be determined on the basis of a fairness analysis through a whole set of relationships that cannot be clarified by one simple rule Milošovičová et al. (2018).

Justice issues always stand in the way of utilities considerations, as Srebalová et al. (2019) states, the ideals of justice interact with utility analyses and normative regulations. In Velek's view (1994), Rawls' theory was generally understood as an attempt to criticise the prevailing utilitarianism in Anglo-Saxon moral and political philosophy on the basis of a procedural reformulation of Kant's moral and political theory. However, Rawls' theory is not only close to Kant's theory. To justify his theory, Panda et al. (2016) uses a specific formal means - the theory of the treaty, which allows him to omit questions of meaning and definition and to advance with the development of some content theory of justice.

According to Panevski at al. (2017) the idea of an agreement or contract as the basis of justice is indeed very old, one of the oldest ways of establishing justice. It can be found in Judaism and consequently in Christianity, the relationship between man and God (and hence the relationship between man and other people) is based on the covenant. Likewise, the ancient tradition is regarded as a key element by the treaties, and in Roman law the theory of contractual relations has become an essential part of it Turčan et al. (2019).

Hayek (1991), in his second volume of Law, Legislation and Freedom, challenges social justice as a term that has no intellectual value (seriousness), it is just a sign of democracy and cheap journalism, and officials should be ashamed to use it. Hayek is an admirer of spontaneous social development, self-regulation, which, if avoided by power interference, results in a complex network of relationships, much more appropriate and acceptable compared to what one might, powerfully and deliberately strive to create, no matter how good the intent was (Vilčeková et al. 2018).

Hayek does not reject Rawls' fairness in its negative definition as a principle that agreed rules must apply to all. But justice understood in this way can only be applied to individual behaviour. Non the mutual behaviour of individuals and never on the cumulative consequences of the actions of several people. It is a sign of immaturity and primitiveness of thinking to demand justice from society, taking it accountable for a particular material position. According to Hayek, society is not at all capable of dealing with any specific purpose, ensuring that everyone receives what belongs to them. Although the way in which the market mechanism divides revenues and burdens appears to be very unfair in a number of cases, this is the traditional proven order of things (Dolobac et al. (2016).

According to Hajduk (2015) as implies from the essence of Hayek's views, the requirement of social justice must be passed on to institutions that are empowered to instruct individuals what to do. This means requiring them to organise the members of society in such a way that it is possible to assign specific shares in a social product to different individuals or groups and to coordinate their efforts to achieve a specific form of distribution that is considered fair (Lackey, 2020). This means insisting that governments set the goal of adopting an acceptable justice-sharing scheme. Being vague, there is a real danger of shifting content corresponding to established interests, which would be truly asocial. In addition, governments will be allowed to decide on the status of different individuals and groups, which is an idea that detracts from the individual's discretion Hajduk (2000).

Conclusion

Based on our research, we can conclude that we have achieved the goal set in the introduction. Using scientific literature, we have analysed and identified the notion of fairness from different points of view. We were unable to find a common view on this concept. Every era, as well as social establishment, brings its view of this concept. We could therefore simply describe justice as a condition that suits us. The

definition of justice is also prevented by the fact that it has more meanings (it is a polysem). Often there is no distinction between justice in terms of legal, moral (ethical), historical (historical justice) and social (social justice), even though it is hard to mention the common denominator. We therefore reject the hypothesis that the historical development has unified the view of justice and its socio - ethical aspects.

In conclusion, however, we consider it necessary to state that justice is now seen as a fundamental value. The concept of the rule of law, to which the Constitution of the Slovak Republic professes, is also based on the restriction of state domination in favour of justice. In contemporary modern-day legal philosophy, we encounter a new kind of justice, so called "iustitia protective". This is a protective justice, designed to prevent arbitrary abuse of power, as we know how dangerous and injustice it can be.

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Government Policy and Its Impact on The Distribution of Information in The Past

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Abstract

The right to information is a fundamental right without which the existence of a genuine democratic establishment is not possible. It allows us to form an opinion on the whole society. Information is also called the oxygen of democracy. Access to truthful, timely and complete information is a prerequisite for making our decisions meaningful. However, our contribution examines the real right to information and public awareness in the period of non-freedom - in the years 1948 to 1989. From the point of view of systematic approach, the contribution is divided into three parts, in addition to the introduction and conclusion. Each of them pays attention to a certain period in the period of non-freedom. We have used several scientific methods for elaboration of the paper, especially description, analysis, synthesis, deduction, logic or comparison. The result of the paper is an evaluation of the overall state of information in Czechoslovakia in the period under review. In the end, we confirm or reject the hypothesis that the right to information was effectively withdrawn in the period under review.

Keywords: Distribution, Govertment Policy, Information

Introduction

According to Gregus and Kryvinska (2015) the right to information is a fundamental right without which the existence of a genuine democratic establishment is not possible. It allows us to form an opinion on the whole society. Information is also called the oxygen of democracy. Access to truthful, timely and complete information is a prerequisite for making our decisions meaningful. However, three years after the end of the Second World War, in time when the economy of the state was in ruins, the right to information was not given as much attention as it is at present. The incoming change of the social system towards the building of socialism in order to create a targeted communist society was fully aware of the power of information. The first steps of the communist regime were directed to dominate the media (Molnár et al. 2014).

The aim of our paper is to review the legislative interventions of the state in order to dominate the media and to critically evaluate the right to information and public awareness during the period of non-freedom, in the years 1948 to 1989. From the systematic point of view, the contribution is divided into three parts in addition to the introduction and conclusion. First part, the years 1948 to

1960, pays attention to informing in the period of purges and terror. In the second part we examine the issue of awareness in the context of the adoption of the new constitution in 1960 until the intervention of the Warsaw Pact troops in 1968.

We have used several scientific methods for thorough elaboration of the paper, especially description, analysis, synthesis, deduction, logic or comparison. The result of the paper is an evaluation of the overall state of information in Czechoslovakia in the period under review. In conclusion, we confirm or reject the hypothesis that the right to information was effectively withdrawn during that period.

Awareness in the years 1948 - 1960

In 1948, the Government of the Czechoslovak Republic, the Ministry of Information and the Corps of Trustees issued a series of resolutions and legal regulations that were to ensure a new order of press matters. These were serious measures in the field of information, publishing, specialisation and concentration of periodicals, paper allocation, advertising and print advertising (Kočišová et al. 2018).

Of decisive importance was the Government Resolution of 12 March 1948 entrusting the Minister of Information and the Minister of Industry with a review of outgoing journals of all kinds, so that the periodical in the future would serve as one of the most important means of information and entertainment for the Czechoslovak People's Democrats. Government resolutions of 23 May and 10 June 1948 reduced paper consumption by approximately one third. The same resolutions for Slovakia were adopted by the commission of commissioners on 22 March and 22 June 1948 (Ševčák and Duhajová, 2009). On the basis of the above-mentioned resolution of the government of the Czechoslovak Republic, 1948, the periodical press was reorganised, which meant its appreciable restriction and reorganisation.

Implementing decrees of the Ministry of Information and the Ministry of Industry have also been issued, under which printing trade operators were only allowed to print newspapers or magazines if they submitted a printing permit issued by the Ministry of Information, or in Slovakia by the Bureau of the Board of Trustees. The obligation to have a certificate from the contingent bearer that a paper supply for printing is ensured has been introduced. Subsequently, on 8 June 1948, the Ministry of Information of the Czechoslovak Republic issued a directive regulating the submission of an application for permission to print periodicals (Dolobač at al. 2016).

Before February 1848, the information commission was operated in Slovakia as part of the commission, but it was temporarily canceled. Its powers passed from 1 April 1848 to the office of the Bureau of the Board of Trustees. Since June 1948, a new Trust of Information and Enlightenment was established and managed by O. Pavlík. By order of 6 November 1848, the new mandate established the Economic Headquarters of the Slovak Publishers of Magazines as its special component. According to Ľalík (2019) this body began its activities on 11 January 1949 as an interest organisation for the publishing houses of periodicals. The task was mainly to address the economic and technical security of the publishing houses.

On 9 May 1948 the National Assembly adopted the new Constitution as a constitutional law of 9 May 1948 no. 150/1948 Coll. Constitution of the Czechoslovak Republic. According to § 96 of the Constitution, the Slovak National Council had legislative power. As Dudic et al. (2018) states, the commission issued legislation in accordance with § 119 of the Constitution. The commissioners themselves were also entitled to issue measures in the form of decrees. The new constitution stated in § 21 paragraph 1 that freedom of the press was guaranteed. However, Article 21 (2) continued with the wording, according to which the law stipulates who has the right to publish newspapers and magazines and under what conditions, especially with regard to the fact that profit is not intended. According to Peráček and Mittelman (2015) the undemocratic nature of this law was rounded off by paragraph 22, determining the State's exclusive right to operate radio, television and film.

On 20 December 1950, a new Press Act published in the Collection of Laws was passed as Act no. 184/1950 Coll. on the publishing of magazines and on the Union of Czechoslovak Journalists. Even to our present conditions, it was very brief, had only 10 paragraphs, which were strictly and cogently regulating conditions for the operation and publishing of the press. For example, Article 8 (1) determined who could be a journalist (Olšovská et al., 2016). To ensure the proper fulfilment of the duties of journalists pursuant to § 1 is imposed on the Union of Czechoslovak Journalists, which unites all professional journalists. As a professional journalist, only one who has been admitted as a member of the Union of Czechoslovak Journalists can be active. Such legislative intervention introduced mandatory membership of the Union of Czechoslovak Journalists. The Act also repealed, in Section 9, the old, still Austro - Hungarian legislation of 1914, as the irreducatory law of 1947.

Decree of the Ministry of Information and Enlightenment of Czechoslovakia of 30 December 1950 issued press regulations of lower legal force. This decree was much more detailed than the Press Act. Resolution of the Government of Czechoslovakia no. 17 of 22 April 1953 created a non-public body - State Press Supervision, which until the end of 1953 cooperated with the government, later the Ministry of Information respectively. Since 1967 it has been replaced by the Central Publication Report, which was canceled in 1968 (Kluknavská and Gábriš, 2017).

Censorship was introduced in Czechoslovakia in 1953. It is interesting that this was only a guideline of the government and not a law. This sub-legal regulation established the Main Press Supervision Report. This was conceived according to the Soviet Directorate General for the Protection of State Secrets in the Press (GLAVLIT). It was incorporated under the Ministry of the Interior of Czechoslovakia. Its activities were governed by the Statute of 1955 and the Staff Regulations of January 1956. Censorship centres have been active in all district towns since the beginning of 1954. Daily reports and reports were sent to Prague and Bratislava through the regional leadership, from which the authority took daily reports for the leaders of the Ministry of the Interior and the Central Committee of the Communist Party of Czechoslovakia. The Special Technical Supervision Department also kept files of interventions against individual editors and persons (Burda and Trellova, 2019). The censorship was expected based on two criteria. Priority was given to protection of the state, professional and economic secrets. The second criterion was the protection of the general interest, which is a very broad term.

The service statute of 1955 then implied that the dissemination of data and facts that are false and otherwise harm the Czechoslovak People's Democratic Republic and its establishment must be prevented. Such information may not be disclosed in the general interest. In particular, at the outset of the formation of the "new socialist culture", the publishers turned to the Ministry of Information and Enlightenment with recommended permits to sell or destroy certain titles. The Church Affairs Office submitted similar information to the Ministry.

According to Kaczor and Kryvinska (2013) Government Decree No. 5/1953 Coll. on the new Government Work Organization, no. 6/1953 Coll., which abolishes and establishes some state administration bodies and regulates their powers and no. 7/1953 Coll., which abolishes and establishes some credentials and regulates their powers, approved several curricula of government orders, which, with the consent of the President, carried out extensive reorganization of the government and Slovak national authorities as a further stage of centralization of state administration. The Trust of Justice and the Trust of Information and Enlightenment have been abolished (Kryvinska and Gregus, 2014).

Central state administration bodies such as the State Committee for the Arts, the State Committee for the Church, exercised their powers in Slovakia through their pendants who were outside the competence of the Board of Commissioners. The Communist Party of Czechoslovakia regularly organized activities with external press officers in the districts, which usually took place at the level of the party's regional committees. Representatives of the Communist Party district committees also attended. As Kryvinska (2012) states from the course of the assets, reports with conclusions were made, which both mapped the situation in the press area and these included also tasks for the future.

Every year, the Censorship Office also prepared information on the evaluation of the control of recipients of titles of publications coming to Czechoslovakia. Some of the prints were discarded due to their "objectionable content". The prints were confiscated because, in the opinion of the censors, they contained articles of emigrants and, in particular, were anti-Marxist and anti-Soviet.

The issue of awareness in the years 1960 - 1968

The new Constitution of the Czechoslovak Republic of 11 July 1960 was adopted as Constitutional Act No. 100/1960 Coll. Not only did it change the name of the Czechoslovak Republic to the Czechoslovak Socialist Republic, but by its diction it interfered with the declared possibility of competition of political parties. The leading force in society and in the state is the vanguard of the working class, the Communist Party of Czechoslovakia, a voluntary battle union of the most active and knowledgeable citizens among workers, peasants and intelligence. This is the announcement of Article 4, which enshrined the leading role of the Communist Party of Czechoslovakia along the lines of the Constitution of the Soviet Union. The leading role of the Communist Party was regulated in Article 6.

Article 28 (1) declared freedom of expression in all areas of social life, in particular freedom of expression. These freedoms were supplemented in the following developing sentence by the statement that their citizens of the Czechoslovak Socialist Republic should use both the development of their personality and their creative efforts, as well as their active participation in the economic and cultural construction of the country (Milošovičová et al. 2018). The following Article 28 (2) (l) stated that these freedoms were safeguarded by making available to the working and their organizations publishing houses, press companies as well as radio, television and other means. They were called material guarantees of these constitutional freedoms. Their feasibility could be verified by every citizen in practice if he decided to publish any opinion or information that was not in accordance with the ideology or politics of the party and government.

According to Panda et al., (2016) the Constitution also defined the constitutional status of the Slovak National Council as the national body of state power and law in Slovakia. It did not return to the characteristics of the Slovak National Council as the national legislative authority in Slovakia. Compared with the systematic Act no. 33/1956 Coll. In addition to the attribute, the National Authority of State Power also added the attribute National Authority of State and Law in Slovakia.

According to some authors (Dudic at al. 2018) in the 1960s, the National Assembly of the Czechoslovak Socialist Republic passed several key laws under which individual means of mass communication were regulated. It further states that, the regulations were as follows: Act No. 17/1964 Coll. about Czechoslovak Radio, Act No. 18/1964 Coll. about Czechoslovak Television, Act No. 123/1965 Coll. about the Czechoslovak Press Office, Act No. 135/1965 Coll. on the competence of the Czechoslovak Press Office in Slovakia, Government Decree no. 13/1962 Coll. about a new organization of Czechoslovak film.

Act No. 81/1966 Coll. on periodical press and other information media was the basic regulation for print media. This law for the first time in our country regulated all means of mass communication called mass information means. The law was prepared in close cooperation with the journalistic community in an atmosphere of the forthcoming liberalization of social conditions. This Act introduced a registration system for publishing periodicals and adjusted the status of the publisher, editor-in-chief, editorial board and editors (Močarníková et al., 2018). The institute for the correction of false and misleading data and the obligation to protect editorial secrecy have been restored. The right to information, the availability of sources of information and the obligation to respond to journalistic criticism have been enacted.

This Act was amended only two years later by Act No. 84/1968 Coll. amending Act no. 81/1966 Coll. on the periodical press and on other mass media dated 26 June 1968, which declared the editors' responsibility not to disclose information containing a matter of public, economic or professional

secrecy and clarified the obligation to publish a press correction. With effectiveness from January 1, 1967, the Main Press Supervision Report changed to the Central Publication Report. The provision of § 17 of this Act also abolished censorship within the Prague Spring. By this measure, censorship was declared inadmissible. The legislature defined it as any interference by state authorities against the freedom of speech. However, its abolition was not absolute, as the possibility of any interference in media freedom was left to the prosecutor's office and the court

Consequences of Warsaw Pact troops intervention

After the intervention of the Warsaw Pact troops in August 1968, Act No. 81/1966 Coll. amended for the second time. The legislator's intervention was a response to the content of the Moscow Protocols. Act no. 127/1968 Coll. on some press measures and other mass media was the first consequence of the normalization in Czechoslovakia. Pursuant to Section 1 (2) of the above mentioned Act, the Press and Information Offices were established to provide uniform guidance and control over the activities of the periodical media and other mass media. Article 3 (1) suspended the first amendment in the part of the prohibition on censorship with the words "§17 of Act no. 81/1966 Coll. as amended by Act no. 84/1968 Coll." Subsequent paragraph 2 allowed the offices of the editors to appoint their plenipotentiaries who were entitled to suspend the publication of information that would be contrary to the important interests of the State's internal and foreign policy (Peráček at al. 2016).

This Act also established the Slovak Press and Information Office, whose existence was one of the consequences of military intervention and was the central body of state administration in the Slovak Socialist Republic (Švec and Madleňák, 2017). Its responsibilities included all issues of management, follow-up and information gathering in Slovakia. The Slovak Office of Press and Information was divided into: section of propaganda, section of evaluation and section of printing.

As is well known, the process of political easing in Czechoslovakia was ended by the subsequent intervention of the Warsaw Pact troops from the night of 20 August to 21 August 1968. Subsequently, the Communist Party was subject to screening. In the field of literature and other works, a program of engaged socialist literature and a socialist realism was established, where the principles of Marxism-Leninism were applied. The management and control of the media and propaganda were entrusted to the competence of the Slovak Press and Information Office, which was the central body of the state administration of the CSF, whose task was mainly to regulate the content and orientation of the media.

On 1 January 1981, Act No. 180/1980 Coll. established by the Federal Press and Information Office. He ensured the protection of important state interests in the media, propose to the government the principles of state media policy, registered periodical press. He also had the authority to decide on the import of foreign periodicals and the dissemination of news from foreign news agencies. After the XIV. Congress of the Communist Party of Czechoslovakia in 1971, the journalist organization continued its activities as a nationwide Czechoslovak Union of Journalists with a territorial unit in the Slovak Socialist Republic, which became the Slovak Union of Journalists (Rentkova and Panevski, 2017).

The Czechoslovak news agency provided news service for press, radio and television. It also promoted Czechoslovakia and other socialist countries. Since 1969, Czechoslovak Radio has been organized on a federal principle. By the provision of § 13 of the Slovak national council Act no. 207/1968 Coll. (Fábry et. al. 2019). The establishment of ministries and other central bodies of the state administration of the CSF also regulated the position of Slovak Television in relation to the national authorities. Television was seen as an ideological-political instrument of the party and government, as a socio-cultural institution. The television broadcasted on two programs.

The main body of Slovak film was the Slovak Film Center managed by the General Director, who managed the work of the Slovak Film Production and the Slovak Film Rental Agency in accordance with the guidelines of the Central Committee of the Communist Party of Czechoslovakia and the

principles of the planned economy. Slovak filmmaking included Fiction and Short Film Studio, which was further divided into News, Animation and Diafilm. The periodical press continued to be published by: PRAVDA - press working for the Communist party KSS, PRÁCA - publishing house of the ROH and SMENA - publishing house of the SÚV SZM.

According to Serafínová and Vartál (2015), professional publishing houses included the Slovak Educational Publishing House, the Publishing House of the Slovak Academy of Sciences VEDA, the Agricultural Publishing House PRÍRODA, the Publishing House of Technical Culture ALFA, the Sports Publishing House ŠPORT and others.

According to Vilčeková et al. (2018) the periodical printing system in Slovakia remained unchanged; however, uniformity prevailed in the context of government policy. After the disappearance of the periodicals Cultural Life in 1968, Literary Life in 1969, Young Work in 1970 began to publish samizdat in the Republic, either in the form of books or periodicals, but for which the publishers were punished.

Samizdat periodicals began to appear in Slovakia since 1948. In the period after the intervention of the troops, in the 1970s a smaller number of such publications were published, in the 1980s their number gradually increased. However, they did not have a regular periodicity or an elaborate treatment. They provided information that was not available in current periodicals. Most were religiously oriented. In 1972 and 1973 four issues of the religious magazine Family, the centre of the cosmos were published. The magazine emphasised the role of the family as a major component of society (Srebalová et al., 2019). In 1981, the first Christian magazine was published in a samizdat called Religion and Present with a two-month periodicity.

Conclusion

The socialist state is theoretically a state which economic and social establishment is socialism and in the government is only one - communist political party. The socialist state is a state serving as an organisational power tool for building socialism. In the context of the people's democratic and, since 1960, socialist Czechoslovakia, it was a state in which the structure of power was diverted from the leading role of the Communist Party as a vanguard of workers, peasants and intelligence. The government had the of to build socialism as a new socio-economic establishment and the state was officially declared a “socialistic" in the Constitution from the 1960s. The basic features in the economic area were the nationalisation of means of production and private property by transfer to social state ownership, central planning of the economy, foreign exchange monopoly or collectivization of land. All these features were immediately reflected in State interventions in the field of public information. However, the public did not perceive the restrictive measures after the end of World War II as it was necessary to rebuild the war-torn economy. However, a fundamental problem occurred at the time of the upcoming Prague Spring. The gradual easing of the situation has brought to people the hope of greater freedom and the democratic establishment. In our opinion, the prohibition of censorship was a fundamental signal of easing the situation, but it did not withstand the intervention of the Warsaw Pact troops. On the basis of our investigation, we can confirm the hypothesis of the offensive withdrawal of the right to information in the years 1948 to 1989.

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The Right to The Access Information from The Perspective of International Law in Years 1948-1989

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Abstract

The importance of information and its impact on the state and society was already recognized by ancient statesmen. However, this was a right that was suppressed for a long time, mainly for strategic reasons. It was only three years after the end of Second World War that political will was found to anchor this right in a generally binding international document. This act founded the adoption of other international documents dealing with this area of human rights. Access to truthful, timely and complete information is a prerequisite for the proper functioning of human society and for our decisions to make sense. The aim of our paper is to review selected international documents guaranteeing the right to information. From a systematic point of view, the paper is divided into four parts, in addition to the introduction, the objective with the methodology and the conclusion. Each of them is focused on a selected document in the field of international information law. For the purposes of the paper, we used several scientific methods of research, especially description, analysis, synthesis, deduction, logic or comparison, but also doctrinal interpretation of international documents. The result of our efforts is the identification of the right to access information from the perspective of international law, the analysis of the key international documents conferring the right to information, as well as the answer to the research question, even in the period of freedom since 1948 until 1989, the right to information was guaranteed by international documents.

Keywords: Freedom, Human Rights, Information, International Law

Introduction

International law is a part of law that has been affected by a number of events having a worldwide impact. Such significant events include the creation of a global peace-keeping organization, in the form of the League of Nations, and later in the form of the United Nations, those organizations were a response to the First and Second World War. Just after Second. World War, it was a period of massive increase in the regulation of international law (a period that we call the period of current international law). As stated Rentkova and Panevski (2017), one of the basic documents is the United Nations Charter, in which the Contracting States condemned as a means of resolving international conflicts and established a system of peaceful resolution of international relationships. Legislation about the use of armed forces, human rights or contract law is also booming, especially in the form of codification conventions, which lay down mandatory rules of international law and customary

international law. In the second half of the 20th century, there was a boom in the contractual arrangements, as well as in the new, currently developing law branches. There are large numbers of contracts, so-called establishing, regulating individual international or regional organizations. The right to information ranks theory of law among political rights. As reported by Bajzíkova et al. (2017) it is the second generation of human rights that emerged in the early twentieth century. The emergence of political rights has necessitated the need to protect the population from the threats posed by the post-modern era and post-industrial society.

Purpose of Contribution and Methodology

In the past, the right to information was evaluated controversially and was not universally recognized. Probably also for this reason the issue remained on the brink of interest of international law experts. We try to investigate this problem. The main aim of this paper is to identify the right to information from the perspective of an international law. In addition to the main objective, we have also chosen two sub-objectives:

1. analyze the main international documents conferring the right to information;

2. to answer the main research question, whether in the period of freedom during years 1948 to 1989, the right to information was guaranteed by international documents.

Through international documents as well as scientific literature, we are looking for answers to the set main goals. At the end of the paper, we evaluated and critically pointed out the identified shortcomings of international documents in the realization of the right to information and possibilities of public information by public authorities.

From a systematic point of view, the paper is divided into four chapters, starting with the introduction, methodology, main objectives for the paper and the conclusion. The first chapter focuses on the importance of the Universal Declaration of Human Rights (year 1948) and its impact on the adoption of other documents. The second chapter examines the International Covenant on Civil and Political Rights. The third chapter deals with the importance of the Convention for the Protection of Fundamental Human Rights and Fundamental Freedoms. The importance of the Organization for Security and Cooperation in Europe in the context of the right to information is given in the last chapter.

We have used several scientific methods for elaboration of paper, especially description, analysis, synthesis, deduction, logic or comparison as well as doctrinal interpretation of international documents dealing with the right to information.

Universal Declaration of Human Rights

By its very nature, the Universal Declaration of Human Rights is the most important document guaranteeing human rights worldwide. It was adopted unanimously at session III. United Nations General Assembly in the form of Resolution No. 217 / III on 10 December 1948. Three years after the end of the Second World War, freedom of expression was recognized as one of the fundamental democratic values necessary for peaceful coexistence of nations. Freedom of expression was thus given the highest status in the Universal Declaration of Human Rights by being included in the preamble as one of the four fundamental freedoms. As stated by Nováčková et al. (2018) according to the preamble, human beings have freedom of expression and religion, and freedom from fear and need. This freedom of expression is also expressed in Article Nr. 19, according to which everyone has the right to freedom of expression, that freedom of opinion to seek, receive and disseminate information and ideas through any media and across borders.

The Tehran proclamation on the 20th anniversary of the Universal Declaration, approved by the United Nations General Assembly, stated that the Universal Declaration found a common understanding of the people in the world regarding the inalienable and inviolable rights of all members of the human race and imposed obligations on members of the international community. As Circolo et al. (2018) the issue of the nature and global significance of the Universal Declaration of Human Rights was also discussed by participants in the 1988 in Bangladesh seminar where the Chief Justice of Pakistan declared that as a result the Universal Declaration is now recognized as the Magna Charter of Humanity to be respected by all politicians in the world arena. What has begun there as a simple social endeavor is now recognized both as an authoritative interpretation of the provisions of the United Nations Charter on Human Rights and as an established customary right (Lalik, 2019) forming the core of the comprehensive list of human rights. By expression, the General Declaration is considered binding on all states as part of international customary law. For this reason too, the Slovak Republic, as a member of the United Nations, is obliged to protect and promote the rights presented in the Universal Declaration of Human Rights. Therefore, in the Article Nr. 2 of the International Covenant on Civil and Political Rights, the Slovak Republic safeguards and protects these rights for anyone within its territory and subject to its jurisdiction.

As mentioned above, Article Nr. 19 of the Universal Declaration directly determines the right to freedom of expression and information. As Dudic et al (2018) further states, Article Nr. 20 declares the right to peaceful assembly and association, including the right not to be a member of any association. These rights are limited by Article Nr. 29, which permits restrictions strictly necessary only in the interests of the rights and freedoms of others and the fulfillment of the requirements of morality, public interest and general welfare in a democratic society. In addition, those rights set out in the Universal Declaration of Human Rights shall in no case be exercised contrary to the purposes and principles of the United Nations.

The content of the Universal Declaration has had a huge impact on the adoption of both international documents and national human rights. In fact, all human rights treaties adopted by the United Nations bodies since 1948 elaborate on the principles set out in the Declaration (Kryvinska and Gregus, 2014). The European Convention on Human Rights states in its preamble that it gives effect to the principles set out in the Declaration. Likewise, the States associated in the Organization for Security and Cooperation in Europe have committed themselves in the Helsinki Final Act to act in accordance with the objectives and principles of the Charter of the United Nations and the Universal Declaration. In addition, many countries have adopted and amended their constitutions and laws on the basis of the principles of the Universal Declaration, and national courts have adopted its standards.

International Covenant on Civil and Political Rights

The Universal Declaration of Human Rights was the first step in the formation of the International Charter of Human Rights after its completion in 1976. However, two other important documents were adopted after that. The first was the International Covenant on Civil and Political Rights and the second was the International Covenant on Economic, Social and Cultural Rights. As of 31 December 1994, 128 countries around the world had ratified the International Covenant on Civil and Political Rights. Of these, 80 countries have also ratified the Voluntary Protocol to this Covenant, authorizing individuals to send petitions to the UN Human Rights Commission, which monitors compliance with the Covenant. Of the 48 countries that now make up Western, Central and Eastern Europe, only four have not signed it: the Vatican, Liechtenstein, Monaco and Turkey. The other 44 countries that signed it, in addition to Albania, Greece and Ireland, also joined the voluntary protocol. As the Slovak Republic is a member of the International Covenant on Civil and Political Rights, it is legally bound by its provisions. As stated Milošovičová et al. (2018), Article Nr. 19 confirms the absolute right to have an opinion without restriction and defines a narrow range of circumstances in which freedom of expression and information may be restricted. Its content implies that every person has the right to have their opinion without hindrance. At the same time, every person is granted the right to freedom of expression. According to Kellenbauer at al. (2019) this right includes the freedom to seek, receive and disseminate information and ideas of all kinds, regardless of frontiers, whether

orally, in writing or in the press, through art, or whatever other media of your choice.

The use of rights in Paragraph Nr. 2 of this Article entails specific obligations and responsibilities. Therefore, according to Burdová (2017), it may be subject to certain restrictions, but only to those laid down by law and necessary to respect the rights and obligations of others, the protection of national security, public order, public health or morality.

In our view, it is worth to discuss that the three requirements specified in Paragraph Nr. 3, are very strict. If a Member State imposes certain restrictions on the exercise of freedom of expression, they must not call into question the law itself. As is apparent from the Report of the Human Rights Commission from the 1983 General Assembly of the United Nations, Paragraph Nr. 3 clearly lays down conditions, and restrictions may be imposed only if they are met. These are:

1. restrictions must be required by law,
2. they may be imposed only if one of the conditions laid down are fulfilled,
3. they must be justified as 'necessary' for the Member State for one of these purposes.

Article Nr. 20 of the Pact requires Member States to prohibit by law, although it is not necessary to declare as criminal any promotion of war and any incitement to discrimination, hostility or violence on a national, racial or religious basis. Consequently, according to Kahil-Wolf (2018), any war propaganda is prohibited by law, and also any national, racial or religious hatred that constitutes incitement to discrimination, hostility or violence must also be prohibited by law. Article Nr. 21 protects the right of peaceful assembly. The following Article Nr. 22 governs the protection of the right to freedom of association, including the right to establish and join trade unions.

Convention for the Protection of Fundamental Human Rights and Fundamental Freedoms

The Council of Europe currently has 47 members from all Western European countries, including Central and Eastern European countries, as well as the new Member States of the European Union. According to Panevski et al. (2018) in June 1995, the Parliamentary Assembly of the Council of Europe recommended that the Committee of Ministers also call on countries such as Albania and Moldova to become members of the Council of Europe. This international organization has developed an extensive system of law, legal science and standards regarding freedom of expression, access to information and rights related to freedom of peaceful assembly and association. The Council of Europe's first declaration is the Convention for the Protection of Fundamental Human Rights and Fundamental Freedoms, better known as the European Convention on Human Rights (hereinafter the Convention). Historically, it is one of the oldest of the human rights treaties, and its implementation processes are the most developed (Kaczor and Kryvinska, 2013). The Convention was ratified by all current members of the Council of Europe except the new members who signed it only after their adoption. However, all the new states were expected to ratify the convention within one year of its membership, with a view to modifying their national laws accordingly.

The right to freedom of expression and the right to information are clearly stated in Article Nr. 10 of the Convention and have also been strengthened and further elaborated in the precedent law of the European Court of Human Rights. According to Olšovska et al. (2016) any country wishing to become a member of the Council of Europe or to consider it a modern European democracy must meet these human rights standards and be able to demonstrate the protection and respect for the right to freedom of expression and information in its legal system and practice.

The European Court of Human Rights was established in 1959 to deal with complaints about violations of rights by convention. That court has delivered more than 25 judgments on Article Nr. 10 issues and two more serious judgments concerning Article Nr. 11, the right to freedom of peaceful

assembly and association. Decisions and recommendations of the Committee of Ministers (political and executive hand of the Council of Ministers) add additional directives in particular as regards access to information. As the literature indicates (Bělohlávek and Rozehnalová, 2019) the judgments of the European Court of Human Rights are legally binding only on the Member State against which the complaint was lodged. Despite this, Nosková (2019) points out that, given the authoritative interpretation of the Convention's obligations, the content of these judgments must be respected and enforced by the courts of all Member States of the European Union. They do so whenever issues arise concerning rights under this Convention.

Organization for Security and Cooperation in Europe

After its establishment in 1993, the Slovak Republic became a member of the Organization for Security and Cooperation in Europe. For this reason, it has signed and is obliged to comply with all the organization's provisions relating to the protection of human rights, freedom of expression and media freedom (Molnár et al. 2014). This is in particular the Copenhagen document of the 1990 Conference on the Human Dimension. Already in 1975, representatives of 35 countries attended the Conference on Security and Cooperation in Europe and signed the Helsinki Final Act of 1975. These 35 countries included all European countries except Albania, such as Canada, the Soviet Union and the United States. Since 1991, Albania, Croatia, Slovenia and some former USSR countries have joined.

The Helsinki Final Act and the following conference papers according to Laczko (2017) are only political declarations and not treaties. Frowein (1977) emphasizes that although they are not legally binding in this way, they do not lose their legal significance. Malanczuk (1990) agrees with this view and stresses that in practice the political and moral power of their commitments may be even more important than their precise legal status.

According to Novackova and Vnukova (2019) the Helsinki Final Act contains four 'packages' of promises, of which Package III is the most important for human rights. One of the sections of Package III, entitled Information, calls for an improved flow of information through print, cinematographic and broadcast media. Until the rebuilding of the Organization for Security Cooperation in Europe, the development of human rights protection has not been significantly recorded (Burda and Trelova, 2019).

In the Vienna Final Document, issued in January 1989, the participating States undertook to further facilitate the free and wider dissemination of information of all kinds, to encourage cooperation in the field of information and to improve the working conditions of journalists. Furthermore, it follows from Article 34 that they have declared their commitments in accordance with the International Covenant and the Vienna Declaration to ensure that individuals are free to choose their own sources of information (Peráček and Mittelman, 2015).

According to Peráček at al. (2016) in addition to these declarations, the Vienna Declaration also reflects the efforts of Member States to prevent and or to deny the Member States. Prohibit the possibility of interference with transboundary radio and television broadcasting. While former Soviet Union officials insisted on the right to cancel broadcasting as part of their sovereignty, the Vienna document requires States Parties to ensure that radio services that are operated in accordance with the International Telecommunications Union Radio Regulations can be received directly and normally in other countries (Močarnikova et al. 2018). We are of the opinion that, although the provision of the Vienna Declaration did not explicitly prohibit interference, the consequence, and indeed the intention, was to achieve a ban on interference beyond national borders.

The Human Dimension Conference, held in Copenhagen in June 1990, resulted in a document of great importance for human rights in general. In particular, the Participating States agreed to ensure that any restriction of fundamental rights and freedoms has to be made only by law and in accordance with their obligations under international law. Valuch et al. (2011) points out that they have made a

special commitment to respect the content, in particular with the International Covenant on Civil and Political Rights and their international obligations, in particular the Universal Declaration of Human Rights. They stated that any restrictions on the rights and freedoms in a democratic society must relate to one of the objectives of the applicable law and be strictly proportionate to the objective of that right (Srebalová et al. 2019).

In this context, the literature (Kryvinska, 2012; Duffalova et al. 2019) points to the importance that the above corresponds to the three-component restriction condition set by the European Court of Human Rights. These are legality, legitimacy of purpose and proportionality. In addition, the Participating States have explicitly recognized the Council of Europe's important human rights expertise and welcomed consideration of the means by which the Council could contribute to the human dimension of the Conference on Security and Cooperation in Europe.

As is apparent from Article Nr. 91 of Appendix A in the Copenhagen document, the Participating States also adopted a declaration on the right to freedom of expression, which is closely linked to Article Nr. 10 of the European Convention. The October 1991 meeting of the Moscow Conference on the Human Dimension reaffirmed and further elaborated this standard by affirming the right of the media to collect, communicate and disseminate information, reports and opinions. In particular, we consider it necessary to emphasize that at the Copenhagen meeting the Participating States have clearly recognized the right to freedom of expression, with international standards (Funta, 2018). They also pledged to combat the proclamation of national racial and religious hatred in all its forms. By the Copenhagen meeting, Western delegates had proposed this issue with regard to anti-Semitism in the former Soviet Union. This new interest, however, reflected a serious threat, namely increasing racism, xenophobia and ethnic hatred for the objectives of security and cooperation throughout the new Europe. Thus, according to Kočišová et al. (2018), the participating states have expressed a strong intention to intensify their efforts to combat totalitarianism, racial and ethnic hatred, anti-semitism, xenophobia, and discrimination against anyone. They also pledged to promote understanding and tolerance, to provide protection against any action that constitutes incitement to violence and to recognize the rights of individuals and to remedy.

Conclusion

Based on our research, we found that the Universal Declaration of Human Rights was one of the greatest importance in terms of granting human rights as well as the right to information and freedom of expression. Although it is the oldest document in the modern history of mankind, its content has had and still has a huge impact on the adoption of other international and European documents as well as national human rights regulations. We see the particular importance of this document in the fact that many countries have changed their legal systems to comply with the legal principles of the Universal Declaration of Human Rights.

From the analysis of the Universal Declaration of Human Rights, the International Covenant on Civil and Political Rights and the Convention on Civil and Political Rights, we can clearly identify the right to information as a fundamental human right. This is a subjective right of every individual that is inalienable, irrevocable, non-prescriptible and inalienable regardless of nationality. We also found, in each of the documents examined, a commitment by the signatory states to respect and protect these rights. On the other hand, we must state that the real implementation of this commitment was more than questionable during the 'Cold War' period, not only in the Eastern Bloc countries.

In answering the research question, we note that even in the period of freedom between the years 1948 and 1989, the right to information was sufficiently guaranteed by several international documents. In conclusion, we need to point out that even in today's globalized world, the realization of information law is questionable. We believe that effective media control by selected groups degrades the right to information only between some kind of “quasi-law.”

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Emergence and Development of Legal Computer Science and Its Role in The Context of Knowledge Management Development in Slovakia

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Abstract

Authors in the contribution focus on the area of emergence and development of legal information systems and legal computer science in the context of knowledge management development. Nowadays, in the information age, knowledge in the field of computer science constitutes the background for success of prospective lawyers. On the other hand, this field of expertise is of minimum attention of legal theoreticians. Due to these reasons, we have decided, using selected methods of scientific research and by scientific and doctrinal interpretation, to analyze available resources concerning the area of historical development of legal computer science. We search for answers to the set goal in academic and scientific literature. In conclusion of this contribution, we summarize the results of the scientific work and confirm or reject the hypothesis on inevitability of teachings of legal computer science at universities in the Slovak Republic. Research of the selected area concerning legal systems and legal computer science in conditions of the Slovak Republic represents the main objective of this contribution, which in its substance intervenes with other areas of research. Primarily, it is directed at the area of legal computer science with substantial overlaps in knowledge management and in theory of law.

Keywords: knowledge management, legal computer science, regulation

Introduction

According to Srebalová et al. (2019) legal computer science as a science deals with defining of legal information – defining the concept of legal computer science directly by its concrete expressions in such a way that we can extract legal information (within the multi-meaning context of language) from the general concept of information. It may be stated that it is a science *par excellence,* considering it from the point of view of high specialization and internal content structuring, both on sc*ientific as well as applied level* (viz. legal information systems, databases – operation and maintenance). Legal computer science as well as computer science itself – in contrast to theory of information - does not deal with movement of information per se; canals and nodes through which information passes through, but focuses on questions of construction of automated systems of legal information (ASLI). Theory of information deals with mathematical description and analysis of various systems of connections which may be understood – in a very general sense – as systems for transfer of messages

Purpose of Contribution and Methodology

The primary purpose of the contribution is to analyze historical development of legal systems. Another purpose is to review development of legal computer science as a course taught at law faculties in the Slovak Republic from its initiation until today. Alongside the main purpose, we have chosen a partial goal, that is:

- to confirm or to reject the hypotheses on inevitable need of teachings of legal computer science at law faculties.

The selected goals are going to be reached with the use of legal regulation, academic and scientific literature as well as judicial decisions in Slovakia.

Due to nature of the contribution, we apply scientific methods of research. From scientific methods of cognition, the analytical method is applied with respect to analysis of legal status and legal regulation. With the use of the comparative method, we have attempted to enable access to various opinions on legal regulation and interpretation of concrete concepts. Coming out from scientific knowledge of valid and effective laws and legal science, we have used doctrinal and scientific interpretation as well. Due to the fact that legal computer science is a relatively new branch of law; in Slovakia this topic was analyzed after the year 1989 by authors such as Gregušová, Susko, Chlipala. Their knowledge was published in University course books, academic and scientific articles in the area of legal computer science, theory of law, business law and civil law. The topic of legal commuter science has been analyzed also be several theoreticians in the Czech Republic, such as the academic Knapp, Cvrček or Novák as well as others. A special place as a source of knowledge belongs to the decision practice of Slovak courts.

Emergence and development

Beginnings of legal computer science may be traced to the period of the second half of the fifties and in the period of the turning point between the fifties and the sixties, at the beginning in the Western Europe and later on in the USA. In former Czechoslovakia, the grounds for legal computer science was put by the academic Viktor Knapp (1993). His most famous work was published in 1963 under the name: On the Possibility of Use of Cybernetic Methods in Law. In the seventies, the automated systems of legal information evolved.

The first important project in the beginnings of formation of legal computer science was the project called „Allowances“ – as the first expert system which should have provided a supportive framework for judicial decisions on the amount of allowances. The project had not found support of judges as they were not willing to subject their decision making on the amount of allowances to an expert system. There were several reasons for it. It was the fear of intervention into independence of judiciary and in particular into independent decision-making of judges in court proceedings on determination of the amount of allowances as it should have been subject to computer technology (Kryvinska (2012). As it results from the Resolution of the Highest Court of the Slovak Republic (2012), independence of judges is closely linked to impartiality and professionality (qualification) of the judge and these attributes are conditions of quality of decision-making and its predictability and follow the importance of due fulfillment (provision) of justice. Independence and impartiality are closely related, frequently overlapping and it is not easy to differentiate the former from the latter.

The second project was the project „ASLI“ – automated system of legal information. Its main objective was to gather, execute, maintain and search (on request) with the use of computer technology all legal regulations that were a part of the legal order in Czechoslovakia (Duľová-Spišáková (2017). It should have been able to find an individual provision of legal regulations, judicial decisions and opinions, opinions of other state authorities, selected works from legal theory etc.

The foundations of the ASLI were put in the year 1971 in Slovakia. It was connected to historical events at that time as a research task directed at creation of the first legal information system had been in progress. According to Milošovičová et al. (2018) results of this research task, the solving of which took place with assistance of informaticians as well as legal theoreticians were extremely favorable and socially important. The importance of this research task was expressed in the fact that its elaboration and results in the form of an automated system of legal information (ASLI) were later transferred from Slovakia to Prague (Czech Republic), where together Slovak and Czech creators – informaticians and law theoreticians - contributed to its completion.

In the eighties, in the Department of State and Law of the Czechoslovakian Academy of Sciences, initial formation of the legal information system CS LEGSYS was made, due to close cooperation of Czech and Slovak theoreticians in the area of law and computer science. Database of the legal information system CS LEGSYS was originally focused on purposes of scientific analysis of development of the Czechoslovakian legal order. According to academic sources (Cvrček and Novák, 1992), the main goal of construction of such information system was to form a database, which would in a broad sense of variables (i.e. from the perspective of characteristics of various types of legal regulations) encompass all legal regulations published in the Czechoslovak Republic form the year 1918 until the last (current) period of time. This legal information system represented a perfect system for the area of legislation and was an amazing example of schooling for teachings of students at law faculties and future legislators in the Czechoslovakia. Legal computer science gradually grew into a legal branch (Mura et al. 2019). It may be stated that it currently deals with following areas in general:

1. Analysis of legal documents as carriers of legal information
2. Typology, formal and language structure of legal information
3. Ways of creation of legal documents
4. Communication, interpretation and mutual relations and connections between these documents
5. Institutions which create, process and maintain legal documents
6. Technical measures
7. Ways and methods, i.e. technology of collection, processing, maintaining, searching and distribution of legal information

Legal Information Systems

According to Peráček (2019) beginnings of formation of legal information systems may be set in the time period of the sixties of the last century. Along with development of computer science, libraries had firstly introduced informatized catalogs that enabled search pursuant to different criteria of choice and these criteria could have been combined with each other. Search thus became more precise and faster. In this time period computers were used only in local operations, later on we can talk about huge machine room computers called mainframes.

Similarly, in this period in developed countries of western Europe, different state institutions started to organize databases according to their fields of competence e.g. publishers of collection of laws published electronic registers. Appeal, cassation and highest courts started to register their decisions on computers; notaries, attorneys and commercial lawyers started to use computers, firstly for the evidence of their members, later on clients as well as for other tasks.

Nowadays, the increasing amount of legal regulations is a trend. In the course of last years, the speed of computer technology has multiplied, as well as capacity of memory of computers (Peráček et al., 2019). Databases are growing bigger and bigger. Instead of registers and resumes, they contain texts

of laws and other legal norms as well as texts of judicial decisions in full.

Databases of legal regulations as well as other databases which initially served only for the purposes of their creators (authority, organization etc.) were later transferred to huge computers accessible to a broad number of users.

Already at the beginning of the seventies of the last century, post offices in western Europe delivered to their participants, gratuitously or for a low lease, simple terminals (e.g. MINITEL in France, VIDEOTEX in the Switzerland), that merged three basic parts in one machine: keyboard with a monitor, telecommunication programme and a mode. Their operation was easy and served broad pubic for the purpose of quick access to information, similarly as a telephone list or a traffic schedule

The basic characteristics of legal information systems is their technological side, based on principle or room computers (mainframes). Currently, their capacity of memory reaches several tens of GBs (gigabytes). Their substance resides in broad information technology that uses data networks at distance as well as huge databases which usually have a universal nature. These systems are based on four principles.

According to Gregušová et al. (2005) the first principle is the principle of complexity, which means that they contain all types of legal regulations, so the whole legal order of a state is contained in the database, in all forms. Data openness is the second principle. From technological point of view, it is the capacity to accept their parts to the database of data and from the content point of view, it is, in particular, the condition for continuous completion of legal documents. It is not only the technological capacity to integrate new parts to the databases, but it is the need for continuous completion of them that has to be addressed. New legal texts, historical and other documents have to be added on a continuous basis, especially due to the fact that upon creation of a database, it is not possible to incorporate all the documents and legal regulations at once. Construction of a database begins with inclusion of already existing legal regulations. Afterwards, historical legal documents are added (Mittelman et al. 2016). The third principle represents provision of services at a distance. It means, in particular, constitution of systems in such a way that distance users may use the provided services. The fourth principle is a broad technological base – network interconnectivity**.** They contain legal regulations, judicial decisions, academic literature, as well as other specific legally important documents.

Nowadays each legal information system contains:

1. **Technological base** – computer and software for search of text
2. **Language extension** – enables to manage search in national environment
3. **Legal Extension –** enables to structure legal documents (specific traits of legal documents)
4. **Data part** – processed by experts in their fields

In this connection, reference is also made to the opinion of Leone et al. (2018). InvestigatiOnt is addressed to users which need to model a system concerning the legal domain. The legal field shows a lot of complexities for which InvestigatiOnt can provide a valuable decision support: (i) different legal systems (e.g., common law, civil law), (ii) different jurisdictions (e.g., local, national, international), (iii) complex interactions between norms (e.g., norms that express the obligation to be accomplished if another obligation is violated, or norms that express an exception to an obligation), (iv) the fixed structure of legal texts (e.g., their division in articles, paragraphs, definitions). InvestigatiOnt helps the user to deal with those challenging issues by offering her two types of service: the visualization service displays the information concerning an ontology as a diagram showing its dependencies with the other reused ontologies, while the search service suggests one or more ontologies suitable to meet the user requirements analyzing the answers she provided to a set of

questions. The ontologies proposed to the user by this tool are those for which the ontology is available for download, and we concentrate on the more recently proposed ontologies (5-6 years ago at most).

Basic principles of informatized legal documents

The system of search of documents in databases is the complicated part. It is based on the use of computer capacity to sort out such documents (from high quantity of documents) that correspond to certain criteria. It is naive to think that it is sufficient to ask the computer to search for the word „theft“ and the computer goes through all the texts and selects those that contain the word „theft“- if the search took place in full texts, it would take several dozens of minutes for the computer to screen through the full texts, regardless of how fast and effective it is (Meisner et al., 2014).

Dictionaries, Indexes

A computer does not work with a text file at the beginning. It uses several accessory files that are, in particular, a dictionary and an index (Ključnikov et al. 2019). If the computer receives an instruction to search for a concrete word, it firstly checks if the word is allocated in the dictionary. If it is not found, it sends an error warning and asks for a new formulation of the word. A part of the dictionary is usually a list of words that should be ignored. In languages of the francophone area, these are the articles *la, le etc.;* in the Slovak language, these are empty words such as this, that or these. Subsequently, the computer consults accessory files of indexes. This is an important part of the search program. It is a dictionary that is completed with data where in the text a concrete word can be found. As in each dictionary, an index file is categorized alphabetically, so the search expression is quickly found (Kaczor and Kryvinska, 2013).

Thesaurus

A dictionary that contains a full enumeration of expressions, hierarchically classified, is called a thesaurus. The use of thesaurus precises the choice as with its use we may broaden or reduce the criteria of choice. Elaboration of a thesaurus is a very complicated and difficult job that requires a great amount of knowledge and time. After finding an expression in the text, another part of the program applies that reads the documents and sends the text to the applicant in the form that he/she required (Kočišová et al. 2018).

Structured query language (SQL).

Structured query language (SQL) is used frequently in conditions of work with legal information systems. Query languages represent the most important part of a database system as they serve the most important part of the communication – system – user, the election of information in the information system (Jansa et al, 2018). According to Mucha (2019) the query language is a set of expressions (above a certain alphabet), for which a certain mechanism of assigning of questions for certain expression exists. The mechanism, such as interpret of language for each database (to the relevant scheme above which the question is formulated) calculates an answer, a structured set of values form the database or derived from them.

Language for selection of documents

Nowadays, a common type of interaction is on-line user contact with documentographic information system, as for example electronic collections of laws. A user sees his/her database as a body of documents describing e.g. articles form academic newspapers. At a certain time, the subject of his/her interest will be “the use of computers in documentographic information systems and other information systems.“

Using, the keyboard or a mouse, he/she chooses the expression computer interpreted as "find all descriptors beginning with the sequence computer together with the number of documents, in which it occurs ". The answer is a corresponding table that contains expressions such as computer, computers, techniques, etc. and serves for further precision of the question. The user is interested only in computer, computers, programming, computer software (Dudič et al. 2018).

Another question arises (the system automatically and continually assigns numbers to), where "**,**" (comma) is interpreted as logical "or". The system splits the question into three sub-questions in compliance with gradual application "," and issues a number of relevant documents for the sub-question. According to Pokorný (1989) the user orientates himself similarly in other sources of adequate descriptors, i.e. documentographic information systems and (other) information systems.

Logical Operators

Frequently, in legal databanks, logical operators, logical conjunctions, such as *"and", "or", "not"* are used. The system works with several logical operators, for example *"or"* (is entered as **+**) and *"at the same time"* (is entered as * or as interspace).

If no logical operator is determined, it is automatically used * (and at the same time). Upon entering the operator **+** in the shape of e.g. A+B the computer extracts all information pertaining to the identification sign A and all information pertaining to the identification sign B from the set of information of the relevant folder. Upon entering A * B the computer selects the information that relates to A and to B at the same time. By the use of brackets and principles of elementary logic it is possible to choose a relevant information file for such information that has immediate relation to the solved problem.

A * (B + C) – find all information related to the identification sign A that have a relation to at least one of the identification signs B or C at the same time. This applies to all situations where logical operators may be used.

Relational Operator

Information systems also use *relational operators* – equals to (=), does not equal to (-), higher than A (> A), lower than A (< A). By numerical and date entries, which are from the point of view of legal information systems very significant, these inequalities are analyzed precisely.

According to Gregušová (1992) with the use of alphabetical entries, these are analyzed according to the alphabet, without diacritic. By alphabetical entries, the operator called „*find subsequence ( )"* is also used. This enables search in compound fields. If we do not enter any relational operator, it is automatically considered as " " (subsequence) by alphabetical entries, or " = " by numeric or date entries.

Structure of Legal Texis

Legal texts have rich structuring. Basic structuring of legal texts includes structuring pursuant to a grammatical, a formal-legal as well as a semantic perspective. Basic grammatical structure is represented by a sentence. From a formal point of view, a sentence is a sequence of words form the majuscule at the beginning of the sentence to the full stop, which ends the sentence. The Use of a majuscule does not have to mean the beginning of the sentence as well as the full stop does not have to mean its ending. Regardless of this fact, structuring a text automatically into sentence is natural (Vilčeková et al., 2018).

Formal-legal structure of legal texts comes out of pragmatic structuring according to Act Nr.

400/2015 Coll. on Creation of legal regulations and on Collection of laws of the Slovak Republic and changes and additions of other acts as amended. We know many types of structuring of legal texts depending, in particular, on the type of a legal text (regulation). Basic differences may be seen if comparing an act and its amended version (amendment). According to Dudič et al. (2018) similarly, we cannot compare an act and an international treaty published in the Collection of Acts of the Slovak Republic (See more: Legislative Rules of the Government of the Slovak Republic (approved by decision of the government of the Slovak Republic dated 4. May 2016 Nr. 164).

Formal-legal structure of legal regulation (act)

Legal regulation is divided into: header, preamble, headlines, designated legal blocks (articles, sections, letters etc.), signatures, text annexes, tables and figures.

Header of Legal Regulation

Header of a legal regulation is composed of identification number of the legal regulation, type of regulation (act, regulation, etc.), author of regulation (who published it), date of publication and name of regulation.

Preamble of a legal regulation usually contains sentences following after the header of the legal regulation. The most famous preamble in the legal order of the Slovak Republic is the preamble of the Constitutional Act of Slovak national council Nr. 460/1992 Coll. Constitution of the Slovak Republic as amended. Preamble does not comprise normative sentences (from the subject matter point of view) and it is not a legal block from the formal perspective.

Teaching of Legal Computer Science at Law Faculties

Teaching of legal computer science had begun in the year 1990 at the Law Faculty of the Comenius University in Bratislava. Later on, after change of the form of study (1st level bachelor, 2nd level master studies) it became a part of mandatory courses in the bachelor level of studies at all law faculties in the Slovak Republic. A change in the status of legal computer science as an obligatory course came after incorporating results of the Bologna process into the Act Nr. 131/2002 Coll. on Universities and changes and amendments of other acts as amended. The Bologna process was an initiative of signatory European states with the aim of creating a *European University space*. This aim should have been reached by harmonization of academic titles and character of study of individual courses. A part of it should have been also a guarantee of standards of quality in the Europe as a whole. With effectiveness of the act on universities and its implementary regulations, especially the Regulation of the Ministry of Education of the Slovak Republic Nr. 614/2002 Coll. on Accredited System of Studies, legal computer science became an obligatorily selective course. As implied by designation of the course as obligatorily selective, not every student has to take the course, even though it has an interdisciplinary character. As a result of this change, lack of knowledge of graduates of law faculties in the field of legal computer science has been evident for several years.

Conclusion

The primary goal of teachings of Legal Computer Science is to provide students with knowledge and skills in the area of practical use of legal information systems and to prove their orientation in national legislation as well as in legislation of all member states in the European Union, including legal documents of the European Union.

The achieved level of knowledge should enable the students (by gradual independent improvement) to master the use of legal information systems in such a way that it enables them to work effectively

as future lawyers in any legal profession.

In our opinion, we have managed to reach the goals set in the introduction of the contribution. With the use of available sources of knowledge as well as several scientific methods, we have analyzed development of legal information systems primarily in the Slovak Republic. In addition, we have justified the need for knowledge of work with information legal systems and their databases for every lawyer. To conclude, we confirm the hypotheses on the inevitable need for teachings of legal computer science at universities in the Slovak Republic.

Finally, we remind that knowledge of the law and hence the necessity of the existence of legal information systems for all arises from the legal and irrefutable legal presumption "ignorance of the law does not justify".

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An Objective View of Government Policy on Access to Information in Years 1948 - 2020

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Abstract

In a modern society, the constitutional right to information is a fundamental right without which the existence of a genuine democratic establishment is not possible. It allows all subjects to form an opinion to the state as well as the whole society. Information is also called the oxygen of democracy. Access to truthful, timely and complete information is a prerequisite for making our decisions meaningful. The aim of our contribution is a thorough review of the constitutionally guaranteed right to information. In terms of systematic approach, the contribution is divided into three parts in addition to the introduction and conclusion. Each of them focuses on a certain aspect of the constitutional right to information. For the thorough elaboration of the paper we used several scientific methods of investigation, especially description, analysis, synthesis, deduction, logic or comparison but also doctrinal interpretation. The result of the paper is an evaluation of the current constitutional status of the implementation of the right to information in the Slovak Republic. At the end of the paper we confirm or reject the hypothesis that the current law is sufficient without the need for further adjustments.

Keywords: Constitution, Freedom, Government Policy, Information, Law

Introduction

The right to information is according to the theory of law among political rights. As reported by Fábry et al. (2019) it is the second generation of human rights that emerged in the early twentieth century. The emergence of political rights has necessitated the need to protect the population from the threats posed by the post-modern era and post-industrial society. In international discussions, even in the context of globalisation, some political rights are evaluated controversially and are not universally recognised. In today's world, their enforcement is quite difficult. Probably for this reason too, this issue remains on the brink of interest in legal theory. Our aim is to review it. We focus primarily on the constitutional aspects of this right. Through scientific and doctrinal interpretation, we examine selected articles of the Constitution of the Slovak Republic relating to the issue of the right of information. The aim of our contribution is a comprehensive review of the constitutional level of the right to information in the conditions of the Slovak Republic in comparison with periods of freedom - 1948 to 1989. We also criticise the identified shortcomings in the execution of the right to information and the possibility of public information by public authorities.

From the systematic point of view, the contribution is divided into four sections, in addition to the introduction and conclusion. The first focuses on the gradual introduction of the right to information into the legal order of the former Czechoslovakia. The second focal point examines this right of animal aspects, including the use of the case law of the Constitutional Court of the Slovak Republic. The third section deals with its constitutional and legal constraints. A brief analysis of the positive discrimination against national minorities is contained in the fourth section. The last fifth section deals with of the right to environmental information.

For the thorough elaboration of the paper we used several scientific methods of investigation, especially description, analysis, synthesis, deduction, logic or comparison as well as doctrinal interpretation of legal norms. The result of the paper is an evaluation of the current constitutional status of the implementation of the right to information in the Slovak Republic. At the end of the paper we confirm or reject the hypothesis that the current law adjustment is sufficient without the need for further adjustments.

Sequence of introducing the right to information into the legal order

As a member state of the United Nations, Czechoslovakia participated in the approval of the Universal Declaration of Human Rights in New York on 10 December 1948. Along with other Eastern European states, Saudi Arabia and South Africa, the vote was abstained, which was not surprising given the country's upcoming political regime. The Declaration was not legally binding, it was merely a recommendation de lege ferenda as an inspiration for future legislative changes. It contained a catalog of human rights that every person has, whether or not a particular state recognises these rights. In addition to traditional human and political rights, social rights were also included. According to Vačok (2016), the international legal significance of the Declaration is that it describes a certain area within which the United Nations bodies can address human rights issues without exposing themselves to interfering with the Member States' internal affairs. It has narrowed considerably in the area of human rights.

After the necessary ratification procedures, another United Nations document establishing the right to information - the International Covenant on Civil and Political Rights of 1966 - became a part of Czechoslovak national law, in the Constitution of the Czechoslovak Republic in 1948, or in the Constitution of the Czechoslovak Socialist Republic in 1960.

As Lalík (2018) states, the right to information was only marginally enshrined in Act No. 81/1966 Coll. on the periodical press and on other mass media, which was effective for 42 years with the amendments. However, according to § 1 of this Act, citizens could use the periodical press and other mass media only to obtain information and publicly express their opinions. However, it was not possible to realise this right in practice.

The right to information was enshrined in legislation only after political and social changes in 1989. Such an important step took place in 1990 when the Constitutional Act - the Constitutional Charter of Fundamental Rights and Freedoms - was adopted. Further, Burda and Trellova (2019) say the above-mentioned document was published in the Collection of Laws as Constitutional Act of the Federal Assembly of the Czech and Slovak Federative Republic No. 23/1991 introducing the Charter of Fundamental Rights and Freedoms. This document is still part of the legal order of the Slovak Republic. The charter became a complete model for creating the II. part of the Constitution, entitled 'Fundamental Rights and Freedoms’. In our opinion, this is an unnecessary duplication of constitutional legislation.

The Charter thus enshrined freedom of expression, the right to information and the right to seek, receive and disseminate information freely, these rights being 'self-enforcing'. In practice, this means that they can be directly applied and implemented without the implementing law. The charter is based on the principles of the rule of law, which means that it is primarily the supremacy of the law. In practice, this means that the sphere of freedom of the individual is primordial, and the state can

intervene in it only on the basis of the law, and in the manner prescribed by law. According to Ľalík (2019), the priority is therefore a human citizen who can do everything that the law does not prohibit.

Constitutional Right to Information and Freedom of Expression in General

According to Brestovanská at al. (2019) the basic legal regulation establishing freedom of expression and right to information is the Constitution of the Slovak Republic adopted as Constitutional Act of the Slovak National Council no. 460/1992 Coll. ("the Constitution"). The latter provides in Article 26 (1) that freedom of expression and the right to information are guaranteed.

By comparing the constitutional arrangements for freedom of expression and the right to information, we can conclude that in principle there are two models of freedom of expression and the right to information. In the first model, the right to information is guaranteed within the framework of freedom of expression. The second model distinguishes between freedom of expression and the right to information, with different purposes and content. According to Olšovská et al. 2016), such a concept is explicitly laid down, for example, by the Swedish Constitution.

In addition to the provisions of Article 26 (1) to (4) of the Constitution of the Slovak Republic, which apply both to freedom of expression and to the right to information, the set of constitutional standards is more extensive in the right to information. The source of the law is also Article 26 paragraph 5 of the Constitution of the Slovak Republic, according to which state authorities and territorial self-governing bodies are obliged to provide information on their activities in the state language in an appropriate manner (Majerčáková et al. 2016). The conditions and method of execution are laid down in the Implementing Act. In its view of the purpose and content of this amendment, the Constitutional Court of the Slovak Republic stated that the prerequisite for the democratic exercise of power in modern society is to inform individual citizens about matters of public interest. Article 26 (5) of the Constitution does not restrict the access of persons to information in the sense that citizens do not have the right to information from authorities other than state authorities and local and regional authorities. Article 26 (1) of the Constitution guarantees the right to information without restriction according to public authorities. All authorities are obliged to behave in such a way as not to undermine the right of citizens guaranteed in Article 26 (1) and (2) of the Constitution. Article 26 (5) guarantees a higher quality of the right to information, as the Constitution imposes an obligation on state and territorial self-governing bodies within the scope of the Act to disseminate and provide information on the adoption activity in the state language. This obligation is not imposed on other public authorities.

The constitution according to Košičiarová et al. (2015) creates, through the right to information, three groups of information. The first is information that the state authorities and the authorities of the territorial self-government have to submit to the authorised persons. The second group consists of information that the authorities or other public authorities do not have to submit to the beneficiaries, but they have to withhold access if the beneficiaries exercise their right to information. The third group of information consists of information that cannot be disclosed because it is information subject to Article 26 (4) of the Constitution.

As follows from this finding no. I.ÚS 10/1999 of 16 May 1999 published in the Collection of Findings and Resolutions of the Constitutional Court of 1999, the Constitution of the Slovak Republic does not restrict the right to information in terms of the subject of this right. This means that it does not provide for a positive calculation of the information that an authorised person can search, receive and disseminate, nor does it provide for a negative calculation that cannot be searched, received and disseminated. All information may be the subject of the right to information, unless it is subject to the restriction under Article 26 (4) of the Constitution. Article 26 (2) of the Constitution grants the right to receive and disseminate information. In exercising this right, the Constitution protects not only the right to receive information to disseminate information, but also the cumulated possibility to further disseminate the information received.

Alongside the above-mentioned provisions of paragraphs 1 to 4 of Article 26 of the Constitution, which apply both to freedom of expression and to the right to information, the set of constitutional standards for the right to information is more numerous. The source of the law is also Article 26 (5), which includes the obligation of public authorities to provide information on their activities in the state language in an appropriate manner. Under Article 26 (1) of the Constitution of the Slovak Republic, freedom of expression and the right to information are guaranteed. The following paragraph 2 guarantees everyone the right to express their views in words, letters, print, pictures or otherwise, as well as freely seek, receive and disseminate ideas and information regardless of national borders. The complexity of the constitutional regulation is also complemented by paragraph 5, which also explicitly introduces the obligations of public authorities to adequately provide information on their activities in the state language.

In its rulings, the Constitutional Court of the Slovak Republic confirmed that Article 26 of the Constitution implies everyone the right to access information that is available to state authorities and public authorities. If someone exercises their right to information, the public authority is obliged to make access to specific information; the information must be available to the person who asked for it.

General implementing legislation - Act no. 211/2000 Coll. on Free Access to Information and on Amendments to Certain Acts (Freedom of Information Act), as amended, however, does not exhaust the entire content of the constitutional right to information. It only regulates the right of access to information which is already in some way stored (e.g., recorded on an information medium) and is therefore already available. Another aspect of the constitutional right to information is the right to receive and record information from ongoing and unrepeatable events in which information is immediately generated and will be irretrievably lost without recording. In particular, it is the right to make audio or video recordings from the activities of public authorities (Dolobac et al. 2016).

Reasons for Limiting the Right to Information

The literature (Panda et al. 2016) also points out that the right to information cannot be understood absolutely. These are cases where it is necessary in a democratic society to protect the rights and freedoms of others, the security of the state, public order, the protection of public health and morality. However, the specific reasons and the manner in which access to information is refused must be determined only by a lawful regulation. As Gregušová et al. (2016) states, the right to information can be restricted if one formal and two material conditions are met, consistent with the conditions under which the Constitution permits restrictions on freedom of expression. In relation to the right to information, the protection of classified information, which constitutes a conflicting public interest to the right protected right to receive information, is of particular importance (Rentkova et al. 2017). The source of the law is Act no. 241/2001 Coll. the protection of classified information, as amended. Pursuant to Section 2 of this Act, Classified Information is an information or thing listed in the list of Classified Information which, due to the interest of the Slovak Republic, must be protected from disclosure, misuse, damage, destruction, loss or theft.

According to Kaczor and Kryvinska (2013) conflicts of public interest in the protection of classified information and public interest in access to information in a democratic and legal state cannot be resolved by denying the right to information. The protection of classified information cannot be based on a method of broader interpretation of the law. The subject of protection is only those information that has the rarely specified properties of classified information, not all materials containing classified information (Peráček, 2019).

The requirement to establish a fair balance between the two public interests protected by the rule of law implies some conclusion. According to it, if the object to which the person entitled asserts the right of access to the information contains classified information, the public authority cannot refuse access to the whole object, but only to the part containing the classified information (Peráček and Mittelman, 2015). Similarly, the disclosure of an object containing classified information shall mean that only classified information is protected from disclosure and not the whole thing in which the

classified information is located. For example, if a document contains classified information, according to Mittelman et al. (2016), the state authority may protect it by blackening or otherwise making the classified information inaccessible to the public, but it cannot refuse to disclose everything else mentioned in the document.

In the context of constitutional possibilities to limit the right to information, a special place is held by Article 51 (2) of the Constitution. It directly allows the restriction of fundamental rights and freedoms at the time of war, emergency and emergency situations on the basis of Constitutional Act no. 227/2002 Coll. dealing with state security at the time of war, state of war, and state of emergency. This constitutional act has repealed Constitutional Act no. 10/1969 Coll. on the State Defence Council as amended by later constitutional laws. As is clear from Article 2 (3) point i) at times of War, the right to freely seek and disseminate information irrespective of national borders and freedom of expression is restricted. Under the terms of point j) it is also possible, in times of war, to make the publishing of the press subject to authorisation, the content of the press and the broadcasting of radio and television to be subject to censorship. The same restrictions can be introduced also during the time of war, emergency and emergency in the whole territory of the Slovak Republic.

Particular Rights of National Minorities

Members of national minorities who are citizens of the Slovak Republic are granted special rights by the Constitution of Article 34 (1-3). According to Dudic et al. (2018) as is clear from Article 4 of the Council of Europe Framework Convention for the Protection of National Minorities, the aim is to promote full and effective equality between persons belonging to a national minority and the majority population, and these measures cannot be regarded as discrimination against the majority. Such an advantage is characterised as positive discrimination. Only national minorities are entitled to rights, as they are generally considered to be disadvantaged. By virtue of Article 34 (1) to (3) of the Constitution, these rights are to be understood as individual meaning they belong to specific persons, not to the minority as a whole. According to Srebalová et al. (2019), the rights granted in this way allow members of national minorities and ethnic groups to develop universally, in particular their own culture, the right to receive and disseminate information in their mother tongue, associate with national associations and the like. National minorities as well as ethnic groups, in addition to the right to have a command of the state language under Article 34 (1), are guaranteed, according to the following paragraph 2 of the Constitution, the right to education in their mother tongue. Vačok (2018) stresses that the use of the language of national minorities and ethnic groups in official communication is regulated directly by Act No. 184/1999 Coll. on the use of languages by national minorities. The exercise of these rights is limited, the border being the protection of the sovereignty and territorial integrity of the Slovak Republic and the rest of the population (Panevski et al. 2018).

Informing on The State of The Environment

According to Kryvinska (2012) article 45 of the Constitution of the Slovak Republic specifically lays down the right of everyone to timely and complete information on the state of the environment and on the causes and consequences of this state. It allows to enforce these rights only within the limits of the implementing laws. The right to environmental information is identical to the general right to information in that it confers on everyone the same forms of exercising that right - to seek, receive and disseminate information to the environment but which, unlike the general right to information, must be timely and complete. The subject of information is three components, the state of the environment, the causes of the state of the environment and the consequences of the state of the environment. As Švec and Madleňák (2017) claims, if the information provided is timely but incomplete, its quality contradicts Article 45 of the Constitution, just as when complete information is provided late. Horvath et al. (2017) state that it is only possible to claim the right to environmental information on the basis of the Implementing Act, which is Act no. 211/2000 Coll. on Free Access to Information and on Amendments to Certain Acts (Freedom of Information Act) as amended. By its provision § 23 abolished lex specialis - Act no. 171/1998 Coll. on access to environmental

information. It follows that the same law applies to the exercise of the rights referred to in Article 26 (1) and Article 45 of the Constitution. This deficiency was partially remedied by Act No. 205/2004 Coll. on collecting, storing and disseminating environmental information and amending certain laws.

Conclusion

In contrast to the past, the constitutional right to information can be understood as an instrument of promoting the principle of transparency, which in a legal and democratic state is one of the general principles governing the activities of public authorities. As a result of our research, we can conclude that its other function is the function of a universal means of enforcing the rule of law in the activity of public authority holders. It therefore has a special position in the legal guarantee system. The right to information enables a person to obtain data that he/she can subsequently claim using another legal means of protection, such as the rights of national minorities or ethnic groups. This is one of the reasons why we can consider the constitutional right to information to be crucial in ensuring the values of the rule of law and democracy. Another, in our opinion, also undeniable significance of the subjective and thus enforceable right to information is its control function in relation to the functioning of public power. Sufficiently extensive, simple and quick access to information also has a positive impact on citizens' confidence in democratic institutions and their willingness to participate in public life.

We are confident that we have managed to achieve the main goal of the paper. We have examined all aspects of the constitutional right to information. We believe that this constitutional right, like other fundamental human rights and freedoms, is a natural right of every person, even without a possible positive grounding in the constitution or other legislation. The protection provided by several laws, including the application of sanctions, directly constitutes the constitutional right to information. In our opinion, it is a right guaranteed by the constitution and other legislation to a sufficient extent without the need for further legislative intervention.

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Heterarchical Coordination in Inter-Organizational Networks: A Report on The Qualitative Research in Progress

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Abstract

Purpose. The aim of the presented study is to report the research in progress on heterarchical coordination within an inter-organizational network in the tourism sector. **Design/methodology/approach.** Due to relative novelty of phenomena examined and a lack of empirical studies in the field, the study follows the qualitative approach and the case study research design, suggested for explorative studies. **Findings.** The study is in progress and first findings have been reported. The results have shown that heterarchy is a proper form of coordination for distributed inter-firm network with the high presence of SME's operating in a tourism sector. **Research implications.** Further empirical studies are required including both next in-depth case studies and also cross sectoral large-n quantitative research. Based on the study, some interesting research streams might be developed e.g.: evolution of coordination mechanisms over time and the role of interpersonal ties in network functioning.

Keywords: Inter-organizational network, Heterarchy, Coordination.

Introduction

The growing body of research on inter-organizational networks (ION's) confirms the significance of this research field. Systematic literature reviews on interfirm networks (see e.g.: Battista *et al.,* 2011; Bergenholtz and Waldstrøm, 2011; Zaheer *et al.,* 2010) show the increasing number of topic-related studies, both qualitative and quantitative, concerning various aspects of network development and functioning, e.g.: determinants and types of interfirm relationships, access to resources, trust, power and network dynamics, knowledge management, and network adaptive capabilities (see e.g.: Ahuja, 2000; Andersen *et al.,* 2019; Battista *et al.,* 2011; Gulati *et al*., 2000; Najafian and Colabi, 2014; Oliver and Ebers, 1998). However, the research on ION's is still limited and fragmentary, and little attention has been paid to coordination mechanisms within networks. It constitutes an interesting research gap, since coordination is regarded as a salient factor affecting efficiency of business activities (Hedlund, 1986; Miles *et al.,* 1992; Mintzberg, 1979, 1992; Ritala *et al*., 2012). Specifically, there is a lack of empirical evidence of coordination mechanisms in distributed networks.

Consequently, the aim of the paper is to report the study in progress on heterarchical coordination. The research is being conducted in the regional inter-organizational network operating in a tourism sector.

Due to the novelty of phenomena examined, the research is based upon a qualitative approach and the case study research design (Eisenhardt, 1989; Yin, 2009). This approach is a highly recommended method in the field of IONs (Halinen and Törnroos, 2005) due to the vital role of the context. The authors attention has been paid to complex and dynamic nature of heterarchy, and also strengths and

weaknesses of heterarchical coordination. The selection of the tourism sector was purposive and based on the set of premises presented in the methodological section.

The study contributes to ION's literature in several ways. First, it examines and describes heterarchy as coordination mechanism. Second, it provides insights into role of heterarchy in inter-organizational networks activities, and allows to identify the strengths and weaknesses of heterarchical coordination. Thus, it recommends the longitudinal case studies to examine network phenomena and its consequences.

The paper is organized as follows. The next section provides the theoretical background of intra-organizational networks and evolution of coordination mechanisms. Then, the research method has been described and justified. The fourth section highlights the initial results of the study as an announcement of wider and deeper findings. In the last section the results have been discussed as well as the study limitations and future research directions have been depicted.

Theoretical Background

Inter-organizational Network and its Need for Coordination

Inter-organizational networks have turned to be one of the fastest-developing fields in management for last decades since it is proved that focusing attention on a single company does not enable to understand the business processes (Johnston, 1981) and a wider perspective is requested. The networks' operations need to be coordinated and researchers underline that the network coordination differs from traditional forms: hierarchy and market (Powell, 1990; Stephenson, 2009; Thorelli, 1986). The coordination is interrelated to many different areas, e.g. development of long-term cooperative relationships between partners (Ferreira *et al.*2017), value creation (Hastings *et al*., 2016) information exchange and knowledge transfer (Caridi *et al*., 2017), and trust building (Akrout and Diallo, 2017). It is also worth noting that the coordination requirements within the inter-organizational network is dependent on a network type, e.g. its centrality degree (Provan *et al*., 2007), power distribution (e.g. Jensen *et al*., 2014), or existence of coopetitive relationships (e.g. Dagnino *et al*., 2012). In centralized, star-type networks the coordination is close to the hierarchical one, due to the power asymmetry and broker-satellite type dependencies. The other types of networks, i.e. "federations" and distributed networks need a different coordination mechanisms (de Almeida Moraes, 2017; Grandori and Soda, 1995; Wall and van der Knaap, 2011). The high power dispersion imposes coordination different than hierarchical, and the competition within the cooperative frameworks, resulting in the development of coopetition (Bengtsson and Kock, 2000; Dagnino *et al*., 2012; Luo, 2004), requires a non-hierarchical coordination.

Summarizing, proper inter-organizational coordination might become one of the success factor for distributed networks (see Moch *et al.,* 2014). Nonetheless, decentralised networks need further research on coordination since even if it might lead to effective and efficient operations in distributed networks, it involves difficulties in selecting coordination kinds and scope (Rauch *et al.,* 2017). However, the aforementioned conditions, i.e. low centrality degree, power dispersion, and internal coopetition, trigger the need for non-hierarchical coordination mechanisms within ION's, and the answer to this challenge might be a heterarchy.

Evolution of Coordination Mechanisms: From Hierarchy to Heterarchy

For decades the dominating coordination form of business activities has been the hierarchy. Although hierarchies are often criticized and numerous scholars predict their decline in favour of fluid structures (see e.g. Handy, 1994; Peters, 1989), hierarchies are still strong (Leavitt, 2005). At the same time the high-velocity environment requires more decentralized and fluid forms of coordination both at intra- and inter-organizational level. Some researchers suggest that traditional hierarchy is being replaced by networks and heterarchies gradually (see: Kellogg *et al*., 2006; Stephenson, 2009; Wang, 2010).

The concept of heterarchy was developed by McCulloch (1965). First research on heterarchy in management field refers to complex relationships and power dispersion among divisions of multinational corporations (Birkinshaw and Morrison, 1995; Hedlund, 1986). The latter studies on the heterarchy apply also to other topics, e.g. knowledge management (Hedlund, 1994), strategy formulation (Chakravarthy and Henderson, 2007), creativity of interdisciplinary teams (Aime *et al*., 2014), or coordination within project-based organizations (Lichtarski, 2018). So, the concept of heterarchy can be incorporated at inter-, meso- as well as intra-organizational levels.

Hedlund (1986) defines heterarchy as a multiplicity and transitivity of power. In a similar way, Fairtlough (2007) describes heterarchy as a multiple and balanced power and he strongly distinguishes it from singular and stable hierarchy. The author explains the balance in executing power in heterarchical systems using analogy to the paper, scissors, and stone game, where none of elements is dominant from the nature. Stephenson (2009, p. 6) stresses that "heterarchy consists of at least three (or more) separate hierarchies, each with their own *raison d'être*, but which, in turn, must collaborate with each other to accomplish a collective good more complex than any one hierarchy can manage on its own." What is important, heterarchy can be permeated and developed in different fields, including hierarchical, social, and market (or quasi-market) mechanisms. It should not be perceived as the contradiction of hierarchy but rather as its more sophisticated and multifaceted equivalent.

Some scholars locate network coordination and heterarchy between hierarchy and market (Powell, 1990; Stephenson, 2009; Thorelli *et al*., 1986) or a complex combination of hierarchical, market, and social mechanisms (Joshi and Campbell, 2003). While a network and heterarchy are not synonyms those two terms are strictly interrelated. For instance, the concept of heterarchy understood as a multiple and balanced power can be applied to integrate and coordinate activities in some types of inter-organizational networks.

Research Design

The study follows the case study research design suggested for explorative and descriptive studies embedded in an inductive field study in management sciences (Eisenhardt, 1989; Flyvberg, 2006; Yin, 2009), According to Halinen and Törnroos (2005), the case study research in network studies is not only possible one, yet the highly recommended method due to the vital role of the context and uniqueness of networks.

The network in a given study was selected intentionally and reveals the following hallmarks: a) it is distributed, b) it is composed of differentiated but co-localized nodes with relatively equal status, and c) it encompasses independent SME's having complementary resources. In turn, the investigated nodes were selected with a purposive sampling technique in compliance with the guidelines for case selection (Gerring, 2007), and preceded with the short preliminary interview.

As well as this, the tourism sector selection was purposive and based on the following premises: (1) the tourism sector is recommended to conduct research on inter-firm cooperation due to high decomposition of value chain and multidirectional ties (Czernek and Czakon, 2016; Wang and Krakover, 2008), (2) tourism destination is a unit of analysis with a shared goal, co-location, cultural proximity, and interconnection (Kylänen and Mariani, 2012); (3) the tourism sector is not concentrated therefore various types of dispersed networks of SME's are dominated; (4) a tourism sector plays a vital role for many countries' economies in terms of GDP, employment, etc.

The empirical data gathering process was based on triangulation and included the following techniques: (1) semi-structured in-depth individual interviews (IDI); (2) documentary analysis, (3) comparative analysis of network members' offers (websites, reservation portals), and (4) analysis of statistical data of the region, articles from local press, local authorities' websites. The interview questionnaire included open and multi-choice questions. At the respondents' behest, the names of companies and the region were not disclosed. The scope of the empirical study covers network actors of the regional cooperative network form the Sudety mountains region (Poland). The empirical data

has been collected since 06.2017 until now, following the literature studies on heterarchy and inter-organizational networks.

Initial results of the study

The results presented in this section are fragmentary as the study is in progress. However, at this preliminary stage of research we can observe many interesting phenomena, draw some conclusions and contribute to ION's literature. For better understanding of coordination mechanisms in the studied network some general information are presented first.

The regional cooperative network operates in the Sudety mountains region for about fifteen years, and since a year 2010 continuous and dynamic development of the network cooperation has been observed. Regarding the size and scope, the network is still small and regional, including around forty co-localized small and medium enterprises of the tourism sector, i.e.: hotels, apartments, SPA centers, restaurants, catering companies, museums, tourist attractions, agritourist inn, ski and sport centers, transport companies, and others. The network can be classified as: (1) informal, based on social ties and affective trust (Provan *et al*., 2007; Ring and Van de Ven, 1994); (2) symmetric and distributed (Ahuja, 2000; Burt, 1992); (3) multidimensional (Moller *et al*., 2005) and (4) dynamic one (Miles *et al*., 1992).

The exemplary common activities conducted by the depicted network are: (1) annual music festival; (2) classical music concert; (3) conferences, congresses and symposia for institutional clients; (4) common marketing activities; (5) and other actions organized *ad hoc*, e.g. environmental activities, charity events, etc. In the foreseeable future it is planned to undertake joint activities in order to train professional staff for hotels and gastronomy in the region. The idea was incubated at the last meeting of network members' representatives as the response to a lack of qualified staff in the region.

The first interviews conducted show that there are not a dominating broker and stable power centers in the studied network. All the actors have the same status regardless of their size, owned resources, or history. The network is distributed and emergent one. According to respondents' opinions, just the equality of nodes and partnership builds the success and longevity of the studied network. Inter-firm cooperation is discontinuous, activated temporarily when common projects or activities are undertaken. Nevertheless, the relationships are maintained due to the interpersonal ties between companies owners'. The level of trust is high, and according to Akrout and Diallo (2017), it can be classified as affective one. Written contracts are rarely used and for the external purpose, i.e. to assure that the other partners' resources are available.

Each commonly conducted activity has a temporary leader (a network member, the role is transitive) who organizes the whole project. The leader's tasks mainly involve representing the network in contacts with the client, "doing all the paperwork", and taking care of client's satisfaction. After completing the event, a temporary configuration disintegrates and all nodes return to their own autonomic activities. At the same time few different common projects are being conducted, as long as unused resources remains. Multiple projects conducted simultaneously result in the multiplicity of power centers, namely there are few leaders and few temporary configurations at the same time.

Coopetitive relationships between partners are the natural part of the network existence as many network members are competitors linked with horizontal cooperative ties. It is the example of complex network coopetition since it involves numerous partners, different areas, and several levels of value chain. The coopetition seems to be an emergent strategy in this case, in contradiction to deliberate processes identified by Wang and Krakover (2008) in tourism destinations. Analyzing competition strategies it is worth highlighting that network partners do not use cost leadership strategy, and arguing their choice, underline that everybody knows that this type of competition may lead to the decrease of profitability in a long-time perspective.

The results from the first interviews reveals also some strengths and weaknesses of heterarchical coordination. One of the advantages is free and multidirectional exchange of information and

knowledge amongst network actors, in contrary to centralized and hierarchically coordinated networks. The next advantage concerns the mechanism of positive selection within the network. The actors who contribute at most to the joint projects develop more dyadic relationships, and as a result, are engaged in further projects. What is important, due to respondents the mechanism protects from opportunism, favours the high level of actors' commitment and guarantees the high level of quality. Thus, heterarchical coordination seems to involve low costs. For instance, the transaction costs are low within the network as the network actors know and trust each other and there is no need to keep institutionalized and expensive hierarchical coordination.

On the other hand, there are some weaknesses of heterarchical coordination, more or less noticed by investigated respondents, but very salient for network operating. First, the lack of standards in communication and cooperation patterns lowers the effectiveness of cooperation and can be a potential source of tensions between network members. Some arrangements are recorded in written contracts, while others have only a verbal form. For some projects a separate bank account has been created, while in the others settlements are done on "leader's" account, or in cash (hand-to-hand). Not only does the lack of standards and routines rise uncertainty, yet according to Jap and Ganesan (2000) it may also increase costs of internal transactions. A majority of respondents is aware of the mentioned negative side and perceive it as the most visible barrier for further development of the network. Second, the presented heterarchical coordination leads to unification of offers and loss of enterprises' identity. Comparing offers over time we can observe that the standard of services are relatively equal and all members include exactly the same attractions (the same events, the same trips, no original offers). The respondents are aware that year after year it is harder to differentiate the offer on the local market. Nonetheless, in comparison with similar regions they observe the increase of the whole destination attractiveness.

The presented strengths and weaknesses of heterarchical coordination do not exhaust the phenomenon. However, their short summary highlights that the described form of coordination can be perceived and judged differently in many respects.

Discussion and Conclusions

The field study yields a more precise and deeper understanding of heterarchical coordination in inter-organizational networks.

On the basis of the results it might be concluded that heterarchical coordination is suggested for cooperative business networks in many tourism destination from different countries. Taking into account the specificity and differences in network architecture, the mechanism of coordination seems to be universal. Wherever distributed networks of SME's with equal status are involved, a heterarchy can be implemented as the main mechanism of integrating and coordinating activities. Finally, the discussion on advantages and disadvantages of the heterarchical coordination approved that not only does it show positive sides of heterarchical coordination, but also possible weaknesses and threats. This research logic seems to be appealing since most researchers focus only on positive facets of networking, while dark sides of network cooperation are not a common research topic.

The presented study makes contributions both to theory and practice. First, the in-depth case study of dynamic inter-organizational network shows the complexity and methodological challenges what indeed calls for further studies. Second, the studied case provides useful guidelines for company owners and managers concerning network relationships development. Specifically, as it has been emphasized, the study identifies and discusses not only strengths of network cooperation what is a dominating stream in the management literature, but also weaknesses and threats. Our study has a methodological contribution as well. It shows that repetitive interviews are required to identify many interesting network phenomena, e.g. weaknesses of network cooperation, latent motives or conflicts. As the first research interview meeting is rather formal and there is the distance between a respondent and a researcher, the next few meetings allow to reveal "the real story" due to the increase of trust and less formal communication. On that basis, longitudinal studies are suggested.

Taking into consideration the aim of the study and its exploratory nature, the selected research design and method (explorative-descriptive case study) seem to be the most appropriate. However, we are aware of possible limitations of the case study research design concerning external validity, case selection problems, or researcher's subjectivity (see: Bennett and Elman, 2006; Gerring, 2007; Yin, 2009).

The study reveals some new fields of exploration and further research directions, concerning e.g. (1) the evolution of coordination mechanisms over time within ION's, (2) the role of interpersonal ties in network functioning and development, and (3) the role of communication channels and tools in coordinating network activities. All the aforementioned research topics seems to be appealing and important as well, both for theory development and managerial practice.

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Innovation in The Polish Financial Sector

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Abstract

The broad scope of defining innovation is related to the multitude of scientific disciplines interested in its effects. The category of innovation becomes an object of research not only in economic sciences, but also in social sciences, as it undoubtedly influences the broadly understood social and economic context of the country. The degree of innovativeness of the state and above all of a given enterprise contributes to the achievement of a competitive position on the market and increases production capabilities, as it is based on new, improved solutions and affects the quality of the created product. Hence, the aspect of innovation undertaken in the article, taking into account the parameters characteristic for the Polish financial sector and new guidelines for the regulation of innovation in the European Union. The aim of the article is to analyse the innovativeness of Poland in comparison with other European countries. The publication was created in connection with the use of analysis of existing data, including a literature study, analysis of the content of the European Innovation Scoreboard 2019, the Central Statistical Office, the Polish Agency for Enterprise Development and OECD.

Keywords: Innovation, Financial Innovation, Law, European Union.

Introduction

The dynamically changing environment and the development of the new technology sector has led to the formulation of a new factor of economic growth which is undoubtedly innovation. The very concept of innovation is understood ambiguously. It is usually defined as a radical change, invention or novelty, especially in the context of a product, as well as technology or methods of managing a business entity.

The rich literary knowledge is not clearly translated into the actual presentation of the broadly understood dimension of innovation. Consequently, this article is a discussion of various definitions of innovation with particular emphasis on financial innovation. The main research objective is to analyse the innovativeness of Poland against the background of selected EU countries. The publication was created in connection with the use of the analysis of existing data, including a broad study of the position of literature. As a result of the research, the necessity of introducing regulations in the aspect of financial innovations was indicated.

The Concept of Innovation

The concept of innovation is not clear. On the one hand, it may refer to improvements in manufacturing, on the other hand, it may also have a social dimension... According to Joseph Alois Schumpeter, who was the first to use the term, innovation (Latin innovatio, renewal) is a set of activities aimed at producing new and better products, technological processes and/or organisational systems. Therefore, innovation can take the form of a new product, a new production method, the discovery of a new

market, the acquisition of previously unknown raw materials or the reorganisation of the existing state (Schumpeter 1934 za Alves and others 2017, pp. 236).

According to Philip Kotler, an innovation may have a marquetry dimension as an idea, product or element of technology developed, implemented and presented to customers who perceive it as new or innovative (Krówczyński 2019, pp. 114). Peter Drucker described innovation "...as a specific tool of entrepreneurs, by means of which changes make it an opportunity to start a new business or to provide new services". In this perspective, the concept of innovation is more related to the economic and social aspect than to the technical one, (Piperopoulos 2016, pp. 24). Innovation can also be seen as the introduction of a new idea into business. In this sense, innovation acquires the characteristics of a public good, as it can be used simultaneously by many organisations, which can contribute to a significant economic growth of the country. Such a consideration of the concept in question indicates the existence of a process of collective learning, within the framework of interaction between different actors. In this context, innovation is not only related to the commercial activity of the private sector, (promoting economic growth), but also to the public sector, in the framework of increasing the learning capacity of enterprises (therefore the effectiveness of solving problems such as social exclusion or unemployment), (Bencheva and others 2017, pp. 95).

One of the most frequently cited definitions of innovation is that proposed by the Organisation for Economic Co-operation and Development (OECD), which divides innovation into four types, namely innovation (OECD):

-product - related to the creation of an innovative product or a significant improvement of an existing product on the market;
-process - implementation of a new or improved manufacturing method;
-organisation - implementation of new management methods aimed at improving work organisation and/or relations with the environment;
-marketing - implementation of a new marketing method, related to key changes in design, packaging, distribution, pricing strategy or promotion.

A wide range of scientific disciplines related to innovation complicates the unambiguous definition of this concept, hence the literature contains a classification of innovation according to selected criteria (Fig. 1).

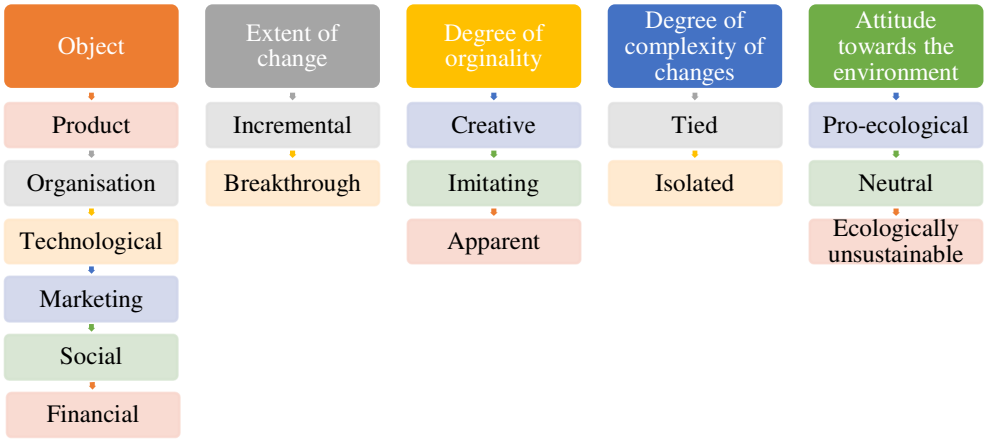

Fig. 1: Selected innovation classifications

Source: Own elaboration based on Białoń L., Zarządzanie działalnością innowacyjną, Wydawnictwo Placet, Warszawa 2010, s. 21-22.

The changing environment has led to the extension of the types of innovation proposed by the OECD to social and financial innovation. Social innovations are new solutions that both respond to social demand and bring about a lasting positive change in the social groups concerned, (Bencheva and others 2017, pp. 95).

Financial innovations are characterized by new financial services related to the improvement of financial instruments, introduction of changes in organizational structures of financial organizations, and the introduction of modern techniques and computerization, (Stachera-Włodarczyk 2015, pp. 64).

According to the Oslo Manual (the international methodological manual for statistical research on innovation recommended in OECD and EU countries), it can be considered in terms of the scale of changes (as new or significantly improved products and/or services), within a given enterprise, market or on a global scale the so-called absolute innovations, (Wielgórka, Idasiak 2017, pp. 540).

In the context of the degree of originality of the offered changes in the literature, one can find creative innovations (innovative), imitating (modelled on previously developed solutions from other markets) and apparent (resulting from the introduction of only minor improvements), (Zastempkowski 2010, pp. 61).

Within the effects of the introduction of innovations, one can distinguish between linked innovations (whose changes in one branch of the economy affect further changes in other, related sectors), and isolated ones, whose effects are concentrated in the original area. In the area of the environment, innovations may be oriented towards the development of ecology, be neutral or have a negative impact on the natural environment, (Griffin 2017, pp. 428).

Christopher Freeman additionally divides innovations into autonomous (when the proposed solution did not result from the search for a solution to an existing problem) and induced (resulting from research resulting from the need for changes), (Freeman 1994, pp. 463).

Christopher Freeman additionally divides innovations into autonomous (when the proposed solution did not result from the search for a solution to an existing problem) and induced (resulting from research resulting from the need for change), (Freeman 1994, pp. 463).

According to the presented definitions, the sources of innovation may include impulses and causes related to the activity of an enterprise (in the external and internal perspective), sector or economy, and groups of people (creating new technological knowledge), as well as demographic, social and moral changes.

Conditions for Innovation of the Polish Economy

According to the World Bank's latest ranking (2020 edition), which indicates ease of doing business, Poland has recorded further declines compared to the previous year and is ranked 40th in OECD countries. Such results were influenced by, among others, insufficient ease of setting up a business and registering property. At the same time, the World Bank suggests greater stability in the area of economic law. New Zealand, Singapore and Hong Kong are among the leaders of this list.

According to the World Economic Forum (2019 edition), Poland is ranked 37th among 148 countries surveyed in terms of competitiveness. Singapore, the United States and Hong Kong scored best in the whole ranking.

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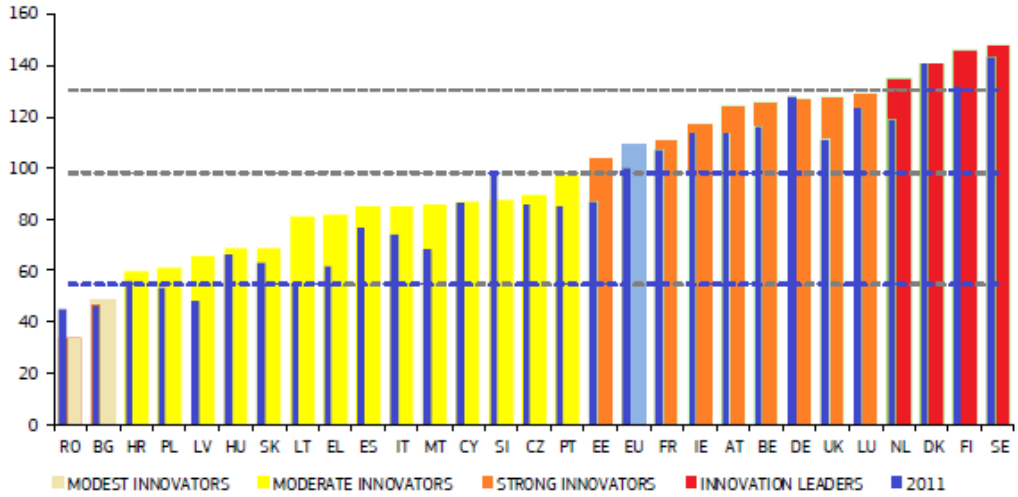

Fig. 2: European innovation scoreboard 2019

Source: Own elaboration based on European innovation scoreboard 2019, https://ec.europa.eu/docsroom/documents/36084, (Access: 20.01.2020).

Poland has been experiencing systematic increases in economic growth, as well as low inflation and debt dynamics. The rating of Poland as a moderate innovator has increased since 2011 (Fig. 2.). In 2019, Polish scientific publications and access to electricity were evaluated positively. The country's competitiveness is hampered by an insufficient labour force base, significant tax burdens, independence of the courts or the creativity of entrepreneurs. In the same group of innovation (as Poland according to the discussed ranking), there are also Lithuania, Hungary and Italy[i].

According to the information of the Local Data Bank, government spending on research and development in Poland is growing year by year (Table 1.) and currently amounts to about 1.21% of GDP (EU average - 2.07% of GDP). For comparison, in 2017 it was 1.03% and in 2016 0.97% respectively (Ministry of Development).

Table 1: Internal expenditure on research and development (in million PLN) in Poland and the size of staff over the years 2011-2018

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Internal R&D expenditure (GERD)	10416	11687	14353	14424	16168	18061	18060	17943	25600
Internal R & D investment per 1 inhabitant (in PLN)	270	303	372	375	420	470	466	535	667

Sources: Own elaboration based on Działalność badawcza i rozwojowa w Polsce w 2010-2018r, Główny Urząd Statystyczny, https://bdl.stat.gov.pl/BDL/metadane/cechy/2401, (Access: 16.01.2020).

Poland has been positively evaluated among the EU countries in the category of friendly environment for innovation, due to the positive assessment of Internet access and the perceived inborn creativity and entrepreneurship of Poles.

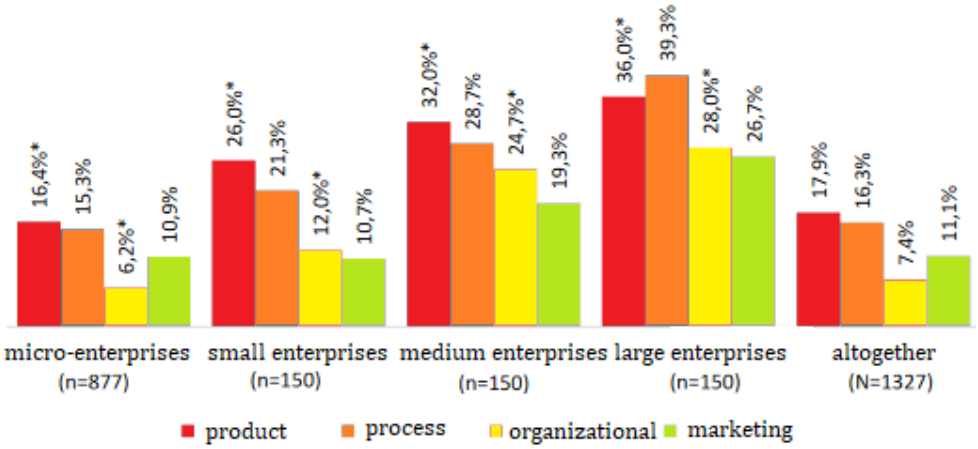

Fig. 3: Percentage of innovative companies broken down four types of innovation company size

**Statistically significant results (confidence level 95%)*

Sources: Own elaboration based on Monitoring innowacyjności polskich przedsiębiorstw –II edycja 2019, https://www.parp.gov.pl/storage/publications/pdf/Raport-2019---II-edycja-Monitoring-innowacyjnoci-polskich-przedsibiorstw.pdf, (Acess: 21.01.2020).

The worst case scenario for Poland is in the category of the SME sector's share in innovations (Fig. 3.) and attractiveness of the research system (which operates only due to the quotability of studies). According to data from the Polish Agency for Enterprise Development, domestic business entities focus their innovations in the area of products and processes. The innovativeness of the indicated areas increases with the growth of employment. Only 16.4% of micro-businesses have derecognised themselves for product innovations, as compared to 32% of medium and 36% of medium and large business entities. Microenterprises, to a comparable extent to small enterprises, continue to introduce underestimated innovations in the field of marketing. We also have a lot to do in the context of Linkages and improvement of human resources skills adjusted to the changing labour market.

Voivodeship	Millennium Index	Work productivity	Expenses for R&D	Post-secondary education	Working in R&D	Number of Patents
mazowieckie	99	100	97	100	100	100
małopolskie	82	66	100	97	73	77
dolnośląskie	72	86	49	89	52	84
pomorskie	62	78	59	77	46	49
śląskie	54	82	34	54	32	69
lubelskie	54	53	48	71	30	70
łódzkie	54	70	39	65	32	64
wielkopolskie	54	75	34	73	31	55
zachodniopomorskie	47	77	24	51	21	60
podkarpackie	46	53	56	48	37	33
kujawsko-pomorskie	44	69	27	59	25	37
opolskie	43	72	25	46	21	52
podlaskie	40	60	32	55	25	26
warmińsko-mazurskie	36	68	27	42	19	24
lubuskie	31	73	20	29	16	19
świętokrzyskie	31	56	17	42	10	27

Fig. 4: Ranking of innovativeness of Polish regions according to five Millennium criteria

Sources: Own elaboration based on Indeks Innowacyjności Millennium, https://www.bankmillennium.pl/documents/10184/27565853/Indeks+Millennium+2019.pdf, (Acess: 21.01.2020).

According to the Milennium Innovation Index data, trust and cooperation is a soft indicator, key to improving the effectiveness of innovation. Regions where the highest percentage of enterprises work together for innovation achieve relatively better results in terms of innovation, (Fig. 4.). This is confirmed by the cases of Podkarpackie (where the Aviation Valley is developing strongly) and Lubelskie, where the percentage of cooperating entities is the highest and the potential for innovation is higher than would result from the strictly economic position of these regions (Millennium Innovation Index).

The cooperation in the regions has a positive impact on the effectiveness of resource use, and this translates into a reduction of the innovation distance in comparison to the leader, which is undoubtedly the Mazowieckie Voivodeship in Poland.

The factor determining the region's innovativeness is primarily human capital. This is confirmed by high ratings of areas with large academic centres. In these areas universities adapt their policy to the needs of the labour markets, and thus more entities locate their headquarters and thus financial resources.

In order to overcome barriers to innovation in regions with lower ratings, it would be necessary to first adjust the academic offer to the needs of the local economy. The aim is not to catch up with the leaders, but to make optimal use of the resources available to a given region, (Millennium Innovation Index).

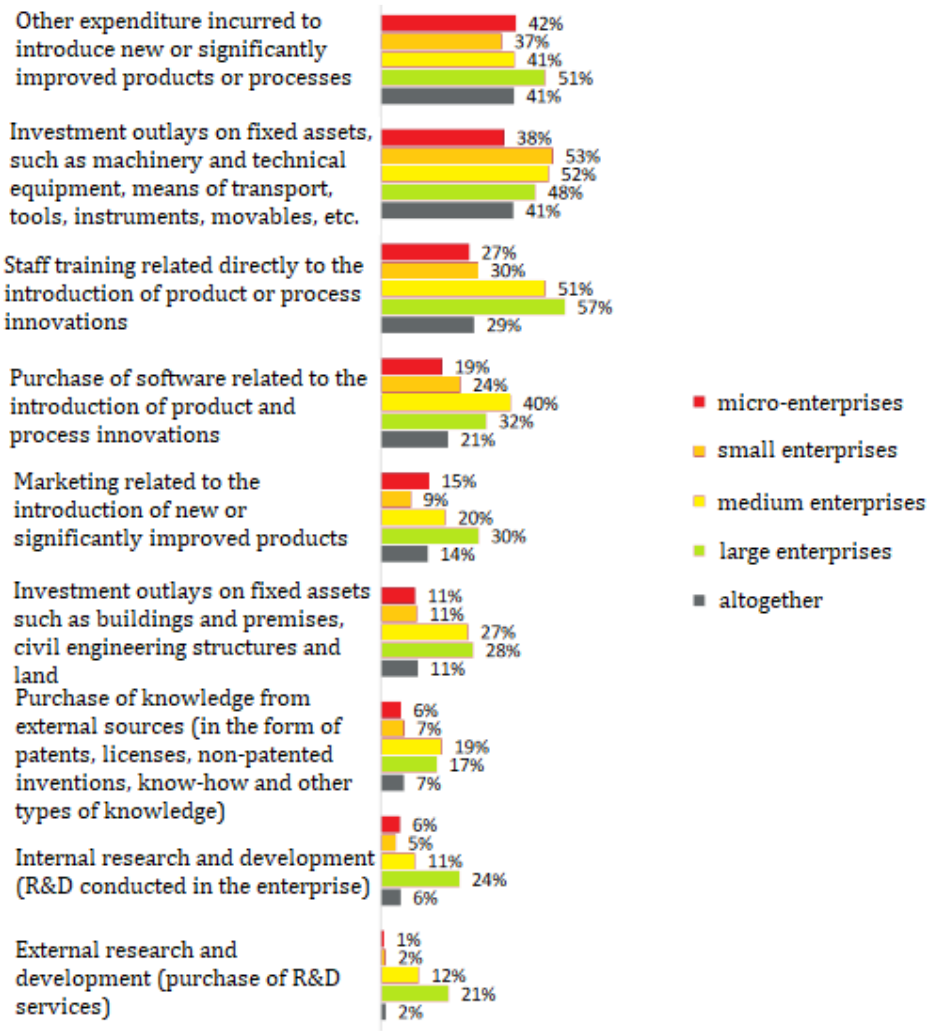

Fig. 5: Expenditure on various types of innovative activities in 2018 company size by number of employees

Sources: Own elaboration based on Monitoring innowacyjności polskich przedsiębiorstw –II edycja 2019, https://www.parp.gov.pl/storage/publications/pdf/Raport-2019---II-edycja-Monitoring-innowacyjnoci-polskich-przedsibiorstw.pdf, (Acess: 21.01.2020).

According to the Monitoring of Enterprise Innovation, in 2016-2018, 32.4% of Polish host entities introduced at least one innovation and 35.8% remained actively innovative. The percentage of innovative and actively innovative entities is significantly correlated with the size of the enterprise - the bigger the entity, the higher the percentage of enterprises is classified as innovative or actively innovative.

Product (17.9% of all enterprises) and process innovations (16.3%) continue to be the most frequently introduced type of innovations, (Fig. 5.). Usually, these are innovations imitating (within a given sub-motor) than breakthrough ones for the whole sector and they include investment expenditures on fixed assets such as: machines and technical devices, means of transport, tools, instruments, movables and equipment, as well as training of personnel directly related to the introduction of product or process innovations (29% of the total number of innovatively active companies) or purchase of software related

to the implementation of product and process innovations (21% of the total number of innovatively active entities), (Monitoring of innovativeness of enterprises 2019, pp. 55).

Financial Innovation - Opportunities and Threats

According to the European Innovation Ranking, Poland is a moderately innovative country. However, taking into account only financial innovations, we are the leader. According to Deloitte's analysis, 40% of the fintech market in Central and Eastern Europe is located in Poland[ii].

Fintech is an economic sector that relies on modern technologies (such as Big Data (A term indicating a large number of variables and various data sets, whose processing and analysis is, due to its size, complicated, but at the same time may lead to the acquisition of new knowledge), blockchain (A decentralised and distributed open source database on a web-based network, used to record individual transactions, payments or accounting records), artificial intelligence and automation) to support financial services. Financial innovations give the opportunity to make a transaction or use a financial service in a modern, convenient (from the consumer's point of view) and safe way (Schueffel 2016, pp. 33) convenient[iii] (from the consumer's point of view) and safe way (Schueffel 2016, pp. 33)

It is estimated that over 25 million people in Poland use the solutions proposed by Fintech. They include virtual wallets (such as Apple Pay or Google Pay), BLIK mobile payments, online shopping, car sharing or mobile bank applications applications[iv].

According to many observers, the year 2020 may become a breakthrough for new trends in the financial sector. What is more, there is talk of the negative phenomenon of deepfake (a technique of image processing based on the use of artificial intelligence, which makes it possible to combine images of human faces, creating the possibility of manipulation[v]) and the growing interest in voicebots and chatbots to automate customer interaction, as well as the PSD2 (Payment Service Directive 2, introduced in the previous year, the main aim of which is, among other things, to increase consumer security and better protect consumers against non-cash fraud by introducing a double authentication procedure)[vi].

Artificial intelligence is becoming a significant technical solution used in the financial sector. So far used to predict traffic in stores or optimize employment, it is increasingly used to analyze millions of users' activities simultaneously, in real time, which is an ideal support for banks and other service companies whose competitiveness depends on the ability to present an individual offer to a potential customer (Płoszajski 2016, pp. 17).

In recent years, the importance of Blockchain has also been growing, both in the context of its application in business and implementation in the context of ensuring the security of data storage and transmission, (crypted). The use of Blockchain is gradually expanded by Amazon (Amazon Managed Blockchain[vii]), Revolut[viii] or Samsung[ix]. In turn, Facebook is still working on the introduction of its own cryptovalute called Libra, designed for fast payments on a social networking site, (Taskinsoy 2019).

Financial innovations are also the subject of work of the Polish Financial Supervision Authority and the National Depository for Securities, which in 2019 signed an agreement on creating a blockchain platform for the capital market, enabling the process of preparing and making available to issuers the list of persons entitled to participate in the general meeting, as well as remote voting at general meetings[x].

According to the data of the report "Final report of the Expert Group on Regulatory Obstalces to Financial Innovation: 30 recommendations on regulation, innovation and finance" published at the end of December 2019 by a group of experts at the EU Commission, the implementation of financial innovations, including in particular artificial intelligence to the financial sector, will allow for the automation of such areas as, among others, the following:

- legal alerts and compliance monitoring;
- voice assistants and text reading plus processing;
- creation of legal information;
- financial modelling and risk or credit rating;
- investment advice.

In this context, it becomes important to create an appropriate legal framework for the algorithms to be used in the financial sector, which may be important for claims, e.g. in a situation of creditworthiness assessment (according to Article 105a(1a) of the Banking Law - right to clarify how and on what basis a creditworthiness assessment should be carried out in automated systems)[xi].

The solutions from the borderline of the Internet of Things -IoT (carrying out transactions, e.g. using smartphones instead of debit cards) or installing readers to automatically identify customers are becoming more and more frequently considered in financial innovations. These solutions may increase the sales capabilities of financial institutions, but they are associated with numerous previously unregulated threats, e.g. in the context of cyber security of risk management or personal data protection[xii].

The potential, but also the threat of financial innovation is beginning to be regulated in Polish legislation. An example can be the designation of requirements for digital alumni to the Act on Counteracting Money Laundering and Financing of Terrorism, (Journal of Laws 2018, item 723), but there is a lack of more decisive actions such as regulating the status of crypto-assets (e.g. tokens) as a kind of financial instruments. A significant subject is also the regulation of the rights of entities that can offer services in the field of digital currency trading[xiii].

Conclusions

Poland's innovativeness is mainly perceived through the prism of large business entities, due to the larger resources that can be allocated to research and development, as well as higher qualifications, human capital associated with a more matched offer of large academic centres operating in areas with higher potential. In addition, the persistence of the innovation stereotype understood as breakthrough changes, often important not only for a given entity but for the whole sector, makes innovative actions

in the small and medium-sized enterprise sector deserve to be called hidden.

In the Innovation Scoreboard Ranking (2019 edition), Poland was evaluated as a moderate innovator, due to the satisfactory level of economic growth, as well as low inflation or debt dynamics. The Polish scientific publication and access to electricity were also evaluated positively. Further changes in the ease of doing business are recommended, as well as a reduction in the complexity of the Polish law, combined with a high level of education may reduce the distance between Poland and innovation leaders. This is indicated by the increase in expenditures on R&D activity over the years.

According to the Monitoring of innovativeness of enterprises, in recent years almost every third Polish entrepreneur has introduced at least one innovation. Unfortunately, in most cases large entities are still interested in innovations.

The most frequently introduced type of innovation is still product and process innovation, in the scope of implementation of already used solutions in other entities or sectors. They include in particular investment expenditures on fixed assets such as: machines and technical devices, means of transport, tools, instruments, movables and equipment, as well as staff training, purchase of software directly related to the introduction of product or process innovations.

Considering only the Fintech market and related financial innovations, Poland is a leader among European countries. Therefore, it is important for the Polish innovation rating to convince SME sector entities to introduce innovations to their business operations. Lack of innovative development of the

SME sector may pose a serious threat in the situation of growing global competition and growing sales areas of global market players.

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Organization Security in The Context of The ISO 9001:2015 Standard Requirements - Limiting or Opportunity for Development

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Abstract

The purpose of the article is to present, based on selected areas of organization security according to ISO standards, how an organization can achieve an appropriate level of development based on the implemented quality management system in accordance with the requirements of ISO 9001: 2015 standard. These selected areas are customer orientation, building trust and credibility of the organization based on the implemented standard, risk analysis and the competencies of top management and at the same time, on the other hand, meeting the requirements that are a specific type of signpost can be a significant limitation to the development of modern management methods, especially when achieving an ideal state as part of meeting the requirements can become an end in itself and cease to serve the good of the organization. The article uses available results of statistical surveys.

Keywords: Organization Security, ISO 9001:2015, Risk Analysis, ISO Standard Requirements, Organization Development.

Introduction

The last two decades have brought about many important changes in the development of organizations, especially in terms of thinking about the needs and expectations of stakeholders. This is evidenced by the fact that it was becoming increasingly easier for organizations to implement ISO 9001. This is largely due to the fact that companies operating on a global market and making a number of purchase transactions are beginning to demand that their business partners have the standard implemented. This is a response to the need to increase the security of an organization's operations in the face of increasing globalization and the many significant environmental changes whose multiplicity and lack of predictability pose a serious threat. The history of human development, which includes examples of many spectacular projects, situates the introduction of the ISO 9000 family of standards alongside projects such as: invention of a computer, sending the first man into space, constructing an atomic submarine, or digging a tunnel under the English Channel (Pawlak 2006). The cited examples indicate that these were projects of great political, scientific, economic and military significance. Assigning such a high rank to the standards of the ISO family proves that the application of standards aimed at improving the quality of products (products, services) based on the organization's own standards and procedures needed to achieve these standards, has gained the title of undertakings raising the development of our civilization to a higher level. The reason for this type of action was the enormous pressure of the organization's environment, which demanded the repetition of processes, as a result of which products or services of the highest quality were to be created. This was the result of the PDCA (Plan-Do-Check-Act) cycle, which, as it soon turned out, could be applied to all processes and to the quality management system as a whole. The essence of the versatility of such solutions and the possibility to use them in various sectors: military, aviation, automotive, health care has caused great popularity. The advantages resulting from the application of ISO 9001 requirements were very quickly implemented in various types of organizations and became the main pillar of safety of their operation and increased competitiveness on the market. An additional advantage of applying the requirements of quality standards in various fields of business is quite a lot of ease and assimilability of such solutions. This article aims to present several selected areas of application of the standard. In the first chapter, statistical data are

presented, which allow a comparison of how the formation of new companies in Poland translates into the number of certificates issued. The second chapter talks about the benefits for organizations that result from having an implemented standard in the field of customer orientation. The next chapter presents the advantages of the organization resulting from building trust and credibility as part of meeting the requirements of the standard, the fifth chapter says that the requirement to prepare a risk analysis by the organization largely increases operational security, and the last chapter indicates how the powers of the top management have influence on building position and development of the whole organization.

Presentation of Statistical Data

Many companies in Poland which currently do not have implemented ISO standards are not aware of the fact that the activities developed by the company and used on a daily basis, as well as solutions concerning the organization of various processes, are nothing more than a form of application of system solutions with the quality standards requirements. It is sufficient to write them down skillfully, disseminate them among employees as part of training and monitor the effects of their application in order to make continuous improvements. Despite the voluntary application of quality standards, it should be remembered that the constantly changing environment of the organizations and the development of the level of organizational culture cause a constantly growing need to improve the quality of services and products offered, which are the basis of international business. The literature contained in the monographs functioning on the publishing market, the Polish Standard PN-EN ISO 9001, reports of the Polish Accreditation Center publishing the results of activity reports for particular years and available statistical research results published on the website of the Central Business Information Center have been used to prepare this article. The aim of the considerations undertaken on selected areas of ISO 9001 requirements is to formulate a research problem: In what areas of application of ISO 9001 requirements can they be effectively used to achieve the development of an organization, and which of them are not keeping up with the contemporary changes and may thus affect the limitation of development and even the growing maladjustment of a given organization to the changing environment? The analysis and drawing conclusions at the level of the initial assessment of the source materials allowed for the following hypothesis: The dynamic development and challenges that constitute the environment of contemporary organizations may in the future lead to the abandonment of the need to implement and maintain a voluntary quality management system in accordance with the requirements of ISO 9001 in favor of seeking own solutions for which there will be no limitations in this respect. The hypothesis formulated and the research problem indicated, as well as the great complexity of the undertaken problem, filled with challenges and threats, have made it necessary to apply various methods: analyses (in particular, analyses in the scope of assessing the adjustment of particular requirements to the actual possibilities of their application in the organization, comparative analysis), synthesis, generalizations and inference. In the case of using empirical methods, there is a problem consisting mainly in the lack of statistical research, which would first of all allow to assess how many organizations on the Polish market have implemented quality management systems. Secondly, access to such statistics is very difficult. From the point of view of certification bodies, which carry out market analyses of the number of companies using their services for their own needs but hide behind commercial confidentiality, they do not provide such data. The annual reports published by the Polish Accreditation Center, in turn, provide data on the total number of valid accreditations in our country (as at 31 December 2018, 1,596 valid accreditations are indicated). It is worth mentioning here that not all organizations have implemented systems based on PCA accreditation, as there is no such requirement. Thus, such data do not reflect the facts as a whole. The group of 1,596 valid accreditations includes all areas and standards and it is difficult to deduce how many ISO 9001 accreditations are in this number, and what is more, how many organizations are covered by this number (Report on the implementation of the 2019 Action Plan). Taking into account the comparative analysis of the PCA statistical reports over the period 2017-2005 in terms of the number of accreditations issued, which is presented as follows: 2017 – 1575, 2016 – 1550, 2015 – 1493, 2014 – 1471, 2013 – 1437, 2012 – 1406, 2011 – 1345, 2010 – 1289, 2009 – 1202, 2008 – 1077, 2007 – 925, 2006 – 873, 2005 – 744 accreditations issued, a certain upward trend can be seen on this basis, but it should still be remembered that this number also includes accredited laboratories and all

systems including those dealing with product certification. Below are the statistics of new company registrations in Poland, with the results for 2019 being broken down into subsequent months to better illustrate the reality. New companies in Poland in 2019 (January - September) - 330,544. The statistics on the registration of new companies in Poland in 2013-2018 are as follows: 2018 - 377,885 companies, 2017 - 359,583 companies, 2016 - 347,425 companies, 2015 - 287,754 companies, 2014-343,214 companies, and in 2013 - 354,593 companies were established. Analyzing the creation of new companies from a geographical point of view, most of the individual business activities are created in Masovian Voivodeship 16.2%, Silesia Voivodeship 10.12% and Greater Poland Voivodeship 9.81%. In the case of companies registered in the National Court Register, 50% of all entities are established in three provinces: in Masovian Voivodeship 34.65% of all companies are registered, Greater Poland Voivodeship 11.26%, Silesia Voivodeship 9.3%. If we compare the indicators of company registration statistics (Central Business Information Center 2019) (there are about 1,000 of them in Poland every day) with the number of accreditations, we can conclude that the potential market of interested customers is huge, but this does not translate into an increase in the number of accreditations. Of course, there can be many reasons for this.

Analysis of selected areas of ISO 9001:2015 standard - Customer Orientation

Polish managers with an increasing ease make decisions about introducing their companies or those they manage into the world of quality, while their foreign colleagues do not have the slightest problem with this, which results in such a change in behavior. It is certainly an effect of the driving force that is a customer and their ever higher demands, and the whole environment accompanying the customer service related to the care of their satisfaction, and thus thinking also about how to create an effect in which the customer will come back to us. The focus of every organization's efforts is therefore directed towards ensuring that every contact with the customer is not an episodic phenomenon. An important element related to having an implemented quality management system is the organization's confirmation of meeting the legal requirements and existing regulations, which should be strictly defined and understood. Such an approach follows directly from section 5.1.2 of this standard (Polish Committee for Standardization: PN-EN ISO 9001:2015). In other words, there is another pillar to increase confidence in an organization, and in the event of a litigation in court, this is another major asset that will ensure that it complies with the law, which in turn increases its ability to defend itself regardless of whether the issue concerns liability for a product or service. In this aspect of the organization's operations it is another element increasing its safety in functioning on the market. The organization should continuously evaluate customer satisfaction in the form of feedback on the products and services provided in the form of questionnaires, documents confirming meetings with customers, compliments or complaints, all kinds of reports on commercial matters closely related to the conduct of market activity and all market analyses carried out. Such records are a documented form confirming the implementation of continuous contact with the market and customers and have an impact on strengthening credibility, as well as allow for active response to changes arising from the environment of the organization. Meeting this requirement of the standard seems to be an important element aimed at continuous development and improvement of the organization. It also serves as a basis for making appropriate reflections and conclusions about the future of the organization.

Building trust and Reliability

Having a quality management system certificate is treated as a serious element of competitiveness in relation to other entities operating on the market. Each of us has certainly met with certificates placed by companies in a clearly visible place and often at high magnification. But here, too, there is a serious risk that having a quality management system in place is much more than just a nice certificate on the wall. Behind this there is hard work and a lot of responsibility. However, the problem is how to check the reliability of the document held by the organization. For a consumer, client or stakeholder, a message in form of a certificate on the wall and trust in what lies behind it is enough. For an organization this is undoubtedly an asset, but there is a concern whether all that is in the content of the certificate is surely a reliable message of the values actually held by the organization. And here again, the ISO 9001 standard, which ensures the security of the organization's

activities, comes to the aid with the whole range of tools that are contained in point 9 of this standard (Polish Committee for Standardization: PN-EN ISO 9001:2015). These are activities related to monitoring, measurement, analysis and evaluation processes. A very important element of these activities is to carry out internal audits, planned at a certain frequency, and in the case of sensitive areas with the likelihood of an increased number of irregularities, to make appropriate corrections and corrective actions. Such activities are confirmed by appropriate reports, stored as evidence of the implementation of audit results and the audit program. Internal audits are an area that is thoroughly assessed not only by the organization's top management, but also by external auditors. The essence of such activities is that internal auditors should be people who are not in any way connected with the area covered by the audit in order to ensure impartiality. A threat to the organization's operations remains the fact whether these activities are carried out in accordance with the principles of impartiality and whether there is no pressure from people who may have an impact on the audit results. An important form of implementation of activities related to maintaining an adequate level of functioning of the organization is the management review by the top management. The openness of such an undertaking is closely related to the assessment of the organization's effectiveness. Achievements and failures shown in the course of a reliable management review, confirmed by an appropriate report, serve to ensure constant compliance with the objectives and set out the directions of activities related to meeting the requirements and increasing customer satisfaction. The level of higher confidence in an organization having a quality management system is additionally confirmed by the obligation to undergo an external audit carried out by independent external auditors, who are randomly selected by the audit organization. But, as in any case, there are also significant threats here, not so much from the existing system solutions, but from the area related to the honesty of people participating in such activities. It may happen that the internal audit will be carried out in an unreliable manner, first of all because of significant competence deficiencies of the employee selected for this type of undertaking and maybe it is not the greatest threat, much worse is the case when there is pressure on positive audit result from the superior of the employee conducting the audit, an even worse dimension of this phenomenon appears when it may happen that the highest management may influence the audit result in order to cover up the existing gross irregularities. It is difficult to establish the existence of such cases unequivocally, all the more so as the documented information produced on this basis does not confirm any infringements. Another barrier to the objective detection of irregularities is the fact of the very design of audit activities, because the essence of the audit is to take and evaluate samples. This means that on the basis of a correct sample obtained during the audit, we consider that the organization has a properly implemented and maintained quality management system. As can be seen, sampling is one of the areas that pose a risk of making an erroneous assessment of the process under investigation. In the case of external audits, there is also a threat resulting from the external auditor's actions and it is not a lack of competence, as these are confirmed by the certification body and the audited entity may always demand their presentation. A much greater risk may be to obtain positive audit results on the basis of an agreement with an external auditor in exchange for obtaining material or other non-material benefits (job offer in the organization for a member of the auditor's family). Such situations are very difficult to catch, and the effect of such a "positive" audit passed by the organization may be a confirmation of malfunctioning of the business entity and growing irregularities in it, which instead of being removed or corrected cause piling up of issues and, as a consequence, may lead to the occurrence of phenomena of a negative nature difficult to predict. Another threat may be the phenomenon of familiarity, which means that the organization becomes attached to the auditor, who in turn, in recognition of the fact that they know all the organization’s secrets so well, falls into a routine and, as a result, may fail to notice any irregularities in the functioning of the system (Dąbrowska-Świder 2018). The presented tools building the credibility of the organization's functioning are a form of protection against undesirable phenomena, but as it results from the analysis of the presented cases of irregularities that may occur, it is very difficult to fight against them. All the more so because the mere possession of the implemented quality management system in accordance with the requirements of ISO 9001 is of a voluntary nature (until 1993 the application of the Polish Standards was obligatory) and this is how it differs significantly from the management systems, the possession of which by organizations is a legal requirement (e.g. the obligation to apply certain Polish Standards in construction, communication, labor protection, recycler audit). The voluntariness also determines that an external audit body (this applies only to certification bodies having accreditation) Polish

Accreditation Center - a national accreditation body authorized to accredit conformity assessment bodies under the Act of 13.04.2016 on conformity assessment systems and market surveillance (consolidated text Journal of Laws of 2019, item 544) is not a police authority and does not have any authority to draw legal consequences for organizations having a management system in accordance with the requirements of ISO 9001. Having a PCA accreditation by a certification body can be a strengthening in building trust and increase the credibility of an organization that holds such a certificate. All the more so since the PCA's mission is to act for the economic development of Poland by ensuring the protection of public interests, such as health and safety, environmental protection and public safety (Report on the implementation of the 2019 Action Plan).

Risk Analysis

The need for risk analysis was reflected in the latest amendment to ISO 9001:2015, which entered into force on 15 September 2018. From the point of view of the application of the requirements of this standard, we can speak of an innovative solution, because until now such a requirement has not been included in it. This is another important element on the way to increasing the security of each organization's operations and is a new look at the action related to risks and opportunities (section 6.1 of this standard)(Polish Committee for Standardization: PN-EN ISO 9001:2015.). When analyzing the concept of risk, it is worth quoting the definition of *The EFQM Framework for Risk Management* - according to which: *risk is a combination of the possibility of occurrence of any event and its consequences* (The EFQM Framework for Risk Management 2005). The requirement of the standard does not specify how to meet it, but draws attention to the fact that any perceived risk related to the operator's activities may, in addition to triggering prevention activities, also lead to the detection of a worrying phenomenon. On this basis, the business entity may, at a later stage of the proceedings, implement elements of action leading to the elimination of the source of risk, and if it considers that this cannot be stopped, it may implement such elements of its action as: searching for new partners, changing the profile of manufactured products or services, acquiring new customers or changing the technologies used. Sometimes it can be a conscious decision to acknowledge the existence of such a risk and not to take any action in the hope that this risk is a permanent element of our organization's functioning.

Table 1: Classification of factors influencing risk (Szyłkowska 2019)

	External risk	**Internal risk**	**Time horizon**	**Variations in the environment**
Shaping Factors	Political	Management	Strategic	Static
	Social	Organization	Operational	Dynamic
	Legal	Human capital and resources	-	Permanent
	Economic	Financial	-	Variable

The risk phenomenon comes from the external environment, i.e. the external environment of the organization as well as its interior. The enormous variability of external factors remains outside the sphere of influence of the organization, but it is worth looking very carefully at the internal risks that can be controlled and over which the organization has great influence. The more hazards of this type can be identified, the better for the functioning of the organization. Many economic operators have a very enigmatic approach to the issue of risk, as part of audit activities, one could be confronted with a risk analysis presented in the form of an A4 sheet-size table. However, there are such organizations as Silesia Coal Holding, which, due to its specific activity, has identified several thousand risks (Silesia Coal Holding 2019). Unfortunately, it is not customary in our organizational culture to share knowledge, so it becomes virtually impossible to reach the resources of individual organizations to create a common database. When analyzing the standard's provision on risk, it should be noted that this is precisely the provision that guarantees the organization's safe development, especially when top management approaches this area with a great deal of responsibility and due attention.

Competence of Top Management

The requirements of ISO 9001 in point 5 and 7.2 (Polish Committee for Standardization: PN-EN ISO 9001:2015-10, Warsaw) determine what role the so-called top management has to play in the organization, behind this dry statement there is a huge area related to the competences and skills of the management. For many years, Polish managers were struggling with the problem of functioning on the domestic market, where the dominant management method was one that differed significantly from that prevailing in the most developed economies. Openness to international markets is not one of the strengths of the Polish economy, and the possibility of entering international markets is the best way to develop the company and its management. Thanks to the research conducted by Think Tank Poland, Go Global!, it turns out that out of ten Polish enterprises, only four are operating abroad, with 85% doing so from offices in Poland. Companies that have managed to win foreign customers are limited to selling them their products and do not create their own structures in foreign markets. Polish managers are very highly regarded, but many of them cannot free themselves from complexes towards their Western colleagues, and strong family ties still stand in the way of an international career. Instead of appreciating the opportunity to work abroad, which should be treated as a life opportunity or a great honor, many managers prefer to give up such an opportunity and change their job in order to remain in the country. The acquisition of additional skills resulting from competing in the global market is a driving force for innovative activities within companies, and those who decide to do business abroad are much more open to introducing new solutions. The stage of transforming knowledge into managerial decisions requires the involvement of the most competent managers, responsible and decision-making, who, acting with the right commitment and equipped with the right tools, are not only responsible for the decisions made, but are also able to assess the value of the innovative ideas of their most competent employees in the right way. Meanwhile, many managers who should focus on strategic decisions, deal with minor issues and solve problems that should be delegated to lower-level managers or officers. Unfortunately, a manager is not the owner of his or her working time and should be skillful in demarcating and prioritizing the problems to be solved. Meanwhile, incompetent managers are able to spend the whole day on these insignificant ones by neglecting the process of making strategic decisions. They do it out of ignorance or fear of responsibility. A huge obstacle in the operation of the managerial staff is the tenure of office binding e.g. in state-owned companies. The result of this state of affairs is an unwillingness to introduce long-term innovative solutions for fear that the next term may belong to the next president. In this situation, it is not worth investing in long-term undertakings which would be beneficial for the development of the company, but unfortunately, from the point of view of the particular interests of the current-term president, they become completely unprofitable. Another important element that distinguishes an average manager from an outstanding and creative one is having a skill called strategic imagination (Modern Management systems 2018). ISO 9001 standard requires an order natural for a human being and providing harmony to an organization operating according to these requirements and to develop everything according to a specific structure. These types of actions are extremely effective, but they work well in a stable environment. Meanwhile, today's constantly changing environment does not guarantee the stability of the organization, but requires constant dynamic adjustments. This approach is guaranteed by visual thinking combined with two elements: an insightful image of the present and the ability to predict the future. Nowadays, a creative manager is able to create a picture of a new reality out of scraps of information, various kinds of conjectures and speculation, which allows to create a new image of the world and imagine a new reality. Such skills are not acquired through learning and it is even difficult to imagine how they could be taught if they are related to the sphere of intuition, visualization and conjecture. On this basis, the image of the future manager appears, i.e. a person who builds the image of the company from seemingly insignificant elements and is able to translate it into a professional strategy of the company through thorough analysis. In addition, they can build a team of people whom they are is able to convince to follow their own ideas. In this situation, one can consider that there appears to be a manager who is absolutely different from the image of ISO 9001 requirements, who creatively seeks niche opportunities for the development of the company based on skills that are the complete opposite of a systematically ordered manager, guarding the order of processes implemented in the organization. No record of the standard is able to provide a description of a manager who should be open-minded and above-average. The image of "*top management"* according to the ISO standard is a group of people

who are the guardians rather than creators of the future of building a modern strategy of the organization (Rothery 1999).

Summary

The article does not fully address the subject of the human factor, which is of key importance in the process of maintaining the quality management system as it is the main carrier of threats. It is also about involving the management, presenting the attitude of the auditor as well as people employed in organizations. Furthermore, new management trends and the level of development of the management staff, as well as instruments to strengthen market competitiveness were not fully addressed. On the basis of the presented comparison of statistical data, it can be concluded that the hypothesis set at the beginning of this article indicating that the influence of dynamic development and challenges constituting the environment of contemporary organizations may in the future lead the organization and organization security to move away from the need to implement and maintain a voluntary quality management system in accordance with the requirements of ISO 9001 in favor of seeking own solutions for which there will be no limitations in this respect has been partially confirmed. However, the complexity of this issue requires a number of additional analyses and consideration of many different factors and available statistical research results related to the organizations areas of operation. Due to the extensive subject of the article, it is very difficult to refer to all aspects, especially since the introduction of the new edition of this ISO 9001 standard requires additional research over the next years of its validity, i.e. from September 2018. The mere fact of implementing a new system is a great challenge and commitment for employees who are often afraid of change. It is not known if such problems will affect the number of certificates issued.

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Conceptual Fundamentals and Key Priorities of the Circumpolar States' Arctic Policies

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Abstract

The authors have presented the research of the conceptual foundations and key priorities of the Arctic policy of circumpolar states in the paper. The relevance of the research is determined by the geopolitical and economic significance of the Arctic. At the same time, there is no any unified international legal center that establishes legal and normative standards of activities in the Arctic. Circumpolar states together and individually develop legal framework of a country, taking into account the following: firstly, their priorities; secondly, the existing legal status of land, water and air spaces of the Arctic; thirdly, global interests of the present and future of the planet. In the presented paper, the authors have revealed some key priorities of the state Arctic policies of circumpolar countries on the base of the analysis of political and programmatic documents. The analysis of political and programmatic documents has shown that the state Arctic policies of the circumpolar countries are focused on expanding of external interaction in the Arctic and maintaining the sustainable development of their own Arctic territories. Certain of main disadvantages of the circumpolar countries' Arctic strategies have been determined. According to the analysis of the conceptual framework and key priorities of the Arctic policies of the circumpolar countries, the conclusion concerning declarative nature of national Arctic strategies has been drawn. It has been shown that main institutions for the practical realization of Arctic policies are regional strategies for socio-economic development. National priorities and regional opportunities is the basis for the development of regional strategies.

Keywords: Arctic Policy, Development Priorities, Circumpolar States.

Introduction

The relevance of the research is determined by the following: in recent decades, the so-called "polar fever" i.e. the activities of some states in the use of arctic natural resources and territories has intensified in the Arctic. The fact is that large reserves of oil, natural gas, coal, and other hydrocarbon resources have been discovered in some arctic seas and on the continental shelf of the Arctic countries. Arctic waters are rich in animal resources, including marine animals, fish, shellfish

and other commercial species (Jorgensen, 1990; Larchenko et al, 2019; Sachs and Warner, 2001; Skufina et al, 2019a).

Owing to global warming and ice cap displacement to higher latitudes, some new opportunities of the Northern Sea Route are being revealed. One of them is a new transport route that can connect Russia, the USA, China, Japan, the EU countries, opening up global economic opportunities. The authors will illustrate the efficiency of this transport highway use with two examples: the distance from the port of St. Petersburg to the port of Vladivostok along the Northern Sea Route is 7559 nautical miles (NM), and the alternative route through the Suez Canal is 1.64 times greater – 12419 NM; the distance from the port of Yokohama to the port of Murmansk on the Northern Sea Route is 5770 NM, and through the Suez Canal it is 2.2 times greater – 12840 NM.

One cannot ignore the Arctic's substantial military potential. Some of circumpolar countries' borders pass along the Arctic Ocean. In the Arctic, there are enterprises of defense-industrial sector, land, air and sea military bases, airfields, and other military infrastructure of the circumpolar states (Killaby, 2006; Skufina et al, 2015).

At the same time, there is no any unified international legal center that lays down legal norms and rules of activity in the Arctic. Circumpolar states in common and each individually develop legal framework of countries, taking into account, firstly, their priorities; secondly, the existing legal status of the Arctic's land, water and air spaces; thirdly, global interests of the present and future of the planet.

The purpose of the research is to reveal some conceptual foundations and key priorities of the circumpolar states' Arctic policies.

In order to achieve this goal based on the analysis of political and programmatic documents, it is necessary to solve the following problems::

- to reveal the key priorities of state Arctic policies of the circumpolar countries;
- to identify main drawbacks of the Arctic strategies of the circumpolar countries;
- to reveal the nature of the relationship between national and regional Arctic strategies for the socio-economic development of the circumpolar states.

Materials and Methods

Representing the methods by which the problems and purpose of the research can be solved, first of all, the authors would like to pay attention to the object of the research. The legal regime of a territory depends on the determination of its borders and components. In the scientific community and in legal literature, the Arctic is considered the northern polar region of the Earth, which includes the North Pole and is limited by the 66th northern parallel, the so-called "Arctic Circle" (Raspotnik, 2018; Jensen and Hønneland, 2015). The Arctic includes significant land areas, parts of the Arctic, Pacific and Atlantic oceans and extensive airspace.

Circumpolar states are otherwise called subarctic ones (Skufina et al, 2019b). The list of the circumpolar states was approved at the meeting of ministers and plenipotentiaries of states in 1996 in Ottawa (Canada), as a result of which the "Declaration on the Establishment of the Arctic Council" was signed (Declaration on the Establishment ..., 1996). The same document was established by the Arctic Council, which, in addition to the circumpolar states, included representatives of small northern peoples. The Arctic Council has a special mechanism for coordinating international cooperation among states concerning the Arctic's issues (Overpeck et al, 2005).

The circumpolar states have their own territories outside of the Arctic Circle, legal borders recognized by international community (Kefferpütz, 2010; Steinberg et al, 2018;). Six circumpolar

countries (Denmark, Iceland, Canada, Norway, Russia and the USA) have direct access to the polar seas, inland maritime Arctic zones. Such circumpolar states as Finland and Sweden do not have maritime territories in the Arctic; therefore, they are not among the states claiming to divide the continental Arctic sea shelf. Iceland, locating on the periphery of the Arctic, is considered an island located mainly in the Atlantic Ocean. Therefore, it also does not participate in the solution of problems within responsibility zone of the states located on the Arctic Ocean coast (Nordquist et al, 2010; Hassan and Karim, 2018).

The characteristics of the circumpolar countries as of 2018 are presented in the table.

Table: Characteristics of the circumpolar countries as of 2018 (based on the materials from the United Nations Population Fund (The United..., 2018) and The World Bank (The World..., 2019)

Circumpolar countries	**Area**		**Population**		**GDP**	
	Index, thousand km^2	World ranking	Index, million population	World ranking	Index, $ billion	World ranking
USA	9363	4	331,43	3	20494,10	1
Canada	9976	2	37,83	39	1712,51	10
Russia	17075	1	146,78	9	1,657,55	11
Sweden	450	54	10,31	89	551,03	22
Norway	324	66	5,48	117	434,75	29
Denmark	43	129	5,76	114	352,06	38
Finland	337	63	5,53	116	273,96	44
Iceland	103	106	0,36	184	25,88	108
Total	37671		543,48		23844,29	

The entire area of the Earth's surface is equal to 510 million km^2 including land area almost of 148.9 million km2. The total area of the eight circumpolar states' territory is 37.7 million km^2. Thus, the circumpolar states accounted for 4.39 percent of the Earth's surface or 25,32% of the Earth's land area. The total population of the Earth at the end of 2018 is 7678,17 million people. 543, 48 million or 7, 08 % of the world population lived in the Arctic circumpolar countries (Samarina et al, 2018; Samarina et al., 2019). In 2018 according to the estimation of the World Bank the total GDP of all countries of the world was 5784,42 trillion $. The total GDP of the circumpolar countries was 23, 84 $ trillion or 0.41% of the world GDP.

The research focused on the political-programmatic and legal documents of the circumpolar states.

The research methods are directly related to the object, subject, aim and problems of the research which is based on general scientific methods. The authors will not dwell on them because of their predetermination in any research. Among interdisciplinary methods the authors shall note sociological one, involving the research of the Arctic policies of the circumpolar states from the standpoint of regulation of social interaction on the basis of specific facts, phenomena and processes taking place in the society between groups of people as subjects of law. In addition to this the authors shall note a concrete historical method that will make it possible to study the Arctic policy of the circumpolar states in the process of development over time, accompanied by changes and improvement. As special methods, the authors will use a dogmatic method, which will make it possible to study the process of formation and realizing of the Arctic policy of the circumpolar states in logical order using special legal terms and constructions. It is also supposed to apply a comparative legal method, which provides a systematic and comprehensive research and comparison of legal features of different countries.

The research has carried out a comparative analysis of the conceptual foundations and key priorities of the Russian Federation's Arctic policy and the policies of other circumpolar countries based on the analysis and comparison of their national Arctic strategies and other political and programmatic documents used as research materials.

Results and Discussion

The Arctic's land area is for the most part under the sovereignty of one or another circumpolar state. The water area outside the sovereignty of the circumpolar countries is regulated by general international legislation.

All eight circumpolar countries are parts of the international organization "The Arctic Council". The declarations adopted by the Arctic Council present the results of the circumpolar countries' basic agreements on the cooperation in the Arctic (Spence, 2014). In addition, each of the countries with national priorities in the Arctic realizes its own arctic policy enshrined in the political and programmatic documents.

Russia has the largest Arctic territory, the longest border, passing through the Arctic's territory and the longest sea coast in the Arctic Ocean. The priority of the Arctic for Russia will be expressed in the creation of a special object of public management of the Russian Federation's Arctic Zone (AZRF). The analysis of such main documents for management of the Russian Arctic as "The Basics of the Russian Federation's State Policy in the Arctic for the Period up to 2020 and the Future" (The Basics of the Russian..., 2008),"Russia's Arctic Zone Development and National Security Strategy for 2020"(Russia's Arctic..., 2013), State Program of the Russian Federation "Social and Economic Development of the Arctic Zone of the Russian Federation" (State Program of the Russian Federation..., 2019) and others has shown that the foundation of Russia's modern Arctic policy is the increased exploitation of natural resources for the development of the rest of the country. The Arctic is seen, first of all as a platform for the distribution of productive forces and government policy is aimed primarily at creating the optimal configuration of the main factors of industrial production.

The analysis of conceptual foundations and key policy priorities of the Arctic in the circumpolar countries has shown that their national Arctic policies are focused on the expansion of external interaction in the Arctic and sustainable development of their own Arctic territories.

In Sweden (Sweden's..., 2015) and Finland (Finland's Strategy..., 2013) the basis of the realization of the Arctic policy is so-called knowledge-based economy; in Denmark (Kingdom of Denmark Strategy..., 2011) and Iceland (Parliamentary Resolution..., 2011) it is green economy. The European Union's Arctic policy determines these countries' key priorities (EU Arctic policy, 2016) which are realized at the expense of regional EU funds. In Canada, Norway and Alaska (USA) Arctic policy's key priorities are the ecosystem approach to the exploitation of mineral and biological resources and stream of rental income to the social development of the Arctic territories. The object of Norway's modern Arctic strategy (Norway's Arctic Strategy, 2017) is the Arctic sector as a "sustainable region" where government, business and communities can cooperate together to achieve economic, environmental and social sustainability of the Arctic territories. The United States' key priority of its new Arctic strategy is strengthening of its presence in the Arctic space (DoD Arctic Strategy..., 2019).

The analysis of political and programmatic documents has shown that the significant disadvantage of the circumpolar countries' Arctic policies is the lack of a detailed elaboration of an economic-organizing mechanism of their realization (realization steps, responsible persons, specific activities, target indicators and indices, volumes and sources of financing). According to the analysis of the conceptual basis and key policy priorities of the Arctic circumpolar countries the authors have drawn the conclusion concerning declarative character of the national Arctic strategies, whose key priorities act as intentions. The main institutions of the practical realization of Arctic policies are regional strategies of socio-economic development.

In Russia such regional strategies, for example, are the following: "The Strategy of Socio-Economic Development of the Nenets Autonomous Region for the Future until 2030" (The strategy..., 2010) "Murmansk Region's Socio-Economic Development Strategy until 2020 and until 2025" (Murmansk Region's..., 2013), "Yamalo-Nenets Autonomous Region's Socio-Economic Development Strategy until 2020" (Yamalo-Nenets..., 2011), "The Strategy of Socio-Economic Development of the Chukchi Autonomous Region until 2030" (The Strategy..., 2016) and others. Regional strategies are developed taking into account regional opportunities based on national priorities.

In Norway, for example, such regional strategies, are the following: "International strategies for Finnmark" (International strategies..., 2015), which provide for the development of international cooperation of Finnmark County in the Barents region with the North-West of the Russian Federation, especially with the Arkhangelsk region; "FoU-strategy for Nordland 2013-2025" (FoU-strategi..., 2012), which provides for the increase in the activity of R & D in the development and cooperation of business, public sector and research institutions on the territory of Nordland County; "SNU-Strategy" (SNU-Strategi..., 2018), concerning the management of industrial development in Tromsø County etc.

In Finland such regional strategies are the following: "Pohjois-Pohjanmaan maakuntaohjelma 2018-2021" (Pohjois-Pohjanmaan..., 2017), which provides for the sustainable development of remote Northern territories (Lapin..., 2012), aimed at ensuring of sustainable industrial growth etc.

In Denmark such a regional strategy is "The Programming document for the sustainable development of Greenland 2014-2020" (Programming..., 2014). The document determines general directions of cooperation between the European Commission and the Government of Greenland with the aim of sustainable development etc. In Sweden the regional strategy is "Regional utvecklingsstrategi 2030 - Region Norrbotten" (Regional..., 2018); its priorities are: social, environmental and economic sustainability of Norrbotten County.

In the USA the regional strategy is "The Northern Opportunity: Alaska's Economic Strategy" (Northern... Opportunity, 2016); its priorities are: business development, finance and investment, infrastructure, socio-economic development, entrepreneurship and innovation, increasing of economic potential, quality of life.

Conclusions

The carried out research made it possible to draw the following conclusions:

1. The analysis of the political and programmatic documents has shown that the state Arctic policies in the circumpolar countries are different. The key priority of Russia's Arctic policy is the exploitation of natural resources based on the establishment of the optimal configuration of the main factors of industrial production. Public policies of other Arctic circumpolar countries are focused on expanding external interaction in the Arctic and maintenance of sustainable development of their own Arctic territories.

2. The essential drawback of the circumpolar countries' Arctic policies is the lack of a detailed elaboration of the economic-organizing mechanism of their realization. The main disadvantage of the Russian Arctic's strategy is the positioning of the Arctic territories as a resource base that ensures socio-economic development of the country, where against the background of the dominance of large corporations' interests, which include Arctic mining companies, some problems of the Arctic regions' social development are poorly taken into account.

3. According to the results of the analysis of conceptual framework and key priorities of the circumpolar countries' Arctic policies, the authors have come to the conclusion that the national Arctic strategies, whose key priorities operate as intentions have predominantly declarative nature. The regional strategies for socio-economic development, whose elaboration is based on national

priorities and regional opportunities, are the main institutions for the practical realization of Arctic policies.

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The Research on Russian Regions Investment Attractiveness: Study Priorities, Methods and Results

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Abstract

Social and economic development requires financial resources which are impossible to provide without the investment attractiveness evaluation. The distribution of investments across the territory is highly uneven. The sustainability of the investment distribution between regions allows us to claim the laws of the territorial organization of investment activity and the existing investment climate of the regions. The investment attractiveness assessment is the point of interest to authorities, investors and local business communities. The ratings of the investment attractiveness and the investment climate of the regions are worked out by different researches, consultors and agencies. The results of these studies are very contradictory. The article is devoted to the comparison and analysis of the region investment attractiveness, to the problems of a conceptual formation. The paper consider the general principles and individual issues of the carried studies as well as the approaches and methods of the assessments.

Keywords: Region, Investment, Investment Attractiveness, Regional Investment Policy

Introduction

Investment attractiveness is an essential characteristics of the region economy due to the fact that it's assessment is necessary for the resources supply of the social economic developments of the territories. The assessments of the investment attractiveness of the regions are diverse. The investment attractiveness of all participants of the investment process, including investors, authorities, local communities are very specific. The assessment of investment attractiveness allows determining the effectiveness of investments and ensuring the social economic development of the regions for the authorities. Investors need fair assessments of the business conditions and the protection guarantees in the future. For local communities, including business communities, the assessments of investment attractiveness is the issue of interest related with changes in conditions and quality of life, with increase in the purchase power as well as with the possibility of expanding and diversifying the business. The investment attractiveness representation of the regions, methods of measuring it and practice have undergone significant changes. The current conditions of socio-economic development require a more detailed consideration of the concepts, improvement of the methodology for evaluating and ensuring the targeting of investment policy measures formed on this basis.

Data and Methods

The uneven distribution of factors and the investment conditions does not allow forming a universal scale for assessing the territorial investment attractiveness. However, there is approach seems to be justifiable, which includes considering the regions in the institutional framework of the national economies and forming the national ratings of the investment attractiveness (Belenov, 2016). The estimation of the investment attractiveness allows getting some ideas about how successful regions realize opportunities available to them. This approach is based on the analysis of the already attracted investments volumes and is narrowly functional (Kuznetsova, 2015). However the approach, which involves an analysis of the conditions and factors for attracting investment is more common. A number of some categorizes, for example "investment potential", "risk investment" and "investment climate" and others, became essential for the estimation of the investment appeal (Chistik, Krivtsov, 2005). The first studies based on this approach date back to the 60s of XX century. They have been based on the inflation data, political stability, elaboration of normative legal basis and the capital export opportunities (Stobaugh, 1969). The following studies were associated with specifying the number of indicators assessing investment areas, methods for their calculation and generalized (Rybalko, 2014; Riabinin and Hudorenko, 2016). The assessments of some consulting: The Economist, Fortune, Euromoney, etc are the most famous. They monitor the investment activity and prepare the investment attractiveness ratings of countries and regions. Also they attempted to estimate the regional investment within Russia in the beginning of the Russian reforms period (Nagaev and Wörgötter, 1995). Nowadays the foreign companies more often consider this issue on the scale of the interstate comparisons. The following rating agencies: RAEX (RAEKS Analytics), Agency for Strategic Initiatives, National Rating Agency as well as RIA Ranking and others are most interesting within the estimation of the Russian regional policy. They try to work out their own methods and ratings of the regional appeals. (Scherbakov, 2017). The methodological support of the assessing investment attractiveness is a popular study subject (Bakieva, 2008; Burtseva 2013). The comparing of the individual groups of regions appeal (Myakshin, 2013) is demand highly as well as the issues of the direct foreign investments attraction (Matraeva 2013; Bunich 2015), the investment in the innovative development (Granberg, 2006; Islankina, 2016), the investment in the real economy (Soboleva and Popova, 2014). The application of the approaches and the methods of investment attractiveness assessment depends on the general state of the economy. Meanwhile these approaches are being transformed.

Results

The investments into the non-financial assets, especially to the fixed capital, should be paid special attention. The determining investments methodology in fixed assets is constantly being improved, at the same time, the volumes of their attraction are being clarified. The investment into fixed capital has been growing for the last few years. They are increased from 97,7 to 99,1% of the total investment in non-financial assets. Its volume in actual prices has increased more than 15 times from 1165,2 billion rubles in 2000 up to 17595,0 billion rubles in 2018 (figure 1). This index changes allow to find out the rides and the recession of the investment activity. So, we can fix the reduction in 2002 and 2005, which was caused by many reasons, for example, the changes in the tax system of Russia (Nikolaev and Shulga, 2002; Makolov, 2007). Negative values of 2009 and 2015 are caused in the first case by the consequences of the global financial crisis, in the second by the introduction of anti-Russian sanctions (Risovany, 2011; Nureyev, 2017).

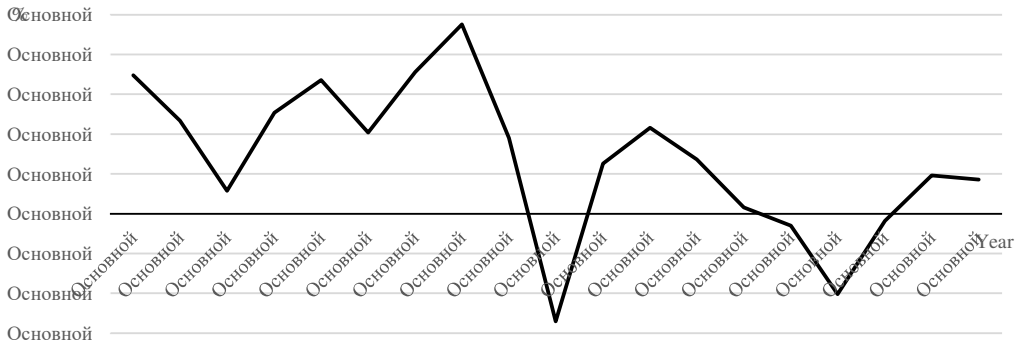

Fig. 1: The index of the physical volume investments in fixed capital in 2000-2018 in comparable prices as a percentage of the previous year.

Compiled by: Investments in Russia. Rosstat, 2017; Russia in numbers. Rosstat, 2019.

The dynamics of the company's financial investments is monitored in the actual prices, which complicates their consideration in dynamics (Fig. 2). However there is a possibility to notice the change of growth pace, which is correlated with the dynamics of the investment volume in fixed assets.

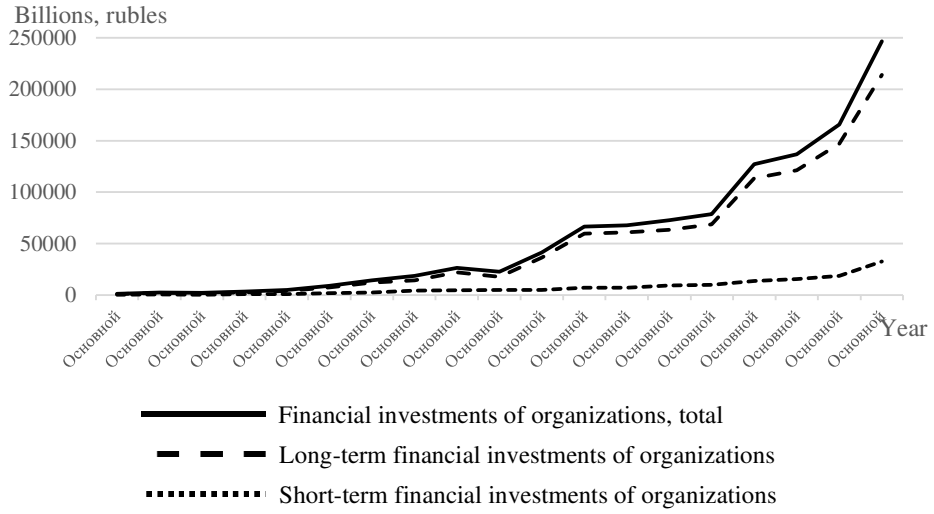

Fig. 2: Financial investments of organizations at actual prices (2000-2018).

Compiled by: Investments in Russia. Rosstat, 2017; Russia in numbers. Rosstat, 2019.

The dynamics of the foreign direct investment is very significant in the issue of the investment attractiveness of the country in the global economy (Fig. 3).

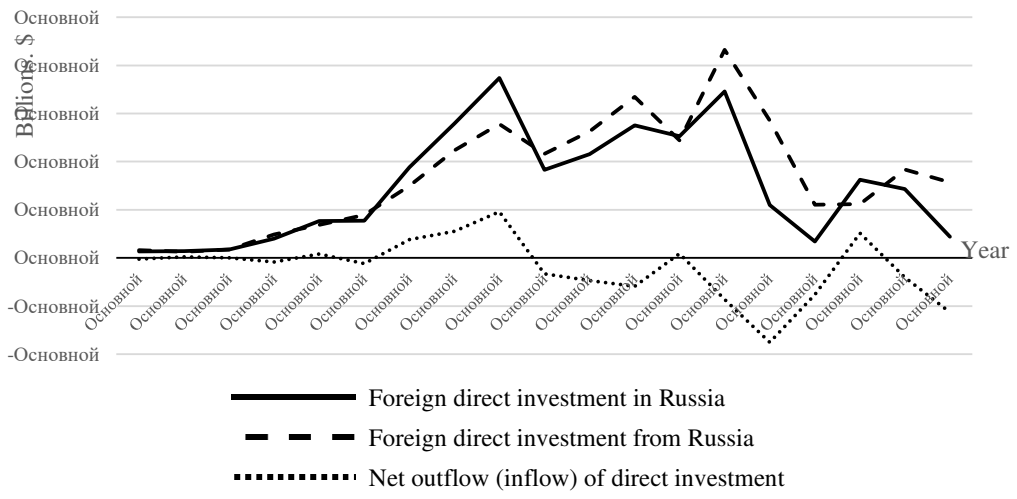

Figure 3: Foreign direct investment in the Russian Federation, billion dollars (2000-2018)

Compiled by: Direct investment. Bank of Russia. URL: https://www.cbr.ru/statistics/macro_itm/svs/ (accessed 08.08.2019); What are the trends talking about. Bank of Russia, 2019.

Some slump numbers came after recovery after the 2008. They were the result of the global financial crisis and the anti-Russia 's sanctions. The actions of the authorities have not led to the positive dynamics of this indicator yet (Bulatov, 2018). The data shows us the sustainable investment distribution between the regions. It has not changed during periods of rise and fall in the investment activity. Figure 1 shows a positive trend in 2007 and the reduction due to the financial crisis 2009, than the restoring position in 2011 and its decline in 2015. However, the distribution of investments in fixed assets between regions in those years, as in 2000, shows us the same 7 top regions each year (Table 1).

Table 1: Leading regions by volume of investments in fixed assets (in actual prices)

The subject of the Russian Federation	2000 year		2007 year		2009 year		2011 year		2015 year	
	million rubles	No.	million rubles	No.	million rubles	No.	million rubles	No.	million rubles	No.
Moscow	156215	**1**	775682	**1**	742422	**1**	856424	**1**	1543601	**1**
Khanty-Mansi Autonomous Okrug - Ugra	107173	**2**	381342	**3**	472195	**2**	636976	**3**	766070	**3**
Yamal-Nenets Autonomous Okrug	82458	**3**	287954	**5**	344336	**5**	477145	**4**	779406	**2**
Krasnodar region	54734	**4**	229714	**6**	377013	**4**	711720	**2**	586903	**6**
Moscow region	50729	**5**	401143	**2**	380061	**3**	449666	**5**	623918	**4**
Republic of Tatarstan	44716	**6**	214558	**7**	277573	**7**	393569	**6**	617128	**5**
Saint Petersburg	35891	**7**	303448	**4**	334074	**6**	360368	**7**	483423	**7**

Compiled by: Regions of Russia. Rosstat, 2018.

The positions in the outsiders group is equally stable. There are the same 10 regions in these years among the 15 regions with the smallest volume of the investment (Table. 2). According to the data of the company's financial investment regions are distributed in the same way. Leaders in 2015 were ranked between the 1 and 12 positions. Among the 15 regions with the lowest index of financial investments, there are 10 outsiders of the fixed capital volume investments. According to the foreign

direct investment data (Regions of Russia. Rosstat, 2018) in 2015, the leaders have occupied the first 13 place, the exception was the Khanty-Mansiysk Autonomous Okrug (31 place). Most of the outsiders ranked from 78th to 85th. Higher places were occupied by the Chukotka Autonomous Region (40th place), the Jewish Autonomous Region (55th place), the Republic of Tyva (66th place) and the Pskov Region (67th place). Similar differences are in the region distribution during the more prosperous 2011. Then Khanty-Mansiysk Autonomous Okrug (53rd place) did not take place in leader group. The Republic of Tatarstan moved from 37th place in 2011 to 13th place in 2015. Mentioned above regions went out from outsiders group in 2011. In addition, Republic of Adygea took the higher position: 55th place against 78th in 2015.

Table 2: Outsider regions by the investment volume in fixed assets (in actual prices)

The subject of the Russian Federation	2000 year		2007 year		2009 year		2011 year		2015 year	
	million rubles	No.	million rubles	No.	million rubles	No.	million rubles	No.	million rubles	No.
Pskov region	2446	**69**	13679	**72**	12717	**76**	24882	**72**	27363	**72**
Kabardino-Balkarian Republic	2404	**70**	12788	**74**	17514	**69**	20855	**73**	28328	**70**
Republic of North Ossetia - Alania	1656	**75**	14644	**70**	13927	**74**	19927	**74**	25457	**75**
Republic of Adygea	1264	**76**	10973	**75**	15874	**71**	18703	**76**	15756	**80**
The Republic of Ingushetia	952	**78**	7678	**79**	6523	**82**	6100	**83**	19759	**77**
Chukotka Autonomous Okrug	701	**79**	5594	**82**	15001	**73**	9302	**81**	14633	**81**
Karachay-Cherkess Republic	637	**80**	9082	**77**	10145	**78**	13610	**79**	19648	**78**
Altai Republic	615	**81**	5967	**81**	7169	**81**	14590	**78**	12185	**83**
Jewish Autonomous Region	340	**82**	8541	**78**	8039	**80**	25430	**71**	12012	**84**
Tyva Republic	282	**83**	2396	**83**	5188	**83**	8119	**82**	12944	**82**

Compiled by: Regions of Russia. Rosstat, 2018.

RAEX (RAEKS Analytics), National rating Agency and the Agency of the Strategic Initiatives study systematically the region investment appeal. The most famous and discussed investment attractiveness rating is being worked out by RAEX agency (RAEX Analytics) since 1996 till now. There are 9 components which form the investment potential: natural resource, production, consumer, infrastructural, innovative, institutional, financial and tourism. The components of investment risk are economic, social, financial, managerial, environmental and criminal. All these issues have been changed over the time. The most numerous is the group of regions with moderate risk (rating B): 61 regions in 2000, 55 in 2007, 64 in 2009, 59 in 2011 and 56 in 2015. The number of regions with high and extreme risk (C and D ratings) is gradually decreased from 26 regions in 2000 to 18 in 2015. At the same time, the number of regions with minimal risk is increased (rating A) from 2 in 2000 to 11 in 2015. The changes in the regions position is a consequence of the reassessment of investment risks. The changes in the rating RAEX (RAEKS Analytics) positions in the regional leaders and outsiders groups in terms of the volume of fixed capitals investment are very enlightening (Table. 3). The rating of the Yamalo-Nenetskiy Autonomous district has been changed: from 17 in 2007 to 44 in 2009. Moscow rank was changed from minimal to moderate due to this fact it changed position from 1 to 12. All leading regions have the rating changed over the years. On the contrary outsider regions are considered in another way. Pskov region (3B2), the Republic of North Ossetia-Alania and the Karachay-Cherkess Republic (3C2), the Republic of Ingushetia (3D) have not placed after 2000.

Table 3: The leading regions and outsiders in terms of investment in fixed assets in the ranking of investment attractiveness by RAEX (RAEX Analytics) and National Rating Agency

The subject of the Russian Federation	RAEX (RAEX-Analytics)								National Rating Agency							
	2007 year		2009 year		2011 year		2015 year		2015 Dec		2017, Feb.		2017 Nov		2018 Nov	
	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.
Moscow	1B	**7**	1B	**3**	1B	**7**	1B	**12**	IC1	**1**	IC1	**1**	IC1	**1**	IC1	**1**
Khanty-Mansi Autonomous Okrug - Ugra	1B	**9**	2B	**15**	2B	**15**	2B	**19**	–	–	–	–	IC3	**25**	IC3	**24**
Yamal-Nenets Autonomous Okrug	2B	**17**	3B1	**44**	3B1	**47**	3B1	**48**	–	–	–	–	IC2	**8**	IC2	**9**
Krasnodar region	2A	**2**	1B	**5**	1A	**3**	1A	**3**	IC3	**10**	IC3	**10**	IC3	**13**	IC3	**13**
Moscow region	1B	**6**	1B	**2**	1A	**1**	1A	**1**	IC2	**4**	IC2	**3**	IC2	**5**	IC2	**5**
Republic of Tatarstan	2B	**13**	2B	**11**	2B	**11**	2A	**5**	IC2	**5**	IC2	**4**	IC2	**6**	IC2	**6**
Saint Petersburg	1A	**1**	1B	**4**	1A	**2**	1A	**2**	IC1	**2**	IC1	**2**	IC1	**2**	IC1	**2**
Pskov region	3B2	**52**	3B2	**56**	3B2	**60**	3B2	**60**	IC7	**62**	IC8	**68**	IC8	**72**	IC8	**69**
Kabardino-Balkarian Republic	3C2	**77**	3B2	**58**	3C2	**72**	3C2	**74**	IC9	**74**	IC9	**74**	IC9	**78**	IC9	**76**
Republic of North Ossetia - Alania	3C2	**70**	3C2	**74**	3C2	**74**	3C2	**76**	IC9	**78**	IC9	**72**	IC9	**83**	IC9	**83**
Republic of Adygea	3B2	**53**	3B2	**57**	3B2	**61**	3B2	**61**	IC7	**63**	IC7	**56**	IC7	**63**	IC6	**50**
The Republic of Ingushetia	3D	**79**	3D	**81**	3D	**81**	3D	**84**	IC9	**76**	IC9	**77**	IC9	**80**	IC9	**80**
Chukotka Autonomous Okrug	3C2	**75**	3C2	**80**	3C2	**80**	3C2	**82**	IC4	**28**	IC4	**28**	IC4	**35**	IC4	**32**
Karachay-Cherkess Republic	3C2	**76**	3C2	**73**	3C2	**73**	3C2	**75**	IC9	**75**	IC9	**75**	IC9	**79**	IC9	**77**
Altai Republic	3B2	**58**	3B2	**62**	3C2	**77**	3C2	**78**	IC9	**72**	IC9	**76**	IC7	**64**	IC7	**64**
Jewish Autonomous Region	3C2	**73**	3C2	**79**	3B2	**65**	3C2	**81**	IC8	**68**	IC8	**62**	IC8	**69**	IC8	**67**
Tyva Republic	3D	**82**	3D	**83**	3D	**83**	3D	**85**	IC9	**79**	IC9	**79**	IC9	**84**	IC9	**84**

Compiled by: Rating of investment attractiveness of Russian regions of the company "RAEKS Analytics". URL: https://raex-a.ru/project/regcongress/2019/regcongress (accessed August 1, 2019); Rating of investment attractiveness of constituent entities of the Russian Federation. Remote. National Rating Agency. URL: http://www.ra-national.ru/ru/ratings/provinces?type=rating (accessed 08.08.2019).

The rating of the region investment appeal is formed by the National Rating Agency from December 2014[5]. Each region is characterized by a certain set of statistical parameters:n natural resources and geographical position; labour force; infrastructure; domestic market; the production potential of the economy; social political stability; the financial stability of the regional budget and enterprises of the region. During the generalizing of the statistics three groups are indicated: with high level of

investment appeal (IC1-IC3), medium (IC4-IC6) and moderate (IC7-IC9). In addition, three subgroups are separated in each group. The leaders in terms of investment in fixed assets predictably were in the group of regions with a high level of investment attractiveness (Table 3). All leaders have stayed in the subgroups of this category, except the Krasnodar Region, which data slightly fell after the Olympic Games in Sochi. The position in the ranking of outsiders is more dynamic, although 6 out of ten regions for four years of observation have retained their position in the subgroups. This is the Chukotka Autonomous Okrug (IC4) as well as the Kabardino-Balkarian Republic, the Republic of North Ossetia-Alania, the Republic of Ingushetia, Karachay-Cherkess Republic, the Republic of Tyva (all of them are in subgroup IC9). Four regions have changed their position in the ranking. So the place of the Pskov region decreased, it has moved from subgroup IC7 to subgroup IC8. The position of the Republic of Adygea slightly decreased: from IC6 to IC7, but it recovered in November 2018. The position of the Altai Republic has significantly improved, which has moved from subgroup IC9 to subgroup IC7. However, the decline of the Jewish Autonomous Region rating from IC6 to IC8 in December 2015 has not been restored since then.

Currently the Government of the Russian Federation launched the work on the formation of National rating of the investment climate in the regions of the Russian Federation. The Autonomous Non-Profit Organization Agency for Strategic Initiatives to Promote New Projects, established by Order of the Government of the Russian Federation in August 11, 2011 No. 1393-r is the main active participant of the launching. All regions have been included in the national rating and the best 20 regions are represented on the official website of the Agency. Special attention should be paid to the significant change in the position of regions in the rating (Table 4).

Table 4: Leader places in terms of investment in fixed assets in the National rated investment climate

Region	2016 year	2017 year	2018 year	2019 year
Moscow	10	3	2	1
Republic of Tatarstan	1	1	3	2
St. Petersburg	22	17	4	5
Moscow region	21	9	9	7
Krasnodar region	7	7	6	13
Khanty-Mansi Autonomous Okrug - Ugra	9	30	14	17
Yamal-Nenets Autonomous Okrug	18	-	-	-

Compiled by: Improving the investment climate. National rating. Agency for Strategic Initiatives to Promote New Projects. URL: https://asi.ru/investclimate/rating/ (accessed 08.08.2019).

The Khanty-Mansi Autonomous Okrug has changed its place from 9 in 2016 to 30 in 2017 (-21st position). However in 2018 this region was on the 14th place, and in 2019": on the 17th line. The Yamalo-Nenets Autonomous Okrug was in 18 place in 206, but in subsequent years did not take place in top 20 group. The agency studies the promotion of best investment practices. The Regional investment standard, which is mandatory for implementation in all regions in response to orders of the President of the Russian Federation was worked out by the Agency. Also the investment climate is considered in terms of the quality of government work. The national rating is based on 44 indicators, grouped in four lists: "Regulatory environment", "Institutes for business", "Infrastructure and resources", "Support of small business". The revision of the 2019 methodology provides 31 extra indicators out of the rating for the preparation of future changes in the assessment methodology [9].

Discussion and Conclusions

During the study of investment attractiveness a conceptual and terminological apparatus was formed where various concepts are often used as synonyms. Meanwhile during the comparing of concepts

"investment appeal" and "investment climate" more narrow content of first state and wider of the second is considered. While the climate characterization more often means the existing investors stable ideas about the possibility of working in the region, in the case of determining investment attractiveness assessment associate with specific views of investors in specific time period and the intensification of investment processes (Litvinova, 2013). The components of investment attractiveness are “investment potential”, objects are attractive to the investor, conditions and circumstances for work, as well as “investment risk” is everything that can prevent an investor from realizing his interests (Shcherbakov, 2017). “Investment resources” means individual components of investment potential and “investment activity” acts as a characteristic of the degree of their involvement in the investment processes (Bakieva, 2008). Concepts such as "competitive" and "creditworthiness" of the regions can be filled with different contents: for comparing individual investment conditions (Golovihin and Nezhivenko, 2017), for determining the unambiguous estimates, i.e. "for" or "against" during making decions by the banks (Kozhina, 2005). The results of research by rating agencies reflect the development of investment processes from various points. Research Agency RAEX (RAEKS Analytics) are guided by the interests of large strategic investors. The ratings of this agency has an aim to form ideas about changes in investment activity in the future. However, the agency rates can vary greatly in the short time period and this limits their use in long-term forecasting. The results of studies of the National Rating Agency are stable and correlate with the volumes of attracting investments in fixed assets. They allow us to use the rating as a rating of the investment climate in the regions. It is significant for an objective assessment of the investment state sphere in the regions. Almost all authors note an excessive number of methods for the assessing investment attractiveness. Thus, the problem is not the lack of the studies, but their abundance and diversity (Grishina, 2001; Litvinova, 2013). A comparison of these studies (Grishina, 2001; Batchaev, 2002) allows us to identify common features and individual characteristics of the applied approaches, methods and results. Firstly, the investment attractiveness, being a relative characteristic, is determined by comparison. The research results are presented on a base of the comparison of regions among themselves and the rating formation. Secondly, each study involves the presentation of the regional economy in the form of a socio-economic system, the components of which are involved in the investment process. This allows to identify those components that may attract the investor and may also be critical to his work. Thirdly, depending on whose interests are presented in the base of the formed ratings, the idea of the regional economy and its components can change. This circumstance is one of the main reasons for the differences in the results of research on the region investment attractiveness. Fourth, investment attractiveness is a complexly measurable issue, which is formed either by statistical data or by expert assessments. Thus, the rating of regions are formed by summarizing their “rankings” compiled on the individual indicators characterizing the state of investment activity (Karminsky, 2005; Karpuzov, 2006). Fifthly, the indicators characterizing the investment attractiveness of the regions have different units of measurement. According to the authors they have a different contribution to the overall assessment of investment attractiveness. A variety of research results are due to the use of the summarizing the rankings various methods. The researching of the regions investment attractiveness has multidirectional characteristics. *A separate direction* is studies carried out by the ratings agencies. The results of these studies are used for various purposes: in order to substance the estimation of the financial and economic activity results as well as for the formation of a positive image of the region. Rating agencies are independent and claim to form an unbiased assessment. These services are demand highly, including by authorities in order to justify decisions made. Rating agencies constantly adjust and modernize the methods of assessment in order to rise the justice of the results got. *Studies related to the perfection of its assessment methodology of the investment attractiveness (*Grishina, 2001; Burtseva, 2013) can be take into account separately. Numerous scientific publications have been devoted to this issue, including monographs and dissertation studies, etc., which offer solutions to improve the quality of assessing the investment attractiveness of regions. The third direction has a narrowly functional purpose. This is a *study of the investment attractiveness for the specific types of activities and economy sectors*. Among them studies dedicated the assessment of the effectiveness of the authorities’ activities responsible for the implementation of the investment policy are essential. There are numerous studies about the region prospects for investors who specialize in a certain area (sector) of the economy related to marketing, promotion of goods and services, determining the parameters of the competitive environment and etc.

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Stakeholder Loyalty Assessment as A Tool to Integrate Risks into Organisations' Strategies

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Abstract

This article emphasises the need to develop techniques and disseminate practices for assessing the loyalty of a company's stakeholders. Loyalty assessments can be instrumental in integrating risks into organisations' strategies. The authors underline the importance of shareholders' loyalty and readiness to take business risks and stress the need to take measures for preventing disloyalty-caused damages, to fund these measures, and to organise the monitoring of their results. The article describes the possibilities of system dynamics models and big data technology in establishing causal relations between the level of stakeholder loyalty and a company's performance.

Keywords: Strategic Management, Risk, Stakeholders, Loyalty.

Introduction

Shareholders have different and sometimes conflicting needs and expectations. They build their relations with organisations at different paces and at different participation levels. It is important to both identify the stakeholders and create conditions for efficient long-term cooperation with them, i.e. to establish a stakeholder relationship management (SRM) system. ISO 9001:2015, ISO 14001:2015, OMG Essence, SEBoK, and other standards list the most common groups of stakeholders.

The stakeholder circles of modern companies have been described by James E. Post, Lee E. Preston and Sybille Sachs (2002), Aubrey L. Mendelow (1991), Max B. E. Clarkson (1995), Grant T. Savage, Timothy W. Nix, Carlton J. Whitehead, John D. Blair and others (1991).

Arkady V. Trachuk, Natalya V. Linder (2016b) emphasize three different approaches to understanding the category of stakeholders:
– normative approach, submitted by Archie B. Carroll and Kareem M. Shabana (2010), according to which management must strive to ensure that the company's values are in the interests of stakeholders;
– descriptive approach that requires attention to individual stakeholders and their role in achieving goals and increasing competitiveness, which are developed by Patricia Crifo, Marc-Arthur Diaye, Sanja Pekovic (2013);
– strategic approach of Dorina Popa, Victoria Bogdan and Diana Balaciu (2012), according to which stakeholders are strong participants in economic relations, capable of both positively and negatively affecting the existence of an organization.

A key indicator of perception by different stakeholder categories is loyalty, which measures favourable attitudes to a company and its products.

We believe that stakeholder loyalty is an indicator of the efficiency of a company's strategic management as well as a tool to overcome risk management being divorced from planning and management decision-making. The problem of coordinating risk management with strategy, corporate management, stakeholder engagement, and business performance management was formulated in the new COSO ERM – Enterprise Risk Management. Integrating with Strategy and Performance by the Committee of Sponsoring Organizations of the Treadway Commission (2017).

Theory

The wavering loyalty of any stakeholder category (customers, staff, owners, shareholders, contractors, the state, investors and underwriters) hinders the achievement of strategic and business goals as well as undermines company efficiency.

A disloyal customer will not buy again and will discourage others from purchasing the product. Bernard Marr (2012) leads a famous rule that on average 60 people will learn about the unsuccessful experience of one client, and information about the product or company of satisfied customers becomes available only to 30 people.

Disloyal staff is prone to embezzlement, negligence, cover-ups, and abuse of power. Reduced loyalty of suppliers translates into disadvantageous trade-credit conditions and makes postponed payments impossible. Disloyal shareholders avoid risks and display 'deviant' behaviour how it determines Victor I. Sigov, Alexander L. Slobodskoi, and Anna O. Evstigneeva (2017). In Russia, this behaviour usually manifests itself in rejecting interested party transactions; the absence of quorum during supervisory body elections; shareholders exercising their right to require the company to buy all or any of their shares at not less than the market price; reputation losses and litigation fees ensuing from the restoration of shareholders' rights, from challenging transactions, or from contesting general meeting's resolutions.

The above evokes Frederick Herzberg's (1968) dual-factor theory. When loyalty is insufficient or wavering, stakeholders show their dissatisfaction with actions threatening the company, just as it happens in the motivation theory when hygiene factors are at play.

A company should include response measures to stakeholder disloyalty (particularly, those for preventing disloyalty-caused damage) in its SRM system, bear the costs of these measures, and monitor their efficiency. These include access systems for physical objects and information, fines and reimbursement systems at the expense of perpetrators, marketing loyalty programs with discount cards, bonuses and gifts, the creation of IR-units to build relationships with investors.

Arkady V. Trachuk, Natalya V. Linder (2016a) note: «E-business strategies make it easier to create the effect of customer «locking», i. e. the creation of various loyalty programs, the deepening of customization through the use of Big Data tools, consisting in the initial data analysis. The results of the latter determine the problems and opportunities to improve offers for customers».

Recommendations

In practice, there are established metrics for the loyalty of customers and staff, who are considered as stakeholders. These are the Net Promoter Score (NPS) and the employee Net Promoter Score (eNPS).

As to the loyalty of owners and shareholders, their needs and expectations cannot be reduced to stable profitability, transparency, or corporate social responsibility. The measure of owners' loyalty is their desire, or the absence thereof, to sell the company in the next one-two years, five years, or ten years. The indicator of shareholders' loyalty is their inclination to recommend the company's shares for investment. A survey of the management of seventy Russian private companies, conducted by Sergey V. Kuznetsov, Yuliya I. Rastova and Natalia V. Suscheva (2018), shows that business is interested in investing in the earning assets of other organisations in order to receive dividends.

For long-term strategic changes, it is important to ensure the quality of data, calculations, and result interpretation. Particularly, there is a need to compute the threshold values of loyalty indices for different stakeholder categories and attain the levels achieved by the leading companies. The findings of Yuliya I. Rastova and Miron Rastov (2018) suggest that most companies have not fully formed such an attribute of strategic management as the controlled variation of strategic management processes and their parameters; nor have they identified the causes of this variation.

To solve the above problems, organisations should conduct industry-specific surveys of controllers, minority shareholders, holders of voting and non-voting shares, etc. To track trends and avoid incorrect forecasts, companies should carry out online polls.

Prospects

An acute problem in strategic management and risk management–strategy integration is the insufficient use of mathematical modelling, which makes it possible to express quantitatively the causal relation between strategic goals and indicators and to measure dynamic changes in final results with lag and gain parameters taken into account. The research results of Jay W. Forrester (1958), John D. Sterman (2000), Kim D. Warren (2008), Marina I. Barabanova and the team of authors (2018) demonstrate the possibilities of using the tools of system dynamics (SD) in overcoming the extreme complexity of making decisions. Models of system dynamics will allow based on the results of monitoring factors and the level of loyalty of stakeholders, to timely and rationally respond to changes in their mood. It is important to establish what sample size and structure ensure representative results and how to leverage the power of end-to-end digital big data technology.

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Linking Passion to Performance: The Role of Work Effort and Work Centrality

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Abstract

Employee performance is perhaps one of the most researched phenomenon in management research. To date, a plethora of factors that may either prompt or impede employees' performance have been identified. The aim of this conceptual paper, however, is to draw researchers' attention towards a relatively less researched determinant of employees' performance i.e., harmonious work passion Particularly, this paper proposes a tentative conditional process model to explicate how harmonious work passion might affect job performance and what role certain factors might play in it. The model we propose suggests that one way via which employees' work passion might affect or relate to their job performance is through work effort. Further, it is also theorized that the passion–work effort and passion–performance relationships would be moderated by work centrality – the extent to which one considers work as central part of his/her life. The paper concludes with suggestions for future empirical research.

Keywords: Work Passion, Job Performance, Work Effort, Work-Centrality, Conceptual Framework.

Introduction and Background

Employee performance is critical to overall functioning and success of any organization. The performance of teams, work units, and the organization, largely depends upon individual performance (Campbell & Wiernik, 2015). Since its conceptualization (late 1980s) to the present day, a plethora of studies on myriad aspects of 'employee performance' (e.g., performance models, measurement, antecedents, and consequences) have been conducted. However, there still exist some 'gaps' in this body of knowledge. For instance, whilst research has shown that harmonious work passion impacts performance (Astakhova & Porter, 2015; Burke et al., 2015; Dubreuil et al., 2014; Ho et al. 2011), little is known about the processes via which the former impacts the latter (e.g., Astakhova & Porter, 2015; Dubreuil et al. 2014; Ho et al. 2011). Similarly, research has yet to explore the moderating role of certain attitudinal factors in the passion–performance relationship. With this in mind, the current paper proposes a conceptual model which suggests that (1) one way via which harmonious work passion impacts performance is through its positive influence on work effort, and (2) work centrality might moderate harmonious work passion's positive relationships with work effort and job performance. This paper is unique in that it is the pioneer in introducing the mediating and moderating mechanisms of work effort and work centrality in the passion–performance link.

This paper is structured in three main sections: introduction, conceptual framework, and conclusion and future research direction. The definitions of constructs, arguments on their interplay, and a

schematized representation of proposed relationships are presented in the conceptual framework. Whereas, the last section provides guidelines for future research.

Conceptual Framework

The term 'passion' connotes an individual's strong inclination towards an activity – something that an individual likes, find important, and willing to expand the energy resources at (Vallerand et al., 2003, p. 757). Based on how that activity is 'internalized' in one's core-self, passion can be classified into two main types: the harmonious passion and the obsessive passion, where the first results from an autonomous internalization of the activity to one's core-self and the latter from controlled internalization. The first type of internalization ensues when one freely accepts the activity, without attaching any contingencies to it. Such an internalization thus motivates one to perform or engage in the activity willingly and freely, in harmony with other aspects of one's life. The latter internalization, on the other hand, stems from interpersonal and intra-personal pressures, implying that certain contingencies such as social pressure and self-esteem, are attached to engaging in or performing the activity. That is, although an individual likes an activity but his/her engagement in it is pressurized or compelled (i.e., lack of control). Due to this, engagement in the activity can conflate with other activities in one's life (Vallerand et al., 2003). In sum, whilst the two types of passion (i.e., harmonious and obsessive) are similar in that both represent a 'motivational force' which derives individuals to engage in or perform an activity, they differ on the basis of the internalization processes that underlie each. Harmoniously passionate individuals perform a job because they chose to do so, not because they are pressurized or compelled (e.g., social approval). On the contrary, however, obsessively passionate individuals view a job as important due to certain pressures and thus feel bound to perform it even when it conflates with other aspects of their lives. It is possible that individuals may have one type of passion but not the other (for a discussion, see Ho et al. 2011).

Turning to job passion, which has been referred to as "*a job attitude which entails affective and cognitive elements that embody one's inclination towards his/her job*" (Ho et al., 2011, p. 28). While the affective element of job passion signifies one's intense liking for the job, its cognitive element captures the perceived significance of the job. For an individual to have job passion, one should have strong linking for the job and consider it personally important. The combination of affective and cognitive orientations sets the job passion construct apart from related constructs which do not capture both elements simultaneously with examples including intrinsic and extrinsic motivation, organizational commitment and job involvement. Although passion and intrinsic motivation are closely related, the latter construct, however, does not include the internalization of an activity as personally important. Similarly, job passion is different from extrinsic motivation in that it entail liking of an activity, which may not necessarily be the case in extrinsic motivation. Job passion also differs from job satisfaction in that it encompasses an element of identification, which the latter construct lacks. Further, job passion is conceptually distinct from organization commitment on the grounds that it is a job related attitude, whereas the latter attitude pertains to the organization i.e., the extent to which an individual is committed to his/her organization. It is likely that an individual might show high commitment for his/her organization (e.g., due to long tenure) but may not be passionate for one's job. The affective component of job passion demarcates it from job involvement, which is purely cognitive (see Ho et al. 2011).

Concurrent with the dualistic model of passion (for a review, see Vallerand et al. 2003), Ho et al. (2011, p. 30-31) contended that job passion can be distinguished in two forms: harmonious job passion and obsessive job passion. To explain, these author quoted an example of two software engineers, who may have different reasons to like their job. One may like the job because he/she enjoys keeping up with the advancements in the programming field (harmonious job passion), the other may do so because of a sense of superiority that he/she derives from being the one that others in the company may turn to for help in solving relevant problems (obsessive job passion). The quest to endure this sense of superiority may thus lead the latter to learn new programming languages in personal time and think about the ways to debug issues even when he/she is away from the work. The job may thus become an obsession for him/her (Ho et al. 2011).

This paper takes into account only one form of job passion, that is, harmonious job passion, and attempts to develop rationale for its relationship with job performance via the hitherto unexplored mediating role of work-effort. Moreover, this paper also suggests that harmonious work passion's relationships with job performance and work effort will be moderated by work-centrality. One plausible reason for not taking into account the obsessive passion is its non-significant relationship with job-performance (for a review, see Astakhova & Porter, 2015; Burke et al., 2015; Ho et al., 2011). Before we develop arguments and propose hypotheses/propositions thereon, a brief delineation of the constructs (i.e., job performance, work-effort, and work centrality) is necessary. According to Campbell et al. (1990), performance consists of those observable job-related behaviors that are relevant to organizational goals. In simple words, what one does in a given role to achieve/support organizational goals and objectives, can be referred to as job/individual performance (Campbell & Wiernik, 2015). Whereas work effort is the constellation of three motivational outcomes: direction (an individual's choice of behavior); intensity (the degree to which an individual works hard); and persistence (the extent to which an individual persistently performs the chosen behavior) (De Cooman et al. 2010); work-centrality, which is generally referred to as an attitude, captures the importance of work in one's life (Paullay et al., 1994).

Having defined all constructs, let us now turn to harmonious job passion's relationship with work effort and job performance. For this we draw upon the work passion model (Zigarmi et al. 2009), attitude–behavior model (Ajzen & Fishbein, 1977), and existing empirical evidence. Particularly, we posit that harmoniously passionate employees will expend more effort and perform well. We first delineate harmonious work passion's relationship with job performance. Several empirical works have shown positive association between harmonious passion and job performance. The study by Ho et al. (2011), for example, has demonstrated a positive correlation between harmonious job passion and work performance. Similar findings were obtained by Astakhova and Porter (2015), Burke et al. (2015), and Dubreuil et al. (2014). The work passion model posits that employees' work passion is an emotionally positive and persistent state which stems from cognitive and affective appraisals of several factors and results in constructive/ positive attitudes behaviors that contribute to the organization (Zigarmi et al. 2009, p. 310). The attitude–behavior model also suggests that individuals' behavior is the function of attitude – the way one feels/thinks toward a behavior (either positive or negative) (Ajzen & Fishbein, 1977). In keeping with these theoretical underpinnings and aforementioned empirical findings, a positive relationship is expected between harmonious work passion – an attitude/motivational force that derives one to work (Ho et al. 2011) – and job performance, which is an observable behavior (Campbell et al. (1990). Hence, the following is proposed:

Proposition One: *Harmonious work passion would be positively associated with job performance.*

Extending similar theoretical reasons (i.e., attitudes may predict behaviors), we predict that the effort level of harmoniously passionate employees would be higher, that is, the higher the level of harmonious work passion, the greater the effort. We are aware of no prior study which has empirically validated or theoretically explained the link between these constructs. One plausible reason for why we predict a positive association between these construct is a theoretical link i.e., harmonious work passion is a '*motivational force'* (Vallerand et al., 2003) and 'motivation' has been asserted to be an important determinant of work effort (De Cooman et al. 2010). This leads us to assume a positive relationship between the two. Hence, it is proposed that:

Proposition Two: *Harmonious work passion would be positively associated with job performance.*

A positive relationship is also predicted between work effort and job performance. The effort to job performance link has already been established and several empirical studies have reported a positive association between the very constructs (see, for example Brown & Leigh, 1996; Christen et al., 2006; Lloyd, 2008; Wheeler et al., 2012). Taking insights from these empirical studies, as well as Campbell's (1990) and De Cooman et al.'s (2010) assertion that performance is a function of employees' effort, the two are expected to be positively associated. Obviously, when people commit to work (direction), put their energies into the chosen task (intensity), and stay consistent in

whatsoever they chose to perform (persistence), their performance is likely to improve/increase; hence, we posit that:

Proposition Three: *work-effort would be positively associated with job performance.*

Further, we theorize that work effort will mediate the harmonious work passion–job performance relationship. We are of the view that passion without effort may not produce favorable results (i.e., good/high performance). More precicesly, we assert that harmonious work passion will result into greater work effort which will then determine performance. There are studies which have shown that work effort mediates the relationships between attitudes and behaviors. For instance, the study by Wheeler et al. (2012) demonstrated that work effort significantly mediated the relationship between organizational job-embeddedness – a psychological force which emneshes workers into their organization – and job performance. Brown and Leigh's (1996) investigation also revealed a significant mediation effect of effort on the relationship between job involvement and job performance. Consistent with our theorization, and taking insights from previous empirical works, we postulate that:

Proposition Four: *The positive relationship between harmonious work passion and work effort would be mediated by work effort.*

Finally, it is expected that harmonious work passion's relationships with work effort and job performance would be moderated by work-centrality. We argue this based on work-centrality's promising implications for work-related attitudes and behaviors (see, for example Bal & Kooij, 2011; Hirschfeld & Feild, 2000; Ziegler & Schlett, 2016), and its previously established moderating role in the attitude–behvaior link (Ziegler & Schlett, 2016). Particularly, it is predicted that the strength of (1) harmonius work passion–work effort, and (2) harmonius work passion–job performance relationships would be stronger when work-centrality is high. For this, we mainly draw upon Ziegler and Schlett (2016), who demonstrated that high work centrality rendered job satisfcation as more powerful attitude in predicting in-role and extra-role behaviors. Concurent with Ziegler and Schlett (2016), we also anticipate that high work-centrality would invigorate/strengthen harmonious work passion's (an attitude) effects on work effort and job perfromance (behaviors). Thus, we propose:

Proposition Five: *Work-centrality would moderate the positive relationship between harmonious work passion and work effort.*

Proposition Six: *Work-centrality would moderate the positive relationship between harmonious work passion and job performance.*

Propositions four and five lead us to anticipate a moderated-mediation effect (Preacher et al., 2007); that is, harmonious work passion's indirect relationship with job performance would be moderated by work-centrality such that this relationship would be stronger when work-centrality is high than when it is low. Therefore, the following is proposed:

Proposition Seven: *Harmonious work passion's indirect relationship with job performance would be moderated by work-centrality.*

The proposed relationships are schematized in the following diagram:

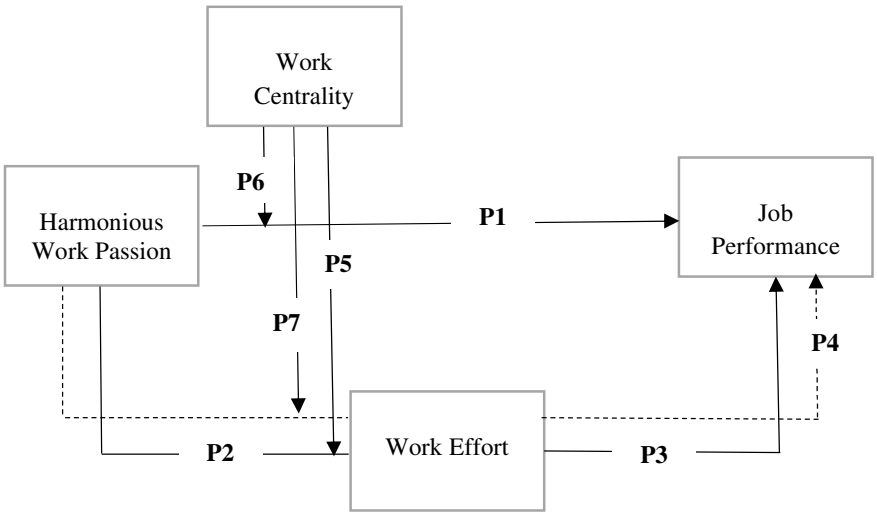

Fig. 1 : The Conceptual Model

Conclusion and Future Research Directions

This paper suggests a tentative conditional-process model for testing. The model we propose is novel in that it suggests the hitherto explored: (1) relationship of harmonious work passion and work effort, (2) the mediating role of work effort in the harmonious work passion–job performance relationship, and (3) the moderating role of work-centrality in the direct and indirect relationships of harmonious work passion with work effort and job performance, respectively. Hence, we believe that the empirical test of the proposed model can significantly advance the relevant literature. Future researchers are therefore strongly encouraged to validate the model empirically. Measurement scales for all the variables are also readily available (see Bal & Kooij, 2011; DeCooman et al. 2010; Vallerand et al., 2003; Williams & Anderson 1991). Researchers may thus easily collect empirical data and determine the extent to which it supports the model.

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Information Quality in The Analysis of Multiple-Choice Questions on An Example of Assessing the Importance of The European Union

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Abstract

The article presents the results of research aimed at indicating a useful set of statistical methods in the analysis of multiple-choice questions and the possibility of choosing many variants of answers (conjunctive cafeteria). The problem is considered due to the quality of information accrue from the analyses of this type of data. The article presents the definitions of questions with conjunctive cafeteria of answers and the most important problems associated with data collection and analysis. Five questions from the Standard Eurobarometer were used to illustrate the problem. For the analysis of conjunctive questions, category frequency, correspondence analysis and parallel plot were proposed. In the study, methods of analysis in the case of data collection errors were depicted. As a result, the proposed methods proved to be appropriate for solving the research problem.

Keywords: Data Vs. Information, Multiple Choice Questions, Conjunctive Cafeteria, Frequency, Correspondence Analysis, Parallel Plot.

Introduction

Often, the terms of information and data are used interchangeably (Wang, 1998), but it should be noted that they are completely separate from the point of many fields of science views. According to Wang and Strong (1996), it should be stated that the quality of information and the satisfaction of the recipient of information or the principal of the study are a key aspect of the information system. The quality of the data, in turn, affects the quality of the information.

In Wang (1998) and then in Kahn, Strong and Wang (2002) and Pipino, Lee and Wang (2002) sixteen dimensions of information quality were indicated. The dimensions that are highlighted in the article are the appropriate amount of information, free-of-error, understandability and value-added. The article also draws attention to the method of collecting data, because in the process of assessing the quality of information, an important element is also assessing the quality of data (Ballou, Wang, Pazer, and Kumar.Tayi, 1998).

In the article, the quality of information concerns the assessment of the preparation for use of the conclusions of a correctly planned study, in which the data was collected in accordance with the assumptions and the methods of analysis appropriate for the type of data collected were used.

Correct connection of data and analysis methods influence the properly conducted inference process (e.g. Babbie, 2013) and therefore also on the quality of information. This statement was the basis for formulating the purpose of the analyses, i.e. determining the issue of multiple choice questions, indicating the types of multiple responses and related analytical problems, and finally proposing a set of analytical methods useful in solving the problem. This goal is part of the methodological function of scientific research (Apanowicz, 2002). It can also be pointed out, like Walesiak (1996), that the choice of variables/data depends on the type of statistical method to be used in the analysis.

An indication of the location of the problem associated with the appearance of multiple choice questions, as an element implying further action, must be preceded by the recognition of problems to

be faced from the first stages of the study. For this reason, before the presentation of selected analysis methods the definition of questions with multiple answers and stages of the study were presented. So it was easier to indicate the difficulties arising from the introduction of questions of the indicated type into the study and to assess the impact of improper analysis on the inference and correctness of the study. The choice of measurement instruments is an action that ultimately influences the substantive selection of variables, the analysis of which is in turn linked to the analytical methods used. In this case, it should be concluded that the substantive selection of variables is the basis for the study.

Walesiak (1996, p. 25) states that "the selection of variables in multivariate data analysis is one of the most important and the most difficult issues". In the case of variables with multiple choice of answers, the problem concerns both one- and multidimensional analysis.

Sagan (2016, p. 48) indicates that "the variables are the basic unit in a research project". At the same time, he indicates the ways of defining variables and perceiving their significance and roles performed in conducted analyses. So, the problem of the variable presented in this way further emphasizes the problem faced by the researcher in the case of variable analysis with the possibility of making multiple selections. Therefore, it is important to indicate the correctness of the conceptualisation and operationalization of the research problem (Sagan, 2004).

Information must be useful and add value (Kahn, Strong and Wang, 2002) in the solution of the research problem, in the analysed case to assess the satisfaction of Europeans with the functioning of the EU. The Standard Eurobarometer survey is conducted twice a year. Therefore, an extremely important problem is finding analytical instruments to assess changes in the indicated area and repeatable in subsequent periods.

Presentation of the Problem

Each scientific research is a multi-stage process. Multiple choice questions appear during the construction of the questionnaire, and therefore at the stage of creating the measurement instrument. The problem posed in the article should not be analyse only within the preparation of the questionnaire, but the impact of the question structure in earlier and later stages of the scientific research should be also considered. This is in one with Apanowicz (2002) definition of scientific research in a broad and narrow sense. According to Łobocki (1975), it should be stated that the questionnaire survey requires careful preparation.

Stages of conducting scientific research can be indicated detailed as Wright (1983) did and in short version in accordance with Stanimir (2003). Wright (1983) also pointed out the mistakes made in all stages. Attention should be paid to errors made during preparing for data collection and measurement errors. However, if these errors appear, the research goal will not be achieved, and the conclusions (information) obtained from the study will not make it possible to assess the truthfulness of the research hypotheses.

At the stage of the measurement instrument construction, there is again the possibility of errors resulting in incorrect analysis of the research problem. Errors that are related to the problem being analysed include:

- structural errors (e.g. failure to use the cafeteria's possibilities, inseparability of the cafeteria, indefinite requirement of completeness, inseparable number of alternatives);
- technical errors (carry forward questions to the next page, too long cafeterias).

The multiple choice questions presented in the article are in practice called cafeterias. Within these questions, a following types of cafeteria are distinguished (Apanowicz, 2002; Churchill, 2002; Kaczmarczyk, 2002; Kauf and Tłuczak, 2013; Mazurek-Łopacińska ed., 1996; Sagan, 2004):

- closed-ended;
- disjunctive;

- conjunctive;
- semi closed-ended question.

The problem of choosing the method of analysis presented in the article concerns the case of conjunctive cafeteria (closed or semi-open), which can be used in one of the following forms (Apanowicz, 2002; Sagan, 2004):

1) the possibility to choose one or any number of variants (minimal request of completeness);
2) selection of all variants that the respondent considers as important (maximum request of completeness);
3) selection of up to *k* variants (limited request of completeness);
4) selection of a given number of responses (limited request of completeness);
5) selection with rank order answers (limited request of completeness);
6) without indicating the number and rank of responses chosen (indefinite request of completeness).

Conjunctive cafeteria makes it possible to learn the attitudes and opinions of respondents to a greater extent than disjunctive cafeteria but at the same time causes analytical problems. Most often categories in conjunctive cafeteria do not correspond to any measuring scale. In addition, these types of questions are very difficult to code, so it's not so easy to apply analytical methods. As Sagan (2004) indicates, in conjunctive questions the claim of completeness (maximum, minimum or limited) should be included, because only such a procedure facilitates the method of coding and analysing data. Few authors take up the issue of recommendations for the construction of conjunctive questions and how to analyse them. Sagan (2004) indicates that the cafeteria should not be longer than 6-8 variants, and in the case of long cafeterias he suggests dividing it into lists. Churchill (2002) points to another problem. Questions with multiple answers may be biased by the order in which they are given. Therefore, it is often recommended that the interviewer should rotate the answers to the question if it is possible. This solution is desirable when the answers to the question can be given with an indication of the hierarchy. First, the respondent indicates the most important variant and then the next. When indicating subsequent variants, they should be presented in a changed order.

To sum up, conjunctive cafeteria must be consciously introduced to the measuring instrument by the researcher due to difficulties in coding the answers, assigning answers to the measuring scale and choosing the method of analysis. Apanowicz (2002, p. 75) emphasizes that "the correct application of quantitative (statistical) methods requires an understanding of their essence, assumptions and limitations". In addition, two structural requirements for the construction of closed-ended questions should be noted (Babbie, 2013). The proposed categories should be completed and categories should be separable. If the first condition is not met, the semi-open question should be entered. Incorrect wording of the questions (in terms of technique and content) prevents the chance to obtain true answers and reliable data (Apanowicz, 2002).

In the analysis of the cafeteria, a data pre-processing stage is also necessary, i.e. data cleaning, integration, transformation, reduction (Han and Kamber, 2006). This action is focused on help to improve the quality of the data, increasing the precision and efficiency of the decision-making process.

Data used in the Analysis

To illustrate the problem of data collection and analysis based on conjunctive questions, data from the Standard Eurobarometer, 2018, autumn wave, were used (European Commission, 2018). Five questions were selected from the questionnaire. In addition, gender and country of residence were also taken into account. This was dictated by the implementation of the goal of the study, i.e. not only an indication of the method of analysis but also a method that will allow the analysis of data in connection with other variables and the recognition of errors made during the data collection process. The study retained the numbering of questions from the original questionnaire.

In the QA10 question, the respondents could choose any number of the most important answers from the 16 categories provided. So, this is an example of conjunctive cafeteria with a maximum request of completeness. The literal question is given below.

QA10: What does the EU mean to you personally?

1. Peace
2. Economic prosperity
3. Democracy
4. Social protection
5. Freedom to travel, study and work anywhere in the EU
6. Cultural diversity
7. Stronger say in the world
8. Euro
9. Unemployment
10. Bureaucracy
11. Waste of money
12. Loss of our cultural identity
13. More crime
14. Not enough control at external borders
15. Other
16. Don't Know

In the questions QA3a, QA4a, QA5, the respondents could only choose two answers from 16 (18) categories given. So this is an example of conjunctive cafeteria with limited request of completeness. The literal question is given below.

QA3a (QA4a, QA5): What do you think are the two most important issues facing (OUR COUNTRY) at the moment? (personally, European Union) (the same first six issues in all)?

	1.Crime 2.Economic situation 3.Rising prices\ inflation\ cost of living 4.Taxation 5.Unemployment 6.Terrorism	
QA3a – Country	QA4a – personally	QA5 – European Union
7.Housing 8.Government debt 9.Immigration 10.Health and social security 11.The education system 12.Pensions 13.The environment, climate and energy issues 14.Other 15.None 16.DK	7.Housing 8.The financial situation of your household 9.Immigration 10.Health and social security 11.The education system 12.The environment, climate and energy issues 13.Pensions 14.Working conditions 15.Living conditions 16.Other 17.None 18.DK	7.EU's influence in the world 8.The state of Member States' public finances 9.Immigration 10.Pensions 11.The environment 12.Energy supply 13.Climate change 14.Other 15.None 16.DK

In question QD4a (QD4b), respondents could choose from 11 (and 9 in the second place) given categories one most important, and then two categories of lower importance. So this is an example of a

combination of disjunctive cafeteria and conjunctive cafeteria with a limited request of completeness. The literal question is given below.

QD4a: Which of the following do you think is the most positive result of the EU? Firstly? (QD4b And then?)?

1. Peace among the Member States of the EU
2. The free movement of people, goods and services within the EU
3. The euro
4. Student exchange programmes such as ERASMUS
5. The Common Agricultural Policy
6. The economic power of the EU
7. The political and diplomatic influence of the EU in the rest of the world
8. The level of social welfare (healthcare, education, pensions) in the EU
9. Other
10. None
11. DK

The problem in question AQ10 was that the maximum number of choices that respondents could make was not known, so there were both single categories in the answers to the question or several categories. In the questions QA3a, QA4a, QA5, respondents should indicate two categories, but this condition was not met by many people and only one category appeared in the answer (of course, apart from those who indicated the answers None and Don't know, in this case two answers could not be expected). In question QD4a, respondents should indicate one most important category, and then indicate two other important categories. Unfortunately, the respondents in the second choice indicated either one or two categories.

Analysis in the case of conjunctive cafeteria with the possibility to indicate multiple answers or a maximum of *k* answers

In order to illustrate the possibility of analysing conjunctive cafeteria with a maximum or limited request of completeness, the answers given by the respondents to question QA10 were selected. Additionally, the variable was analysed in association with the gender.

Frequency calculation is most often used in analysing conjunctive questions. This can be done in two ways. The first refers to the number of respondents (*N*) and the second refers to the number of options selected by all respondents. Łobocki (1975) indicates that calculating the frequencies of answers for this type of question allows to indicate the hierarchy of these answers. The frequencies for each category in the first and second case, marked as p_i and p'_i, respectively, are calculated as follows:

$$p_i = \frac{n_i}{N} 100 \qquad (1)$$

$$p'_i = \frac{n_i}{\sum_{i=1}^{I} n_i} 100 \qquad (2)$$

where: *i* is the category number ($i = 1, \dots, I$); n_i – the number of *i*-th category choices *i*, *N* – the number of respondents, $\sum_{i=1}^{I} n_i$ – the number of all choices made by respondents (if maximum *k* categories can be selected, then $\sum_{i=1}^{I} n_i = kN$).

Table 1: The average, median and dominant number of chosen categories in total (T) and by men (M) and women (W)

	N	$\sum_{1=1}^{I} n_i$	*Average* *Median* *Dominant*
T	6289	22151	3.5 3

			2
W	2812	10205	3.63 2
M	3477	11946	3.43 2

Source: Own study based on European Commission (2018) data, using the IBM SPSS program.

In the analysed example, the respondents didn't have the indicated number of categories they should choose in response to the QA10 question. Frequencies for the categories are presented in Figure 1.

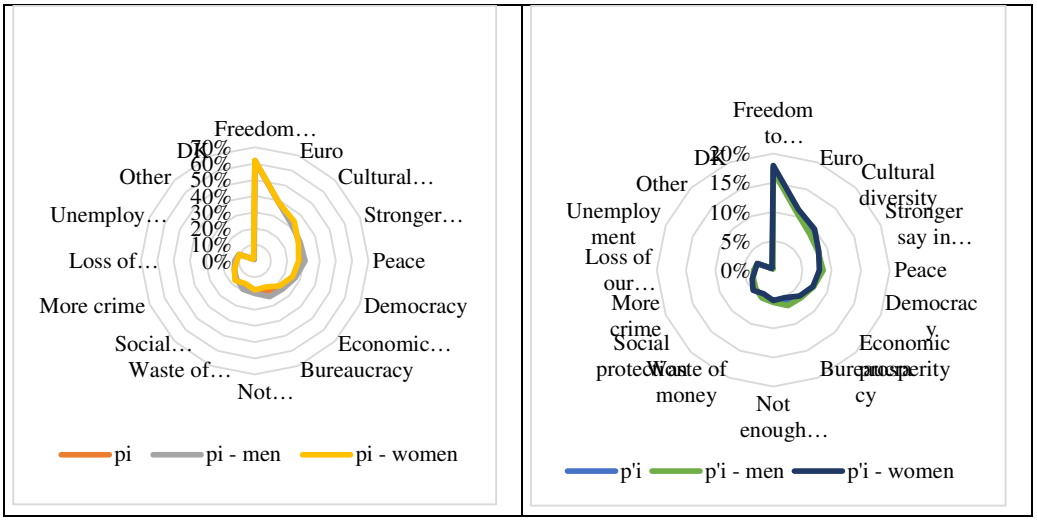

Fig. 1: Frequency of answers in QA10 question depending on the number of references, broken down by gender

Source: Own study based on European Commission (2018) data.

Based on the data presented in Table 1, it should be stated that women chose slightly more categories as answers to QA10 than men. However, choice of two categories dominated for men and women. Figure 1 shows the results of the calculated frequencies according to formulas (1) and (2). The calculation results can be presented in the table, however the graphic presentation shows in a more contrasted way, than tabular, the differences in the frequencies of choices made by women and men. Regardless how the frequencies of answer categories choices were calculated (p_i or p'_i), the importance of variants remains unchanged.

Table 2: Frequencies of choosing a specified number of categories

number of selected answers	number of respondents	*%N*
1	1093	17.4
2	1403	22.3
3	1144	18.2
4	907	14.4
5	633	10.1
6	462	7.3
7	284	4.5
8	185	2.9

9	86	1.4
10	48	0.8
11	20	0.3
12	10	0.2
13	5	0.1
14	7	0.1
15	2	0.0
Total	6289	100.0

Source: Own study based on European Commission (2018) data.

Table 2 presents the choices made by respondents, indicating how many of them chose only one, how many two, and how many fifteen categories. Respondents most often chose combinations of two or three categories or individual answers (Table 2). From the perspective of the recipient of the study results, it should be important to check the structure of these choices. The easiest way to check this is to select individual categories (Fig. 2).

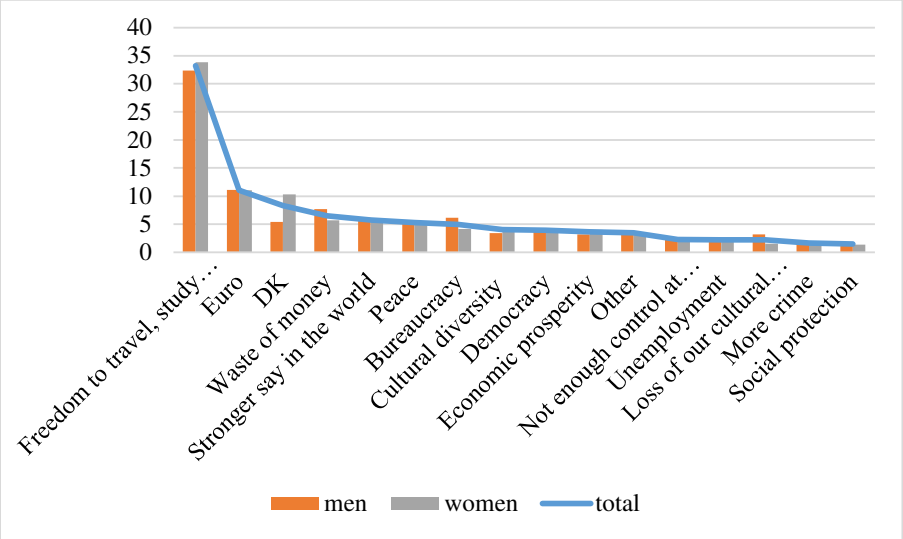

Fig. 2: Frequencies of choosing one category (%), broken down by gender

Source: Own study based on European Commission (2018) data.

The presentation of individual choices in comparison with the analysis of all choices made by all reviewers shows whether the categories most often chosen by all respondents coincide (have a strong position) with the choices made by respondents with very specific views. In the analysed cases, the categories most commonly chosen in determining the importance of the EU are freedom to travel, study and work anywhere in the EU, and a common currency. However, in the third place among the respondents who made a single choice is the Don't know answer. This category is last, taking into account all choices made by respondents (Figure 1).

According to the results presented in Table 2, respondents most often chose two categories. Table 3 presents the most common two-element links of the categories.

Table 3: Most common two-element links of the categories

categories in a pair		%N
Travel, study and work	Euro	9.2
Travel, study and work	Cultural diversity	8
Travel, study and work	Economic prosperity	5.6
Travel, study and work	Stronger say in the world	4.9
Travel, study and work	Peace	3.8
Travel, study and work	Democracy	3.3

Source: own study based on European Commission (2018) data, using the IBM SPSS program.

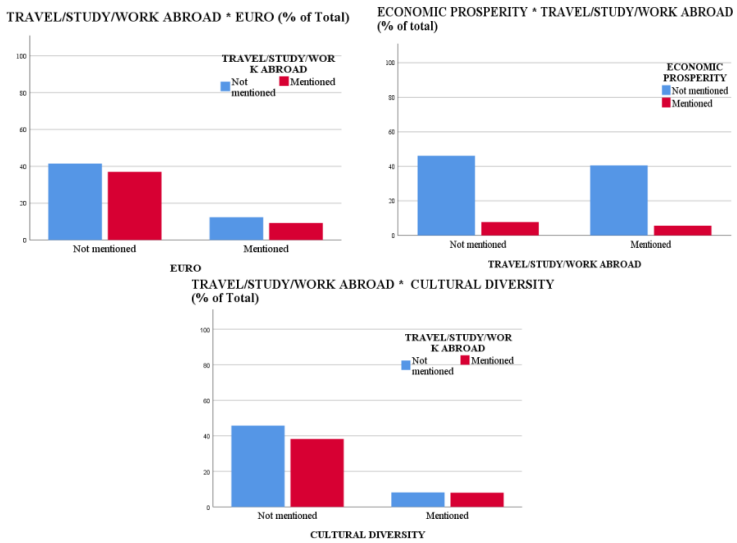

Fig. 3: Frequencies of choosing answers to QA10 in pairs variants
Source: Own study based on European Commission (2018) data, using the IBM SPSS program.

Figure 3 presents the frequencies of choices of respondents in two categories of responses. Although this group of respondents was the largest, the frequencies of the two categories are usually lower than the selection of only one category, or the lack of selection of both categories considered in pair.

Analysis of the frequencies of occurrences of subsequent multi-element combinations of categories presented in Table 2 is increasingly difficult and less readable. Therefore, an analytical method should be indicated that will allow clear presentation of choices made by respondents. To this end, it is possible to use correspondence analysis. This method enables to consider relationships between categories of many nominal or ordinal variables, taking into account the reduction of multidimensionality with the highest possible representation of the observed real relationships. An additional advantage of this method is the ability to graphically presentation the results of the analysis in a lower-dimensional space. This method is discussed in detail in Greenacre (1993), Blasius (2001), and in polish literature by Stanimir (2005). For this reason, the article does not focus on presenting a detailed algorithm used in this method, but only approximates how to prepare data.

In the case of analysis of two variables, in the correspondence analysis, a contingency table is constructed, thus determining the simultaneous number of occurrences of the two categories belonging to different variables. In the case of multi-variable analysis, a Burt matrix is constructed. It is a symmetrical block matrix: on the main diagonal there are diagonal matrices containing numbers of

occurrences of the categories of the following variables, and beyond the diagonal there are contingency tables of the pairs of variables.

If the answers to the questions are conjunctive cafeteria, it is not possible to use any of these approaches. In order to analyse these types of questions, the correspondence analysis should be carried out on the basis of an indicator matrix (for a detailed description of the structure of such a matrix, see Stanimir (2005)). An example of its construction is presented in Table 4.

Table 4: Example of indicator matrix

r. n.	Q10				Gender		Country		
	1	2	…	14	W	M	EU15	EU 2004	EU 2007
1	1	0	…	0	1	0	1	0	1
2	0	0	…	1	1	0	0	1	0
3	1	1	…	1	0	1	0	0	0
4	1	1	…	0	0	1	1	0	0

Source: Own elaboration.

Table 4 presents the situation for four respondents (respondent number – *r.n.*). If the respondent has chosen the category of a specific variable, then 1 appears in the row in the appropriate column. The correspondence analysis of such a matrix is carried out according to the classical approach, i.e. as for the contingency table, using the singular matrix decomposition. The full space for analysing the relationships of the variable categories is *K*-dimensional: $K = \min(r-1; c-1)$, where r is the number of rows, c is the number of columns. In the conducted analysis, three variables were taken into account, with the variable *Q10* having 14 categories (the Other and Don't know answers were not taken into account), gender – two, and the country – three categories (EU15 – countries of the original EU, EU2004 – countries that joined the EU in 2004, EU2007 – countries that joined in 2007 and later). Thus, the full space for projecting relationships between categories of variables is eighteen-dimensional ($K = 19 - 1 = 18$). In assessing the quality of display of categories relationships in the low dimension the Cattel test is very often used. It presents eigenvalues in non-ascending order. In the analysed example (Fig. 4), the graph flattens among the highest eigenvalues twice: for the second and sixth eigenvalues. Therefore, the presentation can be made in two- and six-dimensional space. In the first case, 22% of information about relationships of variable categories will be retained, and graphical presentation of these relationships will be possible (Fig. 5). In the second case, however, the quality of the presentation will be 52%. Graphic presentation is not possible, and the co-occurrences of variable categories are indicated using a hierarchical classification based on projection coordinates of points illustrating the categories of variables in space R^6. After applying the Ward classification, five classes of variable categories relationships were indicated (the Silhouette Index was 0.65, indicating an important structure of classes). The first class contain the positive aspects of EU membership (Peace, Economic prosperity, Democracy, Social protection, Freedom to travel, study and work anywhere in the EU, Cultural diversity, Stronger say in the world, Euro), which are important for both women and men and residents of the EU15. The second group include Unemployment and Bureaucracy. In the third there are attributes such as Waste of money, Loss of our cultural identity, More crime, Not enough control at external borders. In fourth group are residents of the countries which participate in EU since 2004. In the last group are residents of the countries that joined the EU at the latest. Analysing the average coordinate values in these classes, it cannot be indicated that any of these classes in space R^6 are similar to each other.

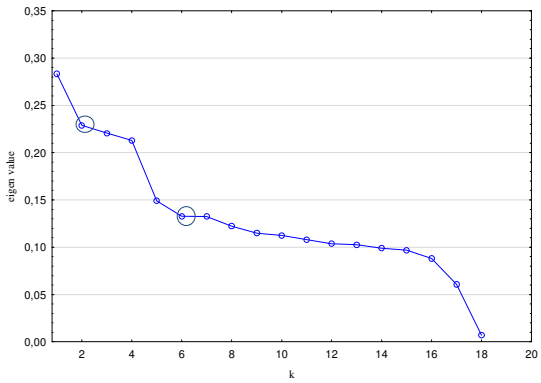

Fig. 4: Eigenvalues – Cattel test

Source: Own study based on European Commission (2018) data, using the Statistica program.

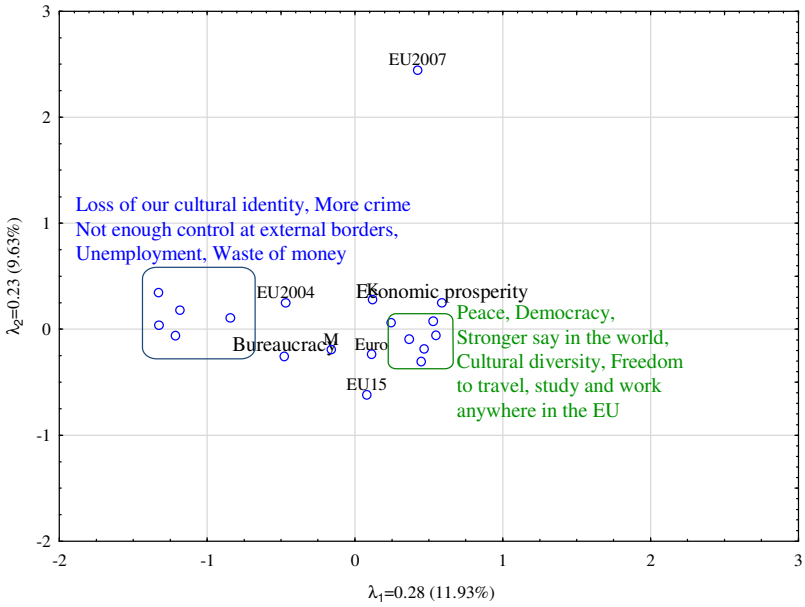

Fig. 5: The result of correspondence analysis in two-dimensional space

Source: Own study based on European Commission (2018) data, using the Statistica program.

The result of correspondence analysis presented in R^2 (Fig. 5) largely coincides with the result obtained after taking into account the coordinates in R^6. Here, too, the positive categories are located at a considerable distance from the negative categories. Positive categories characterize the inhabitants of EU15 more than other countries, and negative categories are most characteristic for EU2004. The views of the resident of EU2007 are undefined.

Analysis of answers to conjunctive cafeteria questions with the option of indicating *k* answers

To illustrate this problem, the answers to questions AQ3a, QA4a, QA5 were used. Respondents could choose two answers in each question. The questions contain very similar sets of answers. The authors of these questions could divide them so that the implementation of the same issues could be assessed by respondents in three areas. Interviewers gathering answers to questions, allowed respondents to make a mistake during answering. Some of them chose only one answer (Table 5).

Table 5: Frequencies of questions answering AQ3a, QA4a, QA5 (%)

	QA3a	QA4a	QA5
one category selection	7.5	21.3	21.3
two categories selection	92.5	78.7	78.7

Source: Own study based on European Commission (2018) data.

In this situation, the analysis can be performed by calculating the frequencies in accordance with formulas (1) and (2), indicating $k = 2$. The result obtained for the question QA3a is presented in Table 6. One category selection

Table 6: Frequencies of categories choices to QA3a (%) and number of respondents choosing categories (n_i)

	n_i	p_i	p'_i $k = 2$	p'_i	missed opportunities
qa3a.1	596	9	5	5	0.19
qa3a.2	1132	18	9	9	0.35
qa3a.3	1701	27	14	14	0.53
qa3a.4	670	11	5	6	0.21
qa3a.5	1427	23	11	12	0.44
qa3a.6	299	5	2	2	0.09
qa3a.7	831	13	7	7	0.26
qa3a.8	596	9	5	5	0.19
qa3a.9	1051	17	8	9	0.33
qa3a.10	1402	22	11	12	0.44
qa3a.11	780	12	6	6	0.24
qa3a.12	627	10	5	5	0.20
qa3a.13	807	13	6	7	0.25
qa3a.14	120	2	1	1	0.04
qa3a.15	17	0	0	0	
qa3a.16	48	1	0	0	

Source: Own study based on European Commission (2018) data.

Table 6 in the missed opportunities column indicates the differences in percentage points between the results obtained by assuming *k*=2 in formula (2) and without making that assumption in formula (2). This is an error of measurement made during data collection. Of course, the amount of missed opportunities cannot be calculated for categories: None and Don't know.

In analysing questions with a conjunctive cafeteria with a limited request of completeness, the analysis of correspondence is helpful. Again, it should be preceded by the preparation of data according to the example shown in Table 4.

In Figures 6-8, it can be seen that the quality of display in R^2 of the real relations of categories slightly exceeds 12%. In such a situation, it should be used again the Cattel test, determine the best projection space and classify the categories of variables based on coordinates. However, significant differences in the perception of individual problems of respondents, problems of the country and EU problems are already visible in the R^2 space. Also in this analysis, variables for groups of member countries and

gender were introduced. If only one criterion is selected (Fig. 8) in each of the three questions, the points illustrating the categories of most answers are located very close to the projection centre, which means that they do not significantly differentiate the analysed respondents' groups.

Figures 6 and 7 show a greater diversification of respondent characteristics. The location of the points is very similar, which means that the general perception of Europeans of the analysed questions categories is not significantly affected by assessments made not in accordance with the rule of choosing a specific number of answers set out in the questions. Figures 6 and 7 show interesting assessments made by respondents, e.g. points depicting unemployment as a personal situation, the national problem and the EU problem are located close to each other, similarly the economic situation and price increase/inflation, cost of living.

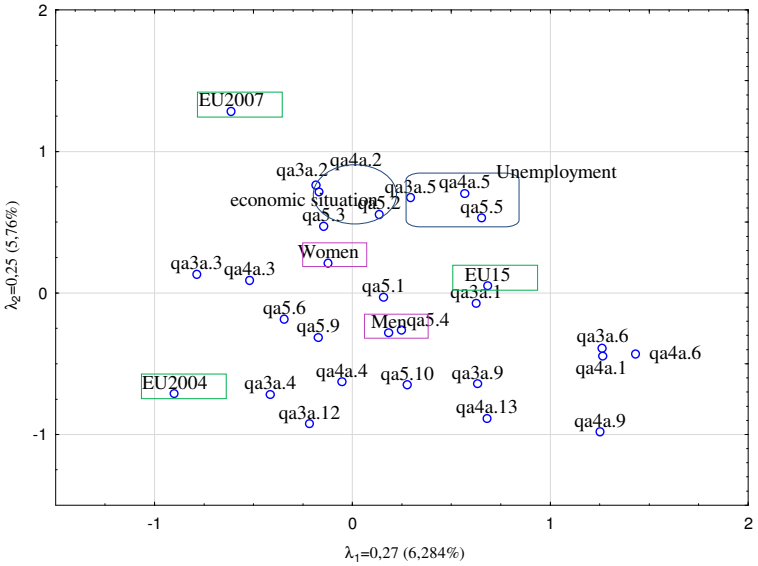

Fig. 6: Result of the correspondence analysis of questions QA3a, QA4a, QA5 in two-dimensional space – analysis of all choices made by respondents

Source: Own study based on European Commission (2018) data, using the Statistica program.

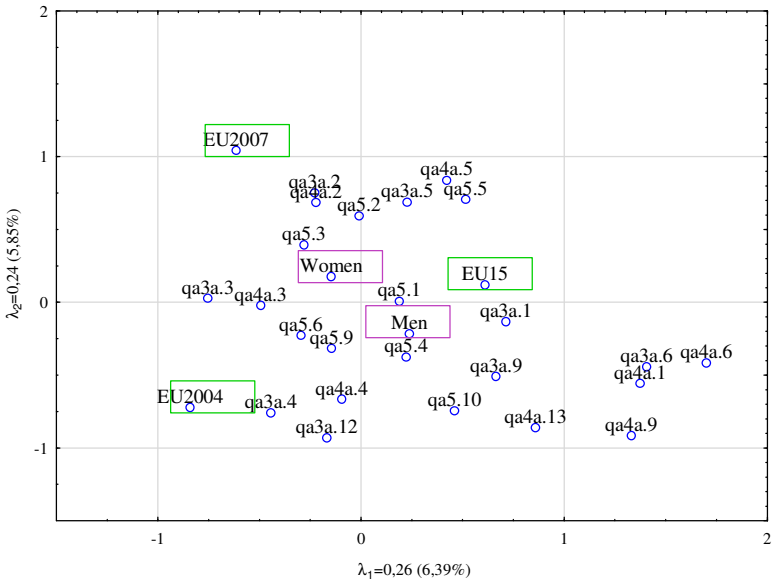

Fig. 7: Result of the correspondence analysis of questions QA3a, QA4a, QA5 in two-dimensional space – exactly two categories chosen by respondents

Source: Own study based on European Commission (2018) data, using the Statistica program.

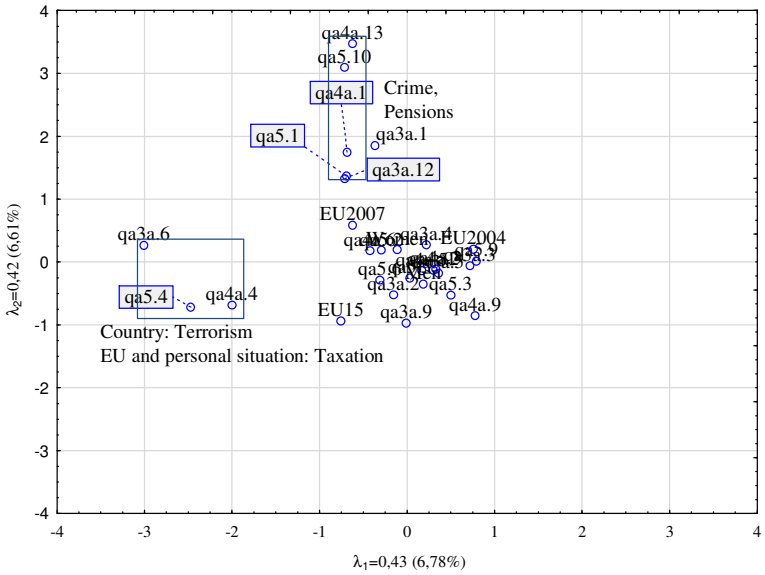

Fig. 8: Result of the correspondence analysis of questions QA3a, QA4a, QA5 in two-dimensional space – only one category chosen by respondents

Source: Own study based on European Commission (2018) data, using the Statistica program.

Analysis of answers to conjunctive questions with the rank order answers

The analysis of the next problem used the answers of the respondents to the QD4a question. First, they pointed out the most important effect of EU membership. Then they gave two of the other variants, which were coded as QD4b question. The choices made first by the respondents are shown in Table 7.

Table 7: Frequencies of QD4a categories selections (%) and number of respondents who chose the categories

	n_i	p_i
QD4.1	1513	24.1
QD4.2	2171	34.5
QD4.3	598	9.5
QD4.4	527	8.4
QD4.5	135	2.1
QD4.6	406	6.5
QD4.7	280	4.5
QD4.8	358	5.7
QD4.9	60	1.0
QD4.10	135	2.1
QD4.11	106	1.7
QD4.12	6289	100.0

Source: Own study based on European Commission (2018) data.

Table 8 presents the significant effects of EU membership selected by respondents in the second place.

Table 8. Frequencies of QD4b categories selected in the second place (%) and number of respondents choosing categories (n_i)

number of categories selected in second place	n_i	%
1	2104	34.8
2	3944	65.2
Total	6048	100.0

Source: Own study based on European Commission (2018) data.

In the second turn the indication of the effects of EU membership was not followed by those who chose firstly the None and Don't know. Approximately one -third of respondents chose only one category in the second turn.

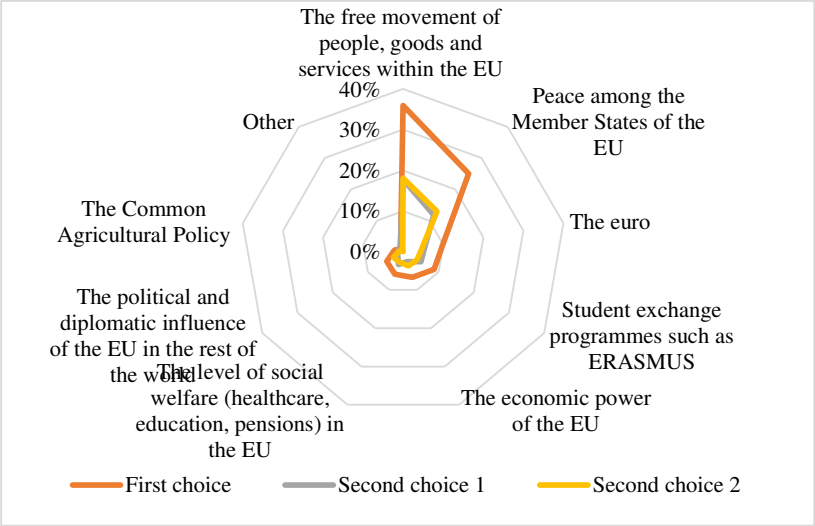

Fig. 9: Frequencies of categories choices by respondents: the most important and subsequent ones

Source: Own study based on European Commission (2018) data.

In Figure 9 *Second choice 1* means that one category was selected in the second order, *Second choice 2* – two categories were selected in the second place.

Based on Figure 9, it should be stated that the validity of the two effects of EU policy, i.e. the Free movement of people, goods and services, and Peace among countries, significantly exceeds the importance of the other categories, regardless of the order in which they were chosen.

For a group of people who chose only one category in the second selection, it is possible to perform an analysis using a parallel coordinates chart (parallel plot). These charts are created based on the frequencies of the number of respondents making categories selections in subsequent variables. In this analysis, it is important to indicate the order of variables in tracking subsequent categories choices made by respondents due to subsequent variables. Figure 10 contains parallel coordinates determined for four variables, in order of: group of countries (1 – EU15, 2 – EU2004 without Poland, 3 – EU2007, 4 – Poland), D10 – gender (1 – male, 2 – female), QD4a – the most important effect of membership in the EU (without None and Don't know), QD4b – the second most important result of EU membership.

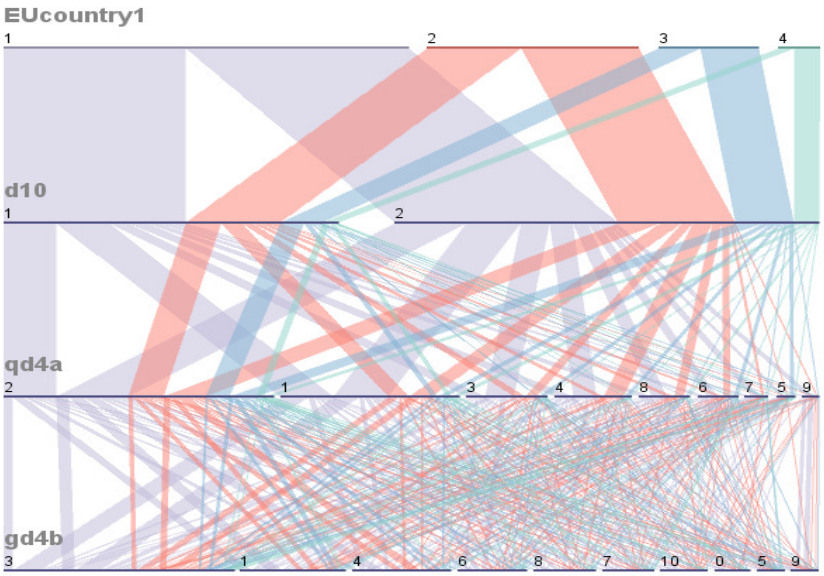

Fig. 10: Parallel plot for four groups of countries, gender and variables QD4a, QD4b – only one category selected in the second order

Source: Own study based on European Commission (2018) data, using the Parallel Sets V2.1 program.

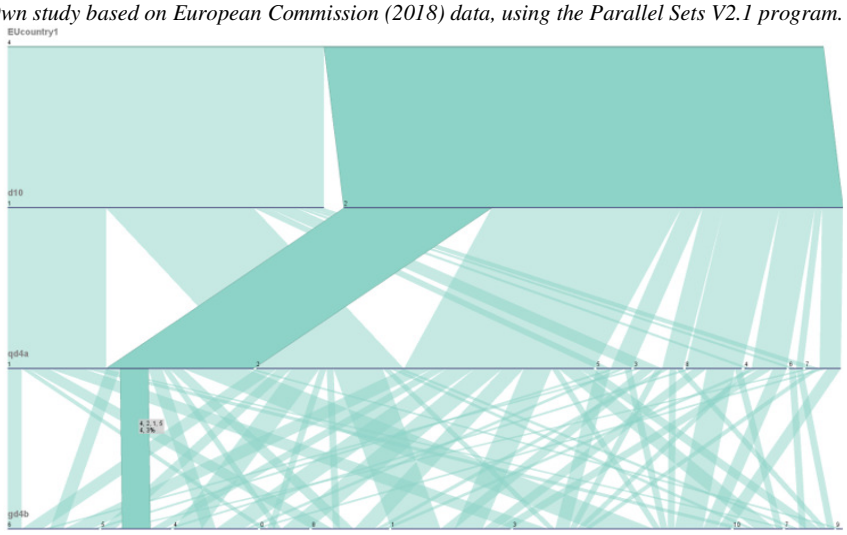

Fig. 11: Parallel plot for Poland by gender and variables QD4a, QD4b – only one category selected in the second order

Source: Own study based on European Commission (2018) data, using the Parallel Sets V2.1 program.

In Figures 10 and 11, the path from top to bottom must be traced. In Figure 10, the first variable dividing the sample is a group of countries, then gender, an indication of the first most important effect of EU membership and finally an indication of the second most important effect of EU membership. In the EU15 group, women first indicated Peace among the Member States of the EU and then the Euro, while men first chose Free movement of people, goods and services within the EU and secondly, with the same frequency, Peace among the Member States of the EU and then the Euro.

Women and men from the countries that joined the EU in 2004 indicated the Free movement of people, goods and services within the EU as the most important effect of the EU and then Student exchange programs such as ERASMUS. The first choice of women and men from the countries that joined the EU at the latest was Free movement of people, goods and services within the EU and then Peace among the Member States of the EU.

The choices of Poles presented in Figure 11 are similar to those of EU15 residents. They are shaped as follows: women first indicate Peace among the Member States of the EU and then the Euro, while men first Free movement of people, goods and services within the EU and secondly Peace among the Member States of the EU.

It is important for the study how the answers given by the respondents were shaped at all. For this purpose, the correspondence analysis may be used again (observations should be written as an indicator matrix). Figure 12 shows the configuration of the points which present categories of answers to the questions QD4A and QD4b.

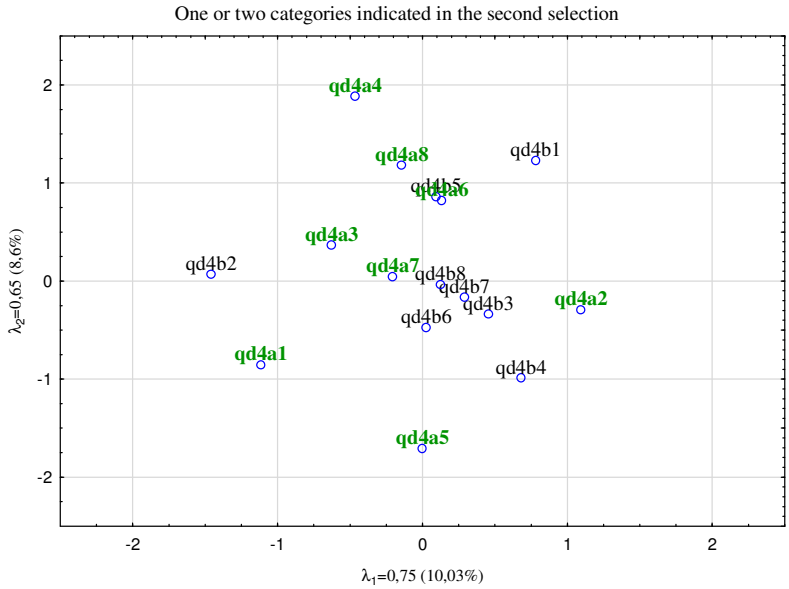

Fig. 12: The result of the correspondence analysis of QD4a and QD4b questions in two-dimensional space

Source: Own study based on European Commission (2018) data, using the Statistica program.

Figure 12 shows the effects of EU membership selected as the most important (in green), followed by the chosen in the second turn (the black ones). It can be seen that the farthest from the projection centre are the points depicting in the first and second choice the Peace among the Member States of the EU, the Free movement of people, goods and services within the EU and Student exchange programs such as ERASMUS. These are the categories of variables that most affect the indication of relationships between response options. Points showing the same effects but selected in the first and second place cannot be located close to each other. Analysing the proximity of the location of the categories chosen in the first and second place can be concluded as, e.g.

- first choice of Peace among the Member States of the EU implies the second choice of Free movement of people, goods and services within the EU;
- indication of the EU's economic power as the most important effect of the EU is associated with the indication next of the Common Agricultural Policy.

Conclusions

In accordance with the postulate of Apanowicz (2002), the study (the results of which were presented in the article) was aimed at using analytical methods to present the scientific problem as accurately as possible. The conducted activities presented a way of analysing questions with conjunctive cafeteria.
The presented analysis techniques and methods of interpreting the results indicate the usefulness of these methods. They give the opportunity to analyse conjunctive cafeteria questions not only when

respondents correctly answer the questions asked, but also when they act differently than the author of the question assumed. To sum up the problems met during the analysis of selected questions from the Standard Eurobarometer survey should be divided into two groups: regarding respondents and authors of questions.

Questions should be constructed in such a way, that analysis and deduction on ground used methods will give the possibility to:

- recognize the difficulties that comes from a measurement instrument with conjunctive cafeteria;
- adapt the structure of questions to the skills and time to be devoted to analysis (the aspect of time is also discussed in Apanowicz (2002));
- in the analysis do not ignore answers that do not meet the assumptions as e.g. in questions QA3a, QA4a and QA5;
- do not create too complex cafeterias, because the respondents can evasively answer the questions or avoid answers.

The problem of respondent group is as in the Standard Eurobarometer. It is a panel survey and respondents consciously decide to answer, so they should indicate the answers in accordance with the instructions in the questionnaire.

For some conjunctive cafeteria questions, creating blocks or lists so that the number of answers is not too high, should also be considered. For example, in questions QA3a, QA4a and QA5 it was possible to carry out the study in a way that was more interesting for both the respondents and author, and predict the possibilities of further analysis. It was possible to create one list of factors compared in three areas (personal, national and EU) and the rest of the answers contained in the original wording of the questions should be included in subsequent lists.

The construction of cafeteria questions with the possibility of ranking a certain number of answers is very interesting. Such questions with multiple answers give the opportunity to use both correspondence analysis, parallel charts but also basket analysis.

It should also be remembered that preparing data for the proposed analysis is very complicated and time-consuming.

Finally, we would like to note that the own contribution is indication of useful set of methods for analysing multiple choice questions, a detailed presentation of the proposed methods, an indication of how to prepare data for analysis and the correct way of inference. We've thoroughly analysed and systematized the cafeterias definitions. We've pointed out possible mistakes that can be caused by improper use of cafeteria questions.

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Current Trends in Marketing Communication of Small, Medium and Family Businesses

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Abstract

Small and medium-sized enterprises and family businesses are an important element of any prosperous economy. The Slovak economy is made up of up to 90% of small and medium-sized enterprises. The content of the paper is to define family businesses and their usage of marketing. Small and medium-sized enterprises also include family enterprises, which are not defined in Slovak legislation. The paper emphasizes the importance of using marketing communication in family businesses, especially in the current turbulent competitive environment. The use of marketing theory in the process offering products to customers also plays an important role. In particular, family businesses in the early stages of business must apply elements of effective marketing communication. The aim of the paper is to emphasize and point out the importance of applying marketing theory in small and medium-sized enterprises and especially family businesses. The importance of the paper consists on the characteristics of the already used tools of marketing communication in family businesses.

Keywords: Family Businesses, Marketing, Small and Medium-Sized Enterprises

Introduction

The first significant steps in the development of business in our territory were made in the 17th century, when the position of crafts in the world economy was significantly strengthened. In order to produce more efficiently and to save energy, in the 19th century, the production was transferred to manufacturing, crafts are completely repealed by Industrial law. In 1930, Slovakia had more than 98,000 trades, employing more than 322,000 employees (Nosková, 2019). Most of them were manufacturing trades. Trade, financial intermediation and insurance accounted for 43.6% of trade, transport trades 2.7%, culture and sports activities 0.5% and health care 22.2%. After World War II, companies were gradually nationalized and, in 1965, the Trade law ceased to exist with the publication of the act. No. 65/1965 Col. Labor Code (Pawera and Jančíková, 2017). It was only in 1989, after the fall of socialism that in Czechoslovakia the directive-oriented economy was reoriented to the market economy. This step required a change in relationships and, in particular, new rules for economic life. As part of these changes, it was also necessary to create conditions for the functioning of small and medium-sized enterprises, which was implemented by the adopted Act on Small Business. According to Mura et al. (2019), over the years, there has been a high expansion of small and medium-sized enterprises created to fill the slits on the market. While the directive-created and more-favored giants

were still declining, the development of small and medium-sized enterprises was evident by a multiple increase in the number of small and medium-sized enterprises between 1988 and the present.

The Aim of The Paper and Methodology

The aim of the paper is to emphasize and point out the importance of applying marketing theory in small and medium-sized and especially family businesses. The importance of the paper lies in the characteristics of the already used tools of marketing communication in family businesses.

We want to achieve the selected goals mainly by means of legislation and scientific literature. Based on our research, we also want to fill the gap in family business. From the scientific methods of knowledge we used the analytical method to analyze the legal status and regulation. Based on the scientific knowledge of valid and effective legal and legal sciences we used in some parts of the work synthesis, deduction and doctrinal interpretation.

Small and medium enterprise, development and significance, European Charter and initiative

The importance of SMEs in the Slovak Republic is beginning to be considered more importantly after 1990 in connection with privatization and transformation of the economy. The rapid development of small and medium-sized enterprises in our conditions was recorded in 1991/1992, and their genesis was conditioned by several facts (Dolodac et al. 2016). We can mention some of them:

- the gradual break-up of large state-owned enterprises in the first wave of large-scale privatization and the emergence of more SMEs;
- return of property to citizens within the framework of the restitution,
- liberalization of trade relations and the emergence of more SMEs with foreign equity participation;
- motivation to start a micro business (Rentkova and Panevski, 2017).

The particularities of the development of SMEs in Slovak conditions are also different in the way that small enterprises are created mainly by the progressive process of creation and growth of private ownership, while medium-sized enterprises are often created as a result of a decrease in the number of structural changes of state enterprises (Mucha et al., 2019). Recently, they have also been created as a result of a qualitative transfer of sole traders as natural persons among entrepreneurs registered in the Commercial Register, or the transformation into commercial companies (Močarníková et al. 2018. This is often the result of efforts to expand their activities.

Economic theory (Kljucnikov et al. 2019) confers several functions on small and medium-sized enterprises. SMEs are characterized by the possibility of increasing employment and SMEs act as a source of job creation. SMEs provide numerous employment opportunities, thus also solving social problems. They make it possible to use local labor resources or employ people with reduced working capacity. According to Havierniková et al. (2017), the importance of SMEs is reflected in flexibility. The importance of SMEs can also be seen in building personal relationships with customers, suppliers, employees - they have immediate and constant contact with individual partners, what is a great marketing advantage. Peráček (2019) claims that, SMEs have simple management structures and do not use bureaucratic management practices, making it more flexible inside and outside the company. They have the prerequisites for flexibly responding to demand fluctuations (Mucha, 2019). Finally SMEs are independent. Their owners have great freedom, which supports their motivation.

Attention to small and medium - sized entrepreneurs in Slovakia began to be paid after 1971, when the Bolton Report was created, which defined SMEs in general, with the following features:

1) SMEs have a relatively small market share and practically cannot have any significant effect on the market in any way;

2) SMEs are managed by owners, entrepreneurs, families, owners or co-owners, and not indirectly through a formal management structure;

3) SMEs are independent enterprises, not part of another larger enterprise (Olšovská et al. 2016).

The viability of SMEs has steadily increased, and SMEs have been credited with significant characteristics, given that they have become the most powerful engine of any market economy by their flexibility (Mucha et al. 2018). This is evidenced by the fact that in Europe the majority of all enterprises are small and medium-sized enterprises, employing more than half of the total working population. Their share in gross domestic product formation is also significant, reaching between 50% and 70% in different countries. They have the same meaning in the Slovak economy as in the European economy. According to Duľová Spišáková et al. (2017), the characteristics, SMEs can be defined on the basis of quantitative characteristics as well as on the basis of qualitative characteristics. In quantitative terms, the concept of small and medium-sized enterprises encompasses all sectors unless they exceed a certain size. Size is measured by the number of employees. Statistical determination of the size of a company raises problems, so a suitable size indicator is discussed.

Within individual countries, a greater number of indicators have been defined for example size of profit, investments, individual types of capital, market share, production volume (Mucha et al. 2019). In practice, it is pointed out that, with the same number of employees, sales in the same sector may fluctuate considerably in individual companies. This may be due to differences in the order structure, but also to the quality of management, the size of capacities, capital and wage demands, or labor productivity. These differences will be even greater if they are classified according to different sectors (Koslakova et al. 2015). Over time, the number of employees began to be used as an indicator for the division of SMEs by size as well as for simplicity and compatibility. For practical reasons, the size of sales began to be used as a characteristic. In 1996, the European Union unified quantitative criteria for determining the size of small and medium-sized enterprises and defined them uniformly. As a quantitative upper limit, small and medium enterprises have less than 250 employees, annual turnover of up to 40 million EUR, may have a balance sheet of not more than EUR 27 million (Mittelman et al., 2016).

Within this classification they began to distinguish between the smallest or micro enterprises (1 to 9 employees), small businesses (10 to 49 employees), medium-sized enterprises (50 to 249 employees), large enterprises (more than 250 employees). Neither were these quantitative criteria definitive (Milošovičová et al., 2018). The definitions by quality characteristics are based on an explanation of the nature of the characteristics of SMEs. Small and medium-sized enterprises are the most important element of national economies.

- SMEs are highly adaptable to the marketing requirements of the market and especially to demand,
- SMEs have an innovative function,
- SMEs satisfy even the most demanding customer requirements, marketing strategy is applied,
- SMEs create new jobs and thus have a significant impact on employment developments. They are credited with many other positive characteristics.

According to Benesova et al. (2018) the particularities of the development of SMEs in our conditions are different in that small enterprises are created mainly by the progressive process of creation and growth of private ownership, while medium-sized enterprises are often created as a result of a decrease in the number and structural changes of state enterprises. Recently, they have also been created as a result of a qualitative transfer of sole traders as natural persons registered as entrepreneurs in the Commercial Register, or by transformation into companies. This is often the result of efforts to expand their activities. The development of SMEs is also related to the fact that increasing sales of consumer goods and services can be achieved by SMEs without major investments. In addition, they can exploit local sources of raw materials as well as large-scale waste (Mucha, 2019).

Marketing in small and medium enterprise and family businesses

According to Peráček et al. (2019), marketing is more than any area of business based on customer relationships. Creating customer value and satisfying customers and their needs and wishes is the real foundation of modern marketing thinking and practice. The goal of marketing is also to find new customers with the promise of gaining added value and retaining existing customers by satisfying their needs and at the same time generating profit (Srebalová et al. 2019). Customer satisfaction depends on the extent to which their desire or expectation is fulfilled. Successful businesses strive not only to meet customer expectations, but also to be pleasantly surprised. They also want the customer to be faithful to the business and repeat their purchase. In a marketing campaign, prudent businesses promise only what they can do. So that the customer is not disappointed. Vilčeková et al. (2018) does that, the customer expectations are based on previous experience with the business and its products, on the opinions of their friends, on the information of marketing specialists, competitors and their promises. It depends very much on how the customer's expectations are met by the company's products. If it is not possible, the company may lose the customer as well as potential customers. The quality of the product has an important place at the customer as well for Slovak people (Kubickova et al. 2018).

Quality also has a direct impact on product performance. It is closely connected with the customer and their expectations. Especially family businesses expect the customer to be of higher quality than non-family businesses (Nosková et al. 2017). The definition of quality is based on the assertion that the quality of the product starts with the customer's needs and ends with his satisfaction. The ultimate goal of all the current effort for absolute quality is to fully satisfy the customer's needs and wishes. In a broader marketing concept, a transaction is also relationship marketing between customers or business partners when certain conditions are set. In addition to short-term or one-off transactions, marketing specialists also need to establish long-term relationships with important customers, distributors, dealers, suppliers (Nosková and Peráček, 2019). They strive to establish strong economic and social ties through the promise of delivering high quality products at affordable prices. In addition to trying to win new customers and enter into individual transactions with them, the goal is also to win customers and enable them to grow with the business. To start a good relationship, the customer can provide exceptional added value. Marketing can be defined as a social and managerial process through which the needs of individuals and groups are met. The endeavor of the enterprise is a product. The product may be goods or services. The product is the result of an enterprise trying to produce something that will satisfy the customer. It can also be as follows: information, idea and experience.

For family businesses, the product is also added to the product. Added value, which can be as follows: tradition that delivers higher quality, family know-how, claim security and references of family members (eg advertising of the Austrian family business Rauch).

Everyone knows world-famous brands such as Monini, William Grant and Sons, Dr. Oetker Deichmann, Llyold, Raymond Weil, Tissot, Swarovski, Ford, Heinz, Lewis, Hilton, IKEA, Bata, Ferrero, Versace, Rauch and many others. They are family businesses, which have become widely known mainly because they have survived politically and economically for several generations, and have influenced both local and global markets significantly by operation and innovation. In many cases, they have entered history forever not only for business success, but often also for significant political and social influence (Majerčáková et al. 2016; Gahér et al. 2019). Many German family businesses have so far been confronted with their political past. It is not only for these reasons that family business deserves more attention. In particular, national governments should promote, through appropriate instruments, the creation of new and maintenance of existing family businesses and their sustainable development conditional on further education, a favorable business environment and available expert advice and tutoring. Supporting local small and medium-sized businesses has undeniable advantages for all interested groups, and the state will undoubtedly pay off (Adamišin et al., 2018). The economy is built by people who live in that country. Here they pay taxes, create jobs and build value. Regions are developing significantly, saving resources for various social programs, increasing the purchasing power of a wider population and, undoubtedly, education. There is a shrinking group of people out of work and hence crime. Not to mention the long-term sustainable development, the stability of the business environment and the loyalty of companies to their own country. After all, running a trade does

not necessarily mean a huge profit, but in many cases only an adequate amount of resources for a dignified and peaceful life. With reasonable state support, family businesses will not pack and leave when the tax holiday period expires or labor costs no longer create a competitive advantage (Koscielnak et al., 2017).

Marketing features of family enterprises, in general

In general, the marketing features of family businesses include product packaging as the main marketing support tool for sales. In addition to product protection, it has other features. Family businesses use it as a marketing tool. As reported by Benda-Prokeinova et al. (2017), as a general rule, shall place on the packaging:

- Handwritten signature of the founder of the family business (Monini, William Grant and Sons, Dr. Oetker)
- Year of incorporation (e.g. Seit / Since 1820) - the older the date, the more product quality and proficiency in production,
- Photograph of the founder or family members
- Family business logo - which has a long tradition.

Accordind to Petru et al. (2019) marketing in the period of development of internet and social networks. As a result of new technologies, businesses are undergoing vigorous changes. The Internet and social networking are bringing fundamental changes in relationships with customers or potential customers. New customer thinking also brings new changes in marketing communications. There are ongoing discussions about how much the Internet, for example, in-store sales will affect whether it will exist or not.

Marketing in small and medium-sized and family businesses

Many businesses use e-marketing to promote their products. Promoting sales via facebook, YouTube and Instagram or online sales is very popular (Grancay et al., 2015). Many businesses combine these marketing tools. Family businesses use selected tools to enhance their image and encourage the sale of their products:

1. facebook - appropriate response of the public and customers,
2. YouTube - advertising by family members,
3. own website - e.g. Dajana Rodriquez,
4. online advertising - banners,
5. television advertising.

Small and medium-sized enterprises as well as family businesses use a great deal of money for online advertising. Overall, the use of these tools can be called e-marketing, whose technological development is growing rapidly (Lazíková and Števček, 2012). New technologies have no limits, and the business can literally win customers from the other side of the globe. E-commerce is beneficial for both parties. It provides the buyer with convenience and privacy when buying and offers easier access to products and a wider choice (Kočišová et al. 2018; Anyim et al. 2018). Also, a wide range of information as well as a quick comparison of products, not just the company. According to Tomčík and Rosenlacher (2018) e-commerce is interactive, the customer has more control over the purchasing process. For the seller it is a powerful tool for creating customer relationships. Sales speed and efficiency are increased, and sales costs are reduced. It also provides greater flexibility and access to global markets.

Conclusion

This paper has a valuable contribution as it shows how the small and medium enterprises and family businesses use marketing theory in practice. With the development of the business process in Slovakia, the competitive environment is growing and businesses have to be distinguished from others. For this purpose, it is marketing and marketing communication. The use of marketing theory in practice is particularly important in family businesses, where they urgently need to use appropriate marketing communications when selling their products. Properly selected marketing communication tools can greatly help businesses to increase sales. Also in family businesses, customer satisfaction with their products is important, followed by the quality of the product and the subsequent customer loyalty to the products of the company.

The results of the research about family entrepreneurs in Slovak republic showed that the family companies at Slovak republic do not have a separate marketing department for financial reasons. All marketing activities are carried out by the owner himself and they often have no marketing theoretical basis. The solution is to focus on the existing foreign family businesses. However, at present, the economy is progressing and the market and customers have started to search for products of family businesses and it is a chance for these types of businesses to promote their product through various marketing communication tools.

Within the years 2018 and 2020 a marketing survey for family businesses was carried out at Slovak republic in cooperation with the EUBA Faculty of Business and Faculty of Management - Comenius University. These results are also based on this article. Scientific methods:

A questionnaire survey was carried out on a sample of 128 family businesses in Slovakia, including small and medium-sized enterprises, since the term family business is not defined in legislative. Publishing activity on marketing in family businesses is not almost generally developed, because it is still a new and unexplored form of entrepreneurship. The author of this article was the first author of the book Marketing in small, medium and family business in Slovak republic. Questions in the questionnaire were also open to multiple choice, focused on san and the use of marketing in family businesses in Slovakia. In Slovakia we do not have publishing activities related to family business, so we have taken all recommendations from foreign family businesses.

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Shaping Polish Economic Development By 2020 In the Light of New Structural Economics Assumptions

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Abstract

In this following paper, the author presents a review of composing contentions of New Structural Economics and a comparison with Polish *Strategy for the Responsible Development by 2020 (with 2030 perspective).* New Structural Economics is a modern economic development doctrine, which combines the postulates of neoclassical and structural economics. This theoretical model accentuate the importance of the role of public institutions in reshaping industries and turning hidden comparative advantages into competitive advantages. This paper aims to identify respective NSE assumptions in the most up to date Polish strategy of development. The discussed controversial strategy SRD 2020/2030 is supposed to make a significant contribution to Polish economic and social development as well as set priorities for public institutions for the coming years. The author, by using an analysis and criticism of available publications, literature and relevant statistical data reviews *Strategy for the Responsible Development,* evaluate its objectives and presents achievements in implementation of 'flag projects' over the period 2017-2019 with appropriate criticism.

Keywords

development, Poland, strategy, new structural economics

Introduction

"(…) New Structural Economics may be described as a new economic doctrine which points out the traps faced by developing countries as they gradually approach the status of developed countries. Even more importantly, NSE indicates solutions and methods enabling middle-income countries to overcome the difficulties inherent in this specific stage of growth and to really catch up with the wealthiest countries. Polish response to that doctrine is found in the form of the Strategy for Responsible Development."

~ Mateusz Morawiecki, Prime Minister of Poland, 2017

Polish economy is currently in a process of a rapid transition caused by various social and economic changes. From governmental perspective, one of the most important objectives is to set priorities for next years and accelerate country's catching up process towards much more developed economies (Poskrobko, 2012). The quotation above (from Polish Prime Minister's preface to one of NSE publications) clearly shows which doctrine was an inspiration to establish new roadmap for the future development in this country (Nowak, Lin 2017). This paper aims to provide significant information about *Strategy for Responsible Development by 2020 (with 2030 perspective)*, hereinafter referred as SRD 2020/2030, and the role of New Structural Economics in shaping Polish economic development in the coming years.

The paper is organised as follows. The first part develops the theoretical background for a better understanding of New Structural Economics assumptions. The next section discusses the methodological issues and data collection procedure used in the research. The third section provides analysis of SRD 2020/2030 postulates with its background and current, the most significant, achievements. The final part of the paper discusses the results and presents policy recommendations.

Literature review

New Structural Economics is a modern economic development doctrine, which combines the assumptions of well-known structural economics and neoclassical economics (Lin, 2012). It was founded and recounted, among others, by Professor Justin Yifu Lin – Dean of Institute for New Structural Economics at Peking University and former Chief Economist of the World Bank.
This economic strategy was designed to stimulate and accelerate the caching-up process of middle-income countries. The NSE postulates are based on these crucial assumptions. First of all, economic development is perceived as a process of constant structural change in the economy (Lin, 2011). The income and labour productivity is increased by technological innovations, while transaction costs are decreased by improvements in infrastructure (Bruno et al, 2015). The industrial and economic structure is endogenous regarding its endowment structure (Woźniak et al., 2018).

Secondly, the government has an important role in shaping economic development, mostly by seeking comparative advantages and - by using industrial policy - trying to turn them into competitive advantages (Nowak, Lin, 2017). Finally, a government of a middle-income country, ought to categorise the nation's sectors and industries: by their importance to the country's economy, distance to foreign developed economies, competitiveness and hidden comparative and competitive advantages. After the review, NSE also recommends various industrial or fiscal policies towards those industries and forms of governmental support, such as special economic zones, incubation programs, industrial parks, corporate income tax holidays or R&D grants (Lin, 2010). In the literature, we can find the description of specific types of economic development policies matching different kinds of industries (Nowak, Lin, 2017).
This crucial assumption is related with neoclassical economics theory of comparative costs and advantages which was widely presented and discussed by Krugman and Obstfeld (2018). Recommended by NSE dominant role of authorities in shaping economic development requires responsible and involved politicians with the ability to recognize comparative advantages and turn them into competitive advantages. This approach means that the success of middle-income countries is strictly related to introduced strategy and endowment of the national economy. The summary and review of industrial polices with matched industries is placed below.

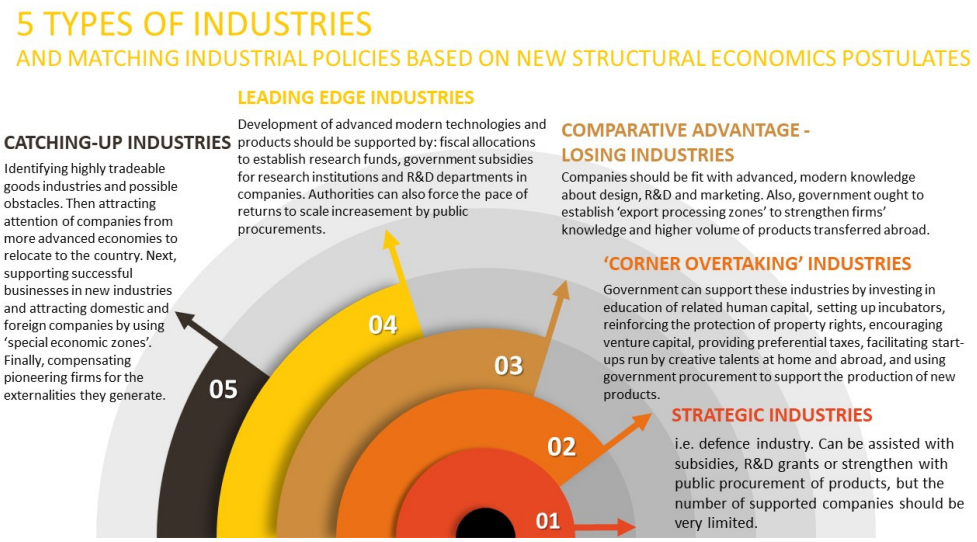

Picture 1. 5 types of industries and matching industrial policies based on NSE assumptions. Source: Own elaboration based on: Lin J. Y., Nowak A. Z. (2017) New Structural Economics for less advanced countries. p. 16.Warsaw: University of Warsaw Faculty of Management Press.

Methods and data collection

This study seeks to make contribution, by addressing the following research questions: *What are the specific aims and expectations on a field of 'Reindustrialization' in SRD 2020/2030? How were the strategic industries chosen and what was the impact of NSE assumptions on this process? What are the 'flag projects' in SRD 2020/2030? What is a current progression in the implementation of SRD 2020/2030 on a field of 'Reindustrialisation'?* This study on *Strategy for Responsible Development* was conducted by using a textual criticism as well as analysis and comparison of available regulations, literature, reports and data about the projects included in SRD 2020/2030. Data used in the evaluation derives from sources like Central Statistical Office (GUS/ Statistics Poland), Eurostat, official publications of Council of Ministers (especially from former Ministry of Development and current counterparts), National Centre for Research and Development, European Commission "Innovation Union Scoreboard' (2004-2019) report and trade magazines.

Results and discussion

New Structural Economics was established less than ten years ago and has already gained popularity among economists and politicians across the world. Due to the fact, that this economic doctrine is devoted to middle-income countries (with a catching-up economy), Polish government, among others, decided to implement NSE postulates and follows its recommendations towards its industrial policy.

The Polish parliament, on the 14th of February 2017, passed a bill and officially introduced widely discussed and criticised *Strategy for Responsible Development by 2020 (with 2030 perspective).* SRD 2020/2030 constitutes the desire to accelerate the economic development, increase the standard of living in Poland, implement rules of sustainable economic growth and strengthen the Polish position within the European Union and global economy.

The government officials acknowledged the fact, that SRD 2020/2030 is also a response to challenges that Poland faces nowadays - such as economic inequality, climate crisis and demographic change, many times. SRD 2020/2030 is an attempt to implement NSE assumptions in a comprehensive

development strategy together with an analysis of the current situation of the Polish economy and society.

Such development strategy was necessary, mostly because Poland became a signatory to many international treaties and agreements, such as:

- *Transforming our world: the 2030 Agenda for Sustainable Development, 2015, United Nations,*
- *Europe 2020: the European Union strategy for growth and employment,*
- *European Union climate and energy package,*
- *European Council 2030 climate & energy framework,*
- *Paris agreement, 2015, United Nations.*

Implementation of the postulates, included in those treaties, required broaden and complex strategy of social and economic development based on eco-friendly solutions.

Regarding previous Polish development strategies, SRD 2020/2030 accentuates the most the role of central authorities in industrial development policy. Undoubtedly, Polish accession to the European Union in 2004 was one of the most important and strategic moments in modern history of this country.

Since that moment, Poland has achieved a lot in the field of economic convergence, mostly because of foreign direct investments, positive balance of foreign trade, access to the EU markets and structural funds, public sector investments, demographic and social changes as well as increase of Polish citizens' living standard.

Polish society and economy still have to lead the charge to adjust the difference to the top EU countries, mainly on a field of innovation . Annual reports, published by European Commission, called *European Innovation Scoreboard*, point out that Poland has nearly the lowest in the EU innovation rate every year. The 2019 results can be found below (Picture 2).

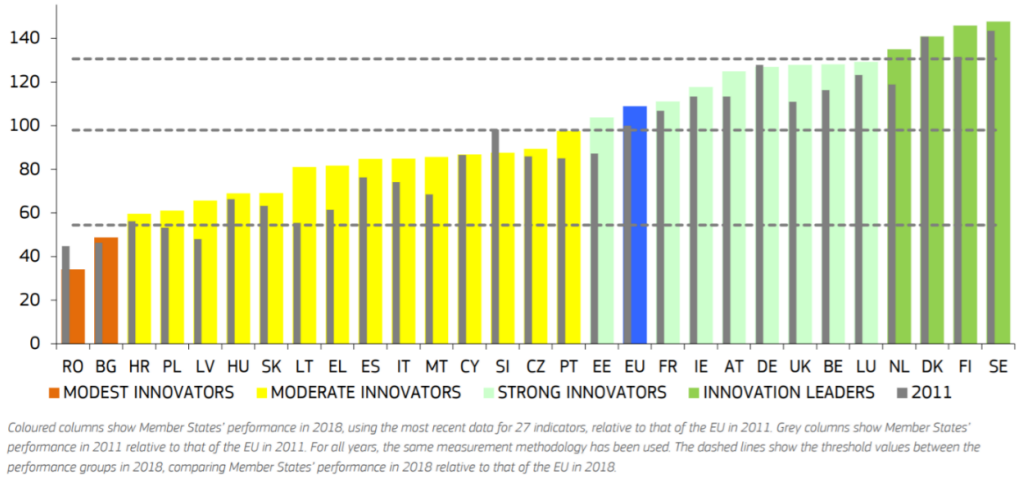

Picture 2. Innovation of EU member states in 2018. Source: European Innovation Scoreboard 2019, p. 7. Accessed online: www.ec.europa.eu (25.02.2020)

Strategy for Responsible Development by 2020 (with 2030 perspective) defines new vision and mission of Polish development, which should be based on several assumptions – stable public finances and spendings, a constant increasement of citizens' living standard, protection of the natural environment, as well as, concern to raise competitiveness of Polish enterprises. A significant part of SRD 2020/2030 was also devoted to equal redistribution of profits coming from economic growth to avoid social and territorial exclusion. Authors of the strategy point out six major 'development challenges' which may impact and inhibit potential economic growth (Picture 3).

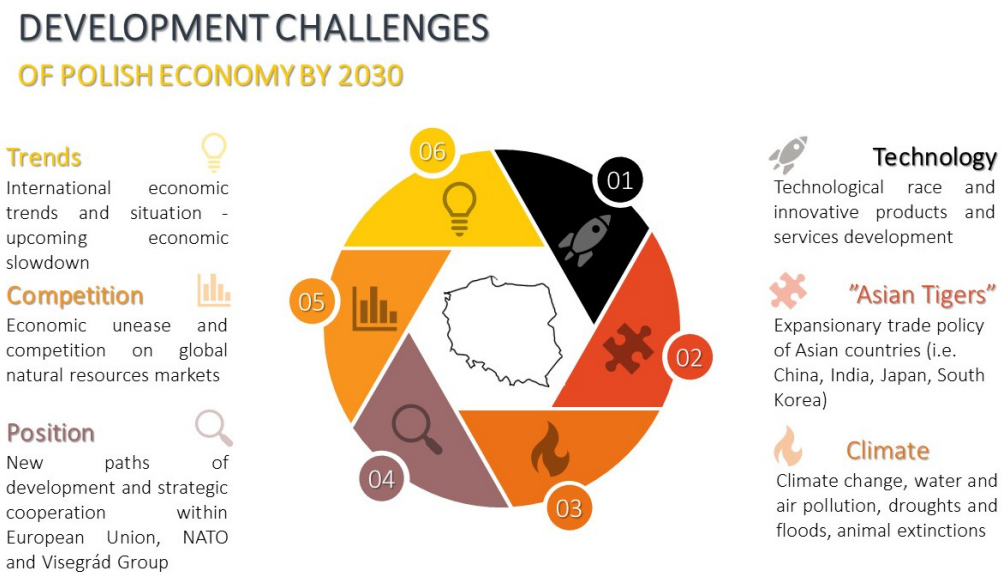

Picture 3. Development challenges of Polish economy by 2030. Source: Own elaboration based on Strategy of Responsible Development by 2020 (with 2030 perspective)

SRD 2020/2030, not only diagnoses the external threats and challenges, but also aims to eradicate impediments to sustainable and responsible growth. Moreover, over last years, Polish enterprises have been basing their competitiveness on cost factors, such as low labour cost instead of high quality of goods or innovative products and services (Zdyb, 2018). To overcome the mentioned threats and challenges authors of the strategy established three main goals:

I. *Permanent economic and industrial growth based on knowledge, data and organizational perfection*

II. *Social development which is responsive and territorially sustainable*

III. *Effective public institutions which serve social inclusion*

Since the author of this paper is essentially focused on economic growth and development only the first general aim was considered during the analysis because it includes specific goals titled: *Reindustrialization, development of innovative enterprises and small and medium enterprises* (SRD).

Role of New Structural Economics in reindustrialization in Poland by 2030

New Structural Economics advices the authorities to discover hidden comparative advantages within national sectors and implement specific strategies to turn them into competitive advantages. Authors of the strategy made a review of Polish current economic situation and a selection of twelve trades and industries which may become crucial for future development or are strategically important at the moment. Those twelve areas of operation were developed into flagship programmes, which are supposed to be the 'game changers' in the national economy (Table 1.)

FLAG PROJECTS AND EXAMPLE OF NSE IMPLEMENTATION in STRATEGY FOR RESPONSIBLE DEVELOPMENT BY 2020 (WITH 2030 PERSPECTIVE)

NAME OF THE FLAG PROJECT	PROJECT BRIEF SUMMARY	TYPE OF THE INDUSTRY REGARDING NSE ASSUMPTIONS	REMARKS RELATED WITH CURRENT IMPLEMENTATION (2019)
POLISH MEDICAL PRODUCTS AND PHARMACEUTICALS	Development of this sector combined with grants and subsidies for innovative R&D projects mainly related to 3D tissue printing, constructing medical robots, devices supporting people with disabilities	'Catching up industry', with very strong potential because of leading pharmaceutical companies such as Polpharma, TZMO and Aflofarm.	The main activity in this field is related to Polish Pharmaceutical Policy (introduced in 2018).
TELEMEDICINE	Support for projects which combine medicine and IT solutions in the diagnostic treatment process.	'Catching up industry' Currently, there is no sufficient infrastructure and leading firms	16,3 million EUR – the budget for the project – covers introducing 7 new procedures of telemedicine – for example - in cardiology, diabetology, palliative care, geriatrics and psychiatry.
CENTRE FOR BIOTECHNOLOGICAL DEVELOPMENT	The project which focuses on development of new genetic pharmaceuticals and process of their commercialization. Authorities plan to develop existing research centres and establish new institutions in this field and also increase the value of public procurements.	'Leading Edge Industries', Polish companies may become frontiers in this rapidly growing field.	Four types of support: · Bio-med R&D grant (up to 40 mln EUR), · INNOMED Program (subsidies up to 2 mln EUR), · 0% CIT within *Special Economic Zones,* · 0% property tax for biomedical companies.
POLISH FURNITURE	Support for Polish furniture producers who offer modern design and high quality products.	'Catching up industry', in this field Poland potentially has a hidden comparative advantage due to low labour cost and high quality of exported products.	*Polish-Design Furniture* Program – a diverse and complex programme promoting export and supporting creative and innovative companies.
LUXTORPEDA 2.0	The project named after Polish high-speed train from 1930's, which is a complex program of railway infrastructure improvement and modern high-speed trains production.	'Corner overtaking' industries, Polish high-speed trains industry has a potential but requires significant governmental support	Established in 2017 business cluster "Forum for Responsible Development – Luxtorpeda 2.0'. Program INNO-PKP together with National Centre of Research and Development (NCBiR) - public procurements of 80 high-speed trains, modernization of 9000 km railway and 230 smaller projects (by 2019) (Madrjas, 2018)

E-BUS	Enhancement of the usage of electric public vehicles in Polish cities.	'Catching up industry' with hidden comparative advantage because of a very high number of Li-Io batteries production and strong local companies like IKARIUS.	Polish E-BUS Consortium together with NCBiR, established in 2018, aims to produce 1000 electric buses for public transportation by 2023 for Polish cities.
ELECTRIC CAR	Similar to the previous project, but in this case, the purpose is to increase the number of electric vehicles on Polish roads and accessibility to the infrastructure such as public chargers.	'Catching up industry'. Very challenging because there is no Polish electric car producer. Poland also has almost the lowest number of such cars 'on the roads' in the EU and poor infrastructure in this matter.	Initially, one million electric cars were supposed to be produced by 2020, but neither new producers appeared, nor the number of cars significantly increased. Government from 2020 only offers 30% public subsidy for new electric cars (original retail price cannot exceed 29 000 EUR).
CYBER-PARK CENTRE	The project postulates opening new national centre with mainly IT technologies, which might be developed in a field of cyber-defence.	'Strategic' industry which is marked up with high importance for national cyber-defence.	Established in 2017 CYBER-PARK ENIGMA – the project developing solutions in fields such as Internet of Things (5G), Industry 4.0 and Artificial Intelligence.
ŻWIRKO I WIGURA	Project named after two Polish aviation pioneers from the beginning of XX century, which aims to encourage and support the aeronautic industry - mostly drones and unmanned planes.	'Catching up industry', but the project also aims to adjust the law and regulations to increasing usage of drones in the Polish aerospace.	In 2018, NCBiR established project INNOSBZ (Innovative Drones and Unmanned Planes) with R&D subsidies. National air traffic control and landing system for drones are in the hopper.
BATORY	An attempt to stimulate the growth of yachting and innovative ferry industry (Batory was first Polish transatlantic liner).	'Comparative advantage-losing industry'. This sector used to be very competitive, but due to structural change its importance has decreased.	The aim fulfilled by four main projects: · Building proms and ferries by Polish Marine Cluster, · INNOship (Smart Ship Technologies), · I-Offshore (Innovative offshore platform), · Ship scrapping/Ship recycling.
INTELLIGENT MINING SYSTEM	Supporting a development of enterprises producing mining machinery and modern coordinating systems.	'Comparative advantage-losing industry'. Despite the international agreements and EU decarbonization process, the Polish government aims to increase the lost competitiveness of the mining industry.	3.99 billion PLN (nearly 1 billion EUR) budget of the project will be spent on modernization and development of security and coordination systems in Polish mines mostly in Silesia region.
ECO-FRIENDLY CONSTRUCTION INDUSTRY	The project aims to put more eco-friendly or energy-efficient constructions on the map.	'Corner overtaking' industry (constructing zero-emission buildings and log houses)	Ministry of Environment constituted Polish Wooden Houses Co-partnership which works on the popularisation of this building construction technology.

Table 1. Flag projects of Strategy for Responsible Development 2020 (with 2030 perspective). Source: Own elaboration based on SRD 2020/2030 and relevant publications.

As shown in table 1, SRD 2020/2030 projects are related to very diverse sectors of the Polish economy. Despite those twelve flag programs, there are also 173 strategic projects which fortify SRD 2020/2030 with varied actions and efforts to achieve the objectives. Indubitably, a substantial amount of money and resources is required to conduct such complex operations. The government assumed that between 2016 and 2020 public sector will channel nearly 1 494,5 billion PLN (346,8 billion EUR) to projects related to SRD 2020/2030. Regarding the tentative calculation placed in the strategy, resources are supposed to come from: local and regional authorities (33,98%), European Union funds and programmes (15,81%), national budget (43,04%) and Polish Development Fund (7,17%). However, authors of the SRD 2020/2030 plan to attract the attention of the private sector and convince individual entrepreneurs and institutions from the financial sector to spend on those projects 670 billion PLN (155,45 billion EUR) by 2020. Initial analysis of the projects shows that the strategy is a very complex program that aims to develop crucial sectors of the Polish economy (Ryć, 2017). Closer studies on specific flag and strategic projects (which are supposed to lead up to a significant shift in an economic and social situation in Poland) show that each of them is modelled on New Structural assumptions. The actions planned within the SRD 2020/2030 projects correspond to postulates related to mentioned in the introduction six categories of catching-up sectors/industries.

(…) This strategy slipped past the fact that the most important development barrier is a significantly low rate of private savings (it is a very unpopular opinion in Polish society which foregrounds individual consumerist aspirations even on account). The strategy also omits another problem – how much very low tendency of Polish enterprises to internationalize and be innovative is caused by low social capital, lack of ability to cooperate and teamwork? (…)

~ Professor Witold Orłowski
Opinion about SRD, National Development Council

The review of specific actions within each flag programme shows that industrial policies were allocated correctly to each industry. Authors of the strategy emphasise the fact that the chosen sectors are not only playing a key role in future Polish economic and social development but, first of all, may turn hidden comparative advantages into competitive advantages. SRD 2020/2030, matching categories and implemented industrial policy are shown in the table above.

Since the first presentation of SRD 2020/2030 initial conception in 2016 Deputy Prime Minister Mateusz Morawiecki (current Prime Minister) in Ministry of Development has been facing dissenting voices and criticism from entrepreneurs, representants of local governments, academic society and even National Development Council in Office of the President of the Republic of Poland. This council was raising the voice against the strategy mostly in the field of shortcomings in the legislative standards and missing essential required elements such as lack of so-called roadmap with described milestones (referencing to the Parliament regulation from 2006 - *About a development strategy conduction*) Regarding the legitimatise criticism related with a form of the strategy, experts raise the fact that statutory law from 2006 established legal requirements for strategies on the national, sectoral and regional level, so those missing sections undermine SRD 2020/2030 credibility.

(…) The objectives of the Strategy for Responsible Development largely respond to the needs existing at the current stage of Poland's development. Its main goal is to create conditions for increasing Poles' incomes while improving social, economic and territorial cohesion. The effects of the implementation of the new idea of Poland's socio-economic development will be possible to asses after several years of implementation (…)

~ Professor Alojzy Z. Nowak
'New Structural Economics and dilemmas of the economic development', University of Warsaw, 2017

Council emphasise that the goals and strategic catching-up sectors are undoubtedly defined properly but the description of the individual projects (including flag projects) is not sufficiently elaborated, which may cause problems with implementation. Last but not least, arguments raised by the National Development Council state that such tremendous planned resources require much more comprehensive arrangements and description (i.e. with an explanation of how local authorities will be able to cover one-third of public spendings on SRD 2020/2030). Experts from Polish Economic Association also criticised the lack of adjustment to European Union directives related with decarbonisation of the economy, decrease of green-house gases emission and protection of the natural environment (Bukowski, Olko, Stefanowicz, 2016). The next argument of PEA against the strategy is considerably fundamental – there is no cost-benefit analysis in SRD 2020/2030 which is a substantial element of every strategy. Such studies might clearly present what are the project future cash flows or net benefits. Despite these concerns, some economics tried to show potential befits of SRD 2020/2030 implementation. All those arguments mentioned above make an evaluation of SRD 2020/2030 complex. However, some of the statistical data show that possibly the strategy has a positive impact already – between 2015 and 2018 the adjusted gross disposable income of households per capita in PPS in Poland increased from 15,135 up to 16,251 (Eurostat). On one hand, this document does not face critical requirements of a legal definition of 'strategy' due to missing parts, but despite this - thesis and goals are correctly formulated and their implementation may accelerate Polish economic development. The following results of my research show, that implementation of the strategy after nearly four years is neither effective, nor successful.

Conclusions

Conducted research and analysis proved that New Structural Economics was instrumental in the process of shaping postulates of Polish Strategy for Responsible Development by 2020 (with 2030 perspective). Authors of SRD 2020/2030 had not only accurately chosen significant industries, but also allocated suitable policies and actions relevant to NSE assumptions. Evaluation of 'flag projects' and the strategy itself was important because this document and current central authorities shape future conditions in Poland – but is it the best path or go-to option? Changes in economic and social structure are incredibly important, but to implement any distinct improvements, Polish situation requires an effective, authentic leaders and a complex, refined strategy.

The assumptions of New Structural Economics are undoubtedly an interesting point of view at the development of less advanced countries and catching-up economies. An example of SRD 2020/2030 shows that the implementation of them is possible in countries like Poland. What clearly brings out from the study is the fact that the theoretical background of the strategy is absolutely correct, while the problem lies with thesis deployment and implementation of investments. I hope that the

results of my research may shed some light on the matter of SRD 2020/2030 and the role of New Structural Economics in shaping middle-income countries, such as Poland.

Acknowledgments

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Atmosphere at The Point of Sale as A Marketing Instrument Affecting Women's Purchasing Decisions

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Abstract

Atmosphere of the point of sale is one of the factors that shape the image of a store and affect customers' purchasing decisions. Properly designed atmospherics at the point of sale arouse buyers' specific feelings and behaviours and increase the probability of making purchases by visitors to the space in question. In practice, buying decisions are made by women and men alike; however, it is women who have dominated the area of shopping within all branches of trade. Adjusting marketing activities to the specificity of women's behaviours during shopping may be key to the success of trading companies. Therefore, the objective of this study was to discover women's opinions on elements of point-of-sale atmospherics and their role in purchasing decision-making. The study was conducted as an opinion poll using a questionnaire on a group of women selected by quota sampling. This pilot study has led to a number of conclusions. A majority of the surveyed women were of the opinion that the impact of gender on purchasing decisions is significant. At the same time, women are relatively more likely to fulfil the role of decision-maker in a household than men. When making purchasing decisions, women pay attention to appearance of the point of sale, and specifically to its atmosphere. Of special import for women are visual and olfactory sensations. The results also indicate that the atmosphere at the point of sale plays a significant role during women's purchasing decision-making.

Keywords: Purchasing Decisions, Women, Atmosphere, Point of Sale, Marketing

Introduction

Research on consumer behaviour and on buying decisions made by consumers entails observation of the impact of a variety of determining factors, which may be classified as internal or external. Among internal factors, of note are psychological, demographic, and economic factors. The literature on the subject often emphasises a significant influence of demographic factors, identified as age, education, lifestyle, family lifecycle stage, and gender, which predisposes to strictly specified market behaviours (Bashar, Ahmad & Wasiq, 2013) (Kumar, 2014). External factors may be subdivided into macroeconomic, microeconomic, socio-cultural, and environmental factors. The strongest influence during purchase has been indicated to be exerted by price, product quality, product offer, promotional activities, shopping location and comfort, appearance of the point of sale, in particular the atmosphere in the store, and informal communication (Kaczmarczyk, 2011) (Rudnicki, 2012) (Kieżel, 2012).

While making purchasing decisions, consumers pay attention to appearance of the point of sale, store surroundings, image of the point of sale, and display of goods; these aspects are analysed by means of visual merchandising known as point-of-sale marketing, which focuses on arrangement and atmospherics of spaces (Kotler, 1973-1974) (Bitner, 1992) (Turley & Milliman, 2000) (Witek, 2006) (Zalewska, 2014) (Binsztok & Zuzański, 2013) (Gigoła, 2013) (Grzybowska-Brzezińska & Rudzewicz, 2013). Consumers tend to evaluate point-of-sale atmosphere by looking at characteristics of the space in question, namely categories such as the interior and its layout, aesthetics, style, image, unproblematic spatial orientation, room and stand organisation, equipment, lighting, cleanliness, temperature, ventilation, display of goods, interior decoration, so-called props, technical devices, or employees' clothing (Gieracz 2011) (Rudnicki, 2012). Point-of-sale atmosphere falls within the range of issues connected with aesthetics in marketing (Schmitt & Simonson, 1997). Point-of-sale atmosphere, conveyed to customers through vision, hearing, sense of touch and smell, is aimed at

evoking emotions which, in consequence, are supposed to trigger consumer's responses anticipated by the company (Verhoef et al., 2009). (Bas, 2015). Aesthetic appearance of the store, the music, and the smell have an impact on how long customers will stay at the point of sale and whether or not they are going to come back (Kotler, 1973-1974). Influence of point-of-sale atmosphere on customers is an attempt to interfere with the subconscious and with the emotional condition of customers in order to engender conditions conducive to making a purchasing decision (Bałoń, 2011) (Bohl, 2012)

On one hand, the course of customer's decision-making process may result from the atmosphere present in the store but on the other hand, it may result from gender character (Jerzakowska-Synoradzka, 2010), (Piotrowska, 2011) (Małysa-Kaleta, 2012) (Das, 2014). These differences pertain to, *inter alia*, time spent on individual actions during shopping, such as comparison of alternatives, choosing from many options, interval between first touching the product and completing the purchase, time devoted to shopping for individual categories of goods (Jurowczyk 2013) (Gender Factor, 2015). Differences in behaviour between women and men may be explained based on functional analysis of the left and right brain hemisphere, both of which are responsible for diverse components of the thinking process. While the left hemisphere identifies details, the right hemisphere perceives the whole and so it is holistic. Right hemisphere function is connected with intuitions and instincts, concentrated on emotionality, whereas left hemisphere function is geared toward logical, analytical, precise thinking. The right hemisphere is more active in performance of tasks that require imagination and visualisation, where colours, music, forms, metaphors, and analogies are being perceived (Pawlikowska & Poleszak 2011). Research shows that men's brains operate in a concentrated, localised manner, which means that a specialised brain area is responsible for a given task; however, in women this operation is more dispersed, integrating and combining areas responsible for different functions. Thereby, women are inclined towards holistic thinking combining more details from fundamentally different sources (Barletta, 2006) (Cunningham & Roberts, 2012). In case of women, senses such as vision, touch, hearing, taste, or smell function with greater intensity than in men (Elliot & Maier, 2014) (Bohl, 2012) (Piprek, 2016). Women receive and recognise diverse sensory information better than men perceive entire spectra of signals and, additionally, women are more capable of combining them and drawing conclusions from them, and of integrating information from various sources (Moir & Jessel, 2014). Women often rely on experiential motivations and sensory qualities when making purchasing decisions. This is associated with their view of shopping as an activity that is supposed to give pleasure (Cebula, 2016).

Development of women's market is currently one of the most recent trends occurring in societies and economies of various countries, especially given the increasing role of the service sector and women's growing wealth (Silverstein & Sayre, 2009). Research shows that the greater the decision-making and purchasing power of women, the greater the economic success of the country (Rosin 2010). Women have had and will have a significant impact on changes in trade and marketing, reflecting their lifestyle and preference trends (Underhill, 2007). Nevertheless, even if manufacturers and service providers address their offer to women, they are still doing it ineffectively in terms of developing the product presented to women itself and in terms of successful marketing activities.

Method

The objective of this study was to discover women's opinions on elements of point-of-sale atmospherics and their role in purchasing decision-making in various types of shops. In addition, the study attempted to gather information on the effects of gender on purchasing decisions, women's role as decision-makers in households and their paying attention to the image of shopping venues, and particularly the role of atmosphere and its individual features. The paper employs two research methods – desk research and survey. Following completion of a literature review and analysis of secondary-source information, a survey was conducted to obtain primary data. The survey, which has been pilot in nature, was conducted in 2019 among 150 women in the city of Bydgoszcz located in the Kuyavia-Pomerania Province, Poland. The survey was conducted as an opinion poll using a questionnaire on a quasi-representative sample selected by quota sampling. The questionnaire included 13 substantive questions and 5 questions on the women's socio-demographic characteristics. A five-level Likert scale was used in questions where the respondents were supposed to provide a

value judgment. The survey was conducted with the use of the PAPI method and analyses were performed in Microsoft Excel and STATISTICA.

Results

Evaluation of elements creating the atmosphere at the point of sale as a marketing instrument affecting purchasing decisions was studied among women. Out of the sample of 150 surveyed respondents, the majority were women living in a city (63.3%), within the working age group (70.0%) and employed (56.0%), with secondary (36.0%) and higher education (28.0%), with household net income per capita within the range of PLN 1,001-2,500 (48.0%).

Results of the study reveal that shopping is the domain of women, as 68.0% confirmed that they fulfil the role of decision-maker in their household. The majority of the surveyed women (88.0%) were of the opinion that gender is a factor that has an effect on consumer behaviour and purchasing decisions. Most of the surveyed women represent the model female style of making shopping decisions. The overwhelming majority of respondents claimed that, when shopping, they are relying on sensory qualities and experiential motivations (95.3%), imagine ways of using the product in daily life (92.7%), are submitting to emotions (90.7%), and are taking a number of detailed features of the product into consideration instead of just the basic elements (89.3%). For most of the surveyed women (88.7%), shopping is a way of spending their free time, a leisure and recreational activity, and something that gives pleasure.

While making purchasing decisions, women pay attention to characteristics of the point of sale. This opinion has been confirmed by 82.0% of the women participating in the study. Among individual categories characterising a point of sale, attributes of the offered products received the highest rating from the respondents, followed by point-of-sale atmosphere, personnel, convenience and comfort of shopping. Features such as location, opinion, and reputation of the point of sale received lower ratings.

A vast majority of the respondents agreed that atmosphere at the point of sale affects their purchasing decisions; thus, it can be recognised as a marketing instrument of influence. The women were usually expressing the opinion that the atmosphere may affect the duration of their stay in the store and evaluation of the quality of products and service, that it improves satisfaction from shopping and the likelihood of purchasing any product at all or a product in larger quantities. Such are the indirect or direct effects of the influence of atmosphere at the point of sale. This instrument also aroused interest in the offer and affected women's perception of the store, its offered products as well as remembering and recognition of the point of sale in question.

Point-of-sale atmosphere may constitute an element directly triggering consumer response. Such perception of atmosphere was indicated by 31.3% of the surveyed respondents. In such an event, the atmosphere is a situational factor which convinces the consumer, in a peculiar way, to make a purchase. The atmosphere may also uniquely serve the purpose of conveying information, communication to consumers. The point of sale may be sending a message, communicating something. It may also suggest the addressee of the offer and help consumers recognise distinguishing features. Perception of the point-of-sale atmosphere as a carrier of information was indicated by the smallest group of surveyed respondents – 23.3%. Thirdly, the atmosphere may constitute an element directly triggering a response – this answer was chosen by 45.3% of the surveyed women. From this viewpoint, the atmosphere is a situational factor convincing women, in a peculiar way, to make purchasing decisions (Fig. 1).

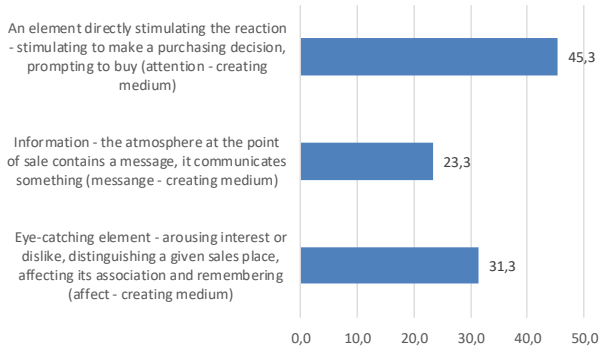

Fig. 1: Perception of the impact of point-of-sale atmosphere on women's purchasing decisions [%]

Source: author's own study

In their evaluation of atmosphere at the point of sale, women make use of their vision, hearing, sense of smell or touch yielding visual, auditory, olfactory, or tactile sensations. The strongest impact on purchasing decisions was exerted by visual sensations (grade 4.48 on a five-grade scale), followed by olfactory sensations (4.15), auditory sensations (3.41), and finally tactile sensations (2.97). Degree of impact of visual sensations subsides with women's age. The older the respondents, the less susceptible they are to the influence of this component of atmosphere.

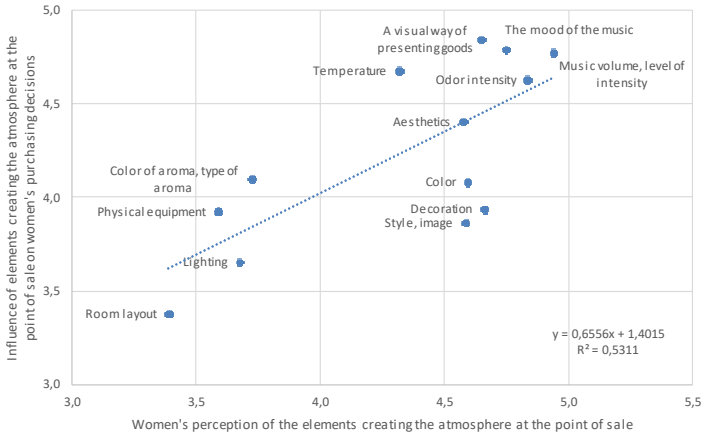

Fig. 1: Women's perception of elements creating the point-of-sale atmosphere as confronted with the influence of these elements on their purchasing decisions

Source: author's own study

Among the elements shaping the point-of-sale atmosphere, women most often perceive the visual way of presenting goods, aesthetics and interior decoration, store style and image as well as the colour scheme. They also take note of items such as mood, music volume and intensity, and odour intensity. However, in their opinion, visual way of presenting goods as well as music and smell intensity are the only elements affecting their purchasing decisions. Such elements of atmosphere as lighting, physical equipment, and room layout are perceived by women less frequently. Similarly, these components of atmospherics also affect women's purchasing decisions less often.

Conclusion

This study has shown that point-of-sale atmosphere is important to women and may be used as a marketing instrument of impact on women. While shopping, women pay particular attention to the visual way of presenting goods, aesthetics, interior decoration and colour scheme as well as style and

image of the shop. Well-kept and aesthetic points of sale give women the feeling of comfort and good mood. As women instinctively evaluate their environment, emotions related to this environment translate into behaviours that are positive or negative from the viewpoint of the company. It has been revealed that elements often neglected by companies help women assess the situation and make a purchasing decision. Information on the impact of elements creating an atmosphere at the point of sale on consumers' purchasing decisions may be used in the process of marketing planning and implementation. This knowledge may be applied to actions related to the product itself and used in the context of marketing communication and creating point-of-sale image. A study concerned with the impact of elements creating an atmosphere at the point of sale on purchasing decisions of both women and men on a representative sample of respondents has been planned for 2020.

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Selected Economic Conditions of the Visegrad Countries

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Abstract

The Visegrad Group is an alliance of the four Central European countries: the Czech Republic, Hungary, Poland and Slovakia. One of the main aims of Visegrad Group is to advance economic cooperation. This paper is to analyze selected economic conditions of the Visegrad countries: sectors and structures of economies, economic growth, international trade. The pace of economic growth is higher than the EU average. However, one should note that they are still in the catching-up process with the EU average in terms of economic performance measured by GDP per capita. Concerning international trade, over 70 % of the Visegrad countries' trade is done with the EU countries. Germany remains as the top trading partner for the Visegrad countries with a share of at least 19 % of total trade for each Visegrad economy. It seems that the trade potential within the Visegrad Group has not been fully used. The Visegrad countries shall use their alliance in the form of the Visegrad Group to further enhance their economic cooperation resulting in the higher level of their economic growth.

Keywords: the Visegrad countries (V4), economic growth, international trade

JELcodes: F43, F15, F63.

An Overview of The Visegrad Economies: Sectors and Structure

The Visegrad Group was initially named as the Visegrad Triangle. It was established in 1991 by three Central European countries: Czechoslovakia, Poland and Hungary. Since 1993 as a result of the break-up of Czechoslovakia, the Czech Republic and Slovakia became members of the Visegrad Triangle so that it changed its name to the Visegrad Group. The main aim of the Group was cooperation with the European Union and NATO in the perspective of joining into their structures. Since this aim was accomplished, now this group is working on the following activities implemented through financial support for promotion and development: cultural cooperation, scientific exchange, research and cooperation in the field of education, youth exchanges, cross-border cooperation, and tourism. The Visegrad Group works closely for the purposes of developing cultural, economic, energy and military cooperation.

The analysis starts with describing economic sectors of the Visegrad countries (table 1). Services are the dominant sector of the Visegrad economies according to value added, then industry and finally agriculture in the analysed countries and groups of countries. The value of services in the Visegrad countries reached a similar level between 54.2 and 56.1 % of GDP, while the EU average was 66.0 % of GDP in 2017. In industry, the disparities were greater than 26.4 % in Hungary to 33,5 % in the Czech Republic, while the EU average was 22 % of GDP in 2017. Agriculture reached 2.2 % in the Czech Republic to 3.3 % in Hungary and Slovakia, with the EU average of 1.5 % of GDP in 2017.

Table 1: Economic sectors by value added as a share of GDP in the Visegrad countries against the background of the EU and the World

	Agriculture	Industry	Services
	% GDP	% GDP	% GDP
	2017	2017	2017
World	3,5*	25,4*	65,0*
EU	1,5	21,9	66,0
The Czech Rep.	2,2	33,5	54,2
Poland	2,8	28,9	56,1
Slovakia	3,3	31,0	55,9
Hungary	3,3	26,4	54,9

*Explanation: * - data from 2016 due to a lack of data from 2017.*
Source: Own study based on data from the World Bank

Figure 1 shows in detail the individual share of certain economic activities in the total gross value added (GVA) output method. Industry, including energy, has a dominant share in each of the Visegrad countries, it amounted to less than 32 % of the total value added in the Czech Republic in 2017, in other countries it was at the level of 26 - 27 %. Then the ranking included trade, transport and catering services. In Poland it was of the greatest importance - only 0.8 % smaller than industry, then in Slovakia with a little over 20 % of GVA and in other countries with over 18 % of GVA. The third largest activity is public administration, defense, education, health and social work with a two-digit share within the range of 14.5 - 17.5 % of the total gross value added in the Visegrad countries. Other activities accounted for less than 10 % of the total GVA in 2017.

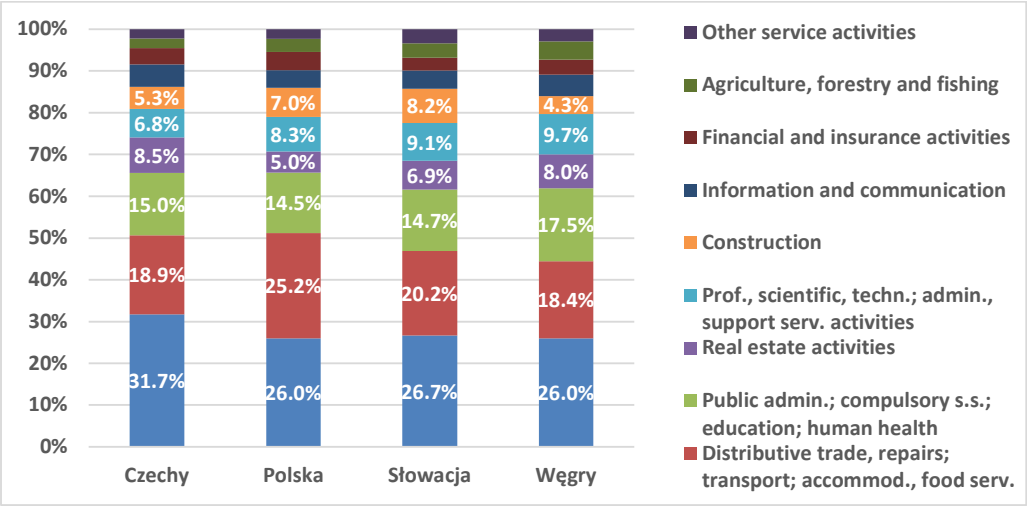

Figure 1: Structure of the Visegrad Group economies, share in total gross value added at current prices in 2017.
Source: Own study based on data from OECD (2018)

Economic Growth of The Visegrad Countries

In terms of GDP expressed in USD billion (table 2), the Visegrad countries are above average compared to neighboring countries. The Visegrad Group is mostly surrounded by the countries of Central and Eastern Europe, most of them have a lower GDP than the Visegrad countries. Therefore, the V4 should

be compared to neighboring countries of Western Europe, namely Austria and Germany. Austria's GDP is lower than Poland's, at least due to the fact that the Polish population is more than 4 times higher than the Austrian population. In contrast, the Czech Republic and Hungary, despite their larger population, have a much lower GDP compared to Austria. Considering Austria's GDP and its population, it should be noted that in this respect they are using human capital much better to fuel economic growth. There is a concept of the quality of human capital, which, among others confirms that there is a positive relationship between education and economic growth (Altinok 2007; Castelló-Climent 2019; Hanushek and Woessmann 2015). In addition, Kubík (2013) notes that years of education have a greater positive impact on economic growth in countries with higher quality education. It is worth noting that the total GDP of the Visegrad Group is over 3.5 times lower than Germany's GDP and it accounts for around 5.6% of the European Union's GDP. Among the Visegrad countries, Poland has the largest GDP value of over USD 0.5 billion, which is also the largest country in terms of population, followed by the Czech Republic, Hungary and finally Slovakia. From a practical point of view, the strength of the economy is, among others its human capital, which effectively managed contributes to economic growth (Barro 1999). The Visegrad countries do have potential in human capital but the question is if they use it in the most efficient way. It seems that they need to work on that as well (Grodzicki 2018).

To compare economies, GDP per capita is used. It allows comparing the condition of the economy in relation to the number of inhabitants. In terms of GDP per capita according to exchange rates (table 2), the Visegrad countries do not perform as impressive compared to their neighbors from Central and Eastern Europe as in the previous statistics. In the Visegrad Group alone, the Czech Republic was ahead in terms of GDP per capita according to exchange rates with a result of over USD 20,000 followed by Slovakia, Hungary and Poland, which was lagging behind with a value of just over USD 13,800 in 2017. Among the countries included in the table, Austria was the best in this statistic with a score of over 47,000. USD, before Germany (over USD 44,000) and Slovenia (over USD 23,000) in 2017. It should be emphasized that the value of this statistics for the EU is over USD 33,000 which indicates that the Visegrad countries still have a lot of work to do to catch up with the EU average.

The last group of indicators in Table 2 are data on GDP and GDP per capita by purchasing power parity (PPP). Due to the fact that the average level of market prices in the countries of Central and Eastern Europe is lower than in Western Europe, the Visegrad countries and their eastern neighbors perform much better in this indicator. According to this statistics, the Visegrad Group generated GDP of Int $ 1,934 billion in 2017, which accounted for about 9.2 % of the European Union's GDP and about 46.2 % of Germany's GDP. The order of the Visegrad countries according to the value of PPP GDP is the same as for GDP according to exchange rates, but what is important, the proportions of values for individual countries were different. GDP according to exchange rates for Poland, the Czech Republic, Hungary and Slovakia accounted for: 3.0 %, 1.2 % 0.8 % and 0.6 % of EU GDP, respectively, while according to PPP, in the same order: 5.2 % , 1.8 %, 1.3 % and 0.8 % of EU GDP. The situation is similar with GDP per capita according to PPP, the Visegrad countries were relatively better than relative to GDP per capita at exchange rates. However, there was a slight difference that after the Czech Republic (over Int $ 36,000) and Slovakia, Poland is ahead of Hungary (over Int $ 28,000), and not after Hungary, as it was the case with GDP per capita statistics at exchange rates. The distance between individual Visegrad countries and the EU, with a value of GDP per capita PPP over 41 Int $, was smaller than in the case of GDP per capita at exchange rates.

Table 2: Area, population and GDP of the Visegrad Group and neighboring countries in 2017

Country	Area in 1000 km²	Population		GDP in current USD		GDP in PPP	
		in mln	per 1 km²	mld USD	*per capita*, USD	mld Int$	*per capita*, Int$
EU	4238,2	512,5	121	17277,7	33715	21075,3	41126
The Czech Rep.	77,2	10,6	137	215,7	20368	384,8	36327
Poland	306,2	38,0	124	524,5	13812	1102,3	29026
Slovakia	48,1	5,4	113	95,8	17605	172,0	31616
Hungary	90,5	9,8	108	139,1	14225	274,9	28108
Austria	82,5	8,8	107	416,6	47291	461,6	52398
Białoruś	202,9	9,5	47	54,4	5726	179,2	18848
Chorwacja	56	4,1	74	54,8	13295	104,2	25264
Litwa	62,7	2,8	45	47,2	16681	90,7	32092
Germany	348,9	82,7	237	3677,4	44470	4187,6	50639
Russia	16376,9	144,5	9	1577,5	10917	3817,2	26418
Romania	230,1	19,6	85	211,8	10814	506,1	25841
Serbia	87,5	7	80	41,4	5900	106	15090
Słowenia	20,1	2,1	103	48,8	23597	72,1	34868
Ukraina	579,3	44,8	77	112,2	2502	368,2	8213

Note: Abbreviation Int $ - means international dollar
Source: Own study based on data from the World Bank

The economic growth rate in the Visegrad countries in 2013 - 2017 was higher than the EU average (except for the Czech economy in 2013). In 2017, Poland achieved the highest economic growth rate of 4.81 %, the Czech Republic also achieved over 4 % economic growth, Hungary less than 4 % and Slovakia 3.40 %.

Table 3: Economic growth in the Visegrad countries, the EU and the World

Year	2013	2014	2015	2016	2017
World	2,62	2,86	2,86	2,51	3,14
EU	0,26	1,75	2,31	1,97	2,45
The Czech Rep.	-0,48	2,72	5,31	2,59	4,29
Poland	1,39	3,32	3,84	3,06	4,81
Slovakia	1,49	2,75	3,85	3,32	3,40
Hungary	2,10	4,23	3,37	2,21	3,99

Source: Own study based on data from the World Bank

Apart from the undoubted advantages of using GDP as an indicator of economic growth and development, there are many words of criticism. The so-called Stiglitz report, which addresses many of the shortcomings and weaknesses of GDP as an indicator such as: it does not consider the degree of depreciation of capital goods, there is no estimated value of public goods such as education and health care, it does not consider the state of the environment and the degree of its pollution and degradation as well as the exploitation of natural resources, it does not include the quality and standard of living of society (E. Stiglitz et al. 2009). Therefore, Ivanová and Masárová (2018) assess the Visegrad economies using three alternative measures that supplement GDP: Human Development Index (HDI),

Global Competitiveness Index (GCI) and the Index of Economic Freedom (IEF). However, none of the above-mentioned indexes are perfect. HDI has been criticized for its components and structure (Noorbakhsh 1998; Chowdhury and Squire 2006; Kelley 1991) and the fact that it does not take into consideration a global perspective but it is limited only to national rankings (Sagar and Najam 1998). Global Competitiveness Index has also been questioned due to its methodology because it assumes that markets are efficient and does not consider the role which government plays in favoring particular activities over other (Lall 2001; Bhawsar and Chattopadhyay 2015). It has also been argued that IEF does not rely on true assumption. Sachs (2006) has proved that there is no correlation between a country IEF's ratings and its GDP. It means that economic openness does not necessarily result in better growth. Moreover, Karlsson (2005) also questions the IEF's methodological issues: what should be included in the index (how *economic freedom* is defined) and the way how the weights are assigned.

International Trade of the Visegrad Countries

The V4 during transformation in the 1990s started to open their economies. Due to the fact that the geographical distance to the European Community countries was rather small, trade was also becoming quite intense. Bröcker (1998) underlines that economic integration reduces barriers to trade between countries. As the European integration process continued, the trade relations were gradually increasing with and within the EU (Toporowski 2017). The advantage of the old EU member states was production of capital-intensive goods whereas the V4 mainly produced labour-intensive goods, and that was their point of departure when starting economies opening process (Kawecka-Wyrzykowska 2009). As from the 1990s, in the V4 a technological gap was notable and the level of industrialization was rather high (Aturupane et al. 1999).

This paper focuses on the trade analysis from perspective of years: 2007 and 2017. Table 3 presents data on foreign trade of the Visegrad countries in comparison to the EU and the World in 2007 and 2017. Among the Visegrad countries, the Czech Republic and Hungary obtained a positive trade balance three years after joining the European Union - in 2007. It seems surprising that in 2017 all Visegrad countries achieved a positive trade balance. Imports of the Visegrad Group accounted for about 7.3 % and 8.5 % of EU ones, while exports about 7.0 % and 8.4 %, respectively in 2007 and 2017. Thus, the share of both imports and exports of the Visegrad Group in EU's imports and exports increased after ten years. The indicator of the share of exports in GDP is an important measure of the openness of the economy. In the analyzed period, the share of exports in GDP increased in the Visegrad coutries. In 2017, the highest value of this indicator was recorded in Slovakia (96.3 % in exports and 92.9 % in imports), followed by Hungary (82.3 % in imports and 90.1 % in exports), the Czech Republic (respectively 72.2% and 79.5 %) and finally Poland (49.4 % in imports and 53.4 % in exports).

Table 2: International trade of the Visegrad countries in comparison to the EU and the World

	Import						Eksport					
	mld USD		per capita, USD		% of GDP		mld USD		per capita, USD		% of GDP	
Country	**2007**	**2017**	**2007**	**2017**	**2007**	**2017**	**2007**	**2017**	**2007**	**2017**	**2007**	**2017**
World	16878,2	22453,7	2525	2982	29,0	27,7 *	17290,6	22989,6	2587	3053	30,1	28,5 *
EU	6647,7	7288,3	13298	14222	37,6	41,2	6768,09	7940,9	13538	15496	38,4	44,6
The Czech Rep.	121,0	155,8	11753	14714	64,0	72,2	125,7	171,4	12202	16183	66,4	79,5
Poland	180,6	259,1	4738	6823	42,1	49,4	165,5	280,0	4341	7374	38,6	53,4
Slovakia	72,8	88,9	13552	16351	84,4	92,9	71,9	92,2	13372	16954	83,3	96,3
Hungary	108,0	114,5	10744	11703	77,3	82,3	109,0	125,3	10840	12815	77,9	90,1

*Explanation: * - data from 2016 due to a lack of data from 2017.*
Source: Own study based on data from the World Bank

Thanks to the EU single market, the European countries are the most important partners for the Visegrad countries. It is worth noting that all Visegrad countries had over 70 % share of imports and exports in EU imports and exports in 2017. The most related EU country in terms of imports in 2007 was the Czech Republic with over 80 % share, while Slovakia was in relation to exports with over 87 % share. Ten years later, Slovakia out of V4 had the highest share of both imports and exports in EU imports and exports, respectively 79.8 % and 85.7 %.

Table 3: The share of the Visegrad Group trade with the EU countries

Country	Import		Eksport	
	2007	2017	2007	2017
The Czech Rep.	80,2 %	78,0 %	85,8 %	83,9 %
Poland	73,4 %	71,7 %	79,2 %	80,0 %
Slovakia	74,8 %	79,8 %	87,2 %	85,7 %
Hungary	69,8 %	76,1 %	80,4 %	81,2 %

Source: Own study based on Eurostat data

Data on foreign trade proved that Germany was the main partner in terms of imports and exports for each of the Visegrad countries, constituting at least 19 % of the import and export of the Visegrad countries in both 2007 and 2017 (table 4). An important fact is that to a large extent the Visegrad countries trade with each other, often being among the 'top five' trading partners. It might be surprising that the Czech Republic did not appear in the top five trading partners in the Hungarian imports and exports, and vice versa the Czech Republic did not have Hungary in this statistics. In turn, only the Czech Republic appeared in Polish exports, while in imports, Poland did not have any Visegrad country among the top five trading partners. Only Slovakia maintained relatively large trade relations with all partners of the Visegrad Group.

Table 4: International trade structure of the Visegrad countries by main trading partner countries

Country	IMPORT						EKSPORT					
	2007			2017			2007			2017		
	Trading partner	in € mld	%	Trading partner	in € mld	%	Trading partner	in € mld	%	Trading partner	in € mld	%
The Czech Rep.	Germany	27,5	31,8	Germany	43,1	29,9	Germany	27,5	30,7	Germany	52,6	32,6
	The Netherlands	5,8	6,8	Poland	13,2	9,1	Slovakia	7,7	8,7	Slovakia	12,3	7,6
	Slovakia	5,5	6,3	China	10,5	7,3	Poland	5,3	5,9	Poland	9,7	6,0
	Poland	5,4	6,3	Slovakia	8,4	5,8	France	4,9	5,4	France	8,2	5,1
	Austria	4,4	5,1	The Netherlands	7,5	5,2	UK	4,6	5,1	UK	8,0	5,0
Poland	Germany	35,1	29,0	Germany	57,9	28,0	Germany	26,5	25,9	Germany	57,0	27,5
	Russia	10,5	8,6	China	16,3	7,9	Italy	6,8	6,6	The Czech Rep.	13,3	6,4
	Italy	7,9	6,6	Russia	12,9	6,2	France	6,2	6,1	UK	13,3	6,4
	The Netherlands	6,9	5,7	The Netherlands	12,3	6,0	UK	6,1	5,9	France	11,6	5,6
	France	6,2	5,1	Italy	11,2	5,4	The Czech Rep.	5,7	5,5	Italy	10,2	4,9
Slovakia	Germany	9,5	21,5	Germany	14,2	19,3	Germany	8,9	20,9	Germany	15,4	20,6
	The Czech Rep.	7,7	17,4	The Czech Rep.	11,9	16,2	The Czech Rep.	5,6	13,1	The Czech Rep.	8,7	11,6

	Russia	4,0	9,1	Austria	7,5	10,1	Hungary	2,8	6,6	Poland	5,8	7,8
	Hungary	3,1	7,0	Poland	4,8	6,5	France	2,8	6,5	France	4,7	6,3
	Austria	2,4	5,3	Hungary	4,7	6,4	Italy	2,7	6,2	Hungary	4,5	6,1
Hungary	Germany	18,6	26,6	Germany	25,0	26,2	Germany	19,6	28,2	Germany	28,1	27,9
	China	5,4	7,7	Austria	6,0	6,3	Italy	3,9	5,6	Romania	5,4	5,4
	Russia	4,8	6,9	China	5,6	5,9	France	3,3	4,7	Italy	5,2	5,2
	Austria	4,2	6,1	Poland	5,2	5,5	Austria	3,2	4,6	Austria	5,0	5,0
	Italy	3,1	4,5	Slovakia	5,0	5,3	Romania	3,1	4,5	Slovakia	4,8	4,8

Source: Own study based on data from the World Bank

Conclusion

The Visegrad economies need to catch up with their western neighbours as well as the EU's average in terms of their economic welfare measured by GDP per capita. Although, the Visegrad economies had higher level of economic growth than the EU's average. It shows that these countries do have potential to be above the EU's average in terms of GDP per capita. Nevertheless, there is still a long way for them to economically converge with the EU's average. Majority of the international trade (over 70 %) of the Visegrad countries is done within the EU countries. The Visegrad countries very much depend on the trade with Germany as the number one trading partner. In general, the trade among the Visegrad Countries is vital, however, it could be increased in its volume and share.

In the analysed data there were quite high disparities among the Visegrad countries. It could be a wise move from the economic policy standpoint to start working together towards the same direction so that the whole Visegrad Group could benefit from it. Therefore, the Visegrad Group shall work much more intensive in order to focus on the economic aspects of their alliance. Further research on this topic might include economic policy analysis of the Visegrad Group in order to find some common goals that could be comprehensively addressed and established at the level of the Visegrad Group.

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Socio-Economic Features and Youths Participation in Agriculture in Selected Local Government Areas in Ekiti-State

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Abstract

Out of many other options to increase sustainable production of foods to feed its teeming population, Nigerian academics now focus on the possibility of motivating the youths into action in a labour intensive drive; finding reasons why Nigerian youths are not taking to farming. It is well known that a lot of young college and university graduates left the shores of Nigeria only to be engaged by strangers in cultivating plantations in foreign lands as a mean of livelihood. The shame of their discovery and the inability to raise adequate funds with which they would return home eventually keep them in long servitude abroad. Moreover, a lot of studies have ensued in regard of this, but none has been done or reported on Ekiti youths. This study fills the gap. A sample of 300 respondents from the population of youths was drawn using multistage sampling method. Five focal questions were raised in the study and two hypotheses were generated and tested using the binary probit regression analysis. Data were collected using a well-structured questionnaire; the research design could be described as a descriptive

survey. Study unveiled that the identified socio-economic determinants youth participation in agriculture are gender, age, marital status, religion, household size and their personal pleasure derivable from agricultural activities. It was also discovered that other things youths also need in Ekiti to encourage them in taking on agriculture include finance, awareness, training, fertile land, loan facility, power supply, loan facility, power supply, improved seedlings, fertilizer/agrochemicals availability, and machinery among others.

Keywords: Agriculture; Youth; Agribusiness; Farming

Introduction

Out of many other options to increase sustainable production of foods to feed its teeming population, Nigerian academics now focus on the possibility of motivating the youths into action in a labour intensive drive; finding reasons why Nigerian youths are not taking to farming. Youth has been defined by Djurfeldt et al (2019) as young people that have not attained adulthood and independence. In the words of Rasak et al (2019), the International Fund for Agricultural Development (2013) recognizes the fact that this group of people constitute a large share of the population in many less developed countries. Yet, only few of this huge proportion partake in agriculture (Essiet, 2014). Despite the fact that many of these young people were trained with money earned via farm practice, many of them after graduation detest farming. Some see it as very degrading. Some that take to if complain of the low rate of returns accruable from farming. They fail to see how rewarding cash cropping and agro-business could be.

It disheartens that a lot of young college and university graduates left the shores of Nigeria only to be engaged by strangers in cultivating plantations in foreign lands as a mean of livelihood. The shame of their discovery and the inability to raise adequate funds with which they would return home eventually keep them in long servitude abroad. Conversely, expatriates are here establishing agro allied ventures and making their million dollar rewards fast here in Nigeria. Hence, correcting the anomaly is so imperative.

For Africa to develop agriculture, the youth must be dully recognised and given adequate attention (Kelly, Singh and Zvenyika, 2017). They are catalysts in developing countries. It is well known that African youth are very talented, energetic and passionate in their commitments. If these attributes are diverted to agriculture, the youth can surmount whatever problems facing agriculture and thereby achieve food security. Kelly et al (2017) asserts that the youth is critical to agriculture development and must be accorded special attention.

Moreover, a lot of studies have ensued in regard of this, but none has been done or reported on Ekiti youths. This study fills the gap. There is dearth of empirical data on the determinants of youths` participation in agriculture in Ekiti State, Nigeria. Yet, agricultural development remains one of the most powerful trappings to end poverty and boost prosperity (World Bank, 2016). Moreover, Ekiti State comprises about 151 communities in 16 local government council areas. The economy enjoys tropical climate with substantial rainfalls every year. Moreover, the land yields bountifully in agricultural resources with a lot of food and cash crops. It is well known that Ekiti land constituted over 40% of the cocoa products of the famous old Western Region. Food crops like yam, cassava, and grains are grown in large qualities. Other notable crops such as kola-nuts and various fruits are also cultivated in commercial quantities. The State, which was created in 1996, has a total population of about 2.4 million (2006 Population Census) and covers a land area of about 6,353KM2. The state has a per capita income of US$1,169.

Nnadi and Akwiwu (2008) investigate the rate of youth's participation in agriculture, agro ventures participated in and the factors that determine their participation in Imo State, Nigeria.
Data were generated from 230 youths from the three agricultural zones of the state using questionnaire and interview schedule. These were analysed with the aid of frequency tables, simple percentage counts and logit regression model. The results show about 84% participation in land clearing, planting,

fertilizer application, collection of fodder for livestock etc. The participation was determined by their ages, education, marital status, parents` income, parents` occupation, household size and youths` dependence status. Study recommends institutional support services to the youths in agriculture and intervention strategies for youths` agricultural activities to be guided.

Nwaogwugwu and Obele (2017) studied the factors that limit youth's participation in agro-allied ventures in Eleme local government area of Niger Delta, Nigeria. Data were collected from a sample size of 112 respondents selected from a population of 1,895 (one thousand, eight hundred and ninety-five) youths in the 17 registered youth associations in the study area using 2-stage random sampling technique. 64% of the respondents are males; about 39.0% falls within the age of 26 and 30 years; about 54.0% of them are single. Data analysis was by the use of frequency, percentage, mean and factor analysis. The predominant Agrico based activities identified in the study area includes: crop farming, livestock farming, fish farming, fuel wood gathering and sales, farm labour services, agriculture product processing. Factor analysis result showed seven major factors that limit youth participation in agriculture as poor social values, poor agriculture support services, environment related land degradation factors, poor agricultural policies, industrialization, inadequate arable land and poor health conditions. The study recommends that credit facilities should be made available through micro-credit agencies and banks to whichever capable youth that wants to take on agriculture.

Prosper et al (2015) finds that age, sex, marital status, education level, family background, availability of rural credit facilities, land, agricultural knowledge, lack of job alternatives and perceptions are important factors associated with rural youth's participation in agricultural activities. The study set out to find the role played by agriculture to rural youth socioeconomic needs, types of agricultural activities which are engaged by rural youth and the factors which influence youth's participation in agriculture. Data were collected through questionnaires and interviews. Study found that majority of the respondents were attracted to invest more in their own farms rather than being employed as labour or involved in family farms. The study also reveals that rural youth in Kahe are provided with their socioeconomic needs through their participation in agriculture.

Cheteni (2016) uses a binary logistic model to analyse the determinants of youth participation in agriculture in the Nkonkobe Municipality, South Africa. A total of 140 youth were purposively selected for the study to complete a survey. The results show that the variables; youth programmes, programme availability, and resources were statistically significant in explaining the factors that affect youth participation in agricultural activities. Based on the study findings, it is recommended that in order to influence youth participation, they should be provided with youth programmes and resources.

Study Objectives

To investigate reasons for low participation in agriculture by youths in Ekiti
To identify the determinants of youth participation in agriculture in Ekiti
To investigate the possibility of reversing the trend

Research Methods

This study employed the primary method of data collection. The study was conducted in Ekiti State, Nigeria. To address the specific objectives of the study, three local government council areas were selected at random from the existing 16 local government council areas that make the State. Using Cochran's (1977) formula for selecting sample size, a sample of 100 respondents was decided and selected from the youths' population in each of the local government council areas that the study covers. Data were collected with copies of a well-structured questionnaire.

Three local government council areas (Oye, Ido/Osi, and Moba local government) of the state were selected for this study. It was believed that this would enable a rich harvest of the inherent peculiarities of the target population relative to agriculture. Cogent focal research questions were raised in the study and two hypotheses were generated and tested at 0.05 level of significance. The study adopts table and percentages to describe the socio-economic characteristics of Ekiti state youths and their level of

participation in agriculture. Also, econometrics analysis was adopted using binary regression to estimate the level of impact of each of the identified socio-economic factors on youth participation in agriculture.

Econometric model

$$Y\text{-}AGRIC = \alpha + \beta_1 GEN + \beta_2 AGE + \beta_3 MAR + \beta_4 OCC + \beta_5 REL + \beta_6 EDU + \beta_7 HHS + \beta_8 EMP + \beta_9 INC + \beta_{10} WIS + \beta_{11} ENJ + \mu$$

Table 1: Binary Regression Variable Description and their Measurements

Variable	Variable Description	Variable Structure On Questionnaire	Response Categories and their codes
Y-AGRIC	Youth participation in agriculture	Have you engaged yourself in agriculture/agriculture related activities before?	1=If engaging in agriculture, 0= If otherwise
GEN	Gender	Gender	1= If male, 0= If otherwise
AGE	Age	Age bracket in year	1= If between 15 – 25, 2= If between 25 – 35, 3= If between 45 – 55, 4=If above 55
MAR	Marital status	Marital Status	1=If single, 2=If married, 3=If divorce, 4=If cohabiting
OCC	Occupation	Occupation	7= If public servant, 6=if trader, 5=If artisan, 4=If transporter/okada, 3=If student, 2=If unemployed , 1=If others
REL	Religion	Religion	3=If Christianity, 2=If Islam, 1=If Traditional Worshiper, 0=If others
EDU	Education	Highest Educational level	6=If postgraduate, 5=If HND/Degree, 4=If undergraduate, 3=If NCE/OND/Diploma , 2=If School Cert/SSCE, 1= If Primary School, 0=If No School
HHS	Household Size	Number of people in your family	Open ended
EMP	Employment status	Are you currently employed?	1=If Yes, 0=If otherwise
INC	Income from employment	If you work with government or private sector, what is your total income per month?	1= if Less than 20,000, 2= if between 21000-50000, 3= if between 51,000 and above
WIS	Preferred Job/Wish	What kinds of employment do wish to fully settle down with if you are opportune?	1= If Salary job, 2=if Personal business, 3= if others
ENY	Employment Enjoy	What nature of employment do you enjoy?	1= If full time, 2= If part time 3, If casual labour
α	Intercept		
β_1 - β_{11}	Parameter Estimates		
μ	Error Term		

Source: Authors' Computation, 2020

Table 2: Results of the Regression Analysis

Variable	Co-Efficient	Robust Standard Error	Z-Statistics	P-Value
*GEN**	-0.827931	0.476377	-1.737973	0.0822
*AGE****	-1.297380	0.462453	-2.805431	0.0050
*MAR***	1.654874	0.690870	2.395348	0.0166
OCC	-0.140225	0.127177	-1.102593	0.2702

*REL**	-1.031395	0.530760	-1.943242	0.0520
EDU	0.088528	0.151304	0.585101	0.5585
*HHS***	0.310571	0.123491	2.514929	0.0119
EMP	0.087704	0.336001	0.261022	0.7941
INC	-0.571636	0.400539	-1.427169	0.1535
WIS	0.545176	0.433100	1.258778	0.2081
*EJY**	0.630480	0.323863	1.946751	0.0516
Intercept	1.887690	1.999160	0.944242	0.3450

**** Statistically significant at 10 percent level of significance*
*** Statistically significant at 5 percent level of significance*
** Statistically significant at 1 percent level of significance*

Table 3: Percentage distribution Showing the Socio-demographic and economic Characteristics of the Respondents on Socio-Economic Determinants of Youth Participation in Agriculture in Oye, Ido/Osi and Moba Local Government Areas of Ekiti State, Nigeria

Variables	Frequency	Percentage
Age Brackets		
15 – 20	199	67.46
25 – 35	79	26.78
36 – 55	11	3.73
Above 55	6	2.03
Total	295	100.00
Responses to the question on if agriculture be left for old people alone		
No		
Yes	201	80.40
Total	49	19.60
	250	100.00
Education		
No school	7	2.46
Primary school	4	1.40
SSCE	50	17.54
NCE/OND/Diploma	82	28.77
Undergraduate	31	10.88
HND/Degree	72	25.26
Postgraduate	39	13.68
Total	285	100.00
Gender		
Male	153	51.87
Female	142	48.14
Total	295	100.00
Religion		
Others	2	0.67
Traditional Worshiper	8	2.69
Islam	49	16.50
Christianity	238	80.13
Total	297	100.00

Marital Status		
Single	249	83.56
Married	36	12.08
Divorced	9	3.02
Cohabiting	4	1.35
Total	298	100.00
Responses to the question: Are you aware that you can be self employed through agriculture/agric related business?		
No	46	15.45
Yes	252	84.56
Total	298	100.00
Responses to the question: what nature of employment do you enjoy?		
Casual Labour		
Part time	14	4.96
Full time	56	19.86
Total	212	75.17
	282	100.00
Responses to the question: what kinds of employment do wish to fully settle down with if you are opportune?		
Salary job	147	53.07
Personal business	116	41.88
Others	14	5.05
Total	277	100.00
Responses to the question: are you currently employed?		
No	179	61.51
Yes	112	38.49
Total	291	100.00
Occupation of the respondent		
Unemployed	28	9.59
Student	28	9.59
Transporter/Okada	117	40.07
Artisan	31	10.62
Trader	9	3.08
Public servant	25	8.56
Total	54	18.49
	292	100.00
Average monthly income ff employed		
Less than ₦20,000	82	57.75
₦21,000 – ₦50,000	35	24.65
₦51,000 and above	25	17.60
Total	142	100.00
Responses to the question on what youths really need to make agriculture interest them		
Awareness	84	28.67
Training	69	23.55
Fertile Land	39	13.31
Loan facility	53	18.09
Power supply	4	1.37
Improved seedlings	10	3.41
Fertilizer/Agrochemicals availability	11	3.75
Machinery	21	7.17
Others	2	0.68
Total	293	100.00

Responses to the question on why youths abstain from agriculture		
Stressful		
Dirty	31	13.48
Unprofitable	17	7.39
No land	51	22.17
No access to fund	35	15.22
No access to farm machinery	62	26.96
Low market demand for agriculture produce	9	3.91
Poor yields	12	5.22
All of the above	4	1.74
Others	4	1.74
Total	5	2.17
	230	100.00
Responses to further question on why most youth refuse to engage in agriculture		
No access to land	65	22.26
Lack of interest	67	22.95
Lack of finance	90	30.82
Laziness	50	17.12
Low profit prospects	16	5.48
Others	4	1.37
Total	292	100.00

Source: Authors' Computation, 2020

Age

Age is a crucial factor to reckon with in farming. Labour intensive farming requires vigour and vitality; such that are found in African youths. In the words of Djurfeldt, et al. (2019), youths are perceived within the villages to be hardworking, capable, strong, and eager to improve their farms. Even when grown, the 'older farmers are expected to make sound farming decisions, ensuring sustainability of their projects; forecasting and guarding against risks' (Douglas et al, 2017). Ekiti State can be described as a growing economy. As Table 3 above indicates, 67% of responses classifies under age 20. Study found the highest frequency between 15 and 20 years old. The remaining 31% constitute the youth. Only 2% is above 55 years of age. Also, the regression result in Table 2 above shows that the age is one of the statistically significant socio-economic determinants of agricultural participation. Hence there is well over 100 percent probability that a randomly selected individual from among the respondents will not engage in agriculture as they reach certain age.

The perception of the population regarding the embrace of agriculture by the youth and the elderly was also revealed in Table 3 above. Out of the 250 that responded to the question on if agriculture should be left for the aged people alone, 201 did not support the idea of leaving farming to the aged people alone. African youths are very energetic and could therefore execute labour intensive farming practice that the system promotes. This figure represents over 80% of the respondents. Precisely, 84.56% responded to affirm that agriculture could make them self-employed, while 91% of the respondents believe that agriculture could turn around the nation Nigeria's fortune.

Education

Table 3 above also shows the level of literacy of Ekiti youths. Out of 285 respondents to the question, only 7 (2.46%) did not obtain or complete formal education. Probably, these seven respondents took to trade apprenticeship very early in life; or that they attended Islamic schools. The table shows that the youths in Ekiti are of the elite class. Approximately 80% attended higher institutions, with 67% already with their certificates obtained. This is out of the entire population of 285 respondents, 97% of which has formal education. It should be noted that despite their chosen professions and mandatory education, the tendency is very high that these personalities still practice farming. They are better enlightened on

modern farm technology that improves production. This is contrary to the opinion of Ahaibwe et al (2013) that the agriculture sector employs the least educated labour force.

Gender

Data collected on the gender balance of respondents and their religious affiliations are also revealed in Table 3 above. Even though male youths are more energetic in the fields, Ekiti women are known for animal husbandry, bees and poultry keeping. Among the 295 respondents, 153 (51.87%) are male, while 142 (48.14%) are female. Out of these, 249 (83.56%) are not married. Even though there are Muslim youths and youths from other religions, Christian youths dominate the survey. 238 (80.13%) Christian youths partook in the survey. While 16.50% were Muslims, 8% were traditional worshipers; and others atheists. Religion has nothing to influence Ekiti youths' participation in agriculture. The youths were seen to be more concerned with their economic relevance to their households and the society at large rather than to religious affiliations. In their common parlance, affluence propels a gratifying heart. In the same vein, the regression result shown in Table 1 above reveals that there is about 83 percent probability that a selected youth engaging in agriculture in Ekiti state will be male as again 17 per cent probability for female.

Marital status

Moreover, majority of the respondents were not yet married. This is shown in Table 3. Out of 298 respondents, only 36 (i.e. 12.08%) were married. What a growing population Ekiti has. This is an indicant of a bright future for food security in Ekiti, if the youths' conscience could be captured now and convinced to take up lucrative career in agriculture. It can also be established in the econometric result that there is also higher probability that youth engaging in agriculture in the state will be married.

Social economic factors of influence

In consideration of the key social economic factors that we believe could influence youth participation in agriculture; we put forth a question on what youths really need most that could encourage them to engage in agriculture. The responses obtained are as presented in Table 3 above.

The factors as shown in the table include youths' awareness of government backing them up to involve themselves in agriculture. Others include special trainings organised to enlighten them on various modern techniques to handle the different areas of farming; availability of fertile land that they could cultivate; finance; power supply; provision of improved seedlings; provision of fertilizers and other agro-chemicals; and the provision of requisite machinery and other farm implements that can make agriculture less risky and more appealing to take up as a career. 293 respondents attended the question, among whom 84 (i.e. 28.67%) affirm that the awareness that government want them in agriculture would boost youth partaking in agriculture.

As shown in the table, 23.55% responses chose that trainings (organised) are needed to boost their interest in agriculture. Trainings in this regard have to do with being able to read the reasons for planting and for harvesting profitably. It involves being trained to efficiently handle each crop and the farm implements with which the crops are produced.

Next to this is the issue of agriculture finance. The unwillingness of banks and finance houses to advance credits to farmers is on the increase due to the inherent risks involved. The youths in Ekiti, as shown in the collated data, preferred that adequate provision of agriculture loans would grossly encourage them to go into agriculture. Such funds could be used to go into agro-business, purchase fertile lands, purchase the necessary farm implements and obtain requisite agro-chemicals.

The relevance of fertile land to farming, as preferred by the respondents, is further stressed by 39 respondents that chose fertile land as the most needed factor to engage the youths in agriculture. That is 13.31% of the 293 respondents. The other influential factors include the provision of requisite machinery to aid cultivation, weeding, and harvesting. 21 (7.71%) respondents desired this. Then, is

the provision of improved seedlings, fertilizers, and agro-chemicals, which the respondents believed could be bought individually if they have the means. The provision of electricity to farms they believed would enhance farm settlements, and promote irrigation systems on the farms.

Challenges faced by youths in farming

The study traced out the problems that Ekiti youths face in agriculture to include paucity of funds and non-profitability of farming, others include lack of access to fertile lands and inherent stressfulness of farming; dirtiness and low market demand for farm produce. Equally added to these is the fact that they lack the financial capability to possess modern machinery and poor farm yield. All these are captured as reported in Table 3. These claims are further buttressed in the same Table 3.

As shown in Table 3, from 292 responses to youths' impediment to agriculture, 90 responses indicate lack of finance. That is about 31% of the total responses. 22.26% claims no access to land, and about 23% responses claim lack of interest in farming. Only 5% of the respondents claimed low profitability as their challenge in farming.

Conclusion

With the above results, one could conclude that Ekiti youths can improve involvement in agriculture if some factors are properly considered and appropriately taken care of by the right quarters. Ekiti youths need to be encouraged by the government. Socio-economic factors that pose challenges to them are not insurmountable. It seems that paucity of funds and access to arable lands poses great challenges to the youths. This reveals that successive government in Ekiti have not been really determined to assist in driving youths to agriculture. Equally, it can be deduced from the study that no financial institution has been drifted to assist in financing agriculture in Ekiti. Neither is any forum put in place to promote this among the youths.

Recommendations

Study found out that what youths really need most in Ekiti to encourage their taking on agriculture include finance, training, and fertile land. Added to these are improved seedlings, fertilizer, agrochemicals, modern farm equipment, and regular supply of electricity to power their gadgets. In view of this, we would recommend that government should design the appropriate policies and create such structures that can contain all the identified challenges.

A well standardized market structure could be arraigned by the state and the local governments tailored towards buying agricultural produce in huge quantities from farmers. Not only buying them for standardized storage, the state government could harness these products and process them for industrial consumption and for exportation if found excessive. Doing this would not only encourage more production, it would improve industrial growth, create more jobs, and generate progressive employment. Moreover, in the words of Rybakowa (2013), as cited by Bednaríkov a et al. (2016) government support is not enough to motivate people to agriculture (Rybakowa, 2013)

Moreover, we acknowledge the finance approved for publishing this article, which Landmark University, Nigeria supplied. It is our hope that tertiary institutions in and around Nigeria will emulate and adopt the laudable gesture.

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Different Presentation Formats of Corporate Financial and Non-Financial Environmental Information and Judgment Accuracy

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Abstract

Information presentation format can influence decision-maker behaviour. The aim of the paper is to compare different information presentation formats in terms of accuracy of judgment on corporate environmental performance. Altogether five presentation formats have been examined: tabular, textual, graphical in form of line and bar graphs and mixed. Subjects of an experiment have been provided with financial and non-financial environmental information on four companies. Judgment accuracy has been measured as the percentage of correct responses to total possible responses of the subjects. The research findings reveal that judgment accuracy can be worsened by using the mixed information presentation format as compared to other homogenous presentation formats. The tabular, textual and two graphical formats do not differ significantly from each other in terms of influence on judgment accuracy.

Keywords: Environmental Information, Information Presentation Format, Cognitive Fit Theory

Introduction

According to the findings in the psychology and economics research the way in which a problem is presented or framed affects the decision makers' perception of the problem and their preferences. This effect is called a framing effect. For example, people may make different choices depending on how possible outcomes of a gamble are pictured: as gains or losses (cf. Tversky and Kahneman, 1981). The influence of the information presentation format on information users is another example of framing effects in a broad sense. Information presentation format is the method used to disseminate information to users (Kelton et al., 2010, p. 79). In the case of corporate financial and non-financial reporting the following presentation formats can be distsinguished: textual, tabular, graphical, audio file and video formats. These different presentation formats of information may affect decision-makers'search behaviour, affective responses, decision accuracy, cognitive effort, functional fixation and satisfaction, persuasion and recall (Ghani et al., 2009, p. 185). Choosing the proper format of presenting corporate good (or bad) performance in order to make stakeholders perceive positively a company may be a part of a company's disclosure strategy, i.e. impression management (Beattie and Jones 2000, Jones 2011). The aim of the paper is to compare different information presentation formats in terms of accuracy of judgment on corporate environmental performance. Altogether five presentation formats have been examined: tabular, textual, graphical in form of line and bar graphs and mixed. The following hypothesis was formulated: The accuracy of answers to questions on corporate environmental performance depends on presentation format of information provided.

The rest of paper is organized as follows: the second section presents the literature review, the research method is described in the third section; research findings are discussed in the fourth section. The last section contains concluding remarks.

Literature Review

Early accounting behavioural research focused primarily on content of financial information and disregarded presentation format and its linkages to decision-making performance (Ghani et al., 2009,

p. 185). With time this issue has gained growing interest among accounting and psychological researchers, among others due to the development of new forms of information presentation like interactive data visualization. For example Dull et al. (2003) in an experimental research explored the effect of hypertext links on users' judgment processes on the example of one large and one small test companies. Their findings indicate significant differences in predictions, the amount of information accessed, and the time to make decisions when using financial statements prepared with or without hypertext links for the small company and no differences for the large company. Hyperlinked financial information was compared to paper-based financial information in the study of Kelton and Pennington (2012) as well. According to their research results, hyperlink users used less effort on the investment-related judgments and decisions than users of paper-based information. Perdana et al. (2019) examined the appropriateness of interactive data visualisation for non-professional investors' use when they access accounting information. They found that this presentation format mitigates subjects' restricted investment capabilities by presenting more salient information, thus reducing their cognitive effort. The influence of graphical and color-enhanced information presentation on decision making was examined by Benbasat and Dexter (1985). According to their research results, color influences decision-making quality especially of the people who exhibit so called field dependence i.e. their cognitive style consists in relying more on external cues rather than internal cues.

Many studies examine effects of alternative presentations of tables versus graphs on understanding, perception, judgment, decision usefulness, confidence and other aspects of decision making (e.g. Cardinaels (2008), Coll (1992), Davis (1989), Hard and Vanecek (1991), Harvey and Bolger (1996), Jatiningsih and Solihin (2011), MacKay and Villarreal (1987), Mertins and White (2016), Remus (1984), Schulz and Booth (1995), So and Smith (2004), Strong and Portz (2003), Volkov and Laing (2012)).

One of the theories explaining how different presentation formats affect decision-making performance, concerning especially tabular versus graphical format problem, is Vessey's cognitive fit theory. This theory assumes that if the information emphasized in the representation type and that required by the task type match, task performance will be improved in terms of speed and accuracy of problem-solving. Vessey (1991) distinguishes graphical and tabular representations that present the same information in different ways; i.e. graphical representations emphasize spatial information (figurative information), while tables emphasize symbolic information (discrete data values). Analogously tasks can be differentiated into into spatial and symbolic ones, depending on the type of information that facilitates their solution. The link between representation and task is provided by the perceptual and analytical processes (or strategies). Using perceptual processes enables solving spatial tasks as they require perceiving the problem as a whole and the relationships in data or comparing two or more values. Analytical processes are useful in solving symbolic tasks because they involve extracting or analyzing discrete data values or decomposing data into separable elements.The cognitive fit theory may be relevant to judgment strategies because they can be characterized as the particular combination of elementary information-processing tasks that are employed to arrive at a judgment (Tuttle, Kershaw, 1998, p. 2). Holistic strategies tend to use elementary information-processing tasks that are spatial in nature, whereas analytical strategies tend to emphasize elementary information-processing tasks that are symbolic (Tuttle, Kershaw, 1998, p. 4). Table 1 presents information presentation formats appropriate for the two judgment strategies and corresponding elementary information processing tasks. According to cognitive fit theory, when information emphasized in the representation type and that required by the task type do not match (i.e. graphs versus symbolic tasks or tables versus spatial tasks), an additional cognitive effort is required to reach a conclusion and decision accuracy can be lower and/or decision speed can be higher. For example, under tabular format in order to identify the highest value (spatial task) several pairwise comparisons are needed until the highest value is obtained. In contrast, the answer can be found directly from e.g. a bar graph (Tuttle, Kershaw, 1998, p. 3).

The results of studies aiming at validating cognitive fit theory have been conflicting therefore researchers began to examine other variables, in addition to presentation format and task, which may influence decision-making effectiveness such as motivation, experience or accounting knowledge (Strong and Portz, 2003).

Table 1: Judgment strategies, elementary information processing tasks and information presentation format

Judgment strategy	Information processes emphasized in strategy	Typical elementary information processing tasks	Information presentation format
Holistic	Spatial	Thinking about the data as a whole Comparing multiple pieces of information Identifying relationships among the data Looking at multiple values simultaneously	Graphical
Analytic	Symbolic	Extracting or analyzing discrete data values Decomposing data into separable elements Using the data to perform computations	Tabular

Source: B. M. Tuttle, R. Kershaw (1998). Information Presentation and Judgment Strategy from a Cognitive Fit Perspective. Journal of Information Systems, 12(1), p. 5.

Studies on effects of information presentation format often explore judgment (decision) accuracy, i.e. making an incisive judgment (decision). The general inference from these studies indicates that judgment accuracy can be (depending on some circumstances like e.g. information and task complexity or decision-maker's experience) enhanced by using the proper information presentation format (Amer (1991), Dull and Tegarden (1999), Hard and Vanecek (1991), Hirsch et al. (2015), MacKay and Villarreal (1987), Sithole (2016), Speier (2006), Stock and Watson (1984)).

The influence of presentation format on decision making has been examined with regard to the time taken to make decisions as well. The importance of this issue results from the fact that 'even small improvements in decision-making time can, in a broader perspective, result in significant resource savings' (Amer, 1991, p. 26). The study conducted by Tuttle and Kershaw (1998) showed that with an analytic strategy judgment time was significantly greater for graphs than for tables but with a holistic strategy judgment time did not differ statistically between the two presentation formats. Tuttle and Kershaw suggest that in the first case different amounts of time were exerted to achieve similar levels of judgment accuracy under the two presentation formats. (1991) examined the amount of time subjects took to complete integrative and selective tasks: determining the bond rating of firms and assessing the debt covenant violations of firms. According to his findings, the form in which the financial accounting information was displayed, influenced the total time taken to make decisions. The numerical display took the shortest time, followed by the polygon display, the bar graph, and the face graph. In the experiment performed by Hirsch et al. (2015) subjects were required to evaluate eight different business units based on four equally valued targets (sales, profit margin, first pass yield and delivery reliability). The information provided to them was either presented as tables only, or in tables and graphs. The empirical results show that supplementary graphs improve decision quality without an increase in decision time. On the contrary to these studies, Benbasat and Dexter (1985) did not find significant differences for decision time among analyzed presentation formats i.e. tabular, graphical, unicolored and many-colored.

Research Method

The aim of the experiment was to compare different information presentation formats in terms of judgment accuracy. The experiment was conducted in 2019 and a total of 150 students from AGH University of Science and Technology took part in it. Participants were randomly assigned to one of five groups of 30 persons each. They were requested to answer the following questions concerning

environmental performance of four companies (power plants): Alpha Inc., Beta Inc., Theta Inc. and Gamma Inc.:

1. In which firm (or firms) was the NOx emission intensity in 2018 higher than in 2016?
2. In which firm (or firms) was the CO_2 emission intensity in 2018 higher than in 2016?
3. Which firm was the best in terms of SO_2 emission intensity in 2018?
4. Which firm was the worst in terms of NOx emission intensity in 2016 ?
5. Which firm held second position in terms of CO_2 emission intensity in 2017?
6. Which firm held second position in terms of dust emission intensity in 2018?
7. In which firm (or firms) did the environmental charges exceed 800,000 EUR in any year?
8. In which firm (or firms) was the decline of environmental charges continuous in 2016-2018 ?
9. In which firm (or firms) was the growth of waste recycling and recovery level continuous in 2016-2018 ?
10. Which firm spent the most on the environmental protection in terms of the relation of environmental capital expenditures to total capital expenditures in 2018?
11. Which firm was the best in terms of overall environmental performance in 2018?
12. Which firm was the worst in terms of overall environmental performance in 2018?

The allotted time for responses was seven minutes. Subjects were explained that:

- the best (worst) firm in terms of emission intensity means the firm with the lowest (highest) emission intensity,
- the lower SO_2, NOx, dust, CO_2 emission intensity and environmental charges, the better environmental performance of a company.
- the higher level of waste recycled or recovered and environmental capital expenditures, the better environmental performance of a company.

Group 1 received information on four companies in the mixed format:

- the information on Alpha Inc. was presented in tabular format (cf. Tables 2 and 3),
- the information on Beta Inc. was presented in textual form,
- the information on Theta Inc. was presented in form of line graphs (cf. Figures 1-5),
- the information on Gamma Inc. was presented in form of bar graphs (cf. Figures 6-10).

With regard to Beta Inc. subjects in group 1 were provided with the following text:

„The emission intensity ratios for Beta Inc. totaled in 2016-2018 as follows:
- SO_2 (in tonne per MWh): 0.241 in 2016, 0.235 in 2017 and 0.229 in 2018
- NO_X (in tonne per MWh): 0.342 in 2016, 0.347 in 2017 and 0.343 in 2018,
- dust (in tonne per MWh): 0.019 in 2016, 0.018 in 2017 and 0.018 in 2018,
- CO_2 (in tonne per kWh): 0.652 in 2016, 0.649 in 2017 and 0.645 in 2018.

The level of waste recycled or recovered (as percentage of total waste generated) amounted to 69% in 2016, 72% in 2017 and 74% in 2018.

The Company was obliged to pay environmental charges: 289.20 thous. EUR in 2016, 274.58 thous. EUR in 2017 and 255.51 thous. EUR in 2018. Capital expenditures on environmental protection amounted to 21.080 mln EUR in 2016, 22.800 mln EUR in 2017 and 20.600 mln EUR in 2018 whereas total capital expenditures came to 76.701 mln EUR, 98.880 mln EUR and 71.470 in these years respectively".

Group 2 was provided with information on all companies only in textual format, i.e. companies Alpha Inc., Theta Inc. and Gamma Inc. were presented in the similar way as Beta Inc. in group 1. Subjects in group 3 and 4 had all infomation set out only in form of line graphs and bar graphs as in Figures 1-5 and 6-10 respectively. Environmental information only in tabular format was provided to subjects in group 5.

Judgment accuracy was measured as the percentage of correct responses to total possible responses. Subjects were asked to answer the question concerning the perceived difficulty to complete the task (i.e. environmental performance judgment): 'How do you assess the difficulty of answering the questions on the basis of information provided?'. The possible responses were on the 5-point Likert scale (1- definitely easy, 2- rather easy, 3- neither easy, nor difficult, 4 – rather difficult, 5 – definitely difficult).

Table 2: SO_2, NOx, dust and CO_2 emission intensity and waste recycled or recovered – Alpha Inc

Specification	Unit	2016	2017	2018
SO_2 emission	tonne/MWh	0.747	0.659	0.649
NOx emission	tonne/MWh	0.924	0.677	0.670
Dust emission	tonne/MWh	0.022	0.022	0.022
CO_2 emission	tonne/kWh	0.871	0.862	0.854
Waste recycled or recovered	% of total waste generated	48	53	50

Table 3: Environmental charges and environmental and total capital expenditures – Alpha Inc.

Specification	Unit	2016	2017	2018
Environmental charges	thous. EUR	723.00	686.85	618.17
Environmental capital expenditures	mln EUR	6.578	5.240	5.896
Total capital expenditures	mln EUR	54.400	78.500	62.300

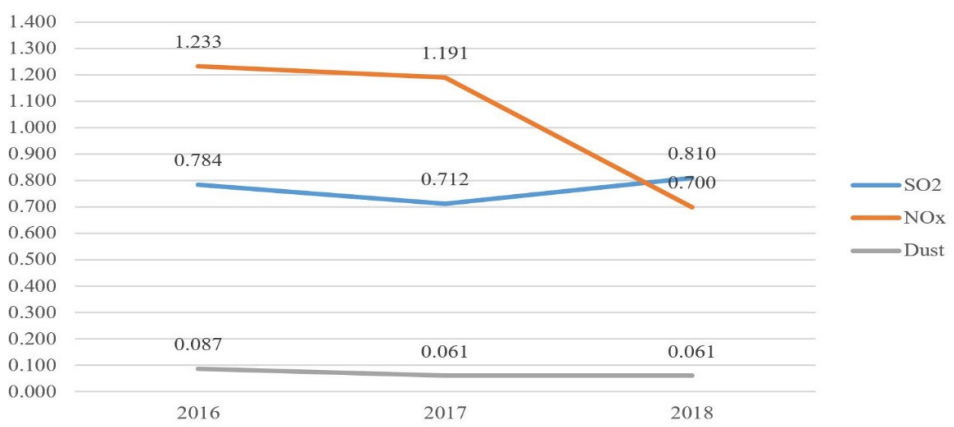

Fig. 1: SO_2, NO_x and dust emission intensity (in tonne per MWh) - Theta Inc.

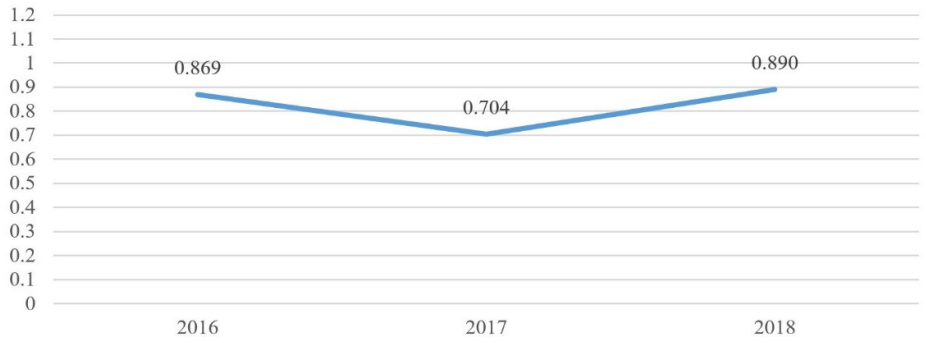

Fig.2: CO_2 emission intensity (in tonne per kWh) – Theta Inc.

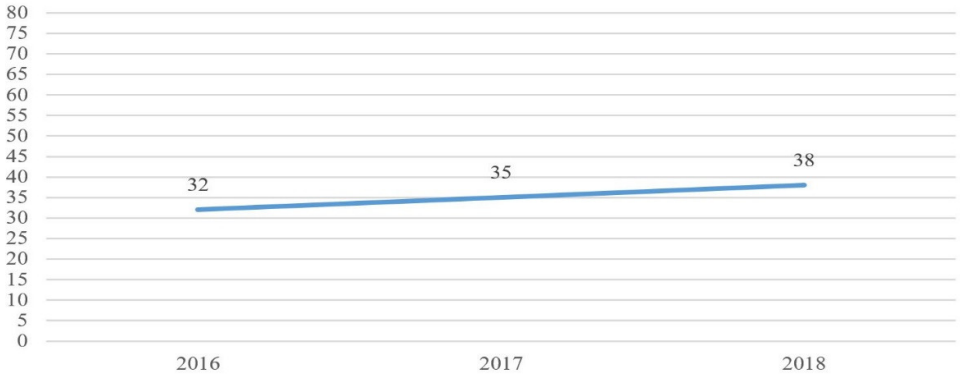

Fig. 3: Waste recycled or recovered (in % of total waste generated) - Theta Inc.

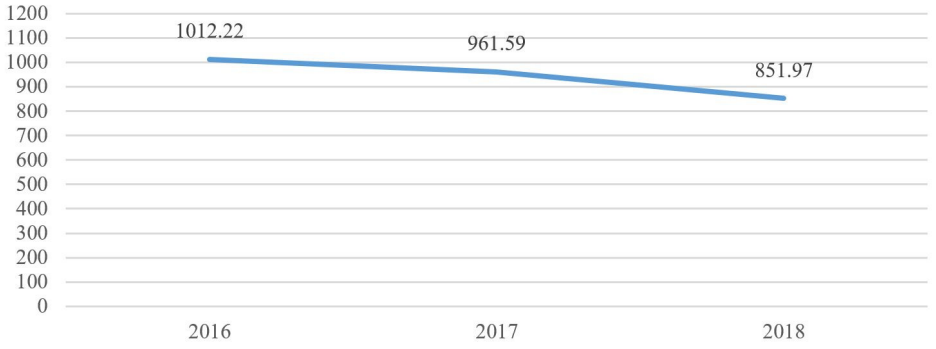

Fig. 4: Environmental charges (in thous. EUR) – Theta Inc.

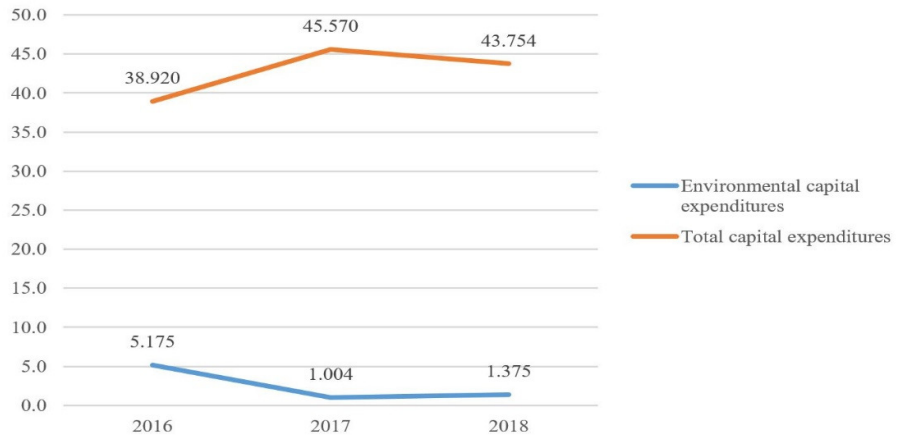

Fig. 5: Environmental and total capital expenditures (in mln EUR) – Theta Inc.

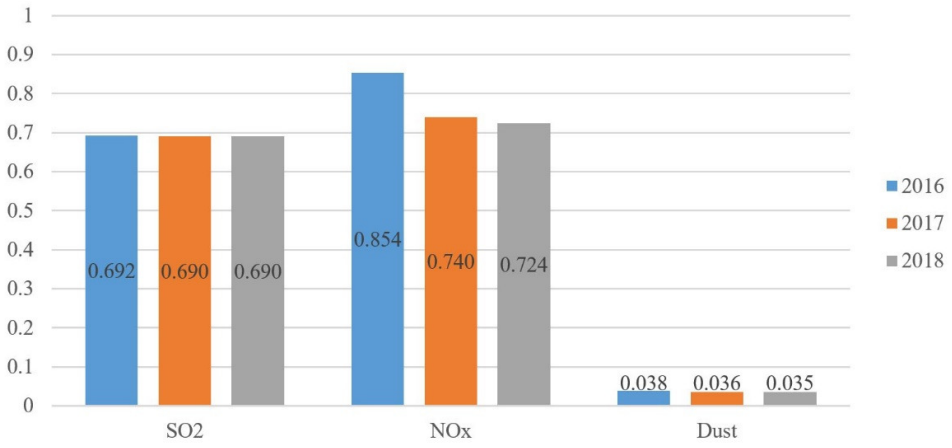

Fig. 6: SO_2, NO_x and dust emission intensity (in tonne per MWh) - Gamma Inc.

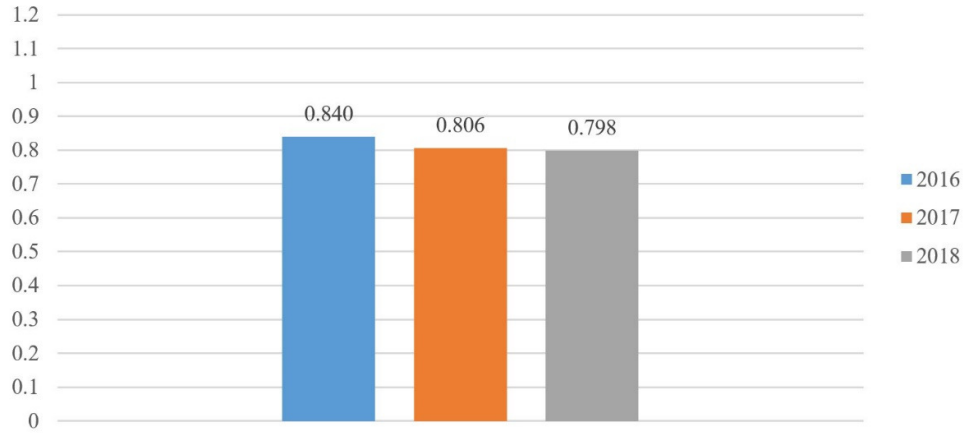

Fig.7: CO_2 emission intensity (in tonne per kWh) – Gamma Inc.

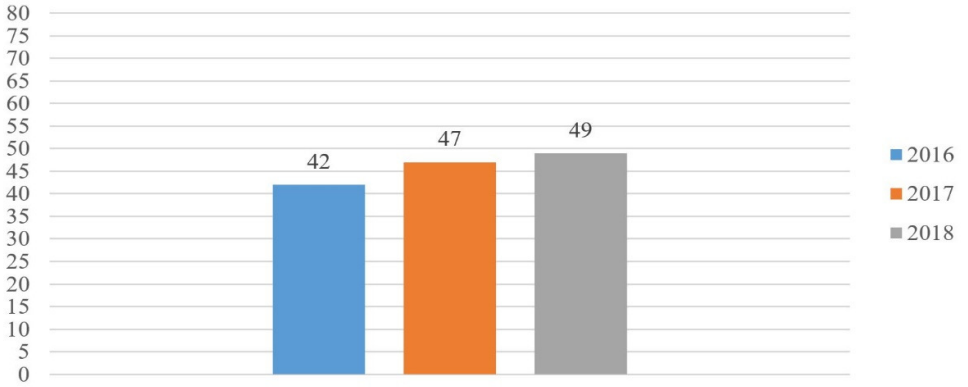

Fig. 8: Waste recycled or recovered (in % of total waste generated) - Gamma Inc.

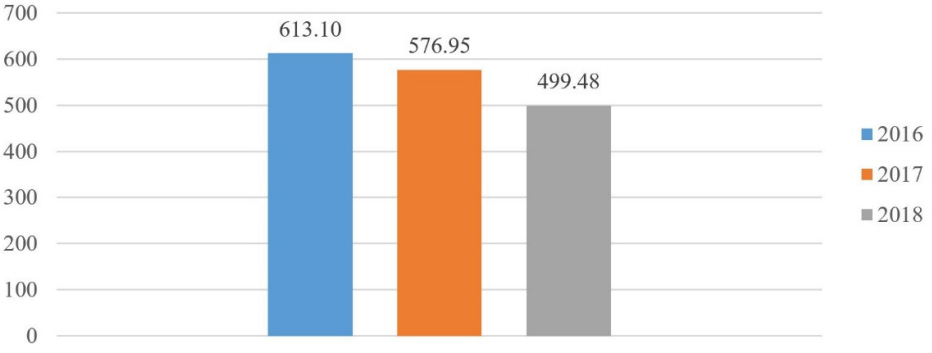

Fig. 9: Environmental charges (in thous. EUR) – Gamma Inc.

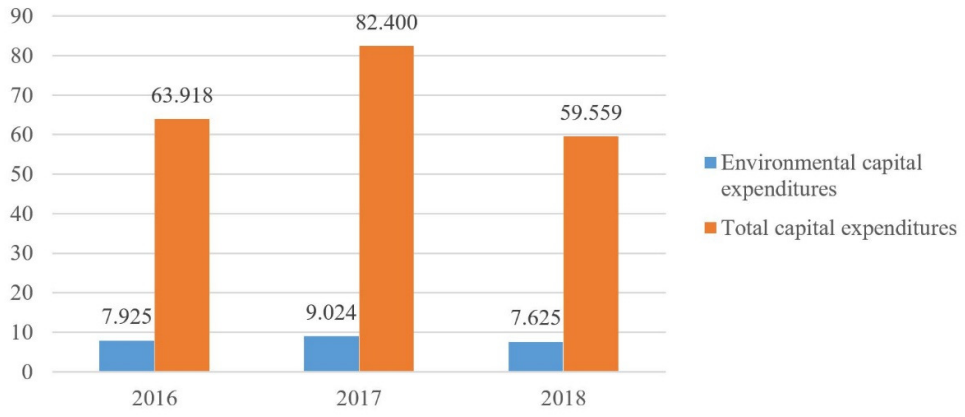

Fig. 10: Environmental and total capital expenditures (in mln EUR) – Gamma Inc.

Research Results

Table 4 presents descriptive statistics for judgment accuracy regarding environmental performance in five analyzed information presentation formats. On average the participants who were provided with environmental information in form of tables achieved the highest score on judgment accuracy (88.1%), followed by the participants using the information in forms of bar and line graphs and these using textual information (84.4%, 83.1% and 81.1% respectively). The lowest average score was observed in the group provided with environmental information in mixed presentation format (65.8%). The two most difficult questions, i.e. with the lowest judgment accuracy score, were these concerning the best firm and the worst one in terms of overall environmental performance in 2018.

The Shapiro-Wilk normality test (cf. Table 4) showed that the the assumption of normality of judgment accuracy scores for different presentation formats had not been met so one-factor ANOVA test for independent measures is not suitable for comparing these formats. Therefore the non-parametric equivalent to ANOVA - the Kruskal-Wallis test - was used in order to evaluate differences between samples.

The p-value corresponing to the H-statistic of Kruskal Wallis test (H =24.4182) is .00007, suggesting at the .05 level of significance that the one or more presentation formats are significantly different. In order to identify which of the pairs of presentation formats are significantly different from each other Bonferroni multiple comparison post-hoc test was used. All possible pairs for simultaneous comparison has been considered. According to the results of the Bonferroni test (cf. Table 5) that significant differences have been observed only for four presentation format pairs (at the level of significance of .05):
- mixed versus textual,
- mixed versus graphical (line graphs),
- mixed versus graphical (bar graphs),
- mixed versus tabular.

This means that judgment accuracy can be worsened by using the mixed information presentation format as compared to other homogenous presentation formats. The tabular, textual and two graphical formats do not differ significantly from each other in terms of influence on judgment accuracy. Thus the formulated hypothesis is thus partially confirmed.

Table 4: Descriptive statistics for judgment accuracy in different information presentation formats

Presentation format	Mean	Median	Min	Max	SD	Shapiro-Wilk test	
						W-statistic	p-value
Mixed (n=30)	65.84	58.33	25.00	100.00	19.48	0.9223	0.0309
Textual (n=30)	81.11	83.33	50.00	100.00	17.47	0.9215	0.0293
Tabular (n=30)	88.06	91.67	50.00	100.00	12.51	0.8292	0.0002
Graphical (line graphs) (n=30)	83.61	87.50	41.67	100.00	15.24	0.8892	0.0046
Graphical (bar graphs) (n=30)	84.44	83.33	50.00	100.00	14.14	0.8982	0.0076

Table 5: Results of Bonferroni multiple comparison test for judgment accuracy in different information presentation formats

Presentation format pairs	Bonferroni t-statistic	Bonferroni p-value	Bonferroni significance
Mixed vs textual	3.8646	0.0017	significant (p <0.005)
Mixed vs graphical (line graphs)	4.5143	0.0001	significant (p <0.005)
Mixed vs graphical (bar graphs)	4.7084	0.0001	significant (p <0.005)
Mixed vs tabular	5.6366	0.0000	significant (p <0.005)
Textual vs graphical (line graphs)	0.6497	1.0000	insignificant
Textual vs graphical (bar graphs)	0.8438	1.0000	insignificant
Textual vs tabular	1.7720	0.7850	insignificant
Graphical (line graphs) vs graphical (bar graphs)	0.1941	1.0000	insignificant
Graphical (line graphs) vs tabular	1.1223	1.0000	insignificant
Graphical (bar graphs) vs tabular	0.9282	1.0000	insignificant

Table 6 shows subjects' assessment of task difficulty in different information presentation formats. Answering the questions on the basis of given information has been the most difficult, on average, for the subjects provided with environmental information in textual presentation format (the mean equals 3.37) and subjects provided with that information in mixed presentation format (the mean equals 3.33). Intergroup differences were assessed by the Kruskal-Wallis test due to lack of normal distribution assessed by the Shapiro-Wilk test (cf. Table 6). The results of the Kruskal Wallis test (H= 12.2639, p-value = .01549) suggest at the .05 level of significance that the one or more presentation formats are significantly different (in terms of task difficulty assessment).

Table 6: Descriptive statistics for the assessment of task difficulty in different information presentation formats

Presentation format	Mean	Median	Min	Max	SD	Shapiro-Wilk test	
						W-statistic	p-value
Mixed (n=30)	3.33	4.00	1.00	5.00	1.21	0.8298	0.0002
Textual (n=30)	3.37	3.50	1.00	5.00	1.35	0.8899	0.0047
Tabular (n=30)	2.43	2.00	1.00	5.00	1.36	0.8662	0.0014
Graphical (line graphs) (n=30)	2.63	2.50	1.00	5.00	1.33	0.8813	0.0030
Graphical (bar graphs) (n=30)	2.57	3.00	1.00	5.00	1.45	0.8218	0.0002

Table 7: Results of Bonferroni multiple comparison test for the assessment of task difficulty in different information presentation formats

Presentation format pairs	Bonferroni t-statistic	Bonferroni p-value	Bonferroni significance
Mixed vs textual	0.0962	1.0000	insignificant
Mixed vs graphical (line graphs)	2.0194	0.4528	insignificant
Mixed vs graphical (bar graphs)	2.2118	0.2855	insignificant
Mixed vs tabular	2.5964	0.1039	insignificant
Textual vs graphical (line graphs)	2.1156	0.3609	insignificant
Textual vs graphical (bar graphs)	2.3079	0.2242	insignificant
Textual vs tabular	2.6926	0.0793	insignificant
Graphical (line graphs) vs graphical (bar graphs)	0.1923	1.0000	insignificant
Graphical (line graphs) vs tabular	0.5770	1.0000	insignificant
Graphical (bar graphs) vs tabular	0.3847	1.0000	insignificant

The Bonferroni multiple comparison post-hoc test was used in order to find out which of the pairs of presentation formats are significantly different from each other. All possible pairs for simultaneous comparison has been considered. The results of the Bonferroni test (cf. Table 7) indicate that assessments of task difficulty among subjects do not differ significantly (regardless of information presentation format).

Conclusions

Corporate social responsibility (CSR) reports are growing in popularity (Jones 2011, Kim et al. 2019). They contain social and environmental information disclosed primarily on a voluntary basis in terms of the information content and presentation format. The latter means that CSR report users when comparing corporate environmental performance of several firms may encounter the information on e.g. their CO_2 emission in quite different presentation formats: as a text disclosure, as a table or a bar graph. The research results described in the preceding section suggest that using the mixed information presentation format can worsen judgment accuracy in comparison with only homogenous presentation formats. Presumably decision makers have to invest more cognitive effort to reach a conclusion if they are provided with information emphasized in dissimilar representation types. In the case of homogenous presentation formats even if the judgment tasks do not match exactly the representation type of information, the repeated exposure to a given presentation format may make decision makers gain experience using this format and consequently make them put less cognitive effort in problem solving. Judgment tasks performed by the subjects have been mostly spatial and according to the cognitive fit theory, graphical presentation formats should outperform tabular ones with regard to judgment accuracy. However the research results do not support this assumption.

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Research Organization on The Basis of The World Foresights Analysis: Trends and Scenarios

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Abstract

The purpose of the article is to identify the trends and scenarios for the organization of research based on analysis of the world foresights, as well as to highlight the main further challenges of research in Ukraine. The article substantiates the need to use foresight methodology to identify trends and scenarios for the development of research space. The results of research on foresight studies of future conducted by Elsevier, the International Scientific Council and other organizations were analysed in the Article. As a result, the research drivers and trends, which have developed in the international research space to date, were identified. The basic tendencies in organization of the world scientific activity were defined: research and formation of new knowledge are becoming globalized; socio-economic inequality between the countries with limited and strong scientific potential is increasing; co-ordination efforts to ensure the openness of science worldwide is required; the ways of research and transfer of new knowledge are altering; the new requirements for substantiating scientific knowledge are being introduced, the boundaries between the basic and applied scientific research are being blurred; the impact of integration processes on scientific institutions and the business sector of the economy is increasing; there is a growing need to introduce new governance models of scientific development that go beyond the traditional state ones. Due to the research conducted, it is possible to identify the main challenges facing Ukrainian science. It is noteworthy, that discrepancy between the state of science development in Ukraine and the general international tendencies, necessitates revision of the existing model of scientific activity management in the country and development of the concept of science development.

Keywords: Organization of Scientific Researches, Research Space, Foresight, Research Space Development Tendencies, Scenarios.

Introduction

Currently, all the countries in the world are facing global challenges relating to the transformation of traditional industries, the emergence of new markets, innovative technologies and products. In addition, the intensity and nature of knowledge transfer, human resources, capital, technology between science

and business, economic sectors and countries are changing. All this determines the prospect of scientific and technological development to ensure the economic growth of the countries in the world within the context of current and future global changes.

Many world researchers, in particular, Ipsos Morey, World Market Specialist and Public Opinion Research, and Alexander van Bottler, Vice President of Elsevie (Mori, 2019), have noted that such rapid and profound changes, as in the last few years, are rarely seen in the history of science, technology and medicine. The research space has changed a lot in the last decades. Requirements for the level and quality of scientific results are increasing, the structure of scientific research customers is changing, and the scope of scientific knowledge is expanding. Advances in technology, pressure on the funding, political uncertainty, changes in population structure, societal challenges on a global scale - all the above factors combine and transform the means of generating and sharing information on research, changing the nature of scientific output, influencing the formation of the scientific research organizational model.

The ability of the research community to be competitive in the new world depends on understanding of the opportunities and challenges that these changes offer and the steps to be taken now. The ability of researchers from the particular countries of the world to adapt to current and future changes in the organization of scientific activity determines formation and use of scientific potential, as well as ensuring a high level of competitiveness of national economic systems.

In this context, the relevance of the request for justification and increase of the evidence-based science and technology policy and innovation policy, substantiation of the areas of scientific research in the long-term horizon, which sets a certain framework in the implementation of new approaches to the management of science and technology. One of such approaches is a foresight methodology, which is a modern effective tool that ensures the achievement of scientific and technological development goals through the foresight of future.

Analysis of recent researches and publications. In the world practice of determining future trends and scenarios of the development of particular socio-economic spheres, foresight studies have been carried out by foreign scientists for several decades. For instance, researches on the foresight methods and their results are described in the scientific works of O. Berzle (Berze, 2016), M. Kinan, and R. Popper (Popper, Georghiou, Miles, and Keenan, 2010) and others. Among Ukrainain scientists, M. Zgurovsky (Zgurovsky, 2015), C. Kvitka (Kvitka, 2016), M. Kyzym, I. Matyushenko (Kyzym, Matyushenko, 2015) and others are well-known for their surveys of the foresight. Existing surveys emphasize that foresight was established as an effective tool for selecting priorities for the development of science and technology, as well as a basis for solving a wide range of socio-economic development problems. Miles I. (Miles, 2008) defines foresight as a kind of prediction that, along with other fields of application, is used to predict the state of the science, technology and innovation system, including the nature of scientific activity. But most of the foresights are dedicated to identifying areas of technological development and research on priority topics (Reshetnyak, 2019). Research of the trends and scenarios of scientific organization of surveys is devoted to the foresights of O. van Bottler, I. Mori (2019), I. Miles (Miles, 2008), International Scientific Council (ISC, 2019), VERA project (Gesellschaft and Daimer, 2014). But complexity of determining the future of domestic science, the need to ensure its competitiveness and integration into the global research environment, require more detailed definition of the world trends and scenarios for organization of scientific research in order to compare them with the national realities.

The purpose of the article. The purpose of this article is to analyse the tendencies and scenarios of the organization of research based on the world foresights, as well as to identify the further challenges of research in Ukraine.

In the view of the above, the tasks of the present article are as follows:

- to determine, on the basis of literary sources and modern surveys of the world foresights, the existing tendencies and scenarios of the world scientific researches organization;

– to highlight the main challenges of organizing future research activities in Ukraine.

Research Materials and Results

There are several ways to identify future trends in science and research that underlie the foresight methodology. Thus, in early 2019, a large-scale foresight study was presented by Elsevier, which resulted in identifying the major drivers of scientific research in future and identifying possible scenarios of the development of research field (Mori, 2019). The main focus of the above study was not on the key scientific topics, which would be explored in 10 years, but on how such research would be conducted, how the findings would be presented, as well as what would constitute the research space. The study identifies 19 drivers of research development, grouped into six topics, namely: funding of future researches, ways to discover the science, changes in the working processes of researchers, research technologies: revolution or evolution, development of the future research information system, academic science and science beyond. In addition, on the basis of the identified trends, mentioned above, results of the questionnaires results and expert opinions, three scenarios have been developed to explore how the research ecosystem might look in decades. These scenarios have been dubbed the "Brave open world" (the main tendency is open science, which aligns the interests of many stakeholders), the "Technical titans" (the dominant force is the large technical corporations that are the main customers of scientific research), and the "Eastern rise" (China becomes the main research area) (Fig. 1).

The foresights aimed at exploring the future of scientific field at the regional level are being developed, as well. For instance, the well-known project VERA was created, on the one hand, to provide appropriate strategic intelligence to identify priorities within the EU research, technology, development and innovation system (RTDI) and the future governance in this field, on the other hand, to adapt science, technology and innovation policy to the changing global environment and future socio-economic challenges. To this end, the VERA project carried out an in-depth analysis and summary of RTDI prospective research activities (Gesellschaft and Daimer, 2014).

The project explored key challenges and opportunities for ERA development. It was determined that research and the generation of new knowledge are becoming globalized, requiring coordination and collaboration to ensure the openness of science around the world. At the same time, the specialization of forming and using scientific knowledge is increasing, what in its turn strengthens requirements for improving the quality of research in the future. Changes in the ways of research and transfer of new knowledge, changes in values and lifestyles also give rise to new societal expectations of research and innovation. Changes in economic and institutional content introduce the new requirements for substantiating scientific knowledge. The boundaries between basic and applied research, users and producers of innovation and scientific knowledge are being blurred. A range of scientific developments require introduction of new governance models, going beyond the traditional state governance model of scientific development. In particular, it is related to financial support of R&D and the involvement of non-state sources of funding. Scientific research is based on harmonization of interests of the state, society, scientists and business - the integration processes in the field of scientific research are increasing. The need to modernize the existing education system in Europe has been identified, which should contribute to sustainability, innovation and training, according to the emergence of new professions, as well as to develop the scientific potential of the EU countries (Gesellschaft and Daimer, 2014).

Based on the trends in international research space, the International Scientific Council (ISC, 2019) has identified four scenarios for the development of international science by 2031: Scenario 1 – “The Triumph of Globalism”, Scenario 2 – “Science for National Needs”, Scenario 3 - “Science for Product Competitiveness in the Global Market”, Scenario 4 - “Growing Aggressive Nationalism”. A brief comparative description of the above scenarios is provided in Table 1.

In general, according to the researcher of the International Scientific Council (ISC, 2019), surveys, scientific organizations, and scientists themselves must constantly adapt to changes in knowledge, technology, and social norms. Scientific systems should be open, flexible and regulated in a way that

protects scientific freedom and enhances scientific accountability, stringency and relevance. Traditional research systems that generate useful knowledge for innovation and transformation of society must now respond to trends in enhanced interdisciplinary collaboration, scientific migration, explosion of digital technologies, as well as the need to ensure gender equality in research and open access to the research results. The need for changes in scientific systems, in particular, reform of academic incentives, funding systems, scientific publication processes, and private sector norms, is increasing, as well.

Despite the possibility to implement different scenarios for the development of international science, generalizing existing foresight studies (Mori, 2019; Gesellschaft and Daimer, 2014; ISC, 2019; Publications Office of the European Union, 2009), eventual major trends in scientific space and challenges facing the national science due to its current state were identified (Astakhova, Reshetnyak and Ilchenko, 2019; Kyzym, Khaustova, Reshetnuk and Danko, 2019; Matyushenko, Khaustova and Knyazev, 2017):

1. Influence of the advantages of the developed countries on the state of international science in future is increasing. In the developed world, there is a significant increase in cost of research, almost 80% of all the scientific achievements come from the developed world (the EU countries, the USA, Japan, Canada), which impacts the scientific activity worldwide. Meanwhile, during almost 30 years of existence of independent Ukraine, the scientific potential has been significantly reduced (the number of organizations carrying out research activities in Ukraine in 2018 has decreased by 1.57 times compared to 1991, the number of researchers decreased by 52,7 times); the share of FDI financing from GDP in Ukraine in 2017 was only 0.45%, while in the developed - 2.33%; the share of scientific publications and patents from the total number of scientific results worldwide is reducing, in future it may lead to a permanent loss of national science positions in international scientific space.

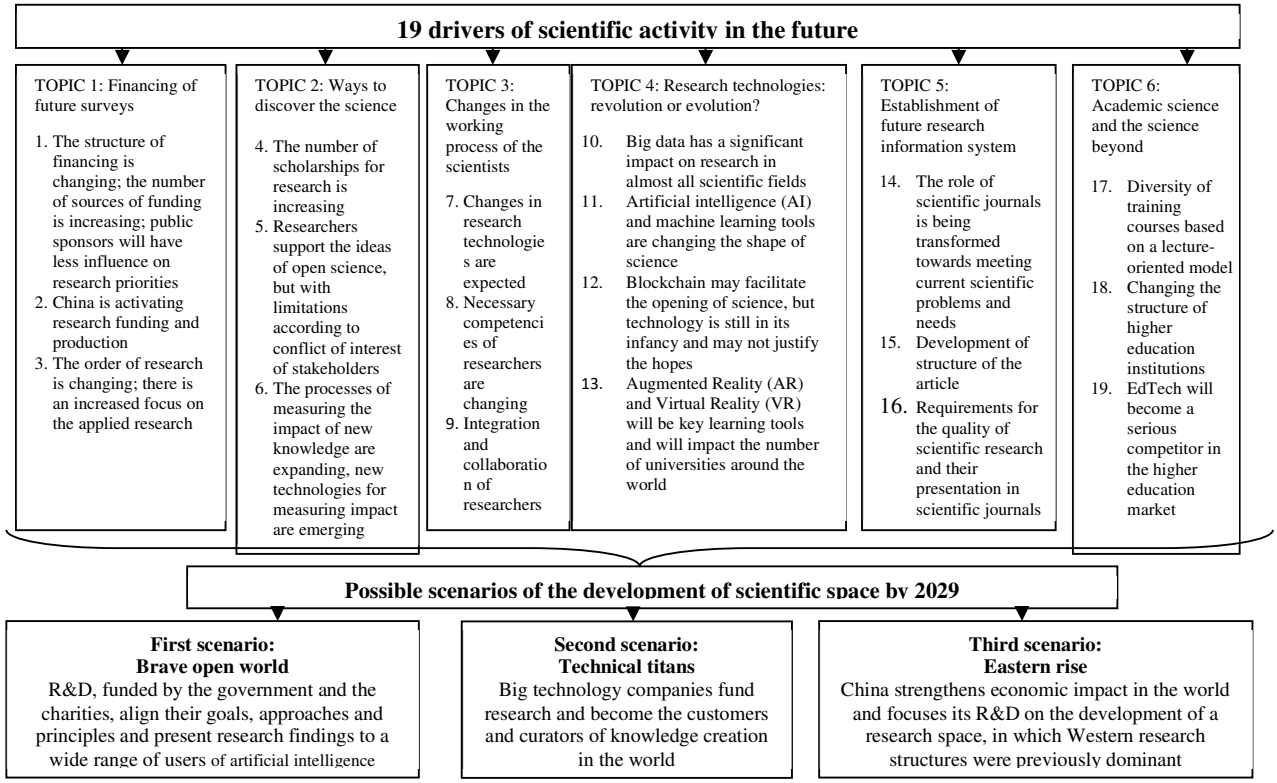

Fig.1: Drivers and scenarios of the development of scientific space by 2029

Source: drafted by the authors, according to (Mori, 2019)

Table 1: Scenario of the development of international science by 2031

Features	Scenarios			
	Scenario 1 – Triumph of globalism	**Scenario 2 - Science for national needs**	**Scenario 3 - Science for product competitiveness in the global market**	**Scenario 4 – Growing aggressive nationalism**
1	2	3	4	5
General characteristics	Socio-economic challenges do not recognize national boundaries and are best addressed jointly. Global management of socio-economic development is gaining a new model of life that anticipates significant impact of industrialized countries. The impact of global civil society, together with international NGOs (such as the United Nations), are playing an increasing role in shaping the new networks, addressing global issues	A number of major global economic crises have led to public discontent with globalization, creating a strong impetus for new, localized growth patterns. A common feature for all the countries is that domestic socio-economic needs strongly influence scientific programs and, in general, the development of science, which is more focused on solving local problems. The notion of scientific integrity has expanded, more significant social role played by scientists. The socio-economic gap between countries with strong and limited scientific potential is widening.	Influence of the business sector, led by large international corporations, is increasing. Thousands of multinational companies are contributing to the spread of globalization. New scientific discoveries and technological developments are creating new industries that affect the development of economies in the advanced countries of the world and several countries that are rapidly developing due to their competitiveness in international markets. Globalization is spreading to universities. E-learning is becoming an important and less expensive means of education. The global accessibility of education is hampering the development of traditional higher education and related scientific opportunities, and contributes to further "brain drain" to economically developed countries. Various anti-globalist movements emerge, based on religious fundamentalism and extreme forms of nationalism. They are hostile to science and its achievements.	With the emergence of new, actively developing countries, the struggle for global leadership and resources continues, creating great uncertainty and instability in international state system. The unresolved problems of sustainable development and competition for scarce resources are a potential factor for hostilities. National states are key actors in an uncertain geopolitical environment. Economic leaders, including the United States, Germany and a number of industrialized nations, are dominant in international decision-making. Due to increased international tension, the economies of the leading powers are largely driven by the national military and industrial complexes.

1	2	3	4	5
Purpose of science development	Science acts as a global stabilizing agent in this new global order, is an integral part of functioning of global society and helps to guide global political agendas. Scientific development and scientific achievements play a decisive role in shaping world views and promoting the important role of science.	The main objective is to strive for science to be more self-sufficient, to increase local production in domestic and regional markets, and to improve the quality of life and the satisfaction of society, rather than to ensure socio-economic and environmental growth.	Maintains the needs of large corporations.	The needs of the military and industrial complex prevail
Organization of scientific research	Science is conducted in short-term, rapidly changing epistemic configurations. The international network is becoming the dominant model of science. Research is increasingly conducted with large-scale networks of decentralized entities that are organized to address pressing global problems. National barriers to collaboration are decreasing and researchers' mobility is increasing. ICTs are playing an increasingly prominent role. This allows the developing countries to participate more actively in global science. International harmonized data standards are an important element of the new science organization, and global data collection, while the monitoring systems are powerful drivers for international research.	Efforts to create effective global governance structures are largely unsuccessful, and complex national and supranational regional alliances are emerging between the states, businesses and community groups to address urgent problems. A variety of national and regional solutions thrive in a broad experimental society. Various national scientific and innovation systems are being created in response to specific concerns about employment, energy and food security, aging and health care. In the absence of large-scale global cooperation, bilateral and regional alliances are strong players in the international scientific arena. There is no global governance of science at the intergovernmental level, although various non-governmental organizations seek to link different national and regional efforts.	In the global governance structures, business and economic interests prevail. It is difficult for intergovernmental and non-governmental organizations to support independent missions, given the lack of public funding and a significant share of private funding. International scientific cooperation is shrinking as a result of using its own international coordination mechanisms to establish a global science program for business groups and private foundations. The societies in advanced economies are hyper-consumers, and much of their consumption is focused on improving health and lifestyles, to which science contributes significantly. Thus, the association of society with science is mediated through its consumer behaviour. But access is restricted for those who cannot pay for these products. This widens the gap between the rich and the poor.	Less developed countries are isolated from any scientific efforts, and support for the universality of science is a major challenge to the freedom and mobility of scientists. International coordination and global sources of funding are limited, and the willingness to join forces to tackle global sustainable development issues is almost gone. There is a culture of secrecy and a lack of transparency and openness that affect all spheres of life, including the scientific field. Countries are establishing difficult barriers to international knowledge sharing, making parallel research efforts thrive in the strong national science. The relationship of society to science is largely mediated through the state, so that science remains distant from the public. In an atmosphere of tension and competition, some countries, such as China, are beginning to promote the use of national languages for scientific communication.

				Researchers' and students' mobility has decreased, and countries rely largely on their own educational resources to train the next generation. The most economically powerful countries prevail in international structures of science management. There are a large number of non-governmental organizations involved in science, but most of them are not truly independent, but serve as tools for the global ambitions of individual countries.
The nature of scientific research	Integration of the natural and social sciences is crucial to solving problems in society. New remuneration structures and online interdisciplinary journals provide impetus for the prosperity of interdisciplinary science. The spirit of cooperation and global solidarity is also reflected at the non-governmental level, with academies and funding agencies demanding creation of a single strong organization representing the independent voice of world science.	There are local research solutions designed to respond to current public challenges in individual countries. Science is becoming more widespread and socially embedded activity and is increasingly practiced outside the traditional institutes of state research systems. This partially undermines some science institutes, including the reviews and publications. The balance between "social" role of universities and the "continuous generation of knowledge" is disturbed. Studies of the "blue sky" (basic research) are diminished due to organized social pressure. In general, there is less scope for interesting research without clear short-term benefits to society.	The countries specialize in specific areas of research. In the leading scientific centres of the state, most of their funding is concentrated on research that is beneficial to the leading technology firms. Research that leads to creation of the new basic knowledge is rarely done. In more peripheral countries, multinationals are pushing governments to meet their research needs.	The state creates a less complex landscape for scientific programmes, dominated by national political needs. Guided by the geopolitical situation, the military sector is a particularly strong research centre.
Financing of scientific activity	Both global and national sources of funding are available, and investment in science is increasing in industries of high public interest.	Research is funded by local investors - national and supranational regional alliances, individual investors seeking to solve local problems	Countries are specializing in supply of only certain types of products to global markets, but are still increasingly competing for investments. These	National investment in science and technology is growing in economic centres, but other countries are lagging behind.

	A global strategic funding body is being created to address the global challenges, providing 2% of GDP to government funding of research.		investments include funding for research activities. Funding is more widely spread among the developed and developing countries, than in previous times. The ability of states to support state research systems is diminished, due to an aging society, tax evasion by multinational companies. Public sector research systems are dependent on their private funding.	

Source: drafted by the authors, according to (ISC, 2019)

2. 2. The socio-economic inequality between the countries with limited and strong scientific potential is increasing. According to the study, countries with strong scientific potential have high levels of GDP per capita. Further reduction of Ukraine's scientific potential may lead to increased dependence on countries with strong scientific potential and worsen the country's socio-economic status.

3. The impact on scientific space of international relations, globalization trends and non-state sector of the economy is increasing. For example, since 2014, there have been a number of milestones in European integration, including involvement in the European Research Area through Ukraine's participation in the EU's programme “Horizon 2020” and other international research projects. But the share of such projects remains small. Only in cooperation with other countries, by means of knowledge transfer and joint work, can the development of national science be ensured, and the sources of funding for scientific activity expanded. However, globalization trends in the development of science increase requirements for the quality of scientific research and production of relevant scientific results. Unfortunately, not all the scientific institutions, according to the existing scientific potential, can provide such quality.

4. Influence of international organizations (such as the UN, the European Commission) and society as a whole on shaping the research landscape is increasing. Thus, the UN's Sustainable Development Goals determine the direction of scientific development in many countries of the world, in particular, they influence selection of scientific projects that will receive public funding. These trends must also be taken into account when substantiating the directions of scientific activity in Ukraine - science is becoming a major driving force in solving global problems of humanity. On the other hand, the European Commission prefers to fund such domestic scientific projects that develop the benefits of the EU countries, rather than local projects, in which Ukraine is interested.

5. The importance of scientific education and general educational level of the population in relation to science and building confidence in it is increasing. Due to this tendency, Ukraine needs to pay more attention to training of highly qualified scientific personnel, as well as to enhance the low image of national science that during the recent years has developed in the country.

6. Influence of private and military structures on forming scientific landscape and the share of scientific research conducted in non-academic conditions are increasing, as well. The private sector and military science are becoming the dominant driving force for the development of science. This trend necessitates involvement of the business sector in financing of scientific activities. Thus, in 2017, 73.09% of the NTRs in the US and 65.79% - in the EU were financed from the business sector, whereas in Ukraine the latter sector financed only 34.49% of the NTRs. It is necessary to create conditions for raising interest of the business sector in innovation activities, which will increase the number of orders for scientific development and increase the total volume of financing research and development.

7. The importance of access to scientific data and information to ensure scientific progress, both at the national and supranational levels, is increasing. The general tendency of open scientific knowledge in the world may contribute to the improvement of quality and relevance of domestic research, however, simultaneously the restrictions on fluency in English (the main language of the scientific community) reduce the opportunities for exchange of scientific data between the domestic scientists and international scientific space, making Ukrainian science local.

8. Ensuring scientific integrity is of increasing importance for building societal confidence and confidence in science. This tendency is very important for Ukrainian scientific community - building confidence in society for national science is one of the basic conditions for its development.

9. The spatial organization of science is changing, and the influence of new countries with strong scientific potential is enhancing. In recent years, the impact of China, South Korea, Japan, and India on the world science has increased significantly. Therefore, Ukraine should consider not only the European scientific space, but also the countries that are rapidly developing their scientific potential as a possible area of international cooperation.

10. In addition, the joint research infrastructure is altering: the share of international research projects is increasing. Over the past 10 years, the number of international research projects in Ukraine has increased by 20%. But Ukrainian science is still detached from the global science, the level of scientific results remains low compared to the results of the leading countries of the world, Ukrainian researchers are poorly known in international circles, this is due to the existing problems in funding (inability to present the results of their scientific achievements at the well-known international conferences, or to be published in journals indexed in international science databases (Scopus, Web of science), or to obtain international patents, etc.).

11. The epistemic organization and management of science is also subject to changes (instead of traditional research, a consortium of researchers, companies, or other new hybrid institutions (integration structures) that unite different stakeholders in scientific activity is formed in the universities and scientific institutions). Organization of scientific activity in Ukraine is still going by traditional models - the level of integration of Ukrainian scientific institutions with the business sector remains very low, while attempts at the legislative level to ensure formation of scientific and innovation parks have not received support in the business environment. Addressing this problem will allow to transfer Ukrainian science to a higher level through increasing the volume of financing, and will create the basis for development of an innovative model of the Ukrainian economy.

12. The nature of access, importance and structure of scientific publications are altering. Requirements for forms of scientific results presentation, including the quality of publications, are increasing worldwide. Ukrainian researchers need to pay more attention to this issue, which may also increase opportunities for Ukrainian scientists to become involved in the global scientific community.

13. Connection between science and society is increasing and scientific research is directed towards solving global problems of humanity. Society, in general, and individual countries, in particular, Ukraine, play a significant role in the development of science. Therefore, the mission of scientific knowledge in solving global problems of humanity is especially important. Ukrainian scientists need to be involved in this process. That will allow them to gain international recognition.

14. Traditional ways of science education are changing due to increasing impact of the new organizations, businesses and communications technologies. The nature of what students are studying, the balance of disciplinary and interdisciplinary courses and the importance of theoretical and applied experience. These trends are more related to the development of university science, which in Ukraine is far behind academic. More attention should be paid to the development of university science, since implementation of its results determines the quality of scientific training, formation of scientific potential in the future and, consequently, the overall level of scientific, technological and socio-economic status of the country in the future.

15. The nature of "scientific career" is changing due to the change in the epistemic organization of science, the processes of scientific education and the direction of science. Traditional models of academic careers will evolve with new ways of evaluating scientists and evaluating research. This necessitates revision of existing systems of organization of scientific research in Ukraine, increasing the requirements for scientific personnel and the results of their scientific activity. However, the low level of remuneration in the field of science without raising the quality of scientific staff makes the field unattractive for young people. The problem of outflow of scientists from the country to countries, where the level of remuneration for scientific activity is higher, remains urgent. Introduction of new ways of evaluating scientists and evaluating their research in Ukraine should be accompanied by a means of stimulating creative and scientific activity of scientists, which needs to solve a number of existing problems, in particular, problems related to the lack of funding for scientific activities.

In the light of the above, if Ukraine intends to ensure in future its economic safety and realize transfer to the innovative economy development model, in order to remain competitive in the particular fields of economy, the research organization in the country must comply with the modern international trends. This necessitates review of the current model of managing scientific activities in Ukraine, development

of science development concept, attention to the scientific research areas, increasing of research funding through involvement of non-state sources, optimization of processes of the resources allocation, ensuring the high level of scientific training and other important issues.

Conclusions

Thus, the conducted research confirms inevitable changes of the research space, that have been observed in the last decades, and raises the requirements for the level and quality of scientific results, changes the structure of scientific research clients, broadens the scope of scientific knowledge, transforms the means of creation and exchange of information about scientific research, transforms the nature of obtaining scientific results, which influence formation of the organizational model of scientific research.

Due to the research, the general trends in the development of scientific space were identified and the main challenges facing the national science were characterized. Discrepancy between the general trends in international science and the state of development of science in Ukraine necessitates revision of the existing model of managing scientific activity in the country and development of the concept of science development.

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Occupational Safety and Health of Employees in the Construction Industry in the Light of Construction Works in the Republic of Serbia's public Railway Sector

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Abstract

Numerous specificities characterize the construction industry with respect to participants, dynamics, lifetime, the value of investments, and other segments. The main participants in the construction industry are also manufacturers – most frequently entrepreneurial businesses - micro- or small enterprises – operating according to the seasonal principle. Numerous occupational risks often appear in the construction industry, and such risks must be anticipated and eliminated. In that sense, the probability of the realization of such risks, or that of potential occupational injuries or the occurrence of occupational diseases, need be reduced.The broader subject matter of the research conducted in the manuscript whose topic addresses the protection and safety of employees in the construction industry is primarily research in the scientific and professional knowledge of employees' protection at work and occupational safety, and the analysis of regulations, standards, practice. Within the framework of the narrower subject matter of the study , the perception of the possible aspects of occupational risk and how to manage them has been researched., as Also, the perception of the main occupational risks, risk management and the specificities of care for the protection and safety of employees within the framework of the construction industry, especially so with respect to construction works done in the railway sector, has been researched and analyzed in details. When referring to methods used in the paper, the method of observation (with and without participation) is applied in the primary research. Secondary research is also used in completing the study. This manuscript sets the central hypothesis indicating that employees' occupational safety and security are a very important segment of business doing and that they are paid great attention to. The hypothesis will be tested through primary and secondary research studies. Apart from that, the focus of this paper is on the improvement of the existing measures by implementing preventive measures and other means of raising employees' safety to a higher level. The paper is descriptive and analytical.

Keywords: Occupational Safety And Health, Construction Industry, Occupational Risks, Human Resources Management, Railway Sector.

Introduction

One of the major challenges for all national economies is finding out a solution and a way how to solve employment problems. For that reason, it is very often the case that, due to a large number of employees in this activity, the development and active role of construction are connected with the creation of new workplaces. Beside that, in the last two centuries, the construction industry has been one of the main factors for the stimulation of economic growth. [9]
There are mortalities every day as a consequence of an occupational accident or work-related diseases – more than 2.78 million mortalities in one year. Additionally, there are also 374 million injuries that do not result in a fatal outcome and diseases every year, many of which result in long-term absence from work. The cost of these everyday accidents is huge and represents an economic burden because of poor occupational safety and health, and the same is estimated at 3.94% of the world's gross domestic product (GDP) every year [3].

Structure of the Paper

In the first chapter, the construction industry is analyzed based on secondary research through a perception of the available reference literature on this field and the current legislation. The characteristics of the construction industry are presented, and the participants in construction works are also mentioned.

In the second chapter, which relates to employees' protection at work and occupational safety and a reference to the industry and the enterprise type, international and national regulations on occupational safety and health are introduced as well. After that, occupational risks and the measures of employees' occupational safety and health are addressed.

Chapter three is a presentation of the occupational safety and health of employees in the construction industry in light of works done in the railway sector. At the end of the paper, the conclusive considerations and analyses are presented.

Enterprises must ensure that employees have a healthy and safe work environment, first of all, because physical and mental health does undoubtedly influence the final result of an organization. Secondly, laws prescribe the safety levels that must be maintained in a work environment. The activities of an organization that are directed towards the preservation of health and ensuring the safety of the personnel are marked as the maintenance activities.

Construction Industry

In practice, the construction industry can be observed as a large number of the markets overlapping with one another, which define a certain service. These markets can be divided based on the geographic separation and based on the size, type, and complexity of the work. The separation of markets in the construction industry enables construction companies to focus their activities, adapt to dynamic changes, and stay sufficiently flexible to achieve competitiveness in different submarkets. The construction industry implies a whole spectrum of economic activities uniting into one and ending on some building, not only implying the production of a construction material and construction equipment, but also a broader notion, including constructing itself. The construction industry is a highly accumulative and exporting economic branch, and these are the attributes pertaining to it. Actually, the construction industry can be said to encompass work on new or existing commercial, industrial or domestic buildings or facilities [18].

When choosing technological processes within the framework of certain construction stages, one must consider that these are standardized, systematized, and complementary parts of overally engaged resources. This is only achieved through a detailed analysis of all possible methods for all types of works within a technological process and the creation of a technological map, i.e. a flowchart of the performance of those works. The fact which should never forget is that the choice of a construction

method and the definition of a construction technological process are tightly connected and interdependent, and that they are also connected and conditioned by the location on which a building is being constructed and the capacity of available resources, too. [27]

Participants in the construction works, i.e. construction workers, are employees in the construction industry, and they mainly work on the construction sites – performing all jobs related to construction, designing, and final works on a particular building. Construction workers may be both unqualified physical workers and highly-qualified professionals, such as electricians, plumbers, carpenters, and so on. [18]

The mentioned law bids that the construction of a building (performance of works) can be performed by a company, another legal entity, or an entrepreneur named by the law as the contractor, which/who is registered for constructing buildings, i.e. for performing construction works, and which/who possesses the needed decision on the fulfilment of the conditions for performing works on the type of buildings on which that person/entity is performing works. Suchlike a natural person or legal entity also needs to have the employees who have a license for the contractor in charge and appropriate professional results. Construction sites must be labelled properly.

A contractor may engage another company, or another legal entity, or another entrepreneur for certain works, and they are named by the law as subcontractors. A subcontractor must also meet the conditions prescribed by the Law on Planning and Construction, or the regulations promulgated based on the said law, for the performance of that type of works for which the subcontractor is engaged. In accordance with this law, the contractor is the one to determine the contractor in charge who is responsible for the management of the construction of a building, i.e. the performance of works.

The financier that the law [18] differs from the investor is "the person that, based on the concluded and verified agreement with the investor, finances, or co-finances construction, extension, reconstruction, adaptation, rehabilitation or the performance of other construction, or investment, works envisaged by this law, and, based on that agreement, acquires certain rights and obligations envisaged by this law for the investor in compliance with that agreement, except for the acquiring of the property rights on the building which is the object of such construction." Other participants in construction works are, first of all, a project manager and a project team. The project manager is the person responsible for bringing the project to completion. The project manager does not work on the implementation of the project, but is in charge of ensuring that the project is finished in the best possible manner. He/she manages a team of people who are entrusted with the task of coordinating the work of the project participants and running the works in a way that enables them to bring the project to completion. [7]

Occupational Safety and Health, Regulations and the Practice of Human Resources Management

International Regulations on Occupational Safety and Health and Republic of Serbia's Regulations

The International Labor Organization has the aim to create the awareness of the dimensions and consequences of occupational diseases and injuries and internationally address the issues of all employees' safety and health so as to stimulate and support practical actions at all levels. With respect to the institutional care of employees' protection at work and occupational safety, the International Labor Organization has greatly contributed to the improvement of the position of workers in enterprises at the international level through its activities. The International Labor Organization has promulgated about 180 conventions and over 190 recommendations that ensure a certain minimum of labor-legal and social protection of workers, also including their occupational security and safety [28].

The Law on Labor [21], the Law on Occupational Safety and Health [22], as well as the Rulebook on the Manner and Procedure of Assessing Risk in the Workplace and the Work Environment [23], regulate the implementation and improvement of the occupational safety and health of the persons taking

part in work processes, as well as the persons who happen to be in the work environment, in order to prevent occupational injuries, occupational diseases, and labor-related diseases. For the purpose of performing certain works of the State Administration in the field of occupational safety and health, this law enables the establishment of the Occupational Safety and Health Administration as the administrative authority within the Ministry of Labor, Employment and Social Policy, and stipulates its competence.

This law also makes a mention of the preventive measures for achieving occupational safety and health, which are ensured by the application of contemporary technical, health, educational, social, organizational, and other measures for and means of the elimination of risks of being injured and impairing the health of employees. This law also regulates the employer's obligations, which are simultaneously the rights of employees related to the implementation of the measures of occupational safety and health. Prior to commencing his/her work, the employee also has the obligation and the right to become familiar with the measures of occupational safety and health on the jobs or in the workplace, which he/she is assigned to, and also to train him-/herself in their implementation.

When the occupational safety and health of employees in railway traffic are concerned, the same are also the subject matter of the consideration of Law on Safety in Railway Traffic [24] and the Law on the Railway System Interoperability, too [25].

Occupational Risks

Risk management is defined as the ability to identify, analyze, and react to risk factors for the duration of the project and is in the best interest of its goals. The risk of some business can be defined as any possible event that may negatively affect the sustainability of the project. Risk represents the possibility of achieving unpredicted and unwanted events and is in connection with uncertainty. The danger arises from the possibility that unfavorable events will happen and that unwanted consequences will also happen. Risk management consists of the prediction of unexpected situations at the beginning of the project, which appear and are beyond the project manager's control. These situations can seriously impair the success of the project. Generally observed, from the manager's point of view, the risk management process includes answers to the following questions [12]:

- What will happen, and with which probability will it happen (a probability and an influence)?
- What can be done to minimize the probability of influence of these events?
- Which signs will signalize the need for such an action (i.e. which traces should actively be looked for)?
- What are the probable outcomes of these problems, and which are the expected reactions?

Project risk is based on a simple equation [13]:

Risk = (the probability of an event) x (the consequences of an event)

In other words, all risks must be assessed in the sense of two different elements: the probability that an event will happen, as well as the consequences, or effects of its occurrence. Therefore, in the project environment, it would be suitable to develop mitigation strategies so as to solve this risk, given the great probability of the occurrence of the same and the negative consequences that the risk would cause [17].

Different industries in which parent organizations exist are faced with numerous risks that can be transferred to their projects as well. In e-banking, for example, all risks represent a danger for the financial institution and by no means must they be neglected, but each one of them should be paid attention to. These risks are existent both in a microenvironment and in the organization's broader environment. Project managers, as well as executives, must undertake risk management measures to reduce risk both at the operational and at the strategic levels [14].

Risk identification implies determining the risks that can negatively impact the goals of the project and assessing which potential influences of each risk might happen should such risks occur. The assessment of each risk implies the determination of the probability that a risk event will appear and the degree of the impact that the event will have on the project goal, and ultimately risk prioritization [17].

The most frequent occupational risks are related to the very activity of the enterprise and the way in which jobs are organized, and to the work tasks that employees must perform. Risks within the framework of the construction industry can be numerous since a risky activity is concerned, since employees might suffer an injury, or their health might be threatened. Many incidents might happen on the construction site, in numerous stages of the construction of a building. It is exactly these potential possibilities of being injured that oblige enterprises to make plans and additional programs of protection. The Rulebook on the Manner and Procedure of Risk Assessment in the Workplace and in the Work Environment defines potential risks in the workplace and in the work environment and offers models for overcoming them [22].

Measures for Ensuring Employees' Safety and Health in the Work Environment

Managers and supervisors have the responsibility for the health and safety of the employed in the organization. The personnel specialist or the specialist in protection at work should help examine the circumstances due to which occupational accidents happen, participate in the creation of the deeds related to employees' health protection and occupational safety, and conduct training courses in connection with these activities. Department supervisors and managers have the main role in the maintenance of safety conditions at work and employees' health. A supervisor in a factory has several responsibilities in connection with the personnel's health and safety. For example, he/she reminds employees that they must wear their protective equipment, checks the cleanliness of the workplace, watches the employees so as to see if some of them is intoxicated or on drugs or have some other problems that might affect his/her work performance, and gives recommendations to specialists in the organization for the use of the equipment.

Supervisors and managers have the main role in the maintenance of secure conditions at work and employees' health. A supervisor in a factory has more responsibilities related to the personnel's health and safety. For example, he/she reminds the employees that they must wear safety glasses, checks the cleanliness of the workplace, watches the employees in order to see if some of them are intoxicated or on drugs or have some other problems that might affect their work performance, and also gives recommendations to specialists in the organization for equipment replacement.

The employer is required to promulgate rulebooks on protection at work, which comply with the law and match job requirements. The law determines the standards with respect to the equipment used at work and in the work environment. The employer is obliged to ensure a safe and healthy work environment, and also to inform employees about the occupational rules. A specialist in protection at work has other protection-related responsibilities: he takes care of the application of the laws pertaining to employees' health and safety, coordinates the training of the newly-employed in relation to these issues, assists supervisors in examining the circumstances under which occupational accidents have happened, develops a program of protection at work throughout the organization and participates in the preparation of a rulebook on protection at work and other materials in connection with the same. The link between the supervisor and the personnel specialist is of crucial importance in the coordination of the activities directed towards the protection of employees' health and safety. With respect to occupational accidents that might have happened, many more problems arise from employees' negligence than from machines or employers. For some time, the workers who were not satisfied with their job were considered to have a higher rate of occupational injuries. Studies have shown that young and inexperienced workers are injured more. There are some differences in the traits between the people who have never been injured at work and those who have been injured at work several times.

The engineering approach to health and safety is such that certain accidents can be prevented by designing machines, pieces of equipment and workplaces in such a way that the workers who are sometimes psychically absent or who perform mechanical jobs cannot injure themselves or injure

others, either. This engineering approach tries to prevent occupational accidents with the help of designing such a work environment in which it is difficult for employees to be injured. Installing safety equipment and protective parts on machines and plants, and installing the signalization indicating a danger makes that occupational accidents can be prevented in that way.

Occupational Safety and Health as a Part of Human Resources Management

Human resources management is a subsystem of enterprise management and falls within the competence of the managerial team leading the enterprise. Human resources management, the management of their potentials and their behavior in the work process, is a very responsible and dynamic process which helps the organization to come to the people possessing the needed abilities, qualities, and possibilities, on the one hand; it also helps the management of the organization to ensure the achievement of desired results and projected goals through influencing the behavior of individuals and groups, on the other. The successful management of human resources helps ensure for each workplace capable and responsible personnel and enable every individual and team to achieve the maximum results. [1]

Human resources management can be defined as a strategic and coherent approach to the management of the precious assets of an organization – the people working in it, who both individually and collectively contribute to the achievement of its goals. [11]Human resources management is a subsystem of enterprise management and falls within the competence of the managerial team leading the enterprise. Human resources management, i.e. the management of their potentials and their behavior in the work process, is a very responsible and dynamic process which helps the organization to come to the people possessing the expected abilities, qualities, and possibilities, on the one hand; it also helps the management of the organization to ensure the achievement of desired results and projected goals through influencing the behavior of individuals and groups, on the other. The successful management of human resources helps ensure for each workplace capable and responsible personnel and enable every individual and team to achieve the maximum results.

Human resources management can be defined as a strategic and coherent approach to the management of the precious assets of a labor organization – the people working in it, who both individually and collectively contribute to the achievement of its goals. [11] ‘’ The average employee’s mindset is focused on personal expertise at work, so the employees are trying to apply their skills at the best possible ways. It is found that, although the employees weren’t satisfied with the level of care that their company is providing to them, they still have a highly developed sense of belonging to the organization.’’ [37]

Human resources management represents a process of attracting, engaging, training, motivating, retaining and rewarding employees with the aim of creating a secure and just environment for employees, on the one hand, whereas on the other, achieving the strategic goals of the organization. That indicates the fact that human resources management is much more than “personal management” today, and that in fact it represents a philosophy efficiently moving towards the needs of the modern organization. Human resources management implies the part of the organization whose activities contribute to the achievement of the strategic goals of the same by attracting, retaining quality and professional employees, and motivating them to work effectively and efficiently. Even more briefly said, the role of human resources management is to enable the organization to achieve success with the help of the people [5].

Human resources management is a field of the science of organization dealing with the study of all aspects of employment in an organization. Given the subject matter of the research, the scientific field of human resources management has not been developing in isolation, but within a broader context of industrial changes and economic development, which is indicative of its adaptation to the turbulent and continuous changes that industrialization made in society as a whole, and especially so in human work. [4]

Human resources management is of great importance to the whole of the organization and those employed in it. The role and significance of human resources management reflects in the fact that the

right organization of activities enables the organization to engage an employee with the needed characteristics in the desired workplace, enable its employees to improve and make progress, correctly motivates and rewards its employees and, through the right coordination of all of the said activities, achieve good results for the organization. However, some studies confirm that the employees are less efficient to answer on the management's expectations if they are not sure what is expected to do [34]. Being in position to know and to plan the future performance, employees are more likely to have satisfactory performance.

The function of human resources management represents a series of diverse and interconnected processes, i.e. activities, of which the following ones have special significance: planning the offer of and demand for human resources, jobs analysis, recruiting potential candidates to fill vacated workplaces, the selection of candidates who have applied, the socialization of the newly-employed, employees' training and development, motivation, the protection of employees' health, respecting the legal and other regulations regulating labor relations and so forth. [10] Following above mentioned function of human resources management, strategic human resources management is an evolutionary stage that represents synergy of strategic planning and human resources management, in order to enable a company to achieve its goals. [35]

The human resources management process implies appropriate measures and activities in which two parties participate. On the one side, there are those who manage, at least to the least possible extent, and on the other side – those who are managed. The management of the enterprise is responsible for managerial activities. Thanks to those activities, the organization comes to employees with the needed skills and abilities, interested in achieving planned tasks and goals. On the other side, there are employees whose behavior and work are managed with the aim of making them direct their mental, physical, and other potentials towards the achievement of the goals of the organization. [2]

Given the fact that human resources management constantly changes and improves by following the trends, challenges, and changes in the field of profitable business doing, huge changes have been made in it. The relations of superiority and subordination that were being cherished for a large number of years have made room for the relations of cooperation and the creative solving of set goals, so that they raise the personality, integrity and initiative of the employee to a higher level in that way. Safety and health of employees in regard to scientific discipline or science of organization is represented by theoretical basis of human resource management as a scientific discipline. In practical terms, the same model - construction safety and health at work are usually organized within sectors or departments for human resources or general affairs. A number of studies linked to the field of science of organization or scientific disciplines research the importance of safety and health at work concerning the variables or factors that are connected with leadership, motivation, performance at work, employee productivity, quality of life at work, conflicts and similar.

Exploration on quality of life at work, that was conducted on 9240 employees in the Ministry of Labor and Immigration of the United States [38] shows that 74.4% of respondents said they were satisfied or very satisfied with their employment, however, their responses about the motives were different. Generally speaking, their widespread activity, personal development, autonomy, safety and health at work were the motives that contributed to the highest level of satisfaction among employees. However, factors such as stress, routine work, risk situation or insufficient care for the health and safety at work, discrimination and harassment are considered to be obstacles that cause the most dissatisfaction. [39]

In terms of researching safety and health at work, some authors from the United States consider safety in conjunction with hygiene (hygiene and safety at work) or with occupational health. Indeed, what we notice is that this new perspective of human resource management in organizations, that is contrary to the classical perspective, is focusing on quality, providing customer service, hygiene and safety, occupational health, access and equality among workers, participation of employees, motivation and training, environmental issues, leadership, competitiveness, performance management, innovation, creativity, etc. [40]

Value of the company Sofman in the context of research studies conducted in Greece include: health and safety at work, quality, innovation, flexibility, and employee development, highlighted by a traditional, family culture. This shows itself a very low rates of staff turnover and a large number of qualified employees who are working for decades in a company. The above mentioned study manifests that children got employed in the companies where their parents were previously engaged. [40]

In the context of the science of the organization in the segment "of work, organization and design of work" vital role has the study of health and safety at work. [41] Design of work is a term that refers to the creation of a system of work as well as work environments that improve organizational efficiency and productivity, ensuring that the organization becomes "a great place to work" and therefore contributes to the health, safety and welfare of employees. The work implies effort and application of knowledge and skills that are going to be attained. Work systems combine processes, methods and techniques that are used for performing a job. Work environment consists of work design, work conditions and the way employees are treated by their colleagues and managers. Design of work is very much linked with the organization as well as with its system of work and the working environment.

Practice has confirmed that today's, contemporary and scientific workers are not "workforce, they are capital", the capital which is productive and which creates additional value for its organization. As the creative and innovative segment of every organization, people have the leading role in the creation and maintenance of its competitive advantage. Only highly-educated, properly motivated employees can respond to the challenges imposed by a new business environment through constantly and continuously learning new business skills. [3] In regard to the efficient job engagement these factors are most relevant: emotional and rational commitment, effort and willingness to stay at the company. [33] Furthermore, ambition is a new dimension for prestige and promotion in the organization. As a result, the employee wants to receive a financial reward and to be completely satisfied by job performing in a healthy work environment.

The protection of employees' health and the safety of employees, i.e. occupational safety and health, represent the discipline dealing with the improvement of work conditions and the work environment, occupational injury prevention, occupational diseases, and labor-related diseases, the protection and improvement of employees' health. This field is regulated by the norms of different countries. In our country, it implies the creation of such conditions at work by which occupational injuries, occupational diseases and labor-related diseases are reduced to the greatest possible extent and which create preconditions for the absolute physical, psychic and social welfare of employees. [6]

An efficient system of the protection of occupational health and safety implies the physical safety and protection of employees, the emotional safety and protection of employees, as well as the social safety and protection of employees. [16]

With respect to human resources management in the construction industry, it is possible to notice certain specificities connected with construction practice. Within the framework of the theoretical approach to human resources management in the construction industry, human resources management at the level of the enterprise is most often perceived, whereas it can also be perceived at the level of processes and procedures, i.e., at the project level. [15]

The Safety and Health of Employees Performing Construction Works in Serbian Railways

The construction industry in Serbia used to be a driver of the economic development of the country, and a lot of things in the country's economy used to depend on it. Now, the situation is much more different since the workers employed in that sector are in a very difficult material position, and the average salary is lower than the Republic's average. [30]

The 2018-2022 Occupational Safety and Health Strategy states as an important goal "the promotion of the development of the national culture of prevention in the field of occupational safety and health and the field of labor relations (raising the awareness of and informing the public), with a special reference

to the small and medium-sized enterprises sector and high-risk sectors (construction, agriculture, the chemical industry, and so on)". [19] [20]

Construction is a risky activity should we bear in mind the potential risk of being injured and a threat to the health of employees. A large number of the incidents happening on the construction site also imply additional plans and programs of protection. It is important that the quality of protection at work should be increased and that much attention should be paid to risk prevention and determination. It is also needed to perceive the statistics of risk and analyze unwanted events. Unfortunately, the employee protection program is frequently only applied once unwanted events have occurred, not preventively.

Most often, accidents and injuries occur in certain stages of the construction of buildings, first of all, in the stage of construction, as well as in the stage of using and maintenance. [26] According to the data displayed by the Serbian construction industry through its Yu Build Portal, a total of 32 fatal occupational injuries were recorded in the year 2016, of which a total of 17 were in the construction industry. Injuries with a tragic outcome in the construction industry of Serbia, on average account for about 53 percent of the total injuries with a tragic outcome, and more than one-half of the victims had also worked without a regulated labor status. Apart from the Serbian construction industry, there are also the employed without a regulated labor status in other fields, first of all, in Serbia's trade and catering, but the number of occupational injuries is considerably smaller. [30] In the past year in Serbia occurred 53 injuries at work resulting in death, what is the most in the last ten years. The most common causes were a fall from a height, electric shock or drop of an object. The most who died at work were engaged in industry, then in construction, service sector, agriculture, forestry, trade, traffic and storing. About 30 percent of them were working illegally, mostly in construction. The most common cause of death or injury at work with fatal results were in the construction industry through sloughing or falling from a height. [42]

Railways represent a unique organizational and technical-technological system. [8] The most frequent construction works done in railways are the reconstruction of the upper substructure of the railway line, the reconstruction of the upper substructure of the railway track – the replacement of rolling fields, the replacement of tramlines, the reconstruction of the upper substructure of tramlines, and other works on the railway line overhaul and maintenance.

When speaking about the performance of the construction activity on the railways of the Republic of Serbia, the enterprise "Serbian Railways Infrastructure" JSC is in charge of these activities. This railway enterprise is the national manager of the railway infrastructure. In the restructuring process, it assumed the responsibility for the clear and transparent management of the assets of the railway infrastructure. [8]

Within the framework of the construction activity, the planning of the current and investment maintenance, works on the maintenance of railway lines and railway line plants and buildings are organized and conducted, as well as the supervision and safeguarding of the same. The jobs related to the planning, maintenance, and reconstruction of the construction railway infrastructure are done through sectoral departments, railway line maintenance sections and the Railway Line Mechanized Maintenance Section. According to the available data displayed on the official web presentation of the enterprise, the Construction Affairs Sector has at its disposal a qualified workforce and the rail track and construction mechanization through whom/which they perform the technical examination and measurements of branch lines, switches, level crossings and other plants, the supervision over the performance of all types of construction works on the railway line, the maintenance of branch lines, switches, level crossings and other plants, the renting of rail line mechanization, and the measurement of the geometric state of the railway track. The same source makes a mention of a huge experience gained through the everyday maintenance of the rail track construction buildings: 5,540 km of the tracks on which railway traffic is performed, 5,135 switches, 981 bridges of a total length of 47 km, 3,800 gates, 334 tunnels of a total length of 154 km, as well as 2,134 level crossings (without the territory of ZOP Kosovo Polje). [31]

In the enterprise's Information Booklet for the year 2019, it is stated that occupational safety and health affairs (as well as affairs in the field of labor relations and human resources in general) are also carried out within the framework of human resources management. [32] Occupational safety and health affairs include the jobs of risk assessment for all workplaces in the work environment, participation in the preparation of normative deeds from within the field of occupational safety and health, the drafting of a proposal for the program of employees' health protection and the control of its implementation, participation in conducting investigation of occupational injuries and their analysis, organizing the inspection and checking of work equipment and the examination of the conditions of the work environment, the examination of elevators, measuring the emission of exhaust gasses from boiler plants, checking welding devices, the organization, and checking of the training and competence of employees for safe and healthy work of those assigned to the jobs with increased risk, taking professional examinations, insurance from employees' accidents and conducting preventive checkups.

A unique, integrated, strategic systemic approach to the "fields of defense, security, situations of emergency and preventive fire protection measures based on the preplanned, preventive, active and connected action" is also ensured within the enterprise's Security Center. The system monitors the processes and activities of the mentioned fields, recognizes the sources of threats that affect the security of the people, the property and the business operations, and determines measures for risk elimination or retention within acceptable frameworks.

Having in mind that railway companies are providers of public Transport Services, along with occupational safety, passenger safety must be considered and achieved, along with their satisfaction and compare with the research results of other authors like Radnović et al [36] which may be the subject of future research.

Conclusive Considerations

The considerations presented in the paper encompass the protection of employees at work within the framework of the concept of occupational safety and health, which is most often presented in the theoretical concept within the framework of human resources management as a scientific, i.e. scientific discipline. In practice, too, the care of employees' safety and health is most frequently left to the organization and implementation inside human resources management as a business function.

The central hypothesis set in the paper indicates that employees' security and safety at work are a very important item in business operations and that they are paid great attention to, which has been proven through the primary research studies. Also, this paper has a focus on the improvement of the stated measures through the implementation of preventive measures and other means that raise employees' security to a higher level.

In Serbia, in the field of occupational safety and health in the construction industry, there is room for the improvement of practice and there is much that can be done with respect to the development of awareness, preventive actions, as well as the development of the legislative framework, standards, and inspection supervision so that a smaller number of occupational injuries could be expected in the future.

With respect to construction works in the railway, the jobs have been entrusted to the joint-stock company for the management of the public railway infrastructure "Serbian Railways Infrastructure" JSC Belgrade.

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Mechanism for Forming Strategy for The Development of Network Entrepreneural Structures

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Abstract

The article shows the features of functioning of network entrepreneurial structures (typology of networks), the principles of developing a strategy, and special methods of resource allocation taking into account factors operating in the entrepreneurial network. The process of determining the policy of developing an entrepreneurial network, a vision of the strategic future of the entire network business and the participation of each strategic business unit (SBU) are presented.

Keywords: Entrepreneurial Structures, Networking, Strategic Sustainability, Factors Of The Business Environment, Principles Of Strategic Development.

Introduction

In modern business conditions, one of the tools to maintain competitive positions and ensure sustainable strategic development by entrepreneurial structures is network interaction. Network entrepreneurial structures are currently an objective necessity according to the requirements of the time, they allow being adaptive due to various types of integration, using innovative technologies, and creating digital ecosystems.

The main characteristics of entrepreneurial networks are flexibility, variability, long-term partnerships, a large number of business relations based on the interweaving of many interests of network stakeholders. By a network entrepreneurial structure we mean a set of business units that has a single strategic development policy as a whole for the network and for its individual units engaged in commercial activities based on partnerships in the implementation of various business processes, as shown in research study by Gerasimova (2016).

In the mechanism of forming a strategy for the development of network entrepreneurial structures, it is necessary to take into account the features of their functioning (typology of networks), the principles of developing a strategy, and also use special methods of resource allocation taking into account factors operating in the entrepreneurial network. It is important that entrepreneurial structures cooperate, mutually strengthen and form a balanced whole with common interests within the same network. The compatibility and unity of entrepreneurial ambitions is required that is noted in researches Håkansson and Ford (2002), Ghisi and Martinelli (2006), Kashshay (2011).

First of all, in our opinion, strategy developers should take into account the characteristics of the object of study, i.e. what kind of network business is an entrepreneurial structure, as shown in research study by Asaul (2013). An exemplary typology of network business structures is presented in table 1:

Table 1: typology of entrepreneurial networks in Russian business

Typology attribute	Type of business network
By area of distribution	Regional; Federal; International
By size	Small; Average; Large
By legal form	Holding, association, cartel, consortium, syndicate, trust, concern, corporation
By specialization	Single profile; Multidisciplinary
By type of integration	Vertical; Horizontal; Independent; Mixed; Partial vertical
By ownership	State; Private; Mixed
On implementation in space	Real; Virtual

Analyzing the market situation and potential opportunities of the entrepreneurial network, it is recommended to adhere to certain principles of formation of a development strategy. The main ones, according to Gerasimova et al (2014), are presented in figure 1:

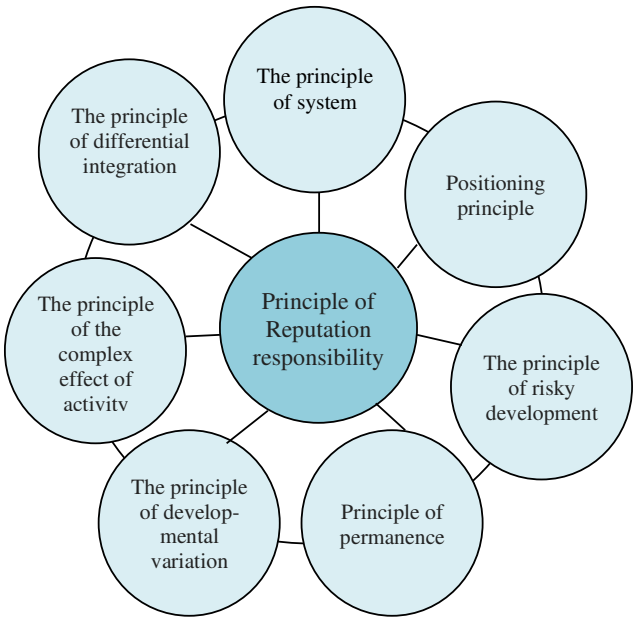

Fig. 1: Principles of forming a strategy for the development of network business structures

In the process of determining the policy of developing an entrepreneurial network, a vision of the strategic future of the entire network business and the participation of each strategic business unit (SBU) should be formed. A strategic business unit, by opinion Aaker (2001) is any organizational unit that has autonomy in carrying out business activities and its own business strategy. An entrepreneurial network may include various structures in terms of size and financial capabilities.

It seems difficult to answer the question of which strategy will be best for each SBU if the network strategy as a whole is not thought out. A strategic idea of the future business structure should include - in what direction should the global strategy, management practice, marketing strategy, reengineering of processes occurring in the enterprise, information technology, organizational development, leadership abilities and more develop.

When substantiating strategic plans, special attention is paid to the relationships between individual business entities and the possibilities for expanding individual SBU strategies, as well as the distribution of financial resources within the network. According to the authors, the possibility of restructuring inefficient enterprises should be taken into account. The following strategic management methods, is noted in researches Kashshay (2011), Aaker (2001), Gumerov et al (2015) can be used:

• Portfolio management method;
• Restructuring method;
• Method of transferring abilities;
• Method of participation in activities.

In our opinion, to determine the strategic policy of the network, the distribution of investment resources within the entrepreneurial network and determine the development potential of each strategic business unit, it is recommended to use the method of strategic maps, based on the determination of strategic sustainability and growth rate of income (Fig. 2).

Strategic business units included in the entrepreneurial network are distributed in squares according to the characteristic of the rate of growth of income and the indicator of strategic stability. The strategic sustainability indicator has an integral form, is determined by experts on the basis of an analysis of a set of characteristics that are specific to specific business units included in the network.

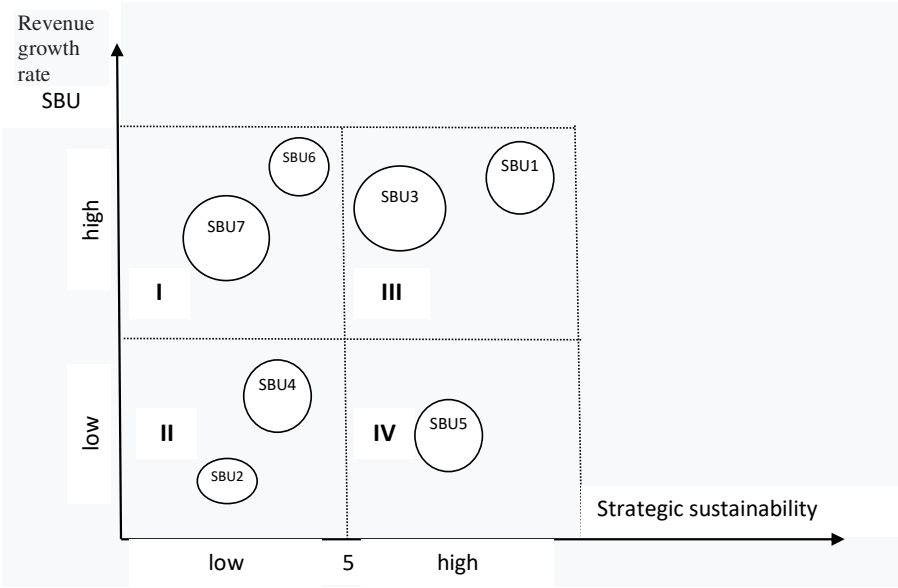

Fig. 2: Strategic map for positioning business units of an enterprise network

A wide range of examination characteristics is recommended depending on the type of network and the specifics of the business. Seasonality of sales, market capacity, size and innovative business, the period of activity of the enterprise, etc. Strategic stability is expressed from 0 to 10 (characteristic from 0 to 5 - low stability, from 5 to 10 - high stability).

One indicator of the profitability of an enterprise cannot give a comprehensive description of a business unit, so it should be supplemented with a characteristic of sustainability.
This can be demonstrated by the following examples (Fig. 3):

As can be seen in Figure 3, strategic business units 1,3 and 4 have approximately the same average annual revenue. SBU1, which tends to grow steadily, will be in square III, where high stability is observed. SBU3 is seasonally dependent, if this is objective and the company is not able to influence it, then this structure will also be referred to as square III. The yield of SBU 4 is not high and is limited by the size of the market. Accordingly, when a competitor appears, profitability may tend to decrease, therefore SBU4 is assigned to square II.

SBU5 is an innovative enterprise that has good development potential and is rapidly increasing its profitability, is assigned to square IV.

Square I includes business units that have a stable income, usually these are large enterprises, but based on classical business practices and introducing little innovative technology.

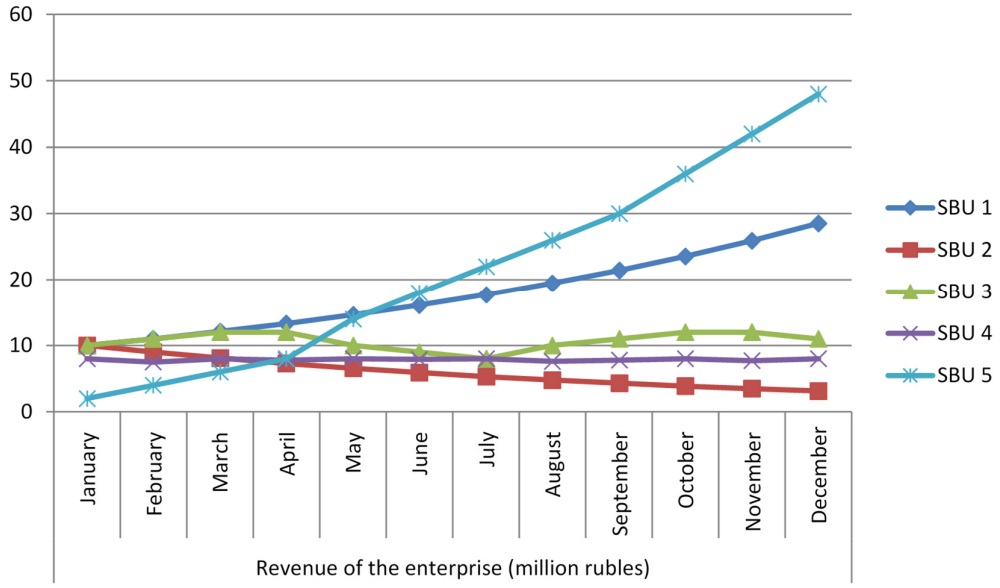

Fig. 3: Different types of trends in the profitability of entrepreneurial structures

To determine the strategic choice of an individual entrepreneurial structure, one can use well-known methods of strategic analysis - SWOT analysis, competitive analysis, PEST-analysis and others. However, the fact that a strategic business unit is located on the network will have a significant impact on it. Therefore, in our opinion, it is advisable to highlight another level of factors that affect the strategic development of an individual enterprise - these are network factors (Fig. 4).

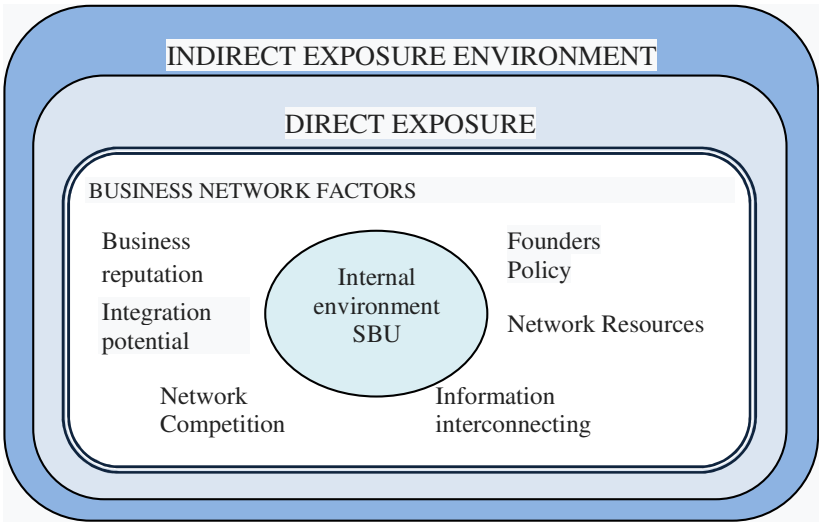

Fig. 4: Entrepreneurial network factors for developing a strategic business unit development strategy

One of the main factors of an entrepreneurial network is its business reputation. The success of each next action of network participants depends on the prevailing opinion about the enterprises included in the network: attracting investments, opening a new business, launching a new product, entering a new market, etc. Violations at any of the enterprises entering the network immediately leave a negative imprint on whole business.

An important factor is the leadership policy of the entrepreneurial network. Depending on the management style and the ambitions of the founders and strategic leadership, more or less risky decisions will be chosen, the introduction of innovative technologies and the development of innovative products, and the expansion of sales markets.

A rather complex factor is the potential for the integration of business structures in the network. Business processes of individual organizational units may not always be integrated into general network processes, may have sufficient autonomy and, accordingly, require specific activities to be taken into account when developing a development strategy.

The entrepreneurial network is trying to rationally approach the use of various resources, to integrate the processes of supply, storage, transportation. Accordingly, the task of allocating resources to individual business units, as well as the selection and support of a business with a greater development potential, becomes relevant. Limited resources in the network leads to competition between individual entrepreneurial structures, which may adversely affect the profitability of the entire network business, as shown in research studies by Perminov (2014), Fedotova (2015).

In modern business conditions, information support and the creation of digital ecosystems are of particular importance. The success of the entrepreneurial system depends on the effectiveness of their work, the safety of use.

Thus, in our opinion, when forming a development strategy for network entrepreneurial structures, it is necessary to rely on the methodological development of modern strategic management, taking into account the specifics of the object of study (such as network interaction), the principles of forming a strategy for a network business, and combining the network strategy with the strategy of each business unit (and its financial strategy), as well as factors of the entrepreneurial network. This approach will ensure the effectiveness of the entrepreneurial network and long-term strategic sustainability.

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Advantages of the EAEU Integration on the Post-Soviet Space

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Abstract

In the presented paper, comparative analysis of the main macroeconomic indicators and indicators of foreign economic activity of the EAEU countries and the CIS countries that are not members of the Union is carried out. The study is based on hypothesis that integration processes in the CIS space have promoted the stabilization of transformation processes, preservation of old and development of new trade and economic relations between member countries of the Union. The research has shown that the EAEU members received additional advantages for national economies development over other CIS countries and have better indicators of economic development in general. It was emphasized that, in contrast to some CIS countries that are not members of the EAEU, negative macroeconomic manifestations are noted in a less degree in these countries, and the growth rates of main macroeconomic indicators have a positive and growing dynamics.

Keywords: Integration, Comparative Analysis, The EAEU Countries, The CIS Countries.

Introduction

After the breakup of the USSR, fifteen republics that were a part of it on federal basis formed fifteen new independent countries. Transition to market economy and the rupture of economic ties between enterprises of former republics as a result of their breakup, led to protracted economic crisis. International organization the CIS (Commonwealth of Independent States) was formed in 1991 in order to overcome the transformational crisis in the post-Soviet space. Ten countries were the founders of it (plus 2 countries associated members).

It was suggested that this formation would allow former republics of the USSR to preserve old and to build new trade and economic relations of these countries in new market conditions. However, within the framework of the CIS, integration processes were rather slow, and some member countries preferred formal type of participation. Role of the CIS as a unifying system has changed a lot today in the result of numerous political crises and dramatic events in Georgia and Ukraine. At the same time, the need for economic cooperation between friendly countries of the post-Soviet space continued to strengthen.

Most close trade and economic ties have developed between three countries: Russia, Kazakhstan and Belarus. These countries had formed the core of integration processes. In 2007, it was decided to create the Customs Union (CU) of Russia, Belarus and Kazakhstan in order to liberalize the movement of goods, services, capital between the countries, and to strengthen cooperative ties. In 2011, the CU was

transformed into the Common Economic Space, and from January 1, 2015, into the Eurasian Economic Union – the EAEU with fully functions. Now five countries are included in the EAEU, and there are backgrounds for its expansion.

In the modern economy, integration processes are objective condition for ensuring competitive advantages for many countries of the world. Despite short life of the EAEU, we can note a significant positive dynamic in development of its member countries. In this regard, there is a unique opportunity to conduct a comparative analysis of main indicators of foreign economic activity in the EAEU member countries and other CIS countries that are still not members of the Union. Such analysis will allow us to answer the question if integration processes over the post-Soviet space do really contribute to the economic development of the countries. We would like to explore how successfully regional trade agreements (RTAs) inspire the development of international economic relations of the Union member countries compared to other CIS countries.

Review of Relevant Studies and Problem Statement

Studies of economic integration advantages have a great foundation in economic science. The most conceptually elaborated are researches devoted to theoretical and practical aspects of European integration. Brugmans (1970), Dagtoglou (1975), Genna (2003), Baele (2004), Breuss (2016), etc. are among the most famous theorists of European integration. Practical issues of European integration related to common markets formation in Europe were studied in works of Bussiere (2005), Casu (2010), Claes (2010), Gokgos (2018), etc.

Literature analysis of European integration processes has led to conclusion that integration processes usually begin with liberalization of mutual trade, restrictions removal on goods flow, then services, capital flow. Moreover, step by step under appropriate conditions and in case of interest between partner countries, it can help to form a single economic, legal, information space within the region. New quality of international economic relations is being formed. The experience of European integration confirms that it is gradual, balanced process of targeted regulation of mutual trade and economic relations (Butorina, 2016; Goncharova et al., 2018).

Dullness and inconsistency are noted in studies devoted to integration processes analysis in the post-Soviet space (Freinkman L. et al., 2004; Shadikhodjaev, 2009; Bershadskaya et al., 2013). Prolonged political and economic crises in numerous countries hamper the development of economically sound trade and economic relationships (Sopilko et al., 2019). However, it is emphasized that trade and economic ties preservation and development between individual countries that formed core of the CU favorably influenced the development of their economies (Perskaya, 2020; Pastukhova and Westphal 2018). In this regard, it is of interest to compare key macroeconomic indicators of the EAEU member countries and other post-Soviet countries that are not members of this Union, as well as dynamics of trade and economic relations development in the context of integration processes.

Research Methodology

Comparative analysis of the EAEU countries and other post-Soviet countries that are not members of the EAEU is based on the hypothesis that integration processes helped to stabilize the transformation processes, to preserve the old ones and to develop new trade and economic relations between the countries of the Union. As a result, the EAEU countries received additional advantages for national economies development over other countries of post-Soviet space.

Conclusions and fundamental points available from the study of theoretical and practical aspects of modern integration processes development are theoretical basis of hypothesis. Methods of comparative statistical analysis of main indicators which observe foreign economic activity of the EAEU countries and the reference group (the post-Soviet countries), included Azerbaijan, Georgia, Ukraine, Moldova, Tajikistan and Uzbekistan, were used for research in the work. Within the framework of this study, we cannot describe in details the specifics of these countries, but we understand and take into account the main trends in their economies. Uzbekistan is a landlocked country, as well as four others EAEU

countries. Georgia, Ukraine (like Moldova) are selected as the most affected countries in the post-Soviet space. We perceive them as good and rather close example of destroyed economic ties of two groups of countries selected for research.

The main source of statistical information is the Data of the Eurasian Economic Commission, which is the main statistical body of the EAEU, the Interstate Statistical Committee of the CIS, as well as statistical information from the IMF and the World Bank.

Results

Comparative analysis of economies development of the post-Soviet countries

After breakup of the USSR and formation of new independent countries, numerous economic ties that were formed within the framework of one country were disrupted. Retained ties became a part of international trade and, in some cases, lost their economic feasibility. After difficult initial period of market transformations, restoration and development of economies in post-Soviet space began, as well as their gradual involvement in world economic system.

General picture of turbulence of the EAEU countries and countries of the reference group over the past 10 years is presented in the figure (Figure 1).

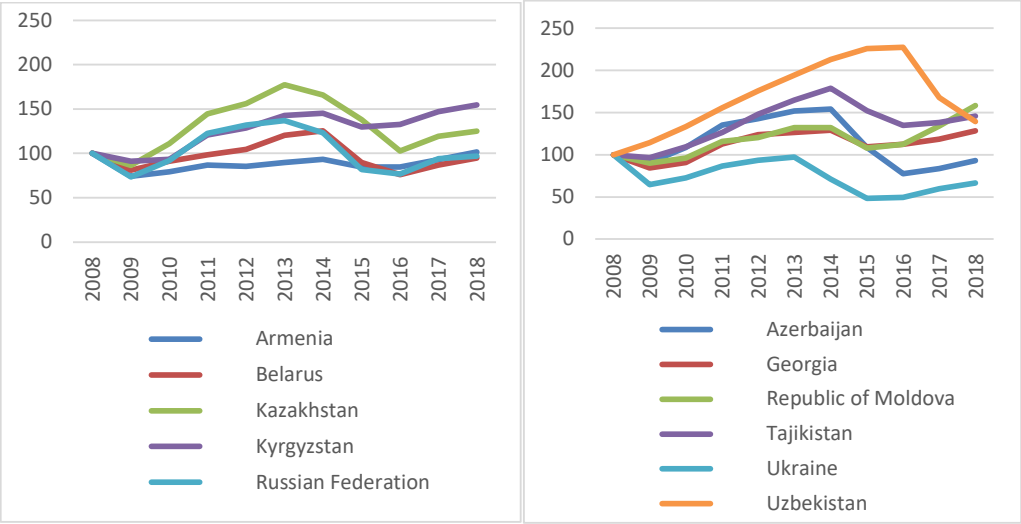

Fig. 1: the GDP growth dynamics, % by 2010, constant prices in 2010
Source: calculated by UNCTAD. URL: http://unctad.org/k.

Statistics data indicates that, in general, the level of the GDP growth in the EAEU countries and countries of reference group shows similar dynamics. At the same time, it should be noted that the dynamic of the GDP of the EAEU countries is more stable and does not have such strong drawdowns as countries of the reference group. The dynamics of the GDP of the reference group countries is very volatile and is characterized by periods of sharp growth and sharp decline. In 2018, two countries like Ukraine and Azerbaijan, had the GDP level well below the level of 2008. One of the reasons for such decline is the gradual breakdown of cooperation ties with the countries of post-Soviet space, while involvement level of these countries in intercompany cooperation was very high.

More stable dynamics of the GDP of the EAEU countries compared with the reference group countries can be explained by partial preservation and cooperative ties development of the countries, which contributed to the stabilization of their economic development. It is important to note that their share of mutual exports to the EAEU in total exports has a steady upward trend (Table 1).

Table 1: Mutual trade of the EAEU countries

Country / year	2015	2016	2017	2018
Trade volume with EAEU member countries, million US dollars				
Armenia	256,2	393,9	571,0	688,5
Belarus	11 007,8	11 384,8	13 651,8	13 932,2
Kazakhstan	5 120,3	3 930,2	5 262,5	6 046,8
Kyrgyzstan	410,2	447,1	541,5	640,6
Russia	28 821,2	26 804,3	34 685,6	39 953,4
The EAEU, total	45 615,7	42 960,3	54 712,4	61 261,5
Share of exports to the EAEU member countries in total exports				
Armenia	17,3%	22,0%	25,4%	28,5%
Belarus	41,3%	48,4%	46,7%	41,3%
Kazakhstan	11,1%	10,7%	10,8%	9,9%
Kyrgyzstan	28,5%	28,4%	30,7%	36,3%
Russia	8,4%	9,5%	9,8%	9,0%
The EAEU, total	10,9%	12,4%	12,6%	11,3%

Source: Eurasian Economic Union in numbers: brief statistical compilation // Eurasian Economic Commission. – Moscow, 2019. – 199 p.

The largest share of exports to the EAEU is typical for Belarus and Kyrgyzstan, the smallest share of exports is in Russia. The share of exports of more than 40% within the association means high level of complementarity, which could more likely decline even if export diversification processes are developing.

The specifics of internal division of labor in the EAEU region historically has intersectoral character, which partly allowed the countries of the region to avoid the severe destruction of national economy in comparison with other post-Soviet countries. In this regard, the formation of common commodity markets plays a huge role for the EAEU.

Increase in trade volumes of the EAEU countries is also observed in dynamics with third countries. According to the EEC, it should be emphasized that in general, trade turnover has increased from 103.3% to 118.9%, exports has grown from 113.9% to 126.8% in the period from 2015 to 2018. Total exports of the EAEU countries and countries of the reference group are presented in Figure 2.

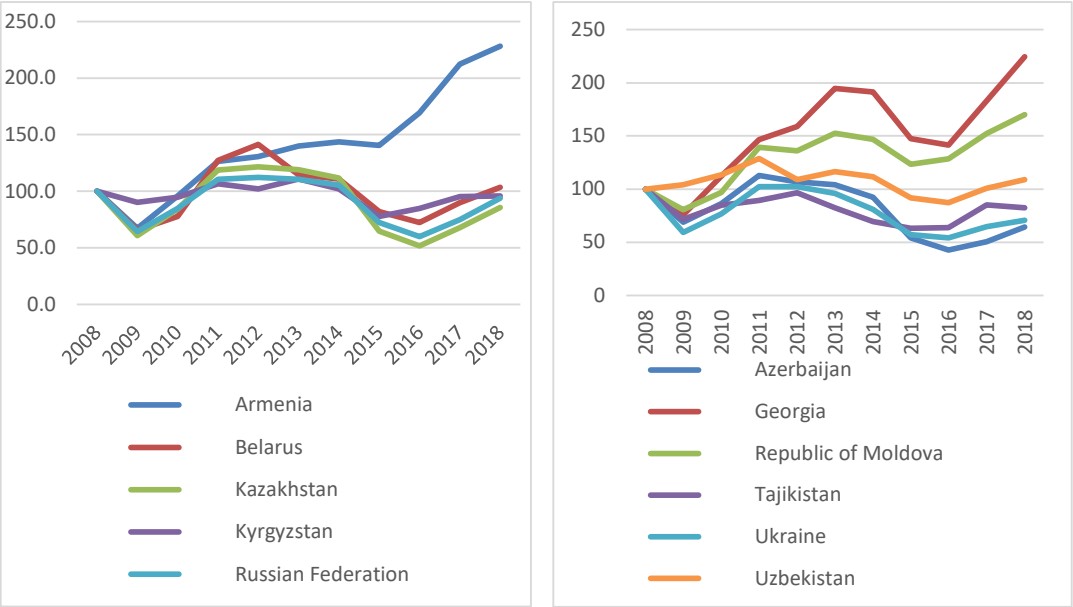

Fig. 2: Export dynamics of countries: the EAEU (left chart), countries of the reference group (right chart), % by 2008

Source: calculated by UNCTAD. URL: http://unctad.org/k.

Statistical data shows that export did not exceed the level of 2008 over the past 10 years in most countries of the former Soviet Union (Figure 2). Only three countries can be distinguished – Armenia, Georgia and the Republic of Moldova, which export has doubled during this period. Both groups are characterized by sharp decline in exports –almost by 50% during crisis periods. It indicates a significant economies dependence on the world market. At the same time, it is important to note an obvious trend after 2015 – 2016, when the decrease in trade volumes of most countries of both groups reached 50%, trade restoration in the EAEU countries was more dynamic. It can be associated with the beginning of the Custom Union functioning. At the same time, three CIS countries that are not members of the EAEU (Ukraine, Azerbaijan and Tajikistan) have an export level of only 70-80% of 2008 level.

Prospects for the EAEU development as alternative to the CIS

Integration processes development leads to refocusing of economic ties of member countries to intra-regional cooperation. Rest of the countries that remain outside the union struggle with some difficulties in trading within grouping countries. As a result, they are also forced to join integration association. For example, "Group of Three" was found in Latin America after Mexico became a member of NAFTA (it has signed free trade agreements with Venezuela and Bolivia).

Such situation may be possible with successful development of the EAEU. Union development includes markets unification. The basis of Eurasian integration is energy sector, which plays a system-forming role for the economies of all EAEU countries. In structure of the GDP, share of fuel and energy complex of the EAEU countries is about 17%, and it reaches 33% in total industrial production. Main producers, net exporters and consumers of energy resources in the EAEU are Russia and Kazakhstan, the rest are net importers. In general, the Eurasian Economic Union has the most significant energy potential in the world.

Main facilities for petroleum products production are located in Russia, Kazakhstan and Belarus. Basically, the EAEU countries import oil for refining and oil products for their own needs chiefly from Russia. In 2017 gasoline, diesel fuel and fuel oil (1.8 and 1.2 million tons) were delivered from Russia

to Kazakhstan and Armenia, gasoline and diesel fuel (960 and 940 thousand tons) were delivered to Kyrgyzstan and Belarus.

Russia and Kazakhstan export gas both to markets of the EAEU countries and to the third countries. The level of gas export orientation is 32% and 25% for Russia and Kazakhstan. Net exports of gas for 2015–2017 significantly increased in Russia (by 40.5 billion m^3 – by 21.7%) and Kazakhstan (by 6.2 billion m^3 – by 93.5%). Gas demand in Armenia and Belarus is almost completely covered by supplies from Russia, Kyrgyzstan exports it from Kazakhstan. Mutual deliveries are made between Russia and Kazakhstan for the purpose of gas supply to the northern regions of the country.

Service Markets Formation

Along with common product markets formation in the EAEU region, common service markets are also actively being created (since 2015), covering about forty-three separate service sectors, and in the near future twenty-one more areas of the economy will be covered.

It is not yet possible to quantify the intensification of trade in services between the EAEU countries due to the lack of sufficiently complete statistical data in this context (the EEC data concerning services as of middle of 2019 was presented only for the period of 2010–2017 without detailed information about mutual trade in services). However, available statistics allowed to reveal a number of certain trends. Firstly, Belarus is the only country with positive balance of trade in services among the EAEU member countries. Transport services prevail in export structure of services in Belarus, Kazakhstan and Russia, while tourist trips dominate in Armenia and Kyrgyzstan. Moreover, this structure has been preserving since 2010. The largest share is made by tourist trips in imports structure of service in Armenia, Kyrgyzstan and Russia, transport services prevail in Belarus, building and construction dominates in Kazakhstan (Table 2).

According to the data of balance sheets of the EAEU countries, total turnover of services amounted to 175.4 billion US dollars in 2017. It is for 14.6% more than in 2016. However, in 2016 volume of services turnover in the EAEU was for 9% lower than in 2015. Such statistics for 2017 emphasizes the necessity for more dynamic development of services sector and the openness of member economies in this field.

Table 2: Dynamics of services export and import by the EAEU member countries, million US dollars

Exports								
Type of service	2010	2011	2012	2013	2014	2015	2016	2017
Transport services	20 422	23 403	25 653	27 748	28 493	23 539	23 959	27 239
Trips	11 081	14 102	14 043	15 712	15 482	12 044	11 444	13 075
Telecommunication services	1 514	1 618	1 696	1 863	2 065	1 691	1 446	1 445
Building and construction	3 702	4 900	5 449	7 287	6 401	5 255	5 109	6 115
Insurance and services of private pension funds	541	462	564	605	504	728	479	462
Financial services	1 101	1 156	1 394	1 768	1 669	1 281	1 231	1 213
Computer and information services	1 743	2 161	2 626	3 322	3 639	3 563	3 980	5 030
Intellectual property fee	396	580	690	769	708	751	579	767
Other business services	13 203	15 682	17 384	19 673	18 018	13 678	12 855	13 717
Services to individuals, cultural and recreational services	510	533	587	803	720	373	454	528
Government services	794	1 030	1 484	1 309	1 255	1 199	1 102	1 191
Imports								
Transport services	16 012	19 967	21 767	22 740	20 398	15 889	15 339	18 474
Trips	29 314	36 035	46 424	57 729	54 932	39 207	27 937	35 393
Telecommunication services	2 290	2 782	2 831	3 114	3 155	2 718	2 178	1 759
Building and construction	6 456	7 843	11 012	12 713	10 690	7 554	6 891	7 119

Insurance and services of private pension funds	1 412	1 671	1 674	1 537	1 794	1 509	1 091	1 350
Financial services	3 089	2 807	3 241	3 925	2 897	2 444	2 693	2 751
Computer and information services	2 094	2 612	2 828	3 532	4 331	3 451	3 852	4 215
Intellectual property fee	5 033	6 020	7 896	8 671	8 430	5 922	5 257	6 258
Other business services	21 496	23 322	25 176	28 279	29 561	23 689	22 324	24 199
Services to individuals, cultural and recreational services	1 073	1 146	1 215	1 410	1 746	1 199	1 117	1 558
Government services	2 261	2 271	2 624	2 806	2 300	1 882	1 736	1 607

Source: Eurasian Economic Union in numbers: brief statistical compilation // Eurasian Economic Commission. – Moscow, 2019. – 199 p.

Labor Market Formation

From the beginning of the EAEU creation, the labor market began to develop at fairly high tempo within the region. It is determined by such indicators as population growth rate of countries, as well as supply and demand for labor.

In Kazakhstan, Kyrgyzstan, and Uzbekistan, in the EAEU countries and countries of the reference group, the lowest birth rates are observed in Ukraine and Moldova. They remain low, but have a positive trend in Russia, Belarus and Georgia. Birth rates remain high and stable in Kazakhstan, Kyrgyzstan, and Uzbekistan.

Under the current conditions, it is obvious that population migration and movement of large manpower masses is directed towards more developed and geographically endowed countries, including neighbors. Stability of labor relations, liberalization of labor and finance markets in the EAEU space ensured the expansion of labor migrants' participation from all countries of the region in Russia and Kazakhstan (Table 3).

Rapid development of labor market in the EAEU region was facilitated by the creation of some regulatory documents, including the list of key advantages over migrants from other countries. Such advantages have increased the flow of migrants within the region, as well as simplified and legalized their residence.

Gradual growth of domestic economies and employment in the EAEU countries opened job opportunities in the domestic markets of those countries, but at the same time, did not allow providing a sufficient level of income for many participants of the process. According to statistics, the number of employees in most countries of the EAEU has grown after decrease connected with the crisis of 2009, especially with the Customs Union creation and the beginning of Integration Treaty. On one hand, such conditions have ensured employment growth, and at the same time have encouraged labor migration within the Union.

Table 3: Dynamics of employment rate in economies from total population, %

Countries	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Reference group of countries											
Azerbaijan	60,5	62,2	60,9	60,9	60,6	61,2	61,4	61,9	0,0	62,7	62,9
Georgia	54,9	52,3	51,2	52,3	53,2	54,3	54,1	55,9	57,4	57,1	56,7
Moldova	0,0	0,0	40,0	38,5	39,4	38,5	39,3	39,6	42,4	40,8	40,5
Tajikistan	29,8	29,3	39,5	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Ukraine	58,7	59,3	57,7	58,5	59,2	59,7	60,2	56,6	56,7	56,3	56,1
Uzbekistan	70,5	70,3	70,3	69,5	68,9	69,6	70,3	71,0	71,4	71,9	0,0
The EAEU member countries											
Armenia	47,7	43,1	42,8	50,6	48,4	44,7	49,8	52,0	50,9	50,0	50,1

Belarus	0,0	0,0	57,7	0,0	0,0	0,0	0,0	0,0	81,3	66,7	67,2
Kazakhstan	65,3	66,4	66,1	67,1	67,8	67,9	68,0	68,0	68,3	66,7	66,2
Kyrgyzstan	60,0	60,0	58,6	58,7	59,3	58,8	57,3	57,3	57,7	57,1	55,9
Russia	63,1	63,3	62,0	62,7	63,9	64,9	64,8	65,3	65,3	65,7	59,5
The EAEU, avg	47,2	46,5	57,4	47,8	47,9	47,3	48,0	48,5	64,7	61,2	59,8

Source: Eurasian Economic Union in numbers: brief statistical compilation // Eurasian Economic Commission. – Moscow, 2017. – 204 p.

There is no doubt that Russia is attraction center for migrants from the EAEU countries. Since 2010, the number of migrants from member countries has more than doubled (from 74 thousand people in 2010 to 156 thousand in 2016), but migrants share from the Union countries in relation to migrants from other countries has decreased from 39% to 28%. This decrease is mainly due to migration increase from the reference group countries.

According to the EEC in 2017, the migration balance for Armenia, Kazakhstan and Kyrgyzstan was negative, for Russia and Belarus it was positive. Russian statistics has led to conclusion that number of people entering the country greatly exceeds the number of emigrants from Russia to the EAEU countries (it is mostly typical for Kyrgyzstan). Such difference grows in time and is encouraged by the conditions for labor migration created inside the region in the framework of common labor market formation.

Relations development between the countries in the framework of trade intensification and labor migration increasing has an impact on national funding of the countries. Data analysis of cash flows from labor migrants showed that the largest volumes are associated with labor migration from/to Russia, which is one of the leading donors to neighboring countries through personal funds transfer channels. The main funds flow is directed to Armenia and Kyrgyzstan, the EAEU countries, where the competition is observed in the migration field of Russia. In Russia, huge flows of migrants from Uzbekistan, Tajikistan, Ukraine and other countries are noticed.

At the same time, personal savings play special role. In such countries as Kyrgyzstan, personal transfers are practically the same as level of national savings. Taking into account high savings ratio in this country, it also indicates a high rationalization of funds application from outside.

Capital Market Formation

Important aspect of integration processes development in the region is capital market formation. The main resources for investment in each country are internal business savings, credit, or government funds. Special role, although not the dominant one, is played by foreign direct investments, which allow to develop business without debt burden increasing, and attract management experience and technology.

Mutual foreign direct investment (FDI) increasing is observed in the Eurasian Economic Union (the EAEU) after three years of decline in 2013–2016. Statistical data of the World Bank and the ECE regarding investments is sufficiently incomplete and is published with significant delay, so it seems possible to evaluate investment indicators only for the period 2017–2018. (Table 4).

Table 4: Mutual direct investment structure in the EAEU countries, net flows for 2017–2018, million US dollars

		Investment recipients					Total
		Armenia	Belarus	Kazakhstan	Kyrgyzstan	Russia	
Investors	Armenia		3,1	0,1	–	4,8	8,0
	Belarus	–		0,3	0,5	49,4	50,2
	Kazakhstan	–	2,7		-37,9	223,8	188,5
	Kyrgyzstan	–	-0,4	1,6		-27,3	-26,0
	Russia	194,2	698,0	616,8	76,8		1585,8
Total		-91,0	194,2	703,3	618,9	39,4	250,7

Source: EEC, "Mutual Investments of the EAEU Member Countries" [Electronic resource]. - Access mode: http://www.eurasiancommission.org/ru/act/integr_i_makroec/dep_stat/fin_stat/express_information/Documents/mutual_investments/express_mi_4Q2018.pdf.

According to the ECE statistics, FDI stocks have amounted about $ 24 billion in the EAEU countries at the beginning of 2019. This is for 2.5% higher in comparison with the previous year.

Russian companies are the largest exporters of capital to the EAEU (over 78% of FDI exports). Kazakhstan goes second (13.5%), Belarus is third (7.8%).

What is new is that now Russia not only directs its investments to the EAEU countries, but also receives them from its neighbors. The accumulated volume of FDI from other EAEU countries reached $ 5 billion. The main recipients of FDI are still Belarus ($ 8.6 billion by the end of 2016) and Kazakhstan ($ 8.2 billion by the end of 2016).

Regarding investment areas, according to statistics, in 2016 Russia's neighbors invest mainly in the Russian chemical industry – 35.1%, agricultural sector – 15.8%, and transport sector – 14.2% of the volume imported FDI from the EAEU countries. In addition, Kazakhstan's investors participate in Russian hotel industry (14%).

Russian companies have increased investments in all EAEU countries. At the beginning of 2017, Russia mostly invested in Belarus ($ 8.5 billion) and Kazakhstan ($ 8.2 billion). Armenia comes next ($ 3.4 billion) and then goes Kyrgyzstan ($ 0.9 billion).

In order to promote an economic growth of participating countries within the framework of integration development in the Eurasian space, Russia and Kazakhstan established the Eurasian Development Bank (EDB) in 2006. Armenia, Belarus, Kyrgyzstan, and Tajikistan joined the EDB in 2009–2011. The authorized capital of the EDB ($ 7 billion) allows the Bank to act as regional financial mechanism in the Eurasian space, to be coordinator and manager of the funds of the Eurasian Fund for Stabilization and Development (the capital of the EFSD established in 2009 amounted $ 8.5 billion).

Currently (as of September 1, 2019), the EDB investment portfolio is $ 3.896 billion, and the Bank's balance sheet portfolio at that date is $ 2.611 billion (excluding provisions and discounts). At the same time, total number of its investments in the economies of the EAEU and Tajikistan reached $ 8.198 billion. The activities of the EDB is up to 96 projects in participating countries. As practice shows, on the part of the Bank, special attention is paid to financing priority projects in the field of energy, transport and infrastructure; the implementation of information-analytical and forecasting studies in the field of financial market of the EAEU, the CIS and other countries of Eurasia. The proportion of such projects amounted about 20.1% (energy) and 17.9% (transport and infrastructure) of the current investment portfolio[1].

Conclusions

Despite short life span of the EAEU and initial process of unified institutions forming that have not yet been able to influence the development of the Union countries in full, it can be already suggested that there is positive impact of integration on the GDP of countries, international trade, and on mutual trade of the member countries.

In the EAEU, in contrast to other countries of reference group, negative macroeconomic consequences are observed in less degree, and the growth rates of main macroeconomic indicators have positive and growing dynamics, which confirms the advisability of developing integration processes in this region. Key element that can impact on integration processes in the post-Soviet space might be the speed of integration processes: the formation of institutions and common markets. While successful development of the EAEU project, an effect associated with relative increase in competitive positions of the member countries over neighboring countries that are not members of the Union may firstly arise. Even now, we are observing a significant decrease in the GDP levels of some post-Soviet countries. One of the reasons was breakdown in cooperation ties and decrease in mutual trade. There is also a significant increase of mutual trade indicators of participating countries. With further integration processes development in the EAEU, «Domino» effect may arise. It's associated with the necessity to join the Union for a number of post-Soviet countries on the basis of associate or full membership for trade and economic ties maintaining.

As a part of the EAEU integration, the processes of common markets forming for goods, services, capital and energy resources have been successfully launched and are still continuing. The first results of common markets creation should be recognized as significant and successful. There has been increase in main indicators of mutual trade of the EAEU member countries in goods and services markets, as well as trade with the third countries, which indicates the efficient functioning of the Customs Union and the Common Economic Space. In the field of common energy and energy markets formation, there are some unresolved problems related to gas, oil and oil products markets, even though development and approval stage of the programs for the EAEU common energy markets creating is basically completed. It is expected that these markets will be fully formed by 2025. But at the same time, it should noted that energy integration remains one of the most important areas for the Eurasian Economic Union development, which is expected to bring significant economic benefits in the long term and is the core of economic integration process as a whole.

The liberalization of migration policy within the EAEU allowed getting free labor movement and entrepreneurial resources between participating countries. It has resulted in multiplication of joint ventures and projects between companies from the EAEU member countries. Common capital market formation makes it possible to increase the flow of mutual investments between the EAEU member countries in all key industries.

Footnotes

[1]Projects of the Eurasian Development Bank [Electronic resource]. – Access mode: https://eabr.org/projects/eabr/. (Application date10.09.2019).

Acknowledgment

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Selected Models of Recurrent Events in the Assessment of the Risk of Subsequent Registrations in the Labour Office

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Abstract

The problem of occurrence of recurrent (multiple) events occurs in many areas. In economic and social sciences, it is possible to analyse the time of entering and leaving the sphere of poverty, the time of subsequent guarantee or insurance claims, as well as the time of subsequent periods of unemployment. It happens that persons looking for job use the Employment Office several times. The research motivation is the will to identify features which significantly influence the subsequent registration in the office. The aim of the article is assessment of the risk of subsequent registrations in the labour office depending on selected characteristics of the unemployed: gender, age, education and seniority. In the study, methods of survival analysis were used. The results obtained for four models were compared: Anderson-Gil model (the counting process model AG), Prentince-Williams-Peterson conditional models: total time (PWP-CP) and time gap (PWP-GT), and Wei, Lin and Weissfeld model (marginal model WLW). These models are the extensions of the Cox proportional hazards model. The AG model does not distinguish between first and next events. The number of events that occurred is important. The other three models are based on the stratified Cox model. They differ in the way risk intervals are determined. The strata are consecutive events. The study used anonymous individual data from the Poviat Labour Office in Szczecin (Poland). In the analysed period, only age and education influenced the risk of multiple registrations. Gender and seniority did not have a significant impact on this.

Keywords: Cox Regression Model, Recurrent Events Models, Risk Of Registration In The Labour Office.

Introduction

Since 2013, the economic situation on the Polish labour market is improving. This is reflected in the decreasing unemployment rate, the number of persons registered as unemployed and the increased outflow of persons registered in labour offices. From the point of view of social policy, it is important to activate the unemployed persons and take up employment. The best solution would be to take up a permanent job or start a long-term business activity. Unfortunately, statistical data show a high percentage of people returning to the labour office and registering again. In 2004 it was 68% of registered persons and it was a minimum value in the period 2004-2018. Since then, this percentage has increased and remains relatively stable. In 2016 it was 83% (the maximum value in the presented period), and in 2017-2018 - 82% (Fig. 1).

In the presented study, methods derived from the survival analysis were used to analyse subsequent registrations in the labour office. The duration of the unit in a specific state is analysed until the moment of occurrence of the specific event ending the observation. They are derived from demography and technical sciences. In the past, they were used to study the duration of human life and failure-free operation of devices. They are now also used in the analysis of the duration of economic phenomena. The investigated phenomenon may result in the occurrence of a specific event (death, illness, failure, company failure, entry into unemployment, entry into or exit from the poverty sphere). The event may not occur before the end of the observation period. Such observations in the analysis of duration shall be taken as censored. In addition to observations not yet completed before the end of the observation period, censorship includes those where the observed entity disappears from sight or there is an observation ending event that excludes the occurrence of a relevant event (Pepe 1991), i.e. a competing event.

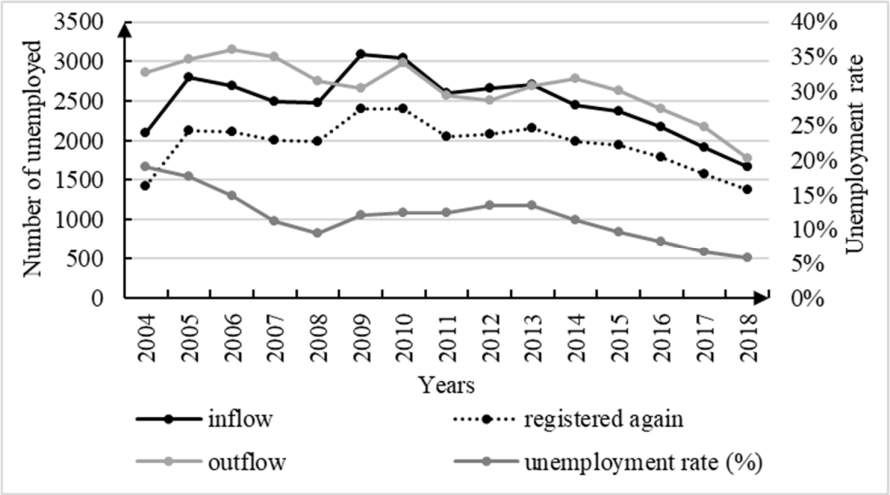

Fig. 1: Inflow and outflow of the registered unemployed and the registered unemployment rate in Poland in the years 2004-2018

A very important issue is the analysis of processes, during which the unit can be in the state defined by the study several times. These processes can be analysed using selected methods from the area of survival analysis. These methods in the technical sciences are used for testing downtime on assembly lines or for analysing software fault detection and troubleshooting processes. In medical science, the time until the relapse of disease symptoms is examined (Sagara et al 2014). In economic and social sciences, it is possible to analyse the time of entering and entering the sphere of poverty (Sączewska-Piotrowska 2014) or the time of subsequent guarantee or insurance claims. The analysed random variable T in such studies is the time to occurrence of the event.

The aim of the study is to assess the risk of subsequent registrations in the labour office depending on the characteristics of the unemployed (gender, age, education, seniority).

Risk intervals in the analysis of recurrent events

Multiple events (recurrent events) are defined as processes that repeatedly generate specific events (Oakes 1992, Hosmer and Lemeshow 1999, Therneau and Grambsch 2000, Machin et al 2006, Cook and Lawless 2007, Aalen et al 2008). The problem of their occurrence is present in many fields of science. In the technical sciences, this involves testing downtime on assembly lines or analysing processes for detecting and removing software errors. In medical science, this is a study of the time until the recurrence of symptoms of the disease. Such events are also analysed in economic and social sciences. It is an analysis of the following times: entering and leaving the sphere of poverty (Sączewska-Piotrowska 2014), guarantee or insurance claims, duration of unemployment (Gałecka-Burdziak 2016, Bieszk-Stolorz 2018). Fig. 2 shows examples of objects with recurrent events. Objects 1, 2 and 3 experienced one, two and three full events respectively. Subject 4 has suffered two complete incidents and subject 3 is being censored. This censorship is related to the end of the observation period. Object 5 suffered an event that initiated the process, but did not suffer a final event. In this case, the observation is also censored because of the loss of a unit from the observation field. The intervals between successive events are often referred to in literature as episodes.

In case of recurrent events the time is indexed in two scales: calendar and between consecutive events (González 2006). In this case, risk ranges (episodes) shall be defined, i.e. the ranges within which the unit is exposed to an event along a given time scale. There are three types of such intervals: the time gap, the total time and the counting process (Prentice et al 1981, Kelly and Lim 2000). Intercurrence time (gap time) is time between events. In order to determine it, the clock is restarted after each subsequent event (Fig. 3). In case of total time, the clock is not restarted, i.e. the time is counted from

the selected point on the time scale. Most often it is the beginning of the observation of the unit (Fig. 4). Counting process is a combination of calendar time and time gaps. In this case, the time is calculated on the same scale as the total time, but the fact that the beginning of each subsequent period coincides with the end of the previous period is taken into account (Fig. 5). The common feature of all presented methods of determining the time is the same risk range for the first event.

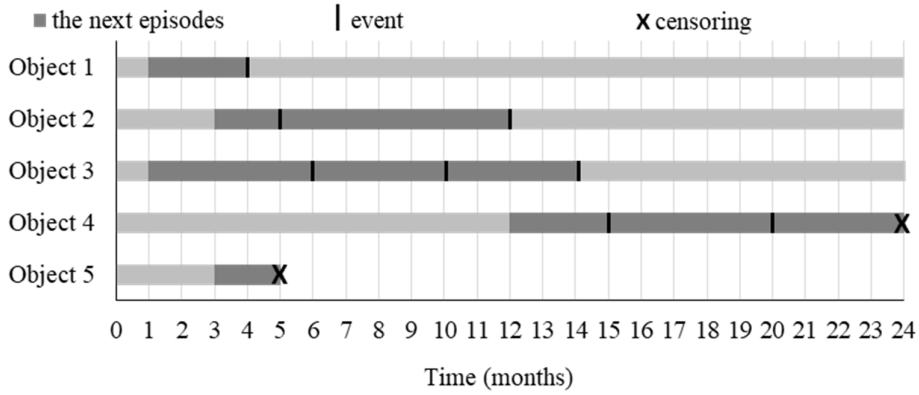

Fig. 2: Examples of objects with multiple events

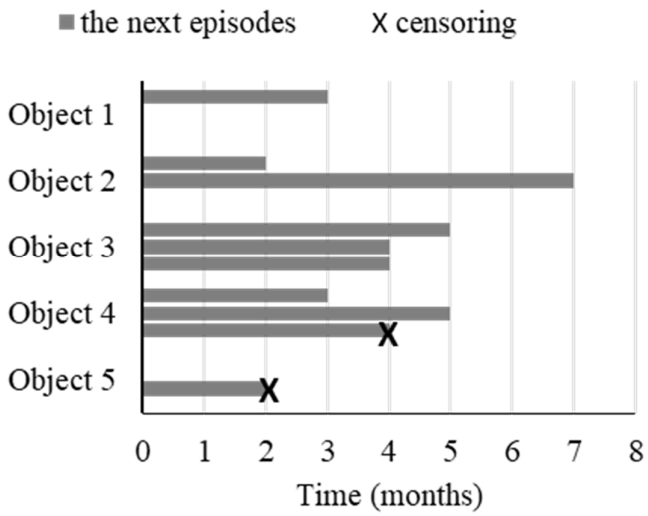

Fig. 3: Risk intervals for the gap time case

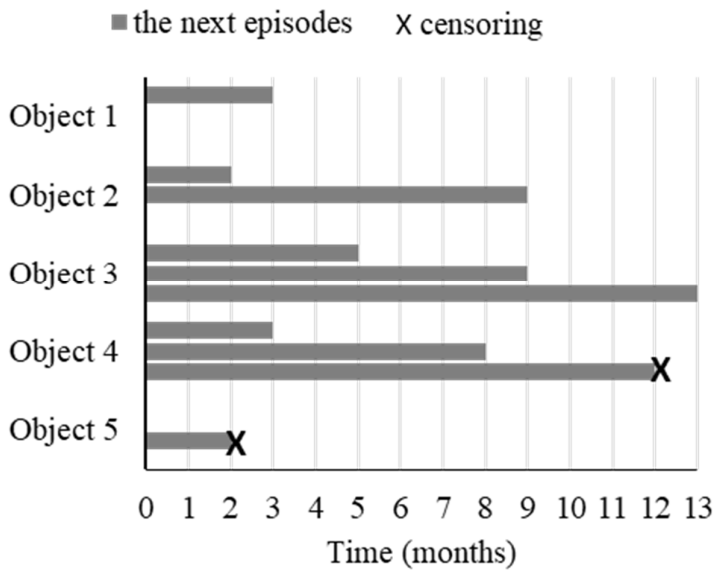

Fig. 4: Risk intervals for total time

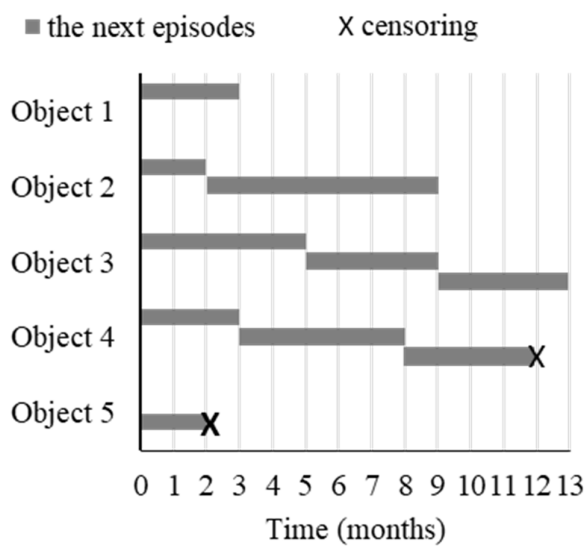

Fig. 5: Risk intervals for the counting process

Research Methodology

The basic concept of the duration analysis is the duration function (survival function) which determines the probability that an event will not occur at least up to time *t*. It is defined as follows:

$$S(t) = P(t < T) = 1 - F(t) \tag{1}$$

where:

T – duration of the phenomenon,
F(*T*) – cumulative density distribution of the random variable *T*.

The most commonly used estimator of the survival function is the Kaplan-Meier estimator (Kaplan and Meier 1958):

$$\hat{S}(t) = \prod_{j:t_j \leq t} \left(1 - \frac{d_j}{n_j}\right) \tag{2}$$

where:

d_j – number of events at the moment t_j,
n_j – number of threatened entities until the moment of t_j.

The second function used in the survival analysis is the hazard function. It describes the intensity of the event, i.e. the probability of the event occurring at moment t provided that it survives to time t, and is defined as follows (Kleinbaum and Klein 2012):

$$h(t) = \lim_{\Delta t \to 0} \frac{P(t \leq T < t + \Delta t | T \geq t)}{\Delta t} \tag{3}$$

In this case, the semiparametric model of Cox proportional hazard, defined by the formula (Cox 1972, 1975), is popular:

$$h(t, X) = h_0(t) \exp\left(\sum_{i=1}^{n} \beta_i X_i\right) \tag{4}$$

where:

t – time,
$X = [X_1, X_2, \ldots, X_n]$ – vector of explanatory variables,
$h_0(t)$ – basic hazard.

In the case of recurrent events in the study, models that are an extension of the Cox regression model may be used. Replacement of recurrent events models has been applied: Prentice, Williams and Peterson (1981) (counting process model – PWP-CP, time gap model – PWP-GT), Andersen and Gill (1982, AG), Wei et al (1989, WLW). Each unit (i) present in the study is assigned successive events that form strata. The model (4) therefore takes one of two forms (Sousa-Ferreira and Abreu 2019):

$$h(t, X_{ik}) = h_0(t) \exp\left(\sum_{j=1}^{n} \beta_j X_{jik}\right) \tag{5}$$

$$h(t, X_{ik}) = h_{0k}(t) \exp\left(\sum_{j=1}^{n} \beta_j X_{jik}\right) \tag{6}$$

where:

t – time,
$\beta = [\beta_1, \beta_2, \ldots, \beta_n]$ – vector of model's parameters,
$X = [X_1, X_2, \ldots, X_n]$ – vector of explanatory variables,
$h_0(t)$ – basic hazard for all events,
$h_{0k}(t)$ – basic hazard for all events from episode k,
i – the number of the object,
k – the number of subsequent episode.

To assess the relative intensity of the event, the hazard ratio (*HR*) determined by the following formula is used:

$$HR = \exp \beta_j \tag{7}$$

In addition to basic hazard, these models differ in the time formula used, which is linked to different risk ranges.

In the Prentice, Williams and Peterson (PWP) models, the hazard function has the form (6). It is assumed that for each episode g the basic hazard is different. Thus, the intensity of the event is considered in strata, i.e. the events that occur in an orderly manner are analysed. The risk of another event occurring is affected by the previous event. The PWP model allows to save risk intervals in two possible time scales: the counting process or the time gap. In the model, the larger the sequence of events, the smaller the size of the subsequent strata, which may lead to unreliable estimates (Cai and Schaubel 2003). Therefore, in order to avoid such a situation, the number of strata should be carefully selected.

In the Prentice, Williams and Peterson models, for the Counting Process (PWP-CP model) the intervals are counted. The counting process is the determination of a time from the start of a study where the initial time of each risk interval coincides with the end of the previous event. In this case, the risk set indicator is defined as:

$$Y_{ik}(t) = I(t_{i(k-1)} < t < t_{ik}) \tag{8}$$

The Prentice, Williams and Peterson gap time models (Gap Time, PWP-GT) are based on the time interval between two events. The clock restarts when each event occurs. The indicator of the risk set is defined as:

$$Y_{ik}(\mathrm{t}) = I(g_{ik} \geq \mathrm{t}) \tag{9}$$

where $g_{ik} = t_{ik} - t_{i(k-1)}$ represents the observed time of interruption between two consecutive events. Instead of basic hazard $h_{0k}(t)$, basic hazard $h_{0k}(t_{ik} - t_{i(k-1)})$ is therefore being considered.

In the next model – Andersen and Gill (AG model) – the hazard function has a form (5). In this case, strata are not considered and the assumption that the basic hazard is the same. The unit is still assigned several events, but they are not ordered. Events have the same risk of occurrence. Similarly to the PWP-CP model, the periods are counted. The risk set indicator is defined as:

$$Y_{ik}(t) = I(t_{i(k-1)} < t < t_{ik}) \tag{10}$$

This model was developed for situations in which events do not depend on the observed time from the last event, nor on the number of events that occur red before. Although counting the formulation of the process requires a conditional structure of dependencies, among the events it is assumed that the times between them are independent. Some authors believe that the AG model is the simplest model, but the one with the strongest assumptions (Therneau and Grambsch 2000, Cai and Schaubel 2003).

The last of the presented models – Wei, Lin and Weissfeld model (WLW model) has the hazard function calculated by means of the equation (6). It is therefore a stratified model with a differentiated function of basic hazard. The risk intervals are based on the total time, i.e. the time from the start of the observation. The indicator of the risk set is defined as:

$$Y_{ik}(\mathrm{t}) = I(t_{ik} \geq \mathrm{t}) \tag{11}$$

There are similarities and differences between the presented models. PWP and WLW models are the stratified ones and have the same hazard function, but differ in the definition of risk intervals. The AG and PWP-CP models have the same defined risk interval, but differ in their basic hazard function. The main limitation of PWP models is that they can give unbelievable results for higher-order events. As the sequence of events increases, the number of objects in the risk range decreases. The construction of the data set in the WLW model allows to avoid this problem.

Data used in the study

In the study, individual data on the unemployed persons registered in the Poviat Labour Office in Szczecin (Poland), generated from the Syriusz system, were used. The data included information on the dates of subsequent registrations and de-registrations, gender, age, education and seniority. Earlier studies indicate that these features are determinants of exiting unemployment of people registered in the Poviat Labour Office in Szczecin (Bieszk-Stolorz 2017, Bieszk-Stolorz and Dmytrów 2019). Among the registered persons, those who were first registered in 2016 were distinguished. The cohort consisted of persons registered for the first time in 2016 and were observed until the end of 2017. The entire history of their registrations was analysed. Subsequent registration in the office was accepted as an event. As a starting point for the observation of each person ($t = 0$), his/her first registration was accepted. Each history consists of events, i.e. successive registrations in the office. These are the recurrent events. Among the observed persons, the highest number of them consisted of persons that did not register again in the analysed period (2808 persons) and there were 836 returning persons. A

total of 3644 histories were analysed. After a preliminary analysis of the number of events in the history of registrations, it was decided to divide them into four groups: without subsequent return, with one, two and three or more events. The separation of the latter group resulted from the small number of people registered with at least three events. The number of separated groups is presented in Table 1. Due to such defined events, censored observations appeared. These are observations in which a given unit suffered the *k-th* event subsequent registration at the office for $k = 1, 2, 3$, and did not experience, by the end of 2017, an event with the number $k + 1$. In the case of the study, all observations are of the same nature as object 4 in Fig. 2. The observation period ended at the end of 2017, but the observed persons may register again with the labour office in the future. The calculations were performed in the R environment by means of the `survival` package.

Table 1: History of registrations by the number of events

Number of events (subsequent registrations)	Number of histories
0	2,808
1	648
2	144
3 and more	44
Total	3,644

The study took into account four characteristics of the unemployed: gender - a dichotomous variable: gender: women (1), men (0, reference group); education – five levels: at most lower secondary (S_1, reference group), basic vocational (S_2), general secondary (S_3), secondary vocational (S_4) and higher (S_5); age – six age groups: 18-24 (W_1, reference group), 25-34 (W_2), 35-44 (W_3), 45-54 (W_4), 55-59 (W_5) and 60+ (W_6); seniority (D) – two groups: people with no professional experience (0, reference group) and people with professional experience (1).

Analysis of subsequent registrations in the labour office

The study was carried out in two stages. The first one consisted in a joint analysis of events, and the second one was an analysis for subsequent events. Both stages were preceded by an initial analysis of the duration of individual episodes in order to justify the choice of the methods used. First, the median and the maximum duration of subsequent event-end episodes were determined (without taking into account censored observations). Both the median and the maximum time in the analysed period were shortened. It follows that if a person re-registered in the office, they did so more and more quickly (Table 2).

Table 2: Median and maximum time to occurrence of subsequent events

Number of subsequent deregistration	Median (months)	Maximum (months)
1	6.7	21.3
2	5.1	18.3
3 and more	2.2	12.0

Since the distribution of duration between subsequent episodes is unknown, it was decided to use non-parametric (Kaplan-Meier estimator) and semiparametric (methods based on the Cox regression model) methods derived from the survival analysis. Decreasing number of subsequent layers does not affect the applicability of these methods. In one of them (WLW model) the number of all layers is equalised by adding censored observations. In the next step the Kaplan-Meier estimators were calculated (Fig. 6).

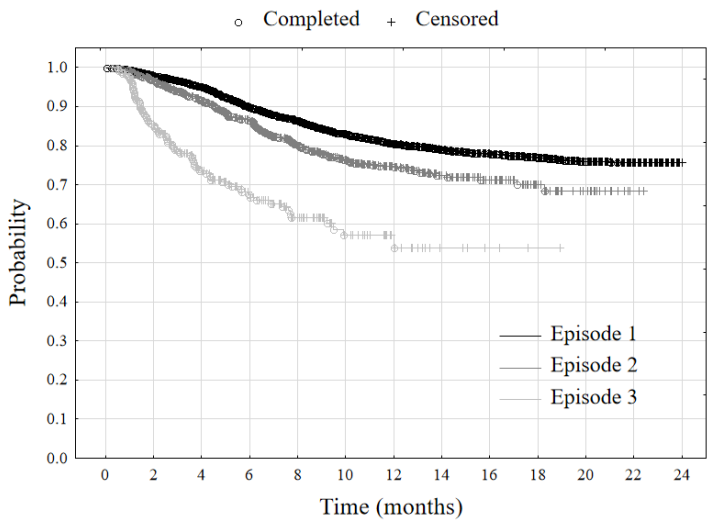

Fig. 6: Kaplan-Meier estimators

The analysis of Kaplan-Meier's estimators indicates that the probability of survival decreases with the observation of recurrent events. Subsequent events carry an increasing risk of occurrence. Differences between the survival curves therefore justify the use of methods for analysing multiple events.

In the first stage of the study, a total analysis of the events was carried out using all four models: PWP-CP, PWP-GT, AG and WLW. It was examined whether there are significant differences between the successive events and whether the characteristics of the unemployed influence the risk of subsequent registrations in the office. The results are presented in Table 3.

Table 3: Hazard ratios for all episodes combined base d on the PWP-CP, PWP-GT, AG and WLW models

Variable	PWP-CP	PWP-GT	AG	WLW
P	0.9752	0.9702	0.9740	0.9799
S_2	0.7037**	0.7005**	0.6615**	0.6345**
S_3	0.6718***	0.6810***	0.6422***	0.6182***
S_4	0.6059***	0.6128***	0.5661***	0.5397***
S_5	0.8225*	0.8330	0.7935*	0.7744*
W_2	0.9013	0.9067	0.9457	0.9485
W_3	0.6979**	0.6948**	0.6839**	0.6649**
W_4	0.7884	0.7901	0.7891	0.7671
W_5	0.6225**	0.6231**	0.6100**	0.5947*
W_6	0.8419	0.8309	0.8567	0.8380
D	0.9605	0.9655	0.9415	0.9318

**** p = 0.001, ** p = 0.01, * p = 0.05*

All the models gave similar results. Gender and seniority did not determine the risk of subsequent registration in the office. People with at most lower secondary education or up to 24 years of age were most at risk of being subsequently registered in the office. This risk decreased as education levels increased. However, for people with higher education, it increased again. In the case of age groups, the lowest risk was observed in the 55-59 age group. In both models the risk was 38% lower than for people aged 18-24. For people aged 60+ the parameters of the model were statistically insignificant.

In the second stage of the study, the relative intensity of subsequent events was analysed. It was examined whether the characteristics of unemployed people influence the risk of *k-th* registration in the office. In this case, models based on Cox's layered regression model, i.e. models, were used: PWP-CP, PWP-GT and WLW. Table 4 shows the hazard quotients for subsequent episodes determined using these models.

Table 4: Hazard ratios for subsequent episodes based on PWP-CP, PWP-GT and WLW models

Variable	Model	Episode 1	Episode 2	Episode 3
P	PWP-CP	1.0131	1.0042	0.7311
	PWP-GT	1.0131	1.0106	0.6478
	WLW	1.0131	1.0395	0.6416
S_2	PWP-CP	0.6220***	1.0532	0.7836
	PWP-GT	0.6220***	1.0242	0.6246
	WLW	0.6220***	0.7195	0.5013
S_3	PWP-CP	0.5829***	1.0947	0.8557
	PWP-GT	0.5829***	1.1150	0.9083
	WLW	0.5829***	0.7373	0.8006
S_4	PWP-CP	0.5387***	0.9447	0.6452*
	PWP-GT	0.5387***	0.9460	0.6084
	WLW	0.5387***	0.5902*	0.3161
S_5	PWP-CP	0.7051***	1.0081	1.6640
	PWP-GT	0.7051***	1.0553	1.5302
	WLW	0.7051***	0.7865	0.7865
W_2	PWP-CP	0.8270*	1.0879	1.7620
	PWP-GT	0.8270*	1.0879	1.9246
	WLW	0.8270*	1.0835	3.2777*
W_3	PWP-CP	0.6727**	0.8615	0.5989
	PWP-GT	0.6727**	0.8586	0.5746
	WLW	0.6727**	0.6859	0.4383
W_4	PWP-CP	0.7140*	0.8704	2.3243
	PWP-GT	0.7140*	0.8330	2.6201
	WLW	0.7140*	0.6507	3.0756
W_5	PWP-CP	0.5556**	0.8786	0.9628
	PWP-GT	0.5556**	0.9088	0.9712
	WLW	0.5556**	0.7490	0.7295
W_6	PWP-CP	0.6381	1.5373	2.3446
	PWP-GT	0.6381	1.5251	2.1455
	WLW	0.6381	1.1591	4.9112*
D	PWP-CP	0.9680	0.9291	1.2199
	PWP-GT	0.9680	0.9435	1.2767
	WLW	0.9680	0.8161	0.9230

**** p = 0.001, ** p = 0.01, * p = 0.05*

According to the assumptions, the estimators for the first event are the same. Women did not differ significantly from men in terms of the risk of subsequent registration for each episode. Education and age (except for the oldest persons) differentiated between the unemployed only in the case of the first event. Professional experience was not a determinant of the intensity of unemployment exit. The analysed features were not determinants (with small exceptions) of the intensity of second, third and subsequent registrations in the labour office.

Conclusions

The paper presents a review of four methods useful in the analysis of data of subsequent events and applies them to model the event consisting in subsequent registrations in the labour office. The declining median and the maximum value of time until the next registration indicate that people who repeatedly register at the office have problems with finding a permanent job or are not interested in it. In the analysed period, only age and education influenced the risk of multiple registrations at the Poviat Labour Office in Szczecin. Gender and seniority did not have a significant impact on this. The analysis performed in each stratum, i.e. for subsequent registrations, confirmed the impact of the same features in the first stratum, i.e. on the first subsequent registration. In general, it can be stated that the analysed characteristics of the unemployed did not have a significant impact on the second and subsequent returns to the labour office. The risk of subsequent registrations was highest in the case of people with low education (and then with higher education) and aged up to 24 (and then at the age of 25-34). Young people had the biggest problem with finding a permanent job. The high intensity of subsequent registration in the case of people with higher or basic vocational education may be a sign of the search for a good job by people with high qualifications. Women and men as well as people without and with professional experience were equally at risk of being re-registered at the labour office. The result could be influenced by the number of strata. The number of observations decreased with the next event. This may have affected the reliability of estimates in the last strata, especially in PWP models. However, similar results were also obtained by means of the WLW model, where the construction of the data set eliminated the problem of decreasing number of events in particular strata.

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Differentiation of The Impact of Taxation on The Propensity to Take Up Self-Employment

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Abstract

The article examines the impact of tax incentives on the choice of form of work performance in Poland. In particular, an attempt was made to answer the question whether the impact of tax incentives on taking up self-employment depends on the employment industry, profession, level of education, gender and age of the taxpayer. The microsimulation model was used to determine tax benefits. The study of the relationship between self-employment and tax benefits was carried out using probit regressions. The results of the analysis lead to the paradoxical conclusion that in most taxpayers' tax incentives have a negative impact on the choice of self-employment, which may be a consequence of the phenomenon of income concealment. A positive effect occurs only in the case of taxpayers performing basic professions and employees in industries strongly associated with the public sector.

Keywords: self-employment, taxation, underreporting

Introduction

One of the basic problems that tax policy researchers deal with is how taxes affect taxpayers' behaviour. From the point of view of the impact of taxation on the economic condition of the state, the consequences it has for business activities are usually analysed. Particular attention is paid to the impact of taxation on activities that are potentially most sensitive to changes in the operating conditions of a group of entities - small businesses, including the self-employed. On the other hand, tax policy is very often used as a tool to support self-employment.

Politicians usually have predefined objectives when pursuing policies to support self-employment. The two most frequently mentioned reasons for applying the support for self-employment are the desire to reduce unemployment and support innovation. However, research shows that not all groups of the self-employed are characterised by a similar capacity to create new jobs (Mason & Brown 2013) and a similar level of innovation. According to Shane, the state should eliminate support for those companies that have a low growth generating potential (Shane 2009). Other studies, on the other hand, recognise that innovation is not a characteristic of all the self-employed, distinguishing real entrepreneurs from other self-employed people (Plotnikova, Romero, & Martínez-Román 2016). This means that supporting self-employment will not always lead to improved innovation. There is therefore a need to profile tax incentives so that they support those self-employed who can best contribute to the objectives of the state.

On the other hand, effectiveness in achieving state policy objectives depends not only on whether the supported entities can implement state policy, but also on whether they respond to the incentives. As is clear from earlier studies, the sensitivity of employment to tax incentives varies significantly between taxpayers. According to Meghir and Phillips, the impact of taxation on the provision of work depends on such factors as gender or level of education (Meghir & Phillips 2008). The motivation of the paper is to answer the question whether the differences in the impact of taxation may also relate to self-employment.

The purpose of the article is therefore to answer the question whether different groups of Polish self-employed respond differently to tax incentives that encourage or discourage self-employment. Tax incentives are understood here as the difference in the level of personal income taxation and social security contributions between employees and self-employed taxpayers receiving the same gross income. Although there is quite extensive literature on the impact of taxation on self-employment, including selected self-employed groups, it lacks a comprehensive study showing how sensitivity to tax incentives depends on the individual characteristics of taxpayers. To answer the question whether the impact of taxation on the propensity to take up self-employment varies depending on such characteristics as gender, occupation, level of education, age or sector, a two-stage analysis based on data from the EU SILC study supplemented with information supplemented by information from the Polish statistical office was carried out. The data were collected in 2017 and concerned Polish taxpayers who are natural persons. Using the Euromod microsimulation model, the tax benefits that can be obtained by changing the form of work from employment to self-employment were determined for individual taxpayers. Next, the whole group of taxpayers was divided into subgroups taking into account such features as gender, education level, age, occupation, and then for each group a probit regression of self-employment was estimated.

The results show that the impact of taxation on the propensity to become self-employed is stronger among the self-employed performing basic occupations.

Factors shaping the sensitivity of self-employment to taxation

Trying to answer the question of what may cause differentiation in the impact of taxation on self-employment decisions, it is necessary to analyse the mechanisms linking taxation with self-employment.

The classic way of explaining the relationship between taxation and self-employment is based on demonstrating that taxation can affect the relationship between the rate of return obtained by self-employed workers and the risk they incur.

The literature distinguishes three approaches to the problem of the impact of taxation on risk and the choice of the form of work provision. For a risk-neutral entrepreneur, proportional income tax with full loss deductibility has no impact on decisions on self-employment (Gentry & Hubbard 2000).

For the same person, a progressive income tax as a "success tax" with incomplete loss deductibility reduces the propensity for taking up self-employment (Gentry & Hubbard 2000);(Wen & Gordon 2014).

On the other hand, for people with a significant risk aversion, a progressive tax can function as an insurance, creating stronger incentives for self-employment than in the case of proportional taxation (Domar & Musgrave 1944).

Therefore, it results from the literature cited that the responses of the self-employed to taxation may vary depending on their risk behaviour. The risk attitudes of taxpayers may in turn depend on characteristics such as gender or age. It is well documented that women have a higher aversion to risk than men (Sexton & Bowman-Upton 1990), (Verheul & Thurik 2001), (Hintermaier & Steinberger 2005). The age of the taxpayers can also influence the attitude to risk and thus the reactions of the self-employed to taxation. According to the research conducted, the aversion to risk-taking increases with age (Hintermaier and Steinberger, 2005). At the same time, age can determine the industry in which the self-employed operate. Older people tend to be employed in more traditional industries, while younger people are more likely to work in new technology segments. There are also studies showing that attitudes to risk can be influenced by education levels. (Black & in. 2015) or occupational activities (Grable 2000). In the case of the Polish system of taxation of self-employed income, which is characterised by the lack of full settlement of income and the progression of taxation, one would expect that it will encourage self-employment of people with high risk aversion.

The second channel of influence of taxation on self-employment is related to the phenomenon of income concealment. High taxation makes taxpayers more willing to change their form of employment from employment to self-employment. This is due to the fact that self-employment gives more opportunities to conceal income than employment (Kleven & in. 2011). As with risk aversion, the scale of income concealment may vary.

Research by Pissarides and Weber shows (Pissarides & Weber 1989) that the type of work done may influence the tendency to conceal income. In the group of people working as "white collars" the level of income concealment is lower than in the group of people working as "blue collars". The opposite was concluded by (Lyssiotou, Pashardes, Stengos, 2004), (Lyssiotou, Pashardes, & Stengos 2004), according to whom it is the taxpayers performing occupations referred to as "white collars" that underestimate their income to a greater extent. According to Slemord, (Slemrod 2007) there is a greater risk of concealing income in professions where cash settlement is dominant.

Not only the occupation, but also the industry can influence the propensity to conceal income. According to Alm, it is the possibility of avoiding taxation that influences taxpayers' decisions concerning the choice of profession or the number of working hours (Alm 2012). Research by Artavanis, Morse and Tsoutsoura shows that tax revenues are most underestimated in industries such as professional services, medicine, law, engineering, education, and media (Artavanis, Morse, & Tsoutsoura 2016).

There are also studies according to which the propensity to underestimate tax income depends on the sex of the taxpayer. They show that women are more averse to tax fraud than men (Torgler & Valev 2010), (D'Attoma, Volintiru, & Steinmo 2017). As the reasons for the greater propensity of women to tax compliance are the differences in their personal and social norms. The lower propensity to underestimate income in women may be due to their higher aversion to risk than in men (Barber & Odean 2001), (Croson & Gneezy 2009).

The willingness to conceal income may also depend on the age of the taxpayer. There is evidence in the literature of a link between age and willingness to tax compliance. Research shows (Hofmann & in. 2017), that the willingness to tax compliance increases with age, although the relationship is relatively weak and regionally differentiated.

On the other hand, expectations regarding the impact of the level of education on the willingness to tax compliance are ambiguous. On the one hand, people with a low level of education have less knowledge about taxes and the consequences of not paying them - which may encourage more tax fraud in this group. On the other hand, people with higher levels of education tend to have a better knowledge of how to avoid taxation (Hofmann & in. 2017).

Since the propensity to underestimate tax income may vary between taxpayers, the benefits that the self-employed may gain from concealing income will also vary. Assuming that there is substitution between the legal tax benefits and the tax benefits from underestimating income, the impact of legal tax benefits is expected to vary between the self-employed. If the benefits from underestimating tax income are greater in a given group of entrepreneurs, it can be expected that formal tax benefits related to self-employment will be less important for them. This means that the impact of legal tax incentives on self-employment should be expected to be greater among older people and women and lower among young men. At the same time, those employed in occupations and sectors where it is easier to underestimate tax income should be less sensitive to legal tax benefits.

Research Data and Methods

The research on the impact of tax benefits on self-employment was conducted on the basis of data collected in 2017 on income and other basic economic and demographic characteristics of a group of 14461 Polish taxpayers. The research used the database of the Euromod microsimulation model, combining data from the EU SILC survey and data collected by the Polish Central Statistical Office. The analysis of the impact of tax benefits on self-employment was conducted in two stages. The first

stage consisted in determining the tax benefits that individual taxpayers can obtain by becoming self-employed. The research assumed that persons obtaining income from employment and the self-employed are subject to the same rules of personal income tax. The difference in the level of tax burden between the employed and the self-employed is due to different rules for determining social security contributions. Due to the fact that social insurance contributions for the self-employed in Poland are paid as a lump sum, while contributions for the employed are calculated in proportion to the income received, it is more profitable to be employed on a full-time basis with a low level of income, and with a high level of income, self-employment is more beneficial. Therefore, it is only when a certain level of income is exceeded (about 60% of the average salary) that the contributions paid by the self-employed are lower than those paid by the employed. This means that the tax benefit from self-employment for people on low incomes may be negative.

The tax benefits of self-employment were determined as the difference between the disposable income that taxpayers would receive on the assumption that they were self-employed and the disposable income assuming they were working under an employment contract. The Euromod microsimulation model was used to determine disposable income. The second stage of the study involved building probit models in which the explained variable is the binary variable describing the employment status (0 employed person, 1 self-employed person) and the variable explaining the value of tax benefits from self-employment. In addition, variables describing the demographic and economic characteristics of taxpayers are controlled in the model. The models were estimated for subsamples separated on the basis of criteria such as age, education level, sex, industry, taxpayer occupation. The division into subgroups will allow determining the sensitivity of individual taxpayers to the benefits of self-employment.

The first to analyse the sensitivity of self-employment to tax incentives, taking into account the division of taxpayers into industries. Data used in the study allowed the identification of 12 industries for which separate probit regressions were estimated. The results of the estimates are presented in Table 1. The results obtained differ from those that could be expected. Reasoning rationally, with the increase in tax benefits obtainable through self-employment, the inclination to self-employment should increase. Yet, the analysis of probit regressions explaining the probability of becoming self-employed shows that in most cases tax benefits from self-employment negatively affect the probability of becoming self-employed. This result was obtained for as many as seven of the twelve industries studied. The most probable reason for the obtained result is the phenomenon of underestimation of the reported income by the self-employed. According to the most recent research conducted by Kukk, Paulus and Staehr, this phenomenon in Poland may reach even 15% of the real income (Kukk, Paulus, & Staehr 2019).

For four industries, the impact of tax benefits on self-employment is statistically insignificant. In contrast, only in one industry - Public administration and defence - is the relationship analysed positive. The analysis therefore shows that the only industry with a statistically significant, though weak, positive impact of tax benefits is the one related to the public sector, which is probably due to the fact that the possibilities of concealing the income of the self-employed working with public institutions are significantly limited.

Table 1 : Impact of tax benefits on self-employment by industry (probit regression)

Variable	Agriculture and Fishing	Mining, Manufacturing and Utilities	Construction	Wholesale and retail trade	Hotels and restaurants	Transport and communication	Financial intermediation	Real estate and business activities	Public administration and defence	Education	Health and social work	Other
Tax advantage (thou. PLN)	-0,0456 (0,0600)	-0,7096*** (0,0470)	-0,6598*** (0,1064)	-0,9958*** (0,1186)	-0,3234 (0,2891)	-0,6678*** (0,1110)	-1,1120*** (0,2587)	-0,4545*** (0,1084)	0,2225* (0,1185)	0,0790 (0,1178)	-0,1697 (0,1228)	-0,7986*** (0,1844)
Age	0,0252*** (0,0038)	0,0315*** (0,0018)	0,0181*** (0,0046)	0,0388*** (0,0041)	0,0393*** (0,0104)	0,0201*** (0,0052)	0,0547*** (0,0121)	0,0194*** (0,0051)	-0,0019 (0,0072)	-0,0065 (0,0062)	0,0211*** (0,0061)	0,0127* (0,0069)
Male	0,3889*** (0,0894)	0,4210*** (0,0495)	0,9669*** (0,3045)	0,7889*** (0,0881)	0,4915** (0,2370)	0,7398*** (0,1588)	0,6074** (0,2474)	0,1783 (0,1166)	0,5631*** (0,1612)	0,4095*** (0,1391)	0,6838*** (0,1665)	0,2605 (0,1691)
Level of education	0,0380 (0,0346)	0,0677*** (0,0142)	0,2364*** (0,0634)	0,2022*** (0,0457)	0,3378*** (0,1213)	0,2690*** (0,0619)	0,3195** (0,1361)	0,4236*** (0,0620)	0,1003 (0,0794)	0,0719 (0,0695)	0,4039*** (0,0748)	0,2470*** (0,0819)
Married	0,2176*** (0,0582)	0,0374 (0,0275)	0,0660 (0,0802)	0,0854 (0,0548)	-0,0339 (0,1371)	0,2208** (0,0859)	-0,1978 (0,1504)	0,0190 (0,0713)	0,0074 (0,1092)	0,0109 (0,0727)	-0,0424 (0,0685)	0,0231 (0,0986)
Constant	-1,2429*** (0,2142)	-3,0491*** (0,0933)	-3,2405*** (0,4579)	-3,7986*** (0,2616)	-3,8991*** (0,6740)	-3,7376*** (0,4103)	-4,4325*** (0,8643)	-3,5806*** (0,4032)	-2,3092*** (0,5244)	-1,5284*** (0,4647)	-3,7485*** (0,4849)	-2,3678*** (0,4544)
N	1272	6063	842	1453	244	858	257	721	754	955	712	330
R2	0,0793	0,1798	0,0807	0,1956	0,1335	0,125	0,269	0,0934	0,0626	0,0233	0,0856	0,0778

*Statistically significant at the 10% level
**Statistically significant at the 5% level
***Statistically significant at the 1% level

Source: Own calculations

The industry study on the impact of tax benefits on the choice of self-employment is complemented by an analysis taking into account the division of the self-employed into professions. As can be seen from the study presented in Table 2, in the case of as many as six out of ten analysed occupational groups, there is a statistically significant negative correlation between tax benefits and self-employment. Only in the case of workers performing basic occupations, this relationship is positive. This may therefore mean that those employed in basic jobs have the least chance of underestimating tax income, thus responding more to legitimate tax incentives.

Table 2 : Impact of tax benefits on self-employment by occupation (probit regression)

Variables	armed forces	senior officials and managers	Professionals	technicians and associate professionals	Clerks	service and sales workers	skilled agricultural	craft and trades workers	plant and machine operators	elementary occupations
Tax advantage	-0,2456 (0,3894)	-0,6683*** (0,0818)	-0,4143*** (0,0557)	-0,6065*** (0,0908)	-0,2498 (0,1714)	-0,6555*** (0,1184)	-0,1026 (0,1153)	-0,5250*** (0,0579)	-0,4893*** (0,0997)	0,3824** (0,1486)
Age	0,0582* (0,0350)	0,0138** (0,0053)	0,0222*** (0,0031)	0,0234*** (0,0041)	0,0267*** (0,0066)	0,0336*** (0,0037)	0,0402*** (0,0067)	0,0204*** (0,0023)	0,0301*** (0,0040)	0,0185*** (0,0053)
Male	-0,7984 (0,8101)	0,5801*** (0,1293)	0,4367*** (0,0788)	0,5451*** (0,0986)	0,0759 (0,1617)	0,5640*** (0,0913)	0,2463 (0,1502)	0,3430*** (0,0717)	0,6541*** (0,1606)	0,2220* (0,1340)
level of education	0,0200 (0,2471)	0,0594 (0,0625)	0,1906*** (0,0575)	0,1537*** (0,0520)	0,0105 (0,0791)	0,2714*** (0,0446)	0,1106 (0,0702)	0,1293*** (0,0197)	0,0029 (0,0631)	-0,0590 (0,0631)
Married	-0,2364 (0,4241)	-0,0253 (0,0761)	-0,0264 (0,0441)	0,0785 (0,0553)	0,0014 (0,0990)	0,0735* (0,0446)	0,0607 (0,0813)	0,0639 (0,0413)	0,0746 (0,0687)	0,0075 (0,0619)
Agriculture and Fishing		2,3882*** (0,4879)	0,6950** (0,2722)	0,9316*** (0,2837)	1,6640*** (0,6360)	1,0969*** (0,2379)	0,7450*** (0,2045)	1,6987*** (0,3494)	0,6688 (0,6306)	0,1527 (0,2998)
Mining, Manufacturing and Utilities	-0,6519 (1,0577)	0,0594 (0,3123)	-0,5464** (0,2159)	-0,4503** (0,2011)	0,3222 (0,5637)	-0,9330*** (0,1705)		-0,0812 (0,3288)	-0,4690 (0,6085)	-0,2184 (0,2763)
Construction		0,4918 (0,3487)	-0,5783* (0,3274)	-0,2553 (0,3284)				0,2249 (0,3320)	-0,3217 (0,6369)	-0,1834 (0,3190)
Wholesale and retail trade		0,1112 (0,3301)	-0,4499* (0,2711)	-0,2217 (0,2290)	0,4725 (0,5853)	-0,3768*** (0,1435)		0,3180 (0,3498)	-0,4740 (0,6621)	-0,8035 (0,4934)
Hotels and restaurants		0,6451 (0,4011)	0,5314 (0,5125)	0,2296 (0,4425)	1,2861** (0,6362)	-0,8307*** (0,2170)				-0,4477 (0,4269)
Transport and communication		0,3507 (0,3601)	-0,2498 (0,2372)	-0,7118** (0,3043)	0,2727 (0,5776)	-1,1302*** (0,3986)		-0,4167 (0,4142)	-0,1237 (0,6130)	-0,6889 (0,5283)
Financial intermediation			-0,4506* (0,2657)	0,1914 (0,2487)	0,1419 (0,6503)					
Real estate and business activities		-0,0117 (0,3795)	0,1017 (0,2213)	0,0507 (0,2170)	0,3406 (0,5954)	-1,5509*** (0,2196)		-0,4809 (0,4750)	0,7450 (0,7455)	-0,3891 (0,3403)
Public administration and defence		-0,6481* (0,3854)	-0,3897 (0,2368)	-0,8190*** (0,2345)	-0,6166 (0,6729)	-0,7545*** (0,2739)				-0,8216 (0,5057)
Education		-0,1938 (0,4198)	-0,5756*** (0,2137)	-0,8836** (0,3995)	-0,1580 (0,7028)	-1,3821*** (0,2872)			-0,2181 (0,9103)	-0,3891 (0,3201)
Health and social work		0,0895 (0,4234)	-0,0899 (0,2181)	-0,7424*** (0,2486)	0,2980 (0,6501)	-1,0978*** (0,2495)		-0,2352 (0,5537)	0,4225 (0,7081)	-0,5086 (0,3807)
Constant	-2,2911 (1,6406)	-1,7463*** (0,5009)	-2,5467*** (0,3690)	-2,6787*** (0,3691)	-3,0580*** (0,7643)	-3,1702*** (0,2695)	-1,6604*** (0,4709)	-2,5496*** (0,3523)	-2,7732*** (0,6684)	-1,9246*** (0,4301)
N	81	732	2231	1330	836	1761	952	3958	1337	1143
R2	0,0883	0,2168	0,1096	0,1771	0,1326	0,1861	0,1165	0,152	0,1668	0,0802

*Statistically significant at the 10% level
**Statistically significant at the 5% level
***Statistically significant at the 1% level

Source: Own calculations

Analysing the sensitivity of self-employment to tax benefits, considering the division of taxpayers by educational level, one can see that there are no clear regularities here (Table 3). This result is quite surprising, taking into account the results of the study with the division into occupations, from which one would expect that the most sensitive to tax benefits should be the self-employed with the lowest level of education.

Table 3: Impact of tax benefits on self-employment by educational level (probit regression)

Variables	Not completed primary education	Primary	Lower Secondary	Upper Secondary	Post-Secondary	Tertiary
Tax advantage	-0,5453*** (0,0996)	-0,3451** (0,1489)	-0,4410 (0,7762)	-0,4752*** (0,0400)	-0,4725*** (0,1804)	-0,4515*** (0,0405)
Age	0,0235*** (0,0040)	0,0486*** (0,0060)	0,0597 (0,0620)	0,0244*** (0,0016)	0,0320*** (0,0077)	0,0239*** (0,0024)
Male	0,4090*** (0,1082)	0,3137** (0,1393)	0,8290 (1,1049)	0,5147*** (0,0437)	0,7113*** (0,1982)	0,4256*** (0,0570)
Married	0,1760** (0,0766)	0,1190* (0,0613)	0,4061 (0,5091)	0,0573** (0,0237)	0,0506 (0,0899)	-0,0114 (0,0352)
Agriculture and Fishing	1,4951*** (0,2087)	2,2020*** (0,3494)	-0,1035 (1,0522)	1,5839*** (0,1221)	0,8629** (0,4251)	1,1603*** (0,1767)
Mining, Manufacturing and Utilities		0,5949* (0,3391)	-0,4997 (0,9425)	-0,3832*** (0,1147)	-1,4377*** (0,3344)	-0,4135*** (0,1430)
Construction		0,3033 (0,3960)	-0,1993 (1,0317)	-0,0675 (0,1257)	-0,7441 (0,5411)	-0,1690 (0,2074)
Wholesale and retail trade		0,6812 (0,4222)		-0,0732 (0,1206)	-1,0189*** (0,3543)	-0,0723 (0,1526)
Hotels and restaurants				-0,1439 (0,1641)	-0,7873 (0,6674)	0,0075 (0,2594)
Transport and communication		0,0311 (0,4990)		-0,3817*** (0,1312)	-0,7050 (0,4640)	-0,2201 (0,1656)
Financial intermediation				-0,2951 (0,2405)	-0,8758 (0,5622)	-0,2904 (0,1830)
Real estate and business activities		-0,7573 (0,5835)		-0,5973*** (0,1447)	-1,2578*** (0,4045)	0,0600 (0,1511)
Public administration and defence		0,0218 (0,5877)		-0,8767*** (0,1756)	-1,1708*** (0,4484)	-0,6243*** (0,1584)
Education				-0,9375*** (0,1871)	-1,8563*** (0,5338)	-0,5109*** (0,1470)
Health and social work				-0,5690*** (0,1545)	-1,3674*** (0,3445)	-0,0297 (0,1546)
Constant	-2,9327*** (0,1838)	-4,2741*** (0,4539)	-4,2789* (2,3564)	-2,2582*** (0,1332)	-1,7292*** (0,4260)	-1,7568*** (0,1640)
N	1839	712	145	7490	424	3775
R2	0,1351	0,3571	0,1699	0,2655	0,2524	0,1429

*Statistically significant at the 10% level
**Statistically significant at the 5% level
***Statistically significant at the 1% level

Source: Own calculations

Another dimension that has been taken into account in the analyses is the differential impact of taxation on the propensity to become self-employed according to sex. Given that women have a higher aversion

to underestimation of tax income, as already mentioned, they could be expected to be more sensitive to the legitimate tax benefits of self-employment. However, the analysis of probit regressions estimated separately for women and men (Table 4) shows no significant differences in the propensity to become self-employed between these groups.

Table 4: Impact of tax benefits on self-employment by gender (probit regression)

Variables	Male	Female
Tax advantage	-0,4721*** (0,0307)	-0,4345*** (0,0483)
Age	0,0239*** (0,0015)	0,0298*** (0,0020)
Education	0,1116*** (0,0136)	0,1527*** (0,0185)
Married	0,0696** (0,0273)	0,0375* (0,0224)
Agriculture and Fishing	1,5778*** (0,1393)	1,4457*** (0,1235)
Mining, Manufacturing and Utilities	-0,2471* (0,1335)	-0,3999*** (0,1066)
Construction	0,0155 (0,1397)	-0,6192** (0,3027)
Wholesale and retail trade	0,1329 (0,1416)	-0,3138*** (0,1147)
Hotels and restaurants	-0,0174 (0,2202)	-0,2992* (0,1613)
Transport and communication	-0,1830 (0,1432)	-0,5785*** (0,1680)
Financial intermediation	-0,0504 (0,2126)	-0,5022*** (0,1726)
Real estate and business activities	-0,3191** (0,1514)	-0,1979 (0,1269)
Public administration and defence	-0,4232*** (0,1598)	-1,0394*** (0,1549)
Education	-0,4503** (0,1747)	-0,7631*** (0,1208)
Health and social work	-0,0157 (0,1895)	-0,5040*** (0,1198)
Constant	-2,1878*** (0,1520)	-2,7451*** (0,1529)
N	8046	6415
R2	0,2372	0,2111

*Statistically significant at the 10% level
**Statistically significant at the 5% level
***Statistically significant at the 1% level

Source: Own calculations

The last dimension of the analyses is to investigate the relationship between tax benefits and taking up self-employment in different age groups. On the basis of the literature review cited above, it can be expected that older people should be less prone to tax fraud and therefore more sensitive to legal tax benefits. However, the results presented in Table 5 do not confirm such regularity.

Table 5: Impact of tax benefits on self-employment by age (probit regression)

Age	(0,25>	(25-35>	(35-45>	(45-55>	(55-65>	over 65
Tax advantage	-0,3032* (0,1586)	-0,4603*** (0,0659)	-0,4447*** (0,0489)	-0,3898*** (0,0514)	-0,5713*** (0,0601)	-1,1114*** (0,1808)
Male	0,3360** (0,1448)	0,5021*** (0,0740)	0,6190*** (0,0619)	0,5460*** (0,0631)	0,3604*** (0,0696)	-0,2865 (0,1749)
Level of education	0,2090*** (0,0516)	0,1035*** (0,0235)	0,0946*** (0,0213)	0,1615*** (0,0247)	0,1509*** (0,0255)	-0,0693 (0,0532)
Married	0,2234 (0,1711)	0,1354*** (0,0506)	0,0038 (0,0396)	-0,0001 (0,0336)	-0,0043 (0,0328)	0,0623 (0,0637)
Agriculture and Fishing	1,6590*** (0,4953)	0,7320*** (0,1856)	1,3707*** (0,1777)	1,8347*** (0,1839)	1,5818*** (0,2133)	
Mining, Manufacturing and Utilities	0,3841 (0,4656)	-0,9274*** (0,1706)	-0,7322*** (0,1652)	-0,1861 (0,1742)	-0,0997 (0,1983)	1,0167** (0,5003)
Construction	0,4938 (0,5127)	-0,6777*** (0,1967)	-0,3675** (0,1814)	0,1473 (0,2005)	-0,1788 (0,2276)	1,3218* (0,7058)
Wholesale and retail trade	-0,1601 (0,5087)	-0,7158*** (0,1790)	-0,3535** (0,1697)	0,2517 (0,1857)	0,2296 (0,2227)	1,0711* (0,6036)
Hotels and restaurants	0,1948 (0,5604)	-0,6510** (0,2642)	-0,5177* (0,2777)	0,3946 (0,2462)	-0,2736 (0,3761)	
Transport and communication	0,1761 (0,5348)	-0,8360*** (0,1993)	-0,5325*** (0,1871)	-0,1774 (0,1986)	-0,3455 (0,2372)	1,3865** (0,6497)
Financial intermediation		-1,2015*** (0,3184)	-0,4569* (0,2428)	-0,0319 (0,2717)	0,1914 (0,3068)	
Real estate and business activities	0,1418 (0,5582)	-0,5399*** (0,1983)	-0,3659* (0,1917)	-0,0284 (0,2006)	-0,4170* (0,2292)	0,6166 (0,5391)
Public administration and defence	0,3938 (0,5833)	-1,0057*** (0,2189)	-0,8757*** (0,1992)	-0,6060*** (0,2270)	-0,7969*** (0,2588)	
Education	0,1142 (0,6592)	-0,8501*** (0,2156)	-0,5608*** (0,1883)	-0,4159** (0,1928)	-0,8388*** (0,2446)	-0,5375 (0,7127)
Health and social work	0,5139 (0,5888)	-0,7639*** (0,2307)	-0,5528*** (0,2008)	0,0485 (0,1923)	-0,2566 (0,2285)	-0,1592 (0,6546)
Constant	-3,2058*** (0,5476)	-1,3638*** (0,2036)	-1,0583*** (0,1942)	-1,6251*** (0,2030)	-1,2727*** (0,2300)	-0,8464 (0,5706)
N	1468	3245	3547	3311	2487	349
R2	0,1392	0,1709	0,2208	0,2567	0,2089	0,2351

*Statistically significant at the 10% level
**Statistically significant at the 5% level
***Statistically significant at the 1% level

Source: Own calculations

Therefore, the results of the presented analyses lead to the conclusion that the legal tax benefits have a positive impact on the probability of choosing self-employment only among persons in basic occupations for the public sector.

Discussion

On the basis of the studies carried out, the hypothesis that the impact of taxation on self-employment differs between sectors of the economy has been confirmed, which is in line with the conclusions of the work of Artavanis, Morse and Tsoutsoura (Artavanis et al., 2016). The reason for this diversity may be that in different sectors of the economy, taxpayers have different options for hiding income. Fewer opportunities to underestimate income should make taxpayers more susceptible to legitimate tax incentives to become self-employed. These groups of taxpayers would therefore be expected to have a positive link between the legal tax benefits and taking up self-employment. The obtained results also confirmed the conclusion of previous studies that the level of underestimation of tax revenues may differ between professions. According to a study by Lyssiotou, Pashardes & Stengos (Lyssiotou, Pashardes, Stengos, 2004), blue collars are less likely to underestimate income. This means that they should be more responsive to legal tax incentives – as the study has proven.

The results of the study on the impact of tax incentives on taking up self-employment, taking into account differences in education levels, did not confirm the hypotheses on the impact of education levels on the scale of income underestimation presented in Hofmann, Voracek, Bock and Kirchler's work (Hofmann et al., 2017). The obtained research results show that there is no clear link between education and the sensitivity of self-employment to tax incentives.

The obtained results do not also support the hypothesis that the impact of taxation on the choice of the form of work performance may vary depending on the taxpayers' attitude to risk. In particular, no evidence was found that the impact of taxation on self-employment changes with age. There is also no evidence to support the hypothesis that women are much more sensitive to incentives to take up self-employment. This may also mean that age and sex of taxpayers do not determine their propensity to take risks and consequently to underestimate income. This is contrary to the conclusions drawn from the work of Sexton & Bowman-Upton (Sexton & Bowman-Upton, 1990), Verheul & Thurik (Verheul & Thurik, 2001), Hintermaier & Steinberger (Hintermaier & Steinberger, 2005) and Hofmann, Voracek, Bock and Kirchler (Hofmann et al., 2017).

Conclusions

The research carried out leads to the conclusion that the different groups of Polish self-employed respond differently to tax incentives that encourage or discourage self-employment. Only for a small group of taxpayers the impact of tax incentives on self-employment is positive. The legal tax benefits that the self-employed may obtain for most taxpayers are not a sufficient incentive to take up self-employment. The analysis shows that for most taxpayers there is a negative relation between the value of the tax benefits available for self-employment and the likelihood of becoming self-employed. This outcome is most likely the consequence of the underestimation of income by the self-employed. Such a result is related to the fact that the tax benefit from self-employment increases with the level of income. An underestimation of income means at the same time an underestimation of the tax benefit resulting from self-employment. As a consequence, without knowing the actual level of income, one can get the impression that the self-employed often make unreasonable decisions about starting self-employment, even though it is seemingly unprofitable for them. It is also possible that the negative

relationship between the value of tax benefits and the likelihood of taking up self-employment is also influenced by other factors, including the fact that certain types of high-paid work are customarily carried out under an employment contract. It is also possible that highly paid taxpayers prefer the convenience of employment to the tax benefits available to the self-employed. However, the fact of underestimating tax income by the self-employed is confirmed by the latest research and the estimated scale of this phenomenon allows to explain the anomalies perceived. At the same time, the results put in question the sense of introducing tax preferences for the self-employed. Based on the models built, it can be seen that their operation is limited to a very narrow group of taxpayers performing basic work. Therefore, the tax preferences applied to this group cannot be expected to increase the innovation of the economy. The only argument in favour of applying tax incentives to these taxpayers is the fight against unemployment. However, in view of the significant improvement in the labour market situation, this motive for applying tax preferences is losing its importance. At the same time, the expectation that sensitivity to tax benefits will be greater among older people and women has not been confirmed. It should be stressed that most entrepreneurs are able to secure their "own" tax preferences by taking advantage of the possibility of flexible income shaping.

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Restructuring of Supply Chain of Medicinal Plants and Sustainability Development of Farmers Through Contract Farming in Kerala, India

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Abstract

Cultivation of medicinal plants need to be promoted among rural farmers in order to meet excess demand of ayurvedic companies and at the same time it can be a potential provider of returns to the rural farmers. The present paper analyses the results of socio-economic improvement of rural farmers by a restructuring of the supply chain of medicinal plants through transforming traditional agriculture system with contract farming cultivation. Moreover, a lot of studies were conducted regarding socio-economic improvement of farmers, but none has been done in connecting contract farming of medicinal plants for socio economic improvement of farmers in Kerala. This study designed to fill this gap. Data was collected from 100 farmers in five districts of Kerala through a structured questionnaire; the research design can be described as a descriptive survey. Likert 5-point scale was used in the study and one hypotheses were generated and tested using Paired t-test in SPSS software. From this study, it was analyzed that all the variables of social impact like health management (25.95%), public recognition (57.69%) and extension participation (102.63%) had shown positive shift due to contract farming in medicinal plants. There was an excellent economic impact on the savings (61.94%) which is visible in the per cent increase. From the study, it was concluded that, Oushadhavanam tripartite model of contract farming will act as a working model for large scale cultivation of medicinal plants that will create assured income and thereby improve socio-economic condition of rural farmers.

Keywords: Rural farmers, Socio-economic improvement, Medicinal plants supply chain, Contract Farming.

Introduction

Medicinal plants have significantly influenced the socio-cultural and spiritual lives of the rural population in Kerala. It has two-fold dimensions; one from an industrial and health care perspective and another from a socio-economic development perspective. Medicinal plant sector is commonly projected as one of the potential industries of employment promotion in rural areas, mainly because of the growing demand for Ayurveda. Kerala has been at the leading edge of the ayurvedic transformation in India. It is considered as a source of positive health which took the lead in promoting health tourism all over the world. The uneasiness of the people with western medicines due to its after-effects and flying increase in price has enforced people to consider and revive their faith in traditional medicines, especially Ayurveda. The rural population also depend upon traditional medicines, chiefly medicinal plants for their primary health care. This rejuvenation in traditional insight had led to an expansion in the large-scale production of Ayurvedic medicines. Rising demand for Ayurveda has paved the way for too many manufacturing units in Kerala. There are around 700 Ayurvedic drug industries producing medicines worth 1,000 crores a year in Kerala. Medicinal plants are the primary raw materials used for the preparation of drugs in these ayurvedic industries. It is a source of living for many rural populations which makes an earning through medicinal plant cultivation. The demand for medicinal plants used for health care needs is increasing at a rate of 8-15 per cent per annum The World Health Organization

estimates supports this viewpoint. Aside from this even in many of the modern medicines, the elemental content is extracted from the medicinal plant base, and these have become very well recognized due to fewer aftereffects, less price, lasting therapeutic properties and nature -friendly attitude. This has further intensified the demand for medicinal plants. Subsequent studies show that the price elasticity is positive for major medicinal plants demanded by ayurvedic firms. The Marshallian demand curve (i.e., higher the price, lower the demand) is not applicable for medicinal plants market. Therefore, cultivation of medicinal plants to meet the growing demands can be a potential provider of returns to the rural farmers and also promoting health tourism in Kerala. It is a labor-intensive activity which involves preparation of land, planting and weeding, collection of plants, drying, harvesting and processing, packing, transporting and selling of plants. In addition to industries-based jobs, medicinal plant cultivation also enhances the possibilities by value-added processing method, which increases the cash earnings and thereby it helps to gain socio-economic improvement of rural farmers.

Even though there is a rise in demand for medicinal plants, which is evolved from the demand for Ayurvedic medicines and health tourism has not upgraded the standard of living of the farmers. This is because there is no correlation between the price paid to farmers and the actual wholesale price prevailing in the medicinal plant market. The cultivators of the medicinal plants get only a fraction of the amount paid by the end-users (ayurvedic industries). For instance, Sida Alnifolia (kurunthotti) sold at Rs 35-40 by the farmers is procured by the final consumer at Rs 70, which means the farmers get only 50 per cent share of the final price. Hence, it is obvious that there involve many players in the supply chain. The players in the supply chain usually increase their profit margin by purchasing the medicinal plants at a lower cost because of the less bargaining ability and ignorance of farmers about the market price. So, this will ultimately end up in the exploitation of farmers in the supply chain.

Figure 1: Supply chain analysis of medicinal plant trade in Kerala

These involve multiple players like private traders, commission agents, wholesalers, final consumers etc. in medicinal plant supply chain and price of these plants varies when it passes from one hand to another. Therefore, the presence of too many players hampers the likelihood of the farmers.

Considering the problems faced by farmers and ayurvedic health tourism, the State Medicinal Plant Board (SMPB), attached to the Department of Health and Family Welfare, in association with the Kerala Forest Research Institute (KFRI) encourages large scale cultivation of medicinal plants by forming a direct link between the farmers and ayurvedic manufactures through a contractual agreement. By entering into contract farming agreement, the farmers ensure to cultivate medicinal plants according to the specified quantity and quality standards stipulated by the company. The company will get supplies of cultivated material of uniform quality, which is otherwise difficult in case of medicinal plants collected from the forest. In return, farmers receive a fixed remuneration from the company at the time of delivery. It provides the farmers with an assured market at a pre-agreed price. Availability of assured markets and a remunerative price for the products are two essential factors that play a significant and decisive role in encouraging farmers. The contract contains clauses which provide inputs like planting material, fertilizers, monetary incentives and training from experts. Contract farming will increase their yield in substantial quantity and thereby, farmers could sell the plants directly to ayurvedic companies without depending on intermediaries.

As the market system of medicinal plants is highly complexed, the farmers will not be successful alone without the help of an efficient cooperative society. A cooperative society can function as a reliable agency for marketing with a direct bind to ayurvedic companies and protect the interest of farmers. Oushadhavanam is a tripartite model of contract farming agreement, implemented by a cooperative labor society based at Mattathur in Thrissur district for the past few years has been proposed as a model to be emulated. The society has a tie-up with farmers registered under the Kudumbasree Mission to

cultivate medicinal plants, which they are buying back and selling through contract farming agreement to manufactures such as Kottakkal Arya Vaidya Sala, Sitaram Ayurveda Pharmacy, Vaidyaratnam Oushadhasala and state-owned Oushadhi for long-standing business. By forming clusters of farmers through Kudumbasree Mission, it would help them in gaining economies of scale by cultivating plants in bulk quantities and easily avail subsidies from the government, thereby it will help to improve socio-economic condition of farmers. The State Medicinal Plant Board (SMPB) is providing funds for procuring seedlings. The Kerala Forest Research Institute (KFRI) had been appointed as a nodal agency for the project, and they would offer technical help on the feasibility of cultivation considering the agroclimatic conditions of respective regions. The institute would also ensure the quality of the raw materials.

The Model Contract Farming Act,2018 is a revolutionary step which promises a win-win situation for both farmers and ayurvedic firms. The basic price is fixed by taking the average price of medicinal plants in previous years and if there is any variation occurs in the current market price it will be taken into consideration before fixing the final price. For instance, the company agreed to take Sida Alnifolia (kurunthotti) for Rs 100 from farmers and after one year, at the time of selling suppose its price raised to 200. In this situation, 50 per cent of the increased amount will be given to farmers, i.e., Rs150. At the same time, if the current market price falls, the company will reduce the amount only if it is going down to 50 per cent of its original price. In this example, if the price drops to 50 Rs, only 15 per cent will be deducted from the original price. I.e. farmers need to bear only 7.5Rs as their loss amount. So, contract farming can lead to an improvement in socio-economic conditions of farmers by reducing their risk faced from production and price fluctuations. Recognizing the potential benefits of contract farming arrangements in the medicinal plant sector, National Medicinal Plant Board (NMPB) provided financial aid to the society through its state branch. With the first phase of the grant, the society bought 50 acres of land in various block panchayaths. In the coming years, the cultivation will be elongated to thirty acres. With this, the cooperative society can venture into large scale cultivation of medicinal plants business with north Indian manufacturers of all Ayush drugs. Under the contract farming agreement, each company will provide an advance amount to the society which will be spent on the expenses for cultivation. Ayurveda Medicine Manufacturers 'Organisation of India (AMMOI) estimates that within six months, all the 700 Ayurveda manufacturers in Kerala will have a tie-up with the Mattathur cooperative society for a long-standing agreement for plant collection. The linkages of the cooperative society with farmers provide a livelihood for thousands of people.

The study aims at providing policymakers to make decisions on how to increase the profitability of farmers by removing intermediaries in the supply chain. The present paper analyses the results of socio-economic improvement of rural farmers by a restructuring of the supply chain of medicinal plants through transforming traditional agriculture system with contract farming cultivation. This study will act as a working model for large scale cultivation of medicinal plants that will generate more job opportunities in rural areas and promote the sustainable development of rural farmers.

Dependent and Independent variables

In the light of inferences derived from recorded evidence in the various works of literature related to this study, a framework has been developed, which diagrammatically presents the critical dimension and relationship among the different variables. This framework diagnoses the problem of research, and it portrays the socio-economic status of contract farmers

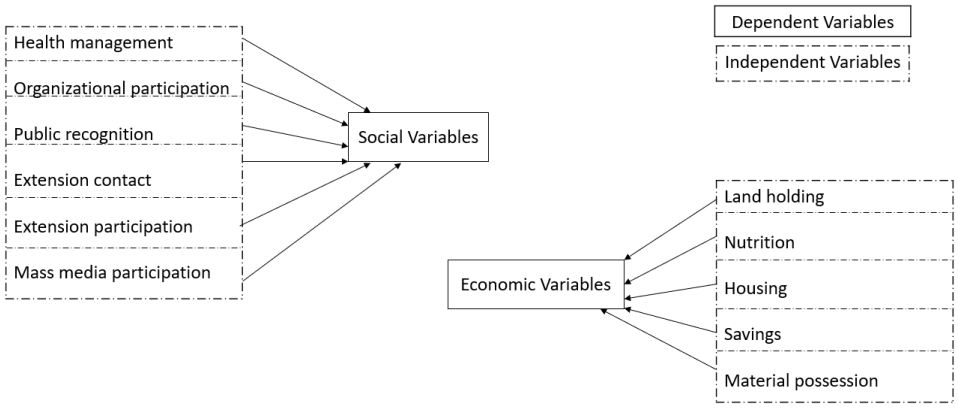

Figure 2: Variables identified for the study

Objectives

With this framework, the conceptual work is implemented to study model for cultivating medicinal plants in large scale through contract farming by removing intermediaries in the supply chain that brings employment opportunities in rural areas and improve sustainability development of farmers in Kerala. It is driven by the following objective:

1. To analyze the economic and social impact of contract farming in medicinal plant farmers.

Analytical Frameworks and Methodology

The study is a descriptive one, and the data was collected from 100 farmers in five districts of Kerala through a structured questionnaire. The Likert five-point rating scale was used. The mode of communication was a personal interview. Based on the reliability test, Cronbach's Alpha value obtained was 0. 960. From this study, one hypotheses was generated and tested using Paired t-test in SPSS software.

***Explanation of the study area*:** The study was operated in the five districts of Kerala, viz., Thrissur, Palakkad, Malappuram, Wayanad and Ernakulam. It was purposively selected because of the highest achievable medicinal plants from these states. The quality and yield are exceptional, and the soil is suited for medicinal plant production.

Statistical analysis: The collected data were entered in SPSS, where the statistical and descriptive analysis was done. Data were analyzed to answer the research objectives of the study is illustrated below.

Objective: To analyze the economic and social impact of contract farming in medicinal plant farmers.

The paired t-test is used for analyzing the significant difference of mean scores of the economic and social impacts on before and after adopting contract farming.

> H 1: There is a significant difference between the social and economic impact on before and after contract medicinal plant farmers.

Results and Discussions

Table 1: Economic and Social Impact of Medicinal Plant Contract Farmers

Sl. No.	Variables	Mean values		Percentage change due to contract farming	Paired t-test value
		Contract Farming before	Contract Farming after		
I	Social variables				
1.	Health management	1.31	1.65	25.95	6.55*
2.	Organizational participation	1.14	1.80	57.89	19.36*
3.	Public recognition	1.30	2.05	57.69	11.39*
4.	Extension contact	1.28	2.79	117.96	27.29*
5.	Extension participation	1.14	2.31	102.63	22.03*
6.	Mass media participation				
	a. Radio	1.45	1.40	-3.44	0.000NS
	b. Television	1.37	2.20	60.58	17.19*
	c. Newspaper	1.32	2.03	53.78	13.44*
II	Economic variables				
1.	Land holding	2.74	4.00	45.98	11.09*
2.	Nutrition	1.88	2.29	21.80	8.18*
3.	Housing	3.06	3.91	27.77	15.28*
4.	Saving	1.13	1.83	61.94	14.97*
5.	Material possession	1.05	1.31	24.76	6.81*

*"*Significant at 5%" "NS: Non – significant"* *Source: Primary Data*

It implies that all the social variables like health management (25.95%), organizational participation (57.89%) public recognition (57.69%), extension participation (102.63%) had switched to positive results due to contract farming in medicinal plants. But in the case of Radio (-3.44%), it had seen a negative impact. All other mass media's have increased after adopting contract farming. There was an economic impact on housing (27.77%), which is visible in the per cent increase. There is a considerable increase in savings (61.94%), compared to other variables. All the variables in economic and social impact were found to be significant but considering the value of radio were non – significant.

The results of the investigation interpreted as, by entering into contract farming, farmers got acceptance and status in the society. It is visible that health management had shown a greater impact due to contract farming in medicinal plants. Improving economic condition and awareness of the farmers made them keener about their health. The improved facilities in a rural area made them more eager about their health. Farmers started engaging in various group activities like Kudumbasree, Joint liability group and other activities very effectively. Excellent performance of the farmer in cultivation has given public recognition. There was a greater impact on extension participation and extension contact due to contract farming in medicinal plants. By engaging in a contract farming made the farmers have a connection with experts of the firm to get more knowledge about medicinal plant cultivation. The firm engaged in contract farming was conducting various programmes like classes, group discussion, seminars and training about cultivation for the benefit of the farmers.

In the case of mass media participation, which involves newspaper, tv and radio there was a greater impact in the case of newspaper and tv in contract farming. But it was non-significant in case of radio. It is because of upgraded ways of communication, nowadays radio was replaced by television, newspaper and other sources.

Variables like housing, material possession, nutrition and savings of the contract farmers made a significant impact on contract farming. When the farmers are involved in contract farming agreement, they get assured market and guaranteed remuneration for their products, which helps them to get good profit. In total, contract farming has tremendously improved the economic status of rural farmers. This helps them to gain sustainable development of farmers in the rural area.

Conclusion

The uneasiness of the people with western medicines due to its after-effects and flying increase in price has enforced people to consider and revive their faith in traditional medicines, especially Ayurveda. The rural population also depend upon traditional medicines, chiefly medicinal plants for their primary health care. This rejuvenation in traditional insight had led to an expansion in the large-scale production of Ayurvedic medicines. The Oushadhavanam tripartite model of contract farming will act as a working model for large scale cultivation of medicinal plants that will create employment opportunities in rural areas and promote the sustainable development of rural farmers. The results of the investigation interpreted as, by entering into contract farming, farmers got acceptance and status in the society. Except radio all other social and economic variables show a positive impact due to contract farming. Here, contract farmers had given more importance to savings than radio which is non -significant because there are upgraded ways of communication and it was replaced by television, newspaper and other means of communication.From the study, it was concluded that contract farming is more cost-effective than the traditional way of medicinal plant cultivation. So, it needs to be motivated and encourage farmers to take up contract farming, which is giving them assured market and guaranteed remuneration for the produce. Moreover, medicinal plant cultivation leads to a source of positive health which took the lead in promoting health tourism all over the world.

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Analysis of Differences in Perception of Selected Aspects of Organizational Culture from The Perspective of Expatriates

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Abstract

One of the consequences of globalization is the establishment of subsidiaries of international companies in foreign countries, as well as the increasing number of employees sent from the home country to the host country, the so-called expatriates who present the category of high performance employees. The paper presents research results of the analysis of differences in the perception of selected elements of organizational culture from the perspective of expatriates and local employees. The paper tested four statistical hypotheses to verify the existence of statistically significant differences in the perception of selected elements of organizational culture, namely workplace atmosphere, addressing interpersonal conflicts, ethical behavior of employees, and communication.

Keywords: human resource management, high performance worker, expatriates, multinational companies.

Introduction

Globalization mixes cultures, languages, perspectives and increases the number of expatriates abroad. Effective expatriates should know the legislative environment of the given country, human resources management practices as these vary considerably from country to country. They have to be able to communicate effectively across different cultures and gain the confidence of local employees. As organizations expand globally, the number of variables they have to cover grows exponentially, and therefore managing the changes that come with such expansion becomes a major challenge (Romero, 2002).

Posting employees from the home country (or company headquarters) to the country where the branch resides is a very common phenomenon, even for companies that do not pursue a purely ethnocentric approach. Posting of an employee, the expatriate, is the initial phase in carrying out international activities. Tung (2001; in Sršňová, 2000) provides the following reasons for posting employees abroad: not enough high performance workers in the host country; the need to transfer managerial and product know-how; guarantees of effective communication and information structure; personal and organizational development; developing a corporate culture across national borders.

Theoretical Background

Globalization and the need to operate in an international environment have become part of the daily business of many organizations. A typical feature of international organizations is the employment of both local employees (from the host country) as well as expatriates (country of the parent company). In order for an international company to function well, its employees must cooperate and interact efficiently. Expatriates fall into the category of high-performance workers due to the difficulty and specificity of the job they have to perform abroad. For an expatriate to be able to deliver maximum performance and be productive, the company must create the most appropriate conditions for a successful adaptation in the host country. Many scientists emphasize the specific skills that

expatriates should possess, while pointing out the importance of preparing these employees to work abroad.

Intercultural communication is becoming increasingly critical for gaining a competitive advantage in the globalized world (Tange and Lauring, 2009). A possible strategy to ensure communication efficiency between parent companies and branches is to use expatriates. As part of their job, expatriates should be involved in developing activities and creating social ties across all cultural differences (Bennett et al., 2000). For this purpose, it is essential that the expatriate can communicate effectively with local employees (Minbaeva, 2005). However, expatriates are not always able to communicate at a satisfactory level in the language of the country in which they work. Thus, communication often becomes a barrier to interaction (Gudykunst, 2004). Peltokorpi (2007) points out the differences in communication styles, cultural values, and language barriers between local employees and expatriates. The vast majority of intercultural studies link communication problems with differences in cultural values that may have an effect on the behavior of expatriates and local employees. However, there are also studies showing that differences in cultural behavior cannot be held accountable for all communication problems in an international environment (Bargiela-Chiappini and Nickerson, 2003). Difficulties in creating effective in-house communication can also be related to power issues (Vaara et al., 2005) It is important that communication problems are targeted mainly in interaction between individuals from different cultures.

Many studies pay attention to the impact culture have on expatriates, however, less attention is paid to organizational culture itself. Since organizational culture distinguishes one organization from the other (Taras et al., 2009) and shapes the perception, knowledge and emotions of the members of the organization, expatriates may have difficulty distinguishing organizational cultural values from national ones. On the one hand, expatriates identify with the values of the parent company more than that of the branch, on the other hand, the branch's organizational values are often rooted in local culture, so expatriates tend to link organizational and national cultural values (Donga and Glaisterb, 2009). In addition, the presence of the expatriate in the organization is temporary, and thus he/ she does not have enough time or resources to get to know the local culture and understand the values of the host society in more detail. A factor underpinning the influence of organizational culture is the behavior of members of the organization. Their behavior can be a source of information on what is acceptable and what is not, and is therefore a valuable guideline to employee behavior (Ali Taha et al., 2016). Since expatriates are exposed to substantial cultural, social, and professional challenges, and the way they perceive home and host organizational culture, their attitudes or behavior may change, sometimes leading to an intention to step down (Nguyen et al., 2015).The expatriate failure rate may not be as high as is often stated but actions of expatriates are often far from ideal. The failure of expatriates is a major problem not only from the employee's perspective, but also from the perspective of cost. Therefore, organizations should be highly motivated to prepare expatriates for their new roles abroad in an effort to minimize potential failures. This can be ensured in two stages. In the first stage, organizations should select and train individuals for their stay abroad. In the second stage, upon arrival of the expatriate in the host country, the expatriate should begin to communicate with the host and adapt their behavior to the cultural norms and habits of the host country (Shay and Baack, 2004). Selmer (2001) states that behavioral training is more effective after arrival than it is before departure because expatriates tend to be more motivated to learn when they are in a new environment and face new challenges. Through training, international organizations try to ensure that the expatriate is well-received in the target country, thus minimizing the bad impact on the branch's organizational culture. In the course of preparation, companies seek to ensure that goals such as improving expatriate's ability to communicate in the foreign language, obtaining information about the host country, training communication skills, overcoming cultural shock, forming realistic expectations etc., are achieved.

Shenkar and Luo (2004) outline negative consequences of using expatriates, in particular the demotivation of local employees in the host country. They may feel the presence of expatriates as a limiting factor in the process of filling managerial positions at the branch. Often, in developing economies, it is a general fact that expatriates have higher salaries than the rest of the staff, which of course is very demotivating towards local employees. Companies are intensively trying to eliminate

these potential negative impacts associated with the use of managers posted from the country the headquarters are located (Bednárová et al., 2018). According to Jonasson and Lauring (2011), the expatriate should be able to accept foreign culture, the specifics of different cultural environments and intercultural differences. He/ she should also be able to lead a foreign team of employees well, be a representative of his/ her branch, and also be able to accept and respond appropriately to different situations arising from different practices. People can prepare for anything before going abroad. The success of posting depends largely on the effectiveness of intercultural education, as this education can help reduce psychological stress and cultural shock, which often causes failure of an expatriate. The successful application of an intercultural learning model can help employees become familiar with the values, rules, beliefs, working styles and other aspects of the foreign environment, thus facilitating the adaptation of employees during posting (Pinto et al., 2017).

Methodology

Expatriates represent a category of high-performance employees whose utilization rate is steadily increasing. Due to the growing number of international organizations in Slovakia, the number of expatriates in the Slovak environment is also increasing. In view of the growing use of expatriates in Slovak branches of international organizations, there was a need to carry out a research aimed at comparing expatriates and local employees in the Slovak environment.

Since expatriates come from a different cultural and institutional environment, our intention was to find out whether there are differences in their perception of aspects such as workplace atmosphere, communication style, behavior of employees, way of resolving conflicts at the relevant branch, as these can be understood as certain intangible elements of organizational culture. The aim of the research was to find out whether there are statistically significant differences in the perception of selected elements of organizational culture among expatriates and local employees in branches of international organizations operating in Slovakia. The research was conducted between January and May 2019. Data were collected using the standardized questionnaire method, and the questionnaire was distributed in person and by e-mail. The research focused on 4 intangible elements of organizational culture, which were evaluated by respondents on Likert scale 1 - 5, where 1 expressed very positive perception of the given element and 5 very negative perception of the given element of corporate culture. The elements are as follows:

1. Atmosphere at the workplace.
2. Way of resolving interpersonal workplace conflicts.
3. Ethical behavior of employees.
4. Workplace communication style.

For our research purposes we used two research samples. The research sample A consisted of local employees of branches of international organizations operating in the Slovak Republic, in which expatriates, i.e. employees of the parent company, work. The research sample A consisted of 132 local employees. Sample B consisted of 77 expatriates who have been working for some time at branches of international organizations in Slovakia. Figure 1 shows the share of both categories of employees.

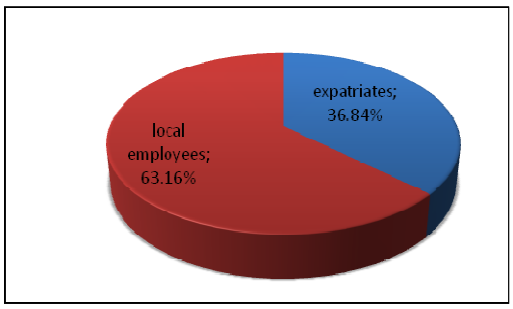

Fig. 1: The share of local employees and expatriates in the research sample

The obtained data were processed using descriptive statistics and the research hypotheses were tested using the Student's t-test at a significance level of α 5%.

Results and Discussion

As mentioned above, the aim was to find statistically significant differences in the perception of selected intangible elements of organizational culture. Subsequently, 4 research hypotheses were tested.

The first variable examined was the workplace atmosphere, which is a very important determinant of individual's performance. If the employee perceives the climate at the workplace in a rather negative way, it will affect his/ her performance and result in reduced motivation to deliver the desired work performance. At the same time, the perception of the workplace atmosphere can be influenced by certain habits that the expatriate brings along from the country of origin. The results in Figure 2 suggest that both categories of employees perceive workplace atmosphere in a similar way, with both local employees and expatriates feeling positive at the workplace, which can be seen as a very favorable factor.

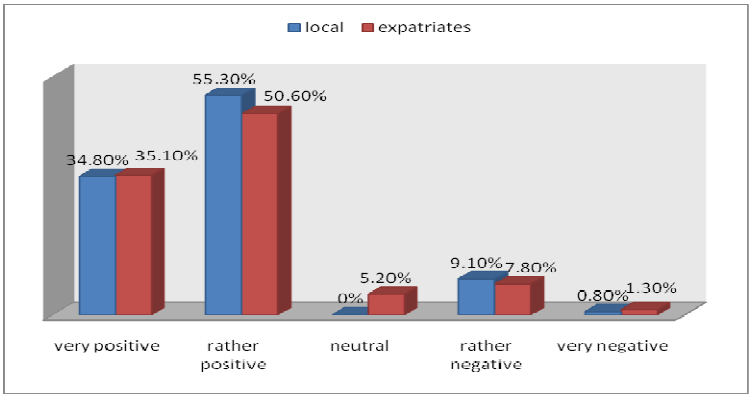

Fig. 2: Comparison of expatriates and local employees in terms of workplace atmosphere perception

H1: We assume the existence of statistically significant differences in the perception of workplace atmosphere between expatriates and local employees.

Table 1: H1 testing

Variable – atmosphere perception	
p – value =0.753632489	No statistical significant difference

As the t-test results show, p-value equals 0.753632489. On the basis of this result we reject H1 hypothesis and state that there is no statistically significant difference in the perception of workplace atmosphere between expatriates and local employees.

Another variable examined was the way of resolving interpersonal conflicts. Conflicts and their resolution is a common part of working life, the question is how the management and employees deal with it, how the dispute is resolved, to what extent management interferes, what are consequences, etc. Way of resolving interpersonal conflicts is an intangible component of corporate culture. Often, the attitude to conflicts is rooted in the personality of a person based on his/ her previous experience and the environment in which the person grew up.

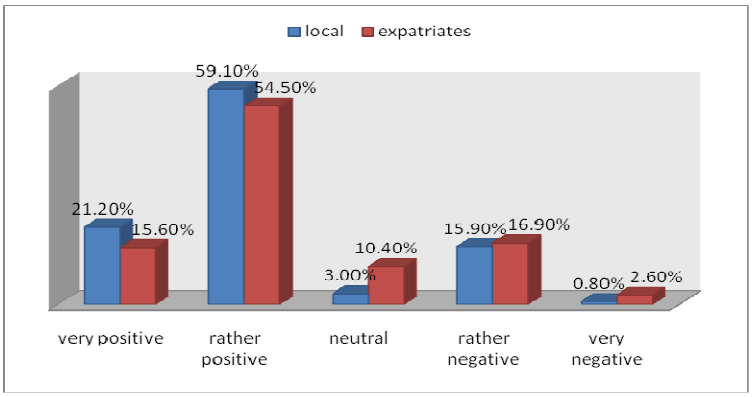

Fig. 3: Comparing expatriates and local employees in terms of perception of resolving interpersonal conflicts

As shown in Figure 3, both expatriates and local employees show a predominantly positive perception of the element.

H2: We assume the existence of statistically significant differences in the perception of interpersonal conflicts resolution between expatriates and local employees.

Table 2: H2 testing

Variable – perception of resolving interpersonal conflicts	
p – value = 0.1497	No statistical significant difference

Based on the results of the t-test, p is >0.05. On the basis of this result we reject H2. Thus, we can state that local employees and expatriates do not perceive the element of resolving interpersonal conflicts differently from one another.

One of the essential features of one's culture as well as organizational culture is the ethical behavior of people. Ethics, like any other cultural features, is a part of the individual's personality that one acquires during his/ her life. It can therefore be assumed that there may be a different approach to evaluating what can be considered ethical and what is not by people of different cultures. Figure 4 shows how expatriates and local employees perceive ethical behavior. Similarly to the previous elements examined, both groups of employees show positive results, as most respondents evaluate the ethical behavior in the branch positively.

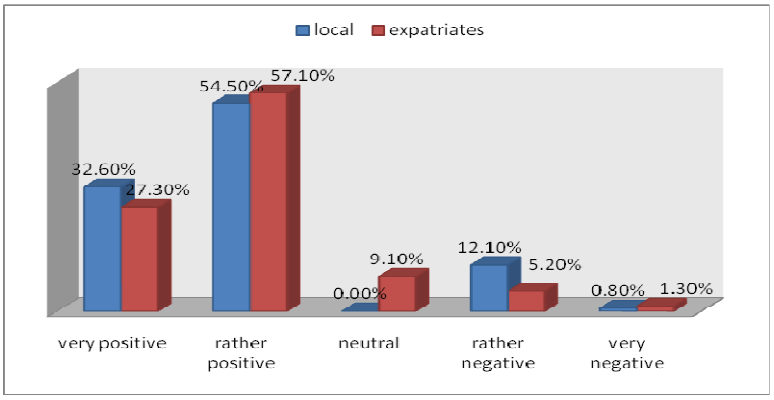

Fig. 4: Comparison of expatriates and local employees in terms of perception of ethical behavior

H3: We assume the existence of statistically significant differences in the perception of ethical behavior between expatriates and local employees.

Table 3: H3 testing

Variable – perception of resolving interpersonal conflicts	
p – value = 0.8673	No statistical significant difference

The results of the statistical testing show that p value is >0.05. Thus, we reject H3 hypothesis, as there was no statistically significant difference in the perception of ethical behavior between expatriates and local employees.

The last important variable in the research was the form and style of communication. Each organization has a typical style and way of communication, for example the extent to which communication is formal or informal, openness or respect in communication between superiors and subordinates, to what extent employees are consulted in person, etc. Our goal was to find out how local employees and expatriates perceive certain forms and styles of communication typical of the particular branch. The results are shown in Figure 5. Although the majority of respondents expressed a positive attitude to this element, the number of positive evaluations is slightly higher for local employees than for expatriates.

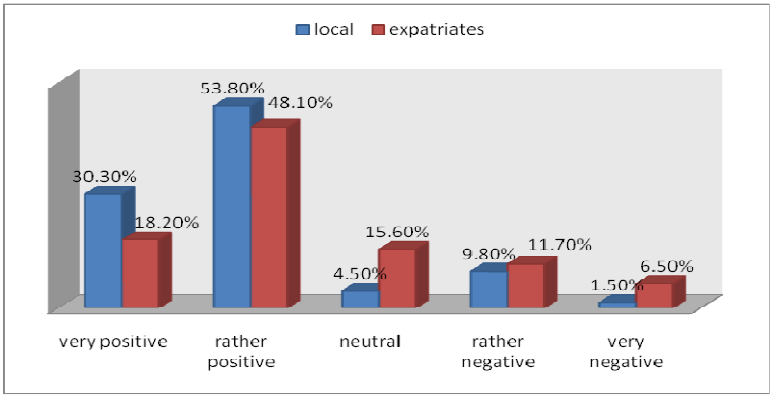

Fig. 5: Comparison of expatriates and local employees in terms of perception of communication style

H4: We assume that there are statistically significant differences in the perception of the communication style between expatriates and local employees.

Table 5: H4 testing

Variable – perception of communication style	
p – value = 0.0043	Statistical significant difference

To test the hypothesis, Student's t-test was used. The results of the statistical testing show that p value is 0.0043 (<0.05). Thus, we can state that we accept the hypothesis H4. As a result, it can be stated that the expatriates and local employees perceive communication style used in branches of international organizations operating in Slovakia differently.

Summary

The results of the research aimed at comparing the perception of selected intangible elements of organizational culture of expatriates and local employees showed that most local employees and expatriates evaluate organizational culture of international organizations' branches positively, namely the workplace atmosphere, conflict resolution, ethical behavior and communication style. Local employees perceive the ethical behavior to be the most positive factor, while expatriates see workplace atmosphere as the most positive factor and the communication style as the least positive factor.

At the same time, the results pointed to the fact that, for the 3 variables examined (workplace atmosphere, conflict resolution, ethic behavior), there were no statistically significant differences between expatriates and local employees. This result may be down to the following reasons: the country of origin of the expatriate and the host country are not that different in terms of culture and that similar style of management is used in both countries. Another reason may be sufficient training of the expatriate, which means that the expatriate knows the conditions of the host country and is prepared for possible differences in the organizational culture. Proper preparation for working in different environment eliminates the consequent negative feelings of change and facilitates the adaptation process.

The only variable in which a statistically significant difference has been found is the communication style. It is a very important factor and many authors mention it as a very important determinant of the successful interaction between expatriates and local employees (eg. Minbaeva, 2005; Tange and Lauring, 2009; Peltokorpi, 2007). The studies by these authors often mention that there is still a language barrier between expatriates and local employees which may result in the lack of mutual understanding. Based on these findings, it is essential to ensure effective language and communication training, not only on the part of expatriates but also on the part of local employees.

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Innovation and Labor Productivity: Empirical Studies of Industrial Enterprises in Ukraine

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Abstract

The development of the industrial sector of Ukraine is impossible without the growth of labor productivity on the basis of improving the qualitative characteristics of the fixed assets and human resources involved, as well as the expansion of innovative activity of industrial enterprises. The study aims to deepen the empirical discussion in two directions: conducting a comparative analysis of the productivity of industrial enterprises in individual EU countries and Ukraine; substantiation of the need for the transition of industrial enterprises from growth based on capital accumulation to growth based on innovation. The aim of the article is to substantiate the directions of increasing the level of labor productivity by increasing the innovative activity of industrial enterprises. To study the productivity of industrial enterprises, data from Eurostat and the State Statistics Service of Ukraine for 2017 and individual indicators for 2010-2018 are used. The method of comparative analysis of the main indicators affecting the productivity of industrial enterprises of Germany, France, Italy, Hungary, Poland, Slovenia, Slovakia and Ukraine is applied. According to the results of the analysis, it has been determined that labor productivity at Ukrainian enterprises is much lower than in the studied group of countries. A comparative analysis of the factors that influence the size of labor productivity has led to the conclusion that ensuring productivity growth at processing enterprises in Ukraine cannot be ensured by the increase in the volume of attracted resources. It has been concluded that the growth of labor productivity based on innovation should be oriented towards enhancing the dynamics of the cost of innovation; improving the structure of innovative spending directions towards increasing the share of expenditures on financing of internal and external research development; expanding the list of sources of financing innovative activity of industrial enterprises by increasing the volume of attracted financial resources from Ukrainian and foreign investors.

Keywords:Labor productivity, industrial enterprises of Ukraine, innovative activity, capital investments

Introduction

The main indicator that allows evaluating the productivity of industrial enterprises is the indicator of labor productivity – a general indicator that characterizes the efficiency of labor resources use in the production of industrial goods.

In a broad sense, labor productivity is the efficiency of useful labor that determines the effectiveness of its use in a specific period of time, under conditions that exist during that period. The characteristics of the efficiency and effectiveness of useful work are influenced, on the one hand, by the qualitative characteristics of the labor resources involved in the process (their qualifications, professional and moral abilities, psychological mood, etc.), on the other – the conditions of use of labor resources (the state of the means of labor and technology, working conditions, etc.).

Depending on the specifics of the industry and the labor parameter (the amount of time spent or the number of employees involved), labor productivity is characterized by the ratio of the volume of production in physical, labor or value terms to the time spent on its production, or the number of employees involved.

Labor productivity growth, as a factor in the development of the industrial sector, can occur through: investing additional capital and attracting additional labor; the impact of technological change and the expansion of innovative activities of industrial enterprises.

Due to the lack of research to justify the relationship between innovation activity and labor productivity at the level of industrial enterprises of Ukraine, this study aims to deepen the empirical discussion in two directions: conducting a comparative analysis of the productivity of industrial enterprises in individual EU countries and Ukraine; substantiation of the need for the transition of industrial enterprises from growth based on capital accumulation to growth based on innovation.

Brief Literature Review

A considerable amount of foreign research on the importance of the identified areas of industry development argues that the expansion of innovation provides an explanation for more than half of the variation in productivity (Cassiman & Golovko, 2011; Huergo & Jaumandreu, 2004; Isabel Martínez Martín, Miguel Sánchez Galindorez, Césarz & Lperez, César Rosa Santero Sánchez, 2019; Tsai & Wang, 2004; Alfredo D'Angelo & Alessandro Baroncelli, 2019; Wakelin, 2001). Some scholars (Griffith, Huergo, Mairesse & Peters, 2006) argue that post-war growth in Europe has largely been based on capital accumulation, whereas what is needed now is that European countries reorient themselves towards innovation-based growth .

In conditions of capital shortages, problems associated with a shortage of qualified labor resources and a high degree of deterioration of fixed assets in the industrial sector of Ukraine, the influence of the first direction of productivity growth is weak (Sergiychuk, Karas, 2011; Kapinos, 2015; Goncharov, 2014; Semykina, 2010) . The above mentioned allows us to conclude that one of the important factors of the extensive type of economic development of enterprises in the country's industrial sector is the growth of labor productivity based on an increase in their innovative activity.

The purpose

The aim of the article is to substantiate the directions of increasing the level of labor productivity by increasing the innovative activity of industrial enterprises (a significant increase in the number of innovatively active enterprises, an increase in the share of expenses for internal and external research and development, expanding sources of financing innovation in the industrial sector, while maintaining amounts of financing from own funds). The basis of the study is a set of industrial enterprises of Ukraine.

Methods

To study the labor productivity of enterprises in the industrial sector, data from Eurostat and the State Statistics Service of Ukraine for 2017 and individual indicators for 2010-2018 are used. The method of comparative analysis of the main indicators that affect the labor productivity of industrial enterprises in Germany, France, Italy, Hungary, Poland, Slovenia, Slovakia and Ukraine is used. The theoretical basis of the study was the latest articles and publications of scientists who have studied the problem of labor productivity in industry.

Results

To analyze the activities of industrial enterprises, a general indicator used to determine labor productivity is the volume of sales per employed person in the industrial sector.
According to Eurostat (2017), the figure in Germany was 296 thousand euros per employee, in France – 329 thousand euros, in Italy – 258 thousand euros (Table 1).

Table 1: Industrial labor productivity in individual EU countries, 2017 (processing industry)

Indicator	Germany	France	Italy
Number of enterprises	190541	197657	383585
Sales volume, EUR million	2193357,5	1021247,9	965031,0
Number of persons employed	7409552	3103594	3744271
Labor productivity (volume of sales per employee), thousand euros	296,0	329,1	257,7
Labor productivity (gross value added per employed person), thousand euros	79,9	77,4	64,5

Source: Eurostat

The similar indicator calculated for the group of Central and Eastern European countries (Table 2) is much smaller and fluctuates between 121-152 thousand euros.

Table 2: Industrial productivity in individual countries of Central and Eastern Europe and Ukraine, 2017 (Prossesing industry)

	Hungary*	Poland*	Slovenia *	Slovakia*	Ukraine
Number of enterprises	50809	198757	19376	72563	63309
Sales volume, EUR million	109581,7	321925,9	29353,0	76382,2	1400214,0 (UAH million)** 46673,8 (mln. euro)
Gross value added, EUR million	24176,0	70361,0	8365,7	14075,1	369452,0 (UAH million)*** 12315 (mln. euro)
Number of employed persons	757819	2654823	204929	501318	1250300***
Labor productivity (volume of sales per employee), thousand euros	144,6	121,3	143,2	152,4	37,3
Labor productivity (gross value added per employed person), thousand euros	31,9	26,5	40,8	28,1	9,84

Source: Eurostat, State Statistics Service of Ukraine

According to the results of the analysis of the data proposed in the tables, labor productivity at the enterprises of the processing industry of Ukraine is significantly less than for the group of countries with developed economies (see Table 1) and the countries of Central and Eastern Europe (see Table 2).

More correct for analysis is the definition of labor productivity as the value of gross value added per one employed person in industry. Gross value added is the value of gross output excluding the cost of raw materials and other intermediate consumption. Using gross value added as an indicator of the evaluation of the productivity of useful labor, only what is created by the attracted labor resources in the process of economic activity is compared.

For Ukrainian industrial enterprises the gross value added per employed person is only EUR 10 thousand, while in Germany the figure is more than 8 times, in France - 7 times, and in Italy - 6 times. For the countries of Central and Eastern Europe, the excess of value added labor productivity is 2-4 times.

A comparative analysis of the factors that affect the value of labor productivity shows that the main reason for such a situation is the amount of human resources involved (Table 3). If the value added value created by the enterprises of the processing industry in Hungary is 2 times higher than in Ukraine, then the number of attracted labor resources is 40% less. In Slovakian processing industry enterprises, the volume of added value is almost identical to the volume created by Ukrainian enterprises. However, the number of workers in the processing industry is 60% less than in Ukraine (Table 3).

Table 3: Comparative analysis of the factors affecting the value of labor productivity in individual countries of Central and Eastern Europe and Ukraine, 2017 (processing industry)

	Hungary*	**Poland***	**Slovenia ***	**Slovakia***	**Ukraine**
Gross value added, EUR million	2,0	5,7	0,7	1,1	1
Number of persons employed	0,6	2,1	0,2	0,4	1

The main reasons for the low level of labor productivity in the industrial sector of Ukraine are the following:

1) a significant proportion and conservation of excess labor resources at state-owned industrial enterprises;
2) inefficiency and laboriousness of the technological process in most industrial enterprises;
3) a high level of shadowing of industrial production and, accordingly, the lack of factual reliable information on the results of industrial production and the number of people employed in industry;
4) lack of a long-term clear strategy for real restructuring of the industrial sector;
5) high level of depreciation of fixed assets and low efficiency of the technological process of industrial production;
6) weak financial interest of external and internal investors in technological and financial investments;
7) low qualifications of the involved labor resources and lack of motivation to improve their quality characteristics.

Consequently, ensuring productivity growth at Ukrainian processing enterprises cannot be ensured by increased labor input. What matters is not so much the increase in their quantitative characteristics but the improvement of their quality and working conditions.

One of the important factors that negatively affect the performance, the level of productivity of the sector, the competitiveness of manufactured products is the lack of capital investment in the development of the industry. Study of the practice of investment activity in the industries of the

Central and Eastern Europe countries (Table 4) shows that the vast majority of capital investments (94-98% of total capital investment) are investments that provide expanded reproduction. It is the focus of the industrial enterprises management on improving the characteristics of fixed assets and their modernization that is a factor in the growth of labor productivity and the effectiveness of economic activity (growth in the volume of added value and the volume of sales of industrial products).

Table 4: Capital investment in industry in individual countries of Central and Eastern Europe and Ukraine, 2017 (processing industry), EUR million

	Gross investment in land	Gross investment in existing buildings and structures	Gross investment in the construction and re-planning of buildings	Gross investment in machinery and equipment
Hungary	26,0	126,3	1652,5	4732,2
Poland	322,4	211,6	3703,9	11443,6
Slovenia	40,3	45,5	340,7	1227,2
Slovakia	47,9	38,7	877,7	2888,9

Source: Eurostat

A comparison of the data proposed in table 4 with statistical data on the volume of costs in the areas of innovative activity of industrial enterprises in Ukraine, indicates their significant thawing (table. 5).

Table 5: Total amount of expenditures by the directions of innovative activity of industrial enterprises of Ukraine, mln

	Capital Investments	Costs of innovation		Including directions			
		UAH million	% of total investment	research and development	acquisition of other external knowledge	purchase of machinery and software	Other expenses
2010	55384,4	8045,5	14,5	996,4	141,6	5051,7	1855,8
2011	78725,8	14333,9	18,2	1079,9	324,7	10489,1	2440,2
2012	91598,4	11480,6	12,5	1196,3	47,0	8051,8	2185,5
2013	97574,1	9562,6	9,8	1638,5	87,0	5546,3	2290,9
2014	86242,0	7695,9	8,9	1754,6	47,2	5115,3	778,8
2015	87656,0	13813,7	15,8	2039,5	84,9	11141,3	548,0
2016	117753,6	23229,5	19,7	2457,8	64,2	19829,0	878,4
2017	143300,0	9117,5	6,4	2169,8	21,8	5898,8	1027,1
2018	199896,0	12180,1	6,1	3208,8	46,1	8291,3	633,9

Source: State Statistics Service of Ukraine

The share of capital investments related to innovation during the analyzed period is in the range of 6-19%, which does not provide the formation of the necessary amount of financial resources for significant updating of fixed assets and improvement of their quality characteristics.

Discussion

Among the set of outlined directions of industrial sector development are the following:

- maintaining and enhancing the dynamics of the volume of expenditures on innovative activities of industrial enterprises, as the basis for ensuring their stable development;
- improvement of the structure of innovation costs directions in the direction of increasing the share of expenses aimed at financing internal and external research;
- a significant factor in the development of the industrial sector and the growth in the volume of manufactured and sold industrial products is the increase in the number of innovatively active enterprises;
- expanding the list of sources of financing the innovative activity of industrial enterprises by increasing the volume of attracted financial resources from both Ukrainian and foreign investors will increase the financial capacity of industrial enterprises and improve the qualitative and quantitative characteristics of their economic activity.

From the point of view of the impact on labor productivity, the so-called innovation process is evaluated when the innovation is introduced in the production process. There are six areas of innovation in the industry (OECD, 2005):

- acquisition and changes of fixed assets and procedures, methods and quality control standards necessary for the production and quality control of a new product or the use of a new process;
- the process of modifications, retraining of personnel in new technologies or in the use of new technology;
- marketing of new products;
- technology acquisition;
- purchase of machinery and equipment;
- design – covers plans and drawings aimed at determining the procedure, technical specifications and operational features necessary for the implementation, development, production and sale of new products and processes.

In general, there are two main problems that arise in determining the impact of innovation on the productivity of industrial enterprises:

- how to measure innovation;
- how to single out the influence of innovations in the totality of factors affecting labor productivity.

A possible solution to the first problem may be to use the costs of industrial enterprises for R&D. A positive point in using this option for measuring the innovative activity of industrial enterprises is the availability of clear statistics and the possibility of comparing results at the level of individual territories of a country or individual countries. The disadvantage is that R&D expenditures are a measure of investments that does not take into account the efficiency and effectiveness of efforts.

Research and development is an important element of the innovation activity of industrial enterprises, since it provides opportunities to maximize the use of their scientific and resource potential. Approximation of innovative activity directly to the production process extends the possibilities to take into account the features of technological, management and other processes at the enterprise level, meets the requirements of increasing their level of efficiency. From the position of stimulating this direction of innovative activity of enterprises in the country's industrial sector, the main goal of industrial policy should be to support (regulatory, patent, licensing, financial, etc.) their activities.

Given the insufficient level of development of the innovation market and the lack of financial resources for the development of national innovation, the vast majority of enterprises in the industrial sector of Ukraine prefer to purchase machinery, equipment and software. This is the simplest version of innovation activity, which provides the shortest period of commercialization of invested financial resources by increasing income from economic activities.

Analysis of the dynamics of innovation activity of industrial enterprises by directions is presented in Table 6.

Table 6: Analysis of the number of enterprises in industry by areas of innovation (2010-2017)

Areas	2010	2012	2013	2014	2015	2016	2017	2018
Internal R&D	224	214	215	189	151	232	130	218
Acquisition of R&D	124	134	114	94	70	103	62	66
Purchase of machinery, equipment and software	840	1096	1082	993	467	590	500	320

Source: State Statistics Service of Ukraine

During the analyzed period, there has been a steady positive dynamics in terms of expenditures in all areas of innovative activity and especially in the direction of the acquisition of machinery, equipment and software. The main reasons are the impact of the exchange rate and the need for a significant upgrade of fixed assets of enterprises of the country's industrial complex. In the structure of expenses during the analyzed period, the largest (in some years 99% of the total) is the share of expenses for the purchase of machinery, equipment and software.

The identified trend, in our opinion, is positive and reflects the growing interest on the part of industrial enterprises in enhancing their own innovative potential and developing internal research activities.

Conclusions of this study

A positive impact on the results of economic activity of industrial enterprises in Ukraine (the volume of sold industrial products and the volume of created added value) of the innovative activity of industrial enterprises is possible only if there are three main conditions: a significant increase in the number of innovatively active enterprises, an increase in the share of expenses for internal and external research and development, expanding sources of financing innovation in the industrial sector, while maintaining amounts of financing from own funds.

Further research will be aimed at exploring the sources of financing the innovative activities of industrial enterprises of the country and finding ways to optimize them.

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Reinforcing the Optimal Strategic Performance Positioning Matrix with Multiple-Criteria Decision Analysis for Digital Transformation Strategy

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Abstract

The present paper applies a multi-criteria decision-making methodology (MCDM) and Analytical Hierarchical Process (AHP) in the Latvian woodworking sector to assess the strategic decision-making criteria. The subject of the study is the influence of digitalization on company's strategic posture and development of OSPP approach. The goal of the study is to examine the development of digitalization strategies and to consider whether the organizational changes are needed to adapt to digital change. According to the research results, our concept helps management to outline the most crucial advantages in industry regarding digital change and gaps between them and company capacity. We modified original OSPP matrix with MCDA method in order to realize the full potential of digital transformation. Nowadays companies need to add learning and digitalization relevant assets and capabilities in order to adjust them in terms of industry's digital ecosystem and assess the gaps.

Keywords: digitalization, digital transformation, multiple-criteria decision analysis, digitalization strategy, strategic management, optimal strategic performance positioning matrix, AHP

Introduction

H. Igor Ansoff is mainly seen as the leader of the 'strategic planning school', as accredited by Mintzberg (Mintzberg 1994, Martinet 2010). Ansoff's concept of the environmental turbulence in Implanting Strategic Management (1984) is extremely topical since nowadays external environment turbulence is becoming more and more dynamic (Ansoff 1999). The reason is that "Digital transformation and resultant business model innovation that have fundamentally altered consumers' expectations and behaviors, pressured traditional firms, and disrupted numerous markets" (Verhoef *et al.* 2019). The issue of employing digital technologies is becoming critical nowadays as companies are striving to develop a new digital business model in order to create and appropriate more value for the company (Kane *et al.* 2015, Schallmo *et al.* 2019). Companies are trying to perceive actual customer behavior towards any product and service through digital feedback in order to develop consumer-oriented offers (Flügge 2017). Digital transformation will become a relevant and multidisciplinary area for future research given the recent developments of digital technologies (Verhoef *et al.* 2019). Digital transformation is a company-wide phenomenon with broad organizational implications in which, most notably, the core business model of the firm is subject to change through the use of digital technology (Agarwal *et al.* 2010). It forces companies to deal with conflicts between existing and new ways of doing business (Christensen *et al.* 2016). To respond to these challenges, firms should be digitally agile to continuously modify and reconfigure existing digital assets and capabilities (Eggers and Francis Park 2018).

Ansoff's OSPP Matrix provides an opportunity to assess capacity for essential digital assets and capabilities needed for digital change (Verhoef *et al.* 2019).

First of all, a company could assess its current capacity gap in terms of Digital Resources – digital assets, such as the storage of data, information and communication infrastructure, and accompanying technologies to effectively compete in the digital era. It is also possible to identify priority for respected capacity, since not all digital assets and capabilities are equally critical for every industry. Second, digital agility concerning the capability to sense and seize market opportunities provided by digital technologies

(Sambamurthy *et al.* 2003, Lee *et al.* 2015) is also part of company's capacity to assess through the OSPP matrix.

A key issue to consider is the organizational changes needed to adapt to digital change (Eggers and Francis Park 2018) regarding organizational structure that is flexible for digital change. The need for autonomous business units that are separated from the headquarters is crucial because they allow for experimentation and quick learning, as well as avoiding cannibalization perils and conflicts (Broekhuizen *et al.* 2018). New agile organizational forms instead of standard, more hierarchical organization schemes, may no longer be effective in fast-changing digital environments, as the bureaucracy involved reduces response speed and innovativeness. New digital functional areas make communication or data flows play a more proactive and orchestrating role that supports the creation of digital value via fast and explorative responses, i.e., the attraction of employees with digital and analytical skills that may replace existing workforce (Leonhardt *et al.* 2017).

It should be outlined that Ansoff's OSPP does not provide a digital growth strategy, but helps management outline the most crucial advantages in industry regarding digital change and gaps between them and company's capacity. We modified an original OSPP matrix, but to realize the full potential of digital transformation, companies would need to add learning and digitalization relevant assets and capabilities in order to adjust them in terms of industry's digital ecosystem.

The key goal of the present paper is to provide a strategic perspective on digital transformation. We would like to open a discussion that prior to building a digital transformation strategy, it is necessary to identify the current gap between the company's capacity and external digital ecosystem. As soon as digital transformation occurs in response to changes in digital technologies, increasing digital competition and resulting digital customer behavior, Ansoff's OSPP could provide necessary tools for assessing the current gap in competitive advantages and organizational structure capacity.

Nonetheless, our goal in revitalizing Ansoff's OSPP was not to identify specific digital assets and capabilities that are relevant for company to be competitive, but to provide guidelines for creating these assets. Digitization transforms business process models and processes in many enterprises. However, many of them need guidance on how digitization is affecting the design of their information systems (Schmidt *et al.* 2017). We provided a multiple-criteria decision analysis (MCDA) for a digital transformation strategy through Ansoff's OSPP. The multiple-criteria decision analysis (MCDA) will help a company adjust our model to be more relevant for company's industry characteristics and will help perform the current digital gap analysis.

The paper consists of introduction, short observation of the OSPP methodology and the logic of the final OSPP concept, as well as some literature discussion associated with the assessment of AHP and ANP. An integrated OSPP-AHP framework has also been proposed and implemented for the wood manufacturing company.

The Optimal Strategic Performance Positioning (OSPP) Matrix

Ansoff's innovations on strategic management were to provide a methodology (Table 1) for managers to analyze and then establish the managerial behavior and capability needed to succeed vs. the present managerial behavior and capability (Moussetis 2011).

Table 1: Matching Strategic Aggressiveness and Responsiveness of Capability with Turbulence (Ansoff and McDonnell 1990)

		Production	**Marketing**	**Entrepreneurship**	**Creativity**
Turbulence scale	1	2	3	4	5
Environmental turbulence	Repetitive	Expanding slow incremental	Changing fast incremental	Discontinuous predictable	Surprising unpredictable
Strategic aggressiveness	**Stable** Based on previous cases	**Reactive**	**Anticipatory**	**Entrepreneurial**	**Creative**

		Incremental based on experience	Incremental based on extrapolation	Discontinuous based on expected futures	Discontinuous based on creativity
Responsiveness of capability	Custodial suppresses changes	Production adapts to change	Marketing pursues familiar change	Strategic seeks new change	Flexible seeks novel change

The OSPP model assists in the completion of a detailed strategic analysis of four critical variables for a company's optimal performance. The most important variable is what Kipley (2012) defines "Strategic Posture". The Strategic Posture is an assessment of the company's Strategic Aggressiveness (SA) and Capability Responsiveness (CR) in relationship to the Environmental Turbulence Level (ETL). Companies, whose CR supports its SA, and SA is matched to the ETL, achieve higher financial performance levels than firms that are misaligned (Kipley *et al.* 2012). The OSPP framework (see Figure 1) and the variables of Strategic Posture analysis data provide accurate measurements of strategic gaps (misalignments).

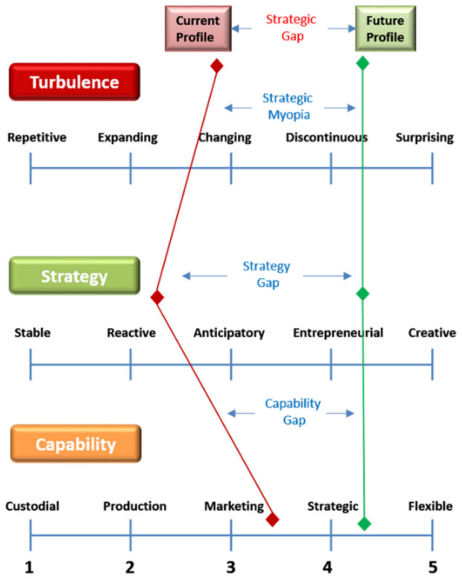

Fig. 1: Optimization of Strategic Posture

Source: based on Ansoff 1987; Lorsch 1986

OSPP has an extensive series of questions (a list of 36 turbulence-level 'descriptors" in 2 different tables, encompassing both industry innovation turbulence (14 descriptors) and marketing turbulence (22 descriptors) for the ETL assessment as a summary (Future Profile, Figure 1). The company's Strategic Aggressiveness (SA) is assessed measuring both marketing aggressiveness (a list of 11 marketing aggressiveness 'descriptors) and innovation aggressiveness (a list of 14 innovation aggressiveness 'descriptors) in 2 different tables as a summary. First, the model calculates the first "gap" analysis between the ETL and SA (Strategy Gap), and the strategic Aggressiveness Gap (Strategy Gap, Figure 1) is entered into the summary output.

The final gap component (Capability Gap, Fig. 1) is used to determine the company's Strategic Posture variable as an assessment of Company Capability Responsiveness against ETL. The Capability Responsiveness is generated by completing five questionnaires measuring General Manager's Capabilities (General Manger's Capability Assessment – 9 descriptors), Corporate Culture (Culture Capability Assessment – 11 descriptors), Company Structure (Structure Assessment – 7 descriptors), Company Systems (System Assessment – 7 descriptors) and Company Technology and Capacity of Management (Technology/Capacity Assessment – 7 descriptors) (see Fig. 2).

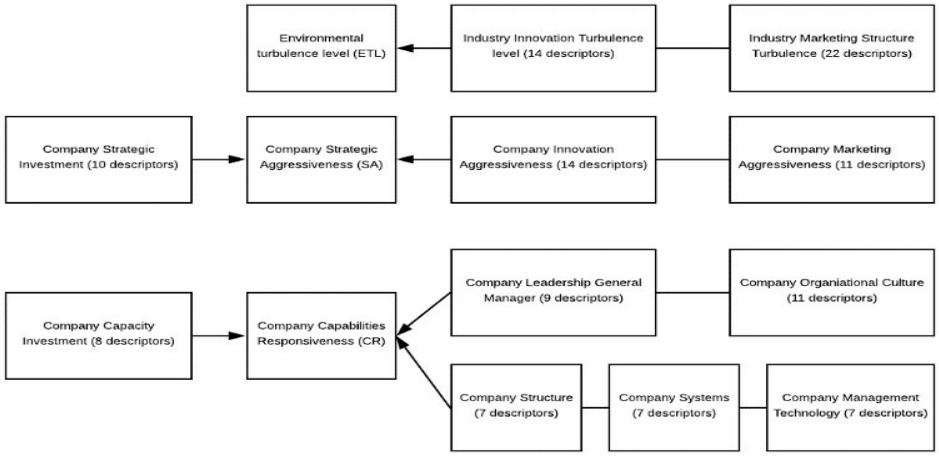

Fig. 2: Optimization of Strategic Posture. Design of OSPP
Source: created by the authors based on the OSPP methodology

Ansoff's paradigm underlines the importance of aligning SA/CR with ETL in achieving optimal strategic success. Ansoff (1986) provided guidance and clarification as to the importance of aligning SA/CR with the ETL in order to achieve optimal strategic success. Empirical evidence confirms that a "gap" in SA and/or CR will adversely affect the company's optimal performance. OSSP Posture Analysis "measures" the "size of the gap" or how wide it is in both the SA and CR.

The final matrix represents the budget committed to the strategic development of the company. The Strategic Investment is the company's total commitment of resources to a strategy, including not only for facilities and equipment (operations), but also for developing the firm's product (R&D) and market position (marketing), as well as the supporting capabilities in management, production, sales, and so on (operations). In each perspective devoted to a strategy, there is a minimal critical mass defined as the strategic breakeven point. Each budget component must be at or above its own critical mass level; misallocation of budgets in a strategy can have serious consequences. In addition, there is an optimal mass representing the level of investment beyond which profitability begins to decline due to decreased speed of organizational response and bureaucratization of the company.

Finally, Strategic Investment represents the Capacity Investment (CI; 8 descriptors) and Strategic Investment (SI; 10 descriptors) of the company. The company's competitive position will be in proportion to the ratio of the company's investment in a strategy to the level of investment that will produce optimal profitability.

We would like to reinforce the methodology, as soon as the coefficients for gaps are generated from a proprietary tables in order to create the final Matrix that is a commercial secret. The four matrix variables are displayed indicating the results of the *Strategic Posture* and *Strategic Investment from proprietary* formulas. The *Company's Future Competitive Position (27 descriptors), and Future Industry Prospects (24 descriptors)* are displayed in the Matrix. The result of the Matrix is necessary for managers to assess the area of the company where to concentrate its resources in order to improve its performance position (Figure 3).

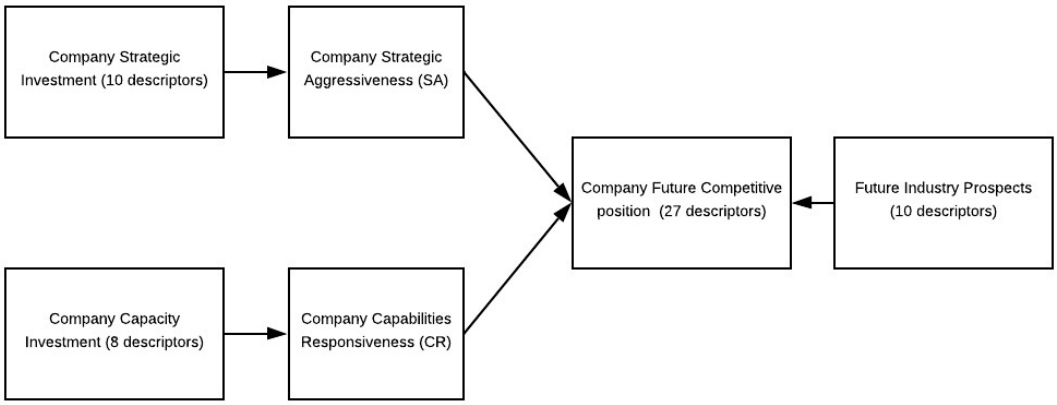

Fig. 3: The Logic of the final OSPP Matrix
Source: created by the authors based on the OSPP methodology

The final OSPP Matrix represents contribution of Strategic Budget to *Company's Future Competitive Position* with respect to *Future Industry Prospects*.

It is recommended by the methodology to increase, modify, and replace the low-performing descriptor factors to increase the score. However, the direct correlation between *Company's Future Competitive Position* and the existing gaps remains hidden. Based on the *Company's Future Competitive Position list* of descriptors, it is difficult for management to directly correlate them with the existing gaps.

We would like to propose the MCDA method in order to assess the contribution of descriptors to the existing gaps and correct allocation of Strategic Budget to eliminate these gaps. In our opinion, correlation between *Company's Future Competitive Position* and SA/CR is sophisticated and should be separately analyzed using an Analytical Network Process (ANP), which is a subject of the subsequent study.

Literature Review on MCDA

MCDA methods allow ranking the determined strategies and factors. AHP, as a hierarchical weighted decision analysis method proposed by Saaty (Saaty 1989), is the most widely used MCDA method and combines a qualitative analysis with a quantitative analysis (Ho 2008). The global priorities of criteria, sub-criteria and alternatives are synthesized using the eigenvalue method (EM). The EM is the solution of the eigenvalue problem:

$$Aw = \lambda_{\max} w, \qquad (1)$$

where λ_{max} is the largest or principle eigenvalue of the pairwise comparison matrix and w is the corresponding principle eigenvector.

The *CR* (Consistency Ratio) of matrix *A* is used to check judgment inconsistency. $CR = CI/RI$, where $CI = (\lambda max - n)/(n - 1)$ and λmax is the maximal eigenvalue of *A*. *RI* (Random Index) is an experimental value, which depends on *n* (Saaty 1989). According to the scale principles, a comparison of pairs is derived in matrix (Saaty 1989).

ANP is a newer tool used to solve multi-criteria problems. It is a type of system decision analysis, which combines qualitative and quantitative factors based on the AHP (Saaty 2004). SWOT nowadays is combined with ANP, which is one more approach proposed to determine the factor weights of dependency or independency by creating more advanced priority determination in hybrid models. Assuming that interdependence of the factors that are used in SWOT analysis can impact the selection of a final strategy, Yuksel and Dagdeviren proposed the hybrid SWOT–ANP model for ranking the strategies, factors and sub-factors (Yüksel and Dağdeviren 2007). Later the ANP approach was widely adopted and exploited by many scientists to determine relative importance of strategic factors as the basis

of prioritizing the previously formulated strategic options (Shahabi *et al.* 2014, Grošelj and Zadnik Stirn 2015, Živković *et al.* 2015, Al-Refaie *et al.* 2016, Di Lallo *et al.* 2016, Zhü *et al.* 2016, Wang *et al.* 2017, Gottfried *et al.* 2018).

Although the ANP method is used by many authors, it has also some acknowledged disadvantages: the mutual dependency of two factors is treated as the reciprocal value in the map of an interrelation network and that does not always correspond to reality. The same problem also arises when normalizing the unweighted supermatrix in ANP, where the same relative importance is assigned to each cluster. The ANP–AHP models have also some drawbacks when experts are evaluating priority determination among factors and alternatives in the case of a huge number of factors. Experts involved in the evaluation process need to perform a mass of accurate identification procedures among factors that could be very exhausting. Another issue is the evaluation uncertainty, when an expert cannot quantify relative influence or priority of the factors very accurately and spends a lot of time to perform the evaluation process. In this case, experts could be allowed to use a linguistic variable.

Saaty (1980) states that in many practical cases the pair-wise judgments of decision-makers would contain some degree of uncertainty. It is frequently the case that the decision-maker is certain about the ranking order of the comparison elements but uncertain about the precise numerical values of his judgments. The classical AHP attempts to overcome this problem by introducing a discrete linguistic set of comparison judgments. Instead of directly assigning numerical values to the comparison ratios, the decision-maker chooses an appropriate linguistic phrase, which best corresponds to his comparison preferences (Saaty 1980).

The New OSSP Concept for MCDA

In order to reinforce the existing OSPP model, we decided to apply change management. The Burke-Litwin model (see **Error! Reference source not found.**) was significant as a bridge to emerging models and concepts of organizational change, due to its dual nature of addressing both the transactional and transformational aspects of change. The model, which emerged out of practice in 1987 and was based on the work around organizational climate conducted by Litwin (Burke, 2014), provides a systemic view of the influencers of organizational change. It does not propose a start or end point of the change process, but rather introduces key change points, with the external environment as the main input and individual and organizational performance as output (Burke, Litwin, 1992).

In the authors' opinion, the key feature of this model is the systemic perspective, representing crucial change elements: dual transformational and transactional dimensions.

The upper level of this model (see Fig. 4) investigates the transformational factors of change: environment, mission, strategy, leadership and culture. The authors distinguish two categories in transformational factors – internal and external; these categories have decisive relationship for company's development, but relationship between these factors is not clear here. The authors emphasize that mission, strategy, leadership and culture are discussed as transformational factors – "change source points".

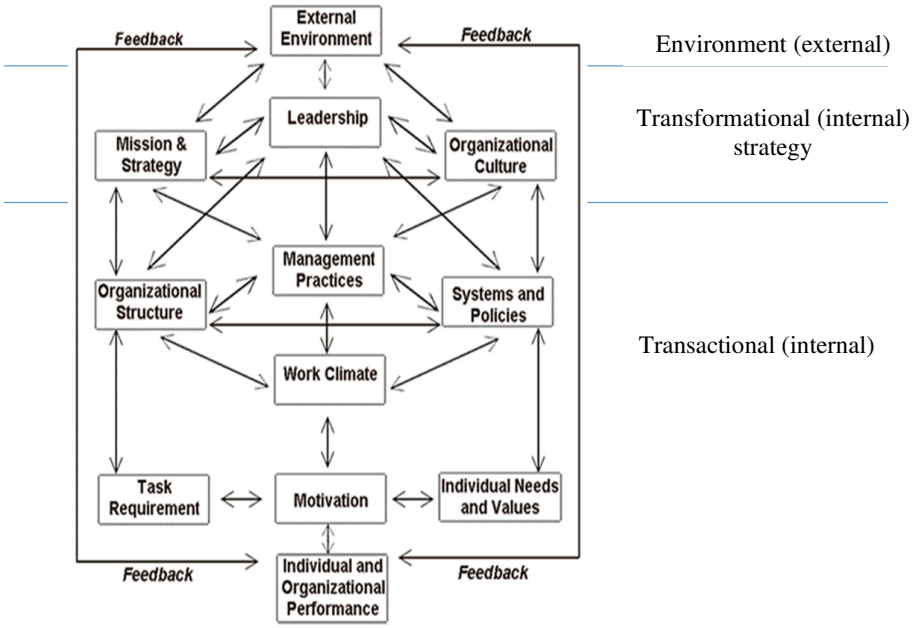

Fig. 4: The Burke-Litwin (Burke and Litwin, 1992) model of organizational performance and change

Source: (Burke, Litwin 1992)

The lower level of the model represents the transactional factors of change: management, structure, systems, task requirements, motivation, individual needs and values. These factors represent more of the day-to-day actions in an organization, and due to their particularities, the change of one such factor will not have as large systemic implications as those of the transformational factors. The model suggests that changes in these elements have a broad systemic impact, creating revolutionary change for an organization (Burke, Litwin, 1992). Nonetheless, in the authors' opinion, the Burke-Litwin model does not focus on the element hierarchical relationship, which is important and is partly represented in (Porras and Robertson 1991) model. We combined this model with OSPP in Fig. 5.

Unfortunately, the original OSPP model does not take into consideration the individual level, which we think is very important for eliminating gaps. However, we decided to leave this inconsistency for later debates.

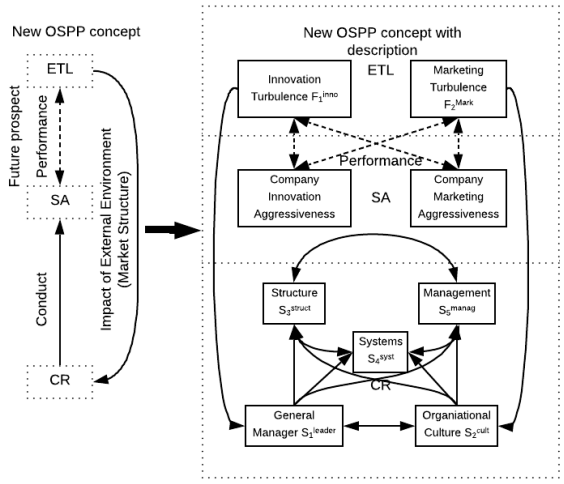

Fig. 5: New OSSP concept based on the Burke-Litwin model of organizational performance and change

Source: Based on Burke and Litwin, 1992 with the authors' comments

Assessment of Digital Transformation Strategies with MCDA: A Case of the Manufacturing Company

After considering the survey results, the OSPP analysis was performed. The present section will discuss the impact of digitization on the Latvian-Norwegian manufacturing company X. The OSPP analysis for digital transformation is presented in Appendix 1; the elaboration of strategies was based on the previously created model (Steps 1–7) (Voronova *et al.* 2018). The respective experts were asked to evaluate the relationships between factors.

All pairwise comparisons were made with the inputs and guidance of the expert team. The global priorities of criteria, sub-criteria and alternatives were synthesized using the eigenvalue method (EM) in Table 2. It is common to observe that the OSPP factors have dependent behaviors; therefore, the authors used the presented model to evaluate strategy results (see Table 2).

Table 2: Evaluation Matrix. Assessment of Company's Digital Strategies by AHP Method for Digital Transformation. ETL Impact on CR

	F_1^{innov}	F_2^{mark}	*EV*	*w*		S_1^{leader}	S_2^{cult}	*EV*	*w*
F_1^{innov}	1.00	0.50	0.447	0.33	S_1^{leader}	1.00	0.20	0.196	0.17
F_2^{mark}	2.00	1.00	0.894	0.67	S_2^{cult}	5.00	1.00	0.981	0.83
		SUM	1.341	1			SUM	1.177	1

In this step, we obtained the evaluation matrix, with regard to the SA/CR alternatives provided by the expert team (Table 3).

Table 3: SA/CR alternatives

	S_3^{strat}	S_4^{sist}	S_5^{manag}	*EV*	W_1	
S_3^{strat}	1.00	3.00	5.00	0.917	0.64	
S_4^{sist}	0.33	1.00	3.00	0.371	0.26	
S_5^{manag}	0.20	0.33	1.00	0.15	0.10	
			SUM	1.438	1	
Eigenvalue 3.033; *CI*				0.0165		
RI random index 0.52; CR				*0.03*		*<0.1*

Inner dependence among the S_3^{strat}, S_4^{sist} and S_5^{manag} factors was determined by analyzing the impact of each factor on every other factor using pairwise comparisons. It is common to observe that the factors have dependent behaviors.

Interpreting Results

As a result of implementing a new concept, now it is possible to assess the impact on different change elements. Figure 6 (visualization) and Table 4 show internal contribution to strategy (CR) on the left and external contribution of company's strategic aggressiveness (SA) on the right.

Table 4: Internal Contribution (CR) and external contribution (SA)

Interrelation Contribution	Element	Gap	Result			Gap	Internal coef.	External coef.	Result
0.64	S_3^{strat}	1.03	0.66		Marketing Aggressiveness	0.2	1.041	0.33	0.07
0.26	S_4^{sist}	1.18	0.31		Innovation Aggressiveness	0.88	1.041	0.67	0.61
0.1	S_5^{manag}	0.75	0.08						

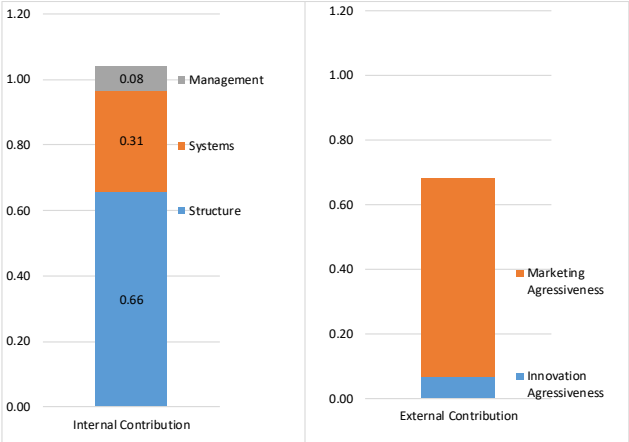

Fig. 6: Result interpretation for transaction factors

Source: calculations made by the authors

Lastly, based on the new OSPP concept we could evaluate GM and culture elements as transformational drivers in Fig. 7 (calculations and visualization).

	Score	Average Turbulence	Gap	Contribution	Result
GM *S4*	2.56	3.32	0.76	0.17	0.13
Culture *S5*	2.86	3.32	0.46	0.83	0.38
		Internal Interrelation		Result	
GM *S4*	0.17	S_1^{leader}	0.46	0.08	
		S_2^{cult}	0.38	0.06	
		S_3^{strat}	0.16	0.03	
Culture S5	0.83	S_1^{leader}	0.46	0.38	
		S_2^{cult}	0.38	0.31	
		S_3^{strat}	0.16	0.14	
			SUM	1	

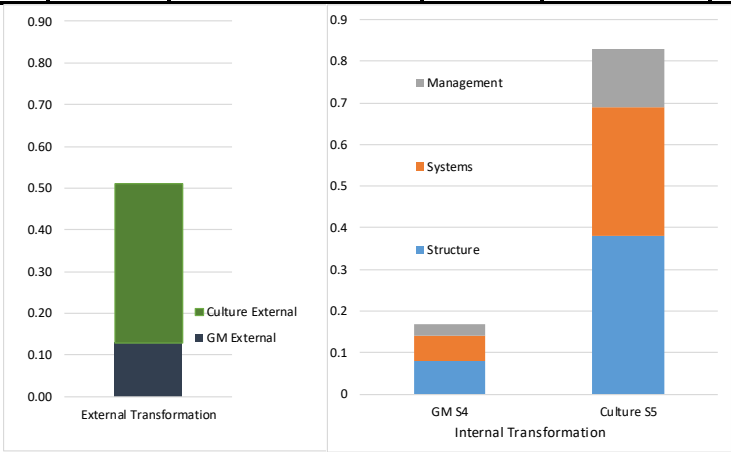

Fig. 7: Result interpretation for transformational factors

Source: calculations made by the authors

Conclusion

The present paper has provided a detailed framework for prioritization of competitive strategies based on the ANP approach with an example for the specific Latvian manufacturing company.

First, the authors have observed the OSPP methodology and created the design of OSPP. Second, the important conclusion associated with the assessment of AHP and ANP has been made. Third, a new OSPP concept has been drawn and a different technique has been proposed, which is more convenient for small companies. Fast response of strategies to rapidly changing market conditions becomes the most demanded topic. Within the framework of the present research, an integrated OSPP-AHP framework has been proposed for the wood manufacturing company using the OSPP approach augmented with the AHP and ANP methodology to obtain criteria weights and prioritize alternative elements, which could be used even for small companies. Finally, according to the empirical results of the OSPP–ANP weighted analytic methodology, we interpreted results for better understanding of turbulence effect on company performance. The proposed integrated OSPP– ANP approach shows greater support of the existing OSPP elements.

The limitations of the research can be discussed since Latvia has a specific geo-political and economic position (Global Innovation Index 44 out of 127 and, compared to other EU countries, Latvian R&D expenditure is greatly reduced – 0.4% of the GDP in 2016 (EU, 2018; WIPO, 2017). Future research in the Baltic States could confirm or reject this limitation. Latvia is a good case for analysis since it has open market with perfect logistic value chains and works as a bridge between Eastern and Western Europe. For this reason, the research results are crucial for wood manufacturing companies in small countries with the target of becoming both locally and internationally competitive in the European markets.

As for practical implication of the research case, it allows even small companies to assess their strategic posture with the OSPP–AHP method and follow the discussed strategic gaps both for the domestic and international market.

According to the research results, digital transformation could be easily applied anywhere to the OSSP methodology, since the AHP-ANP approach is balancing contribution of every element.

Summarizing the results, it can be concluded that managers do not really have a common understanding of the assessment of digitalization strategies, and their main focus should be on the development of customized methodology based on the presented OSPP concept. However, we should keep in mind that the current OSPP approach lacks an individual level, concerning employees' skills, motivation, values, etc. The authors propose in the future to extend the current OSPP approach with the individual level transactional descriptors in order to fill the gap associated with performance assessment.

Development of a better digitalization strategy fitness for future OSPP is most important for the current approach in order to forecast the expected profit/performance. Companies fit their digitalization strategies according to the environmental feedback created by these strategies (or will find themselves at a relative disadvantage in exploiting their environments/resources in digitalization strategies). In the current more competitive and dynamic digital environment, the sustainability of competitive advantage exists when the system of competitive advantages is high and overall value added generated from all the components in the business model proposition is strong.

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Competitiveness as a Basis for Tourism Development

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Abstract

The article studies the issues of managing the competitiveness of a tourist destination. It is established that today the tourism industry is organized in such a way that one of its basic elements of development is a tourist destination. It is stated that the tourist potential of Ukrainian territories is unrealized due to the low level of welfare of the population, overestimated cost and inadequate quality of regional tourism product, underdevelopment of tourism infrastructure, imperfect mechanisms of state regulation and stimulation of tourism development, lack of real coordination and interaction between these entities. Analytical, monographic, comparative, abstract and logical, system and analytical methods of research were used, particularly the use of analytical approach made it possible to build an infological model of innovative development of tourist destinations on the basis of allocation of basic factors and conditions of development of the territory. It was found out that the competitiveness of tourist product is the main condition that distinguishes between the concepts of "tourist region" and "tourist destination". Own definition of the term "tourist destination" is offered.
Innovative principal provisions on increase of level of competitiveness of tourism on the territory level are offered. Components of forming management of tourist destination competitiveness are defined. The infology of tourist destination competitiveness management system is developed.

Keywords: Tourism, Region, Management, Competitiveness, Development.

Introduction

Today, the tourism industry is organized in such a way that one of its main elements of development is a tourist destination. The number of tourist destinations in the world is gradually increasing, prompting market participants to compete hard and take measures to improve the efficiency of their activities management.

In Ukraine, the issue of the lack of competitiveness of tourism is still acutely topicalized. In particular, there is an underdeveloped regional market for domestic and inbound tourism. These processes are caused by both economic and social factors.

The tourism potential of the Ukrainian territories is unrealized due to the low level of welfare of the population, overestimated cost and inadequate quality of regional tourism product, underdeveloped tourism infrastructure, imperfect mechanisms of state regulation and stimulation of tourism development, lack of real coordination and interaction between actors in this area.

These shortcomings are reflected in the low level of competitiveness of the regional tourism product. To solve these problems, new approaches are needed to improve management tools aimed at solving problems of tourist destinations development and increasing their competitive advantages. Taking into account these aspects, the issues of increasing the competitiveness of tourist destinations require further research and studies.

Literature Review

Considerable contributions to acceleration of tourism development, innovative principles of formation of tourist and production processes and management of tourist activity was made by such scholars *S. Medlik, S. Pike, C. Sandage, V. Fryburger, K. Rotzoll, R. Kozhukhivska, N. Parubok, N. Petrenko, S. Podzihun, I. Udovenko*.

Among the researchers of issues related to the problems of economics and management of tourism, efficiency and competitiveness of tourism activities in the modern economy, it is worth noting especially the works of such domestic and foreign authors as *W. Wells, J. Burnett, S. Moriarty, Ch. Pearce* and others.

Recently a lot of scientific works have appeared concerning the research of theoretical and methodological bases of tourist regions development. But, the question of improving the competitiveness of tourism activities in the current economic conditions, in our opinion, is the least developed in the theoretical and practical aspects.

The analysis of theories and concepts presented in the scientific literature, allowed a comprehensive assessment of the problem of tourism development at the regional level and to draw a conclusion about the insufficiency of the study of applied nature to improve the level of competitiveness of tourism at the territorial level, and therefore requires fundamental research in this direction.

The purpose of the article is to study the formation of an innovative form of management of tourist destination and the development of fundamental provisions to improve the level of competitiveness of tourism at the territorial level.

Methodology

Methodology in research is based on the development of domestic scientists and foreign experience of studying innovative forms of development of the tourist region, as well as personal estimates of the author. Analytical, monographic, comparative, abstract and logical, system and analytical methods of research were used, particularly the use of analytical approach made it possible to build an infological model of innovative development of tourist destinations on the basis of allocation of basic factors and conditions of development of the territory.

Results

Tourism should be seen as an open socio-economic system, influenced by many factors. Many enterprises and organizations are directly or indirectly involved in the structure of such a system, each of which tends to depend on the activities of all participants in the system.

At the same time, the most important component of tourism development substantiation is the availability of tourism resources in the region (country) and the interest of tourists to visit the region.

Today the state recognizes the important role of tourism industry and strategic role of tourism in the socio-economic development of Ukraine and its regions.

According to the *Law of Ukraine "On Tourism"* "the tourism industry is a combination of business entities in the tourism sector (hotels and other accommodation facilities, catering, transport, cultural, leisure and entertainment facilities, sports, etc.) that provide tourist services ".

However, with this definition, there is no clear understanding of the relationship between the enterprises that are the components of the regional tourist system.

In our opinion, the tourism industry of a region is a complex which should include all available tourism resources, infrastructure and its varieties), products (services and goods) of the enterprises of the region which are used to organize tourism and meet the needs and requirements of tourists.

In-depth study of tourism processes, in particular, study of the process of assessing economic efficiency, profitability, social orientation, legal security, etc., provides for the expansion of the list of elements of the tourism system to understand that the tourism industry at the regional level should be understood more widely.

Here, in our opinion, the term "tourist destination" should be used. In particular, *Medlik (2003)* interprets this concept as "countries, regions, cities and other territories that attract tourists are the main places of localization of tourist activity, tourist flows and their costs; places of maximum concentration of tourist attractions, accommodation facilities, catering, entertainment, other services of economic, social and physical impact of tourism".

Pearce (1989) interprets the concept of "destination" from a psychological point of view as "a place that leaves tourists with different impressions, experiences and emotions".

Pike (2008) considers a destination from the economic point of view as a territory of tourist demand and determines its primary importance for tourist business development.

When analyzing the content of the term "tourist destination" it is necessary to consider it as a part of the tourist system.

In our opinion, a tourist destination is a geographical area that is attractive to tourists due to the presence of unique or specific tourism and recreational resources and related infrastructure, brought to consumers in the form of a ready-made tourist product to meet their various needs.

The market economy assumes the study of competitiveness in any sphere of activity, regardless of the form of ownership and scale of activity *(Bezhlibna,2017).*

Competitive can be considered a tourist destination that is capable of producing tourist products that are in demand on the domestic and foreign markets and, on this basis, of ensuring economic growth and improving the welfare of the local population.

The formation of tourism destination competitiveness management is based on the model of integration of interrelated functional blocks of management activities (education, research and development, economic and legal support, marketing) into a single independent economic process *(Fig. 1)*, which creates competitive advantages of tourism destination through management decisions that are taken.

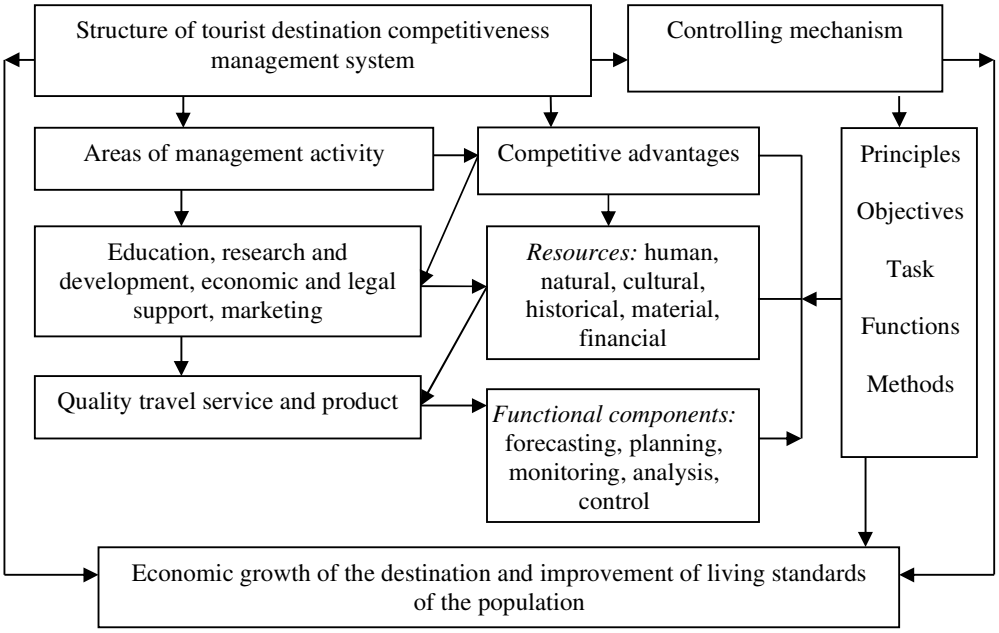

Fig.1: Infology of tourist region competitiveness management system*

**Source: compiled by the author.*

Consequently, the competitiveness of a tourist region is managed through competitive advantage management, with each function block contributing to its creation.

The mechanism of system functioning determines the place of each element of the system, i.e. sets its hierarchy *(Kozhukhivska at all, 2017).*

The mechanism of the proposed system *(Fig.1)* has a complex structure (principles, objectives, control tasks, functions, methods, competencies, mechanisms), represented by the interaction of different blocks.

The main element of the infological system of regional competitiveness management *(Fig.1)* is the mechanism of competitive advantages formation.

The mechanism of the proposed competitiveness management system is aimed at maximum growth of competitiveness of the tourist product and satisfaction of needs of the population through optimization of the structure of distribution of tourist resources in the destination, according to their volume, structure and public needs.

The mechanism highlights the structural interaction of functional components (forecasting, planning, organization, monitoring, analysis and control), which allows to improve the interconnection of system elements, provided that the positive effects of external and internal factors are increased.

Conclusions

Based on the formation of country's (region, city) tourist destinations, which have tourist resources, there are many opportunities for socio and economic development of their territories. The development of tourism allows receiving the basic or additional income in many branches and spheres of human activity.

In our opinion, the system of managing the competitiveness of tourist destinations should cover different hierarchical levels (external and internal environment of the destination, social groups, etc.). with the use of conceptual approaches that reflect the nature of the introduction of subjects of different levels.

In particular, the management of tourist destination competitiveness can be enhanced through the formation and development of secondary sources of income of competitive advantages. It should be noted that:

1. Secondary competitive advantages of distinction are formed as a result of use of existing tourism infrastructure created by public institutions and business entities. At the same time, the destination minimizes the cost of achieving the desired competitiveness and emphasizes the efficiency of resources used to create priority competitive advantages.

Within the destination, the management system is focused on rational use of destination resources, improvement of development management, and provides for maximum use of resources to improve the quality of tourist product.

Using such approach it is possible to provide adaptation of tourist destination to changes of external environment, to increase efficiency of current functioning, that is to increase competitiveness of tourist product.

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Development of the Tourist sphere in Ukraine: Socio-Economic Aspect

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Abstract

The relevance of studying the main aspects of tourism development in Ukraine is due to the fact that in recent decades tourism has developed significantly and has become a massive socio-economic phenomenon. Its rapid development is facilitated by the expansion of political, economic, scientific and cultural relations between Ukraine and other countries. Therefore, the enquiry of the tourism activities status, the identification of the main functions and factors that affects its development have big importance for the further development of this industry. The purpose of the article is to investigate and analyze the economic status of the tourism industry on the basis of inbound and outbound tourism. Social and economic aspects of development the tourism sphere in Ukraine are outlined and investigated in the article. In the course of the study the dynamics of tourist flows was identified and analyzed. The basic elements, functions and factors that affects on the development of the tourism industry are highlighted. The principles of implementation of the state tourism development policy in Ukraine and ways of its realization are generalized. As a result, it is stated that the further development of the tourism industry should be based on new mechanisms of management, effective organizational and management structures, economic freedom of producers of tourism products which in conditions of free competition will ensure the saturation of the market with high-quality services and promote the socio-economic development of the country.

Keywords: tourism, tourist activity, development, social environment, economy.

Introduction

The relevance of studying the main aspects of tourism development in Ukraine is due to the fact that in recent decades tourism has developed significantly and has become a massive socio-economic phenomenon. Its rapid development is facilitated by the expansion of political, economic, scientific and cultural relations between Ukraine and other countries.

Therefore the enquiry of the tourism activities status, the identification of the main functions and factors that affects its development have big importance for the further development of this industry. However due to the unstable condition of the economy, both in Ukraine and in the world as a whole, the issues of studying the status of tourism activity need constant research. In the educational and

professional literature little attention has been given to research of the status of the tourism industry and the factors that affects the development of the tourism industry. All this testifies the relevance of the topic and therefore the direction of the study has been determined and defined its task.

The purpose of the article is to investigate and analyze the economic status of the tourism industry on the basis of inbound and outbound tourism. The tasks of the article consists in identifying the main tourist flows, elements, functions and factors that affects the development of the tourism industry, generalization of principles of implementation of the state tourism development policy in Ukraine and ways of its implementation.

Literature Review

The question of tourism development as a socio-economic phenomenon is considered by many scholars. Among foreign scientists should be noted works written by *A. Hussen, S. Medlik, S. Pike, C. Sandage, V. Fryburger, K. Rotzoll, W. Wells, J. Burnett, S. Moriarty, Ch. Pearce*; and domestic – *V. Azar, N. Golda, R. Kozhukhivska N. Parubok, N. Petrenko, S. Podzihun, I. Udovenko* and others. However, theoretical positions and practical recommendations regarding to the social and economic development of tourism remain poorly researched. The relevance of these problems has led to the choice of research topic.

Methodology

The theoretical and methodological basis of the study is the scientific work of domestic and foreign scientists in studying the social and economic aspects of tourism development, as well as personal evaluative comments of the author. Methods of comparative and economic analysis, expert assessments, graphical interpretation, were used, etc. Thus, the dynamics of tourist flows in Ukraine has been estimated on the basis of the use of economic analysis and graphical interpretation of the data; factors of influence on the development of the tourism industry were determined using the methodology of comparative analysis and expert evaluations.

Results

Considering the tourist activity it is necessary to distinguish in it on the one hand, technical, technological and organizational processes, and on the other - the economy of this activity. Economy of tourist activity include:

- creation and provision of tourist services in volumes and in terms stipulated by the contract for the organization of travel;
- effective use of existing and creation of new logistical and resource base of tourism;
- provision of foreign exchange receipts to the state (region) budget and profit of tourism entities;
- cooperation of means of tourist activity;
- promoting the employment of the population and meeting its needs.

The tourism business is the only one economic and technological system for the formation and sale of the tourism product in order to meet the demand for tourism services. It covers four main elements: the production of tourist services; completing of tourist product; realisation of a tourist product or a separate service; consumption of the tourist product (services).

Economics of the tourism business is, on the one hand, a set of social relations that arise during the implementation of tourism activities that consists in the production, distribution, exchange and consumption of tourism services (tourist product), which is studied by economic theory, and on the other hand, is an integral part of the national economic complex of the country as a catalyst for economic growth.

The tourist business as a component of the economic complex of the country is characterized by the following properties and functions:

– has its own industry of manufacturing and providing services to tourists;
– creates tourist services, forms tourist products and implements them;
– shapes the market for tourist services of various levels of complexity;
– acts as a multiplier for the growth of national income, gross domestic product, employment of the population, development of infrastructure and improvement of the standard of living of the population;
– is an area where jobs are created and high levels of efficiency and rapid return on investment are ensured;
– acts as an effective tool that protects the environment and the historical and cultural heritage of mankind, which is the material basis of the tourism resource potential and forms a specific sphere of activity;
– compatibility with all spheres, industries and types of human activity;
– has advantages in the integration and globalization processes taking place in the world.

The main feature of tourism is its ability to influence the economy of the region, country and world. Ukraine has all the objective prerequisites for the intensive development of inbound and outbound tourism. With its favorable geopolitical location, Ukraine has great tourism and recreational potential, a favorable climate, world-class cultural and historical sites and a fast-growing tourism industry. Considering the place and role of tourism in the world economy, the Cabinet of Ministers of Ukraine approved on April 29, 2014 *Program of tourism development in 2015-2022.* In which the priority to inbound and inland tourism was given. The result of impementation *Program of tourism development in 2015-2022* was an increase in the number of inbound tourists over the outbound ones. During the period of 2011-2019, outbound tourist flow increased from 14.85 million in 2011 to 15.33 million in 2019, while over the same period the inbound tourist flow increased from 9.17 million in 2011 to 20.7 million in 2019.

Fig. 1 presents graphically the dynamics of tourist flows in Ukraine during the 2011-2019.

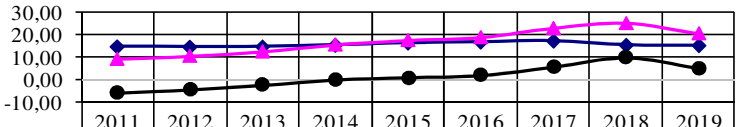

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Outbound stream	14,85	14,73	14,79	15,49	16,45	16,88	17,33	15,49	15,33
Entrance stream	9,17	10,52	12,51	15,63	17,63	18,94	23,10	25,40	20,70
Balance	-5,68	-4,21	-2,28	0,14	1,18	2,06	5,77	9,91	5,37

Fig. 1: Dynamics of tourist flows in Ukraine, 2011-2019, million people*
**Source: built on the data of The State Statistics Committee of Ukraine.*

Assessment of the tourist flows dynamics (Table 1) shows that during 2011-2019 years there were positive trends in the development of tourism in Ukraine, namely – there was a more rapid growth of inbound tourist flow against the background of slow growth (in 2016-2017 gradual reduction) of outbound tourism, which gradually led to the creation of a positive balance of tourist flows in 2018.

Table 1: Assessment of the tourist flows dynamics in Ukraine during 2011-2019*

Years	*Outbound tourist flow*			*Inbound tourist flow*			*Balance of tourist flows*
	Million people	**Increase in million**	**Growth rate, %**	**Million people**	**Increase in million**	**Growth rate, %**	
2011	14,85	–	–	9,17	–	–	-5,68
2012	14,73	-0,12	-0,8%	10,52	1,35	14,7%	-4,21
2013	14,79	0,06	0,4%	12,51	1,99	18,9%	-2,28
2014	15,49	0,7	4,7%	15,63	3,12	24,9%	0,14
2015	16,45	0,96	6,2%	17,63	2	12,8%	1,18
2016	16,88	0,43	2,6%	18,94	1,31	7,4%	2,06
2017	17,33	0,45	2,7%	23,1	4,16	22,0%	5,77
2018	15,49	-1,84	-10,6%	25,4	2,3	10,0%	9,91
2019	15,33	-0,16	-1,0%	20,7	-4,7	-18,5%	5,37

**Information for the period 2014-2019 is given without taking into account the temporarily occupied territory of the Autonomous Republic of Crimea, the city of Sevastopol, and part of the temporarily occupied territories in Donetsk and Luhansk regions.*

***Source: built on the data of The State Statistics Committee of Ukraine.*

Thus, the process of becoming a tourist market in Ukraine during the 2011-2019 in Ukraine, on the one hand, led to a rapid saturation of the tourism market, an increase in the number of tourist companies, qualitative and quantitative indicators of their activities.

On the other hand, recently the tourist market of Ukraine has a high degree of volatility of the market situation in the conditions of economic crisis, significant seasonal fluctuations in demand for tourist services, increased competition, limited resources and so on, which leads to complex management problems in tourism enterprises.

Despite the current crisis phenomena that will in the future affect the demand and use of offers in the tourism market we predict its further development. A necessary condition for the tourism industry functioning is a stable political environment in the country.

Among the factors that affects the development of tourism should be highlighted those ones, related to the political, legal and socio-economic situation in the country and the world (Fig. 2).

The positive action of the tourism development factors ensure high economic results, stable development of activities and successful resolution of social issues.

The factors of influence on tourism in Ukraine, highlighted in the course of the study, identified the goals of state regulation and priority directions of tourism business development envisaged by the Law of Ukraine "About Tourism".

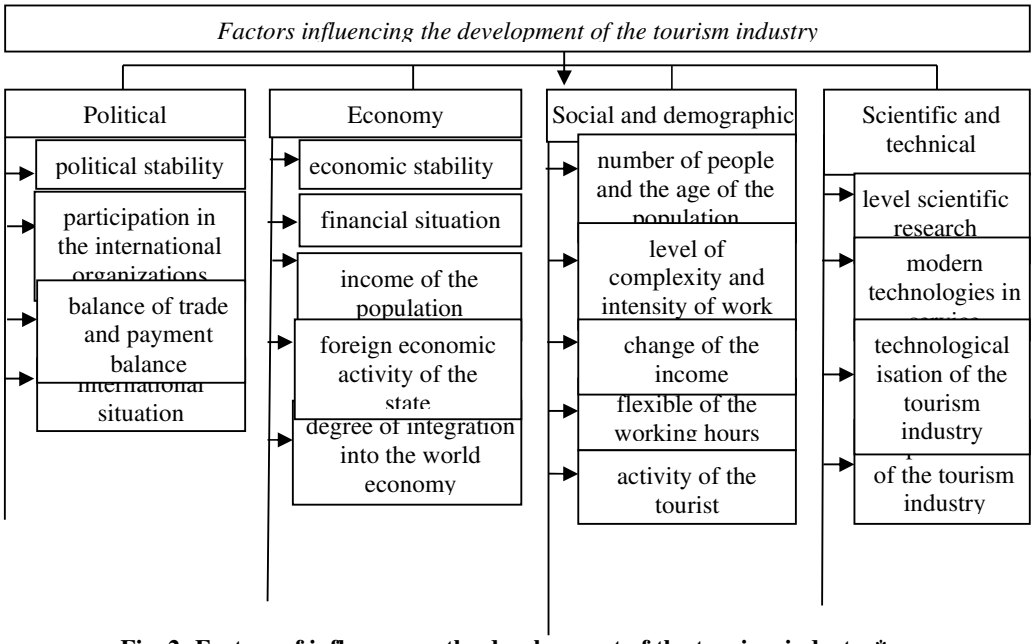

Fig. 2: Factors of influence on the development of the tourism industry*

**Source: made by the author.*

The main goals of state regulation of tourist activity are:

– securing the rights of citizens to rest, restore and promote health, to a safe and environmentally friendly life, to satisfy spiritual needs and other rights;
– protection of the rights and legitimate interests of tourists and business entities;
– restoration and preservation of the integrity of tourist resources of Ukraine, their rational use and protection in the planning and development of the territories on which tourist visit sites are located;
– creation of favorable conditions for improvement and development of tourism industry, support of tourist activity priority directions.

Priority directions of the state policy of tourism development include:

– improvement of legal bases of regulation of tourist relations;
– establishment of tourism business as a highly profitable branch of economy;
– encouraging national and foreign investment in tourism industry development and creation of new workplaces;
– promotion of inbound and inland tourism, rural and ecological (green) tourism;
– expanding international cooperation in the field of tourism and establishing of Ukraine in the world tourism market;
– harmonization of the legislation of Ukraine on tourism to the world requirements, creation of normative base of functioning of systems of standardization and certification of works and services in the tourist business, etc.

Conclusions

The development of tourism business in Ukraine is on a market basis, but it is not in "free navigation", because it is regulated by the state on the basis of legislation, national policy and

indicative planning of all types of tourism. The main tasks of economic activity in the sphere of tourism, in our opinion, are:

- creation (completing) of an innovative tourism product;
- formation of the tourist services market;
- improvement of tourism infrastructure;
- implementation of tourist services based on the use of computer technologies;
- priority development of inland and inbound tourism.

Tourist activity is based on the conditions and factors involved economy, politics, culture of the countries of the world, speed of penetration into the world civilization, the ability to adapt to the new tourist technologies based on computer technology, and the flexible advance to integrative and other processes in the world space.

An assessment of the dynamics of tourist flows shows that there are positive trends in the development of tourism in Ukraine in recent years.

The implementation of the state tourism development policy should be based on compliance with the legal framework of the legislation in the field of tourism industry, development of cooperation with foreign countries and international tourism organizations and participation in the development and implementation of international tourism development programs, etc.

Further development of the tourism industry should be based on new mechanisms of management, effective organizational and management structures, economic freedom of producers of tourism products, which in conditions of free competition will provide saturation of the market with high quality services and promote the socio-economic development of the country.

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The Long Run Effect of Tax Amnesty in Indonesia

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Abstract

Tax amnesty often used by the government of any country to boost their tax collections in the short run. However, the effectiveness of this amnesty is still being debatable, particularly in the long term. This study aimed to examine the effect of a tax amnesty named Sunset Policy in Indonesia conducted in 2008, as a sample case in a developing country. At macro-level, this study shows that the Policy is effective in improving compliance of individual taxpayers in the long run.

Keywords: Tax compliance, developing country, .

Introduction

Tax is the most important revenue instrument for a developing country. In Indonesia, tax revenue accounts for more than 60% of the total state revenue budget. However, in collecting this tax revenue, the government could not just collect it from comply taxpayers who routinely pay their tax obligations. They often need to use extra effort as well as various additional tax policy schemes, one of which is by implementing a tax amnesty program. The tax amnesty program is a program that provides opportunities for individuals and companies to report and pay taxes that have not been paid before without the imposition of part or all of the administrative sanctions and criminal sanctions as imposed on the discovery of normal tax avoidance practices (Alm, McKee, and Beck, 1990; Alm and Beck, 1993). This kind of program is often used by any government around the world, both by developed and developing countries. Nevertheless, the impact of the tax amnesty program often does not run as smoothly as expected. The long-term impact of this program also needs to be questioned as it is argued that tax amnesty has the possibility to reduce compliance in the future (Alm, McKee, and Beck, 1990).

Previous literature examined the long-term effectiveness of a number of tax amnesty programs as for examples Alm and Beck (1993) in America, Alm, Martinez-Vazquez, and Wallace (2009) in Russia, and Kara (2014) in Turkey. Bose and Jetter (2010 and 2012) argued that there are actually critical success factors for other tax amnesty in developing countries that are different from conditions in developed countries. This study aims to examine the effect of tax amnesty program in developing countries, i.e. Indonesia. Specifically, the case of the Sunset Policy tax amnesty in 2008 is explored to answer the following specific research questions: 1) at a macro level, can the 2008 Sunset Policy improve the existing tax base, increase tax compliance, and increase total and long-term tax revenue trends? 2) at a micro level, can the 2008 Sunset Policy improve company tax compliance in the long run, which is projected to decrease the level of corporate tax aggressiveness? The measurements of the study will be carried out under macro and micro perspectives. This study uses five-year data analysis as an approach to "long-term", in reference to Dyreng, Hanlon, and Maydew (2008).

Having discussed the background of the study, the literature review and hypotheses development are then presented, followed by research methodology, results and discussions. The conclusions and suggestions for future research are presented at the end of the paper.

Literature Review and Hypothesis Development

There are at least four types of reasons/justifications for a tax amnesty program, which are: 1) To quickly increase tax revenue in the short term (Uchitelle, 1989; Alm, McKee, and Beck, 1990; Baer and LeBorgne, 2008; Saracoglu and Caskurlu, 2011; Kara, 2014); 2) To encourage repatriation of capital or assets (Uchitelle, 1989); 3) To reduce the underground economy and increase the tax base so that ultimately increase the potential for future tax revenue (Uchitelle, 1989; Saracoglu and Caskurlu, 2011; Kara, 2014); and 4) To facilitate the transition to a new taxation system (Uchitelle, 1989; Alm, McKee, and Beck, 1990).

Previous studies examined the success story of tax amnesty that ever been applied around the world, in order to formulate the factors that are likely plays a role in determining the success of a tax amnesty program. It is suggested that to be successful, tax amnesty program must be seen as a unique program so as to convince the public that this program will not be repeated in the future (Uchitelle, 1989). In addition, it is suggested that the program should not be held repeatedly (Uchitelle, 1989; Saracoglu and Caskurlu, 2011; Alm and Beck, 1993; Alm, Martinez-Vazquez, and Wallace, 2009; Baer and LeBorgne, 2008). Next, stringent tax law enforcement is believed to have a positive impact to the successfulness of the tax amnesty. In fact, it is showed that the success of a tax amnesty program tends to depend on the existence of structural reforms of the prevailing taxation system (Uchitelle, 1989; Alm, McKee, and Beck, 1990; Kara, 2014). Moreover, the program should be known by the whole community at large (Uchitelle, 1989) while it is also believed that changes in economic factors make tax evaders interested in being compliant hence the tax amnesty becomes successful (Bose and Jetter, 2010).

Despite the fact the successful factors mentioned above in regards to tax amnesty program, these factors are not achieved hence the implementation of tax amnesty program is often ineffective. This is resulted from at least two factors which are firstly tax amnesty is believed to be a form of unfair treatment by the state, that is as a form of special treatment to tax evaders; and secondly tax amnesty is conducted not only once but several times (Alm and Beck, 1993; Alm, Martinez-Vazquez, and Wallace, 2009; Baer and LeBorgne, 2008; Saracoglu and Caskurlu, 2011). Moreover, previous study found that low compliance of taxpayers and the emergence of tax avoidance practices can basically be caused by some of the following fundamental problems: weak existing tax administration and weak law enforcement in the country (Baer and LeBorgne, 2008) as well as the insufficient tax regulations and policies to overcome the compliance problem. Overall, although tax amnesty is quite attractive to lure taxpayers to voluntarily admit their mistakes/negligence in the past, as long as some of those things have not been changed the tax amnesty program tends to not increase the compliance of existing taxpayers, especially in the long run (Uchitelle, 1989). In contrast, it tends to reduce the existing compliance and increase tax avoidance practices.

In a developing country i.e. Indonesia, tax amnesty programs have been conducted several times as for example in 1964 and in 1984 which unfortunately experiencing low participation of taxpayers. Then in 2008, a lighter tax amnesty program called the Sunset Policy was also conducted to have a specific purpose to increase the participation of Individual Taxpayers, and found to be successful. Following the 2008 program, Reinventing Policy in 2015 was launched and was conducted in 2016 with the main objective is to repatriate (withdraw back to Indonesia) the capital and assets deposited by taxpayers abroad to avoid taxes applied in Indonesia.

Apart from the claim of the government that tax amnesty programs are quite effective, previous studies reveals different opinions in regards to the programs as for example Tjen and Abbas (2010) stated that most of the individual taxpayers additions that occured in Sunset Policy were employees which were not the tax authority main target since the employees have their tax obligations witheld and paid by their employers, regardless of whether they have a Taxpayer Identification Number. On the other hand, Winastyo (2010) and Anggraeni and Kiswara (2011) found that the Sunset Policy succeeded in achieving its targets in the short term, specifically in raising awareness of paying taxes and increasing understanding of taxpayers regarding tax regulations applicable. Based on Syachbrani (2013), this should be able to improve taxpayer compliance in paying taxes and in accordance with Davis, Hecht,

and Perkins (2003), taxpayers will tend to be insensitive to change back compliance so that it also increases compliance in the long run.

Various results on the effectiveness of tax amnesty program as discussed above, propositions of this study can be formulated as follows:

> "The implementation of the Sunset Policy can have a negative (positive) impact on the tax base and taxpayer compliance so that in the long run it can have a negative (positive) impact on state tax revenue."

Research Methodology

To see the long-term effectiveness of a tax amnesty program in macro perspective, this section aims to see whether there is an increase in tax revenue potential that occurred after the 2008 Sunset Policy. In the previous research (Alm and Beck, 1993; Alm, Martinez-Vazquez, and Wallace, 2009), this measurement is conducted by using empirical analysis on time series of monthly tax revenue in the long run to see whether or not there is a change in the trend of monthly tax revenue in the long run. However, due to some limitations of existing data, the measurement on this study will be carried out with descriptive analysis. Although it is not as accurate as the empirical research model, Alm and Beck (1993) have proven that the preliminary descriptive analysis conducted can still produce results that are consistent with the results of the study.

Results

The following data illustrates the condition of the tax base, tax compliance (specifically in collecting tax returns), and income tax revenue of Indonesia from 2003 to 2013. One way to measure the tax base is by using data on the number of taxpayers. The more taxpayers, the more income should be taxed as shown in Table 1 and Figure 1. According to Table 1 and Chart 1, the increment only occurred in the number of Individual Taxpayer (WP_OP) while the number of corporate taxpayers (WP_B) tends to be constant.

Table 2: Total Registered Taxpayers for the Year 2002-2013

Year	Number of Taxpayers per 31 Dec (Thousand People or Entities)						
	Individual Taxpayers (WP_OP)			Corporate Taxpayer (WP_B)			TOTAL
	Amount	+/-	Mean	Amount	+/-	Mean	
2002	2,113	-	-	941	-	-	3,054
2003	2,426	313	304	1,032	91	92	3,458
2004	2,729	303		1,116	85		3,845
2005	2,999	270		1,208	91		4,207
2006	3,331	332		1,308	100		4,638
2007	5,336	2,005	3,510	1,358	50	100	6,694
2008	8,808	3,471		1,482	124		10,290
2009	13,861	5,054		1,608	126		15,470
2010	16,881	3,019	2,812	1,760	152	180	18,641
2011	19,882	3,001		1,930	169		21,811
2012	22,131	2,250		2,136	207		24,267
2013	25,110	2,979		2,329	192		27,438

Source: Directorate of Tax Potency and Compliance, self-managed

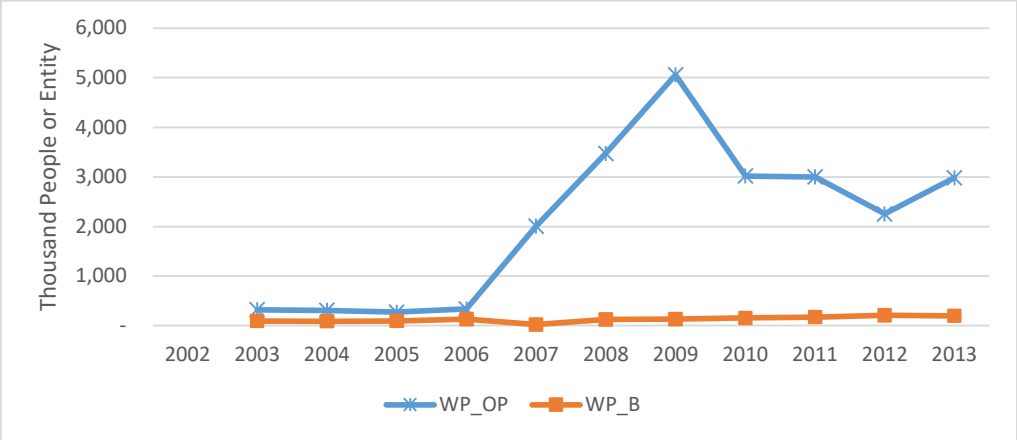

Graph 1: Increment in the Number of Individual Taxpayers and Corporate Taxpayers for 2003-2013

Graph 2 shows the conditions related to taxpayer compliance, especially in term of submitting their tax returns. In this case, the result shows that the individual taxpayers' compliance in submitting their tax returns has increased sharply and is sufficient to last for at least five years. On the other hand, the condition is different for corporate taxpayers. The compliance of corporate taxpayers were increased slightly, but then returned to its original condition after the Sunset Policy period ended. Furthermore, despite the effectiveness in increasing the number of tax returns submission, the number of taxpayers who do not collect their tax returns are also continues to increase every year for both categories of taxpayers.

Panel A: Compliance Ratio

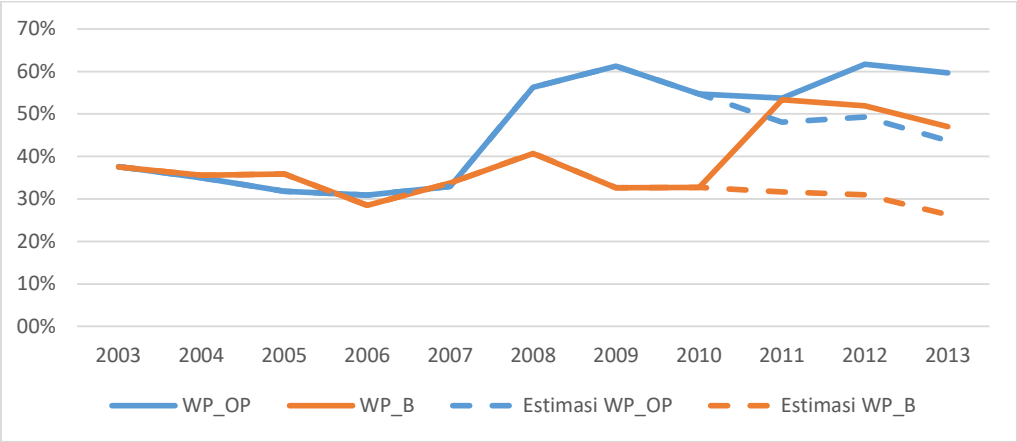

Panel B: Number of taxpayers who do not collect tax returns

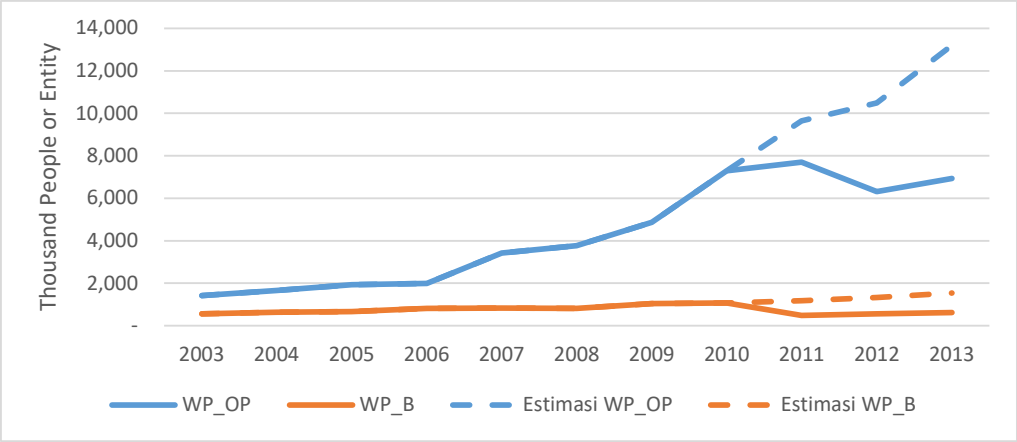

Graph 2: Compliance in term of Submission of Tax Returns for Each Taxpayer Category for 2003-2013[1]

Finally, Graph 3 confirms the accumulated impact of changes in the tax base and compliance which should have an impact on long-term income tax revenue. As can be seen on Graph 3, the increase in the number of individual taxpayers and their compliance in submitting their taxreturns has a positive impact on the income tax revenue in the long run (Panel A). On the other hand, the number of corporate taxpayers that tends to be stable and their compliance in submitting their taxreturns that tends to return to its original condition makes income tax revenue only occur in the short term and tends to not having an impact on long-term revenue (Panel B and Panel C). However, in total, since the income tax originating from corporate taxpayers is far greater than the income tax originating from individual taxpayers, then the positive impact on income from individual taxpayers tends to be overshadowed. Thus, in total, the increase in income tax revenue seems to only occur in the short term, not in the long term.

[1] In 2011, the Directorate General of Tax (DGT) held a National Tax Census for the first time. Through this program, DGT classifies and recalculates taxpayers who are required to submit tax filing. As a result, there is a considerable reduction that occurs in the number of taxpayers who are required to submit the tax filing which leads to an increase in the compliance ratio calculated. This can lead to misinterpretation when compared with data before the census. Therefore, for the sake of this study, the estimation of compliance ratios for 2011-2013 is included when it follows the classification and calculation of the old taxpayer taxpayers.

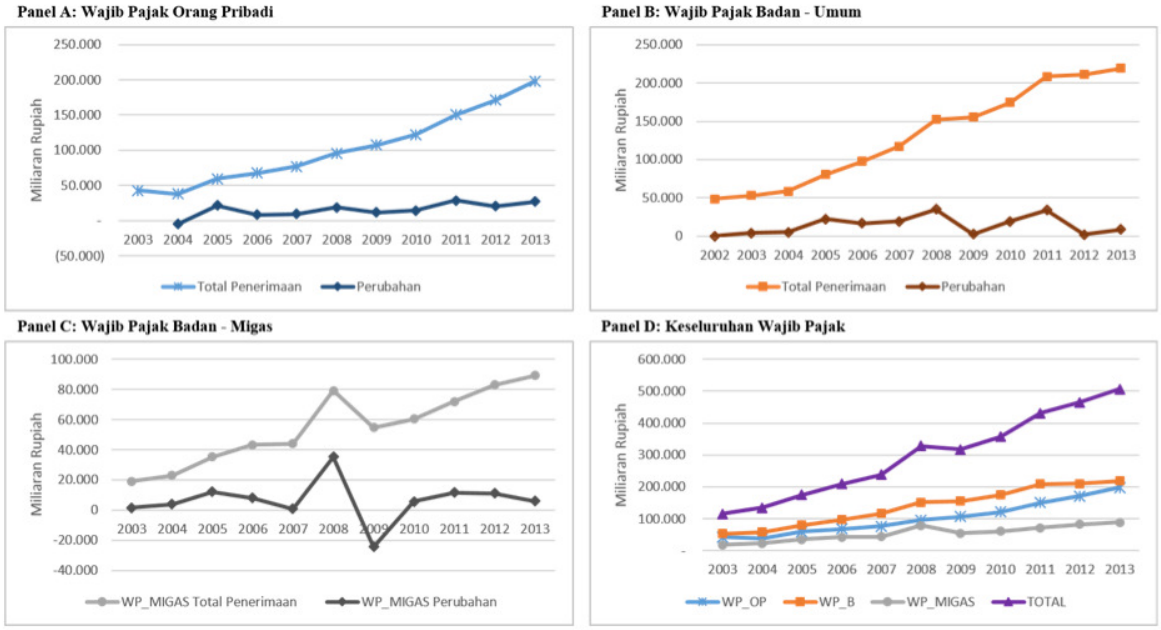

Graph 3: Total Indonesian Tax Revenue for All Categories of Taxpayers for 2003-2013[2]

Discussions

Based on the results of this study, it can be seen that the 2008 Sunset Policy has succeeded in achieving its specific goal, which is to increase tax participation from individual taxpayers and increase income tax revenue in the long run from individual taxpayers. This is characterized by the increase in the number of individual taxpayers (Tax Base), the increase in tax compliance of individual taxpayers in the long run, and the increase in income tax revenue from individual taxpayers. Thus, this study complements the results of research by Winastyo (2010) and Anggraeni and Kiswara (2011), and shows that Sunset Policy does not only achieve its goals in the short term, but in the long term as well.

If related to the literature used, there are several factors that have contributed to the success of the Sunset Policy in achieving its specific objectives , namely:

1. *The uniqueness of the Sunset Policy*. The Sunset Policy scheme is argued to be different from the tax amnesty scheme that was previously carried out by the Indonesian government. This is in accordance with what is stated by Uchitelle (1989) where one of the prerequisites that must be owned by a tax amnesty program is that the program must be seen as a unique and unrepeatable program in the future.

2. *Sunset Policy occurs as one of a series of taxation system reforms in Indonesia*. As Sunset Policy included in the Revised Law General Provisions and Procedures for Taxation published in 2007. This is also supported by a change in a better tax administration system, at least with an increase in tax enforcement (Uchitelle, 1989, Alm, McKee, and Beck, 1990, and Kara, 2014).

3. *Sunset Policy is accompanied by various incentives for the people who follow it*. In addition to offering forgiveness for administrative sanctions and exemption from auditing, Sunset Policy also provides incentives in the form of exemption from fiscal income tax for taxpayers who have Tax Identification Number who wish to go abroad. With the development of globalization, this has become an important thing for the community. This is in accordance with Bose and Jetter (2010 and 2012).

[2] Panel A: Individual taxpayers; Panel B: Corporate taxpayers –general; Panel C: Corporate taxpayers –oil and gas industry; Panel D: All taxpayers.

4. *Sunset Policy is well socialized.* As it is known, a policy cannot run well if it is not known to the wider community. This is what the government faced successfully during the implementation of the Sunset Policy. Large-scale socialization and an extended period allegedly contributed to raising public awareness. This is consistent with the case of the tax amnesty program in India in 1997 by Luitel (2014).
5. *Psychological conditions of Indonesian society*. The last factor which may play a role in the success of the Sunset Policy is characteristic of Indonesian society which tend to be afraid of taxes. This can be seen from the many people who are willing to use the services of tax consultants to ensure that their tax obligations have been carried out in accordance with the laws and regulations that apply solely to avoid administrative sanctions that arise if there are errors. This is consistent with the results of the study of Davis, Hecht, and Perkins (2003) who found that taxpayers who have become compliant, will tend to be insensitive to change their compliance again.

On the other hand, even though the Sunset Policy has achieved its particular effectiveness, however, when viewed as a whole (together with the condition in corporate taxpayers), the actual Sunset Policy tends to be less effective in the long run. This is because this program is not effective against the corporate taxpayers, which accounts for a big proportion of income tax revenue in Indonesia. The increase in revenues from individual taxpayers was actually not large enough because most of the participants were employees whose tax obligations had been witheld directly by their employer, apart from their participation in the Sunset Policy (Tjen and Abbas, 2010). Overall, the ineffectiveness of the Sunset Policy for the corporate taxpayers tends to overshadow the effectiveness of the Sunset Policy for individual taxpayers which make the Sunset Policy seems to be ineffective in the long run.

Conclusion and Suggestion for Future Studies

This research was conducted to measure the long-term effectiveness of a tax amnesty program held in Indonesia, especially the Sunset policy 2008 which is given in relation to the income tax. The effectiveness mentioned above is measured in macro perspective and micro perspective. The measurements in macro perspective are done through the analysis of Indonesian tax base, overall tax compliance, and long-term income tax. While measurements in micro perspective are carried out through empirical research related to the level of tax aggressiveness of corporate taxpayers before and after the Sunset Policy.

The results of this study indicate that the Sunset Policy 2008 is only effective in achieving its specific objectives, which is to increase the tax participation of Individual Taxpayers. The results of the measurement in macro perspective shows the increasing number of new individual taxpayers, the increasing in compliance of individual taxpayers, as well as the increasing in income tax revenue derived from the individual taxpayers in the long run. Meanwhile, this effectiveness does not occur with the corporate taxpayers. Thus, because the income tax revenue from the corporate taxpayers are far greater than those from the individual taxpayers, the effectiveness of the Sunset Policy with the individual taxpayers is overshadowed by its ineffectiveness with the corporate taxpayers. Hence, in overall, the Sunset Policy tends to be ineffective in increasing national income tax revenue in the long run.

Further research using larger data and samples, using other tax amnesty objects and with more comprehensive methods can be carried out to further test the results of this study. One thing needs to be emphasized in this research that might be applied by the government is related to the importance of balanced socialization. In organizing a tax amnesty program, the government should not only focus on the individual taxpayers. The corporate taxpayers needs to be educated and socilized regarding to the plan to increase tax enforcement on all taxpayers after the tax amnesty is over, especially if the corporate taxpayers could also use the tax amnesty facilities provided as they constitute the largest proportion of income tax revenue in Indonesia.

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Features of Social Work with Students: Theoretical and Pedagogical Aspect

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Abstract

The article reveals the meaning of the concept of "student", the age limits and its features; analyzes the social well-being of the young people as of the main indicator of social development; the views of scholars on studies of the peculiarities of student youth development. The article also investigates the social function of the student youth, which consists in preparing oneself for the fulfillment of specific professional and culture-ethical tasks, mainly of intellectual and managing character, as well as focuses on the features of social work with student youth.

Keywords: Social Work, Students, Pedagogical Aspect, Social Development.

Introduction

The modern Ukrainian state is developing by acquiring the true values of humanity that have been accumulated for thousands of years by the entire civilized world. An important task during this period is to build a democratic, legal, social and an independent state which should be integrated into the international community and shape the society in which the priority is equally given to the state and individuals.

Student youth is the future of the Ukrainian state. Therefore, the prospective future depends from its behavior and way of thinking. The social well-being of young people is one of the main indicators of a society's development, and the problem of its formation is one of the leading ones. In order for the formation of youth to be adequate to social processes, it is necessary to determine its role and place in society, to find out the difficulties and problems associated with it.

The purpose of this article is to analyze the essence of social work with student youth and to identify the special aspects of social work with students.

Features of social work with students

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The purpose of this article is to analyze the essence of social work with student youth and to identify the special aspects of social work with students.

In Ukraine the problem of student youth has normally been the subject of close attention of representatives of various social disciplines. The most important are the works of L. Aza, N. Begeki, V. Girginov, V. Kazachkov, P. Kravchuk, N. Nikolaevsky, I. Tarapov, E. Yakuba, and others. At the turn of the millennium, the investigation of topics focused on higher education in Ukraine has intensified (A. Alexyuk, V. Andrushchenko, I. Ziazyun, G. Koval, B. Korotyaev, B. Kurilo, N.Nichkalo, S. Savchenko, S. Kharchenko, S. Shevchenko and others). The analysis of the literature has shown that there are many scholars who are actively interested in researching the problems and life of the young people. Thus, the study of the problems of the students and student youth, particularly the problems of students' household and financial situation, were analyzed by the following scholars: A. Berstein-Kogan, A. Kaufman, P. Sorokin, A. Speransky, I. Yangzhul. Such scholars as M.N Rutkevich, F.R Filippov and V.N Shubkin investigated the sociology of the life plans of young people (M. Pavlyshyn, 1999). The process of socialization of youth, psychology of the age of adolescence, the problems of gender and youth subculture were investigated by: I.S Kon, V.T Lisovsky, A.M Romazan, A.S Sharov.

The authors' research expanded the concept of youth as a special stage of the life cycle, self-identity, self-identification, age crises, youth subculture, which gave rise to the development of applied methods of helping young people (M. Pavlyshyn, 1999). Researchers such as N. Kofirin, V. Levicheva, V. Livanov, F. Sherega have devoted their research to informal youth groups. In order to help the student to reach the tops in spiritual and moral and professional development, it is necessary to know his age and individual psychological characteristics as well as conditions of mental development. Such scholars as L.A. Bondar and G.S. Gribanova consider youth organizations and initiative youth movements as forms of social work with youth, social-club work with young people, and also focus their attention on the problems of employment and work of the young generation (A. Koval, 2016).

The student period of a person's life falls mainly into the period of late adolescence or early adulthood, which is characterized by mastering all the variety of social roles of an adult person. The main areas of students' life are vocational training, personal growth and self-assertion, development of intellectual potential, spiritual enrichment, moral, aesthetic and physical self-improvement.

Student youth is a socio-demographic group of society that is engaged in the preparation for highly qualified professional activity through higher education. The student embodies the intellectual potential of the younger generation of society and is characterized by certain traits. The major need is for self-determination and self-realization of oneself as an individual. The degree of success in educational and professional activity is an important criterion for a person's preparation for professional self-realization. It is necessary to emphasize the multifaceted activities of students, which include educational, professional, scientific research, socio-political, sports, leisure and

cultural activities. Of great importance is valuable attitude of students towards higher education and to the future profession, as well as to their future status (Zlipko, Pavlyshyn, 2000).

Student age is a period of active formation of an individual's inner need to relate his or her own aspirations to the interests of society. Among the scholars, who have researched this age period are: O. Dmitriev, G. Kostyuk, O. Moroz, N. Pasko and others. They view the students as a specific socio-professional group, taking into account its special place in the structure of the state, social knowledge, socio-psychological and political features [4, p. 6].

Students, as a social group, emerged in the XI-XII centuries with the opening of the first higher education institutions in Europe. They brings young people together, who consciously and purposefully master their professional knowledge and skills, acquire professional qualities, prepare for the fulfillment of important professional, cultural, social, political, family and other functions through higher education [9].

The term "student" (from Lat. studens (studentis) is one who works hard; one who is engaged, does the work, that is, acquires knowledge, studies science. According to the Law of Ukraine "On higher education ", the student (trainee) - a person who is enrolled in a higher education institution in the established manner and studies full-time (part-time), at evening or using distance learning in order to obtain certain educational and educational qualification levels.

In our opinion, it is also necessary to take into account the differences between the students of higher educational establishments of I-II and III-IV accreditation levels (14-17 and 17-22 years respectively). It is possible to talk about standard (17-22 years) and non-standard (junior or senior students) periods of student age. Examples of non-standard student age include: 1) "In June 1994, Mike Kearney (USA) became the youngest graduate to receive a bachelor's degree in anthropology at the University of South Alabama, USA, at the age of 10 years and 4 months"; 2) “The youngest Russian students are the sisters Diana and Angela Knyazevy (Moscow). In 1998, Diana successfully graduated from high school at the age of 10 years and 1 month, and became a student of higher education institution at the age of 10 years and 2 months. Angela also successfully graduated from high school at the age of 10 years and 2 months and became a higher education institution student at 12” [From the Guinness Book of Records, 2002]. A 14-year-old student also studied at Taras Shevchenko National University of Kyiv (M. Golovaty, 2006).

We conducted a social survey of 40 people of different age categories: from 17 to 60. To find out at what age they became part of the student life in Ukraine (Fig.1).

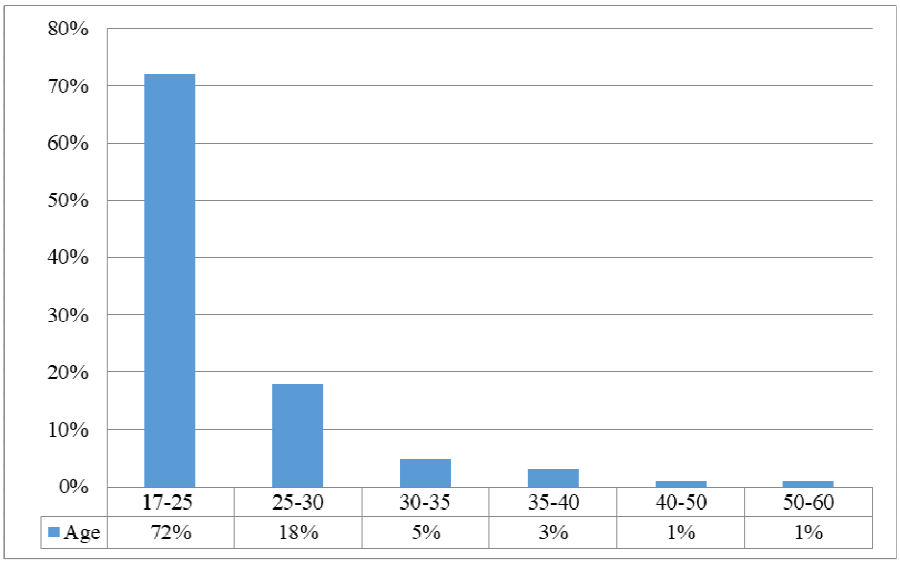

Fig. 1: A survey of people regarding their student age, %, compiled by the authors

Thus, a student is a person, mostly 17-25 years old, who is determined and works hard to obtain appropriate educational and qualification levels for further career development.

Social work with young people has a long history and is based on the basic approaches and directions of personality socialization, which were formed on the basis of the theory of social pedagogy. Social transformations in the state, economic crisis and changes in social life have necessitated the emergence of new social institutions empowered to implement social protection of young people, to form new directions and approaches in social work with youth that meet the needs and requirements of society, the social demands of young men and women (E. Golovakha, 1996).

The task of the present time is to raise an open minded individual, who is able to creatively treat the life and to be able to take on the responsibility. Today, we have the implementation of personalized education in several ways. Firstly, the anthropocentric approach that was proposed by K. Rogers and his followers: N. Basalaeva, T. Dmitrieva, M. Zara, and C. Karan.

The cultural concept of E. Bondarevskaya and the psycho-didactic concept of I. Yakimanskaya, which is based on the principle of subjectivity, have scientific and practical value. Society and man, as its constituent, must evolve according to the laws of harmony, and the greater the life of each individual will be the subject to these laws, the greater the degree of civilization will be gained by society as a whole (M. Pavlyshyn, 1999).

Appeal to the consideration of pedagogical conditions of upbringing of youth in a social context is quite relevant. For example, the dissertation research of A. Mazurenko is devoted to the problem of formation and development of social qualities of student youth. The formation of social activity and social competence was revealed in the works of M. Andreeva, S. Krasnokutskaya and others (Zlipko, M. Pavlyshyn, 2000).

The social function of student youth is to prepare oneself for the fulfillment of specific professional and cultural-ethical tasks, mostly intellectual and management skills. The process of socialization of the student's personality in the process of study and in extracurricular activities is equally important. It does not only affect the higher education system directly but rather indirectly – it influences the development of the whole Ukrainian society (M. Pavlyshyn, 1999).

The fact that the needs of the population for social assistance, psychological support and protection are increasing is indisputable. The social work with student youth in Ukraine is provided by the Ministry of Education and Science, local authorities, a big number of state legislation; a differentiated approach to different categories of young people and related problems; student self-government which is based on a number of normative documents and a high level of youth engagement in organizing the personal space of each student, group of students and all social and educational work at an institution of higher education.

Socio-pedagogical work with student youth has its own characteristics (Table 1).

Table 1: Characteristics of social and pedagogical work with students, compiled by the authors

№	adaptation of the student to the conditions and functioning of the institution of higher education (especially for the first-year students)
1	correction (protection) of the relationship between teaching staff and students
2	prevention of possible physical, mental and socio-cultural encounters of individual and risk groups
3	the development of the student as a unique personality, the formation of the quality of a creative professional through the process of learning, education, socialization

Therefore, social and pedagogical work in higher education institutions is targeted and should take into account: areas of student's life; important and most common social and psychological problems of youth; age, gender, social status of each student; the level of social activity of the student and his attitude to the future profession. The purpose of social and educational work is to create favorable conditions for physical, social, spiritual, moral, intellectual development of a person, prevention of negative phenomena, providing it with complex social-psychological-pedagogical assistance in self-development and self-realization in the process of socialization (L. Manchulenko, 2012).

An important role in social work with student youth is played by the state youth policy. It is the activity of the state that is aimed at creating legal, economic and organizational conditions and guarantees for self-realization of the young person’s identity, development of youth associations, movements and initiatives. The foundations of state youth policy in independent Ukraine were laid with the adoption by the Verkhovna Rada of Ukraine of the Declaration "On the General Principles of State Youth Policy in Ukraine" (December 15, 1992) and the Law of Ukraine "On Promoting the Social Formation and Development of Youth in Ukraine" (February 5, 1993 p.) (Zlipko, M. Pavlyshyn, 2000). Therefore, the main forms of organization of social work should include:

– individual, the essence of which is to provide social assistance, social services and social rehabilitation in accordance with the needs of the individual and the nature of the problems that confronted him/her;

– group, the purpose of which is the organization of socially significant initiatives, the participation of the individual in the socially oriented activities of public associations and organizations;

– organization of socially beneficial activities, including charity;

– social education, which is carried out in different types of educational institutions, such as public and private educational institutions and is associated with the achievement of a certain level of social education;

– socio-psychological-pedagogical and legal support, the purpose of which is the professional assistance and mediation of professionals in solving various problems of the individual and the group;

– counseling, in the process of identifying and outlining the main directions of solving the problem of concern for the individual.

In its form and method, consultation is an interaction between two or more people, during which the consultant transmits the specialist knowledge and relevant information to the advised person in order to help him or her solve overgrown problems, as well as in the preparation of social forecasts, future programs, etc.

Therefore, counseling is a process of thinking together about the client's life situation and finding the best solution to the problem. The personal and professional qualities of the consultant as tools and resources of dynamics are actively involved in this process.

Another method of working with young people is art therapy. At work, not only with children, but also with adolescents, young people, it is very important to use flexible forms of psychotherapy work. Art therapy provides an opportunity to live through, experience, become aware of a conflict situation or any problem using the most convenient means for the psyche of a person.

Art-therapeutic techniques allow you to plunge into the problem as much as one is ready for his or her experience. Art-therapy is a specialized form of psychotherapy based on art, first of all, visual and creative activity. The main purpose of this method is to harmonize the development of the individual through the development of the ability of self-expression and self-knowledge. There are many varieties and approaches in art-therapy. For example, music therapy, fairytale therapy, body-oriented therapy, etc. [10].

Also, forms of social work with student youth include surveys, testing and various trainings. M. Kholodna pointed to the interrelation of knowledge and methods of its acquisition ("cognitive and intellectual competence") (N. Shust, 2012). According to the researcher, the amount of knowledge (because lack of knowledge can be an impulse to search), as well as the strength and depth (because too much immersion impedes the emergence of a new look) does not matter. What matters is how individualized knowledge is organized and how reliable it is as a basis for making effective decisions (A. Koval, 2016).

We conducted anonymous testing in 10 universities of Ukraine to establish which forms of social work they conduct with students (Fig.2).

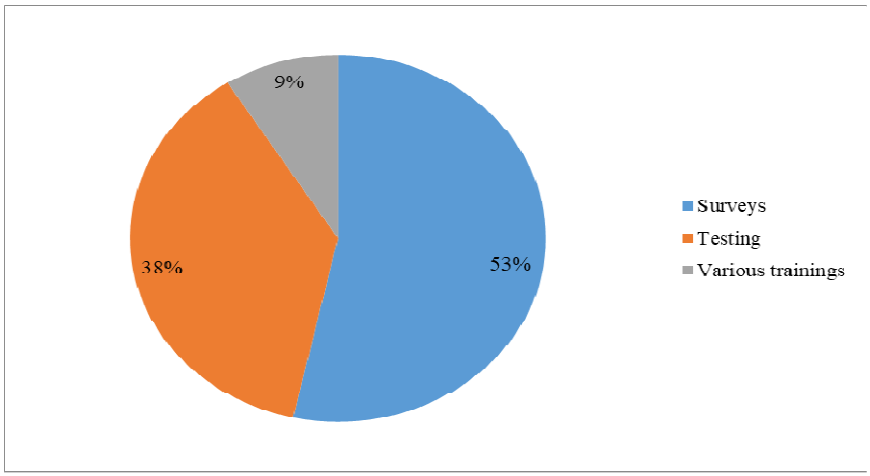

Fig. 2: Results of the survey of universities on the use of various forms of social work with students, %

It becomes apparent that to engage each student in an active and searching process, an adequate educational environment should be created that would provide free access to various sources of information, communication with other students, joint work, training, recreation and leisure. Due to the establishment of the paradigm of personally-oriented education, project technology, which is experiencing a second birth, is becoming relevant as an effective complement to other pedagogical technologies that contribute to student development, supplement social relations and greatly diversify the educational process. Designing is not a fundamentally new technology. The project method originated in the 1920s in the United States and developed within the humanistic philosophy and education, in the pedagogical views and experimental work of John Dewey. In the United Kingdom, Belgium, Israel, Finland, Germany, Italy, the Netherlands, the ideas of the humanistic approach of J. Dewey have become more widespread and popular thanks to the rational combination of theoretical knowledge with their practical application. Born from the idea of free education, project-based learning nowadays becomes an integrated component of a fully developed and structured education system (M. Gorbachev, 1999).

Working on a project is a practice of person-centered learning when, in the course of concrete work, on the basis of free choice of the student, taking into account his or her interests, a concrete result is obtained. Now, unfortunately, we cannot say that the person who graduated from a higher educational institution is an educated, intelligent person. Intelligence, upbringing are not issued with a diploma, they need to be developed, only with hard work one can gain knowledge – this is, in a sense, the result of self-education. An intelligent person is the one who has a depth of intelligence, intuitive nobility, breadth of spiritual inquiries and high cultural level. Therefore, there is an urgent need to actively research the project-based learning and the way it shapes the leisure culture of university students and the concerted efforts of all educational professionals to match national education with world standards. When determining the concept of project-based learning technology one should take as a basis the study of the physical, mental and social components of the health of a young person (M. Golovaty, 2006; I. Mygovich, 1998). Out-of-class project topics can be varied based on the needs of a specific cohort of students and the educational institution as a whole.

According to the method of calculating the level of economic security of the state, external economic security is defined as such a state of conformity of external economic activity with national economic interests, which ensures minimization of losses of the state from the effects of negative external economic factors and creation of benefits.

Conclusions

Thus, the basic principles and methods of working with student youth are counseling, art therapy, the content of preparing students to perform professional functions. The important areas for improving social and educational process in higher education institutions are: providing social and pedagogical assistance to the personal and professional development of future specialists in the educational process in the context of the institution of higher education with the prospect of further career growth; promoting adequate social-role identification in a student group setting taking into consideration gender differences; promoting healthy student life as a viable alternative to disruptive tendencies in the youth environment and an integrated indicator of effective educational work in the socialization process.

In the future, it is necessary to conduct a practical study of the practical application of social work with students at leading universities in Eastern Europe.

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Answering Arabic Why-Questions

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Abstract

Definitional questions and factoid questions are commonly used in recent Arabic Question Answering (QA) works. These questions are 'simple' questions which can be answered by a "simple" sentence or a Named Entity (NE). Most Arabic QA systems lack the capability of processing complex questions, namely Why-questions. Motivated by this issue, we release a new QA system aiming to answer Arabic Why-questions in the medical field. Therefore, we propose a novel approach using Natural Language Processing (NLP) and Information Retrieval (IR) techniques. Our system uses dictionaries and transducers to analyze Why-questions and to extract causal relations which represent the answer of a Why-question. Compared to previous studies, our approach obtains comparable results on processing Why-questions.

Keywords: Why questions answering, medical field, Natural language processing, Information retrieval.

Introduction

The QA is the task in which users try to find ways to make investigation easier for users who are searching for a succinct answer and not a document.

Researchers from the community of NLP and IR have made tremendous efforts to improve the performance of QA systems through several languages. Nevertheless, Shaheen et al [2014] mentioned that the Arabic, the 6th most wide-spread natural language in the world with more than 350 million native speakers, has not seen a proportional development to handle Why-questions in the field of QA.

There are many types of questions in the QA field. The most popular are the type of definition question, i.e., those asked using the word what, and the type of factoid questions, i.e., those asked using the words: how much/many, when, where, what and who. Factoid questions usually deal with NE, such as organization, location, person, etc., and look forward to a short identifiable answer. Another type has to do with the questions using the words how to or why, e.g. 'Why cancer is increasing?' or 'How to prevent hair loss?'. These questions are less common and more challenging because they are more complex and harder to answer than definitional and factoid questions. Why-questions require a different approach than definitional and factoid questions, as their answers are not NE or a short sentence, and they tend to be longer and more complex, as stated by Ezzeldin et al [2012].

The aim of the present paper is to propose a new approach to handle Arabic Why questions in the medical field. Our proposal is based on four main components: corpus study, question analysis, documents/passages retrieval, and answer extraction. We use dictionaries and transducers in question

analysis and answer extraction components and Lucene Apache in PR component to answer any Why medical question. Experimentations of our Arabic medical QA system show interesting results.

The remainder of this paper is structured as follows. Section 2 presents the related works. Section 3 cites Arabic characteristics. Section 4 describes our approach. Section 5 deals with the experimentation carried out to evaluate the efficiency of our QA system. Finally, section 6 draws the main contributions and proposes further perspectives.

Related Works

The research in QA systems began in 1960. Until now, many systems have been designed in different language to attempt QA. However, the development of Arabic QA system for Why-questions is not of high quality compared to other languages such as English and French. This is largely due to the language's particularities.

Most of the research in the area of QA has focused on answering simple questions. The system DefArabicQA is proposed by Trigui et al [2010] for definition questions. This system identifies the answer using manual lexical patterns of sequences of word, letter and punctuation symbols as well as heuristic rules deduced from a set of correct and incorrect definitions. Bekhti et al [2013] proposed an Arabic QA system "AQuASys" which is composed of three components: question analysis component, sentences filtering component and answer extraction component. This system segmented the question into interrogative noun, question's verb, and keywords. Experiments have been conducted and showed that for a test data of 80 questions the system obtained as recall of 97.5, 66.25 % as precision, and 78.89% as F-measure. Hammo et al [2002] described QARAB, an Arabic QA system that is based on a set of rules for each question type excepting "How " and "Why" questions. The system uses well-known techniques from IR to identify the relevant documents by processing the question as a query and then applies keyword-matching strategy. Brini et al [2009] proposed an Arabic QA System which handles factoid and definition questions using linguistics resources building with NooJ platform, described by Silberztein [2018]. The authors use Information Retrieval and Natural Language Processing techniques to process Arabic factoid questions. NooJ platform shows its efficiency in several tasks such as in deciding about the appropriate medicinal plant in the decision support system proposed by Dardour et al [2017]. The Japanese Why-QA system NAZEQA uses sentiment analysis and semantic word classes. This approach improves the system on a large-scale web corpus, as described by Oh et al [2012]. In a second research study by Oh et al [2013], the authors explored the utility of intrasentential and intersentential causal relations in order to rank the candidate answers to a why-question. This increased their precision by 4.4% over the work of Oh et al [2012]. LEMAZA, the Arabic QA system for Why-questions, proposed by Azmi et al [2017], uses the Rhetorical Structure Theory (RST) to extract the relevant answer. If there are several candidate passages corresponding to different rhetoric relations, then LEMAZA returns the answer whose RST relation has the highest priority.

We can confirm, from the related works, that most Arabic QA systems are designed for definitional and factoid questions. Nevertheless, there are few studies that addressed the problem of answering Why-questions, which makes the development of a new Arabic QA system is crucial.

Characteristics of Arabic Language

Arabic specific characteristics consist in its richness that need special processing, which makes regular NLP systems, designed for other languages, unable to process it. Indeed, Arabic is challenging when compared to other languages such as English and other Latin-based languages. One of the Arabic characteristic is the lack of diacritics (i.e. kasra, damma, fatha), which leads to more difficult analysis than any other language. This issue can be explained through the example of the question "لماذا يولد الطفل معاق؟" (*Why is a child born with a disability?).* The lack of diacritics in verb "يولد" (*to born*) presents at least two meaning:

- "يُولَدُ" *yuladu* which means "*born*".
- "يُوَلِّدُ" *yuwal~idu* which means "*generate*".

Arabic language is a highly agglutinative and derivational language where a word token can replace a whole sentence in other languages. For example, the sentence "*and with its spread*" can be expressed in one word in Arabic "فبانتشارها" (*fabiAntishaAriha*) which includes the stem "انتشار" (*spread*), the proclitic "ف" (*and*), the prefix "ب" (*with*), and the pronoun "ها" (*its*). Therefore, extracting keywords from an Arabic Why-question or extracting answer from a corpus will be more complex than any other language.

Another specific characteristic of the Arabic language which regards its syntax is that Arabic is a free-order language. Though the basic syntactic order of Arabic words is Verb–Subject–Object (VSO), however, it allows for VOS and SVO orders too. For instance, the sentence "أخذ المريض العلاج" (*The patient took the treatment*) is written as Verb–Subject–Object, but it may also be written as VOS "أخذ العلاج المريض" and OVS "المريض أخذ العلاج". Let's note that the diacritic marks resolve the Subject and the Object. The lack of the diacritic marks in the sentence "ركل الطفل الولد" (*rkl AlTfl Alwld*), would prevent to decide who the Object and Subject are, and the sentence could be interpreted as either *the child kicked the boy*, or *the boy kicked the child*.

Unlike most Latin-based languages and English, Arabic does not have capital letters which makes Named Entity Recognition harder, as stated by Shaheen [2014].

Overall architecture of the proposed QA system

The challenges discussed in the previous sections make clear the need for new approach to deal with Arabic QA in the medical field. Our proposal is composed of four components as illustrated in Fig. 1: Corpora study, question analysis, documents/passages retrieval, and answer extraction. The first generates the identified patterns used in question analysis and answer extraction components. The second component will use NLP techniques to process the input Why-question to extract keywords. In the third component, a list of candidate passages will be retrieved. Finally, the last component returns the appropriate answer to the user.

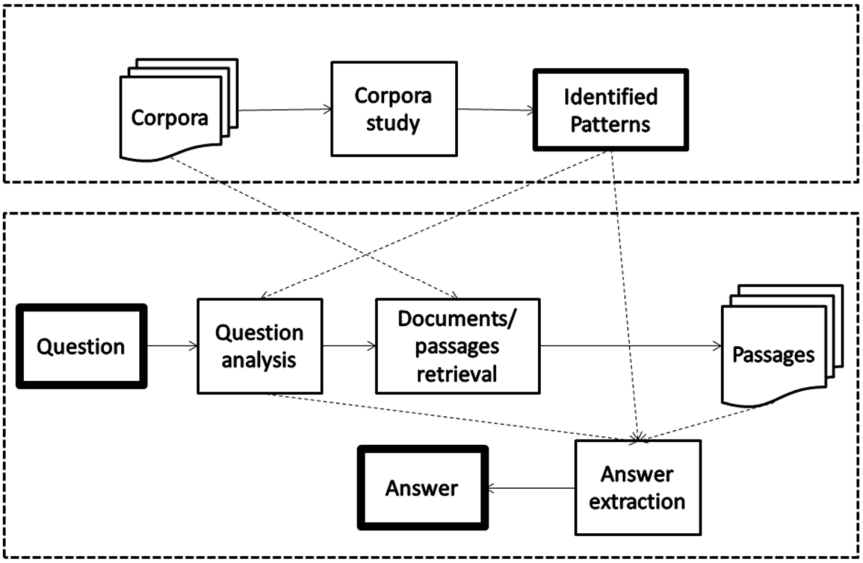

Fig. 1: Overall architecture of the proposed QA system

Corpora Study

We gathered Why-questions from several sources, including discussion forums, Frequently Asked Questions (FAQ), some questions translated from Text REtrieval Conference (TREC). For each gathered question, we collected Arabic medical texts from Arabic websites. Then, we identified patterns

for question analysis and answer extraction components. These patterns were transformed into transducers.

We have decided to use Finite State Transducers (FST) since they can play an important role in providing elegant solutions to alleviate the Why-questions analysis process. FST are finite state machines that are being used in different areas of NLP. FST define relations between two sets of strings by means of a transformation of one string into another, as stated by Pajić [2011]. The main feature of FST is producing some outputs. This feature explains the way transducers are being used in NLP and makes them very suitable for the information extraction process as well. Furthermore, they can be visually presented by graphs, which make them convenient for human use, as mentioned by Dardour et al [2017].

In the sequel, we detail the identified patterns and the corresponding transducers for the question analysis component.

Question Analysis

The main task of this component is to process Why-questions in order to extract some useful keywords representing the user's need. Our question analysis uses dictionaries and transducers to analyze Why-questions. In Arabic, Why-questions starting with "لماذا" (*limaA*aA*) and "ما سبب" (*maA sababu*), both are identified in the patterns of question analysis component. In the following, we cite an example of a question asking in two forms.

(1) لماذا يرتفع ضغط الدم؟

"Why does blood pressure rise?"
P(1):[N: Disease] [V] لماذا

(2) ما سبب ارتفاع ضغط الدم؟

"What is the cause of high blood pressure?"
P(2): [N: Disease] [N] ما سبب

P(1) was constructed from sentence (1) specifying that the word following "لماذا" (*limaA*aA*) represents a verb (V) which is followed by a disease noun (N). When we pose the same question using "ما سبب" (*maA sababu*), example (2), the structure of the question will change P(2). Indeed, the word following "ما سبب" (*maA sababu*),"ارتفاع " (*high*), is the noun of the verb "ارتفع" (*to rise*). This noun is followed by the disease noun "blood pressure". Our system is able to process the two forms of Why-questions. As we mentioned in the previous section, the identified patterns were transformed into transducers.

In our proposal, the question analysis module is based on four steps: Morphological and syntactic analysis, Named Entity Recognition (NER), Stop word removal, and Question Expansion (QE).

Morphological and syntactic analysis

This step allows analyzing the words of a given Why-question and identifying their attributes. We are mainly talking about the grammatical category (Verb, Noun...), definiteness, number, gender, and stem. These grammatical categories are used in the syntactic analysis, where we are interested in the structure of the question. For instance, the syntax representing in P(1) is different than the syntax of P(2).

Named Entity Recognition

The previous works emphasize that the NER is important for all the QA system components. In fact, we developed our own NER method especially formulated for our QA system. To recognize named entities, we have considered five categories: Organ, Disease, Location, Virus, and Treatment.

Stop word removal

This step removes the interrogative pronoun "Why", conjunctions, and prepositions. After removing these words, the important terms in the Why-question will be remaining. In our QA system, the stopwords are eliminated from the outputs of the syntactic transducer.

Question Expansion

Extraction, only original keywords, is proved to have some limitations. To dispose of these limitations, we need to define the meaning the user looking for. Therefore, in this step, we extend the list of the original words of the user's Why-question by adding semantically equivalent words to those in the question. Since the documents may not contain the words that the user used in his question, expanding questions will increase the chance of obtaining the answer, as mentioned by Al-Chalabi [2015].

In the previous studies, QE is achieved using Arabic WordNet. In our proposal, we used our own linguistic resources. In our dictionaries, the feature Syno (for synonyms) is used to expand Why-questions. This feature is called in the QE transducer as illustrated in Fig 2.

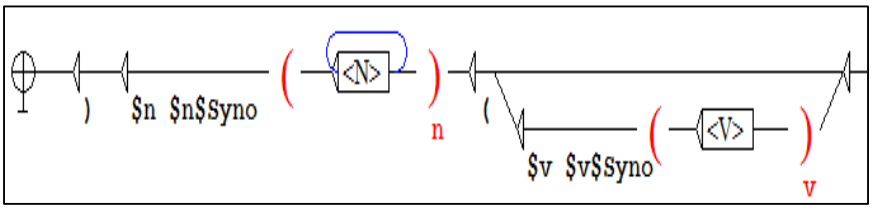

Fig. 2: QA transducer: Synonyms extraction

After processing the question "لماذا يحذر الطبيب من استعمال العقاقير الستيرويدية؟" (Why does the doctor warn against the use of steroid drugs?) with the previous steps, the transducer of Fig 2 can extract the synonym of "يحذر " (*yuHa**~*iru*) which is "ينبه " (*yunab~ihu*), the synonym of "استعمال" (<*isotiEomaAl*) which is "استخدام" (<*isotixdaAm*) and the synonym of "طبيب" (*Tabib*) which is "حكيم" (*Hakim*).

QE can be applied also to overcome the situations where the Passage Retrieval (PR) component excludes relevant passages containing other forms of the original words. The idea now is to add other forms of the original words that share the same root (see Fig 3).

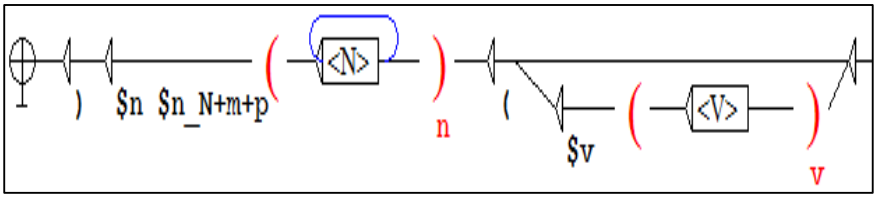

Fig. 3: QA transducer: Different forms extraction

Let's continue with the same question "لماذا يحذر الطبيب من استعمال العقاقير الستيرويدية؟" (Why does the doctor warn against the use of steroid drugs?). Thanks to QE step, the PR module can extract not only the relevant passages that contain the keyword "طبيب" (*Tabib*) but also its broken plural form "أطباء" (*AaTibAa'*). This expansion process is applied to extracted synonyms too. In consequence, we consider each extracted keyword with its synonym and its different forms since the QE would theoretically generate all these terms.

The expanded list of terms extracted from the Why-question will be sent to the next component (PR) to extract the relevant passages that may contain the answer.

Document / Passages Retrieval

This component uses keywords extracted by an earlier component, question analysis, to retrieve a ranked list of candidate passages. In our QA system, we take advantage of Lucene Apache for developing such a PR module for Why Arabic questions in the medical field. There are many reasons for this choice. First, due to specific characteristic of Arabic language, it is very important to have the

possibility to customize Lucene by adding lexical analyzers for multiple languages including Arabic. In addition, our proposal is entirely implemented on the Java platform and Lucene is an open source library written in Java, too. Last but not least, Lucene has been proven more effective than Buckwalter's Arabic Morphological Analyzer in the same conditions.

Answer Extraction

Once candidate passages are retrieved, they are further sent to answer extraction component to return the appropriate answer.

To answer Arabic Why-questions, we need to extract a set of Arabic semantic relations that help our goal to be achieved. In fact, we identified five semantic relation types, which are interpretation, justification, explanation, result, and base. For each type, we detected several alternative forms. In addition, we consider a semantic relation as a semantic link relating two sentences in our corpus. Indeed, we use cue phrases which are used to connect two sentences, serving as a cause [C] and its effect [E]. For instance, the cue phrases of justification are بسبب/لأن *(Because)*. To locate the passages that indicate causation, we surveyed all causative connectors and the verbs that mean "cause", for example "يؤدي","ينتج","يسبب".

To extract the appropriate answer, we identified patterns representing causation relations. For instance, the pattern P(3) was constructed from sentence (3) specifying that the words preceding (بسبب) represent the effect while the words following (بسبب) represent the cause. Table 1 shows some examples of identified patterns for answer extraction component.

(3) تحدث ثلث وفيات السرطان تقريباً **بسبب** عوامل الخطر السلوكية والغذائية.

"About a third of cancer deaths occur due to behavioral and nutritional risk factors."

P(3): [C] بسبب [E]

Table 1: Examples of causation relation patterns

Pattern Number	Pattern
P(4)	[E] [C] و بسبب
P(5)	[C] لأن [E]
P(6)	[C] [E] السبب وراء

We transformed the identified patterns into transducers. For example, Fig.4 represents the pattern P(3).

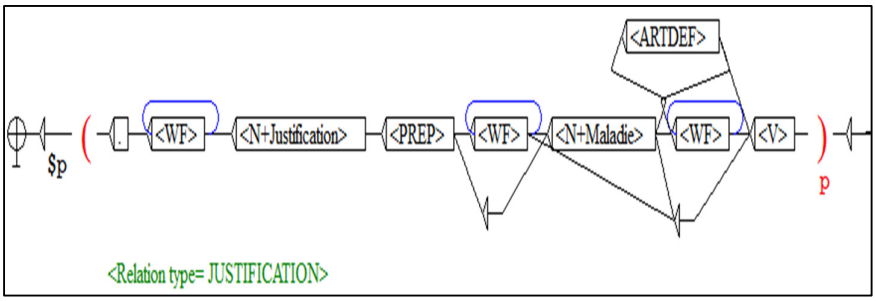

Fig. 4: Extract of transducer to extract JUSTIFICATION relation

To process extracted passages, we applied, like we did in question analysis component, morphological, syntactic analysis and NER process. However, the stop-words were retained because they have an important impact to identify causation relations.

Experimental Evaluation

We implement a prototype of the proposed QA system that exclusively handles Why-questions expressed in Arabic. In this prototype, linguistic resources (transducers and dictionaries) are built with the linguistic platform NooJ. We conduct a set of experimentations to evaluate our QA system efficiency. Therefore, we exploit a test corpus that contains 1285 articles extracted from different Arabic web resources such as Altibbi, Webteb, Sohati.

An Arabic native speaker who isn't one of the authors evaluated our QA system performance and collected 138 Arabic Why-questions in the medical field. Then, each question was passed to the system to get its answer.

After testing the collected questions on the test corpus, we obtain the results illustrated in Table 2.

Table 2: Summarizing the measure values

Method	Values
Precision	83%
Recall	78%
c@1	82%

As shown in Table 2, our proposed QA system achieves satisfactory results. For cases where our proposal did not analyze the question, we noted that the problem is in writing some Arabic letters such as the letter "ا" "*A*" which can also be writing like "أ" ">" or "آ" "ا" or "إ" "<". For example, in some Why-question, we can find the word "diseases/ Plural form" written like "أمراض" *>AmrAD* or "امراض" *AmrAD*. To resolve this problem, we need to rewrite the Why-question by unifying all variants of a letter into a single form. This issue exists also in the PR module. Furthermore, the errors are explained mostly by the fact that there were other semantic relations found in the test corpus, expressed by other than the patterns considered in the present paper.

To put our system in perspective, we will compare our QA system performance with LEMAZA system, described by Azmi et al [2017] that answers Why Arabic questions. Table 3 summarizes the performance of the two systems.

Table 3: Performance comparison

	Our system	LEMAZA
No. of Why-questions	138	110
Data source	Arabic web-sites	OSAC
Corpus size (N of doct)	1285	700
Precision	83%	79.2%
Recall	78%	72.7%

From Table 3 we can see that, our method has comparable results with LEMAZA by comparing 83% to 79.2%, and 78% to 72.7%. This indicates that using existing Arabic tools such as khoja's stemmer, Arabic WordNet, Arabic morphological tool can get a small improvement in processing Why-questions. Indeed, using our linguistic resources enhances our system's performance.

Conclusion

In the present paper, we release a QA system that handles Why Arabic questions, and propose a novel method using NLP and IR techniques. Our proposal is composed of four main components: corpora study, question analysis, document/passages retrieval, and answer extraction. Experiments show that,

compared to related work approaches, our method obtains comparable results. Besides, we put identifying all causal relation patterns in future work.

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Agricultural Companies as a Russian Regions' Economic Driver

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Abstract

Russia is a historically agricultural country with a large area, harsh climate and a specific system of economic relations. Agriculture development is now in focus and the country has succeeded in shifting from import substitution programs to export oriented projects. The sector is being overhauled with digitalization and modernization. Many regions' economies used to be based on industry, while now the importance of farming is widely acknowledged – the development of crop and animal husbandry and even aquaculture are included in the national projects. However, agricultural labour quality remains a pressing issue – a high labour quality growth, upgrade of facilities and power infrastructure lead to lower rural employment and a labour force outflow and as a result a shortage of human resources in agriculture. Out migration depresses budget financing and increases the need for self-sufficiency of rural population. We believe that development of agricultural enterprises cannot be considered without considering the prospects of rural areas transformation. Our article deals with the key directions of their synergetic development.

Keywords: Sectorial Economy, Company Economy, Agriculture, Rural Areas, Development Strategy.

Introduction

A modern agrifood enterprise is a complex, fast developing system of economic relations. Statistics say that this is one of the sectors, where annual expansion and effectiveness persistently exceeds average economic growth and GDP. A good combination of such factors as bumper crops and competitive costs propelled Russia to the position of the world's top wheat exporter in 2016 for the first time. The strategic goal of agricultural products exports is not only their growth, but a higher share of goods with a high added value – a change of structure from raw materials (raws) in favour of high-quality goods, including packaged goods, for the sale in shops and for end consumption. A long-term development strategy of each corporation aimed at entering and cementing its position on the international market should ensure recognizability of the region, area, country of origin, while tracking will lead to the need to concentrate production, processing, packaging in one place to guarantee quality and compliance. Thus, we can easily forecast further integration of agro

corporations in rural development, preservation of their uniqueness and a higher recognizability aimed at higher effectiveness.

Literature Review

The theoretical basis of commercial organization development were laid out in multiple editions by representatives of local and foreign economic schools. Special contribution to the issue was made by such economic scientists as Yu.A. Plugina (2010), Ye. Raevneva (2006), etc. The special features of the factors underpinning development of the agribusiness, including agricultural companies, were studied by I.V. Zagaitov, K.S. Ternovykh (2006). They also pointed to the connection between agrifood companies' and rural areas development as the basis for enhancement of economic potential of the sector.

Other scientists -- M.I. Solosina, I.N. Shchepina (2016) -- laid out the methodology of long-term development management of rural municipal areas and regions.

International experience of rural development is presented in the researches by C.Kay (2009), Ja. Sallinger-McBride (1990), L.A. Picard, N.Ward et al (2003) and others.

These works lead us to a conclusion that modern economic object development is not only a positive change of its criteria and factor system, but also compliance of these alterations to the scenarios and parameters of development of the higher systems, and requires a comprehensive analysis in all spheres.

This statement can be tracked in a 2019 state program of the Russian Federation's Comprehensive Development of Rural Areas. The government's priority directions in synergetic development of farming and rural areas until 2025 include improvement of the demographic situation, ensuring conditions for development and diversification of rural economies, improvement of the living standards of rural population, a wider access of rural population to the development resources, sustainable nature management and improvement of the ecological situation in the countryside, higher efficiency of local management, better statistical surveys and scientific and methodological development of the rural areas, organization of training, retraining and talent management.

Research Question

The problem of Russian Federation's rural areas development has common and specific features. Let's consider the problem as typical for the relations of agrifood companies and rural areas of the Voronezh region. The area is an industrial centre, where various producers of hi-tech industrial products are located. The Voronezh companies produce planes, rocket space engines, mining and oil and gas equipment, forging and pressing machines, synthetic rubber, vehicle tires, bridge structures, complex radio-electronic systems, construction materials, various food and other products. The structure of the Voronezh region economy is mainly agrarian, while its industry structure is mixed. The importance of agricultural production for the region is demonstrated by the fact that it more than doubled in 2011-2016. Agriculture accounts for U.S.$ 2,028 mln in the Voronezh region's gross product in 2018, the processing industry for $1,967 mln. and retail for $2,683 mln. Crop husbandry of the Voronezh region contributed 60% to all agricultural products in 2018, cattle breeding 40%. The Voronezh region is second by the sown area in the Central Federal District (795,542 ha – 15.1% of all sown area of the Central Federal District, compared to the leader, the Belgorod region, where it stands at 16.5%), that's why the interest to the region is justified.

According to the 2016 All-Russian agricultural census, the region's agrifood industry comprises over 700 agricultural organizations, over 2, 500 farmers and small business owners, over 400,000 land plots in individual ownership, over 100 food and processing companies.

The region uses the precision agriculture methods, such as defining the boundaries of fields using satellite navigation systems, parallel driving, satellite monitoring of vehicles, differential spraying of weeds, differentiated application of fertilizers, differentiated irrigation, monitoring of cattle, breeding quality, electronic databases of their production processes, herd monitoring, identification and monitoring of animals with the use of modern information technologies (diet, milk yield, weight gain, body temperature, activity), meeting their individual needs, robotization of milking in their production organization and technology.

At present, agriculture informatization is taking place, the land resources are digitalized, electronic accounting of animals and their movement is introduced. The whole production process from sowing to sales is described in the databases to have information about the condition and production stage in any point of the region.

Although shrinking of the number of agrifood companies in the region has been gaining speed, there is practically no decline of the sown area, cattle numbers are growing, including the numbers of large cattle. This means consolidation of production and companies. Moreover, conglomerates of finances and agriculture are typical for our country, unlike in the developed markets, where such partnerships are not popular. There are also stable companies with simultaneous vertical and horizontal integration. The agribusiness remains in focus of many foreign investors, the number of companies with foreign capital is growing. In our opinion, the growth potential and the possibility to get access to land, which is limited in their home states explain this trend. All these propelled agriculture into the top three sectors on the M&A market, although the market has historically been the raw materials market.

So, agriculture is one of the top segments of the economy of the region under consideration. Moreover, it is practically the only one offering employment for many settlements. The importance of agriculture for development of the region is shown in the tax revenue structure (table 1).

Table 1: Tax payments to the budget of the Voronezh region

Indicators	2014	2015	2016	2017	2018
Tax payments, total, mln dollars	1,243	1,293	1,448	1,603	1,951
Growth, %	100	104.0	112.0	110.7	121.7
Tax payments by agricultural company, mln dollars	124	118	165	191	209
Growth, %	100	95.1	139.8	115.8	109.4
Specific weight of agrifood companies in total revenue, %	10.0	9.1	11.4	11.9	10.7

Thus, the specific weight of the tax payments of agrifood firms is above 10% and it grows consistently. A lower tax revenue could only be seen in 2015, which was connected to the general negative trend in the sector and its typical risks. In 2018, tax payments to the budget from agribusiness of the region amounted to $65.8 bln., which is 135% higher than state support paid to the farmers from the budget of the Russian Federation subject. When considering agriculture companies' of the Voronezh region's tax structure (agriculture and the food industry), we should note that the profit tax accounts for 44% of the payments, regional taxes for 35% and local for 11 %. Payments under a special taxation regime account for 10%. At that, the multiplier effect from state support amounted to 7.38, or by allocating $28 bln. from the Russian Federation subject's budget to agriculture support in 2018, the Voronezh region received $141 mln. from the federal budget and ensured tax collection growth to the regional budget from the agrifood firms. This means that one

ruble of the Voronezh region support translates into a 7.38 ruble monetary effect of investment growth in development of the sector.

The agrarian policy department, the government of the Voronezh region, the universities of region and all subjects of the agrarian segment of the economy participate in economic development and digitalization of the agrifood firms on the territory of the Voronezh region.

The digital pioneers of the Voronezh region's agriculture are EkoNiva-APK Holding Ltd, Logus-Agro LTS. These companies were the first in the Voronezh region to introduce results of R&D into their operations, invest and test new expensive technologies, cooperate with scientific organizations, the governments. Practically all projects are implemented with support from the municipal and regional authorities, which are interested in the growth of both tax revenue and the number of jobs -- one agricultural job produces up to 5 servicing jobs, while farmers' wages are often 10-30% higher than average in the municipality. Thus, according to the Social and Economic Development Strategy of the Voronezh region until 2035, each municipality plans construction of food processing factories, agrifood companies have large-scale projects of entering the international food market and at the moment expand beyond the regional boundaries.

Discussion and Results

The need for creation of theoretical and methodological basis of synergetic development of agriculture and rural areas are presupposed by the following:

First, interconnection of companies, territories and human capital develops with the help of reproduction mechanisms, described in detail by K. Marx. Commercial organizations are not only taxation subjects, but the key agent of distributive and redistributive relations, they form the population's incomes, participate in investment and social programs, in the development of infrastructure and create demand for production of related industries, capital and the workforce.

Secondly, the agribusiness firms lead the economy of rural areas, form the agricultural market, food, economic and ecological state security;

Thirdly, the key goals of the state's rural areas comprehensive development program include preservation of the rural population's share in Russia's total at no less than 25.3%; an average monthly available resources ratio for rural and urban households at 80%; an increase of the share of good-quality residential rural premises to 50%. For instance, the region under research plans to implement three subprograms:

1. Analytical, normative, methodological support of comprehensive development of the countryside for the:

- official project "State Monitoring of the Rural Territories", under which development and forming of an information and analytical resource devoted to the condition of the rural areas, scientific and methodological support of the program will be created;
- official target program "Information and Methodological Provision of Rural Areas Comprehensive Development", under which events will take place in the Russian Federation's subjects to train them in the project skills of initiative projects of rural territories comprehensive development, informing rural population about the measures under the program.

2. Federal events to develop rural areas comprehensively under the:
- official project "Rural Housing Construction and Housing Improvements". Social payments and subsidies to the people working in the agribusiness and living in rural areas to cofinance municipal costs on building (acquisition) of housing, rental of residential premises, rural mortgages, preparation of sites for individual housing construction will be allocated;
- official project "Promotion of rural employment" will ensure training and retraining of rural employees, attract young specialists to work in the countryside;

- official project "Improvement of the Rural Areas";
- official project "Development of the Engineering and Transport Infrastructure in the Rural Localities" presumes construction of gas distribution networks, local water supply, comprehensive preparation of sites for compact housing development, construction and reconstruction of motor roads.

3. The modern image of rural localities will be ensured through:
- an official target program "The Modern Image of Rural Localities", under which comfortable conditions in rural areas will be ensured through driving the share of rural localities with access to the information and telecommunications network to 100% .

After studying the official projects and target programs under the state program of comprehensive development of rural territories, we have established that the region's priorities in the rural localities until 2025 will be economic (employment and income of the households) and social (infrastructure and improvement).

Thus, our research allows us to explain the importance of comprehensive development of the agribusiness and rural localities and the backbone of the country's economy. The synergy effect of this interrelation is done with the help of reproductive processes, the key ideas of which are as follows:

a) agricultural companies and organizations are the backbone of the rural territories of the region and the country;
b) municipal, regional and federal authorities are interested in participation of agricultural enterprises in digitalization projects;
c) subsidization will help multiply investment in the segment;
d) employment in agriculture and related industries ensures a higher standard and life quality of rural population;
e) farmers are interested in branding the origins of agricultural produce, their localization with processing points.

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The Economy of Russia's Regional Horticulture: Conditions and the Future

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Abstract

The goal of our research is to identify the problems of Russian horticulture and establish the directions of their solution in the modern conditions. We have considered the structure of Russia's fruit imports, established that by 2018 fresh apple imports fell by 44.5% compared with 2013. We noted a change in the key importers of horticulture produce -- now, after sanctions are introduced, they are Serbia and Moldova, whose share in total imports amounts to 58.3%. The gross harvest of fruit and berries has been rising recently in the whole of Russia and in the regions on the back of a higher yield and expansion of the area of orchards and berry fields. The state and regional programs of agriculture development and regulation of the markets of agricultural produce, raw materials and food as well as investment and innovation projects help the innovative development of horticulture. Thus, the Lipetsk region planted 2,500 ha of orchards on dwarf rootstocks in 2014–2017 under the investment programs of perennial plantings.

Keywords: horticulture, sanctions, imports, investment, the sales price, profit**,** economic efficiency.

Introduction

Horticulture is one of the forms of local agrarian productions, whose development is exacerbated by the reforms. In 1990, agricultural organizations accounted for 49.5% of fruit and berries produced, while in 2017 they, together with the farmers only produced 27.7% of fruit and berries. Despite a higher innovation activity in the sector and planting of new orchards and berry fields with the use of modern technologies aimed at a higher yield of fruit and berry crops, the Russian Federation only produced 20 kg of fruit and berries per capita (the scientific consumption norm is 90–100 kg) in 2017.

Literature Review

Demand for horticulture products both by industry and for personal consumption precondition the special role of innovative processes in the development of the sector to increase the margins of fruit

production, in raising their investment attractiveness. That's why the innovative technologies applied in production of fruit and berries mainly aim at increasing productivity of the sector.

The general theoretical and methodological approaches to the research of higher horticulture efficiency were considered in the works by S.A. Balashova, N.Yu. Kuzicheva, I.M. Kulikov, S.M. Medvedev, I.A Minakov, K.S. Ternovykh, Yu.V. Trunov, G.A. Khabirov, etc.

According to A.I. Trunov (2012), priority in the development of horticulture is the creation of a system of specialized enterprises located in the regions with favorable conditions for commercial gardening; expansion of the planted area of the low clonal rootstocks; construction of modern storages to ensure maximal preservation of the consumer properties of the products; creation of the necessary social infrastructure for the workforce in the rural areas.

I.M. Kulikov (2015) points to the choice of the varieties of fruit trees, which would grow low, produce early high quality fruit as one of the directions to increase horticulture effectiveness.

I.A.Minakov (1995) believes that rational organization of horticulture production cannot exist without efficient management, whose goal is creation of a favorable climate at the enterprise, in the employees getting material and moral satisfaction. The special features of modern management are in qualified selection and promotion of personnel, which will help raise effectiveness of horticulture companies.

Despite a great number of works about horticulture and raising its efficiency, there is a need in further research of horticulture development's future and a higher efficiency of the sector in different regions taking into account their specific climatic and economic features as the sector is shifting to the investment and innovative development model and intensification of fruit and berries production.

Research Question

The local fruit and berries can boast high nutritious and taste qualities, but their exterior is inferior to those of imported produce, undermining their competitive advantages, because the chain stores prefer the exterior to the organoleptic characteristics.

Everybody knows that fruit and berries should be of the same colour, have a similar form, while their size deviations should not exceed 5%. The failure to meet these requirements is one of the reasons behind a gradual increase of apple imports to the local market. According to the Federal Customs Service, Poland led fruit and berry imports in 2014 with a market share of 53.41%, while in 2017 the imports were prohibited following violation of Russian and international phytosanitary norms. Serbia and Moldova became the key suppliers of horticulture products with the share of these states in total imports amounting to 58.3%.

The analysis of long-term retrospective trends reveals the peak of Russia's apple imports in 2013 – 1,400,000 tons. In 2018, the volume of imports amounted to 770,000 tons, a 44.5% fall on 2013 levels (table 1).

Table 1: Russia's fresh apple imports in 2013–2018

Years	Thousand tons	Mln. dollars
2013	1,400.0	796.0
2014	1,052.8	621.8
2015	896.1	387.9
2016	676.6	370.9
2017	622.2	357.0
2018	770.0	490.4

A fall in Russians' income in the period predetermined market leadership of the countries, which were able to offer the cheapest fruit and berries.

The shortage of good quality fruit and berries on the local market has set the task of maintaining a stable agriculture situation for agribusiness companies. According to the Federal State Statistics Service, production of pome fruit, which is mainly represented by apples, rose by 15% in 2016. Besides, independent experts concluded that imported produce gave way to local products for the first time in Russia's chain stores last year.

Starting from 2015, Russia started to export apples with 70% sold to the Ukrainian market. The sales revenue from the Ukrainian market amounted to $1.55 mln. in 2015, $4.29 mln. in 2016, $2.99 mln. in the first quarter of 2017, which is a 70% increase on the same year-ago period.

Our analysis demonstrated that favorable climatic and economic conditions promoted the highest growth of fruit and berry areas in the southern part of the Central Federative District, namely in the Voronezh, Lipetsk, Tambov, Tula, Belgorod and Moscow regions, which accounted for 32% of Russia's horticulture products.

We researched organizational and economic aspects of horticulture development of the Central Federal District in more detail and studied its southern part, the Lipetsk region, whose geographical position helps commercial gardening to develop. The first commercial orchards were planted in the Lebedyansk district of the Lipetsk region.

As we all know, effectiveness of the horticulture business is only possible if it develops intensively. Such a system should provide for specialization, concentration, cooperation, agro integration, the use of innovative technologies, the quality management, etc. Besides, raising effectiveness of horticulture is possible through loss cuts during harvesting, transportation and storage of fruit and berries; through widening of the range; the use of marketing; creation of a proper motivation system; improvements of economic mechanisms.

Agricultural companies are the Lipetsk region's key producers, which account for over 2/3 of fruit and berry gross crop.

Our research of the gross production of fruit and berries demonstrates growth in all regions of the country. In 2017, their gross harvest increased by 253,000 tons, or by 9.4% compared with 2000. The Lipetsk region's record harvest of fruit and berries took place in 2012 and 2013 -- 94,100 and 85,100 tons respectively mainly thanks to a good weather and a high yield of the orchards (table 2).

Table 2: Gross crop of fruit and berries in all categories of enterprises in 2000–2017

Years	Russian Federation		Lipetsk region	
	Thousand tons	in % to 2000	Thousand tons	in % to 2000
2000	2,690.,0	-	65.1	-
2005	2,403.8	89.36	57.9	88,94
2010	2,148.9	79.88	39.2	60,22
2011	2,514.3	93.47	67.5	103,69
2012	2,663.8	99.03	94.1	144,55
2013	2,941.5	109.35	85.1	130,72
2014	2,995.6	111.36	81.7	125,50
2015	2,903.3	107.93	60.0	92,17
2016	3,311.0	123.09	64.8	99,54
2017	2,943.0	109.41	54.8	84,18

The fruit and berry area amounts to about 3% in the structure of the Russian Federation's garden area. In 2000–2017, the orchards and berry fields' area shrank both in the whole of the Russian Federation and in the Lipetsk region by 250,300 ha and 4,500 ha respectively (table 3).

Table 3: The area and yield of fruit and berry plantings in all categories of enterprises in 2000-2017

Years	Russian Federation		Lipetsk region	
	Area of plantings, thousand ha	Yield, c/ha	Area of plantings, thousand ha	Yield, c/ha
2000	767	35.1	191	40.6
2005	598	40.2	17.4	38.4
2010	518.5	49.2	15.7	29.3
2011	514.8	64.4	15.8	50.3
2012	507.4	68.7	15.8	82.6
2013	502.2	77.1	15.7	81.2
2014	513.6	75.9	15.6	69.9
2015	511.7	75.7	15.0	63.7
2016	517.0	70.0	15.6	69.2
2017	516.7	89.4	14.6	88.0

The key reason behind the falling areas is in the fact that more than half of perennial plantings are beyond the service life in may horticulture companies. Many companies abandoned horticulture due to the lack of funds for garden care agrotechnical techniques. Dead trees were not been removed for many years, there was no proper care for the soil, tree crowns, measures against the diseases and pests were incomplete. The orchards became unsuitable for use fast without due care. Statistics say that at the moment 7,500 ha of perennial plantings of the Lipetsk region are written off and require recultivation.

Discussion and Results

Based on the above, the key condition of effective functioning of the Lipetsk region's horticulture companies is improvement or production organization, which requires the following measures:

- the use of highly productive fruit crop plantings with good taste and commodity parameters;
- introduction of modern progressive methods of drip irrigation;
- comprehensive methods of fighting pests and diseases;
- updating of orchard rotation depending on market requirements;
- creating one chain consisting of flow-line harvesting, processing and storing to ensure continuous consumption of fresh fruit and berries in winter and spring.

The most important intensification factor is planting of intensive orchards with the density of planting of no less than 800 trees per ha .

The researchers say that improvements in horticulture organization are possible as part of investment projects of planting perennial fruit trees, whose area amounted to 2,448 ha in 2014–2017. At that, the area of orchards with the use of intensive technologies (drip irrigation and a compact layout) stood at 1,014 ha. As of 01.01.2018 the total area of perennial fruit plantings at the agricultural companies of the Lipetsk region amounted to 7,400 ha, including 5,500 ha of yielding orchards and 1,900 ha of young orchards.

The Lipetsk region has developed and is implementing large scale investment projects to develop the horticulture business in 2014–2020, which provide for, along with the laying of intensive orchards and berry fields, processing and storage of fruit and berries as well as jobs for the local people.

Thus, under an investment project at Orchards de Beaulieu Ltd, 1,320 ha of intensive orchards and berry fields will be laid; 6,100 tons of fruit and berries produced and processed, 464 locals will get a job.

"UsAgro Ltd", apart from laying 155 ha of intensive orchards, production and processing of 2,100 tons of fruit and berries, is building fruit storages with a capacity of 1,600 tons. It also plans to create 20 jobs.

"Agronom-sad Ltd" is building a logistics complex with a capacity of 40,000 tons of simultaneous storage of fruit and berries produced from an area of 1,000 ha, which, in turn, will provide jobs to 158 people.

Under the "Agriculture Development and Regulation of Agriculture Products, Raw Materials and Food Market of the Lipetsk Region" program, much attention is paid to the development of intensive gardening in "Selkhozinvest Ltd" and "Rasprostranitel Ltd". The companies plan to increase the orchard area by 836 ha, build fruit storages with capacity of 5,600 and 4,800 tons of simultaneous storage of fruit, to boost production volumes to 15,000 tons and create 90 jobs.

One of the leading companies with the greatest share in the region's fruit and berry output, is CJSC "Agrofirma imeni 15 let Oktyabrya", has merged production, storage and sales in one technological process.

We should note that reproduction of orchards and berry fields is curbed by insufficient production volumes of good plating material. There is a lack of seedlings of a certain breed and varietal composition on low-growth rootstocks and new promising varieties of apples, pears and the drupaceous. besides, the seedlings offered on the market do not meet the requirements of intensive horticulture. That's why many specialized horticulture companies, including CJSC "Agrofirma imeni 15 let Oktyabrya", are shifting to growing good-quality planting material both for their own use and for sale.

At that, they take into account the requirements to selection of the planting material – high frost resistance, good rooting ability, resistance to diseases and pests. The modern apple seedling production technology in the nursery of the company ensures branched plantings with a built-in generative sphere, production of seedlings of the highest quality, which guarantee commercial fruiting of an apple tree in an orchard on the 4th or 5th year after planting, production of apples with predetermined parameters for planting intensive orchards of different types. CJSC "Agrofirma imeni 15 let Oktyabrya" increased the volume to 639,000 pomaceous plants and 56,000 bushes, which allowed the company to increase the area of the orchard by 800 ha.

One of the innovative directions of horticulture is the use of fertilizers and chemical agents for care and protection of the orchard for the whole vegetation period. The key suppliers of plant protection products and fertilizers to the Russian market until 2014 were the European states. Imposition of sanctions triggered development of local production of the goods, other countries provided the lacking volumes (China, Serbia).

Thus, the innovative development of the Russian horticulture should be aimed at:

- breeding new high-yielding, disease resilient varieties (the use of special seedlings of low-growing fruit trees);
- improvement of the technology of growing and harvesting of fruit (over 800 trees per ha);
- creation of an effective system of storage and sales (the use of modified atmosphere storage rooms);
- technical upgrade of the sector (introduction of technologies of drip irrigation, creation of a trunk fixing system).

These measures will ensure higher effectiveness and competitiveness of the horticultural business.

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Factors that Shape Innovation Activity in SMEs

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Abstract

For many years, innovation and entrepreneurship have been perceived as the key source of economic development and increasing competitiveness and productivity. The small and medium-sized enterprise sector is regarded in Poland as one of the key sectors that affect the functioning of the country's economy. At the same time, it is observed that the sector lacks innovation activity. Accordingly, the purpose of this paper is to identify the relationship between factors that condition innovation, such as: form of innovation activity, type of innovations introduced and purpose of introducing innovations. The survey was conducted on a sample of 242 SMEs. The results show a positive correlation between the analysed variables in the surveyed enterprises.

Keywords: Innovation, Small and Medium-Sized Enterprises.

Foreword

The sector of micro, small and medium-sized enterprises (SME) is undoubtedly the largest sector in Poland. According to research conducted by the Polish Agency for Enterprise Development PARP (PARP Report, 2018), in 2017, SMEs represented 99.8% of the total number of enterprises in Poland. Also, their contribution to GDP has exceeded 50% in recent years. SMEs are also the largest employer on the Polish market.

The growing importance of the SME sector in domestic economy, globalisation, and the resulting need to meet the requirements imposed by competitors mean that there is a need to implement new products, and services, that is innovative solutions (Pypłacz and Liczmańska-Kopcewicz, 2018; Dabija et al., 2017; Domi et al., 2019). Innovations are becoming an indispensable element of every activity. Unfortunately, the strong development of the SME sector does not coincide with the introduction of innovative solutions. The pace of innovation development in Polish SMEs is currently much slower than in large companies (Czarniewski, 2016). Also, comparison to EU enterprises is unfavourable for Polish companies. The innovation gap will be growing and it will lead to a situation where SMEs will not be able to compete with companies on European market.

The good thing is, however, that despite a difficult market situation of SMEs, some companies stay on the market, expand their activities and achieve positive economic results (Zastempowski, 2019). According to research conducted by PARP (PARP Report, 2018), the enterprises that introduced innovations increased their chances for survival and development on the competitive market. At the same time, importantly, they were definitely more profitable than those who did not implement innovation processes.

The available studies lack information on the relationship between factors that condition the occurrence of innovation in SMEs. Accordingly, the purpose of this paper is to identify the relationship between the form of innovation activity, the type of innovations introduced and the purpose of introducing innovations. Considering the above premises as well as the purpose of the paper, the following research hypotheses were formulated:

H 1. There exists a positive relationship between the form of innovation activity and the type of innovations introduced
H 2. There exists a positive relationship between the type of innovations introduced and the purpose of introducing innovations
H 3. There exists a positive relationship between the purpose of introducing innovations and the form of innovation activity.
For the purpose of this paper, a survey was conducted on a sample of 242 SMEs, which introduced innovations in the last three years. The hypotheses were verified with statistical methods.

SME – the perspective of innovation

In Poland, the sector of micro, small and medium-sized enterprises (SME) started to be analysed in early 20th century. According to the PARP 2018 report, the largest group, representing 96% of total enterprises in Poland, are micro companies and their rate of survival after the first year of operation is nearly 70%. The survival rate of small enterprises is 80% and of medium enterprises – 92% (PARP Report, 2018). Undeniably, it is the fastest developing sector and at the same time, it offers the most jobs. The SME sector consists of three groups of enterprises. The definitions of the respective groups, according to the Commission Regulation (EC) No 800/2008 of 6 August 2008, is based on quantitative criteria – the number of persons employed and financial performance. A micro enterprise may employ 10 or fewer persons and its annual turnover or annual balance sheet total must not exceed 2 million Euro. A small enterprise may not employ more than 50 persons and its annual turnover or annual balance sheet total must not exceed 10 million Euro. A medium enterprise may not employ more than 250 persons and its annual turnover must not exceed 50 million Euro and/or its annual balance sheet total must not exceed 43 million Euro (Commission Regulation (EC) No 800/2008). The same quantitative criteria for distinguishing the size of enterprises are provided for in Polish legislation, in the Entrepreneur's Law Act of 6 March 2018 (Journal of Laws /Dz.U./ of 2019 item 1292 Article 7.1, as amended).

Considering the management and implementation of innovations, it is worth to take a look at qualitative criteria that to a large extent condition the method of implementing innovative solutions (Ślusarczyk, Baryń, 2018; Meyer, Meyer, Molefe, 2016). The most important qualitative criteria of SMEs include:

- The organisation being entirely dominated by the entrepreneur's personality – it is usually the owner and at the same time manager of the organisation, the 100% decision-maker
- Targeting individual consumers with services or products that meet their individual wishes and are customised,
- The activity of the enterprise being limited to a few products/services in order to minimise costs,
- Standing out and surviving on an already saturated market thanks to offering a limited range of services or products,
- Not very formal organisation and unconventional and uncomplicated management systems,
- Fast reaction to changes in the environment,
- Highly competent personnel,
- Financial and managerial autonomy and independence.

The SME sector struggles with a number of problems resulting, among other things, from legal regulations and increasingly difficult employee market. Employers pay high costs of maintaining and qualifying their employees. Also, these enterprises are to a large extent financed from own, internal funds, which makes it difficult to implement new technologies or new managerial solutions and processes.

Innovations – Theoretical Approach

"For an enterprise, lack of innovation means collapse in the long-term" (Freeman, 1982). What Ch. Freeman wrote, directly reflects the importance of innovation for the functioning of every company.

The key role of innovation in national economies results basically from two factors (Blanchard, 2013). First of all, in the stationary state, production growth rate (economic growth) is equal to the sum of population growth rate and economic progress rate, and, on the other hand, in accordance with Schumpeter's theory of innovation, major discoveries are accompanied by "long waves", i.e. multiple-year periods of intensified economic activity associated with derivative innovations. When economic growth slows down, many entrepreneurs increase their investments in risky research and development projects, which stimulates the economy (Hlaváček & Siviček, 2017; Bilan et al., 2019.

The classical approach, proposed by J.A. Schumpeter (Schumpeter, 1960), treats them as a new combination of means of production and capital covering the following five cases: introduction of a new product, - introduction of a new production method, - opening up of a new market, - acquisition of a new source of raw materials or semi-finished products, - reorganisation of existing business. Looking closely at Schumpeter's definition, one notes that at that time, innovation was associated solely with the activity of industrial enterprises, which constituted the foundations of capitalist economy in early 20th century. According to Schumpeter, innovations are only fundamental (radical), unique, one-off and discontinuous changes that involve the transformation of a new idea or invention into a market product or process. All kinds of dissemination of innovation, on the other hand, is a separate kind of change called imitation. Imitation is continuous and repetitive.

A different approach to innovation was adopted by Porter, who regarded innovation as economically successful exploitation of new ideas. He understood them as a continuum of technical and organisational changes, encompassing both simple modifications of existing products, processes and business practices and fundamentally new products and processes (new in the scale of both an enterprise and an industry and economy) (Porter, 1990). New means new for an enterprise, industry or economy (Hoerlsberger, 2019).

The current, contemporary definition taken from the Oslo Manual defines innovation as "introducing a new or significantly improved product (good or service), a new or significantly improved process, a new marketing method or a new organisational method in business practices, workplace organisation or external relations" (Oslo Manual, 2008).

Thus, the Oslo methodology identifies four types of innovations:

- Product innovation, i.e. introduction of a good or service that is new or significantly improved in terms of characteristics or application, -
- Process innovation, i.e. introduction of a new or significantly improved production or delivery method (changes in techniques, equipment and/or software, -
- Marketing innovation, i.e. introduction of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing, -
- Organisational innovation, understood as introduction of a new organisational method in business practices, workplace organisation or external relations.

It is important to engage in and motivate to the innovation process all employees and external entities that collaborate with the organisation, as all kinds of innovations are seen through the prism of the knowledge used (Glabiszewski *et al.*, 2018), (Wiśniewska and Liczmańska-Kopcewicz, 2019). The participation of both groups depends on their knowledge and skills in the area of given activity. Thus, innovation must be understood as a system that develops in different ways, depending on the specificity of a company, the area of its activity, its size, type of innovations, number of persons involved, level of knowledge, funds engaged and the expected results (Mahmud, Aryanto and Hasyim, 2017). According to this approach, evaluating the innovation potential of an enterprise is a multilateral and systemic process (Pachura, 2017).

Research Methodology

In order to achieve the research objective, a critical analysis of literature was conducted and heuristic methods were applied, such as brainstorming, in several familiar SMEs. Cognitive methods were supported by own research. The results of own research were analysed by means of statistical measures and data analysis with the use of pivot tables.

Representatives of companies from the Polish SME sector were invited to answer a survey conducted within the framework of the Innovation Barometer. The Innovation Barometer is a cyclical survey addressed to Polish entrepreneurs and gradually extended to other European states. The survey was conducted as online interview method (CAWI). The survey edition that is analysed in this paper was conducted from 1 April to 30 November 2018 by means of an electronic questionnaire uploaded on an internet platform. 242 companies from various industries responded to the survey. The Innovation Barometer contains 39 questions divided into groups associated with different kinds of innovations listed above in this paper, in accordance with the Oslo Manual classification. Table 1 presents the characteristics of the surveyed group.

Table 1: Characteristics of the enterprises surveyed (N = 242)

The questionnaire elements	Volume	Participation in %
Enterprise size:		
• small (10 - 49 employees)	55	22.7
• medium (50 - 249 employees)	53	21.9
• large (over 250 employees)	134	55.4
Respondent's position		
• Owner / senior level employee	190	78.5
• Employee	52	21.5
Type of enterprise		
• Service provider	99	40.9
• Manufacturer	119	49.2
• Commercial	24	9.9

Source: elaborated by the author.

This paper presents partial results of empirical research that enable evaluation of the relationship between the form of innovation activity, type of innovations introduced and purpose of innovations.

These three characteristics may be perceived in different ways. For the purpose of this research, it was assumed that the main sources of innovation and at the same time the form of innovation activity in an enterprise may be: technology transfer, research and development activity, marketing research on the domestic and international market, using idea generation methods, e.g. "brainstorming", using consulting company services, stimulating the attitudes of employees and managers. It was also taken into consideration that SMEs rely only on old knowledge and do not look for new sources, or they combine existing with newly acquired knowledge. Detailed results of responses are presented in Table 2.

Table 2: Form of innovation activity

	Frequency	Percentage of responses	Percentage of valid responses	Cumulative percentage
Is associated with the use of new knowledge (generated in the course of R&D activity or acquired from external sources)	149	61.6	61.6	61.6
Is founded only on old knowledge/is associated with new application of existing knowledge	50	20.6	20.6	82.2
Combines existing and new knowledge	28	11.6	11.6	93.8
No innovative activities are undertaken	15	6.2	6.2	100

Source: elaborated by the author.

Particularly noteworthy is research and development activity, which in the economic practice of SMEs functions in three ways: independent activity of an enterprise, using the services of external companies and cooperating with an external institution. In each of these models, the following different kinds of research and development activities are undertaken, but in the case of the SME sector, these are mainly development activities. Development activities are: acquiring, combining, forming and using currently available knowledge and skills in the field of science, technology and economic activity, and other knowledge and skills to plan production and to create and design new, changed or improved products, processes and services, excluding activities that involve making routine and periodic changes to products, production lines, manufacturing processes, existing services and other operations in progress, even if such changes are improvements.

It is also worth noting the purpose of implementing innovations. An important factor influencing the implementation of innovations are economic considerations. On the one hand, innovation is to a large extent dictated by the desire to reduce costs (including individual delivery costs), but, on the one hand, financial possibilities are a problem, which also means problems with accessing R&D facilities, new technological solutions or additional sources of financing. Another factor that influences the level of innovation in Polish SMEs are market demands and in particular customer demands. The more demanding a client or the more "difficult" and changing the market, the more innovations are implemented. This is associated with increasing the quality and producing new or significantly improved products and services, and finally with increasing the effectiveness and quality of auxiliary activities. An important factor, independent of the financial barrier, is awareness of the owners (managerial personnel) of SMEs. Unless their needs in the field of searching for and implementing innovations change, it will be hard to push forward "an innovative approach to company management", and consequently, the innovation potential of SMEs will not develop.

Having looked into the definitions presented above, one could say that innovation is a manifestation of the capacity to generate and implement innovation. The question is then how to determine which enterprise is innovative? According to the Oslo Manual, an innovative enterprise is one that has implemented at least one innovation (Oslo Manual, 2008), which another definition makes more specific: the innovation proved to be a novelty in the opinion of the given organisation and it was implemented in the last 3 years (Stawasz, 2005). Thus, as can be seen in table 3, the analysis covered survey results for 242 companies that undertook innovation activities in the last three years.

Table 3: Innovation activities in the area of process innovation undertaken in the last three years

	Frequency	Percentage of responses	Percentage of valid responses	Cumulative percentage
Innovation activities were undertaken but not implemented	18	7.4	7.4	7.4
Innovation activities were undertaken but implemented partially	124	51.3	51.3	58.7
Innovation activities were comprehensively implemented	100	41.3	41.3	100.0
Total	242	100	100	
No innovation activities were undertaken	35	Disregarded in the analysis		

Source: elaborated by the author.

In the first place, in order to verify whether the abovementioned relationship exists and to answer the question of how strongly the type of innovation introduced is influenced by the form of innovation activity, and thus to confirm that hypothesis H1 formulated in the research process is true, a statistical analysis of the relationship between the abovementioned variables was conducted. The Spearman's rank correlation coefficient was used, and the values obtained are presented in Table 4.

Table 4: Correlation between the type of innovation introduced and the form of innovation activity

			Type of innovations introduced
Spearman's rho	Form of innovation activity	Correlation coefficient	.736**
		Significance (two-sided)	.000
		N	242

*** Correlation significant at 0.01 (two-sided).*
Source: elaborated by the author.

The values of Spearman's rank correlation coefficient prove a positive and statistically significant relation. There exists a relationship between the form of innovation activity defined as research and development activity and the process innovation type of innovation. There are grounds to claim that R&D activity influences process innovation. The correlation coefficient between the factors is .736**, which represents quite a strong relation. In the other cases, no significant relationship was reported.

In order to confirm hypothesis H2, the relationship between the type of innovations introduced and the purpose of introducing innovations was analysed, and the result was a positive correlation, as presented in Table 5.

Table 5: Correlation between the type of innovations introduced and the purpose of introducing innovations

			Type of innovations introduced
Spearman's rho	The purpose of introducing innovations	Correlation coefficient	.542**
		Significance (two-sided)	.000
		N	242

*** Correlation significant at 0.01 (two-sided).*
Source: elaborated by the author.

Hypothesis H2 was positively verified only for the process innovations. There are grounds to believe that the innovation purpose of quality improvement, production of new/significantly improved products and services, influences the process innovation type of innovation. The correlation coefficient between the factors is .542**, which represents a moderate relationship. Also, the relationship between improving the quality of innovations introduced and other types of innovations was analysed, but no statistically significant relationship was reported. In the other cases (organisational, product and marketing innovations) there are no relationships between the analysed parameters.

In order to confirm hypothesis H3, the relationship between the purpose of introducing innovations and the form of innovation activity was analysed. As the results presented in Table 6 show, there exists positive relationship between the two factors.

Table 6: Correlation between the purpose of introducing innovations and the form of innovation activity

			Form of innovation activity
Spearman's rho	The purpose of introducing innovations	Correlation coefficient	.725**
		Significance (two-sided)	.000
		N	242

*** Correlation significant at 0.01 (two-sided).*
Source: elaborated by the author.

An analysis of the relationship between the purpose of introducing innovations and the form of innovation activity revealed a positive correlation, which means that the research and development type of innovation activity influences the innovation purpose of quality improvement, production of new/significantly improved products and services. The correlation coefficient between the factors is .625**, which represents a strong relationship.

Discussion

The results of empirical research presented in this paper confirm hypothesis H1. Considering the results presented above, it should be noted that there are also no grounds to reject hypotheses H2 and H3. The research confirms that innovation activity is a complex phenomenon and it depends on multiple variables. The choice of the form of innovation activity determines the type of innovations implemented, which is at the same time dependent on the purpose of implementing innovations. We hope that our analyses will contribute to a more contextualised understanding of the phenomena associated with innovation activities in SMEs and the reasons why they are treated very cautiously or even unwillingly by Polish SMEs.

The values of Spearman's rank correlation coefficient obtained prove positive and statistically significant relationship. Positive correlation means that the form of innovation activity influences introduction of process innovation and the purpose of improving product and service quality. It can

also be stated that the innovation purpose of quality improvement, production of new/significantly improved products and services, influences the process innovation type of innovation.

None of the factors were associated with very strong relationship. The coefficient values prove a strong (.725**; .736**) or moderate relationship (542**), namely positive and statistically significant relationship.

Conclusion

Innovation activity of enterprises is often very specific and exceptionally difficult to analyse. However, as customer demands develop, Polish SMEs must become increasingly innovative. Even though many companies claim that innovation is one of the elements of their strategy, new solutions are often introduced randomly and in response to sudden market demands, or in order to imitate competitors. Unfortunately, innovation is not followed by research and development activity.

SMEs should receive strong supports through a comprehensive innovation support system. Importantly, such system should be founded not only on specialist – commercial or academic – business environment institutions. Effective operation of an innovation support system should be accompanied by a business environment friendly to enterpreneurs. To develop such a support system, knowledge is needed, not only about the level of innovation in Polish small and medium-sized enterprises but, most importantly, about their innovation potential – as a factor that significantly influences the future level of innovation.

Obviously, in order to ensure innovation, SMEs also need to engage in relevant research and development activities themselves and to allocate quite substantial funds for that purpose. Moreover, it is important to engage in and motivate to the innovation process all the employees. They are often the source of new ideas or inventions. Innovation, however, should not be treated as an end in itself. To the contrary, it is a set of measures to build competitive advantage.

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Creating Process Innovations in SMEs, in the Context of The Source of Information on Innovation

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Abstract

The small and medium enterprises sector, in spite of facing numerous financial, legal, organizational or personnel challenges, must also analyse the market situation and seek innovative inspirations. A special type of innovations includes process innovations, which affect the company's situation in a very broad scope. They concern the entire process executed in organizations. The variable market causes that one cannot be content with just imitation of competition but has to be one step ahead. This requires sufficient financial, human and information resources. This article is an attempt to define the relations between sources of information and types of innovations implemented in the organization. The research was conducted on a sample of 242 SMEs. The results indicate positive correlations in examined enterprises between selected variables.

Keywords: Process Innovations, Information Sources, Small and Medium Enterprises,

Introduction

Enterprises that want to take part in the market battle for a customer place more and more emphasis on increased innovativeness. Innovative activity is an important source of competitiveness, economic growth, as well as the image of each country (Janoskova & Kral, 2019; Kiselakova et al., 2018; Kijek & Matras-Bolibok, 2019; Jakimowicz & Rzeczkowski, 2019a; 2019b).Thus, innovations are understood as a factor of growth and development of enterprises. They are the response to market needs, and play an important role in the functioning and development of small and medium enterprises. The small and medium enterprises sector (SME) is actually facing the challenge of creating and implementing innovation, as well as managing the entire innovation process. For SMEs, the main problem, which is decisive in terms of undertaking innovative activity, is the issue of financing, followed by numerous problems related with material, human and information resources (Lewandowska & Stopa, 2018; 2019). Although it is recognized that we are currently facing an information overload, in terms of seeking innovation ideas one should search for professional sources of information, which bring reliable data that may pose the basis for further action.

The subject of this article comprises process innovations - as the selected type of innovations that conditions efficient operation of an enterprise in the SME sector. The purpose of this article is to analyse the relations between sources of information and process information. The author concentrated on an analysis of the source literature, with special focus on the on the concept of innovation, including, in particular, process innovations. Additionally, an analysis of surveys conducted on a sample of 242 SMEs was performed, with the assumption that these enterprises introduced innovations during the past three years. Data was verified using statistical methods, to define the Spearman's rank correlation.

The essence of implementing innovation and managing information in enterprises

Over the years, the approach to process innovation was changing. The following innovation models may be distinguished: the „black box" idea, linear models, interactive models, system models, evolution models, innovative environment models. Each of these models not only ensured a new manner of reviewing the issues, but also attempts to explain what affects innovativeness of individual territorial systems. The first model took into consideration only the financial means invested in research conducted by research & development entities, while the latter models provide for complex solutions such as the concept of regional innovation systems (Dermody, J., Yun, J.J., Della Corte, V., 2019; Koišová et al., 2018; Koišová et al., 2017).

Innovation may be looked at as a specific process, which covers all activities related with creating the idea, creating the invention, and its implementation. Innovation also concerns a service, process or a new product or its enhancement (Pomykalski, 2001; Androniceanu and Tvaronavičienė, 2019). Schumpeter defined innovation as (Schumpeter, 1960):

- Introducing new products or enhancing existing products;
- Introducing a new or enhanced manner of production;
- Opening a new market;
- Applying a new form of sale or purchase of existing goods;
- Obtaining new raw materials or semi-finished products;
- Introducing a new process organization.

Currently, consideration should be given to overall activities, based on an innovation strategy, which may be defined as a "long-term action plan prepared to enhance the innovation management process, meaning the process of seeking such types of innovation, which will increase the market effectiveness of the enterprise through possessed resources" (Pomykalski, 2001; Androniceanu, 2019a). Components of the innovation strategy include mainly (Afonasova, Panfilova, Galichkina and Ślusarczyk, 2019):

- Selection of innovation, meaning a purposeful selection of the technology and the technique to be invested in.
- Obtaining innovation, meaning determining the sources of innovation, methods of obtaining innovation, identification of valuable innovations in the surrounding area, analysis of integration possibilities.
- Use of innovation through internal use or enhancement, or sale of innovation.

An independent execution of the overall innovation process in an enterprise is difficult, especially in case of the SME sector. Such solution is only possible in case of the company demonstrating certain pro-innovative characteristics. These include mainly: pro-development orientation, vigilance, sensitivity, flexibility, acceptability of risk, engagement in technology, cooperation, diversity and so called "slack". Characteristics and their detailed descriptions are presented in Table 1.

Table 1: Characteristics of an organization focused on executing innovation processes

Characteristics of enterprise	Description
Pro-development orientation	Operating and tactical activities should be aimed at execution of a strategy, which assumes long-term growth of the company's goodwill, not maximizing the profit within a short-term perspective
Vigilance	The management and employees should continue to analyse the company's environment, as well as recognize the tendencies and anticipate key changes for the market (Bulut, Gencturk, Aydin, Nazli and Kahraman, 2019)
Sensitivity	Apart from generating own innovation, enterprises should demonstrate appropriate sensitivity, which allows them to detect, identify and implement solutions developed outside of their formal borders
Flexibility	Besides spotting the changes in the company's environment, companies must also present readiness to accept these changes and to quickly adjust the company to new market conditions
Risk acceptance	The innovation process carries the risk of obtaining results other than those assumed, hence it is important to take an approach that will allow to execute also risky projects
Engagement in technology	Due to the intensive progress in the technological area, innovations that take account of these changes may be of critical nature for the company and for the market
Restricted competition inside the organization and tendencies to cooperate	Execution of large and complex innovation projects forces building an organizational structure aimed at cooperation
Diversity	Creation of a pro-innovative organizational culture, including creativity, is favoured by the diversity of employees with various competences, from various cultures, or of different age
Slack	The organization must ensure space for creativity of employees, allowing them to apply unconventional solutions for problems occurring at the company and unconventional methods of creative work

Source: own elaboration based on Tranfield D., Young M., Partington D., Bessant J., Sapsed J. "Knowledge management routines for innovation projects: developing a hierarchical process model, „International Journal of Innovation Management", 2003, no. 7; Trott P. "Innovation Management and New Product Development, Prentice Hall, Harlow-Milan 2005.

The role of innovation is so significant that many organizations implement the supporting method of management, i.e. innovation management (Łobos and Puciato, 2013). Enterprises which are not innovative and do not create new products and disappear from the market, whereas the development of innovation is allowed thanks to (Tomala and Sénéchal, 2004):

- Stimulating new needs of recipients;
- Expanding the product offer;
- Improvement of quality and increasing reliability of products;
- Expanding outlets;
- Limiting external costs (e.g. environmental costs);
- Better adjustment of the company to the legal environment;
- Increase of flexibility of operation;
- Limiting costs, including personnel and material costs;
- Improvement of work efficiency.

Process Innovations

Regardless of what modern definitions of innovation is referred to, in each of them changes concern not only the product or the technology, but they also constitute market changes or even overall process changes. There are many divisions of innovation, however the one most frequently applied differentiates four types of innovation: (Oslo Manual, 2008)

- Product innovation;
- Process innovation;
- Organizational innovation;
- Marketing innovation.

Process innovation may be defined as an implementation of a new or significantly improved method of production or delivery. These methods may consist of introducing changes to devices or in the organization of production, or constitute a combination of both these types of changes, or result from using new knowledge (Riana, Rihayana and Kumala Ratih, 2019; Androniceanu, 2019b). The changes may aim at production or delivering new or enhanced products, which could not have been produced or delivered using conventional methods. Innovation of such type may also result from the need to increase effectiveness of production or the manner of delivering products. An example of such innovation may an implementation of a new IT system, which supports the management process in the enterprise, automation of the production process, or implementation of a new stock control system.

Apart from introducing a radical new approach or technology, process innovations usually requires a longer planning time and support from the senior management (Glabiszewski, 2015). They are also more risky than gradual improvement, and require a higher level of cultural and structural changes. Process innovations usually also expand to a larger part of the organization.

Process innovations may generate value for internal clients, including employees, and the organization itself, or they may create value for external clients, including business partners, end users or actual consumers. The value resulting from process innovation includes reduction of the time needed to manufacture the product or perform the service, increased number of manufactured products or performed services within a given time, and reduction of costs per manufactured product or performed service. In addition, process innovations may generate a substantial growth of the quality of the product and the level of service. In summary, a single entity must record a significant increase of certain key performance indicators (KPI), for the process innovation to be considered true and real.

Implementation of an innovation is related with adopting an appropriate action strategy, but also a relevant form of innovative activity. In many cases, a real problem in implementing innovation is the application of a “pull” strategy where the innovation process is a result of translating the customer’s needs or meeting market requirements (Mahmud, Aryanto and Hasyim, 2017).

A process innovation very likely is the least media-related and attractive form of innovation. This happens because product innovations are often visible for customers, whereas process innovations are noticed only within the organization. Hence the company cannot take pride in them before stakeholders.

Sources of information in the context of process innovation – results of research

Innovation should be treated as a process, and enterprises should properly manage innovation. The innovation management process is characterized by several stages, thanks to which the process may be conducted in an effective and promising manner:

- Search and selection

- Planning process
- Implementation stage
- Diffusion and discounting process
- Controlling

There are numerous factors, which condition the process of implementing and managing innovation in organizations. These include factors of socio-economic, production and financial nature, as well as factors related with the entrepreneur's approach to innovation. Innovation barriers may derive from the environment (e.g. uncertain demand, a lack of access or limited access to external financing sources etc.), and from within the enterprise. Internal barriers do not only include a lack of own funds, but also concerns about using the services of external consulting companies, or problems with the availability of external services, as well as a frequent lack of research & development units in a SME. These problems often result in information gaps.

Throughout the entire innovation management process, valid, reliable and carefully selected information is of key importance. Sources of innovation mean the factors, which inspire the creation of concepts, ideas and projects, which result in seeking innovation and implementing enhancements to existing solutions as well as new ideas (Ślusarczyk and Grondys, 2019). Therefore, this process is usually initiated in the entrepreneur's mind, where he analyses his insights concerning the internal and/or external environment of the company. In turn, the methods of meeting such needs may derive from both inside or outside of the unit. One of the methods allowing the execute innovation projects is to conduct own research & development works (Pypłacz and Liczmańska-Kopcewicz, 2018). Tomaszewski (2015) proposed distinguishing the following concepts: "source of innovation" and "source of information about innovation". In his opinion, sources of innovation may relate to entities, which come up with ideas to meet innovation needs, and relate to technological or organizational solutions (Dermody, Yun, Della Corte, 2019). In turn, sources of information about innovation may include both the entities themselves, as well as tangible and intangible resources, which provide information about innovation. In this case, information is provided about technological solutions, the sale of which will generate income for the source of innovation (Wlodarczyk, 2017). Therefore, sources of innovation usually constitute the sources of information about innovation. The importance of sources of innovation is varied, depending on the type. Most popular sources include: customers, fairs, specialized literature, forecasts, market studies, independent research entities, mass media, press and magazines, entrepreneurs, advisors and associates. Therefore, in terms of the place of development, sources of innovation may be divided into exogenous (e.g. knowledge transfers, scientific research conducted on national and foreign universities etc.) and endogenous (including results of the works of own research & technical units, quality wheels, management, streamlining designers etc.) (Badowska, 2012).

As demonstrated in the presented deliberations, the innovation process on the one hand depends on proper sources of information about innovation, and on the other hand conditions the need of functioning of subsequent sources of innovation.

Research Methodology

A critical analysis of the literature was conducted to achieve the research goal. In addition, cognitive methods were supported by own research. Statistical measures and a data analysis with pivot tables were used for the purpose of analysis the results of own research.

Representatives of companies operating in the Polish SME sector were invited to take part in a research conducted within the Innovation Barometer. The Innovation Barometer is a cyclical research addressed at Polish entrepreneurs, gradually developed for other European countries. The computer-assisted web interviewing (CAWI) method was used in the research. The edition of the research analysed in this elaboration was conducted from 1 April to 30 November 2018 with the use of an electronic form available on the Internet platform. 242 persons from various industries participated in the research. The Innovation Barometer includes 39 questions, divided into groups related with

various types of innovations specified hereinabove, in accordance with the Oslo Manual division (Oslo Manual 2008). Table 2 presents the characteristics of the analysed group.

Table 2: Characteristics of the enterprises surveyed (N = 242)

The questionnaire elements	Volume	Participation in %
Enterprise size:		
• small (10 - 49 employees)	55	22.7
• medium (50 - 249 employees)	53	21.9
• large (over 250 employees)	134	55.4
Respondent's position		
• Owner / senior employee	190	78.5
• Employee	52	21.5
Type of enterprise		
• Service	99	40.9
• Production	119	49.2
• Trade	24	9.9

Source: elaborated by the authors.

This article presents partial results of empirical studies, which allow assessing the dependence between types of innovation and selected and used sources of information.

Discussion

A significant issue in the innovation process is to find inspiration on innovation and to obtain support in the form of data and information, which may initiate planning innovative activities in the enterprise.

The conducted study took account of 3 main sources of information, specifying their detailed elements. Tables 3-6 present all analysed sources and numbers of respondents' indications.

Table 3: Number of responses concerning the use of internal sources of information. N=242

What internal sources of information does the company take account of in the process of preparing innovation?	Number of responses
Own research & development facilities	77
Management employees	137
Other employees	79
Other enterprises within the group	67
We do not use other sources	21

Source: elaborated by the authors.

Table 4: Number of responses concerning used market information sources. N=242

What market information sources does the company use in the innovation process?	Number of responses
Suppliers of technical machines and devices, equipment, materials, components and software	82
Customers	121
Competitors and other enterprises within the same area of activity	85
Consulting companies (consultants), commercial and private R&D laboratories	23
We do not use such sources	24

Source: elaborated by the authors.

Table 5: Number of responses concerning used institutional sources of information. N=242

What institutional sources of information does the company use in the innovation process?	Number of responses
Research facilities of the Polish Academy of Sciences (PAN)	8
Research and development units	81
Foreign public research institutions	22
Universities	32
We do not use such sources	132

Source: elaborated by the authors.

Table 6: Number of responses concerning used information sources (not presented elsewhere). N=242

What other sources of information does the company use in the innovation process?	Number of responses
Conferences, fairs, exhibitions	127
Scientific/ technical/ commercial magazines and publications	46
Scientific & technical, specialist, and professional associations	33
We do not use such sources	84

Source: elaborated by the authors.

As presented in tables 3-6, in case of an overall analysis the most frequently indicated source of innovation were management employees (137 responses), meaning they are the principal decision-makers in SMEs. Fairs, conferences and exhibitions were quite popular (127 responses), as well as customers (121 responses), who are often selected as a source of an inspiration. What's interesting, 132 responses indicate that SMEs do not use institutional sources of information or use them very rarely.

A hypothesis was formulated that there is a positive dependence between the type of innovative activity and the used source of information about innovation.

To verify the existence of the aforementioned dependence, a statistical analysis was conducted with regard to dependencies between the analysed variables. The Spearman's correlation rank coefficient was used; obtained values were presented in table xx.

Table 7: Correlation between the type of introduced innovation and the source of information

		Type of innovation activity – product innovation	Type of innovation activity – organizational innovation	Type of innovation activity – marketing innovation	Type of innovation activity – process innovation
Internal sources of information	Correlation coefficient	.215**	.428**	.182**	.827**
	Significance (two-sided)	.001	.000	.004	.000
Market sources of information	Correlation coefficient	.303**	.336**	.456**	.798**
	Significance (two-sided)	.000	.000	.000	.000
Institutional sources of information	Correlation coefficient	.451**	.121	,163*	.346**
	Significance (two-sided)	.000	.061	,011	.016
Other sources of information	Correlation coefficient	.243**	.229**	.157*	.767**
	Significance (two-sided)	.083	.000	.014	.000

*** Correlation significant at 0.01 (two-sided).*
Source: elaborated by the authors.

The values of the Spearman's correlation coefficient presented in table 7 demonstrate the existence of a positive and statistically significant relation between process innovation and sources of internal, market or other information. In case of a relation between institutional sources of information with four types of innovative activity, there were no statistically significant dependencies, and there were only small dependencies (0,1-0,4). Also in the case of dependencies between all other variables (product, organizational and marketing innovation vs. market information) there are only small dependencies (0,1 – 0,4).

Further analysis was conducted in regard to dependencies between process innovations and sources of information. Results are presented in fig. 1, which demonstrate the values of the coefficient of correlations for selected sources of innovation.

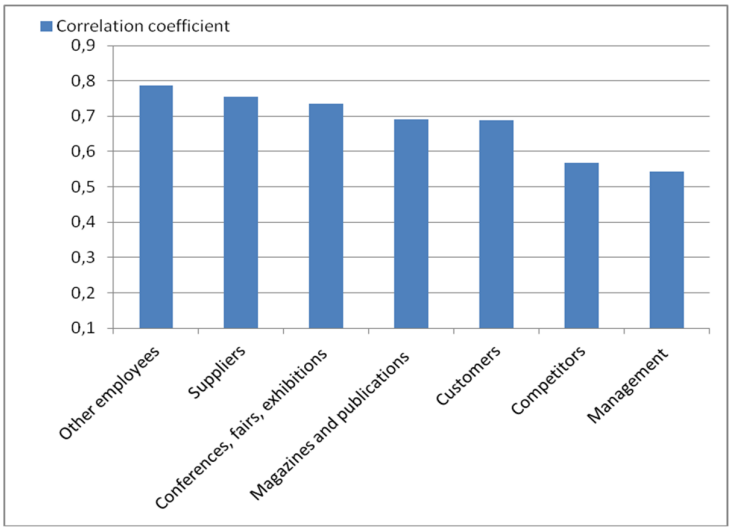

Fig. 1: Correlation between process innovation and selected sources of information

Significance (two-sided): 0.000-0.001
*** Correlation significant at 0.01 (two-sided).*
Source: elaborated by the authors.

The resulting values of the Spearman's correlation coefficient demonstrate a positive and statistically significant relation. The positive character of the correlation means that the indicated sources of information affect the implementation of process innovation.

The correlation coefficient between factors was at.689** to .787**, which demonstrates moderate and quite strong relation. For two factors – dependencies between competitors and management, and their influence on introducing process innovation – moderate dependency was demonstrated, at the level of.567**, .543**. For other sources of information, obtained values were even lower, therefore they were not presented as being insignificant. No strong dependency occurred for any factor.

Summary

It should be noted that innovation play an important role in shaping the company's success on the given market. This mainly happens when the company manages innovation in such manner, so as to synchronize the implementation of innovation with its internal and external operating environment.

Innovative activities are effective if they guarantee achieving and maintaining a proper level of competitiveness. Market success is reserved for those entities, that will spot the opportunity and chances to development in the presence of numerous competitors. Identification of all factors that support innovative activity contributes to the development of an effective strategy in the permanently changing environment. The entire process of managing innovation is conditioned upon the possessed sources of information, thanks to which planning and implementing innovative solutions may be conducted more effectively. The results that indicate a positive dependence between types of innovation and sources of innovation demonstrate that one should consider the type of innovation that the company aims to implement. In particular case of SME, this may contribute to an increase in the effectiveness of innovative activities, in particular thanks to saving time and costs of obtaining information.

Innovativeness is the driver of changes, and changes constitute the basic elements of a business strategy. However, this is possible when the entity creates a culture of innovativeness, which develops when employees at all levels engage in supporting, promoting and implementing new

products, services, and business models, and conscientiously execute the assumptions of the innovative development strategy.

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All-Russian and Regional Development Factors Regional Insurance Market

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Abstract

Insurance is the most important institution of financial protection and a significant investment resource, but its role in the modern economy is underestimated, which is especially evident in regions with a low level of socio-economic development. The relevance of the article is due to the following. It identifies all-Russian and regional factors in the development of the insurance market, the management of which will contribute to the development of the regional insurance market and the region itself. The aim of the article is to identify and systematize the development factors of the regional insurance market, as well as to develop a mechanism for their effective impact on the insurance market and on the development of the region. The study used the method of deduction, the method of comparative empirical research, statistical methods, functional analysis, modeling. The article contains a developed algorithm for increasing the efficiency of the insurance market and the region as a whole by managing stimulating and restraining factors. It takes into account regional peculiarities and can be used for any regions of Russia. The results of the work can be taken into account when developing national and regional strategies for socio-economic development, including through insurance, as well as when adjusting the methods of state regulation of the insurance market in Russia.

Keywords: Regional Insurance Market, Insurance Regulation, Socio-Economic Development Of The Region, The Effectiveness Of The Regional Insurance Market

Introduction

The regional insurance market is able to have a positive impact on the development of the region. The article identifies and analyzes the factors of the development of the insurance market, the management of which will contribute to the development of the regional insurance market and the region itself.

The purpose of the article is to identify and systematize the development factors of the regional insurance market, in the process of developing a mechanism for their effective impact on the insurance market and

The hypothesis of the study is the management of the stimulating and restraining factors of the functioning of the insurance market in the region can ensure its effective development.

Analysis of the development of the problem showed the following.

1. The regional insurance market is part of the national insurance market. Among the issues discussed in the world and Russian scientific community that affect the development of national and regional insurance markets, Porrini (2017), Chang et al. (2013) note the processes of globalization and digitalization of the insurance market. The specifics of the development of insurance markets in regions is determined by the features of national insurance markets, which were studied in Burmaa (2018), Gaganis et al. (2019), Koijen and Shadow (2016), Mnykh (2017). Issues of financial convergence in the insurance market, competition and shadow insurance were considered in the works of Pisarenko (2013), Kuznetsova (2009), Chernova, Kuznetsova and Pisarenko (2018); Hong and Hun-Seog (2018), Geng (2018), RussellToth et al. (2019). The problems of informational openness of the insurance market are discussed in the studies of Ermolaeva (2011), Sholoiko (2018).

One of the important tasks of the development of insurance in world practice is the effective functioning of the insurance infrastructure and its interaction with banks. These issues are explored by Pisarenko (2013), Chang (2018), Sholoiko (2018).

2. The insurance market is a segment of the region's economy.

Considerable attention is paid to the functioning and development of regional insurance markets in Russia. Among the general issues discussed, first of all, there are such as state regulation and the management of regional insurance markets. These questions are studied by Ermolaev (2011), Keneshova (2018), Koijen and Shadow (2016), RussellToth et al. (2019). Factors and problems in the development of regional insurance markets are considered by Keneshova (2018), Orlanyuk-Malitskaya (2017), Tarasova and Voskovskaya (2018), Burmaa (2018). A special place in the study of the problem is occupied by the issues of the influence of the development of the insurance market on the economy of the corresponding region, discussed in the works of Bashlakova (2017), Vorontsov (2014), Efimova and Kochubey (2017), Tsyganova and Kirillova (2018).

In studies of regional insurance markets, the latter is not considered as part of the all-Russian insurance market and as a segment of the regional economy. The presented work closes this gap of fragmentation.

Research Methods and Results

The main research methods are the deduction method - the use of knowledge on the development of the entire national insurance market for development analysis; method of comparative empirical research - observation and comparison of the functioning of both the national insurance market and its regional segments; statistical research methods - correlation and regression analysis of indicators of the functioning of regional insurance markets; functional analysis - consideration of the insurance market as an institution of financial protection from the risks of the region; modeling, allowing to study the influence of the regional economy on the development of its insurance market.

The results obtained in the article include the following.

- consideration of the regional insurance market as part of the national insurance market made it possible to identify all-Russian and specific regional factors in the functioning of regional insurance markets;
- allocation of all-Russian and specific regional factors of the functioning of regional insurance markets confirmed the existence of a connection between all-Russian socio-economic factors and development factors of regional insurance markets, including the example of the Republic of Khakassia;

- to determine the specific impact on the development of the regional insurance market on the example of the Republic of Khakassia, a regression equation was constructed that establishes a relationship between significant factors in the development of the region and the final indicator of the development of the regional insurance market - the total size of all insurance premiums;
- taking into account the different directions of the impact of all-Russian and regional factors on the regional insurance market, groups of stimulating and constraining factors for its development were identified;
- in order to increase the efficiency of the regional insurance market and its positive impact on the development of the region, an algorithm has been developed aimed at strengthening stimulating and weakening constraints.

Discussion

General Russian factors of functioning and development regional insurance market

The regional insurance market is part of the national insurance market, which, in turn, is subject to the influence of all-Russian factors in the functioning and development of the entire economy of the country.

To assess the relationship between the national economy and insurance, the correlation coefficients were calculated between the values of the main indicators of the economy and the values of the functioning indicators of the Russian insurance market (table 1).

For this, we used data from the regional statistics of Rosstat and insurance statistics of the Bank of Russia. The total (total) values of socio-economic indicators for the economy of the Russian Federation and for the Russian insurance market - for the subjects of the Russian Federation for 2011-2017 were used as data arrays. The calculation results are given in table 1.

Table 1: values of paired correlation coefficients between the main all-Russian socio-economic indicators and the most important indicators of the national insurance market (2011-2017)

Factor signs	Effective signs				
	Insurance premiums total	Life insurance premiums	Personal insurance premiums excluding life insurance	Property insurance premiums	Car owner liability insurance premiums
Deposits of individuals and legal entities	0.97	0.97	0.96	0.98	0.75
The financial result of enterprises	0.83	0.83	0.79	0.82	0.78
Consolidated Budget Revenues	0.82	0.84	0.76	0.8	0.81
Fixed assets of enterprises	0.79	0.82	0.71	0.74	0.92
Gross regional product	0.74	0.77	0.67	0.70	0.81
Retail turnover	0.73	0.76	0.65	0.7	0.85
Manufacturing	0.71	0.74	0.62	0.67	0.89
Average annual number of employees	0.66	0.69	0.56	0.61	0.84
Fixed investment	0.65	0.68	0.56	0.59	0.89
Debt on loans to individuals	0.63	0.66	0.53	0.58	0.87

Average annual population	0.54	0.57	0.43	0.49	0.79
Per capita consumer spending	0.54	0.53	0.53	0.55	0.4
Per capita cash income	0.43	0.42	0.43	0.44	0.29
Mineral production	0.42	0.46	0.34	0.34	0.7
Housing commissioning	0.41	0.43	0.29	0.36	0.72
Agricultural output	0.21	0.26	0.11	0.15	0.55

Calculated according to: Federal State Statistics Service. URL: http://www.gks.ru; the official website of the Bank of Russia. URL: http://www.cbr.ru.

A strong correlation (over 0.9) is observed between the all-Russian socio-economic indicator deposits of individuals and legal entities, which describes the factor level of citizens' income and the sum of insurance premiums for all types of insurance. Its weakening is observed only for car owners' liability insurance premiums, since their size is stipulated by the obligatory nature of this type of insurance.

A high correlation (0.7-0.9) with the size of insurance premiums is observed for all-Russian socio-economic indicators financial result of enterprises, income of consolidated budgets, fixed assets of enterprises, gross regional product, retail turnover, population, value of fixed assets in the economy, manufacturing volumes. On May, a high correlation of these socio-economic indicators was noted with premiums on life insurance and premiums on compulsory liability insurance of car owners.

The average correlation (0.5-0.7) with the size of insurance premiums is observed for the following all-Russian socio-economic indicators – the number of people employed in the economy, investment in fixed assets, debt on loans to individuals, population, consumer spending per capita.

Other factors have a weak effect on the scale of insurance activity (correlation coefficient less than 0.5).

Correlation coefficients were calculated according to statistics of the country's economy and the national insurance market. The influence of factors on the insurance market of a particular region may differ from their influence on the national insurance market. Therefore, the following considerations must be taken into account.

Firstly, the relationship between the country's economy and the national insurance market should be confirmed for each region, since the all-Russian factors affecting the development of the entire national market can affect the development of the regional insurance market in different ways.

Secondly, for each region, the influence of factors for which the relationship between the all-Russian socio-economic indicators and the national insurance market indicators is characterized by a low value of the correlation coefficient (below 0.5) should be investigated, since at the country level may be insignificant, and at the level of a particular region - significant.

Thirdly, taking into account the influence of the identified all-Russian factors on the insurance market of a particular region is advisable when calculating the correlation coefficients between the socio-economic indicators of the region and the most important indicators of the regional insurance market.

Regional development factors affecting the regional insurance market

The feasibility of calculating the correlation coefficients between the values of the main socio-economic indicators of the region, describing all-Russian factors, and the most important indicators of the regional insurance market is due to the following. The geographical position of the region, its climatic and / or demographic characteristics of the region have a different degree of influence of all-Russian factors on the development of regional insurance.

The list of socio-economic indicators of the region and its insurance market should coincide with the list of all-Russian socio-economic indicators and indicators of the national insurance market.

The obtained values of the correlation coefficients will make it possible to streamline the all-Russian factors in the development of the region and its insurance market, as well as highlight specific regional factors that influence the regional insurance market.

In the table 2 shows the values of correlation coefficients calculated for the main socio-economic indicators of the region and for the most important indicators of the regional insurance market for the Republic of Khakassia (table 2). For the analysis, we used data for the period 2011-2017.

Table 2: values of paired correlation coefficients between the main socio-economic indicators of the region and the most important indicators of the regional insurance market of Khakassia

Factor sign	Effective signs				
	Insurance premiums total	**Life insurance premiums**	**Personal insurance premiums excluding life insurance**	**Property Insurance Premiums**	**Car owner liability insurance premiums**
Deposits of individuals and legal entities	0.96	0.9 3	-0.09	0.49	0.62
The financial result of enterprises	0.44	0.67	-0.66	-0.63	0.59
Consolidated Budget Revenues	0.9	0.8	-0.19	0.28	0.84
Fixed assets of enterprises	0.98	0.86	-0.1	0.28	0.98
Gross regional product	0.98	0.92	-0.12	0.22	0.85
Retail turnover	0.98	0.83	-0.04	0.3	0.87
Manufacturing	0.89	0.78	-0.24	0.15	0.91
Average annual number of employees	-0.23	0.12	-0.86	-0.9	0.12
Fixed investment	-0.68	-0.88	0.52	0.28	-0.69
Loans to individuals	0.94	0.74	0.05	0.54	0.75
Average annual population	0.96	0.96	0.96	0.96	0.96
Per capita consumer spending	0.99	0.86	-0.03	0.32	0.85
Per capita cash income	0.9 6	0.78	-0.06	0.23	0.92
Mineral production	0.87	0.99	-0.38	0.05	0.76
Housing commissioning	0.56	0.3	0,07	0.45	0.58
Agricultural output	0.96	0.8 3	-0.1 1	0.28	0.89

Calculated according to: Federal State Statistics Service. URL: http://www.gks.ru; the official website of the Bank of Russia. URL: http://www.cbr.ru.

The values of the correlation coefficients calculated according to the statistics of the Republic of Khakassia and the regional insurance market (table 2), significantly differ from the values of the correlation coefficients obtained in the analysis of all regions (table 1). Most of the studied indicators of the region's economy (table 2) reflect a very close relationship with insurance premiums, life insurance premiums and third-party liability insurance (correlation coefficients up to 0.96), which, on the one hand, confirms the relationship between the regional economy and the regional insurance market and, on the other hand, it indicates a negative correlation and the absence of a connection between insurance premiums on personal insurance and most development indicators of Khakassia.

A comparison of the values of the correlation coefficients obtained from the statistics of the whole country and the statistics of Khakassia made it possible to single out the following all-Russian factors influencing the development of the regional insurance market of Khakassia: income level of citizens and enterprises (indicator – deposits of individuals and legal entities); financial potential of the region and the level of activity in the financial markets (indicator - income of consolidated budgets).

Comparison of the values of the correlation coefficients of tables 1 and 2 made it possible to identify specific regional factors — those whose influence is insignificant at the level of the entire regional insurance market, but significantly at the regional level.

Specific regional factors that have a significant impact on the development of the regional insurance market include: the level of development of agriculture (indicator – the volume of agricultural production) and the level of development of the mining industry in the region (indicator – the volume of mining).

In the general case, it is also possible that the influence of the all-Russian factor calculated according to all-Russian statistics is assessed as significant – in this case, the correlation coefficient between the indicators describing this factor is high. However, when analyzing the influence of this factor on a specific regional insurance market (through regional indicators), this factor can be deduced from the number of significant ones. Such a situation is possible, since when calculating indicators at the national level, the statistics of the functioning of a particular region can be blocked by the average values of indicators calculated for all regions. An example is a factor – investment attractiveness and innovative activity, described by such indicators of a country's socio-economic development as the volume of investments in fixed assets.

A comparison of the values of the correlation coefficients obtained for the all-Russian socio-economic indicators and the indicators of the entire Russian insurance, with the values of the coefficients obtained for the regional socio-economic indicators and the indicators of the regional insurance market, helps to highlight those all-Russian factors for the regional insurance market, which are factors in the development of all regional insurance markets and the regional insurance market.

The regression equation and its application for predicting the development of the regional insurance market

In addition to correlation analysis, the purpose of which is to identify factors in the development of the regional insurance market, a more accurate assessment of the influence of factors in the functioning of the region on the level of development of the regional insurance market is advisable. Below is a regression model based on data from the socio-economic region of the Republic of Khakassia, which reflects the influence of the main factors of the development of the republic on a general indicator of the regional insurance market - the level of total insurance premiums.

Only independent factors should be inserted into the regression model, which excludes multicollinearity – a strong correlation dependence of model factors.

According to the statistics of the economy of the Russian Federation and its regions, multiple correlation coefficients were calculated for the subjects of the Russian Federation and a correlation matrix was constructed.

According to the results of its analysis, indicators were excluded from the model, although they corresponded to various factors of the region’s development, but having paired correlation coefficients of more than 0.8, which means multicollinearity.

The construction of the regression equation involves the allocation of factor signs. For their formation, the socio-economic indicators of the region’s activity were analyzed which, with the indicators of the regional insurance market, had correlation coefficients higher than 0.5, confirming

the relationship of regional socio-economic indicators with indicators of the regional insurance market.
In general, the analysis of indicators of the socio-economic development of the region made it possible to single out significant factor signs and construct the following regression equation.

$$y = 3401701{,}9 - 7{,}12x_1 - 199{,}81x_2 - 2875{,}79x_3 + 1{,}92x_4 + 6{,}08x_5 + 78{,}02x_6$$

where x_1 – gross regional product, million rubles;

x_2 – consumer spending per capita, rubles/month;

x_3 – commissioning of housing, thousand square meters;

x_4 – financial result of enterprises, million rubles;

x_5 – the volume of mining, million rubles;

x_6 – deposits of individuals and legal entities, million rubles.

The reliability of any regression model is estimated by the coefficient of determination of R-squared. For the presented model, this indicator is 0.9985, which determines its high reliability (it is close to 100%). It is believed that the regression model correctly describes the real situation with an R-square value above 0.8.

The significance of the constructed model is estimated by the Fisher criterion (F-statistics). The model presented below is significant, so the value of the calculated F-statistics is zero, and in the general case, the model is significant if the F-statistics is less than 0.05.

The obtained regression equation can be used to predict changes in the effective indicator for a certain change in factor characteristics. So, when all factor characteristics are changed by one (each of the signs is 1 million rubles), the effective attribute (the sum of all insurance premiums) will change to the amount of 3˚398˚705 thousand rubles.

Using this model, it is possible to evaluate and predict the change in the volume of insurance premiums received on the regional insurance market of Khakassia, when one or several factor signs characterizing the development of the economy of this region are changed by one.

Stimulating and inhibiting all-Russian factors for the development of insurance of the regional insurance market

The variety of factors, as well as the different degree and orientation of their impact on the insurance market of the region, necessitate their subdivision into stimulating and restraining (fig. 1).

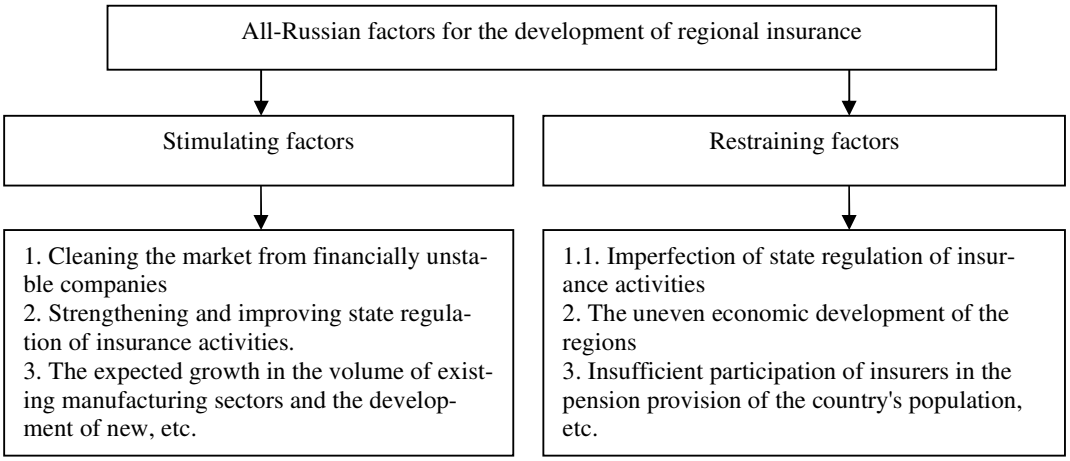

Fig.1: Examples of stimulating and inhibiting nationwide factors development of regional insurance

Compiled by the authors.

Among the stimulating factors are the following.

1. Cleaning the market from financially unstable and unscrupulous companies has a stimulating effect on the development of the insurance market. At the same time, regulation of the insurance market becomes more transparent and effective. In the table 3 presents the dynamics of the number of insurers, illustrating the impact of this factor.

Table 3: dynamics of the number of insurers registered in the Russian Federation for the period 2010-2018

Period	The number of registered insurers (at the end of the year)	The rate of decline,% to the previous period	Number of companies with license revoked	Share of revoked licenses,% of the total number of companies
2010	625	89.03	89	4.68
2011	579	92.64	40	8.97
2012	469	81	103	18.56
2013	432	92.11	39	6.57
2014	416	96.3	19	12.90
2015	364	87.5	70	20.35
2016	297	81.59	73	27.76
2017	226	76.09	30	13.27
2018	190	84.07	20	10.52

Calculated according to: The official website of the Bank of Russia. URL: http://www.cbr.ru; Analytical portal «Insurance today». URL: http://www.insur-info.ru/licence/?page=1&order=date&search=%EE

2. Strengthening and improving state regulation of insurance activities. The factor of state regulation in terms of impact is one of the most powerful, which is explained by the role of regulation as the main mechanism for managing insurance. This factor can have a stimulating effect when the content of the insurance regulation helps to strengthen insurance protection, and restraining, if the legal regulation of insurance is imperfect.

3. The expected growth in existing production sectors and the development of new ones. The development of the economy under the conditions of economic sanctions and the tasks of import

substitution caused by them involves the development of existing ones and the development of new manufacturing sectors. At the same time, the functioning of the production sector is accompanied by various risks. Insurance is an institution of financial protection from economic risks. Therefore, the development of industries becomes an impetus for the use of insurance coverage, contributing to the development of the national insurance market and its regional segments.

Among the constraining factors for the development of the regional insurance market are the following.

1. The imperfection of state regulation of insurance activities. Regulation of insurance activity does not sufficiently take into account the influence of general external and internal factors of insurance development, including regional. It practically does not contain regulation points of the regional insurance market.

2. The uneven economic development of the regions. The basis of insurance as an institution of financial and social protection is the economy of the region - the level of development of the sphere of material production and the social sphere, the development of regional infrastructure, the level of income of the population, the availability of qualified personnel, etc. The results of a study obtained by Tarasova and Voskovskaya (2018) illustrate the impact of the level of economic development of the regions on the insurance market. They showed insufficient insurance development in regions with a low level of socio-economic development, such as the Siberian, Ural, Volga and North Caucasian districts.

3. Insufficient participation of insurers in the pension provision of the population, which is manifested in the imperfection of the pension and tax laws of the Russian Federation and the instability of the national economy. The reasons for this situation are more burdensome taxation of long-term life insurance in insurance companies compared to non-state pension funds, high inflation, as well as long-term investment risks. The legislative solution to these problems will enable insurers to participate in the pension system, will help attract “long” money to the insurance market, and thereby ensure the development of national and regional insurance markets.

Stimulating and inhibiting regional factors in the development of the regional insurance market

A variety of regional factors in the development of the insurance market also determine the importance of dividing them into stimulating and restraining.

In the table 4 gives an example of the impact of factors of socio-economic development (nationwide and specific for the regions under consideration – Central, North-West, Southern Federal and Ural districts) and their division into stimulating and restraining. The selection of factors for each of the regions was carried out taking into account their significance according to the results of the correlation analysis.

Table 4: stimulating and inhibiting factors in the development of the region, affecting the insurance market

Federal districts of the Russian Federation	Regional incentives	Regional constraints
Central Federal District and Northwest Federal District	- high level of economic diversification - predominance of manufacturing, trade and services - proximity of European countries and foreign economic relations - high investment attractiveness - efficient financial markets - high budgetary security - high population density - profitable enterprises and high incomes of the population - significant human potential - high tourist potential - high level of catastrophic risks - adverse environmental conditions	- insignificant reserves of minerals and natural resources - active migration processes
Southern Federal District	- high level of economic diversification - average budgetary security - average development of foreign economic relations - average investment attractiveness - population density is above average - high tourist potential	- active migration processes - limitedly developed financial markets - seasonal nature of the economy - predominance of agriculture, trade - income level of citizens below average - limited human potential - insignificant mineral reserves - high level of natural risks - ecological environment is pleasant and pleasant
Ural Federal District	- attractive investment region - financial market is represented by banking - present mineral reserves - high technogenic and production risks - the environmental situation is difficult - average budgetary security - average income of citizens - migration processes are negligible	- economic diversification is weak - predominance of extractive industries - externally closed region - predominance of single-industry towns - limited human potential - weak tourism potential

Compiled by the authors.

In the regions with the highest level of socio-economic development (Central and North-Western Federal Districts), stimulating factors have a predominant effect on the development of regional insurance. In regions with a lower but satisfactory level of socio-economic development (Ural, Siberian and Far Eastern Federal Districts), both the stimulating and the restraining factors influence the development of the insurance market. In regions with a low level of socio-economic development (South and North Caucasus Federal Districts), the most significant factors are constraints.

The impact of regional insurance on the socio-economic development of the region

In order to increase the efficiency of the regional insurance market and the development of the region itself, it is proposed to use a certain algorithm aimed at strengthening stimulating and weakening constraints.

1st stage. Identification of all-Russian factors in the development of regional insurance markets. It is carried out on the basis of analysis of the level of socio-economic development of the whole country as a set of regions and general information on the state of the entire insurance market.

2nd stage. Identification of regional development factors that affect insurance in the region. Since the insurance market is part of the economy of the region, and its specificity is determined by its geographical position, natural-climatic, demographic and other features, the impact of factors in the regions of Russia is different.

3rd stage. The combination of all-Russian and regional stimulating and restraining factors. It is due to the need to draw up a common factor management program in order to increase the efficiency of the insurance market and improve the socio-economic situation of the region.

4th stage. Classification of development factors of the regional insurance market based on their controllability. Since not all factors lend themselves to direct control, they need to be divided into 3 groups:

1) insurance development factors controlled directly through the regional management system - the sectoral structure of the regional economy and the level of its diversification, tourism potential, investment attractiveness and innovative activity in the region, etc.;

2) factors that are managed indirectly through the introduction of changes to the system of state insurance regulation. These are usually all-Russian factors, the management of which is possible by adjusting insurance regulation at the country level, for example, the cost of voluntary insurance services, the development of professionalism of insurance intermediaries, the participation of bank capital in insurance activities, etc.;

3) uncontrollable factors that can be taken into account in insurance activities. As a rule, these are macroeconomic factors of an uninsurance nature. When solving the problem of forming managerial decisions on the development of insurance in the region, they are excluded from consideration.

To develop appropriate managerial decisions, it is advisable to divide all factors into manageable directly and indirectly (table 5).

Table 5: management decisions for direct or indirect impact on the development factors of the regional insurance market

Federal districts of the Russian Federation	Regional incentives	Regional constraints
Central Federal District and Northwest Federal District	- high level of economic diversification - predominance of manufacturing, trade and services - proximity of European countries and foreign economic relations - high investment attractiveness - efficient financial markets - high budgetary security - high population density - profitable enterprises and high incomes of the population	- insignificant reserves of minerals and natural resources - active migration processes

	- significant human potential - high tourist potential - high level of catastrophic risks - adverse environmental conditions	
Southern Federal District	- high level of economic diversification - average budgetary security - average development of foreign economic relations - average investment attractiveness - population density is above average - high tourist potential	- active migration processes - limitedly developed financial markets - seasonal nature of the economy - predominance of agriculture, trade - income level of citizens below average - limited human potential - insignificant mineral reserves - high level of natural risks - ecological environment is pleasant and pleasant
Ural Federal District	- attractive investment region - financial market is represented by banking - present mineral reserves - high technogenic and production risks - the environmental situation is difficult - average budgetary security - average income of citizens - migration processes are negligible	- economic diversification is weak - predominance of extractive industries - externally closed region - predominance of single-industry towns - limited human potential - weak tourism potential

Compiled by the authors.

5th stage. Formation of the insurance development program, contributing to the socio-economic development of the region. The purpose of the program is to ensure the effective functioning of the insurance market, which helps to increase the level of social economic development of the region. The key tasks of the program for managing all-Russian and regional insurance factors are to strengthen the action of stimulating factors, smoothing the action of constraining factors, and converting constraining factors into stimulating ones.

Conclusions

The regional insurance market is a part of the national market and therefore is subject to the influence of factors of an all-Russian nature. It is a sector of the region's economy and is subject to the development factors of the region, while being its driving force.

The results of the functioning of the region's insurance market are determined by the influence of all-Russian and regional factors on the development of the domestic insurance market. For each region, specific regional factors for the development of insurance are distinguished.

Improving the effectiveness of regional insurance and the socio-economic development of the region implies such management of all-Russian and regional factors, which is aimed at strengthening the impact of stimulating factors and at reducing or eliminating constraining factors.

In order to ensure the effective development of the insurance market and the region as a whole, an algorithm of actions has been developed, which is a mechanism to increase the efficiency of the insurance market and improve the socio-economic development of the region.

In general, the study confirms the hypothesis that the targeted management of factors in the functioning of the insurance market can ensure the effective development of not only the industry market itself, but also the region as a whole.

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Assessment of Impact of Oil and Gas Enterprises Activity on The State of Individual Environmental Components

(A Case of Kharkiv Region, Ukraine)

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Abstract

The article deals with the problem of hydrocarbon contamination of environmental components as a result of Shebelynka Department of Gas Condensate and Oil Processingproduction activity. Studies have shown that the problem of hydrocarbon contamination of groundwater and soil within the urban village Andriyivka remains relevant today. The presence of petroleum products in 100% of soil and groundwater samples and the toxic properties of 75% of soils and 86% of groundwater have been determined. It is proposed to carry out biotesting together with analytical methods of measuring the content of petroleum products in landscape components.

Keywords: technogenic deposit, hydrocarbon pollution, biotest, toxicity.

Statement of the problem

There are a large number of naphtha, natural gas and gas condensate deposits in Ukraine. In total, there aremore than 350 deposits, including 220 in Dnipropetrovsk-Donetsk provinces in the east and northeast of Ukraine(*Chebanenko, 2002).*

More than 100 oil and gas fields are found in Kharkiv region with about 1,200 wells of oil,natural gas and gas condensate wells in operation, including more than 1,000 operating ones. The oil and gas industry is known to be multifunctional and at all stages (well drilling, production, processing and transportation of hydrocarbons), significant volumes of production waste are generated, which negativelyaffect the environment*(Pospelov, 2019).*

In Kharkiv region, the oil and gas territories are located in the form of a wide strip extending diagonally from the northwest to the southeast from Krasnokutsk to Izium. The deposits belong to Dnieper-Donetsk oil and gas province, which coincides spatially with the tectonic depression (DDD). The majority of DDD are gas and gas condensate fieldsand only two relatively large oil and gas condensate fields are located in the west – Koziivka and West –Koziivka.

Within the boundaries of the DDD, oil and gas content of the subsoil varies considerably. The largest technogenic load is associated with the extraction of hydrocarbons within Shebelynka, West-Khrestyshchensk and Yefremiv fields. Density of wells in individual sections of deposits reaches 7-10 units per km2 in the designated areas. Part of the oil and gas fields in Kharkiv region is located

within the floodplains and the first offshore terraces of the rivers. Thus, under such conditions even minor pollution can significantly affect aquatic ecosystems. Environmental problems are particularly acute in the event of emergencies due to the loss of large volumes of oil caused by corrosion of tanks, unauthorized extraction of oil and condensation from product pipelines. Man-made oil deposits that have formed in the areas of oil refineries are extremely dangerous sources of contamination of soil, groundwaterand surface water. More than one hundred oil spills from petrochemical contamination of soil in the aeration zone and groundwater have been recorded in Ukraine with a total area of 30 thousand hectares (Mitropolsky, 2002).

In modern conditions, when the process of fuel and energy resources extraction intensification in Ukraine has become one of the most important tasks of the state policy, the solution to the problem of ecological safety in the territories adjacent to the oil and gas production and processing enterprises becomes extremely relevant.

Since the ultimate purpose of monitoring is to ensure conservation of the environment in accordance with established environmental safety requirements, it is of utmost importance to organize monitoring in the oil and gas territories, taking into account specific features of petrochemical pollutionspread. The urgent need to solve this problem is explained by the fact that systematic observations of the environment state in the oil and gas territories (in particular, in Kharkiv region) are practically not conducted at present. This is connected with the spread of petrochemical contamination in large areas. Considering this fact, it is advisable to use economic technologies and effective research methods when surveying territories contaminated by the operation of oil and gas enterprises. The use of traditional ecological, geochemical and hydrochemical surveys for this purpose is ineffective because petrochemical pollution is of a site nature due to the large number of sources of oil and gas production and processing enterprises' waste in the natural environment. In addition, such surveys on a regular network in large areas involve considerable expenses and other difficulties.

Determining the approach that can be expected to produce the most effective observation results is related to and depends on the location of the petrochemical pollutionsources in the and gas areas (*Krainiukov, 2018).*

The aim of the work is to assess the impact of production activity of an oil and gas company on the state of individual environmental components.

Analysis of Studies on Hydrocarbon Pollution

Oil and gas refineriesare extremely dangerous sources of contamination of the territory where local spots are created - the so-called "technogenic deposits" of free oil products. At present, in Ukraine, the total area of such spots reaches 30 thousand hectares. “Technogenic deposits” were formed as a result of the inflow of technogenic flows from the objects of the widely branched structure of the oil and gas refining industry, the storage of fuel and lubricants, and in case of emergency leakage of petroleum products (*Mitropolsky, 2002).*Accumulation of oil stains in the geological environment is an extremely dangerous source of contamination of the soil in the aeration zone, groundwater, wells for drinking water intakes and water bodies below the technogenic stream from the source of pollution *(Gennadiev, 2015).*

When the territory is contaminated with hydrocarbon, man-made migration flows of petroleum products are created, the main load of which penetrates into soil, groundwater and surface water (*Abdel-Shafy and Mansour, 2016).*

Many petroleum hydrocarbons have high affinity for organic matter and can easily adsorb organic materials and be attached to soil and sediment due to their hydrophobicity (*Clay, 2014).*

Hydrocarbon pollution of geological and related environments has its own peculiarities in character of its impact on geosystems due to the fact that petroleum products have a multicomponent diverse chemical composition. The main characteristics of petroleum productscomposition, which determine their impact on the ecological status of the territory and on the biotic component of ecosystems, are the content of light fraction of cyclic hydrocarbons, solid paraffins, resins, asphaltenes and sulfur. The light fraction of petroleum products is simple low molecular weight methane (alkanes), naphthenic (cycloparaffins) and aromatic hydrocarbons. Methane hydrocarbons, having narcotic properties, exert a toxic effect on soil and aquatic organisms. Cyclics include naphthenic and aromatic hydrocarbons. The total content of naphthenic hydrocarbons in the composition of petroleum products varies from 35 to 60%; the aromatic hydrocarbons content is from 20 to 40%, the bulk of which is benzene. Aromatic hydrocarbons are the most toxic components. Consequences of hydrocarbon pollution of the environment are determined by a set of factors: the amount and chemical composition of petroleum products, the nature of the interaction of abiotic conditions and the biotic component of ecosystems. The combined effect of these factors depends on whether the ecosystem adapts to the hydrocarbon load or whether it degrades *(O'Brien, 2017).*

Man-made migration flows of petroleum products are created during the hydrocarbon pollution of the territory. Their main load is taken by soils, groundwater and surface water.

The main sources of pollution of the geological environment with petroleum products are oil and petroleum productsspills, sewage and emissions from oil refineries and petrochemical enterprises.

When contaminated with petroleum products, ecological equilibrium in the ecosystem is upset, soil productivitydecreases, morphological characteristics change and physicochemical properties of soils create a threat of oil products entering underground and surface waters *(Krainiukov, 2005).*

Contamination of soils with petroleum products causes changes in their physical and chemical properties: bonding of structural parts of the soil with oil leads to a significant increase in the viscosity and density of the soil mass, impairing its air-water regime.Soils soaked in an emulsion of petroleum products lose the ability to absorb and retain moisture. Due to contamination of the soil cover with oil products anaerobic conditions arise, the redox potential changes, the carbon-nitrogen balance is upset. Leaks of petroleum products with a high content of heavy hydrocarbon fractions form a dense, viscous bituminous crust on the soil surface that impedes gas exchange between the atmosphere and the soil (*Pikovsky, 1993).*

Violations of weak soil structures and dispersion of soil particles are accompanied by a decrease in soil permeability. Due to the contamination of soil with petroleum products the ratio between carbon and nitrogen sharply increases, while the content of mobile forms of phosphorus and potassium decreases, resulting in deterioration of water, air and nutritional regimes, impairing the root nutrition of plants, hindering their growth and development..*(Hentati, 2013).*

When they reach the surface of the earth and migrate to the soil, petroleum products contaminate the soil cover and groundwater, resulting in the fact that fertile soil layer cannot restore for a long period of time. This is explained by the fact that soil displaces the oxygen necessary for the life of organisms (*Mahjoub, 2014).*

Due to the presence of aromatic and polycyclic hydrocarbons and other compounds, petroleum products are toxic to the soil biota, so the soil self-healsvery slowlyby biodegradation of oil and petroleum products. Soil is a biologically active environment in which a large number of different organisms live. Microorganisms that are capable of absorbing a wide range of hydrocarbons, including the most toxic (*Margesin, 2003),* have a decisive role in the destruction of petroleum products in soil. Soils subject to petroleum products are characterized by specific microflora with a stable species composition. It is generally accepted that bacterial microflora, the major part of which belongs to microorganisms of the genus Pseudomonas, play an important role in decomposition of hydrocarbons in the soil. The bacterial microflora of oil-contaminated soils is also dominated by representatives of the genera Vibrio, Arthrobacret, Aeromonas and others. Most studies conducted in

different bioclimatic zones indicate that soil microorganisms respond to petrochemical contamination by increasing gross numbers and activity *(Moubasher, 2015).* At the same time, the diversity of microorganisms species declines due to the selection of those with increased metabolic activity and, as a result, the structure of the soil microorganism complex changes *(Varjani, 2017).*

There is information about the impact of petroleum products on plant organisms. According to (*Mendez-Natera, 2004),* the impact of petroleum products on plants is caused by both their direct toxic effects, and the transformation of the soil environment. When entering plant cells, petroleum products cause toxic effects. They manifest themselves in the rapid damage, destruction, and then extinction of all living, actively functioning plant tissues in a vegetative state. Petroleum products affect the growth, metabolism and development of plants, as well as young seedlings, suppressing the growth of terrestrial and underground parts of plants, largely delaying the beginning of flowering. In general, the impact of petroleum products on higher plants is multifaceted: impaired photosynthesis and respiration; change in the structure of chloroplasts; inhibition of growth and root system, leaves, reproductive organs. Plants grown on soils contaminated with petroleum products accumulate more polycyclic and aromatic hydrocarbons, which are carcinogens *(USEPA, 2000).*

Soil animal organisms are an important component of terrestrial ecosystems and play a multifunctional role in the processes of organic matter transformation. The impact of hydrocarbon contamination on soil organisms is determined primarily by the intensity of the contamination. In the area of the most intense pollution, large invertebrates disappear completely, the number of small invertebrates sharply decreases. In surface contamination there is a short-term stimulationin some groups (ticks, tails), which changes to a sharp inhibition of their life. With greater pollution, both large and small invertebrates disappear in the area of the oil slick. The majority of soil animals die in the first days after contamination at a concentration of petroleum products 5 - 10 kg / m2, 3 days after contamination, the number of small arthropods decreases by 10 times, and the majority of large invertebrates die in 2 months after contamination. The lightest fractions of petroleum products are the most toxic to soil animals (*Artemieva, 1998).*

Theoretical basis of the study

To assess the impact of petroleum products on the environmental, it is necessary to have at least the following information: the content of petroleum products in individual components; the speed of their chemical and biological decomposition under the influence of abiotic and biotic factors; the level of petroleum products toxicity in relation to living organisms. With regard to the information on the content of petroleum products, such data are obtained in the standard way when making observations. Information about the second characteristic can be obtained but for this purpose it is necessary to carry out a complex of long-term and time-consuming experiments in full-scale and laboratory conditions. However, the most informative data on the environmental risk of hydrocarbon pollution of the ecosystem are the results of determining the levels of petroleum products'total toxicity in relation to aquatic organisms and phytotoxicity to soil organisms. Such information can be obtained by an integrated assessment of the biological value of the living environment, using a bioassay method that provides for the registration under controlled, standard conditions of the appropriate reactions of test organisms to the toxic effects of environmentally hazardous chemical compounds and mixtures thereof (*Krainiukov, 2013).*

Research methods and methodology

To assess the impact of the refinery on the ecological status of the territory, soil and groundwater samples, we determined the indicators of their composition and properties that give the most representative information on the environmental hazard of the hydrocarbon load. On this basis, a priority indicator of the territory's hydrocarbon contamination is the content of petroleum products - the main chemical substance that can enter the environment in the process of extraction, transportation and processing of hydrocarbon raw materials. The biotest system was also used to assess the level of environmental risk from the area'scontamination with petroleum products and its negative impact on terrestrial and aquatic ecosystems' life.

All selected samples measured the content of petroleum products by appropriate methods: the method of column chromatography was used to measure the mass fraction of petroleum products in soil samples; to measuremass concentration of petroleum products in groundwater - a fluorimetric method based on the extraction of petroleum products with hexane and the measurement of the fluorescence intensity of the extract on the analyzer "Fluorate-02".

Toxicological analyzes of groundwater and soil samples were performed using biotesting techniques: to determine the toxic properties of groundwater using representatives of aquatic biocenosis - crustacean teriodophnia; to determine the phytotoxicity of soils using seeds of higher plants - corn, lettuce and barley.

Research Results

Potential sources of groundwater and surface water contamination are possible oil leakage from integrated gas and gas condensate plantsprocessing, gas condensate pipelines, operational gas and condensate wells, as well as possible disruption of drilling technology when drilling gas and condensate wells. An example of a real threat is the situation that has developed in the territory of Shebelynka Department of Gas Condensate Processing in the village of Andriyivka, Balaklia district.

The Shebelynka Gas Condensate and Petroleum Processing Unit is located in Balaklia district of Kharkiv region. In the past it was called Shebelynka Gas Processing Plant (GPP). In early May 1983, data were obtained regarding the contamination of groundwater contained in Quaternary sands by hydrocarbons in Shebelynka Gas Processing Plant. Gasoline was found in some wells in the village.The thickness of the hydrocarbon layer in the wells of the monitoring network ranged from 0.01 m to 1.16 m. In the northwestern part of the contamination zone there was even complete substitution of groundwater by a layer of hydrocarbons. As a result of technological leaks, a man-made deposit of petroleum products was formed. A specially created commission has come to the conclusion that the causes of these pollution are the objects and systems of Shebelynka gas processing plant (sewage system of technological devices and raw material park, evaporators, technological pipelines, oil reservoirs). A number of measures have been developed to eliminate the causes of groundwater contamination: a large fleet of oil storage tanks has been replaced, evaporation rates eliminated, process pipelines erected on the ground trestle, a system for collecting and separating industrial runoff and other measures have been put in place. Measures were also taken to eliminate the technogenic deposit and establish a contamination zone. To determine the area and capacity of the hydrocarbon layer over groundwater, 148 observation wells were drilled in the direction of the hydrocarbonsmovement. In order to extract hydrocarbons, underground service tubes, underground tanks and mine wells were created. However, the measures taken at that time were not very effective and therefore, at the suggestion of UkrNDIGaz, an organization that monitors groundwater status at the well monitoring network, an anti-filtration barrier ("wall in the ground") was created in the area of the village cemetery to prevent pollution spreading to the south with subsequent hydrocarbon extraction as it accumulates before this filtration barrier (*Prybylova, 2017).*

As a result of the taken measures, the area of the technogenic deposit and the contamination zone, according to the experts of the UkrNDIGaz and Shebelynka technological workshop, decreased from 82 ha to 43 ha. However, verification of compliance with environmental legislation indicated the following gross mistakes in the geological monitoring and works to eliminate hydrocarbon pollution of groundwater. Therefore, groundwater pollution is constantly present in the western part of Andriyivka village and downstream where they drain into Kozine Lake and the SiverskyDonetsk river.In the village of Andriyivka, due to the low quality and pollution of groundwater, the population switches to the use of groundwater from the marl-chalk aquifer. Due to the fact that the position of the levels in the marl-chalk horizon is lower by 7-15 m than in the soil horizon, and there is no reliable insulation in the annulus of the wells, there is a downward flow of contaminated groundwater, which increases with the operation of the wells. There are several dozen such wells in the village.Brackish, hard groundwater contaminated with nitrates, petroleum products, toxic chemicals can penetrate into the aquifer with high-quality freshdrinking water of the marl-chalk

horizon used for centralized water supply on these channels. Water pollution in all intakes on the marl-chalk aquifer within the village Andriyivka as well as below the streamshould be expected, where there is a group water intake of Shebelynka Gas Condensate and Petroleum Processing Unit in the valley of the river Siversky Donetsk *(Prybylova, 2015).*

In order to determine the effect of hydrocarbon pollution on the quality of environmental components in the spring and summer of 2019, soil and groundwater samples were taken at 6 points in the western part of the village Andriyivka. A total of 36 soil and groundwater samples were selected.

An analysis of the obtained results on determining the content of petroleum products in soils and their phytotoxic properties showed that among the 36 samples of soils collected within the western part of the village Andriyivka had the highest oil content of 118 mg / kg. The phytotoxic properties of soils were determined in 75% of the samples selected, of which 37% were slightly contaminated; 33% moderately, and 30% dirty (Fig.1).

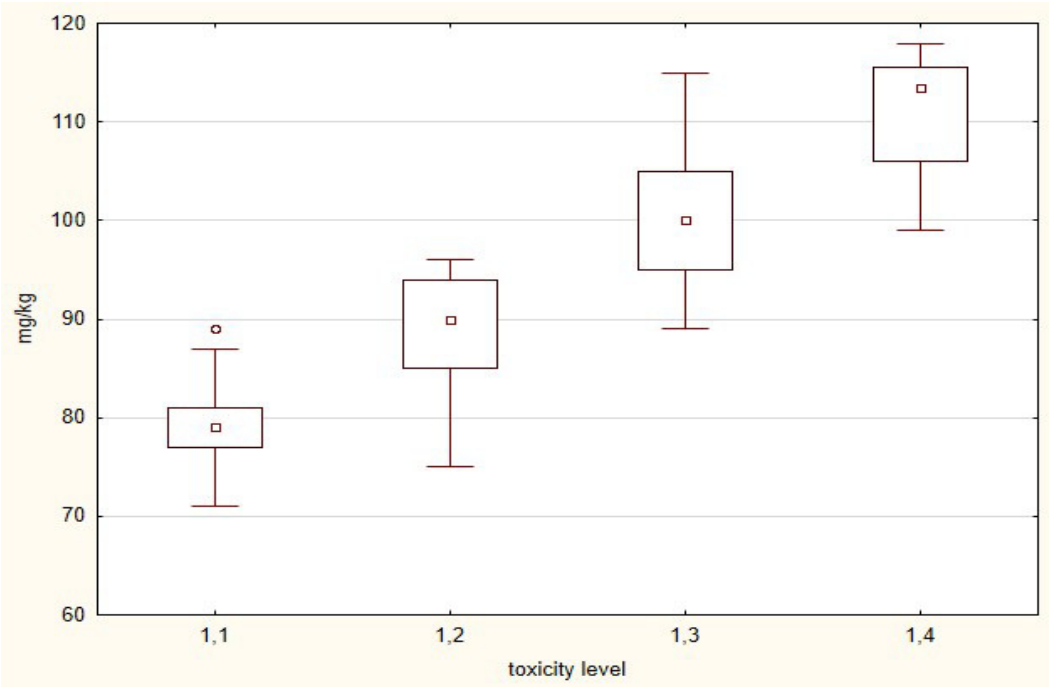

Fig. 1: Diagram of the data magnitude on the content of petroleum products in soils and their toxic properties.

The whole area under study was found to be contaminated by oil products (from 0.35 to 1.6 mg / dm3) in the groundwater samples, while toxicity index showed that 86% of groundwater samples collected in the western part of the village Andriyivka were toxic (Fig. 2).

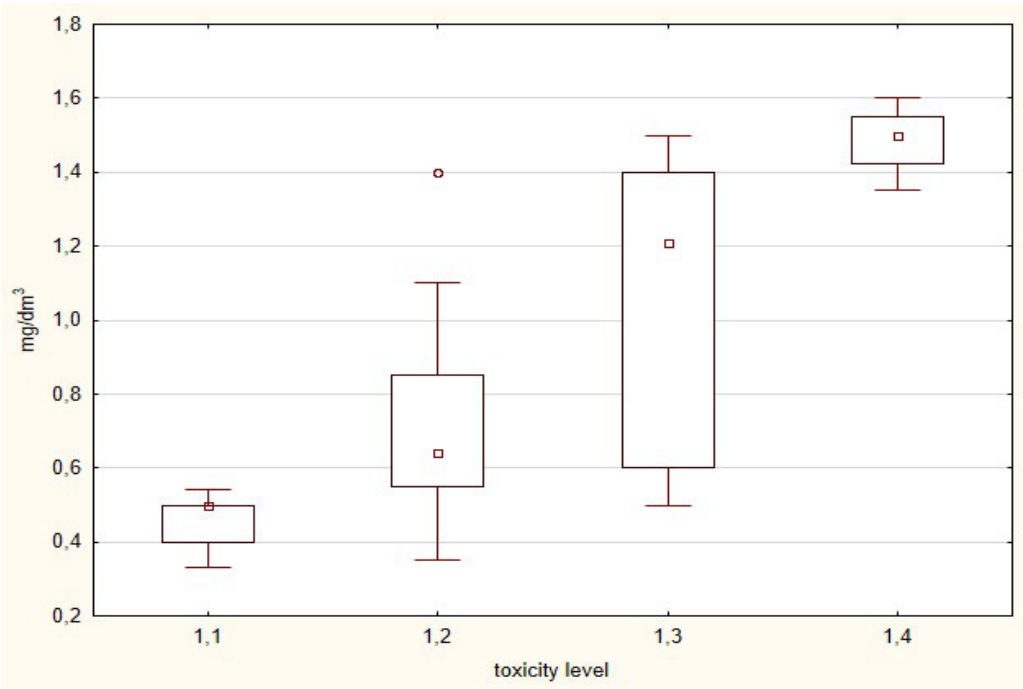

Fig. 2: Diagram of the data magnitude on the content of petroleum products in groundwater and their toxic properties

The results of the comparison of chemical and toxicological analyzes of soil samples show that in the conditions of practically absence of standards for petroleum products for soils, the use of an integral indicator of their quality (phytotoxicity) is appropriate and even necessary.

To investigate possible patterns in the distribution of contamination between soils and groundwater with their toxicity levels, surfaces (graphs) of the function Rt = f (Cg; Cw) were constructed, where Rt is the soil toxicity level (phytotoxicity); Cg - content of petroleum products in soils; Cw - content of petroleum products in groundwater (Fig. 3).

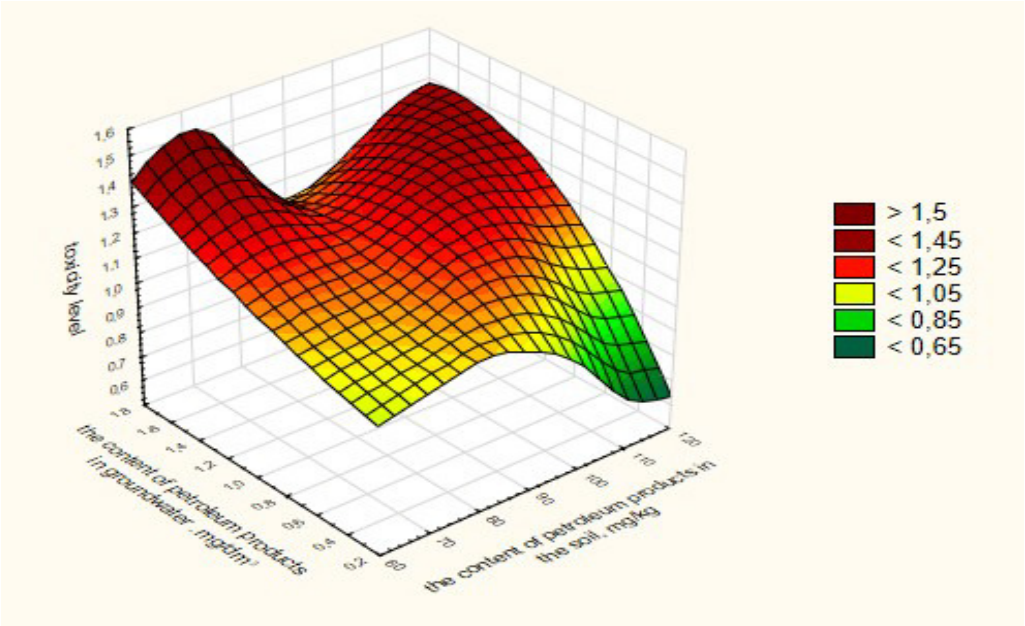

Figure 3: Surfaces (graphs) of the function $R_t = f(C_g; C_w)$

As can be seen from the above nonlinear functions, Rt reaches extrema in various combinations of argument values, i.e, the high or low value of the Cg or Cw argument does not always lead to a correspondingly proportional value of the Rt function.

In view of the above, determining the acceptable hydrocarbon load on the natural environment, it is advisable to take into account, in addition to the established regulatory concentrations of petroleum products for the respective components, the assessment results of the biotic component of terrestrial and aquatic ecosystems by biological indicators. One such indicator is general toxicity, which characterizes the biological value and the degree of biological hazard of the habitat.

Summarizing the results of the assessment of the production activity of the oil and gas company's impact on the state of individual environment components, it should be noted that the negative impact of hydrocarbon pollution remains relevant today.

Discussion and conclusion

A comparative analysis of data on the content of petroleum products in water and soil samples and their toxicity has showed that in many cases assessment of the environmental components quality by chemical and toxicological parameters does not coincide. In this regard, it is advisable to concurrently use chemical and biological methods, including bioassay methods, which are complementary and none of which should be considered as self-sufficient for a comprehensive assessment of hydrocarbon pollution impact on the environmental status of the area contaminated by petroleum products.

To restore the ecological status of the oil-contaminated area under study, it is necessary to implement a number of biotechnological measures: remove the soil-contaminated layer of soil; introduce mineral and organic fertilizers and treatment with bacterial preparations. Implementation of bioremediation measures creates optimal conditions for decomposition of petroleum products hydrocarbons**.**

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Freelance Development Trends in Ukraine as a Reflection of Globalization Processes

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Abstract

The article examines development trends of new types of economic activity of Ukrainians on digital platforms through the prism of globalization processes. The study shows a dialectical relationship between the local economic situation in Ukraine and its inclusion in the global information space, which becomes the main factor in the emergence of new types of economic activity, including freelance. Local conditions of the Ukrainian population become a filter through which globalization processes pass, transforming and acquiring characteristic features. Economic problems and the high level of information infrastructure are becoming factors that contribute to the further development of freelance activities in Ukraine.

Keywords: Freelance, Digital Platform, Globalization, Glocalization.

Introduction

Globalization is a multicomponent process of a continuous transformation of humanity, interaction of social, cultural, political, economic parameters of national states in the context of new formative transnational actors (supranational and international organizations, extraterritorial financial flows and corporations), which suggests a functional relationship between all the phenomena occurring in such a "world system" (Beck, 2001). Moreover, social relations arising in the elements of this system (for example, in individual national states) cannot be integrated solely into national-state policy or be determined by it. Overcoming the space-time framework, using the latest mass media, has led to the loss of the value of "local": world society (this is, rather, an operational criterion characterizing the properties of globalization that we perceive, and, accordingly, the perception of mutually intertwined social relations by the subjects of social space arising in the diversity of their interaction) and the definition of its composition is not reduced to the sum of local phenomena and processes (Beck, 2001). There is no longer a strict attachment to both space and time (Appadurai, 1996). While in the middle of the twentieth century P. Berger and T. Lukmann, 1995, said that the pragmatic interest and business orientations of a person were tied to his daily activities in the context of the spatio-temporal organization "here-and-now", then, with the compression of this framework, human patterns of thinking, behavior, social activity and practice acquire a wide variety of life styles models (Giddens, 1991).

Direct relationship between the information and technological achievements of the scientific revolution and the economic subsystem of society is the main accomplishment of modernization, and, following the logic of E. Giddens, globalization (Giddens, 2011). These two factors - the introduction of extraterritorial subjects of economic activity on the international arena and their interweaving with communication and information technologies are called by W. Beck one of the main reasons for the inability to stop the current era of globality, that is, the era of the second modernity (Beck, 2001).

Globalization is accompanied by the corresponding specialization of labor and its differentiation. The "knowledge society" and "information society" are emerging, and its feature is the use of the latest technologies and the achievements of the information revolution in the production process (Bauman, 2004). In this regard, the traditional labor market is being restructured and takes on new forms that can be expressed in the phrase "giganomics" (Graham et al., 2017; De Stefano, 2016). The information economy is improving every year, attracting an increasing number of employers and free workers (freelancers) to virtual platforms. According to Kyiv International Institute of Sociology, in 2017, approximately 63.4% of the adult population of Ukraine were active Internet users (KISI, 2017), in 2018, according to their joint research with ILO, Ukraine ranks first in Europe and fourth in the world in terms of activities on digital platforms (Aleksynka et al., 2018). As of 2018, according to the same studies, as well as the ILO index (TiLP, 2016), Ukraine occupies high positions on many digital platforms. The problems of our study are to consider modernization of the economic activity of the Ukrainian population in the form of freelance and correlating this process as a manifestation of globalization processes.

In the framework of this study, it is important for us to understand the features of freelance functioning in Ukrainian realities. But, more importantly, we need to establish how freelance and its development in Ukraine represent the processes of inclusion of Ukrainian society in globalization processes. Thus, the aim of the work establish a trend in the development of freelance in Ukraine through the prism of globalization processes.

Analysis of studies on freelance

The main prerequisite for convergence and unification in the context of globalization is technological progress and the emergence of new commercial reality in the form of global markets. Hereof, corporations that can manipulate resource savings by differentiating labor powers in the production process can benefit from the use of marketing strategies, management and effective distribution (and division) of labor (Levitt, 1983). Latest technologies and mass media, the tools to increase the enterprises' own efficiency, include the use of crowdfunding and outsourcing with the involvement of freelancers in this type of activity (De Stefano, 2016). Freelance is understood as a form of economic activity of self-employment, the subject of which has relative independence in its labor activity (Sinicki, 2019). A freelancer is not tied to a specific employer; his work can be described as dynamic and mobile, complementing his financial and organizational autonomy (Sinicki, 2019). A freelancer is a mobile and dynamic highly qualified specialist (Muller, Safir, 2019), an independent professional who is not the subject of a traditional working relationship, i.e. he does not belong to the staff of a certain organization with a fixed rate, regulations, and an appropriate hierarchy of production relations, providing his services to many clients (Strebkov, Shevchuk, 2009). In addition, the specifics of considering freelance in the context of our study is their activity mediated by digital platforms. Freelancers can realize their potential with the help of digital work platforms, which provide the possibility of crowdfunding for tasks related to information technology (web-based crowdworking) (Berg et al., 2018). This type of crowdfunding includes freelance platforms (for example, such a platform for freelancers is Upwork). Crowdworks can also be presented on micro-tasking platforms, which helps the employer to break down massive work into many elements (micro-tasks), providing them to freelancers on a digital platform (for example, AMT is such a platform) for their flexible and efficient implementation (Berg, 2016; De Stefano, 2016). Freelancer's labor can also be involved in online outsourcing, which involves the remote work and interaction of the employer and freelancer through a digital platform (for example, the Freelancer digital platform) (Kuek et al., 2015). Online outsourcing is becoming a promising industry of digital services in the context of globalization, contributing to socio-economic progress and development of practical skills of freelancers. Both employers and self-employed workers of online platforms from "lagging countries" see the potential in this: if the client is a resident of a first-tier country, then the salary of a freelancer from a country located on the periphery and semi-periphery of economic development is very low compared to the rate of a specialist from the first-tier country (Graham et al., 2017).

The theoretical basis of the study

According to Graham et al., 2017, the two main determining factors for the development of the digital platform market are: 1) the economic situation (high un(der)employment, low wages, etc.), 2) the level of development of communication technologies, especially the Internet. The intensive expansion of freelance and outsourcing in India and the Philippines is associated with this. Considering the development trends of freelance in Ukraine through the prism of globalization processes, we can say that the same reasons play an important role here. The economic situation in the country is the third problem that worries Ukrainians (after the military conflict in eastern Ukraine and the low standard of living in general) (KISI, 2018). But, nevertheless, Ukraine remains a country with a developed information infrastructure, which was facilitated by information globalization. Interpreting these arguments in the context of R. Robertson's globalization concept, we can say that the information component is global and the economic component is local, which produces such dialectical construction (glocalization) and the emergence of new forms of economic activity (Robertson, 1987; Robertson, 1990). The scientist is sure that not only "the transnational", but also "the translocal" is being formed, i.e. we can consider the globalization process from the micro-level: events taking place at the local level allow us to include globalization aspects in that particular context that is inherent in this sociocultural space with its characteristic patterns of reproduction of everyday practices. The globalization process includes influence of the global on the local, but also a special reaction of the local on the global - and, again, transformation of global trends by the parameters of the local social space.This can lead to a global / local dichotomy and their convergence / divergence, a kind of interference or mutual extinction. We can investigate such changes by analyzing freelance and its perception and application by the population of Ukraine.

Research Methods and Techniques

A study of freelance in Ukraine was carried out by Kyiv International Institute of Sociology together with the International Labor Organization (ILO) in November-December 2017 (Aleksynka et al., 2018). It included quantitative and qualitative research. The first study was conducted using a survey of 1009 adult respondents experiencedin working with digital platforms for at least 12 months before the study itself. The second was carried out using focus group interviews with 49 freelance respondents from different regions of the country. Also, 8 in-depth interviews were conducted with people who regularly work on digital platforms. Based on this, the socio-demographic profile of freelancers was constructed, working conditions, motivation, experience working on digital platforms, cooperation with customers from other countries, qualifications and the employment sector on digital platforms, spending time on digital work, income from such activities were determined**.**

The results of the study

The data obtained both by quantitative and qualitative methods helped determine the development trends of freelance in Ukraine, its features in the context of globalization processes. The percentage distribution of freelancers in the regions of Ukraine has shown that the quantitative leaders among those working on digital platforms are the most developed cities in Ukraine (Table 1).

The primacy of these cities also correlates with a qualitative attribute, if we take, for example, the income of freelancers on one of the most popular digital platforms Upwork (income of freelancers up to and including 2016: Kharkiv - $ 54 million with the number of freelancers on the platform 14,993; Kyiv - 39.3 $ million, the number of freelancers - 32332; Zaporizhia - $ 17.7 million, the number of freelancers - 9865; Lviv - $ 17.6 million, the number of freelancers - 8206; Dnipro - $ 11 million, the number of freelancers - 3654; Odessa - 6.5 $ million, the number of freelancers - 5389; other cities - $ 17.7 million, the number of freelancers - 40561) (Bozhkova, 2017). Distribution between the general population of Ukraine and the number of digital workers by type of settlement clearly reflects this imbalance (Fig. 1).

Table 1. The percentage distribution of digital platform workers in Ukrainian cities

№	Region of residence	%, of respondents
1	Kyiv	33,7
2	Dnipro	9,2
3	Kharkiv	7,6
4	Lviv	6,1
5	Kyiv Oblast	6,0
6	Odessa	5,4
7	Zaporizhzhia	4,2
8	Poltava	3,1
9	Chernihiv	2,5
10	Donetsk	2,3
11	Cherkasy	2,2
12	Khmelnytskyi	2,2
13	Kherson	1,9
14	Vinnytsia	1,9
15	Sumy	1,7
16	Rivne	1,7
17	Mykolaiv	1,5
18	Ivano-Frankivsk	1,4
19	Zhytomyr	1,3
20	Kropyvnytskyi	1,0
21	Luhansk	0,9
22	Lutsk	0,7
23	Chernivtsi	0,6
24	Ternopil	0,6
25	Uzhhorod	0,5

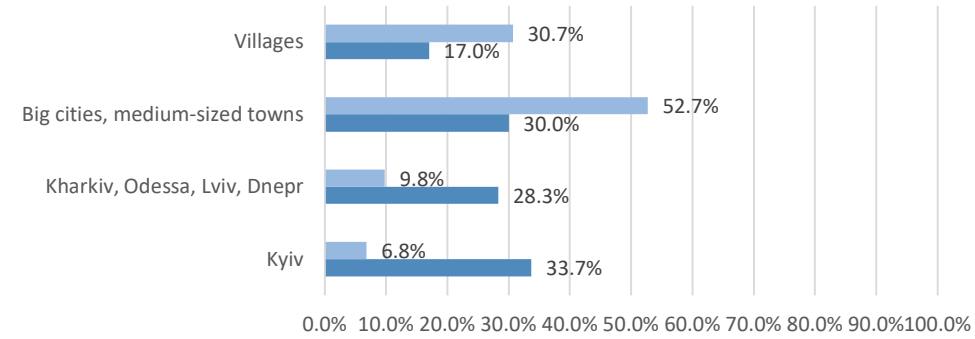

	Kyiv	Kharkiv, Odessa, Lviv, Dnepr	Big cities, medium-sized towns	Villages
Population of Ukraine, % of the total	6.8%	9.8%	52.7%	30.7%
Freelancers, % of the total	33.7%	28.3%	30.0%	17.0%

Population of Ukraine, % of the total Freelancers, % of the total

Figure 1: Percentage distribution of the total population of Ukraine and the number of digital workers by type of settlement

The ratio of the number of freelancers according to the age criterion makes it clear that the Ukrainian pattern in the form of lowering the level (and intensity) of the Internet use with an increase in the age factor is not so sharp, creating gaps between age groups. The average age of the Ukrainian freelancer is 33 years, which indicates the attractiveness of freelancing as a type of activity for both young people, and the older generation. The gender factor plays a significant role in the first age group and the last - among young people (18–25 years old), women are ahead of men in activities on digital platforms (28%), while men are ahead of women in activities on digital platforms in the last age group (41 years or more) with a value of 24% (Fig. 2). The study shows that every second Ukrainian freelancer has a

higher education, that is, is a qualified specialist in his field, which is very important in the Ukrainian labor market (Muller, Safir, 2019) (Fig. 3)

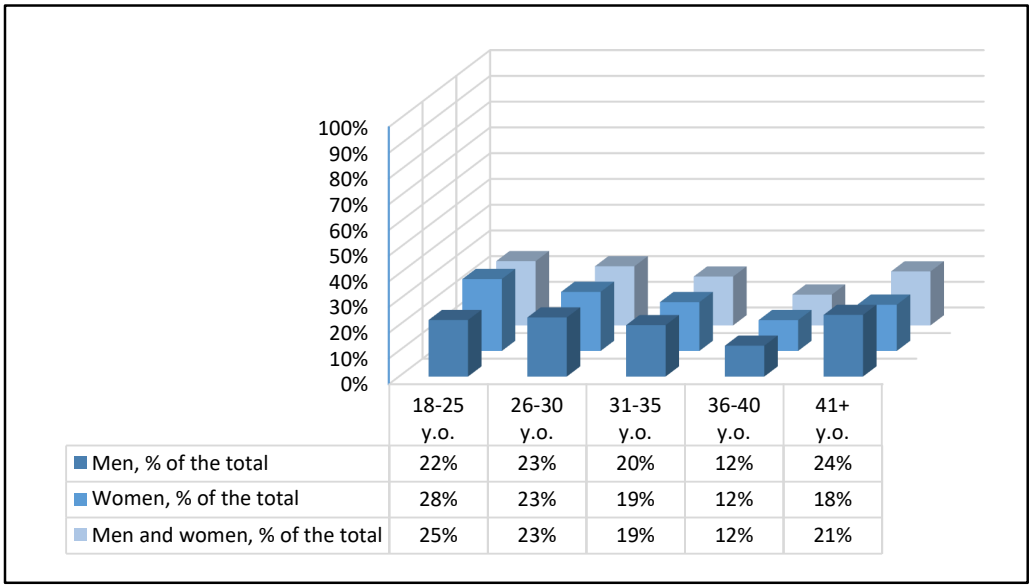

Figure 2: Percentage distribution of digital platform workers by age and gender

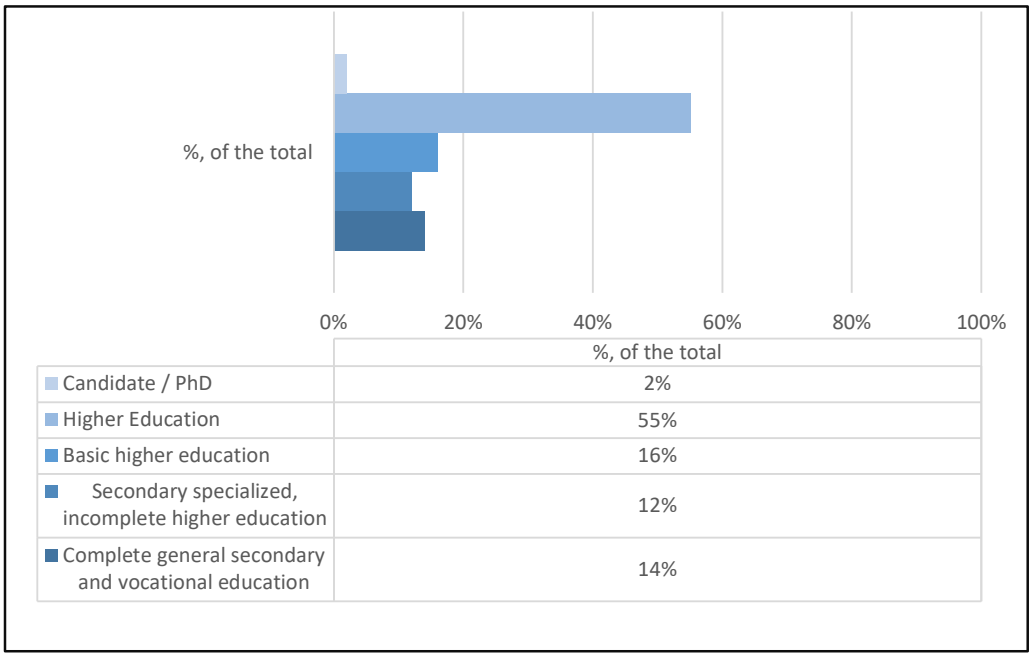

Figure 3: Percentage distribution of digital platform workers by education

Half of the surveyed freelancers are married (49%), and the average household size of freelancers is 3 people. Almost every second freelancer (46%) has children: 30% have one child, 12% - two, 4%- three and more. 42% oftherespondentslive with older people who need financial support. 93% of such

freelancers support their loved ones solely with their income. Chart 4 shows the relationship between the number of freelancers and the number of people they support.

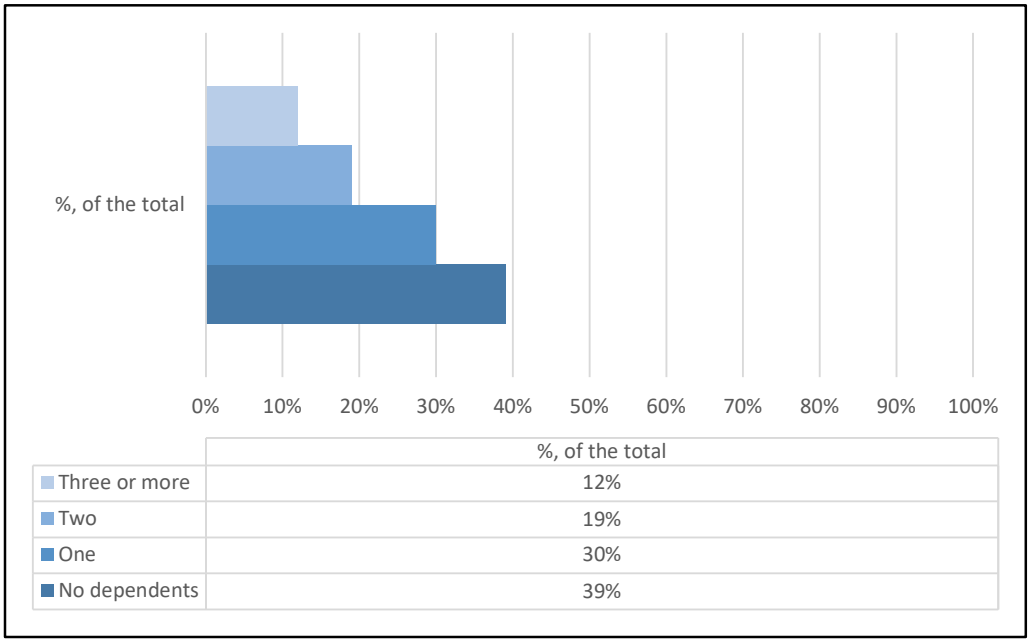

Figure 4: Percentage distributionof digital platform workers and dependents in household

The respondents have different motivation for freelance, but, basically, this is to earn additional income.

Respondents dealing exclusively with freelance explain their choice by a lack of jobs or low salaries at work in their specialization.

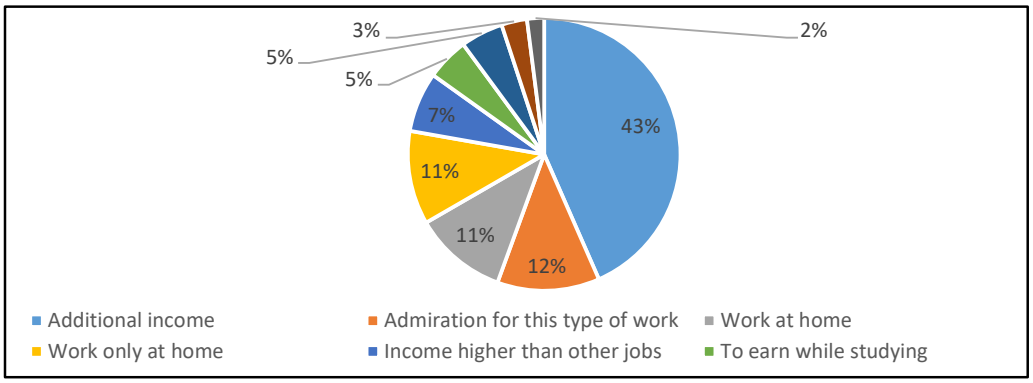

Figure 5: Percentage distributionof digital platform workers and their motivation

Most respondents (83%) who work only at home do so because they need to look after their child or a sick relative (Fig. 5). More than ⅔ (67%) of respondents have another form of employment, which is mostly related to a permanent position for an indefinite period (82%) (Fig. 6). Among them there are specialists of the highest level of qualification (24%), persons holding senior positions (24%),

specialists of the average level of qualification (21%), service and sales workers (15%) and others (16%).

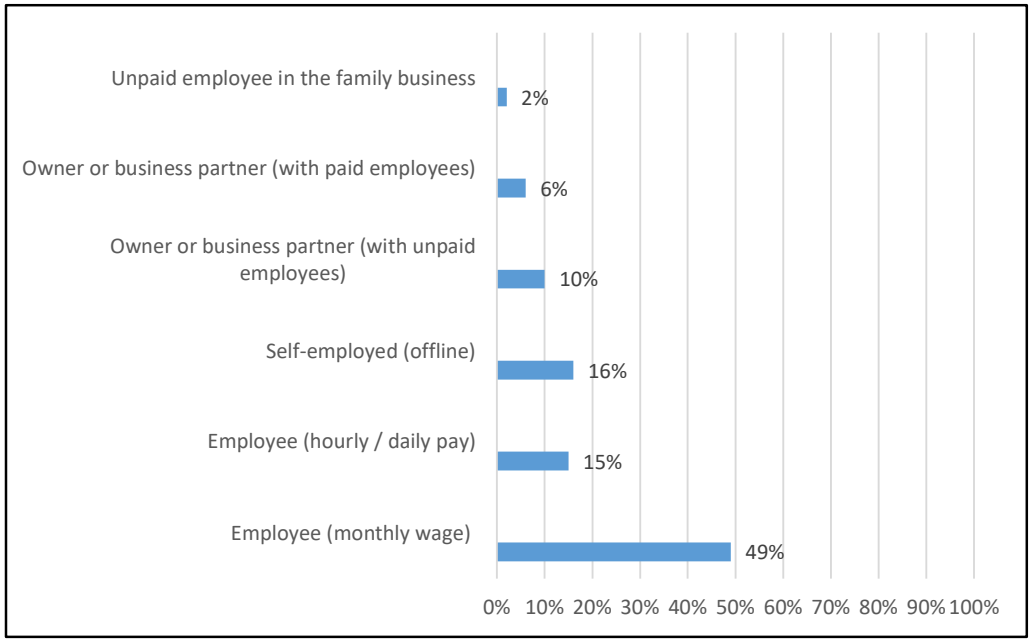

Figure 6: Percentage distribution of digital platform workers and and their employment (number of respondents = 670)

A certain number of respondents (14.4%) are unwilling to increase the amount of work on digital platforms. This is due not only to permanent employment in another job (31% of cases), but also to domestic obligations (35%), a sufficient amount of money received for the completed work (28%), the need for rest (27%) (Fig. 7).

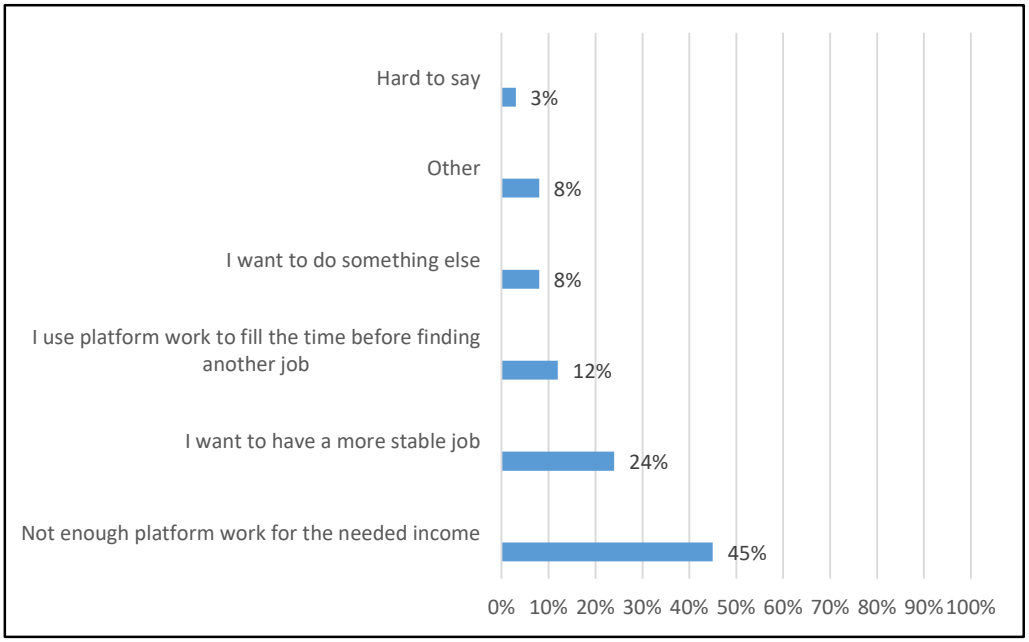

Figure 7: Percentage distributionof cause and unwillingness to do extra work (number of respondents = 144)

The prospects of freelance for Ukrainians are somewhat ambiguous. The respondents are not sure about the long-term (up to work over the next 20 years) prospects for working on digital platforms (63% of respondents deny the possibility of such a long-term experience as a freelancer). About a quarter of respondents (23%) suggest that they are likely to leave digital platforms in the short term. But, nevertheless, the respondents positively assessfurther development of digital platforms and their own development in their context (Fig. 8).

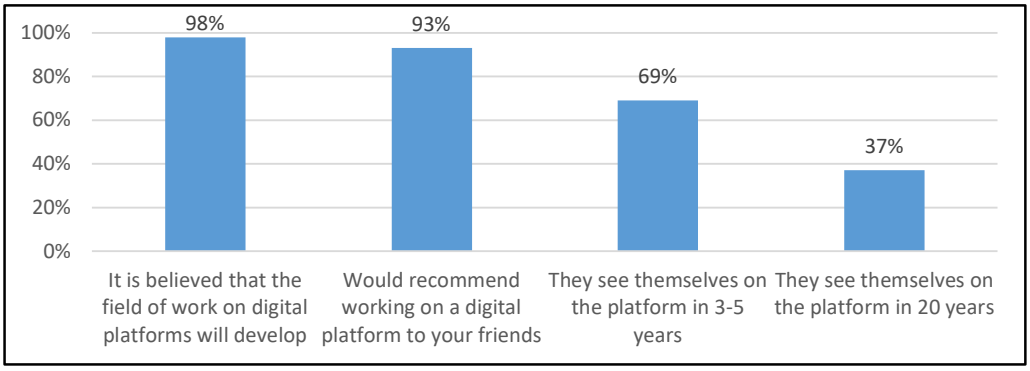

Figure 8: Prospects for the development of freelance and participation in it, %

Digital platform employees often work with foreign clients to fulfill their orders, which, unconditionally, are paid much better than orders at the local level (average income per week at the "international level" is almost seven times higher than the average income per week at the local (Ukrainian) level, although, this, in turn, is due to the fact that foreign customers offer work with high-paid IT macro tasks). The main customer for many freelancers remains a local customer from Ukraine (33.8%), regular customers from Russia (13.4%), the USA (7.1%), other post-Soviet states (5.0%), Canada (2.2%), Poland (2%), Germany (2%), Great Britain (1.8%). The main digital platforms on which freelancers operate are classified into three levels according to the country of operation and scale (local - Ukrainian, Russian and international). Below is the number of respondents (in %) experienced in working on a particular resource (one respondent can work on several digital platforms at once) (Fig. 9).

As a separate case, the activity growth of Ukrainian freelancers on the digital Upwork platform was analyzed (Bozhkova, 2017). Ukrainian freelancers show not only a high growth rate in this digital market in quantitative terms, but also in qualitative, which is reflected in the income of Ukrainian digital workers in recent years (in 2012, the income of Ukrainian freelancers almost amounted to their income for the period from 2006 to 2011, and the income of 2016 doubled the income for 2012). The table includes the growth of Internet users numbers in Ukraine over 10 years (KISI, 2017) in relation to the total population of Ukraine to represent the expansion of information globalization processes. (Minfin, 2019) (Table 2).

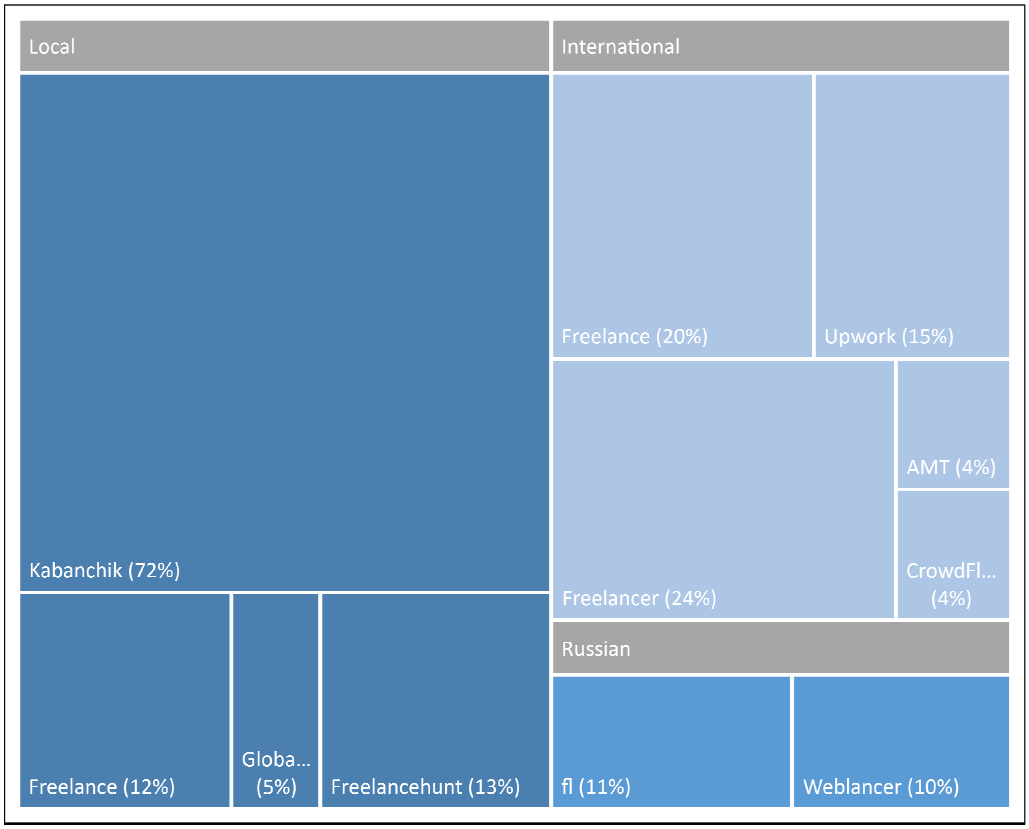

Figure 9: Work experience on digital platforms of various sizes, %

Table 2: The growth of Internet users number in Ukraine and the growth of activity of Ukrainian freelancers

Year	Population (in thousands)	%, the Internet using	Number of people using the Internet (in thousands)	Number of people, who are active freelancers on Upwork (in thousands)	% of people using the Internet, who are active freelancers on Upwork	Earnings on the platform (in millions of US dollars)
2006	46 929,5	19%	8916,61	n/a	n/a	38
2007	46 646,0	19%	8862,74	n/a	n/a	
2008	46 372,7	24%	11129,45	n/a	n/a	
2009	46 143,7	27%	12458,8	n/a	n/a	
2010	45 962,9	29%	13329,24	n/a	n/a	
2011	45 778,5	40%	18311,4	9,157	0,05%	
2012	45 633,6	43%	19622,45	19,105	0,1%	32
2013	45 553,0	49%	22320,97	26,067	0,12%	50
2014	45 426,2	54%	24530,15	32,973	0,13%	61
2015	42 928,9	57%	24469,47	52,354	0,21%	55
2016	42 760,5	62%	26511,51	59,648	0,22%	65

Thus, we can confidently say that the development of the information space in Ukraine has enabled people to modernize not only their everyday practices, but also economic activity (Vorona, Suimenko, 2008). The increasing introduction of the latest technology leads to the expansion of the digital platforms. Freelance is not only a factor that develops socio-economic relations, but also a resulting fact representing integration of the economic subsystem (together with a social interactions system arising on this occasion) into the information space. As studies show, the Ukrainian economically active population is far from moving from the axis of the traditional institution of labor relations, but it is at the stage of perceiving and adapting the opportunities that modern technologies offer. As we can see from the study, the main motivation for working on digital platforms is the economic situation, which forces Ukrainians to use this type of economic activity. But, at the same time, it becomes possible precisely because of the development of information technologies and the Internet. It is this dialectic of global (informational component of globalization) and local (economic development) that becomes fundamental and decisive in the development of this type of economic activity in Ukraine. The less developed regions of Ukraine, in the local (economic) plan, represent the fact that not only low wages stimulate freelance. It depends on the degree of inclusion of the region in the global information space, and on the degree of implementation of innovative communication tools in the production process. This, in principle, agrees with the conceptualization of these aspects by Graham et al., 2017. In addition, research conducted by Graham et al., 2017, show us that Ukraine is one of the countries that is involved in a large volume in the sale of services on digital platforms, but not in their purchase.

The increase in freelance activity in Ukraine is associated with a shortage of jobs, low salaries of certain specialties, inflation, and a drop in the real wage index, which occurred against the backdrop of the political crisis in the period 2014-2015, leading to an aggravation of all economic ailments of the Ukrainian system (Del Carpio et al . 2017; Aleksynka et al., 2018). Freelance in Ukraine is a reaction of the population to the stimulus in the form of an economic crisis and development of the information component of the globalization process. Of course, this form of economic activity is both a manifestation of globalization processes and enhancing its impact on society. According to the study,

it can be argued that there is a convergence of the global and the local, and not vice versa, because freelance in Ukraine is gaining momentum and is rapidly developing further. This happens in the form of perception of this type of activity and its adaptation with further reproduction in the context of the restriction by the structures of the Ukrainian social space. The local here acts as a filter with a certain throughput in relation to the phenomena arising under the influence of globalization.

Discussion and conclusion

The information element of globalization processes builds a knowledge and information society. But this does not happen instantly: various subsystems of society are getting closer and closer to the core of information and technologies for their own improvement (Vorona, Suimenko, 2008). It is precisely such a transitional moment that we observe in the Ukrainian society on the example of freelance and the progress of economic culture and activity, although this happens in a disproportionate manner throughout the country. But, all the factors of our study indicate that Ukraine is moving in this particular path of development of modern, technologically oriented economic relations.

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Industry 4.0: Aspects of Implementation in Polish SME's Sector

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Abstract

Basing on reports and numerous publications, the statement that more than half of businesses in Poland are aware of the idea of Industry 4.0 may be made. Many companies have already launched initiatives enabling introduction of some technological solutions in this area. Business needs and awareness of the spheres that require further optimization are usually quite well defined in case of big companies. In contrary, in the Polish small and medium-sized enterprises sector, the introduction of the Industry 4.0 solutions is more complicated. SME's have to face more serious barriers comparing to larger companies. The paper presents preliminary results of research aimed at identification of the barriers to the Industry 4.0 concept introduction within the SME sector in Poland

Keywords: Industry 4.0, 4th industrial revolution, SME, barriers

Introduction

The modern industrial revolution is a natural result of all previous technological developments, embedded in social and economic systems. The concept of Industry 4.0 is based on the creation of value through the close interaction of all economic agents through digitalization (Bilan et al., 2019).

The Industry 4.0 concept necessitates meeting some specific requirements, not only by entrepreneurs but also by governments. The requirements are related to changes that have taken place in perception of introduced processes, the role that humans play in production systems, as well as the key role of information systems not only in production but also in everyday life. Economic environments and societies demand higher involvement of a state in structural problems and challenges that has occurred in labor markets (Micklethwait and Wooldridge, 2015). Within the new approach, action undertaken by a state as well as their management and effectiveness are crucial. Industry policies, that are introduced by many countries, are aimed at reorientation of national economies towards the fourth generation industry (Berger, 2016).

Problems with transition are highly complexed and different approaches towards them are introduced in different economies (Ślusarczyk, 2018). Although, one common tendency can be observed. Small and medium enterprises have to face much more serious barriers when they introduce the Industry 4.0 solutions than larger entities. The situation may result from the fact that the Industry 4.0 is aimed at achievement of higher level of operational effectiveness and productivity and also a higher level of automation. The most prominent characteristics of the concept are: digitization, optimization and personalization of production; automation and adaptation; human-machine interaction (HMI); value-added services as well as automated data exchange and communication (Kovács and Kot, 2017) (Roblek, Meško and Krapež, 2016).

Polish enterprises generally represent lower level of the Industry 4.0 concept introduction; especially in the sector of smaller and medium-sized enterprises the tendency may be observed. Potential to develop Industry 4.0 in Poland and other countries may be estimated basing on different indexes. They help to indicate different barriers of transformation. There are many ratings that present the level of the 4.0 transition in different countries. Table 1 includes the collation of different indexes that are used in that area (Basl and Doucek, 2019).

Table 1: The main readiness indexes (Basl and Doucek, 2019), (https://ec.europa.eu/digital-single-market/en/desi)

Index Abbreviation	Index Name	Evaluating Authority	Number of Individual Indicators	Number of Countries Evaluated
NRI	Networked Readiness Index	WEF World Economic Forum	51	121
GII	Global Innovation Index	Cornell University, INSEAD, WIPO	80	129
OECD score-board	Science, industry and technology Scoreboard	OECD	200	31
RBI	RB Industry 4.0 Readiness Index	Rolland Berger	The size of the industry's share in the GDP forms the evaluation's second axis alongside this RB Index itself	24
DESI	Digital Economy and Society Index	European Commission	5 dimensions 30 indicators	28 EU + Iceland, Norway, Turkey

The indexes that help to analyze Industry 4.0 are related to many factors. Accessibility and data transfer rates, as well as the level of business and public administration digitalization, availability of specialists, and capability of educational systems, to provide specialists who are qualified to work within digital environments, can be indicated as the basic factors assessed in cases of these indexes (Zhou, Liu and Zhou, 2015).

Industry 4.0 Performance Indexes for Poland

The results of analyses conducted basing on the Digital Economy and Society Index (DESI) prepared by the European Commission indicate that digital competitiveness of Poland has improved for last few years. Although its score has increased, its position in overall ranking has not improved – it ranks 25th out of 28 Member States in 2019. "Poland has the highest mobile broadband take-up in the EU. However, Connectivity along with the Use of internet services and Integration of digital technology remain the most challenging areas. There has been a slight improvement in Human capital and Digital public services, but Poland still scores below the EU average. One fifth of people in Poland are not yet online and nearly half of still lack basic digital skills." In consequence the number of employees declaring even basic computer skills is at the very low level. Despite many ICT courses provided by Polish educational institutions, the supply of ICT specialist scores much below the EU average.

The World Economic Forum's Networked Readiness Index (NRI), also referred to as Technology Readiness, measures the propensity for countries to exploit the opportunities offered by information and communications technology (ICT). It is published in collaboration with INSEAD, as part of their annual Global Information Technology Report (GITR). The report is regarded as the most authoritative and comprehensive assessment of how ICT impacts the competitiveness and well-being of nations. According to the latest NRI Report published in 2019 Poland ranks 25th out of 121 countries. Nonetheless Poland is a leader in the Emerging and Developing Europe group. Figure 1 presents position of Poland in the NRI 2019 ranking and Figure 2 Polish position in the DESI 2019 ranking.

If the positive factor is higher, this means situation when customer satisfaction increases due to the "attractive" and "one-dimensional" attributes. If the negative factor is higher, this means the situation when customer satisfaction decreases (dissatisfaction increases) due to "one-dimensional" and "must-be" attributes. This interpretation is used in the case of product design (Keshavarz, 1993).

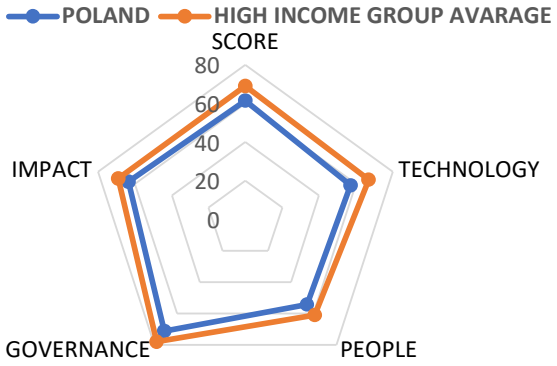

Fig. 1: Position of Poland in the NRI 2019 ranking, (https://networkreadinessindex.org/nri-2019-countries)

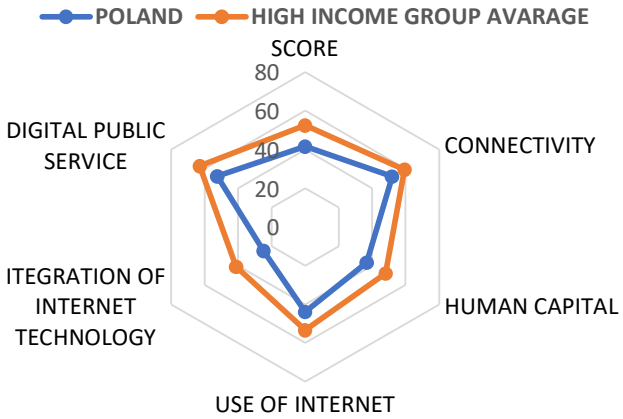

Fig. 2: Position of Poland in the DESI 2019 ranking, (https://ec.europa.eu/digital-single-market/en/desi)

In both rankings in the area of Human capita/people Poland ranks below the European average. Only 46% people at the age between 16 and 74 have basic digital skills while European average in this area is 57%. Within labour market ICT specialists are highly demanded. Small and medium enterprises generally are not able to offer them as good working conditions and as high levels of wages as larger entities. The supply of ICT graduates is growing steadily but it is still below the EU average. ICT specialists represent a lower proportion of the workforce (2.8%) against the EU average at the level of 3.7%. Only 0.9% employed women work as ICT specialists. Polish entrepreneurs are increasingly taking advantage of the opportunities offered by e-commerce: 12% SMEs sell online, whereas EU average is 17%. Only 4% SME's sell on-line to reach foreign markets and 7% Polish SMEs' turnover comes from the online segment. According to Cornell University, INSEAD, and WIPO Poland can be indicated as one of the countries representing „ In line with expectations for level of development" area. Within the Global Innovation Index 2019 Poland ranks 39th in the world and 26th in Europe.

Barriers to Industry 4.0

Companies, before they decide to follow the path of transformation, have to face the key challenge related to finding an answer to a question about changes that should be invested in to ensure strengthening their market position (Kamble, Gunasekaran and Sharma, 2018). The problem of finding financial sources for the investment must also be solved. In contemporary, turbulent reality, explicit indications, what types of actions should be taken to strengthen competitive advantages and to find an adequate position in different types of networks, have not be defined. There are also no ambiguous recommendations which actions should be reckon as the ones of primary and secondary signification (Türkeş et al., 2019).

The problem is even more meaningful because each transformation is generally connected with the necessity to leave a comfort zone and to change a business model (Mittal et al., 2018). That situation is typical for small and medium-sized enterprises whose positions within existing chains of value have been established. That type of rigid networks and unambiguous positioning in production processes may soon become inefficient. It may not be effective enough to assure satisfying performance in the market, and may cause withdrawal from business. In average small and medium-sized enterprises reinvest around 14.5% their incomes to introduce new technologies. Despite serious barriers that limit innovation, Polish small and medium-sized enterprises that operate in production sector have already invested and are still planning to invest in their technological expansion. Most of them have developed their employees' competences through trainings. Even the larger proportion plan to take that type of actions in the future. Despite growing awareness of the threats, entrepreneurs are not willing to abandon business models they are familiar with and which have been useful in development of their businesses so far. Entering the unknown is fraught with high risk because mechanisms and models of changes have not be defined yet. Not being able to accomplish goals that were planned and, as a consequence, losing evolved level of stability, may be indicated as a result of risk taken. Low costs of labor used to be interpreted as one of the barriers to Industry 4.0. However, changes in economic and demographic conditions caused the situation in which costs of man-hour and an hour of autonomous and robotic system performance have become comparable (Ulewicz and Mazur, 2019).

Results and Discussion

The research were conducted in the form of a survey (CAWI and PAPI) among small and medium-sized enterprises representing metal industry, located in Silesian and Łódź Voivodeships. As the result, 89 complete questionnaires were analyzed, which constitutes 32% of all surveys.

In the first part of the questionnaires the respondents were asked to indicate the areas of the highest improvement potential. Effectiveness of production processes (1), quality (2) and communication processes (3) were indicated as three main areas. Accessibility of machines as well as promptness of deliveries were perceived as the ones with much lower potential of improvement. Pilot research results for small and medium enterprises identifying areas for improvement are shown in Fig. 3.

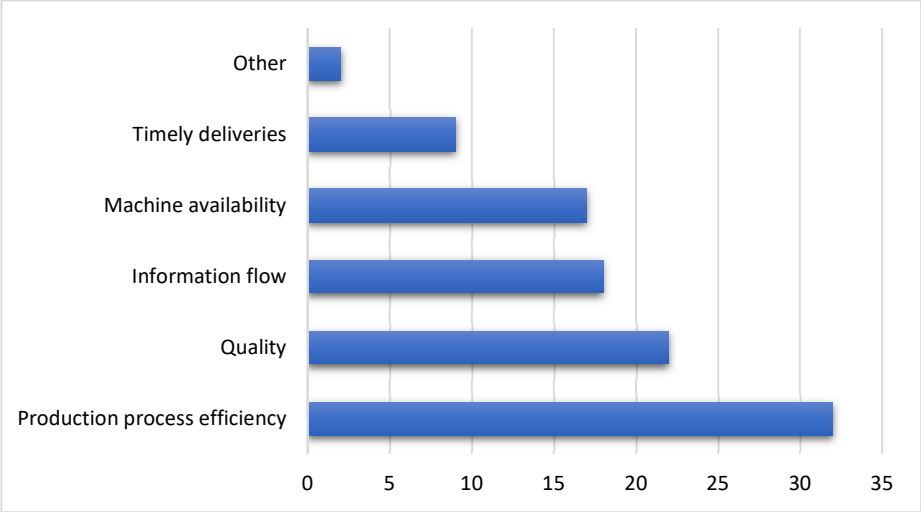

Fig. 3: Identified areas of improvement (own study)

Questions in the second part of the questionnaires were prepared basing on results of the pilot study and the expert opinion study. As result ten main barriers to introduce Industry 4.0 solutions in the SME sector in Poland were identified.

During analyses the following formula was used:

$$\boldsymbol{BI_4 = \frac{\sum_{i=1}^{k} n_i wb_i}{k \sum_{i=1}^{k} n_i}}$$

Where:

BI_4– barrier importance index of Industry 4.0 introduction
i – place of the barrier occurrence
k – maximal weight of the barrier (indication of the order was based on weighting in the opposite order)
n_i – number of indications in the "i" place
wb_i -weight relevant to the barrier occurring in the "i" place

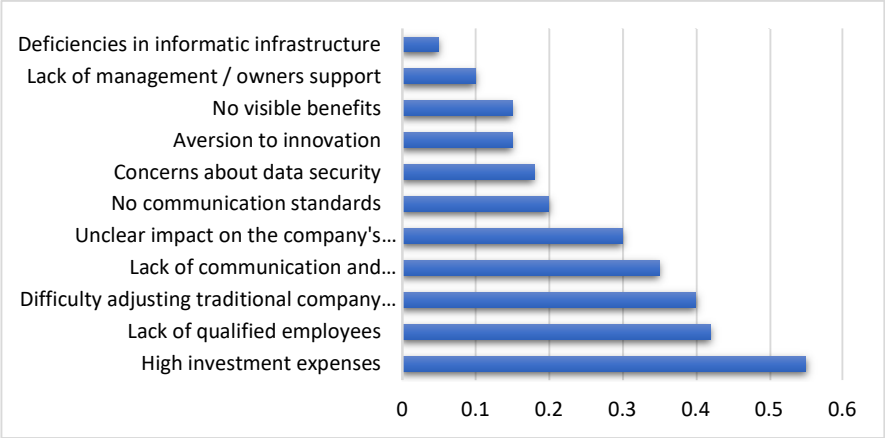

Fig. 4: Identified barriers in Industry 4.0 introduction in the sector of SMEs in Poland (BI_4-index) (own study)

High level of investment expenditures was identified as the most significant barrier (the highest level of the W factor). During the research this element gained the highest value of the factor BI_4=0.55. Thus, this is the main factor constricting general digitalization of manufacturing. A lack of qualified specialists may be indicated as another limitation, as well as high costs of possessing and maintaining adequate staff (Grebski and Grebski, 2019). This problem is common not only in Poland but also in other countries (Nitkiewicz and Ayen, 2018). The MSIE 4.0 program can be indicated as an example of the initiative that is aimed at reduction of a lack of employees with digital competences (Koomsap et al., 2019). It is focused on adjustment of master's degree curriculum to digital requirements of labor markets. Another problem that can be identified is adaptation of traditional/craftsmanlike processes to Industry 4.0 technologies. In case of small and medium-sized enterprises in Poland, which are not able to possess any funds from external sources, the syndrome of the closed investment portfolio can be observed. It is directly connected with enhanced insecurity and lack of expert support in adjusting processes to requirements of production that involves digital control and monitoring.

Conclusion

The Industry 4.0 concept is evaluating rapidly and many of its elements have been introduced in industries of highly developed countries in which costs of labor are generally high. It is a strategic challenge for Polish businesses that build their competitive advantage mainly basing on lower level of costs. Tendencies in the level of labor costs, that can be observed, indicate that the situation is changing. In Poland the level of wages has been increasing, so building competitive advantage basing on that aspect will not be possible soon (Ulewicz and Mazur, 2019). In addition, the predicted growth of wages will cause a situation in which a cost of one hour work performed by a robot will be cheaper than one man-hour.

Basing on the results of the conducted research we can state that small and medium enterprises are able to identify areas that require improvement quite precisely (Fig.3) that relate closely to the Industry 4.0 concept. The ratings that analyze levels of Polish preparation to the 4.0 transformation (Fig.1,2) indicate that the barrier of poor quality of info- and telecommunication infrastructure in our country is not applicable any more, and Poland is a leader in this aspect.

The main problem that hinder wider and more systematic introduction of concepts relating to Industry 4.0 may be indicated in lack of financial sources. The research results unable any further generalizations but the assumption can be made that the problem is faced by many Polish entrepreneurs, especially small and medium-sized ones. Without sufficient support from external funds, Polish SMEs may not be able to deal with introduction of Industry 4.0 solutions. The problem may be solved by (Ingaldi and

Ulewicz, 2019) join venturing of entities which use similar technologies, processes or which offer similar product portfolios.

This type of support is particularly important in those typical industrial and technological areas where there is high research complexity and considerable investment risk e.g. in anti-corrosion protection of fuel cells (Włodarczyk, Dudek and Nitkiewicz, 2011), power plants infrastructure (Dwornicka, 2014), airport programmable equipment (Osocha, Cunha and Giovagnini, 2012), implants (Pawłowska, Klimecka-Tatar and Radomska, 2017) or self-lubricating friction pairs (Korzekwa, Bara, Pietraszek and Pawlus, 2016) and their uncertainty analysis (Pietraszek, Kołomycki, Szczotok and Dwornicka, 2016). Lack of a long term financial support is also important factor in biotechnology research (Skrzypczak-Pietraszek, Urbańska, Żmudzki and Pietraszek, 2019). It may be also a significant factor in decision process in those investments where huge material resources have to be involved e.g. the management of industry processes (Ulewicz, Selejdak, Borkowski and Jagusiak-Kocik, 2013), (Ulewicz, 2016) due to a change of tools lifetime (Ulewicz, Szataniak and Novy, 2014), especially in a case of hydraulic actuators of heavy-duty machines: jet pumps (Domagała, 2013) and erosion of valves caused by particles (Domagała, Momeni, Domagała-Fabiś, Filo and Krawczyk, 2018) and cavitation (Domagała, Momeni, Domagała-Fabiś, Filo and Kwiatkowski, 2018). Such modifications should be considered in the modeling of highly cost control (Filo, 2013) and sensing (Filo, 2015) systems, mechanical models (Domagała and Momeni, 2017) as well as in failure of hydraulic cylinders (Fabiś-Domagała, 2013) or other hydraulic components (Fabiś-Domagała and Domagała, 2017), economy (Kozień and Kozień, 2016) and uncertainty (Kozień and Kozień, 2017), (Pietraszek, Szczotok, Kolomycki, Radek and Kozien, 2017) analysis. However, it should be noted that entrepreneurs in Poland are quite sceptic about that solution and are not too enthusiastic about it.

The results presented in the paper are not without limitations. The research survey was created on the basis of a preliminary survey and expert interview with a small group of enterprises of the SME sector. The authors could not find the main problems in the field of the Industry 4.0; therefore, some factor could have been omitted. Only the most important results are presented, and consequently, some elements might be overlooked, which may affect the understanding of the results. The pilot research will allow minor changes to be made to the survey form before proceeding to the next stage of the study. The research presented in the paper will be continued in other parts of Poland and later will also be continued in other European countries. Additionally, the results of these research works will be compared with each other.

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Tourist Service Quality Vs. Overtourism – Polish Example

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Abstract

People all over the world can afford trips to different part of the world. On the Internet it is easy to find chip flight or a budget hotel. Lots of place which were impossible to visit 15-20 years ago, now are visited by many tourist. The most famous places are full of people, not only during vacation and different holidays. Therefore, it can be observed rapid development in tourism and tourist services. Unfortunately, with this development another phenomenon is also observed, i.e. overtourim. It means that tourism brings work, fame and profit for local people, but at the same time it brings crowd, noise, high prices, environmental pollution etc. It is, as a consequence, necessary to consider how to make such places and people living there feel the least negative impact of tourism on their daily functioning, but also to meet the requirements of tourists, moreover, how to make tourism sustainable. The aim of the paper was to analyze the impact caused by an increase in the number of tourists who visited several popular tourist destinations in southern Poland and quality of tourist services offered in these places. The analysis was conducted in form of a survey from the point of view of visiting tourists. The Importance/Performance analysis was used. This analysis allowed seeing if tourists noted problem of overtourism in research places and to analyze the level of quality of tourist services.

Keywords: Tourist Service; IPA; Quality of Life; Overtourism.

Introduction

There is a continuous increase in the number of tourists around the world, especially in the most popular tourist destinations (Heslinga, 2018). It is associated primarily with an increased population of people around the world (UNWTO, 2018), but also the greater well-being of many people. Another reason is phenomenon of popular low cost airlines, which have significantly reduced the cost of international and domestic travels. Next element that influenced the growth of tourism is the development of technology and the Internet. Various search engines, that inform potential tourists about changes in the price of the flight or help in finding cheap accommodation, have appeared. Due to the development of tourism, it is possible to travel for a short time, often for the weekend, organize different family celebrations abroad. People imagination and own cash are the only limits (Maitland, 2013).

People want to spend their time actively, learning new places that they may have seen on TV or read about them on the Internet (Beeton, 2016; Hess, 2019). Now, with development of tourism and its availability, such places are at the fingertips for many potential tourists, they can visit them, and then boast about it on social media. People are curious about the world, other cultures, different lifestyles, and the best way to get to know them is by traveling. Thus, tourism has become an element of globalization. It should therefore be emphasized that tourism has become one of the largest industries in the world and one of the economic sectors with the largest and fastest development (Gorica, 2007).

Due to the development of technology and the Internet, tourists can organize their own trip without the help of professional tourist offices. The tourist offices themselves, in order to retain customers, outdo each other in their offers, looking for opportunities to reduce costs, which has recently contributed to the collapse of many of them. Therefore, tourist offices and organizations have to face major changes on the tourism market (Ghorbani et al., 2020).

Unfortunately, with the increase in the number of travelers, especially for tourist reason, a phenomenon called overtourism appeared. Well-known European examples of negative effects due to continued quantitative growth include cities such as Amsterdam, Barcelona, Berlin, Lisbon, London, Rome, Venice and Prague (Koens et al., 2018; Novy and Colomb, 2016; Huete and Mantecón, 2018).

According to Dodds and Butler (2019) overtourism is a newly defined term for a problem that is really an old one that many popular tourist destinations have faced, but due to the continuous increase in the number of tourists it has been defined recently. It has only begun to be described more widely from 2018-2019 (Koens et al., 2018; UNWTO, 2018). Overtourim can be defined as excessive numbers of tourists at a specific destination that can result in negative impacts of all types on the community involved. Due to the frequency of occurrence, overtourism has become the object of research for many scientists (e.g. Eckert, et al. 2019; Koens et al., 2018; Milano et al., 2019).

The development of tourism has means that residents and local stakeholders are increasingly calling for coping with the problem of overtourism. However, oveturism should be considered from two perspectives: as the right of tourists to travel and as the right of residents to a peaceful and dignified life (Perkumiene and Pranskuniene, 2019). Thus, a good deal of research on the relationship between the rights of tourists and residents from various points of view has been developed. (e.g. Juss, 2004; Dauvergne, 2004; Gilbert, J 2014).

Tourists flow causes traffic jams, more waste, higher prices, arrival of thieves, disrupting the daily lives of local residents. Tourists often do not follow local rules of life, customs, behave very freely, leave garbage everywhere etc. It also has a negative impact, e.g. on the natural environment, which is very much exploited by tourists.

However, it should be remembered that the increase in the number of tourists visiting a given tourist destination can also have a positive impact. For example, this phenomenon is associated with creation of new jobs in which local residents are employed. Tourism is also profitable for the visited place. Tourists leave money in hotels and catering facilities, as well as tourist attractions, which affects the opportunity for investment and development of this place. That is why it is important to reconcile these two sides with each other.

The aim of the paper was to analyze the impact caused by an increase in the number of tourists who visited several popular tourist destinations in southern Poland and quality of tourist services offered by these places. These destinations have to face the problem of overtourism. Perhaps, in comparison to other popular tourist countries, Poland is not as vulnerable to overtourism, but also here it can be observed felt by the tourists and residents.

The analysis was conducted from the point of view of visiting tourists. The Importance/Performance analysis was used, and the research itself had form of a survey. This analysis allowed seeing if tourists noted problem of overtourism in research places and to analyze the level of quality of tourist services.

Problem of the overtourism

Rosenow and Pulsipher (Rosenow and Pulsipher, 1979) mentioned three main problems of overtourism:

1. too many visitors, possibly aggravated by seasonality;
2. too much adverse visitor impact (e.g., noise, rowdiness and other annoyances);
3. too much physical impact of the visitor economy (e.g., touristified city centers and destruction of natural resources).

The increased number of tourists has a negative impact on many factors, for example the natural environment and local residents. Tourists make a mess, it happens that they leave the marked tourist routes, enter prohibited places. They often do not respect the rights to a peaceful life of the residents, for whom it is a normal working day (Jamieson, 2019; Bouchon and Rauscher, 2019; Seraphin et al., 2018; Staiff, 2008).

Another problem associated with overtourism may also be its impact on the quality of provided tourist services. For example, in Rome, there are so many tourists that many tourists agencies offer tickets to the most important points of the city without waiting in queue, for a specific day and hour, which of course is associated with a very high cost. Tourists who decide to buy a ticket on their own and then visit e.g. Colosseum, must take into account a long queue, and thus a long time to spend waiting, which is difficult especially in summer months, when the temperature reaches 40°C.

With the increased number of tourists it is difficult to find a place where to eat something good and not pay a fortune. Restaurants, in order not to disappoint customers and earn more, often put more tables to serve the largest number of customers. However, they are often unable to provide their services of good quality. Unfortunately, this can affect the quality of the offered dishes or long waiting times.

In the most famous and famous places, overtourism has caused another phenomenon, which is very often described by Internet users, e.g. cheating tourists on the prices of various types of services. With numerous tourists who do not know the realities of the local market, it is easier to steal someone's money by providing sky-high prices. There are also stories available on the Internet about people that had to pay huge bill for cup of coffee or bottle of water or 2 km in taxi.

More and more cities are beginning to fight the phenomenon of overtourism or different issues connected to it. An example would be Venice. The Italian parliament approved an additional admission tax for Venice for one-day tourists, which would apply from 2020 (Russo and Sans, 2009), also in Corenno Plinio (city close to lake Como in Italy) from March 2020 tourist will have to buy tickets to enter the city (https://podroze.gazeta.pl/podroze/7,114158,25621713,miasteczko-nad-jeziorem-como-wprowadza-bilety-wstepu-pieniadze.html#s=BoxOpImg11). In many Italian cities, baths in fountains or eating food near monuments (e.g. Rome) was banned. Tourists can no longer sit on the famous Spanish Steps, which until now were one of their favorite places of tourists to rest (again Rome). In Santorini (Greece) a daily limit of tourists' entry into the city has been introduced. The mayor of Capri (Italy) or the authorities of Majorca (Spain) think about similar solution. In several towns around Venice area to build sand castles on their beaches is banned (Pogórska, 2019). "Tourists go home" is the motto of the anti-tourist protest in Barcelona organized by left-wing social activists in the summer of 2017 (Mihalič, 2019; Hughes, 2018).

In many large cities there is a problem with renting apartments, not the lack of them, but above all the price, as well as the lack of licenses for such activities but also tourists behavior. Many Internet portals offer the possibility of renting such apartments for short periods of time to tourists. Tourists do not always realize that behind the wall of the rented apartment residents live, behave more freely than usual, often abuse alcohol, even drags. On the other hand, it happens that apartments offered via the Internet and paid by customers do not actually exist or their conditions are completely different (usually worse) than those promised, and tourists learn about it only after arrival. That is why in many cities, e.g. Edinburgh, Palma and Paris, protests from the local community forced the authorities to act to limit and better control such accommodation (Gutiérrez et al., 2017).

It is important that both scientists and local authorities notice this problem and try to find any solution. The European Parliament (2018) study suggests five indicators for overtourism, which in the research about overourism can be included:

1. tourism density (bed-nights per km2) and intensity (bed-nights per resident);
2. the share of Airbnb bed capacity of the combined Airbnb and booking.com bed capacity;

3. the share of tourism in regional Gross Domestic Product;
4. air travel intensity (arrivals by air divided by number of residents);
5. closeness to airport, cruise ports and UNESCO World Heritage Sites.

It should be emphasized that the problem of overtourism also affects tourists themselves and the quality of tourist services provided by visited places. Hence, the need for research.

Methodology

The Importance Performance analysis (IPA) was used for the research. This method is designed to determine the importance of the service characteristics and their assessment by the customer (Dziedzic, 2015; Ingaldi, 2018; Eskildsen and Kristensen, 2006). It also allows to assess the strengths and weaknesses of a given service (Guglielmetti Mugion R. 2010; EIPA 2006).

The authors of the method were Martilla and James, who designed in the 1970s a measurement of the perception and significance of factors, variables affecting the service quality, from the point of view of customers (Martilla et al., 1977). IPA was often used to assess transport and tourism, education and health care services (Wong et al., 2011; Kim et al., 2019).

Collecting data for the IPA takes the form of a survey. Customers answer two types of scaled questions. They assess the same dimensions of the service quality twice: once due to their importance during the service process and again, the second group of questions refers to the same features, but in relation to already provided service (Stoma, 2012; Yildiz, 2011, Mustafa et al., 2019). The obtained results are compiled in the form of a map (Fig. 1). The IPA map is a two-dimensional model divided into four areas according to two axes: the X axis is perception (performance), while the Y axis is expectation (importance) (Ormanović et al., 2017; Ingaldi and Ulewicz, 2018).The closer the feature is located to the diagonal of the map, the more its importance is correlated with provided feature.

Features' importance for customers	high	Quadrant I **Focus here** (High Importance/ Low Performance)	Quadrant II **Keep doing** (High Importance/ High Performance)
	small	Quadrant III **Low priority** (Low Importance/ Low Performance)	Quadrant IV **Possible exaggeration** (Low Importance/ High Performance)
		small	high
		Assessment of service performance in terms of a given feature (Performance)	

Fig. 1: IPA map (own study based on Martilla and James, 1977; Stoma, 2012; Hariyani, 2017; Lin et al., 2009; Wong et al., 2011)

The IPA allows to understand the basic factors of customer satisfaction that should be priorities for improvement. It can therefore be considered a simple but effective tool that is very useful in making decisions regarding resource allocation and maximizing customer satisfaction (Matzler et al., 2004). To improve the quality of service attributes, one should focus primarily on those that fit into quarter I. Customers indicate that these attributes are very important to them, but at the same they do not influence customers' satisfaction (Wong et al., 2011; Ingaldi and Lestyanszka Skurkova, 2016; Stoma M, 2012; DiPietro et al., 2019; Kowalik and Klimecka-Tatar, 2018; Labajan and Koomsap, 2019).

The first stage of the research was to create a survey about the quality of tourist services for several popular tourist destinations in southern Poland. The survey contained 42 attributes divided in 6 groups (Table 1) and a respondents' characteristics. These attributes included in the survey are closely related to the phenomenon of overtourism and can be easily noticed by tourists. The survey is quite long, however, attempts were made to include various types of tourist services available in the research places and various aspects of overtourism.

A 5-point Likert scale was used for evaluation, where 1 means I disagree and 5 means I agree. The applicable scale may contain a zero point meaning no measured value (Hariyani, 2017).

Most of the attributes contained in the developed survey are directly related to overtourism, and in particular to the problems described above resulting from overtourism. Among the most important there are attributes connected to e.g. overcrowd (attribute 1, 5, 9, 20, 27, 36), waste and dirt (2, 22, 28, 37, 40), attempts to fool tourists (4, 14, 15, 23, 24, 32, 39), high prices (3, 7, 16, 30, 31, 33), lower quality of services (8, 10, 11, 12, 13, 17, 18, 19, 21, 34, 35, 38).

Table 1: Attributes included in the IPA survey (own study)

No	Group	Attribute
1.	Transport	Buses/trams/trains were not crowded.
2.		Buses/trams/trains were clean.
3.		The prices for different mean of transport were reasonable.
4.		No one tried to fool me in means of transport.
5.		Streets were not crowded.
6.		There were many paths to walk.
7.	Accommodation	There were many hotels for every budget.
8.		The hotel I stayed offered services of good quality.
9.		The hotel was not overcrowded.
10.		The staff was big enough.
11.		The staff was nice and friendly
12.		I did not have to wait too long for being served.
13.		The room was clean and prepared for my visit.
14.		The room was exactly as found in the offer.
15.		No one tried to fool me in the hotel.
16.	Restaurants	There were many restaurants for every budget.
17.		The restaurants I visited offered services of good quality.
18.		The staff was big enough.
19.		The staff was nice and friendly.
20.		The restaurants were not overcrowded.
21.		I did not have to wait too long for being served.
22.		The restaurant was clean and prepared for tourists.
23.		Toilet was without payment.
24.		No one tried to fool me in the restaurant.
25.	Famous monuments/ places to visit/Free time	There were plenty of monuments, places to visit and ways to spend free time.
26.		These places were open in convenient time.
27.		These places were not overcrowded.
28.		These places were clean and prepared for tourists.
29.		Tickets to these places were easy and quick to buy.
30.		Tickets were not too expensive.
31.		I did not have to go to special agencies to buy tickets to visit faster and to choose hour.
32.		No one tried to fool me close to famous monuments/ places to visit.

33.	Shops with souvenirs	There were plenty of shops with souvenirs for every budget.
34.		The staff was big enough.
35.		The staff was nice and friendly.
36.		The shops were not overcrowded.
37.		The shops were clean and prepared for tourists.
38.		The service was nice and fast.
39.		No one tried to fool me in the shops with souvenirs.
40.	Other	The tourist destination I visited was clean and the waste was removed.
41.		The tourist destination I visited was properly had clear street signs.
42.		In the tourist destination I visited did not introduce any restriction for tourists.

The survey was available through various types of social media. The research took place in March - October 2019, 1289 people took part. Respondents were asked to assess the attributes from the point of view of importance (Importance) and performance of the service (Performance). 1163 completed surveys were taken into account for analysis, the remaining ones were rejected because they were not completed properly. Assessments of individual attributes were averaged, presented graphically as bar charts, and then placed on the IPA map.

To assess the level of service quality in the research tourist destinations, the importance and performance were also compared. In the graphic form (bar chart) the relation between the performance of the service according to respondents and the importance indicated by them, as well as the performance to the maximum value that could be given by them (maximum possible importance - 5) for individual attribute, were presented In addition, the total quality ratio was calculated as relation of the average service performance to the average importance and to the maximum possible importance.

Results and Discussion

As mentioned earlier, 1 289 people took part in the research. 1163 surveys were analyzed, of which the respondents were primarily women 63.11%. People aged 30-40 (37.27%) and 20-30 years (34.86%) predominated. These people were mostly employees (42.68%) and students (29.12%.), from large cities (58.47%).

The average Importance and Performance assessment are shown in Figures 2 while the IPA map created on the basis of them in Figure 3.

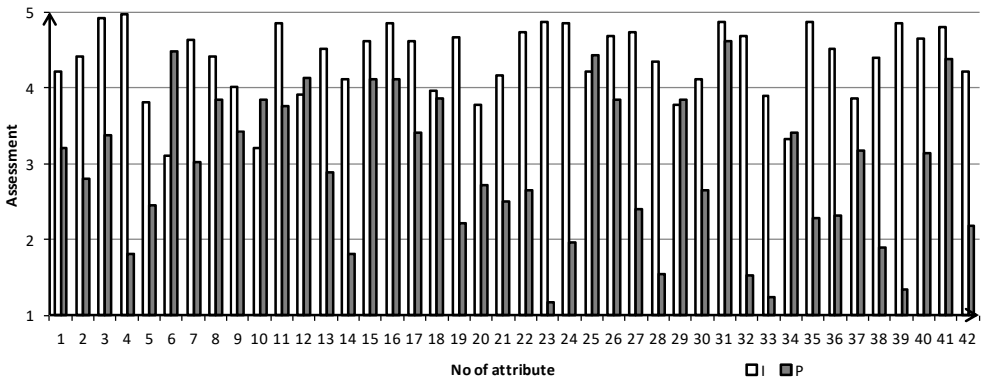

Fig. 2: Attributes assessments - Importance and Performance (own study)

The average Importance was 4.36 and the average Performance 2.95. This means that respondents negatively assessed the quality of tourist services, because the average Performance of the service was much lower than the average Importance.

There is also a large variation in the assessment of individual attributes for both Importance and Performance. For respondents, the following attributes were the most important: 3, 4, 16, 23, 24, 31, 35, 37, 39, 41. These are attributes for which the Importance was above 4.80. However, among the least important attributes it is possible to indicate: 6, 10, 34 (Importance below 3.50). When it comes to Performance, respondents indicated as the best attributes: 6, 13, 15, 16, 25, 31, 41 (Performance above 4). The worst assessed attributes of tourist services were: 4, 14, 23, 24, 28, 32, 33, 38, 39 (Performance below 2). These elements are closely related to overtourism and different problems cause by overtourism. According to respondents, they were assessed low, which means that respondents had negative feeling about them.

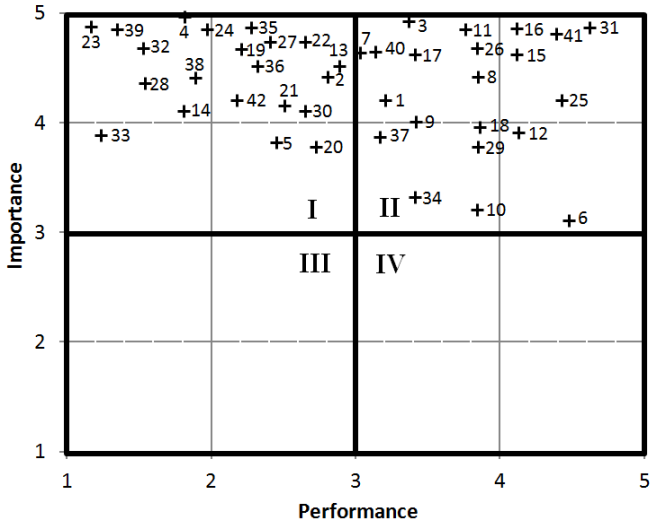

Fig. 3: IPA map for tourist services (own study)

Analyzing the IPA map for the tourist services, it can be seen that all attributes were found only in two quarters: I and II. Attributes found in quarter II were very important for the respondents, but were also largely met, which results from high Performance assessment. They had a positive impact on the quality of tourist services and should be kept at this level.

All attributes from quarter I are attributes need potential improvement. They were important for respondents, but their performance was not satisfactory. The closer to the left of the graph (value 1), the worse. These attributes negatively affect the overall level of quality of tourist services.

In Figure 4 the quality ration for individual attributes was presented. Both relations between the performance of the service to the importance indicated by respondents (white bar), and to the maximum possible importance (gray bar) were included.

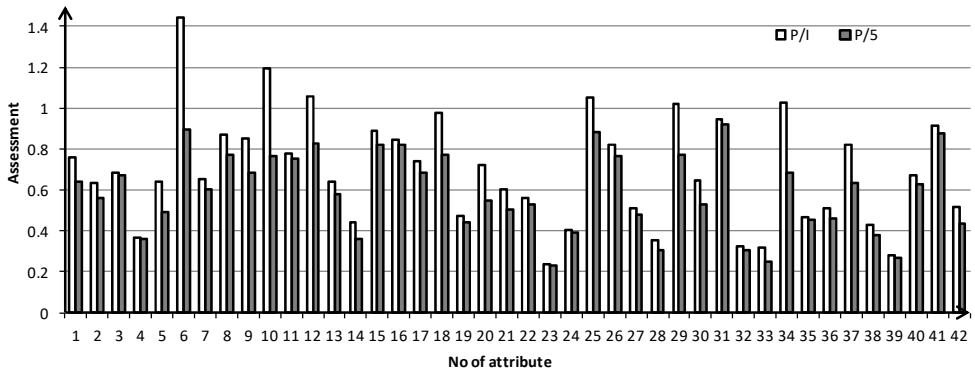

Fig. 4: Quality ratio for individual attributes (own study)

Total quality ratio was 0.69 (relation to the importance indicated by respondents) and 0.59 (relation to maximum possible importance). This indicates that the quality of the tourist services was not very high. Analyzing the ratio of Performance to the maximum possible Importance, it can be seen that in several cases the result was above 0.8 (attributes 6, 25, 31, 41), these attributes had positive impact of quality level. In many cases this ratio was below 0.4. It means that only in this part they met requirements of respondents.

Analyzing this relation to the Importance indicated by the respondents, attributes 6, 10, 12, 25, 29 and 34 can be assessed positively. In these cases, the Performance assessment was higher than Importance which means tourists satisfaction. Unfortunately, in many cases this ratio was below 0.4: 4, 23 28, 32, 33, 39. These are the attributes with a high Importance advantage over Performance, i.e. attributes that need to be improved first in order to raise the level of quality of the tourist services. Especially since their negative assessment is caused by overtourism. Therefore, it can be concluded that respondents noticed the occurrence of this problem and its impact on the quality of tourist services offered in places where this problem appears.

The research showed that tourists noticed problems associated with overtourism, although they may not be aware of it or simply cannot name it. Respondents knew only that they were supposed to assess the quality of tourist services. However, they did not know that the attributes in the survey were related to the phenomenon of overtourism.

Respondents assessing Importance of individual attributes, indicated what was important for them in tourist services, which they paid special attention to. When assessing Performance, they indicated which attributes they were the most and the least satisfied with, what bothers them during travel and sightseeing. The lower the Performance assessment, especially in combination with the high Importance assessment, the more negative impact on the quality of tourist services, but also the more problems arising from overtourism.

Summary

Each of us likes to travel and certainly each of us observes an increasing number of tourists in popular tourist destinations. It is also possible to notice the appearance of a negative effect of this phenomenon, which often has a negative impact on the level of tourist services provided in such places, as well as lack of satisfaction from such visits. This phenomenon is called overturism.

In the paper the issues of overtourism and its impact on the quality of tourist services were presented. Attributes that determine the quality of these services and are associated with the occurrence of overtourism were also analyzed. The research took the form of a survey, and the Importance /

Performance analysis was used during the study. Respondents pointed out those attributes that negatively affected the quality of tourist services offered in several popular tourist destinations in southern Poland and which are associated with overtourism. These attributes form the basis for further analysis in order to make changes and improve the quality of these services.

The research is not without limitations. The survey was created based on the authors' experience and literature review presented in the paper. Some important factors could be omitted due to the subjectivity of authors and found references. Survey itself was quite long so some respondents could feel bored and filled it up without any will or at random but it was necessary because of diversity of the research problem. The sample can be also criticized to have too small size and the research period too short, which was due to tourist period in research places. Another limitation is the fact that customer requirements and are constantly changing because they get new experience about travels. Therefore, the revision of the results should be repeated in 1 or 2 years.

The survey built for the purpose of this research can be used to evaluate other tourist destinations in other countries and on other continents. It can be shortened or changed. However, it is a simple and useful tool that can help to learn about the impact of overtourism on the quality of tourist services and the perception of this phenomenon by the tourists.

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A Cross-Cultural Investigation of Variables Affecting Trust In S-Commerce In 30 To 45-Year-Old Age Group

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Abstract

When it comes to understanding peoples' acceptance of a new field such as s-commerce, trust appears to be an important factor according to recent and former theoretical frameworks. It is also necessary to have an inclusive representation of users of social media in order to fully understand the effects of certain variables and factors in s-commerce. Previous research on social commerce has focussed on a younger demographic; to bridge this gap, we will focus in this paper on users who are college graduates and are over the age of 30 to 45. In this research, Quality of information (QI), Social media influencers (SMI), and payment methods represent the variables of trust attainment that we intend to investigate. Moreover, this study will also take into account sociocultural factors, comparing results from people from Saudi Arabia and Australia. The research data will be quantitative and the tool for data collection is online surveys. This study is targeting university-graduated people who are between 30 to 45 years. The study will analyse the effect of three variables; QI, SMI and payment methods on trust in using SC. The results will also be compared between the Saudi and the Australian responses to unveil any cultural differences. In this research, IBM SPSS software will be used for analysis of the data. The purpose of this study is to help businesses using s-commerce better understand their audience and predict the behaviour of their clients and to collect data that is inclusive of all possible buyer demographics.

Keywords: Social commerce, Trust, Quality of information, Influencers, payment methods.

Introduction

S-commerce is about using societal tools to produce an atmosphere for creating social communications. This study focuses on trust as the backbone of attracting s-commerce customers. The variables investigated in this paper are quality of information, social media influencers, and payment methods. A review of the literature regarding these variables found that there is a lack of representation of users who are older (30 to 45 years); in fact, most study populations were of students between the ages of only 18 and 24. To bridge this gap and to better represent the population of consumers, buyers, and users of social media, we will study the effect of the above variables on an older generation. The criteria of this study are the age of the consumer (college graduates between the age of 30 to 45) as well as taking into consideration the cultural background (Saudi Arabian vs. Australian respondents). With regard to cultural differences, there is a clear lack of comparison in the research between the effects of culture of Saudi Arabia and Australia on trust in s-commerce with regard to the variables in this study, which is also another gap, we intend to fill with this paper.

Literature Review

The effect of trust on social commerce

When referring to the word trust in this research, it is meant as the consumers' trust in the Social commerce seller. In the Hajli et al. (2017) study they highlighted the relevance of trust as an enabler for the intention of individuals to use SC. Given the weight placed on trust in business exchange relationships, it is vital to understand how trust affects particular aspects of customer behaviour (Doney and Cannon, 1997). Trust is also considered a challenge that is not easily attained by businesses and organizations using SC (Beyari and Abareshi, 2018). The results of a study by Hajli (2013) showed that trust is still considered a problem in e-commerce platforms and that trust can be established through s-commerce paradigms.

The role of social media Influencers (SMI)

Advertising plays a big role in social commerce, so big that companies are redirecting their advertising budget towards social media platforms for an interactive and better reach. Anatasia et al. (2016) study three advertisement strategies that are the most successful in selling skin care products. One of the results was that celebrity endorsement was positively connected with user trust in skin care product advertising. Beyari and Abareshi (2018) stated that social influences directly affect the user on SNS in intention and satisfaction upon buying something through SC. Therefore, social media celebrities are a huge component of the content that people interact with while using SNS, so by utilizing them, they become a loud voice in the consumers' pool of influences.

Quality of information (QI)

QI is a term given to the information provided by the buyer, which includes accurate descriptions and prevalence of pictures, videos, testimonials and opinions of users.. Hajli et al. (2017) believe that the quality of information in SC is considered one of the technical enablers of SC usage. They also state that the quality of information provided on the SC platform improves the users' experience. In today's world, prospective buyers can enter and access through social media websites to an overabundance of peer-generated information regarding that product before making a purchase decision. It is projected that 97% of online buyers read users' comments and are swayed by them (Ahmad and Laroche, 2017).

Payment Methods

Releasing private data and billing information causes great apprehension when it comes to e-commerce implementation, and now the concern has surfaced in s-commerce. Paying by card is the most common mode of online payments in the Western world; a vast number of users have used this method for speedy and simple transactions (Mukherjee and Roy, 2017). The second most common payment method found in Yang (2017) was third-party online payment systems like PayPal and AliPay (which is common in China). No matter the method, online payments still may have some financial risks, which has led to some companies considering the cash on delivery (COD) option (Yang, 2017). In a study of Saudi Arabian participants on the use of e-commerce, COD was classified as the most favoured method of online shopping payment (Makki and Chang, 2015). COD was rated the most-selected payment option, which was attributed to the culture and the practices of Saudi shoppers. Choosing COD offers a chance for customers to physically inspect their purchased items (Makki and Chang, 2015). In a study conducted on participants from Kuwait on electronic payment methods, the results revealed that the systems most used in Kuwait were credit cards/debit cards, COD and mobile payment (Rouibah, 2015). This study, as well as the studies done by Yang (2017) and Makki and Chang (2015), were conducted on e-commerce; there remains a gap in the study of preferred payment methods in s-commerce.

Outcome

The outcome of this study will advise business owners seeking to use SC as a platform for selling their products and or services to increase the quality of information on their page and display as many videos, reviews and testimonials as possible. It will also lead to a better understanding of the role of celebrity advertisements and if it is wise to invest in such a strategy based on their target audience and the results of this paper. Another outcome is that it will give the business the information on which type of payment method is preferable and produces the most amount of trust in the online transaction based on the target audience.

Conclusion

S-commerce is an emerging force for business expansion and growth. For s-commerce to be widely accepted and implemented, consumers need to have trust in the s-commerce platform, and corporations should work on building such trust. To bridge the gap that is evident in previous research, in which consumer populations consisted only of students and younger generations, the criteria of this study are consumer age (i.e. college graduates 30 to 45 years old) and cultural differences between Saudi Arabia and Australia. The variables of this study are quality of information, celebrity, social media influencers, and payment methods, all of which have been proven to have a direct correlation with consumer trust.

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Formation of The Integrated Reporting Of the Construction Companies

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Abstract

Nowadays the interest of external users in integrated reporting significantly increases due to its practical importance, recognized both by the professional accounting community and by business entities. The actual significance of the integrated reporting is also confirmed by international as well as Russian practice. Considering the role of the integrated reporting information base, the accounting system of the construction companies was chosen. It is proposed to take into account the peculiarities of the construction company's activity when forming the integrated reporting. The article outlines the procedure of the integrated reporting formation for the construction companies, which includes at least six sections with the specific factors in each. The authors considered the section «Business model of the construction company» in detail. The paper reveals, that the integrated reporting of the construction companies should include financial indicators as well as non-financial ones. Moreover, they should be presented in the context of the main parameters of the section under consideration. Management accounting is recognized the main source of non-financial information. The methodical approach to the integrated reporting formation, using management accounting capabilities of grouping and systematization of information, has been developed. The paper performed the process of forming the indicators of the integrated reporting section «Business model of a construction company» by areas of responsibility of the construction companies. The areas of responsibility are determined according to the functional areas of the construction company's management: supply, production, maintenance and repair, sales, finance, personnel management, etc. The methodological approach proposed allows the construction companies to create the integrated information system in order to prepare the integrated reporting, represented by the subsystems of financial accounting and management accounting.

Keywords: integrated reporting, financial accounting, management accounting, financial and non-financial indicators, construction organization.

Introduction

In recent years the construction industry has been developed widely. Thereby the construction organizations have faced the problem of public reporting formation, including its non-financial component. This part of reporting discloses information regarding to the social and environmental issues of the company's activities. The significant number of construction organizations has recently started using the Global Reporting Initiative (GRI) as well as International Integrated Reporting Standard when forming their reporting. Therefore, the interested users receive the data in the form of a combined report. In addition to the financial statement, it also includes information about the company's impact on the economic, environmental, and social spheres. In some cases two reports are prepared: financial annual report about cash flows and financial results for the certain period and a non-financial one, containing an environmental report, a social report, a report on the sustainable development of the company, etc. The main reason that encourages companies to create integrated reporting is the extremely low degree of transparency of standard reporting information. The authors refer to "transparency" as the timely disclosure of reliable financial information about company's activities and their results.

Moreover, the companies with the transparent reporting are characterized by a readiness to allow interested parties of users (the so-called "stakeholders") to deal with their management information. Therefore, the trend of transparency increasing is one of the essential features of reporting, allowing to estimate the investment attractiveness of the company.

Rendering of integrated financial statements allows interested users (the so-called "stakeholders") to arrive at conclusion of company's strategy, stability and liquidity of its business, financial and economic results within the reporting year, as well as its social and environmental achievements. This also applies to construction companies since they will be obliged to submit non-financial statements in the nearest future. The integrated reporting of the construction company should give a comprehensive understanding for all interested users about the strategy of the construction company, its financial results within the reporting year as well as the social and environmental problems it faced and their solutions.

Promotion of integrated reporting by construction companies meets a number of barriers:

– lack of clear legislative regulation of integrated reporting forming for the construction companies (the International Integrated Reporting Standard is not mandatory for the vast majority of organizations);

– lack of a set of the integrated reporting indicators to evaluate the results of construction companies' activity;

– lack of qualified staff for preparing integrated reporting formation for the construction companies;

– significant time and financial costs for the preparation of integrated reporting of construction companies.

The research is aimed at developing the method of generating integrated reporting formation that characterizes production capital in the "Business Model" section of a construction company in order to provide its transparency.

The further implementation of the integrated reporting in construction sector determines the set of the basic concepts and indicators of disclosing information about company's results within economic, environmental and social spheres. On this basis they will be involved in the process of increasing the investment attractiveness of the construction business.

Main problem

Currently, there are a large number of studies on the integrated reporting of the economic entities. In 2002 J. Robert Eccles considering questions about the causes and methods of financing capital in the market, came to the conclusion that, in addition to financial reporting, non-financial reporting is no less important for investors *(Eccles, Hertz and Phillips, 2002)*. So, considering the answers to the questions given by the financial directors of the largest companies during the survey on this topic, we can conclude that they came to understand the sharp increase in the influence of non-financial information on managerial

decision-making. In particular, only three selected indicators of the ten proposed for assessing financial attractiveness were financial while seven were non-financial. Therefore, it was concluded that the role of non-financial information has been increasing and it is necessary to develop this reporting component.

The analysis of available literature sources allowed the authors to identify the problems of integrated reporting.

1. The requirements formulated by the International Standard on the principles of integrated reporting are advisory in nature and are not mandatory for companies. Therefore the integrated reporting does not follow any strict structure, as well as the strict procedure of collecting the data.

In this regard, companies that are interested in the integrated reporting formation do not often have an understanding of following issues (Rupley, Brown and Marshall, 2017), (Montesinos and Brusca, 2019), (Bouten and Hoozée, 2015):

– what kind of information the integrated reporting should contain;
– what kind of steps should be taken to prepare the integrated reporting and in what sequence;
– what are the sources of getting the information needed in order to form the integrated reporting.

2. Currently, integrated information cannot be presented in the form of standardized reporting, since it cannot be the same for all companies. It depends on the type of the company and contains its unique features. In this regard, the industry-specific features of the financial activities of the company should be reflected in the structure of integrated reporting and its indicators (Nistor et al., 2019), (Bradford, Luke and Furneaux, 2018), (Stubbs and Higgins, 2015).

3. The absence of a unified methodology for assessing financial and non-financial reporting indicators, as well as the presence of a different metric assessment system, does not allow us to evaluate the results of the company from the point of view of various industry areas (Tirado-Valencia et al., 2019), (Lai, Melloni and Stacchezzini, 2018), (Maroun, 2019).

Currently, there is no unified approach to the integrated reporting formation. However, the analysis revealed some common features in the difficulty of implementing integrated reporting in the companies (Atkins and Maroun, 2018), (Rupley, Brown and Marshall, 2017), (Rivera-Arrubla, Zorio-Grima and García-Benau, 2016):

– The International Standard does not provide clear rules for most companies to regulate integrated reporting. As a result, reporting will vary from company to company and will be extremely difficult to compare them;
– Lack of a single conceptual framework for integrated reporting, that also prevents organizations from making unified integrated reporting;
– Lack of understanding of the integrated reporting boundaries, that does not allow determining the materiality of the indicators to be disclosed in the reporting;
– Lack of practical experience of a large number of companies in the integrated reporting forming that significantly complicates the comparison of results with the competitors.

The analysis of the advantages and disadvantages of the integrated reporting formation allowed us to draw the following conclusions on the requirements to be taken into account in the methodological approach to reporting:

– To determine the financial and non-financial indicators, that should be reflected in the integrated reporting of the construction companies;
– To determine the information base of the integrated reporting of the construction companies and to identify the leading role of management accounting;
– To develop a methodological approach to the organization of the collection and presentation of the integrated information system necessary for the formation of the integrated reporting of the construction companies.

Materials and methods

The interested users (investors, first of all) in the companies' activities, in order to make decisions on their transparency and investment attractiveness, need financial and non-financial information within

unified integrated. The following factors should be included in the integrated reporting of the construction company:
– Specifics of construction products;
– Organizational, economic and technological peculiarities of construction production in the company;
– The relationship between the contractor and the customer regarding the contract.
These features affect the main economic indicators of the construction companies and have a direct impact on their financial and economic activities.
Therefore, the integrated reporting of the construction company should contain at least the following sections:
– «Review of the company and the external environment»;
– «Business model of the construction company»;
– «Strategy for the distribution of resources of the construction company»;
– «Results of the construction company»;
– «Risks of the construction company»;
– «Prospects for the future development of the construction company».
The first section of integrated reporting «Review of the company and the external environment» contains information about the markets in which the company operates. Information is displayed both in geographical and technological aspects. When the technological component is disclosed, the types of construction and installation works and the corresponding construction services are specified by categories of types of construction products, main subcontractors, etc. When revealing the technological component, types of construction and installation works and corresponding construction services are: information on the role of the company in contracting relations and main subcontractors, etc. The parameters of the external environment of the construction company should describe changes in the legislative and regulatory acts, in the economic situation and in the industry trends taking place around the company, etc.
The second section «Business model of the construction company» includes the parameters of the company's resources that it will create in short-, medium-, and long-term periods. Taking into account the high capital intensity of construction products and the specifics of this type of activities, the company discloses the methods of settlement used for the completed parts of the volume of construction and installation works and for fully finished construction. When additional working capital is required, it is necessary to provide for the use of borrowed funds. Therefore, within this section of the integrated reporting, it is also necessary to disclose the model and sources of financing of the company's business model. When using the company’s borrowed resources, it is necessary to take into account the following indicators: availability of borrowed resources at the beginning and at the end of the reporting period, movement of them during the analysed period of time, rates of loans, amounts of accrued and paid interest, etc.
In the section «Strategy for the distribution of resources of the construction company» the company, focusing on its short, medium and long-term strategic goals, provides the distribution of all kinds of resources to achieve these goals. The key non-financial indicators of this section characterize the competitive advantages of the company.
The section «Results of the construction company» provides users with quantitative and non-quantitative indicators regarding to historical data. Therefore, in addition to financial indicators of cost, revenues and profit, this section will contain information of non-financial indicators, such as date of putting into operation the construction facilities, volumes of production in natural indicators, results of the company’s participation in tenders, etc.
The section «Risks of the construction company» contains the information about future events related to the company that have not yet occurred but will come with a high probability. Since this information about the future is probabilistic, events will occur with different probabilities. Therefore, all these events should be discussed, and decided upon at meetings devoted to such events. Such decisions, for instance, may involve the creation of event reserves with a probability of occurrence more than 50%.
The section «Prospects for the future development of the construction company» presents the forecast of the future, taking into account the uncertainty and risk that the company may face when implementing its

strategy. At the same time, its key performance indicators should be improved. The investor, as the main person to who integrated reporting is addressed, will be interested in information about signing new construction contracts and development of new construction projects.

Integrated reporting is formed to provide wide and consistent disclosure of company information. As a result, an interested user of reporting can obtain real information regarding to the main financial resources, as well as its economic, environmental and social fields of activities.

The integrated reporting contains multidimensional information. As a rule, financial and management accounting data, as well as any operational information, are used for its formation. Recently, the role of management accounting, which serves as the main supplier of non-financial performance indicators of companies, has become the most significant. The deeper management accounting is developed, the more points of contact with accounting information (planning, budgeting, analysis, control) it has.

As part of the further study, it is planned to give substantial approaches to the process of creating and forming an important part of the accounting system characterizing the reporting section «Business model of the construction company» based on the grouping and systematization of financial and non-financial indicators. The result will allow making a managerial decision in order to conclude that the proposed indicators are acceptable for describing the innovative development of the company.

Results and discussion

To solve the problem of creating an integrated information system capable of providing the user with the necessary information of the report section «Business model of a construction company», it is proposed to use the existing accounting system of the construction company, represented by financial accounting and management accounting subsystems, as a basis. Financial accounting forms information of a financial nature, characterizing financial results of the company's activity, its financial condition, and provision of material and financial resources. In turn, management accounting should provide the user with a wide range of information on all aspects of the company's activities of a non-financial nature. At the same time, management accounting has an unusual function, as it is intended to provide information for planning and control processes at all stages of management.

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The organizational structure of the company is considered as a set of different centres of responsibility from the point of view of management accounting. The responsibility centre is understood as a part of the management system (department of the company), which head can manage the material, labour and financial resources for the implementation of the tasks assigned to it and is directly responsible for the efficiency of their use. The accounting system for responsibility centres ensures the registration, reflection, accumulation, analysis and provision of information, connected to costs and results to the company's management, which makes it possible to evaluate the activities of specific managers. It is proposed to use the management accounting options for grouping and systematizing information and its user orientation when forming the integrated reporting and provide detailed data on the construction company's internal management reporting to all interested users, thereby ensuring informational transparency of its business. However, the construction company's accounting system (primarily the management accounting subsystem divided by responsibility centres), be used directly in this form when forming the integrated reporting.

The study of the information support of integrated reporting was carried out on the example of a large construction company engaged in the construction of housing and civil facilities using monolithic frame technology. The company focuses on the implementation of projects for the integrated development of the territory, the proposal of integrated architectural, planning, engineering and organizational solutions for creating non-standard objects. It carries out all types of design work prior to the construction and operation of facilities and has great investment attractiveness. To ensure the effective functioning the construction company involves design, budget, contract, production departments, planning, economic and financial units, units of the main production (construction departments that perform the whole range of construction and installation works, production sites), units for servicing the main construction production (mechanization department, logistics service, supply departments, quality management, technical supervision, labour protection and technical services security guides), administrative units.
The procedure proposed by the authors for the interaction between the departments of the construction company as part of an integrated information system in the process of forming the integrated reporting is presented below (Fig 1).

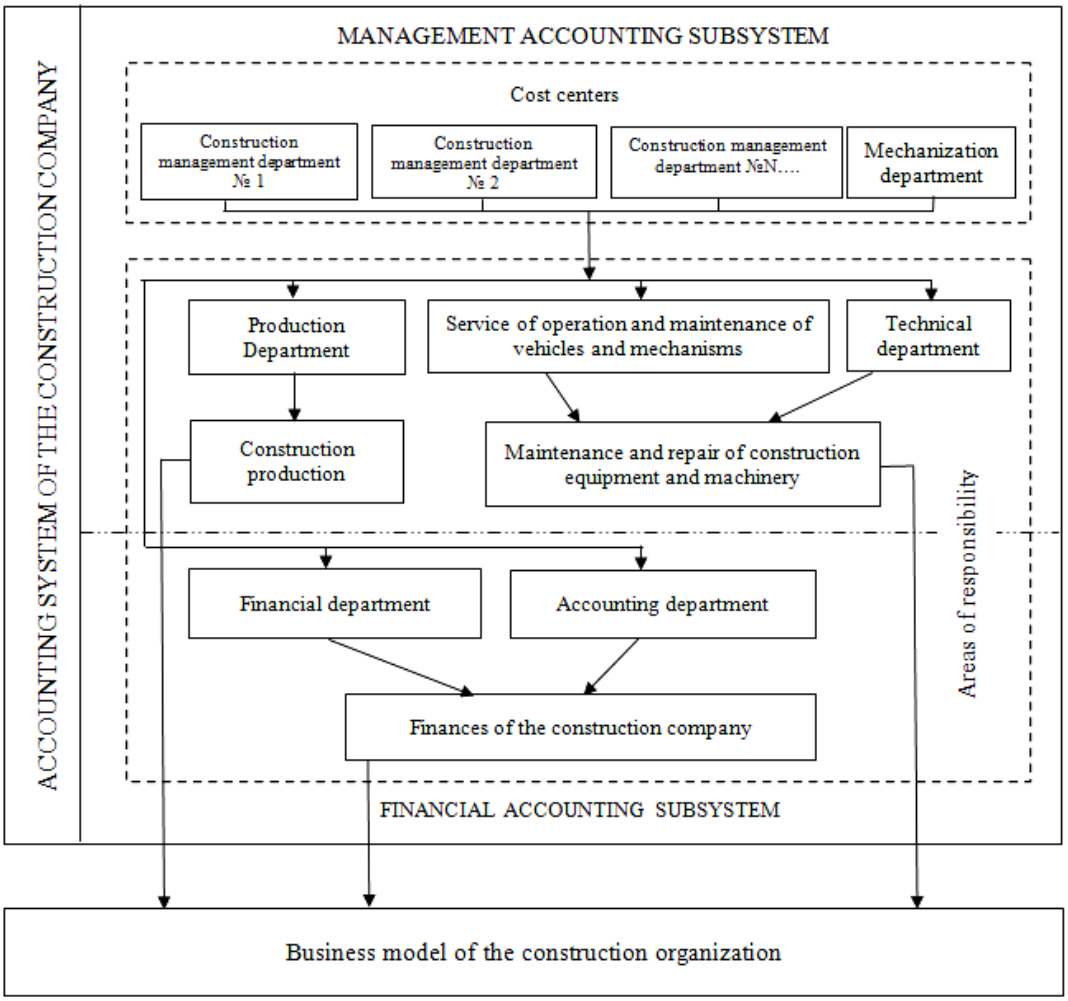

Fig 1. The interaction of the construction company's departments within the information system of the business model of formation of indicators for the construction company
(Source: compiled by the authors)

To increase the efficiency of the process of preparing information to be disclosed in the integrated reporting, it is proposed to identify the segments of the management structure – the areas of responsibility. They will solve the problems of systematizing information about the construction company's activities.

The authors proposed to identify the areas of responsibility "Provision", "Construction Production", "Maintenance and repair of construction equipment and mechanisms", "Sales of the construction company", "Finance of the construction company", "Personnel management of the construction company", etc. in the construction company. For each area of responsibility, the scope of authority, duties, responsibility is determined, and the forms of internal reporting that it prepares are established.

Each area of responsibility combines specific elements of the organizational structure of a construction company that will directly process and summarize information received in response to information requests. Depending on the amount of information processed, this can be either individual employees or the unit as a whole. Thus, it is proposed that the supply department and the logistics service be assigned to the "Provision" responsibility zone, and the "Construction production" responsibility zone, respectively, to the production department, quality management department, technical supervision department, labour and safety protection service. The area of responsibility "Maintenance and repair of construction equipment and mechanisms" should include a technical department (department of the chief mechanic), a service (section) of operation and maintenance of vehicles and mechanisms. The area of responsibility "Sales of the construction company" will unite the marketing department, the design, budget and contractual, planning and economic departments, and the area of responsibility "Finance of the construction company" – the financial department, accounting. The area of responsibility "Personnel management of a construction company" will include a personnel department and a department of labour and wages.

Baseline information is collected at cost centres – production units, where all types of resources are consumed and costs are accumulated. In the construction company, such are the units (construction departments or individual construction teams) that perform special types of work (land, general construction, installation, finishing, etc.), and the mechanization department. The cost centre manager has the responsibility to respond to the information request of the integrated reporting compiler. It is necessary to post the financial and non-financial indicators in the accounting registers, using the data of primary documents of management accounting, and transfer them for further grouping and systematization in the appropriate unit of a certain area of responsibility.

For instance, information about the degree of labour mechanization and automation, provided by all construction management departments, is accumulated by the production department; then it is summarized, analysed and presented in the form of a report to the manager of the "Construction production" area of responsibility.

Further, the information received from all the departments within the area of responsibility, is systematized by the manager and presented in the form of a report to the employee, responsible for the preparation of the integrated reporting. In some cases, the necessary information is generated without the participation of cost centres directly in the areas of responsibility. For instance, data on the average number of employees of a company, is formed directly by the personnel department, which is part of the responsibility for "Managing the personnel of a construction company".

The process of forming the indicators of the integrated reporting by areas of responsibility of the construction company with the participation of structural departments within each area of responsibility and cost centres, is presented in the section "Business model of a construction company" (Table 1).

The choice of the section of the integrated reporting "Business model of a construction company" is determined by the following:

– It is one of the key sections in the integrated reporting. It provides interested users, primarily investors, with information about the capital used by the construction company as resources in creating value in the short, medium and long term. In accordance with the recommendations of the International Standard for Integrated Reporting, this section discloses information on the financial, production, human, intellectual, social and natural capital of the construction company;

– the business model is based on business processes that, through the interaction of elements of the internal and external environment of the construction company, transform the initial capital into the results of operations, the incremental capital of the company, as a result of which it is capable of a long-term viable business;
– practically all areas of responsibility take part in the formation of the information in this section, except the area of responsibility "Sales of the construction company", which entails significant difficulties in practice. In order to qualitatively disclose information in this section, it is necessary to understand the economic essence of the business model of the construction company, its components, and the relationships between them.

Table 1: the process of the formation indicators of the integrated reporting section "Business model of the construction company" by the zones of responsibility of the construction company
(Source: compiled by the authors)

Area of responsibility	Company departments within the area of responsibility	Cost Centres, forming Integrated Reporting Indicators	Integrated reporting indicators		Company resources (type of capital)
			Financial	Non-financial	
Finances of the construction company	Financial department			Types of investors, financing model, sources of financing	Financial
	Accounting department		The structure and cost of equity, the structure and cost of borrowed capital		
Finances of the construction company	Accounting department	Construction management department, Mechanization department	Capacity Expansion Capital Costs	The structure of fixed assets, including share of rented and leased	Production
Maintenance and repair of construction equipment and machinery	Technical department	Construction management department, Mechanization department		Asset status, capacity utilization	
	Maintenance and repair of construction equipment and machinery				
Construction production	Production Department	Construction management department, Mechanization department		Degree of mechanization and automation of labour, stock capacity of labour; Material intensity, energy intensity, labour intensity of production and construction products	
Management of a construction company	HR department			Average number of employees, including by category, structure of personnel by qualification, education, age, level of professional training, staffing	Human
	Department of Labour and		Level of average wages, including		

	Wages		by categories, its ratio to sectorial and regional indicators		
Finances of the construction company	Accounting department	Construction management department, Mechanization department	Labour costs, social support costs, staff retraining costs		
Construction production	Production Department	Construction management department, Mechanization department		Labour productivity level	
	Health and Safety Service			Labour organization, occupational injury rate, health and safety indicators	
Finances of the construction company	Accounting department	Construction management department	Structure of intangible assets and intellectual property objects of the company, their value, dynamics and structure of costs for intellectual capital, costs for innovation, R & D, for acquisition of new technologies, for research and development performed by third-party companies		Intellectual
HR management of the construction company	HR department			Share of research staff to the average number of staff	
Construction production	Production Department			Description of land plots owned by the company: area, location, dynamics and structure of consumed natural resources	Natural
	Department of technical supervision	Construction management department		Indicators of environmental safety	
Finances of the construction company	Financial department		Dynamics and structure of investments in environmental facilities, environmental investments		
	Accounting department		Cost of the natural capital		
Supply	Purchase department			Supplier structure, continuity, urgency	Social
	Logistics Department				
HR management	HR Department	Construction		Turnover factors,	

of the construction company		management department, Mechanization department		acceptance turnover, attrition turnover	
Finances of the construction company	Financial department		Composition, structure and dynamics of social investments; Dynamics of the company's expenditure on assistance to socially vulnerable groups of citizens; Dynamics of costs for support of culture, sports, municipal institutions, public organizations		

In order to implement one of the leading principles – «reliability and completeness», which underlie the integrated reporting forming on the recommendation of the International Standard for Integrated Reporting, the information provided by the accounting system of a construction company must undergo quality control by the company's internal control service. It is recommended to develop a regulation that defines the interaction between departments and employees of the construction company for the practical implementation of the section "Business model of a construction company" as a part of the integrated report forming process. This document is intended to identify employees, who will be responsible for the integrated reporting formation, to consolidate the distribution of responsibility for this process among the areas of responsibility, as well as forms of accounting registers and management reporting.

Conclusion

The proposed methodological approach to the section «Business model of the construction company» allows creating a complex information system necessary for integrated reporting formation. The basis of this system is the existing accounting system of the construction company, represented by financial accounting and management accounting subsystems.

It is proposed to collect initial information in cost centres – construction departments, and its grouping, systematization, analysis implement in departments of responsibility areas in order to reflect this information in the corresponding sections of the integrated reporting. For the effective implementation of these measures, it is recommended to develop the Regulation that defines the procedure for interaction between departments and workers of the construction company as part of the integrated reporting formation process.

This approach allows presenting the interrelated blocks of financial and non-financial information of the construction company in the integrated reporting in order to ensure the completeness and transparency of it for the benefit of stakeholders.

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The Effect of Social Media Dimensions on E-Loyalty on Online Shopping: The Mediating Role of Brand Equity and E-Trust

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Abstract

The purpose of this study is to examine the mediating effect of Brand Equity and E-Trust on the relationship between Social Media Dimensions and E-Loyalty, targeting the online shoppers and online retail stores users in Jordan. A descriptive research conducted to meet the research objectives. Measurement items are adapted from existing scales found in the marketing literature. Quantitative method was used for data collection, and the research model was tested empirically using a sample of 332 respondents who had experiences with social media, online shopping and online retail stores. The data was analyzed using the Statistical Package for the Social Sciences (SPSS) and the Structure Equation Modeling AMOS 22.0. The study found that the online Retail stores can lead their online users to be loyal users by providing them with an entertaining content while they look for products through their social media pages and by delivering a clear and honest content through their social media pages. The results show that Brand Equity and E-Trust have a mediating effect on the relationship between social media dimensions and E-Loyalty.

Keywords: Social Media Dimensions, E-Trust, Brand Equity, E-Loyalty.

Introduction

Nowadays social media plays a major role in today's life, it has been defined as the online program, Media or platforms that is designed to allow people to have an interaction (Prasad et al.,2019). Tuten,(2017) has explained that social media is used to engage with customers, letting them express their opinions and thoughts; it enables customers to gain new information, share thoughts, and have better interaction with other customers and with the organization itself.

In recent years the social media became more and more attractive for businesses as it builds a strong relationship with the customers (Shareefet al., 2019). The social media became a very important aspect in people's lives all over the world, we all can notice the growing participation of consumers in all social media networking sites and applications and how it is affecting the social relations between consumers (Christofides et al., 2009) With social media sites and platforms, people with common interests are able to form their own communities and share their interest online.

According to recent reports, Facebook is the Jordanian online users' favorite site (Facebook most popular social media site in Jordan, May 2019) and according to Social Media stats in Jordan the percent of Facebook users was about 88.5%, (Social Media stats Jordan, May 2019).

Online retail stores that have been created on social media platforms and have been officially registered in the Jordan Chamber of Commerce in 2019 are 101 online stores which is second highest number of online stores in the Middle East after Egypt, used by 6 million Jordanian users, providing a profit estimate of 289 million dollars in 2017. Therefore, one of the reasons for choosing this sector for this study is its impact on the Jordanian economy.

There have been various studies and opinions that recognized the major advantages of social media but actually lack of studies discussed the consequences of social media dimensions on the E-loyalty of customer of E-retail stores, this study will contribute in investigating the impact of social media on E-Loyalty and the mediating effect of Brand Equity and E-Trust.

Literature Review

Social media is a term that is widely used and many recent researchers defined it; (Kim et al, 2012) defined social media as an online platform, application or program or media that ease joint work, interaction or content sharing. (Chang et al., 2015) Defined social media as the way of using the internet to collaborate communicate and share information and ideas we care about".

Due to the emerging rise of social media, in this research we will be exploring the effect of social media dimensions on the E-Loyalty of the customer in online retail stores considering the Brand Equity and E-Trust as a mediating Variables.

Social Media Dimensions

Reliability

Reliability measures the store's ability to deliver the service that has been promised to customers, accurately and without error (Aldweeri, 2019, et al., 2013). It all depends if the online retail store can keep his promises and fulfill the need and wants of the customer, that will definitely increase his confidence in the store (Yuen and Chan, 2010) and will gradually build customer loyalty.

The importance of reliability in businesses was discussed by the researcher; it explained how the Reliability enhances the efficiency, the customers knowledge and personal experience of the services provided (Popat et al., 2017). Brandtzaeg et al., (2016) added that a business that has reliable online position would have additional benefits in their businesses effective interaction and communication and will eventually have trusting, satisfied and loyal customers.

Customers can gain the online store' trust when the expectation of the user has been reached, reliability and trust of the business on social media platforms is one of the major concerns for online customers (Popat et al., 2017) , therefore, the following hypothesis are proposed:

H1.a: Reliability has a significant impact on Customer's Brand Equity.

H1.b: Reliability has a significant impact on Customer's E-trust.

Entertainment

Online entertainment has been defined as the online activity that grabs targeted audiences attention, providing them with the exceptional and enjoyable experience that ends up with having an interested audience (Edwards et al., 2019).

Social media provided a new type of entertainment for the online users to increase the transformation from an old fashioned entertainment tools to a new online tools. Nowadays, a large number of online users logs in into their social media accounts not for the purpose of seeking new information but for the entertainment provided by the online services, online Entertainment access to communicate with other users who use mutual online stores exchanging information reviews and feedback concerning specific products or services (Schulze et al., 2015). According to the uses of customers, individuals have a daily interact with a lot of different technologies because of their internal and external motivations. There's a type of customers who use online services for non-beneficial motivates; they

only use it for the sake of having fun, to disconnect of the outer world in a spontaneous way (Kim et al., 2012).

Social media platforms that cope with the enormous changes social media and stay updated with the new changes around the world will increase the brand equity and Trust of its current users (Edwards et al., 2019). , therefore, the following hypotheses are proposed:

H2.a: Entertainment has a significant impact on Customer's Brand Equity.

H2.b: Entertainment has a significant impact on Customer's E-Trust.

Interaction

Interaction was defined in previous studies as the Interconnection between two individuals (Szabla and Blommaert, 2018), Harrigan et al., (2017) Defined social interaction as the communication between two individual members or two separate groups. Also, Social media interaction was defined by Nguyen (2018) as direct communication between the business and its audience members. (Szabla and Blommaert, 2018) explained how to measure the active online interaction of users; it includes the number of clicks, brand mentions, profile visits and active followers and subscribers. The new online retailers and businesses must cope with the increasing activity of social media (Bonetti et al., 2018). (Nguyen, 2018) also explained that social media interaction must be more dynamic and less time-consuming because it plays a key role in the sector business of the business online performance. The interaction can be used as a tool to reach and attract new customers by delivering the value the customer was expecting.

Therefore, the following hypotheses are proposed:

H3.a: Interaction has a significant impact on Customer's Brand Equity.

H3.b: Interaction has a significant impact on Customer's E-Trust

Commitment

In the previous studies, commitment has been defined as the psychological force that binds an individual to a target or course of action of relevance to that target (Straker et al., 2019). Lim (2015) Defined the online commitment as the ethical framework that obligates the individual to act for the benefit of his online society, therefore social media can create an online commitment.

The commitment of the individual on social media platforms depends on the strength of the relationship with the social media audience and community. Also, the users' commitment depends on expectation of the quality of interaction with the business and the user's community and his perception of the brand image of the business (Belanche et al., 2019). The management of the online businesses can increase the commitment of users by encouraging high quality content, allowing users to contribute more leading the user to be more trustful.

Therefore, the following hypotheses are proposed:

H4.a: Commitment has a significant impact on Customer's Brand Equity.

H4.b: Commitment has a significant impact on Customer's E-Trust.

Brand Equity

Many recent studies have explained the importance of the brand equity concept in the new online businesses and markets. The brand is generally identified as a name, term, sign, symbol or design or combination which is intended to identify the goods and services of the sellers and differentiate it from competitors (Tabaku, 2015). Meanwhile, (Keller, 2016) defined brand equity as various effects on the brand knowledge on customer's response to the marketing of the brand. The brand Equity occurs when the customer has a strong, favorable association the brand in his mind. Brand knowledge is explained according to two components; Brand image and brand awareness (Cifci et al., 2016), the brand awareness is one of the most essential parts of customer-based brand equity by recalling and recognizing a brand (Gomes, 2016), brand image can be a direct lead to generate positive or negative word of mouth, create customers commitment and loyalty. (Biljin, 2018) When the positive brand

image in the consumers' minds is strong and favorable it can lead the brand to enjoy the benefit of commitment and loyalty. (Al-Dweeri et al., (2017) explained the link between brand equity and the customer's purchase intention and online loyalty.

Therefore, the following hypotheses are proposed:

H5: Brand Equity has a significant impact on Customer's E-Trust.

H6.a: Brand Equity has a significant impact on Customer's attitudinal loyalty.

H6.b: Brand Equity has a significant impact on Customer's behavioral loyalty.

E-*Trust*

Trust has generally been defined as the degree of confidence the customer has in exchange of options. Meanwhile, E-trust has been defined in previous studies as the degree of confidence the customer has in any online exchange channel (Yannopoulou et al, 2011). Customer trust is considered as one of the main effects on E-loyalty, trust exists when one party has confidence in the reliability and integrity of the other party, trust is subjective, and it is based on the user's beliefs rather than facts (Phua et al., 2017). Customer can trust the brands when they believe that these brands acts for the benefit and the interest of the customer and understanding the concept of trust is one of the main keys to create a long term relationship with the customers (Veloutsou, 2015), E-Trust depends on many factors; the privacy, security, presentation, technology and interaction, both parties must keep their promises, reduce the emotional risk that customer's might experience with the brand especially when customers feel the support of the brand to their needs, this can result in the development of the customer's satisfaction and loyalty. Furthermore, Phua et al., (2017) explained that the strength of customer's relationship is a strong predictor of trust that leads to E-Loyalty. Al-Dweeri et al., (2017) explained that in order to build E-Loyalty there has to be a prior development of E-Trust. Therefore, we propose the following hypothesis

H7.a: E-Trust has a significant impact on Customer's attitudinal loyalty.

H7.b: E-Trust has a significant impact on Customer's behavioral loyalty

Attitudinal and Behavioral Loyalty

In recent researches, Loyalty has been studied and defined by many researchers, (Aldweeri, 2019) defined loyalty as a deeply-held commitment to rebuy a preferred product or service consistently in the future. There's four stages model has been related to customer's loyalty: cognitive loyalty, affective loyalty, cognitive loyalty and action loyalty (Helgesen et al., 2007). Behavioral loyalty has been defined by Inoue et al., (2017) as the customer's commitment to the brand, Yoshida et al., (2015) referred to the behavioral loyalty as the repetitive purchase and the readiness to act to the benefit of a specific entity. The behavioral loyalty is an outcome of attitudinal loyalty (Inoue et al., 2017). Many previous researcher explained the definition of attitudinal loyalty as the positive attitude that leads to repeated behavior and is considered to be true loyalty (AL-Dweeri, et al., 2017; Del Águila, et al., 2013a) , (Ramaswami and Arunachalam 2016) defined attitudinal loyalty is when a brand fulfills the emotional needs or when the customer has an emotional affiliation with the brand. Strong positive attitudinal and behavioral loyalty influences the customer's behavior causing them to resist any other competitive brand or service (Helgesen et al., 2007). The repeated purchases behavior, the increase of the financial performance of the business, the increase of trust and brand recognition in the mind of the customers are considered measurements of loyalty

This research mainly focuses on investigating the relationship between the four social media dimensions as independent variables with the Behavioral loyalty and attitudinal loyalty as a dependent variable. (Pitta et al., 2012) and this study has two mediating variables which are E-Trust and Brand Equity. Depending on previous studies as the table below showing: We adapt the research Model as the showing figure:

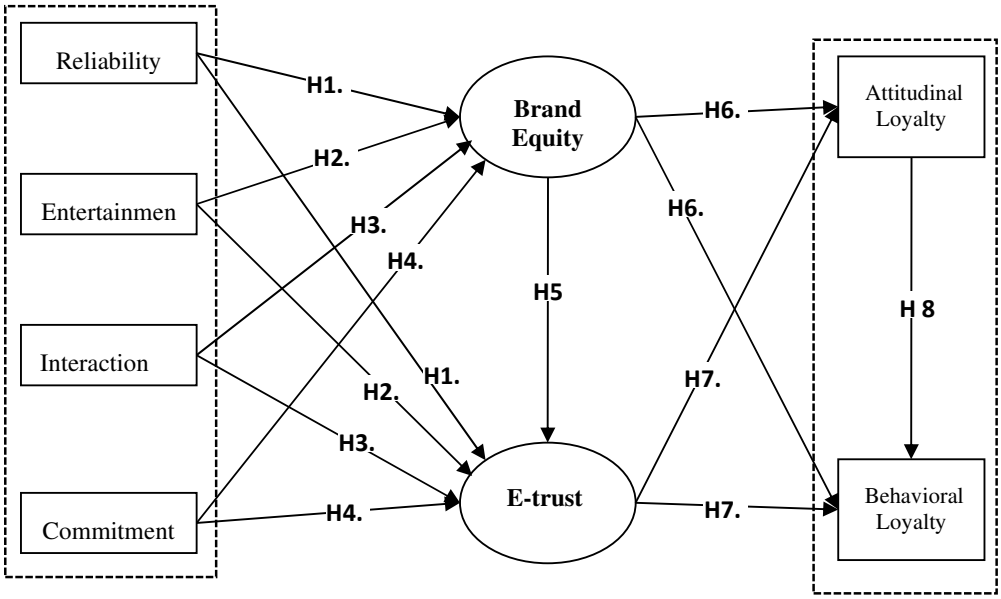

Figure 1: research model

Data and Estimation Results

Sample Characteristics

In order to test the causal relationships, a quantitative approach was used using a web-based questionnaire addressed to Jordanian online users which are following online retailer's facebook pages The distribution of the survey to online users produced 332 useable surveys. The first question asked whether participants had ever follow Facebook pages of online retailers, if they answer no, a thank-you message was given. The survey consisted of a total of 33 items using a 1-5 scale, the survey was validated by three researchers after a pilot study. A cording to first section in the survey: (62.0%) are females. Nearly two thirds of the respondents are aged 18 to 35 years. Little more than half of the respondents 184 (55.4%) are Bachelor's degree holders and 168 (50.6%) with less than 700 J.D. monthly income. Majority connect to Facebook less than 3 hours per day.

Results

Model estimation and Hypothesis Testing

The correlation coefficients were positive and significant at the 0.01 level for all variable pairings. Figure 2 presents the structural equation modeling results specified in the AMOS 22.0 output. The results relating to the fit of the structural model generally support a claim of good fit. Table (2) provides a summary of the goodness-of-fit statistics and all of the indices fall within the recommended ranges, which support acclaim of good fit for the model. In particular, the relative enormed $\chi 2$ value of 2.226 is less than the recommended maximum value of 3.00 (Kline, 1998), which represents a good fit.

Reliability was measured using internal consistency index (Fornell and Larcker, 1981) has been commonly used to assess the degree of shared variance between the latent variables of the model. According to this criterion, the convergent validity of the measurement model can be assessed by the Average Variance Extracted (AVE) and Composite Reliability (CR), Table (1) confirming that all measures demonstrated satisfactory results of AVE ($\geq$0.5) and CR ($\geq$0.7).

Table 1: Validity and Reliability

	CR	AVE
Commitment	0.839	0.567
Reliability	0.886	0.660
Entertainment	0.878	0.642
Interaction	0.821	0.509
Brand Equity	0.840	0.567
Trust	0.890	0.670
Behavioral Loyalty	0.865	0.616
Attitudinal loyalty	0.856	0.598

The correlation coefficients were positive and significant at the 0.01 level for all variable pairings. Figure 2 presents the structural equation modeling results specified in the AMOS 22.0 output. The results relating to the fit of the structural model generally support a claim of good fit. Table (2) provides a summary of the goodness-of-fit statistics (Figure 2). As shown in Table III, all of the indices fall within the recommended ranges, which support a claim of good fit for the model. In particular, the relative normed $\chi 2$ value of 2.68 is less than the recommended maximum value of 3.00 (Kline, 1998), which represents a good fit.

Table 2: Model Fit indices:

Indicator	**Recommended value**	**Value**
$\chi 2$	$P \leqslant 0.05$	P = 0.00
RMSEA	$\leqslant 0.08$	0.061
GFI	$\geqslant 0.90$	0.910
AGFI	$\geqslant 0.90$	0.851
NFI	$\geqslant 0.90$	0.923
IFI	$\geqslant 0.90$	0.913
CFI	$\geqslant 0.90$	0.913
Normed $\chi 2$	1-2	2.226

The RMSEA value of 0.061, which is below the recommended maximum of 0.080 suggested by Browne and Cudeck (1993), also suggests that the measurement model fits well. The GFI value of 0.910 and the AGFI value of 0.851 are both above the 0.900 level recommended by Byrne (2016). This research also used IFI and CFI to measure the goodness-of-fit of the models; the IFI (0.913) and CFI (0.913) index values for the measurement model both exceed the recommended level of 0.900 (Byrne, 2016), which suggests adequate fit of the model (Hu and Bentler, 1999). The NFI value of 0.923 also suggests a reasonable fit. From all of the values outlined above, it is inferred that the structural model represents an acceptable fit. To test the hypotheses, a structural equation model was used (Hair et al., 1998). All measurements of the equations were statistically significant at a significance level of 0.05.The estimated standardized regression coefficients are shown (all t-values exceed the reference values of 1.96 for a significance level of 0.05) (Figure3).

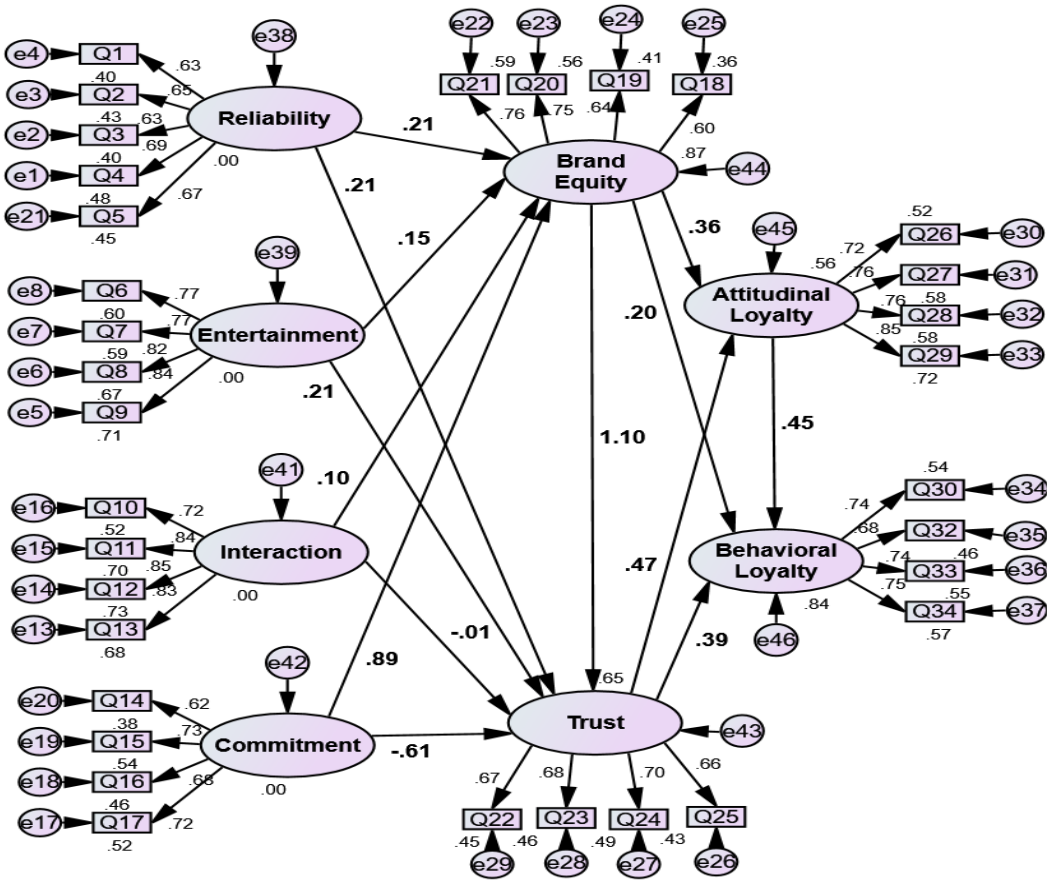

Figure 2: AMOS Model

Table 3: Structural parameters

Causal path			Estimate Coefficient	S.E.	C.R.	P	Hypothesis
Reliability	--->	Brand Equity	.320	.080	4.020	***	Supported
Entertainment	--->	Brand Equity	.291	.049	5.892	***	Supported
Interaction	--->	Brand Equity	.057	.078	.734	.463	Not Supported
Commitment	--->	Brand Equity	.503	.082	6.126	***	Supported
Reliability	--->	Trust	.498	.112	4.426	***	Supported
Entertainment	--->	Trust	-.110	.069	-1.604	.109	Not Supported
Interaction	--->	Trust	.115	.092	1.254	.210	Not Supported
Commitment	--->	Trust	.348	.118	2.950	.003	Supported
Brand Equity	--->	Trust	.499	.140	3.556	***	Supported
Brand Equity	--->	Attitudinal Loyalty	.434	.091	4.750	***	Supported
Trust	--->	Attitudinal Loyalty	.605	.078	7.799	***	Supported

Causal path			Estimate Coefficient	S.E.	C.R.	P	Hypothesis
Brand Equity	--->	Behavioral Loyalty	.459	.106	4.340	***	Supported
Trust	--->	Behavioral Loyalty	-.051	.120	-.426	.670	Not Supported
Attitudinal Loyalty	--->	Behavioral Loyalty	.450	.167	2.701	.007	Supported

Discussion, Limitations and Future research

The aim of this study is to investigate the effect of social media dimensions (Reliability, Entertainment, Interaction and commitment) on the customers E-Loyalty and its two types: Attitudinal and behavioral, also to study the mediating effect of Brand Equity and E-Trust that influence E-Loyalty of customers toward the online retail store, perceived by the online shoppers and users.

Using a convenience sample from the online retail stores users (N=332), this study found that Social media dimensions can lead the online user to be a loyal by enriching their social media platforms with honest, entertaining dimensions concentrating in making the user committed and involved. Moreover, Brand Equity and E-Trust were found to mediate the relationship between social media dimensions and E-Loyalty.

Figure: Final Model

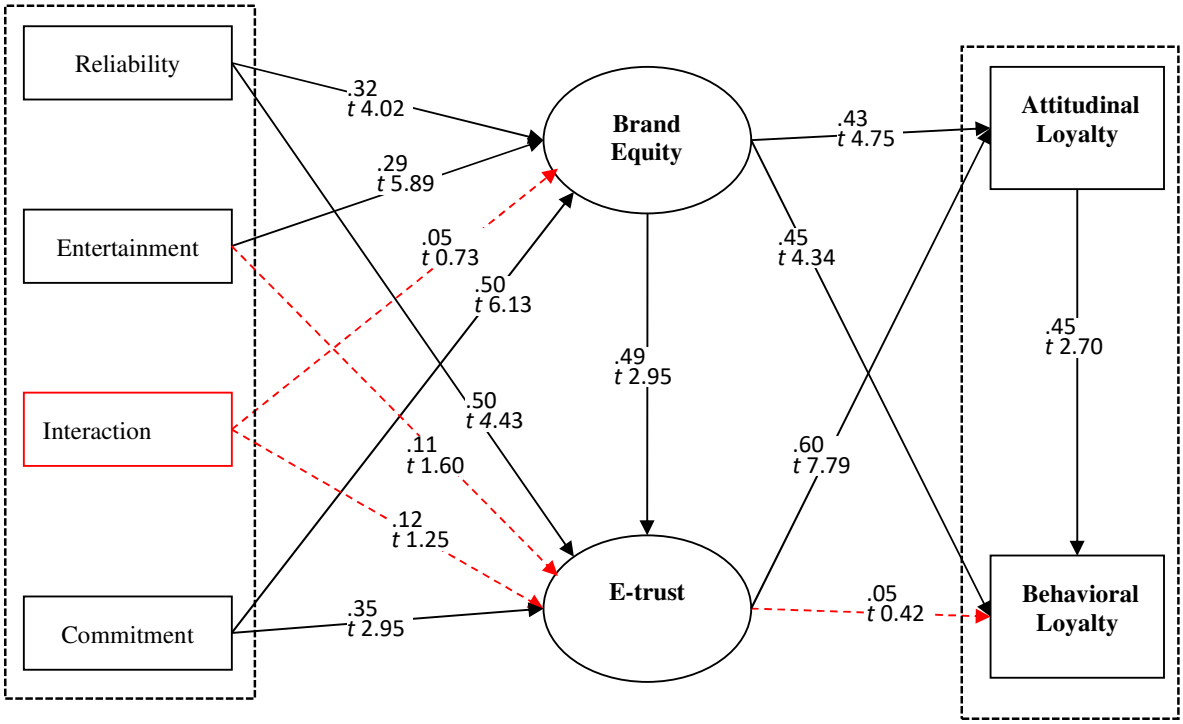

Figure 3: Final Model

According to the results, in this research it confirms that the social media dimensions have an impact on the online retail stores' user's loyalty and it creates a positive relationship between the main dimensions in the measurement model. Brand Equity and E-Trust has a strong and positive mediating impact on the online user if the online retail stores worked on the social media platforms and

supported it with the dimensions that effect the user the most. The results of this study confirm that Brand Equity has an effect on the E-Trust of the user therefore will affect his E-Loyalty.

Managerial Implications and Future Research

After studying the results of this research, there are several suggestions for the managers who manage an online retail store or planning to start any online businesses. The managers must work on their social media pages content, focusing on making it enjoyable for the users, providing the page with different pictures, videos and sounds that makes the visit of the user in the online retail store fun and entertaining. The firms should work on providing the best experience when the user is on their online retail stores' social media pages, a high quality service and an enjoyable time will lead the user to trust the online store more and have a better perception of the brand the online store is using leading the user to be loyal online users who will have a long term relationship with the online retail store.

Second, managers must use an effective strategy and plan to make sure that the online retail stores are keeping its promises to the users and delivering their services or products as planned in the right time and place.

Furthermore, the results shows that the users fully depend on the social media pages of the online retail stores' to get informed about all the daily news of the online retail stores, the manager must keep the content updated with recent news about the services and products their online store is providing to ensure that the user will always be informed with the latest and most recent news and to ensure that the user stay loyal.

Moreover, we would like to give a future advice for the future researchers; first, future studies should investigate other social media dimensions that influence the customer's E-Loyalty. Secondly, future studies should investigate other mediating factors that might have an influence on the relationship between social media dimensions and E-Loyalty of the online retail stores' social media platforms to ensure that the best service is being provided to the online user.

Even though the important findings discovered in this study, there are some limitations such as the sample was limited from Jordan, and the time to conduct the responses was limited as well.

This study was conducted from a limited sample, so it is recommended to increase sample size, and to apply the study on other countries beside Jordan to compare the results.

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Factors Influencing the Development of The Russian Private Banking Services Market

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Abstract

Due to the dynamically changing external environment, private banking market entities, both producers/sellers of a specific banking product and wealthy consumers make strategic and tactical decisions in conditions of a high degree of uncertainty. The article analyzes controllable and uncontrollable environmental factors that influence the development of the banking services market, and shows the main problems and trends of this market. At the same time, the authors analyze the reaction of economic entities of the market to the influence of these factors that pose threats and opportunities for market development. The research was based on a specially developed methodology, which includes mainly qualitative methods in the form of in-depth interviews with market experts and consumers of private banking services. Banks that provide a full range of banking services to wealthy Russian consumers were selected as sampling units, in which 70-75% of attracted funds of individuals were consolidated. The authors revealed that moving towards an open banking system, tightening compliance requirements, instability of the political and economic situation, consolidating the business and reducing the degree of competition between banks, distrust of wealthy consumers in the Russian banking system, digitalization of service, staff qualifications are important challenges for business entities of the private banking services market. As a response of banks to existing challenges, the following areas of market development were identified: active regional development of banks, consumer segmentation both by demographic, psychographic and behavioral characteristics; service differentiation for target segments, changing the structure of the Bank's portfolio through the development of investment expertise both in terms of sales ethics and product line filling, remote service channels development; creating their own programs for training high-quality personnel.

Keywords: Private banking market, factors of influence, consumers.

Introduction

The complexity and uncertainty in decision-making on the part of the subjects of the Russian market of private banking services is explained by the influence on the given market and the behavior of its subjects for the most part of uncontrollable factors of the external environment of banks, informational closeness and poor market knowledge, and a slowdown in market growth. On the one hand, business consolidation in this market reduces the degree of competition between banks; on the other hand, changes in the consumers' behavior of private banking services encourage banks to seek

new strategic solutions to attract wealthy consumers and further development. In order to make objective decisions in these conditions, it is important for banks to understand what environmental factors pose threats and opportunities for business development, how a business can respond to unpredictable and very dynamic environmental challenges.

This article presents the results of one of the annual research of the Russian private banking services market, conducted by the research company Frank Research Group (Moscow)[1] in 2018-2019 according to a specially developed methodology, including desk research, as well as field methods of survey and observation of elements of a multi-stage sample:

– 13 in-depth interviews with CEO-s of private banking divisions;
– 11 in-depth interviews with heads of investment teams of private banking;
– 54 in-depth interviews with consumers of private banking services;
– a survey of 830 consumers of private banking services;
– 14 in-depth interviews with personal managers of private banking divisions;
– benchmark for 75% of banks in the Russian private banking sector [Original research report, Frank Research Group, 2018-2019].

The purpose of this research is to study and analyze the Russian private banking services market, identify and analyze factors of influence on market growth rates, and banks' reactions to dynamic changes in the external environment.

The objects of the study were banks providing a full range of banking services to wealthy consumers in the territory of the Russian Federation, in which 70-75% of attracted funds of physical entities are consolidated.

Analysis of factors influencing the development of the private banking services market

Business entities of the Russian private banking services market carry out their economic, production and marketing activities under the influence of controllable and uncontrollable factors. The use of a combination of desk and field research methods conducted in 2018-2019 on a sample of banks that make up 74% of the private banking market made it possible to describe a number of factors influencing this market and evaluate the banks' response to these factors.

According to the research, the total volume of the Russian market for private banking services is about $ 455 billion. Russian private banks have $136 billion placed in them, 70% of the capital is placed abroad, and investment companies manage about $ 4-5 billion. With the exchange rate stabilizing at 63-64 rubles against the dollar, it is forecasted that real growth in the volume of capital in the consumer segment of private banking services in the dollar equivalent of 16-17% is expected.

The Russian market for private banking services is affected by interrelated macro- and micro-environmental factors similar to those in the global market, but has some local features [Original research report, Frank Research Group, 2018-2019].

One of the most important factors influencing the activities of banks is government regulation of the private banking services market, aimed at improving the Russian banking sector as a whole. It also includes tightening supervision over the movement of funds on foreign accounts of RF residents, taxation of controlled foreign companies, as well as tightening private banking consumers' compliance with the requirements/compliance procedures established by banks [Hanh, Daly, 2020].

In order to counteract the legalization of criminally obtained incomes and cash out funds, the Central Bank systematically raises the requirements for compliance with the procedures for opening accounts in bank organizations. In addition, the Central Bank of the Russian Federation plans to tighten

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legislation in terms of setting limits on cash withdrawals using premium cards, which increases the costs of banks as well as reduces the attractiveness of private banking services for some large consumers.

The private banking market in Russia continues to consolidate; the share of large companies in the private banking services sector remains stable. The share of state-owned banks is growing and by 2018 has reached 72%, which indicates a decrease in competition in this market. A significant increase in the share of the public sector in the Russian banking system as a whole and in the private banking market, in particular, is a new stage in the private banking market development in Russia.

Structurally, the economic entities of the Russian private banking market are represented by banks with state participation, banks with private capital, structures of foreign banks, non-bank organizations (Table 1.). Non-bank organizations in the Russian market are represented by independent financial advisors, multi-family offices, as well as management and brokerage companies that offer consumers customized welfare management solutions. Such organizations do not provide traditional banking services and were not examined in this study did.

Table 1: Comparative characteristics of business entities of the Russian private banking market

Sellers / bank product manufacturers "Private banking"	**Number of customers served**	**Share of funds raised relative to the total amount of funds raised in the private banking segment**	**Advantages in working with consumers**	**Disadvantages in working with consumers**
Banks with state participation	More than 5000 of consumers	75-80%	Reliability, strong brand, wide regional representation	Long approval procedures, lack of flexibility, limited product range.
Banks with private equity	Depending on the scale of the Bank from 500 to 5000 consumers	15-20%	Flexibility of service conditions, the possibility of direct communication with the bank management	Low reliability compared to banks with state participation, the dependence of bank performance on the identity of the shareholder
Structures of foreign banks	1000-2000 consumers	Less than10%	Access to foreign markets, a wide range of banking and investment products, a strong brand, diversification of country risks.	The impact of geopolitical factors on banks ' activities; offer of less competitive deposit rates.

Source: Frank Research Group

The largest banks in the Russian private banking market in terms of borrowed funds are: Sberbank represented by Sberbank First and Sberbank Private Banking, VTB24 Private Banking, Gazprombank Private Banking, VTB Bank of Moscow Private Banking, OTKRITIE Private Banking, Alfa Private, Promsvyazbank Private Banking and Friedrich Wilhelm Raiffeisen. Secondary data analysis showed a slight decrease in the competitiveness of private banks with foreign capital.

One of the environmental factors that can be controlled by the bank is the potential for market growth due to new consumers among previously unreached target audiences in economically developed regions of Russia. It should be noted that active regional development and future increase in the share of regional consumers is only possible with the development of a full-fledged network of regional branches. The presence of a full-fledged regional branch of private banking is an indicator for the consumer of how seriously the bank is set to develop the direction of servicing wealthy clients in this region [Gaur, Kingshott, Sharma, 2019; [Hanh, Daly, 2020].

The results of expert interviews with heads of private banking divisions showed that almost all banks are aimed at developing their regional presence in 2019-2020. At the same time, banks plan to develop the regional network by creating small VIP modules, using the existing infrastructure of the premium-banking sector, as well remote service and in-house consultations from headquarters in Moscow.

The most important partially controllable factor that influences banks' activities in the private banking sector is the wealthy consumers' behavior and the peculiarities of the decision-making process.

Banks assign consumers to the private banking segment based on the value of the threshold for entering this segment, that is, the minimum amount of consumer funds intended for placement in the bank. Depending on the entry thresholds set by banks, banks divide the market into segments/sub-segments and develop strategies for working with them. According to the results of the study, the market of wealthy consumers can be conventionally represented as a hierarchy of segments/sub-segments (Fig. 1).

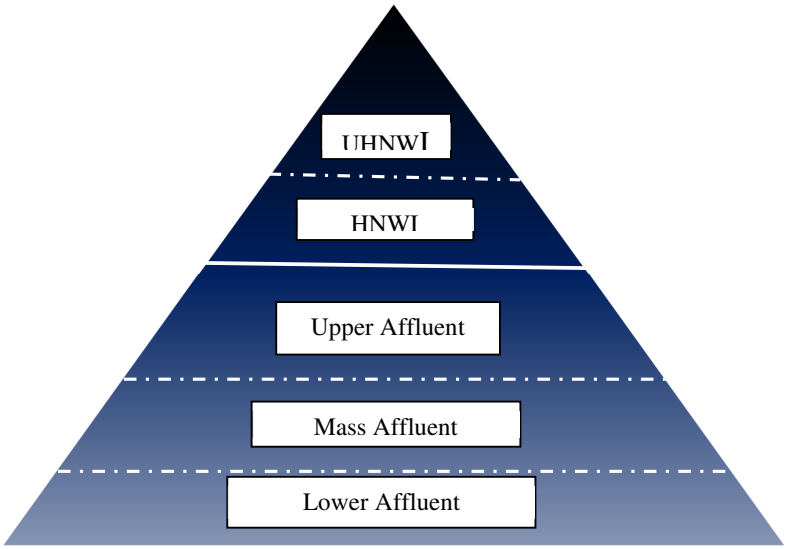

Fig. 1: Hierarchy of segments of high-income consumers in the Russian banking market

Source: Frank Research Group

The lower level in this hierarchy is the affluent segment, which in accordance with the translation from English means "financially prosperous", which can be divided into sub-segments:

- Upper affluent - a high sub-segment of financially prosperous consumers with an entry threshold of 8 to 15 million rubles;
- Mass affluent - the average sub-segment of financially prosperous consumers with an entry threshold of 2.5 to 3 million rubles;

- Lower affluent - a low sub-segment of financially prosperous consumers with an entry threshold of up to 2.5 to 3 million rubles.

The highest level in this hierarchy is the private banking segment, which, in turn, can conditionally be divided into sub-segments:

- HNWI - high net worth individuals-a sub-segment of high-income individuals with an entry threshold of 30 to 40 million rubles;
- UHNWI-ultra high net worth individuals – a sub-segment of individuals with a very high income level with an entry threshold from 100 to 150 million rubles (Fig.1).

Most banks do not distinguish the UHNWI sub-segment in the private banking segment, which means that a single product and service line is offered for the entire private banking segment. However, secondary data on Western practices of servicing wealthy consumers indicate that banks should respond to the specific consumer needs and values in the HNWI and UHNWI segments. In particular, for the UHNWI segment, a wealth management-banking product can be offered, which means managing and optimizing multimillion-dollar family fortunes located in various assets dispersed around the world. In this study, the offer of a banking product for the private banking segment is conditionally divided into two categories: the offer of the product "private banking" and the offer of the product "wealth management". The substantive content of these products is determined by the resources of banks in shaping the demand of consumers not only for banking, but also non-banking services, as well as in creating a customized product for individual consumer needs (Table 2).

Table 2: Product Characteristics «Private Banking» and «Wealth Management»

Product characteristics	**"Private Banking" product**	**"Wealth Management" product**
Product focus	Customer Bank Asset Management	Management of the client's entire state, including non-banking assets
Product range	Privileged Banking. More favourable conditions for deposits. extended limits. More favourable terms for credit products. Additional services provided by the "Concierge service" principle. Investment solutions are offered, but are not the main part of the product content.	Full range of investment services Consulting in various investment areas, such as the securities market and direct investment. Advice on tax issues. Advice on legal issues. Real estate advice Consultations on other issues
Degree of product standardization	High degree of product standardization	High degree of customization
Product manufacturer/seller	Bank organizations	Bank and non-bank organizations

Source: Frank Research Group

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It should be noted that the "private banking" product may include "wealth management" services, which increases the attractiveness of these services in the eyes of wealthy consumers. At the time of the research, the official demarcation of the two segments HNWI and UHNWI in the framework of private banking and the offer of differentiated services was introduced in two banks - Sberbank and Citibank.

About half of the banks in the private banking market have internal segmentation, but it is conditional. The offer of a banking product varies mainly only in terms of coordinating individual deposit rates, depending on the amount of cash allocation and the possibility of providing tax and legal advice.

Most of the bank divisions focused on servicing the private banking consumer segment in Russia operate with an average capital size of 30-50 million rubles ($400 000-$650 000), this is significantly lower than the classical approach to the average capital size of private banking in the European and US markets, where the average capital size can exceed $10 million. Only 4-5 banks in the Russian private banking market operate with an average capital size of $1 million or more.

The results of the research showed that there is no unified approach to segmentation wealthy consumers in the Russian market of private banking services. Banks define and change entry thresholds for the private banking segment for marketing, organizational, economic, and other reasons.

A number of banks deliberately lower the threshold for entering the private banking consumer segment in order to provide the target consumer with an opportunity to test the Bank's service before deciding to place a larger amount. For the same purpose, a number of banks offer consumers paid services in exchange for the opportunity to receive all the privileges of private banking without placing the necessary amount of funds in the Bank. Smaller banks in the private banking market are also deliberately targeting the affluent segment, setting an entry threshold of 3-8 million rubles due to the lack or insufficient development of a separate premium service direction. However, due to the sharp weakening of the national currency, there is a tendency for banks to gradually increase the threshold level for entering the private banking segment.

This study allows us to make a private banking services consumer profile. This is mainly a male, a big city/a capital dweller, a business owner, served in the bank as a legal entity, married, with children. The age groups of 30-40 years, 40-50 years and 50+ are presented in almost equal proportion. However, experts note such a local tendency, which is specific for the Russian private banking market, as a change of generations and an increase in the share of younger consumers in the overall structure of this segment. This trend is the result of the gradual withdrawal from active economic life the owners of the so-called “first wave” capital - the creators of the first capital in the 1990s. There are more women among holders of large capital of more than $500 million in Russia. Compared to the lower segment, the share of CEOs in private banking services consumer structure is almost 2 times lower (59.1% versus 35.4%) and the share of rentiers (investors) is 1.5 times larger, 13.2% of such clients can afford to live exclusively on rent.

The surveyed beneficiaries-consumers of private banking services are mainly engaged in real estate, construction and industry. Geographically affluent consumers prefer to live in Russian cities (where large business management centers are localized) or abroad. Business owners mostly stay in the country, while rentiers can afford to leave this country. The survey conducted by the authors showed that in addition to consumer segmentation of private banking services by demographic characteristics, in particular by the amount of allocated capital, banks begin to segment the market by psychographic and behavioral characteristics [Timokhina, 2019]. Based on a survey of 884 consumers of private banking services (54 in-depth interviews and 830 questionnaires), consumers with equity of $ 1 million or more can be divided into 5 groups/segments according to psychographic characteristics: heirs to capital (up to 35 years), active young holders of capital (25-45 years), active mature holders of capital (45-60 years), rentiers (over 60 years); a group of trustees was also identified.

In order to manage the capital of more than $5 million, consumers of private banking services use an additional category of service providers – multi-family offices and trusted persons. This brings a number of features for a private banker when developing strategies for marketing communications with the consumer by means of building relationships based on trust with his representative.

The results of the analysis of the primary research data on consumer demand for private banking services abroad showed that 2/3 of the consumers surveyed have experience in being serviced abroad, of which slightly less than a third have closed their foreign accounts in the past 2 years.

Compared to the 2017 sample, the share of those who closed accounts abroad increased by 8%. The following factors such as: tightening the compliance procedure, sanctions, changes in Russian tax legislation, introduction of reporting on foreign accounts; negative experience of investing in a foreign bank, a decrease in the level of service, and an increase in capital requirements are considered to be among the main reasons why wealthy consumers close their accounts.

It should be noted that 45% of respondents from a sample of 54 units continue to be served in foreign banks, while none of the affluent consumers who have accounts abroad expressed a desire to close the account.

Respondents identify the following main reasons for servicing abroad: the consumer's and/or family members' residence, doing business abroad, frequent business trips, capital diversification to reduce financial risk, ensuring the safety of capital in reliable jurisdictions, the breadth of investment opportunities and expertise in foreign banks, more favorable terms of service – such as access to credit at low interest rates. The reaction of banks to consumer demand for private banking services abroad is expressed in the offer of these services by the majority of the studied banks on the Russian private banking market (84% of the sample). The attractiveness of banks in foreign jurisdictions for this segment of consumers remains even taking into account the stricter requirements of foreign banks in relation to Russian consumers.

Partially, the behavior model typical of capital owners, who have a fortune in Russia due to the opportunities to obtain a high level of profitability and use conservative investment instruments to accumulate and save funds in foreign banks, is preserved [Timokhina, Kapustina, 2017]. Consumers' desire to withdraw funds outside the territory of the Russian Federation, among other factors, is associated with the instability of the economic and political situation, the lack of a reliable legislative system and regulation of private property issues. On average, according to market experts, about 70% of the funds belonging to RF residents are held in accounts abroad. In this regard, large banks are betting on offering services abroad by involving their own subsidiaries and branches, as well as foreign banks included in the bank group where the Russian bank also belongs, or partner banks.

In general, experts in the private banking services market note a long-term decline in the level of consumer confidence of this segment to the Russian banking system and the stock market. After the global economic crisis of 2008-2009 and the currency crisis in Russia since 2014, not all Russian private banking consumers were able select the ways to preserve and increase their capital [Abdoli, Rostamzadeh, Feizi et.al, 2017; Darzi, Bhat, 2018].

This is reflected in the peculiarities of decision-making by consumers in this segment. The main goal of such consumers is to preserve capital, often at the expense of profitability indicators. Independent investments in the real sector of the economy, real estate and cash are becoming the most popular tools for preserving and increasing capital. Reliability remains the most important factor for all the customers among all the factors that affect the bank choice under a decrease in consumer sensitivity.

The survey of 830 consumers of private banking services showed that the most important criteria for choosing a bank for a consumer in the private banking segment are the following:

- range and quality of banking services (for 24% of consumers from the sample);
- organization and quality of service (for 21% of consumers);
- bank reliability (19%);
- investment service opportunities (11%).

A small number of consumers noted the importance of the bank providing non-banking services, the presence of bank structures abroad, and the characteristics of the bank's branch network. Those consumers who are focused on the using wealth management services are guided by several other priority criteria for choosing a bank (Fig. 2).

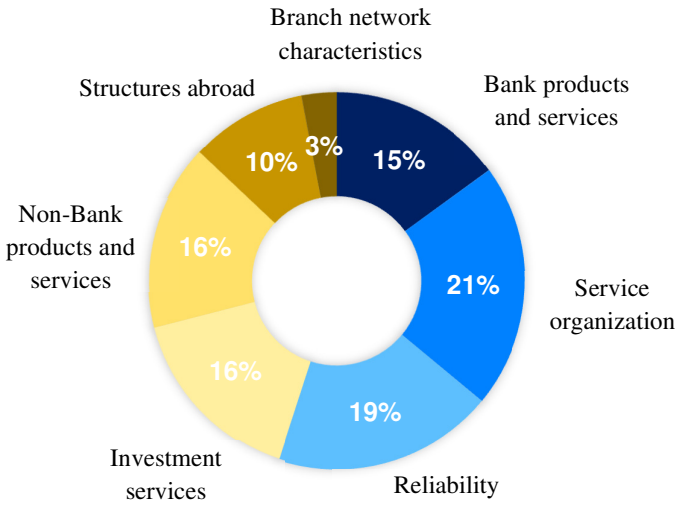

Fig.2: The share of consumers of the banking product in the private banking market, focused on using wealth management services, guided by the following criteria when choosing a bank, %

Source: Frank Research Group, 2019

The reaction of banks to consumer demand for capital preservation services is expressed in a clear predominance of deposits in the bank's portfolio. Deposit account for about 85-90% of the funds raised, i.e. from 5 to 6 trillion ruble. There is a high proportion of deposits in foreign currency within the deposit structure. A significant predominance of deposits is not characteristic of all banks. In a number of banks, the share of investments in investment instruments can range from 20-30% to 50-60% of the allocated capital. However, these banks together account for only about 10% of all attracted funds of consumers of this segment in the Russian market.

According to market experts, a decrease in interest rates on deposits in the banking market as a whole is expected in the future due to the exhaustion of banks ' opportunities for profitable placement of borrowed funds in the face of reduced demand for credit funds, therefore, so the demand for conservative investment instruments such as structural notes and Eurobonds is expected to increase.

In this regard, it is expected that the average share of funds placed in investment products will grow and banks with experience in interacting with consumers in terms of investment services will have an advantage. In 2016-2018, the share of investments in the banks' portfolio in private banking sector increased from 15% to 20%, while the average amount of capital placed in investment instruments grew by almost 20% per year. In response to this growth, banks are introducing the practice of investment advisory within private banking (in 11 banks under research), increasing the number of investment teams of the advisory type, and plan to further expand investment teams.

Along with organizational measures, banks are ready to expand the range of investment services by searching for new non-standard ideas and approaches, and are also working to improve the quality of investment sales.

Apart from banking and investment services, large international banks are expanding the range of private banking services: they offer an additional service for non-bank consultations, including the development of an inheritance plan and the selection of suitable tools for this, offer assistance in choosing a tax/legal advisor, and provide consulting services for consumers' family offices
The influence of technological factors on the growth rate of the private banking market and the growth of consumer demand for remote services encourages banks to widely introduce remote technologies for servicing wealthy consumers. According to experts and secondary data, more than

80% of affluent clients in Europe and about 75% in the United States use remote service channels, replacing personal contact with a personal manager with information communication channels for most operations [Shankar, Jebarajakirthy, 2019; Shuaib, Abdul, 2019].

The high penetration rate of remote service channels in this segment is due, among other things, to the emergence of new business entities offering private wealth management services online: online advisory, consultants, and investment companies in the private banking services market. More technologically advanced and mobile models of online servicing private banking services consumer segment of the above-mentioned market entities are starting to seriously compete with the traditional consumer servicing models used by banks.

According to the results of data analysis, the trend of digitalization of service channels is growing in most of the studied private banks. In 2019, all banks planned to upgrade the Internet banking / mobile application in terms of adding new features, opening separate accesses for trustees and children, life-chats with a personal manager. Digital innovations in investment services for consumers of private banking services are: automation in the risk profiling system, development of a robo-advisory to increase the efficiency of internal processes, creation and automation of a banking reporting system.

The impact of consumer requests on improved quality service in the private banking sector is reflected in the particular attention of bank top management to the professionalism and qualifications of personal managers [Wahlberg, Öhman, Strandberg, 2016]. The results of thirteen expert interviews with the heads of private banking divisions showed that banks feel a significant shortage of high-quality personnel in the market and are aimed at developing their own manpower teams. Two banks have launched an additional training system, and another bank is planning to launch its own training program in 2019-2020.

As a reaction banks after analyzing the challenges of the external environment identified the following areas of market development: meeting all the requirements of compliance procedures, regional development, restructuring banks' business portfolio in accordance with consumer requests, consumer segmentation strategy on a number of psychographic and behavioral characteristics. The main strategic focus of banks in the private banking sector for 2019-2020 is in attracting target consumers, improving the technological component of the business, and carefully working with investment products in terms of increasing their profitability for both the consumer and the bank.

Conclusion

The growth rate of the Russian private banking services market is determined by both controllable and uncontrollable factors. State regulation of the banking sector, economic conditions in Russia and the world; geopolitical conditions for doing business; the bank's potential in developing customer service abroad; regional expansion, in creating a competitive advantage in the face of intense competition; the bank's policy regarding niche segments, and the structure of the business portfolio; work organization with affluent consumers, digitalization of service processes - that is all are factors that can have the most direct impact on market development .

The factors influencing the development of this market are supplemented by the peculiarities of decision-making by consumers of a banking product in the private banking market, consumers' dynamically changing characteristics, their requests for investment products, services abroad, the degree of trust in the bank and the banking system as a whole, and the maturity of the banks ' marketing policy for demand management. The types of banking activities considered in the article will allow banks to determine the main areas of development in the form of strategic, organizational and managerial decisions.

The analysis of factors that influence the development of the private banking market presented in the article testifies to the high dynamism of market processes in this sector of the economy, which makes

it necessary to conduct not only systematic empirical research of this market, but also theoretical research in the future in order to systematize conceptual approaches to its study.

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Measuring the Digital Multiverse in The European Union's Research

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Abstract

We are currently witnessing another industrial revolution, which stems mainly from the acceleration of scientific and technical progress. What is crucial is the exponential development of Information and Communication Technologies (ICT). These technologies affect the society, economy, culture and politics - practically all areas of our existence. The term digital is increasingly used to describe the changes taking place. This article aims to assess the adequacy of the manner in which we define and measure the digital multiverse. A thesis is put forward that the methods we use for this purpose do not fully correspond to the current phenomena.

Keywords: digital multiverse, e-metrics, composite indicators, DESI.

Introduction

Our world is undergoing fundamental transformations. Within the area of intellectual competences the significance of ICT is equivalent with the significance of the steam engine in the area of energy. Digitisation creates new, often unusual shapes of reality.

The development of ICT is of a continuous nature, its pace is accelerating and its impact on our daily lives is becoming more and more meaningful. The scope of this article does not allow for a detailed description of the evolution of information technologies - the transition from standalone computing to ambient computing. Today's ICT is characterized by a cloud of concepts, which are sometimes buzzwords, as shown in Figure 1.

The aim of this article is an attempt to assess the manner in which we measure the transformations of the reality caused by ICT. The DESI (Digital Economy and Society Index), a composite indicator created by the European Union, is subject to a critical analysis here.

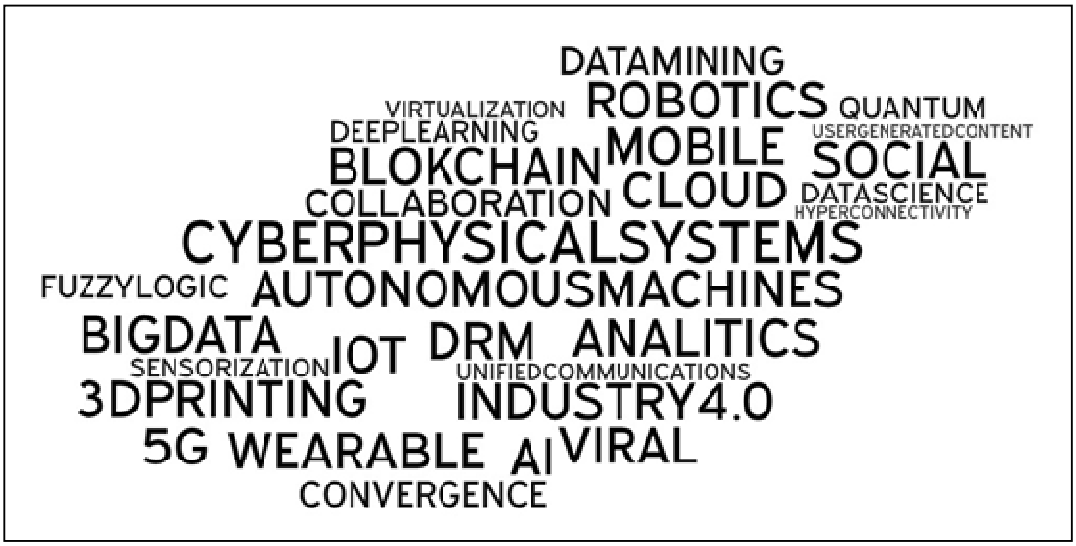

Fig. 1: Contemporary ICT landscape

Source: Own elaboration

Digital Multiverse

Often in the history of mankind it has been attempted to first name new phenomena in order to be able to analyse and understand them, and eventually become accustomed to them more easily. Also in the case of ICT and its impact on the reality around us many terms and descriptions have been created to reflect the nature, main elements or causes of the changes taking place. In the scientific and social discourse there were many descriptions of the impact of ICT on the reality. It seems that previously *information society* was the most popular term. *Digital society* and *digital economy* appear to be more and more popular recently. However, they do not fully reflect the extent to which ICT alters our whole reality. To reflect the complexity and multidimensionality of the research area the author will use the - perhaps a bit ostentatious - term *digital multiverse*.

As is often the case with such concepts, there is a lack of a commonly accepted and unambiguous definition. For the purposes of the considerations presented herein, the following definition of the term concocted by the author will be used.

Digital multiverse (DM) is a network of people, organizations, communities, devices, systems, applications and data and their relationships of a global nature, whose main driving force is the exponential scientific and technological progress. The constitutive elements of DM are: intensive use of ICT, integration of physical and digital systems, hyperconnectivity forcing interdependence and cooperation, automation of information exchange and data analytics, unpredictability of development, disappearance of barriers and the resulting new development opportunities and, in the economic sphere, new business models. The driving forces determining the nature of DM are the processes of digital destruction and digital transformation. The described phenomena determine the characteristics of DM, such as: flexibility of structures and processes, high level of innovativeness, increasing efficiency, globalisation, speed of reaction to signals generated by the environment, creation of new consumer needs, intensification of business interactions, creation of intelligent products and services, progressing servitisation of the economy, transition from owning to using and rise of new occurrences and phenomena. The emergence of DM generates new opportunities, but also new threats in practically all areas of human existence.

The definition presented above does not meet formal requirements. DM is an open and blurry

concept, we do not even know all its designates yet. It is rather a description of the origin, constitutive elements and characteristics of DM. This possibly too broad pseudo-definition of digital multiverse can, however, serve as a scheme, which might prove useful in a further analysis.

Several elements of modern times seem to be critical for further deliberations and crucial for the creation of DM. Brynjolfsson and McAfee (2014) emphasize the essence of modern technological progress: "In particular, we need to understand its three key characteristics: that it is exponential, digital, and combinatorial."

These three characteristics generate the phenomenon of *digital disruption*. It is a contemporary "turbo-equivalent" of Schumpeter's *creative destruction* (Schumpeter 1975) - a principle of the capitalist economy described 80 years ago. Digital disruption is responsible for the collapse of the organisations, industries or phenomena unable to adapt to the changes taking place. Today, however, it affects not only the economy but the whole reality in which we exist. The reaction is *digital transformation* - the necessity faced by existing structures craving for avoiding the consequences of digital disruption.

Another feature of modernity is hyperconnectivity, understood as the possibility of communication of everything with everything: people, devices, systems and applications. These interactions are 1:1, 1:many and many:1.

The last element is the newest achievements of ICT presented in the introduction.

The issue of measuring the impact of ICT on the surrounding

Research on the influence of information technology on the economy and society began in the 1950s (Wiener 1950, Innis 1999, McLuhan 1962, Machlup 1962) and, over time, a new field of science was formed - *information economy*. It had to deal with two still unresolved and fundamental problems: definition and measurement. It is difficult to define unambiguously the concepts it deals with (Webster 2006). It is therefore problematic to decide what characteristics of an undefined concept to measure (Webster 2006, Menou and Taylor 2006, Golinski 2012).

For more than half a century, quantitative studies on the spread of ICT and its effects have been the subject of numerous disputes and discussions. The tools for such measurement play many important functions. They are a prerequisite for the formulation, implementation and verification of development programmes and the supervision over the changes taking place - in accordance with the well-known sentence formulated by DeMarco (1982): "You can't control what you can't measure."

If we acknowledge the significance of the DM issues for contemporary times, then, in order to make rational political, business or personal decisions, we must possess quantitative tools to describe the existing situation, define the direction of desired actions and evaluate their effects.

Appropriate indicators providing information on various aspects of the application of ICT constitute the main tool for quantitative description of DM. They allow for the assessment of the level of the development of DM in regions, social groups and sectors of the economy. They are necessary for planning public or commercial projects and investments, and evaluating their implementation.

Since the 1960s numerous quantitative studies on *information society* (for years the most popular term to describe the impact of ICT on the reality) have been developed. They have used two research approaches – an analysis of a large set of partial indicators or composite measures.

It can be argued that working with a large set of partial indicators is the most dependable way of monitoring such a complex area. However, such an approach has a considerable disadvantage. An

extensive set of specialized indicators is clear practically only to professionals. For a wider audience it is too hermetic, difficult and simply boring.

This is exactly what contributed to the popularization of the second stream of research - composite indicators. The growing popularity of the issue of the impact of ICT on the world around us required the development of tools that are easy to interpret (although not to design) and suitable for propagating this issue to a wider audience and using it also in the area of marketing and politics.

In the last two decades approximately 20 tools of this type have been developed (Goliński 2012). However, they described the world of "the old ICT" - *information society*. The indicators used in them were less and less suitable for digital multiverse.

The most popular were two studies of this type, with their many issues. Published by the oldest international organization - International Telecommunication Union (ITU) - ICT Development Index (ITU 2017, ITU 2017a), the issuance of which has been suspended until a new tool, more suited to the present times (ITU 2020), is developed. The second was The Networked Readiness Index (WEF 2016) published by the World Economic Forum. 2016 was the year of the last edition (WEF 2020) of the research conducted since 2011.

Both studies served their purpose for many years. However, they do not fit into the author's definition of digital multiverse presented earlier. What they measure is only to a very small extent in line with the contemporary reality of the digital world around us and the level of the development of ICT and its applications today. This subjective evaluation will be abandoned here, for the lack of space, without a detailed analysis of the design of both indicators.

The tools presented above are not in line with the contemporary reality of ICT, development trends and the resulting changes. They did not take into account the following processes: digital destruction and transformation, integration of physical and digital systems, hyperconnectivity, network effects, “smart city”. Leading technologies were absent: Artificial Intelligence, IoT, blockchains, 3D printing, virtual, extended and mixed reality, Big Data or autonomous devices.

Digital multiverse in the European Union’s research

The creation of the *Digital Single Market* (DSM) is one of the basic strategies implemented by the European Union. It aims to "(...) open up digital opportunities for people and business and enhance Europe's position as a world leader in the digital economy." (EU 2018). The EU expects that the implementation of this strategy will adapt the single market to the requirements of the 21st century. Removing regulatory barriers and integrating 28 national markets into one is expected to generate €415 billion a year for the EU economy and create hundreds of thousands of new jobs (DG Connect 2018).

A key player in implementing the DSM priority is the Directorate-General for Communications Networks, Content and Technology (DG Connect), which is responsible for the EU policy with regards to the digital single market, Internet security and digital learning and innovation.

The implementation of the DSM strategy includes the realization of three main objectives (DSM 2019):

- better access for consumers and businesses to digital goods and services across Europe,
- creating the right conditions and a level playing field for digital networks and innovative services to flourish,
- maximizing the growth potential of the digital economy.

A platform has been created to monitor the implementation of the DSM strategy, allowing for a comprehensive analysis of the ongoing digitisation policies of the EU countries (DSM 2015). There are more than 100 partial indicators, divided into thematic groups, which illustrate the key dimensions of the digitisation issue. This allows for making comparisons both between particular countries and from a historical perspective. The use of this data set is facilitated by attractive visualization tools.

The data placed here allow for an in-depth and comprehensive analysis of the issue of digitisation. Together with other data and the tools for their exploration offered by EUROSTAT an in-depth analysis of the performance of the Member States in various dimensions is possible. These data, however, have a considerable disadvantage. Their number and nature require some specialist preparation. For those less involved in the issue, it seems to be too difficult and demanding a tool.

As mentioned earlier, composite indicators are attractive to a wider audience. For this purpose a more accessible tool has been developed to measure the implementation of the DSM strategy - the DESI (Digital Economy and Society Index) composite indicator.

DESI and its Assessment

The DESI is a composite measure developed by DG Connect to assess the degree of the implementation of the Digital Single Market strategy.

In 2017 the DESI consisted of 31 partial indicators, which were aggregated into 12 second level subindicators, aggregated into five first level indicators, forming a composite indicator (DESI 2017, DESI 2017a).

In 2019 the DESI was updated to better reflect contemporary transformations. Changes in methodology as well as changes in some data sources were introduced. The alterations applied to all three levels of the indicator. Several partial indicators were altered and 13 new ones added.

Currently, this measure consists of 44 partial indicators, which are aggregated into 14 second level subindicators, aggregated into five first level indicators, which compose the DESI (DESI 2019).

For the purposes of this article an assessment methodology based on the previously presented understanding of the term digital multiverse has been adopted. Thus, the indicators which refer to the elements that are fundamental for DM, presented in point 2, will be considered significant. In the subjective view of the author, these elements are the following:

- progressive digitisation,
- recombinant innovation,
- digital destruction and digital transformation,
- hyperconnectivity,
- the latest ICT.

Table 1 presents the details of the construction of the DESI 2017 and Table 2 – the DESI 2019. These tables also contain a subjective assessment of the partial indicators proposed by the author. The status displayed in the table: irrelevant, neutral and crucial reflects the author’s personal view and should not, of course, be taken literally. Rather, it is an attempt to assess the DESI from the point of view of the author's understanding of the ongoing digitisation process, the corresponding level of the development of ICT and the already visible development trends.

Table 1: DESI 2017 - construction and assessment of the partial indicators

	DIMENSION	SUB-DIMENSION	INDICATOR	STATUS
DESI 2017	1 Connectivity 25%	1a Fixed Broadband -33%	1a1 Fixed Broadband Coverage	irrelevant
			1a2 Fixed Broadband Take-up	irrelevant
		1b Mobile Broadband - 22%	1b1 Mobile Broadband Take-up	irrelevant
			1b2 4G coverage	neutral
			1b3 Spectrum	crucial
		1c Speed -33%	1c1 NGA Coverage	neutral
			1c2 Subscriptions to Fast	neutral
		1d Affordability -11%	1d1 Fixed Broadband Price	neutral
	2 Digital Skills 25%	2a Basic Skills and Usage - 50%	2a1 Internet Users	irrelevant
			2a2 At Least Basic Digital Skills	irrelevant
		2b Advanced skills and Development -50%	2b1 ICT Specialists	crucial
			2b2 STEM Graduates	crucial
	3 Use of Internet 15%	3a Content - 33%	3a1 News	neutral
			3a2 Music, Videos and Games	neutral
			3a3 Video on Demand	neutral
		3b Communication -33%	3b1 Video Calls	neutral
			3b2 Social Networks	neutral
		3c Transactions - 33%	3c1 Banking	neutral
			3c2 Shopping	neutral
	4 Integration of Digital Technology 20%	4a Business digitisation - 60%	4a1 Electronic Information	crucial
			4a2 RFID	crucial
			4a3 Social Media	crucial
			4a4 eInvoices	crucial
			4a5 Cloud	crucial
		4b eCommerce -40%	4b1 SMEs Selling Online	neutral
			4b2 eCommerce Turnover	neutral
			4b3 Selling Online Cross-border	neutral
	5 Digital Public Services 15%	5a eGovernment - 100%	5a1 eGovernment Users	crucial
			5a2 Pre-filled Forms	crucial
			5a3 Online Service Completion	crucial
			5a4 Open Data	crucial

Source: Own elaboration based on the DESI 2017 and the DESI 2017a

Table 2: DESI 2019 - construction and assessment of the partial indicators

	DIMENSION	SUB-DIMENSION	INDICATOR	STATUS
DESI 2019	1 Connectivity 25%	1a Fixed Broadband - 18,5%	1a1 Fixed Broadband Coverage	irrelevant
			1a2 Fixed Broadband Take-up	irrelevant
		1b Mobile Broadband - 35%	1b1 4G coverage	neutral
			1b2 Mobile broadband take-up	irrelevant
			1b3 5G readiness	crucial
		1c Fast broadband - 18,5%	1c1 Fast broadband (NGA)	neutral
			1c2 Fast broadband take-up	neutral
		1d Ultrafast broadband - 18,5%	1d1 Ultrafast broadband coverage	crucial
			1d2 Ultrafast broadband take-up	crucial
		1e BB price index -9,5%	1e1 Broadband price index	neutral
	2 Human capital 25%	2a Internet user skills - 50%	2a1 At least basic digital skills	irrelevant
			2a2 Above basic digital skills	neutral
			2a3 At least basic software skills	neutral
		2b Advanced skills and Development - 50%	2b1 ICT Specialists	crucial
			2b2 Female ICT specialists	crucial
			2b3 ICT graduates	crucial
	3 Use of	3a Internet use - 25%	3a1 People who never used the	irrelevant
			3a2 Internet users	irrelevant

	internet services 15%	3b Activities online - 50%	3b1 News	neutral
			3b2 Music, videos and games	neutral
			3b3 Video on demand	neutral
			3b4 Video calls	neutral
			3b5 Social networks	neutral
			3b6 Professional social networks	crucial
			3b7 Doing an online course	crucial
			3b8 Online consultations and	crucial
		3c Transactions -25%	3c1 Banking	neutral
			3c2 Shopping	neutral
			3c3 Selling online	neutral
	4 Integration of Digital Technology 20%	4a Business digitisation - 60%	4a1 Electronic information	crucial
			4a2 Social media	crucial
			4a3 Big data	crucial
			4a4 Cloud	crucial
		4b eCommerce - 40%	4b1 SMEs Selling Online	neutral
			4b2 eCommerce Turnover	neutral
			4b3 Selling Online Cross-border	neutral
	5 Digital Public Services 15%	5a eGovernment - 80%	5a1 e-Government users	crucial
			5a2 Pre-filled forms	crucial
			5a3 Online service completion	crucial
			5a4 Digital public services for	crucial
			5a5 Open data	crucial
		5b e-Health - 20%	5b1 e-Health services	crucial
			5b2 Medical data exchange	crucial
			5b3 e-Prescription	crucial

Source: Own elaboration based on the DESI 2019

The scope of the article does not allow for a detailed justification of the criticism of all the components of the DESI, in particular partial indicators. Therefore, further evaluation will be of a general nature and will be contained to the level of the five first level sub-indicators.

Connectivity

According to the ITU estimates, in 2019 97% of the entire world's population live within the reach of a mobile cellular signal and 82% live within the reach of an LTE or higher mobile-broadband signal. 93% of the world's population live within the reach of a mobile broadband (or Internet) service. Despite this, only 53% of the world's inhabitants use the Internet (ITU 2019).

In Europe 82.5% of people use the Internet, the percentage of mobile subscribers has reached 118.4%, and mobile-broadband subscribers 97.4%. 99.1% of Europeans are within the reach of mobile networks and 91.3% of LTE or faster (ITU 2019).

It is the author's belief that it is time to stop measuring the users, the level of the development of today's infrastructure and the price level of basic services. Trivializing: "whoever wants, has" and this does not determine the progress of digitisation.

This observation does not, of course, apply to ultrafast broadband networks, and, in particular, to 5G networks - a technique strategic for the development of the Internet of Things (IoT) and other applications that are key to the further development of digital multiverse.

Human Capital

It seems that the study of basic ICT skills can be discontinued. The "digital natives", who make up a growing proportion of the population, are "born" with these skills and use ICT on a daily basis and for a purpose they see fit. The ICT skills of this group of users are often at a low level, usually sufficient only for using ICT as entertainment. It also seems that there is a lack of not so much the

Internet skills but the information skills, such as the ability to critically assess the value of the obtained information or the issues of cyber security and privacy.

Whereas the key skills are the advanced skills allowing to design and create new applications, which will shape the future. Therefore, it is the potential of the developers of future applications that should be monitored, rather than the one of their users.

Use of Internet services

Counting Internet users and non-users in a European environment seems unnecessary. It is a matter of a personal choice rather than the lack of access.

The global Internet user spends on average 6 hours and 42 minutes a day online. 45% of the world's population use social media, of which 42% use mobile devices for this purpose. For Europe these values are 55% and 47% respectively. (DIGITAL 2019). The fact that these are often activities with little "added value" is another story. The "digital natives" use mainly digital content. Whether they obtain the news, play games or watch movies seems to be of secondary importance to digital multiverse. It could be light-heartedly stated that the current level of civilization is rather evidenced by the use of analogue content. The same is true of social networks, in which these people live rather than use them.

However, the use of social networks for professional purposes and digital participation in social and political life are worth monitoring. With the assumption that the Castells's *constant change* characteristic of digital multiverse will be a permanent feature of the future, the use of the Internet for self-learning becomes particularly noteworthy.

The prevalence of Internet shopping and banking makes the monitoring of this area seem unnecessary.

Integration of Digital Technology

According to the author, this is one of the most important characteristics of digital economy and its monitoring is of key importance. Digitisation of enterprises, both in the area of management as well as production, is the foundation of Industry 4.0 - a distinctive feature of DM. The digitisation of trade is already well advanced, but its further observation may still be important. Only the choice of measures can raise some doubts in both these aspects.

Digital Public Services

This is another key element of DM, which is a prerequisite not only for purely administrative applications, but it is also the foundation of such concepts as "smart city" or sustainable development. Recognition should be certainly given to pointing out the issue of open data, which is both a condition for a greater participation of citizens and a basis for creating new ICT solutions. It is also important to introduce indicators to monitor the area of e-health.

The above comments and the "assessment" of the DESI components are obviously not definitive. They constitute a subjective reflection of the author's views. Their main goal is to try to evoke a discussion on the issues of understanding and measuring digital multiverse.

Assessment of the EU actions and postulates regarding further research

The adopted by the EU concept of monitoring digitisation in the years 2016-2021 is described in a dedicated document (DG Connect 2015). It is a "wish list" of a kind - formulated on the basis of the needs of policy makers and not on the basis of the already available statistics. This document takes into account current development trends and focuses on the crucial areas.

Assuming the digitisation model presented in point 2 and the author's definition arising from it, it is important to highly evaluate all the achievements to date, and especially the EU's intentions in the

area of the research into the digitisation processes. Also the evolution of the DESI composite indicator shows that the EU has a good understanding of the requirements of the changing digital reality. The DESI 2019 comes much closer than the DESI 2017 to the understanding of and measuring digital multiverse that are proposed in this article.

It appears therefore advisable to formulate postulates for further work - a kind of a wish list for the EU.

Attention should be focused on the causal factors, the constitutive elements and, above all, on the driving forces behind the changes taking place. In other words, the causes of digitisation should be monitored more intensively, as they determine the nature and pace of the ongoing changes. It seems particularly important, although troublesome, to monitor the driving forces: digital destruction and digital transformation. However, the author finds it problematic to propose concrete measures in this area of research. These aspects appear to be more significant than the nature and potential effects of the changes taking place - they will be variable, dynamic, unpredictable, and some of them we are not yet able to envisage. This does not mean, of course, that we should completely abstain from monitoring them.

The ongoing digitisation process is characterised by high dynamics of the changes we are witnessing. Such a dynamic set of phenomena cannot be analysed by means of once established research methods. Both the subjects of the study and its tools are constantly changing.

Limitations

The limitations of the analysis presented in the paper should be clearly indicated. First of all, it is subjective and the views expressed in it are those of the author. It is an invitation to discussion rather than a final assessment. Secondly, this appraisal was made from the European perspective. The evaluations of individual partial indicators concern highly developed countries and would be inadmissible on a global scale. The EU Member States, even those that joined later, may not be "world champions" in digitisation, but the level of development of their information infrastructure and the intensity of ICT use is not comparable to many developing countries.

The EU also publishes a more global study - the International Digital Economy and Society Index (DG Connect 2018). It covers 45 countries, including 17 outside the EU. This tool, however, has a slightly different design and is not the subject of an analysis here.

The analysis presented is deliberately limited to the EU Member States - it is here and in several other highly developed countries that digital multiverse is being shaped. This allows to highlight the most important features and emerging trends of the phenomenon under investigation.

Conclusion

Future research should focus on an in-depth analysis of digital multiverse and all its aspects. The issue of measuring DM is complex but also interesting. The problem of measurement is crucial for a fundamental reason - DM is our future, therefore we should manage its development and it is not possible to manage something that cannot be measured. This is a difficult task for a number of reasons, which are not mentioned here due to the lack of space. In a way, it is an attempt to measure the unmeasurable.

Pondering on the future development of ICT, Hinchcliffe (2015) envisages the emergence of the 4th Platform, which he understands as a complex fabric of people, community, data, devices, activity and intelligence. Such a structure will have the following characteristics: billions of connected users, applications, sesnsors and uncountable number of network connections and asymptotic network effects. This will enable the implementation of such phenomena as, for instance:

- dynamic contextual services,
- shared perception and learning,
- ecosystem domination,
- instantly composable applications,
- fully digital business models,
- time augmentation,
- digital communities as institutions.

The complexity of the digital multiverse will increase exponentially. The answer to the question what tools to use to measure such a complex reality will become a great challenge for the researchers involved.

The implementation of the vision of digital multiverse will cause significant civilization changes. The society, economy, culture and politics will undergo transformation. In the economic sphere, this means the emergence of new products and services - material, digital and hybrid; the creation of new and the disappearance of many existing industries, markets and professions. DM brings along new opportunities, but also new threats, which will require us to react in real time. The world will change radically and it is not certain that it will be for the better.

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Social Acceptance for Insurance Fraud In the Context of Other Types of Crime

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Abstract

Economic crime is gaining on popularity. The perpetrators of this type of crime expect substantial financial gain by taking inconsiderable risk of being penalized. Additionally, economic crime is perceived by the society as one that causes low social harm. This factor may encourage criminals to commit economic crime. Insurance crime is one of the most complicated among economic crimes. It results in serious financial losses for the insurance industry. Furthermore, effectiveness of the claim verification process and customer trust are affected as well. The research motivation was to study the differences in social perception of different types of crimes. The aim of the paper is to show a connection between the level of social acceptance for committing insurance fraud and characteristic features of the respondents. The research was carried out using a survey on a representative random group of 1000 Polish citizens. According to the results, all crimes against financial institutions are also perceived as easy to commit. Moreover, the level of education is the key factor which affects the perception of social harm and inclination towards informing law enforcement authorities. Higher education enables to understand negative consequences of crime and helps to induce an appropriate action against fraud. This conclusion can be used for creating preventive programs against the phenomenon of crime and the development of prevention methods.

Keywords: Insurance, Insurance Fraud, Social Acceptance

Introduction and Theoretical Background

Economic crimes, so called white collar crimes have specific attributes, which differ them from common crimes, as was mentioned by Strader (2002). Broad field of economic crime consist of fraud, bribery, corruption, money laundering and market abuse, compare with the book by Palmer (2018). According to the definition placed in the text of International Monetary Fund (2020) it is non-violent crime which results a financial loss. In most cases economic crime is carried out in a way that is not directly noticeable. The detection of this type of crime require professional expertise. It is not simple to identify the damage. In most cases the perpetrators are characterized by high qualifications, and they have plenty possibilities of defense. Finally the mechanism of committing economic crimes due to its complexity is incomprehensible to the average citizen, who have limited knowledge concerning finance, banking and insurance industry.

From this reason, police statistics show serious increase of the threat of economic crimes. Although the share of economic crimes is still not very high, the value of losses for financial institutions and whole economy is very significant, like mentioned by FBI (2020).

Insurance crime is one of the most sophisticated economic crimes. So called fraud is committed by dishonest customer, principally as a result of a faked claim. There are many definitions of insurance

crime that are used in practice, as in the text by Derring (2002). For this reason, a coherent definition of insurance crime has been developed for the needs of the insurance industry. According to Insurance Europe report (2013), insurance crime is a claim for unjustified compensation or compensation for it through fraud.

Insurance fraud is a serious problem, which impacts all insurance markets in Europe. Losses of insurers reach as much as 10 per cent of expenditure related to payment of claims and benefits, see report Insurance Europe (2013). Apart from measurable direct financial losses, insurers bear intangible costs in the form of complication and prolongation of claim adjustment processes as well as they lose trust and reputation among clients. Numerous sources indicate insurance fraud as one of the main threats for the development of insurance markets, like in reports by World Economic Forum (2015), PwC (2015), and EIOPA (2016). Over the years, insurers have managed to create numerous methods of preventing crime, as mentioned by Hymes and Wells (2013). They are based on using IT tools and multidimensional analyses as well as exchange of information about clients, damages and the objects of insurance. However, fighting frauds is hindered by a serious problem of how insurers are perceived and also by social acceptance for committing extortions, as in research by Karsten (2011).

People who are inclined to commit an insurance fraud act on their own or they act as members of an organized crime group. In both cases, the decision to commit an extortion depends on the so called crime triangle – that is motivation (usually economic), opportunity (chance) and rationalization, as noticed in a book by Cressey (1973). Additionally, the perpetrator ponders the ethical risk connected with the committed offence, like in the article by Posner (2004), and in report of FRISS (2016), also in the article by Kassem and Higson (2012). It is related to the level of social acceptance for a given type of crime. In the case of economic crimes it is higher than in the case of serious criminal offences.

Insurance fraud are some of the more complicated economic crimes. That problem was mentioned in the book by Riddle (2014) and by Association of Certified Fraud Examiners (2019). Committing them requires a certain level of knowledge of the functioning of the insurance industry, see reports by KPMG (2013) and KPMG (2011). At the same time, it needs to be noted that the perception of insurers by the society is not explicitly positive due to frequent disputes arising in the process of claim adjustment. The level of social acceptance can significantly impact the number of committed insurance fraud, particularly those incidental ones without participation of crime groups.

The Objective and Meaning of the Research

The objective of the authors is to determine the level of social acceptance for committing insurance fraud and to show a connection between the level of social acceptance for committing insurance fraud and characteristic features of respondents, such as age, gender, level of wealth and education.

A potential connection between the level of education and the level of social acceptance for committing insurance fraud can be used for creating preventive programs based on educational actions directed at clients and for formulating informative policy of the industry in the scope of informing about the attitudes of insurers towards the phenomenon of crime and prevention methods.

The contribution of this paper is to examine the perception of insurance fraud in the context of other types of economic and common crimes. Such research has not been conducted in Poland so far. The respondents were asked, among others, about the perception of six different types of crime, including insurance fraud. The questions concerned the perception of social harm, the easiness of committing certain types of crime, the readiness to inform law enforcement authorities and the probability of being punished. The article also researched potential motivations which may induce potential perpetrators to commit extortions as well as the relations between an incident of not receiving a proper financial consideration from a financial institution in the past and the perception of crime.

Research Methodology

The research was conducted using a survey questionnaire applying the CATI method with the assistance of a professional research agency. The research was conducted in March 2015. The respondents were a nationwide, representative random group of 1000 Polish people over 18 years old.

The respondents were asked, among others, about the perception of six different types of crime including insurance fraud. The questions concern the perception of social harm, easiness of committing certain crimes, readiness to inform law enforcement authorities and the probability of suffering consequences. Potential motivations that can induce perpetrators to commit extortions were also researched.

The respondents compared six different types of crime:

- Shoplifting (Shop)
- Extortion of compensation from an insurer (Insurance)
- Stealing property from an employer (Employer)
- Tax evasion (Taxes)
- Loan fraud (Loans)
- Extortion of benefits from social insurance ZUS or KRUS (ZUS)

Research Results

Individual types of crime present different levels of social acceptance, different types of motivations inducing to commit them, as well as the willingness to object expressed through the will to inform law enforcement authorities. Comparing the results of research conducted on the entire surveyed test group it is difficult to notice significant differences in the perception of social harm. The respondents are clearly stratified here and it is difficult to talk about any tendencies or differences between different types of crime. Some of the participants in the research treat all the enumerated types of crime as highly socially harmful, some of them do not have an opinion, some of them do not see any harm. Similarly, the respondents are divided into practically three equal groups in terms of the willingness to inform law enforcement authorities of the commitment of every of the abovementioned crimes. There were also no significant differences noticed between the different types of violating the law.

Table 1: Question: Would you inform law enforcement authorities of a crime if your anonymity was guaranteed?

Answer	Shop	Insurance	Employer	Taxes	Loans	ZUS
Definitely not	19%	22%	20%	22%	19%	23%
Rather not	24%	29%	22%	30%	25%	30%
Neither yes or no	16%	15%	16%	15%	14%	15%
Rather yes	24%	21%	23%	18%	22%	19%
Definitely yes	14%	9%	13%	11%	15%	9%
I don't know	4%	4%	5%	4%	4%	3%

This demonstrates very large discrepancies in individual perception of a crime as violation of common good. Similar results were reported earlier in the nationwide research entitled "Social Diagnosis" by Czapinski and Panek (2015), placed in Table 2.

Table 2: Categories of behaviour

Type of crime	I don't care at all	I care very little about it	I care a little about it	I don't care about it	It is hard to say
Someone pays taxes lower than they should	22.5%	26.6 %	26.7 %	18.1 %	6.2 %
Someone avoids paying for using public transport	22.0 %	30.7 %	24.7 %	17.2 %	5.4 %
Someone receives disability pension unjustly	17.9 %	22.8 %	25.8 %	27.2 %	6.4 %
Someone extorts insurance compensation	18.6 %	23.6 %	23.9 %	26.4 %	7.5 %

In the cited research, the indicators of sensitivity to common good have slightly improved over the past few years.

All types of crime mentioned in the research are considered relatively easy to commit. Only shoplifting is perceived considerably different as exceptionally easy to commit. Nevertheless, all crimes against financial institutions are also perceived as easy to commit.

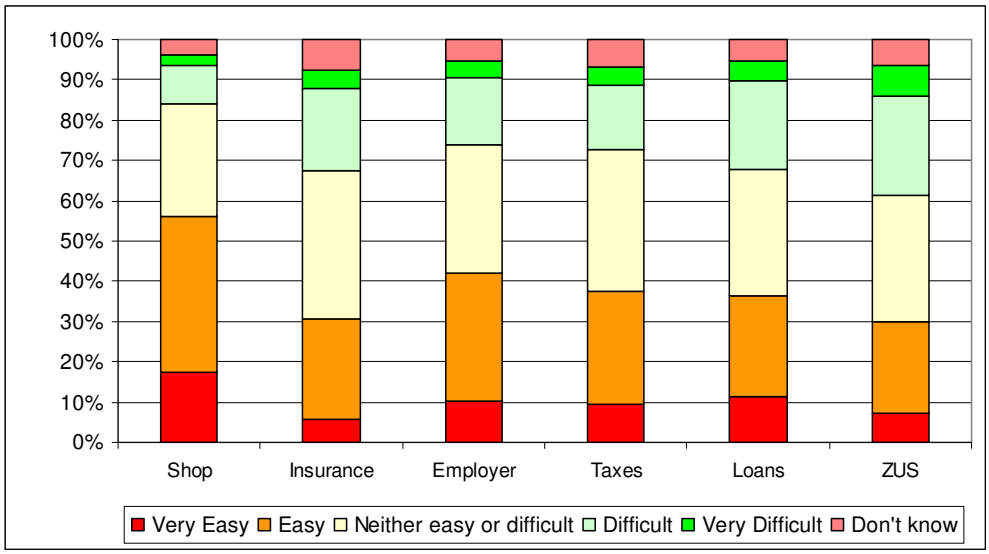

Figure 1: Question: Is it easy to commit a given crime?

Comparing motivations, which potential crime perpetrators are induced by, also provide interesting conclusions.

Table 3: Question: What motivates people who choose to commit a given crime?

Reason	Shop	Insurance	Employer	Taxes	Loans	ZUS
Poverty	75%	40%	51%	38%	45%	46%
Opportunity	56%	45%	57%	34%	43%	39%
Legal loophole	14%	39%	19%	49%	41%	37%
High contributions/costs	3%	14%	6%	25%	5%	16%
Everyone does that	6%	7%	12%	8%	6%	8%
Dishonesty of financial institutions	5%	17%	12%	18%	18%	18%
No threat of punishment	31%	22%	26%	17%	25%	22%
I don't know	2%	4%	2%	2%	3%	4%

For better illustration, the above data was pictured in the form of a chart.

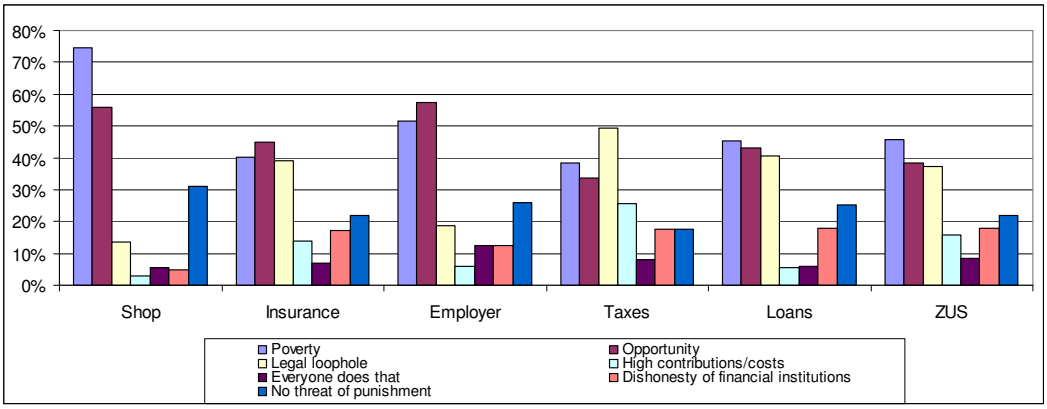

Figure 2: Question: What motivates people who choose to commit a given crime?

There can be a very interesting conclusion drawn from the categories provided by the respondents such as: "opportunity" and "legal loophole" as the main reasons for committing crimes to the detriment of financial institutions – banks and insurers. Only in the case of shoplifting the dominating cause of "poverty" was clearly most frequent. The following causes were considered not significant: "high costs", the universality of the phenomenon – "everyone does that" as well as "dishonesty of financial institutions".

Additional information on the nature of economic crime is provided by the perception of a given characteristic of a crime (in this case it is insurance fraud) in relation to individual traits of the respondents. The main traits considered in the research are age and level of education.

There is a noticeable relation between the level of education and the perception of social harm caused by insurance fraud. The higher the level of education, the more this type of crime is considered more socially harmful. Financial crimes, as they are more complicated, require a certain knowledge so that its essence, scale and effects for the society and economy can be understood.

Table 4: Question: What is the social harm of insurance fraud?

Education	Very low	Low	Average	High	Very high	I don't know
Elementary	9%	20%	38%	13%	8%	11%
Vocational	4%	20%	44%	18%	9%	5%
Secondary	4%	11%	40%	32%	9%	5%
Higher	3%	10%	36%	40%	9%	2%

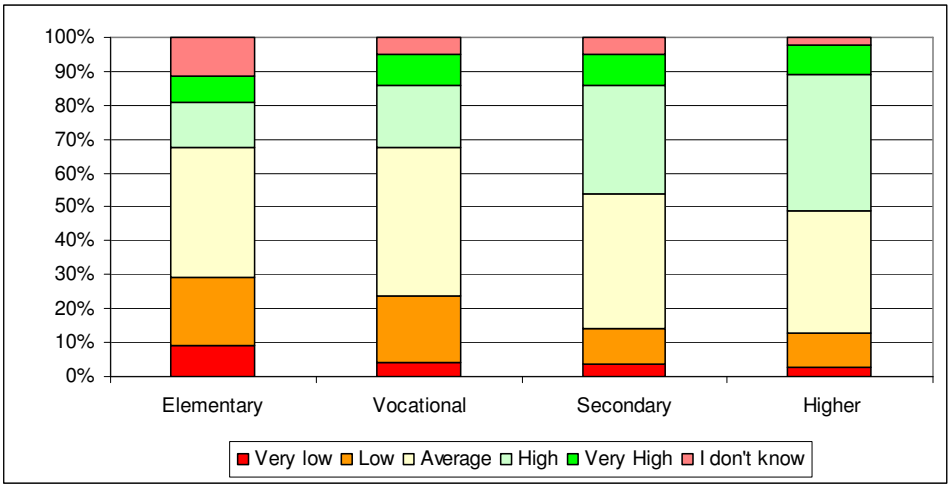

Figure 3: Question: What is the social harm of insurance fraud?

For the above relation the Cramer's V factor was calculated and it resulted in proving that there exists a relation between the researched traits: V Cramer: 0.166153926 with p-value 0.000.

The level of education and age affect the willingness to inform law enforcement authorities of a committed crime, as long as anonymity was guaranteed. The younger the respondents, the more willing they were to report a committed violation to the detriment of an insurer. The older they were, the more resistant they were to fulfil their civil obligations.

Table 5: Question: Would you inform law enforcement authorities of a crime if your anonymity was guaranteed? (insurance fraud)

Age range	Definitely yes	Rather yes	Neither yes or no	Rather not	Definitely not	I don't know
Age 18 to 24	16%	28%	10%	32%	13%	1%
Age 25 to 34	8%	22%	25%	24%	17%	4%
Age 35 to 44	10%	21%	15%	29%	22%	3%
Age 45 to 59	6%	18%	15%	30%	26%	5%
Age above 60	10%	19%	8%	31%	26%	6%

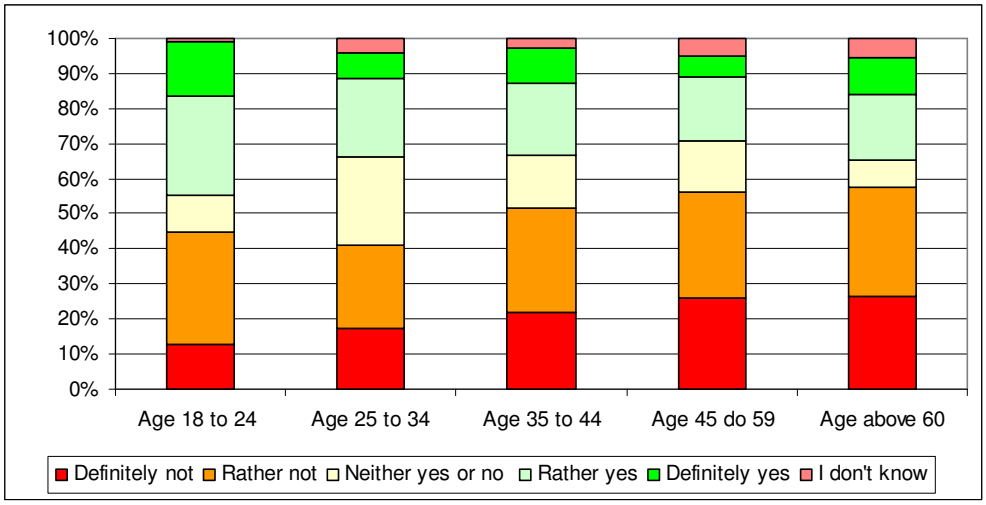

Figure 4: Question: Would you inform law enforcement authorities of a crime if your anonymity was guaranteed? (insurance fraud)

For the above relation the Cramer's V factor was calculated and it resulted in proving that there exists a relation between the researched traits: V Cramer: 0.120309565 with p-value 0.000.

This relation can be explained by a more idealistic attitude of young people, who believe in the standards of law and order and who have not yet experienced negative consequences of reporting a crime. Older people prefer "not to get involved" or they have experienced, for example, an inappropriate reaction of law enforcement authorities to reporting a crime.

As the level of education increases, the size of the group, which is indecisive whether to inform law enforcement authorities, increases. This is a chance for educational programs, which bring awareness of negative consequences of economic crimes. People who are educated at a higher level are able to understand negative consequences of crime and change their decisions in terms of reacting to encountered cases of extortion.

Table 6: Question: Would you inform law enforcement authorities of a crime if your anonymity was guaranteed? (insurance fraud)

Education	Definitely yes	Rather yes	Neither yes or no	Rather not	Definitely not	Don't know
Elementary	8%	23%	6%	26%	27%	10%
Vocational	13%	18%	12%	29%	24%	4%
Secondary	8%	20%	15%	33%	21%	3%
Higher	8%	23%	23%	26%	18%	2%

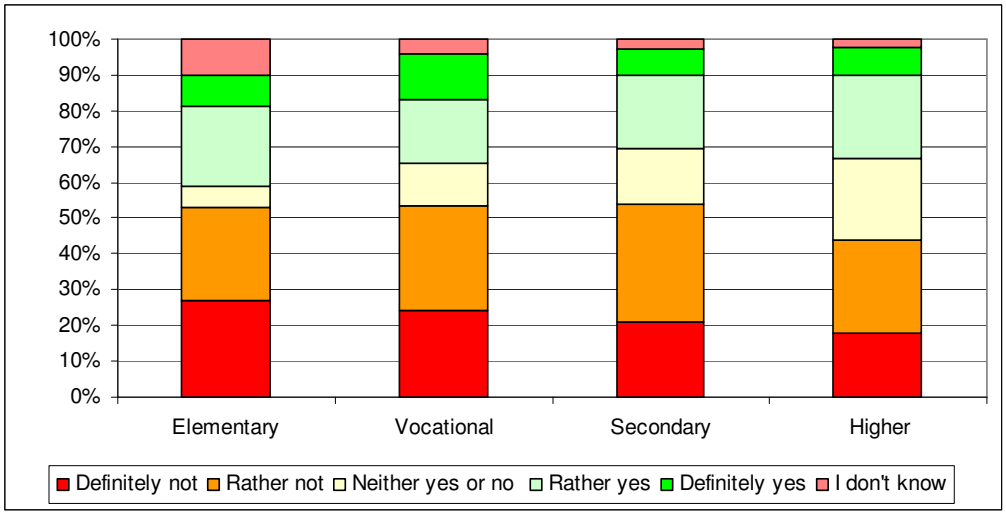

Figure 5: Question: Would you inform law enforcement authorities of a crime if your anonymity was guaranteed? (insurance fraud)

For the above relation the Cramer's V factor was calculated and it resulted in proving that there exists a relation between the researched traits: V Cramer: 0.136786255 with p-value 0.000.

The level of education also influences the perception of criminals' motivations. With the higher level of education, the factor of poverty disappears as the one characterizing the potential motivation selected by people with elementary education. People who have secondary and higher education select opportunity and legal loophole as the main motivation.

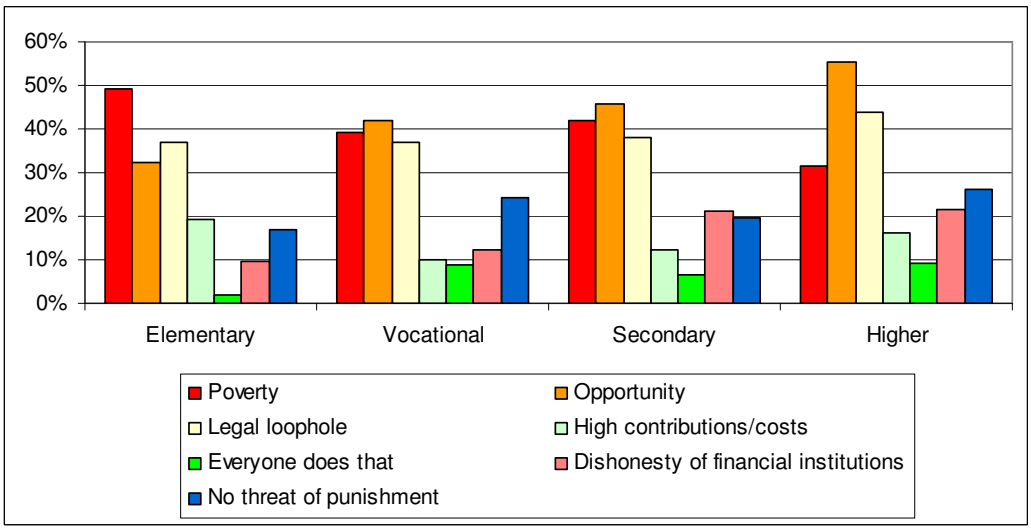

Figure 6: Question: What motivates people who want to commit an insurance fraud?

Conclusion

Crimes to the detriment of financial institutions is a serious multi-layered and complicated phenomenon. It is difficult to unambiguously determine efficient prevention methods.

The conducted research inclines towards drawing the following conclusions: Crimes to the detriment of financial institutions are perceived by large groups of respondents as not very socially harmful and relatively easy to commit. The level of education is the key factor, which affects the perception of social harm and inclination towards informing law enforcement authorities.

The research proves that investing in education can be an effective method of preventing economic crime, including insurance fraud. The respondents who are characterized by education level higher than average are aware of the dangers related to insurance fraud and are inclined to inform law enforcement authorities. At the same time they are aware of the true motivation of crime perpetrators and can see legal loopholes, which favour committing extortions.

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Static-Dynamic and Qualitative Characteristics of Integrated Management Systems for Machine-Building Business Structures

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Abstract

The essence of integrated management systems for business structures is revealed, in particular, from the point of view of their structure and static-dynamic characteristics. It is proved that no matter how integrated structures are considered- from the standpoint of a hierarchy or process, their characteristics remain the same. It is argued that integrated structures can be in a state of forming or functioning, in addition their properties include: the system's ability to coordinate the goals establishment, choose and apply the ways to achieve them; the system's ability to counteract information entropy; the system's ability to show internal purposeful activity.

Keywords: System, Integrated System, Management System, Objectives Of The System; The System State, Sustainable Development.

Introduction

In the world practice, since the 70s of the twentieth century, integration processes in industry, in particular, in mechanical engineering, have been an important factor in economic shifts. Despite the fact that in Ukraine more than 3000 business organizations in mechanical engineering belong to various integrated structures, the synergistic effects of their activities are low. The management systems of these integrated entities are unbalanced and irrational, the production potential of these organizations is neither reproduced, nor reduced, and it has a negative impact on the environment. In order to overcome destructive phenomena and processes in mechanical engineering, it is necessary to create sustainable development management systems that would take into account such features of domestic machine-building business structures as the environmental needs of society, the number and complexity of production processes, the variety of materials used and finished products, the territorial branching of structural divisions, the volume and diversification of data sets of employees and business partners, objects of financial, managerial and statistical accounting, and so on. This task is aimed at integrating local management subsystems based on the introduction of highly automated information systems, which will ensure that machine-building business structures gain competitive positions, increase investment attractiveness, and increase the level of sustainable development. The problem is that there are no conceptual, theoretical and methodological, and methodological-applied provisions for the formation and use of integrated management systems for sustainable development of entrepreneurship in mechanical engineering.

Research Results

It is expedient to reveal the essence of integrated management systems for the economic development of business structures in the engineering industry (IMSBS) on the basis of a theoretical and analytical model based on the use of dialectics and abstraction as general methods of scientific knowledge aimed at specifying the static-dynamic and qualitative characteristics of these systems (Fig. 1).

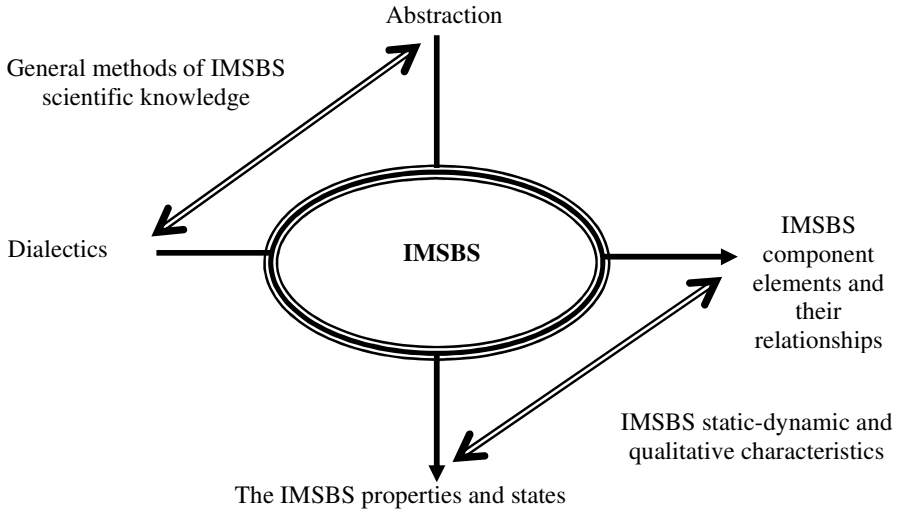

Fig. 1: Theoretical and analytical model for studying IMSBS characteristics

From the dialectics the integrated management system of business structure economic development is a set of interacting management sub-systems (local systems) totally managed by senior level management to shape and implement management decisions for the sustainable development of entrepreneurial structures based on hierarchical and functional coordination of the organization's goals and ways of their achieving [1]. From the hierarchy perspective the IMSBS constituent elements are a management senior, providing the IMSBS general management; the IMSBS goals; the local management systems. Accordingly, from the point of the management process view, the

IMSBS components include: the management subsystem; management functions and methods; management decisions; the controlled management subsystem; information and communications.

It is advisable to divide the IMSBS goals into the local and general ones. The local goals are a set of the local business structure tasks by management subsystems. Their implementation is a necessary, but not sufficient, condition for achieving the IMSBS goals. In IMSBS, the organization's overall goals play the most important role. Their formation reflects the object of the management system – sustainable development. An example of the local goals is the timely provision of production units of the entrepreneurial structure with raw materials and materials, achievement of the expected level of labor discipline and labor productivity of workers, ensuring compliance with current standards of technical conditions for production and storage of products, and so on. Among the general goals are to increase the volume and the rational use of the own resources, achieve financial stability of the business structure, ensure the growth of the business structure innovative potential, increase the competitiveness of products, and so on. Based on setting the common goals, the local goals are specified. Using the general and specific management functions and methods, the IMSBS goals are implemented. On the one hand, the IMSBS functions and methods are aimed at achieving its goals, and on the other hand, at the management object. Given that IMSBS, like any management system, is informative, the hierarchical and functional coordination of the approaches to the objectives largely determines the IMSBS performance [2]. This coordination is achieved through the introduction of automated information management systems. Their purpose is to provide management entities with timely, reliable and complete management information when forming and implementing management decisions. Performing this task in a large business structure is facilitated by a high level automation of all the management processes [3].

The top management executives provide overall management of the business structure, that is, set the common goals for sustainable development, detect problems of the local systems' interaction, make decisions regarding the implementation of organizational changes in order to rationalize the formation and use of material, financial, information, intellectual and other resources of the enterprise, and so on. The nature and pace of sustainable development depend more on the quality of the top managers of the business structure management than on the other IMSBS components [4]. Top managers of business structure management, as well as the system's goals, play an integral role in the IMSBS formation. They are associated with local coordination link management systems. Accordingly, local control systems are connected by links of structure and functioning.

Considering sustainable development as an object of the management system, it is also appropriate to treat it as a function of management systems for business structures. Sustainable development of business structures as an object of the management system is characterized by the dynamics of volumes and levels of efficiency in the use of material, financial, labor, intellectual, information and other resources; actual financial stability; the level of innovative potential; competitiveness, and so on. The dynamics of the volume and the level of efficiency of using the resources of the entrepreneurial structure indicates the effectiveness, systematic and consistent implementation of the selected sustainable development strategy by the owners and managers of the enterprise. Regardless the chosen strategy, if as a result of its application, the volume and efficiency of the resources, which the company owes, increase, this is the evidence of its effectiveness and the sustainable development of the enterprise [5]. As for the financial stability, it characterizes the enterprise's ability to fully and timely settle accounts with the creditors, as well as to ensure such a turnover and profitability level of the used resources that the enterprise has the opportunity to expand its activities, qualitatively update the used technologies, etc. [6]. The actual financial stability of the business structure is a factor that affects the choice of sources and methods of financing by the enterprise, the terms of cooperation with business partners, the ability to fulfill obligations, implement innovative projects, apply for participation in the state order, etc. [7]. Taking this into account, the financial stability of the business structure should be considered as one of the main strategic vectors of sustainable development of the business structure, which should be taken into account by managers at all levels of management when forming and implementing management decisions.

In the context of economic globalization, strengthening integration processes, expanding communication networks, increasing the influence of multinational companies on national economies, achieving economic growth by industrial and economic associations and business structures in particular is impossible without the development of innovative potential. The formation of innovative potential as a strategic reference point for sustainable development of business structure is necessary to ensure its economic efficiency and competitiveness. The competitiveness of business structure is its ability to acquire advantages from consumers of finished products and business partners, who are manifested in growing finished products' sales, improving the conditions for providing the enterprise with raw materials, fuel, materials, etc., and liberalizing the requirements of investors and creditors. These characteristics of sustainable development are general strategic guidelines (development vectors) of business structures, on the basis of which the strategic and current plans for sustainable development are formed.

Fig. 2. depicts IMSBS in dynamics.

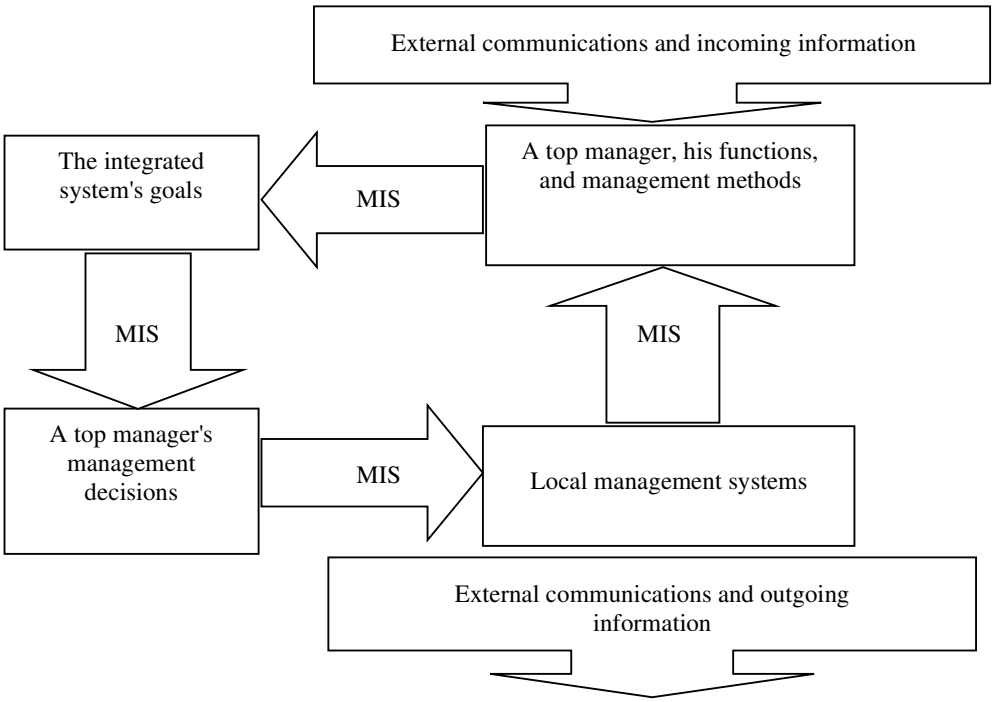

Fig. 2: IMSBS in dynamics

Note: MIS – management information and communications.

Since IMSBS is an open system, forming goals and making decisions on the choice of ways to achieve them are on accumulating management information from the organization internal and external environments [8]. Management decisions made by top managers are aimed at achieving the expected state of the management object. Top managers do not directly influence the management object, but indirectly through local management systems. Under this impact IMSBS performs several functions, namely: ensures sustainable development of business structures, particularly in growing own resources and increasing their use efficiency, forms and uses the innovation potential, achieves financial sustainability and competitiveness; hierarchically and functionally coordinates the local management systems' goals and methods of achieving them; informs the entities of all management levels of the entrepreneurial structure on the priorities of sustainable development, resource state, and appropriate mechanisms for their use; performs storage, recording, saving, processing and transmissing management information from the controlling management subsystem to the controlled one and vice versa.

Based on abstraction as a general method of scientific knowledge, the thesis highlights the IMSBS properties and states. It is known that the modern systemology considers the systems' property as their ability to manifest certain aspects in the interconnection and interaction. The properties determined by the systems' structure and functions are the system-forming ones. These properties usually include organization, division, elementary, homogeneity, completeness of systems, and so on. In IMSBS the indicated group includes the properties generated by the IMSBS integration-forming elements. All the IMSBS components belong to them except local management systems. Among the properties determined by the systems' structure and functions, it is advisable to highlight its emergence, that is, hierarchical and functional consistency in setting the IMSBS goals, as well as the choice and application of the ways to achieve them. According to the above classification, this property is the main one in relation to all the other IMSBS properties.

With regard to the properties forming the ability of the system self-preservation, they include the systems' abilities: to maintain their own state regardless of changing conditions, and adapt to the conditions of the external environment. The IMSBS property, which belongs to this type, is the system ability to counteract information entropy, that is, the economic and political and legal uncertainty of the external environment, which changes the conditions for functioning the business structure and generates temporary fluctuations within the system. These fluctuations, as the materials of business structures showed, are manifested in the system inability to timely and fully meet the expected values of the sustainable development indicators and are accompanied by top managers' identifying the need for responding to changing environmental conditions. Given that the economic entities are the main engine of sustainable development, their conscious ability to set goals and achieve them is a characteristic of any economic system, in particular IMSBS. This system's participants, that is, managers and subordinates, regardless whether the conditions of the external environment have changed or not, can change priorities (goals) and act in their implementation under the influence of internal beliefs, their own needs, moods, ambitions, and corporate relationships. The properties are also divided into the complex properties (the ones that can be decomposed) and the simple properties (the ones that cannot be decomposed). Among the distinguished IMSBS properties, the complex properties include: the IMSBS ability to hierarchically and functionally coordinate the setting of goals, choose and apply ways to achieve them, as well as its ability to counteract information entropy, i.e., economic and political and legal uncertainty of the environment, which changes the conditions of the business structure and generates temporary fluctuations within the system. The properties that undergo decomposition are generated by its completeness and minimality. These properties indicate that it is not possible to attach a new or delete an existing element of the system without destroying it. Each element of the IMSBS is functionally related to the other elements, so its removal entails the system's inability to function. Joining a new element in the conditions of the system completion means its external integration, which will require changing the IMSBS goals, and therefore, changing the system functional relationships, the role of its constituent elements, and so on. As a result, the system becomes an integral part of the new system and thus, loses its identity. The properties that cannot be decomposed are based on the IMSBS ability to adapt to the environmental conditions (adaptability), as well as the properties of structural and functional stochasticity. As already noted, the system's subjects are its engine. Under the influence of various combinations of the organization internal and external factors, top managers who exercise the IMSBS overall management decide to adapt to the developed conditions, or apply the measures of their changes. Since the list of the factors and their impact on IMSBS are constantly changing, it is almost impossible to fully formalize options for changing environments and making decision-options for managers, so the property of structural and functional stochasticity is manifested in the generation of new options for counteracting the detected entropy by top managers.

With respect to the systems' states, they are characterized by the presence of quantitative and qualitative characteristics of the systems' properties fixed in time. The system state is related to the concept of "system behavior" (the transition of the system from one state to another). As a result of the performed research, the two IMSBS states are identified: the state of system formation and the state of its use (functioning).

It is established that from the dialectics, IMSBS is a set of interacting management subsystems (local systems), the total management of which is performed by a top manager shaping and implementing management decisions for sustainable development of business structures based on hierarchical and functional coordination of the organization's goals and ways to achieve them. The IMSBS components from the hierarchy perspective of systems are the goals, local management systems and the top manager who carries out the general management of the system, but from the perspective of process management are the controlling and controlled management subsystems of the economic development of a business structure, functions and methods of management, management decisions, information, and communication. IMSBS performs the following functions: ensures sustainable development of business structure, particularly, in increasing the volume of its own resources and increasing the efficiency of their use, forming and using the innovative potential, achieving financial stability and competitiveness; hierarchically and functionally coordinates the goals of local management systems and methods to achieve them; informs subjects of all management levels of business structure about the priorities of sustainable development, the resources state and appropriate mechanisms for their use; accumulates, registers, saves, processes and transfers management information from the managing subsystem to the managed system and vice versa.

The conducted research allowed identifying the IMSBS properties and states. The IMSBS properties are classified: by type (properties due to the systems' structure and functions; by the properties that form the ability to the system self-preservation; by the properties that characterize the tactics and strategy of the system's behavior when achieving the goal); by structure (complex and simple properties); by nature (main and auxiliary). As a result of the performed research, the two IMSBS states were identified: the state of system formation and the state of its use (functioning).

The content of integrated business structure management systems, in particular, from their structure's and static-dynamic characteristics' point of view, is justified solely by the quantitative approach, since the qualitative assessment results of integrated systems are covered by the author in his works published earlier.

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Analysis of The Factors Affecting the Information Support of Enterprise Management Entities

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Abstract

It is proved that the information support level for enterprise management entities is crucial in forming an enterprise management system stable to internal entropy. Based on the expert assessment method and statistical analysis tools, the factors affecting the information support level for enterprise management entities are analyzed empirically. The significance of the factors' influence on the information support level for enterprise management entities as well as the objectivity of the expert research are proved.

Keywords: Factors, Management System, Information Support, Enterprise, Entropy.

Introduction

In our previous research [1], it is proved that integrated enterprise management systems (IEMS) are formed and developed in the entropy of the enterprises' internal and external environment. Under the influence of the objective and subjective factors' interaction forming the economic development conditions, entropy occurs in economic systems, that is, the disorder phenomenon, the economic systems' disorder, and uncertainty about their development's nature and directions. Entropy is present in both the internal and external environments of enterprises. Fig. 1 depicts the signs of the enterprises' internal entropy.

The performed researches suggest that the internal entropy signs before and during the recent global financial and economic crisis, on the one hand, is a consequence of the negative influence of external global, national and industry environments, and, on the other, the internal entropy, in many cases, is caused by the construction's irrationality and the applied management systems' underdevelopment. Enterprises can counteract the entropy of the internal environment by the construction's rationality of the used management systems [2]. By implementing a highly automated information management system, enterprises turn the used management systems into internal integrated management systems [3], which are devoid of the phenomenon of internal entropy and are able to adapt to the entropy of the external environment [4].

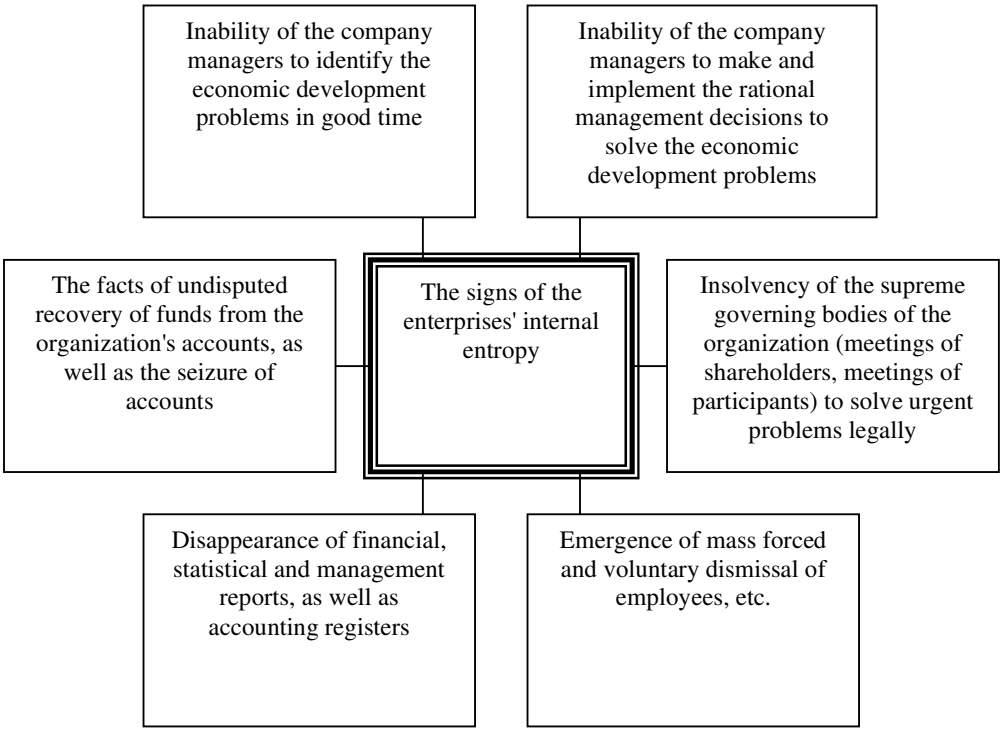

Fig. 1: Entropy signs in the machine-building enterprises' internal environment

It is established that the key parameter that determines the enterprise management system effectiveness is the information support level (software) of management entities [5; 6]. In order to study the identified factors' influence (realism and coherence of the integrated system of enterprise management objectives used by the enterprise (P_{rcz}); supplying enterprise with the management information (P_{dz}); documentary support of management activities (P_{tz}); technological support of management (P_{zi}); management staffing, and maintenance used management information system (P_{kz})) per level I3, and setting the indicators' weigh characterizing I3, questionnaire survey of

enterprises managers is made. The need for expert research is related to the fact that there are no other sources of information on the basis of which these factors can be estimated. The processing of expert information provided for calculation of the following indicators for each factor: the average amount of points and ranks set by experts; the frequency coefficient of the maximum possible ratings; the average weight of factors; the scope of ratings, and so on. Experts were selected according to certain criteria. Questionnaires were sent to 241 enterprises. Taking into account the requirements for experts selection, it turned out that potential experts can be 17 people from 28 enterprises. In order to determine the volume of a simple non-repeat sample, where the share marginal error mustn't exceed 10% with the probability of 0.99, we used the formula [7]:

$$n = \frac{W(1-W)\cdot t^2 \cdot N}{N\cdot \Delta_w^2 + (1-W)\cdot t^2}, \qquad (1)$$

where W is the sample share (the share of the sample population elements that corresponds to the studied feature); t - the confidence coefficient for a given probability value; N – the number of the general population; Δ_w^2 - the margin error.

For the probability$p$=0.990, we find t =2.59 in the table of the normal distribution . Since the share variance is unknown, we assume σ^2 = 0.25, so $n = 17,06.$ Thus, the number of a simple non-repeat sample with the probability of 0.99 and the share marginal error no more than 10% should be approximately 17 people. The organization elements of this expert study were its methodical and informational support. It provided for forming a questionnaire, guidelines for completing it, and reference information about the study subject.

Research Results

Next, we will analyze the factors that affect the determining effectiveness factor of the integrated management systems – the information support level for enterprise management entities. In tables 1-3 the points are given, the ranks assigned by experts studying the factors are calculated, and the results of processing expert information are given. As you can see, the experts assigned the highest amount of points to factor P_{tz}-1000 points. On average, the experts assigned 58.82353 points to this factor. The second place was taken by factor P_{dz}– 880 points, the third place was taken by factor P_{rcz}–780 points, the fourth place was taken by factor P_{kz}–750 points, the fifth one – by factor P_{zi} 690 points. The sequence number of the analyzed factors as a result of summing points and ranks is different. Taking this into account, it is advisable to draw conclusions about the factors' weight by the frequency value of the maximum possible estimates. It characterizes the importance of developing the j--factor by the number of the first places assigned to it by the experts. Preference for a particular factor should be given depending on the average rank values or points. And only under the other equal conditions, the factor can be considered the most important for the maximum value K_{100_j}. Given that, the frequency indicator of the maximum possible estimates should be considered as the additional one to the indicators shown in Table. 3.

Table 1: Matrix of points for evaluating factors that affect I3

Factors	Experts																
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
P_{rcz}	20	30	20	10	10	10	40	10	10	80	70	70	100	100	90	90	20
P_{dz}	70	50	30	30	30	100	60	70	30	40	30	30	60	40	10	100	100
P_{tz}	50	10	60	60	70	70	100	100	90	90	60	10	60	40	60	50	20
P_{zi}	80	30	100	30	30	10	70	10	60	40	60	50	20	10	20	50	20
P_{kz}	30	30	10	70	70	100	30	30	10	70	30	40	60	10	50	60	50

Table 2: Matrix of ranks for evaluating factors that affect I3

Factors	Experts																
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
P_{rcz}	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
P_{dz}	2	2	2	2	2	2	2	2	2	2	2	2	2.5	2.5	2	2	2
P_{tz}	3	3	3	3	3	3	3	3	3	3	3.5	3	2.5	2.5	3	3.5	3.5
P_{zi}	4	4.5	4	4	4	4	4	4	4	4	3.5	4	4	4.5	4	3.5	3.5
P_{kz}	5	4.5	5	5	5	5	5	5	5	5	5	5	5	4.5	5	5	5

Table 3: Results of expert information processing

Factors	Sum of points assigned by experts to the *j*-factor	Average sum of points assigned by experts to the *j*-factor	Sum of ranks assigned by experts to the *j*-factor	Average sum of ranks assigned by experts to the *j*-factor
P_{rcz}	780	50.71429	17	1
P_{dz}	880	52.14286	35	2.058824
P_{tz}	1000	58.82353	51.5	3.029412
P_{zi}	690	40.58824	67.5	3.970588
P_{kz}	750	44.11765	84	4.941176

It can take values ranging from 0 to 1, but the closer it is to 1, the more significant the factor is. The results of the calculation are shown in Table. 4. To increase the adequacy of the expert information perception, the absolute indicators are converted to the relative ones. To do this, the individual indicators are normalized and the average weighted values are calculated.

Table 4: Results of calculating the average weight of each factor taking into account the position of each expert

Factors	The average weight of the factors
P_{rcz}	0.48008
P_{dz}	0.749663
P_{tz}	0.996104
P_{zi}	0.75431
P_{kz}	0.51992

The results of calculating the average weight of each factor, taking into account the position of each expert, are shown in Table 5.

Table 5: Advantage matrix

Factors	P_{rcz}	P_{dz}	P_{tz}	P_{zi}	P_{kz}
P_{rcz}	-	17	17	17	17
P_{dz}	0	-	15	14	17
P_{tz}	0	0	-	14	17
P_{zi}	0	0	0	-	15
P_{kz}	0	0	0	0	-

As with the results of assigning points to factors, factor P_{zi}got the highest average weight. With respect to the other factors, their weight as a result of calculating this indicator has changed slightly compared to the results shown in Tables 1-2. Taking this into account, it is advisable to perform the next stage of processing the expert information, namely, to build a matrix of preferences. It will allow estimating how many experts gave preference to one factor over the others. The importance of factors in the constructed matrix corresponds to the factors' importance, which was revealed during the summation of the expert ranks in Table 2. Let us calculate the scope of assessments, and to identify the significance of the specific expert assessments, let us calculate the coefficient of expert activity. The results of determining these indicators are shown in Table 6.

Table 6: Indicators of the factors' comparative importance

Indicators	Factors				
	P_{rcz}	P_{dz}	P_{tz}	P_{zi}	P_{kz}
Calculating the amount of points set by experts to the *j*-th factor	17	35	51.5	67.5	84
Calculation of the average amount of points set by the experts to the *j*-th factor	1	2.058824	3.029412	3.970588	4.941176
Calculating the average amount of ranks set by experts to the *j*-th factor	50.71429	52.14286	58.82353	40.58824	44.11765
Calculating the frequency coefficient of the maximum possible estimates	0.48008	0.749663	0.996104	0.75431	0.51992
Calculating the average weight of					

factors	0.48008	0.749663	0.996104	0.75431	0.51992
Calculating the range of *j*-factor scores, points	90	90	90	90	90
The calculation of expert activity to assess the factor	1	1	1	1	1

Evaluating the indicators of the factors' comparative importance indicates that the experts gave preference mainly to factors P_{tz}, P_{zi}, P_{kz} . As the magnitude of the scope shows, when evaluating all the factors, there is a significant scope in the experts' responses. Based on the values of the expert activity indicator, we come to the conclusion that all the assessments of the factors are sufficiently justified, since all the experts participated in the assessment of all the factors without exception. It may also indicate a fairly high competence of the experts. The frequency Indicators of the maximum possible assessments indicate that all the proposed factors were evaluated by the experts with 100 points , especially factor P_{tz}.

After calculating also the concordance coefficient and checking it with using the Pearson criterion (Table 7) there are grounds to assert that the concordance coefficient is statistically significant.

Table 7: Determining the average sum of ranks and the squares of deviations of the sum from the average amount

Factors	**The sum of ranks S_j**	**Deviation of the amount from the average amount, d_j**	d_j^2
P_{rcz}	17	34	1156
P_{dz}	35	16	256
P_{tz}	51.5	-0.5	2.5
P_{zi}	67.5	-16.5	272.25
P_{kz}	84	-33	1089
Totally	255	-	2775.75
On average	51	-	-

Using the data from previous calculations, we calculate the Pearson coefficient:

$$X_p^2 = \frac{\sum_{j=1}^{n} d^2}{\frac{1}{12}[mn\cdot(n+1) - \frac{1}{n-1}\cdot\sum_{i=1}^{m} T_i]} = \frac{2775,75}{\frac{1}{12}[17\cdot 5\cdot(5+1) - \frac{1}{5-1}\cdot 30]} = 69,04. \quad (2)$$

Comparing the calculated value of the Pearson coefficient with the table value X_T^2 for n-1 degrees of freedom and confidence probability (P=0.95 or P=0.99), we see that the above condition is met, so the concordance coefficient is significant.

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Administrative and Legal Foundations for The Higher Education Reform in Ukraine In the Context of European Integration

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Abstract

This article explicates relevance of the Eurointegration agenda for reforming higher education in Ukraine and characterizes key studies on administrative and legal aspects of Ukraine's integration to the European and global higher education areas. It emphasizes the importance of implementation of the Bologna process requirements in the higher education system to improve access to education for underrepresented and vulnerable groups, and it proposes to raise the mentioned direction to the level of the national issue of protecting rights and freedoms of participants of the educational process. The article points out the benefits of introduction of the institution of the educational ombudsman in the national system; offers steps to secure adherence to the gender equality principle in the educational system; acknowledges the issue of securing adequate quality of educational services as one of the most important factors in the government policy. The article also emphasizes the importance of deploying the National Higher Education Quality Assurance Agency, and the corresponding system of agencies, as provided by the legislation.The article explores the legal foundations for establishment of the National Higher Education Quality Assurance Agency, and emphasizes the progressive nature of the stipulated procedures to secure gender equality in this process. The article articulates the strategic goal and the guidelines for the Agency's activities, emphasizes the broad scale and constant progress in the educational sector, which calls for continuous academic research, whose practical implementation will help advance the national higher education and propel it towards the European standards.

Keywords: Reforming Higher Education; Higher Education Quality, Anti-Discrimination Assessment of Curriculum Content, Gender Equality.

Introduction

The Eurointegration processes that encompass all sectors of public life in Ukraine are relevant also in the context of reforming higher education in Ukraine and the corresponding administrative and legal regulation of these procedures. Laws and bylaws adopted in the last five years are of importance for this. At the same time, the legislative process in regulating the higher education reform calls for further development. This is why it is useful to analyze and generalize societal relations in the sphere of higher education, to review its current regulatory grounds, and identify the ways to further improve the regulatory grounds of the educational sphere with regard to the European higher education area's norms and standards.

Scientific Hypothesis of the Research

The Eurointegration course of the Ukrainian higher education reform is an adequate response to the globalization challenges. The legal regulation of the mentioned reform will allow formation of the corresponding legal grounds and aligning higher education with the international standards with a goal of its complete integration to the European higher education area.

Methods of the research

In connection with the above, comparative legal analysis of Ukrainian legislation was conducted, with regard to the European Union standards. The legislation in effect regulating public relations in higher education was analyzed using the formal legal method, and the relevant proposals were made for updating and improving the legislation. Possible outcomes of implementing the proposed updates were modeled using the prediction method. The hermeneutical method was used to study and to explain the content and the peculiarities of the laws and bylaws that regulate various aspects of the Eurointegration processes in the higher education sphere. These methods were applied in combination with the general logical methods and techniques, such as analysis and synthesis, generalization, analogy, etc., which enabled conducting an optimal research for identifying problems that can be resolved by improving the current legislation.

Analysis of the Actual Material

The Eurointegration-oriented fundamentals of the higher education reform in Ukraine are crucial and require studying, and so researchers of different fields, in particular, the legal experts, focused their attention on it. Organizational and legal, pedagogical and content-related aspects of Ukraine's integration to the European Union higher education area were studied in the works by N.L.Huberska, I.M. Zarubinska, S.A. Kalashnikova, O.I. Kozievska, V.I. Luhovyi, S.M. Nikolaenko, Y.M. Rashkevych, O.V. Spivakovskyi, O.O. Masalitina, and others. In particular, they studied the problems of changes caused by globalization in the educational sphere, reasons for emergence, goals and instruments of the Bologna process were identified, in particular changes focused on achieving the standards of student-centered learning as the main feature of Europe-bound transformation of the higher education. The research addressed the issues related to regulating procedures of competence-based teaching and assessment of the higher education curricula. Normative, organizational and methodological grounds were laid for introducing the European credit transfer and savings system in Ukraine. The theoretical foundation was developed to implement higher education cycles, qualification frameworks, securing quality of higher education, deployment of international academic mobility, and participation in the European Union's international programs for modernizing higher education. Theoretical fundamentals were laid to restructure the systems of education and its new standards, and organizational, academic and legal support was developed for conducting the reform related to integration into the European higher education system. The Gender Equality Implementation Strategy in the education sector was developed under the name «Education: Gender

Dimension – 2023», whose draft was approved at the Government committee meeting in January 2018.

Protection of the rights of the educational process participants in higher education became the subject of academic analysis conducted by O.O. Kulinich, O.F. Melnychuk, Y. I. Chalyi, and others. Issues of the regulatory mechanisms for implementing the constitutional human right for higher education were addressed, as well as the academic grounds for the constitutional and legal mechanism of implementing the Ukrainian citizens' educational rights. The status of the educational service as the civil law juridical entity was established, and the legal peculiarities of a juridical entity in educational relations were established from the position of securing remedies for their lawful rights and interests. Special attention is turned to securing educational rights for people with disabilities and to development of inclusive education.

The organizational and legal foundations for the reform, improvement, and democratization of management relations in the sphere of higher education were articulated in the works by O.M. Bandurka, L.A. Hayevska, N.M. Zavorotynska, S.V. Krysiuk, M.N. Kurko, M.I. Lehenkyi, R.V.Shapoval, and others. The researchers conducted a comparative legal analysis of centralized and decentralized models of education management, and the latter model proved to be a more advantageous one. The problems of formation and implementation of the innovative educational management were addressed, and the procedures for administrative and organizational, financial and economic, psychological and pedagogical spheres of innovative education management were explicated; the conditions for improvement of expediency and flexibility of higher education public administration were identified, and the guidelines for building the governmental mechanism's organizational structures were articulated. The need to improve the legislation with the goal of normative regulation of communities' participation in education management was substantiated, and the strategy for transition to the state-public model of higher education management in Ukraine was determined.

K.B. Levchenko and O.I. Suslova studied the issue of formation of gender competences of specialists and introduction of gender approaches in education, which is an important direction of further improvement of the education system and of the administrative relations in this sphere.

The problems of ensuring quality of higher education are addressed in the academic studies by V. Y. Bakhrushyn, M.B. Yevtukha, M.Z. Zhurovskyi, H.P. Klimova, H.O. Oborskyi, I.F.Prokopenko, A.A. Sbruyeva, O.V. Spivakovskyi, and others. The strategic goals for the higher education reform at the current stage of social development were established; importance of securing the quality of higher education, as a key point for European grounds of its modernization was explained; the higher education quality management standards were articulated; the ways of standardization and certification of higher education quality management procedures were outlined; the global and regional tendencies of higher education development tendencies in the conditions of building a knowledge-based society were summarized.

At the same time, the advancement and the broad scale of the mentioned issues require constant academic research, and the relevant development and introduction of innovative science-intensive technologies into the higher education reform procedures.

The purpose of the article is to study academic achievements and practical experience of deploying the European higher education area, and to develop the relevant reform proposals for the regulatory framework that will secure incorporation of Ukraine's higher education into this area.

Theoretical provisions of regulatory grounds for the higher education reform in the Eurointegration context

Integration of Ukraine into the European higher education area within the Bologna process framework might be the most important aspect of the educational Eurointegration that calls for researching (The Bologna Declaration, 1999). The Paris Communiqué, approved by the Conference

of Ministers for Education of the European higher education area (May 24–25, 2019), pointed out the achievements of European countries in this sphere, and feasible ways for further development, which, in particular, include deployment of institutional autonomy and formation of civil responsibility for development of higher education, securing a high level of higher education quality to comply with the *Standards and Guidelines for Quality Assurance in the European Higher Education Area*, as well as improvement of access to higher education for underrepresented and vulnerable groups (Paris Communique, 2018). Specifically emphasizing the latter direction's exceptional importance, we consider it feasible to extend it to the level of the overarching problem of protecting rights and freedoms of educational process participants in higher education, which, in addition, is based on crucial international documents as the Incheon UNESCO declaration as of 2015, which was adopted at the World Education Forum (World Education Forum 2015, Incheon, Republic of Korea, May 19-22, 2015) (Forum, 2015), the Council of Europe Gender Equality Strategy 2018-2023 (Council of Europe Strategy, 2018), etc.

Systemic analysis of regulatory grounds for the higher education reform in Ukraine

Pointing out a number of important steps made in this direction, first of all, those related to school education, we emphasize both the importance of their extension to higher education and search and implementation of new forms of protecting and safeguarding the rights of the educational process participants specifically in higher education, and their regulatory codification. In particular, as a positive example of this we can mention the anti-discrimination assessment of textbooks and of the curriculum content conducted by the expert group of the Ministry of Education and Science of Ukraine within the framework of the Laws «On the Principles of Prevention and Combating Discrimination in Ukraine» and «On Ensuring Equal Rights and Equal Opportunities of Women and Men». (On the Principle, Law, 2012 & On Ensuring Equal Rights, Law, 2005). Based on the expert evaluation results, cases of direct, indirect and hidden discrimination based on race, skin color, political, religious, and other beliefs, sex, age, disabilities, ethnic or social background, citizenship, language, marital and property status, place of residence are identified. The expert evaluation results are articulated in a form of an extended expert opinion and are published on the website of the Institute for Modernization of Education Content. They serve as recommendations for correcting regulations and guidebooks (if deemed discriminatory), which are printed at the expense of the state budget. This practice should be extended to include all teaching aid materials used not only in the secondary education system, but also in the higher education system.

An absolute innovation of the Ukrainian educational legislation, focused on facilitation to creating conditions favorable for implementation of the human right for education, is introduction of the institute of the educational ombudsman by the Law of Ukraine «On Education» (On Education, Law, 2017). The educational ombudsman is the official of the Cabinet of Ministers, who has a mandate to review complaints on the issues of education and to verify the facts reported in such complaints, to obtain information necessary for his/her activities from educational institutions and from education administration bodies, and to make decisions based on the results of the verification pertaining presence or absence of violations of educational rights, and to give the relevant recommendations, to notify law enforcement agencies, to visit educational institutions and to participate in meetings/conventions of governmental agencies with relevant competencies, to provide consultations for the educational process participants, to participate in counteraction to bulling in the educational institutions, and to represent the interests of individuals in court.

The bylaw (provision) on the educational ombudsman, as well as the procedure and conditions for filing complaints and addresses to this official are approved by the decree of the Cabinet of Ministers of Ukraine (Some Issues, Decree, 2018). The mentioned document stipulates the procedure for assigning and dismissing the official for the ombudsman office by the initiative of the Minister of Education in Science, for the term of five years, without a right to re-assign. Here, we should point out that designating the Minister of Education and Science as the initiator to nominate the education ombudsman is disputable, as in this case, the ombudsman becomes dependent on the Minister, which can considerably limit the ombudsman's motivation to act in protection of the educational process

participants. A more appropriate solution would be a democratic procedure for assigning the educational ombudsman based on the results of an open competition conducted by the Cabinet of Ministers.

The requirements for the applicants for the position of the educational ombudsman also need improvement. Currently, those requirements include: a Ukrainian citizenship, permanent residence in Ukraine in the last five years, five years of work experience in the sphere of education, fluency in the official language, legal competence, and no criminal record. Our proposal is to expand these requirements by adding 'absence of administrative sanctions for corruption-related offences'. At the same time, the educational ombudsman was already selected and appointed. The current educational ombudsman, S.I. Horbachov, and his office, besides purely organizational measures, have been focusing their attention on resolving the issues of fire safety in educational institutions, use of public service announcements to raise the public awareness about the rights of the educational process participants, tenders for textbooks, etc. The educational ombudsman's key sphere of activities is the pressing problem of combating bullying.

The urgent problems to consider are those of general democratization of the higher education management system both on the national scale and in each higher education institution separately. First of all, this encompasses transition from the state-owned to state-public forms of higher education management and implementing innovative managerial forms and methods. Reform is required for the very management model of higher education, which should secure its competitiveness on both the Ukrainian and European and international labor markets, encourage investments into the educational sphere, and become a foundation for improvement of the quality of educational services by changing motivation of all of the educational process participants. To legislatively support the mentioned innovations, the draft on amendments to the Law of Ukraine "On Higher Education" introducing changes to the management system for higher educational institutions was developed and filed for consideration by the Verkhovna Rada of Ukraine (Draft Law On Higher Education, 2018). The main idea of the proposed legislative changes is re-aligning the higher education management system by dismantling the authoritarian command and control models and deploying democratic and transparent ones, and inclusion of elements of corporate governance. The administrative, legal and organizational aspects of the draft provide for redistribution of powers between the administrative structures of higher educational institutions by means of giving more power to supervisory boards and academic boards, a clearer regulation of activities of the institution's executive body and for activities of the financial director, which is the position introduced not as an imperative requirement, but as following the position and wishes of higher educational institutions.

The authors of the draft law believe its approval and implementation will help make higher educational institutions more robust, enhance their administrative and organizational potential, and secure transparency, effectiveness, and high quality of university educational services by universities.

The draft itself provides for amendment of Section 7 «Managing a higher educational institution», and expanding it with new articles 34-1 (Executive body of a higher education institution), 34-2 (Financial director), and 41-1 (Council of young researchers). The amendments provide for extension of powers of the supervisory board of an educational institution (approval of the institution's development strategy, control over the institution's economic activities and over the elections of the head, approval of nominees for the position of the financial director, approval of the budget and of annual reports, etc.), and updating the procedures for its formation. A considerable focus is on democratic and transparent procedures of formation and operation of supervisory boards. It proposes to task the academic boards mainly with the issues of setting the content and quality of curricula and scientific research, educational and research activities of the higher educational institution. The draft is innovative, first, in its focus on the normative definition of the administrative and legal status of the executive body of an educational institution and on introduction of the position of the financial director, as well as on regulating legal relations that emerge as a result of this. The draft continues the strategy focused on further strengthening of the role of student self-government in organizing the process of education, and in the entire functioning of the institution in general. Of special note is the proposed innovation concerning introduction of the young researchers' council, whose introduction is

seen as deployment of research activities in the community of students. This draft also amends the procedure of electing the head of a higher educational institution, first, by changing the share of votes required to elect a candidate. The draft law stipulates that two thirds of the total number of voters should vote for a candidate to elect him or her the head of the institution without any further conditions. If no candidate makes it to this threshold, the supervisory board retains the right to make this decision and can either ask the founder to appoint one of the candidates that received over a quarter of votes, or to declare the elections void. It is also proposed to align regulation of the appointment procedures with the legislation in effect that stipulates a special validation process for people who are candidates for offices that have the status of "responsible" and "especially responsible", as well as for the offices with increased corruption-related risks.

For the first time, the anti-crisis management procedure is stipulated, the procedure of implementation of which is supposed to be approved by the Cabinet of Ministers of Ukraine. At that, the founder is granted a right to assign, based on the supervisory board's motion and under the term-limited labor agreement, the acting head of a higher educational institution for implementing the anti-crisis management measures, for the term not exceeding two years. Certain limitations are set: the person who was assigned to the position for anti-crisis management may later run for the head of the institution but can be elected only with at least two thirds of the votes during the elections. To improve the transparency of the election procedure, the draft stipulates that it is possible to incorporate public control over the procedures at all stages of the elections.

At the same time, we emphasize that implementation of the innovations listed above will require amendment of the powers of the central government body of the executive power in the sphere of education and science, and of other agencies that have higher educational institutions in their sphere of competence. These amendments are also included to the content of the draft law.

When evaluating viability of the innovations proposed, we can quote the opinion of O.V. Spivakovskyi: «The proposed draft for amending the Law «On Higher Education» is focused, first of all, on improving the effectiveness of management of higher educational institutions, their autonomy, and their internal self-regulation. Mutual reinforcement of different administrative chains should take place by means of rational and measured distribution of powers, combination of the elements of democracy and effective control by key internal and external stakeholders. The draft authors are convinced that this amendment of the legislation will facilitate institutional solidification of the institutions and improvement of the academic sphere in general» (Spivakovskyi, 2018).

Institutional support priorities for quality of higher education in Ukraine

One of most important requirements for Ukraine's entering the European and international area of higher education is securing proper quality of educational services and thus we can consider it among the key aspects of the state education policy. At that, the general agenda of improving the quality of Ukrainian higher education centers around the issues of development and implementation of the updated contents of education and of the standards of educational activities, introduction and running-in of the quality management system and assessment of its results. The latter direction requires this education quality assessment system to be theoretically substantiated and legally regulated, transparent and efficient.

Within the European integration framework, securing proper quality of higher education aligns with the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG), which were adopted by the Ninth conference of Ministers responsible for Higher Education in countries of the European education area, (Yerevan, May 14–15, 2015) (Standards, 2015). These standards and guidelines address the external and internal quality assurance systems and quality assurance agencies. As to the latter aspect, the authors of this document emphasize the significance of the organizational support of these agencies' operation, which has to enable regularity of their activities towards achievement of clear and understandable objectives and public exposure as well as the required scope through, first of all, engagement of stakeholders. These agencies should possess an official legal status acknowledged by the corresponding governmental agencies and independence

and autonomy in their activities, achieved through adequate resources at their disposal, both financial and human. Their activities should be made transparent through regular publication of reports and conclusions, internal quality assurance and integrity in their activities. External assessment of activities of such agencies is also provided for.

Therefore, these Standards envision both a wide deployment of the higher education quality assurance agencies and the need for a government institution, which would ensure deployment and operation of such system and oversee it. As to the first aspect, we want to point out that deployment of such agencies can rely on the principles of centralization and decentralization. While we wholeheartedly support the strategy of Europeanization of education in Ukraine overall through decentralization of its management, we believe we should point out a caution against superfluities in such processes related to quality assurance of higher education, expressed by experts from the Netherlands. Yet, the researchers also emphasize an exceptional effectiveness of a decentralized system, which allows engaging prominent scientists and cultural luminaries, as well as general public, into the administrative procedures of evaluating quality of higher education (Maassen, 1997).

As to the governmental support for securing the proper quality of higher education, it is related to the mandate of the National Higher Education Quality Assurance Agency, which the legislators establish as a standing collegial body, authorized to implement the governmental policy in the sphere of quality assurance of higher education (On Higher Education, Law, 2014). The legislators establish the procedures for establishment of this body, which, importantly, include the sectoral representation principle and the gender balance principle. This body's legally regulated powers, main requirements to its structure, grounds and areas of its activities, as well as sources of its financing are also stipulated.

We emphasized the importance of application of administrative and legal mechanisms to secure such an innovative principle of establishment of the body as gender equality. Attention to this point reflects the content and the directions of the governmental policy of European integration and extension of representation of various social and demographic groups in the decision-making processes. For example, Article 1 of the Law «On Ensuring Equal Rights and Opportunities of Women and Men» gives a definition for the notion of «gender equality» as an equal legal status of women and men, and equal opportunities for its implementation, which enables people of both sexes to equally participate in all spheres of the society's life (On Ensuring Equal Rights, Law, 2005), a balanced representation of representatives of both sexes in administration and in decision-making: «governmental agencies and bodies of local self-government, enterprises, organizations and institutions, NGOs facilitate a balanced representation of sexes in management and in decision-making. To achieve the goal of this Law, in their activities they may use affirmative actions».

The mechanism of practical application of affirmative actions is gender quotas – regulating the ratio of males and females in all decision-making agencies, which is supposed to be used at formation of the National Higher Education Quality Assurance Agency, and which at the same time can be viewed as a practical implementation of Article 4 of the UN Convention for Elimination of All Forms of Discrimination against Women concerning temporary special measures (UN Convention, CEDAW, 1979). This article establishes that member countries can use temporary special measures aimed at accelerating de facto equality between men and women that shall not be considered discrimination as defined in the Convention, but shall in no way entail as a consequence the maintenance of unequal or separate standards; these measures shall be discontinued when the objectives of equality of opportunity and treatment have been achieved.

Clause 5 of the State Social Program on Securing Equal Rights and Opportunities for Women and Men by 2021, approved by the Decree of the Cabinet of Ministers of Ukraine as of April 11, 2018, No. 273, also provides for the necessity to reduce gender imbalance in the sphere of public service and in the human resources sphere (On Approval of the State Social Program, 2018).

A positive example of application of this norm is the Decree of the Cabinet of Ministers of Ukraine as of August 29, 2018 No. 703 «On approval of the Provision on the competition for selection of the

members of the National Higher Education Quality Assurance Agency», which provides for adherence to the principles of gender balance during the selection. (On approval of the Provision on the competition, 2018). The Provision approved by this resolution establishes that, according to part one of Article 19 of the Law of Ukraine "On Higher Education", the National Higher Education Quality Assurance Agency consists of 23 people, who are appointed by the Cabinet of Ministers of Ukraine based on the resolution of the Competition Committee for selection of the members of the National Higher Education Quality Assurance Agency, based on the results of the competition, conducted with adherence to the principles of gender balance and sectoral representation. The principle of gender balance is implemented according to the requirements of the Law of Ukraine "On Ensuring Equal Rights and Opportunities of Women and Men" by means of: mandatory delegation as candidates to the membership in the National Agency of people of different sex by the delegating entities listed in clause 3 of this Provision, if this particular entity delegates at least two people; application of the affirmative action to achieve a more balanced representation of women and men in the National Agency – with preference of representatives of the sex that is a minority (clauses 2 and 4 of the mentioned Provision).

At the same time, implementation of the gender-sensitive approaches into the process of selecting people who will form the National Agency requires its members and all participants of the educational process to have gender competences. For this, it would be reasonable to use the approaches worked out by K.Levchenko and O.Suslova to identify the specialists' gender competences (Levchenko & Suslova, 2019), as well as to secure integration of the topics of gender into the curriculum programs of specialists of all levels.

The strategic goal of the National Agency's operation is deployment and support for functioning of the entire legally-grounded and research-supported quality assurance system for the national higher education, which should be characterized by an active academic and research community, students, employers, professional associations, general public, and mass media. At that, the mentioned system, just as stipulated in the legislation, should cover both internal and external quality assurance institutions of higher education, as well as quality assurance of the operation of the National Agency itself. By identifying, developing and sharing effective and progressive approaches, models, algorithms and technologies for evaluation of the quality of higher education, the National Agency should facilitate integration of the Ukrainian system of higher education into the European and international higher education areas.

It seems feasible to articulate the operation principles of the National Higher Education Quality Assurance Agency, which, in particular, should include professionalism, responsibility, nonpartisanship, openness and transparency. Deployment of the National agency's operation on the foundation of the mentioned principles and their relevant reflection in the operation principles of the system of independent institutions of evaluation and quality assurance of higher education will help advance this sphere to the level of the European and international educational standards.

Conclusions

Analysis of theoretical, methodological, and applied studies of the problematics of administrative and legal grounds for the higher education reform in Ukraine in the context of Eurointegration shows that they are relevant and deserve more attention of the researchers. At the same time, the broad scale and constant development that characterize this sphere, require continuous academic studies be conducted, as it can improve the higher education in Ukraine and bring it closer to the level of the European standards. Probably, the most urgent of the issues in the mentioned academic research are the issues of protecting rights and freedoms of the educational process participants in the higher education, structural reconstruction of the national higher education's management system and improvement of quality assurance system for educational services, and inclusion of the gender equality principle into the system of education. It is advised to resolve these problems by taking organizational, legal and methodological measures for securing rigorous observance of constitutional rights of all participants of the educational process, development of the democratic basis for a higher education organization, and its realignment to state-public management, institutional development of

governmental bodies and institutions of Ukraine, called to facilitate protection of rights and freedoms in higher education, and securing the quality or higher education, and the relevant regulatory and legal support for the mentioned innovations.

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Factors Forming Student Character: Learning Development Models In Schools

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Abstract

This research aims to determine the primary factor of character high school students. The formation of character as a behavior developed from the theory of constructivism, and the theory of social learning Bandura. The research method is a survey with a correlational approach. The population research is 432 High School students with 115 samples of data analyzed. Hypothesis test with regression Liliefors, normality test, linearity test and significance of the regression coefficient and correlation with ANAVA then conducted path analysis. The results showed the direct and positive influence of the learning environment variable on self-concept, direct and positive impact of self-concept variable to learning attitude, the direct and positive effect of attitude variable on the character. The indirect and positive influence of the learning environment on the character through self-concept and attitude with the total weight and the learning environment has a positive indirect effect on the attitude through self-concept. The character is formed effectively by instilling self-concept students through the learning environment to create the right attitude in learning.

Keywords*:* Character, Learning Environment, Self-Concept, Attitude.

Introduction

The character is an essential aspect of the national development of a country. Low character of society will affect into social and economic downturn. Cultural values of the nation as the basis of thinking society and act formed through education. Schools can develop a character-building curriculum as a character education curriculum as former student behavior.

Character issues in Indonesia reflected on the data of Transparency International Corruption Perceptions Index that the level of corruption in Indonesia still show vulnerable numbers (high corrupt) in the rank of 90 out of 176 countries in score 3.7 with the most-cleanest country of corruption is Denmark in rating 9.0 (Transparency International, 2016). Corruption imposes considerable economic and social costs (Starke et al., 2016); (Lewis, 2016) in Indonesia (Merkle, 2018); (Prabowo, 2015) and become a basic problem of development even the classification of corruptors in Indonesia, especially the state officials being imprisoned (Hamdani et al., 2017). Indonesia overcomes it by launching the

national education curriculum program that emphasizes character education as a process and academic subject with the school-based curriculum (SBC) in 2013.

Many factors influence the character as a learning result such as attitude (Muhammad B. & Saparahayuningsih, 2016), (Mohammed Chowdhury, 2016) environment which students develop (Kerr et al., 2018); (Suparno, 2018); (OECD, 2018) which consists of learning environment, social environment, as well as parenting patterns (Ceka, 2016).

Changing student behavior permanently into character is the result of a long learning process. In constructivist learning theory, changes in student behavior is a result of knowledge and learning experiences (Alt, 2016); (Fernando & Marikar, 2017). "Bandura's social cognitive theory explains individual learning, development, acquisition of knowledge, and self-regulated competency within a social context, in which parents, peers, and teachers play a significant role as social models" (Hulleman et al., 2016).

From the perspective of learning, student behavior is learning outcomes programmed through a set of planned and measured curriculum based on plan behavior according to Ajzen's planned behavior theory (de Leeuw et al., 2015). Based on that theory is very important for the school to design a learning program that integrates character in the curriculum (M. A. Arifin, 2017); (Virtues, 2014) merged with lesson with three components of good, there are moral knowing or knowledge of moral, moral feeling or sense of morality, and moral action or moral act (Mohammed Chowdhury, 2016). Learning at school requires the creativity of teachers and a good learning environment so as to foster good learning behaviors and intentions (Saptono, 2016); (Febriantina, 2018).

Character learning result is student behavior after completing learning activities through experience and practice in cognitive, affective and psychomotor. S.M.A.R.T is one of the character education models in IIS students. As an education character developer, integrated Islamic school incorporated in ISS network in Indonesia than in 2017 reached 2100 schools from primary school until senior high school. IIS as a pioneer of education character has a high potential to produce smart students that are needed by the future of the nation such as leadership, entrepreneurship even innovations in science and technology. S.M.A.R.T is an acronym from saleh (pious), musleh, cerdas (intelligent), mandiri (independent) and terampil (skilled).

Various models of character building still not effective, because the character education program needs curriculum and approaching for giving permanent learning experience to students to become independent knowledge. The purpose of this research is to provide a S.M.A.R.T character building model for students in school. Analysis of factors that influence S.M.A.R.T character building of the students being the emphasis on development in the educational process. The learning environment, social environment, parent patterns as a place for students to grow up, attitude and self-concept building, which make the permanent character and ready to live in society. Based on the theory, the structure path analysis (constellation) which built in the research, are:

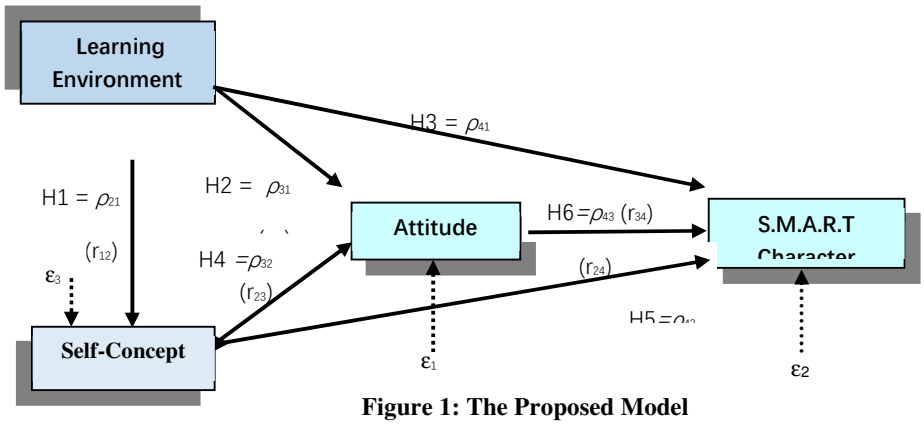

Figure 1: The Proposed Model

Literature Review

Previous research about the learning environment, social environment, parent patterns, self-concept, attitude towards S.M.A.R.T character building of the students only partially analysis. Simultaneously, measurable behavioral changes were evaluated as a habit and being the S.M.A.R.T character of the students which can be formed in school. From the education perspective, the school must be sure as a formal institution that can form the S.M.A.R.T character of the students through the curriculum always evaluated constantly being developed. S.M.A.R.T character of the students comprehensively analyzed based on three fundamental theories there are knowledge formation and behavior based on environment in Social Learning Theory (R. binti M. Arifin et al., 2018); (Hope & Ca, 2016) plan behavior, person behavior to do something based on the attitude toward the behavior, and behavioral control as classification of action, such as deliberate action or done with specific purpose for future which becomes a habit as a character, as well as the formation of knowledge and character as behavior based on experience in constructivism learning. Through behavioral model build upon environment influence accordance Bandura theory, and the effect towards self-concept and attitude, thus becoming a planned behavior matching planned behavior theory, and impact of permanent changing which become a habit of learning theory, as well as cognitive behavior, or even knowledge construction based on experience.

Study character is the focus of the study as a fundamental value of education and morals continue to be developed. Various countries as the study of curriculum development and effective behavior building in Japan (Kimura & Tatsuno, 2017); (Ministry of Education, Culture, Sports, Science and Technology-Japan, 2018), in British (Taylor, 2017), in China (Yang, 2018) and being modern central theme (Pattaro, 2016), even into the 21st-century education theme (Kimura & Tatsuno, 2017); (Bertram, 2016); (Singh, 2019).

S.M.A.R.T Character

Education provides the learning process to change behavior. The character curriculum encourages permanent learning experience as a long-term memory of the learning experience. Implantation of values and long-term habituation is not easy, through character school programs will begin to appear, familiar, and if successful it will be entrenched.

Character is a positive value that can be developed in student behavior, starting with habituation and becoming a repetitive and permanent activity in students. The character becomes the focus of educational institutions in developing student personality as a whole. According to Salls (Suparno, 2018),) character education is the process of transforming values so as to cause virtue/transformation (transforming values into wisdom). Schools as formal educational institutions need to develop models for the formation of character education as excellence in the education curriculum to enter learning classes (Retnawati et al., 2018). Daniel Goleman states that character education consists of 9 basic

values, namely: "1) responsibility; 2) respect; 3) fairness; 4) courage; 5) honesty; 6) citizenship; 7) self-discipline; 8) caring; and 9) perseverance " (Evy et al., 2016).

Character according to the Indonesian Ministry of National Education is nature, behavior, morals or personality which is formed from the internalization results of the various virtues which are believed and used as the basis for perspective, think, attitude, and act. Schools as an educational institution develop character learning to learners. Many patterns developed by the school into a model to reached permanent learning results as a culture or habituation. Character values took from national education purpose then adjusted with school coaching patterns.

S.M.A.R.T character as an acronym from Saleh (pious), muscle, cerdas (intelligent), mandiri (independent) and terampil (skilled) became an application model in IIS. Character values developed as a form of learning, habituation, and create culture suitable with IIS character. When many schools did not have model and character building, S.M.A.R.T is the basic character values that are implemented through a learning process based on students, class, and school as the totality of implementation and school responsibility.

Learning Environment

An environment where learning takes place very influences students' development in learning. Informal education, students learning environment can be done by conditioning and manipulation to obtain learning outcomes that are desired and be able to bring the real learning condition so produce a learning experience.

The environment could be a stimulus for the formation of knowledge and skills. A conducive learning environment is able to shape the character of students so that they have good learning. The learning environment as a determinant of the main learning outcomes can be designed to produce education and character according to learning objectives. Human first educational human is family (Demirel et al., 2016) even parents' responsibility is unlimited for formal education. Family as an early education give a basics character and noble values which formed since early stage. The family environment itself consists of the parent (father and mother) and child. Parenting is an interaction between a child and a parent during parenting activities. This parenting means parents educate, guide, discipline and protecting the child from reached mature by norms that exist in society. This parent's attitude covers how parents give rules, prize even punishment and the way parents give attention and responsibility towards the children. Parent patterns are away or parent manner in interaction with children during parenting in giving rules, prize, punishment, attention, response, and education.

The social environment influences learning activities and behavior (R. binti M. Arifin et al., 2018). The social environment that surrounds our lives and children could be very influential in the learning and development of children. Therefore, we must be able to assist the child so the child could recognize a good environment, in order not to become obstacles or barriers towards the learning process and his development. The environment can make human as the learning process. In a bad environment, a person can do and pushed to do things negatively. In contrast to a conducive and enjoyable learning environment will be able to provide excellent learning and encourage someone to do good things.

Based on the study above it can be concluded the learning environment is everything that comes from outside on student influence, either directly or indirectly and associated with the learning process in the form of the physical environment of schools, parent patterns at home and social environment for growth and development of students to achieve learning success.

Self-Concept

Behavioral change as a result of learning is strongly influenced by individual learners to accept, understand and implement the knowledge gained. Information as the learning process will be verified

and determined by conformity to him. A wide range of knowledge and thought someone about himself reflected in the concept of self (Dani, 2018). Meanwhile, according to Hurlock, self-concept is an idea that people have about themselves and a combination of beliefs that people have about themselves, the physical, psychological, social and emotional, aspirations, and achievements (Mualifah et al., 2019) even important at the time of one's career formation (Istiana, 2017).

Self-concept was formed because of individual interactions with the people around him. What is perceived by other individuals about him is not separated from the structure, role and social status that carried people? Thus, the social image can be realized in the ability to socialize and adapt to the surrounding environment, both at school and in the community. In reviewing of self-concept as a feeling to be appreciated and assessment for self. Djaali (2003) argues self-concept originally came from feeling appreciated or unappreciated (Sustikasari, 2018); (M et al., 2017). So that feeling is the basis of view, assessment or someone's shadow about himself which overall called self-concept. There are four factors which had a role in self-concept formation, there are, a) ability factor of each child, b) feeling factor c) Virtue factor d) strong factor of behavior.

Perception or outlook of itself as a self-concept, which is formed through experience and interaction with others, either physically, psychologically, and socially so that will affect a person's attitude and develop the character by deciding what to do or not to do as a choice based on its knowledge.

Learning Attitude

When someone involved in the social environment and social interaction, then there will appear feeling like it or not. Azwar (2013) states that the phenomenon of attitude, which is the emergence of other than the specified state of the object being faced is also determined on experience. An attitude is a form of evaluation or feeling reaction (Ari Saptono, 2016).

Attitude has a power, where a strong attitude will be relatively stable over time, withstand persuasion and predict real behavior to change. Attitude towards an object act as an intermediary between response an object in question then crystallized as a potential reaction to an attitude object. Furthermore, according to Ajzen, attitude is a picture of a summary evaluation from psychology object recorded in some dimension attributes such as bad-good, harm-benefit, happy-sad, and liked-disliked (Ari Saptono, 2016). “attitude is the basis for all social behavior. In general, attitude is perceived as the hidden reason for people’s behavior towards an object, issue or person”(Kibrislioglu, 2015)

In summary, attitude towards an object showed with a cognitive response, which reflects perceptions and beliefs about an object; effective response, evaluation and feelings towards an object, and the answer showed by a tendency of someone to act in connection with the attitude object. Someone's attitude which response repeatedly to an object becomes a behavior as a character.

Based on the theory and conceptual above, the hypothesis proposed in this study there were six as follows: 1). H1: There is a positive and significant link between the learning environment and student self-concept, 2). H2: There is a positive and significant link between the learning environment and learning attitude, 3). H3: There is a positive and significant link between learning environments and S.M.A.R.T student character, 4). H4: There is a positive and significant link between self-concept and learning attitude, 5). H5: There is a positive and significant link between self-concept and S.M.A.R.T student character, 6). H6: There is a positive and significant link between learning attitude and S.M.A.R.T student character

Method

This study aims to obtain information about the relationship causality and the strength of the relationship directly and indirectly between the variables of the research that is learning environment, self-concept, learning attitude, and SMART character from data that can be trusted and proven

empirically. Information and facts about the influence of these variables can be an alternative guideline for the development of student character for students, teachers, schools, and parents.

The method used in this research is the survey method with a causal approach. The survey method aims to obtain an overview of the observed object, explaining the relationships of several variables whose position has been described regarding theoretical thinking while the research design used in this study is ex post facto. The population in this study are 432 students as respondents. The sampling technique used in this research is a random sample technique or a simple random sampling technique of 115 students. Data collection was done to 125 students with a complete questionnaire instrument as many as 115 students which then analyzed as respondent data.

The development of the instrument of student character variables that reflect the learning activities in the Integrated Islamic School. In carrying out SMART values is measured by Likert scale questionnaire with the dimensions of Sholeh, Muslih, Cerdas, Mandiri, and Skilled, the learning environment variables with the dimensions of physical environment, non-physical environment, variable self-concept with the dimensions of the physical state, psychological, social, variable attitude learning with the dimensions of cognition, affection, and behavioral in learning. Techniques of collecting research data in the form of the statement of instrument items developed based on the conceptual definition, operational definition, and grid on research variables. Data analysis in this study used path analysis (path analysis), used to analyze the relationship pattern between variables to know the direct or indirect effect of a set of independent variables on endogenous variables. Data processed with SPSS 20.

Results and Discussions

The S.M.A.R.T Character variables on the muscle dimension with the commit indicator, with the item "I always correct the mistakes that I've ever done with better practice" have the highest score while the lowest score is "I lead others to carry out good activities". The Learning Environment variables in the Physical Environment dimension with Classrooms in-use indicator and the "I was not focusing on learning for condition of the room" statements have the highest score, while the Facilities and infrastructure in schools indicator on the statement "There are many learning facilities need to be provided in classroom "has the lowest score of student ratings. Variable Self Concept on Psychological dimension with indicator Confidence statement "I can be successful" has the highest score in the assessment of the students, while the Physical state dimension on the indicator Appearance yourself with the item statement "I do not care about my appearance" has the lowest scoring score from students. Attitude variable in Cognitive/thinking dimension with indicator Thought the importance of learning and knowledge and the statement "I have to seriously study to give an important knowledge" and "By learning I can become a successful person" have the highest score, while the dimension of Conative/predisposing action with indicator Predisposition act from learning with item "The results of my study can apply in daily life" has the lowest score. It indicates that learning needs to be done contextually and constructively.

Based on research data is tested and analyzed as follows:

Table 1: Test data distribution research: One-Sample Kolmogorov-Smirnov Test

		Learning Environment	Self Concept	Attitude	S.M.A.R.T Character
N		115	115	115	115
Normal Parameters[a,b]	Mean	55.26	65.66	62.80	53.28
	Std. Deviation	13.93	9.35	8.33	10.29
Most Extreme Differences	Absolute	.084	.119	.107	.071
	Positive	.039	.119	.107	.066
	Negative	-.084	-.079	-.067	-.071
Kolmogorov-Smirnov Z		.904	1.273	1.149	.760
Asymp. Sig. (2-tailed)		.388	.078	.142	.610

a. Test distribution is Normal.

b. Calculated from data.

With testing One-Sample Kolmogorov-Smirnov Test on Asymp. Sig. (2-tailed) obtained data distribution of character variable 0,610; learning environment 0,388; self-concept 0.78; and attitude 0,142; with normal test distribution. Furthermore, the substructure hypothesis test. Sub-structure 1 consists of learning environment variables ($X_{1)}$ as an exogenous variable and self-concept as endogenous variables ($X_{2)}$. Next, influence path form becomes structural equation with the formulation: $X_2 = \rho_{21} + \varepsilon_{1,}$ calculation of path coefficient using SPSS 19.0 and can be seen in this following table:

Table 2: Test the influence of the learning environment toward self-concept coefficients

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	.771	7.719		.100	.921
	Self Concept	.830	.116	.557	7.130	.000

a. Dependent Variable: Learning Environment

Based on the calculations above, the large path coefficient ρ_{21}= 0.83. Thus, structural equation form is $X_2 = 0.83\ X_1 + \varepsilon_{1.}$ The value of $R^2_{2.1}$ or R square can be seen in the model summary table with 0.310, then the magnitude of other variables influence outside the model *(error)* towards endogenous variables X_2 is $\varepsilon_1 = 1 - R^2_{2.1} = 1$ to 0.310 = 0.69. Form visualization and coefficient value on the path shown in the following figure:

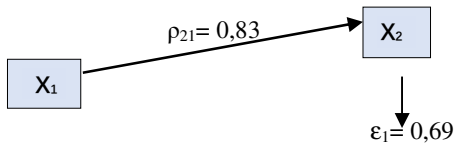

Fig. 2: Model Path Coefficient Sub Structure 1

The model path coefficient substructure 1 test will give a decision-making hypothesis test 1. Sub-structure 2 consists of learning environment variables ($X_{1)}$, self-concept ($X_{2)}$, and learning attitude ($X_{3)}$. Model path coefficient analysis substructure 2 declared in equation $X_3 = \rho_{31}X_1 + \rho_{32}X_2 + \varepsilon 2$. The test results of substructure 2 by using SPSS 19.0 is available at the following table:

Table 4: Test the influence of learning environment, self-concept toward attitude. Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	25.037	3.915		6.395	.000
	Learning Environtment	.224	.048	.374	4.686	.000
	Self Concept	.387	.071	.434	5.443	.000

a. Dependent Variable: Attitude

Based on the calculations above, large of path coefficient ρ_{31}= 0.224 and ρ_{32}= 0.387. Thus, structural equation form is $X_3 = 0{,}224X_1 + 0{,}387X_2 + \varepsilon_2$. Value of $R^2_{3:12}$ or R square can be seen in model summary table with 0,509, then the magnitude of other variables influence outside the model *(error)* towards endogenous variables X_3 is $\varepsilon_2 = 1 - R^2_{3:12} = 1$ to 0.509 = 0.491. Form visualization and coefficient value on the path shown in the following figure:

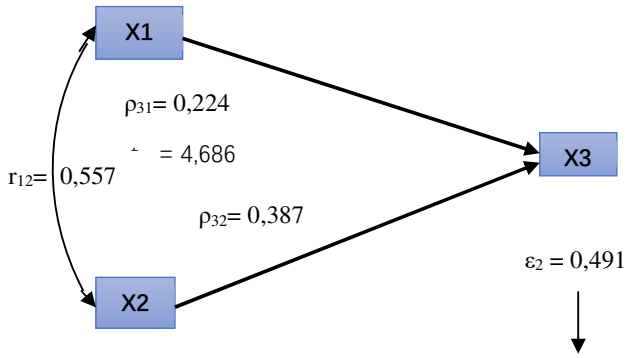

Fig. 3: Model Path Coefficient Sub Structure 2

Model path coefficient substructure 2 test will give a decision making hypothesis test 2 and 3. The substructure three consists of learning environment variables (X_1), self-concept (X_2), learning attitude (X_3) and S.M.A.R.T character (X_4). Model path coefficient analysis substructure 3 declared in equation $X_4 = \rho_{41}X_1 + \rho_{42}X_2 + \rho_{43}X_3 + \varepsilon 3$. The test results of substructure three by using SPSS 20.0 is available at the following table:

Table 5: Test the influence of learning environment, self-concept, attitude toward S.M.A.R.T character coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.746	4.732		-1.426	.157
	Learning Environtment	.232	.054	.314	4.299	.000
	Self Concept	.362	.083	.329	4.382	.000
	Attitude	.373	.098	.302	3.814	.000

a. Dependent Variable: S.M.A.R.T Character

Based on the calculations above, large of path coefficient ρ_{41}= 0.232; ρ_{42}= 0.362; and ρ_{43}= 0.373. Thus, structural equation form is $X_4 = 0{,}232X_1 + 0{,}362X_2\ 0{,}373X+_3 + \varepsilon_3$. Value of $R^2_{4,123}$ or R square can be seen in model summary table with 0.658, then the magnitude of other variables influence outside the model *(error)* towards endogenous variables X_3 is $\varepsilon_3 = 1\text{-}R^2_{3:12} = 1$ to 0.658 = 0.342. Form visualization and coefficient value on the path shown in the following figure:

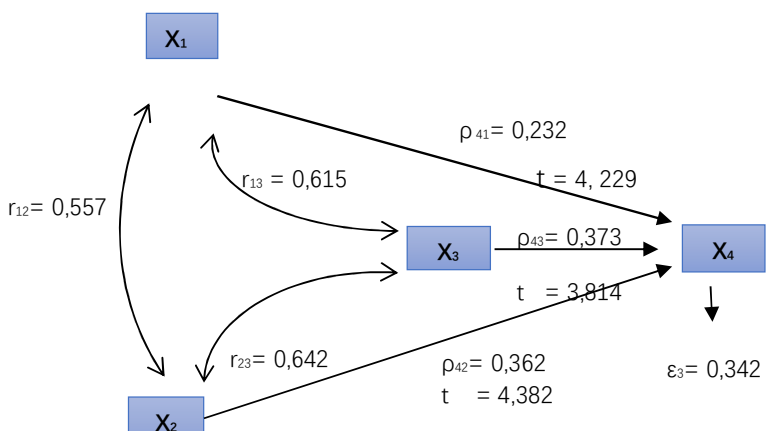

Fig. 4: Model Path Coefficient Sub Structure 2

Model path coefficient substructure 2 test will give a decision making hypothesis test 1, 2 and 3. The complete path is shown in the following figure:

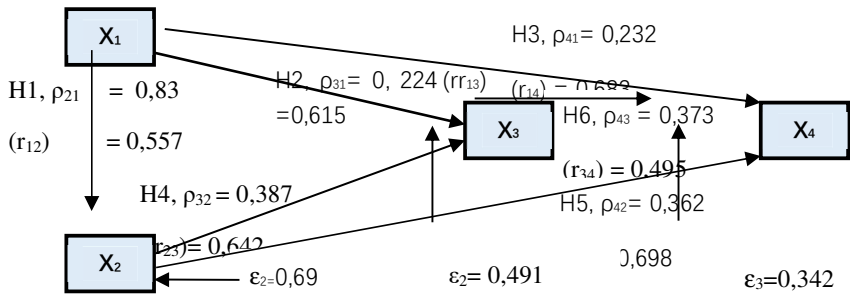

Fig. 5:Path Analysis Results of Influence of Learning Environment, Self-Concept and Learning Attitude towards S.M.A.R.T Character.

Description:

X_1 = Learning environment

X_2 = Self-concept

X_3 = Learning attitude

X_4 = S.M.A.R.T character

The coefficient value in the picture above we can conclude that all paths are significant. Path analysis calculated direct and indirect influence. Direct influence is an influence from one exogenous variable towards an endogenous variable without any other exogenous variables. Indirect influence is an influence where exogenous variable affects endogenous variable through other variables which are called mediating/ intervening variable. Direct and indirect influence is visually displayed through the path diagram. Meanwhile, total influence is a combination of direct and indirect influence. The direct influence, indirect influence, and total are presented in the following table:

Table 6: Summary of Path Coefficient, Direct Influence, Indirect Influence, and Total Influence

Effect Variable /Hypothesis	Causal Effect				Indirect	Total
	Direct	Variable traversed				
		X_2	X_3	X_2 and X_3		
1. X_1 to X_2	0,83	-	-	-	-	0,830
2. X_2 to X_3	0,387	-	-	-	-	0,387
3. X_1 to X_3	0,224	-	-	-	-	0,224
		(0,83) (0,387)	-	-	0,0473	0,304
4. X_3 to X_4	0,373	-	-	-	-	0,373
5. X_2 to X_4	0,362	-	-	-	-	0,362
		-	(0,387) (0,379)	-	0,0812	0,307

Effect Variable /Hypothesis	Causal Effect				Indirect	Total
	Direct	Variable traversed				
		X_2	X_3	X_2 and X_3		
6. X_1 to X_4	0,232	-	-	-	-	0,232
		(0,83) (0,362)	-	-	1.192	0,258
		-	(0,224) (0,379)	-	0,0948	0,304
		-	-	(0,830) (0,387) (0,373)	0,0175	0,227

Discussion and Conclusion

Direct Influence

The learning environment (X1) has a direct positive influence on a high low self-concept (X2). So, the upper low of self-concept can be explained by the learning environment with 0,830. The research result shows that the learning environment gives a direct positive influence on student self-concept, which means learning environment can explain high low entrepreneurship intention. The magnitude learning environment influence of path coefficient towards entrepreneurship intention (ρ41) of 0.209. The research result is consistent with findings that an excellent learning environment with lots of learning interactions in teacher discussion with the whole class significantly made "self-concept academic" which better on students.

The learning environment (X1) has a direct positive influence on a high low student learning attitude (X3). Furthermore, a high low of student learning attitude can be explained by the learning environment with 0,224. This is consistent with research that learning environment based on the classroom gives an effective contribution of about 27% towards student attitude (r2 = 0.267).

The learning environment (X1) has a direct positive influence on high low S.M.A.R.T. character students (X4). Furthermore, the high low of S.M.A.R.T. student character can be explained by the learning environment with 0,232. Bandura's formulate a concept of important cognitive, social theory and intervention in behavior, looked at human behavior is not simply a reflex automatically on the stimulus, but also as a result of the reactions that occur due to an interaction between the environment and human schemes cognitive. The basic learning principle of Bandura included moral and social learning. According to Bandura, a person's behavior can be explained by the relationship of three factors that determine each other *(triadic reciprocity).* The basic principle of this theory is reciprocal influences *(reciprocal determinism)* on three factors that exist, and there are individual, environment, and behavior. School environment as formers of S.M.A.R.T character student closely as an education process and learning. A better condition of school environment, so S.M.A.R.T student character will also improve.

Self-concept (X2) has a direct positive influence on a high low attitude (X3). Furthermore, a high low of learning attitude can be explained by self-concept with 0,387. This indicates that giving counseling guidance services especially good and useful personal guidance on a student could be able to provide the understanding and student insight about self-concept, counseling guidance teacher be able to run program or service with provision of activity programs which can make an attitude and good student behavior (Santoso, 2016). The concept of self (X2) has a direct positive influence on high low S.M.A.R.T student character (X4). Furthermore, the high low of S.M.A.R.T student character can be explained by self-concept with 0,362. That findings strongly that self-concept and social skill together contribute effectively with 29,6% towards power struggle. That thing explained how important self-concept in character building.

Learning attitude (X3) has a direct positive influence on high low S.M.A.R.T student character (X4). Furthermore, the high low of S.M.A.R.T student character can be explained by learning attitude with 0,373. The research findings strongly that attitude in student character development (social care) is significant.

Indirect Influence

The learning environment (X1) has an indirect influence on S.M.A.R.T student character (X4) through self-concept (X2) and attitude (X3), namely: X1 → X2 → X4; X1 → X3 → X4; X1 → X2 → X3 → X4 with total influences 0,227. This indicates that to make student character through self-concept and attitude making gives the most significant contribution of about 22%. Self-concept has an indirect influence on S.M.A.R.T student character (X4) through learning attitude (X3) namely X2 → X3 → X4 with total effect about 0,307. This indicates that to establish student character through self-concept and attitude making gives the most significant contribution of about 3%. The learning environment (X1) has an indirect influence on learning attitude (X3) through self-concept (X2) namely X1 → X2 → X3 with a total effect of about 0,304. This indicates that to establish student character through self-concept and attitude making gives the most significant contribution of about 3%.

Based on that have been described above, it is clear that the social environment, the learning environment, parent patterns, and self-concept has positive influences towards S.M.A.R.T student character according to results on this research and also supported the theory as well as reinforce the relevance of research results. Base on result research the conclusion is there is positive and significant influence between social environment, learning environment, parent patterns, and self-concept towards S.M.A.R.T student character. Some of the research recommendations are: *First,* for school is input to optimizing the achievement and developing character education curriculum, *Second,* for students, that character is essential to be developed. Friendships with peers and group are essential to motivate each other and provide good role models so could give a good character in friendship. *Third,* for the teacher, that character cultivation in learning is essential. Teachers' familiarity aspect, employees in education and interaction in learning became an essential aspect of character cultivation. Learning conditions which flexible will give space to think and character cultivation on the student. *Fourth,* parents, give clear rules and educating is an important part to make S.M.A.R.T student character. Parents are expected to make the character in the family environment through good patterns. Norms and values as the restriction to make a good character that implanted on family education with parents at home as the basic to developed S.M.A.R.T student character.

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Inter-Organizational Network in the Sector of Environmental Goods and Services: Case Studies

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Abstract

Problems regarding the balance of relations between human activities and the natural environment are particularly evident in the Environmental Goods and Services Sector (EGSS). In this sector, it is possible to identify inter-organizational networks based on waste collection processes, recycling, purification, reclamation and the provision of municipal services. These networks may perform operational and supervisory functions. This paper presents a case study of a networks dedicated to the collection, recycling, processing and waste management of tyres and beverage packaging. The study has the character of theoretical assumptions and operationalization of concepts for further empirical research, which going to be a continuation of the ongoing project of analysing relationships in a selected sector.

Keywords: Business Ecosystem, Inter-Organizational Network, Waste Management, Deposit System

Introduction

Problems related to environmental protection have ceased to be the exclusive domain of ecological sciences many years ago, as evidenced by the interdisciplinary concept of sustainable development formulated in the 1980s (Brundlandt, 1987). This idea allowed to undertake extensive research, as well as to search for specific solutions to problems presented at the conference in Rio de Janeiro in 1992 and at subsequent "Earth Summits" (Murphy and Drexhage, 2010). New challenges have emerged over the years and some unfavourable phenomena have deepened (Merino-Saum et al., 2020; Nordhoff et al., 2017). Among them, special attention deserves, among others, differences in the distribution of goods between social groups and countries, a decline in biodiversity, decreasing agricultural resources, shrinking freshwater resources, an increase in ocean water levels, and progressive pollution of seas and oceans (Graczyk, 2019). It should be noted that in the 1980s, problems mainly concerned the natural environment and then also became economic and social problems (Merino-Saum et al., 2020).

The concept of sustainable development in social sciences, especially in economic sciences and management sciences, resulted in the delineation of theoretical assumptions and definitions for the so-called green economy (Ryszawska, 2013) and green jobs (Kryk, 2014). In addition, there was a greening of many fields of science, i.e. the transfer of academic discussion to the field of implemented solutions in technological (Graczyk, 2013) and economic practice (Sulich, 2019), as well as the development of strategies and support for public administration (Sobol, 2015). Moreover, based on the principles of sustainable development, new definitions and classifications of economic activities have

been created (Sulich and Zema, 2018). Therefore, greening is the concentration of activities directly or indirectly solving environmental problems and ecological challenges, e.g. managing limited resources or implementing dedicated patents (Graczyk, 2019). Despite such numerous and even spectacular activities, it has been relatively recently understood how important their success is based on management and organization. They allow the transfer of ideas related to sustainability from the theoretical dimension and global scale to practice and a closer scale (Sobol, 2015). In this context, it is required to develop a description of the relationships occurring in the economic community with the ecological terms previously described (Stańczyk, 2018). The sciences of management and organization, by undertaking the issues of sustainable development, aim to examine the relationships between organizations (Niemczyk and Stańczyk-Hugiet, 2014).

The aim of the work is to present the case of an inter-organizational network functioning in the sector of Environmental Goods and Services (EGSS) in the context of business ecosystem theory (Stańczyk, 2018). Extensive research into the population of organizations in their exploratory relationships can help in the future reveal the reasons for their complexity in ecosystem features such as emergence, self-regulation, coevolution, and coadaptation (Stańczyk, 2018). That is why this article has a character of theoretical assumptions and operationalization of concepts for empirical research, which will be a continuation of the conducted project. The method adopted at work is abductive explanatory reasoning (Wirth, 2005).

Management and Sustainable Development

Evidence of the greening of management sciences is the business ecosystem theory, which is a metaphor directly derived from the theory of ecology (Stańczyk, 2018, p. 64). Therefore, the business ecosystem is defined by the dynamic organization system (biocenosis) connected with each other by the economic environment (biotope) it occupies (Stańczyk, 2018, p. 64). In the natural environment, relationships between organisms are nutritious (trophic), and there are no neutral relationships between them (they mean no relationship). Trophic relationships define different food networks within the ecosystem. The same applies to the business ecosystem. However, in the modern economy, organizations choose to cooperate, that is, "act with others when at least two entities have complementary goals" (Jasiński, 2012, p. 101). According to many authors, positive impact and cooperation is the basis primarily for inter-organizational networks (Niemczyk and Jasiński, 2012, p. 12). In addition, the success of implementing such ambitious and long-term projects related to the concept of sustainable development depends, as it seems, on positive relationships between entities, cooperation and synergy (Häkansson and Johanson, 1993; Sobol, 2015). Cooperation, therefore, is the basis for forming an inter-organizational network in which many different and undefined relationships can also occur (Stańczyk-Hugiet, 2012; Zema and Sulich, 2019).

"While one can see [...] the significant contribution of management sciences researchers to understanding the essence and nature of business networks, there is still a shortage of theoretical and empirical studies that would allow them to understand their network structure and the relationships that co-create them" (Stańczyk, 2018). The issue of relations between networks in such a diverse sector as the sector of Environmental Goods and Services is a new topic, not yet addressed in the management sciences literature. Moreover, entities focused around the exchange of one good or ecological service may have different relationships (positive or negative) with entities of a separate network, e.g. public administration, which also belongs to the sector of ecological goods and services (Gontarz and Sulich, 2019).

The transformation of the economy towards a sustainable, green economy (Ryszawska, 2013) requires activities in the field of green management (Lorek and Sonnenschein, 1999; Sulich, 2019) environmental management and environmental management (Sulich, 2019). These activities lead not only to a reduction in anthropopression, but also to the creation of green jobs (Sulich and Zema, 2018), which is also a manifestation of green management. This requires management to make a comprehensive diagnosis of variables, phenomena and processes occurring in the multidimensional economy - society - environment system (Kasztelan, 2016; Sobol, 2015, p. 226; Sulich et al., 2018). These activities may be accompanied by such behaviours towards other business entities that include antagonistic, neutral and non-antagonistic activities (Stańczyk, 2018). However, it is not unequivocal

that antagonistic actions towards certain groups of business entities do not entail positive or at least non-antagonistic actions towards other members of the business ecosystem within the sector.

The Environmental Goods and Services Sector

The concept of the Environmental Goods and Services Sector (EGSS) sector is used by the European Commission and Eurostat in their documents (Lorek and Lorek, 2002). They define this sector as covering various producers of goods and services whose purpose is to protect the environment and manage its resources (Eurostat, 2018). Moreover, in addition to the definition of the sector itself, Eurostat provides a definition of services and environmental goods, which are products manufactured or services provided for the purpose (Eurostat, 2018):

- reduce or prevent pollution, degradation or depletion of natural resources;
- restoring the original state of air, water, biodiversity and landscapes, reducing waste and noise;
- reducing, eliminating, repairing and managing pollution, degradation and depletion of natural resources;
- conducting other activities such as measurement and monitoring, control, research and development, education, training, information and communication related to environmental protection or resource management.

The presented definition of Ecological Goods and Services is broad and recognizes as ecological those goods and services from the pool of all goods and services available on the market whose "methods of production, distribution, consumption have or can have a significant, positive or indifferent effect on the functioning of ecosystems and population health human, as well as on the aesthetic values of the landscape and the unique elements of nature" (Lorek, 2002). It is impossible to completely eliminate the production of pollution and production waste and consumption that cause anthropopressure (Bogusz and Sulich, 2019), which means that there are no products or services that are completely neutral or have a positive impact on the natural environment (Ryszawska, 2013; Sulich, 2018). Sometimes it depends on the scale of their use whether they will be anti-ecological (Khall Khalid, 2019). What to consider in the case of consumables, among others: for the automotive industry, which will be created regardless of whether the cars will be electric or fuelled with minerals. Therefore, due to production, use or final utilization techniques, products and services can be distinguished (Lorek and Lorek, 2002, p. 119):

- ecological - related to new techniques that reduce environmental pressure,
- ecologically neutral - associated with techniques that, at the current scale of application, cause anthropopressure that is within the capacity of the environment to assimilate them (Dokurno, 2006).
- anti-ecological - mainly associated with old techniques characteristic of the brown economy (Sulich and Zema, 2018), causing large environmental pressures, which can be improved by greening the economy (Grudziński, 2018) or modified by creating eco-innovations (Rutkowska, 2016).

The EGSS in Poland is developing mainly in the field of public services and municipal services. Moreover, "the municipal economy is the sphere of socio-economic life in which radical transformation has been taking place in Poland in recent years" (Sobol, 2015, p. 8). The successful transformation in the direction of the green economy is determined by the combined efforts of politicians (local government officials), residents (consumers) and the broadly understood sector of environmental protection entities and institutions. This is because in Poland the main direction of the transformation process are activities for environmental protection, which is served by the majority of ongoing investments and organizational changes (Sobol, 2015). The green economy and its concept (Ryszawska, 2013; Sulich, 2018) lead to the creation of a green labour market, which is a consequence of the market of Environmental Goods and Services. This market operates within management processes, covering the real and regulatory sphere. However, the basic entities of this market are (Lorek and Lorek, 2002, p. 120):

- natural environment - a source of raw materials and energy,
- consumers (households),

- business entities,
- producers (industrial enterprises, farms, craft workshops),
- service enterprises, trade enterprises,
- financial institutions,
- state government.

The state and its administration are part of the regulatory sphere in the course of material and material processes. The state through legal systems has a significant impact on economic processes. The issue of normative acts (environmental management), the role of market moderator and the representation of the natural environment articulating the environment preferences on the market (environmental management) are important tasks of the state (Ponomarenko et al., 2018). However, the current state policy and related legal regulations transpose the Community provisions of the European Union (Sobol, 2015, p. 226). A condition for including natural resources in economic market mechanisms is to cease their perception as free goods and to establish an entity with ownership competences. "Such an entity should be a regional or state authority or an international institution" (Lorek and Lorek, 2002, p. 121).

Public Green Services

Public administration in Poland is responsible for the implementation of the majority of services provided to society and the environment. Therefore, the state is not only a participant (investor, contractor), but also a coordinator of the market of Environmental Goods and Services, in accordance with the assumptions of sustainable development (which is a constitutional principle) ensures safety for the environment, economy and citizens. An important component of implementing sustainable development activities is spatial planning and municipal management (Sobol, 2015, p. 225). In this way, some public administration at the local (commune) level has a service character to residents (Pawliszczy, 2016). The quality of service to residents is improving due to the pressure of the private sector, which is why changes in the public sector are visible mainly in the area of municipal economy (Pawliszczy, 2016; Sobol, 2015). In addition, many of the statutory tasks of the commune concern services related to the market of ecological goods and services (Sobol, 2015, p. 230), and these are:

- collective water supply;
- collective sewage disposal and treatment;
- waste management;
- air protection;
- transport, maintenance of municipal roads;
- protection and maintenance of green areas;
- ecological construction;
- soil protection, reclamation and revitalization of brownfield sites;
- flood protection;
- ecological education;
- alternative energy sources, improving energy efficiency;
- protecting nature and biodiversity;
- protection against noise,
- organic farming.

"The greening of the municipal economy is also an expression of the growing ecological awareness of the inhabitants" (Sobol, 2015, p. 226). Pursuant to the Act on municipal economy of December 20, 1996 (Journal of Laws 1997 No. 9 item 43), municipalities may create their own organizational units or engage external entities that belong to the sector of Environmental Goods and Services (EGSS).

Orientation to innovation and environmental protection is one of the manifestations of a modern approach to management. Eco-innovations play a special role on the market of ecological goods and services, i.e. "any innovation that reduces the negative impact on the natural environment throughout the product life cycle and reduces damage to this environment" (Rutkowska, 2016; Sobol, 2015). In this case, green jobs are gaining importance, which are also treated as eco-innovation, because "they are solutions to ecological and economic problems, which are becoming both social and management

problems" (Sulich, 2019). Green jobs transfer the theoretical assumptions of sustainable development to economic practice (Grudziński, 2018; Kozar, 2015). The European Commission defines green jobs as "all jobs dependent on the environment or created, converted or transformed (in terms of the greening of qualifications, working methods, job profile) in the process of moving towards a greener [green] economy" (Cox and Foley, 2013; Sulich, 2019). For many organizations, one of the expected results of eco-innovation is to increase ecological efficiency - directly by improving environmental performance and parameters, and indirectly by increasing competitiveness (Niemczyk and Trzaska, 2018; Sobol, 2015, p. 229). However, the ever-faster pace of technological changes and the shortening of the life cycle of products and technologies require increasing expenditure on research (Jasiński, 2012, p. 103), development and of course the introduction of new products, with increased requirements for environmental protection and consumer service (Gontarz and Sulich, 2019).

Inter-Organizational Networks

The growing popularity of networks among researchers in the field of management is mainly due to the dynamic development of network collaboration. This cooperation is primarily "innovation-oriented, i.e. cooperation in an innovation network" (Klimas, 2014, p. 7). Cooperation is a positive impact. Networks are based mainly on material exchange and mutual services, supplemented by the exchange of intangible resources "which are the driving force of a strategic process having the nature of a holistic process" (Klimas, 2014, p. 27). Sometimes these networks are separate structures in which the value provided to stakeholders is created (Klimas, 2014, p. 27). There is therefore a positive interaction within the network, but there is some separation between the networks. This separation means that various inter-organizational networks, focused on their own defined goals, have non-antagonistic, neutral impacts (without relationships) in a given sector. In this approach, inter-organizational networks are treated as a source of information, knowledge and a place to create and implement innovations, e.g. green jobs (Rutkowska, 2016). The set of all networks and interactions between networks forms the business ecosystem of the Environmental Goods and Services sector.

An inter-organizational network is a system of at least two independent and independent organizations (diadems), connected with each other by a set of bonds for cooperation. The inter-organizational network is "a system composed of long-term, non-incidental relationships of entities oriented on the relationship of convergent goals" (Klimas, 2014, p. 31). In the description of the inter-organizational network based on graph theory, the organizations forming the network are called nodes or nodes, while "oriented towards achieving common goals, long-term ties" (Klimas, 2014, p. 31) between them (inter-organizational ties, links) they are called edges. The use of graph theory allows to trace the processes occurring in the network, including determining the direction of interactions (Zema and Sulich, 2019). A process that may reveal the existence and elements of an inter-organizational network is the product life cycle management (Stańczyk-Hugiet, Lichtarski, et al., 2019). However, in the case of an inter-organizational network within the sector of Environmental Goods and Services with waste, e.g. used tyres.

The Tyres Utilization Centre

The considered example of an inter-organizational network in the sector of Environmental Goods and Services is the network created by the Tyres Utilization Centre - Recovery Organization (Polish: Centrum Utylizacji Opon Organizacja Odzysku S.A., abbreviated as the CUO) together with producers and processors, among others companies from Grupa Recykl S.A. and cementation, create a network dedicated to the recycling, processing and management of post-consumer waste, such as tyres. The main task of CUO is to solve the problem of used tyres, by organizing their collection from tire change points and car workshops, and subjecting them to recovery and recycling (Tyres Utilization Center - Recovery Organization, 2019). The collection of tyres from residents can be organized by the municipal government, who, as an entity of state administration, will entrust the CUO with their collection. In this case, the inter-organizational network cooperates with entities of various levels of public administration of a control and executive nature for reporting purposes, while the mutual provision of services occurs at the lowest local government level. Grupa Recykl S.A is a strategic partner of the

CUO, and as a result of the entire inter-organizational network, used tyres are processed, e.g. in the mechanical grinding process, products such as:

- rubber granulate - mainly used for the production of rubberized surfaces (surfaces of playgrounds, sports facilities, release thresholds);
- chips - used for co-firing with fine coal and alternative fuels in the cement industry;
- steel scrap - used as input in the steel industry.

Other companies also produce rubber flour, which is a cheaper substitute for rubber and is a valuable secondary raw material for the tire industry (Majka, 2011). The CUO is a company founded by the largest tire manufacturers on the Polish market: Bridgestone, Continental, Dębica, GoodYear, Michelin and Pirelli, which also act as the company's shareholders. The purpose of activities is to fulfil the assumptions of the Act of 11 May 2001 on the obligations of entrepreneurs in the scope of managing certain waste and on the product fee (Journal of Laws of 2018, item 1932). The Act imposes, among others for tire manufacturers and importers, the need to collect within the country and recover waste mass of tyres not less than 75% of the tonnage of tyres they placed on the market in the previous calendar year. CUO comprehensively deals with the entire logistics process, starting from free collection of used tyres from all entities indicated by the CUO customers as authorized, through sorting by type to transport to points that recover them (e.g. energy) or material recycling. At the same time, the company makes it easier for entrepreneurs from the automotive industry to meet their obligations under environmental protection regulations. Among other things, thanks to the activities of the CUO, within a few years the problem of the creation of illegal landfills for used tyres and their illegal landfills was virtually eliminated. the Tire Utilization Centre - Recovery Organization (the CUO) is also a member of ETRMA, the European Association of Tire Manufacturers and Rubber Products (Tyres Utilization Center - Recovery Organization, 2019).

In the case of the network presented, there are no cases of competition because waste from the tire industry is not a rare recyclable material. Cooperation between entities reflects the recycling process. Waste treatment in the network under consideration is primarily a fulfilment of the formal requirement imposed by the state administration (centralized hierarchical network), (Stańczyk-Hugiet, 2019). However, belonging to the network are elements of prestige and building a responsible brand (tire manufacturers). Post-consumer waste from the automotive industry is the most difficult to recycle and will be generated irrespective of the power source of automotive vehicles, which is why effective network functioning is so important (Gontarz and Sulich, 2019).

Waste Deposit System in EU Countries

The deposit system and the related waste collection system on various scales operates in most European Union (EU) countries. But it takes the most developed and technologically advanced forms in the countries where it operates the longest. Within the EU, three ways to manage waste from liquid packaging can be identified (Crawford, 2011).

- refilling (usually with a deposit) - bottles and cans that have been used by the customer are transported back to the manufacturer, where they are rinsed, refilled and transported back to the consumer for use. Reusable glass bottles can be filled more than 50 times, reusable PET bottles up to 15 times. The result is zero waste, minimal environmental impact and significant savings for municipalities.
- one-way deposit - bottles and cans are used by the consumer only once, the producer can recover the packaging only when it comes to him directly from a recycling company that produces completely new bottles. The producer then fills the bottle and sends it back to the store. Such solutions provide zero amount of garbage but have a greater negative impact on the environment than it was in the first case.
- one-way no deposit - the customer uses bottles and cans, and the producer - at best, pays the fee to the waste management organization, but after processing it will have nothing to do with their product. The public authorities will bear the main costs of creating the waste, and a

significant part of the waste will have to be landfilled or incinerated. The result is a large amount of garbage, a high environmental impact, but the cheapest option for producers.

At the level of the entire community, the waste deposit system is regulated by EU Directives. These are: Directive 94/62 / EC and Directive (EU) 2018/852 which updates it. Both documents contain measures to prevent the generation of post-packaging waste and to promote recycling and other forms of post-packaging waste recovery instead of final disposal, thus contributing to the transition to a circular economy (European Commission, 1995). The goals defined are:

- improving the quality of the environment;
- protection of human health;
- resource protection;
- ensuring the functioning of the internal market and restrictions of competition in the EU.

Table 1: Share of recycled waste in the total amount of waste, presented in Directive 94/62 / EC and in Directive (EU) 2018/852 which updates it.

Year 2025	Year 2030
50% plastic	55% plastic
25% wood	30% wood
70% glass	75% glass
70% ferrous metals	80% ferrous metals
50% aluminium	60% aluminium
75% paper and cardboard	85% paper and cardboard

Source: author own elaboration based on (European Commission, 2018, para. 5).

Another provision in the directive is that EU countries must ensure that packaging placed on the market in their territory meets the following requirements (European Commission, 1995):

- limiting the weight and volume of the packaging to a minimum to achieve the required level of safety, hygiene and acceptability for consumers;
- reducing the content of hazardous substances and materials in the packaging material and its ingredients;
- increasing the number of reusable or recoverable packaging.

The purpose of the above changes is to implement a circular economy (Sulich, 2018), the circular economy minimizes resource consumption, waste production, and energy consumption (Stewart, 2009). This can be achieved through prolonged and reuse of packaging and recycling. This contrasts with the linear economy, which uses resources without reprocessing and using them (Geissdoerfer et al., 2017). Among European countries should be distinguished countries in which the deposit system for waste was introduced at the earliest.

Table 2: List of European countries that have introduced the deposit system for drinks after drinks at the earliest

Sweden	• 1984 - a one-way deposit for cans • 1994 - a deposit for PET • bottles average packaging return at 80 –90%
Norway	• 1999 - a deposit was introduced in a nationwide one-way deposit for bottles of non-alcoholic beverages and beer • average level of packaging return at the level of 75 -90%
Finland	• 1996 - one-way deposit for cans 2008 - a deposit for PET bottles

Germany	• 2003 - a national deposit system for PET bottles, glass bottles and cans
Denmark	• 2002 - a national deposit system for PET cans and bottles for water, soft drinks
Netherlands	• 2006 - a deposit for large PET bottles
Estonia	• 2005
Croatia	• 2005

Source: author own elaboration based on (ZeroWasteEurope, 2010).

Recently, many countries, including European countries, are moving towards the automation of waste management methods, using, among others, Radio-frequency identification (RFID) (Abdoli, 2009). The implementations to date indicate that the technology can ensure effective waste management and can also contribute to its effective recycling (Sulich and Zema, 2018; Tomari et al., 2017). In addition, at the end of the previous century, reward was found to be the most effective way to maintain a high level of participation in the recycling process (Grau, 1997).

The development of issues related to extended producer responsibility (EPR) creates an opportunity to support green innovation and new business models by changing the institutional environment of the current waste segregation regime in cities (Lynch, 2007). The new policy changes the existing approach, and its main goal is, inter alia, to encourage entrepreneurs to create product innovations with less environmental impact (Lynch, 2007). EPR extends the producer's responsibility, both physically and financially, for its product to the post-consumer stage, and transfers waste management costs from local government to consumers and producers (Tong et al., 2018). The framework of the new policy also changes the functions of products and services rendered, to more efficient functions of product and service systems, interest in the reprocessing of used resources (Grudziński, 2018; Pires et al., 2015).

One of the possible methods of implementing the provisions of Directive 94/62/EC and Directive (EU) 2018/852 updating it is the implementation of the concept of Reverse vending machine (RVM), under which the consumer will receive an award for taking the used packaging for recycling (European Commission, 2018). RVM is undoubtedly an innovative concept that was introduced to collect materials for recycling to effectively improve recycling activities and thus improve waste management ((Wahab et al., 2014). RVM machine encourages the community to properly dispose of waste, recycling materials such as plastic, glass, paper and aluminium.

Fig. 1: Two types of reverse vending machines, from the left: a vending machine for bottles and a vending machine for larger plastic packaging. Source: Authors and (Gaur et al., 2018).

The construction of RVM required several studies and works in order to best adapt to the needs of the local community (Exito et al., 2015). Basically, in the RVM construction you can distinguish the components that are crucial for the device due to its purpose. The machines mount various types of microcontroller (Karin et al., 2017) and detection mechanism (Wahab et al., 2014)). The selection of equipment depends on the purpose of the machine and the type of waste it collects (Lorek and Lorek, 2002). The RVM operating process consists of three main stages (input stage, process stage, result), and the operation during the process has the following course (Gaur et al., 2018):

1. The consumer can insert the correct shaped waste into the Reverse Vending Machine.
2. After insertion, the packaging is checked by a series of sensors. The size of the packaging, the type of plastic and the origin of the packaging are checked (based on the bar code).
3. Then, once the packaging is accepted, the consumer gets a discount in the form of a cash or shopping voucher.

Then sorted precipitation is stored for a short time and recycled. Recycling brings tangible benefits to consumers, producers and local authorities (Tonglet et al., 2004). It was also found that the remuneration system (Tomari et al., 2017) next to public education on recycling (Sidique et al., 2010)are the most effective methods to increase the recycling rate.

RVMs are usually located near food supermarkets and are equipped with automatic devices that accept empty glass, plastic or aluminium packaging in exchange for a cash amount in the form of a coupon or receipt (Tomari et al., 2017). An increase in the number of these vending machines can be observed, especially in countries where it is required by regulations regarding the recycling of this type of waste, regulations regarding the system of bottle deposits (Groth, 2008).

RVM implantation at the point of sale is also associated with the implementation of a new business model. Research to date in this field, using organizational level theory and case studies, identifies various business models for the Environmental Goods and Services sector (Schaltegger et al., 2016). According to Teece (Teece, 2010), the business model describes the design or architecture of the mechanisms used to create, deliver and capture value. The essence of the business model is that it crystallizes the customer's needs and ability to pay, determines how the company provides value to customers, encourages customers to pay for value and transforms these payments into profit through proper design and the operation of various elements of the value chain. In the case of the model where the key factor is a sustainable development strategy by sharing the company's sustainable value by customers, employees and all other stakeholders within the organization (Porter and Kramer, 2011).

The Lidl Stiftung & Co. Supermarket Chain

One of these models based on an inter-organizational network is the PET bottles recycling model in the Lidl chain store belonging to the Schwarz group in Germany. In 2003, the deposit was introduced in Germany by the legislator. One of the goals was to avoid or reduce littering. After that time, PET bottles were almost entirely made of newly produced, more environmentally friendly PET material. The German company Mitteldeutsche Erfrischungsgetränke GmbH & Co. KG (MEG) produces soft drinks in bottles. The production area of (MEG), which currently belongs to the Schwarz Group, contributed to this process very efficiently by producing disposable PET bottles from recycled materials.

After several years of research and development at the recycling, German company Rossbacher Kunststoffverarbeitung, which also belongs to the MEG group, in 2007 for the first time in bottles sold in Lidl, using small quantities of processed PET material for the production of bottles. In 2009, close cooperation in research and development was established with the recycling company Vogtland PET. In this way, MEG, Vogtland PET and the Schwarz Grupe began cooperation in research and development on the processing of PET bottles. Due to the full integration of the recycling plant with the Schwarze corporate group, in 2011 the share of recycled PET in the sales of the Lidl network is constantly increased. This is essentially through the constant refinement of technical requirements has

become possible, in particular through substantial investments in machinery and plants in recycling, as well as in the technology of processing and filling plastics.

The producer of mineral water Saskia joined the cooperation within the presented inter-organizational network. The share of recycled material in new Saskia private label bottles is 60 percent. In 2016, MEG launched a recycling plant in North Rhine-Westphalia. Thanks to investments in the recycling process, the goal of MEG is to use the new material in the long term so that the new bottles are entirely made of recycled material.

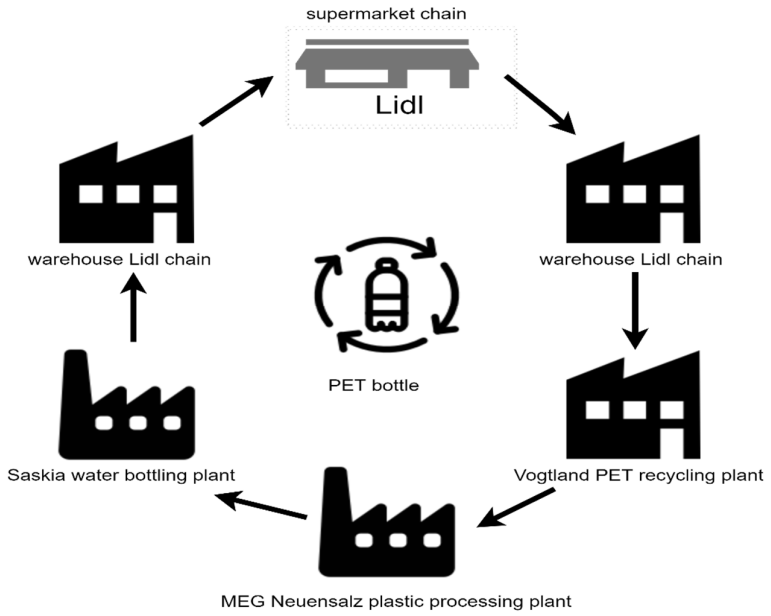

Fig. 2: PET bottles recycling cycle in the Lidl supermarket chain.

One-way deposit led to the fact that littering due to disposable PET disposable bottles almost disappeared. The LIDL explicitly demands and promotes the efforts of the Federal Ministry of the Environment to use the deposit system on disposable PET packaging for beverages that were previously not subject to deposit. This creates an increasingly stable basis for the PET recycling cycle. LIDL made very high investments at an early stage of over half a billion euros in beverage return machines, which is the best condition for high-quality recycling. In addition to the installation of recycling loops, the weight of bottles has been significantly reduced. In addition, we have reduced the transport distance of disposable bottles by investing in new bottling plants and central warehouses. These measures have made significant ecological progress.

Conclusions

Inter-organizational networks are a specific form of multi-stakeholder cooperation in which the relationships between entities are inter-organizational ties (Stańczyk-Hugiet, Piórkowska, et al., 2019). For educational goods and services, inter-organizational networks in the Environmental Goods and Services sector have 'value constellations' or 'value networks. The activities of individual networks are process-oriented, and their activities serve to improve the state of the environment. Interactions between networks are controlled by the state administration, which "in accordance with the assumptions of sustainable development, ensures synergy of economic, social and environmental aspects, and also ensures security for both men, the environment and the economy" (Sobol, 2015, p. 225).

There is a non-antagonistic (positive) relationship between the supreme government administration network and the analysed tire recycling network. As a result, green jobs may be created, i.e. jobs that

have a positive impact on the environment in terms of product (service) and process. What's more, within the network whose centre is made up of CUO, there is a group of enterprises involved in the continuous development of the organizational network they co-create. Their behaviour is based not only on intangible relationships (searching for new tire recycling techniques), but primarily on the exchange of material goods and accompanying services, and is determined by the desire to develop. A similar network of inter-organizational links was created by producers, distributors and recyclers of PET bottles for soft drinks in Germany. The result of their cooperation is to create a modern solution for collecting, recycling and reusing PET garbage. This action is in line with the environmental policy of the European Union and the needs for sustainable development in Germany. A positive aspect of the network is the reuse of a significant amount of recyclable materials in tire production and the reduction of the negative effects of the tire industry.

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The Structure of Health Services in Public Hospitals as The Factor Determining the Medical Malpractice Risk – Case Study from Poland

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Abstract

Market research shows that the number and value of claims in medical malpractice cases is increasing. From the point of view of risk management processes in healthcare entities, it is important to analyze both the frequency of claims and potential damages. Research covering US, Western Europe or China markets indicates that - apart from the differences in compensation systems - the frequency and value of claims depend on specialty, and their effectiveness is lower than e.g. in traffic accidents under liability insurance. The authors in this article undertake research for the Polish market. The study hypothesized that the percentage of claims effectiveness is lower than in third party liability insurance, close to the level in developed countries, and the risk of claims arising from medical malpractice depends on specialty. The article reviews research and data on other markets. Their results were compared with data identified for the Polish market - general, including statistics covering lawsuits in medical malpractice cases and with detailed data obtained from a large university clinical hospital from Poland, to illustrative and initiating further case study. The data includes claims and benefits paid to victims in 2017-2018 and applications submitted in 2010-2014. The structure of the size and number of claims and payments was assessed in terms of recognition of claims by the court and reimbursement by the insurer. Potential costs related to claims submitted in 2017-2018 were estimated. The methods of descriptive statistics and the triangulation method were used for the analysis. The obtained results were compared with data from other markets. FINDINGS: The results confirm that the number and value of claims depend on the ward specialty. Neurosurgery faced the highest risk and is also the specialty highly affected in other markets. However other risky specialty as gynecology and obstetrics wasn't examined due to the lack of such one in analyzed hospital. The effectiveness of medical malpractice claims on the Polish market is similar to other markets (20-30%) - which is confirmed by aggregated data on claims brought in courts and claims faced by analyzed hospital.

Keywords: Medical Malpractice Insurance, Hospitals Risk Management, Claims Management, Compensation

JEL Codes: G23, G32, I11, K32.

Introduction

Market research shows that the number and value of claims in medical malpractice cases is increasing. This implies discussions about optimizing compensation systems for damages - based on the traditional tort liability, fault or negligence, by the ADR mono- fault systems (Raposo 2016 Watson Kottenhagen 2017), with the participation of insurers or (Koch 2011). These discussions also include the problem of the impact of system design on the attitudes of entities at risk of liability (hospitals, doctors) and harm (patients). It is pointed out that often entities providing medical services adopt defensive attitudes (defensive medicine), may affect the scope of services, work comfort, focus on basic goals. Different solutions regarding the legal basis for pursuing claims and offsetting damages can, on the one hand, lead to excessive escalation of claims or, on the contrary, to a reduction in the scope of compensation and externalization of losses. It is argued that they are "frustrating" for patients, health professionals, health institutions and society (Raposo 2016).

Meanwhile, risk assessment, management and design of compensation systems, also by the regulator, requires risk analysis, identification and assessment taking into account the basic parameters such as probability and potential damage value (which is unquestionable - against the background of COSO, FERMA or ISO standards).

Research covering US, Western Europe or China markets indicates that - apart from the differences resulting from compensation systems - the frequency and value of claims depends on specialty, and their effectiveness is lower than e.g. in claims for personal injury from traffic accidents.

Polish health service does not conduct public detailed record of this medical errors, which in fact is a mistake and disability for the processes of risk analysis and optimization of solutions for both compensation and prevention, minimizing the likelihood of risk implementation and potential effects. Such records are kept and made available to varying degrees in the United States, and in Europe, e.g. in Denmark or Germany, and are intended to serve, as is indicated, analysis, elimination of causes and improvement of system solutions (Korytkowska, 2013). This is, moreover, consistent with the assumption of a conscious and active attitude relevant to success in the risk management process (among others Hillson, Murray-Webster, 2017).

The study hypothesized that the percentage of claims effectiveness is lower than in motor third party liability insurance, close to the ratio in developed countries, and the risk of medical malpractice claims depends on specialty.

Research and data on other markets will be reviewed in order. Next, the data that has been identified for the Polish market will be presented. First, statistics covering lawsuits in medical malpractice cases from 2001 to 2018 and from other sources. Then a case study will be presented - based on detailed data obtained from a large university clinical hospital from Poland.

Medical malpractice claims vs specialty in selected countries

Medical malpractice claims are analyzed in many publications and collected in reports. Their comparability, conclusions, and assessment of findings from various studies may be difficult due to:

- system differences cited (the liability rules and compensation systems in individual countries),
- differences in the scope of the concept of medical malpractice, which may include medical malpractice as well as other actions, resulting in bodily injury, upset health, but also violation of the patient's rights without harming the person (the right to documentation, information, respect for dignity),
- differences in the approach to the problem of medical malpractice, as it can be included through the structure of hospital wards or staff specialty (for example, in one study anesthesiologist errors are reported separately, and in some jointly, recognizing that they are connected with treatment provided in other departments, for example surgery, obstetrics)

– different bases used to determine the loss ratio of a given specialty - some studies compile them by the number of reported claims, others by claims paid, and others consider the value of claims – made or only paid.

It should also be pointed out that on the one hand the analysis is also hampered by the long period of incubation of damages (which, for example, in insurance implies the need to consider triggers - e.g. occurrence vs loss occurrence or claims made) and, on the other hand, the length of claims settlement processes and claims components, which also include long-term annuities, which makes it difficult to assess and compare the value of claims. These issues are not the subject of this study, only pointed out as requiring further work.

Table 1 contains a concise extract from selected analyzes related to medical malpractice depending on the specialty / scope of medical services.

Table 1: Summary results of the relationship between medical malpractice claims vs specialty

Research	Country and time range of the analysis	Specialty	Method of calculation of " claims"
Munich Re Group - for Insurance Monthly (2002)	Germany	Total surgery - 37% Obstetrics - 27% Other - 10% Internal Med. -8% Pediatrics - 7% Anesthesiology - 5% Orthopedics - 4% ENT - 2%	The number of reported damage dependi ng on the specialty of staff (not branches) to the total number of reported damage
		Gynecology - 41% General surgery - 18% Pediatrics - 13% Other - 13% Anesthesiology 8% Internet - 5% Orthopedics 2%	Value of claims paid by staff specialty to the total number of claims paid
Alsaddique AA (2004)	1999 - 2003, Ministry of Health Riyadh, Kingdom of Saudi Arabia,	Obstetrics - 27% Surgery - 17% Sp. Surgery - 17% Internal Med - 13% Pediatrics - 10% Orthopedic - 6% Anesth - 4% Others - 3.5% Dental - 3.5%	The number of lawsuits for a given specialty to the total number of lawsuits
Anupam et al. (2011)	USA, 1991 – 2005, data of 233,738 physician-years of coverage in one insurance company	Neurosurgery - 19.1% thoracic – cardiovascular surgery - 18.9% general surgery - 15.3% listed in order without data (figure 1): orthopedic surgery, plastic surgery, gastroenterology, obstetrics and gynecology, urology, pulmonary medicine, oncology, cardiology, gynecology, neurology, internal medicine, emergency, anesthesiology, diagnostic radiology, ophthalmology, nephrology, pathology, dermatology family medicine - 5.2% pediatrics - 3.1% psychiatrist - 2.6%.	Number of claims to specialty to the total number of claims

		No value figure 3 - median payouts from the highest: Pediatrics, pathology, obstetrics and gynecology, neurosurgery, pulmonary medicine, internal medicine, cardiology, urology, thoracic – cardiovascular surgery, general surgery, anesthesiology, gynecology, family general medicine, neurology, diagnostic radiology, orthopedic surgery, gastroenterology, psychiatry, emergency, plastic surgery, ophthalmology, other, dermatology	The ranking is different after the values paid in the specialty Mean payments ranged from $ 117,832 for dermatology to $ 520,923 for pediatrics.
Saber Tehrani el al. (2013)	The USA, 1986-2010, from the National Practitioner Data Bank	Diagnostic -36% Surgery - 24% Treatment - 19% Obstetrics - 16% Internal med. - 5%	Value of claims paid in a given category to the total value of claims paid
Buzzacchi, Scellat, Ugh etto (2016)	Italy, 2004-2010, public hospitals	(the analysis is for each of the surveyed years separately, I refer only to the total - the average structure for 7 years in total) Orthopedics - 32% Other - 31% Surgery - 15% Specialist surgery - 11% Obstetrics - 11%	Number of claims submitted to the total number of claims
Benetti (2016)	Italy, from January 1 st 2004 to December 31 st 2012, from 15 Italian regions (over a total of 20).	Surgery - 30% orthopedics - 16% emergency - 15% internal Med. - 14% other - 12% Obstetrics - 10% Anesthesiology - 3%	The number of reported errors depending on the specialty of the staff (not branches) to the total number of reported errors
Hwang el al. (2018)	Taywan January 2002 to December 2013	Other - 26% Obstetrics - 11% Orthopedics - 10% Rescue - 8% Neurosurgery - 8% Total surgery - 7% Plastic surgery - 6% Internet - 5% pulmonary medicine - 5% gastrointerinst - 5% urologist - 4% ophthalmology - 4% pediatrics - 4%	The number of claims submitted depending on the specialty of the staff (not branches) to the total number of claims submitted
		Orthopedics - 10% Urology - 9% Midwifery - 8% Rescue - 8% Neurosurgery - 7% Surgery - 7% Plastic surgery - 7% Gastrology - 7% Internet - 6% Pulmonary - 2% Other - 30%	Paid, up to the total number of claims paid

Source: own study

It is also worth mentioning after the last report cited in Table 1 (Hwang et al., 2018) that "in 133 cases only 14.1% of the verdicts were against clinicians, with a mean indemnity payment of $ 83,350. The most common single specialty involved was obstetrics (10.7%), while the surgery group accounted for approximately 40% of the cases. In total, 46.3% of the patients named in the claims had either died or been gravely injured. Compared to the $ 75,632 indemnity for deceased patients, the mean indemnity payment for plaintiffs with grave outcomes was approximately 4.5 times higher. The diagnosis groups at high risk of malpractice litigation were infectious diseases (7.3%), malignancies (7.2%), and limb fractures (4.9%). A relatively low success rate was found in claims concerning undiagnosed congenital anomalies (4.5%) and infectious diseases (5.8%) group. A surgery dispute was the most frequent argument in civil malpractice claims (38.8%), followed by diagnosis error (19.3%).

The study of Hickon el al. (2002) based on the cohort study in a large US medical group between January 1992 and March 1998, accounting for 2546 physician-years of care, in which he compares only two specialties important for claims and shows that the risk of claims is higher for surgeons than for neurosurgeons. Specifically, 137 (32%) of the 426 nonsurgeons had at least 1 risk management file compared with nearly two thirds (137 [63%] of 219) of all surgeons.

Also the report on error risk assessment for liability insurance purposes in the US market, prepared by the American Medical Association (AMA, Guardado 2018) titled "Medical Professional Liability Insurance Premiums: An Overview of the Market from 2008 to 2017," indicates that in an analyzed period rates have remaining largely unchanged, however, cites that some specialists face higher risk and will also require higher limits of liability coverage. Therefore specialties that fall into a higher risk category will also be charged with higher premium rates. Those specialties assessed in this report as more risky include:

- Obstetricians.
- Neurosurgeons.
- Emergency room physicians.
- Cardiovascular surgeons.
- General surgeons.
- Orthopedic surgeons.
- Plastic surgeons.

Another important issue concerns the effectiveness of claims. That is, what percentage of claims are recognized and results in the necessity of payments. Anupam et al.(2011) examining data from 1991-2005 of 233,738 physician-years of coverage in one insurance company in US indicated that 78% claims was unsuccessful. The small insurance company from Maryland (US) Capson reported the percentage of considered and recognized claims depending on the selected specialties (Table 2).

Table 2: Effectiveness of claims depending on the specialty

	number faced a claim annually	Claims resulted payment to a plaintiff	Mean payment in USD
Radiology	7,3 %	2,3 %	233.000
Neurosurgery	19,1 %	3 %	344.000
cardiovascular surgery	18,9 %	3,8 %	308.000
General surgery	15,3%	4,2 %	290.000
Internal medicine	7,8 %	2,4 %	311.000
OB/GYN Obstetricians and Gynecologists	11,2 %	3,7 %	375.000
General practitioners/family practice	5,2 %	1,3 %	255.000

Source: data presented by Capson Physicians Ins Co https://www.capson.com/medical-malpractice-insurance-by-specialty (received 06.05.2019)[1]

The cited results correspond to German data, which show that as much as 76.4% of patients' claims are unfounded (Becker, 2017).

Research on the Japanese market indicates very high claims effectiveness. As gives Wang el al. (2017) Of the cases we investigated, 68% ended with monetary compensation. This percentage is close to the corresponding values previously reported in China (67%), Japan (60%) and the USA (56%) but substantially higher than the value reported for Canada (33%). 5,6,32,38 The between-country differences in this proportion probably reflect between-country differences in legal and medical systems and socioeconomic backgrounds[2]. In addition, it is pointed out that these high-performing data include claims in which medical malpractice was recognized, as well as bodily injury and health impairment.

Also the already mentioned study of Anupam el al. (2011) indicates, that of 7, 4% faced only claim 22% payment with a plaintiff.

Medical malptractice claims in Poland

In Poland, the legislator, as the basic source of compensation in medical malpractice cases, introduced the compulsory liability insurance - thus transferring the risk to a certain extent to commercial insurers. The regulation indicates the minimum guarantee sums, which are respectively (Regulation of the Minister of Finance on compulsory third party liability insurance of an entity performing medical activity of 29 April 2019, Journal of Laws of 2019, item 866):

– for a medical staff
- EUR 75,000 per one occurrence,
- EUR 350,000 with respect to all occurrences;

– for a hospital are:
- EUR 100,000 per one occurrence,
- EUR 500,000 with respect to all occurrences.

It should be noted that the cost of compulsory liability insurance for hospitals reaches 30 % of the guarantee sum, and the sum is exhausted by the payment of claims. Due to the high insurance prices, in practice the policies are concluded with minimal guarantee sums. Excessive damage will thus be charged to the healthcare provider. At the same time, the legislator did not provide for the differentiation of the minimum guarantee sum depending on the specialty and scope of services. These factors are only analyzed by insurance companies in premium valuation. In addition, in recent years the phenomenon of connecting public health care institutions has intensified. This is done by means of horizontal connections. The result of the merger is the creation of a large variety of functioning hospitals in Poland, both in terms of the number of beds and the scope of health services. At the same time, the legislator did not provide for modification of the minimum guarantee sum of compulsory liability insurance in the event of a merger, thus the guarantee sum indicated as minimal - and at the same time constituting a guide to the legislator on the risk level - applies to both small and large establishments.

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[1] However it has to be pointed that Capson Psychisians Ins Co has only 0,07% market share in one US state Maryland in 2017 (Redmer, 2018) and was placed into liquidation on June 28, 2019, at the request of the Texas Department of Insurance (http://www.capsonsdr.com/index.htm).

[2] But this assesment is based on a review of old Canada literature from a 1991 publication (Coyte PC, Dewees DN, Trebilcock MJ. Medical malpractice – the Canadian experience. N Engl J Med. 1991 Jan 10; 324 (2): 89 –93. Http://dx.doi.org/10.1056/NEJM199101103240204 pmid : 1984189) or US of 2006 (Studdert DM, Mello MM, Gawande AA, Gandhi TK, Kachalia A, Yoon C, et al. Claims, errors, and compensation payments in medical malpractice litigation. N Engl J Med. 2006 May 11; 354 (19): 2024–33. http://dx.doi.org/10.1056/NEJMsa054479 pmid : 16687715

As indicated - the Polish health service does not keep publicly available detailed registers of medical errors, including component claims on the one hand, and the areas of medical services to which they relate, on the other.

The image of the Polish market regarding compensation for medical malpractice is provided by data from the Ministry of Justice records regarding civil court proceedings for compensation for damages caused by the health service in the years 2011-2017 (ISWS, 2018). General data on cases referred to litigation provided by the Ministries of Justice presented in Table 3 indicate that since 2011 the number of civil lawsuits has not increased drastically, remains relatively similar, their value changes, which is illustrated by the decrease in cases brought before District Courts as courts of first instance, where cases of value are considered in accordance with the property jurisdiction up to 75 thousand PLN.

According to data for the period from 2001, the total number decreased - in 2001 it was 1295 lawsuits, in 2002 -1447).

Table 3: Impact of cases at first instance in 2011 - 2017*

	2002	2005	2010	2011	2012	2013	2014	2015	2016	2017
Regional courts	340	395	229	249	225	217	196	194	150	164
District Courts	1107	686	585	613	746	773	725	753	604	683
Together	1447	1081	814	862	971	990	921	947	754	847

** only 3 years were selected for the years 2002 - 2010*
Source: own study based on ISWS, 2018

The effectiveness of cases can be generally assessed on the basis of cases in which the claim has been upheld in whole or in part. These data are presented in Table 4 - and includes cases that in a given year ended in a ruling (settled) and only cases in 1 instance (the analysis does not include appeal proceedings, i.e. related to the fact that the judgment may be appealed by the losing party or by the claimant if partially accepted).

Nevertheless, the presented data indicate that the effectiveness was in the range of 19-28% in cases in district courts, and slightly higher 25-30% in cases of claims of higher value examined by regional courts.

Table 4: The number and effectiveness of court cases in 1 instance in 2011-2017 - included in full or in part

	2011	2012	2013	2014	2015	2016	2017
SR – done	219	264	187	191	194	156	157
SR – included in full or in part	51	52	37	41	37	36	44
Efficiency in %	23	20	20	21	19	23	28
SO – taken care of	550	537	612	700	637	629	609
SO – included in full or in part	140	148	153	199	193	190	172
Efficiency in %	25	28	25	28	30	30	28

Source: own study based on ISWS 2018

Data for earlier periods indicate that the effectiveness was similar in 2001 and then since 2006. In 2002-2005, however, significantly higher 33-35%. In 2001, 30% of cases dealt with in district and regional courts, the claim was granted in full or in part. 38% for 2002 and 2003. In the following year (2004) in 33%, in 2005 in 37%, in 2006 = 28%, 2007 = 27%, in 2008 = 25%, in 2009 = 26% and in 2010 = 25% (Korytkowska, 2015).

Based on these data, it is difficult to assess the shape of claims on the total market, because some of them do not go to courts, some are settled in amicable proceedings, e.g. by recognizing the claim by a medical entity and more often by the insurer. Some claims are considered in the alternative system - by provincial commissions for medical events.

It is also difficult to assess the structure of medical malpractice in Poland, taking into account the type of events, the type of claims (for property, non-pecuniary damage) as well as the specialty / area of services. Available data includes cases of patient rights violations, not just cases of bodily injury or health impairment or death resulting from medical errors.

However, some data indicate that there is a growing tendency to direct claims in this area. According to the report of the Chief Ombudsman of professional responsibility of doctors in Poland:

- the number of complaints increased in the period 2006 - 2013 from 3,085 to 4,030 (by 30%)
- including the number of complaints covering events such as illness or death from 1822 to 2328

The number of complaints in the above title represents in this period 56-60% of the total complaints.
The structure of complaints depending on the specialty (however, it also includes allegations regarding the acceptance of material benefits, unethical behavior of the doctor, confirmation of untruth, violation of the rights of the mentally ill and conflicts between doctors) in the years 2006-2013

- internal medicine, mainly cardiology 28-33% of all complaints
- surgery with orthopedics 22-25%
- dentistry 15-17%
- obstetrics and gynecology 10-13%

Another study worth considering in the Polish market is the work of Tyminski and Serocka (2018). The authors based on the analysis of 312 court rulings in the field of medical errors and patient rights in the period 2000 to 2016 determined areas of specialty in which claims were submitted and considered:

- General surgery 25%
- Orthopedics and traumatology 20%
- Gynecology and obstetrics 11%
- Ophthalmology 4%
- Oncology 4%
- Neurosurgery 4%
- Neurology 3%
- Other 28%

The authors also indicate that in 45% of the analyzed cases the patient or his family won as a claimant, which is higher than that resulting from the analysis of aggregated data, however, it should be noted that aggregated data includes only decisions in 1 instance. They do not include appeal proceedings - however, the authors abandoned this analysis from general data and it cannot be determined which party appealed. In addition, this study covers the period with higher efficacy relationships at first instance (2002-2003).

Unfortunately, it was not indicated how the effectiveness is shaped depending on the specialty. However, the figures are similar to the specialty indicated, as areas which are submitted complaints to the Ombudsman professional liability.

Empirical Example

The following example is a contribution to further analysis of the Polish market in terms of claims directed to hospitals. Due to the very difficult access to data illustrating the scale of the phenomenon, we present data on one medical facility. It is worth emphasizing that this is a large university /

clinical hospital. The article analyzes data on claims lodged in 2007-2018 (no data for 2014), as well as claims for personal injuries in patients in 2015-2018. In 2017 and 2018, compensation paid and claims paid were analyzed in relation to individual claims. Data for other years were aggregated. The data came from one of the Polish clinical hospitals, which in 2017 had over 300 permanent beds in 15 wards. Of which 13% of beds in the neurosurgical department, 11% in each of the departments: ophthalmology, plastic surgery and general surgery, 8% each in the department of transplantology and lung diseases, 7% in the gastroenterology department, 6% in the neurological department, 5% in the department percussive, on other branches below 5%. There is no gynecological ward in the hospital. The structure of the number of beds in hospital wards is similar to the structure of the number of patients per year in these wards. All of these departments service approximately 2000-2400 patients annually. Hospital total about 21 thousand. In 2017, the value of the contract at the neurosurgery department was over 17 million PLN, for the entire hospital over 90 million PLN.

In the analyzed years, the structure of the size and number of claims and payments was assessed in terms of recognition of claims and reimbursement by the insurer. The hospital's future costs were estimated based on the claims made in 2017-2018 in two options: assuming 100% recognition of claims and assuming 20% recognition of the value of claims (this value was estimated on the basis of historical data on the percentage of recognized claims).

Analysis of claims submitted in the years 2007-2018

The analysis was started by presenting the number (Fig. 2) and size of claims (Fig. 3) for personal injury reported in 2007-2018 (no data for 2014) in the analyzed hospital. It is worth emphasizing that the presented data relate only to claims for personal injury, and do not relate to complaints addressed directly to the hospital, university or Provincial Department of the National Health Fund. In 2015, 16 such complaints were recorded. Of these, 2 complaints concerned distant dates of access to medical services (including 1 justified), 3 complaints concerned dissatisfaction with the quality of health services provided in relation to interpersonal relations (including 1 justified), 2 complaints concerning refusal to provide advice (considered justified), 6 complaints regarding doubts or advisability of medical services (including 2 justified), 2 complaints related to documentation problems (including 1 justified), 1 complaint concerned the accusation of a hospital employee to steal patient's money (considered unreasonable).

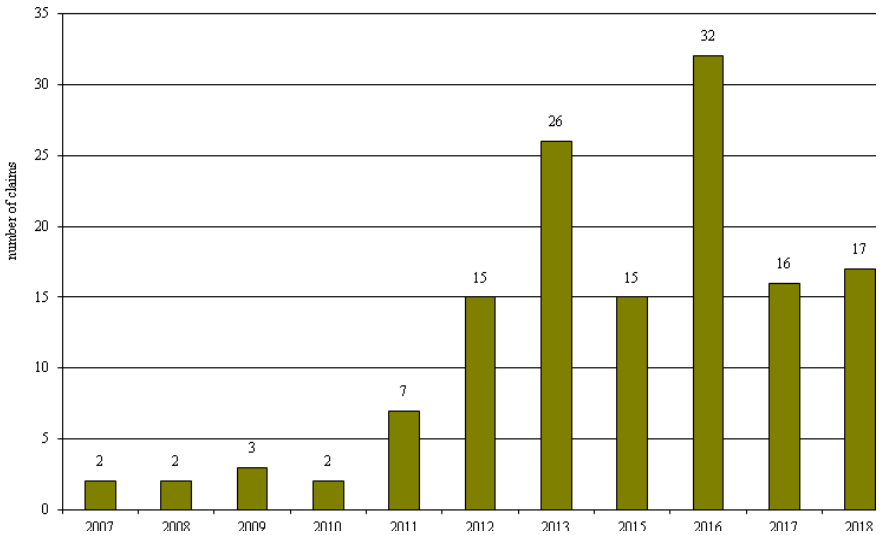

Fig. 1: The number of claims reported in the hospital in years 2007-2018
Source: own study

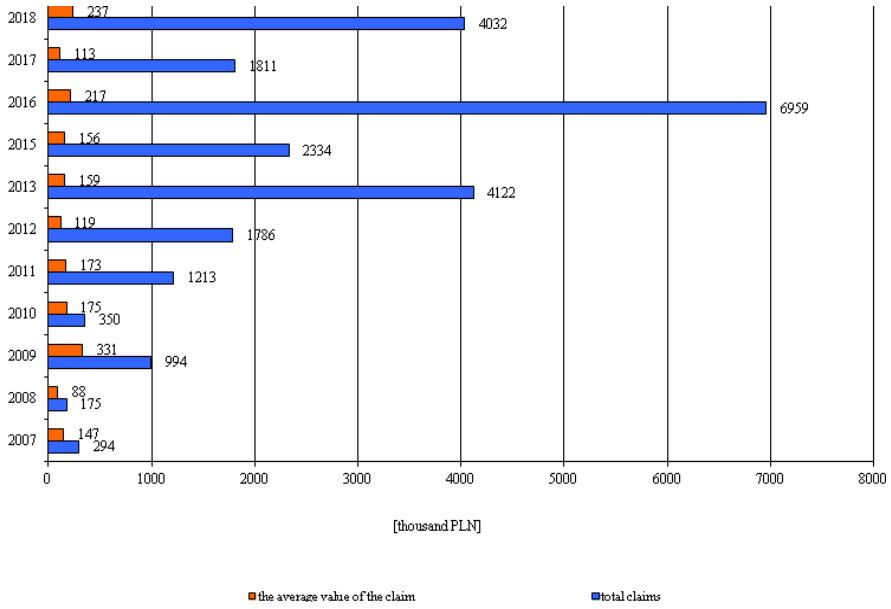

Fig. 2: The value of claims reported in the hospital in years 2007-2018
Source: own study

Analysis of data on the number and value of claims for personal injury (Figure 1 and Figure 2) shows that in 2007-2013 the number and value of claims increased from year to year. In 2015, 2017 and 2018 the number of claims decreased compared to 2013, in 2016 a large increase in the number and value of claims was observed, but it is still eight times higher than in the first year of the analysis.

A total of 16 claims totaling over 1.8 million PLN were filed in the studied hospital in 2017. The average claim size was 113 thousand PLN, with a minimum value of 5 thousand PLN and the maximum value of 657 thousand PLN. The median value of claims was 76 thousand PLN. In 2018, 17 claims totaling over 4 million PLN were filed at the same hospital. The average value of the claim was higher and amounted to 237 thousand PLN. The lowest claims were 20 thousand PLN, the highest over 1.6 million PLN, median 125 thousand PLN.

Given the similar number of claims in these years, a significant increase in the amount of claims should be noted.

Most of the claims reported in 2017-2018 were contentious. Only two cases out of 33 ended in a settlement. It should be emphasized that not all claims filed in a given year related to damage incurred in this year. One claim among those filed in 2017-2018 was considered by the insurance company to be time-barred, and in five cases the insurer stated that there are no grounds to recognize the claim. Court proceedings extend the time for resolving contentious damages. An analysis of the benefits paid in 2017-2018 shows that the duration of court proceedings ranged from one to as many as 10 years. Withdrawals in 2017 were on average after 2.5 years, while in 2018 on average after 5.5 years.

There is a caveat necessary in the assessment of claims submitted - if they include personal injury, they may include disability claims for serious damage: lost income, increased needs or reduced future views. The value of these claims may not be reflected in hospital statistics, as they are recognized e.g. monthly and the hospitals are not used to establish provisions for their value, like e.g. insurance companies. Meanwhile, they may result in far more significant charges in terms of value, given the

long payout period (Jędrzychowska, 2015). The examined hospital left a budget reserve of approx. 28% of claims in the given year to cover future claims, benefits and pensions.

Analysis of claims and benefits paid in the years 2017-2018

In 2017, the examined hospital paid a total of over 341 thousand PLN of claims and benefits, of which approximately 30% were pensions and 70% compensation plus interest and court costs. The insurer covered 70.23% of costs (Figure 3). In other cases, the insurer considered that there were no grounds for the insurance undertaking to accept liability.

In 2018, the hospital paid over 412 thousand PLN, of which 20% were pensions and 80% compensation and court costs. The insurer covered 80.41% of the payment costs incurred (Figure 3).

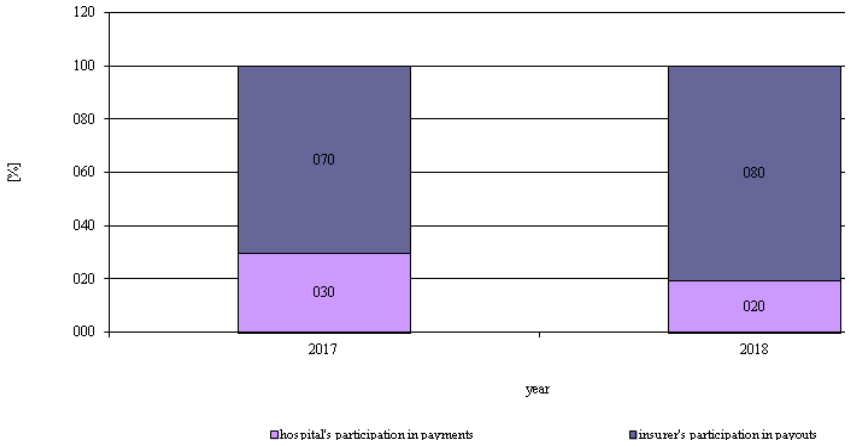

Fig. 3: Contribution to the costs of payments (%)

Source: own study

Looking for the answer to the question about the hospital's own participation in the claims payment - several suppositions can be made. It may come from an integral franchise (until July 15, 2016 deductible was allowed in the contract of compulsory third party liability insurance, and claims may be made from events prior to that date (Act on Medical Activity of April 15, 2011 Art. 25) - the basic limitation period in Poland is 3 years, in the case of crimes up to 20 years, but it is interrupted by reporting to the insurer or e.g. filing a lawsuit against the institution). Other options are – recognition by the hospital of claims not recognized by the insurer (although the scope of exclusions in compulsory liability insurance is very limited (Regulation 2019), e.g. excludes property damages). These may be payments recognized in other procedure of settlements of so-called "medical events" considered by the Medical Incident Commission (alternative dispute resolution), where insurance was compulsory for several years only. They can also be payments due to the exhaustion of the guarantee sum or over the guarantee sum for one occurrence. It should be noted here that until December 2011 in Poland, the guarantee sum in compulsory medical liability insurance was lower than the amount mentioned above, i.e. 46,500 EUR per event and 275 thousand EUR for all for ZOS. There are such claims on the market for a failure from that period, reported a few years later, especially when the damage results from a crime.

The share of pensions in benefits paid out may imply the assumption that the value in this respect will increase, as the next ones, newly awarded or awarded will be added to the paid. In addition, the injured party may request verification of the benefit awarded due to the decrease in its real value over time (inflation) and apply for valorization, which will increase the cost for the hospital or insurer.

When assessing the claims and benefits paid in respect of hospital departments, the largest share in the payments not covered by the insurer in the period under review was related to neurosurgery (around 66%) (Figure 4).

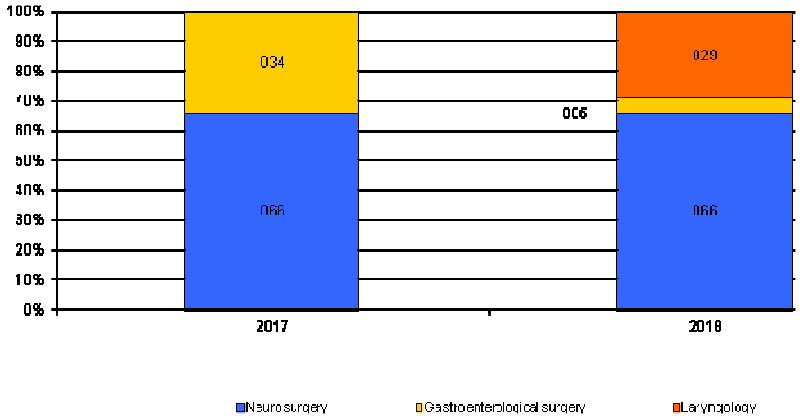

Fig. 4: The participation of payments in total payments by hospital wards in years 2017-2018
Source: own study

They amounted to an average of 7 thousand. on a branch bed. Other wards are gastroenterological surgery and laryngology (Figure 5).

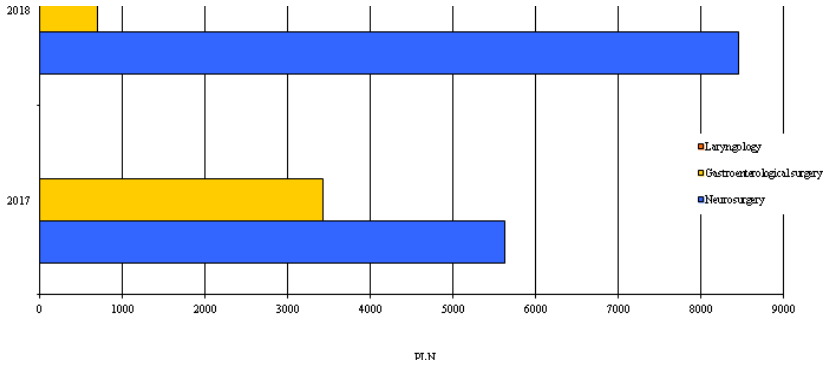

Fig. 5: Average payment per ward bed

Source: own study

Comparative analysis of claims and benefits paid in 2017 and 2018 with claims submitted in these cases

In the further part of the study, only payments were analyzed, for which full data on the value and type of claims submitted was available.

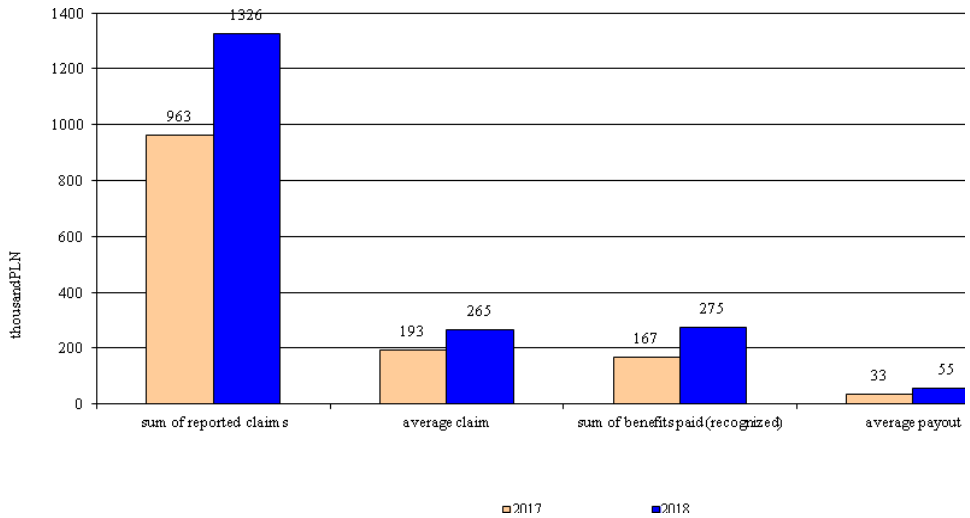

Fig. 6: Claims and payments in 2017 and 2018

Source: own study

The value of claims and benefits paid in 2017 was over 167 thousand PLN (average payment is 33 thousand PLN) and accounted for around 17% of the value of claims submitted in these cases. The amount of expected claims was over 960 thousand PLN (average claim amounted to 193 thousand PLN), of which approx. 850 thousand PLN constituted compensation, over 92 thousand PLN damages, over 20 thousand PLN annuity. The average value of expected redress was around 170 thousand PLN, and paid slightly over 33 thousand PLN. Compensation was not paid, the average value of the granted disability pension was over 10 thousand PLN.

In 2018, claims and benefits paid out amounted to over 275 thousand PLN (average payment amounted to 55 thousand PLN) and accounted for over 20% of the value of claims submitted. The amount of expected claims was over 1.3 million PLN, and the average value of a single claim was 265 thousand PLN. The average value of expected redress was approx. 260 thousand PLN and 87 thousand PLN paid out. Data is referenced in Figure 6.

It should be noted that the average value of the claim for compensation in 2018 increased by 53.57% compared to the previous year, while the average value of compensation paid after a court case in 2018 increased by 160.61% compared to 2017.

Simulation of future hospital costs due to claims made in 2017-2018

In this part of the study, the authors want to show how the finances of the hospital will be charged in four hypothetical variants regarding the recognition of claims. The first option is the "black scenario" stating that all patients' claims will be recognized, the second will be 40% of claims and the third 30% of claims will be recognized. The last one is the "typical" scenario based on the 20% level of recognition of claims submitted based on historical data. It was also assumed that the costs not reimbursed by the insurer constitute 25% of the value of claims and benefits paid in each of the variants.

Table 5: Costs of future claims and benefits due to claims submitted in 2017 and 2018 respectively

Year of Claim	Value of future claims and benefits [PLN]			
	Variant I – 100%	Variant II – 40%	Variant III – 30%	Variant IV – 20%
2017	452 752	181 101	135 826	90 550
2018	1 007 894	403 158	302 368	201 579

Source: own calculations

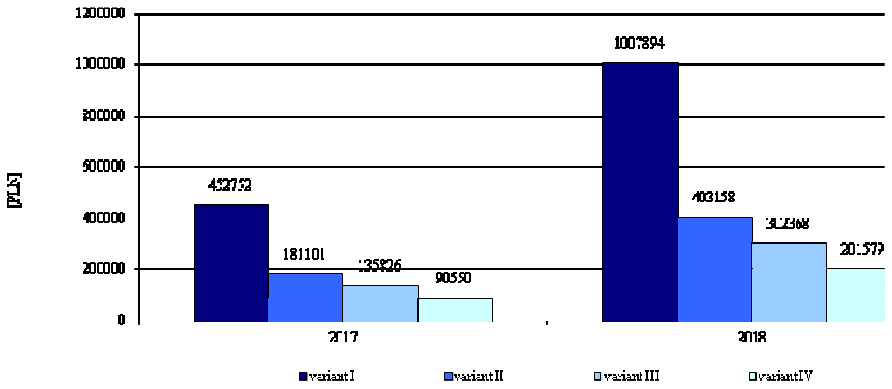

Fig. 7: Value of estimated claims and benefits

Source: own study

The data in Table 5 and Figure 7 indicate a large increase in the value of future costs incurred by the hospital.

Summary

The results confirm that the number and value of claims depend on the ward specialty. Neurosurgery faced the highest risk and is also the specialty highly affected in other markets. However other risky specialty as gynecology and obstetrics wasn't examined due to the lack of such one in analyzed hospital.

The effectiveness of medical malpractice claims on the Polish market is similar to other markets (20-30%) - which is confirmed by aggregated data on claims in courts and claims faced by analyzed hospital. Based on data on the effectiveness of claims in motor liability insurance (MTPL) made available by claims management companies in the report of the Promotor Association edited by Monkiewicz, Monkiewicz April (2011) it was established that - effectiveness of seeking claims in 2007-2008, before courts exceeded 99%. However, it should be noted here that in cases of MTPL insurance more often, the dispute concerns only the amount, not the liability itself, unlike in case of medical malpractice.

Research indicates that the type of wards in the hospital determines the scale of payments. It should be should considered whether the guarantee sum should not be correlated with the profile of wards of the entity performing the medical activity and the number of medical services provided.

Liability insurance of entities conducting medical activity does not fully cover the costs incurred by hospitals. The research shows that the insurer did not cover, on average, around 25% of the costs in the years under review, stating that there were no grounds for recognizing the claim or limitation,

despite positive court judgments for the injured party. This contradicts the basic protective function of insurance and indicates a lack of competitiveness on the insurance market in the scope of the discussed civil liability insurance. Hospitals, as public entities, include the said insurance through public procurement, where there is often only one offer in the proceedings.

The insurer's failure to reimburse part or all of the claims and benefits is particularly worrying because of the significant increase in the value of claims from year to year. On the other hand, due to the lengthy court proceedings, the entity finds it difficult to estimate future costs.

When referring to the risk management process in hospitals, it should also be borne in mind regarding personal injury that:

- average values of claims and total value faced by analyzed hospital are low and fall within the statutes guarantee sums, but our other studies show that the values in the case of serious bodily injuries, as well as Swiss Re scenario - are much higher and the guarantee sums are insufficient,
- the incubation time of loss and claims as well as the claim adjusting time and limitation periods make analysis difficult and should be taken into account.
- the value of disability benefits is not limited by time, but by the life expectancy of the injured party. In addition, the value of the benefit may be adjusted and increased.

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Methodological Approach to Creating Customer Value Chain

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Abstract

The article presents the author's methodology for creating customer value chain, which includes a set of methods and techniques, i.e., the method of structuring the business portfolio of producers by goods and consumers; a method for clarifying the main and supportive types of business processes for the production; the methodology for determining critical success factor in the identified business processes and determining the benefits and values of each critical success factor for various market segments; a method for identifying key factors in selected business processes that lead manufacturers to failure and developing marketing decisions to turn failure factors into success factors; a method for determining the added value for different market segments from the developed marketing-management solutions and a method for evaluating the effectiveness of customer value chain by product manufacturers. The author's methodology for creating customer value chain is provided on a basis of a case on organizing an eco-business at Ecocluster LLC, the largest Russian voluntary association of producers, suppliers and sellers of natural, environmentally friendly and functional products under the Ecofarm brand, in which hundreds of farmers, processors and owners of agro-tourism complexes in 37 regions of Russia cooperate. The author's methodology is universal and can be applied in analyzing the effectiveness of creating customer value chain and making marketing-management decisions in order to create perceived and benefit by producers not only of organic products, but also of various types of products.

Keywords: Value Chain, Customers, Methodology, Organic Products

Introduction

In the face of deteriorating living conditions, the country's population begins to seriously think about the need to consume at least safe products and, at the very least, products that provide a high quality of life. This level of needs and values when consuming food corresponds to products with the prefixes "eco", "bio", "organic".

Organic products are products of agriculture and the food industry that are manufactured in accordance with approved environmental standards that provide for the rejection of the use of pesticides, synthetic mineral fertilizers, growth regulators, artificial food additives, genetically modified organisms.

Demand for organic products in Russia is growing in line with global demand trends. Over the past 15 years, the global market for organic food has grown 5 times, the share of organic products amounted to 10% of the total global food market. Relative to the global market, the Russian market for organic products is in its initial stage and is 0.16% of the world market. The country's government sets actual and potential producers of organic products an ambitious task: in the near future to produce and sell volumes of organic products, which will make up 10-25% of the global volume. In 2019, per capita consumption of organic food accounted for only 48 rubles [Analysis of the Russian market of organic products, 2019].

According to forecasts of "Euromonitor International", it is expected that sales of organic products as a whole will grow by 30 percent in the coming five-year period. This growth will be due to a new stage in the production and certification of products and increasing demand from the Russian consumer [Kuznetsova, Avzalov M, Avzalov R., 2019; Kuznetsova, Avzalov, Gorbunov, et.al. 2019].

The supply in the market of organic food is presented by both certified and non-certified producers. As of May 2019, 82 certified organic agricultural producers are engaged in the production of organic products in Russia, of which: 25 farms in the field of crop production, 9 farms in the livestock sector, 6 farms are engaged in wild plants collection, 2 enterprises - in the production of alcoholic products, 2 enterprises - in agricultural processing, other enterprises combine several types of production [Overview of the market for organic products in Russia, 2019]. Six certified manufacturers export products to EU countries. The annual growth rate of agricultural land areas in Russia involved in the production of organic products is 40-70%, which is the highest rate in the world [Seifullaeva, Panasenko, Shirochenskaya, et.al, 2018; Seifullaeva, Shirochenskaya, Shklyar, et.al, 2017].

Domestic producers of organic agricultural products are affected by both domestic and global competition. Internal competition is becoming increasingly intense on the domestic market due to selling products labeled as environmentally friendly, without the use of food additives, synthetic fertilizers and GMOs, without manufacturers passing the appropriate certification procedure. Thus, unscrupulous manufacturers, speculating on the names of products with the prefixes "eco", "bio", "organic", using obscure labels and misleading consumers, are participants in the organic market, drawing a substantial market share.

According to marketing research conducted by AgriCapital, 45% of Russian food manufacturers illegally place such labels on the product label, and about 60 percent of consumers in Moscow supermarkets are willing to pay more for products if their package contains an "organic" mark [Overview of the market for organic products in Russia, 2018].

On the domestic market, domestic producers of organic products are affected by international competition due to their imports from EU countries, such as Germany, France, Italy and others.

According to the NeoAnalytics research, about 80-85% of the Russian market for organic products is imported [Analysis of the Russian market of organic products, 2019]. Due to many years of experience in the market of organic food, international companies supply the Russian market with high quality and innovative organic products, many of which are not yet produced in Russia. The competition between domestic producers and international companies for "shelf space" in supermarkets is increasing due to the long-standing presence of these companies on the Russian market and the presence of long-term contracts for the supply of products.

Consumer demand for organic products is mainly represented by the consumer demand in mid-price, premium and luxury segments. According to the results of a study conducted by the Centre of System Business Technologies SATIO on a sample of 210 units, it was revealed that under the prefixes "bio", "eco", "organic", consumers of these products understand products in which most of the ingredients are of natural origin. Regarding the price of organic products, the opinions of respondents were divided: 41.9% of respondents agree that organic products should be more expensive than their equivalents, and most of the respondents are willing to overpay for the naturalness and environmental friendliness of the products [Kozlova, Sukhostav, Anashkina, et.al, 2019]. The main values in the

consumption of this product for 81.1% of respondents are health benefits, while for every third respondent it is important that the consumption of such products will give him/her a sense of some status and will allow to save the environment. [Research: Portrait of the consumer of eco-products in Belarus, 2018].

In marketing as well as consumer behavior theories and practice, it is assumed that a consumer buys not goods or services, but opportunities to meet needs, get benefits and values [Doyle, 2001; Graf and Maas, 2008]. The perception of values from the consumption of organic products varies from culture to culture [Timokhina, Wagner, Ürkmez, 2018; Lepak, Smith and Taylor, 2007; Maccion, Borgianni, Basso, 2019].

For example, according to the Research Institute of Organic Agriculture (FiBL) and IFOAM, the main value in the consumption of such products for the French and Czechs is health care, for the German consumers is care for the environment, for the Danes is care for animals, for US residents is health due to the lack of genetically modified organisms in food. Secondary data obtained by us show that the main values of organic products are health care and the status “I can afford it” for Russian consumers. Organic food is more expensive than their equivalents in the range from 20 to 400 percent, so not every Russian consumer can afford to eat such food [Overview of the market for organic products in Russia, 2018]..

The current market conditions for organic food products, intense competition in this market and changes in consumer preferences, the level of their purchasing power are the main factors that determine the managerial, economic and marketing strategic decisions of organic producers.

Theoretical Framework

Organic production is localized, mainly on a regional basis in the form of a cluster organization of the business of small and medium enterprises. Regional localization of the business is explained by the need to bring the producer closer to the consumer due to the short shelf life of organic products and the need to build logistics with a view to the quick delivery of products to consumers living in this territory [Gusmanov, Kuznetsova, Stovba, et.al., 2018].

According to M. Porter, the advantages of cluster organization of agricultural business within the region will also be the strengthening of interconnection, complementarity of agricultural enterprises and related industries due to faster dissemination of specific knowledge, technologies, professional skills, marketing, innovation, etc. [Porter, 2005; Zamora, 2016].

In 1985, Michael Porter proposed a theory of value chain that can be applied to both a single enterprise and the cluster as a whole [Porter, 2005]. The essence of this theory is expressed in obtaining additional business benefits and increasing the competitiveness of the enterprise/cluster by creating customer value for each business process of the main and supportive activities of the enterprise /cluster [Timokhina, Kapustina, Agababaev, 2018; Yudin, 2012; Yuldasheva, 2012; Walter, Lancaster, 2000].

Earlier in our study [Timokhina, Kapustina, Agababaev, 2018], we came to the conclusion that it is necessary to modernize Michael Porter's value chain creation model and develop alternative value chains in competitive markets (Fig. 1)

Michael Porter's modernized customer value chain model in competitive markets, shown in Fig.1 can be adapted to the activities of producers of any type of products, including natural, environmentally friendly and functional organic products.

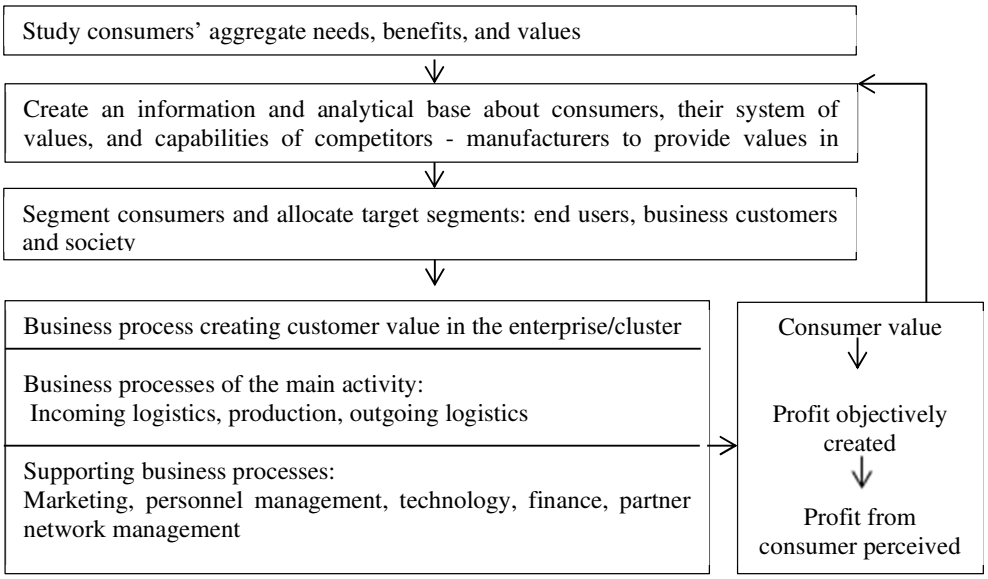

Fig.1: An alternative approach to customer value chain by product manufacturer

Project Goals

The purpose of this study is to develop the author's methodology for creating customer value chain and its description on a basis of a case on organizing eco-business in LLC Ecocluster. Ecocluster LLC is the largest voluntary association in Russia of producers, suppliers and sellers of natural, environmentally friendly and functional products under the Ecoferma brand, in which hundreds of farmers, processors and owners of agro-tourism complexes in 37 regions of Russia cooperate.

Author's Methodology

At the same time, it is assumed that the analysis of the customer value chain is based on the research of customers and competitors, the results of customer segmentation and data from the information and analytical database of the enterprise on the desired values of the selected target consumer segments.

1. The method of structuring the business portfolio of producers by goods and consumers.
2. The method for clarifying the main and supportive types of business processes for the production.
3. The methodology for determining critical success factor in the identified business processes and determining the benefits and values of each key factor of success for various market segments.
4. The method for identifying key factors in selected business processes that lead manufacturers to failure and developing marketing-management solutions to turn failure factors into success factors.
5. The method for determining the benefit for different market segments from the developed marketing-management solutions.
6. The method for evaluating the effectiveness of the customer value chain by product manufacturers.

Let us consider in detail the proposed methods and techniques for Ecocluster LLC, the largest voluntary association of producers, suppliers and sellers of organic products in Russia.

1. At the first stage of the customer value chain analysis, the method of structuring the manufacturers' business portfolio by creating a functional map is applied, which allows us to solve several problems (Table 1):

- identify segments and sub-segments of consumers for which consumer value is created;
- determine the product range intended for targeted sub-segments;
- check the ratio of tangible and intangible products in the portfolio of manufacturers to make marketing-management solutions to differentiate interaction with consumers;
- determine the degree of concentration of efforts on providing target consumers with goods and services and make decisions on expanding the product range for target segments/sub-segments to create benefit;
- identify the main and supportive markets; develop strategies for the development of supportive markets.

Table 1: Functional map for structuring the Ecocluster LLC business portfolio

Segments		Goods											Services						
		milk	bread	meat	vegetables	fish	sweets	cosmetics	eggs	tea	pork hearts	livestock products	tourist	entertainment	educational	franchise	rehabilitation	certification	engineering
End users	Product consumers	v	v	v	v	v	v	v	v	v									
	Eco tourists	v	v	v	v	v	v	v	v	v			v	v	v				
Business customers	Partners											v			v	v	v	v	v
	Educational organizations	v	v	v	v	v	v	v	v	v			v	v			v		
	Rehabilitation organizations	v	v	v	v	v	v	v	v	v								v	
	Public catering	v	v	v	v	v	v	v	v	v						v			
	Retail	v	v	v	v	v	v	v	v	v						v			
Society	People in need of implants										v								

Based on the analysis of the functional map of the Ecocluster business portfolio (Table 1), it can be seen that the product range is developed for all three classic marketing segments in marketing: final consumers (end users), business customers and society. These segments are divided into sub-segments depending on the range of products and services offered. There is some potential in

expanding the range of goods for business customers to whom services are provided, as well as in expanding the range of services for end users.

The realization of this potential will allow us to concentrate our efforts on servicing the target segments without scattering the efforts in the production and sales activities of the cluster, which we observe when analyzing this functional map.2. When using the method of clarifying the main and supportive types of business processes for production and sales, it is important to identify those business processes that will generate an objectively existing set of specific values for target segments.

In the process of creating customer value chain, Michael Porter identifies the main (primary) business processes that directly create a set of consumer-perceived values and supportive (secondary) business processes that do not create a set of values, but ensure the normal functioning of the main business processes [Porter, 2005]. For each production and type of manufactured goods, the main and supportive business processes will vary, and supportive can be considered as the main and vice versa. The most difficult at this stage of the analysis is the allocation of the most significant business processes in the main and supportive activities.

For the production of goods and services in the Ecocluster, we have identified the following main business processes: incoming logistics, production and outgoing logistics. Technologies, personnel management, marketing, finance, and partner network management were considered as supportive business processes.

It should be noted that we have identified and characterized the main and supportive business processes of the Ecocluster, both in the production of tangible goods and services. However, in this article we will focus only on the description of examples on the application of the developed methodology related to the production of tangible goods.

3. The methodology for determining the key factors in selected business processes that lead the company to success and determining the benefits and values of success factors for various market segments is based on the concept of critical success factor (CSF) by Boynlon, A.C. and Zmud, R.W. [Boynlon, Zmud, 1984]. When using this technique, one selects the factors that should be focused on in order to set up business processes to create the desired consumer value (Table 2).

Table 2: Critical success factors for the core and supportive business processes of Ecocluster LLC

Business processes	**Critical success factors and the most significant CSFs for creating consumer value of (in bold)**
Main activities	
Incoming logistics	Low cost of production and sales
	Purchase of breeding cattle
	Cluster business organization
	Domestic fertilizers
	Supplier Reliability
	Fast response to changing demand
	Favourable location
Production	**High quality products**
	Full capacity utilization
	Cooperation and specialization
	Product range diversification
	Use of old Russian recipes
	The whole production cycle in one place
Outgoing	Speed of delivery

logistics	Own outlets/ points of sale
	Famous brand
	Partner network throughout Russia
	Online delivery
	Differentiated supply chain
	Developed network
	Unified logistics chain
Supportive activities	
Technologies	Availability of patented production and sales technologies
	The combination of traditional recipes and modern technology
	Pioneers in building a business model of eco-farming based on world experience
	Application of highly productive technologies in crop production and animal husbandry
	Active use of information technologies
	Franchising
	Development of eco-certification methodology
	Efficient incoming quality control system
	Non-waste production
Personnel management	Powerful educational platform
	Community on the site as a talent pool
	Expertise in the field of Ecobusiness (experience of the business founder and staff)
	Family business
Marketing	Own unique, well-known and recognizable brand
	Organization of BTL events
	Socially responsible policy
	Diversified product policy
	Effective PR and GR
	Personal communication
	Promoting a healthy lifestyle
	A system of quality guarantee and product environmental friendliness aimed at consumers
	Experiential marketing
	High prices as an indicator of high product quality
Finance	Cost management through a single supply chain
	High levels of profitability/ROI
	High sales growth rates
	Own assets
	Cash flow in the form of royalties from franchisees
	Stable income due to portfolio diversification
Partner network	**Expansion of the cluster based on franchising activities**
	Turnkey Franchising
	Certification system as a methodological basis for expanding the partner network

management	Availability of own certification standards
	Ecocluster company is the only ready-made eco-business project in Russia
	Lobbying the interests of eco-producers in government structures
	Compensating for the risks of price increases by distributing orders between partners
	Ability to set the price for licensing patents
	Selection of partners based on agricultural experience

For the Ecocluster, we have identified the critical/key success factors for the main and supportive business processes, from which, based on the experts' opinion in the organic market, the most significant success factor for each business process has been identified in terms of creating consumer value (Table 2). Using this technique, we have formulated customer value for three key segments: end users, business customers and society (Table 3).

Table 3: Consumer values generated by CSFs for key segments

Business process	**Significant CSF**	**Consumer values**		
		End users	**Business customers**	**Society**
Incoming logistics	Cluster business organization	Functional value - proximity to the consumer: "you eat what is grown on the territory where you live."	A business development model clear to all cluster members	-
Production	High quality production,	Associative value- "Consumer can consume products that are not affordable for everyone"	Guaranteed sales and predictable revenue	Improving people's quality of life
Outgoing logistics	Unified logistics chain	Consumption of fresh products: from field to fork	Uninterrupted rhythmic production of organic products	-
Technologies	The combination of traditional recipes and modern technology	Emotional value from involvement in family values, their origins	Creating a competitive advantage and competitiveness	Bringing modern environmental technologies to Russia
Personnel management	Founder's Experience	Cognitive value: encouraging consumers to expand their knowledge of eco-friendly life	Multilevel consulting on any issues of creation and development of eco-business	Cognitive value- dissemination of information about eco-friendly life
Marketing	A system of guaranteeing the quality and environmental friendliness of products for the consumer	Associative value - empowerment through a healthy lifestyle	A constant base of loyal consumers, which leads to lower marketing costs	Improving people's quality of life

Finance	Stable income due to portfolio diversification	Functional value – the ability to plan the costs of maintaining an eco-friendly lifestyle	Risk diversification and investment attractiveness.	-
Partner network management	Expansion of the cluster based on franchising activities	Functional value - stable quality and a variety of products in "eco" the style	Business scalability through predictability of entry and exit points for partners	-

By using this technique and having data on a high degree of heterogeneity of sub-segments, it is possible to formulate the desired consumer values not only for segments as a whole, but also for sub-segments. Table 3 presents the consumer values highlighted by CSF experts for each business process and expected by consumers of the three key segments.

4. The method for identifying critical factors in selected business processes that lead manufacturers to failure and developing marketing-management solutions to turn failure factors into success factors. With the allocation of CSFs in the main and supportive business processes, it becomes easy to identify problem areas, weaknesses in the activities of manufacturers, that is, factors that reduce the effectiveness of activities in creating consumer value (Table 4).

Table 4: Critical factors of failure in the production of tangible goods at Ecocluster and management decisions to level them down

Business process	Critical factors of failure	Failure Management Decisions	Benefit due to management decisions
Incoming logistics	High interdependence of cluster partners	Horizontal and vertical integration based on environmental standards, the development of information logistics, improving management efficiency	For consumers of organizations: guarantees of uninterrupted supply, production and sales
Production	Lack of production capacity	Expansion of production Attracting new partners	For business customers: guarantees of supply and sales. For end users – satisfied demand for organic products
Outgoing logistics	Perishable product, short shelf life	Product positioning based on naturalness and quality	For end users and business customers: the perception of products as exclusively natural and fresh
Technologies	High time and money costs for the implementation of traditional old Russian technologies	Attracting new partners with traditional old Russian recipes	For business customers: economies of scale
Personnel management	Weak HR brand management	Creating a corporate loyalty system	For business customers: loyal staff - predictability of the business of cluster partners
Marketing	There is no single brand image in the minds of consumers	Conducting marketing research, creating and implementing a Brandbook	For end users and business customers: reducing all types of risks in the decision-

	of organic products	for the entire cluster	making process
Finance	High production cost	Economies of scale, increasing the price while increasing the benefit of the product	For end users: associative value, belonging to a high social class
Partner network management	Lack of state compensation for eco-certification	Attract investments to reduce the burden on the financial activities of the organization Lobby interests in power structures. Create a professional association of eco-producers.	For business customers: reduce the cost of eco-certification through state compensation for its costs. For end consumers: reduce the price of organic products

Accordingly, at the fourth stage of the customer value chain analysis at Ecocluster, critical factors leading to failure are identified, and management decisions are developed to turn the failure factors into success factors (Table 4). We have identified up to six factors of failure in each of the business processes under consideration, however, in this article we focus only on one, the most critical factor of failure in the cluster.

5.The method for determining the added value for different market segments from the developed marketing-management solutions is used to formulate the benefit that the consumer receives when managers focus their efforts on leveling problem areas in manufacturers' business processes and/or turning their weaknesses into strengths (Table.4).

As a result, by initially positioning Ecocluster as generating consumer values, marketing-management can demonstrate added value as a competitive advantage of the cluster in marketing communications.

6. The method for evaluating the effectiveness of the customer value chain by product manufacturers. Due to the prevailing market conditions in the modern economy and the market conditions described above, most organic producers build their marketing activities in such a way that they are based on the paradigm of primary consumer value creation and secondary profit generation (Fig.1). Objectively created by business processes and subjectively perceived by consumers, the value of market supply should be transformed into specific economic indicators that reflect the effectiveness/effect of creating customer value chain.

Comparison of specific unit profit indicators for creating objectively created value and subjectively perceived value by consumers for which they are willing to pay allows us to draw conclusions about the effect of competent marketing-management decisions. The unit profit of objectively created value for such a factor as the material basis costs of the created consumer value is determined by the following equation:

$$P^{I}{}_{u} = \frac{P}{M} = \frac{(P - C_{fc} - C_{fc} - C_{l} - C_{pf}}{M - 1} = \qquad (1)$$

Where:

$P^{I}{}_{u}$ – unit profit of objectively created value;

C_{fc} – costs of fixed capital;

M – material basis costs of the created consumer value;

C_{l} – labor costs;

C_{pf} – costs of other productive factors,

$$P = R - C \tag{2}$$

Where:

R and *C* – result and costs characterizing this production process.
The effect of creating customer value without generating added value will be determined by means of the following equation:

$$E_1 = P^{II}{}_u - P^{I}{}_u \tag{3}$$

Where:

$P^{II}{}_u$ – unit profit received as a result of selling a product at a higher price due to the consumer's perception of the product value;

$P_u{}^1$ – unit profit of objectively created value.

By focusing marketing-management on the transformation of weak factors in the producers' activities in the CSF business processes and thereby providing consumers with added value, additional unit profit can be obtained, which will lead to an increase in the effect of marketing-management decisions.

$$E_2 = \left[P_u^{II} + P_{u_{add}}^{II}\right] - P_u^{I} \tag{4}$$

Where:

E_2 – the effect of creating customer value by providing benefit to customers.

Calculation of the effect of marketing-management decisions on the creation of customer value by producers is carried out over a certain period, carried out together with the managers of business customers then the result is evaluated and documented.

Based on the analysis of the achieved result, the process of creating customer value is adjusted through the focus of limited producer resources on the most significant elements of consumer value and the collection of data necessary to evaluate each of them.

Conclusion

The authors' methodology for creating the customer value chain presented in this article includes a set of methods and techniques for analyzing customer value chain of three target segments; for making marketing-management decisions in order to level the problem areas in the manufacturers' business processes; for evaluating the effect of creating the customer value from providing consumers with perceived and added value. This methodology, considered for manufacturers of organic products, can be applied to analyze the effectiveness of creating the consumer value and make marketing- management solutions to create perceived and benefit for manufacturers of various types of products**.**

In the conditions of increased intensity of competition and significant changes in consumer preferences and consumer behavior, this approach to business process management will allow producers of goods and services to best generate consumer values and thereby increase competitiveness.

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Organizational Work Environment and Creativity of Knowledge Workers – Selected Aspects

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Abstract

Nowadays a special role in the process of building the competitiveness of the organisation play knowledge workers. On the one hand, they require a lot from themselves and from others, on the other hand, widely understood environment (including the organisations in which they work) requires a lot of knowledge workers. One of the characteristics of knowledge workers, which is very important for the organisations operating in a knowledge-based economy, is their creativity. The topic of the discussion presented in this article is the analysis of the organisational work environment in the aspect of its impact on the knowledge workers' creativity. In the article the knowledge worker's characteristics are described as well as the mutual expectations of knowledge workers and organisations in which they work are identified. The issue of the creativity of knowledge workers and its determinants, both personal and organisational, are also presented. The results of the survey, which enabled the analysis of organisational determinants of knowledge workers' creativity, were presented as well. The final part of the article contains conclusions of previous theoretical and practical considerations.

Keywords: Knowledge Worker, Creativity, Work Environment.

Introduction

In the contemporary times, knowledge workers, who are the possessors of knowledge currently considered the most important resource in the knowledge-based economy, have a special role in the process of building the organisation's competitiveness. When properly processed, using the creativity potential of the workers, knowledge allows generation of added value in the form of so expected innovations. A lot is required from knowledge workers, but they also require a lot from themselves, from people they work with and from the organisations they tied they professional careers to. Setting high expectations for the knowledge workers, including those regarding their creativity, they must be given the opportunity to meet such requirements, which includes, for instance, creation of a friendly work environment in the organisation. Bearing the aforementioned in mind, to show a certain scientific area regarding the conditions created by the work environment of the organisation for development of knowledge workers' creativity as well as to analyse it, the article distinguishes two trends. One is of cognitive nature, concentrated on analysis of subject literature. These studies covered national and foreign literature that allowed for a critical analysis and formation of the research framework. They regarded notions related to the concept of the knowledge worker, his or her features as well as the organisational work environment. The other, desk study-based, stream focuses on studies conducted in the form of a questionnaire concerning knowledge management in

organisations the results of which allowed for evaluation of the organisational work environment in terms of its influence on the knowledge workers' creativity.

Knowledge workers and their characteristics

The creator of the knowledge worker concept is P. Drucker who described such a worker as a person possessing the most important production means, i.e. knowledge (Drucker, 1999, p. 13). This very general definition has become the base for many other definitions, describing the knowledge worker from the angle of possessed resources and features, presented attitudes and behaviours as well as actions taken by such a worker and expectations set for him or her.

For the purposes of this article, the knowledge worker is defined as a person whose passion, work and professional career are connected with active participation in the knowledge management processes, such as: localisation, acquisition, sharing, development, use and preservation of knowledge. As results from the above definition, to consider a given person a knowledge worker, he or she must possess knowledge, skills, experience, social competences, etc. as well as want and be able to develop, share and use them in the decision making process and actions taken. Furthermore, the said knowledge, skills and experience of the employee must be important for the organisation he or she works in, i.e. allow accomplishment of goals assumed by it. If the knowledge possessed by the worker is not useful for the specific organisation, such a person cannot be considered a knowledge worker of this organisation (Figurska, 2015, p. 84-86).

Analysis of literature devoted to knowledge workers as well as conclusions resulting from own studies allow for a more detailed description of this group of workers as persons characterised with high intellectual potential, multi-thread, perspective-oriented and critical thinking, ability to formulate problems and look for solutions, inquisitiveness, systematic learning with use of various methods, systematic extension of the scope of their professional skills, interpersonal competences and ability to use ICT tools, high internal motivation, presentation of a specific system of values, treating failures as challenges to act on, treating changes as opportunities and their skilful use with benefit for themselves and the organisation they work for, independence and mobility, ability to build a network of relations enabling knowledge sharing and dissemination, awareness of their own role in the organisation and setting high requirements for themselves, commitment to work, ability to manage personal knowledge, creativity and innovativeness as well as generation of the highest added value and, thus, highest effect on the value of their organisation (cf. Davenport, 2007; Mikuła, 2006; Morawski, 2003; Blaskova and Grazulis, 2009; Kelley and Caplan, 1993; Figurska, 2012; Figurska, 2019; Kowalski, 2011; Gaižauskienė, Tunčikiene, 2016; Turriago-Hoyos, Thoene, Arjoon, 2016).

Knowledge Worker and the Organisation - Mutual Expectations

To bind a knowledge worker with the organisation and gain his or her loyalty and full commitment, the organisations must know and try to meet the expectations of the knowledge employees, whereas the employees must know and try to meet the expectations set by the organisations.

The expectations of the worker towards the organisation he or she works for are determined by broadly understood needs, both basic ones such as income allowing for a decent life as well as higher tier needs, including the need for: affiliation, respect, recognition and self-fulfilment the satisfaction of which is of fundamental significance for the knowledge workers. Generally, the expectations set by the knowledge worker for the organisation include, without limitations: (Figurska, 2016, p. 196).

- securing the financial needs;
- creation of a proper, friendly work environment;
- proper management of human resources.

Securing the financial needs of the knowledge employee through guarantee of the relevant level of remuneration, corresponding to his or her work contribution and accepted responsibility is, in a way,

fulfilment of the conditions of the contract concluded by the organisation with the employee at the time of employment. The level of remuneration is one of the basic factors taken into consideration by knowledge employees aware of their worth when choosing work.

To meet the expectations set before the knowledge employee by the organisation, he or she needs an adequate work environment allowing for effective work and accomplishment of the set goals. Such an environment comprises broadly understood work conditions, defined as "the overall physical (material) and psychosocial factors the source of which is the work environment and having effect on the persons performing work" (Pocztowski, 2008, p. 377). The material work environment includes, inter alia, such factors as: workplace location, workstation equipment, lighting, noise, worktime and many other. Care about material work conditions, determining efficiency and productivity of the worker to a great extent, lies mainly with the employer (Schultz and Schultz, 2006).

On the other hand, the psychosocial work environment includes: social and amenity conditions, engagement of employees in the life of the organisation and interpersonal relations (Jasińska, 2010). Social and amenity conditions relate to satisfaction of social and amenity needs of the knowledge workers as well as various privileges resulting from being an employee of the given organisation (e.g. integration trips, additional health insurance, etc.). Involvement of knowledge workers in the life of the organisation first and foremost strengthens their participation in sharing the working conditions and functioning of the organisation. In turn, interpersonal relations in the organisation are a derivative of mutual relations between its employees at various tiers (Jakimiuk, 2016, pp. 45-46).

Psychosocial factors and their effect on the human being are linked with the material conditions of the workplace, but they are also significantly dependant on the organisational culture, the educational nature of which is expressed in the employees' adaptation to the values, norms and principles of conduct effective in the organisation and to external requirements and in coping with them (Jakimiuk, 2016, p. 45).

Analysing the expectations of knowledge workers as regards the work environment, special attention must be paid to the equipment of the workstation with modern IT and communication technologies, thus allowing them active participation in knowledge management processes. However, it is worth emphasising that the usefulness of those tools is not determined by their complexity level but by their adaptation to the needs of the knowledge worker, which need result from the specific nature of their work.

The knowledge worker also expects proper work organisation. In particular, emphasis must be put on clear determination of the scope of each worker's rights and duties so as to avoid any unnecessary competence-related disputes and lack of clarity in the process of employee evaluation, which have a negative impact on the involvement of the worker in work. Furthermore, proper organisation is the organisation where the knowledge worker – who is required, for instance, to develop and share their knowledge – has time to learn, think, contact other employees and build a network of relations.

As mentioned earlier, psychosocial factors of the work environment and their effect on the human being depend on the organisational culture to a considerable degree. As the knowledge worker works with and on the basis of knowledge, they expect that the culture of the organisation will make it easier for them to participate in knowledge management processes. Such a culture motivates them to develop knowledge and to actively seek its sources in and out of the organisation, encourages to share the knowledge with other employees and learn from them, mobilises to use and preserve the knowledge that is worth remembering in the organisation. The organisation culture that fosters knowledge management is based on mutual trust as well as promotes lifelong learning and cooperation between employees (cf. Figurska, 2018; Sokół and Figurska, 2017).

The knowledge worker also expects proper management of human resources, with respect for their own dignity, individuality and independence. They expect that they will be treated as an individual, not a part of a larger system, that their achievements will be appreciated and their mistakes will be tolerated to a reasonable extent. They expect creation of possibility of professional development, a

sense that they are treated as an employee and as a human being, agreement between the performed work and their competence, professional challenges, inclusion in the decision-making process and feedback concerning issues related to their work. What is more, the knowledge worker expects a competent superior who is not only an expert in their field, but also a role model as a human being and as a superior (Figurska, 2015, pp. 93-94).

What the organisation expects from knowledge workers are determined for instance by its nature (e.g. the industry it operates it, its mission and strategy, applied technologies, organisational culture etc.) as well as external conditions (e.g. changes occurring in the surroundings). In general, the organisation first and foremost expects the following from the knowledge worker:

- extensive knowledge suited to the needs of the organisation (both general and specialised knowledge) as well as experience and a rich set of skills;
- taking actions on knowledge and based on knowledge;
- presentation of expected attitudes and behaviours.

Possession of knowledge is the basic requirement the organisations set for knowledge workers who work for them. Proper level of formal knowledge confirmed with a diploma, a certificate etc. is usually one of the basic criteria taken into consideration in the process of recruitment and selection of candidates for work, who will be required to take action based on knowledge. Analogously, the knowledge worker is also expected experience and a set of skills important in the knowledge-based economy (e.g. communication, analytical, conceptual, technical, interpersonal, organisational skills etc.), which skills allow them to work effectively.

Organisations expect that knowledge workers will take action on the basis of knowledge, that is they will participate in knowledge management processes. In a dynamically transforming surroundings, the knowledge important today may be obsolete tomorrow, so having the knowledge suited to the needs of the organisation requires that the worker, on a regular basis, locates the knowledge and obtains it from various sources in and out of the organisation as well as develops knowledge using various learning methods. What is also of high significance is the sharing of knowledge with colleagues, which process is one of the knowledge management processes that are most difficult to implement, as well as the preservation of knowledge important for the organisation, which leads to building organisational memory. All processes specified above are very important. However, they acquire special merit when they lead to creative application of knowledge in decision-making and action-taking. This is so as unapplied knowledge is knowledge useless for the organisation.

Moreover, the organisations expect that knowledge workers present specific attitudes and behaviours. M. Rokeach defines attitude as a relatively stable organisation of beliefs concerning a specific object or situation, one which predisposes the given person to react to them in a specific manner (Rokeach,1968, p. 112). An attitude can be towards a person or people, institutions, ideas, notions, theories etc. that are important for the individual. Attitudes are reinforced by beliefs, they are most often related to strong feelings and generate specific behaviours (Oppenheim, 2004, p. 204) Please note that the knowledge possessed by the knowledge worker affects the attitudes exhibited by them as knowledge facilitates rejection of stereotypes and prejudices in the process of perception and evaluation of the surrounding reality.

In the domain of attitudes, knowledge workers are first of all expected to have a positive attitude (towards the organisation, co-workers, performed work etc.) and present a proactive attitude, which is characterised by taking responsibility for their actions and decisions, taking action exceeding the imposed duties, noticing opportunities and using them skilfully, continued seeking (of new solutions, possibilities etc.) and going beyond the routine giving the sense of safety. A proactive approach of the knowledge worker is positively correlated with their commitment to work, work satisfaction as well as creativity and innovativeness.

Knowledge of mutual expectations of the knowledge worker and the organisation where they work allows determining the following (Figurska, 2016, p. 200):

- a gap in the expectations of the organisation that results from failure to adapt that which the worker offers the organisation to its expectations towards the knowledge worker;
- a gap in the expectations of the knowledge worker that results from failure to adapt that which the organisation offers the worker to their expectations towards the organisation.

The knowledge of the specified gaps in the expectations is the point of departure to determine the possible, and to select the best, means to eliminate them according to the assumed criteria for their evaluation.

Knowledge Worker's Creativity and Its Determinants

As mentioned earlier, one of the features of the knowledge worker, which is expected by the organisation at the same time, is creativity, understood as a feature of every human being (Brzeziński, 2009) that allows them to make creative work. It is perhaps worthwhile to point out that there is interplay between knowledge and creativity. Even though it is said that creativity can result from inspirations, e.g. breath of the spirit or creative anxiety, the literature shows there are a lot of proponents of the idea that it results from hard work. Please note that some creative work results from performed work, e.g. acquired knowledge. Consistent work and intense interest in a specific field, that is acquisition of knowledge related to it, lead to creative achievements. It is often the case that interests, thinking about them and following related processes become an inspiration to creative acts. This is how the theoretical and observational material is gathered, which is a contribution in the performed work. However, please note that the origin of many a creative work was preceded by certain physical and intellectual effort.

The creativity of the knowledge worker depends on their personal traits and environmental factors, organisational ones in this case. Therefore, the paper will now go on to present selected traits of a creative knowledge worker and then to discuss the organisational factors determining their creativity.

A creative knowledge worker should first and foremost strive to deepen both their general and specialised knowledge. Interest are often an internal motivator to perform work and knowledge allows performing them at the required level so that the effect of human work has proper creative dimensions. In addition, such a worker is thought to be able to use the potential of their intuition and intelligence. Intuition, though hard to grasp, highly individual and specific to the given person, may be a proper point of reference in seeking proper solutions (Sokół, 2015).

When presenting selected skills of a creative knowledge, it might be said that they, performing their work, should take on new tasks, which is also related to the process of acquiring new knowledge – even if the given task has not been performed by them yet and there is fear that mistakes will be made. It needs to be remembered that creative seeking of solutions entails making mistakes, which is a very important form of learning and may lead to finding the right solution. A creative knowledge worker should also commit to work – creativity requires intellectual effort, knowledge and time.

An additional, vital and characteristic feature of a creative knowledge worker is that they are open to experiences. This factor is regarded as the most related to creativity and knowledge at the same time as it was proven that creative people that are open to novelty generate much more novel ideas and are turned towards acquiring new knowledge (Kaufman, 2011). Moreover, a creative knowledge worker should trust their beliefs and ideas and that they will be approved of by others. They should be resolute but at the same time open to the opinion of others and they should exhibit some degree of agreeableness, which allows them to adopt solutions suggested by other employees involved in the decision-making and creative process. However, agreeableness is the feature that is the least correlated with creativity, which is confirmed by studies conducted by Feista (1998), which showed that scientists of considerable creative potential were less agreeable than their less creative colleagues.

The creativity of a knowledge worker is also connected with perseverance, which allows actually completing the task. Perseverance is determined by proper motivation – motivation for achievement and internal motivation. Those character-related conditions are vital for creativity as those traits combined allow rational and effective evaluation of actions taken to develop new ideas, processes and products (Sokół, 2015).

Creative knowledge workers are also described as conscientious, careful, orderly, solid, responsible and composed. However, please note that the conscientiousness of creative knowledge workers should be moderate as too much of it may lead to taking action that hinders creativity. Studies show that there is a strong domain relationship between conscientiousness and creativity, which means that e.g. artistic creativity is not correlated with conscientiousness (Kaufman, 2011).
Moreover, a creative knowledge worker should be focused on individual work but be able to work in group as well. Teamwork often allows achieving a level of creative solutions higher than if the worker performed their work on their own.

For creativity to develop in the organisation and generate added value, the organisation must create conditions fostering creativity development. Evaluating the organisation in terms of its effectiveness in developing creativity of knowledge workers is very difficult as the phenomenon at hand is a complex one. It reflects the traits of organisation members, its characteristics and the scope of performed task as well as the requirements imposed on it. To be able to generate effectiveness and efficiency of work of such workers, the following is to be done (Sokół, 2015):

1. create a proper structure of the organisation and its member composition. To that end, psychological examinations are often conducted to assess individual members of a prospective group so that activity maximisation is achieved;
2. create a proper culture of organisation, which fosters creativity (Franková, 2011);
3. build proper two-way communication, create the possibilities of monitoring, mutual support and prediction of behaviours of other organisation members as well as the possibility to create a joint mental model of the group (Puccio, 1999);
4. put emphasis on creativity-fostering leadership as it is mostly the managers that facilitate creativity development by implementing proper management practices;
5. build a motivational system for knowledge workers, one which appreciates their creative effort. A prize for creativity can be appreciation, power, celebration or leisure; nevertheless, the prize cannot become the end of its own as it may lead to deterioration of relations in the team and contribute to its disintegration (Luecke, 2003);
6. create the atmosphere of trust, learning and development in the organisation, one which facilitates knowledge sharing. Studies show that organisation members are inclined to share their knowledge with those who they trust (Politis, 2003) and trust also has a strong positive impact on contentment at work and commitment to the organisation and it reduces the level of felt stress;
7. build a conviction of general effectiveness of operation of the organisation (Guzzo, Shea, 1992). Some scientists claim that collective effectiveness is the product of its individual perception (Bandura, 1982); on the other hand, others state that collective effectiveness often results from organisation members' joint conviction concerning the acquisition of proper results for the group (Gully et al., 2002);
8. take care of satisfaction of organisation members (Lester et al., 2002) because when people feel more at ease with others, they are less inclined to fear judgment of their own ideas, which improves their inclination towards sharing their ideas (Anderson i West, 1998). On the other hand, however, excessive level of satisfaction with belonging to a team may reduce the number of ideas as people, afraid of conflicts, may avoid confrontation;
9. find balance between cooperation and competition in the organisation, whereby it is difficult to clearly determine the level of cooperation and competition conducive to generation of ideas. One study showed that competition limits creativity (Amabile, 1982), whereas another one that competition may drive creativity (Clydesdale, 2006).

Organisational barriers may also limit the creativity of knowledge workers. Several studies found that internal disputes, conservatism and stiff atmosphere of cooperation as well as formal leadership structure preclude creativity (Franková, 2011).

Organisational determinants of creativity of knowledge workers in the light of study results

In 2016, a survey study was carried out regarding knowledge management in organisations, addressed to employees having at least secondary education and considered knowledge workers, who worked in organisations that vary in size and industry. 445 persons participated in the study. The spatial scope of the study covered the Słupsk sub-region, located in the central part of Central Pomerania in northern Poland. The results of the study allowed, inter alia, to determine whether the work environment is conducive to creativity of knowledge workers in the practice of organisation functioning.

Many organisations implement and apply various initiatives not being aware that they are related to knowledge and can affect creativity of knowledge workers. Therefore, the respondents were asked if and which of the initiatives specified in the initiative survey are applied in the organisations they work for. Analysing the results, emphasis was placed on the initiatives that support development of knowledge workers' creativity directly or indirectly. These included: gathering and analysis of ideas of the employees, creating knowledge teams, organisation of the so-called brainstorming and linking the incentive system with knowledge sharing.

Slightly over six per ten participants of the study indicated that their organisations gather and analyse ideas of the workers which is a significant factor determining their creativity. Openness to the ideas of workers and their analysis and, first and foremost, elimination of the fears of workers related to presentation of their own ideas, are important factors opening the organisation to increase in creativity. On the other hand, generation of new knowledge and new ideas through organisation of the so-called brainstorming in the organisations they work for was indicated by 36.6% of respondents. Other initiatives listed above were applied more rarely in the organisations as creation of knowledge teams was confirmed by less than 11% of respondents, whereas linking the incentive system with knowledge sharing in the organisations they work for was declared by 11.5% of study participants.

As already mentioned earlier in this article, organisational culture is a very important element of the organisational work environment. Such elements of the organisational culture as trust, cooperation and open, unhampered communication are the most important factors determining implementation of the knowledge and information sharing process, contributing to increase in the knowledge resources of the organisation and increasing the potential capability of using them creatively. Thus, it seemed interesting to see how the respondents evaluate trust, cooperation and communication with the superiors, inferiors and co-workers and, therefore, they were requested to evaluate the specified organisational culture elements, awarding them points, where 1 point was the lowest score and 5 points the highest.

In the light of results of the study, trust, cooperation and communication were given the highest number of the highest scores (5 points) in relation to co-workers, whereas the lowest number of those - in relation to the inferiors. On the other hand, the highest number of the lowest scores (1 point) in relation to the particular elements of the organisational culture were granted to: trusting the superiors, cooperation with superiors and communication with the superiors.

Table 1: Selected elements of the organisational culture conducive to knowledge management and development of creativity (prepared based on own studies)

Elements of the organisational culture	Ponts					no answer
	1	2	3	4	5	
	in %					
Trust						
trust in co-workers	2.9	11.5	26.3	28.1	24.7	6.5
trust in superiors	5.6	8.3	23.1	31.5	23.6	7.9
trust in subordinates	1.7	3.4	8.3	48.3	13.3	25.0
Cooperation						
cooperation with co-workers	0.5	3.8	20.5	38.4	26.7	10.1
cooperation with superiors	4.5	9.0	25.8	27.6	22.5	10.6
cooperation with subordinates	1.7	3.4	11.7	56.7	13.3	13.3
Communication						
communication with co-workers	1.6	5.6	14.2	38.4	29.0	11.2
communication with superiors	3.8	11.5	16.9	33.7	22.9	11.2
communication with subordinates	0,0	0,0	5,0	66,7	8,3	20,0

Respondents were also requested to indicate which issues specified in the next question are encountered in their organisations and what is their intensity. They had to award points to the given issues, where 1 point meant: the issue does not exist in my organisation, whereas 5 points meant: it is a very important issue in my organisation. Table 2 presents data regarding issues occurrence of which in organisations has a negative effect on development of creativity of workers.

Table 2: Selected issues of organisations affecting knowledge management and development of creativity (prepared based on own studies)

Problems in the organisation	points					no answer
	1	2	3	4	5	
	in %					
knowledge is treated as a source of power and advantage over others	30.3	13.0	21.4	11.2	14.6	9.5
lack of time - for learning, knowledge sharing, etc.	21.4	6.7	20.9	19.1	22.9	9.0
information flow is incorrect	27.6	12.8	19.6	10.8	20.2	9.0
new ideas, concepts are ignored	34.8	14.6	15.7	13.9	9.5	11.4
lack of tolerance for making mistakes	37.5	16.4	16.2	6.3	11.7	11.9
lack of leadership	48.8	10.8	11.2	4.5	12.1	12.6

The analysis of respondents' replies shows that lack of time (for learning, knowledge sharing, etc.) as well as improper flow of information were most frequently indicated by the study participants as a very big problem of their organisations. On the other hand, almost 38% of respondents indicated that they did not observe lack of tolerance for mistakes made in their organisation, and 35% of respondents confirmed definitively that there is no problem with informing of new concepts and ideas in their organisations.

Managers play a special role in the process of creativity development in the organisations and, thus, the next question described various activities and behaviours of the superiors and the respondents were asked to indicate if and to what extent those were true. The respondents had to award points to

the particular statements, where 1 point meant: I do not agree with this statement at all, whereas 5 points meant: I fully agree with this statement. All replies are presented in table 3.
Over 1/4 of respondents indicated that they are definitely treated with respect by their superiors, whereas nearly 1/5 of responding knowledge workers definitively confirmed the fact that their superiors take care of their development and use their knowledge and experience fully.

Table 3: Superiors and their effect on development of creativity in the investigated organisations (based on own studies)

Superiors…	**Points**					no answer
	1	2	3	4	5	
	in %					
care for employees' development	17.5	13.5	23.6	17.3	19.1	9.0
share their experience with employees	11.5	14.6	20.7	25.8	17.3	10.1
mobilize employees to cooperate with their own example	16.4	16.9	24.0	15.7	16.4	10.6
encourage employees to be creative and innovative	22.9	16.6	22.0	13.5	14.2	10.8
treat employees with respect	11.9	11.2	18.0	23.2	26.3	9.4
notice and reward employees' successes	19.8	16.4	25.8	13.5	13.9	10.6
give employees great independence in action	12.8	13.0	22.9	23.2	16.9	11.2
take full advantage of employees' knowledge and experience	6.3	14.6	27.0	21.3	19.6	11.2

On the other hand, nearly 23% of responding knowledge workers declared that their superiors do not encourage creativity and innovation at all, which is symptomatic and very alarming in the aspect of formation of the organisational work environment conducive to development of creativity. Furthermore, every fifth respondent confirmed that the superiors do not recognise or award the successes of their employees in their organisations which is highly discouraging and is not conducive to their creativity.

Conclusions

Creativity of the knowledge workers as well as its significance and development in organisations as a research category in management sciences has recently become extremely popular, inspiring scholars to identify further scientific areas and contribute to the development of this issue. Despite that, this concept is still insufficiently identified, both in theoretical and empiric terms. The analyses presented in the subject literature refer both to qualitative and quantitative studies, extending and increasing knowledge on this issue, so important for development of the contemporary organisation.

The results of the conducted survey study presented in this article confirmed that the organisational work environment requires taking a number of actions oriented at such its formation that it is conducive to development of creativity of the knowledge workers in organisations. In particular, these actions should be oriented at:

- building an organisational culture based on trust, cooperation and open, honest communication conducive to knowledge sharing, tolerating mistakes to a reasonable extent,
- proper work organisation, giving the knowledge workers time for thinking, discussions, sharing knowledge with other employees,
- dignity-oriented management of knowledge workers, based rather on values than "farm-like", consisting in application of traditional employee management tools in the form of a "carrot" (reward) and "stick" (penalty).

A special role in the process of creation of the organisational work environment conducive to development of creativity must be attributed to the managers who, through the decisions they make and actions oriented at building of such an environment, take care, in the context of long-term development, of progress and innovativeness, thus having effect on generation of added value in the future. The superiors of knowledge workers should remember that "limitation of human creation and creativity, lack of interest in using the capabilities, skills, knowledge and experience of the particular persons in full as well as depriving them of impact on the decisions made and any actions taken (...) does not result in accomplishment of goals, either by individuals or the entire organisation, but rather gives rise to conflict situations" (Mazurkiewicz, Uryniak, 2006, p. 231).

Creativity of knowledge workers is a complex issue. This article is not exhaustive with regard to its subject but is a basis for further considerations on creativity.

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El Uso De Las Bases De Datos En La Redacción De Tesis Jurídicas

The Use of Databases in The Drafting of Undergraduate Legal Theses

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Resumen

El presente estudio analiza el uso de las bases de datos principales: Web of Science y Scopus en la redacción de tesis jurídicas de pregrado. Se consultaron los repositorios de acceso libre de tesis de cuatro facultades de derecho de universidades latinoamericanas que están en el ranquin Scimago (2019). Se analizaron las referencias donde se citan los artículos publicados en revistas indizadas en Web of Science y Scopus, que fundamentan los antecedentes y parte de la teoría de las investigaciones. Se concluyó que la cita de artículos en estas bases no pasa el 49% sumando los que están de manera individual en cada una de ellas y las que se encuentran en ambas. El porcentaje de acceso a estas bases también es restringido, no supera el 12%.

Palabras clave: Scopus, Web Of Science, Tesis, Ranquin.

Abstract

The present study analyzes the use of the main databases: Web of Science and Scopus in the drafting of undergraduate legal thesis. The free-access thesis repositories of four law faculties in Latin American universities that are in the ranquin Scimago (2019) were consulted. The references were analyzed in what part of the published articles in journals indexed in WoS and Scopus are cited, which are based on the background and a part of the research theory. It was concluded that the article citations from these databases does not reach 49%, adding the ones those are in WoS and Scopus individually and in both databases. The percentage of access into these databases is also restricted; it does not exceed 12%.

Keywords: Scopus, Web Of Science, Thesis, Ranquin.

Introducción

El propósito de la presente investigación es analizar el uso de los artículos de las revistas indizadas en Scopus y Web of Science en la redacción de las tesis jurídicas de pregrado, teniendo en cuenta el ranquin de las facultades de derecho de Latinoamérica, según Scimago (2019). Se ha considerado el indicador de investigación porque es uno de los más relevantes de este ranquin, similar al de innovación e impacto social.

Las bases de datos: Scopus y Web of Science proporcionan teoría relevante, confiable y actual para la redacción de los trabajos de investigación jurídica. Se complementan con las otras bases especializadas: vLex Global, La Ley digital, biblioteca virtual Tirant, Tirant on line, Derecho de la Unión Europea: Información y Recursos, Portal legislativo del BOE, etc. (Universidad Autónoma de Barcelona, 2019); asimismo, con los diversos repositorios (de tesis) de las facultades de derecho que se publican a través de la web.

Vera-Baceta, Thelwall y Kousha (2019) establecen la importancia de Scopus y Web of Science en el desarrollo de la investigación. Incluso, las citaciones que se realizan a través de Google Scholar, corresponden en una mayor proporción a Scopus y WOS (Martín-Martín, Orduña-Malea, Thelwall, Delgado López-Cózar, 2018); son las más citadas y predominantes.

El estudio es relevante porque aún no se ha estudiado el uso de las fuentes: WOS y Scopus en la redacción de las tesis jurídicas, según el ranquin Scimago (2019). Su uso permite mejorar la calidad de la teoría y la discusión de resultados de las tesis jurídicas de pregrado.

Fundamentación

Fundamento de la Teoría

La tesis es una investigación novedosa, original, polémica, incluso controversial en la que el autor fundamenta una postura en función de sus hallazgos. Su construcción es sistemática: desde el problema hasta la solución del mismo. No se trata de un trabajo de mera compilación, sino de una investigación con fundamento metodológico, teórico, una adecuada redacción y que aporte a la ciencia. Una parte relevante de la tesis es el marco teórico. Por eso, esta parte de la tesis no solo se trata de un tema de estilo o de redacción, sino de una cuestión epistemológica y conceptual en función del objeto de estudio (Gallego Ramos, 2018). Debe relacionarse con las variables de estudio, las dimensiones y el enfoque teórico.

La teoría se obtiene de las fuentes primarias o secundarias. Estas deben ser confiables, de especialistas o autoridades en el tema, ser cualificadas, imparciales, veraces, ser contrastables con otros especialistas u organizaciones igualmente cualificadas e imparciales para verificar si concuerdan o no (Weston, 2006). Implica seleccionar pertinentemente el argumento de autoridad (especialista, una organización) que tenga credibilidad, imparcialidad y sea un experto sobre la materia o tema.

Los documentos, que contienen a la teoría, deben ser fiables, auténticos, implica la competencia del autor, reproducen los hechos sociales, los valores, toman en cuenta el contexto (Sierra, 2001). En este caso, se trata de un contexto científico, competitivo, donde el conocimiento se jerarquiza, un claro ejemplo es la valoración por cuartiles de las revistas indizadas en Scopus.

La teoría en la investigación sirve de base para la discusión de resultados, la contrastación de hipótesis y en base a esto la creación de nuevo conocimiento.

Las fuentes de investigación jurídica

Son diversas y consolidan el marco teórico: la ley, la jurisprudencia, la doctrina jurídica constituido por los preceptos, las teorías científicas que desarrollan los expertos en esta disciplina (Álvarez, 2014); sirven para interpretar las normas y orientar su aplicación.

Las principales revistas jurídicas publicadas en Scopus y Web of Science

El total de revistas jurídicas en la base de Scopus es de 653 y de acceso abierto 76 que representa un 11.63%. También se muestran las revistas que están en ambas bases de datos (Web of Science y Scopus) incluidas en Scimago (un total de 409), de las cuales solo 36 son de acceso abierto, que equivale a un 8.80%.

En el ámbito latinoamericano, la cantidad de revistas jurídicas en Scopus es de 28, el cual equivale a un 4.28% del total. La presencia científica en el ámbito jurídico es muy baja. De las 28 revistas, 27 son de acceso abierto. Las revistas que están en ambas bases de datos (Scopus y Web of Science), en Latinoamérica, son 10, que representan a un 35.7%.

A nivel de jerarquía, de revistas latinoamericanas, no existe ninguna que esté en Q1, nueve están en Q2; ocho en Q3 y once en Q4. Refleja el desnivel en relación con Europa Oriental, Norteamérica que tienen mayor cantidad de revistas jurídicas en Q1. Europa Oriental cuenta con 386 revistas en total, de las cuales 84 están en Q1; Norteamérica con 193 revistas, de estas 72 pertenecen a Q1.

En el caso de Web of Science, registra 451 revistas jurídicas, de las cuales 64 tienen acceso abierto, que representa un 2.88%.

Los datos evidencian que, en el caso latinoamericano, los ránquines de las revistas jurídicas no están en un buen nivel y la cantidad de estas es reducida.

A partir de la información analizada de las bases de datos, se infiere una contradicción, con la sociedad del conocimiento ya que esta permite mayor comunicación, integración e intercambio de información; en el ámbito científico no es cierto, el estudiante de pregrado quien requiere de fuentes para su tesis jurídica no dispone de los recursos suficientes para pagar por el acceso a algunos artículos que necesita y solamente debe consultar las de acceso abierto (que son reducidas). Esto impide el acceso a la información de mejor calidad.

Método

Se ha realizado un estudio descriptivo interpretativo, con una muestra intencional. Se ha realizado un análisis sobre el uso de las bases de datos en la redacción en las tesis jurídicas de pregrado, publicadas entre el 2018, 2019, en cuatro facultades de derecho de las universidades latinoamericanas (según Scimago, 2019), que han difundido sus trabajos a través de su página web o repositorios. Se han seleccionado las tesis, de acceso libre, sobre la temática relacionada con derecho y medio ambiente.

Análisis de Resultados Y Discusión

El presente análisis comprende una primera indagación sobre cómo los estudiantes y las universidades generan una cultura científica para citar las fuentes más relevantes y competitivas sobre investigación.

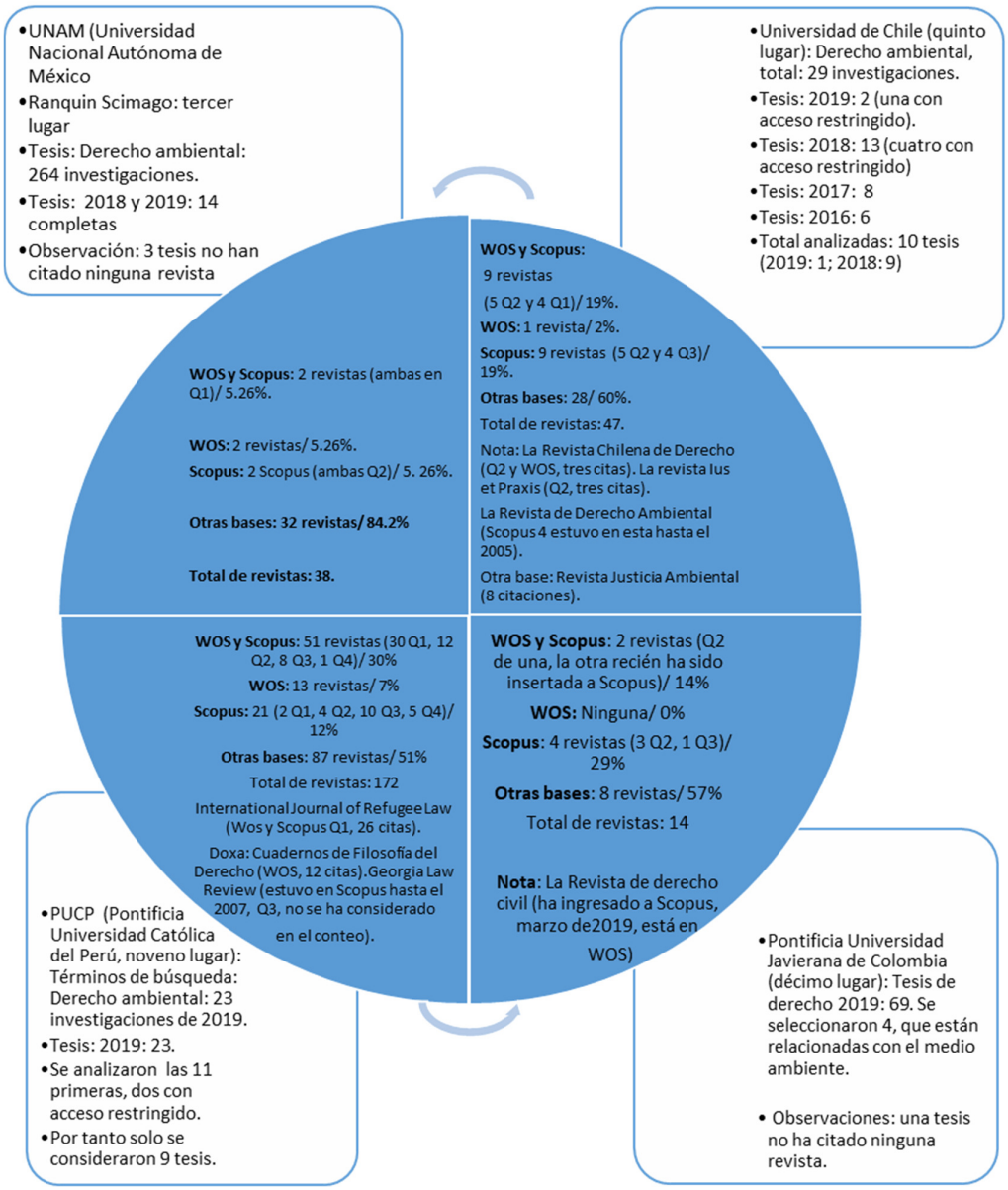

Figura 1: Revistas citadas en las tesis de pregrado relacionadas con derecho ambiental

Fuente: Elaborado por el autor, en base a las tesis consultadas de la web de las universidades

En base a las tesis analizadas de la UNAM, se aprecia que las revistas indizadas en Scopus y WOS tienen menor cantidad de citas que las demás revistas, no pasan el 5.26%, a diferencia de las que se encuentran en otras bases que representan un 84.2%, solamente de las tesis seleccionadas. La Universidad de Chile, de las 10 tesis analizadas relacionadas con la temática de derecho ambiental, se han citado 47 revistas; evidencian bajo porcentaje sobre la citación de artículos indizados en WOS y Scopus, no pasa el 19%; en cambio, las revistas de otras bases representan el 60%. La Pontificia Universidad Católica del Perú, de las nueve tesis analizadas, ha citado un total de 172 revistas; de estas no pasan el 30% que se encuentran en ambas bases (WOS y Scopus con predominancia de Q1). Las demás bases representan un 51%. La Pontificia Universidad Javeriana de Colombia, de 4 revistas analizadas, ha citado 14 revistas; de estas no sobrepasan el 29% en Scopus, las demás representan el 57%. Si se suma de cada universidad las revistas que están en Scopus, WOS y en ambas no llegan al 50%; la UNAM no pasa del 16%; la Universidad de Chile cuenta con un 40%; La PUCP llega a un 49%; y la Pontificia Universidad Javeriana tiene un 43%.

De los datos preliminares obtenidos, se colige que aún falta desarrollar una cultura científica sobre la citación de fuentes de mejor calidad, actuales (Sierra, 2001; Weston, 2006). No obstante, también es necesario reconocer que hay una tendencia a mejorar, como la prevalencia de una cantidad relevante de citas en los trabajos de la PUCP. Este caso es concordante con la apreciación de un grupo de estudiantes de una universidad privada de Lima Sur, del último año de derecho, que terminaron la redacción de tesis, quienes consideraron en un 66.66% (2018) que siempre utilizan argumentos de autoridad en su marco teórico. Obviamente, el hecho que no se cite más artículos de las revistas de las bases analizadas, no significa que una tesis carezca de valor, teniendo en cuenta que las fuentes, en investigaciones jurídicas, son diversas (Álvarez, 2014), como la doctrina, la norma, la jurisprudencia que se interrelacionan o triangulan en la construcción del marco teórico. Este es la base o la guía del investigador que permite explicar y fundar el problema, discutir los resultados, confirmar la teoría o estudios previos y además generar nuevos conocimientos.

La baja citación también se presenta por la restricción a las bases de datos, los que son de acceso libre no sobrepasa el 11.6%, el cual genera una controversia con la era de la información o la democratización de la información, esta no se puede dar si existe una buena cantidad de datos a los cuales no se tiene acceso. La paradoja de la sociedad del conocimiento es que se genera más ciencia, tecnología, pero con restricciones.

Del análisis, se evidencian algunas particularidades, la revista “International Journal of Refugee Law” , especializada en derecho internacional sobre migración forzada, a pesar de ser de acceso restringido ha sido citada 26 veces en las tesis de la PUCP; se debe tener en cuenta que es una Universidad privada y que los estudiantes sí tienen la posibilidad de pagar para acceder a los artículos científicos. La revista “Doxa”, de acceso abierto, ha sido citada unas 12 veces (indizada en la base de WOS). Esto demuestra una mayor tendencia a seleccionar fuentes de las bases de datos más importantes para la estructuración de las tesis jurídicas.

Es necesario aclarar que existen diversas líneas que se deben investigar, el uso de las fuentes por especialidades: penal, civil, administrativo, comercial, constitucional, etc. teniendo en cuenta el enfoque inter o transdisciplinar que incluyen a otros protagonistas y ciencias. Asimismo, el análisis se debe extender a más facultades de derecho, solo hemos tomado una pequeña muestra para evidenciar el uso de las bases de datos en las tesis jurídicas.

Conclusiones

Después del análisis realizado se concluye que aún persisten las restricciones para acceder a la ciencia en plena sociedad del conocimiento. Existe poca cultura científica para citar fuentes de mejor calidad de las bases de Web of Science y Scopus. No obstante, sí existe cierto progreso para usar fuentes de calidad y en una proporción ascendente como lo evidencia la PUCP a través de las citas realizadas en sus tesis jurídicas que están relacionadas con el medio ambiente.

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Anexo 1

Percepción de los estudiantes de una universidad privada de Lima Sur, sobre el uso de estrategias argumentativas en la redacción de tesis jurídicas (2018).

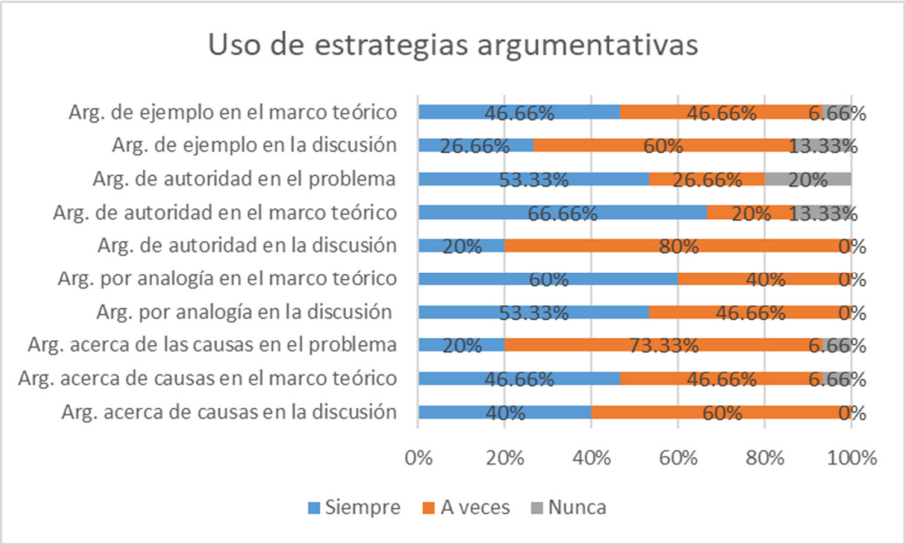

Figura 2: El uso de estrategias argumentativas: argumento de autoridad en el marco teórico.

Fuente: Elaborado por el investigador en base a la aplicación de un cuestionario a estudiantes de undécimo ciclo de derecho (2018).

Investigation of The Tendencies of Social Networking in The Modern Society

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Abstract

The article presents results of the investigation of Ukrainian society, conducted by popular social media in the period from December 2017 to December 2019. The research determines the share of adult population of Ukraine, who used social media in December 2019. The work demonstrates the dynamics of the social network reach of the adult population of Ukraine in the period from December 2017 to December 2019. The authors of the paper have composed polynomial trendlines of Ukrainian people reach on Facebook and Pinterest in the period from December 2017 to December 2019; exponential and power trendline of the reach on Twitter and YouTube of Ukrainian population in the period from December 2017 to December 2019; exponential and power trendline of Ukraine people reach on VKontakte and Instagram in the period from December 2017 to December 2019; polynomial trendline of Ukrainian population reach on Tumblr and others in the period from December 2017 to December 2019. The work gives a forecast of changes in the tendencies of behavior of Ukrainian population, who use the social media, for six future periods, i.e. January – June 2020. It is argued that the principal goal of people's social networking is to keep in touch with close people and relatives, as well as to review the news.

Keywords: Social Networks, Facebook, Internet, Society.

Introduction

Nowadays, social networking has become a necessary component of our life. They provide people with the opportunity to study, to discuss problems of their concern, to make friends and keep in touch with them, as well as to move to any country in the world, to read about its culture and traditions, etc. Moreover, social media shape a personal opinion and influence a person, whereas not always in a positive way. In some cases, communication in social networks causes negative, even fatal effects. Thus, there is a necessity to study the level of social networking, aimed at communication. Moreover,

there is a problem of the analytical investigating concerning argumentation of the period of stay in the social networks.

The goal of the work is to study the tendencies of the popular social networks reach of the adult population of Ukraine. Accomplishment of the set goal substantiates the necessity to solve the following tasks, particularly:

- to study the time a modern person spends in a social platform;
- to set the reason of stay in a social network;
- to make retrospective investigation concerning social media reach of adult population.

Literature Review

Investigation of the Facebook impact on the process of decision making by consumers concerning the choice of hotels was performed by Mohammd Abuhashesh, Mohammad Al-Khasawneh, Rand Al-Dmour and Ra'ed Masa'deh (2019). In the modern conditions, clients get more information about a commodity due to the opportunity to communicate in different social media, particularly Facebook (Varkaris E. and Neuhofer B., 2017). YouTube, Facebook, and Twitter take an important position in the modern world, because having viewed some podcasts with advertisement, potential clients can reconsider their life attitude, influence the purchasing process (Smith, A., Fischer, E., and Yongjian, C., 2012).

Brooke Auxier, Monica Anderson and Madhu Kumar (2019) shaped the following principal changes, related with the social platforms, studied by the Pew research center for the recent decade:

1. Social media sites appeared as a platform for communication, search of news and political involvement.
2. In the world, social media have become the key instrument for activists and their opponents.
3. For many Americans, smartphones have changed their way to access the Internet.
4. The increased use of mobile and social media has provoked discussions about the screen time impact on the youth of America and other countries.
5. Privacy and control for data have become the main problems in the post-Snowden age.
6. Technical platforms gave rise to the economy.
7. The Internet requests have become a common feature of life of both teenagers and adults.
8. Fabricated news and misinformation cause the increased concern.

Kathleen Stansberry, Janna Anderson and Lee Rainie (2019) consider that fifty years after connecting the first computer network, experts estimate that the digital life will change people’s life to better in the next fifty years. However, they give a notice that it will happen in case the people accept the reforms, which will secure improvement of cooperation, safety, main rights and economic justice.

The research by Esther Dyson (1998) (businesswoman, former journalist, founder of the ICANN Department and the Wellville company) is well-reasoned. She writes that “The impact of the Internet is not entirely technology-specific; it depends on what we do with it. It is so powerful that it has enabled us to satisfy many of our short-term desires instantly; we need to learn to think long-term. For the most part, we have done a bad use of this: people depend on short-term pleasures such as liking and other appraisals (say nothing about drugs and immediately available favors on the Internet), search of friends, but not making friends (and marriages); businesses to increase their

quarterly earnings and raise "stars", rather than invest in their people; non-profit organizations to run programs, but not establish institutions; and politicians for voting and power".

Moreover, investigation of social platforms has been codnucted both by foreign researchers (A. Voiskunskyi, A. Goldberg, D. Greenfield, K.Yang), and Ukrainian scientists (O. Bielinska, Yu. Danko, Ye. Akimova, Yu. Babayeva, A. Zhychkyna, O. Filatova and others). In their works, they reveal motivation of the users of the Internet and social networks: their impact on development and socialization of a person, on the users' personality, symptoms, reasons of the Internet addiction, as well as develop preventive measures concerning its prevention.

Methodology

To argue investigation of the system of social networking in the modern society, the following methods were used, particularly inductive, deductive –to collect, make systematization and processing of the information, obtained due to marketing research; economic analysis and comparison – to make analysis of the reasons for people's stay in the social networks; economic-mathematic modeling with application of Microsoft Excel – to compose models of the social media reach of Ukrainian population in the period of 2017-2019; graphical – to visualize results of the conducted investigation; abstract-logical – to make theoretical generalization and conclusion making.

Empirical Analysis and Discussions

In the recent decades, the world of technologies has crucially changed, both in Ukraine and in the whole world. Use of social media and online-planforms (including Facebook and Instagram) and technologies (for instance, the Internet, mobile phones and smartphone) has significantly increased. In some cases, it has caused an excessive level of use among the main layers of population, particularly youth.

Facebook, which has recently celebrated its 15th anniversary, is still one of the most used sites of the social media among the adult USA population. Almost seven-ten adults (69%) say they use the platform from time to time (Andrew Perrin And Monica Andersona Pril, 2019).

One can observe an annual growth of the number of people, who use social networks. The shares of Ukrainian population, who use the popular social media like Facebook, Pinterest, Twitter, YouTube, VKontakte, Instagram, Tumblr, Reddit, Google+, LinkedIn, StumbleUpon, News.ycombinator.com, Sina Weibo in the period of 2017-2019 are systemized in the Table 1.

Table 1: Popular social media reach of Ukrainian population in the period from December 2017 to December 2019, %

Date	Social Media							
	Facebook	Pinterest	Twitter	YouTube	VKontakte	Instagram	Tumblr	Other
2017-12	39.42	4.46	18.57	18.83	15.03	0.95	0.98	1.76
2018-01	54.13	7.04	15.22	12.88	5.53	1.53	1.45	2.22
2018-02	44.45	6.92	23.22	15.78	3.64	2.21	1.47	2.31
2018-03	55.85	9.12	6.95	16.11	3.54	2.86	2.18	3.39
2018-04	59.41	8.48	12.06	10.04	3.38	2.17	1.80	2.66
2018-05	4532	5.57	14.11	17.47	12.40	2.13	0.95	2.05
2018-06	47.82	5.21	13.58	16.85	11.27	2.64	0.94	1.69
2018-07	40.68	4.27	14.60	17.26	12.86	9.08	0.73	0.52
2018-08	56.20	6.50	7.31	10.49	4.77	12.41	0.98	1.34

2018-09	53.11	8.88	5.80	9.10	2.94	16.79	1.43	1.95
2018-10	49.23	10.11	9.65	13.15	5.76	8.25	1.58	2.27
2018-11	61.70	10.48	6.74	7.39	2.69	6.75	1.61	2.64
2018-12	45.21	14.68	22.14	6.85	3.62	2.39	1.67	3.44
2019-01	40.28	19.68	23.95	5.68	4.32	2.40	1.23	2.46
2019-02	43.00	25.98	10.54	9.96	2.33	3.94	1.52	2.73
2019-03	47.47	22.53	7.76	8.32	2.32	6.42	1.27	3.91
2019-04	54.96	19.32	5.71	10.92	1.74	4.08	1.25	2.02
2019-05	46.87	18.38	8.26	15.26	3.63	4.06	1.44	2.10
2019-06	52.42	18.90	8.69	9.59	3.87	3.02	1.48	2.03
2019-07	52.35	21.68	5.75	8.70	4.06	3.99	1.53	1.94
2019-08	57.69	22.08	4.99	6.52	2.70	3.80	1.45	0.77
2019-09	58.89	17.76	5.86	5.67	2.64	4.84	1.19	3.15
2019-10	57.63	16.53	6.56	5.63	2.10	8.97	0.94	1.64
2019-11	71.19	11.82	4.27	3.46	1.56	6.41	0.56	0.73
2019-12	73.56	11.49	3.99	3.05	0.97	6.20	0.46	0.28

Source: https://gs.statcounter.com/social-media-stats/all/ukraine#monthly-201712-201912

Thus, as of December 2019, in Ukraine there were two the most popular social networks, namely Facebook 73.56% and Pinterest 11.49%. Facebook currently has more than 11 million active users in Ukraine. The second position is occupied by a very interesting social platform, namely Pinterest, which is attractive due to some innovations: “Products like this” and Pinterest lens. Pinterest can be called a visual searching platform due to its searching options. The third place is taken by Instagram, i.e. 6.2 %, which keeps the position steady in time and by the territorial characteristic, i.e. everywhere and always. It appeared in 2010, rapidly won the favour of people, because its users liked the option to share videos and photos. The fifth position is occupied by YouTube, i.e. 3.05 %. However, there is a question, is it a social network or a search network? Twitter has lost its position a little, taking 3.99%. Hence, VKontakte took 0.97% of requests, but held a high position by the number of visitors among the sites of Ukraine. The seventh position is held by Tumblr, i.e. 0.46%. It is a favourite site of bloggers. They keep their blogs, comment and read others’ comments. The resource was created in 2007. Considering the fact of appearance and rapid growth of new Ukrainian social networks, they stay within the figure of 0.28%.

Since 2014, many new Ukrainian social networks have rapidly appeared after significant transformations in Ukrainian society, whereas there are earlier examples. The list of new Ukrainian social networks includes Ukrainians.co, Nimses.com, WEUA.info, SICH.UKR, Namaidani.com (since 2014), Cimbor.net, Famalyua.com, Yachudo.com (since 2010), Ukrainci.org.ua (since 2009) etc. To earn reputation, a social platform needs much time and costs. It is not an easy task, because Google has recently declared about the stop of supporting for its social network G+ in the nearest future. Thus, currently, Nimses, which has its specific feature, is the most prospective platform among the Ukrainian media. A general picture of the share of Ukraine’ adult population, who use social platforms, is depicted at the Fig. 1.

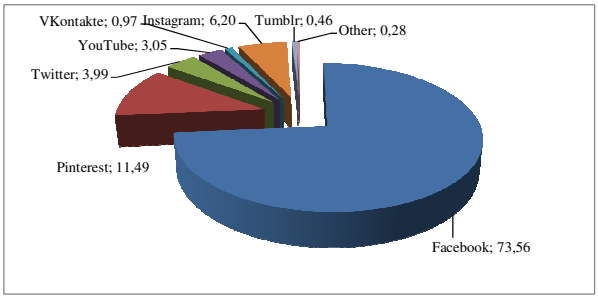

Fig. 1: The share of Ukraine's adult population, who used social media in December 2019, %.
Source: systemized by the authors on the base https://gs.statcounter.com

The popularity of social networks Facebook and Instagram among the Ukrainian population continues to increase in contrast to the fall in coverage of Russian social networks Vkontakte and Odnoklassniki. The key factor determining the significant popularity of Facebook in Ukraine (73.56%) is the ban on Russian social networks. Results of the conducted research demonstrate the dynamics of popular social network reach of Ukrainian population in the period of 2017-2019 using monthly dynamics of the indices (Fig. 2).

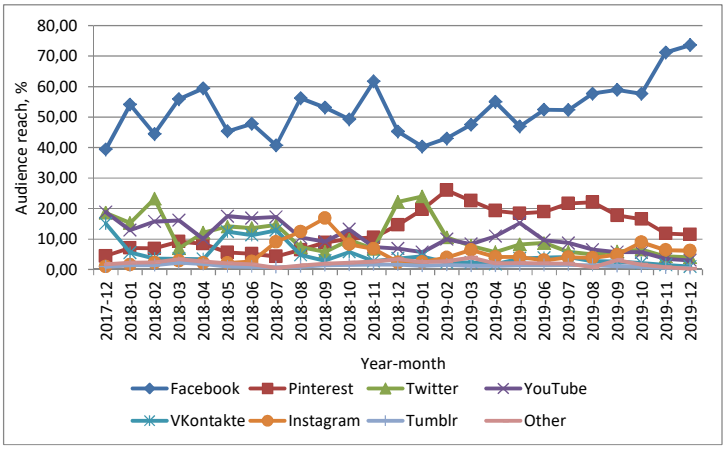

Fig. 2: Dynamics of the popular social network reach of the adult population of Ukraine in the period from December 2017 to December 2019, %.
Source: developed by the authors.

Investigation of the tendencies in behavior of Ukrainian people, who use popular social media, is conducted using the methods of economic-mathematic modeling with Microsoft Excel. The reach on Facebook and Pinterest of Ukrainian population is measured by polynomial models of the 2nd degree (Fig. 3).

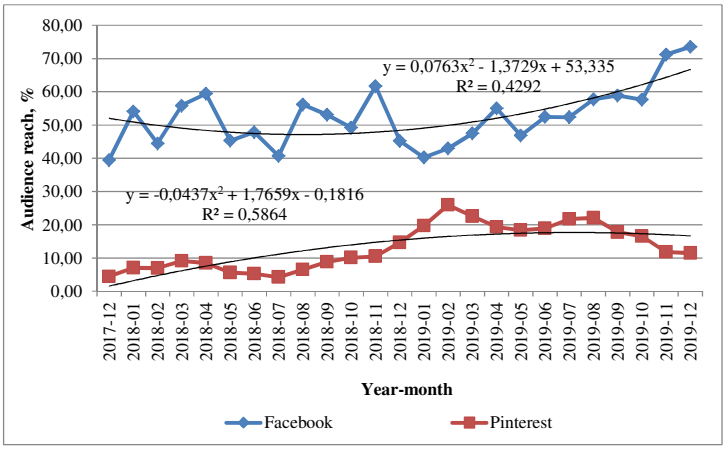

Fig. 3: Polynomial trendlines of the reach on Facebook and Pinterest of Ukrainian people in the period from December 2017 to December 2019, %.

Source: composed by the authors

The correlation-regression analysis on the reach on Facebook and Pinterest supplies the following results: the factor of determination $R^2 = 0.4292$ and 0.5864 respectively confirms that changes of the dependent variable y_t can be primarily explained by the changes of time t. Therefore, the relation type in the model is chosen correctly. It is determined that the obtained regression equations $y = 0.0763x^2 - 1.3729x + 53.335$ and $y = -0.0437x^2 + 1.7659x - 0.1816$ respectively, are significant, because examination of the relation essentiality under the F-criterion supplies the following results: 17.2943 > 4.2793 and 32.6093 > 4.2793 under the significance level a = 0.05 and the number of the freedom degrees k1 = 1 and k2 = 23. Thus, results of the correlation-regression modeling substantiate that the relation between the figure of the social media reach of the society and the time is functional and essential. The proposed regression equations are acceptable and recommended to be used as trend models for the future forecast.

The reach on Twitter and YouTube of Ukrainian society is measured by exponential and logarithmic models (Fig. 4).

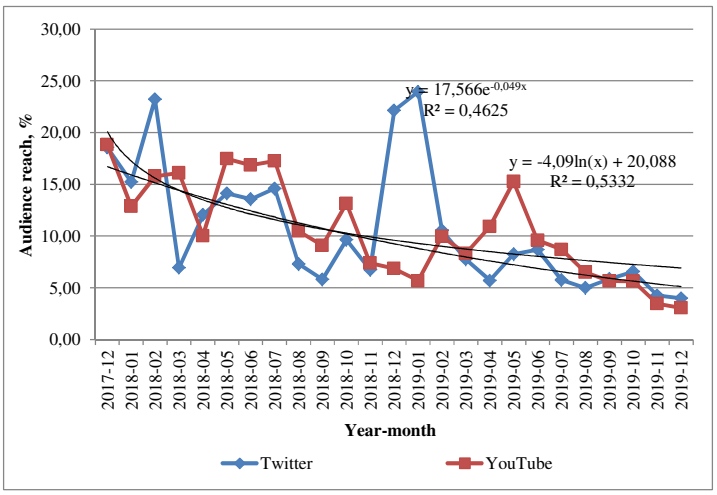

Fig. 4: Exponential and logarithmic trendlines of Twitter and YouTube reach of Ukrainian public in the period from December 2017 to December 2019, %.

Source: composed by the authors.

The correlation-regression modeling of the Twitter and YouTube reach of Ukrainian people supplies the following results: factor of determination R^2 = 0.4625 and 0.5332 respectively, confirms that changes of the dependent variable y_t can be primarily explained by the changes of time t. Therefore, the relation type in the model is chosen correctly. It is stated that the obtained regression equations $y = 17.566e^{-0,049x}$ and $y = -4.09\ln(x) + 20.088$ respectively, are significant, because examination of the relation essentiality under the Fisher criterion supplies the following results: 19.7907 > 4.2793 and 26.2716 > 4.2793 respectively. Thus, results of the correlation-regression analysis characterize that the relation between the value of the reach and time is functional and significant. The proposed regression equations are acceptable and recommended to be used as trend models for the future forecast.

The VKontakte and Instagram reach of Ukrainian population is calculated by using exponential and power law models (Fig. 5).

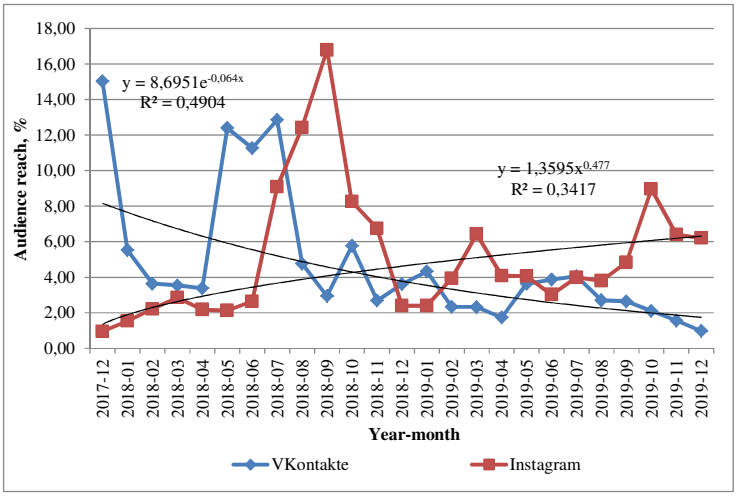

Fig. 5: Exponential and power law trendlines of the VKontakte and Instagram reach of Ukrainian people in period from December 2017 to December 2019, %.

Source: composed by the authors.

The correlation-regression analysis of the VKontakte and Instagram reach of Ukrainian people supplies the following results: the factor of determination R^2 = 0.4904 and 0.3417 respectively, confirms that changes of the dependent variable y_t can be partially explained by the changes of time t. Therefore, the relation type in the model is chosen correctly. It is argued that the obtained regression equations $y = 8.6951e^{-0,064x}$ and $y = 1.3595x^{0,477}$ respectively, are significant, because examination of the relation essentiality under the F-criterion supplies the following results: 22.1334 > 4.2793 and 11.9385 > 4.2793 under the level of significance a = 0.05 and the number of the freedom degrees k1 = 1 and k2 = 23. Thus, results of the correlation-regression modeling characterize that the relation between the value of the reach and time is functional and significant. The presented regression equations are acceptable and recommended to be used as the trend models for the future forecast.

Referring to results of the conducted research and composition of the trendlines of the social media reach of Ukrainian people, the authors of the work make forecast about the change of tendencies in the behaviour of Ukrainian population, who use popular social media like Facebook, Pinterest, Twitter, YouTube, VKontakte and Instagram. The forecast is made for the six future periods, i.e. January - June 2020 (Fig. 6).

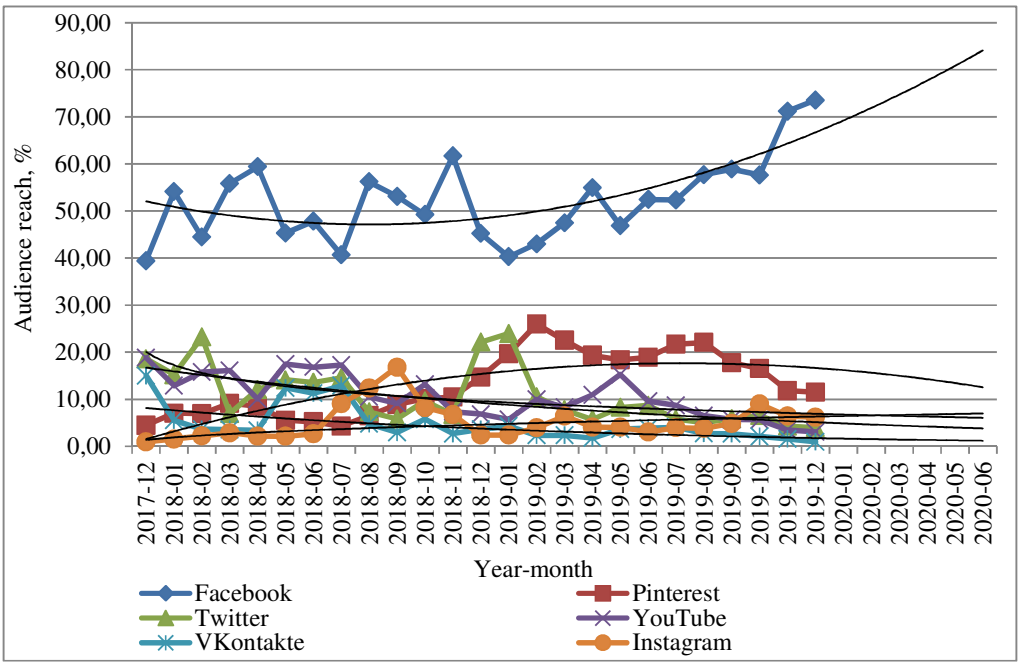

Fig. 6: Forecast of the change of tendencies in behaviour of Ukrainian people, who use popular social media, is made for the six future period, i.e. January-June 2020.

Source: competed by the authors

The above-studied trend models, depicting the dynamics of the reach of Ukrainian population, provide an adequate characteristic of the current tendency in society. The forecast of future tendencies suggests the further positive dynamics of the reach on Facebook, YouTube and Instagram. A little negative dynamics features the indices of the social platforms like Pinterest, Twitter and VKontakte. The determined type of dynamics of the index of reach of the population can be used to analyze and make forecast of the tendencies of future development.

Moreover, the authors of the work have conducted a marketing investigation in the Internet using the software https://docs.google.com/. (Link to the questionnaire https://docs.google.com/forms/d/1-NEiqINBOeF0lvIW9Or24naD39Sk97Xewo2OiFahNXo/edit?ts=5df52cf3#responses) concerning the spent time and principal goal of activity in the social networks.

Nevertheless, it is worth noting that practice of empiric sociological investigations demonstrates that the interviewing is conducted mainly in the local researches, being performed rare. The principal peculiarity of the social opinion interviewing is that usually a small share of some group of population is interviewed, whereas conclusions refer to the whole group. The main problem of the sampling is about what should be the correlation between the group in total and the share of its interviewed members.

To calculate the volume of sampling of the investigation of social networking, it is necessary to set a permissible scale of the sampling deviation and the level of the confidence figure. Values of those parameters will depend on the compromise between the value of more precise information and the necessity to expend the sampling.

The level of confidence figure suggests a degree of confidence that the figure of the observed element stays within the confident interval. Normally, the 95% confidence figure is used. A confidence interval (tolerable error) – is the allowable variation of the studied figures referring the real ones. The

interval size is set by the researcher with consideration of the requirements to information accuracy. In case the tolerable error is increased, the sampling size is reduced. In the current case, the size of the tolerable error accounts for 5%.

Under such initial data, the formula to measure the sampling volume will look like (Paniotto V., Maksymenko V., Kharchenko N., 2004):

$$n = 1 / (\Delta^2/0{,}9604 + 1/N)$$

where, n – is the sampling volume;
Δ – is the size of the tolerable error;
N – is the volume of the sampled population.

Using the above-presented formula, the volume of the current sampling will make: 1/(0.0025/0.9604+1/262) = 155.766. To improve representativeness of the research, the obtained figure is rounded to n = 160. Thus, it confirms representativeness of the sampling and credibility of the authors' investigation.

In the marketing survey, Ukrainian respondents participated in the following ratio: 66.5% - women and 33.5% - men. Referring to the results of the conducted investigation, it is determined that among the interviewees there is no person, who is not registered in a social network. The largest share of the interviewees were 18-24 years old (60.4%), the share of under 18-age made 15.6%, and those, who were 36-45, accounted for 12.4% of the interviewed people (Fig. 7).

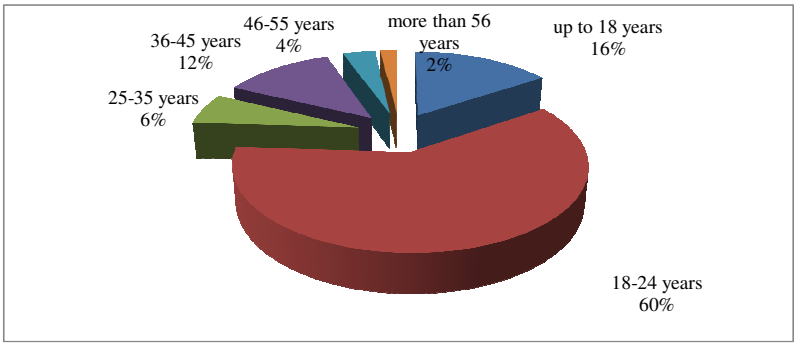

Fig. 7: The results of the age structure research of Ukrainian users of social networks
Source: researched by the authors

According to the survey, the social network Facebook is the most popular among users aged 25-35 years, slightly less among the young people aged 18-24 and the least common among respondents aged 36-45 years. Instagram has more users under 30 than Facebook. The number of Instagram users has been decreasing since 25-year-olds and Facebook - by 35-year-olds. Instagram social network is popular among Ukrainian users aged 18-24. Every third respondent between the ages of 25-35 and only a quarter of those between 36-45 is registered on Instagram. In the Ukrainian segment of Facebook and Instagram, according to the research, the female audience dominates.

It is reasonable to note that among the interviewees, 89.8% were registered in Facebook, 87.5% - in Instagram, and 71.2% - in YouTube (Fig. 8). However, one person could be registered in more than one social network.

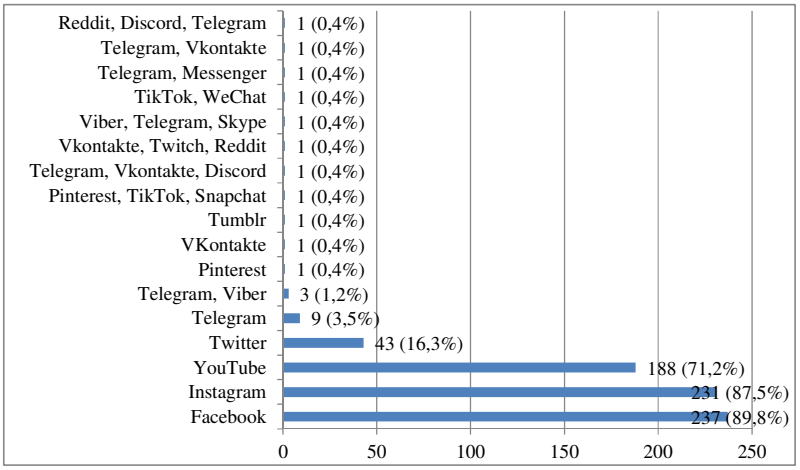

Fig. 8: Figures of the number of people, registered in social networks

Source: studied by the authors

According to the research results, the number of people, who spend from 1 to 3 hours in the social media accounts for 46.6%, and of those, who spend from 3 to 6 hours, accounts for 31.4% (Fig. 9).

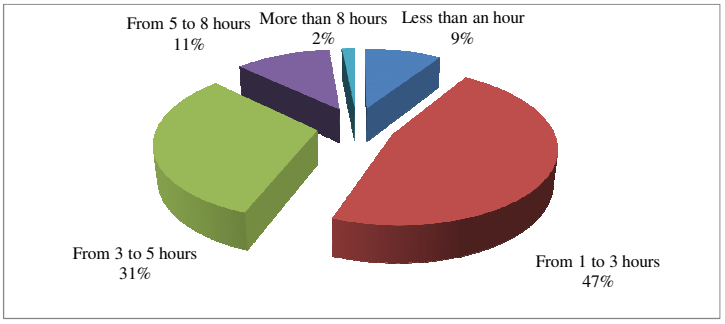

Fig. 9: Figures of the amount of time, spent in social networks

Source: studied by the authors

It is noted that the main reason of people's stay in the social platform is to keep in touch with the friends and relatives (86.7%). Besides, almost 83.3% of the interviewees use social platforms to review news (Fig. 10).

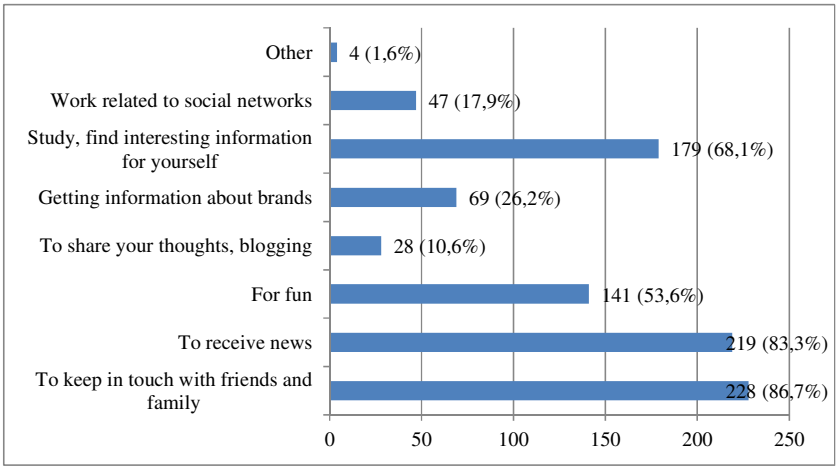

Fig. 10: Results of the research of the main reason for social networking

Source: studied by the authors

The research argues a growing number of the users of Facebook and Instagram, whereas a fall of the number of Tumblr users. Most of the interviewees spend their time in the social media efficiently, i.e. to communicate with friends, exchange news, work and advertise.

Conclusions

Results of the conducted investigation demonstrate a gradual growth of the reach of popular social planforms of the population of Ukraine. Moreover, the composed trend models prove the growing popularity of Facebook and Instagram. In contrast, once-popular platforms like OK (Odnoklassniki) and VK (VKontakte) have crucially lost their position. It is primarily connected with implementation of the Decree of the President of Ukraine of May 16, 2017 concerning exercising of the resolution of the National Security and Defense Council of Ukraine of April 28, 2017 "About performance of personal specific economic and other restricting measures (sanctions)", which shut out the access to the above-mentioned resources for a three-year period. Results of the investigation, in spite of some skepticism about the efficiency of such measures, demonstrate that some Russian social platforms have been substituted with their Western competitors.

Results of the conducted questionnaire are of great importance. They manifest that almost 78% of the respondents spend from 1 to 5 hours in the social networks, and more than 11% - from 5 to 8 hours. However, social platforms are used mainly to keep in touch with friends and relatives, to get entertaining content and information about commodities and brands. Nevertheless, there is still a considerable share of respondents, who have never used social platforms to make purchases. Thus, it provides a great potential for growth.

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Government Crowdsourcing in the Russian Federation

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Abstract

The article considers the concept of online crowdsourcing as a modern information technology solution aimed at establishing closer interaction between civil society and the state. Its role in the system of Russian public administration is shown through identifying the objectives and results of online crowdsourcing projects. Crowdsourcing technologies offer new ways of supporting public administration and have been rapidly introduced in different countries. Information technologies contribute to a wider citizen involvement in public administration problem-solving. Citizens are given the opportunity to more actively participate in managerial decision-making and the development of governmental programs, both at the federal level and at the level of the constituent entities of the Russian Federation. Crowdsourcing makes it possible to build up a fundamentally new model of Russian public administration. The platforms created so far allow every Russian citizen, regardless of their place of residence, social status, work employment, and lifestyle, to broach various subjects, to put forward initiatives aimed at solving issues raised, to discuss draft legal acts. This ensures more active public involvement in managing state affairs. As a result, the state gains more extensive and active public feedback, which supports government efforts to improve the quality of life.

Keywords: Crowdsourcing, Public Administration, Civil Society.

Introduction

Today it is impossible to imagine the world without information technologies. The scale of their implementation in all spheres of state and social life has heavily influenced modern society. Crowdsourcing interacts with the state and public administration system, providing the opportunity to actively involve citizens in public administration, and solving social and other problems.

The term “crowdsourcing” was introduced by Jeff Howe (2006) into public parlance in as early as 2006. According to Kazakova and Denisova (2016, p. 21), “crowdsourcing is a social technology for attracting wide social strata to solve specific problems.” According to Zhabin and Pryakhina (2013, p. 43), “crowdsourcing can be called a social innovation technology, which uses the potential of a certain social group to achieve specific purposes of developing the social sphere (improving the quality and standard of living).” One cannot disagree with Epinina (2012) who regards public administration crowdsourcing as a tool to solicit public expertise of draft government resolutions, to enhance citizens’ trust in the authorities and to support effective solutions to arising problems. In our

opinion, however, the most correct definition is introduced by Sokolov and Deev (2017, p. 49), who consider crowdsourcing in public administration as "the purposeful activity of public authorities to attract human capital (both general and specific) to solve the problems of the country's socio-economic development through the use and development of information and communication technologies (including organization of online public networks and introduction of political innovations)."

Crowdsourcing Projects

Crowdsourcing technologies, first used in business management, were later adopted as a tool of Russian public administration. Crowdsourcing projects have been implemented in many constituent entities of the Russian Federation. The examples are "The Primorsky Kray: Problems and Solutions" (in the Primorsky Kray), "The Arkhangelsk Region: Ideas and Solutions" (in the Arkhangelsk Region), "Society and Power: Together for the Benefit of the Volgograd Region" (in the Volgograd Region). The website "Moscow Government's Crowdsourcing Projects" provides information on methodology, principles and outcomes of various projects, including "Our City" (February 2014), "Moscow Clinic", "Moscow Ecological Strategy", "My Library" (2015), and the 9th project "Children's Clinic" (finished in February 2016).

Online petitions are a way to implement crowdsourcing in many countries, providing an opportunity for a more effective government to citizen interaction in solving public administration issues. In Russia, Finland, Germany, Great Britain, the USA, and other countries, citizens can submit their proposals to deputies or the government online. In the UK and Russia a petition is required to have at least 100,000 votes to be considered, while in Germany and Scotland 50,000 votes are enough. In Russia, a tool to place an online petition can be found at the Russian Public Initiative portal (https://www.roi.ru). In addition, you can place an online petition at such portals as Change.org (www.change.org), OnlinePetition.ru (https://www.onlinepetition.ru), and Petition to the President (https://петиция-президенту.рф). Russia also has websites where government authorities can post information on draft legal acts and the results of their public discussions. Among them are "The Federal Portal of Legal Act Drafts" (https://regulation.gov.ru), and regional portals like the ones in the Komi Republic (https://pravo.rkomi.ru), in the city of Yekaterinburg (https://discussions.ekaterinburg.rf), in the Khanty-Mansiysk Autonomous District (https://regulation.admhmao.ru), in the Khabarovsk Kray (https://regulation.khv.gov.ru) and others.

However, in our opinion, the use of information technologies in Russia is associated with some problems. Firstly, while draft acts of executive authorities are subject to public discussion, Decrees of the President of the Russian Federation are often regulatory acts and as such are not subject to discussion. In addition, the range of issues subject to public discussion is rather narrow; it does not include political issues. A petition will not be placed for voting if it contradicts the Constitution of the Russian Federation (paragraph 10 of the Rules for the consideration of public initiatives submitted by citizens of the Russian Federation via the Russian Public Initiative Internet resource approved by the Decree of the President of the Russian Federation, No. 183 of March 4, 2013). The paragraph is in force despite the fact that some of the articles of the fundamental law are subject to amendments (Chapter 3. The Federal Structure; Chapter 4. The President of the Russian Federation; Chapter 5. The Federal Assembly; Chapter 6. The Government of the Russian Federation; Chapter 7. Judicial Power; Chapter 8. Local Self-Government). Therefore, we believe there is a need to expand the range of issues and categories of legal acts subject to public discussion.

The use of crowdsourcing in public administration, according to various researchers, helps to solve a number of problems: to identify existing social problems, to consolidate civil society (Miroshnichenko, 2011), to modernize the current legislation, to form a personnel reserve, to modernize certain areas of human life and managerial personnel (Nemchenko and Tarasenko, 2014), to determine the directions, goals and objectives of federal, regional and local politics (Ilyin, 2012), to increase citizens' trust and confidence in the government (Lobova, 2016), to develop ways to effectively achieve the goals set, and to take into account the interests of the majority.

Conclusion

Indeed, the crowdsourcing projects being launched today can contribute to solving public administration problems quicker and more efficiently. In this situation, political parties do not need to conduct public opinion polls to identify and accumulate citizens' problems in order to further include possible solutions into their election agendas. Crowdsourcing significantly reduces time political parties take to prepare for the upcoming elections. They no longer need to develop questionnaires. This consequently eliminates time and expenses required to hire experts to do this job, as inadequate questionnaires will lead to distorted poll findings. It also serves as a labour-saving tool allowing to avoid opinion polls and the analysis of their findings. Crowdsourcing projects are more efficient than opinion polls in surveying large groups. With crowdsourcing, the government is able to quickly respond to the citizens' needs. Today, many Russian regions are running crowdsourcing projects aimed at gathering citizens' opinions regarding measures necessary to improve their quality of life. The public gets the opportunity to analyze bills at the drafting stage, thus influencing their content. For this government to citizen interaction model to be a success, it is necessary for crowdsourcing to be used both by the federal government and local self-government. Government authorities should create opportunities for proactive citizens to put forward their proposals, attract as many participants as possible by disseminating information on existing projects, and enable the participants to select the best proposals to solve the problem raised or prevent problems in public administration.

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Protecting Cashless Transactions in Russia

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Abstract

The article discusses issues that have arisen in connection with the rising popularity of cashless payments in Russia. In addition to technological solutions to secure electronic transactions, legal protection, including the implementation of criminal law mechanisms, is of vital importance. The article provides a detailed analysis of the specific legal elements of criminal acts in the sphere of illegal electronic payments under the recent amendments to the Criminal Code of the Russian Federation.

Keywords: Cashless Payments, Fraud, Theft, Electronic Monetary Funds.

Introduction

The world economic community is actively switching to digital payments, adapting to non-cash bank transfers and electronic payment systems (EPS) (Fabris, 2019). This payment method is convenient and relatively safe.

E-payments are more efficient in terms of time and cost saving and are more secure thanks to advanced data protection systems. As e-payments make it easier to refill an account balance or perform a money transfer, people are increasingly choosing this payment method.

The first EPS to appear in Russia in 1997 was CyberPlat, followed by PayCash (now YandexMoney), RUPay (now RBK Money), and Qiwi. Nowadays, the amount of online payments performed by leading Russian banks' clients and EPS users is increasing annually and currently accounts for over 95% of all transactions.[1]

Analysts say that over the past 10 years the number of cashless transactions in Russia has increased over 30 times – from 5 to 172 operations per person. "According to this indicator, Russia has overtaken all European countries, including leaders who have shown double and triple growth over the same period," said Max Hauser, heading The Boston Consulting Group's (BCG) Digital Expert Practice in Russia and the CIS.[2] He explained that the reasons for the "phenomenal" surge are that "the actions of each of the participants in the transition to cashless transactions worked for each other as catalysts, fueling and intensifying rapid development."[3] The BCG report also says Russia is "the global leader in tokenized secured transactions and the largest market in Europe for digital wallets."[4]

Security Challenges and Solutions

The introduction of new forms of banking services inevitably increases the criminal threat due to high-tech hacking and social engineering attacks resulting in unauthorized access to remote banking services, theft of electronic monetary funds, etc. (Fernandes, 2013; Sheveleva, 2017; Luneva, 2018). Russia is interested in cooperation with European partners, and therefore it seeks to maximize the security of all non-cash transactions.

Technological solutions enhancing protection against fraudulent activity include integrated circuit cards (smart cards), SMS two-factor authentication, and payment tokenization.

Russian legislators have also stepped up, giving criminal opportunists new reasons to think twice. Recent amendments to the Russian Criminal Code are keeping pace with technology to protect the security of electronic payment systems. A further discussion of the legal framework protecting the EPS industry and consumers alike should be prefaced by the following consideration.

According to Russian civil law, e-money and e-wallets are not monetary funds. Unlike the ruble, they are not legal tender subject to obligatory acceptance at face value throughout the Russian Federation (Art. 140 Part 1 of the Civil Code of the Russian Federation). Therefore, the term “electronic money” is simply a legal fiction, as it is in essence a way of recognizing EPS users’ proprietary interests against the payment systems. These interests should enjoy the same legal protections as any other property rights.

The 2018 amendments to the Criminal Code of the Russian Federation (hereinafter – the Criminal Code) were aimed at deterring illegal cashless transactions (Ivanova and Ivanov, 2019) and introducing tougher criminal penalties for bank account theft and theft of electronic money. (Prior to the amendments under consideration, the criminal prosecution against perpetrators accused of electronic money theft could be terminated due to the conciliation of the parties (Art. 76 of the Criminal Code). The amendments make it impossible due to a change in crime classification from misdemeanor to felony.)

Our focus will be Article 158 (Theft), Article 159.3 (Fraud committed with the use of electronic means of payment), and Article 159.6 Part 3 (Fraud in the area of computer information).

The amendment to Article 158 of the Criminal Code expands the scope of the offense of theft to include bank account theft and electronic money theft in the absence of fraud elements (cf.: Art. 159.3). Article 159.6 Part 3 of the Criminal Code is amended to add to the offense of computer fraud “the act of computer fraud relating to bank accounts and electronic monetary funds.”[5]

It seems obvious that law enforcement efficiency is dependent – to a certain degree – on how clear and coherent is the language of law (Teneneva et al, 2015). However, the above-mentioned legislative changes may make it difficult for law enforcers to correctly define the nature of a crime committed, partly due to the linguistic ambiguity of the articles under consideration (Oleynik, 2018; Sheveleva, 2019). Identical criminal acts may be qualified as bank account theft or electronic money theft (Art. 158 Part 3 Clause "d"), as fraudulent use of electronic means of payment (Art. 159.3) and as computer fraud relating to bank accounts and electronic monetary funds (Art. 159.6 Part 3 Clause "c"). For all of the Criminal Code amendments in question, the circumstances and instrument of a crime are an essential element in delineation of similar crimes (Starichkov, 2018; Karpov, 2019).

When qualifying a crime in violation of Art. 158 Part 3 Clause "d", the following element should be taken into account: the transfer of e-money or money in a bank account was performed covertly, i.e. at the time the crime was committed, the perpetrator was in no intellectual contact with the victim.

For example, an employee of the Russian Post was found guilty of a series of thefts committed via the Yandex.Money payment system. He stole a package of Yandex.Money payment cards in 1,500 ruble denomination. Subsequently, he used a PC to transfer the money from the cards to a virtual

account opened in his name.[6] The amendments to the Criminal Code of April 2018 provide a sentence of up to six years of imprisonment for similar criminal acts subject to qualification under Art. 158 Part 3 Clause “d” of the Criminal Code.

Another theft verdict was against a Sberbank employee. She noticed some clients discard ATM receipts into waste bins next to ATMs after refilling their cards. The receipts contain a 20-digit number for a one-time access to the Sberbank Online service. With accomplices picking up receipts from the bins, the perpetrator gained access to passwords to the Sberbank Online clients’ personal accounts. Using her mobile phone, she secretly stole money from the Sberbank of Russia clients’ cards and transferred part of it to her Yandex.Money virtual account.[7] Since the Federal Law No. 111-FZ was enacted, illegal acts like the one described above are also subject to a sentence of up to six years in prison according to Art. 158 Part 3 Clause "d" of the Criminal Code.

On the contrary, when qualifying a crime in violation of Art. 159.3, it is necessary to detect a fraud or breach of trust, suggesting the perpetrator’s contact with the victim. The perpetrator-victim contact should be associated with information impact on the victim’s will in order to adversely affect their perception of reality and to distrain their property (Malysheva, 2018). For this reason, using a victim’s bank card to perform a transaction – while deceiving a financial institution employee – cannot be qualified as fraud. Such acts should be qualified as a bank account theft or e-money theft, as described above.

Crime indictments based on the legal elements stated in Art. 159.6 Part 3 Clause "c" should be applied whenever the perpetrator interferes with processing, storing or transmitting computer data to transfer electronic money or money in a bank account to their personal accounts as long as the criminal act does not involve any “communication between the victim and the fraudster” (Bergmen, 2005, p. 20). Therefore, we can assume that the term “fraud” in the Article in question is a tribute to a certain tradition, when the method of theft had to appear in the offense description. In general, if we “do not pay attention” to the word “fraud,” there are no contradictions within the Code.

It should also be taken into consideration that according to Art. 159.6, the criminal instrument is a computer or any other device that can be used to change, modify, and block access to computer data. Article 159.3 regards electronic means of payment as an instrument of crime. In accordance with the Federal Law “On the National Payment System”, electronic means of payment is understood as a means and/or a method that allows a client, with the help of a bank operator, to perform cashless transfers using IT technologies, electronic storage device, including payment cards and other devices. Thus, electronic means of payment include physical objects like bank cards, mobile devices, e-wallets, etc., as well as a client-to-operator way of communication necessary to perform a money transfer (for example, the Client-Bank system, Yandex.Money, WebMoney, etc.). Therefore, the essential element of crime delimitation in Art. 159.3 of the Criminal Code is interpreted in a broader sense than in Art. 159.6.

Conclusion

The amendments to the Criminal Code of the Russian Federation are keeping pace to provide legal deterrence and consequences to the e-crime threats the society is facing today. Legislators have enacted new laws expanding the scope of the offenses of theft and fraud and introducing more severe punishments for the crimes. However, problems related to proper interpretation of the new provisions of the Criminal Code can impede law enforcement practice.

Notes

[1] See online at: http://base.garant.ru/57265095/

[2] See online at: https://www.oreanda.ru/en/finansy/bcg-announces-russian-miracle-in-the-field-of-card-payments/article1283706/

[3] Ibid.

[4] Global Payments 2019: Tapping into Pockets of Growth. See online at: http://image-src.bcg.com/Images/BCG-Global-Payments-2019-Tapping-into-Pockets-of-Growth-September-2019-rev_tcm9-231986.pdf

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The Pension Scheme in Poland and its Changes in the Context of Budgetary Deficit and Public Debt after the Year 1999

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Abstract

The aim of the paper is to review the changes in the pension scheme in Poland in the context of permanent budgetary deficit and accumulating public debt. It should be underlined that the impact of the changes introduced in this scheme on the state of the public finance is considerable. When evaluating the current changes, it can be said that the solutions suggested by the government can be described as choosing between responsibility for the present and responsibility for the future, especially that the influence of demographic changes on economy and the government budget is nowadays connected with two trends, that is with the decrease in the population and its ageing. The authors emphasise that the effects of the current changes in the pension scheme will burden future generations and the sources of their financing, whether in the form of higher taxes, smaller public expenditure or a higher government debt, will depend on the future fiscal policy.

Keywords Pension Scheme, Open Pension Funds, Employee Capital Programmes, Budgetary Deficit, And Public Debt.

Introduction

The problem of the social security in general and retirement security in particular has been growing in many rich European countries and in Poland. It results first of all from the progressing process of ageing of the population, which by no means facilitates the functioning of the contemporary systems of social security but it also comes with its own challenges for governments. Moreover, changes in medicine and the existing family model, in which a downward trend in fertility rate exists, can be observed (Kulpaka, 2013, p. 163). Thus, the relation between the number of working people and the number of people not working is more and more unfavourable. It incurs additional costs for the social security fund and the state budget.

As it is underlined in the source literature, pension schemes operating in the world function according to different solutions. The ones with a defined benefit (DB), which operate in 18 OECD countries, and those with a defined contribution (DC) used in 11 OECD countries are the most popular. However, the system of national defined contribution (NDC), functioning in four countries from the OECD group (OECD 2011, p. 106) including Poland, constitutes a particular type.

Each pension system, regardless of its shape, meets the same social objective – it is to provide income for every person who does not work any longer (Góra 2003, p. 37; European Commission 2003, p. 23). It is therefore expected that a pension will constitute an adequate income during retirement. Adequacy in

this case means income which prevents poverty and enables at least partly the standard of living like before retirement (European Commission 2012, p. 3; Ratajczak-Tuchołka 2012, p. 221).

Insurance systems are characterised by the fact that a part of the insured receive payments higher that the amount of contributions they paid, whereas others receive smaller amount. It results from uncertainty of fortuitous events and inability to indicate the subjects in the case of which an even described as fortuitous can happen. In a pension scheme people living longer receive much more from the scheme than they contributed, whereas those who died soon after retiring receive less (Owczarzak, 2009, p. 112). As it is underlined in the source literature, the insurance mechanism is not unfair in itself. It is a financial product whose price is determined on the basis of different indicators (age, gender and the amount of contributions). The redistribution of income itself occurs in the situation when for people making similar contributions the expected amount of payments (pension) is considerably different e.g. due to the level of previous income, family situation or gender (Stiglitz, 2004, p. 448).

In studies concerning pension schemes, it is often claimed that people with smaller incomes are characterised by higher mortality rates and a shorter average further life expectancy (Valdes-Piereto 1998, p. 35) – as a consequence, calculated benefits for people who earn less should be higher that those with above-average salaries due to a shorter period of retirement (Owczarzak, 2009, p. 113).

In Poland the pressure on expenditure connected with social benefits was additionally increased by profound political transformations, which started after 1990. The most significant changes in this scope however were not introduced until the reform in 1999. Apart from the pay-as-you-go pension scheme, which functioned in the previous system of centrally-planned economy and which was based on an intergenerational contract, a second pillar based on capital principle was introduced (Ciak, Kołosowska, Piotrowska-Marczak, 2019, p. 160).

Combining the pay-as-you-go system and capital financing instead of the existing intergenerational contract may imply a limitation of intergenerational redistribution and burdening next working generations. However, it must be remembered that both pension benefits accumulated in the Social Insurance Institution (ZUS) accounts and additionally saved capital (in Open Pension Funds (OFE) or Employee Capital Programs (PPK)) must be covered in the future by product manufactured by consecutive generations of insured people. In this respect both the pay-as-you-go and capital systems are not free from demographic risk and the level and direction of their intergenerational redistribution depends on the indexation rate of benefits in the first pillar account and the valorisation rates in OFE. It is commonly acknowledged that the funded pension scheme is less sensitive to demographic changes since pension capital is covered by financial assets unlike pay-as-you-go systems financed from current contributions (Barr 2000, pp. 8-11; Holzman 1999, p. 10). The aim of the paper is to review the changes in the pension scheme in Poland in the context of permanent budgetary deficit and accumulating public debt. The following research methods were used in this paper: literature analysis, an analysis of legal acts, a descriptive and comparative analysis and an analysis of statistical source data.

Changes in the Polish Pension Scheme after the Year 1999

The reform of 1999 was the crucial element of the process of creating a new pension system and its introduction was justified by the following (*Bezpieczeństwo dzięki różnorodności. Reforma system emerytalnego w Polsce* 1997):

- a threat of a disaster in the social insurance finance and in the public finance as a result of demographic changes that were to occur after 2010;
- a large share of the budget in financing pension benefits;

- a poor condition of the social insurance finance;
- heavy burdening of employers with the labour cost;
- a low level of benefits.

As early as at the very beginning of the reform implementation, a lot of economists pointed out the existence of numerous unknown factors. Jan Czekaj claimed that not completely specified financial results of the reform in relation to the budget caused concern, also the pension funds' actual ability to maintain and multiply the value of the funds obtained from pension contributions raised reservations (see: Czekaj 1997, p. 67). Unequivocal specification of the financial consequences of introducing the new system appeared particularly difficult due to the considerable number of variables, such as the activities rationalising the existing system and their effectiveness, the rate of GDP growth, the rate of the labour productivity growth, the impact of the reform on the economic growth and the shadow economy absorptions.

The alterations that have occurred in the social insurance system since 1st January 1999 have caused the growth in the expenditure borne by the state budget. It has been triggered by the following (indicated by: Kołosowska 2004, p. 60):

- transferring of a part of social insurance contributions to Open Pension Funds (20% of paid contribution),
- lowering social insurance contribution for the highest paid people due to the fact that contributions are deducted from the monthly income up to 2.5 of an average salary,
- an employer having the possibility of transferring a part of contribution (up to 7%) to an employee pension plan, the results of which are discussed later,
- introducing the obligation to pay social insurance contributions from the state budget (e.g. for employees taking child care leave, army soldiers),
- the increase in the costs of ZUS functioning resulting from among other things introducing a new information management system, correcting errors in the information management system and other things.

Considering the loss of a part of contribution transferred to Open Pension Funds (OFE), the Social Insurance Fund's (FUS's) liquidity ought to be secured through increasing the aids from the national budget.

Over the years, other essential activities structuring the Polish pension system followed, and they were as follows (as indicated by: Jedynak 2014, p. 48):

- re-establishment of the special pension system of uniformed services, excluding them form the standard pension system in 2003
- passing an amended act on the employee pension programs (PPE) and introducing individual retirement accounts (IKE) in 2004
- by way of trade unions' protests and pressing preferential pensions for miners were introduced in 2005
- the introduction of changes in the functioning of the second pillar in 2011
- raising and equalisation of the retirement age in 2012
- modification in the functioning of the Open Pension Funds and the possibility to transfer a part of funds from the Open Pension Funds (OFE) to the Social Insurance Institution (ZUS) in 2014

Another significant stage of creating of the Polish pension system in 2012 was the decision to raise the retirement age to 67 and its equalisation for men and women. Until 2012 the retirement age was 60 for women and 65 for men, which corresponded to the retirement age in the 'old' system. The Act of 11th May 2012 stated that the modifications would be gradually introduced from 1st January 2013, raising it

every three months by one month (the Act of 11th May 2012 *to amend Act on Old-age and Disability Pensions…*). Through such assumptions, men retiring after 2020 and women retiring after 2040 will reach the age of 67. However, there appear some derogations from this rule, such as among other things early retirement for people born before the 1st January 1969 who did not join OFE, bridging pensions, uniformed service pensions, miners, etc.

In 2014 again on grounds of a bad condition of the public finance and the poor performance of the second pillar, another correction in the pension system was introduced. The serious risk of exceeding the so-called second safety threshold (a situation when the public debt exceeds 55% of GDP) was an obvious symptom of a bad condition of the public finance. An annual deficit in FUS constituted only a part of burden to the budget that led to the difficult situation of the public finance. The claims of the poor performance of the second pillar concerned, above all, the functioning of the Open Pension Funds. The issues raised related to among other things the rationality of OFE purchasing the State Treasury bonds. (The Treasury borrowing requirements, connected above all with the necessity to cover the deficit in FUS, were in this way financed. Thus, through the State Treasury bonds being purchased by OFE, other costs of transferring funds within the pension system were generated.) Moreover, the problem also concerned the obligation to transfer a part of contributions to OFE, the effectiveness of the mechanism of competition between individual OFE and also the limits of investing in particular categories of assets imposed on OFE. Additionally, the issues of relatively high charges collected by OFE caused uncertainty (Jedynak 2014, p. 56). Finally, by virtue of the Act of 6th December 2013 on the amendment of certain acts in connection with the determination of the rules for payment of pension from resources collected in the Open Pension Funds, the following corrections in the pension system were implemented (the Act of 6th December 2013 *on the amendment of certain acts…*):

- the transfer of the State Treasury bonds owned by OFE to ZUS and also their redemption with a simultaneous entry resulting from the rights of insured persons on capital sub-accounts in ZUS
- specifying the amount of contributions transferred to OFE as 2.92% of the basis of assessment
- enabling insured persons to make a choice concerning the participation in OFE
- the abolition of the mechanism of the minimum rate of return and the change of investment limits of OFE
- modification in the system of charges collected by OFE

In the period from 1st April to 31st July 2014, the members of OFE made a decision whether the contribution amounting to 2.92% of the basis of assessment is to be transferred to OFE.

The introduction of prohibition on investments in treasury bonds was also connected with the changes in Open Pension Funds. It entailed the necessity to transfer the funds invested in debt securities to Social Insurance Institution (*Appeals taken on decisions by ZUS 2014*).

The changes also concerned the third pillar of the retirement security, and more precisely its part, IKZE, that is Individual Retirement Protection Account. From the moment of the introduction of this form of voluntary saving for old age, contributions to IKZE were exempted from the income tax unlike payments, which were taxed. The changes introduced in 2014 concerned a reduction of the tax rate for payments from IKZE.

The preferential tax rate was to encourage using IKZE. As a result of those changes, "a lump-sum tax" of 10% of payments from IKZE accounts was introduced" (Rutecka 2014). In the following year, further changes in the Polish pension scheme were introduced. On 1st May 2015 the Act of 5th March 2015 amending the Act on Old-age and Disability Pensions from the Social Insurance Fund was introduced.

The Latest Regulations Creating the Pension Scheme in Poland

Citizens' lack of adequate awareness and their dissatisfaction with the current pension scheme constituted one of the main reasons for developing and implementing further changes, whose objective was to improve the existing system. In 2017 more modifications regulating provisions entering into force on 1st October 2017 were introduced.

A part of the society did not conceal dissatisfaction when the retirement age was increased in 2013, therefore during the preparation of new regulations concerning the pension scheme, the issue of the minimum retirement age was the main concern. The previous retirement age, that is age 60 for women and age 65 for men, was restored. Those changes also involve the rules concerning pre-retirement protection. The four-year period of protection against dismissal for women is set to age 56, and for men to age 61 (Piec-waznych-zmian-w-emeryturach-w-2017-rokuobnizony-wiek.html 2017). It should be added that currently women are entitled to a minimum pension after 20 years of professional activity and men after 25 years.

The introduced changes also concerned the second pillar of retirement security, that is OFE. The current regulations specify that the majority of funds accumulated in the Open Pension Funds should be transferred to Individual Retirement Protection Accounts (IKZE). The remaining funds will be transferred to the Demographic Reserve Fund.

In July 2016 the Capital Building Program, one of the pillars of the Strategy for Responsible Development, was presented. It states that the Open Pension Funds should be transformed into investment funds – 75% of the funds should be transferred to Individual Retirement Protection Accounts (IKZE). The remaining 25% is to be transferred to the Demographic Reserve Fund, whose management is to be taken over by the Polish Development Fund (PFR).

The first objective of the Program is to create Employee Capital Programmes (PPK), which would constitute "the government's plan for the citizens to save systematically" (morawiecki-i-plan-budowy-kapitalu-co-sie-stanie-zofe-ike/m6v81r6 2017).

Employee Capital Programmes are supposed to become an additional source of saving for retirement, to which funds would be transferred by both an employer and an employee. They were to be introduced in 2019. Public Real Estate Funds, which would focus on investing in property, were a novelty in connection with the programme.

In connection with the changes introduced on 1st October 2017, further development of Employee Pension Programs (PPE), a type of organised, group and systematic saving for future retirement, was announced. Currently they are created by employers, who finance the basic contribution, which is transferred to a selected financial institution managing it until its payment.

In 2019 a final liquidation of pension funds (OFE) was announced and two alternative solutions to the problem of the remaining funds accumulated in the Open Pension Funds were presented. According to the draft bill, each of the 15.5 million Polish citizens with an account in OFE will have to decide whether all the pension fund savings will go to a private Individual Retirement Pension Account (IKE) or to FUS. However, all those who will decide to transfer the retirement savings from OFE to IKE will have to pay 15% of so called transformation fee. Transferring money from OFE to IKE or to FUS is supposed to take place in January 2020. In the case of the latter, all pension contributions (19.52%) will go to ZUS, and the whole state pension will come from one source, that is from FUS.

The Social Insurance Fund as a Public Finance Sector Entity and the Impact of the Changes in the Pension Scheme on the State Budget after the 2009 Crisis

The pension system formed in the last years, functioning within the framework of the public finance, has greatly influenced the financial situation of this sector. Both the earlier (2015) changes in OFE and the current changes (OFE liquidation, the introduction of PPK) in this area have an impact on the whole government sector. It is therefore useful to analyse the impact on the state budget deficit and the public debt. Firstly, attention should be drawn to the financial situation of the Social Insurance Fund (FUS) and of the state budget. Table 1 presents the situation of the Social Insurance Fund in the years 2010 – 2018.

Table 1: Situation of FUS in the years 2010 – 2018 (in PLN billion)

Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018
FUS income	119.5	122.3	132.5	136.4	186.6	196.1	208.7	260.7	238.5
FUS expenditure	130.4	139.0	151.5	168.3	195.0	201.7	208.1	217.6	231.6
FUS balance	-10.9	-16.7	-19.0	-31.9	-8.4	-5.6	+0.6	+43.1	+6.9
Grant from the state budget to FUS	38.1	37.5	39.5	37.1	30.4	42.1	44.8	40.9	35.8
Share of grants from BP in FUS income (%)	31.9	30.7	29.8	27.2	16.3	21.5	21.5	15.7	15.0
Funds from FRD	7.5	4.0	2.9	2.5	2.5	bd	bd	-	-
Contribution refund to OFE	22.3	15.4	8.2	10.9	8.2	3.1	3.2	3.2	2.3
Loan to FUS	5.5	5.0	3.0	12.0	8.9	5.5	1.0	0.0	0.0
Loans to FUS in total:	10.87	15.87	18.87	30.87	47.0	53.8	45.3	14.8	8.6

Source: Own study based on: Egzekucja należności z tytułu składek na ubezpieczenie społeczne. Informacja o wynikach kontroli, Sprawozdania z wykonania budżetu państwa za lata 2010 – 2018 (2019), NIK, Warszawa.

The data in table 1 allow concluding that:

FUS revenues to 2015 were insufficient to cover current expenditure. From 2010 to 2014, a growing deficit in FUS budget despite considerable funds in the form of a budget grant transferred annually was visible. Those funds constituted on average in that period 26% of the total FUS income. After 2014 a reverse tendency manifested itself. In 2016 FUS reached a small financial surplus, which in 2017 grew significantly to PLN 43.1 billion. It was the first such a considerable surplus achieved by FUS.

Every year FUS was co-financed with a budget grant (23.3% of its total income), whereby the highest contribution of a grant in FUS income was observed in 2010 (31.9%), and the lowest in the years 2017 – 2018 (15.7% and 15% respectively). It should be underlined that a lower demand for a state budget grant in those years resulted from a beneficial financial situation of FUS, which was influenced by the economic situation and prosperity on the labour market (*Sprawozdanie z wykonania ..., 2019).*

FUS income is supplemented by funds from the Demographic Reserve Fund. In the years 2010 – 2014 they varied and ranged from PLN 2.5 billion to PLN 7.5 billion. In the following years (2017 – 2018) funds from the Demographic Reserve Fund were not used.

FUS permanent deficit was additionally supported with a loan from the budget outgoings, which means the flow of funds outside the budget. Such funds do not contribute to the increase of the state budget. FUS liabilities arising out of this amounted to PLN 45.3 billion at the end of 2016 (compared with an even higher amount in 2015). The reduction of FUS liabilities resulted first of all from the amortisation of interest-free loans from the outgoings of the state budget (1st January 2017 – PLN 39.2 billion was amortised, and 1st January 2018 – PLN 7.2 billion).

The necessity to transfer a part of pension contribution from ZUS to OFE resulted in a systematic loss of social security contributions in FUS. This loss was reimbursed by the state budget in the form of funds transferred to FUS in an amount equivalent to contributions for OFE. Their amount was different and in the years 2010 – 2018 it ranged from PLN 22.3 billion to PLN 2.3 billion. The fact that when in 2014 the bond part of OFE was transferred to ZUS (and amortised) and not many future pensioners stayed in OFE contributed to such a reduction.

Despite the slight improvement of the situation of FUS, the earlier imbalances will come back as according to the information included in the publication after controls of the Supreme Chamber of Control, debit balance of FUS is supposed to increase in the forthcoming years and amount to PLN 56.4 billion in 2020, PLN 64.5 billion in 2025 (*Egzekucja należności ...,* 2014). Also, worrying demographic indicators concerning the birth rate, a systematic growth in the number of people at the retirement age and emigration are of permanent character and will significantly worsen the financial situation of FUS.

It should be emphasised that the mentioned activities adversely affect the public finance, the state budget in particular. They also cause an increase of the borrowing requirements of the whole public finance sector. The government's permanent help for FUS (though reduced in recent years) has resulted in an imbalance in the state budget, which requires additional source of financing (Ciak 2012). The issues of income, expenditure and the government budget balance are presented in table 2.

Table 2: Income, expenditure and the government budget balance in Poland in the years 2010 – 2018 (in PLN billion)

Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018
Income	250.3	277.6	287.6	279.2	283.5	289.1	314.7	350.4	380.1
Expenditure	294.9	302.7	318.0	321.4	312.5	331.7	360.8	375.8	390.5
Deficit	44.6	25.1	30.4	42.2	29.0	42.6	46.1	25.4	10.4

Source: Own study on the basis of: The Minister of Finance on the State Budget Execution in the years 2010 - 2018.

In the period of time indicated in the table, significant divergences between the income and expenditure can be observed. The income tended to increase (apart from 2013), and the expenditure increased throughout he whole period (except 2014 with a smaller costs of the public debt servicing resulting from the amortisation of the bond part of OFE). The higher expenditure in the whole examined period resulted in a budgetary deficit.

It should also be underlined that the budgetary deficit represented the highest share of the deficit of the whole public finance sector. It was significantly intensified by the requirements of the social insurance sector.

As it was mentioned earlier, the loss of income from the social insurance contributions causes an increase in the state budget deficit. Additionally, its amount was influenced by the costs of the servicing of public debt for OFE. As indicated in the source literature, without the need to finance additional requirements for OFE (to finance earlier contributions to OFE), the debt to GDP ratio would have been much lower and even in the crisis years, i.e. 2009 – 2012, it would have amounted to 40% of GDP (*Przegląd funkcjonowania* … 2013), and its amount would not have exceeded PLN 1 trillion (*Na liczniku*… 2015). Currently, the public debt has risen above PLN 1 trillion despite the mentioned above activities undertaken by the public authorities in the context of the acquisition of PLN 153 billion of OFE funds in 2014.

Table 3 presents the costs of the state debt servicing in the years 2010 – 2018.

Table 3: Costs of the state debt servicing in the years 2010-2018

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Costs of the state debt servicing in total (in PLN billion):	34.1	36.0	42.1	42.5	34.5	29.2	32.1	29.6	29.5
- national:	26.8	27.1	31.8	32.3	24.8	19.4	22.2	20.7	21.5
-foreign:	7.4	8.8	10.3	10.1	9.6	9.7	9.8	8.9	8.0
Costs in total as % GDP:	2.4	2.3	2.6	2.6	2.0	1.6	1.7	1.5	1.4
Costs in total to state budget expenditure ratio (%):	11.6	11.9	13.2	13.2	11.0	8.8	8.9	7.9	7.6

Source: Own study based on: Dług publiczny. Raport Roczny 2018 (2019), Ministerstwo Finansów, Warszawa, p. 93.

Taking into account the data included in table 3, a slow improvement in the costs of the public debt servicing, particularly in the context of costs in total to GDP ratio and in relation to the state budget expenditure can be seen. However, the upward trend of the public debt itself in 2018 and for the forthcoming years (i.e. 2019 – 2021 – PLN 1.093 billion, PLN 1.131 billion and PLN 1.142 billion respectively) should not be neglected.

Conclusion

The aim of the paper was to discuss the current changes in the pension scheme in Poland in the context of permanent budgetary deficit and accumulating public debt.

The actions taken so far by the governments cannot be described as reformative, they are rather short-term solutions of the problem of deficit in the government budget and in the Social Insurance Fund. They

improve the situation of the pay-as-you-go part of the public pension system only temporarily. The changes aiming at introducing Employee Capital Programmes can mitigate the negative tendency to reduce the future pensions only to some extent.

The actions taken so far by the public authorities are rather temporary solutions to the problem of the state budget deficit. They the situation of the pay-as-you-go part of the public pension systems only temporarily, however threatening with a disassembly of the pension reform, which was so hard to introduce twenty years ago.

Without neglecting the need to correct the system, acceleration of pro-development structural reforms in economy that would improve the state of the public finance should be demanded, like many distinguished economists do. The changes aiming at liquidating capital solutions in the form of OFE and replacing them by introducing employee capital programmes can only alleviate the negative trend of considerable reduction of pensions in the future.

An increase in the number of pensioners and a reduction in the number of contributors to the social insurance will favour the growth of imbalance in FUS in the forthcoming years. Therefore, according to the information included in the publication after controls of the Supreme Chamber of Control, debit balance of FUS is supposed to increase in the forthcoming years and amount to PLN 56.4 billion in 2020, PLN 64.5 billion in 2025. This will not favour the improvement of the situation of the state budget, on the contrary, it will have a detrimental effect and generate an increased demand for additional, external funds. As a result, the public debt, already high, will continue to increase even more.

The conducted analysis indicates an unfavourable situation not only in the state budget itself (annual budgetary deficit at different levels before 2018), but also in the Social Insurance Fund before 2016, which was not able to meet the requirements of the new social insurance system by itself (additional loans from the state budget). Although after 2017 a short-term improvement was noticed, it resulted from a good economic situation on one hand, and from the good situation on the labour market on the other hand. It should also be emphasised that the negative demographic situation which has been observed in Poland for a long time will continue to exert a negative impact on the financial situation of FUS. The current contributions to social insurance are already insufficient to cover the expenses in connection with old-age and disability pensions. An increased number of recipients and a reduced number of contributors to the social insurance will favour the growth of imbalance in FUS in the forthcoming years. It will therefore require further outlays in the form of increased state subsidies and further loans for the social insurance sector.

This therefore means that the negative effects of the new pension scheme introduced in 1999 will burden future generations. It remains to be seen what the form of the cost of the reform will be. It will depend on the future fiscal policy.

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Export Orientedness of Agriculture in Russia in the Context of Food Security Imperatives

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Abstract

The article is dedicated to the analysis of the implementation of the federal level priority project on «Export of the agro-industrial complex products» in the context of previously existing, newly adopted and future Food Security Doctrine of the Russian Federation. Risks of the Russian agriculture transition from import-substitution model to export orientation are determined. It is concluded that it is necessary to expand the criteria for achieving the Food Security of the Russian Federation in terms of setting control figures for food consumption broken down into population decile groups to strengthen control over ensuring the food products' economic availability, especially for the least protected social strata. The author considers it appropriate to maintain the criterion of the country's self-sufficiency with agricultural goods and food.

Keywords: Food Security, Export Orientation, Agriculture.

Introduction

The several trends collision determine the study relevance. The trend towards national economies' openness has been suspended by the crises and conflicts generated by globalization. Russia seeks to take a worthy position in the global economy but faces difficulties and opposition in the form of sanctions and other obstacles. Following the national security strategy of the Russian Federation [Decree, 2015], the state must ensure protection from external and internal threats, as well as the country's sovereignty and territorial integrity. Food security is officially part of national security. The economic stability, the citizens' quality of life improvement, and demographics are directly linked to the implementation of the Food Security Doctrine of the Russian Federation (FSD) [Decree, 2010]. The document sets out the state policy strategic goal in this area, which is to provide the country's population with safe agricultural, fish products and food mainly through stable domestic production, the necessary resources, and reserves availability.

It is interesting to analyze the degree of the FSD indicators implementation and consider the possibility of changing or adjusting the adopted methodology for assessing the FSD achievement level. Issues related to achieving multi-level FS have been actively discussed and are being discussed in the scientific community. Even before the adoption of the Doctrine, several authors spoke in favor of coordinated agricultural policy in the Commonwealth of Independent States area [Boev, Rumyantseva, Dadalko, 1998]. Methodological foundations of the Russian understanding of FS are reflected in the works of academicians Ushachev I.G. [Ushachev, 2016], Krylatykh E.N. [Krylatykh, 2011], Altukhov A. I. [Altukhov, Drokin, Zhuravlev, 2015], Paptsov A.G. [Paptsov, Shelamova, 2018]. The work of Shagaida N.I. [Shagaida, Uzun, 2015] is devoted to the problematics research from the point of view of providing households with food products. Issues of achieving FS in Europe were considered in the works of Revenko L. [Revenko, Panteleeva, Isachenko, 2019]. However, not all angles of the issue are covered fully enough. Over the past decade, since the adoption of the Doctrine, the agricultural development model has changed from imported goods substitution towards export orientation. This turn is typical for many countries that traditionally import agricultural products [Ivanova, Latyshov, 2018].

How is the federal level priority project on «Export of agricultural products» aimed at a sharp increase in the agro-food products export being implemented? What are the consequences of its implementation, including in the context of the goals of the FSD of the Russian Federation? The answers to these questions can be found in this article.

The relevance of the work is increased by the Decree of the President of the Russian Federation of January 21, 2020 No. 20 [Decree, 2020], which presents an updated variant of the Doctrine. This in turn became a factor in the development of a new draft Concept of Collective Food Security of the Member States of the Eurasian Economic Union [Romashkin, 2019].

The purpose of the study is to formulate the directions for adjusting the FSD of the Russian Federation taking into account the identified positive and negative consequences of agricultural products and food products exports buildup.

Research Methods

The study was based on a conceptual understanding of the export-oriented model of the agro-industrial complex in Russia in the formats of the previously existing and newly adopted Food Security Doctrine of the Russian Federation, possible addition (reformatting) of its targets in the future.

The research used the following methods: historical, abstract-logical, monographic, comparative analysis, statistical. The food security conceptual settings in the understanding of the Food and agriculture organization of the United Nations (FAO), Russia and the Eurasian Economic Union (EAEU) were compared. To determine the self-sufficiency level in the main types of agricultural products and the consumption level of the main types of food products by the population, the Russian indicator was compared with similar data from other EAEU member states. The analysis of negative and positive consequences and factors for the growth of exports of Russian products, especially wheat, was carried out.

Results and Their Discussion

The main criterion for assessing the state of the FS of the Russian Federation is to achieve the accepted threshold value of the domestic production share in the total volume of commodity resources (including carryover stocks) for grain, potatoes – at least 95%; meat and meat products, food salt – at least 85%; milk and dairy products – at least 90%; sugar, vegetable oil, fish products – at least 80%.

The priority of self-sufficiency distinguishes the approach of the FSD of the Russian Federation from the understanding of the Food and Agriculture Organization of the United Nations (FAO), where the emphasis is on the physical and economic accessibility of the population to useful food products without specifying where the product is produced, domestically or imported [FAO, 2012].

The Russian approach, in our opinion, is quite established from the point of view of historical memory and modern sanctions against Russia. The same approach underlies the Concept of collective food security of the Eurasian Economic Union (CCFS) where the collective FS of the EAEC is understood as the ability to provide a sufficient level of food physical and economic availability for the population of the EAEU member states in the quantity and quality matching criteria of the high standard of living, mainly due to the own production of agricultural raw materials and foodstuffs, based on rational use of resource potential of agrarian and industrial complex, industries innovative development, interstate cooperation, as well as the balanced functioning of the Union's food markets [Eurasian intergovernmental council, 2019]. The CCFS is an important element of the coordinated agro-industrial policy of the EAEU member states.

The self-sufficiency level in terms of the main types of agricultural products in the EAEU member states is shown in table 1.

Table 1: Level of self-sufficiency of main types of agricultural products in the EAEU member states, %, 2017

Product	Armenia	Belarus	Kazakhstan	Kyrgyzstan	Russia
Grain	40,7	89,8	148,5	62,3	170,6
Milk	91,2	235,4	90,3	105,7	82,0
Meat	67,7	135,9	81,2	62,5	93,3
Potatoes	102,6	112,3	99,1	110,0	92,7
Vegetables and cucurbits crop	102,5	105,5	127,8	146,8	87,5
Fruits and berries	108,5	43,5	25,1	20,7	33,1
Sugar	65,2	224,3	64,8	63,0	98,8
Vegetable oil	4,3	74,0	85,0	19,6	…
Fish	101,8	13,9	…	4,0	…
Eggs	98,2	128,8	106,3	41,5	…

Source: [Eurasian Economic Union. Legal Portal (2019), p. 28-29]

The level of self-sufficiency in different countries varies and is directly related to the countries' specialization in particular product production. Thus, domestic grain production in Russia and Kazakhstan exceeds demand, while in Armenia it is only 40% of consumption. Milk and meat production in Belarus is 2.3 and 1.3 times higher than the consumption while these products are in deficit in other countries of the Union (except for milk in Kyrgyzstan). The self-sufficiency of the EAEU countries in fruits/berries and fish is relatively low (except for Armenia).

According to the Eurasian Economic Commission (EEC), the highest level of self-sufficiency has been achieved in Belarus – 96%. Next are: Russia – 89%, Kazakhstan – 83%, Kyrgyzstan – 81%, Armenia – 71%.

In general, in the period from 2012 to 2018, the trend was dominated by an increase in domestic agricultural production – by 19.1%, a decrease in agricultural products and food imports by 30%, an increase in exports by almost 40% and a reduction in the negative balance by almost 5 times. There are reserves for further import dependence reduction– at least a third of imported goods can be produced within the EEU. Thus, in 2018, more than a quarter of the import structure consisted of vegetables and fruits. More than one and a half million tons of apples and pears are imported annually.

The situation is much worse with agricultural production resources self-sufficiency of the EAEU countries, especially in terms of imports of breeding and genetic materials, technical devices, machinery and equipment, feed and vitamin supplements. Within the context of national currencies devaluation, this stimulates the production costs and final consumption prices growth.

Other indicators for assessing the state of collective food security of the EAEU countries include the physical and economic availability of food, and the human nutrition level (table 2).

Table 2: The level of consumption of basic types of food by the population in the EAEU countries, kg per year

Product	Armenia	Belarus	Kazakhstan	Kyrgyzstan	Russia
Bread products	175,8	81,0	133,7	127,7	117,0
Milk and dairy products	262,1	249,0	237,7	223,3	231,0
Meat and meat products	57,1	92,0	72,9	38,5	75,0
Fish and fish products	5,6	12,6	10,7	0,9	19,6
Vegetable oil	9,8	18,1	19,5	10,3	13,9
Eggs, pieces	237,2	265	168,5	86,0	279,0
Potatoes	67,6	172,0	46,9	106,6	90,0
Vegetables and cucurbits crop	211,1	153,0	88,5	174,4	103,0
Fruits and berries	106,6	89,0	64,6	34,2	59,0
Sugar	22,6	36,8	41,3	22,8	39,0

Source:ibid., p. 26-27

Comparison of countries by consumption level relative to the norm is difficult since each country recommends its national consumption norms. In Russia, there is still a significant under-consumption of milk and dairy products, vegetables and cucurbits crop – by a third, and fruits and berries – by 40%. The level of consumption of these products per capita is the highest in Armenia.

10 years after the adoption of the FSD of the Russian Federation, the self-sufficiency criteria were achieved for all these products, except milk and dairy products, and food salt. That is, by the beginning of 2020, the problem of import substitution has been solved in general. In this regard, a new variant of the Doctrine was prepared and entered into force on January 21, 2020. The list of products was supplemented with vegetables and cucurbits crop with a self-sufficiency threshold of at least 90%, fruits and berries – at least 60%, and the threshold for vegetable oil, fish and fish products was raised. However, a number of the provisions discussed in the scientific community have not been reflected in the doctrine [Belugin, 2020].

In our opinion, such aspects of FS as the population's economic accessibility to food deserve increased attention. The average figures growth hides a substantive discrepancy in the food consumption level of different groups of the population. The poorest segments of the population spend up to 60% of their income on food. In this sense, self-sufficiency is only the first step towards achieving the FS's goal of improving the quality of life of citizens. Economic affordability is directly related to food inflation, population income, and food product quality and nutritional value. It is very important to track the nutrition structure in different age groups. In other words, we are talking about expanding the benchmarks for achieving the FS of the Russian Federation, shifting the emphasis from controlling the production level to the consumption level, broken down by population decile groups.

According to official data, for the 1st quarter of 2019, the country has about 20.9 million people (14.3% of the country's population) with incomes below the subsistence level. In 2019, the consumer price index was 4.5%, including for food products (excluding alcoholic beverages) - 5.5%. The change in prices for the commodity group "cereals and legumes" demanded by socially unprotected layers of the population - 12%. There is a tendency to increase the value of the Gini coefficient - 0.413. Relative to 2018, a decrease in the growth rate of retail trade was noted. Food assistance to the population is an

integral part of food security, a factor in reducing social ill-being, stimulating demand for local agricultural products and food products. It is permitted under the requirements of the World Trade Organization. According to the author, the concept of developing domestic food aid in the Russian Federation is being implemented very slowly. This is partly determined by the fact that such support programs should be implemented mainly at the expense of the budgets of the constituent entities of the Russian Federation. And this is not always possible. Pilot projects were launched to create a food aid system in Mordovia, Omsk, Saratov, Ulyanovsk regions, and in other regions. The most common forms of providing food assistance in Russia are compensation for part of the cost of feeding children in schools and kindergartens, for the purchase of food by the poor in special stores, and for food in free canteens. In Moscow, certificates for essential products for the poor, senior citizens and large families began to operate. Such a certificate allows you to get food assistance if the recipient's income does not exceed the cost of living by 1.5 times. Against the background of these measures, it seems quite inappropriate to suggest equating the ownership of a personal subsidiary farms of the population to business activity with the corresponding taxation. These personal subsidiary plots of the population have low marketability and serve as a source of self-sufficiency with necessary food products for families.

The adjustment of the FSD of the Russian Federation is closely related to the shift in the model of agricultural development: from import substitution to export orientation. Since 2016, Russia has been implementing the federal level priority project on «Export of agro-industrial complex products». The new project on «export of agro-industrial complex products» [National project…, 2018], prepared as part of the implementation of the «May decree» of President Vladimir Putin in 2018 [Decree, 2018], provides for an increase in agricultural exports from 21.6 billion dollars in 2017 to 45 billion dollars by 2024, that is almost twice. Including the volume of grain exports – the project's locomotive – is to increase from 7.5 to 11.4 billion dollars. Grains account for about 35% in the export pattern (by value). Minister of Agriculture D. Patrushev defined export as an agricultural development driver [Report…, 2019]. The goal is set to become one of the world's top ten exporters of agricultural products in the medium term.

The project provides for four directions of development: creating a new product mass, including through the new processing plants creation; removing trade barriers of a tariff and non-tariff nature in the target foreign markets; creating an export-oriented commodity distribution infrastructure; forming an effective system for promoting and positioning exported products.

Over the years of the project implementation, several positive shifts have taken place in Russian agriculture, related to the quantitative growth of yields, acreage, gross taxes, and exports. Thus, the wheat export, the main export position, increased from 22 million tons in 2014 to 47 million tons in 2018, which is more than twice. The Rostov region, Moscow and Krasnodar territory remain the main exporting regions of Russian wheat, which account for more than 80% of all its exports, with a redistribution of shares in favor of the Rostov region.

Over the past five years, on the agricultural exports growing wave and the decline in food and agricultural raw materials imports, it has been possible to improve the balance of export-import flows of agro-industrial complex products by value; diversify the grain exports geography, and increase the profitability of Russian agro-business. According to Rosstat, in the I-III quarters of 2017, the profitability level in crop production was 24%, and in animal husbandry – 15%. The most important factors in this trend are state support, counter-sanctions, the devaluation of the ruble, and exports.

In 2017-2018, grain exports amounted to 52.4 million tons, including 40.4 million tons of wheat. According to preliminary data, grain exports from Russia decreased slightly and amounted to 42 million tons in 2018-2019, including wheat – 37 million tons, which is due to a decrease in gross receipts and adverse weather events. However, it is assumed that the cost of the total export of all agro-industrial complex products of the Russian Federation will not be lower than the planned volume of 23 billion dollars due to the expansion of other agro-export commodity positions. According to various forecasts, the volume of Russian wheat exports in the 2019/2020 agricultural year will amount to 31.4-34.5 million tons (excluding exports to the EAEU countries), which means that it will have a downward trend.

World export prices for wheat are quite volatile and had a downward trend in the 2018-2019 agricultural years. Figure 1 shows global wheat prices from 1959 to 2019.

Figure 1: World wheat prices, dollars per bushel

Source: Macrotrends (2019)

The maximum rise in prices was observed in April 2008 – up to $ 8.97 per bushel. As of September 6, 2019, the price was $ 4.63 per bushel.

A decrease in prices for exporters means a decrease in their income at the already made costs for commercial grain production and transportation. The decline in contracting activity in the new season is also due to the discrepancy between the external and internal prices for wheat. The subsidence of the latter significantly lagged behind the world price and provoked inflation within the country for food, primarily for flour, bread and bakery products, feed compound and meat. World wheat prices forecasts depend on the global market conditions, the harvest in the competing countries –the United States, the EU, Ukraine, weather conditions and yields in the Volga region, the Center and South of Russia, and the carry-over grain reserves volume.

To support export, the Ministry of Agriculture of the Russian Federation has developed a project of pre-export preferential target loans for grain traders, who will be able to receive financing at a rate of no more than 5% per annum. It is assumed that such a mechanism will increase the Russian exporters' competitiveness relative to foreign multinational companies operating in the Russian territory.

In addition to the above-mentioned benefit, the zero duty on wheat exports will continue to apply [Government…, 2018]; state support in the form of partial coverage of grain transportation costs will continue; VAT refund to exporters from the federal budget will go on; the use of a transferable letter of credit for settlements between residents and non-residents has been introduced.

In 2019, VTB, the state bank, announced its intention to create a vertically integrated «United Grain Holding». It is planned to buy a 50% stake in the grain terminal in Taman, sidelining the American GLENCORE. GLENCORE's subsidiary, the International Grain Company (IGC), established in 2004, operates in Russia. It owns 12 large grain elevators in the Krasnodar and Stavropol territories, Rostov and Volgograd regions. VTB would like to participate in the privatization of the United Grain Company (JSC UGC) — the largest infrastructure and trading company that provides the export potential of Russian grain on the global and domestic market within the framework of the national food security program and support for Russian agriculture. Currently, the state owns 51% of UGC's shares. The sale of VTB's state stake has been suspended.

It is noteworthy that the largest transnational traders of Russian grain are the American companies Cargill and Bunge, and the French Louis Dreyfus Company. Thus, there is a tendency to consolidate grain trading, a substantial presence of foreign multinational companies, and there may be a decrease in state business in this area in the future. In this context, it is necessary to note the close relationship between attracting direct foreign investments and increasing the export potential of the recipient country. Foreign investors, of course, contribute to buildup of the agricultural production and creating product supply chains. However, their excessive concentration in the area of processing and sale of agricultural products is a threat to self-sufficiency. Search of the optimal balance between increasing the investment attractiveness of the agro-industrial complex and limiting the monopolization of the country's agro-food markets by global companies is the task of the future Doctrine.

Stabilization and even reduction of grain production and exports is a good opportunity to think about the quality of growth. Russia exports mainly feed wheat of classes 4 and 5, losing in price. Cases of infected grain detection have become more frequent, which is directly related to a significant shortage of grain storage facilities and other infrastructure including port infrastructure.

The quality of baking flour and noodle products is declining within the country. Class 1 wheat has not been produced in the country for more than five years. The presence of counterfeit and low-quality flour in the domestic market makes the industrial mills' operation unprofitable. According to the Russian Union of Flour Mills and Grain Businesses, 57 enterprises went bankrupt by 2018.

The task of buildup of the deep processing products volume in the structure of agro-export is slowly being solved, which means the reindustrialization of the agro-industrial complex of the Russian Federation. In this sense, according to the authors, the foreign production localization should not be relied on, it is to complement, not replace, the Russian business.

Finally, the most important result of Russian grain entering the world market should be the development of Russian rural areas, improving the quality and standard of living of agricultural products direct producers. According to the statistical collection «Russia in numbers. 2018» in 2017, with higher than the national average growth in labor productivity, people working in agriculture have the lowest nominal salary – about 25 thousand rubles per month.

Thus, an excessive focus on exporting grain abroad provokes a decrease in grain quality, a shortage within the country, and an increase in prices for animal feed. Moderate food inflation remains over the past five years, which together with the reduction in the population income level in 2018 decreases economic access of the population to food and impairs the consumption structure. The exporters' income level and growth rate are not adequate to the dynamics of incomes of agricultural workers and the population as a whole.

Conclusion

Food security achievment is being carried out stage by stage in Russia. The methodologies of the previously existing, newly adopted and future Food Security Doctrine of the Russian Federation were analyzed, taking into account the risks of successful implementation of the federal project on «Export of agricultural products».

The achievement of the self-sufficiency criteria of the country for most agricultural products (except milk and dairy products, food salt), based on the domestic production share in the total volume of commodity resources, allowed to update the Doctrine-2010. In addition to expanding the list of products for which the lower level of self-sufficiency is fixed, by including new items in the list – vegetables and cucurbits crop, fruits and berries – according to the author, it is necessary to expand the list of criteria in the future. In addition to the control figures for self-sufficiency in agricultural and food products, it is necessary to record the consumption level of the population decile group of the main ten food groups. This will strengthen the state's control over the food economic availability, especially for the least protected social groups. To support people with minimum income the amount

of guaranteed food aid provided to them should be fixed, including by way of redistributing part of the income from products exports.

Export orientedness creates inevitable risks, including the possible deficit product creation within the country at a high yield; the occurrence of «bursts» of internal procurement prices inadequate to global trends; the rising cost of flour and animal feed and food inflation with faltering income growth of the population and several other risks as a result. In this regard, the methodology of the future FS Doctrine should be based on a turn from the producer to the consumer.

A factor in overcoming the agro-industrial complex resources high import dependence, especially in terms of import of breeding and genetic materials, veterinary drugs, technical devices, machinery and equipment, feed and vitamin supplements, can be the control figures development in the format of a future FSD to achieve a minimum self-sufficiency level in this area.

The relationship between the policy of localization of foreign production in the territory of Russia and the methodology of the Doctrine of Food Security of the country requires further clarification.

Implementation of the Collective FS project of the EAEC countries as an important part of the coordinated agrarian policy of these countries should be focused, among others, on the «pulling up» the per capita food consumption level to the level the integration unit countries, the most advanced in this aspect, using the gain of activation of mutual commodity circulation.

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Telecommunications Market Trends in the Digital Economy

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Abstract

One of the most important problem in the conditions of the formation of a new paradigm of economic development is the improving the functioning of telecommunications companies, including the sphere of management, in the special case that the digital economy become popular in the Russian Federation and in the world, and growing level of competition. To solve this problem, it is necessary identify trends affecting the activities of telecommunications companies in the market and on their basis to form directions for the development of telecommunication companies, which would contribute to the appearance of key competitive advantages, that arise because of the opportunities of the digital economy, because of this, the authors identified the main problems of the development of telecommunications companies in the Russian market. At the same time, insufficiently studied questions of direction of development of telecommunication companies in the digital economy, therefore, the focus of this paper is on the problem of identifying trends in the development of the telecommunications market in the digital economy. The purpose of this article is to consider possible ways of developing telecommunication companies by integrating their business processes with Internet technologies and increasing the quantity and quality of services provided to users. The article discusses ways to reduce the cost of development and maintenance of the network and infrastructure, as well as the integration of telecommunications and Internet technologies.

Keywords: Telecommunication Company, Digital Economy, Internet Technologies, Internet Of Things, Business Processes

Introduction

In present-day world of rapidly developing technologies for traditional telecommunications organizations, including mobile companies, have a problem of reducing income growth with constantly growing traffic passing through them. This problem may contribute to their displacement from the general telecommunications market, leaving them only a segment of the means of traffic transfer. To avoid this scenario, telecommunications companies need to rethink their business processes and how they do business. These changes are associated with the use of modern Internet technologies (IT), which brings with it the need to attract specialists for IT-integration.

Analysis of the main segments of the telecommunications market shows the following results. CISCO forecasts that by 2022, total IP traffic will grow to 396 exabytes per month, compared with 122 exabytes in 2017 or more than 3 times in five years. Based on this, the Compound Annual Growth Rate (CAGR) is 26% (Fig. 1) (Anait S. Basyuk, Victoria V. Prokhorova & et all, 2016).

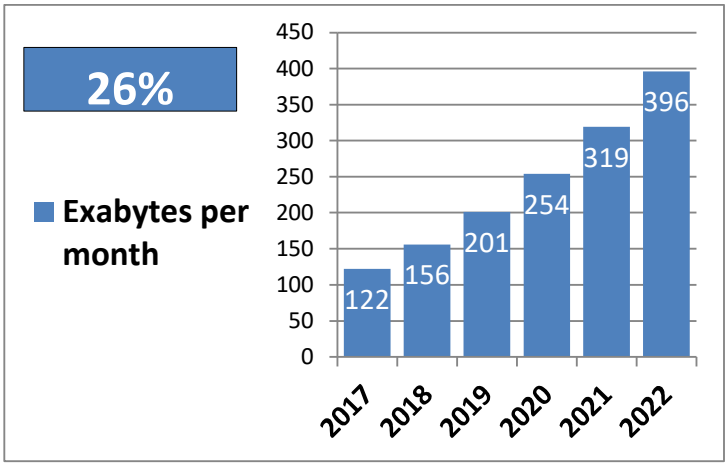

Fig. 1: The total growth of IP traffic 2017-2022

But for all that, according to preliminary data of "TMT Consulting" the size of the telecommunications market in 2019 reached 1.73 trillion. rub., growth rates compared to compared with the growth rates of the previous two years decreased and amounted to 2.1% (Fig. 2) (Fasna M. F. F., Gunatilake S., 2019).

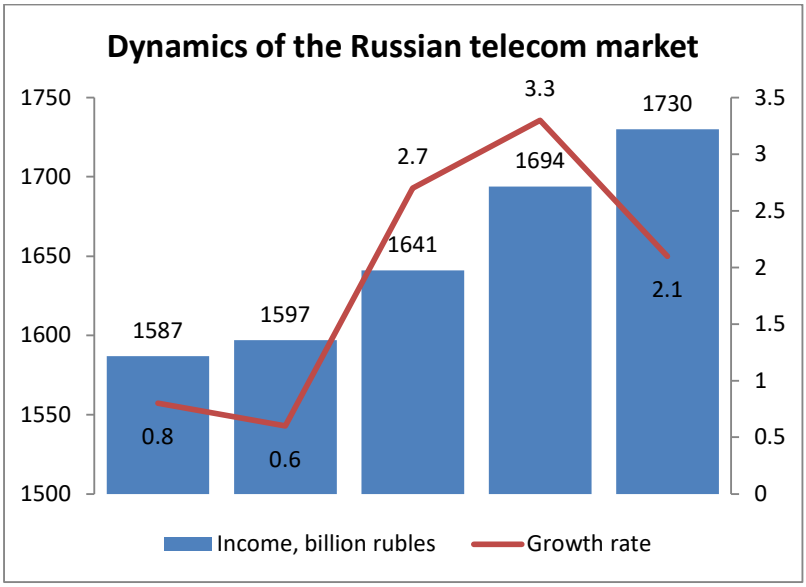

Fig. 2: The dynamics of the Russian telecommunication market 2015 - 2019

The decline in dynamics can be associated with a slowdown in the growth of the mobile communications market, this market forms 57% of the total revenue of telecommunications companies and determines the growth dynamics of the communications industry. Negatively affected by the steadily high rate of falling income in the market of inter-operator services and fixed telephony. Figure 3 shows the structure of the Russian telecom market for 2019 (Chountalas PT, Lagodimos AG., 2019).

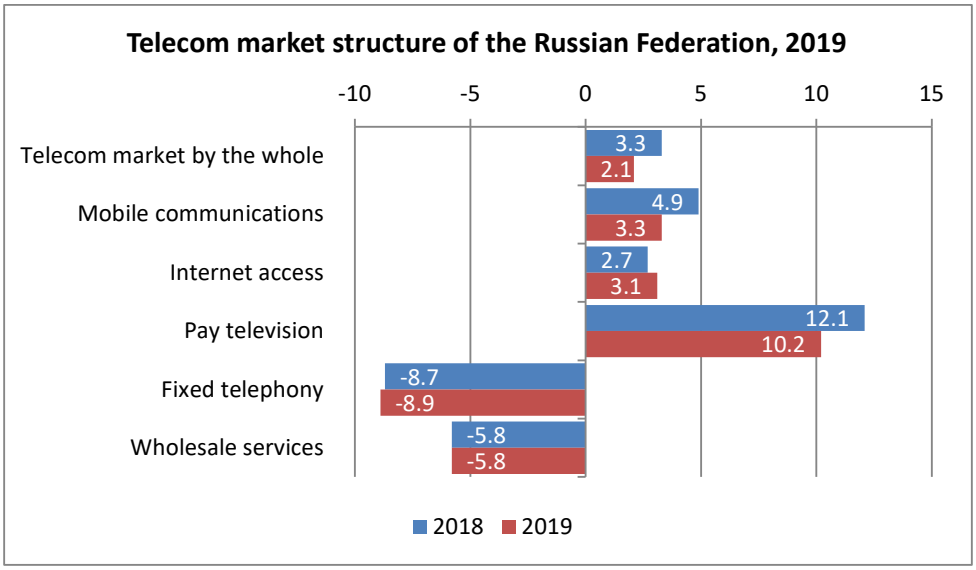

Fig. 3: Russian Telecom Market Structure 2019

All of the above indicates that telecommunications companies need to change and adapt to the growing volumes of traffic and transform their approach to doing business and type of services provided, otherwise, they will face a gradual decrease in revenue growth due to a decrease in demand for "traditional" services of telecommunication companies, such as fixed telephony, inter-operator services, etc.

Identification of Telecommunication Market Trends

The traffic growth is due to the growing popularity of various digital services provided by the OTT model (Over The Top). The largest share of revenue from these services is received by providers. Telecommunication companies are becoming only a way of transmitting information, while the load on their infrastructure is constantly growing. Based on this, in the modern world, the concepts of “service” and “user” are rethought. At the present time service is understood not only as a telephony or data communication, but rather access to various service platforms such as video content, mobile and banking applications, etc. (Kalimov O.V., 2016) Most often, it means a model for receiving services and content on demand, i.e. self-maintaining. Users means not only people, but also various devices, this is how the Internet of Things (IoT) manifests itself (Charochkina E.Yu., Androsova I.V., Sogacheva O.V., 2018). To successfully continue to do business in these conditions, telecommunication companies should transform their business processes in order to diversify their activities, including direction of various digital services.

Based on the analysis carried out by EY experts (Fig. 4), the most promising areas for diversification are areas focused on the provision of content services and IoT projects. Indicators of corporate cloud services market showed less growth, but because of its volume, it should be developed approaches to it. (Eriksson O., Johannesson P., Bergholtz M., 2019), (Gevorgyan R.M., Martynov L.M., 2019).

Based on the possibility of growth of services related to video and content, operators should actively monetize content such as games, videos, music, etc. Their main advantage over OTT providers is the infrastructure, when a user requests specific content, only the operator, who owns this infrastructure, can provide network resources to him. OTT providers can enter into agreements with operators to temporarily provide the user services, for example, network bandwidth was increased, which would speed up the service or improve its quality for the user (Marcinkowski, B. & Gawin, B., 2019).

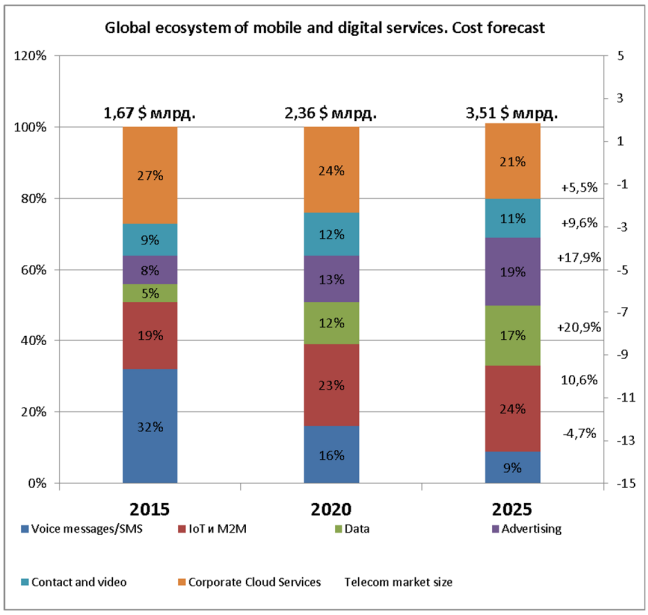

Fig.4: Global growth of mobile and digital services ecosystem

Strategic direction: development of innovative strategies for implementing 5G technologies and 4G development

An important advantage for telecommunication companies can be optimization of the processes of commercialization of content based on 5G technologies and 4G development. This should be based on innovative strategies, which take into account the following areas:

1. An increase in the number of devices that can be connected to one base station;

2. The ability to isolate and protect various sections of virtual networks;

3. Integration of existing technologies (LTE and Wi-Fi).

Strategic direction: reducing the cost of development and maintenance of the network and infrastructure (main business processes)

The development problem in this strategic direction may become the infrastructure of telecommunications companies. Traditional networks were created to provide services per minute or byte. It does not quite fit under the provision of digital services, because those often have within themselves the customization of parameters that can improve the quality of service for a particular user (Gbongli K, Xu YA, Amedjonekou K.M., 2019). Software Defined Network (SDN) technology may be a way to optimize infrastructure (Gevorgyan R.M., Martynov L.M., Starozhuk E.A., 2017). This concept involves the separation of traffic transfer and the functions of managing this process, including net point configuration and adaptive routing. This will allow the use of cheaper switchboards, which will reduce the cost of upgrading networks to support growing traffic. Also, the controller that manages the operation of network equipment can quickly reconfigure the entire network to comply with every applications or services request. For example, it is possible to allocate resources for a videoconferencing session, which may be important for corporate customers.

Another way is Network Functions Virtualization (NFV) (Ozmen M, Aydogan EK, Delice Y, Toksari MD, 2019). This technology provides the ability to implement various network functions by means of software modules, which interact with the network through open API (application programming interface) (Liu S., 2018). These technologies reduce the costs of network development, and also reduce the time for the introduction of services allowing to bring new products to the market, which is very important in the face of growing competition. In addition to reducing maintenance and

development costs, it is possible to increase the efficiency of using infrastructure by implementing projects MVNE (mobile virtual network enabler), which involve providing infrastructure to a virtual operator (MVNO) that sells services under its brand (Plakhotnikova M.A., Vertakova Yu. V. & Emelyanov S. G., 2017).

According to forecast by IKS-Consulting, by 2020, the M2M/IoT market in Russia will increase to 26 million SIM cards. At the same time, less than 20% of devices will be used by B2C. Most of the devices will be used by the corporate sector. This sector does not generate a large volume of traffic, here the most important characteristics are delay in traffic, long battery life, etc. Effective IoT support requires the development of a radio technology and network architecture. The effectiveness of IoT support is connect with the development of radio technology and digital network architecture. Potential growth in the supply services to corporate customers is small, but market is large and perspective.

According to IKS-Consulting, the growth of cloud technologies in the Russian Federation for the period until 2021 will be about 20% per year. To consolidate positions in this segment, need to develop cloud platforms and invest in data centers

In this area, a variety of experiments are possible that allow to combine telecom and Internet technology. Consider some of them on the example of large telecommunications companies. For example, 'VimpelCom' in 2017 released unifying aggregator of online services and messenger functional. MegaFon bought a controlling stock interest in Mail.Ru for more active interaction with IT users (Qu YJ, Ming XG, Ni YR, Li XZ, Liu ZW, Zhang XY, Xie LY, 2019).

One of the areas in the IT sector, which is being actively developed in telecom operators, is associated with Big Data. Telecommunications companies have a large amount of subscriber data. It can be used, for example, to predict customer outflow, analyze Internet usage statistics, etc., and then implement it through data exchanges (Plotnikov V., Vertakova Y., Leontyev E., 2016). Another possible area could be mobile finance: issuing payment cards, developing own banks, etc (Riyanto A, Primiana I, Yunizar Y., Azis Y., 2019).

Based on the above problem, for telecommunication companies it is simply necessary to make changes to the network structure, and also to modernize the infrastructure and use it as efficiently as possible. It is also necessary to take into account market changes and tendency to consume a different type of service and adapt to the new needs and requirements of users (Cisco Visual Networking Index: Forecast and Trends, 2017–2022).

Conclusion

For effective functioning, provision of quality services, and quick entrance to the market in the terms of growing competition, it is necessary to make changes to the network structure and infrastructure, it is indicate on the priority and importance of making these changes.

In addition, a significant direction in increasing the efficiency of telecommunication companies is the commercialization of content in 4G and 5G concepts. This can be achieved by developing innovative strategies that optimize the implementation of these concepts in the activities of telecommunications companies From an income point of view, the integration of telecommunications and IT is very important. This will allow to extract additional profit from existing information assets, and attract new users by providing them comprehensive service.

For telecommunication companies, the most important is the modernization of networks and infrastructure. Except for reducing maintenance costs, this is a fundamental step for accessing the rapidly developing and most profitable segments of the modern Internet, because without changes in the structural networks and infrastructure, it is impossible to provide users with the proper quality and short terms, it makes a company uncompetitive.

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Social Project Planning as a Resource of Developing Students' Professional Competencies

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Abstract

In modern socio-economic conditions, the state needs an active social policy; for this purpose, project technologies are used in many countries. Social project planning is directly related to the social sphere, being an instrument for overcoming various social problems. The article analyzes volunteering in Russia. The authors suggest using social project planning technology in the educational process as a way to attract students to social activities, combining the process of formation and development of competencies with the implementation of various social projects. The author offered the definition of «social project planning». The main areas of volunteering are described depending on the training area. The article describes the relationship between the content of the stages of a social project and the competencies that can be formed at each stage of the project.

Keywords: Social Project Planning, Social Project, Volunteering, Competencies.

Introduction

Currently, in the conditions of a dynamically developing competitive environment in the educational market, universities need to meet modern requirements and development trends in education. In our view, in modern conditions, the preparation of graduates for labor market requirements is a key factor increasing university's competitiveness. Optimizing and increasing the effectiveness of the educational process we can achieve high level of training for graduates.

Content of the training must meet standards of the labor market, so in the conditions of a competency approach, the requirements for educational services market participants are changing, and actively ongoing innovative processes in education lead to the modernization of educational technologies (Androsova I.V., 2013).

Traditional training methods are not always able to form students' satisfactory level of competency for effective problem solving in all fields and situations, especially in a rapidly changing society where new situations and activity areas show up. Currently, one of the main goals of education is the formation and development students' practical skills.

In this connection, changes require not only the instructional content, but also the form of organization of the educational process, which should help to increase the role of independent work and constant optimization it. Thus, focusing on labor market demands, great attention must be paid to the training of specialists with competitive advantages, the formation of which is directly related with level of professional competencies.

Effective training technology should contribute to the development of students' research and cognitive skills, prepare graduates to be able to self-development. Such factors as the development of students' skills to generalize and analyze information, plan their learning activities, work in a team should become an important part of the educational process (Liu Ch., Simonenko E. and Anisimov A., 2019).

In the conditions of a competency approach, the students' skills of solving practical problems come to the fore. In our opinion, the development of all necessary skills of a modern graduate helps to use the social project planning in the educational process.

Results and Discussion

Since the 50s of XX century social project planning started to become popular. Growing interest was based of common use of projects in business, where economic efficiency is the main indicator of the project success. However, social projects were less systemized, and the effectiveness of social projects cannot always be in money form.

In the research of V. Lukov noted, that the essence of social project planning is to construct the desired status of the future. A social project is a tool for making positive social changes, which is based on the human ability to construct reality (Lukov V.A., 2007).

At the present stage, to achieve sustainable social and economic development, is necessary to form a value-oriented society including people who are ready for active social activity. To solve this problem, it is necessary to stimulate the work of attracting students to volunteering as a part of social projects which has been designed and implemented during the educational process.

Volunteering has problems with adaptation in Russia and does not find approval of the majority of the country's population by reason of many social stereotypes. The tasks of modern public and philanthropic institutions include the promotion of volunteering, propaganda of voluntary work and creating a positive image of a volunteer.

According to World Giving Index, the Russian Federation on the one of the last places (Table 1).

Table 1: highest and lowest scoring countries over 10 years

Country	CAF World Giving Index		Helping a stranger		Donating money		Volunteering time	
	Ranking	Score	Ranking	Score	Ranking	Score	Ranking	Score
United States of America	1	58%	3	72%	11	61%	5	42%
Myanmar	2	58%	49	49%	1	81%	3	43%
New Zealand	3	57%	10	64%	9	65%	6	41%
Australia	4	56%	11	64%	8	68%	12	37%
Ireland	5	56%	16	62%	7	69%	10	38%
Canada	6	55%	9	64%	10	63%	11	37%
United Kingdom	7	54%	19	60%	2	71%	25	30%
Netherlands	8	53%	37	53%	5	71%	14	36%
Sri Lanka	9	51%	29	55%	19	50%	1	46%
Indonesia	10	50%	86	42%	6	69%	7	40%
…								
The Russian Federation	117	21%	112	35%	112	12%	74	16%
Croatia	118	21%	120	30%	68	22%	108	9%
Montenegro	119	20%	114	33%	82	20%	115	8%
Bulgaria	120	19%	107	36%	98	16%	124	5%
Lithuania	121	19%	104	37%	113	12%	101	11%

State of Palestine	122	19%	101	38%	120	10%	111	8%
Serbia	123	19%	123	28%	73	22%	122	6%
Yemen	124	17%	92	41%	123	6%	123	5%
Greece	125	16%	109	36%	122	7%	119	6%
China	126	16%	119	31%	116	11%	125	5%

Source: World Giving Index 2019 http://www.cafrussia.ru/page/mirovoi_reiting_blagotvoritelnosti_1

However, according to World Giving Index for the period from 2010 to 2018, we can talk about positive trends in philanthropy in Russia (Figure 1).

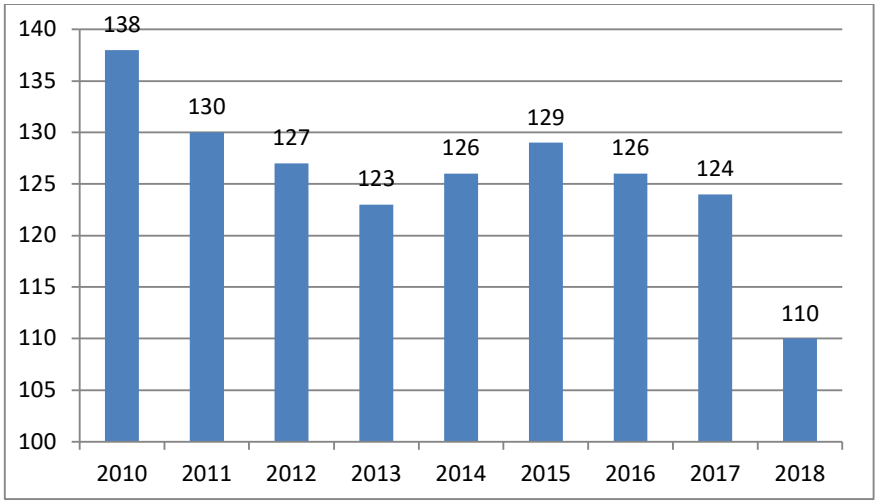

Source: World Giving Index http://www.cafrussia.ru/page/mirovoi_reiting_blagotvoritelnosti_1

Fig. 1: The Russian Federation by the global charity index for 2010-2018

Helping a stranger is the most popular in the Russian Federation. Donations money have increased over the past few years (Figure 2).

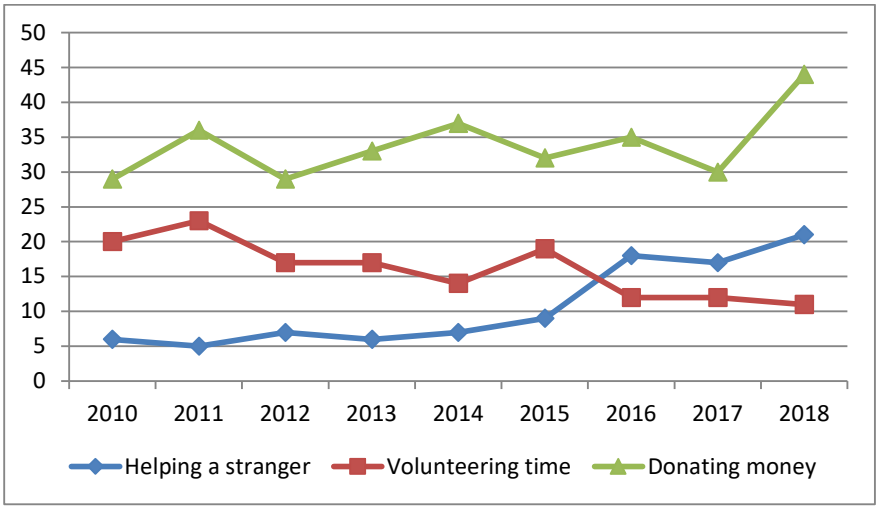

Source: World Giving Index http://www.cafrussia.ru/page/mirovoi_reiting_blagotvoritelnosti_1

Fig. 2: Dynamics of three aspects of charitable work in the Russian Federation by percent for 2010-2018

Currently, Russia has an active state policy aimed at activation of the potential of volunteering: 2018 was declared the Year of Volunteer; the Concept of development of volunteering in the Russian Federation was approved till 2025.

Since 2016, Federal State Statistic Service, develops information on volunteer activities among people based on the results of a sample survey of labor. Figure 3 shows the number of people participating in volunteering for the period from 2016 to 2018.

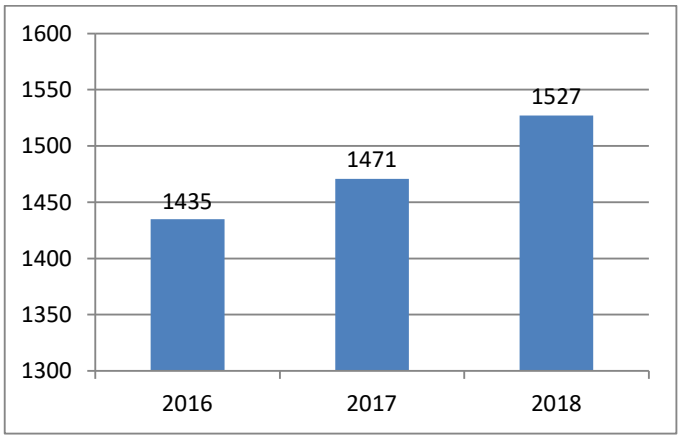

Source: Federal State Statistic Service
http://old.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/publications/catalog/doc_1140097038766

Fig. 3: Number of people participating in volunteering in the Russian Federation, thousand people

Every year in Russia the number of people involved in volunteering is increasing, that is a sign of some of the maturity of civil society, as well as the result of state support in this area.

Most of the volunteer work in Russia falls at social work (Figure 4). Social work includes the provision of any unpaid assistance to persons outside their own households. For example, elderly people, children, people with disabilities or victims of accident, cooking and serving food or transporting people, etc.

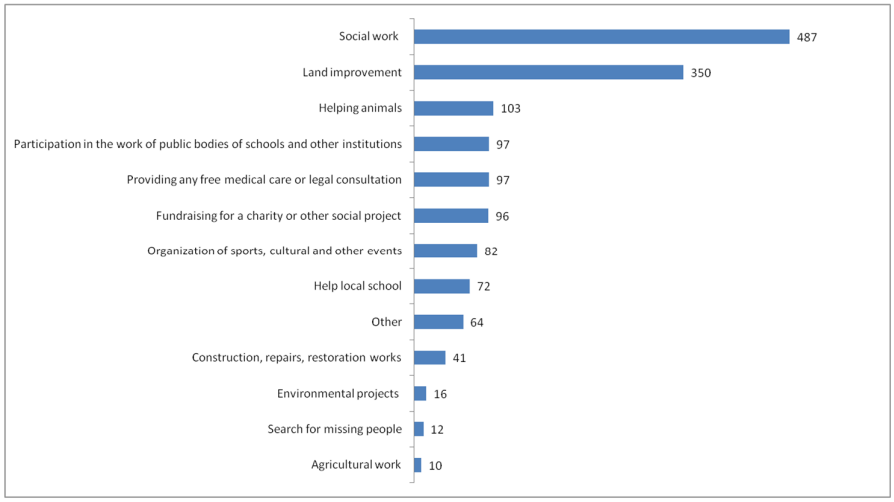

Source: Federal State Statistic Service
http://old.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/publications/catalog/doc_1140097038766

Fig. 4: The number of people working as volunteers, by type of work in Russia at 2018, thousand people

In Russia, volunteering as a system is at the stage of forming. It is necessary to get the consent of parents, to attract pupils to volunteering, and they also they need to be accompanied by an adult. To take part in volunteering is the problem for working citizens because their free time is limited. Thus, basically students become volunteers, because they are quite independent, they want to get new experience and have free time for it (Makarova E., 2016).

One of the requirements of the government for universities is the training of highly moral, competent specialists. Students can become the main volunteering participants combining the process of formation and development of competencies with the implementation of different social projects.

Using the social project planning technology in the educational process will not only expand and deepen the training of graduates by new training courses and its modernization, but also to increase the effectiveness of educational work.

There are different approaches to defining social project planning. In our research, we consider social project planning as a training technology that forms and develops students' professional competencies during the process of developing and implementing projects are aimed at the practical solution of topical social problems.

Work on a social project begins with identifying the problem to which the project will be directed. The effectiveness of the obtained results of the social project implementation is influenced by taking into account the risks of the project, the necessary resources data, project timeline, executors, amount of financing, the common view on results that will be obtained during the implementation of the project. In the process of implementing all stages of a social project the participants not only get practical experience, but also get impulse for self-development, self-realization, and using creative potential.

Participating in the developing and implementation of a social project, students enter into collaboration. Team work contributes to the formation and development of communicative competence, the development of group decision-making skills, the ability to allocate duties and coordinate actions, be responsible for the decisions made.

Thus, the participation of students in volunteering will contribute to self-development, getting new experience and acquirement new professional competencies.

Depending on the training areas, students can take part in various social projects, its implementation will contribute to the development of students' professional skills:

students of engineering faculty may be involved in the following types of social projects: improvement of the visual environment, reconstruction and restoration of buildings; creation of shelters for homeless animals, for animal management; creation of children's playgrounds and sports areas in the orphanage territory; assistance in creating a comfortable environment for people with disabilities, etc.

medical students can participate in such social projects as: assistance to medical personnel in medical institutions (medical records, accompanying patients to diagnostic and treatment procedures, assistance in checking vital signs, assistance to nurses in fulfilling doctor's prescriptions, etc.); participation of volunteers in the promotion of a healthy lifestyle and the disease prevention; work cooperatively with emergency teams in the first-aid treatment at sports and public events; informational, consulting, psychological, educational, leisure and other support for patients of medical organizations; help in pupils' career guidance.

students of law faculty can provide free legal consultation and help with paperwork.

students of foreign language faculties can participate in social projects in the field of migration policy (to help learn the language, familiarize with the cultural and spiritual assets); be a translators for large-scale international events; participate in international volunteer projects.

students of management faculty can participate in career guidance with orphaned children. During career guidance they can use cases, business and role playing games and other interactive methods aimed at the formation of communication, teamwork, decision-making skills, etc. The implementation of such projects will help students to develop their organizational, managerial and

leadership skills that are necessary for a modern effective manager. Table 2 presents the professional competencies of masters students in management training area which can be formed during the development and implementation of social projects

Table 2: competencies formed at each stage of a social project

Stage content (Lukov V.A., 2007)	**Competencies**
Stage 1. Project concept development	
Creative process aimed at awareness of social needs. Fixation of design concept and self-evaluation. Determining the relevance of the project, goals and objectives, main content, expected results.	to be able to self-development, self-realization, use of creative potential; ability to substantiate the relevance, theoretical and practical significance of the chosen topic of scientific research
Stage 2. Evaluation of project viability	
Collection and analysis information on issues related to the project to determine the degree of risk	the ability to use quantitative and qualitative methods for applied research and managing business processes, to prepare analytical materials based on its results.
Stage 3. Project planning	
Definition of the list and the order of measures for the implementation of the project. Determination of necessary resources, project timeline, executors, amount of financing, final result	knowledge of economic and strategic analysis methods; the ability to conduct independent research in accordance with the developed program
Stage 4. Budgeting	
Preparation of cost estimates indicating the sources of funds	knowledge of business planning skills for the creation and development of new organizations (area of business, products); ability to use modern methods of corporate finance management to solve strategic problems
Stage 5. Project defense	
Making decisions about implementation of the project, financial and other support	the ability to present the results of the study in the form of a scientific report, article or paper
Stage 6. Preliminary control	
at the beginning of the project, check material, technical, financial and human resources	knowledge of economic and strategic analysis methods; the ability to use quantitative and qualitative methods for applied research and managing business processes, to prepare analytical materials based on its results.
Stage 7. Project implementation	
Project implementation in practice	ability to manage organizations, departments, groups (teams) of employees, projects and networks
Stage 8. Project correction based on monitoring results	
Fixing dynamic changes of the project and its environment under the influence of their interaction	the ability to conduct independent research in accordance with the developed program; to able to act in non-routine situations, bear social and ethical responsibility for decisions made
Stage 9. Completion and liquidation of the project	
Making a decision to close or continue the project. Project closure report	to able to act in non-routine situations, bear social and ethical responsibility for decisions made

In our opinion, social project planning technology can be adapted to all training areas. Using this technology in the educational process will allow students to get practical experience connected with their training area, and to take part in volunteering, which is directly related to the students' education.

Conclusion

The socio-economic changes taking place in modern society present new requirements for the training of university graduates, ensuring their relevance not only in the regional but also in the international labor market. Creation of conditions for development of students' social activity and the opportunity to make a contribution to social life during the process of participating in social projects can help in solving problems. Participation in volunteering makes the process of socialization of the young generation the most effective. Developing and implementing various social projects while studying of educational subject, students gain practical experience, form and develop professional competencies, learn to work in a group, develop personality qualities such as tolerance, empathy, reflexivity, expand their social circle, and learn to be independent.

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Factors of Occupational Satisfaction and Reduction in the Work Motivation of Employees in a Quality Control Laboratory

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Abstract

According to the interpretation of a large number of authors, motivation is interpreted as the process of the satisfaction of employees' individual needs, which, according to its structure, includes unsatisfied needs and tension, then actions that follow in order to satisfy the need that leads to reduction in tension. We speak about the ultimate complex phenomenon in connection with individuals' behavior in different situations pertaining to occupational satisfaction. The basic subject matter of the paper is the examination of the influence of certain individual factors that exert influence on job satisfaction and the factors that have an influence on reduction in work motivation through cabinet and field research. The factors that influence job satisfaction, using 10 indicators, and the factors that influence employees' reduced motivation in their work, using 11 indicators, made up the independent variable. Besides, personal and status characteristics of the respondents (i.e. the sex, the years of age, the years of service and the education level) were used as the independent variables in the paper. The descriptive Survey Research method was used as the basic research method. Apart from determining the basic statistical parameters, correlation analysis and the Chi-square test were used in the paper for the purpose of determining the connectedness between the indicators of the independent variable and between the indicators of the independent and dependent variables. The examination was performed on an intentional sample of 20 respondents. In this paper, the respondents' assessments of the influence of some factors on job satisfaction, using the basic statistical indicators (the frequency, percentage, the arithmetic mean, the standard deviation and the rank) were examined. Then, the correlation between the influential factors of job satisfaction and the influential factors of reduction in work motivation was determined. Finally, the analysis of the connectedness between some personal and status characteristics of the respondents and their assessment of the influence of some factors on job satisfaction and reduction in employees' occupational motivation was carried out. The research results have shown a different influence of individual factors on job satisfaction and employees' work motivation, as well as the connectedness inside the influential factors of job satisfaction and employees' work motivation. Small, but significant, connectedness between the personal and status characteristics of the respondents and some influential factors of job satisfaction and work motivation was also determined.

Keywords: employees' satisfaction with work, employees' work motivation, factors influencing job satisfaction, factors influencing greater work motivation, correlation analysis, chi-square test, laboratory

Introduction

More than two centuries ago, psychologists considered the three separate segments of human mind: *cognition*, *affect* or *emotion*, and *motivation* (Chakrabarti, Chatterjea, 2018). The first sphere of cognitive excellence is concerned with the *human intellect*; the second sphere relates to *affect* that

includes emotions, moods and considerations; the third aspect or *motivation* refers to the natural or acquired human desire to achieve a definite goal (Hilgard, 1980).

The authors recognize different kinds of motivation, first of all motivation for achievements (McClelland, 1985). The people who are highly motivated by achievements seek moderate challenges and risks. They are attracted to the tasks that are of medium difficulty, while they themselves constantly try to improve both their own selves and their own achievements. The second kind of motivation – competence (self-efficiency) – refers to persons' belief in their own ability to solve problems (Bandura, 1996), which results in internal and external awards (Sternberg, 1996).

Self-Determination Theory (SDT), which has acquired significance in organizational psychology and management in recent years, suggests that all people have developed psychological needs for competence, autonomy and relatedness, so it is important that the types of motivation be differentiated, while the most important difference is that made between autonomous and controlled motivation when more efficient work and a workplace adaptation are envisaged (Gagne, 2014). Meyer et al., 2004, were the first to start integrating the theory of dedication and motivation proposing a causal relationship between dedication and goal regulation, suggesting that the nature of employees' dedication to the organization would have an impact on how it regulates labor behavior every day.

Numerous factors influence whether employees will be motivated at work, and they are either personal or organizational by their nature. With respect to organizational factors, an enterprise has to create optima organizational preconditions so as to create a motivational atmosphere, an adequate organizational culture, a feeling of belongingness, a choice of a leadership style and so on (Ilić, 2018). The specificity of each employee must also be appreciated and more complex relations with employees, which do not only presuppose the salary as motivation, must be ensured and jobs need to be so designed as to pursue the goal of improving occupational satisfaction or the politics that tend to develop loyalty and trust amongst employed to be so created as to allow for a direct influence on internal satisfaction, or an indirect influence on high individual and organizational performances (Coyle-Shapiro et al., 2013). Certain studies prove the existence of different levels of dedication depending on the cross-cultural context, as well as a lower level of the dedication of workers engaged on a short-term basis in relation to those employed for an indefinite period (Mesner-Andolšek, Štebe, 2015). Regarding the personal factors that influence motivation, competence is considered as a psychological whole that helps man adapt in different environments (Elliot & Dweck, 2005). Research studies confirm its versatility and usefulness as a motivation construct.

Maslow considered that an organization could ensure a context within which high levels of motivation were possible to achieve by ensuring initiatives and rewards, a satisfactory job and a possibility of learning and growing. He also considered that leaders should play the main role in motivating employees so as to win them over to give their maximum, simultaneously using motivational means ensured by the organization (Maslow, 1964).

Job satisfaction is considered as a positive emotional condition which appears as a consequence of the employee's perception that the job he/she does fulfils his/her important business values and brings them into harmony with his/her personal needs (Hoynala, 2009).

Locke's theory (of goal setting) indicates that job satisfaction is present to an extent to which employees are satisfied with the outcome of the job itself, pointing out the fact that satisfaction is also influenced by expectations and satisfaction with the individual dimensions of the job, too, establishing a connection between goals and performances (Locke, 1990).

In contemporary organizational theory, motivation is presented as the key indicator of job satisfaction, and three forms of job satisfaction are highlighted, namely: internal job satisfaction – enjoying one's job is connected with subjective rewards, interest, creativity…; external job satisfaction, which is conditioned by the profits of the job itself, such as the salary, the social status,

reputation, working conditions, etc.; a combination of internal and external satisfaction (Jakšić, Jakšić, 2014)

The organizational factors of occupational satisfaction refer to the rules and procedures in the enterprise, management's practice and the reward system contributing to the efficiency of the organization as well as the strategy and policy of human resources. These factors should be brought into such compliance that they attract new and retain old employees. The organizational factors of occupational satisfaction imply the job itself, the relationship with colleagues at work, the salary and the reward system, a perceived control quality, pleasant working conditions and the decentralization of power (Martinović, Tanasković, 2014). If employees consider their job to be challenging, that will reflect on their satisfaction and feeling of belongingness, and greater productivity well be achieved. In an opposite situation, unchallenging or inadequate tasks lead to the appearance of dissatisfaction, a fall in productivity and the influence of this fact on the achievement of the organization's performances and goals. With respect to employees' satisfaction with colleagues, i.e. the atmosphere at work, there is satisfaction if there is a pleasant environment and a good relationship with superiors and other colleagues, a relationship based on trust, which may even have an influence on reduction in the effect of other dissatisfaction effects. If speaking about an exchange between knowledge and skills, on the one hand, and money, on the other, salaries and the reward system start from the basic presupposition that the level of the employee's satisfaction depends on the amount of the salary. Of course, there is also the intangible reward concept, while tangible earnings include salaries, compensations, stimulations, then scholarships, travels, paid leaves and other. Intangible rewards refer to ensuring a more challenging job, participation in decision-making and other elements. In view of a perceived control quality, there is a presumption of employee satisfaction should there be a higher degree of communication with superiors and the perception of their competence. When speaking about pleasant working conditions, there is a presumption of a connection between good working conditions and the pleasant working environment and employee satisfaction, or the nonexistence of conditions like these and absenteeism. The decentralization of power, i.e. participation in decision-making, may increase satisfaction in those who like the distribution of power, whereas others respect stability and safety since they want to avoid uncertainty (Ilić, 2018). The individual factors of occupational satisfaction include a harmony between personal interests and the job, then the relationship between the years of service and the years of age, the position and the status, as well as total satisfaction with life (Schermerhorn et al., 2005).

There is a positive correlation between motivation for work, job satisfaction and dedication to the organization (Brown, Shepherd, 1997). The motivational component is frequently presented as extremely significant, so work productivity is brought into direct connection with motivation for work (Srivastava, Barmola, 2011). Apart from this, a connection is also established between job satisfaction and, but not only, productivity, but with absenteeism and job quitting as well (Janićijević, 2013).

Over time, authors have presented different motivation theories (both early and contemporary). Today, managers are suggested to use the integrative motivation model that includes several contemporary motivation theories, such as expectations theory, ERG theory and achievements and equality theory (Petković, 2012).

The Subject Matter of the Research Study

In this paper, employee satisfaction with working conditions and their motivation are influenced by numerous factors such as organizational conditions, the personnel structure, the valuation of employees' work, the amount of the financial earnings, the social climate across the organization and so on, as well as personal factors. Pursuant to that, the subject matter of the research carried out in this paper was the influence of some factors on occupational satisfaction and motivation in the work of employees in a laboratory as the presumptions of their professional efficiency. The research goal was determined as the examination of the influence of individual factors on employee satisfaction with the working conditions and the influence of individual factors on reduction in employee work motivation.

The following research goals are defined in this paper: 1) to determine the factors that contribute to greater occupational satisfaction; 2) to determine the factors that influence reduction in employee work motivation; 3) to establish what the interconnectedness between the factors influencing greater occupational satisfaction is like; 4) to establish what the interconnectedness between the factors influencing reduced work motivation is like; 5) to perceive what the interconnectedness between the personal and status characteristics of the respondents and their assessment of the influence of individual factors on job satisfaction is like, and 6) what the interconnectedness between the personal and status characteristics of the respondents and their assessment of the influence of individual factors on reduction in employee motivation is like.

The independent variable in this research study is defined as the factors influencing occupational satisfaction and reduction in work motivation, whereas the dependent variable is defined as occupational satisfaction and reduction in work motivation. Besides, the respondents' personal and status characteristics made up the independent variable.

The research indicators were defined for each independent and dependent variable. The following indicators were determined with the factors influencing occupational satisfaction: 1) a greater possibility of being promoted (TASK1); 2) a higher salary (TASK2); 3) more acknowledgement and rewards for a successfully done job (TASK3); 4) better working conditions (TASK4); 5) better work organization (TASK5); 6) a more creative job (TASK6); 7) greater respect of employees' rights (TASK7); 8) better interpersonal relationships (TASK8); 9) a greater possibility of participating in decision-making (TASK9), and 10) the level of occupational motivation (TASK10).

The indicators of the factors influencing reduction in work motivation were as follows: 1) a greater possibility of improving (RM1); 2) a greater possibility of achieving acknowledgments for job success and personal affirmation (RM2); 3) the current salary (RM3); 4) a challenging and responsible job (RM4); 5) a greater possibility of being promoted (RM5); 6) a more creative, more interesting and more dynamic job (RM6); 7) current working conditions (RM7); 8) current work organization (RM8); 9) a greater possibility of participating in decision-making (RM9); 10) current interpersonal relationships (RM10), and 11) current respect for employees' rights (RM11). Abbreviations used in paper to streamline records are: RM ("reduces motivation") and IM ("increases motivation")

The following indicators were used to analyze the respondents' personal and status characteristics, namely: the sex (male, female); the years of age (from 26 to 35; from 36 to 45; over 46); the total years of service in the laboratory (up to 5 years; from 8 to 10 years; from 11 to 20 years); the last acquired education level (secondary school; college; university; specialization) and whether there are employees under their management (yes and no).

The indicators of the dependent variable were defined on a 5-degree Likert scale separately with job satisfaction and reduced work motivation. When speaking about job satisfaction, the following indicators were determined: 1) very demotivating; 2) demotivating; 3) neither motivating nor demotivating; 4) motivating, and 5) very motivating. The motivation level indicators were determined as follows: 1) does not reduce motivation; 2) reduces motivation very little; 3) reduces motivation a little; 4) reduces motivation, and 5) reduces motivation a lot.

The Research Methods

The descriptive and analytical Survey Method was applied in this research study; of research techniques, surveying was applied. To collect data, a Survey Questionnaire consisting of the general part (the respondents' personal and status characteristics) and two subscales of the Likert type: 10 statements (factors) influencing job satisfaction and 11 statements (factors) influencing reduction in work motivation was used. The statistical processing of the data included the determination of the basic statistical indicators of the respondents' personal and status characteristics and the factors contributing greater occupational satisfaction and lesser work motivation; then a correlation analysis between the factors influencing an increase in occupational satisfaction and between the factors influencing reduction in work motivation, as well as the Chi-test for the determination of the

connectedness between the respondents' personal and status characteristics, on the one hand, and the factors influencing an increase in occupational satisfaction and reduction in work motivation, on the other.

The sample type was an intentional sample of 20 employees in the REA LAB DOO laboratory, whereas the respondents' personal and status characteristics are given in the tables from 1 to 6.

According to the data shown in Table 1, the respondents sample consists of 20% of men and 80% of women.

Table 1: Sex

Respondents' answers	Frequency	%	Cumulative %
Male	4	20.0	20.0
Female	16	80.0	100.0
Total	20	100.0	

When speaking about the years of age of the respondents, the data shown in Table 2 account for the fact that over one-half of the respondents belong to the category from 26 to 35 years of age (55%), only to be followed by those from 36 to 45 years of age (35%), whereas the smallest percentage of the respondents are from the group of those older than 46 (10%).

Table 2: Years of age

Respondents' answers	Frequency	%	Cumulative %
from 26 to 35 years of age	11	55.0	55.0
from 36 to 45 years of age	7	35.0	90.0
over 46 years of age	2	10.0	100.0
Total	20	100.0	

While considering the total years of service of the respondents, the results presented in Table 3 were obtained, showing that more than one-half of the respondents have up to 5 years of service (55%), only to be followed by those with 6 to 10 years of service (30%), whereas the least number of the respondents are those with 11 to 20 years of service (15%).

Table 3: The total years of service in the laboratory

Respondents' answers	Frequency	%	Cumulative %
up to 5 years	11	55.0	55.0
from 6 to 10 years	6	30.0	85.0
from 11 to 20 years	3	15.0	100.0
Total	20	100.0	

When speaking about the highest acquired level of education, the data in Table 4 reveal that the biggest percentage of the respondents belong to the group with a university degree (45%), only to be followed by the respondents with a secondary school diploma (30%), whereas the remaining 25% of the respondents have a college degree (15%) or a specialization (10%).

Table 4: The last acquired education level

Respondents' answers	Frequency	%	Cumulative %
Secondary school diploma	6	30.0	30.0
College degree	3	15.0	45.0
University degree	9	45.0	90.0
Specialization	2	10.0	100.0
Total	20	100.0	

When answering the question: "Are there employees under your management?", according to the data presented in Table 5, it is possible to conclude that only 5% of the respondents answered that they had a managerial function in the organization, whereas 95% answered they did not have a managerial function.

Table 5: Are there employees under their management?

Respondents' answers	Frequency	%	Cumulative %
Yes	1	5.0	5.0
No	19	95.0	100.0
Total	20	100.0	

The Research Results

The research results include the analysis of the assessment of the factors contributing greater occupational satisfaction and the analysis of the assessment of the factors contributing to reduction in work motivation, then the analysis of the correlation between the factors contributing to grater occupational satisfaction and the analysis of the correlation between the factors contributing to lesser work motivation, and ultimately the analysis of the connectedness between the respondents' personal and status characteristics and the assessment of the factors contributing to greater occupational satisfaction and the analysis of the connectedness between the respondents' personal and status characteristics and the assessment of the factors contributing to lesser work motivation.

The assessment of the factors contributing to the respondents' greater occupational satisfaction and lesser work motivation

In order to determine the degree of the significance of the influence exerted by individual factors on occupational satisfaction and reduction in work motivation, the respondents were given the task to assess, on a 5-degree Likert scale, the extent to which individual factors influence an increase in their occupational satisfaction and reduction in their work motivation. In connection with that, the respondents assessed which factors significantly influenced their occupational satisfaction, namely: 1) a greater possibility of being promoted (TASK1); 2) a higher salary (TASK2); 3) more acknowledgement and rewards for a successfully done job (TASK3); 4) better working conditions (TASK4); 5) better work organization (TASK5); 6) a more creative job (TASK6); 7) greater respect of employees' rights (TASK7); 8) better interpersonal relationships (TASK8); 9) a greater possibility of participating in decision-making (TASK9), and 10) the level of occupational motivation (TASK10). The results of the assessment in a form of the frequency and percentages of the answers received from the respondents are shown in Table 6.

Based on the summary review of all the considered influential factors presented in the said table, it is possible to see that, except for one answer, the majority of the answers range from "neither motivating nor demotivating" to "very motivating".

When speaking about the first factor, "a greater possibility of being promoted", as many as 65% of the respondents answered that that factor has a "motivating" effect on their occupational satisfaction, and this percentage should be added yet 25% of the respondents in whom this factor has a "very motivating" effect. While assessing the influence of this factor on occupational satisfaction, only 10% of the respondents were in two minds ("neither motivating nor demotivating").

Almost two-thirds of the respondents consider that a "higher salary" has a motivating effect on their occupational satisfaction (65%), and the additional 30% of them highlight the "motivating" influence of a higher salary. In this case, too, there were 10% of the respondents who were in two minds.

Table 6: The basic statistical indicators for the respondents' answers regarding the influential factors for an increase in occupational satisfaction

Factors influencing and increase in occupational satisfaction	Respondents' answers										Total	
	Very demotivating		Demotivating		Neither motivating nor demotivating		Motivating		Very motivating			
	f	%	f	%	f	%	f	%	f	%	f	%
TASK-1: a greater possibility of being promoted					2	10%	13	65%	5	25%	20	100%
TASK -2: a higher salary					2	10%	6	30%	12	60%	20	100%
TASK - 3: more acknowledgement and rewards for a successfully done job					3	15%	8	40%	9	45%	20	100%
TASK - 4: better working conditions					1	5%	9	45%	10	50%	20	100%
TASK -5: better work organization					1	5%	6	30%	13	65%	20	100%
TASK -6: a more creative job					4	20%	9	45%	7	35%	20	100%
TASK -7: greater respect for employees' rights					3	15%	5	25%	12	60%	20	100%
TASK-8: better interpersonal relationships					2	10%	6	30%	12	60%	20	100%
TASK -9: a greater possibility of participating in decision-making	1	5%			3	15%	11	55%	5	25%	20	100%
TASK-10: the level of occupational motivation			6	30%	2	10%	10	50%	2	10%	20	100%

A high percentage of the respondents, 45% and 40%, answer that "more acknowledgement and rewards for a successfully done job" has a "very motivating" and "motivating", respectfully,

influence on their occupational satisfaction. A total of 15% of the respondents are in two minds regarding this question.

One-half of the respondents (50%) consider that "better working conditions" have an effect on their occupational satisfaction in a very motivating way, and this percentage of the respondents should be added yet another 45% of those influenced in a motivating way when their occupational satisfaction is concerned. Only 5% of the respondents were in two minds when this question is concerned.

Almost two-thirds of the respondents (65%) assessed "better work organization" to have an effect on their satisfaction in a very motivating way, whereas 30% of them assessed that this factor had a motivating influence on that satisfaction. In this case, too, only 5% of the respondents were in two minds.

The biggest percentage of the respondents consider that "a creative job" has a motivating effect on their satisfaction, only to be followed by 35% of the respondents in whom this factor has a very motivating effect. A total of 20% of the respondents were in two minds when assessing the influence of this factor.

As many as 60% of the respondents consider that "greater respect for employees' rights" has a very motivating effect on their satisfaction, whereas the additional 25% of them assess this factor to have a motivating effect on their satisfaction. When assessing the influence of this factor, 15% of them were in two minds.

A big percentage of the respondents assess "better interpersonal relationships" to have a very motivating (60%) and motivating (30%) effect on their job satisfaction, whereas a total of 10% of them were in two minds.

When speaking about "a greater possibility of participating in decision-making", over 50% of the respondents assess this factor to have a motivating effect on their satisfaction (55%), whereas 25% of them highlight the very motivating influence of this factor. While assessing the influence of this factor on job satisfaction, 15% of the respondents were in two minds, and only 5% of them highlighted a very demotivating influence of this factor.

While examining the influence of the level of motivation on the respondents' job satisfaction, a fact was established that as many as half of them highlighted the fact that motivation had a "positive" effect on occupational satisfaction (50%), and the additional 10% of them pointed to the "very positive influence" of motivation on the job they did. Less than one-third of the respondents pointed out the fact that motivation had a negative influence (30%), whereas 10% of them were in two minds as per this question.

In the continuation of this analysis, we examined which factors had a significant effect on reduction in the respondents' work motivation. Those were the following factors: 1) a greater possibility of improving (RM1); 2) a greater possibility of achieving acknowledgments for job success and personal affirmation (RM2); 3) the current salary (RM3); 4) a challenging and responsible job (RM4); 5) a greater possibility of being promoted (RM5); 6) a more creative, more interesting and more dynamic job (RM6); 7) current working conditions (RM7); 8) current work organization (RM8); 9) a greater possibility of participating in decision-making (RM9); 10) current interpersonal relationships (RM10), and 11) current respect for employees' rights (RM11). The results of the assessment in a form of the frequency and percentages of the answers received from the respondents are shown in Table 7.

According to the assessment of 75% of the respondents, a greater possibility of being promoted "does not reduce work motivation", whereas the remaining 25% of the respondents consider this factor to, yet, influence reduction in motivation in a range from "very little" (10%), via "a little" (5%), to "a lot" (10%).

When speaking about "a greater possibility of achieving acknowledgments for job success and personal affirmation", 60% of the respondents highlighted the fact that this factor "does not reduce" motivation, whereas the remaining 40% of them assessed this factor to have, in a certain percentage, an effect on reduction in motivation (very little – 15%, a little – 5%, reduces motivation – 10%, and reduces motivation a lot – 10%).

When speaking about "the current salary", only 5% of the respondents consider this this factor "does not reduce motivation", whereas the remaining 95% of the respondents highlight its negative influence ("reduces motivation" – 35%, "reduces motivation a little" – 25%, and "reduces motivation a lot" – 20%).

Table 7: The basic statistical indicators for the respondents' answers regarding the influential factors for an increase in work motivation

Factors influencing an increase in work motivation	Respondents' answers										Total	
	Does not reduce motivation		Reduces motivation very little		Reduces motivation a little		Reduces motivation		Reduces motivation a lot			
	f	%	f	%	f	%	f	%	f	%	f	%
IM-1: a greater possibility of improvement	15	75%	2	10%	1	5%			2	10%	20	100%
IM-2: a greater possibility of achieving acknowledgments for job success and personal affirmation	12	60%	3	15%	1	5%	2	10%	2	10%	20	100%
IM-3: the current salary	1	5%	3	15%	5	25%	7	35%	4	20%	20	100%
IM-4: a challenging and responsible job	15	75%	2	10%	1	5%	2	10%			20	100%
IM-5: a greater possibility of being promoted	13	65%	2	10%	3	15%	1	5%	1	5%	20	100%
IM-6: a more creative, more interesting and more dynamic job	13	65%	4	20%	1	5%			2	10%	20	100%
IM-7: current working conditions	3	15%	5	25%			6	30%	6	30%	20	100%
IM-8: current work organization			3	15%	4	20%	8	40%	5	25%	20	100%
IM-9: a greater possibility of participating in decision-making	8	40%	2	10%	7	35%	3	15%			20	100%
IM-10: current interpersonal relationships	5	25%	2	10%	5	25%	7	35%	1	5%	20	100%
IM-11: current respect for employees' rights	2	10%	1	5%	5	25%	6	30%	6	30%	20	100%

When the following factor, defined as "a challenging and responsible job", is concerned, as many as 75% of the respondents consider that factor not to reduce motivation, whereas 25% of them assess the

mentioned factor to reduce their motivation (very little – 10%, a little – 5% and that it reduces motivation – 10%).

According to the assessment of 65% of the respondents, a greater possibility of being promoted does not reduce their occupational motivation, either, whereas the remaining 35% of the respondents assess that their influence on reduction in work motivation exists in a range from "a lot" (5%) and "reduces motivation" (5%), via "reduces motivation very little" (10%) to "reduces motivation a little" (15%).

An equal percentage of the respondents (65%) consider that "a more creative, more interesting and more dynamic job" does not reduce motivation, whereas 20% of them answered that it did influence reduction in motivation "very little". A total of 5% of the respondents highlight the fact that it influences reduction in motivation "a little", whereas 10% of them consider that it reduces motivation a lot.

When the "current working conditions" are in question, only 25% of the respondents answered that this factor "does not reduce motivation", whereas the remaining 75% of the respondents highlight its negative influence ranging from "a little" (25%) to "a lot" and "reduces motivation" (30%).

Similar results were also obtained in the assessment of the factor defined as the "current work organization", where only 15% of the respondents stated that this factor did not influence reduction in motivation, and as many as 40% of the respondents answered that it reduced motivation. This percentage should be added the additional 25% of the respondents who considered that it influenced reduction in motivation "a lot" and 25% of them who stated that this factor "reduces motivation a little".

When the factor "a greater possibility of participating in decision-making" is concerned, 40% of the respondents stated that this factor "does not reduce" motivation, whereas 60% of them asserted that it influenced reduction in motivation ranging from "very little" (10%), via "reduces" (15%) to "reduces a little" (35%).

Only one-fourth (25%) of the respondents consider that "current interpersonal relationships" do not influence reduction in motivation, whereas 75% of them highlight the fact that this factor influences reduction in motivation (very little – 10%, a little – 25%, reduces motivation – 35%, and reduces motivation a lot – 5%).

During the analysis of the influence of the "current respect for employees' rights" on their motivation, it is possible to see that only 10% of the respondents highlight the fact that this factor "does not reduce motivation", whereas 90% of them consider that that factor does influence reduction in motivation. Simultaneously, as many as 30% of the respondents point out that it "reduces motivation" and "reduces motivation a lot"; 25% of them consider that it "reduces motivation a little", and another 5% of the respondents point out that it "reduces motivation very little".

Apart from the frequency and percentages, the descriptive analysis of the factors influencing an increase in occupational satisfaction and reduction in work motivation also included the analysis of the arithmetic mean, standard deviation and rank of the results obtained.

According to the indicators presented in Table 8, the greatest contribution to greater occupational satisfaction is made by better work organization (4.60). The second and third ranks belong to a higher salary and better interpersonal relationships, respectively (4.50), whereas the following factors rank fourth and fifth, respectively: better working conditions and greater respect for employee's rights (4.45). The first before the last rank belongs to a greater possibility in decision-making (3.95), whereas occupational motivation ranks the last (3.40).

When speaking about the standard deviation, i.e. the degree of the respondents' agreement in the answers, the results of the examination shown in Table 8 reflect the highest degree of agreement in the respondents' answers regarding the assessment of the factors influencing greater occupational satisfaction in the factor "a greater possibility of being promoted" (0.587), then in the factor "better working conditions" (0.605), which is perceived as the factor with the greatest contribution to occupational satisfaction. The third factor whose contribution to better occupational satisfaction the respondents have a high degree of agreement upon is "better working conditions" (0.605). The lowest

degree of agreement among the respondents is perceived in the assessment of the factor "occupational motivation" (1.05), which otherwise ranks the lowest as per the significance of its contribution to greater occupational satisfaction (3.40). Due to the said, an additional analysis of the factors influencing reduction in work motivation was carried out.

Table 8: The basic statistical indicators of the factors contributing to greater occupational satisfaction

	Factors contributing to greater occupational satisfaction and work motivation	Arithmetic mean	Standard deviation	Rank
1	A greater possibility of being promoted	4.15	0.587	6-7
2	A higher salary	4.50	0.688	2-3
3	More acknowledgements and rewards for a successfully done job	4.30	0.733	8
4	Better working conditions	4.45	0.605	4-5
5	Better work organization	4.60	0.598	1
6	A more creative job	4.15	0.745	6-7
7	Greater respect for employees' rights	4.45	0.759	4-5
8	Better interpersonal relationships	4.50	0.688	2-3
9	A greater possibility of participating in decision-making	3.95	0.945	9
10	Occupational motivation	3.40	1.05	10

The rate 1 marks the factor that has a very demotivating effect, and the rate 5 marks the factor that has a very motivating effect on the respondents' job satisfaction.

In Table 9 the basic statistical indicators (the arithmetic mean, the standard deviation and the rank) of the factors influencing reduction in work motivation are shown. According to the data obtained, reduction in motivation is to the greatest extent influenced by the following factors: **current working conditions** and **current work organization** (3.75). The third and fourth ranks belong to the factors indicating dissatisfaction with **current respect for employees' rights** (3.65) and **the current salary** (3.50). The least influence on reduction in employees' motivation is, in the respondents' opinion, exerted by **a challenging and responsible job** (1.50), as well as the factor which **enables a greater possibility of employment** (1.60).

Table 9: The basic statistical indicators of the factors influencing reduction in work motivation

Factors influencing reduction in motivation		Arithmetic mean	Standard deviation	Rank
1	A greater possibility of improving	1.60	1.273	10
2	A greater possibility of achieving acknowledgments for job success and personal affirmation	1.95	1.432	7
3	The current salary	3.50	1.147	4
4	A challenging and responsible job	1.50	1.000	11
5	A greater possibility of being promoted	1.75	1.209	8
6	A more creative, more interesting and more dynamic job	1.70	1.261	9
7	Current working conditions	3.75	1.070	1-2
8	Current work organization	3.75	1.020	1-2
9	A greater possibility of participating in decision-making	2.25	1.164	6
10	Current interpersonal relationships	2.85	1.309	5
11	Current respect for employees' rights	3.65	1.268	3

The rate 1 marks the factor that does not reduce motivation, whereas the rate 5 marks the factor that reduces motivation a lot.

It is interesting to point out the fact that, during the processing of these research results, high coefficients of the standard deviation were obtained in all examined factors, whereas the greatest dissipation of the research results is visible in the assessment of the influence of "a greater possibility of achieving acknowledgments for job success and personal affirmation" (1.432). Also, a high degree of the respondents' disagreement was determined during the assessment of the influence of "current interpersonal relationships" (1.309), "a greater possibility of improving" (1.273) and "current respect for employees' rights" (1.268). Although there is a relatively big coefficient of the standard deviation, yet the highest degree of the respondents' agreement was determined in the assessment of the influence of "a challenging and responsible job" (1.000), which on its part, however, represents the factor that influences reduction in employees' motivation to the smallest extent.

Correlation between the factors contributing to greater occupational satisfaction and reduced work motivation

Endeavoring to determine the nature of the connectedness between the factors contributing the respondents' greater occupational satisfaction and their work motivation, significant correlations between individual factors were determined by means of the Pearson correlation coefficient at the levels of 0.01 (99%) and 0.05 (95% reliability).

When the correlations between the factors contributing to greater occupational satisfaction are in question, the significant coefficients of the Pearson correlation coefficient at the levels of 0.01 and 0.05 are given in Table 10.

Table 10: The correlation between the factors contributing greater occupational satisfaction

FACTORS	TASK6	TASK7	TASK8	TASK9	TASK10	TASK11	TASK12	TASK13	TASK14	TASK15
TASK6-a greater possibility of being promoted	1									
TASK7- a higher salary	.195	1								
	.409									
TASK8-more acknowledgements and rewards for a successfully done job	.135	**.626****	1							
	.572	.003								
TASK9-better working conditions	.096	**.695****	**.629****	1						
	.686	.001	.003							
TASK10-better work organization	.180	**.639****	**.528***	**.815****	1					
	.448	.002	.017	.000						
TASK11-a more creative job	.066	**.667****	**.492***	**.543***	.260	1				
	.782	.001	.028	.013	.269					
TASK12-greater respect for employees' rights	.195	**.655****	**.501***	**.682****	.417	**.712****	1			
	.410	.002	.024	.001	.067	.000				
TASK13-better interpersonal relationships	.326	**.444***	.209	.443	.383	**.667****	.353	1		

	.161	.050	.377	.051	.095	.001	.127			
TASK14-a greater possibility of participating in decision-making	.204	.202	.023	.134	.149	.161	.033	.202	1	
	.388	.392	.924	.574	.531	.498	.890	.392		
TASK15-greater occupational motivation	-.017	-.146	-.027	-.216	-.235	.122	-.106	.146	-.085	1
	.943	.539	.909	.360	.318	.610	.656	.539	.721	

***. Correlation is significant at the 0.01 level (2-tailed);*
**. Correlation is significant at the 0.05 level (2-tailed).*

Significant correlations at the level of 0.01 were determined between the following factors influencing an increase in occupational satisfaction: TASK7 “a higher salary” – TASK8 “more acknowledgements and rewards for successfully done job” (r=0.626); TASK7 “a higher salary” – TASK9 “better working conditions” (r=0.695); TASK8 “more acknowledgements and rewards for a successfully done job” – TASK9 “better working conditions” (r=0.629); TASK7 “a higher salary” – TASK10 “better work organization” (r=0.815); TASK7 “a higher salary” – TASK11 “a more creative job” (r=0.667); TASK7 “a higher salary” – TASK12 “greater respect for employees’ rights” (r=0.655); TASK9 “better working conditions” – TASK12 “greater respect for employees’ rights” (r=0.682); TASK11 “a more creative job” – TASK12 “greater respect for employees’ rights” (r=0.712); TASK11 “a more creative job” – TASK13 “better interpersonal relationships” (r=0.667).

Between the factors influencing an increase in occupational satisfaction and motivation, the following significant correlations at the level of 0.05 were determined, namely: TASK8 “more acknowledgements and rewards for a successfully done job” – TASK10 “a better work organization” (r=0.528); TASK8 “more acknowledgements and rewards for a successfully done job” – TASK11 “a more creative job” (0.492); TASK9 “better working conditions” – TASK11 “a more creative job” (r=0.543); TASK8 “more acknowledgements and rewards for a successfully done job” – TASK12 “greater respect for employees’ rights” (r=0.501) and TASK7 “a higher salary” – TASK13 “better interpersonal relationships” (r=0.444).

The same procedure for determining connectedness was also carried out between the factors influencing reduction in work motivation. The results of the examination of the connectedness by means of the Pearson correlation coefficient are presented in Table 11.

These results show that significant connectedness between the following factors was determined at the 0.01 level: RM-16 “a greater possibility of improving” – RM17 “a greater possibility of achieving acknowledgments for job success and personal affirmation” (0.652); RM-16 “a greater possibility of improving” – RM19 “a challenging and responsible job” (0.827); RM17 “a greater possibility of achieving acknowledgments for job success and personal affirmation” (0.652) – RM19 “a challenging and responsible job” (0.570); RM-16 “a greater possibility of improving” – RM20 “a greater possibility of being promoted” (0.753); RM19 “a challenging and responsible job” – RM20 “a greater possibility of being promoted” (0.762); RM16 “a greater possibility of improving” – RM21 “a more creative, more interesting and more dynamic job” (0.938); RM17 “a greater possibility of achieving acknowledgments for job success and personal affirmation” – RM21 “a more creative, more interesting and more dynamic job” (0.604); RM19 “a challenging and responsible job” – RM21 “a more creative, more interesting and more dynamic job” (0.835); RM20 “a greater possibility of being promoted” – RM21 “a more creative, more interesting and more dynamic job” (0.812); RM22 “current working conditions” – RM23 “current work organization” (0.567); RM20 “a greater possibility of being promoted” – RM24 “a greater possibility of participating in decision-making” (0.570); RM22 “current working conditions” – RM26 “current respect for employees’ rights” (0.786); RM23 “current work organization” – RM26 “current respect for employees’ rights” (0.662).

Table 11: The correlation of the factors contributing to reduction in work motivation

FACTORS	RM16	RM17	RM18	RM19	RM20	RM21	RM22	RM23	RM24	RM25	RM26
RM16 – a greater possibility of improving	1										
RM17 – a greater possibility of achieving acknowledgments for job success and personal affirmation	**.652****	1									
	.002										
RM18 – the current salary	-.036	.016	1								
	.880	.947									
RM19 – a challenging and responsible job	**.827****	**.570****	.046	1							
	.000	.009	.848								
RM20 – a greater possibility of being promoted	**.821****	**.753****	.057	**.762****	1						
	.000	.000	.812	.000							
RM21 – a more creative, more interesting and more dynamic job	**.938****	**.604****	-.073	**.835****	**.812****	1					
	.000	.005	.760	.000	.000						
RM22 – current working conditions	-.116	-.112	-.064	-.123	-.092	.020	1				
	.627	.639	.788	.605	.701	.935					
RM23 – current work organization	**-.527***	-.406	.158	**-.490***	-.438	-.430	**.567****	1			
	.017	.076	.507	.028	.054	.058	.009				
RM24 – a greater possibility of participating in decision-making	.284	.387	.177	.384	**.570****	.377	-.116	-.078	1		
	.225	.092	.454	.094	.009	.102	.626	.745			
RM25 – current interpersonal relationships	.341	.333	-.088	.181	.175	.258	.197	-.030	.337	1	
	.141	.152	.713	.445	.461	.271	.404	.901	.147		
RM26 – current respect for employees' rights	-.059	-.097	.163	-.145	.009	.030	**.786****	**.662****	.098	.284	1
	.806	.684	.493	.541	.971	.901	.000	.001	.681	.225	

***. Correlation is significant at the 0.01 level (2-tailed).*
**. Correlation is significant at the 0.05 level (2-tailed).*

Significant, but negative, correlation at the 0.05 level was determined between the following factors: RM16 "a greater possibility of being promoted" – RM23 "current work organization" (-0.527) and RM19 "a challenging and responsible job" – RM23 "current work organization" (-0.490).

Connectedness between the personal and status characteristics of the respondents and their assessment of the significance of the factors influencing occupational satisfaction and the factors influencing reduction in work motivation

The connectedness between the respondents' personal and status characteristics and their assessment of the significance of the factors influencing an increase in occupational satisfaction and the factors influencing reduction in work motivation was examined by using the Chi-square test.

Only one statistically significant connection between the respondents' sex and "job creativity" that influences an increase in occupational satisfaction was determined during the examination of the connectedness between the respondents' personal and status characteristics and their assessment of the contribution of individual factors to an increase in occupational satisfaction.

As has been highlighted, the significance of the difference between the answers given by the men and the women to the question "*To what extent does a more creative job contribute to your greater occupational satisfaction and motivation?*" was tested by means of the Chi-square test. The number, i.e. percentage of the respondents of both sexes who chose one of the five offered answers (Table 12) indicate a tendency for men (more frequently than for women) to choose the answer that "a creative job" contributes to greater occupational satisfaction in a very motivating manner. Among the men, the score is 100%, and among the women somewhat more than one-third (35%). Less than one-half of the women (45%) consider "a creative job" as motivating for their occupational satisfaction, whereas one-fifth of the women (20%) were in two minds when this question is concerned. Generally perceived, "a creative job" does contribute to greater job satisfaction in men rather than in women, and the significance of that difference was confirmed by the Pearson Chi-square test. The value of the Chi-square test in this case is 9.286 and is statistically significant at the 0.01 level.

Table 12: The respondents' sex and their answers to the question: To what extent does a more creative job contribute to your greater occupational satisfaction and motivation?

Offered answers	Respondents' sex				Total
	Male		Female		
	f	%	f	%	
Neither motivates nor demotivates	0	0%	4	20%	4
Motivating	0	0%	9	45%	9
Very motivating	4	100%	3	35%	7
Total	4	100%	16	100%	20

(χ^2 = 9.286, π = 0.01); F – denotes the number of the respondents

When speaking about the connectedness between the respondents personal and status characteristics and their assessment of the influence of individual factors on reduction in work motivation, the Pearson Chi-square test was used and only three significant correlation coefficients were determined between these characteristics, namely: 1) the respondents' years of age and RM19 "a challenging and responsible job"; 2) the respondents' education level and RM19 "a challenging and responsible job", and 3) the respondents' education level and RM20 "a greater possibility of being promoted".

By the same procedure (the Pearson Chi-square test), the soundness of the assumption of the connectedness between the respondents' "years of age" and their answer to the question "*To what extent does a challenging and responsible job lead to reduction in work motivation?*" According to the data given in Table 13, a great majority in all the respondent categories (from 26 to 35 years of age) are those who do not question reduction in work motivation, i.e. those who consider that a challenging and responsible job "does not reduce motivation at all" (as many as 90.9%), whereas only about nine percent of the respondents from this years-of-age category point out that such a job "reduces motivation a little" (9.1%). In the next category of the respondents of the years of age from 36 to 45, the biggest percentage of them consider that that job "does not reduce motivation" (71.4%),

whereas about 29% of the respondents consider that job to yet "reduce motivation" (28.6%). All the respondents of over 46 years of age consider that that job "reduces motivation very little" (100%).

Table 13: The respondents' years of age and answers to the question "To what extent does a challenging and responsible job influences reduction in occupational motivation?"

Offered answers	Respondents' years of age								Total
	18-25		26-35		36-45		over 46		
	f	%	f	%	f	%	f	%	
Does not reduce motivation	0		10	90.9%	5	71.4%	0		15
Reduces motivation very little	0		0		0		2	100%	2
Reduces motivation a little	0		1	9.1%	0		0		1
Reduces motivation	0		0		2	28.6%	0		2
Reduces motivation a lot	0		0		0		0		0
Total	0		11	100%	7	100%	2	100%	20

(χ^2 = 24.416; π = 0.000)

It was also established that there was significant connectedness between the respondents' "education level" and their answer to the question: "*To what extent does a challenging and responsible job influence reduction in occupational motivation?*" The first thing that attracts attention in the presented distribution of the answers to this question (Table 14) is the fact that the three-fourths (75%) of all the respondent categories (from 50% of the respondents with a secondary school diploma and a specialization to 100% of the respondents with a university degree) consider that "a challenging and responsible job" does not reduce motivation. The remaining 25% of the respondents stated that that job reduced motivation very little, then that it reduced motivation a little, and there were even those (only 10%) who considered that that job reduced motivation. The value of the Pearson Chi-square test is 18.111 and is significant at the π<0.05 level.

Table 14: The respondents' education level and answers to the question "To what extent does a challenging and responsible job influence reduction in occupational motivation?"

Offered answers	Respondents' education level								Total
	Secondary school		College		University		Specialization		
	f	%	f	%	f	%	f	%	
Does not reduce motivation	3	50%	2	66.7%	9	100%	1	50%	15
Reduces motivation very little	2	33.3%	0		0		0		2
Reduces motivation a little	0		0		0		1	50%	1
Reduces motivation	1	16.7%	1	33.3%	0		0		2
Reduces motivation a lot	0		0		0		0		0
Total	6	100%	3	100%	9	100%	2	100%	20

(χ^2 = 18.111; π = 0.034)

The Chi-square test was used to determine significant connectedness between the respondents' "education level" and their answer to the question: "*To what extent does a greater possibility of being promoted influence reduction in your occupational motivation?*". The distribution of the respondents' answers is shown in Table 15. The data obtained indicate that as many as 65% of all the respondent categories, classified as per the education level, consider that a possibility of being promoted "does not influence reduction in occupational motivation" (from 50% of the respondents with a secondary school diploma, via 66.7% of the respondents with a college degree, all the way to 88.9% of the respondents with a university degree). The remaining 10% of the respondents with a secondary school diploma and a specialization consider that this activity "reduces motivation very little"; 15% of the respondents with a secondary school diploma and a university degree point out the fact that this activity reduces motivation a little, whereas only 10% of the respondents consider that this activity reduces motivation "a little" and "a lot". The value of the Pearson Chi-square test is 23.818 and is significant at the level $\pi<0.05$.

Table 15: The respondents' education level and answers to the question: "To what extent does a greater possibility of being promoted influence reduction in your occupational motivation?"

Offered answers	Respondents' education level								Total
	Secondary school		College		University		Specialization		
	f	%	f	%	f	%	f	%	
Does not reduce motivation	3	50%	2	66.7%	8	88.9%	0		13
Reduces motivation very little	1	16.7%	0		0		1	50%	2
Reduces motivation a little	2	33.3%	0		1	11.1%	0		3
Reduces motivation	0		0		0		1	50%	1
Reduces motivation a lot	0		1	33.3%	0		0		1
Total	6	100%	3	100%	9	100%	2	100%	20

($\chi^2 = 23.818$; $\pi = 0.022$)

Conclusion

Through the observation of the correlation between occupational motivation and satisfaction, a review of the current literature and the authors' attitudes towards the significance of these phenomena and the factors determining them was performed as part of the cabinet research. The field research of occupational motivation and satisfaction was carried out in a quality control laboratory.

According to the indicators obtained, the greatest contribution to greater occupational satisfaction is made by better work organization (4.60), only to be followed by the second- and third-ranked a higher salary and better interpersonal relationships (4.50), whereas the fourth and fifth ranks belong to the following factors: better working conditions and greater respect for employees' rights (4.45). The first before the last rank is that of a greater possibility of participating in decision-making (3.95), while occupational motivation ranks the last (3.40).

When speaking about the influence of the factor influencing reduction in work motivation, the research results show that such reduction in work motivation is, to the greatest extent, influenced by the following factors: current working conditions and current work organization (3.75), only to be followed by the third- and fourth-ranked factors indicating dissatisfaction with current respect for employees' rights (3.65) and the current salary (3.50). In the respondents' opinion, the smallest

influence on reduction in employees' motivation is that of a challenging and responsible job (1.50), as well as the factor that enables a greater possibility of employment (1.60).

During the examination of the correlation between the factors contributing to greater occupational satisfaction, the significant coefficients of the Pearson correlation coefficient at the level of 0.01, were determined between the following factors: TASK7 "a higher salary" – TASK8 "more acknowledgements and rewards for successfully done job" (r=0.626); TASK7 "a higher salary" – TASK9 "better working conditions" (r=0.695); TASK8 "more acknowledgements and rewards for a successfully done job" – TASK9 "better working conditions" (r=0.629); TASK7 "a higher salary" – TASK10 "better work organization" (r=0.815); TASK7 "a higher salary" – TASK11 "a more creative job" (r=0.667); TASK7 "a higher salary" – TASK12 "greater respect for employees' rights" (r=0.655); TASK9 "better working conditions" – TASK12 "greater respect for employees' rights" (r=0.682); TASK11 "a more creative job" – TASK12 "greater respect for employees' rights" (r=0.712); TASK11 "a more creative job" – TASK13 "better interpersonal relationships" (r=0.667).

Between the factors influencing an increase in occupational satisfaction, the significant correlations at the level of 0.05 were determined, namely with the following factors: TASK8 "more acknowledgements and rewards for a successfully done job" – TASK10 "a better work organization" (r=0.528); TASK8 "more acknowledgements and rewards for a successfully done job" – TASK11 "a more creative job" (0.492); TASK9 "better working conditions" – TASK11 "a more creative job" (r=0.543); TASK8 "more acknowledgements and rewards for a successfully done job" – TASK12 "greater respect for employees' rights" (r=0.501) and TASK7 "a higher salary" – TASK13 "better interpersonal relationships" (r=0.444).

The same procedure for determining connectedness was also performed between the factors influencing reduction in work motivation. The research results show that significant connectedness at the level 0.01 was determined between the following factors: RM-16 "a greater possibility of improving" – RM17 "a greater possibility of achieving acknowledgments for job success and personal affirmation" (0.652); RM-16 "a greater possibility of improving" – RM19 "a challenging and responsible job" (0.827); RM17 "a greater possibility of achieving acknowledgments for job success and personal affirmation" (0.652) – RM19 "a challenging and responsible job" (0.570); RM-16 "a greater possibility of improving" – RM20 "a greater possibility of being promoted" (0.753); RM19 "a challenging and responsible job" – RM20 "a greater possibility of being promoted" (0.762); RM16 "a greater possibility of improving" – RM21 "a more creative, more interesting and more dynamic job" (0.938); RM17 "a greater possibility of achieving acknowledgments for job success and personal affirmation" – RM21 "a more creative, more interesting and more dynamic job" (0.604); RM19 "a challenging and responsible job" – RM21 "a more creative, more interesting and more dynamic job" (0.835); RM20 "a greater possibility of being promoted" – RM21 "a more creative, more interesting and more dynamic job" (0.812); RM22 "current working conditions" – RM23 "current work organization" (0.567); RM20 "a greater possibility of being promoted" – RM24 "a greater possibility of participating in decision-making" (0.570); RM22 "current working conditions" – RM26 "current respect for employees' rights" (0.786); RM23 "current work organization" – RM26 "current respect for employees' rights" (0.662).

Significant, but negative, correlation at the 0.05 level was determined between the following factors: RM16 "a greater possibility of being promoted" – RM23 "current work organization" (-0.527) and RM19 "a challenging and responsible job" – RM23 "current work organization" (-0.490).

The connectedness between the respondents' personal and status characteristics and their assessment of the factors influencing an increase in occupational satisfaction and the factors influencing reduction in work motivation was examined by the Chi-square test.

Only one statistically significant connection between the respondents' sex and the "job creativity" as the factor influencing an increase in occupational satisfaction was established during the examination of the connectedness between the respondents' personal and status characteristics and their assessment of the contribution of individual factors to an increase in occupational satisfaction. Generally perceived, "a creative job" does contribute to greater job satisfaction in men rather than in women, and the significance of that difference was confirmed by the Pearson Chi-square test. The value of the Chi-square test in this case is 9.286 and is statistically significant at the 0.01 level.

When speaking about the connectedness between the respondents' personal and status characteristics and their assessment of the influence of individual factors on reduction in work motivation, the Pearson Chi-square test was used and only three significant correlation coefficients were determined between these characteristics, namely as follows: 1) the respondents' years of age and RM19: a challenging and responsible job (Chi-square test being 24.416, significant at the level π<0,01); 2) the respondents' education level and RM19: a challenging and responsible job (the value of the Pearson Chi-square test being 18.111, significant at the level π<0.05) and 3) the respondents' education level and RM20: a greater possibility of being promoted (the value of the Pearson Chi-square test being 23.818, significant at the level π<0,05).

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Diversification and Specialization of Regions in The Economic Space of The Russian Federation

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Abstract

In modern conditions, the formation of a regional development model involves the use of technologies for identifying "smart specialization" of the economy. The article discusses the problem of the validity of the strategy to strengthen diversification, traditionally regarded as a source of economic growth in the regions. Methodological approaches and a set of indicators have been proposed, the monitoring of which allows us to assess the general dynamics and probability of a "breakpoint" in diversification of the sectoral structure of the region's economy. On the example of regions of a similar industry profile (regions of the Russian Federation with dominance of the manufacturing industry and metallurgical specialization), an empirical analysis of indicators over a period of 11 years was carried out, the changes of which help to assess the presence / absence of qualitative processes of latent transition of regions to a fundamentally different stage of profiling. That is, the achieved maximum diversification of the economy becomes a platform for launching an updated specialization, concentration of the region's economic activity on an efficient industry. As indicators we used the growth rate of diversification and the physical volume of GRP, the integral indicator of localization, the efficiency indicators of the manufacturing industry in the region, the observation of the dynamics of which is expedient for intensification of state support in the sectoral structure of the economy. The method of determining the probability of "break points" of diversification as an effective tool for obtaining new data on the situation in the regions and their readiness for structural changes has been tested.

Keywords: sector specialization, region development, activities localization, smart specialization, region economics' efficiency, diversification trend break point.

Introduction and review of publications

In modern conditions, the spatial development of countries and regions is focused on the use of "smart" technologies and determination of priorities in development management of both developed and

developing countries, including Russia. The concept of "smart specialization" *(Camagni and Capello, 2013)*, developed in 2009 to identify effective industries, unique sectors and perspective directions for the development of EU countries, is an effective tool for the "European Plan 2020" strategy increasing the quality of macroeconomic regulation of the European space and a rational distribution of budget funds. The ultimate goal of the plan is the creation of Europe as a set of countries with complementary sectoral competencies, differing in the direction of development of the innovation sphere and technological platforms, actively using the advantages of intersectoral and interregional (intercountry) interconnections, accumulating synergistic effects of cooperated and interdisciplinary development.

A new format of functioning and strategies of European countries and their regions are being formed on the basis of identifying leading sectors with competitive resources, assets, industries, products. These sectors become platforms for capitalizing local benefits; as well as the creation (in unity with other interested European counterparties) of world-class clusters. The process of transition to smart development involves connecting not only the EU regions with a high-tech sector, but also the activation of territories with a traditional sectoral structure, the expansion of diversification or the induction of new areas of the economy.

A development strategy focused on the uniqueness of each region, combined with the process of forming centres of economic growth, focusing on efficient industry specializations, and taking into account the economic potential of other regions, is a global trend not only in the EU, but also in the Russian economic space. Moreover, the dilemma between maintaining the monospecialization of territories or stimulating the diversification of the economy is a universal problem, the solution of which determines the speed and quality of territories development.

The problem of industry prioritization is quite controversial in economic science. Methods for choosing perspective sectoral specializations of the regions is an international subject of research by many foreign scientists *(Krugman, 1991), (Hausmann, Hwang and Rodrik, 2005)*. The authors note that the formation of a post-industrial economy is not always a unidirectional process of enhancing sectoral diversification, despite the fact that this factor is traditionally regarded as a reserve for increasing the rates of economic growth and sustainable development of regions. The cyclical pro-cesses of strengthening / weakening of monospecialization (or its reverse side - diversification) are noted.

Studies show that increased concentration is observed when a certain level of economic development of territories (countries, regions) and the degree of diversification of the sectoral structure are achieved *(Imbs and Wacziarg, 2003), (Cadot, Carrère and Strauss-Kahn, 2011)*. The authors agree with the opinion of N. Mikheeva that the course towards specialization provides significant advantages to the economy when it comes to breakthrough or growing sectors (Mikheeva, 2016).

Determining the optimal level of diversification and perspective sectors is an urgent scientific and applied task, since decentralization of economic activity in a market economy, the presence of a delay lag of both positive and negative effects, and the latency of processes do not allow for the prompt activation of state support (stimulate dynamics or neutralize the consequences). The identification of qualitatively new phenomena in the regional economy (turning from diversification to deepening specialization) is not only a scientific task, but also a public administration function, primarily for timely reduction of institutional frictions from legislation and infrastructure support.

A systematization of the algorithm and methodological approaches that help regions identify smart specializations is presented in a specially developed guide to Research and Innovation Strategies for Smart Specializations *(S3platform.jrc.ec.europa.eu, 2019)*. The manual provides for the use of a whole range of procedures and iterations: information databases, analytical assistance from EU experts, and participation in the work of European Smart Specialization Platforms *(S3platform.jrc.ec.europa.eu, 2019), (Bole, Živković and Nedović, 2019)*, European cluster observatory (*European Cluster Observatory, 2019)*, selection of benchmarks in the system of country cases and accumulated experience.

The solution to the problem of changing the level of localization or diversification, the development of priority sectors of the regions, is associated with the assessment of production efficiency parameters, GRP and investment volatility, comparative studies of regions with identical industry specialization (comparison with average indicators for the economy), determination of "breaking points" in the saturation of industry diversity. Accordingly, the formation of Socioeconomic Development Strategies

should orient the regions not on universal recommendations regarding the need to diversify the sectoral structure (traditionally, mono-profile is seen as a negative situation) or preserve existing specializations (as an accumulated asset of the region), but rely on objective data that allow timely identify germs of effective specializations, areas for enhancing innovation, intensify government support. A similar point of view is expressed by Russian scientists, noting the need for caution in the recommendations on the mandatory diversification *(Grebenkin, 2018)*; about the existence of the limits of diversification, manifested in the loss of economic efficiency *(Parakhina, Fedorenko and Harchenko, 2012)*.

Theory and methods

The theoretical platform of the Smart Specialization concept is very consistent with the ideas of the Spatial Development Strategy of the Russian Federation, in which the economic space of the Russian Federation is represented as a territory of diversified economic growth and "connected diversity" of regions, that is, the regions development at different speeds, in non-repeatable, varied directions models based on existing competencies and advantages, but taking into account embeddedness in global and national networks and value added creation chains.

The course towards economic diversification is classically considered as a way to ensure sustainability in the context of macroeconomic volatility, while studies show that economic stability is not necessarily accompanied by high rates of economic growth, and high growth rates are often associated with increased specialization (if innovative technologies are changing at the same time in the horizontal expansion of the core industry) *(Mikheeva, 2016)*. Diversification, as noted in economic publications, brings benefits for territories that have low and medium per capita incomes and an appropriate level of development (conclusions of IMF experts *(Papageorgiou and Spatafora, 2012)*: the higher the level of development of the region, the rate of change in diversification becomes less significant *(Cadot, Carrère and Strauss-Kahn, 2011)*. At the same time, there are often periods of market transformation of the industry structure in the direction of diversification or concentration of the economy (for short-term adaptation, as a rule, to crisis changes in the economy.) In the medium and long-term interval, a decrease in the rate of diversification is traditionally regarded as an indicator of the exhaustion of benefits and the approximation of the "breaking point" of the economy. The task of researchers in this context is to distinguish between fundamental and market processes.

It is possible to identify the exhaustion of positive diversification resources, determine the period of trend change in the sectoral structure of the economy, and focus on the transformation of the basic core industry, as the review of publications showed, using observation and analysis of a number of indicators. So, the passage of the highest possible level of diversification (for a specific stage of technological development) and the transition to a qualitatively new stage of concentration are ac-companied by an increase in the region's position in terms of GRP per capita (the average Russian level and the excess of this base can serve as a reference point) while at the same time the growth rate of the diversification indicator declines and a "turn" in the opposite direction of its trend appears (this fact requires checking for connection with crisis processes). The authors believe that monitoring several parameters simultaneously is a way to distinguish between fundamental and market trends. For this, we consider it reasonable to compare the levels and dynamics of the localization coefficients of the core industry (localization coefficients by sales, employment and the number of enterprises) be-tween homogeneous regions, an analysis of the comparative (relative to the Russian Federation as a whole) productivity and scale of enterprises in the specialization industry, observation for the probability of reaching a "breaking point" in saturating industry diversity. An analysis of this kind of in-formation can be used to monitor the effectiveness of state regulation of the economy of the region.

The industrial regions of the Russian Federation are currently shaping industrial policy, taking into account the choice of the sectoral development vector. Under the industry specialization of the region is understood the prevailing concentration of activities identified by the criterion of localization. Under diversification - industry diversity and lack of concentration of activity on a limited number of industries.

The authors sequentially implemented a number of steps of the author's methodology for determining changes in economic diversification (Fig 1).

I stage. A cluster analysis of the regions of the Russian Federation using the IBM.SPSS Statistics program based on the GRP structure (gross value added at current prices for 15 types of economic activity) made it possible to single out a cluster with a close sectoral focus (manufacturing) and metallurgical profile; focus analysis on 4 monospecialized regions.

II stage. To analyse the level of concentration / diversification of the regional economy and its growth rates, the Herfindahl-Hirschman index was used as the sum of the squares of the shares of the sectors in the gross value added of the region *(Borisov, 2015)*:

$$HHI = \sum_{i=1}^{n} d_i^2, \quad (1)$$

where n is the number of population units in a given market.

III stage. To determine the coefficient of localization (Localization Quotient) *(Vasilieva, 2014), (Pavlov, Rastvortceva and Cherepovskaya, 2015),* three types of normalized data were used (by the share of employment, the number of enterprises and the value of the industry organizations sales), as well as the calculation of the integral localization index based on partial coefficients (Table 1).

IV stage. On the basis of localization indices in the context of comparative analysis, two derived indicators are distinguished - the relative productivity of the manufacturing industry and the relative indicator of the scale of manufacturing enterprises.

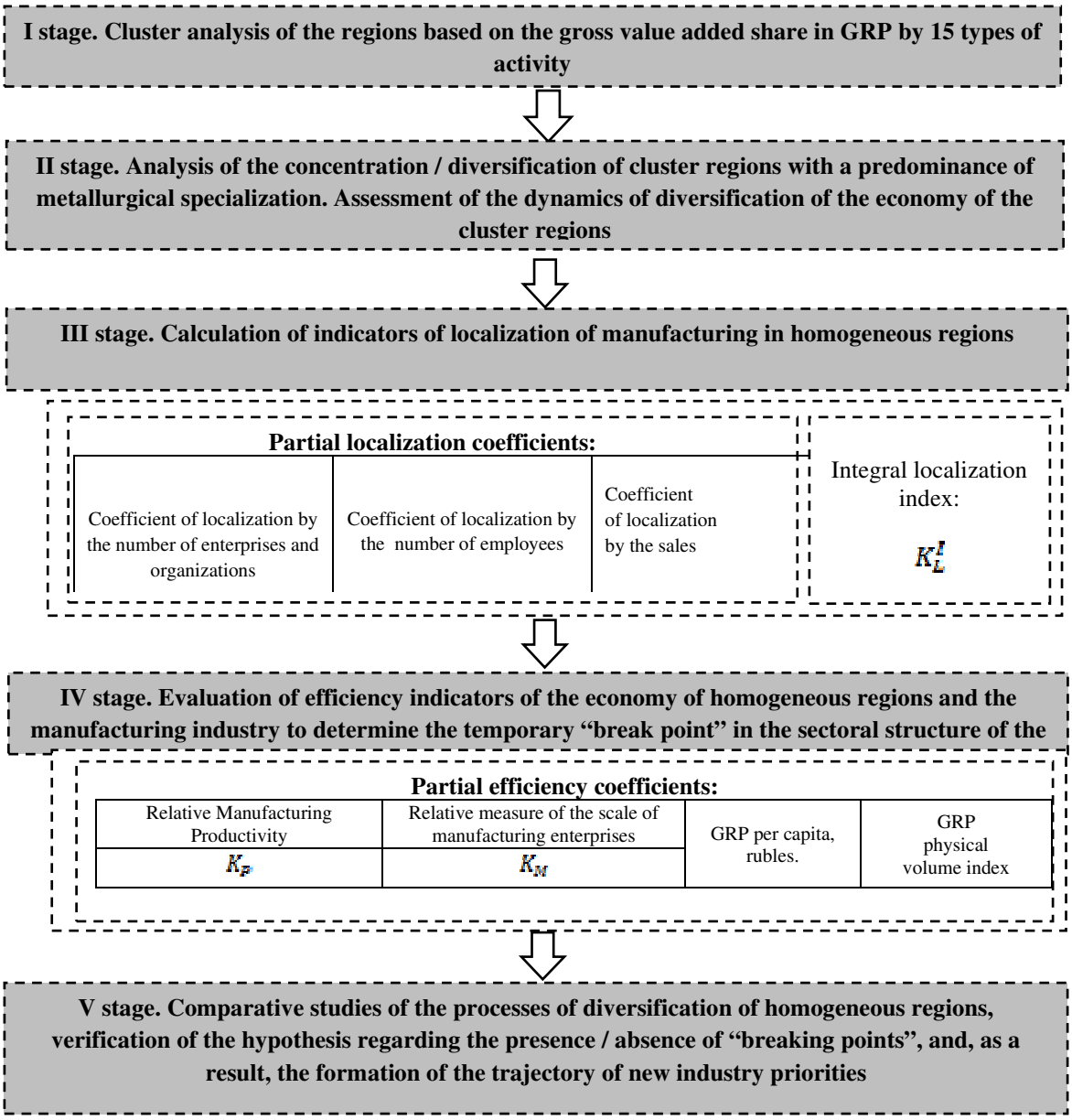

Fig 1. Methodology of comparative studies of the processes of diversification of homogeneous regions
(Source: compiled by the authors)

Table 1: the structure of the Integral localization index (K_L^I) and derived indicators (K_P, K_M)

(Source: compiled by the authors)

Components	Characteristics
Coefficient of localization by the number of enterprises and organizations	$K_L^o = \frac{O_{i,g}}{O_g} / \frac{O_{i,R}}{O_R}$
Coefficient of localization by the number of employees	$K_L^e = \frac{E_{i,g}}{E_g} / \frac{E_{i,R}}{E_R}$
Coefficient of localization by the sales	$K_L^s = \frac{S_{i,g}}{S_g} / \frac{S_{i,R}}{S_R}$
Integral localization index $K_L^I = 1/3(K_L^o + K_L^e + K_L^s)$ where K_L^I – localization index of the sector *i* in the region *g* or Russia *R*; *O* – number of enterprises and organizations; *E* – average annual number of employees; *S* – sales of enterprises and organizations	
Relative manufacturing productivity	$K_P = \left(\frac{\frac{S_{i,g}}{S_g}}{\frac{E_{i,g}}{E_g}}\right) / \left(\frac{\frac{S_{i,R}}{S_R}}{\frac{E_{i,R}}{E_R}}\right)$
Relative scale of manufacturing enterprises	$K_M = \left(\frac{\frac{S_{i,g}}{S_g}}{\frac{O_{i,g}}{O_g}}\right) / \left(\frac{\frac{S_{i,R}}{S_R}}{\frac{O_{i,R}}{O_R}}\right)$

The relative productivity of the manufacturing industry is calculated as the ratio of the localization coefficient by the sales of organizations to the localization coefficient by the number of enter-prises and organizations and shows the ratio of regional labour productivity in comparison with the Russian Federation, and for regions of an identical industry orientation it shows the level of efficiency of labour use in the manufacturing sector. The relative indicator of the scale of manufacturing enterprises is calculated as the ratio of the localization coefficient by the sales of organizations to the coefficient of localization by the number of enterprises and shows the difference in the effect of the scale of enterprises that are homogeneous by industry output (Table 1).

In addition to the indicators presented in table 1, data on the per capita level of GRP and growth rates of the physical volume of GRP were used for the analysis. This allows us to form an idea of the trends in the basic indicators of the economy and the industry.

To identify the time parameters of the "breaking points" and the saturation of industry diversity, the logistic regression method was used *(Kauppi and Saikkonen, 2008)*, which allows us to establish the relationship between the categorical output variable and the set of input variables.

As part of the study, the output variable (y) is specified as follows:

- the absence of a turning point in the deepening of specialized industry specializations (state "0");
- a state of rotation from diversification to deepening of specialized industry specializations (state "1").

State "1" is characterized by increased specialization against the background of increased efficiency of the regional economy, its signs are:

1) increase in the value of the Herfindahl-Hirschman index;
2) increase in the physical volume of GRP;
3) excess of the value of the index of the physical volume of GRP of the average Russian value.

As a set of input variables are presented:

1) integral localization index (x_1);

2) relative manufacturing productivity (x_2);

3) relative scale of manufacturing enterprises (x_3);

4) GRP physical volume index (x_4).

To assess the probability of rotation, a conditional average p (x) of the values of the output variable y is introduced for a given value of the set of input variables x, which has the form:

$$p(x) = \frac{e^{\beta_0+\beta_1 x_1+\beta_2 x_2+\beta_3 x_3+\beta_4 x_4}}{1+e^{\beta_0+\beta_1 x_1+\beta_2 x_2+\beta_3 x_3+\beta_4 x_4}}, \quad (2)$$

where β – parameters (coefficients) of logistic regression.

The range of variation of p (x) is from 0 to 1, therefore, this function can be interpreted as the probability that the output variable acquired the value 1 - the state of rotation, and 1-p(x) – as the probability of the occurrence of value 0 – the absence of rotation.
The coefficients of the logistic regression equation were estimated on the basis of the method of optimal likelihood, which allows finding the values of the coefficients for which the probability of occurrence is maximum. The article uses the likelihood function, which has the form:

$$l(\beta|x) = \prod_{i=1}^{n}[p(x_i)]^{y_i} \cdot [1 - p(x_i)]^{(1-y_i)}. \quad (3)$$

Maximum likelihood estimates were found by differentiating l (β | x) with respect to each parameter and equating the resulting expressions to 0.
To assess the likelihood, a saturated model was used (in which the number of input variables is equal to the number of data observations) and a conventional model, based on which the deviation D was determined by the formula where the ratio of the two values of the likelihood function was used:

$$D = -2\ln\frac{l(\beta|x)}{l_{sat}(\beta|x)} \quad (4)$$

Indicator D characterizes the model and shows how well it matches the source data. The smaller this value, the more adequately is the formed model.
The share of the influence of all predictors of the model on the variance of the dependent variable is characterized by indicators showing the Cox and Snell R-square and the Neijelkerk R-square. They take values from 0 to 1 and values less than 0.3 indicate a low quality model and a small fraction of the influence of all input variables on variance of the output variable.
V stage. Analysis of a set of criteria for identifying breaking points in the specialization / di-versification of the sectoral structure of the region.

Results

As a statistical base for the implementation of the proposed methodology, the official data of Rosstat were used (Gks.ru, 2019). Based on the cluster analysis of Russian regions, those that have a similar sectoral structure are identified: the dominance of the manufacturing industry and the metallurgical profile (Lipetsk, Vologda, Chelyabinsk regions and Krasnoyarsk Territory). The share of manufacturing in the gross value added structure of the regions varies from 39 to 55.6% in 2006 with a clear de-crease in the range from 35.5 to 42.1 in 2016. In 2016, a greater similarity is observed due to the smaller the spread between the minimum and maximum values (Table 2).

Table 2: manufacturing industries share in the structure of the gross value added, %
(Source: compiled by the authors on the basis of statistical data (Regions of Russia. Socio-economic indicators. Available at: https://www.gks.ru/folder/210/document/13204)

Regions	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Lipetsk region	55.6	52.4	53.5	42.8	40.9	38.8	32.2	33.7	40.9	40.6	42.1
Vologda region	46.1	46.0	50.5	36.6	38.1	40.8	36.1	32.6	34.7	39.0	37.6
Chelyabinsk region	39.0	41.0	39.2	33.4	36.2	36.2	35.8	31.0	33.8	35.7	35.5
Krasnoyarsk territory	52.4	50.2	37.6	31.4	34.5	34.3	29.8	28.1	31.1	33.5	31.8

It is worth noting that during the crisis period, the share of manufacturing industries in the regions is falling, with further recovery (with the general trend decreasing slightly by 2016). Such a synchronous reaction is explained by the same level of sanction pressure on the economy of the territories, the intensity of the outflow of foreign capital, and equivalent changes in the situation on the world export markets of the regions. Variability and a decrease in the share of the manufacturing industry are an indirect signal of the spontaneous inclusion of diversification processes as a shock absorber of crisis phenomena.
The authors according to the Herfindahl-Hirschman index estimated a change in the level of diversification for the period 2007-2016. There are two trends: an increase in diversification from 2007 to 2012-2013 with a subsequent increase in concentration, visually, the boundary of the change in directionality is highlighted in grey (Table 3).

Table 3: Herfindahl-Hirschman Index
(Source: Calculated by the authors)

Regions	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Lipetsk region	3033.7	3084.1	2233.1	2147.0	1980.4	1613.1	1674.8	2118.5	2143.7	2229.1
Vologda region	2471.7	2801.3	1822.2	1937.9	2122.6	1856.6	1697.1	1814.6	2075.3	1963.0
Chelyabinsk region	2156.5	2027.9	1684.0	1823.4	1801.4	1771.8	1521.2	1652.2	1777.6	1748.8
Krasnoyarsk territory	2789.9	1835.1	1479.3	1980.2	1740.4	1484.8	1428.2	1557.3	1681.4	1645.6

We note that all regions of the metallurgical profile have passed the stage of significant diversification (having, as a starting point, a rather high level of economic concentration). To the greatest degree, the transformation of the sectoral structure is typical for the Lipetsk region and the Krasnoyarsk Territory. A stable tendency to pass the minimum point is observed only in one region (Lipetsk region), while in other regions, periods of concentration look like consequences of the post-crisis state. In order to exclude the effect of the factor of the delayed effect associated with the influence of cyclic processes (to exclude an incorrect conclusion about the “breaking point”) the authors analysed a set of indicators, namely: the localization and efficiency coefficients of the manufacturing industry in comparison with the average Russian data.
Particular and integral localization coefficients for the manufacturing industry (Table 4).

Table 4: coefficients of localization of regions of the Russian Federation *

(Source: calculated by the authors on the basis of statistical data (Regions of Russia. Socio-economic indicators. Available at: https://www.gks.ru/folder/210/document/13204)

Cluster regions	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
The dynamics of the coefficient of localization by the number of enterprises and organizations										
Lipetsk region	0.42	0.38	0.60	0.61	0.58	0.61	0.62	0.45	0.46	0.51
Vologda region	0.34	0.30	0.53	0.56	0.52	0.55	0.57	0.42	0.43	0.47
Chelyabinsk region	0.51	0.51	0.70	0.68	0.64	0.69	0.80	0.52	0.52	0.58
Krasnoyarsk territory	0.37	0.38	0.59	0.60	0.55	0.58	0.59	0.42	0.42	0.45
Dynamics of the coefficient of localization by the number of employees in the industry										
Lipetsk region	0.63	0.63	0.67	0.68	0.69	0.70	0.69	0.68	0.69	0.69
Vologda region	0.76	0.74	0.75	0.80	0.80	0.74	0.74	0.72	0.72	0.76
Chelyabinsk region	0.90	0.89	0.85	0.88	0.90	0.87	0.87	0.86	0.88	0.89
Krasnoyarsk territory	0.48	0.48	0.51	0.55	0.54	0.50	0.48	0.48	0.49	0.51
The dynamics of the coefficient of localization by the sales of organizations in the industry										
Lipetsk region	1.0	0.98	0.88	0.91	0.83	0.84	0.85	0.85	0.90	0.89
Vologda region	0.97	1.00	0.92	0.95	0.93	0.92	0.94	0.95	1.00	1.00
Chelyabinsk region	0.97	0.91	0.74	0.80	0.77	0.76	0.75	0.75	0.81	0.74
Krasnoyarsk territory	0.87	0.61	0.58	0.52	0.45	0.42	0.46	0.53	0.55	0.51
Dynamics of the integral localization index										
Lipetsk region	0.68	0.66	0.72	0.73	0.70	0.71	0.72	0.66	0.68	0.70
Vologda region	0.69	0.68	0.74	0.77	0.75	0.66	0.75	0.69	0.71	0.74
Chelyabinsk region	0.79	0.77	0.76	0.79	0.77	0.77	0.78	0.71	0.74	0.74
Krasnoyarsk territory	0.57	0.49	0.56	0.55	0.51	0.50	0.51	0.47	0.49	0.49

* The black fill indicates the maximum values; the grey fill indicates the minimum.

It can be noted that the highest values for almost all indicators of localization are characteristic of one region (Chelyabinsk region), the smallest - of the Krasnoyarsk Territory. To interpret the change in the localization coefficient, one should take into account the change in the base, that is, indicators for the Russian Federation. The share of enterprises operating in the manufacturing industry in the total number of enterprises in the Russian Federation has a downward trend, and if the localization coefficient has increased in the regions, this is due to an increase in the number of enterprises in the manufacturing sector in the economy of the regions of the Russian Federation. A similar trend was observed in the share of employed (Table 5).

The most interesting are the data on the localization coefficient by the sales of manufacturing enterprises, the share of which over the long-term time interval remained unchanged (the periods of its increase, in particular, 2008, 2011, 2015 are highlighted with grey fill), while the localization co-efficient of Chelyabinsk region and Krasnoyarsk Territory decreased, unlike other regions. This shows a decrease in the scale of activity of the region enterprises, compared with the average values for the Russian Federation (the localization coefficient by the number of manufacturing enterprises increased, while the localization coefficient by the sales of enterprises decreased).

Table 5: dynamics of indicators characterizing processes in the whole of the Russian Federation
(Source: Calculated by the authors)

Indicators	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
The share of enterprises operating in the manufacturing industry in the total number of enterprises of the Russian Federation	0.089	0.086	0.085	0.083	0.083	0.082	0.082	0.082	0.081	0.081
The share of the sales of manufacturing enterprises in the total sales of enterprises of the Russian Federation	0.302	0.398	0.265	0.341	0.352	0.319	0.315	0.247	0.302	0.300
The share of workers in the manufacturing industry in the total number of employees in the Russian Federation	0.167	0.163	0.154	0.152	0.152	0.150	0.148	0.146	0.144	0.142

Table 6 presents data on relative labour productivity and on the relative scale of manufacturing enterprises. Obvious is a lower relative labour productivity in the Chelyabinsk region than in the regions of a similar industry group and a relatively smaller scale of enterprises in terms of sales of enterprises compared with the average for the Russian Federation.

Table 6: indicators of relative (to the average for the Russian Federation) labour productivity, relative scale of enterprises and GRP
(Source: compiled by the authors)

Indicators	Regions	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Russia	**GRP per capita, in rubles.**	195819	237552.2	224163.3	263828.6	316626.6	348641.5	377006	405147.7	449097.9	472049.9
	GRP physical volume indices	108.3	105.7	92.4	104.6	105.4	103.1	101.8	101.3	99.4	100.8
Lipetsk region	**Relative labour productivity**	1.07	0.86	1.14	0.91	0.84	0.86	1.06	1.05	0.9	0.93
	Relative scale of manufacturing enterprises	0.61	0.51	0.73	0.57	0.52	0.56	0.71	0.72	0.6	0.62
	GRP per capita, in rubles.	176534.6	219135.8	192165.2	211610.6	244560.6	251960.8	271896.2	343840	388074.7	418328.4
Vologda region	**Relative labour productivity**	0.88	0.75	1.07	0.82	0.82	1.18	1.1	1.12	0.95	0.97
	Relative scale of manufacturing enterpris	0.69	0.59	0.87	0.66	0.65	0.74	0.85	0.87	0.71	0.77

Indicators	Regions	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
	es										
	GRP per capita, in rubles.	199003	242347.7	176179.2	217826.8	264157	296726.1	289782.8	324790.3	402652.1	402455.1
Chelyabinsk region	Relative labour productivity	0.74	0.57	0.76	0.63	0.61	0.62	0.74	0.73	0.63	0.61
	Relative scale of manufacturing enterprises	0.53	0.4	0.53	0.47	0.44	0.45	0.55	0.55	0.48	0.46
	GRP per capita, in rubles.	164797.5	190565.5	159901	187673.7	223105.2	241758	252988.8	284486.7	345597.1	363023.3
Krasnoyarsk territory	Relative labour productivity	1.21	0.68	0.98	0.64	0.59	0.6	0.81	0.92	0.75	0.72
	Relative scale of manufacturing enterprises	0.59	0.32	0.49	0.33	0.3	0.3	0.4	0.48	0.4	0.4
	GRP per capita, in rubles.	258394.3	260318.2	264478.7	372848.1	419507	416272.7	441084.9	493985.7	582345.8	608083.3

To build a model of logistic regression and estimate the likelihood of a turn, the values of the output variable and the nominal state of the economies of the studied regions are determined.

Table 7: correlation of the dynamics of indicators of specialization and regional Economies with a nominal state of rotation from diversification

(Source: compiled by the authors)

Regions	2008	2009	2010	2011	2012	2013	2014	2015	2016
Lipetsk region									
Herfindahl-Hirschman index growth rate	1.017	0.724	0.961	0.922	0.815	1.038	1.265	1.012	1.040
GRP physical volume index	1.036	0.935	1.040	1.048	1.018	1.034	1.051	1.010	1.016
The ratio of the index of the physical volume of GRP to the average for the Russian Federation	0.980	1.012	0.994	0.994	0.987	1.016	1.038	1.016	1.008
Condition	0	0	0	0	0	1	1	1	1
Vologda region									
Herfindahl-Hirschman index growth rate	1.133	0.651	1.064	1.095	0.875	0.914	1.069	1.144	0.946
GRP physical volume index	0.967	0.871	1.057	1.069	1.048	0.957	1.030	1.013	1.001
The ratio of the index of the	0.915	0.943	1.011	1.014	1.016	0.940	1.017	1.019	0.993

physical volume of GRP to the average for the Russian Federation									
Condition	0	0	1	1	0	0	1	1	0
Chelyabinsk region									
Herfindahl-Hirschman index growth rate	0.940	0.830	1.083	0.988	0.984	0.859	1.086	1.076	0.984
GRP physical volume index	1.015	0.859	1.060	1.053	1.024	1.015	1.028	0.995	0.969
The ratio of the index of the physical volume of GRP to the average for the Russian Federation	0.960	0.930	1.013	0.999	0.993	0.997	1.015	1.001	0.961
Condition	0	0	1	0	0	0	1	0	0
Krasnoyarsk territory									
Herfindahl-Hirschman index growth rate	0.658	0.806	1.013	0.879	0.853	0.962	1.090	1.078	0.979
GRP physical volume index	1.046	0.985	1.058	1.057	1.058	1.029	1.010	0.978	1.015
The ratio of the index of the physical volume of GRP to the average for the Russian Federation	0.990	1.066	1.011	1.003	1.026	1.011	0.997	0.984	1.007
Condition	0	0	1	0	0	0	0	0	0

The simulation results are presented in table 8. In general, there is a noticeable statistical dependence between the input and output variables, so the model is qualitative.

Table 8: summary for Logistic Regression Model
(Source: compiled by the authors)

Step	–2 Log-likeihood	R-squared Cox and Snella	R-squared Nagelkerk
1	22.909	0.448	0.633

We also analysed the data of the classification table (table 9). The total share of correct model outcomes is 83.3%. The probability of an error of the first kind (skipping a signal about the start of a turn) is 27.3%; error of a second kind (receiving a false result about a start of a turn) is 12.0%, which also allows you to use the model to assess the probability of a turn and sufficient saturation of the industry diversity.

Table 9: classification table
(Source: compiled by the authors)

Outcomes		Predicted		Percentage correct
		0	1	
Observed	0	22	3	88.0
	1	3	8	72.7
Total percentage				83.3

An analysis of the coefficients of the regression equation indicates the significance of most variables at the 5% level (Table 10).

Table 10: equation variables
(Source: compiled by the authors)

Variables	Value	Standard error	Relevance
Integral localization index	–15.435	10.806	0.153
Relevant productivity of the manufacturing industry	–22.553*	11.203	0.044
Relative scale of manufacturing enterprises	39.355*	17.068	0.021
GRP physical volume index	0.783*	5.860	0.015
Constant	–74.142*	5.446	0.020

* – relevance on the level 5%

Discussion

Based on the results of the analysis, the probability of the turning of the regions of the metallurgical profile of the manufacturing industry from diversification to the deepening of industry specializations is determined. You can talk about various dynamic profiles:

- in the Lipetsk region, signs of a deepening of specializations are observed in 2014 with a high level of probability, as well as in 2016, but in the absence of official data for subsequent periods, it is impossible to confirm the stability of the latest trend (Fig 2);

– in the Chelyabinsk region and Vologda region, the maximum opportunities for reaching a new level of specialization and industry changes as a result of the "shake-up" by the crisis processes were observed in 2010 and 2014, both coinciding with either post-shocks or shocks and a simultaneous deterioration situations in major export markets (Fig 3-4);

– in the observed period, the Krasnoyarsk Territory is characterized by a low probability of the onset of a turning point in the deepening of specialized industry specializations (Fig 5)

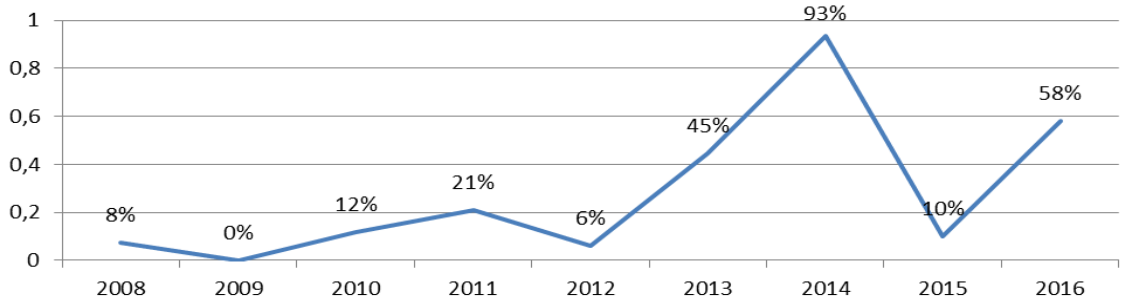

Fig 2. The probability of the turn of the Lipetsk region from diversification to deepen core industry specializations
(Source: compiled by the authors)

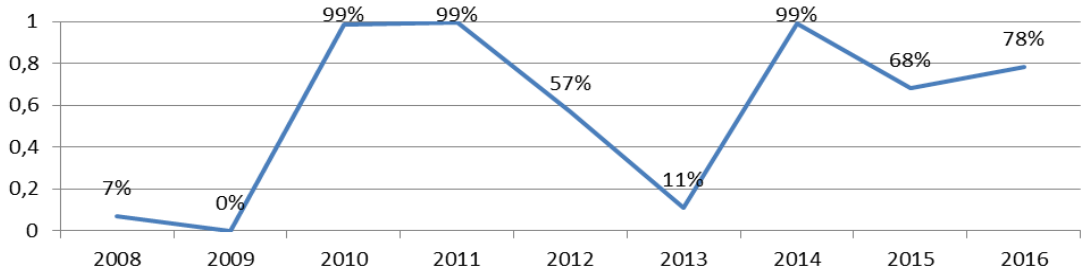

Fig 3. The probability of the turn of the Vologda region from diversification to deepen core industry specializations
(Source: compiled by the authors)

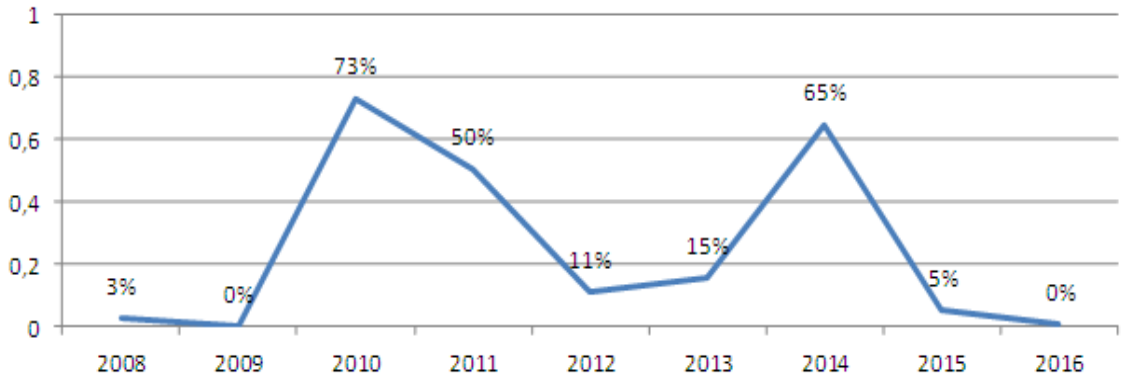

Fig 4. The probability of the turn of the Chelyabinsk region from diversification to deepen core industry specializations (Source: compiled by the authors)

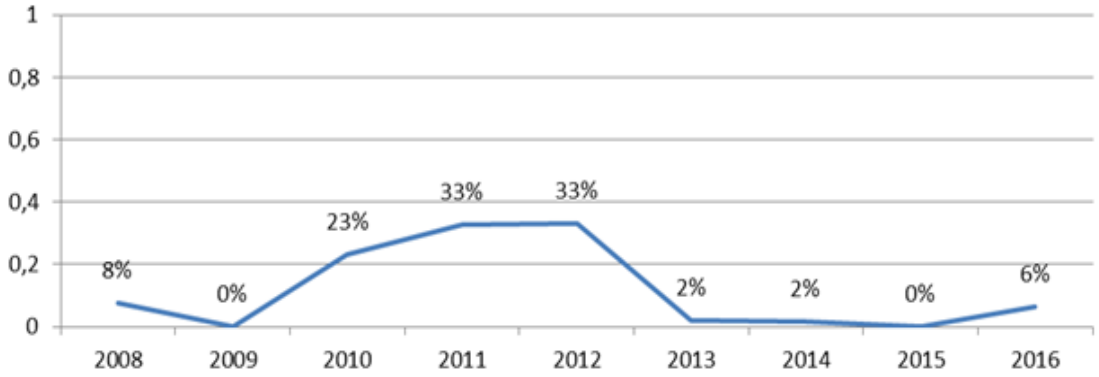

Fig 5. The probability of the turn of the Krasnoyarsk Territory from diversification to deepen core industry specializations (Source: compiled by the authors)

We draw attention to the fact that the opportunities that have opened up in the crisis for gaining a new format of the sectoral structure are largely triggered by macroeconomic circumstances and external economic instability, require a distinction, first of all, between national and regional components, as well as the influence of the world market, which is the direction for further research by monospecialized and export-oriented regions. In a generalized form, a set of estimated parameters as additional data to justify the course on concentration and the presence of a breaking point is presented in Table 11.

Table 11: comparative studies of diversification of homogeneous regions
(Source: compiled by the authors)

Regions	The probability of a breaking point	Diversification growth rate (sustainability of a trend change)	Integral localization index (growth + / decline –)	The efficiency of the manufacturing industry in the regions in comparison with the average indicators for the Russian Federation			
				Relative labour productivity (+ higher / - lower than in the Russian Federation)	GRP physical volume index	The relative scale of enterprises (+ higher / - lower than in Russia)	GRP per capita in comparison with the Russian Federation (+ higher / - lower than in Russia)
LR	+	+	+	+	+	+	–
VR	+/–	–	+	+	–	+	–
ChR	+/–	–	–	–	–	–	–
KT	–	–	–	–	+	–	+

Conclusions

The spatial development of the economy at the present stage involves the reassessment of the existing format of territorial specialization, the determination of the rationality of the existing industry profiles, and the identification of new perspective types of activities. The necessity of a multi-criteria approach to identify trends in changes in the sectoral structure of the region's economy and the direction of diversification / concentration processes is justified. The choice of a regional development strategy requires an objective analysis of the data, taking into account the distorting influence of the crisis processes of the macroeconomic order and external economic instability, and the delimitation of national trends and regional specifics. It is shown that there is a probability of a trend change and positive indicators (Table 11) in one region - the Lipetsk region, which suggests the need for methodological and organizational support for the development of new processes in this territorial area and the study of practice in other regions similar in profile. This article is the initial stage of the analysis of the processes of effective specializations formation in the Russian regions.

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E-participation in the Czech Republic: Current State and Selected "Best-Practices" of Czech Municipalities

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Abstract

This article discusses the concept of e-participation (involving residents of cities and municipalities in public activities via information technology), its level in the Czech Republic, and on selecting and describing chosen "best practices" in Czech cities and city districts. According to the E-Participation Index, which is regularly published by the UN, its level in the Czech Republic is relatively low. As of now, Czech municipalities do not fully make use of the potential of e-participation. However, there is a number of successful Czech participation projects that could at least partially inspire other municipalities, which could then gain access to benefits from a higher level of satisfaction of their residents – one of the positive effects that e-participation has. The described Czech best practices can also inspire municipalities in other European countries.

Keywords: E-Participation, E-Government, Municipality

Introduction

Modern technologies provide a number of options that can contribute to the improvement of the social climate. The turbulent speed of development of modern ICTs and the growing availability of communication devices has significantly contributed to simplifying communication and lowering transaction costs over the past 20 years. Internet and related communication channels can also be used in public administration. The question is how to use the Internet and ICT technologies to strengthen democratic processes and thereby providing individuals with larger and broader options for interacting with government institutions – a concept called e-democracy. It can also be understood as a form of government in which the citizens have the option of participating in the administration of public matters and in public life via ICT technologies. The actual interaction and sharing of ideas from individuals can be a valuable input of information for the government further strengthening democratic principles, confirmed by Riley (2003), Chadwick (2003) or Grönlund (2001).

The term e-democracy is closely connected to the term e-government which it is based on. This phenomenon can be defined as a practical use of ICTs and the authorities being connected to the Internet (ministries, offices, municipality management, …) when carrying out common tasks or providing services to citizens, or sharing and collecting information proved by Palvia and Sharma (2007), Silcock (2001) or Curtin (2006). Study written by the World Bank (2017) also mentioned that implementing this concept can generate a number of benefits such as growing level of transparency, lowering the costs, or eliminating corruption.

One of the key elements of e-government is e-participation – involving residents into decision-making processes via ICTs and the Internet. The level of e-participation in the Czech Republic is according to an international comparison (see below) below average. Many countries worldwide have – primarily over the last decade – reached much more significant progress. The goal of the article is to provide information regarding the best Czech e-participation projects as well as key recommendations for all other municipalities across EU who struggle with successful implementation.

Especially over the past two decades, the importance of involving city residents and municipalities into public decision-making processes has increased. Research study by Franklin and Ebdon (2004) shows that successful participative programs can not only increase democratic values but also the principles of responsibility and helpfulness towards the public. Primarily the very quick development of ICTs allows for a large number of potential participants to connect, for more effective data collection and its evaluation. The point is to not only know how to use these tools correctly but also how to involve as many people as possible as research by OECD (2003) suggests.

Macintosh (2004) defines three fundamental dimensions of e-participation as follows:

1. *E-enabling* – this dimension is based in approaching (providing information) to as many potential participants as possible, as well as the persons who under normal circumstances would not make use of ICTs. The objective is therefore to use appropriate tools that will provide an understandable and easy way to crucial information which can reach the maximum audience.
2. *E-engaging* – involving the residents of cities and municipalities is based on deepening the discussion, consulting political topics and planning of important decisions. In this context, we speak about top to bottom consulting (the management of municipalities to their residents).
3. *E-empowering* – this third dimension is based on active participation of residents in the political matters and them being able to promote their own ideas and suggestions (bottom to top). In this context, the residents are understood as not only clients but also as fully-fledged partners on the political level.

These three dimensions are illustrated in the following Figure 1. It clearly shows that the progression of these dimensions depends on time and also on maturity and trust of residents in the management of their municipality.

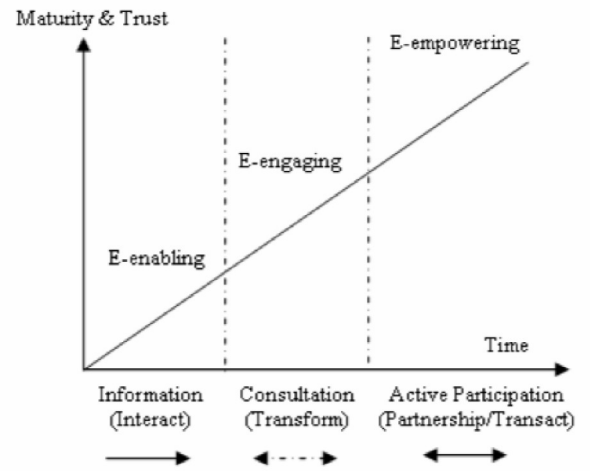

Figure 1: Three fundamental dimensions of e-participation (Macintosh, 2004)

Methodology

Two main sources of information were used for the purpose of this research. Czech Participation Index results made by the Institute for Democracy 21 (who is also provider of on-line voting systems) - ranking of 101 largest Czech towns and city districts with number of inhabitants over 10 thousand according to public participation in participatory projects. Second main source of information is a website of particular municipality and on-line database of voting results, with comments, rules and other relevant information.

Level of e-participation in the Czech Republic

The level of development of e-participation is among others also monitored and assessed by the United Nations for their member states. Figure 2 shows the development of the index of e-participation for the Czech Republic between 2003-2018. From the 193 member states, the Czech Republic placed 92nd in 2018. According to the UN, e-participation is on a higher level in many less developed countries than the Czech Republic, e.g. Albania, Romania, Ukraine Uganda. In comparison, the Czech Republic placed 41st in 2004.

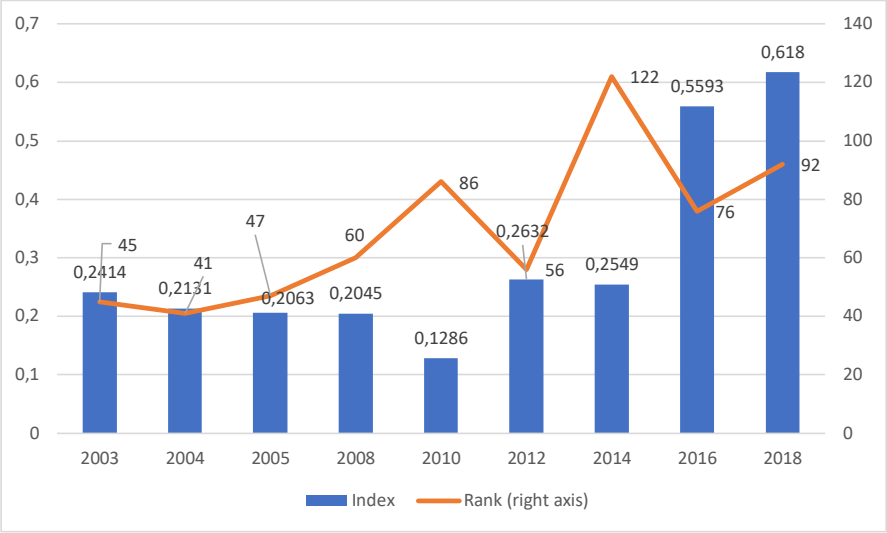

Fig 2. E-Participation Index, Czech Republic (OSN)

To strengthen this concept, it is now necessary to regularly map out not only worldwide but also domestic best practices that provide valuable tips and recommendations for not only Czech municipalities but also for the country as a whole. Domestic best practices can be more easily grasped and implemented by other Czech municipalities but also used by other European countries.

Selected Examples of Best-Practices in Czech Municipalities

Říčany – Řídím Říčany ("I run Říčany")

General description: The municipality Říčany and its residents cooperate since 2015 via an Internet application called D21 (Democracy 2.1) as a part of the continuous projects named "Řídím Říčany" ("I run Říčany"). The objective of the project is to involve the public in the decision-making, as well as to gather the public's opinions on various municipal activities.

Voting process: The vote on the concrete topics is divided into two categories – crucial and lighter topics. The lighter (more common) topics can be voted on by almost everyone. The crucial topics require voters to fulfill several requirements – registration via a registration form, being older than 15, and be a permanent resident of Říčany. Residents can apply via a printed form which they then submit at a local collection place, or electronically from home. After the registration, their data is transmitted to the D21 application via which they can then participate in any current vote, survey, etc. The D21 voting system also allows its users to submit more than one vote (in contrast to the classic voting systems) and thereby show their preferences better. The results of all votes are available on-line accompanied by comprehensive statistics.

Selected implemented projects:

Regulating activity via ordinances – Voting on problematic areas/issues that the residents of Říčany wanted to limit via ordinances or other legal regulation. From the overall twelve topics, the one topic was selected – reducing casinos and slot machines. The municipality also gathered information on what kind of regulation the residents wanted. Overall, 620 residents participated in the vote.

- Překvapte Říčany (Surprise Říčany) – Local residents can make any suggestion on how to improve their environment as part of participative budgeting. The entire project (already its third year) started in 2018 by an informational campaign, which was followed up by several public meetings in which the suggested projects were discusses (residents were able to submit their ideas until the end of January 2019). Until April 2019, the selected projects were evaluated based on their feasibility. At the beginning of June, the vote started and lasted for two weeks. Four days after the end of the vote, the results were published. A month later, the winning project begun to be implemented. In total 654 residents participated in the vote.
- Playground for children – The decision on the concrete design of playgrounds. In total 1,389 votes throughout the 144 voting days.
- Investment project – Decision about a concrete investment project which should be implemented (10 options overall), the vote lasted 3 months, overall votes submitted: 602 (permanent residents of Říčany).

Prague 7 – Student mayor

General description: An interesting project for the students of primary and secondary school in Prague 7. Via virtual voting rooms, the students elected the first ever student mayor in 2018. The role of student mayor is to regularly attend the meetings of district management where he/she can present his/her ideas and comments. He/she will also receive a budget of 50,000 CZK (approx. 1 960 EUR). This way, Prague 7 wants to approach young people and teach them to continuously participate in such projects.

Voting process: The election of the student mayor was conducted on-line over the course of one week. Students from the lower-secondary level and secondary level students were allowed to vote. Overall, 439 votes were collected.

Lovosice – Mobilní rozhlas (Mobile radio) and Zlepšeme Česko (Improving Czechia)

General description: The municipality Lovosice decided to improve and unify the already-existing communication channels at the start of 2019, which is why they decided to implement two platforms. As a result, the townhall can quickly and effectively share important news with the registered users of these platforms. These platforms also serve as a list of voluntary contact information provided by its residents, employees, and entrepreneurs.

Communication channels: First of the platforms is the mobile application Zlepšeme Česko (Improving Czechia) that users can easily download into their mobile phones and register for free. The application enables its users to receive alerts about important news, street cleaning, outages, dates of votes of surveys, or invitations to sporting events. This application does not only work as a one-way channel but it can also be used for sending in ideas or report illegal dumps, disorder, damaged property, etc. (the problem can be simply photographed and picture subsequently sent via the app with the information on the problem's location). The Internet portal Mobilní rozhlas (Mobile radio) functions similarly. Users of these channels can also set filters for preferred information and receive notifications e.g. via text messages, e-mails, voice messages, or via the related mobile application.

Prague 10 – Moje stopa (My mark)

General description: The Prague 10 District places first in the Czech version of the Participation Index. Similar to Lovosice, it uses the Mobilní rozhlas (Mobile radio) and Zlepšeme Česko (Improving Czechia) applications to communicate with its residents. Additionally, every year (2019 was its fourth year) it also organizes the project Moje stopa (My mark) in which residents can as a part of participative

budgeting decide by voting about which investment projects should the budgeted 5 million CZK be invested in.

Project progress: The project Moje stopa (My mark) always begins with a wide-spread information campaign on the website of the project as well as on the website of Prague 10, on social media, via text messages, flyers, and billboards. Besides the campaign, civic leagues and clubs are approached. The informational campaign is followed by four public meetings where local residents can present their ideas and improvement suggestions concerning their locality. Ideas can also be submitted on-line via the website of the project. Public meetings are followed by technical analysis of the feasibility of the presented suggestions and subsequently evaluated. After that, the decision on the suggestions is communicated to their originators. Successful originators can then create a fundamental concept and present it to the public as part of another public meeting where the concepts are presented and discussed. The specifications of individual suggestions are also available on-line, including video recordings of the presentations from the public meetings so that every voter can be equally informed before the vote starts.

The winning suggestion is decided upon via an on-line vote (for the duration of two weeks) using the on-line survey tool D21 (similarly to the votes in Říčany). The projects are divided into two categories - small (max. 500,000 CZK equal to 19 600 EUR) and large (max. 1 mill. CZK equal to 39 200 EUR). For the small category, each resident gets to vote positively for 4 projects and negatively for 2 projects. For the large category, each resident gets to vote positively for 2 projects and negatively for 1 project. During its first year, more than 5,000 residents participated in the project and decided for implementation of 7 projects.

Brno – Data portal

General description: The city Brno, including its municipal enterprises, wanted not to only enable the access to all available databases and analyses to its residents, it also wanted to simplify the access. The objective of the on-line portal is to meaningfully interconnect, interpret, and make available the individual data to analysts as well as the general public. The portal also offers cooperation to students looking for data. Another regular output of this project is the annual Report on the State of the City in which residents can easily gain information on how the city is developing.

DATA.BRNO: The on-line portal does not only provide analyses, timelines and articles, it also serves as a hub for all available applications for the residents of Brno, such as Brňáci pro Brno ("Brno residents for Brno" – reporting of defects on local communications and roads), Cenová mapa města (Price map of the city), Dopravní nehody v Brně (Traffic accidents in Brno), Firmy v Brně (Enterprises in Brno), Mapa majetku Brna (Property Map of Brno), etc.

Recommendations

From the above-presented examples of best practices, we can conclude the following recommendations that can further help when looking for solutions of e-participation projects on the local level:

- **Feedback.** Feedback is a key feature for building a mutual relationship between residents and municipalities since it provides residents with the feeling that their municipality values them. A message thanking for a submitted idea via an application or confirmation about solving a reported problem is valuable feedback for the effort that the residents have put in.
- **Using social media.** Social media has over time become the number one communication channel since they are gaining a much broader user basis. On social media, users look for various information about public or social events organized by the municipality. Social media allow municipalities to promote e.g. the new municipal website or a new mobile application which will serve the residents. Municipalities having profiles on social media has become the norm. These profiles can be used for sharing important updates about the municipality.
- **Participative budgeting**. Municipalities that successfully implemented participative budgeting are also one of the most innovative in the area of participation and received on average double the points in the domestic index than cities that do not make use of participative budgeting. The option

of feasibly influence or decisions about investments funded by city budget can truly provide the residents with a feeling of participating in public affairs which deepens the trust and overall relationship between municipal management and its residents.

- **Participation coordinator**. Municipalities that employ a participation coordinator (at least part time) score higher on the index. A number of Czech cities or municipalities therefore have a specific employee for this purpose, either as a part of an already existing department (e.g. planning and development) or they create new specialized departments for communication and resident cooperation.
- **Participation of school children.** Awareness of e-participation and participation of a broader spectrum of the public significantly grow via participative projects with school children. It is very rewarding for municipalities and cities to introduce their youngest population to the concept of participation and to raise them to regularly and continuously cooperate when they are older.

Conclusion

The Czech Republic achieves only below average results in international rankings that evaluate the level of e-government and e-participation. The fundamental problem of this placement seems to be how to correctly and effectively use on-line tools for communicating between state institutions and citizens. As is the case with off-line tools of participation, on-line tools and practices also need to be adapted to the concrete status quo and social situation in the region. That is why when thinking about starting e-participation projects, is crucial to not only respect the recommendations published by organizations such as the EU, OECD, World Bank, but to also look at worldwide and domestic best practices that provide valuable practical recommendations and point out a number of complications that can happen during the individual phases of a project. The conducted analysis provided 5 key recommendations that can strengthen the concept of e-participation: providing the participating residents with feedback, using social media to promote e-participation projects, implementing participative budgeting, having a participation coordinator, and last but not least introducing e-participation projects to school children.

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Sustainable Human Resource Management as an Element of Corporate Social Responsibility (CSR) Strategy in Innovative Enterprises - The Economic, Social and Environmental Depiction

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Abstract

The aim of the article is to present the nature of the strategy of corporate social responsibility in innovative enterprises and the concept of sustainable human resources management, indicating their connections in economic, social and environmentalterms and an attempt to answer the question whether innovative enterprises actually show CSR and sustainable human resources management in business management as an element of their innovation. That is why the following hypothesis was put forward in the study: the strategy of corporate social responsibility and the concept of sustainable human resources management are very important for increasing the innovativeness of the enterprise, because they influence economically, socially and environmentally the building of competitive advantage of the organisation. The verification of the hypothesis and the realisation of the stated goal was made on the basis of a critical analysis of the source literature and the case study. Striving to achieve the research goal, the first part of the article presents the strategy of corporate social responsibility in innovative enterprises and the essence of sustainable human resources management and their linkage in an economic, social and environmental depiction. In the second part the case study was presented using primary research. The publication was completed with applications in which the hypothesis was confirmed. Because the undertaken issue is extensive and multithreaded, the article focuses on the presentation of the most important problems. They can be the basis for further discussion regarding various aspects of sustainable human resources management in organisations, e.g. in EU and the Poland.

Keywords: Sustainable Human Resource Management, HRM, Corporate Social Responsibility Strategy, CSR, Enterprises Strategy, Management.

Introduction

Contemporary enterprises, wanting to meet the constantly growing requirements of the market, competition, consumer associations and environmental organisations, recognise that, in addition to economic goals, they must also take into account social and ecological goals. The dynamics of the environment forces them to introduce specific changes in operating methods and concepts of management, which is related to the fact that in order to gain a lasting competitive advantage, enterprises reach for newer and newer theories and methods that are based on ensuring balance in the process of creating company value with its obligations towards owners and creditors (economic values), towards employees and the local community (economic and social values), towards customers (market and economic), towards the natural environment (ecological).

Leading companies around the world are increasingly recognising the importance of people and the society in which the organisation functions. Both HRM and CSR are closely related to man and his role in all company activities. Appropriate management of the personnel and the image of the company in the eyes of the society can significantly improve the relationship in the internal and external environment of the company, which will affect its better functioning. The aim of the article is to present the nature of the strategy of corporate social responsibility in innovative enterprises and the concept of sustainable human resources management, indicating their connections in economic,

social and environmentalterms and an attempt to answer the question whether innovative enterprises actually show CSR and sustainable human resources management in business management as an element of their innovation. That is why the following hypothesis was put forward in the study: the strategy of corporate social responsibility and the concept of sustainable human resources management are very important for increasing the innovativeness of the enterprise, because they influence economically, socially and environmentally the building of competitive advantage of the organisation.

The verification of the hypothesis and the realisation of the stated goal was made on the basis of a critical analysis of the source literature and the case study. Striving to achieve the research goal, the first part of the article presents the strategy of corporate social responsibility in innovative enterprises and the essence of sustainable human resources management and their linkage in an economic, social and environmental depiction. In the second part the case study was presented using primary research. The publication was completed with applications in which the hypothesis was confirmed. Because the undertaken issue is extensive and multithreaded, the article focuses on the presentation of the most important problems. They can be the basis for further discussion regarding various aspects of sustainable human resources management in organisations, e.g. in EU and the Poland.

Literature Review - Theoretical Background of The Corporate Social Responsibility and Sustainable Human Resource Management

The concept of Corporate Social Responsibility - CSR is a voluntary respect for ecological and social values in making business decisions, while taking into account the expectations of all interested parties, is part of business ethics and the assumptions of sustainable socio-economic development (Green Paper, 2001, pp. 6-8; Słupik, 2013, p. 257). Considering the fact that the category of sustainable development is nowadays more and more important for the understanding of CSR, in the process involving social and economic changes, in which - in order to balance the chances of access to the environment of individual societies and their citizens, both contemporary and future generations - integration of both political, economic and social activities while maintaining natural balance and sustainability of natural processes, the concept of CSR goes back to creating social added value - investing in the environment and the community (Słupik, 2013, p. 258). CSR, now often perceived as a way of creating an image, is not only a theory and scientific discipline, but also an increasingly widespread practice. The implementation of the CSR concept is becoming more and more common thanks to the policy realised by the European Commission (2011), which recognised CSR as a strategic area (Słupik, 2013, p. 258).

Corporate social responsibility in English source literature is defined in many ways. The terms used are: Corporate Sustainability Management, Business Responsibility, Corporate Citizenship, Global Business Citizenship, Corporate Social Performance, Corporate Social Responsiveness, Social Responsibility, Corporate Responsibility, Community Relations (Roszkowska, 2011, p. 23). In Polish source literature, the most commonly used English language term is Corporate Social Responsibility - CSR, referred to as Company Stakeholder Responsibility, proposed and used in R. Edward Freeman's, S. Rama Velamuri's and Brian Moriarty's (Freeman, Velamuri and Moriarty, 2006) publications. In Poland, next to the name "CSR", there are also such terms as: corporate social responsibility, enterprise responsibility, enterprise social responsibility. The reason for the various terms is the fact that the concept has evolved over the years (Carroll, 1999, pp. 268-295; Lee, 2008, pp. 53-73) and it varies depending on the region, country, culture or type of organisation (Matten and Moon, 2008, pp. 404-424; Spence, 2007, pp. 533-552). Therefore, Table 1 presents various definitions of corporate social responsibility.

Table 1: Various definitions of corporate social responsibility (CSR)

Autor	Definition
Friedman (1970, pp. 32-33)	it is the maximisation of the profits, which is the only social responsibility of the organisation
Carroll (1979, p. 500)	economic, legal, ethical and discretionary expectations that the society has towards the organisation at a given moment
Griffin (1996, p. 31)	a set of organisational commitments to protect and strengthen the society with which it functions
Green Paper (2001)	an idea where companies voluntarily embed social and environmental issues in their business activities and in relationships with their stakeholder groups
Young (2005, p. 75)	- a strategic and long-term approach based on the principles of social dialogue, transparent relationships and the search for solutions that are beneficial for everyone - achieving constant profit while wisely shaping relationships with all stakeholders, including employees, customers, suppliers, shareholders, competition and the local community - conducting business in a way that takes into account ethical values, law, respect for employees, society and the natural environment, as well as allowing a contribution to sustainable development through cooperation with them in order to improve the quality of life of all citizens
Korpus (2006, p. 11)	the global direction of changes in strategic company management, which obliges companies to sustainable development while respecting the principles of economy, ecology and ethics
Żemigała (2008, p. 16)	specific sensitivity to external environment issues (social sensitivity, ecological), the ability to maintain a balance between the interests of customers, employees and stakeholders, as well as the provision of certain services to the local community
Adamczyk (2009, p. 43)	responsibility for the obligations assumed by the enterprise as a result of its functioning in society
Norm PN-ISO 26000 (Polski Komitet Normalizacyjny, 2012)	responsible impact of decisions and actions (products, service, processes) on society and the environment, through transparent and ethical behaviour contributing to the development of sustainable well-being, public health, taking into account the expectations of stakeholders, legal provisions, consistency with the organisation
Rok (2012, p. 424)	a voluntary attitude of entrepreneurs towards sustainable development in the economic, social and environmental dimensions, in relations with current stakeholders, as well as in the process of protecting and developing the resources necessary in the future
Juzefczyk (2013, p. 6)	synergy between the economic, environmental and social area of business activity, defined by the “3P” principle - People-Planet-Profit
Wolska (2015, p. 86)	non-compulsory, ethical and responsible implementation of the principles contained in the concept of corporate social responsibility not only in one's own interest, but also in the entire society and all stakeholders among whom the company conducts business
Coombs, Holladay (2015, p. 130)	the company's commitment to maximise a positive social impact and minimise a negative impact
Voegtlin, Greenwood (2016, p. 185)	shifting political contest between business, government and civil society actors over governance of the corporation

Source: own study.

Analysing Table 1, it should be emphasised that there are many definitions and they include various aspects. Undoubtedly, this concept has been evolving to this day, its definitions, assumptions, priorities, and above all the perception and scope of application by entities expected to implement it are changing (Tylec, 2016, p. 514). Leoński and Tylżanowski (2017, pp. 60-61) rightly claim that corporate social responsibility is of an internal (caring for employees and human capital, health and

safety of workplaces, observing human rights and eliminating discrimination) and external activities character (caring for the local community, partners, suppliers, customers and such stakeholders such as public authorities, NGOs and natural environment).

CSR is now, more than ever before, an important concept of management. The increasing pressure of various environments forces enterprises to take economic, legal, social or environmental actions that take into account the needs of different interest groups. The primary goal of organisations that practice social responsibility is to maximise their contribution to sustainable development (Charucka, 2015, p. 37). The very concept of CSR emphasises the fact that enterprises have not only economic and legal responsibility for their actions, but they should feel obliged to realise social goals and goals oriented towards sustainable development (Stawicka, 2016, p. 316).

The idea of CSR goes back to the concept of sustainable development, created at the turn of the 1960s. and 70s of the twentieth century in the US and Western Europe, according to which not only economic but also social and ecological aspects are important in economic development. Jerzy Bogdanienko (Bogdanienko, 2011, pp. 23-24) emphasises that social involvement allows striving to maintain a balance between the economic, ecological and social aspects in the activity of an enterprise, and thus can contribute to achieving the objectives that are attributed to sustainable development, particularly to such ones as the protection of natural resources and maintaining the stability of ecosystems, with all the positive effects in a form of improvement of people's health, overall security and well-being.

Apart from economic indicators (GDP growth rate, inflation or interest rate), entrepreneurs and managers also began to notice non-economic development criteria - social and ecological. They concluded that the perception of the company's purpose only by making a profit will result in a conflict of interest between the company and society, which can have a negative impact on the company's development. Consumer boycotts are one of the reasons for corporate social responsibility. Society has started to attach more and more importance to the quality of life and is becoming increasingly aware of the dangers carried by the progress of civilisation. Customers use their purchasing power by refusing to buy goods that have been produced in violation of ethics. CSR owes its current shape primarily to the socio-economic changes that took place in the 1980s. and 90s of the 20th century. a special role was played by transnational corporations, as they developed dynamically at that time, providing new management models alongside capital alone.

To sum up, after introducing CSR instruments into the company's activities, profits for the entrepreneur in the form of trust and favour of the local community are increasing. This is of great importance for economic success, more effective recruitment and effective management of human resources. Taking into account the interest of the local community is particularly important when investing in a region where the investment benefits from additional privileges granted by the state (e.g. Special Economic Zones in Poland). Following the principles of corporate social responsibility leads to building mutual trust and transparency in relations with the external and internal environment of the organisation. A positive image in the eyes of offices, employees or the local community allows long-term cooperation with partners, greater employee involvement and better conditions for conducting business in the administrative and social sphere. The way to achieve the above benefits is to implement CSR integrated with the enterprise management system, including sustainable human resource management, because in accordance with ISO 26000 (Polski Komitet Normalizacyjny, 2012), seven areas of corporate social responsibility are distinguished (Kowalska, 2011, p. 211):

- organisational order,
- human rights,
- labour relations,
- environment,
- fair market practices,
- relations with consumers and social involvement.

To demonstrate the relationship between CSR and HRM, a brief overview of HRM concept and practice as an important strategic responsibility in the organisation should be presented.

The sustainable management of human resources, is to contribute both to achieving the economic goals of the enterprise and balancing the needs of present and future generations, and thus preventing serious social and ecological problems in the future. It is an approach that aims to link human resource management and sustainable development. Therefore, sustainable human resource management is perceived in many ways. There are more and more publications in this field in the world. Their authors are, among others: R. Zaugg, A. Blum and N. Thom (2001), I. Ehnert (2009), M. Jones (2010), S. Cohen (2011), G. Muller-Christ (2011), B. Bossink (2012), G. Haugen (2014), M. Epstein and A. Buhovac (2014). In Poland, these issues are dealt with, among others by: A. Pabian (2011, pp. 13-14), B. Wyrzykowska and A. Zaleśna (2017), E. Bombiak and A. Marciniuk-Kluska (2019) or B. Mazur (2015, p. 8).

One of the most important definitions of sustainable human resource management was presented by R. Zaugg, A. Blum and N. Thom (2001). According to them, balanced HRM includes: work-life balance, ability and willingness to remain attractive in the labour market, increasing the scope of employees' autonomy and using their competences. And such a definition was adopted later in the article as appropriate.

Summing up, the assumptions of the concept of sustainable development and thinking in the context of business-society-ecology forces a change of the approach to the implementation of the personnel function in organizations (Hilarowicz, 2015), especially where it was only reduced to the area of human resources administration.

The concept of CSR covers many areas, most of which are within the operational activities of an enterprise - HRM is one of them. Recently, studies have begun to appear in which scientists undertake discussions concerning research and practice combining CSR and HRM. Among others: Brammer and Millington (Brammer, Millington and Rayton, 2007, pp. 1701-1719), Cooke and He (2010, pp. 355-376), Gond, Igalens, Swaen, and El Akremi (2011, pp. 115-132), Shen (2011, pp. 1351-1363), Morgeson, Aguinis, Waldman and Siegel (2013, pp. 805-824), DeNisi, Wilson and Biteman (2014, pp. 219-231) undertake them. When analysing the publications of the above-mentioned economists, it should be emphasised that HRM plays a significant role in the way of understanding, developing and implementing CSR, and the understanding of social responsibility by organisations has an influence on the treatment of employees employed there. There is also a big misunderstanding of the importance of CSR and HRM in the role of enterprises and the relationship between the employer and employees. On the one hand, entrepreneurs are increasingly employing employees in non-standard forms of employment, employees are stressed because of the lack of employment stability, on the other hand, NGOs, media and consumers are putting pressure on companies to involve in socially responsible activities (Teegen, Doh and Vachani, 2004, pp. 463-483). Positive is the fact that the noticeable pressure on CSR can be a reason to improve employment conditions and activities related to sustainable human resource management, and personnel education more and more frequently includes training within the range of CSR (SHRM, 2006). Therefore, the transfer of responsibility as well as working conditions to enterprises causes that HRM is perceived as a tool for good employment and good work for employees employed in the organisation and external employees.

As previously mentioned, CSR covers many areas of the enterprise and one of them is HRM. CSR is a strategic issue that penetrates into all the departments in the organisation and affects the way the business is conducted and also establishes relationships with stakeholders, both internal and external. Whereas HRM is equally ubiquitous in enterprises and applies to all units and departments in the organisation. Therefore, the human resources management system should assume the main responsibility for managing CSR activities. It should be added that CSR is therefore developing or expanding the HR program and focusing on effective implementation. As Sammer (2009) rightly pointed out, CSR gives the opportunity for the HR department to have a positive impact on the company's results. PR Leap (PR Leap, 2007) claims that activities of HRM and CSR overlap, and for HR professionals the leading role of sustainable HRM in both planning and implementing CSR strategies, and then using CSR to achieve HRM objectives, is becoming increasingly important.

Sharma, Sharma and Devi (2009, p. 205), Kotler and Lee (2005) add that the influence of CSR and HRM strengthens desirable behaviour and can significantly contribute to achieving long-term success in the enterprise and Inyang, Awa and Enuoh (2011, p. 121) rightly notes that HRM is both a component and a potential factor facilitating CSR.

Employees play a very important role in achieving the company's success, which is why the introduction of the CSR concept in the field of personnel activities is aimed at: creating opportunities for employee promotion and development, supported by an appropriate motivation system, activating employees, conducive to achieving their individual goals, supporting cooperation, involvement and teamwork, employee support in the event of redundancies. There is no doubt that balanced HRM plays a key role and responsibility in creating CSR. Without proper management, there is a risk of loss of CSR attention by employees of the organisation due to incorrect interpretation of the fact that it is a balanced HR activity. The involvement of only top-level managers in CSR activities is not enough, support from other levels is extremely significant, so it is important that CSR is embedded in the organisational culture, and the attitudes and actions of employees are appropriately changed to CSR-oriented. Therefore, the main responsibility of HR includes communicating and implementing ideas/policies, cultural and behavioural changes throughout the organisation.

CSR activities in the workplace include inter alia:

- ensuring employee safety,
- ensuring a good atmosphere and employee development, managing diversity, employing the disabled, implementing codes of conduct and ethical infrastructure,
- clear procedures and equal treatment of employees,
- social support,
- additional medical insurance,
- ensuring harmony between work and private life,
- employee volunteering.

Each of them requires considerable organisational effort, often also financial.

The employee area should form the basis of the organisation's CSR activities. If an enterprise forgets this, while simultaneously implementing CSR solutions in other areas, it becomes unreliable to attentive observers, thus provoking the loss of reputation. It must be remembered that employee development not only serves the development of a given organisation, but also helps build social capital. That is why some countries support companies in the area of employee development through specific tax incentives.
Cooperation between business and administration in the employee area should primarily include hiring new employees. Some European countries have implemented or are implementing tax incentives for enterprises employing new employees, including specific solutions for employing people with disabilities.

Safety in the workplace and respect for human rights are another important area. Therefore, the issue of work safety is particularly important for the creators of the international reporting CSR system (Global Reporting Initiative). Also in the tax systems of some European countries, tax solutions are foreseen to encourage companies to invest in additional security or OHS training.

Therefore, the goal of sustainable human resource management in relation to CSR is to understand the essential elements that should be introduced to promote the development of CSR and to design a framework or action plan for an organisation that wants to become one. The procedures regarding personnel management in a company most often relate to the employee evaluation system and the incentive system (if staff development is taken into account). They should also apply to the recruitment and selection of employees in a sustainable manner.

The evaluation system should influence the development of employees and provide them with feedback on their achievements. Employee appraisal procedures should meet the basic principles: appraisal procedures should cover all employees, after earlier familiarising with the criteria and

assessment principles, and the criteria should be stable, unambiguous and adapted to the workplace specificity and accepted by the appraised employees, and the appraisal should be formalised in terms of usability, accuracy, integrity, versatility and confidentiality of results and include a procedure for appealing from the results (Zieliński, 2015, p. 159).

The employee incentive system should include, apart from motivating factors (such as: remuneration, bonuses, employee benefits, cafeteria programs) and career opportunities, also the so called political (e.g. authority, responsibility, control), technical (participation in project teams, impact on working conditions and the way results are measured) and socio-psychological motivation (trust, recognition, status). The basic principle of creating an incentive system is to base it on objective criteria used to determine the basic salary, as well as to establish rules for granting bonuses and additional benefits to employees. The level of suggested remuneration must take into account the financial capabilities of the enterprise, but also the level of market remuneration offered to individual groups of employees, e.g. on the Internet. Properly prepared and implemented employee evaluation and motivation procedures allow managing the tasks of employees, supporting the achievement of expected employee performance and determining the expected ratio of performance to remuneration, as well as reducing the range of staff fluctuations.

The development of human resources is based mainly on the training process, which can be treated as a strategic investment. As in the previous areas (recruitment, evaluation and motivation), properly prepared and implemented staff development procedures should result in increased efficiency, managing employees' tasks and reducing the level of fluctuation.

If it is necessary to lower the employment level, the enterprise should try to limit the scale and effects of this phenomenon. If dismissals prove necessary, dismissal criteria should be presented in good time and consulted with staff representatives. As far as possible, the company should support the redundant employees, making it easier for them to find new jobs and maintain good relations with former employees. Properly prepared and implemented procedures for dismissing employees allow maintaining a positive image of the employer and motivation of employees remaining in the enterprise, avoiding the costs associated with social unrest, which can turn into strikes.

Balanced HRM must therefore affect people's attitudes and connect employees with top management for greater CSR. Thanks to HR it is also possible to give credibility to CSR and adapt CSR activities to business strategy. HR can also integrate CSR with processes such as the employer's brand, evaluation, motivation, recruitment, rewarding, internal communication, diversity, coaching and training. HRM activities can convey, communicate and increase the sense of social responsibility in one enterprise, thus encouraging employees to contribute to being part of CSR, as shown in Table 2.

Table 2: The linking of CSR and sustainable HRM in economic, legal, social, environmental and ethical terms

Approach	CSR	Sustainable HRM
Economic approach/economic responsibility	- long-term behavior profitability - maximising profits - minimising costs - making good strategic decisions - conducting a careful policy of distributing generated profits - creating competitiveness - efficiency - sustainability of development - shaping a more positive image of business and entrepreneurs in society, which can be helpful in stimulating entrepreneurship and creativity, risk readiness, especially among young	- adopting the right development strategy, ensuring good working conditions, using good practices - organisational order related to organisation management - good practices in this area are a condition for achieving operational efficiency, and also increase the organisation's ability to socially responsible behaviour - investment in upgrading qualifications, lifelong learning and ensuring employability that is necessary to build the

	people - recognition among investors, which means e.g. easier access to financing sources - increased sales	competitiveness of the economy based on on knowledge - shaping a positive image of the company among employees: increases motivation and loyalty of employees, which means their increased creativity, innovation and activity for the benefit of the company, as well as the respect for the boss and the management - this aspect also means the increase of the company's attractiveness on the labour market , which results in attracting new, good employees
Legal approach / legal liability	- compliance with environmental protection regulations, consumer rights, labour legislation/employee rights, anti-corruption laws, compliance with obligations/contracts - honouring guarantees, providing products or services in accordance with the requirements of the regulations and thus maintaining the "social contract"	- respecting human rights: the right to life and freedom, equality before the law, as well as the right to work, health, education, social security - greater respect for human rights, protection of natural environment and basic labour norms, poverty reduction and support for suppliers in complying with these principles
Social approach / philanthropic responsibility	- social commitment related to supporting and developing the local community in the field of education, culture, health - should be done by planning and implementation of the social investment - being a good citizen, caring for improving the quality of social life - involvement in volunteering, charity - supporting art and education - commitment in favour of local communities	- supporting employee volunteering - applying transparent business practices based on the respect for employees and the community - raising the level of social integration, by, inter alia, employing employees from marginalised groups - increasing innovation in enterprises, first of all, in relation to innovations to solve social and employee problems - strengthening the process of building intellectual capital, social capital in particular, civic activity, trust, strategic planning skills, by disseminating methods of dialogue with stakeholders and participatory forms of management - improving the situation in the field of quality of life and public health, resulting from voluntary initiatives of enterprises in such areas as health education also of employees, increasing the scope and availability of services
Environmental/ ecological depiction	- actions in the area of the environment regarding the elimination of emissions of pollutants and toxic chemicals, sustainable use of natural resources, mitigation of effects and adaptation to climate change, particularly through investments in ecological innovations	- compliance with the obligation to the environment (including society), as well as the use of technologies conducive to the environment and employees

	and voluntary adoption of environmental management systems and labeling	
Ethical/ethical responsibility	- limiting unwanted behaviour - ethical leadership - enforcement of legal standards - avoiding undesirable behaviour - treatment of the law as an unconditional minimum and taking action above this minimum, - acting in accordance with social expectations, customs and morals - ethical business coherence	- ethical workplace practices related to recruitment, employee promotion, work discipline, employee transfer, training and competence development, health, safety and hygiene at work, working conditions related to working time and employee remuneration - fair operational market practices regarding compliance with generally applicable ethical standards, in accordance with the principles of fair competition, respecting property rights, promoting social responsibility in the value chain, i.e. the entire sequence of activities or persons who provide or receive value in the form of products or services

Source: own study.

To sum up, many authors identify CSR with the idea of sustainable development, which causes the interchangeable use of both concepts (Laszlo, 2008, p. 34) and indicates new challenges facing modern organisations. Efficiency and ethics should characterise all stages of the HR process (recruitment, employee development, motivating and staff reduction). The combination of the corporate social responsibility method and human resource management poses a big challenge for the management, aimed at achieving a situation in which employees become part of sustainable management, and organisations, apart from making a profit, care about social and ecological aspects.

Methodology

The main goal of this study was to check whether innovative enterprises actually show CSR and sustainable human resources management in business management as an element of their innovation and to present the essence of present the nature of the strategy of corporate social responsibility in innovative enterprises, and the concept of sustainable human resources management, indicating their connections in economic, social and environmental terms in the light of available literature. The study was based on secondary and primary data.

The stages of the research process included:

1. The assessment of the current state of knowledge about the strategy of corporate social responsibility in innovative enterprises and the concept of sustainable human resources management, indicating their connections in economic, social and environmentalterms. To this end, the source literature and data from available sources, databases and websites were collected. A review of Polish and foreign literature has been carried out. The implementation of this stage made it possible to present the essence of corporate social responsibility, sustainable human resources management and their linkage in an economic, legal, social, environmental and ethical terms depiction in the light of available literature.
2. 405 surveys were conducted from March to July 2019 in Polish enterprises, of which 320 were correct. The results of the research are presented in the case study.

The implementation of this stage was used to: prove that the strategy of corporate social responsibility and the concept of sustainable human resources management are very important for

increasing the innovativeness of the enterprise, because they influence economically, socially and environmentally the building of competitive advantage of the organisation. Enterprises want to achieve (strategy) of corporate social responsibility and sustainable development and a big group of surveyed enterprises actually use sustainable human resources management in business management and CSR. It also enabled confirmation that the concept of sustainable human resource management and the strategy of corporate social responsibility in innovative enterprisesis very important for achieving sustainable enterprise development. The hypothesis was also confirmed, because sustainable HRM and CSR properly managed, affect the building of competitive advantage of the organisation, including those related to sustainable development.

The respondents were asked to answer the following questions:

Question 1. Have you encountered the concept of CSR in connection with your work?
Question 2. Is the concept (strategy) of corporate social responsibility (if so in what areas) implemented in the enterprise in which you work?
Question 3. Has the position or person responsible for implementing the concept (strategy) of corporate social responsibility been identified in the organisation in which you work?
Question 4. What does it mean to you that an enterprise is socially responsible?
Question 5. Are there any internal regulations in your enterprise that take into account the assumptions of corporate social responsibility?
Question 6. Does your enterprise use sustainable human resource management in company management to achieve sustainable development, and what are the main challenges it faces?
Question 7. What made your enterprise undertake activities related to CSR and HRM?
Question 8. What aspects (and in what areas) related to management and employees, related to sustainable development and CSR, does your enterprise highlight in its activities?
Question 9. Are the strategy of corporate social responsibility and the concept of sustainable human resource management in your company important for increasing the innovation of your enterprise, why?
The results are presented in the further part of the article. The aim of the work was achieved and the hypothesis was verified on the basis of the results of the empirical study.

Sustainable HRM and CSR in the surveyed enterprises – case study

Considering the above, and in order to examine the essence of CSR and HRM in the surveyed enterprises, surveys were carried out, as a result of which information was obtained that in recent years the verbalised need to increase the readability of business operations and its consequences, including mainly the elimination of corruption and unethical behavior, can be seen more and more often in business and using good practices in relations with stakeholders in various configurations.

Enterprises operating in Poland, especially micro, small and medium, still underestimate the importance of corporate social responsibility. They focus mainly on achieving ad hoc market goals without further strategic vision. This also applies, although to a lesser extent, to large enterprises. Table 3 present the results of research on the implementation and realisation of the CSR and HRM concept by enterprises operating in Poland in 2019.

Table 3: Results of research on the implementation and realisation of the CSR and HRM concept by enterprises operating in Poland in 2019, n-320

Variables	Number	%
Have you encountered the concept of CSR in connection with your work?		
Yes	154	48
No	166	52
Is the concept (strategy) of corporate social responsibility (if so in what areas) implemented in the enterprise in which you work?		
No	112	35%
I do not know	64	20%
Yes: - Investments in employee development (work organisation) - Investment in human resources related to respect for human rights - Environmental protection - Compliance with norms and ethical rules in economic life, included in ethical codes - Shaping mutually beneficial relations with all stakeholders -with consumers -with employees -with suppliers - Fair market practices - Activities directed at local communities - Presentation of the way of managing the enterprise implementation of an enterprise strategy including CSR	144 140 125 103 100 79 58 57 51 91 70 65	45% 44% (97% yes) 39% (87% yes) 32% (72% yes) 31% (70% yes) 25% (55% yes) 18% (74% relations with all stakeholders) 18% (72% relations with all stakeholders) 16% (65% relations with all stakeholders) 28% (63% yes) 22% (49% yes) 20% (45% yes)
Has the position or person responsible for implementing the concept (strategy) of corporate social responsibility been identified in the organisation in which you work?		
No	179	56%
I do not know	77	24%
Yes: - the position responsible for implementing the concept (strategy) of corporate social responsibility (responsible only for implementing and realisation CSR assumptions, was appointed) - person responsible for implementing the concept (strategy) of corporate social responsibility (performs these duties alongside other tasks)	64 22 42	20% 7% (34% yes) 13% (66% yes)
Are there any internal regulations in your enterprise that take into account the assumptions of corporate social responsibility?		
Yes	128	40%
I do not know	112	35%
No	80	25%

Source: own study based on conducted research.

The implications of the conducted research indicate that:

1. The vast majority (over 52%) of the respondents do not know the concept of corporate social responsibility, while about 48% have met this term.

2. Investments in employee development were the most frequently implemented area within the concept of corporate social responsibility. Investment in human resources related to respect for human rights came second. As the third respondents, they described their commitment to environmental protection. The least frequently indicated area of implementation of the idea of corporate social responsibility were activities directed at local communities and presentation of the way of managing the enterprise.

3. Over 13% of the respondents indicated that the implementation of corporate social responsibility is done by a person who performs these duties alongside other tasks. Only in about 7% of the surveyed enterprises a person, who was responsible only for implementing and realisation the corporate social responsibility assumptions, was appointed.

4. Over 45% of the respondents say that the concept of corporate social responsibility is implemented in their enterprise. About 35% said that the idea of corporate social responsibility was not implemented in their workplace. However, over 20% of the respondents do not know whether the company implements such a concept.

5. About 40% of the surveyed enterprises have internal regulations that take into account the principles of corporate social responsibility. It should also be pointed out that over 35% of the respondents did not know if such regulations exist in the enterprise. Innovation is conducive to CSR and vice versa.

Considering four areas of social responsibility, i.e. the market, environment, society and employees, the first area in which the respondents saw development and innovation was the workplace. The respondents pointed to new solutions, such as employee initiatives, referred to as innovative, employee participation in decisions. There were also those that introduced various innovations in response to the unmet needs of employees. The respondents representing companies in which CSR solutions were present confirmed that all innovations introduced in their structures are not activities serving only to implement some noble idea, but very clearly translate into specific business benefits of the company.

The approach to business can be considered innovative, where people's attitudes change more and more frequently. It seems that the companies participating in the survey had such a high awareness of CSR that following the responsible principles seems to them the only way to do business. An atmosphere of openness in relationships and offering tools for submitting ideas were mentioned as factors conducive to innovation. It seems that innovation in the area of CSR is not related to the industry in which the company operates. However, depending on the specificity of the company's operations, different areas of CSR, more than others, are a source of innovation. Also, certain industries, such as telecommunication, transport and construction are, in a way, "doomed" to innovation combined with social responsibility. Among the 70 enterprises surveyed in the aspect of CSR, almost 32% of the respondents confirmed that sources of innovation can be found especially in the organization of employees' work, 25% of respondents pointed to innovations in production methods and services rendered, 22% in products or services themselves, 18% indicated innovations in marketing, related to appearance or communication. In addition to the indicated innovations in the organisational and employee areas, there were product innovation activities in the area of process and marketing as well as in the area of social and environmental protection.

Discussion

Very often, CSR initiatives begin to function in organisations with the appearence of foreign investors. Apart from resources, technology and know-how, they also bring a specific perception of reality and business to the company. However, there is too little creativity in Polish solutions specific to the culture, value and specificity of the domestic market, although in CSR enterprises it is

becoming an important element of the company's philosophy. Such a model of implementing CSR rules means that nobody undertakes a polemic with the legitimacy of actions, nobody questions anything and nobody has to be convinced of anything. Some companies include social and environmental responsibility in a set of key company policies. In companies, the effects of undertaken actions are systematically measured and projects implemented are evaluated. In units where CSR has a formalised structure, specific activities are carried out by working teams or groups of people employed in internal communication departments, PR or the presidential department, which is to ensure the possibly fullest view of the situation. There are also companies in which activities belonging to the CSR area are included in the goals of each employee and the bonus depends on their implementation, but there are also those where only one employee is appointed to develop the strategy and implement CSR. The involvement of all departments in CSR means that the idea remains alive, not limiting itself to the provision in the statute.

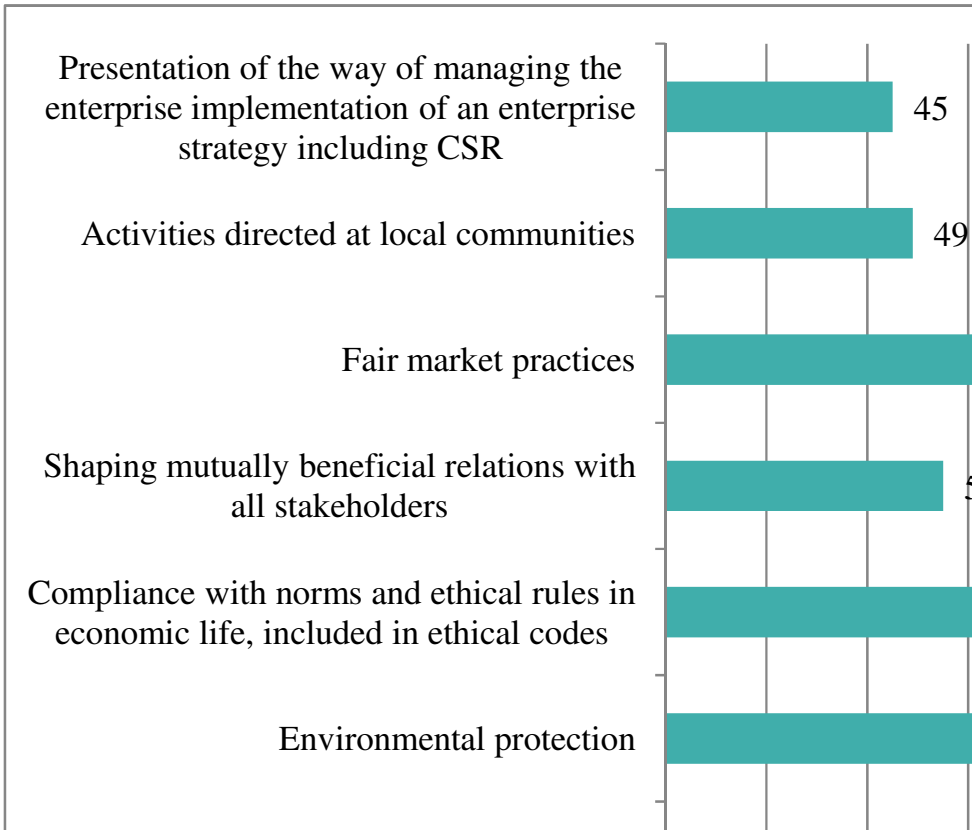

Fig. 1: CSR and sustainable HRM activities defined in the ISO 26 000 standard implemented according to the respondents' indications in 2019 (Concept (strategy) CSR and sustainable HRM is implemented in the enterprise in areas in %)

Source: own study based on conducted research.

Entrepreneurs implementing CSR solutions and innovations caused by this way of management emphasised that in 34% they were new innovative solutions, 25% declared that they were equally new and improving existing ones, 39% mostly improving existing solutions. The most important research results include the fact that among the surveyed entities the concept of "corporate social responsibility" was known by 48% of the representatives of companies operating in Poland, they were especially entrepreneurs representing large companies (70% of responses), established over 15 years ago (52%) and operating on foreign markets (59%).

As it results from the data presented in Fig. 1 out of CSR and sustainable HRM areas, defined by the ISO 26000 standard, the respondents considered as particularly important: relations with consumers (74%) and employees (72%). 97% of the entities considered work organisation to be particularly

important, 63% of the companies indicated fair market practices. Definitely less frequently as areas important for the development of the company were compliance with human rights (87%) or environmental protection (72% of companies) and social involvement (49%).

Only in 38% organisations the implementation of including sustainable HRM is taken into account, and in 33% the interviewees declared that the sustainable business management and sustainable human resources management function in their enterprises to achieve sustainable development. Significant motivators of introducing sustainable human resources management were most often: willingness to increase participation in social life, care for the environment, promoting social and environmental health, saving financial resources and operating costs, care for the health and safety of employees, better company reputation, fashion, the competitive advantage of the organisation, better organisational structure, better qualified senior, middle and lower level staff the willingness to increase participation in social life, savings of financial and operational costs and growing awareness among the business community regarding ecological significance and adopting various management techniques related to environmental protection.

Conclusions

The synthetical discussion on the definition of corporate social responsibility (CSR) strategy and sustainable human resource management in the organisation, does not exhaust the discussed issues, but it is sufficient to explain the essence of the relationship between CSR and HRM in the context of human resources, in this article.

The hypothesis was confirmed, stating that enterprises the strategy of corporate social responsibility and the concept of sustainable human resources management are very important for increasing the innovativeness of the enterprise, because they influence economically, socially and environmentally the building of competitive advantage of the organisation.

It is worth emphasising that CSR (as shown not only by scientific research, but also practice) has a real impact on the efficiency of business operations of enterprises and their innovativeness. Enterprises should therefore treat the implementation of assumptions within the idea of CSR and HRM as an investment and source of innovation, and not only as costs associated with the activities of the enterprise.

The presented results of the conducted tests are characterised by a high degree of generalisation and constitute, above all, the basis for further considerations and inquiries. When analysing related issues, it is worth considering why, despite a very intense discussion on CSR assumptions and balanced HRM, both in Poland and at European, international or global levels, in Poland these ideas are underestimated and often downplayed. There are many reasons, but the most important and mentioned in numerous publications include the belief that:

- every enterprise should focus only on creating profits,
- social involvement of business is not able to realistically change the world for the better,
- enterprises do not have experience in managing social programs,
- business should not take over from public institutions the responsibility for motivating,
- implementing, observing and overseeing social and environmental standards.

It also seems that a very important reason for the lack of wider interest in these concepts, in addition to the reasons mentioned above, is the lack of understanding among the majority of Polish entrepreneurs for their assumptions and, above all, the belief that compliance with CSR motives is not economically viable. As a result, despite the fact that more and more is being said about CSR and balanced HRM in Poland, in the economic reality still only a few enterprises are opting for comprehensive strategies. On the other hand, a large part of them perceive corporate social responsibility through the prism of social commitment, but often narrowed down to one-off social, philanthropic or employee volunteering activities. Such an approach of Polish enterprises to corporate social responsibility differs significantly from the modern understanding of this idea.

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The Impact of the Foreign Direct Investments upon the Cultural Dimensions of Romania

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Abstract

The study below follows the context, in which a former Eastern Bloc country transitioned from a command economy, to a free market one, as well as the substantial impact that the globalization process had on its economy and on its cultural dimensions. As the first stage of the research, this study presents the available literature review, an analysis on certain economic aspects, followed by the results for Romania and the Anglo-Saxon countries using the framework for cross-cultural communication developed by Gert Hofstede. This work provides a platform in gaining a deeper understanding of the implications of a major infusion of capital in a country and how it had started to change the symbols, heroes, rituals and values of a culture in a certain period.

Keywords: Globalization, Foreign Direct Investment, Cultural Dimensions

Introduction

In an era of globalization, the multinational companies have often been credited with bringing wealth and technology, as well as having a socio-cultural impact to developing or least developing countries all around the world.

Of course, there are pros and cons for globalization, but ultimately it "has had the effect of markedly increasing both international trade and cultural exchange" (Kazi, 2018) because it had connected – aside from the economic aspect – people around the world, that had different beliefs, religions or way of doing things.

One sovereign state that was directly affected by globalization was, and continues to be Romania, a former communist country, that for forty-two years had – as all Eastern bloc countries – a command economy in which the state controlled all means of production, characterized mainly by state-owned monopolies over all key sectors of the economy.

With the fall of the Communist regime in 1989, a period of an economic recession began, when the new free-elected Government started the transition towards a free market economy, with consequences such as an increase in inflation from "0.9% in 1989, to 256,1% in 1993, an increase in unemployment from 3,4% in 1989 to 9,2% in 1993" (International Monetary Fund, 2018); and the privatization of key state-owned companies.

As Romania joined the European Union on 1st of January 2007 it gained access to the European single market and an international trade liberalization for itself, attracting significant foreign direct investment, but also, with a great loss to the country "as many as 3.4 million Romanians have fled the country, represents 17% of the total population" (Turp, 2018)

This embodies the context in which the foreign investors – mainly represented by multinational companies - entered and had developed in the Romanian market. Therefore, in this paper, we shall analyze the impact they had, on certain economic points and by comparing the culture dimensions of the Anglo-Saxon world with the national one from Romania.

Literature Review

The study of people that are part of an organization is certainly not a new topic, as a matter of fact, even the modern word "*culture*" comes from Ancient Rome, when the famous orator Cicero firstly

used it in his book *Tusculanae Disputationes,* as he wrote about the "cultivation of the soul or cultura animi" (Nismes, 1812).

Why is culture important?

Firstly, from an anthropology point of interest, culture is important, as at the center of this phenomenon we can always find and place the people and their behavior in a certain point of a society.

Categorically, in anthropology, this concept has two meanings: "the evolved human capacity to classify and represent experiences with symbols, and to act imaginatively and creatively; and the distinct ways that people living in different parts of the world classified and represented their experiences, and acted creatively" (Deji, 2011)

From this we can understand that culture is not attributed to the genetic inheritance of any individual, but is a set of systems of beliefs, values and learned behavior that was encompassed upon them by external and internal factors. "Although exactly where the borders lie between nature and culture, and between culture and personality, is a matter of discussion among social scientists" (Hofstede, McCrae, 2004)

Secondly, our society today has grown on the idea of close cooperation between its members. We have people with a different genetic material, coming from different geographical locations, backgrounds, with completely different values, but who must work together for the good of all.

Additionally, our society had changed its way from an economy that was based on tangible resources to one, that is based on intangible ones and that has in its center the people.

For this reason, we can do a parallel with what is called organizational culture and, add a dynamic and modern definition, "the culture of a group can be defined as the accumulated shared learning of that group as it solves its problems of external adaptation and internal integrations: which has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, feel, and behave in relation to those problems" (Schein, 2017).

What we can understand from all these definitions, is that culture always has implications for the people who form a group, or social environment. Presents them with a way to react, to both internal and external factors and, that this way has been validated in the past and implicitly is passed on to new members as a correct way to react.

However, if we follow a series of definitions of organizational culture, we will notice that there is a considerable variation between them, especially in the use of the term. But this situation does not change the fact that the culture is still so important in academic research and organizational theory, as it affects all aspects of the organizational life.

Cultural differences manifest themselves in different ways, but "the following four together cover the total concept rather neatly: symbols, heroes, rituals, and values" (Hofstede et al., 2010), in the form of an onion, since it is desired to show the degree of superficiality from the outside to the inside.

- Symbols: can be words or gestures, or in any form that can have a specific meaning for someone;
- Heroes: can be persons, which possessed a highly prized number of characteristics for a person;
- "Rituals are collective activities that are technically superfluous to reach desired ends but that, within a culture, are considered socially essential. They are therefore carried out for their own sake. Examples include ways of greeting and paying respect to others, as well as social and religious ceremonies." (Hofstede et al., 2010),
- The core is represented by values that "are broad tendencies to prefer certain states of affairs over others. Values are feelings with an added arrow indicating a plus and a minus side." (Hofstede et al., 2010),

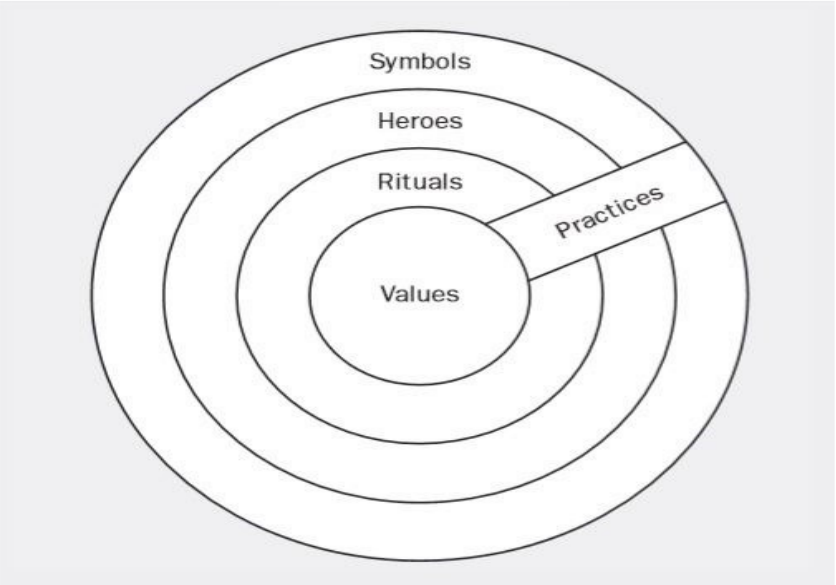

Figure 1: The "Onion": Manifestations of Culture at Different Levels of Depth
Source: Hofstede et al., 2010

Culture can change very quickly when we talk about practices (symbols, heroes, rituals) because these parts are the visible part of any culture. The most difficult and slow to change, is when we talk about values, regardless of the internal and external factors that are present.

For instance, a situation that can perfectly underline the fact that we cannot change the way individuals in a country think, or feel is the case of former communist countries that have tried to adopt a capitalist way of governance and, we can say that they have all failed because "each country has to struggle through its own type of reforms, adapted to the software of its people's minds. Globalization by multinational corporations and supranational institutions such as the World Bank meets fierce local resistance because economic systems are not culture free" (Hofstede et al., 2010).

Globalization and Foreign investors in Romania

Romania is a member country of the European Union since 1st of January 2007, which offered an immediate liberalization of international trade and access to the single European market of more than 500 million customers.

The accession of Romania to the European Union paved the way for multinational companies to enter the Romanian national market, mainly, because the labor market is characterized by specialized but cheap workers, low taxes, a liberal labor law and last but not least, the proximity to Western Europe.

By multinational company, we understand and use the usual definition of being a firm with operations in more than one country - other than the one in which it is registered – and the "general theories of the multinational corporation (MNC), the main institutional agent of international production, or general theories of foreign direct investment (FDI) , the major means by which international production is financed" (Pitelis, 2000).

With these facts under consideration, this chapter continues to briefly summarize the impact of multinationals companies, through the prism of three items.

Foreign Direct Investments

Is an investment in which the controlling ownership in a business is in one country by an entity based in another country.

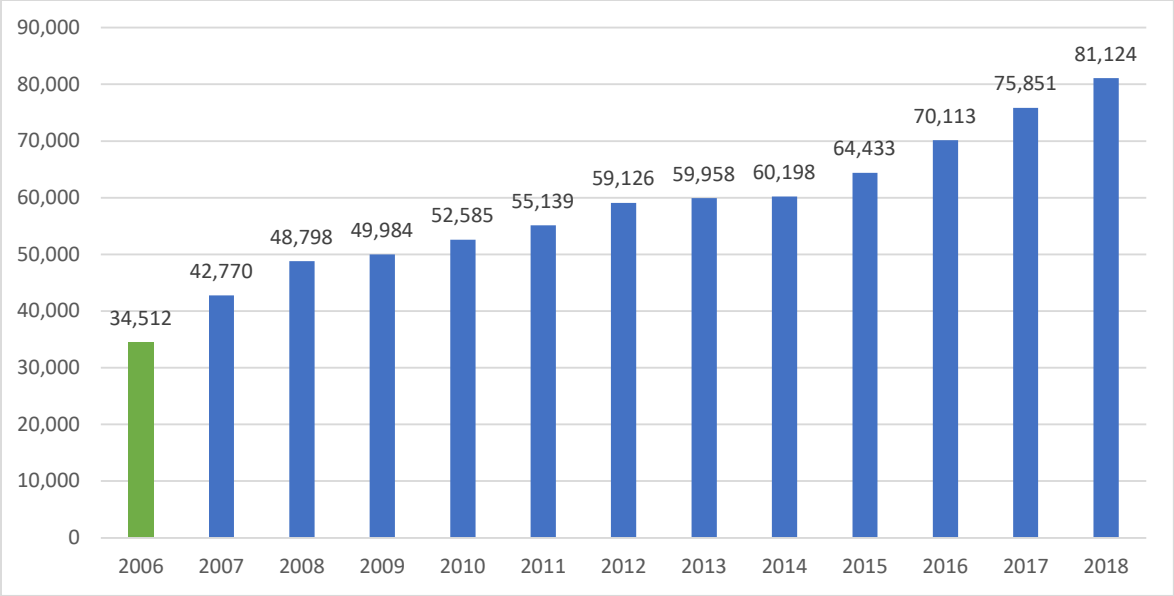

Figure 2: The evolution of FDI in Romania during the period of 2006-2018
Source: National Bank of Romania (2019), adapted by author

As we can see from the above figure, according to the National Bank of Romania, the Foreign direct investment in Romania grew in 12 years from 42,770 mil. EUR in 2007, to 81,124 mil. EUR in 2018, with 89.68% and by 38,354 mil. EUR.

Table 1: The evolution of FDI in Romania during 2007-2018 (%)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Increase %	23.93%	14.09%	2.43%	5.20%	4.86%	7.23%	1.41%	0.40%	7.04%	8.82%	8.18%	6.95%

Source: National Bank of Romania (2019), adapted by author

If we analyze the period of 2006 (non-EU member) to 2007 (EU member), we see that the Foreign direct investment grew from 34,512 mil. EUR to 42,770 mil. EUR, with 23.93% or 8,258 mil. EUR.

Employees in Companies with Foreign Integral Ownership

In 2018, according to the Romanian National Statistics Institute (2019), the average number of employees was 5.07 million, with 24.87% (1.26 million) employed by a company with a public ownership, and 75,13% (3.81 million) employed by a company with a private ownership.

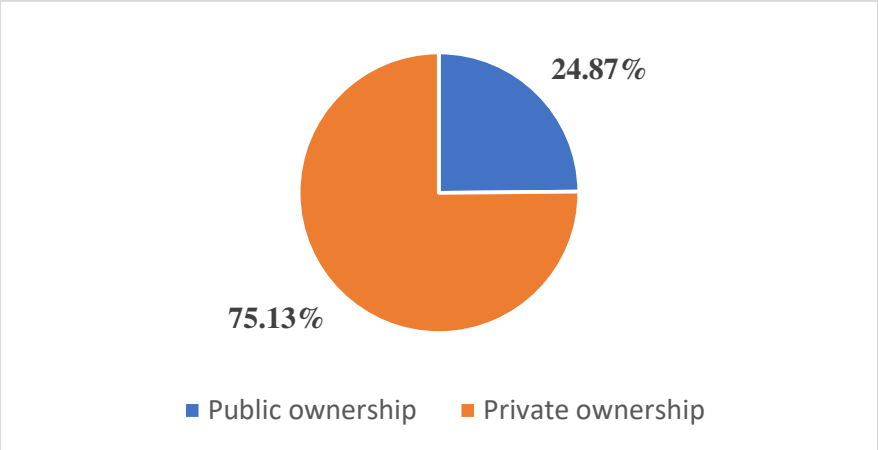

Figure 3: Employees by Type of Ownership
Source: Romanian National Statistics Institute (2019), adapted by author

According to the National Bank of Romania (2019), the average number of employees in Foreign direct investments companies in 2018 was 1.32 million. This means that foreign companies employed in average at 2018 level, 34.56% of all employees that have worked for a private company, or 25.97% of all employees in Romania.

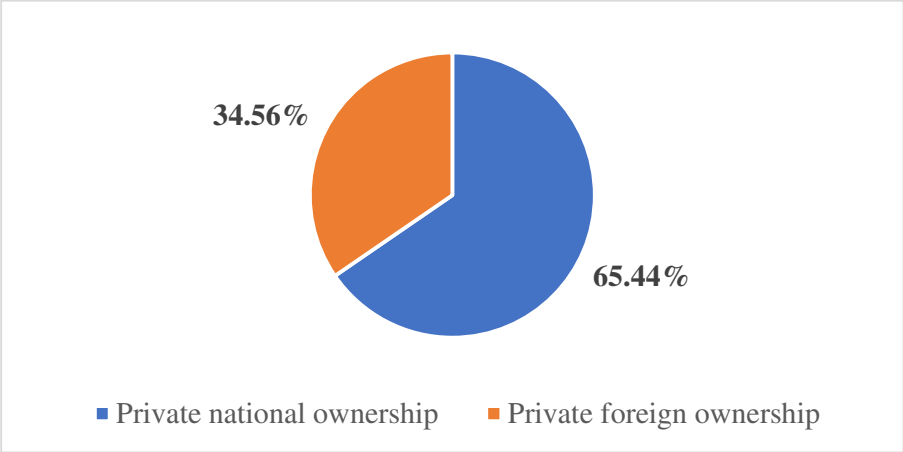

Figure 4: Employees working for a Private Company by Ownership
Source: Romanian National Statistics Institute (2019), National Bank of Romania (2019), adapted by author

With the above data, we can say without a doubt, that the impact of foreign companies in the Romanian labor market is a categorical one as they employed more than 1.32 million people or 25.97% out of all employees in Romania.

Average Monthly Nominal Net Earnings

At 2018 level, based on National Statistics Institute information (2019), in Romania, the average monthly nominal net earnings for an employee was EUR 568.

If we look at the categories of employees by ownership types, we find that in average an employee that was working for a public company was paid EUR 726 and for an employee from a private company was EUR 450.

But for an employees working for a foreign integral ownership company, the average monthly nominal net earnings was EUR 750.

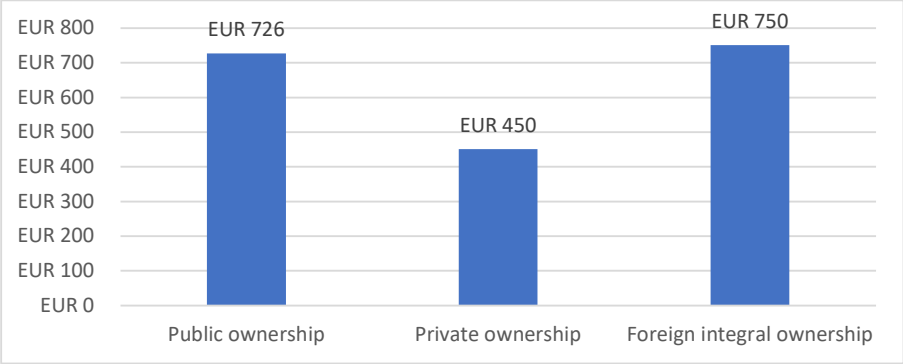

Figure 5: Average monthly nominal net earnings
Source: Romanian National Statistics Institute, adapted by author

In the end, we can see that an employee working for a foreign integral ownership company, had earned in avearge with more than 3.3% than a public employee, with more than 66.5% than a private employee, and with more than 32% that the national average.

Summarizing the impact of multinational companies in Romania we can say that they indeed have a strong presence at National level as they employ more than 25.97% of all employees in Romania, pay more than 32% that the national average and accoriding to the Romanian National Bank they represend 57% of the total turnover of non-financial companies. (National Bank of Romania, 2019)

Cultural Dimensions in Romania and the Anglo-Saxon world

In this part of the paper, we will investigate the Cultural Dimension found in Romania against the ones that are exibited in the Anglo-Saxons world, mainly the ones from United States of America and the United Kingdom.We have chosen to do this cross-cultural comparison, as the presence of companies from those countries is substantially found in Romania.

The comparison established by referring to other countries/cultures, can be seen in the figure below. We are obliged to mention that in the case of Romania, the results below are obtained not on samples of participants, but as an analysis done by the experts.

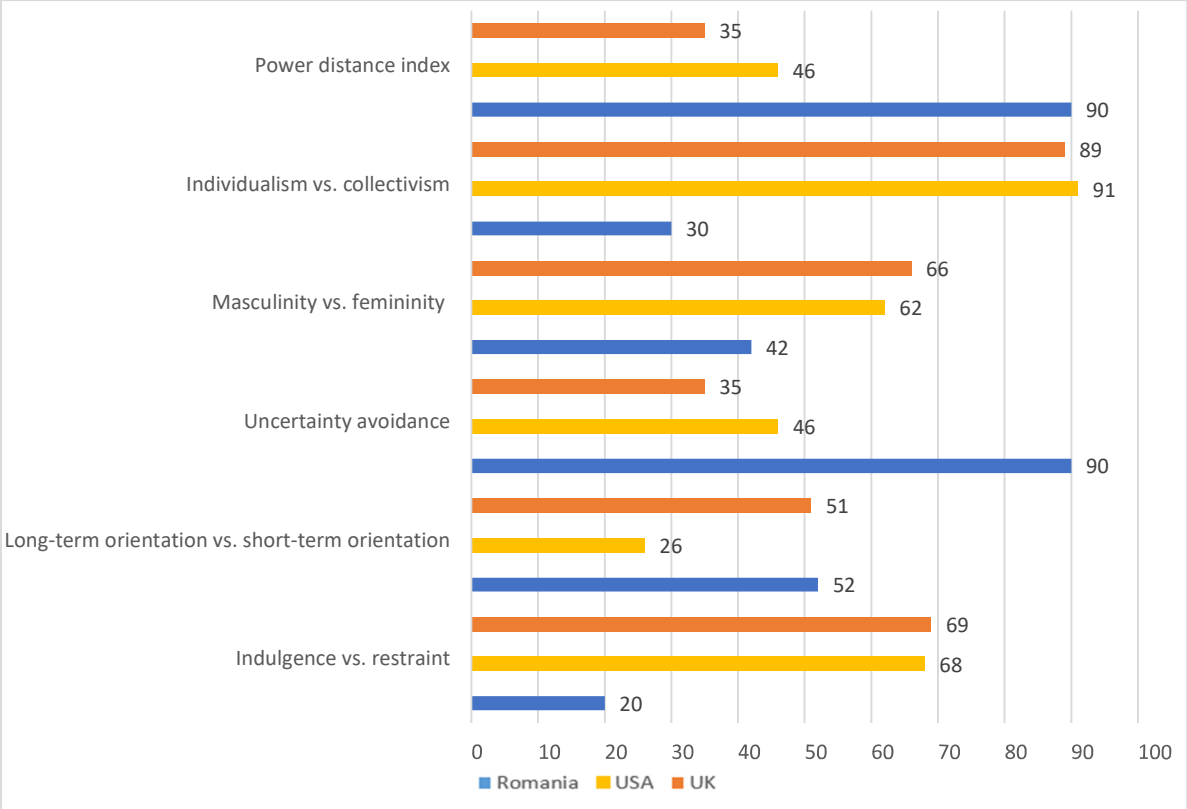

Figure 6: Cultural dimensions from Romania, USA and UK

Source: Hofstede et all, 2010, adapted by author

Similar studies, Human Synergistics (2009), Luca (2005), Nica (2013), found results - with some small differences – to the ones found by Hofstede et all. (2010)

Power Distance Index

Cultures with a low index of power, easiley accept hierarchies, considering the unequal distribution of power even normal, without putting them under question and without asking for many justifications. An higher index of power, accepts the hierarchies more as an social organizational form, in which there must be a permanent and democratic consultation.

Romania has a score of 90 (unequal power), which indicates a country/culture with a low/concentrated distribution of power. Contrary to this score, we find the United Kingdom, with a result of 35 and United States of America, with a result of 46, which indicates a low score, showing an increased/concentrated distribution of power.

Individualism Versus Collectivism

In an individualistic culture, there is a given emphasize, on the individual rights, his personal achivevements - that must be sustained autonomously – and in which the individual must express, without retribution, his own desires and goals. Simply put, in an individualist culture, there is a strong emphasize on "I" and not on "we".

In counterpart, collectivism, reffers to the individual in which his behaviour is influenced by its position inside a certain group and his desires and goals are expressed in the agreed form of the group.

Individualism is strictly associated with competition, uniqueness, innovation and responsibility, while collectivism is mainly associated with harmony and consensus.

Romania has a score of 30, which indicates a collective culture, without having an extremely high degree of collectivism. We can say it has a tendency towards equilibrium, between individualism and collectivism, but it still has a strong focus on collectivism.

Contrary to the result for Romania, for United States of America and United Kingdom, we find the highest results, 91 for the first and 89 for second, indicating a strong, individualistic cultures.

Masculinity Versus Femininity

In this dimension, a masculine cultures promotes personal and social achivements, heroism, success and material reward, while the opposite one, the feminine culture, promotes cooperation, modesty, care for the weak and better quality of life.

"The women in feminine countries have the same modest, caring values as the men; in the masculine countries they are somewhat assertive and competitive, but not as much as the men, so that these countries show a gap between men's values and women's values. In masculine cultures there is often a taboo around this dimension" (Hofstede et al., 1998).

It was shown, that in countries, "where there is a higher level of masculinity, tend to have a higher level of individualism, but the connection is not very strong." (Barry, 2015)

In this dimension, Romania has a score of 42, which presents it as a country/culture characterized by femininity, without having an emphasize on it. In the case of United Kingdom and the United States of America - with a score of 66 and 62 respectively - we can say that thease are countries/cultures defined by masculinity

Uncertainty Avoidance

This dimension refers to how a culture relates to uncertainy about the future and/or to the new and unplanned situations. A culture with a low level of uncertainty avoidance, has individuals that are pragmatic and, are not focused on rules or regulations, having, off course, a high level of accepting uncertainy, something that is new, or any change in their lives.

On the opposide side, a culture with a high level of uncertainy is having individuals that are more emotional and, tries to minimize it by having a set of accepted behaviours, rules and regulations that are often too inflexible and do not work.

Romania has a score of 90, which indicates a country with a high level of uncertainty avoidance, contrary to the Anglo-Saxon environment, where United Kingdom had a score of 35 and the United States of America one of 46, which represents a lower but moderate score.

In other specialized studies, that have followed this indicator, Romania appears as a "conservative culture, with little openess to change or new." (Becker et al., 2012)

Long-Term Orientation Versus Short-Term Orientation

Cultures that are dominated by short-term orientation are based on the past and present, with individuals that tend to respect the traditions and obligations of the society, but they do not tend to make great sacrifices in the present for the future; while cultures that have a long-term orientation stimulate the individuals with pragmatic values, only oriented towards the future with an accent on adaptation, persistents, desire for reward and, they are often allowed to rethink the customs and behaviours of the society.

For this dimension, Romania and the United Kingdom have an intermediary score of 52 respectively 51, which shows a balance and a direction to the long-term orientation, while the United States of America has a score of 26 which means a short-term orientation.

Indulgence Versus. Restraint

This dimension follows the degree to which a culture is lenient towards personal gratifications and the degree of freedom that individuals have, while other cultures have a strict control over them, with strict behaviours and norms.

Romania has a score of 20, that shows that it has a culture that favors restraint. The indulgence culture is often found in the Anglo-Saxon world and that is why both the United Kingdom and the United States of America had obtained a score of 69, respectively 68.

It must be emphasised and underlined the importance of understaging that these scores come together only through relative comparisons between countries, or by a standard set, based on the scores of several countries.

"A striking fact of the various validations is that correlations do not tend to become weaker over time" (Hofstede et all., 2010), even when cultural changes occur, these causes are usually at a very large scale "as a major infusion of foreign capital - sustainable in the long-term - in an economy of a collective culture can stimulate the development of a social capital and, an individualistic profile." (Hofstede et all., 2010)".

"It seems that young people in Romania, probably under the influence of Western models, are already starting to have a much more individualistic/autonomous profile" (Shulruf et al., 2011).

Conclusions

Even if the cultural dimensions for Romania are different that the ones found in the Anglo-Saxon world, we still see every year an increase in Foreign Direct Investments from those parts of the world. The results are similar and under the framework of cross-cultural communication developed by Gert Hofstede, to the ones from other Eastern Bloc and Balcanic countries, more over, other studies (with small differences) found similar cultural dimension for Romania as Human Synergistics (2006), Luca (2005), Nica (2013).

The other studies had used well-grounded theoretical models, but none of the research has national relevance, as they had not used a representative sample, but rather a convenience one.

We have differences on all six cultural dimensions between the results of Romania and the ones of the most important foreign investors represented by the United Kingdom and the United States of America.

The only resemblence being on the Long-term orientation versus short-term orientation dimension in which both Romania and the United Kingdom have a close score of 52 respectively 51 which shows both contries are in balance, but have a direction towards the long-term orientation.

Even if we have differences on the cultural dimension framework, we presume that we do not have in Romania subsidiaries of foreign companies that have difficulties "in functioning efficiently because of differences in language, thought and emotional processes" (Schein, 2017)

It can be seen, that a major infusion of capital (not only) in a collective culture, had impacted the young people by developing a more individualistic/autonomous profile. (Shulruf et al., 2011).

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The Application of Business Process Management in the Hospitality Industry

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Abstract

The study focuses on the application of Business Process Management and modelling within the hospitality industry. The lack of recent research shows the need for a deeper understanding of this topic and its application in the hospitality industry. This paper focuses on the use of BPM in the four-star hotel located in city-centre of Prague. Overview model was created to distinguish the core and managerial and supporting processes. Within the core processes, accommodation services were selected for a more in-depth description. Check-in sub-process was modelled on the level of EPC (Event-Drive Process Chain) where thank to observation, processing times were measured to provide a platform for further optimisation. Critical shortcomings were identified within activities not involving the client interaction. Thank application of available technologies, increase in processing times were reached and well the increase in incremental revenue generation. Thanks to higher involvement of clients and time saving within other activities front-desk employees were able to increase the overall satisfaction level of hotels guest which stimulated the hotel online reputation shift (increase in online hotel perception).

Keywords: Business process modelling, front-office process model, check-in optimisation

Introduction

Intensive application of new technologies in the hospitality industry is shifting the way how hotels and other accommodation facilities are being operated. This shift is connected with the need for understanding hotel processes and their evaluation or optimisation. Errors in hotel operations can lead to a decrease in client satisfaction and due to internationalisation and globalisation, high level of competition and increasing client's needs, these errors can be fatal for the hotel. Application of new approaches, innovations and data usage are the way how to maintain a high level of service and competitive advantages. One way is business process management, which is intensively used in other industries.

Business Process Management (BPM) can be perceived as a set of methods, techniques and tools used for identifying, analysing, optimising (redesigning) and monitoring processes with a focus on productivity increase and cost reduction (Dumas et al., 2013). The main focus of this managerial approach is in Business Processes (BP), sets of coordinated activities prosecuted by people (users) in order to achieve smart objectives and company goals (Doebeli et al., 2011) and their notation, process modelling, (PM).

The business PM is providing support to organisational processes using software tools to control and analyse business activities while including people, organisations, documents, technical equipment and other assets, IT applications and other related information (Tan et al., 2013). PM is supporting as well the business goals in three main areas: process description in order to deeply understand the activities and interactions of people and technologies (Curtis, Kellner& Over, 1992); process analysis

using qualitative or quantitative approaches (Reijers&Mendling, 2011); and process simulation (Mili et al., 2010). Using PM, organisations can not only increase the productivity and reduce costs but as well improve the communication channels and reduce communication inconsistencies (Becker, Rosemann& Van Uthmann, 2000; Hammer, 2010).

A crucial part of BPM is its comprehensive understanding by stakeholders (Stein Dani, Dal SassoFreitas& Thom, 2019). Several studies show the negative impact of lack of BPM knowledge of stakeholders and modellers (Geiger et al., 2018; DoldebergJúnior et al., 2018).

This paper focuses on the use of BPM and PM in the hospitality industry, directly in hotel operations. Services are always connected to a high level of interpersonal communication and interactions where the standardisation is being applied to deliver an expected level of services to the client. Several hotels are having SOPs (Standardized Operational Procedures) that are used to describe the workflow of activities needs to be prosecuted for processing quests inquiries. Application of BPM can bring a better, deeper and more comprehensive understanding of these processes and identify problematic places or inefficiencies in hotel operation.

Literature Review

Application of business PM in hospitality is weakly examined by researchers and only a few studies focusing on this topic can be found. Krstic, Kahrovic&Stanisic (2015) are proposing a framework for the application of BPM in the hospitality industry. The main focus of their study is on a holistic approach towards processes and their execution. Using examples of hotel services processes, authors are presenting the possibilities of BPM use, while creating a general methodological framework. The proposed framework is lately used within the study of Xuhuaet al. (2018) for identification of new innovative strategies for a small hotel in Ghana.

Han, Lustigova& Chalupa (2016) are focusing on the resort gastronomy stand model creation. Created model is based on observed data with emphasis on the revenue generation and customer need fulfilment. The “as-in” model was used to identify operation errors in staff movement and later precreated to new operation model with keeping the service structure with emphasis on queue management and revenue optimisation. Real observed data were used to simulate the behaviour of the system after process redesign. The output of this study shows the feasibility of BPM use in gastronomy. In the study of Poulova et al. (2019), hotel process simulator was proposed to allow hotel managers and university students to solve the operational “what-if” questions.

Nebel, Rutherford & Schaffer (1994) proposed process reengineering as a way how to increase the efficiency of the operation. During the process of reengineering, reengineering team should evaluate the process maps of core activities and later propose process-oriented functional map abstracting from commonly used organisational structures. Thanks to the process reengineering, the hotel manager can effectively measure the performance using customer-based criteria, plan preparation complex preparation shifts and improve interpersonal communication within the organisation. The same approach toward operations innovations is proposed by Sinclair & Sinclair (2009).

Seamless customer experience based on the process redesign and organisation shift from formal organisational structure to process lead organisation is being described as well by Chacko (1998) or Chacko, Williams & Schaffer (2012). Akin Aksu (2001) proposes process redesign and the use of new technologies with a focus on Total Quality Management. Focus on quality management is as well proposed by Ingram (1997). Kozak&Gürel (2015) are focusing on process standardisation and quality management. As the business process management is closely connected to quality management, process modelling and optimisation plays a crucial role as well in human resources management (Kim, Tavitiymana& Kim, 2009).

Özdemir, Colak&Shmilli (2018) are focusing on the front-desk processes of pre-arrival, arrival and accommodation, stay and departure. The results show not only the need for using available technologies but as wellsupporting documents and other assets that should minimise the time spend by operating computers and the hotel systems. The used system should be able to prepare needed data for smooth reservation handling and check-in and payment processing. Using available technologies in process optimisation in proposed by Beldona, Beck &Qu (2001).

Methodology and Data Collection

To identify and model business processes within hotel operations methodology supported by ARIS Architect was used, including minor customisations to fit better the hospitality industry specifics and needs. The methodology of ARIS is being used to standardise the notation of business processes and their possible redesign or optimisation. Modelled processes are created on several levels to assure global and comprehensive understanding of partial processes and their interconnection.

This global overview is represented by meta-model, which consists of organisation structure, documents and knowledge, processes, E2E scenarios, information and communication technologies, technical equipment, goals and inputs and outputs (accomplishments). This overview represents not only the processes but as well all the assets need for their prosecution.

When focusing on processes and their structure, four different levels are used. A general overview is represented by Overview model, which consists of Control processes, Core processes and Support processes. Core processes are directly connected to value delivery to the client and direct interactions with the client where Support processes are being executed to prepare needed assets for Core processes without direct interaction with the client. Control processes are responsible for managerial and control activities that coordinate whole organisation, usage of assets and goal setting.

These process groups are modelled in more details in Value-added chain diagram, which describes sub-processes and their interconnection. These sub-processes represent the meaningful division of activities into groups to distinguish differences in sub-process structures and usage of assets. Identified sub-processes are connected to Overview model through Function allocation diagram. This model consists of identified sub-process, inputs and outputs, used technical equipment including information systems, owner and connected roles, an external user of the sub-process, documents needed for sub-processes prosecution and output documents, the main goal of the sub-process and the identified risks.

To describe partial activities Event-driven process chain model is used. Using EPC, events and activities (functions) are compiled to describe in details partial activities that can be measured and based on the measurements redesign or optimised.

ARIS methodology can help optimise and standardise hotel operations through authentic visualisation of processes and their models. Based on the granularity of models, hoteliers can understand the processes, their interconnection, possible risk and narrow spaces properly.

To measure the efficiency of the models created, a timeline for selected EPC was created and measured using observation. The time needed to prosecute partial activities was a measure to client individual time-line. These single cases were connected to comments to understand the differences between these measurements properly. Selected process (Check-In) was measured 102 times. Model and data are listed below.

All processes were directly connected to the hotel Louis Leger in Prague. Hotel Louis Leger is located in the broader centre of Prague, Czech republic. Its location within the district of Prague 2 is beneficial for its clients due to the easy accessibility of Prague city centre and other historical

monuments. The hotel has 55 non-smoking rooms in secession style with a wide range of services in suitable quality (Booking.com score of 8,7).

The room rates are being created by the senior manager based on the current and forecasted occupancy and are ranging from 120 - 300 EUR in high season and 60 - 200 in low season. Hotel is mainly focusing strictly on leisure clients, where 93 % of quests are using OTAs or Tour Operators, 5 % hotel websites and only 2 % guest are coming directly to the hotel or using a different distribution channel. This causes high rates to be applied mainly for national (of international) feasts and holidays, summer season and weekends.

Nearly 65 % of hotels guests are coming from Italy (19, 5%), Germany (17, 5%), Czech republic (11, 5%), United Kingdom (9 %) and Spain (7%).

Results

Using the methodology described in the previous section, core processes of previously described Prageu hotel were identified and modelled using ARIS Architect tool.Based on the range of services provided by the hotel, three Core process groups were identified (Accommodation Services, F&B services and Additional services). Figure 1 describes the Value-added chain diagram for Accommodation services where nine sub-processes were identified to capture the customer-oriented chain (main “storyline”).

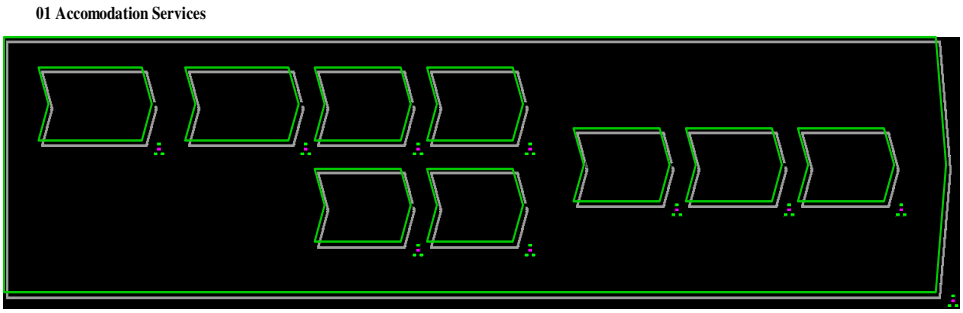

Fig. 1: Value-added chain diagram of Accommodation Services

The whole process is initialised by Reservation creation, followed by Pre-stay sub-process. During Pre-stay, clients can modify their reservation in terms of dates and amount of rooms booked, order more services or, if meeting cancellation policy and terms and conditions, cancel the reservation. During this stage, hoteliers can approach the client with marketing activities (Marketing is part of Support processes). Pre-stay sub-process is only available for clients with created reservation. Walk-ins are handled separately in sub-processes Walk-in and Walk-in Check-in. Division of these two ways of providing accommodation services is based on the different procedures needed to handle these inquiries. The main focus of this study is in Check-in sub-process; where clients are being given the stay information and go through standardise procedure consisting of several activities (EPC diagram of Check-in including the full details can be found in Appendices).

During-stay consists of handling request of clients during their stays, cross-selling while maintaining a high level of clients’ satisfaction and maximisation of hotel revenue. Check-out and Post-stay terminate the stay. Post-stay is directly connected to the marketing activities of the hotel in Reputation management and further product distribution.

Value-added chain diagram does not capture used assets, only clients-flow within accommodation service providing process. For more detailed connection to other models, Function allocation diagram (FAD) was created. Figure 2 represents the FAD of the Check-in process. Focusing on individual

parts of the model, goal, KPI's, inputs and output, used and created documents, internal and external users, used technological assets and risks were identified.

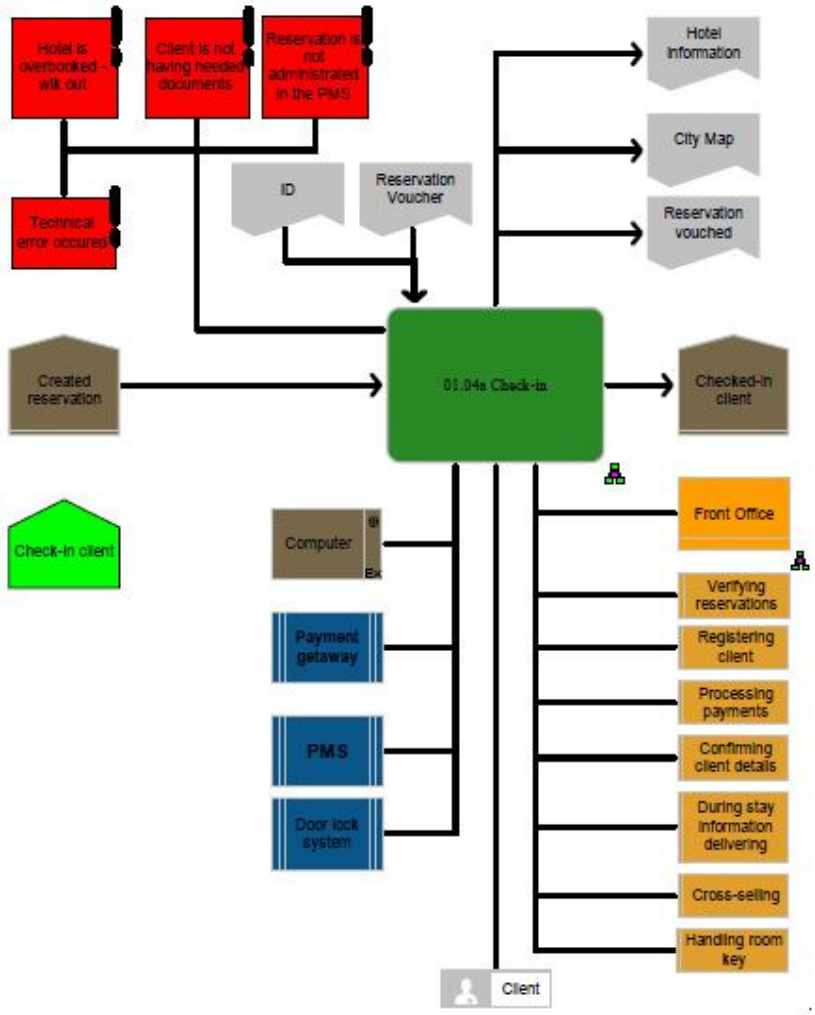

Fig. 2 : Function allocation diagram of Check-in sub-process

The main goal of the sub-process is to successfully check-in client (occupy reserved room). The number of successfully accommodated clients is measured by simple KPI as well as the total number of un-accommodated clients, including reasons for disapproval of their requests. The input for the sub-process is created by Pre-Stay sub-process, the Created reservation, is being documented by Reservation voucher. Main output for During-stay sub-process is Checked-in client. During the Check-in, several documents are being handled to clients (official Hotel information, City Map and Breakfast voucher – if breakfast is included in the reservation).

Check-in sub-process is having an external user (the Client) and the internal user. Internal user is represented by an organisational group (Front-office department) and set of roles needed to prosecute all activities of this sub-process. The roles are later-on used for the creation of job positions and their descriptions to consider all activities being prosecuted by the employee. This procedure can also be used for job description optimisation. While doing check-in, PMS, payment getaway and door lock systems are used supported by the computer as o technical tool.

An essential part of FAD is the risk definition. These risks can have a direct impact on the sub-process and can harmthe client's satisfaction or process flow. Following risks and their impact is described below.

- **Hotel is overbooked – walk-out.** Even though the client arrived atthe hotel with a valid reservation voucher, all the rooms are occupied, and the hotel must start the walk-out procedure. Based on pre-created standards, the client is offered accommodation in a cooperating hotel or the hotel refunds client and compensates the difference in another hotel.

- **Reservation is not administrated in PMS.** This risk consists of several possible events. The client has third party confirmation, but to the reservation was not transferred to the hotel. The client is having an invalid reservation voucher (different dates for example). The client has valid reservation voucher but due to mistake in Front-Office, the reservation was not administrated into the PMS. In all cases, Front-Desk employees should be able to create a suitable offer or walk to the client out.

- **The client is not having needed documents.**During the check-in,the client should provide the Front-Desk staff ID. According to legislation, the client without valid ID could not be accommodated. In this case, walk-out procedure and simple disapproval of request should be done.

- **A technical error occurred.** During the data processing, confirmation creation or door lock and payment getaway functionality error, Front-Desk staff should follow standardised procedure.

Previously mentioned risks are markedly influencing the process flow, and hotel managers should pay great attention to creating standardised procedures to assure a high level of personal services.

To benefit from business process modelling, times of critical activities of the Check-In process were observed on 102 clients. Table 1 describes min, mean and maximum times needed to execute identified main activities in format MM:SS,MS (MINUTES:SECODS,MILISECONDS).

Table 1 : Descriptive statistics of measured time for selected activities

Activity	Min	Mean	Max
1. Reservation verification	0:04,59	0:45,56	2:19,00
2. Client registration	0:19,00	1:59,45	7:02,00
3. Personal details confirmation	0:16,00	0:51,04	3:01,00
4. Whole stay information delivery	0:11,00	1:32,05	3:59,00
5. Cross-selling	0:00,00	0:52,21	2:23,00
6. Service payment	0:45,00	1:02,67	1:53,00
7. Key handling	0:15,00	0:49,32	2:45,00

The main objective of the study was to optimise the whole process of clients check-in to ensure a high level of services provided to client and minimisation of time needed to handle partial activities where there is a lack of communication with the client. From this perspective, identified activities were divided into two groups.

- **Activities involving client interaction** – Reservation verification, Personal details confirmation, Whole stay information delivery, Cross-selling, Service Payment and Key handling.

- **Activities not involving client interaction** – Client registration.

Time reduction should be mainly made within activities that do not involve interaction with the client; in this view; several proposals were made to increase the efficiency of service delivery in the short and long run. To create more relevant proposals, data about quests nationalities and employees language knowledge were collected. Another factor like the experience of Front-Desk employees was not considered, as the team of the hotel in the stable for last year. During the process of observation two main issues were identified, including a possible solution.

Increasing the language knowledge level of employees and decreasing processing time of clients' registration. In short, terms, strengthening language knowledge is only possible through very intensive language training (currently the in-depth knowledge of German and Italian is slowing down the processing speed) and to comprehensively increase these competencies, the hotel should invest in the long-term learning program. As the hotel is not using the full potential of technologies offered by their PMS provider (including cooperating companies), hotel manager negotiated the testing of ID reader compatible with the PMS.

After initial training and testing operations period, the same observation was conducted to measure the impact of ID reader implementation within the process of Check-In. Results have shown a 13% decrease in processing time during client registration as well a 5% increase in cross-selling revenue. Not only direct impact was perceived as after the implementation hotel improved its average online reputation on Google by 0,2 mainly by an increase in the level of service (the number of positive Front-desk mentions increased).

Discussion

Presented results of process optimisation using smart technologies show one of the ways of business process management use in services. Contrary to other industries, hospitality is directly connected to communicate with clients in different stages of their stay. This contact should be standardised on property level not influencing the general process of these activities. As presented within the study, processes that are not involving interpersonal interactions with the client could be optimised or redesigned. As proposed by Özdemir, Colak&Shmilli (2018) and Akin Aksu (2001) processes including client should be supported by available technologies and assets to reach "nearly seamless" client experience. The focus on seamless experience can be used the reach more corporate client proposing timesaving technologies of digital-born Generation Y (Chacko, Williams & Schaffer, 2012).

Thanks to the application of new technology, Front-desk employees were able to focus more on the interaction with clients, cross-selling and sales increase. This orientation should be reflected by human resources management and revenue management. Proper training should be planned right after employee hiring (in position training) and further development should be secured.

Conclusion

To conclude, the field of business process management, business process modelling and optimisation (redesign) in hospitality is not deeply examined and only a few empirical studies can be found. Majority of these studies are not providing empirical data to prove the importance of business process management in hospitality. Due to the high proportion of client-oriented and client involving activities, processes should be designed with implementing of supporting tools and technologies to provide enough time for communication and cross-selling. This study was directly focused on the processes related to Accommodation services providing in centrally located four-star hotels in Prague.

The output shows the benefits of is a room for further research and BPM application. Due to various levels of service within hotel categories, it is crucial to model and compare the complexity of business processes of five and four-star hotels and to find the drivers of their efficiency optimisation.

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The Gravity Model for One Country and One Class of Goods

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Abstract

Purpose: The aim of this paper is to investigate the impact of the economic, trade policy and political factors, along with the traditional factors, like economic size and distance on the electronics trade flows of Romania before and after the EU integration. **Design / Methodology / Approach:** An augmented gravity model was used, including traditional variables as GDP, distance between countries, EU membership and common border, as well as nontraditional ones, as trade openness, political stability, inflation. A balanced panel approach was used and EViews 10 was used for regression. **Findings:** For Romanian trading partners, the findings are in line with the previous studies, but some atypical results were found for Romanian variables. **Practical implications**: A deeper understanding of the dynamics of the Romanian electronic trade flows should be considered by the Romanian trade deciders and the impact of the trade openness and of the political stability should be taken into account. **Originality / Value**: Combining the traditional and nontraditional factors, including economical, political and trade policy ones, electronics trade flows determinants lead to some atypical findings for Romania. **Limitations**: Further research should be performed to study separately the Romanian electronics' exports, re-exports, as well as electronics' parts as components.

Keywords: Gravity Model, Romanian Trade Flows, Electronic Products.

JEL Classification: F14: Empirical Studies of Trade

C33: Panel Data Models; Spatio-temporal Models

Introduction

Romanian trade flows with electronics in 2001-2018 period - brief overview

Electronics are among the most important Romanian exports, as well as imports in 2001 - 2018 period. The value of the exported electronics was 14 times greater in 2018 than in 2001, while the import value was 9 times greater, yet except for year 2016, when exports surpassed imports, Romania remained a net importer of electronics. Germany was the main trading partner, in the top 10 electronics' importers there were mainly EU countries and the electronics' imports came also from EU countries, with the exception of China.

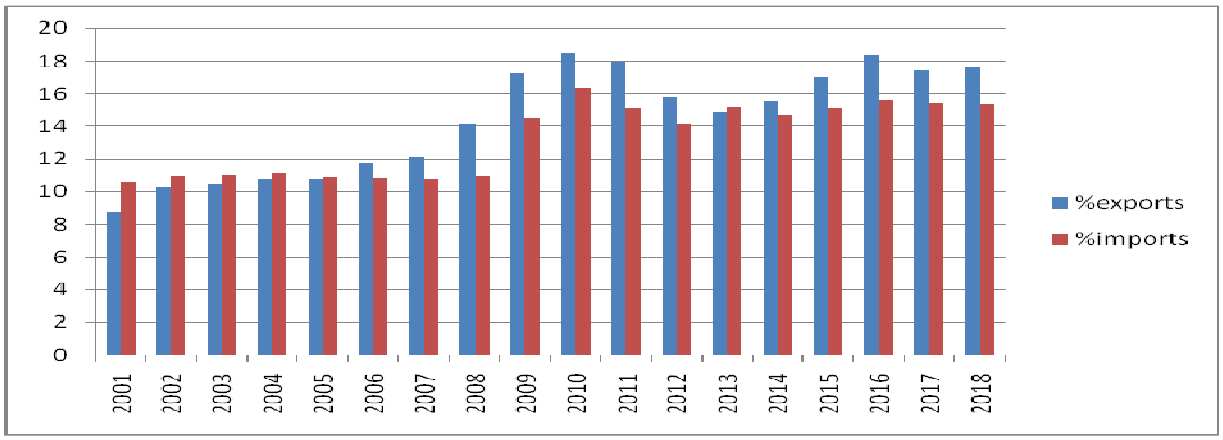

Fig. 1:The share of electronics in all exported and imported goods

Source: Author's figure based on data from https://www.trademap.org/tradestat/Product_SelCountry_TS.aspx?nvpm

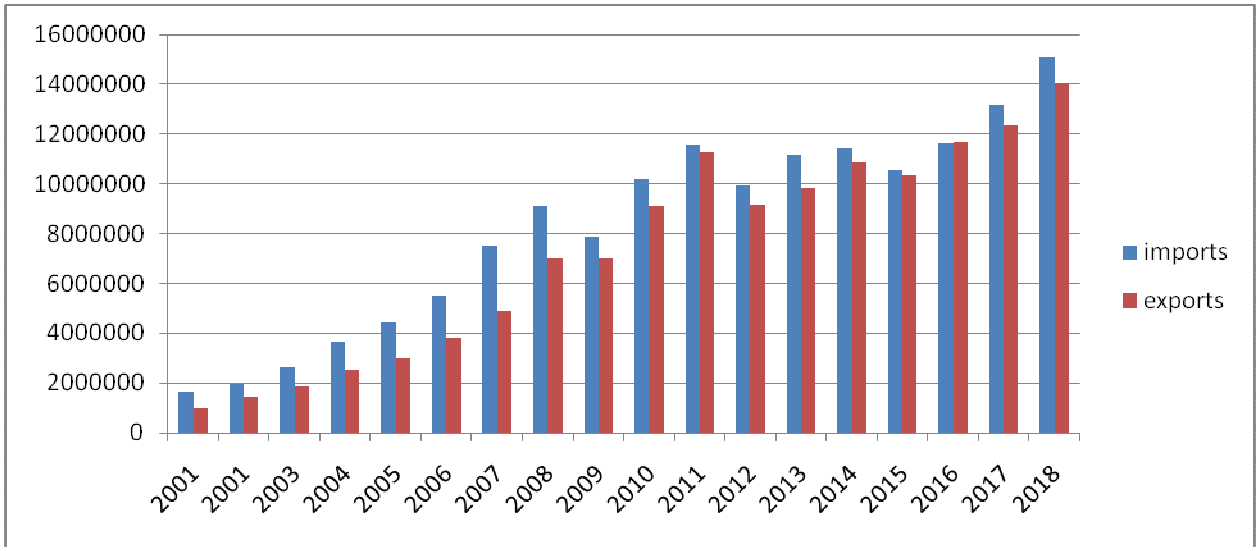

Fig. 2: The value of electronics imports and exports in US dollars in the period 2001-2018

Source: Author's figure based on data from https://www.trademap.org/tradestat/Product_SelCountry_TS.aspx?nvpm

Literature Review

The gravity model was developed independently by Tinberger (1962) and by Poyhonen (1963), although a gravity theory was before developed by Adam Smith, refering to a proportional relationship between economic size and distance (Elmslie, 2018). Over more than 50 years, the gravity model became the most successful model for international trade and it is often labeled as the workhorse of the research in this field. The initial gravity model is based on Newton's gravity law: the force between two particles is directly proportional with their mass and inversely proportional with the square of the distance between them. The translation for Newton's law of universal attraction goes like this: the trade flows between two countries is positively influenced by their economic size and negatively influenced by the distance between them. What means the economic size? Could be GDP, GNI (formally GNP), GDP per capita,

population, income, GDP per capita. What does distance mean? In the first place, it was simply the geographical distance between the capitals of the two countries, but later it became a proxy for trade costs, transport costs, taxes and tariffs, transaction costs, communication costs, cultural distance, country familiarity.

For more than a decade, the gravity model was just a successful empirical model with no solid theoretical base. It was in 1979 when Anderson developed a solid theoretical foundation for the gravity model based on Armington's assumption ("Goods are differentiated by their country of origin") and introduced the term *economic distance*. Bergstrand added price variables in 1985. The Helpman and Krugman model was developed in 1985 to explain mainly the intra-industry international trade. Bergstrand (1985, 1989) considered a Heckscher-Ohlin model, including monopolistic competition with differentiated products to develop the theory of gravity. If Helpman, Krugman and Bergstand were critics to Heckscher and Ohlin, in 1998, Deardorff was critical with respect to the critics of Helpman, Krugman and Bergstand and reevaluated the Heckscher-Ohlin model. According to this model, countries closed to each other will tend to trade more, while countries which are far away will trade even less than the predicted trade. Evenett and Keller (2002) tested both models and concluded that both models are a theoretical base for the gravity model, but the Heckscher-Ohlin model should be preferred from an empirical point of view. All models have an explanatory power of at least 80%.

Regarding the relationship between the gravity equation and the models which generated the equation:

- The gravity equations fit in with the Heckscher-Ohlin model of inter-industry, as well as with the Helpman – Krugman - Markusen model of intra industry trade (Berstrand, 1989).

- The gravity equation is a reduced form from a partial equilibrium subsystem (Bergstrand, 1985).

- The gravity equation could be generated by a model with incomplete specialization and trade costs (Haveman and Hummels, 2004).

- The estimates from the gravity equation could be different when heterogeneity is considered (Tzouvelekas, 2007).

The debate on the best model is not over yet: if all random components of the model are homoskedastic, the Helpman-Melitz-Rubinstein model works better (Santos Silva and Tenreyro, 2009).

The Pros of the gravity model:

- Has a better overall performance compared to radiation models (Masucci et al, 2013).
- It's perfectly applicable to a single country case (Sohn, 2005).
- Was used for over 50 years to analyze the impact of the globalization factors on the bilateral trade (Bergstrand and Egger, 2009).
- The augmented gravity model including Linder hypothesis is better suited for tourism flows than the traditional gravity model (Tamaș, 2019).
- Explains the financial transactions in the same manner as the trade with goods (Portes and Rey, 2005).
- Could be applied to International Trade Network (Fagiolo, 2010).
- The trade with homogeneous goods is better described by the gravity model (Feenstra, Markusen & Rose, 2001).
- The gravity model could be used to study the traffic flows between cities (Jung, Wang & Stanley, 2008).

- The more technologically complex and intense are the industries, the larger is the gravity strenghth (Keller and Yeaple, 2009).
- The inter cities' communications are explained by the gravity model (Krings et al, 2009).

The Cons of the gravity model:

- Performs poorly for bilateral trade with parts and components (Baldwin & Taglioni, 2010).
- The traditional gravity model estimates are not reliable in analyzing the East-West trade potential (Breuss and Egger, 1999).
- The results of the gravity model for the potential trade are highly sensitive on the country heterogeneity (De Benedictis and Vicarelli, 2005).
- The use of the gravity model for the trade policies is severely limited (De Benedictis and Vicarelli, 2009).

The major problems of the gravity model are related to the heteroskedasticity in the trade data and the existence of the zero flows (Gómez-Herrera, 2013). The zero trade may occur if the trade volume or value is too small or if the firms of the exporting country are not competitive enough for the customers in the importing country (Anderson, 2011). Zero values are very common in trade data and omitting them could lead to omitting important information (Shepherd, 2008). Zero values should not be neglected because of the information they may contain (De Benedictis and Taglioni, 2011). Treating zero trade flows properly is important from both a statistical and an economical perspective (Haq, Meilke and Cranfield, 2010). Among all the solutions to deal with the zeroes (omitting the zeroes, various Tobit estimations, truncated regression, substitutions for zeroes), omitting the zeroes from the sample leads to the most acceptable results (Linders and de Groot, 2006).

Methodological issues:

- The linear approximation method can have lower average absolute comparative static errors (Baier and Berstrand, 2009).
- The simple least squares estimates outperform the generalized method of moments for dynamic panels (Bun and Klaassen, 2002).
- The fixed effects estimator is similar to a dynamic OLS (Fidrmuc, 2009).
- The Standard Poisson model, seen as an alternative to log normality assumption, is vulnerable to excess zero flows and over dispersion (Burger, van Oort and Linders, 2009).
- The Poisson Pseudo-Maximum Likelihood estimator solves the heteroscedasticity bias problem only when this is the only problem and fails to do so when heteroscedasticity bias is combined with frequent zeroes (Martin and Pham, 2008).

- For small samples, the performances of the Poisson Pseudo-Maximum Likelihood estimator and of the Feasible Generalized Least Squares estimator are similar (Martinez Zarzoso, 2013) (Westerlund and Wilhelmsson, 2009).

- The Poisson Pseudo-Maximum Likelihood estimator leads to significant differences compared to traditional estimators (Santos Silva and Tenreyro, 2006).

- The Poisson Pseudo-Maximum Likelihood estimator is still robust for large proportions of zeroes (Santos Silva and Tenreyro, 2011).

- The nonparametric cross section estimates are more stable than the OLS cross section estimates (Baier and Bergstrand, 2009).

- The Anderson-Van Wincoop's multilateral trade resistance factor, which works with cross section data, could be adaptive to panel data, as well as using time variant country dummies (Baldwin and Taglioni, 2006).
- The omission of interactions might lead to biased estimates (Baltagi, Egger and Pfaffermayr, 2003).
- Panel estimations should be considered instead of cross section estimations (Egger, 1999) and fixed effects should be preferred to random effects (De Benedictis and Taglioni, 2011).
- A proper gravity equation should include time invariant bilateral interactions (Egger and Pfaffermayr, 2003).
- The gravity equations perform better in explaining the trade among the industrial nations (Evenett and Keller, 2002).
- Spatial autocorrelation and heterogeneity are affected by the bias introduced by logarithmic scale in the gravity equation (Porojan, 2001).
- The log linearity of the gravity equation could be replaced by Box Cox transformations (Sanso, Rogelio and Sanz, 1993).

Among all the trade determinants, the income or the GDP plays a special role. Income growth explains 67% of the trade flows (Baier and Bergstrand, 2001). Income differences, exchange rates and infrastructure are among the most important determinants of bilateral trade flows (Martínez-Zarzoso and Nowak-Lehman, 2003). GDP per capita and common membership positively influence the wine trade flows (Tamaș, 2017). Income, population, production capacity and distance are the determinants of the meat trade (Karemera et al. 2015). There is a positive robust correlation between the investment share and the ratio of international trade to GDP (Levine and Renelt, 1992). The trade openness of a country is inversely proportional with the size of the country (Siliverstovs and Schumacher, 2008). The trade volumes depend on the trading partners and are smaller for pairs of less developed countries compared to pairs of developed and less developed countries (Helpman, Melitz and Rubinstein, 2008). Usually, GDP coefficients are between 0.5 and 1.5.

Distance is an important determinant of trade flows. The negative effect of the distance on the trade flows remains high since the middle of the century (Head, 2008). The absolute value of the distance increased over the time (Brun et al, 2005). The distance impact is larger when OLS is used (Siliverstovs and Schumacher, 2008). The existing measure for the distance between two countries overestimates the distance effect on the trade flows (Keith and Mayer, 2002). The geographical distance is more important for services trade than it is for goods trade (Kimura and Lee, 2004). Distance has a larger effect on the number of exporting firms than on export sales (Lawless, 2010). Internal distance has an impact 10 times larger than remoteness (Melitz, 2007).

Distance is an imperfect proxy for the trade costs and its effects differ among trading goods (De Benedictis and Taglioni, 2011). Distance combined with common language, common culture and country familiarity plays an important role in the gravity model (Deardoff, 1998). The negative impact of the distance on the trade flows could be explained not only by the transport costs, but also by the unfamiliarity of the countries (Grossman, 1996). Usually, distance coefficients are between -0.6 and -1.6.

But, in special cases, distance could have a smaller effect on the trade flows. Exports and imports among the countries from the Gulf Cooperation Council do not depend on the distance because of the development of the transport facilities and the characteristics of the region (Filippini and Molini, 2003). The geographical distance and the cultural distance do not have a significant influence on the Erasmus students flows (Tamaș, 2017). The distance has no statistical effect for non taste dependent products, like software, while for taste dependent products, like movies, it has similar effect as for goods (Blum and Goldfarb, 2006).

More and more, the distance is associated with the trade costs. Transport costs reductions explain 8% of the trade flows, while tariff rate reductions explain 25% of them (Baier and Bergstrand, 2001). The trade costs depend on the size of the country (Baier and Berstrand, 2009). Trade costs vary among countries, developing countries have trade costs 7 times larger than developed countries (Anderson and van Wincoop, 2004). Surprisingly, most country pairs reduce their trade after a multilateral fall in trade costs (Behar and Nelson, 2014). The impact of the trade barriers is reduced by the elasticity of the substitution (Chaney, 2008). A fall in the trade costs increases the trade volumes and the number of firms of the exporting country which enter the trade (Anderson, 2011). Trade costs could be used for the gravity, but also the gravity model could be used to analyze the impact of the infrastructure investments on the trade costs (Egger, 2002).

In relationship with the distance effect is sharing a common border effect. It is not clearly why the common border matters as long as distance (Head, 2003). The gravity model produces consistent estimates regarding the average border effect on the trade flows (Feenstra, 2002). The border effect is sensitive regarding the size and the sign of the chosen method (Magerman, Studnicka and Van Hove, 2016). National borders reduce the trade among industrialized countries by 30% (Anderson and van Wincoop, 2003). Border effects remain large even when the tariffs are very small (Head and Mayer, 2013). Countries closed to each other have fewer opportunities to develop export opportunities (Stavytskyy et al, 2019). The most easily transportable industries have no border effect (Keith and Mayer, 2002).

The membership in the same trade agreement has a positive impact on trade flows. The common membership is one of the most used dummies in the gravity model.

The results show that both the EEC and EFTA have experienced a cumulative growth in gross trade creation (GTC), with the GTC of the EEC being substantially greater than the GTC of EFTA (Aitken, 1973). The probability of two countries already having a trade agreement to have another trade agreement with another country is 50 times larger than the probability that any of the first two countries to have another agreement with the third one (Baier and Bergstrand, 2004). The gravity model tends to overestimate the effect of the integration on the trade volumes (Cheng and Wall, 1999). There is no additional trade between Turkey and EU following the Association Act from 1963 and the customs union from 1996 (Antonucci and Manzocchi, 2006). Trade flows are influenced by amity or enmity between countries (Pollins, 1989).

Free Trade Agreements (FTAs) effect: FTA increase trade flows 4 times. A FTA could double the trade flows between two countries in 10 years (Baier and Bergstrand, 2007). FTAs effects on trade flows are not clear, because not all the studies find trade creation or trade diversion (Henderson and Millimet, 2008). The effects of the FTAs for the less developed countries trade flows (Cambodia, Laos, Myanmar and Vietnam) are negative (Roberts, 2004).

Preferential Trade Agreements (PTAs) effect: foster the trade among the countries in the PTA (Cardamone, 2007).

Regional Trade Agreements (RTAs) effect: increase the trade among their members on the expense of the non members (Carrere, 2006). RTAs have a positive impact on the bilateral trade (Cipollina and Salvatici, 2010). The RTAs have a larger positive effect on the trade flows for developed countries compared to developing countries (Horsewood, 2009). Membership in the same RTA have a positive effect on goods trade, as well as on services trade (Kimura and Lee, 2004). Regional integration may increase the trade flows, but sometimes it leads to a decline (Elliott, 2007).

Similarity seems to have a positive influence on the trade flows. Similarities between countries regarding GDP per capita and population positively influence the trade flows (Miron, Cojocariu and Tamaș, 2019). Similar cultural attributes lead to trade flows increasing (Söderström, 2008). Trade among countries with similar income per capita is more intense (Hallak, 2010).

Gravity model best fits for countries with similar preferences for traded goods and similar trade costs (Anderson, 1979). The similarities between two countries regarding the capital – labor relationship have an impact on the intra-industry bilateral trade (Bergstrand, 1990). If two countries with similar GDP have a bilateral trade and one of them reaches a higher GDP, the first goods which this country will eliminate from the trade would be the actual goods exported by the other country (Linder, 1961). The Linder hypothesis gains strength since 1990 due to globalization (Choi, 2002). The Linder effect on bilateral Foreign Direct Investments is larger in industries with greater quality differentiation (Fajgelbaum, Grossman & Helpman, 2011).

Tourists' flows are determined by similarities in preference between the origin and the destination country and the climate distance (Lorde, Li and Airey, 2015). Linguistic similarities between the country of origin and the host country have a positive impact on Erasmus students' flows (Tamaș, 2017). Although Greece and Portugal have similar characteristics, their exports differ because of Greece unique geographically position in EU (Papazoglou, 2007).

Other variables were considered over the time, like migration (Migrants stimulate exports, but have no impact on imports (Hatzigeorgiou and Lodefalk, 2015)) or exchange rate (Increasing exchange rate volatility or other things equally is detrimental to trade (Abrams, 1980)). Euro has a positive impact on overall trade flows (Baldwin and Di Nino, 2006). Increasing exchange rate variability affects bilateral trade flows (Thursby and Thursby, 1987).

Research Hypothesis

1. The economic size (measured by GDP) of Romania and the partner countries positively influences the electronics trade flows.

2. The distance (between the countries, as well as within the countries) negatively impacts the electronics trade flows.

3. EU membership positively influences the electronics trade flows.

4. Economic factors, like partners' inflation, negatively impact the trade flows of a net electronics importer.

5. Trade policy factors, like trade openess (measured as the percent of trade in the GDP) of the partner countries positively influence the electronics trade flows.

6. Political factors, like stability, positively impact the electronics trade flows.

7. Replacing two variables (the SDINT and the DISTINT), would significantly impact the results.

Data Description and Methodology

The gravity equation:

$LNTRADE_t = c_0 + c_1LnGDP_t + c_2LnGDPR_t + c_3LnDIST + c_4LnSDINT + c_5LnINFLATION_t + c_5LnINFLATIONR_t + c_6\ LnTRADEOPEN_t + c_7LnTRADEOPENR_t + c_8LnSTABILITY_t + c_9LnSTABILITYR_t + c_{10}EU + c_{11}COMBOR + \varepsilon_k$

$Trade_t$ is the dependent variable, it represents the total values of the electronic bilateral trade between Romania and a partner country in year t, where t takes values from 2001 to 2018.

GDP_t is the GDP of a partner country in year t and GDPR is the GDP of Romania in year t. They both are expected to have coefficients with positive signs and values between 0.2 to 1 (Head, 2003). The data is from *https://data.worldbank.org › .*

DIST is the distance between the capital cities of Romania and the partner countries. It is expected to have coefficient with negative sign and values from -0.6 to -1.6 for dist. The data is from *www.chemical-ecology.net* for DIST variable and from *www.cepii.fr › pdf_pub* for internal distance. SDINT is the sum of the internal distance of Romania and the partner country. It is expected to have coefficient with negative sign and values smaller than those of DIST (Melitz, 2007). DISTINT is the internal distance of the partner country, the data are from *www.cepii.fr › pdf_pub*, the coefficient is expected to have negative signs and smaller values as DIST.

$INFLATION_t$ and $INFLATIONR_t$ are respectively the inflation rates of the partner country and of Romania in year t. A positive sign of the coefficient should have a positive impact on the exports, therefore a positive impact on the trade flows if the country is a net exporter (Stockman, 1981).

$TROPEN_t$ and $TROPENR_t$ are respectively the trade openness of the partner country and of Romania in year t. It is expected to have coefficient with positive sign if the country is a net exporter (Anderson and Neary, 2005). The data is from *https://data.worldbank.org › .*

$STABILITY_t$ and $STABILITYR_t$ are respectively the indexes for political stability for partner country and for Romania in year t. It is expected to have coefficient with positive sign. The data is from https://www.theglobaleconomy.com › rankings .

EU is a dichotomic variable, taking the value 1 if both Romania and the partner countries are EU members and 0 otherwise. The coefficient should have positive signs and values larger than 1 (Abrams, 1980).

COMBOR is a dichotomic variable, taking the value 1 if both Romania and the partner countries share a common border and 0 otherwise. The coefficient should have positive signs and values around 1 (Head, 2003).

An unbalanced panel approach was used to address the heteroskedasticity issue (Breuss and Egger, 1999). Also, a dynamic panel model was considered for better results (Bun and Klaassen, 2002). The zero flows were omitted in the sample, as often leading to most acceptable results (Linders and de Groot, 2006). The EViews soft version 8 was used.

Results and Discussions

Table 1: The results for the panel regression

Panel options/ Variable	Cross-section weights	Period weights	Cross-section weights	Period weights
C	-4.23	-2.91	-6.58	-3.71
LNGDP	1.44*	1.50*	1.39*	1.46*
LNGDPR	-0.8	-0.77**	-0.78	-0.80**
LNDIST	-0.81*	-0.89*	-0.84*	-0.93*
LNSDINT	-0.7*	-0.75*	-	-
LNDISTINT	-	-	-0.18*	-0.20*
LNINFLATION	-1.60*	-1.65*	-1.62*	-1.65*
LNINFLATIONR	1.16**	1.12*	1.13*	1.09*
LNSTABILITY	2.08**	2.10*	2.07**	2.06*
LNSTABILITYR	1.22	0.15	1.21	-0.02
LNTROPEN	0.91*	0.96*	0.96*	1.05*
LNTROPENR	-0.51	-0.73***	-0.50	-0.78***
EU	1.77*	1.51*	1.85*	1.60*
COMBOR	2.45*	2.53*	2.48*	2.54*
R-squared	0.71	0.87	0.71	0.86

*Legend statistically significant at 1% *, at 5% **, at 10%****

Source: Author's table based on the outputs

Some of the variables are not statistically significant: STABILITYR and C in either versions, GDPR and TROPENR in the first one.

The coefficients for GDP are between 1.39 and 1.5 for the whole period and prove that Romanian trade flows follow a GDP pattern, relaying on the trading partners' economic size and the electronics exports are mainly quantity based and low prices based.

The results for the distance between countries are in line with the previous studies, between -0.93 and -0.81. For internal distance, if both Romania and the partner countries are taken into account, the coefficients are from -0.75 to -0.7, but when taking into account only the internal distance for trading partner, the values are from -0.2 to -0.18.

The trading partners' inflation negatively impacts the trade flows because it diminishes the buying power of the Romanian trading partners. But the Romanian inflation positively influences mainly the exports, which are based on low prices, making the prices even more affordable.

Political stability of the trading partners strongly and positively influences the trade flows, even more than the trade openness does. On the long time, Romanian trade openness negatively influences the trade flows, maybe because of the low competitiveness of the products.

As expected, EU membership has a powerful and positive influence, the values are from 1.51 to 1.85.

The common border has a positive influence, the values are overestimated by the model 5 times in average, which sustains the findings of Keith and Mayer (2002).

Table 2: The results for the panel regression before and after the EU integration

Panel options/ Variable	2001-2007				2007-2018			
	Cross-section weights		Period weights		Cross-section weights		Period weights	
C	-31.36	-39.38	-18.42	-8.01	-14.48	-15.95	-25.28*	-26.40*
LNGDP	1.69*	1.63*	1.73*	1.66*	1.34*	1.30*	1.36*	1.31*
LNGDPR	-0.15	0.12	-0.27	-0.81	-0.73	-0.71	0.0004	0.008
LNDIST	-0.73*	-0.81*	-0.85*	-0.91*	-0.81*	-0.82*	-0.78*	-0.79*
LNSDINT	-1.74*	-	-1.51*	-	-0.26***	-	-0.42*	-
LNDISTINT	-	-0.71*	-	-0.61*	-	-0.0009	-	-0.08**
LNINFLATION	-2.06*	-2.43*	-1.77*	-1.58*	-1.11**	-1.13**	-0.89*	-0.79*
LNINFLATIONR	0.49	0.59	1.47*	1.72**	-2.12***	-2.14***	-0.74***	-0.66
LNSTABILITY	2.89***	3.62**	2.31***	1.54	1.13	1.13	0.88	0.73
LNSTABILITYR	0.69	0.54	-0.14	-0.98	6.40***	6.41***	2.03	1.73
LNTROPEN	0.82*	0.69*	0.87*	0.75*	0.95*	1.04*	0.91*	0.97*
LNTROPENR	2.80	1.96	-0.66	-0.39	2.85**	2.86**	1.03**	0.97**
EU	-	-	-	-	1.89*	1.92*	1.78*	1.90*
COMBOR	1.54*	1.68	1.45*	1.62	2.81*	2.79*	3.30*	3.32*
R-squared	0.67	0.66	0.98	0.97	0.73	0.73	0.94	0.95

*Legend statistically significant at 1% *, at 5% **, at 10%****

Source: Author's table based on the outputs

Same variable were tested for two periods: the one before 2007, which is the year of Romanian integration in the EU and the period 2007-2018, since when Romania is an EU member.

In the before EU period, some of the variables are not statistically significant: GDPR, STABILITYR, TROPENR and C in either versions and INFLATIONR for the first one. In the EU membership, the not statistically significant variables are: GDPR, STABILITYR in either version and DISTINT and C in the first one.

GDP explanatory power decreases from 1.7 before EU integration to 1.3 after integration. The role of the distance between trading countries remains pretty much the same in the two considered periods, but the coefficients for internal distances sharply increase after EU integration.

The Romanian political stability and trade openness were not statistically significant before EU integration, but became significant afterwards, while the trading partners' stability was significant before and not significant after EU integration.

The trade openness of the partner countries becomes even more important after EU integration and so the common border.

Two revised gravity equations are considered removing the not statistically significant variables.

$LNTRADE_t = c_0 + c_1LnGDP_t + c_2LnDIST + c_3LnSDINT + c_4LnINFLATION_t + c_5LnINFLATIONR_t + c_6 LnTRADEOPEN_t + c_7LnSTABILITY_t + + c_8EU + c_9COMBOR + \varepsilon_k$

$LNTRADE_t = c_0 + c_1LnGDP_t + c_2LnDIST + c_3LnDISTINT + c_4LnINFLATION_t + c_5LnINFLATIONR_t + c_6 LnTRADEOPEN_t + c_7LnSTABILITY_t + c_8EU + c_9COMBOR + \varepsilon_k$

Table 3: The results for the panel second regression

Panel options/ Variable	Cross-section weights	Period weights	Cross-section weights	Period weights
C	-23.08*	-23.13*	-24.89*	-25.003*
LNGDP	1.43*	1.50*	1.39*	1.45*
LNDIST	-0.81*	-0.89*	-0.85*	-0.93*
LNSDINT	-0.70*	-0.76*	-	-
LNDISTINT	-	-	-0.18*	-0.20*
LNINFLATION	-1.62*	-1.68*	-1.63*	-1.67*
LNINFLATIONR	0.58*	0.45*	0.56*	0.37*
LNSTABILITY	2.09**	2.12*	2.08**	2.08*
LNTROPEN	0.91*	0.95*	0.96*	1.04*
EU	1.76*	1.49*	1.84*	1.59*
COMBOR	2.45*	2.51*	2.47*	2.51*
R-squared	0.71	0.87	0.71	0.86

*Legend statistically significant at 1% *, at 5% **, at 10%****

Source: Author's table based on the outputs

For the period before the Romanian integration in EU, these revised equations were considered:

$LNTRADE_t = c_0 + c_1LnGDP_t + c_2LnDIST + c_3LnSDINT + c_4LnINFLATION_t + c_5LnINFLATIONR_t + c_6 LnTRADEOPEN_t + c_7LnSTABILITY_t + + c_8EU + c_9COMBOR + \varepsilon_k$

$LNTRADE_t = c_0 + c_1LnGDP_t + c_2LnDIST + c_3LnDISTINT + c_4LnINFLATION_t + c_5LnINFLATIONR_t + c_6 LnTRADEOPEN_t + c_7LnSTABILITY_t + c_8EU + c_9COMBOR + \varepsilon_k$

Table 4: The results for the panel regression before and after the EU integration

Panel options/ Variable	2001-2007				2007-2018			
	Cross-section weights		Period weights		Cross-section weights		Period weights	
C	19.63*	-22.13*	-17.39*	-18.87*	-34.37*	-35.35*	-20.91*	-21.87*
LNGDP	1.49*	1.41	1.50*	1.43*	1.33*	1.30*	1.36*	1.31*
LNDIST	-1.15*	-1.20*	-1.21*	-1.26*	-0.81*	-0.82*	-0.79*	-0.80
LNSDINT	-0.69*	-	-0.78*	-	-0.26***	-	-0.40*	-
LNDISTINT	-	-	-	-0.15*	-	-	-	-0.07**
LNINFLATION	-1.84*	-1.91*	-1.60*	-1.87*	-0.57*	-0.58*	-1.19*	-1.44*
LNINFLATIONR	-	-	-0.44**	-0.43**	-2.64**	-2.66**	-	-

LNSTABILITY	1.95**	1.98***	2.10*	2.21*	-	-	1.48**	1.95*
LNTROPEN	1.24*	1.50	1.26*	1.29*	0.94*	-	0.94*	1.009
LNSTABILITYR	-	-	-	-	7.22**	7.22**	-	-
LNTROPENR	-	-	-	-	3.09*	3.12*	-	-
EU	-	-	-	-	1.89*	1.93*	1.76*	1.87*
COMBOR	2.68*	2.61*	2.59*	2.69*	2.82*	2.79*	3.31*	3.34*
R-squared	0.67	0.66	0.86	0.94	0.73	0.73	0.97	0.98

*Legend statistically significant at 1% *, at 5% **, at 10%****

Source: Author's table based on the outputs

Conclusions

The economic size of the partner countries positively influences the electronic trade flows. The coefficient for the Romanian GDP is negative, which is atypically, therefore the first hypothesis is partially sustained. But how could be this negative coefficient explained? The deficit at the internal production, correlated with the internal demand, leads to relatively small Romanian exports and Romanian economic growth is not significantly influenced by exports. By contrast, the imports had a sharp growth, which leads to a constant growth of the deficit of the trade balance. On the other side, the Romanian exports are based on low value, especially because of low wages compared to trading partners, so if the Romanian GDP would significantly grow, so would the wages and therefore the unit value for the exports, which would negatively influence the volume of the exports.

The second hypothesis is supported. In line with the previous studies, the distance between countries or the internal one has a negative impact on the electronics trade flows. The closed values for the sum of the internal distances and the distance between countries could be explained by the fact that a considerable share of the trade flows are with trading partners from Europe. The common border has a powerfull positive impact on the electronics trade flows.

The membership in the same trade agreement and subquently the EU membership has a positive impact on the electronics flows, so the third hypothesis is supported.

The trading partners inflation negatively impacts the trade flows of a net electronics importer such is Romania, so the fourth hypothesis is sustained. As for the Romanian inflation, once more atypical results were found, namely negative, as well as positive coefficients. The consumer price index, which expresses the inflation, is based on a serie of statistic asimmetries because of mantaining on the administrated prices, for instance on energy or natural gas. All these make the dynamics of the exports and the dynamics of the inflation uncorrelated.

Trade policy factors, like trade openess, as well as political factors, like stability, positively impact the electronics trade flows, therefore the last two hypothesis are fully supported.

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Entrepreneurial Behaviors on Millennial Generations: Evidence from Small Medium Enterprises (SMES)

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Abstract

Millennial generations have their own culture because of the different values with the previous generation. Characteristics of the millennial generation and cultural values shown include making technology as a lifestyle. The purpose of this study is to measure empirical linkages between the individual, cultural values and entrepreneurial characteristics on the entrepreneurial behavior in the context of SMEs' of run by millennial generations. This study used survey methods that explains the relationship between variables through hypothesis testing The number of respondents was 151 respondent from SMEs' in Banjarmasin Indonesia and Structural Equation Modelling were employed. The test result proves that there is a strong correlation between exogenous variables and endogen variables, that individual characteristic has a significant effect to entrepreneurial behaviors, and also cultural value, and entrepreneurial characteristic have a significant effect on entrepreneurial behaviors.

Keywords: Characteristics, Cultural Values, Entrepreneurial, Behavior, Millennial,

Introduction

The high potential of natural resources guarantee a growth of the national economy, but is heavily dependent on potential quality of human resources possessed especially the ability in the field of entrepreneurship.

Entrepreneurship is the engines of economic growth. According to Iyer, RM, 2018, entrepreneurs bring enormous positive contributions to a country's economic growth and social development. Entrepreneurs play the role of innovators who can fully explore the complete potentialities of the countries available resources of labor, technology and capital.

The trend in the growth of entrepreneurial behavior is due to economic pressures, so that a person is forced to create his own employment (Bosma et al., 2011). Furthermore, Mazzarol *et al* ., (1999); Shane *et al.* , (2008); *Segal et al* ., (2005) also explained that other factors cause the growth of entrepreneurial behavior, namely unemployment, the frustration of previous work, and the necessities of a decent life. Fugate *et al.* (2005) also stated that micro business is one of the entrepreneurial techniques to promote a self-sufficient economy that enables micro-entrepreneurs to create their jobs and earn their own income.

The success of a businessman, including millennial generation entrepreneurs in carrying out business activities, cannot be separated from the internal characteristics they have.

In Indonesian Millennial Generation Profile, it has been drawn that millennial generation has a unique character based on region and socio-economic conditions. One of the main characteristics of the millennial generation is marked by increased use and familiarity with communication, media and digital technology. Being raised by technological advancements, millennial have creative, informative, passionate and productive traits. Compared to previous generations, they are more friends with technology. This generation is the generation that involves technology in all aspects of life.

Meredith (1996) put forward the characteristics and character of entrepreneurship as follows: always trying to excel, profit-oriented, have perseverance and perseverance, have a strong determination, like to work hard, energetic and have initiative; can take risks and love challenges; behave as a leader, can get along with others and like constructive suggestions and criticism; innovation and creativity has a strong, flexible, versatile and have a business network; have a perception and perspective oriented to the future, and have the belief that life is the same as hard work.

Molenaar (2002), explains that culture can have a powerful influence on an individual and performance. The same thing was conveyed by Kotter and Heskett (1992) that culture is a force that has a full influence on an individual and his performance even in the individual's work environment. Culture is the difference or similarity of values held in each society that arises from the social environment that originates in its history, life experiences, and belief systems. Culture is as mind software that regulates how to think, act and perceive envy (Hofstede, 2001).

Cultures are the differences or similarities are shared values in every society arising from the social environment that comes to its history, life experiences, as well as its belief system that also spawned the millennial generation bud a yes new. Characteristics and characteristic values of culture millennial generation showed, among others, is to make the technology as a lifestyle (*lifestyle*), as shaded generation (*sheltered*), because they are born from parents who are educated. They are *multi-talented, multi-languages* , more expressive and exploratory. This view of the nature of life, always confident, optimistic, confident, straightforward, and everything was almost instantaneous.

Based on empirical studies and theoretical studies of individual millennial generation characteristics variables, entrepreneurial characteristics and cultural values of the community towards entrepreneurial behavior are very important to be further investigated, then the relationship of the influence of these variables is fascinating to be empirically tested in the context of the Small Business Industries (SMEs) Millennial generation.

Literature Review

The success of an individual in carrying out business activities cannot be separated from the internal characteristics of the individual. In Indonesian setting, Rajiani (2010) suggests some individual characteristics that affect the world of work individuals and companies are Openness ***to Experience***, ***Conscientiousness***, ***Extraversion, Agreeableness, Neuroticism.*** Meanwhile, in the Profile of Indonesian Millennial Generation (2018), it has been drawn that millennial generation has a unique character based on region and socio-economic conditions. One of the main characteristics of the millennial generation is marked by increased use and familiarity with communication, media, and digital technology millennial also has the characteristics of a creative, informative, passionate and productive. They involve technology in all aspects of life, have the characteristics of open communication, fanatical social media users, their lives are strongly influenced by technological developments, and are more open to political and economic views.

Entrepreneurial characteristics can be a factor in the failure of someone trying. Meredith (1996) put forward the characteristics and character of entrepreneurship as follows: always trying to excel,

profit-oriented, have perseverance and perseverance, have a strong determination, like to work hard, energetic and have initiative; can take risks and love challenges; behave as a leader, can get along with others and like constructive suggestions and criticism; innovation and creativity has a strong, flexible, versatile and have an extensive business network; have a perception and perspective oriented to the future, and have the belief that life is the same as hard work. Also, no less important is the success of an individual in carrying out his business activities cannot be separated from the culture that grows and develops in society (Rajiani & Pyplacz, 2018). Molenaar (2002), explains that culture can have a powerful influence on an individual and performance. The same thing was conveyed by Kotter and Heskett (1992) that culture is a force that has a full influence on an individual and his performance even in the individual's work environment.

Individual characteristics and culture value of millennial generation, among others, is to make the technology as a lifestyle (*lifestyle*), as shaded generation (*sheltered*), because they are born from parents who are educated. They are *multi-talented, multi-language* , more expressive and exploratory.

Hypothesis of this research are:

H1: Individual characteristics significantly influence entrepreneurial behavior of millennial generation
H2: Culture value has a significant effect on entrepreneurial behavior of millennial generation
H3: Entrepreneurial characteristics significantly influence the entrepreneurial behavior of millennial generation

Methodology

This research was conducted in November 2018 until May 2019 in the area of Banjarmasin City , which consists of 5 districts namely: East Banjarmasin District, South Banjarmasin, Central Banjarmasin, West Banjarmasin and North Banjarmasin. Locations were selected premises and consideration intentionally that in Banjarmasin, there number of SMEs as much as 36.781. The choice of Millennial generation SMEs to be investigated is because there are unique characteristics in this business. Therefore SMEs generation of millennial in Banjarmasin cannot be exactly examined; the sampling was done by using purposive sampling with 151 respondents.

The data has been collected, then tabulated into tables and discussed descriptively. For *inferential* statistical analysis, the data analysis technique uses a causality or causal approach between the independent variable and the dependent variable. This *inferential* analysis is used to study/analyze the effect of several variables in this study, namely by using multiple linear regression. Data processing is done with tools software of Amos version 26.

Result and Discussion

Variable of individual characteristics among millennial generation in the Banjarmasin city is reflected in the form of ambitious character. It shows that 53.67% of the millennial generation respondents in Banjarmasin City do not have an ambitious character in entrepreneurship. This is reinforced from the results of the mean score *(mean)* indicator of 2.61 included in the low category, meaning that the respondents do not have the ambitious character in running their entrepreneurship. Even those who are successful when they try will be happy to share that success with others. Ambitious is having a strong desire to achieve something (hopes, goals); full of ambition (Big Indonesian Dictionary) and this word is absorbed from the word ambition which means *desired to achieve something.* This ambitious character will lead to negative behavior.

Furthermore, the multitasking indicator is an information technology term in English that refers to a method where much work or also known as a process is processed using the same CPU resources. Thus, the millennial generation is analogous to an operating system that is multitasking and

multiuser like most operating systems that exist today that can or can run multiple tasks and work processes at the same time. Based on the results of a descriptive analysis of 150 millennial generations of SMEs' as respondents, 54.00% said they had multitasking abilities in entrepreneurship. This is also reinforced from the results of the average score (*mean)* indicator of 4.30 included in the category of strong/ good. Thus it can be interpreted that millennial generation SME respondents in Banjarmasin City have a stable multitasking ability/good in entrepreneurship.

Multitasking generally consists of several jobs / tasks in carrying out their duties consciously shifting tasks from one task to another and or doing more work than one with a convergence of task shifts that occurs in a short time (Oswald, 2018). Millennial generation SMEs' entrepreneurs in the Banjarmasin city besides carrying out their entrepreneurial work while also studying in various influential universities. This means they run a business at home through an online business without leaving their primary duties.

Further, the indicator of independence is a character and attitude of the soul that is independent and does not want to depend on other parties to meet their needs. Independent soul does not mean that it does not need another party, but a character that always tries to face and solve its problems. Respondent of millennial generation SMEs' in Banjarmasin City, 46.00% have an independent character or character. This is also reinforced from the results of the average score (mean) indicator of 4.29 included in the category of strong/good. Thus it can be interpreted that millennial generation SMEs' respondents have a good independence character in running their business.

Then, the indicator close to technology, 52,67% respondent is the generation who are literate with technology. This generation is in direct contact with information technology, the internet and smartphone. The typology of the younger generation in using the internet Monggilo (2016) confirms as information, communication and socialization, entertainment, and recreation as well as self-expression. The development of telecommunications and information makes it easier for the millennial generation of SMEs' to be able to reach the world more closely and quickly obtain information that can be utilized for business activities.
Descriptive analysis results of millennial generation cultural value variables that are measured from six dimensions / indices that are reflected into various items of questions in this study, namely: technology as a lifestyle (lifestyle): 46.67% of respondents make technology as a lifestyle (lifestyle) with score of an average indicator of 3.79 included in the category of strong/good.

Based on the result, this analysis showed that the values of the culture that developed in the life of the respondent as technology a lifestyle. They cannot be separated from technology, especially those who come into contact with the internet. All activities that they do every day are always in contact with equipment especially with robust technology such as computers (laptops), mobile phones, and gadgets.

Human relationships 54.67% of respondents said that they were more open to various information accesses with an average score of 3.91 indicators included in the category of strong/good. The view of human relations as reflected in the form of openness to various information accesses that are cross-border, and open to diversity, they are very open to various information and diversity including views on the economy and politics. They do not care about privacy and are willing to share intimate details about themselves with strangers.

Likewise with the indicators of the nature of life values 54.33% of respondents are always confident, optimistic, confident, wanting a concise and instantaneous with an average score of 3.83 indicators ; Perspective to the values of the essence of life, always confident, optimistic, straightforward, and everything is almost instantaneous on SMEs generation of millennial is a necessity.

Indicator values of the nature of work 56,67% of respondents stated that the achievement is something that must be achieved to score an average value of 4.30 is included in the category

of strong/good.

Perspective to virtually work or work that is reflected in the look of achievement on millennial generation is something that must be achieved, working and learning more interactive through teamwork, collaboration and groupthink, independent and structured in the use of technology, communication gadgets, in internet access prefers visual or picture clues.

Meanwhile, for human relationships with 50.00% respondent states that they are trying to develop networks to connect and collaborate with an average score of 3.83 included in the category of strong/good. Perspective human relation with space and time are reflected in trying to develop a network that enables connection to each other to connect and collaborate of respondent in communication is the Network Development, which is developing a network that enables this generation to connect to each another for connection and collaboration.

Whereas for indicators of human relations with nature, 50.67% of respondents said they must master technology and knowledge for the preservation of humanity and nature with an average score of 3.98 in the stable/ good category. The view of human relations with nature is reflected in the necessity of mastering technology and knowledge to be used in the management and preservation of human and natural surroundings. Humans must master technology and science to be used in the use, management, sustainability as well as for harmony, harmony and mastery of nature for the benefit of humanity and the natural surroundings.

Based on the data illustrated in the result study of the six indicators that reflect entrepreneurial characteristics, namely: the courage to take risks. From the graph above illustrates that 70.67% of millennial generation SME respondents have the courage to take risks. This is reinforced from the results of the average score (mean) indicator of 4.07 included in the category of strong/good, meaning that respondents dare to take risks when they run an entrepreneur. They will not be able to avoid the possibility of risks and various obstacles. They can see and assess business challenges and opportunities, and try to gather the resources needed to take the right action to achieve success. The millennial generation of SMEs when running their business has understood the risks they face in the form of losses or failures as a result of external environmental factors and internal business factors.

Conversely, people who lack confidence can find it challenging to be successful. Millennial generation of SMEs in Banjarmasin City, 60.00% have a sense of confidence in entrepreneurship. This is also reinforced from the results of the average score (mean) indicator of 4.21 included in the category of strong / good. Thus it can be interpreted that the respondent has a sense of confidence that strong/good, which can be used as the basis for success in entrepreneurship.

Indicative of the soul of leadership, 63.33% have a leadership spirit in entrepreneurship. This is also reinforced from the results of the average score (*mean)* indicator of 3.83 included in the category of strong/good. Thus it can be interpreted that the respondent has a strong leadership spirit/good, things indeed also become the basis for success in entrepreneurship.

Otherwise, the millennial generation orthodox indicators, only 48.00% have equity in entrepreneurship. This is also reinforced from the results of the average score (*mean)* index factor of 3.59 included in the medium category . Thus it can be interpreted that the respondent SMEs millennial generation has a character originality who in carrying out its business activities.

Then, concerning an indicator task oriented and the results are reflected in the form of need for achievement, profit-oriented, have the perseverance and fortitude, have a strong determination, hardworking, energetic and have initiative, based on the analysis the majority or 65.33% in carrying out their business activities were oriented to the tasks and results.

This is also reinforced from the results of the average score (*mean)* indicator of 4.19 included in the category of strong/good. Thus it can be interpreted that millennial generation SMEs respondents in

Banjarmasin City in running their business have a character-oriented towards tasks and strong/excellent results.

Regarding future-oriented indicators, which are reflected in the form of perception and have a future-oriented perspective/mindset, millennial generation of SMEs in Banjarmasin City are mostly or 68.67% in conducting future-oriented business activities. This is also reinforced from the results of the average score (*mean)* indicator of 4.24 included in the category of strong/good. Thus it can be interpreted that millennial generation in carrying out their business have a strong or proper orientation to the future.

Based on the data illustrated in the resulting study that the indicators try to start a business that is reflected in the form of question items that are starting a new business now on its own and trying to start a new business at this time with others, millennial generation SME entrepreneurs is only 42.33 %, but most of them lack interest in trying to do business activities. This is reinforced from the results of the average score *(mean)* indicator of 2.79 included in the category of strong enough / good enough, meaning that the level of interest in entrepreneurial behavior of millennial is only strong enough , this can be understood because to be an SME entrepreneur not become their first choice, because their mindset is still hoping to become a civil servant.

Based on the results of the descriptive analysis as many as 151 respondent were mostly or 46.22%, while most of them were quite involved in every step towards venture creation. This is also reinforced from the results of the average score (*mean)* indicator of 3.51 included in the category of strong enough/good enough. Thus it can be interpreted that millennial generation only has a strong enough/good enough interest in entrepreneurship.

Table 1 : MODEL DESCRIPTION RATINGS WITH DATA

GOF CRITERIA	VALUE	INTERPRETATION
The chi-square ratio with df	1,203	Results are less than 5 and more than 1
Probability value	0,235	More than 0.05
Root mean square error of approximation (RMSEA)	0,091	The value between 0.8-1.0 so that the model is quite reasonable category and not in the category of rejection
Goodness of fix index (GFI)	0,796	value is close to 1 and falls from the number 0 remains <0.90
Incremental Fit Index IFI	0,804	The value 1 and away from the number 0, and more than 0.90 means the fit model.
Comparative fit index (CFI)	1,00	9 means this model is Fit.

According to Table 1, based on the probability value of model 0,235 ≥ 0.05 and goodness of fix index (GFI) 0,796 and then the comparative fit index (CFI) that mean is the model is fit. This study results can be found as follows: The significance test is done by comparing the value of r arithmetic with r table degree of freedom (df) n-k in this case n is the number of samples and k is the construct. In this case df can be calculated 275-72 or df. 203 with alpha 0.05 obtained r table 0.135. If the count r (for each item can be seen in the Corrected Item-Total Correlation column) is more than the r table and the positive value, and if in this table is all larger, then all questions are valid (Hair, 2010).

This research consists of 4 individual variable characteristic, culture value, entrepreneurial characteristic, and entrepreneurial behavior in South Kalimantan. Furthermore, it will be explained in the table of hypothesis test results such as table 2.

Table 2: RESULT OF SOCIAL INDIVIDUAL MATCHING TEST

	Influence		Estimate	S.E.	P	Mark
Y	<---	X1	.218	.184	.235	significant
Y	<---	X2	.357	.095	.010	significant
Y	<---	X3	.487	.162	.023	significant
X1.5	<---	X1	1.000			
X1.4	<---	X1	2.565	.698	.022	significant
X1.3	<---	X1	2.296	.632	.020	significant
X1.2	<---	X1	1.879	.526	‘008	significant
X1.1	<---	X1	-.045	.313	.885	significant
X2.6	<---	X2	1.000			
X2.5	<---	X2	.852	.086	.061	significant
X2.4	<---	X2	.400	.077	.210	significant
X2.3	<---	X2	.813	.092	.541	significant
X2.2	<---	X2	.940	.077	.102	significant
X2.1	<---	X2	1.071	.088	.241	significant
X3.6	<---	X3	1.000			
X3.5	<---	X3	.357	.241	.139	significant
X3.4	<---	X3	1.076	.200	.101	significant
X3.3	<---	X3	1.438	.183	.421	significant
X3.2	<---	X3	1.311	.163	.061	significant
X3.1	<---	X3	1.514	.201	.239	significant

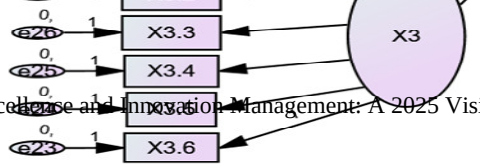

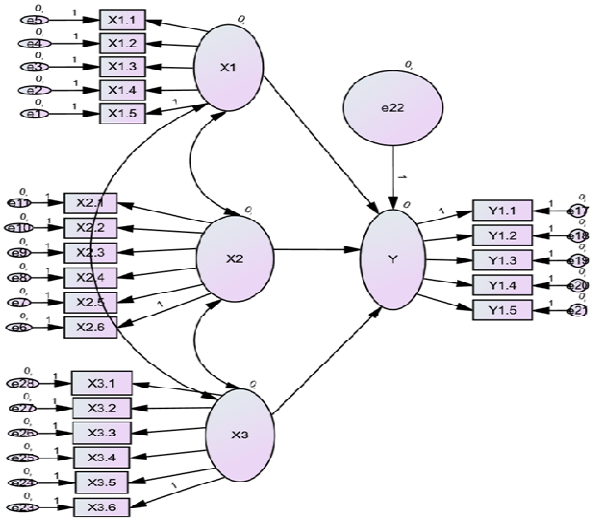

Figure 1: Research Model Analysis

Based on the results of the structural equation test, it can be seen full variables individual characteristics, culture values and entrepreneurial characteristics significantly influence entrepreneurial behaviors.

Regression analysis to draw lines showing the direction of influence between variables, and used to make predictions. This analysis is used to examine the effect between two or more variables, especially to see the pattern of influence whose model is not yet fully known. To see the effect of millennial generation characteristics, millennial generation cultural values and entrepreneurial characteristics on entrepreneurial behavior together using the F test.

Based on the F test, simultaneous testing of millennial generation characteristics variables, millennial generation cultural values and entrepreneurial characteristics on entrepreneurial behavior variables.

As stated by Rajiani (2010) several kinds of individual characteristics influence the world of one's work and company.

Furthermore, the success or failure of a businessman in carrying out his business activities cannot be separated from the cultural values that grow and develop in society. As confirmed by Molenaar (2002) that culture can have a powerful influence on individuals and performance. The same thing was conveyed by Kotter and Heskett (1992) that culture is a force that has a full influence on an individual and his performance even in the individual's work environment. Culture is the difference or similarity of values held in each society that arises from the social environment that originates in its history, life experiences, and belief systems. Culture is as mind software that regulates how to think, act and perceive envy (Hofstede, 2001).

This result confirms a meta-analysis shows that the *Theory of Planned Behavior* accounts for 27% and 39% of the variance in behavior and intention, respectively (Armitage & Conner, 2001).
This theory has been applied to the context of entrepreneurship because engaging in entrepreneurship is behavior that is under the control of the will. Various studies have used the theory to explain the intention to become an entrepreneur (Krueger et al., 2000; Liñan & Chen, 2009) and entrepreneurial behavior. (Kautonen, van Gelderen, & Tornikoski, 2013), as well as the

effects of entrepreneurship education (Athayde, 2009; Ferreira, Raposo, Rodrigues, Dinis, & Paco, 2012; Mwasalwiba, 2010; Rico & Bernardi, 2009). A meta-analysis evaluating *Theory of Planned Behavior* in the context of entrepreneurship reported that attitudes, subjective norms, and perceived behavioral control accounted for 39% of the variance in entrepreneurial intentions (Schlaegel & Koenig, 2011).

Conclusion

The millennial generation of SMEs' in Banjarmasin City have strong/excellent individual characteristics, measured from six dimensions/indicators that are reflected in the form of multitasking, independence and close to technology, while ambitious indicator has low values, meaning that millennial generation SMEs respondents do not have the ambitious character in running his entrepreneurship. Even those who are successful when trying will be happy to share that success with others.

Likewise, the cultural values at millennial generation SMEs in Banjarmasin City are reflected into six dimensions/indicators, namely: technology as a lifestyle, human relations with others, the values of the nature of life, the values of the nature of work/significant works and the relationship between humans and howl of time and human relations with nature are categorized as strong/useful.

Furthermore, the entrepreneurial characteristics of the millennial generation SMEs' have strong/ethical values which are reflected in six dimensions/ indicators, namely: courage to take risks; confidence; leadership spirit; originality; task oriented and results oriented.

Whereas the entrepreneurial behavior at millennial generations on SMEs has a value only strong enough/good enough that is reflected in two dimensions/indicators: trying to start a business, and being involved in every step towards venture creation. The result has shown that individual characteristics significantly influence entrepreneurial behaviors. Likewise, cultural values and entrepreneurial characteristics also have a significant effect on entrepreneurial behaviors.

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GDP per Capita Convergence in European Monetary Union

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Abstract

For a state to join the Eurozone, its economy must tend to synchronize with the economies of the Member States. The main question that arises is whether, after accession to the European Monetary Union, Member States' economies tend to converge or not. In the present paper we set out to analyze the convergence of GDP per capita within the Eurozone, to see if this indicator of real convergence tends towards convergence or not. In the analysis we use the Sigma convergence test to measure the degree of convergence. According to the results, we can observe the differences in GDP per capita level within the European Monetary Union.

Keywords: GDP, Eurozone, convergence, EMU

Introduction

Real convergence requires reducing the structural differences that have repercussions on the competition and the competitiveness of these economies. These criteria complement the criteria set out in the Maastricht Treaty. They are not imposed as a mandatory condition for accession to the euro area, but it is desirable that they are respected. Especially, since through them you can see the real state of the national economy. Real convergence aims at economic development, so that the states that wish to accede reach the economic level of the Member States. At the same time, the amplitude of the economic cycles of the Member States is also being monitored, because the major growth differences between them can lead to major discrepancies and to imbalances within the union. Real convergence touches on other indicators as well, especially macroeconomic ones: the price level, the GDP, the investments, the unemployment level, the interest rate, the wage level, but also the competition.

Bojețeanu and Manu (2011, p.31) mentioned that the theory of optimal monetary areas expresses the idea that as long as the economic cycle of a member country of a monetary union is not synchronized with that of the partner states, when the autonomy of the monetary policy is renounced, negative economic effects can be created. Therefore, one of the primary conditions for joining a monetary union is the synchronization of business cycles between member countries (Mongelli, 2002, pp. 31-33). If we do not find a synchronization of economic cycles within a monetary union, there is a risk that the common monetary policy will have different effects at the level of the member countries (Artis, 2003, pp. 10-12). Under these conditions, the possibility of conflicts between the members of the monetary union increases, when developing the common monetary policy, as each member wishes to be benefited as much as possible when implementing the act.

In this paper we stop with the study on the most representative indicator of real convergence: GDP per capita. This indicator reveals the degree of development of a state. At the same time, by analyzing it, we can identify the discrepancies that may arise between the economies of the Eurozone member states.

Methodology

In the study of real convergence we will use the sigma convergence test (Barro & Sala-i-Martin, 1995). The Sala-i-Martin is the one that used for the first time this indicator to test the degree of convergence between different economies (Mihuț, 2013, p. 29). He defined this concept as follows: "a group of countries converges in the sense of Sigma convergence if the dispersion in terms of GDP per capita decreases over time" (Sala-i-Martin, 1995). In other words, the convergence σ is revealed by the temporal dependence of the standard deviation or the coefficient of variation of GDP per capita within a group of countries (Dvorokova, 2014, p. 315) (Oprițescu, 2017, p. 138).

$$\sigma = \sqrt{\frac{1}{n}\sum_{1=1}^{m}\left[\log\left(\frac{y_i}{y^*}\right)\right]^2}$$

y_i represents the indicator analyzed at time i
y^* represents the indicator analyzed at time 0

However, the most common indicator used in calculating the coefficient of variation is:

$$Cv_T = \frac{\sigma_T}{\overline{X_T}}$$

Cv_T represents the coefficient of variation between period T
σ_T is the square value of the degree of regional development in the T period and is calculated as follows:

$$\sigma_T = \sqrt{\frac{1}{n}\sum_{i=1}^{n}\left(X_{i,T} - \overline{X_T}\right)^2}$$

$\overline{x_T}$ represents the average level of development during the period T.

GDP per capita convergence within the European Monetary Union

In a first analysis we used the GDP per capita from the countries of the European Monetary Union, from 1999-2018. We must mention that we adjusted the average value of GDP per capita, but also the standard error, following each new accession to the euro area. Following the application of the sigma convergence formula, we obtained the following variation of GDP per capita convergence within the European Monetary Union:

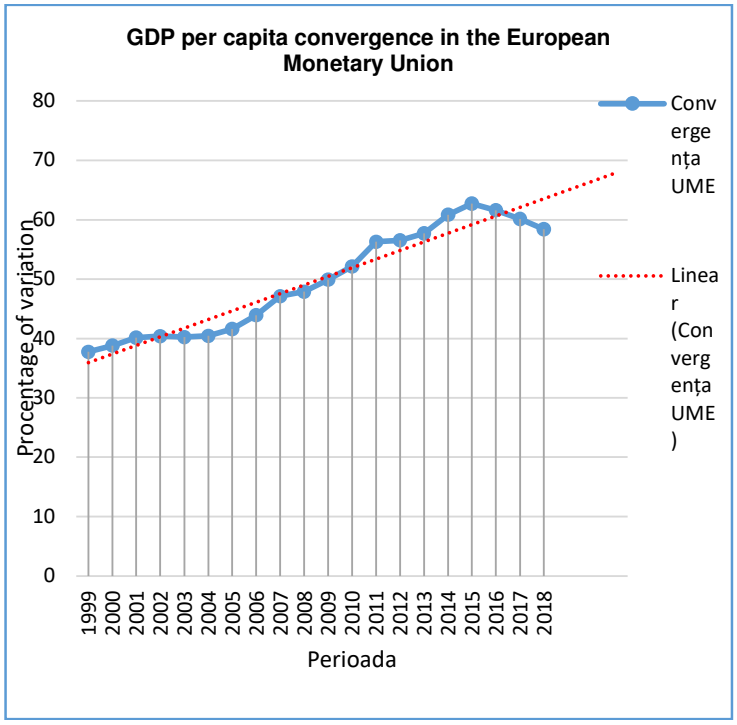

Figure 1: GDP per capita convergence in the European Monetary Union (%), between 1999-2018

Source: own processing according to Eurostat

To say that an indicator tends toward convergence, the sigma convergence indicator must tend towards 0. The closer the value is to 0, the more that indicator tends towards divergence. As we can see from the figure no. 1, the GDP per capita of the European Monetary Union is much greater than 0. From this we can deduce that this specific indicator of real convergence does not tend towards convergence within the union, but on the contrary, the trend is one of divergence. Since the establishment of the euro area and until 2010, the GDP per capita variation has remained below 50%. After this year, the variation exceeded the value of 50%, the maximum was reached in 2015, when the variation was 62.71%. This increase in the GDP per capita gap between states leads us to the idea that the level of development between the euro area states is different. Precisely for this reason, in the periods in which new states joined, from central or eastern Europe, the GDP per capita variation increased. To support this assertion comes the period between 2015 and 2018. In 2015, Lithuania became the last state to join the euro area. After this year we can see how the convergence variation decreases. However, the trend is one of increasing GDP per capita variation.

The main problem identified in this context is: how influence this increase in the discrepancy between the level of GDP per capita in the member countries of the European Monetary Union? It is rushed to draw some conclusions from the analysis of a single economic indicator, but nevertheless, if we put in the political and economic context of the European Monetary Union, we can outline certain directions induced by the evolution of GDP per capita. Instead of striving for perfect convergence, between the Member States, the trend is one of divergence. This evolution reveals first of all a discrepancy in the implementation of the various economic measures in the Member States. The main shortcoming in the European Monetary Union is the lack of a common fiscal policy. Even if the European Central Bank plays the role of a national central bank of the whole union, all fiscal measures are adopted by the political authority of each Member State. When the national policy intervenes, the interests of the union pass secondary.

The rate of change of GDP per capita of Member States

As we have seen, GDP per capita within the European Monetary Union, tends towards divergence. For a better observation, we have also chosen to analyze the rate of change of GDP per capita of each Member State in relation to the average of the European Monetary Union. Through this analysis, we aim to see which states are experiencing the greatest difficulties in the process of synchronizing this indicator with the union average.

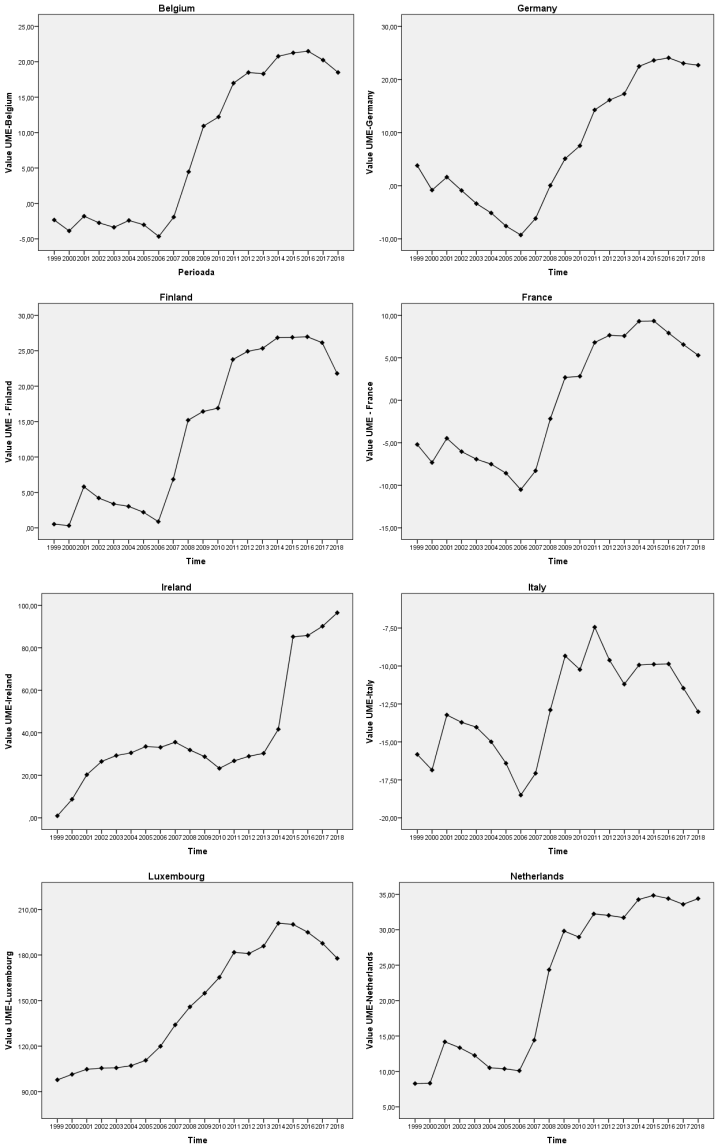

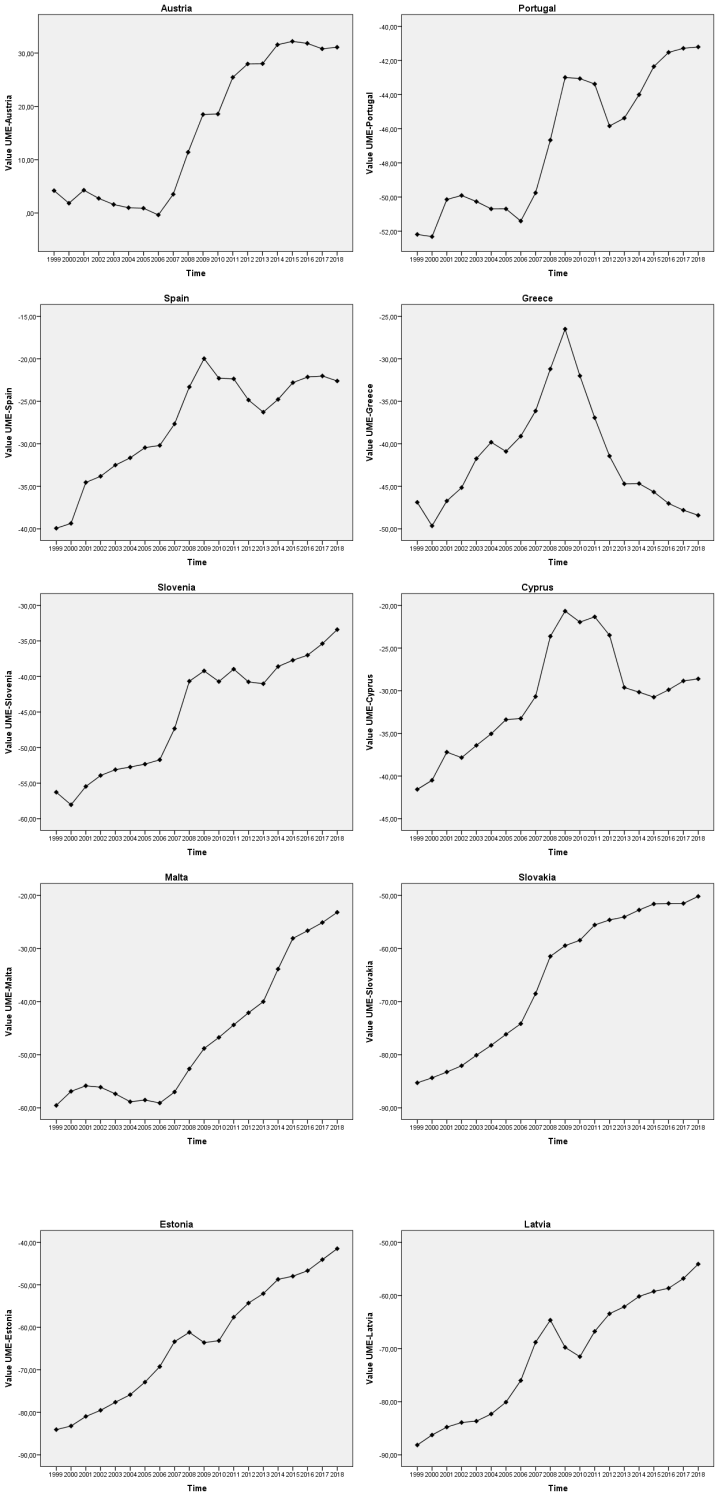
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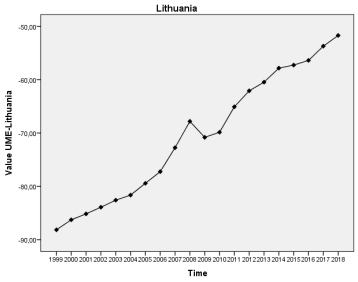

Figure 2: The rate of change of GDP per capita between the Member States and the average of the European Monetary Union (%), between 1997-2018

Source: own processing according to Eurostat data

From Figure no. 2, we can draw several conclusions regarding the convergence of GDP per capita within the European Monetary Union.

First of all, we notice the following group of states: Belgium, Germany, Finland, France, Netherlands and Austria. These states have managed to keep the GDP per capita variation rate below 30%, with the exception of the Netherlands which is slightly above this ceiling. It should be noted that all these states are founders of the euro area. The rate of change in these six states followed the same trend. We can see how at the time of the establishment of the European Monetary Union, the rate of change was low, and by 2007 it was possible to observe a tendency to decrease it, in some states the rate of change became even negative. Which meant that the GDP per capita of those states was lower than the union average. After 2007 we can see a steep trend of increasing the rate of change of GDP per capita. This trend is maintained until 2016, when the rate of change begins to fall, except for the Netherlands, where there is an upward trend.

Another category of states is Ireland and Luxembourg. In both countries, the rate of change from the average of the European Monetary Union is very high. Ireland started in 1999 with a variation rate of about 0% and reached a variation rate of about 100% in 2018. Between 2014-2015 we can see the steepest increase in the rate of change of GDP per capita in Ireland. In the case of Luxembourg, by 2014, the rate of change of GDP per capita against the euro area average has increased to a value of 200%. After this period, the rate of change has a slight downward trend. The two states have the highest GDP per capita, which is also due to the high variation rate.

On the other hand we have: Portugal, Spain, Slovenia, Cyprus, Malta Slovakia, Estonia, Latvia and Lithuania. All these states have a negative rate of change of GDP per capita compared to the European Monetary Union average. Which means that GDP per capita in these states is lower than the euro area average. What we notice is that even though these states have a negative rate of variation, this is on an upward trend that tends towards 0. This fact indicates that the GDP per capita of these states tends towards convergence. In the period 2009-2013, in the case of Spain and 2009-2015 in the case of Cyprus, the rate of change went away from 0, thus abandoning for a short period of time the convergence trend.

The last category includes the states with a negative variation rate, but which still tends to move away from 0. Here we find Italy and Greece. In the case of Italy, from 2012 it can be observed how the rate of change moves away from 0, reaching in 2018 a value of -13%. Greece is a special case. Since 2009 it has seen a trend of removing the rate variation from the value 0, but compared to Italy, the decrease is much more drastic. In 2018, the rate of change of GDP per capita compared to the average of the European Monetary Union in Greece was -48.40%.

Conclusions

Following the analysis of GDP per capita convergence within the European Monetary Union, we have reached a number of conclusions:

The GDP per capita indicator tends rather to divergence within the Euro Zone. We could observe that instead of diminishing the differences between states regarding this indicator, for the most part of the analyzed period, the differences were accentuated.

There are significant differences between the rate of change of GDP per capita between different countries of the Euro Zone and the union's average. We could observe that there are four categories of states: those with a positive variation, but which tends towards 0; with a positive variation, but far from 0; with negative variation and tending towards; negative variation, but it goes away from 0.

Italy and Greece are the states with the biggest problems. As we could see the level of GDP per capita is below the Eurozone average and at the same time, it tends to go even further.

We can say that there are major development gaps between the Member States of the European Monetary Union, in terms of GDP per capita.

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Modern Information Technologies How Means of HR Activity

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Abstract

The article is devoted to modern information technologies as a means of successful implementation of HR-activities. In the period of an active state and social policy in the field of dissemination and popularization of the principles of digitalization in the world as a whole, and in Russia in particular, the use of the potential of information technologies in personnel management becomes especially important. The Internet, various specialized mobile sites, applications and programs for selecting and evaluating personnel in terms of hiring, supporting and adapting personnel at the enterprise during the period of employment have a significant impact. The analysis is carried out and the strengths and weaknesses of using modern information technologies as a means of HR-activity are revealed. The materials of the article touch upon urgent issues of the shortage of modern scarce professions, the problems of finding workers, as well as the role of modern IT technologies in the implementation of the function of providing the organization with personnel. The importance of information technologies in the implementation of the work of an HR specialist is emphasized. In particular, the use of modern sites for recruiters, staff appraisals and developed mobile applications and programs based on them.

Keywords: HR-Activity, Information Technology, Digitalization, Mobile Application

Introduction

In modern conditions, the problem of digital updating of the tools of professional activity of an HR specialist is caused by the processes of digitalization, informatization and the growth of automation of the modern Russian economy. Personnel management specialists who are actively introducing new digital technologies into their practice in the segment of personnel selection, adaptation, assessment, and development are no exception. According to McKinsey Global Institute estimates, in 15 years, up to 50% of all work processes will be fully automated. Based on such a forecast, it is logical to assume the mass dismissal of workers, job cuts, as well as a strong degree of differentiation in wage levels. The stratification of the labor market that will follow the expansion of information technology will lead to a situation where jobs of the “middle” level will be actively replaced by low-paying and high-paying, depending on the level of application of digital technologies. One of the likely consequences of the global digitalization of the economy will be the stratification of the population by income level, increase, unemployment rate, especially in single-industry towns and for people with limited health and labor [6]. These negative phenomena are almost inevitable, but there are also positive aspects to this global process. So, the introduction of information technology in all areas of the economy entails and the emergence of new professions and jobs that did not previously exist, for example, a tutor, Big Data administrator, Big Data analyst. As a result, a real situation related to personnel shortages may soon appear in today's relevant professions. That is, if there is the possibility and desire for retraining, every liberated specialist as a result has a chance to take a high-paying position related to the use of digital technologies [4]. In fact, this situation is beneficial for employees and disadvantageous for employers. At present, objective difficulties are observed in the training of such workers. There is, on the one hand, a certain deficit of scientific and pedagogical personnel, specialists of the training

departments of a practical but not theoretical orientation, in particular for practical specialties. On the other hand, first of all such a shortage of personnel is caused by insufficient motivation of employees to master their competencies in the context of the digitalization of the economy, as well as the frequent resistance of older people to changes in the implementation of software products.

In any case, information technology is being actively introduced into the practice of specialists of all levels, one of the latest "new products" in the field of personnel management, in particular, are mobile applications, sites and programs. They take into account many of the needs of the organization - the selection, assessment and development of personnel, including mobile applications, sites and programs can just be used as a platform for searching for specialists in “scarce” professions, when other methods of selection are already exhausted [5].

Materials and Methods (Model)

The main theoretical sources were the works devoted to the problems of personnel development management in the digital economy (Belonogova E.I., 2018). Digitalization and its impact on the Russian economy and society: advantages, challenges, threats and risks (Khalin V.G., Chernova, G.V., 2018).Innovative forms of organizing work on managing human resources of an organization (Shekurova, M.M., Latypov, Z.Ya., 2018). Current status and prospects for the development of cloud technologies in Russia (Sobolev A. Yu., 2017). Cloud-based human capital management systems (K. Noskova) and cloud technologies in the personnel management system (D.K. Zakharov, 2018). The use of digital technologies in the selection and assessment of personnel (Rytova E.V., Lukashina A.S., 2018), digitalization of personnel management as part of the organizational culture of the enterprise (Gasparovich E.O., Uskova E.V., 2019). Gender trajectories of professional and personal development as a condition of effective management in a digital economy (Gasparovich E.O., Tokareva Y., Tokarev A., 2017). The use of modern information technologies as a means of optimizing the educational process in the training of personnel management specialists (Uskova E.V., Gasparovich E.O., 2019).

The aim of the study was the study of modern information technology as a means of successful implementation of HR-activities. Research objectives: analysis of modern information technology as a means of HR-activity; the definition of the role of modern IT-technologies in the implementation of the function of providing personnel for the organization; identification of the importance of information technology in the implementation of the work of an HR specialist. in particular, the use of modern sites for recruiters, staff evaluations and developed mobile applications and programs based on them.

The study was conducted in three directions and allowed to consider: programs, sites and mobile applications as a means of HR-activity.

Programs as a means of HR-activity

Programs along with applications and sites become an important part of the HR specialist toolkit. We single out the most demanded of them in the Russian digital market, identifying the practical benefits of using the HR manager in the activities: E-Staff Recruiter, Experium, Recruiter, Resumax, Staffery 2009, “Oracle Taleo Cloud Service”, “Microsoft Dynamic CRM Recruitment Agency”, “1C: Enterprise 8. Recruitment Agency”, “Molga (SAP)”.

Program "E-Staff Recruiter". One of the oldest and most popular digital software products. It can be used as a comprehensive program for an HR department employee, and as a universal tool for large recruitment agencies. The Internet module imitates human actions, saving time and effort in filling out forms and processing the results generated by sites. Options include automatic publication of vacancies on job search sites (there are more than 40 in the main list) and collecting feedback from job seekers. The program keeps records of clients, vacancies and applications [9]. There is a function of sending resumes and messages according to customized templates, a fairly convenient search for

resumes according to specified criteria. For management, statistics on the work of the re-crusher campaign and on employee employment are kept. Of course, there is a function to import resumes of candidates from mail services and Word or OpenOffice documents and integration with other systems (Boss-Kadrovik, 1C, SAP, WebSoft, WebTutor).

What is the use of the E-Staff Recruiter program: automatic posting of vacancies, search for resumes on professional portals.

The program "Experium". The program is convenient to use, it takes into account all the features of the work of HR-specialists. Service capabilities allow you to publish and analyze vacancies on popular sites, collect feedback directly from the program, create and maintain a database of not only candidates, but also the company's own specialists [9]. It is used in two versions: as a program for recruiting, and as a complete program for managing internal resources. In the program, you can store data on the organizational structure, company employees, work with arrays of documents in text and graphic formats, generate reports by any parameters. The Experium diary is synced with Outlook, Mozilla, or Google Calendar.

What is the use of the Experium program: a full cycle of recruiting projects.

The program "Recruiter". It was created to work with a large number of vacancies and customers. The developers clearly saved on the design, so the program is not able to amaze the imagination. At the same time, it is quite useful in working with vacancies and job seekers. “Recruiter” allows you to keep a record of all information about candidates, employers, interviews and tests, payments and contracts, recommendations and letters. The “usefulness” of the program should include: organizing competitive selection, rating candidates and employees, automating business correspondence, the ability to integrate with a website, simplifying control over contracts and payments, and a convenient database for monitoring [10].

What is the use of the Recruiter program: it is designed to work with a large number of vacancies and customers.

The program "Resumax". At first glance, this program barely overshot the artisanal level of development. In fact, software can pleasantly surprise you with its obvious simplicity and functionality. It provides for the creation on the company’s website of a section that is able to automatically post vacancies, accept questionnaires from applicants and conduct preliminary testing. Basic options: notification of new candidates, new applications or interviews. Automatic response by e-mail, a perfectly sane search for data according to specified criteria and keywords. The main advantage is the cloud service, where there is no binding to specific machines: work from home, on the road, from another office. You can also note the multilingual interface, support for HR-XML, the ability to configure at several system levels, when each user has individual access to the functions that are provided to him [7].

What is the use of the Resumax program: an online service for HR managers and job seekers.

The program "Staffery 2009". The program greatly simplifies the work of the company's HR specialists. In addition to storing personal data, it facilitates the quick search for employees by manually selected criteria. It also allows employees to make changes to their personal card or resume themselves. The application is certified by Microsoft during the testing of affiliate products.

What is the use of Staffery 2009: designed to manage data and track information about education, professional experience and skills of employees.

Oracle Taleo Cloud Service Program. The program is able to accumulate all information about employees throughout their labor biography, convenient navigation through the personnel potential of the company. Based on the data collected, the program allows you to predict the possible needs of specialists in various industries (although the forecast is approximate). This is Oracle, so the

interactive structure of the application is intended for companies of the widest scale and from any industry. Taleo is one of the world leaders in the number of users [11].

What is the use of the Oracle Taleo Cloud Service program: one of the most comprehensive, advanced and latest cloud programs in the HR sphere.

Program "Microsoft Dynamic CRM Recruitment Agency." As with any products of this reverently beloved by advanced users of the developer, everything is simple, reliable and even beautiful. The solution of typical industry tasks in the field of recruiting: recruiting employees, automating the interaction of employers and job seekers, monitoring deadlines for executing contracts, monitoring orders of company executives, and others. The obvious advantages include maintaining a common database regarding applications, contracts, vacancies, the use of automated selection of applicants and candidates for specific parameters. For HR managers, automation of their daily work, convenient navigation, quick access to information about the availability of vacancies, monitoring of task performance, etc., is set up [9].

What is the use of the Microsoft Dynamic CRM Recruitment Agency program:
this is the use of capabilities, potential, tools of Microsoft.

The program "1C: Enterprise 8. Employment Agency." The main function of the program is the automation of everyday work in recruiting and personnel agencies. The processes of assessing professional knowledge, skills, individual qualities of candidates are simplified as much as possible. When developing software, the task was to facilitate the business processes of recruiting agencies and personnel services, to automate the relationship between customers and the company. Among the strengths include maintaining a common information base of candidates for vacancies, automatic comparison of the requirements of employers and the capabilities of applicants. The target audience - HR managers - software offers convenient information processing, increasing efficiency in managing work and reducing the likelihood of errors when working with clients [10].

What is the use of the 1C: Enterprise 8. Recruitment Agency program:
this is the use of capabilities, potential, tools "1C".

The program "Molga (SAP)". For all corporate SAP users, it's clear without description how the next program of this global system looks. For the uninitiated, any description is unnecessary, in addition, small and medium-sized businesses will still refuse to buy the solutions of this company because of an unbearable budget. The application, in addition to the search and selection of employees, includes the development of an optimal model of personnel management, unification of payroll processes, accounting for an enterprise strategy regarding HR issues and much more [1].

What is the use of the Molga (SAP) program: this is the use of capabilities, potential, tools of the international company SAP AG.

Sites as a means of HR-activity

In modern conditions of economic development and personnel management, sites are emerging to help in the successful use of information technology as a means of HR-activity. It should be noted that almost all mobile applications use from 20 to 50 sites with resume databases (job.ru, rabota.ru, zarplata.ru, hh.ru, joblist.ru, rabota.mail.ru, rjb. ru, resume-bank.ru, resuminka.ru, job.ws, etc.). Most of the modern systems can adapt to: user, specialization, company scale, integrate with the "1 C" platform, which is significant for Russian companies.

Mobile applications as a means of HR-activity

Mobile apps that help HR professionals in finding potential candidates for vacancies, a sufficient number are represented in the global economy. However, in our country they are not yet very

popular, although, as world practice shows, their potential is huge. For this reason, most of these applications do not "support" the Russian language. However, as was noted, due to the high degree of potential and to some extent the inevitability of the beginning of their widespread use in Russian companies in the future, some applications that are already popular abroad in the business environment should be considered [12]. The above does not mean that such applications are not created in Russia, for example, in table 1 of the six applications considered, four are the development of Russian specialists.

Table 1: Overview of mobile applications for HR professionals

Mobile attachment	**Characteristic**	**Cost**

1. Jobvite Personnel Search Application	1. Developer: Jobvite Inc. (USA, California, Burlingame).
	
	2. Key feature: application integration into the global recruiting system.
	
	3. Application features:
	
	  integrated into social networks (LinkedIn, Twitter and Facebook), the relevance is due to the fact that many job seekers look for work through social networks, communities, friends, groups, and can easily offer vacancies to their acquaintances and friends that they saw;
	
	  allows you to send information about the vacancy in one click;
	
	  This application is especially useful for an HR specialist, since it contains the function of “tracking paths” of receiving recommendations from friends of the applicant. Such a “tracking path” helps the cadre employee to better understand the candidate and draw up an initial opinion about him.
	
	4. The main drawback for Russian users: the application is not Russified.
		500 - $ 1,500 / month

2.BeKnown staff search app	1. Developer: Monster.com (USA, New York).
	
	2. A key feature: it works as an aggregator of social networks and mail services, as a result, it turns out to be a kind of “super network” in which you can post vacancies and share company news.
	
	3. Application features:
	
	  job seekers can share job links with other users;
	
	  the gamification mechanism is used, for a large number of "business connections" the user receives "badges";
	
	obvious advantages are: scale, support for 19 languages (including Russian), while the application is free.
		Is free

3.Experium search	1. Developer: Heliosoft (Russia, Moscow).	50,000 -

application	2. Key feature: all resumes of applicants are transformed by type of card with 25 fields (in meaning). 3. Application features: □ works as a tool for staff recruitment from the beginning of the search to successful completion; □ greatly facilitated search allows you to quickly find a suitable candidate; □ integration with recruiting sites, as well as links to social networks and mass mailings; easily integrates with MS Outlook calendar and corporate website of the company; □ The obvious advantage is the function of access to the HR network - a service that enables communication between recruiters. 4. The main drawback for Russian users: very high cost.	300,000 rubles
4.Application for personnel search Staffim	1. Developer: Russian startup “Staffim” (Russia, Moscow). 2. Key feature: application integration into domestic recruiting sites. 3. Application features: □ posting vacancies on several HR portals at once, and new responses come to the smartphone with notifications; □ integrated into mail servers, i.e. you can have working correspondence with candidates; □ has its own database of applicants; □ work with QR codes to quickly find the right candidate profile; □ excludes the possibility of re-saving the questionnaire of the same candidate, which allows not to overload the database of applicants. 4. The main drawback for Russian users: the application does not have a foreign information base.	1000 - 19500 rubles / month
5.Pruffi Friends Staff Search App	1. Developer: Pruffi Friends (Russia, Moscow). 2. Key feature: ideal for scarce professions or complex vacancies (for example, the synchrophasotron collector), as well as companies doing business in a specific field (for example, art painting). 3. Application features: □ allows you to search for candidates on social networks (including Russian networks); □ the purpose of the application is to daily send out	Is free

	information about vacancies to users, which can then be reposted, sent to other users; □ gamification mechanisms are used, □ a user who recommended a friend who is suitable for the employer receives a money transfer, as a result it is a kind of free recruiting on the network. 4. The main drawback for Russian users: an inconvenient interface, the catalog contains mixed vacancies from different industries, in one list.	
6. HeadHunter employee search application	1. Developer: HeadHunter (Russia, Moscow) 2. Key feature: widely used application, covers dozens of cities in Russia, having high-quality functionality, intuitive interface. 3. Application features: □ for the user: creating auto search by keywords and categories; job seekers can leave clicks; Jobs are sorted by category; □ for the employer: personal account, all resumes are co-stored in the database; □ The advantage for applicants and employers is the wide coverage of the territory of Ukraine, Belorussia and Kazakhstan. 4. The main drawback for Russian users: □ unlike the site of the same name, it is not possible to edit the vacancy and resume online, only through access to the main page; □ focus on the applicant, the recruiter can use the application mainly to solve the problem of monitoring the level of wages in the industry, field of activity.	Is free

Summarize, the previously analyzed and listed mobile applications (except for HeadHunter) are actively starting to gain momentum in Russia.

As an addition, we note that in foreign practice there are applications that are already quite popular, and, accordingly, have a chance to take a place in the Russian market in the future. As the most promising for integration into the Russian digital economy, experts consider Worki and Huntflow (Huntflow) applications.

The Worki application allows you to find employees based on their place of residence, and in a fairly quick time. When registering, the geolocation function is used, and first of all the applicant sees those vacancies that are close to his residence. This type of search is relevant for enterprises in the field of public catering, retail chains, salons of communication, serving enterprises of household services. Such companies have vacancies with not very high earnings, which is why it is taken into account that the applicant can be attracted by the opportunity to work near the house [5]. Also, for an HR specialist, this application may turn out to be important, when it is required to recruit personnel to a

specific outlet. The registration form in this application, unlike many others, is very simple: a code is sent to the mobile phone number, after receiving it a HR specialist can immediately add a vacancy indicating the location of the company. There is also a chat function with job seekers. According to the manufacturer, you can find an employee in one day, although this, of course, will be highly dependent on the city (locality). The obvious advantage of this mobile application is its free, but there are also paid functions - for example, publishing vacancies in excess of the package, highlighting ads among others).

The Huntflow application integrates all vacancy feedback from different sites, forming a single database. A key feature is the removal of repeated resumes. The application has the function of a joint interview on the type of holding a conference online. Huntflow was mainly created as a tool for forming the personnel reserve of the company [4].

The wide range of programs, sites and mobile applications proposed for analysis allows us to talk about the relevance of these modern information technologies as a means of HR-activity.

Results and Discussion

A practical study of the use of mobile applications as a means of HR-activity was carried out in the Personnel Management Department on the basis of Sberbank PJSC in Yekaterinburg in 2019. It was decided to use the Team.si mobile application. The functionality of this application:

- application - a portal where several HR resources are combined;
- personal account of each user;
- internal social network for communication and exchange of experience and information.

The main goal and objectives for the practical study of the use of mobile applications, sites and programs as a means of HR-activities were: increasing the level of adaptation of employees; simplifying the collection of feedback and information; viewing courses for off-line training.

The results of the implementation and the effectiveness of using the Team.si mobile application in the practice of Sberbank PJSC (according to the reports of Sberbank PJSC) for the first year of operation are as follows:

- increase in the level of adaptation of employees increased by 5.6%;
- simplification of the collection of feedback and information by 10.2%;
- increase in the level of work on personnel assessment by 8.0%.

When analyzing the foreign practice of using mobile applications as a means of HR-activity, the research experience of “Bersin by Deloitte” is of interest. A note in “WhatWorks” (2016) presents the generalized results of the study “HR applications for training and personnel search for smartphones”. The study showed that 93% of the 45 human resource management (HCM) solution providers surveyed now offer HR applications and employee search features on smartphones, and many of them are initially designed specifically for mobile devices. Such applications typically use the specific functionality of smartphones. First of all, the ability to provide small information, more personalized and do it instantly. This explains why training and employee search applications are most popular on mobile platforms. 73% of surveyed developers offer mobile apps for conducting surveys related to training, quizzes and employee assessment. The study also shows that developers focus on mobile applications that make it possible to make decisions on work issues (64%), manage productivity (56%) and self-organization of employees (49%). The function of searching for employees, in particular, has become the object of increased attention.

According to a New Research Center article “Evidence on the use of mobile technology ”, 64% of all adult Americans have a smartphone, which is usually defined as a cell phone and performs many computer functions.

The study also showed that the percentage of developers offering mobile applications for managing human resources and on-demand employees differs depending on the functions performed and the areas of application. According to a survey on the practice of using mobile applications, the study showed the possibility of using mobile applications as a percentage. So, 41% of respondents say that they help harmonize performance indicators. 35% of respondents say that they allow coordinating staffing decisions on payment. 8% of respondents say that they allow you to coordinate applications for absenteeism. 27% of respondents say that they help to manage bonuses and compensations. 24% of respondents say that they help regulate requests for changes in the work schedule.

Conclusion

The results of the study show the disappointing results of a brief test of mobile applications, programs and sites that are relevant in Russia. If we turn to the experience of Western companies, then the development of mobile applications, programs from site aggregators for re-establishment there is many times higher. Abroad, unlike Russian practice, today there is a variety of mobile applications, there are products with a good study. For Russian users may be useful applications that allow you to search for workers in neighboring countries. The most popular applications in the oil and gas industry, such as: “Oil and Gas Job Search” from the portal of the same name or “UK Job Search”.

It should be noted the special importance for recruiters of mobile applications of professional and social networks. The best among such networks abroad today is the LinkedIn application. This mobile application has a convenient menu, a clear interface, and the functionality is not inferior to the usual web version of the site. Russian social networks, including VKontakte, do not have such potential for HR specialists [12].

A large line of mobile HR applications is represented by products of companies in the field of career counseling. As a rule, they are created as memos for users containing information – tips interviews, resume writing, and more. The Russian user of the application will help and refresh the current vocabulary in memory. There are several similar applications in the AppStore. In the Resume Service Plus application, you can watch video training on how to conduct a co-talk and write a resume. The Interview app contains a large number of questions in English with detailed comments on them and the ability to record your answers. You can find many short appendices-memos on writing resumes from "nameless" authors, such as "CV / Resume Lite".

Information applications, HR magazine applications or Internet portals are also useful to keep on your mobile. It’s important to have applications with the ability to read materials on the road from Russian HRM, Recruiting News and others, but, unfortunately, Russian users have so fardo not have such an opportunity. Western thematic publications often have paid subscription applications, but there are also free versions. Among them there is the HR Management application, the HR News from People Management Magazine application and the SHRM HR News application. All three applications are free and interesting enough for acquaintance. Paid applications (by subscription) are also included in Russian publications, for example, the magazine “Director for Human Resources”.

Summarizing the study, we note that the study of modern information technologies allows their use as a means of successful implementation of HR-activities. The analysis of modern information technologies as means of HR-activity allowed us to determine the significant role of modern IT-technologies in the implementation of the function of providing the organization’s personnel and emphasize the importance of information technologies in the implementation of the work of an HR specialist. in particular, the use of modern sites for recruiters, staff evaluations and developed mobile applications and programs based on them.

Thus, we can conclude that through the use of information technologies as a means of HR-activity, the possibilities of performing almost all operations through a computer, including the provision or receipt of various information and the execution of transactions, are qualitatively and quantitatively increased. However, in addition to a number of advantages, digital transformation carries certain risks. As we can see, the market for mobile applications related to the topic of job search and staff

recruitment is rather undeveloped. In Russia, unfortunately, the mobile application market is only just beginning to develop, but it has huge development potential, especially when dealing with scarce frames.

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Information Systems and Technologies in the Insurance Protection of Agricultural Sector of Economy

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Abstract

The article assesses the development of information systems and technologies in the insurance industry in general and examines their impact on the organization of insurance protection in the agricultural sector, in particular. The expediency and necessity of a widespread use of modern information technologies in the organization of insurance protection of agricultural producers has been substantiated, which is not only a global trend, but also the realities of today. According to the results of generalization of a specific set of information systems and IT technologies in the insurance protection of the agricultural sector of economy, the most common of its forms are characterized. As a consequence, the latter include: multispectral sensing using unmanned aerial vehicles; estimation of vegetation cover on the basis of satellite images; remote sensing with data display in the Geographic Information System (GIS); analysis of multispectral images of the Internet of Things; digital early warning networks; crowdsourcing; social media-based information interaction tool. The peculiarities of the use of UAV technologies and drones in the insurance protection of the agricultural sector of economy are revealed.

Keywords: Information Systems and Technologies, Unmanned Aerial Vehicles, Remote Sensing, Crowdsourcing, Social Networks, Digitization, Insurance Protection, Agricultural Sector Of Economy.

Introduction

In terems of the number of IT employees, Ukraine holds a leading position in Eastern Europe. At present, the development of this sector is surprisingly dynamic, which, to some extent, is commensurate with the development of the agricultural sector of the economy. After all, in recent years, the domestic agricultural sector creates about 9-13% of the gross value added of the country and is one of the main budget-forming sectors of the national economy. In addition, it can be viewed from the perspective of the most promising direction of structural transformation of the domestic economy. That is why, in the context of modern integration processes, the agricultural sector of economy is becoming increasingly important.

As a result, there is a reasonable combination of these two upcoming sectors: agriculture and information technologies (IT).

Modern technologies, in particular in the context of social, mobile, analytical and cloud types, based on the capture, transmission and storage of information, influence the development of the agricultural sector of economy more significantly than ever before. This information, or the use of information advantage as a strategy, will completely refocus the competitive environment in the insurance industry in general, and one of its segments - agri-insurance, in particular.

Analysis of the latest studies and publications

Various aspects of the functioning of such an important financial instrument, as agricultural insurance market, were investigated by a number of scholars and practitioners, among which Herasymenko & Zhemoida, 2009; Martsenyuk-Rozaronova, 2010; Navrotskyi, 2012; Nesterchuk et al., 2018; Pikus et al., 2018; Polchanov, 2013; Potiko, 2017; Sholoiko, 2014; Vilenchuk, 2014 and others should be pointed out.

In their works, the researchers studied the main tendencies of the Ukrainian agricultural insurance market in general and certain aspects of its development, generalized the historical aspects of its formation and start-up, studied the peculiarities of insurance legislation, as well as the specifics of the investigated market structure.

At the same time, at present the problem of implementation of information technologies and systems in the insurance industry have not been properly researched in the publications of Ukrainian scientists. Only a small number of scholars are engaged in research on this subject, including Hudz, 2016; Erastov, 2015, 2017.

The considerable attention to the use of information systems and technologies in the insurance protection of agricultural entrepreneurship was paid by foreign researchers: Byerlee, de Janvry & Sadoulet (2009), as well as international companies related and specialized in IT technologies, insurance activities and consulting services in the agricultural sphere: Allianz Re Suisse, BoughtByMany, Accenture Digital, Cognizant Insurance Business Unit, InsureMyFriend, Gartner Inc., Swiss Re.

Research Methods

For the scientific solution of the goal, the general scientific methods of scientific cognition and study of economic phenomena were used, the dialectical method of cognition, in particular - for the analysis of scientific practices of domestic and foreign scientists on the influence of modern information technologies and systems on the system of insurance protection in the agricultural sector of economy; the method of empirical research - as part of the assessment of the current state and development of the study object; analytical - to outline a combination of factors for the development of modern IT technologies and determine their impact on the development of insurance services in the agricultural enterprise; comparative analysis - to compare and study the current development state of information technologies and systems in the insurance protection of the agricultural sector of economy, as well as to study the trends and patterns of other indicators and criteria development, which was carried out in the article; graphic method – to integrate and visually display the processed material; abstract-logical approach - to summarize the study results and draw the conclusions on this basis.

Aims

The article is to evaluate the development of information systems and technologies in the insurance industry in general and to investigate the peculiarites of their impact on the organization of insurance protection in the agricultural sector, in particular.

Results

The increase in the intensity of crops cultivation causes the need to obtain information on the state of environment.

Remote methods, including in the context of satellite imagery, onboard photos, unmanned aerial vehicles (UAVs)/drones and ground spectral measurements can significantly simplify the monitoring of crops and decision-making to optimize the payment of claims under the loss of agricultural producers (Fig. 1).

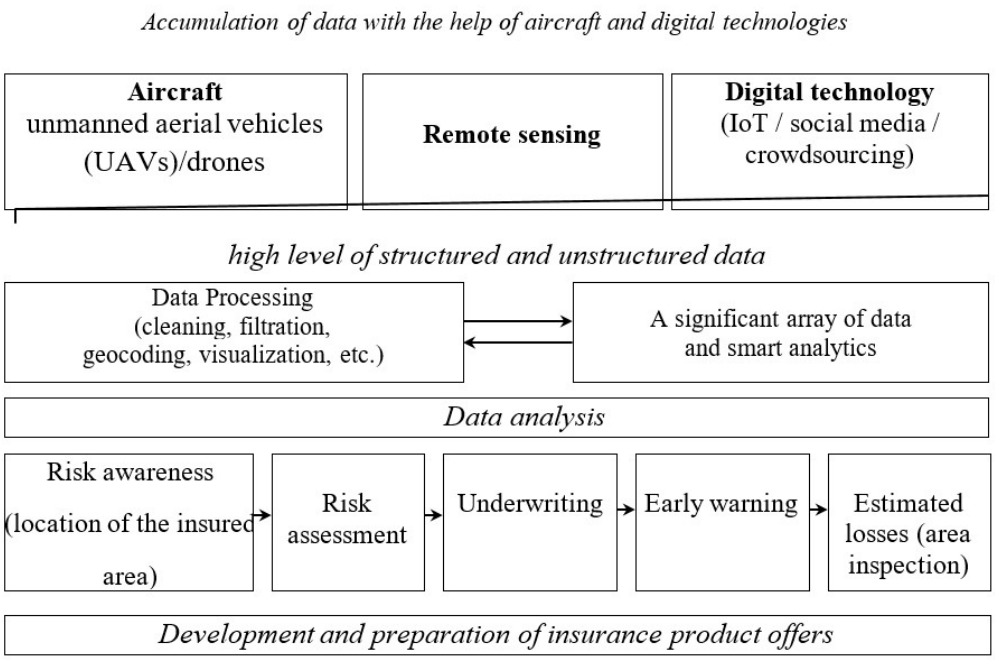

Fig. 1: Modern information technologies and systems in insurance protection of the agricultural sector of economy

UAVs are characterized by the advantages of being small in size, relatively inexpensive, and allow accurately and effectively survey and video significant areas. These technologies simplify and update the process of performing the loss assessment.

The use of drones can be considered in the agricultural insurance as an auxiliary tool for crop monitoring and risk management in agriculture (Fig. 2). Solutions for both insurance companies and agricultural producers include a number of measures, grouped in fig. 2.

Multispectral sensing, performed on a mounted drone camera, is capable to provide new data for the crop monitoring. As a result, these technologies will allow farmers to identify stressed areas and potential threats and, therefore, respond immediately to challenges. Combining such data into a common database (in the agricultural insurance market) will allow to monitor in detail agricultural land at the state level, which will ensure the development of agri-industry. In particular, insurers should consider using drones to improve efficiency, reduce operating costs, and improve service quality.

There are two key benefits to drones for agricultural producers. First, aerial images of the crop make it possible to cover everything from irrigation problems to soil change, and even detect the presence of pests that are not obvious at a ground level due to the scale of the area. Secondly, sensors mounted onboard cameras are capable of taking multispectral images to identify differences between healthy and problematic plants and, thus, improve management.

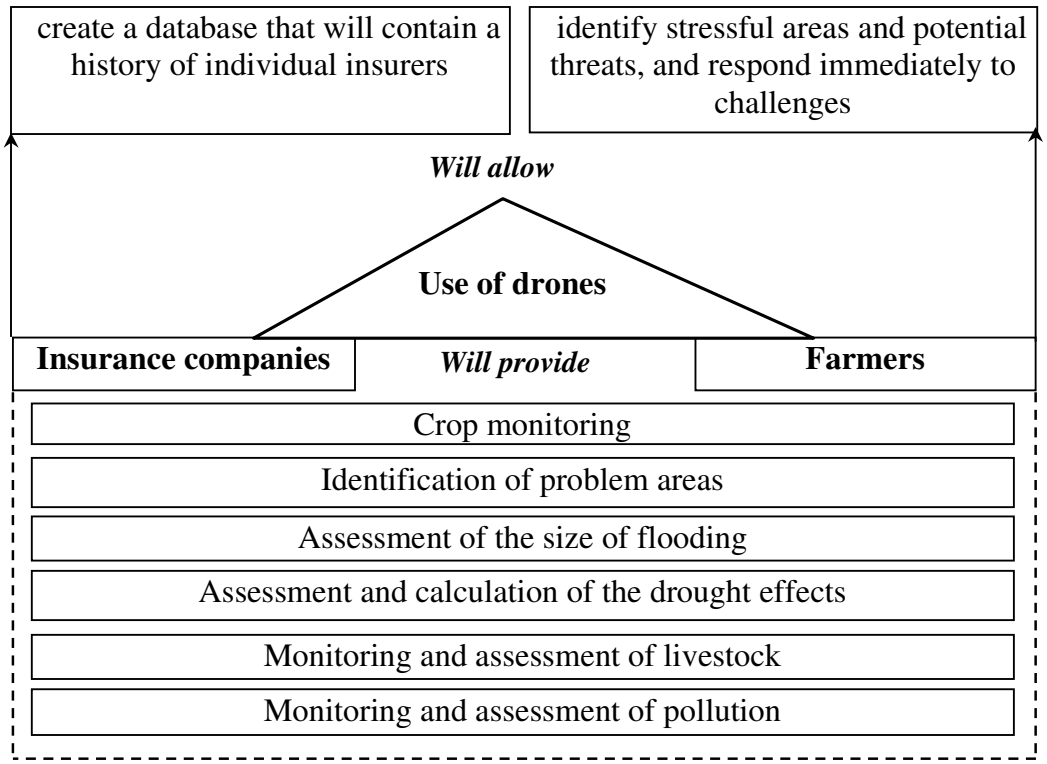

Fig. 2:Patterns of the use of drones in the insurance protection of the agricultural sector of economy

Considering current trends and forecasts for the perspectives of different technologies in agriculture in the short term, based on the statistics of Canada, it should be noted that the country is actively using information systems and technologies in the agricultural sector of economy.

UAV technology (UAV is an unmanned aerial vehicle) and drones are currently used by about 39% of Canadian farmers, while projecting that their number will increase by 35% in the next few years (by 2025), that is, it will nearly double. Satellite monitoring data is used by 65% of farmers in Canada, and in the next few years their number will increase by 15%. Soil sampling from GPS is already carried out by 81% of farmers. This technology has already reached its peak, so the trend of its development in the near future is not high (5%). Mapping of soil properties in Canada is carried out by 79% of producers, but in the short term their number will increase to 90%.

Also interesting is the fact, that in Canada 62% of farmers used the no-till soil cultivation system in 2018. Agricultural producers of the country are actively involved in modern technologies and their direct use in their practice: 70% of them used the technology of automatic switch-off of sections on sprayers, 36% - on fertilizer spreaders, 26% - on seeders. And only 27% of surveyed Canadian farmers have no section control technology on any of the equipment.

The IT trend is gradually coming to the Ukrainian agricultural sector. However, its development is constrained by a number of factors (Fig. 3).

Fig. 3: Obstacles to the digitization of the agricultural sector of the Ukrainian economy

It is advisable to mark five key trends to attract modern IT technologies in the agricultural sector of Ukraine (Fig. 4).

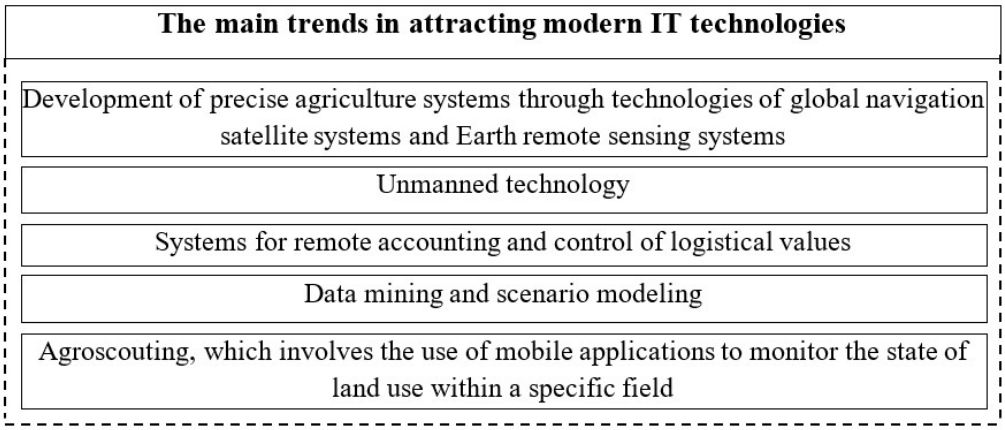

Fig. 4: Key trends in the atraction of modern IT technologies into the agricultural sector of the Ukrainian economy

At the level of agricultural enterprise and insurance company the use of IT technologies allows to carry out: monitoring of production processes; monitoring of plant development processes; crop yield forecast; assessment of the crops state; determining the dynamics of changes in the crops state; identification of areas requiring fertilizers and toxic chemicals; control of crop rotations and quality of agricultural measures; determination of crops freezing areas; assessment of snow cover, humidity.

Nowadays intensive development of the agricultural sector is possible only under condition of maximum use of modern science and technology. Telecommunications and information technology are of great importance. Their development is so intense that they undego changes within a relatively short period of time. Therefore, it is necessarily to develop IT technologies in the agricultural sector of economy as a whole, and in its insurance protection, because it is not only a global trend, but the facts of today.

The practice of using information systems and technologies is now being acquired in the active development of the insurance industry. In the current context, where IT technologies are at the forefront of various sectors of the global economy, there is a significant need for research into the effectiveness of their use. The insurance industry at this stage, requires a significant improvement in the methodology of business operations, the efficiency of providing insurance services, the modernization of existing insurance schemes and their product offerings within their limits, according to innovative technologies. Agricultural producers are constantly confronted with the consequences of risks affecting production efficiency and, consequently, the profitability of business operations. The development of information technologies and the growing role of the Internet as a platform for doing business, make it possible to constantly monitor agricultural enterprises in real time at all stages of production.

The challenge that we believe are key in achieving maximum efficiency of information systems and technologies in insurance protection of agricultural sector are grouped and displayed in Fig. 5.

Main tasks of development and informatization in insurance protection of the agricultural sector of economy

- Increase the level of reliability of information on crop production in the regional context *(scaling through the main growing area of a particular crop);*
- Outline the manufacturing points of weakness in the use of technology to improve and update agricultural insurance schemes in general and the product line within them, in particular
- Model crop insurance decisions based on real-time data collection and insurer database
- Data acquisition and processing of remote sensing technology and climate observations with further development of a forecasting model
- Use of unmanned aerial vehicles - drones by insurance companies and agricultural producers to improve the accuracy of crop monitoring and risk management in agriculture
- Development of yield and soil maps with further possibility of calculating irrigation doses and fertilizer application

Fig. 5: Tasks to achieve maximum efficiency of information systems and technologies in insurance protection of the agricultural sector of economy

Thus, the results of generalization of a specific set of information systems and IT technologies in the insurance protection of the agraricultural sector economy characterize its most common forms, which include: multispectral sensing by the use of unmanned aerial vehicles; estimation of vegetation on the basis of satellite images; remote sensing with data display in the Geographic Information System (GIS); analysis of multispectral images of the Internet of Things; digital early warning networks; crowdsourcing; social media-based information interaction tool.

Conclusions

The conducted research shows that the practice of using information systems and technologies is quite in active use in the insurance industry. In today's context, there is an essential need for research

into the effectiveness of these technologies, as they have a prominent place in various areas of the global economy.

At this stage, the insurance industry requires a significant improvement in the methodology of conducting business, the efficiency of providing insurance services, the modernization of existing insurance schemes and product offers within their limits, according to innovative technologies.

The agricultural industry stands out from all other industries by a number of specific features, one of which is the direct dependence on natural disasters and climate conditions, which causes the industry to be in constant high-risk mode with a significant impact on production indicators.

With the development of information technology and the increasing role of the Internet as a platform for conducting business, agricultural producers can provide continuous monitoring in real time at all stages of production.

As a consequence, there is a need for further research into the effectiveness of information systems and technologies in the insurance protection of the agricultural sector of economy. The range of tasks that need to be solved in the short term is as follows:

- to increase the level of reliability of informatization regarding crop production in the district context (scaling according to the main area of cultivation of a certain crop);
- to formulate manufacturing points of weakness in the use of technology to improve and update agricultural insurance schemes;
- to model crop insurance decisions based on real-time data collection and insurance companies database;
- to summarize the data of remote sensing technology and climate observations with the possibility of further development of the forecasting model;
- to improve the accuracy of monitoring of the use of drones by insurance companies and agricultural producers;
- to develop yield and soil maps to determine irrigation dosage and fertilizer application.

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Structural Features of the Agricultural Insurance Market of Ukraine

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Abstract

The article investigates structural features of the agricultural insurance market, which results in the definition that the latter has a complex three-sector internal structure and is surrounded by the external environment. It is determined that its internal structure, in turn, consists of a set of components that are combined into three sectors: sector I - an authorized body for insurance activity supervision; II - structural elements; III - infrastructure elements. External environment is a system of interdependent factors that surround and affect the internal system. Such grouping more fully and orderly reflects the structural composition of the agricultural insurance market from the point of both internal and external components. The interpretation of 'agricultural insurance' concept has been improved. As a result, the four key definitions of this category as well as its key advantages have been identified and outlined. The essence of the concept of 'insurance protection in the agricultural sector of economy' is investigated.

Keywords: Agricultural Insurance, Agricultural Insurance Market, Structure, Insurance Protection, Insurance Protection System, Agricultural Sector of Economy

Introduction

One of the key features of agriculture is its dependence on natural conditions. Along with price volatility, the presence of commercial risk and raiding, Ukrainian farmers are also suffering from weather freaks and features of used production assets - biological assets.

Insurance is called to minimize losses from the latter. That is a system of economic relations to guarantee insurance protection in order to ensure the income stability and the available property conservation.

At the same time, the agricultural insurance market in Ukraine is still undeveloped, and insurance products are not well-received among farmers. As a result, a certain imbalance arose - a powerful development of the agri-industrial complex in Ukraine in recent years has not been accompanied by the proper development of the insurance market, which goes against the generally established international practice. After all, the majority of countries in the world where agriculture are successful (the USA, Canada, Spain, China, etc.), are characterized by a high level of agricultural insurance development. Instead, Ukraine is an exception from the general rule that determines the need to strengthen scientific research in order to deepen theoretical and methodological principles

and methodological and organizational aspects of agricultural insurance development in Ukraine in order to ensure the level of its distribution at least comparable to that of developed agrarian countries.

Analysis of the latest studies and publications

Different aspects of the functioning of such an important tool as agrarian insurance were studied by the number of national scientists and practitioners, among them are Martseniuk-Rozaronova, (2010); Navrotskyi, (2012); Nesterchuk. (2018); Polchanov, (2013) et al. In their research the scientists studied the main development trends of the Ukrainian agricultural insurance market in general and some problematic aspects of its development, generalized historical aspects of its formation and establishing, studied the specific features of insurance legislation, and found out the specific character of the insurance market. Ukrainian scientists researched insurance products and insurance schemes that provide insurance protection of agricultural producers: Nesterchuk, Tsymbalyuk & Rolinskyi (2018); Sinitsina (2011).

Some theoretical and practical aspects of agricultural insurance were profoundly investigated by foreign scientists, among them the following should be mentioned: Adhikari, Belasco & Knight (2010); Assa (2015); Komadel, Pinda & Sakalova (2018); Nunoo & Acheampong (2014); Rejesus, Goodwin, Coble & Knight (2010).

It is necessary to mention that foreign scientists provide a profound and elaborate analysis of insurance programs, used in the agrarian insurance. This aspect was covered by foreign researchers in the context of classical, parametric and specific insurance schemes.

A great body of scientific literature deals with parametric schemes in the agricultural insurance, that is the index insurance products for agriculture. This aspect is sufficiently and elaborately researched by the following foreign scientists Mußhoff, Hirschauer, Grüner & Pielsticker (2018); Xiao & Yao (2018).

At the same time, the realities of today are such that the structure of the agricultural insurance market is disparate in nature, as it is limited by the classification of structural and partly infrastructural elements, as well as by the supervisory and control bodies and lacks a holistic perception.

In view of this, at this stage, the question of the structure peculiarities of the agricultural insurance market requires more and more attention.

Research Methods

For the scientific solution of the goal set out in the article, general scientific methods of scientific cognition and study of economic phenomena were used, in particular the dialectical method of cognition - for the analysis of scientific works of scientists on the domestic and foreign functioning problems of the agricultural insurance market in general, and the study of its structure peculiarities, in particular; the method of empirical research - as part of the assessment of the current state and development of the study object; graphical method - for systematization and visual representation of research results; abstract-logical approach - to summarize the study results and formulate conclusions on this basis.

Aims. The aim of the article is to study the features of Ukrainian agricultural insurance market structure.

Results. The presence of risk elements that accompany social production, entrepreneurial activity in the conditions of market economy development and life of individual citizens, creates the need for prevention of possible risks, compensation and reduction of possible negative consequences. This need can be met by providing insurance protection. The economic content of the category ‘insurance protection’ is shaped by relationships between people about providing stable guarantees for the protection of their property interests.

The need for insurance protection is determined by the following aspects:

- the economic aspect of insurance protection is explained by the need to organize public relations based on the mobilization and use of financial resources to compensate for losses in order to ensure a continuous process of social reproduction;
- from the standpoint of the natural interests of mankind, insurance protection has emerged as means of preserving material well-being in the event of unforeseen situations or incidents, with the aim of distributing losses caused to individual citizens, among many members of society, in order to reduce casualties;
- the social need for insurance protection is caused by the need to address social issues in society to protect the personal interests of citizens;
- in the legal aspect, the organization of insurance protection as civil legal relations is carried out in accordance with the current insurance legislation and the insurance contract;
- the international aspect of insurance protection is to eliminate national differences in the laws of different countries in order to provide sufficient financial guarantees for insurers and underwriters.

Thus, insurance protection is a set of economic relations related to the prevention, overcoming or reduction of the negative impact of perils (risks) and compensation of their consequences in order to ensure continuous and uninterrupted social manufacture, financial stability of the state, its sustainable economic development and general well-being.

As an economic category, insurance protection has the following characteristics:
- accidental nature of adverse events;
- uneven damage;
- the expression of loss in real and in monetary forms;
- the objective necessity of indemnity of losses;
- taking measures to prevent and mitigate the effects of adverse events.

Insurance protection can be provided only if there are resources that are concentrated for these purposes in the social insurance fund. As an aggregate of natural and monetary reserves, the insurance fund is formed at the expense of gross domestic product (GDP), which as a result of distribution is transformed into consumption and accumulation funds. Insurance funds are created to indemnify for losses and belong to accumulation funds.

In terms of building market relations, insurance protection of agricultural producers in the economic stabilization of their development plays a significant role. Insurance may be one of the most effective tools for managing industrial, market and legal risks, but agricultural insurance is undeveloped in the country.

Features of the agricultural insurance market structure are shown in Fig. 1.

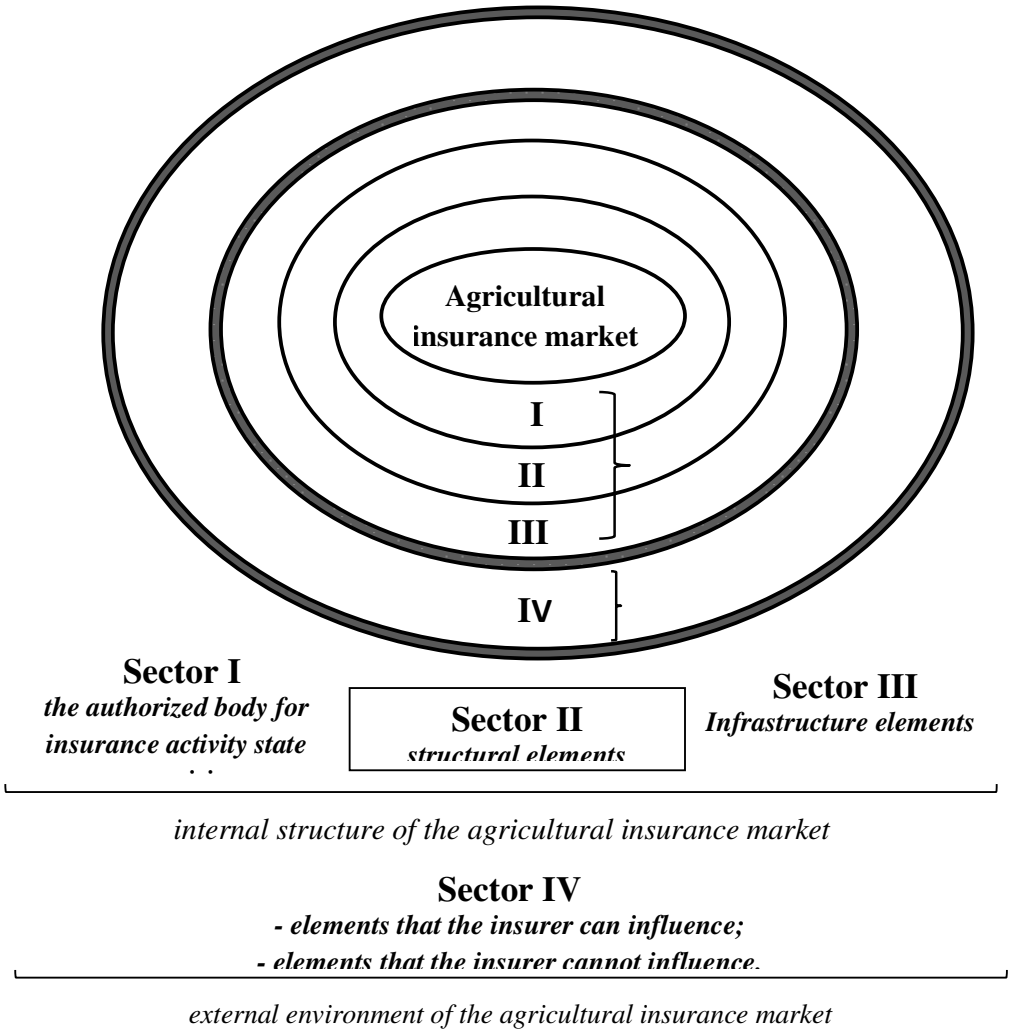

Fig. 1: Features of the agricultural insurance market structure of Ukraine

Thus, it should be noted that the Ukrainian agricultural insurance market has a complex three-sector internal structure and is surrounded by the external environment. The key sectors that shape its internal structure include: I sector - the authorized body for insurance activity supervision; II - structural elements; III - infrastructure elements. The external environment of the insurance market is a system of interaction between the factors that surround and influence the internal system. It is represented by elements that the insurer can manage (market demand, competition, insurance know-how, insurance market infrastructure) and those that it cannot influence (population, age and sex, seasonal migration, consuming purchasing power), but should take into account in the activity. In more detail, the features of the internal structure of the agricultural insurance market are shown in Fig. 2.

Internal structure of the Agricultural Insurance Market

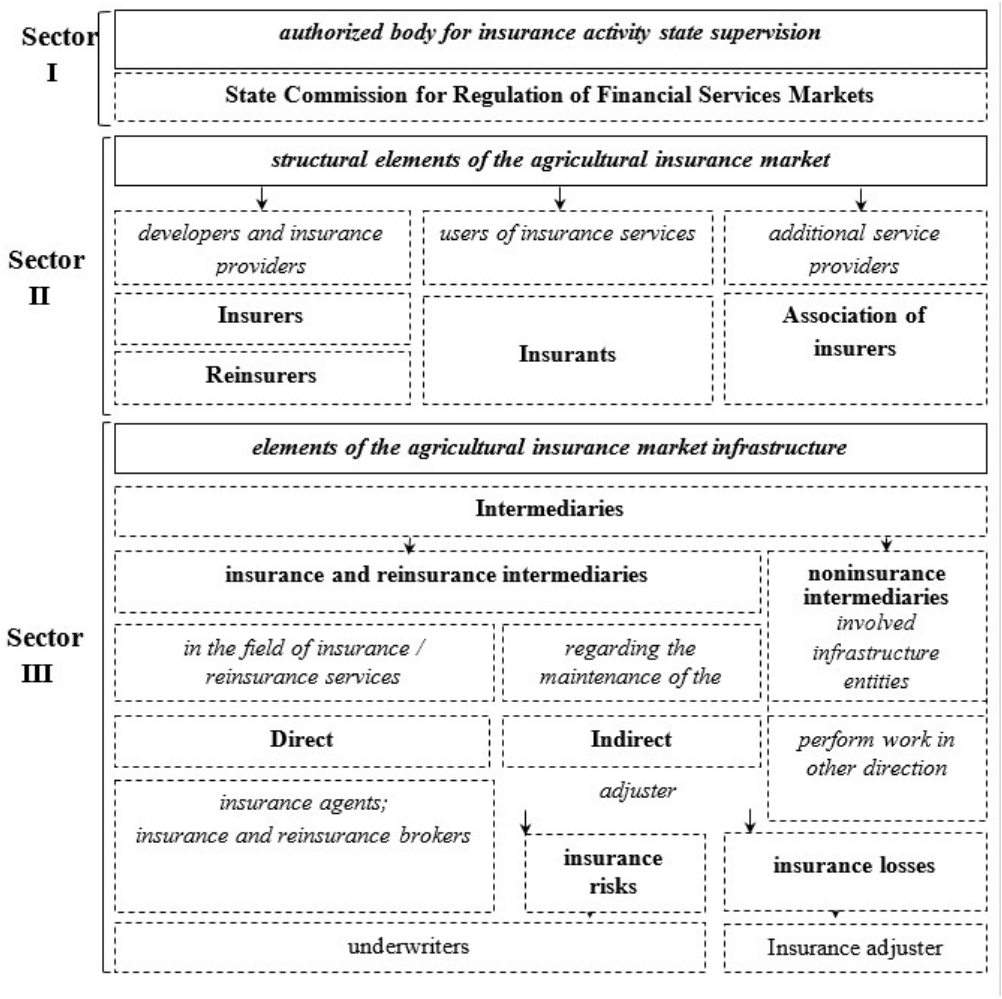

Fig. 2: Features of the internal structure of the agricultural insurance market

Insurance protection in the agricultural sector of the economy - economic, redistributive relationships that are formed in the process of preventing, overcoming and compensating losses caused by agricultural production.

According to the modern characteristics, insurance protection of the agricultural sector of economy acts as a set of redistributive relations in connection with overcoming and loss compensation caused to agricultural production.

When buying insurance protection, agricultural producers, as a rule, pursue several aims, one of which is dominant and the others are secondary (Fig. 3).

Risk financing **Risk management** **Risk minimization**		This goal was the cause of insurance relations. In these circumstances, insurance protection acts as a risk management tool.
Compliance with current legislation		In some cases, farmers has no other motive for purchasing insurance protection than his legal obligation. *Thus, for four years (2005-2008) Ukraine's agricultural insurance market operated within the framework of the state support program, subject to compulsory insurance.*
The tool to achieve other objectives (possibility of internal company financing)		The practice of using insurance protection as a tool to achieve other objectives by agricultural producers is common. *In such cases, the insurance is purely formal and only accompanies the process of taking out a loan or in other situations where the conclusion of an insurance contract is a condition for carrying out other operations.*

Fig. 3: Key motives for purchasing insurance protection by agricultural producers

Agricultural production has a high degree of risk. This is due to the fact that it is an area of activity, the success of which is heavily influenced by a variety of weather and climate factors that cannot be controlled.

There are several approaches by which farmers can regulate the risks to which their economy is exposed (Fig. 4).

Key approaches to risk management of agricultural producers	
Group I	***independent risk management*** strategies that the farmer directly uses to avoid, prevent and mitigate the effects of existing risks
Group II	***Risk sharing*** transfer strategies (for a fee) of risks from agricultural to other entities

Fig. 4: Approaches to regulate the risk effects the farmers run

The most common tool for risk transferring (full or partial) of agricultural production is insurance. The key benefits of agricultural insurance are grouped in fig. 5.

AGRICULTURAL INSURANCE ADVANTAGES	
I	It is a relatively inexpensive way of risk managing compared to others
II	In the event of total or partial crop loss, there is a possibility to cover the losses due to insurance payments, which allows to stabilize the agricultural producer income and continue to work without long interruptions in work or problems with financial stability.
III	Loss copmpensation allow farmers to pay on time to processors, material and technical providers and other partners
IV	Encourages the use of modern technical and technological achievements, including the use of reliable crop protection, which helps to promote increase production efficiency
V	Allows to repay the borrowed funds by insurance indemnity in case of an adverse event and facilitates access of agricultural producers to credit resources, which is very important in Ukraine today

Fig. 5: The key benefits of agricultural insurance

The positive dynamics of agricultural production development in Ukraine in recent years is mainly due to the tandem of two key factors: the implementation of effective innovative technologies and the presence of relatively favorable weather conditions in recent years.

At the same time, all this requires a stable financial support. World practice shows that recources directed at the development of agricultural production must be supported by agricultural insurance (Fig. 6), which guarantees the possibility of their return to creditors in case of occurrence of insured events.

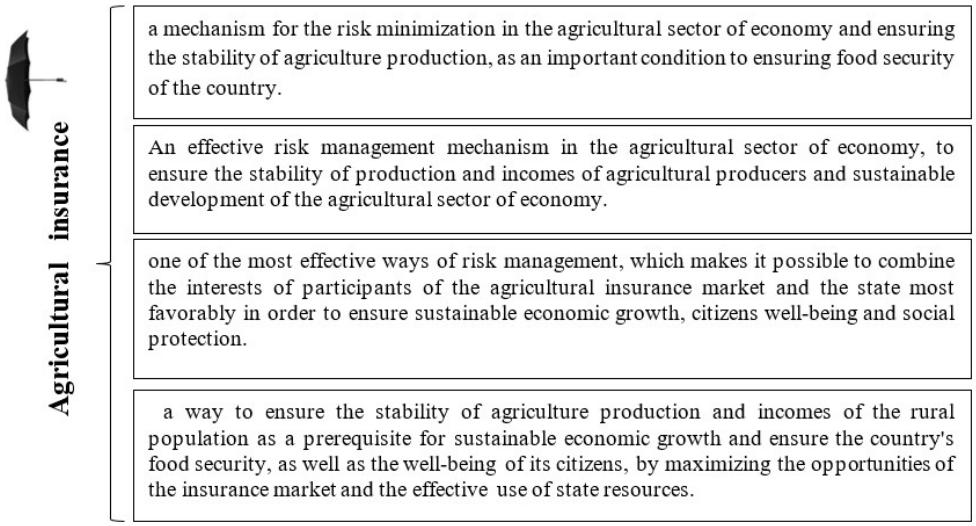

Fig. 6: Agricultural insurance definitions

In Ukraine, this instrument for minimizing production risk is still not too demanded by agricultural producers. And this greatly enhances their lack of money and limits the ability of the banking sector and investors to properly finance the agricultural sector. Against the background of its dynamic development, this problem has become much more widespread in recent times, and therefore needs to be solved.

Conclusions

At present, the structure of the agricultural insurance market is fragmented since it is limited by the classification of structural and partly infrastructural elements, as well as by the supervisory and control bodies and lacks a holistic perception.

Considering the broader sense of the agricultural insurance market structure, its classification has been improved by structuring the latter into three sectors: sector I - an authorized body for insurance activity supervision (State Commission for Regulation of Financial Services Markets); II - structural elements (developers and providers of insurance services - insurance/reinsurance companies providing services in the agricultural sector; users of insurance services - agricultural producers; providers of additional services - association of insurers); III - infrastructure elements (intermediaries - insurance/reinsurance (in the sale field of insurance/reinsurance services and concerning support of insurance services), which are direct (insurance agents, insurance/reinsurance brokers) and indirect (insurance risk assessors - underwriters and insurance losses – insurance adjusters) and involved infrastructure entities (noninsurance intermediaries) performing other business - auditors, rating agencies etc.). The external environment of the agricultural insurance market is a system of interrelated factors that surround and affect its internal system.

This classification makes it possible to describe the structure of the agricultural insurance market as a complex polystructural system having a three-sector internal structure and surrounded by the external environment and to substantiate the feasibility of complex supervision, regulation and development of all its constituents.

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Efficiency Study in Implementation of The State Financial Sustainable Development Policy of Ukraine

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Abstract

The paper suggests a scientific and methodological approach to assessing the efficiency level in implementation of the state financial sustainable development policy. The calculation procedure is substantiated for the composite index of benchmarks in terms of the individual task execution considering the priority of the sustainable development goals. The proposed scientific and methodological approach differs from the similar, previously considered, by the study of the significance level of sustainable development goals of Ukraine, which make up a single system of Ukraine's financial policy. Based on the assessment of integral level of the SFSDP course implementation efficiency, recommendations for each of these options for the indicator value are given.On the grounds of the significance (priority) level of the sustainable development goals forming the mainstay of financial policy guidelines of Ukraine until 2030, the priority level of the goals to be sought is established as building a partnership for sustainable development; responsible consumption and production. Composite indices are calculated for implementation of the sustainable development goals of Ukraine in 2015-2018 regarding target fulfilment of the state financial policy. The efficiency radar is offered for implementation of the SFSDP of Ukraine in 2015-2018. The integral level of implementation efficiency is evaluated for a direction of the state financial sustainable development policy. The study was carried out using general scientific and special research methods. In particular, the use of inductive and deductive scientific methods allowed the study of complex indicators for the implementation of sustainable development goals, graphic - for a visual display of the efficiency radar of the SFSDP course of Ukraine implementation in 2015-2018., settlement and constructive - for carrying out calculations of significance (priority) level of the sustainable development goals, which form the basis of Ukraine's financial policy goals up to 2030; abstract-logical - for theoretical generalizations and the formation of conclusions.

Keywords: State Financial Sustainable Development Policy, Sustainable Development Goals, Financial Mechanism.

Introduction

One of the steps to achieve the sustainable development goals is their integration into the state policy of sustainable development, which is impossible without financial support. Level determination of the SFSDP (state financial sustainable development policy) implementation efficiency is one crucial target of managing the financial support for the national economy development under the current economic environment. To increase the efficiency of the state financial sustainable development policy implementation, it is extremely important to harmonize the following main elements: economic growth and government regulation of bills. These elements are interconnected, and all of them are crucial for improving the country's financial growth. It defines both the need to adjust the individual parameters and goal priorities of the SFSDP within its application, and the necessity to move towards other principles of its implementation being, in general, a course change for such policies depending on a behavior and development trends of the factor system which forms and implements it.

The direction selection for the SFSDP implementation is subject to rational and optimizing financial policies aimed at harmonious development of all areas of society on the basis of the gross domestic product redistribution and ensuring the society development through the use of balanced economic, environmental and social orientation.

The conducted studies enable the state authorities to choose the right direction for the development of SFSDP, depending on the required level of efficiency. In particular, it was proposed to develop and implement financial mechanisms to stimulate sustainable development, aimed at improving the values of the established target indicators.

Literature Review

The efficiency research in implementation of the state financial sustainable development policy is revealed in the works of domestic and foreign scientists. The works of B. B. Bakker & L. E. Christiansen (2011) should be highlighted among foreign scholars who investigated fiscal challenges in European developing countries. In addition, issues related to the emergence of the financial crisis under a market environment are revealed in the works of R. Hemming, M. Kell & A. Schimmelpfennig (2003), as well as in the works of E. Ilzetzki & C. A. Vegh (2008).

Special attention should be given to the works (Dolls, Fuest, and Peichl, 2010; Zohlnhöfer, 2005) researchers focus their attention on comparing situations, measures taken, and outcomes over public financial policy. Recently, however, financial policy seeks to be responsible for the economy secured for its sustainable development. The study of the sustainable development concept and its relation to the economic growth issues are substantiated by S. Prykazka (2014). It should be pointed out that sustainable development is ensured by three main areas as environmental, social and economic one. It should be noted that the economic direction plays one leading role within the development of the state financial policy.

It should be pointed out that the relationship between state, finance and sustainable development was discovered in 1969 (R. W. Goldsmith (1969)) and proceeded with the works of R. I. McKinnon (1973). It could be also observed within the papers of famous contemporaries. M. V. Honcharenko particularly discloses the essence of the financial mechanism for the strategy implementation of the territory sustainable development (M. V. Honcharenko), O. S. Badrak proposed improvement of the financial mechanism for ensuring the sustainable development of Ukraine (O. S. Badrak, 2006), I. M. Vakhovych substantiated the implementation processes of the regional policy of financial support of sustainable development (I. M. Vakhovych). Despite the large arsenal of research in that direction, insufficient attention has been paid to the study of the efficiency level in implementation of the state financial sustainable development policy of Ukraine.

Having regard to the above the main objective of the paper is to investigate the efficiency level in implementation of the state financial sustainable development policy of Ukraine.

Methodology

As evidenced by the practice of applying economic and mathematical methods and techniques, it is advisable to use taxonomic analysis in order to assess the efficiency level in implementation of the SFSDP as a process of controlled change of benchmarks. This is because it allows comparison of multidimensional objects characterized by a large number of controlled parameters accumulating all the features that characterize the phenomenon or process under an integral indicator, a taxonomic indicator of the development level (S. A. Ashmanov, 2001, B. Pliuta, 1980).

While determining the taxonomic indicator of the efficiency level in implementation of the SFSDP, it is envisaged the formation of a data matrix including standardized indicators for each target competence of such a policy being the sustainable development goal identified through a set of benchmarks.

Considering the multidimensionality of the efficiency parameters for the implementation of the SFSDP (first of all, the goal differentiation for tasks, as well as the definition of specific target indicators for each of these tasks), we propose to use a comprehensive approach based on combining taxonomic analysis and a radar method to evaluate such efficiency.

The efficiency radar for implementation of the SFSDP will constitute a polygon built on axes meeting target competencies of the policy. That is, application of this method involves circular division into sectors, which number corresponds to the number of sustainable development goals determining the direction of the respective SFP.

Therefore, a height of the line segments forming the efficiency radar polygon for implementation of the SFSDP is suggested to determine through taxonomic analysis. The result of its application is a system development of composite indicators of task achievement under the context of sustainable development goals calculated by the method of determining the development level for the taxonomic indicator. A value increase of such indicators illustrates moving further away from the circle center and indicates the efficiency growth in implementation of the SFP under the terms of the achievement promotion of the relevant sustainable development goal.

We propose a scientific and methodological approach to assessing the efficiency level in implementation of the SFSDP consisting of sequential application of six stages aimed at calculating and qualitative evaluation of the integral indicator system, which allow both to determine and evaluate the implementation level of the of the selected SFP direction in general, and obtain a comprehensive assessment the achievement level of individual sustainable development goals and tasks, as well as the correspondence of the achieved indicators and established benchmarks taking into account their priorities (Figure 1).

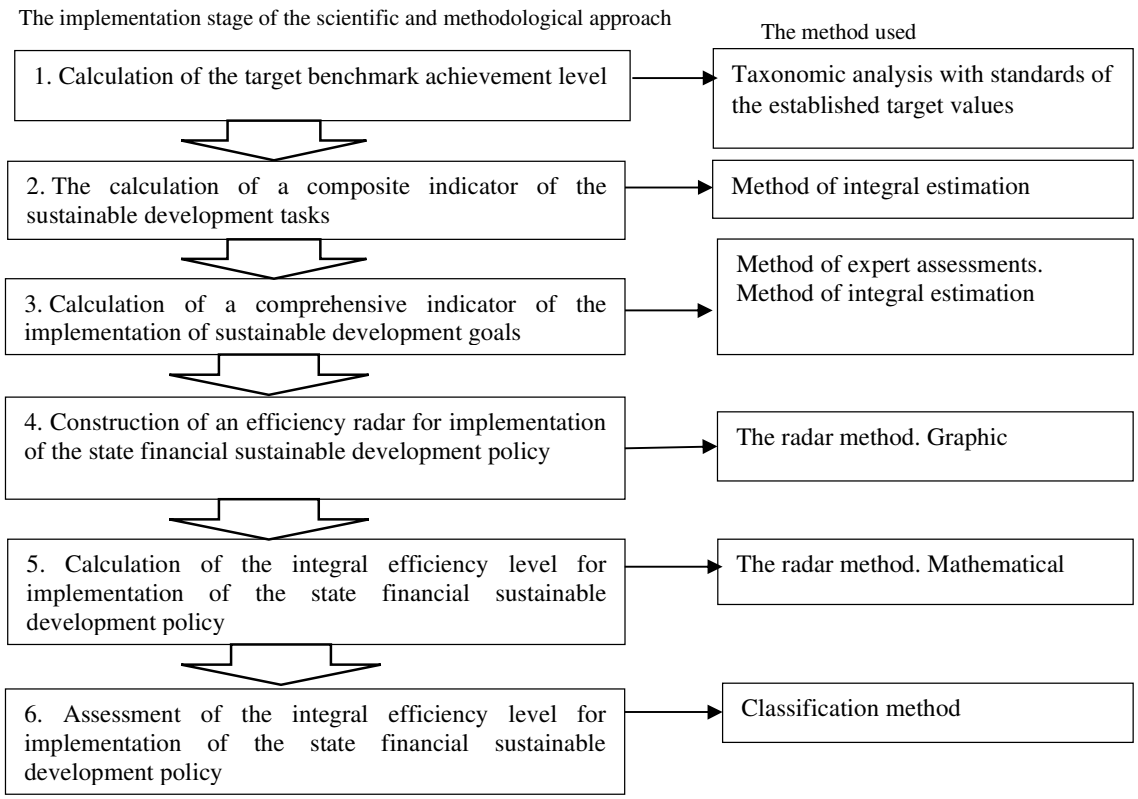

Fig. 1: Scientific and Methodological Approach to Assessing the Efficiency Level for Implementation of the SFSDP

Source: author's developments

The calculation of the composite indicator of the target indicators achievement in terms of the fulfillment of individual tasks is based on the taxonomic analysis with standardization of relatively established target values and taking into account the sustainable development goals priority and assumes:

1) forming a data matrix (X), which can be submitted as follows:

$$X = \begin{pmatrix} X_{11} & X_{12} & X_{13} & \dots & X_{1j} & \dots & X_{1m} \\ X_{21} & X_{22} & X_{23} & \dots & X_{2j} & \dots & X_{2m} \\ X_{i1} & X_{i2} & X_{i3} & \dots & X_{ij} & \dots & X_{im} \\ X_{n1} & X_{n2} & X_{n3} & \dots & X_{nj} & \dots & X_{nm} \end{pmatrix} \quad (1)$$

where i – the number of the observation period in order ($i = \overline{1,n}$);

n – the quantity of observation periods;

j – Target indicator of the Sustainable Development task ($j = \overline{1,m}$);

m – the quantity of Sustainable Development Goals;

X_{ij} – the actual value of target indicator j over time i.

2) the standardization procedure, which allows to obtain a matrix of standardized values of indicators and provides for their reduction to a comparable form. Considering that one of the main criteria for the effectiveness of the implementation of the SFP course, in our opinion, is to ensure that the targets for indicators are met, we propose to standardize against the target values set for a certain period of time:

$$\overline{X} = \begin{pmatrix} \overline{X}_{11} & \overline{X}_{12} & \overline{X}_{13} \dots & \overline{X}_{1j} \dots & \overline{X}_{1m} \\ \overline{X}_{21} & \overline{X}_{22} & \overline{X}_{23} \dots & \overline{X}_{2j} \dots & \overline{X}_{2m} \\ \overline{X}_{i1} & \overline{X}_{i2} & \overline{X}_{i3} \dots & \overline{X}_{ij} \;.. & \overline{X}_{im} \\ \overline{X}_{n1} & \overline{X}_{n2} & \overline{X}_{n3} \dots & \overline{X}_{nj} \;\dots & \overline{X}_{nm} \end{pmatrix} \quad (2)$$

where $\overline{X}_{ij}$ – the target value of the target indicator *j* over time *i*.

It should be noted that, depending on the application of differentiation of target values by years of implementation of the SFSDP or the establishment of a single target for the period, either the matrix or the vector of target indicators ($\overline{X}$) can be used in standardization.

Formation of the standardized values matrix is carried out by the formula:

$$Z_{ij} = \frac{X_{ij}}{\overline{X}_{ij}} \quad (3)$$

where Z_{ij} – the standardized value of target indicator j over time *i*.

3) the calculation of the distance between the metrics and the targets:

$$C_j = \sqrt{\sum_{i=1}^{n} (Z_{ij} - 1)^2} \quad (4)$$

where C_j – the distance between the reached and the target values of the target indicator j*;*

1 – the standardized value of the target indicator *j*.

4) the calculation of the average distance between the achieved indicators and the target values for the period of the SFSDP course implementation:

$$\overline{C} = \frac{1}{m} \sum_{j=1}^{m} C_j \quad (5)$$

5) the calculation of the standard deviation (S), the maximum possible deviation from the composite target reference parameter for the implementation of the SFP course (C_e) and the definition of a composite dynamic indicator of the target indicators achievement of the implementation of the sustainable development task (d_j):

$$S = \sqrt{\frac{1}{m}\sum (C_j - \overline{C})^2} \quad (6)$$

$$C_e = \overline{C} + 2S \quad (7)$$

$$d_j = \frac{C_j}{C_e} \quad (8)$$

6) the calculation the level of the target achievement by indicator j:

$$K_j = 1 - d_j \quad (9)$$

The target benchmarks achievement level in the indicator may range from 0 to 1. The higher the indicator, the higher the level of achievement of the established target indicator during the study period of the SFSDP course implementation;

7) the calculation of the composite indicator of the performance of individual tasks of sustainable development (K_I) is proposed to be carried out using the arithmetic average of the target indicators achievement levels:

$$K_I = \frac{\sum_{j=1}^{m} K_j}{m}. \quad (10)$$

In our opinion, it is advisable to use the traditional scale of developmental taxonomic value differentiation for qualitative assessment of the status of the target indicators achievement in terms of individual indicators (K_j), as well as interpretation of the obtained values of the composite indicator of the target indicators achievement (K_I) in terms of performance of individual tasks (Table 1).

Table 1: Achievement Level Ranking of the Target Indicators of Sustainable Development

The target indicator achievement level	Estimated level of the target indicatorsachievement
Highest	1,00 - 0,80
High	0,79 - 0,60
Medium	0,59 - 0,40
Low	0,39 - 0,20
Lowest	0,19 - 0,0001

It is proposed to calculate a composite indicator of the implementation of the Sustainable Development Goals by the formula of the arithmetic average of the composite indicators of the performance of individual tasks (K_I).

At the same time, in our opinion, such assessment should be carried out both without and taking into account the priority of the respective goal. Such consideration is provided by adjusting the significance (priority) ratio of the relevant goal:

$$R_I = w_I \cdot \frac{\sum_{j=1}^{m} K_{IJ}}{m} \quad (11)$$

where w_I – the priority ratio of the Sustainable Development Goal

Empirical analysis and Discussions

To determine such significance (priority) levels it is suggested to rely on the expert assessment results. Table 2 presents the results of the calculation of the significance levels of theSustainable Development Goals, which form the basis of Ukraine's financial policy targets for 2030, based on the expert assessments of the priorities and rankings of the Sustainable Development Goals conducted by Osborn D., A. Cutter and F.Ullah. The basis of table 2 is the calculation of formulas 1-11.

Table 2: Significance (Priority) Levels of the Sustainable Development Goals Forming the Basis of Ukraine's Financial Policy Targets until 2030

Goal	Expert assessment, point	Significance level (priority)	
		unit.	%
Goal 1. Overcoming poverty	1.8	0.05625	5.63
Goal 5. Gender equality	2.2	0.06875	6.88
Goal 8. Decent work and economic growth	2.7	0.084375	8.44
Goal 9. Industry, innovation and infrastructure	2.1	0.065625	6.56
Goal 10. Reducing inequalities	3.6	0.1125	11.25
Goal 11. Sustainable development of cities and communities	2.6	0.08125	8.13
Goal 12. Responsible consumption and production	6.3	0.196875	19.69
Goal 16. Peace, justice and strong institutions	2.7	0.084375	8.44
Goal 17. Partnership for Sustainable Development	8	0.25	25.00
Total	32	1	100.00

Source: author's developments

Table 3 presents the results of our assessment of the composite indicators of the implementation of the Sustainable Development Goals of Ukraine in 2015-2018 in terms of the implementation of SFP tasks. As can be seen from the above indicators, without taking into account the set priorities for the set of foreseen targets for the implementation of the sustainable development goals and tasks, which are related to the financial support, the operation of financial mechanisms, instruments and levers, implementation of the state financial policy, Ukraine as a whole demonstrates a high level of security achievement of the Sustainable Development Goals for most of the targets set by the current SFSDP course.

The medium level of implementation is observed for the Task 9 "Industry, Innovation and Infrastructure", according to which the medium of the taxonomic indicators of target parameters achievement by the set of tasks is 0,5571, which indicates that the system of expected targets is only 55.7%. The highest level of the Sustainable Development Goals achievement is observed in terms of the implementation of the Task 10 “Reducing inequalities” and Task 12 “Proper consumption and production”, according to which the integrated indicator of implementation without priority is 81.3% and 83.2% respectively.

The calculation of the integral efficiency level in the implementation of the SFSDP course (R_{EFP})

can be determined by the formula (11):

$$R_{EFP} = \frac{S_R}{S} \tag{11}$$

where S_R – the area of actual efficiency radar for the course implementation;
S – the area of the benchmark radar.

Given that, according to the 2030 Sustainable Development Goals of Ukraine, the Financial Indicators are foreseen for the nine objectives, the actual radar area for the efficiency of the implementation of the SFSDP course is calculated as the sum of the areas of 9 triangles according to the formula:

$$S_R = \frac{1}{2}\sin\frac{360}{k}\cdot(R_1 \cdot R_2 + R_2 \cdot R_3 + ... + R_i \cdot R_{i+1} + ... + R_k \cdot R_1) \tag{12}$$

where R_i – a composite indicator of the implementation of the i-th Sustainable Development Goal;
k – the number of sustainable development goals pursued by the SFSDP.

Table 3: Composite Indicators for Implementation of the Sustainable Development Goals of Ukraine in 2015-2018 as regards Implementation of the SFP Tasks*

Sustainable development goals	w_I, unit	Assessment of sustainable development goals				A comprehensive indicator of the implementation of the sustainable development goals	
						without priority	weighted priority
Goal 1	0.0563	Task*	1.1.	1.2.	1.3.	0.6063	0.0341
		K_I	0.6254	0.6374	0.5562		
Goal 5	0.0688	Task*	5.6.			0.7138	0.0491
		K_I	0.7138				
Goal 8	0.0844	Task*	8.1.	8.2.	8.6.	0.6828	0.0576
		K_I	0.5712	0.7242	0.7529		
Goal 9	0.0656	Task*	9.4.	9.5.		0.5571	0.0366
		K_I	0.6824	0.4318			
Goal 10	0.1125	Task*	10.1.	10.4.	10.5.	0.8132	0.0915
		K_I	0.8023	0.8812	0.7562		
Goal 11	0.0813	Task*	11.1.			0.6782	0.0551
		K_I	0.6782				
Goal 12	0.1969	Task*	12.1.			0.8324	0.1639
		K_I	0.8324				
Goal 16	0.0844	Task*	16.4.			0.7735	0.0653
		K_I	0.7735				
Goal 17	0.2500	Task*	17.1.	17.2.	17.3.	0.6711	0.1678
		K_I	0.6278	0.6543	0.7312		

** Task numbering according to (Sustainable Development Goals: Ukraine (national report)*
Source: author's calculations

Considering that, in accordance with the 2030 Sustainable Development Goals of Ukraine, the Financial Indicators are foreseen for the implementation of 9 goals, and that the maximum level of sustainable development goals without priority is 1, the area of the reference radar is determined by the formula 12 and is 0.037066.

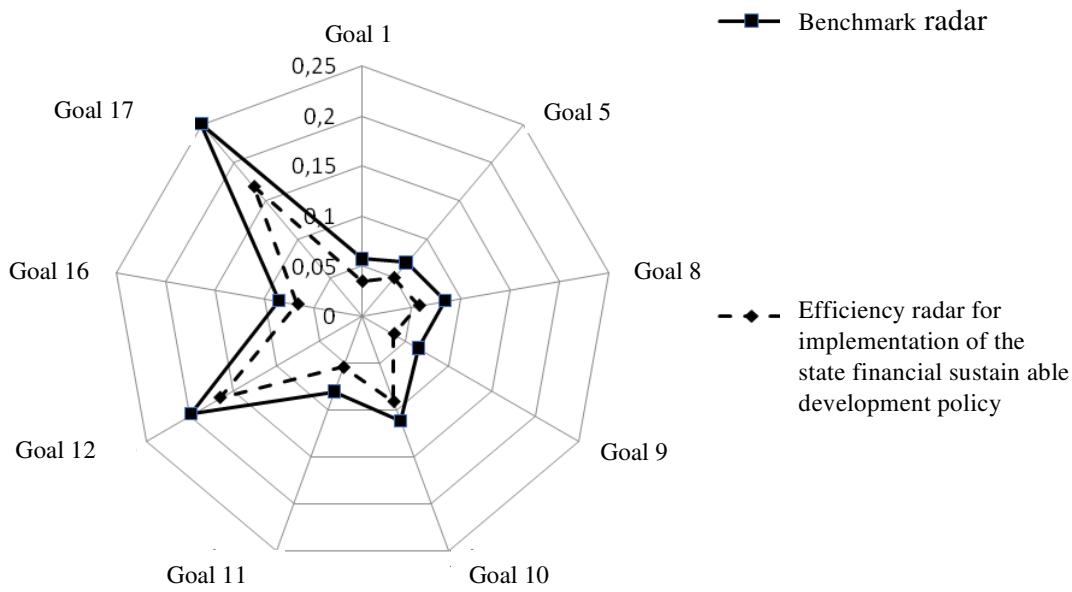

Fig. 2: Efficiency Radar for Implementation of the SFSDP of Ukraine in 2015-2018
Source: author's calculations

The value of the integral efficiency level indicator of the SFSDP implementation is in the range from 0 to 1. It shows the extent to which the targets set during the SFSDP course have been implemented.

Figure 2 presents a graphical representation of the SFSDP implementation radar of Ukraine, built on the basis of the proposed scientific and methodological approach.

At the same time, the integral efficiency level in the implementation of the SFSDP of Ukraine in 2015-2018 (R_{EFP}) is equal to:

$$R_{EFP} = \frac{0{,}019146}{0{,}037066} = 0{,}51653\,. \qquad (13)$$

The integrated efficiency level in the implementation of the SFSDP of Ukraine in 2015-2018 indicates that the aggregate targets of this policy achieved the level of achievement of the set targets of sustainable development, taking into account their priority is only 51.6%. This corresponds to the medium efficiency level (Table 4).

Table 4: Assessment of the Integral Efficiency Level in theImplementation of the SFSDP

A value of the indicator R_{EFP}	Efficiency level	Recommendations
$R_{EFP} \geq 0{,}95$	Highest	Maintaining the current state of using the tools of the financial mechanism for sustainable development. Changing course by defining a new system of goals and tasks.
$0{,}80 \leq R_{EFP} < 0{,}95$	High	Stabilization of the financial mechanism for sustainable development. Changing course by reviewing priorities
$0{,}40 \leq R_{EFP} < 0{,}80$	Medium	Development and implementation of financial mechanisms for promoting sustainable development aimed at improving the values of the identified target indicators. Adjustment of target values
$R_{EFP} < 0{,}40$	Low	Revise the target indicator system

Source: author's calculations

Conclusions

Such efficiency level in implementation of the SFSDP, on the one hand, evidences of the possible overestimation of the target indicator values set as a benchmark for such policy for a certain time period, discrepancy between the established quantitative parameters for achieving the goals and tasks and actual potential of financial support for sustainable development of the Ukrainian economy, and, on the other hand, it points to the need to develop and implement effective financial mechanisms promoting sustainable development under the directions identified by the target indicators underlying the elaborated state financial policy.

Hence, the suggested scientific and methodological approach makes it possible to comprehensively evaluate the efficiency in implementation of the SFP, since unlike existing ones it facilitates to extensively assess both the performance index in whole and in part characterizing the implementation status for certain target indicators, tasks and goals of the sustainable development, identify its contribution to the development of the integral efficiency indicator, consider the priority of individual goals and tasks.

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Regional Insurance Market of The Russian Federation: Efficiency, Factors, Risks

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Abstract

The general state of the Russian insurance market is characterized by its regional segments functioning and hence the problem of their status, position and effectiveness analysis is relevant. Regional insurance markets (RIM) should provide the region with insurance cover against risks in terms of content and amount that meets the region's needs for it (that appears to be the first strategic goal of the RIM's functioning and development). At the same time, the regional insurance market is an independent segment of the regional economy and therefore it is interested in making a profit (the second strategic goal of the RIM's functioning and development). The extent of these goals achievement characterizes the effectiveness of the RIM's functioning. The paper discloses two criteria for the effectiveness of the RIM's functioning and development related to these strategic goals achievement. The effectiveness of the RIM's functioning is influenced by many different-leveled factors, which are studied in the paper. The proposed division of factors into two groups - factors that positively and negatively affect the development of RIM, allowed to divide the group of negative factors into two parts - already implemented and those that can be implemented. The latter determined the ability to describe potential negative factors through risks.
The identification of factors and risks of the RIM's functioning is reasonable because management aimed at enhancing positive factors impact, reduces the influence of negative factors and prevents the realization of risks, contributes the increase of the RIM's effectiveness. The proposed approach to determination of the RIM's effectiveness, to factors classification and risks identification, can be used to increase the effectiveness of RIM. Results obtained may also be used to develop and implement national and regional strategies for socio-economic development, including the use of insurance as an institute of social and financial protection against risks.

Keywords: Regional Insurance Market, Strategic Objectives Of The Regional Insurance Market Functioning, The Regional Insurance Market Effectiveness, Factors And Risks Of The Regional Insurance Market.

Introduction

Insurance is the most important institute that provides social and financial protection against risks. Hence the effectiveness of this institute functioning will be determined by the quality of such protection provision both at the level of the country as a whole and at the level of any individual region.

Currently, the level of the Russian insurance market development is presented (2018 data) (See table 1).

Table 1: performance indicators of the Russian insurance market for 2018

Types of insurance	Insurance premiums		Insurance payments	
	million rubles	share,%	million rubles	share,%
Life insurance	452 400	30,60	67 070	12,82
Personal insurance other	321 364	21,74	128 335	24,53
Property insurance	361 481	24,45	154 405	29,51
Liability insurance	48 638	3,29	10 206	1,95
Business and financial risk insurance	43590	2,95	11365	2,17
Total voluntary insurance	1 227 473	83,03	371 381	70,98
Compulsory motor vehicle liability insurance	225 965	15,28	137902	26,36
Other compulsory insurance	24968	1,69	13905	2,66
Total compulsory insurance	250 933	16,97	151 807	29,02
Total	1 478 406	100,00	523 188	100,00

Calculated according to: Official website of the Bank of Russia. [Electronic resource]. URL: http://www.cbr.ru.

The regional insurance market (RIM) is a segment of the national Russian insurance market. Therefore the level of its functioning has a significant impact not only on the development of the corresponding region, but also on the development of the entire national insurance industry.

In the framework of this study, the region refers to the subjects and federal districts of the Russian Federation, and the regional insurance market refers to the totality of organizations which act in a particular region's insurance market.

An example one of the regional insurance markets functioning is given in table 2.

Table 2: performance indicators of the regional insurance market of the Republic Khakassia for 2018

Types of insurance	Insurance premiums		Insurance payments	
	thousand roubles	share,%	thousand roubles	share,%
Life insurance	486 435,	34,14	37 733,	6,09
Personal insurance other	162 223,	11,39	44 216,	7,13
Property insurance	247 673,	17,38	99 378,	16,03
Liability insurance	15 870,	1,11	735,	0,12
Business and financial risk insurance	9608	0,67	812,	0,13
Total voluntary insurance	921 809,	64,69	182 874,	29,49
Compulsory motor vehicle liability insurance	481 656,	33,80	434 627,	70,10

Other compulsory insurance	21406	1,50	2545	0,41
Total compulsory insurance	503 062,	35,31	437 172,	70,51
Total	1 424 871,	100,00	620 046,	100,00

Calculated according to: Official website of the Bank of Russia. [Electronic resource]. URL: http://www.cbr.ru.

The most important strategic goal of regional insurance development as an industrial organization sector of the regional economy is the insurance services provision a structure and size of which is adequate to the regional needs for insurance protection.

As an independent financial institute operating in market conditions, the regional segment of the national insurance market is interested to gain profit. Therefore, the second strategic goal of any RIM, as an element of a market economy, is a profit maximization.

A task of strategic goals achievement poses the problem RIM's functioning and development effectiveness.

Currently, there are different approaches to the definition of effectiveness. However, the significance and content of the RIM's functioning and development strategic goals necessitate their consideration in effectiveness comprehension.

This article is devoted to the disclosure of the concept of effectiveness for RIM, as well as the identification of factors and risks that affect effectiveness level, which determines the relevance of the research topic.

The purpose of the article is to highlight the strategic goals of RIM development, justify and formulate the concept of the effectiveness of the functioning of the regional insurance market, build a model for identifying the factors and risks that determine the effectiveness of the functioning of RIM. The hypothesis of the study is formulated as follows: the increase of the RIM's functioning effectiveness as an extent of its two strategic goals realization, is possible by identifying and managing factors and risks of different levels, aimed at enhancing the influence of positive factors on RIM, weakening the impact of negative factors and reducing or preventing the impact of different risks realization.

The analysis of the stated problem elaboration showed the following.

A lot of research has been devoted to the issues of regional insurance and the study of its development factors. Most authors agree on the uneven development of regional insurance markets. So, Belozerov et al. (2018), Kirillova (2018) attribute this uneven development to the influence of different factors and the presence of various risks in in the regions. Kuznetsova et al. (2019), Porrini (2017) identify various factors in the development of RIM, dividing them into external and internal, as well as general and specific.

Alyakina et al. (2017), Arkhipov et al. (2017), Chernova et al. (2019), Tarasova et al. (2018) pay attention to regional risks – the risks of functioning and development of regions, their specificity and causes of occurrence. The world theory and practice of insurance as an institute of financial protection is connected to risk management at the level of a particular region and the world insurance market as well. Currently, the risks' identification and management problems are considered not only at the level of a particular region. The studies by Chernova et al. (2017), Kalayda and Chernova (2016), Blake (2013), Laux and Muermann (2010) on risks arising in the financial markets and risks associated with financial convergence processes are of particular significance. This is due to the fact that the development of financial markets and the deepening of financial convergence processes cover different regions of the country and, thereby, contribute to the emergence of specific regional risks that are external to the region. Gaganis et al. (2019), Mnykh (2017), Njegomir and Stojić (2010) note that national characteristics, organizational and legal factors for the development of the country's insurance market have an important effect on the level of internal regional risks.

The mechanisms and methods of risk management at the regional level are closely related to the effective functioning of the insurance market. As a socio-economic category, the effectiveness of insurance is comprehensively covered in the works of Prokopjeva (2018), Kuznetsova and al. (2019). The effectiveness of the insurance market functioning is also associated with macroeconomic processes in the national and global economies. Therefore, it is worth noting the studies of Mohy ul din et al. (2017), Porrini (2017), Zheng and Zhao (2017), which describe the relationship between the development of the insurance market and economic growth.

Basically, the issues of insurance markets of the regions, factors of their development and increasing the efficiency of functioning are significantly studied in the scientific literature. At the same time, in determining the effectiveness of the regional insurance markets functioning a traditional approach is mainly used that does not consider the strategic goals of the regional insurance markets development. A more detailed analysis requires the classification of RIM development factors, as well as the ratio of factors and risks of RIM development.

This range of problems with the participation of the authors is investigated in this paper by a sequential consideration of the following issues:

1) Chernova G.V., Khalin V.G.: building a theoretical model of the effectiveness of the regional insurance market functioning; substantiation of the assessment of the effectiveness of RIM as the degree of implementation of its strategic goals; building a model for identifying factors and risks, developing a theoretical approach to considering risks as potential negative factors for the development of RIM;
2) Prokopjeva E.L., Kuznetsova N.P., Chernova G.V.: analysis of the possibilities of application and selection of specific data for testing a theoretical model for assessing the effectiveness of RIM development to achieve two strategic goals;
3) Prokopjeva E.L., Kalayda S.A.: selection and analysis of all-Russian and regional factors of development of the RIM of the Republic of Khakassia;
4) Prokopjeva E.L., Kuznetsova N.P., Khalin V.G.: justification and selection of priority types of insurance based on the risks identified due to the influence of potential negative factors on the development of RIM.

The effectiveness of the RIM's functioning

It is well-known that often efficiency is understood as the implementation of a process with minimal costs, efforts and losses, and economic efficiency is usually understood as the ratio of the economic effect (output) and the costs (input).

The activity of a separate economic actor (enterprise, company, organization) is considered to be economically effective if it is carried out at minimal cost. Moreover, the result can be described by any indicators (profit, output, etc.), and the costs can be represented by some resource or factor of production (labor, capital, etc.). Resource efficiency indicators are, for example, labor productivity, material consumption, etc.

The theory of efficiency gained some development through the use of the concept of maximum public utility introduced by V. Pareto, which is called the "Pareto optimum". Pareto optimum is defined as follows: conditions under which the state of economic efficiency (where no one can be made better off by making someone worse off) occurs. Also called Pareto optimal or Pareto optimality.

In accordance with it, the performance of a separate economic entity (enterprise, company, organization) is considered to be economically effective if, given the level of knowledge and quantitative factors of production, it is impossible to produce more of one product without sacrificing to produce a certain amount of another product (Pareto-efficient allocation resources in production).

The operational efficiency of an individual business unit, measured by Pareto, in the general case is not identical to the operational efficiency of a particular economic system. The functioning of a certain financial system is cost-effective if the system is in a state in which it is impossible to increase the degree of satisfaction of the needs of at least one person without worsening the position of another member of the society (Pareto-efficiency of the economic system).
In order to evaluate the effectiveness of the RIM's functioning, it is necessary to keep in mind the following consideration. The strategic goal of the functioning and development of any RIM is to provide the region with social and financial protection from the risks to which it is exposed.

The degree of implementation of the strategic goal set for RIM can characterize the effectiveness of the RIM's functioning and development. In other words, the effectiveness of RIM can be understood as the extent to which the entire insurance coverage provided by the regional insurance market to the region corresponds to its size, which is determined by the region's need. At the same time, the higher the volume and type of insurance provided by the regional insurance market protection meets the regional need, the higher the effectiveness of RIM. Otherwise, the higher a mismatch between the provided insurance cover and the need for the region, the lower the effectiveness of RIM. Only when RIM provides full insurance coverage one can say that RIM is functioning efficiently. This statement defines the first criterion for the effectiveness of the RIM's functioning - RIM is effective if it provides the region with insurance coverage adequate (in structure and scope) to the regional level of development.

The achievement of the goal for providing insurance coverage for the region is carried out through the implementation of the insurance activity itself. Therefore, the effectiveness of the RIM's functioning can be assessed through the degree to which the quality and cost of the insurance services provided are of standard quality and cost of similar services. The average or industry best values of the relevant indicators can be considered; performance indicators of the region considered as the best, etc.
In this case, the effectiveness of RIM can be understood as the degree of adequacy of the quality and cost of the insurance services it provides with the standard quality and the cost of similar services in the entire Russian insurance market. Moreover, the higher the quality and cost of the services provided meets the standard requirements, the higher the efficiency of RIM. The greater the discrepancy between the quality and cost of the insurance services provided by the regional insurance market to the standard services, the lower the effectiveness of RIM. Only in the case when RIM provides insurance coverage of the proper (reference) quality and cost, one can say that RIM functions efficiently (implementation of the second strategic goal of RIM development). This statement defines the second criterion for the effectiveness of the RIM's functioning - RIM is effective if it provides the region with insurance coverage in quality and cost meeting the reference requirements.

The use of two criteria for the effectiveness of the RIM's functioning and development is determined by the most important social role of insurance as an institute of financial protection (the first criterion) and the survival requirements of RIM in a competitive environment (second criterion).

Since both goals of RIM functioning are strategic for it, we understand by RIM's effective functioning and development such a state that meets the achievement of both strategic goals set for it (simultaneous fulfillment of the first and second criteria for the effectiveness of RIM functioning).

Various factors influence the level of efficiency of the RIM's functioning and development. Therefore, increasing the efficiency of the RIM's functioning and development involves identifying these factors and developing such solutions for their management that would enhance the effectiveness of RIM — the achievement of both strategic goals by the regional insurance market.

Factors of the RIM's functioning and development

Solving the problem of ensuring the necessary RIM's efficiency according to both criteria determines the feasibility of factors identification, as well as analysis of the latter influence on the RIM's functioning and development (See fig. 1).

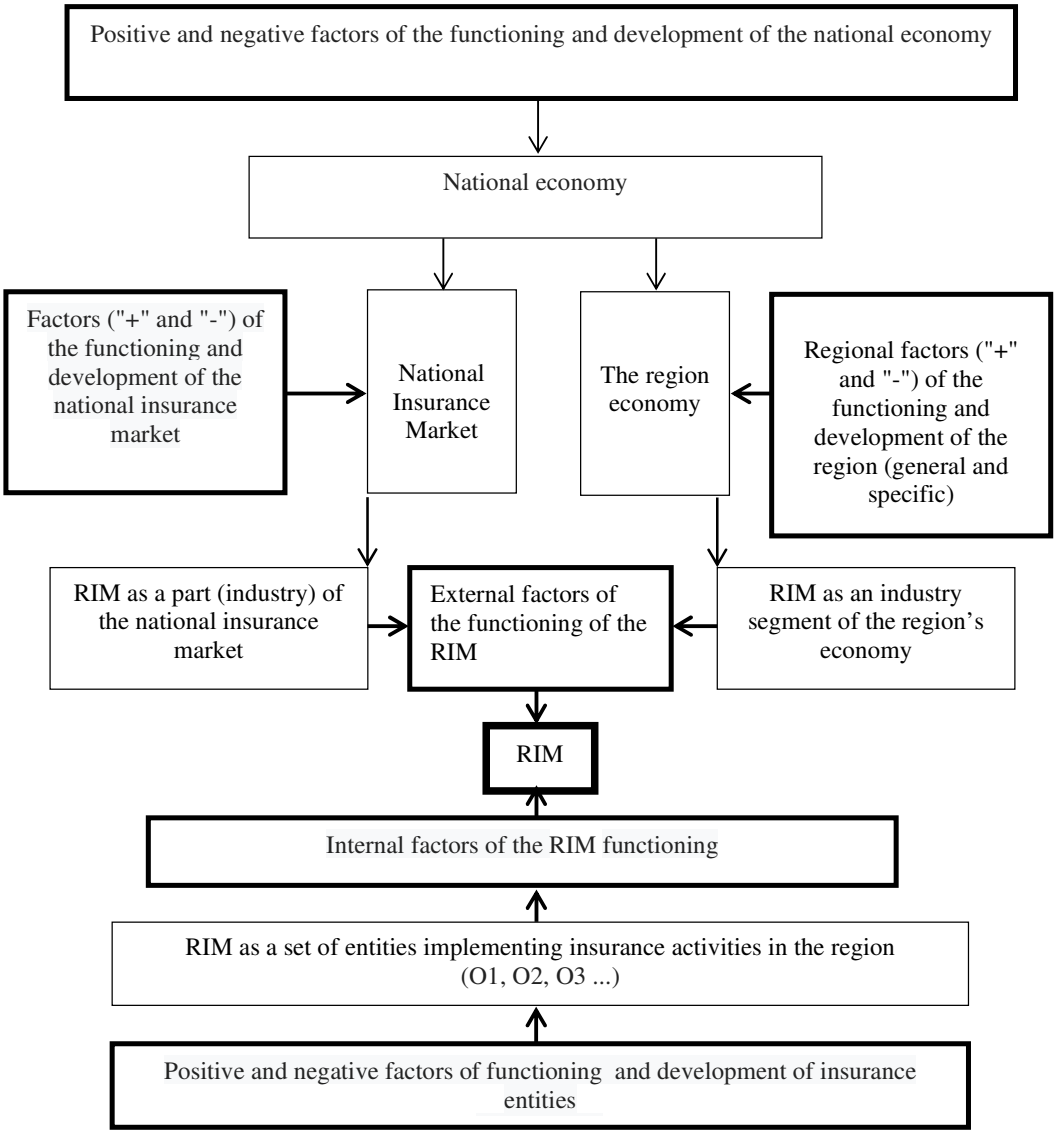

Fig. 1: The factor scheme of the RIM functioning and development

Source: compiled by the authors.

All factors can be divided into 2 large groups according to their influence on RIM:

- external factors affecting the functioning and development of RIM from the outside as a segment of the national insurance market and as a sector of the region's economy.
- internal factors that determine the functioning and development of RIM from the inside out — as a set of entities that carry out insurance activities in the region.

External factors of the RIM's development. The Russian national economy includes such an industry as the national insurance market, within the framework of which any RIM is its segment. For this reason, the functioning and development of any RIM is indirectly (through the national economy and through the Russian insurance market) influenced by the functioning and development of the economy and factors of the national insurance market. External factors include the imbalance in the regional structure of the insurance market; overpriced insurance costs; lack of incentives for long-term insurance; inefficient investment activities of insurers; constant changes in legislation; strengthening government regulation and increasing the transparency of insurance operations; the opportunity for insurers to participate in the pension system and the growth of accumulative life insurance; expected growth of manufacturing industries insurance; improving of insurance portfolios quality and etc.

The economy of any region is a part of the national economy. At the same time, it includes RIM as its separate sector. For this reason, the functioning and development of any RIM is indirectly (through the national economy and through the economy of the region) influenced by the functioning and development of the economy and the development factors of a particular region.

Internal factors of RIM development as factors in the insurance activities implementation in the region are: the level of diversification of the economy and its industrial structure; mineral reserves; investment attractiveness and innovative activity; effectiveness of the financial markets functioning; level of budgetary provision; agglomeration development and population density; population income and quality of life; touristic potential; degree to catastrophic risks exposure and environmental conditions.

The RIM's functioning and development as a set of entities implementing insurance activities in the region may be influenced by general factors, (similar for all regional insurance markets), and specific to each of the region's factors. One should keep in mind the following - insurance entities present in the region may have different responsibilities and functions with respect to RIM, as well as different goals of their activities at RIM. Such a variety of functions and goals leads to differences in the factors affecting the activities of these entities in the implementation of the insurance activity itself.

All external and internal factors of RIM can be divided into the following groups:

- positive (stimulating) factors in the development of RIM. These factors can include: improving the quality of insurance portfolios; strengthening state regulation and increasing transparency of insurance operations; agglomeration development and population density.
- negative (inhibiting) factors in the development of RIM. These factors may include: the imbalance in the structure of the Russian insurance portfolio and the instability of its loss; overpriced insurance services; inefficiency of financial markets functioning; low level of budgetary provision.
- factors changing the way of influence on RIM - under certain conditions, they have a stimulating effect on RIM, and under others - a negative one. The factor of strengthening state regulation helps to improve the quality of insurance services, but with excessive strengthening will lead to the curtailment of insurance activities. The factor of investment activity of insurers in the region, on the one hand, can stimulate the development of the region and its insurance market, on the other hand, can lead to capital outflows to other regions with insufficiently flexible regional policies.

Common factors for all regions for the development of the regional insurance market include, for example, the imbalance in the structure of the entire Russian insurance portfolio by type of insurance and the territorial unevenness in the development of regional insurance markets (negative factors), the cleansing of the market from financially unstable insurance companies (positive factor). As the analysis showed, a significant influence on the development of the region and on its regional insurance market is exerted by geographic, demographic, national and other features that determine the specific development factors of a particular RIM. The latter include, for example, the level of diversification of the region's economy and its sectoral structure, investment attractiveness and innovative activity, etc. A variety of regional features makes it necessary to identify specific regional factors for each of the RIMs that determine the development of RIM. For the Republic of Khakassia

(Siberian Federal District), taking into account the peculiarities of the regional development the following regional factors for the development of RIM were identified: a difficult environmental situation, a single-industry structure of the economy (poor diversification of the regional economy), limited financial capabilities of enterprises (negative factors); favorable conditions for the development of agriculture (positive factors).

In order to increase the efficiency of the RIM's functioning and development, determined by both criteria for the effectiveness of RIM functioning, the development of management decisions that would be consistent with maintaining or enhancing of positive factors impact and eliminating or reducing the impact of negative factors on the RIM's functioning and development.

Risks of the RIM's functioning and development

Among the positive factors in the functioning and development of RIM, one can distinguish those that have a well-known positive impact on RIM, and those that can be enhanced by additional management decisions.

Among the negative factors of the RIM's functioning and development, one can distinguish those which negative (restraining) influence is already manifested, and those which negative impact may occur. That is why the latter (factors) can be described by the corresponding risks - the risks of negative (constraining) factors of the RIM' functioning and development. Fig. 2 presents a diagram of the RIM's functioning and development risks due to external and internal factors influence.

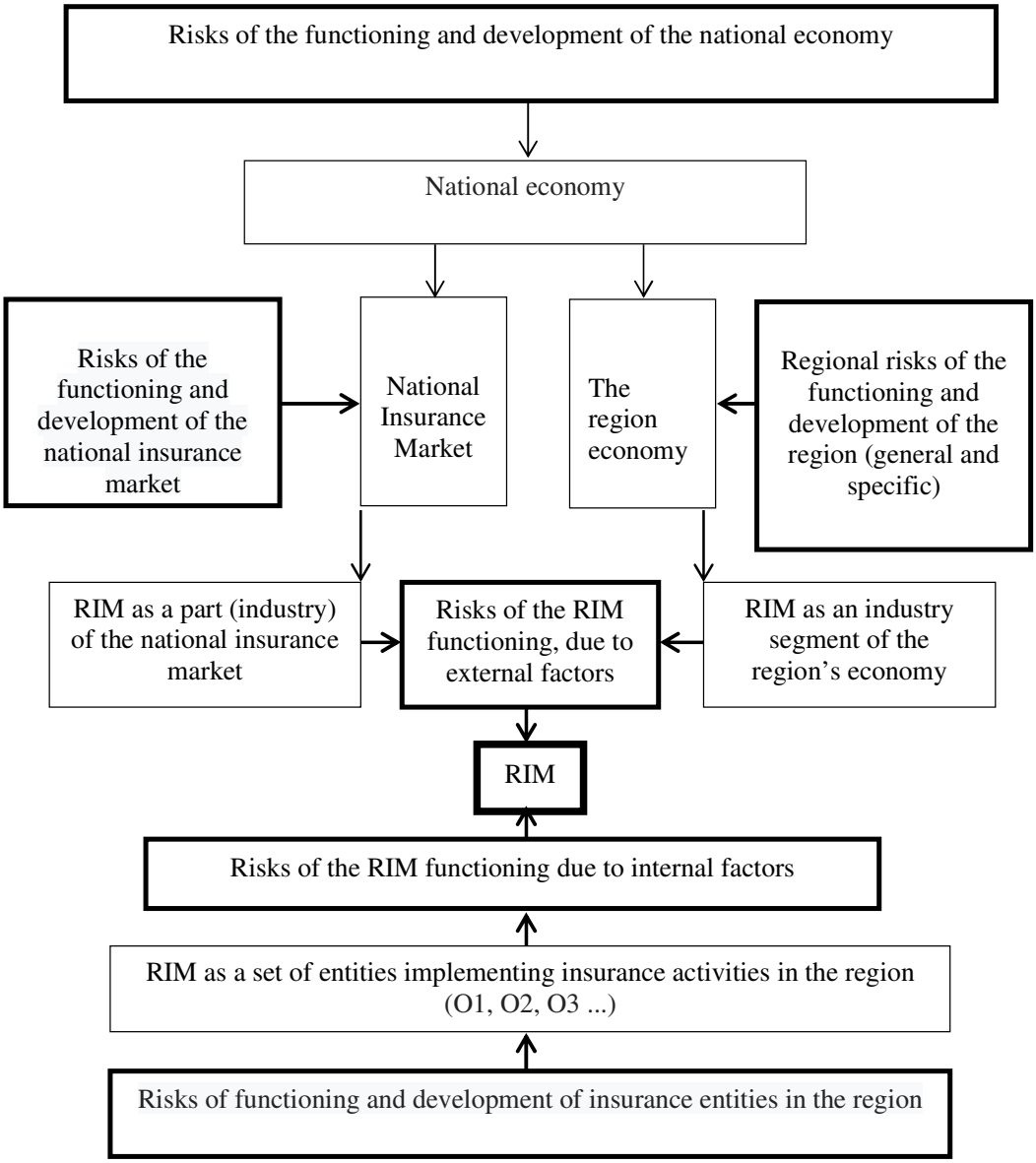

Fig. 2: The risk scheme of the RIM functioning and development

Source: compiled by the authors.

Negative management distinguishes difference between two situations. In the first case, management decisions should be aimed at eliminating the already known consequences of the influence of negative (restraining) factors, and in the second – at preventing the risks' implementation of the of negative (restraining) factors for the RIM's functioning and development.

An example of a negative regional factor impact can be the presence of hazardous industries that have shown their negative influence on the development of the Republic of Khakassia. In particular, a technological accident that occurred in one of the largest Sajano-Shushenskaja hydro-electric power station (HEPS) in August 2009. The legislative and managerial decisions made after that were aimed at correcting the situation, at restoring production facilities, but with the observance of more stringent measures to ensure the safety of HEPS functioning. An example of a negative factor, the manifestation of which is possible in future, is the presence in the region of a large number of

enterprises of the coal and metallurgical industries. This factor can be described, for example, by environmental risks, risks of public health loss.

The use of the concept of risks in describing the negative factors of the RIM's functioning and development provides the following advantages. Firstly, since the risks are associated only with the possible negative consequences of the influence of constraints on RIM, managing them can prevent these consequences. Secondly, risks are the object of insurance protection, and therefore, they determine those types of insurance, the development of which the region is experiencing. Through the identified regional risks, it is possible to determine the types of insurance that have priority for a given region, develop them, and thereby increase the efficiency of RIM functioning, which is determined by the first criterion. According to this criterion, RIM will be effective to the extent that it meets the needs of the region in insurance coverage.

For the example presented above, a measure of protection against environmental risks may be the development of environmental insurance, which is a priority for the region, and voluntary medical insurance of the population of the region for protection against risks of health loss.

The risks of the national economy functioning and development, as well as the risks of the national insurance market are the same for all regional markets of the Russian Federation. But the regional risks of the functioning and development of various constituent entities of the Russian Federation can be divided into 2 groups - common for all regions and specific for each region either for a separate group of regions. The level and specificity of the regional socio-economic development have a significant influence on a list of regional risks. Table 3 gives an example of significant regional risks specific to the regions of the Siberian Federal District (SFD). The choice of Siberia is due to its specificity - remoteness from the capital, resource- oriented economy, harsh natural and climatic conditions, technological and environmental risks.

Table 1: significant regional risks and necessary types of insurance on the example of the Siberian Federal District

Significant regional risks		Necessary types of insurance
Class of risks	**Specific risk manifestation**	
Financial	- low budgetary security - limited tax potential - low efficiency of financial markets - credit risks (insolvency)	- business risk insurance - insurance of financial risks - credit operations insurance - real estate insurance against fire and natural disasters
Economic	- mono-industry structure of the economy - low diversification, predominance of extractive industries	- insurance of production risks - liability insurance
International economic	absolute predominance of raw materials exports	- insurance of export-import operations - insurance of transport, casco and cargo risks
Environmental	activity of coal and metallurgical enterprises - hydroelectric power station /HEPS activities	- insurance of environmental risks; - voluntary medical insurance for employees and other residents
Investment	- lack of organizational and financial support for investors - low efficiency of small business	- business risk insurance; - insurance of investments and construction risks;
Tourist	- poorly developed touristic infrastructure and seasonality of touristic activity	- tourism insurance; - insurance of building risks

Natural	- exposure to natural disasters (flooding, fires)	- insurance of natural and legal persons' property from fire and natural disasters
Technogenic	- potential flood zone of the world largest hydroelectric power station, - blasting at mining enterprises	- liability insurance; - insurance of production risks; - accident insurance
Agricultural	- risks of crop loss as a result of natural disasters and weather conditions - seasonal nature of production	- crop insurance against adverse weather conditions and natural disasters
Social	- the dependence of employment on the structure of the economy - low level of social protection - influx of migrants from other countries	- cumulative life insurance

Source: compiled by the authors.

The increased impact of positive factors, the reduction of existing negative factors influence on the RIM's development, the reduction or elimination of possible negative factors described by risks will contribute to the fact that, firstly, the insurance cover provided by the regional insurance market will meet the needs of the region, and, secondly, it will help to reduce costs and increase profitability of the regional insurance. The latter corresponds to the achievement of the strategic development goals of RIM, i.e. meets the increased efficiency of RIM.

The directions of further research of this problem include the consideration of issues related to the development of a program for managing national and regional factors and RIM development risks. The program should be aimed at improving the effectiveness of the RIM functioning, evaluated by both criteria. The formation of such a program should include: clarification of general and regional factors for the development of RIM, identification of stimulating and constraining factors groups, the development of managerial decisions aimed at strengthening stimulating factors and at weakening or eliminating constraining factors. Another area of further research is the development of a method for assessing the impact of changes in the level of RIM's development on the development of the region itself.

Conclusions

The paper proposes an author's approach to determining the effectiveness of the RIM's functioning. In accordance with it, the effectiveness of the RIM's functioning is understood as the degree of achievement of strategic goals set for RIM.

The most important strategic goals for the RIM functioning and development are determined by two performance criteria. The first of them is the complete satisfaction of the region's needs for social and financial protection from regional risks by the regional insurance market; and the second is the provision of standard quality and cost insurance services by the regional insurance market. At the same time, the RIM performance and development indicator by the first criterion shows the degree to which the regional insurance market has achieved the first goal, and the efficiency indicator by the second criterion - the degree to which it has achieved the second goal.

The RIM's functioning and development is significantly influenced by various factors. RIM, on the one hand, is a segment of the national insurance market, and, on the other, - a sector of the regional economy, is influenced by factors that are external to RIM.

At the same time, RIM functions as a specific business system, subject to the influence of internal factors.

All external and internal factors have different directions of impact on RIM - stimulating its development, inhibiting it, as well as factors that (under different conditions of RIM development) can have different effects.

The identified negative factors can be divided into two subgroups - those that already negatively affect the RIM functioning and development, and those that currently do not yet manifest themselves, but may manifest themselves in the future.

The latter can be represented as risks of negative factors in the RIM's functioning and development. Since the realization of such risks can be accompanied by severe negative consequences, their management, aimed at reducing such consequences, is extremely important.

In general, increasing of the RIM's effectiveness involves managing the positive and negative factors of its functioning and development, however, the severity of the possible realization of the negative (restraining) factors risks also necessitates the particular management of these risks.

The study confirms the hypothesis advanced by the authors. Increasing the efficiency of RIM functioning, defined as the degree of achievement of two strategic goals, can be reached by identifying factors and risks of different levels, managing them aimed at strengthening the influence of positive factors, weakening the impact of negative factors and reducing or preventing possible risks.

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Ergonomics as An Innovative Workflow Management Tool

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Abstract

The aim of the article is to present ergonomics as an innovative path to organize and manage work. The research method used was an internet survey and snapshot observation. The research included two small enterprises from the area of Kujawsko-Pomorskie Voivodeship. The organizations operate in the same industry and carry out tasks that are their key business area in a similar way. As a result of the survey, it was possible to create a comparative analysis showing how the work environment is shaped in two companies with the same business profile. The first company implemented low-budget ergonomic solutions, while the second company has been working in unchanged working conditions for many years. The results of the research show how an ergonomic approach to the management of organizations and human capital affects the achievement of economic and social benefits in the workplace.

Keywords: Management, Organization, Ergonomics, Work Process, Productivity.

Introduction

Ergonomics is a scientific discipline dealing with the adaptation of the working environment to the human being, to his interpersonal characteristics and to his physical and mental abilities. Such a way of organizing work is extremely beneficial for the employee, because it makes it much easier to perform work tasks, the employee gets tired more slowly and is able to achieve very good results. Much better than people working in positions not adjusted to their individual needs. Unfortunately, in Poland this discipline of learning is still underestimated by entrepreneurs. This is mainly due to the fact that it is treated marginally and is not given any attention within research projects. And it is only by carrying out scientific research that it can be proved that economic and social effects for enterprises implementing ergonomic recommendations are very high. That is why an attempt was made to prove how the working environments are shaped in two companies that have a similar business profile and only one of the companies has implemented ergonomic solutions.

The aim of the articles is to present ergonomics as an innovative method used to manage organizations. What is more, by applying ergonomic recommendations in an enterprise, it is possible to increase work efficiency, as well as improve morale of employees and increase their job satisfaction. However, the most important issue is that the implementation of ergonomics and its indications reduce the occurrence of skeletal-articular ailments in employees, i.e. improve their well-being by eliminating pain.

Ergonomics and work management in the company

Managing a company is a very complex task. The need to plan work for each activity, organize resources, train and prepare employees, as well as the necessary control element in each area. Faced with so many tasks, employers often forget about one important aspect, namely the creation of an appropriate working environment in technical terms. The proper adaptation of machines, equipment, tools, space to workers and their basic needs will allow them to perform their work better and more efficiently. However, as a consequence, an employer may obtain a better financial result and make his employees work more efficiently (Imada, Nagamachi, 1995, pp. 309).

One of the most important links between ergonomics and work management is the employee. It depends on employees if company will achieve the effects. In order for an employee to obtain the best possible results, increase his productivity, but thus not feel chronic fatigue and monotony at work, it is necessary to apply ergonomic solutions (Binczycki, 2013, p. 264). Only proper management of the work process will allow to achieve these goals. First of all, individual selection for particular work tasks. Already at the stage of recruitment it is necessary to decide whether the personal qualities possessed by an employee predestine him/her to work on a given position. In human capital management, it is extremely important to look at the employee through the prism of competences, skills and personal qualities and, on this basis, assign him or her an area of tasks to be performed.

Another important area combining ergonomics with work management is to ensure that the employee has all the necessary equipment, tools and workstation equipment so that he can work efficiently, effectively, safely and at the lowest possible biological cost. Only such ergonomic working conditions give the employer confidence that he has guaranteed everything that is important for the employee to perform the tasks entrusted to him (Kalkis, Roja, 2016, item 36). In a situation where the workplace is not adequately equipped to meet the requirements of the employee, it should be reckoned with the fact that his productivity will be lower, the time of work will be longer and the effects of work may be unsatisfactory for the employer.

The last factor that concerns work management and is closely related to ergonomics is the organization of working hours and breaks. This is an element that largely determines the effects of work. Contrary to what employers consider a fact, long working hours do not mean a better financial result. An employee working for a long time, who is entitled to only one break, will be tired of work, more nervous, prone to make frequent mistakes (Nakphet, Chaikumarn, Janwantanakul, 2014, pp. 342). It is a big challenge for the employer to properly manage his working time, first of all to complete all orders on time, and secondly to optimize the employee's work.

Ergonomics in the working environment – Research Project Results

The research was conducted using three different methods. The first method was snapshot observation of workplaces. The second method was the analysis of the company's documentation, and the third method was an internet survey.

At the beginning of the survey, employees in both companies were observed to gather information about the working environment and to prepare a proper questionnaire. The developed electronic questionnaire was sent out to employees to answer 15 short questions. The documentation of the companies made it possible to examine employee performance in different periods.

Due to the limited form of the article, only selected elements of the research project, concerning working time and position at work, will be presented below.

In the first company for a year there have been new work rules in place, which were introduced after the director completed training in ergonomics. He decided that it is worth to implement low-budget solutions and check what effects they will bring. The first solution that was implemented was to introduce one additional break lasting 15 minutes. So the working time was divided into three equal sections by two breaks. The first break at 10:30 and the second one at 13:30. In the second company, however, employees are only entitled to one 15-minute break during the day, at 12:30. On the basis of observation and analysis of documentation, it was established what amounts of details are produced by individual employees on an hourly basis. The average quantity for employees in one and the other company was determined and then presented in a graphic version. Figure 1 shows a comparison of the average number of produced details by employees of two companies. In the first case, employees have two breaks of 15 minutes each, and in the second only one break, which lasts 15 minutes.

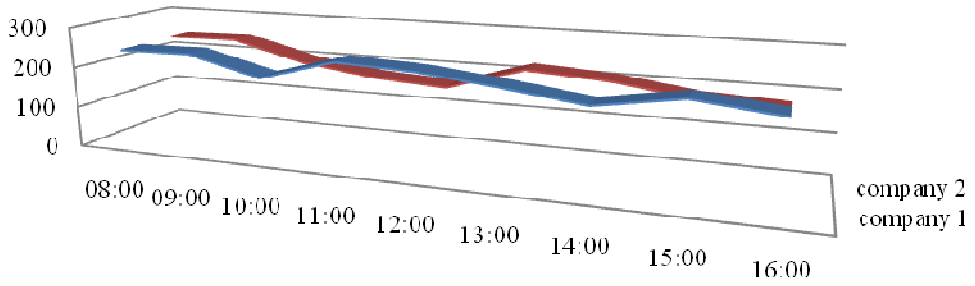

	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00
company 1	240	243	198	250	242	222	198	229	209
company 2	243	246	200	175	164	221	210	184	175

Fig. 1: Average number of produced parts per working hour in two companies
Source: Own study

The effects of 20 production workers from the first company and the same number of production workers from the second company were allowed for analysis. It turned out that the introduction of one additional break is a very accurate measure, because the productivity of the employees, which was very much decreasing at about 1 p.m., increased significantly just after coming back from the second break. On the other hand, in the second company, a decrease in productivity can be observed from 10 a.m., and productivity growth occurs only after returning from the break. It is very interesting that although the employees of the first company perform their work shorter than their colleagues from the second company, they are still able to produce more than 200 pieces more during the day. The conclusion of this study is unambiguous and shows that employees doing monotonous work with increasing worked hours produce fewer pieces. One additional break is enough to increase their productivity.

Another improvement that was introduced in the first company was the possibility to change the position at work. Employees were given chairs without a backrest, on which they could sit down during production of details and perform work in a sitting position. The possibility of changing the body position proved to be very important for those working on the assembly tape. The employees were asked about this aspect in the questionnaire. It turned out that in the first company, where the possibility to change position during work has been introduced, job satisfaction, caused by the reduction of pain, increased significantly. Figure 2 shows the answers of production workers to their position in working time.

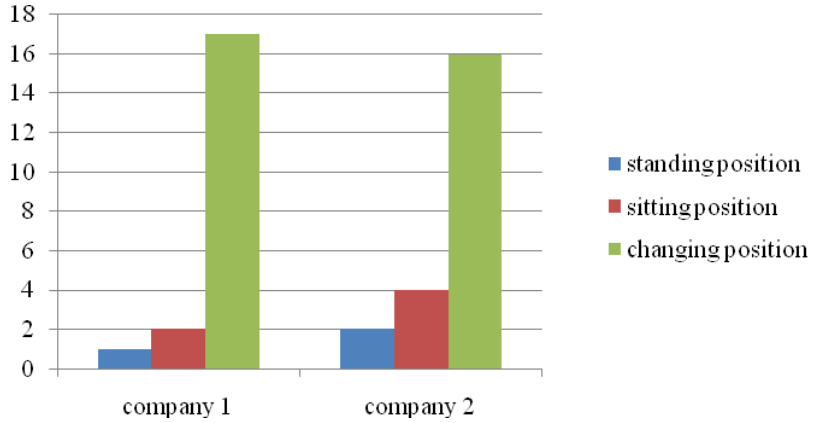

Fig. 2: Work position preferred by employees

Source: Own study

The vast majority of employees of both companies prefer alternating positions at work. Unfortunately, employees of the other company do not have the possibility to sit down at all while working, which increases their fatigue, backache and leg aches and causes less satisfaction from work. This is confirmed by their answers to the questionnaire.

Conclusions

Work management using ergonomic recommendations makes it possible to achieve very good results, improve employees satisfaction and reduce their health problems. By implementing practically cost-free ergonomic solutions to the work process, it is possible to increase the productivity of employees. This is clearly confirmed by the results obtained during the research. Companies wishing to obtain economic and social benefits at the same time should implement ergonomic solutions in every possible area of operation.

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The Role of Finance in Ensuring Sustainable Economic Development

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Abstract

Recently, there has been discussion about the need to rethink finance for sustainable economic development—in particular, how to influence inclusive growth through finance. There is a widespread opinion that conventional finance is not suited to financing sustainable economic growth. Studies have indicated that sustainable finance provides effective financing for sustainable economic development. This article is one of the first to search for the answer to the question whether countries with more sustainable finance have more sustainable economic development. This study attempts to investigate if there is a relationship between sustainable finance and sustainable economic development and thus if sustainable finance ensures a better adjustment of the financial sphere to the needs of the real economy. This study uses the relative taxonomy method to analyze the level of development, both in sustainable economic development and sustainable finance, for 23 EU countries belonging to the OECD. For this purpose, the Eurostat dataset from 2016 was analysed. Twenty-four indicators representing sustainable finance (15) and sustainable economic development (9) were used. The study results show the diversity of EU countries belonging to the OECD in terms of the studied phenomenon. From both an economic and a financial perspective, the best position belongs to countries in Northern and Western Europe, with the exception of Belgium. The countries of Eastern and Southern Europe have different and much more poorly ranking positions.

Keywords: Sustainability, Finance, Economic Development, Relative Taxonomy Method

Introduction

Discussions about the role of finance in the economy and its impact on development has had a long history (Bagehot, *Lombard Street* 1873). Levine (2004) notes that countries with better operating banks and financial markets tend to grow faster. Khan and Senhadji (2000) made an overview of related work, and their conclusion was that the impact of financial development on growth is positive, although the size of the effect varies with different indicators of financial development and the methodology of the study. Also Loayza et al. (2018) reviewed papers published in the last 20 years concerning financial development, financial crises, and economic growth. The authors concluded that financial development can ensure the development of a crucial framework to propose policies linked to financial depth, diversity, and inclusion. The relationship between finance and sustainability has already been the subject of many papers.

In the context of finance versus sustainability, there are several research problems that are frequently discussed. The biggest concern is the issue of adjusting finance and designing financial systems for financing sustainable development. Pissano et al. (2012) reported a crucial gap between sustainable development and financial markets. The major issue relates to balancing sustainable development dimensions that are typically long-term focused with the typically short-term profits of conventional finance. Fullwiler (2015) argues that the developing scope of sustainable finance offers an opportunity

to create a more general theory of finance that takes into account the social and environmental pillars of sustainable development.

The current research debate usually refers to sustainability and finance (Ferreira et al. 2016) in the context of the following four factors: the institutional links in capital markets (Gray 2011), the impact of ESG (environmental, social and corporate governance) on financial performance (Nikolakis et al. 2012), the impact of investment (Hebb 2013) and socially responsible investment (Vandekerckhove and Leys 2012). Considering the relationship between social and environmental performance versus financial performance, the literature gives an unclear picture. Some studies have found evidence for a positive relationship (Dowell et al. 2000), whereas some report a negative relationship (Walley and Whitehead 1994), and others find a neutral linkages (Elsayed and Paton, 2005) between these areas. The only study provides a positive conclusion is Orlitzky et al. (2003).

Lastly, there is wide discussion about finance and economic development in the context of sustainability. Sestakova (2012) argues that the stability of the financial sector is an important precondition for sustainable economic development. At the same time, the financing in the Sustainable Development Report (2019) calls for making the global economy and global finance more sustainable. Anwar et al. (2011) found a stable long run relationship between financial sector indicators and sustainable economic development. The authors reported that the financial sector had a positive impact on sustainable economic development in both the short- and long-term. Although a positive relationship has been reported between finance and sustainable economic development, there is currently no in-depth study that explores sustainable finance's role in supporting sustainable economic development. The present study intends to cover this gap and to determine if the finance model matters in ensuring sustainable economic development. This paper assumes that the sustainable finance model enhances the degree to which the financial sphere fits into the real economy and provides a more efficient dissemination of the sustainability development process compared to conventional finance. The aim of this article is to show the differences between countries depending on the finance model they represent (sustainable or conventional) and to demonstrate the relationship between a country's financial model and sustainable economic development.

The paper is organized as follows: Section I discusses the research procedure, Section II presents the research results and discussion, and Section III presents conclusions.

Research Procedure

Selection of Diagnostic Indicators

In the paper two sets of diagnostic indicators were used. First one is related to the economic area of sustainable development. In this group the indicators applied by the European Commission to monitor the progress in the implementation of „The 2030 Agenda for Sustainable Development" in the European Union, were used. To this group also one indicator described the results in the area of competitive position (value of Foreign Direct Investment *per capita*, FDI *per capita*), was assigned. The paper considers the concept of sustainable economic development discussed by inter alia Barbier (1987). For the second one the indicators selected by authors according to the profound literature review and already presented in the previous research papers (Zioło et al., 2019 a, 2019b), were assigned. The indicators explaining sustainable finance scope were selected to reflect the three dimensional nature of sustainable finance, where: 2 indicators are related to the environmental pillar of sustainable development and sustainable finance ($x_{2.9S}$, $x_{2.10S}$); indicators $x_{2.3S} - x_{2.6S}$ are applied to describe the social pillar; and the rest of them are utilized to present the economic pillar. In the study we based on financial models proposed by Schoenmaker (2017). The selection of the indicators in sustainable finance scope was based on the related work: Apergis, Eleftheriou and Payne, (2013) (environmental pillar), Burchardt and Vizard (2007), Balcerzak (2020) (social pillar) and Čihák et al. 2012, Pietrzak (2019) (economic pillar). In the paper the results of 23 EU countries belonging to OECD were analysed. Table 1 contains a detailed list of indicators constituting the basis of empirical research presented in the paper.

Table 1: The research database divided into two groups of indicators described economic area of

sustainable development and sustainable finance

Symbol	Economic area of sustainable development
$x_{1.1S}$	real GDP *per capita*, chain linked volumes (2010=100), Euro *per capita*
$x_{1.2S}$	employment in high-and medium-high technology manufacturing sectors and knowledge-intensive service sectors, %of total employment
$x_{1.3D}$	involuntary temporary employment, % of employees aged 20 to 73
$x_{1.4S}$	R&D personnel by sector, % of active population
$x_{1.5S}$	employment rates of recent graduates, % of population aged 20 to 43
$x_{1.6S}$	purchasing power adjusted GDP *per capita* (in PPS EU28)
$x_{1.7S}$	Foreign Direct Investment (FDI) in million Dollars *per capita*
$x_{1.8S}$	energy productivity, Euro per kilogram of oil equivalent (KGOE)
$x_{1.9d}$	greenhouse gas emissions intensity of energy consumption (source: EEA and Eurostat), index (2000 = 100)
Symbol	**Sustainable finance**
$x_{2.1S}$	gross domestic expenditure on R&D, % of GDP
$x_{2.2D}$	Gini coefficient of equivalised disposable income, coefficient of 0 (maximal equality) to 100 (maximal inequality)
$x_{2.3S}$	general government expenditure on education, % of GDP
$x_{2.4S}$	general government expenditure on health % of GDP
$x_{2.5S}$	general government expenditure on social protection, % of GDP
$x_{2.6S}$	general government total expenditure on law courts, Euro per inhabitant
$x_{2.7D}$	general government gross debt, Percentage of gross domestic product (GDP)
$x_{2.8S}$	shares of labour taxes in total tax revenues, % of total taxes
$x_{2.9S}$	shares of environmental taxes in total tax revenues, % of total taxes
$x_{2.10S}$	environmental taxes, percentage of total revenues from taxes and social contributions (including imputed social contributions)
$x_{2.11D}$	consolidated banking leverage, domestic and foreign entities (asset-to-equity multiple)
$x_{2.12S}$	bank credit to the private sector as percent of GDP
$x_{2.13S}$	official development assistance as share of gross national income (source: OECD), % of gross national income (GNI)
$x_{2.14S}$	EU imports from developing countries, million EUR, Development Assistance Committee (DAC) in millions of Euro
$x_{2.15S}$	income from natural resources, percent of GDP

Source: Eurostat data base, where: S – Stimulant; D- Destimulant.

Statistical Methods

In the paper, to study the disparities between the selected EU countries belonging to the OECD, the relative taxonomy described in the work of Wydymus (2013) was used. The main advantage of this method is the possibility to analyse changes simultaneously in the assigned rankings not only due to the situation of individual countries, but also to the situation of all others. The detailed description and results of its applications can be also found in the paper of Cheba (2020). In the first step after the selection of diagnostic indicators, destimulant should be transformed into stimulants. For this purpose a quotient transformations can be used. It should be noted that relative taxonomy can also analyse attributes expressed in different units of measure. The research procedure is provided according the following steps:

Step 1. Relativization the values of diagnostic indicators

The selected indicators are relativized for each object *i* and for the given *t*-year against the other analysed *l*-object with use the following formula (Wydymus 2013):

$$d_{(l/i)jt} = x_{ljt}/x_{ijt}, \tag{1}$$

where:

d – relativized values of the indicators, i, $l = 1, \ldots, k$ – objects' numbers, $i \neq l$, $j = 1, \ldots, m$ – numbers of sub-indicators, $t = 1, \ldots, n$ – numbers of years.
The structure of the individual arrays for each j-feature and t-year can be presented in the following form:

$$D_{jt} = \begin{bmatrix} 1 & d_{(2/1)_{jt}} & \cdots & d_{(k/1)_{jt}} \\ d_{(1/2)_{jt}} & 1 & \cdots & d_{(k/2)_{jt}} \\ \cdots & \cdots & 1 & \cdots \\ d_{(1/k)_{jt}} & d_{(2/k)_{jt}} & \cdots & 1 \end{bmatrix} \tag{2}$$

The magnitudes d in matrix (2) are unchanged and assume values close to 1. If: $d > 1$, then this implies the relative advantage of the l-th country in terms of the analysed diagnostic X. Conversely, if: $d < 1$, the interpretation is reversed. It can also be expressed as a percentage:

$$\lambda_{l/j} = \left(d_{l/i} - 1\right) \cdot 100 \tag{3}$$

Step 2. Classification of the objects

Based on the matrices $\mathbf{D}_{jt}$, matrix Δ_{it} for each spatial i object at the t-year was constructed. This matrix adopts the following form for individual objects (Wydymus 2013):

$$\Delta_{1t} = \begin{bmatrix} d_{(1/2)_{1t}} & d_{(1/2)_{2t}} & \cdots & d_{(1/2)_{jt}} \\ d_{(1/3)_{1t}} & d_{(1/3)_{2t}} & \cdots & d_{(1/3)_{jt}} \\ \vdots & \vdots & \ddots & \vdots \\ d_{(1/k)_{1t}} & d_{(1/k)_{2t}} & \cdots & d_{(1/k)_{jt}} \end{bmatrix},$$

$$\Delta_{2t} = \begin{bmatrix} d_{(2/1)_{1t}} & d_{(2/1)_{2t}} & \cdots & d_{(2/1)_{jt}} \\ d_{(2/3)_{1t}} & d_{(2/3)_{2t}} & \cdots & d_{(2/3)_{jt}} \\ \vdots & \vdots & \ddots & \vdots \\ d_{(2/k)_{1t}} & d_{(2/k)_{2t}} & \cdots & d_{(2/k)_{jt}} \end{bmatrix},$$

$$\Delta_{jt} = \begin{bmatrix} d_{(k/1)_{1t}} & d_{(k/1)_{2t}} & \cdots & d_{(k/1)_{jt}} \\ d_{(k/2)_{1t}} & d_{(k/2)_{2t}} & \cdots & d_{(k/2)_{jt}} \\ \vdots & \vdots & \ddots & \vdots \\ d_{(k/k-1)_{1t}} & d_{(k/k-1)_{2t}} & \cdots & d_{(k/k-1)_{jt}} \end{bmatrix}.$$

Matrices Δ_{jt} are usually defined as k-1 observation vectors of j-feature objects. Based on the array of $\mathbf{D}_{jt}$ matrices, the EU Member States belonging to the OECD are classified. In this step, the whole set of diagnostic indicators X is taken into account. This means defining the following matrices (Wydymus 2013):

$$A = \begin{bmatrix} 0 & & \frac{1}{(k-1)} \\ & \cdots & \\ \frac{1}{((k-1)} & & 0 \end{bmatrix}, \tag{4}$$

and products $D_{jt} = A \cdot D_{jt}$. Elements on the main diagonal matrix $\mathbf{D}^*$ form a three-dimensional matrix $\mathbf{W}$ defined for all j indicators and periods t (Wydymus, 2013):

$$W = \begin{bmatrix} w_{11t} & w_{12t} & \cdots & w_{1mt} \\ w_{21t} & w_{22t} & \cdots & w_{2mt} \\ \cdots & \cdots & \cdots & \cdots \\ w_{k1t} & w_{k2t} & \cdots & w_{kmt} \end{bmatrix}, \tag{5}$$

Finally, the relative taxonomic measure of development determined by the $\mathbf{W}$ matrix is calculated based on the following formula:

$$S_{it} = \left[\sum 1/w_{ijt}\right]/m, \tag{6}$$

The value of this measure is close to 1. The obtained results can be interpreted as the relative position of the particular EU country belonging to the OECD relative to all other analysed countries. For objects with a similar level of development, the values generally hover around unity. The lower the value of the measure is the better the situation of the EU countries against the others.

Study Results and Discussion

Table 2 compares the results of ordering and classifying-EU Member States belonging to the OECD in economic area of sustainable development and sustainable finance in 2016. Relative measures were used to assess the situation of a given country relatively to all others.

Table 2: Comparison of results of EU countries belonging to OECD within economic area of sustainable development and sustainable finance in 2016

EU countries	Economic area of sustainable development			Sustainable finance		
	S_{eci}	Rank	Group	S_{fi}	Rank	Group
Austria	0.699	4	I	0.857	7	II
Belgium	0.775	8	II	1.310	23	IV
Czech Republic	1.107	12	III	1.057	13	III
Denmark	0.705	5	I	0.688	1	I
Estonia	1.233	19	III	0.944	8	II
Finland	0.987	11	II	0.840	4	I
France	0.901	10	II	1.109	17	III
Germany	0.811	9	II	0.982	10	II
Greece	1.512	22	IV	1.165	20	III
Hungary	1.149	15	III	1.133	18	III
Ireland	0.617	1	I	1.056	12	III
Italy	1.140	14	III	1.042	11	III
Latvia	1.276	21	III	1.302	22	IV
Lithuania	1.174	16	III	1.221	21	IV
Luxembourg	0.657	2	I	0.950	9	II
Netherlands	0.752	7	II	0.736	2	I
Poland	1.597	23	IV	1.091	16	III
Portugal	1.219	18	III	1.077	14	III
Slovakia	1.183	17	III	1.159	19	III
Slovenia	1.127	13	III	0.845	6	II
Spain	1.257	20	III	1.088	15	III
Sweden	0.720	6	I	0.779	3	I
United Kingdom	0.695	3	I	0.841	5	I

Source: own research

Table 2 shows that the positions taken by individual EU countries belonging to the OECD in the received rankings in most cases differed significantly. In terms of the economic situation, a development of such countries as: Ireland, Luxembourg and the United Kingdom were better than other countries. However, at the top of the ranking due to sustainable finances were: Denmark, the Netherlands and Sweden. It should be noted that in both areas, the top of the rankings included countries located in Northern and Western Europe. There is no country that would be developed at the same level in both areas. Two countries are the closest in this respect: the Czech Republic (12 position due to economic area and 13 due to financial) and Germany (9 position due to economic area and 10 due to financial). In the case of three countries, the differences in positions exceed 10 and the largest of them concerns Belgium (8 and 23 position respectively), Estonia (19 and 8 position respectively) and Ireland (1 and 12 position respectively). The ordering of countries in the ranking calculated on the basis of indicators describing

the economic dimension of sustainable development was primarily affected by such indicators as: $x_{1.1S}$ – real GDP *per capita*, chain linked volumes (2010=100), Euro *per capita,* $x_{1.2S}$ – employment in high-and medium-high technology manufacturing sectors and knowledge-intensive service sectors, %of total employment $x_{1.4S}$ - R&D personnel by sector, % of active population. The estimates of the Pearson correlation coefficients between these indicators and the results of the taxonomic measure of development were above 0.8. However, in the case of indicators used to calculate a ranking describing the situation of the studied countries in terms of sustainable finance, the highest Pearson correlation coefficient (r = -0.62) was obtained in the case of the $x_{2.1S}$ describing gross domestic expenditure on R&D as % of GDP.

Due to the fact that the rankings of countries in the studied areas are not the same and in some cases they differ quite significantly, to find out to what extent there is a compliance between the ordered objects, the Pearson and τ Kendall correlation coefficients were determined (Tables 3 and 4). In these cases the coefficient values indicate a moderate compliance of the linear ordering of countries, which confirms the significant discrepancies in the positions occupied by some countries.

Table 3: Matrix of Pearson coefficients for the results of ordering EU countries belonging to OECD in 2016

Area:	**Economic area of sustainable development**	**Sustainable finance**
Economic area of sustainable development	1.000	0.514
Sustainable finance	0.514	1.000

Source: own research

Table 4: Matrix of Kendall τ correlation coefficients for the results of ordering EU countries belonging to OECD in 2016

Area:	**Economic area of sustainable development**	**Sustainable finance**
Economic area of sustainable development	1.000	0.391
Sustainable finance	0.391	1.000

Source: own research

The mean values and standard deviation of relative taxonomic measures were the basis for grouping EU countries into four typological groups bringing together countries with a similar level of economic and financial development (Table 2, figures 1-2). The differences in the distribution of the EU Member States into typological groups due to the studied areas are not large, which confirms the value of the Kendall τ correlation coefficient (Table 5). Only for 2 EU countries (Belgium and Ireland) the distance between groups is 2, and for 10 countries no changes in typological groups were observed.

The analysis of typological groups showed a clear diversity of EU countries in terms of the studied phenomenon. For both the economic and financial area, the best situation concerns countries located in Northern and Western Europe, with the exception of Belgium, which takes the last position in the ranking of sustainable finances. Countries located in Eastern and Southern Europe (e.g. Greece, Spain, and Poland, Slovakia) are in a much worse situation.

Table 5: Matrix of Kendall τ correlation coefficients for the results of division of EU countries belonging to OECD into typological groups in 2016

Area:	Economic area of sustainable development	Sustainable finance
Economic area of sustainable development	1.000	0.474
Sustainable finance	0.474	1.000

Source: own research

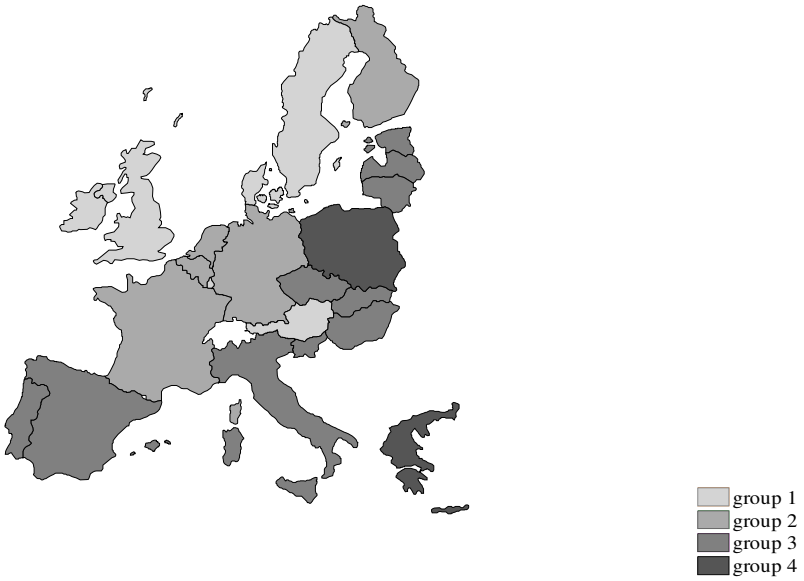

Fig. 1: The results of division of EU countries belonging to OECD into typological groups according to the results obtained in economic area of sustainable development

Source: own research

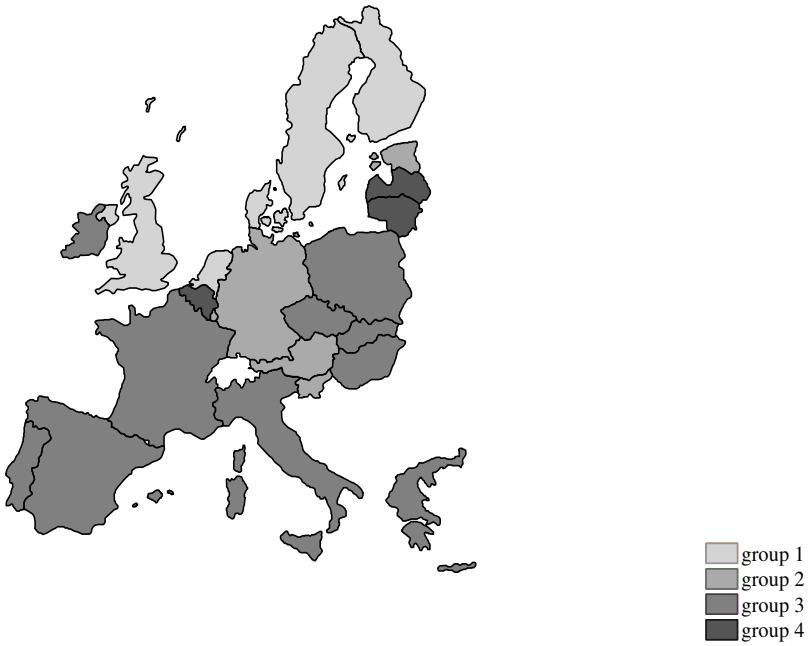

Fig. 2: The results of division of EU countries belonging to OECD into typological groups according to the results obtained in economic area of sustainable finance

Source: own research

The general results of the study show that the countries of Northern and Western Europe achieve better positions than Eastern and Southern Europe in their rankings for both sustainable finance and sustainable economic development. This is particularly apparent for Sweden, Denmark, and the United Kingdom (typological group I in both categories); Germany (typological group II in both categories); and the Czech Republic, Hungary, Italy, Portugal, Slovakia, and Spain (typological group III in both categories). In the case of other countries, the difference between the typological groups in both categories is not greater than one—e.g., countries from the 3rd typological group are in typological group IV in the second category and vice versa.

There is, therefore, a relationship between the sustainable finance model and sustainable economic development. The results of this study are problematized by the phenomenon of financialisation, which affects the ranking position of sustainable finance in highly developed countries that have problems with excessive leveraging in financial markets; hence, the financial stability of the countries considered in the rankings has an impact on their position in terms of sustainable finance. Financialisation is observed in developed countries, especially those with a well-developed capital market, such as countries located in Western Europe.

On the other hand, in the case of Central and Eastern European countries, environmental taxes are significant in assessing the sustainable finance model. This indicator, as one of the most important instruments for sustainable finance supporting positive changes in the utilisation of the environment by humans, plays a different role in Central and Eastern Europe than in Western and Northern Europe. In Central and Eastern Europe, tax rules are applied according such that the polluter pays higher taxes. In highly developed countries, environmental taxes are also paid by advanced entities to help protect the environment. This reflects their contribution to supporting environmental protection.

The results of this study show that sustainable economic development is related to the sustainable finance model, which is based on mixed instruments representing social and environmental pillars of sustainable development. In particular, instruments like environmental taxes or a redistribution policy based on transfers and inclusion-friendly expenditures play an important role. Factors that negatively affect sustainable economic growth include the excessive financial leverage used in developed financial markets and financial engineering conducive to the development of financialisation.

At the same time, an important factor positioning the Scandinavian countries (Northern Europe) so high in the sustainable finance model ranking is their effective redistribution systems that reduce income inequality and promote social inclusion. In the countries of Central and Eastern Europe, this system is less effective.

Our findings are in line with other relevant research that confirms a positive impact of finance on sustainable economic development. Paun et al. (2019) argue that credit expansion during and after the last financial crisis, which diminished economic growth, and banking sector were less effective in sustaining economic growth compared to capital markets. Finally, sustainable development is very strongly influenced by financial markets and institutions. Our results are also related to those presented by Gur (2017), who found that by providing external finance to R&D, technology-intensive industries became more important for sustainable economic growth. In sum, an evolving financial system is necessary to achieve sustainable growth.

Conclusion

The problem of adjusting the financial sphere to contemporary socio-economic realities has been widely discussed in the literature. The research notes that conventional finance does not take into account a three-dimensional perspective of development and sustainable growth, making it an ineffective financing model. It is increasingly suggested that a sustainable finance model is one that allows for the effective financing of a sustainable economy and sustainable development, but very few studies have attempted to prove this thesis empirically. The present article is one of the first in this field to try to determine the relationship between the sustainable finance model and sustainable economic development.

This study examined 23 EU countries belonging to the OECD in 2016 based on Eurostat data set. To analyse the disparities between the selected EU countries belonging to the OECD, the relative taxonomy method was used. An empirical analysis was conducted based on 24 indicators representing sustainable finance (15) and sustainable economic development (9). The research methodology of this study, however, faces numerous limitations, including data availability and completeness, particularly for sustainable finance. However, based on the available data, it is possible to draw preliminary conclusions that can be subjected to further in-depth analyses using qualitative methods.

The results of this study show that there is a relationship between the sustainable finance model and sustainable economic development. In the case of most developed countries located in Northern Europe, such as the Scandinavian countries, this relationship is particularly important. This study allowed us to identify four typological groups of countries in both sections of the sustainable finance model and sustainable economic development. The highest rated countries in terms of meeting the criteria of the sustainable finance model and sustainable economic development were assigned to the first typological group, while to the fourth group contains countries with the weakest positions in both these categories. Typological group II contains countries with scores above the mean value for all analysed objects, while the third typological group contains countries with results below the mean value. A similar situation concerns so called post-transformation countries (the Visegrad countries), which form a subgroup in the countries of Central and Eastern Europe. Notably, in the case of countries located in Northern and Western Europe and in Central and Eastern Europe, there are different factors that determine their ranking positions.

For the first aforementioned group, one of the most important factors is financialisation. This factor negatively affects the sustainable finance model. Importantly, in this group, environmental taxes and the budget redistribution system have a positive impact on the sustainable finance model.

In the second group, the main factors negatively affecting a country's ranking in the sustainable finance model are environmental taxes and the redistribution system. For the results of countries in this group, financialistaion is not as important as a factor that can be taken into account when formulating a more sustainable financial system.

This distinction is important because the countries located in Central and Eastern Europe have economies that are based on fossil fuels (coal), which contributes to excessive greenhouse gas emissions. For this group, ensuring environmental sustainability is very important, hence the significant role of environmental taxes in their financial systems. The second issue is social inclusion, which remains a challenge for this group of countries. Sustainable economic development, in turn, requires a green and inclusive approach for growth, which is not possible without a sustainable finance model. The relationships between variables, which were ignored in the study, encourage further in-depth analyses on the role of the market and public financial sustainable systems in ensuring sustainable economic development. This will also be a subject of the authors' future research.

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European Integration Economic Challenges, Financial Impacts, and Monitoring the Absorption of Ukraine's Identity

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Abstract

Being in a situation of the socio-economic system disintegration, Ukraine faces the problem of protecting its own identity against the background of the European integration course chosen by the government at the legislative level and enshrined in the Constitution of Ukraine. The situational Ukrainian problem is that if the government continues to focus on integration trends at an accelerated pace, skills, labor and human resources, which are significantly declining now in Ukraine, will lose their qualitative value, which will inevitably lead to a Ukrainian collapse economic system, but also significant issues of partner countries. *The aim of the article* is theoretical and applied aspects of reflecting the real state of integration economic challenges and their financial consequences for the country with a focus on monitoring the absorption of Ukraine's national identity. *Methods / approaches*: research methodology based on methods of correlation and comparative analysis; logical and heuristic; extrapolation; Feedback. Results: The study confirmed the fact that, despite global trends, Ukraine should question the legitimacy and rationality of the materialistic selfish principle in the economy. The Ukrainian platform of socio-economic strategic development, in activating the policy of national protectionism, as opposed to the populist movement, may become a new paradigm for the existence of national economic environments, which will replace the usual short-sightedness of thoughts and actions today. The authors worked out the determinants of determining the effectiveness of integration processes in the financial and economic sphere, analyzed the peculiarities of the Ukrainian integration direction of development, proposed the creation of appropriate conditions to stop the absorption of national identification and balanced development of the Ukrainian economy. *Conclusions.* The continued attraction to the integration of conventional and uncontrolled growth in the well-being of individual sections of the population leads to severe conflicts in the face of natural laws of the universe and human behavior. Economic laws, rigidly governed by the financial system and its speculative transactions, will further increase the difference in the well-being and income of the various social strata.

Keywords: Integration Challenges, Identity, Financial Implications, Economic Background, Monitoring.

Introduction

After experiencing the problem of the socio-economic system disintegration for the sixth year, Ukraine faces the problem of protecting its own identity against the background of the European integration course chosen by the state in the 21st century. The essence of national identity is set out in the so-called "Ukrainian National Idea" (Ukrainian National Idea, 2011), which, in the view of modern researchers (Vovkanych, 2015), expresses not only the own historical values of Ukraine people, which were formed at the beginning of the last millennium, but also modern values inherent not only for our country but also for other countries of the European Community and the rest the states in the entire civilized world.

The Ukrainian National Idea envisages three main strategic directions for the development of a state that should be cathedral, Ukrainian and worthy of the individual, the whole nation and humanity (Vovkanych, 2015). The notion of catholicity implies not only territorial integrity, but in the current conditions of European integration, it means the ability of the country population to jointly support effectively and promote their own state on the international arena as a competitive participant of economic activity, offering quality products for the international arena which is produced without loss of the social values system due to the accumulated social capital (inside and outside the country).

The second strategic component of identity – Ukrainian – in the context of economic development in the frame of European integration, presupposes the nation's self-sufficiency, its capacity for sustainable development on its own territory, which is at the same time a cozy home for many ethnic minorities, able to create favorable socio-economic conditions for their living, and quality of life. This strategic direction involves the formation of a sustainable image of Ukraine as a country with established values, which develops on the basis of cultural and historical heritage, taking into account innovative transformational instruments of the domestic economic system in accordance with the desired technological style, state interests and world trends.

The third strategic direction – a state which is worthy of man, nation and humanity – within the framework of European integration, provides equal stable socio-economic and environmental conditions for every citizen of the country, which is provided not only with material goods in accordance with European Union standards, but also with development opportunities for each personality, its full self-realization at the expense of accessible quality education, science, inclusive cultural environment, the presence of which makes it possible to fully reveal and realize their full potential.

Priority Integration Areas for Ukraine

In recent years, Ukraine, having identified for itself the course on European integration as the main priority of the country's development, gradually loses all three of the above mentioned components: catholicity as well as Ukrainian identity and worth towards its own citizens:

1. The complex economic indicator of the catholicity created by us, which generates the economic competitiveness of the country, is the gross domestic product per person. According to statistical sources in Ukraine, this indicator is recovering very slowly, but this trend is partly explained by the decrease in the number of permanent residents. On the other hand, in the rating among other countries of the world, including the countries of the European Union, the country gradually slips down: in 2013 according to the UN - 113 place (GDP per person - $ 4 ths.); in 2015, according to the World Bank - 127th place (GDP per person - $ 2.6 ths.); in 2018 - 131st place (GDP - $ 2.96 ths.). The situation of Ukraine as of 2018 among other European countries is presented in the figure. 1. The leader in for this indicator is Luxembourg, which is ranked first not only in Europe but also in the world. Ukraine, ranked 131st, has an indicator that is 38.6 times smaller than the leader country has.

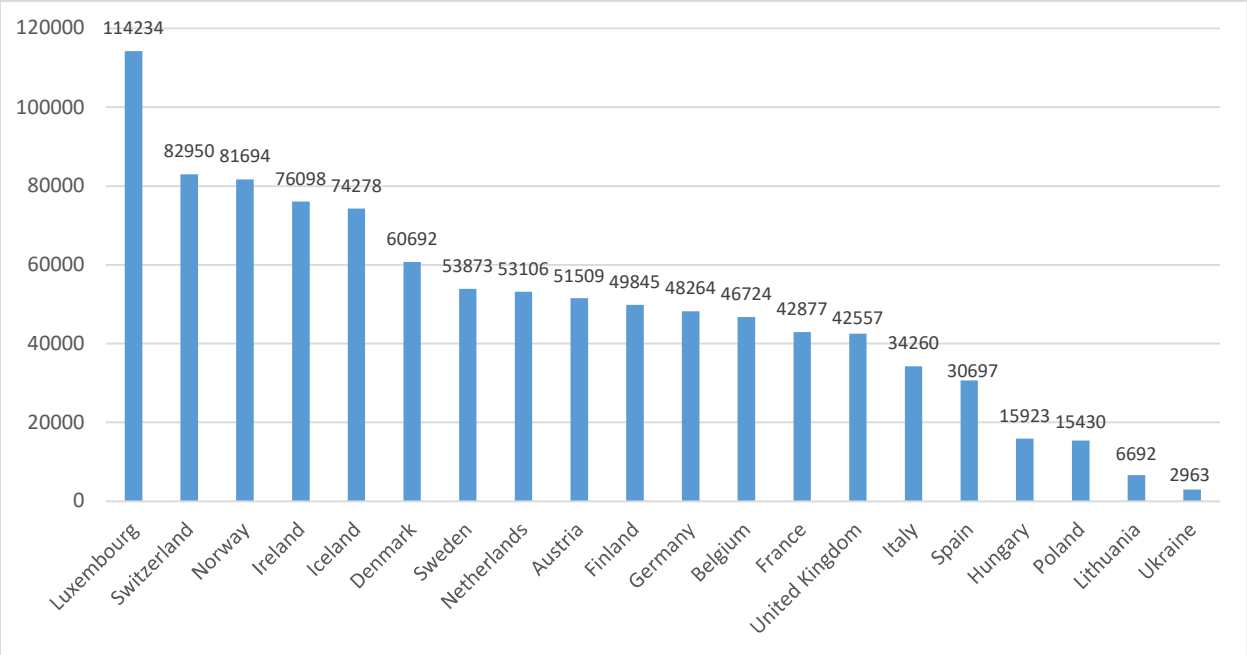

Fig. 1:GDP per capita in 2018, $ ths.

Source: list of countries by GDP, 2019

2. There are reports in the media with regular intervals that allegedly oppressing the rights and freedoms of ethnic minorities against the backdrop of the Ukrainian language. The problem of the invented oppression of the Russian-speaking population, including ethnic Ukrainians speaking Russian, is particularly acute. This part of population is reluctant to switch to the official language even in official communication (most often, this situation is observed with the elderly people in the eastern regions). On the other hand, in the same eastern regions of the country, during the implementation of the so-called "New Ukrainian School" in the general secondary education system, against a large proportion of the Russian-speaking population, there is a shortage of educational materials in the state language. As a result, these circumstances indirectly affect the Human Development Index, which led Ukraine down from 84 places in 2016 (Chorna, 2018) to 88 in 2018 (UNDP Ukraine, 2018).

3. Despite declaring poverty rates, de facto gap between rich and poor sections of the population is only growing. Confirmatory facts confirm the gap between the income of the rich and the poor. If in 2006 this gap was 1:10, in 2016 - 1:30, in 2017 - 1:40. While in EU countries, this figure is 1:5 (Worthy Life - 2017, 2018). Poverty of employees not only in the budget sector but also in entrepreneurship is becoming widespread (What Has Made the Human Rights, 2017)

Situational Ukrainian issues are that if the government continues to focus on integration trends at an accelerated pace, skills, labor and human resources, which are rapidly declining in Ukraine now, will lose their qualitative value, which will inevitably lead to a Ukrainian collapse economic system, but also significant issues of partner countries.

Results

Today, the world faces many challenges, which, with the expansion of integration processes, also involve Ukraine: the financial and economic crisis, climate change, the scarcity of fertile lands and the uncontrolled movement of migration flows. Moreover, the social situation in the world remains extremely unsatisfactory: about 4 billion people are living in poor economic conditions, they are at risk of disasters and natural disasters every day. According to the latest estimates of the Roman Club experts, more than 50 million people are forced to leave their homes and emigrate every year. In 2017, there were already 60 million refugees worldwide (Ulrich von Weizsäcker, 2019).

At the same time, certain societies have nevertheless achieved a considerable level of economic well-being, a scientific base and technological potential, which enables them to carry out the necessary conversions and transformations, but also to ensure the development of other population sections. However, no one is in a hurry to worry about someone's interests, not their own.

Based on this world experience, Ukraine has the opportunity to question the legitimacy and rationality of the materialistic selfishness principle (Likhonosova, 2013), which is one of the most powerful driving forces in the world today. The Ukrainian platform of socio-economic strategic development, in activating the policy of national protectionism, as opposed to the populist libertarian movement (Zagoda, 2019), may become a new paradigm for the existence of national economic environments, which will replace the usual short-sightedness of thoughts and actions today.

Leading economic experts (Feldman, 2020) emphasize that the directions of globalization have been and remain abstract, and at the same time they are becoming a threat to the part of countries that are unable to defend their economic interests and social values. What are the ways in which globalization can be discussed when the European Union leaves the United Kingdom (Brexit, 2020), when the United States chooses to develop in isolationism of a new generation, and the Russian Federation is consciously isolated (Feldman, 2020).

European expert on strategic business planning Godin R. (Godin, 2020) notes that the mood in the business environment around the world is quite alarming. The economic elite is considering a future with a great deal of pessimism that has not been there since the financial crisis of 2009. Already, the signs of a global split, growing geopolitical tensions and the threat of a new financial crisis can be noted.

Managing Director of the International Monetary Fund, Kristalin Georgiev, during a speech at the Peterson Institute for International Economics (Astafurova, 2020), said that the global economy risks returning to an era of Great Depression caused by inequality between different populations. According to the head of the IMF (Astafurova, 2020), over the next decade, problems such as climate change and increasing trade protectionism in each country can lead to social unrest, political turmoil and instability in the financial markets.

Some of the ways out from this situation and possible further development have already been outlined in the 2018 UN Sustainable Development Agenda 2030 (Transforming Our World, 2018), which outlines 17 Sustainable Development Goals to be achieved for the next 15 years. But without curbing the driving force of economic growth - destructive pure materialism - the fear of finding itself in 15 years in a world with even worse economic, food and environmental conditions than it is today is not without reason.

The main doctrines of development of Ukraine, which are adopted today and are actively debated in society, are (Challenges and Opportuninities, 2019; Ukraine 2030: Doctrine of the balanced development, 2017):

1) accelerating economic growth;
2) building a modern security system;
3) keeping the course for joining the Euro-Atlantic Union;
4) stopping mass labor external migration;
5) creation of the Ukrainian narrative in the humanitarian sphere;
6) further decentralization of regions and formation of their new young elite;
7) full energy and gas independence.

And so on, it depending on what priorities the global economy puts forward and what opportunities the Ukrainian economy has. The consequences of such development should not be forgotten. Each country identifies them based on their specificities and national characteristics of the accelerated search for stability.

However, there are well-defined challenges that are discussed and highlighted by the international community, which proposes to address them as part of 13 decisions (Maxton, 2017), which should be taken by the leading economically developed countries of the world, but all of them are mostly reduced to the main problems of humanity: as unemployment, growing property inequality and rapid climate change. An alternative to all this can only be a bold national policy aimed at overcoming the major challenges facing Ukraine today, such as: unemployment, inequality and mass impoverishment; investment deficit and neo-industrialization (Calinescu, Likhonosova, Zelenko, 2019); external energy and financial dependence (Calinescu, Likhonosova, 2019); depletion of natural resources and loss of human resources; large-scale shadow corruption and social inequality.

However, traditional classical approaches to the new convergence of economics and world society, offered by most recognized scholars (Friedman, 2017; Spence, 2017; Reinert, 2015; Soto, 2012), do not always work, even in those countries where they are already tightly tested, but on the contrary, give rise to new crisis phenomena that require finding specific (own) approaches to counteract the absorption of countries' identities.

Ukraine has at present its own path of European integration development, which has not been felt by any country in Europe and which can be characterized by the following trends:

1. Ukraine has been in a state of hybrid war for 6 years. In the wake of recent country developments during recent years, when a country cannot focus all its efforts on any integration or reorganization, when it is necessary to fight on two fronts (economic and political) - to gain its identity and lose every day its population in the war zone, protecting their independence. This state of affairs affect the deterioration of all those indicators that allow the country to come closer to European standards, but it does create the conditions for its unique measures to change the current situation. In such circumstances, the top priority should be the end the war, which has been a major factor in the change of political power in the country. 65% of those who voted for the change of president and power in Ukraine (Kramar, 2019a), consider that the termination of war is the main task and trend in the near future. Also it is the interesting fact that the level of trust to the new authorities in the territories located in the area of war (28 – 29 %%) is close to the level of influence on the population of those parties that are at any cost to end the war in the country (43–49 %%) (Kazanskiy, 2019).

2. Despite all Euro-optimistic sentiments (52% of the population), still a sufficient number of the population (34%) is not yet ready to say confidently about their desire to join the European Union (Vikhrov, 2019). And if we move from the West of Ukraine to the East, this opposition of the population towards the European economic integration increases to almost 55%. At the same time, the highest achievements that Ukrainians have to achieve in the context of European integration are high standards of living (38.1% of respondents indicated this); the fight against corruption (27%); free movement within the territories of different countries (26%); access to European education (21%) and only then comes the opportunity for economic growth in the country (18%).

3. The negative trend for the country is the labor migration of the population to the countries of the European Union (EU), which is the result of the critical state of the country economy. The most attractive countries for Ukrainians migration is Germany, where in 2019 migration has increased almost twice compared to other equally attractive countries such as Estonia, Lithuania, Slovakia, Poland and the Czech Republic, which have almost the same conditions for migrants (Kramar, 2019b). These countries are attracting Ukrainian migrants because, first of all, not only the developed industrial infrastructure, but also the taxation system, social protection of the population, health care, education, etc.

4. One of the demographic challenge components in Ukraine is the increased mortality rate compared to other countries in the world. Moreover, the age difference between mortality of men and women is almost 10 years (Ozerna, 2019). And the reason for this is not only the presence of hostilities on the territory of the country, but also negative social phenomena such as unrestricted use of alcohol, smoking against the background of increasing transport incidents, exceeding the limit of infectious, respiratory diseases, lack of a well-established system of preventive vaccinations, health insurance, etc.

5. However, the demographic situation in the country is the biggest challenge that is increasing every year. And, even the situation presented in the official statistics does not correspond to the real state of affairs, because only a real census, declared in 2020, can illuminate the real picture with both

the available labor resources in the country and the economically active population. However, the birth rate has almost doubled, despite the fact that the birth rate in Ukraine has been steadily increasing since 2008 (Kramar, 2019c), does not give any hope for improvement of demographic status.

6. Ukraine's energy and gas independence is another challenge that intensifies all economic transformations in the country. Electricity production by thermal power plants decreased by almost 17% compared to 2016. The main consumers of this electricity are mainly metallurgical enterprises, whose production has also dropped significantly (almost twice compared to 2013, although it has some tendency to return to the base level) (Kramar, 2019d), and they are the main export suppliers in Ukraine.

Discussion

Ukraine, as a country that is currently a direct subject of integration processes in many socio-political processes, including the financial and economic spheres, should be guided by several determinants to determine their effectiveness (Figure 2):

1. Fair competition. Competition in the financial and economic sphere is a dynamic process of rivalry between the subjects of interaction, which provide similar or interchangeable financial services and seek to secure a strong position in the market, which allows to secure high return on capital in the future. Fair competition is a market environment in which individual players conscientiously compete for the consumer, without being able to significantly influence the conditions of circulation of the goods.

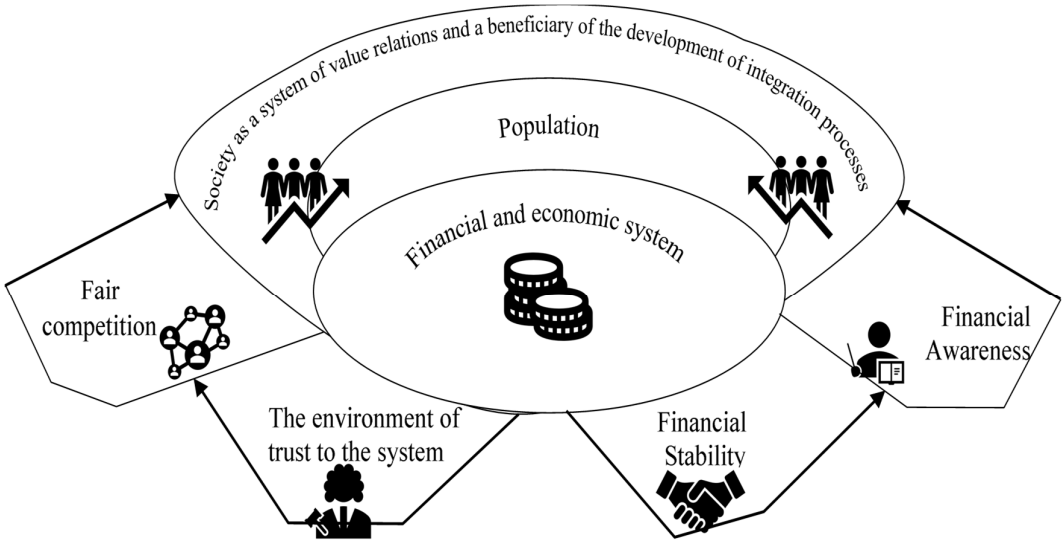

Fig. 2: Determinants for identification the effectiveness of integration processes in the financial and economic sphere

Source: developed by the authors

2. The environment of trust to the system. The financial and economic sphere as a system of relations between suppliers and buyers of financial services cannot function fully not only without economic but also without social capital, the most important component of which is trust. A developed trust environment reduces the transaction costs of the market to protect against fraudulent behavior and in the long run reduces the need for regulatory oversight.

3. Financial stability. Financial stability should be understood to mean the smooth and efficient implementation of integration processes, including the process of transforming savings into investment, its resilience to internal and external shocks. Ensuring financial stability reduces the costs of the economy from the realization of financial risks, increases the predictability of the cost of capital to

economic agents, ensures the continuity of services and prevents structural imbalances. Shock-protection, in turn, reduces the systemic risk premium inherent in the value of financial products, increasing the availability of financial services to the consumer.

4. Financial Awareness. Making financial services accessible to all members of society is a major socio-economic challenge. In general, financial awareness of the population expresses the ability to manage funds with minimal risks and maximum profit. That is, financial awareness combines a person's financial knowledge, skills and financial behavior to effectively manage their personal financial resources to make sound financial decisions. It is unfortunate, but at present, Ukrainians have a very low level of financial services use. 27% of citizens do not make savings at all, while those who practice savings more often defer them to the “foreseeable situation” (NBU Official Website, 2020). However, due to lack of awareness of financial institutions, every second person saves money at home while losing money on a daily basis. A significant distrust of financial institutions in every fourth Ukrainian is also characteristic because of their bitter experience with consumer credit institutions. At the same time, from those who had problems using the financial service, a small part defends their rights, files a complaint to the appropriate authorities and as a result loses trust in all financial institutions simply because of ignorance.

Indeed, most Ukrainians have a frankly passive attitude to creating their own well-being and have a philosophy of relying solely on their own. It turns out that 29% of the population of Ukraine do not have bank accounts. Most Ukrainians use only basic financial services, including (NBU Official Website, 2020): 1) payment of utility bills by banking services (72%); 2) use of bank account and plastic card (68%); 3) consumer credit (30%); 4) making payments through terminals of payment systems (38%); 5) currency exchange (31%) and more.

The National Bank made a significant contribution to financing the budget deficit of Ukraine by transferring UAH 47.6 billion of its revenues to the State Budget in 2019 (Danylyshyn, 2019). But it is worth noting that some of the National Bank of Ukraine's income is generated by the proceeds of domestic government bonds, which are in the National Bank's portfolio. In fact, the National Bank of Ukraine redeemed government bonds, helping to smooth the cash gaps of the state budget of Ukraine; instead, the Ministry of Finance of Ukraine provides high interest rates on domestic government bonds in favor of the National Bank, therefore, much of the proceeds received by the National Bank of Ukraine are transferred to the state. Some experts refer to this as the "cycle of debt in public finances" (Kovalchuk, 2019). In support of this argument, it can be noted that in the portfolio of the National Bank of Ukraine as of 1 January 2020, the bonds of the domestic government loan were concentrated at UAH 337 billion (NBU Official Website, 2020). Even a small portion of these funds, if involved in the implementation of special lending programs for the real sector of the economy, would be able to accelerate the pace of economic growth.

As of June 1, 2019, non-residents' investments in domestic government bonds stood at UAH 39.2 billion, up almost 6.5 times since the beginning of the year (Danylyshyn, 2019). Therefore, using the current favorable national currency rate, the National Bank of Ukraine should continue to buy foreign currency in the interbank market in order to increase its foreign exchange reserves.

Taking all this into account, the government should now focus on modernizing approaches to the country's monetary policy. It makes sense to take into account that under Article 116 of the Constitution of Ukraine (Constitution of Ukraine, 1996), the responsibility for the economic growth and development of the financial system rests with the Cabinet of Ministers of Ukraine. According to Article 99 of the Constitution of Ukraine, the National Bank is responsible for the stability of the national currency (Constitution of Ukraine, 1996). In view of this, it would be worthwhile to coordinate the actions of both bodies more actively. At the same time, the Cabinet of Ministers of Ukraine should address the issue of improving the quality and pace of economic growth, as well as the development of the financial system, based on the indicators of state-owned banks. In addition, given the integration requirements of the Ukrainian economy growth (chronic commodity downturns and lagging behind the global average), it will be quite difficult to ensure long-term stability of the hryvnia.

In addition, integration processes pose new challenges for Ukraine and require new management challenges: deep social inequality, military conflicts and civil wars, unemployment and mass migration.

C. Arsenault's study found that nearly half of fertile land has declined on Earth over the last 150 years (Arsenault, 2014), with about 90% of food resources being endangered. Climate stability and predictability are in grave danger. Moreover, some experts (Kolbert, 2014) point out that the planet is now undergoing a sixth mass extinction period in its history.

The trends of crisis in socio-economic and ecological systems are thoroughly described in the "imperative to action" (Rees, 2012). Susan Solomon points out that a person's ability to act often outstrips his or her ability to analyze. As a result of civilization, they absorb each other, causing problems not to be solved, but only to widen: increased consumption, increased inequality, the use of environmentally destructive technologies, uncontrolled migration, etc. However, the rapidly deteriorating biophysical situation is unlikely to be the starting point for the governments of countries seeking integration integrations that believe the resource economy can grow forever.

The nature of the crisis is not cyclical, but much worse - its spiral is expanding. To date, crisis phenomena are not limited to environmental catastrophes and "subsidence" of world currencies. The consequences of the social, cultural and moral crisis, the crisis of confidence and the dominant ideologies come to the fore. Billions of people tend to distrust their own governments. A worldwide survey by the Edelman Sociological Center states that 53% of the population in 28 countries believe that their systems are not up to the task; and only 15% believe the opposite (The Edelman Trust Barometer, 2017).

At worst, governments are responding to a populist attempt to improve their image, at best - trying to correct the symptoms of the crisis, not the cause. The problem is that the decision of the political elite around the world depends heavily on transnational corporations, international investors and donors of financial aid.

A prime example of this is, for example, Brexit. As noted by Fareed Zakaria, in most countries populism is in opposition, but is steadily gaining ground, in others, particularly in Hungary, it is now the main ideology and direction of government (Zakaria, 2016).

In addition, the trend of cautious attitudes towards "exponential technologies" is already being traced. There is a real danger of uncontrolled development and unethical use of technology and until society has come up with ways to counteract it. In addition, the limitless development of technologies and their fields of application demotivates decision-makers: if technologies are capable of solving all problems, there is no need to find complex, complex solutions that require lifestyle changes and exit from the comfort zone.

Conclusions

The current trends in the functioning of the social, humanitarian and financial-economic systems of Ukraine are far from the goals of sustainable development proclaimed by the UN in 2018. The continuing attraction to the integration of conventional and uncontrolled welfare growth of some sections of the population leads to severe conflicts with the collision with natural laws. Economic laws, rigidly governed by the financial system and its speculative operations, will further increase the difference in the well-being and income of different societies.

Based on the above, Ukraine should create conditions in the near future to stop absorption of national identification and balanced development of the economy, namely:

1. Conduct continuous monitoring and accounting of factors that do not allow us to move forward, such as tracking:

a) fair distribution through the national wealth budget by indicators that meet the EU average and, at the same time, signal the level of the shadow economy in the country (such as per capita income);

b) reforms in the social security and insurance systems, including the sources of filling the pension funds and the consequences of carrying out health insurance in terms of fertility, mortality and migration of the population leading to loss of human factor;

c) implementation of the state's investment policy on indicators that ensure national security and reduction of the country's external debts;

d) ensuring sufficient energy intensity of the state according to the parameters of competitiveness of the national economy.

2. Preventive financial, tax response and effective management of the state budget in accordance with the expectations of Ukrainian society and at the same time stimulate the development of the internal market in response to changes in the demand of the global economic environment.

3. Creation of legal and institutional bases for mobilization and modernization of national economy capacities in accordance with interests, cultural and scientific exclusivity of Ukraine with the purpose of implementation into the European system of state and economic management, adaptation to world trends of socio-economic development and formation of their personal identity in the system international division of labor.

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The Importance and Role of Cooperation in The Development of the Agricultural Market

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Abstract

In the modern world, the process of the cooperative movement development, particularly in the agricultural sector, allows to increase the level of production and processing of agricultural products, as well as to earn greater profits for cooperative associations and farms. In developed countries there is a tendency of reducing the total number of farms by liquidating small ones while increasing large cooperative associations and enhancing their economic effectiveness. In view of the above, a comprehensive study of theoretical and practical aspects of agricultural cooperatives' development in the agrarian sector of the economy in the current economic conditions, as well as determining the directions of improving the efficiency of their activities is a genuine pressing problem, which has led to the choice of research topics. The aim of the article is to investigate the processes of cooperative activity in the field of agriculture and to determine its impact on the development of the agricultural sector of the economy. The role and importance of agricultural cooperatives in the development of the economy's agricultural sector is investigated in the article. The world, European and Ukrainian experience of using cooperative movement in the field of agriculture is analyzed. The processes of cooperation in the sphere of agrarian business of Ukraine are investigated. The level of influence and importance of cooperative associations in the structure of the economy's agrarian sector development is determined. During the research it was found that cooperative associations play a significant role in the development of agriculture, performing the functions of supply, sale, servicing, lending and make a major contribution to the regulation of inter–sectoral exchanges in the agro industrial business. It is established that the characteristic feature of the modern agricultural cooperative sector is the growth of vertical integration and the approach of an agricultural producer to a consumer but at the same time, there are new difficulties associated with increasing competition in the world markets and therefore it is necessary to look for innovative forms of agribusiness, particularly on a cooperative basis. The factors of assistance to the development of agricultural cooperation in Ukraine are identified and the factors that impede further integration into the agricultural sector of the economy are pointed out. As a result, the organization and formation of the agrarian sector of the Ukrainian economy on the basis of cooperation has a significant value as it allows to improve the level of production and processing of products, as well as to increase the profitability of agricultural producers and, as a consequence, allows to promote the development of the agricultural sector and the country as a whole.

Keywords: Economy, Cooperation, Agrarian Sector, Agricultural Cooperative, Development, Profit.

Problem Formulation

In the modern world, the process of the cooperative movement development, particularly in the agricultural sector, allows to increase the level of production and processing of agricultural products, as well as to earn greater profits for cooperative associations and farms. In developed countries there is a tendency of reducing the total number of farms by liquidating small ones while increasing large cooperative associations and enhancing their economic effectiveness.

In 2013, the Cabinet of Ministers of Ukraine developed and approved "The Strategy for the Development of the Agricultural Sector for the Period up to 2020", which outlines the strategic goals and indicators of agricultural development [1]. At the same time, in "The Concept of the State Target Program for the Development of the Agricultural Sector for the Period up to 2022", one of the main directions of achieving the strategic goals is the development of agricultural entrepreneurship and cooperation through the creation of favourable economic conditions for starting and organizing activities, including state support for the formation and improvement material and technical base of cooperative formations [2].

In view of the above, a comprehensive study of theoretical and practical aspects of agricultural cooperatives' development in the agrarian sector of the economy in the current economic conditions, as well as determining the directions of improving the efficiency of their activities is a genuine pressing problem, which has led to the choice of research topics.

Analysis of recent research and publications

The works of such well–known foreign and Ukrainian scientists are devoted to the study of the peculiarities of agricultural industry development: N. O. Mosiichuk [5], I. A Romanyuk [10], H. V. Finashyna [8] and others. Issues of development of the cooperation theory and cooperative movement occupy a prominent place in the works of O. O. Klokar [6], Yu. Ya. Luzan. [9], M. Y. Malik [9], O. V. Skydan [7], etc. However, the issue of defining the integration processes of the cooperative movement in the direction of development of economy's agricultural sector remains unexplored. Fragmentation of consideration of theoretical, methodological and practical processes of foundation and further activity of cooperative associations in the field of agriculture, insufficient coverage of issues of state influence on cooperation, imperfection of methods of economic policy implementation, low efficiency of actions on economic regulation of cooperative processes determines the necessity for the research in this field.

The aim of the article is to investigate the processes of cooperative activity in the field of agriculture and to determine its impact on the development of the agricultural sector of the economy.

Considering the aim of the article, **the main task** of the research is to conduct a comparative analysis of agricultural cooperatives' activities in the world and Ukraine.

The research methodology is based on the use of an empirical approach. In the process of research, the abstract–logical method (problem formulation and hypothesis, logical constructions, synthesis of generalizations and conclusions), statistical–economic method (processing of statistical indicators, comparison of data, etc.), monographic method (analysis of world and Ukrainian experience of cooperative movements' development and implementation in the agricultural sector).

Outline of the Main Research Material

In the world, cooperative formations play an important role in the development of agricultural production, performing the functions of supply, sale, servicing, crediting, making a major contribution to the regulation of inter–sectoral exchange in agro-industrial complex. Thus, in the USA, despite the decline in the number of agricultural cooperatives, their role in performing the above functions remains significant. By bringing together about 3 million people, they provide services worth about $ 116 billion. More than one and a half thousand cooperatives (50% of all cooperatives) are engaged in the sale of agricultural products, over one thousand (38%) of them perform the function of supply, providing agricultural producers with raw materials and equipment, more than four hundred (12%) of serving cooperatives give to rural trade producers' transportation, storage and other services [3].

Sales cooperatives are mostly widespread in vegetable, fruit, grain, fat and livestock sub–complexes. In Canada, sales, marketing, service cooperatives dominate. In 2018, their numbers and revenue were

$1.3 and $14.3 billion, respectively. The share of Canadian cooperatives in the markets of poultry and eggs is 57%, milk – 39, grain – 22% [4].

India, followed by the USA, France, Sweden, Germany, Morocco, Canada, has the leading position in number of acting agricultural cooperatives. In England about 40% of agricultural products are sold through cooperatives, the market share of cooperatives in the sale of milk is 90%, pork – 30%, potatoes and vegetables – 25%, cooperative share in the supply of fertilizers – 30%, seeds – 22%, plant protection products – 18%. The turnover of agrarian cooperatives in England is £ 4406 million. In Germany, marketing cooperatives are common in purchasing resources and selling products, but the most developed are credit cooperatives led by Raiffeisenbank. The share of the market occupied by German cooperatives varies by production area and is: in the processing and marketing of meat – 30%, milk and dairy products – 60%, fruits and vegetables – 60%, providing services to agricultural producers – 50–60%. The development of cooperative agrarian movement in such Scandinavian countries as Denmark, Norway, Finland and Sweden is also specific. In Sweden, the turnover of cooperative associations in 2018 amounted to EUR 12.6 million. Cooperative share in the milk markets exceeds 99%, pig and cattle meat – 88%, grain and seeds – 75% [3].

The first place in the number of acting agricultural cooperatives in the EU is in France, where more than 90% of farmers are members of agricultural cooperatives, through which 50% of agricultural products are sold. French agricultural cooperatives specialize in the purchase, sale, processing of products, as well as supplying agricultural producers with the means of production and sale services. Cooperatives for the common purchase and use of equipment have become most widespread. All agricultural cooperatives in France are united into national cooperative federations on a sectoral basis. This organizational hierarchy also extends to agricultural credit cooperatives, which are headed at the national level by the Credit-Agricole cooperative bank. Through cooperatives, the state pursues agrarian policy based on the use of a subsidy system. Thus, the construction of grain stores up to 10% is subsidized by the state, the state also guarantees the payment of the farmer's products through cooperatives at a minimum price in case of possible absence in its marketing. All cooperatives are non-profit organizations.

Studying the peculiarities of the cooperative movement development at the present stage, it should be noted that the increase in the activity size of agricultural cooperative associations by means of merger smaller ones, which before the unity, were local in nature. At the same time, more and more cooperatives are beginning to use innovative information technologies that help agricultural producers to implement computerized systems for managing production and marketing processes of agricultural products sales, supplying the necessary means of production, etc.

The vast majority of cooperative farmers use the opportunities of the Internet network in their businesses [5, p.25]. More and more trading operations in the agricultural markets are carried out through the e-business system. The widespread use of information technologies enables agricultural producers, especially small and medium-sized agribusinesses, to participate in biotechnology development, scientific research, open access to the use of new varieties and hybrids, animal breeds, new technologies and new fuels, etc. But such activity requires significant capital investments, which can be accessed only for cooperative and integration entities, which are able to concentrate significant funds and get economic effect from the scale of production, sales of products and services, marketing, logistics, scientific development, etc.

A characteristic feature of the modern agricultural cooperative sector is the increase in vertical integration, the convergence of an agricultural producer with a consumer, and, as a consequence, the strengthening of competitive advantages and the increase of agribusiness income [6]. But at the same time, it should be noted that there are new challenges associated with competition strengthening in world markets, and therefore one should look for innovative forms of agribusiness activity. The experience of cooperative associations' development around the world testifies to their universal adaptation to changing market conditions. The processes of globalization and integration that are currently taking place in the world's economy, did not sidestep agricultural cooperatives' activity [7]. Strengthening of competition compels agricultural cooperatives to achieve the level of the most

successful competitive organizational forms, expand the domestic market and export of agricultural products, lobby for protectionism [8, p.48]. Thus, modern agricultural cooperatives should consider in their activities the development of concentration and integration processes in the segments of the production and marketing chain, increasing demands of retail chains and end consumers to the quality of products and services, changing their preferences, international requirements for quality standards, etc. To support the competitiveness of agricultural producers-members of cooperative associations and their activities, agricultural cooperatives are forced to engage in functions that are not inherent to them, such as to expand sphere of their activities by providing services to non-cooperatives, to use venture capital, to enter securities market creating joint ventures and subsidiaries.

In many countries of Europe and the world, for the more successful operation of agricultural cooperatives, the conditions for their development are created by preferential, tax, credit and antitrust state policy. Such state support is conditioned by the social nature of the activities of non-profit agricultural cooperatives, creating new jobs and solving social problems of the rural population, cooperative formation facilitates the development of rural territories.

In the current system of agricultural cooperatives, there are agricultural consumer, processing, supplying, marketing, servicing, credit, insurance cooperatives, information and consulting centres [9, p.4; 10, p.13]. Their activity is regulated in particular by the Law of Ukraine "On Agricultural Cooperation" [11]. In practice, multifunctional cooperatives have become widespread, typically combining supplying and marketing functions, encompassing cross-industry exchange functions in the agro-industrial complex.

In Ukraine, agricultural cooperatives mainly combine small and medium-sized agribusiness enterprises (rural (farmer) and personal subsistence farms) of agricultural producers whose interest is determined by the functional principles of a cooperative.

The activities of agricultural producers can be carried out using various forms and types of cooperation from simple forms of relationships to complex integrated formations, from the production of raw materials to the sale of finished products.

At present, Ukraine's agricultural policy is focused on supporting the development of small and medium-sized businesses in rural areas, including farming and agricultural cooperatives. As at 01 January 2015, there were 1427 agricultural cooperatives registered in Ukraine, of which only 728 entities were active, at 01 January 2016 1627 agricultural cooperatives (817 entities were active), as at 01 January 2017. 1947 (558 entities actually operated). And as at 01 January 2018, there were registered 2014 cooperatives (997 manufacturing and 1017 servicing), by the beginning of 2019 there were 2069 cooperatives in Ukraine (996 manufacturing and 1073 servicing). That is, 55 cooperatives or 3% more. The most active cooperatives are in Kyiv (65), Cherkasy (55), Zaporizhia (49), Odesa (48), and Ivano-Frankivsk (47) regions. Sumy (60 vs. 24), Volyn (55 vs. 26), Khmelnitsky (60 vs. 34), and Zakarpattia (63 vs. 33) regions, which do not operate about half of the registered cooperatives, are the leaders of anti-rating in the proportion of inactive but officially registered cooperatives [12; thirteen; 14] (Table 1).

Analyzing the data in Table. 1 it can be said that the most widespread types of cooperative associations in Ukraine’s agricultural sector are multifunctional and multifaceted services (others). They are almost half of the total.

Among serving cooperatives the most widespread are the associations of agrarians for joint harvesting and dairy cooperatives. It should be noted that of the 735 operating agricultural service cooperatives: dairies 186 (+44), land cultivation and harvesting 162 (+16), meat 35 (–16), fruit and vegetable 113 (+34), grain 41 (+1) and other services 198 (+46). Associations for the joint cultivation of vegetables and fruits, cooperatives of meat direction and grain associations are also quite developed [14]. However, compared to other European countries, their number is small.

Table 1: Number of registered agricultural cooperatives in Ukraine as at 01 January 2019.*

Region	Number of agricultural cooperatives, a unit.							
				According to kind of activity, a unit.				
	Total	Registered	Acting	Processing, a unit.	Storing–marketing, a unit.	Supplying, a unit.	Others, a unit.	Multifunctional, a unit.
Vinnytsia	94	52	42	6	14	3	9	10
Volyn	81	55	26	0	8	10	2	6
Dnipropetrovsk	106	60	46	12	10	7	9	8
Zhytomyr	80	50	30	5	10	0	5	10
Zakarpattia	96	63	33	3	5	0	15	10
Zaporizhia	101	52	49	10	10	10	12	7
Ivano-Frankivsk	97	50	47	8	12	9	8	10
Kyiv	131	66	65	12	16	13	14	10
Kirovohrad	92	50	42	5	10	8	9	10
Lviv	87	49	38	14	8	0	6	10
Mykolaiv	88	50	38	5	6	8	8	11
Odessa	98	50	48	8	7	6	10	17
Poltava	92	46	46	4	6	6	16	14
Rivne	91	50	41	9	8	8	9	7
Sumy	84	60	24	0	9	0	10	5
Ternopil	87	42	45	8	10	10	8	9
Kharkiv	96	45	41	6	7	5	11	12
Kherson	92	52	40	5	11	10	8	6
Khmelnytsky	94	60	34	0	10	5	9	10
Cherkasy	117	62	55	9	16	5	10	15
Chernivtsi	86	46	40	11	7	0	12	10
Chernihiv	79	43	36	4	8	3	12	9
Total	**2069**	**1190**	**906**	**144**	**208**	**126**	**212**	**216**

** Source: compiled by the author according to the analysis of statistical sources [12; 13; 14]*

In our opinion, the main factors preventing the development of agricultural cooperation in Ukraine can be identified as:

- incomplete structural restructuring of the agrarian sphere;
- unsatisfactory material and technical equipment of cooperatives, especially in stock areas of agricultural production;
- unavailability of credit and poor financial support for the development of agricultural cooperation by the state.

Based on the research of scientists' works [5; 6; 7; 8; 9; 10] regarding the development and implementation of the cooperative movement, it is necessary to highlight the key factors that contribute to the development of agricultural cooperation (Fig. 1).

In our opinion, in order to strengthen the pace of agricultural cooperation development in Ukraine, it is necessary to increase state support and to improve the main directions of its use. Thus, we are considering the possibility of directing part of the budget funds to support the development of rural credit cooperative funds, in particular, directing 30% of the amount of credit resources intended for

agro-industrial complex entities, credit cooperatives to finance small and medium agribusiness and extending subsidies to offset part of interest rates on loans, received by agricultural credit cooperatives in commercial banks.

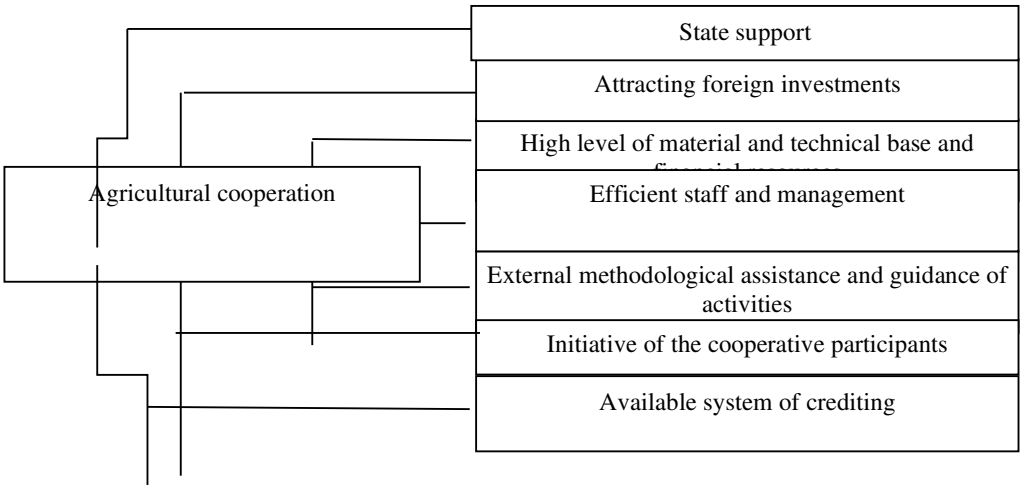

Fig. 1: Factors promoting the development of agricultural cooperation in Ukraine *

** Source: Created by the author based on the research.*

Also, in our opinion, the purchase of products (grain, milk, meat, vegetables, potatoes, fish) for government needs should be contracted directly through agricultural cooperatives at minimum prices, the level of which should ensure the profitability of agricultural production.

The prerequisite for the successful development and functioning of cooperatives is providing them with organizational, methodological and financial support, which will ensure the promotion of agricultural products of individual rural farms and agricultural producers to the organized agrarian market at stable prices, promoting the realization of economy's potential agricultural sector and increasing its competitiveness. Besides, one of the important factors for solving the problem of cooperative movement development in Ukraine is the implementation of the programs of cooperative movement development at regional and local levels and grant projects of the European Union.

In order to increase the motivation of Ukrainian agricultural cooperatives to enter the world markets, it is necessary to develop a mechanism of supporting export of domestic agri-food products, to introduce preferential taxation for newly established and export-oriented agricultural cooperatives. In order to improve state support, we also propose to bring it to a specific representative of small and medium-sized agribusiness through the system of agricultural cooperatives, differentiating it by region of the country depending on soil and climatic conditions and remoteness from sales markets.

Conclusions

Considering the conducted research, it should be concluded that the organization of economy's agricultural sector based on cooperation is a priority in the field of agriculture, the development of which is based on the consolidation and interaction of resources and capabilities of agricultural producers.

An important criterion for the modern agricultural cooperative sector is vertical integration and synergy with other industries, bringing a farmer closer to a consumer, and, as a consequence, enhancing competitive advantages and increasing income from agribusiness activity implementation. But at the same time, it should be noted that there are new challenges associated with increasing competition in world markets, and therefore should constantly search for innovative forms of

business. In our opinion, cooperative activity, in particular in the field of agricultural, is one of these innovative forms.

Increasing the role of agricultural cooperatives in the development of economy's agricultural sector can be facilitated by scientific substantiation and implementation of motivational mechanisms for involving agricultural producers and their partners in the agricultural business to create vertical economic systems, determining the role of the state in this process, ensuring the interaction of agrarian sector and financial side, as well as information component of the agricultural infrastructure.

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Main Trends of Regional Development in the Context of the Paradigm of the "New Economy"

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Abstract

The relevance of the study is due to the problems of developing Russian cities to technological challenges. In this regard, this article is aimed at identifying the need to build an ideal model of the city. A leading approach to the study of this problem is a systematic method allowing to address the study of the green economy in the modern city as a whole, as well as to identify the diversity of causal connections and relationships taking place inside the studied system and its interaction with the external environment. In this paper, the environmental rating of regions is considered, and statistics on man-made and natural emergencies are given. It is concluded that an effective adaptation to technological challenges is the creation of a new institutional model for the development of a modern city. The materials of the article are of practical value for authorities at the regional level when making management decisions on the sustainable development of the region.

Keywords: eco city, technogenic challenge, stable development, city, green economy.

Introduction

In the context of a multi-crisis situation, the problem of development of modern Russian cities is the most noticeable. Currently, it is considered that urban agglomerations are the most important carriers of the "new economy", formed by the development of the complex services and technologies sector, as well as the ultra-fast growth of the consumer market. Indeed, the density of ties, the quality of life and the economy of modern cities make it possible to move to a new level of development of social and economic relations, which will include as a mandatory component interaction along the lines of: society-ecology-economy. The new paradigm of socio-economic development should put the security of the individual and society as a whole at the forefront in an environment of serious natural and technogenic challenges.

At present, traditional methods of developing modern cities are more negative than positive. The development of the "new economy" with its increased demands for connectivity within the city faces critical challenges. Thus, the explosive growth of motorization of the population and the inability of

urban transport systems to cope with traffic flows creates a contradiction between the standards of quality of life and the objective characteristics of urban space.

Methods

Recently, in modern cities, social, economic, and environmental problems have become more acute. Over the past forty years, the economic burden on natural complexes has increased dramatically, so the issue of protecting the environment from excessive anthropogenic pressure has been raised over the past twenty years. The UNO document on sustainable development "Agenda for the XXI century" justifies the need to develop new concepts of sustainable economic growth and prosperity.

The essence of environmental protection is to find a rational balance between the environmental needs of society in a clean, healthy and highly productive natural environment and the economic interests of society associated with meeting the material needs of people. There are now three main environmental concepts. The first is based on a return to lower standards of consumption and its maximum restriction. According to this concept, it is necessary to restrain the growth of consumption by establishing a balance between fertility and mortality - this is the concept of "zero growth", it originated on the basis of the world development models of G. Forrester and D. Meadows (Meadows et al., 1972). In the 70-s years the dynamic model of the ordinary American city according to the evolution was built by G.Forrester. Analyzing this dynamic model in the urban environment three main sub-systems can be defined city according to the evolution: population, buildings and enterprises.

The special peculiarity of this concept is Forrester`s suggestion about counter intuitive nature of these complex systems. These intuitive suggestions are reaction to causal relationships which are characterized for simple systems. While in complex systems, the true causes may be deeply hidden or distant in time, and, more often are rooted in the structure of the system itself, which is not immediately recognized. For this reason, in this situation, it is necessary to use algorithms when making decisions, rather than relying on intuitive judgments.

Thus, G. Forrester proposed a complex dynamic model with many forward and backward links between subsystems, which made it possible to predict the development of the city and analyze the impact of various programs of the city administration.

The disadvantage of this concept is the uneven development of the economy of different regions and their populations, since this is the expected exponential growth of the population in conditions of sufficient resources and in the absence of birth control.

D. Meadows proposed the "Growth Limits" model with feedback loops (Meadows et al., 1972). The main directions of this theory are industrialization, rapid population growth, increasing hunger, depletion of non-renewable resources, and environmental degradation.

In accordance to the concept of zero growth, humanity should stabilize the population, stop industrial growth, invest and develop only agriculture to increase food production and services, and in industry only compensate for the depreciation of funds.

Despite a number of weaknesses of the study D. Meadows, in particular the underestimation of the possibilities of scientific-technical progress, the progress of knowledge, this work was an attempt to assess the value of an ecological factor for world development, which shows the inevitability of global catastrophe while maintaining the trend of natural resource use and environmental degradation.

In 1992, a new work by D. Meadows "Beyond the limits to growth" appeared. The main theme of this work is formulated as follows: "there are limits to growth, but there are no limits to development" (Meadows et al., 1992). According to the researcher, the limits of growth are the limits

of the intensity of flows, i.e. the limits of the sources 'ability to ensure the flow of resources, and the drains' ability to absorb waste.

Going beyond the limits is understood as a violation of the stability of this ratio due to exceeding the potential capacity of the environment. The reason for the limits is that the population and capital in the world system are growing exponentially, and in this situation, the quantitatively growing economy destroys its resource base, after which it must collapse.

The second concept suggests economy development without any ecological restrictions; this policy will lead to nature degradation and mankind death. The third way is combination of ecological and economic wishes. Therefore, if we approach the solution of environmental problems from a more rational and utilitarian point of view, a complete rejection of the achievements and achievements of the modern scientific and technical revolution is not required, we need to direct the results of scientific activity to meet human needs while respecting the principles of sustainable development (Ogorodnikov and Ogorodnikov,1998).

Currently, indicators that take into account the impact of the economy on the natural environment are being actively developed. For example, a system of environmental and economic accounting aimed at accounting for the environmental factor in national statistics. This system describes the relationship between the state of the natural environment and the country's economy. This is a system of “green accounts”, in which the account for forest resources is kept in natural indicators, the concept of environmental debt and the concept of “natural capitalism” (Pakhomova, 2014).

The problems of development of small towns in the conditions of new economy discussed in this article are being researched by some scientists. Let`s make a review of some of them.

The method of measuring of eco-efficiency proposed by E. Passetti and A. Tenucci is to use clearly defined management accounting tools related to environmental and economic indicators. This will allow companies to use the concept of environmental management more widely (Passetti and Tenucci, 2016).

In the researches of L. Yang and X. Zhang analyze model id suggested. It combines technology, function of directing distance and a new bootstrapping approach for researches of dynamic tendencies of regional economy (Yang and Zhang, 2018).

As for M. Păunică and M. Mocanu stable city development focuses on the three dimensional measurement of economical, social and ecological aims (Păunică and Mocanu, 2017).

Based on the analysis of statistical data, the economic and mathematical model, as well as on the analysis of the UN experience in assessing the most rapidly disappearing and fastest-growing cities, a new institutional model for the development of a modern city should be developed.

Attempts to assess the “natural potential” allow us to specify the amount of environmental damage only partially, without taking into account the humanitarian component and the size of the total destruction of production factors. Meanwhile, the Organization for economic cooperation and development (OECD) forecasts that today's methods of production and consumption can destroy about 70% of flora and fauna by 2050 (Animitsa, 2007). In our opinion, it is appropriate to talk about the assessment of the complex natural and human potential of a modern city.

The environmental rating of the cities of LLC “Green patrol” (Ecological rating, 2020) allows for a comprehensive comparative assessment of positive and negative factors and trends in environmental, social and economic activities based on the criteria of environmental safety and balanced sustainable development of the regions of the Russian Federation.

Ecological city rating consists of 15 indicators, which cover three basic areas of monitoring in the regions of the Russian Federation:

- Eco-sphere – environmental protection;

- Socio-sphere – protection and improving of human and society environment;

- Techno-sphere – condition and industrial development according to the requirements of ecological safety.

In table 1 the assessment area and calculation components for the environmental rating are presented.

The environmental rating is formed on-line as information materials are received from various sources, including the media, government agencies, business entities and citizen initiative groups.

Table 1: The assessment area and calculation components of the project

The assessment area		**Calculation components**		**Total regional rating**
Sphere	**Indicators**			
Eco-sphere	Atmosphere	Nature safety index	**Σ** Free index	**1.** **2.** **3.** **.** **N**
	Water resources			
	Soil			
	Bioresources			
	Biodifferentiation			
Socio-sphere	Authority and law	Social – ecological index		
	Civil society			
	Education and culture			
	Human environment			
	Informative and psychological climate			
Techno-sphere	Industrial environment	Industrial-ecological index		
	Science and technology			
	Business responsibility			
	Industrial waste			
	Goods and services			

The rating is calculated on the basis of a single mathematical model and software for all subjects of the Russian Federation.

Results and Discussion

The rating compares the number of man-made accidents in the regions, natural fires, floods, deterioration of the sanitary and epidemiological situation, indicators of the quality of the urban environment, the number of innovations, business participation in solving environmental problems, etc.

The rating of the Rostov region in the environmental rating of cities is presented in table 2.

Table 2 : The rating of the Rostov region in the environmental rating of cities for 2013-2017

Year	Nature safety index	Industrial-ecological index	Social –ecological index	Total index	Place in rating
2013	+ 39 / - 61	+ 60 / -40	+ 50 / - 50	+ 49 / - 51	13
2014	+ 38 / - 62	+ 49 / - 51	+ 62 / - 38	+ 50 / - 50	14
2015	+ 39 / - 61	+ 50 / - 50	+ 62 / - 38	+ 51 / - 49	9
2016	+ 37 / - 63	+ 49 / - 51	+ 68 / - 32	+ 53 / - 47	11
2017	+ 38 / - 62	+ 51 / - 42	+ 68 / - 32	+ 54 / - 46	17
2018	+ 38 / - 62	+ 51 / - 42	+ 71 / - 29	+ 55 / - 45	25
for 9 month 2019	+ 41 / -59	+ 53 / - 47	+ 72 / - 28	+ 58 / - 42	31

Note: compiled by authors on the basis of data http://greenpatrol.ru/ru/regiony/rostovskaya-oblast

From the above table 2, we can conclude that in 2019, the Rostov region significantly worsened its position in the environmental rating compared to 2013 and ranks 31st. This indicates that the Rostov region does not pay enough attention to environmental problems, as well as to solving issues to improve the environmental situation.

From table 2, it can be seen that the environmental index is quite low in comparison with other indices during the analyzed period. But the region occupies a very high position in the social and environmental index.

Because the rapid development of complex technological systems introduced into economic circulation has caused both the development of the modern city and the increase in the risk of various man-made accidents and catastrophes.

Data from The United Nations (UN) shows that man-made disasters rank third among all types of disasters in terms of the number of deaths. In the first place there are hydro meteorological disasters, floods and tsunamis, in the second – geological (earthquakes, mudslides, volcanic eruptions, etc.) (Mizutori and Guha-Sapir, 2017).

One of the most striking examples of a man-made environmental disaster is the accident at “the Fukushima-1” nuclear power plant in Japan, caused by natural disasters and currently threatening the scale of an environmental disaster of a global nature. The irrational placement of nuclear power plant blocks, as well as the use of buildings built before the 1980s in the nuclear power industry, despite the innovative technological equipment of Japan, calls into question the further development of nuclear power throughout the world, which refocuses the attention of mankind on safe energy sources that are created by wind farms and solar panels.

As a result of the “Fukushima effect”, many States began to devote more time to the organization of human and social security. One example is the preparation of the German leadership for a possible disaster at the Belgian “Tiange” nuclear power plant after warnings from experts about the possibility of an emergency situation at the plant. This indicates that the country's leadership is taking measures to ensure the safety of its citizens.

The “Fukushima effect” thus confirmed that the survival and development of mankind requires a transition to a “green” economy – that is, a system of economic activities related to the production, distribution, exchange and consumption of goods and services that lead to increased human well-being in the long term, without exposing future generations to significant environmental risks or environmental deficits.

Thus, we can conclude that despite the contrast of man-made disasters with natural disasters, we can see a consistent pattern of increasing man-made disasters against the background of increasing

natural disasters. One of the reasons is the rapid technical development of society and the human factor, which is manifested in the errors of employees, engineering calculations, and ineffective assistance from rescue services.

Figure 1 shows the dynamics of natural and man-made disasters in Russia in 2005-2017.

The above figure shows that by 2017 there is a significant decrease in man-made and natural emergencies. From the graph, you can see that the level of man-made disasters significantly exceeded natural and bio-social emergencies in 2005-2008.

Thus, it can be concluded that an effective adaptation to technological challenges is the creation of a new institutional model for the development of a modern city.

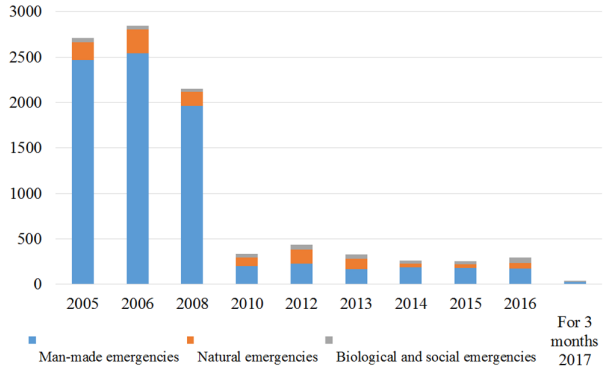

Fig. 1: The dynamics of natural and man-made disasters in Russia in 2005-2017.

Note: compiled by the authors based on data from the Ministry of emergency situations of Russia http://www.mchs.gov.ru/activities/stats/CHrezvichajnie_situacii

According to the Polish scientist T. Tolwinski, in the middle of the XX century, there was a crisis of cities (Aliyeva et al., 2014), which forced a new look at the future ecological and economic model of urban economy.

In modern Economics, a new field of research is emerging that deals with the relationship between natural ecosystems and socio-economic systems in the broadest sense. The green economy can solve the current human problems, as well as the problems of building an “eco-city”.

In our opinion, an eco-city should be understood as a natural-adapted model of a city that has an economically productive and socially effective functioning environment based on the greening of life.

For many years, the idea of an eco-city was only proclaimed and not implemented. At the “Global Forum-94”, the first real eco-city project in Sweden, created in accordance with the provisions of the sustainable development strategy, was presented. At the beginning of the XXI century, the global forum “Habitat-II” adopted the concept of creating an eco-city (United Nations, 1996). Table 3 shows the main goals of creating an environmentally friendly city.

Table 3: The main goals of creating of eco-city [compiled by the authors based on research materials based on the document of the UN Conference on human settlements (Habitat-II) (United Nations, 1996)

The main goals of creating of eco-city	
For population	**For environment**
1. Improving the quality of life of the population	1. Restoration of the biosphere
2. Formation of the ecological outlook of the population	2. Increasing the area of green spaces in the city
3. Ensuring the health and safety of residents.	3. Reducing pollution from the city
4. Achieving energy savings and housing efficiency in general.	4. Use of renewable energy and reduction of consumption of non-renewable energy, non-renewable materials
5. Improving the aesthetic qualities of the city. Perception of the city as a natural component of the natural environment, its inclusion in the ecosystem	5. Maintaining an ecological balance between developed and natural areas

The main task to be solved when creating an eco-city should be its organic inclusion in the course of natural processes of this territory. Here, conditions must be created for the normal implementation of the most important social functions in the family, collective, and society. Finally, an eco-city should become a generator of cultural processes that take place in the urban economy.

The modern practice of creating Eco-city has been developing since the beginning of the 60s of the XX century. Basically, it is widely distributed in Europe, North America, and Australia. However, European countries, especially Sweden and Denmark, were the most active in the field of environmental construction. Germany, Belgium and Norway are participating in this process. In General, almost all European States have joined the process of greening their cities. Currently, there are 6 eco-cities in the European Union: Malmo (Sweden), Dublin (Ireland), Tallinn (Estonia), Hillerod (Denmark), Hamburg (Germany), and Augustenborg (Denmark) (Cherkesova et al., 2016).

As an example of a holistic Eco-city, in which the principles of social and architectural ecology are fully implemented, we can cite the city of Malmo. One of the main tasks of reconstructing the city of Malmo into an eco-city was to reduce emissions of pollutants into the air from stationary sources. This goal is achieved through the use of new construction technologies, the development of public transport, the transition of car owners to hybrid transport and electric cars, and the promotion of alternative energy and energy-saving technologies.

At present, the city of Malmo is the third largest industrial city in Sweden. In this regard, the city government decided to use only renewable energy sources (solar panels, wind turbines, heat pumps, and biogas for generating electricity, heat and fuel for cars).

In the Russian Federation, the process has not yet gone beyond the design and construction of individual eco-houses. Experience in this area is being developed, and organizational and financial resources are being accumulated. However, in Russia, the development of urban greening is still mainly carried out by the efforts of scientists.

In Russia and the CIS countries, which have a fairly significant reserve of environmental, natural and territorial resources, the process has also not yet found support from government agencies; it is being developed through the efforts of individuals and organizations. Theoretical issues of ecologization and methods of its implementation at a large urban planning level are actively discussed in the scientific press and at various conferences. But practical activities in this area have not yet reached the urban planning level.

Conclusion

The "green" economy is now the focus of attention of States around the world. Investments in energy-efficient technologies and natural infrastructure are becoming more attractive and profitable. In the crisis year of 2009, the June meeting of the OECD Council at the Ministerial level was not coincidentally adopted the Declaration on "green growth", which recognizes that the promotion of environmentally oriented investments can help both raise and create the necessary infrastructure for the functioning of a new model of city development. This will help ensure sustainable economic growth, social welfare of the population, and environmental health (Animitsa, 2007).

From all of the above, it can be concluded that creating environmentally friendly conditions in cities is a complex process. In the modern world, it is the ecological economy that should help solve the problems of the social ecology of cities. This means that the formation of the city model as a stable functioning socio-economic system is associated with the need to develop and solve a number of complex problems.

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The Influence of Bad Debt Reserves on Financial Health of Organization

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Abstract

The current financial instability and a threat of a deepening international crisis mean that many companies often face inability of their debtors to pay for the services or goods on time, which in the end hurts financial indicators and management effectiveness of the organization. If an organization avoids regular assessment of its accounts receivable, account them without reserves, the financial result of such a company becomes rigged. Our research reveals the advantages and disadvantages of bad debt reserves, studies the problems of these reserves financing, establish the difference in the use of the reserve in bookkeeping and tax accounting. Accounts receivable are the most important part of a company's working capital; liquidity, margins and investment attractiveness of the company depends on it. This is why the results of our research will help companies to put correct focuses when analyzing its activities.

Keywords: Bad Debt Reserves, Accounts Receivable, Financial Result, Data Reliability

Introduction

Reliable information about the company's activities, accounting objects is one of the key goals of modern accounting (Alessi, 2010). A good method of attaining this goal is creation of bad debt reserves (Beber, 2015). Bad debts, i.e. the debts, which were not redeemed by the deadline specified in an agreement or other documents and are not guaranteed, dwarf financial activities and trigger losses. Debt collateralization helps a company minimize its financial losses from bad debtors by presenting a comprehensive picture of economic development of the company, optimize losses by reducing the profit tax and improve company's operations on the whole (Petrov, et. al., 2019; Korableva, et. al. 2019). To attain this goal, we need timely control over accounts receivable and the use of reserves if necessary to cover them to use the funds of the company rationally.

Theoretical Background

A debt for the goods or services is acknowledged doubtful, when it is repaid after a deadline or there is a high probability of nonpayment. A bad debt reserve is created to receive true information about the receivables in such cases to estimate the debt (Celerier, 2017; Bykanova et. al., 2018). Changes in the reserves will be reflected as part of profit and losses. If after the end of a reporting year, which follows the year of this reserve creation (Glubokova, et. al. 2019, Deputatova, et. al., 2018) the funds allocated to the reserve are not spent, they are accounted as a financial result as of the end of the year in accordance with Provision on Bookkeeping and Accounts in the Russian Federation approved by a Russian Federation Finance Ministry order dated July 29, 1998, № 34. At that, the bad debt reserve cannot exceed 10% of revenue of the reporting period in accordance with article 249 of the Russian Federation Tax Code (Fig. 1).

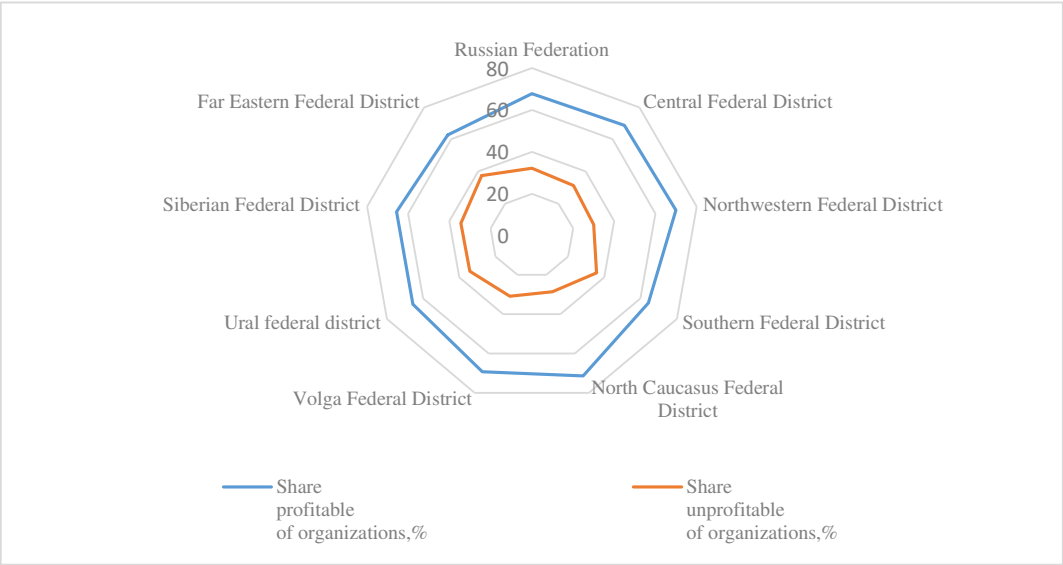

Fig. 1: Comparative characteristics of profitable and loss-making organizations as of January 2020

A company has the right to account its monetary assets as bad debt reserves only on debt on normal operations, which used to be profitable. Russian Accounting Standards 9 / 99 Revenue of Organizations sets the reserve on each bad debt according to the possibility of debt repayment and solvency of the debtor (Dubovik, et. al., 2018; Akhmadeev, et. al., 2019). The bad debt reserve can be restored, i.e. included in other revenue if stocktaking reveals an excess or the debtor redeemed the debt with a payment exceeding the volume of the debt. The methodology of bad debt reserves creation in bookkeeping differs radically from the methodology in fiscal accounting, which makes their simultaneous use wrong. Bookkeeping focuses on the economic value of the facts and conditions of business operations, while fiscal accounting focuses on legislation (Benazzoli, 2016; Ekimova, et. al., 2017).

Besides, there are other significant differences of the two types of accounting (Prodanova, et. al. 2018). Under bookkeeping, a reserve is obligatory and should be reflected among other spending items on the debt side of account 91 and the credit side of account 63, while in fiscal accounting an organization decides on its own whether to create the reserve or not and if the decision is in favour of its creation accounts it as non-operating expenses (Golubtsova, et. al. 2019; Petrov, et. al. 2019). The repayment dates also differ: bookkeeping deems bad both overdue and future debt, while for fiscal accounting only overdue debt matters. When faced with overdue receivables, organizations spend bad debt reserves because of the lack of current funds and receive some economic profits. After debt stocktaking organizations increase the reserves in line with the term of bad debts – for the debt 90 days overdue for the whole sum of it, from 45 to 90 days for 50% of the discovered debt. No increase is done for the debt up to 45 days overdue (Morozova, et. al. 2019).

Thus, the organizations can reduce their profit tax. Clients, customers and other debtors unable to pay their due entail overdue accounts receivable and thus reduce the tax obligations of the company to the budget by the size of the tax on the profit it failed to receive. The organization also diminishes its tax burden for the whole taxation period and saves its current assets needed for production and improves financial stability when the market is unstable. The organization also has the right to shift the reserve to the next taxation period, if the reserve was not fully spent to cover losses of the reporting period. Reserves accounting allows companies to adjust financial reports. Assets and liabilities of the company are often adjusted by the estimated values to make information reliable. In the case of receivables, the estimated value is a bad debt reserve, that's why receivables are accounted less the reserve (Kosolapova, et. al. 2019). In the current conditions the volume of a potentially bad debt in the capital

of an organization can account for its significant part and become fatal for effective management. But a debt, which is discovered and written off timely, helps the company create a true picture of its financial standing.

However, a bad debt reserve can reduce economic benefits. By creating a bad debt reserve for the whole volume of receivables in the wake of depriving a supplier of its reliable counteragent status, the organization can incur solid losses. If the overdue debt accounts for more than 20% of the annual company's turnover, the reserve and debt write off for the bankrupt companies will reduce the taxable profit and other payments to the budget, dilute investment attractiveness as a result such economic indicators as equity to total assets and equity plus long-term debt to total assets ratio will decrease. Thus, annual losses of a company with a 30 bln rbl turnover will amount to about 1 bln rbls.

Discussion

When creating a bad debt reserve, the accountant should realize the aim of its creation setting aside the fact that it is obligatory under accounting rules. One the one hand, it aims at providing all users with reliable information about the state of affairs in the company (Morozova, et. al. 2019). However, unlike the balance sheet, which only reflects accounts receivable less the reserve, an explanatory note can contain more information: about the time of delay, the size of debt, etc.

One the other hand, a bad debt reserve will be of no use for the organizations with poor current asset and leverage management (Kosolapova, et. al. 2019). A bad debt reserve will be most beneficiary for the organizations with sufficient annual turnovers to cushion the blow of bad debts. Insolvent clients and other debtors of more or less stable organizations only affect their development insignificantly (Kolesnichenko, et. al. 2018). By using its reserve, the company can avoid significant losses in any accounting period and write off the debt to other expenses before its due date.

The key advantage of the reserve is the reduction of tax obligations to the budget, optimization of the profit tax. By creating a reserve in fiscal accounting, an organization saves its current assets, because the tax payment shifts to a later date. At that, a bad debt reserve can be good, when spending is to be done at the end of the year, otherwise the taxable profit will not fall (Barasinska, 2012). The organization will also boost its benefits, if uncollectable debt, debts barred by limitation or the terminated obligation exceeds the reserve, because the difference will be accounted as overhead costs.

Conclusion

The influence of bad debt reserves cannot be assessed negatively now. Despite the risks of a profit slump, we should note that the bulk of organizations derive economic profits from the reserve. By impacting accounting indicators, the reserve helps companies carry out a healthy financial analysis, discover the areas requiring close control and thus increase the quality of receivables management, which in the end will improve the company's margins (Fig. 2).

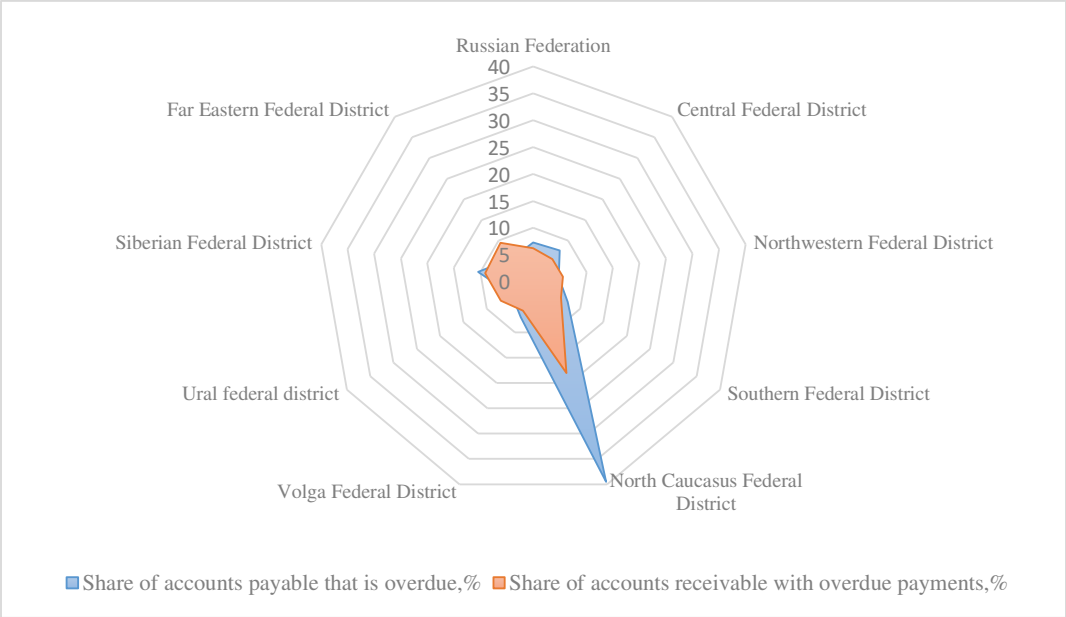

Fig. 2: Comparison of company accounts receivable and payable indicators as of January 2020

The organization will have significant difficulty in staying competitive among companies with solvent debtors. We should also keep in mind that a balance sheet with excessive reserves can be harmful for a company in some cases, for instance, when it wants to receive a loan, because it inflates or reduces the grand total. However, accounting should provide its internal and external users with only reliable information about the financial state of a company. Optimization of taxation, as another advantage of a bad debt reserve, helps companies to lessen their tax burden and tax penalties legally, by helping them spend the saved amount for current needs. An organization can increase its margins and thus its competitiveness during market instability and crises, which would kill its peers. Thus, all organizations should see a bad debt reserve as an excellent possibility to improve their financial standing if bad debts from insolvent debtors appear.

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The Impact of Retirement Age Increasing on Demographic Processes in Russia and its Arctic Territories

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Abstract

The paper deals with the assessment of the impact of the retirement age increasing on demographic processes in Russia and its Arctic territories. The aim of the research is the consideration of the question whether the effect of the change in the retirement age for Russia on the whole and the Russian Arctic in particular is justified from the standpoint of demographics. There are the following objectives: 1) to assess the number of able-bodied population of Russia taking into account changes in retirement age; 2) to evaluate medical and demographic reserves and the validity of the retirement age increasing for the Russian Arctic's population. The trivariant long-term forecast of the number of the able-bodied population that points out the feasibility of the retirement age increasing for Russia on the whole from the standpoint of economic demands has been formulated. It has been determined that Russia is characterized by steady growth in life expectancy, which is the basis of retirement age increasing. The indicators of the retirement age in Russia which will be fixed by 2028 as a whole conform to European standards. The comparison of actual values of average age of death of the Russian Arctic's population with the retirement age and trends research points out the baselessness of pension age increase for the residents of Arctic regions. These areas are characterized by low medical and demographic reserves insufficient to increase the retirement age.

Keywords: Russia, The Arctic, Retirement Age Increasing; Demographic Processes.

Introduction

The problem solving of population ageing in terms of ensuring the balanced functioning of any pension systems leads, in particular, to retirement age increasing (Chai and Kim, 2018; Attanasio et al, 2016) . The relevance and value of considering the effect of retirement age increasing on economic and social processes naturally lead to active research in all countries of the world (Amaglobeli et al, 2019; Staveley-O'Carroll and Staveley-O'Carroll, 2017).

In modern world practice, the average normal retirement age is 61.7 years for men and 60.5 years for women, but the retirement age in different regions of the world is different. Thus, the average retirement age in Europe (including Russia) is 64.4 years for men and 63.1 years for women; in America - 62.7 and 61.6; in Asia and the Pacific, 60.2 and 58.3; in Africa, 59.7 years for men and 59.1 years for women.

The research of the impact of retirement age increasing on the economy and social processes is a relatively new line of research for Russia. This is due to the fact that until 2019 (beginning of the rising of the retirement age in Russia), the retirement age in Russia has remained unchanged since 1932. In Russia, in accordance with the Federal law of 03.10.2018 No. 350-FZ "On amendments to certain legislative acts of the Russian Federation on the issues of assignment and payment of pensions", a phased ten-year period of the retirement age increasing began. As a result, by 2028 the retirement age for Russia's residents will be increased by 5 years (60 years for women and 65 for men).

The relevance of considering of the impact of retirement age increasing on social, economic and demographic processes in Russia is determined not only by the novelty of such a problem, which determines the scientific interest and special social acuteness focus of the problem (Mao et al, 2019). Its urgency is generated by the specific character of Russia's socio-economic space as well, i.e. the availability of a number of territorial problems and problems of Russia's socio-economic development which are caused by the factor of uneven development, differences in economic specializations of Russia's vast territory, interregional differences in medical-demographic characteristics of the population. Thus, in Russia there exists a special regional aspect of the impact of retirement age increasing on social and economic processes in Russia's specific territories. So, for the Russian Arctic's population a number of privileges and preferences, including age retirement benefits are provided in order to encourage people to remain in these areas. These benefits also take into account the negative impact of the specific "Arctic" factors on the state of human health. Thus, with these benefits some problems can be solved: firstly, the problem of "empty space"; secondly, the problem of availability of labor resources necessary for the realization of ambitious goals of natural resources development in the Russian Arctic; thirdly, government social purpose i.e. negative influence of the Arctic on humans (Korchak et al, 2019; Larchenko L.V. et al, 2016; Skufina et al, 2015) . Before 2019 (the year of retirement age increasing) the Arctic's inhabitants retired 5 years earlier than people in other Russia's territories (women at 50, men at 55 years). However, the regional aspect of the influence of the retirement age change on social and economic processes in the Russian Arctic is virtually unexplored.

A relatively small number of the research concerning regional aspects of the problem of the retirement age increasing, including the authors' research can be grouped into three thematic areas. Firstly, the effect on economic production factors is examined. Using groundwork of the world of science (Staveley-O'Carroll and Staveley-O'Carroll, 2017; Bongaarts, 2015; Ushakov et al, 2017), it is possible to forecast the impact of retirement age increasing on the labor market, demographic characteristics of the population and GRP production. The conclusions are drawn on the link between retirement age increasing (which increases able-bodied population), and opportunities for social and economic development of the country as a whole and individual regions, in particular Arctic ones (Samarina et al, 2018; Skufina et al, 2019b). Secondly, the problems of economic growth. In this case, the research is based, as a rule, on well-developed approaches of economic-mathematical modeling corrected to qualitative assessment of the factors and conditions of economic growth of certain countries and regions (Baranov and Skufina, 2018; Chakraborty, 2004; Li et al, 2007; Mitchell, 1993)). It has been ascertained that the retirement age increasing in Russia will have a positive impact on the economic growth of Russia and its regions (Baranov et al, 2018; Skufina et al, 2019a). Thirdly, in this research it has been proved that special attention should be paid to the impact of regional specificity on the Arctic's economic development, migration processes and medical-demographic characteristics of the population. There is a contradiction – on the one hand, there is a growing need for able-bodied population of the Arctic in connection with the necessity of the realization of large projects concerning development of transport infrastructure, projects of exploitation of natural resources. On the other hand, there is an outflow of employable population in

the Arctic (Samarina et al, 2019). At the same time pension benefits of the Arctic inhabitants are a factor which has a positive influence on citizens' decision not to leave the Russian Arctic's territory until their retirement age.

Before 2019 (the year of retirement age increasing) the Arctic's inhabitants retired 5 years earlier than people in other Russia's territories (women at 50, men at 55 years). In the new conditions according to pension law, the Arctic's inhabitants will also retire 5 years earlier than people in other areas of Russia, but now this period is increased in proportion to other residents. In such a way, women working in the Arctic territory will retire at 55 and men at 60 years. But is this proportional change in retirement age, taking into account the Arctic's negative impact on medical and demographic state well-founded ? How will the retirement age increasing affect Russia's labor force as a whole? All these and related problems have not been completely solved yet regarding their scientific and practical significance.

The aim of the paper is the examination of the following question: whether the effect of the retirement age change for Russia and the Russian Arctic in particular, in the context of demographics is justified?

Tasks:

- to assess the number of able-bodied population of Russia taking into account changes in retirement age;

- to evaluate medical-demographic reserves and the validity of retirement age increasing for the Russian Arctic's population.

Methodological prerequisites and results of impact evaluation of retirement age increasing on able-bodied population in Russia

Among lots of demographic characteristics, the object of attention we have chosen is the able-bodied population. This is due to two factors. Firstly, the retirement age increasing extends the period of working age population, thus increasing the working-age population size in the country. That is, from the standpoint of assessing the impact of retirement age changes this indicator directly depends on the changes in the retirement age. Secondly, the changes in the able-bodied population have direct influence on economic growth. Therefore, this indicator largely characterizes the feasibility of retirement age increasing from the standpoint of the development of national production factors.

The data of the Federal Service of State Statistics concerning population size, age and sex composition, mortality, fertility and other demographic indicators form the information base of the able-bodied population forecast.

Table 1 presents the authors' predictive estimates concerning the growth of able-bodied population in Russia caused by the retirement age increasing. The forecast methodology is based on the use of the official forecast of able-bodied population size, which was compiled by the Federal State Statistics Service of the Russian Federation in 2017. The methodology of our forecast is to impose on this forecast the fact of an increase in the retirement age, taking into account the age and sex structure of the population. The forecast of the Federal State Statistics Service for the period up to 2036 is made in three versions. Accordingly, our forecast is made in three versions as well.

Table 1: The forecast of able-bodied population (thousand people) taking into account the retirement age increasing

Years	Forecast according to the "old" scheme of retirement (55 years for women, 60 for men) (thousand people)			Forecast according to the "new" scheme of retirement (60 years for women, 65 for men) (thousand people)		
	Low	***Medium***	***High***	***Low***	***Medium***	***High***
2019	82187	82240	82274	82187	82240	82274
2023	78462	79250	79947	82052	82872	83602
2028	77072	78958	80561	85397	87485	89278
2029	77038	79161	80955	85331	87685	89695
2034	76118	79481	82130	87790	91656	94795
2036	75046	79039	82208	87070	91662	95410

The forecast was prepared in three variants for the period up to 2036. For comparison, there is a forecast of the Federal Service of State Statistics of the Russian Federation, compiled for the preservation of an "old" scheme of the retirement (the left part of the table 1).

The analysis of forecasting results indicates the following important facts: in case, if there was not retirement age increasing (saving working age for women 16-54 years, men 16-59 years, retirement, respectively 55 and 60 years), further decline in the working age population in all three options would be projected. Thus, the retirement age increasing from 2019 (the retirement age is 60 years for women, 65 for men) has halted a steady trend of decline in the able-bodied population in Russia.

Thus, from a purely economic position, it should be determined that the retirement age increasing had a positive impact on the able-bodied population in Russia. It is a necessary and expedient option for the economic development of the country.

Methodical prerequisites and results of the assessment of medical-demographic reserves and the reasonableness of the retirement age increasing for the Russian Arctic's population

The major factor in the justification of retirement age increasing in all countries of the world is the availability of sustainable global growth in life expectancy. It should also be noted, at least two positive factors, objectively characterized global trend of retirement age increasing: firstly, there is a steady increase of healthy life, and secondly, there is a global trend of increasing lag between retirement age increasing and life expectancy increasing, including healthy life) (Barr and Diamond, 2009; Holzmann, 2013).

A survey of the literature concerning changes in pension law, allows us to establish the following: the basis of the decision on the possibility of increasing the age of eligibility for awarding of insurance old-age pensions in most countries is primarily the sustainability of the positive changes in indicators of lifetime. Therefore, this indicator will be the main one in the feasibility analysis of the retirement age increasing for Russia on the whole and its Arctic territories in particular.

The information base of the research contains data of Federal State Statistics Service of the Russian Federation, the International Social Security Association (International Social Security Association – ISSA), Social Security Administration (US Social Security Administration – SSA) and World Health Organization – WHO).

The research has shown that scheduled in Russia age of eligibility for a pension (65 years for men and 60 women) as a whole corresponds to the average age of retirement in Europe – 64.4 years for men and 63.1 years for women (calculated by the authors according to the data from 44 countries

presented in the analytical report prepared by the ISSA and SSA).

For regions of the Russian Federation's Arctic zone pensionable age is 60 years for men and 55 for women (compared to 55 years and 50 which had place before 2019). A comparison of life expectancy of the Arctic regions' population (tab. 2) with the retirement age shows that before the pension reform, lifetime after retirement age of the Arctic's inhabitants as a whole corresponded to the indices of the European average male population and was higher for female one.

Table 2: Life expectancy for Russia and the Russian Arctic's regions, 2008-2017 (based on the materials from the Date of the Federal State Statistics (Date of the Federal..., 2018)

Russian Arctic's regions	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
life expectancy (men), years										
Murmansk Region	60,7	61,2	62,7	63,0	63,9	65,1	64,0	64,5	65,7	66,5
Nenets Autonomous Area	56,1	59,3	59,1	60,6	62,0	60,2	64,7	65,2	63,9	65,9
Yamal-Nenets Autonomous Area	66,0	67,8	65,6	65,6	66,3	66,5	67,0	66,9	67,1	69,0
Chukotka Autonomous Area	56,3	53,7	52,7	57,5	56,6	58,6	58,8	59,3	59,7	60,3
Russia	*61,8*	*62,8*	*63,1*	*64,0*	*64,6*	*65,1*	*65,3*	*65,9*	*66,5*	*67,5*
life expectancy (women), years										
Murmansk Region	72,7	73,0	73,9	74,6	75,3	75,3	75,7	75,7	75,6	76,3
Nenets Autonomous Area	71,9	71,3	71,4	73,5	75,9	75,2	76,2	76,9	78,4	77,2
Yamal-Nenets Autonomous Area	74,7	75,5	74,6	74,9	75,1	75,9	76,9	76,4	77,0	77,9
Chukotka Autonomous Area	64,2	64,6	63,6	66,3	64,9	66,4	66,6	69,7	69,6	71,7
Russia	*74,2*	*74,7*	*74,9*	*75,6*	*75,9*	*76,3*	*76,5*	*76,7*	*77,1*	*77,6*

In the Russian Arctic's regions until the beginning of pension reform, the average life expectancy after retirement age was 10.4 years for men and 25.8 for women (the difference between life expectancy and age of retirement on average for Europe is +12.5 years for men and 19 years for women). In the Murmansk region lifetime after retirement age was 11.5 years for men and 26.3 years for women; in the Nenets Autonomous district - 10.9 years and 27.2 years, respectively; in the Yamalo-Nenets Autonomous district – 14 years for men and 27.9 years for women; in the Chukotka Autonomous area - 21.7 years for women. Chukotka Autonomous Okrug is stood out among the above-listed regions. The difference between life expectancy and retirement age for men in Chukotka was 2.4 times lower than in European countries, and was only 5.3 years.

After increasing the age of eligibility for awarding of insurance old-age pensions to 5 years life expectancy after retirement age (while maintaining the existing level of lifetime) will reduce for the Arctic zone's regions and is expected to average 5.4 years for men and 20.7 years for women (with a minimum value in the Chukotka Autonomous district +0.3 years for males).

When considering the compliance of two indicators – life expectancy (tab. 2) and the average age of the deceased (tab. 3) in Russia and Arctic regions it has been revealed the divergence of their values. For Russia on the whole, the deviation of the value of the prognostic index of life expectancy from the actual average age of death in the period 2008-2016 was slight, in the range of exceeding the prognostic index above the actual one to 0.1-0.2 years. For the Russian Arctic's regions such

deviation was considerable. So, in the Murmansk region the actual age of the death for men in 2011, 2014, 2016, were on average 7.1 years lower than life expectancy; in the Nenets Autonomous district in 2011-2016 – 9.5 years (men) and 19.5 years (women); in the Chukotka Autonomous district the real age of the death for men in the period 2008-2014, the average was 4.9 years lower than life expectancy, women – 10.9 years in the period 2011-2016, the only exception is the Yamalo-Nenets Autonomous Okrug, where the divergence values of these indicators exceeded the national average, but it is not as critical as in other regions of the Arctic zone of the Russian Federation.

Table 3: The average age of death for Russia and the Russian Arctic's regions, 2008-2016

Russian Arctic's regions	2008	2009	2010	2011	2012	2013	2014	2016
average age of death (men) years								
Murmansk Region	60,7	61,2	62,7	56,9	63,9	65,1	56,8	57,6
Nenets Autonomous Area	56,0	59,3	59,0	51,0	47,1	54,4	54,6	57,1
Yamal-Nenets Autonomous Area	66,0	67,8	65,5	65,9	66,1	66,3	64,5	66,9
Chukotka Autonomous Area	51,1	48,2	52,7	51,5	52,8	53,9	54,8	59,7
Russia	*61,8*	*62,7*	*63,1*	*64,0*	*64,5*	*65,1*	*65,2*	*66,4*
average age of death (women), years								
Murmansk Region	72,6	73,0	73,9	74,6	75,3	75,2	75,7	49,0
Nenets Autonomous Area	71,6	70,8	71,1	72,9	47,6	74,6	45,2	41,3
Yamal-Nenets Autonomous Area	74,5	75,2	74,5	75,0	51,7	75,6	76,4	76,7
Chukotka Autonomous Area	64,2	64,6	63,5	55,4	57,2	54,3	56,2	56,4
Russia	*74,1*	*74,6*	*74,8*	*75,5*	*75,7*	*76,2*	*76,4*	*76,9*

The comparison of actual values of average age of the death of the Arctic regions' inhabitants with the age of retirement has shown that in 2016 the life expectancy after retirement age of the average male resident of the Nenets Autonomous district was 2.1 years, in Murmansk Region – 2.6 years, the Chukotka Autonomous district – 4.7 years; only in Yamalo-Nenets Autonomous district, this index corresponded both to the national average value, and the European one - 11.9 years. The actual lifetime after retirement age of an average woman, living in Yamalo-Nenets Autonomous district was 26.7 years; in the Chukotka Autonomous district - 6.4 years, whereas in the Murmansk Region and the Nenets Autonomous district in 2016, women on average did not live to the retirement age and died prematurely (1 and 8.7 years, respectively). By 2016, in comparison with 2008, there was a significant reduction in the number of actual lived years (with the exception of the Yamalo-Nenets Autonomous district). We can assume that in the long term, in conditions of retirement age increasing only men and women living in the Yamal-Nenets Autonomous Okrug will be able to live to the age of retirement.

Conclusions

The carried out research made it possible to draw the following conclusions:

1. The research of world practice of the retirement age establishing has shown that the retirement age increase corresponds to the global trends. The reasons of retirement age increasing to 65 years for men and 60 for women in Russia were sustainable positive changes in the indices of lifetime.

2. The comparison of the indices of life expectancy of the Russian Arctic's inhabitants with the age

of retirement (until 2019) has shown that the residual life corresponded to the values of the European average male populations and higher than ones for women. However, the comparison of actual values of average age of death of the Russian Arctic regions' inhabitants with the age of retirement shows a downward trend in the number of actual lived years, and the groundlessness of the retirement age increasing for the Arctic regions' residents. With the exception of the Yamalo-Nenets Autonomous district, the values of the new retirement age for the Arctic's residents (60 years - men, 55 - women) will exceed average lifetime.

3. Thus, the retirement age increase without significant policy changes in the health system of the Russian Arctic, will not allow achieving significant economic effect. Thus, in case of legislative implementation of important changes in the pension system in Russia it is advisable to take into consideration regional specificity, in particular regions of the Arctic.

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Corporate Governance in The Small and Medium Enterprises (SMES) As Performance Enhancer

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Abstract

Although the number of Palestinian SMEs has been grown last few decades, they face a lot of challenges. The low performance compared to other counterparts around the world is the first of these challenges. Therefore, this paper aims to provide concise description of SMEs in Palestine with an analysis for the current challenges they face. Moreover, the study aims to explore the need of SMEs to embrace a corporate governance (CG) code to elevate their performance and the different advantages and disadvantages of the implementation of their practices. The study found that there is a wide believe that CG code introduces new strategic perspectives through the use of external directors who will add value over the improvement of entrepreneurial activities and increase the competitiveness of SMEs. This is particularly important, as a considerable portion of entrepreneurs in context of Palestine initiated business without a former technical experience. Further challenges such as funding constraint and managerial lack of proficiency in the sector of Palestinians SMEs could be coped with the use of a sound structure of CG in place. There is a wide body of knowledge supports the embracing of CG practices within SMEs at premature phase, in order to have a smooth progress when these SMEs grow in the market.

Keywords: SMEs, Corporate Governance, SMEs Performance; SMEs in Palestine.

Introduction

During last few decades, the corporate governance (thereafter; CG) became an interesting and debatable dominated policy agenda in the most of developed countries. It progressively heating its path to the top priorities of the policy schedule in many governments around the world. The financial crises (eg.1997 Asian crisis, and 2008 US crisis) resulted in the collapse of multinational corporations and impacted many other economies around the world, beyond the corporations themselves. This makes CG a catchphrase in the development debate among practitioners and academic researchers.

Emerging markets, of which Palestine is no exemption, are progressively accolade the concept of CG, as this concept has the ability to influence positively on the sustainable growth. It is believed that well CG breeds a confidence for an investor. Currently, companies are working on enhancing their CG practices in order to rise their values and promote the bottom line. CG is seen as followed structure to direct and run the affairs of the firms toward improving business operations and firm's accountability with the final aim of obtaining a long-run stockholders' value, while taking into the considerations the interests of all other stakeholders. In addition, CG delineates to the structure and strategies to be implemented in place to assure a suitable running of company bodies (Adonu, 2017). As argued by (Claessens, Djankov, Fan, & Lang, 2002) keeping a good CG framework could benefit the companies by increase access to funds, reduce costs of fund, promote good performance and provide more appropriate value for all of stakeholders.

The topic of CG has been a growing realm of management studies particularly among listed big companies. However, studies relate CG to SMEs gained substantial attention in the developed countries (Abor & Adjasi, 2007). SMEs around the world do not strictly comply with CG codes; nevertheless, such SMEs do believe that such CG codes should also been applied by them. Accordingly, the aim of this article is to provide concise description of SMEs in Palestine with an analysis for the current challenges they face. Moreover, the study aims to explore the need of SMEs to embrace a corporate governance (CG) code to elevate their performance and the different advantages and disadvantages of the implementation of their practices. The argument will be provided based on some reasoning of the benefits of adopting CG practices as opposed to some scholars who placed less importance of embracing CG practices for SMEs. Furthermore, the study will provide some insights on the lack of use of CG practices among SMEs.

Small and Medium Enterprises (SMEs)

The literature did not have an agreement over a certain definition for SMEs, as various authors provided various definitions (Bundaleska & Dimitrova, Makedonka Nikolovska, 2012). However, it is generally related to some criteria such as magnitude, number of employees, capital… etc. (Abor & Adjasi, 2007; Asunka, 2017). OECD defines SMEs as "non-subsidiary, independent firms which employ less than a given number of employees".

The number of employees can vary from a country to another. For instance, it is commonly known that the medium enterprises are those which employ less than 200 employees, however it is 250 in the European Union and 500 in US. Firms which employee less than these numbers fall under the category of "Small firms", while micro-enterprises employ a maximum of 5 to 10 workers.

A new definition for SMEs came into force in the European Union by the beginning of 2005, it takes the financial ceilings into consideration. Hence, SMEs are those which have number of employees between 50 and 249 with turnovers do not exceed EUR 50 million. With this new definition, the small enterprises are which have number of employees between 10 to 49 and with an annual turnover does not exceed EUR 10 million. Micro firms are defined with a number of employees of less than 10 and an annual turnover that does not exceed EUR 2 million. Alternatively, the classification can be done according to the balance sheet, as it should not exceed EUR 43 million EUR for medium size enterprises, EUR 10 million EUR for small size firms and EUR 2 million EUR for micro size enterprises (OECD).

Governments of many countries have undertaken steps to promote and support the establishment and the growth of SMEs, since these SMEs are the backbone of the economic development. SMEs sector is deemed to be the largest in terms of employing workers at some of the developed industrial economies (Carsamer, 2009). Small Businesses are evident in many sectors, such as in commerce, education, health, manufacturing and other service industries (Adonu, 2017).

A Glance about SMEs in Palestine

The Palestinian Monetary Authority defined Small Enterprises as those with less than 25 employees and with annual sales of less than USD 7 million (The Portland Trust, 2013).

A survey conducted on the Palestinian economy found that 97% of the firms are classified as SMEs and they currently employs 65% of the total workforce in Palestine. Two thirds of the sole proprietorship Palestinian enterprises are located in the West bank and the third are located in Gaza (PCBS, p.21). Above 85% of all establishments in Palestine are owned by sole individuals, which means that SMEs dominates the Palestinian economy (S. S. Sultan, 2014). In the West Bank, there are 88,4421 national establishments. In Gaza Strip, the number of these national operating establishments are 42,853 (PCBS, p.19). Only 137 enterprises in Palestine employ over than 100 workers, majority of them are located in West Bank (100 companies) and the other 37 are located in Gaza. The majority of SMEs in Palestine employ less than 9 employees (The Portland Trust, 2013). The entrepreneurship in Palestine is mainly initiated based on the individual or family savings with little support from the official agencies.

Similar to other economics, SMEs in Palestine play a vital role in the process of economic development, as they reduce the government burden on creating jobs and therefore reduce government expenditures. SMEs are considered the safety valve against political instability arises from deteriorating political conditions in the country. SMEs Establishment can be an efficient strategy to mitigate unemployment and reduce the government expenditure (Abuznaid & Doole, 1999, p.1).

The main incentive for Palestinian start-up business varies from one to another, as majority of them start their businesses motivated by their prior experiences and savings, other entrepreneurs start their businesses to find job and to invest savings (Sabri, 2008).

SMEs growth in Palestine is obstructed by a number of challenges, mainly are: limited funding chances; weakness of legal environment; tighten resources for expansion and lack of skillful employees. Moreover, it faces many challenges related to marketing aspects, such as: weakness of marketing capabilities and limited access to markets; weak distribution network; limited marketing polices and a high percent of inactive capacity as most of business companies have no brand names for their products. The Palestinian SMEs lack of ability competition in both local and international markets is another challenge they face, as they are not able to reduce their costs of production and enhance the products quality, whether it is commodities and services to meet favored requirements by customers. Finally, the majority of Palestinian SMEs are family firms which encounter conflicts in management (Sultan, 2014).

Family business is dominated in Palestine, as 96% of Palestinian SMEs are considered family firms, Over 70% of them are located in the west bank. Varying interests among family members can complicate the management process through arise tension which often leads to disputes and management operation could tangle with the family relationships which may cause inefficiency of management (Abuznaid, 2014). For Palestinian family businesses, the main sources of insider disputes are distributing profit, withdrawing profits without former agreement and differences in managing style. These conflicts often cause to liquidation or may to dividing the firm among family members (Nidal, 2010).

In Palestine, family firms struggle to perform well compared to non-family firms. Further, Palestinian family companies are centralized and their owners of to keep the affairs in privacy, which cause a lack of sharing information about their businesses, this leads to slowing down the responses of SMEs towards the threats and opportunities in the external environment. Moreover, family businesses discourage the possibility of staff promotion in the firms. Therefore, such practices lead to the loss of chance to make a better informed decisions or even contributing in making a creative idea which could affect development of business (S. Sultan, de Waal, & Goedegebuure, 2017). The lack of experience is another challenge face Palestinian family businesses, as 26% of them start their own business without former technical experience (Abuznaid, 2014). Most importantly, the Israeli occupation policies and procedures restrict the movement of individuals and raw material in or out of Palestine even among Palestinian cities (Atyani & Sarah, 2009; Nidal, 2010). This further restricts the growth of such sector and limits its activities significantly.

Corporate Governance

The CG has been initiated by number of the international organizations. In 1999, the OECD has developed the principles of CG to support the framework of organization. Since that date, those principles shaped the basis of the CG in both OECD and non-OECD states alike. These principles have been adopted as one of the 12 key criterion for sound financial system by the Financial Stability Forum (OECD, 2004). CG is critically important matter in the services industry. Scholars defined the CG from different perspectives. Table no. 1 shows some of these definitions.

Table 1: definitions for CG

Definition	Author (s)
"Corporate governance is concerned with ways of bringing the interests (of investors and managers) into line and ensuring that firms are run for the benefit of investors".	Mayer,1997
"CG is concerned with the relationship between the internal governance mechanisms of corporations and society's conception of the scope of corporate accountability"	Deakin and Hughes,1997
"CG is the process and structure used to direct and manage the business affairs of the company towards enhancing business prosperity and corporate accountability with the ultimate objective of realizing long-term shareholder value, whilst taking into account the interest of other stakeholders"	Keasey et al., 1997

Thus, CG is all about that firm is managed well and in line of the interest of stockholders (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2007; Mayer, 1997). The rapid progress of CG and its' structures indicate how important is such concept to the business entities, governments and communities as well (Ho, 2005). Hence, the relationship between CG and firms performance is an interested topic for investigation (Brennan & Solomon, 2008). Accordingly, well devised CG practices are essential for companies to access funds from the stock market and to maximize its market value. These practices assist firms to reduce inefficiencies and at the same time boost firms' profits.

CG and the internal operations of the company

CG could affect a wide range of internal operations of the company, which are strategic direction; financial anticipations; transparency and stockholder's activism. Strategic direction determines the company's long-run direction. CG requires the placement of board members which should bring in skilled members into the enterprise which foster the entrepreneurial direction of the company. Furthermore, appointing such members in the company might cause in more attention to be given to the research & development and the innovation. The choice of governance mechanisms actually does affect firms' ability to change their strategy (Brunninge, Nordqvist, & Wiklund, 2007).

Managers prefer projects that have immediate results, as their performance is subjected to how well these projects perform. This could result on some impeding on the entrepreneurial success. On another hand, some managers do not share the profit with other employees upon the success of selected project, this may reflects an environment whereby corporate governance is not well practiced (Abor & Adjasi, 2007).

The transparency has been touched at the initiation of CG and through its' reform as well. The transparency has been assured through the followings: i) There are clear guidelines for disclosure of all activities of the board of directors; ii) The audit committee at levels of external and internal is a requirement for sound CG (Brennan & Solomon, 2008) and iii) all CG procedures sought to control managers' misbehaviors and frauds as well as regule the activities of over keen auditors to control in value creating activities.

CG and SMEs

CG has been traditionally related to larger firms where there is probability of having agency conflicts. These conflicts arise as a consequence of separation of ownership and the management of firms, which lead to have different interests among parties. In other words, the agency problems arise within company if there is a conflict between stockholders and the management (Hart, 1995). This may refer that CG is not applicable to SMEs where there is less probability of occurrence of such agency conflicts. SMEs are, usually, developed by only a single person who is the owner and the manager at the same time. SMEs incline to have a less pronounced separation of ownership and managing compared to big enterprises (Adonu, 2017). As they have few staff who are, in generally, relatives to the owner. Hence, there is almost non-existence of the separation between the ownership and management, this eliminates the need for the CG in the SMEs operations.

The non-need for the CG by SMEs can be shown again when there is no accountability for SMEs by the public as these firms do not rely on public funds. Most of the single proprietorship ventures may not need to comply with standards of the disclosure. Moreover, there is no agency conflict in SMEs as a result of: i) the absence of the wealth maximization goal for this type of ventures and ii) there is ignorance for the results of firm's activities, these results usually lead to conflict between different parties of the venture. Thence, conflicts do not exist and therefore no need for CG to resolve such issues.

Despite such arguments, there is an international interest for the implementation of CG in SMEs as the CG guidelines are applicable for SMEs. "The ongoing tendency toward improving board functions within publicly listed firms will extend to SMEs by mimicry and institutional pressures" (Corbetta & Salvato, 2004). There are lots of areas where CG could be applied in SMEs. For example, board size and characteristics of board members can be an area of inquiry. In a sense of how does the board size and board member characteristics can impact the performance of the enterprise and the extent of the difference between SME and an established corporation. Other areas of inquiries can include the effect of CEO duality of SMEs and family ownership on SMEs financial performance (Abor & Adjasi, 2007).

Benefits of CG for SMEs

Some scholars claimed that the merits of CG may entice SMEs to adopt, particularly growing entrepreneurial companies which have the prospects growth and trend to extend beyond their states of survival (Abor & Adjasi, 2007; Clarke & Klettner, 2014). The advantages of CG to listed companies could be implemented to SMEs as well. Simply, the implementation of CG practices can help SMEs to grow rapidly. The growth of entrepreneurial companies requires access to necessary resources which can be obtained via the existence of effective board of directors that characterized by high independence as in the situation of listed companies (Adams, Hermalin, & Weisbach., 2010).

Chen (2008) analysed the impact of CG on listed companies, he pointed out that good strategies impact the firm performance and external board members confront policies and strategies by managers of firms. Therefore, the implementation of the same on SMEs may enable to have such members and lead to take best decisions for the firm.

As referred earlier, obtaining funds is one of the major hindrance face Palestinian SME sector to grow. Hence, the incorporation of CG into SMEs sector could highly minimize such restriction, as the external board members may come up with ideas to entice funds. Further, they may foster the enterprise's creativity and innovation by provide suggestions during the process of decision-making. A sever example of this is "Small Enterprise Agency" in Japan which achieved great growth via the utilization of non-executive directors more actively than big companies (Abor & Adjasi, 2007). On another hand, the growth of the entrepreneurial companies requires implementation of good governance practices and professional managers. This may starts by the separation of ownership and management (Fleming, Heaney, & McCosker, 2005).

To have good performance, motivations would be offered to professional directors to encourage them to do their best. Additionally, to have good performance a governance unit must be evident and distinguished. For example, internal audit unit and accounting control unit will have been laid in place

to assist in evaluating the performance of such directors. The absence of such feature resulted in dreadful implications on SMEs in Palestine, where SMEs are managed by less qualified people, mostly family members and a single proprietor. Hence, the implementation of CG is a constitute room for the composition of the board that encompass outside directors who are not necessarily related to the owners and therefore deduce more independent sound practices of managing the firm and gaining profits (Adams et al., 2010).

In Palestine, SMEs growth is a tremendous challenge. Many reasons can be provided, but poor managerial skills by entrepreneurs is evident. In this case, the CG structure introduced within SMEs business process could tackle this problem by introduce more expertise and further enhance the internal procedure of the business. Introducing CG structure will free up proprietor operator from working duties, hence the separation between management and ownership control could be possible in the SMEs. CG paves the path for potential future growth. Sometimes company sought to obtain new finance, this oblige much work to be done pre confidently going to the stock market and requires some time for the SME to be completely listed in the stock market. During this time, the CG adoption and implementation become critical for SMEs to enhance their potential growth (Adonu, 2017). Thus, harmonious trajectory record of sound governance will highly help when that time comes. Thence, the implementation of CG structure at premature phase will lead to obtain experience and cultivate discipline in the management of the company. This is significant, as the external bodies such as the stock market authority and other lending institutes need to assure good managing practices are followed by SMEs. CG permits such companies to smoothly been prepared for future initial public offering (IPOs). For instance, in Palestine, early implementation of CG would prepare SMEs sufficiently even pre they get listed in Palestine Exchange Stock Market. The presence of a board of directors for instance will prompt fast growth strategies in SMEs for quick profit; at some point this will require the company to seek for more finance, thus, going public will be of added value to them. Therefore, the transmission from a small to medium and eventually to big firms will be smoothly supported through an efficient CG which ensure active company control system.

In same token, sound CG practices help SMEs to enhance their chances of access finance from both financial institutions and other angel investors. This is an expected result of proper book keeping, good accounting practices and the disclosure of information which convey the trust among all the relevant stakeholders. In the same line, SMEs will have a healthier growth and be obliged to firm's effectiveness because of the existence outside supervisory parties. In addition, applying the sound CG principles minimizes the problems related to asymmetric information and makes such firms low in risk for investing.

Disadvantages of CG for SMEs

Although the benefits which SMEs can be gained on the implementation of CG practices, its' disadvantages should be taken into consideration as well. Implementation of the CG will imply extra auditing rules, reward and candidacy committees. Furthermore, the implementation of CG will require an additional recruitment of directors as it will add to the management complexity of SMEs at an early stage. The recruitment of additional directors will require a complex reward system and appointment of external directors based on some regulation in the country. accordingly, the implementation of CG into operations of SMEs will rise operational costs in the form of high cost of start-up which may dissuade many from initiating business. This issue can be solved by the policy-makers through providing their services as volunteers for SMEs, especially in the start-up stage.

It is worth here to refer to the perspective of the stakeholder theory on CG. The proponents of this theory postulate that stockholders are only a part of the significant stakeholder group. Thus, CG tools must consider and integrate all of other stakeholders. As this may assist in enhancing CG through promoting stakeholders' interests with the firm's interests. Furthermore, such integration can assist to boost CG tools. In fact, although it is argued that all stakeholders may have a common interest in SMEs business. However, such common interest does not necessarily result in a unified owner's interest. As individuals, there is a likelihood of free-ride problem to occur or individuals evade work efforts despite the joint interest (Heath & Norman, 2004; Norman, 2004).

Conclusion

The significance of the CG cannot be overlooked since it forms the organizational climate for the inside activities of the firm. CG in Palestine can highly help the SMEs sector through implanting sound managing practices, powerful insider auditing committee and largely chance for growth. Applying CG in Palestinian SMEs can brings new strategic sights by outside independent directors which may improve entrepreneurship and competitiveness of Palestinian SMEs. Applying principles of CG properly in entrepreneurial companies cannot form a threat of value creation. Thus, it is significant for companies to have commitments on value creation.

Sound governance tools in SMEs are probably to cause boards to put much needed pressure on performance improvement via assuring that the interests of the company are served. In the situation of SMEs, members of board bring into company new experiences and knowledge on funding choices obtainable and strategies to source such funds, therefore it can deal with the credit handcuff issues as well. Sometimes, firm who are willing to have external finance realize that a lot of effort needs to be done pre confidently going to the financial market. Recording history of sound governance will highly help it for that. SMEs need to take into consideration the role of all stakeholders by a bottom-up approach where, for instance, the perspectives of unions (e.g. in the situation of employees) are explicitly put in the meetings of board. Also, it should be pointed out that sound governance maybe does not guarantee firm success. However, non-well governance maybe is an indicative of a firm non-success. More significantly, rising the trust of current owners and possible new ones is a worth aim.

Limitation, implications and future studies

The limitations and of the study is the debate fundamentally concentrate on CG in the context of Palestinian SMEs. Therefore, the current study offers conceptual views on the application of CG among SMEs particularly in Palestine. Thus, future studies could empirically examine the impact of CG on these issues whether in the context of Palestine or in other business environment, in order to provide evidence about how could the implementation of sound CG reduce funding constraint and managerial lack of proficiency and enhance management practices within SMEs.

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The Role of The Information Flow Management System in Creating Organizational Knowledge

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Abstract

The emerging information society and knowledge-based economy are characterised by fast flow and a large amount of information provided and processed by organisations. Modern organisations wishing to develop and increase their position on the market need to develop and implement knowledge creation systems in the organisation based on information flow management systems. Efficiently functioning information systems provide the right quality of raw material - data to create new and better knowledge. Errors made in managing the flow of information cause difficulties in the creation and dissemination of knowledge, and often even prevent the generation and transfer of knowledge. The purpose of the study is to present the role of information flow management in creating organisational knowledge. The article analyses the literature and relationships that connect the efficient flow of information with knowledge creation processes. Own research has been used to illustrate the assumptions of the concept. The theoretical model of an intelligent decision-making system for information flow management was analysed, at the same time indicating the conditions for its implementation.

Keywords: Information, Knowledge, Decision-Making System for Information Flow Management

Introduction

A characteristic feature of modern society is globalisation processes that commonly occur, leading not only to the blurring of state borders, but also organisational boundaries. Such changes make it necessary to change the management model. The classic post Tylorism approach is replaced by new tendencies characterized by a different language, organizational culture, management methods and modern communication-based structures, modern IT and information solutions.

The consequence of the emergence of the information society is the development of a knowledge-based economy characterized by: virtualization of the organization's activities; selling not services and products, but the knowledge contained therein; predominance of virtual processes; blurring the boundaries between the organization and the environment, and changing the traditional static and object-oriented approach to the process approach to the organization. Nogalski and Kowalczyk claim that a product becomes a medium carrying a load of knowledge of a company, the more valuable it is, the more knowledge it will be able to contain (Nogalski, Kowalczyk, 2004, pp. 156-157). Gaining competitive advantage and development of an organizations in such an economy are possible mainly due to efficient knowledge management, and especially the processes of its creation.

The factor conditioning the transformation of classic economic systems into a knowledge-based economy is the development of methods and techniques for processing and managing information. Effective and quick processing of information enables the creation of knowledge which is the basic resource and source of competitive advantage of modern organizations.

Decisions regarding information systems arise much controversy both among decision makers and employees who are to be direct users of the systems. In addition to efficiency (related to effects and costs), usability should be considered, in which the system's operation should be assessed from the side of the effects obtained. It is necessary to take into account potential barriers. Thus, potential and actual utility should be assessed.

The paper attempts to present the role of information flow management in creating organizational knowledge. The theoretical foundations and dependencies combining efficient information flow with knowledge creation processes were analysed, and own research was used to illustrate the assumptions of the concept.

The process of creating knowledge in the organization

The information revolution we are witnessing affects competition on the market in three basic ways: (Porter, 2001)

- changes the structure of the sector and at the same time changes the competition rules;
- creates a competitive advantage by enabling companies to achieve better results than those obtained by their competitors;
- leads to the creation of completely new fields of activity, often based on the company's current operations.

Thus, strategic analysis activities are not only the domain of large organizations. Everyone, including small businesses, must think strategically, despite the turbulent and dynamic market often changing the entrepreneur's long-term “plans” (Aymen, Alhamzah & Bilal, 2019).

When dealing with an increasing amount of information coming from outside the organization as well as inside information, it is necessary to manage it properly. The first element is researching and identifying information needs. Comprehensive, systemic approaches that bring new quality to the information system are crucial to the quality of the process. Methodologies derived from the analysis and design of IT systems are most commonly used then, i.e.: (Agus, Isa, Farid, Permono, 2015) product research, total study, study of critical success factors, key indicators system, information ownership research (business information characterization study), economic process model (business process model), enterprise activity matrix (information control net model).

The cited preasumptions condition the development of various types of organizations, such as: learning, intelligent, network or virtual. Their development is directed at the increase of innovation, entrepreneurship and competitiveness through constant raising of the level of knowledge and excellent intellectual capital. It is pointed out that the most important thing for the organization is to have highly educated employees who, equipped with knowledge and the ability to use it to design modern systems, technologies, production organization and provision of services guarantee the best satisfaction of contractors' needs translating into the economic situation of the organization and its position on market. Efficient use and development of intellectual potential requires the implementation and development of IT networks, intelligent systems creating Intranet and Extranet in these organizations as basic tools for creating and propagating knowledge in an organization (Rajiani, Ismail, 2019).

Knowledge management has had many ambiguous definitions, whose common feature is to indicate the objectives of the management process, in which processes related to the flow of information play a large role. Among the goals Grudzewski and Hejduk (2004) mention:

- knowledge creation,
- valuable and useless knowledge identification,
- knowledge storage,
- promotion and use of knowledge,
- reducing the risk of knowledge loss,
- increasing the organization's advantage.

The first of these goals should be considered as particularly important. The intellectual potential of the organization and, consequently, the effective implementation of organizational goals depend on the quality of its implementation.

The process of creating knowledge is based on the "interaction of two types of knowledge: explicit (formal) and hidden (silent)." It can be presented in four phases (Perechuda, 2005, pp. 124-126).

- linear,
- cascade,
- wave,
- fractal - design.

The first phase is characterized by gradual learning of the organization. In the psychological sphere, managers assume the possibility of independent and individual mastery of the complexity of their own organization. The flow of information and creation of knowledge is carried out by trial and error. This phase is characteristic for small Polish companies.

Polish companies have reached the second phase, in which the strategic game paradigm between the organization and the environment is characteristic. Organizational learning is implemented by the method of rapid increase in knowledge. This knowledge is collected in a planned and organized way, and information management is the basis for its codification.

The third phase characterizes supranational organizations that play the role of integrators in the network. These organizations create large amounts of explicit knowledge - for members of the integrator's organization and at the same time classified - for business partners. A pot of explicit knowledge, necessary for efficient cooperation in the network, is cyclically transferred to the subcontractors. The integrator's information systems precisely assign knowledge access rights to individual subcontractors in such a way as to ensure stable network operation.

The fourth phase is referred to as the network-fractal model. A characteristic feature is the disappearance of the coordinator, dispersion of co-operators. Cooperating organizations have full organizational and legal independence, they simultaneously run many projects in which they play the role of controlling or subcontracting companies (Susanto, Meiryani, 2019). Business processes in this phase shorten, often penetrate and intersect in the information space. Promotion of knowledge is characterized by concentration in some areas and a lack in others - insularity of knowledge.

Currently, the knowledge creation model used by network organizations is considered the most optimal. It assumes that implicit knowledge arises in research and development teams within the organization and that explicit knowledge is widely available on the web. In this situation, the organization acting as the coordinator has full control over the processes of creating knowledge, and the organizations cooperating with the network have only fragments of knowledge, often they do not even know the coordinator's main goal. Cooperating organizations gain access to the minimum amount of knowledge necessary to carry out the task assigned to them. In this way, the coordinator protects his knowledge, maintains key competences, controls the directions of knowledge development carried out by his own research teams, strongly determines the organizations forming the network, thus ensuring a financial, technological and human advantage. In addition, the organization acting as a coordinator efficiently acquires a large amount of classified knowledge of its partners. Creating knowledge in this type of organization requires efficient and effective management of information and its flow. This management must be supported by the latest computer technologies and highly specialized management systems.

Virtual organizations are now considered the highest form of development of network organizations. A characteristic feature of these organizations is the transfer of the entire knowledge creation process to a virtual level. Both public and silent viewers are created through the internet. This change in the space for creating knowledge raises additional problems. It is relatively easy to impersonate known brands, it is difficult to identify and authenticate partners. Identifying the organizational structure and

management system becomes difficult. Combining key competences and resources necessary to implement projects also raises problems. A prerequisite for generating knowledge in such organizations is having an information management system whose task will be to intelligently acquire, verify and provide knowledge creation sites. In addition, the information management system must ensure effective communication and automatic coding of the created knowledge.

Information Flow Management as A Knowledge Management Tool

The knowledge management process in modern organizations is inseparable from information management. At present, chaos and information overload are common. The excess of information blends and overwhelms organizations, minds of managers, designers and experts, effectively hindering and sometimes even preventing the generation of knowledge (Ungerman, Dedkova, Gurinova, 2018; Ivanová, Masárová, 2016; Zygmunt, 2017; Sachpazidu-Wójcicka, 2017; Ruchkina, Melnichuk, Frumina, Mentel, 2017). Searching for information necessary to solve difficult problems is particularly time-consuming and often creates frustration, especially when the sources of information are poorly organized and access to them is difficult due to the lack of proper infrastructure. When analyzing publicly available sources of information, it should be stated that they store huge amounts of unstructured knowledge and information, stored in a way that hinders access and usage (Kuś, Pypłacz, 2019).

In the era of information overload, it is important to ensure a sufficiently high level of information quality. Information quality management is understood as all actions aimed at providing end users with useful information, i.e. about features that meet their expectations, at a specific place and time. Low quality of information can cost a company a loss of 10 to even 50% of sales turnover (Fitri, Nugraha, Hakimah, Manihuruk, 2019; Grabara, Cehlar, Dabylova, 2019). Therefore, having information resources is necessary, but another indispensable element is their effective management, and thus: (Ostoj, 2009)

- building information resources in an enterprise in such a way that its greatest potential
- usefulness can be achieved in current and subsequent decisions (expenditure on this resource, i.e. its generation, processing, storage, protection);
- caring for the quality of information resources determined by their adequacy to the
- processes reflected and adaptation to decision-making competences of specific positions;
- protection of the resource against unauthorized persons;
- resource completeness assessed from both the company's current and future needs;
- determining the effects of information management;
- measurability of the information resource and / or its services;
- measurability of effects achieved through the use of this resource.

Taking care of the right quality of information, one should strive to create appropriate conditions that enable obtaining, analyzing, processing, sending information both within the organization as well as at the level of organization - the environment. Organizing the right conditions over time allows to build an efficiently operating information system in the enterprise, the purpose of which is ongoing monitoring of incoming and outgoing information, verifying, updating, distributing to individual levels of management, and storing them for later historical verification.

The facts presented above clearly indicate the need to build efficient information flow management systems (IFMS) in the first place. The basis for the construction of such a system is the development of a knowledge management policy on which the information flow management policy is based.

The team of experts analyzing the mission and goals of the organization, information sources, directions of its flow, knowledge map and knowledge transformation algorithms build initial assumptions for the IFMS policy, whose main assumptions are: (Borisova, Demkina, Mikhailova, Zieliński, 2019; Shakeel, Karim, Khan, 2020)

- setting standards for information flow management,
- coordination of information flow management centers,
- definition of procedures and guidelines regarding the flow of information and knowledge
- allocation between individual organizational units,
- developing procedures for applying and updating knowledge for an intelligent
- information flow management system,
- defining information and knowledge security standards.

Based on a predefined policy, an intelligent decision-making system for information flow management (Yazdani, Chatterjee, Pamucar, Chakraborty, 2020) is built. This is the author's original solution. The scheme of operation of this system is shown in Figure 1.

The core of the system is the coordinating and requesting module, whose task is to coordinate the work of other modules and make decisions. The decisions are made in accordance with the work patterns written in the sets of procedures (Susanto, Meiryani, 2019), functions and methods. When choosing a solution, the system uses the knowledge contained in the knowledge base, constant and variable information available in the system and forecasts generated by the forecasting module. The decisions taken are translated into the language of the orders by the executive module and sent to the appropriate information flow management points. Changes triggered by decisions are observed by the monitoring module, analyzed and used to build the system's knowledge base. The system supports managers in decision-making process.

In emergency situations, initiating decision procedures is triggered by the observation module. Information on the observed irregularities in the flow of information is transferred to the decision-making module, where emergency decisions are made based on the knowledge and implemented procedures. The main purpose of the monitoring module is to control the ongoing operation of integrators and provide information necessary for efficient management of information flow.

A special element in the decision system (Rizk, Elragal, 2020) is the evaluation module. Its task is to evaluate the knowledge acquired by the system and to eliminate irrelevant information managers generated by the system. The introduction of such a system element is related to the amount of information processed by the system and related activities. The module does not permanently delete reports, it only filters them, and actions regarding knowledge evaluation rely on appropriate flagging. The decision on the final removal of elements from the knowledge base or reports is always made by the information flow management system manager.

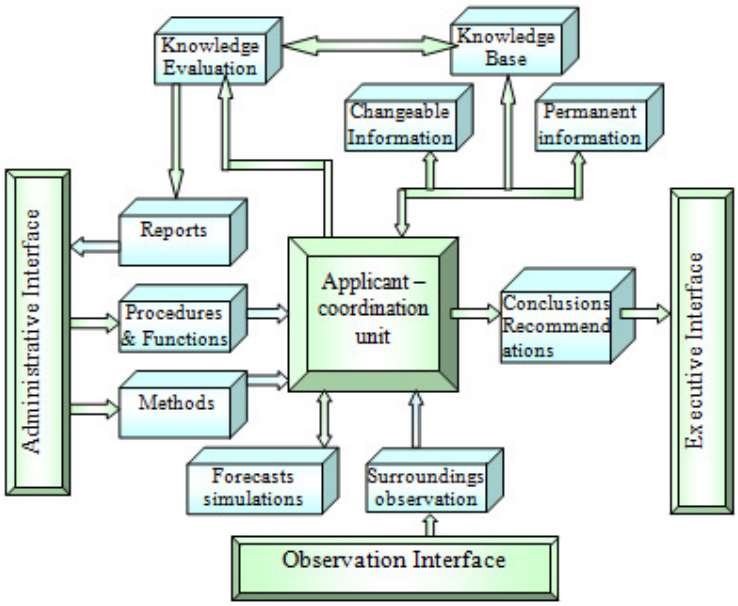

Figure 1: Functional diagram of the Intelligent Information Integrator Management System
Source: Own study.

Decision Making System Managing Information Flow is the implementation of an expert system making decisions without human control (Yazdani, Chatterjee, Pamucar, Chakraborty, 2020). The modular structure of the system ensures efficient operation and facilitates its development.

Decision Making System Managing Information Flow (Susanto, Meiryani 2019) communicates with the environment through three interfaces: administrative, observation and executive. The administrative coupling is used by managers of the information flow management system to update a set of procedures, functions and methods. It enables control of the system operation, using the knowledge base and the forecasting module. It also serves as a tool to verify policies that are being developed. The executive interface is used by the system to control the flow of information in the organization. With its help, the system sends orders to integrators setting priorities and routes for information transfer and knowledge allocation. The observation interface is intended for controlling integrators' work, collecting data from information demand analyses, requests for access to organization's knowledge, updating the organization's knowledge map, detecting errors and damages.

The original structure of the system knowledge base and the knowledge map of the organization is made up of a team of specialists. Then, using the system modules, the system knowledge base and organization knowledge map are updated and developed. An important element of the knowledge base building process is the system learning process. Well-chosen learning procedures enable rapid evaluation of knowledge, which in turn, increases the quality of the management process and the effectiveness of the flow of information and knowledge in the organization.

Forecasting and reporting modules are complementary elements of the system. They are used by the requesting module to verify decision variants and to inform about actions taken by the system. These elements can also be used in the planning and designing process of developing the information flow management system. They allow for checking and verifying planned solutions before their implementation. With a sufficiently high level of knowledge, the applicant module of the system will be able to propose the necessary changes in the information flow management system in the form of multi-variant solutions.

Conclusion

The formation of the information society as well as the emergence of increasingly new communication solutions forces changes in the organization's ways of operating. This process has significantly accelerated in recent years. Lack of thoughtful solutions results in incurring unnecessary costs for computerization, which, with limited resources, makes the organization inefficient. At the same time, profound changes in the structure and processes of the organization caused by globalization and integration require reaching for ever more perfect management methods. It is necessary to efficiently create knowledge, evaluate it and allocate it constantly. The proposed solution is one of the possible ways to improve the functioning of the organization.

Wide access to knowledge intensifies competition on the market, the problem now is not the access to knowledge, but its effective creation based on precise information. The introduction of solutions improving access to knowledge is a key factor in the success of the organization.

The use of an information flow management system can support the knowledge creation process and improve the use of its resources. The possibility of effective knowledge creation guaranteed by an efficient information flow management system will give a chance to achieve competitive advantage and further development.

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Explore the Influence of Internet Rumors on Purchase Decisions

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Abstract

People have the desire to prolong life, compare with others, live comfortably, lose love, enjoy food and drink, and avoid suffering and danger. These innate desires are the most attractive. When you can realize these human beings, instinctual desires can also control those emotional motivations that drive people, and they are beyond control. Human beings are affected by information. Among the products that are about to be discontinued or are in short supply, causing community topics to continue to follow and follow the trend of buying, this research intends to change individuals from positive, negative, rumor characteristics, rumor intensity, source credibility, and interfering with the middle factors (including the level of involvement, emotional identity, risk avoidance, political party tendencies) to explore the impact of online rumors on consumer purchasing behavior in a more in-depth manner, using questionnaires, collect data and provide research results for corporate product marketing or government future planning for reference.

Keywords: Rumor, Consumer purchase decisions, Emotional identity, Rumor transmission.

Introduction

Fear marketing is a marketing technique, and rumors are the oldest media. In the past, rumors were mostly spread through newspapers or word of mouth, but the development of their spread was quite limited. Recently, rumors came out. The message flow is large and fast, and the content is all-encompassing. Whether in reality or in the online world, rumors always make people unclear about authenticity.

Words of mouth, social media rendering, and mass media appeared. These did not eliminate the rumors, but only upgraded the rumors more professionally. It is difficult to distinguish between true and false. So it is easy to be spread out. The mysterious and magical things are more difficult to get rid of, and the rumor is to make people believe, so it is generally not just a situation that makes people happy or relaxed. Therefore, it is difficult for people to use subconscious to distinguish hypocrisy.

The falseness of rumors is even more questioned. For example, in a research study by the experimental rumors of Allport & Postman, (1947), rumors can only go wrong. In the process of spreading, whether it is from its original intention or retelling, rumors are often farther and farther away from the truth, reflecting a distortion of reality. Sometimes, everyone is extra cautious in the process of passing the message, but in the process of retelling, more or less some of their own emotions and ideas are gradually distorted. The rumor may start with an unconfirmed report, a friend's personal experience, or a discussion in the message area of the villagers, but the motive for spreading the rumor online may be to increase the consumerism of sales internet rumors create topicality, but it is also likely to be just a prank, and consumer internet rumors have positive or negative effects through the product, even hurting the reputation of the store or affecting consumers' willingness to buy.

"COVID-19. " is discussed animatedly. The first and most direct impact is that masks and alcohol are sold out. The news reports mention which masks are effective defenses and which are ineffective. Even masks can represent life. "Toilet Paper Chaos" was in February 2018, because major news media reported that the sales channel RT-Mart was notified that the price of toilet paper will increase by up to 30%, which will cause panic among the people. The resurgence of "Toilet Paper Chaos 2.0"

this time, with the increasing impact of the epidemic, the pulp has been portrayed as a shortage problem by online rumors. This time, what is more serious is that it is no longer unique phenomenon in Taiwan. From Japan and Hong Kong in Asia, Sydney in Australia, the United Kingdom in Europe, and as far as the United States. Unexpectedly, from masks to alcohol, toilet paper is not a necessity for epidemic prevention. The Guardian wrote that if they suddenly saw a pack of toilet paper in the supermarket, they wanted to buy it quickly. In addition to being a temporary anomaly, this behavior can also have some scientifically reasonable explanations. Fear is one of the eight principles of humanity. The main innate desire of human beings, so long as you can use this in your own products and services, if your products and services can provide a suitable solution for a panic situation. As long as it does not violate morality, if only it can provide a truly effective solution, as long as the things you sell can effectively eliminate fear, you can easily sell and profit from it. Use, persuade and contagion. So if you use the fear in your heart to sell a certain product or service immediately, it means that this product or service has the characteristics of solving panic. If not, no matter how much fear you try to cause in people's hearts, it's not contagious, is it?

Discuss from consumer behaviors to understand the factors that influence consumer buying decisions, consumer snapping behaviors, herd behaviors, information verification behaviors, and distribution behaviors, highlighting the scarcity of products or services. Today is a common marketing technique, but past research more pointed out the significance of price strategy and promotion strategy, less talked about whether the information released by fear marketing is true, or the verification method of the true and false identification after the outflow of information, so in such a variety of theories, collecting theory and summarize the method.

The purpose of this study is to collect the Internet rumors of "Toilet Paper Chaos 2.0" on the website and test the strength and characteristics of the message, the credibility of the source, and add intermediary personal factors to verify which have a positive impact on consumer purchase decisions? Collect the interviewees' opinions and data in the form of questionnaires, and then provide the research results for enterprise product marketing and future planning for reference.

Based on the research motivation and background, the research objectives are as follows:

1) Discuss how consumers' buying behavior and communication behavior are affected by rumors. The influences include: the positive and negative strength, credibility and characteristics of rumors.

2) Discuss whether the personal characteristics of consumers (the degree of risk avoidance, the degree of involvement, and the relationship with information sources) will interfere with the effects of rumors.

Literature Review

Rumors

Rumor is a social phenomenon and a political phenomenon. There are many "unconfirmed" or hesitant rumors in the mind of the rumors involved, many of which have panic effects and negative connotations. In the book "Rumor" by the French scholar Kapferer, (1990) that if the rumor is hypocritical, the public will not be attracted to the matter. The reason why some people believe that rumors are because they are often proved to be true at the end, and rumors are often considered to be tangible can be spread; the rumor may be false or correct, but it may also be a mistake from the original intention after the actual message passed from word to word. Rumors belonged to the research scope of psychology in the past. The definition of rumors is briefly described in Table1.

Table 1: Rumor Definition

Time	Academic	Definition
1944	Knapp	Rumors are a special social model, and statements related to immediate facts are widely disseminated without formal confirmation.
1947	Allport & Postman	When an incident affects the masses, it is to make people believe that rumors are usually passed on by word of mouth during interpersonal communication, but there is no actual evidence to confirm.
1951	Peterson & Gist	Rumors are issues about issues, events, or things that interest the public, and events that have not been explained.
1955	Schachter & Burdict	Rumors are unreliable, and they use secrets that gradually spread or spread to covertly communicate and distort communication between people.
1976	Rosnow	The rumor is a mass exchange of information, reflecting individual hypotheses about an unproven social phenomenon.
1990	Kapferer	Rumors are the most primitive mass media. Information that has existed in society but has not been officially publicly proven or officially classified as repelling the rumor is not specific to the government, but includes companies, manufacturers, and organizations related to the rumor.
1966	Shibutani	Rumors refer to unprepared news or newspapers produced by a group of people during the course of discussion.
2007	Coombs & Hlladayo	The main reason why rumors will become a corporate crisis is that consumers' purchasing intentions will change due to rumors.

Rumors Type

Knapp (1994) divided rumors into three types as shown in Table 2.

Table 2: Rumor Type

Type	Explanation
The Pipe-dream or Wish Rumor	When such rumors are circulating, the content looks promising.
The Bogie Rumor	Such rumors stem from fear and anxiety in the heart.
The Wedge-driving or Aggression Rumor	To divide groups and fight loyalty, the motivation is often aggressive or hateful.

Allport & Postman, (1947) sorted Knapp growth patterns into two types: (1) Expectation, (2) Damage, and Negative.

Peterson & Gist, (1951) said that when an event is attracted by the propagandist and the recipient, but the event itself is unclear as if it were true or false, rumors are likely to arise. According to scholars' views, rumors have three main characteristics:

1) Rumors are messages related to existing facts.

2) They are different from previous urban and rural stories and legends. The purpose of rumors is to make people believe that things really exist and the content of the message. It will also try to be as true as possible.

3) The rumors emphasize unconfirmed information, which may be authentic and not completely false (Kimmel, 2004; Sunstein, 2009).

In the book by Kapferer (Kapferer, 1990) classifies rumors into six types according to the process of rumor generation and origin, based on and extending Rowan (Rowan, 1979) classification of rumors, as shown in Table 3:

Table 3: Six types of rumors

		Originated from one thing	Retrieve a clip	Simple imagination
Rumor produce process	**Spontaneous**	1	3	5
	Passive	2	4	6

Source: Kapferer, J. Zheng Ruolin / Bian Qin translation, 1992, Rumors, Taipei; Laurel, p.308

1) The first type of rumors: This type of rumors mostly came from the occurrence of a shock event. Since January 1980, several recruits have disappeared near the Mourmelon camp. This is a real event. In the past eight years, the possibility of an incident has not been explained by an official unit to investigate.

2) The second type of rumor: This type of rumor is intentional by someone, and the possibility of someone deliberately using an event is not ruled out.

3) The third type of rumors: these rumors are extracted from certain details, small details or signs that have not been paid attention to by the public, in order to attract the attention of some people, try to uncover the "truth" hidden in the secret, no any basis may be mistaken for true due to the recipient's rendering.

4) The fourth type of rumors: This type of rumors is that someone deliberately dissembles these details among social groups, exaggerating the story and deliberately spreading it.

5) The fifth type of rumors: This kind of rumors is characterized by no basis of origin, and no signs can be found, that is, the so-called out of nothing. This rumor is derived from human imagination, some "city legends" or "models" "Story", adding special plots formed in this way.

6) The sixth type of rumors: This kind of rumors may have been deliberately fabricated, that is, the so-called windless waves, many adapted "model stories" are reproduced and then spread out, most of them are deliberately provoking, so-called "Rumors".

Rumor Transmission

In the book by Kapferer, et al. (1992) Every time we talk about rumors, we will create a consensus by incorporating details, assumptions, and vinegar into the discussion. It can be said that speaking is to persuade others, that it is to liberate itself, that it is for fun, or that it is to seek knowledge, and the public speaks for it.

Koenig, (1985) mentioned the analysis of rumors from different points of view. He made an in-depth discussion on the Satan totem rumors of P & G Company and found that there must be three indispensable elements for the rumors to appear:

1) Target: It may be a person, place or anything related

2) Charge or allegation: specific issues related to the goal

3) Source: The formality of the source of the rumor or the endorsement of the relevant authority will increase its credibility. These three elements dominate the text and channel structure of the rumor spread.

Source Credibility

One of the purposes of the rumor is to make people believe so that it can continue to spread. If the rumor cannot be trusted by others, then the spread of the rumor will be unexpected. From this, the credibility of the rumor is the key to the spread of the rumor.

DiFonzo and Rosnow, (1994) mentioned that people would want to spread rumors because they believe the credibility of the message is high, and the credibility of the message will be affected by the source of the message. Perception of the communicator. Credibility can be regarded as believability, which is cognition of the credibility of people, events and information.

In a research study by Kiousis, (2001) divides credibility into two categories, namely source credibility and media credibility. Source credibility is mainly for research and investigation of individuals, organizations, and mass media texts, usually for research that considers individuals, groups, or organizations as communicators; media credibility is for channels for disseminating information content, usually news for the research object. Among them, the media credibility can be divided into "absolute credibility" and "relative credibility", the former refers to the reader's credibility to various media such as newspapers, television, radio, etc. It is reported that when the reports in different media (newspapers, television, radio, etc.) are inconsistent, the credibility of the readers to the media.

Involvement

The degree of involvement mentioned in this study refers to the degree of involvement in different messages. The degree of involvement has a great effect on consumer behavior, including product service and brand selection, consumer thinking and emotional response, information search and explanation, and attitude change.

McQuarrie and Munson, (1987) mentioned that the importance and interest felt by consumers are important factors affecting the degree of involvement. When the need, importance and interest in a message or product are higher, the degree of involvement will be the higher.

Risk Aversion

When discussing risk avoidance, for consumers, risk is the unpredictable uncertainty that they feel when making a purchase decision, that is, when making consumer behavior, the consumer believes that this move may not meet their consumption goals. There will be risk awareness, so consumer behavior can be said to be a risk-taking behavior. This kind of risk awareness is affected by external environment and individual psychological factors, including personality traits, personal experience, trust of risk information sources, risk relevance and cross-cultural factors. It is a subjective consciousness. This risk awareness may occur before consumption, and the consumer behavior may have unfavorable consequences; or after consumption, dissatisfaction with the results may result in a subjectively perceived loss level. The above two factors can be distinguished into two aspects: uncertainty risk and outcome risk. In a research study by Cunningham (1967) uses these two facets to measure the consumer's perceptual risk status.

- **Perceived Risk = Uncertainty Risk × Outcome Risk**

Emotional Identity

Westbrook, (1987) pointed out that emotion is an individual's assessment of the meaning, cause, consequence, and personal influence of a particular stimulus. Lazarus, (1991) advocates that emotion is the result of personal cognitive evaluation of the environment. Cognitive evaluation will produce emotion influences. However, some scholars such as Zajonc & Markus, (1982) believe that cognitive evaluation may not cause emotional reactions, because sometimes cognitive and emotional reactions are produced together. Chaudhuri & Holbrook, (2001) further argues that emotion refers to customers and service providers after contact, a positive emotional response to it occurs. Therefore, the

customer's emotional factors for the brand or service provider are also important factors that affect the customer's behavior intention.

Integrating Chaudhuri & Holbrook (2001) and Hall (1996) 's opinion on emotional identity, this study defines emotional identity as a positive emotional response to customers after contact with service providers, which is a process of long-term learning and re-learning It is also an important factor that affects customer behavior intentions, and this assimilation process is carried out unconsciously.

Consumer Purchase Decisions

The factors that influence purchase intention are divided into market motivation factors and individual difference factors.

According Hu Tian-zhong, et al. (2011), the purchase intention comes from the cognitive value. When consumers face the real price, they will be related to the quality of the product. As a basis for whether they are willing to pay, the higher the awareness or knowledge of the product, the higher the purchase intention.

Research Methodology

The independent variables in this study are "type of message", "intensity and characteristics of message", and "credibility of source", the intermediary variables are "verification", "distribution behavior", "conformity behavior", and the dependent variable Consumers' reaction to the purchase decision behavior of rumors. In addition, this study also added personal factors as disturbance variables, including "degree of involvement", "risk avoidance", "emotional identity", and "party tendency". The research object was set for the ethnic groups over 20 and under 65, and a questionnaire survey was conducted to understand the impact of online rumors on consumers' purchase decisions.

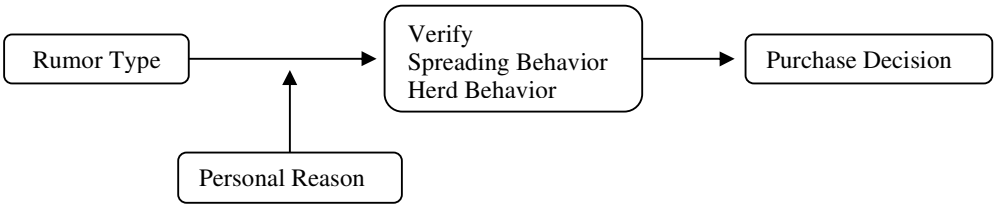

Fig. 1: Research Framework

Rumor Questionnaire Design

This study is expected to measure the positive and negative rumors and the source credibility of the variables, in order to explore consumer purchase decisions and personal factors (risk avoidance, involvement, emotional identity, political party tendencies, propaganda intensity and propaganda. Whether it is influenced by the relationship strength of the messenger), so this research tests based on the version of the online news rumors, and uses "Toilet Paper Chaos 2.0" as a keyword to highlight the livelihood issues of product attributes. The Survey Cake online questionnaire survey was used to provide rumors and ask questions to investigate the above purposes, and integrate the results of the literature discussion to carry out the overall design of the research questionnaire. The Likert scale 5-point scale is used to measure who should fill out the questionnaire agreement with each question: 1 means strongly agree, 2 means agree, 3 means ordinary, 4 means disagree, and 5 means strongly disagree.

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The Strategy of Competitiveness of Lower Middle-Income Countries in ASEAN with a Dynamic Panel Approach

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Abstract

Competitiveness is a primary factor in supporting economic growth through international trade performance. The ASEAN region counted as an essential geostrategic for the world. Based on the porter theory, the level of competitiveness is generating through a low-cost strategy. This study aims to analyze the factors that determine the competitiveness of middle-low income countries in ASEAN. There are 12 pillars as indicators of global competitiveness based on the Global Competitiveness Index (GCI). The data used in panel data, consisting of 4 countries in ASEAN with GCI data from 2008-2017 with dynamic panel data analysis. Four factors contribute the most to the competitiveness of middle-income countries: supporting elements consisting of adequate infrastructure both land, sea, and air, macro-economic environment with inflation and controlled government debt, as well as maintaining the credibility of institutions through bureaucracy with integrity, proper regulation and driving efficiency through antitrust competition in the goods market. But the drivers of innovation poorly the competitiveness of middle-low income countries in ASEAN. It is related to high costs for R&D expenses, and the quality of scientific institutions is not yet comparable with the output. Recommendations from the results of the study are needed infrastructure support, macroeconomic stability, improvement of institutions, both bureaucracy and regulations that guarantee antitrust competition in the goods market.

Keywords: Competitiveness, ASEAN, Panel Dynamic, Lower Middle-income countries

Introduction

Free trade based on a capitalist system has brought the consequences of business competition in the global market for all countries in the world. It opens up equal opportunities for all countries to access markets. Based on the perspective of national resilience, free trade provides opportunities as well as threats to a country's local economy. Economic opportunities are obtaining from the increasingly broad potential of the trade market, which in turn will have an impact on the potential for state revenue from the growing international trade sector. In this case, international trade can support the acceleration of a country's economic growth. For middle-lower income countries, this opportunity becomes a new hope in poverty alleviation efforts, which is the main problem of economic development. But along with economic openness in this globalization era, there are also external challenges that must be responded by each country is facing the free competitive market.

The high level of Singapore's gross domestic product reflected an excellent international economic performance and interpreted a higher competitive advantage compared to other countries in ASEAN. The per capita income of USD 58,248 shows the success of development in Singapore. Furthermore, the second and third rank has occupied by Brunei Darussalam, Malaysia, with income per capita of 31.437 USD and 12.110 USD, respectively (Tradingeconomic,2018). The high level of competitiveness of high-income countries such as the European Union-12 is characterized by high average expenditure on education of 5.1% of GDP compared to the countries of Croatia, Macedonia and Turkey with average spending on education at 3.5% of GDP (Matovac, VA, Vlatka, B and Sanja, F. 2010). That shows of strengthening human capital through education in realizing high competitiveness for high-income countries. Research results for the Romanian case by Badea, L and

Angela (2012) conclude there is a strong relationship between education with welfare and competitiveness. Countries that have invested in the education system have a high degree of success in development (Pan, Su-Yan. 2011). Other studies that strengthen the argument for the importance of human capital through education for the competitiveness of developed countries have been carried out by Aleksejeva L, (2016), Cherkesova, EY, Evgeniya, AB, Ekaterina, PS and Nataliya, ED, (2016), Palmer, RT, Ryan, JD, James. LM and Adriel, AH (2010), Kowal, J and Grazyna, P. (2017), Lengyel, I and Janos, R. (2013), Sekuloska, J.D. (2014), Sahlberg, P. (2006).

In addition to strengthening human capital, technology is also an essential factor that determines the level of competitiveness of a country. Several studies have proven the influence of technology on competitiveness, including Fagerberg J and Martin, S. (2007), and Chou, Y, and Ying-ying Hsu and Hsin-Yi Yen, (2008). Singapore and Malaysia have the highest level of technological readiness compared to Brunei Darussalam and Thailand. Based on GCI data, Malaysia ranks second after Singapore, with an average competitiveness growth rate of 1.57% per year. However, during the financial crisis in 2008-2009, Malaysia's competitiveness level had decreased by -3.37%, from 5.04 to 4.87. This because macroeconomic performance as a driving factor in Malaysia's competitiveness is lower than the three high-income countries in ASEAN.

Indonesia occupies the highest competitiveness value for lower-middle countries, with an average rating of 4.456 from 2008 to 2017. The performance of Indonesia's competitiveness is almost the same as Thailand, with a difference of 0.135 points. Of the four middle-low income countries in ASEAN, Cambodia is the lowest competitiveness country with an average level of competitiveness at a score of 3,828. The main weakness of Cambodia's competitiveness performance lies in the low value of higher education and training.

Amid the slowdown in the global economy, ASEAN middle-income countries such as Indonesia, Philippines, and Vietnam are taken into account by the world because they have stable economic growth with an average increase of above 5%. In comparison, other developing countries such as India and Russia have decreased by 0.1 each % and 0.3% in 2019 (BI, 2019). In this case, ASEAN has several advantages, including; (1) a market potential with a population of around 650 million people is ranked third largest in the world (2) fourth largest export in the world at 7% of global exports, and (3) The largest economy with the sixth-largest GDP value in the world (ASEAN, 2019). In the industrial era 4.0, investment in the digital economy became the most important factor for countries in the ASEAN region to increase regional competitiveness.

The ability to read the strengths and weaknesses of each state determines improvements in the country's competitiveness. Therefore, this research aims to analyze the determinants of the competitiveness of low-middle income countries. Understanding these competitiveness characteristics will be beneficial for determining international trade strategies in the face of free competition.

Literature Review

According to the law of comparative advantage by David Ricardo, it states that although one country produces less efficiently than two other commodity production, trade is still profitable for that country. On the contrary, the state will decide to import commodities which, if produced by themselves, are lost higher (Salvatore, D. 2013). For example, China can compete in furniture products with strong traditional competitors such as Italy and Germany, by understanding the comparative advantage possessed through labor-intensive industries (Han Xiao, Yali, W and Shasi, K. 2009).

Competitive advantage theory used in this study was developed by Michael Porter (Cho, S.D and Moon, H.C, 2000) as a critique of Ricardo's comparative advantage theory. The theory of competitive advantage is more relevant in measuring the competitiveness of every country competing in today's global market. It can explain the country's success in winning global markets through national competitiveness. Porter told four factors to determine national competitiveness (diamond models) consisting of: factor conditions, demand conditions, related and supporting industries, and firm, strategy, structure, and rivalry. It means that a country that can win a competition in the global market is a country that can build national competitiveness by ensuring competitive games from upstream to

downstream. This capability cannot only depend on the domestic industry but must also support by high demand. The more competitive the local market will drive innovation to produce quality and differentiated products. Furthermore, upstream sector support (suppliers) determines the level of production efficiency. So that government support is needed in maintaining competitive national markets.

Methodology

The research method uses a quantitative approach with dynamic panel analysis. The data consists of 4 lower middle-income countries in the ASEAN Region, namely: Indonesia, Vietnam, Philippines, and Cambodia, and annual data (2008-2017). The data source comes from the yearly Global Competitiveness Index report published by the world economic forum. The variables used consisted of 12 independent variables consisting of Institutions (Inst), Infrastructure (Infrast), Macroeconomic environment (Macro), Health and Primary Education (HPE), Higher Education and Training (HigherET), Goods market efficiency (GME), Labor market efficiency (LME), Financial market development (FMD), Technology Readiness (TR), Market size (MS), Business (Buss), Innovation (Inov).

Panel data analysis used in dynamic models, where the dependent variable depends not only on the exogenous variable but also on the lag of the dependent variable. The lag coefficient of the dependent variable produced by PLS will be biased upwards, while the lag coefficient of the dependent variable produced by FEM will be biased downwards. Therefore the method of moments or the Generalized Method of Moment (GMM) approach is used to overcome these problems using the System GMM (SYS-GMM) approach. The essence of the GMM System is an equation system that is estimated to be the form in the first difference and level. The dynamic panel data model illustrated as follows :

$$GCI_{it} = b_0 + b_1 GCI_{i,t-1} + b_2 Inst_{it} + b_3 Infrast_{it} + b_4 Macro_{it} + b_5 HPE_{it} + b_6 HigherET_{it} + b_7 GME_{it} + b_8 LME_{it} + b_9 FMD_{it} + b_{10} TR_{it} + b_{11} MS_{it} + b_{12} Buss_{it} + b_{13} Inov_{it}$$

All of these variables measured on a scale of 1-7. A score of close to 7 means excellent performance. After the estimation results obtained, the instrument validity test will carry out using the Sargan analysis and the Arrelano-Bond m1 and m2 statistical tests. Next will be seen whether the coefficient value is biased or not by comparing the lag value of the SYS-GMM coefficient with the pooled least squares (PLS) dependent lag coefficient and the fixed effects model (FEM). Having obtained a more valid model, then it will be further analyzed to answer the research objectives and hypotheses.

Findings

Performance Analysis of Factor-Driven

The assessment results show that Indonesia has the best performance in almost all categories of supporting factors compared to Cambodia, the Philippines, and Vietnam. The average value of the performance of Indonesian institutions is 4.008 out of a maximum scale value of 7. The performance of infrastructure also shows that Indonesia has the best average annual assessment compared to the three countries. That cannot be separated from government intervention, especially since the era of President Jokowi to lead in 2014 to the present. President Jokowi's work priorities set out in NAWACITA, which aims to provide equitable development throughout Indonesia. One form of construction is infrastructure projects, both on land, sea, and air. In facing the free market era and industry 4.0, air infrastructure has built in the form of PALAPA RING. The role of digital determines the superiority of products ranging from upstream to downstream in the free market. Therefore investment in affordability of digital access is urgently needed by Indonesia to encourage the competitiveness of domestic products.

The performance of Indonesia's macro-environment also ranks better than the Philippines. The government's ability to maintain macro conditions will have an impact on business confidence in the country. However, for the assessment of health and primary education, Vietnam has better performance

than Indonesia, the Philippines, and Cambodia. That indicated by an assessment score of 5.687 for Vietnam and 5.535 for Indonesia.

Performance Analysis of Efficiency-Driven

Performance booster efficiency explained by the main factors that determine product competitiveness. The efficiency aspect is a direct assessment of the microeconomic conditions, in this case, including input factors that affect production to the state of the goods market and the money market. The more efficient it reflects, the higher competitiveness of a product.

Philippines and Indonesia have higher levels of education and training than Cambodia and Vietnam. For the efficiency of the goods market, Indonesia has the most efficient performance compared to other countries, but this is not in line with the efficiency performance in the labor market. That is partly because the minimum wage setting in Indonesia and the Philippines is higher than in Vietnam and Cambodia. The more upper minimum wage fixing indicates a less efficient level of wage determination.

Furthermore, Indonesia also considered having the best efficiency performance in the financial market and market share among the three countries. The average value of the return is 4,279 and 5,386, respectively (WFE, 2017). For technology readiness, the Philippines is the country with the best level of technological readiness compared to Indonesia, Vietnam, and Cambodia.

Performance Analysis of Innovation-Driven

The performance drivers of innovation explained by two factors, namely business sophistication and innovation. Business sophistication defines the quality of the business from upstream to downstream. The best business sophistication performance among lower middle-income countries in ASEAN is Indonesia. Overall, the average innovation performance of middle-low countries in ASEAN is at a low level. It was showing from the highest score of 3.76 out of a maximum rating of 7 occupied by Indonesia and the weakest in Cambodia with an average value of 2.865 (WFE, 2017)

Competitiveness Model of Lower Middle-Income Countries in ASEAN

The competitiveness model of lower middle-income countries in ASEAN explained through the SYS-GMM estimation procedure. Before the competitiveness model obtained, the instrument validity test first performed using the Sargan test. The validity test aims to ensure that the instrument does not correlate with errors in the SYS-GMM equation. Then an autocorrelation test was performed using the Arrelano-Bond *m1* and *m2* statistics. The autocorrelation test intended to see the consistency of the SYS-GMM estimation results.

Based on table (4), it can see that the dynamic panel method with the SYS-GMM approach has met the criteria of the best model statistically. The Arellano-Bond (AB) results on m2 show a p-value of 0.3684; value used by 5 percent, so the decision is to fail to reject H0. That is, estimates are said to be consistent, and there is no autocorrelation in the first-order difference of the second order. Sargan test estimation results show the p-value of 0.9605. By using an of 5 percent, it can conclude failing to reject H0. That is, there is no correlation between residuals and over-identifying restrictions or variable instruments that used more than the estimated number of parameters. So there is no problem with the validity of the device.

Table 4: Panel Estimation Results with SYS-GMM, PLS, and FEM

Variable	Estimated Coefficients	Standard-Error	P-Value
SYS-GMM			
Lag(1) Gci	0,0441	0,0325	0,175
Lag(3) Gci	-0,0134	0,0453	0,768
Institution	0,1035	0,0480	0,031**
Infrastructure	0,1544	0,0227	0,000***
Macro	0,1220	0,0125	0,000***
HealthEdu	0,0801	0,0302	0,008***
HigherHE	0,0756	0,0101	0,000***
GoodME	0,2152	0,0474	0,000***
LabourME	0,0919	0,0176	0,000***
FinancMS	0,0475	0,0188	0,012**
TechR	0,0796	0,0133	0,000***
Markets	0,0769	0,0266	0,004***
Bussiness	-0,0209	0,03308	0,527
Innovation	-0,0768	0,0263	0,004***
Cons_	0,0372	0,3099	0,904
Pooled Least Squared		0,0452	
Lag(1) Gci	0,04008	0,0479	0,392
Lag(3) Gci	-0,03915		0,429
Fixed Effect			
Lag(1) Gci	0,0275	0,0439	0,545
Lag(3) Gci	-0,0105	0,0427	0,811
Wald Chi2	107,94		
Prob>Chi2	0,000***		
AB Test	**Z**	**P-value**	
Arrelano-Bond *m1*	-1,9338	0,053*	
Arrelano-Bond *m2*	-0,8994	0,3684	
Sargan Test	**Chi(10)**	**Prob> Chi2**	
	8,2618	0,9606	

Sources : Calculated from Eviews.7 Output

Estimation results show the amount of influence of independent variables on the dependent variable. These competitiveness variables explained in three factors that drive a country's competitiveness. The level of significance used in this study uses a value of 5 percent.

Effect of Current Competitiveness Performance on Future Competitiveness

Variable global competitiveness index in the previous period, both the last one year period and three years,did not have a significant impact on the performance of the country's competitiveness in the current period. Or in other words, the level of performance of the country's competitiveness at this time does not determine the level of competitiveness of the country in the coming period. It is shown from the results of the estimated GCI lag variable (1) and GCI lag (3) with p-values of 0.175 and 0.768, respectively. It means it fails to reject H0, so it can conclude that the competitiveness performance of previous years does not determine the performance of future competitiveness. The performance of the

country's competitiveness cannot build in a short time. A long process is needed to prepare a country's competitiveness to increase in the long run. One example of China, since 2014, China's GDP has surpassed the United States. Whereas in 2004, the difference in China's GDP compared to the United States reached -6.7 trillion US $. Then in 2014, China's GDP exceeded the United States GDP by 0.2 Trillion US $. It means that it takes more than ten years for China to match the competitiveness of the United States so that the competitiveness performance of a country cannot change in a short period of one or three years (IMF, 2015).

However, the positive sign of the estimated GCI lag coefficient (1) is greater than the negative sign of the GCI lag estimated coefficient (3) shows the total magnitude of the effect of the current competitiveness performance has a positive impact on the competitiveness of a country in the future. It means that for countries with lower middle-income, it takes a long time to prepare competitiveness as early as possible so that in the future, it can match the competitiveness of developed countries.

Effect of Driving Factors on the Competitiveness of Lower Middle-Income Countries in ASEAN

Four independent variables are used to explain the driving factors of competitiveness, namely the assessment of institutions, infrastructure, macro environment, and health and primary education. This driving factor illustrates the macroeconomic perspective as a factor that drives the realization of a highly competitive country identical driving elements with government involvement in preparing and guaranteeing a conducive and stable business climate. The estimation results with the SYS-GMM panel model show that there is a positive and significant influence between infrastructure on the competitiveness of middle-lower income countries in the ASEAN Region. The magnitude of the influence of infrastructure on competitiveness can show from the estimated coefficient of 0.1544. However, for Indonesia, which has an average rating of the best infrastructure performance compared to the other three countries, amounting to 3,872, an increase in infrastructure performance by one point is not large enough to improve the country's competitiveness. A minimum of 15 times more effort is needed than normal conditions to reach a value of 6.188 so that it can compete with the infrastructure performance of developed countries like Singapore.

Currently, under the leadership of President Jokowi, Indonesia has built infrastructure ranging from road repair, building new roads that connect between regions, building ports, development in disadvantaged areas, development on regional borders to support for internet networks. From 2013 to 2019, there was an increase in spending on priority programs for infrastructure by 158.4%, health increased by 96.3%, and Education increased by 35.4% (Ksp, 2019). Infrastructure factor was the chief development priority for President Jokowi's administration during his five-year term of leadership in the first period

The second factor that contributes significantly in determining the competitiveness of lower middle-income countries in ASEAN is the macro condition. The estimation results show that there is a positive and significant influence between macro conditions on the competitiveness of middle-lower income countries in the ASEAN Region. The magnitude of the effect of macro conditions on competitiveness can show every one-point increase in performance evaluation of macro conditions in middle-low income countries in the ASEAN region will have an impact on improving the assessment of competitiveness performance by 0.122 points.

The average performance value of macro conditions in Indonesia and the Philippines is not too different, respectively, 5,418 and 5,321. This value can be said to be on a scale closer to the maximum amount of 7. That means that to maintain macroeconomic performance, and two countries need to improve the performance of inflation stability, economic growth, maintain budget deficits, and strengthen public savings by five times higher than the conditions typical to be able to rival the competitiveness of developed countries in ASEAN. Indonesia's macroeconomic performance shows a stable rate of economic growth amid global uncertainty. The average value of economic growth indicates this from 2006 to 2019, which is always above 5% and ranks third-best in the world after India and China. Indonesia's macro performance also shows a stable condition, as seen from the inflation rate data, which is getting lower from year to year (YoY), from 8.36% in 2014 to 2.36% in

July 2019 (Ksp, 2019). The low level of inflation shows the ability of the government to maintain public purchasing power and balanced prices of input goods.

The institution is the third driving factor that determines the level of competitiveness of lower middle-income countries in the ASEAN Region. Bureaucratic performance, government policy transparency, public trust to ensure a conducive business climate through legal certainty are factors that determine the performance of a country's institutions. Estimation results show that there is a positive and significant effect between the performance of institutions on the competitiveness of lower middle-income countries in the ASEAN Region. Every time there is an increase in the assessment of institutional performance in lower middle-income countries in the ASEAN Region by one point, it will have an impact on improving the evaluation of competitiveness performance by 0.1035 points. However, if Indonesia wants to increase its competitiveness, it can improve the performance of institutions through improving governance by up to 20 times better than regular efforts to be able to compete with developed countries in ASEAN. Indonesia occupies the fifth position in ASEAN as a country with a level of public service with a value of 59.1 better than the Philippines and Vietnam (Ksp, 2019).

Based on the estimation results, it concluded that lower middle-income countries in the ASEAN Region need government support in providing infrastructure, maintaining macroeconomic conditions, and ensuring a conducive business climate through excellent institutional performance to improve their competitiveness. Nigeria also experienced this result in Dimnwobi, S.K, Chukwunonso, S.E, and Emilia, M.M (2016) research, which recommended Nigeria to take concrete steps to overcome infrastructure, macro policy and security weaknesses in improving Nigeria's competitiveness.

Effect of Efficiency Drivers on the Competitiveness of Lower-Middle Income Countries in ASEAN

Efficiency drivers describe the factors that determine product efficiency performance, which is explained by input factors, technological readiness, the goods market, market size, and financial markets. The higher level of efficiency of these factors indicates the lower the cost of factor inputs or, in other words, the more competitive output prices. Estimation results show that the main factor that has the most influence on the competitiveness of low-middle income countries is efficiency in the goods market. The p-value of the goods market efficiency of 0,000 is smaller than the alpha error tolerance of 5 percent. The value of this magnitude of influence can interpret as a higher level of proficiency in the goods market; the performance of competitiveness will increase by 0.2152. Indonesia occupies the country with the most top average market efficiency assessment of 4.439. It means that there are consequences of increasingly less government intervention in the goods market. That is in line with the market theory of neo-liberal economics, which wants the market mechanism to run by itself. Every economic actor has the same right to determine the market price according to the agreement through a bargaining process.

For developed countries, this condition can apply easily because most economic actors have relatively equal commercial capabilities or have balanced competitiveness. It is different from lower middle-income countries in the ASEAN Region. Because in general, every country faced with the economic capabilities of economic actors that not evenly distributed. The high level of economic inequality is the main problem of not functioning a perfect market mechanism. The level of economic inequality in Indonesia with the GINI index shows a value of 45.7 less than the Philippines of 47.9 (world bank, 2018). That is one of the supporting factors that cause the goods market in Indonesia to run more efficiently than the goods market in the Philippines. Other factors that cause the goods market in Indonesia to be more efficient than Vietnam, Cambodia, and the Philippines are explained by the value of Indonesia's trade surplus in 2018 higher than the three countries. Although in terms of trade volume, Vietnam is 213.9 billion US dollars compared to Indonesia at 168.8 billion US dollars, Indonesia is better able to take advantage of free trade with a trade surplus of 11.8 billion US dollars compared to Vietnam only 3.3 US $ billion (Aseanstas, 2018)

Other factors affecting the competitiveness of lower middle-income countries in ASEAN are higher education and training, efficiency in the labor market, financial market development, technology

readiness, and market size. But the magnitude of the effect shown by the estimated coefficient values of the five factors is less than 0.1 point. It means minimal efforts made up to 100 times greater than standard repairs. That indicates that there are still many problems related to the level of production efficiency that needs to fixed in a relatively long time. The results of previous studies that support the findings in this study are Sum, N.L (2013), Sahlberg, P (2006), which explains the importance of higher education and knowledge-based economics can improve a country's competitiveness according to Michael Porter's theory.

Effect of Innovation Drivers on the Competitiveness of Lower-Middle Income Countries in ASEAN

Business sophistication and innovation are factors that determine a country's innovation performance. Estimation results show the p-value of 0.527 is higher than the 5 percent. It can conclude that there is no significant effect between business sophistication on the competitiveness of middle-low income countries in the ASEAN Region. This result illustrates that business sophistication is currently not able to increase the competitiveness of middle-low income countries in the ASEAN Region.

The second factor that determines the drivers of innovation is innovation itself. The estimation results above show the p-value 0.004 is smaller than the alpha error tolerance value of 5 percent. It means rejecting the null hypothesis, i.e., statistically, there is a significant influence between innovation on the competitiveness of middle-low income countries in ASEAN. However, the regression coefficient shows a negative sign of -0.0768, which can interpret if there is an increase in innovation performance through the procurement of sophisticated technology, company expenditures for R&D to the availability of scientists and engineers will only hurt increasing the competitiveness of these countries. That contradicts the results of previous studies, which stated that competitiveness is closely related to a country's ability to innovate, such as the results of Clark, J and Key, G (2010) and Atkinson, R.D and Scott, M.A (2009). The negative impact of innovation on the competitiveness of low-middle income countries indicates that not all countries have a competitive advantage through innovation. Because the characteristics of lower middle-income countries are different from those of developed countries that have superior technological advantages, the quality of scientific research institutions, and the availability of scientists, with these advantages, make it easier for developed countries to produce innovative products. It is different from middle-lower income countries with characteristics of a low-educated population, and a large number of productive age workers. With these characteristics, the right strategy used by low-middle income countries to be able to compete with developed countries is to strengthen labor-intensive. The policy of strengthening innovation is not appropriate for lower middle-income countries because the costs incurred for the procurement of advanced technology, and investment in R&D has not to balance with the results obtained.

Conclusion

Four factors contribute the most to the competitiveness of lower middle-income countries. Those are supporting factors including adequate infrastructure, both land, sea, and water, macro-economic environment with inflation and controlled government debt, as well as maintaining the credibility of institutions through bureaucracy with integrity, proper regulation, and driving efficiency through antitrust competition in the goods market. Cambodia, Philippines, and Vietnam need to prioritize infrastructure development to support their national competitiveness. But the drivers of innovation hurt the competitiveness of lower middle-income countries in ASEAN. It is related to high costs for R&D expenses, and the quality of scientific institutions is not yet comparable with the output. Recommendations from the results of the study are needed infrastructure support, macroeconomic stability, improvement of institutions, bureaucracy and regulations that guarantee antitrust competition in the goods market.

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Assessing Cloud Infrastructure Suitability for A Manufacturing Environment in South Africa

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Abstract

Cloud infrastructure solutions in South Africa are still in its infancy and it must be assessed if it is capable for use by the manufacturing sector where costs are a concern and rapid delivery of service is a requirement. The research is conducted in a local manufacturing company in which the population is all of the employees who can influence cloud migration. The research follows the positivistic paradigm and questionnaires are used to collect the data. Factor analysis is used to analyse the data and network performance tests are also run. Two significant factors namely security and business productivity are identified, with network performance showing that the performance of on premise servers are significantly better than that of cloud servers. It is concluded that manufacturing companies in South Africa should wait for cloud solutions to mature as well as wait for more advanced telecommunications technologies before attempting to use cloud solutions for daily operations. Future research possibilities include making use of the interpretivism methodology to gain insight from an interpretative perspective, increasing the Likert scale from 5 to 10 to gain better results from the data collected, and research can be conducted at multiple manufacturing companies to gain better experiences and results across South Africa and globally.

Keywords: Cloud computing, network performance, business productivity.

Introduction

Cloud infrastructure solutions in South Africa are still in its infancy and it must be assessed if it is capable for use by the manufacturing sector where costs are a concern and rapid delivery of service is a requirement. According to Schwab (2017) the technological world is entering into the Fourth Industrial Revolution which will have a great impact on how consumers and companies will use systems and services for the foreseeable future. The Fourth Industrial Revolution can be defined as "the advent of cyber-physical systems" (Davis, 2016). Companies, such as those in the manufacturing sector need to consider cloud computing solutions to modernize manufacturing and to gain a competitive advantage in the industry as well as streamline some if not all business processes. Stocking (2017) also states that especially the manufacturing industry lacks interest in cloud computing due to numerous key factors that play a significant role in the decisions made to implement solutions to benefit the sector.

This research will be identifying and discussing these key factors to emphasize the importance of improving these factors, in order to influence the manufacturer's decision making for considering cloud computing solutions for daily business operations. It will also discuss the identified key factors that play a significant role in the decision by manufacturers for considering cloud computing as a solution for certain services and if at this stage, it would be possible for manufacturers to utilize the cloud.

Cloud Computing

As the world is entering the Fourth Industrial revolution, new technologies and solutions comes with it. One of those technological solutions is cloud computing. As Mell and Grance (2011) defined, cloud computing is simply the delivering of computing services over the Internet in a globally distributed manner. These computing services refers to either physical hardware such as servers, data centres, or storage. It can also be software solutions such as applications, databases, and analytics that can be hosted in a cloud data centre (Mell & Grance, 2011). As Fox *et al.* (2009) explains, the term "Cloud" refers to a collection of computers, called servers, which are situated in a specific global location. Each of the servers are placed in a data centre, and there can exists several data centres across the world. There is a term for this, called the "distributed cloud". According to Rouse (2015), the term "distributed" in the information technology field refers to something that is shared by several systems that can co-exist in multiple locations. Cloud computing is an innovative way for businesses to reach more consumers or do business operations more efficiently.

According to Fox et al. (2009), there exists three main types of cloud computing deployment models. These are called the Public Cloud, Private Cloud, and Hybrid Cloud. According to Knorr (2018), these are considered to be the main deployment models to use when a business should decide on moving to the cloud. Microsoft (2019) states that the public cloud is a cloud solution offered by cloud providers over the Internet for anyone to use or purchase. Mell and Grance (2011) further states that a public cloud is created to be used by the public and is usually located on the cloud providers premises. The public cloud is a solution for any consumer or business to start with, although there may be some limitation regarding security and trust since the public cloud is owned by the cloud provider.

Mell and Grance (2011) states that the private cloud is created to be provisioned by a single business entity. The private cloud is usually owned and managed by the same business entity. Further, Microsoft (2019) states that a private cloud is cloud services that are offered over the Internet usually in the form of a company internal network (intranet) and is offered to a limited set of users instead of to the general public. The limited set of users are usually the employees that can work with the services only, such as financial information. According to Knorr (2018), the private cloud runs on a business entity's own infrastructure and it is the responsibility of the business entity to maintain the physical hardware and network connections to keep the cloud operational. A private cloud is a better suited deployment model for businesses that have sensitive data that needs to be kept private and managed by the business itself.

Microsoft (2019) defines a hybrid cloud as a combination of a public cloud and a private cloud. When the workload of computing tasks gets too intensive to be processed in the businesses' own data centres, it can be offloaded to a public cloud solution. According to Knorr (2018), businesses can run applications in the public cloud while databases with critical information can be contained in the private cloud. This separates the business-critical data from the data that can be shared with external cloud providers. In Table 1 a comparison of the different cloud deployment models is illustrated in terms of the tenancy environment, data centre location, how resources are shared, the storage provided, pricing, security, and performance.

Table 1: Comparison of cloud deployment models (Espreson, 2016)

Comparing Cloud Deployment models	Public cloud	Private cloud	Hybrid Cloud
Cloud environment	Multi-Tenancy-Shared environment.	Single tenancy-only for single use of an organization.	Both single tenancy and multi –tenancy. When data is stored in the public cloud, it delivers multi- tenant environment meaningthe data from multiple organizations is stored in a shared environment whereas when data is stored in private cloud, it is kept private for the use of asingle organization.
Data center location	Anywhere – where the cloud service provider's services are located.	Inside the organization's network.	Inside the organization's network for private cloud services as well as wherever service provider's services are there for public cloud services.
Resource sharing	Server hardware, network and storage are shared by multiple users in the cloud.	No sharing of resources. Hardware, storage and network are dedicated to the use of a single client or company.	Very secure; integration options add an additional layer of security.
Cloud storage	Public cloud delivers storage as a service on a pay per use basis. Best for backups asa part of a disaster recovery plan as well as archiving email and static non-core application data. OneDrive is an example of public cloud storage.	Private cloud delivers internal cloud storage that runs on a dedicated infrastructure in a data center.	Hybrid cloud manages streamlined *storage* that uses both local and off-site resources and serves as a gateway between on premise and public cloud storage.
Scalability	Instant and unlimited.	Sacrifices scalability but provides greater control and security.	On demand unlimited resources.
Pricing structure	Prices charged on the usage basis.	Comparatively expensive.	High but delivers competitive advantage.
Cloud Security	Good, but depends on the security measures of the service provider.	Most secure.	Secure.
Performance	Low to medium.	Very High.	Very High.

Not only should there be distinguished between cloud deployment models but also between cloud computing service models. Firstly, Microsoft (2019) define Infrastructure as a Service as a cloud service model in which consumers rent a cloud providers infrastructure such as servers and pay only for the resources used. Knorr (2018) further states that most public cloud providers offer a large range of services on the pay as you use principle that are largely scalable to a user's needs. Infrastructure as a Service is the most basic cloud service model. Secondly, Microsoft (2019) state that Platform as a Service is a cloud service model that is mainly aimed at developers. Knorr (2018) supports the statement that in this service model developers can quickly build, test, and deploy solutions using only specific assigned cloud services, while the operators manage the infrastructure. Developers can rapidly create business solutions without having to worry about the underlying infrastructure in this service model. Lastly, according to (Knorr, 2018), the Software as a Service cloud service model involves providing applications over the Internet that can be opened on a web browser. A popular service is Gmail that utilizes this service model. The infrastructure on which the applications are running are maintained by the cloud providers (Microsoft, 2019). This cloud service model is efficient for businesses that has the capacity to provide services to consumers by managing a data centre internally.

Research Methodology

According to Kuhn (1962), a research paradigm is a set of common agreements that is used by scientists globally to understand and scientifically prove real world problems. The choice of paradigm usually also governs the relevant methodology, which MacIntosh (2009) defines as the methods or tools used in conducting a research study. There are currently four major research paradigms that can be used to conduct research. These paradigms are Positivism, Interpretivism, Critical Social Theory, and Design science research. Since this research will use the positivism paradigm and methods for conducting research, it will be the only method to be discussed in more detail.

The positivist approach first emerged in the 19th century from French philosopher, Auguste Comte (1798–1857), who rejected metaphysics for research and considered that scientific knowledge is the only manner of proving the truth about reality (Kaboub, 2008). Metaphysics, as defined by Masters (2017), is the combination of the word meta – meaning over and beyond, and physics. It means over and beyond physics and is usually related to a branch of philosophy studies that handles the nature of being. Positivism requires a researcher to prove the knowledge in a measurable and observable manner before it can be considered science. The positivism paradigm can only be used when there is a need to turn qualitative data into quantitative data that can be measured and observed by means of scientific methods. The positivistic approach is used in the study to measure and gain knowledge in a quantifiable manner to be used by South African companies in a decision-making process. Companies today use numerical figures rather than relying on feeling or ideas to make decision of the future of the company.

The population for this research consists of all the employees involved directly or indirectly with the decision-making process for cloud solutions in the company. For the study, the population size is relatively controllable for analysis and therefore sampling is not required as all 23 employees took part. Data was collected in the form of questionnaires that conform to the positivistic paradigm standards. Since the positivistic paradigm works with research methods that require analysis and results of quantitative data, the inputs will first be obtained as qualitative data from questionnaires before being transformed to quantitative data for analysis. Each of the 10 questions were answered in a closed-question format for quantitative analysis. Closed-ended questions are better suited to this research as the questions will be transformed into quantitative data for analysis. Each question carried a weight of between zero and five and the respondent will be asked to choose a value based on their agreement with the question. Questions 1, 2, 4 and 9 relate to security, 3, 5, 6, 7 and 10 to productivity, and question 8 to the network. Each of the respondents will be working for the South African company faced with the issue of moving to the Cloud, and each respondent will be actively involved in the decision-making process for Cloud computing migrations.

Data Analysis will take place through factor analysis, which is the process of taking a large data set of data and converting it into a more manageable smaller data set that can be used to analyze and interpret the data in an efficient way (StatisticsHowTo, 2019). Factor analysis involves multiple variables that have similar response patterns that all relate to one variable that is not directly measurable, called the latent (hidden) variable. StatisticsHowTo (2019) states that factors are classified and listed according to their variance (factor loading) and that factors providing little information can be discarded from the analysis. For this research the explanatory factor analysis method will be used. Employing this method, a researcher can discover the relationships between the set of variables and the underlying latent variable.

Network Performance

Network performance refers to the speed or quality of service that the network provides. In the case of cloud computing, the network is the global Internet, and the network performance is the measurement of how long it takes to access certain cloud services and the amount of data transferred between client and cloud. Network performance is measured using several different metrics such as bandwidth (capacity), network throughput, and network latency.

According to Spacey (2018), bandwidth is the theoretical limit of the maximum amount of data that can be transmitted over a computer network. Bandwidth can also be referred to as the "volume of information per unit of time" that can be transferred over a specified medium (Fisher, 2019). There are several things that can affect the network bandwidth, as mentioned the amount of data that can be transferred at a time, as well as the number of simultaneous connections using the same network line (Fisher, 2019).

Network throughput can seem similar in definition to network bandwidth, although it is not the same. According to Rivenes (2016), network throughput is the actual amount of data that can be transferred in a certain time. While bandwidth refers to the number of packets that can be theoretically transferred over the Internet, throughput refers to the number of data packets that actual gets transferred factoring in lost packets.

Spacey (2018) defines network latency as the time it takes for a communication circuit between two endpoints to occur. Network latency is generally a collective term referring to the types of delays that can occur during a network transfer. According to Mitchell (2019), the types of delays are called transmission delays, usually caused by the characteristics of the transmission medium, and processing delays such as network hops and the processing power of a piece of equipment. Network latency has a direct influence on network throughput and bandwidth. If there exist delays in the network, this can lower the amount of data that transfers in a time frame between the two endpoints (Mitchell, 2019). Spacey (2018) states that network latency is mostly caused by the geographical position of the server relevant to the accessing client. The closer the client is to the server the less network latency will possibly occur in communication. To measure network latency in this research, ping tests and traceroute tests between the server and the client will be performed to determine the best geographical location to use by a business entity for using cloud services (Mitchell, 2019).

Data Analysis and Findings

The software that was used to perform the factor analysis was IBM SPSS Statistics. The criteria that were used to complete the factor analysis were:

- Descriptive Correlation Matrix:
  - Coefficients.
  - Significant levels.
- Extraction:
  - Maximum likelihood extraction method was used based on the eigenvalue.
  - Maximum Iterations of 16 was used for convergence.
  - Direct Oblimin was used for rotation.
  - Loading plots were added.

Table 2 contains the correlation matrix obtained from the data.

Table 2: Correlation Matrix

Correlation Matrix

		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Correlation	Q1	1.000	.552	-.177	.228	-.026	.026	-.025	-.333	.030	-.123
	Q2	.552	1.000	-.038	-.059	.239	.290	.252	-.126	.002	-.133
	Q3	-.177	-.038	1.000	-.019	-.010	-.037	.085	.213	.278	.333
	Q4	.228	-.059	-.019	1.000	.550	.209	.007	-.182	-.102	-.086
	Q5	-.026	.239	-.010	.550	1.000	.255	.098	-.100	.160	.171
	Q6	.026	.290	-.037	.209	.255	1.000	.408	-.109	-.030	-.127
	Q7	-.025	.252	.085	.007	.098	.408	1.000	.442	.353	.396
	Q8	-.333	-.126	.213	-.182	-.100	-.109	.442	1.000	.482	.641
	Q9	.030	.002	.278	-.102	.160	-.030	.353	.482	1.000	.888
	Q10	-.123	-.133	.333	-.086	.171	-.127	.396	.641	.888	1.000
Sig. (1-tailed)	Q1		.003	.210	.148	.452	.452	.455	.060	.446	.288
	Q2	.003		.432	.395	.136	.090	.123	.283	.497	.273
	Q3	.210	.432		.467	.482	.434	.350	.164	.099	.060
	Q4	.148	.395	.467		.003	.169	.487	.203	.321	.348
	Q5	.452	.136	.482	.003		.121	.329	.324	.234	.218
	Q6	.452	.090	.434	.169	.121		.027	.309	.446	.281
	Q7	.455	.123	.350	.487	.329	.027		.017	.049	.031
	Q8	.060	.283	.164	.203	.324	.309	.017		.010	.000
	Q9	.446	.497	.099	.321	.234	.446	.049	.010		.000
	Q10	.288	.273	.060	.348	.218	.281	.031	.000	.000	

The correlation matrix shows all the p-values for each question variable used in the analysis. In the research the values that should be looked at should be in the 95% interval range which correlates to p-values that are equal to or less than 0.05. Q1 (Security) has a p-value of 0.003 in comparison with Q2 (Security) with the same p-value. Both these variables are in equal significance for the Security category. Q5 (Productivity) also has a p-value of 0.003 in comparison with Q4 (Security), which means that these questions are correlated in a manner.

Table 3: Communalities

Communalities[a]

	Initial	Extraction
Q1	.740	.999
Q2	.748	.505
Q3	.251	.135
Q4	.691	.386
Q5	.729	.999
Q6	.396	.377
Q7	.515	.864
Q8	.647	.577
Q9	.828	.809
Q10	.894	1.000

Extraction Method: Maximum Likelihood.

In Table 3 the Extraction column shows the proportion of variance for each question variable. The higher the extraction value of each question variable, the more information can be explained

regarding the important factors analysed. As shown, Q10 has a .894 proportion which means it contributes greatly to the factor of Productivity, and secondly Q1 and Q5 both also contributes to Security and Productivity. Q3 contributed the least with the lowest proportion of all.

Table Error! No text of specified style in document.**: Total Variance**

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	2.851	28.508	28.508	2.555	25.554	25.554	2.606
2	2.072	20.723	49.231	1.300	12.998	38.552	1.630
3	1.387	13.871	63.102	1.628	16.285	54.837	1.606
4	1.170	11.697	74.799	1.161	11.610	66.448	1.353
5	.874	8.736	83.535				
6	.641	6.407	89.942				
7	.539	5.390	95.332				
8	.313	3.132	98.464				
9	.096	.956	99.419				
10	.058	.581	100.000				

Extraction Method: Maximum Likelihood.

According to Table 4, the factor analysis has summarized a total of four factors from the data set. Under the "Extraction Sums of Squared Loadings" data, the total column values explain the Eigen values gathered from each derived factor. The percentage of variance explains how much variance is contributed by each of the derived factors. The cumulative percentage for the derived factors is 66% which explains the variability of the 10 variables from the data set with a 34% loss of information during summarization. Figure 1 contains the graphical representation of Table 4.

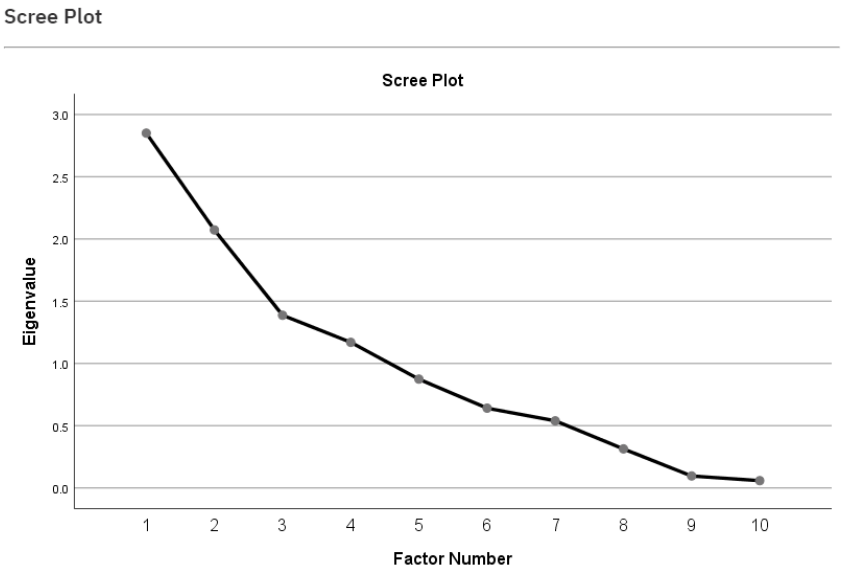

Figure 1: Scree Plot

The Scree Plot shows that 4 factors have an Eigen value of above 1. Factors with an Eigen value of 1 and above explain the most variance from the data set provided. Should more variables from the factors be added to the data set, the Eigen values demonstrates how the analysis would evolve.

Table 5: Factor Matrix

Factor Matrix[a]

	Factor			
	1	2	3	4
Q10	1.000	.012	-.011	.000
Q9	.887	.147	.025	.010
Q8	.640	-.203	-.266	.234
Q3	.333	-.117	-.097	-.032
Q1	-.133	.972	.190	.000
Q2	-.135	.478	.367	.348
Q5	.184	-.190	.964	.000
Q4	-.081	.104	.607	-.013
Q7	.396	.023	.031	.840
Q6	-.123	-.044	.279	.528

Extraction Method: Maximum Likelihood.

The factor matrix shown in Table 5 explains all the variances across the derived factors from the analysis. According to the table, Factor 1 has the most variance explained with a significance above 0.5. This factor includes Q10 (1.000), Q9 (.887), and Q8 (.640) as the variables that provides the most significant values of the analysis.

Factor Plot of Factors 1, 2, 3

Factor Plot in Rotated Factor Space

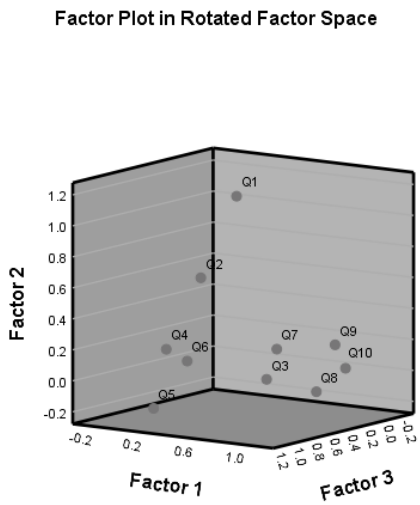

Figure 2: Factor Plot

Figure 2 is a data visualization provided by the analysis software to aid understanding of how each of the variables fit into the main derived factors for the research. It can be used as a guidance tool for analysing the data set.

Network performance test were conducted for the study since asking about network performance in a questionnaire would not particularly provide accurate results towards if South African Internet bandwidth can handle day to day operation to the cloud. The respondents expressed that network performance is a major concern in South Africa and that motivated the creation of the network test separately from the factor analysis. Thus, a simple network ping test was conducted using on premise servers along with servers based in the cloud that are used by the organisation where the tests were conducted.

The network test consists of running a ping test 25 times at specific intervals, first at 9h00 in the morning, 12h00 at noon, and lastly 15h00 in the afternoon. The reason the network tests were conducted as such is to ensure proper network conditions were tested to reflect possible daily operation and network traffic impact that may occur during the day. Each ping test performed returned the minimum, maximum, and average based on a local on premise test, or a test to the cloud provider server. Each element is measured in milliseconds (ms).

During the time interval of 09h00 the on premise server was very responsive by having a total average of 13 milliseconds where the cloud server has a round trip time of 313 milliseconds across the test runs. The local server has fluctuations of 1 to 104 milliseconds of maximum recorded round trip, which is substantially lower than the cloud server that had variations of 8 – 279 milliseconds. It

should also be noted that the results were recorded an hour after employees commences their daily operations.

During the interval of 12h00, the local server network traffic has slowed down with an average of 6 milliseconds across the test runs performed. This is in contradiction with the cloud server which had experienced an increased in network traffic resulting in an average of 2107 milliseconds across all test runs. The results also show that the local server has maximum latency fluctuations of between 1 and 61 milliseconds, while the cloud server has between 81 and 316 milliseconds fluctuations during the continuous test runs.

The 15h00 time interval is the time before most of the employees leave work to go home and finish off their last tasks for the day. The local server has a 1 milliseconds average and the cloud server has 2017 milliseconds across the test runs. The cloud server still experienced longer round-trip delays with a 2017 millisecond average across the test runs.

Table 6: Local vs. Cloud averages

	Daily Interval		
Service	09h00	12h00	15h00
Local	13	6	1
Cloud	313	2107	2017

Per the averages summarized in Table 6, the cloud server experienced larger fluctuations of network delay during the morning (09h00), midday (12h00) and afternoon (15h00) time intervals. The local server which hosts the services on premise had its largest delay in the morning, although it decreased throughout the day. The cloud server had its lowest delay in the morning, but only increased as the day went progressed. The network traffic delay to the cloud server could be caused by a poor network connection or a very busy network that needs to handle large requests between the premise and the cloud.

Conclusion

The analysis was performed to determine the most significant factors that contribute to the decision-making process of a manufacturing environment for using Cloud services in South Africa. According to the analysis done based on the questionnaire results, the most significant factor identified is Factor 1.

Factor 1, 2, and 4 corresponds to the key factor (categories), Security. Factor 3 corresponds to Business Productivity. Each of these factors had a significant outcome from the results obtained in the questionnaires. It seems that the key factor, Security, is the largest factor taken into consideration for moving daily operations to the cloud in South Africa. This is an important factor for many of the employees as business information must always be handled confidentially. One of the comments provided by an employee states as follows; “Data privacy is very important to me & the security of my data & company data is very important to me”.

Factor 3 that is identified as Business Productivity was the least significant regarding the employees as most are trained or will be trained in using the cloud solutions effectively. The main reason the factor was identified is due to the smaller sample size causing a slight skew in the results of the study where the variances do not correlate properly.

Based on the separate network performance analysis, it has been discovered that on premise solutions provide faster access times than cloud solutions. It is evident in the results that the latency experienced between on premise solutions and cloud solutions on certain times of the day is too significantly apart to choose cloud solutions as a use for daily operations. The geographical location of the manufacturing company also contributed to the latency experienced.

One question in the questionnaire was based on network performance and did not create a large impact in the factor analysis but created a large interest in the comments of the employees. One comment provided was: "Certain manufacturing environments do not have proper connections to the Internet and that cloud solutions are simply not possible". This is true to the results where an on premise solution would be better for performing critical daily operation, and cloud solutions can be used for backups of data that are safely encrypted locally before storage. One employee provided a comment in general that stated: "South Africa is just not ready for cloud solutions". This correlates to the key factor of Network performance where South African Internet bandwidth is not suitable yet for employing cloud solutions in a manufacturing environment. Manufacturing companies in South Africa should therefore wait for cloud solutions to mature as well as wait for more advanced telecommunications technologies before attempting to use cloud solutions for daily operations.

Future research possibilities include making use of the interpretivism methodology to gain insight from an interpretative perspective, increasing the Likert scale from 5 to 10 to gain better results from the data collected, and research can be conducted at multiple manufacturing companies to gain better experiences and results across South Africa and globally.

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Peculiarities of Implementation of Peace Education in Ukraine

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Abstract

Purpose: The article provides synthesis and critical analysis of the best foreign practices concerning peace education and outlines the system of civic education based on peace-making and peacekeeping trends in the light of contemporary Ukrainian realities. The authors identify the potential of education in conflict-affected environments in foreign studies, which is of great use in conditions of protracted conflict in the East of Ukraine. On implementing peace education, Ukraine should consider the necessity to tackle the following problems: inequality, recognition and respect for multiculturalism, local communities' involvement in educational policy and reforms; reconciliation, combating injustice and conflict consequences. **Methodology**: In the study system approach is used which consideri peace education in the system of general education. The systematic method has become the basis for realization methodological instruments in the process of critical analyzing the most successful world practices in peace education and determining own vision of citizenship education system. Furthermore, a set of methods of scientific knowledge applied in humanitarian and social sciences are used, in particular, methods of structural and functional analysis, comparative analysis, synthesis, induction, deduction, analogue and generalization. **Conclusions**: Peace education events in volatile environment should take place in different sectors, cobbering the processes of social changes. On implementing peace education in Ukraine, definitions like 'lecturer's mission' and 'teacher's mission' should be the first to pay the closest attention to. The tasks of providing the teacher with strategies, practices and methods of self-efficiency improvement, impact on students' SE and other results, as well as creating strong school communities are among the priorities. Regarding the educational level of Ukrainian citizens as pretty high, this country's peace education should cope with the challenges of the youth's civic education more than just tasks to teach reading and writing. **Implications**: Promoting peace education should provide gradual changes of attitudinal guidance in the society aimed at shaping universal human values. Their final purpose is to ensure sustainable development of society based on the principles of democracy and peace.

Keywords: Peace Education, Peace-Making, Peacekeeping, Peacebuilding.

Introduction

According to the UN estimates, the conflict in the East of Ukraine is "one of the highly lethal in Europe after the Second World War". 7,2 per cent of Ukraine's territory, including Crimea and eastern parts of the Donetsk and Luhansk regions, are currently under occupation, with about 13,000 people killed, including 240 children, and more than 28,000 wounded in the conflict, which began in 2014. 700 schools were ruined as a result of banned artillery and tanks firing; 177 educational establishments are in a field of fire reaching. 36 thousand children were granted the status

of victims of war conflict. More than 1.8 million residents of Crimea and Donbas had to leave their homes and became the internally displaced persons, including 200 thousand children. 25 thousand children live and study in so called 'grey zone' at present [13].

Lasting military confrontation and the growth in human losses, population being in the occupied territories and surrounding areas under the constant impact of Russian propaganda reinforce the trends of misunderstanding and opposition in society. Defusing such stand-off requires a great deal of outreach and advocacy which should involve all stakeholders who influence human's world view shaping, in particular, educationalists.

Civil reconciliation will take at least 10-15 years and has to become an essential part of complicated and complex process of Ukrainian society consolidation, patriotism and Ukrainian identity establishment. GEFI – Global Education First Initiative define global citizenship as a third priority of its work: "Global education policy should be a profound link on the way of creating fairer more tolerant and more inclusive societies" [17]. Grounded on that fact, peace education in Ukraine is of actual importance, since it is aimed at addressing such root causes of conflicts as political, economic and social inequality and injustice. Peace education promotes security enhancement in the country, as well as political, economic, social and cultural transformations in communities which experience conflicts.

Literature Review

A lot of scientific studies reveal the problem of peace education implementing, among them we should emphasize works by Professor Harris I.M. who investigated evolution of peace education theories and their impact on contemporary theories based on non-violence (reducing threats posed by interpersonal and ecological violence). He highlights five ways of diversified peace education: international education, human rights education, development education, environmental education and conflict resolution education [8]. The significant contribution into peace education development was made by the Canadian Professor H. Danesh, the founder of integrative theory of peace and the author of 11-volume educational program "Education for peace". His integrative theory of peace is grounded on the fact that peace is understood as a psychosocial, political, moral and spiritual reality. So human's worldviews are defined as the subconscious lens (acquired through cultural, family, historical, religious and societal influences) through which people perceive the nature of reality, human nature, the purpose of existence, the principles governing appropriate relationships [2].

Fountain S. considered the issue of peace education founded on Convention on Child's Rights and Jomtien World Declaration on Education for All [4], which followed the interlinks between peace education and other educational trends (education on Human rights, Education for Development, Gender Training, Global Education, Education on Life Skills, Changes Awareness and Psychosocial rehabilitation).

Works by Datzberger S., Dr of Amsterdam University are of scientific and practical interest. She carried out a number of field-based case studies in several countries which implemented the process of transformation from conflict to peace (Sierra-Leone, Uganda and Mexico) [3; 15]. Studies by Datzberger S. are aimed at processing whether peace education matches security conditions and conflicts or not; searching for the ways of addressing structural and non-direct forms of violence with the help of alternative and flexible educational trends; civilian society developing in these countries.

In their studies Greenberg M., Weissberg R., O'Brien M., Zins J., Fredericks L., Resnik H, & Elias M. deal with the overview of schools reformation models directed at achieving social, medical and academic results [5]. Scholars proved that educational policy promotes child's full development. Its realization is in vain without professional development and education improvement which should guarantee the efficient realization of educational programs.

Harber C., Emeritus Professor of International Education, School of Education, University of Birmingham, studied the phenomenon of peace education impact on individuals and society basing on the example of Southern Africa schools. He came to conclusion that peace education influences the community in different ways. It can benefit society, reviving it at its best, but in specific cases making it worse and harmful to people [6]. Harber S. made a substantial contribution to the study of existing alternative educational forms directed at democracy and peace development [7].

Hymel S., Darwich L. studied ethnic discriminatory at schools and impact of Social and Emotional Learning (SEL) within reconciliation context [9]. Scholars proved that SEL can be achieved with the help of different educational programs, interaction between a teacher and a student, mixed engagement in the process of tackling the problems of peaceful resolution of conflicts etc.

The studies and results of foreign scholars are of relevant use and value for Ukraine concerning the profound experience study in developing peace education, its spreading into security and peaceful processes in regions covered by the conflicts etc. The first steps in this direction were introduced by the UN Program on Restoring Peace and Development which has secured priority demands in the East of Ukraine since the start of military conflict in the spring of 2014. The Program is aimed at enhancing civilian security and social mobilizing, supporting economic recovery for those who suffered from community conflicts and realizing reforms aimed at central power decentralization and helath care reviving on the territories of Donetsk and Luhansk regions under the Ukrainian control. Ukrainian Peacebuilding School (UPS), represented by Association for Middle East Studies (AMES) and Maidan Monitoring Information Center, as well as Fund "Europe XXI" made the substantial contribution to promoting such outreach work (education). At the same time a set of challenges concerning implementation of peace education in Ukraine are remained uncovered.

The purpose of article

lies in critical analysis of the best foreign practices concerning peace education and defining own concept of civilian education system in our country based on peace-making and democratic contemporary trends.

Social and Emotional Learning while implementing peace education.

At present time the studies aimed at emphasizing advantages of Concept on Social and Emotional Learning (SEL) while implementing peace education are of actual importance. SEL is directed at providing students with academic knowledge, efficient socialization skills, emotional control, emotional interaction with other people, as well as developing skills concerning care about people, complicated problem-solving etc. We consider the teaching students social and emotional skills in secondary educational establishments and their further development in higher educational establishments of great importance nowadays. They promote positive children's and adolescents' development, increasing choices of pro-social and non-violent ways of fixing relationships with surrounding people (developing interpersonal skills). Hymel S., Darwich L., basing on the SEL Concept, explain the ways of its realizing with the help of different educational strategies, including programs, relations between a teacher and a student, co-education, approaches to discipline and peace conflict-solving. They claim that peace-building through promoting social and emotional development in education bears a great hope for future generations [9]. Complex knowledge and skills linked to the understanding of the processes concerning shaping senses of justice and affiliation in a human, team-work skills, interpersonal skills, as well as ability to study efficiently is of high value for the youth.

According to World Economic Forum (WEF) results [18], education innovations require developing in young people the skills which promote their efficient participation both in educational process and society in general. WEF experts named 16 most important skills in XXI century for students which are divided into three groups : fundamental knowledge (literacy), competences (skills), personal qualities. It should be mentioned that educational reform in Ukraine also considers SEL Concept and related methodology while shaping global vision of education in future.

The researchers group's conclusions are of great interest as well. [1]. They estimated the economic value of SE skills within benefits and expenses analysis. They claim that despite the existing of specific challenges the benefits from acquiring SE skills by young people outweigh the expenses on their developing.

Challenges of Implementing and Spreading Peace Education

There are specific challenges occurring while implementing peace education which should be outlined. It is clear that global mission of educational establishments is to teach young people to be healthy, socially responsible and careful citizens. This mission is supported by increasing number of educational programs on prevention and development of different age groups of the youth. Simultaneously, the impact of these programs is limited due to insufficient accordance with other components of educational processes and ignoring specific tools of realization as well as their impact factor. In American scholars' view [5], the wide implementation of programs aimed at peace education programs promotion require development of complex school reforms program directed at improving social, medical and academic results; educational policy which demands responsibility for promoting children's comprehensive development; professional advancement that prepares and supports teachers to realize the programs efficiently; constant monitoring and evaluation for the authorities of educational establishments. Within Ukrainian realities it is clear that above-mentioned scholars are cautious about this situation. If we consider peace education as itself, it is not the top priority in Ukrainian educational establishments, so it is not a component of national educational programs. In particular, it is hard to link peace education to other components of educational programs in secondary educational establishments. It is also the reason why realization of peace education is of no substantial impact factor during institutional auditing in educational establishments which, in its turn, does not motivate establishments authorities to implement peace education.

Moreover, educational establishments may experience the lack of time to implement peace education, as an efficient educational programs, particularly in secondary educational establishments, are overburdened which is explained by the fact that considerable part of educational tasks should be fulfilled at limited time period. Mapping the way to realize peace education in institutes of formal and non-formal education is also a specific challenge. We should mention that the majority of scholars consider the idea of peace education incompatible with existing system of formal education. For instance, the study of Harber C., Sakade N. [7] reveals the role of school education both in reconstruction and active violent behaviour. They make historic argument as for the case that school is established in a way to make the violence possible. We believe that in Ukrainian secondary educational establishments the contrasts and tension like those are also probable because of authoritarian approach in education which has not been eradicated yet.

Peace education conflicts with school spirit in terms of structure, customs and methods of studying. Occasionally, peace upbringing is regarded as a threat to existing school hierarchy. Some professionals (i.e. overwhelming majority of elderly teachers in Ukrainian secondary educational establishments) are really afraid of the situation when hesitations in authoritarian approach correctness can lead to anarchy, as reconciliation education motivates students to ask questions and come up with own ideas which is considered the threat to existing hierarchy.

It is clear that peace education will be successful in educational establishments which appreciate children's thoughts of themselves, one another, their peers, as well as at schools which pay specific attention to 'positive behavioural management' which helps students change their behaviour giving them positive stimuli instead of punishment, At the same time it should be emphasized that 'positive behavioural management' is absent in this country's educational management practice.

As for school education, the model existing in the world, beyond some exceptions, is of more authoritarian nature than democratic one. A vast majority of schools represent authoritarian institutions as of good nature and bearing useful educational aspects. According to Harber C. and Sakade N., "due to organization and contents of educational programs, school education has become one of the institutes of social control alongside with prisons, hospitals, factories which used constant supervision to discipline and punish, prevent social fragmentation and provide order and obedience" [7].

This problem is especially acute in developing countries. According to the UN estimates [6], the role of school education in supporting of explicit violence is widespread and takes various manifestations. The results of Global Education First Initiative which examined the health condition of school-age children in 16 developing countries show that a part of pupils who suffered rude verbal or physical

bulling at school within 30 days fluctuated from 30% to 65%. Besides, it revealed the following negative manifestations [11]:

- gender violence (girls who are a subject of sexual abuse and violence by male-classmates and male-teachers);
- racial and ethnical discrimination, hatred and tortures;
- use of corporal punishment;
- school education militarization.

Pope D.C. [12] emphasizes one more negative manifestation. It is physical, psychological stress and diseases caused by over-testing and over-examining of pupils (students) for the sake of the state. We are also cautious about this country's educational policy which provides mass introduction of State Certification of pupils of primary school, External Independent Evaluation of pupils in Grades 9 and 11, as well as Common Entrance Examination to enter the Magistrate and planned External Independent Evaluation on its graduation.

At the end of the 20th century the increase in social concern as for the harsh forms of violence such as genocide, ecocide, contemporary war, ethnic hatred, racism, sexual abuse and family violence was observed. The peace education studies have become actually important as a decent reply to these challenges. The study by Harris I.M. [8] is a good confirmation to the fact. He highlighted the peace education theory evolution from the sources of international community concerns like war danger to up-to-date theories based on decreasing the threats of interpersonal and ecological violence.

Peace education is implemented with the aim to provide opportunities for the skills, knowledge and values development which is necessary in conflict-solving practice, communication and cooperation on peacekeeping, war and conflict prevention and justice establishment. It can be realized in conflict, post-conflict and sustainable societies to acquire peace solution to the problems. According to UNICEF definition, "peace-building education is a process of investing knowledge, skills, views and values which are necessary for behaviour changes. It allows children, the youth and adults to prevent conflicts and violence both factual and structural; solve conflicts in a peace way; create conditions promoting peace at intrapersonal, interpersonal, intergroup levels, as well as at national and international levels" [8].

Professor Danesh H. [2], the founder of integrative theory of the world, claims that all human state of being statuses including peace are determined by our worldviews, our views of reality, human nature, aim of life and human relations. Danesh H. formulates four preconditions of efficient peace education: worldviews based on unity, healing culture, education culture and educational program aimed at peacekeeping.

According to Johnson D. W. and Johnson R. T. [10], to develop the viable peace through education we need:

- to shape the concept of national peace education which allows students from conflicting groups to communicate with one another and develop positive relations;
- to shape the sense of common fate which emphasizes common purposes, fair distribution of means to achieve goals and common identity;
- to teach student the procedure of constructive arguing, the skill of complicated decision-making and participate in political debates;
- to equip the students with the skills of integrating negotiating and interpersonal mediation, as well as skills of constructive mutual conflict-solving;
- to shape civilian values designed to be of benefit for the society.

While shaping the national concept of peace education we have to realize the distinguishing features between the education which is given in comparatively peace and stable conditions and education got in a period of violent conflicts and education, being both as a component of reviving after conflicts or political transition and as a part of a long-term process if peace and reconciliation.

As for the chances to implement peace education, we should mention the potential of informal education in Ukraine. The program of informal education ABEK in Karamoja (Uganda) is of great scientific and practical interest [3] which helped to overcome structural and non-direct forms of

violence at schools with the help of alternative and flexible forms of education. It is clear that Uganda by the education development index is of huge gap with Ukraine, though they have faced common challenges, in particular, economic inequality and uneven distribution of wealth, competitiveness for resources, land arguments, inefficient management, absence of truth in informational environment, corruption. The studies show the opportunities for informal education in the countries which suffered from conflicts which is of great value under the terms of lasting war conflict in the East of Ukraine. We should consider the experience of Uganda while implementing peace education in Ukraine to solve the following challenges:

- inequality (vertical and horizontal inequality in educational resources and results, redistribution in reforms or educational policy, particularly, the impact of decentralization in different communities and population groups);
- recognition and respect for multiculturalism (language policy, policy of cultural diversity and religious identity recognition, civilian education as a tool of state building);
- participation involvement (involving of local communities into educational policy and reforms shaping, efficient school management oriented at stakeholders' interests, support of main freedoms in education system);
- reconciliation, combating injustice and conflict consequences (preventing historical injustice, linked to the conflicts, vertical trust to schools and horizontal trust among the groups grounded on identity).

Regarding that experience, we should realize that to make the peace education measures in unstable environment sustainably influential on peace-building process in general they ought to work simultaneously in different sectors covering processes of social changes lying beyond the sphere of education. Their success depends on a set of political, historical, cultural and economic factors. Educational peace-building programming should consider history and reasons of a conflict, as well as cultural, historical, socio-economic and political context of the country or region. All stakeholders (state authorities, authorities of educational establishments, scholars, practical teachers, non-governmental and civilian organizations etc.) have to be a part of dialogue concerning peace education model adaptation and its limits.

In our view, while implementing peace education in Ukraine, first and foremost we have to draw attention to 'mission of a teacher' and 'mission of a lecturer'. The mission of a teacher in 21st century is to bring up a decent human enable to live and work efficiently in globalized world, as well as realize own creative abilities with respect to ideas, culture and traditions of own nation in full way". We should also mention that a mission of a teacher should have peacemaking and educational direction, since efficient peace education management is impossible without teachers' equipment with strategies, practices and methods to increase self-efficiency, impact on students' SE and other results, as well as creating of strong school communities.

Practical aspects of peace education implementation in Ukraine

Within the UN traditional four-vectored approach to the work on peace reconciliation (preventive diplomacy, peace-making, peacekeeping and peace-building) the role of communities, civic and international organizations is more and more recognizable. The structure of peacekeeping which matches the UN approach to the work on peace achievement comprises 9 models: 1) peacekeeping through diplomacy realized by the government activity with further distribution into other models; 2) peacekeeping through professional conflict problem-solving; 3) peacekeeping through commerce (business); 4) peacekeeping through personal engagement (privates); 5) peacekeeping through education (science and education); 6) peacekeeping through advocacy (activity); 7) peacekeeping through faith in actions (religion); 8) peacekeeping through resource supply (financing); 9) peacekeeping through informing (communication and media). All these models work in Ukraine. Though the support of civilian society and international organizations is of extreme tangibility at this stage. In this context we should highlight the Program on dialogue support which matches the UN Security Council Resolution 1325 "Women, peace, security" and aimed at the search for mutual understanding between Ukrainian and Russian leaders and world activists for peace. Furthermore, at state level we observe the constant support of decentralization and local management strengthening. This Government introduced National Plan of Actions "Women, peace, security" till 2020 [16]. One

of this plan main priorities is organization and introducing peace education of wide range of actions. It provides development and implementation of educational programs including distant courses or special courses and national and methodical materials on gender problems in education in emergencies and war conflicts into the system of staff training and improving qualification. Such education is directed at general population from civil servants, military men, volunteers, social workers, psychologists, lawyers, defendants, medical staff, educational establishment authorities, internally displaced persons to students of comprehensive schools and fosters of kindergartens. Enlightenment mission of peacekeeping educational programs lies in education on prevention and resistance to violence, gender aspects of forced relocation, and problems of disarmament, security, demobilization, reintegration and justice availability. Unlike the number of countries which implement peace education, Ukraine pays much attention to adults at present. The issues on applying positive actions in the activity of law enforcement bodies and Army, as well as preventing sexual abuse linked to the conflicts, establishing the set of measures to protect and rehabilitate women suffered from conflict and crisis situations, settling of conflicts, dialoguing, promoting good governance and capacity-building of communities which experienced the conflict are included into staff educational programs and improving qualification programs for servicemen and policemen.

The experience of Ukrainian social project based on peace-building "Community of the future" is of great practical interest for the counties suffering from war conflict. Ukrainian entrepreneur Satov O. is the creator and ideologist of the project. The purpose of the project is the realization of population's collective self-organization model, as well as shaping the community of people with active citizenship through common independent housing construction within one social settlement. The project is aimed at addressing human needs for creating and resettlement own housing space and self-realization. The participants of the project are low-income families, young couples, residents of dormitories, tenants of a dwelling, internally displaced persons, families of soldiers, war veterans and members of hostilities, underpaid families (there are more than 5 mln families of such kind in Ukraine). It is the project which has to become important ground for accumulating the best practices of peace education both for children and adults, adapted to Ukrainian realities [14].

As we mentioned above, authoritarian system of formal education is unable to develop critical thinking skills, objective perception of a problem and problem-solving skills in the youth. Among the consequences of authoritarian approaches in education there are low economic efficiency of the society and its technological backlog from developed world countries. Considering these challenges, participants of the project "Community of the future" formed a team of specialists-teachers, creators of innovative educational systems who believe that school teachers' slogan should be "a little bit ahead but always nearby". The project provides implementing of El'konin-Davydov's system in educational establishments of newly-formed communities. This system promotes the use of developing methodology grounded on the basis of modernized educational environment with loyal approach of teachers to students' studying process.

Danylo El'konin was a Soviet scientist, the author of theory of Child Studies, corresponding member of The Academy of Psychology. But the greatest El'konin's contribution to the world pedagogics is developing and implementing a new system of so called 'developing training'. The term 'developing training' was introduced by the scientist Vasyl' Davydov, a teacher, psychologist and vice-President of Academy of Pedagogical Sciences.

El'konin-Davydov's sytem is well known for more than 50 years. However, during the period of Soviet power, as well as within times of Ukrainian independence it was not recognized and even rejected by the official authorities. Neither Soviet Ukraine nor the USSR required critically thinking citizens. Young independent Ukraine has not been aware of this need for some time. The complexity of implementation of El'konin-Davydov's system lies in the fact that it is grounded on fundamental psychological and philosophical theories. Besides scientific research done by its founders, it is based on Hegel's dialectics, works by Vygorskyi L., Leontyev O. Gal'perin P. The system demands a whole new concept of educational preparation of a teacher who is able to shape national identity and citizenship in students, promotes personality's development and socialization, manners and attitudinal guidance, critical thinking and creativity, research and analytical skills as well as professional qualities. Ideologists provides for formation SE skills and peacebuilding upbringing in communities of future which should be integral part of both children's and adults' education.

At present the Project founders and the school of Boryspil district in Kyiv region, located nearby the settlement of the project concluded the agreement on cooperation. The plans are made to organize improvement qualification courses for the teachers with the involvement of the Department of Management of Borys Grinchenko Kyiv University, particularly, the authors of this article. Since 2019 the Department has been working closely on developing educational modules for the general secondary education staff focused on SE skills and peace education which are being tested in secondary educational establishments. These programs are based on the results of the Department's experimental work "Formation 21st century skills as a the basis for self-determination and self-realization of a personality" in Gymnasia №191 in Dniprovskiy district in Kyiv. In 2020 the Department of Management is going to start a new experiment on implementation of peace education skills in Lyceum-Boarding school №23 "Cadet corps" of Kyiv where the future servicemen study. The education in newly-formed communities will be free for the settlement inhabitants so it is planned to attract public funds as well as grants.

Social and psychological rehabilitation of the inhabitants of newly-formed settlement is one more important challenge for the project participants. It is explained by the fact that the project is mainly focused on internally displaced persons, veterans of Russian-Ukrainian war who are need for social and psychological assistance to restore psychic and physical power and integrate successfully into micro-society "Community of the Future".

Conclusion

Military events of 2013-2019 in Ukraine brought a lot of losses, including human cost. Along with this, they revealed new opportunities for the development of the country, civic society, generated inquiry for a new vector of social and cultural promotion which will guarantee peace and democracy. Peace education in conditions of military conflict in Ukraine has become of actual importance. At present it is considered an integral part of state-building processes grounded on humanization, social equality and justice.

Currently in Ukrainian society there is an objective need for social reboot, value integration inside the country as well as in the processes of restoration of the state's unity and achieving peace. In our view, social project "Community of the Future" in Ukraine is the first step towards practical implementation of peace education concept. The project promotes educational, cultural, social and professional realization of socially vulnerable groups of people, war veterans, members of hostilities as well as their families that had to leave their homes due to military events. The participants of the project will gain the chance to enter psychological rehabilitation in combination with reintegration into civilian life and restoring their social, economic and professional skills. The main social effect of the project is creation of new jobs and maintenance of the settlement with own social infrastructure, own energy resources and own production. Social project "Community of the Future" presents the opportunity for the war-affected and members of hostilities to return to peace life as well as the way of achieving the goals which were seen as a dream for the majority of them before military conflict.

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Classification of Post-Soviet Countries by The Level of Socio-Economic Development

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Abstract

The process of transition of 15 post-Soviet republics from the centrally-controlled economy to a market economy was accompanied by fundamental changes in their political, economic and social life. As a result of cluster analysis of 15 post-Soviet countries, 3 groups were defined, and during the last three periods the proportion and filling of groups is the same, which indicates stabilization of the cluster. Those post-Soviet countries that had strong natural and human capital in the beginning of the transition, have achieved significant success and integrated into the global economy. The Baltics also stand out: these countries have joined the European Union and significantly improved their macroeconomic indicators.

Keywords: Post-Soviet Countries, Classification, Cluster Analysis.

Introduction

It has been almost 29 years since the dissolution of the Soviet Union. Fifteen republics of the ex-USSR have initiated their own development. According to Firsova et al (2014), this led to emergence of a new transition process that has never existed before in the world practice - the transition from the centrally-controlled economy to the market economy. Moreover, with the dissolution of the USSR new states have undergone three stages of transformation from regional economy to the national economy of their own state. Akayev (2016) revealed that the first stage is the ideological transformation, the second - economic transformation, and the third stage is institutional.

At that, all post-Soviet countries had history of a unified Soviet approach to the economic management, such as centrally planned organization and financing, subordination to several sector ministries, etc. Despite these common features, differences in socio-economic development between ex-USSR republics were quite significant.

Difficulties that accompanied the transition from the centrally-controlled system of economic management to the market system, were approached differently by the governments of post-Soviet countries. Some stayed the course of the shocking therapy, while others implemented the gradualist policy. In their researches, Sunday, Babatunde (2018), Sawhney and Kiran (2019) mention that transition to the market has significantly affected the relationship between ex-republics of the USSR, which resulted in formation of communities and commonwealths (CIS, EEU, SCO, BRICS). A number of countries have changed their preferences from Russia to the EU countries and USA. Therefore, classification of the group of post-Soviet countries during dissolution of the Soviet Union (1991), post-crisis years (1999 and 2009), and the reporting period (2015, 2017) is considered relevant. This approach allows to assess changes in differentiation of post-Soviet countries under the influence of transformational shifts.

In this research, post-Soviet countries should be understood as a group of 15 countries, that were a part of the USSR.

On the one hand, the considered group of countries is characterized by common roots (ties of history, language, ethnic culture, confession, etc.), and on the other hand - by inconsistency in development after dissolution of the Soviet Union in 1991. This is the reason for increased interest on the part of Russian scientists pursuing this issue, such as Avdeeva (2014), Vardomskiy (2012), Petrov (2012), Tekueva et al (2016).

Considering the submitted materials from a perspective of the group of post-Soviet countries, the following papers, containing the authorial vision for the amount and members of the group of post-Soviet countries, should be mentioned.

In her research, Avdeeva (2014) studies the state of economies of post-Soviet countries as of 2013, groups the CIS countries 'in accordance with the state and budget revenue sources'. In this, three groups are identified:

The first group includes countries exporting energy carriers: Russia, Kazakhstan, Azerbaijan, the budget of these countries is filling through the hydrocarbon export;

The second group consists of countries exporting labor: Armenia, Moldova, Kirgizstan, Tajikistan, budgets are mostly funded through flow of funds from migrant workers;

The third group includes countries with export diversification, such as: Belarus, Uzbekistan, Ukraine, where along with commodities export there is a large proportion of highly processed products.

The multi-author monograph 'Social and economic development of the Post-Soviet countries: twentieth anniversary results' guided by L. Vardomskyi is the most detailed scientific work dedicated to post-Soviet countries. In particular, a socio-economic survey of each of 15 USSR republics is conducted, heritage of the Soviet Union and its impact on trajectories of counties during the transformation period are analyzed. Development of the classification of member countries of the Soviet Union during its dissolution is to the credit of the teams of authors. The authors specify three groups of countries: 1 - the Baltics (Latvia, Lithuania, Estonia); 2 - Neighbors of EU and Russia (Moldova, Belarus, Ukraine); 3 - Caucasus (Azerbaijan, Georgia, Armenia); 4 - Central Asian 'mosaics' (Kazakhstan, Kirgizstan, Tajikistan, Turkmenistan, Uzbekistan).

Considering socio-economic development of post-Soviet countries, Petrov (2012) specifies four groups of countries and one 'overshoot'. According to the territorial belonging, the countries are grouped as follows:

The first group is represented by Eastern European countries (Ukraine, Belarus and Moldova). Their location between Europe and Russia imposes certain limitations to their economic and social sovereignty.

The second group includes Central Asian countries (Kazakhstan, Kirgizia, Tajikistan, Uzbekistan, Turkmenistan). The political elite of these countries faces certain problems, each of which can threaten the existence of any of them. The region is influenced by Islamic culture and economic pressure from China.

The third group consists of Transcaucasian countries (Armenia, Azerbaijan and Georgia). Area of political instability. USA and Russia have maximum impact on these countries' policies.

The fourth group includes the Baltics (Latvia, Lithuania and Estonia). The economy of these countries is greatly influenced by their integration into the European Union.

Russia is an 'overshoot' - this country is seen as a separate group due to its leading role in the region.

The shortcoming of selected groups lies in the approach to categorization and grouping of post-Soviet countries, because scientists do not use any formalized methods, which does not devoid the results of subjectivism. It seems necessary to implement statistical tools such as table and graphic methods, grouping method, cluster analysis, and general scientific methods (analysis, synthesis).

Methods of Research

Objects grouping is one of the ways of studying the structure of cluster at a single point in time. It should be noted that post-Soviet countries are in a turbulent state and their positions always change with respect to each other. The possible solution to this situation is grouping in reference periods, such as 1991 (dissolution of the Soviet Union), 1999 (impact of the 1998 crisis), 2009 (impact of the 2008 crisis), 2015 (impact of the 2014 crisis), and 2017 (relevant data is currently available), which would help to establish the amount of change in the relationship between countries.

In most of researches groups of post-Soviet countries are specified In accordance with one of the indicators, and it is usually a qualitative one. However, their socio-economic development can be characterized by not only one indicator, but a set of them.

Therefore, to construct a classification it is more appropriate to use statistical methods of polythetic classification, which main feature is that all available attributes are used when forming a group.

The set of subjects of post-Soviet countries forms an attribute space. If the federal subject is characterized by m attributes, then it is considered as a point in the m-dimensional attribute space. The solution is to identify the points close to each other in this attribute space. This multidimensional grouping is solved by means of cluster analysis, when the entire set of objects is divided into homogeneous groups (clusters). Those post-Soviet countries that belong to the same cluster should be similar to each other, and the degree of similarity between them within each cluster should be higher than between the subjects of the Russian Federation included in other clusters.

At present, statistics has a significant range of clustering algorithms. Most often, researchers use hierarchical algorithms, among which the Ward method is the most common. According to Mooi and Sarstedt (2001), this method involves using dispersion analysis procedures to estimate distances between clusters. With this, as noted in the research by Nosov, Tcypin, Abdulragimov, Mahanova and Zhenzhebir (2019), at each step of clustering, elements leading to the smallest increase in intracluster dispersion, will be combined into one cluster. Therefore, the smallest clusters are gradually merging into larger ones.

Research Results and Discussion

The easiest way of grouping post-Soviet countries in accordance with their economy development levels, is the GDP grouping, as this indicator is calculated on the common methodological basis, which means that it is comparable in space. Figure 1 and figure 2 present positions of post-Soviet

countries in two-dimensional space in accordance with data obtained from the UN Statistics Division and the World Bank.

According to information presented in the figure 1, transformation processes have negatively affected the economic efficiency of the country: none of 15 ex-republics of the Soviet Union were able to keep the economy from sinking, therefore, the whole cluster has a rate of decline.

Looking at the GDP per capita value, it can be seen that Russia, the Baltics and three large republics (Kazakhstan, Ukraine and Belarus) had high figures. The value for other countries was varying around 750 USD.

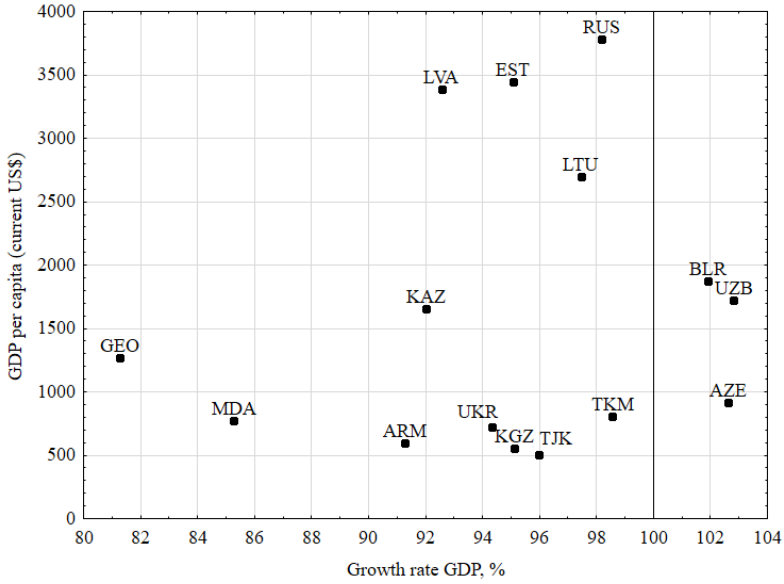

Fig. 1: Distribution of post-Soviet countries by GDP per capita and GDP growth rate in 1991. Drafted by authors using the service 'A world of information un data'

To assess the impact of transformation processes on the economies of considered countries, it is proposed to look at the figure 2, that contains data for 2017.

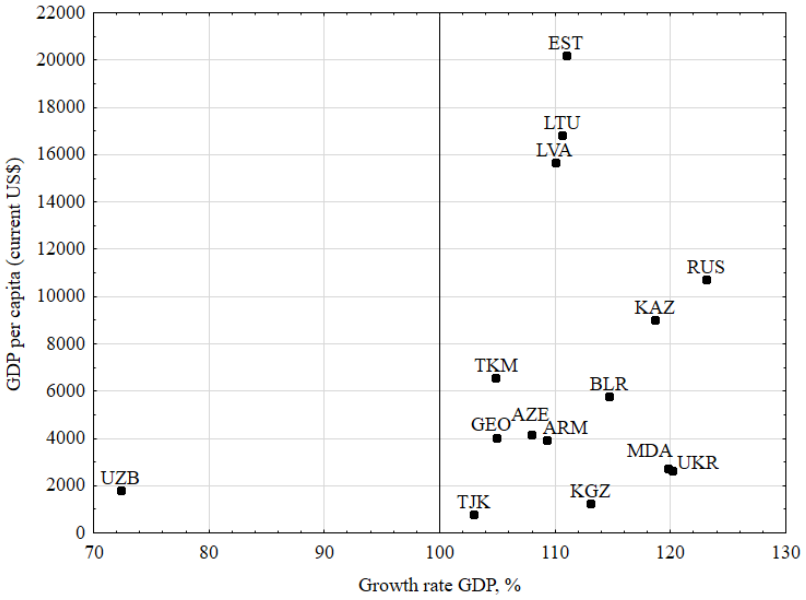

Fig. 2: Distribution of post-Soviet countries by GDP per capita and GDP growth rate in 2017. Drafted by authors based on the research by Benešová, Smutka and Laputková (2019).

According to information presented in figure 2, high GDP per capita values in the Baltics (EST, LTU, LVA) are worth pointing out. In regard to such success, it should be noted that outcomes of the 25-year development of independent Latvia, Lithuania and Estonia are mixed. Technically, they carried out successful political and socio-economic transformations, which have made it possible to achieve the needed macroeconomic indicators and join the EU and NATO in a short time. On the other hand, by joining these unions, they themselves have transferred a significant part of sovereignty they have been working so actively towards, to the supranational level. Being subsidized Soviet Union republics, they are now subsidized by Brussels.

However, it is not entirely correct to judge positions of post-Soviet countries based on only two indicators, which means that there is a need to use a set of characteristics of objects. For these purposes, a multidimensional pooling is most suited, and cluster analysis appears to be one of its forms.

It is proposed to use socio-economic indicators provided by the World Bank and the UN Statistical Division as indicators in the cluster analysis: X1 - GDP per capita, USD per person; X2 - share of industry (sections C-E) in GDP, %; X3 - share of agriculture (sections A-B) in GDP, %; X4 - labor coefficient, %; X5 - the unemployment rate, %; X6 - share of export in GDP, %; X7 - gross fixed capital formation, USD per worker.

Information processing in the STATISTICA package results in the dendrogram presented in the figure 3.

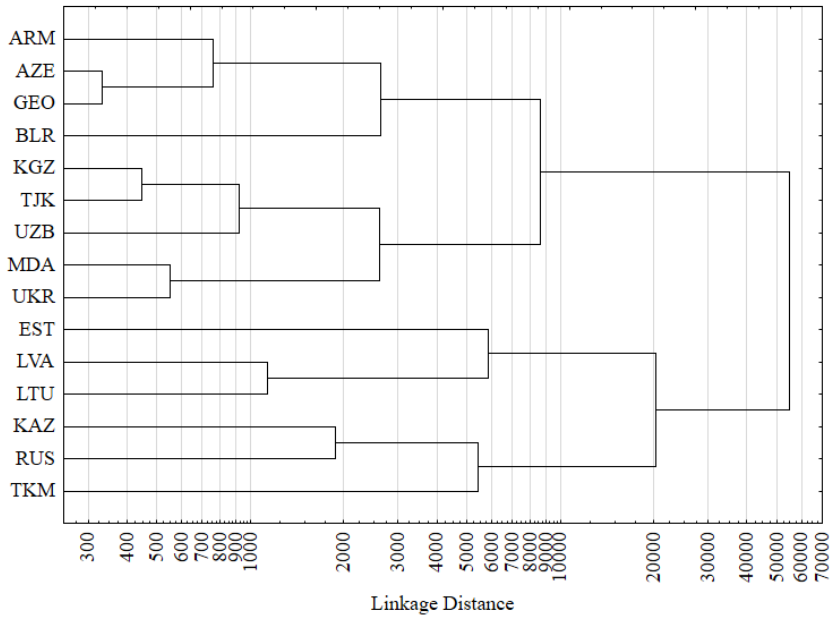

Fig. 3: Tree diagram of groups of post-Soviet countries in 2017

In their research, Benešová, I., Smutka, L. and Laputková, A. (2019) highlight that there are three groups in 2017. The first one includes Russia, Kazakhstan and Turkmenistan, which were characterized by average GDP per capita values, high share of industry and low share of agriculture. The second group has low values of the X1 indicator and average shares of industry and agriculture. The third group only consists of Estonia, Latvia and Lithuania, these countries have the highest GDP per capita values, low share of agriculture and the highest share of export in GDP.

Similar calculation conducted for the rest of reference points have provided the following results presented in the table 1.

Table 1: content of groups of post-Soviet countries in accordance with the results of the cluster analysis

Group	1991	1999	2009	2015	2017
1	RUS, LTU, LVA, EST	RUS, BLR, KAZ, TKM	RUS, BLR, KAZ, TKM	RUS, BLR, KAZ, AZE, TKM	RUS, TKM, KAZ
2	UKR, BLR, KAZ, GEO	UKR, UZB, GEO, AZE, MDA, KGZ, TJK, ARM	UKR, UZB, GEO, AZE, MDA, KGZ, TJK, ARM	UKR, UZB, GEO, MDA, KGZ, TJK, ARM	UKR, UZB, GEO, MDA, KGZ, TJK, ARM, AZE, BLR
3	UZB, AZE, MDA, KGZ, TJK, ARM, TKM	LTU, LVA, EST	LTU, LVA, EST	LTU, LVA, EST	LTU, LVA, EST

Drafted by authors in the STATISTICA package

It can be seen that the content of 1991 groups is completely different from the groups in subsequent periods. In all times Russia is included in the first group, but the content is different: whereas in the first year of transition to the market economy this group included the Baltics, further these countries were in a separate group. In the late 1990-s large countries which are now among the EEU members,

started to consolidate around Russia. It can be concluded that integration of the Baltics into the European Union had a great impact on them, which resulted in them moving apart from Russia.

Comparative characteristics of existing groups and the one obtained as a result of research, is presented in the table 2.

Table 2: comparison of the results with other studies

Group	Results of 2017 grouping	Avdeeva, Varapaeva (2014)	Vardomskyi et al (2012)	Petrov (2012)
1	RUS, TKM, KAZ	RUS, KAZ, AZE	LTU, LVA, EST	UKR, BLR, MDA
2	UKR, UZB, GEO, MDA, KGZ, TJK, ARM, AZE, BLR	ARM, MDA, KGZ, TJK	RUS, MDA, BLR, UKR	KAZ, KGZ, TJK, UZB, TKM
3	LTU, LVA, EST	BLR, UKR, UZB	AZE, GEO, ARM	ARM, AZE, GEO
4	-	-	KAZ, KGZ, TJK, TKM, UZB	LTU, LVA, EST
5	-	-	-	RUS

Drafted by authors using data regarding the CIS countries.

According to the data presented in the table 2, different grouping characteristics (and approaches), lying in the foundation of the grouping result in different contents of these groups. The only group that is similar in 3 out of 4 variants, is the one that includes the Baltics. Evidently, these republics differ so much from the rest 11 post-Soviet countries that they identify uniquely.

Conclusions

Obtained results show stabilization of the structure of post-Soviet countries. The conducted cluster procedure has resulted in three groups selected from the analyzed pooling of post-Soviet countries. The first cluster includes large post-Soviet countries led by Russia. All these countries have a common denominator such as natural capital and labor force.

The second group consists of countries that have changed their polarity, which means that they share political views with western countries and keep 'moving apart' from Russia in their development process (Ukraine, Armenia, Georgia).

The third group includes the Baltics, which are characterized by the most rapid pace of movement towards the market system, which can be due to a number of factors: the existence of fundamentals of market economy before the establishment of the centrally-controlled system, close economics and historical ties with the Western Europe, relatively balanced structure if the national economy or small disparities, consensus of all social groups on the necessity of transition to the market system.

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Application of The Cognitive Linguistics Methodology in The Process of Identifying the Linguistic Potential of The Child

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Abstract

The aim of the article is to present an innovative approach using the methodology of cognitive linguistics to describe the image of children's linguistic capabilities as a social group and the child as a subject with the right to be an individuality. The text refers to fundamental concepts of cognitivism: conceptualization, profiling, usage-based model, prototype, family resemblances, experimental Gestalt, Idealized Cognitive Models (ICM), fuzzy sets, metaphors, etc. The description of the cognitive linguistics-based methodology of research on children's language is so detailed that it will allow educators to use this form of viewing the child's linguistic competence in everyday pedagogical practice, in activities focused on researching, diagnosing, designing and planning of activities supporting and assisting the child in a harmonious, holistic development. According to the methodology of qualitative research, it is the child speaking language who is the subject of the research, and not – as it is traditionally expressed in quantitative methodologies – the language of the child which is the object of the research. The approach built on the dialogue, in which the potential for positive synergy lies, is guided by an anthropocentric philosophy, and the research strategy presented here leads to a positive picture of a child's linguistic competence, taking into account both those aspects that place the child's vocabulary and grammatical forms in the group of those language users who communicate without disruption and without cognitive effort, as well as revealing the individual character of the linguistic realizations, resulting from various reasons: the child's creativity, disorders, e.g. in Asperger syndrome, or a socioconstructive pattern based on a limited code. The author also signaled wider possibilities of implementing this strategy, e.g. in learning a foreign language, to study the understanding of abstract or literary texts, especially poetry.

Keywords: the child's linguistic competence, conceptualization, family resemblances, usage-based model, Idealized Cognitive Models

Introduction

The use of all kinds of tests to diagnose linguistic competence is becoming almost standard in countries of Western civilization. These procedures are being applied to younger and younger children, e.g. in Poland the following tests are gaining popularity: TUNSS – Ability test at school start, TRJ – Language Development Test, OBUT – The Polish National Third Grade Skills Survey. However, the constructivist approach leads to the search for such methods of research and diagnosis that would have an inscribed individualization and subjectivity of the child as a Person, and would depart from the primitive differential evaluation that Niemierko (1975) characterized already half a century ago, and to which Niemierko (1999) continues to refer, stressing its strength inherent in teaching habits. Drawing on models from the world of medicine, educators are constantly raising the need for such observation of the child and such a diagnosis of child's linguistic competence that would illustrate progression or regression, and even herald the stagnation in the child's both lexical and grammatical acquisition. Such research is assumed to be of a longitudinal nature and requires systematic monitoring of the speech, or rather the language of a particular child in general, so that all references, including any implied comparisons, can be made within the material collected only from that research subject. It seems that this type of research approach is both laborious and incomplete, since it does not allow to make deductions regarding the language development process as a result of

socioconstructive or even connective interactions, as Bednarkowa (2009, 2012) pointed out, focusing only on the conceptual structure of the subject.

The aim of this article is to present a picture of linguistic capabilities of the children as a social group and the child as the subject with its right to be an individuality, an innovative approach using a boldly developing methodology of cognitive linguistics. Definitions of fundamental notions of cognitivism, used to describe abstracts – an untouchable, unspecific and difficult to imagine layer of language, especially the conceptualization of feelings can be found in Bartmiński (1988), Nowakowska-Kempna (1995) or Bednarkowa (2005, 2009). The conclusions that have been drawn from the results of the signaling research on the language of children in primary education carried out by Bednarkowa (2010a, 2011a) or their confirmation by Bednarkowa (2010b, 2011b) after the research of older youth give grounds to describe the methodology of research on children's language – based on the methodology of cognitive linguistics and reaching for such concepts as profiling, prototype, family resemblance – which in my opinion could and should be successfully used in pedagogical activities: research, diagnosis, design and planning of activities supporting and assisting the child in their harmonious, holistic development.

In pedagogics, situated the field of social sciences yet still associated with the humanities, there is an increasing departure from unprofessional research using quantitative methodology, and qualitative research is undertaken in which the child and not the child's language – according to the methodology of qualitative research – **is the subject of research and not the object**. It is the child who, due to their phenomenological subjectivity, requires researchers to reflect on the ethics of behavior. Even when the subject of such research is the child's behavior / feelings / attitudes / competences, the researchers give attention to the child, turn to the child, collect data / information / opinions about the child, talk to the child, observe the child, etc.

Micro-scale research (deepened, multi-instrumental, using triangulation in various ways – consisting in a thorough examination of a fragment of reality, focusing on in-depth case studies, also using changing research perspectives) is becoming desirable, and probably even popular. And it is precisely such a pedagogical practice that can be aided by this part of the cognitive linguistics methodology which in my opinion is worth implementing to pedagogical research because in pedagogy the entirety of research activities both is based on language, directly subjecting it to the view, and in the equal amount uses language, e.g. as a communicative medium, and thus reaches for language directly and indirectly.

The Text Itself – The Marriage of Pedagogy with Cognitivism and the Study of the Child's Language

Cognitivism is characterized by interdisciplinarity, therefore the cognitive study of the language people speak and which puts them at the top of the ladder of biological organisms requires an openness to other disciplines of science in order to draw from them knowledge that helps to describe the grammar of language.

Cognitive linguists use among others, the results of the research in general psychology and social psychology, neurology, philosophy and religion, as well as sociology, ethnology, anthropology and pedagogy, which, in order to improve the quality of its work, also merges with various fields of science. It is enough to mention the emergence of neurodidactics in pedagogy, or educational linguistics, which, although it was separated as a science by Rittel (1994) within the framework of applied linguistics, is also successfully used by teachers and educators. Educational linguistics, facing the requirements of building a coherent theory and own language – by its very nature language (meta-language) of linguistics, shaped today on the road from structuralism to cognitivism, allows to combine educational discourse with the simultaneous accommodation of specific meanings, definitions and terms of various fields in an appropriate way used in linguistics.

Lakoff, Johnson (1988) in the spirit of cognitivism rejected the thesis that all language users have the same language units in their grammar and the same meaning for a given word. It was also confirmed

on multiple occasions by Langacker (1995), what opened the way to learn / study the linguistic competence of a child or a person of any other age, to learn / study the overall extra-linguistic and linguistic knowledge of language users, combining the rules of semantics, pragmatics and grammar.

As a basic methodological principle, cognitivism accepts holistic gestaltism, in which semantic representation (RS) extends the characteristics of meaning to essential characteristics, i.e. considered representative, perceivable, typical, and characterized by cognitive obviousness, without necessity of cognitive **efforts**. Rosch (1978) was the first to see this, while Bartmiński (1988) was the first to present it in Poland.

The idea of Zadeh (1976) to move away from the sharp, clearly defined boundaries between categories/collections, caused by the influence of significant discoveries in the field of molecular physics, has given rise to changes in the categorization process by indicating the importance of the **theories of prototype, family resemblances, fuzzy sets** and **cognitive schemas**. The processes of the human mind consisting in combining isolated objects into classes, sets, i.e. categories, using fuzzy set theory and a natural biological principle, as pointed out by Lakoff (1986) and using various parameters that are difficult to determine unequivocally, are subject to significant differentiation in relation to activities carried out on multitude sets, which, for example, are not capable of creating synergies. The cognitivists' finding of a different type of logic than the set theory, such that would allow for the interpretation of linguistic phenomena, led to the abandonment of the collection of members/representatives within the category on the basis of having the necessary and sufficient characteristics required so far. The solution was brought by game theory of Wittgenstein (1972), which showed that there are representations of one category, seemingly without any common features, but whose individual copies have something in common, which was called family resemblances after Wittgenstein, and what was adopted by Rosch (1973) and Kleiber (1990) and in Poland by Kurcz (1992). In my opinion, this discovery cannot be overestimated when looking at it from the perspective of pedagogics and in relation to the analysis of the results of pedagogical research on the child – its intellectual (mental) as well as physical potential, e.g. in the assessment of the latter, doctors have been using percentile scales for a long time, which seems to be a step towards cognitive methodology. In order to prove this theory right, it is also worthwhile to recall situations where strangers find similarities between adopted children and adoptive parents.

In the mind of a human being, so also of a child, in their consciousness, and often beyond it, the contact with reality, with the world, results in the possibility of a faithful copy of the impression (totally adequate to perception) or only a signal of things. This is because the human perception uses above all the human ability to think with symbols. Perception is not a passive, photographic representation of reality, but an active process of cognition and shaping relations of appropriateness, as Langacker (1995) pointed out in his lectures. Since the dawn of time, the man has been "recording" his experiences by using a system of signs, especially language signs. Using expressions, the man names concrete things (objects) as well as abstract things (relations, features, feelings, literary creations, etc.). If we pay attention to the nature of the meanings of abstract words, it is impossible to analyze them in isolation from the meanings of concrete words, which is particularly evident in relation to children's language, therefore cognitivists speak of the embodiment of thought.

Children, reflecting on the attributes of humanity, on the meaning of life, give voice to their emotions, feelings and imagination, which enables and helps to develop creative attitudes, model their dreams. The study of feelings / relationships / understanding becomes interesting not only for philologists or linguists, but also for educators and other representatives of social sciences. As a result of such reflections on the language of a particular group of people, images of captured knowledge about..., lingualized definition of the term... These images can be presented in a comprehensive linguistic portrait as pointed out by Apresjan (1993). The application of cognitive semantics to linguistic analysis allows to expose the essential features of the subject (notion) given by children, because for cognitive grammar it is possible to study and thoroughly analyze the structure of the notion/feeling, which is given by the image of its understanding by children in language. Cognitivism helps to bring the concept closer to understanding. The understanding is possible thanks to the functioning in the research paradigm of cognitivism of such assumptions as the thesis regarding:

- **inductive** way of the research procedure,
- a drawing of a **prototype**,
- a description of **individual experiences**.

The human being understands what they can call, what they have experienced directly, or what they have been communicated to them within a cultural community. In cognitive science, the term **conceptualization**, introduced by R. W. Langacker, is used to name the term understanding, which means a cognitive way of determining meaning. Langacker puts the mark of equality between conceptualization and meaning. Nowakowska-Kempna (1995) believes that "conceptualization can be called such a way of inductive conduct, based on a logical cause, on which due to a presumed cause it is concluded from a visible effect and is based on the direct analysis of given contexts, the construction of metaphors and/or metonymies and other ways of imaging that make it possible to detect the meaning of a word".

From the pedagogue's point of view, it seems interesting that the characteristics of the ideal may appear – characteristics that are also important for individual experience. Cognitive semantics meets the axiological aspects in the process of developing consciousness, attitudes, general human behavior towards another person by exposing these contents in the sense of the concept, and the analysis of individual multiplications of the use of language allows to observe a tendency to categorize according to certain rules: a prototype in the center of the category and the members joined to it by family resemblances.

When psychologists found that concepts relating to natural categories, such as animals, plants, everyday objects made by man, created in the human mind based on family probability, the problem of a specific mental representation – a prototype – emerged. It was in the **gestalt of experience**, a multidimensional whole with a specific structure that contains the features of a prototype case, that G. Lakoff and M. Johnson (1988) saw the key to understanding the coherence of human experience.

The Gestalt has two structures of organization: vertical (phonological – syntactic – semantic), the study of which is mainly dealt with by linguists, as well as horizontal – prototype (scalar), which allows to separate nuclei (central units) and individual (peripheral) experiences. The study of the latter structure – horizontal and spatial – is worthwhile for the interest of educators who, thanks to their humanistic approach, seem to be predestined to apply in their pedagogical research a cognitive methodology, using, among other things, the notion of **graduality** – membership based on gradual affiliation – allowing to respect the individuality and, sometimes, specific behaviors of children. However, in order to talk about graduality, clusters, scalability, one must start from identifying and describing the central unit – the nucleus, or the **prototype**.

The prototype – the most representative, typical, important and conventional representative of a category whose members are combined by the characteristics of family similarity with the prototype itself and with each other. This is what we perceive during the process of classification, when usually not individual objects, but a representative of the object class, who is a model representative for us, is recalled in the mind without the slightest cognitive effort, e.g. for a keyword: "an animal" – a response is: "a dog."

Rosch (1978) says about the **prototype**: "by **prototypes** of categories we have generally meant the clearest cases of category membership defined operationally by people's judgements of goodness of membership in the category". It also indicates the whole diapason of characteristics essential for a given category and, at the same time, **by standing in the center of the category, it allows for analyzing the place occupied by individual representatives in the category**. Adopting such a position in the analysis and interpretation of research results is by all means worth popularizing, as it allows us to see both what is important in children's statements/behavior from the point of view of the child itself and from the perspective of the entire cultural community.

For cognitivists, the **prototype** is a concept that has grown from **experience**. So, if you assume that the category membership is graded, it means that the members of the category can be said to be more or less similar to the prototype, meaning their best representative. The category is therefore described by the characteristics of the best representative of the category. It should also be stressed that the term "prototype" – apart from referring to the semantic component of "pattern" – has little in common in Polish with a technical prototype (e.g. a prototype car means the first signaling copy). Therefore, it should be introduced as *ex definitione*. Also noteworthy are the conclusions from the conducted summary of the discussion on the prototype, which indicated different understandings of the term: due to its way of existence (ontological); object of cognition; object of linguistic analysis; cognitive dimension (ideal object, real object, mental object, conditional and conditioned by the way the designates are conceptualized); type of thinking (e.g. typical examples, ideals, model cases, generators, detailed models, expressive copies); the principle of emergence (typical or representative).

Cognitivists, including the creator of the usage-based model, R. W. Langacker (2003) and the father of the theory of multiple intelligences, H. Gardner (1988) believe **that there is no unique linguistic ability that is separate from other mental abilities**. Langacker (2003) recalls: I proposed the concept of a usage-based model. In "Foundations of Cognitive Grammar" (2000) I described such a model as follows: "Substantial importance is given to the actual use of the linguistic system and a speaker's knowledge of this use; the grammar is held responsible for a speaker's knowledge of the full range of linguistic conventions, regardless of whether these conventions can be subsumed under more general statements."

It is precisely for this reason, that in order to make it safe for the researcher – for the value of their conclusions – and to ethically operate with a language during pedagogical research and to penetrate into the language of another person, especially a child, it is worth learning the elementary principles of cognitive research methodology. It seems that the description of human cognitive abilities by cognitivists has a chance to become a "first aid kit" for a researcher-educator who, according to the etymology of the name of the profession – paidagogos – "leading a child" – takes responsibility for both the subject of the research and the quality of their research, conducted in the spirit of the methodology of qualitative research (sic!).

It is important for cognitivists to believe that the people – and so the children – have:

- the innate ability for sensual experience. Thanks to the fact that a thought is "embodied", a person can be perceived as an **experiencer** – i.e. a subjectively experienced person, also thanks to the polysensory ability to perceive the world – and a **conceptualizer** – a rational person, thanks to the cerebral potential of the ability to make mental effort to give meaning to the image in the mind – the effect of conceptualization and activity of multiple intelligences;
- awareness of physical space;
- the ability to experience – not always consciously – different emotions that always influence conceptualization;
- the ability to perceive the passage of time objectively measured and subjectively assessed as people grow older;
- the ability to compare, which Bloom observed in his studies in infants (2015) and the ability to find similarities and differences.

Based on cognitive analysis, there is a possibility of dealing with the experiencers of discussion of the examined concept/perceived object. The answers to these questions provide knowledge about the **individual experiences of the experiencers** and **their conceptualization**, which, included in the semantic scheme, allows for the emergence of Idealized Cognitive Models (**ICM**), giving a "full portrait" of a concept/feeling.

The representative function of language, i.e. the ability of language to present an objective reality, was described and specified by Benveniste (1974) long before the cognitivists, when he wrote: "the task of a sign is to represent, to replace another thing by evoking it by a substitute. (...) So the

language will be the system that interprets society". It is therefore necessary to refer to the sign theory in order to make this thought easier to understand. In his theory, Cassirer (1929) distinguished two types of signs:

- arbitrary signs, indicating that they refer to a marked (represented or at least representable) reality;
- allegorical signs, referring to a difficult marked reality.

The sign established without a marked object becomes primarily a symbol, which – as stated by Durand (1986) leads to the conclusion that the **symbol belongs to the category of the sign**. Thus, it can be assumed that the path of the symbol leads from the senses and imagination to mental conceptualization – marking something difficult to express (unspeakable). However, to make possible to recall the mysterious meaning, in its significant half the symbol is overloaded with concreteness and, as Ricoeur (1986) believes, it has three specific dimensions:

- "cosmic" refers to the visible world that surrounds us;
- "oneiric" rooted in gestures, in memories (experiences);
- "poetic" the symbol refers to the most concrete language.

Structures of concepts, semantic representations (RS) have been called differently over the centuries: the content of thoughts, propositional content, dictum, lecton, and in cognitive terms, i.e., **nonreducible** and **holistic**, they appear in the form of a full picture/portrait of a concept. For a given category, an intersecting beam of characteristics of the most **representative, typical representative** may be defined, forming cluster models. This cluster proves the application of non-reductionist theory of cognition and meaning. Any other member of the category thus distinguished is more or less – to a greater or lesser extent – like the prototype, i.e. it occupies a more central or peripheral place within the category.

The cognitive methodology also uses the concept of constructing a scene in the terms of figure – ground. Thanks to those notions the pedagogues have many opportunities to seek out solutions, for example in organizing didactic situations which will facilitate:

- the birth of positive emotions (non-destructive to the process of conceptualization and thinking) in a child – pupil/student, which will make the learners active;
- intellectual activity (activation of child's dominating abilities/separated intelligences of multiple intelligences as "tools" aiding the development of those abilities/intelligences which are desired for the sake of learning efficiency/effective mastery of the educational content determined educational curriculum, e.g. children with dominant kinesthetic intelligence need to move in order to "make it" possible to activate the potential of linguistic intelligence – blocking movement in such a child also closes the language skills needed to learn to read and write);
- profiling (seeing) in order to widen / narrow the field of vision, focusing attention on what results from the content of education components (balancing between the "individual" and "community");
- metaphorizing – conceptualizing a more difficult concept in terms of another concept (easier to conceptualize or already so anchored in the mind of the child that it does not require excessive cognitive effort). According to Lakoff, Johnson (1988) for a man the ability to understand experiences through a metaphor means as much as having another sense, such as sight, touch or hearing, because a metaphor provides the only way to perceive and experience a large part of the real world, co-creates a basic resource of human notions, and not only serves as a stylistic ornament of a text;
- using metonymy to help the child mentally reach the notion (the metonymy will be willingly used by those pedagogues/teachers who will accept Langacker's usage-based model), and conceptual amalgams that creatively combine elements of different concepts, enabling the understanding of complex aspects of the world in terms of what is more familiar and possible to be learned in an organoleptic, polysensoric way.

Cultural assumptions, values and attitudes are not the top layer that can be applied to experience at will – **human experience is deeply cultural** – culture, experiencing the world is an immanent part of the Gestalt, as Lakoff, Johnson (1988) pointed out. Although the emotional experience is obviously and unambiguously less clearly defined in terms of the actions performed by the body, it is as fundamental as spatial and perceptual experiences. Therefore, a more explicit way of conceptualization, e.g. feeling, is allowed by a referral to the category of metaphors, e.g. HAPPY IS UP / GO UP, np. Jumping with joy, chin up, lightened up eyes, SAD/UNHAPPY IS DOWN / GO DOWN, np. with lowered head, slouching, burdened.

Conclusion

In my pedagogical practice I often met pupils and/or their parents who were upset by the children's educational problems. The reluctance to learn, destructive reactions to emerging stress, especially in difficult situations, and the school's assessment is definitely such a situation, or finally, the numerous children's educational failures, which traumatize for years from adolescence to adulthood, made me look for ways to solve them and, even better, to prevent them. I deliberately use the imperfect aspect, because it is an endless process of searching for the best didactic, pedagogical and educational solutions. As a cognitive linguist, it is in the methodology of cognitive linguistics that I see an opportunity to introduce changes to pedagogical practice. I presented my thoughts for the first time in the form of a report at the conference of cognitive linguists – Bednarkowa (2002), however it is not the group of researchers and scholars with whom I should share my reflections. I found support in the publications of a Canadian psychoeducator, whose books, translated by me, could be made available to Polish readers – Royer (2009). However, the real chance that children's problems generated by bad habits used in education can be challenged – which, I hope, under the influence of theory will change the practice – I noticed in the publications of a Polish researcher of children's life problems – Cywińska (2011, 2014, 2017).

I see a remedy for the ineptitude and inefficiency of education in cognitive linguistics. Lack of school effectiveness is generated by a lack of school efficiency both in the methodical area – the school loses to an attractive virtual reality that surrounds and attacks children – as well as, above all, in the diagnostic-evaluation area. To understand human activity: non-verbal and verbal, it is necessary to know how the human mind functions, as Eliot (2003) raised this issue. Therefore, it is cognitivism that places the grammar within the abilities of the human mind which means that children, having various potentials, abilities, domains of their multiple intelligences (i.e. talents) also have various, neither deserved nor culpable, cognitive and linguistic abilities – creates for pedagogues conditions to introduce individualized approach to the study and diagnosis of children's linguistic potential – their linguistic competence, their perception and conceptual abilities and the power of not only lexical acquisition.

A category, having an internal prototype structure that allows it to evoke in the mind without the slightest effort a cognitive prototype – the best specimen/representative – as the central element of the category, becomes a space with a designated cognitive reference point. Since the boundaries of categories or concepts are blurred, it is sufficient for educators to make an effort, to make an appropriate cognitive effort, which will allow them to find arguments, resulting from family resemblances, in favor of recognizing the belonging to a category of a given copy, especially the effects of work/behavior (not only linguistic) of children, especially those which in the traditional (behavioral) approach seem to be "difficult", with problems, i.e. requiring exceptional care on the part of teachers. This kind of categorization will allow children to feel the taste of success and avoid the pain of failure.

The Gestalt's holistic approach to the child – to its conceptualization, creations and behaviors – allows and encourages to reach out to contexts, to combine not to divide, to organize didactic situations that favor learning to cooperate and consciously reduce the need for competition, and finally to generate positive synergy, thanks to which the sum of the ingredients is not only a mathematical sum, but is enriched with added value.

The use of cognitive methodology in pedagogical research guarantees its anthropocentric character. The approach to the human being, as a research subject situated in the center of research activities, allows for profiling both the common, socio-cultural and individual, resulting from the uniqueness of a Person. The research strategy presented here leads to a positive picture of a child's linguistic competence, taking into account both those aspects that place the child's vocabulary and grammatical forms, in the group of those language users who communicate without disruption and without cognitive effort, as well as revealing the individual character of the linguistic realizations, resulting from various reasons: the child's creativity, disorders, e.g. in Asperger syndrome, or a socioconstructive pattern based on a limited code.

The cognitive approach allows to change points of view, i.e. to respect the subjective judgement of the experiencer; the cognitive perspective and the goal, i.e. the clarity/graininess of the analysis (the view from the position of a generalist, as if "from the bird's eye view" and/or from the point of view of a specialist interested in details, as if "under a magnifying glass"), and also makes the study flexible, and in the evaluation of values – treating all results equally.

The methodology of cognitive research assumes that subjects have the right to use different language codes – from limited to developed – and the researcher should approach children (pupils/students) as sensory subjects – experiencing the world with their senses; thinking – conceptualizing in a way that is characteristic for them. Such a research approach enables finding for answers to questions, among others: How does a child understands / what does it mean to a child...? What is the semantic structure of the concept being learned/remembered? What structure of the meaning of ICMs the individual effects of children's experiences is laid down?

The basic condition for the success of this type of research strategy, the application of the main concepts of methodology of cognitive linguistics and the usage-based model presented here is the teacher's openness to the fact that children have the right to constructively experience themselves, the world and themselves in this world; that it is worth creating conditions for socioconstructive cooperation and safe exchange of personal thought constructs within a group, and that there is a potential for positive synergy in the dialogue, as Bednarkowa (2016) stated in a report at the IACEP conference.

The implementation of the fundamental concepts of the methodology of cognitive linguistics presented here may be more widely used in educational practice, e.g. in the methodology of learning a foreign language, to study understanding of highly abstract texts, or for literary works, especially poetic ones, especially when the text has been written in a language with some archaic features. A communication on piloting the use of such a research strategy was presented by Bednarkowa (2014) at the IACEP conference in Budapest.

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Climate Effects in EU Agriculture

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Abstract

Climate change and pressures on natural resources will continue to affect agriculture and pose food security concerns. The EU's 2030 climate and energy targets set ambitious targets. Like all other sectors, agriculture should make a fair contribution to achieving them, as outlined in the Commission's proposals on effort sharing and land use, land change and forestry (LULUCF). At the same time, agriculture is one of the sectors most vulnerable to climate change. Water deficit, changing rainfall regime, general temperature rises and variations, increased intensity and frequency of extreme climate-related phenomena, the presence and persistence of (new) harmful organisms and diseases, as well as fire risks are already challenges for practices and current agricultural and forestry production. Farmers and foresters are not only users of natural resources, but also indispensable managers of ecosystems, habitats and landscapes. Any new type of CAP should reflect greater ambition and focus more on results in terms of resource efficiency, environmental care and climate action.

Keywords: Natural Resources, Global Warming, Climate Change, Agri-Food, Growing Population

Global/Mondial Context

Worldwide there is a process of structural transformation, as a result of the emergence of new global challenges with long-term effect, which requires the elaboration of a strategic vision in the field and the realization of concrete actions by the competent authorities. The growing global population, increasing the pressure on natural resources and global warming determine a new working framework at national and international level. In Europe, the aging process of the population is also an additional challenge. All these aspects will have profound implications for agriculture and rural areas.

World food demand is increasing, rising prices for inputs, increased urbanization, pressure on water resources and increased vulnerability of crops and animals to climate change will limit food production. It is forecast that, globally, the demand for food will increase by 70% by 2050, as a result of the growing population and increasing incomes. Developing countries will contribute the most to this trend, their demand for food is expected to double in the coming years. It is estimated that the world population will grow from 7 billion, as it is today, to 9 billion by the middle of this century, and 95% of this growth will occur in the least developed countries (in 50 of the least developed countries, worldwide). Increasing global incomes will be mostly associated with increased urbanization (70% of the world's population is expected to live in the urban area by 2050, compared to 49% today) and with rapid economic growth in some the most populous countries (for example, Brazil, China, India and Russia). (MADR, 2014)

For the agri-food sector, these aspects are both an opportunity and a challenge. The prospects for the growth of the agri-food market are a significant advantage for farmers around the world. However, it is expected that deficient market infrastructures and socio-economic vulnerabilities in the most populated areas of the world will increase food insecurity. In addition, global agricultural systems will increasingly face the negative effects of climate change (changing precipitation patterns, extreme weather phenomena, water scarcity) as well as price volatility.

On the other hand, increasing agricultural productivity can be achieved through investments, research and innovation, good agricultural practices and proper public policies. In this global context, the

Northern Hemisphere (including Europe) will be well positioned to continue to supply global markets with numerous essential agri-food products. The outlook is positive, for example, for cereal production in temperate areas and favorable areas for vegetable production could extend even north as the temperature rises. In turn, countries in the southern hemisphere, as well as those in the (sub) dry tropical areas, are likely to be strongly affected by climate change, by decreasing yields and increasing the frequency of extreme climate events (drought and floods).

Although agriculture has always focused on food security and has been a positive driver of economic growth, society's growing concern for the environment in recent decades has affected global agricultural policies. Since the United Nations Earth Summit in 1992, sustainable development has received worldwide recognition, and consumers are increasingly concerned about the environmental sustainability of agriculture. The desire to know where the food comes from, how it was produced and whether agricultural practices respect the environment are just some of the demands of today's consumers. (MADR, 2014)

Increasing Demand for Food Products – Causes

In the EU the number of farms decreased by about one quarter in a short period, between 2005 and 2016. This suggests losses of up to 4.2 million farms across the Member States, the vast majority of which (about 85 %) were small farms of a size under 5 ha. During this period, Poland has the largest reductions in farm numbers (1.1 million farms, or 43 %), Romania (0.8 million farms, or 20 %) and Italy (0.6 million farms, or 34 %). (Eurostat, 2017)

Worldwide there is a growing demand for food while supply is relatively the same. Romania has easy access to world markets through the Black Sea ports and the Danube, and accession to the EU offers access to substantial financing, as well as access to important markets. Domestic demand is solid and is fulfilled both by national production and from imports of processed agricultural products. In the same context of increasing demand for food products, there is the major problem of food waste, the year 2014 being stated as the year of the reduction of food waste at European level. According to the latest studies by FAO and OECD, this must be taken into account by all the states of the world. (MADR, 2014)

Unlike the global trend, it is expected that the European population will grow old and stagnate. The aging of the population is considered to be one of the fundamental socio-economic challenges of Europe over the next fifty years. With an average age of 46.8 years, and with over 27.8% of its population aged at least 65, this challenge reaches unprecedented levels. Also, it is expected that the working population to decrease as the generation born in the period of significant increase in the birth rate goes to retirement. At the same time, the number of people over the age of 60 will increase twice as fast as before 2007, by about 2 million per year. By 2050, the total EU population is expected to grow only 5% from the 2008 level and reach just over 515 million people.

As the number of farms in the EU has declined, so has the number of farmers and those employed in agriculture; the share of people employed in agriculture fell from 5.7 % of total EU employment in 2005 to 4.4 % in 2016. The volume of work carried out by the EU's labour force in agricultural activities declined by 3.3 million AWUs between 2005 and 2016, a decline of one quarter (-25.7 %). Just shy of three quarters (71.1 %) of these full-time equivalent job losses occurred in the Member States that joined the EU after May 2004. The biggest losses were in Romania (1.0 million AWUs), Poland (0.6 million AWUs) and Bulgaria (0.4 million AWUs, which represented a 60 % decline).

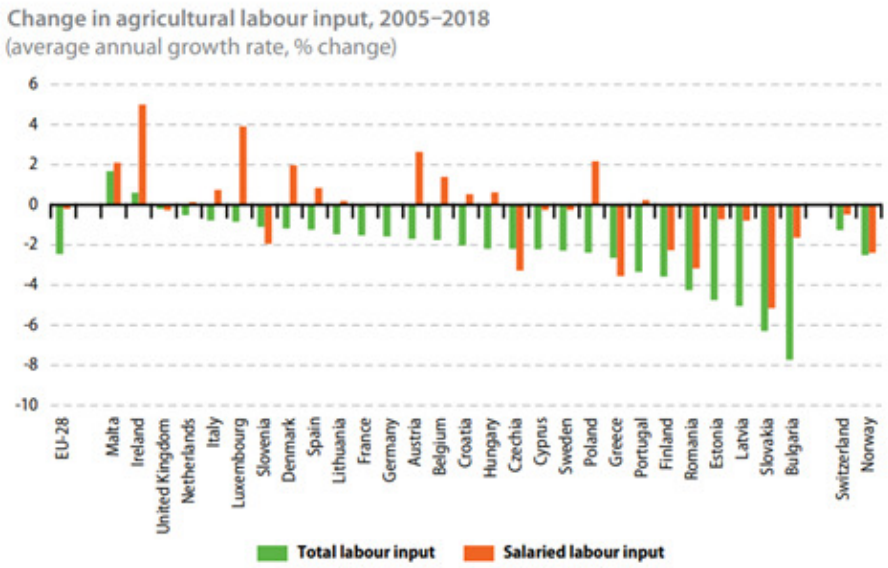

By 2050, Romania total population is expected to fall to just over 18 million, which is a 10% decrease from 2011. This is one of the strongest declines in the EU, being only surpassed by Bulgaria (-22, 5%), Latvia (-20.5%) and Lithuania (-18.7%). Although it is in the general trend affecting the NSM (-10.5%), this contrasts with the forecasts for the old Member States (+ 8.3%).

The aging of the population will also affect Romania more than Europe on average, and by 2050, the average age will reach 51.4 years, with a population aged 65 representing 30.8% of the total.

Farmers				EU-28 average
Employment in agriculture	2017	22.8 %	share of total employment	*4.1 %*
Total labour force input in agriculture	2018	1 474	thousand annual work units	-
Young farmers (under 40 years old)	2016	7.4 %	share of all farm managers	*10.6 %*
Female farmers	2016	33.5 %	share of all farm managers	*28.4 %*
Farmers with full agricultural training	2016	0.4 %	share of all farm managers	9.1 %

Compared to the urban environment, rural areas in Europe are facing the greatest demographic threats. In line with global trends, Europe will see an increase in urbanization. Compared to 2011 levels, the total urban population of Europe is expected to increase by approximately 10%, while the rural population will decrease by 2.7%. External migration, rather than negative spur, would be a driving factor. A smaller and smaller rural population will restrict the supply of work in agriculture and threaten the vitality of the rural areas as a whole. These trends have serious implications for the demand for agri-food products, as European markets are expected to provide limited scope for expansion. For arable crops, the medium-term outlook for goods in Europe (in 2022) suggests only slight increases in EU consumption. The demand for food and feed will be subject to a slow growth, with the notable exception of biofuels, which will continue to be a dynamic market segment.

Expected Climate Effects in Eu Agriculture

It is expected that in the medium and long term, climate change will increasingly affect Romania and its agricultural sector. Romania will have to expect a constant increase in average annual temperature, similar to the projections for Europe, which can fluctuate between 0.5 ° C and 1.5 ° C by 2029 and between 2.0 ° C and 5.0 ° C until 2099, depending on the global scenario. It is expected that the precipitation models will change significantly and produce a differentiated territorial impact in Romania. The northern part of the country will possibly reap productivity gains in the medium term,

but will be subject to higher flooding in winter and problems due to lack of water in summer. The south and south-east of Romania will be more severely affected, and the heat and drought waves will lead to a general decrease in productivity and production in the plant sector.

More specifically, some climate models do not provide that, in the absence of climate change mitigation actions, individual harvests and yields could be affected as follows:

- **Maize**: in a "warm" scenario, the EU is facing a decrease and this will mainly affect France, Romania, Italy, Hungary and Spain. In a "cold" scenario, however, Romania could even register an increase of maize production.
- **Wheat**: Romania could be significantly affected in the cold scenario (-25% by 2030), but this could actually benefit from an increase in production under a hot scenario (7%). Comparatively, a warm scenario would affect northern and Western Europe (France, Belgium, northern Germany, Poland and Lithuania) and favor the southern countries, while a cold scenario would most significantly affect Poland and parts of Germany.

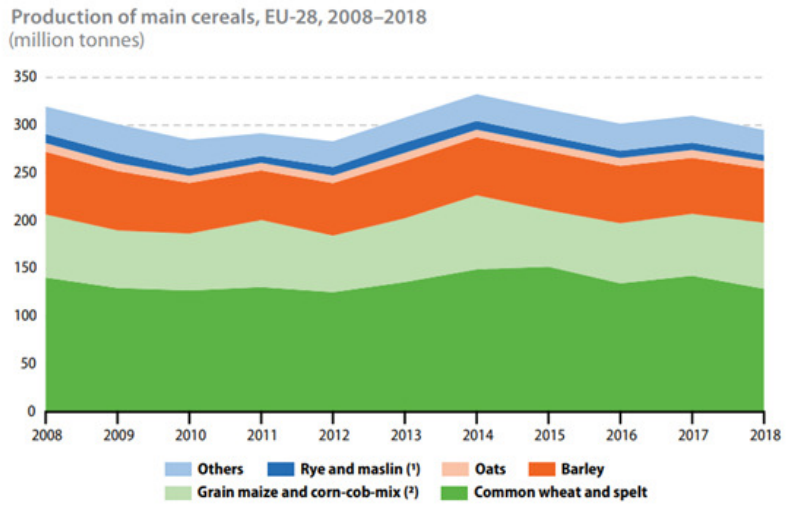

- **Sunflower**: In both hot and cold scenarios, Romania should expect a decrease in sunflower production by up to about 14% by 2030. Other EU producers (Bulgaria and Hungary) are expected to be similarly affected.

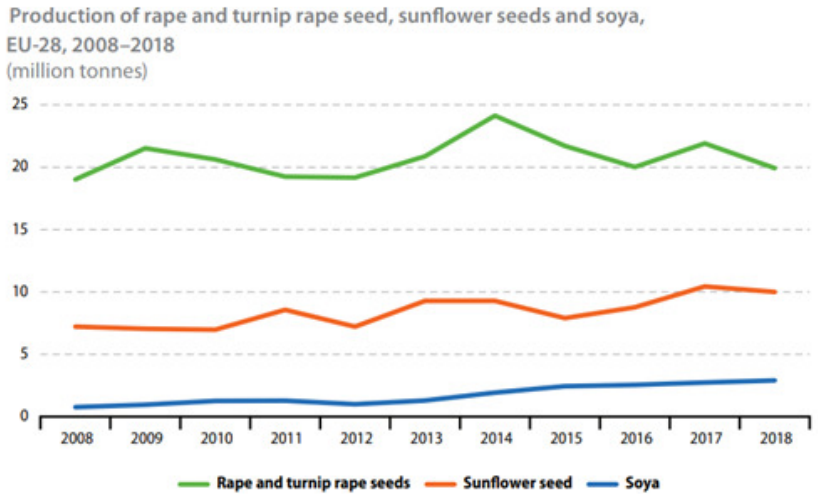

Production of Organic Goods Across The EU

Today, farmers in the 28 EU Member States guarantee food security for over 500 million consumers. Food abundance, accessibility, safety and quality are just a few attributes offered by the approximately 14 million farmers in the EU.

Organic farming tends to have a limited environmental impact as it encourages, inter alia: the responsible use of energy and natural resources; preservation of regional ecological balances; maintenance of water quality; the maintenance of biodiversity; enhancement of soil fertility; a high standard of animal welfare which requires farmers to meet the specific behavioural of animals needs. This type of farming looks to use many of the factors to produce agricultural goods in a more sustainable way than conventional farming. European Union (EU) regulations on organic farming are designed to provide a clear structure for the production of organic goods across the whole of the EU. This is to satisfy consumer demand for trustworthy organic products while providing a fair marketplace for producers, distributors and marketers.

The total organic area in the EU increased by one quarter (25.0 %) between 2012 and 2017. This upward development was noted in a majority of Member States, with some notable exceptions. The increase in the EU as a whole was driven by the above-average growth in the total organic area in France (+69.2 % between 2012 and 2017) and in Italy (+63.5 %) but also Germany (+18.6 %) and Spain (+18.5 %). This development was further supported by the increasing of organic area between 2012 and 2017 in Bulgaria (where about 100 000 ha were added) and Croatia. The overall growth at the level of the EU as a whole was tempered by declines in the total organic areas in Romania (-10.3 %), Greece (-11.3 %), the United Kingdom (-15.6 %) and Poland (-24.5 %). (Eurostat, 2018)

The Agricultural Sector in Romania

Agriculture plays an important role in Romania, in relation to the size of the rural population and the degree of employment. About 45.7% of the population in Romania lives in the rural area, compared with about 23.6% in the EU member states. About 30% of the population is engaged in agriculture, compared to about 2% in the old Member States (EU15) and 3-14% in the new Member States(EU-8).

There are major differences between rural and urban areas, the former being marked by a significantly higher level of poverty and a correspondingly lower standard of living. Agriculture development and the provision of public goods in rural areas is therefore essential for the European integration of Romania and for achieving the objectives of social cohesion. Compared to other EU countries, the agricultural sector in Romania has a relatively high share in gross value added (GVA), but lags behind in labor productivity.

The upward trend in agricultural factor income per annual work unit, particularly since the relative low in 2007, was confirmed by a further small rise (+1.9 %) in 2018.

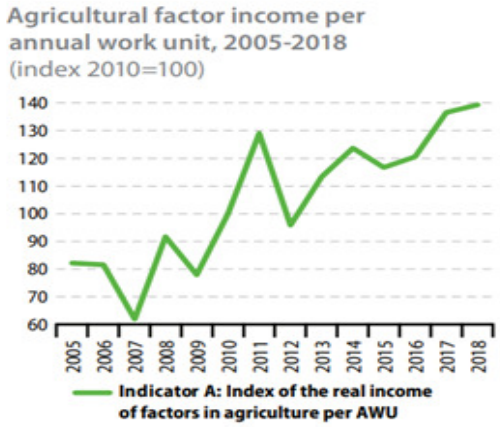

When communism fell in 1989, 28.5% of Romania's population was involved in agriculture. Until 1989, the total labor force in Romania increased, while the agricultural labor force decreased; after 1990, these trends reversed: the total labor force began to decline, and the agricultural labor force increased quite rapidly until 2000, when it reached 115% of its level since 1989. The percentage increased to 43.5% in 2001, as the population brought by the communist system in urban areas moved back to the relative stability of the rural environment and subsistence agriculture. 2003 data, however, indicate a decline in the share of agriculture in the total workforce for the first time since 1996 (the share of agriculture in the total workforce has fallen below the level of 36%). 3.6 million people active in the agriculture of Romania, representing 34.7% of the total work force of Romania. By 2008, the population involved in agriculture decreased to about 30%. About three million Romanians worked in agriculture, about 30% of the total number of employed persons (August 2009).

Agricultural sector in Romania has the folowing percentage, in country's GDP:

Percent	Year
14,5%	**1989**
23%	**1990**
12,1%	**2000**
11,7 %	**2003**
12,6%	**2004**
6%	**2007**
5,4%	**2013**
4,8%	**2015**
5,5%	**2018**

The active population in agriculture in Romania - in a continuous decrease:

Percent	Year
28,5%	**1989**
28,2%	**1990**
41%	**2000**
29,47%	**2007**
29,25%	**2013**
25,6%	**2015**
22,3%	**2018**

Agricultural labour input, 2010 and 2013-2016

	Total agricultural labour input (thousand annual work unit)					Change 2010-2016 (%)
	2010	2013	2014	2015	2016	
EU-28	10 345.3	9 913.5	9 737.4	9 504.3	*9 490.1*	*-8.3*
Romania	1 639.0	1 564.0	1 433.0	1 293.0	1 592.0	-2.9

Conclusions

CAP is the basis of the policies set out in the energy and climate framework for 2030, which calls on the agricultural sector to contribute to achieving the target of the entire 40% reduction economy by 2030 and the EU Adaptation Strategy. European agriculture must also contribute more to achieving the EU's environmental goals. These commitments cannot be fulfilled without farmers, foresters and other rural actors managing more than half of EU land, being key users and guardians of associated natural resources and providing large-scale carbon absorbers as well as renewable resources for industry and energy. For this reason, a modernized CAP should increase its European added value by reflecting a greater degree of ambition in the field of environment and climate and addressing citizens' concerns about sustainable agricultural production.

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Relations of Multinational Business at the Local Level as an Economic Modernization Factor (The Russian Black Sea Region Experience).

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Abstract

The economic modernization processes modern analysis includes the study of the multinational corporation (MNC) role as the modernization resource and mechanism at the local level. The MNC and local business integration mechanisms and results in various economy sectors in the Russian Black Sea region (Rostov Region and Krasnodar Region) are analyzed in the article. The forms and tools for including MNC in the processes of restructuring the economy of the Russian Federation regions from the point of view of forming ties at the local level and of management mechanisms providing this result, are analyzed for the first time in the Russian research practice. The practice analysis of more than 20 multinational corporations that came to the regions after 2000 revealed a number of patterns in organizing their presence in both regions: significant investment volumes, export orientation, formation of relations between foreign multinational corporations, business models' change compared to those in Europe. A significant number of MNC relations were established in both regions, for the reason of the agrarian orientation (which implies the counterparties multiplicity), and also owing to the MNC conditions fulfillment to localize production. A fairly active role of both regions authorities in promoting foreign investment has been identified, a number of policy measures strengthening the ties between MNC and local economies have been identified.

Keywords: MNC, economic modernization, Black Sea region, Russia.

Introduction

The problem of economic modernization and the formation of conditions for its implementation remains on the agenda of the Russian scientific community and management system. In world practice the modernization problems analysis from the 2nd half of the XX century was mainly connected with the MNC role as a significant actor in the developing and transition economies structural transformation. Relevant discussions have included not only discussions on industrialization issues, but also the problem of innovative updates through technology and experience transfer of large companies to local businesses in recent years. At the same time, the connection between the MNC sector and the national economy is discussed as a key condition for such a transfer. Targeted efforts to form such links can increase the chances of involving local producers in the relations chains and cause an increase in value-added and in the share of national value-added in exports.

The Russian specificity lies in the inherited significant industrial complex, but in modern conditions it is oriented primarily towards the extraction and export of raw materials. At the same time, the problem of modernizing the Russian economy is constantly on the agenda of both the scientific community and the management system. This task is of the greatest importance at the local level. Two key regions forming the Russian Black Sea region are considered in the article as an object of analysis: the Rostov Region and the Krasnodar Region. They which occupy fairly strong positions in the Russian economy, have a developed economic structure and also attracted a significant number of foreign MNC in the post-Soviet period, making up a significant part of the economy regions today. The experience of forming MNC relations with local producers, the problems and factors of this process are analyzed in the article and an analysis of public administration practices at the

regional level as a tool for building the ties between MNC and local producers in the interests of modernizing the economy is proposed.

Methodological Framework

The experience of analyzing and formulating modernization policies is mainly based on evidence from developing countries, but in recent decades it has also affected countries with economies in transition. Extensive theoretical generalizations of this experience, as well as empirical evidence, are contained in a series of Flagship Reports of UNCTAD (Trade and Development Report World and Investment Report, from the early 2000s). The reports provide the modernization processes analysis, as well as the role and risks of MNC participation in this process, the state policy features of regulating the MNC participation in the economy. The significance of the national approach to the economy modernization and the importance of local conditions are substantiated.

At the same time, a systematic analysis of the forms and scales of foreign MNC communication and the influence of these processes on modernization of the Russian Economy has not been carried out yet. The corresponding analysis requires an interdisciplinary approach, in particular, the analysis of MNC factors entry into the country's economy. The most popular research methods are the statistical research methods. To study the nature of the MNC influence on the local economy, structural-sectoral analysis was used. The institutional approach, in turn, made it possible to analyze the building state regional policy practice in the regions with regard to MNC, to form their links with the local economy and to identify promising transformations of such policy in the interests of MNC modernization functions accelerating.

MNC links formation and local economy in the interests of modernization: features and problems

The redistribution of influence and resources in the global economy determines the active processes of finding the positions by countries and regions. As a model of the economies' adaptive transformation in such countries, modernization restructuring with the approach to the developed countries model is considered. Industrialization and increasing the exports share are considered as tools, including the ways of attracting MNC as technology carriers and managerial knowledge. At the same time, the condition for the success of such a strategy is the presence or absence of links between foreign MNC and the national economy.

The particular importance of relations between foreign affiliates and local suppliers is seen as a tool to maximize the benefits of export-oriented FDI as it is underlined by WIR (2002). In export-oriented economies, an increase in the MNC ties role contributes both to an increase in the technological products share in exports and in the share of value-added created in the country in exports according to Trade and.. (2016).

The process of forming MNC relations in the host economy is significantly associated with the MNC's sphere of activity. So, the mining sector MNC forms fewer bonds. Such companies use more capital-intensive technologies and processes according to the opinion of WIR(2006). However, this sector can form the relationships in the host economy in order to obtain locally produced inputs at lower cost. Business development in agricultural production can also lead to increased demand for local equipment and materials as proved by The Least.. (2015).

On the contrary, the manufacturing industry has the maximum effect on linking due to the need to form the links in the areas of production, investment, knowledge and income generation (in particular: Tregenna F (2008), Structural change.. (2009).

Regardless of the industry, however, MNC can have only a limited positive impact on development, in particular, due to the MNC affiliates' desire to acquire the production factors bulk from parent companies or associated suppliers, and not from the local companies. Leveling this risk is provided by stimulating the competitive suppliers of resources or MNC products' consumers network creation according to the Trade and.. (2006).

A different kind of risk in increasing the FDI importance and encouraging exports may be the host countries (natural resources, cheap labor) traditional, non-profitable, comparative advantages strengthening which does not allow achieving productivity growth and structural transformation. An

example of this kind is the establishment of subcontracting relations with multinational corporations or the strengthening of relations with multinational enterprises by the enterprises to the detriment of relations within the economy. Also, a wide selection of subcontractors leads to the enterprises' competition, to the buildup of benefits for multinational corporations, which reduces the benefits of foreign trade exchanges and FDI. These processes also do not imply the ties creation in the host economy. Thus, with the exception of Taiwan and Singapore, the emphasis of East Asian countries on the output production for export did not allow them to develop and strengthen feedback. With the exception of Taiwan, the export of industrial products continues to be dominated by foreign enterprises that do not maintain sufficient links with the local market and local firms according to Oxford Analytica (2002), Trade and …(2002).

Trade in tolling products can contribute to the appropriation of MNC value-added, so that the actual production in the countries of foreign branches localization accounts for a small part of the exported finished products' value. For example, the transformation of Mexico and the countries of Central America into industrial assembly centers in the form of an enclave economy that is weakly connected with the country's economy (see: Gallagher and Zarsky (2007) should be mentioned here. The same can be said of the electronic and automotive industries in Eastern and Central Europe (see, for example: Pavlinek P (2015). According to Fons-Rosen et al. (2013) a serious "internal technological update" took place in the MNC branches, which, however, rarely affected the rest of the country's economy in the form of increased labor productivity or imitation activities of national companies, partly due to the MNC weaknesses with local firms and labor markets.

However, the FDI effectiveness depends on the human capital existing in the host country (Borensztein, De Gregorio and Lee, 1998); a significant positive effect of FDI on growth has been found in a number of countries with more skilled labor as proved by Xu (2000). The multinational corporations' arrival can ensure the knowledge and technology transfer, however - only with educated and qualified personnel availability and a significant level of demand noted in World Investment… (2006). So, in the 2000s the list of developing countries where, for example, American MNC localized R&D was very limited: 5 countries — Brazil, China, Mexico, the Republic of Korea, and Singapore — accounted for an estimated 70% of the corresponding FDI inflows noted by WIR (2005).

As a kind of external factor the terms of international trade, due to which, for example, most of the China's previous industrial policy elements were curtailed, can be called. In particular, measures to protect fragile industries, preferential interest and tax rates, as well as some forms of direct financial assistance to industries were abolished. With the China's accession to the WTO, many JV participants in China separated from their local partners, becoming fully owned by foreign capital, which made it difficult to obtain technological and other external FDI effects indicated in the work Trade and ..(2006).

The complexity and variety of factors in the productive relations formation between MNC and the local economy make this sphere a priority of the management system, designed to help creating the appropriate mechanisms.

The management system goals in the MNC potential implementation as an actor of modernization

Integration into global production chains can help to master knowledge, technical modernization and industrialization if appropriate policy tools are used as proved by Trade and.. (2016). Such a policy should take into account modern processes of global interaction transformation within the value chains framework, among which, in particular:

• high competition in the markets for simple products, which makes relying on export of such products less efficient today,

• the MNC attracting effect absence during cross-country competition in the situation of providing the excessive benefits and on the basis of low wages, which reduces the state resources,

• the need, for the formation of the effect of attracting FDI, in the formation of a balance of MNC relations outside and inside the economy.

The lack of economic ties can often reflect the lack of a strategy to strengthen such ties, examples of which are the economies of Mexico, Costa Rica and Honduras, where export growth was not accompanied by the simultaneous development of the local industrial base (see: Summary and.. (2002). A study conducted by UNCTAD / ECLAC suggested that merely attracting FDI is fraught with the preservation of statistical comparative advantages in export activities, which have minimal connection to the domestic industry.

Due to the importance of relations with foreign branches for the dissemination of vocational skills, knowledge and technology among domestic companies, the policy in this area needs such tools as: providing information; encouraging foreign affiliates to participate in technological modernization programs; encouraging the establishment of supplier associations; joint training activities. At the same time, for example, Ireland rejects the idea of establishing communication only between local companies and foreign branches, and encourages the participation of domestic companies in the supply chains of MNC located in any region of the world according to the WIR (2001, WIR (2002).

It is significant that both the MNC attraction and the formation of their relations with the national economy can be based not only on specific policies, but also on general measures of economic development, such as: ensuring demand, investment and a stable exchange rate; assistance to training processes in the form of research and development financing, institutions of formal education and vocational training; industrialization by replacing imported intermediate products. It is also justified to turn the export processing zones into integrated industrial development parks with stronger bonds with suppliers and consumers from other economy sectors at the local level (see: Trade and…(2016).

Incentives for the production localization played a particularly important role in the first generation NIC, and especially in the Republic of Korea and Taiwan: the decision-makers of these countries sought to maximize currency and technological returns from the cooperation with transnational corporations, as well as to ensure that their activities complement, rather than replace the efforts to strengthen domestic capacity according to the Trade and…(2002).

In order to achieve the competitiveness in the increasingly technically complex output production, the leading role of private enterprises should be complemented by the support policy as it is underlined in Trade and…(2006).

MNC in the Russian Black sea region: features formation of links with local economy

The Russian Black Sea region, which, after the USSR collapse, included such entities as the Rostov Region and the Krasnodar Region, has significant economic potential all over Russia). Both regions are highly populated (9.8 million people totally), have a diversified economic structure, specialize in agriculture (in total, providing 12% of production in the agricultural sector of the Russia). Both regions are important exporters of grain, oilseeds, vegetable oil. At the same time, industry is widely represented in both regions, including machine building, building materials industry, food industry, and metallurgy. A number of Russian companies based on the Forbes-200 largest private companies of Russia list are based here (Magnit, Neftegazindustriya, Novorossiysk Commercial Sea Port, Agrocom, Rostselmash, and other) (see in: Forbes-200..). In the two studied regions, there are 10 significant ports with a total cargo turnover in 2019 of 258.1 million tons.

From the beginning 2000s both regions became the areas of attraction for MNC from abroad, which contributed to the structural adjustment and renewal of the economy (Knauf, Claas, Metro Cash & Carry, Bonduelle, Danone, Auchan, Philip Morris, PepsiCo, Tetra Pak, Alcoa, PepsiCo, Guardian, IKEA, Leroy Merlin, Metro and others).

The MNC activities analysis in these regions based on the study of about 20 foreign MNC made it possible to draw a number of conclusions regarding the models and strategies for the MNC presence in these regions and their formation of bonds with the local economy. Modernization strategies of large Russian business in the South of Russia were investigated earlier (see the work of Gontar N. and Sapozhnikova A. (2019).

The factors of MNC production localization in the South of Russia in the studied regions were the concentration of demand (due to the population of the regions themselves, tourists, as well as the

orientation of companies to the demand of the neighboring CIS countries, and to supply their subdivisions in Russia). For the MNC in the agricultural sphere, the geographical position, the raw materials local suppliers' network, the developed business infrastructure, human resources and the positive attitude of the regional authorities have become important. A significant factor in the MNC's part localization was reliance on local natural resources (for example, building materials).

A feature of MNC investments in the Russian Black Sea region is their significant volumes. This is due to the fact that reckoning on a significant market has stimulated MNC to create significant production volumes capable of ensuring, among other things, exporting products from the territory of the Russian Federation.

In addition, clustering is a characteristic model of localization of the MNC network in the studied regions of the Russian Black Sea region, in particular, based on the use of the significant agricultural potential of both regions. So, for example, both enterprises were established for the primary processing and transportation of agricultural products, packaging production, and for the production of final food products.

At the same time, single companies over time formed local production clusters around the base activity. Thus, the «Air Products» plant in the Rostov Region, having started the production of a full range industrial gases, also proceeded to create a modern shipbuilding and ship repair complex on the Azov Sea coast.

In addition, the interaction between MNC based in the studied regions gradually developed among themselves: for example, Cargill supplies the Russian market with high-quality chicken nuggets, as well as other chicken products, at "McDonald's" restaurants.

The initial orientation of foreign companies in both regions of the Black Sea region towards their products export was realized in the form of exporting not only industrial products (industrial gases, Guardian float glass, Claas harvester sets), but also food products and food raw materials (corn grown by Bonduelle), which significantly expands and differentiates exports of the South of Russia.

Speaking about the actual formation of relations between MNC and local companies, two aspects can be noted: relations in the course of production localization and establishing relations with raw materials' suppliers.

For example, Claas TUCANO combines are considered to be the example of production localization: since 2018 Russian components have been installed in them (axles, combine cabins, threshing drums are next in line).

In the Krasnodar Territory packaging for Bonduelle products are produced: cans, labels, cardboard boxes. The company plans to organize the cans production for canning. **(see the work of** Kisin (2011).

GUARDIAN plant stimulated the development of satellite industries, small and medium businesses, and collaborates with more than 300 local companies (see: GUARDIAN..).

The most extensive bonds, however, were formed by foreign MNC in the field of processing agricultural products. Thus, the share of local suppliers of Krasnodar Territory in the assortment of METRO Cash and Carry in the Kuban is 21%; these are meat, dairy products, cheese, seasonal vegetables and fruits. 70 Kuban suppliers work with the company (see, for example Jerry Kalmis (2018).

"Nestle Kuban" actively cooperates with more than 600 companies supplying products and services. More than half of these companies are located in the Krasnodar Region.

About 30% of potato suppliers for the PepsiCo Azov plant are enterprises in the Rostov Region. 95% of the raw materials for Coca-Cola Hellenic in 2014 were purchased from the Russian suppliers. according to Coca-Cola (2015).

Currently, McDonald's purchases more than 90% of the products used from the Russian suppliers. In total, about 160 enterprises cooperate with the suppliers in Russia with McDonald's. Over the 27 years of operation, the company has localized almost all the deliveries of the main product categories.

Along with the establishment of broad ties in the supply of agricultural products, the considered MNCs are introducing the standards for suppliers. So, it is mandatory for the McDonald's suppliers to implement the HACCP risk analysis and the critical control point system, for agricultural producers - the basis of standards and requirements laid down in the MAAP program (see McDonald's.. (2017). A similar practice has also been established at Bonduelle.

The securing factor in the regions and strengthening ties for the companies is their cooperation with universities, vocational training, and the cognitive programs implementation ("KNAUF", "Nestle Kuban").

A characteristic feature of a number of companies' models is the change in the traditional business model to adapt to the conditions of the Russian Federation. So, "Bonduelle" today independently processes 10 thousand hectares of crops, as well as 1,5 thousand hectares - as a part of partnership programs with farmers. In Europe, "Bonduelle" has the largest share of all agriculture (99%) in partnership projects. The company's plant in the Krasnodar Region is the only one at which vegetables are also grown. "Bonduelle" factories in Europe are engaged only in processing. This is due to the farming underdevelopment. Also the company is trying to transfer the technologies to farmers, supporting them, buying seeds for them, providing agronomic advice, guaranteed the products' purchase. The experience of "Bonduelle-Kuban" was also taken over by the Russian canneries, which started assuming the functions of growing, which is unusual for the processors (see Kisin (2011).

A significant role in the formation of modern MNC relations in various sectors of the economy of both regions in the Russian Black Sea region is played by the management system for attracting MNC.

Perspective vectors of management system development in the interests of MNC integration and local economy

Achieving a sufficiently significant integration of transnational corporations that came to the Russian Black Sea region territory after 2000 became possible in many respects as a result of quite dynamic activity of the regional management in attracting foreign investments and supporting the investment projects' implementation. These efforts make a significant contribution to the economy modernization of both studied regions.

The most significant regional marketing tool is the annual Russian Investment Forum in Sochi, which brings together both the largest Russian and foreign companies. Also, the regional projects were presented outside the South of Russia, in particular, at the annual St. Petersburg Economic Forum, and abroad (Green Week in Berlin and others). At the same time, regional governors are actively involved in the presentation of proposals of their territories. Special zones prepared for the enterprises' location are being formed in the regions (industrial zones in the Rostov region, state industrial parks in the Krasnodar region).

Permanent bodies for working with foreign investors have been created and operate in the regions. The Advisory Council on Foreign Investment under the Governor has been functioning in Krasnodar region since 2004. Today, the Investment Development Agency has been operating in the Rostov Region and since 2018 the special service to support investment projects has been operating in the Krasnodar Region.

Among the permanent institutions supporting the large-scale projects in the Rostov Region is the list of «100 governor investment projects» of the Rostov Region. Thus, the «Air Products» project, being included in the list, received support from the governor and government at all stages of its implementation.

The expansion of the «KLAAS» plant in Krasnodar was also based on the Special Investment Contract concluded in 2016 with the Ministry of Industry and Trade of the Russian Federation, specifying the terms, volume of investments and the production localization level The regions regularly use a number of FDI support tools. So, in 2012, the Guardian plant was granted a subsidy for the cost part reimbursement of connecting to electricity and gas supply networks in the amount of 28.9 million rubles. In the Krasnodar Region, the administration assumes the coordination functions when connecting new enterprises to gas and electricity networks (the Swedish IKEA is an example (see: Khanova V. Kozlov V.(2011).

In connection with the effectiveness dependence of both FDI and the relations they form with local companies on the macroeconomic situation, as well as on the policies of regional authorities, the need to maintain a two-level system of measures for the participation of MNC in the modernization of regional economies can be pointed out.

So, the macro-level tasks include: stimulating demand in the economy, developing trunk infrastructure, limiting the monopolists' power in the field of energy, gas supply and facilitating administrative procedures.

It is necessary to preserve and maintain the measures in the field of mediation, dispute resolution, the formation of contacts between MNC and the scientific and educational sphere, informational assistance in establishing links between local producers and MNC at the regional level. Among the measures of assistance in the agricultural sector the following measures should be taken: educational and training programs for local farmers, provision of agricultural services with state support, establishment of certification standards and procedures, provision of financial assistance, intermediary services for establishing links between local farmers and MNC, support for farmers' organizations as it is underlined in WIR (2008).

Thus, the formation of strong ties between MNCs and local producers in the two studied Russian Black Sea regions allowed to fulfil the structural modernization of the both regions' economies. So, the new industries (industrial gas production, float glass) were formed and the range of existing industries' products (mechanical engineering, food industry, metallurgy, production of building materials) was expanded. The presence of multi-national companies also contributed to the modernization of technological processes, standards and production skills. In addition, the structure of regional exports has undergone modernization (the formation of non-resource exports, including engineering products). Both regions have successfully used the period of favorable commodity conditions of the 2000s to attract foreign transnational corporations, transform the structure of economies with their help and form the transnational corporations' relations with local companies.

Conclusion

The multi-national corporations' localization in developing and transition economies is an important tool for these economies' modernization, a subject to the formation of broad and strong connections of foreign MNCs with local producers. These connections play a significant role in the economies' industrialization, increasing the level of national value added in exports and increasing the country's competitiveness in the global economy. Obstacles to this scenario realization are the formation of an enclave economy, without establishing MNC connections with local producers, the lack of government requirements for localizing production, and the lack of significant domestic demand for products manufactured with the participation of MNCs.

Russia in the 2000s demonstrated a great demand potential, which attracted a lot of multi-national companies from Europe and the USA to the country. Numerous foreign MNCs have established their production in agriculture and the processing industry in the Russian Black Sea regions. The most notable results of their presence were the structural modernization of the economies in both regions, where a large number of transnational corporations are located. Due to the regional authorities' policies, as well as the MNC sectors' specifics (agriculture and processing of raw materials), numerous relations of MNCs with local suppliers, as well as with consumers throughout Russia, have been formed. MNCs also significantly affected the expansion of non-resource exports of both regions. Thus, the Russian Black Sea region has demonstrated the experience of successfully

attracting foreign MNCs, modernizing the economy and increasing its competitiveness by means of their potential.

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Regional Digitalization in Russia and Model for its Evaluation

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Abstract

The article is devoted to the problems of diagnostics and increasing the efficiency of digital technologies use in regional management. The basic concepts associated with the digitization of management processes at the regional level are considered and the author's method of assessing the degree of regions' digital maturity is proposed. The method is based on the calculation and analysis of the complex index of regions' digital maturity and its components – integrated indicators (subindices) that characterize the main directions and factors of digital development. The methodology of the Index is based on a conceptual framework for assessing "digital readiness". Within the framework of this approach, the indicators of digital maturity are considered systematically, in an analytical perspective, allowing giving a comprehensive assessment of the processes of using digital technologies and the factors affecting them. Ranking by component indices, subindices and individual indicators allows to determine the region's lagging behind in the use of digital technologies and to assess the current conditions for digital maturity. The analysis can be carried out at different levels of indicators aggregation. The rating of digital maturity of Russian regions was formed using the method. According to the results of the study, the directions of increasing the efficiency of regions digitalization are proposed. The method can be used in the future to diagnose the digital maturity of regions in different countries

Keywords: Digital Region, Digital Maturity, Digital Society Development, Index Of Digital Maturity, Region Digital Readiness, Rating Of Digital Maturity, Russian Regions, Regional Management, Digital Technologies, Factors Of Digital Development.

Introduction

In recent years, the problems of digital technologies development in regions have become increasingly important for Russia. In this regard, the concept of "digital region" is growing in popularity in the domestic political and economic discourse. Members of the scientific community analyze international experience and discuss how to use this knowledge in practice, in the Russian realities.

The paradigm of the "digital region" is becoming increasingly popular for the management at the regional level. This paradigm (in the most general sense) is an interconnected system of communication and information technologies, equipped with the ability to interact with each other or with the external environment (Coyle, 2009). This simplifies the management processes in the region, which leads to an increase in the population's living standards. In other words, the "digital region" is the region with efficient economy and governance, high standard of living, mobility and respect for the environment for long-term sustainable development.

For effective management in the framework of the "digital region" concept it is necessary that the public authorities have reliable information about the level of penetration and specificity of digital

technologies use at the control object (Cortada, 2008). A scientifically based method of assessing the digital maturity of the region is required.

This article describes the basic methodological principles of such assessment by constructing the digital maturity index and its components for region. The article also presents the results of the assessment – the ratings of Russian regions on the overall digital maturity index.

Digital Region: Theoretical Framework

At the moment there is no single concept of "digital region", as there are no regions that experts could unanimously adopt as an etalon. This is largely due to the constant change in the technological landscape, the transformation of regions, the avalanche-like growth in the volume and diversity of data that can be used in the framework of the "digital region" concept (Duranton, Puga, 2004).

The Chinese government defines the digital region as "a new concept and model that uses the next generation of information technology, such as the Internet of things, cloud computing, big data, to promote smart planning, construction, management and services for the region" (Report: Digital Regions in China, 2015).

The largest Swiss telecommunications company, Swisscom Ltd. gives the following definition: "digital region is a region that has become more productive and/or cleaner and/or more socially engaged through the use of digital technologies. The purpose of the digital region is to increase the attractiveness for citizens and businesses by improving regional services" (Saxenian, 2016).

The European Commission defines the digital region as "a place where traditional networks and services become more efficient using digital and telecommunication technologies for the benefit of its residents and businesses" (Barrosso, 2010).

Smart Cities Council (USA) notes in its guidelines that "a digital city or region uses information and communication technologies to improve quality of life, working conditions and sustainable development. In the simplest terms, this activity has three components: information collection, communication and information processing" (Rabari, Storper, 2015).

In the monograph (Peacock, 2011) the digital region is considered "the region where information technologies are integrated into services for solving regional problems".

The UN defines the digital region as "an innovative region that uses information and communication technologies and other means to improve living standards, efficiency of activities and services in the region, as well as competitiveness, while ensuring that the needs of present and future generations in economic, social, cultural and environmental aspects are met" (Komninos, 2008).

Analysis of definitions of the digital region, including definitions from the report of the International telecommunication Union, shows that advanced digital technologies are the basis of the digital region.

The current stage of digital technologies development is characterized by the technologies of the third platform according to the classification of the consulting company International Data Corporation (USA): Social, (social network), Mobility, Big data/Analytics, Cloud (cloud computing). For this set of technologies, the company Cognizant (USA) introduced the acronym SMAC (SMAC Stack) (Visnjic, et al, 2016). In the report of the China-Britain Business Council technologies of social, mobile, internet, cloud designated as the SMIC. Switzerland Global Enterprise (Zurich) uses the acronym ACMS for digital technologies Analytics and Big Data, Cloud Computing, Mobile technologies and Social Media. Information and Communications Technology Council (Canada) offers definition SMAAC for these technologies, considering the interrelated Social, Mobile, Applications, Analytics and Cloud digital technologies. According to Ernst&Young the key factors of

digital transformation are determined by the interaction of digital technologies (SMACi): Social media, Mobility, Analytics, Cloud and Internet of Everything (Arigoni, et al., 2015).

Sogeti Research Institute for the Analysis of New Technology adds Internet of Things to the technological trends of the third platform and uses for this set of digital technologies definition SMACT (Van Manen, 2014).

Digital technologies are among the strategic priorities of the innovation component of the world's largest economies.

In the definition of digital in the region from IBM notes three characteristics: instrumented and interconnected, intelligent (Wernberg, Dexe, 2016). Such a model IBM can be briefly described as a model 3I.

According to (Wernberg, Dexe, 2016), instrumentation or digitalization of the regional system means that the functioning of this system is reflected in quantitative indicators and the system becomes measurable. Interconnection means that different parts of core systems can interact with each other, turning data into information. Intelligence refers to the ability to use established information, to form patterns of behavior or likely outcomes and convert them to real knowledge allowing for informed actions. At the same time, the six key systems of the region include population, business, transport, communications, water and energy.

Sustainable development of regions is associated with the introduction of energy-saving technologies and environmentally safe development of regional systems.

In the World Bank's 2016 world development report "Digital dividends" model 3I is presented in graphical form and is called a three-stage approach to solving regional problems. Sensor technologies and social networks are referred to the "instrumentality" stage in the report, the "interconnectedness" stage corresponds to the Internet of things and the "intelligence" stage includes digital technologies of big data and Analytics, predictive Analytics, data-driven optimization (World development report, 2016).

IBM's presentation (Jenkins, 2016) considers big data, cognitive analytics, cloud computing, the Internet of things and security to be the key technologies of the digital region.

Thus, given the fundamental model of IBM, the key technologies of the digital region can be called the Internet of things, mobility, social networks, cloud computing, big data, cognitive analytics.

Innovative ways of data collection and analysis are gradually taking the place of well-established mechanisms of regional governance. Unlike statistical samples, which are outdated at the time of analysis, "big data" can be processed in real time, which improves the quality and speed of decision-making.

"Big data" in the area of regional governance complements traditional types of information about the region and expands their scope. Thus, thanks to the "big data" it became possible to monitor behavioral models, to analyze regional lifestyle and such familiar categories as population, economic development, construction and infrastructure, etc. The digital revolution and the widespread use of the Internet have created a new phenomenon – data driven region (DDR) (Komninos, 2006).

The combining efforts of business, authorities and public organizations gives regions the possibility to create safer, more environmentally friendly and economically effective infrastructure. At the same time, regions and cities are experiencing a lot of problems. They face the task of ensuring equal access to digital systems as well as attracting investment and highly skilled professionals. The solution of these problems can be achieved through the implementation of smart digital technologies (Komarevtseva, 2017).

Modern regions are using the latest technology to support sustainable development and a high standard of living in conditions of rapidly growing population, increasing the territory of the region and the complexity of its infrastructure. Among the most urgent tasks we can distinguish the following:

- ensuring comfortable movement within the region;
- increasing the capacity of regional infrastructure (water, electricity, etc.);
- maintaining security in the face of increasing social tensions;
- reducing the negative impact on the environment;
- improving the quality of municipal services;
- equal access of all categories of the population to education, health care and other socially important services;
- involvement of residents in the management of the region.

The author supposes that the key components of the region's management based on digital technologies are the data itself, the technologies of their processing and the authorities using the results of the analysis for decision-making. The digital region is characterized by the ability of public authorities to use data collection, processing and analysis technologies to improve the socio-economic, environmental situation and improve the living standards of the population.

Decision-making based on digital data can become the main driving force of innovation and will dramatically change the regional governance. But the introduction of new technologies in each case should have clear goals. Without this, it is impossible to predict and evaluate the effect of innovation.

The Model of Region Digital Maturity Assessment

To speed up the implementation of the "digital region" concept the author proposes to start programs of digital changes with diagnostics. For this purpose, a diagnostic technique, a model of region digital maturity is developed.

The maturity model is a valuable tool for analysis that allows to assess the current situation in the region for the implementation of digital technologies, as well as to identify reasonable measures to improve the digitalization of management processes.

The model is based on the calculation and analysis of the complex Index of digital maturity of regions (hereinafter the Index) and its components – integrated indicators (subindices) that characterize the main directions and factors of digital development. On the basis of the Index and its components the rating of digital maturity of the Russian regions is constructed.

The Index is an important information and analytical tool for the formulation, implementation and adjustment of digital policy at the regional level. Comprehensive index is a single number characterizing the situation with digitalization. Its use helps to identify the main problems, strengths and weaknesses of a region in the field of digital technology and to set guidelines for further development.

The Index is based on the assessment of digital maturity factors. It characterizes the use of digital technologies for the development of the main spheres of society in regions, as well as the use of digital technologies in households.

The Index uses 77 indicators of digital maturity, including key indicators of access and use of digital technologies recommended by international organizations.

The Methodology of the Digital Maturity Index

The digital maturity index is a measure of regions preparedness for large-scale use of digital technologies for development. The methodology of the Index is based on a conceptual framework for assessing "digital readiness". Within the framework of this approach, the indicators of digital maturity are considered systematically, in an analytical perspective, allowing giving a comprehensive assessment of the processes of using digital technologies and the factors affecting them.

The Index is based on indicators that characterize the three key factors of digital development (human capital, economic environment, digital infrastructure) and indicators of access and use of digital technologies in six areas – public and municipal administration, business, education, health, culture, as well as the use of digital technologies by households (see Figure 1).

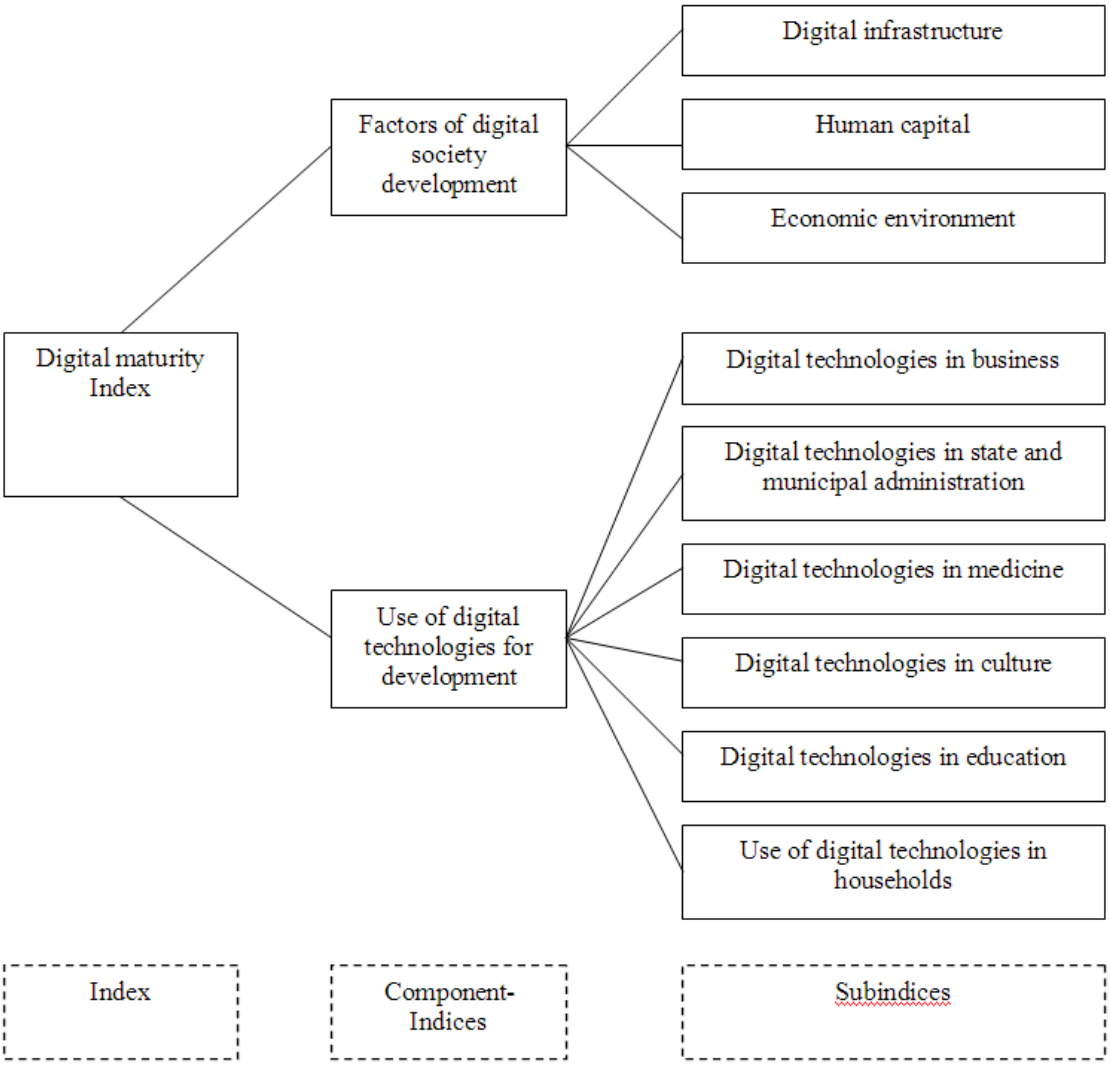

Figure 1: Structure of the digital maturity index

The Index is built on the basis of aggregating the indicators values. The aggregation is made at several levels, allowing building ratings of regions in different areas of digital maturity with varying degrees of detail.

To obtain an assessment of subject areas (subindices), sets of indicators are used, combined according to the parameters of the assessment of this area. Figure 2 shows, for example, the structure of the "digital technologies in culture" subindex, for which seven indicators were used.

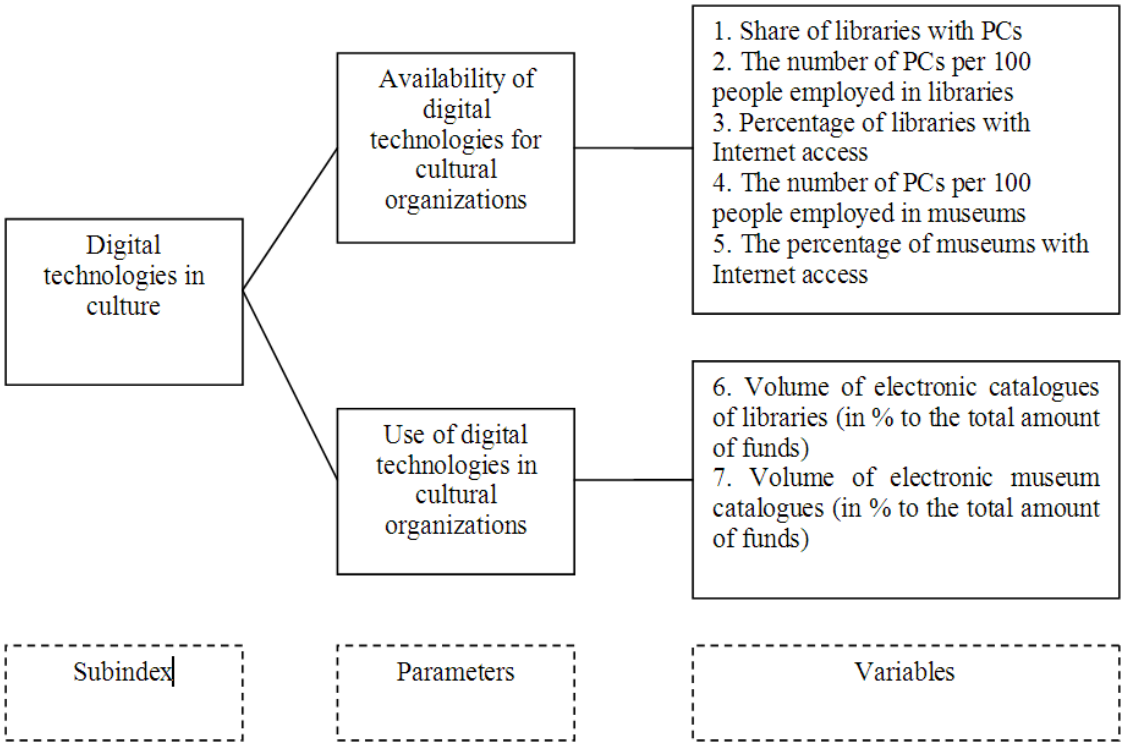

Figure 2: The structure of the subindex "Digital technologies in culture"

In a number of areas (Infrastructure of digital technologies, Economic environment, Use of digital technologies in households, Digital technologies in education), subindices were calculated directly on the basis of their constituent indicators without the introduction and calculation of intermediate parameters (as in the case of the subindex of "Digital technologies in culture", etc).

The Method of the Index Calculation

To calculate the indices, all the indicators used are normalized (transformed into an estimate in the range from 0 to 1). Our methodology of normalization is similar to the procedure used in the integrated development index of digital technologies developed by the International Telecommunication Union (ICT Development Index, IDI) (Measuring the Information Society, 2010).

This procedure is based on the calculation of the ratio of the current indicator value for the region to the "reference" (normalizing) value – usually the maximum possible for this indicator. The following formula is used:

normalized value (estimate) of region X = Rx / Rn, (1)
where Rx is the index value for region x,
Rn is normalizing ("reference") value of the indicator.

Thus, if the region has a "reference" (usually the maximum possible) value of the indicator, its score for this indicator is 1, if the value is less than the "reference", then its normalized value will be less than 1. The normalized value shows how the region lags behind the reference value.

Another formula is used to estimate indicators whose increase in value is negative (for example, the share of food in the structure of final consumption of households):

$$\text{Normalized value of the indicator for region X} = Rn / Rx . \qquad (2)$$

As normalizing ("reference") values of indicators in case of share indicators the maximum possible (100%) value is taken. In other cases, the normalizing value is chosen on the basis of the desired, sufficient and achievable values for the leading regions on the ten-year planning horizon. It is necessary to take into account the forecasts of the values for the leading regions, Russia as a whole and indicators values in the most developed countries.

If there is no indicator value for a particular region, its value is determined using statistical methods (correlation analysis, etc.).

The values of the subindices are calculated as a weighted average of the estimates of the parameters characterizing the corresponding subject area (if parameters were entered). The value of parameters and a number of subindices (if they were calculated without parameters) is defined as a weighted average of indicators characterizing this direction of digital development – each indicator is included with a certain weight coefficient (in most cases equal weights are used). The evaluation of the component indices ("Factors of digital maturity" and "Use of digital technologies for development") is calculated as an arithmetic mean of the subindices estimates. The overall digital maturity Index is obtained as a weighted average of the component indices (with weights 1/3 and 2/3, respectively), which is equivalent to the arithmetic mean of the estimates of all subindices included in the Index. The ratings of regions are formed on the basis of the General Index, component indices, subindices and estimates of individual indicators.

Sources of Information

Two types of data are used in the calculation of indicators and subindices:

1. Official data of international, state and industry statistics: Eurostat, International Telecommunication Union, Russian Federal State Statistics Service (Rosstat), as well as Russian ministries and agencies.
2. Opinion polls and surveys: results of evaluation of official web-sites of regional executive authorities, carried out according to the methodology of the United Nations; the data of the representative survey of Russian regions population, carried out by "Public Opinion" Foundation (the "Georating" project).

Calculation of indicators and subindex "infrastructure of digital technologies" was based on the data of the Ministry of Telecom and mass communications of the Russian Federation and Rosstat data. The calculation of the number of computers per 100 people was carried out using data on the availability of PCs in organizations (form of state statistical observation No. 3-inform) and Rosstat data on the availability of computers in households.

The assessment of the subject area "Human capital" was based on the published statistical data of Rosstat.

Indicators of the economic environment were calculated on the basis of the published data of Rosstat and data of population surveys in the regions carried out by the "Public Opinion" Foundation (the "Georating" project, autumn 2017).

The rating of digital technologies use by households was based on the results of the household budget survey conducted by Rosstat.

Indicators of digital technologies use by the authorities were calculated on the basis of the results of the state statistical observation.

To assess the use of digital technologies in business, indicators based on Rosstat databases (results of the survey of enterprises in form No. 3-inform, selected by economic activity in accordance with the recommendations of the OECD and Eurostat for similar surveys) were also used.

Evaluation of digital technologies use in culture was carried out on the basis of data published by the Ministry of culture of the Russian Federation.

Evaluation of digital technologies use in medicine was carried out on the basis of the results of the survey of health organizations in the form № 3-inform from the databases of Rosstat.

Evaluation of digital technologies use in education was based on the data obtained by Rosobrazovanie on the basis of the D-4 form.

Thus, all regions were ranked on the basis of complex indices based on a complete set of data for all indicators.

Interpretation of Results

Ranking by component indices, subindices and individual indicators allows to determine the region's lagging behind in the use of digital technologies and to assess the current conditions for digital maturity. The analysis can be carried out at different levels of indicators aggregation.

The normalization procedure makes it possible to interpret the digital maturity Indices of the regions in the following areas:

1. Normalized values of indicators and complex indices can be interpreted as distances from "reference" values. For example, the subindex value of 0.250 means that the region in this area of digital development is 4 times behind (its level is a quarter or 0.25) from the "reference" level.
2. Normalized values of indicators and complex indices allow to measure differences between regions on the level of digital maturity and thereby to trace values of the corresponding control indicator of digital development strategy.
3. If you save a set of indicators and their fixed "reference" (normalizing) values, it becomes possible to track changes in complex indices of the regions in time. With the chosen normalization procedure, the change in the index values and its components in different years is easily interpreted and becomes significant.

However, when interpreting data on the relative level of digital maturity of regions, their relative "advancement" in the use of digital technologies and in creating conditions for digital maturity, it is important to understand that there are two limitations in the analytical use of the Index and its components that need to be taken into account:

1. There are regions with very close values of the digital maturity Index, and their differences in the level of digital maturity are beyond the limits of statistical significance.
2. The use of complex indices to characterize the relative level of digital maturity and certain areas of use of digital technologies in the regions smoothes out certain problems with the quality of state and departmental statistics, but the existing defects of official data can have an impact on the results of the rating (especially at the level of individual indicators).

Main Results

The values of the digital maturity index of the Russian regions are presented in table 1 below.

Table 1: Rating of digital maturity index of the Russian regions

Position	Region	Index
1	Moscow	0.691
2	Saint-Petersburg	0.613
3	Khanty-Mansiysk Autonomous Okrug	0.545
4	Yamalo-Nenets Autonomous Okrug	0.531
5	Tomsk Oblast	0.511
6	Tyumen Oblast	0.485
7	Murmansk Oblast	0.477
8	Chuvash Republic	0.465
9	Chukotka Autonomous Okrug	0.459
10	Republic of Karelia	0.455
11	Khabarovsk Krai	0.450
12	Sakhalin Oblast	0.449
13	Moscow Oblast	0.440
14	Nizhny Novgorod Oblast	0.439
15	Samara Oblast	0.435
16	Sverdlovsk Oblast	0.432
17	Nenets Autonomous Okrug	0.431
18	Kamchatka Krai	0.430
19	Krasnoyarsk Krai	0.427
20	Novosibirsk Oblast	0.426
21	Yaroslavl Oblast	0.424
22	Chelyabinsk Oblast	0.424
23	Kaluga Oblast	0.423
24	Magadan Oblast	0.417
25	The Republic Of Tatarstan	0.414
26	Arkhangelsk Oblast	0.413
27	Leningrad Oblast	0.409
28	Perm Oblast	0.409
29	Kaliningrad Oblast	0.407
30	Belgorod Oblast	0.407
31	Primorsky Krai	0.407
32	Vladimir Oblast	0.400
33	Republic of Udmurtia	0.399
34	Irkutsk Oblast	0.398
35	Kemerovo Oblast	0.398
36	Penza Oblast	0.398
37	Krasnodar Krai	0.398
38	Stavropol Krai	0.395
39	Rostov Oblast	0.394
40	The Republic Of Sakha (Yakutia)	0.392
41	Republic of Komi	0.386
42	Nizhny Novgorod Oblast	0.386
43	The Republic of Khakassia	0.385
44	Vologda Oblast	0.384
45	Voronezh Oblast	0.380
46	Republic of Buryatia	0.379

47	Lipetsk Oblast	0.376
48	Orenburg Oblast	0.376
49	Saratov Oblast	0.375
50	Volgograd Oblast	0.371
51	Republic of Bashkortostan	0.368
52	Astrakhan Oblast	0.366
53	Omsk Oblast	0.365
54	Ryazan Oblast	0.361
55	Tula Oblast	0.357
56	Tver Oblast	0.356
57	Altai Krai	0.356
58	Ulyanovsk Oblast	0.355
59	Kirovsky Oblast	0.354
60	Jewish Autonomous Oblast	0.351
61	The Republic of Mari El	0.348
62	Pskov Oblast	0.348
63	Ivanov Oblast	0.347
64	Kurgan Oblast	0.346
65	Republic of Mordovia	0.345
66	Smolensk Oblast	0.339
67	Oryol Oblast	0.339
68	Kostroma Oblast	0.338
69	Amur Oblast	0.336
70	Tambov Oblast	0.334
71	Bryansk Oblast	0.333
72	Republic of Altai	0.328
73	Kursk Oblast	0.328
74	Republic Of Adygea	0.326
75	Republic of North Ossetia – Alania	0.325
76	Zabaikalsky Krai	0.323
77	Kabardin-Balkar Republic	0.307
78	Republic of Kalmykia	0.300
79	The Karachay-Cherkess Republic	0.281
80	Republic of Dagestan	0.256
81	Republic of Tuva	0.251
82	Republic of Ingushetiya	0.213

Capital cities - Moscow and St. Petersburg are in the first place in the ranking of digital maturity. The third and fourth places in the ranking are occupied by rich resource-producing regions: Khanty-Mansiysk Autonomous Okrug and Yamal-Nenets Autonomous Okrug. The fifth place belongs to the Tomsk Oblast, the level of digital maturity of which is determined by high rates of human capital development and the use of digital technologies in business and medicine (third place in the country). Rich resource-producing regions demonstrate a traditionally high level of digital maturity. First of all, this applies to the Khanty-Mansiysk and Yamal-Nenets Autonomous Okrugs (third and fifth places), Tyumen oblast (sixth place) and Chukchi Autonomous Okrug (ninth), in which a high level of gross regional product per capita production and high household income create economic opportunities for effective demand for digital technologies.

Five outsider regions in terms of digital maturity: the Republic of Kalmykia, Karachay-Cherkess Republic, the Republic of Dagestan, the Republic of Tuva, the Republic of Ingushetia.

The maximum gap between the Russian regions on the integral indicator characterizing digital maturity is 3.3 times.

The Factors of Digital Development

The rating of regions readiness by factors of digital development is presented in table 2. To build this component-index, we used, as already noted, indicators that characterize three groups of factors: the ICT infrastructure, human capital and the economic environment for the use of digital technologies.

ICT Infrastructure

ICT infrastructure is a set of geographically distributed networks and communication systems, subscriber equipment and computer equipment. The availability of modern high-tech ICT infrastructure is a prerequisite for the widespread use of information and communication technologies and the development of the information society.

The state of ICT infrastructure is one of the three most important determinants of digital development of regions and the country as a whole.

To assess the level of development of ICT infrastructure in the regions of Russia, a set of indicators characterizing the state of its four main segments: fixed telephony, mobile cellular communications, computers and data networks was used.

The following key indicators were used:

- fixed telecommunication telephone density (number of telephones per 100 population));
- distribution of mobile cellular communication (number of active SIM-cards per 100 people);
- number of personal computers per 100 population;
- share of Internet users in the age group of 16 years and older (semi-annual audience).

A system of indicators and a methodology developed in response to the recommendations of international organizations were used to calculate the ICT infrastructure sub-index, allowing for a number of cross-country comparisons of indicators.

Human Capital

The state of human capital, which, according to the classical definition, refers to the body of knowledge and skills that a person possesses and uses in the process of work, plays an important role in expanding the use of information and communication technologies (ICT) in various areas of life in the country and its regions. To compile the “human capital” sub-index, we used the indicators of its state, which have the highest correlation with the indicators of ICT development in various spheres of society:

- number of researchers per 10,000 population;
- share of employed population with higher education;
- number of University students per 1,000 population;
- admission of students in specialties (areas of training) of higher professional education in the field of ICT for 10,000 people;
- graduates of specialists, bachelors and masters in specialties (areas of training) of higher professional education in the field of ICT for 10,000 people.

The specific number of scientists characterizes the state of scientific and innovative potential of the region, which determines the degree of development and application of ICT. The share of employment with higher education and the proportion of students indicate the level of education of the population, which, in turn, has an impact on the extent of use of ICT by the population and the

dynamics of their spread. Specific indicators of admission of students in specialties (areas of training) of higher professional education in the field of ICT and the release of relevant specialists (bachelors, masters) reflect the state of human resources in the field of ICT, which is important for the expansion of production of ICT goods and services and their use for the development of various fields of activity.

Economic Environment

The state of the economic environment, which includes a set of economic conditions of the population, the functioning of economic and social structures, has a significant impact on the demand and supply of ICT. The "economic environment" sub-index shows how favourable economic conditions are for the production and consumption of digital technologies and reflects the maturity of the economic prerequisites for the digital development of the territory.

When constructing the sub-indices, as described above, the method of normalization was used. From the large number of indicators that characterize the state of the economic environment, the indicators that show the closest relationship with the indicators of ICT use by the population and organizations were selected. As a result, the assessment of the economic environment of digital development in the region is based on the following indicators:

- GRP per capita, reflecting the level of economic development that substantially determines the scale of ICT production and consumption;
- average annual growth rates of GRP volume, characterizing the General state of the economy, which, in turn, affects the dynamics of digital development of the territory;
- share of food costs in household final consumption expenditure, reflecting the potential purchasing power of the population for ICT-related goods and services;
- revenues of the consolidated budget of the region per capita, indicating the possibility of allocating budget funds for the development of ICT in the region.

Table 2: The Component Index of Digital Development Factors

Position	Region	Index
1	Moscow	0.839
2	St. Petersburg	0.724
3	Tomsk Oblast	0.566
4	Khanty-Mansiysk Autonomous Okrug	0.545
5	Yamalo-Nenets Autonomous Okrug	0.539
6	Tyumen Oblast	0.516
7	Nenets Autonomous Okrug	0.500
8	Moscow Oblast	0.489
9	Magadan Oblast	0.483
10	Sakhalin Oblast	0.477
11	Novosibirsk Oblast	0.477
12	Kamchatka Krai	0.475
13	Nizhny Novgorod Oblast	0.474
14	Chukotka Autonomous Okrug	0.459
15	Samara Oblast	0.451
16	Murmansk Oblast	0.451
17	Kaluga Oblast	0.449
18	Republic of Tatarstan	0.426
19	Chelyabinsk Oblast	0.422
20	Republic of Sakha (Yakutia)	0.418
21	Yaroslavl Oblast	0.414

22	Voronezh Oblast	0.413
23	Khabarovsk Krai	0.413
24	Sverdlovsk Oblast	0.411
25	Krasnoyarsk Krai	0.411
26	Primorsky Krai	0.410
27	Chelyabinsk Oblast Republic of Komi	0.409
28	Arkhangelsk Oblast	0.405
29	Perm Krai	0.400
30	Penza Oblast	0.394
31	Kaliningrad Oblast	0.390
32	Irkutsk Oblast	0.388
33	Rostov Oblast	0.386
34	Ryazan Oblast	0.379
35	Republic of Karelia	0.376
36	Belgorod Oblast	0.375
37	Leningrad Oblast	0.375
38	Vologda Oblast	0.372
39	Tver Oblast	0.372
40	Udmurt Republic	0.372
41	Vladimir Oblast	0.371
42	Omsk Oblast	0.368
43	Saratov Oblast	0.365
44	Ulyanovsk Oblast	0.365
45	Tula Oblast	0.365
46	Nizhny Novgorod Oblast	0.364
47	Volgograd Oblast	0.363
48	Republic of Bashkortostan	0.363
49	Chuvash Republic	0.363
50	Smolensk Oblast	0.355
51	Republic of Mordovia	0.353
52	Astrakhan Oblast	0.353
53	Republic of Buryatia	0.352
54	Kursk Oblast	0.351
55	Oryol Oblast	0.351
56	Republic of North Ossetia – Alanya	0.349
57	Stavropol Krai	0.348
58	Tambov Oblast	0.345
59	Kemerovo Oblast	0.345
60	Krasnodar Krai	0.342
61	Orenburg Oblast	0.340
62	Republic of Mari El	0.339
63	Pskov Oblast	0.337
64	Republic of Khakassia	0.334
65	Ivanovo Oblast	0.333
66	Altai Krai	0.333
67	Kurgan Oblast	0.329
68	Kirov Oblast	0.329
69	Bryansk Oblast	0.327
70	Amur Oblast	0.327
71	Lipetsk Oblast	0.325

72	Jewish Autonomous Oblast	0.324
73	Kostroma Oblast	0.323
74	Karachay-Cherkess Republic	0.312
75	Zabaikalsky Krai	0.304
76	Republic of Altai	0.304
77	Republic of Adygea (Adygea)	0.302
78	Republic of Kalmykia	0.301
79	Kabardin-Balkan Republic	0.300
80	Republic of Tuva	0.269
81	Republic of Dagestan	0.262
82	Republic of Ingushetiya	0.223

The component index of digital development factors in the Russian regions demonstrates a high degree of correlation with the use of digital technologies.

The five leaders according to the availability of the prerequisites for digital development consists mainly of the same Russian regions who occupy the leading positions in the overall Index of digital maturity, although the order slightly changed – Tomsk Oblast is in the third place, Khanty-Mansi Autonomous Okrug is in the fourth place, Yamalo-Nenets Autonomous Okrug is in the fifth. Moscow and St. Petersburg are in the first two places in the ranking.

The maximum gap between the Russian regions on the integral indicator characterizing the factors of digital maturity is 3.8 times.

Conclusion

In the article we stated the essence of method for calculating the digital maturity index for regions and presented the main results of testing the method on the example of Russia.

Regions were compared according to the degree of implementation of the concept of “digital region”. We compared:

1. The factors of the digital society development,
2. The use of digital technologies for development.

In order to assess the level of technology implementation in the regional management, we analyzed the existing experience in the selected regions. The applied technological solutions used are grouped according to the spheres of life of the region or the branch principle. The following areas were identified: business, state and municipal administration, medicine, culture, education, households.

The current situation in Russia is characterized by a significant difference in the economic opportunities of the capital (Moscow) and most regions, which on average have GRP per capita 4 times less than Moscow.

The degree of digitalization of the regions is heterogeneous, which allows us to identify four main groups and discuss the features of their further development.

1. The leaders of digitalization.

Despite the shrinking digital divide, Moscow and St. Petersburg remain the undisputed leaders. These are role models for other regions. Further growth can be achieved by increasing the penetration of online services and the overall increase in the involvement of citizens, business and the state in the digital economy.

2. Developing regions (the main group).

This group includes most of the regions of Central and Southern Russia, the Urals, as well as some regions of Siberia and the Far East. These regions have an average level of digitalization and over the past 5 years have significantly reduced their backlog from the leaders. We should also mention the Moscow and Leningrad regions (oblasts), the driver of the digital development of which are Moscow and St. Petersburg.

The regions in this group have potential for growth in all key areas – infrastructure and engagement.

In the current macroeconomic situation, the priority of development should be to maximize the use of existing infrastructure and access, as well as to increase the efficiency of processes through digital services and platforms.

3. Developing sparsely populated regions.

This group includes the Northern regions of Russia and sparsely populated regions of the Far East. They have a level of digitalization comparable to the previous group, but their further development in the field of digitalization has a number of features.

First, these regions are the centers of the mining industry. Best practices confirm that the introduction of digital technologies in the industrial sector can significantly improve efficiency and, consequently, added value.

Secondly, the low population density imposes a number of restrictions on the development of e-Commerce opportunities, as well as the availability of quality education and medicine. The introduction of online services in the social sectors will allow to neutralize the geographical features of these regions and provide access to quality services without significantly increasing costs.

4. Lagging regions.

This group includes some regions of the North Caucasus. Despite a relatively small lag from the main group in terms of infrastructure development, they are significantly behind the average in terms of involvement in the digital economy.

Regional governments should play a leading role in digitalization. This will not only improve the efficiency of public services, but also increase the involvement of citizens in the use of digital technologies.

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The Role of Social Transfers in Equalizing Income Inequalities in Poland. A Factor Component Decomposition

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Abstract

The aim of the paper is to assess the impact of various income sources on the level of inequality in Poland. Particular attention was paid to the role of social transfers, especially the "Family 500+" programme, and taxes in levelling income inequalities. The study refers to household disposable incomes from 2015-2016, i.e. the year of the programme "Family 500+" introduction and the previous year. The study was carried out on the EU-SILC data. To examine the extent to which different income components affect income inequality, we decompose the Gini coefficient according to the method introduced by Lerman and Yitzhaki. Our results indicate that, in 2016 compared to 2015, income inequality decreased in the groups of households with children, while in the groups of households without children increased. Taxes and social transfers, except old-age and survivor's benefits, reduced income inequality regardless of the household group. However, it was income taxes and social security contributions that were by far the most important factor in reducing income inequalities. Our study also revealed that in the group of single person with dependent children, the share of family and children related allowances in disposable income has increased, while their inequality-reducing effect has decreased.

Keywords: Income inequality, Income source, Decomposition, Households

Introduction

During the transitional years, the countries of Central and Eastern Europe, including Poland, have experienced a sharp increase in income inequality. Since 2007, in Poland, a gradual decrease in income inequality has been observed. Brzeziński (2017, p. 6) suggests the following reasons for the decrease in income inequality in Poland between 2007 and 2014: reforms of the tax-benefit system (in particular, the introduction of child tax credits in 2007), reforms of the family allowance system and a fall in earnings inequality. Moreover, in 2016 a government programme "Family 500+" was introduced.

"Family 500+" is a programme under which parents receive PLN 500 a month for the second and each next child, no matter how much they earn. It was introduced mainly to improve a demographic situation in Poland because of the fertility rate, which had changed significantly in the last 30 years. Currently, Poland has a very low fertility rate, lower than the majority of European countries (in 2016 it was 1.39). The opponents of the programme openly stated in many debates that they do not believe the programme will produce the desired results.

Therefore, the aim of this paper is the investigation how different income sources affect the level of inequality in Poland, with focus on the role of social transfers and taxes in decreasing income inequalities in 2015-2016. Our paper aims at examining the sources of income inequality in Poland by decomposing household income by factor sources at the micro level. In order to achieve the aim, a Gini coefficient decomposition analysis, according to the type of households is carried out. This paper uses data from the European Union Statistics on Income and Living Conditions (EU-SILC) to study the extent to which different components of household income affect total income inequality.

The analysis of redistributive effects of tax and social systems has a long tradition in economic and social science literature. Empirical studies on redistributive policies are based on two approaches. The first of these, called standard approach (see Fuest et al., 2010), is based on a certain income accounting framework. The analysis of the redistributive impact of income taxes and social transfers is based solely on direct comparisons of the income distribution before and after cash benefits and before and after income taxes. To assess the partial effects of specific social benefits and taxes on overall redistribution, a sequential accounting decomposition technique to the Gini is used by Fuest et al. (2010), Alves (2012), Guillaud et al. (2017), Caminada et al. (2019). Redistribution is simply the difference between primary income inequality and disposable income inequality (Caminada et al., 2019). This approach has been, among others, advocated by of Reynolds and Smolensky (1977), Kakwani (1984), Mahler and Jesuit (2006).

The second possibility to assess the impact of different income components such as taxes and transfers on income inequality is the factor decomposition approach as suggested by Shorrocks (1982). In this case, the inequality contribution of each factor component is determined simultaneously. Thanks to this approach to decomposition, it is possible not only to determine the impact of taxes and transfers on inequality, but also other sources of total income. This way of analysis was adopted, among others, by Fräßdorf et al. (2011), Garcia-Peñalosa and Orgiazzi (2013), Medgyesi (2014), Amarante (2016), Rani and Furrer (2016). In this article, we will refer primarily to such an approach to assess the impact of tax and transfer system on inequality reduction.

One of the most relevant studies concerning identifying the role of tax and benefit policies in Poland can be attributed to Myck and Najsztub (2016). They examined the dynamics of disposable incomes and their specific components in Poland, between 2005 and 2014. Their results show why at the time of rapid economic growth, which Poland experienced at the time, income inequality has remained relatively stable. The impact of different sources of income on income inequality in Poland was investigated by Wędrowska and Muszyńska (2019), who focused on income inequalities in the Visegrad Group countries in 2015. The impact of the "Family 500+" programme on the level of income inequality of Polish households was studied by Graca-Gelert (2018) and Jędrzejczak and Pekasiewicz (2019).

Data

Our analysis is based on EU-SILC database. The EU-SILC is an annual EU-wide household survey, that provides information on the income and living conditions for a sample of households. In this paper, we used micro-data extracted from the cross-sectional EU-SILC data set (EU-SILC CROSS-SECTIONAL UDB 2016, 2017 – version of September 2018). The data taken from 2016 and 2017 surveys refer to information on income from years 2015 and 2016, respectively, i.e. the year of the programme "Family 500+" introduction and the previous year. For the vast majority of countries, including Poland, the EU-SILC income reference period is a previous year (Eurostat, 2020). For 2016, the sample covers 11,982 households (with 2,609 persons) and for 2017 it includes 13,053 households, i.e. 34,832 individuals.

The unit of the study is the household which can be defined as a group of individuals living together and sharing expenditures. To account for differences in household size, we adjust household income, by dividing total income by the number of equivalent adults in the household and assigning this value to each

household member. This procedure was applied for all income components. When adjusting household incomes we used the OECD-modified equivalence scale. This scale assigns a value of 1 to the household head, of 0.5 to each additional adult member and of 0.3 to each child.

All results presented in this paper were calculated using the personal cross-sectional weights (available in the database) thus they correspond to an extrapolation of the measures to the whole population.

Three basic sources of income are included in this study: market income, social transfers and taxes. Total disposable income of household was defined as the sum of gross personal income components for all household members, plus gross income components at household level minus taxes and social insurance contributions. It is worth noting that on the basis of EU-SILC data, it is not possible to distinguish income taxes from social security contributions (Alves, 2012, p.42). In order to analyse the impact of income components on income inequality, we constructed seven variables. These were: earnings, self-employment income, residual category of market income, old-age and survivor's benefits, family and children related allowances, residual category of social transfers and taxes. Figure 1 presents the composition of household disposable income and detailed information on the components of income that create the variables.

Our analysis was conducted for all households, as well as for groups of households distinguished due to household composition and having dependent children. We distinguished four groups of households:

- single person without children (denoted as the first group),
- household without dependent children (second group),
- single person with dependent children (third group),
- household with dependent children (fourth group).

Households were assigned to the groups based on the types of households distinguished in the EU-SILC database The groups covered the following types of households:

- the first: H-5 - one person household,
- the second: H-6 - two adults, both under 65, with no dependent children, H-7 - two adults, at least one 65 years or more, with no dependent children, H-8 - other households without dependent children and H-16- other households,
- the third: H-9 - single parent with one or more dependent children,
- the fourth: H-10 - two adults with one dependent child, H-11 - two adults with two dependent children, H-12 - two adults with three or more dependent children and H-13 - other households with dependent children

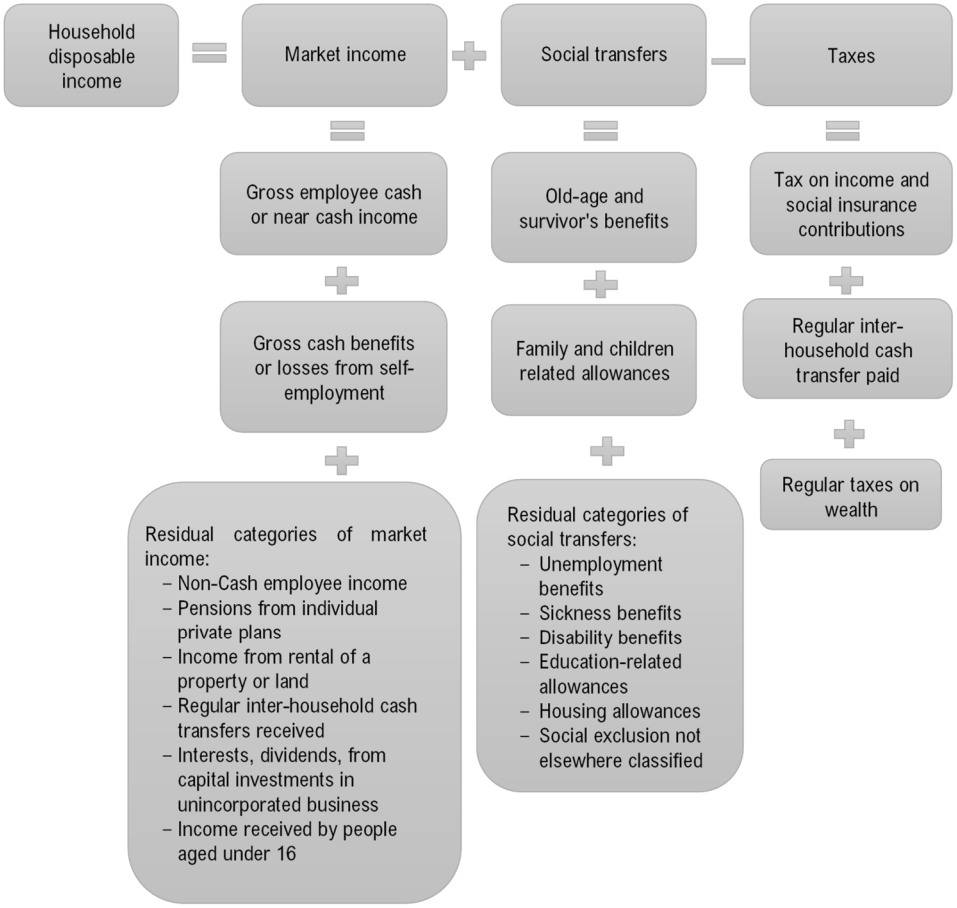

Fig. 1: Composition of household disposable income
Source: Authors' elaboration based on Description of SILC User Database Variables.

Methodology

The measure we applied in the analysis is the Gini coefficient, which is probably the most popular and most commonly used measure of income inequality. Its popularity can be attributed to the availability in many databases (e.g. Eurostat, World Bank) and widespread use in research and reports of international organizations such as OECD or Eurofound. The important virtue of the Gini index is that it meets the four main principles that any inequality metric should meet in order to be considered a reliable measure, namely: the Pigou-Dalton principle, scale independence, anonymity principle and population independence (Charles-Coll, 2011, p.26). Another advantage of the Gini coefficient is that it can be applied to compare different income distributions of different countries, regions or groups of populations, as in our case.

In this paper, we employed the Gini coefficient to assess the level of income inequality in various types of Polish households. To estimate the extent to which income components affect total income inequality, we decompose the Gini index according to the method introduced by Lerman and Yitzhaki (1985).

Decomposing inequality by factor incomes, we consider a population of n households denoted by i, with mean income μ and variance σ^2, and assume that the household income consists of K income components. The income from the source k $(k = 1, \dots, K)$ for the household i equals Y_{ik}. The distribution of incomes from source k is $Y_k = (Y_{1k}, Y_{2k}, \dots, Y_{nk})$, the distribution of total incomes is $Y = (Y_1, Y_2, \dots, Y_n)$, where the total income for the household i equals $Y_i = \sum_k Y_{ik}$.

Following Lerman and Yitzhaki (1985), the Gini coefficient for total income inequality, can be represented as

$$G = \sum_{k=1}^{K} s_k \, G_k R_k \tag{1}$$

where: s_k presents the share of source k in total income ($s_k = \mu_k/\mu$); $G_k$is the Gini coefficient of income source k; R_k is the Gini correlation between income source k and total income. The Gini correlation is a form of rank correlation coefficient. It estimates the extent to which the relationship between $\mathrm{Y_k}$ and the cumulative rank distribution of Y concurs with the relationship between $\mathrm{Y_k}$ and its own cumulative rank distribution $\mathrm{F_k}$. R_k ranges $[-1, 1]$ and is equal to zero if a particular component (k) and disposable income inequality are independent, and it is equal to 1 (-1) if they are perfectly positively (negatively) correlated.

Equation (1) permits us to assess the impact of any income source upon total inequality. The absolute contribution of each income source k to total inequality, C_k, can be estimated as the product of the share of that source in total income, s_k, the Gini coefficient of that income source, G_k, and its Gini correlation, R_k:

$$C_k = s_k G_k R_k \tag{2}$$

The proportional contribution of each income source to total inequality is then the ratio between C_k and Gini: $c_k = C_k/G$.

Although the decomposition analysis tells us the relative contribution of each income component to overall inequality, which is useful information for policy makers, it seems important to know how the marginal changes in each income component affect the level of inequality (Satya, 2004, p.436). Lerman and Yitzhaki (1985) also raised this issue. The effect of a marginal change in any source of the Gini coefficient equals to:

$$\frac{\partial G}{\partial e_k} = s_k (R_k G_k - G) \tag{3}$$

Dividing equation (3) by the overall Gini, Gini elasticity with respect to factor income components can be obtained. i.e. a percentage change in the Gini index as a result of a marginal percentage change in income component k can be determined:

$$\eta_k(G) = \frac{\partial G/\partial e_k}{G} = \frac{s_k R_k G_k}{G} - s_k \tag{4}$$

A negative sign of the factor's marginal effect means that a marginal increase in the source has an equalizing effect. The sum of relative marginal effects is zero.

Factor Inequality Decompositions

In the next section, before presenting the inequality decomposition results, we will briefly discuss the share of components in household disposable income in all surveyed groups.

Household income composition by source

In the first step of our analysis, we examine the structure of household income in all distinguished groups. Because we are analysing disposable income and taxes constitute its negative part (reflecting the tax redistributive effect) hence the share of market incomes and social transfers in total income adds up to over 100%. Figure 2 presents the structure of household disposable income for all surveyed groups of households

If we look at the shares of the various income sources in total household income, we can notice that, in 2015-2016, the main sources of income for all households were earnings, old-age and survivor's benefits as well as self-employment income. In addition, in all groups of households, except for single person households, earnings constituted the prevailing source of disposable income. A similar share of earnings and pensions in the income of the first group of households resulted from the composition of the group.

In 2016, due to the additional transfers of family benefits ("Family 500+" programme), the share of earnings in total income decreased in the groups of households with dependent children, while the structure of disposable income for households without children remained almost the same. It is worth noting that the decline in the share of earnings was nearly twice as large in the third group (one-person household with children) than in the fourth group.

In 2016 compared to 2015, the share of family benefits in total income rose from 1.9% to 4.8%, on average. For one person with dependent children there was an increase from 8.7% up to 18.2% while for other households with children - from 3.3% to 8.6%.

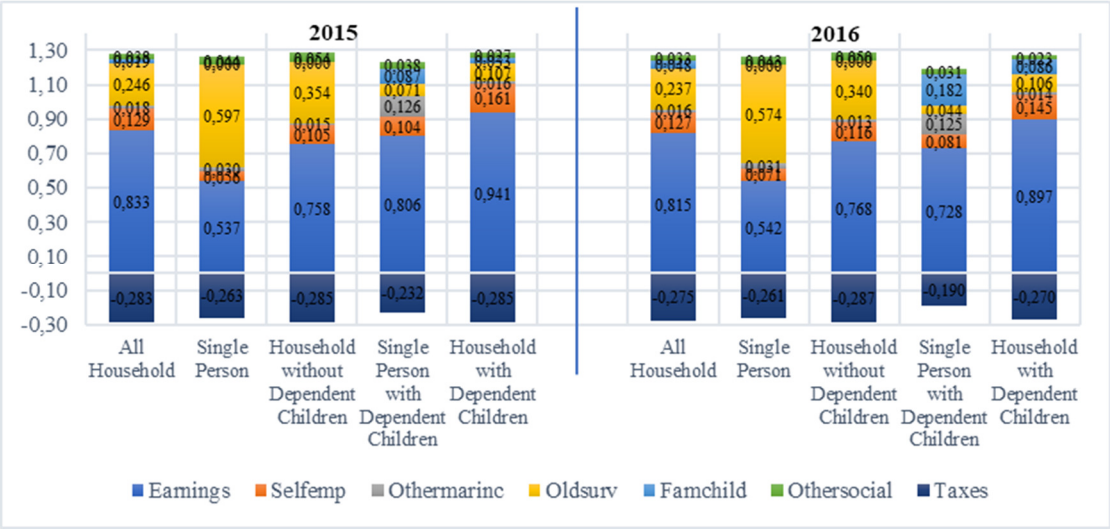

Fig. 2: Household income composition

Source: Authors' calculation using EU-SILC data.

Factor Inequality Decompositions

In the current section, we examine how different income sources affect total income inequality in the group of all households and in the four distinguished groups, using Lerman and Yitzhaki's decomposition method. Table 1 reports the results of the Gini coefficient decomposition for Polish households in 2015 and 2016. In our analysis, we compare the shares of various components in inequality with their shares in total income (s_k) in order to reveal which income components are relatively strengthening, and which are rather smoothing inequality.

In group of all households we find that disposable income inequality is lower than earnings inequality, which in turn is much lower than inequality in the other factors. However, within the four groups of surveyed households, the level of earnings inequality varies significantly. In first group the Gini coefficient was the highest and it rose from 80.98 in 2015 to 80.27 in 2016, while in the fourth group it increased from 44.02 to 44.75 over the period of 2015-2016. Earnings had a dominant positive impact on total inequality, both in all households and in four distinguished groups, which means that they increased the inequality the most. In the first group the relative contribution of earnings to total inequality was disproportionately high compared to its share in disposable income. It should be noted that this group of households is the most diverse in terms of demographics. One could hence expect that differences in the demographic composition play a significant role in explaining inequality. In conclusion, earnings were a disequalising source of income in all the groups, but with the highest marginal effect in the group of single person (figure 3). It is not a surprise, because it needs to be highlighted that, in the decomposition of inequality by factor components, three dimensions are taken into consideration: inequality observed within each income source, relative shares of income sources in total income, and the correlation between income sources and total income.

The other income components that made positive and significant contributions to inequality in all groups were income from self-employment and the residual categories of market income, however their marginal effect was very small over the whole period. The contributions of self-employment income to total inequality increased for the group of all households (from 9.99% to 12.07%). The increase in the contribution of self-employment was particularly large and important for the first and the second group (the groups of households without dependent children). The positive effect of the residual categories of market income on inequality was particularly large in the first group. The highest relative contribution of the residual categories of market income to total inequality is observed in the group of single person with dependent children (9.62% in 2015 and 14.37% in 2016). This is due to the fact that regular inter-household cash transfers received were an important component of this income.

As mentioned in the previous section, old-age and survivor' benefits were the next largest components of all households' income. This income source contributed positively to the inequality of disposable household income in both years. In 2015 and in 2016 old-age and survivor' benefits accounted for 11.03 and 8.52 percent of overall inequality. What is more, the marginal effect of old-age and survivor' benefits on inequality was negative and significant during the studied period and its highest value was noted in 2016.

Table 1: Gini coefficient decomposition results

	Year	All Household	Single Person	Household without Dependent Children	Single Person with Dependent Children	Household with Dependent Children
Total disposable income						
Gini	2015	29.78	33.36	28.50	30.92	29.53
	2016	29.19	33.98	28.57	25.05	28.47
Gross employee cash or near cash income (Earnings)						
Gini	2015	52.17	80.98	55.85	55.94	44.02
	2016	52.33	80.27	55.23	51.98	44.75
Gini correlation	2015	0.7619	0.7728	0.7235	0.7857	0.8370
	2016	0.7735	0.7803	0.7262	0.7062	0.8434
Relative contribution to overall inequality (%)	2015	111.20	100.70	107.47	114.61	117.41
	2016	113.09	99.93	107.88	106.72	118.90
Gross cash benefits or losses from self-employment (Selfemp)						
Gini	2015	87.10	97.13	89.23	93.77	83.48
	2016	87.77	97.11	89.38	95.28	84.38
Gini correlation	2015	0.2649	0.2810	0.2744	0.3760	0.2612
	2016	0.3173	0.5973	0.3506	0.3402	0.2629
Relative contribution to overall inequality (%)	2015	9.99	4.55	9.02	11.89	11.86
	2016	12.07	12.13	12.68	10.45	11.29
Residual categories of market income (Othermarinc)						
Gini	2015	95.62	94.86	97.46	68.85	94.66
	2016	95.92	95.22	97.67	68.91	94.97
Gini correlation	2015	0.4129	0.2411	0.5834	0.3428	0.4400
	2016	0.4160	0.2848	0.5690	0.4176	0.4693
Relative contribution to overall inequality (%)	2015	2.39	2.05	3.02	9.62	2.27
	2016	2.17	5.50	2.49	14.37	2.12
Old-age and survivor's benefits (Oldsurv)						
Gini	2015	73.32	53.21	63.93	90.71	78.04
	2016	73.10	53.98	64.57	93.54	76.78
Gini correlation	2015	0.1824	0.2806	0.2026	0.1374	0.0887
	2016	0.1437	0.2601	0.1650	0.1132	0.0873
Relative contribution to overall inequality (%)	2015	11.03	26.71	16.05	2.87	2.50
	2016	8.52	23.72	12.67	1.84	2.49
Family and children related allowances (Famchild)						
Gini	2015	90.60	-	-	79.47	84.01
	2016	78.77	-	-	65.23	61.25
Gini correlation	2015	-0.0909	-	-	-0.2630	-0.0237
	2016	-0.1163	-	-	-0.1028	-0.0959
Relative contribution	2015	-0.54	-	-	-5.86	-0.22

to ov□rall i□□quality (%)	2016	-1.49	-	-	-4.88	-1.77
Residual categories of social transfers (Othersocial)						
Gi□i	2015	87.77	92.68	83.77	85.76	87.74
	2016	88.54	92.93	84.15	88.52	88.85
Gi□i corr□latio□	2015	-0.1831	-0.3850	-0.2217	-0.2380	-0.1965
	2016	-0.2020	-0.3981	-0.2444	-0.1852	-0.1748
R□lativ□co□tributio□ to ov□rall i□□quality (%)	2015	-2.04	-4.70	-3.49	-2.50	-1.60
	2016	-2.05	-4.67	-6.62	-2.00	-1.26
Tax on income and social insurance contributions (Taxes)						
Gi□i	2015	40.10	51.97	38.61	52.08	38.28
	2016	39.93	51.39	38.29	50.44	38.22
Gi□i corr□latio□	2015	0.8412	0.7147	0.8293	0.7824	0,8726
	2016	0.8575	0.8499	0.8352	-0.6915	0.8761
R□lativ□co□tributio□ to ov□rall i□□quality (%)	2015	-32.03	-29.32	-32.07	-30.63	-32.21
	2016	-32.32	-33.60	-32.10	-26.51	-31.77

Source: Authors' calculation using EU-SILC data.

The elasticity of the Gini coefficient with respect to old-age and survivor' benefits was -0.15 in 2016 which implies that 1% increase in old-age and survivor' benefits would lead to 0.15% decrease in the inequality of household income distribution. What's more, old-age and survivor' benefits contribute positively and significantly to the inequality of disposable income only in households without dependent children and in the group of single persons. In Poland the statutory pension insurance still is the main pillar of old-age provision for the majority of the population. That is why it is important to increase pensions in order to reduce overall inequalities

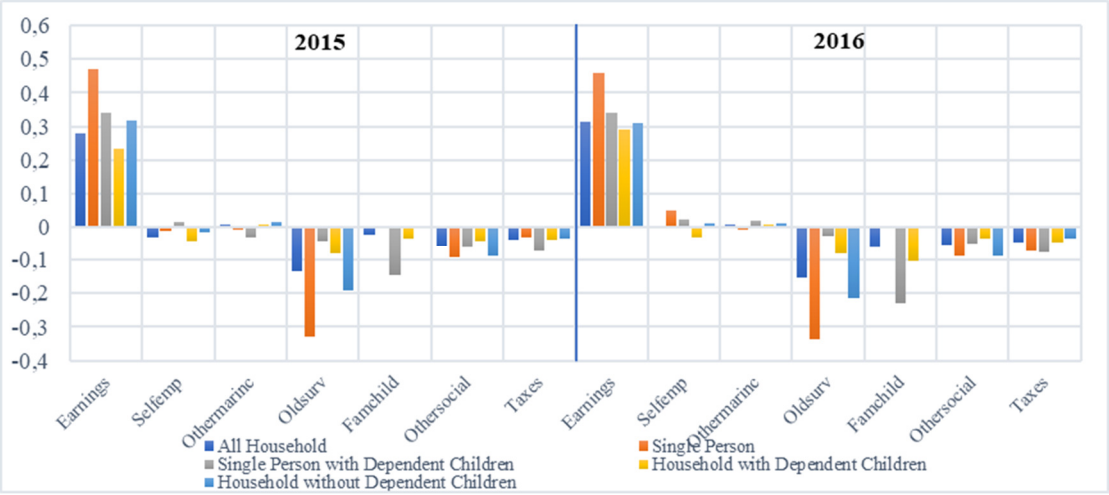

Fig. 3: Marginal effects of income components

Source: Authors' calculation using EU-SILC data.

In 2016, due to the implementation of the "Family 500+" programme, family and children related allowances constituted a higher proportion of income compared to 2015, and the level of inequality in this income component has significantly decreased. Family and children related allowances contribute negatively to the inequality of household disposable income in all groups. An inequality-reducing effect caused by family and children related allowances was higher in 2016 than in 2015, however only in the group of all households and in the fourth group. It is surprising that in the group of single persons with dependent children, in 2016, inequality-reducing effect caused by this income component was lower than the year before. This is because the correlation between disposable income and family and children related allowances was weaker in 2016 than in 2015. It should be noted that the child support benefit from the "Family 500+" programme does not depend on household income. Under the programme parents can receive a tax-free benefit of PLN 500 (about EUR 120) per month for the second and any consecutive children until they reach the age of 18. Families are also eligible to receive the benefit for their first child if the family income is under PLN 800 (about EUR 180) per family member or under PLN 1200 per family member in the case of families with a disabled child (European Commission, 2018). The marginal effect of family and children related allowances was negative in all groups. Moreover, it increased significantly in 2016 compared to 2015 (Figure 3).

The residual categories of social transfers generated negative contributions in all groups of households. Throughout the period of the study, the relative contribution of these transfers was higher in the first and second group of households than in the third and fourth. However, the correlation between disposable income and social benefits was weak.

As it was expected, taxes on income and social insurance contributions negatively contributed to income inequality, decreasing their level. The decomposition of the Gini shows that their contribution to overall inequality was about -32% in all households in both years. Note that the relative contribution of taxes was throughout the period higher in the first group. Income taxes and social insurance contributions are by far the most important factor of income inequality reductions in each surveyed group of households. Taxes, on the other hand, show a substantial correlation with disposable incomes, and the income share of social benefits was smaller than the share of taxes and social insurance contributions, in absolute terms. It's worth mentioning that in Poland the personal income tax system is characterised by low progressivity.

Conclusions

The article has attempted to examine the income distribution of Polish households, focusing on the impact of various sources of income on the level of inequality in disposable income. We have investigated to what extent labour income, social transfers and taxes have contributed to total inequality, using the micro household income data from the European Union Statistics on Income and Living Conditions.

Our results have shown that income inequality decreased in the groups of households with children in 2016, while in the groups of households without children increased. The largest decrease in income inequality took place in the group of single person with dependent children.

The decomposition results have demonstrated that gross employee cash (earnings) contributed to household disposable income inequality at the highest extent in all groups of households in both years. This factor, as well as self-employment income, residual categories of market income and old-age and survivor' benefits, was the disequalising source. Family and children related allowances, residual categories of social transfers and taxes reduced income inequality irrespectively of the households' group.

As expected, due to the "Family 500+ programme, we observed an increase in the share of family benefits in disposable income among households. An inequality-reducing effect caused by family and children

related allowances was much higher in group of single person with dependent children than in household with dependent children in both years. Using the Gini decomposition, we can conclude that the share of family and children related allowances in disposable income has increased in group of single person with dependent children, while the inequality-reducing effect has decreased.

With respect to inequality-reducing effect, income taxes and social insurance contributions were by far the most important factor of income inequality reductions, while the contribution of social benefits was irrelevant. It can be argued that taxes and social insurance contributions are significantly correlated with disposable income, whereas the correlation between social benefits and disposable income is insignificant. While taxes and contributions decreased income inequality by 32% on average, social benefits do not seem to have any significant impact on inequality (<7% in all groups of households).

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New Paradigm of the Strategy of Advanced Development in the Digital Economy: Prerequisites, Contradictions and Prospects

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Abstract

Outsider countries can implement various catch-up and advance development strategies to overcome their lag behind the leaders of the global economic system. The scale of natural potential, the ability to accumulate available resources and their forced use in the production process were factors of the country's advanced development during the industrial period. However, in the digital environment, there is a shift in priorities and a change in the mechanisms for ensuring long-term advance. It is proved that the strategy of advancing in the digital economy for outsider countries should change the goals of accelerated development in the short term. Instead, it should be aimed at ensuring a new quality of factors of production, increasing the efficiency of their use and implementing the policy of creating an inclusive digital society in the long term. Methods used in the study: economic analysis (absolute difference, relative value, comparison, grouping of indicators, analytical tables), observation, analysis and synthesis, system approach, induction and deduction, graphic, and dialectical method. The information base of the research is the materials of reports of international organizations and reports of consulting groups, including IMD, TED, European Commission, Bank of England, OECD, USnews, HDR etc.

Keywords: Digital Economy, Advanced Development, Catch-Up Development, Strategy, Innovation, Productivity Paradox.

Introduction

The transition to a new stage of the global economy development requires changing the mechanisms for overcoming the socio-economic gap, ensuring the advance and retention of leadership positions. Thus, at the stage of industrial development, the state's position in the system of world economic relations was determined by the scale of its natural potential, the ability to accumulate available resources and opportunities for their use in the production process, and the availability of an effective institutional framework. The country's lag behind world leaders in these conditions could be

overcome by adapting the positive experience of other countries in the framework of a catch-up development strategy or using its own breakthrough technologies in the process of accelerated development.

In the digital space, traditional economic relations and business models are changing, the uncertainty of digital environment factors is increasing (due to the inability to accurately assess and predict the impact of new digital technologies on certain aspects of human life, production and consumption processes), which causes new unforeseen contradictions of an economic, social and environmental nature that can undermine the leadership positions of developed countries and make changes in the ratio of leading countries to outsiders (Sukharev 2013, Rajnert 2011).

In this situation, the study of the problem of overcoming the socio-economic and technological gap, the search for effective tools for advancing and maintaining leadership in the digital economy is particularly relevant.

Materials and Methods

The scientific hypothesis of the study is the assumption that the transition to the digital stage of the world economy's development transforms ideas about leaders and outsiders, about mechanisms and strategies for overcoming the gap, making the previous strategies of catching up and advancing development less effective. The strategy of achieving qualitative indicators of human development and factors of human well-being in the long term replaces the strategy of accelerated development on the basis of achieving the effect of increasing returns on the scale of the world economic system in the short term. Advance in the digital environment becomes possible by ensuring a new quality of production factors, increasing the efficiency of their use and implementing the policy of forming an inclusive digital society in the long term.

The theoretical and methodological basis of the research is the works of Hess and Ross (1997), Shishkov (2006), Ray (1998), Sukharev (2013), Nureyev (2001), Gerschenkron (1962), Rajnert (2011), Karpunina and Gjorchev (2019), reflecting the specifics of overcoming the gap in socio-economic development and strategies to ensure it (catch-up development strategy, advanced development strategy).

The development of the digital economy differs significantly depending on the historical and socio-economic conditions of each country and is reflected in the following studies:

- the analysis of patterns and dynamics of development of the ICT sector and related sectors taking into account country specifics is reflected in the works of Perez and Soete (1988);

- structural changes in production and employment, changes in the productivity of factors of production, as well as the relationship between technological changes and the dynamics of economic growth are presented in the works of Hempell (2006), Gilbert et al. (2016);

- research aimed at revealing the reserves of economic growth and shaping the development strategy of the world's countries in the new technological order belongs to Shin (1996).

The information base of the research is made up of reports of international organizations and consulting groups, including IMD (2019), TED (2019), European Commission (2014, 2019), Bank of England (2018), OECD (2019), USnews (2018), HDR (2018) etc.

The research was carried out using the methodology of economic analysis (absolute difference, relative value, comparison, grouping of indicators, analytical tables), observation, analysis and synthesis, system approach, induction and deduction, graphic, and dialectical method.

In the industrial economy, differentiation in the level of socio-economic development of the world's countries was manifested in the form of clear leadership of some countries that set standards for the

development of science, production, consumption and social well-being, and lagging behind other countries, the so-called periphery.

The leading countries (Switzerland, Denmark, Sweden, the United States, and others) have dominated the world stage due to their ability to develop their own resource potential, historically strong institutional framework, and implementation of a leadership strategy for lagging countries that involves shifting the costs of development to their economies.

In turn, lagging countries mastered technological achievements and implemented institutions created in the leading countries, independently adapting them to their own specific economic conditions (Japan, Singapore, China) (Volpi 2012, Rodrik 2004), or carried out large-scale borrowing of created technologies and knowledge and completely subordinated the development processes to the goals of developed countries (South Korea, Taiwan, Brazil, Mexico) (Sukharev 2013).

At the same time, they relied on one of the recognized development strategies: a strategy of catch-up development or a strategy of advanced development, depending on the initial level of economic development, access to knowledge and technology, the state of the fundamental institutions, and their natural resource potential. These strategies differ both in their meaning and in the system of government actions being implemented.

For example, the catch-up strategy is aimed at reducing the gap between countries based on the concentration of their own resources or by borrowing the missing technologies in the framework of industrialization and economic modernization, while maintaining the movement of the lagging country along the chosen trajectory (List 1930). This strategy responds to protectionist views and can be useful in the context of a sharp expansion of international trade.

The advanced development strategy is based on the possibility of accelerated development by achieving the effect of increasing returns in the global economic system through the intensive introduction of new technologies based on new knowledge, taking into account country specialization. In other words, to overcome the lag, the country chooses a parallel development trajectory based on investing in the creation of new technologies that will allow it to achieve competitive advantages and occupy its own niche in the world market due to high product (income) growth rates that exceed the growth rate of economic leaders.

As practice has shown, some countries implementing a strategy of advanced development (for example, Canada, Australia, New Zealand, etc.) used their own natural resource potential, formed an institutional system and provided acceleration by removing foreign economic barriers and creating a more favorable internal and external environment(Anderson 2006).

Other countries that have unique natural resources and conditions for rapid economic growth (for example, Kuwait, the UAE, Saudi Arabia, Iran, etc.) were able to ensure rapid development by implementing a coordinated policy in the field of production, trade, prices and a sharp strengthening of their own foreign economic positions in oil trade with its main importers (Aker and Aghaei 2019).

The third option for achieving advanced development was chosen by countries that had limited resource potential and were able to create a developed manufacturing sector that produces competitive products based on the gradual development of new technologies (Japan, South Korea, Taiwan, Hong Kong, Singapore), as well as implement an export strategy for promoting finished products to world markets (Volpi 2012, Rodrik 2004).

However, the transition to a new digital stage of development transforms the perception of leaders and outsiders, mechanisms and strategies for overcoming the gap, making the previous strategies of catch - up and advanced development less effective, despite the successful reduction of the income gap between rich and poor countries in the global economy. After all, catching up on one parameter (for example, technical and technological equipment), it is likely to sharply worsen the overall quality of another parameter (for example, environmental pollution), even despite the effect associated with changing the productivity function, when technologies allow you to spend less resources and produce less waste (Sukharev 2013).

Results and Discussion

According to the European Commission, the digital economy can be characterized by a set of key characteristics: mobility, network effects, and data usage (European Commission 2014).

Indeed, digitalization allows companies to benefit from reducing labor costs per unit of cost by automating the production process. Digitalization reduces the marginal cost of products and prices (van Ark et al. 2014). Rapid growth to a large scale is a necessary feature of the business models of modern companies, which becomes sustainable due to the reduction of geographical barriers. New digital companies are actively innovating to create new product lines. This is because small differences in quality can cause consumers to switch to other manufacturers and lead to potentially huge differences in profits (European Commission, 2014).

ICTs reduce the cost of collecting, storing, and analyzing data in accordance with Moore's law, this reduces transaction costs (Kholod,et al. 2019). ICTs have also reduced consumer costs in terms of price and choice by creating competing online markets that offer a wide range of products. In addition, big data has helped companies develop innovative products and services with less innovation-related costs in terms of measurement, experimentation, exchange, and replication than in the pre-digital era (Byrne et al. 2013, Syverson 2013).

The presented research and the dynamics of digital development on a global scale allow us to say that today the world's countries are at different stages of digital development: some demonstrate strong growth rates of added value in the field of creating new technologies based on expanded reproduction of human capital, while others are faced with the problem of overcoming the technological and economic lag behind advanced countries (Karpunina 2011, Simcoe and Timothy, 2015).

I. The leaders in terms of digital competitiveness in 2019 according to IMD World Digital Competitiveness Ranking are the United States, Singapore, Sweden, Denmark, and Switzerland. These countries have the greatest potential and readiness to implement and study digital technologies as a key factor of economic transformation in business, government and society as a whole (IMD 2019). The top 5 countries share common features in terms of their focus on knowledge generation (emphasizes the process of digital transformation through the discovery, understanding and study of new technologies), but each of the leading countries has a different approach to digital competitiveness. For example, the United States and Sweden have a balanced approach to building knowledge, creating an enabling environment for technology development, and being willing to innovate.

The top ten most developed countries in the world in terms of digital competitiveness in 2019 also include the Netherlands (6th place), Finland (7th place), Hong Kong (8th place), Norway (9th place) and the Republic of Korea (10th place).

Several Asian economies - China, Indonesia, Korea, and India – have made significant progress in developing their technology infrastructure and business dynamics in 2019 (IMD 2019).

Average indicators of digital competitiveness are also increasing in South Asia and the Pacific region, as well as in the former CIS and Central Asia (according to the rating methodology, digital competitiveness is calculated based on 51 ranked criteria that assess three main factors: knowledge (talent, training and education, scientific concentration), technology (regulatory framework, capital, technological base), and readiness for the future (adaptive settings, business flexibility, it integration) (IMD, 2019). At the same time, the values of similar indicators for Western Asia, Africa and Eastern Europe correspond to the indicators of 2018. The economies of South American countries lag behind other subregions, experiencing a decrease in digitalization compared to 2018.

Conclusion: in general, countries with high digital competitiveness indicators are more likely to maintain their leading positions as global knowledge centers and remain the main digital centers (due to the predominance of human capital in their wealth structure and the ability to provide new quality of factors of production), in contrast to outsider countries (which are characterized by capital

accumulation and redistribution of resources). For example, several Asian economies in 2018 narrowed the digital divide through technology development and future readiness factors. However, they remain dependent on Western economies for knowledge production.

II. Despite the growth of many indicators of digital competitiveness in the developed economies of the world, in the last decade there has been a decline in global productivity growth (that is, labor productivity (including output per worker or per working hour) and factor productivity (which takes into account investment in capital and labor force skills) (The Total Economy Database 2019).

Using the example of countries in the top 10 of the digital competitiveness rating, we will show the dynamics of GDP growth per hour worked and the contribution of the digital production sectors (table 1).

Table 1: Indicators that reflect the dynamics of GDP growth per hour worked and the contribution of digital production sectors, in % (2000-2017) (created by authors, source: Conference Board calculations using data from Eurostat; BEA; BLS и European Commission 2019)

Country / Indicator	GDP per Hour Worked, annual average percent change			Digital producing (this includes investments in ICT, intermediate purchases of ICT goods and services, a stock of robots for one hundred employees, ICT specialists in the total number of employees, and turnover from online sales)	
	2000-2007	2007-2017	2018	2000-2007	2007-2017
USA	2,6	1,0	0,9	0,78	0,51
Singapore	3,4	3,2	3,7	0,74	0,83
Sweden	2,7	1,2	0,2	0,98	0,32
Denmark	1,3	1,4	0,6	0,46	0,29
Switzerland	1,7	0,8	1,6	0,68	0,75
Netherlands	1,6	0,8	0,3	0,43	0,12
Finland	2,6	1,1	-0,3	0,71	0,34
Hong Kong	3,7	2,7	1,5	0,93	0,81
Norway	1,6	0,7	-0,2	0,76	0,38
South Korea	4,6	2,6	2,8	0,69	0,74

These tables show that the slight increase in labor productivity that is still occurring in some of the leading countries may be due to the intensification of information and communication technologies, automation, or innovation activity.

Country assessments show that the contribution of the digital manufacturing sector to productivity has declined significantly in all countries, including the United States, European and Asian countries, especially in Finland and Sweden. The most intensive growth of the digital usage sector was observed in some countries of Northern Europe (great Britain) and Eastern Europe (Czech Republic, Poland and Slovenia) (European Commission 2019).

At the same time, an exception to the identified trend of slowing labor productivity growth in mature economies can be found in Poland, Slovakia and Hungary, where in 2018, compared with 2017, there was a positive trend in the growth rate of production per hour: in Poland, the value of the "GDP per

Hour Worked" indicator increased to 6.2% (in 2017 – 4.5%), in Slovakia-3.1 % (in 2017 – 2.5 %), in Hungary-4.4% (whereas in 2017 – 3.2%) (The Total Economy Database 2019).

Note that these countries are not among the leading countries in terms of digital competitiveness, and occupy 33, 47 and 43 places in the ranking, respectively. However, they may experience increased side effects from integration with Western European economies and pressure from wage costs that stimulate business, which may explain the strong growth in labor productivity in these countries. As for the dynamics of the digitalization process in these countries, it should be noted that in Poland there is an annual growth of the digital production sector (on average from 0.21% of GDP in 2000-2007 to 0.3 % in 2007-2017), while in Slovakia and Hungary the share of digital production tends to decrease (by 1.8 and 3.8 times, respectively).

In addition, according to The Total Economy Database, productivity growth in emerging markets has also slowed since 2010 (in Brazil, China, India, Indonesia, Mexico, Russia, South Africa, and Turkey, output growth per worker slowed from 5.5% between 2000 and 2007 to 4.4% between 2010 and 2017), in all developing countries, output per worker increased by 2.6% in 2018, compared to the average of 1% for mature economies. All of these developing countries, with the exception of China (22nd place), did not rise above 38th place in the ranking on the level of digital competitiveness (The Total Economy Database 2019).

At the global level, overall growth in factor productivity (including investment in capital and labor skills), which reflects overall efficiency, was negative again in 2018 at -0.1 percent, compared with a slight increase of 0.2 percent in 2017 (TED, 2019). At the same time, the maximum decrease in the overall growth of factor productivity was observed in 2016 in the economies of emerging and developing economies (-0.8), while the maximum decrease in the leading countries ranged from -0.2 to -0.1 (TED, 2019).

Conclusion: the decline in productivity growth of factors of production (labor productivity, investment in capital and skills of the labor force) is typical for both leading and outsider countries. However, the leading countries that ensure the growth of the digital production sector (investments in ICT, intermediate purchases of goods and services, robotics, training of specialists with ICT skills) demonstrate greater stability. Researchers try to explain the productivity paradox of the new digital economy by various factors, including slower growth in the amount and quality of capital available to each employee, changes in the quality of the workforce or human capital, changes in the efficiency of capital and labor use adjusted for quality, and the consequences of the financial crisis (Bank of England 2018, Simcoe 2015, Gilbert et al. 2016, Hempell 2005).

III. The slowdown in real GDP growth is another factor of uncertainty that affects the choice of a strategy for advanced development in the digital economy (Fig. 1).

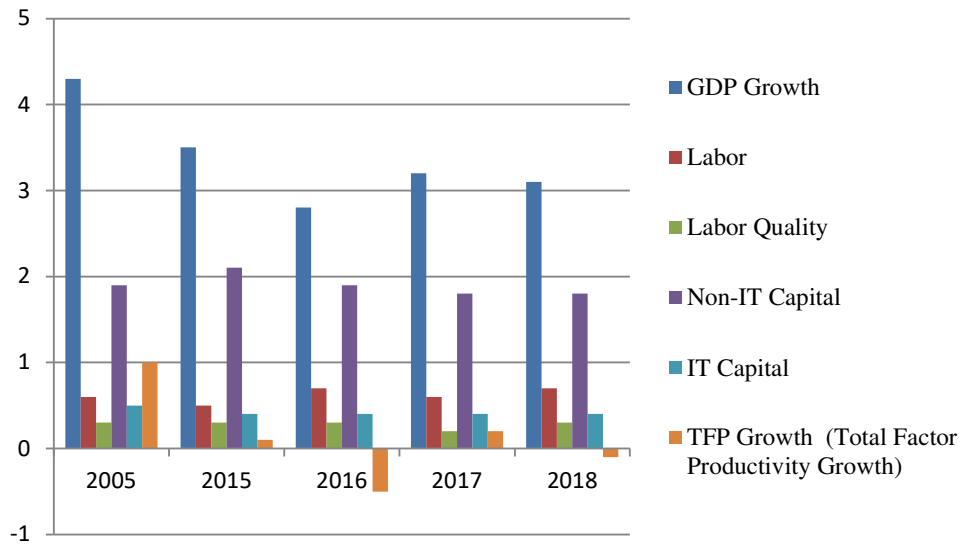

Fig. 1: Dynamics of GDP growth in the world and the contribution of growth sources to its creation, 2005-2018 (compiled by the authors according to data The Conference Board Productivity Brief 2019)

As can be seen from the figure, in the period 2005-2018, there is a significant drop in GDP in the context of the global economy. Of course, when looking at the dynamics in the context of Mature and emerging economies, it becomes obvious that the largest drop was due to the decline in GDP in emerging markets, which began in 2010, and by now emerging markets have lost most of their potential for catching up with productivity growth over the past decade (almost 2 times, from 6.1% in 2005 to 3.7% in 2018) (The Total Economy Database 2019).

But even in the G20 countries, where overall GDP growth was relatively stable and the average annual growth rate remained at 2.9%, in 2010 it fell sharply to 2.1%, and the decline continued to 1.8% in 2016. In 2018, after a slight increase in 2017, mature economies as a whole again showed a drop to 2.4%.

The beginning of 2019 was characterized by positive dynamics, but in the third quarter of 2019, GDP growth remained stable only in the United States, France and Italy (by 0.5%, 0.3% and 0.1%, respectively). In the European Union, it fell slightly (to 0.3%, from 0.2%), in the UK and Germany (to 0.3% and 0.1%, respectively, after a 0.2% reduction in each country in the previous quarter) (OECD 2019).

Conclusion: the slowdown in real GDP growth is stronger in the outsider countries than in the leading countries, which may be a consequence of their digital development strategies, which were adopted in order to integrate into digital processes as quickly as possible, taking into account their national characteristics (Karpunina et al. 2019).

Note that this decline is taking place against the background of digital development strategies implemented by many countries, which were adopted in order to be included in digital processes as quickly as possible, taking into account their national characteristics (Karpunina et al. 2019). For example, since the beginning of 2000, Sweden has been implementing The digital agenda for Sweden, the UK - The digital economy Act, Japan - The New information and communication technology strategy, Australia - The Australian national digital economy strategy, Austria - The research, technology and innovation strategy, Canada - Canada's digital economy strategy is built on the government's economic plan for Canada, and so on.

IV. An integral characteristic of the socio-economic development of the state is the growth of the level and quality of life of the population. On the one hand, the analysis of the dynamics of human development index (a composite index that measures a person's ability to lead a long and healthy life, the ability to obtain knowledge and skills to achieve a decent standard of living) and gender development index and multidimensional poverty index allows us to conclude that developed countries with mature economies, occupying the leading position on a global scale, are currently created conditions for the formation of an inclusive digital society (HDR 2018).

These countries have the highest level of human development. For example, in 2018, the value of the human development index in Norway was recorded at 0.953, in Switzerland-0.944, in Australia-0.939, in Ireland-0.938, in Germany-0.936, in Iceland-0.935, in Hong Kong-0.933, in Sweden-0.933, in Singapore-0.932, in the Netherlands - 0.931. This means that these countries not only have high per capita income, but also high standards of health and education. Note that 6 of the 10 leading countries in terms of digital competitiveness occupy the highest positions in terms of human development (Singapore, Sweden, Switzerland, the Netherlands, Hong Kong, Norway). Such indicators can be achieved by increasing spending on human development, i.e. education, science, health, social services, and environmental well-being.

For example, the leading countries analyzed by us, both in terms of digital competitiveness and human development, Singapore, Sweden, Switzerland, the Netherlands, Hong Kong, and Norway, have consistently high values of the indicator “public spending on education” (Fig. 2).

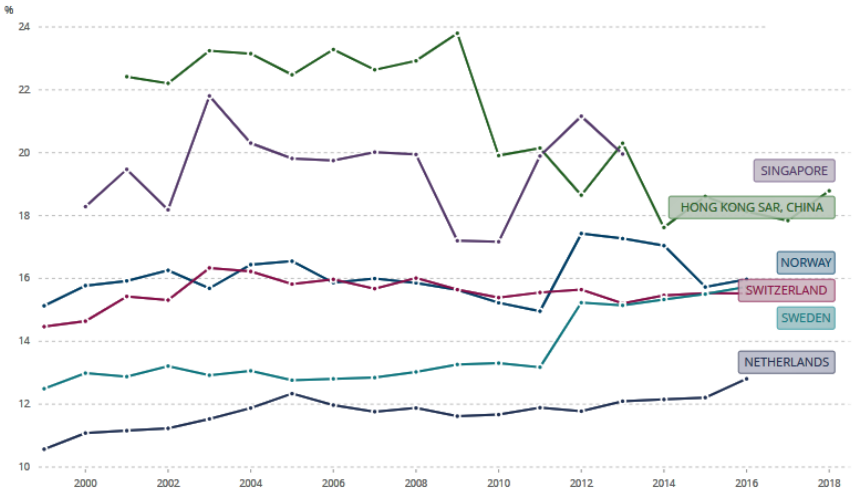

Fig. 2. Government expenditure on education, total (% of GDP), 2000-2018 (compiled by the authors according to the data The World Bank 2019)

As for R&D spending, two leading countries in terms of digital competitiveness occupy the top positions in the world ranking : the United States (2.84 % of GDP in 2018 was invested in this sector), and South Korea (in 2018, it spent 88.2 billion dollars on R&D, which is about 4.3 percent of GDP) (USNews 2018).

According to the World health organization, health expenditures are calculated (the Global Health Expenditure indicator), which are considered one of the key indicators of social development, since they reflect the degree of attention paid by the state and society to the health of citizens. The leading countries analyzed by us mostly have high values of the Global Health Expenditure indicator, % of GDP in 2017, which allows them to maintain a decent level of national health and ensure the full realization of human potential: the United States - 17.1, Switzerland -12.2, Sweden - 10.9, Norway - 10.5, Denmark -10.4, the Netherlands – 10.4, Finland – 9.5. However, in this aspect, South Korea and

Singapore show a significant lag behind the leaders, traditionally having low indicators of public financing of the health system - at the level of 7.3 and 4.5 percent, respectively.

Despite the fact that the report "Human development Indices and indicators. Updated statistics 2018 " it is noted that countries with very high levels of human development contribute the most to climate change, with average carbon dioxide emissions of 10.7 t per capita, compared to 0.3 t per capita in countries with low levels of human development (HDR 2018), environmental Finance remains critical to the success of collective efforts (OECD 2019). The commitment of governments in developed countries to allocate $ 100 billion a year by 2020 is both symbolic and essential for improving their environmental sustainability.

In general, despite the fact that the leading countries pay significant attention to human capital development, statistics show that they have also experienced a slowdown in HDI growth over the past decade. However, this is primarily due to reversals caused by conflicts, epidemics, and economic crises, as well as the achievement of growth limits for individual components of HDI (for example, the biological limit of life expectancy, learning duration, and educational coverage).

Conclusion: the leading countries have fully created conditions for an inclusive digital society due to high spending on education and science, health, social services, and environmental well-being, which is an absolute competitive advantage and a guarantee of sustainable development in the digital environment.

Conclusions

It is proved that during the transition to the digital stage of development, ideas about leaders and outsiders, about mechanisms and strategies for overcoming the gap are transformed, and previous strategies for catching up and advancing development become less effective in the global economy.

The analysis showed, first, that countries with high indicators of digital competitiveness are easier to maintain leadership positions as global centers of knowledge and remain the main digital centers (due to the predominance of human capital in the structure of their wealth and the possibility of providing a new quality of factors of production), in contrast to outsiders (which are characterized by capital accumulation and redistribution of resources).

Second, in the leading countries and outsiders, there is a decrease in the growth of productivity of factors of production (labor productivity, investment in capital and skills of the labor force). However, the leading countries that ensure the growth of the digital production sector (investment in ICT, intermediate purchases of goods and services, robotics, training of specialists with ICT skills) have greater stability.

Third, the slowdown in real GDP growth is more pronounced in outsider countries than in leading countries, which is a consequence of their digital development strategies, which were adopted in order to integrate into digital processes as quickly as possible, taking into account their national characteristics.

Fourth, the leading countries have fully created conditions for an inclusive digital society due to high spending on education and science, health, social services, and environmental well-being, which is an absolute competitive advantage and a guarantee of sustainable development in the digital environment.

Thus, the strategy of advancing in the digital economy for outsider countries should not pursue the goals of accelerated development in the short term, but should be aimed at ensuring a new quality of factors of production, increasing the efficiency of their use and implementing the policy of forming an inclusive digital society in the long term.

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Mechanisms of Self-Development of Subsidized Regions

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Abstract

The high level of socio-economic differentiation of the territorial development of Russia actualizes the problem of finding new effective tools for its alignment. The disclosure of the region's self-development potential can become a condition for the transition of a poorly developed subsidized region to the category of self-developing ones. This requires a review of the mechanism for the formation and implementation of regional policy based on the identification and assessment of the potential for self-development of the region. The features of Russia's socio-economic development in the context of its territorial division are revealed, contradictions and existing restrictions on the country's uniform territorial development are systematized. The concept of "potential for self-development of the region" was identified and its structural components were clarified. The method of identifying and evaluating the self-development potential of the subsidized region in accordance with its structural features is proposed (in the context of economic and social, dynamic and static, internal and external components). The mechanism of transition of the subsidized region to self-developing regions based on regional policy adjustments is proposed.

Keywords: Regional Differentiation, Self-Development Potential, Subsidized Region

Introduction

Russian regions have a high degree of differentiation in terms of economic development and quality of the population life. This unevenness is determined by different availability of natural resources, historical infrastructure, natural and climatic conditions, the mentality of the population, and other factors. According to the world Bank, Russia is one of the top three countries in terms of regional inequality in Europe and Central Asia (RBC, 2018).

Taking into account the existing problem of poverty in some regions (according to the Ministry of Economic development of Russia, its level varies from 6 to 40% of the population of regions) and the intensive development of other regions (regions-leaders), the key task of the public administration system is to ensure territorial alignment (RBC, 2019).

As practice shows, the implementation of various socio-economic development programs in subsidized regions is difficult for various reasons, starting with the lack of a resource base for territorial development, and ending with the inefficiency of the existing management system in the region.

Thus, modern economic conditions dictate the need to find new tools for regional policy development of underdeveloped regions that can ensure the transformation of subsidized regions into self-developing ones.

Materials and Methods

The scientific hypothesis of the research is based on the assumption that in the conditions of significant socio-economic differentiation of regions and imperfection of their state regulation, the only way to overcome the lag and ensure their dynamic development is to reveal the potential of self-development of the region. This process can be achieved through the use of regional policy tools that can transform underdeveloped regions into self-developing ones.

Main purpose of the study:

1. To reveal the features of Russia's socio-economic development in the context of its territorial division, to identify contradictions and existing restrictions.
2. Identify the concept of "self-development potential of the region" and clarify its structural components.

3. Propose effective regional policy tools aimed at identifying and realizing the potential for self-development of subsidized regions.

The theoretical basis of the research consists of publications that reflect the specifics of regional development (Shekhovtseva, 2005).

Tyunen's research is devoted to the analysis of regional differentiation problems (Tyunen, 1926). The author has shown that the differentiation of territories occurs on the basis of the location of production and areas around the city and depending on the impact of transport costs on production.

Lyosh proposed a typology of regions, highlighting market zones that are formed by selling products, and the economic landscape that unites market zones (Lyosh, 2007).

The problems of regional disproportion, as well as the emergence of centers of economic growth and channels for spreading growth in space are reflected in the concept of "center-periphery", presented in the works of Friedmann, 1973, Hägerstrand, 1966. The authors proved that regional differentiation does not completely disappear, and individual territorial entities can relatively converge in terms of socio-economic development.

Features of state regulation of regions are presented in the works of Granberg, 2001.

The information base of the research is the official materials of the Federal state statistics service of the Russian Federation, the Ministry of Finance of the Russian Federation, EMISS, World Bank data, expert opinions of RBC, Garant, and RIA.

Methods that were used to implement the study: the method of economic analysis, grouping, induction and deduction, expert assessments.

Results and Discussion

The spatial development of Russia has a pronounced specificity, which is manifested in the following.

Firstly, *85 regions (subjects of the Russian Federation) are allocated as part of the state)* (Statedata, 2020), that is, relatively independent territorial units that have clear internal borders and a specific resource and material base, infrastructure, as well as a unique production complex with a certain specialization.

The presence of such a large number of territorial units creates prerequisites for their significant differentiation in terms of socio-economic development.

Martin revealed a specific trend in the formation of regional development inequality: the increase in regional differentiation occurs even despite the positive dynamics of the country's economic growth (Martin, 2005).

In Russia, regions that have clear competitive advantages due to the powerful natural resource potential or developed Metropolitan regions traditionally show economic growth. This phenomenon can be explained by a more developed infrastructure and greater capacity of the consumer market, respectively, lower business costs, investors prefer to invest in initially economically developed regions.

If we consider the Russian regions by the level of differentiation, a pattern is highlighted: the presence of a significant gap between the upper and lower borders, which at certain stages of development tended to increase. For example, the value of this gap was 10 times in 1996 and 13 times in 2016 (Midov, 2018) (table 1).

Table 1: Differentiation of Russian regions in terms of GRP per capita in 2014 and 2017

2014		**2017**	
Regions with the highest GRP per capita			
Sakhalin region	29022,2	Tyumen region	32991,7
Tyumen region	26424,7	Sakhalin region	27394,3
Chukotka Autonomous district	20318,4	Chukotka Autonomous district	24064,0
Moscow	18701,0	Moscow	21939,2
The Republic Of Sakha (Yakutia)	12245,1	Magadan region	18894,9
Magadan region	11555,1	The Republic Of Sakha (Yakutia)	16514,2
Republic of Komi	9917,2	Saint Petersburg	12625,2
Saint Petersburg	9168,7	Republic of Komi	11791,0
Krasnoyarsk region	8785,1	Krasnoyarsk region	11363,1
Kamchatka territory	8137,2	Kamchatka territory	11108,5
Regions with the lowest GRP per capita			
Republic of Dagestan	3154,8	Republic of Buryatia	3555,0
Adygeya Republic	3003,4	Republic of Dagestan	3545,1
Republic of Kalmykia	2951,3	Republic of Tuva	3204,7
Ivanovo region	2597,1	Republic of North Ossetia-Alania	3168,7
Karachay-Cherkess Republic	2474,8	Ivanovo region	3166,6
Kabardino-Balkar Republic	2418,4	Sevastopol	2864,2
Ingush republic	2013,6	Karachay-Cherkess Republic	2779,7
Republic of Chechnya	1950,0	Kabardino-Balkar Republic	2779,1
Republic of Crimea	1787,8	Republic of Chechnya	2178,3
Sevastopol	1387,3	Ingush republic	1993,8

(created by authors, source: Gks, 2020)

The table shows that the positions of highly developed and underdeveloped Russian regions do not change over time. The maximum value of GRP per capita in the Tyumen region is the main oil-producing region of Russia. This situation will continue in the coming years, and the prospects for reducing this indicator can only be associated with the intensification of economic development of more backward regions. In 2014-2017 there was a redistribution within the group of regions with the lowest GRP per capita: the Republic of Crimea and Sevastopol improved their performance, moving to higher positions in the ranking.

Disparities in economic development between regions lead to social development inequalities, which, in turn, limit the opportunities for economic development of the regional economic system (for example, due to the outflow of the working-age population).

For example, the upper limit of the average monetary income per capita differs from the lower limit by more than 5 times (Fig. 1).

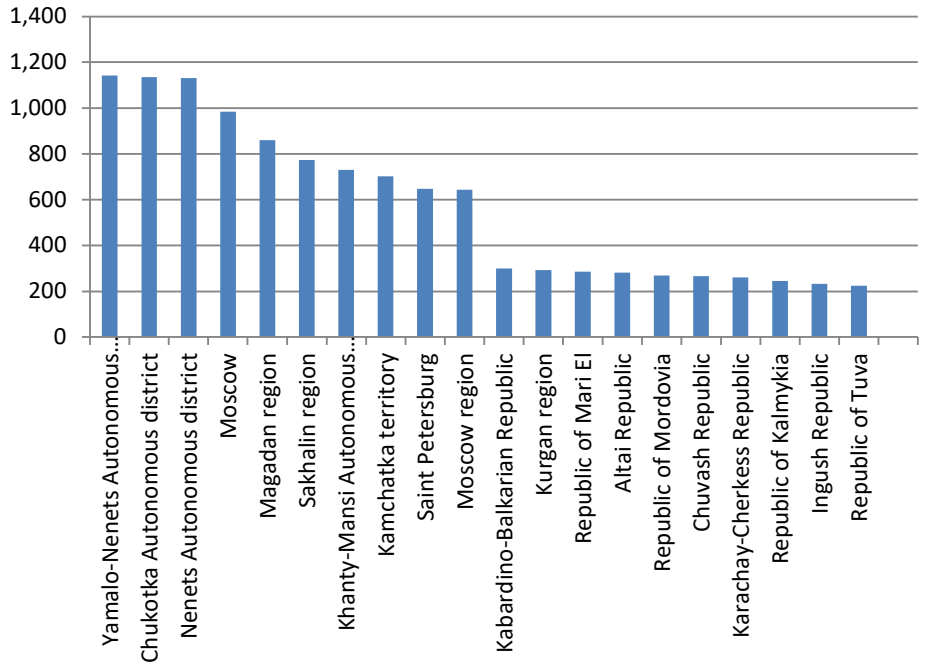

Fig. 1: Differentiation of Russian regions by average per capita income in 2018

(created by authors, source: Gks, 2019)

The Gini coefficient and decile coefficient are used to measure social and economic inequality in regions. The values of the Gini coefficient (income concentration index) in the period from 2014 to 2017 ranged from 0.42 to 0.41(EMISS, 2019), this allows us to conclude that the dynamics of the coefficient has a weakly expressed positive character in the analyzed period.

The decile ratio (the ratio of the minimum income of the 10% of the most affluent population to the maximum income of the 10% of the least affluent population) remained at 7.1 between 2014 and 2017 (EMISS, 2019). Note that the value of the decile coefficient in Germany in recent years is 1.8, in France - 1.4, in Italy - 2.1, in China - 2.93, which indicates the evenly developed economies of these countries.

Secondly, the typology of regions used in Russian regional management practice also has distinctive features.

In the European Union, the typology of regions is based on the principle of "center-periphery" and Central, peripheral and transitional regions are distinguished (depending on their "accessibility index"). Depending on the nature of socio-economic development, Friedman's typology is also used (division of regions into main, ascending, and descending development corridors). The first three of these types of regions are growing or developing, and the last one is a problem region that requires some effort on the part of the authorities (Friedmann and Alonso, 1964).

In Russian scientific research on regional Economics, the Bandman's typology is used, according to which traditionally backward, depressed, developed industrial, industrial-agrarian, agricultural, raw material, resource developing regions are distinguished (Bandman et al., 1984). Granberg reveals the specific features of various types of regional economic systems, highlighting: crisis; underdeveloped, old-industrial, agricultural, mining regions, depressive in nature of their development, border regions (Granberg, 2001).

However, the most suitable for Russian business practice is the typology of regions into donor and recipient regions.

The basis of the classification of the subjects of the Russian Federation into "donor regions" and "recipient regions" is the nature of their development and the degree of its dependence on the assistance of the Federal center (Egorov and Kuznecov, 2018). According to this classification, the donor region has its own funds for sustainable development, while the amount of tax revenues to the Federal budget exceeds the amount of funds received from the Federal budget for the development and support of a specific territory. Recipient regions or subsidized regions are characterized by the lack of sufficient budget funds to ensure their own development and a decent standard of living for the population, which is the basis for receiving subsidies from the Federal budget. These regions usually include crisis, backward and depressed regions.

From the standpoint of this approach, crisis regions with indicators of socio-economic development lower than the national average are recipient regions (for example, in Russia, these are regions of the Ural belt, which are characterized by a decline in production, unemployment, low living standards, budget security, etc.). Backward regions are regions with pronounced features of stagnation due to the poorly diversified structure of the economy, unrealized scientific and technical potential (in Russia, this is the majority of the republics of the Caucasus, the districts of southern Siberia, and Kalmykia (Rkgovru, 2018).

Depressed regions are regions that are in a state of depression under the influence of a certain set of factors, but previously have traditionally high indicators of socio-economic development (for example, reduced product competitiveness, lack of government orders and reduced demand, exhaustion of the mineral resource base, structural changes in the economic complex of the country (Cito-web, 2019).

The list of subsidized regions in accordance with the Order of the Ministry of Finance of the Russian Federation dated 15.11.2019 No. 1032 in 2020 includes 72 Russian regions. These include regions that have 40% of their own revenues from the consolidated budget of the region made up of subsidies from the Federal budget (Garant, 2019).

As a rule, the budgets of subsidized regions tend to slow down the growth rate of their own income, exhaust the sources of growth of the tax base, the state of deficit, debt dependence, imbalance and dominance of social obligations (Filatov, 2017). Investments in fixed capital in subsidized regions tend to fall in growth rates due to stagnation of production, damping of business activity, exhaustion of the reserve strength and resources of the basic enterprises of the region, slowing the growth rate of GRP, increasing the separation of production and economic potential from other regions.

As a result, the working population moves to more developed regions, informal employment zones grow, and the subsidized region reduces the residual competitive advantages.

Thirdly, the implemented policy of inter-budgetary alignment is low-effective. This occurs as a result of the regional economic system's disequilibrium (Karpunina et al., 2018a): under the influence of impulses, they change randomly over time, mostly in leaps and bounds (Zagulyaev, 2011); the time

period required for diagnosing the internal structure and state of the regional economic system is quite long and limited by the inertia of the economic system itself. Nonequilibrium regional economic systems of subsidized regions neutralize the results of management actions of authorities and do not provide a response from the economic complex of the region (Karpunina et al., 2018b). The failure to ensure a budget surplus and its own socio-economic sustainability is the final result.

In 2017, we can see a positive trend in the reduction of regions with budget deficits: from 74 in 2014 to 30 in 2017 (table 2).

Table 2: Execution of the consolidated budgets of the Russian Federation subjects in 2014-2017, billion dollars

Name	2014	% by 2013	2015	% by 2014	2016	% by 2015	2017	% by 2016
REVENUE	158,3	109,1	127,6	104,5	136,1	106,6	178,1	103,4
Tax and non-tax revenues	127,6	108,9	104,6	106,2	113,7	108,7	149,8	104,1
Gratuitous receipts	30,7	109,6	23,1	97,4	21,5	97,8	28,3	104
EXPENSES	166,3	106,2	130,0	101,4	136,3	104,8	179,0	103,8
Surplus (+)/ Deficit (-)	- 8	69,8%	- 2,3	38,3	- 0,2	7,3	-0,9	
From them:								
The deficit (the number of regions)	-9,3 (74)		-5,1 (76)		- 2,8 (56)		-0,7 (30)	
The surplus (the number of regions)	+1,4 (11)		+2,7 (9)		+ 2,6 (29)		+ 11,7 (55)	

(created by authors, source: Ministry of Finance of Russia, 2017)

We can see that the size of inter-budget transfers in the period 2017-2020 tends to decrease, however, the alignment is mainly due to a massive budget policy, and not due to the intensive economic development of weaker regions (table 3).

Table 3: Inter-budget transfers to the budgets of the Russian Federation subjects

in 2017-2020, billion dollars

Indicator	2017	Limit volumes 2018	Change in %	Limit volumes 2019	Change in %	Limit volumes 2020	Change in %
1. Inter-budget transfers, total	28,3	27,7	97,7	26,6	96,2	25,6	99,7
including:							
1.1. Grants, including:	12,9	13,2	102,6	13,3	100,6	13,5	101,1
Equalization grants	10,7	11,0	103,0	11,0	100,0	11,0	100,0
1.2. Subsidies	7,4	6,7	91,0	5,9	88,7	5,9	99,4
1.3. Subventions	5,4	5,4	100,0	5,5	102,6	5,6	101,0
1.4. Other inter-budget transfers	2,7	2,4	88,8	1,9	78,5	1,6	87,0

(created by authors, source: Ministry of Finance of Russia, 2017)

Thus, today we need a new methodological approach to unlocking the potential for self-development of subsidized regions and developing regional policy tools that can ensure the transformation of underdeveloped subsidized regions into self-developing ones. This will eliminate the socio-economic differentiation of Russian regions.

A self-developing region is a region with an economic system that can ensure the growth of production volumes along with expanded reproduction of the gross regional product, optimize the use of all available resources in the region, and prevent the negative impact of factors on individual sectors of the economy and territories (Fedolyak, 2014).

The self-development potential of region this is the unity of its economic and social components, static (a set of available resources that provide simple reproduction based on the use of extensive factors and management methods) and dynamic components (opportunities and target orientations that the region accumulates, replenishes, restores, transforms and implements throughout the entire period of its operation in order to obtain economic and social results), internal (effectiveness of the implemented regional policy) and external (institutional conditions and restrictions from the outside world) components that serve as a source of regional economic development (Fig. 2).

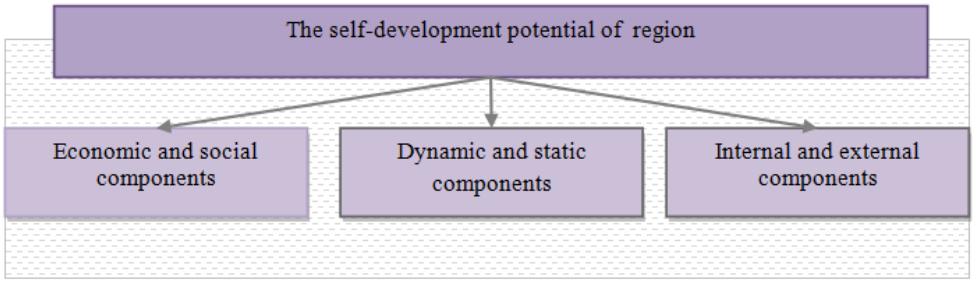

Fig. 2: Structural features of self-development potential of the region

(created by authors)

It is possible to identify the self-development potential of region by using indicators of national ratings (external), or by analyzing the internal characteristics of regional development (internal) (Yur'ev and Bludov, 2013).

External assessment of self-development potential of the region is based on expert assessments, which are reflected in the form of regional ratings. For example, the rating of the socio-economic situation of Russian regions, built by experts of the "RIA Rating" on the basis of aggregation of key indicators of regional development (indicators of the scale of the economy; indicators of economic efficiency; indicators of the budget sector; indicators of the social sphere) allows you to answer the question about the positions of a region on the economic map of Russia, to determine the disparities in the level of regional development.

External rating approach to the assessment of self-development potential of Russian regions shows that in 2018 the smallest size potential of self-development possess such highly subsidized regions: Republic of Tuva, Jewish Autonomous district, Altai Republic, Ingush Republic and Chukotka Autonomous districts (RIA Rating, 2019). The decrease in rating points and lower the position of these regions was due to the reduction in the share of profitable enterprises, lower tax and non-tax revenues of the consolidated budget, rising debt burden, a rise in infant mortality.

However, such ratings are widely used to compare regions, but do not allow you to identify and assess the self-development potential of the region.

We believe that the identification and objective assessment of the self-development potential of the region should be based on the calculation of the average value of the rate of change of indicators that

characterize the effectiveness of the regional economic system (Yur'ev and Bludov, 2013):

1) indicators of development: the volume of investments in social infrastructure (investments in social projects), investment in human capital; investment in non-financial assets (as intellectual property), the volume of innovative goods and services (%of total volume), the amount of tax revenues to the budget, payments to social and pension funds.
2) indicators of overall socio-economic situation in the region: average annual number of employed in the economy of the region, average monthly real wages by region, the number of business structures during the reporting period, the average annual turnover.
3) indicators of deceleration (their increase indicates an increase in negative trends in the region's economy): the degree of depreciation of fixed assets; shadow turnover; the share of "gray" wages.

Let's group these indicators in accordance with the features of the structure of the self-development potential of region:

- economic (average number of people employed in the economy of the region; the number of business structures during the reporting period; the degree of validity of fixed assets (indicator, reverse indicator of the degree of depreciation of fixed assets); volume of innovative products and services; the average monthly real gross wage; the amount of tax revenues in the budget) and social (payments to social and pension funds; investment in human capital; investment in social infrastructure; the share of "white" wages (the inverse of the share of "gray" wages in the region's economy));

- static (number of business structures for the period; average annual turnover; average number of people employed in the region's economy) and dynamic (the amount of payments to social and pension funds; investment in human capital; investment in social infrastructure; the share of "white" wages; the degree of validity of the fixed assets; the volume of innovative products and services in the total volume of goods and services; average monthly real wages in the region; the volume of tax payments to the budget) ;

- internal (the number of business structures for the period; average annual turnover; the proportion of "white" wages; the degree of validity of the fixed assets; the volume of innovative products and services in the total volume of goods and services; average monthly real wages by region; average number of people employed in the region's economy; investment in human capital; investment in social infrastructure) and external (the amount of tax revenues to the budget; the amount of payments to social and pension funds; the amount of tax payments to the budget).

The final assessment of the existing self-development potential of the region is made by calculating the average value of generalizing indicators that characterize the dynamics of economic and social effects of the region's activities and its contribution to the development of the national economy. If the index value exceeds 100%, this demonstrates the high self-development potential of the region, in the case of the indicator value equal to or less than 100%, we are talking about low level implementation of the self-development potential of the region.

Conclusions

Economic systems of subsidized regions that have non-equilibrium properties and have a self-development potential more than 100% require a special system of state regulation and support aimed at stimulating. In this case, the traditional mechanism of creation and implementation of regional socio-economic policy of the subsidized region must be enabled in the unit identify and evaluate the self-development potential of the region, which will provide flexible regional management in accordance with a pre-ranked in order of importance, the target system functions in pursuit of the complex index (Fig. 3).

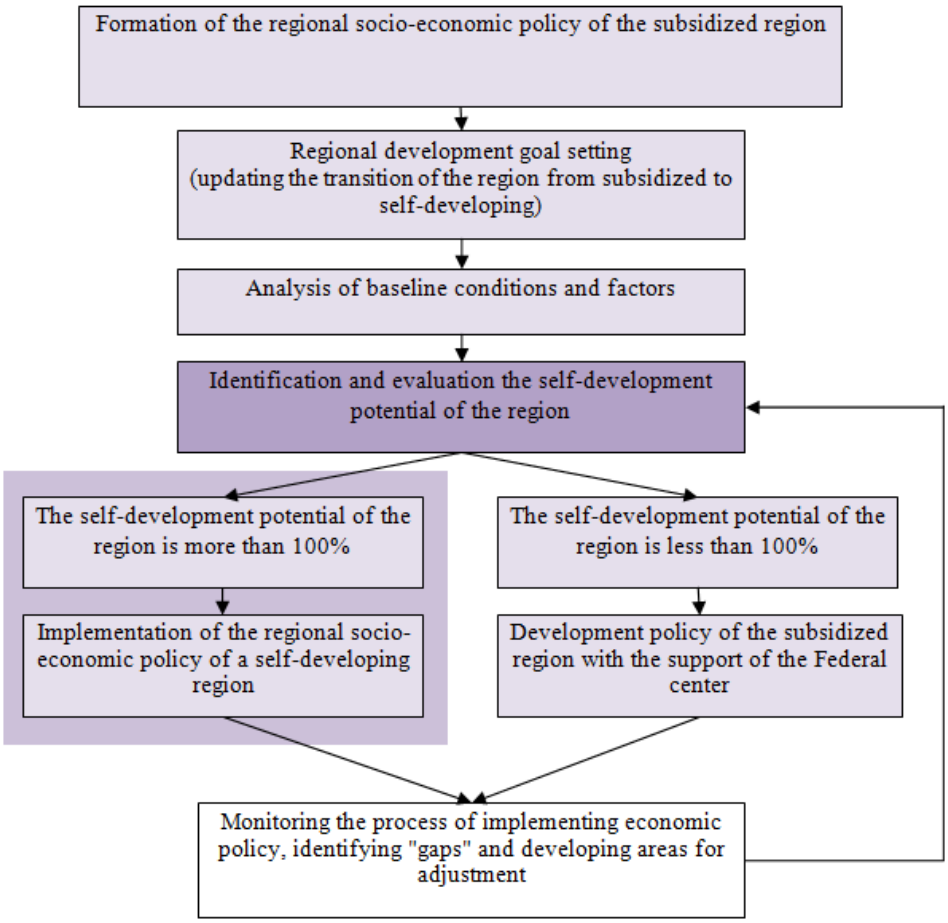

Fig.3: The mechanism of transfer of a subsidized region into a self-developing

(created by authors)

When a subsidized region moves to self-development, its lowest goal is self-sufficiency, and the highest goal is to achieve full financial independence of the region from the budget subsidies of the Federal center at the expense of:

1) improving the efficiency of using regional factors (natural, material, financial, intellectual);

2) application of financial incentives and levers that contribute to the growth of production and increase the income of economic entities in the region;

3) realization of human potential on the basis of activation of creative abilities, initiative, self-development of the individual;

4) development of economic relations of the region with other territorial systems and countries that can meet its production and final social needs.

Thus, the study allowed us to identify the features of the territorial development of Russia, to systematize the existing contradictions that prevent the alignment of regions in terms of socio-economic development. The dynamics of development of subsidized regions and the factors that

constrain their ability to build development potential are analyzed. The disclosure of the concept of "self-development potential of the region", as well as the developed methodological approach to its identification and evaluation, allowed us to propose new mechanisms for the development of subsidized regions.

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The Moldovan Free Economic Zones and Their Effects on the Republic of Moldova's Economy

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Abstract

The main purpose of the paper is to identify the strategic importance that the Free Economic Zones (FEZ) have for the economy of the Republic of Moldova. Although, the definitions of said zones differ from country to country, the main incentives are the same: socio-economic growth and business and trade facilitation. One of the objectives of the paper is to determine the current state of the Moldovan FEZs and understand how their usage has translated into numbers, regarding growth and economic and commercial potential. Using statistical data on trade, foreign direct investment inflows and employment we were able to quantify some of the main effects the FEZs had during the last 10-15 years on the national economy as a whole. In the last part of the paper, the main focus is on future research directions and recommendations to take into consideration in order to obtain more viable and impactful results regarding the proposed subject.

Keywords*:* Special Economic Zones, Free Economic Zones, Foreign Direct Investment, Trade Facilitation

Introduction

Despite its rapid economic growth since the beginning of the century, the Republic of Moldova still remains one of the poorest countries in Europe and in the world. Since its economy still relies on a small variety of goods and services and shows a great deal of vulnerability when it comes to external factors, its trade performance and potential is of great interest for the academia and the society as a whole.

Within the new globalized economic framework, it is very hard to ignore the importance of trade and foreign investment for such small and relatively newly formed countries like the Republic of Moldova, especially taking into consideration its soviet past. Thus, the policy-makers should rather focus on reducing the gap between Moldovan producers and the global and regional markets like the EU and CIS, but also allow the foreign investors gain access to the internal market in order to facilitate trade, know-how transfers and development when it comes to management efficiency.

That is why the role of the Free Economic Zones present a massive interest and might prove to be a great way to achieve all of the above, or at least be the push that is so needed in order to finally surpass the transition period between a formally centralized economy and a free-market one. Although, the implications are more complex than it might seem at first, we would like to begin with identifying the Moldovan Free Economic Zones, how much investment comes through them and how do they effect the Moldovan economy in terms of trade, employment and production diversity. In the end, we hope to be able to identify new ways for further research that would allow us to come with empirical data and possible suggestions for future policies.

A Review of The General Framework. Incentives and Typology

The Free Economic Zones (FEZ) are basically a type of Special Economic Zones (SEZ), which are designated territories of a country where the applied economic rules differ from the rest of the economy. Usually the main objectives of any Special Zone might be summed as following: attracting FDI; act as a catalyst for unemployment reduction programs; diversifying exports and develop a less vulnerable economy, especially when it comes to global economic shock; and last but not least, they might act like experimental grounds for new policies, before applying them on a larger scale (World Bank, 2011).

There is no single and universally accepted classification of special economic zones, but the commonest approaches group them according to key factors such as their development objectives, their location and the types of activities they house. According to the classification used by the World Bank there are six zones, based on the main focus of the policies used within said zones. The main incentives may vary from free-trade facilitation in the case of the Free-Trade Zones (FTZ) to boarder regional development in the case of Free ports or wider Special Zones those which include a wide variety of commercial and industrial activities (OECD, 2017). The former represents a traditional model used widely throughout the developing world for almost four decades. The latter represents a more recent form of economic zone, originating in the 1980s in China and gaining in popularity in recent years. At the same time, the presented models do not necessarily exclude each other, most of the SEZs actually include FTZ in itself and the definition of each typology might differ from country to country. It is also quite difficult to find one generally accepted opinion when it comes to the positives that the establishment of the SEZs might bring for a country's economic growth, the results and the incentives being varied as well.

Moldova's Free Economic Zones and Their Effect on The Economy

The Moldovan government defines its Free Economic Zones as parts of the customs territory of the Republic of Moldova, economically separated, strictly delimited throughout their perimeter, where for domestic and foreign investors are allowed, preferentially, genres of the entrepreneurial activity. Meanwhile the main incentives are stated to be the acceleration of the socio-economic development of certain territories and of the country as a whole. In order to achieve this, the authorities hope to attract foreign investment; implement new technology; develop export-oriented production; apply the advanced management and production policies and create new jobs.

Moldova is known for its reliance on the Free Economic Zones. At the moment, there are 7 active Zones in the whole country, which are further divided into 34 subzones. More than a half of them were created during 2018. The number of active enterprises in the said territories has been constantly growing during the 2015-2018 period after years of stagnation and failed attempts to attract more investors the years prior. The total number of residents has reached over 200 units at the beginning of last year, which represent a 10% growth in comparison to the prior 12 months (Fig 1).

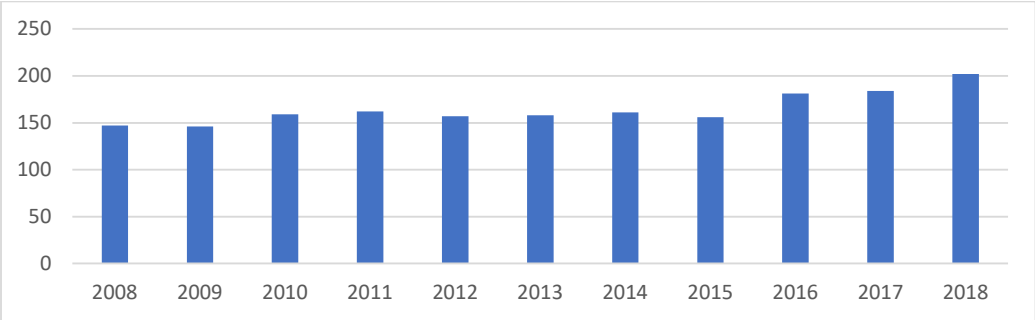

Fig. 1: Number of active enterprises within the Moldovan FEZs (2008-2018)

Source: Ministry of Economy and Infrastructure of the Republic of Moldova

When it comes to investing in the FEZs, the total value of the inflows constituted 402.4 million US dollars, increasing in 2018 by more than 15% in comparison to 2017, generally retaining an upward trend since the inception of the free zones (Fig 2). During the last 1ast 17 years, the total value of the investment has reached ten times the numbers from 2002. Most of the investment it is, however, absorbed by the Balti Zone, situated in the north of the country (around 46% of the total), second being the capital city of Chisinau with a little more than 18%. In 2018, on average, a resident total investment was around 247 thousand US dollars. As a whole, the FEZs are estimated to attract almost 30% of all FDI inflows of the country.

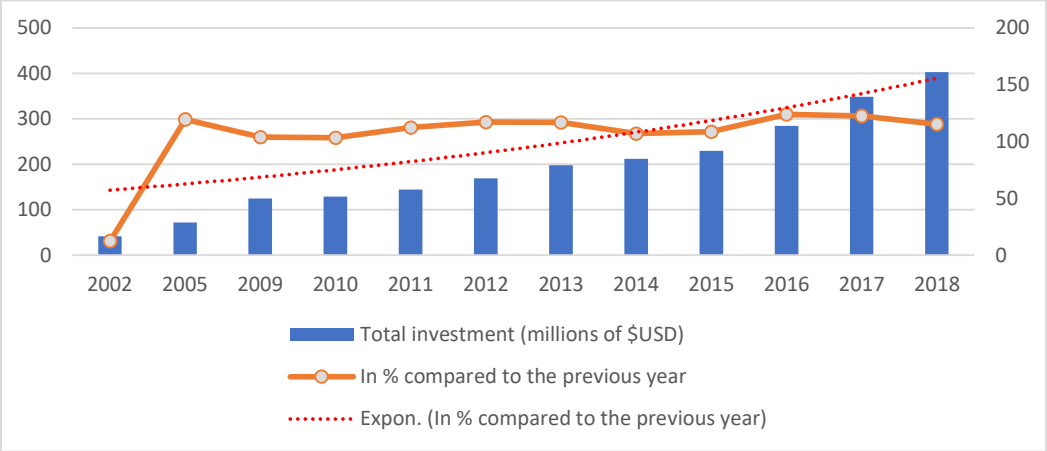

Fig. 2: The evolution of total investment towards the Moldovan FEZs (2002-2018)

Source: Ministry of Economy and Infrastructure of the Republic of Moldova

Another clear tendency that becomes easy to spot during the last decade is the growth of the industrial output within these economic zones. As far as the government is concerned, this can be considered a nice trend to follow, because the economy is quite vulnerable to external shocks as it still depends a lot on the agricultural sector. Once again, it seems that the overall income from industrial activities has grown tenfold within the last decade (Fig 3). The latest estimates show that at least 18% of the total industrial production was generated by the FEZs.

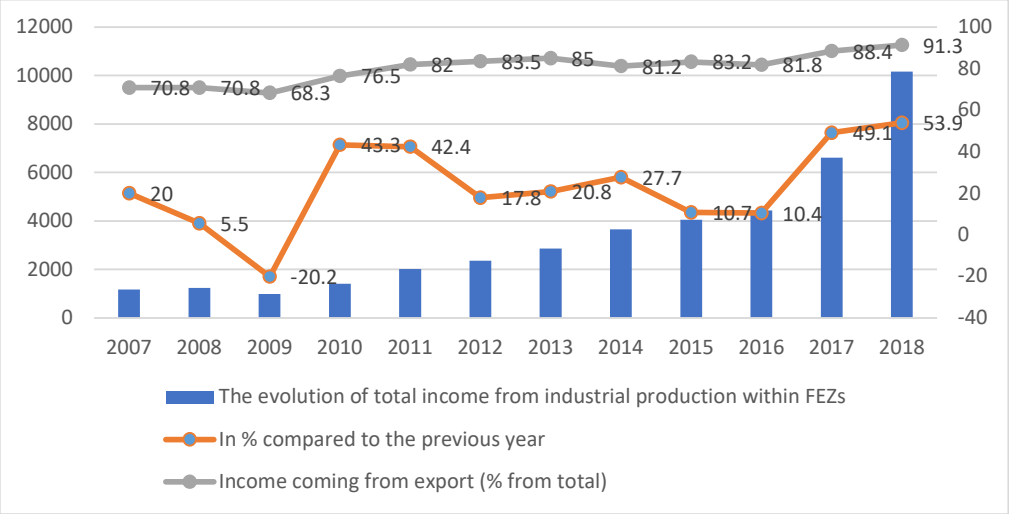

Fig. 3: The evolution of total income from industrial activities within FEZs (2007-2018)

Source: Ministry of Economy and Infrastructure of the Republic of Moldova

Apart from the effects all this might have on the structure of the economy, it is also worth mentioning that these activities generate an increased income as a result of their general orientation to the external markets. It is safe to guess that foreign investment in the zones has brought new technologies and know-how, but also new methods of conducting affairs, that might eventually increase the standards of the local production and make Moldovan exports more competitive. In 2018, more than 90% of the total revenue obtained in said territories from industrial activities came from export (Fig 3). At the same time, when compared to the economy as a whole, almost 21% of the total exports for 2018 came from the FEZs.

Table 1: Evolution of number of employees and average wages within FEZs

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Number of people employed	3586	3018	5177	5875	6512	6896	6620	6502	8024	11926	15867
Average salary (MDL)	-	-	-	-	-	-	4900	5300	5600	8300	7500

Source: Ministry of Economy and Infrastructure of the Republic of Moldova

The continuously growing activities within the Free Economic Zones have lead to a greater number of people getting employed by the economic agents who do business here. Also, the average salary of the people working here, although still low by the Western standards, are higher than the national average. In fact, the average salary within the FEZs is at least 11.3% higher than the national average value. This is most definitely a result of the higher added value of the production that is obtained by said enterprises. It is estimated that almost 2.5% of all the employed Moldovans are working within the FEZs. The same number of employees consists more than 13% out of all people working in the secondary sector of the economy. At the same time, an increase in income for the people and the active firms means more money collected from taxes, which can only bring positive long-term effects and further upward trend when it comes to work remuneration and increasing living standards for the residents.

Conclusions and Further Recommendations

The Free Economic Zones seem to maintain a really important role for the economy of the Republic of Moldova. In general, the activities that take place within these territories and the enterprises that choose to settle here bring a lot of positive effects on the country and its economic potential. The number of said enterprises is constantly increasing, bringing more foreign investment and technological and soft skills know-how to the table. This also act as a catalyst for a slow, but needed change when it comes to economic structures and lowering vulnerabilities in front of shocks and imbalances. And, at the same time, the FEZs actually has a social impact, by countering long-term unemployment and low living standards.

Although the data proves the utility of said zones and that the results are in-line with the government intentions of economic and social growth, it is hard to quantify yet how big the impact really is. Further research is definitely required in order to identify if there are differences between the zones and subzones themselves, since most of the activities are taking place in three main units (Balti, Chisinau and Ungheni). We would also like to identify the main factors that determine the attractivity of each territorial unit and what were the results so far in comparison with all the others. At the same time, it is also important to see how the FEZs acted as experimental grounds for policies and which policies work or didn't work in the past and if there are any new ideas in order to boost the FEZs positive effect on the economy.

Acknowledgment

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Impact of Social Media Marketing and e-Commerce on The Performance of SMEs in UAE: A Structural Equation Modelling

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Abstract

This research is on the impact of social media marketing and e-commerce on the performance of SMEs in UAE: A structural equation modelling. The research papers investigate the social media marketing impact on SMEs performance. Data were collected from the SMEs in UAE. The research employed quantitative approach and used questionnaire to collect relevant data from the respondents. The model was developed using SPSS and AMOS software as the research is quantitative in nature.

Keywords: Facebook, WhatsApp, Twitter, Social Media, SMEs and UAE

Introduction

The usage of online marketing technologies in SMEs does not stretched out to the required level (Ahmad et al., 2019). In study conducted by Sarah, (2012) on the social media marketing in a small business. The results of this study found that SMEs are not using social network marketing to its full potential and scope. SMEs have been struggling to follow a sequence of stages in their adoption of Internet technologies. These staged models were also termed to be ladders postulate that businesses move in stages from basic use of the internet as an e-mail or marketing tool to a more sophisticated use that integrates business systems and redesigns business processes (Fernando, 2005).

Online social channels offer connectivity and transparency for SMEs to gain a competitive advantage. Among the 83% of marketers indicated that social media network is very important for their business (Nuseir, 2018). A report by Orient Planet Research found that social media channels such as Facebook, YouTube, WhatsApp and LinkedIn are increasingly being used by SMEs and have become major business enablers. The report also revealed that social media in U.A.E presents itself as an invaluable tool for SMEs due to the range of benefits that it has to offer and at a reasonable cost. The report also showed that SMEs represent 95 per cent of all local establishments, accounting for 42 per cent of the workforce and contributing around 40 per cent to Dubai's economy (Basri, 2016).

Today the penetration of social media network is huge in U.A.E. However, it is not being used for marketing purposes (AlSharji, 2018). Even though, the U.A.E is among the top countries in the world, with high percent smartphone penetration (78%) and more social media adoption even higher than the United States (Zaidan, 2017). This shows that UAE citizen does not make use full advantages of social network especially with broad coverage wider penetration for the online user persuade them to become online buyers.

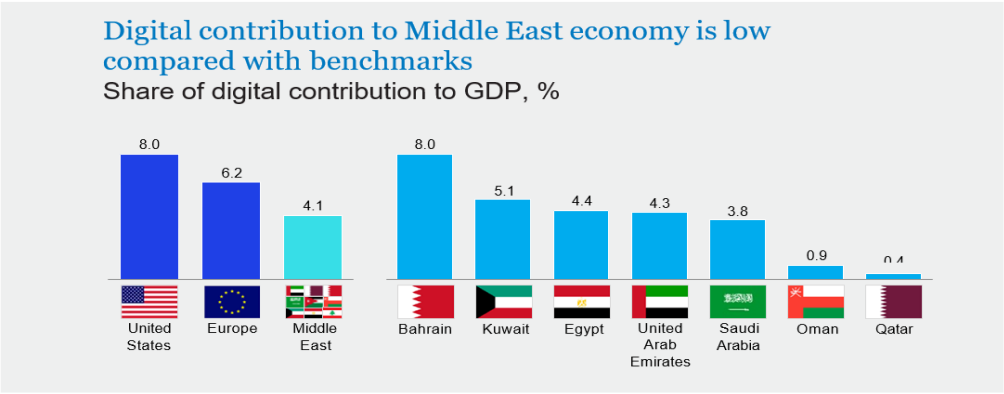

Figure 1: The digital distribution in Middle East economy

Source: James et al (2016)

In addition to that, the UAE government ranks number one in digital and internet adoption among Middle Eastern countries and matches the digital frontier countries. Nonetheless, using social media as marketing agent for SME in U.A.E is not encouraging (Makki, et al., 2015). It is found that 73% of small businesses are now using social media. Furthermore, four fifths (81 percent) of these plans to further increase their social marketing efforts, and 62% of SME not currently using these channels have said that they plan to do so in the next year (Basri, 2019) Based on the survey conducted by IPSOS, of those UAE online adults polled, 63% had shopped online in the last 12 months with almost half (49%) of these shopping both domestically and cross-border and the top three countries that UAE online shoppers opt to buy from are revealed as the United States (30%), United Kingdom (18%) and India (18%). These statistics shows how online shopping give impact to the businesses locally and globally. The statistics highlighted that UAE citizen are still not satisfied with the quality of the e-commerce website locally whereby they prefer to shop from other countries instead of their local website. Hence, it is important to increase the economic growth specifically among SME's in U.A.E that have interest to involve with e-commerce and social media marketing activities. The presence of SME's in UAE economy is trivial For example SMEs contribute around 40% to the total value-add generated by the Dubai's economy, with the trading accounted for 47% of the total value-add by SMEs; the share of Service SMEs is around 41% and that of Manufacturing SMEs is estimated at around 13% (Abu Bakar et al., 2019).

The consumers in U.A.E are primed and ready to lead digitally enhanced lives, businesses and governments have not fully embraced the digital opportunity yet. A recent survey revealed that just 18 percent of small and midsize enterprises (SMEs) in the United Arab Emirates have an online presence through social media network (Olanrewaju et al., 2020). Despite The following figure shows SMEs percentage of presence in online business.

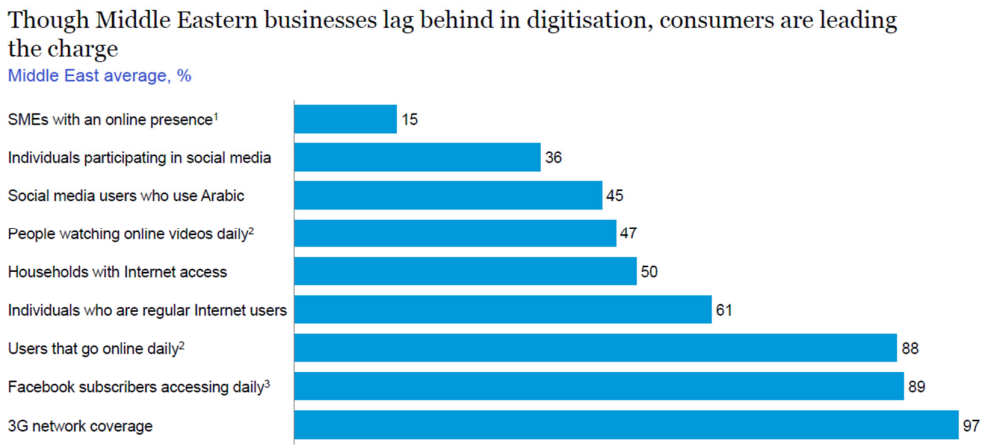

Figure 2: SMEs percentage of presence in online business

Source: Networked Readiness Index (2015)

It is evident that the presence of SMEs through social media network is facing big challenges due to several obstacles, whereby 2019, projections estimate that the Middle East and Africa will have the world's highest cloud traffic growth rate at 41% (Global Cloud Index forecast, 2016). Large corporations as well as SMEs in U.A.E often struggle to drive innovation from inside the company. Today, many companies have yet to tap into social media opportunities to innovate in business and expand (Kareem, 2015). Social media adaption by firms creates a great network among businesses, customers and suppliers. However, less attention has been paid to the social media marketing values for SMEs performance (Odoom et al., 2018). Given that small and medium sized enterprises are economic engine of most of countries, previous studies mainly have focused on the adaption (Durkin, McGowan, & McKeown, 2013; Wamba & Carter, 2016) and benefits and barriers (Michaelidou, Siamagka, & Christodoulides, 2011) of social media in SMEs context. SMEs in U.A.E do not fully make the best use of the potentials and opportunities offered by online marketing. The application of mobile devices, and social media networks (SMNs) such as Facebook has revolutionalised the e-commerce adoption process in SMEs. However, research into this area is still developing and there is a dearth of knowledge on how SMEs in UAE enact and apply this phenomenon.

There is a growing body of academic literature on the use of social media marketing among SME's. However, most of the existing studies focus on larger enterprises that have a higher propensity for adopting new and innovative technologies. There have been modest studies on social media marketing in the context of SMEs explicitly (Ahmed et al. 2018). It is widely known that SMEs are often less likely to use emerging technologies due to their limited capabilities, lack of resources, absence of technical expertise, unstable organization structure, small number of employees and lack of capacity (Al Tawara et al., 2017). Additionally, Karjaluoto (2015) found out that SMEs look like not utilising the social media and online tools to maximum potential marketing, and therefore SMEs are not getting any benefits offers by these tools. This result is matched with a study conducted by Alaa, (2016) in U.A.E. They found that SMEs' average sales from online marketing are 32.2% and it is "somewhat very low" due to low attitude of customers to rely on social media ads of SME, he found a positive correlation between sales of SMEs and the efficiency of social media marketing.

Based on the above argument, the problem statement of the current study is that SMEs in U.A.E are unable to achieve a significant increase in their sales through social media network due to several obstacles such as weak attitude of customer to use social media ads, subjective norm of customers, information quality of ads on social media pages, and behavioral intention to use social media network as a marketing agent for e-commerce in U.A.E. This problem will be investigated in this study and suggesting the appropriate recommendations.

Methodology

The study used quantitative approach to achieve the research objectives. The use of quantitative methodology provides a concrete manifestation of the findings on an actual setting. In the same light, the use of this type of research allows the researcher to measure the parameters held in the objective of this research. (Benz, 2011).

The collection of data for analysis was conducted through questionnaire as the main tools for collecting data. Quantitative research based on the statistics was used to evaluate the impact of social media marketing and e-commerce on the performance of SMEs in UAE. Also, SPSS and AMOS software were employed to analyse the data collected from the respondents.

Result

Demographic Information

Table 1 shows the firm information provided by the respondents. About 40 percent of the respondents indicated that their firms had 6-20 employees while a slightly above 10 percent indicated that their firm had 101-250 employees. Only 2 respondents indicated that their firm had more than 251 employees. Exactly 29 percent indicated that their firm had 21 to 100 employees while the remaining 19 percent showed that their firms' employee capacity was between 1 to 5 employees.

Information on the type of activities undertaken by the firm indicated that majority were in the service sector (42.4 %). This was followed by manufacturing (25.3 %), research and development (19.6 %). The remaining firms either engage in wholesale, retailing or distribution as the case may be.

Regarding the number of years, the firm spend doing business about 47 percent indicated that they spent more than 15 years in business, 44.1 percent spent 7 to 15 years while the remaining indicated that they spent between 1 to 7 years in business.

Considering the position of the respondents, 42.4 percent indicated that they were owner managers, about 40 percent indicated that they were managers while about 13 percent mentioned that they were supervisors. The remaining 5 percent indicated that they were employees.

On sectorial distribution of the respondents' firm, about 67 percent indicated that they were in private sector while the remaining 33 percent were in public sector. Regarding the social media use, the analysis revealed that all the respondents indicated that they use social media.

More than 50 percent of the respondents indicated that they use social media for networking for more than 5 years. Another 30 percent of the respondents indicated that the had been using social media for networking for about 3-4 years while 8.2 percent indicated that they had been using social media for networking for the period of 1-2 years. Less than 3 percent indicated that they spend less than a month using social media for networking.

When asked about the effect of online networking, more than the three-quarter of the respondents indicated that it somehow has effect on face to face communication. Some 16 percent believed that online networking could replace face to face communication while 6 percent of the respondents believed that online networking had no effect on face to face communication.

Majority of the respondent agreed that social media is important (38.8 %) while exactly 32.2 percent strongly agreed that social media is important. More than one-quarter (29 %) had a fair opinion about the importance of social media.

Table 1: Demographic characteristics

	Frequency	Percent
	Number of employees	
1-5	47	19.2
6-20	97	39.6
21-100	71	29.0
101-250	28	11.4
251 and above	2	.8
Total	245	100.0
Firm Type		
Manufacturing	62	25.3
Service	104	42.4
Research & Development	48	19.6
Wholesale	21	8.6
Retailing	6	2.4
Distribution	4	1.6
Total	245	100.0
	Years in business	
Less than 3 years	5	2.0
3-7 years	18	7.3
7-15 years	108	44.1
More than 15 years	114	46.5
Total	245	100.0
	Job Position	
Owner manager	104	42.4
Manager	97	39.6
Supervisor	31	12.7
Employee	13	5.3
Total	245	100.0
	Sector	
Private	163	66.5
Public	82	33.5
Total	245	100.0
	Social media use	
Yes	245	100.0
	Years of social media use for networking	
Less than a month	7	2.9
1-2 years	20	8.2
3-4 years	74	30.2
More than 5 years	144	58.8
Total	245	100.0
	Effects of online networking	
Does not have any effect on face to face communication	15	6.1
Somewhat has an effect on face to face communication	190	77.6
Replaces faces to face communication	40	16.3

Total	245	100.0
	Importance of social media	
Strongly agree	79	32.2
Agree	95	38.8
Fair	71	29.0
Total	245	100.0

After explaining the demography of the respondents above and also achieving the validity and model fitness of the individual latent variables, there is need to evaluate the validity and overall model fitness. The reliability and validity of the entire measurement model was assessed by running CFA involving the entire constructs in the research. The purpose was to establish the convergent and discriminant validity of the model prior to proceeding with the structural model evaluation.

Convergent Validity

Convergent validity is a measure of the degree to which the items or indicators of a construct are correlated with the construct. Gaffen and Straub (2005) defined convergent validity as the extent the proposed measures within the construct are strongly correlated. Convergent validity is normally established by determining the standardized factor loading, average variance extracted and construct reliability.

Hair et al (2010) stated that factor loading that are statistically significant indicate the achievement of convergent validity while indicators with factor loading of .50 and above are regarded sufficient to establish convergent validity. Convergent validity is also assessed using the Bentler-Bonett coefficient (NFI). Recommended threshold for convergent validity using the NFI index is .90 (Hair, et al, 2010; Kline, 2011; Byrne, 2010). In this research, the convergent validity of the measurement model was assessed using the standardized factor loading and the NFI criteria. Table 2 shows the standardized factor loading and the NFIs of the individual latent constructs in the research. As shown in the table, the entire individual measurement models achieved convergent validity.

Table 2: Convergent validity measures of final measurement models

S/N	Construct	Residual items number	Factor loading		NFI Index
			Lowest FL	Highest FL	
1	Marketing	5	.727	.946	.990
2	Time	6	.517	.899	.972
3	Human resource	6	.547	.789	.967
4	Finance	7	.623	.783	.957
5	Flexibility	6	.518	.806	.968
6	Facebook	6	.583	.680	.947
7	Whatsapp	5	.717	.922	.991
8	Twitter	5	.720	.796	.984
9	Email	5	.574	.822	.975
10	National culture	7	.518	.743	.964

Discriminant Validity

Hair et al., (2014) described discriminant validity as the degree to which a construct is distinct from other constructs in the model. Fornell and Larcker (1986) suggested that the square of the correlation between two constructs should be less than their corresponding average variance extracted (AVE). Discriminant validity was examined by comparing the squared correlation between constructs with the average variance extracted of the individual constructs (Hair, et al. 2014). Table 3 shows the AVE of

each construct at the diagonal while the off-diagonal values represent the correlation coefficients between the constructs. Based on the recommended threshold, all the AVEs are greater than .50 and each AVE value is higher than any correlation with other construct, hence indicating the achievement of discriminant validity.

Table 3: Discriminant validity

	MKT	TM	HMR	FIN	FLX	FB	WA	TW	EM	NC
Marketing	**.779**									
Time	.046	**.566**								
Human resource	.050	.029	**.660**							
Finance	.086	.028	.500	**.514**						
Flexibility	.049	.051	.091	.038	**.726**					
Facebook	.112	.071	.005	.080	.010	**.647**				
Whatsapp	.036	.046	.025	.044	.052	.015	**.673**			
Twitter	.037	.142	.066	.003	.044	.004	.038	**.590**		
Email	.138	.162	.127	.006	.072	.072	.028	.365	**.521**	
National culture	.006	.026	.038	.066	.021	.189	.062	.115	.152	**.658**

Multicollinearity Assessment

Checking for multicollinearity is an important requirement when evaluating structural equation models. Pallant (2011) described multicollinearity as the presence of a strong correlation between predictor variables. Hair et al., (2010) stated that multicollinearity is a threat to the validity of multivariate analysis which could led to potential error in hypotheses testing. Hair et al., (2010) recommended that correlations between constructs should not be greater than .90. Table 3 shows the correlations among the constructs in the research model. It is shown that the highest correlation occurred between email and twitter with a Pearson's Product Moment correlation coefficient (r) of .365 while the lowest correlation was between national culture and marketing r = .006. This suggests that there is absence of excessive multicollinearity.

Table 4: Correlation matrix of research constructs

	MKT	TM	HMR	FIN	FLX	FB	WA	TW	EM	NC
Marketing										
Time	.046									
Human resource	.050	.029								
Finance	.086	.028	.500							
Flexibility	.049	.051	.091	.038						
Facebook	.112	.071	.005	.080	.010					
Whatsapp	.036	.046	.025	.044	.052	.015				
Twitter	.037	.142	.066	.003	.044	.004	.038			
Email	.138	.162	.127	.006	.072	.072	.028	.365		
National culture	.006	.026	.038	.066	.021	.189	.062	.115	.152	

Table 5 shows the measure of construct validity for the final measurement model. The respective standardized factor loading, the composite reliability (C.R.) and the AVEs all met the desired thresholds of reliability.

Table 5: Construct validity of the overall research measurement model

Construct	Items	Estimate	CR	AVE
Marketing	mkt1	.894	.946	.779
	mkt2	.902		
	mkt3	.946		
	mkt4	.926		
	mkt5	.727		
Time	tm1	.844	.884	.566
	tm2	.820		
	tm3	Item removed		
	tm4	.899		
	tm5	.517		
	tm6	.690		
	tm7	Item removed		
	tm8	.680		
Human resource	hmr1	.628	.907	.660
	hmr2	.547		
	hmr3	.658		
	hmr4	.690		
	hmr5	.789		
	hmr6	.649		
Finance	fin1	.623	.881	.514
	fin2	.722		
	fin3	.706		
	fin4	.775		
	fin5	.667		
	fin6	.783		
	fin7	.731		
Flexibility	flx1	.518	.923	.726
	flx2	.798		
	flx3	.806		
	flx4	.755		
	flx5	.752		
	flx6	.728		
	flx7	Item removed		
Facebook	fb1	.583	.903	.647
	fb2	.629		
	fb3	.680		
	fb4	.640		
	fb5	.677		
	fb6	.674		
Whatsapp	wa1	.753	.911	.673
	wa2	.717		
	wa3	.876		
	wa4	.922		
	wa5	.817		
Twitter	tw1	.720	.878	.590
	tw2	.758		

	tw3	.780		
	tw4	.796		
	tw5	.783		
Email	em1	.597	.785	.521
	em2	.822		
	em3	.574		
	em4	Item removed		
	em5	.632		
	em6	.613		
National culture	nc1	.709	.913	.658
	nc2	.743		
	nc3	.670		
	nc4	.645		
	nc5	.750		
	nc6	.518		
	nc7	.573		
	nc8	.709		

Structural Model Evaluation

Once the validity of the constructs was assessed and proposed measurement model achieved and model fit was confirmed then the next step was to test the hypothesized relationships among the constructs using structural model. In other way, when a measurement model fulfills the model fit criteria then hypothesized relations between constructs can be confirmed by building a structural model. According to Hair et al., (2010) a structural model represents the theory with a set of structural equations and is usually depicted with a visual diagram. After confirming the measurement model as model fit, the hypotheses were tested by investigating the strengths of proposed relationships among its constructs. This includes testing the hypothesised theoretical framework and the relationships between latent constructs. Latent constructs are unobserved variables measured by their respective items or indicators. Endogenous and exogenous are the two types of latent variables (Kline, 2011; Hair et al., 2010). In the current research the exogenous latent constructs were FB, WA, TW, EM and NC while the endogenous constructs were marketing, time, human resource, finance and flexibility.

To test the proposed hypotheses, structural model was tested using all ten constructs which were used in measurement model. In measurement model, constructs were associated using two sided arrows "covariance" (↔) whereas in structural model, constructs were associated using single sided arrow (→) which represents the "path relationship" between the constructs (Hair et al., 2010). In structural equation modeling (SEM), structural model assessment results produce estimated path coefficient, standard errors, critical ratio (C.R.) or t-values, and p-values. The t-values is the critical ratio (C.R.) achieved by dividing path coefficient by standard errors. Hypothesized relationship is considered significant when C.R. or t-value (>=1.96). Non-significant path coefficient can be considered unimportant in the model and can be eliminated from the model (Hair et al., 2010).

Figure 3 shows the first-round output of the structural model. From the figure it is shown that while other fitness indexes were achieved, however, some indexes failed to meet the acceptable level. For example, all the observed factor loading and their corresponding square multiple regression meet the required thresholds of .50 and .30 respectively. In respect of the fit indexes, however, none satisfied the requirement for model fitness which was an indication that model re-specification was required.

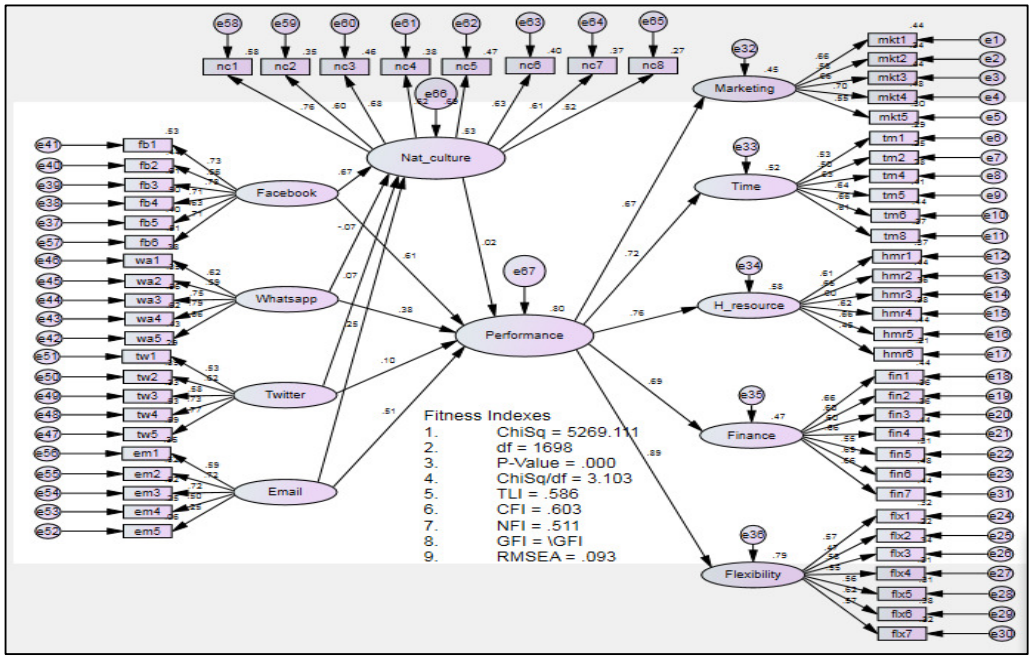

Figure 3: Initial structural model

A re-specified model is presented in Figure 4. The final structural model was achieved after a reiterative process of re-specification based on the examination of the standardized factor loading, SMCs, and other relevant fitness indices. In the process the latent construct, twitter had to be removed entirely from the model due to insufficient loading. Similarly, two items were deleted from the latent construct, flexibility. The final model had achieved model fitness

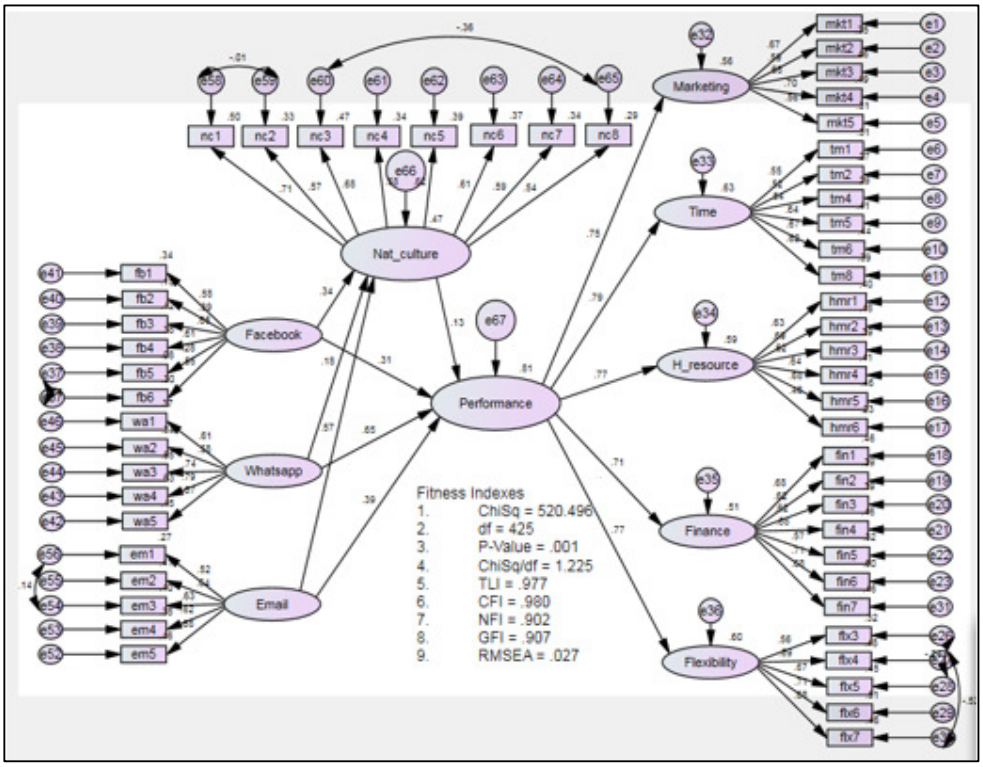

Figure 4: Final structural model

Table 6 shows a summary of the fitness indexes obtained from the initial and final structural model. The analysis indicated that the final model satisfied all the necessary requirements for model acceptance.

Table 6: Fitness indexes for structural models

Category	**Parsimonious fit**	**Absolute fit**	**Incremental fit**	**Incremental fit**	**Absolute fit**	**Comment**
Fitness Indexes	Chisq/df	GFI	CFI	NFI	RMSEA	
Acceptance Threshold	Chisq/df ≤ 30	GFI ≥ .90	CFI ≥ .90	NFI ≥ .90	RMSEA ≤ .08	
Initial Structural Model	3.128	Na	.598	.507	.093	Fitness level not achieved; model not accepted
Final Structural Model	1.225	.907	.980	.902	.027	Fitness level achieved; model accepted

Evaluation of Direct Relationships

The structural path for the relations between the exogenous and endogenous constructs is presented in Table 7. The table shows that the direct relationships between SME Performance and the four exogenous constructs. The standardized regression weight for the path indicated that only one of the path coefficients was non-statistically significant. Thus, the paths reported the following statistics: Performance←National culture (β= .130; C.R. = 1.458; p = .145); Performance←Facebook (β= .315; C.R. = 3.585; p < .05); Performance←Whatsapp (β= .654; C.R. = 6.158; p < .05), Performance←Email (β= .385; C.R. = 3.935; p < .05) which collectively explained about 81 percent variation in SME

Performance.

Similarly, the path coefficients for the relations between the endogenous construct, national culture and the three exogenous constructs (facebook, whatsapp and email) Nat_culture←Facebook indicated a statiscally significant relationship with the following path statistics: (β= .342; p < .05); Nat_culture←Whatsapp (β= .176; C.R. = 2.665; p < .05), and Nat_culture←Email (β= .567; C.R. = 6.400; p < .05). The three exogenous constructs collectively explained about 56 variation in national culture.

Table 7: Standardized regression weight of the path relationship

Path relationship	Estimate	S.E.	C.R.	P-value	R^2
Performance←National culture	.130	.055	1.458	.145	.81
Performance←Facebook	.315	.157	3.585	***	
Performance←Whatsapp	.654	.073	6.158	***	
Performance←Email	.385	.060	3.935	***	
Nat_culture←Facebook	.342	-	-	***	.56
Nat_culture←Whatsapp	.176	.074	2.665	.008	
Nat_culture←Email	.567	.089	6.400	***	

***indicates significance at p<.05*

Evaluation of Indirect Relationship

The research theoretical framework depicts an indirect relation between the exogenous constructs (facebook, whatsapp, and email) and the endogenous construct (SME Performance) with national culture acting as a mediator construct. This suggests the need for testing the indirect effect of the exogenous constructs on the endogenous construct via the national culture.

To test the mediation effect, the bootstrapping method was used. Hayes (2014) described the bootstrapping method as the most effective method for testing mediation in SEM analysis. The procedure involved re-sampling of the working data set between 500 and 1000 times to create a sampling distribution from which the total effect, the direct effect and indirect effect estimates and their corresponding 95 percent confidence interval values are produced. The algorithm also estimates the lower and upper limits as well as the two-tailed significant values for the effects.

Table 8 shows the bootstrapping result for testing the mediation effect of national culture in the research model. As shown in the table the standardized indirect (mediated) effect of Facebook on Performance is significantly different from zero at the 0.001 level (p=.200 two-tailed). Similarly, the standardized indirect (mediated) effect of Whatsapp on Performance is significantly different from zero at the 0.001 level (p=.309 two-tailed). Likewise, the standardized indirect (mediated) effect of Email on Performance is significantly different from zero at the 0.001 level (p=.200 two-tailed).

Table 8: Two-tailed significance of bootstrap confidence interval for indirect effect

Path relationship	**Estimate**	**Lower Bounds**	**Upper Bounds**	**P-value**
Performance←Nat. Culture←facebook	.044	-.045	.155	.200
Performance←Nat. Culture←whatsapp	.023	-.020	.102	.309
Performance←Nat. Culture←email	.074	-.070	.215	.200

Limitations of the Study

As a norm with all studies, this study faced several limitations. If these limitations are addressed in a proper manner in future work, it could result in an improvement of results with better overall quality

and findings.

This limitation was observed based on insufficient literature on the relations between the components of the variables. The researcher was limited in having a detailed discussion on social media marketing tolls based on various perspectives with the scarcity of past research materials. Time and budget were also obstacles to conduct the study with larger sample size and on more than one industry.

However, the limitations of the study provide avenues for future researches. A significant limitation was felt in the process of collecting data. Firstly, since the target population in this study is SMEs in UAE, gaining access to the right department and employee of the SMEs in UAE turned out to be an arduous task. In addition, given the nature of the questionnaire which touches on areas of social media marketing, privacy of the respondent was of utmost importance. In future, it is suggested that the model is utilized in various sections of the SMEs to prevent the difficulty of collecting data and to assist in expanding the findings.

Recommendations for Future Research

The researcher recommends the following steps for future work in this area. The limitations in this study are expected to be addressed in future studies. Therefore, the researcher recommends that a wider scope with more detailed questions are developed and utilized. Future studies can narrow the study's scope to certain criteria to prevent biased responses. In future, the questionnaires should also be distributed to more people in order to improve the findings of the survey. The researcher recommends the following for future work in this area.

The sample area and size should be widened by including companies out of SMEs in UAE. This would help to lower the case of bias and help in improving the accuracy of the findings.

The variables should be increased. The variables used in future studies could be increased to include variables that are not include so that the scope could be widen. It is suggested that, future research work should be as a comparative study between different countries, this could undoubtedly increase the cope and provide more understanding of social media marketing by many organizations in different countries.

Summary

This research is on the impact of social media marketing and e-commerce on the performance of SMEs in UAE: A structural equation modelling. The research papers investigate the social media marketing impact on SMEs performance. Data were collected from the SMEs in UAE. The research employed quantitative approach and used questionnaire to collect relevant data from the respondents. The model was developed using SPSS and AMOS software as the research is quantitative in nature.

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Comparative Analysis of Motivation Systems, That Create Innovation of Enterprises X and Y – Case Study

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Abstract

This publication identifies motivation as one of the most important management functions and selected theories that significantly influence the motivation process. The analysis of company X and Y in 2017 and 2019 was made in order to determine the possibility of creating motivation. The factors motivating to work were indicated and the changes that occurred were verified. The research was carried out on the basis of the literature review and the applied questionnaire in the surveyed entities.

Keywords: Human Resources, Management, Motivation, Motivation System;

Introduction

Employees are driving force of enterprise. That is why they are often put in the first place. The element of effective management of human resources in enterprise is proper motivation. Motivating of employees is perceived as one of the main managerial functions of undeniable meaning. Proper motivation to action is the main factor resulting in significant achievements at work (Wojtaszek, 2016, p. 4-9).

Motivation is the concept of many various definitions and wide scope of interpretation. It induces, directs and sustains the complex human behaviors, also encourages subordinates to constant improvement, development of knowledge and skills - Lawler III (1973). Financial motivation means additional benefits for employees. They are diversified according to the value and attractiveness (Miciuła, 2018).

Non-financial motivation means awarding the employees through ensuring them the feeling of confidence, employment stability and good atmosphere at work. Motivating tools are a set of methods, procedures, rules and ways as well as organizational solutions that should adequately address motivational problems. There can be distinguished tools (material and non-material) and motivators that create a system of rewards and punishments. Motivating tools can be divided into coercive and incentive to ols and persuasion (Locke 1991).

Innovation (in Latin innovatio means renewal) is the sequence of actions leading to creation of new, better products, technological processes or organizational systems (Wojtaszek & Miciuła, 2019). The definition has been introduced into the economical sciences by J.A. Schumpeter, pointing out the five cases of innovation occurrence: creation of new product, using of new technology, method of production, creation of new market, acquisition of so far unknown raw materials and reorganization of branch of economy (Stępień & Miciuła, 2017).

The main objective of the study is to characterize the issues related to the motivation of employees and a comparative analysis of the incentive system creating innovation used in manufacturing enterprises X and Y. For this purpose, have been used publications in the field of human resources management, discussing the issues of motivation and surveys, documents of the studied organizational units, employees' knowledge and authors' own observations.

An Incentive System In The Organization

The concept of motivation

The concept of motivation is derived from the Latin word "motus" and English "move", meaning to move from one place to another, to set in motion, encourage, influence someone, and stimulate action (Eccles, Wigfield, Schiefele 1998). Motivation is an internal state of man that has an attribute dimension that is appropriate to every human being, whereas/which motivating has activity and functional dimension, which consists/bases in conscious and deliberate impact on the motives of people's behavior by creating means and possibilities to implement/relize their systems of values, expectations (goals of action) to achieve purposes of motivating person (Heckhausen, Heckhausen, 1991, p. 109-132).

Motivating affects human attitudes and behaviors through specific stimuli that are transformed into motifs. Motivating to work is the use of a range of diverse and individual tools and instruments for influencing people. It is a conscious creation of stimulus systems having their source in the human environment. Motivation is an individual problem for a specific employee (Kopertyńska, 2008, p. 13).

Three levels of motivation can be distinguished: (Cox, Hoover, 2005, s.61)

- subordination, meaning to do what the supervisor orders, just as if the employee himself could not think or reason and did not have any talents or was involved in the work,
- goal identification is a type of investment, it creates a desire to achieve it and therefore increases motivation,
- commitment, motivation is never greater than when the employee considers the goal as his own, the employee feels that good work is in his own interest and will bring everything that he can.

In management theory, the term motivation is used for a factor that determines the level, direction and sustainability of efforts at work. A person with high motivation works hard at his or her workplace, while not-motivated person does not. The manager, who uses motivation tools to guide the staff, creates conditions in which the subordinates will feel constant inspiration for hard work and achieve results corresponding to their maximum capabilities (Schermerhom, 2008, p. 259-260).
Themes/Motives/Reasons of human motivation, like needs, can be divided into three basic groups (Sikorski, 2004, p. 12):

- primary (basic) - have a physiological basis, are innate – they are not the effect of learning,
- general - they do not have a physiological basis, they are motives: curiosity, influence on others and emotional attachment, encourage people to increase stimulation,
- secondary (higher order) - they are a product of learning, one can include the motives of power, achievements, belonging, security of status.

Motivating System

It is difficult to find a uniform definition of the motivating system. According to S. Borkowska, the motivating system is a coherent and purposefully chosen set of motivating tools from the point of view of achieving the goals of the organization and employees (Weiner 2012). L. Kozioł assumes that the motivating system is a collection of important instruments and tools for behavior (Kozioł, 2002, p.8).

The motivational system is therefore not detached from the organization. The goal of its creation is the success of the organization and its employees. The effectiveness of the motivating system can be considered from the point of view of the enterprise, then the measure of effectiveness will be the degree of achieving the objectives. From the employee's point of view, this measure will be the level of satisfaction or lack of satisfaction (Borkowska, p. 16). Therefore, it serves specific purposes and applies to most processes in the organization. According to M. Armstrong, it is created in order to: (Armstrong , 1997, p.255):

- optimal use of employees' potential in order to implement the company's strategic objectives,
- increasing the efficiency of employees by making the amount of remuneration dependent on the results of work,
- employee identification with company actions and goals,
- increase of group motivation,
- increase of individual motivation of employees (Wojtaszek & Miciuła, 2018).

Effectiveness of motivating systems

An effective motivational system is called the one that pursues the goal set for it, that is, mobilizes employees to work more efficiently and at the same time satisfies their needs and expectations (Matejun, Socha, 2010, p.90).

When implementing such a system, it is necessary to take into account various conditions concerning the environment in which motivation takes place (Jasiński, 2005, s. 264). When constructing motivational systems of contemporary enterprises operating in a dynamic environment, it is necessary to observe two principles: individualization and the complexity of the motivating process. Individualization requires learning the needs and expectations of individual employees. As a result of this action, the manager will have information on the personal characteristics of employees. However, comprehensiveness requires a systematic approach to motivating. This means the need to create in the company a system of logically coherent and mutually supporting means of motivation, as well as their teams acting on the principle of strengthening. It is then possible to influence on one employee at the same time several motivators tailored to his individual needs, goals and aspirations. Therefore, for the proper motivation, it is necessary to apply the entire set, the system of forces, factors and instruments affecting the employee (Sajkiewicz, 2000, p.18).

Model of the expected value by Vroom

The Vroom model clearly shows the dynamics of motivation processes in the context of the organization. Vroom models human behavior as a decision-making. Man is always forced to decide on one of many possible ways of behaving. He tries to present a decision process that precedes individual activities as the cause of action. The readiness to take any action by man is always the resultant of: (Michoń, 1981, p. 157-1490).

- expectations of the value of the result that a man wants to achieve - a man depends on causing some effect,
- expectations of the reachability of the result, it is about assessing the (objective) possibility of achieving a result that is valuable in a positive sense.

Hence, the value generally refers to how highly an individual values a particular action option or related ef fort (Steinmann, 1998, S. 330-331). The strength of motivation to perform any sequence of actions is the product of the value of the expected result and the expectation (likelyhood) that such action will lead to exected result in forseen sequence of activities (Banaszyk 2002, p. 25).

Basic theories of motivation
Victor Vroom's Expectations Theory

Motivation relies on the strength of expectation and making the individual assessment of likelyhood that this expectation may actually happen.

Involvement = effort = Achievements

The above expectation theory indicates that it is achieved through probability compared to certain results. Commitment requires effort to achieve it.

Hierarchy of needs according to Maslow

The idea of the hierarchy of needs is the way of theoretical explanation of the two-way decline and the rise of tension.

According to the Maslow hierarchy, people are motivated by a system of five basic needs: (Steinmann, Schreyögg, p.. 340-341).

- physiological needs include elementary desires related to eating, drinking, clothing and living. Their priority over other types of needs arises from the nature of man,
- security needs are expressed in the desire to protect against random events (unfortunate accident, assault, illness, disability, etc.) that could frustrate the satisfaction of physiological needs,
- social needs include the pursuit of community, belonging and satisfactorily satisfying social relations,
- the need for recognition reflects the desire for recognition and respect. This desire refers to the recognition of other people and to self-recognition and self-confidence. It is a desire to be useful and necessary,
- the need for self-realization means the striving for independence and the realization as a person.

Fig. 2: Maslow's pyramid of Leeds (Steinmann, G. Schreyögg, s. 340).

Source: https://www.vectorstock.com/royalty-free-vector/maslow-pyramid-of-needs-vector-7402228 (dostęp: 12-12-2019)

As shown in Figure 2, satisfying the needs located lower in the hierarchy is a condition for the activation of higher needs: the first, when they are not satisfied, dominate and win in conflict with the other. Physiological and security needs dominate, and later the need for self-fulfillment. Human activities are only triggered by unmet Leeds (Koźmiński, Piotrowski, 2002, p.3).

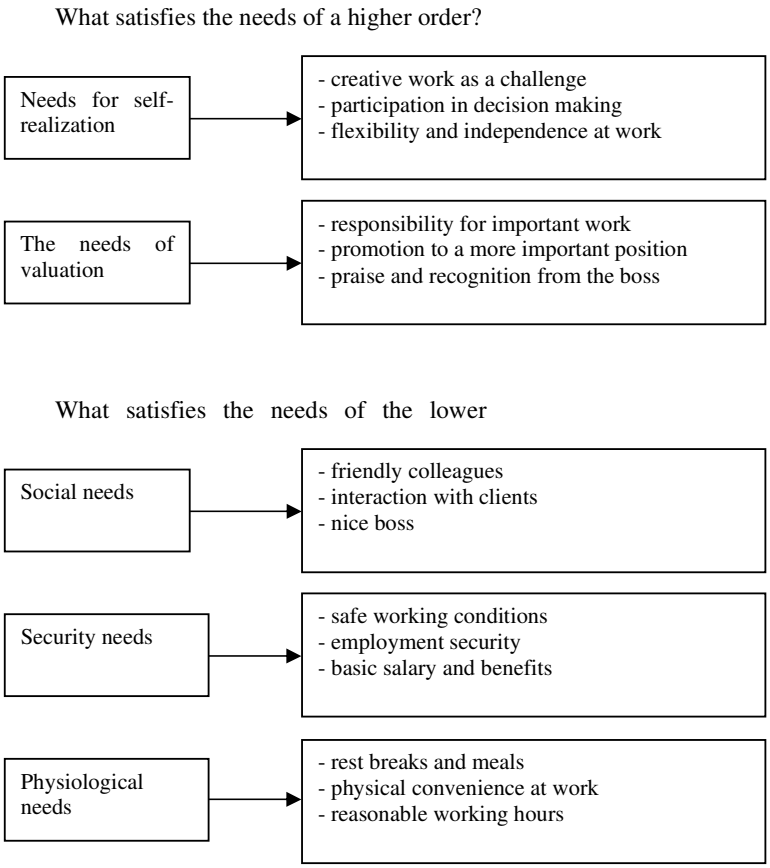

Fig. 3:Options motivation to work in A. Maslow's hierarchy of Leeds (Schermerhorn, p. 261).

Source: own elaboration based on (Nejman, 2009).

The process of motivating employees (Figure 3) continues until the level of self-fulfillment is reached, and this need can never be met. Thus, these last needs present a special type of system called development needs, in contrast to the needs arising from the deficit. The process of motif development is inhibited when one of the levels does not satisfy the Reed (Steinmann, Schreyögg, p. 341).

Richards and Greenlaw model of motivation

Richardson and Greenlaw in their model try to describe more precisely the relationship between the needs and the process of behavioral targeting. Constructive behavior is focused on finding solutions that meet the needs: the need for group acceptance at work forces the adoption of group norms; the need for promotion in the company leads to efforts in the direction of further education. Defensive

behavior is formed when the satisfaction of needs seems unattainable. Through feedback, a new, unmet need is detected, which in turn leads to a new cycle. This basic model of motivation creates frame concepts that illuminate the interrelationships between needs, motivation and behavior.

Further differentiations can be achieved by incorporating the personality structure into the model. The extended model of motivation determines the mutual relation of needs, the absolute level of aspirations, the intensity and nature of the states of tension and frustration, and strategies for satisfying needs. The most common forms of behavior are:

- rationalization is the searching for causes of failure, which are to a lesser extent threatening the ego (or are more willingly accepted) than the real reasons,
- suppression, or repression, negative experiences or feelings are forced to the subconscious,
- aggression, which can be defined as an attack on an object that is considered a source of frustration.

Herzberg's two-factor theory

The basis for the development of the two-factor Herzberg's theory were interviews with workers and officials of American companies. The respondents presented occupational events that were perceived as very pleasant or very unpleasant. The content analysis of interviews has shown that a certain class of factors related to work gives satisfaction, while other factors are the cause of dissatisfaction. Hence, according to Herzberg's satisfaction or dissatisfaction, it can not be considered as extreme points on one scale, but as two independent dimensions (Steinmann, p. 343-345). Some aspects of work, such as the physical working environment, pay, relationships with the boss and colleagues, cause dissatisfaction when absent or prevent dissatisfaction when they are present. These factors have been termed as hygienic. These factors have been termed hygienic. There are also aspects of work that cause satisfaction when they occur. These factors are motivators. They include interesting tasks, recognition for the performance of a job, a sense of responsibility (Koźmiński, Piotrowski, p.327). Dissatisfaction is caused by external factors in the work environment. The most important "factors of psychological discomfort" can be: personnel policy, complaints handling, supervisory competence, safety at work, remuneration. Paying attention to these factors leads to the dissatisfaction of the truth, but it is not a source of satisfaction. Satisfaction can only be achieved through factors that are related to the content of the work. The main "factors of psychological comfort" were: experiencing achievements, recognition for the work done, the work itself, responsibility, promotion, the possibility of personality development (Steinmann, Schreyögg, s. 347).

McGregor's X and Y theory

McGregor distinguished two sets of assumptions about human nature, which were named as "X theory" and "Y theory." According to "theory X", man is lazy, he does not like to show initiative or take responsibility and he or she is mainly interested in economic terms. Work is a necessary evil. The "theory of Y" presents the man as willing by nature to work, intelligent, liking responsibility and eagerly looking for new tasks (Frey, Jegen, 2001).

The theory of equity arose from the criticism of Vroom's theory of expectations. In this theory, fair rewards are important, especially remuneration in relation to the work done. Equity is the belief that an employee is treated identically in comparison to other people. The effects of unfair remuneration can be conflicts, rivalry, lower productivity, increased productivity of some employees, greater fluctuation of employment, and change of the workplace. If an employee believes that there is an inequality between the contribution and the remuneration, it gives a feeling of undervaluation. According to the theory of equity, the incentive system should take into account the rules of division by quantity and quality, which are too general. Two forms of equity are distinguished: distributive and procedural:

- distributive equity concerns comparison of prizes and effort,
- procedural equity refers to the motivational tools used by the organization, such as the assessment of effects.

For the comparative assessment and carrying out a case study of incentive systems, the following motivators were considered in the bank and the office: business car, allowances, improving professional qualifications, stability of employment, business outfit, remuneration, work system, responsibility and prestige. The tests carried out have the authors' own character and based on closed questions. Only those motivational factors were taken into account that were real and achievable.

Research Methodology

The survey was carried out in the selected office X in the Silesian Province and in the banking company Y also in the Silesian Province. The research was conducted in October 2017 and October 2019. Due to the protection of personal data and lack of consent to provide accurate data of the surveyed entities the names were not disclosed. Thanks to the anonymity of the entities, it was possible to collect reliable data that would give a comparative advantage.

Companies X and Y were analysed, as indicated in table 1 below.

Companies X and Y in 2017 and 2019 were analysed	
Subject under investigation X	Subject under investigation Y
The survey was conducted in October 2017 and in October 2019 in enterprise X among 102 randomly selected (from 148) employees (at different ages, with different seniority, education and gender), occupying clerical positions, answered nine questions. Questionnaire was the research tool. The sampling was done using an Excel pseudo random number generator. To determine the character of a random sample, a randomness test of sample 1 was used, where the zero hypothesis was verified in the form of: H0: - the sample is random, against the alternative hypothesis: H1: - the sample is not random. As a result of testing at the significance level of $\alpha = 0.05$, there were no grounds for rejecting the null hypothesis that the sample is random ($p > 0.05$), so it is assumed that the sample is random (Białek, Depta 2010, p.169-171).	The survey was conducted in October 2017 and in October 2019 in a production enterprise Y among 84 randomly selected from among 123 employees (at different ages, with different seniority, education and gender), who took bank positions and answered nine questions. The research tool used is a questionnaire. The sample was drawn based on the pseudorandom number generator Excel. The character of randomness was checked with the series (Depta, Białek, 2010, p. 169-171) test, that is why the zero hypothesis was stated: H_0: - the sample is random, against the alternative hypothesis: H_1: - the sample is not random. As a result of testing at the significance level of $\alpha = 0.05$, there were no grounds for rejecting the null hypothesis that the sample is random ($p > 0.05$), so it is assumed that the sample is random (Białek, Depta 2010, p.169-171).

Source: Own study

The research problem is Poland's low ranking of innovation. There is a lack of innovation on the Polish market. Innovations are created by people. To create anything (innovations) there must be motivation. Without motivation there is no innovation.

The motivation to work is linked to the motivation to create innovation. It seems logical to formulate that employees who have no desire to work (lack of motivation) will not be motivated to create innovations either.

The purpose of analyzing each case was to inform:

- What factors influence motivation at work? Creating innovations?
- Does motivation, including job satisfaction, affect the creation of innovations?
- Have there been any significant changes at the turn of 2017 and 2019?
- Has the situation not changed? And the comparative element/ aspects are the same?

Research hypothesis:

Employment stability and wages are still one of the most important motivational elements.
The way of motivating is different.
Employees in a state-owned company are less motivated than in a private company.
There is a lack of innovation because there is no motivation to work.

Analysis of the motivation system

Table 2 below shows the classification of respondents by gender and education.

Table 2: Classification of respondents by gender and education.

Personal composition of the surveyed companies	
Company X	**Company Y**
Classification by gender	
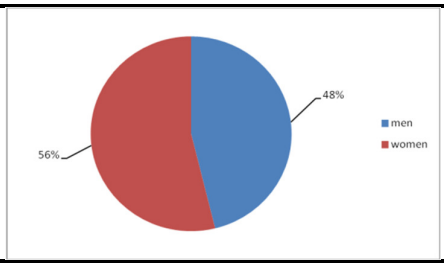	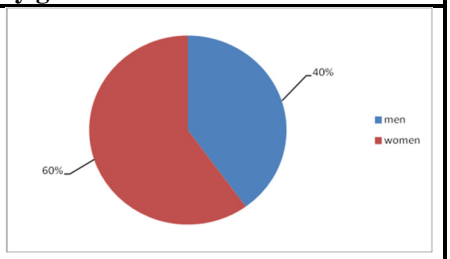
Breakdown by education	
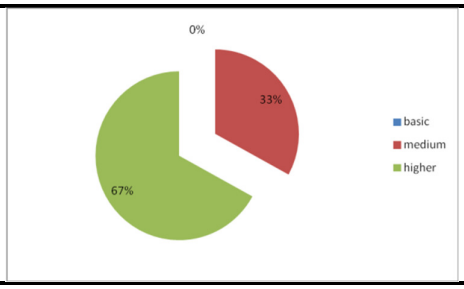	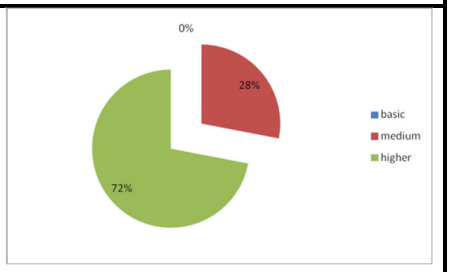

Source: Own work

In the study, the majority of people surveyed are women as much as 56% and 48% are men. A small difference between the number of women and men (company X) was noted. The persons participating in the study are those with higher education 67%, secondary education 33% . There were no reports of persons with primary education (company X) among the respondents.

The chart below shows that the vast majority of those with higher education are women (as much as 67 %) and the minority are men (33 %) (company X).

In the conducted survey, the majority of people surveyed are women as much as 60 % and 40 % are men. A slight difference between the number of women and men was noted (company Y).

The persons participating in the survey are those with higher education 72%, secondary education 28% . There were no persons with primary education (company X) among the surveyed persons.

The chart below shows that the vast majority of those with higher education are women (as much as 72%) and the minority are men (28%) (company X).

There are more women in company Y than in company X.

In the course of further analyses, no correlation between gender and education of both employees from company X and Y was detected.

Company x

The survey was conducted in October 2017 and in October 2019 in enterprise X among 102 randomly selected (from 148) employees (at different ages, with different seniority, education and gender), occupying clerical positions, answered nine questions. Questionnaire was the research tool.
The sampling was done using an Excel pseudo random number generator.
To determine the character of a random sample, a randomness test of sample 1 was used, where the zero hypothesis was verified in the form of:

H0: - the sample is random, against the alternative hypothesis:
H1: - the sample is not random.

As a result of testing at the significance level of $\alpha = 0.05$, there were no grounds for rejecting the null hypothesis that the sample is random ($p > 0.05$), so it is assumed that the sample is random (Białek, Depta 2010, p.169-171).

The research was carried out in order to obtain information about the motivators most desired by employees in enterprise X. Analyzing individual motivators, it was noted that the most important element for employees is stability of employment (9 on a scale of 10 points), then prestige and business outfit, where in the assessment they had the same number of points , 5 out of 10 points. The results of the survey are presented in the following chart number 1.

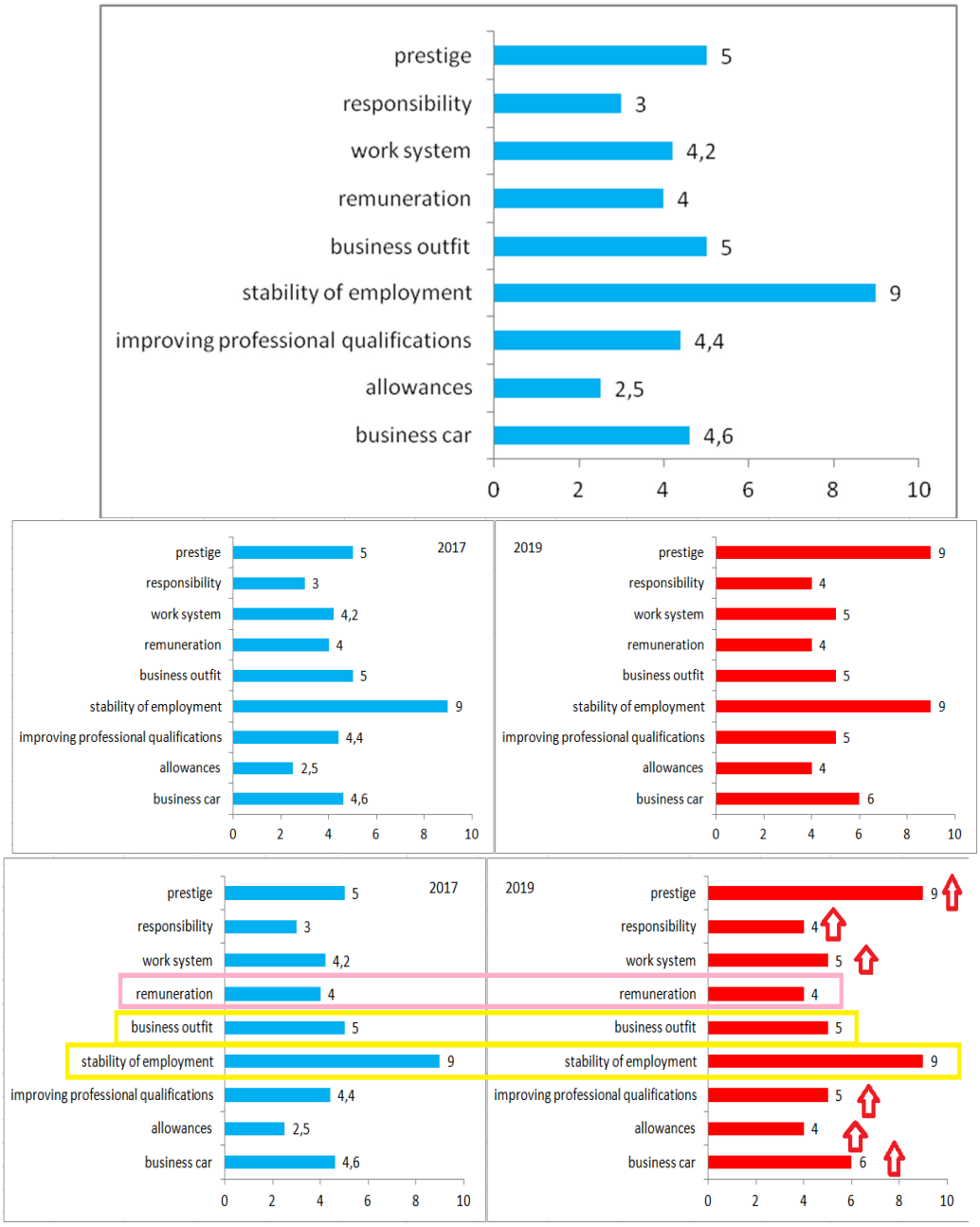

Figure 1: Motivation in the City Hall X in 2017 and 2019

The last least desirable motivator are allowances[1], this is due to the fact that employees do not show high necessity in performing their work outside their place of residence.

Comparing 2017 with 2019, we note that stability of employment (9) is still the most important factor and business out fit is at a uniform level of 5, and remuneration 4. The most important in 2019 was the prestige of the increase from 5 to 9 compared to 2017, and not much, because only one point of responsibility and only slightly from 4.2 to 5 work system and from

[1] Diet - is considered as an allowance for doing your job outside your home.

4.4 to 5 improving professional qualifications, allowances increase from 2.5 to 4, business car increase from 4.6 to 6.

Company Y

The survey was conducted in October 2017 and in October 2019 in a production enterprise Y among 84 randomly selected from among 123 employees (at different ages, with different seniority, education and gender), who took bank positions and answered nine questions. The research tool used is a questionnaire. The sample was drawn based on the pseudorandom number generator Excel. The character of randomness was checked with the series (Depta, Białek, 2010, p. 169-171) test, that is why the zero hypothesis was stated:

H_0: - the sample is random, against the alternative hypothesis:
H_1: - the sample is not random.

As a result of testing at the significance level of $\alpha = 0.05$, there were no grounds for rejecting the null hypothesis that the sample is random ($p > 0.05$), so it is assumed that the sample is random (Białek, Depta 2010, p.169-171).

The research was carried out in order to obtain information about motivators most desired by employees in the bank. Analyzing individual motivators, it was noticed that the most important motivating elements for employees are remuneration, company car and prestige. They are least motivated by allowances, stability of employment and business outfit[2].

The results of the survey are presented in the following chart number 2.

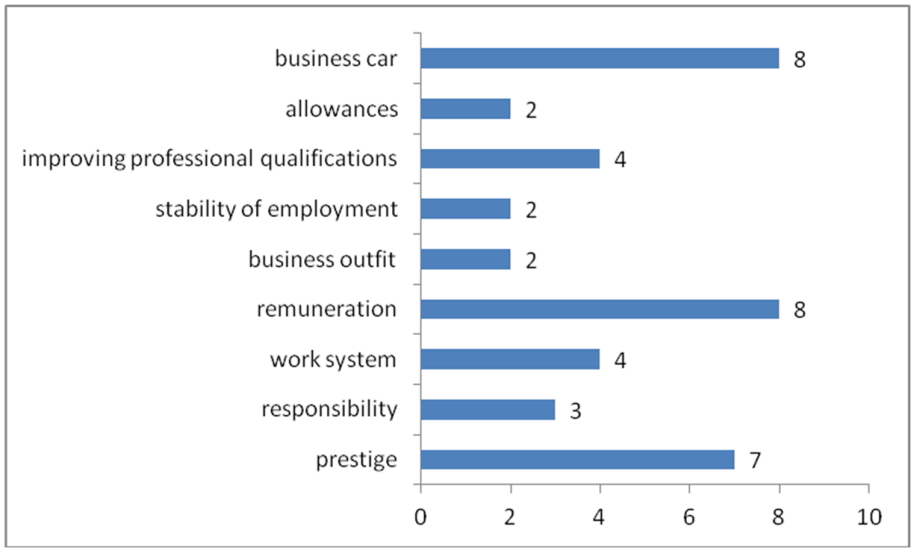

[2] The authors, using the phrase "work dress", understand the equipment of the employee with the necessary work clothes (for a man's bank employee it is a suit, a tie, and for women: a skirt and a jacket and a scarf).

Figure 2: Motivation in the City Hall Y

When comparing company Y from 2017 to 2019, we note that there were no changes in business car, stability from employment, business oufit. On the other hand, there was an increase in allowances from 2 to 3 points, improving Professional wualifications from 4 to 6 points and an increase of one percentage point in the work system, responsibility. There was a decrease of one percentage point, from 8 points to 7 points, and prestige from 7 points to 6 points.

The Results of Analyzes

The graph below (number 3) presents a summary comparison of the results of the analyzes carried out. The motivators of manufacturing enterprises X and Y were analyzed.

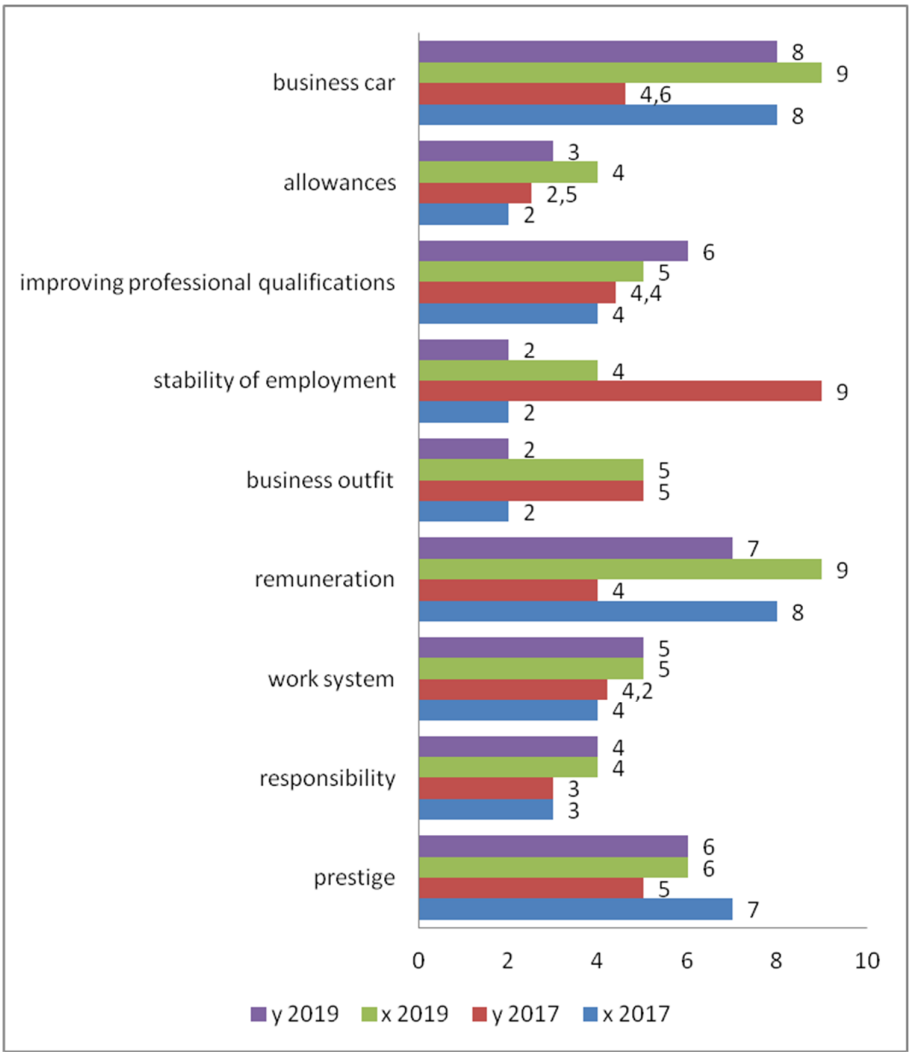

Figure 2: Motivation in the City Hall X and Y (2017 and 2019)

Analysis of chart number 3 indicates that there were large differences in motivation by bank employees and the City Hall. Differential factors are: prestige, work system, remuneration, business outfit, stability of employment, improving qualifications, allowances and a company car. The prestige of occupying a banking position is greater than occupying an official position. Responsibility is comparable in both X and Y.

The work system is better perceived in enterprise X than Y. In enterprise X, salaries are more motivating than in enterprise Y. This is due to the higher wages in banking. Having a formal outfit is more motivating in enterprise Y than in enterprise X. This probably results from the fact that in most enterprises business outfit is issued to an employee as part of his work in accordance with the policy of that enterprise, as was the case (in this situation) bank. Employment stability is definitely much higher in enterprise X than in enterprise Y. Raising qualifications motivates employees of enterprise X more than Y. Allowances are more motivating for town hall officials than for bank employees.

A company car motivates Y employees more than X.

For the analysis of the level of remuneration, the analysis of HR and payroll documents were used. Those documents are included in the regulations for the remuneration of employees in each of analyzed enterprise. The chart 4 below shows the level of earnings of enterprises X and Y.

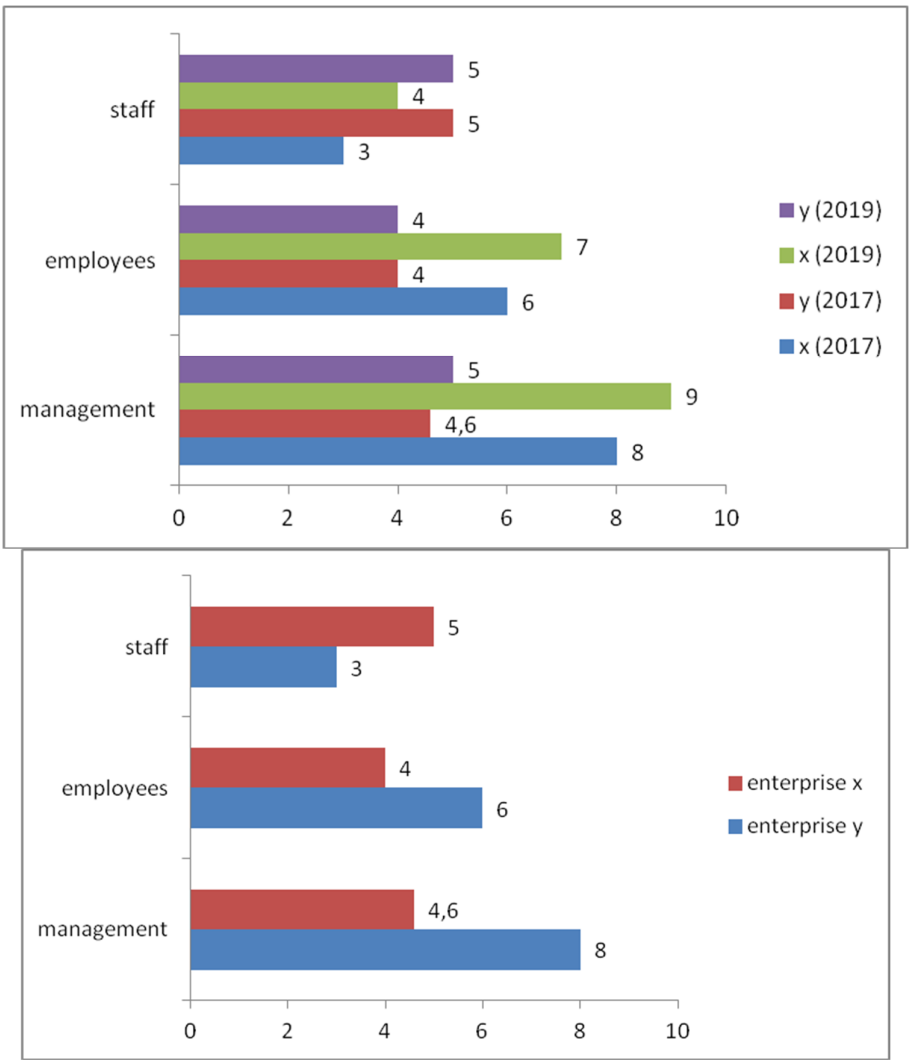

Chart 4: Level of earnings in enterprises

The highest remuneration is obtained by managers and employees in enterprise X. Customer service in enterprise Y earns more than in enterprise Y. The following chart number 5 shows the amount of the remuneration base in the surveyed enterprises.

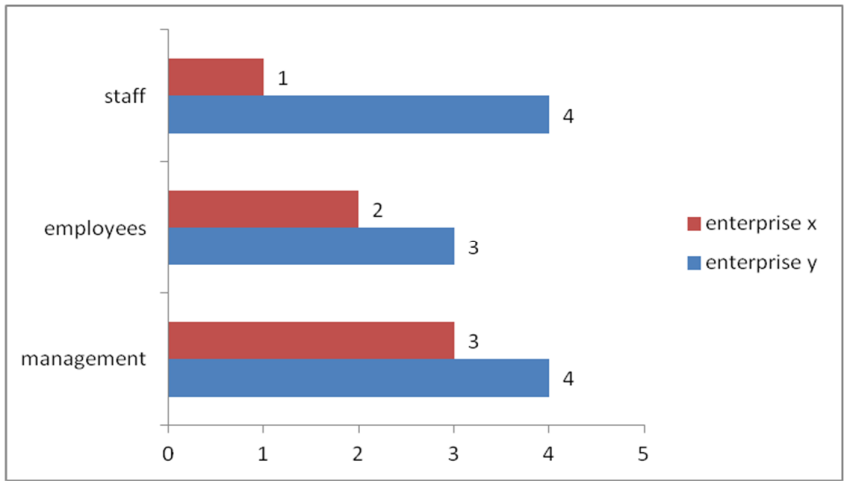

Chart 5: Basis of remuneration in enterprises X and Y

The bases of remuneration in enterprise Y are higher than the bases in enterprise X at all levels of the employees: managerial (white-collar), employee (blue-collar) and staff (customer service) positions. Service employees charge a much higher remuneration than at banks. They are wage workers, can be concluded form participant observation.

The need to work is a natural progression of every person whose stimulus is to support the family, buy a house and other goods, and even luxury goods. From the literature studies we can indicate that a positive attitude to work is important, which will certainly indicate a satisfactory financial result, satisfaction with work. It should be noted here that through the forester effect, success is achieved by maintaining a balance of expectations, which in total results in a multiplication of: promotion, rising salaries, positive relationships, a pleasant atmosphere and many other positive dimensions resulting from a positive attitude and a balance of expectations, which, as it turns out, has no impact on which or where we find ourselves. Innovation is the introduction of elements: balance of expectations and positive attitude.

Conclusions

The theoretical and cognitive implications allow us to conclude that over the years there have been no significant changes in perception or motivation, and more specifically to indicate why there is motivation.

The main hypothesis that stability of employment and remuneration are still one of the most important motivational elements was confirmed.

Two more hypotheses were confirmed: the way of motivating is different and Employees in a state-owned company are less motivated than in a private company.

It was also confirmed that there is a lack of innovation creation because there is no motivation to work.

The conducted surveys clearly emphasize the stability of employment in the production enterprise Y, as a main factor. Employees for whom a higher remuneration is more important will definitely choose work in the enterprise X. Employees for whom stability of employment is more important will probably choose a job in enterprise Y.

Nowadays, we must remember that the basis of remuneration and the level of remuneration is very important for the employee. The way of motivating and motivational

measures significantly affect the choice of the workplace. People with low qualifications will be more satisfied with work in enterprise Y, because of the level of wages. People with high financial expectations and willingness to make frequent business trips will benefit from employment in enterprise X. Persons showing tendencies to stability will be focused on work in enterprise Y.

The above analysis indicates the lack of substantial cohesion of enterprises X and Y. an enterprise X and Y with the same profile and similar structure and have completely different indicators (or needs) in the aspect of motivational systems.

It still seems quite natural that in private companies there is a need for, or even a greater motivation to do the work, as can be seen from the involvement of this whole process.
There is a noticeable increase in prestige in the state sector, which may result from the lack of high salaries in the private sector. We can clearly state that salaries are comparable.

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Towards Building an Open-Domain Corpus for Arabic Reading Comprehension

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Abstract

Reading comprehension is one of the fields of natural language understanding in which machine understanding can be evaluated through answering questions about paragraphs. The work in Arabic reading comprehension is little due to the lack of reading comprehension datasets for Arabic language. The goal of this paper is to present detailed phases aimed to create an Arabic dataset semi-automatically for the purpose of computerized reading comprehension. The paper starts by presenting an introductory survey of available datasets for the English language, then presents the phases of creating a dataset semi-automatically. The presented phases are mainly four each having sub-steps. The first phase is the manual check of the question and answer pairs, the second phase is the google search, the third phase is the document retrieval, and the fourth phase is the paragraph retrieval. The paper then presents some statistics for each phase.

Keywords: Arabic Reading Comprehension, Arabic Question Answering, Resource Building, Vector Space Model.

Introduction

The freely available datasets of Question Answering (QA) have been created with varying objectives in mind. Some of these datasets are fit for the open domain QA task; while, others are fit for the closed domain QA task. QA systems generally comprise of three main components; question processing/analysis, document processing/retrieval, and answer processing/extraction (Mishra & Jain, 2016). The first component aims to analyze the question in order to enhance both document processing/retrieval and answer processing/extraction components. The second component, document processing/retrieval, aims to retrieve related documents, extract and rank the related paragraphs. The last component, answer processing/extraction, aims to extract and rank answers from the top related paragraphs, and display the best answer. In open-domain QA datasets, the answer to the question can be found in several documents retrieved either from the web or from a dataset of documents, and the goal is to extract the correct answer rather than the relevant paragraphs or sentences being listed. It is worth noting that QA datasets consist of pairs of questions with their answers. Questions for QA applications were categorized by the Text Retrieval Conference (TREC)[i] into the following categories: factoid, list, hypothetical, definition, causal, relationship, confirmation, procedural, description, and opinion.

Reading Comprehension (RC) is the task of answering questions from a given paragraph. The answers to those questions are either a span of text, a missing word/entity, a choice from several choices, or any free-form text denoting the answer. Several differences exist between QA and RC. The key distinction is that RC can be considered a sub-task of QA applications (Chen, 2018). This subtask is last component of QA applications, the answer processing/extraction component. Another difference lies in the categorization of questions, see table 1. RC datasets can be categorized according to the type of questions they contain and which can be either span-extraction, cloze-style, multiple-choice, or free-form. In addition, RC datasets consists of triples of the form <question, answer, paragraph>; while, QA datasets consist of pairs of the form <question, answer>.

Table 1: QA versus RC in terms of question categories and dataset content

Comparison	Question Answering	Reading Comprehension
Question categories	Factoid List Hypothetical Definition Causal Relationship Confirmation Procedural Description Opinion	Span-extraction Cloze-style Multiple-choice Free-form
Dataset content	Pairs of <question, answer>	Triples of <question, answer, paragraph>

Arabic language is a Semitic language spoken by more than 330 million native speakers. It comprises of three main forms, the classical Arabic, the modern standard Arabic, and the colloquial Arabic. Although Arabic is widely spread, research targeting Arabic is considered limited when compared to other languages. One of the under researched fields that target the Arabic language is RC. Till 2019, there was only one work that touched upon the main idea of Arabic RC (Mozannar, et al., 2019). This is due to the fact that no datasets have been created for that purpose. The goal of this paper is to propose a technique whose purpose is to create an Arabic RC dataset through exploiting a QA dataset. This paper is structured as follows; section 2 presents the related work, section 3 proposed approach, section 4 presents the discussion, and finally the conclusion.

Related work

Before RC become the source of attention, QA applications were mainly the dominant field, starting by building QA systems such as Watson (Ferrucci, 2012). Here we will presents some of QA datasets, and table 2 shows a short comparison among the presented ones. Smith et al. (Smith, et al., 2008) created a dataset within an undergraduate NLP course, were students were asked to write and evaluate questions with their answers about Wikipedia articles, through four phases, the resulted dataset mainly presented yes/no questions with their answers, having the yes answered questions the most dominant. Berant et al. (Berant, et al., 2013) created webQuestions, which consists of popular questions, asked on the web, they are mainly factoid questions centered about name entities. However, simpleQuestion dataset was created to overcome the problem of small sized datasets, it was proposed by Bordes et al. (Bordes, et al., 2015) and consisted of over 100,000 QA pairs. Mille et al. proposed (Miller, et al., 2016) WikiMovies, which is a dataset constructed through exploiting Wikipedia and MovieLens dataset; one of the goals of creating such a dataset was to provide training examples for machine learning algorithms. There are two main conferences that used to publish datasets and competitions each year, the Cross-Language Evaluation Forum (CLEF) and the Text Retrieval Conference (TREC). CLEF and TREC published a number of competitions for the QA field, where they provide a dataset used as a benchmark. Some researchers translated CLEF and TREC datasets into Arabic language and used them in their research such as Abouenour et al. (Abouenour, et al., 2010), others extended the available datasets and used them in their research such as Baudiš and ŠedivÝ (Baudiš & Šedivý, 2015) which proposed an extended version of TREC dataset, namely curatedTREC consisted of over 1000 QA pairs.

Table 2: QA datasets

Ref.	Year	Dataset	Domain	Size	Answer Types	Dataset Source	Created
(Smith, et al., 2008)	2008	NLP-Project QA-dataset	Open	3997 question-answer pair	Most of the questions are Yes/No	Wikipedia	Manually by undergraduate NLP students over 3 semesters
(Berant, et al., 2013)	2013	webQuestions	Open	5,810 questions-answer	WH-questions	Freebase	Manually by crowed-workers which were asked to answer collected questions
(Bordes, et al., 2015)	2015	simpleQuestions	Open	108,442 question and fact as an answer from FB2M	Factoid	Freebase	Questions generated by crowd-workers based on facts from freebase
(Baudiš & Šedivý, 2015)	2015	CuratedTREC	Open	1,180 questions	Factoid	TREC 1999 TREC 2000 TREC 2001 TREC 2002 Extended with questions from the net	Prepared with regular expression answer patterns
(Miller, et al., 2016)	2016	WikiMovies	Movies	100,000 question-answer pair	13 classes of questions	Wikipedia MovieLens dataset	Substituting entities with other entities in the question written by human annotators

There are several English datasets created for the RC purposes. Such datasets can be categorized into span-extraction, cloze-style, multiple-choice, and free-form. In span-extraction based datasets, the answer for a given question is a single span of text extracted from the related paragraph, such datasets are the Stanford Question Answering Dataset (SQuAD) (Rajpurkar, et al., 2016), and NewsQA (Trischler, et al., 2016). The cloze-style datasets consist of questions with a missing word. Such datasets are inspired from exams that aim to evaluate students. The cloze-style datasets may or may not provide candidate answers. Example on such datasets are; Children Book Test (CBT) (Hill, et al., 2015), CNN and Daily Mail (Hermann, et al., 2015), Who Did What (WDW) (Onishi, et al., 2016), and Clinical Case Reports (CliCR) (Šuster & Daelemans, 2018). Multiple-choice datasets consist of the question, multiple-choices (two or more), the correct answer(s), and the related paragraph. Such datasets include Science Question (SciQ) (Welbl, et al., 2017), ReAding Comprehension dataset from Examinations (RACE) (Lai, et al., 2017), Multi-sentence Reading Comprehension (MultiRC) (Khashabi, et al., 2018), and the Machine Comprehension of Text (MCTest) (Richardson, et al., 2013). Free-form dataset, and which is the most difficult dataset to create, consists of different forms of questions. In the free-form dataset, the answer can be either an exact span of the paragraph, multiple pans of the paragraph, span of the question and the paragraph, or not found in the paragraph. Examples of such datasets are; bAbi

(Weston, et al., 2015), MAchine Reading COmprehension dataset (MS MARCO) (Bajaj, et al., 2016), and NarrativeQA (Kočiský, et al., 2018).

One of the first datasets for multiple-choice RC was created in 2013 namely MCTest (Richardson, et al., 2013). MCTest is a dataset of multiple-choice questions, restricted to fictional stories. It consists of 2000 questions with their multiple choices and their answers constructed from 500 stories. The stories along with with their questions, their multiple choice options, and their answers were all created by crowd workers. In 2017, two multiple-choice datasets were created, the first one is by Welbl and Liu (Welbl, et al., 2017) namely SciQ dataset. SciQ was built with the help of crowd-workers and comprised of 13.7K science exam questions having four multiple-choices, and a corresponding passage. The second one is RACE proposed by Lai et al. (Lai, et al., 2017). RACE was constructed from English exam questions that were created to assess Chinese students of age group 12 to 18. The authors provided a thorough discussion about their dataset with detailed statistics. In 2018, MultiRC was proposed by Khashabi et al. (Khashabi, et al., 2018). MultiRC is a multiple-choice dataset, but it differs from the previous ones in that its questions may have more than one correct answer. It was also created manually by crowd workers.

The first dataset created for cloze-style RC was in 2015 by Hermann et al. (Hermann, et al., 2015). The dataset was created using CNN and Daily Mail news articles automatically. The datasets consist of 92k and 219k documents each for CNN and Daily Mail respectively. Each document has four questions on average. The questions are sentences with one missing word or phrase that can be found from the relevant document. Two cloze-style datasets were created in 2016, the first one is CBT proposed by Hill et al. (Hill, et al., 2015), CBT was created by collecting questions and answers with their contexts from 108 online freely available children's books. CBT is similar to multiple-choice datasets in which each cloze-style question accompanied with four multiple choices. The second dataset is WDW dataset proposed by Onishi et al. (Onishi, et al., 2016), it is different from other RC datasets that the question is formed from two different documents. WDW was created automatically using Natural Language Processing (NLP) tools and exploiting LDC English Gigaword newswire corpus. The cloze question of this dataset is mainly about the person name entities. In 2018, another cloze-style dataset was proposed namely CliCR by Šuster and Daelemans (Šuster & Daelemans, 2018). CliCR is the first medical-based RC dataset, created from medical reports.

The first span-extraction RC dataset was proposed in 2016 namely SQuAD by Rajpurkar et al. (Rajpurkar, et al., 2016), it differs from cloze-style datasets in that its answers include non-entities and may have much longer phrases. It was created in three stages; passage preparation where the passaged were prepared and collected from Wikipedia articles. The creation of the question and answer pairs were also conducted by crowd-workers, and finally the addition of another answer for each question was also done by the crowd-workers. SQuAD consists of 107,785 pairs, obtained from 536 Wikipedia articles, where the answer of each question is a segment of text or span from the corresponding passage. Later in 2018, SQuAD2.0 was proposed (Rajpurkar, et al., 2018), which is a combination of SQuAD dataset along with 50,000 unanswerable questions and their answers, these questions were also devised by crowd-workers. Another span-extraction dataset is NewsQA which was proposed in 2017 by Trischler et al. (Trischler, et al., 2016). NewsQA was also created by crowd workers from 12,744 CNN news articles. On the other hand, Dhingra et al. (Dhingra, et al., 2017) proposed two types of RC datasets, the cloze-style and span-extraction, each having different sizes and sources.

The first free-form RC dataset was created in 2015 namely bAbi (Weston, et al., 2015). It consists of 20 tasks, each having 1000 pairs for training and 1000 pairs for testing. Two datasets of free-form proposed in 2017, namely TriviaQA (Joshi, et al., 2017) and SearchQA (Dunn, et al., 2017). Both TriviaQA and SearchQA were created by first collecting QA pairs and then retrieving the relevant documents or paragraphs for the QA pairs. Three RC datasets of free-form created in 2018, the first one is NarrativeQA (Kočiský, et al., 2018) which is created from stories collected from books and movie scripts. The second one is HotpotQA (Yang, et al., 2018), and the third one is MS MARCO (Bajaj, et al., 2016). Table 3 illustrates a comparative detail between the datasets, in terms of; dataset creation year, type, domain, size, source, question-types included, and how it is created either automatically or manually. Nine datasets out of twenty where generated automatically. As shown in

the table, the size of the datasets have increased with time, the first dataset that was created contains only 2000 pairs on 500 stories, while the largest dataset created consists of 1,010,916 pairs on 8,841,823 paragraphs.

Table 3: RC datasets

Ref.	Year	Dataset	Dataset Type	Domain	Size	Question Type	Dataset Source	Creation
(Richardson, et al., 2013)	2013	MCTest	Multiple-choice	Closed	2,000 questions and answers on 500 stories	N/A	Fictional stories written by crowd-workers	Manually by crowd-workers based on stories
(Hermann, et al., 2015)	2015	CNN	Cloze-style	News articles	387,420 questions and answers on 92,579 documents	Entities	CNN news articles	Automatically
(Hermann, et al., 2015)	2015	Daily Mail	Cloze-style	News articles	997,467 questions and answers on 219,506 documents	Entities	Daily mail news articles	Automatically
(Weston, et al., 2015)	2015	BAbi	Free-form	N/A	20 tasks each have: 1000 training questions and answers 1000 testing questions and answers	Depend on the tasks	N/A	Automatically
(Hill, et al., 2015)	2016	CBT	Cloze-style	N/A	687,343 questions and answers collected from 108 books	Contains multiple choices to choose one correct answer	Children books	Manually directly from children books freely available online
(Onishi, et al., 2016)	2016	WDW	Cloze-style	N/A	200,000 questions and answers	Person entities	LDC English Gigaword newswire corpus	Automatically
(Rajpurkar, et al., 2016)	2016	SQuAD	Span-extraction	Open	107,785 question-answer pair on 536 articles	Date Other Numeric Person Location Other Entity	Wikipedia	Manually by crowd-workers

						Common Noun Phrase Adjective Phrase Verb Phrase Clause other		
(Trischler, et al., 2016)	2017	NewsQA	Span-extraction	News articles	119,633 questions and answers on 12,744 news articles	Date/Time Numeric Person Location Other Entity Common Noun Phrase Adjective Phrase Verb Phrase Clause Phrase Prepositional Phrase other	CNN news	Manually by crowd-workers
(Joshi, et al., 2017)	2017	TriviaQA	Free-form	Open	95K questions and answers with independently gathered evidence documents	Numerical Free text Wikipedia title Person Location Organization Misc	QA pairs are from 14 trivia and quiz-league websites Documents from web search results and Wikipedia	Automatically
(Dunn, et al., 2017)	2017	SearchQA	Free-form	Open	140,461 question-answer-snippet	N/A	QA pairs of Jeopardy and used google search to retrieve relevant snippets	Automatically
(Welbl, et al., 2017)	2017	SciQ	Multiple-choice	Biology Chemistry Earth science Physics Elementary level to college introductory material	13,7K	Science exam questions	28 science textbooks from online resources	Manually by crowd-workers

(Dhingra, et al., 2017)	2017	QUASAR-S	Cloze-style	Definitions of software entities	37,362 cloze question, answer, context	Factoid-based	Stack overflow website	Automatically
(Dhingra, et al., 2017)	2017	QUASAR-T	Span-extraction	Open	43,013 trivia question, answer, document	Factoid-based	Multiple internet sources	Automatically
(Lai, et al., 2017)	2017	RACE	Multiple-choice	N/A	97,687 questions 27,933 passages	English exam questions	English exams for middle and high school Chinese students	Manually created by collecting and cleaning questions generated by English instructors
(Šuster & Daelemans, 2018)	2018	CliCR	Cloze-style	Medical reports	100,000 questions and answers	N/A	BMJ Case Reports	Automatically
(Kočiský, et al., 2018)	2018	Narrative QA	Free-form	Books and Movie scripts	46,765 questions and answers from 1,567 stories	Most answer types are based on WH-questions	Books from Project Gutenberg Movie scripts from the web	Manually by crowd-workers
(Khashabi, et al., 2018)	2018	MultiRC	Multiple-choice	News Society Law Justice, History and Anthropology Science Stories Movie plots	6,000 questions on 871 paragraphs	Multiple-choice questions having more than one correct answer	CNN news WSJ news NYT news Wikipedia Society, Law, Justice, History and Anthropology articles Elementary school science textbooks 9/11 reports Stories from the Gutenberg project and MCTest CMU Movie Summary corpus	Manually by Crowd-workers

(Rajpurkar, et al., 2018)	2018	SQuAD	Span-extraction	Open	107,785 question-answer pair + 50,000 unanswerable question-answer pair on 536 articles	N/A	Wikipedia	Manually by crowd-workers
(Yang, et al., 2018)	2018	HOTPOTQA	Free-form	Open	112,779 questions, answer and supporting facts	Person Group/Org Location Number Date Artwork Adjective Event Yes/No Common noun Other proper noun	Wikipedia	Manually by crowd-workers
(Bajaj, et al., 2016)	2018	MS MARCO	Free-form	Open	1,010,916 question-answer on 8,841,823 passages	Description Numeric Entity Location Person	Bing query logs	The answers for the query logs were generated by crowd-workers

Proposed Approach

Since there exists no RC dataset created for the Arabic language, we opt to create one semi-automatically through exploiting an existing dataset originally created for QA applications and comprising of pairs of the form <question, answer>. This paper provides details of one experiment whose aim is to create a RC dataset exploiting the CLEF QA dataset. The RC dataset was created in four phases as detailed in figure 1. In phase 1, native Arabic speaker manually checked each pair of the CLEF dataset for correctness. In phase 2, a google search for relevant documents was performed. This is followed by phase 3 and then phase 4 in which document retrieval and paragraph retrieval were performed. Details of the phases are as follows:

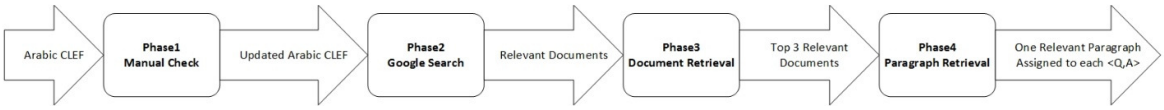

Fig. 1: Dataset Creation Phases

Phase1: Manual Check of Existing Pairs

The Arabic CLEF dataset was given to an Arabic native speaker for a manual standard review of correctness. The dataset was reviewed for two main reasons; (1) Arabic CLEF is a translated version of an English one; therefore, a syntactical correctness check is needed. (2) The development of the Arabic CLEF can be tracked back to the early 90s; thus, some of the included factual information which might have been valid at the time of the dataset creation may no longer apply and thus require updating; otherwise, the outdated information will have a negative impact on the results of phase 2. The result of a pair that needs to be updated was either an omitted pair, or a modified pair. Four types of pairs were omitted: (a) syntactically incorrect pairs with no answers as it was difficult to know what the questions were really about, (b) replicated questions (only a single copy of the pair was left in the dataset), (c) pairs with ambiguous questions, and (d) pairs with questions including English abbreviations. Modification of questions and their answers were performed for three reasons; (a) Pairs that have one or two syntactic incorrectness were corrected. (b) Pairs that included factual questions with old answers, their answers were updated according to the current time. (c) In some cases whole pairs were update, since the question and the answer were technically related back to 90s and had no records online. The original Arabic CLEF consisted of 800 pairs, however, after performing the above modifications, 189 pairs were modified, and 200 pairs were omitted resulting in a modified Arabic CLEF of 600 pairs. Questions were also given labels, which can be found with more statistics and examples in our previous work (Biltawi, et al., 2019).

Phase2: Google Search

After creating the updated version of Arabic CLEF, the pairs were converted into queries to perform google search. The goal is to retrieve 20 to 30 relevant document from the web or maybe less, see figure 3. Following are the detailed steps:

1. Perform preprocessing on both the question and its answer. The preprocessing step includes three sub-steps; the first one is tokenization, the second one is noise removal, and the third sub-step is normalization. Noise removal refers to removing punctuations, diacritical marks and stop words. The main punctuation mark in the case of questions and answers is the "?" that comes after the question itself. However, normalization refers to normalizing the Arabic letters. For example, all forms of the letter Alif (آ ، إ ، أ) is transformed to the bare Alif (ا). Hamza (ء) is removed from the Arabic letter Waw (ؤ) to be the bare (و), and from the Alif al-Maqsoora (ئ) to be (ى). Ta' al-Marbootah (ة) is transformed to Ha' (ه) by removing the two dots. Finally, elongation (-) which called Tatweel in Arabic is also removed, for example the word university in Arabic with the elongation is written as (جـــــامـــعـــة) and without elongation is written as (جامعة).

2. Combine the preprocessed question and answer to formulate a single query.

3. Perform google search using google API in Python. This step consists of the following two sub-steps; first, after retrieving the relevant document, only the textual material is fetched from it, paragraph by paragraph. Then the size of the document is checked, if the size is less than 2KB then the document is discarded, otherwise the document is saved in a text file. This is concluded after a number of experimentation. Generally, having documents of sizes less than 2KB contains rubbish data.

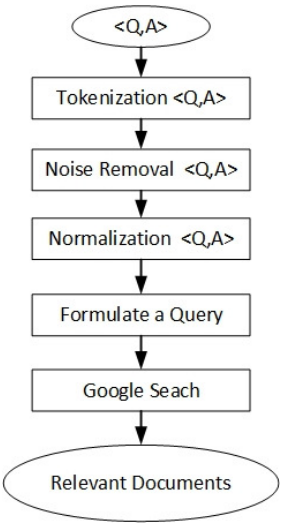

Fig. 2: Phase 2 - Google Search

Phase3: Document Retrieval

Document retrieval was performed using Vector Space Model (VSM) to retrieve the top three related documents resulted from google search. Figure 4 illustrated detailed steps of this phase. Following are the detailed steps:

1. Prepare three forms of each query and three forms of its equivalent related documents retrieved in the previous phase. The query is a combination of the question and its answer, while the documents are the related documents for that question and answer pair. The main preprocessing steps that were shared by the three forms were; tokenization, noise removal, and normalization, which are already discussed in the previous phase, having the noise removal, an additional sub-step which is the removal of non-Arabic letters/words performed on the relevant documents and one exception which is avoid removing stop-words. The three forms are;

    a. The first form is the original question and its answer preprocessed and combine to be used as a query with the original preprocessed related documents.

    b. The second form is similar to the first form but with additional step, which is stop-words removal.

    c. The third form is also similar to the second form but with additional step, which is stemming.

2. The query and its relevant documents of each form were represented as vectors using Term Frequency-Inverse Document Frequency (TF-IDF). TF alone refers to the number of times the term occurs in the document, while IDF refers to the number of documents that a term appears in. However, TF-IDF refers to the relevancy of the term. Following are the equations for IDF, and TF-IDF, where DF is document frequency of the term i, N is the number of documents in total, and j represents a document.

$$IDF_i = \log \frac{N}{DF_i} \quad (1)$$

$$TF - IDF = TF_{i,j}\ x\ IDF_i \quad (2)$$

3. Create a postings file or an inverted file from the vectors of each form of the relevant documents, then perform cosine similarity between each form of the query Q with its equivalent related document inverted file D. Next is the equation of the cosine similarity.

$$cosine\ similarity = \cos\theta = \frac{\sum_{i=1}^{n} Q_i D_i}{\sqrt{\sum_{i=1}^{n} Q_i^2}\sqrt{\sum_{i=1}^{n} D_i^2}} \qquad (3)$$

4. Take the average for the similarity measure of the three forms, and retrieve the top three relevant documents.

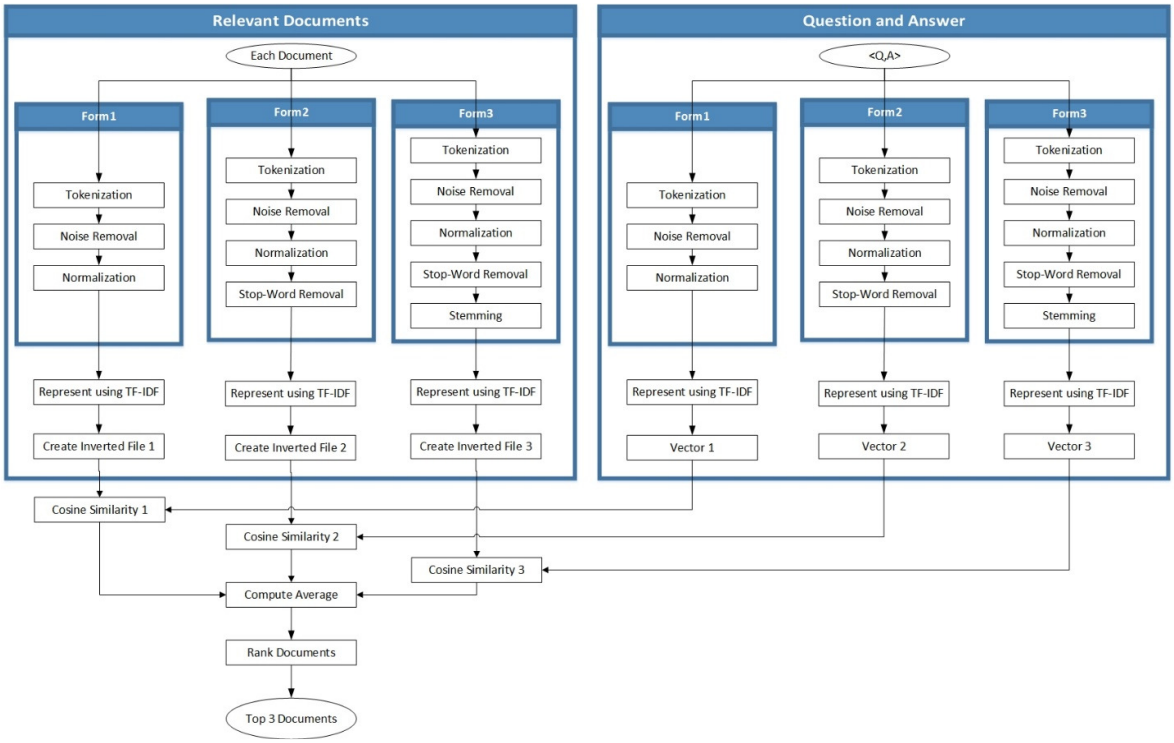

Fig. 3: Phase 3 - Document Retrieval

Phase4: Paragraph Retrieval

Paragraph retrieval was performed using VSM as well, to choose the most relevant paragraph among the paragraphs of the top three relevant documents retrieved in the previous phase, then these paragraphs were assigned to its equivalent question answer pair, figure 5 illustrated the main steps of phase 4. Following are the steps:

1. For each query, combine all three top relevant documents, and then separate the paragraphs according to “new line” character.

2. Preprocess each paragraph using the same preprocessing techniques used in the previous phase, to create three forms from each paragraph.

3. The query and its relevant paragraphs of each form were represented as vectors using Term Frequency-Inverse Document Frequency (TF-IDF).

4. Create a postings file or an inverted file from the vectors of each form of the relevant paragraphs, then perform cosine similarity between each form of the query Q with its equivalent related paragraph inverted file P. Next is the equation of the cosine similarity.

$$cosine\ similarity = \cos\theta = \frac{\sum_{i=1}^{n} Q_i P_i}{\sqrt{\sum_{i=1}^{n} Q_i^2}\sqrt{\sum_{i=1}^{n} P_i^2}} \quad (4)$$

5. Take the average of the three similarity results, then choose the top similar paragraph and assign it to its equivalent question-answer pair.

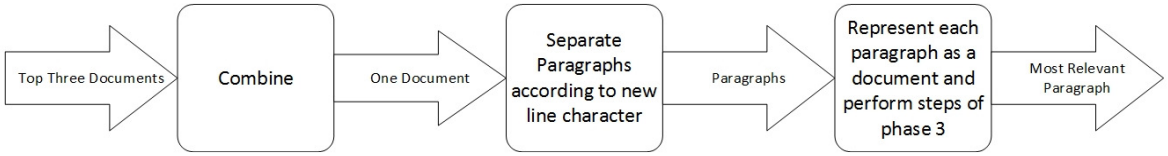

Fig. 4: Phase 4 - Paragraph Retrieval

Discussion

Since each phase has a different output, this section tracks the results of each phase, starting from phase one and ending with phase four. The output of phase one is the modified CLEF, the output of phase two is a set of documents from the web, the output of phase three is a list of the top three relevant documents, and finally phase four outputs a paragraph for each QA pair.

1. Phase 1: the modified version of Arabic CLEF consisted of 600 question and answer pairs. A detailed discussion can be found in our previous work (Biltawi, et al., 2019).

2. Phase 2: The expected number of retrieved documents was in the range of [20-30] documents for each query, but the actual range after implementation was [2-26]. Only three queries returned no documents. Therefore, the acceptance size was decreased from 2KB to 1.6KB for the retrieved documents during this phase, and the implementation of this phase was repeated only for the three queries. Table 4 demonstrates the average number of files retrieved from the web, the average number of tokens, the maximum and minimum number of tokens, the average number of maximum and minimum tokens during phase 2.

Table 4: statistics of phase 2

Average No. of files retrieved	Average No. of tokens	Max No. of tokens	Min No. of Tokens	Average No. of max tokens	Average No. of min tokens
13	13569	19607634	44	92121	329

3. Phase 3: the goal of this phase was to retrieve the top three relevant documents, but the range of the retrieved documents in phase 2 was [2-26]. Therefore, in phase 3, if the number of relevant documents is three or less then the documents are passed to the next phase; otherwise, the top three relevant documents were retrieved using VSM as discussed in the previous section. At the end of this phase, the total number of queries with only two files were 6 while the remaining 594 queries had three files. Table 5 demonstrates the average number of tokens, the maximum and minimum number of tokens, the average number of maximum and minimum number of tokens.

Table 5: statistics of phase 3

Average No. of tokens	Max No. of tokens	Min No. of Tokens	Average No. of max tokens	Average No. of min tokens
10356	5594261	116	26841	724

4. Phase 4: the goal of this phase was to assign a paragraph for each QA pair, and after implementing the experiment, the average number of tokens for the relevant paragraphs is 6603 having the maximum equal to 32767 and the minimum equal to 118, see table 6.

Table 6: statistics of phase 4

Average No. of tokens	Max No. of tokens	Min No. of Tokens
6603	32767	118

Conclusion

This paper provides a survey for the existing datasets for both question answering and reading comprehension. Then the paper discussed in details the phases with their outcomes for creating an Arabic reading comprehension dataset semi-automatically exploiting an existing dataset of question answering. The main four phases discussed were; the manual check, google search, document retrieval, and paragraph retrieval. As a future work, the presented experiment will be implemented on more QA datasets, and a detailed statistic will be provided.

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Tax Compliance Control as A Protection Method Against Tax Risks in Business

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Abstract

Many modern studies in the field of taxpayer behavior are focused not on studying the problem of tax evasion, but on the issue of voluntary compliance with tax laws. The key issue is to increase the share of taxpayers who voluntarily comply with the tax laws of their country, and thereby reduce government spending related to tax administration. The tax behavior of people and their willingness to pay taxes can be considered as a universal phenomenon, which is formed under the influence of a number of factors. Often, tax compliance by taxpayers is called tax compliance. The main tool for the implementation of the convergence mechanism in the tax system is tax compliance, which acts as a unified methodological base and attribute point in the harmonization of various groups of economic interests in the field of taxation. Tax compliance at the macro level involves building a clear, vertical relationship of the chain “tax legislator - tax executor - taxpayer" acting as the basis for building a stable tax convergence system.

Keywords: Compliance Control, Tax, Tax Accounting, Business.

Introduction

Each enterprise in the process of its financial and economic activities is prone to various financial risks associated with its current work. Tax risks present one type of such financial risks, when the enterprise has a possibility of financial losses arising in the process of calculating, paying and optimizing tax payments (Akamah, 2018). Nowadays, most organizations have a number of issues that do not allow it to quickly and effectively eliminate or minimize tax risks. Today, one of the key problems is the lack of a responsible person in the company who collects and analyzes information on tax risks, which is necessary for evaluation and information support of the tax risk management. Which limits the tax risk management activities to merely disputing decisions of tax authorities in court. This problem stems from the absence of a single mechanism for monitoring, accounting, analysis and assessment of tax risks, set by internal documents (Lennox, 2013).

Competent management of tax risks will ensure saving of money, as these risks present not only potential tax assessments and penalties, but also an instrument with which one can avoid overpaying taxes, correctly use tax incentives and reserves, and ensure the absence of budget lending (Filzen, 2015). The use of such mechanisms in tax policy management of an economic entity directly affects the state of its tax security, which is an integral part of economic security as a whole (Sandmo, 2005). The introduction of a tax compliance system will reduce the company's tax risks. As of today this buzzword refers, per se, to that group of internal control measures that in one way or another deals with tax issues, including contractual relations. Introduction of compliance control into activities of taxpayers in terms of taxation will allow to quickly identify, control and minimize arising tax risks.

Literature Review

At present, a study of foreign experience in application of tax compliance control and its adaptation to Russian realities is becoming increasingly relevant. Russian scientists agree on the definition and essence of the "tax compliance" concept. One of the leading researchers in this field, I. A. Mayburov, by "tax compliance" understands "one of the controlling authorities' functions, which ensures taxpayer's compliance with tax laws and other regulatory legal acts, standards of organizations (regulations of tax authorities) and prevents taxpayer from involvement into unlawful activities, as well as timely recommendations concerning the application of types and methods for conducting effective financial and economic activities by a taxpayer in a given legal framework" (Goncharenko, 2015). Korostelkin (2014) also understands "tax compliance" as following tax legislation by participants of tax legal relations, and reduction of financial, economic, legal and tax costs arising due to tax legislation violation (Akhmadeev, 2019).

Thus, the tax compliance control system is designed to promptly identify tax risks and mitigate the occurrence of those situations that provoke them. According to M. R. Pinskaya (2012) "the tax compliance process has two components: an advisory one aimed at reducing the invalidity risks through setting standards for taxpayer's behavior, and a controlling one aimed at overseeing the proper implementation of tax legislation by the tax authorities".

Tax compliance control is based on the preliminary control and identification of potential factors that entail violation of the law and other obligations of an economic entity to its counterparties. Savseris (2012) has a similar opinion on this matter. He believes that "tax compliance system is designed to identify tax risks in advance, to prevent situations with which they are associated. And if it is impossible to exclude such situations, assess tax risk and reduce its level".

Methodology

Development of an effective tax compliance control system in a company depends largely on the available budget sum for its creation and implementation, as well as staff qualifications. However, common elements in the development of such a system are: methodology, automation, internal control system and company's personnel. The efficiency of the developed and implemented tax compliance control system directly depends on the quality characteristics of these elements. The methodology implies the level of detalization of the accounting policy adopted in the organization in terms of taxation. The complexity of applying RAS (Russian Accounting Standards) 18/02, tax balance compilation, and effective tax risk management depend on the automation of individual processes. The internal control system monitors and verifies the correctness of filling out tax returns, and the need to hire a tax consultant and conduct advanced training depends on the qualifications of the staff. Based on the elements highlighted above and their quality characteristics, you can choose one of the tax compliance control organization models (fig.1).

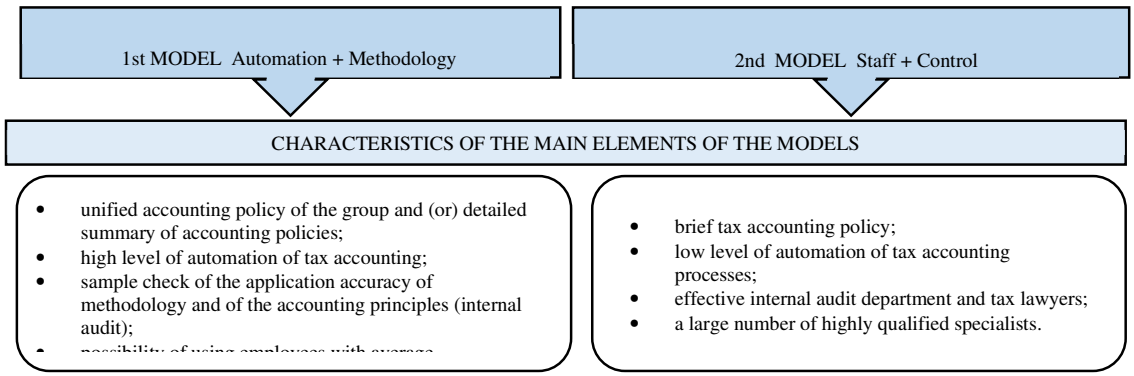

Figure 1: Models of tax compliance control at the enterprise

Source: Based on the materials of the Ernst & Young

The principal tasks of tax compliance control are:

a) confirmation of tax accounting accuracy (Armstrong, 2015);
b) determination of tax risks and identification of tax assets (Cerqueti, 2011);
c) monitoring over tax legislation compliance and data source for conducting financial analysis (Sparta, 2018);
d) an instrument for implementing tax control measures, including external ones.

The main positive aspects of the tax compliance control for an organization are the prevention or minimization of financial losses and sanctions from both Russian and foreign tax regulators, and the presence of a well-organized system for detecting and preventing tax risks. Based on the fact that one of the principal tasks of the tax compliance control is tax risk management, it can be concluded that it also manages the entire tax policy of the organization. The tax compliance control mechanism of an economic entity cannot effectively function without a system for prevention, minimization, or complete elimination of possible tax risks.

To establish and implement a system for prevention, minimization, or complete elimination of possible tax risks, it is necessary to solve a number of tasks:

1. Organize the collection and storage of information related to changes in the internal and external environment that may affect the operation of an economic entity (especially changes in tax legislation and the economic situation in the country). Economic factors usually include the possibility of an audit, the sum of penalties, tax rates, economic benefits, income sum, and the taxpayer's tax burden.
2. After analyzing the specifics of the business entity's activity, to determine the tax risk factors and its consequences specific to it.
3. Identify areas and develop methods to eliminate or minimize established tax risks.
4. To set the developed methods for reducing the tax risk level in the internal acts of the economic entity.
5. Organize management accounting and financial reporting for decisions that may cause tax risks.

Implementation of tax compliance control functions to the company's internal acts and regulations allows to solve these problems, which is indicated in a number of successive stages presented in Figure 2.

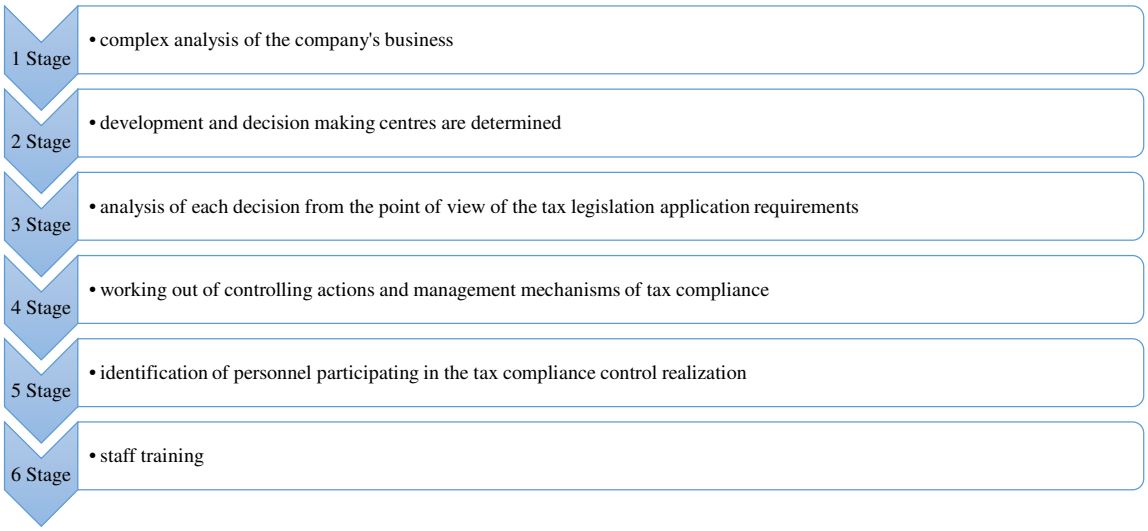

Figure 2: Stages of development and implementation of tax compliance control functions in internal regulations of an economic entity

Source: compiled by the author

At the first stage it is necessary to analyze the company's activities, its legal form and its business specifics, as well as to determine a specialist among the staff that can trusted with responsibilities of

the tax compliance Manager. Then, development and decision-making centers are determined based on the results of the first stage of development and implementation of tax compliance control functions. The third stage is to determine the impact of a decision made during the second stage on the taxation of an economic entity, as well as the possibility of tax risks. Based on the results obtained during the third stage, at the fourth stage tax compliance control measures are developed and implemented in the current internal regulations of the business entity.

In the final two stages, employees who are directly involved into establishment and operation of the tax compliance control mechanism are identified and trained, and their job descriptions are amended. Summing up, it can be concluded that the essence of tax compliance control lies not only in the preliminary detection and effective influence on financial, economic, legal and tax costs that arise as a result of tax legislation violation due to insufficient understanding of the tax mechanism by participants of tax relations, but also in the adequate assessment and minimization of their negative consequences, which in its turn is the basis of the company's tax security.

Discussion

Tax compliance as a key tool for forming an effective tax policy. Compliance control in an organization is a system of measures aimed at combating violations of legal norms, ignoring of internal regulations and ethical provisions in business by both managers and linear staff units. Mandatory compliance control is carried out only in the constituent entities of the banking sector (Bank of Russia Regulation no. 242-P, no. 06-29/PZ). Other companies and organizations are not required to do this. It will be useful for business entities to introduce separate controlling elements:

a) with strict administrative regulations (operating in the areas of energy, pharmaceutical, and telecommunications);
b) subsidiaries of international corporate groups that may be subject to requirements of the anti-corruption legislation of the United States and the United Kingdom;
c) whose managers, contractors, and products are blacklisted or subject to sanctions.

One of the most effective ways to manage the taxation of an economic entity is tax planning, one of the directions of which includes the development of accounting policy. In Russia, the issue of implementation of tax compliance control in the economic entities has been little studied. According to Korostelkin (2014) "tax compliance" should be considered as a system that allows to confirm the reliability of tax liabilities calculation. Kirilova (2012) believes that tax compliance is one of the functions performed by the management bodies of an economic entity in order to:

a) comply with tax laws and regulations (Bertrand, 2003);
b) prevent illegal activities (Petrov, 2019);
c) develop recommendations for effective financial and economic activities, with consideration of tax legislation norms (Lehoux, 2019).

The need to develop and implement tax compliance control can be dictated by both regulatory authorities, as well as by self-regulatory organizations (auditors, tax consultants) and the business entity itself. In general, the goals of tax compliance control can be attributed to:

- development of measures for optimization of the company's tax liabilities and reduction of tax risks (Kosov, 2018);
- improvement of tax reporting methods (Korableva, 2019);
- compliance with external tax regulations and organization's internal acts when forming the tax base.

The basis of the compliance control system are the principles presented in figure 3.

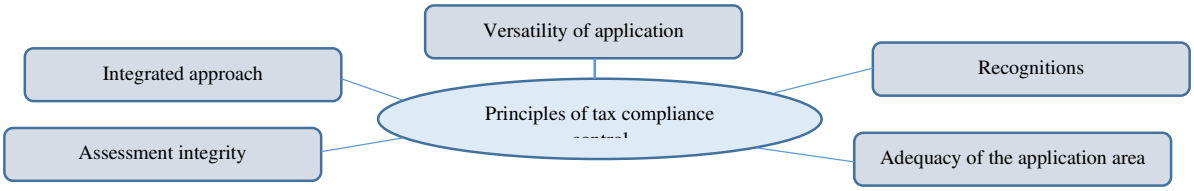

Figure 3: principles of tax compliance control

Source: compiled by the author

The principle of an integrated approach is affirmed by the fact that compliance control covers all of the company's tax risks, starting from unintentional or erroneous tax base erosion, and ending with deliberate tax evasion. The principle of the assessment integrity takes into account that the system is aimed at improving the performance of the accounting staff, financial departments, and managers of the organization (Fischer and Zachmann, 2020). The principle of versatility of application means that the tax compliance control system is applicable to all organizations due to its universality. The principle of recognition states that despite the possible reluctance of the company's employees to use this system, it is an effective tool for minimizing tax risks and should be implemented at a high administrative level (Bykanova, 2017). The principle of adequacy of the application area lies in the fact that compliance control affects only those areas of the company's activity that are regulated by the tax legislation (Xiao, 2020).

The need to implement compliance control for the formation of the tax base for corporate income tax is confirmed by data of the Federal Tax Service of the Russian Federation according to which 98% of field inspections in 2017 in Russia resulted in detection of violations. The minimum additional charges per one on-site tax inspection in Russia have increased by 73% over the past 3 years. For example, as of 2017 the total sum of such additional charges comprised 16.4 million roubles. Budget revenues have increased by 32% as a result of enforced collection across Russia (fig. 4.)

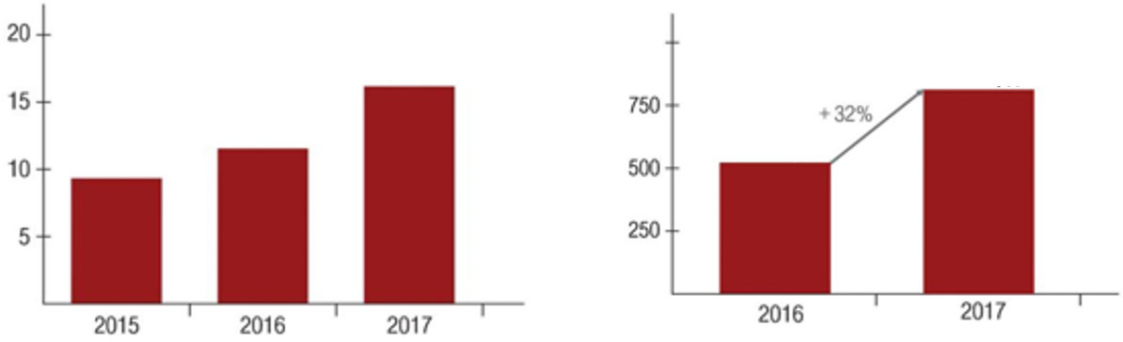

Figure 4 : Additional charges and budget revenues graphs according to data of the Federal Tax Service

Source: website pravovest-audit.ru/nashi-statii-nalogi-i-buhuchet/nalogovyy-kontrol-v-cifrah-i-perspektivah-2018-goda/ (access date: December 12, 2019)

The average sum of additional charges in major cities comprised over 55 million roubles per one on-site tax inspection. These sums could have been saved by the company thanks to the implementation of the compliance control system. Obvious, that additional charges in the result of tax inspections have a tendency for growth, which indicates at the low efficiency of the existing internal control in organizations in the area of taxation. This fact is confirmed by the number of lawsuits won by tax authorities, which in 2017 comprised 82.8%.

The development and implementation of tax compliance control in organizations can become an effective instrument for reducing the number of tax audits, and as result the sum of additional taxes, penalties and fines. General criteria for organizations that above all need a tax compliance system can be formulated as following:

a) having close interaction with contractors (suppliers of goods, works or services);
b) carrying out expenses whose feasibility and economic justification are difficult to confirm;
c) the company's revenue is above 200 million roubles per year (according to data from monitoring of carried out tax audits);
d) the cost of contracts exceeds a certain level (as determined by the organization and depends on the number of contracts with one counterparty);
e) the duration of cooperation with one and the same counterparty (the counterparty's integrity should be regularly analyzed to avoid the tax inspector's classification of transactions with this counterparty as unfavorable)

The purpose of implementing tax compliance control in an enterprise is to reduce the possibility of tax violations and, as a result, the risk of tax sanctions. In order to minimize or eliminate the risks of incorrect interpretation of tax legislation, it is advisable for an economic entity to develop and implement a detailed accounting policy for tax purposes. It should contain a uniform approach related to controversial points of taxation, for example, in the calculation of income tax, special attention should be paid to the certain types of income and expenses. With the correct choice of a particular tax option provided by the law, the accounting policy can be considered and used as a tool to plan the tax burden.

Conclusion

Based on the above, the main areas to pay attention to when implementing tax compliance control during the development of the accounting policy of an economic entity are:

a) Stability of the accounting mechanism. Which will significantly increase the reliability of results, especially when using the tax policy developed in accordance with the law. And in the case of consistent application of the accounting policy provisions in terms of accounting and taxation of business activities related to calculation and payment of taxes.
b) Completeness of the accounting mechanism. Each fact of economic activity that occurred in the reporting (tax) period can be correlated with the tax return. And on the other hand, each indicator of the tax return can be detailed in accordance with forming and documented facts of the economic activity.
c) Sufficiency and thoroughness of the accounting mechanism. The controlling tax authority must be able to access all necessary information provided for by Russian law.
d) Internal account of questionable facts of the economic activity. Facts of the economic activity that have dual interpretation for the purposes of tax accounting are subject to specialized accounting.

Delegate to the finance department the responsibilities for development of a unified tax accounting methodology, a clear and detailed accounting policy, tax analysis of transactions, as well as interaction with tax authorities during audits as per the experience of foreign companies.

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Specifics of Social Financing to Build A Modern Academic Staff Incentive Programme

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Abstract

The article considers the place of active personnel policy in the system of modern management-marketing and specific of insurance social package financing in a University. The possibility of increasing the level of motivational component of personnel potential of the company through strengthening of the administration's attention to the working conditions and social protection of people of creative professions related to one of the most sensitive to changes in the corporate culture and social policy, organizing groups of highly qualified personnel. General trends in the provision of social packages to employees of organizations are revealed. Modern approaches to the structure of the social package's formation are described. A questionnaire was formed for conducting a pilot survey of Moscow university's professors as well as the regional universities. As a result of the survey was identified some positive attitude of university teachers to the opportunity to participate in the programs of voluntary health insurance and non-state pension provision. The preferences of teaching staff's on the constituent elements of each of these programs are specified and their readiness to participate in these programs on the terms of co-financing was assessed. There was also formulated some features of social guarantees' financing in higher education institution.

Keywords: Teaching Staff of The University; Motivation of The University Teacher; Social Guarantees; Social Insurance.

JEL Classification: M14, M12, G22, G23, J39

Introduction and literature Review

In business, to build a company's development strategy, a popular management and marketing tool is used, which is a balanced scorecard. One of the key items in this system is *Personnel*. At the same time, the balanced scorecard is effective not only to develop a general shared understanding of the strategy and to link high-level goals and tasks set for certain departments and staff members, but also to serve as a staff incentive system.

As covered in the article by Isaeva (2015), to exploit the management and marketing concept in higher education at the present stage of development of Russian universities, we need to take into account the multifaceted nature of development of the educational services market. It also shows that such factors as "a balance between horizontal self-organization and vertical managing of a university", "blending" of rigid hierarchy structures into horizontal relationship networks" significantly impact on how a particular university in the sector will be developing. These factors identify the need to create special environment to support the system's primary resource which is the academic staff.
Within a university's marketing and management framework, a special monitoring system to assess and develop the academic staff potential needs to be built.

In our previous publications, we have singled out "staff loyalty" as an indicator to develop academic staff potential. When measuring the level of staff loyalty, factors that contribute to the development of the university's staff, its corporate culture, motivational potential and the teaching staff's passion, shall be evaluated.

According to Babynina (2013) Motivation potential is usually studied in two dimensions – how much is the teaching staff satisfied with various aspects of their work at the university, and aspects of the development of the corporate culture such as the motivational environment and the incentive system by assessing teacher satisfaction with various aspects of the university's employment policy.

Benefits package to the staff is one of the components of a positive human resources policy (Babynina 2014).

In her work, E. H. Vergara mentions the structure of the benefits package that is offered to an employee on a voluntary (compulsory) basis apart from his or her wage, and the one as a supplement to his or her wage or as a reimbursement of personal expenses: a mandatory benefits package, a competitive package and a compensation package (Vergara, 2013).

Compulsory benefits package includes obligatory employer payouts prescribed by the Russian law: annual paid leave, payments under certificates of sickness, contributions to the pension fund, compulsory health insurance.

Competitive benefits package includes employer company's voluntary fringe benefits: subsidized or free meals, voluntary medical insurance, sports expenses, subsidized sanatoria and holiday-home vouchers, etc.

In the research on Ageeva (2017) states, that compensation package includes measures aimed to compensate or refund employee's personal funds spent while at work .

In for-profit enterprises, in addition to the actual wages, employers also use indirect methods (cash and non-cash benefits) to motivate their staff, which form a so called "benefit package".

The work by I. Dolgopolova (2015) identifies general trends of benefit packages offered by for-profit enterprises to their employees:

- The list of benefits is getting more diverse and unconventional. For example, employees get extra pay for engaging in creative activities, rewards for personal self-fulfillment in cyberspace in order to respond to social needs.
- Welfare payments motivate staff to stick with the company for a longer time, and therefore are usually provided to employees who stayed in the company for more than a year.

Welfare payments are not provided or are limited to employees who had professional failings or abused the discipline during a year.

The work by Gutsu, et (2018) specifically studies the downfall of motivation and professional identity in the higher education sector due to over-complication of work for today's high school teachers. The authors say that in such conditions "developing and implementing a totally new, effective management policy aimed at attracting, retaining and motivating talented academia become the priority".

The work further states that in their work teachers are mainly motivated by their desire for self-improvement, personal fulfillment, professional commitment, interest in and enthusiasm for their discipline. Teachers' professional commitment is independent of both employment terms and of how much their material needs are satisfied.

A bureaucratic incentive system that ignores individual and typological characteristics of a particular occupational category stimulates teachers' motivation very slightly believes Isaeva (2007).

Findings obtained by the researchers suggest that both interdisciplinary research on high school teacher motivation and niche research aimed at creating favorable working environment in a particular university that allows to make maximum possible use of employees' innovative creative potential, are required.

Presently, the Russian welfare benefits practice involves compulsory guaranteed payments formed based on transfers of insurance contributions made by employers to social off-budget funds and paid out additionally within social partnership with the employees. Ageeva (2017) believes, that in the real economy, enterprises widely use corporate social benefits.

An important salary component is a company's benefits package that may be formed based on the job grade, on the offered program options ("cafeteria", "menu"), etc.

Hypotheses

Since the work of an University teacher is a creative process that is largely related to his personality and interaction with students, in order to increase the motivation, it is necessary to provide such working conditions that will allow him to quickly monitor the state of health, as well as participate in a voluntary funded pension system.

The purpose of the study is to prove the relationship between the value of the motivational potential of the universities' teaching staff and the level of teachers' satisfaction with their working conditions and social protection, as well as substantiate the importance of improving the system of financing social guarantees for University teachers.

The objectives of the study are to conduct a pilot sociological survey of teachers of Russian universities located in different regions of the country, and to identify the relationship between the possible package's content, which is offered to Moscow and regional universities' teaching staff, including insurance part of the package, and those services in which are mostly demanded.

Methodology and Data

Sixty teachers were surveyed whose sets of answers helped to shape certain patterns using correlation and regression analysis. For that, answers from table 3 were selected and correlated with the answers from tables 9 and 10.

During the research, general scientific methods were used, such as analysis, synthesis, a systematic approach, formalization method, scientific abstraction technique, as well as special methods of scientific understanding: statistical (correlation and regression analysis), experimental approach (opinion poll), modeling.

With increasingly growing competition for students in the higher education market, as well as due to the growing need to improve educational process, educators and their qualifications become the key wheel gear that takes a university higher in the domestic ranking. Crucial components for a university to be included in global university rankings include the teaching level, profound educational content, the use of modern educational technology, as well as publication activity in international peer-reviewed journals.

Employee motivation is a tool for a company's long-term strategy, and universities are no exception here.

When we talk about motivating teaching staff in institutions of higher education, benefits package, and its insurance component in particular, becomes of huge importance since psychological pressure that a teacher regularly faces when communicating with a large audience, as well as the tremendous amount of methodological work and department's activities that need to be done in brief time frame in addition to research activity, tend to worsen their health.

As a result, they more often contact healthcare facilities, there is a bigger need for a proper rest which, unfortunately, they don't have that much during the summer since intense teaching and teachers' pursuit of excellence in both educational and research activities takes a good deal of summer time to do research, write monographs, workbooks and opinion pieces.

This study aimed to establish relation between the possible composition of the benefits package, including its insurance component, offered to teachers of Moscow and regional universities, and the services that are actually needed.

The study followed teachers of the Moscow Automobile and Road Construction State Technical University (Moscow), Bauman Moscow State Technical University (Moscow), Moscow State Tchaikovsky Conservatory (Moscow), the National Research Tomsk Polytechnic University (Tomsk), Russian State University named after A. N. Kosygin (Technology. Design. Art) (Moscow), Plekhanov Russian University of Economics (Moscow), Saratov Socio-Economic Institute of Plekhanov Russian University of Economics (Saratov), Ural State Economic University (Yekaterinburg).

There are sixty teachers aged 25 to 75 were interviewed. Interviewed teacher ranks show that the pilot survey matched current university teacher ranking structure: 1 dean, 3 heads of departments, 7 professors, 37 associate professors, 10 senior teachers, 2 assistants / teachers.

More than 70% of respondents (42 persons) have a Ph.D. degree, 15% (9 persons) have a higher doctorate degree and equal number of respondents are non-degree.

More than half of our respondents are middle-aged persons: 25 persons (41.7%) are aged 40-49 years, 19 persons (31.7%) are aged 30-39 years. There are 7 persons (11.7%) aged 50-59 years, 2 persons (3.3%) are age 60-65 years, 3 persons (5%) are above 65 years, and 4 persons (6.7%) are less than 30 years of age. 75% of respondents are women.

One third of the respondents – 21 persons (35%) have been working in the field of higher education for over 20 years, 27 persons have been working 11 to 20 years (45%) in this field and 12 people (20%) – less than 10 years. At that, the majority of respondents are employed as full-time teachers – 44 people (73.3%).

The study produced the following indictors.

The first stage determined the teachers' general attitude to their professional activities.

Table 1: What attracts you most to work in a university?

	Answer options			
	Teaching	**Research**	**Teaching and research equally**	**Hard to say**
persons	20	6	34	-
%	33.3	10.0	56.7	-

The data show that the majority of teachers interviewed (56.7%) are equally attracted by both teaching and research. One third of respondents (33.3%) are professionally interested in teaching.

Table 2: What do you think is the most important thing for you in your scientific and teaching career? (respondents were asked to select three most significant items)

Answer options	Persons	%
Serving society	15	25
Constant scientific pursuit	22	36.7
Opportunity to disseminate knowledge	38	63.3
Work with young people	42	70.0
Creative environment	44	73.3
Other	3	5.0

The majority (44 persons out of 60) of teachers interviewed (73.3%) associate their professional activity with creative environment; 70% (42 persons) singled out their wish to work with young people, 63.3% (38 persons) opted for an opportunity to transfer their knowledge to younger generations; 36.7% of respondents (22 persons) selected constant scientific pursuit as one of the key points in their teacher career choice, and for 15 persons (25%) high school teaching is a form of serving society.

Since this was a free-answer question, three teachers also added “Opportunity to evolve”, “Flexible hours”, “Opportunity to select a potential employee”.

Table 3: What social aids do you think may be attractive for a university teacher? (respondents were asked to select three most significant items)

Answer options	Persons	%
Subsidized voluntary health insurance (health services in various out-patient clinics)	31	51.7
Subsidized travel vouchers for university staff and faculty and their families	25	41.7
Paying for recreational activities (visiting health care centres; swimming pool, gym membership, etc.)	24	40.0
Paying for skills-enhancement	23	38.3
Paying for costly healthcare services	19	31.7
Education fee discounts for children of university staff and faculty	16	26.7
Financial aid	16	26.7
Non-state pension scheme	15	25.0
Covered travel-to-work expenses (public transport pass)	9	15.0
Life and health insurance	5	8.3
Free meals	-	-
Other (please, specify)	3	5.0

Items such as “Subsidized voluntary health insurance (health services in various out-patient clinics)” (51.7% of respondents); “Subsidized travel vouchers for university staff and faculty and their families” (41.7% of respondents); “Payment for recreational activities (visiting health care centers; swimming pool, gym membership, etc.)” (40.0% of respondents) became of the greatest interest among teachers.

The least popular are “Covered travel-to-work expenses (public transport pass)” (15.0%); “Life and health insurance” (8.3%). Free meals option won nobody’s interest.

Three interviewed teachers also mentioned “Materially lowered mortgage rates to 1.5-2% plus compensation for guaranteed long-term employment at the university (at least 10 years). Like the one the armed forces have”; “Favorable terms to rent and purchase housing”; “Covered costs for international internship” as well-wished forms of aid.

After correlation and regression analysis of the answers, the authors concluded that subsidized voluntary health insurance (health services in various out-patient clinics) was most preferred by teachers – candidates of science, aged 30-39, with 11 to 20 years of university experience and holding the office of assistant professor or senior teacher. This is a group of teachers who don't have sufficient income to fully pay for for-profit healthcare, but have a need for better healthcare services compared to the publicly funded health care.

Non-state pension scheme was of interest for teachers aged 50-59 years who have 11 to 20 years of high school experience, hold the office of assistant professor and have a degree of candidate of sciences. And this is quite explicable since as a person nears the retirement age, there is a growing concern of whether a person will have enough savings to maintain a desired quality of life considering low public pensions.

Table 4: What social aids have you been enjoying over the past three years?

Answer options	Persons	%
Paying for skills-enhancement	20	40.8
Financial aid	7	14.3
Subsidized travel vouchers for university staff and faculty and their families	4	8.2
Education fee discounts for children of university staff and faculty	4	8.2
Paying for recreational activities (visiting health care centres; swimming pool, gym membership, etc.)	3	6.1
Subsidized voluntary health insurance (health services in various out-patient clinics)	2	4.1
Paying for costly healthcare services	1	2.0
Other (please, specify)	14	23.3

The most opted answer amongst available social aids was "Paying for skills-enhancement" with one third of respondents (40.8%) who enjoyed it.

A rather high number of respondents (13 out of 60 interviewees or 21.7% of respondents) stated they did not use any form of social aid and one teacher (1.7% of the total number of respondents) had a study tour abroad financed by the university.

The data in table 4 show that the issue of availability of voluntary health insurance schemes for university teachers and the reasons why they do not use these schemes, where they are offered by the university, despite their statistically high demand, needs further study.

Table 5: How would you respond if your employer offered you a social insurance package (participation in a voluntary health insurance scheme and/or non-state pension scheme)?

Answer options	Persons	%
You would start appreciating your workplace more only in case of fully covered insurance scheme	30	50.0
You would start appreciating your workplace more even in case of partially covered insurance scheme	11	18.3
It would not affect your work ethic	19	31.7

The answers show the majority of respondents would appreciate their workplace more if they had additional insurance schemes covered by the employer (41 persons or 68.3% of respondents).

Table 6: If your employer offered you to cover one scheme of your choice at his expense, what scheme would you choose?

Answer options	Persons	%
Voluntary health insurance scheme	39	65.0
Non-state pension scheme	17	28.3
None is of interest	4	6.7

Out of the two proposed schemes, voluntary health insurance scheme was of greater interest to the respondents, with more than two-thirds of the interviewed teachers who opted for it (65.0%).

Non-state pension scheme covered by the employer was much less interesting for respondents, with only one third of respondents (28.3%) who chose it.

Four respondents (6.7% of the total number of respondents) were not interested in any of the offered schemes.

Table 7: What voluntary health insurance schemes are of the most interest to you?

Answer options	**Persons**	**%**
Out-patient and in-patient medical services incl. dental care	42	70.0
Out-patient medical services incl. dental care, only	12	20.0
In-patient medical services only	4	6.7
Other	2	3.3

Respondents' most preferred voluntary health insurance scheme was "Out-patient and in-patient medical services incl. dental care", with 42 out of 60 interviewed teachers (70%) who chose it.

One teacher noted that he (she) was not interested in health insurance schemes, and another was interested in having out-patient medical services without dental care.

Table 8: What non-state pension schemes are of most interest to you?

Answer options	Persons	%
Life pension subject to the amount of savings	29	48.3
Fixed-term pension, for the agreed timeframe, subject to the amount of savings	8	13.3
Fixed-term or life pension in amount agreed in advance	18	30.0
Other	5	8.3

The assessment is broken down as follows: almost half of the teachers would be interested in having "Life pension subject to the amount of savings" (48.3%), one third of teachers (30.0%) opted for "Fixed-term or life pension in amount agreed in advance" and only 13.3% chose "Fixed-term pension, for the agreed timeframe, subject to the amount of savings".

Since this was a free-answer question, five interviewees responded as follows: "None"; "None is of interest"; "I do not trust non-state pension schemes, their integrity and longevity"; "I am not interested in non-state pension schemes"; "I have never participated in non-state pension schemes".

Table 9: Are you willing to participate in voluntary health insurance schemes as co-financing? If so, what size of voluntary health insurance premiums are you willing to contribute?

Answer options						
	up to 60%	40 to 50%	30 to 40%	20 to 30%	up to 20%	I am not willing to co-finance using own funds

persons	0	1	3	4	25	27
%	0	1.7	5.0	6.7	41.7	45.0

According to the survey results, 45% of respondents are not willing to co-finance voluntary health insurance schemes using their own funds.

Just under half of respondents (41.7%) are willing to co-finance a voluntary health insurance scheme, however, in the amount of up to one fifth of the required premium.

Certainly, the size of premiums under co-financed voluntary health insurance schemes may significantly vary depending on the scheme content and health care institution ranking. Therefore, this study featured deemed amount of financing that is required. So, the data obtained rather reveal how much people are willing to contribute independently, from psychological perspective.

After correlation and regression analysis, the data showed that teachers who are candidates of science aged under 30, with less than 10 years of high school experience, and those with 11 to 20 years of high school experience, holding associate professor offices, were not willing to co-finance using their own funds. This trend can be accounted for the fact that up to the age of 30, health status does not yet require frequent health center visits. And with limited free funds, they are usually unfavorably disposed towards health insurance.

Table 10: Are you willing to participate in non-state pension schemes as co-financing? If so, what size of non-state pension contributions are you willing to make?

	Answer options					
	up to 60%	40 to 50%	30 to 40%	20 to 30%	up to 20%	I am not willing to co-finance using own funds
persons	0	0	4	5	15	36
%	0	0	6.7	8.3	25.0	60%

Even more peremptory answers were provided to this question: 60% of respondents are not willing to co-finance a private pension scheme using their own funds. One quarter of respondents (25%) are willing to co-finance, however, in the amount of up to 20% of the required amount.

At the same time, after correlation and regression analysis, we found that non-degree teachers aged under 30 with less than 10 years of experience holding senior teacher offices were not willing to co-finance using their own funds.

The reason for this is that many teachers, at the outset of their academic career, which starts at a young age, do not yet realize that they should start to save money as early as possible.

Conclusion and Discussion

The performed survey revealed that:

- modern teachers are attracted by both scientific and teaching elements of the profession: an opportunity to transfer their knowledge to younger generation, as well as an opportunity to be creative;

- voluntary health insurance became the undisputed leader among the social benefits, leaving behind such needs as subsidized travel vouchers and recreational activities;
- our survey reaffirmed the acute need for voluntary health and pension insurance schemes, making them a new motivation for teachers to improve their performance;
- most teachers are not willing to co-finance health and pension insurance.

The results of this study may help Russian universities to make useful and relevant decisions when developing incentive programs and forming demand-driven benefits packages for teachers.

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Public-Private Partnership as a Tool for Implementing the State Infrastructure Policy of The State

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Abstract

In conditions of deficiency of budgetary funds important task facing government is to find tools that allow you to replace public investment in the creation and upgrading of infrastructure to private capital and at the same time to optimize financial expenses for this purpose. To define the positions in this direction is the search for new approaches in the use of public-private partnership with active participation of private capital. Based on the results of a study of the distribution of global investments in priority sectors of the economy identified the factors and conditions necessary for effective interaction between government and business. Highlighted a number of problems that hinder the effective implementation of public-private partnerships in priority sectors of the economy. It is established that the existing potential in the implementation of public-private partnership projects is not being realized enough. Based on the experience of advanced economies and identifies some priority areas of its improvement, taking into account current world trends.

Keywords: Public-Private Partnership, Economy, Business, Infrastructure Policy, Innovation, Investment.

Introduction

Infrastructure policy of the state is influenced by many objectively defined for the country factors, including its size, geographical location, availability of natural resources, features of historical development of States and forms of business activities. There is no doubt that for any country is important to have a clear understanding of internal and external challenges that have emerged on the way to effective development, and identifying opportunities and prospects of formation of effective innovation system. The implementation of government infrastructure policy based on the use of public-private partnership (PPP) has the objective preconditions in the modern world. The mechanism of interaction between the state and business in realization of priority national projects actively studied in Russia and in foreign countries is determined by different approaches to the definition of public-private partnership and its role in the development of the economy (Vertakova Yu., Plotnikov V., (2014), Salinger, L. (2004), etc.). Great attention to the understanding of the role of public-private partnerships in the modern economy innovation is paid in developed countries, where implementation of projects on PPP basis, is considered as an important instrument of state innovation strategy (Delmon, J. (2014), Petersen, O. H. (2011)). As practice shows the outcome of such interaction should be to attract additional private investment in the formation of innovation infrastructure of the economy and increasing the quality of public goods (Lebedenko O., Agamagomedova E., Charochkina E. and Vertakova A. (2017)).

Results and Discussion

Search and implementation of the most effective mechanisms and relevant directions for the development of infrastructure does not lose its relevance today. According to experts, in order to ensure the rapid development of the country's national economy in the development of infrastructure, it is necessary to invest more than 5% of GDP annually. In world practice, infrastructure investment is considered one of the most effective tools to stimulate economic development. Globally, data on Russian investments in key infrastructure sectors almost coincide with the global trend and remain at an average level of 3.2%. If we consider investments by sectors of the economy, then in 2018 the transport sector of the economy traditionally occupies the largest share in the distribution of global infrastructure costs. About 1.3 dollars trillion is spent on roads, bridges, airports and other transport facilities in the world per year. Investments in energy take the second place, as for the sector of information and communication technologies, it occupies a small share in government spending (Fig. 1).

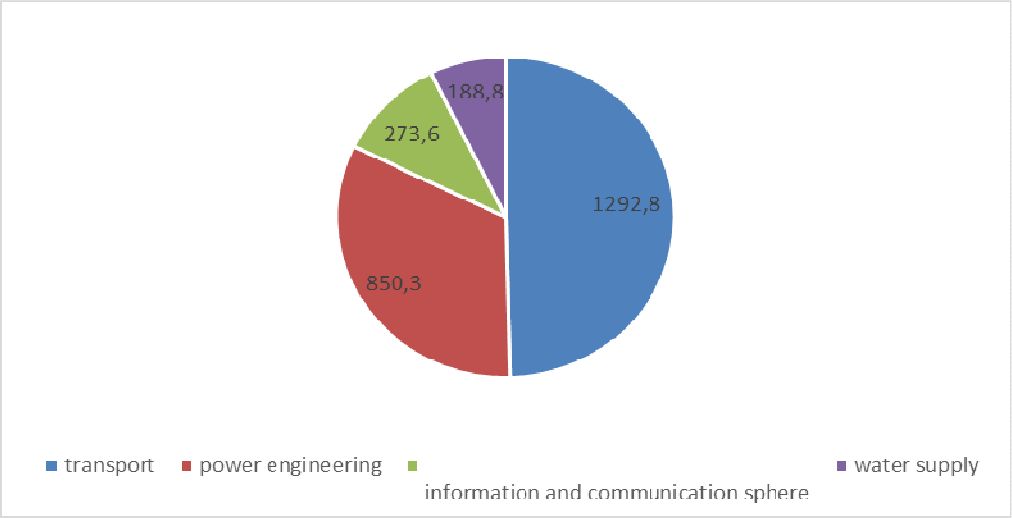

Fig. 1: Global investment in major sectors of the economy in 2018, billion US dollars

The source: Rating of regions by the level of PPP development. Analytical review, 2019. [http: //pppcenter.ru/assets/docs/reit240419.pdf]

With regard to the distribution of investment by country, China today occupies a leading position in all areas of infrastructure, the three leaders include India, the USA and Japan. Russia does not occupy a leading position in more than one sector (Table 1).

Table 1: Ranking of countries by investment in the economy in 2018

Transpotr	Energy	Information and communication environment	Water supply
1) China	1) China	1) China	1) China
2) USA	2) USA	2) Japan	2) Japan
3) Japan	3) Japan	3)USA	3) India
…	…	…	…
11) Russia	**15) Russia**	**12) Russia**	**25) Russia**

The source: Rating of regions by the level of PPP development. Analytical review, 2019. [http: //pppcenter.ru/assets/docs/reit240419.pdf]

Today it is obvious that government spending on infrastructure needs to be increased. In many developing countries, including Russia, the potential of public-private partnerships being realized is not always fully consistent with the necessary trends of the modern innovative global community. A

large share of investments in infrastructure is carried out at the expense of the state, for example, education, transport and healthcare, but as the experience of developed countries shows, the mechanism of public-private partnerships can work well in these areas. In general, 3 422 PPP projects are currently being implemented in Russia with a total volume of private investments of 2 182 billion rubles, and in China at the end of 2018, 4691 PPP projects were under implementation, where the volume of private investments amounted to 1 trillion dollars.

The main challenge for developing countries is to maximize the potential of the business for the implementation of the tasks, the responsibility for which rests with the state. It is important to develop directions for the use of PPPs in new sectors of the economy, in particular in the field of IT infrastructure. To activate the PPP in the social sphere. On the world market has been formed certain trends that have an impact on the entire system of economic relations, including the trends in the field of PPP, in particular, PPP projects have become larger, but also riskier, higher priority commitments of the public side, there is a growing demand for "green" investments and quality projects, these processes are increasingly being transferred to digital form, countries are more active in sharing their practices and develop universal approaches to investing. In the world there is a trend for high-quality infrastructure investment (Infrastructure Investment, Quality). Russia, as a member of the Working group on infrastructure of the "Big twenty" (G20) has been working on the formation of criteria for assessment of projects in relation to Quality Infrastructure Investment. United center for the development of infrastructure and PPP will combine the capabilities of the Corporation, and the Center's experience in this field, will increase the quantity and quality of infrastructure projects, implement global best practices in the field of application of PPP mechanisms, as well as accelerate the launch of new projects. An effective tool to overcome the lack of data about infrastructure and attracting private investment in its development is the creation, development and integration of digital platforms. In Russia have already created such aggregator platform support infrastructure projects "ROSINTER". A wide range of tools and services allows you to simplify the process of preparation of projects to attract the necessary partners to enhance the competence in the issues of attracting investments (Fig.2).

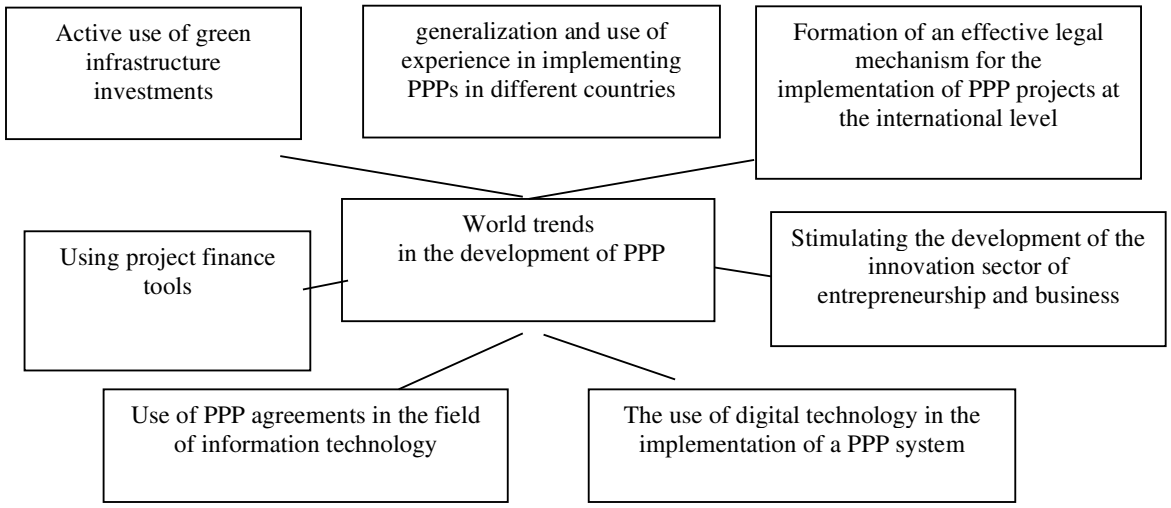

Fig. 2: World trends in the development of public-private partnerships at the present stage

Undoubtedly, the instrument of public-private partnership is in demand. This is evidenced by the changes in legislation that have appeared recently. Recently, we have the opportunity to implement PPP agreements in the field of information technology. Active interaction between business and government allows balancing risks. Now, concessionaires have resorted to the tools of the Project Financing Factory to attract syndicated loans to their projects. This allows you to implement much larger undertakings than before, and reduce the cost of projects. Obviously, those countries that strive to achieve success in implementing an effective infrastructure policy, based on the

implementation of PPP projects that are in line with global trends, will eventually gain significant competitive advantages.

Conclusions

Over the past several decades, the phenomenon of PPP has significantly changed and has undergone a number of changes. The number of projects is gradually increasing, the legal framework is being strengthened, and the industry is expanding. The study of foreign experience indicates that there is a centralization of public administration in this area: public institutions play an increasingly important role in the establishment of the PPP institution and its transformation into an instrument for implementing the country's infrastructure policy.

The mechanism for implementing public-private partnerships should primarily be determined by the strategic goals of the country's innovative development. Modern conditions require the development of high-tech industries and the expansion of scientific potential, which is impossible without investment and interest from both the state and private business. The PPP implementation mechanism should include socio-economic and institutional mechanisms to stimulate all participants at each stage of implementation. They could include forms and methods of monitoring the global PPP markets, integration of production with science and education, economic incentives for private business for progress in implementing projects, some privileges on innovative patents, subsidization of innovation, business activity, as well as insurance of economic risks, institutional consolidation of new economic and social relations and their results. As a result, we should receive a growth in innovative activity of the economy, increase in competitiveness and resistance to the global challenges of our time.

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The Impact of Digital Business on Competitive Advantages of Social and Economic System

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Abstract

Competitiveness of modern national social and economic systems depend on the digital technologies and they are the key economic drivers. Depending on the degree of information progress influence the market dictates new trends for all the industries. This means that digitalization opens promising prospects of effectiveness of warehouse stocks management and logistics processes. At that, automated management systems of supply chains ensure significant optimization of stocks of end products, raw materials, spare parts at a warehouse of an enterprise. At the same time digital instruments also reduce logistic costs, help the owners plan routes more effectively, control transport loading, establish correct logistic priorities in the company's operations. Thus, large companies will be able to interact with technological businessmen and IT specialists by creating venture funds and business incubators specializing on Industry 4.0 technologies and also as part of technological contests aimed at solving of business problems.

Keywords: Economy, Companies, Digitalization, Costs, Competitive Advantages, Society

Introduction

The computer and information technologies changed business processes in many industries a long time ago and became a routine thing. Digitalization has already attained good results in corporate and state management, in the education, healthcare, public services systems. Russia leads the world by the spread of digital technologies in state management, in some types of urban transportation service (Petrov, 2019).

At present, digitalization is already introduced into industrial technologies and Russia's aviation, car, shipbuilding, food industry companies, nuclear power and the rocket and space industry. Digital twins are created; production processes are doubled in virtual reality. A transfer to a distributed production model has started (Akhmadeev, 2016). A company can use a machine tool located at another plant in another city remotely.

Literature Review

The digital economy phenomenon is very multidimensional and includes penetration of information technologies into all spheres of society's life. The term was coined by the founder of MIT Media Lab Nicholas Negroponte in 1995 (The Massachusetts University). Modern researchers Brennen J. S (2016) mean the same by the word, but they focus exclusively on industry changes. Slepov V.A. (2019) in his works point to the rising role of digital technologies in the producing industries and, as a consequence, the impact on the labour market. Researches by Parviainen (2017) say that digitalization influences not only the processes of industrial production, but also the whole value chain and all external and internal

agents. In his turn, Sabbagh (2013) and Kayikci (2018) focuses in his research on digitalization's influence on logistics as an industry and on transaction cost cuts on the whole. The authors of research Zubarev (2019) state that new technologies help companies speed up processes at all stages of the production chain. According to Kosov (2018), this is a great competitive advantage of the business.

Theoretical Background

Competitive advantages of the key subjects of economic relations are ensured by a significant profit growth, more effective work of employees and material assets optimization. Thus, revenue of the digital business in the West grew by 9%, while its market value by 12% compared to its peers. Basing on the higher economic and financial indicators of the business, 78% of company managers, who participated in a poll held by Capgemini Consulting and MIT Sloan Management, said that digitalization will become critically important for their companies, which is why for 67% of general director's digitalization will become pivotal in their corporate strategies. The researches demonstrate that the companies, which use digital technologies successfully, are more competitive than those, which lag behind in digital maturity. These features allow us to single out several competitive advantages inherent only to the digital business.

First, the competitive advantages include altered and adapted business models. As more devices are switched to the networks, the company's possibilities of collecting data from the most faraway links of the value chain ensure conditions for reforming the business models and creation of new ones thanks to the Internet. E-commerce development became one of the key growth drivers of the digital economy in the USA and China and gave them a powerful incentive for the development of related logistics. "Those who solve other people's problems get the profit. The current global profit now is to sell the stuff produced by somebody else. Everything that helps it – from logistics to Facebook – is profitable and promising." That is why logistics is gaining momentum now and "an even relatively overpriced delivery service is of incredible popularity."

At that, Amazon has recently achieved delivery speed of one day after the order – the client can receive 70% of Amazon's own goods (i.e. not provided by other online retailers) within 6-14 hours after ordering. Despite higher express delivery tariffs, this segment expands by 25–60% annually. Consequently, when supply exceeds demand, such a psychological feature as fast satisfaction of customer's desires becomes one of the demand supporting factors (Glubokova, 2019). However, the new economy of fast delivery requires special infrastructure – ports, warehouses, high-speed railways, a plane fleet, the absence of traffic jams on the roads, etc, including special culture of treating the consumer.

Thus, in 2017, the US e-commerce turnover amounted to U.S.$445–455 bln, or 550% more than in Russia. For comparison: Russian Post's revenue from the delivery business amounts to 116.6 bln rbls (or $1.94 bln rbl) compared with a revenue of FedEx alone, which amounts to $60 bln, or nearly 200% as much. Experts forecast that the gap will be bridged in the next few years, because "a real boom of superfast delivery only starts, while it can be stopped short by prohibitively high prices and a low quality of servicing." (Neubert, 2018). However, global e-commerce development and switching to the networks can face some obstacles. Although some social and economic systems are successful in spreading internet technologies, it is evident that the emerging markets will be limited in signing contracts and entering the market because of poor Internet penetration.

Another competitive advantage ensured by the digital technologies in the social and economic systems is reduction of the time needed to produce new goods and services, higher efficiency of operations and a stronger ability to react to market changes. Automated digital management of supply chains helps the company boost its productivity, efficiency and transparency of operations, produce good demand forecasts and manage its material assets in a real time regime creating a reliable system of order delivery (Prodanova, 2018; Kosolapova, 2019). A research done by International Data Corporation FutureScape, confirms that 75% of value chains will be built on the processes, products and services

united with the help of digital technologies as early as by 2019, which will help increase labor productivity and increase the time of reaction to market changes.

Discussion and Result

This leads us to outlining the following competitive advantages.

a) Creation of new ways of client service. It was only recently that competitive advantages were gained by the price leadership and uniqueness of the product, while today competition is won with the help of innovations and outsourcing (Aksenova, 2010). Digital companies attain loyalty by offering each client uniformity and a high quality of service regardless of the interaction channel. At the same time, it helps companies receive valuable analytics for constant improvement of their products and services and precise forecasting of future purchases;
b) A higher service quality. Two out of three clients change their service supplier because of the quality of service. The companies which pay as much attention as they can to the quality of client service outstrip the market and are ahead of their competitors (Ekimova, 2016). Watermark Consulting analyzed the stock prices of such companies for six years and concluded that the yield on these securities is almost three times as high as of the companies comprising the S&P. The companies which do not pay much attention to the quality of client service lag behind the market by about 34% (Korableva, 2019);
c) The use of innovations to increase labor productivity. People want to work at the companies, which have the means and the wish to encourage and support their productivity, help react to the changes faster. The digital companies offer their employees the instruments necessary for effective connection, a high degree of involvement, joint work and mobility. In its turn, Deloitte said in a research that profit per equity growth will exceed 50%, if employee dissatisfaction falls to 10% (Shtefan, 2017).

Thus, the spread of information technologies and digitalization will ensure the spread of entrepreneurship (e-commerce, information and communication technologies); more creative and innovative solutions will be applied; the service quality will increase; access to new markets and new clients will increase (Lehoux, 2019; Turishcheva, 2019).

Conclusion

Digitalization is gaining momentum both in the middle-size businesses, which are conspicuous for their high mobility and fast reaction to market changes, and in big business. Nowadays, even the sectors usually controlled by the state digitalize. All these create the prerequisites of digital business influence on the whole social and economic system of a whole state. A research by Dorofeyev (2018) demonstrates significant changes in all business areas thanks to digitalization and proves that information and communication technologies grow rapidly. A research done by Kutsuri G. (2019) explains the influence of digital technologies on different areas of economic activities depending on the level of economic development of various social and economic systems. At that, a research by Maiti M. (2017) and Neubert M. (2018) points to direct correlation between information technologies and social and economic development. Consequently, this correlation is about the same in developed and developing states.

Digitalization opens promising business opportunities of higher effectiveness in managing warehouse stocks and logistics processes. Automated systems of supply chain management optimize ready products, raw materials, spare parts stocks at the warehouses of a company significantly. Digital instruments also reduce logistic costs, help create effective routes, control transport loading, form better priorities of logistics operations for the whole company. In its turn, development of Industry 4.0 technologies requires concentration of resources, that's why the companies have to form industry partnerships for joint project financing, reduce risks, interaction with the government agents, technological companies and research centers to create expert and consultative centers, exemplary enterprises, develop industry platforms, solutions and standards. Thus, large companies will be able to

interact with technological businessmen and IT specialists by creating venture funds and business incubators specializing on Industry 4.0 technologies and also as part of technological contests aimed at solving of business problems.

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Students` Research Projects in Science: Involvement Evaluation Methods

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Abstract

The issues of attracting students to scientific work and research projects always cause considerable discussion. This is explained by high competition of scientists and faculty for the right to publish their scientific achievements and also by the possibility to be among the winners in the distribution of grant funds for research and development. This state of affairs leads to a situation where the student community is actually "out of the brackets" of the scientific life of a higher educational institution. In fact, the student scientific community remains an underestimated resource for the research activities of an educational organization. As a result a difficult task appears concerning involvement of students in scientific and educational projects (scientific articles, monographs, conferences, scientific grants, etc.). Based on empirical data, the authors propose a methodology that takes into account the criteria for assessing the degree of student participation in research projects.

Keywords: Students` Science, Scienceprojects, Sciencepapers, Experts, Sciencejournals.

Introduction

Student science in the academic environment is included in the list of key areas of work. The task of the university is to prepare not only specialists in the fields of study, but also scientific and pedagogical workers. Higher educational institutions seek to find students who are predisposed to scientific activity in order to make them future teachers. The streamlined process of introducing students to the teaching staff ensures a well-balanced change of generations, new vision, approaches and methods in education.

The state, business and non-profit organizations encourage students who have distinguished themselves in research activities. The grant and scholarship support that students receive, increases the prestige of the educational institution, affects its domestic and international ratings, and popularizes it among applicants. There are interesting and successful international projects for integrating the scientific potentials of the student and business communities, for example, Demola Network [6, p. 224]. This interaction format unites more than 750,000 students, 50 universities and leading world companies [9].

Student science is an important contribution to the quality of education. Many researchers rightfully note that students involved in scientific work have better academic performance and more developed critical thinking [8, p. 264]. There is a consensus that teachers play a special moderator role in attracting students to big science [4, p. 106]. It is close cooperation with curators, teachers that allows to acquire the much-needed primary positive experience of scientific research.

For the development of student science in higher educational institutions, separate structural units are distinguished, such as the Council of Young Scientists and the Student Scientific Society [1,

p. 297]. Individual faculty members are appointed as scientific curators in faculties, training areas, and study groups. As part of the scientific work, a plan of scientific events is compiled, scientific journals are published, where young researchers publish their works. Effective teacher contracts contain KPIs for academic leadership – the staff is motivated to work personally with students. The authors describe only a small part of the amount of work aimed at involving students in the research process.

The process of involving students in scientific work creates a certain burden on the budget of a higher educational institution. In this regard, the question arises from assessing the effectiveness of the expenditure of funds or evaluating the effectiveness of involvement, which determines the relevance of this research.

The purpose of the research is to identify criteria for evaluating the effectiveness of involving students in scientific work within the framework of a higher educational institution and, based on the criteria, develop a formula for calculating the engagement rate.

Objective: to test the developed formula on the example of the North-West Institute of Management, RANEPA.

The object of the research is the academic environment, the subject is the process of students involvement in research activity at the university.

Research Methodology

The main method of this scientific research is the content analysis of the essay. In the article, the authors asked leaders of student scientific communities from leading universities and experts from the North-West Institute of Management, RANEPA to answer in a free form the question: "By what criteria would you rate the level of student involvement in scientific work?" Students and experts received anonymous google forms via the Internet. The research involved 15 students from 7 leading universities of St. Petersburg and Moscow and the Brussels Free University, as well as 5 experts from the North-West Institute of Management, RANEPA.

Based on the analysis of essays written by leaders of student scientific associations and experts of NWIM RANEPA, the authors formed a list of criteria, highlighted comments regarding the proposed question. The list consists of ten quantitative criteria, three qualitative criteria and one remark. The results of the analysis of the essays are shown in table 1.

Table 1: Essay criteria analysis

	Criterion name	**Comment by authors**
Quantitative criteria	1. Number of publications per year	As the experts rightly noted in the remark, the criterion for the number of publications cannot be an integral part of a comprehensive assessment of involvement. It is necessary to determine the list of journals that can guarantee the quality of published works.
	2.Number of presentations at conferences	The list of recorded conferences should be formed by a special commission.
	3. Belonging to a scientific team led by a specific scientist	Belonging to the scientific team, according to the authors, can be an objective criterion. For example, the number of participants in a student scientific society, a council of young scientists, or another scientific association

	4. The number of participants, winners and winners at recognized scientific competitions	The list of contests, as well as magazines for publications and conferences, must be approved by a special commission.
	5. Frequency of visiting online libraries and information resources	Not every university has an electronic library portal. If an electronic library is available, this criterion is suitable for assessing engagement.
	6. The level of rivalry in competitions for motivational financial incentives	The difficulty lies in the fact that a number of financial incentives are provided only for students of the budget form of education. Under certain conditions, the criterion can be used.
	7. Availability of a developed research project	A scientific project is a rather vague concept. Coursework can also be a scientific project. Criterion can be used only in certain conditions, when the concept of a scientific project is clearly defined.
	8. Publications in journals indexed in Scopus and WoS	The criterion is suitable for certain universities where the practice of student publications in such journals is common.
	9. Presence of a permanent scientific supervisor	The assignment of a scientific adviser to a student does not always indicate active scientific work. This criterion can only be used in certain conditions.
	10. Participation in university research projects	The criterion can be used for universities in where the participation of students involved in such projects is guaranteed.
Qualitycriteria	1. The quality of theses	An objective qualitative assessment requires the involvement of independent third-party experts, which is associated with additional financial costs. Qualitative criteria can be used once every several years (for example, once every 4 years) as a fundamental assessment of changes.
	2. Quality of a research	
	3. Satisfaction of students with the quality of involvement in scientific work	
Remarks	The criterion for the number of publications is not indicative, because very often students make insignificant publications to receive scholarships for scientific work	

The authors also note the importance of internal evaluation. An internal assessment is a set of criteria for involving students in research work within the university based on indicators associated with this university. For example, a criterion may be a student's scientific publication in journals published by a university in which students are studying. The dynamics of the number of student publications in such journals will also make it possible to determine the efficiency of expenditure of funds for these journals, and to select their optimal number and focus. Similarly for conferences, scientific competitions, competitions for material incentives (internal scholarship competitions), the frequency of visits to internal online resources (electronic scientific libraries of the university).

In this way, it is possible to formulate a formula for assessing the involvement of students in research work. A formula may contain individual criteria or combinations thereof.

$$Involvement = \frac{Criterion}{Total\ number\ of\ students} \times 100\%$$

Results

Testing on the example of the North-West Institute of Management, RANEPA

As part of the solution to the problem, the authors analyzed data related to the process of involving students in research work at NWIM RANEPA. The generated data set includes data on the publication activity of students enrolled in the full-time department in the summer of 2015 in scientific journals published by NWIM RANEPA.
The process of collecting and processing data was as automated as possible. Data was downloaded from the official websites of the institute and scientific journals into the MS Office environment. Data processing was carried out using macros and an object-oriented programming language Visual Basic.

Limitations

The quality of the studied data was often quite low. The text was not machine-readable, so the authors had to use recognition tools. Under such conditions, minor errors and data loss are possible.

The studied sample of students enrolled in the summer of 2015 contained 1010 people. Data was exported from documents of orders for admission. Data on the authors of scientific articles were downloaded from the table of contents of scientific journals. Next was the intersection of the sets of the studied sample of students and authors. In order to minimize possible errors and coincidences, the surname, name and patronymic were used in the format "SurnameNP" (Surname, name and patronymic). The dynamics of student involvement in research projects in the context of academic years is clearly shown in table 2.

Table2: Students` involvement dynamics

The name of the scientific journal	The number of scientific publications of NWIM students for the academic year			
	2015-16	2016-17	2017-18	2018-19
Eurasian integration	0	0	0	1
Scientific works of NWIM	0	1	6	1
Student Science Journal	2	5	4	9
Administrative Consulting	1	0	0	1
State and business. Ecosystem of the Digital Economy	1	5	4	6
Amount	4	11	14	18
Number of unique authors	3	10	14	16
Involvement	0,30%	0,99%	1,39%	1,58%

From table 2 it follows that from one academic year to another, the number of authors among students of the sample being analyzed is growing.

The positive dynamics of the involvement of students in scientific activity shows not only the increased interest of this category of actors in the educational environment to science in general, but also the conscious need to publish their research and educational achievements.

Discussion

In recent years, Russian science has been dynamically developing. The President of Russia sets the Government of the country strategic goals to bring Russian science to a new level. The spectrum and amount of scholarship payments to young scientists are growing. The President has set tasks in order to increase the number of graduate students in Russian universities. Also it's necessary to emphasize that salaries of scientific and pedagogical workers are growing. In general, the main accent is put on the development of human capital, on the formation of a wide range of skills, including soft skills, which will allow to obtain qualitative changes in all key strategic priorities [3, p. 92].
However, to achieve certain goals, quite controversial projects and indicators are being developed. So, according to the charter of the national project "Education", Russia should come in fifth place in terms of the total number of articles in areas determined by the priorities of scientific and technological progress, in publications indexed in international databases. There is a well-founded opinion that a quantitative approach in such matters motivates researchers to write more and more articles, which can be detrimental not only to their quality, but to the education system as a whole [4, p. 66].

The conclusion of this scientific research is confirmed by the results of many researches regarding the fact that the share of student research projects remains modest and correspond to modern world trends and challenges [2, p. 49; 9, p. 1492; 7, p. 33].

According to the authors, in order to maintain the quality of educational services and the development of science, higher educational institutions need to build a competent monitoring system for many indicators, including the involvement of students in the scientific process.

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Responsible and Sustainable Innovations: In Search of Emerging Topics

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Abstract

The aim of the study is to identify the emerging topics in research on responsible and sustainable innovations. The study employs the bibliometric methodology. The analysis of keywords included in the Scopus-indexed publications and their co-occurrence is used to discover topics, which have been attracting the attention of academia in recent years. VOSviewer software supports analysis and visualization of research findings. First of all, top high-frequency keywords in the research field are retrieved and their time distribution is analyzed. Secondly, the time-based overlay visualization of high-frequency keywords network is presented and discussed. 'Responsibility', 'responsible research and innovation', 'philosophical aspects' and 'government' are recognized as four leading emerging topics in the research field. The study fills the identified gap in the body of knowledge and contributes to the development of the research field through indicating emerging topics of scientific inquiry related to responsible and sustainable innovations. Its originality derives from employing bibliometric methodology based on keywords co-occurrence analysis, which has not been done before.

Keywords: Responsible Innovation, Responsible Research And Innovation, Sustainable Innovation, Bibliometrics.

Introduction

Nowadays innovation is regarded as the engine of change for companies, economies and societies. Given innovation nature, it is aimed at generating value and benefits for several stakeholders. However, it is already known that innovation can also bring about some unexpected effects. This may happen if an innovation is based on deception about benefits and side effects or if some ethical or societal anxiety being implication of an innovation were not taken into consideration (Dreyer et al., 2017; Leone & Belingheri, 2017). The idea of responsible innovation (called also responsible research and innovation, sustainable innovation) emerged as the response to aforesaid phenomena. The idea of responsible innovation has arisen as a new approach which amplifies on formerly proposed concepts related to business responsibility by drawing on technology assessment, ethics in science, ethical, legal and social aspects embedded in innovation processes (von Schomberg, 2012; Martinuzzi et al., 2018). The idea of responsible innovations has grown in recent years, however the ways it is defined and described have become increasingly diverse (Wilford, 2018; Sudolska et al., 2019). Some frameworks describe it as responsible research and innovations – RRI (von Schomberg, 2011; Martinuzzi et al., 2018), while others call the idea as responsible innovations – RI (Owen et al., 2013; Burget et al., 2017) or sustainable innovations – SI (Hargadon, 2015; Dyck & Silvestre, 2018). Despite the name used, the core of the analyzed idea is to embed responsibility at very early stages of research and innovation by focusing on research integrity with environmental and institutional dynamics, putting strong pressure on societal impact of business. The concept of RRI, RI or SI points out that currently both science and innovation are directed on socially desirable and socially acceptable ends (Owen et al., 2013). Both research and innovation should be responsible in several aspects: environmentally, ethically, socially and politically. The concept offers an inclusive approach

to research and innovation ensuring the cooperation of several market actors (innovators, researchers and research founders, policy makers, companies, society) during the entire research and innovation process. The main aim of this is to better align both the process and outcomes of research and innovation with the values, needs and expectations of whole societies.

The issues related to responsible and sustainable innovations attract numerous ranks of scholars, which leads to the development of the research field (Timmermans, 2018; Sudolska et al., 2019). This observation is confirmed by scanning the research productivity indexed in Scopus and Web of Science databases. As of 31 December 2019, there are found 1,863 Scopus-indexed publications comprising at least one of the phrases 'responsible innovation', 'responsible research and innovation' or 'sustainable innovation' in their titles, keywords and abstracts (topic search). Respectively, 1,357 of such publications are retrieved from the Web of Science database. The selection of keywords for the search is motivated by the fact that these three concepts overlap (cf. Sudolska et al., 2019, pp. 16–19).

Nevertheless, so far, the amassing research output in the field has not been yet mapped thoroughly with bibliometric methods. The search for the following combination of phrases: Topic Search ('responsible innovation' OR 'responsible research and innovation' OR 'sustainable innovation') AND ('bibliometric' OR 'bibliometrics' OR 'scientometrics' OR 'informetrics') brings only 11 bibliometric items in Scopus and 5 in Web of Science. Excluding duplicates and one item not related to the topic (Bührer et al., 2019), there are found 11 publications employing bibliometric methods to study the aspects related to responsible and sustainable innovations.

The first category of publications presents bibliometric analysis of studies related to the sustainability concept (Martens & Carvalho, 2017; Storopoli et al., 2019). The second category is concentrated on particular technologies such as autonomous vehicles (Cavazza et al., 2017, 2019) or brain-machine and brain-computer interfaces (Compañó, 2009) as potential solutions in sustainable innovation processes. The third group of papers employs bibliometric methods to study some aspects related to responsible innovations, responsible research and innovations or sustainable innovations. Sudolska and her colleagues (2019) map the field of responsible and sustainable innovations with the use of research profiling methodology (cf. Porter et al., 2002). Nazarko conducts bibliometric analysis of the research output focused on responsible research and innovation (Nazarko, 2019) and discusses this construct as a component of a conceptual system paired with future oriented technology assessment (FOTA) (Nazarko, 2017). Franceschini et al. (2016) explore research communities focused around eco-innovations, environmental innovations, green innovations and sustainable innovations. Similarly, De-Miguel-Molina and associates (2018) study the evolution of research on eco-innovations. Vaz, Lezana and Maldonado (2017; cf. Vaz, Shoeninger Rauen, & Rojas Lezana, 2017) conduct bibliometric analysis of sustainable innovations in the context of the automotive industry. Nevertheless, none of the aforementioned publications identifies and explores emerging topics in the research field related to responsible and sustainable innovations, which indicates the gap in the body of knowledge.

Filling the discovered gap is the motivation to conduct the study aimed at identifying the emerging topics in research on responsible and sustainable innovations. Keywords co-occurrence analysis (He, 1999) is used to discover topics, which have been attracting the attention of academia in recent years. This method has been found to be an effective approach to map the research themes in neighboring fields related to e.g. sustainability (Guo et al., 2017) or the sustainable enterprise and the sustainable organization (Lis, 2018). The structure of the paper follows the traditional model consisting of the methodology section, research results presentation, discussion and conclusions.

Method of study

Research Sample

We used the Scopus database for retrieving bibliometric data in the research sampling process. As of 04 January 2020, we searched for the logical disjunction of phrases 'responsible innovation',

'responsible research and innovation' or 'sustainable innovation' in the titles, keywords and abstracts of publications indexed in the Scopus database. Neither a subject area nor a date of publication were limited in order to ensure including all relevant publications related to the topic under the study. In total, we retrieved 1,869 bibliometric records (publications). Research output is distributed over 26 subject areas defined by the Scopus database. The most populated are: Business, Management and Accounting (790 publications), Social Sciences (595), Environmental Science (389), Engineering (386), Energy (253), Decision Sciences (247), and Computer Science (233). Journal articles are the most numerous category of documents in the sample, followed by conference papers and book chapters. In regard to the language of publications, the sample is very much biased towards English (97% of the items). The detailed parameters of the research sample are presented in Table 1./

Table 1: Parameters of the research sample

Category	Items (occurrences)
Date (year) of publication	2020 (18); 2019 (323); 2018 (292); 2017 (257); 2016 (212); 2015 (168); 2014 (143); 2013 (120); 2012 (69); 2011 (62); 2010 (49); 2009 (36); 2008 (36); 2007 (23); 2006 (20); 2005 (9); 2004 (18); 2003 (5); 2001 (2); 2000 (2); 1999 (1); 1995 (1); 1993 (1); 1992 (1); 1978 (1)
Subject areas (overlapping)	Business, Management and Accounting (790); Social Sciences (595); Environmental Science (389); Engineering (386); Energy (253); Decision Sciences (247); Computer Science (233); Arts and Humanities (184); Economics, Econometrics and Finance (168); Medicine (140); Biochemistry, Genetics, and Molecular Biology (89); Agricultural and Biological Sciences (82); Chemistry (52); Psychology (52); Materials Science (51); Nursing (51); Mathematics (50); Chemical Engineering (37); Earth and Planetary Sciences (25); Physics and Astronomy (22); Multidisciplinary (14); Pharmacology, Toxicology and Pharmaceutics (13); Immunobiology and Microbiology (13); Neuroscience (11); Health Professions (9); Veterinary (3)
Document type	Article (1,117); Conference Paper (293); Book Chapter (166); Review (114); Editorial (50); Book (38); Note (31); Conference Review (19); Short Survey (13); Letter (8); Erratum (5); Retracted (1); Undefined (14)
Language	English (1,813); Spanish (18); French (12); Portuguese (12); German (10); Chinese (3); Italian (5); Russian (4); Lithuanian (3); Slovenian (1); Ukrainian (1)

Source: Own study based on data retrieved from the Scopus database (04 January 2020).

The publications included in the sample provide 8,563 keywords, including both author keywords and index keywords. 'Innovation', which occurred 448 times, is the most cited keyword. The threshold of 100 occurrences is achieved by 9 expressions, 50 occurrences – by 16 items, 20 occurrences – by 93 items and 10 occurrences – by 240. There are 6,427 keywords which occurred only once. Following the formula provided by Donohue (1974; as cited in: Guo et al., 2017, p. 7), the number of high-frequency keywords in the sample is 113, which corresponds with the minimum number of occurrences equal to 16. This threshold is achieved by 115 keywords included in the sample, which are selected for co-occurrence analysis.

Research Instruments

Keywords co-occurrence analysis is supported with VOSviewer software (van Eck & Waltman, 2010, 2018) in order to visualize the findings (van Eck & Waltman, 2014). The parameters of VOSviewer software used for analysis are provided in Table 2.

Table 2: VOSviewer parameters used for analysis

Item	Characteristic/ value
Type of analysis	Co-occurrence analysis
Unit of analysis	All keywords
Counting method	Full counting
Method of normalization of strength of the links between items	Association strength method
Layout	
Attraction	2 (default setting)
Repulsion	0 (default setting)
Clustering	
Resolution parameter (detail of clustering)	1 (default setting)
Minimum cluster size [N]	1 (default setting)
Merging small clusters	Switched on
Visualization	
Scale	1.00
Weights	occurrences
Labels size	0.50
Maximum number of lines	1000
High frequency keywords used for analysis [N]	115
Minimum occurrences of a keyword used for analysis [N]	16

Source: Own study based the use of the VOSiewer application (04 January 2020).

The item density and overlay visualization functions of VOSviewer are used to identify the most prominent and the emerging topics in the research field.

Results Presentation

High Frequency-Keywords Identification

The item density visualization function of VOSviewer is employed to present the prominence of high-frequency keywords illustrating the topics attracting the most of attention of the academia (cf. Figure 1).

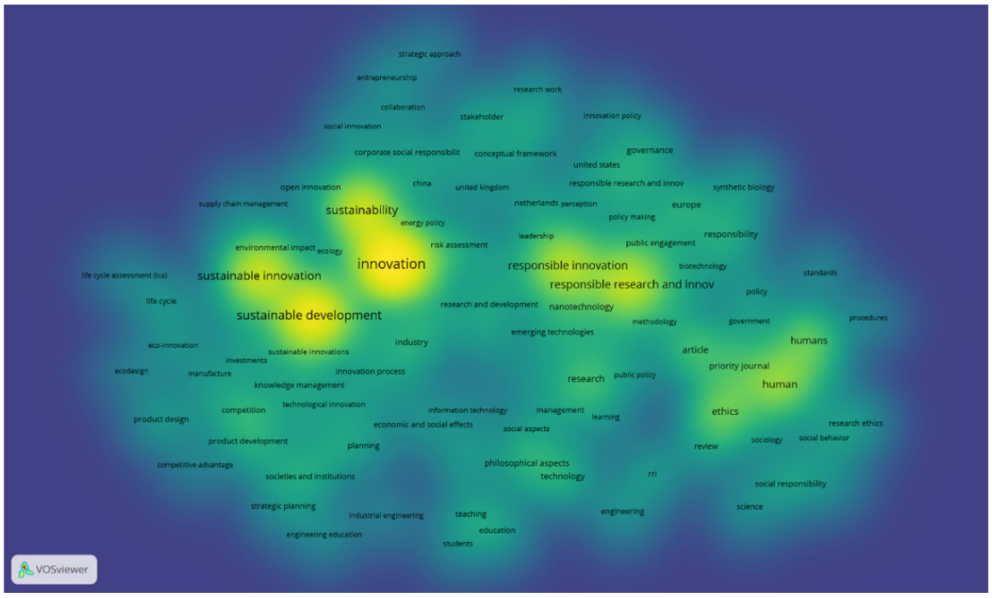

Figure 1: Item density visualization of co-occurrence analysis of high-frequency keywords in research on RI, RRI and SI

Source: Own study based on data retrieved from the Scopus database and analyzed with the use of the VOSviewer application (04 January 2020).

Top 10 high-frequency keywords in the research field and their time distribution between 2015 and 2019/2020 is presented in Table 3. Moreover, information regarding the average publication date for these expressions is provided.

Table 3: Top 10 high frequency keywords (occurrences) in research on RI, RRI and SI

Keywords	Total	2019/20	2018	2017	2016	2015	Average publication year
innovation	1 (448)	1 (90)	1 (58)	2 (50)	1 (43)	1 (32)	2014.66
sustainable development	2 (327)	4 (58)	3 (44)	3 (40)	2 (40)	2 (25)	2014.55
sustainability	3 (241)	2 (62)	4 (39)	4 (31)	4 (26)	5 (19)	2015.72
sustainable innovation	4 (225)	6 (42)	6 (36)	5 (25)	3 (30)	8 (15)	2015.20
responsible research and innovation	5 (217)	3 (59)	2 (45)	1 (52)	5 (25)	3 (23)	2017.24
responsible innovation	6 (195)	5 (43)	5 (38)	7 (22)	6 (22)	3 (23)	2016.29
human	7 (151)	7 (30)	7 (26)	6 (23)	7 (18)	6 (17)	2016.10
ethics	8 (112)	8 (25)	9 (17)	8 (17)	8 (15)	9 (14)	2016.38
humans	9 (104)		8 (18)	9 (16)	9 (14)	7 (16)	2015.66
article	10 (75)	9 (21)	10 (12)			10 (8)	2015.88
research and development		10 (16)					2016.14
technology assessment				10 (13)			2015.94
decision making					10 (9)		2016.02

Source: Own study based on data retrieved from the Scopus database and analyzed with the use of the VOSviewer application (04 January 2020).

Overlay Visualization of Publication Date of High Frequency-Keywords

The overlay visualization function is employed to identify emerging topics in the research field (cf. Figure 2). In this kind of visualization, the scores are assigned to each item taken for analysis. While searching for emerging topics, the date (year) of publication is such a score. In the visualization, the range of colors is from blue (the lowest score, here: the earliest publications) to green (middle score) and yellow (the highest score, here: the most up-to-date publications) (van Eck & Waltman, 2018, p. 9).

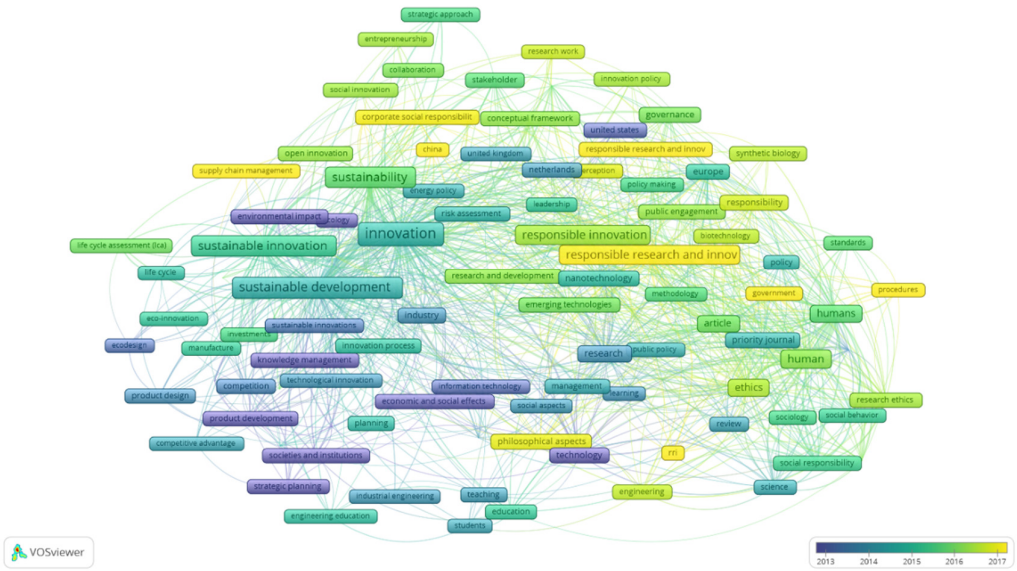

Figure 2: Overlay visualization of high-frequency keywords in research on RI, RRI and SI
Source: Own study based on data retrieved from the Scopus database and analyzed with the use of the VOSviewer application (04 January 2020).

The following keywords in the RI, RRI and SI research field have the most up-to-date average publication year according to the calculations for the overlay visualization: 'literature review', 'RRI', 'government', 'China', 'procedures', 'supply chain management', and 'responsible research and innovation'. In total, in the sample, there are 8 keywords with the average publication year newer than 2017.00 and 8 other keywords with the score between 2016.50 and 2017.00. Detailed bibliometric characteristics of these items are provided in Table 4.

Table 4: Bibliometric characteristics of the newest keywords in research on RI, RRI and SI (sorted by date)

Keyword	Average publication year	Occurrences	Links	Total links strength
literature review	2017.84	19	46	89
RRI	2017.58	33	50	113
government	2017.35	23	48	129
China	2017.29	24	39	88
procedures	2017.26	19	43	11
supply chain management	2017.25	16	32	63
responsible research and innovation	2017.24	217	89	664
responsible research and innovation (RRI)	2017.22	37	48	84

corporate social responsibility	2016.89	28	45	105
philosophical aspects	2016.77	48	62	160
perception	2016.70	20	50	94
responsibility	2016.61	51	61	188
stakeholder engagement	2016.59	22	52	98
artificial intelligence	2016.57	23	40	75
technology adoption	2016.56	25	55	115
research work	2016.55	20	56	131

Source: Own study based on data retrieved from the Scopus database and analyzed with the use of the VOSviewer application (04 January 2020).

Discussion

The data presented in Table 4 indicate four keywords that we consider as worth noticing among emerging research topics, i.e.: (1) 'responsible research and innovation', (2) 'responsibility', and (3) 'philosophical aspects' and (4) 'government'. We have chosen the keywords that have been attracting the attention of academia in recent years based on the analysis of their high-frequency occurrence in the research field combined with their time distribution and total links strength. Given these findings, the identified keywords prove an increasing interest of researchers in the aspects related to responsibility understood in broad meaning. Responsibility is a social aspiration expanding over time as it follows the progress in social values and norms. The way of understanding and interpreting responsibility in regard to innovations is increasingly changing. Nowadays, the researchers highlight that the span of responsibility in relation to innovations comprises not only legal requirements, but also the expectations of the stakeholders as well as the values connected to the society and the natural environment. This may be linked with the increasing interest of scholars in the philosophical aspects related to responsible and sustainable innovations. The findings regarding the newest keywords in the studied research field confirm that issues related to incorporating responsibility into scientific research and business strategies attract academia. Responsible research and innovation has emerged as a new concept which broadens previously proposed approaches considering business responsibility through leaning on technology assessment (cf. 'technology adoption' and 'artificial intelligence' in Table 4), ethics in science and technology, legal, social and ethical issues (cf. 'corporate and social responsibility' in Table 4) involved in innovation processes. Furthermore, the issues related to 'government' appear among interesting emerging topics in the field of research. This is probably caused by the fact that responsible research and innovation is an approach that focuses on applying appropriate governance mechanisms in relation to innovations. It proposes establishing governance mechanisms to include all the stakeholders (cf. 'stakeholders engagement' in Table 4) and the public in the early stages of research and development in order to identify and resolve potential value conflicts. Governing the research and innovation process boosts the probability of anticipating and recognizing how research and innovation on one hand may benefit society and on the other hand prevent any negative consequences from happening. The role of governments in support of responsible and sustainable innovations and discussing related recommendations and implications for government policies may be another explanation for including 'government' among emerging issues in the field.

The aforesaid findings are consistent with the literature review, which appeared to be a very popular type of methodology applied in the up-to-date publications in the field (cf. Table 4). The importance of responsibility issues in regard to research and innovation is discussed by Leone and Belingheri (2017) and Dreyer et al. (2017). Leone and Belingheri (2017) focus on integrity of the principles of ethics and responsibility in the discourse of business innovativeness. Furthermore, Dreyer et al. (2017) point out the differences between research and innovation, however, focusing on the impacts of both on society and the environment. The responsibility aspects are extensively considered also by Owen et al. (2013), Hargadon (2015) or Wilford (2018). Owen et al. (2013) and Hargadon (2015) highlight that while analyzing responsibility related to innovation, the significant issue is to reflect the social changes as well as the modern context in which innovations occur. Wilford (2018) argues that responsibility is a core element of the responsible research and innovation approach. The

necessity of conscious and responsible governing of research and innovation is discussed by Burget et al. (2017) who highlight that responsible research and innovation is an attempt to govern innovation processes in the way that enables including all the stakeholders and public actors in it to increase anticipation of research and innovation outcomes, both positive and negative. Von Schomberg (2011, 2012) underlies the significance of governing innovation processes through early 'upstream' interventions instead of 'downstream' monitoring and 'correction' of interventions ex post. While considering the issues of governing research and innovation, he points out the shift towards ex ante calculations of the risks and benefits associated with uncertain decisions regarding technology and innovations. In a similar vein, Martinuzzi et al. (2018) examine the responsibility of the industry towards society and the environment. They argue that responsible research and innovation is a new concept with the potential to advance the discourse of governing innovation processes taking into account the responsibility challenges that the industry is facing today.

Conclusions

The study has identified emerging topics in research on responsible and sustainable innovations. The analysis of keywords included in the Scopus-indexed publications and their co-occurrence has been used to achieve the aim of the study. Firstly, high-frequency keywords in the research field have been retrieved and their time distribution has been analyzed. Secondly, the time-based overlay visualization of high-frequency keywords network has been presented and discussed.

The analysis of high-frequency keywords in the research field combined with their time distribution and total links strength allowed to identify 'responsibility', 'responsible research and innovation', 'philosophical aspects' and 'government' as four leading emerging topics in the field of research. Responsible research and innovation is a very complex and multidimensional concept. However, the essence of the approach is widely understood responsibility. The conducted study raises awareness of possibility to solve problems related to research and innovation with the focus on delivering particular social and environmental benefits in addition to commercial goals. The identified emerging research topics call all market actors: researchers, research founders, regulations' and policy makers as well as business innovators, for searching the solutions to address negative impacts of innovation processes. The aforementioned emerging topics focus on stakeholders and public engagement while governing innovation processes directed at treating responsible research and innovation as a kind of common researchers' and businesses innovators' capability incorporating conscious and responsible processes, mechanisms as well as organizational routines.

The study fills the identified gap in the body of knowledge and contributes to the development of the research field through indicating emerging topics of scientific inquiry related to responsible and sustainable innovations. Its originality derives from employing bibliometric methodology based on keywords co-occurrence analysis, which has not been done before.

While discussing the findings of the study and their implications and added value for the research field, limitations of the research process should be revealed. First of all, the study employs only one research method, which means the lack of research triangulation. Such a fact may be considered as a weakness. Secondly, the research sample includes publications indexed in only one bibliometric database. Although Scopus is recognized as a highly valuable source of bibliometric data indexing quality source titles, relying on one database may result in some biases. The bias towards publications written in English may be an example. As indicated in the methodology section, 97% of items in the research sample are in English. It may mean underrepresentation of valuable publications written in other languages, indexed in local, national databases. Thirdly, the study is conducted from the perspective of the whole research field, neglecting potential differences between subject areas. In order to mitigate the aforementioned limitations, in further research it is recommended to: (1) employ other research methods in order to ensure triangulation and increase objectivity of the research findings; (2) replicate the study with use of data retrieved from other bibliometric databases to avoid potential biases e.g. towards the language of publication; (3) conduct the separate analysis of emerging topics within each of the most densely populated subject areas in the research field i.e.

Business, Management and Accounting, Social Sciences, Environmental Science, Engineering, Energy, Decision Sciences, and Computer Science.

Among the implications of our study we point out the necessity of integrating up-to-date questions and problems faced by governments, business units, non-governmental organizations as well as individuals while implementing innovation processes. This is important conclusion, particularly taking into account that delivering profitable but at the same time ethically acceptable and socially desirable innovations nowadays becomes a requirement of competitive economies and businesses. Although the paper contributes mainly to the development of the body of knowledge in management sciences, it seems to provide some implications for business practice as well. Pointing out the main emerging research topics may focus the attention of research and business representatives on the complexity of innovation processes and their impacts not only in terms of internal effects but also innovation externalities, both positive and negative.

The conducted study inspires us for further research. The field of research on responsible and sustainable innovation is highly dynamic. Therefore, the emerging topics identified through the conducted study need to be monitored over time. The dynamics of the changes and shifts of newest keyword occurrences and their total strength seem to be highly interesting for further research. Secondly, we plan a depth-in investigation of the directions of future research within emerging topics in order to raise the market actors' awareness of areas significant for business and economy development while conducting the empirical research on responsible and sustainable innovations.

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Youth Preferences and Behaviour Related to Food Products from the Sustainability and Marketing Perspective

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Abstract

The main goal of the article is to find whether the following generation, comprised by today's young people, has a tendency to aggravate or to eliminate ecological and social problems resulting from consumption of food products. The achievement of the research was possible thanks to investigate young people's preferences and behaviour concerning this area in the aspect of sustainability. The survey questionnaire was addressed to 440 people aged 15-23. The research has shown that highest nutrition irregularity occurs in case of having suppers by young people (41.2%), breakfasts (20.6%) and dinners (18.4%). The largest group of people (61.2%) prefers typical dishes of the Polish cuisine. A group of respondents comprising 24.8% of the total eat products of the fast food category. Relatively few people (11.7%) consume vegetable and fruit salads, vegetable and fruit cocktails. Eating one's fill and overeating are practiced by 72.2% of respondents. Young people are uninterested in veganism (0.5%) and vegetarianism (4,3%). Only 10.8% of the surveyed do not waste food. Only 12.4% of young people make free donation of food for social purposes. More than 20% of them do not segregate food product packaging (23.4% at home, 27.0% outside the home). The research has shown that most young people in Poland contribute to aggravation of ecological and social problems in the sector of food products. Such situation is also a challenge for marketing.

Keywords: Sustainable Development, Food Products, Young Generation.

Introduction

Sustainable science is a young, still developing area of knowledge, concerned with the problems of excessive exploitation of natural resources and creation of conditions for sustainable development. The paradigm of sustainable development is a foundation of this science. This is a developing trend of research, given the quick growth pace of ecological and social problems. According to Rogall, we are already quite sure today that the limits of nature's capacity have been exceeded, it only remains unclear to what extent. The consumption of resources and emission of harmful substances will double every 28 years. This means that after 280 years, emission of harmful substances and consumption of resources will be thousand times higher than today (Rogall, 2010, pp. 145, 158). This evidences that sustainable development cannot keep pace with the rate and scale of growth of ecological and social problems. "The distance between current practices and truly sustainable practices is enormous" (Martin and Schouten, 2014, p. 11). The greatest threat to the modern world and future generations is production and consumption of goods and services. The scholarly literature puts strong emphasis on production and consumption of goods. However, there are no detailed studies explaining whether the generation to replace us, comprised by today's youth, has a tendency for aggravation or for mitigation of the growing ecological and social problems. This issue is important, since the future of sustainable development is in the hands of the young generation. Curtailing thereof will have catastrophic effect on our planet. Earth, as an isolated system externally powered by nothing more than solar energy,

will not sustain excessive exploitation of its resources and increasing pollution with harmful substances.

The main goal of the article is to explain whether the following generation, comprised by today's young people, has a tendency to aggravate or to eliminate ecological and social problems resulting from consumption of food products. To induce upward trends in sustainable development, the young generation should contribute to elimination rather than aggravation of such problems. The authors examine the issue on the basis of a survey conducted among 440 young people aged 15-23. The results of the research may also be useful in the catering industry and marketing. They facilitate proper development of culinary offers by Central and Eastern European restaurants and cafés frequented by young people.

Consumption of food creates many problems in the area of sustainability. Unsustainability is predominant in the sphere of consumption of food products. Symptoms thereof include: purchase of excessive amounts of food, consumption of unhealthy food, food waste, generation of refuse comprised by enormous amounts of food product packages and waste. Consumption of unhealthy food, eating of excessive amounts thereof, irregular nutrition all lead to many diseases and ailments.

The world must undergo transition from a state of deep unsustainability to a state Pabian calls mass sustainability. Currently, few producers and consumers genuinely respect the principles of sustainable development (Pabian et al. 2013, p. 6). Under conditions of mass sustainability, only few people will fail to respect them (Pabian, 2017, p. 15). Therefore, the subject matter of sustainability is increasingly reflected in scholarly literature, being examined by such authors as Holden, Linnerud, Banister, Schwanitz and Wierling (2018), Brinkmann (2016), Fogel (2016), Haugan (2014), Thiele (2016), Jeanrenaud, Jeanrenaud and Gosling (2017), Avianas and Nassos (2014), Bossink (2012).

Literature Review

Within the globally conducted research activity related to the food consumption one can distinguish several themes, which have been discussed below. The research that has been conducted so far has not explained whether the following generation, comprised by today's young people, has a tendency to aggravate or to eliminate ecological and social problems resulting from consumption of food products taking into consideration their preferences and behaviour in this area in the aspect of sustainability.

One of the most important issues analysed in the world literature is nutritional assessment of particular products intended for consumption. AlJahani and Cheikhousman, (2017), developed a pumpkin-based functional juice and assessed its acceptability by various consumers. Mitiku, Abera, Bussa and Abera (2018), investigated what effect produced a partial substitution of wheat flour with sweet potato flour on the nutrient composition and sensory properties of bread. Tadesse, Ibrahim, Forsido and Duguma, (2018), attempted to improve the nutritional and sensory qualities of enset-based food with pumpkin and amaranth.

Attempts have also been made to investigate the impact of various factors on food consumption. Septianto (2016) explored the effect of musical tempo on consumer choice of tea in different temperatures. Kitsawad, Joseph and Tipvarkarnkoon (2017) examined the changes in sensory qualities of jaew sauce taking heat into consideration and to determine its acceptance among Thai and foreign consumers. Ziv (2018) solved the following scientific problem: whether changing the pleasantness of background music while tasting two identical products in succession may influence the experience of taste and preference. Vignolles and Pichon (2014) analyzed the links between nostalgia and food consumption.

A vital area of research constitutes determining the dietary patterns and behaviours related to food in various countries of the world. Vanhonacker, Lengard, Hersleth and Verbeke (2010) showed a picture of the profile of European traditional food consumers in terms of their socio-demographics, attitudes, life-style orientations and behavioural characteristics. Guine, Ferrao, Ferreira, Correia,

Cardoso, Duarte, Rumbak, Shehata, Vittadini and Papageorgiou (2019) focused their attention on Mediterranean countries. They investigated factors that influence food choices and consumption patterns in five countries: Croatia, Egypt, Italy, Greece and Portugal. According to them the food choices were also determined by concerns related to the environment and sustainability. Serrano-Cruz, Espinoza-Ortega, Sepulveda, Vizcarra-Bordi and Thome-Ortiz (2018) covered in their study central Mexico. The researchers identified the factors related to the consumption of traditional foods in central Mexico. Sijtsema, Reinders, Hiller and Guardia (2012) examined the relationship between the consumption of different types of fruit and other snacks and consumer taste preferences (consumers from Poland, Greece, Spain and The Netherlands) for sweet, salty and sour.

In the context of the undertaken subject a study needs to be mentioned related to food with reference to youngsters. Adelina and Nurwanti, (2018) investigated behaviours of Indonesian students regarding food in various study locations. The study covered two cities in two different countries – Indonesia and Taiwan. Duarte, Raposo and Ferraz (2013) investigated the influence of marketing-controlled external factors that motivated impulse buying behaviour of snack foods in cafeterias among young students. Kowalska and Tarnowska (2018) evaluated the eating habits of students in the field of food products management and engineering compared to students from faculties not related to food science and also taking into consideration gender. Students were also examined by Savelli, Murmura, Liberatore, Casolani and Bravi (2017). They proved that the Italian university students attach great importance to price and sales promotion, they are also well informed in food products and pay high attention to ingredients, origin and healthiness of food products that they buy. Chan, Tse, Tam and Huang (2016) investigated the snacking behaviour and perspectives on healthy and unhealthy food choices among adolescents in Mainland China.

The object of the researchers' attention has also been food marketing and behaviours of its consumers on the market. Anić, Piri Rajh and Rajh (2014) examined the impacts of demographic variables (gender, age, income, education) and food product involvement on food-related consumer decision-making styles. Haase, Wiedmann, Bettels and Labenz (2018) determined the effectiveness of advertising content comprising text (sensory, functional and symbolic messages) and pictures (product image) on food product evaluation. Bonaiuto, Caddeo, Carrus, De Dominicis, Maroni and Bonnes (2012) investigated the impact of food reputation dimensions' effects on consumers' food choices.

As the conducted query of scientific literature demonstrates until present there have been no studies conducted regarding a wide range of young people's preferences and behaviour concerning the food consumption in the aspect of sustainability. The problem: do people aged 15-23 consuming foodstuffs contribute to or hinder sustainable development? has not been solved.

Research Method

The main goal of the research was to explain whether the following generation, comprised by today's young people, has a tendency to aggravate or to eliminate ecological and social problems resulting from consumption of food products. Therefor it was necessary to determine young people's preferences and behaviour concerning food products in the aspect of sustainability. The research problems were formulated as follows: do young people consuming foodstuffs contribute to or hinder sustainable development? In order to explain the issues above, a survey of a group of Poles aged 15-23 was conducted. They are young people of the generation which will gradually take over the initiative and replace us in different aspects of life.

Before proceeding with the survey, its project was developed. The first phase of the survey was the method of analysis and criticism of literature, which proved the purposefulness and originality of the examined research problems (bibliographic query, at-desk research). For the purposes of the survey, a research tool in the form of a questionnaire was developed, the minimum sample size was determined, and the manner of communication with the respondents was specified. Having conducted the field study, its results were listed and analysed, and conclusions were formulated.

The achievement of the determined research goal was possible thanks to a study conducted using a representational method, which had been considered the most proper form of partial research. Random selection of individuals enabled obtaining of a sample as similar to the population as possible. This procedure became a basis for estimation of population property based on sample property.

The survey questionnaire was addressed to 440 people (290 women and 150 men), secondary school students and university students. Such a number of respondents meets the assumptions of a minimum sample size. The minimum sample size was specified in order to draw conclusions about the surveyed population, characterized by specific accuracy and degree of certainty, on the basis of the conducted measurements. When determining the necessary sample size, the following steps were taken:
- estimation accuracy was determined, assuming a specific maximum error of estimate;
- a high confidence level was assumed;
- assumptions concerning the proportion of the surveyed population were made.

Assuming that the success probability order of magnitude p is unknown, the minimum number of individuals was 422 at the following assumptions: significance level $\alpha=0.04$, maximum error of estimate $d=5\%$ ($u_\alpha=2.053749$).

The survey was anonymous. The respondents were contacted in person (face to face). The further part of the article shows the results.

Empirical Results

Irregular nutrition has an adverse effect on health, which may lead to various diseases, thus aggravating social problems. Research has shown that the highest irregularity occurs in case of having suppers by young people (41.2%), followed by breakfasts (20.6%) and dinners (18.4%). Fortunately, these are not predominant kinds of behaviour. As shown in Figure 1, most young people prefer having dinners (80.9%), breakfasts (71.3%), suppers (52.4%) on a regular basis.

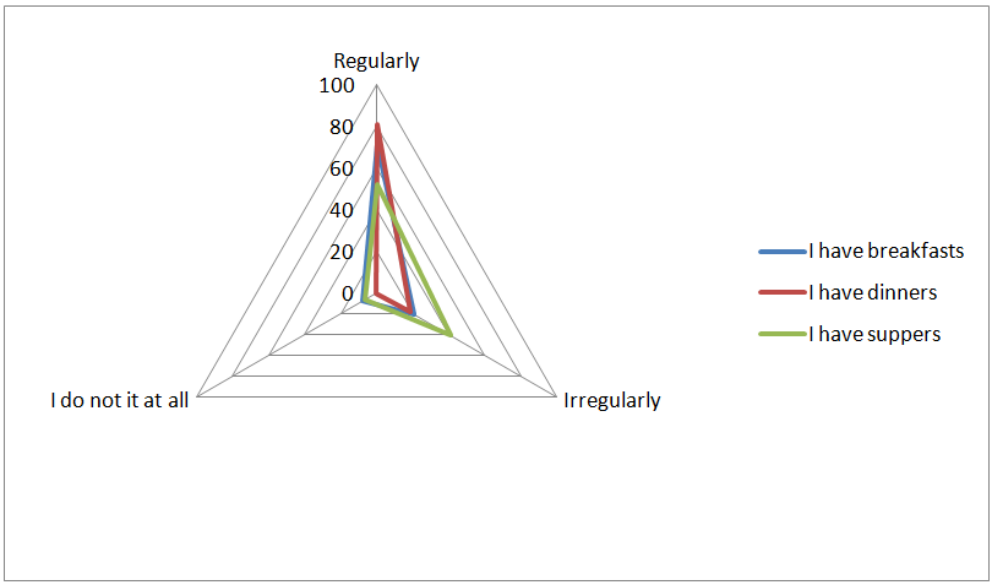

Fig. 1: Regularity of having breakfasts, dinners and suppers by the surveyed group of young people

Source: own study.

The health condition is also affected by the kind of consumed foods. This problem will be explained using the example of dishes consumed by the youth at dinner time. In Poland, dinner is the main, most copious meal, consumed between 12 p.m. and 4 p.m. The conducted study indicates the following three nutritional trends among the youth at dinner time:

a) the largest group of people (61.2%) prefers typical dishes of the Polish cuisine;
b) a group of respondents comprising 24.8% of the total consumes products which may be predominantly classified as fast food (hot dogs, hamburgers, wraps, tortillas, pizzas);
c) relatively few people (11.7%) consume vegetable and fruit salads as well as vegetable and fruit cocktails.

The remaining persons (2.3%) showed diverse preferences, beginning from classic dishes, such as pierogi dumplings, through ready-made foods including casseroles or kebab, to healthy products, e.g. legumes.

More than 20% respondents eat products of the fast food category or of a similar nature. This food is not healthy but it is tasty and filling. In many cases, it carries the so-called fifth taste, known as umami (from Japanese *umai*, "delicious"). Separate glutamic acid receptors respond to this taste. Young people eat such foods because they give more pleasure than other dishes.

Only more than 10% of the youth choose to eat vegetable-based and fruit-based products, which can be considered healthy, at dinner time. This is a minority trend. It requires a change of dietary habits.

The amount of consumed food affects the health condition. Therefore, young people were asked whether, when having breakfast/dinner/super, they usually overeat, eat their fill, do not eat their fill (feeling slight hunger after a meal), have small, rather token meals. The research has shown that 69.1% of the surveyed eat their fill, whereas 19.8% do not do this (feeling slight hunger after a meal). 8% of respondents prefer slight, token meals. Only 3.1% of the surveyed overeat. Not eating one's fill and preferring small, token-amount meals has a better effect on health. Followers of such practices comprise 27.8% of the surveyed young people, which is almost 1/3 of the surveyed population. Eating one's fill and overeating are practiced by 72.2% of respondents, or more than 2/3 of the total number.

The researchers were also interested in the preferences of young people concerning healthy food, vegetarianism and veganism. The structure of answers to questions concerning these issues is presented in Table 1. It shows that 42.3% of young people eat healthy foods often or very often. The remaining respondents (57.7%) consume healthy foods rarely, very rarely or never. Young people are virtually uninterested in veganism – only 0.5% respondents identify with it. Vegetarianism has slightly more adherents (4,3%).

Table 1: Young people's preferences concerning eating of healthy foods, vegetarianism and veganism

Do you eat so-called healthy foods (ecologic and organic products made without fertilizers, pesticides and chemical additives)?	
Very often	9.5%
Often	32.8%
Rarely	32.1%
Very rarely	17%
I do not eat such foods	8.6%
Are you a vegetarian, i.e. do you renounce eating meat, fish, seafood and other animal products?	
Yes	4.3%
No	95.7%

Are you a vegan, i.e. do you renounce eating meat, poultry, fish, milk, butter, eggs, cheese, honey and other animal products?	
Yes	0.5%
No	99.5%

Source: own study.

Food discarding means waste. Figure 2 explains whether young people discard food and what is the scale of these negative practices. Only 10.8% of the surveyed do not waste food. It is discarded rarely or very rarely by 67.8% of young people. 21.4% of the survey discard food often or very often. Therefore, there is twice as much respondents who discard food as those who do not.

Poverty is a significant social problem. By free sharing of food with the poor, one may contribute to at least partial elimination thereof. As the figure 2 shows, free donation of food for social purposes is not very widespread among young people. Only 12.4% of this age group do it often or very often. A much higher percentage of the surveyed, amounting to 29.6%, does not engage in free distribution of food. 58% of young people undertake such actions rarely or very rarely.

Segregation of food product packaging facilitates management of consumption waste and can thus contribute to environmental protection. Do young people segregate such packaging? The data in Table 2 allow us to answer this question. Two issues were considered: segregation of food product packaging at the place of residence and away from it.

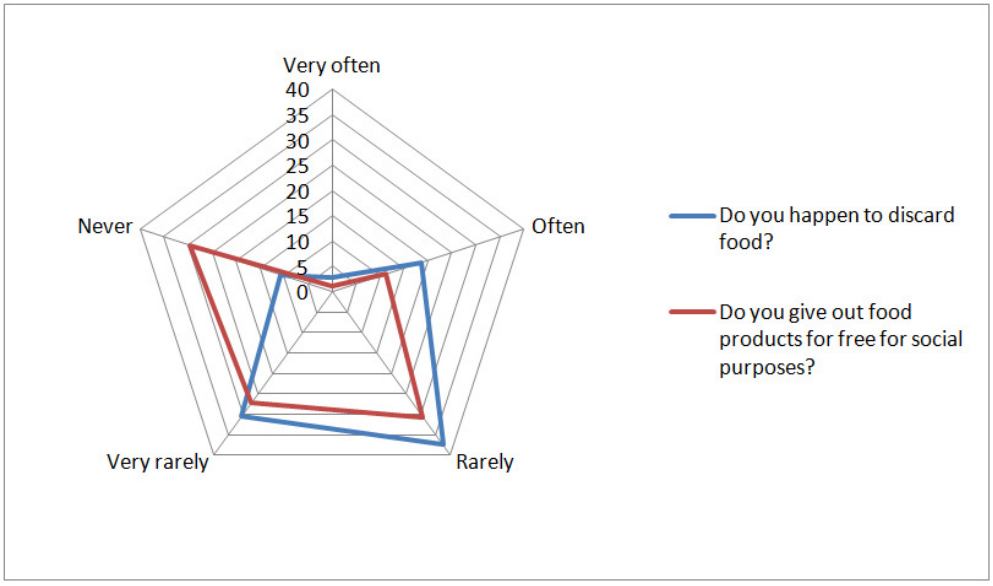

Fig. 2: Discarding of food by young people and sharing of food with the poor.
Source: own study.

Table 2: Young people's attitude to segregation of food product packaging

Do you segregate food product packaging while at home, i.e. do you throw it into specially marked containers?	
I segregate	46.2%
I sometimes segregate	30.4%
I do not segregate	23.4%
Do you segregate food product (beverages, sweets, chips, etc.) packaging while being away from home, i.e. do you throw it into specially marked containers when they are around?	
I segregate	33.3%

I sometimes segregate	39.7%
I do not segregate	27%

Source: own study.

More than 20% of young people do not segregate food product packaging (23.4% at home, 27.0% away from their place of residence). The remaining persons segregate or sometimes segregate such packaging (76.6% at home, 73.9% away from their place of residence).

Conclusions and Discussion

The amount of consumed food affects the volume of production. An increase in the volume of production adversely affects the natural environment, from acquisition of raw materials for production of foodstuffs to problems with packaging and waste. The research has shown that young people do not show a tendency for consumption of smaller amounts of food. Thus, they do not contribute to the reduction of the volume, and consequently, to environmental protection (72.2% of the surveyed eat their fill and overeat). Overeating has also a negative impact on health. Irregular nutrition affects a human similarly. In case of the young generation, the greatest irregularity applies to suppers (41.2% of the respondents have them on an irregular basis). All of this affects the aggravation of the social problem of increase of morbidity in the society.

The production of food is also affected by the structure of consumption of foodstuffs. For example, if a society is dominated by vegetarians, the demand for animal products decreases, leading to a drop in production thereof. As the research shows, consumption of food by young people at dinner time is a source of demand for three categories of foodstuffs: 1. products used in typical dishes of the Polish cuisine; 2. products used for production of fast food; 3. vegetable and fruit products.

Young people are not particularly interested in veganism or vegetarianism. However, 42.3% of them eat healthy food often or very often. Therefore, consumption practices of the youth predominantly affect the supply and demand of foodstuffs comprising the categories 1, 2, and 3 mentioned above, as well as products qualified as so-called healthy food. The structure of this food includes less products that are not subject to technical and technological processes, such as vegetables and fruit. The more technology is involved in production of foodstuffs, the greater damage is done to the environment. These processes require consumption of considerable amounts of energy and water and are often a source of different kinds of environmental pollution.

Examining the impact of food consumed by young people on their health, one can see a positive trend consisting in frequent and very frequent consumption of healthy foods by more than 40% of the surveyed. A certain part of the youth (11.7%) prefers vegetable and fruit products, which can also positively affect their health. However, the fact of consumption of products from the fast food category by almost ¼ of the surveyed population is alarming. They are usually high-calorific, and frequent consumption thereof leads to overweight. Most respondents (61.2%) consume typical dishes of the Polish cuisine. Consumption of some of them is favourable to healthy lifestyle.

The survey has shown that only 10.8% young people do not discard food. This is an alarming tendency, aggravating both ecological and social problems. By discarding food, one wastes not only raw materials needed for production and transport thereof but also water, energy and other production factors. Moreover, wasted food becomes waste contaminating the environment. The social problem results from the fact that food needed by millions starving people worldwide is being wasted.

As the research shows, young people make a slight contribution to the resolution of the aforementioned social problem connected with food waste. A very high percentage of the surveyed population (87.6%) rarely, very rarely or never distributes foodstuffs for social purposes, e.g. to the poor. This evidences low social sensitivity of this age group. Conversely, the survey confirms considerably higher ecological sensitivity of the surveyed generation. Only 23.4% people living at their homes and 27.0% of those away from their places of residence do not segregate food product packaging.

To sum up, the conducted research allows formulation of general conclusion: most young people in Poland do not contribute to the improvement of sustainability in the sector of food products. Through their preferences and behaviour, they show a tendency for aggravation of both ecological (overeating and eating one's fill require larger amounts of food, which should be produced first, than incomplete satisfaction of hunger, food waste consisting in discarding thereof, failure to segregate food product packaging) and social (overeating, irregular meals, consumption of unhealthy foods) problems. Most young people do not contribute to alleviation of the social problem of famine/malnutrition resulting from poverty (do not share food with the poor). All this poses a hazard of the following generation aggravating the state of unsustainability in the sector of food products.

The presented research results can also be used in marketing activities. This is not about aggravating negative trends, e.g. encouraging young people in advertising campaigns to eat fast food. The main challenge is to change the attitudes and behaviour of young people that relate to the purchase, consumption and handling of food products. Marketing messages targeted at young people should: 1. encourage them to change their eating habits 2. encourage them to buy organic food products 3. discourage them from wasting food 4. encourage them to share food with poor people and sorting packaging. Marketing messages may take different forms, typical of press, television, radio and online advertising, as well as outdoor and indoor. Such marketing campaigns should be implemented by the government and by organizations working for sustainable development.

Discussion on this article may relate to various problems. Here are some of them. The article presents nutritional preferences and behavior of the young Polish generation as seen through the lens of sustainability. In further research, it is worth focusing on other age groups. It is rather certain that the nutrition preferences and behavior of older people and middle-aged people will differ from the nutritional preferences and behavior of young people. Perhaps these age groups are more pro-ecological and pro-social in this sphere of consumption. This subject matter is also worth elaborating in international and global terms. The cultural and economic differences between nations have a significant impact on what, how much and when we eat. Young food consumers in different countries can contribute to aggravation or mitigation of ecological and social problems to varying degrees. Another problem concerns factors that affect young people's food preferences also in the aspect of sustainability. Probably the following factors play a big role here: financial situation, eating habits taken from the family home, education in the field of sustainability, availability of food products and others.

Sustainability is a challenge for all people and all nations of the world. All people and all nations should contribute to sustainable development because they are located on the same planet.

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Taste Preferences of Young Consumers – Perspective of Sensory Marketing

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Abstract

Marketing that utilises taste sensations to affect customers is still a poorly investigated area of sensory marketing. Sensory marketing consists in appealing by manufacturers and sellers to the five human senses: sight sense, sound sense, smell sense, taste sense and touch sense. The research that has been conducted so far in the area of taste has primarily focused on: nutritional and sensory assessment of various food products, determining dietary patterns and behaviours related to food, investigating the relationships between taste and other types of sensory sensations, food marketing. The issues of taste sensations are associated exclusively with food products, beverages and catering. In the opinion of the authors of the present paper, the taste sense of customers may become engaged also to promote and sell many inedible products. It is particularly important in the marketing that utilises taste sensations to recognise taste preferences of consumer. The paper discovers taste preferences of young persons aged 15-23 with regard to five tastes: sweet, salty, bitter, sour, umami as well as spiciness of dishes and their temperature. It also finds out similarities and differences in taste preferences of young men and women. The research was conducted in Poland on a sample of 440 persons aged 15-23. The results may prove useful in the three areas of economic activity: food products manufacturing, preparing culinary offer by catering facilities, promoting inedible goods using food products.

Keywords: Sensory Marketing, Taste Preferences, Young Consumers.

Introduction

Taste marketing is presently at an initial stage of its development. It constitutes a part of sensory marketing, which engages the senses of consumers and has an impact on their behaviour (Krishna, 2010). Its objective is to affect all the five human senses: sight sense, sound sense, smell sense, taste sense and touch sense. The sensory gratification constitutes one of the most important purchasing incentives (Dahlen, Lange and Smith, 2010).

The taste has been underestimated in marketing and such a state of affairs does not contribute to an increase in brand awareness developing a sustainable brand image (Hulten, Broweus and van Gijk, 2009). The research conducted in 13 countries demonstrates that as far as 99 percent of all brand communication concentrates on two senses – sight and sound (Lindstrom, 2005). However, while appealing to other senses of consumers, including the taste sense, they can be triggered to purchase various types of goods. This does not concern food products alone (edible products), but also a wide range of goods and services that have nothing to do with satisfying hunger and the related consumption (inedible products).

The scientific background so far has concentrated on food products, beverages and catering. This primarily concerns the following: nutritional and sensory assessment of various food products, determining dietary patterns and behaviours related to food, investigating the relationships between the taste and other types of sensory sensations, food marketing.

The paper presents the results of the research whose goal was to discover poorly investigated taste preferences of young consumers aged 15-23. The research was conducted in Poland on a representative sample of 440 persons, secondary school students and university students. The following five senses were considered in the research: sweet, salty, bitter, sour, umami. Additionally, spiciness of dishes was considered (very spicy, spicy, mild, of diverse spiciness) as well as preferences related to their temperature. The objective of the research was also to discover the differences and similarities in taste preferences of young men and women.

The results of the research broaden the knowledge on preferences and behaviours of young consumers on the market. They may prove useful in the following areas of economic activity: food products manufacturing, preparing culinary offer by catering facilities, promoting inedible goods using food products.

Literature Review

Tastes are primarily experienced through the taste buds on the tongue, although the taste buds are also present in the palate and throat. Adults possess 10.000 taste buds through which information is registered and sent to the nerve cells that subsequently transmit signals to the brain. The taste is called the intimate sense as it is impossible to taste something from a distance (Hulten, Broweus and van Gijk, 2009). Within the globally conducted research activity related to the taste one can distinguish several themes, which have been discussed below. The research that has been conducted so far has not explained what taste preferences are characteristic of young consumers aged 15-23.

One of the most important issues analysed in the world literature is nutritional and sensory assessment of particular products intended for consumption. AlJahani and Cheikhousman (2017), developed a pumpkin-based functional juice and assessed its acceptability by various consumers. Mitiku, Abera, Bussa and Abera (2018), investigated what effect produced a partial substitution of wheat flour with sweet potato flour on the nutrient composition and sensory properties of bread. Tadesse, Ibrahim, Forsido and Duguma (2018) attempted to improve the nutritional and sensory qualities of enset-based food with pumpkin and amaranth. Schouteten, De Pelsmaeker, Juvinal, Lagast, Dewettinck and Gellynck (2018) investigated the impact of sensory attributes of milk chocolate on consumers' emotions as well as their hedonic ratings with the use of three commercial brands of milk chocolate.

A vital area of research constitutes determining the dietary patterns and behaviours related to food in various countries of the world. Guine, Ferrao, Ferreira, Correia, Cardoso, Duarte, Rumbak, Shehata, Vittadini and Papageorgiou (2019) focused their attention on Mediterranean countries. They investigated factors that influence food choices and consumption patterns in five countries: Croatia, Egypt, Italy, Greece and Portugal. They considered in their study health-related factors, economic and availability aspects, emotional determinants, impact of social, cultural and religious factors, marketing and advertising campaigns and environmental concerns. Serrano-Cruz, Espinoza-Ortega, Sepulveda, Vizcarra-Bordi and Thome-Ortiz (2018) covered in their study central Mexico. The researchers identified the factors related to the consumption of traditional foods (TFs) in central Mexico. Adelina and Nurwanti (2018) investigated behaviours of Indonesian students regarding food in various study locations. The study covered two cities in two different countries – Indonesia and Taiwan. The centre of attention for Tiu Wright, Nancarrow and Brace (2000) were the UK and France. They analysed the proposition by Bourdieu that our tastes in food actually betray our social origin and took advantage of interesting distinctions in the literature between the UK and France.

Attempts have also been made to investigate the relationships between the taste and other sensory sensations. Ezan, Pantin-Sohier and Lancelot-Miltgen (2019) examined the influence of the three-dimensional character of colour (i.e. brightness, saturation, vividness) on children's behaviour towards a food product and as a source of well-being. Tu, Ma, Wu and Yang (2018) were interested in the impact of a passive body touch experience on the perceived spiciness intensity.

The object of the researchers' attention has also been food marketing and behaviours of its consumers on the market. Haase, Wiedmann, Bettels and Labenz (2018) investigated the effectiveness of advertising content comprising text (sensory, functional and symbolic messages) and pictures (product image) on food product evaluation. Vanhonacker, Lengard, Hersleth and Verbeke (2010) presented a picture of the profile of European traditional food consumers (TFC) regarding their socio-demographics, attitudes, life-style orientations and behavioural characteristics. Anić, Piri Rajh and Rajh (2014) examined the influence of demographic variables (i.e. gender, age, income, education) and food product involvement (FPI) on food-related consumer decision-making styles (CDMS). Bonaiuto, Caddeo, Carrus, De Dominicis, Maroni and Bonnes (2012) investigated the impact of food reputation dimensions' effects on consumers' food choices.

Other issues related to the taste and food undertaken by researchers include, among others, the following: investigating the relationships between the consumption of different types of fruit and other snacks and taste preferences of consumers from various countries (Sijtsema, Reinders, Hiller and Guardia, 2012), the analysis of the links between nostalgia and food consumption (Vignolles and Pichon, 2014), determining a typology of experience providers that concerned eating-out (Carvalho de Rezende and Alberto Rodrigues Silva, 2014), understanding the role of emotions as well as sensual delight in dining experience (Arora, 2012).

In the context of the undertaken subject a study needs to be mentioned related to taste and food with reference to youngsters. Duarte, Raposo and Ferraz (2013) investigated the influence of marketing-controlled external factors that motivated impulse buying behaviour of snack foods in cafeterias among young students. Kowalska and Tarnowska (2018) evaluated the eating habits of students in the field of food products management and engineering compared to students from faculties not related to food science and also taking into consideration gender. Students were also examined by Savelli, Murmura, Liberatore, Casolani and Bravi (2017). They proved that the Italian university students attach great importance to price and sales promotion, they are also well informed in food products and pay high attention to ingredients, origin and healthiness of food products that they buy. Chan, Tse, Tam and Huang (2016) investigated the snacking behaviour and perspectives on healthy and unhealthy food choices among adolescents in Mainland China.

As the conducted query of scientific literature demonstrates until present there have been no studies conducted regarding a wide range of taste preferences of consumers aged 15-23, which refer to the five types of taste (sweet, salty, bitter, sour, umami), dish spiciness and preferences related to their temperature. Considering in the research widely understood taste preferences referred to above and applying them to a particular age group of consumers are certainly in line with the marketing nature, contrary to many other studies, which have not been conducted for the purposes of this area of knowledge.

Research Method

The underlying objective of the research conducted by the authors of the present paper was to discover taste preferences of young consumers aged 15-23. The following five tastes were considered in the research: sweet, salty, bitter, sour, umami. Additionally, spiciness of dishes was also considered (very spicy, spicy, mild, of diverse spiciness) as well as preferences regarding their temperature. It was vital to determine taste preferences with regard to gender-mixed groups of customers as well as individually for men and women. Determination of preferences, according to such a breakdown, will allow for a better adjustment of assortment, taste and temperature of beverages and dishes for those producers whose customers are both men and women as well as for the companies that provide services for one gender only. The objective of the research was also to discover the differences and similarities in taste preferences of young men and women.

For the purpose of the research its authors developed a research tool in the form of a survey questionnaire, determined the minimum size of the sample and defined the manner of communication with the respondents. Having conducted the field study, the authors summarised its results, analysed them and formulated conclusions.

The adopted research objective was achieved by means of the study conducted with the use of the representative method. The survey process comprised 440 persons aged 15-23. secondary school students and university students. The indicated number of respondents meets the assumptions of a minimum sample size. The minimum sample size was determined in order to formulate conclusions regarding the investigated population, characterised by specific accuracy and degree of certainty, based on the conducted measurements.

While determining the minimum sample size the following steps were taken:
- estimation accuracy was established, assuming a defined maximum estimation error,
- high trust level was assumed,
- assumptions regarding the proportion of the investigated population were adopted.

Given that the order of magnitude of p success probability is unknown the minimum number of units amounted to 385 at the following assumptions: statistical significance $\alpha=0,05$, maximum estimate error $d=5\%$ ($u_\alpha=1,959964$).

Empirical Results

The authors begin the presentation of the research results with demonstrating the taste preferences of young men and women without a breakdown with regard to gender. This breakdown will be applied in the second part of the present subchapter. The authors adopt such a convention as purchasers of products, including grocery ones, as well as customers of catering facilities are differentiated with regard to gender. Thus, in a majority of cases sellers should satisfy the taste preferences of mixed-gender customers taking into consideration their preferences.

Figures 1 and 2 have been prepared based on the data included in Table 1. In Figure 1 the authors present the distribution of the taste preferences regarding consumers aged 15-23 (men and women). As shown in Table 1 and Figure 1, each type of taste has a smaller or greater number of its proponents. Therefore, the distribution of preferences is not homogenous among young persons. However, in each case it is possible to indicate taste options represented by the largest group of the respondents. These options have been presented in Figure 2. As demonstrated in Table 1 and Figure 2, most young people like the taste of salt (66.0%), like sweet beverages/dishes (65.1%), like sour beverages/dishes (50.9%), really like sweets (50.7%), like bitter beverages/dishes (42.6%), infrequently consume products that contain natural glutamic acid (umami flavour) (40.7%). It has been surprising to discover that such a great number of young consumers like the taste of salt as well as sour and bitter beverages/dishes, which are rather associated with sensory discomfort.

Two additional issues have been reflected in Figure 2, namely: dish spiciness and temperature of dishes and beverages that are served hot. As the research shows, most of young consumers differentiate spiciness of dishes (46.3%). There are fewer proponents of very spicy dishes (8.2%), spicy ones (18.3%) and mild ones (27.2%). As far as the temperature of beverages and meals served hot is concerned, the distribution of responses was as follows: it is best when beverages/dishes are: hot (67.0%), lukewarm (22.7%), very hot (6.7%), cool (0.9%), cold (0.7%), I am unconcerned of the temperature of beverages/dishes (2.0%). The discovery pertaining to the temperature of beverages/dishes served hot provides important practical implications. It is not an uncommon mistake committed by restaurants, cafes and other catering facilities, which serve their customers beverages and dishes that are supposed to be, but fail to be hot, which leads to customer dissatisfaction.

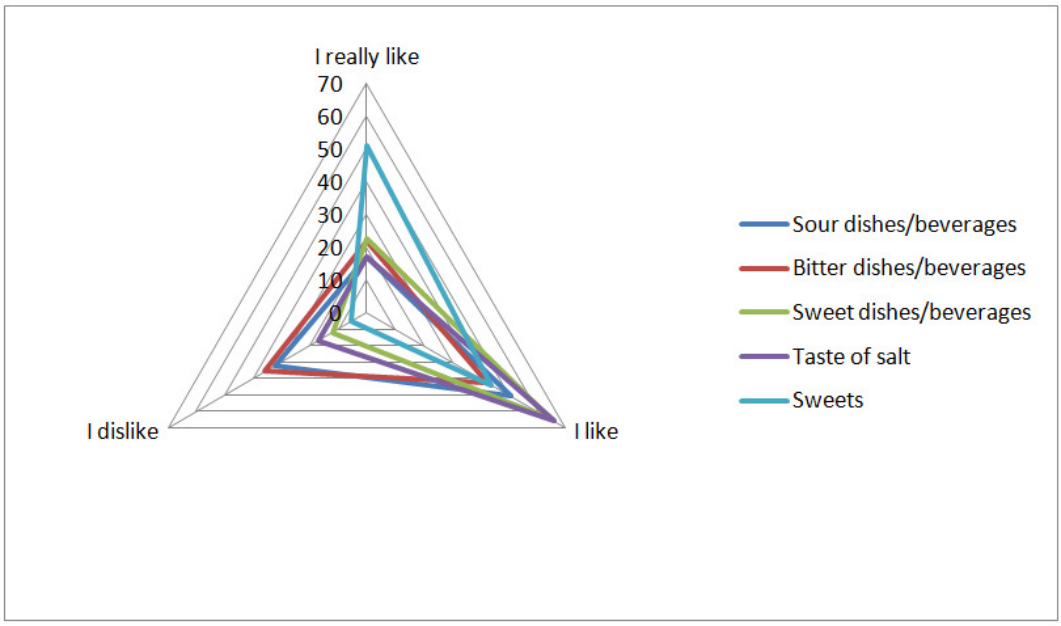

Fig. 1: Taste preferences of consumers aged 15-23 (men and women)
Source: own research.

Table 1: Taste preferences of consumers aged 15-23 (men and women) (%)

Type of taste	I really like	I like	I dislike
Sour beverages/dishes (e.g. sauerkraut juice, pickled sour cucumber soup, kefir)	17.0%	50.9%	32.1%
Bitter beverages/dishes (e.g. tea without sugar, tonic water, grapefruit juice)	21.6%	42.6%	35.8%
Sweet beverages/dishes	22.7%	65.1%	12.2%
Taste of salt (adding salt to dishes, eating products with a lot of salt, e.g. salty sticks, salty peanuts)	17.0%	66.0%	17.0%
Sweets (cookies, candies, chocolates, etc.)	50.7%	43.9%	5.4%

Source: own research.

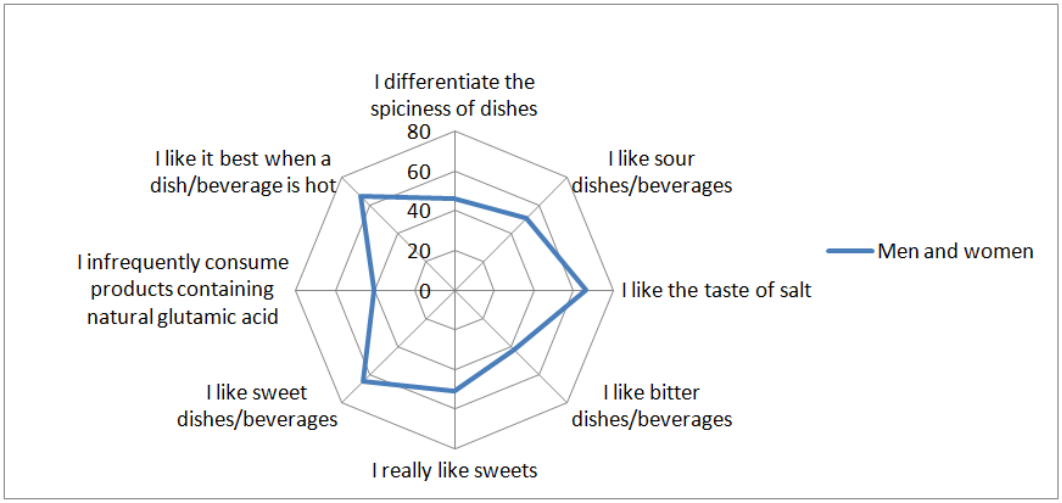

Fig. 2: Taste options and temperature of beverages and dishes preferred by the largest number of consumers aged 15-21 (men and women)

Source: own research.

When analysing the differences in the taste preferences of men and women, it is worth drawing attention to a few important issues. The study shows that in some taste options there is a clear percentage predominance of women over men or men over women. This problem has been explained in Figure 3 and Table 2. There are 17.5% more women who really like sweets than men, while the percentage predominance of women who prefer mild dishes most amounts 14.7%. In the remaining cases, presented in Figure 1, there is a percentage predominance of men over women. As can be observed in Table 2 (third column), it ranges from 8.5% to 11.8%. Hence, there are significantly more men than women who: like spicy dishes most, dislike sour dishes and beverages, like sweets, infrequently consume products containing natural glutamic acid (umami flavour).

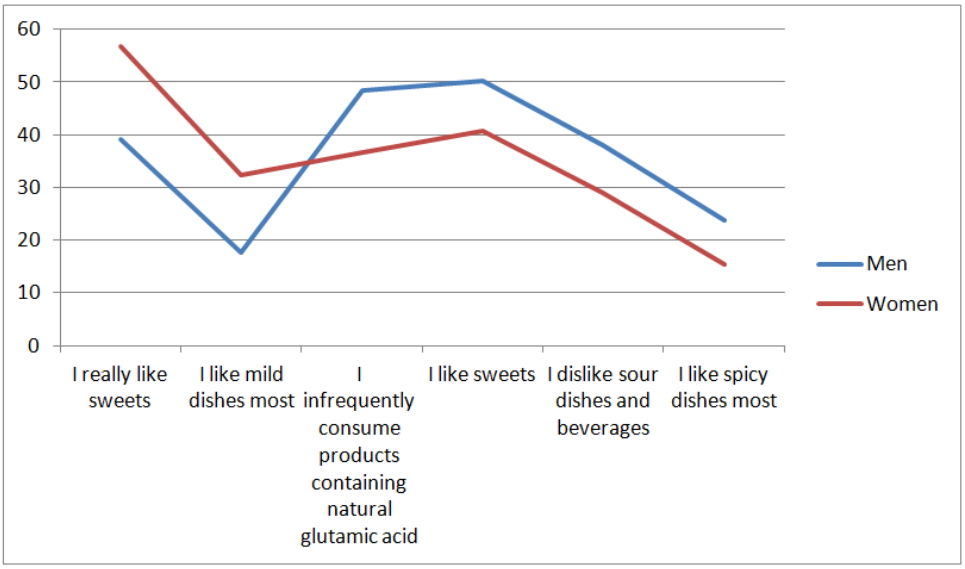

Fig. 3: The largest differences in the number of men and women (consumers aged 15-23) who prefer a given taste option

Source: own research.

Table 2: The largest differences in the number of men and women (consumers aged 15-23) who prefer a given taste option (%)

Preferences	Percentage predominance of women over men	Percentage predominance of men over women
I really like sweets	17.5%	-
I like mild dishes most	14.7%	-
I infrequently consume products containing natural glutamic acid (umami flavour)	-	11.8%
I like sweets	-	9.7%
I dislike sour dishes and beverages	-	8.9%
I like spicy dishes the most	-	8.5%

Source: own research.

Figure 4 and Table 3 demonstrate, on the other hand, the smallest differences in the number of men and women who prefer a given taste option. They range from 0% to 0.4%. The same or very similar number of men and women: differentiates the spiciness of dishes, really likes the taste of salt, very infrequently consumes products containing natural glutamic acid (umami flavour), dislikes sweet dishes/beverages, dislikes bitter dishes/beverages.

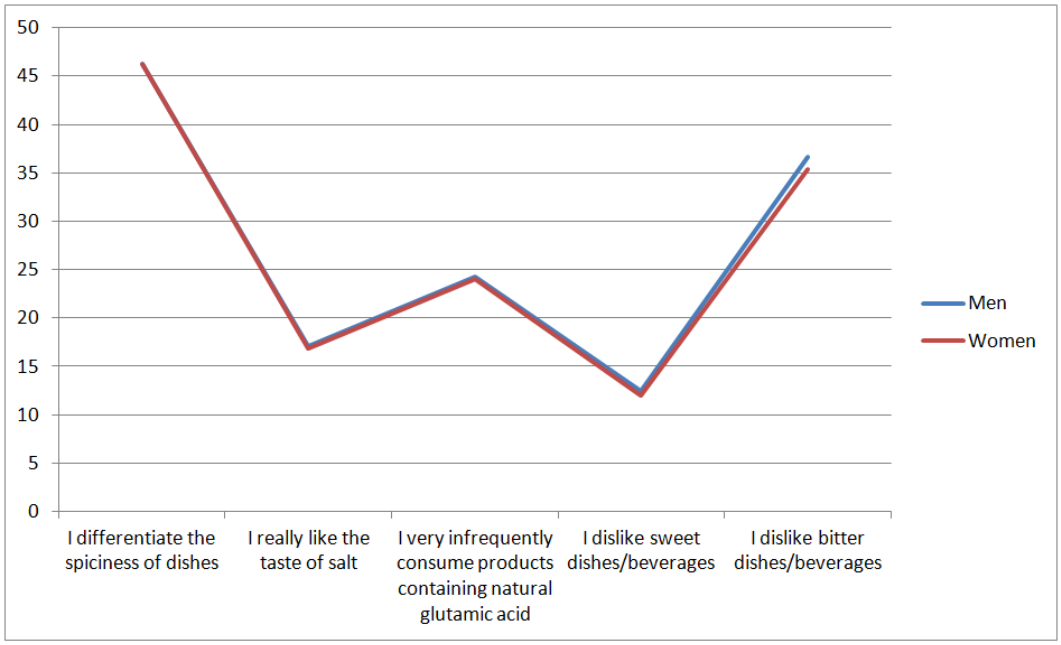

Fig. 4: The smallest differences in the number of men and women (consumers aged 15-23) who prefer a given taste option

Source: own research.

Table 3: The smallest differences in the number of men and women (consumers aged 15-23) who prefer a given taste option (%)

Preferences	Percentage predominance of women over men	Percentage predominance of men over women
I differentiate the spiciness of dishes	0%	0%
I really like the taste of salt		0.2%
I very infrequently consume products containing natural glutamic acid (umami flavour)		0.2%
I dislike sweet dishes/beverages		0.4%
I dislike bitter dishes/beverages		1.2%

Source: own research.

Conclusions

The research conducted by the authors of the present article has revealed taste preferences of young consumers aged 15-23. The research focused on preferences concerning five types of taste (sweet, salty, bitter, sour, umami), spiciness of dishes (very spicy, spicy, mild, of differentiated spiciness), and their temperature. As the research has proved, these preferences are not completely homogeneous. However, in each case more than half or nearly half of young consumers prefer the same type of taste, the same approach to the problem of spiciness of dishes and their temperature. Most young people: like the taste of salt (66.0%), like sweet beverages/dishes (65.1%), like sour beverages/dishes (50.9%), really like sweets (50.7%), like bitter beverages/dishes (42.6%), infrequently consume products with natural glutamic acid (umami flavour) (40.7%), differentiate the spiciness of dishes (46.3%). Furthermore, young consumers believe that hot beverages and dishes (e.g. tea, coffee, soups) should be genuinely hot, not lukewarm, cool or cold (67.0%). According to these figures, a significant percentage of young consumers prefer the taste of salt as well as sour and bitter beverages/dishes, and hence flavours that are more associated with discomfort rather than sensory comfort. This constitutes valuable information for producers and sellers of food products destined for young people, as well as for owners of catering facilities. They should include in their offers products and dishes with this kind of flavours. The research has also revealed the attitude of young consumers to the temperature of beverages and dishes which on principle are supposed to be served hot (e.g. tea, coffee, soups). They believe that such beverages and dishes served to customers in restaurants, cafes, bars and other catering facilities should be genuinely hot. The owners of catering outlets should take the result of this study into account since, in the opinion of the authors of the present article, beverages/dishes often served to the guests are not hot but lukewarm or cold. This causes customer dissatisfaction and discourages them from choosing such catering offers again.

While analysing taste preferences of young men and women separately, one may notice that in most cases they are very similar or even identical. The same percentage of men and women differentiates the spiciness of dishes. With regard to the following options: I really like the taste of salt, I very infrequently consume products containing natural glutamic acid (umami flavour), I dislike sweet dishes/beverages, I dislike bitter dishes/beverages the percentage difference between men and women does not exceed 1.2%. Only in six cases there is a distinctive percentage difference between the two genders ranging from 8.5% to 17.5%. Two of them show that significantly more women than men really like sweets and like mild dishes most. In four cases, considerably more men than women like sweets, dislike sour dishes and beverages, like spicy dishes the most and infrequently consume products containing natural glutamic acid (umami flavour).

The results of the conducted research expand the knowledge about the preferences and behaviours of young consumers on the market. They may prove useful in the following three areas of business activity: 1) food products manufacturing 2) creating culinary offers by catering facilities such as

restaurants, cafes, bars, canteens 3) promoting inedible goods using food products. The third point requires clarification. In many industries (household appliances, home electronics, vehicles, furniture, computer equipment, clothing, footwear and others) it is still generally believed that taste is relevant only in catering industry and in the production and sale of food products and beverages. This misconception means that the use of taste as a sensory stimulus in the process of selling inedible products and services is occasional or completely rejected by a great number of companies. Meanwhile in the inedible product sectors, there are many possibilities to influence the sense of taste of customers. They include the following activities:

a) adding a flavoured product free of charge to the purchased good,
b) treating customers with flavoured products while shopping,
c) shipment of flavoured products to customers along with commercial offers,
d) dissemination of flavoured advertising gadgets among customers.

If the customers are young people, it is worth considering the results of this research and choosing such food products for promotional purposes that will meet their taste preferences.

Discussion

Young consumers constitute an important and large market segment. They purchase food products, attend various types of catering facilities. They also take advantage of promotional offers regarding food products. Promotions that engage customers' sense of taste are often organised in the catering industry and in the sale of food products. These include: tasting, sweets as company gadgets, free groceries attached to a purchased food product, increased quantities of the food item at a current price, and others (Pabian, 2008).

However, promotions involving the sense of taste are not widespread in inedible product sectors. In this area of marketing activity there is a significant and poorly exploited potential which requires broader research and analysis.

Wherever the sense of taste of a young consumer is influenced, it is essential to know his/her taste preferences. It is beyond doubt that the higher a degree of satisfying taste preferences, the higher the probability that a consumer will purchase a food product or use a catering offer. This relationship applies to the food and catering industry. However, it is not clear whether and to what extent utilisation of food products with a specific taste is effective (prompts consumers to purchase) in the promotion of inedible products (household appliances, electronics, cars, furniture, computer equipment, clothing, footwear and others). It can be assumed that using food products that meet consumer taste preferences in the promotion of inedible products may be an additional incentive to make a purchase. This issue may be worth explaining by conducting research not only on the younger generation of consumers.

In the conducted research, its authors have focused on a group of young consumers aged 15-23, since the ability to distinguish flavours decreases as we age (Hulten, Broweus and van Gijk, 2009). Therefore, in the future, all age groups of consumers, from the youngest to the oldest, should be included in the research concerning taste preferences. This will enable a more accurate selection of a range of flavours, both in case of promoted food products and catering offers, as well as food products that are used in a promotion of inedible goods, to a given age group.

The authors suggest that studies regarding taste preferences in particular age groups should be conducted both with reference to the whole group of respondents, composed of women and men, as well as from the perspective of each of the genders. Such an orientation of research makes it more useful in practice. Purchasers of food and catering products are usually mixed in terms of gender, which means that both men and women purchase the same food products, attend catering facilities, and are recipients of promotional campaigns for inedible goods that should be supported by food products. From the practical point of view, the study of taste preferences only from the perspective

of one of the genders (men or women) makes sense when either only women or only men are customers of a producer/seller of a given good or one of the genders dominates among customers.

Knowledge regarding taste preferences of consumers is the basis for creating appropriate offers in the catering industry as well as manufacturing and sale of food products. Knowledge of taste preferences can also prove very beneficial in promotion campaigns for inedible products in which foodstuffs are used.

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Technological, Behavioral, and Organizational-Procedural Aspects of Management of Safety Information in Companies

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Abstract

An analysis of contemporary publications on information security demonstrates a clear increase in awareness among information protection professionals that traditional technical aspects of security must coexist with behavioral aspects describing human behavior in the process of information processing and organizational-procedural aspects that determine the ways in which modern security systems are created. What can also be seen is a clear increase in interest in information security factors that involve human behavior. However, do managers of business entities responsible for the security of intangible resources share this approach of information protection specialists and are they aware of the importance of the human factor? The aim of this article is to present a contemporary, multi-faceted approach to information resource security that is shaped directly by the methods of attacks on digital information resources. The article describes the most important types of safeguards in business entities, makes an attempt to synthetically describe individual areas of information security and to answer the question of what actions should be taken to minimize the negative impact of the so-called "human factor." Some of the issues analyzed in the article have been supplemented by the results of research conducted by the largest intelligence companies in the world. The empirical part of the article presents original research conducted in medium and large business organizations in order to show the current status of the security systems in selected areas of business operations.

Keywords: Information Security, Technology, Human Factor, Information Management

Introduction

Nowadays, in the digital age, information is treated by business entities as a key resource of a business that determines its competitiveness on the economic market and constitutes the basis for determination of operations. The development of the Internet, cellular and satellite networks, storage methods, and computer technologies, including mobile technologies that enable communication at any time and location, have resulted in the possibility to transmit information in the digital format over any geographical distances in a few seconds and have made it accessible from virtually any place regardless of its physical allocation. Modern technical capabilities of mobile and personal devices enable practically unlimited processing of information and storing it in quantities of up to tens of terabytes. The digital transformation is changing the current shape of business and affecting companies in every industry and consumers around the world. Nowadays, information (its generation and processing) is associated with everything we do, both at work and privately. Nowadays we are experiencing a digital revolution, also called the fourth industrial revolution, and we live in an information society. According to an IDC report (Reinsel et al., 2018, p. 3), 33 zettabytes of data were stored worldwide in 2018 and this number is expected to increase to 175 zettabytes by 2025. This is both private and business sector data and information and is mostly connected to the global network. Every Internet user can potentially gain access to all data and information resources connected to this network. Access to the digital resources of any business organization or any other network user, therefore, depends on two factors: the knowledge and skills of the person who wants to access it and the state of the safeguards developed and implemented by the organization. Thus, physical security of buildings and premises is no longer relevant (from the point of view of information resources). Nowadays, it is possible to gain access to an organization's information from practically any place on Earth. These opportunities foster the development of such areas as remote

working, virtual teams, and creation of branches of companies worldwide using shared database resources (Big Data). They also encourage the development of so-called cyber crimes.

Nowadays, in business entities where information resources are managed, Information Security Management Systems (ISMS, a set of rules describing the procedures for such systems is currently included in the ISO/IEC 27000 series of standards) are implemented, which covers people, processes, and information systems. On the basis of theoretical and practical deliberations concerning information security, three aspects of information protection are distinguished:

the technical aspect;
the behavioral aspect; and
the organizational-procedural aspect.

The aim of this article is to present a contemporary, multi-faceted approach to information resource security that is shaped directly by the methods of attacks on digital information resources. The empirical part of the article presents original research conducted in medium and large business organizations in order to show the current status of the security systems in selected areas of business operations.

Theoretical, Technological Aspects of Information Resource Security

The most popular information security solutions, also in business entities, are all kinds of solutions based on configuration of hardware and software. They can be divided into two categories:

Appropriate configuration of existing hardware and software solutions used for information processing;
Installation and configuration of additional information security solutions.
The first category refers to such configuration of computer hardware and application software used by an entity that minimizes the risk of loss of basic security functions: authenticity, non-repudiation, confidentiality, integrity, availability, accountability, and anonymity. This is done through:

Establishing a specific system of access rights;
Setting up access passwords, PIN numbers, etc.;
Encrypting transmitted information;
Ensuring appropriate configuration of network devices (e.g. blocking ports, establishing NAT network address translation, establishing network domains, and assigning IP addresses to MAC addresses);

Saving backup copies and saving simultaneously to at least 2 memory areas (e.g. RAID 1);
Ensuring updates of the software being used in the company.

The second category of safeguards concerns implementation of third-party solutions cooperating with the solutions already existing in the company and minimizing the risk of information threats. Solutions of this type include:

Local network security, e.g. Unified Threat Management (UTM) devices integrating such solutions as firewalls, Intrusion Prevention Systems (IPS), Virtual Private Networks (VPN) servers, spam protection, URL filters, and antivirus protection;

Security of desktop computers and servers, including installation of security software, encryption of storage of portable devices using external software, and implementation of additional identification devices, e.g. for biometric identification.

Technical and software safeguards are the basis for all safeguards in business entities. They are the starting point for developing further aspects of information protection. Development of these safeguards is correlated with the development of illegal methods and ways of obtaining information. It can be said that the development of newer and newer methods used by cyber criminals stimulates

the development of security technologies and, vice versa, new protection technologies "inspire" cyber criminals to develop new methods of attack. New methods should be defined as new concepts of attack that use mechanisms that have not been used so far or that improve the mechanisms and concepts that have been used for a certain period of time. As D. Reinsel, J. Gantz, and J. Rydning (2018, p. 2) put it, "*The data-driven world will be always on, always tracking, always monitoring, always listening and always watching – because it will be always learning.*"

Theoretical, behavioral aspects of Information Security

Increasingly sophisticated technical and software security solutions force cyber criminals to seek methods that will allow them to acquire information without having to overcome the complex safeguards they encounter. In this way, many techniques have been created that belong to the so-called social engineering category, which make it possible to achieve the goal by way of appropriate manipulation of other people (Breda et al., 2017, p. 4204). The attacking party tries to manipulate an employee's actions in such a way that the employee, unaware of the threat, discloses passwords and ways in which information is secured in the company, or runs a specially developed spying program or a virus. There are many methods of manipulation and social-engineering activities and their number keeps increasing. One of the most famous hackers in the world who use social engineering and socio-technical activities is Kevin David Mitnick, who never broke the technical safeguards and used the so-called "human factor": "*I broke people, not passwords.*"

As a result, business organizations need to minimize the risk in the area of the so-called behavioral aspect of information security, often referred to in many publications as the "human factor." The "human factor" in the area of information security most often refers to all the errors made by an employee who processes information that can be taken advantage of by third parties to illegally obtain information (Kobis, 2019, pp. 37, 38). For example, Y. Wang (2008, p. 75) generally defines this concept as: "*Human factors are the roles and effects of humans in a system that introduce additional strengths, weaknesses, and uncertainty.*" He also defines the taxonomy of human factors, in which he specifies the factors that are part of the three categories listed in the definition (Wang, 2008, p. 75).

As a human factor aspect, social engineering techniques are directly related to research topics concerning human interaction with new technologies. In the area of information protection related to human behavior towards digital processing of intangible resources, new terms are currently in use that describe specific mechanisms, such as cyber psychology and cyber hygiene.

Cyber psychology is a sub-discipline of psychology that describes the mechanisms governing the human mind and behavior in the context of new technologies. Modern research focuses on man-machine interaction, the psychological consequences of use of cyberspace, virtual and augmented reality, artificial intelligence, and other digital innovations that are gradually reaching a growing number of users. On the one hand, the research enables understanding of human behavior in relation to technology and, on the other hand, it examines the impact of technology on the social behavior of individuals, groups, and organizations (Clock, 2019). According to G. Kirwan (2016, p. 3), "Cyberpsychology is the branch of psychology that examines how we interact with others using technology, how our behavior is influenced by technology, how technology can be developed to best suit our needs, and how our psychological states can be affected by technologies." The very notion of cyber psychology is, therefore, very broad and extends far beyond the subject matter of this article. However, it also includes issues related to digital information security: direct dependence of the risk to which information is exposed on human behavior in the virtual environment (Hadlington & Parsons, 2017; Janicke et al., 2018; Nemati, 2008; Parsons et al., 2017).

Cyber hygiene, on the other hand, is a term directly related to the concept of hygiene in the broadest sense. Just as personal hygiene practices are used to maintain good health and well-being, cyber-hygiene practices ensure security and protection of data (Brook, 2018). Similarly, the European

Union Network and Information Security Agency (ENISA) has adopted the following definition of cyber hygiene: "*cyber hygiene should be viewed in the same manner as personal hygiene and, once properly integrated into an organization will be simple daily routines, good behaviors and occasional checkups to make sure the organizations online health is in optimum condition"* (ENISA, 2016, p. 6). In the area of cyber hygiene, some basic activities are listed: regular updates of the operating system and software, taking care of software security features, ensuring regular changes of access passwords and their appropriate level of complexity, and taking care of the privacy of access to one's own workstation. Some authors also mention effective patch management, awareness of the prohibition to use certain types of software, computer backups, avoidance of cyber-bullying, and detection of false messages (Vishwanath et al., 2020, p. 2).

Behavioral aspects of information security are currently a major challenge for business entities. Social engineering and socio-technical activities are the biggest challenge in ensuring the expected level of security in economic organizations. According to a KPMG report, as much as 63% of the surveyed companies in Poland believe that the human factor constitutes the greatest threat to the information resources of companies (KPMG, 2019, p. 5).

Theoretical organizational-procedural aspects of information security

Information resource management also requires appropriate organization of data and information security processes. This area includes:

Implementation of legal aspects universally applicable in a given country;
Implementation of the organization's internal rules and procedures;
Implementation of risk management processes, e.g. according to ISO/IEC 27005; and
Training.

An important element of an information security structure in business entities is development of a security policy and an IT system management instruction. These documents, which are available to all employees, should constitute the initial guidelines for information protection that take into account all laws and company policies. They should provide guidance on how information is to be treated in a given job. Every business entity should individually estimate the value of its own resources in the various departments and, on this basis, should develop guidelines for specific jobs. Company managers should ensure that each employee becomes familiar with the guidelines and confirms this, e.g. with his or her own signature. Such practices make it possible for employees to have a sense of responsibility for information resources and, at the same time, they affect security.

Risk management is an important organizational-procedural aspect. Risk assessment and analysis related to security of information resources is the starting point for development of effective safeguards. Reliable classification of an organization's resources and safeguards makes it possible to effectively assess the risk of an incident and to develop procedures preventing and minimizing loss or theft of intangible assets. It enables development and implementation of new information protection safeguards that take into account the cost and benefit analysis related to the value of the information held (see Kuś, Pypłacz, 2019).

Training is a very important element of any information security system. The pace of development of information techniques and technologies (see Haseeb et al., 2019), sociotechnical activities, and social engineering techniques, and thus the methods of illegal acquisition of information, is now so high that the life cycle of information concerning security aspects - its timeliness - does not currently exceed one year. It is therefore important to implement training programs for employees who process information. Appropriate training makes it possible for them to become familiar with the current methods of both information protection and illegal information acquisition. Lack of training exposes the business entity to the risk of loss of intangible assets: as a result, employees who manage information to a different extent are not aware of the reality in which they must function.

The organizational-procedural aspects also include all activities related to the management of employees from the time they are hired to the time they are dismissed or quit. In the case of selected employees with specific jobs involving information that is sensitive to the company, appropriate

recruitment procedures are required. To this end, all possible lawful measures should be taken to determine the suitability of the candidates for the post. Similar measures should be implemented at the time of an employee's dismissal. Appropriate procedures (perhaps as early as during hiring) should be developed to minimize the risk of disclosure of the business organization's information to others. People holding key positions during their employment have access to information that is the most important to the organization. Accidental or deliberate disclosure to third persons or third parties may significantly weaken the market position of the company or, in extreme cases, cause the company to cease operations.

Research Methodology

The research was conducted in the period from May 2019 to November 2019 on a sample of 185 medium and large non-financial enterprises operating in Poland. The entities were selected using the purposive sampling method. The study sample included business organizations that satisfied the following conditions:

The company processes information in a digital way;
There is a job or a department in the company, represented by a person or a group of persons, that is directly responsible for information security;
The company applies risk management methods to any extent in terms of protection of information resources.

Micro and small enterprises were deliberately excluded from the study due to the fact that these entities relatively rarely establish a separate job in charge of information protection. Usually the owner is responsible for information security or this responsibility is distributed among the individuals processing digital resources.

The search and selection of business entities were carried out on the Internet. The companies were contacted electronically (by e-mail or chat if the company offered such a solution on its website) or by telephone. The key study was conducted using the CAWI (Computer-Assisted Web Interview) technique, by means of an electronic questionnaire placed on the author's website. People working in jobs that involved responsibility for security of information resources in the company were asked to fill in the questionnaire. Out of the 185 completed questionnaires, 179 were qualified for further analysis. The others were found to be filled out incorrectly.

Research Results

With reference to the theoretical part of this paper, there are 3 aspects of information protection: technical and technological, behavioral, and organizational-procedural. The study has shown that, in the opinion of information security managers in medium and large companies, the technical and technological aspect plays the most important role (the average grade 4.8) (Fig. 1). This this approach must be considered to be correct. Hardware and software security is now the foundation of all types of safeguards. System software makers include basic security software as a component of the system, which demonstrates the status of these solutions. It is also important to note that most of the risks, especially originating in the computer network, are caused by certain automatically spreading forms of threats. They work by searching for "gaps" and "vulnerabilities" in network elements and then explore these "gaps" to cause specific damage. Software and hardware safeguards are used to block this type of threats. To this day, they form the backbone of security in virtually all business entities.

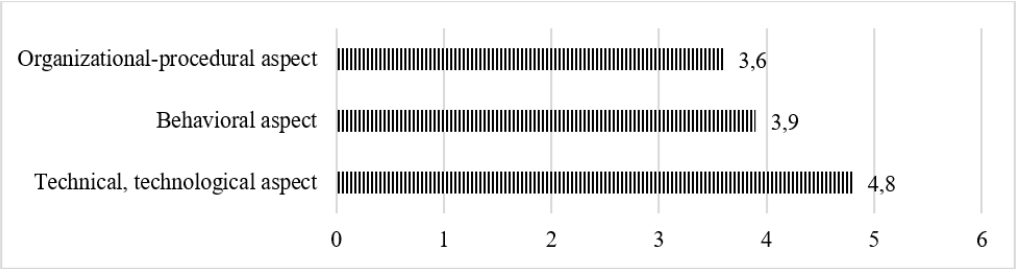

Fig. 1: Respondents' answers to the following question: "Please estimate the importance of the different aspects to the protection of information resources on a scale of 1 to 5, where 1 is the aspect that is the least important to information protection and 5 is the aspect that is the most important to information protection."

Source: prepared by the author

In the second place, the respondents indicated the behavioral aspect (average grade 3.9). This is an average result, which demonstrates the average awareness of the respondents of the risks caused by the so-called human factor. The most advanced security features cannot function properly if a person, intentionally or unknowingly, discloses information or enables access to information to third parties. As the results of research carried out by the largest intelligence companies in the world indicate, errors committed by humans result in up to 90% of all information security breaches (Sedgwick, 2019). The question arises: How can one minimize the impact of the human factor? An analysis of publications on this subject leads to the conclusion that the most frequent answers are: selection of appropriate staff at the recruitment stage and carrying out regular training. Information security training should constitute a permanent part of each business entity's schedule. The pace of development of information management methods and thus the types of threats is so high that the optimum frequency of training is 1 year. Figure 2 shows the respondents' answers related to the frequency of training in the surveyed business entities. Only 17% of the surveyed organizations declare annual training and 4% more declare that they conduct it more often than once a year. As many as 27% of companies conduct training less than once a year and 18% believe that it is the employees themselves who should make sure to have the knowledge related to protection of intangible resources. Out of all the surveyed companies, 34% declare that they provide training once for each employee before assigning him or her to a specific job.

An analysis of the responses and their comparison with current studies related to the importance of the human factor to information security (see Kaspersky Lab, 2018; Proofpoint, 2019) leads to the conclusion that business entities pay too little attention to training of their employees in this area. It should be noted that this knowledge cannot be acquired to the full extent before starting work. The pace of changes in this matter is so fast that a continuous learning process is inevitable. This is a process on which business entities should depend most, as it is their information resources that are a key factor that can enable them to improve their competitiveness in the economy.

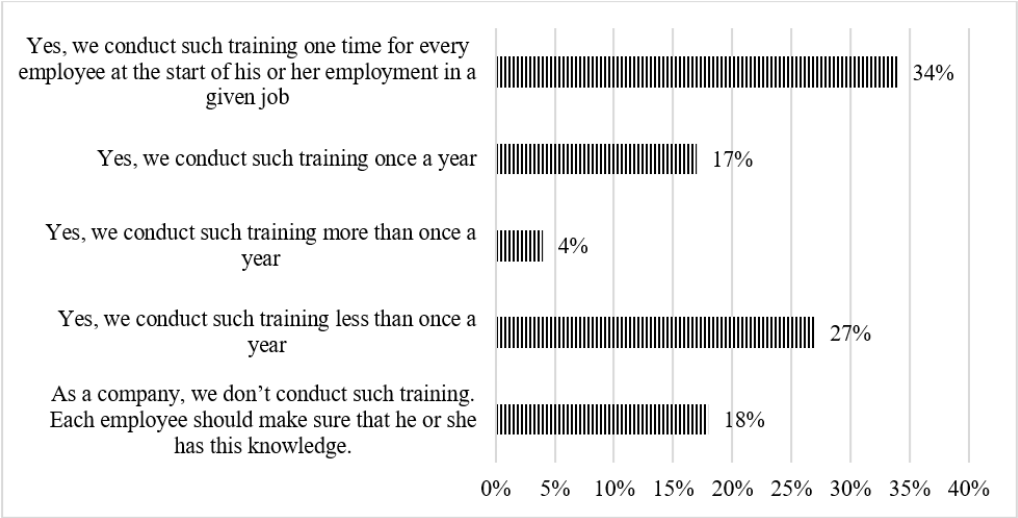

Fig. 2: Respondents' answers to the following question: "Does your company provide information protection training to all employees who process information resources and at what frequency?"

Source: prepared by the author

As shown in Figure 1, the smallest average was obtained for the answer to the question concerning the organizational-procedural aspect. Although 3.6 is not a very low score, it places the problems it represents in last place. The result can be interpreted as an attitude where business people value existing safeguards and information management skills more than the regulations, laws, obligations specified in specific security policies. It should be noted, however, that e.g. risk estimation and risk analysis, which are included in the procedural area, provide guidelines for other aspects. They must be carried out with due diligence and regularly, at even the smallest changes in the environment of the information system. They are the foundation for security systems. Risk assessment should take into account both technical and behavioral aspects. However, according to the research, most business entities only consider technical safeguards (Fig. 3).

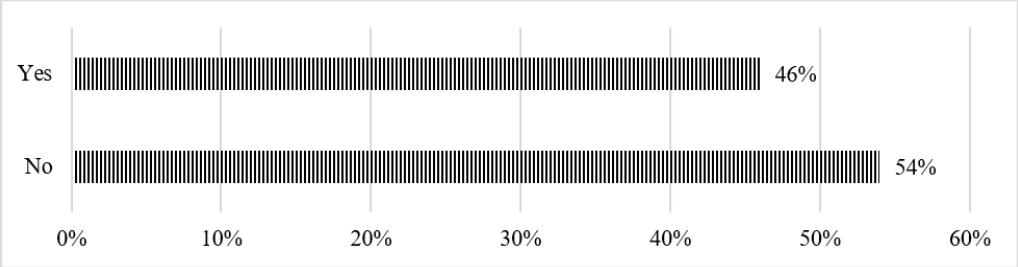

Fig. 3: Respondents' answers to the following question: "Does information security risk assessment in your company include social engineering techniques?"

Source: prepared by the author.

It is procedurally quite difficult to include social engineering techniques in risk assessment. Perhaps that is why only 46% of companies do it. In order to effectively anticipate the consequences and plan a possible defense against actions of cyber criminals practicing in sociotechnics, it is necessary to develop a number of probable scenarios and to carry out simulated actions (penetration tests) (see Lee et al., 2016; Tang, 2014) in order to identify the strengths and weaknesses of employees (their

vulnerability to sociotechnics). An additional difficulty is that the most probable results can only be obtained when working on unsuspecting employees. This causes great organizational difficulties and requires a large amount of time and money (preferably if the simulated activities are carried out by a hired external company).

Another question asked of the respondents concerned the technical area of the safeguards. The answers shown in Figure 4 show a complete map of the most popular information resource safeguards. The most visible aspect of the results is the fact that none of the security factors received 100% of the responses. Anti-virus software is still the most popular method of protection of devices and systems. The study deliberately divided the responses into paid and free software. This was intended to get the answer to the following question: What percentage of companies do not buy basic protection against computer viruses? Although the choice of free software is nowadays very wide (also due to the actions of operating system makers), its performance in relation to the wide range of modern-day threats is typically much lower than that of its paid equivalents (see Chakraborty, 2017; Zarghoon et al., 2017). However, 13% of business entities do not pay much attention to this. On the other hand, 86% of respondents declared the use of paid antivirus protection systems. Thus, 1% do not use such software at all, which seems completely irresponsible given the current vulnerability to attacks from the global network. However, these companies are likely to use standard security features built into their operating systems.

Other most common ways to protect information are to establish access passwords and PIN numbers for computer devices and software and to establish a specific system of access rights. Thus, each employee has access only to a given range of information necessary in his or her job, which is protected by a password or, in 26% of companies, additionally by biometric safeguards (fingerprint, retina scan, or face recognition). 74% of business entities back up their digital resources. This number is relatively high. However, given the scale of the ransomware threat in recent years, as much as 26% of organizations may never regain access to information if their resources are encrypted. In the case of most companies, this can result in a virtual stop to their operations or in major problems in the area of both their operations and their image. The least frequently used safeguards are solutions designed to protect the local network. This concerns both encryption of transmitted information (only 13% of respondents) and security at the interface between the local network and the Internet (hardware firewall - 43%, IPS - 34%).

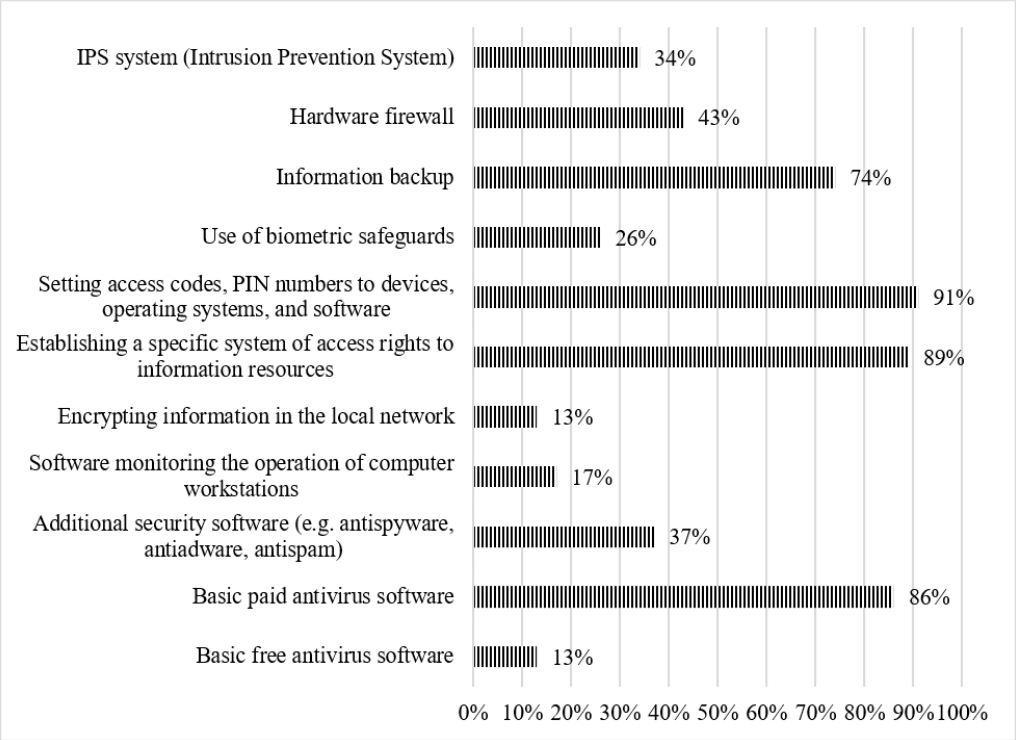

Fig. 4: Respondents' answers to the following question: "Please indicate which of the listed security techniques are used in your company."

Source: prepared by the author.

Conclusion

Security of information resources in business entities is currently one of the biggest challenges facing modern companies. Information is currently one of the most important resources of companies. Therefore, it becomes the target for people who, for various reasons, want to acquire it illegally. The multitude of threats occurring in modern information systems forces business entities to maximize the effectiveness of their protective actions. Ensuring information security is currently not a one-time or multi-stage operation. It is now a process that involves all employees with any contact with information resources. and requires continuous acquisition of new knowledge and experience, as well as improvement of existing procedures and implementation of new ones.

Surveys conducted among medium and large business entities prove that there is a high awareness of information security issues among people responsible for this area of operations. However, actions are lacking in the behavioral aspect (average of 3.9, as shown in Fig. 1) and the related areas of training (Fig. 2) and risk estimation (Fig. 3). There is a great need to make those who decide about information security aware that only properly prepared employees can build an effective security system. State-of-the-art technical and software measures, security policies, and external and internal regulations are only tools in the hands of people, who can act either responsibly or irresponsibly.

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Romanian Target Market Identification for a New Spinal Orthosis

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Abstract

Taking into consideration the fact that the global aging population is increasing every year and that the number of people with disabilities constantly on the rise, it becomes vital to allow and sustain the development process for new medical devices that will satisfy the specific needs of these categories of people. Considering these facts, every country is in a continuous process of developing and updating proper regulations and laws in order to provide necessary information and facility for companies that embrace the manufacturing of assistive devices. To align to international standards, manufacturers strive develop assistive devices that meet customers' requirements. Any development process which targets a new product, starts with customer needs, specifically customer requirements. Thus, the current study is aimed at the identification of the specific Romanian target market for the development process of a new spinal orthosis. In this regard, within the study, it was identified which categories of people with disabilities are targeted to be taken into consideration when new product development process will be deployed. Also, it was identified the exact county that will be targeted and the number of people that would potentially benefit by using a redesigned assistive device like a spinal orthosis.

Keywords: Regulation, Legislation, Standard, Assistive Devices.

Introduction

According to Lantada and Morgado (2012) the proportion of the population over 60 years was 8% in 1950, over 10% in 2000, and it is estimated to reach 21% in 2050. Partial or complete loss of mobility affects not only the ability to walk, but also the ability to perform personal tasks, which is a determining factor in the quality of life and determines the dependence of others in daily activities.

Lantada and Morgado (2012) also considering that in an aging society it is extremely important to develop devices that can support and assist older people and people with neuromotor disabilities in their daily activities. Thus, it is becoming increasingly relevant to find ways and tools to compensate, improve or restore specific mobility functions.

Monge et al. (2016) consider that the conservation of a person's posture requires complex stabilization mechanisms formed by the skeleton and the nervous, cardiovascular muscle and sensory. The medical device market includes a plethora of assistive products which simplify routine tasks for people with neuromotor disabilities. Assistive technology generally includes devices like mobility,

hearing, visual, cognitive and multi-sensorial aids. In particular, mobility aids can be: wheelchairs, scooters, walkers, canes, crutches, prosthetic devices, orthotic devices and a variety of specific physical modification in the built environment. All these can be either mechanical products, or "smart products", the latter including both hardware and software. The use of these "technical aids" as they are called, are not a regression, but rather, a way to live better. Some are traditional like the wheelchair or cane, but others are relatively new, so they are little or poorly known. Their appearance on the market has been as a result of technological progress to increase the autonomy of people who use them. The result is a wide range covering almost all needs. For several years, researchers have addressed the needs of people with neuromotor disabilities through alternative or augmentative devices. Most commonly, these solutions are selected according to the disability degree of the user.

According to Helal et al. (2008) many simple, low-tech devices can be bought in stores, through catalogues and on the internet without a physicians' prescription or any professional guidance whatsoever. Regardless of the price and technical complexity, to be useful, assistive technology must match the individual's specific needs, do the job for which it is intended, be compatible with the environments in which it will be used and be available and affordable to the person who needs it.

The devices can be custom made, designed to meet the functional requirements of each individual user, or prefabricated and designed to meet certain classes of functional requirements. The prefabricated devices are adjustable, meaning they need adjustment for each individual user, or are ready to use, meaning they do not need any adjustment for each individual user.

Considering the aforementioned, the main objective of the current study is to identify the profile of the romanian potential customer and the target market for the development of a new spinal orthosis. In order to differentiate a new product from its competitors and create a reliable and sustainable competitive advantage, it is necessary to conduct a situational analysis of the external (macro) factors facing the development process. Perera (2017) suggests that a PESTLE model should be best used when evaluating the dynamics of a competitive business environment. The model is targeted to evaluate several external environment factors: political, economic, socio-cultural, technological, legal, ecological and geographic. For the current product development process, the authors propose a two stage PESTLE model. In the first stage, the political, economic, socio-cultural, legal and geographic factors are evaluated. The second stage will target the technological and ecological factors. The reasoning is that technological and ecological factors are strictly interconnected with the product requirements analysed in the first stages of the product development process, as from Ulrich and Eppinger (2012). The current study focuses on the implementation of first stage PESTLE, evaluating regulations, political environment, legislation, standards and market segmentation for the development of a new spinal orthosis in Romania (figure 1).

Fig. 1: Analysed macro factors for the development of a new spinal orthosis

Regulations

In order to develop a new spinal orthosis, it was necessary to evaluate what institutions regulate the main activities in field of assistive devices development. Authors identified the World Health Organisation and the United Nations as the two main actors in regulating the development process of assistive medical devices for neuromotor disabilities.

World Health Organization

According with web site of World Health Organization (2014), the Constitution was adopted by the International Health Conference held in New York from 19 June to 22 July 1946, signed on 22 July 1946 by the representatives of 61 and entered into force on 7 April 1948. Amendments adopted by the Twenty-sixth, Twenty-ninth, Thirty-ninth and Fifty-first World Health Assemblies came into force on 3 February 1977, 20 January 1984, 11 July 1994 and 15 September 2005 respectively.

The objective of the World Health Organization shall be the attainment by all people of the highest possible level of health. In order to achieve its objective, few functions of the Organization shall be:

- to stimulate and advance work to eradicate epidemic, endemic and other diseases;
- to promote co-operation among scientific and professional groups which contribute to the advancement of health;
- to promote and conduct research in the field of health.

Convention on the Rights of Persons with Disabilities

Don MacKay, Chairman of the committee that negotiated the United Nations (2016) treaty said what the Convention on the Rights of Persons with Disabilities endeavours to do is to elaborate in detail the rights of persons with disabilities and set out a code of implementation. On the fundamental issue of accessibility, the Convention developed by the United Nations (2016), requires countries to identify and eliminate obstacles and barriers and ensure that persons with disabilities can access their environment, transportation, public facilities and services, and information and communications technologies.

The European Parliament and the Council of the European Union

According with Regulation 2017/745 of the European Parliament and of the Council of 5 April 2017 on medical devices (2017) this Regulation aims to ensure the smooth functioning of the internal market as regards medical devices, taking as a base a high level of protection of health for patients and users, and taking into account the small and medium-sized enterprises that are active in this sector. At the same time, this Regulation sets high standards of quality and safety for medical devices in order to meet common safety concerns as regards such products. Both objectives are being pursued simultaneously and are inseparably linked whilst one not being secondary to the other. As regards Article 114 of the Treaty on the Functioning of the European Union, this Regulation harmonises the rules for the placing on the market and putting into service of medical devices and their accessories on the Union market thus allowing them to benefit from the principle of free movement of goods.

Political environment and legislation

For better understanding of the rules that are applied in development process of new medical devices, it was consulted both, european and romanian law.

European Environment

The European Pillar of Social Rights (2017) aims to serve as a guide towards efficient employment and social outcomes when responding to current and future challenges which are directly aimed at fulfilling people's essential needs, and towards ensuring better enactment and implementation of social rights.

The European Pillar of Social Rights expresses principles and rights essential for fair and well-functioning labour markets and welfare systems in 21st century Europe. It reaffirms some of the rights already present in the Union acquis. It adds new principles which address the challenges arising from societal, technological and economic developments. For them to be legally enforceable, the principles and rights first require dedicated measures or legislation to be adopted at the appropriate level.

Everyone has the right to timely access to affordable, preventive and curative health care of good quality.

Romanian Environment

The law 448/2006 (2006) regulates the rights and obligations of persons with disabilities granted in the purpose of their social inclusion. The protection and promotion of the rights of persons with disabilities are based on the following principles (here are extracted few of them):

- respect for human rights and fundamental freedoms;
- preventing and combating discrimination;
- equalization of opportunities;
- equal treatment in terms of employment;
- social solidarity;
- empowering the community;
- subsidiarity;
- adaptation of the company to the disabled person;
- the interest of the disabled person.

Standards

There are many products that can help people with disabilities to improve the quality of life: hearing aids, wheelchairs, Braille equipment, communication devices, software equipment, oxygen devices and mobile lifting devices. All help people with disabilities to function better in everyday activities and to actively participate in society. Support product subdivisions can be found in several classifications and nomenclatures. The most important at the international level are ISO 9999 (products for people with disabilities - Classification and terminology), GMDN (global medical devices classification), EMDN (The European Medical Device Nomenclature) (2020) and SNOMED CT (Systematic nomenclature of Medicine - Clinical terms). For better understanding of the environment, hereafter, the authors provide a thorough analysis of the main classes, subclasses and divisions of the main standard, targeted at neuromotor disabilities.

ISO 9999:2016

ISO 9999 (2016) establishes a classification and terminology of assistive products, especially produced or generally available, for persons with disability. Assistive products used by a person with disability, but which require the assistance of another person for their operation, are included in the classification.

The best known classification of Assistive Technologies is the international classification ISO 9999, is a three-level system that groups Assistive Technologies, firstly into classes (mobility, communication, recreation) – extras in table 1, secondly into subclasses, (in the "mobility" class:

wheelchairs, motor adaptations) – extras in table 2, and thirdly into divisions (in the "motorized wheelchairs" subclass: power steering wheelchairs) – extras in table 3.

Table 1: ISO 9999 main classes [extracted from ISO 9999 (2016)]

Class	Description
04	Assistive products for measuring, supporting, training or replacing body functions
05	Assistive products for education and training in skills
06	***Assistive products attached to the body for supporting neuromusculoskeletal or movement related functions (orthoses) and replacing anatomical structures (prostheses)***
09	Assistive products for self-care activities and participation in self-care
12	Assistive products for activities and participation relating to personal mobility and transportation
15	Assistive products for domestic activities and participation in domestic life
18	Furnishings, fixtures and other assistive products for supporting activities in indoor and outdoor human-made environments
22	Assistive products for communication and information management
24	Assistive products for controlling, carrying, moving and handling objects and devices
27	Assistive products for controlling, adapting or measuring elements of physical environments
28	Assistive products for work activities and participation in employment
30	Assistive products for recreation in leisure

Each entry in ISO 9999 has a numeric code: in this case, "cervical-thoracic-lumbar-sacral orthoses" has the code 06.03.18, where the first two digits represent Class 06 "orthoses", the next two subclasses 06.03 "spinal and cranial orthoses", and the last two represent the specific division. ISO 9999 class, subclass and divisions are that present interest for this study is in the following tables.

Table 2: Subclasses for main class 06 [extracted from ISO 9999 (2016)]

Class	Subclass	Description
06	***03***	***Spinal and cranial orthoses***
06	04	Abdominal orthoses
06	06	Upper limb orthoses
06	12	Lower limb orthoses
06	15	Functional neuromuscular stimulators and hybrid orthoses
06	18	Upper limb prostheses
06	24	Lower limb prostheses
06	30	Prostheses other than limb prostheses

Table 3: Division for subclass 03 [extracted from ISO 9999 (2016)]

Class	Subclass	Division	Description
06	03	03	Sacro-iliac orthoses
06	03	06	Lumbo-sacral orthoses
06	03	09	Thoracic-lumbar-sacral orthoses
06	03	12	Cervical orthoses

06	03	15	Thoracic-cervical orthoses
06	03	18	Cervical-thoracic-lumbar-sacral orthoses

In order to find all requirements and functions for assistive device that will be developed, it was studied other standards regarding assistive technologies.

Few of that standard are: ISO 8548:1993 – Prosthetic and orthotic - limb deficiencies; ISO 8549:1989 – Prosthetic and orthotic - vocabulary; ISO 10328:1996 – Prosthetics - Structural tests of prostheses; ISO 13405:1996 – Prosthetics and orthotics - Classification and description of prosthetic components; ISO 15032 – Prosthetics - Structural tests; ISO 13485:2016 Medical devices — Quality management systems — Requirements for regulatory purposes (2016).

Market Analysis

The market is made up of buyers who differ in their wishes, power purchase, geographic location, purchasing behaviour and buying practices. It is important to identify the market size differentiated by disability type, geographical location, age group and gender.

Market Size

On September 30, 2019, the total number of persons with disabilities communicated to the National Authority for Persons with Disabilities within the Ministry of Labour and Social Justice (2019), through the general directions of social assistance and the protection of the county child, respectively local of the sectors of the municipality of Bucharest, was 839,632 persons. Out of these, 97.89% (821,939 persons) are in the care of families and / or live independently (non-institutionalized) and 2.11% (17,693 persons) are in public residential social assistance institutions for adults with disabilities (institutionalized). After analysing data collected from National Authority for Persons with Disabilities, the authors present in figure 2 the evolution of the number of people with disabilities from Romania in the last 13 years.

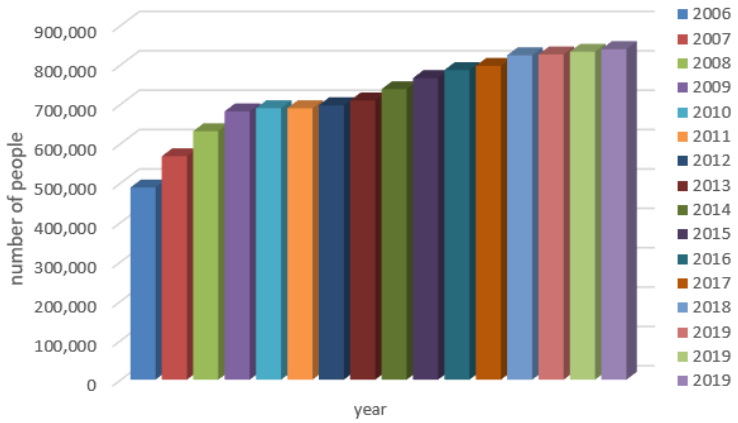

Fig. 2: Evolution of the number of people with disabilities in Romania [*data collected from National Authority for Persons with Disabilities, Ministry of Labour and Social Justice (2019)*]

On September 30, 2019, the rate of persons with disabilities in the population of Romania was 3.79%. From the centralization of the data by age groups it follows that 54.23% are persons between the ages of 18-64 (418,629 persons) and 45.77% are over 65 years (353,364 persons), in total adults with disabilities. Those numbers are split in accordance with the type of disability. For this study the relevant category is physical disability and the number of people with this disability is shown in figure 3.

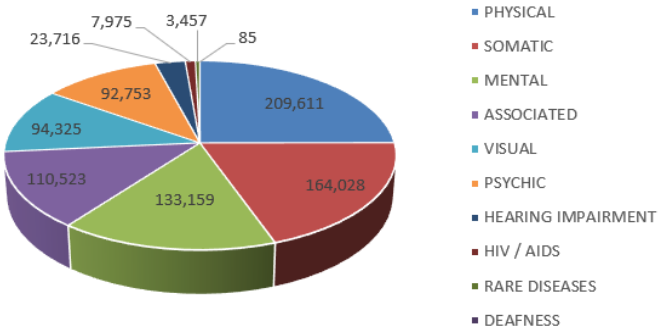

Fig. 3: Number of people with disabilities by type of disability in Romania [*data collected from National Authority for Persons with Disabilities, Ministry of Labour and Social Justice (2019)*]

The total number of people with physical disability was categorised according with county from where they come. In this way it can be easily to identify the region from Romania were the proposed type of medical devices is more suitable and affordable. These categories are shown in figure 4.

Compared to the 3.79% rate of persons with disabilities per 100 inhabitants, calculated at the level of Romania, the South-West Oltenia, South-Muntenia and North-West regions have the highest rates. By counties / municipalities, the highest number of persons with disabilities is registered in the municipality of Bucharest (70,107 persons) followed by Prahova county (37,633 persons), and the smallest number is registered in Covasna county (6,273 persons).

Women represent 53.10% of the total number of persons with disabilities. The number of people over the age of 50 represents 72.12% of the total number of adults with disabilities. From the centralization of the data by age groups it is shown that 54.23% are persons between the ages of 18-64 (418,629 persons) and 45.77% are over 65 years (353,364 persons), in total adult persons with disabilities.

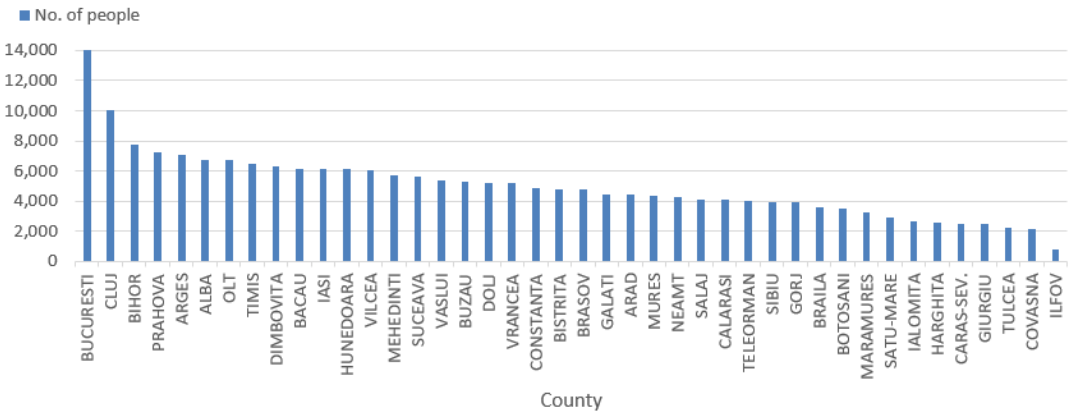

Fig. 4: Number of people with physical disabilities by county in Romania [data collected from National Authority for Persons with Disabilities, Ministry of Labour and Social Justice (2019)]

The number of public social welfare institutions for adults with disabilities on September 30, 2019 is 502 (compared to 489 on September 30, 2018), of which: 442 residential (compared to 427 as of September 30, 2018) and 60 non-residential - day (compared from 62 to 30 September 2018). About two-thirds (60.40%) of public residential institutions for adults with disabilities are: care and assistance centre's (28.05%), with 6,341 beneficiaries and protected housing (32.35%), with 1,035 beneficiaries. They represent 41.69% of the total number of 17,693 persons in residential institutions. A significant number of beneficiaries also exist in the 74 neuropsychiatric recovery and rehabilitation centres, respectively 6,214 persons (35.12%).

Market Segmentation

Tion (2006) says that the market is a group of current or potential customers who may want a good or service and who also have: purchasing power, willingness to spend money, authority to do these expenses. From an economic point of view the market is regarded as the meeting place of the demand with the offer, that is, represents all the buyers and sellers who are engaged in one transaction. The market share of an enterprise or product is determined as a ratio between sales of the company or product and total sales recorded in the respective market, in a certain period.

Market segmentation is the process of dividing a market into distinct groups of buyers, based on their needs, characteristics or purchasing behaviour. Market segmentation is done to achieve better customer satisfaction than competitors.

The market segment is the group of consumers with similar needs or requirements. The market niche is an even smaller consumer group that requires a special combination of advantages, for which they are willing to pay a higher price.

Not every criterion is suitable for market segmentation of a product. To be get effective segmentation, a criterion must have, cumulatively, three main qualities: be relevant, measurable and operational for the market studied.

A segmentation criterion is relevant when the segments you are identifies behavioural differences in relation to the analysed product. Not just the criterion chosen must be relevant, but also how uses it in the concrete segmentation process.

Thus, for the market segmentation of a new spinal orthosis, the following criteria presented in table 4 were considered:

- *Geographic*: · Region; · County; · Medium.
- *Demographic*: · Type of disability; · Age; · Gender.

Following the analysis of the statistical data within the Statistical Bulletin developed by the National Authority for Persons with Disabilities of the Ministry of Labour and Social Justice (2019), developed on September 30, 2019, table 4 was completed.

Table 4: Market segmentation for the development of a new spinal orthosis

No.	Criteria	Topic	Segment	Value
1	Geographic	Region	South-Muntenia	137,649
			North-East	124,534
			North-West	118,171
			South-West-Oltenia	104,772
			South-East	98,557
			Centre	94,541
			Bucharest-Ilfov	83,320
			West	78,088
		County	Bucharest	70,107
			Prahova	37,633
			Arges	32,361
			Iasi	28,224
			Cluj	28,075
			Timis	26,566
		Environment	Rural	-
			Urban	-

2	Demographic	Type of disability	Physic	209,611
			Somatic	164,028
			Associate	110,523
			Mental	133,159
			Visual	94,325
			Psychic	92,753
		Age	Children	67,639
			Adults	771,993
		Gender	Male	393,787
			Female	445,845

Demographic segmentation entails the breakdown of the total market into categories of consumers, according to variables such as: age, gender, family size, life cycle of family. Demographic variables are most often used in the segmentation of commodity markets for three main reasons: they are measurable, they are operational, and they are relevant. Geographic segmentation involves the breakdown of the market into sub-markets, according to criteria such as: country, region, county, city.

Following the analysis of the data presented in table 4 and figure 5, it turned out that the market segment for the development of a new spinal orthosis has the following characteristics:

- *Geographic*:

· Region - South-Muntenia and Bucharest-Ilfov;
· County - Bucharest, Ilvof, Prahova, Dambovita, Arges and Giurgiu;
· Environment - rural and urban.

- *Demographic*:
· Type of disability - physical;
· Age - Adults;
· Gender - male and female.

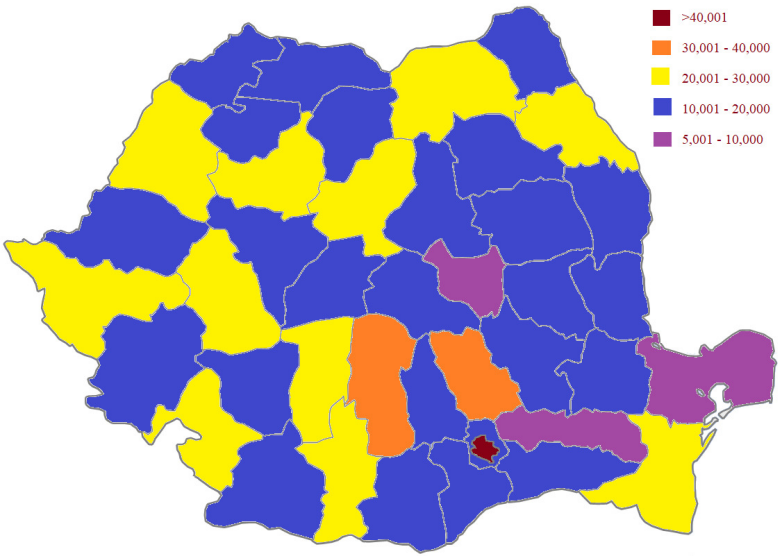

Fig. 5: Number of people with disabilities by county, in Romania

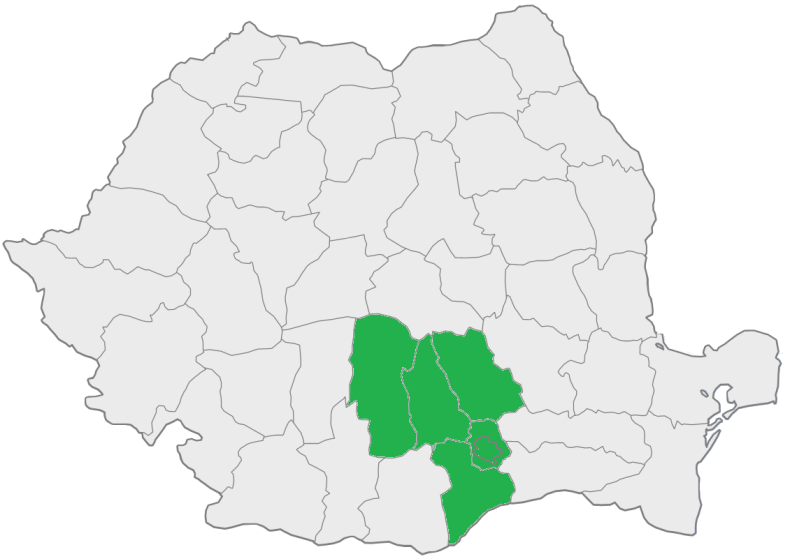

Fig. 6: Geographical localization of the target market of a new spinal orthosis

The market segment that presents interest in the development of a new spinal orthosis is comprised of persons with physical neuromotor disabilities, both, adult men and women. They are located in South-Muntenia and Bucharest-Ilvof, both from the rural area and from the urban area (figure 6).

The next step in the development process is to define the real needs of the identified customers within the targeted market segment. Based on the needs, functions will be constructed and translated into customer/ product requirements. At this point, the second step of the PESTLE model will be completed.

Conclusion

The paper presents a thorough research on EU and specific Romanian regulations and how these can influence the possibility to develop new spinal orthosis through the difficulties that appear before commercialization. It was also studied how European and national laws help and allow to develop a device that will potentially pass all necessary approvals. For development team the most difficult step is to follow the standards recommendation in order to meet all requirements for the new product that will be developed. In this case, the standards that describe the assistive devices development and manufacturing were studied and presented. Specific market segmentation was undertaken, and a possible customer profile was identified. The market segment that presents interest is made up of persons with physical disabilities, adult men and women from the South-Muntenia and Bucharest-Ilvof. Because of lack of data, it was taken in target market both, from the rural area and from the urban area. Further research involves undertaking the second step of the PESTLE model.

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Functional Development of a Posture Correction Orthosis, From Need to Concept

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Abstract

A rapidly aging society and a consistent growth in injury occurrence led over the last decade to an increase of neuromotor disabilities and impairments among the global population. Thus, assistive technologies have become a focus point in the product development process for medical device manufacturers. In their race to achieve sustainable competitive advantage manufacturers offer a variety of medical aids purposed to improve the customers' quality of life. Addressing these issues, the current paper proposes a process for the functional design and development of five posture correction orthosis concepts. Smart assistive devices are constantly developed through an array of methods, that are ultimately targeted at performing specific neuromotor tasks. There is no "universal pill", no ideal methodology which can be unanimously applied to the design and development of successful products. Selection of such methods is ultimately up to the company's requirements: experienced professionals, tradition, internal regulations, national or international requirements, specific standards etc. Based on Ulrich and Eppinger's product design and development process and on Miles's technical functional analysis tools, the authors propose an integrated method for the functional development of a new medical assistive device for the upper body. To develop a new medical device, especially a new spinal orthosis it is necessary to understand that these types of products refer to physiological needs and they should fit perfect to the needs of the potential customers. In this scope, 25 potential customers were interviewed in order to determine their expectations for a new medical device, which potentially could help them correct their posture. Target specifications and specific functions were developed based on the correlation of identified customer needs and existing product metrics. Five concepts of posture correction orthosis were generated, which meet both, customer needs and economic efficiency criteria. Further research will be undertaken for concept selection, manufacturing and testing of the final selected concept.

Keywords: product development, needs, specifications, functions, concepts.

Introduction

Product design and development of medical products starts with understanding the biology, physiology, pathology and biomechanics of the targeted body part.

Galbusera and Wilke (2018) describe the biomechanical aspects of spinal pathologies and their surgical treatment, revealing that one of most common pathology is scoliosis. Scoliosis is manifested

by the appearance of curves of the spine, especially in the lumbar region, in the frontal plane, the column taking the form of the letter "C", often followed by a compensatory modification that appears in the neighbouring area, the spine being in the form of the letter "S". Untreated, scoliosis leads to the appearance of an unsightly aspect of the back but especially to the appearance of back pain and ultimately to loss of mobility.

To address the pathology described above it is mandatory to know what the customer physiological needs are. Understanding customer needs is a crucial contribution to the product development process and, at the same time, a very big challenge. Conceptually, understanding customer needs leads to products that are desirable, achievable, marketable and ultimately successful

From the plethora of product development tools and instruments, the authors selected as the most appropriate for the current study, the methodology proposed by Ulrich and Eppinger (2015), constructed of seven main stages (figure 1).

Fig. 1: Product specifications within the concept development process [adapted from Ulrich K.T. and Eppinger S.D. (2012)]

The present paper is targeted at detailing the first three stages from the development process of a posture correction orthosis. Identification of customer needs is undertaken by defining the customer needs portfolio, data collection through interviews from potential customers, data interpretation and hierarchisation of needs. Product target specifications lay out in precise, measurable detail what a product must do in order to satisfy the previously identified customer needs. Authors constructed the specifications, as proposed by Ulrich and Eppinger (2015), from a metric and a value. The product needs and target specifications are translated into hierarchical functions which are ranked according to their importance. Posture correction orthosis concepts were generated to exactly fulfil the defined product functions. The identification and definition of functions are undertaken in accordance with the concepts defined by Miles LD (2008).

According to Shane (2003), there are five levels of needs, ranging from the basic needs that are present at birth, to the psychological needs, which become important only once the lower level of needs have been met. From this point of view, to develop a new medical device and especially a new spinal orthosis it is necessary to understand that this type of product refers to physiological needs and it should fulfil perfect the need of potential customer. In this regard, 25 potential customers were interviewed, in order to find out what expectations they have from a new medical device that will help them correct their posture. Prior to this research, authors conducted a detailed market analysis and managed to establish the main target market and the customer profile. With a clear picture of the customer it was a simple and concise hierarchical process to define the specific needs, target

specifications and product functions for a posture correction orthosis. Based on the functions five new medical device concepts were developed by the authors.

Need Identification

According with Woinaroschy (2015), the development of a new product begins with the identification of the customer's requirements, where the notion of customer means both those who buy and those who consume that product, which can be individual consumers or large corporations. Delimiting the client's requirements involves three sequential steps: Interview customers; Interpret the expressed needs/ requirements; Translate the requirements into the product specifications.

Roemer (2012) proposed for the process of identifying needs a structure with six stages: 1. Defining the purpose: - Mission; 2. Data collection: - Observation; - Interviews; - Target groups; 3. Data interpretation: - Interpretation of needs; 4. Organization of needs: - Hierarchization; 5. Establishing importance: - Examining the relative importance; 6. Reflections on the process: - Continuous improvement.

In this case, the **mission** can be formulated as follows: *Develop a new medical device which can improve the performance of specific neuromotor tasks for disabled people*.

According to Ulrich and Eppinger (2015) the first step into fulfilling the stated mission is to establish the customers' needs portfolio. Next, the design team establishes a set of restrictions and selects the appropriate product for further analysis. Data collection is undertaken through interviews with potential customers.

Prior to conducting the current research, the authors undertook a thorough market analysis in order to identify the target market and the profile of the customer. Following the analysis of the market and its segmentation, five needs were formulated. In the process of formulating the needs, the following observations were considered: The needs formulated must clearly result from the surrounding reality (in which people live and work); All the needs formulated should refer to a significant number of individuals; Needs should be formulated starting from shortcomings identified in various everyday situations.

Market research revealed that the customer needs portfolio is composed of **five imperative needs**: The need to walk independently; The need to coordinate and to have strength in the upper limbs; The need for a correct posture; The need to balance when rising/ sitting; The need to coordinate and to have strength in the lower limbs.

The product developed by the team should meet one of the needs specified above. Also, the product should meet a set of restrictions, imposed by all lifecycle phases (concept development, manufacture, usage, recycle/ reuse/ disposal). The product identified **restrictions** are as follows: Be a product of mechanical construction; Have as few components as possible; Have a simple constructive shape; Have small overall dimensions; Contain parts made from cheap and readily available materials; Contain components made by conventional processing technologies; Have a large potential market; Present a high degree of innovation; Have a minimum cost.

Five types of products are identified by the authors, that fully meet the needs of the target customers. In order to select the most appropriate product to further develop, the team applies a tool proposed by Ulrich and Eppinger (2015), namely the Decision matrix for **product selection** (table 1).

Table 1: Decision matrix for product selection

Product / Restriction	Exoskeleton for the lower limbs	Orthosis for the upper limbs	Orthosis for the spine	Exoskeleton for balance	Orthosis for the lower limbs
Mechanical construction	-	0	+	-	0
Have as few components	0	0	+	0	-
Simple constructive form	-	0	+	-	0
Small dimensions of gauge	0	0	0	-	-
Made from cheap materials	0	0	+	0	0
made by conventional processing techniques	0	0	0	0	0
Large potential market	0	0	0	0	0
High degree of innovation	0	0	+	+	0
Minimum cost	-	0	+	-	-
Σ +	0	0	6	1	0
Σ -	3	0	0	4	3
Σ 0	6	9	3	4	6
Scoring	-3	0	6	3	-3
Rank	4	3	1	2	4

Products are evaluated in correlation with the group of restrictions and a referential product. In this case, the referential product is the Orthosis for the upper limbs, thus its' column in the matrix will be allocated with zero values for all corresponding restrictions. Similar product proposals get zero values, inferior products are allocated a "-" sign and superior products are allocated a "+" sign. The rank is calculated as the sum of symbols and products with more pluses are ranked higher.

Because the medical device "Orthosis for spine correction" best meets the restrictions (rank 1), it was selected for further development. The orthosis product for posture correction will be portable (will allow it to be worn under clothes), easy (its total mass will allow daily movements without inconvenience to the user). The orthosis for posture correction will be programmable and electrically driven, thus allowing continuous correction of the spine according to the established schedule. In addition to the posture correction regime, the orthosis will have a regime of relaxation of the spine and prevention of diseases of the spine.

After selecting the most appropriate product for further development, **data collection** is necessary.

According with Griffin A. and Hauser RJ. (1993), it turns out that by interviewing between 25 and 30 people, a percentage of over 90% of needs is identified (figure 2). Thus, for data collection in the development process of the spinal orthosis, an interview guide was developed, and was applied to 25 potential customers.

Because the information collected from two or more customers may have the same content, but expressed in different forms, the "translation" of customer statements into needs was accomplished. Translation of needs led to the definition of several primary needs regarding the posture correction orthosis (table 2). Relative importance and ranking of the identified primary needs were undertaken in order to facilitate the conceptual design process (table 2). This step is important, as several concepts will be developed within the conceptual design process and each of them cover as many

primary needs as possible. The optimal constructive variant is chosen by the development team depending on the relative importance and ranking of the needs.

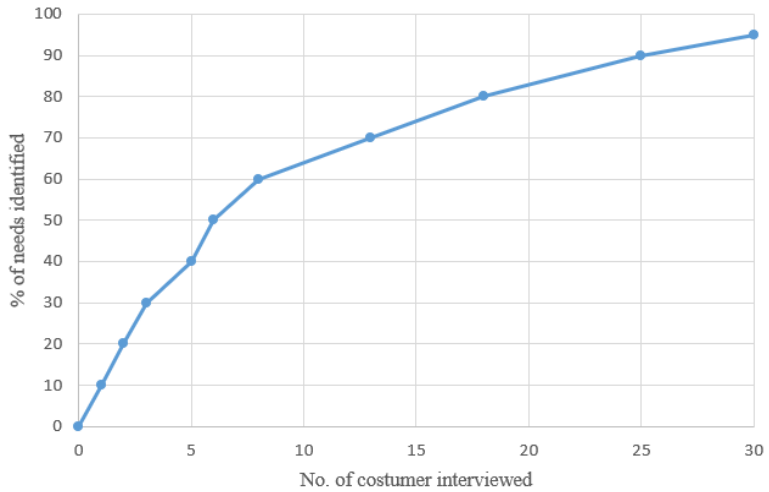

Fig. 2: Correlation between % of needs identification and no. of interviewed costumer [adapted from Griffin A. and Hauser RJ. (1993)]

Table 2: The relative importance of primary needs for a posture correction orthosis

Customer needs	Importance	Rank
The device performs therapeutic movements	5	1
The device allows posture correction	5	1
Use of the Device ensures user comfort	5	1
The device avoids injury during use	5	1
The device is operated in safe conditions	5	1
The device is adjustable and allows its customization	5	1
The device can be used during daily activities	4	2
The device allows periodic sterilization	4	2
The device is accompanied by a technical book	4	2
The device has user proportional dimensions	4	2
The device allows the skin to breathe	4	2
The device is easy to maintain	3	3
The device allows its effortless handling by the user	3	3
The device allows dynamic correction	2	4
The device is a multifunctional product	1	5

Target specifications for a new posture correction orthosis

Target specifications are established after the needs of the customers have been identified, but before generating the product concepts and selecting the most promising one. An arbitrary setting of specifications may make them impossible to achieve technically.

Customers' needs are generally expressed in "customer language". In order to provide precise guidance, close to what will be projected and close to the technical product, the development team

establishes a set of target specifications, which mean precise and measurable outputs. The specifications must reflect the needs of the customers, should differentiate the product from the competing products and be technically and economically feasible.

The target specifications represent the hopes and aspirations of the team, but they are established before knowing the restrictions that the technology of the product will impose. The team's efforts may fail to meet certain specifications, and others may exceed them, depending on the details of the product concept that the team has selected.

The most useful metrics are those that reflect as directly as possible the degree to which the product meets the needs of customers. The relationship between needs and metrics is at the heart of the process of designing specifications. The working hypothesis is that moving from the needs of customers to a set of precise, measurable specifications is possible and that they will lead to meeting the associated needs of customers.

The relationship between the new product and the competing ones is essential for determining the commercial success. While the team started the product development process with a number of ideas on how it wants to compete in the marketplace, the target specifications are the language used by the team to discuss and agree on the precise positioning of the product or report with existing products, both its own and its competitors'.

This step synthesizes the information available to determine the actual values of the metrics. Two types of objectives are useful: an ideal objective and another acceptable limit objective. The ideal objective is the best expected result. The acceptable limit objective is the value of the size that would allow the product to be commercially viable. Both objectives are useful for guiding in the next steps of generating concepts and selecting the right concept as well as for finalizing the specifications after the concept has been selected.

To agree on objectives, several iterations are required. The reflections after each iteration contribute to the verification of the concordance between the obtained results and the project goals. Target specifications are used to choose a concept and determine when it is commercially viable, and they are set by correlating the metrics and needs using the metrics-needs matrix (table 3).

Table 3: The metrics-needs matrix

	Needs \ Metrics	Dimensions	Sizes	Target	Type	Locking system	Drive system	Wear period	Warning	Weight	Supply voltage	Colour	Composition	Action area	Technical book	Adjustability	Injury	Therapeutic	Reinforcing	Price
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	The device can be used during daily activities			*				*												
2	The device performs therapeutic movements													*				*		
3	The device allows posture correction			*	*									*						
4	The device allows periodic sterilisation												*							
5	Use of the device ensure user comfort							*		*						*				
6	The device is easy to maintain						*				*									
7	The device is operated in safe conditions					*			*								*			
8	The device is accompanied by a technical book														*					
9	The device avoids injury during use																*		*	
10	The device has user proportional dimensions	*																		
11	The device allows it’s effortless handling by the user		*							*					*					
12	The device is a multifunctional product				*									*						
13	The device is adjustable and allows its customisation											*				*				*
14	The device allows dynamic correction						*											*	*	
15	The device allows the skin to breathe												*							

Based on the correlation of needs and metrics presented in table 3, the objective limit and ideal values can be defined. Thus, the target specifications for the posture correction orthosis is presented in table 4.

Table 4: Target specifications for a new posture correction orthosis

No. Crt.	Needs	Metrics	Relative importance	Measuring units	Limit values	Ideal values
1	10	Dimensions	4	cm	70 - 110	50 - 130
2	11	Sizes	3	No.	4	6
3	1, 3	Target disability	5	-	Posture correction	Posture correction Kyphosis
4	3, 12	Type	3	-	Semi-rigid	Semi-rigid
5	7	Locking system	5	-	Velcro	Magnetic
6	6, 14	Drive system	3	-	Mechanic	Electric
7	1, 5	Wear period	5	h/day	10	24
8	7	Warning	4	-	Audible	Audible, Visual
9	5, 11	Weight	5	g	4000	1500
10	6	Supply voltage	2	V	6	4
11	13	Colour	1	-	Monochrome	Multichromatic
12	4, 15	Composition	5	-	Polyester	Cotton
13	2, 3, 12	Action area	5	-	Lumbar	Thoracic, Lumbar, Sacral
14	8, 11	Technical book	3	Yes/No	Yes	Yes
15	5, 13	Adjustability	5	Yes/No	Yes	Yes
16	7, 9	Injury	5	Yes/No	No	No
17	2, 14	Therapeutic movements	3	-	No	Yes
18	9, 14	Reinforcing	4	-	Da	Da
19	13	Price	5	RON	500	350

The finalization of specifications is made through existing technical restrictions and estimated production costs using analytical and physical models. During this phase of completion, compromises must be made between different desired characteristics of the product.

Concept Generation for A New Posture Correction Orthosis

As Ulrich and Eppinger (2012) discussed, following the creation of the database of conceptual solutions known and new for the main functions of the product, a few technically possible solutions are established by combining the concepts. Since, in general, the number of technically possible solutions is very high, considering the objective specifications previously established, a few conceptual solutions are excluded.

The general function is defined as the whole of the properties of the product through which it satisfies the need for which it is designed. Starting from the identified need, it was established that the general function of the developed product is posture correction. The general function is subjected to an analysis process which will result first the main functions (table 5) and then the secondary functions. The main functions are features of the product that determine the general function. Secondary functions result from the interaction of the main functions between them and the bearing the name of

internal interactions and interactions between the main functions and the environment in which they develop and represent external interactions.

From the previously established functions, the list of critical functions has been created, which determines the commercial success of the product (table 7). These critical functions correspond to the sizes and needs with maximum relative importance. Using the hierarchical analytical process, the relative importance of each function was established (table 6).

Table 5: Main functions of a new posture correction orthosis

Function no.	Main functions
φ_1	Adapting to different categories of people
φ_2	Fixing the orthosis on the human body
φ_3	Programming the wearing intervals
φ_4	Operating status indication
φ_5	Setting the treatment regime
φ_6	Ensuring retainment
φ_7	View all operating indicators
φ_8	The physical continuity of the component elements
φ_9	Joining components together
φ_{10}	Aesthetics of the orthosis

Table 6: The hierarchy of the main functions

	φ_1	φ_2	φ_3	φ_4	φ_5	φ_6	φ_7	φ_8	φ_9	φ_{10}	$\sum$	$\prod$
φ_1	1	0.33	0.50	2	0.50	0.33	0.50	1	1	0.50	**7.66**	**0.064**
φ_2	3	1	1	2	1	1	2	2	3	1	**17.0**	**0.142**
φ_3	2	1	1	2	1	1	2	2	2	1	**15.0**	**0.125**
φ_4	0.50	0.50	0.50	1	0.33	0.50	1	1	1	0.50	**6.83**	**0.057**
φ_5	2	1	1	3	1	1	3	2	3	1	**18.0**	**0.150**
φ_6	3	1	1	2	1	1	3	2	2	1	**17.0**	**0.142**
φ_7	2	0.50	0.50	1	0.33	0.33	1	0.50	1	0.50	**7.66**	**0.064**
φ_8	1	0.50	0.50	1	0.50	0.50	2	1	2	1	**10.0**	**0.083**
φ_9	1	0.33	0.50	1	0.33	0.50	1	0.50	1	0.50	**6.66**	**0.056**
φ_{10}	2	1	1	2	1	1	2	1	2	1	**14.0**	**0.117**

Following the analytical hierarchical process, the critical functions and their weight are presented in table 7.

Table 7: Critical functions

Functions no.	Critical function	Weight
φ_2	Fixing the orthosis on the human body	0.142
φ_3	Programming the wearing intervals	0.125
φ_5	Setting the treatment regime	0.150
φ_6	Ensuring retainment	0.142
φ_{10}	Aesthetics of the orthosis	0.117

As Ulmeanu M. et al. (2019) specify, concepts are generated based on the integral concepts table. The main physical systems defined are as follows: Size adjustment system, System for fastening on the body, Timing system for the wearing period, System for choosing the area of action, System for

performing therapeutic movements, Restraint insurance system. For each physical system the designer registers all possible materializations of each sub-function, ensuring a comprehensive coverage of concept solutions. The first three systems had eleven registered components each and the last three physical systems had seven components each. The theoretical concepts solutions are generated by combining every element from one physical system with all other elements from the other six columns. Thus, the theoretical concept possibilities group is calculated by multiplying the number of all elements. For the new posture correction orthosis, the partial conceptual solution database can comprise several 456,533 theoretical concepts. It is unrealistic to say that all these concepts will be analysed or even tested. Thus, various solutions need to be eliminated from this comprehensive list.

Considering the main selection criteria – safety and cost, five medical device concepts were developed and detailed. The constructive solutions for each system identified is detailed hereafter for all concepts.

Concept 1

Concept 1 (figure 3) is presented as an orthopaedic vest for posture correction and has the body (1) made of cotton. The adjustment of the dimensions is made progressively by means of the ratchet system, which is composed of the toothed belt (2) and the flap (3). Thus, with the help of the ratchet system, the orthopaedic vest can be adjusted on the human body. After the dimensional adjustment of the vest on the body, it is fixed by means of staples (5). According to the prescriptions of the specialist doctor, the user can set the daily wear interval with the help of the timer switch (4).

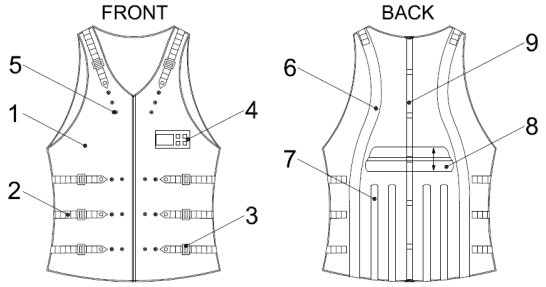

Fig. 3: Concept 1 of a new posture correction orthosis

With the help of the timer switch (4), the user can set an "alarm" for the memory, both for the dressing time and for the end of the wearing period. Depending on the condition of the user, the area of action of the orthopaedic vest (cervical, thoracic, lumbar) can be chosen through the mechanical system, which consists of the rigid plate (8) and the guide (9). The rigid plate (8) may be positioned in one of the said areas by translating it into the guide (9) and fixing it to the required area. The therapeutic effect of the orthopaedic vest is given by the kinesiological bands (6) which directly stimulate the peripheral and lymphatic circulatory systems, and indirectly, the muscular and neurological systems. The containment is ensured by means of metallic splinters (7), these "enclose" the user's body in the orthopaedic vest, so the spine is supported by them.

Concept 2

Concept 2 (figure 4) is designed as an orthopaedic vest for posture correction and has the body (1) made of cotton. The adjustment of the dimensions is made progressively with straps (2). After the dimensional adjustment of the vest on the body, it is fixed using buckles (3) which are located on the vest. According to the prescriptions of the specialist doctor, the user can set the daily wear interval using the analogous time relay (5). Depending on the disability type degree of the user, the area of action of the orthopaedic vest (cervical, thoracic, lumbar) can be chosen through the mechanical system, which is composed of the driving screw (6) and the nut (7). The bar system (8) may be positioned in one of the said areas by translating it onto the driver screw (6) and fixing it to the required area. The therapeutic effect of the orthopaedic vest is given by the brush system (4) which

directly stimulates the peripheral and lymphatic circulatory systems, and indirectly, the muscular and neurological systems.

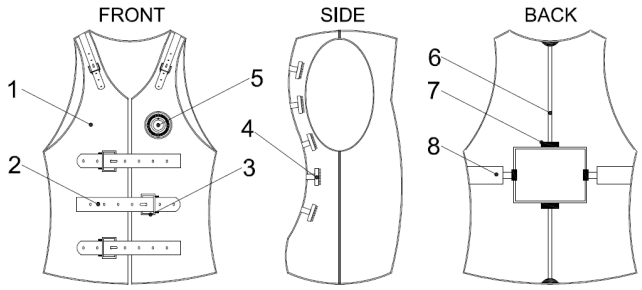

Fig. 4: Concept 2 of a new posture correction orthosis

Concept 3

The third posture correction orthosis concept (figure 5) is a memory harness (1). The memory harness (1) ensures the containment of the entire device on the patients' body. The adjustment of the dimensions is made progressively through the magnet system, which is composed of two magnets, a movable magnet (4) and a fixed magnet, positioned underneeth.

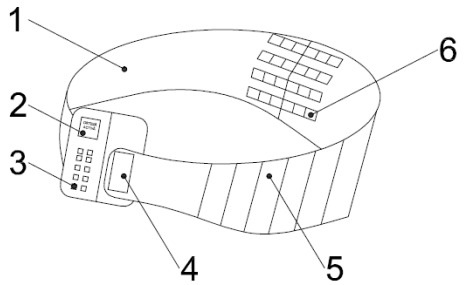

Fig. 5: Concept 3 of a new posture correction orthosis

According to the prescriptions of the specialist doctor, the user can set the daily wear interval using the digital time relay (2). The therapeutic effect of the orthopaedic vest is given by the therapeutic massage system (6) which directly stimulates the peripheral and lymphatic circulatory systems, and indirectly, the muscular and neurological systems. Through the electronic system (3), the orthosis can be programmed to act after certain pre-set cycles. Likewise, this system allows the user's preferences to be stored, thus offering as much comfort as possible.

Concept 4

The fourth concept (figure 6) is designed as an orthopaedic vest for posture correction and has the main body (1) made of cotton. Dimensions can be adjusted progressively using the straps (5). After the dimensional adjustment of the vest on the body, it can be fixed using the Velcro system (6) which is located on the vest to cover all the dimensional ranges of the vest (XS - XXL). The user can set the daily wear interval using the modular electronic device (4), according to the prescriptions of a specialist. Depending on the condition of the user, the area of action of the orthopaedic vest (cervical, thoracic, lumbar) can be chosen through the sensory system, which acts exactly in the selected area. The stretching system (3) ensures the restraint of the orthosis on the human body. The therapeutic effect of the orthopaedic vest is given by the postural akinetic system (2) which directly stimulates the peripheral and lymphatic circulatory systems, and indirectly, the muscular and neurological systems.

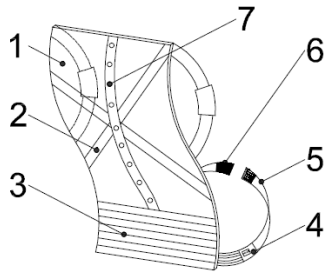

Fig. 6: Concept 4 of a new posture correction orthosis

Concept 5

The fifth and final concept (figure 7) proposed by the development team is also an orthopaedic vest for posture correction and has the body (1) made of cotton. The user cand adjust the dimensions progressively using the Velcro system (2). The user can also set the daily wear interval with the help of the digital timer (3). Usually this wear interval is prescribed to the patient by a medical professional. With the help of the timer (3), the user can set an "alarm", for notifications regarding the dressing time and for the end of the wearing period. Depending on the condition of the user, the area of action of the orthopaedic vest (cervical, thoracic, lumbar) can be chosen through the electronic system (5). The therapeutic effect of the orthopaedic vest is given by the massage pillows (4) that directly stimulate the peripheral and lymphatic circulatory systems, and indirectly, the muscular and neurological systems. The containment is ensured by means of metallic splinters (7), these "enclose" the user's body in the orthopaedic vest, so that the spine is supported by them.

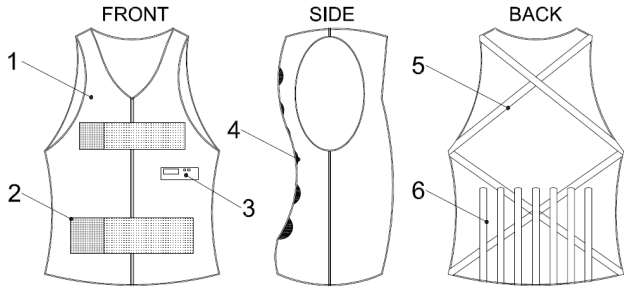

Fig. 7: Concept 5 of a new posture correction orthosis

Conclusion

As the society evolves, the needs of its members increase in complexity and gradually people are presented with more and more options of interactive smart products. The posture correction orthosis concepts presented in this paper come in response to these multiple requests, managing to cover a diverse range of requirements and to bring an innovative contribution in order to exceed the classic expectations of the clients.

Identifying needs consists of analysing the clients' requirements. After collecting the requirements and ordering them, they were evaluated. Subsequently, these needs were transformed into target specifications. Understanding customer needs is a crucial contribution to the product development process and, at the same time, a very big challenge. The interview was used as a tool for the identification of the clients' needs. Customer needs have been transformed into a set of target specifications, meaning precise measurable outputs that the product should accomplish in order to be a commercial success. Once the specifications of the selected product have been established, it was necessary to generate concept ideas to meet these specifications. The success of this stage of product design and development is favoured by generating as many ideas as possible. Successful product developers believe that, with case-by-case variations, about 100 ideas need to be investigated in order to find a valuable one. Many ideas come from customers, competing producers, consultants, members

of the product development team. The generation of these ideas must be as free and as unrestricted as possible.

Five concepts were developed and presented within the current research, with specific physical elements that meet customer needs. Further research includes concept selection and the definition of final product specifications in relation with technological requirements.

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Teaching the Values of Environmental Citizenship in A Developing Country; The Difference Level of Responsiveness Across the Gender

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Abstract

Pleasant living environment and health is a fundamental right of every citizen. However, significant problems in Indonesia now is environmental issues, including the river in an unhealthy condition coupled with a lack of awareness and wrong attitude of the citizens, toward the environment. Research on environmental citizenship in Indonesia is still minimal. This study aimed to evaluate the environmental citizenship teachers are expected later to instil the values of ecological against students at the school. The research method is quantitative descriptive. The technique of collecting data used questionnaires. Analysis of data applied Mean and SD. The results showed that male students and female-only able to achieve moderate levels of all dimensions of environmental citizenship. The level of female students is higher than male students on the dimensions of sustainability and responsibility. Level conditions of students cannot be expected to inculcate of ecological values. The implication is that dimensions worthy of environmental citizenship grown, developed and enhanced through the integration of ecological values, implemented in the learning activities and extracurricular activities, and among them are explicitly designed to improve the competence of male students in the dimensions of sustainability and responsibility.

Keywords: Environmental citizenship, Student, Gender, Ecological Values

Introduction

Environmental issues in Indonesia are now a significant problem. According to the Survey of Research and Development Koran Sindo (2018), there are 10 big problems of the environment in Indonesia, namely trash (40%), floods (20%), the river is polluted (11%), global warming (10%), air pollution (6%), the destruction of marine ecosystems (4%), the difficulty of clean water (3%), deforestation (2%), abrasion (2%), and pollution (2%). The same tone expressed by Nahruddin (2018) that the strategic issues of environmental challenges consist of illegal logging, illegal mining, marine pollution, and conversion of agricultural land.

Issues relating to the environment in South Kalimantan are Mount Meratus problems, pit, and smog (Rifani, 2019). Besides the poor environmental conditions, the damage continues to increase, because of mining, plantation activities with less open land clearing or comply with the provisions of the Law on Environment (Hasan, 2015), even index the worst environmental quality South Kalimantan in Borneo and ranks 26 out of 33 provinces in the country (Susanto, 2017).

South Kalimantan topography is mostly on wetlands, including rivers. Condition of the major rivers in South Kalimantan like Barito Martapura and Nagara rivers over the last five years have been severely polluted (PPKL KLHK RI, 2019). The cause is the uncontrolled amount of faecal coliform bacteria and total coliform which come from animal and human fecal waste, especially the number of latrines in the river, and the activity of the coal mine waste disposal recklessly became the source of the problem. (DLHD South Kalimantan, 2018)

Environmental problems in Banjarmasin city related to the destruction of several rivers because of high levels of acidity, due to the exploitation of peatlands, such as the massive oil fields, fields and settlements. Thus, the coli bacterial content is very high above the normal range. Also, the turbidity level of the river in Banjarmasin contaminated sludge and degradation due to upstream erosion region. Banjarmasin river conditions are already in the category of dangerous and in the borderline of heavily polluted. Besides the river ecosystem is in danger because of the bad habits that residents throw garbage into the river. If the first form of household waste were vegetables and fish, now in the form of plastic waste (Irmita, 2018).

The leading cause of the problems of environmental degradation is the lack of awareness of citizens in protecting and preserving the environment and caused by the wrong attitude of the citizens towards the environment (Prasetiyo and Budimansyah, 2016; Sudarmadi et al., 2001; Irmita, 2018).In facing the environmental degradation and its management, are required role of government, legislators, law enforcement, and society as citizens. In Indonesia, a pleasant living environment and health is a fundamental right of every citizen of Indonesia as stipulated in Article 28H of the Constitution of the Republic of Indonesia Year 1945 and Law No. 23 of 1997 on environmental management (UUPLH) Article 5 (3) explains that everyone has the right to participate in environmental management.

Participation and responsibilities of citizens sorely needed in protecting the environment as a form of awareness of the rights, obligations, sustainability and ecological justice, because humans are part of the environment. This is in line with the development of citizenship concept which is no longer refers to the concept of classic citizenship in the dimension of civil, political, and social (Abowitz and Harnish, 2006), or the legal, political and social (Iija, 2011), but has crossed dimensions of the other, social, economic and political (MaCregor et al., 2005), cultural (Rosaldo, 1994; Ong, 1996), and environment (Jagers and Martisson, 2010).

Environmental citizenship refers to the activity of local community-based citizenship, nation-states, and the world (McGregor, 2006), involves the concept of virtues that play a crucial role (Carme Melo-Escrihuela, 2008), and used (Martinho, Nicolau, Caeiro, Amador, and Oliveira, 2010), to teach values and practices appropriate for achievement of sustainability, through changes in personal behaviors, become responsible citizens on the environment; disciplined "good", behave "green", and more emphasis on environmental rights. Not only that, environmental citizenship empowerment requires citizens to have the knowledge, skills, and attitudes needed to identify the values and goals concerning the environment, but also can act on his knowledge of the consequences that will occur (Berkowitz, 2005: 228).

Studies of environmental citizenship are still limited (Uysal, 2018; Mohtar & Rajiani, 2016; Erdilmen, 2012; Ozden, 2011; Jagers & Matti 2010; Jagers, 2009) with the most recent studies conducted by Karatekin (2018, 2019). Similarly, in Indonesia, studies of environmental citizenship / ecological still limited, because it is still new, among others; community development of citizens concerned about the environment (Prasetiyo and Budimansyah, 2016), strategy formation of ecological citizenship through schooling (Mariyani, 2017), reconstruction of ecological citizenship through civic education based eco-literacy (Rondli and Yuli, 2017), creating ecological citizenship through the digital era (Jannah, 2018). None of these studies has assessed students of *Pancasila* – the state ideology - and Citizenship Education mainly to do with the level of ecological citizenship, including in the perspective of gender differences. Therefore this study aimed to evaluate the environmental citizenship of students from the perspective of gender.

Theoretical Framework

Environmental citizenship has been discussed since 1990 in policy documents, academic and campaign institutions (Carme Melo-Escrihuela, 2008). The traditional concept of Marshall on citizenship will change when dealing with the needs, rights, duties, and obligations that grow concerning the environment and sustainability, particularly global threats such as depletion of natural resources and the degradation of the environment, so was born the proposal 'we all now are nationals

environment' (Newby, 1996). Therefore contemporary citizenship has four dimensions, namely civil rights, political and social, and environmental or ecological citizenship (Steenbergen, 1994).

Citizenship ecological/environmental citizenship based on the scope of activities of local communities, nation-states, and the world (MacGregor, 2006a, 85-96), involves the concept of virtues that play a key role (Carme Melo-Escrihuela, 2008), is used (Martinho, Nicolau, Caeiro, Amador, and Oliveira, 2010) to teach values and practices that are appropriate for the achievement of sustainability through changes in personal behaviors, become responsible citizens on the environment; disciplined "good", behave "green", and more emphasize environmental rights. Environmental citizenship also demonstrated a pro-environmental behavior, either publicly or privately, which is driven by a belief in the fairness of the distribution of the merits of the environment,

Pro-environmental behavior is rooted in a commitment to the principles and underlying values. Environmental citizenship is a value-based approach to encourage pro-environmental behavior, with a way of trying to pull out the values that are hidden within the individual, rather than approaches based on values aimed at changing the values there, 'value' key is justice among human beings, rather than caring for the environment for the sake of his own, or even for what he was given to us. (Dobson, 2010)

Due to environmental citizenship primarily includes an understanding of ecological issues, rights, responsibilities of citizens in environmental issues, the action taken is not only address environmental problems, but also to promote human interaction a positive and sustainable with the environment (Berkowitz et al., 2005: 227; Clarke & Agyeman, 2011: 1775; Latta, 2007: 18; Gabrielson & Cawley, 2010: 605; Gebbels, Evans, & Delany, 2011: 13). For that integrate environmental education and civic education, feasible through the integration of ecological values, inquiry, interdisciplinary and practice reflexively with pedagogy affection in civic education environment, implemented by teachers in schools, to foster nationals environment as defenders of social order new(MacPherson, 2005; Dobson, 2003; Akyüz, 1978), including in this case the student teachers.

One way to foster environmental nationals who have an awareness of the values and ecological behavior is to evaluate the level of environmental citizenship teachers and student teachers. It thus carried out, to know the condition of achieving environmental citizenship level student teachers. From the condition of a certain level is reached, will determine the dimensions of anything that contains values and ecological behavior of environmental citizenship that will be grown and strengthened, and the charge or the exercise pattern of pre-service and in-service environmental citizenship.

The level of environmental citizenship refers to the scale of environmental citizenship newly developed by Karatekin (2018), and with the scale used to conduct a study of teachers (2019). Four dimensions emphasize environmental citizenship, namely responsibility, sustainability, rights and justice, and participation. The responsibilities grow apart responsibilities contract and non-contract is the responsibility of the citizens of the environment to support the ecological balance, and "responsibility" is an essential dimension of environmental citizenship. Environmental citizenship is the type of citizenship that encourages individuals, communities, and organizations as citizens of the world.

Participation is one of the concepts that are used when determining the developed democracies. Participation is the involvement of the people in the decision-making process involving individuals and communities in a way that affects the processes (Karatekin and Elvan, 2016). The citizen should behave participation in efforts to meet the responsibilities and obligations, as the realization of the rights of the environment, such as affecting the making, change, protection and sustainable development of the people who live in an environment (Akyüz, 2001). Because of the participation in the resolution of environmental problems is right at the same time as responsibility is as a task (Karatekin, Kus and Merey, 2014). In this sense, environmental citizenship will be seen as a mechanism of political participation in the processes of decision making (Martinho, Nicolau, Caeiro, Amador & Oliveira, 2010). However, research shows that the low level of civic participation of

young people (Karatekin, Kus and Merey, 2014; Harris, Wyn & Younes, 2010; Doganay, Çuhadar and cider, 2007; Henn, Weinstein, and Forrest, 2005; Erdoğan, 2003; Torney-Purtra & Amadeo, 2003). To make the young generation as a citizen of the environment can be done through educational activities. Research suggests that low levels of civic participation of young people (Karatekin, Kus and Merey, 2014; Harris, Wyn & Younes, 2010; Doganay, Çuhadar and cider, 2007; Henn, Weinstein, and Forrest, 2005; Erdoğan, 2003; Torney- Purtra & Amadeo, 2003). To make the young generation as a citizen of the environment can be done through educational activities. Research suggests that low levels of civic participation of young people (Karatekin, Kus and Merey, 2014; Harris, Wyn & Younes, 2010; Doganay, Çuhadar and cider, 2007; Henn, Weinstein, and Forrest, 2005; Erdoğan, 2003; Torney- Purtra & Amadeo, 2003). To make the young generation as a citizen of the environment can be done through educational activities.

The level younger generation and elaborating citizenship from a gender perspective, including student teachers is essential because they will become teachers of civic education in the future that will affect the values and behavior of environmental citizenship young protege. Because research shows, women tend to have higher scores on environmental values that underlie environmental behavior (Srbinovski, 2016) as well as the views of pro-environment and concern for environmental problems (Xiao and McCright, 2015). A gender perspective is also interesting to be elaborated because the findings Borden and Francis (1978, in Zelezny et al., 2000) compared with men, women are more powerful in the level of social responsibility towards the environment.

Method

The research is descriptive quantitative research with a survey method. The study population was a student of *Pancasila* and Citizenship Education of Lambung Mangkurat University. The sample will be determined by the technique respondents proportional random sample per batch of students from the class of 2013-2018. The respondents were 100 people, consisting of 46 men and 46 women, techniques of data collection using the questionnaire. Questionnaires were used to adopt the Level Scale questionnaire from Karaktekin Environmental Citizenship (2018). Data analysis was performed using the Mean and SD. To measure the level of Citizenship Environment using the criteria and categories Environmental Citizenship rate by category of Karetekin (2018), namely: Mean score 1.00-1. 80 (Almost never/Very Low); 1.81-2.60 (Rare/Low); 2.61-3.40, (Sometimes/Moderate); 3.41 to 4.20 (Normally / High); and 4.21 to 5.00 (Always /Very High).

Findings and Discussion

Level Environmental Citizenship Prospective Students Teachers

Environmental citizenship	$\overline{X}$	SD	Level
Dimensions of Participation	2.48	0.812	low
Dimensions of Sustainability	3.26	0.736	moderate
Dimensions Responsibility	3.42	0.776	high
Rights and Justice	3.76	0.970	high
Total Dimensions	3.09	0.639	moderate

The above data shows that student of *Pancasila* and Citizenship Education is at a low level or rarely perform in the dimension of participation, dimensions of sustainability occupies a moderate level, sometimes just done, only the dimensions of responsibility and dimensions of rights and justice occupy a high level, used to do. However, the overall level of environmental citizenship student of *Pancasila* and Citizenship Education at the level of being.

Environmental Citizenship Achievement Level Views of Gender

Environmental citizenship	$\overline{X}$		SD		Level	
	men	women	men	women	men	women
Dimensions of Participation	2.48	2.48	0.793	0.839	low	low
Dimensions of Sustainability	3.08	3.45	0.756	0.677	moderate	high
Dimensions Responsibility	3.37	3.47	0.776	0.782	moderate	high
Rights and Justice	3.66	3.87	0.845	1.078	high	high
Total Dimensions	3.06	3.17	0.639	0.635	moderate	moderate

Environmental citizenship dimensional views of gender show the position of the same level, which is lower in the dimensions of participation, and high in the dimension of rights and justice. However, different levels of the dimensions of sustainability and responsibility, the men are at moderate levels, while women are at a high level. Nevertheless, the overall level of environmental citizenship both men and women were on the same level, namely the level of moderate or sometimes do.

Associated with the condition of the already alarming environmental degradation and growing (Hasan, 2015), even index the worst environmental quality South Kalimantan in Borneo and ranks 26 out of 33 provinces in the country.(Susanto, 2017). Coupled with the finding that the overall level of environmental citizenship student teachers Pancasila and Citizenship Education at the level of being, or sometimes, especially on the dimensions of sustainability and responsibility, the prospective teachers who thus cannot be expected (Karatekin, 2018) to instil the values and behaviors environmental citizenship, because the activity is merely incidental, showing the regularity and consistency.

This level indicates that the required increase in the level of environmental citizenship for student teachers Pancasila and Citizenship Education, better knowledge, awareness, skills, and participation related to the competence of the ecological and environmental citizenship activities. To increase the level of environmental citizenship, especially given birth behavioral regularities and consistent student teachers of civic education needs to be done planting, development, and cultivation of values, competencies, behavioral ecology through the variables that influence the growth of environmental citizenship (Karatekin, 2018), such as the level of curiosity about the environment and the frequency of participation in community activities. Besides ecological competence form of knowledge, Prasetiyo and Budimansyah, 2016), strategy formation of ecological citizenship through schooling (Mariyani, 2017), the reconstruction of civic ecological through civic education based eco-literacy (Rondli and Yuli. (2017), and create a citizenship ecological digital age (Jannah, 2018). All of these variables need to be implemented in learning activities in Study Program of *Pancasila* and Citizenship Education specialized in eye-course Citizenship, Environmental Education, Environmental Law and Environmental Citizenship Prodi Wetlands in Pancasila and Citizenship Education Study, which is expected to give birth to Pancasila and Citizenship Education teachers who have a high level and very high on the scale Environmental Citizenship.

The findings of concern are the low level of environmental citizenship student teachers Pancasila and Citizenship Education of the dimension of participation. Since the element of participation by Steenbergen, 1994) plays a key role in environmental citizenship. Participation indicates the involvement of individuals and communities and ways to influence the decision-making process (Karatekin and Elvan, 2016), shows the participatory behavior to fulfill the responsibilities and obligations. Akyüz (2001) describes participation in the perspective of environmental rights such as to affect the manufacture, alteration, protection and sustainable development of the people living in an environment. Because of the participation in the resolution of environmental problems is right at the same time as the responsibility as a task (Karatekin, Kus and Merey, 2014). Environmental citizenship is a mechanism of political participation in the processes of decision making (Martinho, Nicolau, Caeiro, Amador & Oliveira, 2010).

However, the low level of environmental citizenship of student after being taught *Pancasila* – the state ideology - and Citizenship Education strengthen research findings about the low level of civic participation of young people (Karatekin, Kus and Merey, 2014; Harris, Wyn & Younes, 2010; Doganay, Çuhadar and cider 2007; Henn, Weinstein, Forrest, 2005; Erdoğan, 2003; Torney-Purtra & Amadeo, 2003).

The fourth dimension of the level of environmental citizenship, only the dimensions of rights and justice are to be at a high level, which means that student teachers always feel sad about the forest fires that occurred in other areas. Environmental citizenship is a value-based approach to encourage pro-environmental behavior, with a way of trying to pull out the values that are hidden within the individual, rather than approaches based on values aimed at changing the values there, 'value' key is justice among human beings, rather than caring for the environment for the sake of his own, or even for what he was given to us. (Dobson, 2010). The high level on the dimensions of rights and justice has attracted equity value from within the student, that cares for the environment, not just for himself, but also intended for someone else. Although a small scale in this dimension of responsibility, student teachers always file a complaint against the torture of animals, especially endangered animals, that damage the plants in the garden, who cut down a protected tree. The same thing on the dimensions of sustainability, student teachers usually pay attention to the products purchased, are included in foods genetically modified or not.

The research findings have illustrated that environmental citizenship is a way to discuss the risks differently to human bodies specifically, and how governments and corporations often trample on the rights of the environment of the -the specifics. This is according to Horton (2006) a discourse of the struggle for social justice and is an integral part of the concept of citizenship ecological, where the citizens of the neighborhood "doing good" like the right thing to do, rather than for the sake of gifts or economic penalties (Dobson, 2003), made a commitment to goodness together and consider their behavior under conditions of justice and injustice Dobson (2007).

Although overall there is a similar position among male and female students in the level of environmental citizenship, the different levels of the dimensions of sustainability and responsibility exist where the men are at moderate levels, while women are at a high level. These findings reinforce the results of several studies, that women tend to have higher scores on environmental values that underlie environmental behavior (Srbinovski, 2016) as well as the views of pro-environment and concern for the problems of the environment (Xiao and McCright, 2015).

This distinction is interesting to be elaborated because it reinforces the findings of Borden and Francis (1978, in Zelezny et al., 2000) that compared with men, women are more powerful in the level of social responsibility towards the environment. Why are women more pro-environmental attitude? Theoretically, the gender differences in environmental perspective by Zelezny, Chua, and Aldrich (2000) are strong linkages between socialization and values, especially the socialization of the value of the needs of others, the behavior is more helpful and altruistic, thereby affecting gender differences in awareness and environmental behavior (Dietz et al., 2002; Berenguer, 2007).

Conclusion

Environmental citizenship level achieved as a whole are at moderate levels, while views dimensions, the low level of participation in the dimension, the dimension of sustainability occupies a moderate level, only the dimensions of responsibility and dimensions of rights and justice occupy a high level. Judging from the gender, the overall level of environmental citizenship both men and women were on the same level, namely the level of medium, low in participation dimension, height in the dimensions of rights and justice. However, different levels of the dimensions of sustainability and responsibility, the men are at moderate levels, while women are at a high level.

With such level conditions may not be desirable, implying teachers are not able to embed, develop, and foster the values, competencies and ecological behavior that manifests in environmental citizenship. The implication is necessary to increase the level of achievement of environmental

citizenship for teachers by designing a better delivery for *Pancasila* and Citizenship Education subjects containing knowledge, awareness, skills, and participation concerning the values, competencies and activities and ecological behavior.

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Corporate Volunteering as A Management Tool Shaping Employee Behavior

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Abstract

It is commonly argued that corporate volunteering leads to various positive results for companies and their employees. However, there is still a significant lack of knowledge regarding how and why such programs shape employee behavior. To fill this gap, the following research question is proposed: *How does participation in corporate volunteer projects influence employee behaviors and attitudes?* The study is based on interview data collected from 18 companies operating in Poland. The results of the research confirm the beneficial impact of employee involvement in corporate volunteer programs on work meaningfulness, development of employee competences and positive interpersonal relationships at work.

Keywords: Corporate Volunteering, Employee Behavior, CSR, Sustainable Development.

Introduction

The latest global report published by the United Nations (2019) indicates that the world faces a complex set of ecological and social issues that still have not been solved. Fighting such problems as catastrophic climate change, increasing inequalities, poverty, biodiversity loss or depletion of natural resources requires cooperation and integration of activities, both at the macro (i.e. global economy, national economies) and micro (i.e. companies) levels (Bitzer and Glasbergen, 2015). The idea of sustainable development (SD) will fail without involving business in this process because it affects not only the economy but also society and natural environment (Eccles et al., 2012). For this reason, business is experiencing increasing social and political pressure to engage in corporate social responsibility (CSR) (van Huijstee, 2010).

Although today CSR becomes a priority for all types of organizations, including companies (Kanji and Chopra, 2010), there is a discrepancy between declared and real actions undertaken by companies in this area (Doda, 2015). It is claimed that implementation of CSR in a company, i.e. in its strategy, procedures and organizational culture is very difficult (Glavas and Kelley, 2014). For various reasons many businesses still focus mainly on profits rather than on integrating economic, social and environmental issues in their performance (Laszlo, 2008). Therefore, it is assumed that active engagement of managers and employees is key in this respect, leading to a real change in business approach through changes in attitudes and behaviors of organizational members (Glavas and Kelley, 2014, Glińska-Neweś et al., 2020).

Studies suggest that very often companies express a sense of CSR through involving employees in corporate volunteering (CV) (Cavalaro, 2006; Muthuri et al., 2009; Grant, 2012). This form of active membership in local communities has been found to positively impact corporate role as responsible corporate citizen (de Gilder et al., 2005; Muthuri et al., 2009; Grant, 2012). Moreover, studies on CV suggest it can lead to positive effects for both companies and employees. CV supports, among others, work meaningfulness (Rodell, 2013; Chaudhary and Akhouri, 2018), volunteers' competence development (Booth et al., 2009; Bellé, 2013; Haski-Leventhal et al., 2019) and interpersonal relationships at work (Boštjančič et al., 2018).

However, there is still significant gap regarding knowledge about how and why CV, as one of CSR tools, influence employee performance in the organization (Glavas and Kelly, 2014). Additionally, although the literature suggests the aforementioned benefits of CV, there is still a lack of their empirical evidence (Peterson, 2004).

The aim of this article is to examine the effects of CV on employees. The following research question is posed: *How does participation in corporate volunteer projects influence employee behaviors and attitudes?* Specifically, the emphasis is placed on three main effects of employee involvement in CV, i.e. work meaningfulness, employee competences' development and strengthening interpersonal relationships between employees. The study is based on interview data collected from 18 companies operating in Poland.

The study contributes to the conceptualization of CV and understanding of its impact on organizations. It also contributes to the organizational behavior field, specifically regarding the aforementioned effects of CV on employee behaviors and attitudes and their antecedents in the organization. The article provides practical implications as well, especially for how companies can improve their volunteering programs to make them more beneficial for all parties involved.

In the article, firstly the existing literature is examined to clarify the essence of CV and its influence on selected dimensions of employee behavior. Then the methodology and results of empirical study are presented. Finally, the findings in reference to existing literature on CV and work meaningfulness are discussed.

Nature of corporate volunteering

Corporate volunteering (CV) refers to voluntary activities taken by employees outside their organization, which are socially and/or environmentally beneficial, and encouraged by employers through formal programs (Gratton and Ghoshal, 2003; do Paço et al., 2013; Cook and Burchell, 2018). Therefore, CV represents business engagement in SD and shifts attention on CSR from institutional level to individual (employee) perspective. The role of CV is constantly growing because, as a CSR tool, brings many effects for companies implementing it (do Paço et al., 2013; Boštjančič et al., 2018). Similarly, Licandro (2017) proves empirically that implementation of CV is effectively associated with the incorporation of CSR into corporate management.

Volunteering is about giving time or skills for a beneficiary or beneficiaries' group (Rodell, 2013). It is a proactive form of support, opposed to more passive ones e.g. monetary donations (Wilson, 2000). Furthermore, volunteering is a planned activity in contrast to spontaneous acts of helping (Clary and Snyder, 1999). In CV, the employees use their key competences for collective action while being supported and encouraged by employers through formal and informal policies or programs (Muthuri et al., 2009; do Paço et al., 2013). There are different types of CV programs that differ on a variety of dimensions. For instance, Cnaan et al. (1996) mention four dimensions: free choice, remuneration, structure and intended beneficiaries. Companies can participate in formal agreements or more informal and flexible arrangements. In formal projects, they collaborate with specific volunteer organizations, creating volunteer programs. In informal arrangements, employees have greater autonomy in choosing volunteer organization to collaborate with, and there are fewer formalities (Booth et al., 2009).

Effects of corporate volunteering

Research on CV indicate that it leads to various positive effects, both at organizational (Greening and Turban, 2000; Booth et al., 2009; Mirvis, 2012) and individual (Cook and Burchell, 2018) levels. It is well documented that at individual level CV has a substantial influence on employee behavior (Booth et al., 2009; Grant, 2012; Rodell, 2013). Recent, though limited studies in this context confirm that CV affects, among others, work meaningfulness (Rodell, 2013; Chaudhary and Akhouri, 2018), employee competence development (Booth et al., 2009; Bellé, 2013; Haski-Leventhal et al., 2019) and interpersonal relationships at work (Boštjančič et al., 2018).

Work meaningfulness is a derivative of the value of work purpose and the experienced relationship with other people; it is a sense that individuals are useful and their actions bring significant effects (Kahn, 1990; May et al., 2004). It is also understood as subjective beliefs, values and attitudes regarding work (Rosso et al., 2010). Work meaningfulness is argued as the key factor of employee motivation and engagement.

Various researchers emphasize that working for socially responsible company gives employees a sense of meaning, purpose and value in their lives leading to personal growth (e.g. Rodell, 2013; Chaudhary and Akhouri, 2018). Particularly, an active engagement in the projects related to CSR in an organization can enhance employees' sense of work meaningfulness through making valuable social contribution (Lavine, 2012; Chaudhary and Akhouri, 2018). Experienced meaningfulness makes employees feel confident of their generative competences and encourage them to engage in solving problems creatively (Cohen-Meitar et al., 2009).

CV also offers employees a chance to learn and practice new competences, as well as to develop existing ones (Sundeen and Raskoff, 1994; Mirvis, 2012; Haski-Leventhal et al., 2019). Competences are defined in various ways. For instance, Winterton et al. (2005) present a holistic view in which competences include knowledge, skills, and behavioral and psychosocial features. Developing employee competences is among key factors improving organizational performance and guaranteeing its competitive position (Lado and Wilson, 1994; Boyd, 2003). Participation in CV programs provides employees with the opportunity to develop job-related skills, such as teamwork, effective communications, project management, and leadership (Wild, 1993). Also, socially responsible behavior and emotional competence increase among the participants of such programs (Bartsch, 2012).

As it was mentioned earlier, the effects of CV include better acquaintance and employees' integration achieved through collective actions. A significant role in this area is attributed to positive interpersonal relationships built on various levels of interactions: in dyads, in employee teams, between teams, and in inter-organizational cooperation (Ragins and Dutton, 2007; Reich and Hershcovis, 2010; Glińska-Neweś et al., 2018). There are different dimensions of positive interpersonal relationships identified in literature, including mutual kindness, interest and liking (Glińska-Neweś, 2017). Various researchers indicate that positive interpersonal relationships are associated with better individual and work-related outcomes (e.g. Ragins and Dutton, 2007; Heaphy and Dutton, 2008; Peyrat-Guillard and Glińska-Neweś, 2014; Glińska-Neweś, 2017).

Summing up, all aforementioned benefits of CV are argued in the literature but empirical evidence in this regard is scarce. Results of the study presented in the next paragraph may, therefore, contribute to reducing this gap.

Research Method

The study described in the article was part of a larger research project that has been implemented in cooperation with Polish and Finnish academics since January 2018. In this article, only the results from the companies operating in Poland are presented because the study in Finland is still in progress. In Poland, 18 companies were investigated, representing various sectors and selected among those listed in the ranking published by the Responsible Business Forum (http://odpowiedzialnybiznes.pl). In 2017, there were 62 companies in this ranking.

Since the study was qualitative in nature, the selection of the companies was purposive. Only companies that declared the implementation of CV were selected for this study. Most of them, except two, were Polish subsidiaries of international corporations. First, 18 semi-structured in-depth interviews with managers responsible for CV were conducted. Next, the employees who participated in corporate volunteer programs were interviewed in five companies. Four to eight individual in-depth interviews were conducted in each company. Table 1 presents basic information about the companies selected for the analysis.

Table 1: Companies represented in the data collection

Company code	Sector	Dominant capital	Respondent's position
Assurance.com	Insurance	British	Head of CSR Department
Grout&Co	Production of building materials	Mexican	Specialist in Corporate Communication Department
DriveMe	Automotive industry	Japanese	Senior Specialist in Corporate Communication Department
Delivery4You	Logistics	Dutch	Group CSR and Internal Communication Coordinator
GlobeBank	Bank	Spanish	CEO of corporate foundation
BlueLine	Public transport	Polish	CEO of corporate foundation
SpeedLogistics	Logistics	German	Specialist in CSR Department
Drink4Fun	Brewery	Dutch	Coordinator in press office; Employees
Call3Me	Telecom	French	Coordinator of Volunteering and Internal Communication; Employees
ChairAuto	Automotive industry	German	Employee Department of External Contacts
DraakBank	Bank	Dutch	Expert of Corporate Communication; Employees
HeatHouse	Cooling/heating/powering machinery	Danish	Communication Consultant
Sunflower Bank	Bank	French	CSR Specialist
BiggerDigger	Wholesale of construction machinery	Dutch	Director of Business Development
LoanAdvanced	Home-credit and digital consumer finance	British	CSR Coordinator; Employees
NiceCar	Automotive industry	German	Communications Specialist
AllConsulting	Consulting	French	Corporate Responsibility & Sustainability Manager; Employees
Creditton	Consulting	Polish	CSR Manager

The interviews were conducted in May-June 2018. Each interview took 60-90 minutes and was recorded and transcribed. In order to minimize the research bias during data analysis, generally binding code book was introduced. The transcriptions were independently coded by three researchers from the research team using MAXQDA software and then their results were shared to reach coding consistency.

Results

CV programs are implemented in the examined companies for various reasons. Sometimes they are a result of the general corporate policy, which reflects the expectations of parent companies regarding the implementation of such programs. In other cases it is the idea of managers, or the employees themselves who initiate the volunteer program in their units. Usually, in the latter case, they are people who previously acted as individual volunteers, and want to implant this idea also in their company.

According to the respondents, CV can lead to a number of positive effects for companies and their employees. Taking into account the aim of this paper, the results related to work meaningfulness,

employee competences and interpersonal relationships are presented. Due to the editorial restrictions related to the size of the article, only the selected results of the study are depicted.

Work Meaningfulness

The results show that the employees who are supported and encouraged to do good through CV programs feel pride and a sense of relationship with the company which does important and good things for the society and the environment:

"It is nice to identify with the company that promotes such values. I have not changed this work so far partly because the company supports such activities. And for many people it is also important, they get involved because they want a good company image". (AllConsulting)

The implementation of CV projects is of great value to the employees themselves, strengthening their individual sense of meaningfulness and value. This is because they see and feel their personal participation in solving social or environmental problems:

"This is the sense of doing something meaningful. It is helping yourself in the sense that you just feel good after such actions, after such activities, where you can help someone but also help yourself". (Call3Me)

For the surveyed employees, the sense of work meaningfulness was higher, the more: a) the tasks performed were important, b) the tasks formed a separate unit, c) the employee had a sense of autonomy, d) the employee could use a variety of their skills and e) the employee received feedback. This is how one of the volunteers stated it:

"Here it is certainly important to give a free hand, to trust people and let them prove themselves, because thanks to that they have a pleasant satisfaction and the effect is what we expect". (AllConsulting)

Employee Competences

Participation in CV programs leads also to the development of employee competences. The competences acquired in this way can be divided into categories described below.

Attitudes Towards the Organization - Pride and Loyalty

As it was stated earlier, the activity of the company, perceived by the employees in the field of CSR, gives them a meaning of what they do, which makes them feel more connected with the company and proud of it:

"The added value of the volunteer project is that the employees feel proud that they did something for the local community, and that the company supports it (...). If they support the local community where they live every day, they can say: my company implemented this project". (DriveMe)

Discovering Hidden Talents

Corporate volunteer projects are a great example of freedom at the workplace - the employees decide for themselves what and how they will do. This makes them use their real and natural talents in the way, which the colleagues sometimes do not know about. In addition to getting to know each other in this way, from a slightly different side than everyday professional duties, it allows companies to discover 'hidden diamonds' - candidates for internal promotion:

"Some people paint beautifully or cook well. We can meet colleagues from another side, this is such a value for me! We meet in a completely different situation than 'tie, work, desk, client'. Usually we don't have time to talk about what someone likes, about our passions". (GlobeBank)

Social Sensitivity, Openness, Empathy

Participation in the volunteer program develops awareness of existing social and environmental problems. This is not only an advantage of general social significance - thanks to this, the individual competences of the employees are enriched, influencing their attitude to work and colleagues:

"It changes volunteers, tremendously! Before that, we had predictable work and family life. Now, going beyond this predictable world makes us think: Crap! My problems are not comparable to those of people here at all". (DraakBank)

Leadership Competence, Team Work, Project Management

The projects submitted to corporate volunteer programs are entirely prepared and coordinated by volunteer employees. They must identify the goal of the project, its beneficiaries, calculate the budget, plan activities, organize people and material resources. Along the way, there is a number of problems to be dealt with. There is often a need to handle new social situations. It is a 'priceless school' and employee competence test:

"I think that each of the projects that I do, first of all, strengthens my logistics skills. The second thing is definitely strengthening relationships in the team, because we do not only work on substantive tasks, but we have the opportunity to get to know such projects from another side and get involved, do something together. And it certainly allows me to gain new contacts, because either I contact some external companies or representatives of the given institution, which we are helping at the moment, so surely these contacts are getting bigger and later opportunities for other projects may also be different". (Call3Me)

Positive Interpersonal Relationships at Work

Based on the collected data, it can be stated that positive interpersonal relationships are built through participation in volunteering program. Thanks to them, job satisfaction and general well-being of employees increase. Positive-minded people are more likely to communicate with each other, share knowledge, help each other in their daily duties. A positive climate which arises, releases the potential of team creativity, contributing to the company innovativeness. Creating an organizational climate is favored by various types of integration activities:

"People were integrating on this occasion, they got to know other volunteers too. I know that they exchanged contacts and then more often met each other, even in private". (GlobeBank)

Discussion and Conclusions

This study examines the role of CV in shaping employee behavior. Based on the existing literature it is argued that CV leads to various positive results for companies (Booth et al., 2009; Greening and Turban, 2000) and their employees (Grant, 2012; Rodell, 2013). However, there is still a significant gap regarding knowledge about how and why such programs influence employee behavior (Glavas and Kelly, 2014). To fill this lack of knowledge, the emphasis in this article was placed on such effects of employee involvement in CV, as: work meaningfulness, employee competences and interpersonal relationships at work.

Working for a socially responsible company that, by implementing social and environmental activities, contributes to a higher good, gives employees a sense of purpose and importance of their work (Chaudhary and Akhouri, 2018). Working in the framework of corporate volunteer program is a great example of what is referred to as job crafting, i.e. actions taken by employees to adapt work to their needs, values and skills (Bakker et al., 2012; Nielsen and Abildgaard, 2012; Oldham and Fried, 2016). Therefore, regardless of the origin and nature of volunteer programs, organizations should give the greatest autonomy to employees: in terms of selecting beneficiaries, ways of implementing

the project, and selection of team members. Such a statement results from the job crafting theory described above: work that an employee decides about, giving it meaning in accordance with subjective criteria, is done with much greater commitment. Secondly, autonomy in the selection of goals and means of project implementation allows employees to reveal and develop their talents. This is due to the fact that when designing their volunteer project, they naturally direct their attention and commitment to such activities that they do best, i.e. their talents. Thirdly, it is associated with increased motivation (for volunteer activities, to help other people, to work in general). A contemporary approach to motivation, based on the so-called self-determination theory states that motivation is a derivative of autonomy, competence and social interaction (Grant, 2007). The more people are independent at work, can use and develop their competences in it, as well as make relationships with people they want to, the higher their motivation to work is.

According to the results of the study, most often the employees have complete freedom in creating their volunteer projects. They compete on equal terms in grant competitions in their organization, where the professionalism of project preparation is the most important. The companies definitely less often promote specific goals and beneficiaries associated with them, encouraging their employees to prepare the projects profiled in this way.

The benefits of corporate volunteer programs, in the form of greater pride in a company, integration with colleagues or developing competences, can be elucidated by a sense of serving the local community, i.e. the community in which employees operate on a daily basis. In other words, if volunteering is carried out for the benefit of e.g. a local hospital or orphanage or if the space in the town where the company is located is revitalized, the intra-organizational positive effects of volunteering are much greater. This can be explained by referring to the concept of social capital (Muthuri et al., 2009). By working for the benefit of the local community and helping it solve real social or environmental problems, volunteers express values such as solidarity, responsibility, reciprocity and kindness.

Prosocial motivation, i.e. the desire to help others increases in a situation where the helper has contact with the beneficiary (Grant, 2012). The more frequent, longer and closer interpersonally this contact is, the stronger the motivation to help. This is due to, among others, the fact of the volunteer's emotional involvement in the beneficiary's situation and the sense of work meaningfulness.

Positive interpersonal relationships bring a number of individual and organizational benefits. Thanks to them, job satisfaction and general well-being of employees are raised, because remaining in social relations is among the basic needs of every human being. People involved in positive relationships are more likely to communicate with each other, share knowledge, help each other in daily duties (Glińska-Neweś, 2017). Various integration activities, such as joint events or trips, favor this. Thus, it is not surprising that when talking about the effects of CV, its participants most often mention building relationships in the company.

All in all, the conducted research has brought a very interesting picture of how CV influences employee behavior in the companies operating in Poland. The findings on the positive effects that CV brings to the companies provide strong arguments in favor of business involvement in such programs. Moreover, the aforementioned analyses provide guidelines how such programs should be designed.

Among limitations of the study, it should be noted that its qualitative nature makes the results hard to generalize. The same applies to the fact that empirical study includes only the companies operating in Poland. However, it seems that the results presented in the article can serve as an inspiration for further research, including quantitative study.

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Between Hope and Reality: Curriculum 13 (K-13) Implementation in Teacher's Ability to Develop Learning Devices in the Era 4.0

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Abstract

After six years of the launching of the Curriculum 2013 (K-13), it is expected that all schools and teachers have been able to implement the curriculum both in terms of preparation for learning devices as well as in the learning process. However, the reality is far from expectations as the ability of teachers in the preparation of the learning device is still lacking. Detected through learning device compiled from teachers who are following the Professional Teacher Education online, the results were far from expectations posing a big question mark for researchers. For this reason, the researchers tried to explore the issue through a qualitative approach. Although in this study quantitative data also exist, it was just as supportive data to strengthen the argument and conclusion. Sources of data in this study are a physical education, sports and health teachers amounted 123 people. From these studies it was found that K-13 training has not met the need of all teachers reflected in the material is not understood comprehensively by the teachers. Further, in some training, there are instructors who didn't come from the field of physical education, sports and health, but from other fields of study. This fact is of course very worrying as if it remains, the national education goal will never be reached. Therefore, it is necessary to reorder the instructors in accordance with expertise in the field of study as well as evaluating the effectiveness of the program.

Keywords: Curriculum, Device, Teacher, Learning.

Introduction

The task of the teacher in the context of Indonesia is not only to teach, but also to educate, direct, guide, train, assess and evaluate. This is in accordance with Government Regulation No. 74 of 2008. The Teachers and Lecturers Law No. 14 of 2005 emphasizes that professional teachers are obliged to plan, implement quality learning process, assess and evaluate learning.

Learning tool is a weapon for a teacher indicating a sign of readiness to give directions for teachers in teaching. Lesson preparation contained in learning devices such as syllabus, Preparation Plan Learning, Instructional Materials, Media Education, Worksheet Students, and Evaluation Rubric / Assessment. The device can be seen through the readiness of a teacher which has been stated clearly in the ministerial decree No. 22 of 2016. However, regulations are not always in line with the reality on the ground as the teachers seem reluctant in preparing the learning device.

Since the publication of curriculum 2013, it several times experienced improvement and change, but in terms of processes and products for the physical education curriculum, sports and health, the implementation has not met the standards (Setiadi, B., Soegiyanto, M., Rahayu, S., & Setijono, H,

2018). Since the enactment of the curriculum in 2013, the implementation of the curriculum has been uneven across the school. Teachers should have been very understanding about the content of the curriculum, but in fact the teachers still have difficulty understanding basic competencies and core competencies translated into lesson plan as proved by Boleng et al, (2018) that teachers of physical education, sport and health are not yet ready to make a learning device.

After six years running, the expectations of researchers originally have thought that the ability of teachers to prepare learning device, and translate core competence and basic competences in the affective, cognitive and psychomotor already proficient. But the fact that almost 95% of the learning device made by the participants do not meet expectations indicating that the teachers do not understand about the preparation of the learning device. As such, the writers conducted this research in order to determine field problems hampering the ability of the preparation of learning tools for teachers of physical education, sport and health.

Literature Review

In the 2013 national education system law, has been set up on the curriculum. The curriculum gives direction to the educational process, and is a preparation for learning that is designed and implemented individually or in groups, both at school and outside of school. (Lloyd J. Trump and Delmas F. Miller, 1973; Harold B. Albertsycs, 1965; J. Galen Saylor and William M. Alexander, 1956)

The Government through the regulation number 19 of 2005 and No. 32 of 2013 set to eight (8) National Education Standards in the planning, execution, and monitoring of education in order to realize the national education quality. The goal is to ensure the quality of national education according to the Law of the Republic of Indonesia aimed at educating the nation and shape the character and dignified civilization.

Since the enactment of the curriculum in 2013 (K13) in the year 2013/2014, teacher be expected more focused and more prepared to teach. The readiness is shown by the learning device that must be made. Although apparently teachers are burdened with the administration as the readiness of a teacher, learning device is very important for teachers in preparing the learning process. With the learning device that has been prepared properly enabled learning can take place properly. Learning devices are tools or equipment to carry out the process that allows teachers and learners perform the learning activities. Learning tool created as one of support for learning to work well (Zuhdan et al, 2011).

Learning plan stated in culture Education Minister Regulation No. 22 of 2016 on Standards for Primary and Secondary Education Process. The device consists of a syllabus of learning, the Learning Plan (RPP), Instructional Materials, Media Education, Worksheet Students (LKPD), and Evaluation / Assessment. Learning device is made to be able to accommodate a student-centered learning system (Student Center), meaning that it was students who are active in learning steps according to the draft made by the teacher.

In designing the study, teachers of supposedly able to use technology as a teacher professional teacher should be able to master competencies, in addition to the professional teachers must also have a moral quality, cultured, dignified, whose duties with full responsibility, justice, conscience, disciplined, obedient to the rules and discipline (Belinova, NV, Bicheva, IB, Kolesova, OV, Khanova, TG, & Khizhnaya, AV, 2017). In view of the progressive, characteristic changes in society must be accompanied by changes in the culture of the teacher in the learning process. Rapid change requires teachers should prepare themselves to being run over by age, and can occur even exceed the capacity of students teachers, if teachers do not have extensive knowledge.

In this 21st century resources beLajar there are everywhere, books can be replaced technology, however, the presence of permanent teachers is irreplaceable. The ability of teachers to educate in this digital era strengthened on pedagogy Siber on teachers themselves. The teacher's role more as a

facilitator who is able to take advantage of digital technology well to design them to be creative to make learners active and high-level thinking. Therefore, inevitably, it is the teacher's role must be strengthened. Teachers are required able to utilize technology in instructional design. This time learning to use e-learning is no stranger, however, for teachers in areas far from the reach of the Internet have become a matter of course, and also related to the mindset difference where among teachers who were in the city, especially with teachers who come from developed countries. It is associated with dimension and cultural references. (Sarbaini et al, 2019). As a teacher who professional a teacher should be able to master competencies, in addition to the teacher professional also should have the moral quality, cultured, dignified, whose duties with full responsibility, justice, conscience, discipline, abiding by the rules, and discipline (Belinova, NV, Bicheva, IB, Kolesova, OV, Khanova, TG, & Khizhnaya , AV, 2017).

Teachers are very instrumental in developing 21st century skills. Besides, teachers should also be able to adapt to the curriculum, and is capable of imagination to produce high creativity in learning (Guo, 2014; Woon Chia & Goh, 2016; Drake & Reid, 2018). The characteristics of teachers in the 21st century include: *First*, Teachers as well as the facilitator should also be a motivator and inspiration for students.Teacher as facilitator, meaning not make the teacher as a knowledge center (teacher centered), because knowledge can be accessed through a variety of media. The positions of learners in the 21st century become the center of (student center) as well as the demands of the curriculum of 2013. In this case the teacher should be able to position itself as a study partner for learners. Second, teachers must have the ability to read high interest. This is to anticipate the development of quick learners knowledge through digital technology. If not, then there will be a loss of authority of the teacher who of course have an impact on the learning process itself and the progress of the nation. Third, the ability to write. In the 21st century a teacher in addition must have a high interest must also be able to write. Teachers are required capable of expressing ideas through writing idea of thinking as the enrichment of learning delivered to students in improving the quality of learning. Fourth, teachers are also required to be creative and innovative. Learning e-learning system is a necessity or requirement for a teacher in order to maintain the authority of the teacher in front of his students. ICT-based teaching competencies for teachers of the 21st century are an absolute. Fifth, 21st century teachers are required to have the ability to do a cultural transformation. This transformation process termed self-change, from being considered old-fashioned replaced by novelty.

Teachers should have the competence as readiness to teach, besides that it expected to have a high knowledge. Therefore, continuing education for teachers is necessary, as are the existence of cooperation among professional teachers to improve knowledge will have an impact on the quality of learning for students. (Pecheone, RL, & Whittaker, A. 2016; Borko, 2004; Vescio et al., 2008).

Method

This study uses descriptive qualitative study in the form of documents, interviews and questionnaires.Although encountered data is quantitative, it was just as supportive data to reinforce and complement the arguments in drawing conclusions. Subject research is a teacher of Physical Education, Sport and Health in South Kalimantan who are following Professional Teacher Education, numbered 123person. As for thefocus in the study is the ability of physical education teachers in developing learning tools based K13, as well as the problems faced by the teachers in implementing K13 into preparationteaching and learning process. The study was conducted in professional education center teachers in physical education, sports and health, in Banjarbaru, throughout the month of June to December 2019.

Data retrieval is divided into two parts. First, the initial data as a backrest base is a learning device in the form of syllabus, lesson plans, Instructional Materials, Media Education, Worksheet Students, and Evaluation/ Assessment, which has been created by teachers who were studying the teaching profession, at the timelecturesby online. The data is used as a base to explore the problems faced by teachers in preparing a learning device. Second, the data obtained through interviews conducted during face to face lectures / workshops. Some basic questions posed, and then to dig deeper into the

questions were developed by the researchers. The main question posed, among others; 1). Is your school already use K-13; 2) .Would you've been training K-13; 3). Is the material presented has been understood by you indetail? ; 4). Does the personK-13comes from the same field? ; 5). Books or reference what you use as a resource?

Result

Findings from the study documents the manufacture of devices such learning syllabus, lesson plan preparation, teaching materials, media, and evaluations made by teachers of physical education, sports and health, amounting to 123 teachers are still lacking. Preliminary data compiled learning device capabilities are taken during lectures through Online Learning Systems Indonesia (SPADA). The study's findings about the ability to create a learning device per item device (syllabus, lesson plans, Instructional Materials, Media, and Evaluation / Assessment) displayed in Figure 1 below.

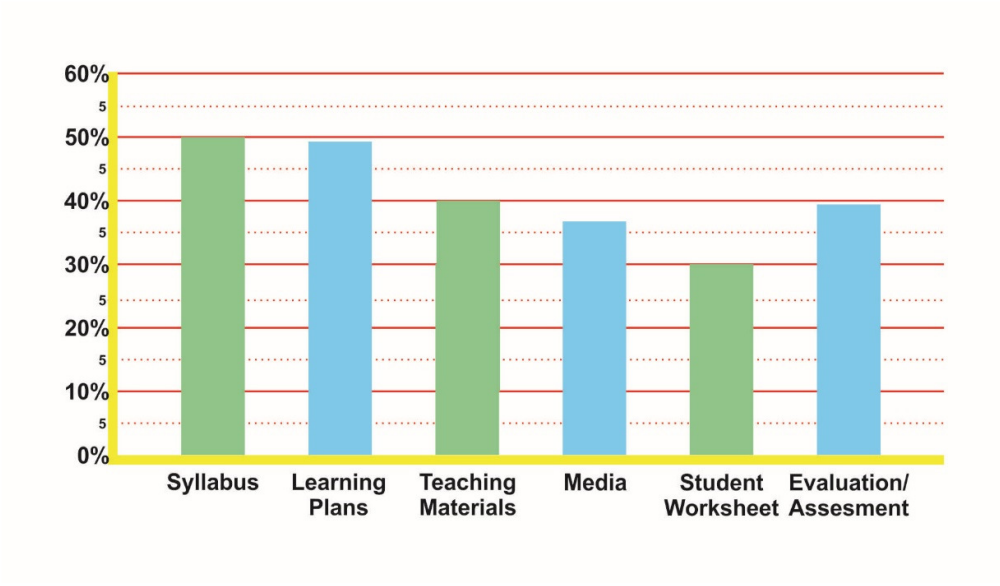

Figure 1: Preparation Capabilities Learning Tool

Once the data found that the ability of teachers to make the learning device is lacking, then subsequently traced the cause. Search cause of the ability of teachers is still lacking is done when teachers PPG PJOK workshop participants. The summary of the principal results of the interview are described in the following table.

Table 1: Causes of Lack of Teacher's Ability to Understand K-13

No.	Statement components	Percentage (%) answers
1	Statement using K-13	40%
2	A statement that he has never attended a K-13 training	60%
3	Understanding of training materials is poorly understood	70%
4	Resource persons from other fields	75%
5	Use of textbooks	80%

From the data in Table 1, it can be argued that the lack of ability of teachers in preparing a learning device caused by, among other things: Dissemination and training K13 has not been evenly distributed throughout the area. Proven 60% of teachers said that they had never received training K13. This is especially true on the teachers who are in the area. As noted A2, one of the teachers, "I have never received a briefing K13, and we still use the school curriculum in 2006 or the so-called Education Unit Level Curriculum.

From interviews, it was stated by the teachers who had attended the training, most said that they did not understand the curriculum material in detail. Regulations underlying minister is not presented in detail. The material in the form of materials Learning Pathways Plan is received in the form of copy and paste, without a detailed explanation of how to plan lessons. Even raised by some teachers who have been trained, the training curriculum delivered by speakers who are not of the fields of study physical education, sports and health, but from other areas of study. As stated by H 35, "we received training K-13, but his sources instead of physical education, sports and health but from other fields, so when we asked they were not able to give a clear answer, and we were only given examples of copy and paste without explanation means ". Such information also strengthened by F 29, "how we can understand the new curriculum, especially that part of Core Competence (KI) and the Basic Competency (KD), if that explains not of the field of Physical Education, Sport and Health, but on the field of study other. And we need a detailed explanation of how to translate KI and KD, KD nature especially skills ". if that explains not of the field of Physical Education, Sport and Health, but from other fields of study. And we need a detailed explanation of how to translate KI and KD, KD nature especially skills ". if that explains not of the field of Physical Education, Sport and Health, but from other fields of study.

Other findings are, teachers in conducting the learning process are only based on textbooks, the contents of which tend to the sports branch without paying attention to the contents of the curriculum and class levels according to curriculum material. A15 stated, "I teach based on textbooks purchased by schools". When the researcher asked again, did the textbook match the demands of the contents of the 2013 curriculum? A15 and others answered, "I don't know, for us the important thing is there is an example, because so far we don't understand how to implement the K13". In addition, in teaching teachers tend to teach sports material as obtained in college, as stated by 54 B, an elementary school teacher, "what we teach is in accordance with what we have received during last lecture. What has been stated by 54 B is clearly not in accordance with the contents of the current curriculum. The teachers stated that they could only understand about K13 after receiving the material during the PPG workshop. As one teacher put it, "We just understood ma'am, we used to teach without a device that became a guide. We always feel we lack material to teach, because what we teach is only the lessons we have received during college, without seeing the curriculum message."

Discussion

The success of a curriculum is applied for socialization and intense training. Before conducting socialization of course prepared human resource tools, namely instructors or speakers who have the ability and the field that will be delivered. If socialization is not conveyed properly then the result will not be as expected. This is evident from the research that proves that the ability of teachers to prepare learning device is still weak, due because not all teachers get the socialization and guidance regarding the application of K13 which is a typical in university when trying to innovate (Abbas et al, 2018). As a result, teachers have not been able to draw up plans well. Learning tool created as one of support for learning to work well. Learning will be effective if teachers are able to design learning well. A good teacher is a teacher who can prepare lesson plans well (Meador, D., 2019; Prasad, ZK, 2011).

Curriculum changes will not give any meaning if it is not accompanied by a clear policy. The low quality of education in Indonesia certainly can not be answered simply by changing the curriculum. Or even replace the education authorities. Quality education can only be answered by the quality of teachers. Teachers who are qualified professionals who guarantee. Without improvement in the

quality of teachers, the quality of education will remain "far from the fire", always be inadequate (Yunus, S, 2017). As good as any curriculum, if the teacher is not equipped with either about how to implement the curriculum will not be able to walk up.

Facts on the field, that the teachers are stuck with textbooks purchased by the school. Come to think of it of course makes it a teacher, but their impact is reducing the creativity of teachers, because teachers are not glued and just had enough with the materials that are already available. Habit of following the book spay and off the creativity of teachers so that the implementation of Curriculum 2013, which has not happened contextually (Koesoema, D, A, 2019). Their book these packages must be revisited. Government in this case the Ministry of Education and Culture must evaluate the content of the books, especially handbooks PJOK learning, whether in accordance with the curriculum.

It is very alarming, when the findings of the study, including the teachers glued to the textbooks, and teaching the lessons of physical education, sports and health based solely on experience when receiving the same lesson when college. Though the content of the curriculum is not the same as the college curriculum, indeed, core competence and basic competences are in between the different levels. For the dominant primary school level with the basic motion, for the junior high school level towards a specific motion, while the middle class has entered the upper level motion analysis to sports. If teachers teach using textbooks and references only having experience in college without learning curriculum well, then the result of the primary school level to the intermediate level will be stuck on learning the sport.

Professional teachers are educated and well-trained and have experience in the field. (Koesoema, D, A, 2019). There are nine competencies that must be mastered by teachers. The field is; philosophical aspects, history, anatomy, kinesiology, physiology, psychology, sociology, development of motion and motion study. This was stated in the ministerial decree No. 16 of 2007, concerning academic standards and qualification of teachers. The competence of the basis is for translating the curriculum into learning. Learning physical education, sports and health care are dominant learning via motion. But in learning to be able to accommodate the affective, cognitive, psychomotor aspects in addition to that is characteristic of physical education lessons. The most alarming of these findings is their socialization curriculum instructors come from other fields. How can teachers be able to absorb the curriculum well, if the instructor does not come from the field of physical education, sports and health ?. This is contrary to the professional principles contained in Law No. 14/2005 on Teachers and Lecturers, the work or activities carried out by someone and become a source of income that life requires skill, expertise or skills that meet certain quality standards or norms as well as the need professional education. This explanation shows that the profession requires expertise in the field of education if wishing to be in compliant with the demand of community in the era of 4.0 (Rajiani & Ismail, 2019).

Conclusion

Curriculum 2013, which has been going for approximately six years, have not been properly socialized. It appears that the desire to change the curriculum is not accompanied with the appropriate human resources to be able to disseminate to all teachers and education personnel. Their instructors out of the same field, is certainly very worrying, because it is contrary to the principles of professionalism. The ability of a teacher in developing learning tools is very important, because these devices gave way to a good learning process. Their required textbooks for schools, on the other hand is pretty good if it is used only as reference material, but if the book into a main handle then it will turn off their creativity in designing learning. Quality education can only be answered by the quality of teachers. If the quality of teachers is not corrected, then no matter how great the curriculum does not guarantee the quality of education. It is suggested, to answer the challenges of our time industrial era 4.0, teachers must be given a lot of skills training related to learning and mastery of IT. If not, then the teacher will be left out of from the ability of the students who are now very technologically savvy. It was also suggested that there is research that examines the ability of teachers to translate into Indicators Basic Competencies and Learning Objectives in accordance with the industrial era 4.0.

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Classification of Expenses into the Concept of Maintenance of Capital for the Purposes of Financial Result Management

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Abstract

Based on an assessment of the current cost classification regulations in international practice, including costs that can be incurred through profit, a classification approach has been proposed. The proposed classification can be a component of the development of the theory of preservation of purchasing power of investments and the concept of support of physical capital used in international financial reporting standards. We have concluded that profit is a marker of capital gains that can be reallocated. However, expenses at the expense of profit from which economic benefits are expected can be considered as economically justified investments. However, expenses that do not initially result in economic benefits, but are image-based, should be within the limits of adjusted profit, taking into account the capital maintenance provision

Keywords: Profit, Cost of Capital, Income and Expenses, Cost Classification.

Introduction

The financial result of a commercial organization is always under close supervision of current and potential investors and creditors. Therefore, the indicator of financial result, the trend of its positive dynamics is a priority direction of business management. The profit indicator is formed as a difference between income and expenses. However, profit itself, as an economic category, represents an ambiguous understanding of this term. Perception of profit index for the purposes of tax accounting, accounting, management accounting, for the purposes of financial reporting, understanding of profit in economic theory is one of the most complicated and discussed categories in scientific research.

The order of recognition of income and expenses has a significant influence on the formation of financial result, which in its turn depends on many factors. The legislation of national jurisdictions has a significant impact on the classification of these elements, as well as on categorical or loyal approaches to their recognition. The biggest challenges are faced by multinational companies engaged in export-import operations operating simultaneously in several jurisdictions (Golubtsova, 2019). At the same time, for certain types of accounting - tax, accounting, there are their own rules for the recognition and classification of expenses, within the framework of the legislation of individual jurisdictions (Lehoux, 2019).

Literature Review

Understanding profit is one of the complex and discussed problems in modern economic theory. In scientific research, the concept of profit is ambiguous and the evolution of the understanding of this definition goes deep into the past, when an individual or an economic unit has identified the increase of its capital value. The researchers note that the understanding of profit has both practical, scientific and philosophical connotations, for example, in the works of Plato and Aristotle, where profit was understood as accumulation of money in society (Blank, 2007).

Further unification of the ideas of the development of the definition of "profit" made it possible to unite them by directions and schools. Not setting a task of deep research of directions-schools, we should note that the most significant for the society understanding of profit was brought by scientists - the school of mercantilists, physicists, marginists and others. A.Smith's views as a result of the self-regulating market (Couse, 1977) had the greatest influence on the understanding of the definition of "profit". In today's context, profit is seen as an indicator that is influenced by many existing trends. One of such directions is recombination of the company's financial architecture, where the financial result is dependent on other elements of financial reporting and their ratios (Davidson, 2019). The authors note that the formation of profit margins in the light of increased knowledge about finance and markets, the development of economic theory and other sciences are undergoing significant changes (Domitilla, 2019).

Increasingly influencing the formation of indicators in financial reporting are the needs of external users, as the need to make decisions about the investment of capital and loans (Iron, 2019). Modern financial results practice is characterized by palliative approaches, which come from the concept of business value management with a key EVA indicator (Bennett, 1991). Despite the subjectivity of this indicator, its analytical value for investors is high. This term is also known as economic profit (Penman, 2004). For the management of a company the order of formation of the profit index is of paramount importance, because management of the company's value and profit index are interrelated.

Another important aspect is the ability of the company's management to incur expenses at the expense of net profit and the organization of internal control over its use. Thus, scientific researches emphasize the dependence of the company's capabilities, but also the institutional environment for the necessary activities (Turishcheva, 2019). In author's studies multiple calculations are made on the relationship of indicators, for example, the value of the company, the amount of dividends paid. Or identifying the relationship between net profit and return on company shares paid to shareholders (Tawiah, 2015). Thus, it is possible to confirm the hypothesis that the concept of profit management is large-scale, including both the formation of the financial result and its effective use.

Theoretical Background

The more common rule for many transnational businesses, international business are international financial reporting standards. However, these standards, which also regulate the recognition, classification and presentation in the financial statements of such elements as income and expenses are not applied by all companies. However, the interest of national jurisdictions around the world in international financial reporting standards is unquestionable, leading to a convergence of national and international standards. This is a positive development as the convergence of rules for the recognition of revenues and expenses generally leads to a uniform approach to the preparation of financial statements. The second influencing factor on income and expenditure indicators is internal regulations of an economic agent and its accounting policy. The influence of professional judgment on the internal order of formation of accounting policy, estimation values, creation of reserves, application of estimation models, estimation methods and other components can essentially influence the financial result of the company.

At the same time, there is a trend towards convergence of valuation standards in financial statements and international valuation standards (Morozova, 2019). It can be noted that some businesses, which

are mainly small businesses, find the most rational solution to the issues of recognition of income and expenses in the convergence of accounting and tax accounting.

However, from the point of view of the economic understanding of profit, such convergence of the tax and accounting system may have a negative impact on the comprehensibility and transparency of this indicator for external users. It should be noted that traditionally, for accounting purposes, expenses are classified as expenses by ordinary activities and other expenses.

This approach to classification is classic both for international financial reporting standards and for most national jurisdictions. Analysis of costs by their classification can provide companies with valuable information on optimization of costs, their evaluation, classification and reclassification. Such actions are aimed not only at optimizing the financial result, although this seems to be the baseline. Other direction, closely interconnected with the presented thesis, is management of profit of the company and possibilities of the company on use of profit, that is realization of expenses at the expense of net profit. This direction, in our opinion, is relevant and, accordingly, the purpose of the research can be presented as formation of the company's expenses classification for the purposes of optimization of financial result management.

Research Question and Discussion

In the perimeter of this work will be considered the issues of efficiency of use of the received profit. The profit indicator in accounting and financial reporting can be formed without taking into account adjustments for the inflation factor. In addition, it is necessary to take into account the influence of indirect taxes, which may be included into the calculation of the indicator, i.e. non-refundable taxes (Akhmadeev, 2020) Also, the profit component may be extended by write-offs of capital gains before disposal of revaluated objects, if such order is fixed in the accounting policy (Lehoux, 2020) On this basis, the expenses which may be made at the expense of profit have no marker on the maximum size of its use so that the company does not lose its resource potential. This provision is based on the J.R. Hicks theory about the solvency of an economic subject. Thus, a company can only use the profit to the extent that it can spend while remaining as wealthy as it was before (Hicks, 1946).

This theory implies the influence of internal factors on the amount of profit of a business entity. In addition, external factors may influence the amount of profit, which the company is unable to influence. The adopted accounting policy on formation of production, works, services cost can be referred to internal factors. Thus, approaches can be regulated on achievement of certain business goals of the company. Distribution of expenses by periods, with their classification into constants and variables, can essentially influence the financial result. The Company's income is generally recognized at current prices and measured at fair value, as is the case in certain economic jurisdictions. In some cases, income may also depend on the pricing strategy of the company (Shtefan, 2017). Certain categories of companies are companies in the innovation sector whose products have no equivalent in the market (Korableva, 2018).

At the same time, companies have no influence on external business factors, cannot prevent them, and often do not foresee them. Changes in the company's specialized items may be related to forecasted but unforeseen circumstances related to changes in currency exchange rates, digital assets, significant changes in the value of investments. For example, ups and downs in exchange quotations of investments in company securities or precious metals or bi-currency deposits. Such risks are disclosed in the financial statements.

Companies are also able to present contingencies in the format of events occurring after the reporting date that have a material effect on their financial position. However, the financial statements may be accompanied by other types of corporate reporting in which such risks may also be presented to external users. Companies generally present a methodology for calculating the impact of risks on the company's components, with the presentation of possible components. Such reports may include financial reports, integrated reports, sustainability reports and others (Petrov, 2019). In modern accounting practice, this approach can be implemented by applying capital support concepts (Fig. 1).

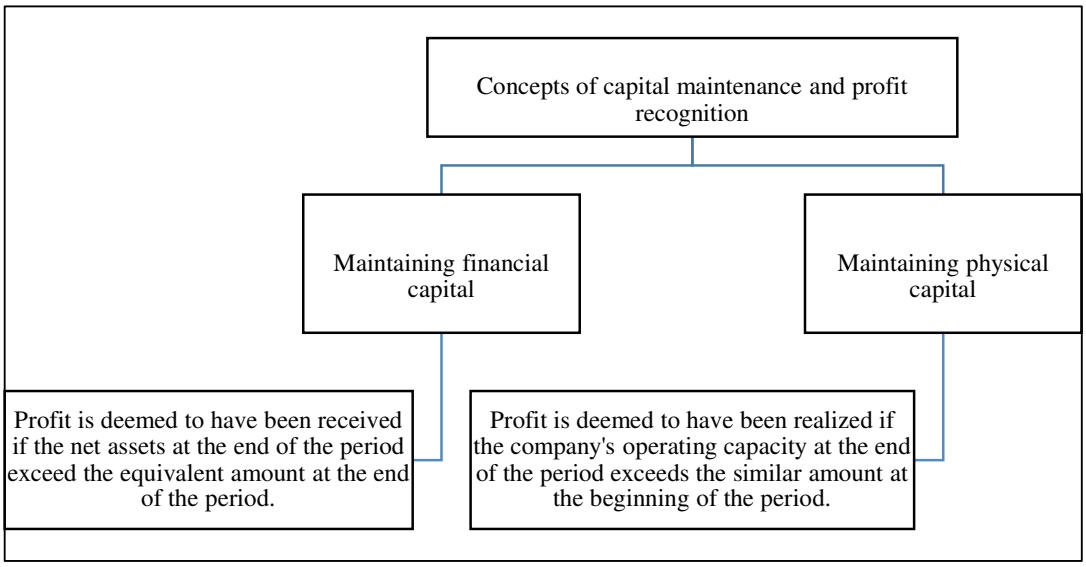

Fig. 1: Concepts of capital support and profit recognition

Assumptions about the certainty that an event may occur in the future are not a factor in its occurrence. Such external circumstances may include inflation, changes in the consumer value of the consumed or produced goods that are specific to the organization. For example, the equipment or materials produced by the company from which the products are made. Risks associated with changing prices for common components consumed or used by the company, such as electricity, fuel, etc., may also have an impact. Changes in the price of such components affect not only the production cycle of the individual or industry company, but the entire consumer and manufacturing market.

Thus, the concept of support for physical capital provides a marker of the volume of profit used in such a way that it is guaranteed that the production potential or the operational capacity of the company is maintained (Kosolapova, 2019). Under this concept, it is necessary to determine the possible costs that can be incurred from profit. For this purpose, we propose that all expenses incurred from profit should be divided into expenses that generate economic benefits, expenses that do not generate economic benefits. (Fig. 2.).

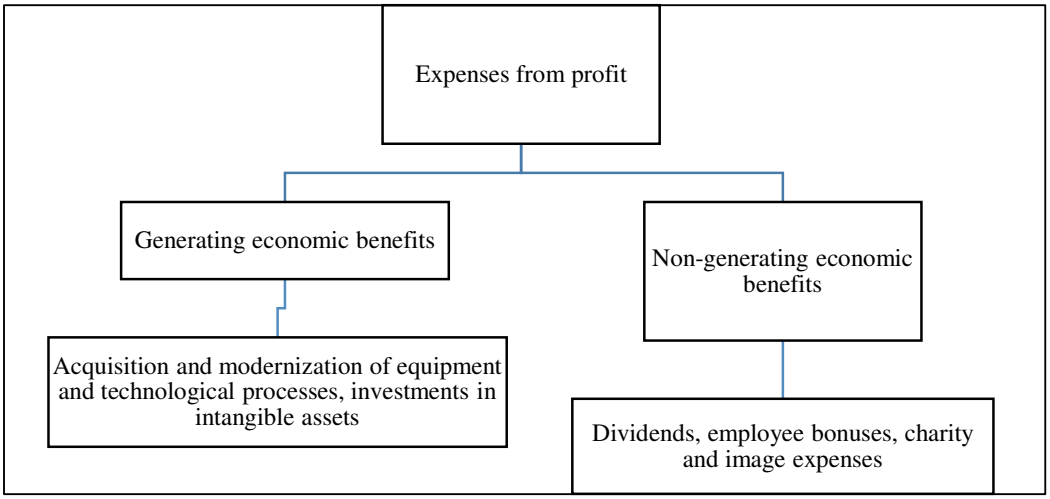

Fig. 2: Classification of expenses incurred at the expense of profit

The first category includes all expenses that can potentially bring economic benefits to the company. Such expenses may include expenses for acquisition of long-term assets, such as fixed assets, investment real estate, intangible assets, as well as acquisition of technological processes, investment in other investments. Costs that do not generate future economic benefits can be considered as incentive and image payments. For example, the payment of dividends to shareholders, bonuses to employees, payments to form a pension fund for employees. A portion of payments made from profits can be considered as image payments. For example, transfers to support social and cultural structures, health care funds, charity funds, transfers to support sports teams and others.

International Financial Reporting Standards do not have a specific methodology for determining the amount of profit that can be used while maintaining a company's operational capability. In practice, companies use multiple methods to calculate this amount, mainly related to the method of calculating the amount of dividends. At the same time, in scientific works, in accounting policies of companies such calculations become more complicated, multiple correction factors are included, resulting in multifactor models and creation of three-dimensional financial matrices for dividend policy management. Such approaches may be based on different theories. For example, the theory of payment of dividends on the residual principle when funds are spent on investments (Modigliani, 1958; Ekimova, 2016). There may also be a theory of priority payment of dividends, which should contribute to the value of the company (Gordon, M.J., 1959). Without questioning the need for the existing methods of dividend policy, we believe that there are simpler and no less effective approaches.

We propose a hypothesis that such a solution may be an approach based on the J. Hicks theory and the concept of supporting physical capital, which may be applied in the framework of international financial reporting standards and the legislation of some national jurisdictions. In order to determine the amount of profit that can be distributed, an organization must choose an indicator that will adjust the amount of profit. This indicator or ratio may be an inflation rate, commodity price index, etc. Thus, the organization will have a certain amount of profit not subject to redistribution, which will serve as a reserve for maintaining capital. At the same time, the full amount of profit can be used as a marker, since investments foresee risks, such as investment, currency, tax, etc. (Akhmadeev, 2019; Petrova, 2019). For example, at 500,000$ revenue, 300,000$ expenses and 10% inflation for the period, the capital support reserve will amount to 30,000$, and the profit, which can be redistributed should not exceed 170,000$. An important condition is the calculation of the profit indicator with adjustments on a continuous basis. It is the value of adjusted profit that will correspond to the amount of profit that can be allocated to expenses that do not generate economic benefits.

Conclusion

Based on the results of the study, it can be concluded that the classification of expenses in the format of the concept of maintenance of capital and recognition of profits for the purposes of the most effective management is a complex economic object that combines both general economic understanding and accounting techniques. We have concluded that profit is a marker of capital appreciation, which can be subject to redistribution. However, expenses at the expense of profit from which economic benefits are expected can be considered as economically justified investments. In this case, the full amount of profit can be used as a marker. However, expenses that initially do not lead to economic benefits, but are image, should be within the limits of adjusted profit, taking into account the capital maintenance reserve. We see further development of this hypothesis in the development of profit adjustment methodology.

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The Financial and Economic Strategy Formation at an Enterprise: Its Impact on a Managerial Decision-Making Process

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Abstract

In view of the current paradigm of financial management of sustainable development, the methodological foundations used to form adaptive financial and economic strategies of companies are highlighted. The study identifies the mechanisms of both active and passive adaptation of the strategic financial management system towards the conditions of the market. The identified factors are represented by the characteristics of the relevant facilities and the components of the financial and economic strategy of the company, embracing investment, structural, taxation and credit constituencies. This, in turn, allows revealing the patterns of strategic financial planning to realize the company's financial strategy by applying the proposed mechanism to assess the conformity of the financial and economic strategy and the targets, set by the company, and to exercise a sustainable development of the company. However, the procedure for the formation and implementation of an appropriate financial and economic strategy is viable only when using a combination of tools for managing financial resources of an enterprise. The process of managing the financial and economic strategy itself requires the formation of an effective management system, adapted to the modern business conditions and changes at the micro and macro levels. This process plays the key role in financial activity implementation and contributes to making effective management decisions.

Keywords: Financial Management, Strategic Financial Management, Financial And Economic Strategy, Sustainable Development Of The Enterprise.

Introduction

Practical approaches to the development of a mechanism and the implementation of a financial and economic strategy in modern transformational processes of emerging markets impose new rules on the

strategic management of an enterprise (Acharya, 2005). In this regard, the development of a financial and economic strategy, which is provided by the enterprise management system, determines the following key research objectives:

a) formation and effective use of financial resources (Galariotis, 2015);
b) compliance of financial actions with the economic condition and tangible assets of the enterprise (Golubtsova, 2019);
c) identification of potential sources of threat from competitors (Dagaev, 2019);
d) determination of priority areas for financial actions and maneuvering to gain a crucial competitive advantage (Kalacheva, 2019).

Literature Review

The review of economic literature indicates that the subject of financial and economic strategy formation at an enterprise has been studied by both foreign and Russian authors. In particular, theoretical and methodical aspects of strategic and financial analysis were researched by prominent contemporary researchers, such as Brigham (1989), VanHorne (2005), Hasan (2017) and many others. At the same time, the activity on the development and implementation of the financial and economic strategy of an enterprise represents a kind of management activity (Golubtsova, 2019), which is a combination of actions within an overall financial management system of the company. Both in theory and practice financial management specialists apply matrix modeling methods (name), strategic analysis of the strengths and weaknesses of company performance (name) and financial analysis of the branch of industry (name). Without diminishing the importance and the effective application of certain methodological approaches while choosing a financial and economic strategy, it should be noted that their usage does not allow, in the opinion of (full name), to comprehensively present the procedure for selecting alternatives:

a) formation of an analytical basis for the parameters used to select a financial strategy based on the strategic diagnostic procedure (Deputatova, 2018);
b) optimization of the procedure when choosing an alternative financial and economic strategy (Ivanova, 2018);
c) rationing and justification of limitations of target vectors of strategic alternatives depending on the level of financial equilibrium and changes in financial and economic stability (Lehoux, 2019);
d) modeling net assets and liabilities behavior of an enterprise applying various strategic alternatives (Kandeeva, 2015).

In this regard, the principal goal of the study is to analyze theoretical approaches and determine the essence of “a financial and economic strategy of an enterprise” concept taking into account the development of guidelines on the effective formation of a mechanism used to implement financial and economic strategy employing the enterprise management system.

Theoretical Background

The majority of practical studies tend to determine a long-term goal of the company performance, which should be attained due to an effectively developed financial and economic strategy. Nowadays there is no consensus regarding the definition of this concept. That is why its formulation has become the subject of research conducted by many scientists. The set of definitions of strategies combines the evidence-based aggregate underlying the adoption of developed strategic decisions. We believe that the company’s financial and economic strategy constitutes a long-term financial plan of its development, which is aimed at the determination, usage and realization of strategies to ensure the company’s stability and establish financial relations with counterparties, which a business entity needs to follow to reach the goal. The major

drawback of the definitions under consideration is their fragmentation as well as isolation of the company's financial strategy from its main strategy.

In this regard, it is possible to group certain features of the financial strategy as functioning according to the following classification, which is:

1) an integral part of the financial and economic strategy, allocated for the relevant sphere of economic activity of the enterprise;
2) the chosen economic strategy of the enterprise, aimed at implementing not the whole range of interests of its owners, but serving only its financial interests;
3) the means of origin of the chosen economic strategy which occur due to the effective use of the financial potential of the enterprise;
4) the development of the key guideline of the financial and economic strategy, providing for a quick adaptation of the enterprise to changing conditions of the external financial environment, and directly affecting the financial results of the enterprise.

Considering the identified peculiarities, the key goals of a financial and economic strategy are as follows:

a) determination of methods that can successfully exploit financial opportunities of an enterprise;
b) identifying perspective financial links with non-financial organizations, the state and other institutions;
c) ensuring future trends for financial operational and investment activity;
d) studying economic and financial opportunities of competitors, developing and holding measures to ensure financial stability;
e) working out ways to get out of crisis situations as well as management methods that can be used in crisis situations of enterprises.

Therefore, the process of establishing a financial and economic strategy of an enterprise may include the following principle stages ranging from its development up to the assessment of its effectiveness (fig. 1).

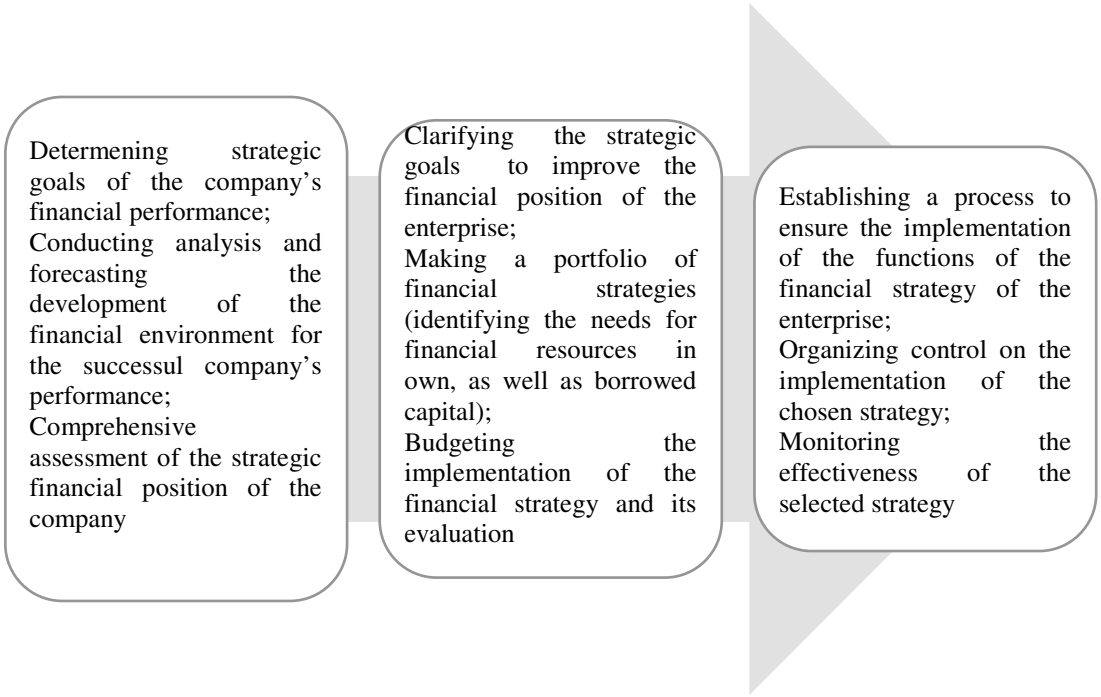

Fig. 1 : The main principle stages of the enterprise's financial and economic strategy development

It should be noted that the degree, to which the factors influence the financial stability of the enterprise, depends not only on the potency of each of them and the correlation between the factors, but also on the stage of the enterprise life cycle at the moment, taking into account the conformity of established management procedures. Considering the implementation of the financial and economic strategy, we should highlight the financial mechanism that forms similar conditions for macro- and microenvironments as well as the factors affecting both the overall strategy of the enterprise and the implementation of the company's financial and economic strategy to develop its own resources, attracted external resources and the like. The development priorities and the objectives of a financial and economic strategy for each element of the value chain are presented in Figure 2.

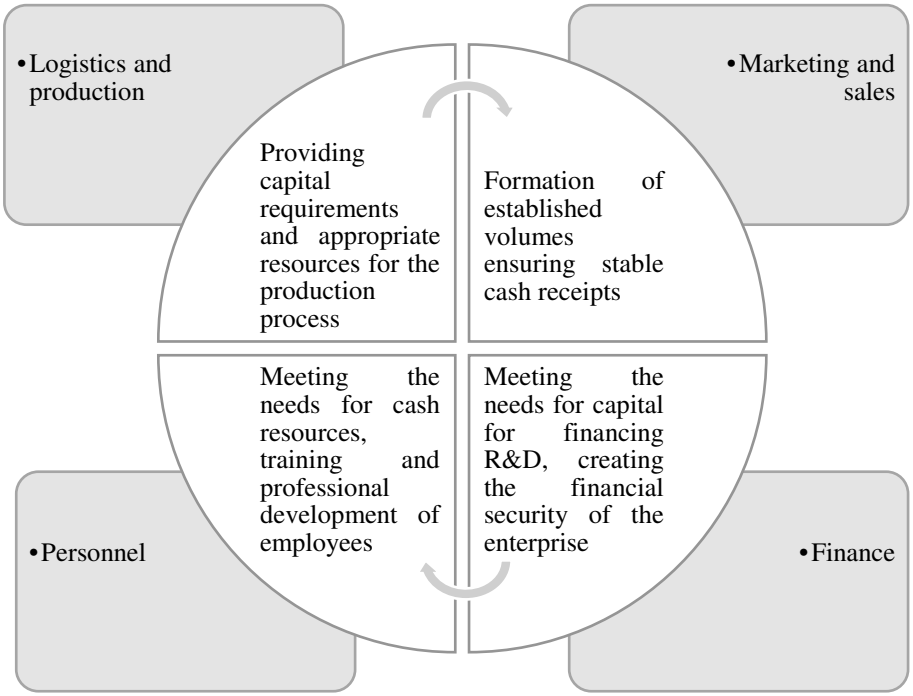

Fig. 2 : The key development priorities and the goals of the financial strategy established for each element of the value chain

Meanwhile, a competently built financial mechanism affects the effectiveness of the financial and economic strategy implementation inside the overall management strategy of the enterprise, which can be achieved with the help of the following factors:

1) the compliance of the designed financial strategy with the overall strategy of an enterprise (Kandeeva, (2015);
2) the degree of coordination of goals, directions and stages of their implementation (Orekhova, 2017);
3) the consistency of the financial and economic strategy of an enterprise with projected changes in the external business environment.

In doing so, the effective financial and economic strategy should consider risks, needs for business plan financing, financial goals of the enterprise and the market business conditions. In vague economic conditions and instability of financial markets, high risks of applying financial instruments, the interdependence of individual economic entities on the fluctuations of the world market, we should consider the elements of financial and economic policy of an enterprise.

Discussion

The current scientific sources determine the following dominant areas of financial development of an enterprise:

a) the financial resources development strategy, which aims at capacity building of enterprise financial resources, sufficient to meet the needs for its development (Korableva, 2019);
b) the investment strategy which, if applied, permits to rationally use the financial resources of an enterprise, allocate them according to the areas and types of investments, taking into account the criteria of the risk and return ratio (Kosov, 2016);
c) the enterprise financial security strategy, which provides the financial stability of the enterprise during its strategic development (Turishcheva, 2019);
d) the strategy which improves the quality of financial management of the enterprise in strategic perspective (Titova, 2019).

Thus, the economic behavior of an enterprise can be determined above all by the choice of sources to finance its performance. Subsequently, a financial and economic strategy should meet the following criteria:

1) to consider the inner financial factors when choosing the sources of financing as they are easier to predict (Glubokova, 2019; Petrov, 2019);

2) to take into account the external financial environmental factors that can be predicted with a certain degree of risk (Kretschmann, 2020);

3) to ensure that a financial and economic strategy should justify the choice of the ratio of the sources of funding;
4) to consider financial risks while choosing an appropriate source of financing.

In addition, a financial and economic strategy characterizes diverse relations of the enterprise in production, credit, investment and financial spheres of activity. It predetermines the company's behavior on the market, its position on the market, the usage of financial resources as well as monetary instruments. Therefore, the financial and economic strategy is aimed first of all at a long-term perspective or at solving key priority tasks in a definite period of time.

Conclusion

In the conducted study, the initial position for the choice of a financial and economic strategy of an enterprise is considered. It is based on the developed concept and principles which determine the formation of the mechanism of a financial and economic strategy at a contemporary enterprise. The process of choosing an alternative to the financial and economic strategy possessing practical value rests on a systematic and scenario-based approaches, the use of which makes it possible to present, on the one hand, the continuity of the selection procedure, and on the other, the use of an integral criterion of the potential for financial and economic stability, which will justify the optimal choice (Porter, 2006). The study highlights the importance of financial and economic strategy determination in various business situations, employing a practical approach, depending on the current financial situation of an enterprise and perspectives of its sustainable development on the basis of building scenario options. Feedback information communication allows comparing the result of the implementation of the financial and economic strategy with the company goals at the entry level and determining the deviations of the real vector of the system

development from the ideal one. It is the deviation of actual parameters from the preset ones that constitutes the essence of the problem.

Management means solving a number of problems. Therefore, when considering the practical approach of decision making, financial decisions tend to be unprogrammed, that is why the process of solving financial problems is endless. The formulation of the problem and its awareness lay the foundation for the identification of a practically applicable financial and economic strategy as well as setting strategic goals. In order to identify real-time strategic goals, it is necessary to meet the effectiveness requirements, namely, to achieve the main goal of a financial and economic strategy, i.e. to maximize the value of the enterprise. At the same time the practicalities of a financial and economic strategy should be developed in such a way that the implementation of one strategic goal should not affect another one.

Consequently, the conducted studies allow us to formulate the following statement. The formation and implementation of the relevant financial and economic strategy in real life is possible when using a combination of tools to manage the financial resources of the company. The process of a financial and economic strategy management itself needs developing an effective system of management, adapted to the current business conditions and changes at the micro and macro levels, and is the most important aspect of financial activity, which allows making effective management decisions in practice.

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Conceptual Aspects of State Regulation of The Russian Economy: Industrial Sector

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Abstract

The authors of the article analyze the conceptual aspects of the industrial policy of Russia. Based on a generalization of the historical experience of developed countries in this area, the urgent problems of Russian industrial policy and ways to solve them are also investigated.

Keywords: Industrial Policy, Institutions, Innovation System, Spatial Development

Introduction

The development of the concept of industrial policy in Russia requires the fullest possible consideration of world experience in this area. Its analysis allows us, in our opinion, to distinguish two models of industrial policy. Industrial policy has been formed for almost two centuries (XIX-XX centuries) and has gone through an evolutionary path from direct state management ("etatist model") to a set of liberal measures ("institutional model").

The etatist model was formed in the era of industrialization in the XIX century, when technological means were considered as the main tool for solving the most important socio-political tasks: ensuring national security, overcoming disparities in territorial development, and resolving social conflicts.

Its central element was engineering projects initiated or supported by the state and of national significance. The success of such projects depended on the state of the entire national economy, and therefore industrial policy claimed the status of a comprehensive economic policy. This is how the us economic development doctrine was developed and implemented at the beginning of the XIX century, the principles of which then formed the basis of the" Meiji revolution " in Japan in the 1860-1870s, as well as the program for building a network of all-German Railways in the first half of the XIX century.

However, not only in the United States, Japan and Germany, industrial policy was used as the main tool of state management of national development. For example, all railway systems in the nineteenth century were planned by national governments (except the British metropolis). The state built Railways or supported private companies by providing lucrative concessions, guarantees, etc. The dominance of the etatist industrial policy lasted from the beginning of the XIX century to the 70s of the XX century.

The revision of the foundations of state industrial policy in economically developed countries was largely due to the technological shift in industry, as well as changes in the corporate organization of its subjects. The scale of the latter and the nature of their decisions led to the fact that there was no economic need for the state as a holder of large engineering projects. Most technical and technological decisions were not made at the state level.

However, there was another factor that played a major role in the reevaluation of industrial policy, namely, globalization, which destroyed the economic autonomy of States. On the one hand, the new way of ensuring security through defense integration has deprived States of incentives for economic protectionism of their own industry. On the other hand, resources began to circulate in world markets

that were no longer subject to individual national States. The state's pre-existing involvement in the design-Finance-production-sales chain has been disrupted.

By the early 1990s, in Europe and the United States, the state began to abandon direct management of engineering infrastructures, privatize the electric power industry, transport and communications, and transfer public utilities to concessions.

Thus, at the end of the XX century, there was a strong belief that industrial policy in its original sense had almost exhausted itself. The etatist industrial policy was replaced by an institutional one. Its goal was to ensure the competitiveness of the national economy in an open market, and as the main tool was used a set of institutional and financial-regulatory measures that indirectly affect the technological development of the economy and literally dissolve in the General economic policy (see Fig. 1 and 2).

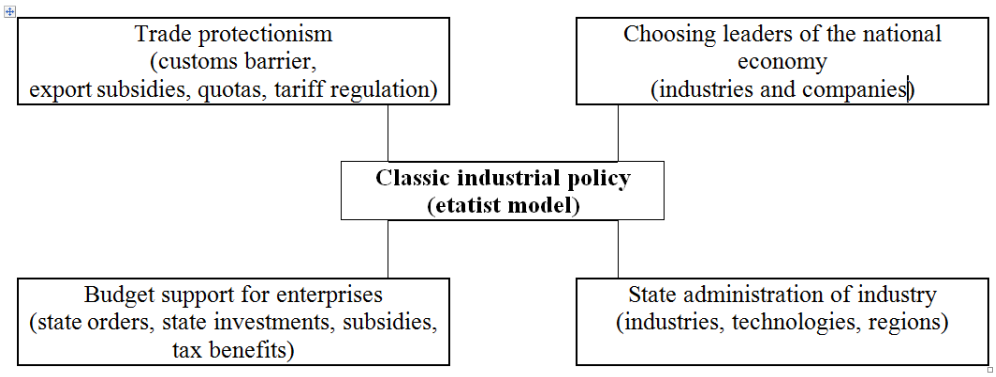

Fig.1. Scheme of the etatist model of classical industrial policy
Source: Compiled by the authors

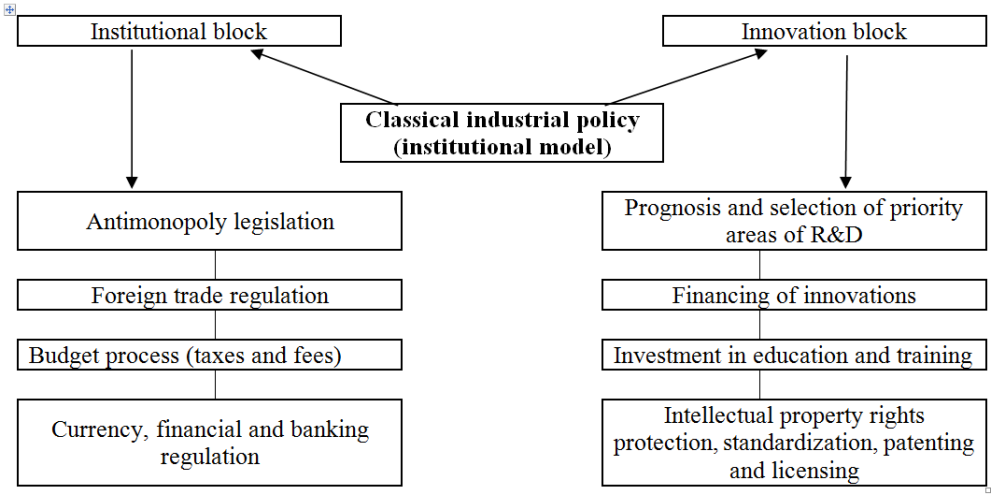

Fig.2: Scheme of the institutional model of classical industrial policy
Source: Compiled by the authors

Materials and Methods

In our view, the Russian specificity is that the main conflict lies in a different plane. This is a contradiction between the local character of most Russian industrial enterprises and the global economy in which they are placed. The weak ruble created preferences for the Russian industry, which allowed it to regain (though not completely) the national market and facilitate the promotion of

certain types of its products on the world market. The old industry, designed for isolation and internal balance of the economy, revived, restored internal connections and claimed resources. However, now the growth reserves of Russian industry, which were provided by a weak ruble and low prices for certain types of resources (raw materials, transport and energy services, labor, etc.) in comparison with the world's domestic prices, have actually been exhausted. Further economic growth should be provided by new factors related to the integration of Russia into the world economy.

Let's make two important marks. First, the asynchronous development of the processes of production, circulation, consumption and turnover of finance can lead to the fact that the integration of the Russian economy into the global market will occur in fragments, and the economy itself will continue to lose its integrity. Therefore, it is necessary to synchronize the pace of development of the main economic processes. Moreover, it may be necessary to synchronize not only by "spurring" production and consumption, financial turnover, but also by keeping the economy from growing too fast.

Secondly, the place of industrial policy that was previously occupied by industry as a complex of technologically related and complementary industries-productions-must now be assigned to a new set of processes that intertwine industrial production and that together ensure its integration into the global market (production, circulation, consumption, financing and regulation). The institutional model of classical industrial policy gets a new tool-project management of the economy.

The project as an industrial policy tool allows you to combine administrative, financial, structural, technological and market resources, as well as to establish targeted control of results at each stage of implementation. Only the creation of a system of priority projects of various scales will help to move industrial development from the dead point.

The analysis of the needs of the Russian economy shows two types of such projects.

The first is infrastructure projects that serve the needs of the economy and the country as a whole: transport, information, educational, scientific and technical, social and communal infrastructure projects. They have a positive effect not only for the investing company, but also for other market participants (for example, capacity port capacity, promotes not only the profits of companies-operators and exporters).

Reforming natural monopolies: the electric power industry, the railway and gas sectors of the economy, as well as housing and utilities-these are the elements of the project approach in industrial policy.

Another key project may be the development of mortgages. Its implementation as the largest investment and construction project will not only revive a huge number of companies, but also give them a significant impetus for intensive growth.

The second type is innovative projects aimed at securing the country in promising niches of the world market. They lead to the creation of national value chains, the output of which is a science - intensive product that is competitive by world standards. An indispensable condition for obtaining such a product is to increase the degree of processing of raw materials (metallurgy, oil and gas and forest complexes), to realize the intellectual potential of the military-industrial complex, and to cooperate between innovative small and medium-sized businesses and integrated industrial groups.

Such projects aimed at creating qualitatively new technologies and production facilities are usually long-term and require unhindered access of companies to long-term credit resources. Both of these conditions are currently absent in Russia. The state is faced with the task of eliminating this negative factor, largely due to its inconsistent economic policy.

Methods Study

In the study, the authors used some methods such as a comparative analysis, synthesis, systematic approach and classification, historical method.

Results

International experience shows that the creation of national value chains with the participation of

small and medium-sized businesses is one of the most important resources for improving competitiveness. And industrial policy is designed to encourage the creation of such national chains.

The goal of innovative projects may also be to integrate Russian companies into global value chains. But as suppliers of high-tech products, not raw materials. This is a recipe for those companies and industries that, for objective reasons, cannot become market leaders, but will find themselves in international cooperation. Examples include projects related to the creation of modern Airliners, the implementation of rocket and space programs, the production of unique medical equipment, or the global partnership of air carriers. Even the rise of the automotive industry can be achieved if, instead of an industry approach, we choose a project for the production of, say, automotive components for modern cars.

Conclusions

Whatever value chains are created – national or global-the strategic priority of improving the competitiveness of domestic products must remain unchanged. The main criterion here is the growth rate of added value. It reflects the evolution of companies from the simplest forms of production (with minimal human capital expenditure and high natural rents) to more complex forms.

Thus, overcoming the economic imbalances that arise as a result of Russia's rapid involvement in the global economy can be facilitated by implementing a series of projects aimed at breaking the most problematic nodes for the national economy tied by globalization. First of all, we are talking about a package of social and management projects-specific corridors for adapting the domestic economic and economic complex and its supporting infrastructure to the global economy: creating a national innovation system; changing the training system; development of consumer lending and mortgages.

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Industrial Policy in The Context of State Regulation of The Russian Economy

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Abstract

The author of the article analyzes the place and role of industrial policy in the system of state regulation of the Russian economy. The article discusses the basic concepts, principles and options for the implementation of the national industrial policy in the conditions of market transformation of the country's economy.

Keywords: Industrial Policy, State Regulation Of Economy, Market Transformation, Strategic Goals

Introduction

As the experience of many countries of the world confirms, the mechanisms of a market economy sooner or later bring the national economy to an equilibrium state, orient producers to the needs of the market and create the prerequisites for boosting industrial production.

However, hoping for self-regulation and determinism of market processes would be an unforgivable mistake. In order to preserve the industrial potential of Russia, to carry out its structural adjustment, to make it competitive in the world market of industrial goods, active state regulation is necessary. First of all, for successful reform of the national economy requires an active industrial policy.

Industrial policy is the most important component of the socio-economic policy of the state, it is aimed at implementing strategic and tactical goals in the field of industrial production. In other words, this is a policy of supporting and creating the conditions (regime) of the most favored nation-wide industrial producers.

In world literature, the concept of "industrial policy" is unambiguously characterized as the focus of structural transformations. Its content is a system of measures conducive to progressive changes in the ratios and proportions of industrial production in accordance with national goals and priorities.

Transformational transformations in the real sector of the economy relied mainly on macroeconomic levers of regulatory influence. During this period, the need for a focused industrial policy was gradually recognized as the crisis in the industrial sphere worsened. The experience of the destruction of national industry in the phase of adapting the Russian economy to market transformations has led to the widespread recognition that an active industrial policy is necessary for the hastening establishment of a market system and overcoming the crisis in industrial sectors.

Materials and Methods

Distinguish industrial policy in the broad and narrow sense. State industrial policy in the broad sense includes all targeted actions of the state in the tax, price, credit, investment, foreign economic spheres, and measures to reform property relations.

State industrial policy in the narrow sense is understood as a macroeconomic policy in the field of management of individual industries and enterprises. Within its framework, tasks may be set to increase (reduce) the output of a particular product, achieve an industrial structure adequate to the requirements of the economy, mechanize individual industries, create new industries, prevent

inefficient investments or make up for their deficit in individual sectors, develop small and medium enterprises, and save resources environmental safety.

The leading components of industrial policy are highlighted (Fig. 1).

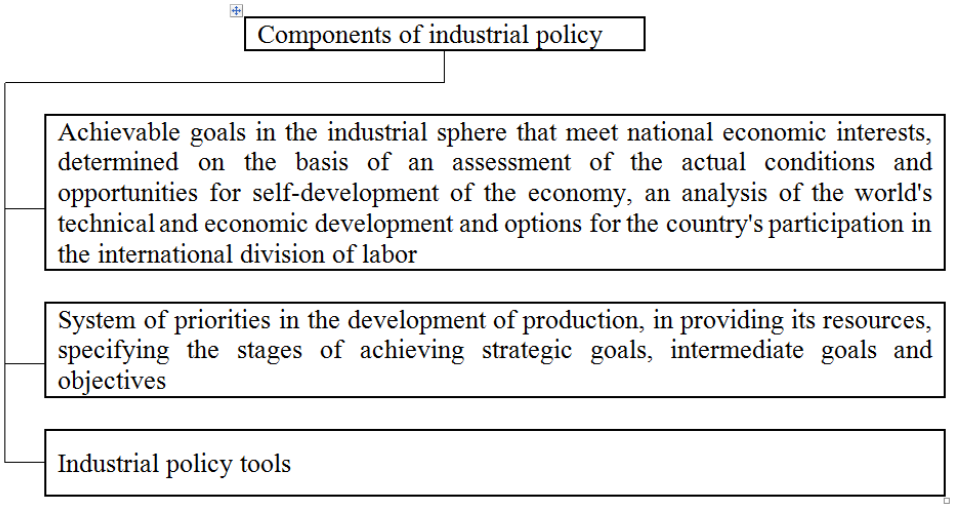

Fig. 1: The components of industrial policy in a market economy
Source: Compiled by the author

The choice of an appropriate industrial policy is associated with factors of its differentiation. In the evolutionary phase of adapting the economy to market transformations, three industrial policy strategies have been identified:

1) support for export-oriented industries, ensuring the accelerated development of exports and the inflow of capital necessary for the country;

2) import substitution as a result of supporting the national manufacturing industry through protectionist measures of protection against external competition;

3) support and development of high-tech industries, regardless of the capacity of the domestic market and the demand for their products.

Variants of modern industrial policy in Russia are aimed at supporting sectors and industries that differ in technological level, real economic mechanisms and prospects for achieving high competitiveness.

Methods Study

In the study, the authors used some methods such as a comparative analysis, synthesis, systematic approach and classification, historical method.

Results

Enterprises involved in the transformation processes in the industrial sphere of the Russian regions are distinguished by the enormous diversity of technologies and equipment and equipment of varying degrees of moral and physical wear and tear applied to them. The content, directions and priorities of industrial policy at all levels must be determined taking into account these characteristics of the real sector of the economy, that is, to differentiate the policy in accordance with the qualitative state of market entities.

This involves the work of the state in two directions. The first of these is associated with the use of methods of direct government influence on market entities in the form of state orders, direct

subsidies, soft loans, customs duties, licenses and quotas. The second direction is associated with the work of the state in the formation and further strengthening of the above elements of market infrastructure, primarily through the development of adequate legal norms and rules.

The laws necessary for the implementation of industrial policy can be divided into three groups. The first includes legislative acts governing: property rights and their management at the state, regional and municipal levels, privatization processes, the bankruptcy of enterprises, the functioning of the real estate market, land tenure and land use relations.

The second is the laws that determine the formation of the capital market, that is, the accumulation and use of financial resources of the state, federal subjects, organizations and individuals. The third group includes laws regulating the functioning of the real sector of the economy, that is, determining free competition, taxation, the functioning of the labor market, pricing, regulation of commodity markets, foreign economic activity, etc.

In the framework of industrial policy, it is necessary to determine a set of macroeconomic measures to stimulate the development of industry in the phase of economic growth (Fig. 2).

Industrial policy is not only capable of eliminating the negative side effects of tough credit and monetary conditions, but also allows you to move away from the debilitating financial system support for weak enterprises, focusing efforts on priority areas of production. The experience of Russian reforms confirms that the transfer of production to market rails, which is not supported by an active structural policy, including a selective approach to individual sectors of the economy, production groups, can lead to the country's loss of existing technological positions.

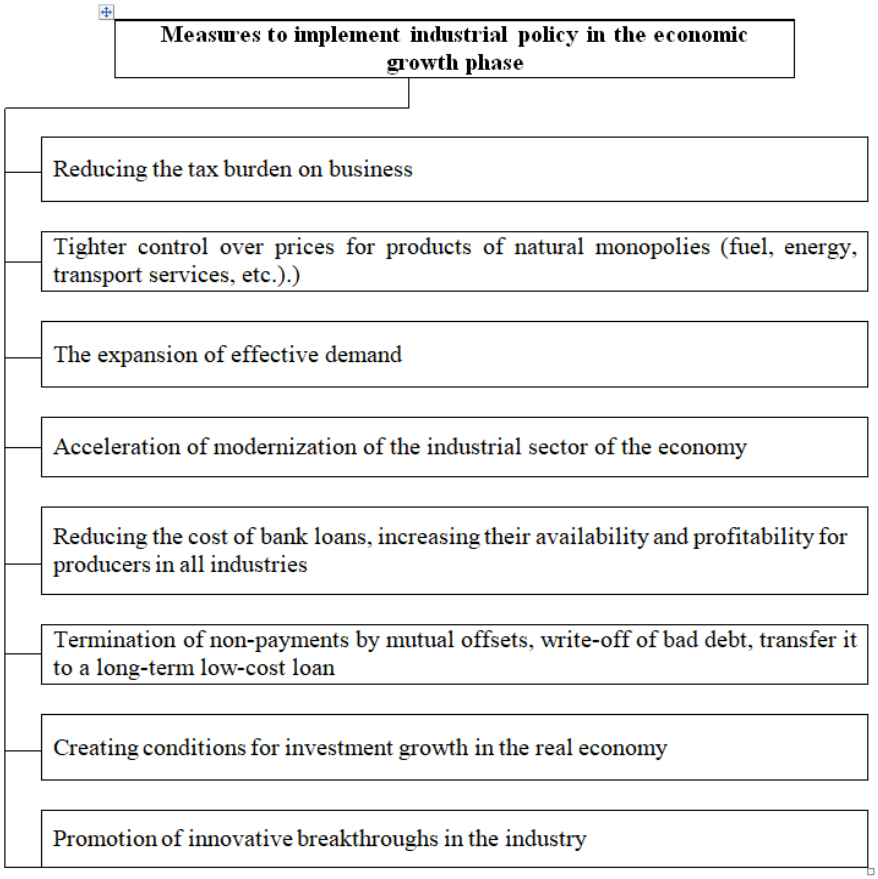

Fig. 2: The system of macroeconomic measures to stimulate the development of industry in the phase of economic growth

Source: Compiled by the author

Conclusions

All these circumstances put industrial policy at the forefront of economic reforms, determine the need for urgent linking with it all economic transformations, including corporatization, privatization, de-monopolization, anti-crisis management, etc. Industrial policy should be considered as a projection of national economic development goals on the industrial sphere, translating them into a system of priorities and distribution of production resources, in the mechanisms for implementing these priorities. The basis for detailed study of industrial policy is intended to serve as a strategy for industrial development, which builds its stage tasks taking into account the state of the country's production base, and trends in the global economic environment.

Industrial policy as an economic term is a complex, multidimensional concept. In our opinion, industrial policy is a set of economic, political and organizational measures at different levels of the national economic system aimed at:

- compensation for market mechanism shortcomings (in terms of quick movement of resources, ecology, infrastructure creation);

- improving the industrial (market) organization (industry structure, placement of production, regulation and promotion of investment and production activities, formation of industrial and financial groups, promotion of small and medium-sized businesses);

- maintaining an optimal competition regime in industries (production quotas, antitrust policy, competition promotion);

- promotion and maintenance of certain sectors of the economy that are important in their socio-economic significance or priority in terms of scientific prospects, high growth potential and competitiveness;

- stimulating the development of export potential and competitiveness of the national economy, taking into account both macro-and micro-economic factors;

- implementation of large-scale national R&D programs.

Acknowledgment

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Development of Export-oriented Supply Chain Management in Agri-food Industries

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Abstract

The preconditions for the successful development of agricultural industries in Ukraine are the favorable geopolitical position, significant production potential, the availability of a skilled labor, and a powerful raw material base. The authors justified the basic goals in Ukraine's agricultural trade policy improvements, including increasing the share of processed foods and improvements of agricultural exports structure; opening new niches in the global market and diversification of export markets; support of small and medium-sized producers in their export efforts; increasing the level of global competitiveness of Ukrainian producers and processors. It is determined that the main scientific and practical task in exporting agricultural products is to build effective supply chain management mechanisms. Export-oriented management of the agri-food supply chain is aimed at achieving not only economic but also social goals – increasing employment in rural areas and improving the standard of living of the population. A promising direction for enhancing agro-export potential may be the use of cooperative forms of business that will be able to realize themselves in the fields of procurement, distribution, transportation and finance.

Keywords: Agri-Food Industries, Supply Chain Management, Export, Global Competitive Advantage.

Introduction

The growth of global economy is accompanied by an increase in the intensity of technologies' flows, movements of goods, services and economic resources across national borders. Globalization is combined with the dynamic processes of increasing the volume of inter- and intra-industry trades, deepening the interdependence of agricultural markets and technologies, enhancing the influence of the world macroeconomic factors. The modern system of global food markets is characterized by dynamic and complex nature.

The economic transformations in the agri-food sector of Ukraine are aimed at ensuring the conditions of a competitive environment and creating the economic mechanism in accordance with the principles of a decentralized system. The agro-industrial complex is an important component of the Ukrainian economy. The country has all prerequisites for gaining global competitive advantage in the agricultural sector. The availability of fertile lands and the orientation to strategic global marketing niches can be mentioned as preconditions for the successful development of agricultural industries.

Ukraine is located near important global markets. The favorable geopolitical position, significant production potential, the availability of a skilled labor, the powerful raw material base in the agricultural sector determine the investment attractiveness of the country. Nowadays, considering the influence of economic and political drivers, a strong recognition of the importance receives the ensuring the competitiveness of domestic agriculture. An urgent problem is the restoration of lost and the maintenance of new export positions. The reduction in in the level of monopolization of the economy, regulatory measures towards the transparency of the economic environment, coordinative improvements of strategies of domestic business entities aimed at achieving competitive positions in world commodity markets can be listed as significant steps towards the solutions of the current problems which continued to have a negative effect on agriculture. As volumes of agri-food exports continue to grow the construction of efficient supply chain management mechanisms is among the important scientific and practical tasks at the moment.

The development of Ukraine's agriculture in the context of competitiveness

In the conditions of transformation of property rights and changes of forms of management in the agrarian sector of Ukraine, it is necessary to ensure efficient use of production resources and achieve stable economic growth of the economy.

An important element of Ukraine's agricultural policy is the development of the food market system. In current conditions it is necessary to increase the level of production and technological efficiency, to ensure the improvement of national standards of food quality in accordance with international requirements, to stimulate the creation of competitive conditions and to continue carrying out economic reforms.

A sustainable agricultural management mechanism can be provided with an integrated crop and livestock system capable of meeting demands in food and raw materials, most effectively utilizing renewable and non-renewable resources, guaranteeing the balance of natural biological cycles, and supporting businesses efforts to raise the living standard of the population. Growing plants and raising animals are at the origin of the export-oriented food supply chains.

The next forms of competitive behavior may be observed in transitional economies (Wehrheim, et al., 2000].

1. Traditional forms that are common to advanced market economies:
   - price competition;
   - non-price competition;
   - commodity differentiation;
   - application of the system of guaranteeing the quality of products and services;
   - use of sales promotion system.

2. Specific forms inherited from the command and administrative system of governance and planned economy:

   - economic support from governmental bodies at all levels;
   - creating favorable economic conditions for individual entrepreneurs through informal contacts.

3. Specific forms that are combined with the economic crisis:

- delay in making payments;
- the usage of payments in kind.
- 4. Specific forms that that can be observed in the functioning of underdeveloped markets and manifestations of market inefficiency:
- involvement of officially unregistered labor;
- the practice of officially unregistered production;
- tax avoidance.

At the beginning of the economic reform period in the context of the Static World Policy Simulation modeling framework Liefert (1994) predicted an increase in grain exports, a decrease in meat production, and the utilization of most of the stocks of the obsolescent and deprecated equipment in agriculture, emphasizing the lack of competitive advantage in animal production in the newly independent states. Many experts' predictions about the prospects of the domestic agricultural market have come true. The imperfection of regulatory strategy and tactics in the process of reforming Ukraine's agro-industrial complex has led to a decrease in the efficiency of the domestic animal production (Figure 1).

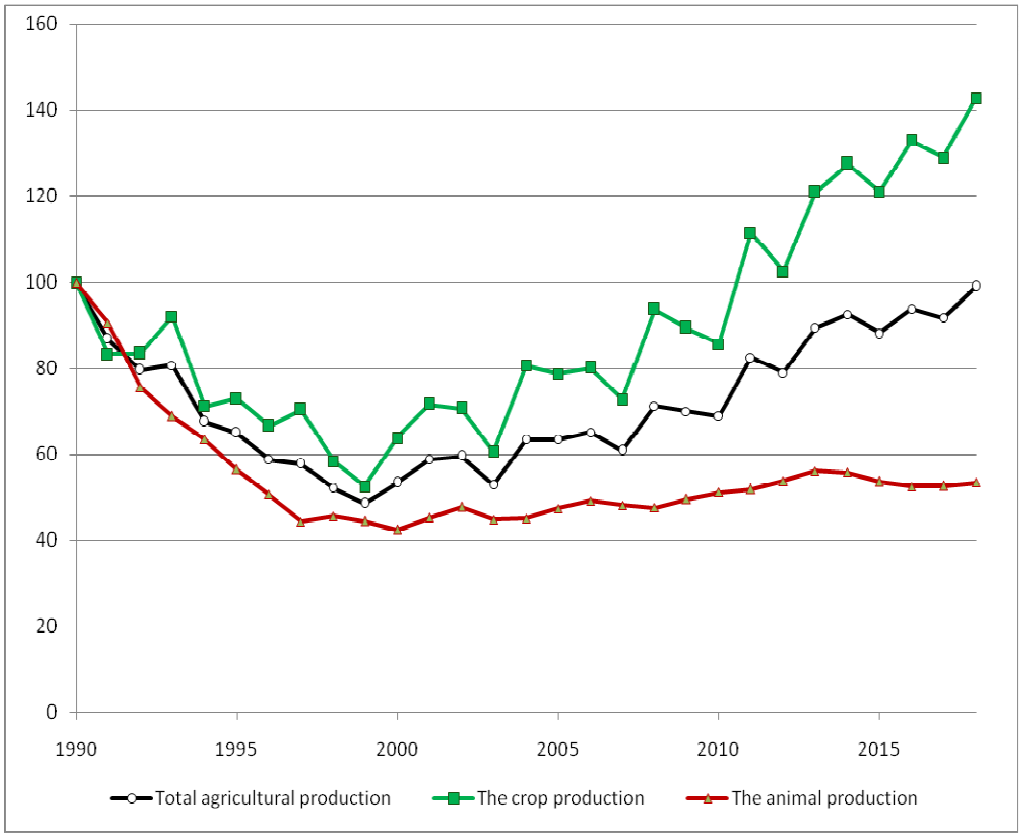

Fig. 1: Indices of agricultural production (1990=100%)

Source: data from the State Statistics Service of Ukraine (2019)

Supply Chain Management in Agri-food Export

Stoke and Lambert (2001), identifying strategic planning tools and analyzing operational practices in key logistics activities, consider the main reasons for the increased interest in logistics management: changes of consumer preferences, reduction in profits due to increased logistics costs, intensification of competition in the field of information technologies, redistribution of market power in supply chains. The conceptual framework by Aramyan *et al.* (2007) states that agri-food supply chain performance is characterized by efficiency (costs, profit, return on investment, inventory), flexibility (customer satisfaction, volume flexibility, the quantity of back orders and lost sales), responsiveness (fill rate, delivery delays, customer response time, lead time, shipping errors, customer complaints), product quality (sensory properties and shelf life, product safety and health, product reliability and convenience), and process quality (production system characteristics, environmental aspects, marketing).

The fall in the terms of trade indexes of meat and meat preparations, fish and crustacean, milk and milk products; eggs; honey, some other animal products, seedings and other trees, eatable fruits and nuts, shellac, sugar and sugar confectionery, cocoa and cocoa preparations, preparations of grains, products of vegetables processing indicates an unfavorable trends (Table 1).

Table 1: Terms of trade indexes for some agri-food commodities in Ukraine, 2018 (per cent)

Product group	2017	2018	One year change, (+,-)
Live animals	102,3	114,9	12,6
Meat and meat preparations	112,5	110,7	-1,8
Fish and crustacea	100,8	97,1	-3,7
Milk and milk products; eggs; honey	108,5	97,4	-11,1
Other animal products	112,9	96,7	-16,2
Seedings and other trees	113,9	104,1	-9,8
Vegetables	94,5	95,2	0,7
Eatable fruits and nuts	146,3	106,6	-39,7
Coffee, tea	85,7	111,2	25,5
Cereals	102,1	105,6	3,5
Flour-grinding products	118,8	127,7	8,9
Oil seeds and fruits	97,9	98,4	0,5
Natural shellac	113,3	94,4	-18,9
Plant materials for producing	84,2	190,5	106,3
Animal or plant fats and oils	92,3	103,0	10,7
Preparations from meat, fish	92,7	99,3	6,6
Sugar and sugar confectionery	97,6	82,6	-15,0
Cocoa and cocoa preparations	111,4	100,0	-11,4
Preparations of grains	104,9	100,6	-4,3
Products of vegetables processing	112,9	107,6	-5,3
Other mixed foodstuffs	93,1	98,3	5,2
Alcoholic and non-alcoholic beverages, vinegar	97,4	108,2	10,8
Remains and wastes of food industry	89,7	112,2	22,5
Tobacco and industrial substitutes of tobacco	93,7	100,2	6,5

Source: data from the State Statistics Service of Ukraine (2019)

The main goals in Ukraine's agricultural trade policy improvements can be seen as:

• increasing the share of processed foods and improvements of agricultural exports structure;
• opening new niches in the global market and diversification of export markets;
• support of small and medium-sized producers in their export efforts;
• increasing the level of global competitiveness of Ukrainian producers and processors (Trofimtseva, 2016).

Supporting the dynamic competitiveness of the agri-food supply chains requires an immediate response to changes in the global food market system. Among the main promising Ukraine's exported agricultural commodities are sunflower oil, maize, wheat, rapeseed, oilcake, soy beans, barley, poultry meat, cigars and cigarettes, sugar; fish, raw tobacco, sunflower seeds, foodstuffs, ethyl alcohol, citrus fruits, animal feedstock, palm oil, bananas and maize prevail among the imported food items (the State Statistics Service of Ukraine, 2019).

The agri-food supply chain management with export orientation centered on reflection of the economic and social objectives is intended to achieving not only economic but also social goals – increasing employment in rural areas and improving living standards of the population (Fig. 2).

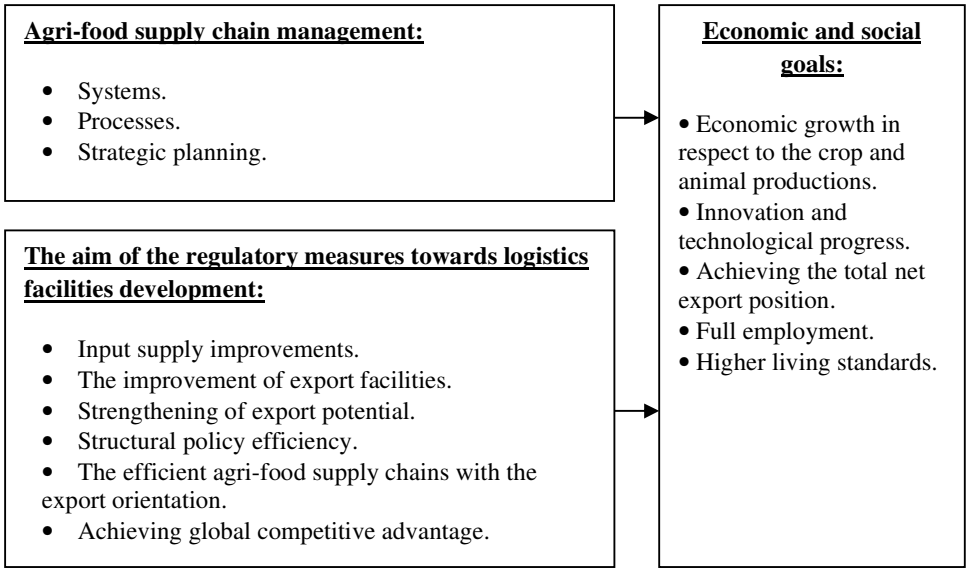

Fig. 2: Achieving economic and social goals through the agri-food supply chain management with export orientation

Strengthening the economic position of domestic agricultural enterprises on the export markets is possible the improvement of government's regulatory policy and development of logistics infrastructure.

A promising direction for enhancing agro-export potential may be the use of cooperative forms of business that will be able to realize themselves in the fields of procurement, distribution, transportation and financing. In this case, manufacturers have the opportunity to form the required set of products for sale and to provide storage through capacity sharing. For the same aim the reflexive and responsive agro-industrial clusters with a global diffusive capacity may be created.

Conclusion

Nowadays, Ukraine is considered as one of the most influential agricultural exporters, which in the conditions of increasing global demand for food gives a chance to win and hold competitive positions in the world food markets.

In such circumstances, the issues of comprehensive studies of logistic processes in agriculture are extremely urgent, the analysis of which is impossible without defining the system characteristics. Identifying these characteristics provides the basis for describing a common criterion for the efficiency of the logistics system, the operation of which is linked to the profit generated by the optimization of agri-supply chains – from the production of raw materials to the production of the final product and export facilities.

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Measurement, Reporting and Intellectual Capital Management in Polish Enterprises In the Light of Surveys

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Abstract

The main purpose of the article is to present the results of two surveys on identification, measurement, reporting and management of intellectual capital in Polish enterprises. These studies were conducted twice, for the first time in 2003 and repeated in 2017. Their goal was to gain knowledge on how companies operating in Poland approach the issue of intellectual capital accounting in financial and managerial terms, and whether their approach has changed over the period of time studied. Surveys carried out, showed that undertaking the task of introducing intellectual capital accounting to the company would be a beneficial move from the perspective of knowledge-based companies. However, this seems to be a matter of the future in Poland. On the other hand, the implementation of intellectual capital accounting should be preceded by the acquisition of thorough knowledge and familiarization with the internationally used practices in this field.

Keywords: Intellectual capital management, measurement and reporting of intellectual capital

Introduction

This article and the studies it contains were influenced by the interest in the concept of intellectual capital accounting, which has been trying to mark its presence in the accounting system in Poland since the 1990s. This concept focuses on the management, measurement and presentation of this type of capital in an enterprise.

In the world, the concept of intellectual capital accounting has been the subject of research since the second half of the 20th century. It was noticed that there is a difference between a market value and a book value of some companies being sold. Market analysts observe that company market value can be several times higher than its book value. The fact of this difference was the main reason for creating the concept of intellectual capital. Researchers began to be interested in this phenomenon. They focused on finding common reason for the differences in these values. The first observation was that this difference occurs in the case of not all companies but operating in specific industries. The examples are pharmaceutical, IT or consulting related firms. In general, we can call them a service industries area. The second observation which was made was the fact that such firms select their staff very carefully. They pay attention to knowledge, experience and competence of candidates during recruitment processes Thirdly, it has been noted that these companies often generate very spectacular profits. However, based on the analysis of the balance sheet, one might think that these are enterprises with assets of average value, which do not stand out from other organizations.

Based on these facts, scientists have come to the following conclusion: profits and value of a company depend on assets which are not revealed in annual financial reports. These assets have been called intangible assets, because they are not included in balance sheet. Skills, knowledge and experience of employees are examples of these kinds of assets. Looking at these examples we can see it is a very wide category of resources. But all of them have one common characteristic. Their occurrence is only possible when the adequate people are employed in the company. "Adequate" means people who have high competence and extensive knowledge. The conclusion is that financial capital cannot be a source of intangible assets. The source of intangible assets is therefore a completely different type of capital. It has been called intellectual capital because it comes from people. Intellectual capital is the difference between the book value and market value of an enterprise, and its counterpart on the assets side are intangible assets. Another conclusion that has been made in relation to intellectual capital is the fact that although it largely represents the value of some companies, it is not shown anywhere. That is, there is no official financial reporting document on the basis of which its value could be determined. This is not a desirable situation for the company itself or for potential shareholders or investors. First of all, because the picture of the company, its potential possibilities and profits is distorted. Moreover, the lack of information about intangible assets makes it impossible to manage and use such assets.

The main purpose of the article is to present the results of two surveys on identification, measurement, reporting and management of intellectual capital in Polish enterprises. These studies were conducted twice, for the first time in 2003 and repeated in 2017. Their goal was to gain knowledge on how companies operating in Poland approach the issue of intellectual capital accounting in financial and managerial terms, and whether their approach has changed over the period of time studied.

Meaning, measurement and presentation of intellectual capital in the light of literature research

The concept of intellectual capital derives from the so-called Human Resources Accounting, an area that dates back to the 1960s. The theoretical basis in this field was created by the Danish scientist E. Flamholz.

The first definition of intellectual capital was developed by K.E. Sveiby (1989). He distinguished two basic components of this type of capital, namely the intellectual capital assigned to the individual and the intellectual capital assigned to the organization. By the individual capital he meant individual, personal professional competence and social abilities, experience, education and other skills of employees, oriented outwards, towards the company's customers. By the organization capital he meant experience and history of entire organization, documented in handbooks, computer programs and tools; with concepts developed to solve customer problems. T. Stewart (1997) described it as " the sum of everything that everyone in the company knows and what determines competitive advantage". G. Ross and J. Ross (1997) state that „Intellectual capital is the sum of the „hidden" assets of the company, not fully captured in the balance sheet, and thus includes both what is in the minds of organizational members, and what remains in the company when they leave".

Following the example of the precursor of the intellectual capital accounting, K.E. Sveiby (1989), the methods of measuring intellectual capital can be divided into four basic categories:

- Direct Intellectual Capital Methods (DIC): These methods estimate the value of intangible assets expressed in monetary units by identifying and adding up its individual components.
- Market Capitalization Methods (MCM). The calculation is based on the difference between market value and book value.
- Return on Assets methods (ROA). The average pre-tax revenues of a given company for a given period of time are divided by the average value of the company's tangible assets. The result of the above calculation is the ROA, which is then compared with the industry average. The difference obtained is multiplied by the average value of tangible assets in order to calculate the average annual income from intangible assets. By dividing the average income calculated above by the aver-

age cost of capital or by the interest rate, one can estimate the value of intangible assets or intellectual capital.

- Scorecard Methods (SC). Individual intangible assets or intellectual capital are identified and then measured using indicators. The results obtained are then presented in a scorecard or in graphic form. Scorecard methods are similar to direct methods with the difference that they do not estimate the monetary value of intangible assets. Sometimes an aggregate indicator is introduced.

The methods of measuring intellectual capital presented above have both advantages and disadvantages, and the use of such and not another depends directly on the situation, needs and objectives of the analysis. Methods that offer monetary valuation, such as methods based on ROA and market capitalization methods, are useful in the case of mergers and acquisitions and for the valuation of a company for the needs of stock exchange. Their disadvantage is the assumption that everything can be converted into money. In addition, methods based on ROA are very sensitive to changes in the interest rate. In turn, market capitalization methods do not apply to non-profit companies or budgetary entities. It should also be mentioned that methods treating intellectual capital as an indivisible whole have limited cognitive value and are not applicable to intellectual capital management, where the recognition of its structure and value of individual components plays a significant role in the process of using and growing this type of capital.

Direct methods and scorecard methods, in turn, have such advantages as: presenting the overall picture of the company's operation, the ability to be applied at each organizational level, ease of implementation. The need to match your own set of indicators makes it more difficult to make comparisons with competing companies. In addition, due to the fact that they are relatively new, they have opponents among managers and investors who have become accustomed to analyzing data only in the financial perspective. Another disadvantage is receiving a large amount of information that is difficult to analyze and present to recipients.

Precursors in the field of intellectual capital presentation are K. E. Sveiby, L. Edvinsson and M. S. Malone. Sveiby is the creator of the so-called Intangible Assets Monitor, while the other two are the authors of intellectual capital reports for the company AFS Skandia. In total, they developed three models for the presentation of this type of capital (1997). The first and most general model provided only cursory information about intellectual capital itself. It is known as the Skandia Market Value Scheme. The second and best known model is the Navigator. That document consists of five parts, focusing on such areas as: finances, clients, employees, processes as well as renewal and development. Each of these areas is measured using a separate, specific group of indicators and indices that give results in monetary units, percentages or natural units. The latest model is the Intellectual Capital Index. This model is based on the results taken from the Navigator, but its advantage is that it can be used for forecasts, because it presents numerical data in the form of indicators.

On the American continent, in turn, a model for the presentation of intellectual capital was created, whose creators are R. Kaplan and D. Norton (2001). It is called Balanced Scorecard (BCS) and in its form it has many features in common with the Swedish Navigator.

Currently, in the world literature, based on theoretical foundations and ever more complete research results, many publications on intellectual capital are being created. Analyzing them in terms of topics discussed, several distinct areas can be distinguished among them. One of them concerns the concept of identifying components of intellectual capital, e.g. Cabrita and Bontis (2008), Kong, (2008), Al-Zayyat et al. (2010), Fădur et al. (2013), Oyewo Babajide et al. (2014). The issues presented within it relate, among others, to aspects such as knowledge contained in human and organizational resources, customer base or level of innovation. One of the concepts developed in this field is Resource-Based View e.g. Arthurs and Busenitz (2006), Zou (2010). There are also many studies in the literature on methods of measuring intellectual capital e.g. Cater and Cater (2009), Zeghal and Maalooul (2010), Pulic (2004), Bakhsha et al. (2007), Caldas (2012). The measurement is designed to, among other things, enable real valuation of intangible assets, support the construction of an operating strategy adapted to the conditions and making the most appropriate decisions based on reliable information.

Theoretical foundations of the concept of measurement, reporting and management of intellectual capital were transferred to the Polish context, in the works of, among others, Jarugowa and Fijałkowska (2002), Mieczysław Dobija (2002), Dorota Dobija (2003), Strojny (2000), Fazlagić (2002). The publications that appeared in the Polish literature in the following years had a practical dimension, presenting the results of own research. The authors of this type of work include, but are not limited to, such names as Zielińska (2005), Pypłacz and Peter-Bombik (2015), Bombiak (2016), Banaszkiewicz and Makowska (2018).

Methodology of Questionnaire Surveys

The empirical study carried out in 2003 aimed to collect data on the basis of which the following questions could be answered:

- is there a connection between intellectual capital and the amount of profit generated by the company,
- is there a need to measure and manage intellectual capital,
- should the accounting system be modified in such a way that it takes into account the measurement, presentation and monitoring of intellectual capital.

The questionnaire form containing the above questions was sent out in the fourth quarter of 2003. In response, 45 completed surveys from units from the sector of knowledge-based companies, such as, for example, IT, consulting or pharmaceutical companies were sent back. The surveys were completed by owners, directors or chief accountants.

The answers obtained in 2003 showed that intellectual capital accounting in the practice of Polish enterprises is basically not a very popular tool, although on the other hand the results of the survey showed that companies operating in Poland were aware of the importance of intellectual capital as an element contributing to market success. Therefore, the authors of the article, after 14 years decided to repeat the study in this area in order to obtain answers to two research questions. Firstly, how the concept of intellectual capital accounting is perceived by practitioners of Polish economic life recently and, secondly, whether the Polish enterprises' view on this subject has changed since 2003. In order to verify these questions in May 2017, a survey was sent containing a very similar set of questions, like the one from 2003. The questionnaire was sent electronically in the amount of 51 copies. In total, 24 correctly completed surveys were obtained. The data collected shows that a typical respondent, as before, was a company operating in the service industry in northern Poland, employing from 51 to 250 people, with Polish capital only and operating in the market for more than 10 years. Due to the size of the sample, the study was for information purposes only.

The survey questionnaire included questions about research areas such as: identification of intellectual capital, measurement of intellectual capital, intellectual capital management and intellectual capital reporting. The article presents the answers of the respondents to selected questions from the above-mentioned individual issues.

The authors of the publication are aware of the fact that the selection of questions made for the purposes of the article makes it possible to obtain only a general view on the topic under discussion. However, this was a deliberate procedure because it ensured comparability of the results obtained over time. Apart from one question, the other questions discussed were included in the questionnaire in both 2003 and 2017. The survey prepared in 2003 was of a general nature due to the fact that at the beginning of the 20th century the concept of intellectual capital was a new issue for accounting and management practitioners in Poland. Notwithstanding the above, it should also be taken into account that a significant limitation of surveys on intellectual capital is the reluctance of some business entities to participate in such survey and thus disclosure of data on the strategic resource for the company. At the moment, the authors of the publication treat the obtained research material as an introduction to further research, both quantitative (extensive questionnaire) and qualitative (interviews).

Survey Results

The first question that was asked was: What determines success in the industry in which the company operates? There were two answers to choose from: traditional resources and intellectual capital. In the case of this question, all respondents in 2017 showed unanimity indicating intellectual capital as a key element guaranteeing the achievement of success in their industry. Similar results were obtained in the first survey. In 2003, 44 companies from the 45 surveyed indicated intellectual capital. The distribution of the results is presented in Figure 1.

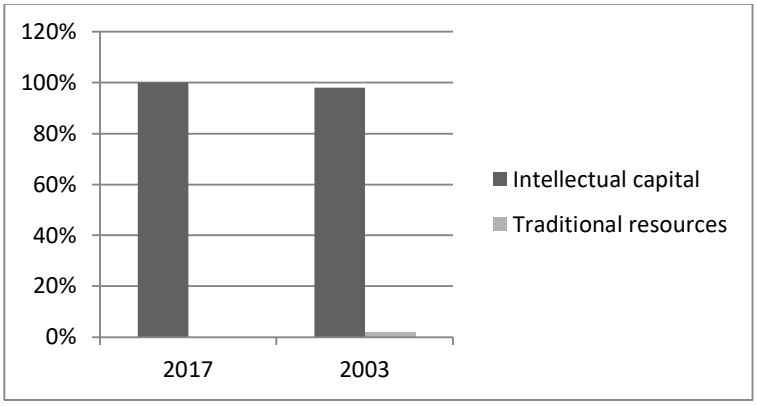

Fig. 1: What determines success in the industry in which the company operates?
Source: own study based on the questionnaire survey.

The next question concerned the share of intangible assets in creating the total value of the surveyed entities. The answers provided indicate that intangible assets, in line with the opinion of the majority of respondents (88%), constitute from 41 to 100% of the value of the enterprise. The remaining part of the surveyed valued intangible assets from 0 to 40% of goodwill. In 2003, the range of 41 - 100% was given by 67% of respondents. Interestingly, that year, the range of 0 - 20% was indicated by about 26% of respondents, while in 2017 such a response was not given by any of them. Answers given by respondents are illustrated in Figure 2.

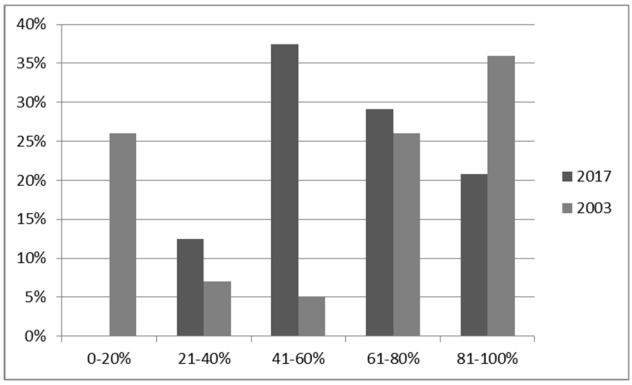

Fig. 2: What percentage of the company's total value would you attribute to intangible assets?
Source: own study based on the questionnaire survey.

When asked whether the departure of 10% of the best specialists from the company would have an impact on reducing its profits, the majority of respondents gave the answer "definitely yes" or "rather yes". In total, 83% of all respondents gave such answers. In the previous study, this indicator was at the level of 75%. Obtained results are graphically presented in the Figure 3.

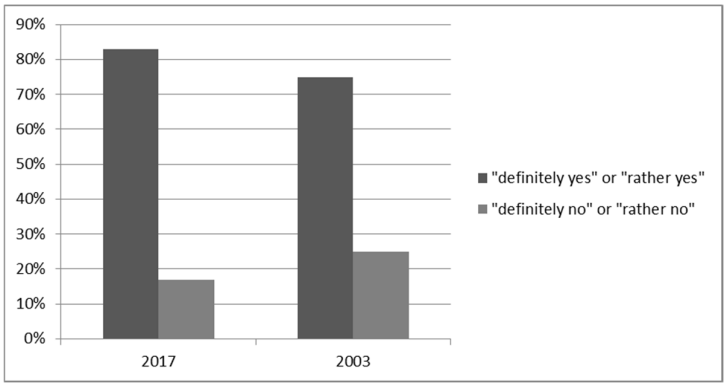

Fig. 3: Will the departure of 10% of the best specialists from your company have an impact on the reduction of its profits?

Source: own study based on the questionnaire survey.

Intangible assets as an income-generating factor should in particular be known and identified. It is difficult to manage something that has not been known or measured.

The results obtained in 2017 showed that the measurement of intellectual capital components is found in 62% of the surveyed companies. The rest of enterprises, i.e. 38%, do not undertake this task, according to respondents. In 2003, the answer "yes" was marked by 42%, which means that the majority of companies, i.e. 58%, did not deal with the issue of identifying and measuring the components of intellectual capital. The distribution of the results is presented in Figure 4.

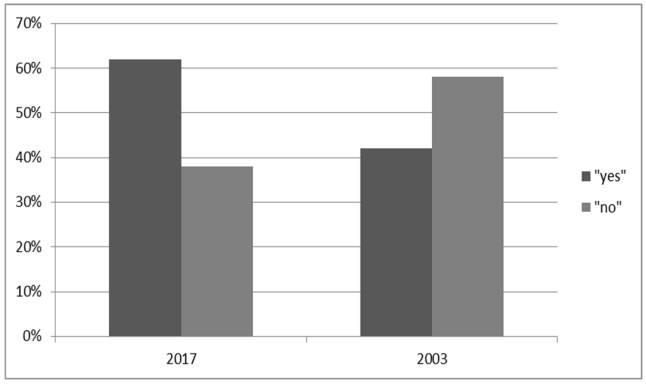

Fig. 4: Does the company measure intellectual capital?

Source: own study based on the questionnaire survey.

Most respondents recognized the usefulness of collecting information necessary to develop measures of intellectual capital. Answering the question in 2017, 63% of the respondents marked the answer "definitely yes" or "rather yes". Other people stated that there was no need to measure intellectual capital in their enterprises, although none of the respondents gave a "definitely not" answer. In 2003, the percentage of people who outlined "definitely yes" or "rather yes" was 45%. Answers given by respondents are presented in Figure 5.

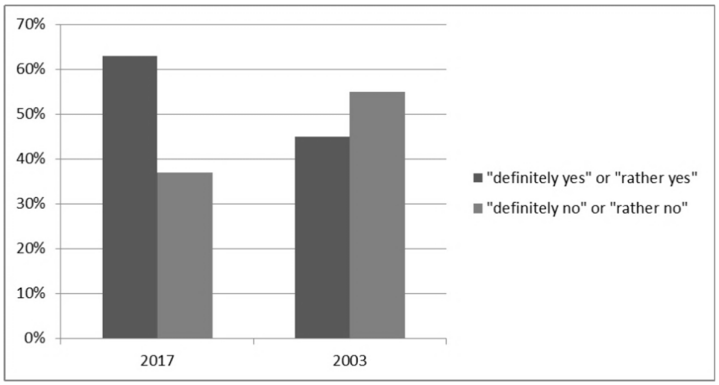

Fig. 5: Is there a need in your company to collect information necessary to develop measures of intellectual capital?

Source: own study based on the questionnaire survey.

In 2017, the question which components of intellectual capital are measured and analyzed was asked. The people participating in the study could mark any number of proposed items and enter their own answer.

According to the respondents, the number of clients is the most frequently measured and / or analyzed intangible element by the surveyed entities. This answer was indicated by 63% of respondents. Marketing was also a frequently highlighted item. In total, 58% of respondents said that their companies measure and / or analyze this component. 54% of the surveyed entities measure and discuss training. The same percentage of respondents indicated "education". 54% of respondents indicated the answer "investments in IT". 46% of surveyed entities measure and / or analyze seniority. 38% of respondents indicated the "brand" position. Obtained results are graphically presented in the Figure 6.

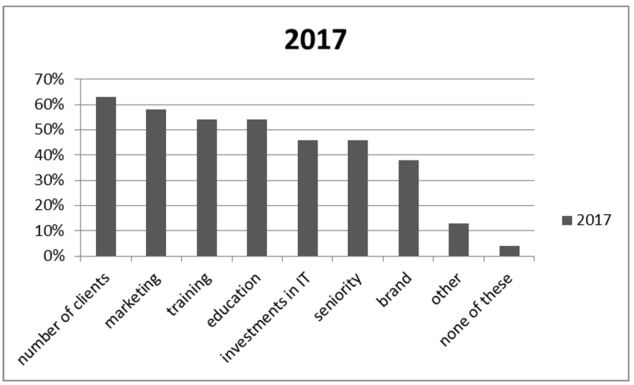

Fig. 6: Which components of intellectual capital are measured and analysed in your company?

Source: own study based on the questionnaire survey.

The next question was to check how many companies prepared a report on the state of intellectual capital.

Based on the answers provided, it can be concluded that intellectual capital reporting is not a well-known issue in the majority of surveyed entities. In 2017, the "no" position was indicated by 75% of the people. Only 25% of the respondents said their company was preparing additional reports on intangible assets. In the previous survey only 3 out of 45 companies that responded to the survey created such documents. As it can be noticed, there has been some improvement here because in the

case of the survey from 2017, six companies from among 24 were preparing reports. The distribution of the results is presented in Figures 7 and 8.

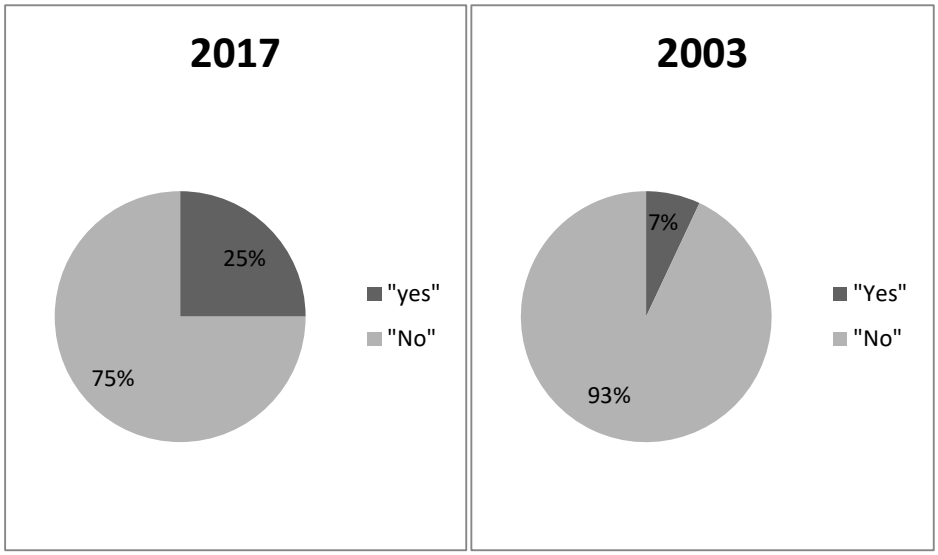

Fig. 7 and 8: Do you prepare a report on the state of intellectual capital?
Source: own study based on the questionnaire survey.

As for the knowledge of methods of presenting intellectual capital, the survey carried out showed that 25% of respondents in 2017 marked the answer "no". One can see here some improvement in relation to the results from 2003, when 52% of the respondents gave such an answer. Answers given by respondents are illustrated in Figures 9 and 10.

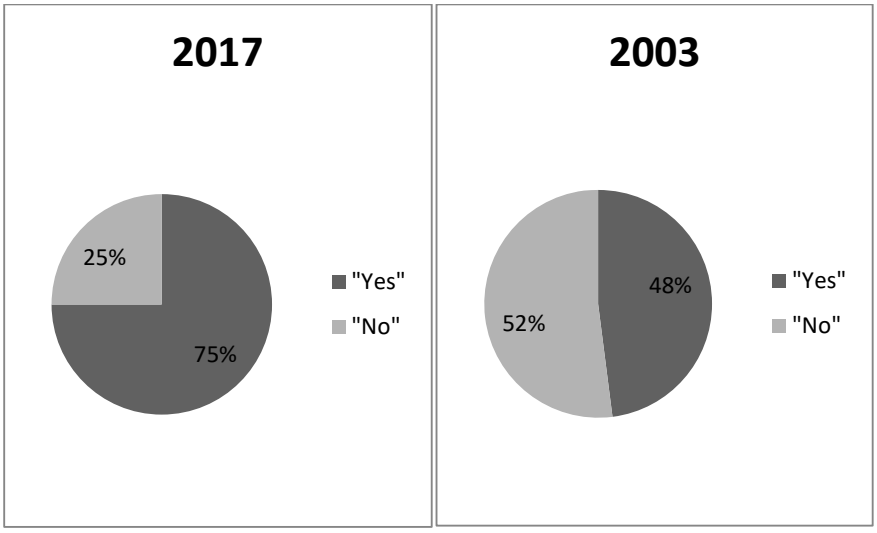

Fig. 9 and 10: Do you know at least one method of presenting intellectual capital?
Source: own study based on the questionnaire survey.

Discussion

The study was aimed at gathering information on the knowledge, insights and opinions of people working in the banking, IT or pharmaceutical sector on intellectual capital. Analyzing the survey's answers, one can first conclude that companies are aware of the fact that knowledge and other intangible assets are an important element contributing to market success. As a result, they see the role of employees in the process of generating profits for the organization. They also admit that a significant percentage of goodwill - especially in service companies - is included in intangible assets. It can be noted that these observations have grown in popularity as evidenced by the percentage increase in respondents providing such answers. The results obtained are consistent with the results of other such surveys. Intellectual capital is presented in them as one of the most important resources of the enterprise, and its effective management becomes the key competence of modern organizations, distinguishing the company from its competitors. They also overlap with theoretical considerations in this field, presented in the literature.

When considering the issue of intellectual capital, it is worth remembering that making sound management and investment decisions in its area requires prior analysis of the state of intangible assets held. Its measurement and valuation is important both from the perspective of financial accounting and management accounting. This was also the approach of people who took part in the survey studies discussed in the article. When analyzing the approach to measuring intellectual capital, one can notice a significant increase in this respect. At present, 62% of the surveyed enterprises deal with the measurement of intellectual capital components, which is 20 percentage points more than in 2003. Therefore, the majority of surveyed entities from the service sector consider that the components of intangible assets should be measured. When measuring the elements of intellectual capital, they focus mainly on the data related to the number of clients, branding or education of employees. Measuring the components of intellectual capital is however not a simple task. The main reason for this is the difficulty of expressing the value of intellectual capital in monetary units. First of all, because it is qualitative and relative in nature, i.e. dependent on the specificity of a given organization. Therefore, assets that are significant in one enterprise may be less important in another. Another limitation is the knowledge deficit in the scope of intangible assets valuation and the variety of methods provided in the literature on the subject, which has not yet developed a coherent concept of its measurement. Regardless of which method is chosen to estimate intellectual capital, it should be remembered that the measurement should be made by persons who are specialists in the field of accounting and additionally have appropriate training in this subject. This is a task for the whole team, not for an individual employee.

As regards the presentation of intellectual capital, based on the information obtained, it can be concluded that the subject of its presentation in financial reporting is better known in the surveyed enterprises as compared to 2003. This is evidenced by the fact that only about a quarter of respondents do not know any of the methods of presentation of intellectual capital. However, still only a small percentage of companies provide reports on the state of this type of capital. Presentation of intellectual capital is not easy due to several important barriers. The most important obstacle is the difficulty of obtaining the data needed to build specific indicators. The reason for this is the imperfection of information systems, which means that some indicators simply have to be abandoned. On the other hand, reporting, especially in knowledge-based companies, limited only to data on the state of tangible and financial assets, gives an incomplete picture of the full state of the enterprise's assets. In a knowledge-based economy, modern accounting should comprehensively reflect the value creation process in the enterprise, both in financial and non-financial terms. The implementation of its primary goal in the form of providing information used in the process of making rational economic decisions requires its mandatory extension with a report on the state of intellectual capital.

Conclusions

Certainly, the implementation of the concept of measuring, reporting and managing intellectual capital in an enterprise is a difficult process that requires not only financial expenses but also appropriate competences and openness to change among employees, managers and owners. Although

this is a complicated issue that may pose difficulties in effective management, it is an extremely valuable asset in competitive struggle. Investments in intellectual capital require managers to incur large expenses. In the long run, however, they can significantly contribute to ensuring that an enterprise generates a high rate of return and increase in value.

To sum up, the conclusion is that introducing the concept of measuring, reporting and managing intellectual capital to the company would be a beneficial move from the perspective of knowledge-based companies. However, this seems to be a matter of the future in Poland. On the other hand, the implementation of intellectual capital accounting should be preceded by the acquisition of thorough knowledge and familiarization with the internationally used practices in this field. In connection with the above, the authors of the article intend to continue scientific research in the field of intellectual capital using such research tools as an extensive questionnaire and interviews.

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Eco-Innovative Barriers and Needs of Manufacturing SMEs from the BSR Region

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Abstract

The present paper comprises two parts: cognitive and empirical ones. In the first part the authors have synthetically defined eco-innovations, introduced their division and scope. They have also made an attempt to justify that "the strength and size of the SME sector fosters diffusion of eco-innovations". In the empirical part, based on the secondary research conducted for the European Commission (Flash Eurobarometer 456), the authors have determined the percentage involvement of SMEs in green activity for the BSR countries – partners in the project "Network of Service Providers for Eco-innovations in Manufacturing SMEs (Ecolabnet)". Based on secondary research the authors have indicated and justified the existing differences of green activity" of SMEs in the selected European countries. They have also attempted to justify the research assumption that a higher percentage of SMEs perceive and identify various barriers of "green activity" in the countries characterised by a higher percentage of this activeness. Also, based on own research of the project Partners (including the authors of the present paper) three groups of needs in the scope of eco-innovations have been summarised and evaluated (business, development, technological ones). It has also been indicated that the needs of SMEs regarding eco-innovations depend on their expert knowledge and strategic involvement.

Keywords: Eco-Innovations, Green Activity, SMES, Eco-Innovative Needs and Barriers, Network of Service Providers

Introduction

This paper summarises the determinants of green activity diffusion primarily with relation to small and medium-sized enterprises (SMEs), therefore also selected support mechanisms promoting their active mobilisation. According to this plan the European Union (EU) supports, among others, consortia, organisational networks created by these enterprises with the cooperation of scientific and research units and intermediary entities (Muller et al., 2017; *European Commission*, 2014).

The paper is organised in the following way. In its first part the authors have presented the theoretical background referring to the origins of the term of eco-innovations. The second part concentrates on evaluating the primary areas of green activity and its barriers (based on secondary research - according to Flash Eurobarometer 456 - the research was conducted on a sample N=13, 117). In the third part, based on the own research of the Ecolabnet Partners, the authors have attempted to evaluate the nature of eco-innovation barriers in the investigated SMEs (N=296) from the six partner countries of the Baltic Sea Region (BSR). The underlying objective of the paper was to identify and evaluate the eco-innovative needs of the SMEs from the BSR region, such as: *business, development, technological ones*, which may be supported by the *Network of Service Providers for Eco-innovations in Manufacturing SMEs" – Ecolabnet.* Identifying these barriers has allowed for

determining eco-innovative needs of the investigated SMEs and at the same time categorising them. The final part includes the conclusions and indicates directions of future research in this field.

Theoretical Framework – Eco-Innovation

In the literature on the subject the transformation of innovations into eco-innovations emerged at the end of the past century. Obviously, the foundations for the term of eco-innovations were innovations in the process grasp. One of the first definitions of eco-innovations was introduced by C. Fussler and P. James, who defined eco-innovations as new products and processes that provide the business and customers with added value, simultaneously reducing the impact on the environment (Fussler and James, 1996).

A. Reid, M. Miedzinski (2008) in turn, define eco-innovations as creation of new goods, services or systems at competitive prices, as well as processes and procedures that satisfy human needs and ensure better quality of life simultaneously minimising the consumption of natural resources per one production unit, reducing to a large extent emission of toxic substances.

In the process grasp in the literature on the subject, among others, N.M.P. Bocken, M. Farracho, R. Bosworth, R. Kemp, define eco-innovations as "a significant" improvement of general process of innovation at the enterprise so it can achieve sustainable development of its primary operation (Bocken et al., 2014).

The diversity in defining eco-innovations contributed to the attempts that have been undertaken to unify them. One of them was made by the European Commission in 2009, which defines eco-innovations as all forms of innovations, technical and non-technical ones – that create opportunities for enterprises and are beneficial for the environment, prevent the negative impact of economic activity on the environment, e.g. by optimisation of resource use (*European Commission*). OECD defines eco-innovations as environmental innovations related to development or implementation of new or significantly improved products, processes, but also marketing methods, organisational structures and institutional solutions that lead to an improvement of the natural environment's condition, compared to corresponding alternative solutions (*OECD*, 2009).

Presently, eco-innovations are not limited to product and process ones. According to Oslo Manual 2018 eco-innovations are extended to all business processes, e.g. in: logistics and distribution, marketing and sales, information and communication technology, administration, organisation and management (*OECD*, 2018).

The scope of eco-innovations may go beyond the boundaries of innovations organisation and comprise wider social systems, resulting in changes of the existing social and cultural standards as well as institutional structures. The scope of implemented eco-innovations varies and depends on the adopted attitude to changes, e.g. modification – slight or progressive improvements of products and processes; redesign – significant changes to the existing processes, products, business processes; supplementation – introducing pro-environmental products and services – supplements of products or services available on the markets and "novelty" – developing and introducing completely new products, processes, organisation structures and business procedures.

Therefore, while returning to the terminology of eco-innovations it is worth referring to the definitions that in their discussions introduce A. Triguero, L. Moreno-Mondéjar, M.A. Davia. They perceive eco-innovations as a method for increasing the potential tangible and intangible benefits of enterprises in correlation with an increase in their pro-environmental awareness, but also the awareness of their customers – consumers of created values in three various dimensions: eco-product, eco-process and eco-organisational ones (Triguero, Moreno-Mondéjar and Davia, 2013).

Presently, the common goal of pro-environmentally aware producers and consumers is contributing to more sustainable production and creating consumption patterns. Moreover, high pro-environmental

awareness is reflected in an ability to identify heterogeneous eco-innovative needs, an intense transfer and the ability to develop eco-innovations. This is also justified by the perception of a high correlation between greening and competitiveness.

However, it needs to be stressed here that in the neo-classical grasp the natural environment itself was a burden for enterprises, which was identified through: production costs, administrative costs or restrictive environmental policy. In this approach competitiveness and greening were perceived as opposites (Munch Andersen, 2002). Frequently, this was associated with the perceived barriers of "green activity". Thus, barriers to eco-innovation emerge as a critical factor in either preventing or enabling EU strategies, energy and environmental policy implementation, and "green activities" (Marin, Marzucchi and Zoboli, 2015). The most frequently distinguished in the literature on the subject barriers include legislative and financial ones, but also the ones related to asymmetry of information between the perceived barriers and actual eco-innovative needs of economic entities (Polzin, von Flotow and Klerkx, 2016). In the present paper, with reference to the definition of eco-innovations and their elements, perceived asymmetries between eco-innovations and competitiveness as well as barriers and eco-innovative needs, based on the research conducted within the Ecolabnet project, identifying the barriers allowed the authors to determine and categorise the eco-innovative needs of SMEs in the BSR.

"Green Activity" Areas of the European SME Sector

While concentrating on the defined group of entities – SMEs, based on the secondary research for the European Commission (*European Commission*, 2017), it should be emphasised that 33% of the European SMEs have undertaken and 89% them are planning at least one action that stimulates a decrease in resource intensity, frequently through implementation of eco-innovations: product ones and business processes (including technological, organizational ones in production and logistics). Currently implemented eco-innovations in the scope of resource intensity regard reduction in consumption of various primary and auxiliary materials/resources and also maximised use of source materials. According to Flash Eurobarometer 456 – TNS Political & Social at the request of the European Commission, Directorate-General for Enterprise and Industry (*European Commission*, 2018) the dominant areas of pro-environmental activity of the European sector of micro and small enterprises in 2017 constituted (the research was conducted on a sample N=13. 117): 1. minimising waste - 65% SMEs; 2. energy savings - 63% SMEs; 3. material savings - 57% SMEs; 4. water savings - 47% SMEs; 5. waste recycling and its reuse - 42% SMEs; 6. eco-product development - 25% SMEs; 7. waste material sales - 21% SMEs; 8. RES installation in prosumer models - 14% SME.

While analysing percentage indexes of green activity in particular distinguished areas (European SMEs), it should be indicated that these activities are differentiated (Karaarslan, 2015) in particular countries of the European Union. With reference to the subject matter specified in the title of the present paper, which basically concerns the evaluations of eco-innovative needs of SMEs in the BSR countries, based on secondary research (*European Commission*, 2018) conducted for the European Commission (Flash Eurobarometer 456) the authors have attempted to answer the following partial question: *What is the percentage of SMEs involvement in „green activity", including eco-innovations in the BSR countries involved in the project?*

For this reason, the authors have aggregated in Table 1 the percentage figures of the conducted „green activity" of SMEs in primary areas – in the countries included in the Ecolabnet project (Finland, Lithuania, Estonia, Sweden, Denmark, Poland).

Table 1: Percentage figures of SMEs from the BSR region in the context of conducted "green activity"

Areas of green activity SMEs	EU-28	Finland	Lithuania	Estonia	Sweden	Denmark	Poland
Minimizing waste	**65%**	55%(2)	20%(4)	9%(5)	**76%**(1)	49%(3)	55%(2)
Energy savings	**63%**	51%(3)	42%(4)	21%(5)	57%(1)	55%(2)	57%(1)
Material savings	**57%**	54%(3)	33%(5)	15%(6)	**66%**(1)	52%(4)	**60%**(2)
Water savings	**47%**	27%(4)	36%(3)	8%(5)	36%(3)	40%(2)	**49%**(1)
Waste recycling and its reuse	**42%**	31%(2)	7%(6)	13%(5)	**62%**(1)	29%(3)	24%(4)
Eco-product development	**25%**	23%(3)	7%(5)	5%(6)	**32%**(1)	**26%**(2)	17%(4)
Waste material sales	**21%**	18%(3)	15%(4)	6%(5)	**26%**(1)	**26%**(1)	21%(2)
RES installation in prosumer models	**14%**	14%(2)	4%(4)	4%(4)	**35%**(1) *leader in EU-28*	9%(3)	4%(4)

(1), (2), (3), ... - descending order of percentage figures
Source: Own elaboration on the basis Flash Eurobarometer (European Commission, 2018)

The clear leader of „green activity" among SMEs (including the scope of eco-innovations), in the BSR countries is Sweden. The only exception is the area of *water savings* (36% of Swedish SMEs). In all seven remaining areas of „green activity" distinguished by the European Commission, the percentage figures for Swedish SMEs are higher than figures aggregated for the SMEs in the whole population of EU-28. Swedish enterprises form the SME sector lead in the whole of the EU in *implementation* of RES *installations* (including eco-innovative prosumer solutions). The percentage figures in this area are over twice as high in this area of "green activity" as the aggregated figures for the SMEs in all the EU member states (Sweden 35% - EU-28 – 14%). The lowest in turn percentage figures have been recorded with reference to the distinguished areas of "green activity" of SMEs in such countries as: Lithuania or Estonia. For instance, in case of *minimising waste*, the activity in this area was declared by 9% of Estonian SMEs and 20% of the Lithuanian ones. This far below the value aggregated in the whole group of European SMEs (EU-28). Respectively, the figures are lower by 56% (Estonia) and 45% (Lithuania). While analysing the sample area of green activity of the SMEs – *minimising waste* the difference between the leader, Sweden, and Estonia amounts to 67% and Lithuania 56%. Therefore, it can be justified that the differentiation of percentage figures of the "green activity" area for the SMEs in the BSR, but also in the whole EU-28 is very high. In Poland and Denmark the differences are smaller. In two case the obtained percentage figures of "green activity" of SMEs are higher than in the aggregated total population of the investigated European SMEs. In case of Denmark these are the areas of *eco-product development* – 26% and *waste material sales* – also 26%. In both cases the percentage figures of Danish SMEs are higher than the aggregated figures for the whole sector in EU-28, respectively by 1% and 5%. In turn in case of investigated Polish SMEs the percentage threshold compared to the total research population of EU-28 was exceeded in two areas: *material savings* and *water savings*, respectively by 3% and 2% the percentage figures are higher than the aggregated ones in the SME sector of the whole investigated population of EU-28. Undoubtedly, the disparities in the undertaken „green activities" of SMEs in the BSR countries (partner countries in the Ecolabnet network), occur in all the primary areas. Based on the preliminary research/observations conducted by the authors prior to the Ecolabnet project implementation, it was assumed that in the particular BSR countries (partner ones) these differences

occur primarily due to the following reasons: heterogeneity of the existing social and cultural standards and institutional structures, level of knowledge and eco-innovations transfer, access to external sources of eco-innovative solutions financing (e.g. EU funds, capital venture, preferential loans and credits or business angels) or implementation level of legislative support mechanisms. Detailed results of the research have been aggregated in previous papers of the authors, among others: *Levels of Pro-Environmental Maturity in Micro and Small Enterprises, Environmental Management and Green Attitudes of the European SME Sector, The Influence of Environmental Awareness and Attitudes of Entrepreneurs on the Acceleration of eco-Innovation in Micro and Small Enterprises* (Kuceba, 2019; Kuceba and Zawada, 2019).

However, it needs to be stressed in the present paper that the level of involvement of the SME sector enterprises into the implementation, development and transfer of eco-innovative solutions also depends on the level of their pro-environmental awareness, which reflects their pro-environmental attitudes. For instance, the sector of Swedish SMEs, whose activeness in the investigated BSR countries is the highest (Table 1), is assigned a highly pro-environmental attitude. This sector is characterised by a high level of knowledge, high level of interest in environmental problems, willingness to incur higher environmental costs. This translates into offensive pro-environmental actions, among others, through implementing eco-innovations in the abovementioned, primary areas of "green activity". This is also associated with the abilities (reflected by proper skills and competencies) concerning: designing, elaborating, implementing, developing completely new products and processes, and also organisational structures and business procedures. In the opinion of the authors, high pro-environmental awareness itself reflected in an active attitude of SMEs is just a supply side, which has to be balanced on the demand side – an active pro-environmental attitude of aware consumers. Thus, with reference to the Swedish example and presenting a highly-active pro-environmental attitude of the SME sector, it is important that the maturity regarding green activity occurs both on the supply and demand side.

In the remaining countries that have been subject to analysis the green activity of the SME sector (compared to the product life cycle) is at the stage of "growth", certainly differentiated with respect to the analysed heterogenous areas. In Table 2 the authors have also introduced barriers of "green activity" for SMEs in the investigated BSR countries. They have attempted to identify how barriers of "green activity" affect the percentage figures of SMEs that undertake such an activity.

A "leader" in identifying the barriers in the BSR countries are Polish SMEs. The percentage figures for SMEs in Poland, assigned to all the primary eight barriers of "green activity" are higher than the figures in the aggregated total investigated population of SMEs in EU-28.

However, while analysing the assigned percentage figures of perceiving the barriers by SMES one can observe that especially in case of Lithuania and Estonia, despite a low population of SMEs that implement "green activity", the basic barriers distinguished in Table 2 are also perceived by a small percentage of this sector's entities. In case of Lithuanian and Estonian SMEs the percentage figures regarding all the eight barriers of "green activity" are lower than the aggregated figures of all the SMEs in the investigate population of EU-28. For instance, *difficulty in choosing the right resource efficiency actions for your company* in Estonia (2%) is ten times lower that in the total aggregated population of SMEs in EU-28 (20%).

Table 2: Percentage figures of SMEs from the BSR region in the context of "green activity" barriers

Barriers of green activity SMEs	EU-28	Finland	Lithuania	Estonia	Sweden	Denmark*	Poland*
Complexity of administrative or legal procedures	**33%**	20%(3)	14%(4)	9%(5)	24%(2)	20%(3)	**52%**(1)
Cost of environmental actions	**24%**	18%(3)	4%(4)	9%(5)	**25%**(2)	**27%**(1)	**27%**(1)
Difficulty to adapt environmental legislation to your company	**22%**	12%(3)	8%(4)	7%(5)	7%(5)	14%(2)	**31%**(1)
Lack of specific environmental expertise	**20%**	14%(2)	8%(4)	3%(5)	14%(2)	13%(3)	**28%**(1)
Technical requirements of the legislation not being up to date	**20%**	17%(2)	7%(4)	7%(4)	8%(3)	17%(2)	**24%**(1)
Difficulty in choosing the right resource efficiency actions for your company	**20%**	**26%**(2)	7%(5)	2%(6)	**24%**(3)	15%(4)	**28%**(1)
Lack of demand for resource efficient products or services	**17%**	**18%**(3)	7%(6)	9%(5)	**22%**(1)	**14%**(4)	**21%**(2)
Lack of supply of required materials, parts, products or services	**14%**	**15%**(1)	9%(3)	7%(4)	13%(2)	9%(3)	**15%**(1)

(1), (2), (3), … - descending order of percentage figures

Source: Own elaboration on the basis Flash Eurobarometer 456 (European Commission, 2018)

Paradoxically, the higher percentage of SMES perceive and identify various barriers of "green activity" in the countries characterised by a higher level of growth and at the same time awareness reflected in their „green activities" (Poland, Denmark, Finland, and also Sweden).

Therefore, based on the example of Estonia and Lithuania it is possible to unequivocally adopt a classic postulate (Munch Andersen, 2002), that the low level of „green activity" in the countries of the Baltic Sea Region is conditioned by barriers perceived by the investigated SME sector. Thus, in an inversion to the identified for the European Commission barriers of "green activity", the authors have made an attempt to identify the needs of SMEs, purely eco-innovative ones that stimulate the development of this activity in the BSR countries covered by the Ecolabnet project.

Evaluation of Barriers and Needs to Support Eco-Innovations in the Manufacturing SMEs of the BSR – Research Within the Ecolabnet Project

The research conducted within the Ecolabnet project in the first stage of project implementation (2nd half of 2019) involved identifying, measuring and evaluating the significance of heterogeneous factors that stimulate, but also hinder, the diffusion of eco-innovations of SMEs in the partner countries of the Baltic Sea Region. In particular they pertained to: identifying and classifying consumers of eco-innovations – created or co-created by the manufacturing SMEs, evaluating their knowledge about eco-innovation, categorising eco-innovations, motivators, needs in the scope of developing, implementing and utilising them as well as barriers identified by the investigated group of manufacturing entities in the BSR. The research sample constituted N=296 of entities (in this: Estonia 69 – 23.31%, Poland 57 – 19.26%, Finland 54 – 18.24%, Lithuania 15.88% - 47, Sweden 12.84% - 38, Denmark 10.47% - 31). The research was conducted with the use of the research method CAWI – (Computer-Assisted Web Interview) in the form of a survey questionnaire that included 26 questions. It needs to be stressed that 49.66% - 147 of the SMEs out of the total investigated population identified their primary activity as purely correlated with eco-innovations (including: pro-active attitude of SMEs – working with eco-innovations 25.68% -76, eco-innovations integrated with the company's strategy 1.82% - 35, mission of the SME is based on eco-innovations – 12.16% - 36).

In the first step the authors have attempted to evaluate the significance of eco-innovations barriers, which having been identified allowed for determining the needs of SMEs and simultaneously their categorisation/grouping, not being limited exclusively to financial and technological ones (Table 3).

In order to synthetically evaluate the resultant of particular eco-innovations barriers the authors in each case determined the weighted average (WA). In case of green activity barriers (Table 2) in the aggregated group of entities EU-28 (*European Commission*, 2018), the largest percentage of the investigated SMEs indicate as significant ones - Complexity of administrative or legal procedures. However, in case of own research of the project Partners regarding the barriers of eco-innovations the largest group of the investigated BSR SMEs 31.44% (72) indicate lack of capital as the most significant barrier. Also, the determined weighted average from the evaluations of SMEs is the highest (WA – 3.60), which justifies the continuous fears of this sector pertaining to financing eco-innovations from external sources as well as an increase in the costs of their operations.

However, while analysing the summarised in Table 3 grades assigned to eco-innovations barriers, but in the context of the needs of SMEs, it should be stressed that not only financial barriers are given high grades but also the ones related to access to expert knowledge (e.g. Limited access to external knowledge WA 3.24, Lack of in-house expertise – WA 3.21). In the opinion of the BSR SMEs also the barriers related to development of process and product eco-innovations are significant (e.g. Lack of alternative materials – WA 3.31, Lack of suitable tools and methods - WA 3.26, Lack of proven technologies – WA 3.22) and business ones (e.g. Uncertain demand from the market – WA 3.34, the outcome of which is, among others, their Uncertain return on eco-innovation investment – WA 3.43).

Table 3: Evaluation of eco-innovations barriers in the manufacturing sector of SMEs of the BSR.
(*Likert scale between 1=I totally disagree and 5=I totally agree*)

The barriers relevant for eco - innovation	Weight 1	Weight 2	Weight 3	Weight 4	Weight 5	WEIGHTED AVERAGE (WA)
Lack of capital	10,48% (24)	8,73% (20)	22,71% (52)	26,64%(61)	31,44% (72)	**3,60**
Uncertain return on eco-innovation investment	7,86%(18)	14,85%(34)	22,71%(52)	35,81%(82)	18,78%(43)	**3,43**
Uncertain demand from the market	8,73%(20)	12,66%(29)	31,00%(71)	31,44%(72)	16,16%(37)	**3,34**
Certification costs	10,92%(25)	14,85%(34)	27,51%(63)	24,89%(57)	21,83%(50)	**3,32**
Lack of alternative materials	9,17%(21)	16,16%(37)	28,38%(65)	27,07%(62)	19,21%(44)	**3,31**
Lack of suitable tools and methods	6,99%(16)	20,96%(48)	28,82%(66)	25,76%(59)	17,47%(40)	**3,26**
Limited access to external knowledge	10,48%(24)	21,40%(49)	35,37%(81)	20,96%(48)	11,79%(37)	**3,24**
Lack of proven technologies	8,30%(19)	18,78%(43)	31,00%(71)	26,64%(61)	15,28%(35)	**3,22**
Lack of in-house expertise	9,17%(21)	17,90%(41)	30,57%(70)	27,51%(63)	14,85%(34)	**3,21**
Legislative demands	13,10%(30)	18,78%(43)	28,38%(65)	27,07%(62)	12,66%(29)	**3,07**
Integration into product development proces	14,85%(34)	18,34%(42)	31,44%(72)	24,02%(55)	11,35%(26)	**2,99**
Capability to collect and process data	12,66%(29)	20,09%(46)	35,37%(81)	23,14%(53)	8,73% (20)	**2,95**
Internal resistance in the company	27,95%(64)	26,64%(61)	23,14%(53)	13,54%(31)	8,73% (20)	**2,48**

Total responses N=296, Answered: 229 Skipped: 67
(…) – number of indications
Source: Own elaboration based on the research conducted in the Ecolabnet project

While analysing the needs in the scope of technological eco-innovations of SMEs it should be stressed that they were identified, accepted and aggregated in the survey questionnaire in the first/abovementioned stage, by all the project Partners (including the authors of the present paper). In the survey addressed at the European SMEs the three-level evaluation of the summarised needs was conducted: No needs, Possible needs, Highlighted needs. The results of this research for the total

investigated population of SMEs in the partner countries of the BSR have been summarised in Table 4.

Table 4: Needs of SMEs in the BSR countries in the scope of external support for eco-innovations in the manufacturing sector

Company needs within eco-innovation	Area of needs	No needs	Possible needs	Highlighted needs
Branding and communication	Business	29,72% (63)	34,43% (73)	35,85% (76)
Customer insights		25,94% (55)	41,51% (88)	32,55% (69)
Supplier relations		43,40% (92)	38,68% (82)	17,92% (38)
Business models		34,91% (74)	48,58% (103)	16,51% (35)
Value chain assessment		40,57% (86)	43,87% (93)	15,57% (33)
Financial aspects		31,13% (66)	38,21% (81)	30,66% (65)
Intangible and legal assets (e.g. IPR)		35,38% (75)	40,57% (86)	24,06% (51)
Legislation		36,32% (77)	40,57% (86)	23,11% (49)
Product design	Development	35,38% (75)	32,55% (69)	32,08% (68)
Packaging development		39,15% (83)	37,26% (79)	23,58% (50)
Life-cycle assessment (LCA)		41,98% (89)	38,21% (81)	19,81% (42)
Service design		36,32% (77)	44,34% (94)	19,34% (41)
Biocomposites	Technology / Production	55,66% (118)	31,13% (66)	13,21% (28)
Bioresins		64,15% (136)	26,42% (56)	9,43% (20)
Recycling		34,43% (73)	38,21% (81)	27,36% (58)
Energy optimisation		18,40% (39)	19,81% (42)	61,79% (131)
Material efficiency		37,26% (79)	34,91% (74)	27,83% (59)
Other alternative materials		37,26% (79)	34,91% (74)	27,83% (59)
Certifications		28,30% (60)	44,81% (95)	26,89% (57)
3D printing		55,19% (117)	28,77% (61)	16,04% (34)

Total responses N=296, Answered: 212 Skipped: 84
(…) – number of indications
Source: Own elaboration based on the research conducted in the Ecolabnet project

It should be stressed here that while identifying various categories of barriers during the empirical analysis of external support factors, in particular in the scope of eco-innovations, the authors categorised the needs in a breakdown into: business, development, technological and production ones. Business needs that are particularly noticed by the BSR SMEs in the scope of eco-innovations include support in the scope of: Branding and communication (Highlighted needs 35.85% -76 and possible needs 34.43% - 73), Customer insights (Highlighted needs 32.55% - 69 and possible needs 41.51% - 88), but also Financial aspects (Highlighted needs 30.66% - 65 and possible needs 38.21% - 81). Indication of these needs justifies the fact that the investigated enterprises do not only expect external financial support, but also the one pertaining to carrying out business tasks, among others related to promotion, marketing research or potential customer segmentation. The expected support concerns also: both from other SME sector entrepreneurs, but also from the Ecolabnet-like networks

this regards development of eco-innovative products and services (Highlighted needs 32.08% - 68 and possible needs 32.55% - 69). Interestingly, lower significance was attributed to, for example, Life-cycle assessment (LCA). While analysing the responses of particular SMEs the abovementioned need is perceived only by enterprises in which eco-innovations are in line with the strategy or even the mission of the enterprise. Obviously, this confirms the distinguished barriers related to lack or limited access to expert knowledge, including managerial one, particularly in the scope of environmental management. While referring to the needs of Technology/Production high activeness of European enterprises is confirmed in the scope of Energy Saving (Table 1) (*European Commission*, 2018). In the context of own research, 61.79% (131) of the investigated entities expect support in the scope of Energy optimisation and 19.81% (42) of the investigated SMEs believe that such support in the scope of optimisation is possible. In turn, in case of Biocomposites, Bioresins, or 3D printing, current needs of the BSR SMEs - Table 4) are low. Indications of the abovementioned needs concerned also those enterprises where eco-innovations are consistent with the mission or/and strategy of the enterprise.

Summary

The aggregated in the present paper research results as well as their discussion constitute an attempt of justification that the investigated manufacturing enterprises from the SME sector in the BSR region not only expect support in the form of external financing, but also in the scope of carrying out business actions or development, among others pertaining to promotion or marketing research, potential customer segmentation or product design. Moreover, the expert knowledge as a need of SMEs in the scope of eco-innovations is a foundation and it motivates entrepreneurs to develop pro-environmental attitudes in the processes of planning, designing and scheduling the implementations of eco-innovative solutions, as well as integration of eco-innovations with their strategies and even, which has been stressed, their mission. Obviously, this is possible when SMEs are fully involved in improvement and acceleration of structured practical knowledge as well as through developing competencies and skills in the scope of recognising, evaluating, designing eco-innovative solutions. Thus, identifying the eco-innovative barriers and needs allows for conducting further research pertaining to business models creation and collaboration tools, which are not only a business, organisational or communication platform, but also an accelerator of the created eco-innovative services – a response to actual needs of the investigated SMEs. Also, while referring to the selected and evaluated by the SMEs needs, to address them support is required from experts, R&D units collaborating in the networks of eco-innovative solutions, e.g. *"Network of Service Providers for Eco-innovations in Manufacturing SMEs(Ecolabnet)"*.

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Drivers of Developing Eco-Innovations in Manufacturing SMEs from the BSR Region

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Abstract

The present paper presents the analysis of drivers of eco-innovative solutions development in manufacturing SMEs of the Baltic Sea Region. In the first part the authors have addressed the issue regarding the importance of developing eco-innovations in the European SME sector and presented the main premises for eco-innovations and benefit resulting from the cooperation between R&D units and possible partnerships that foster application of eco-innovation in companies. They have also included in it an example of a new project aimed at supporting eco-innovations in the manufacturing enterprises of the BSR - the project "Network of Service Providers for Eco-innovations in Manufacturing SMEs (Ecolabnet)". In the empirical part of the paper, based on the secondary research, but also on the own research of the partners participating in the project (including the authors of the present paper) the authors have presented an analysis pertaining to the results of the survey that was conducted within the Ecolabnet project, which were used in the analysis aimed at identifying the key drivers of eco-innovative initiatives among the investigated SMEs. It has been indicated that the drivers behind eco-innovations in case of European SMEs depend to a large extent on legislative measures and also utilisation of expert knowledge of R&D units.

Keywords: Eco-Innovations, Green Activity, Smes, Eco-Innovative Needs, Network Of Service Providers.

Introduction

The European Commission defines Small and Medium Sized (SMEs) as enterprises that employ less than 250 persons. Also, their annual turnover should amount to up EUR 50 million or their balance sheet should not exceed more than EUR 43 million (Commission Recommendation of 6 May 2003). These definitions regarding the size and annual turnover are of particular importance in the assessment process determining which enterprises may become beneficiaries of financial support offered by the European Union within the funding programmes aimed at promoting SMEs or in relation to certain policies, e.g. SME-specific competition rules. European Commission runs its own policy in relation to SMEs regarding the areas of their operations, which primarily covers the following five priority areas:

- the promotion of entrepreneurship and skills;
- the improvement of SMEs' access to markets;
- cutting red tape;
- the improvement of SMEs' growth potential, and;

- strengthening dialogue and consultation with SME stakeholders (*Small and medium-sized enterprises (SMEs) - Eurostat*, n.d.).

Presently, SMEs may seek for access to new markets or improve their growth potential thanks to the European Union's financial support that is aimed at developing green activity of the European SMEs within specially created programmes such as Horizon 2020 or Interreg. Aimed at promoting introduction and development of environmentally-friendly solutions these programmes, by providing much-wanted by entrepreneurs from the SME sector source of funds, constitute a chance to overcome the barriers of entering the markets for those enterprises that can offer eco-innovative products that are in line with the principles of sustainability. For this reason, it is necessary to recognise whether they are provided with access to RDI units that can support them in the processes of developing, introducing and commercializing eco-innovative products and services and also what are key drivers that stimulate the development of eco-innovative products. Therefore, the underlying objective of the paper is to identify the main drivers behind the eco-innovations development, which can constitute a precious source of knowledge on the actions that need to be undertaken by enterprises (including SMEs) in order to successfully develop and commercialise eco-innovative products and solutions. With this in view the authors have formulated the objective of the present paper – an attempt to answer the following research questions:

RQ1 – Are legislation and state programmes the key drivers for eco-innovations in manufacturing SMEs of the BSR region.

RQ2. Is utilising the potential of RDI units one of the major drivers of eco-innovations development?

The paper constitutes a contribution to the literature in implementing solutions in the scope of eco-innovations development. The paper has the following structure. Chapter 1 discusses briefly the role of the SME sector in the investigated BSR region countries and highlights the importance of the Ecolabnet project for supporting eco-innovations in these countries. Chapter 2 includes a literature review regarding the concept of eco-innovations with a particular stress on the drivers (incentives) for their development. Chapter 3 includes the research results and analyses the main drivers of eco-innovations in the investigated countries and attempts to account for the possible reasons of their differentiation. The last chapter summarises the paper and contains suggestions regarding further research works.

The Need for Eco-Innovations and Ecolabnet Network

Ecolabnet is a project funded by Interreg Baltic Sea Region which aims to create a network of service providers for supporting eco-innovations in manufacturing SMEs of Baltic Sea Region. The areas of competences of the newly-created network include knowledge in additive manufacturing, bio-based materials, product-service system design, eco-branding, value chain assessment, business model development, legislation, customer insights, certifications and life cycle assessment.

The project partners include scientific institutions and R&D ones from six of the Baltic Sea Region countries: Finland – Project Leader, Lithuania, Estonia, Sweden, Denmark and Poland, whose representatives are the authors of the present paper. The consortium of partners develops prototypes to demonstrate capability of Ecolabnet to support manufacturing SMEs when they deal with eco-innovations. The idea for creating such a project consortium that involves actors from the three key areas: SME sector entrepreneurs, intermediary organisations and RDI units can generate numerous benefits for all the stakeholders and prove to be more effective than projects aimed solely at financial support for SMEs. According to the research by Triguero et al, those entrepreneurs who give importance to collaboration with research institutes, agencies and universities, and to the increase of market demand for green products are more active in all types of eco-innovations (their eco-awareness grows) (Triguero et al., 2013). Also, according to another study by Szilagyi et al., the existing premises for eco-innovation and possible partnerships that foster application of eco-innovation in companies include policy changes, and increased cooperation between interested stakeholders from R&D, academia, businesses, clusters and policy makers (Szilagyi et al., 2018).

Thus, the creation of Ecolabnet network may prove effective in bridging the gap between the still low level of innovativeness of SMEs in the European Union (also with regard to eco-innovative products) and lack of expert knowledge and infrastructure which are necessary to unleash their potential in the area of innovations. For instance, according to the data published in 2019 the annual Report on the Condition of Small and Medium-Sized Enterprises in Poland, SMEs from this country are characterised by low innovative activity, which in case of small enterprises reached the level of 12.5% for industrial SMEs and 8.3% for service ones. Their innovative activity was financed in 46% from own funds while 24% of resources came from abroad. The situation seems better in case of medium-sized enterprises where about a third of them was involved in innovative activity, which was financed in 57% from own funds and 10% of the resources came from abroad (including the EU funds) (*2019_07_ROSS.pdf*, n.d.). Also, SMEs rarely conduct R&D activity themselves, which makes it even more important to utilise the expertise resources of scientific units – which is one of the objectives of the Ecolabnet project. According to the estimates in 2017 only about 7% of industrial enterprises in Poland incurred expenditures related to R&D while in case of service ones this percentage was 3.2% (*Małe i średnie przedsiębiorstwa zatrudniają w Polsce ok. 10 mln osób [RAPORT]- Forsal.pl - Biznes, Gospodarka, Świat*, n.d.).

Undoubtedly, the role of SME sector for the economy of EU member states is crucial. It is enough to refer to the statistics to see that in the whole territory of the European Union SMEs account for 99.8% of the total number of enterprises and 66.6% of total EU employment. The sector generated €4,030 billion of value added in 2016, which represents a share of 56.8% of total European value added in that year (*Pwc-europe-monitor-innovation-sme.pdf*, n.d.).

It is worth stressing that as the need for eco-innovation is becoming more widely recognised and perceived as an important issue in a world where the growth **of population is also changing** the patterns of consumption pattern, integration of environmental aspects at an early stage in the process of designing products has the benefit of minimising environmental impacts right from the start. Once product specifications are being made, only minor changes can be introduced (Bocken et al., 2014). Therefore, this is of particular importance that special knowledge and tools which are needed for dealing with environmental issues are implemented at the very initial stage of eco-innovative products development, and this translates into a special role of manufacturing enterprises, which are responsible for designing, developing and introducing to the market such new products. With this in mind, in the present paper the primary focus of the authors pertains to identifying main incentives behind the eco-innovative actions of manufacturing SMEs in the countries of the BSR region that collaborate within the newly created *"Network of Service Providers for Eco-innovations in Manufacturing SMEs – Ecolabnet"*.

Theoretical Framework – Types of Eco-Innovation Drivers

In this part of the paper, based on the literature query, the authors have made an attempt to present the changing approach to defining the concept of eco-innovations, however, their primary focus regarded identify the most significant incentives (drivers) for eco-innovations development in the SME area.

As a result of the conducted literature query it can be concluded that the subject of transforming innovations into eco-innovations dates back to the end of the past century. It was at that time that the foundations for the term of eco-innovations were linked to innovations in the process grasp. One of the first definitions of eco-innovations was introduced by C. Fussler and P. James, who defined eco-innovations as new products and processes that provide the business and customers with added value, simultaneously reducing the impact on the environment (James, 1997). The concept of process-oriented eco-innovations as originating from the process ones has been extended with two other types of eco-innovations: product, and organizational innovations. While eco-innovations that are process-oriented consist in introducing changes to processes that improve a product's environmental performance product innovations pertain to the process of introducing new characteristics or significant improvements to existing goods or services. In developing eco-product innovations enterprises use internal resources (e.g., management and human resource capabilities) or external resources (e.g., collaboration with universities and research centres). Organisational eco-innovations

in turn refer to implementation of managerial activities so as to reduce environmental impacts at the firm level (Afshari et al., 2019).

One of the most frequently cited definitions of eco-innovations was proposed by Rennings, according to which eco-innovations are all measures of relevant actors (firms, politicians, unions, associations, churches, private households) which:

- develop new ideas, behaviour, products and processes, apply or introduce them,
- contribute to a reduction of environmental burdens or to ecologically specified sustainability targets.

Eco-innovations can be developed by firms or non-profit organizations, they can be traded on markets or not. They can be of technological, organizational, social or institutional nature (Rennings, 2000). Eco-innovation, which has been linked to a business strategy, can enhance a firm's capabilities and reduce negative impacts on the environment during the production process. Eco-innovation has generally been accepted by industry and scholars as a method to reduce the environmental issues (Fernando and Wah, 2017). However, it has been observed by a number of researchers that the concept of environmental innovation itself has not been widely discussed in the management literature. Yet, organisations may utilise the potential of external networks as a means of improving firms' performance, which can be treated as a crucial way for the business competitive advantage (Dezi et al., 2019). Another key factor that has not been analysed extensively in the studies is appreciation of the strategic role of knowledge as a measure of open-mindedness, which enhances sustainable organisational performance (Cegarra-Navarro et al., 2019). Thus, it can be stated that presently, it is necessary to stress in the area of sustainable management the importance of combing the actions of the beneficiaries of the created values – enterprises, and also intermediary organisations and scientific units, whose role is growing in importance as contemporary eco-innovations frequently require expert knowledge, which can be only provided by the RDI units. Therefore, it seems to be particularly important, with regard to the subject matter of the present paper, to refer to these concepts of eco-innovations that indicate the elements that play a key role in developing eco-innovative solutions in SME sector enterprises, which can be termed incentives or drivers of eco-innovations. With this in mind, the authors have attempted to find the theoretical framework that would allow them to answer the research question 2 (RQ2) "*Is utilising the potential of RDI units is one of the major drivers of eco-innovations development***.** With this regard an interesting approach to analysing the types of eco-innovations and the drivers behind their successful diffusion was presented Kiefer and al., who applied in their research robust analyses of the equality of averages, in particular, the Welch and Brown-Forsythe tests. As the significance in both tests is always given, this confirms the existence of a significant difference between the centroid values of particular groups of eco-innovations. The researchers distinguished five groups reflecting five eco-innovation types that they had identified: systemic eco-innovations, externally driven eco-innovations, continuous improvement eco-innovations, radical and tech-push initiated eco-innovations, eco-efficient eco-innovations (Kiefer et al., 2019). In an attempt to determine which types of eco-innovations are of particular importance with regard to eco-innovations diffusion in the SME sector and what the main drivers (incentives) of such activities are in case of the SMEs form the investigated BSR countries, the authors have aggregated their most important characteristics in Table 1 below.

Table 1: Types of eco-innovations

Type of eco-innovation	Number	Characteristics
Systemic eco-innovations	37	These eco-innovations pertain to changes in the product/service process with a significant shift from current sales and traditional markets, towards new models of cooperation with suppliers. They also rank high in the area of new products and services and in the area of governance regarding scientific-academic cooperation, cooperation with suppliers, interactions with competitors and industry associations.
Externally driven eco-innovations	20	These eco-innovations scores well below the average in all subdimensions of design, user and product-service. However, they rank very high (highest of all the types of eco-innovations) in the area of cooperation with non-governmental organisations and regulators.
Continuous improvement eco-innovations	20	This type of eco-innovations is very similar to externally driven ones with scores well below the average in all subdimensions of design, user and product-service. Also, in terms of cooperation and the governance dimension, they score below the average in most subdimensions.
Radical and tech-push initiated eco-innovations	76	These eco-innovations score high in the design subdimensions of purely ecological characteristics and rupture with current business models. Also, they score above average in the subdimensions of external and internal clients and intermediaries. Their score is also high with regard to cooperation with research centres, universities and consultants.
Eco-efficient eco-innovations	36	These eco-innovations score high in the subdimension of savings / eco-efficiency, and cooperation with competitors and industrial organizations. The scores in the other subdimensions are relatively low.

Source: own elaboration based on: (Kiefer et al., 2019).

As Table 1 shows three types of eco-innovations demonstrate a particularly strong relationship between eco-innovations diffusion and cooperation with scientific units, and also legislative measures. The type of eco-innovations that ranked the highest in the research are externally driven eco-innovations, which stress the need for cooperation with non-governmental organisations and also regulators, who are in charge of introducing new legislative measures that foster eco-innovations development. Also systemic eco-innovations confirm the significance of developing eco-innovations and collaboration with scientific-academic units as well as industry associations. Finally, radical and tech-push initiated eco-innovations, which regard development and introduction to the market new, eco-innovative solutions scored very high with regard to cooperation with research centres, universities and consultants. Therefore, it can be concluded that that conducted analysis of the theoretical framework provides an answer to the research question 2 (RQ2) and confirms the fact that *utilising the potential of RDI units does constitute one of the major drivers of eco-innovations development*.

Eco-Innovation Drivers in the BSR Countries – Research Results Discussion

The Ecolabnet project will be carried out in the years 2019-2021 and its initial stage involved research aimed at identifying the current level of eco-innovative activity of the said SMEs, main incentives and barriers of eco-innovations implementation and also their level of pro-environmental awareness. The research was conducted with the use of CAWI method in the group of 296 enterprises

located in the six partner countries of project participants and it provided valuable data on the patterns of similarities and differences regarding implementing eco-innovative solutions by the manufacturing SMEs in all six investigated countries. The research sample constituted N=296 of entities (in this: Estonia 69 – 23.31%, Poland 57 – 19.26%, Finland 54 – 18.24%, Lithuania 15.88% - 47, Sweden 12.84% - 38, Denmark 10.47% - 31). In the whole aggregated group of the investigated SMEs small and medium-sized enterprises constituted 69.59%, respectively: 42.23% (125), 27.36% (81). It needs to be stressed that 49.66% - 147 of the SMEs out of the total investigated population identified their primary activity as purely correlated with eco-innovations (including: pro-active attitude of SMEs – working with eco-innovations 25.68% -76, eco-innovations integrated with the company's strategy 1.82% - 35, mission of the SME is based on eco-innovations – 12.16% - 36).

In the first step, so as to evaluate the current level of eco-innovations implementation in the investigated BSR countries (partners in the Ecolabnet project) as well as identify the main drivers of their development, the authors have referred to the tool created by the European Commission - The Eco-Innovation Scoreboard (Eco-IS). Together with the Eco-Innovation Index the tool illustrates performance with regard to eco-innovations across the EU Member States. To demonstrate various aspects of eco-innovations applied in the EU member states the tool applies 16 indicators grouped into five dimensions: eco-innovation inputs, eco-innovation activities, eco-innovation outputs, resource efficiency and socio-economic outcomes. In this way The Eco-Innovation Index presents performance of particular member states in different dimensions of eco-innovation by comparing them to the EU average as well as highlighting their strengths and weaknesses (*The Eco-Innovation Scoreboard and the Eco-Innovation Index*, 2016). In Figure 1 below the authors have aggregated the figures for all the six BSR countries being the subject of the investigation in the present paper.

As it can be observed in Figure 2 the analysed BSR countries belong to the three various groups within the Eco-Innovation Scoreboard. The most numerous group within the investigated countries create Eco-Innovation Leaders: Sweden, Finland and Denmark, whose indexes of eco-innovations are respectively 132, 121, 115. This means that these BSR countries have managed to create an eco-innovation-oriented environment where they combine business eco-related initiatives with research programmes that are aimed at increasing the share of eco-innovative products being introduced to the market and simultaneously increasing the competitiveness of the companies that develop them. Due to the limited length of the present paper its authors have limited the analysis to the leader of the rank – Sweden, with a view to explain its top position in the area of eco-innovativeness. The applied in the analysis data by the European Commission shows that since 2008 Sweden has continued to focus on encouraging innovation and has addressed skills matching through integration and education policy measures. In the years 2015-2017 the proportion of SMEs that adopted resource efficiency measures increased from 88 % to 92 %. Sweden is also one of the best countries in the EU on the percentage of SMEs that offer green products. This has been achieved as a result of implementing various initiatives to promote sustainability concept among companies and support them in developing green solutions. Some of them include:

- Development funds provided by the Swedish Agency for Economic and Regional Growth business to support the internationalisation of SMEs within the cleantech sector.
- An initiative aimed at providing work opportunities for newly arrived migrants and the long-term unemployed, including internships and subsidised employment in the 'green' industry.
- The country has also invested further in promoting solutions for smart and sustainable cities within the 'Smart City Sweden' demonstration platform. The government's export strategy clearly commits to internationalisation and promoting exports by SMEs.

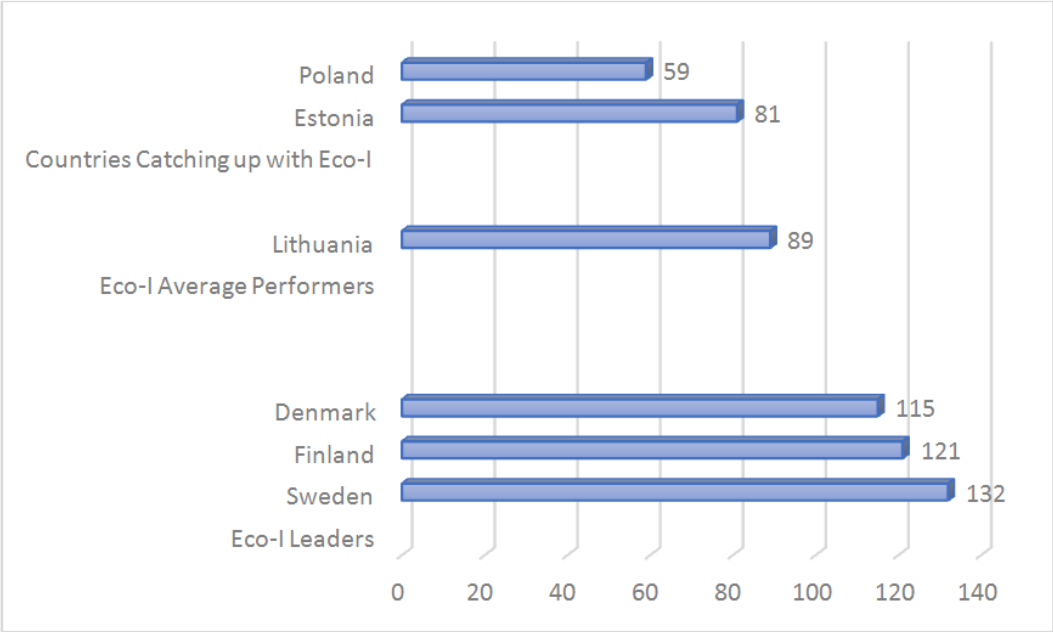

Fig. 1: Eco Index figures for the investigated BSR countries.
Source: own elaboration based on: (The Eco-Innovation Scoreboard and the Eco-Innovation Index, 2016)

Therefore, in an attempt to determine the significance of legislative measures the authors have evaluated the main identified by the investigated enterprises drivers of their eco-innovative activity. To evaluate the distinguished by the BSR entrepreneurs key drivers of their eco-innovative activity the authors have adopted Likert scale from 1 to 5. The results of the analysis have been aggregated in Table 2 below.

As Table 2 demonstrates, the entrepreneurs from the analysed BSR countries regard satisfying customer needs as the primary driver of eco-innovations development (53.19% - 125). The second identified incentive for undertaking eco-innovative actions according to the respondents constitute effective use of resources (50.21% - 118) and the third position in the rank occupies strengthening the brand's image (43.40% - 102). The fourth key driver of eco-innovations development indicated by the research participants is complying with legislation (42.13% - 99), which confirms that legislative measures introduced by the state are of vital importance for undertaking actions aimed at developing eco-innovative solutions in case of the analysed BSR enterprises. The next drivers of eco-innovations development that were evaluated at a high level included: Differentiate from competitors (40% - 94), Reduction of environmental effects on the business operations (38.30% - 90), Cost reduction (37.87% - 89) and Potential business opportunities (37.02% - 87). Attracting competent employees, Meeting stakeholder expectations and Increasing transparency were recognised to be less significant drivers of eco-innovations development receiving respectively 25.11% - 59, 24.68% - 58 and 22.98% - 54 of indications. The least valued incentive for developing eco-innovations in the opinion of the investigated BSR enterprises constituted Attracting capital investments, which received 18.72% - 44.

Table 2: Key drivers of eco-innovative drivers in the SMEs of the Baltic Sea Region
(Likert scale where 1= I totally disagree and 5= I totally agree)

Driver	Weight 1	Weight 2	Weight 3	Weight 4	Weight 5	Weighted average
To satisfy customer needs	1.28% 3	4.26% 10	12.77% 30	28.51% 67	53.19% 125	4.28
Efficient use of resources	1.28% 3	2.98% 7	8.09% 19	37.45% 88	50.21% 118	4.32
Strengthening corporate brand image	2.98% 7	4.68% 11	13.19% 31	35.74% 84	43.40% 102	4.11
To comply with legislation	4.68% 11	4.26% 10	15.74% 37	33.19% 78	42.13% 99	4.03
Differentiate from competitors	2.98% 7	7.66% 18	14.47% 34	34.89% 82	40.00% 94	4.01
Reduction of environmental effects on the business operations	5.11% 12	5.11% 12	20.85% 49	30.64% 72	38.30% 90	3.91
Cost reduction	2.55% 6	11.49% 27	16.17% 38	31.91% 75	37.87% 89	3.91
Potential business opportunities	5.53% 13	8.09% 19	14.89% 35	34.47% 81	37.02% 87	3.89
Attracting competent employees	6.38% 15	10.64% 25	29.36% 69	28.51% 67	25.11% 59	3.55
Meeting stakeholder expectations	6.38% 15	12.34% 29	25.11% 59	31.49% 74	24.68% 58	3.42
To increase transparency	7.23% 17	13.62% 32	31.49% 74	24.68% 58	22.98% 54	3.42
Attracting capital investments	17.45% 41	18.30% 43	24.26% 57	21.28% 50	18.72% 44	3.05

Total responses N=296, Answered: 229 Skipped: 67
(…) – number of indications
Source: Own elaboration based on the research conducted in the Ecolabnet project

Within the conducted research the investigated BSR SMEs were also asked to evaluate their attitude towards developing eco-innovations within the enterprise. Their responses to this survey question have been aggregated in Table 3 below.

Table 3: Attitudes of BSR SMEs towards development of eco-innovations

Answer choices	Number of responses	
A minimum of attention towards eco-innovation except from legal demands.	17.53%	44
React on external stimuli either from legislative or other interest groups e.g. customers, suppliers or NGOs. Eco-innovation initiatives are considered as an extra cost.	23.90%	60
Is pro-active and working with eco-innovation. Considers eco-innovative initiatives in the company as cost reducers or improving of the competitive advantages. Takes place primarily internally in the company. Tries to be ahead of the legislation.	30.28%	76
Eco-innovation is fully integrated in the company's strategy and involve all functions in the company. The eco-innovative activities lead to new market opportunities. The development activities can be product-, organisational- or process-oriented. Can be in cooperation with external partners.	13.94%	35
The entire company and its basic mission are based on eco-innovation. The fundamental business model includes environmental, social and economic variables. It contributes to an eco-innovative development for markets and society.	14.34%	36

Total responses N=296, Answered: 251 Skipped: 45
(…) – number of indications
Source: Own elaboration based on the research conducted in the Ecolabnet project

As Table 3 demonstrates despite being considered as an extra cost an incentive for eco-innovations development constitute stimuli from legislative groups, which confirms their significant role among all the drivers for undertaking eco-innovative actions among the investigated SMEs of the BSR. It is also worth stressing that with reference to the high position attributed to legislative measures by the BSR sector entrepreneurs their special role has also been confirmed in the research conducted by Hojnik and Ruzzier, who also found out that regulations remain a dominating driving force compared to other factors for different eco-innovation types (product, process and organizational eco-innovation, environmental technology and, environmental R&D); they play a role in both stages of eco-innovation (development and diffusion) and prevail over economic incentive instruments (Hojnik and Ruzzier, 2016). Therefore, the results of the conducted analysis regarding the level of eco-innovations development in the investigated BSR countries (Eco-Index) as well as research results allow for providing a positive answer to the research question 1 (RQ1) confirming the fact the *legislation and state programmes are the key drivers for eco-innovations in manufacturing SMEs of the BSR region.*

Summary

The presented in the paper result of the literature review and also the results of own research conducted within the Ecolabnet project confirm the crucial role of SME sector for the economy of EU member states and also its significance for developing and implementing eco-innovative solutions, which are perceived as an important aspect of sustainable development in line with the adopted by the EU principles of limiting the environmental impact of man's activity on the natural environment. The results of the analysis included in the paper prove the significance of state's legislative measures as well as collaboration with scientific units in the process of eco-innovations development in the SME sector of the European Union. This is convergent with opinion of other researchers in this domain (e.g. Hojnik and Ruzzier, Kiefer et al.). The present paper confirms that there exists a particular need in the analysed sector that pertains to expert knowledge that can be provided by the R&D units to the SME sector entrepreneurs, which can support them in developing pro-environmental attitudes and implementing eco-innovative solutions. Thus, especially created for such a purpose networks that combine the expertise of scientific units with the practical needs of SMEs may help enterprises from the SME sector in improving their business performance, which

can lead to winning the business competitive advantage. One of such networks is "*Network of Service Providers for Eco-innovations in Manufacturing SMEs (Ecolabnet)"*. The research conducted in the BSR region of SMEs confirms that such a cooperation may prove beneficial for all the actors involved in such networks, and more importantly for the reduced negative impact of the SME sector's operations on the natural environment. However, the research presented in the paper was conducted among manufacturing SMEs only, which may constitute its limitation. Yet, this provides an excellent opportunity to compare the obtained results with future research conducted in other areas of SMEs operations.

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The Internet in Management of the Promotion of Selected Health-Promoting Factors of the Lifestyles of the Inhabitants of Kuyavian-Pomeranian Voivodeship

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Abstract

The aim of the article is to recognize the opinion of the inhabitants of Kuyavian-Pomeranian Voivodeship on a health-promoting lifestyle and significance of the internet in its promotion. During the tests there have been selected some factors impacting health-promoting lifestyles of the inhabitants, i.e. factors related to nutrition, physical activeness, sleep, medical surveillance. In particular, attention was paid to consuming organic food by the inhabitants as those of greater nutritional value, however, not always considered as a health-promoting factor. They were deemed to be one of multiple factors. The necessity of promoting actions, including the Internet actions, were evaluated. The obtained test results including recommendations for selected factors impacting health-promoting lifestyle, proposed by i.e. World Health Organization, in compliance with local and EU regulations. The research hypothesis presumed that the majority of surveyed inhabitants has, as for the majority of the factors, health-promoting lifestyles (it has been confirmed). However, people consuming organic food are in the minority, they seldom purchase and are hardly ever interested in buying organic products via the internet. There is significant connection between the sex and purchasing organic food on the Internet (women more). Health-promoting attitudes rmainly referred to consuming balanced meals, taking up general physical activeness, proper duration of sleep. Antihealth-promoting attitudes mainly referrend to consuming sweets, lack of control of taken fat, lack of exercise to keep one's balance, helping to avoid falls, which is particularly significant for the elderly. The inhabitants, however, indicate a further demand in those terms, including using the Internet.

Keywords: Marketing, Management, Healthier Lifestyle, Organic Food, Internet

Introduction

Public health is a significant aspect of social and economical environment of the country. It was presumed that a lifestyle is one of the significant factors impacting tchem (Szczepanek, Prus, Knapowski 2018). Widespreading health-promoting attitudes among the inhabitants requires planning efficient promotional actions (Korporowicz 2005; Chomątowska 2011; Kitajewska, Szeląg, Kopański 2014; Hulewska, 2016; Golinowska 2017; Promocja 2017; Puchalski, Korzeniowska 2017; Zadarko-Domaradzka, Zadarko 2017; Puchalski, Korzeniowska, 2019; Didkowska, Wojciechowska, Mańczuk, Łobaszewski, Sanitarny, Beręsewicz, Kształcenia 2019; Syper-Jędrzejak, M 2019). The starting point to those actions is to identify the current lifestyle of the inhabitants. The research connected with this concept have been performed throughout many years (Siciński 1978; Ponczek, Olszowy, 2012; Thees, Gobel , Jose , Bohrhardt , Esch 2012; Lipka, Janiszewski, Walentukiewicz, Łysak, Wilk 2013; Woynarowska-Soldan, Tabak 2013; Musiałek, Dłużniewski 2015; Woźniak, Brukwicka, Kopański, Kollár, Kollárová, Bajger 2015; Błaszczuk 2016; Kotarska, Drohomirecka, Wilk, 2016; Szalonka, Witek 2016; Hanus 2017; Kaczmarek 2017; Malińska 2017; Ucieklak-Jeż, Bem 2017; Gawlik 2018; Hildt-Ciupińska 2018; Światowy, Szalonka, 2018; Zmuda-Palka, Siwek 2018; Dąbrowska, Janoś-Kresło, Lubowiecki-Vikuk, 2019; Gardocka-Jałowiec, Szalonka 2019; Korporowicz 2019; Pochwała, 2019). It seems that the changes in these terms prove the need of

constant monitoring and further actions. This article is a continuation of previous research of the author of the article (Ferenc, Koreleska 2017, 2018, Koreleska, Kuczyńska 2015).

Method

The aim of the article is to recognize the opinion of the inhabitants of Kuyavian-Pomeranian Voivodeship on a health-promoting lifestyle and significance of the internet in its promotion. The inhabitants assessed themselves in those terms. During the tests there have been selected some factors impacting health-promoting lifestyles of the inhabitants, i.e. factors related to nutrition, physical activeness, sleep, medical surveillance. In particular, attention was paid to consuming organic food by the inhabitants as those of greater nutritional value, however, not always considered as a health-promoting factor. They were deemed to be one of multiple factors. The necessity of promoting actions, including the Internet actions, were evaluated.

The obtained test results including recommendations for selected factors impacting health-promoting lifestyle, proposed by i.e. World Health Organization (WHO), in compliance with local and EU regulations.

The research hypothesis presumed that the majority of surveyed inhabitants has, as for the majority of the factors, health-promoting lifestyles

The research was performed in 2019 via the method of the direct survey in Kuyavian and Pomeranian Voivodeship. Initially, the researchers presumed the minimal value of the sample suggested for the range researches, with their regional nature (N=600 inhabitants). The choice of the sample was not random, they adapted the method of quota sampling. The researchers used geographical criteria, which is commonly selected in this method of selection of the sampling and the sex. They used the Central Statistical Office for Kuyavian and Pomeranian Voivodeship.

The obtained data were a subject to an analysis using the methods of mathematical statistics. There has been used the Pearson test of the feature independence.

The statictics form is shown in this formula (Sagan, Mynarski 2002):

$$\chi^2 = \sum_{i=1}^{r}\sum_{j=1}^{k}\frac{(n_{ij} - n'_{ij})^2}{n'_{ij}}$$

where:

n_{ij} - there have been observed numbers in *i* - this line and *j* - this column,

n'_{ij} - expected numbers in *i* - this line and *j* - this column.

Results

Health-promoting attitudes of the inhabitants of Kuyavian and Pomeranian Voivodeship compared to the own research

The first assessed element was physical activeness. According to the WHO recommendations the adult in the age range of 18-65 should take up physical activeness including moderate physical effort (> 150 min./week), intensive (75 min./week) or the equivalent of previously mentioned moderate and intensive effort combinations (World Health Organization… 2010). The majority of the region inhabitants meets the requirements these requirements (64%). Another recommendation of WHO in the terms of physical activeness enhancing strength and toughness of muscles ≥2 days/week. The majority of the surveyed do not perform them (53%). To compare this group to the people above 65 years old it is particularly significant the balance exercises are particularly prominent and they help to avoid collapsing (≥ 3 days/week). It was presumed that in this age group only 20% of the people

meet the reccommendation. It is concerning since among all the surveyed in the region the number was even higher and it was 25%.

Another criteria is nutrition (Bortnowska 2014; Mickiewicz A., Mickiewicz B., Prus, Wawrzyniak 2015; Roman, Prus, Ramczykowska 2017; Szczepanek, Prus, Knapowski 2018). Most people meet the recommendations and consume balanced meals, including possible products, from all the groups in every meal (78%). Apart from this, the number of meals is from 4 to 5, which is compliable with the adapted recommendation (55%). Unfortunately, the people who eat at regular times are the minority (48%).

In accordance with nutrition recommendations of WHO and FAO for European inhabitants it is indicated to consume fruit and vegetables, particularly and of local origin, in the amount of at least 400 g., several times a day. Most of the surveyed inhabitants, 63%, meets the requirements. Only 1% of the surveyed did not answer the question.

Unfortunately, most of the surveyed do not control the amount of consumed fat (56%). An enormous number of the surveyed say they eat sweets (75%). Consuming excessively much sugar and too many sweets might lead to multiple illnesses, including dental caries and arteriosclerosis (Wieczorek 1978).

Another assessed element of healthy lifestyle is duration of sleep a day. Most of the surveyed inhabitants (65%) sleep a proper number of hours a day as, according to the recommendation, it should be 7-9h (National Sleep…). 28% of the surveyed say they sleep one hour less, making it 6 h and the other surveyed say they spend even less time sleeping. Only one person said they slept 10 h and the other 2 did not answer the question.

The research shows that most of the surveyed inhabitants say they do not smoke (83%)as . Different results have been obtained as for alcohol consumption. Over 60 % (63%) say they drink alcohol, however most of them drink alcohol occassionally.

Most of the inhabitants of the region (62%) say they take part in the medical surveillance. It is a genuinely positive phenomenon. It is worth noticing that preventional actions are one of the main targets of the National Health Program in 2016-2020.

The opportunities of purchasing and promoting organic food on the Internet in the opinion of the inhabitants of the region

The conducted research shows that most of the surveyed do not consume organic food (63%). Other surveyed said they quite differentiated as for consumption of organic food. (fig 1.).

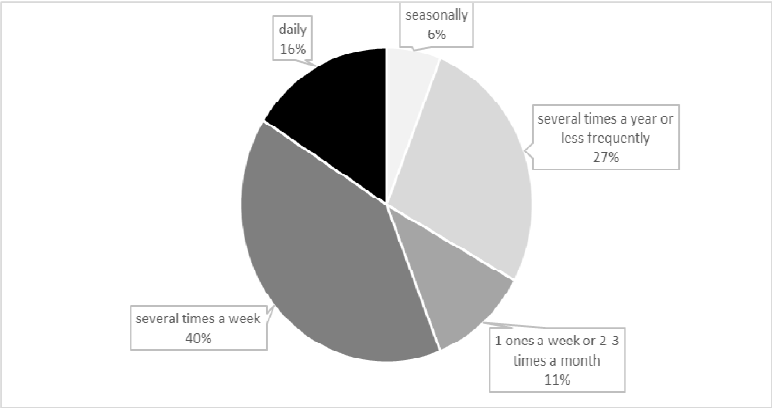

Fig. 1: Frequency of consumption of organic food among the inhabitants declaring its purchase

Source: own research

What impacts the purchase of organic products, in the opinion of the surveyed, is the price, quality and taste.

At this point it is also worth noting that consumers who decide to buy organic food should be sure that these products are of the highest quality and meet all standards. It is therefore important that control systems function effectively, i. e. institutions controlling and certifying organic food (Mickiewicz A., Mickiewicz B., Prus, Wawrzyniak 2015).

The inhabitants seldom buy organic products on the Internet (6%) (fig. 2). There is significant connection between the sex and purchasing organic food on the Internet. Women more often than men declared buying organic food over the Internet. (The compliance test value is 15,219 and exceeds the critical values λ0,01 = 6,635). Only 7% of the surveyed say this is the most expected venue to purchase organic goods (fig. 3).

Fig. 2: The Internet as the purchase venue of organic food according to the inhabitants of the region

Source: own research

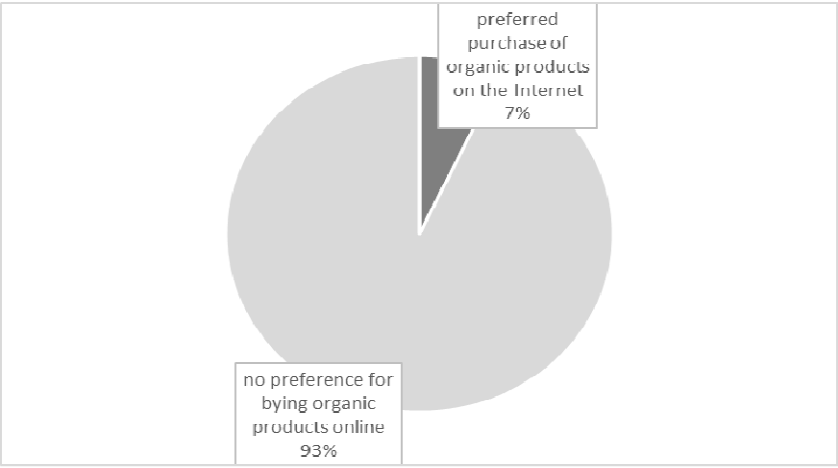

Fig. 3: The Internet as the most expected venue of purchasing organic food according to the inhabitants of the region

Source: own research

The survey showed that the inhabitants of the region find it necessary to have promotional actions in terms of healthy lifestyle taken up.

Conclusions

The performed analysis confirmed the presumed research analysis and it showed that the most of the inhabitants have as for the most factors, health-promoting lifestyles. Health-promoting attitudes rmainly referred to consuming balanced meals, taking up general physical activeness, proper duration of sleep. Antihealth-promoting attitudes as for the majority of the surveyed inhabitants mainly to consuming sweets, lack of control of taken fat, lack of exercise to keep one's balance, helping to avoid falls, which is particularly significant for the elderly. The inhabitants claim it is necessary to perform further promotional actions in terms of promoting healthy lifestyles, also with use of the Internet. The obtained results might be an indication to the institutions and organizations when forming health programmed as well as promoting and managing them.

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Selected Aspects of The Enterprises' Marketing

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Abstract

The aim of the research was to present and assess the performed marketing activity in selected enterprises. The criteria of this choice was the location in Kuyavian and Pomeranian Voivodeship. The research was performed in fifty enterprises via the direct survey method in 2019 in Kuyavian and Pomeranian Voivodeship. In the research there has been used a survey verified in pilot studies. The researchers paid attention to such components as conducting marketing researches, formulating marketing targets and their connection with marketing instruments and particular marketing tools in the concept of 7P. During the process, the researchers noticed some new trends, i.e. the opportunity of performing ecology-promoting activities in the enterprises and their significance for the marketing activity. The performed analysis confirmed the presumed research hypothesis stating that in the most of enterprises, the marketing activity is performed in a satisfactory manner. As for the product and material evidence there were no negative reviews, which stands for a positive phenomenon and marketing research. The most of the negative reviews referred to such marketing tools as promotion, people and marketing research. In these areas it is highly recommended to implement corrective actions. Simultaneously, most enterprises are interested in introducing ecology-promoting solutions and using them in marketing activities.

Keywords: Marketing, Management, Ecological Marketing, Enterprises

Introduction

According to the Encyclopaedia of Management, "performing the rules of modern marketing stands for being recipient-oriented instead of being product-oriented. Problem of marketing orientation is frequently a subject of research (Kramer 1995; Kędzior 1997; Fonfara 1999; Rawski 200; Kotler, Armstrong, Saunders, Wong 2002; Kłeczek 2003; Szulc 2007; Oniszczuk-Jastrząbek 2011; Kotler, Lane 2012; Nowotarska-Romaniak 2012; Escher 2014; Kozielski 2015; Panasiuk 2017; Sawińska 2017; Janczewska 2018). Such understanding of marketing requirers the enterpreneurs to perform marketing research, identify the recipients' needs, define the precise and measurable targets as well as properly adjusting marketing instruments, control, etc.

Among the contemporary consumers there is a growing interest in product and ecology-promoting activities [Zaremba 2002; Żakowska-Biemans 2011; Zaremba-Warnke 2011; Niezgoda 2012; Zalejski, Faszczewska 2012; Źółkowski 2013; Pukas 2014; Sobczyk 2014; Escher, Petrykowska 2015; Sajdakowska, Żakowska-Biemans, Gutkowska 2015; Żakowska-Biemans 2015; Pawlak-Kołodziejska 2016; Sobczyk-Kolbuch 2016; Zaremba-Warnke 2016, Koreleska 2016; Koreleska, Ferenc 2017, Sobczyk 2018; Kozłowski, Rutkowska, 2018; Ropuszyńska-Surma, Węglarz 2018). The situation is similar in some companies (Soboń 2003, Wilk 2011, Koreleska, 2009; Olejniczak 2014; Wiśniewska 2014, Kalińska-Kula 2016; Wilk 2018). It raises a question if the enterprises in Kuyavian and Pomeranian Voivodeship can see the trends and if they are interested in implementing and fitting them into the marketing activity. This thesis aims at answering the question.

The main aim of the research was to present and assess the performed marketing activity in selected enterprises. The performed analysis confirmed the presumed research hypothesis stating that in the most of enterprises, the marketing activity is performed in a satisfactory manner.

Method

The research was performed in fifty enterprises via the direct survey method in 2019 in Kuyavian and Pomeranian Voivodeship. The criteria of this choice was the location in Kuyavian and Pomeranian Voivodeship. In the research there has been used a survey verified in pilot studies. The researchers paid attention to such components as conducting marketing researches, formulating marketing targets and their connection with marketing instruments and particular marketing tools in the concept of 7P. In the literature, there are many supporters of extending the 4P concept) (Kramer 1997; Payne 1997; Roza 2009; Garbarski, Rutkowski, Wrzosek 2001). Taking into consideration lack of access to particular enterprises and their latency, the researchers conducted the assessment in the indirect manner, via the direct survey method with the owner or employees of enterprises. In relation to that factor, the obtained assessment might be of slightly inflated nature. However, indicating the factors, which are the best and worst assessed might be some kind of indication to optimize the marketing activity. During the process, the researchers noticed some new trends, i.e. the opportunity of performing ecology-promoting activities in the enterprises and their significance for the marketing activity.

Results

The first evaluated marketing instrument in the enterprise was the Product. It was presumed that in the assessment of enterprises it gained the best reviews as a marketing tool. There were no negative reviews. The special role of the product (in the marketing-mix concept) is indicated by some authors (McDonald, Wilson 2012). Meffert (1991) points to problems with the choice of marketing-mix combination.

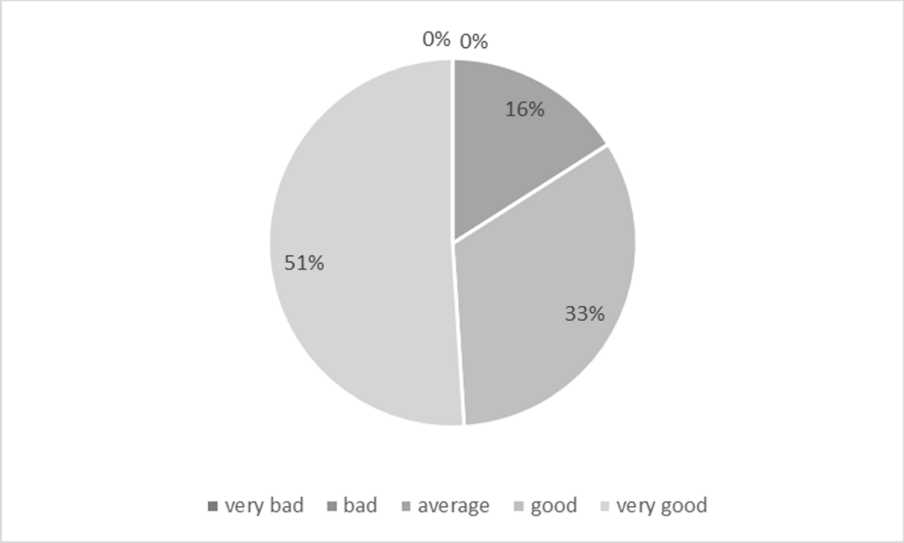

Chart 1 : Assessment of the product policy performed by the enterprises in Kuyavian and Pomeranian Voivodeship.

Source: own research

Promotion performed in the enterprises gained the most negative reviews as the marketing element. There were some problems indicated, which referred to internal PR, Internet activities (websites, social network), slogans of advertising campaignes changing too rarely etc.

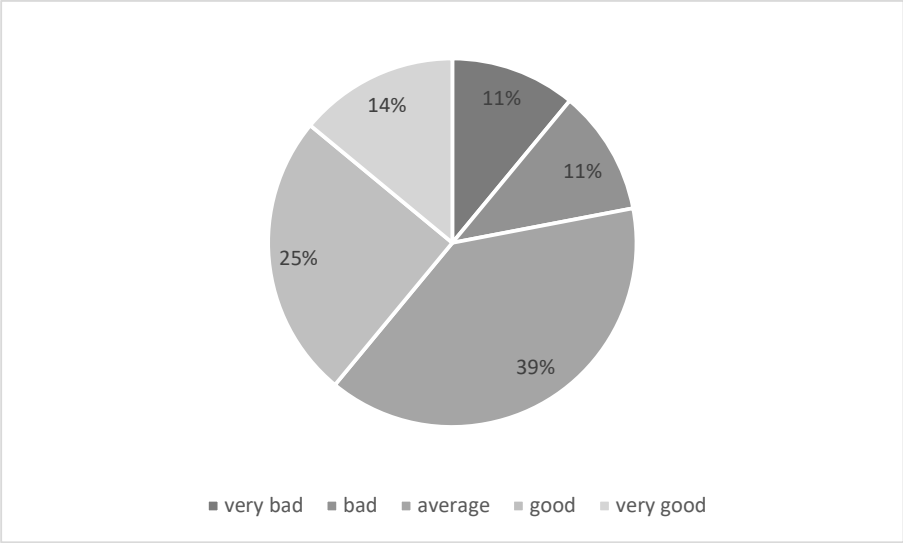

Chart 2 : The assessment of the policy of promoting performed by the enterprises in Kuyavian and Pomeranian Voivodeship

Source: own research

Another assessed element was the price The price is a significant element in the consumer decisions. Companies consider price to be a basic and effective means of communication with the customer (Andruszkiewicz 2007). The assessment of price policy was presented on the chart no. 3

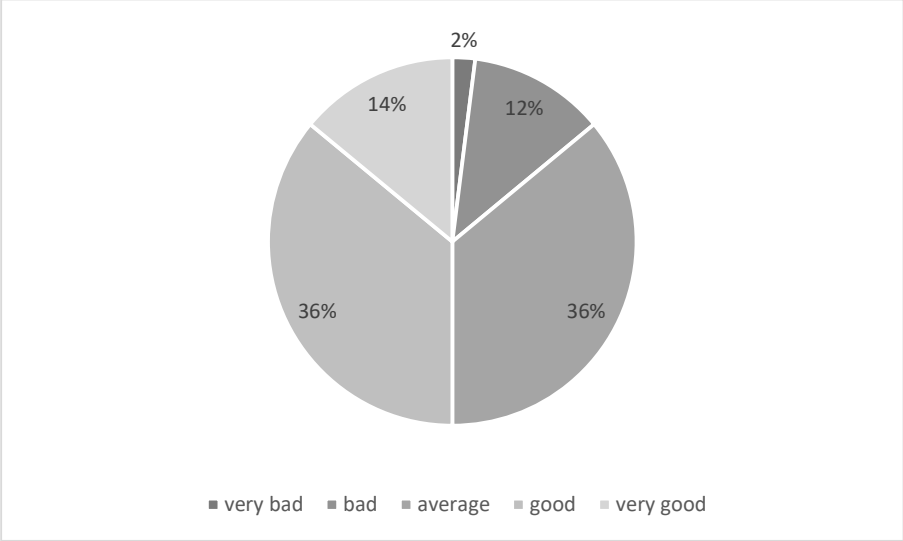

Chart 3: The assessment of policy of price performed by the enterprises in Kuyavian and Pomeranian Voivodeship.

Source: own research

Providing the product in the convenient venue and time is a significant element of a marketing activity. The assessment is presented on the chart no. 4.

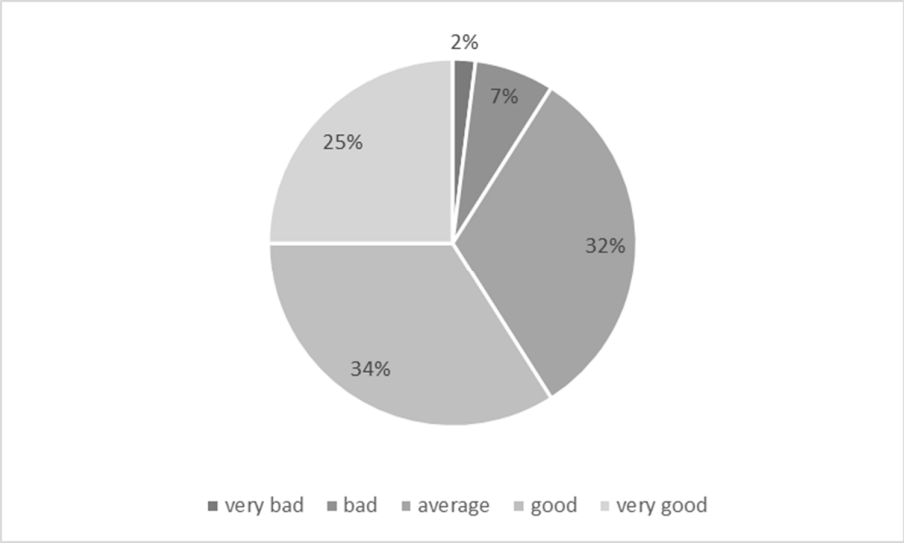

Chart 4 : The assessment of policy of distribution performed by enterprises in Kuyavian and Pomeranian Voivodeship

Source: own research

Another element subject to an analysis was the personnel, their marketing competences, benevolence and the ability to advise. The chart no. 5 presents the results. The need to increase the marketing competence of the employees was indicated by, among others Thomas (1999); Wasiak (2011); Bombol, Sikora (2014), Alejziak (2014), Molenda, Kruhlaya (2018).

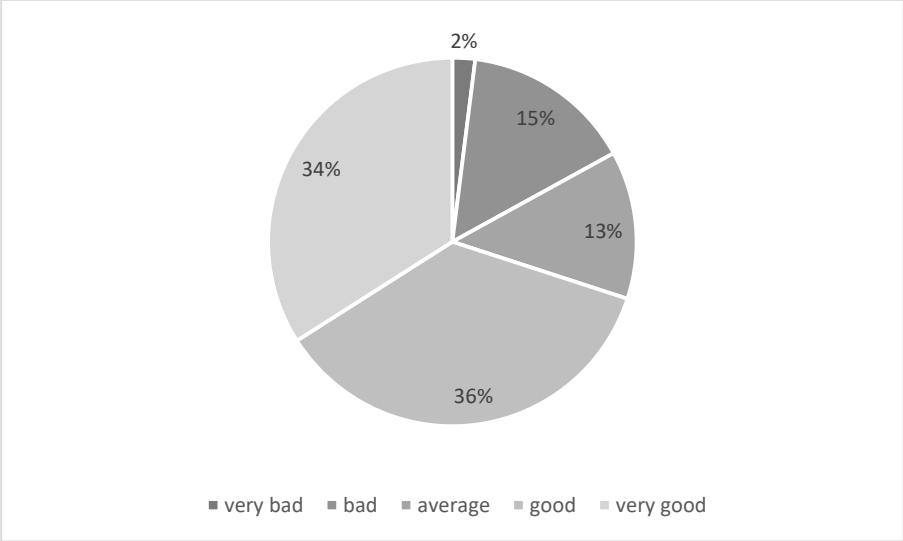

Chart 5 : The assessment of personnel in the enterprises in Kuyavian and Pomeranian Voivodeship

Source: own research

The process includes a series of actions from selecting the product, through purchasing it and the possibility of making a complaint. The results of the assessment are presented on the chart no. 6. Some

companies pointed out the need to hire specialists in the field of marketing, employee training in this area

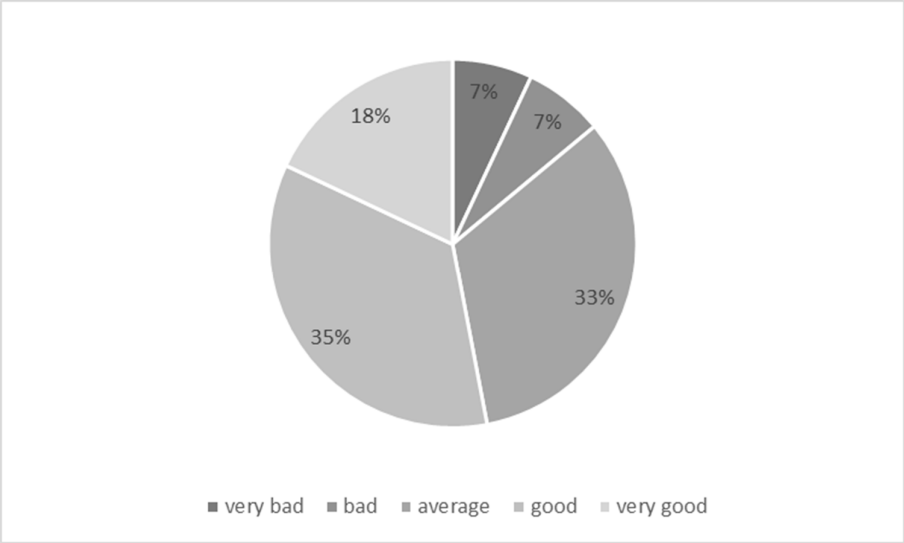

Chart 6: The assessment of policy of the process performed by the enterprises in Kuyavian and Pomeranian Voivodeship

Source: own research

The tangible evidence was assessed in a highly positive or satisfactory manner by all the enterprises, there were no negative reviews and it can be presumed that the enterprises provided the client with outstanding conditions through creating a proper company image, appearance and equipping of the building, parking areas, etc.

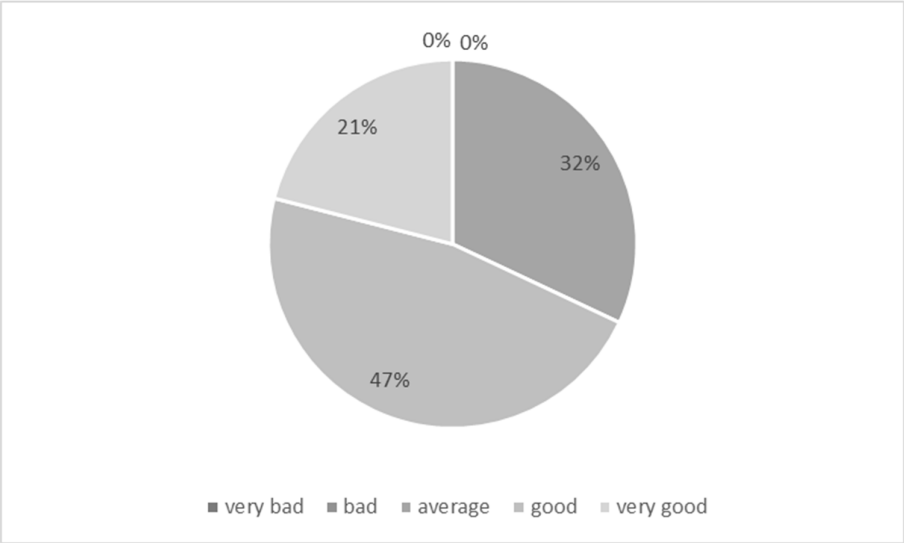

Chart 7 : The assessment of the policy of the tangible evidence performed by the enterprises in Kuyavian and Pomeranian Voivodeship

Source: own research

The total marketing activity was assessed on average, well and very well by the vast majority of companies (chart 8). The majority of companies declared that their marketing objectives were properly formulated and linked to their business objectives and mission.

Among the problems indicated by entrepreneurs were mainly the lack of sufficient funds for marketing activities, the need to hire specialists for marketing, employee training in this area, insufficient promotional activities, including on the Internet.

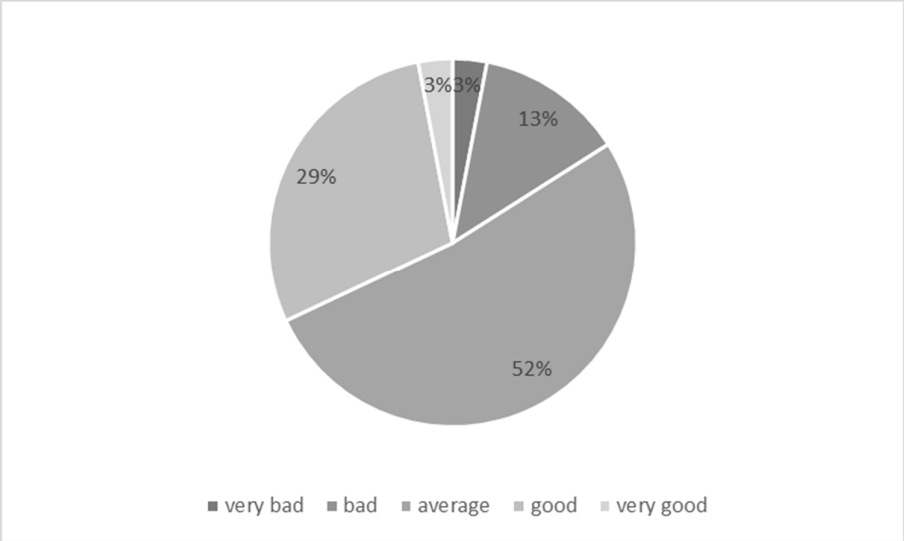

Chart 8 : General assesment of marketing activities by the enterprises in Kuyavian and Pomeranian Voivodeship

Source: own research

By skillful and systematic use of marketing research, decision-makers reduce the risk of making decisions (Kaczmarczyk 2007). The implementation of marketing research was assessed slightly less well in comparison to other elements of marketing activity (chart 9). Problems with the implementation of the concept of marketing orientation in companies, of which marketing research is a fundamental element, are indicated in earlier publications (Szostek 2012, Szulc 2014).

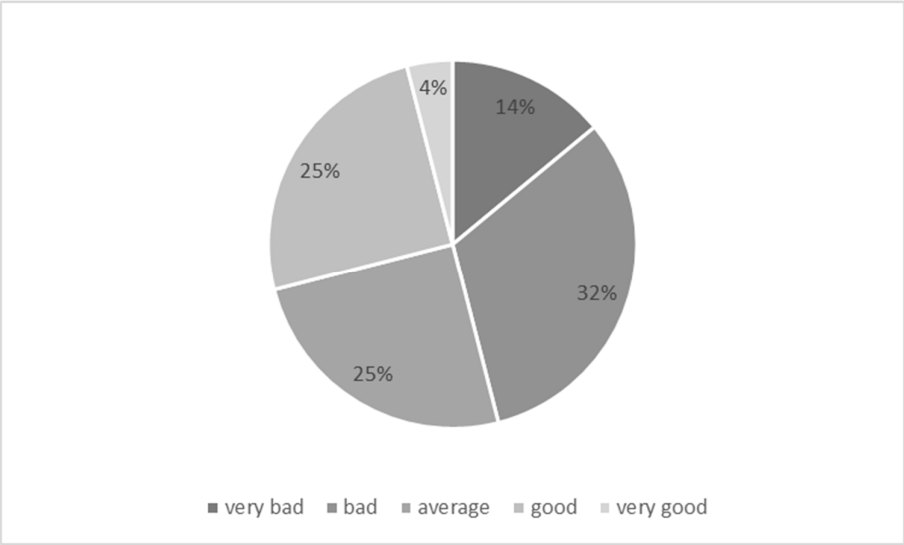

Chart 9 : Evaluation of marketing research conducted by the enterprises in Kuyavian and Pomeranian Voivodeship

Source: own research

Most of the surveyed (63%) said they were interested in implementing ecology-promoting actions. 28% of them showed no interest in the activities. 8% did not express their opinions.

Most of the surveyed enterprises, i.e. 58% are planning to use the implementation of ecology-promoting solutions in the marketing actions and company image actions. Every fourth enterprise says they are not planning to take up those activities, and the other enterprises did not express their opinion on it. It can be presumed that not all enterprises are planning to widespread the information on ecology-promoting activity, which is an error in terms of marketing activities - in the area of promotion - of public relations.

Summary

The performed analysis confirmed the presumed research hypothesis stating that in the most of enterprises, the marketing activity is performed in a satisfactory manner. As for the product and material evidence there were no negative reviews, which stands for a positive phenomenon. The most of the negative reviews referred to such marketing tools as promotion, people and marketing research. In these areas it is highly recommended to implement corrective actions. Simultaneously, most enterprises are interested in introducing ecology-promoting solutions and using them in marketing activities.

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Organizational and Economic Aspects of Increasing the Sustainability of Farms in Ukraine

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Abstract

It is substantiated that modern farms have both the features of peasant farms and the properties of "Western-type" farms. Modern farms are characterized by multifunctionality, in particular, the combination of economic and socio-cultural functions in the economic activity. Economic include: production of agricultural products; satisfaction of consumer demand for quality products; creating a competitive environment; contribution to food security in the country; profit and profit sharing; increasing the level of business activity in the region; increasing budget revenues at different levels.
The main features of a farm in Ukraine: it is based on an individual, small-group, mainly family form of work organization; the means of production, including land, are privately owned by the peasants, although some of them may be in another form of ownership or use; the farm may or may not have legal personality; completely independent in making economic decisions, managing the created product and income; its production is commodity; is fully responsible for the management results.
It is established that in 2017 compared to 2016 there was a slight increase in the number of farms. During 2008–2017, the number of smallholder farms decreased by 21.1%, while the medium and large ones increased, mainly due to the merger of bankrupt small FHs and owners of land units united by family ties. The necessity to concentrate state support for the development of small farms is justified, and to exclude medium and large farms from the list of entities that are provided by the state in the framework of financing agriculture. The results of the cluster analysis of small farms indicate that it is advisable to direct state support to the development of farms in which revenues are generated from the sale of crop products, as well as from other crop products - "niche" products and livestock. The feasibility of state support for beginning farmers on the basis of a grant for the creation of a family livestock farm has been proved.

Keywords*: farms, small farms, large and medium sized, niche crops, government support.*

Introduction

The formation of a multifaceted economy has led to the mass creation of small forms of farming in agriculture and the development of an organizational form such as farming, whose role is significant in ensuring employment in the countryside, raising the incomes of the rural population and shaping the commodity supply of certain types of agricultural products. Farms have proved their high viability due to their inherent economic isolation and freedom, family basis, high adaptability to external conditions of operation, which creates the motivation for high-performance work. However, the low level of development of their material and technical base, the predominance of extensive agricultural production technologies and the high labor costs significantly reduce their competitiveness in highly competitive agricultural markets, limit the opportunities for development and increase of human capital in rural areas. In such circumstances, there is an objective need to create a favorable environment for the functioning of farms, focused on improving their competitiveness in the context of European integration and ensuring the sustainable development of rural areas within the framework of forming a balanced agrarian structure of the economy.

Farmers in a short period of time have passed the stage of their emergence, a difficult period of formation and strengthening of positions in the production of certain types of agricultural products, and now have entered the stage of development in the new conditions of European integration, globalization climate change, decentralization of power and unification of rural communities. In addition, the issues of scientific substantiation of effective organizational and economic levers and practical approaches to the creation of favorable organizational and economic conditions for the development of farms, which provide effective instruments of state support, regulation of uncertainty of the status of farms, establishment of full-fledged advisory, are still poorly understood. and integration ties in agricultural development, and other stimulating factors idvyschennya efficiency.

Literature

In the Law of Ukraine "On Farming" this legal act states: "Farming is a form of entrepreneurial activity of citizens who have expressed a desire to produce commodity agricultural products, to carry out its processing and sale in order to profit on the land plots given to them in the property and / or use, including for rent, for farming, commodity farming, personal farming in accordance with the law ”[1].

The study of the features of small forms of farming in agriculture allowed us to establish their dual character, which is already embedded in the phrase - farming, since it focuses primarily on the market nature of modern farming in developed countries, it is necessary to remember the historical specificity of the domestic peasantry. We believe that the most important features of the systematization of the features of the peasant farms were offered by O.V. Chayanov, who named two main criteria for this form of farming: its marketability and the absence of hired (alienated) labor. At the same time, he characterized the peasant family farms as “farms built in the vast majority of the work done by them on the work of household members, without the involvement of hired labor…; in its purest form - farms do not attract hired labor at all and are not hired themselves ”[2].

We share the position of domestic researcher N.M. Onyshchenko regarding the fact that farming is a form of commodity production, and its activity should be based not only on the personal labor participation of the farmer, members of his household and employees, but also organized entirely on wage labor [3]. At the same time, on the approach of L. Hnatyshyn, on the contrary, it is emphasized that a farm is an agricultural enterprise that is established on an individual, family and collective basis with the right of a legal entity and carries on its activity without the use of hired labor [4].

Well-known scientist V. P. Horovyi emphasizes that it is an entity created by a group of persons who have experience in agriculture, qualification of specialists of agricultural profile or have undergone special training, function on the principle of independence, jointly carried out with the direct participation of each member of the economy production, processing, sale of agricultural products that have jointly owned or leased land area of more than one hectare, equipment (when performing

activities in plant), working and productive livestock or poultry (in the production of livestock products) and other property [5]. Contrary to the above, M. H. Shulskyi believes that it is a subject in the field of agricultural production and food, which should embody mainly all moral, spiritual, socio-cultural traditions [6].

We believe that the comparison of the domestic peasant economy of the past and the beginning of this century with the currently operating economic entities is not correct. First of all, the higher potential of the material and technical base, innovative conditions of production, legal status, motivation to work give grounds to believe that the concept of "farmer" is more consistent with modern conditions, but we do not deny the deep traits of the farmer. From our point of view, the term "peasant" has a more pronounced social meaning than economic.

The author's approach to the definition of the concept of farming boils down to the fact that it is an agricultural producer based on private ownership of means of production and land and in his activity uses the work of members of the household and part-time workers, and the purpose of his activity is the production and sale of agricultural products and food. Therefore, the peculiarity of the functioning of the peasant farms is that they are both a production and a consumer unit, and therefore they combine two goals - production (maximizing income) and consumer (increasing the welfare of all household members).

The efficiency of the farm is provided by its peculiar features and advantages: lack of hired labor; high level of utilization of work of members of the agricultural household; lack of external control over the production process; the particular motivation of the activity, which is not in the generation of income, but in the consumption and reproduction of the resource potential. Strengthening the position of farms in the current conditions is possible with the acquisition of new knowledge, increasing the level of education of peasants and the widespread use of modern technology and innovative technologies, as well as deepening cooperative and integration ties, which requires comprehensive research on their functioning and development of reasonable proposals effective levers of organizational and economic support for their activities.

Research Methodology

The purpose of the study is to conduct a comprehensive analysis of the results of production activities and to develop sound proposals for the formation of organizational and economic conditions for the development of farms, as well as to determine the levers of their adaptation, taking into account changes in their environment.

The study was based on the use of the following methods: statistical analysis to determine the dynamics, structure and performance of farms; grouping - to determine the impact of various factors on the level of production efficiency of crop and livestock products by groups - small, medium and large farms; comparative - to compare economic processes in agricultural production at different time periods in order to identiPF cause and effect. The algorithm of intragroup averages, that is, the clustering method, which involves the ordering of multiple objects into relatively homogeneous groups, is selected for classification.

The output is given as a matrix having n columns and t rows (Table 9), where Xi is a vector column (i = 1,2, ..., n), Yj is a vector row (j = 1, 2, m). In this case, columns are the name of the metrics, and the rows are their values.

The algorithm, based on the calculation of K intragroup averages, involves 4 steps.

Step 1. Select the initial centers of clusters Z_1 (1), Z_2 (1),…, Z_k (1). This choice is made arbitrarily, usually the first K results of a given set of images are used as the center of the source centers.

Step 2. At the k-th step of the iteration, the set of images {x} is distributed over K clusters by the following rule: X belongs to S_j (k) if $\| x - z_j (k) \| < \| x - z_i (k) \|$ for all i = 1, 2, ..., K, $i \neq j$, where S_j *(k)*

is the set of images included in the cluster centered zj (k). In the case of equality, the decision is made arbitrarily.

Step 3. According to preliminary results (step 2), the new centers of the clusters z_j (k + 1), j = 1, 2, ..., K are determined, on the assumption that the sum of squares of distances between all images belonging to the set $S_j(k)$, and the new cluster center should be minimal. That is, new centers of clusters z_j (k + 1) are chosen in such a way as to minimize the quality index:

$$I_j = \sum_{x \in S_j^{(k)}} \left\| x - x_j(k+1) \right\|^2, \text{ j =1,2,..., K.} \quad (1)$$

$$\text{Center } z_j(k+1) = \frac{1}{N_j} \sum_{x \in S_j(k)} x, \text{ j =1,2,..., K,} \quad (2)$$

where N_j – is the number of sample images included in the set Sj (k).

It is obvious that the name of the algorithm "K intragroup averages" is determined by the method used to consistently correct the definition of cluster centers.

Step 4. The equality $z_j(k+1) = z_j(k)$ at j = 1, 2, K is a condition of convergence of the algorithm, and upon its achievement the algorithm ends. Otherwise, the algorithm is repeated from step 2.

The accuracy of algorithms based on the calculation of K intragroup averages depends on the number of cluster centers selected, on the choice of source cluster centers, and, accordingly, on the features of the data.

Research Results

Farming as a form of professional activity determines the degree of responsibility of the employee for the effective performance of work responsibilities, his lifestyle influences the socialization of the individual, its inclusion in the system of public relations. On the basis of socio-economic relations, a system of moral and cultural values of the farmer's professional activity is formed, which is influenced by the national peculiarities of agricultural production, as well as the experience and traditions gained. It is established that due to imperfect current legislation, insufficient attention from the state to the needs of agriculture and their poor social protection in Ukraine in recent years there is a tendency to decrease the number of farms (Fig. 1). However, this category of agricultural producers holds the largest share among the corporate entities in the agricultural sector. Therefore, in 2017 compared to 2016, there is a slight increase in the number of farms. This circumstance is primarily due to the formation of favorable conditions for the production activities of newly established farms, mainly family type.

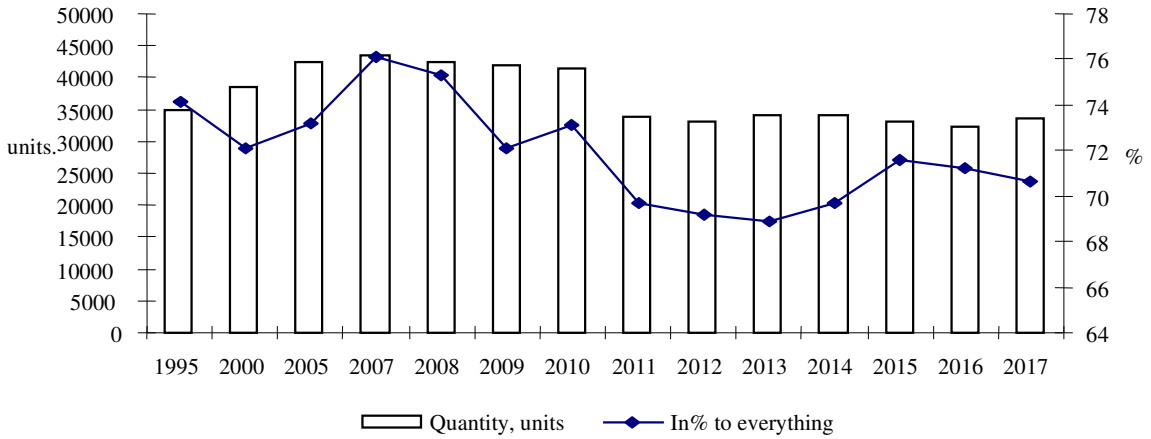

Figure 1: Dynamics of the number of farms and their share in the total structure of agricultural producers

Source: Compiled according to the State Statistics Service of Ukraine.

It is established that the dynamics clearly show two stages of change in the number of farms: the first (1995-2007) - the growth of the agricultural sector of the agrarian economy, which is caused primarily by significant financial investments that came as state support; the second - (2008 to date) - a decrease in the number of farms due to a number of objective and subjective reasons.

It has been established that the overall downward trend in the number of farms is due to a number of circumstances. First, there is a lack of effective financial and credit mechanisms and risk insurance mechanisms. Difficult access to financial resources, unreliable system of crediting of farms significantly reduce the entrepreneurial activity of the rural population, do not contribute to the formation and development of agricultural business entities of the above-mentioned organizational and legal form of management [7].

When developing agro-finance programs for small and medium-sized farms, financial institutions are confronted with the situation that some farmers are in no hurry to take advantage of bank loan offers. Moreover, the rather high market rates of financing at that time can not be considered as the primary cause of this situation. Too often, agricultural producers have been reluctant to risk borrowing, arguing their decision to have a volatile economic situation in the country, so they have the intention of saving on fertilizers, plant protection products, repair or upgrading of machinery. That is, they have not only invested in expanding their own production, but also in improving the quality and increasing the yields [8].

Among the reasons for the slow development of lending to small agricultural producers in Ukraine are, first of all, the difficulty in lending quickly due to the bank's territorial remoteness from farms, the manifestation of bureaucracy in the work of financial institutions that require too much documentation to satisPF the intention of the farmer to take credit. It should be noted that in agribusiness, long processes of making credit decisions are unacceptable.

Second, the ineffectiveness of existing state support for farms. For farms, the tax pressure at the actual low yield is too high. Moreover, tax legislation as a whole is still controversial and complicated. As a result, not all registered enterprises of small agrarian business fully and legally conduct business activities [9].

Third, difficulties in implementing innovative farm projects and programs. Increased risk of innovative projects, underdevelopment of the insurance system and guarantees in the implementation of such projects in the context of unpredictable fluctuations in agricultural prices and input material resources hamper the development of farms, in particular small ones. The lack of financial resources

to invest in the dire need of equipment upgrades and the use of modern technologies hinder their technical re-equipment.

Fourth, the underdeveloped system of information support for farms, in particular small ones. There is no complete and objective statistical information on the activities of these formations. The statistics of the State Statistical Service of Ukraine are formed on the basis of sample surveys using constantly changing methods of calculation, as well as the lack of necessary statistical observations on farms, including small ones, do not allow to have a clear idea about the real state of functioning of farms in Ukraine.

Fifth, there is a lack of professional training for farm owners to compete in competitive production. Due to the lack of a specialized system of training and qualification of farmers, their agricultural business is unstable and vulnerable in terms of competitiveness.

Sixth, a high level of market monopolization. As a result of monopolization by highly concentrated agricultural enterprises, some segments of the agrarian market, farmers do not have sufficient opportunities to sell their products.

When researching the activities of farms, it is important to analyze the characteristics of the management of medium, large and small agricultural enterprises. According to the methodology of the State Statistics Service of Ukraine, large and medium-sized enterprises are enterprises whose size is equal to or exceeds the thresholds of at least one of the following statistical criteria: the area of agricultural land is 200 hectares; 50 cattle livestock; livestock of pigs - 50 heads; livestock of sheep or goats - 50 heads; 500 birds livestock; number of employees in agriculture - 20 people; the amount of income (profit) from the sale of products, works and services of agriculture - 150 thousand UAH. An enterprise smaller than these thresholds is a small agricultural enterprise [10].

During the study period, small entities in the structure of farms were dominated by small entities of the aforementioned category of agricultural producers of the corporate sector of the agrarian economy (Fig. 2).

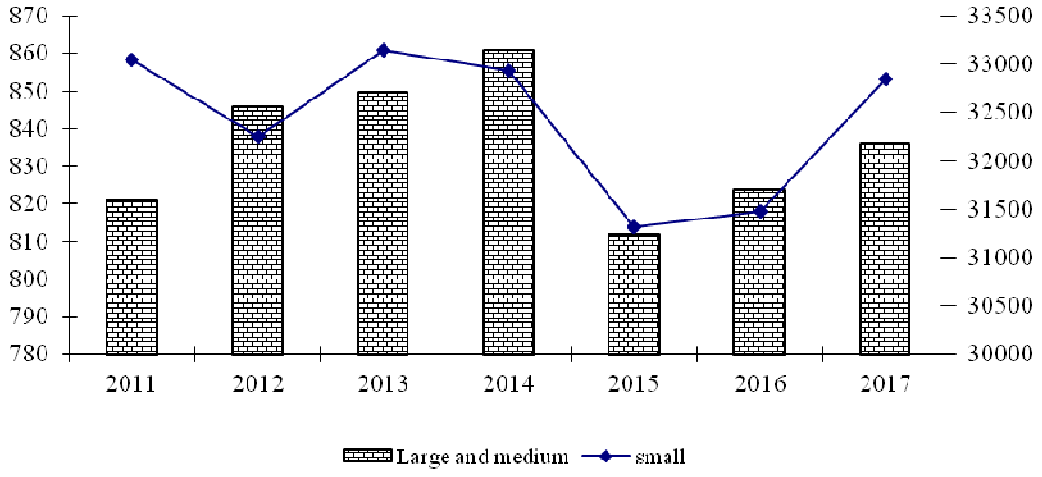

Fig. 2: Dynamics of the number of medium and large and small farms, units.
Source: Compiled according to the State Statistics Service of Ukraine.

It should be noted that during 2008–2017, the number of small farms decreased by 21.1%. The main reasons for this situation according to the survey results (123 polled in Kyiv, Cherkasy and Khmelnitsky regions in 2017) of the heads of the aforementioned category of farms are: elderly manager and lack of heir (41%), high probability of raider capture (23%), loss of production activity over a long period of time (32%), 4% - other factors.

It should be borne in mind that the land use area of the farm depends on the influence of certain factors: the subject's specialization, the quality of the farmland, the availability of labor and material resources, the location of the farm, the possibility of obtaining land for private ownership and rent.

According to the Land Code of Ukraine in 1990, a farmer could receive up to 50 hectares from the state for ownership and lifetime ownership. In fact, during 1990–1992, 0.54 million hectares of land were transferred to farmers. Over the past five years, land use has increased by 12.1% and amounted to 4.4 million hectares in 2017. The main land users are small farms, which account for 62.1% of agricultural land, which belongs to this category of agricultural producers as a whole.

For the production activity they use leased land. In the structure of land use, the share of leased agricultural land in 2017 was: large and medium-sized farms - 98%, small - 74.4%. There are about 4308.6 thousand hectares of farms in the country, or 12% of the total area of agricultural land, while agricultural enterprises use 44.6% of the total agricultural land fund, and personal peasant farms - 43.5%. During 2012–2017, the concentration of agricultural land and arable land in particular increased. Thus, in 2016 versus 2012, the area of agricultural land per farm increased by 27.6% (Fig. 3).

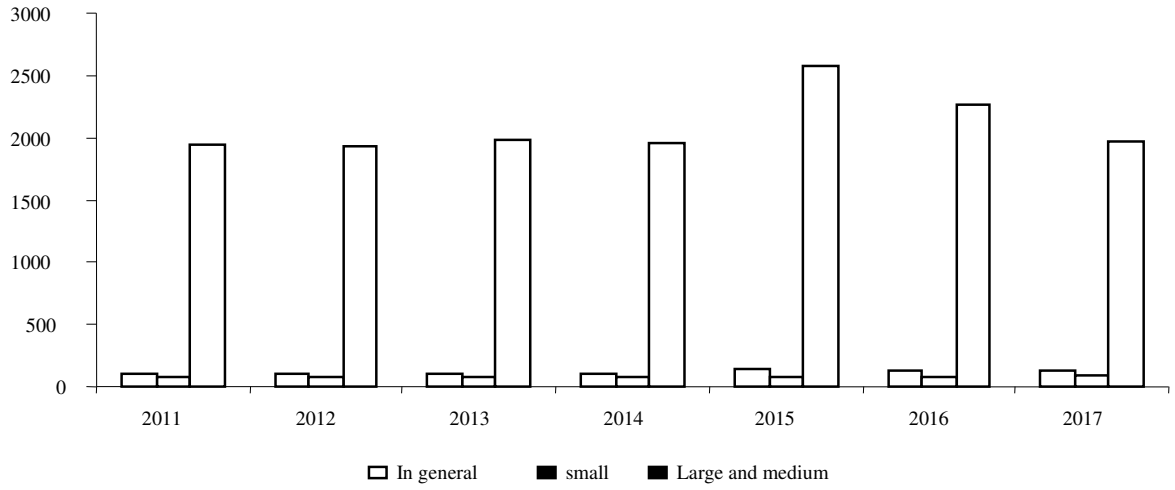

Fig. 3: Dynamics of land use depending on the size of farms per farm, ha
Source: Compiled by the State Statistics Service of Ukraine.

It should be noted that in the group of medium-sized and large farms, land use per capita is gradually decreasing (by 23.6%). This fact is due to the fact that now owners of land units in large numbers refuse to conclude formal lease agreements with agricultural producers, in order to save profits from farming due to non-payment of taxes. According to experts, as a result, the state budget is underpaid about 16 billion UAH [12].

It should be noted that in 2017, 75% of farms had an area of agricultural land up to 100 hectares, which is evidence of the low level of concentration of agricultural land and forms the prerequisites for the development of family-owned farms focused on local markets for agricultural products and food. Hence the need to develop a draft law on agrarian local markets, the adoption of which will

allow to sell in the local markets products of their own production in accordance with European requirements.

We believe that this size of land use by farms creates an environment for the emergence of trade and intermediary structures that could provide for the formation of large commodity lots of agricultural products and ensure their further sale, including in foreign markets. It was found that in 2017, the largest share - 33.3% (11 207 units) in the total number of farms was **occupied** by the group with land area from 20.1 ha to 50 ha. It can be assumed that this group is potentially formed by entrepreneurs, who are mostly family oriented, or lack the potential for expansion.

Attention is drawn to the fact that during the study period there is a decrease in the number of non-agricultural holdings. In 2017, there were 1,650 units, with a share in the structure of 4.9%, that is, for the period of analysis, a decrease of 43.2% compared to 2005 and 61.7% compared to 2010.

A detailed examination of the structure of farms by area of land use during the analyzed period gave reason to conclude that there were no significant changes, only slight deviations were noted, the value of which indicates that the current trends are maintained. In this regard, there is a need for a more in-depth study of small farms by the level of concentration of agricultural land (Table 1). The study found that, depending on the area of land use, the largest share is occupied by farms that use more than 100 hectares of agricultural land.

Table 1: Grouping of smallholder farms by agricultural concentration, 2017

№	Groups for area agricultural whatever, ha	Fraction PF, %	Specific weight in land use,%	Profitability, plant growing, %	Profitability, animal husbandry, %	Fraction products animal husbandry, %	Product rural farms	
							% to everything	rofitability,%
1	by 5	12,1	0,5	14,6	-0,7	67,6	1,3	3,8
2	5,1-10	9,1	0,9	26,9	15,1	12,4	0,5	25,3
3	10,1-25	17,6	3,8	38,7	6,5	18,8	2,6	31,3
4	25,1-50	30,5	14,7	33,8	11,2	3,2	7,1	32,9
5	50,1-100	12,3	10,5	41,2	9,6	8,0	8,4	38,0
6	100,1-500	15,0	40,7	47,7	12,7	1,8	44,6	46,9
7	More 500	3,5	28,9	48,9	27,0	2,7	35,6	48,3
Total		100,0	100,0	46,0	11,0	4,1	100,0	44,2

Source: calculated according to the State Statistics Service of Ukraine.

The results of the grouping show that with the increase in the level of concentration of land resources in farms the level of profitability of agricultural production increases. The area of agricultural land used by small farms is a determining factor that influences the choice of the direction of production activity. Thus, business entities with an area of land use up to 5 hectares specialize mainly in the production of livestock products. As farmland increases in smallholder land use, they reorient themselves to crop production, which is adequately reflected in an increase in the share of agricultural production in the entity's income structure.

Obviously, small farms have a high enough potential for future development. Thus, choosing a specialization of farms and defining a set of crops for cultivation, owners of small agricultural businesses should focus on those products that have a steadily increasing **demand** in both domestic and foreign markets, as well as those that can provide the greatest return - from 30 thousand UAH to 100 thousand UAH per 1 ha. So, the perspective direction for the development of small agricultural enterprises is the production of organic products, as well as "niche" - nuts, beans, spices, sorghum,

chickpeas, peas, lentils, mustard, flax, hemp, nuts, berries - raspberries, strawberries, blackberries, strawberries , blueberries, cranberries and more.

Among medium-sized and large farms, the largest share is occupied by economic entities that own 1001-2000 ha and occupy 45.8% of the land use structure. Thus, medium and large farms of groups 1 and 7 have almost no production of livestock products, with cultivation of up to 1000 hectares and more than 10,000 hectares. This situation can be explained by the following factors - both the economic result of business activity, the risks and complexity of animal husbandry processes, and the low efficiency of supporting livestock industries, in particular beef and dairy, pig, sheep and goat farming.

A comparative analysis of the efficiency of agricultural use of the two types of farms shows that the level of profitability of crop production in small businesses is lower compared to medium and large ones. In this case, the factor of scale of production, as well as the productivity of technical resources, higher savings in the procurement of material resources and so on.

Therefore, the contribution of the farming sector to the development of animal husbandry is not significant, which can be explained by the high level of complexity of production and capital intensity, the low profitability of the industry and the increased risk of epidemics, diseases and biosecurity, the implementation of additional costs for environmental protection.

The predominance of the share of crop production in farms has a negative impact on agricultural production in years with adverse climatic conditions, which also exacerbates the impact of this type of risk on the performance. In view of the above, there is a need to diversiPF the risks of farms on the basis of the development of a scientifically sound production program of the combination of plant and animal husbandry.

Effective and sustainable development of farms involves the strengthening of their skilled staff with sufficient experience, knowledge and skills in conducting agricultural production and agricultural business. In today's economic environment, the pre-emptive right to set up and operate a farm should belong to enterprising and enterprising citizens with experience in agriculture, capable of conducting effective business activities.

Farms in the economic crisis are becoming an important factor in the stability of the functioning of the country's agriculture, provide the village with additional jobs, improve labor resources, promote the involvement of retirees and adolescents in the production process, reduce rural unemployment, promote the recovery of peasants the younger generation. Being engaged in the production of a wider range of crops and animals than large forms of farming, farms help to preserve biodiversity of agrocenoses, ensure their sustainability, thereby improving the environmental situation in the countryside.

According to the results of a study by the author of farms in the Kiev region, the social portrait of a modern farmer looks like this. For the most part (90%) farmers are men. The average age is 48 years. 66% of farmers have higher education, a small part (10%) - secondary, 24% - secondary specialized. In terms of qualifications, 42% are engineers, 24% are agronomists, 9% are veterinarians and economists, 6% are teachers, 3% are lawyers and zootechnics. In most farmers (45%) families consist of 4 people, in 23% of farmers - 3, 18% - 2, 12% - 5; 2% of farmers have no family. Farming experience of up to 5 years is held by 24% of farmers, 6-10 years - 30%, 11-15 years - 34%, over 15 years - 12%.

At the same time, the unpretentiousness of work in agriculture causes a negative tendency to decrease the number of workers in farms since 2005. It should be noted that the number of members of farms during the study period decreased by almost 40%. This tendency in the development of farms testifies to the intensification of the processes of intensification of the production process in the production of agricultural products, which ultimately leads to a reduction in the complexity.

It is necessary to emphasize such a feature as an increase in the number of permanent employees - producers of the above-mentioned category of the corporate sector of the agrarian economy. This circumstance is evidence of a positive trend in the development of farms, ie the process of legalization of their activities.

Regarding the peculiarities of employment in the environment of small farms, where in almost 70% of them the number of employees is up to 1 person, who are members of the aforementioned agricultural business entity. This leads to the assumption that this group of agricultural producers can be considered as family farms.

According to the Law of Ukraine "On Stimulation of Creation and Activity of Family Farms" it is possible to create a family farm without the status of a legal entity on the basis of the agreement / declaration on creation of such farm. The contract is concluded by the person-owner together with family members at the location of the property and land plots of the farm. If a person intends to run the business on his own, then he makes a declaration about it (a typical form of the Ministry of Agrarian Policy). After writing the contract or declaration, the head of the family farm must register as a sole proprietor. Family farms can create families that cultivate up to 20 hectares of land without hiring workers. At the same time they are engaged only in growing agricultural products, fattening animals, preparing such goods for sale.

The law aims to obtain official status for rural people working on their land, which will allow legally to sell grown produce and obtain social protection and the right to a pension. The implementation of the provisions of the above-mentioned legal act will create the conditions for starting the development of family farms and the shading of entrepreneurial activity in the agricultural sector, which will positively affect the increase in local budget revenues from tax payments and create jobs in the country.

It should be noted that in medium and large farms more than 85% of employees are involved in the production of crop products except for 5-6 groups of the above-mentioned organizational and legal form of management. It is established that with increasing number of employees the level of land security in the farm decreases. This fact shows that these farms are highly concentrated and use innovative technologies that help reduce the complexity of production processes. Therefore, farms are in dire need of skilled professionals who have a specialist knowledge of the basics of agricultural technology, crop production, accounting, taxation, capable of performing commercial and management functions. Usually, the number of members of the farm is limited by the family, the responsibilities between the members of the farm are clearly distributed, and hired workers are engaged in sowing and harvesting.

Effective agricultural activity is not possible without sufficient technical means to complete the full cycle of production, storage and processing of products. In the EU countries, 95% of farms do not have permanent employees. All farm work is done mainly by farmers and their families. Outsiders are only hired to perform seasonal work for relatively shorter periods of time [13].

Summarizing the above, we can conclude that farms are now engaged in entrepreneurial activity in uncertain conditions, thus increasing the manifestation of various risks of economic activity. Therefore, the priority is to adapt them to new economic conditions and to ensure sustainable development, which can help to improve their economic efficiency.

The main focus on farms is the production of crop products. The main reason for the minimization of the number of agricultural enterprises of the above-mentioned organizational and legal form of livestock specialization is due to the system of pricing for agricultural products, which is characterized by an imbalance of prices for crop and livestock products, as well as due to the high complexity of production; the lack or overestimation of the necessary facilities and equipment for keeping animals; low profitability of the industry.

Scientists' calculations confirm that the enterprise of the corporate sector of agrarian economy, which specializes in the production of crop production, requires 3.0–3.5 times less fixed assets than the agricultural enterprise that produces livestock products [14].

The results of the analysis show that there are positive trends in the production of both crop and livestock products by farms. Thus, in 2017 compared to 2000, the volume of crop production increased by 7 times, animal husbandry - almost 6 times, which led to slight changes in the structure of agricultural production depending on the organizational and legal forms of agricultural producers.

It should be noted that in 95% of small farms in the structure of commodity production, the share of crop production accounts for more than 75%, which provides a high level of profitability. In the structure of commodity production of small farms, cereals and sunflowers, which are highly profitable and export-oriented crops, dominate. Such situation in the conditions of weakening of the national currency positively affected the level of profitability of crop production, which fluctuated within 24.5-52.8%. As regards the profitability of livestock production, the level of profitability in highly specialized livestock farms reaches 33.8%. With the increase in the share in the structure of commodity products of crop production the economic efficiency of production activity decreases and the loss of livestock production increases.

Unlike small farms, in 2017, 14.7% of medium and large farms did not produce crop products, focusing solely on animal husbandry. Thus, almost 85% of medium and large farms specialize only in crop production, focusing mainly on growing crops and sunflower. This ensures a high return on production costs, as evidenced by the level of profitability of production.

According to the results of the grouping, we have selected farms focused mainly on the production of crop products, namely with an area of land use of an average of 92 hectares and larger with an average value of agricultural land - 358 and 455 hectares. In the group of medium and large farms are allocated those not engaged in the production of crop production, the share of which reaches 14.7%, the average size of land use is 25 hectares.

The development of farms requires the use of a systematic approach to justiPF the prospects for their operation. In this regard, there is an objective need to investigate the areas of PF development that will improve their functioning and maximize the economic interests of all subjects of market relations. We believe that government support for PF is also necessary in view of the fact that agricultural products and food are social and strategic commodities [15]. The state should help to provide the population with food at reasonable prices to ensure social stability and strengthen our position in the world. In addition, in today's environment, small and medium-sized agribusiness is not only the production of agricultural raw materials and food, but also the guarantor of sustainable socio-economic development of rural areas.

State support must first and foremost ensure the profitability of farms, which will contribute to their economic sustainability. In a system of market relations, the PF may be considered sustainable if its economic activity ensures "... the fulfillment of all its obligations to employees, other economic entities, the state due to a sufficient level of income and compliance with income and expenses" [16]. Profitability of farms depends to a large extent on prices for agricultural products.

In order to substantiate the organizational and economic levers of improving the efficiency of farms, we have identified 5 clusters of small farms, which are characterized by specific features of the organization of production activities (table 2).

Table 2: Grouping (clustering) of small farms in Ukraine, 2017

Indicator	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
	6201	1898	2960	1575	15
Area, ha	127	276	75	181	3197
Number of employees	3	5	3	4	132
FG members	1	1	1	1	1
Employees	1,6	3,5	1,7	3,0	131,0
Share of employees	62,0	76,5	62,6	73,9	99,9
Revenue per 1 ha of agricultural land everything, UAH	10798	12803	12280	13294	6621
Profit per 1 ha of farmland everything, UAH	3269	3929	2776	3871	1405
Costs per hectare, UAH	8705,0	9635,0	11102,7	10716,7	12849,5
Profitability,%	43,4	44,3	29,2	41,1	26,9
Revenue share,%					
crop production	90,3	97,1	78,6	95,3	60,4
Crops	41,0	46,7	18,8	42,1	32,7
Sunflower	45,7	34,3	0,7	13,0	21,7
Potato	0,0	0,3	1,9	1,0	0,0
Vegetables	2,5	1,8	0,1	1,0	0,0
sugar beets	0,0	0,3	1,0	1,0	0,1
fruit, berry crops	0,0	0,1	7,5	0,2	0,1
Grape	0,0	0,0	0,7	0,1	0,0
other crop products,	1,0	13,6	48,0	37,0	5,8
not mentioned above	7,3	1,1	21,0	3,4	38,0
Livestock production is everything	1,1	0,9	13,5	1,5	16,4
livestock and poultry (live weight) - everything	0,0	0,1	4,4	0,6	11,7
Cattle	0,0	0,3	9,0	0,9	4,0
Pigs	0,0	0,0	0,1	0,0	0,0
sheep, goats	1,0	0,5	0,0	0,0	0,0
Poultry	0,1	0,0	0,0	0,0	0,7
other livestock	0,0	0,2	7,4	1,6	21,1
Milk	6,2	0,1	0,1	0,3	0,6
other livestock products,	2,4	1,7	0,4	1,2	1,6

Source: calculated by the author.

The given data of table 2 indicates that the fifth cluster has uncharacteristic characteristics that do not correspond to the characteristics of small agribusiness entities that are primarily family-owned. At the same time, in the farms of the second and third clusters, incomes from sales of crop production by 37% or more are generated at the expense of other crop production, that is, through the cultivation of so-called "niche" crops.

Despite the dominance in the overall structure of incomes of small farms of crop production, in the third cluster a significant share is occupied by livestock products, mainly cattle breeding and pig breeding. It should be noted that in the first cluster group up to 10% occupies the cultivation of so-called small farm animals and sheep. We believe that this circumstance requires the development of an effective program of support for the aforementioned groups of small farms.

We consider it necessary to develop a support program for small farms, in particular livestock products, whose share in the structure of agricultural production varies from 1.1 to 37%. Provide a mechanism for obtaining state support in the form of a grant for the development of a family livestock farm, based on the developed criteria for the selection of participants and the procedure for forming the composition of the selection boards. To identiPF the source of financial support for the proposed measures, the implementation of which will facilitate the process of their creation.

In order to encourage small-scale farms that produce “niche” crops, it is necessary to develop Regional Support Programs, in which it is advisable to provide for a material cost compensation of 50% of the normative costs of its production, and the mechanism of financing the compensation payments will be implemented on the principle of co-financing by the United territorial communities and state bodies in the ratio of 50:50. One of the areas of social partnership implementation may be the involvement of small territorial communities in the territorial communities in the supply of products under the School Food program.

Conclusions

The results of the study of organizational and economic conditions of development of farms in Ukraine allowed to systematize the restraining factors of development of farms: low level of economic efficiency of production activity; the presence of psychological barriers, lack of proper social status are often the cause of low entrepreneurial activity; because of small investments it is not possible to significantly improve economic results; the underdevelopment of cooperatives impedes the rational utilization of the potential of smallholder farms and rural areas; farmers' lack of educational attainment hinders economic transformation in the agricultural sector; low or lack of state support, imperfect government regulation impede the dynamic development of farms. A significant brake factor for the modernization of agriculture is the incompleteness of land reform, which reflects only the initial stage of the process of land capital formation and effective functioning.

It has been proved that dairy and meat cattle breeding, sheep breeding, open soil vegetable growing should be the priority directions of production activity of farms, provided that the state support is increased. In order to increase the effectiveness of state support for the purchase of agricultural machinery, it is advisable in the regulatory acts regulating its provision, to abolish the norm of location of the manufacturer of technical equipment, but at the same time to require economic justification from the economy regarding the financial and economic indicators of its use.

Farmers who have transparency and objectivity in declaring their income and expenses should be eligible for state support. In order to increase the effectiveness of the state farm support program, it is advisable to provide for the possibility of providing financial support for newly established farms and the creation of a Farm Guarantee Fund as a whole. There is a need to normalize the transfer of ownership of farms to land plots granted to the founders of such farms for permanent use, permanent ownership, lifelong inheritance, ownership for the establishment and maintenance of farms, as well as regulation of issues regarding manifestations of raiding.

One of the ways of ensuring the sustainability of small farms is to define the diversification of production activities based on the introduction of non-agricultural activities. In order to stimulate the development of non-agricultural activities, it is advisable to improve the taxation system for farms. The existing farm tax system (tax group 4) minimizes the tax burden. However, the introduction of non-agricultural activities by farms increases the risk of losing the status of payer of group 4, if the share of non-agricultural income exceeds 25%. We consider it advisable to attribute the income from the non-agricultural activity of the farm to the aggregate income of the household and to tax using a progressive scale.

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Role of the Management in the World Driven by the Industry 4.0

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Abstract

The Artificial Intelligence and connectivity between machines are the essences of the Industry 4.0 revolution. These rapid changes create challenges for the management and are the main reason for the question about its further role. There are differences between natural and artificial intelligence. Although artificial intelligence supports the decision making by a human now in very narrow fields, there are questions related to the replacement of people for example in the oncology hospitals network and change management in the inter-organizational networks. These doubts revolve around decisions making process, Artificial Intelligence development and management itself, therefore this paper present a theoretical discussion and research assumptions about the role of management in the world driven by the Industry 4.0 revolution.

Keywords: Decision-making, Industry 4.0, Inter-organizational Networks

Introduction

Industry 4.0 Revolution (hereinafter IR 4.0 or Industry 4.0) is a concept relating to the use of automation in industries, data processing and data exchange (Niemczyk and Trzaska, 2020). This concept also encompasses Artificial Intelligence (AI) and the digitization of the production process, introducing new technologies. These rapid changes create challenges for the management and are the main reason for the question about its further role. Industry 4.0 is quite well defined idea of the ongoing technological changes in many entities both private and public sector (Michalski et al., 2018; Rosienkiewicz et al., 2018)

Therefore, this paper attempts to explore and synthesize issues related to the creating an inter-organizational networks to achieve growth and development of organisations (Stańczyk-Hugiet et al., 2017). These concerns are based on the making decision process and the role of the management in the world driven by the IR 4.0. The Industry 4.0 is intertwined with the AI and its impact on the management (Lichtarski et al., 2014), what provokes deep philosophical reflection about the technological progress, opportunities and risks related to the technical philosophy (Sulich and Zema, 2017).

In this paper some research assumptions related to the Industry 4.0 concept are presented. These are difference between artificial and natural intelligence, similarity of collective intelligence and inter-organizational network performance. The reason of undertaking such problem is fact, that until now, organizations that have invested in acquiring knowledge or information and human resources have usually been successful in management (Hernes and Nguyen, 2007; Stańczyk-Hugiet et al., 2017). Modern organizations (and their members) operate in the "age of the big data", and overabundance of information, therefore, to be successful they need to perform better decision taking using IR 4.0 solutions (Lu, 2017). Currently, however, organizations that still invest in their assets and employees, these organization still are not successful and they have to compete with artificial intelligence (Hernes and Nguyen, 2007; Kuik et al., 2019; Lichtarski et al., 2014). The other companies try to gain advantage

creating an inter-organizational networks (Lichtarski et al., 2014) and use the synergy effect or to use a collective intelligence (Krupski et al., 2017) collective learning or knowledge management (Vaidya et al., 2018).

The presented in this paper research assumptions and definitions are related to the ongoing research which is dedicated to the relationships in the inter-organizational network (Zema and Sulich, 2019) created by the entities of Environmental Goods and Services Sector (EGSS) (Zema and Sulich, 2019). The connection to the Industry 4.0 in such specific sector is more expected than in others because of lower attractiveness of jobs dedicated to waste treatment and recycling. Also in this article the other examples of the researches on the inter-organizational networks are presented to draw our own study dedicated to the oncological hospitals inter-organizational network in Poland (Sus et al., 2019; Sus and Organa, 2020), which is the second research project that will benefit from the results of this article. Presented networks are related to the our research project, due to limited awareness among businesses regarding their specificity, prevalence and consequences of adopting IR 4.0 (Rüssmann et al., 2015). The adopted method used in this article was the literature review. The main finding of this study is that in the inter-organizational networks are one of the opportunities coming from the IR 4.0 positive impact. The IR 4.0 is a stimulus for both cooperation and organizational innovation and the development of inter-organizational networks. In future research the IR 4.0 will be analysed in terms of its impact on present-day organizations and the changes that occur in cooperation between companies in inter-organizational networks.

Impact of Industry 4.0 on the Management Sciences

Industry 4.0 Revolution generate significant issues to still large group of organisations and often create challenges and opportunities related to the processes of their further growth (quantitative changes) or improvements and development (qualitative changes) (Michalski et al., 2018; Stańczyk-Hugiet et al., 2019; Sung, 2018). Therefore IR 4.0 has an influence on organisation's management and the cooperation between them. This revolution changes everything in business and classic passive matching strategies will be ineffective (Niemczyk et al., 2018; Niemczyk and Trzaska, 2020; Schlingensiepen et al., 2016; Stańczyk-Hugiet et al., 2011). Strategic management process is striving to achieve the organization's objectives (Sus and Organa, 2020), and is based on the relevance of factors coming from the business environment (Chlebus et al., 2019; Michalski et al., 2018).

The professional literature of the subject (Gwóźdź and Parkitna, 2015; Niemczyk et al., 2012; Stańczyk-Hugiet et al., 2019) attempts to give inter-organizational networks a diverse theoretical framework with a wide spectrum from sociology, computer science through economics to management (Zema and Sulich, 2019). The interdisciplinary nature of considerations and research in the field of inter-organizational networks allows for a better recognition of their nature, functioning principles and significance for the functioning of the economy (Lichtarski, 2017; Zhong et al., 2017). The most-exposed reference theories in social sciences are transaction cost theory (economics), social network theory (sociology), and resource theory (strategic management) (Krupski et al., 2017). According to resource theory (resource-based view), competitive advantage depends on having or access to the appropriate resources (Sus et al., 2019). The resources giving a competitive advantage should therefore be valuable but scarce (rare) (Stańczyk-Hugiet et al., 2017). Resource based view assumes that there is no enterprise that has all the resources it needs (Niemczyk et al., 2012). Resources scarcity results in paying attention to the association of the organization with the business environment being the source of resources that the organization is not able to independently produce (Lichtarski and Niemczyk, 2015; Niemczyk and Trzaska, 2020). The desire to fill the resource gap pushes organizations seeking to maintain or gain a competitive advantage to establish inter-organizational ties and enter a network of collaboration (inter-organizational network) (Niemczyk et al., 2012). The networks are made up of at least two autonomous organizations that are becoming more similar to each other with time and the growing use of information technology (Kolberg and Zühlke, 2015; Lu, 2017). The necessity of cooperation with many stakeholders and business partners can bring surprises, discouragement and resistance in relation to the changes required in modern organisations which implement IR 4.0 infrastructure (Barreto et al., 2017; Hernes, 2019). This infrastructure is crucial not only for the management and information change, but also create a similarity between autonomous organizations

in the network. There are sectors in which not networked activities are impossible. However, the cooperation between organizations in the network brings more positive than negative effects (Gąbka et al., 2016; Niemczyk et al., 2012). Implementation of the IR 4.0 in the organizations allow them to form a network and to gain some organisational proximity (Lichtarski, 2017). Organizational proximity is a key property of cooperating organizations. Additionally the Artificial Intelligence can influence: explaining sources of competitiveness and efficiency as well as stages and conditions for development; identification of basic features and characteristics of nodes - transfer of research attention from ties to network nodes, identification and characteristics of relationships on the line of cooperation in networks and types of innovation (Chlebus and Rosienkiewicz, 2011; Michalski et al., 2018; Piórkowska and Lichtarski, 2016; Sung, 2018). Industry 4.0 in organization management favours: sharing information, knowledge and technology, thereby accelerating the implementation of innovation; intensifying development thanks to the effective benefits of cooperation; building inter-organizational trust reducing the level of business uncertainty.

Artificial and Natural Intelligence

The AI is often demonstrated in the contrast to the natural intelligence (Hernes and Nguyen, 2007; Rosienkiewicz, 2013) possessed by any of natural object, especially by the humans or animals (Sung, 2018). Human intelligence is based on the multiple cognitive abilities to learn, form concepts, understand, apply logic, and reason, including the capacities to recognize patterns, comprehend ideas, plan, solve problems, make decisions, retain information, and use language to communicate (Reinhard et al., 2016). Natural intelligence is measurable by different tests. Additionally according to the multiple intelligence theory there is no single human intelligence, but variety of them used in different context or situation interchangeably (Rojko, 2017). Multiple intelligence theory assumes that there are types of intelligence such as (Hernes, 2019): logical-mathematical, spatial, linguistic, musical, social (interpersonal), bodily-kinesthetic etc., used by human with elasticity in action, although one of this type can be leading one. Although we can observe the results of the intelligence, it is very hard to understand what it is. There are of course different tests measuring the intelligence, but they are also criticised because some of the require some knowledge and they can be not applicable in different cultures or even languages (Xu et al., 2018). Brain therefore can be understood as a biological infrastructure for the mind functions (natural algorithm) which combined effects creates intelligence phenomenon (Fig.1).

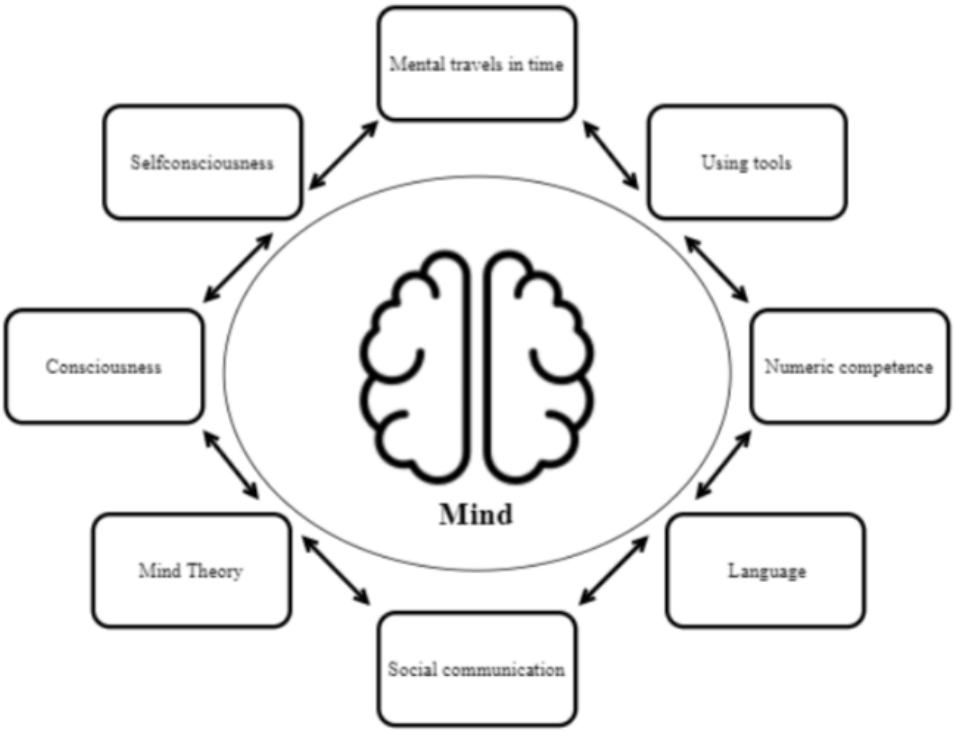

Fig. 1: Brain is an infrastructure for the mind functions used in natural intelligence phenomena. Authors' own elaboration.

Measurement of the intelligence among people or their individual achievement observation allow to distinguish group of genius. However, science recognised multiple examples of individuals, called savants, who possessed extraordinary narrow type of intelligence with dysfunction of other intelligence types. Savant syndrome is a condition in which someone with significant mental disabilities demonstrates certain abilities far in excess of average. There is also natural intelligence observed among animals. Intelligent creatures in a natural environment evolved and through the biological evolution (Vaidya et al., 2018) gained the biological infrastructure and capabilities to develop their intelligence. The bigger animals (vertebrates especially) has individual intelligence, although smaller (invertebrates) are sometimes characterised by the collective intelligence to achieve cognition, cooperation and coordination. The goal of collective intelligence is mutual recognition and enrichment of individuals. The collective intelligence phenomenon in the inter-organizational network is going to be discussed in the next sub-chapter. What is important collective intelligence group intelligence that emerges from the collaboration, collective efforts, and competition of many individuals and appears in consensus decision making.

The one of the proposed definition of AI is a this, which assume that it is "the ability of the system to adapt its operation in order to achieve the assumed goal in the environment in which it is located" (Zhong et al., 2017).

Artificial intelligence (AI) is a type of intelligence performed by any human-made machine equipped by the program or algorithm. Therefore, artificial intelligence aims to mimic human cognitive functions related to the problem solving and learning (Niemczyk and Trzaska, 2020; Stańczyk-Hugiet et al., 2011; Sus and Organa, 2020). Artificiality of this intelligence is caused by algorithm-based intelligence functions demonstrated by the computer program. It is often stated that algorithm is not elastic, but highly specialized and therefore its performance is higher than average human. This disproportion of effectiveness of undertaken action such decision making is visible especially in: decoding or

deciphering information, taking decision in business, market games, games and sport or searching for the unknown objects on the photos taken by telescope.

There are experiments which examine intelligence both natural and artificial. The most interesting is the Turing's test which is used to determining whether or not a computer is capable of thinking like a human being. On the one hand, generally humans are less effective when complicated mathematical patterns have to be used. On the other hand, it is very difficult to create an algorithm which can successfully recognize different human faces and the emotions of observed people, combined with situations. There are also works to help people with the security protection for example to prevent terrorist attacks. The AI can support human intelligence and inventiveness in areas which demand action and such is environment protection.

Chess Algorithms and Computers with Artificial Intelligence

The researches based on the automation of human calculations by mathematical algorithms began many years before modern microchip computers. The idea of computer invention was simple to help scientists perform fast calculations with great numbers related to the rocket industry. Some of scientist concerned an idea of artificial intelligence, which would mimic the human intelligence not in proteins but in silica. Their goal was to communicate with a computer and ask questions, to obtain best answers. The real revolution in Artificial intelligence began in 1950, when article titled "Programming a computer for playing chess" by Claude E. Shannon was published (Shannon, 1950). In his paper Shannon concerned with the problem of the constructing a computer routine or program for a modern general-purpose computer which will be enable it to play chess. Shannon predicted that this simple theoretical deliberation can bring a satisfactory solution for problems of a greater significance (Shannon, 1950). Proposed algorithm was simple, based on the computer which consider using the algorithm the current configuration of chess pieces. The computer considers using the algorithm the current configuration of all chess pieces and all their moves. The algorithm assigns a numerical value (evaluation function) to each move, which assesses how good the move is (Shannon, 1950). Subsequent moves made with chess pieces are evaluated and further moves with the highest value of the evaluation function are anticipated. The algorithm logic has been developed so much that in 1997 computer "Deep Blue" won chess match with world chess champion Garry Kasparov. Algorithm was improved by programmers and best chess players, and its latest form is called Stockfish chess engine. The algorithm was based on human experience, and it was supervised learning.

Completely other approach was to train algorithm in neuron network, which is unsupervised learning. There are no predefined assumptions (except basic game rules) in neural network learning, such as best moves. The algorithm must somehow come up with the best moves itself, it starts with the random structure of the algorithm steps, whose steps are strengthened if they lead to the expected result. Other alternative algorithm steps are not considered over time.

Management and Decision Taking

In recent years extended discussion concerning new trends in modern management and the challenges facing managers of contemporary organizations have been triggered repeatedly (Michalski et al., 2018). What is explored in this debate are the new demands related to dynamic, unpredictable and disruptive technological changes (Kolberg and Zühlke, 2015; Xu et al., 2018), and new expectations and requirements towards employees. Management is the most human action, making a decision is based on many factors, which computers can compute faster. Although their performance is higher than human (in this sense that any decision made by computer is far better, made faster, efficient than taken by human (Rüssmann et al., 2015; Stock and Seliger, 2016), it has to be said that machines will never become a human, and human never is going to become the machine. The decision process in the case of man consists of two thought processes: inventive and decision-making (Figure 2).

Human decision making is different from algorithms and machine learning methods described. The simplest form of making decisions consists of three phases: determining the set of action variants,

assessing them, and choosing the option considered the most advantageous (Bogdan et al., 1981; Nosal, 2001). Human thinking is sequential, so the algorithms reflect the stages of human thinking. The main reason for such organization of the decision-making process is the complexity of the situation and cognitive limitations experienced by members of the organization. People making key decisions in organizations naturally strive to expand the sequence of decision-making steps, but on the other hand it extends the time needed. The limited resources, the growing number of options for action, contradictory assessments and the lack of clear decisions lead to the search for an organization with which relationships can be established and cooperation to solve a problem or make a decision (Klimas, 2015).

In figure 2 presented the decision-making phases in two reference systems. The first of these covers the basic sequence of phases of related results and control questions. The second form of presentation captures decision thinking as a process involving "deviations" caused by various psychological factors. Convergence in the decision-making process means that this variant of decision thinking means that this variant of action, which will become a decision, did not appear by accident (Nosal, 2001). Moreover, the sequence of decision making phases gradually leads to a narrowing of results, enabling final settlement (Nosal, 2001).

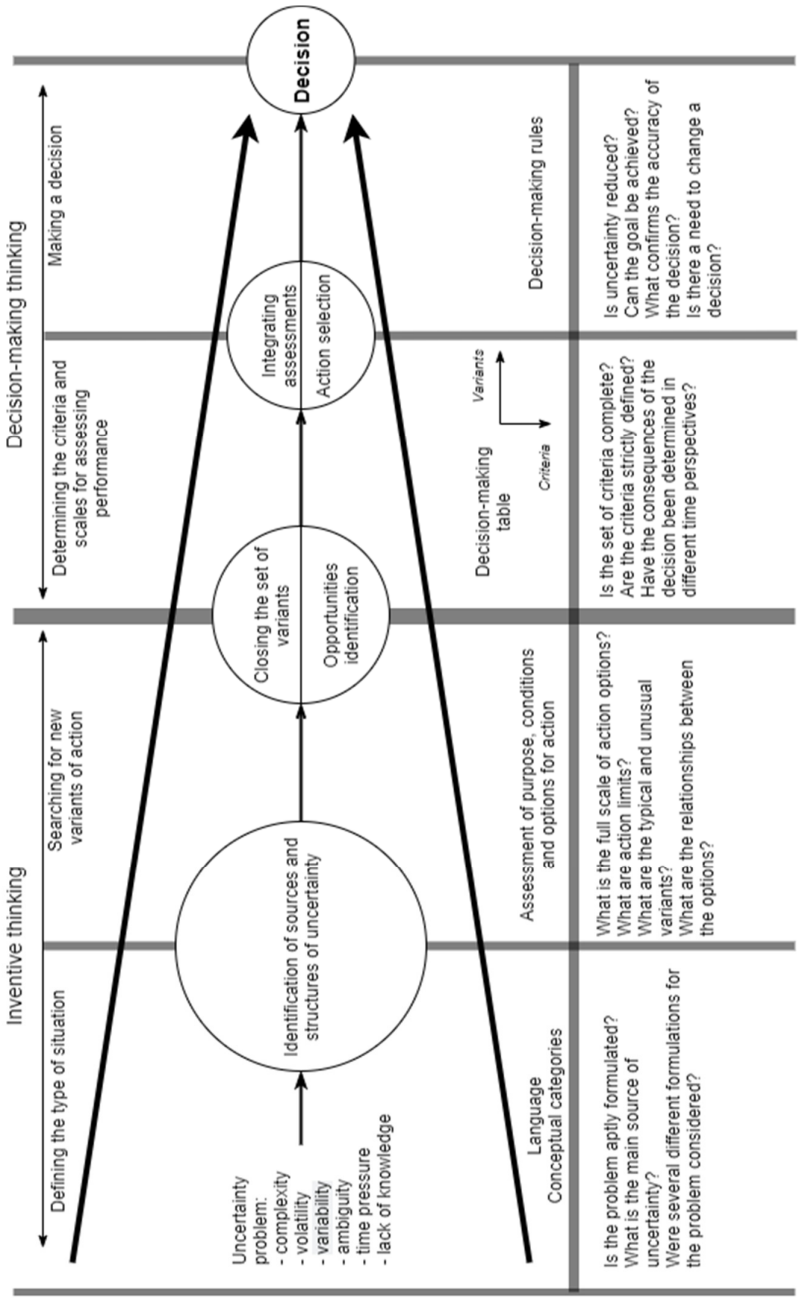

Fig. 2: Convergence of the decision-making process. Authors' own elaboration based on (Nosal, 2001).

Naming a computer code an Artificial Intelligence, which means that it can mimic functionality of brain, to some of people is somehow offensive. This term has been invented to rise this type of feelings. Some people, when they hear it automatically get triggered and contrary to that, there are people who see AI as promise of better future. Either way, everyone will admit that this mixed usage of biological and IT terms rises a discussion at many levels. At the most recent, looking at the peoples' attitude to AI it seems like majority of humanity decided, that if they cannot stop it, they may also enjoy the ride and get accustomed to self-driving vehicles, custom phone applications, but also chat bots and surveillance of public activities.

Network Organization

The inter-organizational network is a system of at least two independent and independent organizations (diad), connected with each other by a set of bonds for cooperation (Klimas, 2014). The inter-organizational network is a system composed of long-term, non-incidental connections of entities oriented on the relation of convergent goals (Ćwik et al., 2017; Klimas, 2012). In the description of the inter-organizational network based on graph theory, the organizations forming the network are called network nodes or vertices, while long-term relationships (inter-organizational ties, connections) oriented towards achieving common goals are called edges (Sulich et al., 2019). The application of graph theory allows to trace the processes occurring in the network, including determining the direction of interactions. The process that can reveal the existence and elements of an inter-organizational network is the product life cycle management (Sus and Organa, 2020). However, in the case of an inter-organizational network within the sector of environmental goods and services this process can be a waste recycling, e.g. waste tyres. This sector provides a wide spectrum for the usage of the robots and AI combined with the image recognition.

The adopted in this paper definition of the network organisation recognise it as a set of entities and relatively lasting ties between them. The main element defining the network are cooperative ties. The strength of the bond is based on trust and long-term contracts (Sulich et al., 2019).

Relationships in the Network Organisation

The natural intelligence is performed also by a group of animals. For example, ants exhibit some form of natural intelligence as a colony or in a swarm of bees. The similar natural collective intelligence can be observed among birds and fishes (the different species of fish) when they form a shoal. There is a similarity between biological forms of cooperation and these observed in the business environment.

Among the factors conducive to generating market advantage in management sciences are long-term inter-organizational interactions, participation in inter-organizational networks and availability of network resources (Klimas, 2015; Stańczyk-Hugiet et al., 2019). Inter-organizational relations on the market may take the form of coexistence, cooperation, competition and coopetition (Czakon, 2007; Czetwertyński, 2016; Kabarowski et al., 2006). These four relationship forms exist in parallel, but not proportionally in the space of economic practice (Klimas, 2014).

On the basis of strategic management, cooperation is seen as:

- a multi-entity activity aiming at achieving mutually consistent goals (Klimas, 2012),
- a dynamic and separate competences of the organization strengthening competitiveness (Klimas, 2014) and contributing to the increase of competitive advantage (Klimas, 2015);
- a type of knowledge management strategy (Dudek-Godeau et al., 2016; Sulich, 2018)in organizations used to create new, non-existent knowledge (Lichtarski, 2013).

The purpose of creating relationships in the network organization is to increase management competence and increase the flow of information between entities to improve their cooperation.

Cooperation is crucial for creating a network consist of independent organisations (Sulich et al., 2019). Moreover, the network organization gains an advantage over the other networks in the environment, due to the synergy effects. Humans and AI already collaborate: AI know best way in the traffic, drive autonomously or is able to find more efficient ways in the processes. In those examples human acknowledges, the results that AI delivers, because it improves the outcome. In the future AI itself might find best organisations to cooperate with. In industry 4.0 the machines can interact with each other and creating a similar network. Nevertheless, to reach such AI communication, the organizations cannot encapsulate their data to potential competitor (Stańczyk-Hugiet et al., 2019).

Conclusions

The modern economy based on knowledge and intelligence is characterized by networking (creation of inter-organizational networks). Organizations operate in a network economy supported by infrastructure solutions (development of information technologies and artificial intelligence) and cooperation relationships. The network economy is characterized by above-average dynamics, process orientation, chaos, lack of boundaries, unpredictability and promotion of intangible resources and cooperation processes between organizations (Klimas, 2014). Therefore, organizational efficiency and market advantage are generated due to network membership. The exchange of tangible and intangible resources, reciprocity and commitment are essential for the development of the network (Sus et al., 2019).

The artificial intelligence, which arose in the 20th century, transforms our reality and future. IR 4.0 organizes our reality and influences decision making (Niemczyk et al., 2012). The digitization is advancing in all areas of life from public administration, education, production and hobby implementation. In the literature, definitions of artificial intelligence boil down to determining that it is an attempt to model aspects of human reasoning using computers, or an attempt to solve using computers such problems that are usually solved by a human.

The conditions of the modern economy are privileged by innovative organizations, using the latest technologies, which fall under IR 4.0. This is because pioneering and innovation are one of the cornerstones of the competitive advantage sought by organizations. They subordinate their activities to the requirements of the market game, putting emphasis in their strategies, processes and activities on increasing the level of innovation. IR 4.0 IR 4.0 decides about inter-organizational cooperation, improves learning, creation, absorption and commercialization of knowledge.

The implementation of the Industry 4.0 concept necessitates involvement from top management promoting comprehensive change management activities and processes for arranging organizational and production structures according to the needs of the connected value creation. A collaborative, explorative, and entrepreneurial mind-set is a success factor that is necessary to establish among a company's most important resource: the employees.

Managers should have willingness to convince employees of the beneficial nature of Industry 4.0 and to address their concerns actively. By analysing the Industry 4.0 studies published so far, it has been discovered that they mostly discuss the technical aspects but do not pay attention to managerial approaches and organisational culture that are a significant factor influencing the success of the implementation of this concept. Implementing the Industry 4.0 concept requires continuous innovation and educatio1n that not only depend on people's abilities but also on organisational culture. Research has shown that successful organisations will be those that disperse decision making processes related to the leadership and managerial responsibilities throughout a network in the organisation.

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Financial Innovations and Their Role in Banking Industry (The Area of Funds Transfer) Development in Poland

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Abstract

The article aims to determine the characteristic features of the development of Polish banking in the area of funds transfer since the 1990s. through the prism of implemented innovations and their development. The study was conducted using both historiographic and factographic methods, as well as desk research. The fast pace of development of Polish banking is particularly visible in the area of services related to the transfer of funds. Directions of further development in this area focus on the speed, security and ease of payment transactions and other forms of financial settlements. Based on a preliminary analysis of the development processes in Polish banking since the early 1990s, one can observe four such breakthrough moments (mile-stones) that have introduced new revolutionary changes in areas related to money transfers, namely: the first cards and ATMs - "card revolution "; Internet banking services accessible from a personal computer; mobile banking services available from smartphones, tablets and other mobile devices; network banking based on blockchain technology. Observations provided evidence to support the thesis that the development of Polish banking was stimulated by implementing disruptive financial innovations and driving fast development based on implementing sustaining innovations at a given banking stage. The findings suggest that the main impetus for the continuous progress of such gradual "banking revolutions" lies outside the banking sector.

Keywords: Financial Innovations, Funds Transfer, Polish Banking, Development.

Introduction

The paper is an attempt at presenting the properties of banking industry in the area of funds transfer development in Poland from the viewpoint of financial innovations, both existing and foreseeable, from the 1990ies up to the present. The selection of properties for scrutiny was based on observations of initial implementations in time progression form as well as the forms and ranges of the associated financial innovations, with separate evaluation of main driving forces behind their implementation to the banking industry, and, lastly, the character of changes generated by their introduction.

Polish banking has been undergoing accelerated development since the beginning of the 1990s. It is known that this development is influenced by the implementation of various types of financial innovations (i.e. regarding products, processes, organization, marketing) and solutions adapting to the changed legal and regulatory environment. At the same time, banking industry development associated with financial innovations is accompanied by rapid civilizational progress, and further stimulated by advancement of technologies. It is also known that the rapid pace of development is particularly evident in relation to services related to the transfer of funds (money transactions and payments and management). And that directions for further development in this area focus on the speed, security and ease of payment transactions and other forms of financial settlement. Developments in funds transfer systems (EFTS) have long been a popular topic of discussion in banking circles. There are many papers about new technologies in payments in various contexts, such as: description of some EFT systems; categories of real-time payments and their potential to disrupt the existing payment ecosystem (Wu 2015, Thomalla, Arsdale 2017); the costs of making payments in the UE (Schmiedel, Kostova, Ruttenberg 2012) or in the United States

(Chakravorti, Mazzotta 2013); potential for changing costs and providing new services that will likely have far-reaching effects on the structure of and competition within the financial industry (Gupta, Tham 2018, FSB 2019, McKinsey.com 2019); strategies for improving payment system, e.g. to the U.S. payment system (2015); challenges to monetary policy (IssingLecture 2000). ECB publications, i.e. reports containing descriptions of the operation of payment systems in the European Union (institutional and legal aspects of the payment system, used forms of monetary settlement, retail and large-value payment systems, and securities settlement systems) - e.g. such as: Payment and securities settlement systems in the European Union (2007) - and data on the general economic situation in each EU country and payment statistics provided information on the number and value of payment transactions for each type of payment instrument and service in Europe can be used to identify trends in payments or to compare the degree and development directions of payment systems in different countries. But such, mainly quantitative, picture of state and changes is not enough to determine the properties (in particular features and character) of banking (in the area of funds transfer) development of a given country. A description of the course of development based on facts and chronological order, as well as a picture of changes in the quality of payment instruments, banking services and delivery channels are needed to determine these properties. Such information is not collected or recorded systematically in social accounting. There are no studies in the literature, neither on a national scale (e.g. Poland) nor international comparisons, which would comprehensively present or compare the properties (in particular the features and nature) of banking development in the area of transfer of funds under the influence of financial innovation implementations. This study assumes that the theory of disruptive and sustaining innovation – the Theory of Disruptive Innovation (1997, 2014) and the Theory of Hybrids (2013) – by Clayton M. Christensen provides a sufficient theoretical basis for describing and recognizing these properties. Although this theory concerns the issues of sustaining innovation and disruptive innovation, seen from the company perspective, it seems that it is also suitable for the sector perspective, e.g. banking industry perspective. Disruptive innovation means to reinvent a technology, business model, or simply invent it all together. It generates new markets and values, in order to disrupt existing ones. As opposed to disruptive innovation, sustaining innovation, seeks to improve existing products or services. Meaning, it does not create new markets or values, but rather merely develop existing ones. More distinguishing characteristics of sustaining innovation vs. disruptive innovation presents the Theory of Disruptive Innovation (2014). According to the Theory of Hybrids (Christensen, Horn, Staker 2013) disruptive innovation and sustaining innovation do not necessarily need to be alternative to one another, but rather complementary measures.

Based on a preliminary own analysis of progression of development processes in Polish banking from the early 1990ies, four such major breakthrough moments (milestones) can be observed, which have set (or are believed to present a potential for setting) new revolutionary changes in areas associated with funds transfers, namely:

- the first cards and cash-dispensing machines – “the card revolution”;
- Internet banking services accessed from a personal computer,
- mobile banking services accessed from smartphones, tablets, and other mobile devices,
- network banking, based on the blockchain technology.

Each new revolution is initiated by the introduction of disruptive innovations, which are forced by significant changes in the environment of the banking sector (primarily by competition from outside the banking sector). Disruptive innovations lead to the establishment of new rules of the game in the banking sector. As part of a given revolution, there are development changes based on sustaining innovations, i.e. implementations of financial innovations by banks that improve their competitiveness and gradually also transform the perception of banking by its users.

“The card revolution” in Polish banking

From the local perspective of Poland, the major stimulus for the development of electronic banking services was the introduction of cashless settlements in 1968, based on the use of the Diners Club International card issued by a non-banking entity, as part of the travel service package offered by

Polskie Biuro Podróży „Orbis" acting as a debit card agent. This decision proved to be the most important stimulus for further development of various types of payment card solutions. It must be noted that the response from the Polish banking sector proved quite deferred, as the first payment cards were issued as late as 1991, in the form of debit cards for enterprises and institutions, and ID cards for individual customers (Table 1). It may also be useful to emphasise that the above impulse came into focus much later than the one associated with the introduction of the pre-paid-card idea in many developed countries. The prepaid card concept was coined by Bellamini in 1880ies, and was subsequently realised in the form of metal cards (plates) first issued in 1914 to selected customers of the Western Union (a non-banking entity at that time). In 1946, the concept was formally introduced by the banking system J. Biggins, in the form of a card to be used for settling dues in service and trade outlets in Brooklyn. In 1991, holders of the Polish banking ID cards could make withdrawals from Poland's first cash-dispensing machine, originally installed in 1987 to service cards of a certain non-banking issue. The introduction of cash-dispensing machines in Poland was also dramatically, as the first European implementation of this type came into service in 1967 (London).

Table1: Early implementations of innovations in banking, based on dispersed network of cash-dispensing machines (ATMs)

Year of implementation	Nature of the innovation	Name of the implementing organisation (bank)
1991	Debit card BIG Visa Business Card for entrepreneurs and institutions	Bank Inicjatyw Gospodarczych BIG SA
	Customer ID card for individual customers	Polska Kasa Opieki S.A. (Bank Pekao)
	Cash dispensers with ID card access	Polska Kasa Opieki S.A. (Bank Pekao)
	Polcard – the Polish card transaction settlement centre (an entity responsible for settlement of non-cash transactions registered in trade and service outlets)	A limited liability company with shares held by Polskie Biuro Podróży „Orbis" and Bank Inicjatyw Gospodarczych; at present, after a series of ownership changes, the company operates under the name of First Data Polska
1993	The "Polcard" debit card for local transactions (only accepted in Poland), offered in various forms: for electronic transactions, for ATM access, both for individual customers and institutions	Bank Inicjatyw Gospodarczych BIG SA; soon followed by many other banks
2007	The Mastercard PayPass proximity payment card – a debit card with added proximity payment functionality – Poland was the first Central European country to introduce proximity payment solutions	
2010	The first implementation of biometrics in cash dispensing machines on the European market	Podkarpacki Bank Spółdzielczy and Bank Polskiej Spółdzielczości
2012	Cash dispensers with cash deposit	several banks

	functionality, a quality-of-life improvement with basic account services accessed without visiting the branch	
2013	The first card fitted with an electronic display and remote account operations functionalities: account balance verification, system messages, and transaction authorisation codes.	Getin Bank
2013	An ATM card with added function of withdrawals made in EUR, without the need for a separate foreign currencies account	Euronet Worldwide, Inc.
	Updated functionality of Bank Millennium's cash dispensing machines: petty cash loans with immediate card charge transfer; ordering of prepaid cards; and high-interest banking deposits managed solely via ATMs (the first such solution in Poland and Europe, probably also world-first)	Millennium Bank
2014	Mobile cash dispensing/deposit machines to service remote-location transactions, such as large deposits in coins or large sum operations in cash and petty cash (offered in the form of motored units – the first such innovation, and recognised as the 2015 best global innovation in payments (the BAI Finacle Global Banking Innovation Awards)	Idea Bank
2015	Cashless, or dual function cash dispensing/deposit machines offering deposits and withdrawals in a number of foreign currencies	City Handlowy
	Cards fitted with dynamic CVC codes, replacing the static security code with a dynamic one, displayed on reverse; the automatic changes of code are designed to limit the risk of data loss or unauthorised access in online transactions	Getin Bank
	The European payment card – widely accepted by trade and service outlets across Europe; the card is each time recognised as issued by a local provider, regardless of the customer's current location or place of transaction	Bank Smart
2017	Poland's first proximity-operated cash dispensing/deposit machines (with both deposits and withdrawals authorised by proximity access, without the need for physical contact between the card and the machine.	BGŻ PNB

Source: own study

The card revolution, initiated by stimuli generated outside the structure of the banking systems, is an ongoing phenomenon, propelled by technological advancements and yielding an incessant flow of

new innovations in the sphere of card payment services and products, resulting in formation and rapid development of card service infrastructure (dispensing machines, merchants, trade and service outlets, POS terminals, cash back). These product and service innovations are sustaining because they give results in performance improvement in attributes most valued by the banking industry's mainstream customers. These improvements are incremental or breakthrough in character. Radical changes ensued in payment turnover mechanisms, and the trend is continuing, with dynamic and incessant increase in the number of new cards issued to customers (from ca. 50 thousand in 1993, passing the 30 million mark early in 2009, with 2018 estimates at ca. 40 million, with 2019 estimates at ca. 42,5 million), with debit cards representing more than 3/4th of all issues. This was followed by a systematic increase in the number of dispensing units, with a slight decrease in 2018 (the steady increase continued up to the year 2017, resulting in ca. 23750 units installed in Poland, while the most current reports of 2018 place it at ca. 23200 units, Q3 2019 in. ca. 22600 units). In the initial period, the most dominant forms of card-based transaction were: ATM withdrawals, branch office withdrawals, and cash back services. Present trends show a clear dominance of cashless payment transactions – in 2018, card payments constituted 86% of all card-based transactions, and in Q3 2019 ca. 90% (NBP 2003, 2018, 2019). The ongoing technological revolution in the Polish card-based transaction turnover seems to fortify the present development trends on the path to cashless economy. These trends manifest themselves through various sustainable innovations of a breakthrough nature introduced to the banking system, particularly the following:

- late 20th cent. – a pilot chi card programme designed to streamline and secure the transaction process;
- early 21st cent. – proximity cards for the ease of servicing low value payments (PayPass and payWave: contactless readout and no PIN confirmation), largely improving the quality and speed of transactions (in 2016, proximity cards constituted nearly 80%, in 2018 – more than 80%, and in Q3 2019 – more than 86% of all payment cards in service, and Poland is one of the global leaders on the market of proximity transactions) (NBP 2016, 2018, 2019).

It may be interesting to note that, in the area of cashless transactions, development trends seem to focus on improvements and added functionalities, such as alternative forms of authorisation (with or without PIN codes), cards fitted with displays and keypads to enable remote access to services other than simple payment trans-actions. In addition (following the example of the Millennium Bank), banks are beginning to perceive ATMs as a basic form of interaction with their customers, in support of the already established network of local branches, thus constituting a major organisational innovation (i.e. departure from the rigid forms of tradition-al banking with dispersed networks of local branch offices towards an ATM-based model of service) as well as a modern embodiment of the traditional model of banking operation.

The technological revolution in card-based transaction turnover is an ongoing process, particularly well-manifested in the segment of cashless payments, and one that strongly affects the transformation of payment-related customs and routines among general public in support of the much-desired model of cashless economy. This, in turn, serves to fuel new revolutions in the sector, and their correlations seem to follow several distinct trends:

- integration of a modernised form of traditional banking based on dispersed POS networks (in the form of ATMs) with Internet banking, through special-offer products, both traditional (loans, deposits) and modern (online authorisation of ATM-ordered prepaid cards) – as evidenced in Bank Millennium's approach, or the use of dynamic CVC codes – as employed by Getin Bank;
- integration of a modernised form of traditional banking based on dispersed POS networks (in the form of ATMs) with mobile banking, exemplified by such products as: the "put credit on your phone" service offered by PKO BP, and servicing of deposits to banking accounts from modern ATMs and mobile devices – as in the case of ING Bank Śląski and BGŻ Paribas;
- recapitulation of conceptually parallel product innovations in subsequent revolutions – a good example of this trend is the use of proximity payments (near-field communication technology) in both the card revolution and the mobile banking revolution, as contactless payments may now be serviced from a card or from a smartphone.

Development of Polish Internet banking

With the onset of the card revolution, seed were sown for two equally revolutionary and almost parallel trends: Internet banking and mobile banking. The 1990s marked the entry of both the Internet and the IT and mobile technologies in Poland, resulting in a rapid transformation of the banking sector into a modern, refurbished and innovative model of 21st century banking service (Table 2). The common denominator of the two revolutions can be found in their modern approach to customers as active partners unrestrained by the constraints of time and space. This way of perceiving banking services, i.e. mobile banking service in the broadest sense of the term, is now commonly employed by Polish banks, as evidenced (PRNews.pl 2019) by more than 8 million in 2018, by more than 12 million in 2019 individual users in this segment of services, with ca. 50% accessing the service from an app installed on a mobile device.

Table 2: Early implementations of innovations in online banking (accessed via Internet from a personal computer)

Year of implementation	Nature of the innovation	Name of the implementing organisation (bank)
1993	Poland's first home-banking system – customers were required to download dedicated PC platform software to manage their accounts remotely	Bank Rozwoju Eksportu
1998	Poland's first on-line banking service, with complete online access to the banking account	Powszechny Bank Gospodarczy w Łodzi
2000	Poland's first internet bank; the common denominators of such organisations are the reduction of account service charges, and the ease of management	mBank
2000-2002	Development of e-banking as a distinct field of operation for universal banks	Bank Millennium, Bank Handlowy, ING Bank Śląski, and others
2010	The first implementation of biometrics in customer login authorisations in online platform services	Bank Pekao SA
	Poland's first implementation of online-submitted applications for loans	mBank
	Poland's first implementation of a solution for finance management and analyses in transaction systems	Meritum Bank
2011	The first personal account system with Internet-based access, and with new accounts opened by simple transfer of funds	Bank Ochrony Środowiska
2012	The first fund-transfer service accessed via Facebook	Alior Sync
2013	The first banking service to offer smart TV accessibility via a dedicated banking app designed for Samsung models and distributed through the Samsung Apps store	BZ WBK
2016	The first solution offering automated generation of the "Standard Audit Files for Tax" (for business customers only) and their submission to appropriate tax offices	Bank Millennium
2017	Poland's first implementation of video-	Inbank

	verification for the authentication of loan operations accessed online	
	Poland's first implementation of video-verification for the authentication of personal account opening procedures accessed online	Alior Bank
	Introduction of specialised services for the automatic generation of annual PIT (personal income tax) statements from personal account data	PKO BP, BGŻ PNB Paribas, Raiffeisen Polbank, and others

Source: own study.

The development of Internet banking in Poland was clearly preceded by the introduction of online commerce services, but it must be noted that the precedence was quite negligible, in view of the fact that the first e-mail message on record in Poland dates back to the year 1990. The revolution of online banking erupted in a sudden fashion and in many forms: new channels for accessing the banking account and banking services; new functionalities offered by e-banking (including those which cannot be accessed by traditional means); new models of banking operation (e-bank). In Q2-2019, the number of banking customers with online access to their accounts was reported in the vicinity of 37 million, with ca. 52% regarded as active users (defined as logging to the system at least once a month) (ZBP 2019). It may be useful to note that online banking was, from the very onset, designed to stimulate the shift from a POS service to a self-service banking model. While online banking functionality is now part of the industry standard of service, the online systems remain subject to regular updates, with new functions added to serve the interests and needs of both parties, i.e. the customer and the service provider.

Thus far, the development of online banking (expressed both in the number of individual users and the range of products on offer) has been contained within the classical formula of a two-way platform of communication (bank – customer). A popular view holds that the above formula has lost the potential to provide tangible benefits in terms of customer value added. Proponents of this idea believe that the future of banking lies in an evolutionary transformation towards multilateral platforms. Early signs of this approach can already be discerned, as evidenced in the evolution of the Polish mBank's multilateral plat-form offered as part of the mOkazje loyalty programme. The above approach is in line with the popular belief that banks will soon focus their efforts on consolidation of their product offer within a wider context of specific needs and requirements of their customers, be it individual or corporate (e-point.pl 2017), a trend already reflected in banking practice, a good example being the trade-auction platform for enterprises (aleo.pl), owned by ING Bank Śląski. AT the same time, the idea seems fairly consistent with the 'new economy' philosophy, where companies are expected to create new consumer needs with the purpose of future commercialisation of demand thus inspired.

Polish Banking in the Smartphone Era

The apex of the vigorous development of online banking coincided with the onset of another revolution – mobile banking, based on new technologies offered by the next generation of mobile devices: the smartphones (Table 3).

Table 3: Early implementations of innovations in mobile banking

(banking in the smartphone era)

Year of implementation	Nature of the innovation	Name of the implementing organisation (bank)
1999	Poland's first mobile banking service, based on WAP protocols and SMS (text) communication – customers were offered SMS access to account balance reports and details of the last 5 operations; for customers of the Plus GSM mobile network only	Wielkopolski Bank Kredytowy
2000	Access to accounts via mobile (WAP) browsers	Wielkopolski Bank Kredytowy, mBank
2004	Poland's first mobile banking app – R-Mobile, accessed from any device supporting the Java standard	Raiffeisen Bank
	Introduction of a 'lite' standard of services, offering a reasonable set of account functionalities which could be accessed easily from limited-size displays, coupled with packet size reductions (for economy and speed), and regular updates (new functions, improvements)	several banks
from 2011	The rapid increase in the share of Android-based devices on the Polish market; at present, dedicated smartphone apps (with Android and OS support) are part of the standard offer of banking services	several banks
from 2012	Introduction of proximity payments serviced via mobile phones, through dedicated NFC-SIM cards: Orange Cash, My Wallet; quality-of-life solutions offering intuitive interface, ease of service, and fast transfer rates	Operator Orange, T-Mobile
2014	Implementation of the first banking product linked to a mobile service plan – T-Mobile Usługi Bankowe; this represents a distinct revision of the banking mode of operation: 'a mobile plan with banking services attached' (in place of the traditional: 'bank in your phone' approach);	Alior Bank i T-Mobile
2015	Money transfers can now be made to accounts identified only by the owner's telephone number (no need for detailed account information).	Bank Śląski
	Poland's first implementation of voice-operated service and login confirmation via handprint sensors (from smartphones equipped with such functionality)	Smart Bank
2017	Further development of money transfers made to phones, in the form of BLIK – an 'insta-payment' platform serviced by the Express Elixir system (with special focus on defining a local standard of payments –	Alior Bank, Bank Millennium, Bank Zachodni WBK, ING Bank Śląski, Inteligo, mBank, PKO Bank Polski

	Polski Standard Platności)	
2017	Poland's first integration of video-verification technologies in support of account opening procedures initiated from a mobile app	BZ WBK

Source: own study.

It must be said here that the boundary between the two banking revolutions (online banking – mobile banking) is purely academic and does not attempt to emphasise the breakthrough nature of the latter in freeing the user from the constraint of personal computer access. It may be dubious to say that the disruptive financial innovation of the smartphone era has been reached. The perception of the smartphone revolution as a separate process seems to be based on a popular belief often expressed in Poland that the mobile revolution shall lead to the development of a specific target model of mobile banking, one in which customers' wallets shall be replaced by smartphones, and that such a model should emphasise complete integration of payments and account operations from a single mobile app. So far, the mobile banking services based on smartphone access have largely taken the shape of simple renditions of the existing online functionalities in a mobile app form – one cannot possibly consider this a disruptive innovation. However, early symptoms of true innovations can already be observed, as in the case of the overseas Bank Number26 – "Your bank in a smartphone" – representing an entirely new business approach to banking services and a new concept of app functionality with potential to evolve into a disruptive innovation. Bank Num-ber26 is a German provider of mobile banking services (also with regular online access) with no physical points of service, which can be accessed from any location within the Euro zone (with the exception of Cyprus and Malta), offering full support of products such as card operations, account management and transfers, cash dispensing service via ATMs or paid from cash registers by selected outlets, etc. In its early days, the app was only an interface for third-party services, as the operations at that time were conducted without a banking licence. Thus, the impulse for this particular banking innovation came from out-side – its origins are in the fintech sector. In Poland, similar early symptoms of future innovation trends can be seen: as early as 2014, Alior Bank introduced mechanisms of support for invoices scanned and transferred from smartphones – this represents a truly innovative use of modern mobile devices, opening up new paths of development for the industry (e-point.pl 2017). The above are only examples of the latent potential behind the close and deep integration of banking as part of standard smartphone functionality, adding a completely new dimension to such elements as a personal contact list, event planner, and so on.

In parallel with the ongoing trend in mobile banking based on the idea of smartphones as wallets, and involving strong focus on mobile app development, the sector shows interest in alternative trends, such as the transition to responsive online banking through the use of the RWD (Responsive Web Design) technology – the first such solution (initiated in 2017) is already on offer on the Polish market (prnews.pl 2014). It seems reasonable to assume that new solutions in responsive online banking will soon emerge. One such promising area is the potential for direct integration of services with a mobile device, in place of the present middleware-based solutions (e-point.pl 2017).

New and prospective directions of development in the Polish banking industry, in the context of innovations

1. Introduction of new functionalities and service channels in online and mobile banking remains the core objective in the sector's development. In the area of banking services, innovations seem to place major focus on simplification of decision-making processes and streamlining of procedures. Present trends show a gradual emergence of another objective, aspiring to take the leading position, namely – providing cost effective methods for increasing the security of banking services.

2. In September 2019, the Payment Services Directive - PSD2 (2015/2366) regarding payment services, which all EU countries had to adapt to, came into force. This forced a stronger orientation of the banking development on:

- increasing consumer security and better protecting them against fraud in non-cash transactions, through a strong authentication procedure, and reducing customer liability for unauthorized transactions;
- increasing the speed of cashless payments.

This leads to the so-called open banking and two types of new services: Account Information Service (AIS) and Payment Initiation Service (PIS). The introduction of new payment services to legal transactions is an introduction to the construction of modern services based on the so-called API (Application Programming Interface), i.e. the economics of programmable access interfaces, which are to guarantee the safe functioning of both new services in the financial sector and are an introduction to the construction of so-called solutions open banking assuming the integration and greater personalization of financial and non-financial services for consumers and entrepreneurs performed by banks and competing technology companies. So far, the Polish Financial Supervision Authority's consent to provide services as a Third Party Provider (TPP) has been obtained by four banks in Poland, but fintechs are also applying for it - 64 notifications from foreign companies willing to provide services as TPP have already been submitted to Polish supervision (Uryniuk 2019). Banks will also have competition from the giants' websites - the so-called GAFAA (Google, Amazon, Facebook, Apple, Alibaba). The report „2019 Ovum ICT Enterprise Insights" shows that open banking will translate into better customer service and the so-called customer experience - 75 percent EU banks have confirmed that PSD2 will enable them to increase innovation by working with fintechs.

3. The future of banking (this also applies to Poland) will soon be shaped by the revolutionary impact of the latest techno-logical solution – the blockchain. Two important elements of this solution can be seen as evidence of the breakthrough nature of this innovation, namely:

- advanced cryptographic methods to increase the security of digital asset transfers, without intermediation or agency of any trusted third party (such as a bank), and
- the prospect of automating some of the most tedious banking procedures (from tasks related to checking decision compliance with the pending regulations, through claim processing, to communication and dissemination of last will), offered by the 'smart contract' instrument.

Preliminary analyses of potential risks and benefits associated with the broader use of the blockchain technology are al-ready under way, as evidenced by the report published by CB Insights, one of the globally recognised expert analytical centres specialising in new technologies (Szymański 2018). Polish banking sector also shows some interest in the blockchain technology, good examples being: the One Pay FX money transfer service offered by Santander Bank and serviced by the Ripple platform (prnews.pl 13.04.2018), or the first trade-finance transaction reported by HSBC and based on the distributed ledger technology (Wilson, White 2018). However, it seems that the key impulse for the increased interest from the Polish banking sector in blockchain solutions was not so much related to the impending competition from the fintech sector, but rather to the verdict of the EU Tribunal of Justice clarifying the concept of 'durable medium' in banking communication with customers (Polish banking sector was found in default of this regulation, as information passed via e-mails and via online banking platforms was judged in violation of the duty) and advised on reaching a systemic solution in this respect. Early in 2017, the national association of Polish banks - Związek Banków Polskich – in cooperation with banking institutions, initiated formal procedures for the development of a sectoral solution. The project reached the 'proof of concept' phase in 2018, as a blockchain-based solution offered by Billon (a Polish start-up company of the fintech sector, legal issuer of cryptocurriencies licenced by FCA – the British conduct regulator) in cooperation with Biuro Informacji Kredytowej (Credit Information Bureau) (prnews.pl 9.05.2018). The blockchain solution to the 'durable medium' problem, based on a distributed ledger system offered by Billon, shows promise to become the new standard for the exchange of digital information and assets. The solution presents a good embodiment of the new 'decentralisation paradigm' in banking and finance, much different from the established solutions employed by modern banks, and much favoured in the fintech industry. As such, it does not necessarily represent a new revolution in Polish banking, since it lacks the context of departure from the existing global financial order. It may, however, be read as a sign of two new trends in the area of banking security: decentralised and secure transaction systems

with proper support infrastructure (payment and settlement infrastructure), and the focus on increasing cost-effectiveness of such solutions. Blockchain, in this approach, serves to augment the traditional financial infra-structure, in terms of increased efficiency and omnipotence. But the world may still be in advent of a truly full-blown revolution in banking services, with the emergence of the Founders Bank, the first global and decentralised banking institution in world history, borne in the fintech sector with support from Binance (one of the largest cryptocurrency exchange providers) and in cooperation with Neufund platform (Germany). Founders Bank project is in the process of obtaining a full EU banking license under the regulation of the MFSA and the European Central Bank (Founders Bank 2018). The Founders Bank represents an entirely new approach to banking philosophy and business model. It is de-signed to utilise the blockchain technology in full capacity, instead of focusing on selected benefits (security) or restricting its use to narrow segments of operation. The originality of this approach lies in formulation of business and operational frameworks in tandem by stakeholders and ishareholders, giving the banking business an entirely new sense of existence (much different from the present profit maximisation models employed by financial corporations). The project is clearly designed to instil a revolutionary transformation of the existing global financial order into a zone of global financial order and just distribution of profits. It is obvious that the postulated model con-tests the pervasive 'greed is good' concept, along with capital concentration, profit maximisation, and corporate power. Proponents of this new revolution claim that the advent of new technologies, such as blockchain and tokenization, is a clear sign of the new era, but one that requires radical changes of standards and infrastructure. Most importantly, the future of these two trends seems to rest within legislative powers, slowly padding their way to embrace the rapid advancement of the technological blockchain revolution. Supervision authorities are left with the impossible task of trying to apply the existing regulations to a phenomenon that defies all available description. For the moment, the most favourable conditions in support of this type of operations are offered by the Malta Financial Services Authority.

Conclusions

So far, the development of the Polish banking in the area of funds transfer has transpired within the limits of the existing ('good old') global financial order, showing no real interest in exploring the new territories governed by the paradigm of decentralisation in finance and banking. Within the existing financial order, three distinct phases can be observed in the sector's development, which may be perceived as revolutionary: the card revolution based on dispersed networks of ATM, the online banking revolution based on Internet (PC) access, and mobile banking revolution following the introduction of smartphones and tablets. Each of the above revolutions resulted in a decidedly incremental increase in sector development. Despite being initiated at different points in time, all three phases are continued (often overlapping and converging), leading to further changes of a more evolutionary character, associated with such aspects as: updates and new functionalities, ease-of-use solutions and quality-of-life improvements, data transfer speeds, quality and range of account and finance management information, reduction of service costs and prices. This means that banks strive to implement sustainable innovations that are focused on product or service performance (resulting in improved performance in the attributes most valued by the main customers of banks) and affect the required business model (improve or maintain profit margins through the use of existing processes and structure costs and better use of current competitive advantages). At the same time, breakthrough solutions (disruptive innovations) must be implemented promptly, as the potential for supplying significant customer added value wanes dramatically if a bank fails to follow an important path of development. Directions for exploration are fairly diverse, including new uses for mobile apps, responsive online banking, open banking, and blockchain solutions for increased security and for servicing of selected narrow segments of operation.

From the viewpoint of financial innovations – sustainable innovations, both incremental and breakthrough in character – and their implementations, the present development of the Polish banking industry displays certain specific characteristics, namely:

- a relative expedience in closing the gap that distanced the sector from its counterparts in more developed economies,
- the incessantly high dynamics of growth, expressed both in the number of card users and the number of individual transactions (ATM and cashless),
- the increasing number, variety, and intensity of successful implementations, with examples of the world's first achievements, particularly after 2012, and
- nearly parallel coincidence and rapid development of innovations within each of the three revolutions, but also within the bounds of the established financial order.

At present, the sector reports suggest a rushing flood of interest among users in mobile banking solutions, but online banking and ATM banking remain as popular alternatives, as attested by continued growth in both segments. At the end of September 2019, active mobile banking users, with the help of smartphones and tablets, were already close to 13 million people. Already more than half of users of mobile banking applications are mobile only customers (prnews.pl 2019).

The most important challenge faced by the banking industry at present is the advent of the blockchain revolution. In an interesting turn of events, all major projects stemming from the fintech industry seem to concentrate on certain creative uses of the blockchain technology designed to replace some of the functions previously reserved to banks. The most decisive impulse for a revolutionary revision of the existing 'old' financial order will come from the fintech industry, perhaps in the form of the world's first decentralised and community-owned bank, currently awaiting banking licence approval in Malta.

In general, it can be stated that the development of the Polish banking sector was (and probably will be) stimulated by impulses generated outside the banking sector, causing revolutionary changes or impulses from the segment itself and causing changes of an evolutionary nature. Each new revolution in Polish banking (a new phase of banking development) in the area of funds transfer, triggered by a disruptive financial innovation that proves changes in the game by establishing new rules of the game in the banking sector, stimulates further changes and adjustments - i.e. sustaining innovations, resulting in noticeable development of banking services and their use by customers.

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The Support of The Bioeconomy in The Development of The European Union

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Abstract

In this study I will show that the bioeconomy involves a multitude of factors and actors whose collaboration depends on its success. Most of the times, the bioeconomy starts from the available resources, and its development can be influenced by the accumulation of new knowledge generated by the research-innovation projects. In the development process, the EU has identified a series of major social challenges whose resolution the bioeconomy can also contribute to a great extent. In order to support the development of the European Union, bioeconomy must establish a balance between economic growth, social development and environmental protection, which are essential components of sustainable development.

Keywords: Bioeconomy, European Union, Policies, Development

Classification JEL: F63, Q01, Q57

Brief History

The bioeconomy first appeared in the work *"The Entropy Law and the Economic Process",* published in 1971, on economic entropy. The father of bioeconomy theory, a theory that presents a revolutionary, integrative way and shows you how to see the economy, is Nicholas Georgescu-Roegen, a mathematician, statistician and American economist of Romanian origin.

Officially, a first definition of the term bioeconomy, given by the OECD, appeared with the publication of the document *"The Bioeconomy to 2030: Designing a Policy Agenda".*

Initially, in the European Union it was used the term of economy based on the bio concept, first oriented to food and energy. In a communication from the European Commission of 2011, the economy based on the bio concept is presented as "the full range of natural and renewable biological resources - terrestrial and marine resources, biodiversity and biological materials", to this concept being assimilated rather references to natural resources than to the conversion process itself.

Investigation of the specialized literature

I have studied the work entitled *"Leading the way to a European circular bioeconomy strategy",* Hetemaki et. al. (2017) and I've found that the authors believe that the orientation towards a circular bioeconomy could allow the achieving of at least some of the *Sustainable Development Goals (SDGs)* set by the United Nations (UN) for the period 2015 - 2030, which would lead to a growth of the whole economy.

In the authors' view, circular bioeconomy means more than bioeconomy or circular economy, so we made a table that presents sustainable management for the various ecosystem services.

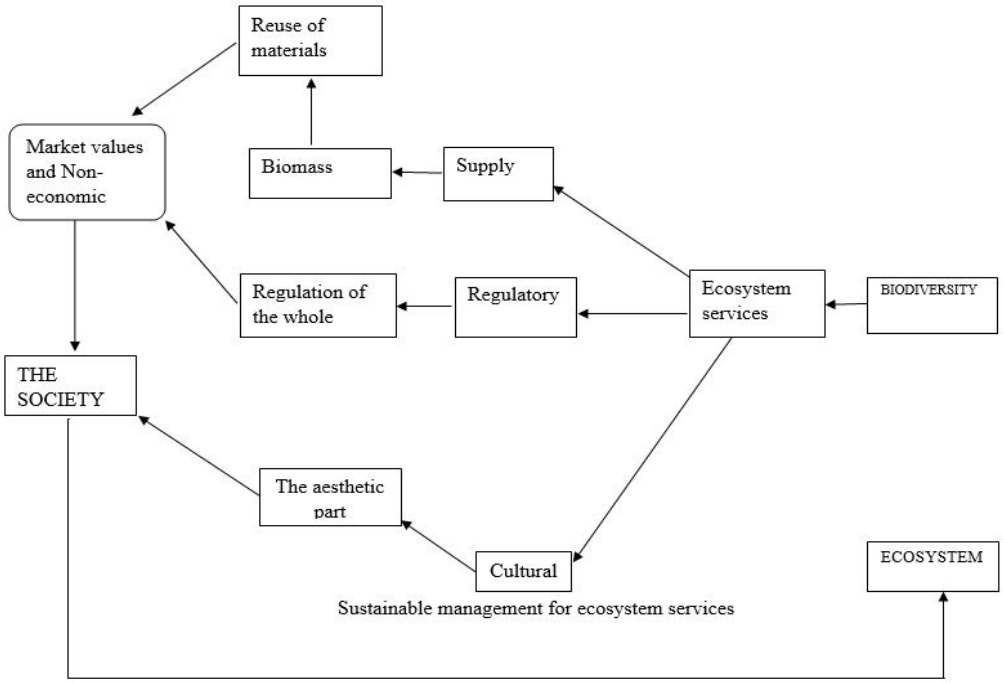

Figure 1: Bioeconomy seen as a future strategy

Source: Adaptation by Hetemaki et. al., Leading the way to a European circular bioeconomy strategy, 2017

From the figure above we see how biodiversity leads to ecosystem services, services that can be of Supply, Regulation and Cultural services.

The Supply services are directed towards the Biomass, then towards the Reuse of the materials to preserve the natural climate, the Regulatory ones follow the Regulation of the procedures of the whole climate, and the Cultural services follow the Aesthetic part. All this leads to a good organization and coordination of market values, but also of non-economic values.

Following the study of another paper, published by D'Amato et al. (2017), I found that, if we follow the concept of circular bioeconomy, we observe that this merges the two tendencies related to the concepts of circular economy, on the one hand, and bioeconomy, on the other, with the purpose of connecting rural and urban communities. This conclusion is the result of the analysis of 2,000 scientific articles that study the circular economy, the green economy and the bioeconomy.

Significant differences between concepts emerge from the specialty literature, but if we look at it from the perspective of scientific research, we see that the definitions and differences are very clear. An example can be given after I have studied the articles published by the above-mentioned authors, where I have identified that the circular economy is found in the specialized literature in closer connection with the urban industrial process, while the bioeconomy is analyzed in connection with the innovations related to the resources and land use in the context of urban development.

How the bioeconomy appeared and who supports it

Over the last 20 years, new concepts have emerged in the global economy. All these concepts are based on the same premise and have a common purpose, namely how the society will succeed in creating a balance between the resources available, which are limited, and the needs or desires of its members, which are potentially unlimited.

At the moment, there are asked questions which follow which of these concepts is more complex, what similarities and differences are between them, but also which will best answer the present and future needs of the society.

Table 1: Green economy, circular economy, bioeconomy

Source: Adapted by the author after the European Commission

	Green economy	**Circular economy**	**Bioeconomy**
When did it appear?	It was introduced in 1989 in the Blueprint report for a Green Economy (Pearce et al., 1989). The role of the report was to advise the UK government if there is a consensual link between the term of sustainable development and its implications for recording technological progress.	It took shape after 2012, with the publication of the report *Towards the Circular Economy: Economic and Business Rational for an Accelerated Transition* (Ellen MacArthur Foundation, 2012).	Its foundations were laid in the 1990s by the European Council - *Growth, competitiveness and employment. Challenges and ways to be followed in the 21st century*, document also known as the *White Paper of 1993* (European Commission, 1993).
How is it distinguished?	It aims to improve human well-being and social equity, significantly reducing the risks to the environment and the ecological deficit. At the same time, it is resource efficient and socially inclusive and generates low carbon emissions, according to the United Nations Environment Program (UNEP) in 2011.	It is regarded as the only viable alternative to the linear economy, i.e. the classical model of production and consumption. The raw materials are taken from nature and are used in the manufacture products, which are then consumed and eventually disposed of in the form of waste, and the cycle is realized again, reaching the concept "manufacture – use - throw".	It tracks the intelligent use of resources and encompasses the production of renewable biological resources and their conversion into food, animal food, bioproducts and bioenergy.

Therefore, the three concepts - green economy, circular economy, bioeconomy are different from several points of view, but in principle they have common goals.

However, the bioeconomy represents more than the circular economy or the green economy, because this aims to increase the efficiency of the production process beyond maintaining the value of products and materials for as long as possible.

Is the bioeconomy coming to support the development of the European Union?

In the last years the first aggregate data on the "size" of the bioeconomy began to appear and the main sectors completely integrated in the bioeconomy refer on the one hand to agriculture, forestry and fisheries, food, beverages, tobacco, paper and paper products and, on the other hand, in the textile and textile sectors, forestry industry, chemicals and plastics, pharmaceuticals, biodiesel and bioethanol production, bioenergy.

For a good development of the European Union, I think that some priorities must be achieved and followed until they are implemented.

Table 2: The bioeconomy priorities in the EU development

The relevant priorities of the bioeconomy for the European Union development	
Jobs that lead to economic growth	Stimulating investments and creating jobs
Energy union and combating change	Energy more secure, more sustainable, at accessible prices
A deeper economic and monetary union	A balanced and progressive trade policy that to capitalize the opportunities offered by globalization
An open trade - without sacrificing the European standards	To combine stability with equity and democratic responsibility
A deeper and fairer internal market	The digital single market

Source: The contribution of author based on literature.

The bioeconomy has received support from the European Union, and its strategies and initiatives are considered both a necessity and an opportunity.

For a good organization of the development policies of the European Union, the bioeconomy aims to promote public and private research, investments of companies in innovation but also the creation of multidisciplinary alliances between research centers and companies, so as to increase the chances of obtaining funds for development.

At the same time, as the social, political and administrative context of the bioeconomy is being consolidated, the proposed measures allow a social dialogue program on the bioeconomy, and the generation of an extended group of stakeholders from the bioeconomic field, but also the promotion of bioeconomic education in universities..

For a good development of the European Union we must follow the bioeconomy on the development side of the concept of social and environmental sustainability where we identify the legislative, administrative or of another nature limitations that impede the entry of new products into the market, but also how we can support the promotion of exports for new products obtained from biological resources, which come along with the analysis of standardization and certification processes of products or services.

Conclusions

In order to support the development of the European Union, I believe that the whole society must become aware of the role that the bioeconomy can play in meeting all needs. Bioeconomy is represented as a strategic, interdisciplinary, long-term project that addresses global issues that can only be solved through dialogue and collaboration between all stakeholders.

For a good organization, the bioeconomy helps to carry out research and innovation in the biological sciences sector in order to support the economic activities and to create advantages for the public, and has as main fields of action the health, energy, agriculture, environment and information sharing between different sectors.

The bioeconomy has development perspectives, if a closer partnership will be realized between the entrepreneurs, the academic environment, the central and local authorities, and, last but not least, the media as a means of promoting the proposed measures.

We want the European Union to rise to the highest standards, but we must realize that the change begins with us. We must support the bioeconomy, ensure the energy and resources efficiency, decrease the pollution degree towards 0 and be actively involved in creating the consumer profile.

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Digitalization of Higher Education (On the Example of Distance Course of Urfu)

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Abstract

Digitalization has covered all areas of our lives, including education, changing it in a fundamental way. National digital education platforms allow a variety of distance courses to study, the same opportunities provided by educational platforms of individual universities, including UrFU. The purpose of this article was to conduct an evaluation and comparative characterization of the distance form of higher education on the example of a philosophy course for bachelors in Ural Federal University in terms of its flexibility and openness. We also aimed to analyze the advantages and disadvantages of distance learning as such. The model by D. Orr et al. was the basis of the research, using as the main criteria: 1) delivery; 2) content; and 3) recognition of learning outcomes. The data obtained allow us to conclude about a sufficiently high level of openness of distance education (65%), not a sufficiently high level of its flexibility (20%). There is also no doubt that distance learning is very convenient for students, which was noted by 75% of respondents, while 16% of respondents said that communication with a teacher is preferable. We believe that distance courses in humanitarian subjects for students of technical specialties should be converted into a blended form, which will allow students to create the soft-skills so necessary for them, such as creativity, sociability, communication, teamwork, that are in demand on the labor market of Industry 4.0.

Keywords: Digitalization, Higher Education, Distance Education, Teaching Methods.

Introduction

With the emergence of new information technologies, all around the world higher education is undergoing a period of transformation, which has affected our country as well. Digitalization of all areas of public life has become part of a general state program directly related to the field of education. [5, p. 124; 12]. Federal Authorities created the project "Modern Digital Educational Environment in the Russian Federation" and educational portal "Modern Educational Space in the Russian Federation", which included 125 Russian universities. [Ibid., p. 127] On the UrFU platform, which is also part of this educational portal, there is a course on philosophy, which we are going to consider in this paper based on the opinions of its listeners.

Digitalization is indeed the main direction for modern Russian higher education, as evidenced by experts (1,481 teachers and management representatives from 65 Russian universities) who took part in a study conducted at Siberian Federal University by V.S. Efimov and A.V. Lapteva and was presented in the article "The future of universities - is digitalization really a priority?" [3] It was found that in fact among the priorities of the high educational institutions on the first place is "PR and promotion of the university," as well as "interaction with the Ministry of Education and Science and

federal authorities," while investments in digitalization occupy only the third place among the current priorities of universities. [3, p. 1925] At the same time, experts note that some of the most important problems that higher education may face in the near future are "degradation of secondary education" and "development of the country according to the scenario of" commodity power "[3, p. 1925].

The purpose of our study is to consider the effect of digitalization of higher education as a distance learning form. Despite the fact that this form of training is gaining popularity everywhere, its effectiveness is still questionable. Experts, scientists, the administration of higher education institutions, as well as the participants of the educational process – teachers and students, have ambiguous opinions about it. Doubts are caused by such aspects of distance education as the criteria for evaluating tasks, the inability to accurately identify the person, who performs these tasks – the need for proctoring system, and the main problem is the motivation of students, since the absence of the teacher's identity can not be filled with any soft or hard deadlines, ratings, etc. Another important disadvantage of distance education, which we emphasize in our study – is the lack of communication between the teacher and students, which greatly impoverishes both the educational process as a whole and the personal development of students and strongly transforms the very profession of a teacher.

Methodology

The basis of our research was a model that considers flexibility and openness as key characteristics of distance education, proposed by D. Orr, M. Weller and R. Farrow and tested it at a URFU course. To check this model we gave a questionnaire to students who attended the course. In addition, we supplemented our study with an analysis of modern domestic and foreign sources on this issue, published in 2017-2019.

Distance education has become part of modern life, allowing to get both first education and retraining or advanced training. Despite constant criticism from adherents of traditional forms of learning, distance education is increasingly complementary to or replacing face-to-face education. If we accept distance learning as an equal form among others, we need to find adequate criteria to evaluate it. D. Orr, M. Weller and R. Farrow propose this kind of criteria. Their article has a title: "How does digitalization affect the flexibility and openness of higher education as such?" [9] The authors propose to base the idea of three pillars of education: "hours, content and powers." The authors finalize this model and consider it possible to talk about such components of education as 1) delivery; 2) content and 3) recognition of training results. All three criteria were considered in terms of flexibility and openness of education. In the above article, the authors analyze data on universities around the world having distance programs and courses. As the application of the proposed research model, the authors consider it possible to present 6 versions of its modification. Each modification is a diagram, on which 9 axes are located: 1) content delivery - flexible; 2) of content delivery - open; 3) content production - open; 4) content personalization; 5) support delivery - open; 6) support delivery - flexible; 7) recognition - open; 8) formal recognition - flexible; 9) assessment - flexible. [9, pp. 1-6)].

For our part, we propose to check this model on the example of UrFU and distance courses read for students of technical specialties.

Results of the study

Based on the results of a small study (150 respondents) conducted among students of the Radio Engineering Institute who took a distance course in philosophy last year, the following data were obtained. We obtained the following results on the respective scales: 50%; 2) 61,4%; 3) 15,9%; 4) 40%; 5) 50%; 6) 55%; 7) 15,9; 8) 10%; 9) 11,4%.
How can we translate this data? What do they mean? First of all we must pointed out, it is obvious that the greatest estimates are given in indicator 2 - openness of content delivery and 6 - flexibility of support delivery. This means, that students appreciate the possibility of accessing the course materials, considering that this course is available to everyone (52.3%), or is available to students of

universities included in a single educational space (9.1%). Accordingly, the lowest scores were obtained for 7 - the openness of formal access to learning results, because each student can only see the results of his or her learning, so consider 65.9% of the respondents and can also see only the results of his or her academic group as a whole - 18.2%. Also 8 - flexibility of formal access to training results, i.e. assessment per course is made up of estimates for individual tasks and results of final testing, as 55.5% of respondents believe. 9 indicator - flexibility of assessment of course results, i.e. 88.6% of participants believe that only creators of the course and tutors can carry out current and final control of the course. In addition, quite low estimates were obtained for 3 indictor - openness in content creation, because 84.1 students believe that the content of the course is exclusively determined by the author and the management of the institute, respectively students themselves, for example, cannot participate in topic correction, task creation, etc.

We can conclude from this data that the openness and flexibility of the distance course on philosophy were rated on 5 out of 9 indicators at 40 to 60%, and on 4 indicators at 10 to 20%. It turns out that the accessibility, i.e. the openness of this course to everyone is high, but the flexibility, i.e. the possibility of influencing its content, cannot be rated high enough. We must mention that the course discussed by us, is located on the platform of open education: http:// openedu.ru, which means that everyone has access to it. There also, for example, you can find a course for masters in "Philosophy and Methodology of Science," Time Management, "and many others also created by UrFU teachers.

The results, similar to those presented in this article, were obtained by Chinese scientists who conducted research on two groups of students who studied "Inorganic Chemistry" at the College for School Teachers in Shaanxi Province in a mixed-learning option: students watched online lectures and then discussed them at seminars, working in groups led by a teacher. [14] One group was experimental and the other was control. The students used the distance course (MOOC) for 6 weeks, listening to lectures and doing the corresponding tasks in it, and then already discussed what was not clear to them in the group with the teacher. The results of this study showed that 1) in the learning process, about 80% of students watched instructional videos more than up to half; 2) about 55% of students did more than half of online assignments, although a significant decrease in the number performing these assignments was observed - to 41.6%, starting with the second week of study. The authors of the study explain these results by the fact that the participants as a result could only see whether their answers were correct or not, but did not receive appropriate explanations, they were not provided for by the distance course. This, by the way, is one of the main disadvantages of all online courses. 3) 90% of students were satisfied with the very process of communicating with other students in groups when discussing course materials and 80% were satisfied with the communication between teacher and students 4) 90% of students praised the quality of online lectures and the possibility to view and review them, as much as needed. 5) 70% of students were convinced that the mixed learning option made their learning more effective. [Ibid., p. 11-12]

Discussion

Recently were published the results of a large-scale sociological study conducted under the leadership of Professor of Social Sciences G.E. Zborovsky in the universities of UrFO in 2018. According to it, the author raises many questions and discusses the pressing problems of modern Russian education. The main idea discussed by G.E. Zborovsky is to answer the question about the advantages and disadvantages of distance education, the main disadvantage of which he considers the division of the two main groups: students and teachers. Distance education, designed to link, on the contrary, breeds more and more teachers and students. "Meanwhile, distance education was originally conceived as an opportunity to establish new forms of communication between teachers and students. One of the main terms in the process of technological implementation of this type of formation - connect - means "connect, bind." But ironically, quite quickly, distance education from the linking, connecting has turned into its opposite - into an undertaking separating students and teachers. "[15] But, on the other hand, the obvious advantage and merit of distance education lies in its flexibility and supposed openness (which is true only partly and with many reservations, though proclaimed). Its flexibility is evident just in the independence of time and place, and sometimes even the pace of passing the course. This is the dignity of distance courses noted firstly by all students interviewed by us (75%).

It turns out to be an interesting situation: the distance nature of training is both a downside and a plus of this training, separating the teacher and the student, but freeing both of them from the need for mandatory interaction in a strictly defined time and place. This leads to the following obvious problem of distance education - assessment of learning outcomes and development and improvement of new methods of testing these outcomes. Here, of course, the task of organizing such work of students that not only trains their memory, but also other cognitive abilities: imagination and thinking, and creative abilities based on them, comes to the fore. How can we train this skills online, while tasks of the course, as well as answers to them, prepared in advance? So, what about problem learning, dialogue that encourages communication and activates thinking abilities? This task in distance education has is performed by blogs, chat rooms, seminars, where students ask questions and together search for answers to them, sometimes with the help of a teacher. However, in a series of studies [2] were noted that these tools of distance education are rarely used. "This indicates that tools like virtual seminars, online exams and professional networks are used extremely infrequently" [Ibid., p. 10]. Part of this task is to be carried out by mutual checks, i.e. mutual assessments of works/tasks by the course participants themselves, not by the teacher. Here we usually face initially loyalty of listeners to each other and a known different basic level of knowledge in a certain area, which does not allow everyone to complete the task completely in accordance with the requirements of the teacher. All these requirements, as well as the criteria for their evaluation, remain largely completely formal and rarely relate to the content of the work itself. As a result of this learning method, the teacher disappears as the key figure who evaluates and guides the student.

Of course, it is assumed that during 11 years of school the student has acquired an advanced skill in searching and working with information, which allows him to quickly and accurately find answers to the questions asked. Obviously, the answers to the questions of the tests are far from the same as the answers to the problematic questions of the teacher at the university, because for their preparation and formulation it is necessary to think, analyze, compare, rather than simply copy the found information. This skill is very much lacking for modern students. Lack of autonomy, which is particularly surprising at the beginning of the 21st century, when everyone and everyone "aspires" to it, not wanting and afraid of it really. So, here we see an infantile and in many ways template-thinking individual for performing distance course tasks and watching lectures. What do we want to get as a result? Where he will develop skills of creative thinking and originality, if there is no competition (each student knows mainly about his achievements, i.e. the level of academic achievement in the course - 65.9% of respondents believe that this is true, as a holistic picture is seen only by a teacher or a technical specialist, or a educational management, i.e. a person with the appropriate powers); communication (because there is no dialogue, which means there is no need to defend the actual opinion, look for arguments, etc.), team work?

In contrast to the opinion expressed in our article, M. Radovic-Markovic believes that distance education provides more opportunities for communication between teachers and students, communication becomes less formal, stimulates critical thinking and, in general, gives more freedom in discussing topics of the subject area. When students participate in a dialogue, nobody is looking at them, they do not attract attention, and, indeed, this is convenient for some people from the point of view of psychology. [7, p.292]

These are all key requirements for a modern person who wants to be successful, and therefore competitive in the labor market. It is interesting that G.E. Zborovsky also points to this: "only 10-15% of students are really motivated for educational activity and only 20% value the time factor in daily activity." [15, p. 53] With regard to the last comment, this is particularly surprising, especially since in the same article the author refers to an increase in the number of students who have been looking for work since the second year, and therefore spend their time not only on study, but also on work. Therefore the skills of self-management and time management should be demanded among students. It is a pity, but not many people realize it apparently. With regard to the students of the Radio Engineering Institute, I would like to note the following. Although they, in terms of their future profession, feel in a fairly privileged position in the labour market and indeed they fall into the I or III quadrant, according to model by F. Fossen and A. Sorgner, [4] because it refers to "Rising Stars

Occupations" or " Human Terrain Occupations." However, it is those additional to the main soft-skills, so necessary in the future, in principle, cannot form outside the group of other people exclusively in the digital environment. Most interesting, the possibility and ability to form these skills appears in students of technical specialties precisely when studying humanitarian subjects. One of the most difficult and important subjects designed to shape students "independent thinking" is the philosophy, which with easy submission of university leadership has been put into distance course mode (for some institutions). We will not discuss the reasons for such a short-sighted decision, but its devastating consequences will still affect students. However, it is pleasing that not all students think the same and there are those who consider the distance form of philosophy learning unacceptable because of the "fundamentality" of philosophy, as one listener has said, "Philosophy is fundamental and complex in self-study, thus online philosophy is not an effective way to study, (rather, from the discharge of hobby-study)." It is worth noting that 16% of respondents to the question "Should all humanitarian subjects be translated into an online environment?" answered that direct contact between the student and the teacher is preferable.

Despite these problems, the evaluation of distance learning should not be one-sided, so we will consider both the advantages and disadvantages of this form of training on the example of some of the studies and literature analysis.

In the article mentioned above, M. Radovic-Markovic points out the following positive aspects of online learning:

- Students at more than 90% of virtual facilities are satisfied with this kind of education and knowledge acquisition
- If you train teachers, the results of the education are good.
- Saving time and effort of teachers, which turns into additional income for the University. However, it is worth noting that in Russia, teachers are afraid of losing their "teaching rent", as noted by Roshchina Y. M. et al. [11, pp. 174-199.]
- Students also believe that the quality of distance education is not inferior to the traditional one, in addition, the training itself can be completed in a shorter time.
- At the same time, it should be noted that the work of the teacher changes its nature and becomes more stressful, since it requires daily communication with students, and not only during consultation hours.
- The number of students who want to get higher education is increasing.

The author also tells us that not all faculties switch to distance learning, some of the highly rated ones do not seek it, not seeing the need for it. [7, p. 191-193]

Another large-scale study conducted in Russia in 2016. Roshchina I. M. et al. [7] showed that along with the advantages of distance learning that we have already listed, online course participants in Russia point to following disadvantages: "a high probability of not completing the training (48%), the lack of individual communication with the teacher (41%), the inability to control who performs the task (30%), the requirement of payment for obtaining a certificate of completion of such a course (22%). The possibility of reducing the quality of education when using mass open online courses was noted by 18% of University students"" [7, p. 184]

An exhaustive analysis of the advantages and disadvantages of distance learning is presented in the article Arkorful V. and Abaidoo N. "The role of e-learning, advantages and disadvantages of its adoption in higher education". [1]

Another study that we would like to mention was conducted by scientists from Eastern Europe and is an analysis the demand for distance learning. [13] Analyzing the reasons for students ' choice of distance learning, the authors come to the following interesting conclusions: "The following conclusions can be drawn from the data listed above. Firstly, students who prefer the distance education form choose it not because of the form of the received materials but due to another reason. Secondly, students do not use information technology tools for acquisition of study information; they

still prefer traditional forms of real-life communication with the lecturer**.** It is fair to assume that the preference of this form is a result of the education at school, based only on communication between the teacher and the student. The core disadvantages of the distance education model mentioned by the students are insufficiency of face-to-face communication with the lecturer and lack of practical studies. Self-control and motivation are essential requirements of distance learning; however, many students lack them."[13, pp.110-112]

A separate detailed article is devoted to a comparative study on the electrocardiogram course, which students of one of the German universities can learn both online and face-to-face. The authors come to the following conclusions: "Despite the limitations mentioned above, our results provide first indications that the following three aspects could be of particular interest in the future development of online courses in order to better meet students' needs:

- Extrinsic motivation – create both fixed timeframes for working on topics and external support of self-regulation,
- Intrinsic motivation –Feedback to students and
- Preference of formats that enable at least some personal interaction with the lecturer" [6, p. 7]

Finally, we should mention another author, whose critical message is aimed at analyzing the opportunities that appear in different segments of the population in connection with distance learning. A separate study conducted by S. R. Lambert focuses on the reasons that enables and constraints the study of online courses. To do this, the author suggests considering each course through six relevant dimensions: technology, autonomy, purpose, skills, social support, and training materials. A separate area of research by the same author is related to the study of opportunities that appear due to the introduction of online training for everyone. Here, the focus of research problems is centered around the issue of accessibility of distance courses for people who, for example, lack basic knowledge (did not study well in school or did not finish it), do not know English, have a cultural background, different from European or American, etc. [7,8]

Conclusions

1. We believe that in the continuation of our study masters can be interviewed who listen to the distance course on Philosophy and Methodology of Science. In addition, a comparative study to evaluate the technical distance courses taught at UrFU for humanitarian professions is needed.
2. We also believe that mixed or blended training in the study of distance courses is worth to use. That is, holding lectures in a distance, online version, and after that group work in audiences. This will allow developing the skills of dialogue and communication so needed by students. We can apply this method, for example, for humanitarian courses in technical fields or for technical courses in humanitarian fields.
3. We are convinced that integration of different subjects into one course through modular training can be used, or through consistent teaching of different subjects within the same course. For example, it can be philosophy, logic, history of science and technology. If this is built into a unit course, where it is possible to weave topics and transit from one subject area to another, it would create in students minds a single picture of the history of ideas. They could see the process of there emergence, formation, consistently tested, denied and only the strongest remained as theories in science, making up the basis that is familiar to us today. Then students of technical specialties will have no rejection to humanitarian disciplines. It is necessary not to reduce the number of hours in humanitarian subjects or to translate them completely into a distance format of training, but to integrate them into technical specialties, at least in terms of studying the history of these sciences. Modern technicians, future engineers, have a steady, completely deceptive and actually dangerous illusion of seeing the world as it is (not for a second doubting in the correctness of their view). They do not realize that our whole world itself (our Planet), but also humanity in particular, has passed a rather long path of development, which needs to be known not just to broaden their horizons, but to understand the present state of affairs, to better represent our place in the world and our prospects.

Of course, integrating different humanitarian subjects into one course requires the interaction of different teachers, often working in different departments, much less when it comes to integrating humanitarian knowledge into technical knowledge. It is necessary to learn different subject areas by one teacher, but it is quite difficult, considering specialization.

It is also important to remember the ethical component of any knowledge, and especially its application from a technical point of view. Modern technologies fundamentally change our lives, so ideas about the value of human life, about the basic categories of freedom, responsibility, good and evil should somehow be part of the program of humanitarian courses for students of technical specialties. Scientists already now ask questions about the change of legislation due to the emergence of robots and artificial intelligence, the carriers of which need to be included in legal and ethical relations with people. These are not fairy tales from the future, but our present.

The process of digitalization, having fundamentally changed education, has become an integral part of it. It brought new challenges and new interesting ways of solving problems, new methods of training and evaluation of the results of the educational process. Our task is to make the new education effective and useful to all its participants. A careful study of the advantages and disadvantages of online learning will make it more effective and meet the requirements of both teachers and students.

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Análisis Crítico Del Discurso En Las TIC Sobre La Ley De Procedimiento Administrativo General De Perú

Critical Analysis on The Speech in The IT About General Administrative Procedure Law in Peru

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Resumen

El presente artículo analiza las TIC en la Ley de Procedimiento Administrativo General peruano con base en el análisis crítico del discurso desarrollado por Van Dijk (2016). A pesar de que se ha realizado con fines de agilizar o efectivizar la atención a los ciudadanos en relación con la función administrativa del Estado; sin embargo, existe una asimetría en este proceso porque las entidades públicas sí cuentan con equipos o dispositivos tecnológicos para dar a conocer sus actos administrativos, pero los ciudadanos que viven en zonas rurales o alejadas de las urbes, donde no cuentan con internet, no tienen acceso a la información.

Palabras clave: Análisis crítico, procedimiento administrativo, función administrativa, asimetría.

Summary

The present article analyzes the IT in the General Administrative Procedure law in Peru based on the critical analysis of speech developed by Van Dijk (2016). It has been developed for the purpose of speeding up or making effective the attention to the citizens, in relation to administrative function of the Peruvian State, however, there is a symmetry in this process because the public entities do count on equipment or technological devices; so they can give make known their administrative acts, but the citizens who live in the countryside or far from the cities, where they don't have any Internet service, they don't have access to the information.

Keywords: Critical Analysis, Administrative Procedure, Administrative Function, Asymmetry.

Introducción

La presente investigación tiene como propósito analizar el uso de las TIC en la función administrativa, a pesar de que se ha realizado con un fin de comunicar con eficacia y eficiencia los actos administrativos del Estado; sin embargo, los administrados de las zonas rurales o zonas alejadas no tienen acceso a los medios electrónicos o internet, solo han accedido en un 22,5% frente a un 63,1% de la zona urbana (Instituto de Estadística e Informática, 2019); no tienen acceso a la virtualización del procedimiento administrativo y en algunos casos desconocen su uso. Esto genera una distancia e incomunicación entre una parte de los administrados y los funcionarios o administradores del Estado, el cual impide que los ciudadanos tengan acceso a los servicios del Estado. De esta manera no se cumple el propósito de la administración pública que es la búsqueda del bienestar de los administrados o a un proceso administrativo motivado en cumplimiento de los derechos de los particulares (Huapaya, 2019).

A pesar de que existe la Ley sobre transparencia y acceso a la información (Ley 27806), que está consagrada en la Constitución como un derecho fundamental (art. 2, numeral 5); sin embargo, las políticas del Estado no garantizan el acceso ni el uso de la información, generando un distanciamiento con los administrados.

El art. 182 de la Ley de Procedimiento Administrativo General establece que, en las zonas lejanas, deben encargarse de notificar las autoridades, asunto alejado de la realidad, porque muchas veces las autoridades no atienden intereses o problemas de los ciudadanos, menos los casos de los administrados de manera particular.

La falta de acceso a internet impide que los avances tecnológicos, que han acelerado el proceso de globalización (Mojica, Barandica, Rodero, Franco, Hernández y Arboleda, 2015), lleguen a toda la población, generando desigualdad o asimetría, y concentrando el poder en quienes tienen el control económico y mayor acceso a las TIC, en este caso el Estado quien incluso impone o propone un determinado sistema administrativo que el ciudadano debe acatar, muchas veces sin pensar en su bienestar, por ejemplo cuando los procesos se dilatan o demoran, violando el principio de celeridad. El Estado se ampara en el monopolio de la fuerza que es gobernada por una minoría (Bobbio, 2014).

Antecedentes y fundamentación

Existen diversos estudios sobre las TIC relacionadas con el derecho, desde perspectivas positivas o negativas. En el ámbito jurídico se han estudiado en relación al problema de plagio y la vulneración de los derechos de autor por los estudiantes (Vinueza et al, 2020); en el ámbito laboral, sobre los derechos del trabajador que tiene (derecho) a desconectarse ya que a veces está interconectado en horario no laborable el cual afecta a su tiempo libre (Victoria y Herrero, 2010); en la utilización de la enseñanza del derecho que permite a los estudiantes el dominio de competencias para desempeñarse adecuadamente en su campo laboral: judicatura, docencia, etc. (Antúnez, 2018); en aspectos relacionados con la regulación en su uso (Califano, 2017); en el acceso o uso para la adquisición de medicamentos y su respectiva protección del consumidor (Fernández, 2017); y su aplicación en el derecho procesal civil (Castro, 2016).

Respecto a los antecedentes específicos, sobre la virtualización o uso de las TIC en el derecho peruano, el Poder Judicial en enero de 2017, inició con el expediente judicial electrónico, acto que permitirá la celeridad de los procesos en el acceso a la justicia. Se está implementado en la Corte Superior de Justicia de Lima, en las especialidades de Comercial, Tributario y de Mercado y Nueva Ley Procesal del Trabajo (Poder Judicial del Perú, 2017).

Nuestro país tiene como referentes a otros países quienes tienen experiencia en la aplicación de las TIC. Por ejemplo, Brasil ha agilizado sus procesos internos, ha permitido modificar su corpus normativo; Costa Rica evidencia cambios en sus procedimientos y gestión con base a la aplicación de la tecnología; España ha creado los órganos judiciales: Justicia Digital y Fiscalía Digital, en ambos se han consolidado los procesos electrónicos íntegros; México también usa la tecnología para la toma de decisiones oportunas y el intercambio de información entre sus instituciones; Paraguay ha implementado su proceso electrónico judicial e incluso ha generado un sistema que guía a los profesionales para que puedan realizar el proceso (Lama, 2017). Estos avances reflejan que la tecnología sirve de base en los procesos y acceder a la justicia de manera eficaz y eficiente, sin dilataciones que afecten al Estado y al ciudadano.

Las nuevas tecnologías permiten afrontar cambios o adaptarse a estos, almacenar información, relacionarla, reproducirla por parte del legislador o la autoridad y tomar decisiones más justas para el administrado o ciudadano (Castro, 2015).

En este contexto, un aspecto relevante es al acceso a la información, como un derecho humano, en la que la persona reciba y difunda sus ideas, que le permita generar un diálogo armónico con la parte administrativa (Olivos y Gómez, 2019). No obstante, en este proceso se da una asimetría en la que una parte tiene menor información que la otra (Abello-Romero et al, 2019). Se enmarca dentro de la democracia que garantiza el acceso a la información y que debe ser tutelado de manera eficaz (Ruiz-Rico, 2019). Sin embargo, existe una brecha entre el acceso a la información pública y el acceso real a los espacios de transparencia de las entidades públicas (Fierro, 2018).

El derecho y la tecnología se enmarcan dentro de un enfoque interdisciplinar. Esta interacción ha ido fortaleciéndose y ha generado dos disciplinas: el derecho informático y la informática jurídica (Sanz, 1997).

El origen de la tecnología informática data desde la Segunda Guerra Mundial para satisfacer exigencias militares (Sanz, 1997). Esta ha sido una de las principales impulsoras de la reforma administrativa que tiene como función principal mejorar la actuación de la gestión pública en beneficio del administrado y del Estado (Elliot, 2014).

Las TIC permiten la celeridad, la simplificación administrativa, acortar tiempos y como consecuencia de ello también beneficio económico para el Estado y el administrado. Prevalece la responsabilidad del administrado y de la administración en la realización de los actos administrativos. En este contexto se genera la convergencia tecnológica que integra las tecnologías de la información y lo audiovisual (Califano, 2017), también entre los administrados y las autoridades o funcionarios.

El proceso de virtualización requiere de documento electrónico o virtual, el uso del correo electrónico, la firma electrónica (Castro, 2016). Estos elementos son fundamentales para la parte administrativa y para el administrado quienes interactúan o se comunican con el propósito de satisfacer el interés o petición del administrado, dentro del marco legal. Sin embargo, el desarrollo de la tecnología en el ámbito jurídico también acarrea algunos problemas, entre ellos, la incertidumbre regulatoria (Pacheco, 2019).

El proceso de virtualización administrativa se da dentro de un contexto macro y micro. El primero se establece en base al poder, la denominación, la desigualdad de los grupos sociales; en cambio el segundo, se funda en la interacción o comunicación verbal, el uso del discurso (Van Dijk, 2016). En tal sentido se debe establecer un puente entre el aspecto macro y micro, es decir debe existir una correspondencia entre los grupos dispares a través del discurso, que va acompañado de la cognición que implica poseer conocimiento sobre las reglas, normas que permitan una actuación pertinente dentro de la sociedad; estos principios se establecen en la comunicación virtual administrativa, en la que los funcionarios o administradores comunican sus decisiones a los administrados en función de las peticiones de estos.

El discurso legal se desarrolla a través de las macroestructuras y microestructuras semánticas (Van Dijk, 2016) que se expresan en el procedimiento administrativo. En las macroestructuras son los temas o tópicos que se desarrollan y están relacionados con el logro del bienestar social, pero este se obtiene a través de proposiciones o conceptos claros que están contenidos en la norma y que el administrador debe aplicarlo de manera pertinente, eficaz y eficiente. Sin embargo, existe una distancia entre la norma y la realidad por su inaplicabilidad.

Otro aspecto relevante del poder es el control (Van Dijk, 2016). En este caso, dentro del proceso administrativo, el poder lo tiene la autoridad porque es quien resuelve o no la petición; a pesar de que la norma le fija un plazo, muchas veces es incumplido o vulnerado. Este poder se da porque el administrador o autoridad tiene acceso privilegiado a la información, tiene mayor estatus.

El poder establece relaciones o jerarquías y por tanto una relación o comunicación vertical, la autoridad tendrá mayor poder sobre el administrado. Esto se da porque tiene acceso y conocimiento de las normas, la reglas, mayor estatus por su condición.

Método

La presente investigación es cualitativa. Se basa en el análisis de la Ley de Procedimiento Administrativo General de Perú, específicamente se interpretan los aspectos relacionados con los componentes tecnológicos que se expresan en la misma norma. No tiene fines de generalizar los resultados o conclusiones por tratarse de un caso específico, no obstante, se recurre también a otros trabajos de investigación para reforzar el análisis o estudio.

En este caso se trata de un análisis de documento cualitativo que tiene como unidad de análisis a la misma normativa administrativa, y las categorías se han establecido con base a la secuencia temática (Cáceres, 2003) de la misma ley, donde se evidencia la aplicación o uso de la tecnología: tratamiento de la información (acceso, difusión, intercambio y verificación), las formas o

modalidades, los requisitos, el procedimiento y expediente administrativo electrónico, administración de la información.

Análisis y Discusión de Resultados

Para el análisis se consideró la Ley de Procedimiento Administrativo General, que se modificó en enero de 2019, con algunos cambios que permiten su mayor efectividad o eficacia en los actos administrativos de la función pública. También recurriendo a fuentes teóricas o jurisprudenciales para triangular la información. Incluyendo la teoría del discurso crítico que estudia la relación entre discurso, cognición y sociedad, así como el abuso del poder que se desarrolla en los textos y los contextos sociales (Van Dijk, 2016), en este caso un contexto social-jurídico, que establece reglas o normas que regulan las conductas de los administrados y autoridades.

A pesar de la efectividad, eficacia o celeridad establecida en la ley del procedimiento administrativo, en la realidad concreta no se da, por ejemplo, en el caso concreto que ha resuelto el Tribunal Constitucional peruano a través del Exp. nro. 01264-PHD/TC, en el recurso de agravio constitucional interpuesto por el ciudadano Frank Vela contra la resolución expedida por la Segunda Sala Civil de la Corte Superior de Justicia de Lima que declaró improcedente la demanda, esta entidad del Estado declaró nulas las resoluciones del Poder Judicial y admitió la demanda a trámite interpuesta por el administrado porque las resoluciones del Poder Judicial habían incurrido en vicio procesal. En este hecho se demuestra que la administración de justicia no es eficaz y además es lenta, es un caso que se originó en marzo de 2016, fecha en la que Frank solicita una copia simple de cargo de un oficio ante la Procuraduría Pública, y esta se negó a proporcionarla, afectando su derecho al acceso a la información; después de esto el administrado presentó una demanda (el 23 de mayo de 2016) ante el juzgado el cual fue declarada improcedente, la misma acción tomó la Segunda Sala Civil, por este motivo presentó su recurso ante el Tribunal Constitucional y este resolvió en abril de 2019 a favor de Frank. En este caso específico, de una solicitud sobre acceso a la información, que es un derecho fundamental, termina siendo complicado y agónico, llegando al Tribunal Constitucional para que resuelva, generando más inversión de tiempo y economía para el Estado y para el administrado.

Parte 1. Tratamiento de la información: acceso, difusión, intercambio y verificación

La Ley de Procedimiento, en la parte preliminar establece el principio de acceso "Permanente" del administrado para recibir información de la entidad pública sobre el estado de su proceso u obtener las copias del mismo, en caso lo requiera; asimismo, el principio de "participación" que implica el acceso de la información por parte del administrado de manera directa o a su representante, siempre que solicite información que no afecta a la intimidad personal o el interés nacional, o que esté prohibida de acuerdo a Ley.

Aparte de los principios, citados previamente, también se especifica que el administrado, sin limitaciones, debe o puede acceder a la información de los expedientes u obtener copias de los documentos (66, incisos 3 y 4). La consulta de su expediente lo puede realizar en cualquier momento por él o por su abogado (art. 171.1). Asimismo, acceder a la información gratuita que brindan las entidades públicas. Los documentos o información pueden ser enviados por la entidad a los administrados a través de correo electrónico cuando se trate de una transmisión a distancia (art. 134.1).

Son concordantes con los planteamientos de las TIC porque permiten la comunicación y difusión de la información entre los protagonistas o interesados. No obstante, en muchos casos las entidades no proporcionan información oportuna a los ciudadanos, alterando el principio de celeridad y de acceso a la información; por tanto, se evidencia un mayor poder de la autoridad o Estado frente al administrado; en este caso la autoridad tiene el control o el dominio de la información.

Aparte de estar amparado en la Constitución, también se establece en la Declaración Universal de los Derechos Humanos, en su art. 19 donde se precisa que el individuo tiene derecho a aceptar o recibir información y a transmitirla sin limitaciones territoriales.

Sobre la difusión de información, le corresponde a las entidades hacerla llegar a los administrados a través de las notificaciones (físicas, electrónicas) o a través de sus portales o el diario oficial El Peruano. Por ejemplo, la publicación del TUPA se realiza a través de El Peruano o los portales de las instituciones que deben tener los procedimientos estandarizados a fin de que no haya conflictos o contradicciones entre estos; y en el caso de que haya cambios o modificaciones se deben realizar a través de resolución de la autoridad competente y luego ser publicados (arts. 44.1, 44.2, 44.3, 44.5).

Sobre el intercambio de información entre entidades, estas están en la obligación de permitir a otras instituciones sus bases de datos para obtener la información que requieran de los administrados, y en este caso el administrado solo debe presentar una declaración jurada indicando que cumple con lo requerido para el procedimiento administrativo o servicio que requiera (arts. 46.1, 46.2).

A la autoridad, también le corresponde solicitar información del administrado a fin de contrastar, verificar o encontrar la verdad material (art. 68.2); asimismo, la entidad puede solicitar información al administrado con base a lo que ha peticionado para que resuelva o se pronuncie sobre ello (art. 68.1). Lo realiza como un control posterior, para descartar si ha actuado de mala fe, para ello debe recabar información del administrado e incluso realizar pericias (art. 240, incisos 4 y 5).

En este caso la información se da dentro de un proceso comunicativo eficaz que interrelacionan a la autoridad con los administrados y a su vez entre entidades. Su propósito es comunicar con eficacia los actos administrativos que satisfacen los intereses de los administrados de manera oportuna. Aunque en la práctica los procesos o resoluciones no llegan oportunamente a los administrados y muchas veces no resuelven las peticiones de manera oportuna y pertinente, acentuando el poder de la autoridad administrativa sobre el administrado.

Parte 2. Las formas o modalidades de difundir la información

La Ley de Procedimiento establece formas de notificación: personal o a través de diversos medios, entre ellos telegrama, correo certificado (art. 20.1.2) siempre que el administrado lo haya solicitado.

La otra modalidad se da a través del diario oficial EL Peruano u otros medios de mayor circulación, cuyo propósito es que llegue la comunicación al administrado (arts. 20.1.3, 25.3). Aunque la norma contempla solo a través del diario Oficial en el art. 25.3, respecto a las publicaciones por notificaciones. Asimismo, a través de su portal institucional, si es que la institución cuenta con ese medio (art. 20.1.3). La entidad puede publicar en su portal de manera íntegra el acto administrativo (art. 23.3).

El administrado pude ser notificado del acto administrativo por correo electrónico, siempre que haya dado su autorización y además evidencie respuesta o aceptación de dicho acto (arts. 20.4, 25.2).

La autoridad administrativa muestra su poder porque tiene la prerrogativa o la potestad de publicar sus actos o resoluciones a través del diario El Peruano y otros medios; tiene mayores facultades que el administrado y por tanto mayor poder o control de la información.

Parte 3. Los requisitos que deben cumplir

Para difundir la información automatizada del acto administrativo, este debe cumplir algunos requisitos fundamentales: conocer el nombre y el cargo de la autoridad emisora (art. 4, inciso 4.3). Específicamente, cumplir con "lugar y fecha de emisión, el órgano que lo emite, el nombre y la firma de quien lo emite, además de contar con la firma autógrafa del funcionario con el nombre completo y claro" (Morón, 2019, pág. 230).
Sobre la firma, esta puede ser digital o electrónica. Es establecida a través de la plataforma digital. La primera tiene como firma previa a la autógrafa; y la segunda, en un sistema informático. Debe cumplir con todos los procedimientos, documentos y demás requerimientos legales: principios, derechos, garantías para que tenga plena validez (art.30.2).

Parte 4. El procedimiento y expediente administrativo electrónico

La Ley establece que el acto administrativo puede efectuarse total o parcialmente a través de medios tecnológicos a través del expediente o escrito electrónico sobre información de los administrados, de terceros o de las entidades. Este procedimiento tiene el mismo valor legal que el tradicional. Debe preverse las medidas pertinentes en el caso de que el administrado no tenga acceso a los medios tecnológicos. Todos los elementos o procedimientos administrativos que se realizan por estos medios electrónicos tienen la misma validez legal que los tradicionales (arts. 30.1, 30.2, 30.3).

El expediente electrónico debe contener todos los documentos del procedimiento administrativo que consta en una determinada entidad; poseer una única identificación y ser inalterable para que no se confunda entre otros casos o expedientes y que sirva de base para otras entidades que lo requieran, también constar con un número correlativo y la firma digital o electrónica del responsable (arts. 31.1, 31.2, 31.3).

Parte 5. Administración de la información

Las entidades están facultadas para recepcionar información y trámite documentario. En este proceso existe la posibilidad de que administren su información en soporte electrónico o informático a través de un solo sistema de trámite documentario (art. 128.3) y por tanto, a través de dichas unidades realizar todos sus procedimientos y adquisición de información para cumplir sus propósitos (art. 128.4).

En estos procesos es factible instalar mecanismos que permitan a los usuarios suministrar su información para su digitalización (art. 129.5).

Las entidades pueden emplear la tecnología o medios informáticos para el archivo y tramitación de expedientes manteniendo la seguridad e integridad de estos (art. 164.3).

Un aspecto relevante de la norma es el establecimiento del enfoque intercultural (art. 47) para adaptarse a las características geográficas, ambientales, socioeconómicas, lingüísticas y culturales; no obstante, en la realidad no es posible sobre todo en las zonas alejadas de la sierra y la selva donde tienen otra cultura, otros idiomas (quecha, aimara, etc.). Sin embargo, las normas siguen prevaleciendo o difundiéndose solo en el idioma español. Se evidencia el problema del poder que se ejerce a través del gobierno o el Estado, frente al administrado que está desprotegido, incluso por la misma ley que realmente no se adapta a su lengua, a su cultura.

Del análisis previo, se colige que el administrado tiene prerrogativas sobre el acceso a la información de las entidades públicas, sin embargo estas son las que mantienen el poder y el control de la información legal; es decir tienen la facultad de elaborarla, difundirla. Estas emanan sus decisiones a través de las resoluciones que transmiten a los administrados. Tienen el poder y

el control de la información legal porque poseen mayores conocimientos normativos que los administrados.

La ley administrativa, al igual que las demás actividades jurídicas (enseñanza, académicas, laboral, procesal civil, consumidor), está regulando de manera gradual la aplicación de las TIC; sin embargo, entre esta y la realidad existe una asimetría. Primero porque no todos los administrados tienen acceso a internet, quienes viven en zonas rurales solo tienen acceso en un 22,5%, frente a los de las zonas urbanas que es más del 60% (INEI, 2019).

Asimismo, no se genera la convergencia (Califano, 2017) entre la resolución de los actos administrativos de los funcionario o autoridades y los administrados, tampoco se resuelven con celeridad, como el caso de Frank, de quien el TC resolvió sobre el proceso de acceso a la información, que es un derecho fundamental, pero que debió solucionarse en el ámbito administrativo y no llegar al Poder Judicial y luego al Tribunal Constitucional. El mismo caso es concordante en el ámbito administrativo y en el ámbito del Poder Judicial, con el planteamiento de Huapaya (2019) que el administrado debe tener un proceso motivado. En este caso las autoridades administrativas concentran el poder y el control normativo frente al administrado.

No obstante la tecnología se viene usando gradualmente en el ámbito administrativo, que es concordante con lo que viene implementado del Poder Judicial desde enero de 2017; asimismo, es coherente con los avances tecnológicos legales de otros países: Brasil, Costa Rica, España, Paraguay, etc.

Este nuevo reto tecnológico de cambios e inclusión en el ámbito legal, va en camino a tomar mejores decisiones en favor del administrado (Castro, 2015) y que en algún momento se llegue a un diálogo armónico entre la autoridad administrativa y el administrado (Olivos y Gómez, 2019). No obstante, persiste la asimetría en entre el dominio y difusión de la información que se concentra en la autoridad y solucionar el problema del acceso reducido a las tecnologías de los ciudadanos de las zonas rurales que solo acceden en un 22.5%.

De todo lo avanzado aún falta incluir de manera integral las TIC en el procedimiento administrativo, a fin de evitar la incertidumbre regulatoria (Pacheco, 2019). Asimismo, armonizar el poder de la autoridad (que tiene el dominio de la información, Van Dijk, 2016) frente al administrado a fin de equilibrar el monopolio de la fuerza (del Estado) que es gobernada por pocos (Bobbio, 2014).

Conclusiones

Las TIC en el proceso administrativo tienen una finalidad: resolver los casos administrativos con celeridad y eficacia. Sin embargo, existe una asimetría o distancia entre la norma y la realidad, no se puede aplicar las TIC debido a que los administrados que viven en zonas rurales tienen menor acceso a internet (solo un 22,5%).

La celeridad y motivación se ven afectadas cuando los casos no se resuelven ni en el ámbito administrativo ni en el Poder Judicial, y concluyen en el Tribunal Constitucional, acentuando y prolongando la agonía del administrado.

Prevalece el poder de la autoridad o del Estado quien no resuelve los casos administrativos con la prontitud que se requiere y afecta directamente al administrado.

Las autoridades tienen el conocimiento y el dominio de la información legal porque están facultadas para difundir o dar a conocer sus decisiones a través de los diversos medios: diarios, portales.

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Trust from Employees' Perspective in Polish Companies: A Preliminary Study

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Abstract

The present study aimed to investigate dependencies between the levels of trust in Polish companies and employment and organization structures. To measure trust in organizations from employee's perspective, we applied a multifaceted approach to trust that included survey measurement of the key content components of trust beliefs such as integrity, reliability, and dependability. The respondents were part-time undergraduate students who filled in the Trust Measurement Questionnaire. The results revealed that the most trusted organizations were small-sized companies as opposed to large-sized enterprises, which retained the least trust. Overall, our pilot analysis of trust beliefs suggests that the population of young adults in Poland is more willing to trust smaller-scale entrepreneurs.

Keywords: Trust, Trust Management, Organizations, Polish Companies.

Introduction

Trust as a vital category of management in organizations, particularly in the business sphere, has been a recurrent issue of academic discussion since at least 1970s (e.g. Zand 1972), assuming various different conceptualizations (see Dietz and Den Hartog 2006, pp. 557-566), along with different empirical approaches to its measuring and monitoring (Dietz and Den Hartog 2006, pp. 566-571; Shockley-Zalabak and Ellis 2006, p. 52-53). In Poland, especially after its transformation from the socialist system to the liberal one, the question of trust became more and more important both on the sociological level – which was manifested for example in Sztompka's work (see Sztompka 2003; Żółkowska 2014) – and on the specifically managerial level (e.g. Bugdol 2010; Trembaczewski 2016; Paliszkiewicz 2011; 2014). However, in the researches having been hitherto undertaken the main stress has been placed on the top and middle managers' perspective on trust in their doing business (e.g. Trembaczewski 2016; Paliszkiewicz 2011), while the employees' perception of organizations with respect to trust has gained relatively little attention. Accordingly, our study focuses primarily on the employees' experience of trust inside organizations in Poland.

Trust Manifested in Organizations

Trust, as referred to organizations, is a manifold phenomenon which may be approached on at least several different levels as well as placed in different contexts. Despite the variety of theoretical views on it (Shockeley-Zalabak and Ellis 2006), its significance both in successful dealing with crises (Mishra

1996; Kramer and Cook 2004) and in an organization's "business as usual" is nowadays widely acknowledged: "*it saves the organization money by reducing the costs of litigation, regulation, legislation, pressure campaigns, boycotts, or lost revenue that results from bad relationships*" (Paine 2003, 80), but it also – at the bottom level – favours employees' efficiency at work. And conversely, the detrimental long-run effects of lack of trust are clearly identified and counteracted (Kutsyuruba and Walker 2016).

As to the conceptualization of trust, it is usually accepted that (1) trust may be treated as a *multi-level relation* established between: co-workers, teams, organizations, as well as between an organization and its clients or the public. It is also held that (2) trust is *culturally rooted* and thus, on the large part, stems from values, norms and beliefs that are intrinsic in particular cultural background. Besides, it is believed that (3) it is *communication-based*, which means that it can be taken as a result of successful and fair communication: i.e. "providing accurate information, giving explanations for decisions and demonstrating sincere and appropriate openness" (Paine 2003, 5). Next, it is thought (4) to be *dynamic*, being changeable, possible to be built, rebuilt, sustained, but also undermined or dissolved. And finally, it is usually taken (5) to be *multi-dimensional* while also having three aspects: cognitive, emotional and/or behavioural (Shockeley-Zalabak and Ellis 2006, 45-46; Dietz and Den Hartog 2006, 558-560; Paine 2003, 5). The multi-dimensionality ramifies into a number of spheres that overall constitute the concept trust: competence, integrity, dependability/reliability, openness and honesty, vulnerability, concern for employees, identification, control mutuality, satisfaction and commitment (after Paine 2003, 5-6).

Measurments of Trust

The question of how one should measure trust has been the subject of several studies (see Dietz and Den Hartog 2006; Mishra 1996; Paine 2003). There is no simple all-encompassing research instrument or methodology to indicate levels of trust in organizations. Usually, a combination of variety of both quantitative and qualitative research techniques, such as surveys, focus groups, before-and-after polls, ethnographic studies, experimental and quasi-experimental designs, or multivariate analysis are used (Paine 2003). In fact, Dietz and Den Hartog (2006) have identified several criteria for choosing an adequate measure of trust. In particular, their analysis of the most-quoted definitions of trust has indicated three crucial elements to be measured: *trust as a belief*, *trust as a decision*, and *trust as an action*. Because trust is based on working relationships in organizations, all these elements may be involved in the process of party A (employee/manager-as the trustor) interacting with a trusting party "B" (manager/organization as the trustor). In fact, some measures of trust in the process are focused on the analysis of the content of the trust belief while other methodologies deal with either the output of this process (decision-making) or input (a specific source of the trust beliefs) (for more details see Dietz and Den Hartog 2006).

Objective of The Study

Our conceptualization of trust in this work was understood as a compilation of subjective judgments presented by employees on different characteristics of the organization. A similar way of measuring trust was presented in Mayer et al. (1995), who pointed out ability, benevolence and integrity as the key factors of trust. In other work, Mishra (1996) has presented arguments that characteristics of an organization (the trustee) should include also dependability/reliability as an important factor describing business's predictability. According to Paine (2003), the key elements needed to form trust inside an organization should embrace integrity, competence, and dependability (reliability).

Following the above mentioned multi-faceted approach to trust, it can be said that a key aspect of working relationships in an organization is employees' perceptions of these components in organizations (Mishra 1996). Our study adapted definitions by Dietz and Den Hartog (2006), claiming the component of integrity to be an "adherence to a set of principles acceptable to the other party, encompassing honesty and fair treatment" (Dietz and Den Hartog 2006). The second component, i.e. competence, describes skills and knowledge indicating organization's capabilities to carry out its

obligations. And the last component, i.e. dependability/reliability, is related to the consistency and regularity displayed in behaviour.

In spite of a large body of research on knowledge-based trust there are other research streams indicating how the formation of trust in the organisation proceeds (McKnight, Cummings and Chervany, 1998). For instance, McKnight and colleagues (1988) emphasize a role of situational variables (institution-based approach) that determine one's feelings of the security in the organization that is linked with structural safeguards including (i) guarantees, (ii) regulations and (iii) legal recourse. In other words, institution-based trust is associated with expectations that there is an impersonal structure in the organization that enables individuals to expect that their efforts and commitment will pay off in the future (Shapiro, 1987). According to McKnight, Cummings and Chervany (1998) guarantees may reduce the perceived risk of uncertainty in terms of trust building in the organization and contribute to an increase of one's positive interpersonal trust. Moreover, contracts or promises (legal recourse) make the employee's (the trustor) comfortable in believing that the employer (the trusted party) make every effort to fulfill promises and will be acting according to social norms in order to secure such promises (Sitkin, 1995). In addition, a high-trust organization should stimulate interpersonal trust via corporate practices and procedures (regulations) that assure people's beliefs about their expectations of future institution's behaviour (Sitkin, 1995). Thus, safeguards such as regulations, guarantees and contracts build sort of system trust that is based on the efficiency of social norms in diminishing uncertainty and providing secure feelings about the individuals' future (Luhmann, 1991).

Shapiro (1987) claims that above-mentioned institutional safeguards form a sort of structural assurance belief that most likely have the effects on the formation of initial trust towards an organization. Therefore, the process of believing that the situation of an individual is connected with the institutional safeguards makes possible for an individual to believe that his or her situation is trustworthy (McKnight, Cummings and Chervany, 1998). Here, we therefore investigated the effects of institution-based trust on trusting beliefs (see Figure 1). Since structural assurance beliefs are not directly measurable constructs, we operationalized these variables by linking structural assurances with the size of an organization and the form of employment respectively. As indicated above, the variable such as the form of employment is indicative of legal recourse and therefore might be influential on trusting beliefs. Blunsdon and Reed (2003) indicated that organizational factors linked with size, location and type of industry have an impact on generation and its maintenance of interpersonal trust. For example, Dasgupta (1988) claims that trust which an individual has in other's party to fulfil a contract is strictly dependent on the power of an agency. Therefore, we linked the contextual condition such as the company size with one's beliefs about a combination of regulations and guarantees reflecting trust on a group- or organizational-level (McKnight, Cummings and Chervany, 1998).

Taking the above perspective on trust in organization, the main research question in this study was identified as follows: *Does institution-based trust linked with contextual conditions of the organization (company size and the form of employment) affect employees' trusting beliefs*? With regard to this research problem the following hypotheses relating institution-based trust and knowledge-based trust as specified by Paine (2003) were formulated:

1) *Institution-based trust, i.e. the size of an organisation and the form of employment, will affect the component of integrity*.
2) *Institution-based trust, i.e. the size of an organization and the form of employment, will affect the component of dependability*.
3) *Institution-based trust, i.e. the size of an organization and the form of employment, the size of an organization and the form of employment, will affect the component of competence*.

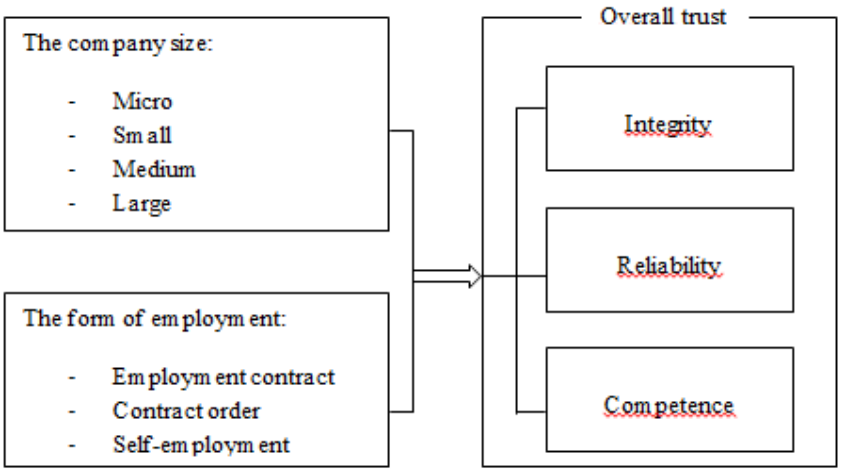

Figure 1: Theoretical model of Formation of Trust in Organization. The contextual conditions of the organizations such as the company size and the form of employment were the independent variables (on the right side). The trusting beliefs of integrity, reliability and competence were dependent variables.

Method

Respondents

One hundred twenty-eight part-time students of psychology at University of Lower Silesia took part in the study. A total of 110 usable questionnaires was further analysed (72 women and 38 men). Selected participants ranged in age from 19 to 50, yet the vast majority in the sample were young people under 30 (84%). All participants completed informed consent forms before the study. The study was approved by the Research Ethics Committee at the University of Lower Silesia, Wrocław, Poland. The survey was conducted in 2020.

Table 1: Sociodemographic characteristics

		Frequency	Percent
Gender	Woman	72	65.5
	Man	38	34.5
Education	Secondary	78	70.9
	Higher incomplete	26	23.6
	Higher	6	5.5
Place of residence	Village	18	1.4
	A city of up to 50,000 residents	16	14.5
	A city from 50,000 to 100,000 residents	24	21.8
	A city of over 100,000 residents	52	47.3

Sociodemographic and structures of employment and organization

The study included employees of micro-sized enterprises, small-sized enterprises, medium-sized enterprises and large-sized enterprise in the population of part-time undergraduates. The criteria for the inclusion in the study considered individuals who worked in various forms of employment: (i) employment contract, (ii) contract order; (iii) a contract of work, (iv) self-employment, (v) managerial, contract. In addition, to address our research questions, we also gathered information on employee population with regard to working time system, a period of employment in the company, position held.

Table 2: The respondents' characteristics as to their employment structure

		Frequency	Percent
The company size	Micro (up to 10 employees)	40	36.4
	Small (up to 50 employees)	18	16.4
	Medium (up to 250 employees)	14	12.7
	Large	38	34.5
The form of employment	Employment contract	72	65.5
	Contract order	34	30.9
	Self-employment	4	3.6
The position held	Managerial	7	6.4
	Specialist	39	35.5
	Worker	36	32.7
	Other	28	25.5
The level of monthly net income*	Up to 1000 PLN	10	9.1
	(1000 – 2000 > PLN	24	21.8
	(2000 – 3000 > PLN	42	38.2
	(3000 – 4000 > PLN	20	18.2
	Over 4000 PLN	14	12.7

**1 PLN equals to 0.23 EURO*

The Questionnaire

The measurement of trust was based on the Trust Measurement Questionnaire (TMQ) (Paine 2003, 9-10). To measure trust, we used 11 items from TMQ survey (see Table 3 for particular items). The items come from three subscales of the original TMQ (Paine 2003, 9-10); in the present study the dimensions of *Integrity*, *Competence* and *Dependability* (*Reliability)* have been applied. The subscale of Integrity measured beliefs that an organization is fair and just. Dependability (Reliability) subscale indicated beliefs that an organization acts in a consistent and dependable manner, while the last subscale of Competence was relevant to measures of beliefs that an organization manifests its competence as being effective, able to compete on the market.

The Polish version of the TMQ was adapted following a back-translation procedure. First, we involved a team of two translators with a psychological and ethical background (one of them was living in English-speaking countries in the past), who were fluent in English and native in Polish, in translating the original version into a single Polish version of the tool. Then, the team of two researchers with deep knowledge in organizational psychology and ethical philosophy and a specialist in the English language being familiar with British and American culture, evaluated all aspects of the translation and reached the agreed version of the items. After the positive evaluation, two bilingual translators made two back-

translations. Next, the team involved in preparing the Polish version of the instrument and evaluated its compatibility with the original. As a result, the content of the back-translations did not depart from the original version.

Table 3: Items to measure Trust including Dimensions of Integrity, Competence, and Dependability/Reliability (Paine 2003)

	Dimension	Item
1.	Integrity	This organization treats people like me fairly and justly.
2.	Integrity	Whenever this organization makes an important decision, I know it will be concerned about people like me.
3.	Integrity	Sound principles seem to guide this organization's behavior.
4.	Integrity	This organization does not mislead people like me.
5.	Dependability	This organization can be relied on to keep its promises.
6.	Dependability	I believe that this organization takes the opinions of people like me into account when making decisions.
7.	Dependability	I am very willing to let this organization make decisions for people like me.
8.	Dependability (Reversed)	I think it is important to watch this organization closely so that it does not take advantage of people like me.
9.	Competence	I feel very confident about this organization's skills.
10.	Competence	This organization has the ability to accomplish what it says it will do.
11.	Competence	This organization is known to be successful at the things it tries to do.

The instructions and procedure were slightly modified as compared to previous studies investigating trust in organizations (see Paine 2003). Participants in the present study indicated their responses on a five-point Likert scale from (0) „Strongly disagree" to (5) „Strongly agree". The five categories were worded as follows "strongly disagree, ... disagree, ... undecided, ... agree," and "strongly agree." The respondents were asked to respond to the items based on the statement "*what you can tell about the company/organization/institution which you work in or cooperate with*".

The reliability of the Polish version of TMQ subscales for Integrity and Dependability was at the satisfactory levels, yielding Cronbach's Alfas of 0.793 and 0.700. In the case of Competence component, the Cronbach's alpha was of 0.274. The items of Competence with the lowest reliability were therefore removed from the data.

Statistical Analysis

The independent variables were groups of respondents categorized on the ordinal scale with the grouping variables such as (i) size of the company, (ii) the form of employment, and (iii) the position held. Separate analyses were conducted for dependent variables which constituted the overall measure of trust as well as each content component of trust measured on TMQ sub-scales. Since the Shapiro-Wilk test indicated that the data did not comply with normality assumption, hypotheses testing was examined using a non-parametric Kruskal-Wallis method. All calculations were done with SPSS software and the significance level of 0.05 was established.

Results

First, we calculated mean ranks based on individual observations for overall trust as well as for two trust components of Integrity and Dependability given the enterprise size, the form of employment, and the position held by the respondents.

Table 4: Effects of the company's size on the employees' perceived trust – Kruskal-Wallis analysis

	Overall trust Mean Rank	Integrity Mean Rank	Dependability Mean Rank
Micro	69.25	70.25	66.73
Small	71.61	68.78	74.33
Medium	34.50	38.36	31.07
Large	41.13	40.00	43.76
	p < 0.0001	**p < 0.0001**	**p < 0.0001**

In the next step, we started investigating dependencies between company size and overall employee's trust with the Kruskal-Wallis statistics. The results are presented in Table 4. In particular, for company size, the non-parametric K-W test showed a significant difference in overall trust across all groups ($p < 0.05$) (Figure 1).

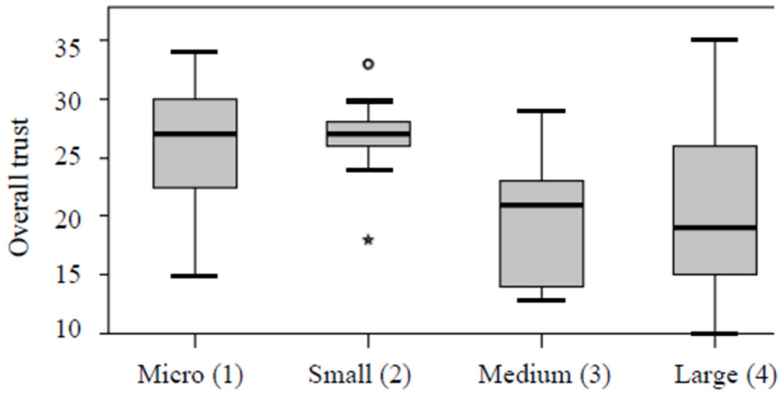

Figure 1: Boxplots with the effects of company size on overall trust perceived in organizations, Kruskal Wallis *p*<0.0001. Not significant difference between Groups 3–4 and 1–2. Significant difference between Groups 3–1, *p*=0.003. Significant difference between Groups 3–2, *p*=0.006. Significant difference between Groups 4–1, *p*=0.001. Significant difference between Groups 4–2, *p*=0.005.

Then, we analysed trust belief components of Integrity and Dependability, separately. For Integrity sub-scale, there was a significant difference between the groups overall (Kruskal Wallis, $p < .0001$). In the boxplots (Figure 2, 3) it can be seen that the most trusted organizations was the micro-sized enterprises (Group 1), and the least trusted organizations were those of a large size (Group 4).

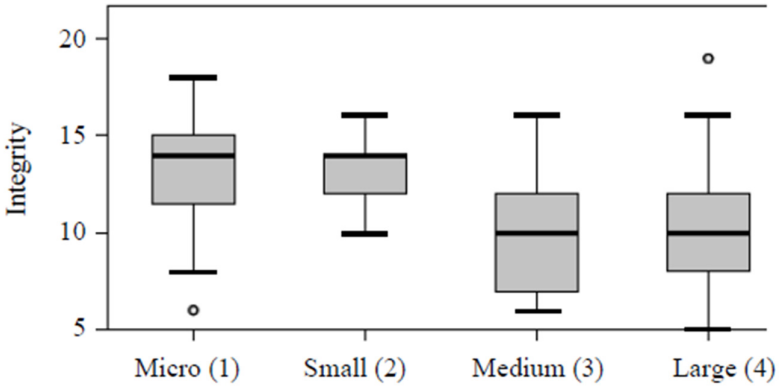

Figure 2: Boxplots with effects of company size on perceived integrity in organization (Kruskal Wallis, *p*=0.000). Not significant difference between Groups 3–4 and 1–2. Significant difference between Groups 2– 3, *p*=0.042. Significant difference between Groups 1–3, *p*=0.007. Significant difference between Groups 2–4, *p*=0.009. Significant difference between Groups 1–4, *p*=0.000.

For Dependability sub-scale, there were also significant differences among all groups (Kruskal Wallis, $p < 0.0001$). Again, the boxplots (see Figure 3) suggested a similar course of the measured trust component, because the highest reliability was declared in micro-sized organizations as opposed to the least trusted organizations, i.e. the large size ones (see difference between Groups 1-3 on figure).

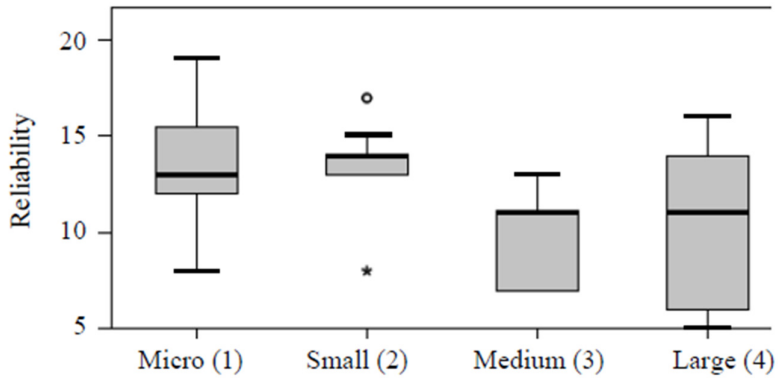

Figure 3: Boxplots with effects of company size on perceived reliability in organization, Kruskal Wallis *p*=0.000. Not significant difference between Groups 3–4 and 1–2. Significant difference between Groups 1–3 and, *p*=0.002. Significant between Groups 2–3, *p*=0.001. Significant difference between Groups 1–4, *p*=0.008. Significant difference between Groups 2–4, *p*=0.005.

Table 5: Effects of employment form on the perceived trust - Kruskal-Wallis analysis

	Overall trust Mean Rank	Integrity Mean Rank	Reliability Mean Rank
Employment contract	50.75	50.43	51.72
Contract order	61.44	62.00	60.38
Self-employment	90.50	91.50	82.00
	p = 0.022	**p = 0.015**	**p = 0.099**

Then, we analysed how the form of employment in an organization might affect trust in the organization. The results are presented in Table 5. There were significant differences for overall trust (K-W $p < 0.05$) and for the single component of integrity ($p<.05$), respectively. For both measures of trust presented in boxplots (Figure 4 and 6), post-hoc analyses indicated that employees trusted companies less when the employment was in the form of a contract as opposed to self-employment (Kruskal Wallis $p=.045$). The analyses of other factors on trust in organizations showed no effect (K-W, $p > 0.05$).

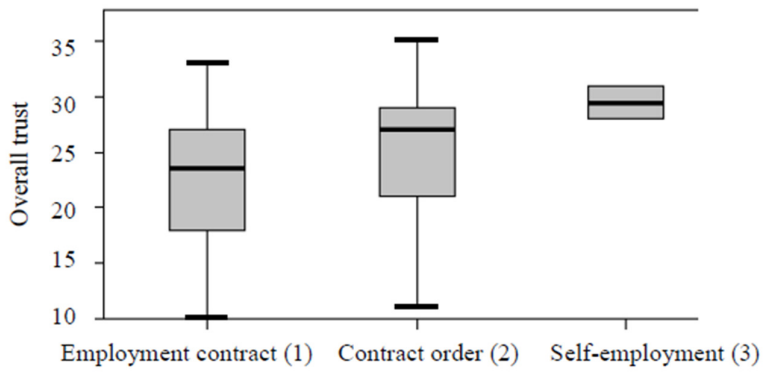

Figure 4: Boxplots with effects of employment forms on perceived overall trust in organization (Kruskal Wallis p=0.022). Not significant difference between Groups 1–2 and 2–3. Significant difference between Groups 1–3, *p*=0.045.

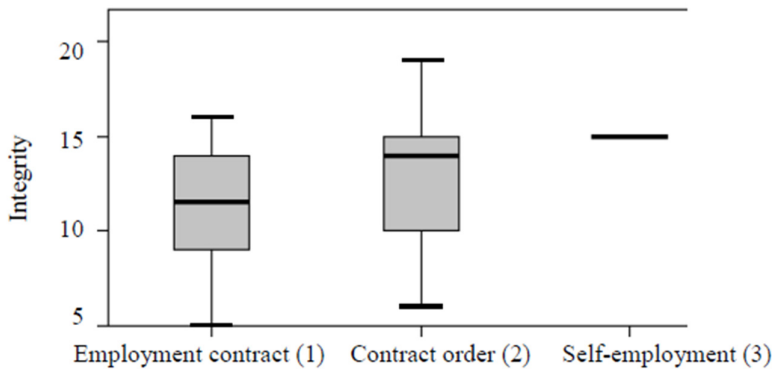

Figure 5: Boxplots with effects of employment forms on perceived integrity in organizations, Kruskal Wallis statistics, *p*=0.006. Not significant between all groups, except of significant between Groups 1–3, *p*=0.035.

Discussion

The present research confirmed the effects of institution-based trust on trusting beliefs. We indicated that institution-based trust affected the components of integrity and dependability. In terms of the organization size, the post-hoc analyses showed that the highest level of trust was displayed by the employees of small-size companies, while the lowest one was a characteristic feature of the large ones: the bigger the company the less trust in it. For the contextual condition of the form of employment, the study showed that the highest level was declared by the self-employed as opposed to contract orders and employment contracts.

The focus of our study was on intra-organizational trust and aimed at identifying "bottom-up" direction of it: at stating and measuring trust exhibited by employees towards the organization, whose structure and actions are, in turn, shaped by the leaders. We accepted trust's culture-rootedness, though it we have not set ourselves the task of relating the results of our research to any specific factors/values of Polish culture. We also admitted both the belief that trust is communication based and the conviction that is dynamic. Similarly, we share the stance that the dynamics of trust largely depends on the actual communication in organization. As to the issue of three-aspect/dimension understanding of trust, our research attempted to access this phenomenon – via survey that explored the employee's trust beliefs of cognitive and emotional aspects as declared in the survey's responses. The dimensions of trust that we employed in order to measure its level and that are relevant to relate it with the organization's size

and the form of employment (the categories that we have distinguished to inspect) are: "competence", "integrity" and "dependability/reliability".

Our study included the contextual factors of the company size and forms of employment to manipulate system trust that is based on beliefs about the effectiveness of social structures in reducing uncertainty and securing feelings about employee's future (Luhman, 1991). The results showed that the efforts of Polish companies in building system trust do not bring expected results in increasing trust in the organization. On the contrary, it seems that for the companies of larger size there is a lack of trust among employees who more likely start to rely on their own dispositional trust within the organization. These effects of institution-based trust on trusting beliefs could be explained at some point by a participant sample that mainly consisted of young adults who in fact have little or no work experience (young adults under 30 age represented 84% of our sample). It seems plausible that young adults usually have no sufficient access to information about company policies and regulations. Therefore, they use their own's distrusting beliefs about the functioning of company and their role in the organisation (McKnight, Cummings and Chervany, 1998), indicating that social structures implemented into the organization to enable an employee to be successful are not possibly in a place. Since young people seem to be feeling relatively unsecure with companies of larger size, entrepreneurs who want to reach a higher stage of trust in their organization should implement set of policies to stimulate interpersonal trust for young employees, for instance, via relationship-oriented culture, consistent induction training, creating opportunities for meeting informally (Six and Sorge, 2008).

Limitations of the study

It should be noted that the Polish version of TMQ questionnaire was applied to population of part-time undergraduates. The authors claim that this was a reason of getting low reliability values of items measuring beliefs of competence in organization as opposed to the American version of the survey. For that reasons, the competence data was removed from further analysis as being uninterpretable. Further research needs to be taken to validate the Polish version of TMQ in broader samples of adult employees.

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Evaluation of Adaptation Process Efficiency: Russian Practice

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Abstract

Personnel adaptation is one of the most important elements in the personnel management system. Adaptation represents an important component of the professional training system and regulates the links between the education system and the production industry. The personnel adaptation measures taken in the organization aim to cover the organization's needs in qualitative and quantitative workforce in order to increase their profitability and competitiveness using minimal costs. Interpretation of the results made it possible to formulate and implement a number of measures to improve the adaptation process within the organization. The practical significance of this work lies in the opportunity of using the developed recommendations for the personnel adaptation process in various organizations.

Keywords: Personnel Management, Adaptation Process, Mentor, Professional Adaptation

Introduction

Experts give a large number of definitions to the concept of adaptation in a wide and a narrow sense, and reduce the essence of the adaptation process to the problems of a certain level – from biochemistry to sociology (Kirina and Khomyakova, 2015). The "adaptation" concept was proposed and justified by such biologists as Jean-Baptiste Lamarck, Etienne Geoffroy Saint-Hilaire and Charles Darwin in the nineteenth century, and was used only in biology, where it was considered as adjustment of organisms to the environment. During the scientific development, the problem of adaptation went beyond the field of biology and started to spread into medicine, social psychology and sociology (Krutsova, 2010). «In general, the concept of adaptation reflects the basic principles that ensure the existence and development of various systems in a certain interaction of the internal and external conditions of their existence.

The variety of the definitions of adaptation builds on the results of research in different fields of science.

In common definitions of the concept of adaptation the researchers working on that problem can give this concept several meanings depending on the examined area (Fig. 1).

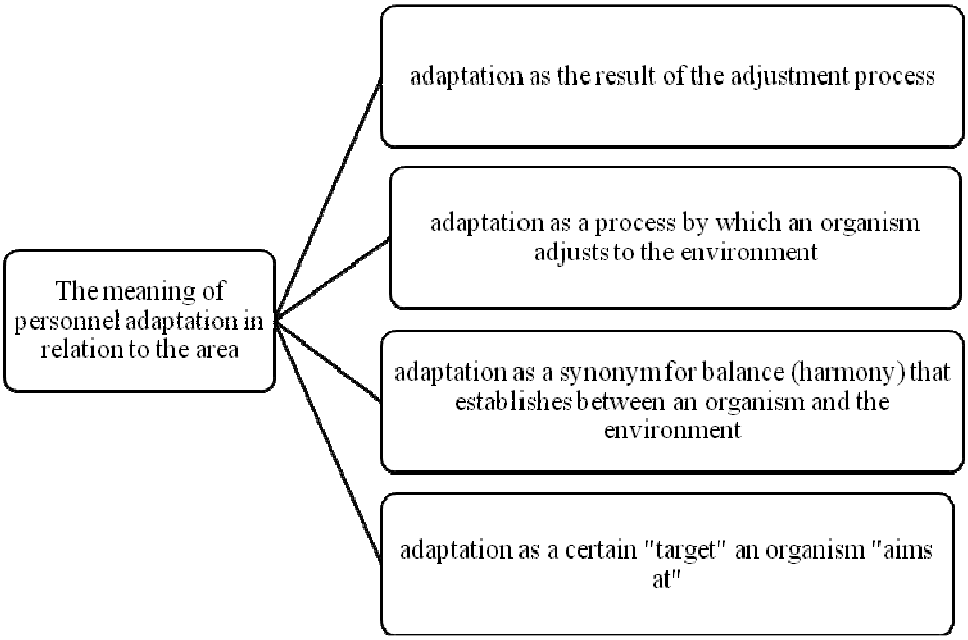

Fig. 1: The meaning of personnel adaptation in relation to the area

Personnel adaptation is a process of introducing an employee to the goals, strategies, colleagues and work of the entire organization; as well as developing the appropriate behavior in accordance with the requirements of the company, in other words, establishing the relations between the organization and an employee at the very first stage of collaborative work. The adaptation goals are represented in Figure 2.

The wide variety of adaptation types depends on the criteria in review» (Krutsova, 2010).

Depending upon the problem solving tactic, the adaptation types can be:

– adaptation of an individual by changing or complete solving an emerging problem or conflict. This is an active and mainly non-protective adaptation. In this case, the resources and mechanisms of adaptation of an individual are activated to build a real social situation; at this time the individual experiences insignificant and mostly positive changes (obtaining new skills and knowledge);

– adaptation of an individual by avoiding a problematic situation. This is a so-called “passive” adaptation that leads to searching for new strategies, which are more favorable for the individuals’ safety and for meeting their needs. In this case the individuals experience the most significant changes, however, many of them do not affect human self-actualization and self-improvement;

– adaptation that preserves a problematic situation and adjusts to it. This adaptive strategy is implemented either by changing a person’s perception and interpretation of this situation, in other words, by creating its positive subjective image, or by means of the most serious changes in human personality, first of all in its Self-concept.

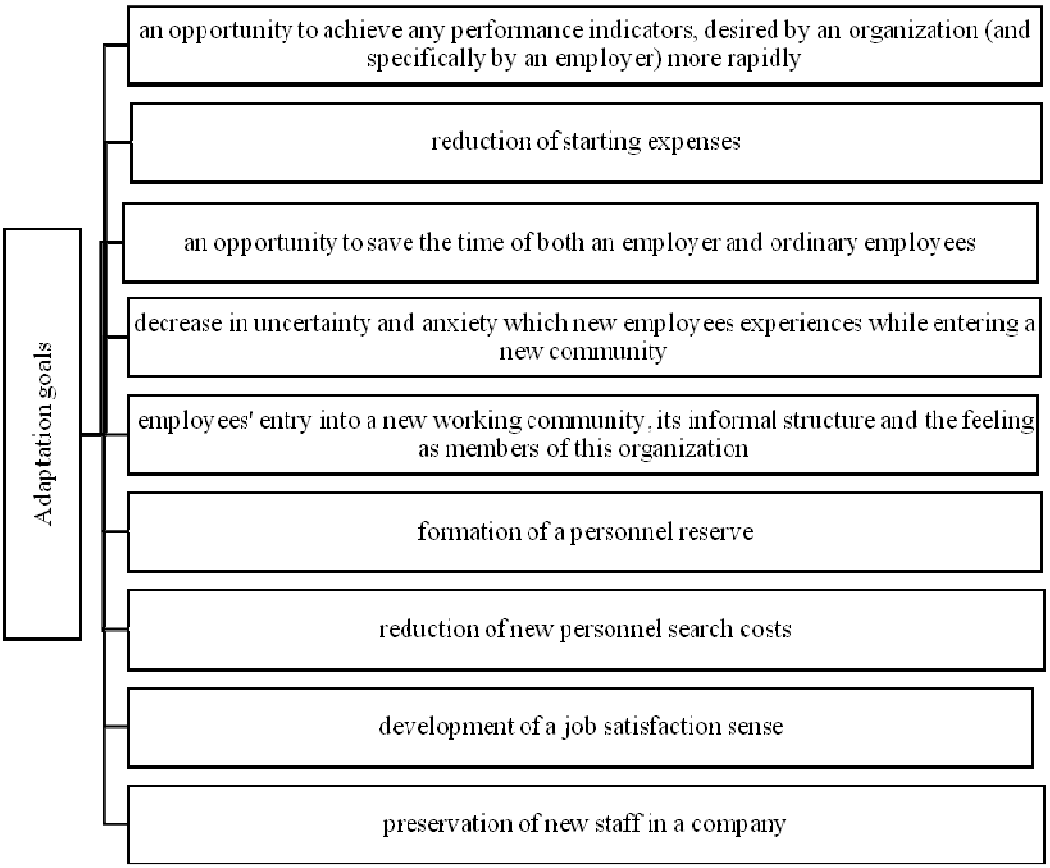

Fig. 2: Personnel adaptation goals

There is also another classification that includes external and internal adaptation.

External adaptation is an adaptation process in which an individual adjusts to external objective problematic conditions (by maintaining or eliminating a problematic situation).

There are several types of internal adaptation:

– adaptation that aims at resolving various internal conflicts and other internal personal problems (Pushkareva and Sudorgina, 2012);

– structural adaptation in the narrowest sense. This is a process of coordinating a separate mechanism of the human organism with already formed mechanisms, in combination with which it will constitute a complex;

– structural adaptation in a general sense. This is an adaptation process of a separate mechanism or a complex of mechanisms to the general personality structure (Bykova, 2008);

– according to the subject-object relationship, adaptation can be active and passive. Active adaptation is a desire of an individual to have an impact on the environment in order to change it. Passive adaptation has the opposite meaning – this is a lack of any desire to change the environment.

According to the employee exposure criteria, adaptation can be progressive and regressive (Esikova, 2017).

Progressive adaptation has a positive effect on a person, whereas the regressive type has a negative effect.

Depending on the adaptation level, there is primary and secondary adaptation. Primary adaptation involves a new employee who does not have any work experience, whereas secondary adaptation implies adjustment of new employees who already have it. Within secondary adaptation, there are two subtypes as well: employee's adaptation in a new position and to the demotion.

All adaptation types are closely interrelated and represent an integrated system, but the value of separate types is not the same (Fig. 3).

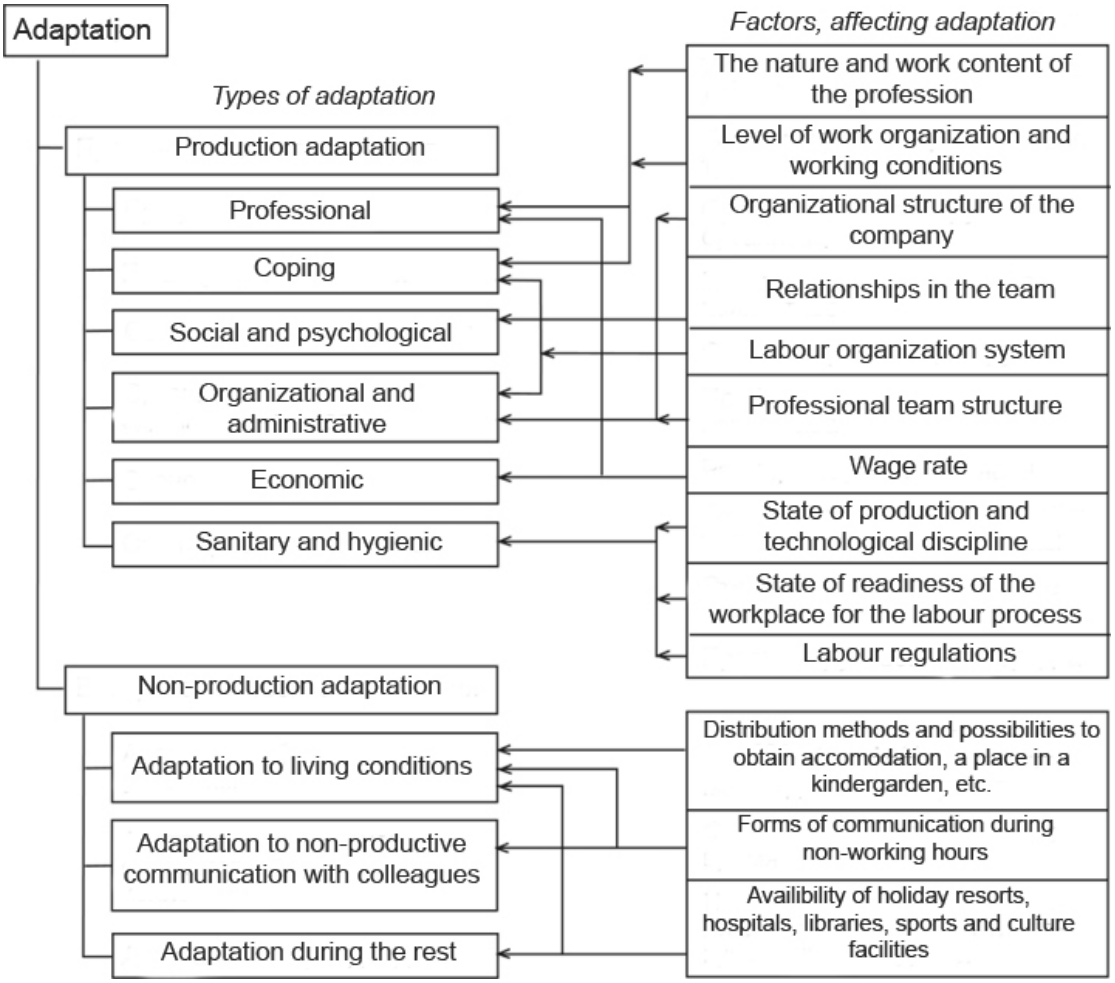

Fig. 3: Classification of adaptation types

The adaptation mechanisms can be divided into:

– social imagination, which is an ability to determine one's own experience and destiny by imagining (dreaming), i.e. to put oneself mentally into the real framework of any period of society development and realize one's capabilities;

– social intelligence, which is an ability to identify complicated relationships, processes and dependencies in a particular social environment;

– realistic perception;

– orientation on what is proper.

Protective mechanisms represent a system of human adaptation reactions that allows to reduce anxiety and ensures the integrity of "Self-concept" as well as steadiness of self-esteem by understanding the relations between one's ideas about the world and about oneself.
There are four main adaptation types during the adaptation process (Fig.4):

– negation. It occurs when an employee protests against the company's values, and their expectations exist in contradiction with reality. As a rule, such employees leave the job in a couple of months;

– conformism. It occurs when an employee fully accepts the company's values, norms and rules, and is ready to obey any "rules of the game". Generally, these employees represent the bulk of the team;

– adaptative individualism. In this case, newcomers agree with the company's basic values, however, they have some rejection of the secondary norms and values;

– mimicry. A new employee complies with the secondary norms but does not accept the basic ones. This type is mainly characteristic of a potential risk group, the participants of which can leave their company in any moment. The employees maintain a certain level of individualism, but still work well in a team (Kaznacheeva and Repina, 2015).

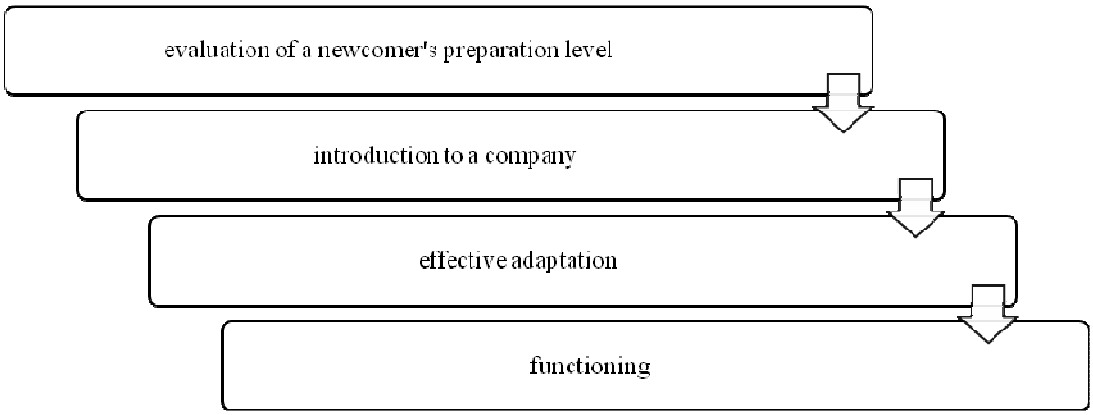

Fig. 4: Stages of the adaptation process

Based on the research literature, the four main sides of a new employee's adaptation process in a new team can be divided into organizational, coping, social and psychological, and professional.

Professional adaptation is an active development of skills, techniques and nuances of a new profession.
Coping involves adaptation to labour activity by physiological changes.

Social and psychological adaptation involves networking within a team, introduction to its values, norms and traditions.

Economic adaptation implies adjusting to the earned revenues and methods of income generation.

Express adaptation is also considered one of the adaptation types, which represents a short stage in the initial period of an employee's work in a company.

The adaptation process includes four stages: evaluation of a newcomer's preparation level, introduction to a company, effective adaptation and functioning. At the first stage, it is more desirable to use such instruments as proprietary documents, introductory workshops and instructions.

The second stage is orientation, which is an introduction of a new employee to their duties and a company's requirements. It is also called "orientative" and involves a strong reaction or a certain tension of all the human organism systems in response to a common set of some new external stimuli. This so-called "physiological storm" can last approximately for two-three weeks, or even more.

The third stage is effective adaptation. This stage involves an employee's adjustment to their new status and provides their incorporating to a team. At this point, it is important for colleagues and directors to provide the fullest support to a newcomer, and regularly evaluate the efficiency of their activity and the features of interaction with their team (Zelenskaya, 2016).

This stage can also be called unstable accommodation as it represents a search of the body for any optimal response to these effects. However, it must be taken into account that at the first stage of adaptation the human body uses (and sometimes it even "borrows") all the accumulated resources, so the body resource saving is out of the question. But at the second stage the consumption of the human body resources decreases and "the storm" slowly stops.

The last stage is functioning. It implies overcoming all the production and interpersonal challenges and transition to stable work. At this stage, it is necessary to monitor an employee's work in order to reduce the adaptation period to ensure the financial benefits for the company. During this time, the human body finds the most convenient responses to certain pressures that require less stress of the body systems.

There are a great number of reasons to create comfortable conditions for an employee's adaptation, and that should be done with the help of adaptation programmes.

All adaptation programmes must solve the following problems:

– reducing the work period of an employee to reach their planned productivity level more rapidly;

– normalization of warm relationship within a team, i.e. creating interpersonal relations that exclude conflicts, aggression, envy and other types of hostility. This can significantly eliminate the amount of the time lost for resolving conflict situations;

– reducing staff turnover. Dismissal of an employee entails the costs of new staff recruitment. Therefore, an employer spends more time and money on adaptation of a newcomer;

– raising self-confidence. If employees are bolder and more confident in the workplace, they perform much more efficiently. As during this period the stress level is quite high, it can lead to some professional mistakes uncharacteristic of this specialist in comfortable conditions, which results in decreased performance of an employee.

Today companies rarely use adaptation programmes, despite the fact that the result of staff adaptation has an impact not only on cost savings in terms of staffing, but also on better motivation and loyalty, taking into account the positive effect after the starting period of an employee's adaptation in a company. If the actions of a personnel service are right, companies do not have any problems with an employee turnover. Consequently, efficient adaptation of a new employee affects the economic and financial indicators of a company, and also serves as a measure of success of a personnel service work.

An adaptation programme can be developed and implemented not only by a personnel service in a company, but by some recruitment agency as well. It is important to understand that nowadays an employer should both attract employees by providing a good salary and retain them by creating a psychologically comfortable atmosphere. Generally, personnel adaptation takes time equal to the probation period of a new employee. In that case, newcomers check their abilities at work, whereas companies test personnel adaptation programmes.

Adaptation programmes are necessary for full functioning of a company. Each organization develops their own programmes, which are usually general and individual ones. General programmes are developed for the whole company, whereas individual ones - for a particular work unit or department.

Adaptation process has a complicated structure which includes the following constituents: acquisition of professional knowledge and skills, acquisition of professional role, meeting the requirements of different spheres, satisfaction from the job content, an interest to the job, desire of improvement in a chosen profession, awareness, psychological comfort and safety, sense of fairness of exchanges, mutual understanding with administration.

Adaptation process management is an active influence on the factors that presuppose the course and timing of adaptation, as well as reducing negative consequences that arise in this process.

The basis of the adaptation management process is a certain technology, which includes a specific approach to each employee, evaluation of one or another side of adaptation for particular conditions of the production environment, development of appropriate measures to facilitate the process.

The need for adaptation management is predetermined by the chance of the maximum damage to both the organization and employees, which has been proven by the experience of domestic and foreign enterprises and companies.

The information about how the process of a new employee's adaptation is organized in a company can say a lot to the company, including the development level of a team, its unity and internal integration.

Notably, the largest companies attach high priority to such an important process as adaptation, as their future will mostly depend on it.

Methods

The theoretical basis of this study is represented by the results of scientific and practice-oriented research in the field of personnel management and particularly in the sphere of personnel adaptation, by the works of psychologists and executives, devoted to the problems of adaptation process research and its role in modern companies.

For the first time, questions of adaptation of the individual to the social environment are present in the works of Z. Freud and G. Gartman. Psychological aspects of personality adaptation were addressed in the writings of G. Eisenk, A. Maslow, L. Colberg, C. Cooley, R. Linton, J. Piage, E. Fromm, T. Shibutani.

The methodological basis of the sociological approach in the study of adaptation problems is M. Weber 's theory of social action.

The social and managerial foundations of the problems of staff adaptation in are covered in the works of N. Archapov, T. Bazarov, V. Vesnina, V. Volina, V. Dyatlov, B. Eremina, A. Ignatiev, A. Kibanov, E. Kohanov, Yu. Kuznetsov, E. Maslov, M. Meskon.

In relation to this article, the object of study is the largest vertical agricultural holding in Russia. The total number of respondents is 3000 persons. At the moment, it occupies the leading positions in sugar production, pig breeding, crop production and the oil and fat manufacturing. In all business areas the group is actively introducing the newest world technologies both in terms of equipment and management practices.

In order to identify the problems and develop the recommendations for the personnel adaptation process improvement, there was performed the diagnostics of the personnel adaptation system efficiency, which consisted of 3 stages:

– defining the level of employees' satisfaction with the adaptation process and with the organization in general;

– defining the level of employees' alienation;

– staff turnover evaluation.

The first step aimed at defining the level of employees' satisfaction. To define the level of satisfaction there was conducted a survey.

The second stage of the diagnostics aimed at defining the level of employees' alienation (Esikova, 2017) with the help of the "Evaluation of professional alienation" questionnaire. The respondents were asked to read the statements and evaluate how these statements correspond to their condition, and after that, the responses of the survey participants were compared with the key to calculate the results. Each answer that matched the key was worth 2 points, the answers "conforms partially" were worth 1 point. The more points people had, the higher was the level of alienation, and, therefore, the lower was the level of employees' adaptation.

The third step of the diagnostics of personnel adaptation system aimed at staff turnover evaluation.

Systematization of the achieved results made it possible to evaluate the efficiency of the personnel adaptation system and identify existing problems.

Results and Discussion

The analysis of the questionnaire results showed that the degree of the employees' satisfaction with the adaptation process is high, so the adaptation system can be considered acceptable.

The respondents' answers made it clear that new employees are given enough attention, as the adaptation period takes no more than 6 months.

Only 20% of the respondents need readaptation, i.e. a number of measures aimed at adjustment to the environmental conditions at one level or another (Fig. 5). This demonstrates the minor defects of the adaptation system.

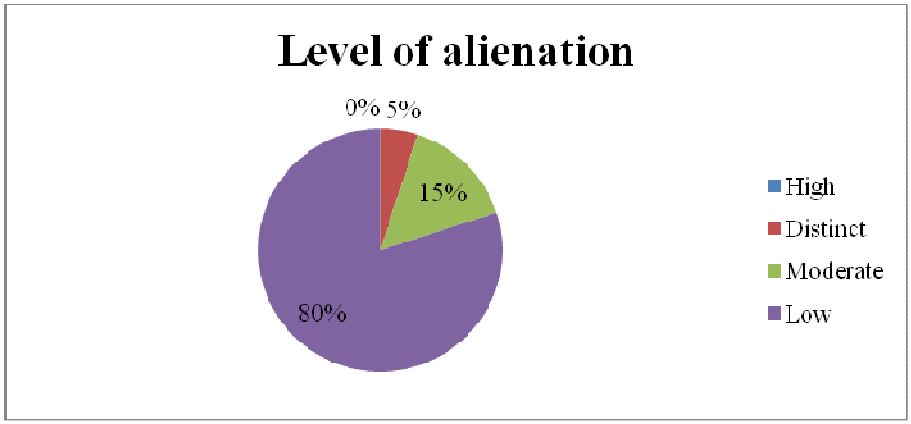

Fig. 5: Level of employees' alienation

The analysis of staff turnover indicators for the last three years showed that the number of employees who quit during the adaptation period changes every year, but does not exceed the minimum limit.

This is due to the fact that newcomers face with some difficulties in obtaining precise information about the company, where and how they can find some help, and also with conflicts between colleagues.

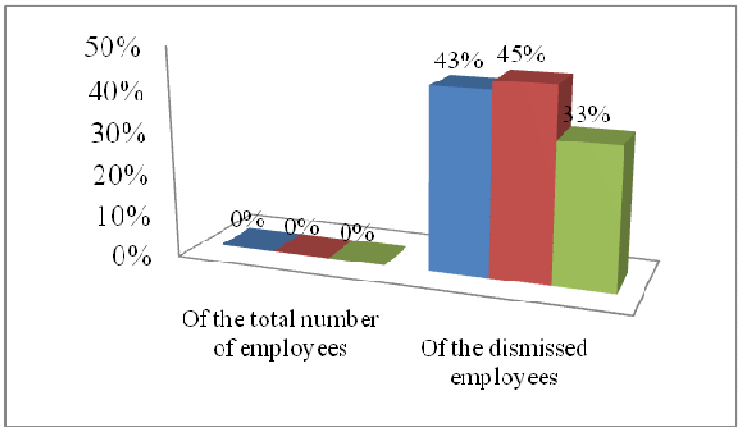

Fig.6: The dynamics of staff turnover during the adaptation of workers in the company.

Having compared the results of the conducted research, we can draw the following conclusions: the adaptation process in the company goes well, but during the analysis it was revealed that it has some disadvantages that have a negative effect on the adaptation process in general, as well as on the indicators and the development of the company. Insufficient attention is paid to such stages of adaptation as effective adaptation and functioning, as well as to such type of adaptation as social and psychological adaptation. And the conflicts between the mentor and newcomers in the process of mentoring method implementing can have a negative effect on the adaptation process and on the organization, too.

Recommendations

The conducted research and analysis of the adaptation process allowed us to define the directions to improve the process:

to improve the stages of the adaptation process it is necessary:

– to ensure feedback at the stage of effective adaptation

– for managers to regulate the adaptation process of a new employee by designing certain documents “Adaptation Plan” and “Task List” at the stage of functioning.

2) to improve social and psychological adaptation, it was proposed to conduct teambuilding events that could enhance the social-psychological climate in the team.

3) to regulate the conflicts between the mentor and new employees, as well as to increase the interest and efficiency of mentoring methods it was proposed to:

– introduce an entrance test (character test) for both mentors and newcomers to resolve the conflict between them;

– hold an annual contest “Best mentor of the company”.

Consequently, implementation of proposed recommendations can contribute to solving the problems that arise in the process of adaptation in the company, and can also improve the quality of that process.

Conclusions

As can be seen from the above, personnel adaptation is an essential element of the personnel management system.

Personnel adaptation is a process of “initiation” of a new employee to the work of a company by using special techniques and methods.

The classification of the process is diverse. All adaptation types are closely interrelated and represent an integrated system, but the value of separate types is not the same.

Adaptation process includes four stages: evaluation of a newcomer’s preparation level, introduction to a company, effective adaptation and functioning.

Adaptation process has a complicated structure which includes the following constituents: acquisition of professional knowledge and skills, acquisition of professional role, meeting the requirements of different spheres, satisfaction from the job content, an interest to the job, desire of improvement in a chosen profession, awareness, psychological comfort and safety, sense of fairness of exchanges, mutual understanding with administration.

The basis of the adaptation management process is a certain technology, which includes a specific approach to each employee, evaluation of one or another side of adaptation for particular conditions of the production environment, development of appropriate measures to facilitate the process.

The interpretation of the obtained study results showed that the way the process of a new employee's adaptation is organized can say a lot about the development level of a team, its unity and internal integration.

Further observations of this adaptation process, as well as surveys conducted with employees, confirmed the results.

As a result of the research and implementation of the proposed measures, the following problems were solved:

– to reduce the entry period for new employees in the company;

– to establish a positive attitude towards the company and its current rules and standards among new employees, and to develop skills for applying corporate standards in work situations;

– to increase staff awareness of the company's market position, its mission, goals, and history, and "educate" this trait as a characteristic of the company's corporate culture;

– to ensure that employees are familiar with the company's procedures;

– to increase the motivation of employees.

The measures proposed by the authors are effective and can be implemented in other enterprises to improve the process of personnel adaptation.

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Tools to Promote Smoking Cessation in The Workplace

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Abstract

The purpose of the study was to develop an incentive program to encourage employees to quit smoking. The authors developed a four-stage program. The first step is to find out how many employees smoke in the workplace and identify what made them nicotine-addicted. At this stage of the program, it is planned to install cigarette smoke detectors, introduce video surveillance and control systems, to conduct questionnaire surveys to identify the causes of smoking and provide the employees with the psychological assistance they need. At the second stage it is essential to implement incentive measures (incentive pay to those employees who lead a healthy lifestyle). At the third stage, it is proposed to introduce a system of penalties for smoking during working hours by means of reducing the monthly performance-based incentives and introduction of long working hours. The fourth stage implies continuous monitoring of the implementation of incentive measures and the system of penalties. After this program was tested, it proved to be economically and socially effective.

Keywords: Personnel Management, Healthy Lifestyle, Promoting A Healthy Lifestyle For Employees

Introduction

Tobacco smoking results in many chronic diseases that cause significant economic damage to the organization. According to the expert data presented in the public domain, if in the company there are 15 employees who have 4 five-minute smoke breaks during the working hours, the firm loses almost 150,000 rubles per month (an average salary is 30,000 rubles per month).

In 2019, an average salary was 43,700 rubles, which means that the loss of the company was as much as 218,500 rubles per month. According to the study conducted by the Higher School of Economics, the smoking employees are 9 % more likely to fall ill and take a sick leave than non-smokers. Also, it takes smoking workers over the age of 35 longer to recover. Non-smokers often work more efficiently than those who smoke.

The labor productivity depends on how much an employee smokes: the labor productivity loss caused by the employees who smoked one pack of cigarettes a day was as much as 75% compared with the

labor productivity of non-smokers. Preventive programs lead not only to financial investment return, but they also contribute to the creation of a healthy microclimate in the team, social cohesion, and a healthy working atmosphere. Prohibitive measures turn out to be the most effective. Thus, it is advisable to use an integrated approach based on systematization, generalization and ordering. Applying these methods, a company can significantly increase its labor productivity.

Methods

The experiment that was carried out in one of the service businesses in Tambov region became a methodological basis for the study and development of a program to promote smoking cessation in the workplace. The methodology relies on the consistency of the proposed motivation program in terms of labor legislation. The implemented tools within the framework of the system for promoting a healthy lifestyle and the application of penalties do not contradict the Labor Code of the Russian Federation and are regulated by internal local regulatory acts of the organization.

The introduced system of long working hours does not contradict labor legislation, since it is not about working overtime, but it implies that the working time lost due to smoking is to be recovered. The implemented monitoring and diagnostics system does not contradict either the Federal Law "On Fire Safety" dated December 21, 1994 No. 69-ФЗ, or the local acts regulating enterprise safety issues. Furthermore, there are no patented smoking cessation programs, registered in Rospatent (Russian Federal Service for Intellectual Property, Patents and Trademarks).

The experimental project was to be implemented within one year; it was aimed at 15 smoking employees; the total number of the employees was 20; the average salary was 18,000 rubles; initially, the average number of smoke breaks was 8; one smoke break lasted for 5 minutes; the room area was 162 m^2. The empirical base of the study and conduct an analysis does not need to be differentiated according to the category of employees (worker, specialist, manager). Because the tools presented are suitable for all categories of employees in the enterprise and have the same influence on them with the same efficiency.

The project was economically justified on the basis of income and expenditure budget (Table 1, Table 2) within the framework of implementation of smoking cessation program.

Table 1: the expenditure budget related to the period of implementation of smoking cessation program

№	Item of expenditure	Cost per 1	Quantity	Total
1	Smoke sensors of special sensitivity	20000 rub/pie	9 pieces (one sensor per 18 m^2)	180000
2	Surveillance cameras	33000 rub/pie	1 piece	33000
3	Questioning	500 rub/hour	4 hour (15 min. for 1 employee)	2000
4	Services of the psychologist (outsourcing)	1000 rub/hour	15 hours during the project	15000
5	Incentive payments to non-smoking employees (by phase) *	2880 rub/hour	5 person*1 month	14400
		2880 rub/hour	10 person *3 months	86400
		2880 rub/per	14 person *1 month	40320
		2880 rub/per	18 person *7 months	362880
	Total			**734000**

* the average monthly salary is 18,000 rub; the incentive pay is as much as 30% (6,000 rub). A non-smoking employee gets 2% of the incentive pay per day (120 rubles per day or 2880 rubles per month(there are 24 working days in a month).

** There were no penalties for smoking in inappropriate places within the period the program was implemented. When the program was launched, there were 15 smoking employees in the company. They made 8 smoke breaks a day. The fine for the first smoke break was as much as 60 rubles (900 rubles in total). The fine for the second smoke break was 72 rubles (1080 rubles in total). The fine for the third smoke break was 78 rubles (1170 rubles in total). The fine for the 4th-8thsmoke breaks was 90 rubles for each (6750 rubles in total). In total, each day the fine was as much as 9900 rubles.

Table 2: the income budget related to the period of implementation of smoking cessation program

№	Item of income	Cost per 1	Quantity	Total
1	Losses from smoking	0,465 rub/min [1]	40 minutes a day per person	68913[2]
2	Smoking penalties (by program phase)	9900 rub/day **	10 working days	99000
		9900 rub/day ** 4800 rub/day ***	24 working days 72 working days	237600 345600
		4800 rub/day *** 600 rub/day ****	24 working days 118 working days	115200 70800
	Total			**937113**

*** After the implementation of the second stage (by the end of the first month the incentive measures were introduced), five employees quit smoking. Within the first month of implementation of incentive measures the employees were fined 9900 rubles per day (in total) for smoking. There were 10 employees who continued to smoke (within the next three months). They had6 smoke breaks per day. The fine for the first smoke break was as much as 60 rubles (600 rubles in total). The fine for the second smoke break was 72 rubles (720 rubles in total). The fine for the third smoke break was 78 rubles (780 rubles in total). The fine for the 4th-6thsmoke breaks was 90 rubles for each (2700 rubles in total). In total, each day the fine was as much as 4800 rubles.

**** After the implementation of the third stage (by the end of the first month the system of penalties was introduced), four employees gave up smoking. Due to the introduction of penalties, the employees were fined 4800 rubles per day (in total) for smoking. Within the next three months, 4 employees gave up smoking. Within the last three months of the program implementation there were only two smoking employees who had 4 smoke breaks per day. The fine for the first smoke break was as much as 60 rubles (120 rubles in total). The fine for the second smoke break was 72 rubles (144 rubles in total). The fine for the third smoke break was 78 rubles (156 rubles in total). The fine for the 4th smoke break was 90 rubles (180 rubles in total). In total, each day the fine was as much as 600 rubles.

The program was implemented within the period of one year. The expenditures were as much as 734,000 rubles while thereceipts were 937113 rubles. Thus, the economic efficiency was as much as 1.27 for each ruble invested. It was also effective from the social point of view, as more employees started to lead a healthy lifestyle. Thus, the employees had a better state of health and good workplace microclimate.

Results and Discussion

Implementing the above-mentioned stages, the authors put forward a program aimed at smoking cessation in the workplace. This program includes four stages.

Stage 1 –identifying the number of the smoking employees and the causes of smoking.

[1] With annual production of 1,100,000 rubles. Based on the work of 20 people. 118200 minutes at 40 hours working week - 1970 hours (Working time standards in 2018 [Electronic resource]. – Access mode: http://www.consultant.ru/law/ref/calendar/proizvodstvennye/2018/ [in Russian]

[2] Based on 247 working days per year.

At this stage the following measures have to be taken:

- installation of AR01-12M cigarette smoke detectors. These tools are the first to be employed and they have to be used as long as the program is implemented. They are aimed at preventing the employees from smoking in inappropriate places. Detectors help to monitor the level of cigarette smoke indoors. They are also used to analyze the air quality in the workplace. If the air gets polluted with cigarette smoke, the detector goes off. The detector consists of open and closed contacts, an optoelectronic relay (100V 0,1A) and two red LEDs. In addition, if necessary, a built-in buzzer can be used. The high sensitivity smoke detectors are installed in the places where employees are likely to smoke (staircases, WC, corridors). The process of work of the detectors is monitored by the employee responsible for fire safety. In case the detector goes off, a formal note is taken which is later used alongside with the recordings made by the video surveillance systems to impose disciplinary sanctions in accordance with Article 192 of the Labor Code of the Russian Federation (the fine for a first offense is 1000 rubles, while the fine for a second offense is 1500 rubles);

- the in stallation of video surveillance and control systems. These systems are introduced within 2 week sand they have to be used as long as the program is implemented. At this stage the goal is to identify the total number of smoking employees and to determine how much working time is lost due to smoke breaks. The video surveillance and control system includes two components. Firstly, surveillance cameras (with a facial recognition system) are in stalled in smoking areas to identify the employees. Secondly, in smoking are as there should be access control systems (electronic identification cards are used to monitor how long each employee spends at work) to identify the smoking employees and determine how much working time is lost due to smoke breaks. All the information is dealt with by the personnel manager responsible for the implementation of the program and later a psychologist consults the smoking employees. The information received via the access control system is also dealt with by the personnel manager responsible for the implementation of the program, who finds out who many employees smoke and how many smoke breaks they make. This diagnostic system is aimed at systematization of information on the number of smoking employees at the moment the program is launched and the information on how much working time is lost due to smoke breaks;

- a question naire survey carried out by a psychologist who collects and processes data. At this stage it is crucial to identify the causes of smoking and if needed the psychologist has to consult the employees who cannot quit smoking. The questionnaire was developed by the staff of the Department of Therapy, Cardiology and Functional Diagnostics of the Ministry of Health and Social Development. The authors made some changes in the questionnaire to accurately identify the causes of smoking.

Questionnaire "Causes and level of nicotine addiction"

We would like to identify the level of your nicotine addiction. Could you please read the questions carefully and then tick or write your answers that reflect your personal position about the problems mentioned in this questionnaire? Thank you for your participation.

1. How often do you smoke?
    - To 10
    - 10-20
    - 20 or more
2. How many years have you been smoking? _____
3. When did you smoke the first cigarette?
    - Up to 14 years old
    - 14-20 years
    - Over 20 years old
4. Why did you start smoking?
    - Because friends smoked
    - Because parents smoked
    - Because the older brother or sister smoked

- To change your image
- Due to problems at study, work, family
- To look older
- I do not know
- Another _____

5. How many cigarettes do you smoke at work?
- Rarely, 1-5 cigarettes a day
- Often, 6-10 cigarettes a day
- Very often, more than 10 cigarettes a day

6. If Give the main reason for which you do not want or you cannot leave off smoking? _____

7. Do you feel more cheerful when you smoke?
- Sometimes
- Often
- From case to case
- Seldom
- Never

8. Do you like the smell of tobacco?
- Yes
- No
- I find it difficult to answer

9. Do you smoke when you need to focus and pack?
- Sometimes
- Often
- From case to case
- Seldom
- Never

10. Do you think that with smoking you can find new friends and it is easier to maintain social contacts?
- Yes
- No
- I find it difficult to answer

11. Does smoking affect your workflow?
- Yes, affects
- No, does not affect
- Did not notice similar
- Other

The questionnaire survey is carried out by a psychologist after the video surveillance and control systems are installed. It takes each employee 15 minutes to answer the questions. The information on the number of the employees who are potentially willing to quit smoking on their own is provided to the personnel manager responsible for implementing the program. Then the manager decides which additional incentives should be introduced;

- psychological assistance according to the results of the question nairesurvey. The psychologist consults the smoking employees as long as the program is implemented. The psychologist can consult both the employees who make their first attempt to quit smoking and the employees who have already made such attempts before. At this stage employees should be encouraged to give up smoking. They need to learn to deal with stressful situations at work and in their personal life. After processing the results of the questionnaire survey, the psychologist figures out which psychological assistance the employees need. For example, an automated advisory system "Quit Smoking Treatment, could help to cope with nicotine addiction.

<u>Stage 2 - implementation of incentive measures.</u>

This strategy involves the introduction of additional incentive measures alongside with performance-based incentive pay. At this stage the goal is to promote smoking cessation in the workplace by means of additional incentives. The employees are offered incentive pay if they refrain from smoking for one full day. This stage is to be introduced within 4 months. Additional incentives (2% of the salary) are offered to those employees who lead a healthy lifestyle (do not smoke). The employees are awarded this way at the end of each month after the program is launched. To get additional payments, the employees must have no smoke breaks at work, which is controlled by the video surveillance system.

Stage 3 - the implementation of the system of penalties.

This system involves two tools introducing a ban on the employees who smoke during working hours:

- firstly, the employees who have smoke breaks during working hours will be fined (the monthly performance-based incentive pay will be reduced). At the end of every work day the head of the department analyzes the data received via the video surveillance and control system that was introduced at the first stage of the program and calculates the total amount of fines (which is cumulative). The fine for the first smoke break is as much as 1% of the performance-based incentive pay. The fine for the second smoke break is1.2%. The fine for the third smoke break is 1.3%. If the employee has the 4th smoke break etc., the fine rises up to 1.5%;

- secondly, the system of penalties should introduce long working hours to recover the time the employees lose when they have a smoke break. This measure is taken as soon as the amount of fines is as much as the monthly amount of performance-based incentive pay. The employees start to work longer hours after the manager processes the data received via the access control system which was introduced at the first stage of the program (electronic identification cards are used to monitor how long each employee spends at work).If the employee has one smoke break, his/her work day gets 5 minutes longer and he/she will have to work overtime. A second smoke break prolongs the work day by ten minutes, a third smoke break adds twelve minutes to working overtime; whereas each subsequent smoke break prolongs the work day by15 minutes. The implementation period of this stage takes four months. It is aimed at motivating 100 % of the employees to quit smoking in the workplace.

At this stage the goal is to urge all the employees to give up smoking by means of the system of penalties.

Stage 4 - continuous monitoring of the way the incentive measures are taken and the system of penalties is introduced.

It is essential to control the process of promotion of the smoking cessation program, to timely make necessary changes and to ensure the coordinated and effective implementation of all program stages. The process of continuous control over the employees' activities in the work place is aimed at prevention of smoking during the working hours. It is realized by means of cigarette smoke detectors, video surveillance and control systems which were installed at the first stage of the program. To control the employees, the incentive system is introduced, and the system of penalties stimulates the employees to completely stop smoking. If the employees manage to give up smoking, the incentive pay will be offered to them on a regular basis. If new employees are hired, this program starts from the first stage. If the employees start smoking again, it is advisable to use a questionnaire to identify the reasons for that and to provide psychological assistance to them, since it might be connected with certain psychological problems and stressful situations.

Conclusions

The novelty of the study consists in the development of a smoking cessation program, which differs from the programs introduced before. It includes a number of stages implemented in strict sequence; in addition, a different set of tools is employed. The program promoting smoking cessation is effective for companies of any type. It consists of the following stages (Table 3).

Table 3: smoking cessation program for employees

Stage of program implementation	**Tools**	**The period of implementation**	**The ways the tools are employed**	**Results**
Stage - identifying the number of the smoking employees and the causes of smoking. At this stage the goal is to find out how many employees smoke in the workplace and what made them nicotine addicted.	Installation of AR01-12M Cigarette Smoke Detectors The goal is to prevent smoking in inappropriate places.	Introduction– within 2 weeks after the program is launched. Implementation period - on a constant basis.	The high sensitivity smoke detectors are installed in the places where employees are likely to smoke (staircases, WC, corridors).	Preventing the employees from smoking in inappropriate places
	Installation of video surveillance and control systems. The goal is to identify the total number of smoking employees and to determine how much working time is lost due to smoke breaks.	Introduction -within 2 weeks after the program is launched. Implementation period - on a constant basis.	The video surveillance and control systems are introduced: - surveillance cameras (with a facial recognition system) are installed in smoking areas to identify the employees. - access control systems (electronic identification cards are used to monitor how long each employee spends at work) are installed in smoking areas to identify the smoking employees and to determine how much working time is lost due to smoke breaks.	Systematization of information on: - the number of smoking employees at the moment the program is introduced; -how much working time is lost due to smoke breaks.
	Conducting asurvey. The goal is to identify the causes of smoking and to offer psychological help to the employees who cannot quit smoking.	Introduction - a month after the program is launched. It is to be carried out only once.	A psychologist carries out a questionnaire survey (on the basis of the adapted questionnaire which was initially developed by the staff of the Department of Therapy, Cardiology and Functional Diagnostics of the Ministry of Health and Social Development) and processes personal data.	Systematization of information on the number of the employees who need psychological help to quit smoking.
Stage – providing the smoking employees with the psychological assistance.	Providing psychological assistance tothe employees who make their first attempt to quit smoking and to the	Introduction - after the questionnaire survey is carried out and the results are	Consulting the employees after the questionnaire survey is carried out and the results are processed. In some cases a psychologist can advise the employees to	A drop in the number of smokers who have problems giving up smoking on their own.

At this stage the goal is to help the employees to quit smoking and to cope with high levels of stress in the workplace.	employees who have already made such attempts before.	processed. Implementation period - within the implementation of the program.	address specialized centers for nicotine addiction treatment.	
Stage - the implementation of incentive measures. At this stage the goal is to promote smoking cessation in the workplace.	Offering higher incentive pay to the employees leading a healthy lifestyle (who do not smoke or quit smoking).	Introduction - within four months (a month after the program was launched) Implementation period – on a constant basis.	The introduction of additional monthly incentive pay which is offered to the employees who lead a healthy lifestyle (do not smoke).	A drop in the number of smokers, a promotion of a healthy lifestyle.
Stage - introduction of the system of penalties. At this stage the goal is to motivate all the smoking employees to give up smoking by introducing a system of fines and long working hours.	The introduction of the system of penalties for smoking during the working day. It is aimed at the promotion of smoking cessation in the workplace.	Introduction - within four months (after the incentive measures are introduced). Implementation period – on a constant basis.	The employees who have smoke breaks during working hours are fined (the monthly performance-based incentives are reduced). At the end of every work day the head of the department analyzes the data received via the video surveillance and control system that was introduced at the first stage of the program and calculates the total amount of fines (which is cumulative).	A drop in the number of smokersthanks to the introduction of additional measures.
	Introduction of long working hours for having smoke breaks. It is aimed at stimulating the employees to give up smoking.	Introduction - as soon as the amount of fines is as much as the amount of performance-based payments. Implementation period –as long as this measure is required.	The employees work overtime (in accordance with how many smoke breaks they have during the working hours).	The system of penalties is aimed at motivating 100 % of the employees to quit smoking in the workplace.
Stage - continuous monitoring of the way	Continuous control over the employees' activities in the	Introduction– as soon as the program is	The process of monitoring is carried out via the cigarette smoke detectors, video	The integrated use of incentive measures and

the incentive measures are taken and the system of penalties is introduced. At this stage the goal is to control the process of promotion of the smoking cessation program, to timely make necessary changes and to ensure the coordinated and effective implementation of all program stages.	workplace is aimed at prevention of smoking during the working hours.	launched. Implementation period – on a constant basis.	surveillance and control systems which were installed at the first stage of the program.	the system of penalties ensures that 100 % of the employees quit smoking in the workplace.

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Net International Investment Position as Early Warning Indicator: Does It Differ for European Union CEECs and non-CEECs?

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Abstract

The Macroeconomic Imbalance Procedure (MIP) applied by the European Commission aims to identify, prevent and address the emergence of potentially harmful macroeconomic imbalances that could adversely affect economic stability in the EU. Fourteen scoreboard MIP indicators have been defined. In our previous papers we were able to show that 1) net international investment position (NIIP) is one of the few MIP variables able to predict economic and financial crises and 2) only two of five NIIP components possess systematic predictive capacity of crises: derivatives and other investment. The aim of the paper is to check whether the NIIP components, which have the most predictive strength of crises, differ between two groups of EU countries: Central and Eastern European Countries (CEECs) and non-CEECs. All components of NIIP (direct investment, portfolio investment, financial derivatives, other investments, reserve assets) at the end of the year will be applied as regressors. Our model is an ordered probit model. We show that different components of NIIP are able to predict crises in Central and Eastern European Countries (CEECs) and non-CEECs. Only two NIIP components show relatively systematic predictive capacity of crises in CEECs: portfolio investments and other investments, while for non-CEECs there are no systematically proven variables.

Keywords: Macroeconomic Imbalance Procedure; European Semester, macroeconomic stability, economic crisis, ordered probit model.

Introduction

The Macroeconomic Imbalance Procedure (MIP) aims to identify, prevent and address the emergence of potentially harmful macroeconomic imbalances that could adversely affect economic stability in the EU. MIP should be considered as a tool of the European Semester, which was introduced in 2010. It helps the EU member countries to coordinate their economic policies and address the economic challenges facing the EU. The goals of the European Semester are: ensuring sound public finances (avoiding excessive government debt), preventing excessive macroeconomic imbalances in the EU supporting structural reforms, creating more jobs and growth, and boosting investment (European Commission, 2019).

In our previous research paper, using an ordered probit model, we managed to identify the MIP indicators which were effective in crises prediction. Especially net international investment position (NIIP) was statistically significant for all crisis levels under investigation. A possible explanation may be that an increase in international assets minus liabilities (or an increase in international savings) constitutes a kind of buffer against potential crises. Catão and Milesi-Ferretti (2014), Knedlik

(2014) as well as Siranova and Radvanský (2018) have also shown that NIIP is one of the significant explanatory variables for crises. Positive and stable values of NIIP (and also current account balance) are important for macroeconomic stability of EU countries (Kološta, Kráľ and Flaška, 2018).

The aim of the paper is to check whether the NIIP components, which have the most predictive strength of crises, differ between two groups of EU countries: Central and Eastern European Countries (CEECs) and non-CEECs. Considering different economic structure of CEECs and non-CEECs it can be hypothesised that different components of NIIP will be able to predict crises in these two groups of countries.

The paper is organized as follows. Next section presents the Macroeconomic Imbalance Procedure and our two concepts of crises. Then we short describe the components of net international investment position. The following section describes the methodology, data used for model parameter estimation and finally results.

Macroeconomic Imbalance Procedure and concepts of crises

Macroeconomic Imbalance Procedure is a part of European Semester – annual cycle of economic monitoring and guidance introduced in 2011. The MIP uses a scoreboard of indicators, to screen Member States for potential economic imbalances in need of policy action. The MIP identifies Member States which need assessment whether major imbalances exist. A scoreboard of indicators with indicative thresholds serves as a filtering device for detecting *prima facie* cases of possible imbalances deserving further investigation. As compared with the surveillance framework of the Stability and Growth Pact, MIP surveillance is not equally driven by numerical rules and automatic triggers.

Since its introduction, the scoreboard was revised several times. In 2012 a headline indicator for the financial sector was added (total financial sector liabilities), In 2013, the statistical definition of a number of headline scoreboard variables was revised (definition of the REER indicator, private sector debt and credit flow) and some auxiliary indicators were added (including a set of social and employment indicators). In 2015, headline employment indicators were added.

Fourteen scoreboard MIP indicators have been set for 2020: current account balance, net international investment position, real effective exchange rate, export market share, nominal unit labour cost index, house price index, private sector credit flow, private sector debt, general government gross debt, unemployment rate, total financial sector liabilities, activity rate, long-term unemployment rate, and youth unemployment rate. For more details concerning MIP indicators see *Statistical Annex of Alert Mechanism Report 2018* (2017).

Prevention and correction of macroeconomic imbalances in the EU are based on two main pillars:

- Regulation (EU) No 1176/2011 details the procedure to detect and correct macroeconomic imbalances. This regulation applies to all Member States.

- Regulation (EU) No 1174/2011 that includes an enforcement mechanism. This mechanism culminates in financial sanctions for euro area countries which do not comply with the Macroeconomic Imbalance Procedure (MIP) recommendations made on the EU level.

The alert system for all the Member States consists of:

- Regular assessment of the risks arising from economic imbalances in each Member State, based on a scoreboard made up of economic indicators and indicative thresholds.

- Identification by the Commission, based on an economic, rather than mechanical, reading of the scoreboard of those Member States where risks of imbalances are considered to exist, in order to assess their real severity.

- An in-depth review of the general economic situation in any Member State displaying a particularly negative scoreboard.

- Possible recommendation (in the event of a real risk) from the Commission to the Member State in question to correct the imbalance, in the framework of the other policy recommendations made in the European semester (Article 121(2) TFEU).

- Opening of an excessive imbalance procedure if there is serious risk that such an imbalance may spread to other Member States, jeopardizing the proper functioning of the EMU (Article 121(4) TFEU).

- The Member State under the excessive imbalance procedure, is obliged to present a corrective action plan to the EU Council. If proposed corrective measures seem to be sufficient, the procedure is placed in abeyance, but the Member State must report periodically to the Ecofin.

- Following the recommendation from the Commission, the procedure can only be closed by the Council, which decides that the imbalance has been sufficiently reduced and should no longer be considered excessive, Euro zone members which failed to act regarding excessive imbalances might be fined (maximum 0.1% of GDP) when the Member State concerned has failed twice in a row to submit a sufficient corrective action plan, or to implement the planned measures, according to set deadlines.

The presented procedure presentation was based on: ECO/286 - CESE 799/2011, Macroeconomic imbalances; Opinion of the European Economic and Social Committee on the Proposal for a Regulation of the European Parliament and of the Council on enforcement measures to correct excessive macroeconomic imbalances in the euro area (COM(2010) 525 final - 2010/0279 (COD)) and the Proposal for a Regulation of the European Parliament and of the Council on the prevention and correction of macroeconomic imbalances (COM(2010) 527 final - 2010/0281 (COD)).

The European Semester and the MIP tool should lead to stronger synergies by facilitating policy coordination among Member States by ensuring that Council and Commission recommendations are appropriately integrated in the budgetary procedure of the Member States. That procedure should be consistent with the framework for economic policy coordination in the context of the annual cycle of surveillance.

The MIP procedure has been of interest to researchers for the last few years. However, most of the publications covered the institutional and legal nature of the European Semester and the cooperation of the EU institutions with the Member States or used various types of signal approach; an overview of these papers can be found in the report published by the Joint Research Centre (Erhart, Becker and Saisana, 2018). In general, unfortunately different studies identified different indicators useful as alarm bells. For example, Boysen-Hogrefe *et al.* (2015) found that house prices, private sector debt, and private sector credit flow are the best early warning indicators of crisis events. Furthermore, export market shares, private sector credit flow and private debt were best predictors of MIP classification. Domonkos *et al.* (2017) found that in the short run private sector debt is the best performing indicator amongst the headline indicators, complemented by current account balances in the long term. But in general, empirical works have concluded that the predictive power of the MIP Scoreboard Indicators is relatively low. Possible reasons may include no common agreement on definition of systemic banking crisis, sovereign debt crisis, currency crisis, and others, as well as different statistical approaches applied.

In our previous paper we defined economic crises as deterioration of economic situation, either in real or financial sector, causing more or less severe losses in money and social terms. We refer to Claessens and Kose (2013) who differentiate between currency crises, debt crises and banking crises. This approach is broader than proposed by Mishkin (2010) who concentrated on downturn in GDP and increase in unemployment. We proposed the concept of “multidimensional crisis” based on sev-

eral economic indicators: decline in GDP (year-on-year change), inflation (year-on-year change), devaluation or depreciation of home currency against USD (either average or end of period), local stock market decline (end of quarter against end of previous quarter) and restrictions on cash withdrawal. In addition, we track "abnormal data", and declare that a crisis is above or below a certain threshold, like De Scheemaekere, Oosterlinck, and Szafarz (2015). If a certain threshold is exceeded, it counts as a "single crisis" (1). Accordingly, "multidimensional crisis" may reach level 1, 2, 3, 4 or 5 in a quarter. If a crisis has occurred more often than once a quarter of the year, the maximum value from all quarters is taken as a crisis indicator.

We test two sets of thresholds. Set 1 relies on statistical distributions of crisis indicators and set 2 is based on an expert opinion on what a crisis is.

Set 1. We investigate the distributions of four crisis indicators in the period 2008-2017. Thresholds values are defined as mean values plus or minus one, two or three standard deviations (Table 1). Restrictions on cash withdrawals are always defined as 1 if imposed or 0 otherwise.

Table 1: Set 1 crisis thresholds (in %)

Variables	Level 1	Level 2	Level 3	Level 4
1. Decline in GDP	0	–2,84	–6.86	–10.87
2. High inflation	1.77	4.03	6.30	8.57
3. High devaluation / depreciation of home currency against USD*	0.70 0.73	5.56 6.35	10.43 11.97	15.29 17.58
4. Severe stock market decline	–0.04	–12.24	–24.44	–36.64

Source: own calculations and definitions.

*First figure refers to quarter average, second one to end-of-period value.

Set 2. Our "multidimensional crisis" in its standard expert version covers:

a) fall of GDP by more than 10% on yearly basis;

b) high inflation by 10% or more;

c) high depreciation / devaluation of home currency against USD by more than 15%,

d) severe stock market decline by more than 20% quarterly;

e) instability of banking system, manifested by restrictions on cash withdrawals.

Other thresholds, indicating more or less severe crisis, are arbitrarily set 20% lower / higher, starting from the standard version, until extreme or almost "normal" values are reached.

Table 2: Set 2 crisis thresholds (in %)

Variables	Level 1	Level 2	Level 3	Level 4 (standard)	Level 5	Level 6
1. Decline in GDP	–4	–6	–8	**–10**	–12	-14
2. High inflation	4	6	8	**10**	12	14
3. High devaluation / depreciation of home currency against USD*	6 6	9 9	12 12	**15** **15**	18 18	21 21
4. Severe stock market decline	–8	–12	–16	**–20**	–24	–28

Source: own definitions.

*First figure refers to quarter average, second one to end-of-period value.

In our previous papers we managed to:

1) identify the MIP indicators which were quite effective in crises prediction (net international investment position, nominal unit labour cost index, house price index, private sector credit flow and general government gross debt) and

2) show, that only two of five NIIP components possess systematic predictive capacity of crises: derivatives and other investment, for all 28 EU countries as a group.

Net International Investment Position

Net international investment position has been defined by the IMF as a difference between (a) financial assets [A] of residents of an economy that are claims on nonresidents and gold bullion held as reserve assets, and (b) liabilities [L] of residents of an economy to nonresidents (IMF 2009, p. 119). The main components of the international investment position are:

Direct investment (DI = direct investment abroad [DIA] minus direct investment in the reporting economy [DIL]) – category of cross-border investment associated with a resident in one economy having control (more than 50 percent of the voting power) or a significant degree of influence (from 10 to 50 percent of the voting power), directly or indirectly, on the management of an enterprise that is resident in another economy;

Portfolio investment (P = portfolio investment abroad [PA] minus portfolio investment in the reporting economy [PL]), involving debt or equity securities, other than those included in direct investment or reserve assets. Negotiability allows investors to withdraw investment readily. This feature makes portfolio investment sensitive to any signs of deterioration of economic situation and potentially an efficient indicator of upcoming crisis;

Financial derivatives (other than reserves) and employee stock options (DER = derivatives assets [DERA] minus derivatives liabilities [DERL]) consist of financial instruments that are linked to another specific financial instruments or indicators or commodities and through which specific financial risks (such as interest rate risk, foreign exchange risk, equity and commodity price risks, credit risk, and so on) can be traded in their own right in financial markets. Employee stock option is an option to buy a certain amount of company shares at a predetermined price for a specific period, offered to employees of the company as a form of remuneration;

Other investment (O = other assets [OA] minus other liabilities [OL]) is a residual category that includes positions (and transactions) other than those included in direct investment, portfolio investment, financial derivatives and employee stock options, and reserve assets. This item covers diversified subcategories, of different importance: a) other equity; b) currency and deposits; c) loans (including use of IMF credit and loans from the IMF); d) nonlife insurance technical reserves, life insurance and annuities entitlements, pension entitlements, and provisions for calls under standardized guarantees; e) trade credit and advances; f) other accounts receivable/payable; and g) SDR allocations (SDR holdings are included in reserve assets). "Other investment" is, contrary to appearances, a quite significant position, comparable and in many cases higher than direct investment and portfolio investment;

Reserve assets (R) are those external assets that are readily available to and controlled by monetary authorities for meeting balance of payments financing needs, for intervention in exchange markets to affect the currency exchange rate, and for other related purposes (such as maintaining confidence in the currency and the economy, and serving as a basis for foreign borrowing). Reserve assets must be foreign currency assets and assets that actually exist. Reserve assets consist of monetary gold, SDR holdings, reserve position in the IMF, currency and deposits, securities, financial derivatives, and other claims.

Methodology

Our model is an ordered probit model:

$$CRISIS^{*} = NIIP^{T}\,\beta + \varepsilon,$$

where:

CRISIS* is dependent unobservable crisis variable,

NIIP is the vector of selected components of net international investment position (independent variable),

β is the vector of regression coefficients.

Ordered probit model is a generalization of the probit model to the case of more than two outcomes of a dependent variable for which the potential values have a natural ordering, as "no crisis" (0), "minor crisis" (1), "big crisis" (2), and so on. Ordered probit model was previously used in literature to examine currency crises, but recently also effectiveness of economic policy responses during European semester procedure (Bricongne, Turrini and Garcia, 2019).

NIIP has been proven as a statistically significant variable in the sample of 28 EU countries, when predicting crises at all considered thresholds levels, but only two of five NIIP components possess systematic predictive capacity of crises: derivatives and other investment. Now we repeat the test separately for 11 CEECs and 17 non-CEECs.

We use all available components of NIIP according to the rule: assets (positions at the end of year), liabilities (positions at the end of year, with exception of official reserve assets, which are assets only), and net position (assets minus liabilities) at the end of the year.

First, we test the significance of every NIIP component, one by one, for 11 CEECs and 17 non-CEECs and 10 years (2007-2016), in predicting crises in years 2008-2017. We use the same methodology as in our previous paper, which produced results suggesting relevance of NIIP in predicting crises, and we expect minus sign at variables "net" and "assets" and plus sign at "liabilities", which means that rising net values and foreign assets counteract crises while increase in liabilities possibly fosters crises. Second, we test the significance of net values at once. Third, regressors are all assets and liabilities of variables constituting NIIP. We express all NIIP components as % of GDP.

We use the following data provided by Eurostat:

- direct investment, portfolio investment, financial derivatives and employee stock options, other investment (annual data, million units of national currency); net positions, assets and liabilities,
- gross domestic product at market prices, in euro,
- MIP indicators as well as
- official reserve assets available at IMF (International Reserves and Foreign Currency Liquidity), in US$ million,
- Euro Foreign Exchange Reference Rates on the last day of the year, provided by the European Central Bank.

Results

We already know that some of NIIP components have better predictive strength of crises than others. Therefore, we test the single component predictive strength using ordered probit model, where regressors are NIIP components, one by one. We use panel data, for 11 CEECs and 17 non-CEECs and 10 years (2007-2016) and crisis data, with one-year lag (2008-2017).

Table 3 shows which single variables are statistically significant and signs of their parameters, for two sets of crisis definitions, all crisis levels and two groups of EU countries.

Table 3: Signs of statistically significant parameters for different crisis sets and threshold levels (all NIIP components, one by one), for CEECs / non-CEECs.

	DI 1	DIA 2	DIL 3	P 4	PA 5	PL 6	DER 7	DERA 8	DERL 9	O 10	OA 11	OL 12	R 13
Set 1, level 1		/–**	/–**		–*/	–**/	–**/		+*/	–***/–*		+*/	
Set 1, level 2		/–*	/–*		–**/	–***/	–**/–*	/–***	/–**	–***/		+*/	
Set 1, level 3					–**/		/–**	/–**	/–*	–*/			
Set 1, level 4					–*/					–**/			
Set 2, level 1		/–*	/–*		–***/	–***/	–***/	–*/–**	/–*	–***/	–**/		
Set 2, level 2					–**/	–**/		/–**	/–**	–***/	–*/		
Set 2, level 3						–*/	/–***	/–**	/–**	–**/			
Set 2, level 4					–**/		/–**	/–*		–*/			
Set 2, level 5					–**/								
Set 2, level 6													

Source: own calculations.

The results show that:

1. only selected NIIP components allow to predict crises more or less systematically: portfolio investment, derivatives and other investment,
2. in extremely few cases the same NIIP component is able to predict crisis in both CEECs and non-CEECs,

3. portfolio flows and other investment are good predictors of crisis in the CEECs, while derivatives, much more complex instruments, are at work in more developed non-CEECs.

Second, we test a model with five net NIIP regressors at once (Table 4).

Table 4: Signs of statistically significant parameters for different crisis sets and threshold levels (all net NIIP components), for CEECs / non-CEECs.

	DI 1	P 4	DER 7	O 10	R 13
Set 1, level 1			–**/	–***/–*	/–*
Set 1, level 2			–**/–**	–***/	/–**
Set 1, level 3			/–**		/–**
Set 1, level 4				–**/	
Set 2, level 1	+**/		–***/–*	–***/	/–***
Set 2, level 2				–*/	/–***
Set 2, level 3			/–***		
Set 2, level 4			/–*		/–**
Set 2, level 5					
Set 2, level 6					

Source: own calculations.

In general, for CEECs none of net positions seem to have ability to predict "crisis"; only derivatives and other investment are useful, in case of "small" deterioration of economic situation. For non-CEECs official reserves are important, what is very strange for rather well-developed countries, and to some extent again derivatives.

Third, we test separately assets and liabilities as explanatory variables (Table 5).

Table 5: Signs of statistically significant parameters for different crisis sets and threshold levels (all NIIP components, assets and liabilities), for CEECs / non-CEECs.

	DIA 2	DIL 3	PA 5	PL 6	DERA 8	DERL 9	OA 11	OL 12	R 13
Set 1, level 1	+***/	–**/		–***/		+***/	–***/	+***/	–*/–*
Set 1, level 2				–***/	/–*	+***/	–***/	+***/	–*/–***
Set 1, level 3	/+**	/–**	/+*	/–*	/–*				/–**
Set 1, level 4			–**/				–*/	+**/	–**/
Set 2, level 1	+**/	–**/		–***/	/–*	+***/	–***/	+***/	–*/–***
Set 2, level 2	/+**	/–**	/+*	–***/–*		+*/	–**/	+*/	/–***
Set 2, level 3	/+*	/–*	/+*		/–**				/–**
Set 2, level 4	**/+***	/–*	–**/	–**/					/–**
Set 2, level 5			–**/						–**/
Set 2, level 6			–*/						–*/

Source: own calculations.

For CEECs only slight deterioration of economic situation (level 1 and 2) can be predicted. However, portfolio assets abroad (PA) and official reserves (R) have some predictive strength for serious crises (if both rise, probability of crisis is lower). In case of non-CEECs only reserves (R) play an important role, and – to some extent – direct investments from abroad (DIL). If both variables rise, crisis is less probable. Again, we would expect this association rather in less developed countries.

Conclusions

The aim of the paper was to check whether the variables constituting one of the MIP indicators, namely the net international investment position (NIIP), differ in predictive strength of crises between two groups of EU countries: Central and Eastern European Countries (CEECs) and non-CEECs. Using ordered probit model and three tests of significance of NIIP components, on the whole we were able to confirm our hypothesis, that different components of NIIP are able to predict crises in CEECs and non-CEECs and ascribe this effect to the differences in size and complexity of external capital relations of both groups of countries. In addition, we may assume that early warning crisis indicators for CEECs are portfolio investments and other investments, while for non-CEECs there are no systematically proven variables. Sometimes deterioration of economic situation in well-developed countries may be signalled by changes in official reserves, derivatives or direct investment from abroad.

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Operational Risk Assessment For Blockchain Solutions in Supply Chains: A Conceptual Framework

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Abstract

The paper presents interdisciplinary framework for operational risk assessment for blockchain solutions in supply chains[1]. The operational risk fundamentals have been briefly described as well as supply chain risks and blockchain technology implementation possibilities in supply chains. The main part of the paper focuses on the problem of operational risk assessment in the sophisticated context of blockchain solutions in supply chains. A conceptual framework for the risk assessment idea has been presented together with the proposition of risk assessment approach for information security risk as an operational risk sub-area.

Keywords: Operational Risk, Supply Chain, Blockchain, Risk Assessment.

Introduction

Operational risk is a crucial element of total risk faced by modern institutions. In financial business this type of risk plays very important role as a part of the triple “credit-market-operational” defined by Basel Committee in its recommendations (Basel, 2003). Non-financial business is not free of operational risk at all. More to say – the rapid development of information technologies results with the operational risk reaching its highs these days. The goal of the paper is to make a foundation for a conceptual framework describing the fundamentals for operational risk assessment for blockchain solutions in supply chains. The paper focuses on information technology risk and proposes a quantitative approach for its assessment as a part of holistic view on operational risk for blockchain implementations in supply chains.

Operational Risk

The first attempts to define operational risk appeared at the end of the last century and were of negative definitions, most often treating operational risk as other risk, which does not fall within the scope of

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financial risks. However, the growing significance of the problem and its direct impact on the business resulted with the need for more detailed analysis of the causes and potential effects of this phenomenon, as well as the creation of a positive definition. The sources of these analyzes include, among the others, a survey conducted in 1999 by the British Bankers Association among entities of the banking sector. They asked about practical operational risk definitions. The answers received defined this risk as (Wawrzyniak, 2012):

- risk of fraud by employees or people outside the organization,
- risk of unauthorized transactions carried out by employees or errors caused by IT and telecommunications systems,
- risk arising from systems maladjustment, operational problems, violation of guidelines formulated by internal control, fraud and unforeseen disasters, causing unexpected losses in the organization,
- risk that should be considered in the context of correctness, efficiency and integrity of the control system and other mechanisms aimed at implementing business processes; the main elements of operational risk include processes, people, systems, business strategy and the business environment,
- exposure to financial and non-financial losses caused by unforeseen events or failures in processes and operating systems with particular emphasis on the environment, business strategy, processes, people and systems.

In June 2004, the Basel Committee on Banking Supervision published the final version of the New Capital Accord (Basel, 2003), ending in some way the discussion on the nature and definition of operational risk. The definition adopted in the regulation says that operational risk is the risk of direct or indirect loss resulting from improper or unreliable internal processes, people and systems or external events. Basel II distinguished between seven operational risk categories:

1) risk related to internal fraud; it concerns material losses caused by embezzlement, fraudulent reporting,
2) risk related to external abuse; it relates to material losses resulting from theft, physical or computer hacking made by persons not related to the financial institution,
3) risk related to human resources management and work safety; it applies to losses resulting from unlawful conduct and various forms of discrimination, as well as non-compliance with work safety rules,
4) risk related to clients, products and business practices; in this case, the losses are caused by intentional or unintentional conduct incompatible with professional practice, e.g. money laundering, conducting unauthorized transactions on bank accounts, the use of confidential information and customers, the sale of unauthorized products,
5) risk related to destruction of assets; it concerns losses resulting from acts of vandalism, terrorism or disasters,
6) risk related to disruptions in the work of systems supporting the work of a financial institution; in this case, the losses are caused by problems related to the operation of IT and telecommunications equipment and software,
7) risk related to the implementation of business processes; it concerns losses related to incorrect execution of transactions and incorrect management of business processes.

Originally, they were related to financial business but nowadays the differences between financial and non-financial institutions information systems are becoming less and less significant in the context of operational risk. The table 2 presented below shows the possible mapping of these original risk categories into risk areas in modern supply chain systems. In the other words, financial background for operational risk approach should play significant role in operational risk management in non-financial institutions nowadays.

Supply Chain Risks

The importance of information and communication technology for supply chains is widely acknowledged (Gunasekaran et al., 2004; Stadtler et al., 2005). Supply chain risk management is a sophisticated problem. It covers wide range of different risk types and does not allow for simple analytical approaches. Contemporary risk management is a cross-disciplinary process that takes a holistic approach and employs a wide range of specific methods, techniques and tools (Mullai, 2009). Risk management is becoming an integral part of a holistic supply chain management systems design (Christopher and Lee, 2004). There is diverse classification of supply chain risks found in the literature. Risk itself is often termed as deviation, disruption, vulnerability, uncertainty, disaster, peril and hazard. The taxonomy of operational risks evolved in last years. Gallagher et al. distinguish between mission, work processes and constraints (Gallagher et al., 2013). Cavinato points out five sub-chains in every supply chain and addresses them to different risk categories (Cavinato, 2004). They are:

- physical – the actual movements and flows within and between firms, transportation, service mobilization, delivery movement, storage, and inventories;
- financial – the flows of cash between organizations, incurrence of expenses, and use of investments for the entire chain/network, settlements, A/R and A/P processes and systems;
- informational – the processes and electronic systems, data movement triggers, access to key information, capture and use of data, enabling processes, market intelligence;
- relational – the appropriate linkage between a supplier, the organization andits customers for maximum benefit; includes internal supply matter relationships throughout the organization;
- innovational – the processes and linkages across the firm, its customers, suppliers, and resource parties for the purpose of discovering and bringing to market product, service, and process opportunities.

Chopra and Sodhi (2004) suggest nine categories of supply chain risks: disruptions, delays, systems, forecast, intellectual property, procurement, receivables, inventory and capacity. Mason-Jones and Towill (1998) identify risk sources related to supply chain: environment, demand, supply, process and control. Similarly, Jüttner (2005) classified risks based on supply chain basic constructs: environmental-risk, organizational risk and network risks.

All these approaches are important. However, they seem not to focus on the possibilities of risk assessment – so important for the Basel context mentioned earlier. Mixing up such terms as disruption, uncertainty, disaster or hazard makes it impossible to propose any assessment solution that would be practically useful. On the other hand, identifying operational risk and its main sub areas: people, processes and technology allows for finding out the scientific backgrounds for risk assessment possibilities described later. For this paper it has been assumed that operational risk in supply chains consists of three categories:

- risk related to people and their behavior,
- risk related to the business processes,
- risk related to the information technology solutions implemented in supply chains.

Operational risk in this context can be defined as the potential for unwanted negative consequences that arise from an event or activity. In the other words operational risk arises as an unwanted by-product of the activities dealing with core business and related to people, processes and technology.

Blockchain solutions for supply chains

Most fundamentally, a blockchain is a distributed ledger that is shared and agreed upon a peer-to-peer network. Blockchain provides four key features that can enhance integration and coordination among the members of a supply chain: transparency, validation, automation, and tokenization (Blossey et al.,

2019). Blockchain networks should not be called innovations, because they base on mathematic, cryptography and information technology well known from years. Nevertheless, they can be used to develop new technological solutions of an innovative nature. There are numbers of current supply chain limitations that can be reduced by the use of blockchain technology. These limitations and the positive impact introduced through blockchain adoption are presented in the table 1 (Litke et al., 2019).

Table 1: Supply Chain actors and their current limitations

Supply chain actor	Current limitations	Blockchain impact
Raw material / Producer	Ability to prove in a global and transparent way the origin and quality metrics of products.	Benefits from increased trust of keep track of the production raw material and value chain from the raw material to end customer.
Manufacturer	Limited ability to monitor the product to the final destination. Limited capabilities of checking quality measured from raw material.	Added value from shared information system with raw material suppliers and distribution networks.
Distributor	Custom tracking systems with poor collaboration capabilities. Limited certification ability and trust issuers.	Ability to have proof-of-location and conditions certificates registered in the ledger.
Wholesaler	Lack of trust and certification of the products' path.	Ability to check the origin of the goods and the transformation / transportation conditions.
Retailer	Lack of trust and certification of the products' path.	Track of each individual product between the end consumer and the wholesaler. Ability to handle effectively return of malfunctioning products.
End user / Consumer	Lack of trust regarding the compliance of the product with respect to origin, quality and compliance of the product to the specified standard and origin.	Full and transparent view on the product origin and its whole journey from raw material to final, purchased product.

Source: Litke et al., 2019

Blockchain as a technology that allows maintaining joint and collective information about operations (transactions) in a digital form, guaranteeing the possibility of confirming the authenticity of information and not requiring central database can find many applications in logistics and supply chain management. Although the literature on the subject indicates many different areas of application of blockchain technology in logistics, in fact each of them can be classified into one of two areas:

- Product Tracking,
- Documentation Processing.

The first area defined as Product Tracking is the ability to track the path of the product and its ingredients from the manufacturer to the end customer. The record in the form of blockchain information on the history of production and transport of goods ensures buyers that the purchased goods are delivered and produced from verified sources. This technology would also prevent information from being hidden or modified. An important aspect in this case would be information to ensure fair work practices and better protection of human rights. Blockchain can help supply chains detect unethical suppliers and counterfeit products because all information can only be recorded by authorized entities.

In the second area referred to as Documentation Processing, blockchain technology can support the collection, storage and management of data related to the documentation of operations implemented in the supply chain (especially transport documents). In this technological context, openness, transparency, neutrality, reliability and security are important for all supply chain participants (Abeyratne et al., 2016).

Blockchain technology can ensure data security and authenticity, which will reduce the cost of preventing intentional and accidental data changes, increasing risk in the supply chain and reducing business reliability (Ivanov et al., 2018).

It has to be mentioned that the process of implementation of blockchain technology in supply chains will be a challenge for many companies. The implementation of the blockchain will not only help the companies to control other entities but will also allow for controlling the organization implementing this technology (Mendling et al., 2017). When considering the implementation of blockchain technology in supply chains, two key problems of its implementation should be underlined. The first barrier deals with limited knowledge about the application opportunities of blockchain technology. This is an obstacle to the introduction of this new technology into the supply chain. Despite the growing interest in blockchain technology on the technical market, the problem is related to the limited number of real-life applications and examples of successful implementations (Mougayar, 2016). Another important issue is the fact that transparency and the ability to verify information by some organizations can be considered a competitive advantage, which will cause that they will block access to them and limit the scope of implementation and use of the blockchain (Sayogo et al., 2015). The fear of disclosure may significantly limit the full benefits of implementing blockchain technology.

Blockchain technology enables organizations to develop new tools that can significantly improve their supply chains. Blockchain ensures transaction transparency, data security and trouble-free trust, resulting in reduced costs, greater efficiency in supply chains, and increased customer confidence. Technology enables supply chain partners to share data more reliably, leading to better collaboration. The blockchain will be a truly transformative technology for the supply chain ecosystem. Supply chain managers and other network users, thanks to blockchain technology, are able to see real-time digital and physical products in their supply chains along with changes in quantities and prices. Every single part of a final product can be tracked in chronological order from the origin to the final point of sale. As all authorized users can view the same information at the same time, the goods flow and billing process is significantly improved. As a consequence, this condition translates into effective recording, acceleration of payment processes, improvement of the method of tracking shipments, and additionally limiting the likelihood of fraud due to total transparency and availability of data. Blockchain allows aggregation of data between manufacturers, distributors, buyers and financial partners. By sharing data, payments can be made as soon as the delivery is confirmed. The implementation of blockchain technology in logistics enables third-party verification, registration and coordination of transactions, which essentially eliminates intermediaries. Blockchain technology implementations definitely introduce new types of risk into supply chains world. Being often innovations and offering new possibilities they also become a source of new threats and uncertainty areas. Dealing with blockchain related operational risks will be of a great importance in future supply chain networks. The table 2 presents the key risks areas for blockchain implementations in supply chains. They are related to (in alphabetical order):

- centralization - blockchain is comprised of independent nodes; although these nodes are operating independently from each other, these nodes might be owned by a single organization or by a collaboration of organizations; competitors might be blocked from transacting on this system or risk being restricted from using certain functionalities (van der Weerd, 2019);
- compliance – the immaturity of blockchain solutions is both legal and regulatory driven problem; missing international legal standards as well as different legal status of blockchain tokens results with significant risk of participating in money laundering of terrorist financing;
- computational overhead – depending on the consensus type the has puzzle may be more or less difficult; nevertheless, computational costs will always be source for additional operational risk;

- consensus - achieving consensus in a blockchain generally involves a complex set of mathematical functions and coordination between the network nodes; if the consensus process is flawed, organizations transacting on this blockchain might be exposed to significant risks – both operational as financial,
- continuity - reaching consensus requires coordination and communication between nodes that are often spatially separated from each other and located in internal networks; the business continuity is a challenge in such environment;
- cryptographic key management – public key infrastructure as well as blockchain specific key management solutions are a target for external security attacks; operational risk arises even if the solutions use only standard protocols and algorithms; the weakest part of any blockchain deals not with the protocols but with their implementation;
- data complexity – with the rapid growth of data-driven applications, the systems for supply chain management have to deal with data complexity; to meet these challenges the blockchain systems must offer the functionalities vulnerable for security breaches;
- human attitudes – blockchain solutions do not require trusted third parties but it does not mean the human factor disappears from the operational risk view; more to say – its importance is getting more and more significant in the context of blockchain sophisticated technology;
- law and regulations – current legal issues give no clear answer for the question: what will be the legal status for blockchain technology implementations – especially in the context of tokens and their role in financial systems; legal risk plays significant role in the world of blockchain and should be treated rather as uncertainty;
- physical damage – no blockchain innovation is able to avoid the physical damage risk; however, distributed ledger technology has huge potential to mitigate such type of risk;
- privacy - unauthorized blockchain ledger transactions might result in unintended consequences such as degraded data integrity or violated privacy requirements due to the fact that personal data is accessible, and the transaction commits cannot be reverted; sensitive personal data cannot be stored directly on the blockchain;
- scalability – the consensus problem already mentioned requires coordination and communication between the network nodes that may eventually result in a lack of scalability of the blockchain network;
- smart contracts development - smart contracts are agreements between blockchain participants that are codified into the authoritative ledger; they are executed automatically when certain requirements are met; development errors in this field may result with serious information security;
- systems integration – operational risk can be found in the integration area very often as the integration processes involving people, technology and protocols not always result with secure and optimizes solutions; the variety of protocols – both standard and tailored – should be seen as a significant supply chain risk source.

Table 2: Blockchain risk areas mapped with Basel risk categories and their relevance for supply chains

Basel risk category (presented earlier) mapped for blockchain related risk area	Blockchain related risk area (alphabetical order)	Relevance for supply chains (very high, high, medium, low, very low)	Possibilities of the risk area quantitative measurement (very good, good, medium, low, very low)
1	Centralization	High	Medium
1, 2	Consensus	Very high	Medium
1, 4, 5	Continuity	Very high	Medium
2	Compliance	High	Medium
1	Computational overhead	High	Medium
1, 2	Cryptographic key management	High	Low
1, 2	Data complexity	High	Low
1, 2, 3, 4, 7	Human attitudes	Very high	Medium
1, 2, 5, 6	Physical damage	Very high	Low
1, 2	Privacy	High	Medium
1, 2, 6	Systems integration	Very high	Medium
1, 4	Smart contracts	Very high	Medium
1	Scalability	Medium	Medium
2, 3, 7	Law and regulations	Medium	Low

Source: Own research

These risks will not stop the distributed ledger technology development but they definitely have to be assessed and managed within supply chains.

Operational Risk Assessment

Operational risk defined above can be managed according to many standards and approaches. Some of them take the advantage of Basel Committee regulations, some use ISO standards and some can be described as scientific approaches. The last of these deals mainly with using sophisticated statistical methods taking the advantage of some strong assumptions. Most commonly used (and questionable alike) is that these methods use statistical distributions in order to describe the variables being assessed and evaluate some probabilities of risk events occurrence. An important question arises in such case: What is the meaning of the phrase "known probability distribution"? If an expert assumes subjective probabilities of some events (e.g. of such events that have no precedents), can this approach be considered as valid knowledge about probability distribution, or rather should we have access to sufficiently extensive past data? Due to the philosophical nature of this problem it is seldom approached by scientific publications. The variety of operational risk management solutions does not stand against the basic idea: in order to manage you have to be able to use quantitative assessment methods. Thus, the important question arises: is it possible to assess the risk dealing with people, processes and technology in a complicated environment of blockchain implemented in supply chain? The answer can be positive with a set of assumptions:

1. The operational risk problems have to be divided into individual sub-areas allowing for possible implementation of quantitative methods.
2. Every sub-area has to distinguish between:
    - low frequency and high severity risk events (LF-HS),

- high frequency and low severity risk events (HF-LS).

3. Only HF-LS for given sub-area can be practically assessed by the use of quantitative methods.
4. These methods should not focus only on standard statistical tools (probability distributions) since information technology rapid development and blockchain implementations in supply chains sophistication make them useless for business practice.

The information security risk assessment framework described below is an example of operational risk sub-area HF-LS approach that can be implemented for blockchain risk management in supply chain.

Information Security Risk Assessment

There are two types of risk events in information security sub-area: low frequency and high severity risk events (LF-HS), high frequency and low severity risk events (HF-LS). Assessing the risk dealing with LF-HS is practically impossible. Statistical approaches become useless with zero knowledge about the probability distributions. On the other hand, HF-LS can be assessed by the use of statistical tools and basic quantitative approaches alike.

The concept of information security risk has been known for a long time, however the manner of approaching the problem has significantly changed over the past dozens of years, evolving from the simple ideas of risk analysis to complex processes of risk management. To begin the discussion about information security risk, one should introduce the four key terms, i.e., resources (assets), sensitivity, threats and vulnerability. Assets are anything that is valued by an institution and should be protected for its benefit and undisturbed functioning. Sensitivity measures the weight assigned to information by its author or owner so as to indicate the need and principles of its protection. Threats are potential causes of unwanted events whose consequences can be the losses occurred in an information system, and furthermore in the institution. Vulnerabilities are weaknesses or gaps in an information system that can be used by threats, generating losses. Threats as such are intrinsic features of any system and its environment, and do not necessarily result in incidents, i.e. events that detrimentally affect system security. An incident and resulting losses can occur only when a threat exploits some vulnerability of a system. In other words, a loss results from the occurring threat, not just from the existing threat. The concept of threats strongly depends on a concept of attack – an attempt to breach security measures of a system.

Information security defined as a system state characterized by certain levels of security attributes on one hand is factually different from the concept of information security risk, on the other though the relation between both terms is evidently noticeable and significant for optimization of risk management and security management processes. Information security is about the state of the system, at the same time indicating a certain level of information security risk of this system. The indication can be more accurate if the assessments of security level in many past periods are put together. A data set delivered in this way can serve as an element of a solution oriented towards risk management. However, can a security assessment and a risk assessment be equated? In a particular case, yes, but in a general case, definitely not. A particular case is when a system under review is not subject to internal changes and external influence. Only then one may claim that the observed changes in security level correspond with the changes in information security risk level. However, this assumption is rather hypothetical and impractical so that its detailed analysis does not seem relevant. As a result, one asserts that evaluating security level and information security risk level are two different problems, although correlated, but requiring different methodologies, tools and input data, as well as oriented on different goals and attributes of output information. At the beginning of discussion about potential assessment of security level, one has to exactly distinguish the two aspects:

- a theoretical level of system security resulting from implemented solutions,
- an observed level of system security resulting from activities of its users.

The first one is relatively easy to determine. Most frequently, the theoretical level is determined by comparing security measures implemented in the system to criteria specified in one of many standards.

As a result, a defined security class is assigned to the system. Nevertheless, no answer is given to the question whether implemented measures proved effective or whether they will also prove effective in future, that is a much more important issue regarding risk management. Evaluating the observed levels of security is not intricate, especially as regards a methodological layer. Most generally, the evaluation of security level leads to a numerical summary of past data set associated with a chosen subset of the system. This is clearly a bit simplified, but fully justifiable. However, is it enough to rely the evaluation procedures solely on historical data – that is so typical when estimating risks in many areas, especially in finance – if one aims at a quantitative description of information security risk. The answer to the question asked in this form must be definitely negative as a result of the definition of information security risk as well as of practical aspects of implementation of risk management methods. However, security evaluation methods can be a significant element supporting risk assessment procedures. As mentioned, risk assessment in first place is to deliver probabilities of some events. In so doing, one should not neglect historical aspects of occurrence. In other words, each set of historical data, both as primary input and as processed by security evaluation method, represents an information basis of risk assessment methods. The latter ones are naturally created by contrasting two factual areas: information area and computation area. Information area represents historical data complemented (modified) by their expert analysis, whereas computational area comprises a manner of mathematical transformation of information area into output measures that can support information security (IS) risk management process. The concept is illustrated in the figure 1.

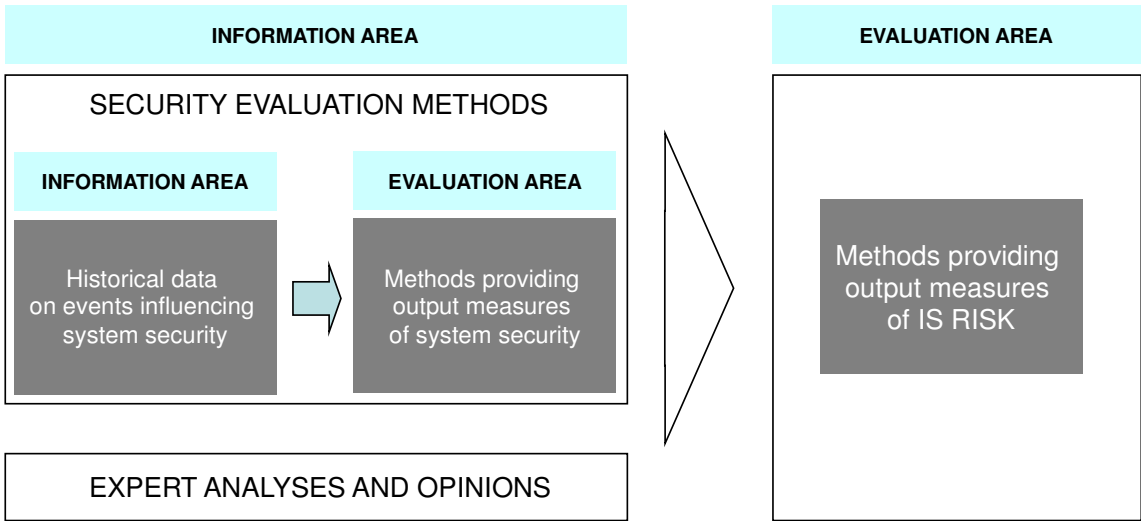

Fig. 1: A concept of coexistence of security evaluation and information security risk assessment methods

Source: own elaboration.

Formally the concept above can be written as:

$$R = \{I(M_B), O(M_B), E(M_R), O(M_R)\} \tag{1}$$

where: R – an abstract set of output measures describing the levels of IS risk, MB – an abstract set of security evaluation methods, MR – an abstract set of IS risk assessment methods, I(MB) – the information area of an abstract set of security evaluation methods, O(MB) – the computation area of an abstract set of security evaluation methods, E(MR) – the expert area of an abstract set of IS risk assessment methods, O(MR) – the computation area of an abstract set of IS risk assessment methods.

Evidently, the following equality holds:

$$I(M_B) + O(M_B) + E(M_R) = I(M_R), \quad (2)$$

where I(MR) – the information area of an abstract set of security evaluation methods.
The following practical constraints are also important:

$$\begin{aligned} &O(M_B) \geq 0 \\ &I(M_B) + E(M_R) \geq 0 \end{aligned} \quad (3)$$

In other words, computation area of security evaluation methods is optional in the context of risk assessment, whereas simultaneous absence of both the information area of security evaluation methods and the expert area of risk assessment methods is not allowed.

Hence, can we argue that security evaluation methods represent a special type of information security risk assessment methods? The answer to such a question should be positive and justifying arguments follow:

1. When assessing information security risk, we need to assign values of probability to likelihood of occurring events, whereas the most information-bearing source enabling identification of such probabilities are historical data on system functioning, including diverse synthetic measures of security level evaluation. In other words, each security evaluation method can support the information area of a risk assessment method.
2. Cyclical and meaningful process of quantitative security evaluation naturally sets some trends that should be considered also as significant determinants of information security risk.
3. The measures of security levels are unbiased because there is no need for the use of expert knowledge, therefore in a long run the assessment process of probability values can be optimized, thus resulting in minimization of levels of assessment errors.

According to the arguments above, even the simplest way of quantitative description of security levels for blockchain solutions, temporarily implemented, can provide a basis of quantitative risk assessment tools. This is an important statement for business practice. It implies a possibility to employ existing, simple and inexpensive quantitative security evaluation methods to assess information security risk that is typically associated with practically advanced mathematical description and implementation problems. In addition, the increasing number of security measurements is followed by the increased accuracy of the method in the context of risk assessment. Thus, one deals here with a sort of enhancement of risk assessment methods. Assuming that cyclical employment of simple security level evaluation methods is sufficient for risk assessment is of course arguable. Both changes of the system, as well as of its environment will influence the need to repetitive elimination of historical measures. Thus, security evaluation methods and risk assessment methods both originate from a common set of assumptions and goals. Yet, the scope, advancement level of mathematical tools, as well as diversity of ideas and concepts are noticeably higher in case of the latter.

Blockchain management in supply chains can definitely take the advantage of above concept avoiding sophisticated statistical approaches and focus on simple evaluation data. It is worth mentioning that more and more complicated business environment should benefit from less complicated management tools.

Conclusions

The paper presents various dimensions for the title subjects as well as wide range of problems that are of a great importance for supply chains nowadays. Implementing the innovative technology – like blockchain - always deals with risk and managing this risk becomes crucial issue. A risk conceptual framework together with the information security risk assessment approach presented above may be a

background for company specific solutions that could aim at supporting the operational risk management processes.

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The System Value of Municipal Waste - Entities, Processes, Outcomes

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Abstract

Effective waste management seems to be systemic in nature, so municipal waste – as its core business – has value that is generated by many entities and co-created in a variety of ways and, as a result, is multidimensional, at least dual (primary and secondary markets), enabling the achievement of strategic integral eco-outcomes. Municipal waste is definitely a product developed based on at least a tripartite concept of operation (in subject approach), which implies the identified business model implemented by entities of the waste management sector, in cooperation with customers/suppliers of the waste stream and other enterprises (recipients of value). The relationships of a variety of entities, including mainly the ones between the waste management sector, committed prosumers, and public benefit organizations, but also local and regional trade and service enterprises, the municipality and other companies, leads to the creation of strategic multi-value, beneficial in terms of the social good, drawing on the concept of sustainable development, through socially conscious actions incorporating the principles of integral marketing, where the supplier of waste stream components and their recipient meet, on the secondary market or in the recycle, to achieve a long-term strategic effect. The strategic effect, in turn, can also have a social, economic (including image-related) and environmental character. Accordingly, the author aims to identify the subject structure, the ways to create value and the nature of the outcomes in the broadly defined municipal waste management sector, what is crucial for the competitive position of the researched firms and, what is the most important, creates the future of next generations. Due to this, the conceptual and qualitative empirical research methods (case study) were used. In addition, the review of industry-related, Polish and international journals was carried out.

Keywords: the waste management sector, municipal waste value, municipal waste re-value, garbology, re-use

Introduction

Enterprises operating in the municipal waste management sector mainly build value in the processes of the collection and effective management of the waste stream with the use of modern technological solutions, in global perspective (Sakai, Sawell, Chandler, Eighmy, Kosson, Vehlow, 1996; Goddard, 1995; Cheremisinoff, 2003; Vergara, Tchobanoglous, 2012). Technological tools enable smart management of municipal waste[i] through the efficient separation of stream fractions, which allows for the extraction of recycling and re-use intended material, the management of the fraction obtained from bio-mechanical waste treatment, and, above all, the minimization of the amount of unproductively landfilled waste. The knowledge of the chemical composition of waste reaching the stream enhances the process of precise separation. In the process-based approach, organizational knowledge and competences paired with modern technologies adequately applied in **the processes of municipal waste separation and treatment** (Bohne, Brattebø, Bergsdal, 2008; El-Haggar, 2007) constitute one of the sub-areas of municipal waste value creation by relevant entities and manifest their *social responsibility and strategic operation* (Bilitewski, 2008; Sztangret, Sobociński, 2017; Kud, 2016; Sztangret, 2016). Furthermore, the diffusion of information and knowledge accompanying the waste stream circulation facilitates the building and maintaining of *integral relations* (Loughlin, Barlaz, 2006; Chertow, 2007) between primary and secondary market players. The conscious supplier of sorted municipal waste becomes a prosumer (Bolaane, 2006; Matysiewicz, Sztangret, 2018) and co-creator in the process of creating eco-value by a waste management sector

enterprise and delivering the offering for the secondary market. This constitutes another sub-area of municipal waste value creation, this time involving the subject-based approach, which can be seen as a *modern marketing concept* combining the management of eco-knowledge with its commercial application (Kumar, Dhar, Nair, Bhattacharyya, Vaidya, Akolkar, 2016).

The **commercial application of information**, automatically recorded by the readers installed in separators of particular municipal waste fractions, is the sub-area in the operations of the surveyed enterprises that is still significantly underused. The information contained in or on waste forming the stream obtained by a waste management enterprise, used in an effective way, can improve the separation process at the level of sorting material for treatment and sale. Additionally, it can build knowledge about purchasing and consumption behavior patterns of waste stream creators/suppliers (Iyer, Kashyap, 2007). Therefore, waste holds marketing value, which is also useful in **market research (garbology) (**Humes, 2012; Rathje, Murphy, 2001; Wagner, 2007; Tudor, Robinson, Riley, Guilbert, Barr, 2011; Matsumoto, 2011; Connett, Sheehan, 2001), which constitutes the functional approach, another interesting sub-area of municipal waste value.

The **system value of municipal waste** also includes the value created by waste in its market re-cycle, defined as the recovery of waste to the economy in its primary form, as opposed to recovering resources as a result of mechanical biological treatment or selecting materials for the secondary market. Therefore, the analysis of the sector also involves other entities (e.g. **Re-use Centers**) (McDougall, White, Franke, Hindle, 2001), implementing the concept of the circular economy (Murray, Skene, Haynes, 2015; Geissdoerfer, Savaget, Bocken, Hultink, 2017).

Therefore, the article aims to identify the subject structure, the ways to create value and the multidimensional nature (Seadon, 2006) of the outcomes in the broadly defined municipal waste management sector.

A Municipal Installation as the Researched Entities

Research Methodology

The study involves the survey of entities operating in the municipal waste management sector. So far, Regional Waste Treatment Facilities[ii] have been a major entity in this sector in Poland. Legal provisions stipulated in the amendment to the Waste Act of January 22, 2015, define a regional municipal waste treatment facility as a waste management plant with sufficient capacity to receive and process waste from an area inhabited by at least 120,000 residents, meeting the requirements of the best available technology referred to in Art. 207 of the Act on Environmental Protection, as of April 27, 2001, or the technology referred to in Art. 143 of the same Act, including the use of new, available waste treatment technologies or ensuring:

- mechanical biological treatment of municipal solid waste and the separation of the waste fraction suitable for recovery, either partially or in full, from solid waste, or
- treatment of separated green waste and other bio-waste and the production of soil conditioners or plant growth enhancers that meet the requirements set out in separate regulations, or the material subjected to composting or fermentation allowed for recovery in the R10 recovery process, meeting the requirements stipulated in the regulations issued pursuant to Art. 30 paragraph 4, or
- landfilling of waste generated in the process of mechanical biological treatment of municipal solid waste and remains from sorted municipal waste in the capacity allowing, in a period not shorter than 15 years, for the reception of waste in an amount not smaller than the one produced in the facility for mechanical biological treatment of municipal solid waste (Act of 27 April 2001. Environmental Law).

The municipal waste management region could include neighboring municipalities from different voivodships, if their regional waste management plans allowed for it (Act of 15 January 2015 amending the Act on Waste and certain other acts). Another important provision of the Act was the introduction of the concept of a transregional facility, which could be a municipal waste incineration

plant with sufficient capacity to receive and process municipal solid waste collected from an area inhabited by at least 500,000 residents, meeting the requirements of the state-of the-art technology, referred to as "a transregional municipal waste incineration plant". The **abolition of the regionalization principle** was introduced as a game-changing amendment to the Act[iii] in 2019. The Act allows for the transfer of bio-waste, unsorted (mixed) municipal waste as well as remains from sorting and mechanical biological treatment of municipal waste to facilities based throughout the country. Until the Act was amended, this had only been possible within the waste management regions defined in a regional waste management plan. Pursuant to the Act, regional waste management facilities and a transregional facility were replaced by a new entity – **a municipal facility** that is an installation for the treatment of unsorted municipal solid waste or remains from the treatment of this waste, specified on the list referred to in Art. 38b paragraph 1 point 1, meeting the requirements of the state-of-the-art technology as referred to in Art. 207, the Act of April 27, 2001, Environmental Law, or the technology referred to in Art. 143 of the Act, ensuring two of the above three requirements:

- mechanical and biological treatment of unsorted municipal solid waste and the separation of fractions suitable for recovery, partially or in full, from unsorted municipal solid waste, or
- landfill of waste produced in the process of mechanical and biological treatment of unsorted municipal solid waste and remains from sorted municipal waste.

This shows that the requirement of having sufficient capacity to receive and process waste from the area inhabited by 120,000 residents was removed from the definition of a regional waste management facility. In addition, the status of a regional waste management facility will no longer be granted to an entire facility, but only to its particular installations, hence the name: a municipal facility.

Pursuant to the amended Act, communes and municipalities – under the statutory obligation to ensure cleanliness and order in their territory, can set up and run repair and re-use centers for non-waste products or product parts as part of waste reduction policy[iv]. The fees charged for municipal waste management can be used to contribute towards the costs of setting up and running repair and re-use centers[v].

The rationale behind the amendment to the Act, in terms of its subject-matter and related liability, involved:

- increased municipal control of the municipal waste management system, including supervision of municipal waste collectors – it aims to prevent lump-sum settlements between the municipality and a municipal waste collector, for example, by linking payment for waste collection exclusively with waste transferred to treatment;
- the elimination of the need to transfer municipal waste to installations based in the region, which should increase competitiveness and eliminate monopolistic practices, such as price fixing;
- the opportunity to charge a reduced waste management fee using funds from the sale of recyclable materials collected selectively (this mechanism is optional and aims to encourage residents to sort waste);
- he flexible application of the criteria differentiating fee rates in municipalities and municipal associations

and other[vi].

The **article focuses on** municipal installations with modern technological solutions ensuring mechanical and biological treatment of municipal solid waste and landfilling of waste produced as a result of mechanical biological treatment of unsorted municipal solid waste and remains of sorted municipal waste, according to the information disclosed in the Public Information Bulletin for individual Marshal's Offices in Poland, as of 2019.

It draws on conceptual and qualitative empirical research methods (case study)[vii]. In addition, the review of industry-related, Polish and international journals was carried out.

Table 1: Basic information on the survey conducted

Specification	Characteristics
research methodology	the analysis of industry journals, websites, sponsored interviews, personal interviews
sample selection	targeted selection of typical units
sample size	entities of the waste management sector, based on the lists of municipal facilities in the Regional Waste Management Plan
	over 100 industry websites of the waste management sector
geographical scope	national scope
time scope	2016-2019

Source: own elaboration

The system value of municipal waste – the model approach

The relationships of a variety of entities, primarily the ones between the waste management sector, committed prosumers, and waste stream suppliers, but also public benefit organizations, local and regional manufacturers, retailers and service providers, the municipality and other companies involved in the waste re-cycle, leads to the creation of strategic multi-value, beneficial in terms of the social good, drawing on the concept of sustainable development, incorporating the principles of integral marketing concepts, where the supplier of waste stream components and their recipient meet, on the secondary market or in the recycle, to achieve a long-term strategic effect. The strategic effect, in turn, can also have a social, economic (including image-related) and environmental character.

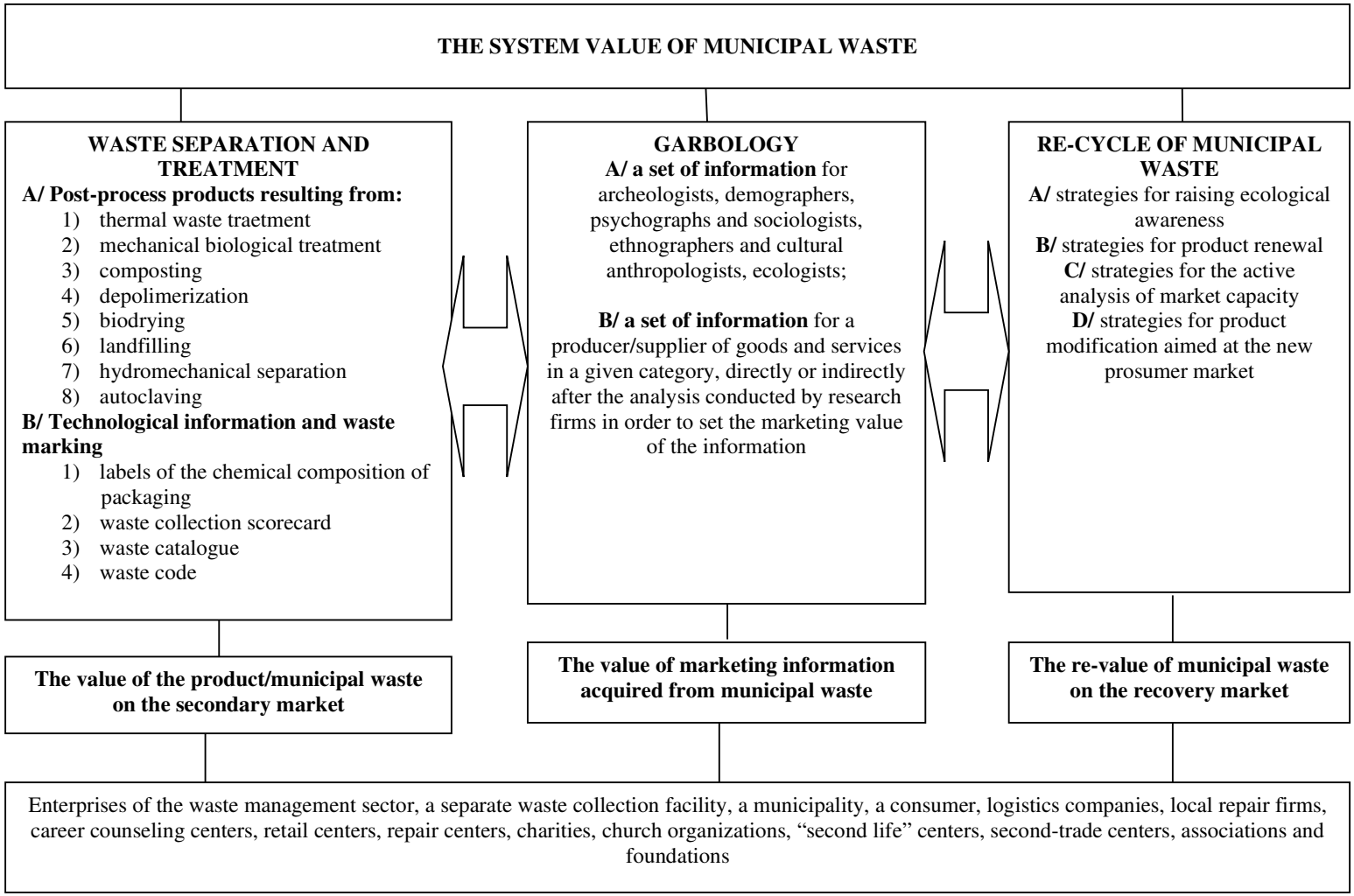

Fig. 1: The model of the system value of municipal waste

Source: own elaboration

Research results show that the system value of municipal waste stems from (Figure 1):

effective separation and treatment processes as well as the adequate recording of technological information on and labeling of waste for secondary markets;
waste-contained marketing data that can inform the decision-making processes of manufacturers and retailers and be of interest to research agencies;
eco-value acquired from the recovery process, as part of the re-cycle of waste, for the eco-prosumer and/or downmarket entities.

The subsystem of municipal waste separation and treatment

The waste management system is built based on the technologies and technological processes that allow for the management of collected municipal waste, its recycling, thermal treatment, or energy recovery, and the application of these processes requiring adequate process knowledge. Other forms of waste recovery are also acceptable – requiring pre-treatment (separation of particular fractions), which then allows for the disposal of waste through its processing. The process of municipal waste treatment in the surveyed enterprises usually includes four main elements:

A. Thermal waste treatment, involving waste oxidation (including incineration and gasification) or waste decomposition (including pyrolytic decomposition).
B. Mechanical biological waste treatment involving mechanical waste treatment and biological waste treatment combined into one integrated technological process of municipal solid waste treatment aiming to prepare waste for recovery processes, including recycling, energy recovery, thermal treatment, and landfilling.
C. Processing of separately collected green waste and other bio-waste, which involves composting (processing waste in the process of natural decomposition of organic substances by microorganisms).
D. Landfilling, which is a method of disposal used for waste which, for technological or economic reasons, has not been recovered or disposed of by other methods.

The state-of-the-art methods to reduce the amount of waste collected include:

E. Depolymerization, i.e. processing plastic waste, which involves the breakdown of hydrocarbon chains under temperature, lack of air and a catalyst, resulting in a product with new properties – synthetic paraffin oil.
F. Biodrying, taking place in heaps, covered with a semi-permeable geomembrane, in boxes providing intensive aeration. Sorted processed waste is transported to the alternative fuel production line or given away as pre-RDF28 used in energy-intensive industries, such as cement plants.
G. Hydromechanical separation, which involves separating the mixed waste stream by means of hydroseparation. The method ensures the recovery of 70-90% of materials intended for further recycling. The selected organic fraction is subjected to fermentation and then it is used to produce a soil conditioner.
H. Autoclaving, involving mechanical thermal treatment of waste. The process eliminates odors and pathogens. The technology uses three physical factors regulated automatically based on waste morphology: temperature, pressure and time. Sterilized waste is sorted mechanically. The sterile organic fraction and clean recyclable inorganic fractions are extracted from the municipal solid waste stream (Styś, Foks, 2014).

The commercial use of information – garbology

The results of the analysis of information contained in the bar code of the municipal waste label and the analysis of the contents of the garbage bin (**garbology**) have marketing value and can inform marketing decisions of businesses delivering particular products to a given market. Accordingly, they can be the subject of commercialization of knowledge in the relationships of waste management enterprises with businesses and research centers.

Contemporary waste science, called **garbology**, was started as a scientific discipline at the University of Arizona and practiced by William Rathje from 1973. The very notion of "garbology" was defined by A. J. Weberman in 1971, following the first analysis of the contents of the garbage bin of the famous musician, Bob Dylan. Similar analyses were carried out for the bins of Dustin Hoffman, Tony Perkins, John Mitchell, Jackie Kennedy and the like. Garbology is also used in technical terminology, where it is associated with waste stream management and the robotic solutions in use are called **garbologists**[viii]. This approach originated in Australia in the 1960s. Garbology, in Holden Village's broader, prosumer view, is defined as "joint sorting, separation and closing down of landfills". The use of garbology in marketing research, on the other hand, draws on its application as an investigation tool in law enforcement and corporate espionage in the 1950s. "Trash covers" analysis involved the analysis of the garbage bin and, more broadly, the analysis of files in the computer "bin" (Humes, 2012).

It should be noted that **archeology**, defined as "the scientific study of the remains such as fossil, relics and monuments of the past and man, i.e. the history of humanity," is the historical foundation of the marketing approach to garbology. Identifying, observing, analyzing the material culture of the contemporary population, it studies the remains of material existence and forms for assumptions about the behaviors of a particular civilization.

Such forms of eliciting information are part of open-source intelligence (**OSINT**), a type of industrial intelligence that involves gathering information from publicly available sources. Intelligence agents use only overt and, most frequently, ethical information collection methods (Stromczyński, Waszkiewicz, 2014). OSINT sources include:

- public life, in this case expressed in the structure and amount of waste, i.e. the content of the garbage bin or, more broadly, the composition of waste in the landfill,
- analysis of products/waste using reverse engineering, in order to achieve certain functionality, i.e. for the purpose of collecting information useful for treatment and recovery as well as marketing research.

The information obtained though the **"analysis of the garbage bin contents"** concerns the buying and consumption habits of a household, which can be the subject of comparative analysis in the cross-section of a given category (natural persons, economic entities, and institutions, from residential and non-residential areas, including industrial locations), a geographical cross-section (international, regional, local), a category of territorial unit (urban, rural), a type of residential architecture (detached houses, blocks of flats), or a time category, distinguishing "special periods" (e.g. festive seasons, vacation time, etc.).

Research into the garbage bin contents may concern the following **areas**, relevant in terms of marketing research, which, in practice, is confirmed by many studies already completed (Baguchinsky, 1999; Rathje, Murphy, 2001; Kowalski, Szczelina, 2017):

- the structure of goods purchased and consumed in a household, by the residents of a building, a housing estate, or a district, enterprises or a group thereof, in a particular zone;
- eco-habits, manifested in purchasing behaviors regarding products in disposable packaging and in willingness to sort waste;
- the amount of a consumed good in a given category in a time unit and the size of a single purchase measured, for example, with the size of the packaging;
- consumption intensity, measured with the bin filling time and the disposal frequency;
- the social level of a household;
- information on consumption habits regarding the consumption of highly processed products or natural products;
- information on preferences for local, domestic or foreign products, taking into account a country of origin;
- the degree to which purchased products go to waste: food, household appliances and electronics;

- the structure of waste, broken down into processable, re-usable and reducible, as well as ballast, i.e. civilization eco-culture and the efficiency of eco-knowledge management,
and other.

Garbological marketing research can concern both the past and the present in relation to consumer behavior and the subject of analysis (waste). Accordingly, four strategies of marketing garbology can be distinguished (Table 2).

Table 2: Strategies of the marketing garbology

		material entity/subject of analysis	
		from the past	in the present
Purchasing and consumption behaviours	in the past	pre-historical, historical and classic garbology	retrospective ethno-garbology
	in the present	strategic garbology – long-term changes in consumer behaviour	contemporary garbology, demographic, economic, social and psychological aspects

Source: own elaboration

Re-use Centers as entities involved in building re-value of waste in the market re-cycle

In compliance with the EU Directive on waste (Directive 2008/98/EC Of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives, Official Journal of the European Union, L 312/3, 22.11.2008) regarding the EU's objectives in the area of the prevention, treatment and disposal of waste by 2020, **"re-use of waste"** is defined as any operation by which products or components that are not waste are used again for the same purpose for which they were conceived. **Preparation for re-use** involves checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing. Art. 17 of the 2012 Act on Waste, preparation for re-use was determined as preferred action, i.e. one that ranked higher than recycling and other forms of recovery in the hierarchy of waste management. Products accepted by re-use centers are, for example, furniture, electrical and electronic equipment, toys, rugs, carpets, dishes, ceramic and glass products, plant pots, sports equipment, books, comics, CDs, various items collected as part of charity initiatives organized for people in need from social welfare centers. Larger quantities of ceramic tiles, wallpapers, veneers, etc. that were not used during renovation works may also be collected. Additionally, doors, bathroom fittings, etc., which were removed and are fit for further use.

Re-use of waste contributes to the "extended life of a product", i.e. its **re-cycle in the market life cycle,** through its repeated use by the same or other user for the same or different purpose that is the result of waste compilation (value building) by the customer (Table 3).

Table 3: Strategies of municipal waste re-value in purpose-user dimensions

		purpose of use	
		the same	new
user	the same	strategy involving the renovation of waste	strategy involving awareness raising in the process of knowledge diffusion and/or strategy of waste modification
	new	strategy of waste replacement and/or strategy involving an active approach to unsatisfied demand (active analysis of market capacity)	strategy involving awareness raising and/or waste modification aimed to pursue an active approach to unsatisfied demand

Source: own elaboration

Each strategy can be operationalized in a number of ways. The **strategy focused on waste renovation** mainly involves the promotion of repair and maintenance services and improving the condition of products by their owners, before their ultimate disposal. Such actions may be undertaken by the owner or commissioned to special service outlets. The **strategy of waste replacement and/or strategy involving an active approach to unsatisfied demand** is particularly adequate in the market for home appliances, household electronics, computers, furniture and bicycles. Initiatives such as "give or take days", "second-hand banks", street markets, exchange through online platforms are the examples of how this strategy can be pursued. Its implementation is also achieved through furniture renovation networks, repair of electronic equipment, refrigerators, and bicycles, which, as part of an active approach to unsatisfied demand, are handed over to low-income families or – after renewal – sold to low-income customers. This can occur on an transmunicipal scale in the form of "exchange and resale centers". In order for such projects to be self-sufficient, it is recommended that most of the recovered equipment should be sold, although at an attractively low price. In addition, this eliminates the customer's sense of discomfort associated with being given something for free and reduces the risk of disappointment when the equipment quickly becomes underestimated waste. Food banks also play a role in the implementation of this strategy, as they counteract wasting food and combat hunger in certain social groups. The **strategy involving awareness raising in the process of knowledge diffusion and/or strategy of waste modification** is mainly based on pro-ecological initiatives aimed at forming social attitudes and behaviors compliant with the assumptions of waste reduction policy. Consumer "zero waste" attitudes, expressed in a particularly creative way giving second life to products treated as waste, contribute to the successful implementation of this strategy. The **strategy involving awareness raising and/or waste modification aimed to pursue an active approach to unsatisfied demand** includes activities relating to customers who make conscious purchases at re-use centers, regardless of their financial status. Consumer eco-convictions determine purchasing behavior. The examples of how this strategy is implemented include, for example, wood banks, set up in order to recover wood from construction sites and re-use it in house woodwork, artistic sculpture or as firewood, as well as "leftover paint recovery" schemes, which, when paint is mixed appropriately, can give new quality.

These strategies, implemented by **re-use centers**[ix], set up as a strategic business unit of a separate waste collection facility, include specific actions constituting the **process of re-using products** considered waste and relate to:

- waste collection;
- waste storage;

- checking whether collected waste is suitable for re-use without the need for maintenance or repair;
- the separation of products from the waste stream that are suitable for re-use (without the need for maintenance or repair);
- necessary operations in the process of preparation or re-use involving waste that requires maintenance or repair. These operations include: anti-corrosion protection, waxing, repair of damaged products by replacing damaged elements, filling, riveting, drilling, welding, grinding,
- storage of products for re-use;
- selective storage of waste originated in the treatment process.

Preparation for re-use may be conducted beyond installations and devices. This form of waste recovery is allowed under Art. 30 paragraphs 3 and 5 of the 2012 Act on Waste, as well as the Regulation on waste recovery beyond installations and devices (Annex to the Regulation, item 21)[x]. Due to the implementation of the components of the process discussed above, the organizational structure of a re-use centre can take a functional and market-oriented form (Table 4).

Table 4: Re-use centre – organizational matrix

Organizational matrix, functional and market-oriented						
renewal centers for a product/waste (maintenance, repair, renewal) for economic consumers in the low- and medium-price market		centers for collection and exchange of potential waste for the segment of economic consumers		a center for the distribution of goods separated from the waste stream		
				products after renovation released commercially in low-price markets or eco-consumer segments	*products acquired directly from the waste stream*	
					for use in an unchanged condition by less well-off consumers and eco-consumers	*as components and parts of a product for the DIY / prosumer segment*

Source: own elaboration

Undoubtedly, the re-cycle in the market life cycle of a product delays and reduces the cost that the environment incurs in the production of a new product, bought to meet the replacement demand. It also allows for the employment of the socially excluded or the long-term unemployed and activates the elderly. Finally, it helps people in need and, in this way, supports a commune or a municipality in their pursuit of the image of a socially minded entity.

Conclusion

The sector of building municipal waste value embraces a variety of stakeholders and includes primary and secondary market operators, commercial and non-profit enterprises, prosumers in various price segments and the like. The multi-value of waste, which originates in multiple stakeholder relationships, has a strategic character, due to benefits in terms of the social good, drawing on the concept of sustainable development, through socially conscious actions incorporating the principles of integral marketing, where the supplier of waste stream component and their recipient meet, on the secondary market or in the recycle, to achieve a long-term strategic effect (Figure 2).

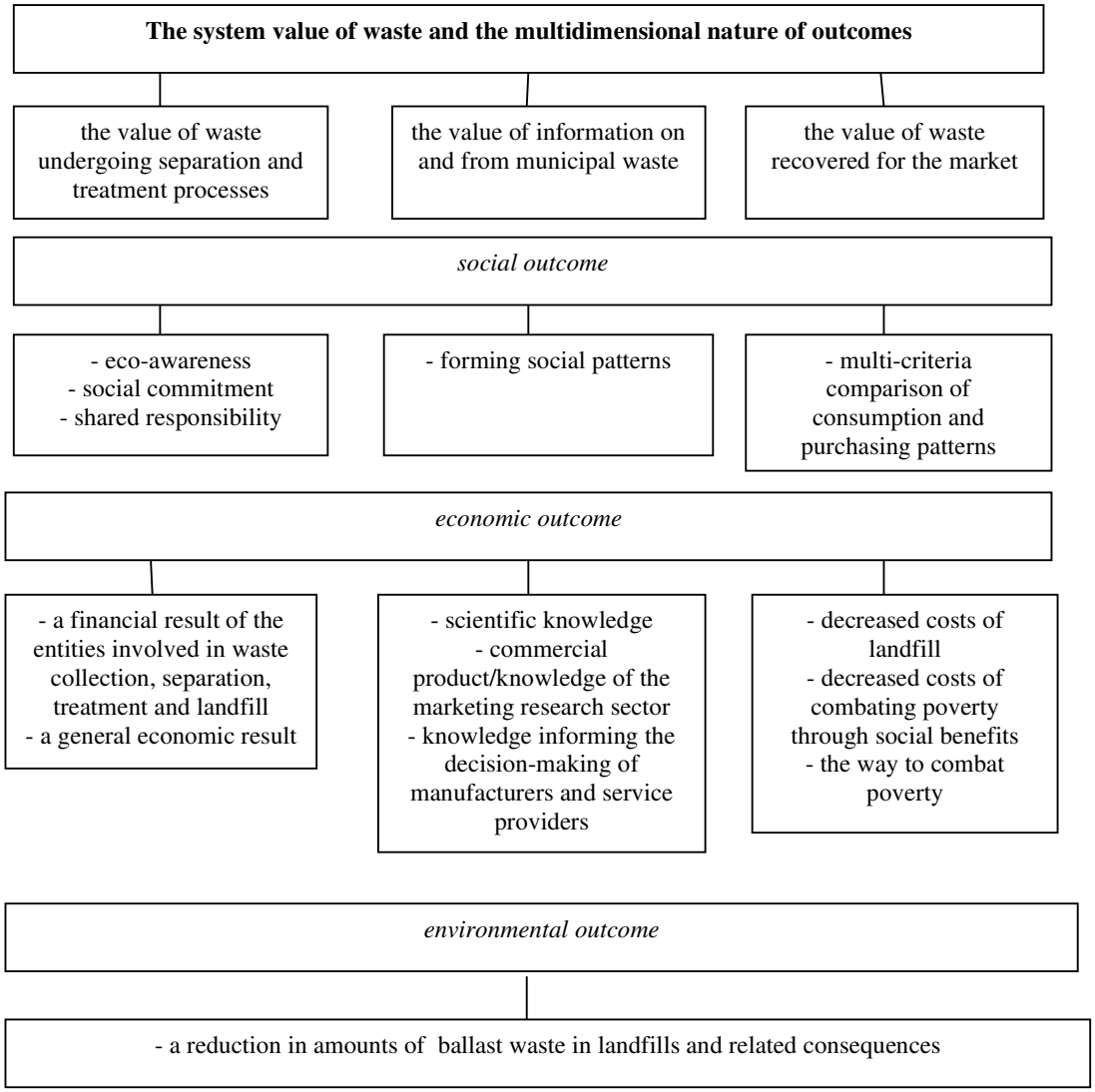

Fig. 2: The model of the system value of municipal waste in the context of the sustainable development concept

Source: own elaboration

Each of the three sub-areas of creating the system value of municipal waste, identified and discussed in the article, corresponds to a range of outcomes in the space of sustainable development: social, economic and environmental, which may offer interesting paths for in-depth research in the future.

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[i] Smart Waste Management is connected with such solutions, especially IT solutions, that can greatly optimize collection, separation, storage services and reduce operational costs for cities and social-cost, transitioning waste management into data-driven collection processes. IoT applications in waste management are engaging citizens and cities alike in the project of making our waste practices more sustainable. Smart Waste Management needs multistructured relations of different entities in the process of creation of strategic multi-ecovalue. Some of the SWM practices are:

1. deeply automating the categorization of waste content, in city and in the installations;
2. collection of a vast amount of data, often in real-time, and the distillation of those data into insights on which users can take action - entities of both markets: primary and secondary;

3. optimization of the route of garbage pickup trucks;
4. facilitation of more insightful, multi-pronged actions, such as planning the better distribution of garbage bins, zeroing on problems (e.g. incorrect disposal practices), or reducing waste going to the landfill (second use points);
5. managing citizens consumption, by integrating inputs from hardware units (sensors) into software applications, and creation of waste habits more sustainability.

The systemic treatment of problem is the main sign of Smart Waste Management.

[ii] Poland had 182 Regional Waste Treatment Facilities managed by 174 entities, as on 15 March 2019. The database of the facilities was compiled by UOKIK (Office of Competition and Consumer Protection) based on documents with public access (Regional waste Management Plans with amendments) and verified by the Marshal's Offices.

[iii] Act of July 19, 2019, amending the act on maintaining cleanliness and order in the commune and some other acts, Journal of Laws 2019.1579

[iv] re-use - any operation by which products or components that are not waste are used again for the same purpose for which they were conceived; Act on amending the act on maintaining cleanliness and order in the commune and some other acts, submitted in the Seym on 5.06.209; The act enforces the Directive of the European Parliament and of the Council 2008/98/WE as of 19 November 2008 on waste and repealing other Directives (Official Journal of the European Union L 312 as of 22.11.2008, pp. 3, 2) the Directive of the European Parliament and of the Council 2010/75/UE as of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (Official Journal of the European Union L 334 as of 17.12.2010, p.17 and Official Journal of the European Union L 158 as of 19.06.2012, p. 25). http://orka.sejm.gov.pl/Druki8ka.nsf/Projekty/8-020-1340-2019/$file/8-020-1340-2019.pdf accessed on: 2.12.2019

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[vii] The methodology is applicable due to:
1/ research concerns contemporary dynamic phenomena and the growing knowledge about them;
2/ research is related to specific contexts of these phenomena, where boundaries between the phenomena and their contexts remain blurred;
3/ the research problem is too complicated to explain causality with methods based on a survey or experiment. (Perry, 2001; Żabińska, Żabiński, 2007)

[viii] RFID (radio-frequency identification) is one of the tools used for object identification (e.g. waste), appplying elektro-magnetic fields for automatic identification and tracking of markers attached to objects. In 2014, the worl RFOD market was worth USD 8.89 billion, compared with USD 7.77 billion in 2013 and USD 6.96 billion in 2012. The figure is expected to grow to USD 18.68 billion by 2026; (Angell, Kietzmann, 2006; Das, 2017)

[ix] Solutions involving re-use centers in Poland are called: *Repair Cafe* in Piła, *Kącik rzeczy używanych* in Stalowa Wola, *Gratowisko* in Poznań, *Galeria Szpargałek* in Szczecin.

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Cybercrime in The System of Economic Security Threats

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Abstract

Digitalization changes the nature of economic relations, the ways of production and promotion of goods and services, the mechanisms of interaction between contractors, and the methods of meeting consumer needs. Information and communication technologies, Internet resources and digital artifacts create new opportunities for an individual, an economic entity, and a state, while at the same time being a major challenge to global security. In the digital space, solving the problem of ensuring cybersecurity is becoming increasingly important all over the world. Today, we need to understand it, and build the capacity to deploy appropriate strategies to improve cyber security. The purpose of the study is to identify cybercrime as a new systemic threat to the economic security of an individual, firm, or state, to identify its motives and methods of manifestation, and to develop an interdisciplinary approach to leveling this threat. The relationship between economic security and the processes of digitalization of social and economic relations is established. The types of cybercrime are systematized and its specifics are specified depending on the subject against which the illegal action is being taken –an individual, a firm, or a state. The analysis of the world practice of countering cybercrime allowed us to develop a pyramid of cybersecurity and propose a set of measures to prevent criminal acts in the information space.

Keywords: Digital Economy, Cybercrime, Economic Security, Individual, Firm, State

Introduction

The current stage of development of public relations and the economy is closely related to the expansion of the Internet, the introduction of information and communication technologies and digitalization. Currently, more than half of the world's population uses the Internet, which is equivalent to 3.9 billion people. According to ITU Connect, Internet penetration will reach 70% by 2023% (ITU 2018).

Many aspects of a person's daily life, the company's production activities, and the state's management initiatives are becoming more convenient, operational, and accessible. The Internet of things, artificial intelligence technologies, automated systems for collecting information and data, robots, and e-government services are transforming the life of society. In addition, the opportunities for all economic entities to develop, achieve more ambitious financial results, and enter international markets are significantly expanding.

However, the openness and transborder nature of information systems create conditions for the vulnerability of all types of transactions, information leakage, occurrence of cyber threats, cybercrime is evolving and declining economic security of business entities from the outside. For example, in 2019, organizations in Spain (57%), the Netherlands (50%), Germany (48%), the UK (40%), and the US (38%) were mostly targeted by cyber attacks% (Hiscox Forrester Consulting 2018).

The main problem of the modern inclusive global information society is the lack of information about the nature and motives of criminal acts in the open information space, about the mechanisms of their implementation and the possibilities of preventing and reducing damage, that is, there is an important need to strengthen cyber protection.

Materials and Methods

The purpose of this study is to identify cybercrime as a new systemic economic security threat of an individual, company, or state, to identify its motives and methods of manifestation, and to develop an interdisciplinary approach to leveling this threat.

To achieve this goal, you need to search for answers to the following questions.

What is the relationship between economic security and the digitalization of social and economic relations?

What are the types of cybercrime and its specifics depending on the subject against which the illegal action is being taken?

Is it possible to prevent criminal acts in the information space and what is the mechanism for leveling them by an individual, firm, or state?

The theoretical foundations of digital transformations are formed by research of Simcoe (2015), Gilbert et al. (2016), which reflect the impact of digital technologies on factor productivity and economic growth dynamics; nature of the impact of digitalization processes on consumer welfare (Brynjolfsson 2018), growth of opportunities of economic systems of the world countries due to intensive introduction of digital technologies (Cooper and Kaplinsky, 1989); Karpunina et al., 2019b)).

Articles of Dasgupta and David (1987), Leonard-Barton (1995), Womack et al. (1990) are devoted to the analysis of information threats to the security of economic systems.

The research was carried out using methods of economic and statistical analysis, induction and deduction, grouping, and the system method.

The information base of the study was made up of publications and information materials of the European Commission, reports of analytical companies Experian, CSO, Financesonline, Verizon, IBM, ITU, Hiscox Forrester Consulting.

Results and Discussion

The concept of "economic security" is used to assess the stability and well-being of individuals, firms, and the state (table. 1).

Table 1: Content and levels of economic security

Level of economic security	Content of the concept	Economic security indicators
Economic security of the individual	it is connected with guaranteed conditions for protecting the vital interests of the individual, ensuring his full-fledged social development and social security	• human life, health, and physical and intellectual condition; • the well-being of the human social and environmental environment; • the state of resource sources of income (land, property, capital, knowledge, labor, entrepreneurship, information, etc.); • the quality of the spiritual, cultural, and socio-political environment of existence (Alabicheva 2014)
Economic security of the company	determines the state of legal, industrial and organizational relations, material and intellectual resources that ensure the reliability and stability of the company's operation, its financial and commercial success, and progressive scientific, technical, and social development	• level of intellectual and human resources support; • state of technical and technological security; state of political and legal security; • state of the information component; • level of environmental sustainability
Economic security of the state	this is a set of conditions and factors that ensure the independence of the state, its stability and stability, the ability to constantly update and improve (Abalkin 1994)	• total and sectoral labor productivity; • GDP production per person employed in the economy; • the volume of production of the industry's products per person employed in this industry; • profitability of products and assets of enterprises; • use of working time; industrial injuries; • the level of use of average annual capacity of enterprises to produce certain types of products; • specific energy consumption on production of certain products and services; • specific consumption of conditional fuel for production of separate kinds of production and works; • losses of individual minerals during mining (Petrenko 2003)

Thus, economic security is based on four key concepts:

- interests (national, state, social, organizational, personal);

- independence (of the national economy from external markets, economic policy from external influence, independence of the company in making production decisions, the individual in choosing the vector of their own development);

- competitiveness (national economy, company, individual);

- sustainability (socio-economic development of the state, company functioning, self-activity of the individual).

Digitalization of products and services reduces the distance between people and things, increasing mobility and making network effects crucial. It allows you to use specific data to meet the individual needs of consumers or companies. In turn, this opens up wide opportunities for developing innovations, investments, creating new businesses and jobs, and creating conditions for sustainable growth (European Commission 2014).

According to researchers, the size of the digital economy in the world is estimated at 11.5 trillion dollars, which is equivalent to 15.5% of world GDP, while over the past 15 years it has grown two and a half times faster than world GDP (Huawei and Oxford Economics 2017).

In the European Union alone, the added value of the ICT sector is 642 billion euros per year. The breakdown by sub-sector shows the predominance of ICT services (590 billion euros and 92% of the total value added of the ICT sector in 2016) over ICT production. At the global level, the share of value added in the ICT sector in the European Union's GDP (4%) lags behind that of its main competitors (Japan (5.8%), the United States (5.4%), and China (4.9%). The ICT sector employed 6.6 million people in 2016, mainly in the ICT services sector (excluding telecommunications-4.9 million people). The share of employment in the ICT sector in relation to total employment in the European Union in 2016 was 2.8% (European Commission 2019). Labor productivity in the ICT sector in the European Union in 2016 was 97,000 euros per employee (index 57.8), which is lower than in the United States (index 100), Japan (index 64.6), but significantly ahead of China (index 28.0).

At the same time, digitalization causes a whole range of new economic security threats of the individual, company, and state, which have social and economic consequences, expressed in the amount of damage caused. Existing threats to economic security from the digital economy can be systematized as follows (table 2).

Table 2: Economic security threats from the digital economy

Level of economic security	Threat type	Effects
Economic security of the individual	• leakage of personal data • cybercrime using Bank cards • Internet fraud • SMS fraud • Internet addiction • everyday attacks by information systems	• loss of professional reputation • economic damage due to blackmail • leakage of money from Bank cards • direct financial losses • job loss • psychological problem
Economic security of the company	• damage to information systems • cybercrime • cyber-espionage • low level of information literacy of employees	• direct financial damage • loss of competitive advantages • decline of productivity • decrease in market share and revenue

	• uncontrolled use of the Internet	• loss of trust
Economic security of the state	• cybercrime • information war • the information advantage of the lead countries • information inequality	• the instability of the economy • under-production of GDP • growth of the black cyber market • economic dependence on highly developed countries • economic inequality

From the table above, we can see that one of the most common threats to the economic security of all business entities (individuals, companies, and States) is cybercrime, cyber attacks on critical infrastructure, and offensive operations in the form of cyber fraud.

The Internet activity of individuals reflects the widespread use of digital Commerce as a way to purchase goods and services (90%) and conduct personal banking (88%) (Experian 2018). This activity becomes the main source of cyber threats. In the online interaction process, three-quarters (75%) of companies are interested in more advanced security measures and authentication processes that affect customer confidence. However, in the course of digital transactions, personal information is regularly leaked, and consumers are exposed to cyber fraud using various tools.

The analysis of the facts of cybercrime actions allowed us to identify the most common types in relation to individuals (Sergeev et al., 2020):

- fictitious online stores are a common type of cybercrime, represented by single-page sites with a unique price offer for a product. When an individual makes a money transfer, they do not receive the required product. Then the site is blocked, changes the hosting or domain name and continues its illegal activities. This type of fraud is one of the simplest methods of carrying out criminal activities on the Internet and causes great damage to the financial viability of poorly protected and uninformed citizens, taking into account their low level of information literacy.

- phishing is a more advanced type of cybercrime that aims to obtain Bank details, electronic payment card data, or data from users ' electronic Internet wallets. A phishing site is difficult to distinguish because it completely copies the original site. In this situation, the victim voluntarily enters their credentials from a wallet or Bank card and soon loses money from this carrier.

- black infobusiness is a type of cyber fraud related to the sale of information in the form of books, audio and video files, presentations, and so on. The user is supposed to buy information or mentoring and mentoring for a certain period in any field of business or science in the form of webinars, refresher courses or online schools. After transferring funds, the user either receives information that can be found on the Internet in free access, or does not receive the goods or services, and loses their money.

- cybercrime with content distribution is a type of cybercrime in which fraudsters create an archive with the information required by the user. As a rule, a simple script is triggered that replaces the name of the archive with the information requested by the user in the search engine. But when you try to unpack or download this archive, the user is asked to send a message to verify his account, so that a large amount of money is debited from his account, and you do not receive the required information.

- pyramid schemes are an illegal part of multi-level / network marketing related to the sale of goods and services through a network of independent distributors (sales agents), each of which also has the right to attract partners with similar rights. Companies appear on the Internet that sell products of extremely questionable quality, which the distributor simply cannot sell later, or use the MLM scheme to provide fictitious financial services.

In addition, the Informatization of the process of providing services to the population, the introduction of electronic services of public services, increase the likelihood of leakage of information about personal data of individuals from state and municipal information systems.

As companies make digital transformations of their operations, they become more vulnerable to the undue influence of competitors and cyber attacks initiated to seize commercial information and market share.

Every year, the number of companies affected by cybercrime is growing, this is partly due to the growth of cybercrime activities and the use of more advanced and malicious methods by criminals to damage businesses. According to the UK ICT authority, 1.76 billion records were leaked in January 2019 alone due to various data breaches around the world.

The most serious threat to companies is information leakage in order to gain certain competitive advantages. For example, data on business plans, investment projects of companies, and technologies being implemented are of interest to competitors. In order to steal business information, competitors use faulty nodes and information systems, access to web servers, industrial espionage technologies, malicious software, phishing, and use a low level of information literacy of employees. Cyber espionage provokes leakage of corporate information, causes direct and indirect financial losses for business, loss of competitive advantages, loss of customer base, and disruption of investment processes.

Nearly three-quarters of companies (72%) call cybercrime a growing problem, and nearly two-thirds (63%) report high levels of fraudulent losses. The FBI's internal crime complaints center (IC3) in the United States confirms that just over 350,000 cybercrimes were reported to it in 2018, but it is estimated that only 15% of victims report their crimes to law enforcement (CSO 2019).

The Kaspersky Lab report noted that in 2017 alone, the average cost of a data breach in North America is 1.3 million dollars for large enterprises and 117,000 dollars for small and medium-sized businesses (CSO 2017). Globally, the cost of data leakage for businesses increased by 11 percent in 2017. In the United States, the average cost of a cyber attack for businesses increased from $ 1.2 million in 2016 to $ 1.3 million in 2017. This is 10 times higher than the $ 117,000 violation cost for SMBs.

Information leakage, cybercrime and cyber espionage are also evident in public administration systems. they violate the natural information structure of markets, create conditions for conducting large speculative transactions, violate the rules of open trading on commodity, stock and currency exchanges, and contribute to the loss of normal market competition and motivation (Karpunina et al., 2020).

For example, the introduction of e-government systems, on the one hand, contributes to improving the efficiency of public administration and is accompanied by the following qualitative changes in the field of public administration: there is a decrease in labor and financial costs of public authorities when using information exchange at the interdepartmental level; the quality of services provided by the state for citizens is increasing; reduced waiting time citizens get their services by improving the efficiency of interaction through the use of ICT, which saves the expenditure of the target budget; reduced wavecontrol due to the openness of the system and possibilities of civil control of activities of the state apparatus; there is a noticeable decrease in the number of appeals of citizens to state authorities for providing different services, due to the possibility of obtaining similar services through the Internet portal of state services; the administrative burden on public administration bodies is reduced, since all necessary information is centrally stored in databases on the Internet (Karpunina et al., 2019a).

On the other hand, the issues of technical implementation of the e-government system from user positions or from the positions of the authorities responsible for its implementation cannot reflect the scale of the problems associated with the emergence of threats to the economic security of the state from their use. In this aspect, it is necessary to take into account the possible purposeful use of

information technologies and the Internet itself in order to cause harmful actions to the entire system of state administration and undermine the welfare of the national economy.

Recent trends indicate the emergence of new types of institutional traps and the formation of a new segment of the shadow economy – the "black" cyber market, which negatively affects the economic security of the entire state (Manohina 2011).

On a national scale, the development of illegitimate cybercrime technologies leads to irreversible consequences, including a lag in GDP caused by an increase in unproductive expenses associated with maintaining information systems in working order and financing the implementation of security systems, the destruction of the natural information structure of markets, the destruction of normal market motivation and competition conditions due to violations of the rules of open trading on commodity, stock and currency exchanges, large speculative transactions, and the formation of a false image of companies, overstating credit ratings (Elyakov 2009).

Overall, IBM notes that malicious or criminal cyber attacks are responsible for 48% of data breaches, human errors account for 27%, and system failures for 25%, with an average data breach size of 25,575 records (Financesonline 2019).

Thus, the methods used in cybercrime against individuals, companies, and the state as a whole are significantly differentiated (Fig. 1) (Verizon 2018).

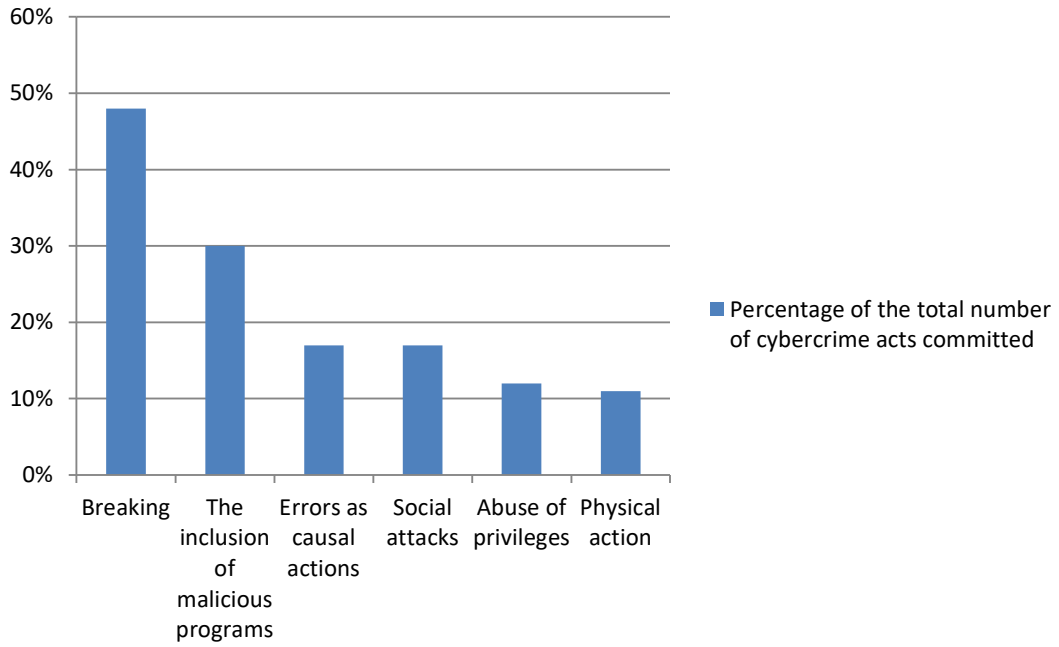

Fig. 1: Methods of cybercrime (compiled by the authors according to IBM 2019)

According to Verizon, the sectors of the economy most frequently exposed to cybercrime are: healthcare organizations (24%), housing and utilities (15%), and public sector enterprises (14%).

International statistics describing the motives and nature of cybercrime activities are as follows: 76% of cyber attacks are committed for money, 73% of offenses were committed by people outside the organization, including 50% by organized criminal groups and 12% by national or state-related entities (Verizon 2018). Приведенные факты обращают исследовательское внимание на существование условий для устойчивого роста количества преступлений и мошеннических операций в киберсреде и расширение способов и форм данных противоправных деяний.

The state's response to the emergence of cyber threats is manifested in the form of implemented state policy measures and cybersecurity programs aimed at countering and leveling these threats.

Internationally, the global cybersecurity index IDI has been developed, which is used to monitor and compare the development of information and communication technologies (ICTs) between countries and over time. A country's ranking in the Global cybersecurity index reflects the contribution of each country to the formation of a global cybersecurity culture and its integration into the core of information and communication technologies. Five main areas of cybersecurity improvement are evaluated: legal, technical, organizational measures, capacity-building measures, and cooperation (ITU 2018).

At the end of 2018, the top ten leaders included the following countries: great Britain (0.931), USA (926), France (0.918), Lithuania (0.908), Estonia (0.905), Singapore (0.898), Spain (0.896), Malaysia (0.893), Norway (0.892), Canada (0.892). These countries have a good position in risk management based on monitoring the performance of key elements of the national cybersecurity program. However, this does not guarantee full protection from cyber attacks for both business entities and the state as a whole.

Conclusions

The analysis of the attempts made to level this threat to economic security allows us to present a combination of the most effective measures to improve the security of individuals, companies and the state in the form of a pyramid of cybersecurity (Fig. 2).

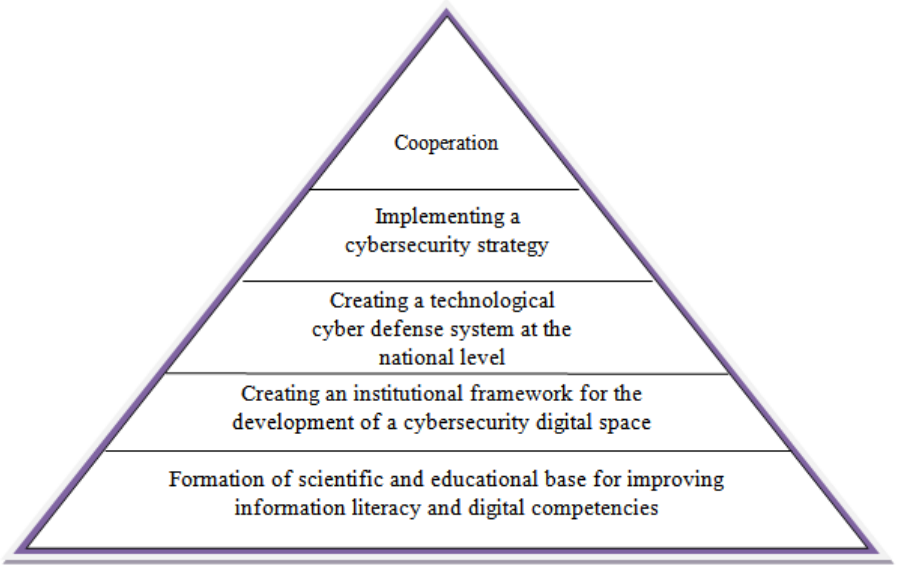

Fig. 2: Cybersecurity pyramid (compiled by the authors)

The basic level of the cybersecurity pyramid is the creation of conditions for improving the information literacy of individuals and the development of digital competencies of employees. Measures of this level are reactionary in the short term due to the rapidly worsening nature of the problem and the need to quickly reduce the negative consequences of cybercrime at all levels of management. The most effective measures to solve this problem are: the formation of motivational mechanisms for building the educational potential of the population, the preparation of information about educational programs and curricula in the field of cybersecurity, the development of differentiated trainings and courses to ensure readiness for cyber attacks for various categories of people, the organization of a public information campaign in the field of cybersecurity. In the long term requires the formation of common scientific and educational platform for continuous

improvement of human capital and training professionals for the digital economy and the national system of research and development, contributing to capacity-building of scientific and educational potential of the nation.

The second level of the pyramid is the creation of an institutional framework for the cybersecurity digital space, that is, legal institutions and structures that deal with cybersecurity and cybercrime leveling. This is a strategically important level of the pyramid, whose measures are of a long-term preventive nature and are related to the regulation of the digital space and the organization of an open discussion of lawyers, economists, technical specialists and management bodies in order to find optimal solutions to the problem of leveling cybercrime. In 2018, cybercrime legislation is applied almost all over the world. About 177 countries around the world have legislation regulating cybercrime (91%), and their number is growing from year to year (in 2017, there were only 79% of such countries) . Laws should be used as a basis for implementing strategies that ensure the sustainability of government ICT initiatives in accordance with the requirements of information technology authorities.

The creation of a technological cyber defense system at the national level based on the development of technical institutions and framework agreements on cybersecurity is the third level of the pyramid and has a long-term reactive and preventive character. In the case of technological readiness of cybersecurity services of enterprises and national agencies (in terms of the availability of technical mechanisms for combating spam, online tools for protecting against cyber attacks, blocking malicious resources), cyber protection is provided reactively. In order to achieve long-term sustainability, it is necessary to form a comprehensive technologically advanced cyber defense system, taking into account the technical capabilities of all economic entities.

The fourth level of the pyramid is organizational measures based on the development of institutions and policy coordination strategies for ensuring cybersecurity at the national level. Overall, in 2018, the majority of countries (58%) reported having a national cybersecurity strategy, whereas in 2017, only 50% of the countries studied attempted to develop and implement it. The presence of a national cybersecurity strategy is more common in European and CIS countries, and less common in the African region (14 out of 44 countries have national strategies). In addition, 91 countries have now developed a system of monitoring indicators to assess the dynamics of cybersecurity development at the national level.

Cooperation between countries and international organizations is the top of the pyramid and allows not only to create conditions for the exchange of practical and effective experience in leveling cybercrime, but also to become an open platform for discussing institutional initiatives, technological solutions and directions for further development of the system of combating cybercrime.

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Improving the Management of the Municipal Education System in Russia

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Abstract

The organizational structure of the municipal Executive and administrative authority is an important starting point for effective management of the municipal education system. The education management body is part of the entire system of municipal Executive power, and its status in this system significantly affects the subjectivity and quality of management decisions in relation to the municipal education system. Regional regulation of the organizational aspect of the management of municipal education systems is possible as a result of the use of a tool for evaluating the effectiveness of local self-government bodies and municipal executive authorities, as part of their management of the education system. In this work, a number of proposals are put forward for the formation and Desk control of organizational structures of municipal administrations, which do not contradict the legislation of the Russian Federation, but at the same time increase the manageability of municipal education systems by the regional authorities. The proposed changes in the order of presentation of organizational structures in terms of socio-economic efficiency will increase the information content, openness of power decisions, reduce transaction costs, reduce the distance between the local administration and the will of the population, and therefore affect the quality of life of citizens.

Keywords: The Organizational Structure of The Municipal Education System, The Executive Authorities, Management Efficiency

Introduction

The search for new mechanisms to improve the efficiency of state and municipal authorities is caused by modern economic conditions, characterized by limited resources and the need for rapid adaptation of the management process to socio-economic and political changes (Karpunina et al., 2018). Improving the effectiveness of municipal authorities in implementing regional socio-economic policies requires studying the existing conditions and factors that affect the effectiveness of the state apparatus.

The relevance of the study is determined by its focus on improving the efficiency of management of the municipal education system in order to improve the quality of life of the population. The study of the quality of the organizational structure of the administration as a starting condition for effective management of the municipal education system can reveal the reasons for stable (low or high) performance results, will provide the necessary information for making decisions to improve the management process.

In addition, the problem of non-compliance with the conditions for the organization of effective management of the municipal education system in Russia is not given due attention. This is evidenced by the system of organization of evaluation of the effectiveness of local self-government bodies in implementing social and economic policy, created at the state level. In practice, the evaluation is aimed only at achieving the result, and the conditions are not studied.

Materials and Methods

The scientific hypothesis of the study is the assumption that in Russian conditions, in order to level the negative starting conditions in the organization of management of the municipal education system, the procedure for forming (changing), registration of the organizational structure of the local administration requires standardization and state regulation without infringing the right of the subject to determine the structure of the individual.

The theoretical basis of the research is the work of Burganova (2014), Emerson (2010), Fayol (1999), Mil'ner (2016), Chandler (1962), Akoff and Emery (1972), Parkinson and Rustomji (2013).

In the study, the "organizational structure" will be understood as the structure of the management object, built taking into account the requirements of the best functioning of the system.

Creating an effective organizational structure helps to achieve the goals set for any system (Mescon et al., 1985).

Empirical studies by Bish (2001), Bicker and Daan van der Linde (2016), Blesse and Baskaran (2016), Tavares (2015) prove the relationship between the organizational structure and the effectiveness of local authorities.

Lapygin (2007) highlights the General rules for the formation of organizational structures of municipal authorities: the structure forms a list of strategic functions; duplication of functions is prohibited; the optimal management is subordination of no more than 6-7 management units.

Researchers note that control factors play a significant role in building the organizational structure of local authorities (Ouchi 1977). The principle of individualization in the construction of organizational structures of municipal authorities should not reduce the quality of interaction between divisions and the external environment (Benzer et al. (2016)), and their similarity does not negate the consideration of individual characteristics of municipalities.

The process of improving organizational structures in the field of education has its own specifics, is an important object of research in the context of increased interest in the reproduction of human capital and the basis for improving the efficiency of management of the municipal education system (Potashnik and Solozhnin (2014).

Research methods: system approach, method of comparative analysis, observations, classification, expert analysis, survey and generalization, method of analogy, differentiation. Additional sources of information are local regulations of local governments. The survey, conducted to clarify the components of the problem of diversity of local administration structures and the place of the education management body in them, was generalized using the A. Pareto method. The Kepner-Trego method was used to identify the causes of existing problems and develop alternative solutions. The link between the effectiveness of the management of the municipal education system and the

organizational structure of the local administration is proved on the basis of the results of expert evaluation and calculated statistical methods for its processing.

Results and Discussions

A sample of 100 sites of municipal administrations of the regions of the Southern and Volga Federal districts of the Russian Federation was formed to conduct research. The official websites of municipal administrations were studied: Krasnodar territory, Stavropol territory, Rostov region, the Republic of Adygea, Saratov region, Orenburg region. The coverage of municipal sites is determined in connection with the need to study the features of municipal education systems in regions where the majority of rural municipal areas (table 1).

Table 1: The scope of the research (compiled by the authors)

Region	Number of municipal districts and urban districts (GKS 2019)			Sites investigated, % (units)	The representativeness of the sample
	Municipal district	City district	Total		
Krasnodar region	37	7	44	100 (44)	+
Adygeya Republic	7	2	9	100 (9)	+
Stavropol region	26	10	36	8 (3)	_
Rostov region	43	12	55	5 (3)	_
Orenburg region	35	12 (1)	48	6 (3)	_
Saratov region	38	1 (3)	42	90 (38)	95%±5
Total	186	48	234	43 (100)	99%±10

The confidence probability for municipalities throughout Russia (2350) of the second level is 95% with a confidence interval of ±10%. The study of methods of formation and generalization of the practice of forming organizational structures with such a representative sample allows you to generalize the results to the entire General population with an error of 10%. It should be noted that the sample has a bias to the South-West of Russia. For the Volga and southern Federal districts, the confidence probability is 99% with a confidence interval of ±10%.

Analysis of the official websites of municipal Executive and administrative authorities allowed us to distinguish two forms of representation of the structure: graphic and/or list. For example, the structure of the administration of the city of Krasnodar on the site is indicated by a list method with the indication of positions, photos, surnames, names, patronymics and supervised directions at the levels of the hierarchy (Kdr 2019).

While the organizational structure of the administration of the Pavlovsky district of Krasnodar territory is presented in figure 1 in a graphical way (Pavl123 (2019)). The sample includes municipalities in which the organizational structure of the administration is presented both graphically and in a list.

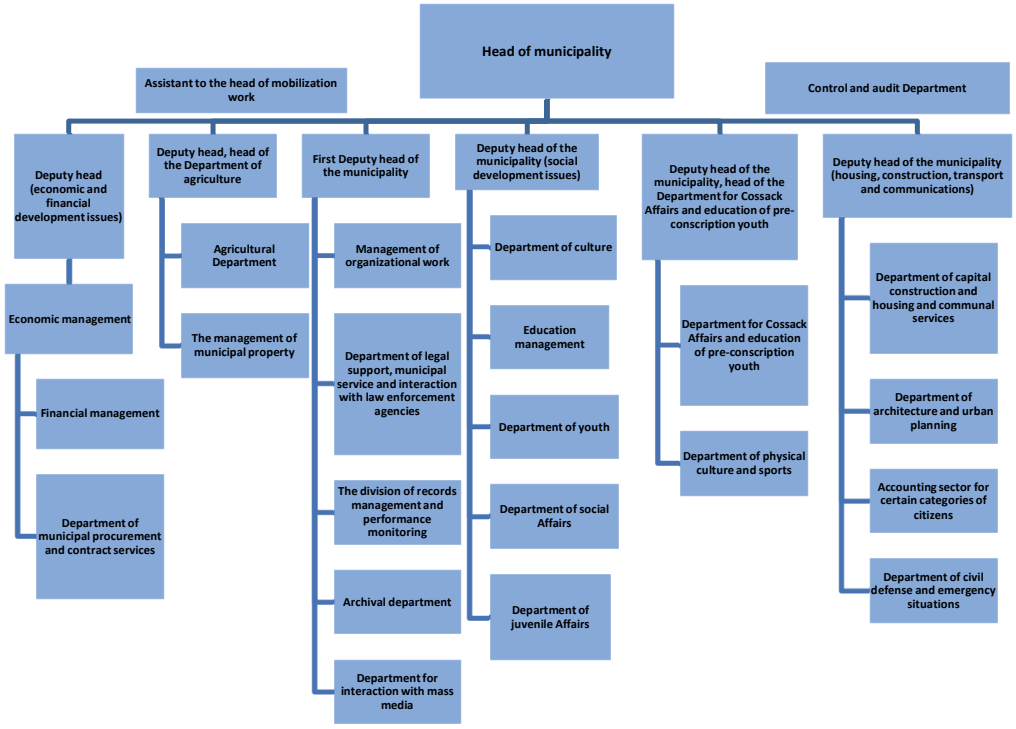

Fig. 1: An example of the structure of the municipal administration formed in a graphic way (compiled by the authors based on the materials of the official website of the Pavlovsky district of Krasnodar region) (Pavl123 (2019))

In accordance with paragraph 1 of article 131 of the Constitution of the Russian Federation (1993), the structure of local self-government bodies is determined by the population independently (Constitution 1993). However, in practice, the structure is formed by the municipal Executive and administrative authorities, and the representative body approves it. The process of changing the structure has a top-down direction. And the opinion of the population, especially employees of administrative structures, is not studied.

The analysis of graphic diagrams (organigrams) allowed us to identify common features: subordination of the education management body to the Deputy for social issues and the presence of the status of a legal entity in most of these divisions. In large urban municipalities, the governing bodies of the municipal education system have a wide range of powers with appropriate resources.

The variety of organizational structures of the municipal education system management bodies (Potashnik and Solozhnin, 2014) and their position in the structure of the local administration is not only related to the scale of municipalities and the volume of educational services provided. In addition, in some cases, the education management body is outside the structure of the local administration and does not have management links on the organogram (Zatosvetly (2019)).

The revealed variety of organizational and legal forms and provisions of education management bodies in the structure of local administrations was the basis for the expert survey of 100 employees of municipal administrations (80 % of whom are specialists of education management bodies) to identify the reasons for the low efficiency of the execution of powers. The results of the survey showed that 44 % of employees surveyed see the reason in hidden rules in the administration – rank 1 (a); 42% - in the shortcomings of the organizational structure-rank 2 (B); 7 % - in the low

performance of some employees-rank 3 (C); 5 % - in the absence of financial resources –rank 4; 2 % - indicated other reasons – rank 5 (Fig. 2).

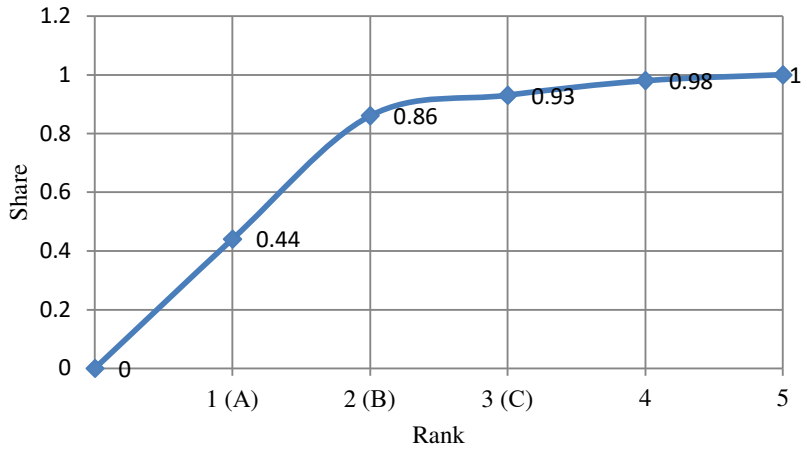

Fig. 2: Lorentz curve (compiled by the authors)

According to A. Pareto, three components of the problem cause 80% of its manifestations and consequences. In our case, two components determine more than 80% - hidden rules and shortcomings of the organizational structure and the problem of low efficiency.

Using the Kepner-Trego method, we systematize the information and prioritize the information (table 2).

Table 2: Kepner - Trego matrix for problem identification (compiled by the authors)

№	Characteristics of symptoms (manifestations) of the problem	Fixing symptoms	
		Appear	Not appear
1	2	3	4
1	The nature of the symptoms	What they are (do not represent)	
		They have an administrative (political) character: different organizational and legal form, status, conditions, opportunities and powers of the municipal education system management bodies in the presence of a single strategy for the development of the "Education" industry and requirements for the provision of educational services	They do not have General requirements for the security of the education management body
2	When did they appear	When	
		- during the formulation of performance criteria and methods of calculating indicators - in the treatment of the population to the authorities - when planning and forecasting the development of the education system in the region. Problems have a hidden internal character and are manifested: - during the implementation of projects and programs; - when performing tasks in the preparation of reports;	External manifestations are not recorded.

№	Characteristics of symptoms (manifestations) of the problem	Fixing symptoms	
		Appear	Not appear
		- when assessing the quality of the results of the municipal education system as a whole and individual elements separately; - when forming and distributing the budget for the maintenance of the education system as a whole and individual elements separately; - when interacting with administrative divisions; - when stimulating and motivating employees, when appointing (dismissing) a position; - when making decisions on the functioning and development of the municipal education system.	
3	Where did they appear	Where	
		In regions where a General concept defining the structure of the municipal education management body has not been developed, its status in the structure of the local administration. Appear: - in performance; - in the personnel of the reaction; - in assessing the population; - in the cost-effectiveness of resources and the practice of their distribution; - in saving working time; - as a clerk.	Control and Supervisory authorities do not assess the availability of resources assigned to the authorities and the creation of appropriate conditions for the management of the municipal education system
4	What do they apply to	On what	
		- on the quality of external and internal relations; - the climate in the team, job satisfaction, and work discipline; - the emergence of imbalances in the development and functioning of the region's education system, as well as in the provision of educational services	- does not affect the evaluation of the effectiveness of state bodies in managing the education system; - does not affect the assessment of the effectiveness of the heads of local administrations
5	Any changes that have occurred	Changes	
		- affect the resource provision of activities - affect the transaction costs of adapting the management system to new conditions; - on the status and motivation of employees of the education management body	- There is no quick reaction to changes to hidden rules
6.	Reason	1. different approaches to the formation of the administration structure in relation to the management of the education system, despite the unity of strategic	Administrative (legislative) drawback of a

№	Characteristics of symptoms (manifestations) of the problem	Fixing symptoms	
		Appear	Not appear
		goals; 2. weak controllability (controllability conditions for the control and predictability of the results of the system) of the municipal systems of education from the regional authorities; 3. personal interests of groups of people in the management of the administration; 4. closeness of the municipal management system (opacity of procedures for forming structures)	systemic nature. Absent: - restrictions on changes or formation of the structure in terms of time and quality; - regulated justifications for changes in the structure; - responsibility for the quality of the structure; - control of structure formation

As a result of systematization of information, it was revealed that the reason for the diversity of structures and weak regulation is the lack of unified approaches to the formation of the structure of local administration. This is due to the implementation of the principle of individualization-taking into account local conditions, as well as the policy of deliberate non-interference in structural changes in local administrations in accordance with the Constitution of the Russian Federation (Constitution 1993).

The result of identifying the reasons of the problem is alternative solutions that determine the manageability of the municipal education system (that is, its ability to perceive the effects of the management system (in this case, the super-system – a regional Executive authority in education) in order to achieve socio-economic goals (internal properties of the municipal education system) (table 3).

Table 3: Alternative solutions to the problem (compiled by the authors)

№	Decisions	Risks	Positive effect
1.	Leave as is	- increasing disparities in development; - weakening of control and manageability; - increasing differences in the quality of services; - bias evaluation of the effectiveness of activities; - General decrease in the quality of services; - the closeness, the growth of corruption; - dissatisfaction of the population	
	Alternatives		
2.	Standardize the process of forming	- bringing to the details; - the lack of competent	- development of the rules of procedure;

№	Decisions	Risks	Positive effect
	and making changes to the organizational structure	control of	- saving time, reducing corruption, violations of labor laws and management laws.
3.	Assign responsibility for the quality of the structure design	With collective responsibility, the state of affairs will not change	- reducing corruption; - improving the quality of organizational structures, forming structures based on scientific recommendations and regulatory requirements.
4.	Define requirements and improve the quality of user-oriented organigrams	Increasing the depth of questions for control and Supervisory authorities and the population due to increased openness	- elaboration of assigned functions; - time saving; - reduction of corruption manifestations; - increasing the efficiency of activities and the possibility of forming criteria for evaluating activities.
5.	Influence through an assessment of the conditions for effective management of the municipal education system	Restriction of the subject's right to individualization	- uniformity of the status of education management bodies in the region, which contributes to an objective assessment of performance; - improving the management of the municipal education system; - ability to calculate the trajectory of resource flows, which means to predict the periods of task execution

It is necessary to conduct a comparative analysis of organizational structures using local normative documents for compliance of the organizational structure (graphic or list) with the real state of affairs in order to find the most constructive structures. This analysis allowed us to identify critical areas of differences in the powers and capabilities of education management bodies, and, consequently, the conditions for managing the municipal education system (table 4).

Table 4: Connection of individual starting conditions of management with the organizational structure of the administration

№	Critical areas	A variety of conditions	Impact aspect	Relation to the administration structure
1.	Municipal service	attitude of employees of education management bodies to the municipal service (whether they are municipal employees)	motivation of employees	the education management body is located in the administration structure, usually subordinate to the Deputy head of social affairs
2.	Employer of managers	attitude to the heads of educational organizations (personnel records for Directors of educational	motivation of heads of educational organizations (management directly, without approval:	tracked by designations of links with municipal organizations (interaction or management)

№	Critical areas	A variety of conditions	Impact aspect	Relation to the administration structure
		organizations are conducted in the Department of education or in the personnel service of the administration)	administrative documents are developed faster)	
3.	Employer of employees	attitude to employees of the education management authority (who is the employer- the head of the authority or the head of the administration)	motivation of employees of the education management body (direct management of employees, management without approval, personnel and management decisions are made faster)	it is assumed if a legal entity (automatically considered if the municipal education management body is a legal entity; additional verification of personnel records and the Charter is required)
4.	The main Manager of budgetary funds	attitude to the distribution of financial resources (the education management body is the main Manager of budget funds or not for municipal educational organizations)	planning, organization of the functioning and development of the education system (disposal of financial resources of the municipal education system without approval – the effect of saving time; the possibility of using the synergy effect))	it is possible only if the relations between the authority and educational organizations are managed
5.	Founder	attitude to the disposal of the property of educational organizations (whether the educational management body is the founder of municipal educational organizations or not)	planning, organizing the functioning and development of the education system (saving time)	it is assumed that the relations between the authority and educational organizations are managed
6.	The trajectory document	document flow direction (main requests and documents from the Ministry of education of the region are sent to the education management body directly or through the administration's office)	organization of the functioning and development of the municipal education system (the effect of saving time, completeness of information, absence of errors in the distribution of responsibilities and assignments when signing documents to	it is assumed that the relations between the authority and educational organizations are managed

№	Critical areas	A variety of conditions	Impact aspect	Relation to the administration structure
			performers)	

Among the factors of efficiency of organizational structures of the local administration of the municipal education system by means of expert analysis identify: the status of legal entity of the educational authorities; a finding unit of administration; the status of municipal employees the employees of the educational authorities; the ability of HR administration and independent decision-making on the appointment, dismissal, etc. of heads of educational institutions and employees of educational authorities; the status of founder for educational institutions from the authority of education management; the status of the main manager of budgetary funds for educational organizations and support institutions (units); the presence of methodical institutions (divisions) in the body of the education management (Karpunina et al., 2019); the existence of own books in the educational authorities; the availability of other support units in the managing authority of the education; no destructive hidden rules (conflicts regulations) in the administration; development of constructive regulations for the interaction of local administration departments in the course of performing the main types of work and providing municipal services .

Using a logical analysis of the relationships between factors, as well as an extremely low number of preferences by experts (group A-employees of education management bodies, group B-other specialists of local administrations), indicators 1, 2, 5, 9 were excluded. Thus, they left 7 indicators (table 5).

Table 5: Results of ranking of organizational structure factors (compiled by the authors)

№	**Factors**	**Rank of group A experts ' responses (x_i)**	**Rank of group B experts ' responses (y_i)**	**The difference between the ranks (d_i)**	**Squared difference (d_i^2)**
1.	Status of municipal employees	5	4	1	1
2.	Personnel records management for heads of educational organizations and employees of the education management body	1	1	0	0
3.	Status of the chief administrator of budget funds for educational organizations	2	3	-1	1
4.	Availability of methodological divisions	6	6	0	0
5.	Having your own accounting Department in the education management system	3	2	1	1
6.	No destructive hidden rules in the local administration	4	5	-1	1
7.	Development of constructive regulations for interaction of local administration departments	7	7	0	0
n = 7	-	Total ranks: 28, which corresponds to checking	Total ranks: 28, which corresponds to checking	-	$\Sigma d_i^2=4$

№	Factors	Rank of group A experts ' responses (x_i)	Rank of group B experts ' responses (y_i)	The difference between the ranks (d_i)	Squared difference (d_i^2)
		the correctness of the ranking	the correctness of the ranking		

Spearman's sample rank correlation coefficient is calculated according to formula 1 and 2:

$$p = 1 - \frac{6\sum_{i=1}^{7} d_i^2}{n(n^2-1)} \approx 0{,}93 \ (1)$$

где $d_i = x_i - y_i$, (2)

n- sample size.

Thus, the value of Spearman's rank correlation coefficient (p) does not exceed 1 and, according to the Chedoc scale, indicates a close relationship between the two samples presented. The significance of the correlation is explained by the similarity (dependence) of experts ' opinions on the relationship between the effectiveness of management of the municipal education system and the organizational structure of the administration. However, the correlation indicator calculated from a limited sample (population) is only an estimate of statistical regularity, since in any survey there is an element of randomness inherent in the individual (subjective) judgments of experts. The statistical significance of the correlation coefficient was verified by the student's criterion (formula 3).

$$t_p = p \cdot \sqrt{\frac{n-2}{1-p^2}} \approx 5{,}66 (3)$$

$$t_{tabl} = 2{,}571 \ (4)$$

The result is significant, since the table value of the student's critical distribution points (t_{tabl}) is less than the calculated value obtained (TP). In other words, the rank correlation between expert assessments of two different groups in relation Both groups of experts first put the HR inside the on education management, i.e. the ability to manage staff resource experts on and managers of educational institutions. Positions related to accounting and managing financial resources came in second and third place. The lowest number of preferences was expressed by the experts of both groups of regulation of consolidated operations within the framework of functions. to the municipal education system (external and internal) is significant.

Thus, the study allowed us to confirm the relationship between the effectiveness of management of the municipal education system and the organizational structure of the local administration (in relation to the education management body).

Designing the organizational structures of local administrations should meet the following principles: performing the functions and tasks of local self-government; cost-effectiveness; taking into account the characteristics of municipalities (the principle of individualization).

However, the frequent change of the structure of bodies of management of municipal educational system, labour turnover, changing regulations of rendering of services and execution of works or the inconsistency of functions of a real opportunity, labor law violations, a manifestation of corrupt elements are evidence of low bureaucratic culture of the municipal authorities, but the weak controllability of the municipal system of education by regional educational authorities.

Indicators of weak controllability of the issues of management of municipal system of education by regional authorities are: the lack of common approaches to the formation of municipal bodies of education management in municipalities; the lack of similarity between the status of employees of municipal bodies of education management and provision of educational authorities in the structure of the municipal administration; frequent changes in the structure of municipal authority of education

management and structure administration; turnover of staff in the municipal education authorities; unjustified change in the functional (job) responsibilities of employees.

These indicators of weak manageability are factors of inefficient activity of municipal Executive and administrative bodies for managing the education system, which are easily detected by Desk control (in accordance with table 4). Therefore, the organizational structure should be established based on the volume and content of tasks, the intensity of information flows and taking into account the material capabilities of the municipality.

The study confirmed the important role of regional regulation in the effective management of municipal education systems. As part of the strengthening of the regulatory function of regional education management bodies in many regions of Russia at the present stage of development, provisions are being developed to assess the effectiveness of municipal education management bodies. An important factor in objectively evaluating the effectiveness of Executive and administrative authorities in managing the municipal education system is the assessment of the effectiveness of the organizational structure of the municipal administration and the place of the education management body in it. An objective assessment of the effectiveness of municipal Executive and administrative bodies in managing the municipal education system by regional authorities and subsequent methodological, explanatory and control measures can serve as a tool for solving the identified problems.

Conclusions

The study confirmed the hypothesis that it is necessary to regulate the formation of organizational structures of local administrations in order to improve the efficiency of management of the municipal education system. This regulation can be implemented at the state level by indirect tools, without violating constitutional rights. The regional education management body as a competent super-system of management for the municipal body in the field of education can best influence the quality of the organizational structure. The weakening of control in the organizational and structural issues of municipal administrations, the disappearance of the "spirit of anonymity" leads to the transformation of relations between units of the administration, and a loss of purpose of the management system to integrate the activities of all components and subsystems to achieve the desired wellbeing of the population.

Creating a comfortable environment for the population on the issue of orientation in the organizational structure, as well as for effective in-house control conducted by Supervisory and other state bodies, is possible through:

1) mandatory placement of the structure on the official website of the administration with a reference to the official document that indicates the date of approval;

2) in the upper-left corner of the document, it is recommended to set the dates of all changes to the structure;

3) the structure must be represented by both a graphical and a list method;

4) in the upper-right corner of the symbol that indicates a structural division, the number of full-time positions should be indicated, and the list of organizational structures lists all employees who fill these positions;

5) the structure should not change more often than once every three years (the strategy is unlikely to change more often!), with the exception of additional staff positions or divisions that are necessary for the implementation of new municipal powers transferred from state authorities, as well as changes related to the regulation of control and Supervisory authorities;

6) the list form of the structure should reflect vacant positions with the indication of the start date of the competition for its replacement and the date of the vacancy with weekly reconciliation and updating of information;

7) unreliability of information about the organizational structure on the site should be subject to administrative punishment.

These proposals will reduce the number of unjustified structural changes that require correction of interaction regulations and job responsibilities of employees of transformed departments. Consequently, the cost of human and material resources and time to adapt to new management conditions will be reduced. In addition, certain recommendations for improving the organizational structure will help to combat personnel corruption.

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Non-Material Factors of Employee Motivation – Sex Aspects

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Abstract

The article is an attempt to answer questions concerning the most common intangible employee motivation factors and their evaluation by employees. In the first part of the article the authors try to find an answer to the question why people work in this way and not in any other way and discuss issues related to employee motivation and motivation. The second part presents the results of empirical research conducted in Polish micro and small production enterprises located in the Wielkopolska Region; the research concerns the most frequently occurring and most significant, from the perspective of the respondents, intangible motivation factors. The main aim of this article is to present the results of research evaluating the effectiveness of particular non-material motivation factors and trying to explain their influence on the development of motivation systems. The study analyzes concepts related to employee motivation and presents the results of own research, taking into account the gender aspect.

Keywords: Motivation to Work, Motivation Tools, Motivational Factors, Employee Sex.

JEL Classification: I25, M5

Introduction

Why do people work this way and not another way? The answer to this question has long been sought by scientists, business practitioners, psychologists and sociologists. Due to the changing environment, which causes changes in the approach to work and professional life and parallel to personal life - this question is still relevant and seems to always be. In the present times of uncertainty, attempts to minimize costs and maximize effects and growing competition, the answer to the question: what intangible elements motivate employees? Due to the current conditions on the labour market (employee's market), employees are provided with the convenience and comfort of living by meeting their financial expectations. This manifests itself in the form of remuneration and additional health insurance, company car, laptop, smartphone. However, it turns out that this is not enough to keep key human resources in the company. To this end, companies have the opportunity to apply a wide range of intangible motivation factors, which in fact have a significant impact on employees. Sociologists and representatives of the sciences of organisation and management understand motivation as influencing the employee in order to achieve behaviour in line with the needs and interests of the company. Psychologists, on the other hand, treat motivation in a subjective dimension - characteristic of every person.

The main aim of this article is to present the results of research on the assessment of the effectiveness of individual non-material motivation factors and an attempt to explain their influence on the formation of motivation systems. The study analyzes the concepts related to employee motivation and presents the results of own research, taking into account the gender aspect.

Research Problem

The Characteristics of Employee Motivation

According to Terry (in Tripathi, 2012), there are elements that companies use to achieve management objectives. Terry classifies them as „The Six M's in Management", that is people, money, methods, machines and the market. The success of a company depends on how the company manages its human resources (HR), because it is the human resources that generate profits for the organisation through the development of their professional career (Tripathi, 2012). The employer expects not only employees who are capable and competent, but also who are not afraid of hard work and achieve optimal results (Ramadanty, Martinus, 2016, p. 78-80). Hence the basic task of managers, who should stimulate high motivation of employees to act. (Hasibuan, 2009). According to Daisy, motivating employees can bring benefits and contribute to the full use of the potential of their human resources. Motivated employees are more willing to fulfil their duties and perform them more effectively (Daisy,2017, p. 165).

Each of us is motivated to meet every day. It occurs when a person feels a need and has the opportunity to satisfy it. Motivation to work is the state and energy that drives employees to achieve the organizational goals of the company. Moreover, it encourages to act and results from internal factors thanks to which an employee can give maximum effort in his work or reduce it to a minimum (Mangkunegara, 2005). In a company, motivation plays a very important role, because motivation in the form of encouragement involves generating, directing and maintaining behaviour in order to achieve the goals of the organisation (Rajhans, 2012:81).

Motivation is an ambiguous concept and is the subject of research in many sciences: psychology, sociology, the science of morality and, in general, the sciences dealing with the interpretation of human behaviour. It derives from the Latin word "motus" and the English word "move", which means "to move, move, encourage, influence and stimulate someone". As proposed by Kanfer, motivation is defined as: "Psychological processes that determine (or energize) the direction, intensity, and persistence of action within the continuing stream of experiences that characterize the person in relation to his or her work." (Lerner, Busch-Rossnagel, 1981. p. 2). According to Bartol and Martin, motivation "energizes behavior, gives direction to behavior, and underscores the tendency to persist"(Bartol., Martin, 1998). Islam and Ismail suggested that motivation is an important aspect of influencing others to work towards achieving company goals (Islam, Ismail, 2008, pp. 344-362).

In the process of motivating employees the most important thing is to choose the right motivational factors. According to the literature, these instruments are divided into tangible (monetary and non-monetary) and intangible. Financial motivation is directly related to remuneration, bonus, salary increase and monetary reward. Among the factors of material non-monetary motivation are the organization of recreation, meals subsidized by the company, additional medical care, the possibility to use a car or a company laptop. Among non-material motivating factors, employers have a whole range of possibilities, starting from increasing independence at work through equal treatment of all employees, correct relations or friendly atmosphere (Daisy, 2017, pp. 165-166).

Research Problem

The choice of an appropriate method of motivation contributes to the proper use of human resources so that employees feel satisfaction with their work (Sadłowska-Wrzesińska, Nejman, 2016, p. 399). The process of motivation uses specific motivation factors. In Poland, motivation factors are used according to various criteria.

In Poland, the criteria for dividing motivational factors are applied (Sępek, 2010, p. 103):

- scope of influence: internal (recognition, independence, development) and external (pay, promotion, feeling of security),

-form: wage (prizes, bonuses) and non-wage (oral praise, good working conditions, training, integration trips),
- impact direction: positive (reinforcing desired behaviour) and negative (penalties to motivate avoidance of behaviour considered undesirable),
- mode of influence: individual and team,
-requirements: factors satisfying basic stimuli (the body's life needs) and factors satisfying higher-order stimuli (the needs of a social and aesthetic moral type).
In the last year in Poland about 16% of employees changed jobs, a year earlier about 10%. This problem concerns the manufacturing industry to the greatest extent. It is commonly believed that this is an effect of underestimation of employees by employers; this is manifested both by low financial remuneration and lack of recognition and motivation for development and achievements (HRPolska, access 28.01.2020). The frequent change of employment among Poles is also influenced by record low unemployment. The Central Statistical Office (GUS) reported that the unemployment rate in Poland in 2018 was 5.8% (958.6 thousand unemployed), and in September 2019 it was only 5.2% (866.7 thousand unemployed). The unemployment rate is the lowest in history for 30 years. This fact makes us currently dealing with an employee-oriented labour market (CSO, access 29.01.2020).

Despite the fact that Poland is experiencing a period of dynamic economic development (the GDP per capita ratio of Poland increased by 149.8%, and for the entire European Union by 58.8%), the remuneration is still much lower than in other EU countries. According to the data of the European Statistical Office (Eurostat), the average monthly per capita salary of the entire European Union amounts to almost EUR 2,904.30 gross, or about PLN 12,560. The average of the euro zone countries is even higher and amounts to 3 094.22 euro (about 13 380 PLN). Poland is ranked 8th from the end and the average monthly salary in Poland is 982.32 euro (Eurostat, accessed 29.01.2020).

Due to unsatisfactory earnings, there is a widespread belief in Poland that job satisfaction and employee involvement can only be achieved through the use of financial incentives by employers. Immaterial factors of employee motivation are neglected by employers and are not part of the incentive system. This leads to a situation which escalates the level of stress on both sides of the relationship (employees - employers) and weakens both employees' satisfaction with work and their performance and involvement.

An additional problem of the Polish labour market is low awareness of gender equality policies among employers. In view of the growing participation of women in the labour market, including in the manufacturing sector (traditionally associated with men), new challenges arise in terms of work organisation. Women and men are exposed to different threats to the working environment and different types of requirements and stressors, even when they are employed in the same sector and perform the same profession. Gender differences in employment conditions affect both job security and the quality of relationships and job satisfaction. Many women are in low-paid, precarious jobs, which affects the risks to which they are exposed. Moreover, there is a clear link between psychosocial risks at work and health. Improving the quality of women's working life cannot be disconnected from the wider problem of discrimination at work and in society.

Research Methodology

Empirical research was conducted in Polish production companies in Wielkopolskie voivodship. The specificity of production activity (according to the Polish Classification of Activities of PKD 2007 - industrial processing), based on cooperation and teamwork, requires special solutions for human resources management. The choice of this industry was dictated by the fact that production occupies an important position in the economy of Wielkopolskie Voivodeship. Wielkopolska, located in the west-central part of Poland, is characterized by uniform economic development, a significant degree of industrialisation, high technological level, and openness to external markets. It is primarily indicated by its large and still growing production potential and high level of entrepreneurship. A significant increase in interest from foreign investors is also important. Industry occupies an important position in the voivodship's economy - it constitutes a source of income for about 1/3 of the total workforce and provides the main part of the gross domestic product produced in Wielkopolska. A characteristic feature

of Wielkopolska's industry is a clear advantage of small and medium-sized enterprises, whose advantage is high mobility and flexibility (Wielkopolska Region, 14.01.2020).

In the study, a targeted (non-probabilistic) selection of quotas was used, which made it possible to study such a number of people that the results could be obtained for the entire population. The research tool was a self-assessment questionnaire, which was checked in a pilot study. The questionnaire consisted of two parts and a tag. The first part of the questionnaire concerned the opinion about the workplace, consisted of 18 statements, in which 4 areas were identified (the questions in this part were marked with a Roman numeral and with consecutive question numbers 1-18):

- emotional factor - consisted of 6 opinions: I.1 (*I am satisfied with my work*), I.4 (*I feel confident in my employment*), I.8 (*I feel appreciated in the company*), I.16 (*my work is an overwhelming duty*), I.17 (*I feel used in my work*) and I.18 (*I think about leaving the company*),
- a development opportunity factor - consists of 4 opinions: I.2 (*work allows me to use my qualifications*), I.9 (*at work I have the opportunity for professional development*), I.10 (*I have the opportunity for promotion at work*) and I.11 (*at work I have the opportunity to present ideas and solutions*),
- organisational factor - consists of 4 opinions: I.3 (*the atmosphere in my company is good*), I.7 (I understand well how my remuneration is *calculated*), I.12 (*my work is safe, it promotes a safety culture*) and I.15 (*machines, means of work and technology allow to do the work properly*),
- cognitive factor - consists of 4 opinions: I.5 (*remuneration and bonuses are appropriate to the tasks performed*), I.6 (*the remuneration I receive motivates me to work*), I.13 (*I know the objectives of the company and identify myself with them*) and I.14 (*my company has a good reputation*).

Responses to the opinion about the workplace were based on a five-level Likert scale: 1 - no, 2 - rather no, 3 - hard to say, 4 - rather yes, 5 - yes.

The second part of the survey contained factors of motivation to work. It consisted of 34 statements, in which 3 areas were distinguished (the questions in this part were marked with a Roman numeral II together with sequentially assigned question numbers 1-34):

- Intangible motivation factors - consists of 24 factors: II.1 (*employment contract*), II.2 (*job security*), II.3 (*sense of stability and security at work*), II.4 (*certainty of receiving remuneration on time*), II.5 (*sense of fair pay*), II.6 (*equal treatment of all employees*), II.7 (*good open communication*), II.8 (*good relations with colleagues*), II.9 (*correct relations with the boss*), II.10 (*praise from the superior*), II.11 (*consultations of superiors with the crew concerning the future of the company*), II.12 *(importance of performed tasks*), II.13 (*satisfaction with performed work*), II.14 (*opinions about the company where I work*), II.15 (*fixed working hours*), II.16 (*flexible working hours*), II.17 (*compliance with labour law principles*), II.18 (*lack of mobbing and discrimination*), II.19 (*stress-free work*), II.20 (*possibility of promotion*), II.21 (*possibility of professional development*), II.24 (*integration meetings / trips*), II.32 (*fear of punishment*), II.34 (*fear of dismissal*).
- Material non-monetary motivation factors - consists of 6 factors: II.22 (*co-financing of education*), II.23 (*participation in trainings*), II.27 (*discount on the purchase of company goods*), II.29 (*holiday vouchers*), II.30 (*co-financing for the cinema, gym, swimming pool, etc.*), II.31 (*receiving a car, laptop, company phone*).
- Material monetary motivation factors - consists of 4 factors: II.25 (*salary increase*), II.26 (*receiving cash prizes*), II.28 (*share in company's profit*), II.33 (*fear of losing the bonus*),

Answers to questions related to motivation factors were scored on a scale from 0 to 4 points. The respondents' markings 3 and 4 were treated as an effective motivation factor: 0 - does not motivate, 1 - motivates me very poorly, 2 - motivates me on average, 3 - motivates me, 4 - very motivates.

Due to the selected research problem, quantitative research methods were adopted. When analysing the research results, the methods were applied statistically. Due to the fact that opinions about the workplace (5-point Likert scale) and factors motivating to work (scale from 0 to 4 points) are discrete quantitative variables, non-parametric tests were used. Statistical analysis was carried out using statistical package STATISTICA 10 EN. The collection of empirical material allowed to develop models of structural equations, because emotional, developmental, organisational and cognitive factors, as well as intangible, material and non-material non-monetary factors motivating to work are latent (hidden) variables. Their construction took place in two stages. In the first stage, by means of confirmation factor analysis (CFA), measurement models were constructed in order to select important

factor loads of hidden variables. Those variables for which the factor load is at least 0.6 were subjected to in-depth analysis. In the second stage models of structural equations were constructed. Variables significantly affecting the hidden variables obtained by means of confirmation factor analysis were selected.

The research was carried out in the years 2015-2019. Its aim was to develop a universal system of motivation of employees of micro and small production companies In order to achieve the goal, a set of motivation factors was developed, and then the relationships between opinions about the workplace and the examined motivation factors were identified. The research assumed that one of the most important resources of the organisation are properly motivated and efficient employees, and the competitive labour market forces the need to look for solutions to effectively motivate employees in small and medium-sized production companies.

For the purposes of a smaller study, the authors have presented a part of the study which includes a study of the assessment of the effectiveness of individual motivation factors, with particular emphasis on gender differences; the issue of gender is currently under discussion in social and political debates in Poland.

The study involved 449 employees, including 149 women and 300 men. The predominant age group of the respondents were employees aged 20-30 years, which constitute 39.6% of the respondents. The 31-40 age group was represented by 27.2% of people, and 22.7% of people aged 41-50. Respondents over 50 years of age constituted only 10.5% of the respondents. The main group of respondents were people with secondary education - 46.8%, followed by 26.9% with higher education and 21.8% with vocational education. The basic education was 4.5% of the respondents. 35.9% of the respondents declared that they have been working in the present company for at least 3 years, while 26% had a work experience of less than 1 year; 25.8% of people worked no longer than 1 year, and 21.6% of people - over 10 years. The remaining respondents worked for 1-3 years and constituted 16.7% of the respondents. The research indicated that more than half of the respondents (56.8%) hold executive positions, 28.3% specialist positions according to their qualifications. On the other hand, 14.9% are employees occupying managerial positions. The respondents represented the following industries: furniture production - 21.2% of the respondents, machinery and equipment production - 19.8 respondents, food production - 14.7% of the respondents and metal production - 12.2% of the respondents. The reliability of the questionnaire was checked using the alpha-Cronbach reliability test. The result indicated values in the range of 0.9 (for factors motivating to work) and 0.6 for material non-monetary factors motivating to work. Therefore, the questionnaire is characterized by satisfactory reliability of scale.

Research Results

For the purposes of the study, immaterial motivation factors were analysed.

Table 1 presents the average and standard deviations of non-material motivational factors in the scale 0-4.

Table 1: Averages and standard deviations of intangible work incentives on a scale of 0-4

Incentives to work - intangibles	Factor no	n	Average	Standard deviation
1	2	3	4	5
Employment contract	II.1	449	2,86	1,11
Security of employment	II.2	449	3,07	0,96
A sense of stability and safety at work	II.3	449	3,03	1,00
Certainty of receiving the salary on time	II.4	449	3,19	0,95
A sense of fair pay	II.5	449	2,95	1,08
Equal treatment of all employees	II.6	449	2,92	1,02
Good open communication	II.7	449	2,98	1,00
Good relations with colleagues	II.8	449	3,02	1,02
Correct relations with the management	II.9	449	2,93	1,06
Praise from your superior	II.10	449	2,73	1,14
Consultation of superiors with the crew on the future of the company	II.11	449	2,65	1,11
Validity of the tasks performed	II.12	449	2,73	1,03
Drawing satisfaction from your work	II.13	449	2,94	1,04
Opinions about the company I work for	II.14	449	2,69	1,12
Fixed working hours	II.15	449	2,84	1,17
Flexible working hours	II.16	449	2,45	1,26
Compliance with labour law principles	II.17	449	2,92	0,97
No bullying and discrimination	II.18	449	3,14	1,00
Stress-free work	II.19	449	3,02	1,00
Promotion opportunities	II.20	449	2,90	1,14
Professional development opportunities	II.21	449	2,95	1,05
Integration meetings/exhibitions	II.24	449	2,61	1,27
Fear of punishment	II.32	449	2,12	1,29
Fear of dismissal	II.34	449	2,07	1,33

Source: Own study based on empirical research results

Figure 1 graphically shows the results of empirical research on intangible motivational factors

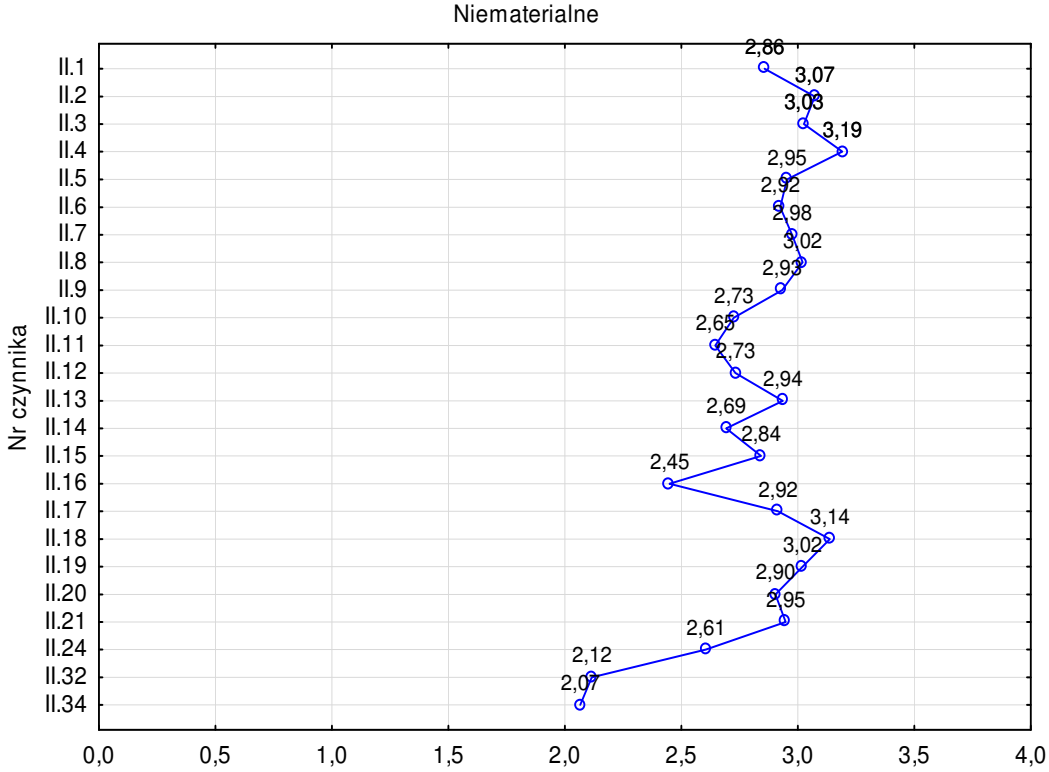

Figure 1: Non-material motivational factors for work

Source: Own study based on empirical research resultsch

Of the intangible motivational factors included in the questionnaire, respondents were most motivated by: *certainty of receiving pay on time* (II.4) - mean score of 3.19±0.95 points, *lack of mobbing and discrimination* (II.18) - mean score of 3.14±1.00 points and *certainty of employment* (II.2) - mean score of 3.07±0.96 points. The following are regarded as the least effective motivation factors: *fear of dismissal* (II.34) - average 2.07±1.33 points and *fear of punishment* (II.32) - average 2.12±1.29 points. In the further part of the article, statistically significant relationships are presented. The authors checked which of the analysed non-material motivation factors motivate women and men particularly effectively.

Table 2 presents average and standard deviations of non-material motivation factors in the scale 0-4 and Mann-Whitney test results.

Table 2: Averages and standard deviations of non-material work motivation factors

Factor number	Gender				Test Manna-Whitneya	
	Woman n=149		Malea n=300			
	Average	Standard deviation	Average	Standard deviation	Z	P
1	2	3	4	5	6	7
II.1	2,87	1,22	2,85	1,05	0,84	0,4012
II.2	3,10	1,00	3,06	0,94	0,75	0,4555
II.3	3,01	1,07	3,04	0,97	0,05	0,9625
II.4	3,28	0,90	3,15	0,97	1,28	0,1997
II.5	3,03	1,04	2,91	1,10	1,07	0,2839
II.6	3,07	0,93	2,85	1,06	1,97*	0,0488*
II.7	2,92	1,11	3,00	0,93	-0,27	0,7891
II.8	3,04	1,05	3,01	1,00	0,52	0,6024
II.9	3,03	1,09	2,89	1,04	1,73	0,0833
II.10	2,87	1,02	2,65	1,19	1,52	0,1287
II.11	2,64	1,05	2,65	1,13	-0,30	0,7647
II.12	2,77	1,07	2,72	1,01	0,57	0,5714
II.13	2,97	1,03	2,92	1,05	0,53	0,5982
II.14	2,79	1,15	2,65	1,11	1,38	0,1684
II.15	2,89	1,19	2,82	1,17	0,74	0,4593
II.16	2,46	1,30	2,44	1,25	0,24	0,8120
II.17	2,93	1,05	2,91	0,93	0,52	0,6051
II.18	3,32	0,84	3,05	1,06	2,40*	0,0164*
II.19	3,13	0,96	2,96	1,02	1,66	0,0963
II.20	3,03	1,15	2,84	1,14	2,03*	0,0421*
II.21	2,98	1,14	2,93	1,00	1,04	0,2983
II.24	2,72	1,20	2,55	1,30	1,13	0,2598
II.32	2,13	1,36	2,11	1,25	0,12	0,9033
II.34	2,01	1,42	2,09	1,29	-0,60	0,5513

** statistically significant, p<0.05*
Source: Own study based on empirical research results

Figure 2 shows the immaterial motivating factors for work.

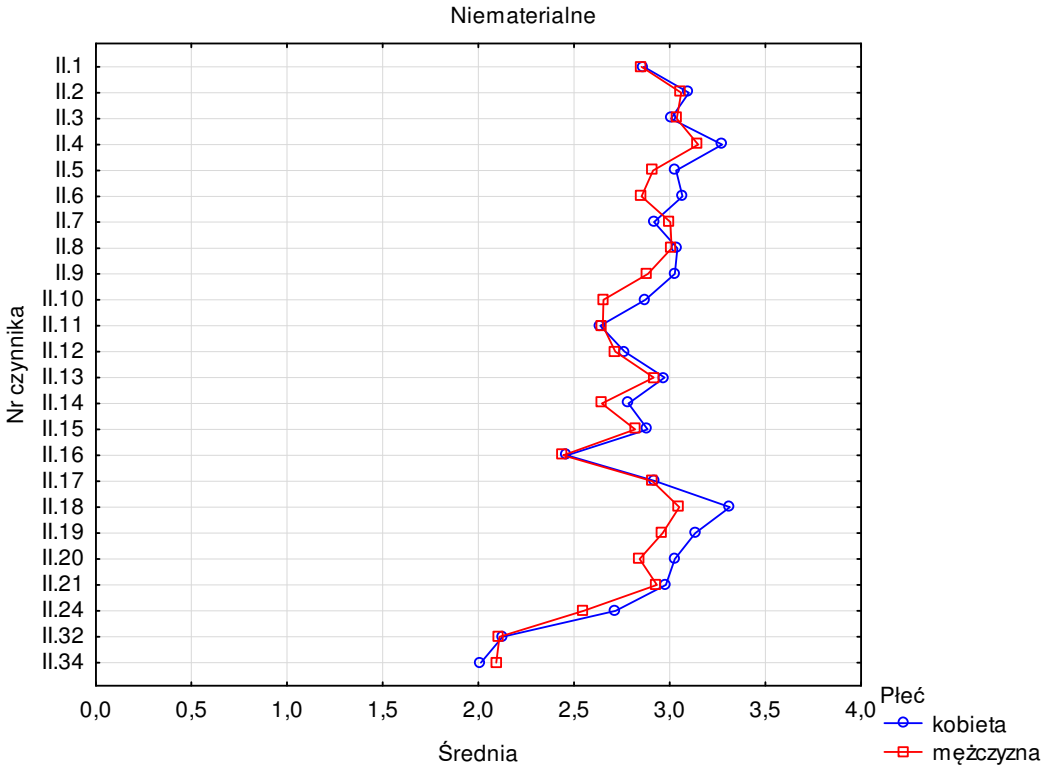

Figure 2: Non-material motivational factors for work

Source: Own study based on empirical research results

The analysis of the research results indicated that the respondents are most motivated by: *certainty of receiving remuneration on time, lack of mobbing and discrimination and certainty of employment*. For men, *good relations with colleagues, certainty of receiving pay on time, certainty of employment* have proved most effective. The most statistically significant gender differences occurred for the factor: *equal treatment of all employees* (p=0.0488). It was women who indicated this factor much more often than men. Women much more often indicated the following factors: *lack of mobbing and discrimination* (p=0.016) and *the possibility of promotion* (p=0.0421). No statistically significant differences were found for the other examined factors. For the factors: *correct relationship with the boss and stress-free work, level* p was close to the accepted level of significance. Women more often than men indicated the following factors: *correct relations with the boss* (p=0.0833) and *stress-free work* (p=0.0963).

Younger women between the ages of 20 and 30 are particularly motivated by the *absence of mobbing and discrimination* and *the possibility of promotion*. For women aged 31-40 mainly *enjoying the satisfaction of their work, stress-free work*. The factor of *equal treatment of all employees*, on the other hand, is important mainly for women in the 41-50 age group.

Women over 50 motivate most effectively: correct relations with the boss and praise from the superior. The variable related to education gave very interesting results; for women with secondary education the motivator proved to be the most effective: equal treatment of all employees, for women with higher education: *no mobbing and discrimination and the possibility of promotion*. Women with primary and vocational education are most effectively motivated by *the employment contract and the feeling of stability and security at work*.

Analysing women's length of service, it can be concluded that for women working in an enterprise between 3-10 years, the most effective were: *lack of mobbing and discrimination and the possibility of*

promotion. The factor of *equal treatment of all employees and the praise of the supervisor*, on the other hand, is important for women working in an enterprise between 1-3 years. Women with less than 1 year's seniority as the most effective factor were assessed as *stress-free work*, while women over 10 years of age were assessed as *having the most effective factor*.

Relevant data were obtained by analyzing the position held by the examined women. The factors of *lack of mobbing and discrimination*, *the possibility of promotion*, *equal treatment of all employees* and *correct relations with the management* are important motivational factors for women employed in *the executive position*. For women in specialist positions, on the other hand, the most valuable motivators are: *job security and good relations with colleagues*. Women in managerial positions value the most: *the absence of mobbing and discrimination and correct relations with the boss.*

Discussion

For the surveyed respondents - employees of micro and small production companies - the most effective non-material motivation factors are: *certainty of receiving remuneration on time, lack of mobbing* and *discrimination and uncertainty of employment*. The least effective factors in this area are *the fear of being made redundant* and *the fear of punishment.*

In Poland, job insecurity and insecurity are mentioned as one of the most severely affected stressors. The issue of psychosocial threats and their impact on the safety and functioning of people at work and the whole organisation is one of the most current areas of interest for Polish and global institutions and organisations dealing with the health and safety of employees. The European Agency for Safety and Health at Work (OSHA), in its analysis, identifies existing and 'new and emerging psychosocial risks' as the most current risks to workers, highlighting the increasing level of risk (EU-OSHA 2007; Cox, Griffiths, Leka 2005, WHO 2008). This is also confirmed by recent reports; the most interesting of these are the ESENER reports (Safety and health in micro and small enterprises in the EU: the view from the workplace).

When considering the lack of mobbing and discrimination, it is worth quoting the results of research by Zapf, who analysed the causes of mobbing at work. The author claims that bullying is a long-term stressor for employees. This view is also supported by doctors and clinical psychologists who diagnose victims of mobbing. In addition, research shows that the last decade has seen a sharp increase in the number of class actions for mobbing and discrimination in employment (Zapf, 2009). The results of Haberfeld's empirical research indicate that gender discrimination manifests itself in the assignment of employees to the workplace. The position held has a significant impact on employee pay. According to the author, discriminatory programmes should be included in the model of wage discrimination. The results of the author's research have shown that organisational variables were more important than individual variables in explaining the differences in wages between the surveyed men and women, as well as gender discrimination in wages (Haberfeld, 2017). In turn, the results of the Kunze, Boehmh and Bruch team confirm that employers should be aware that as the age gap increases, age discrimination may occur in companies, which negatively affects employee engagement (Kunze, Boehmh, Bruch, 2009) . When analysing the precarious employment factor, it is worth noting the results of the Ferrie study, which show that precarious employment is harmful to workers' health as it causes great stress. The author's observations show that the uncertainty of employment has a negative impact on the involvement of employees and the effort put into the performed tasks. In recent years this problem has been noticed and described: the lack of job security brings serious financial and social costs to the organisation (Ferrie, 2000).

It is also worth noting that in the conducted survey women much more often than men indicated such motivation factors as: *equal treatment of all employees, lack of mobbing and discrimination, possibility of promotion, correct relations with the boss, work free from stress*. The presented results confirm the results obtained by other authors analyzing similar dimensions of human functioning in the workplace. Tiwari and Mishra (2008) demonstrated a clear negative relationship between professional stress and all dimensions of involvement in the work environment. Michael, Court and Petal (2009) and Nasr (2012) also showed relationships between increased occupational stress and reduced work

commitment. Equally interesting studies were conducted by Ruck and Welch (2012) showing that the right work organisation based on good internal relations is one of the most important predictors of success for the company/organisation. Mikkelson with the team (2015) demonstrated (based on a survey of 276 respondents) that effective communication within the team and good relations with the boss are reflected in the employees' declared level of job satisfaction, motivation to work and organizational commitment. This is confirmed by the results of the analysis presented by Jacobs and co-workers (2016); these studies show that good relations: supervisor-supervisor significantly translate into the level of job satisfaction, which in turn affects effective cooperation both within the company and with external partners.

When considering the friendly atmosphere at work in the organizational context, it should be taken into account that it is related to a number of indicators of individual functioning of employees, as well as their relations with the organization. For example, Ståle Einarsen and her team have shown in their research that there is a relationship between dissatisfaction with the quantity and quality of guidance, instructions and information that employees receive from their superiors and a higher incidence of abuse in human relations, including discrimination and bullying. Elisa Dessa's study of healthcare workers showed that effective communication and good relations with the supervisor are factors preventing the development of negative consequences of stress and burnout. Lewis-Enright, Crafford and Crous, who have been conducting research for many years, are looking for reasons why women do not sufficiently represent top positions. In their view, despite continuous work by organisations to integrate women into senior management structures, little progress has been made in recent years (Lewis-Enright, Crafford and Crous, 2009).

Conclusions

Motivating employees is the most important element of human resources management, because motivated, enthusiastic and committed employees are the success of the company. Managers of modern organizations should develop motivation systems that stimulate employees to act. Unfortunately, the experience of Polish companies indicates significant barriers preventing / limiting such activities. Building an effective motivation system is a complex and time-consuming process for the company, requiring the employees to get to know: their preferences, system of values, expectations and ambitions. In recent years entrepreneurs more and more often take up this challenge, understanding that motivated human resources make it possible to achieve the development goals set for the company. Due to the fact that the process of motivation is very complex, it should be constantly monitored and improved in order to keep up with the changing external conditions (political situation, economy) as well as those concerning the employees themselves. This is another barrier which makes the scale of employers' involvement in creating motivation systems that meet employees' expectations still unsatisfactory.

The main aim of this article was to present the results of the research evaluating the effectiveness of particular non-material motivation factors and to try to explain their influence on the development of motivation systems. As the results of our own research indicate, the role of intangible factors in shaping the motivation of employees of modern enterprises is unquestionable, and failure to notice the gender differences in this respect may lead to both economic losses and loss of employee potential. It is important for the organization to have at its disposal such employees who will be able to effectively implement its objectives. The formation of such staff is not an easy task, due to the number of variables in the organization and its environment. The need to have and maintain a strong base in the form of people is a condition for the company to gain a position on the market, which is possible only if this base is properly "used". Human capital can be the source of competitive advantage of any organization and constitute the basis of the chosen strategy provided that the employees are treated subjectively.

The results presented in the presented paper confirm the reports of the researchers indicating the adverse impact of insecure employment, untimely payment of salaries and unfavourable psychosocial work environment on the perception of employees' own development and involvement in work. As in the above mentioned research papers, the results presented in this paper indicate that working in unfavourable psychosocial conditions will be associated with weaker work commitment and lower job satisfaction, while inducing higher levels of occupational stress.

The study also confirmed the existence of gender differences in the assessment of employers' motivation tools. This leads to the conclusion that designing an effective motivation system requires knowledge not only of psychology and economics, but also of social and cultural conditions of the work environment.

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Microgeneration: The Democratization Accelerator in Authoritarian and Autocratic Political Spaces

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Abstract

The existence of energy sector based on the centralized concession-statist model remains one of the important reasons behind the conservation of the autocratic elements of political systems. The benefits that state structures derive from maintaining the aforementioned state result from the relationship between the ruling party and the management of energy companies whose shareholder is the State Treasury. Staffing the management of companies with their own political base by creating many vacancies for party's supporters can be regarded as the standard of system-generated dependencies. Political systems persisting in former Eastern Bloc countries remain one of the key beneficiaries of this state of affairs. This process in all its intensity manifests itself in countries operating within the borders of the former Soviet Union. One threat to this type of governance, with energy companies forming a support base for governments, is the growing popularity of microgeneration. Adoption of new solutions allowing the connection of independent electricity producers to the network harms the interests of these enterprises. A significant weakening of their position entails a serious threat of dismantling the political order maintained for years

Keywords: Microgeneration, Energy, Eastern Bloc, Energy Policy

Introduction

In the future, electric energy will be a fundamental and, most probably, the only source of power. Futuristic concepts and anticipations of the development of modern technologies do not even consider alternative solutions. A crucial concept in this context is the notion of "fuel of tomorrow." The issue of control of this kind of fuel goes beyond economic considerations as it would not be the source of revenue. It is not difficult to see the potential of political control in the distributive and manufacturing-distributive energy sectors. Due to considerable diversification with respect to the types of carriers that have been in use up to date in the combustion machines or heating, the problem of control has not been so evident thanks to many carriers being currently in use.

Universalization, which will be most probably the result of gradual elimination of various fuels in favor of electricity, will soon prove this very problem to be of vital importance. Hence, the questions related to the generation capacity of electric power and distribution thereof ought to be encouraged as a natural consequence of the assessment and recognition of the potential of control which the very first and the last link in the chain of distribution hold.

Methods being currently in use with regard to energy distribution might be considered a peculiar *signum temporis*. They reflect direction and management of modern technologies which has been undertaken up to date. Importantly, by outlining the past which has been shaping the electro-energetic systems, one might shed light into their future as well, helping to trace the evolution and identify factors that has shaped the existing system and recognize the ones which had been responsible for the

maintenance of the *status quo*. The identification of those factors has recently become the foundation in evaluating their potential social impact (Miśkiewicz 1974).

The analysis of thus selected elements with respect to the concept of prosumption of microgeneration systems, intents to identify potential political limitations and barriers to their development. Recognition of connection between indicated limits or obstacles that the development of microgeneration systems will face and prerogatives of state power responsible for reduction of the democratic dimension of the government serves to establish the role that the prosumer-households might have in the process of building of the civil society.

The applied method of the assessment of the energy-related issues might be called as *conditio sine qua non* of the current mode of anticipating only the short or middle-term outcomes – and planning the energy policy accordingly. This way of the situation assessment exposes continuity in shifts observable in the energy sector and of the circumstances behind them. Its application has helped to verify the research hypothesis, according to which a political system of a state is correlated with choices that it makes with regard to its energy sector. In order to fulfill the main objectives of the paper, a methodology based on social science research methods has been chosen, particularly systematic, institutional and qualitative comparative analyses (Sztompka 1975).

The beginnings of the power system

As aforementioned, in order to determine the future directions of the electro-energetic system, it is vital to briefly present its development from the moment of its inception to the present times – to establish its past determinants as well as these elements which continue to constitute it.

Analyzing the past of the sector, it is important to stress the decentralization in the time of its commencement. The then-structure of the sector was reminiscent of the organization of proto-states of Elam or South Mesopotamia, whose borders were established not by existence of neighboring states but by the sheer capacity of a given community to make use of the terrain (Zabłocka 1987). Agreeing on the pioneering character of the Pear Street Station (and considering T. A. Edison as the first innovator), it is nevertheless important to highlight limited scope of its powerline, which was constrained to merely several dozens of recipients and street lamps (Josephson 1959). It was not a distribution network as it is understood nowadays, however one can easily perceive it as its beginning. Each of similar power delivery systems created during the last two decades of the nineteenth century was substantially identical to the aforementioned one (Kirby and Davis 1990).

Production and often also distribution of energy was the domain of small, often family businesses created out of personal interest and passion of its founders. They frequently did not have the capital that would allow to build an infrastructure necessary for distribution of energy, thus frequently these small enterprises would solve this problem by merging (Borberly and Kreider 2001). Furthermore, they would often create syndicates aiming to reach the biggest possible number of clients or, alternatively, to increase the production of electric energy. It was the time of creation of the very first consortiums in the industry (Hughes 1977) – they were formed in order to manage the tasks too laborious or simply too expensive to be completed singlehandedly. Increasing amount of enterprises regarding both production as well as distribution had been gradually undertaken. Shareholders were comprised of companies, private entrepreneurs or even local communities.

This period can be perceived as the pioneering phase of the industry whose development resembles, in many regards, the evolution of the century-older railroad industry. Similarly, building of the infrastructure which could connect increasing amount of distant places demanded huge financial input. The fast development of energy sector accounts not only for a rapidly growing and densifying transmission grid but also for an increasing number of companies active in it and, consequently, rising competition on the market (Smil 2005). The latter grew proportionally to the market value of the industry and was progressively fierce. It had a negative impact on the smaller enterprises, which did not have enough resources to make investments allowing them to strengthen or even remain on the

market. Soon after, the first big companies appeared; the activity of these was mainly focused on the business aspects of the electric energy, both in terms of its production as well as its consumption.

These processes were similar globally – the same development could have been observed in China, Russian Empire, United Kingdom or in the United States during that period. Main differences were mainly connected with dynamics with which these events had unfolded. The same line of development could have been observed also on the territory of Poland, which was partitioned in that times. The very first power stations existed in the country in the last decade of the nineteenth century and these were private properties used to power small, private factories. Shortly after, powerhouses with slightly higher potential for energy production that intended to sell it further were created. They were functioning mainly in form of syndicates with a maximum of a couple of owners. Nevertheless, public institutions remained the main consumers of electric energy. Hence, with increasing frequency, it were cities (in rarer instances, countries) – represented by members of magistrates in regulatory bodies – who were becoming shareholders. In these instances, inspection of power plants was carried out by officials working for an institution that would be specifically brought into being for that purpose.

A Period of Dynamic Electrification

This situation started to gradually change after the first world war. The entire countries were more and more engaged in the process of electrification, seeing it as something more than a mere business opportunity or investment. In the case of states which had suffered significantly during the war, this process seemed almost indispensable. Pauperization of large masses of people was ubiquitous, and impoverishment could be seen even in the circles of the financial elites. To rebuild the economy in those countries after the conflict was too labor- and capital-intensive for the private entrepreneurs to take it solely upon themselves (Czubiński 1998). However, with the exception of the Russian Soviet Federative Socialist Republic (called Soviet Union from 1922) where, for obvious reasons, the state took upon itself entirety of the efforts of the electrification as a part of GOELRO – economic recovery and development plan, the support of the state with regard to electrification was rather indirect. One of the ways in which states provided help for entrepreneurs was giving tax exemptions as it happened, for instance, in Poland. It was still quite rare for a state to place an order or to become a shareholder in projects being realized by these enterprises, however. The latter instance has become popular in Mussolini's Italy, and, after 1933, in Nazi Germany (Skodlarski 1995). During the interwar period in Poland, the state support was to be found in the form of the aforementioned tax exemptions for private investors and legal entities investing in powerhouses or electrical grids.

Political changes which took place in countries of the so-called Eastern Bloc after the Second World War have had put an end to all private initiatives regarding energy production and distribution. These were regarded as contrary to what centrally planned economy of a socialist republic. Hence, all the countries behind the Iron Curtain had taken a similar approach towards energy production and distribution. The only exception was to be observed in Yugoslavia where Tito, under the flag of "social justice", have executed scenarios slightly different from the ones designed by Moscow. These included creation of extensive cooperatives that could be easily seen as a concept naturally allied to distributed energy, however, the vision of the centralized economy based on a hierarchical structure has, in the end, prevailed also in Yugoslavia (Olszewski 2000).

The West has not been different in that respect, though the centralization has realized by means of private enterprises either forming cooperatives or else loosely associated with one another, as aforementioned. They functioned under the auspices of a given state and, consequently, pursued these projects which ultimately served it. At that time, given the socio-economical situation and the level of technological development, the role of the state in the industry seemed irreplaceable. It was the main investor or, in some cases, a "mere" coordinator of various projects. Considering the scope of the mission of electrification, demanding huge financial investments and cooperation of a number of entities, not to mention the administrative effort, active support from a state was a condition for a successful finalization of a project (Hughes 1979).

Results were nothing short of impressive; the amount of produced and consumed energy in the post-war period globally has been increasing by a couple of percent each year. It was connected to rising number of consumers, where the so-called highly-industrialized nations took the lead; however, changes which occurred in pejoratively-called "third world countries" were also not devoid of significance. They were left behind highly-industrialized countries only in terms of quantity, but hardly in terms of quality or dynamics of developments. For this reason, the progress that took place on these terrains was more perceivable. Hence, the perception of these countries had also evolved, and all kind of socio-political consequences followed.

In the sixties and seventies, the structure of electro-energetic market was very similar worldwide. Everywhere, gigantic corporations were in control of the situation. With their strong position on the market (these enterprises were either having a monopole or by cooperation with other such entities they were sharing monopole among themselves) the giant corporations had taken over the entire sphere of either energy production or its distribution, or often – both of them. As argued in the previous sections, the reason of this development was connected to the immense amount of both labor and capital necessary for the process of electrification. Differences regarding ownership had not been significant as states were, in almost every case, becoming shareholders or else they secured their rights to make strategic decisions (thus the ones that would have an impact on a given country) in certain companies (Schramm 1990).

The shift in perception of Energy Security

The aforementioned attitude fostered conceptualization of energy security which was understood mainly in terms of stability of supply in the discussed period. Therefore, to guarantee energy security meant primarily assuring a certain level of production and providing the access to electrical grid. Costs of production did not matter as much as they do nowadays and the same applies to ecological dimension of the industry: what was important was "here and now" and short-term results. The only exception was the attitude towards nuclear power plants, which were met with suspicion in society (Weart 2012).

Dangers, besides the ones that have been outlined, were virtually not examined. All potential problems, including issues such as terroristic attacks on electro-energetic infrastructures, were marginalized. This attitude can be justified, however, given that every single blackout which occurred in this period happened due to the excess demand. This situation started to slowly change in the 80s when the aforementioned issue practically disappeared.

Consequently, the concept of energy security had been re-defined. The primary importance was given to economic aspects of the industry. Such conceptualization was again advantaging giant companies, as it was impossible to compete with them on the market. Once the environmental safety and an attitude favoring protection thereof was added to the definition of energy security alongside financial considerations, the perception of the entire problem had changed. More recently, it has begun to be increasingly difficult to reconcile this fairly new definition with entirely novel dangers such as, for example, cyberterrorism.

Renewable Energy Sources and Beginnings of Structural Changes

Structurally, the shift in the industry has started with popularisation of renewable energy sources (referred to as RES in the following part of the paper). Shifts in production of wind power and, afterward, solar energy had led to a fact that – in the first decades of the twenty-first century – these two RESs have multiplied its contribution to energy production in the developed countries each following year. It had been achieved by means of farms whose huge potential was not due to their size but quantity. Clearly, this has stood in clear opposition to the established order. The centralized system of energy production started to become maladjusted and, moreover, counterproductive. Increasing amount of enterprises tied to the industry had decided to strategically diversify its activity by creating units devoted solely to production of the RESs. After 2010, seasonal overproduction of electric energy was repeatedly felt, hence it became clear that the main issue was no more how to produce the energy but instead, what to do with the surplus thereof during the seasons when its production is at its greatest

but simultaneously demand for it is at its lowest. This situation started to expose the difficulties which reconciliation of different systematic models of energy production and distribution poses (Rabl and Fusaro 2001).

Photovoltaics

Photovoltaics is often considered a new-generation technology, a development of the last decade which is clearly associated with the twenty-first century. It is a superficial presupposition which is not entirely in accordance with truth. The last decade is unmistakably a period of intense development and use of the solar energy, which is conspicuous by its unprecedented growth rate in terms of technological advancement. However, the technology has been commercially in use for at least last fifty years. Photovoltaic farms are in use from the onset of the 60s of the previous century. Circumstances responsible for the heighten attention that the technology is getting these days are, to put it simply, complex, and should not be accessed outside of political and economic context. Certainly, the aforementioned changes in the energy sector, combined with the thwarting tensions in international relations after the Cold War has ended have prompted many enterprises to switch from military to civil production.

It is in this period that substantial reduction in prices of single panels, as well as entire installations, occurred. They were never unaffordable; however, they were not popular among private consumers either, since the product was considered luxurious and unnecessary in everyday life. It was mainly offered and advertised in the stores specialized in selling weapons and survival equipment, and whose typical clientele is usually as government-suspicious far-right wingers. The aforementioned drop in prices (which happened already in the beginning of the new millennium) turned out to be one of the most decisive factors in creation of demand, which has, in turn, led to its mass production resulting in further decrease in prices, and so it continued. This way, photovoltaic installations became one of the fastest-growing sector of the energy industry, though with respect to profitability it gives way to, more traditional, gas and oil industry. It also can not be compared to the latter in terms of market capitalization (Rapier 2016).

Phenomenon of photovoltaics is comprised of, at least, several factors. Among others, there is durability of installations; user-friendliness; as well as easy and affordable service. Nevertheless, its price remains the most pivotal one. There exists no cheaper source of electrical energy – in fact, it is even hard to imagine that something could possibly be less expensive. For instance, by making an investment of roughly seven thousand euros, an average Polish household, for example, equipped in a modern heating system, may forget about the electricity bills for the amount of time that basically constitutes a lifetime. Moreover, the amount of the energy thus produced would also suffice to charge an electric car belonging to this exemplary household, which could make up to 18 000 per year. In this respect, it is impossible to compete with photovoltaics. It probably will never be, because in the first case wind farms that may be considered potential competition are almost 50% more expensive and this difference is growing , while in the second case - structural solutions functioning in the power industry are too big ballast for it to come out with a competitive offer.

Political Systems and Microgeneration

Political system of the given country and the energy industry thereof are closely interdependent. It is a relationship of a symbiotic kind, however its hard to label it as appropriate and reconcile it with the concept of model institutional arrangements of a democratic country. In its essence, this interdependency might be seen as a precise negation of the latter. It concerns the entire energy industry considering the dominating role that mining plays in it, from the moment of extracting of the material, through its processing all the way to its distribution. The negative part in the process is played out by the state-owned energy companies. Their legally sanctioned relationship with the government, whichever political party is in power at the given moment, tends to preserve existing order. In the aforementioned relationship, the superior position should be ascribed to the human resources policy. The placement of figures associated with a dominating political party in the management of such companies has become a consolidated form of rewarding one's own political base, meaning a concrete

payoff for the activities benefiting the political fraction in a period preceding its political takeover. Placing one's own supporters in the structures of crucial state-owned companies allows for the range of opportunities such as granting financial support to pro-governmental initiatives or participation in preserving the supporting media channels and, consequently, having a direct influence over a significant amount of workers and their families being a huge electorate.

The concept of prosumerism of energy is threatening the interests of the players in the energy industry controlled by the state – and to be precise, by the political parties in power. Every single kW produced outside of these companies decreases their incomes which, in turn, affects their economic condition whereas the latter is a reflection of the potential of a given company and its utility as perceived by those in power. Lower profit or complete lack thereof reduces the chance to create positions in these companies which complicates development of the political capital or even creates a potentiality for its loss. It also narrows down the opportunity to influence society.

In the political realm of the states struggling with a deficit of democracy, micro-installations, micropower plants, as well as the microgeneration, are all undesirable elements. Circumstances which determine this state of affairs are among others, the model ownership and structure thereof that does not allow to employ the people associated with the ruling political fraction. Moreover, they do not support creation of the advantageous, from the perspective of a government that is, initiatives, such as giving support to the endeavors indicated by it. Together with the possibility of the grassroots demands or postulates considering, for instance, infrastructural investments, etc., that the popularisation of microgeneration might lead to must be also taken into consideration. Hence, the conclusion is that the existence of microgeneration in the form of household microgeneration installations, wind or photovoltaic farms was tolerated as long as these were isolated cases. Popularization of these technologies has resulted in a significant change of attitude towards them. This shift in sentiments is definitely not caused by the need to stabilize the system by establishing bigger generational units since their presence does not stand in a way of microgeneration. Rigid coordination of the latter is very much desirable and might be seen as a way of transitioning from the centralized to the distributed energy system.

The model of "energy democracy" and photovoltaics

The presence of huge electro-energetic concerns justified only by their identity and potential laying at their disposal in the public sphere is contrary to the equality being the basis of democracy. It is not a "natural order" resulting from the relationship between the state and the industry even though it started to be perceived as such. Stronger position of these companies is comprised of many elements such as, to mention just a few, its human and financial capital. The crucial factor is their aforementioned relationship with the world of politics. The resulting arrangements are behind the legal and institutional structures created in order to benefit these big players and it remains their biggest asset on the market and in financial structures as such.

This kind of status quo is disagreeable; popularisation of photovoltaics nourishes the rebellion against it. In this context, "energy cooperatives" might serve as an inspiration. They have appeared in Europe relatively recently, the oldest ones operating in Germany are roughly 10 years old. In the beginning, they used small wind farms stabilized by biogas plants. Thus produced energy had powered small communities comprised of a dozen to a couple dozen households. Even though connected with the state-owned electric networks, they were in fact completely independent. In several instances, either by creating new distribution lines or re-appropriating the existing they have also taken over the distribution of the energy. Nevertheless, these were investments which continued to be too costly for individuals. Moreover, they required an integrated local society – a group of people from the direct neighborhood capable of forming of a collective.

The appearance of photovoltaic cells which do not require huge financial expenses on the market has significantly reduced the necessity of participation of a larger group of people in the endeavor. Minimalization of the required assets allows for the energy independence individuals, even the less wealthy ones. A bulk of representatives of the middle class had recently turned into "prosumers."

Projects of "virtual energy plants" together with attempts to re-define the mode of cooperation with professional energy producers had appeared, but it had stumbled upon the barrier preventing thus conceptualize "energy democracy" which has been political defiance to these ideas. This attitude might be considered an infringement of the statutory rights in the form of exclusion from participation in the decisions executed by a government (Dahl and Stinebricker 2007).

Conclusions

The process of "democratization of the energy" might be seen as a global phenomenon characteristic of the most developed economies. It is a *signum temporis*, and is largely a result of popularization of photovoltaics which is the cheapest investment in the context of non-professional energy production. The pace with which it has established itself on the market puts into question the point of the further existence of centralized, concession-based and statist model of the current energetic industry. The recipients of the latter remain to be the states that used to be a part of the Soviet Union – with the exception of the states that belong to the European Union and Georgia, these do not meet the standards of the modern democracy. Benefits from centralized energy productions are the outcome of relationships between a ruling party and the management of corporations, whose shareholder is the State Treasury. Accepting novel solutions which would require connecting independent producers of electric energy to the electrical grid is contrary to the interests of the aforementioned companies. Potential weakening of their position which could follow is a serious risk to the established political order. Hence, all the initiative and pro-civil movements which promote and realize the idea of prosumerism are struggling with a number of legal and administrative obstacles. Moreover, these ideas are not supported by the existing law, which might be seen as a defense of the existing system against the phenomenon that threatens it.

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Behavioral Trend in Contemporary Accounting – The Essence and Subject-Object Scope

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Abstract

Behaviourism in accounting has been recognized as a significant trend influencing its development and addressing human resources behaviour, which affects significantly the functioning of accounting in an enterprise. The variety of behavioural problems to be analysed in accounting encourages specifying the subject-object scope based on the behaviour of enterprise stakeholders. The inclusion of e.g. the right to choose in accounting for the application of some instruments (methods), creative activities and voluntary disclosure of additional information (including non-financial information) contributes to the development of the scope of behavioural research. Further development of the behavioural trend in accounting can be observed, e.g., in knowledge-based enterprises, which emphasize the unique role of the human factor (their capital) and behaviours influencing the decisions made as well as the interpersonal relationships between internal and external stakeholders. Behaviourism in accounting, apart from the traditional research areas, also refers to the contemporary accounting challenges, e.g., the aspects of social responsibility, invisible assets and intellectual capital.

Keywords: Behavioural Trend In Accounting, Subject Of Behavioural Trend In Accounting, Object Of Behavioural Trend In Accounting

Introduction

The beginnings of behaviourism in accounting refer primarily to management accounting, which is not subject to legal regulations and standardization, whereas the respective processes implemented in an enterprise depend on operational and strategic decisions taken by the human factor (e.g. manager). Perhaps for this reason management accounting was considered the appropriate research area to discuss human behaviour in accounting. However, since the aspect of voluntary and creative approach appeared in financial accounting manifested, e.g., by the possibility of an individual accounting policy development and implementation in an enterprise and preparing additional (frequently optional) statements/reports extended by the non-financial information, the development of behavioural trend in this research area can also be observed.

Contemporary accounting, in the author's opinion, represents integrated retrospective and prospective accounting (Burzym, 1990) created by the behaviour (decisions) of human resources and their intellectual capital. The interests of modern accounting are influenced by, e.g., the development of knowledge-based economy, which contributes to its scope gradual extension by invisible (undisclosed) assets in accounting and intellectual capital, which determine yet another research area in accounting. Therefore, when considering behaviourism in accounting, the components of invisible property should also be included, e.g. brand, image, reputation, customer relations, because their creation and existence depend on the behaviour presented by both internal and external stakeholders.

The purpose of the article is to present the behavioural trend evolution in accounting, based on which its subjective and objective scope as well as the main research areas will be determined. Scientific divagations will be supported by the analysis of the subject literature, descriptive method and the author's considerations in the scientific and practical perspective, based on the deduction method.

Behavioural Trend in Accounting – The Essence and Evolution

Behavioural trend, in economic sciences, resulted from the criticism of market efficiency and market participants' rationality. H.A. Simon (1955), as the creator of the bounded rationality theory, proved that the capacity of human mind is too small in relation to the arising problems to be able to solve them in a rational way. People, encountering internal limitations (due to mental imperfections) as well as external ones (resulting from the environment and social interactions), are unable to access all information relevant to a given problem, thus also incapable of processing this information accurately. This means that people are rational in, nothing less than, a limited way (Czerwonka and Gorlewski, 2008). H.A. Simon (1955) stated that a human being does not strive for the optimal choice of the action variant, but rather settles for the satisfying option. This choice is a consequence of the tendency towards preferring a particular action variant under the influence of formulated expectations and the defined goals.

Based on the author's own research covering accountants (survey on a sample of 119 people), carried out in the period May – June 2017, among students of economic universities studying the specialty of accounting and the students of post-graduate courses educating candidates for chief accountants (including working accountants) it was found that, e.g., the accountants usually locate their dilemmas around such decisions as: an optimal choice or a satisfying choice – 71.4%.

The concept of bounded rationality has become the background for the development of behaviourism in economic sciences (economics and finance). The most important studies which undermined the classical concept of human rationality were created in the 1970s (Tversky and Kahneman, 1974; Kahneman and Tversky, 1979). The theory of perspective provided grounds for behavioural finance and the research results confirmed the hypothesis that a human being is emotional, fallible and vulnerable to environmental influences. Thus, the psychological aspect of making business decisions cannot be considered fully rational. The theory of perspective has changed the existing approach to *homo oeconomicus* and set the new standards for rational action. It was found that in the decision-making process, investors are guided by emotions, hence, quite frequently their decisions depend on a coincidence or the form of presenting the problem. The subjective approach to profit value will be less positively felt when compared against the subjective feeling of loss once it is incurred. If the decision-making situation is presented in the way that the decision maker feels the loss, he/she will show a tendency to risk in order to minimize such loss. If the result is approached as a profit, then the decision-maker will be willing to avoid taking risks and choose a more reliable, even though less profitable solution (Kahneman and Tversky, 2012; Kahneman and Tversky (ed.), 2009).

In global terms, behavioural accounting has been developing since the second half of the 20th century, in Poland it was noticed no sooner than at the end of the 20th century. Currently, an increased interest in the problems of behavioural accounting is observed in Poland (Artienwicz, 2018a). In the sixty years history (since 1960) of behavioural accounting development, its various stages (e.g. inception, weakening, revival) can be distinguished. E. Jaworska (2015), based on the research by K.T. Trotman et al. (2011), J.G. Brinberg and J.F. Shieldsa (1989), J.G. Brinberga et al. (2007) identifies five phases in the development of behavioural accounting:

- phase I (1960-1970) – research is focused on, e.g., the impact of management control and budgeting on behaviours, the impact of accounting information on internal and external users;
- phase II (1979-1980) – methodological foundations were developed, the research is focused on information mainly (form, type and amount of information), models of influence on an individual decision-maker, information processing in accounting;
- phase III (1980-1990) – research confirms that people are characterised by limited rationality, behavioural limitations and heuristics represent, among others, major subjects of interest;
- phase IV (1990-2000) – attention is focused on correlations between specialist knowledge and accounting behaviours, the research addresses, e.g., learning functions, decision support systems;

- phase V (since 2000) – the conducted research is subject to diversification and specification and covers, e.g., beliefs and probability assessments, knowledge structure (invisible assets and intellectual capital represent an important element of knowledge in a modern enterprise), group decision making.

Behavioural accounting is the youngest and the least known representative of the behavioural trend among economic sciences (Caplan, 1989; Helmann, 2013). The conducted pioneering research in the development of behavioural accounting should be highlighted, including e.g.:

- C. Argyris (1952), who, within the scope of management accounting, analysed behaviours of employees and management in the budgeting process. The research addressed behaviours of internal managers in organizational units, their interests in developing budgets and the impact of remuneration on the motivation behind making optimal decisions for an economic entity;
- C. Devine (1960), who emphasized behavioural aspects in accounting, arguing that most accounting theories are based on unsubstantiated assumptions regarding human behaviours;
- E.H. Caplan (1966) who showed that understanding behavioural theory is important for the development of theory and practice in management accounting.

It has been adopted that in recent decades the penetration of behavioural trend into the science of accounting is a natural implication of its dominance in economics and finance, which coexist and cooperate with accounting within economic sciences. Behavioural research was of great importance in the development of accounting as a science, because until their application, accounting was perceived as a descriptive and analytical discipline alone. Since the beginning of the research focused on various users of information in the accounting system, including behaviours of managers and their subordinates, it has become an empirical discipline (Szychta, 2008). Behavioural research in accounting covers the behaviours of those involved in its functioning, rejecting the assumption of economic rationality in behaviour, because accounting is approached as a human activity consisting of values and intuition. It can be concluded that the behavioural trend in accounting analyses factors and situations that contradict full rationality.

In the author's opinion, behavioural accounting (also referred to as *behavioural accounting research*) or actually behavioural trend in accounting, represent all scientific and practical problems of retrospective and prospective accounting considered from the perspective of human behaviour, which is an internal and external entity involved in its existence and functioning. In order to implement these assumptions, the instruments available in accounting and psychology should be used and supported by the function of their modification to obtain proper information.

In the opinion of M. Nowak (2016), the term "behavioural accounting" translated into Polish means "behaviour in accounting", which has been replaced by a more meaningful term (shorthand expression) – behavioural accounting, commonly used in various circles. Behaviourism in accounting or behavioural trend in accounting stand for the expressions reflecting the essence of this phenomenon better, because it is not a new type of accounting ("accounting is one"), but another area that supplements the research on accounting as a practical science. Behavioural accounting, as part of economic sciences, does not fully comply with the rules of behavioural school (e.g. experimentalism, optimism), however, as part of social sciences extends the research by the aspects relevant from an accounting perspective (Seligman et al., 2003). The author opts for using the phrase "behavioural trend in accounting". In the study the term "behavioural accounting" will be used in the context of a shortcut, mainly due to its widespread use by many authors in the subject literature.

M. Balachandran (1985) believes that behavioural accounting stands for the application of the concept of social sciences to certain areas of research in accounting, e.g. budgeting, decision making, audit and financial reporting. A. Riahi-Belkaoui (2004) states that behavioural accounting introduces human aspects to accounting, and its main purpose is to explain and predict human behaviour in all possible accounting contexts. The author also expresses an opinion that behavioural accounting

should cover the widest possible areas of the accounting system in which all stakeholders, not just the users of information generated by accounting, participate.

Accounting is practical science, therefore, behavioural trend in accounting is a scientific and practical possibility to apply the assumptions and instruments of behavioural sciences in accounting. Behavioural trend in accounting can be interpreted as an attempt to explain and predict human behaviour in the context of accounting, such as: the usefulness of data from financial statements, the impact on addressees' decisions related to using the alternative accounting procedures or the influence of culture and language on the interpretation and application of accounting standards as well as many other issues (Breitkreuz, 2009). N. Artienwicz (2018b) defines behavioural accounting as "an interdisciplinary trend in accounting and social and behavioural sciences, which expands the classical approach of accounting by human aspects, allowing better understanding of these elements of human behaviour resulting from the individual characteristics and also the environment which affects the decision making processes in all contexts and in accounting processes".

E.A. Hendriksen and M.F. van Breda (2002) identify correlations between behavioural accounting and the positive theory in accounting, highlighting their descriptive approach to accounting research. The positive theory based on empirical research allows predicting stakeholders' behaviour, which can be referred to the behavioural trend in accounting. Empirical studies based on the hypotheses of the positive theory are of significant importance because they explain the economic consequences of using specific accounting solutions and show how important it is for various stakeholders for whom achieving the set goals depends on the decisions taken in accounting (e.g. by management).

"This theory helps in predicting the reactions of market participants to the actions of managers and also the behaviour of financial statements' users in response to information these statements disclose" (Szychta, 2015). However, there are significant differences between positive and behavioural accounting. Behavioural approach to accounting implies that all knowledge about the examined object is contained in the sensory-external (empirical) observation of its behaviour. Its research subject is focused on the behaviour of individuals. In turn, the positive approach to accounting is concentrated on the study of collectively (aggregate level), therefore it relates more to the decisions taken by an enterprise than the decisions of individual persons. Its essence is to explain and predict the accounting practice, whereas statistical methods are used to make inferences. To sum up, the integration between behavioural accounting and positive accounting is small. The subject literature, practically, does not offer models showing how individual decisions are aggregated and become enterprise decisions. Both branches of theory also differ in the assumptions about human cognitive abilities (Nadolna, 2012). Methodological foundations of behavioural accounting stem primarily from psychology and sociology, while positive accounting is the component of mainstream accounting.

Traditional accounting theories do not take human behaviour into account, assuming that accountants, auditors and other persons representing significant resources of the accounting system act in a rational manner. The decisions taken in accordance with legal regulations, standards and practical guidelines were regarded as rational accounting behaviour. This standpoint was verified under the influence of behavioural trend, because the decisions made in accounting are correlated, e.g., with the human thinking process and the views/opinions of the responsible professionals, whereas each individual person is subject to numerous limitations in his/her rationality being subject to many influences of various internal and external factors.

Behavioural accounting, to maintain the essence of accounting and behavioural research, should take into account the observation of internal and external stakeholders' behaviour, as well as analyse the processes influenced by such behaviours within the framework of accounting functioning in a given enterprise. These processes may refer to changes in the assets disclosed in accounting (e.g. equity and foreign capital) as well as in invisible property undisclosed in accounting (invisible assets and intellectual capital). Most often, behavioural accounting is not limited to behaviour, but more broadly understood as any behaviour of a person who has contact with accounting and remains in a relationship with accounting (Lord, 1989).

The research on behaviourism in accounting addresses simultaneously the scientific and practical sphere, and falls within the scope of accounting understood as a practical science, which is confirmed by M. Nowak (2016) presenting a proposal of the term behavioural accounting for science and practice. Behavioural accounting in a scientific context refers to a science focused on searching for and formulating laws which govern human behaviour related to the creation and functioning of accounting in an enterprise and the implementation of its fundamental principles. The subject of behavioural accounting research covers the problems related to the behaviour of people involved in the accounting system ("from the system entry to its exit"), i.e. accountants, auditors and managers. This "science is seeking to demonstrate the laws which govern accounting behaviours of those who implement accounting, work in the field of accounting, the providers of accounting data or the addresses of accounting information" (Nowak, 2015). The behavioural approach in accounting is also focused on studying the relationship between information and the behaviour of different individuals/groups (Hendriksen and van Breda, 2002).

The skilful application of management accounting can influence employee behaviour in a way which can result in the reduction of costs and expenses, increased revenues, inflows, better financial result, and the respective tasks will be implemented in accordance with the planned budgets. "In the case of management accounting, the deliberate use of accounting as an instrument designed to trigger a specific behavioural response will occur" (Nowak, 2015), i.e. actions of the people involved, e.g., management at different levels, management board, employees. The behaviours and tasks carried out as part of management accounting may also affect external stakeholders, e.g. clients. Their purchasing decisions depend on the level of prices determined through price calculations and profit and loss accounts. The main research area of management accounting is the measurement using the appropriate instruments and their submission to the decisions made. In turn, behavioural accounting addresses the behaviours associated with this measurement and refers to people: measuring, using it and providing the necessary data for its implementation.

The Subject and Object of Behavioural Trend in Contemporary Accounting

The scope of behavioural research in accounting is diverse. The behavioural accounting domains most frequently cited in the subject literature are listed below:

- J.G. Birnberg and J.F. Shields (1989), who distinguished five main research areas: 1) managerial control, 2) accounting information processing, 3) accounting information system design, 4) audit and 5) organizational sociology;
- E.H. Caplan (1989), who identified six general research areas in behavioural accounting: 1) financial accounting; 2) management accounting; 3) audit; 4) human resources accounting; 5) social accounting; 6) accounting information systems and human information processing;
- E. M. Bamber (1993), who proposed four research domains: 1) audit, 2) financial accounting, 3) management accounting and 4) accounting system;
- J.G. Birnberg (2011), who stated that the object (research subject) is the most important in the conducted research. He distinguished the following objects: unit, small groups, organizations and environmental conditions.

Based on the current trends which characterize modern knowledge-based enterprises and taking into account the current achievements of behavioural accounting, the author identified the following research areas in the behavioural trend of contemporary accounting: 1) organization of accounting, 2) retrospective accounting, 3) prospective accounting, 4) invisible property accounting, 5) tax accounting, 6) computerization in accounting, 7) audit in accounting.

In the areas of retrospective accounting (understood more broadly than financial accounting) and prospective accounting (understood more broadly than management accounting) the following problems can be analysed, e.g.: behaviour of stakeholders in the context of the enterprise core business and corporate social responsibility, including financial and non-financial information. In the author's opinion, special attention should be paid to the area of invisible property accounting, referring to invisible assets and intellectual capital (in a modern knowledge-based enterprise) and

their relationship with stakeholders' behaviourism. Taxes, the process of accounting computerization and organization as well as auditing require separate research.

The analysis of behavioural trend in accounting confirms that it mainly covers the problems of management accounting. It primarily addresses the following issues (Artienwicz, 2018b):

- budgeting (budget preparation, approval, implementation and control) and its impact on the behaviour of people in an entity;
- budget and the level of employee involvement including the reward system in the context of budgeting;
- participation in the budgeting process (M. Tiller (1983) analysed the degree of difficulty of budgetary targets and their impact on performance. M.D. Shields et al. (2000) analysed the impact of stress on the influence of budgeting effects on behaviour);
- leadership in the budgeting process (D. Otley and B. Pierce (1995) analysed the leadership style in the companies providing accounting services);
- tendency to create budget slack (D.E. Stevens (2002) analysed the impact of reputation and ethics on creating budget slack, using manipulation in the level of information asymmetry between superiors and subordinates in terms of productivity. He analysed the reputation of subordinates and their ethical doubts regarding budget slack);
- intentional distortion of costs and revenues;
- the impact of leadership styles on budget stress levels;
- the impact of internal audit on performance.

Decision-making (e.g. in the budgeting process) is influenced by behavioural factors at an individual and enterprise level. Among these factors the following are listed (Bek-Gaik, 2001): conflicts of interest which may occur between the company goals (e.g. maximizing goodwill) and the employee's personal goals (e.g. maximizing salary, power); irrational behaviour of the decision-makers (e.g. a tendency to withhold information selectively in accordance with their own prejudices, rejecting information incompatible with their beliefs, the tendency of decision-makers to collect excessive information).

N. Artienwicz (2018b) analysing behavioural research in accounting identifies, apart from management accounting, also the following areas: financial accounting, auditing and tax aspects. Behavioural issues in financial accounting concern, e.g.:

- the role of accounting in disclosing information to its addressees;
- the impact of valuation methods on stakeholder decisions;
- the scope and forms of the information disclosed on stakeholders' decisions (A. Abdel-Khalika (1973) analysed the impact of the aggregation level of figures in financial statements on the judgment and decisions made by credit inspectors. L. Dong et al. (2016) examined the form of data presentation and its impact on the decisions of financial reports users, in particular the investors' reactions to unusual items affecting the company financial result. J. Han and Hun-Tong Tan (2007) analysed whether the form of management forecasts has impact on the method of estimating company profits by investors presenting high and low knowledge level. L.M. Sedor (2002) in her research focused attention on the narrative form of the presented management board plans regarding future profits and their impact on the reactions of market participants);
- the analysis of non-financial information disclosed in reports/statements, e.g., the impact of the message presented in the management board's letter by the company President (optimistic or pessimistic) on the decisions taken by the stakeholders;
- the chief accountant's influence on creating the accounting policy;
- the impact of the applied impression management techniques (e.g. self-promotion in company reporting) on investors' decisions;
- the influence of management on the chief accountant's choices;
- the impact of personality on the choices made in accounting (Cewińska et al., 2017).

Within the framework of financial audit, behavioural research addresses, e.g.: auditor's expert knowledge and experience; ethical and moral issues; the influence of moods and emotions on the auditor's work. In terms of taxation, behavioural studies include, e.g.: compliance with ethics by tax specialists; relations of tax specialists with clients; tax manipulation and creation; taxpayers' behaviour in the context of tax audits and penalties for non-compliance with tax regulations.

As part of the distinguished research areas referring to the behavioural trend in accounting, their subject and object can be defined. The main subject takes the form of human resources and their intellectual capital, in particular both internal and external stakeholders of the enterprise. In turn, the object consists of human behaviours, among which the following can be distinguished, e.g.: external and internal behaviours, individual and group behaviours, interpersonal and intergroup behaviours (interactions) and the respective factors influencing these behaviours. Table 1 presents the subject and object of the behavioural current in accounting.

Table 1: The subject and subject of behavioural trend in accounting

Subject of behavioural accounting	
Human resources (and their capital – knowledge, skills, experience), which influence the functioning of the accounting system and also remain under its influence	
Internal stakeholders e.g. employees, management, management board, managers	External stakeholders e.g. clients, suppliers, financial institutions, banks
Object of behavioural accounting – behaviours	
1. Human behaviour (e.g. accountant's, manager's) affecting the functioning of enterprise accounting. Individual and internal behaviours. 2. Human behaviour (e.g. investor's/investors') under the influence of accounting information related to the enterprise activities. Individual and group, external behaviours. 3. Interpersonal behaviour (e.g. employee/employees – manager, employee – client/clients) affecting the activities carried out in the enterprise accounting. Individual and group, internal and external behaviours. 4. Behaviours presented by suppliers (entry into the accounting system) and addressees (exit from the accounting system) of the information. Individual and group, external and internal behaviours. 5. Behaviours influencing the creation of the traditional enterprise property and the invisible property in accounting (e.g. brand, image and reputation). **Synthetic characteristics of behaviour:** – Behaviours can present the following nature: a) internal and external, b) individual and group, c) interpersonal and intergroup (interactions). – Behaviours, thinking processes and decisions are covered by the research. – Behaviours result from, e.g.: emotions, commitment, preferences, personality traits, views, knowledge or ignorance, competences and physical abilities. – Factors influencing behaviour – physiological, cultural, social, psychological, environmental, organizational	

Source: author's compilation based on (Artienwicz, 2018; Caplan, 1989; Korzeniowska, 2018; Siegel and Ramanauskas-Marconi, 1999).

The subject and object scope diversity within the behavioural trend in accounting results from many of its research areas determining mutual subject-object correlations (e.g. accountant's behaviour in the course of preparing financial statements, manager's behaviour during strategic planning, sales department employees' behaviour when promoting a new product and developing customer relations). Table 2 presents examples of the subject-object correlations within the behavioural trend in accounting.

Table 2: The subject-object correlations within the behavioural trend in accounting – examples

Subject	Object
Accountants Managers	Accounting policy – the right to choose instruments regarding, e.g.: – reducing or increasing costs/revenues, – creating, using and releasing provisions, – creating revaluation write-offs for fixed and current assets, – estimating fair value
Investors Clients External auditors Statutory auditors	Behaviours resulting from the company image creation, e.g. a positive one: – higher dividends expected by investors, – contracts execution continuity, price reductions and better products expected by customers. The opinions of external auditors and statutory auditors regarding the quality of the enterprise accounting – reliable or manipulated opinions
Managers	Financial result management, e.g.: – non-infringement of the integrity of the financial statements, – realization of managers' personal interests, without violating the accounting law. Strategies for influencing the results focused on investors: – smoothing profits, – avoiding to report losses, – presenting higher profit level compared to the previous year, – increasing the loss when it is obvious, e.g. during a financial crisis
Investors Managers Clients	Financial reporting and additional reporting, including: – object scope and forms of disclosure, – managers' interference in preparing statements and reports to achieve personal benefits, – non-financial information as an extended information offer for investors and clients, – manipulation/creation of financial and non-financial information

Source: author's compilation.

From the perspective of behaviourism in the area of financial accounting, one of the most important issues is the development of financial statements constituting the information base for the interested stakeholders before making a decision. In terms of financial reporting in behavioural terms, the following problems requiring solutions may arise (Masztalerz, 2010), e.g.: do the disclosed information affect the valuation of shares and can they be used by investors to generate profits; which disclosed information is of the greatest importance to investors and has the greatest impact on their decisions.

Extending reporting by additional and voluntary forms of financial and non-financial information disclosure in order to create the enterprise reputation and image is accompanied by human behaviour influenced by environmental incentives (e.g. success of a competitive company). M. Mazurska (2014) notes that the developing, so-called narrative reporting makes sense only if it takes into account (analyses) how the addressees respond to the information disclosed in those reports.

In the accounting practice, one can observe both an increase in demand for non-financial information and an increase in the supply (disclosure) of such information by the enterprises concerned. S. Arvidsson (2011), based on the carried out research, concluded that the most common reasons for the disclosure of non-financial information by companies is, e.g., the desire to improve the understanding of an enterprise by stakeholders. Unfortunately, the phenomenon of extended and voluntary disclosure of information (in particular non-financial information) by enterprises has negative effects too – a violation of the principles of human and business ethics. An important motivation to distort this information may its manipulation in favour of the company, e.g. in order to maintain the stakeholders' support (Merkl-Davies et al., 2011).

Referring to the behavioural instruments in economic sciences, it can be stated that the cognitive process in behavioural accounting, following which the decisions are made, can also take the form of heuristics, i.e. inducing the mind by the elements used in the course of the thinking process (e.g. attention, memory) to use mental shortcuts in comprehensive analytical processes (Nofsinger, 2006).

Mentally, the heuristics formulated by R.H. Thaler (1980), called *mental accounting*, refers to the accounting (accounting principles) which is not integrated with traditional accounting. Mental accounting refers to a situation when investors think of all of their transactions separately rather than as a single investment. People are not able to approach money originating from different sources in an equal way. They keep in mind their "general ledger", which is divided into individual categories marked as profit or loss. People try to achieve profit or neutrality on each of their accounts in line with the theory of perspective. In the human mind, the information about inflows and expenses is assigned to separate "mental accounts".

The application of heuristics does not guarantee results' correctness and the decisions made may not be rational or optimal. Different types of heuristics are distinguished in the subject literature (Nęcka et al., 2006) and among the most widely described heuristics the following can be distinguished: representativeness, accessibility as well as anchoring and adjustment (Tversky and Khaneman, 1974). Most often, the effects of cognitive heuristics in accounting have impact on such actions as (Jaworska, 2015): estimating or assessing current information, forecasting future results, evaluating and reviewing the probability of achieving a specific result, choosing between possible courses of action.

Heuristics (cognitive propensities) in behavioural accounting can be referred to the behaviour of both external and internal stakeholders of an enterprise. Heuristics related to the perception of reality in human behaviour may refer to the components of invisible property, e.g.: a) frame effect – developing a product brand, b) anchoring error – reference to a retrospective image, c) halo effect – strengthening customer relationships. Table 3 shows the reference of some heuristics to the selected examples within the behavioural trend of accounting.

Table 3: Selected heuristics in the behavioural trend of accounting – examples

Selected heuristics	Behavioural trend in accounting – examples
Frame effect	Problems are analysed in the wrong context, e.g. too narrow or too wide. When developing a product brand, the decisions made are often based on the belief of being right, infallible, refer to the events from the past, reject information inconsistent with the adopted assumptions.
Anchoring error	People get strongly attached to the initial suggestion (so-called anchor) and accept it subconsciously. Decisions are based on some information, its modification, which they adjust to it in order to prepare an answer or issue an opinion. An anchor can take the form of referring to a retrospective (positive) image of an enterprise which is supposed to hide current failures and losses from public opinion.
Hallo effect	People, having noticed a positive quality of a person, an object or a phenomenon stretch such opinion and become convinced of their other positive qualities. The halo effect allows developing business relationships with clients.
Self-perception theory	People, by observing their own behaviours in different circumstances, learn themselves. When making new decisions, they recall earlier behaviours, thus forming certain habits. It can be used by an accountant in the process of preparing the annual financial statement.
Representativity error	People formulate conclusions based on very few and erroneous observations, although representing some typical features. It is used in the enterprise accounting policy, especially in its creative part, where there is a possibility of the so-called right to choose.

Source: author's compilation based on: (Tversky and Kahneman, 1991; Polowczyk, 2012).

Stakeholders often prefer the following principles while making decisions: loss aversion, risk aversion, fear of the unknown and defence of the *status quo*. The aversion to change is the greater the more decision options are presented to stakeholders at the same time. The multitude and diversity of variants can result in the so-called decision paralysis, consisting in the inability of making optimal choices (e.g. by an accountant). Behavioural problems in accounting may relate to a wide variety of issues, e.g.: business costs and factors which cause them, corporate governance in relation to the quality of financial information, corporate social responsibility, compliance with business ethics, assessment and control of managers, relationships between an employer and employees, motives for certain behaviours and making decisions in various situations, personalities and attitudes of managers in various types of entities, e.g. listed companies and budgetary entities.

Conclusion

The evolution of accounting in a modern enterprise defines the research areas within the behavioural trend of accounting. In each research area, the research subject and object, as well as the mutual subject-object correlations, resulting from human behaviours and factors which influence them, including the enterprise goals, should be defined. The variety of issues raised within the behavioural trend of accounting does not facilitate, e.g., developing a standard object scope and defining a closed catalogue of subjects. For the knowledge-based enterprises, the behaviours of stakeholders creating invisible assets and intellectual capital are of particular importance.

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Analysis of The Perception of Sustainability from the Perspective Of Entrepreneurs and Consumers in The Food Industry in Slovakia

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Abstract

Sustainability as an aspect of the circular operation of business models should be a core aspect of the business-making. The article presents the results of the research whose main aim is to analyse the level of perception of sustainability's importance in Slovakia. The level of awareness in this field in the Slovak market is low compared to the situation abroad. However, companies are starting to actively address this issue. What are they actively doing for sustainability and what do they plan to add? Can sustainability be a new trend that will reflect in the customers' preferences? The article is focused on the analysis of the environment and activities related to this issue in the Slovak market. The methodological approach was based on the identification of substantial results based not only on the secondary data processed but also on the primary research in the field of food companies in Slovakia and their perception of sustainability. The secondary and primary data inputs were processed in the form of case studies in which mutual relationships were revealed using the method of comparison. One of the main findings of the article shows the high awareness of the need for responsible approach, regarding the fact that 100% of the researched companies are minimizing the amount of waste being produced and almost 77% of them are planning to implement structured waste management.

Keywords: Sustainability, Food Management, Perceived Sustainability, CSR – Corporate Social Responsibility

Introduction

The current situation of sustainability and global challenges is a topic that concerns both the end consumers and companies. The pressure for change in the environmental burden comes not only from the European Union but also from the customers. Consumers are becoming aware of the impact of their purchasing choices and are actively addressing not only the quality and price of the products they purchase but also their origin, composition, or side effects. Companies are therefore forced to *centrally and locally change their activities.*

Partial objectives of this article include: *(1) analysis of the current state of the issue in Slovakia; (2) identification of the attitude of companies towards this topic; as well as (3) gathering the information on what solutions are available.* These pieces of information will be collected via the market analysis within the food industry. The secondary data inputs obtained from the literature sources will actively support the theoretical foundations and the environmental analysis will provide information on external influences. These data inputs will be compared with the research conducted in Slovak companies, focusing on the perception of sustainability as an aspect of business-making and its active implementation.

Theoretical Background

Sustainability is already leaving the private environment and is becoming a public matter. Therefore, this topic includes the description of *sustainability in general, sustainability in relation to the food industry, and sustainability from the consumers' perspective.*

Sustainability and Its Form in The Food Industry

Sustainability can be viewed from several perspectives. When we talk about the sustainability of a product, we focus on whether the product is recyclable or whether it is produced in an environmental-friendly manner (Kim, Ko, 2012). Korten (2001) stated that the world has come closer to unity and people can find new social values for humanity. This opinion humanly describes the need for sustainability, not just within the *business models* but within an overall approach to the business-making. Consumption strongly depends on what is being offered. It is necessary to think whether the food that reaches consumers is sustainable and whether the companies producing it are building their business models responsibly (Ranta, Aarikka-Stenroos, 2008). However, this aspect also has a significant impact on consumers who are starting to look for values in the goods available.

According to Cambridge dictionary, sustainability is: *"the idea that goods and services should be produced in ways that do not use resources that cannot be replaced and that do not damage the environment"* (Demjanovičová, 2018). Strand (2006) then worked with the **concept of CSR** and sustainability. In addition to the CSR Implementation Adviser, he also conducted business ethics research. His work is a foundation for large companies that are trying to put CSR into practice. He focuses on the need for sustainability applications in mainstream companies. *"The sustainability and networking of stakeholders are essential. One without the other is almost unreachable"* (Strand, 2006). While companies are trying to follow the CSR practices and apply them to their daily activities, the overall outcome is influenced by the stakeholders who fail to comply with the agreed CSR parameters. This idea is also supported by the opinion of Ferenc, et al., (2017). Strand also points out that if the principles of sustainability are not entrenched in the whole structure of a company, they are ineffective (Strand, 2014).

Kucharčíková and Mičiak (2018) build on several definitions of sustainability in relation to *sustainable development.* Sustainability has a subset of activities that are specific to it. Hence, an organization may apply some of the values of sustainable development, but it still does not have to get to the state of a sustainable organization. Following this, the conditions that need to be met to achieve food sustainability are: *"a sustainable increase in yields on the supply side and an improvement in the use of agricultural products at different stages, including a reduction in losses and wastage between the farm gate and the consumers plate"* (Esnouf et al., 2013).

The food industry has an impact on the environment within the whole production chain, from growing through processing to distribution and the end of the products' lifespan (Borghi et al., 2014). This statement is supported by Lafontaine et al. (2012) and Parent and Lavallée (2011). They emphasise that at the international level an integrated evaluation of sustainability needs to stem from the life cycle of products.

Consumers' Behaviour

The customers' behaviour is the feedback for the companies in relation to innovation but also to the plans for future growth. If a company knows the consumer preferences, it can effectively set its activities. It is essential to know the consumers and to understand their reactions and behaviour related to purchasing.

The entire business-making is focused on the consumers. It is therefore important for the companies to understand their consumers and meet their needs (Csengeri, 2020). In relation to the food industry, the aim of quantification of environmental properties of food and beverages also includes the

communication of this information towards consumers. Via this process, the consumers become encouraged to make *sustainable decisions* (Jungbluth et al., 2000).

The creation of a product or service that will meet the customers' needs is not only connected to the product itself, price and promotion. Companies are also selling their values as a part of their products. The value is what is considered important. It is in the aspects to which an individual or a group attach importance. According to many authors (Hofstede, 1991; Kotter and Hesket, 1992; Hall, 1995), the values represent the core of the organizational culture (Lukášová et al., 2004). Consumers want to be a part of the product and therefore, they want to be a part of the company itself. To do this, they need to be able to identify with the company and its activities. The inner attitude of people is derived from what they focus on. Looking at an individual as a human being, the value can be defined as what s/he believes in. This perspective can be named psycho-social-behavioural (Blašková, Hriníková, 2019).

The current situation regarding sustainability and consumers' behaviour

The identification of the current state within the studied topic was performed using relevant results describing the situation at the global, European and Slovak level.

Based on the global survey from 2012, *over 56% of consumers are interested in environmental issues.* In total, 17 000 respondents were surveyed in relation to their consumer behaviour. The *Sustainable Consumption Index – Greendex, and the guilt factor related to the environmental impact of individuals* were developed. The guilt factor was highest among consumers living in the countries where the people behave the most sustainably. Regarding the extent to which consumers feel able to contribute to the change and improvement of the environment, the results were the opposite (Nadácia Pontis, online, 2013).

According to Cetelem's European Consumer Behaviour Survey's (2017) results, as many as 74% of Europeans are concerned about *future environmental changes.* This finding is supported by the importance of addressing sustainability. This was supported by further conclusions from the survey, where only *27% of respondents were optimistic about the fate of future generations* (only 21% in Slovakia). On the other hand, among the factors that would have a positive impact on the change in a given country, *the environmental management* was at a low place in the ranking (only 15% of respondents chose this factor), (Cetelem, online, 2017).

Thus, these results indicate the need for building environmental and sustainability awareness so that this factor is perceived by people as an important way of promoting the positive development of the country. *The European Environment Agency* was examining household consumption (2015). The results show that 13% of total European households' expenditures were spent on *food and non-alcoholic beverages.* The impact on environment here includes travelling to shops, storage, cooking, and waste generation (2016).

The situation in the Slovak market already reflects the need for responsibility for the *environmental impact of business activities*. Entrepreneurs realise that it is necessary to make changes in their activities. Venhartová (2019), director of the Food Chamber of Slovakia, presented the commitment to sharing best practices, fostering innovation in food production and packaging, and considerate extraction of raw materials. FoodDrink Europe, has been devoting effort towards sustainability of the food industry for a long time. It focuses on the objectives of sustainable development included in the European Green Deal. The aim of the agreement is to create an environment in which sustainability can be implemented in the food industry (Jakubčo, 2019). *"Our industry is still committed to achieving more sustainable food systems. Simply put, sustainability is the right thing for our businesses, for our society and for our planet"* (Frewen, 2019).

The GfK is engaged in regular surveys of consumers' behaviour in the Slovak Republic. A relevant finding is that in 2019, *fresh and chilled foods* accounted for up to 49% of the fast-moving consumer

goods of Slovak households (GfK, 2019). Sustainability in the Slovak Republic is also addressed by the *Sustainable Society Foundation* (2016). In 2016, they published their own *Index of Sustainable Society*. The complete structure of the index's components is shown in Tab. 1.

Table 1 : The structure of the Index of Sustainable Society

Categories	Areas	Indicators
Welfare of humanity	Basic needs	Food sufficiency
		Drinking water sufficiency
		Safe sanitation
	Personal development and education	Education
		Healthy years of life
		Gender equality
	Balanced society	Revenue distribution
		Population growth
		Good management
Quality of the environment	Natural resources	Biodiversity
		Renewable water resources
		Consumption
	Climate and energy	Energy consumption
		Energy savings
		Renewable energy sources
		Greenhouse gasses
Economic welfare	Change	Organic farming
		Savings
	Economy	GDP
		Employment
		Public debt

The resulting evaluation of countries within the indicators and relevant areas ranged from 0 to 10. The Slovak Republic achieved the best evaluation of the following indicators: *food, drinking water sufficiency, safe sanitation and renewable water resources* (Nadácia udržateľnej spoločnosti, online 2016). In terms of food sustainability, the fifth-highest value attributed to the *organic farming factor* is an interesting result (Nadácia udržateľnej spoločnosti, online, 2016).

The presented findings show that the consumers are interested in environmental issues. They also feel guilty for behaviour that damages the environment. Especially, people in Slovakia are not optimistic about future changes in relation to the environment. Specific position in the achievement of overall sustainability is held by the food industry. Here, the entrepreneurs' statements indicate their focus on sustainability. Therefore, in our research it is crucial to analyse the companies' perception of sustainability and the activities already being performed to achieve it.

Research Methods

The materials for this article were selected from primary and secondary sources of data in the studied field. The primary focus is on food companies. Specifically, 13 companies from the Slovak Republic were approached by a deliberate selection *(Sladkosti pre hostí, s.r.o., Art ateliér cafe, Aurelica coffee, Stanica Žilina-Záriečie, Miho cafe, Verticcio, Gentlejam s.r.o., Habesh coffee, LUZA SK, s.r.o., Československá pivotéka, VÁŽ SI, Le Torri, Extreme park s.r.o.)*. The primary data points were collected directly from companies' owners using the method of inquiring via a questionnaire survey. The aim of the survey was to identify the perception of sustainability by entrepreneurs. The aim

included the perception of the importance of this issue linked to the business model and the actual implementation of the concept.

The part of the secondary research is aimed at large companies. Food stores operating in the Slovak Republic were selected. These are ones of the largest retailers in Slovakia, but at the same time, they are also well-known companies performing positive activities in the field of sustainable development. These are the Tesco STORES SR, a.s., Lidl Slovak Republic, v.o.s., and METRO Cash & Carry SR s.r.o. (*The abbreviations of the types of companies from Slovak language are explained as follows: a.s. = SpA; v.o.s. = C.I.; s.r.o. = Ltd.*).

The methods used in the research that is presented in this article included the analysis, synthesis, comparison, and statistical analysis (frequencies and techniques of exploratory analysis). The method of case studies was applied in two ways: analysis of existing cases, creation of an original case. According to Yin (2017), the application of the case study method has these six elements: "the plan, design, preparation, data collection, analysis and reporting". A case study is defined as *"an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-world context"*. This method helps explain the outcomes because the analysis consists of matching empirically observed events to the theoretically predicted ones.

Results

The research results combine the part represented by examined successful cases of companies operating in the food industry and their sustainable practices with the part of an original case study created using answers in the questionnaire survey.

Analysis of Selected Cases from The Food Industry

Companies in Slovakia are already active in social responsibility and in the sustainable development within the food industry. The solutions not only address waste management but also the sustainable development issues related to minimizing waste and preventing waste generation or reducing the carbon footprint. The survey discusses specific cases of companies in Slovakia as a successful application of a sustainable approach in the food industry.

Lidl

Lidl as one of the leading food suppliers in the Slovak market represents an ideal example of a socially responsible company. Since 2004, Lidl has been demonstrating a responsible approach not only to consumption but also to its own production. It eliminates the negative impact on the environment via its own eco-products and points to the need to perceive the burden for the environment.

Table 2 : Sustainable activities – Lidl

Metrics/results achieved	Activities
9 320 hours	Employees attending training courses within tailor-made training programs
1 772 stakeholders involved	Business partners familiar with anti-corruption policy and the fight against bribery
96% of energy	Electricity from renewable sources within total energy consumption
39.7% of total number of stores	The latest LED technology installed in the stores
100% of employees	Employees receiving training on energy efficiency
432 498 of Facebook fans	Facebook fans receiving regular information about the company's responsible activities
109 articles	Articles published on internal Lidlnet, dealing with the topic of social responsibility
185 000 trees	Trees planted in the Tatra forests affected by a calamity
53 birth centres	Birth centres in Slovakia being given a new equipment for the rescue of premature babies
2 mil. €	The value of socially responsible projects realised
10 towns	Slovak towns in which modern and safe Lidl playgrounds were built
increased by 23%	The value of goods from Slovak suppliers in purchase prices increased compared to the fiscal years 2016 and 2017
100% suppliers	Suppliers being committed to Code of Ethics

(elaborated according to: Spoločenská zodpovednosť.sk, online, 2017)

"The one who stops improving, stops being good." This is the idea stated in the report on sustainable operation of Lidl company in Slovakia (Spoločenská zodpovednosť, 2017). The company has been in the Slovak market since 2004. At the beginning, it had 14 stores here, now it has 141. The company is striving for continuous improvement in relation to suppliers' networks, products or the stores themselves, including the level of work being done by the employees. Lidl has been awarded many times, getting awards such as Qudal – Top quality medal for the year 2016/2017. The company got the award related to quality in 2018/2019. It is a mark of the highest quality in the food industry in Slovakia. Besides that, Lidl also got the award of the Retailer of the year in 2016 and 2017 and 2018. In addition, Lidl got the BestBuy award for 2019/2020 in the main category – the best ratio of price and quality.

Tesco

Tesco has been in the Slovak market since 1996. During this time, the company managed to create a network of 154 stores. Nowadays, the company belongs to one of the biggest private employers with more than 10 000 employees.

Table 3: Sustainable activities – Tesco

Metrics/results achieved	Activities
since 2017, as the 1st retail store in Slovakia	Measurement and transparent disclosing of the data on food waste
decrease in the food waste by 52%	Achievement of the OSN 12.3. objective for the sustainable development
report with detailed data on the food waste	Measurement of the total amount of food waste and detailed evaluation of its structure
donated food overall – increase by 533% in comparison with the previous period	Donated food surplus (for people's needs or as the feed material for animals)
donated food for people's needs – 1 792 tons – annual increase by 211%	Food donated to the Food bank of the Slovak Republic

donated food for animals – 2 043 tons	Food donated as the feed material for animals
132 stores	Stores engaged in the donation of food to the Food bank of the Slovak Republic

(elaborated according to: SITA, Tlačová agentúra (Press agency), online 2019)

Tesco has received the Via Bona award in 2017 for the contribution to the fulfilment of sustainable development goals. It is one of the most prestigious awards in Slovakia. It is being given by the Pontis foundation as acknowledgement for the most responsible companies in the Slovak market (teraz.sk, online 2018).

Original Case Based on Survey Among CEOS Of Companies from The Food Industry

The findings obtained from the analysis of the secondary data sources were followed by the creation of an original case from the food industry in Slovakia. The creation was preceded by the design of a questionnaire survey and its distribution to selected entities. These entities included companies from the Slovak Republic that are actively engaged in the food industry. The survey's results are captured using tables and charts below.

The first question in the above-mentioned survey was focused on the identification of the perceived importance of individual elements of sustainability within the food industry. The results from answers to this question are displayed in Fig. 1.

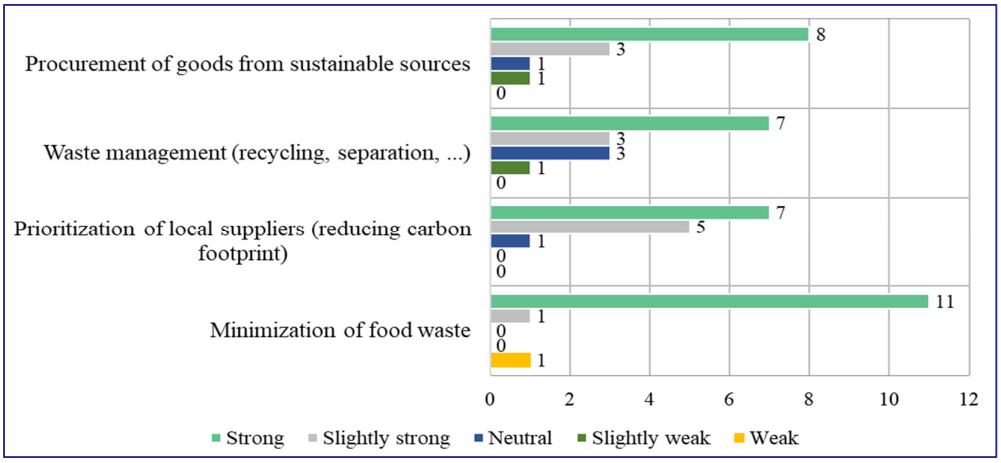

Figure 1 : The level of perceived importance of sustainability elements

Thus, the results show that the most important element of sustainability from the entrepreneurs' perspective based on the greatest number of the highest value assigned (strong) is the *Minimization of food waste*. Within the same context, it can be stated that the second place in the ranking is taken by the *Procurement of goods from sustainable sources*.

Subsequently, the Tab. 4 was created, showing the *total score* of perceived importance of the individual sustainability elements, besides the above-mentioned values (listed in Fig. 1). Based on this calculation, the *order of importance* was created for the sustainability elements.

Table 4 : The order of the perceived importance of sustainability elements according to the overall score

Perceived level of importance of sustainability elements	Weak	Slightly weak	Neu-tral	Slightly strong	Strong	Total score
	Frequency of answers					
Minimization of food waste	1	0	0	1	11	**60**
Prioritization of local suppliers (reducing carbon footprint)	0	0	1	5	7	**58**
Waste management (recycling, separation,	0	1	3	3	7	**58**
Procurement of goods from sustainable	0	1	1	3	8	**57**

**Total score was calculated using the assigned value: 1=week, 2, 3, 4, 5=strong*

This order indicates that the first place is still taken by the element of *Minimization of food waste*. However, the element of *Procurement of goods from sustainable sources* was shifted to the last place in the ranking created. On the other hand, the identified differences are not considerable, so it can be stated that the listed elements of sustainability are comparably important for the entrepreneurs in the food industry in Slovakia.

The second question in the survey was focused on the identification of the level at which the entrepreneurs are already actively engaged regarding the sustainability elements. The results are shown in Fig. 2.

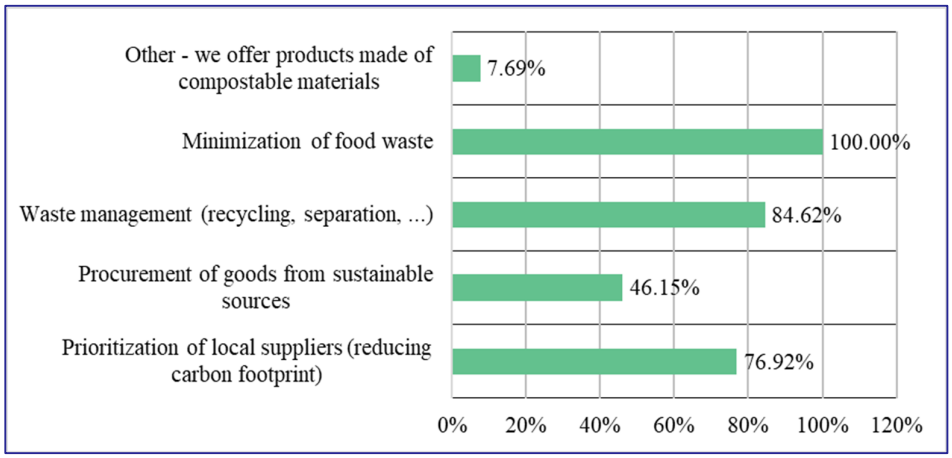

Figure 2 : Sustainability elements already applied in researched companies

In connection with Fig. 1 and Tab. 4, it can be concluded that entrepreneurs are really the most engaged in activities related to the element that they consider the most important.

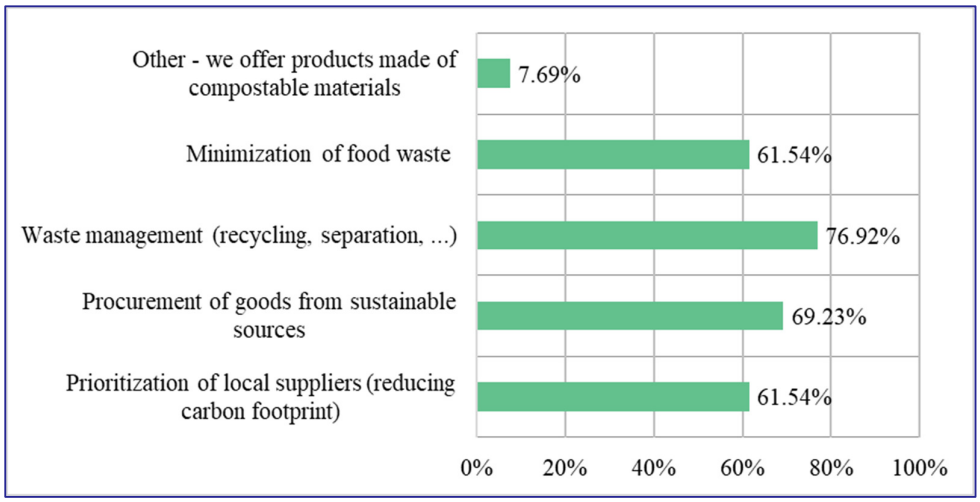

Figure 3: Planned application of sustainability elements in selected companies

Then, Fig. 3 presents the results of the third question in the survey, revealing the planned changes in relation to sustainability.

The future focus of entrepreneurs in the food industry mostly leads to the element of *Waste management*
(76.92% of respondents) and the *Procurement of goods from sustainable sources* (69.23% of respondents).

Discussion and Conclusions

The food industry belongs to main producers of the food waste. The European Commission (EC) created a plan for "Europe efficiently utilising resources" that has been implemented since 2011. The EC estimates that 90 million tons of food are being wasted every year. The most serious aspect of these results is that the food that is becoming a part of waste is deteriorated and unsuitable for consuming. A huge part of this amount ends in the waste due to improperly set laws. According to the EC's plan, the value chain of food and beverages accounts for 17% of direct emissions of greenhouse gasses. The EC's plan appeals for common effort of farmers, food industry, retailers and consumers via the manufacturing technology. The European goal is clear: decrease the disposal of edible food in the EU to one half by 2020 (eea.europa.eu, 2016).

Via the primary research, we got the outlook on the issue from the perspective of small entrepreneurs in Slovakia. The awareness of the need for the sustainable approach is high, regarding the fact that 100% of addressed companies are minimizing the waste in their business-making and almost 77% of the respondents are planning to apply structured waste management into their business model. This idea is also supported by the opinion of Hittmár, et al., (2014). Other aspects that could be considered while modifying the business model include the impact on reputation, changes in the inventory management, utilisation of modern information systems, and ethical principles (Zraková et al., 2017; Sroka et al., 2015; Stopka et al., 2016; Kubina et al., 2015). In comparison with large companies studied, the awareness is at a very good level. Small companies realise the need for a sustainable approach to the business-making and they are planning to improve within this field. The approach of the studied large companies is an ideal example of responsible business models. Consumers appreciate these activities of companies, which shows in the number of awards won by Lidl and Tesco. The results of our research are therefore aligned with Strand's results. Specifically, they corroborate the importance of CSR activities and their linkage to consumers as a significant stakeholder group.

The main contribution of our article is *an in-depth analysis* of food sustainability in the Slovak Republic based on a combination of primary and secondary sources within the real-world context. The contribution also lies in *the implications for the business model's changes.*

Limitations and Implications for Future Research

Research limitations are connected to the possible shortcomings of the case study method. These include insufficient rigorousness, application of the case study approach not in the scientific way, and the lack of quality of the study. We tackled these limitations to the best of our abilities via following the scientific procedure described in the methodology part and using our academic skills and knowledge.

Implications for future research follow the fact that our qualitative research cannot be used for general statements valid for the whole set of Slovak companies. Therefore, future research can be focused on testing the results in a quantitative research so that the validity can be expanded to a representative sample. Next opportunity is in applying the business model with values we identified in other fields.

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Disability as The Self-Employment Stimulant for People with Disabilities in Poland And Other Countries

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Abstract

The purpose of this article is to determine the interest of people with disabilities in taking up self-employment and whether their health status and other health conditions such as various types of diseases and their intensity facilitate the decision about undertaking self-employment or remain major barriers in this respect. The research conducted by Ricardo Pagan in thirteen European Union countries, published in 2009, became the inspiration to develop this study and perform the respective research. Seeking the answer to the question of whether the disabled are willing to undertake self-employment on a larger scale than non-disabled people and whether, in this respect, their disability constitutes a barrier or a stimulant was adopted as the basic research problem. Unfortunately, Poland was not included in the research and, therefore, this study and its results may fill in the existing gap. The additional justification for taking up these problems is a significant lapse of time since the publication of Ricardo Pagan's research results. In the context of dynamic changes occurring within the last dozen or so years on the global labour market, it has become an important incentive to address it in this study. Thus, the conducted research is a part of the more extensive global research in the field of self-employment, as well as entrepreneurship of the disabled, allowing better understanding and also popularizing these problems. The article presents a descriptive and comparative analysis based on the studies covering the leading world literature and statistical data supported by the survey results conducted among over 450 self-employed Polish disabled entrepreneurs. The research timeframe covered 2014-2018, due to the significant transformations occurring on Polish labour market and the availability of consistent and revised statistical data.

Keywords: Disability, Entrepreneurship, Self-Employment.

Introduction

People with disabilities are present in all countries worldwide and constitute 10 to 15% of every population ILO (2014) and World Bank (2011). They are generally less competitive on the labour market, presenting relatively low economic activity. They are commonly included among the disadvantaged groups at risk of marginalization resulting from unemployment. Unemployment, comparing to non-disabled people, definitely limits their opportunities to participate in social life Barnes (2008). They suffer poverty and deprivation more often, they are also discriminated in the economic sphere Barnes, Mercer et al. (1999). In many countries, in particular the highly developed ones, the disabled function in the society owing to the developed social programs. Their role is focused on, e.g., reducing the distance between people with different disabilities and the able-bodied ones in diverse aspects of social and professional life. Various programs devote much space to counteracting unemployment of people with disabilities. It is widely recognized that

unemployment is the main reason for their marginalization Palmer et al (2002). Researchers also notice that the limitations experienced by the disabled impose seeking alternative, to a full-time job, forms of professional activity Blanchflower (2000), Brown (2006).

In the light of Ricardo Pagan's research results, the disabled undertake self-employment more often than the non-disabled people. The differences in self-employment, in favour of the disabled, were particularly evident in southern countries such as Greece and Portugal, i.e. the countries recording a relatively high unemployment rate. In the countries where, at that time, unemployment was a much less significant problem (Germany, the Netherlands, United Kingdom), such extensive differences were not recorded. The research conclusions also indicate that the severely disabled people (with large limitations in their daily activities) are more likely to take up self-employment than others with milder impairments or even the able-bodied individuals. It means that the health condition and the disease specificity can stimulate disabled people towards self-employment instead of working full-time. Such persons choose self-employment as an option to accept their disability and adjust it to their professional life in the context of the absence of suitable, for them, forms of employment Pagan (2009). It can, therefore, be adopted that health condition and some dysfunctions can act as an incentive to undertake the effort of self-employment and thus implementing entrepreneurial attitudesThis section should follow keywords. This section should provide background of the study and highlight research motivation.

Entrepreneurship Vs. Self-Employment – Literature Overview

The world literature covers extensively the problems of people with disabilities, including their social and labour market situation. Their particularly susceptibility to exclusion from the labour market, or their low competitiveness on this market is frequently highlighted. However, much less scientific attention is devoted to their entrepreneurship. Simultaneously, the absence of statistical data in this respect is widely emphasized Blanchflower (2000), Brown, Farrel and Sessions (2006), Hyytinen and Rouvinen (2008). The mainstream publications, however, are focused on employment and unemployment problems, rather than entrepreneurship. Some authors have adopted the measurement of entrepreneurship through the prism of self-employment as a solution to this situation.

A typical example of an entrepreneurship idea implementation is the new business entity registration, a new division of the existing enterprise, or intra-corporate activities Lumpkin (1996). Entrepreneurial attitudes are also visible in the decision-making situations involving risk and uncertainty, e.g., when deciding to purchase goods at current prices with an intention of their future resale not knowing their future prices Knight (1942). Innovative attitudes and activities of individual employees or the entire teams also represent the manifestations of entrepreneurship. They can be shown through, e.g., developing and launching new products or services, new production methods, entering new markets, attracting new suppliers and changing the industry Schumpeter (1934). Entrepreneurship and an entrepreneur are, therefore, associated with the implementation of innovative activities consisting in providing the existing resources with the new production and organizational capacity Drucker (1985).

Classical approach to the problem of self-employment in literature refers to this form of economic activity and the implementation of entrepreneurial ideas as the ultimate solution to racial, gender, ethnic or disabled people problems by arranging work for these groups Clark and Drinkwater (1998), frequently supported by the state Blanchflower (2000). Self-employment was also described as social reintegration or the program for improving qualifications and acquiring new skills useful after finishing self-employment Bruce and Schuetze (2004).

Some researchers emphasize the idea of entrepreneurship implementation through self-employment as the method to ensure greater work flexibility and better working environment adaptation to the physical possibilities resulting from disability. It refers to the working time, conditions and performed tasks Doyle (2002), Boylan and Burchardt (2002). Moreover, self-employment can serve as a potential tool for the occupational rehabilitation facilitating faster and better integration of people with disabilities on the labour market Arnold and Seekins (2002).

Disability Vs. Self-Employment – Literature Overview

The existing research shows that disability can be stimulating in taking the risk of starting and running a business and also the reason for closing it. Deteriorating health, contracting diseases or dysfunctions may prevent the disabled from performing work at the level satisfying their employer. Such individuals, unable to continue their current career path, may switch to self-employment. In turn, those who run a business, but their drastically deteriorating health prevents them from running a business can be forced to abandon self-employment and become inactive or seek employment in sheltered workshops Kendall et al. (2006); Callahan et al. (2002).

The choice of a professional career path as an entrepreneur results from the possibility of better functioning conditions and solving the disability related problems Arnold and Seekins (2002); Hagner and Davies (2002). It is also true that some employers can adapt working conditions to the capabilities of the disabled, however, it is not a rule and does not change the overall picture of their functioning at work Batavia and Schriner (2001). The self-employed disabled are exposed to various barriers hampering their functioning in the business environment. However, there is a widespread recognition of the need for their elimination to support self-employment or switching from full-time employment to this option Piggott et al (2005). The disabled choosing self-employment must also take into account that it is connected with greater stress at work as well as hard work, long working hours, emotional energy and, above all, risk Buttner (1992); Kaufman (1999). The attractiveness of self-employment can also be associated with freedom of choice and independence. The disabled often need additional facilities, e.g., work schedule flexibility resulting from their treatment and rehabilitation process Arnold and Seekins (2002); Hagner and Davies (2002). In addition, some diseases affecting the disabled virtually prevent them from functioning in the work environment (machinery, equipment, means of transport and other people). According to some researchers, people suffering from ADHD consider entrepreneurship an attractive career path allowing the work environment adjustment to ADHD symptoms (e.g. different energy levels, changes in attention focus, problems with routine activities) Shepherd and Patzelt (2018) and also Wiklund et al. (2016).

Shepherd and Patzelt present US statistics confirming that the disabled are more than twice willing to become self-employed than the non-disabled individuals. Therefore, it seems that the limitations resulting from health problems motivate them to choose the entrepreneurial career, which provides flexibility in taking care of their health needs and receiving treatment Shepherd and Patzelt (2018). Similar conclusions were also formulated by Ricardo Pagan, based on the research results from thirteen EU countries, along with identifying certain disproportions between the analysed countries Pagan (2009).

Disabled People on The Labour Market

Researchers argue that an important reason for choosing self-employment is the desire to leave unemployment and economic inactivity Shima et al. (2008), which is even more significant considering that the disabled are less competitive on the labour market comparing to non-disabled

people. On average, the disabled are characterized by lower education, no professional experience, greater absence from work, additional privileges limiting their working time, greater requirements regarding working conditions, health and personal care, lower efficiency and flexibility in the performed tasks Gramenos (2017). It can, therefore, be adopted that those attempting to leave unemployment or return to the labour market are forced to achieve it through self-employment. An additional reason is the employers' reluctance to employ them under the quota system. This system, functioning in many countries and imposing the obligation to employ a certain percentage of people with disabilities under financial penalty, in practice, may have an opposite effect to the assumed one. Employers may present negative attitudes towards the disabled and approach their employment as a compulsion rather than the expected benefits of their work Niehaus & Bauer (2013).

The situation of the disabled on the labour market and their willingness for self-employment results, to some extent, from demographic changes. Population aging and demographic crisis in many highly developed countries impose significant changes on the labour market. The disabled are becoming an increasingly attractive workforce, which may turn out a disadvantage in developing entrepreneurship among them.

In Polish law, a disabled person is recognized, pursuant to the Act dated 27 August 1997 on professional and social rehabilitation and employment of people with disabilities, a person having permanent or periodic inability to fulfil social roles due to permanent or long-term body impairment, causing incapacity for work. A disability certificate is issued for persons under 16 and for those aged 16 and over, a disability gradation certificate stating mild, moderate or severe disability.

Art. 4. (1) of the Act dated 27 August 1997 provides that severe disability describes a person with physical impairment, unable to work or able to work only in sheltered employment and requiring, to perform social roles, permanent or long-term care and assistance of other persons due to the inability of living independently. A moderate disability refers to a person with physical impairment, unable to work, or able to work only in sheltered employment or requiring temporary or partial assistance of others to perform social roles. A mild disability describes a person with physical impairment significantly reducing the ability to perform work, compared to the ability of a person with similar professional qualifications presenting full mental and physical functionality, or with limitations in performing social roles to be compensated using orthopaedic items, aids or technical means (MF,L&SP 2020).

The quoted statutory provisions, characterizing disability grading, suggest that the mildly disabled should perform the best on the labour market. In turn, the severely disabled remain at the other end, for whom the only choice is either sheltered employment or leaving the labour market.

In 2014-2018 a significant improvement in the overall situation on Polish labour market was observed. This is confirmed by the data collected under the Labour Force Survey (LFS), conducted by the Statistics Poland (SP) and the data from labour offices' records regarding the registered unemployment presented by MF,L&SP.

In the light of LFS survey results, in 2014-2018, the economic activity rate and employment rate increased, whereas unemployment measured by the unemployment rate and the number of the unemployed declined significantly (Tab. 1).

Table 1: Non-disabled and disabled people on the Polish labour market according to LFS in 2014-2018

Year	Annual report							
	Total	Economically active			Economically inactive	Economic activity	Employ-ment rate	Unemploy-ment rate
		total	employed	unemployed				
	thousand					%		
Non-disabled								
2014	20 846	16 394	14 924	1 471	4 452	78,6	71,6	9,0
2015	20 743	16 350	15 123	1 228	4 393	78,8	72,9	7,5
2016	20 394	16 183	15 187	996	4 211	79,4	74,5	6,2
2017	20 179	16 099	15 309	789	4 080	79,8	75,9	4,9
2018	19 890	16 020	15 402	627	3 869	80,5	77,4	3,9
Disabled								
2014	1901	516	434	83	1385	27,1	22,8	16,1
2015	1864	483	419	63	1381	25,9	22,5	13,0
2016	1773	476	421	55	1297	26,8	23,7	11,6
2017	1680	486	442	45	1194	28,9	26,3	9,3
2018	1625	460	426	33	1166	28,3	26,2	7,2

Source: SP – LFS, (2019) and MF,L&SP, (2019)

However, the differences in the level of economic activity referring to the disabled and non-disabled did not disappear significantly. In 2018, people with disabilities were still almost three times less economically active and worked three times less often. The unemployment of the disabled was approx. twice as high and its decline rate was slightly lower than for the non-disabled (Figure 1).

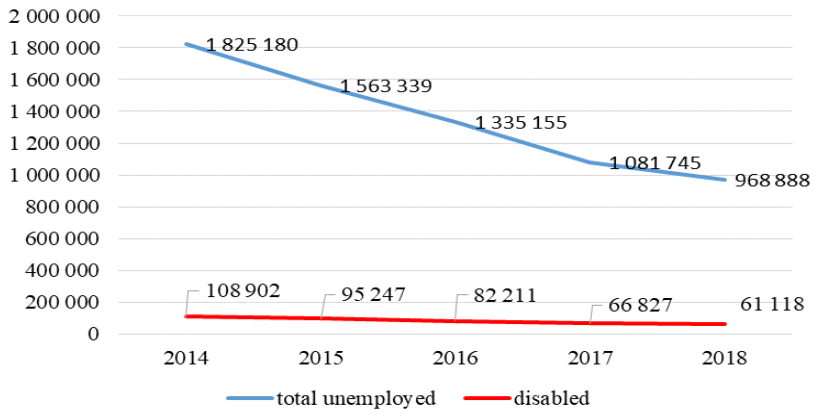

Figure 1: Total registered unemployed and disabled in Poland in 2014-2018.
Source: MF,L&SP data (2019)

In the labour offices' records, almost half of the unemployed disabled were the individuals suffering from either severe and moderate disability (Figure 2).

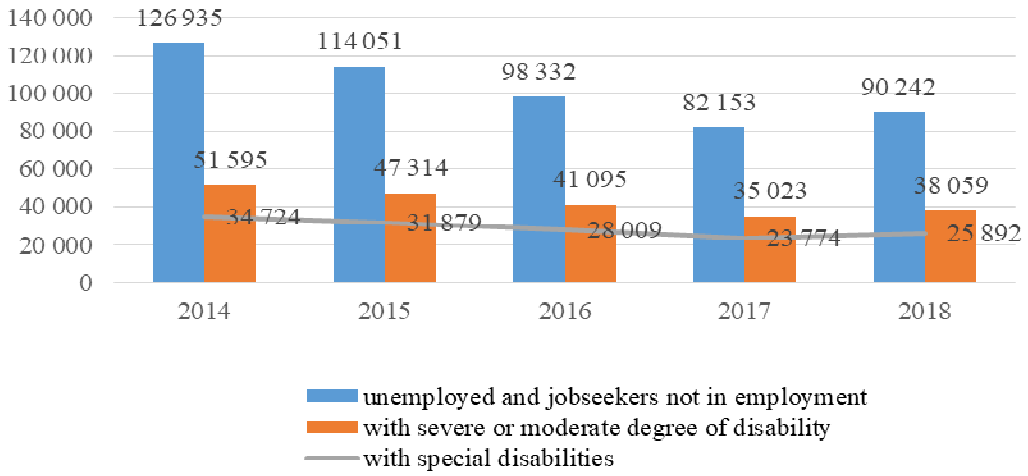

Figure 2: Total registered unemployed and jobseekers and the disabled in Poland in 2014-2018.

Source: (MF,L&SP data 2019)

In 2014 their number was almost 52 000, i.e. over 43%, whereas five years later over 38 000, i.e. over 62% of the unemployed disabled people. It shows that those with severe disability had most problems with finding a job and leaving unemployment.

Self-Employment of People with Disabilities in Poland

Based on LFS surveys, conducted in 2014-2018, there is a clear difference between self-employment of the disabled and non-disabled people, primarily in 2016-2018 (Figure 3).

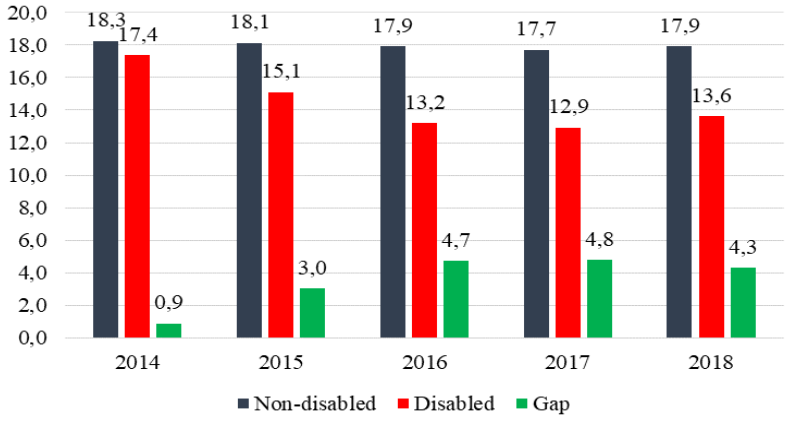

Figure 3: Percentage of self-employed disabled and non-disabled people aged 15/16 (i) and more in Poland in 2014-2018

Source: (SP –LFS 2019) and (MF,L&SP data 2019).

In 2014-2018 the percentage of self-employed non-disabled people against total employment remained at a relatively stable level ranging from 18,3% to 17,7% of total employment. In the case of the disabled it was a few percentage points (pp.) lower, reaching the lowest 13,6% level in

2018, i.e. 4,3 pp. less than for the non-disabled, in 2014 this difference was only 0,9 pp. Even greater disproportions between the self-employed non-disabled people and the total population of Poland are noticeable by referring the number of self-employed to the total population aged 15/16 and over and to the total working population (Figure 4).

Regarding the self-employed percentage against the total population aged 16 and over, the disabled are almost four times less often self-employed than the total population of Poland. Much smaller disproportions occur when comparing the self-employed to the economically active population (2,4 – 5,7 pp).

Information on self-employment of the disabled in Poland can also be obtained from PFRON (State Fund for the Rehabilitation of the Disabled). PFRON registers information about the self-employed disabled, whose percentage against those reported in LFS reaches approx. 30%. These data cover active economic entities run in the form of self-employment by persons with a valid disability certificate.

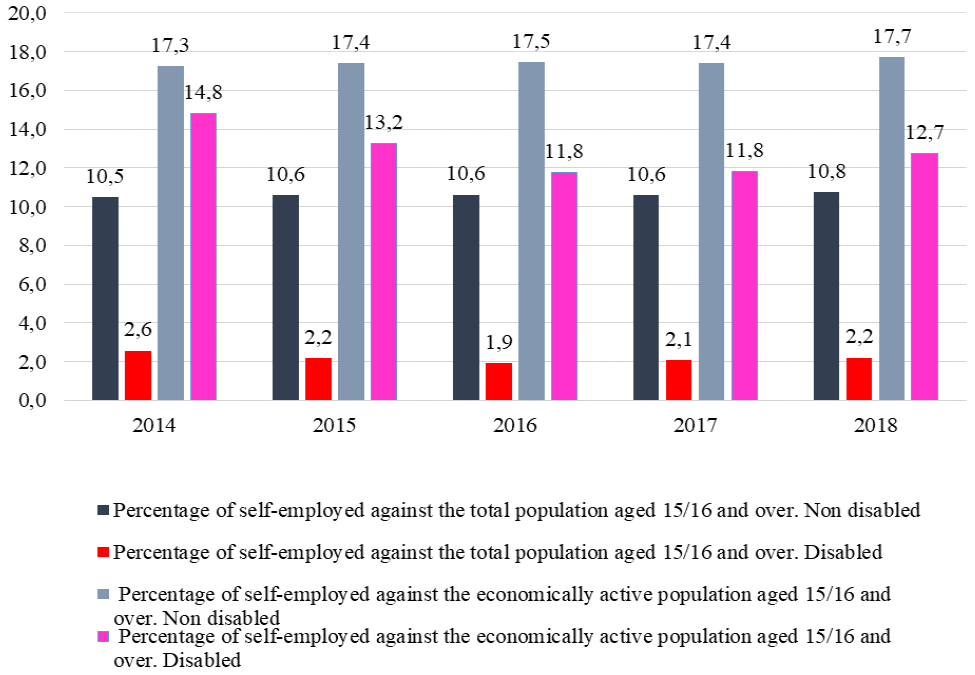

Figure 4: Self-employed against the total population aged 15-16 and over in 2014-2018
Source: (SP –LFS 2019) and (MF,L&SP data 2019).

Based on PFRON data, the number of self-employed with disabilities decreased in 2014-2018. In 2014 their number amounted to 23,978, i.e. over 10% in relation to the disabled employed full-time in sheltered workshops and working for employers in the open labour market (Tab. 2).

Table 2: Number of the disabled employees and self-employed persons registered in PFRON in Poland in 2014-2018

Year	Disabled people							
	degree of disability						Total	
	Severe		Moderate		Mild			
	employed	self-employed	employed	self-employed	employed	self-employed	employed	self-employed
2014	17 840	2 049	144 678	11 913	67 446	10 016	229 964	23 978
2015	18 819	2 003	148 988	12 188	64 648	9 173	230 298	23 364
2016	19 691	2 012	157 640	12 762	68 824	9 081	246 154	23 855
2017	20 598	2 017	159 071	12 567	69 521	8 293	249 190	22 877
2018	20 660	1 995	154 092	12 536	66 111	7 945	240 863	22 476

Source: PFRON-SODiR (2020).

In 2018, their number reached 22,476, i.e. less by over 1500 people. The self-employed constituted 9,3% of total employment registered in the Fund that year. The drop in the number of self-employed disabled people was most noticeable among those with mild disability, whose number was over 10,000 in 2014. Five years later, over two thousand less. Minor changes occurred among the severely disabled, who received the reimbursement of social security contributions resulting from their self-employment. In 2014 their number was 2049 and in 2018 – 1995, i.e. 54 less. The number of moderately disabled running their own business increased by 623 people.

The changes in the structure of self-employed disabled people, depending on the degree of disability are particularly visible in Figure 5.

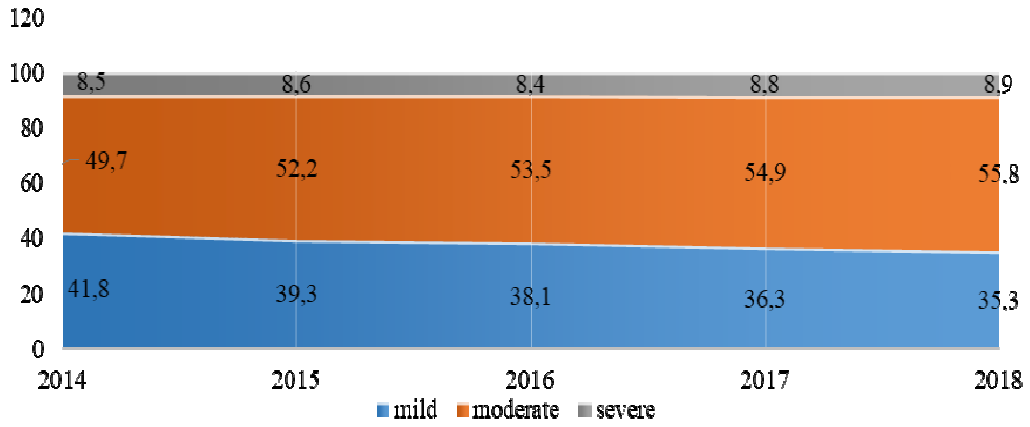

Figure 5: The structure of self-employed disabled people depending on the degree of disability based on PFRON data in 2014-2018

Source: PFRON-SODiR (2019).

The above data show that mainly the mildly disabled give up economic activity. Their share in 2014-2018 decreased by 6,5 pp. Therefore, those with the relatively smallest dysfunctions, for whom running their own company is theoretically the least problematic, most often abandon this

form of participation in the labour market. In turn, people with significant health problems, large psycho-physical impairments undertake the effort of self-employment more frequently.

Disability Vs. Self-Employment of Disabled People – Survey Results

To supplement information about the impact of disability on self-employment of the disabled, a survey was conducted in 2019 among almost 15,000 disabled entrepreneurs registered in PFRON from all over Poland. Answers were collected from 452 respondents, with 447 full answers. The answers were provided by people holding severe, moderate or mild disability certificates, and in some cases certificates of specific disabilities (ii). Disability in certain conditions does not have to prevent self-employment. If the subject and scope of economic activity is adjusted to the physical and physical possibilities of the disabled, self-employment is not only possible but, in fact, the only form of economic activity of the disabled.

In the light of the survey results, the moderately and severely disabled people – i.e. with the most severe impairments – constituted the largest group among the respondents (Figure 6).

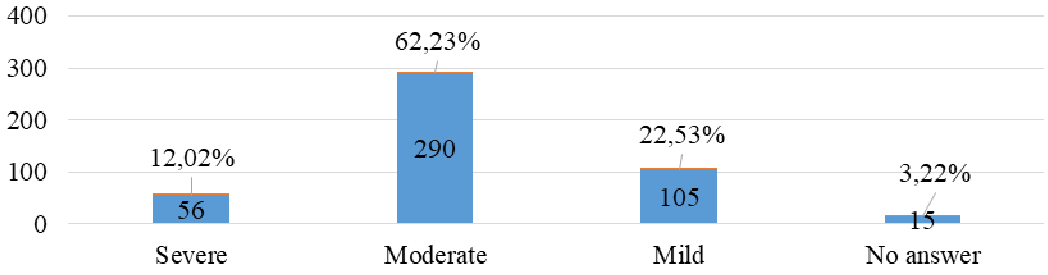

Figure 6: The disabled entrepreneurs covered by the survey according to the disability degree

Source: Survey results

The question regarding the degree of disability was answered by 451 respondents, of whom 290, i.e. over 62,2%, indicated moderate disability, and 56 severe disability (over 12%). People with the mildest disability (holding the certificate of mild disability) constituted slightly over 22,5% (105 respondents).

Among all respondents, the largest group suffered from musculoskeletal impairments (iii) (Figure 7). In the group of 450 respondents who answered the question about the type of disease, over half indicated musculoskeletal disorders (254 responses, i.e. over 54,5%) of all provided answers.

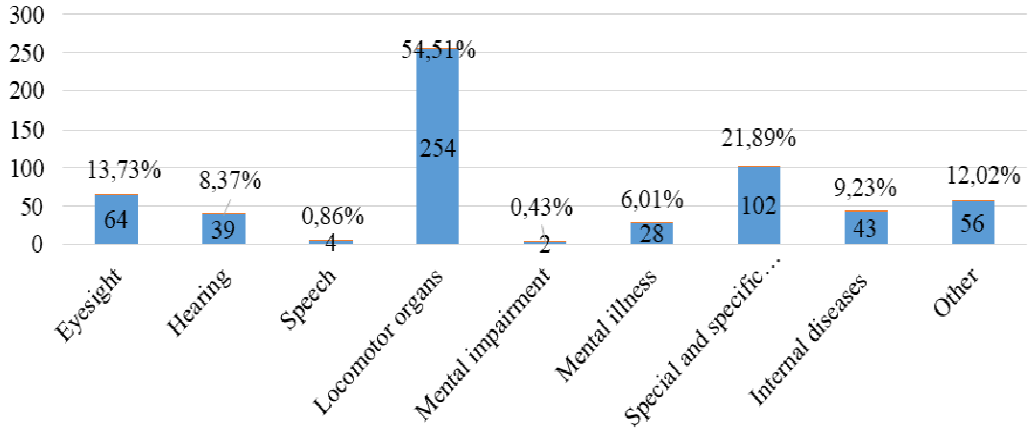

Figure 7: The disabled entrepreneurs covered by the survey according to the disability degree

Source: Survey results.

The respondents indicating internal diseases (102 indications to this type of disease – almost 21,9%) and vision impairments (64 indications, i.e. over 13,7% of all responses to this question) constituted a significant group. Mental, psychiatric and speech disorders were indicated least frequently.) The total of these three types of illnesses accounted for slightly over 7% of all the received responses.

Conclusion

In the course of conducted literature studies and statistical data analysis, the generally worse situation of the disabled on the labour market in 2014-2018 was confirmed, comparing to the non-disabled or the total population of Poland. Although the overall improvement on the Polish market also involved the disabled, it was to a much lesser extent than regarding the non-disabled people. Concerns are raised by the fact that 40% share of the registered unemployed disabled persons are those with the most severe disabilities and one-third with special diseases (iiii). People with special diseases (similarly to the specific diseases) are particularly "valuable" for employers, as their employment brings additional financial benefits (iiiii). Therefore, their large percentage among the unemployed is worrying. It could be concluded that these financial benefits are not attractive enough to balance the need for additional expenditure on their employment.

The information obtained from LFS indicates lower interest of the disabled in self-employment than in the case of non-disabled people. Therefore, in the case of Poland, the conclusions of Ricardo Pagan's research, who stated that in the surveyed 13 EU countries the percentage of self-employed disabled people was higher than the non-disabled ones were not confirmed. However, his observations about disability having a positive effect on self-employment were confirmed. Both surveys and data obtained from PFRON show that the moderately disabled constitute the largest percentage in the group of self-employed disabled people. They constitute over 62% in the entire subpopulation of the self-employed. Interestingly, a significant percentage (almost 22%) refers to those with certified specific and special diseases. It indicates that only in this way people with the most severe diseases can find a place for themselves on the labour market. Among the self-employed, the most numerous group, according to the survey results, were the disabled with musculoskeletal impairments. It shows that through self-employment they are able to use their

physical abilities best and minimize the negative effects of the dysfunctions resulting from their disability.

People with disabilities are able to function in a society and on the labour market if provided with proper conditions. Being less competitive on the labour market than the non-disabled candidates, they are forced to seek alternative, to full-time employment, forms of the labour market participation. Based on the research results and literature studies only some take up self-employment, frequently forced to do so because the available jobs fail to meet their psycho-physical needs. Sometimes the reason is the desire to become independent from the rigid working conditions and use disability as an incentive to implement the idea of entrepreneurship. Disability can be a stimulus for self-employment, however, as in the case of non-disabled people, individual predispositions will be decisive. For some people, disability will remain a barrier, whereas for others an incentive to choose the path of self-employment.

Footnotes

(i) In Poland, the economic activity research conducted by the Statistics Poland presents data for the disabled aged 16 and over, because until the age of 15 only the disability certificate is issued and from 16 years of age also the degree of disability and types of diseases. For the general population the age of 15 and over is adopted.

(ii) Specific disabilities certificates refer to the disabled diagnosed with the conditions particularly difficult to perform work: Parkinson‘s disease, multiple sclerosis, paraplegia, tetraplegia and hemiplegia, vision impairment, hearing impairment, HIV positive and AIDS, epilepsy, chronic mental diseases, mental retardation, myasthenia gravis, late complications of diabetes.

(iii) The total of 592 responses was collected, because the question allowed providing several answers, since some respondents suffered from several diseases.

(iiii) Special diseases include mental retardation, mental illness, voice, speech and hearing disorders, vision impairment, musculoskeletal impairment, epilepsy, respiratory and circulatory diseases, gastrointestinal diseases, genitourinary diseases, neurological and other diseases, including endocrine, metabolic, enzymatic disorders, infectious and zoonotic diseases, malformations, haematopoietic disorders, holistic developmental disorders such as autism or Asperger’s syndrome. Some of these special diseases are also classified as specific diseases. Both types of conditions, i.e. special and specific are additionally certified and used by employers to obtain higher wage subsidies and to reduce the quota employment rate of the disabled.

(iiiii) E.g. larger employment subsidies and/or lower mandatory employment rate under the quota system in force in Poland. Such persons require special working conditions and often additional assistant and medical care.

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The Method for Determining the Angle of Rotation of The Image Using the Hough Transform

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Abstract

The success of text recognition, when using machine vision, directly depends on the quality of the preliminary processing of the image, as a result of which the image is obtained from the original image . At the stage of detecting text areas by methods of mathematical morphology in an image with laser engraving, the authors encountered a problem that arises when the label with text id (next label) is rotated in front of the image pickup device by an angle greater than 20º: the area containing the text is not detected. The article is devoted to the presentation of the methodology proposed by the authors to solve this problem. The Hough transformation, developed in 1962, is an excellent tool for finding straight lines in an image. The authors used this algorithm, finalizing a preliminary analysis of areas to find the angle of deviation of the label. The article provides a description of the technique for rotating the image of a label made by laser engraving on metal, as well as the results of testing the technique, proving its performance and effectiveness.

Keywords: Hough Transformation, Dynamic Determination of The Angle of Rotation of The Image, Image Processing Before Recognition.

Introduction

In recent decades, there has been a rapid increase in interest in visual systems technologies, including computer vision, image analysis and processing. Initially, the main reason for this was the powerful progress of computer technology, then-the introduction of robotic systems in the industry, and recently-the ubiquity of mobile devices equipped with video cameras. At all stages of development of technologies of visual systems the list of basic tools necessary for this purpose, such as morphological filtration, fast calculation of convolutions, selection of borders, color adaptation and so on was replenished. Among foreign scientists who have made a significant contribution to the

development of image analysis, it is worth noting R. Deresh, B. Horn, K. Shapiro, G. Finlayson, and among domestic - V. L. Arlazarov, M. M. Bongard, Yu. V. Vizilter, S. Yu. Zheltov, Yu. I. Zhuravlev, D. S. Lebedev, B. M. Miller, V. A. Soifer and P. A. Chochia.

Recognition operations on images of certain objects are usually preceded by image processing to create conditions that improve the efficiency and quality of selection and recognition of the desired or studied objects. The methods of mathematical morphology are an excellent tool for highlighting the text area on the image with laser engraving [1]. But when turning the label at an angle of more than 20º, there is a problem of selecting the text area, due to the fact that the algorithm proposed by the authors [1] is not isotropic, due to differentiation only in the horizontal direction (Fig. 1). The purpose of this work is to solve the problem arising when turning the label in front of the image capture device with the lowest resource consumption. The proposed method of eliminating this drawback is based on a preliminary analysis of the image regions, the construction of the Hough space, on the basis of which the angle of deviation of the tag with laser engraving from the horizontal position on the image is determined.

The Hough transform is recognized as one of the most popular methods for detecting straight lines and other parametrically described shapes in discrete images. This transformation was discovered by Hough [2] in 1962, the advantage of Hough's algorithm over similar algorithms lies in its durability and stability when working with noisy images.

Fig.1: The illustration of the drawback of text area selection by mathematical morphology methods, when the label is rotated by an angle of more than 20º

R.Duda and P.Hart [3] applied this algorithm with some improvements to computer vision. D.H.Ballard provided a generalized Hough transform that could find arbitrary shapes of any orientation and any scale [4]. A number of other Hough transform modifications have been proposed for:

a) improving accuracy [5-8];

b) reduction of time costs [9-12];

c) reducing the cost of computer resources (memory) [13, 14].

Additional analysis was done to quantize the space used in the Hough transform [15, 16]. An excellent overview of the problems and methods of Hough transform is given in [8].

Hough transform is mainly used to detect straight lines, which is also applicable to contour analysis [17, 18]. The use of the Hough transform is limited by the fact that this approach allows us to determine only the polar parameters of straight lines, but not the exact position of their pixels [17].

Based on the above, the study of the selected area is extremely relevant in our time.

This article provides a theoretical justification for the technique proposed by the authors and practical implementation in high-level programming language C #.

The method of determining an angle of turning the label

A general idea of the Hough transform for detecting straight lines in a image label made by laser engraving on metal

The main idea of the Hough transform for finding straight lines is that any point of a binary image can belong to some set of straight lines [19]. Consider a point (x_i, y_i) in the *xy*-plane and the general equation of a straight line in slope-intercept form $y = ax + b$. However it is more convenient to represent a straight line using two other parameters ρ and Θ. The parameter ρ is the length of the perpendicular dropped on a straight line from the origin, and Θ – is the angle between this perpendicular and the *x*-axis (fig. 2).

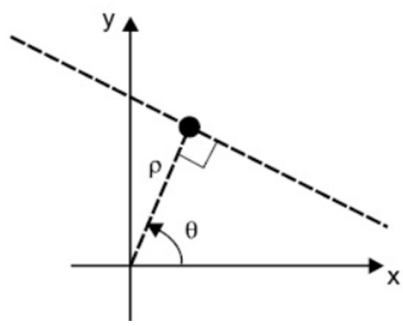

Fig. 2: (ρ, Θ) parameterization of line in the *xy*-plane

The plane (ρ, Θ) is sometimes called the Hough space for a set of lines in the two-dimensional case (also called parameter space) [21].

Infinitely many lines pass through A (x_i, y_i), but they all satisfy the equation $y_i = ax_i + b$ for varying values of *a* and *b*. The all lines pass through *A* corresponds to the next equation [20]:

$$\rho(\theta) = x_i \cdot \cos\theta + y_i \cdot \sin\theta \tag{1}$$

The illustration of formula (1) is shown in fig 3 for two points, that lie on the same straight line with coordinates (x_i, y_i) and (x_j, y_j). Each sinusoidal curve in fig. 3 represents the family of lines that pass through a particular point (x_k, y_k) in the *xy*-plane. The intersection point (ρ', Θ') in fig. 3 corresponds to the line that passes through both (x_i, y_i) and (x_j, y_j).

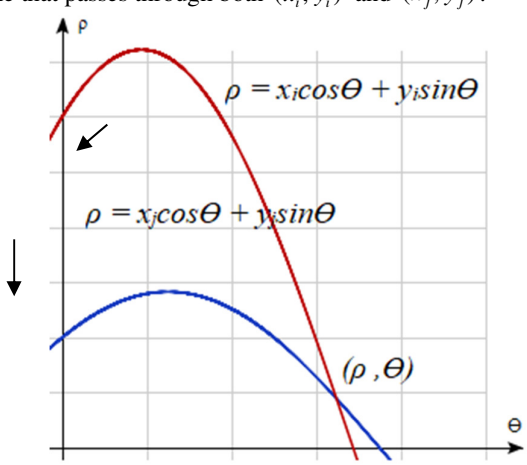

Fig. 3: Sinusoids on the plane $\rho\Theta$

The computational attractiveness of the Hough transform arises from subdividing the $\rho\Theta$ parameter space into so-called "accumulator cells" (fig. 4). The cell at coordinates *(p,q)* with accumulator value *A(p,q)* corresponds to the square associated with parameter-space coordinates (ρ_p, θ_q). Initially, these cells are set to zero. Then, for every non-background point (x_i, y_i) in the xy-plane, we let parameter Θ equal each of the allowed subdivision values on the Θ and solve for the corresponding using the equation (1). The resulting values are then rounded off to the nearest allowed cell value along the ρ axis. If a choice of θ_q results in solution ρ_p, we add 1 to value in the cell (there is a voting procedure): *A(p,q) = A(p,q) + 1.* After performing the described procedure for all the studied points (x_i, y_i) which is wrote in *(p,q)* value *A(p,q) = P* means, that there are *P* points t hat lie on the same straight line $\rho_p = x \cdot \cos\theta_q + y \cdot \sin\theta_q$ into *xy-plane.* The number of subdivisions in the $\rho\Theta$-plane determines the accuracy of the co linearity of these points. It can be shown that the number of computations in the method just discussed is linear with respect to *n* the number of non-background points in the *xy-plane*.

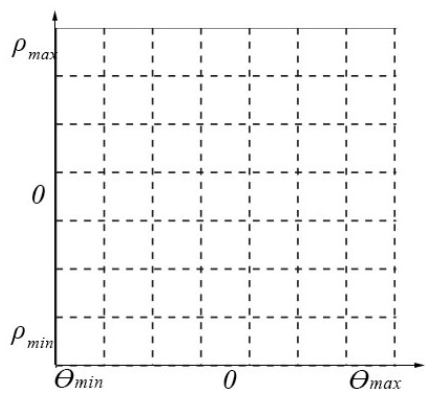

Fig. 4: Division of the into ρΘ accumulator cells

Description of the methodology for optimizing the application of the Hough transform to label images made by laser engraving on metal

To reduce the execution time of the algorithm, the authors propose to pre-analyze the area by the number of pixels contained in it. Assuming that the color of the background pixel is zero, and the color of the object pixel is one, we derive the following technique for analyzing the region.

Let's introduce a filter mask *w(x,y)* with size *m*x*n,* all values this mask is equation to 1. Next, we need to "scan" the input mask of the original image. Scanning consists in the element-by-element multiplication of the image area and the mask, if the sum of the products of elements is less than 60% of the mask area, then this area is not of interest and the Hough transform is not applied to it. The authors consider optimal parameters of the mask size to take no more than 7x7, due to the narrow areas around the text area (fig. 1). Let's derive the formula for the described scanning of areas:

$$w(x,y) \bullet f(x,y) = \sum_{s=-a}^{b} \sum_{t=-b}^{b} w(s,t) \cdot f(x+s, y+t) \geq 0.6 \cdot \sum_{x=0}^{m} \sum_{y=0}^{n} w(x,y) \qquad (2)$$

where $a = (m-1)/2$, $b = (m-1)/2$.

We use the above technique of scanning areas to build the Hough space of the image shown in Fig. 1 on the left. Initially, the cells of the accumulation are blank (fig. 4). After performing the "voting" procedure, the cells contain different values, display these values in gradations of brightness (the higher the value, the brighter the color). The result is shown in fig. 5, where is the horizontal parameter Θ, the vertical parameter is *p*. The areas of the image with pronounced bursts indicate that the corresponding polar points (cells) are the longest straight lines of the original image.

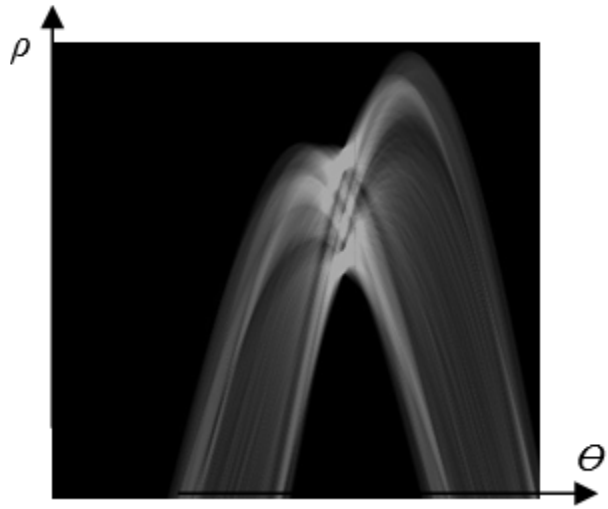

Fig. 5: Hough space for source image

Description of the method of obtaining the angle of rotation using the Hough transform to label images made by laser engraving on metal

In relation to the images of tags with laser engraving, the authors propose the following method of pre - processing images to reduce the angle of deviation of the image of the tag made by laser engraving on metal from the horizontal line.

All images of labels of this type have a wide border around the text area (fig. 4 on the left). Using this property, it is possible to determine that the longest line (in the Hough space has the largest number of votes) containing the pixels of the object will pass along or inside the edging line. As an example, figure 6 on the right shows the longest straight line detected by the Hough algorithm (a white line passing through the border). Knowing the parameter Θ of this line in the future, you can apply the affine transformation "rotation".

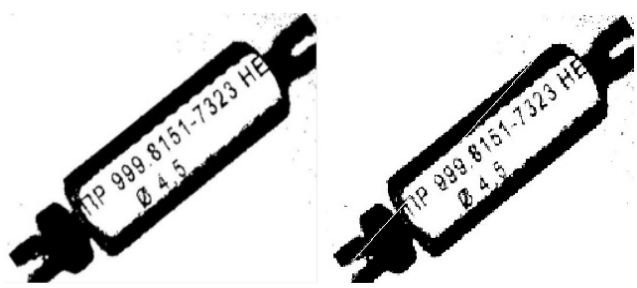

Fig.6: On the left – source image, on the right – found straight line by Hough transform

The full algorithm of the software module, which implements the proposed method of finding the angle of deviation of the image tag made by laser engraving on metal with a preliminary analysis of the areas, consists of the following steps:

1. Capture the image;
2. To perform the process of binarization with adaptive threshold;
3. To do areas analysis using formula (2);

4. To do loop through all the pixels in the area where:

   a. If pixel is black, then to perform the voting procedure for $0^o \leq \Theta \leq 180^o$ according to equation (1);

5. To define the point with more number of votes in Hough space;

6. To do affine transform "rotation" with angle Θ.

As it was shown earlier, the detection of the text area by the method of mathematical morphology described in [1] does not work when the detail is repeated by more than 20º. This disadvantage is eliminated by the introduction of the proposed method of rotation of the image with laser engraving using the Hough method. The result of solving the problem shown in fig.1 is shown in fig. 7

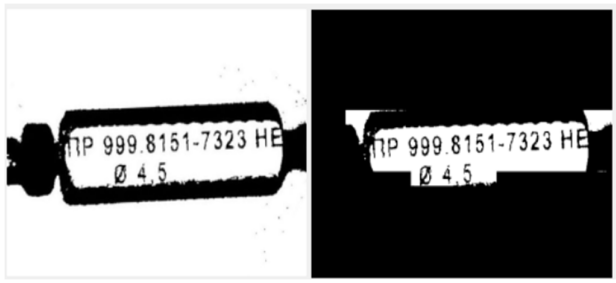

Fig. 7: The result of affine transformation "rotation" on the angle Θ, with further successful localization of the text

As seen in Fig. 7 the text area was detected without loss, later on this image was recognized text without errors.

The practical implementation of the method proposed by the authors was carried out in C# without third-party libraries.

Practical Implementation

For label made by laser engraving on metal, the main part of the software module that implements the proposed technique in C # in Visual Studio Community 2017 is divided into two functions, shown in Listing 1 and Listing 2.

Listing 1

```
/**************************************************

The function of preliminary analysis of regions, to which part of
the binarized image is transferred as the first parameter
(BinaryImage img. The BinaryImage class has a pixels property in
which the pixel values of the image are stored. The second and third
parameters transfer the sizes by which the filter mask will be built
(int m , int n), the default filter size is 7x7

**************************************************/
public int scanning(BinaryImage img,int m = 7, int n = 7)
{
// initialization and filling of the filter mask
int[,] filter = new int[m, n];
```

```
for (int i = 0; i < m; i++)
    for (int j = 0; j < n; j++)
        filter[i, j] = 1;
//the variable that will store the sum of the product of elements
double sum = 0;
// The cycle in which the rectangular area of the image is scanned
for (int y = 0; y < m; y++)
{
    for (int x = 0; x < n; x++)
    {
/* We do the conversion of the index of a two-dimensional array into
a one-dimensional one, so that we can refer to the corresponding
pixel of the image region of interest*/
        int index = img.height * y + x;
//The implementation of the calculation according to //the formula 2
        sum += filter[y, x] * img.pixels[index];
    }
 }
//We check whether the selected area is suitable for
//further analysis
if(sum >= 0.6*m*n)
    return HoughTransform(img);
}
```

Listing 2

```
/**************************************************

The function that implements the Hough transform, a binarized image
region suitable for analysis is passed as a parameter

**************************************************/
public int HoughTransform (BinaryImage img)
{
//The variables for tracking cells with the maximum
//number of votes (maxVote), and the maximum angle Θ (thetaMax)
int maxVote = 0;
double thetaMAX = 0;
//The variable declarations used in the Hough transform
double theta = 0; /* The variable Θ in formula (1), which will take
the values of the specified range in degrees */
double thetaRadians = 0; //The variable Θ in radians
double ro = 0; //The variable ρ in formula (1)
//D - diagonal distance between the corners of the image.
int D = Convert.ToInt32(Math.Round(Math.Sqrt(Math.Pow(ImageWidth, 2)
+ Math.Pow(ImageHeight, 2))));
// votes - two-dimensional array in which the values
//of votes for the i, jth cell will be stored
int[,] votes = new int[2 * D, 181];
}

for (int y = 0; y < img.height; y++)
{
  for (int x = 0; x < img.width; x++)
  {
```

```
    /*transforming the index of a two-dimensional array into one-
dimensional, so that we can refer to the corresponding pixel of the
image area of interest.*/
    int index = img.width * y + x;
    //pixel is black?
    if (img.pixels[index] == 0)
      {
       // θ  takes values from 0° to 180°
       for (theta = 0; theta <= 180; theta++)
       { //θ conversion from degrees to radians
         thetaRadians = theta * Math.PI / 180;
//we calculate the value of ρ in accordance with the formula (1)
         ro = Math.Round(y * Math.Cos(thetaRadians) + x *
Math.Sin(thetaRadians));
// We make a vote in the cell votes[ρ, θ].
//Adding D to ρ means centering along the y axis.
         votes[(int)ro + D, (int)theta]++;
        /* If there are more votes in the votes [ρ, θ] cell than in
the variable containing the maximum number of votes, then we assign
the value of votes [ρ, θ] to maxVote, and enter θmax = θ, thereby
determining the maximum angle of rotation of the image*/
         if (votes[(int)ro + D, (int)theta] > maxVote)
         {
           maxVote = votes[(int)ro + D, (int)theta];
           thetaMAX = (int)theta;
         }
       }
     }
   }
   // return the maximum angle of rotation of the image
   return thetaMAX;
```

Conclusion

Summarizing, we can say that in the framework of this article, the Hough transform for tag images made by laser engraving was investigated, a theoretical substantiation of the technique for determining the image rotation angle proposed by the authors was also given, and the practical implementation of this technique was given. The main idea of the work was achieved. In the practice, the authors proposed methodology for determining the angle of rotation of the label, made by laser engraving on metal taken using USB devices, photo-video fixing using the Hough transform with a preliminary analysis of image areas. The technique showed high quality of determining the image rotation angle, which subsequently allowed the image to be rotated by the found angle and the deviation from the horizontal line was minimized, the algorithm described in [1] correctly detected the test group, which made it possible, in the future, to transfer these images to standard OCR systems 100% recognition of shot text labels.

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Debt Management of Local Government Units in Poland In 2014-2018

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Abstract

The paper presents important aspects of local government debt management based on the experience of local government units in Poland. The considerations were based on the concept and standards of debt management in terms of economic and legal determinants for incurring and servicing debt by local government units in Poland, and data from the Ministry of Finance and reports on budget implementation in the entities studied. The aim of the paper is to evaluate the debt of local government units in Poland after the introduction of new legal regulations concerning its monitoring. In particular, an ex-post analysis was carried out based on the historical data of the level and structure of debt in local government units in Poland, the individual debt index (IDI), general debt index and debt service. The research period covered the years 2014-2018.

Keywords: Debt Management, Individual Debt Index (IDI), Local Government Units (LGUs).

Introduction

Debt management in LGUs is one of the most dynamic categories of public finance in Poland (Poniatowicz et al 2017). It's includes activities aimed at the planned, incurring and repayment of liabilities in accordance with the financial needs and capabilities of these entities and the situation on financial markets (Wiśniewski 2016). The LGUs debt mainly serves investment purposes. Because LGUs in Poland needs projects fostering its development, the steadily rising volume of investment spending must be recognised as a positive phenomenon (Uryszek 2013). It should be emphasized that, among others, Jastrzebska (2017) points out that the implementation of local government investments, including those co-financed with EU funds, induces LGUs to increase the debt, which requires effective management of the resulting debt. The ability of these entities to incur debt, measured by their creditworthiness as an element of local government financial potential, allows them to repay all liabilities with interest due on time and enables them to obtain additional external funds, mainly for investment tasks. For many LGUs, specifically those having low revenues at their disposal, the only alternative is to search for external sources as their own essential contribution for obtaining the EU aid (Nogalski et al 2015).

There are several researches examining both local government debt level, its growth and the determinants. Veiga and Veiga (2014) analysed lots of variables on fiscal (e.g. own revenues in total revenues without loans, interest payments of debt in total expenditures, investment expenditures in total expenditures,), socio-economic (e.g. earnings, unemployment, building permits or touristic facilities per inhabitant, type of the area,) as well as political situation (e.g. election cycle or issues of a ruling party). Balaguer-Coll, Prior and Tortosa-Ausina (2014) specify other variables, such as: density of residence or issues of decentralization, economic activity, which might be tied with the debt of local government.

Peter-Bombik and Kożuch (2013) argue that debt management in LGUs in Poland cannot be found effective if the possibilities of its generation are more and more limited. The Public Finance Act of 27 August 2009 introduced, first of all, a new way of limiting debt, which makes the unit's capability to incur debt dependent on its ability to create financial surpluses. The main objective of these activities was primarily to limit further dynamic growth of liabilities of local government units in Poland (Wiśniewska and Wiśniewski 2014). As indicated by Marchewka-Bartkowiak and Wiśniewski

(2012), the research shows that the new legal restrictions limiting the debt (IDI) are on average more stringent for the majority of local government units in Poland than the limit valid until the end of 2013: general debt limit (60% of total income) and debt service (with the limit of 15% of total income planned). Referring to this thesis, the main objective of this study was adopted: the analysis and evaluation of the level and structure of debt of particular types of local government units in Poland after the change of its statutory limits in 2014-2018.

Selected problems of debt management of LGUs in Poland in 2014-2018

The source of indebtedness LGUs is the accounting difference between income and expenditure, referred to as the budget deficit (Osiatyński 2006, Ostachowski 2019). The financing of the resulting budget deficit often requires the incurring of financial liabilities, whose repayment obliges LGUs to manage the debt efficiently. The literature postulates that an important element of local finance management is the adoption of an appropriate debt management strategy for local government units in Poland (Poniatowicz et al 2010). The debt management process of these entities includes (Jastrzębska 2009): planning the debt level, organization of technical operations related to incurring liabilities, motivating, monitoring and evaluation of the level and structure of debt, analysis of the budgetary burden of the liabilities, and controlling the level of debt and adjusting it *ex ante* and *ex post* to the legal debt limits.

It should be emphasized that legal regulations in Poland allowed, until new Law on Public Finance as of 27 August 2009 was introduced, for using two limits for debt in local self-government units (Table 1), i.e. limit of total debt level at the end of financial year (it could not exceed 60% of the budget revenues) and total amount of instalments from credits and loans, potential repayment of amounts due to sureties and the level of debt servicing (could not be higher than 15% of the planned budgetary revenues or 12% if state public debt in relation to GDP exceeded 55%).

Table 1: Comparison of the structure of debt ratios in *Law on Public Finance, dated* 30 June 2005 with *Law on Public Finance, as of* 27 August 2009

Comparison of the structure of debt ratios in *Law on Public Finance, as of* 30 June 2005 until the end of 2013	Comparison of the structure of debt ratios in *Law on Public Finance, as of* 27 August 2009 in 2014-2018
1) Total debt in local self-governments at the end of financial year could not exceed 60% of the revenues in total in the financial year: $\left(\frac{Z_o}{D_o}\right) \leq 60\ \%$ where: Z_o – total debt in local self-government due to repayment of instalments of credits and loans and buying bonds, D_o – revenues in total in the budget for the given financial year. 2) During a financial year, total amount of debt in a unit of local self-government could not exceed 60% of the revenues planned for the given financial year: $\left(\frac{Z_o}{D_{pl}}\right) \leq 60\ \%$ where: Z_o – total debt in local self-government unit due to repayment of instalments of credits and loans and buying bonds, D_{pl} – revenues in total in the budget for the given financial year. 3) Level of debt servicing – total amounts for the given	Executive body in a unit in local self-government cannot pass the budget if it causes that relation of total amount for the given financial year (in a financial year and in each year following the financial year): 1) of repayment of credits and loans with interests due in the given year, 2) of redemption of securities with interest due and discount from securities, 3) of potential amounts due resulting from granted sureties and guarantees, to planned revenues in total exceeds arithmetic mean for relation (calculated for the last three years) of its current revenues, extended with revenues on selling the property and reduced with current expenditures to the revenues in total within the budget, given by the following formula: $\left(\frac{R+O}{D}\right)_n \leq \frac{1}{3} \times \left(\frac{Db_{n-1}+Sm_{n-1}-Wb_{n-1}}{D_{n-1}} + \frac{Db_{n-2}+Sm_{n-2}-Wb_{n-2}}{D_{n-2}} + \frac{Db_{n-3}+Sm_{n-3}-Wb_{n-3}}{D_{n-3}} \right) * 100\%$ where:

financial year: - repayment of credits and loans with interest on these credits and loand due in the given year, - redemption of securities with due interests and discount from securities, - potential repayment of amonts resulting from sureties and guarantees, could not exceed: • 15% of the revenues of the local self-government unit planned for the given financial year: $$\left(\frac{R+O}{D_{pl}}\right) \leq 15\%$$ where: R – total amount planned for the given financial year due to repayment of credits and loand and redemption of securities, O – interest on credits and loans and interests and discount from issued bonds and repayment of amounts due to sureties and guaranties planned for the given financial year, D_{pl} – planned budget revenues in total fo the given financial year, • or 12%, when state public debt, in relation to GDP, exceeded 55%: $$PDP > 55\% PKB \Rightarrow \left(\frac{R+O}{D_{pl}}\right) \leq 12\%$$ where: SPD – State Public Debt, GDP – Gross Domestic Product.	R – total amount due to repayment of credits and loand and redemption of securities planned for the given financial year, O - interest on credits and loans and interests and discount from issued bonds and repayment of amounts due to sureties and guaranties planned for the given financial year, D – revenues in total in budget for the given financial year, Db – current revenues, Sm – revenues on property sale, Wb – current expenditures, n – financial year for which the relation is determined, n-1 – the year preceding the financial year for which the relation is determined, n-2 – the year preceding the financial year by two years, n-3 – the year preceding the financial year by three years. New law introduced an institution of individual debt ratio for local government units, which depends of financial situation in this entity within three years preceding liability.

Source: author's own study based on: (Law on Public Finance, dated 30 June 2005 (Journal of Laws 2005, No. 249, item 2104, with subsequent amendments), Law on Public Finance, dated 27 August 2009 (Journal of Laws 2009, No. 157, item 1240); (Łukomska-Szarek, 2010, p. 70).

In the beginning of 2014, local government units had to face new conditions regarding the possibilities of financing tasks with debt instruments (Łukomska-Szarek 2011). Abolition of the debt level limit for local government units in Poland and the introduction of the debt service payment limit (IDI index - calculated formula presented in Table 1), should induce local government units to effectively manage the debt, especially its level and costs of debt service. However, it is postulated in the literature that debt management policies in LGUs in Poland cannot be considered efficient, especially because the conditions were not conducive to taking effective actions in this area (Peter-Bombik and Kożuch 2013).

In a research study Liu and Waibel (2010) argue that in some economies (mainly in industrial countries) are enacted fiscal rules, in which the debt must have investment-oriented purpose. This concept indicates that only such borrowing is beneficial. Therefore, it is prohibited to introduce the deficit in the current part of the budget (golden rule - current expenditures cannot exceed current revenues). He confirms this thesis Galiński (2015) argue that 'since 2011 in Poland, it is forbidden to enact the local government budget, in which planned current expenditures exceed expected current revenues with the budget surplus from previous years and free resources. Therefore, the growth of the debt does not result from the deficit in the current part of the budget and actually finances investment activity of the unit'.

Methodology and Data

Taking into account the above considerations, the following main research hypothesis was adopted in the study: *The legal regulations limiting the level of debt in local government units in Poland led to a reduction, in the first years of their operation, of the likelihood to incur and repay their financial liabilities*. In order to verify the main research thesis, the ratio analysis was performed to examine the structure and level of debt in local government units in Poland: IDI, the general debt and debt service ratios were evaluated. The research period was 5 years. The survey was conducted from 2014, considering the fact that this is the first year of the debt limit change for local government units in Poland, until 2018. The study covered 2,478 LGUs in Poland, including 16 voivodeships, 314 powiats and 66 cities on powiat status. The article is based on the Polish and international literature on the subject and the presented data were made available by the Polish Ministry of Finance and reports on the implementation of the LGUs budget.

Results and Discussion

Based on the data presented in Table 2, it can be concluded that liabilities of local government units in Poland were characterised in 2014-2017 by a negative rate of changes: from PLN 72.1 billion in 2015, they decreased to PLN 68.9 billion (change by 4.4%). Their renewed growth was not recorded until 2018, when they amounted to 76.1 billion PLN. As part of debt financing, local government units in Poland primarily incur loans and credits, and they do not use bank deposits at all while securities are of marginal importance. In the structure of *debt* types, loans and credits in the period of 2014-2018 accounted for between 93-95%, while securities accounted for 4.8-6.2%, as shown in details in Fig. 1 and 2.

Table 2: Local governments' liability by types of debt in Poland in 2014-2018

SPECIFICATION	2014	2015	2016	2017	2018
	in millions of PLN				
liability by types of debt	**72 109,9**	**71 634,7**	**69 019,9**	**68 926,1**	**76 115,8**
Securities	4 267,8	4 157,9	4 272,7	3 942,0	3 645,7
credits and loans	67 628,9	67 328,8	64 653,2	64 907,4	72 338,9
deposits in banks	0,0	0,0	0,0	0,0	0,0
matured payables	213,1	148,0	94,0	76,7	131,2

Source: own study based on data from the Ministry of Finance.

The share of credits and loans in the structure of debt titles of individual types of LGUs in Poland is illustrated in Figure 1. In 2014-2018, gmina and powiat governments incurred liabilities from credits and loans at the level of 98-99%, voivodeships from 94 to 96%, while the towns with powiat status, from 88 to 90%.

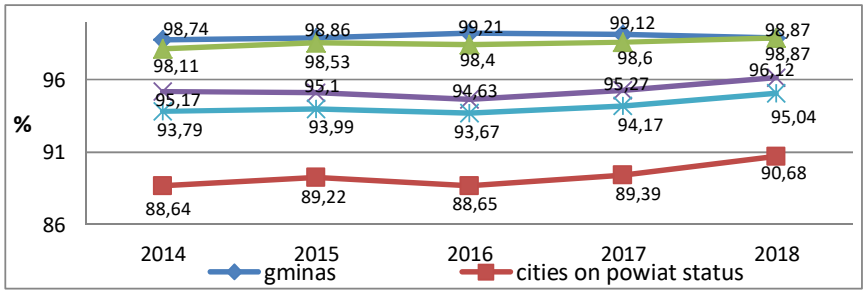

Fig. 1: The share of credits and loans in the structure of debt titles of individual types of LGUs in Poland in 2014-2018

Source: own study based on data from the Ministry of Finance.

In the case of gminas, the issuing of securities did not exceed 1% in the structure of debt. Furthermore, for voivodeships, this was between 3-5%, while for towns with powiat status, the value of the examined measure ranged between 9 and 11% (which is confirmed by the data shown in Figure 2).

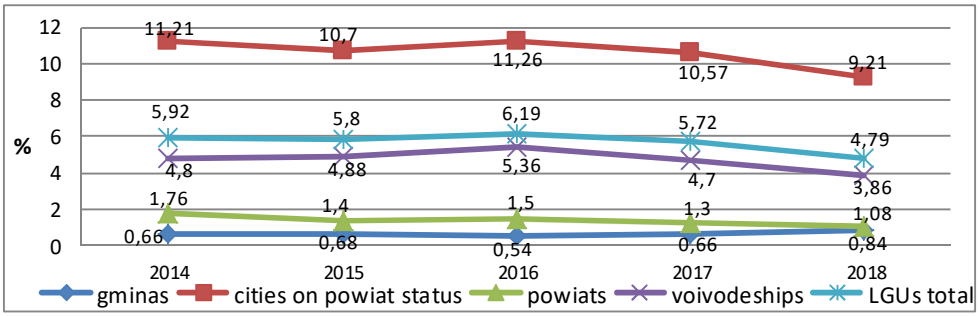

Fig. 2: Share of securities in the structure of debt titles of individual types of LGUs in Poland in 2014-2018

Source: own study based on data from the Ministry of Finance.

The results of the survey lead to the conclusion that liabilities incurred by local government units in Poland are characterized by a dominant share of loans and credits, whereas issuing of securities is of marginal importance, especially in the case of gminas and powiats. In the period covered by the survey, the towns with powiat status had the largest fraction of securities in the structure of types of debt in local government units with over 10%.

Table 2: Debt ratios of different types of LGUs in Poland in 2014-2018 [in %]

Specification		2014	2015	2016	2017	2018
LGUs total	WZ_1	32.1	31.6	29.7	30.6	30.3
	WZ_3	5.7	5.6	5.2	5.3	4.3
	IDI	8.4	8.8	9.2	9.9	10.4
Gminas	WZ_1	24.0	22.6	18.1	17.1	24.4
	WZ_3	9.1	9.7	7.5	6.6	3.8
	IDI	9.1	9.8	10.3	10.4	10.4
Cities on powiat status	WZ_1	40.4	40.7	37.5	36.7	37.5
	WZ_3	5,0	4.9	4.3	4.2	4.1
	IDI	7.8	8.1	8.6	9.1	9.1

Powiats	WZ_1	25.3	25.1	23.8	22.6	23.4
	WZ_3	3.3	3.5	3.5	3.4	3.3
	IDI	6.0	6.2	6.8	7.7	8.3
Voivodeships	WZ_1	38.2	39.6	46.0	39.3	36.0
	WZ_3	4.5	5.3	6.8	7.1	6.0
	IDI	10.9	11.0	11.1	12.5	13.8

**WZ_1 – Total debt in local governments (Share of total liabilities in total revenues); WZ_3 – total amount of debt in a unit of local government; IDI – Individual Debt Index*
Source: own study based on data from the Ministry of Finance.

The introduction of new legal regulations in the area of debt monitoring resulted in a regression of the liabilities incurred, which resulted in a slowdown in investment activity and cautious policy of using returnable sources of finance at all levels of local government in Poland. This thesis is confirmed by the calculated ratios for liabilities by types of debt and the individual debt index as shown in Table 2. When analysing detailed data, it can be observed that the level of the total debt ratio for local government units in Poland ranged from 29.7 to 32.1%. The highest level of debt (over 40% of total income) and its constant appreciation, except for the years 2016-2017, were recorded in towns with powiat rights, although in 2016, the indicator reached its peak in local government voivodeships at 46%.

The analysed LGUs did not show any major problems with the repayment of liabilities, as the ratio of burdening the total income with expenditures on debt servicing in the case of local government units in total in Poland decreased from 5.7% in 2014 to ca. 4.3% in 2018. Debt service in gminas decreased from 9.1% to 3.8%, in towns with powiat status - from 5% to 4.1%, in powiats - from 3.3 to 3.5%, and in voivodeships - from 4.5 to 7.1%. In voivodeships, as opposed to other types of local government units, the surveyed measure was characterized by progress until 2017.

The presented values of IDIs illustrate the progression of debt repayment capacity in local government units in the analysed years. For the entities in Poland in total, this was the change from 8.4% to 10.4%: from 9.1% to 10.4% in gminas, from 7.8% to 9.1% in towns with powiat status, from 6% to 8.3% in powiats, and from 10.9% to 13.8% in local government voivodeship. Therefore, it should be noted that individual types of local government units did not show any significant differences in the measure studied. Its lowest level was found in powiats whereas the highest was observed in voivodeships. Gminas showed values close to the arithmetic mean for LGUs in total (Łukomska-Szarek et al 2018).

Conclusion

The main reason for introducing individualized debt limits for particular local government units in Poland was first of all to strive to make the foundations of the local financial policy more credible in terms of adjustment of the capability to incur liabilities with the capability to actually repay them. From this point of view, the introduction of a new solution can be considered to be fully justified. The research leads to the conclusion that the new regulations have led to the limitation of the debt in the entities studied, especially in the first 3 years. A cautious policy of financing tasks from foreign capital has led to an increase in the IDI. The consequence of these activities was a slowdown in the investment activity of local government units in Poland in the years 2014-2016, whereas its revival was recorded after 2017.

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Debt Limitation in the Management of Local Government Units in Poland With the Example of the Financial Forecast of Voivodeships

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Abstract

Managing local government units requires using efficient tools to ensure their effective and efficient operation. In the case of local government units in Poland, many instruments improving the process of local finance management have been implemented in the last decade, such as internal control, long-term financial forecasting and participatory budgeting. Significant changes were also introduced in the area of debt management, especially in terms of the limitation and monitoring of financial liabilities made by LGUs. These changes concerned the debt limit in 2014 based on the Individual Debt Index (IDI), which was obligatory until the end of 2018. The introduction of this index was widely criticised not only by local government officials themselves, but also in the literature on the subject, which resulted in the government undertaking legislative work in Poland to modify the index. As a result of discussions and the work of parliamentary committees, the Act of 14 December 2018 amending the Public Finance Act and other laws was passed and, on its basis, a new formula for calculating IDI was introduced from 1 January 2019. The aim of the paper is to assess, based on the many-year financial forecast, the impact of a change in the way of IDI calculation on the possibilities of incurring and repaying liabilities by voivodeship governments in Poland. The research was conducted for the years 2016-2026.

Keywords: Public Management, Debt Management, Individual Debt Index (IDI), Long-Term Financial Forecasts

Introduction

Having limited financial resources requires the local government to make rational decisions on the methods and directions of spending its funds (Król 2016). Dafflon (2002) mentioned that Incurring debt for financing current needs LGUs in extreme cases, can lead to accumulation of the so-called debt loop and solvency problems In Poland, from 2011 was the need to balance current budgets of LGUs - current expenditures cannot exceed obtained current revenue. Bitner (2013) mentioned that this assumption, which is rational and inhibits incurring debt for financing of current expenses, is applied also in many EU countries. Fixing the limit of expenditure (the amount of the so-called free funds from the previous year), this enables more flexible approach to management of LGU budgets, which is positively stressed also in international experiences (Ashworth et al. 2005). Limiting debt of LGUs is used in many European countries, but there are no uniform solutions in this regard (Satoła 2015):

a) Goal of debt:
   - both investment and current goals (the necessity of balance in three-year planning period): Finland, Hungary, Czech Republic;
   - only investment goals: UK, Sweden, Spain, Slovakia, Luxembourg, Italy, Netherlands, Ireland, Germany, France, Estonia, Denmark, Belgium, Austria,
b) Consent to incurring credit or loan:
   - required: Slovenia, Spain, Malta, Latvia, Ireland, Germany, Denmark, Cyprus, Austria,
   - not required: Hungary, Estonia, Czech Republic;
c) Upper annual debt limit:
   - Slovakia 60% – of the annual current income in the previous budget year;
   - Estonia – 60% of the annual income;

- Cyprus – 40% of the annual income for long-term liabilities and 20% of the annual income short-term liabilities;
- Lithuania – 35% of the annual income;
- UK – self-governments must comply with the individual upper debt limit determined on the annual basis by the supervisory authorities;
- Denmark – the central authorities determine maximum debt limits corresponding to maximum percentage of annual income, budget expenses or general investments;
- Austria – diverse, depending on land;

d) Upper limit of annual debt service costs:
- Hungary – 70% of current income.
- Spain – 25% of operating income;
- Slovakia – 25% of income in the previous budget year;
- Estonia – 20% of the annual income;
- Portugal – 12.5% of annual financial transfers in the current year or 10% of capital outlays in the previous year;
- Slovenia – 5% of income in the previous budget year.

LGUs often have to make financial commitments in order to carry out planned tasks. Since 2014, IDI (Individual Debt Index) has been used in the Polish public finance system. It is one of the important factors affecting budgetary planning process in LGUs, determined by the accuracy of forecasts (Grad 2018). In the beginning of 2014, local government units in Poland had to face new conditions regarding the possibilities of financing tasks with debt instruments. A total departure was observed from the debt reduction system based on the general debt ratios (60%) and debt service (15%) and the transition to debt limitation based on the individual debt index (IDI) calculated for each local government unit individually, depending on the financial resources held by the unit (in the past). As before, this also represents a universal solution, independent of the type and size of the local government unit (Dylewski 2014).

According to new principles (effective from 2014-2018), the executive body in LGUs could not sign the budget if it causes that in the financial year and in each year following financial year, relation of total amount of debt to planned revenues in total exceeds arithmetic mean for relation (calculated for the last three years) of its current revenues, extended with revenues on selling the property and reduced with current expenditures to the revenues in total within the budget (Łukomska-Szarek, 2011).

The inspiration for this study was a review of the literature on the subject and a search for answers to the question: Will the introduction of new regulations on debt limitation have a positive impact on the budget management in local government units in Poland, especially their investment activity? Therefore, an attempt was made to analyse and evaluate individual debt limits in a selected group of local government units in Poland i.e. voivodeships (the highest level of territorial division, regional units). The analysis of debt limits was supplemented by an assessment of 5 budget indicators.

One of the most popular approaches to assess financial standing of local government units in the USA is the Financial Trend Monitoring System (FTMS) developed by the International City/County Management Association (ICMA) in 1980. This system operates based on around 35 indicators for the analysis of variables that have the greatest impact on the financial standing of LGUs (Rivenbark, Roenigk 2011). A 10-point test was used for small LGUs, with the results compared with the benchmark. The calculated ratios were compared with the ratios for other LGUs and they were assigned the appropriate numbers of points. However, one of the most recent approaches uses a method based on 11 ratios categorized into four groups of solvency ratios (Rivenbark, Roenigk, Allison 2010). It is worth emphasizing that in the USA, different methods are used in different states to measure financial standing and use ratios which represent a combination of financial and demographic indices (Wang Dennis, Tu 2007). In Poland, the indicator analysis of the budget of local government units is based on 5 groups of indicators: financial liquidity, debt, financial independence, investment activity, and development capacity. The choice of this group of indicators was considered appropriate to verify the research hypothesis: 'The introduction of new legal regulations in the field

of limiting the debt level led to a slowdown in the investment activity of local governments (voivodeships) in Poland'.

The study adopted the groups of ratios covering the following research areas (Łukomska-Szarek 2011):

- degree of financial liquidity in the cash-based arrangement, measured as a ratio of total budget revenues and incomes to the total of budget expenditures and disbursements.
- degree of financial independence: expressed as a ratio of own revenues to total budget revenues;
- degree of debt – Individual Debt Ratio (2014) constituting the arithmetic mean of its current revenues increased by revenues on sales of property and decreased by current expenses to total budget revenues calculated for the last three years; Individual Debt Ratio (2019) constituting the arithmetic mean of its current revenue less grants and ongoing funds to implement the programme, project or task financed with the EU funds and decreased by current expenditure less current expenditure on the repayment of instalments of liabilities, current expenditure on debt service and current expenditure on the implementation of the programme, project or task financed with the EU funds to total budget revenues calculated for the last seven years;
- assessment of investment activity: ratio of investment expenditures to total expenditures,
- degree of self-financing of investment activity measured as a ratio of operating surplus and property revenues to property expenditures;
- assessment of developmental potential: operational capability of development measured as a ratio of the difference between current revenues and current expenditures to current expenditures, total capability of local government units to develop: ratio of the difference between total revenues and current expenditures to total revenues.

The formulas for calculating the indicators are given in the section 'Methodology and data'. The research period was the years 2016-2026 in order to identify the trends and pace of changes of individual ratios. The problems covered by the research included the assessment of budget ratios based on the reports on the implementation of the budget of voivodeships using the ex-post analysis (historical data on the implementation of the budget for the years 2016-2018) and ex-ante analysis (estimates for the period 2020-2026).

Methodology and Data

The main aim of the paper is to assess the effect of a change in the way of IDI calculation on the capability of incurring and repaying liabilities by voivodeship governments in Poland. The following research questions were asked in order to achieve the main aim:

- will the modification of IDI limit the investment activity of voivodeships in Poland?
- what is the degree of operational and total capacity for the development in the entities studied compared to the individual debt capabilities?
- to what extent can voivodeships benefit from self-financing of property expenses from free resources including operating surplus and property income?
- does the debt limit allow the level of financial liquidity to be stabilised on a cash basis?

In order to answer the above questions, the paper attempts to carry out financial analysis of budget based on the data from the Ministry of Finance in Poland for 2016-2018 (ex post analysis based on the reports on the implementation of the budget) and for 2019-2026 (ex-ante analysis based on long-term financial forecast 2019).

The term analysis is an ambiguous term, which results from its broad use, since there is neither science nor practical human activity which would not use a variety of analytical tools. Analysis is a science of the methods of analysing, i.e. the science of analysis of not only characteristics, structures and internal and external relationships in a complex phenomenon or an object, but also investigating,

simulation and forecasting the effects of the activities or abandoning activities based on the characteristics, structures and relationships (Dudycz 2000, Łukomska-Szarek 2011).

Important elements of the LGU debt management process include continuous monitoring of debt level, budget burden analysis, and adjustment of the debt level to currently used ratios. Debt ratio analysis in local governments takes into account changes in time, environmental factors, multidimensional relations, and both explicit and implicit liabilities (Rivenbark, Roenigk, Allison, 2010).

Dafflon and Beer-Tóth (2009) stressed that debt has a positive impact on the modernization of local economies. However, in the face of the increasing level of debt, implementation of effective debt management policies is needed, resulting in financing the tasks which are not covered by the entity's revenues, minimizing the financial risk, losing financial liquidity, or reducing debt costs.

Based on the aggregated data, the calculations were made for 16 voivodeship governments in Poland. In particular, the following indices were analysed and evaluated (Łukomska-Szarek 2011):

1) IDI (according to the formula from 2014 and modified formula from 2019),

– IDI 2019 (The Act of 14 December 2018 amending the Public Finance Act and other laws (*Journal of Laws* 2018, item 2500)):

$$\frac{(R+O)}{Db} \leq \frac{1}{7}\sum_{i=1}^{7}\frac{Dbei-Wbei}{Dbi} * 100\% \qquad 1)$$

Where:
R - the total amount planned for the financial year for the repayment of the instalments of the liabilities included in the debt and redemption of securities, excluding repayments of loans and credits and redemptions of securities taken out or issued respectively for the purpose referred to in Article 89(1)(1) and the obligations set out in Article 91(3)(1),
O - current expenditure planned for the financial year for debt service, including interest on liabilities included in the debt referred to in Article 72(1)(2), interest and discount on securities and repayment of amounts resulting from hedging and guarantees provided,
Db - planned for the year for which the relationship is established, the budget's current revenue less grants and current goals,
Dbei - current revenue in the year preceding (by *i* years) the year for which the relationship is established, less grants and ongoing funds to implement the programme, project or task financed with the funds referred to in Article 5(1)(2),
Dbi - current revenue in the year preceding (by *i* years) the year for which the relationship is established, less grants and funds for current purposes,
Wbei - current expenditure in the year preceding (by *i* years) the year for which the relation is established, less current expenditure on the repayment of instalments of liabilities included in the debt title referred to in Article 72(1)(2), current expenditure on debt service and current expenditure on the implementation of the programme, project or task financed with the funds referred to in Article 5(1)(2).

– IDI 2014 (*Law on Public Finance, as of* 27 August 2009 (*Journal of Laws* 2009, No. 157, item 1240, with subsequent amendments)):

$$\left(\frac{R+O}{D}\right)_i \leq \frac{1}{3}\sum_{i=1}^{3}\frac{Db_i+Sm_i-Wb_i}{D_i} * 100\% \qquad 2)$$

Where:

R – total amount due to repayment of credits and loans and redemption of securities planned for the given financial year,
O – interest on credits and loans and interests and discount from issued bonds and repayment of amounts due to sureties and guaranties planned for the given financial year,
D – revenues in total in budget for the given financial year,

Db_i – current revenues in the year preceding (by *i* years),
Sm_i – revenues on property sale in the year preceding (by *i* years),
Wb_i – current expenditure in the year preceding in the year preceding (by *i* years),
D_i – revenues in total in budget for the given financial year in the year preceding (by *i* years)

2) WPK – liquidity ratio on cash basis is calculated as a quotient of the totalled performed budget revenues, performed budget incomes and receivables and the totalled performed budget expenditures, performed budget disbursements and payments:

$$WPK = \frac{D_t + PB_t}{W_t + RB_t} \quad 3)$$

Where:
D_t –budget incomes performed at the moment *t*,
PB_t –budget revenues performed at the moment *t*,
W_t – budget expenditures performed at the moment *t*,
RB_t – budget disbursements performed at the moment *t*.

3) WOR – operational capacity of development in a unit of territorial self-government:

$$WOR = \frac{Db_i - Wb_t}{Db_t} * 100\,\% \quad 4)$$

where:
Db_t – current revenues in a year t,
Wb_t – current expenditures in a year t,

4) WORC – total capacity of development in a unit of territorial self-government:

$$WORC = \frac{Db_t - Wb_t + Dm_t}{D_t} * 100\% \quad 5)$$

Where:
Db_t – current revenues in a year t,
Wb_t – current expenditures in a year t,
Dm_t – property revenues in a year t,
D_t – revenues in total in a year t.

5) WB_7 - self-financing level (share of operating surplus increased by property income in property expenditure):

$$WB_7 = \frac{Db_t - Wb_t + Dm_t}{Wm_t} * 100\% \quad 6)$$

Where:
Db_t – current revenues in a year t,
Dm_t – property revenues in a year t,
Wb_t – property expenditures in a year t,
Wm_t – expenditures in total in a year t.

6) WB_4 – degree of investment activity (measured as the share of property expenditure in total expenditure):

$$WB_4 = \frac{Wm_t}{W_t} * 100\% \quad 7)$$

Where:
Wm_t – property expenditures in a year t,
W_t – expenditures in total in a year t.

Ratio analysis delivers information on financial situation in business entities and the results of their operation on the basis of a set of logically interrelated ratios. The value of these ratios, their changes

and relations between them enable assessment of business entities' operation and they are the basis for formulation of conclusion for the future (Gabrusewicz, 2005, p.29).

The research allowed for the indication of how the modification of the index limiting the debt level in LGUs in Poland affect selected areas of the budget economy of local government voivodeships.

Analysis of the debt of voivodships in Poland based on the long-term financial forecast in 2016-2026 - Results and Discussion

Based on the data of 16 voivodeships in Poland and their many-year financial forecast, arithmetic means were calculated for the selected group of financial indicators as presented in Table 1. The results of the study lead to the conclusion that the voivodeship governments, in the financial forecast for the years 2019-2026 according to the arithmetic mean of the WOR index (formula for calculating number 4), are characterized by a steady progression of the operational development capacity. The indicator increased in the period studied from the level of 15% to 26.8%, which means that on average, the voivodeships planned to generate an operating surplus at the level of over a quarter of the current income. Very high (50-70%) total potential for the development (WORC – formula for calculating number 5) of the analysed local government units was reduced in the last four years the forecasts to ca. 30%. This affects the investment activity of the voivodeships implemented in 2016-2018 and planned for the following years.

Table 1: Long-term financial forecast of selected indicators of voivodeships budget in Poland in 2016-2026

	Year	WOR (%)	WORC (%)	WB_4 (%)	WB_7 (%)	WPK	Individual Debt Indicators (%)		
							IDI_{2014}	IDI_{2019}*	IDI_{2019}**
ex-post analysis	2016	20.80	51.28	27.82	131.31	1,35	11.1	6.23	6.13
	2017	21.20	54.08	32.45	107.56	1,34	12.5	6.15	5.77
	2018	13.75	64.34	42.37	79.74	1,33	13.8	5.18	4.75
ex-ante analysis (data contained in the Long-Term Financial Forecast are approximate)	2019	14.99	60.67	40.69	81.72	1,32	12.7	5.28	4.86
	2020	19.55	69.73	44.27	85.93	1,37	11.,3	5.73	5.21
	2021	21.47	57.93	35.43	102.31	1,35	10.5	6.81	6.36
	2022	22.32	41.17	25.33	119.62	1,28	12.0	7.83	7.32
	2023	24.11	31.53	18.84	139.56	1,24	14.0	8.41	8.03
	2024	24.82	29.57	16.96	150.38	1,23	16.0	8.96	8.43
	2025	26.46	30.33	17.11	155.12	1,24	17.7	9.08	8.43
	2026	26.77	30.50	18.06	144.12	1,24	19.1	7.97	7.56

** The ratio of the planned total amount of repayment of liabilities to income, excluding the liabilities of the association co-created by local government units and excluding statutory exclusions for a given year (IDI 2019)*

*** The ratio of the planned total amount of repayment of liabilities to income, excluding the liabilities of the association co-created by local government units and not excluding statutory exclusions for a given year (IDI 2019)*

Source: own study based on data from the Ministry of Finance.

The share of their property expenditure in total expenditure (WB_4 – formula for calculating number 7) in the ex-post period was characterized by an increasing trend: the indicator ranged between 28 and 42%. On the other hand, the ex-ante forecast period shows a decrease in the measure studied after 2020 from over 44% to ca. 16-18% in subsequent years. It can be concluded that with a noticeable slowdown in investment activity, the capability of self-financing of voivodeships (WB_7 – formula for calculating number 6) has been growing dynamically since 2018 (has been growing from ca. 80% over the analysed period of time to 155%). On the other hand, financial liquidity on a cash basis

(formula for calculating number 3) shows no large amplitude of fluctuations, between 1.24 and 1.35 but with a slight downward trend. The budget management presented in the selected areas was affected by the possibility of incurring and repayment financial liabilities. IDI_{2014} (formula for calculating number 2) calculated according to the 2014 formula would allow for servicing the debt at the level of 10-19%, depending on the individual years indicated in Table 1. On the other hand, the ratio of the planned total amount of repayment of liabilities to income, excluding the liabilities of the association co-created by local government units and excluding statutory exclusions for a given year (IDI_{2019} - formula for calculating number 1), is expected to range from 5.3% to 9.1%, with a noticeable progression to 2025. With the correction of the index by taking into account the statutory exclusions for a given year, the calculated values were slightly lower and ranged from 4.9% to 8.43%, which significantly limits the possibilities of voivodeships in Poland to use debt capital.

Conclusion

The introduction of new regulations concerning monitoring of local government units and its service resulted in a wide discussion on the formula of index calculation. Already before the introduction of IDI in 2014, K. Marchewka-Bartkowiak and M. Wiśniewski (2012, p. 1-6) subjected its structure to a thorough critical analysis, pointing to proposals for changes. After the introduction of new legal solutions for modification of the IDI index, scientific studies concerning the analysis of the impact of index changes on the financial standing of local government units appeared (this was analysed by e.g. M. Wojciel, W. Kańczuga (2019, p. 58-66) and M. Grad (2018, p.107-120). The new formula (effective from 2019) of control over LGUs liabilities seems more accurate, although it is worrying that local authorities' practices aimed at circumventing this regulation by hiding debt in municipal companies whose liabilities are not included in the methodology for calculating their debt (Langer, 2014, p.77-80, Ostachowski, 2019, p. 87).

In Poland, a new way of limiting LGU debt level, the so-called Individual Debts Indicators (IDIs), has been in force since 2014 (Poniatowicz, Wyszykowska, Piekarska, 2017, p.106). The presented considerations concerning the limitation of debt service level in local government units in Poland reveal that various solutions concerning monitoring of their debt have been implemented for several years. The greatest changes concerning the abolition of the general debt ratio from 2014 and the necessity of individual monitoring of the debt based on the 3-year financial standing of local government units were subject to wide criticism, which resulted in the modification of the ratio and extension of this period to 7 years. It is difficult to answer the question of how the new form of the indicator will affect budget management in local government units. The results of the analysis concern only a selected group (voivodeships). However, they allow for a conclusion that the possibilities of incurring liabilities by voivodeships in Poland are decreasing, which translates into a slowdown in their investment activity, despite the growing operational capacity for their development. The increase in their self-financing capacity may result in an accumulation of financial resources and a lack of implementation of many important tasks, especially in the field of municipal infrastructure.

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"New" Primary Covered Bonds Market in Poland

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Abstract

The main aim of the article is presentation of the changes that have occurred on the primary covered bonds markets in Poland in the period 2000-2019 with emphasis on the impact of changes in legal regulations. The desk research was used to achieve the main goal. Based on the conducted analysis, it can be concluded that domestic mortgage banks benefited from new legal solutions, which resulted in a significant increase in the quantity and value of issued covered bonds and their introduction onto European markets. The abolition of withholding tax and increased investor protection resulted in increased interest in Polish mortgage bonds from foreign investors who became the main purchasers of mortgage bonds issued since 2016. A bold statement can be made that the covered bonds market in Poland has transformed from the local market into foreign market.

Keywords: Mortgage Banks in Poland, Polish Covered Bonds, Mortgage Legal Regulations.

Introduction

Covered bonds are financial instruments issued by financial institutions to raise capital to finance lending. Most often, covered bonds are issued by universal banks or authorized credit institutions (in Poland mortgage banks). In recent years, financial institutions operating in various European countries have increased the value of issued covered bonds. According to the European Covered Bond Council, the value of issued covered bonds at the end of 2018 was EUR 2,576 trillion. There are many reasons for increasing the value of issued covered bonds. One of the most important is the change in legal regulations, in particular in the scope of increasing the security of buyers of covered bonds. The second reason is the search for other sources of capital financing than bank deposits and a better match of maturities of covered bonds and loans granted.

In the literature, the most developed and long-existing mortgage letter markets are most often analysed, for example France, Spain, Germany and the United Kingdom. Researchers investigate factors influencing mortgage covered bonds' risk premiums (Prokopczuk and Vonhoff 2012; Gürtler and Neelmeier 2018, 2019). Other studies investigate covered bonds' illiquidity (Prokopczuk et al. 2013; Wegener et al. 2019). However, all these studies investigate countries excluding Poland.

The stringent provisions became the starting point in the analyses regarding the opportunities for and barriers to mortgage banking development (Cyburt 2002, Getka 2002, Reksa 2002, Szulfer 2005, Gorlecka 2006, Szelągowska and Marlęga 2007, Sitek 2010, Szelągowska 2010, Dżuryk 2017, Frańczuk 2017, Dziuba 2018). Other researchers concentrated on comparing polish mortgage banking market to foreign markets (Bucholski 2012, Sołtysiak 2014, Lechowicz 2015). The common characteristic of the enumerated studies is the focus on the impact of the law on the development level of the mortgage banking market in Poland.

This paper points to other aspects of mortgage bank and covered bond functioning. The objective of the paper is to check to what extent changes in legal regulations affected the subjective and objective structure of the covered bond market, with a particular consideration of purchasers of such financial instruments in the period 2000–2019.

The organization of the rest of the paper is as follows. In the next section, we present fundamentals about the mortgage banking market in Poland. In the third section, we show changes in legal regulations and differences between Polish and German covered bonds. Next we present structure of mortgages banks and issue of covered bonds. We present the primary and secondary covered bonds market in the fifth and sixth section. At the end we provide a short conclusion with a summary of the results.

The Mortgage Banking Market in Poland

The beginnings of mortgage banking in Poland date back to the 18th century. Śląskie Towarzystwo Kredytowe Ziemskie [Silesian Landowners' Loan Society], which extended mortgage cash loans, is considered one of the first institutions associated with covered bonds. It obtained funds for lending by issuing mortgage covered bonds. Other institutions were established and legal regulations were introduced as time went by (Gąsowska 2000). Mortgage banking developed in Poland until 1948, when it was banned under two decrees. Covered bonds were reintroduced to the Polish banking system after almost 50 years. Adopted in 1997, the Act on Covered Bonds and Mortgage Banks used pre-war provisions and solutions applied in Germany. The basis for the new law was maximising the security of banks and covered bonds issued by them and providing a stable source of funding for the real property market and long-term funding for banks.

In order to ensure as high security of covered bondholders as possible, the Act of 1997 imposed numerous restrictions and limits on mortgage banks both as regards their activities and prospective purchasers.

The first mortgage bank established under the Act of 1997 was Rheinhyp-BRE Bank Hipoteczny (March 1999, at present: mBank Hipoteczny). A few months later, another mortgage bank commenced its activity, namely HypoVereinsbank Bank Hipoteczny (1999, at present: Pekao Bank Hipoteczny). At the same time (1998 and 1999), applications for licences, which were finally suspended, were filed also by PBK, WBK, and PKO in collaboration with BGK (Cyburt 2002: 59). In 2001 and 2002, two more banks were established: Śląski Bank Hipoteczny (later: ING Bank Hipoteczny) and Nykredit Bank Hipoteczny. PKO Bank Hipoteczny, which commenced its operating activities in 2015, is the mortgage bank which has operated for the shortest period. That year, a few other universal banks announced their plans to found mortgage banks, yet only Raiffeisen Bank submitted an application for permit to establish Raiffeisen Bank Hipoteczny to the PFSA (March 2015) but the PFSA suspended the procedure in October 2016. Out of the mentioned banks, only three operated at the end of 2016: mBank Hipoteczny, Pekao Bank Hipoteczny, and PKO Bank Hipoteczny.

In the period 2000–2012, mBank Hipoteczny dealt mainly with financing small commercial real properties and real property development activities. Its ancillary activity was extending loans to the natural persons who purchased real properties from developer companies, financed by mBank Hipoteczny. In 2013, the bank's management board decided to change the operating model and concentrate mainly on issuing mortgage covered bonds and refinancing the mortgage loans granted by mBank (Newseria.pl 2013). Since the beginning of its operation, Pekao Bank Hipoteczny has been pursuing a policy of financing mainly projects related to commercial real properties and, to a limited extent, natural persons. Nykredit Bank Hipoteczny, which operated in

the period 2002–2005, did not pursue operating activities actively and was finally liquidated in 2005. ING Bank Hipoteczny, in turn, limited lending and changed its operating strategies several times over the entire period of its activity (2001–2011). Ultimately, ING Bank Hipoteczny was merged with ING Bank Śląski in 2011 and reopened in 2019.

The last of the founded banks, PKO Bank Hipoteczny, intends to pursue an activity consisting mainly in issuing covered bonds based on mortgage loans extended by PKO BP to natural persons in PLN for housing. The second pillar of its activity is to grant mortgage loans in collaboration with PKO BP.

Changes in Legal Regulations

On 1 January 2016, the amendment to The Act on Covered Bonds and Mortgage Banks was adopted, which introduced several changes in response to the expectations of the banking sector. The main changes concerned facilitating the issue of covered bonds and increasing the protection of their buyers by, among others, reducing the mortgage bank insolvency risk and improving the liquidity of mortgage bonds (more in section 5). One of the most significant changes, which has a direct impact on the size of new issues of mortgage bonds, is the increase in the refinancing limit for housing loans from the funds obtained from the issue of mortgage bonds from 60% to 80%. For commercial properties, the limit was left at the same level (60%). The second notable change in the payment of mortgage loans. Individual and institutional investors were also exempted from tax on interest and profit from the discount on mortgage bonds.

On the other hand, in the scope of increasing legal protection of buyers of mortgage bonds, two key changes were introduced. One of them is an overcollateralisation institution of 10%. The total amount of claims secured by a mortgage of a given issuer increased by cash, securities issued or guaranteed by a public institution or placed at the NBP should not be less than 110% of the total amount of covered bonds on the market mortgage bonds of this issuer. The purpose of the minimum mandatory overcollateralization institution is to create a capital buffer that will reduce the liquidity risk of the mortgage bank. The second change is the strengthening of investor protection (purchasers of mortgage bonds), including as part of bankruptcy proceedings. In the case of bankruptcy of a mortgage bank by law, a separate asset arises, from which purchasers of mortgage bonds will be able to satisfy themselves without taking into account other creditors. In addition, a pass-through was introduced, i.e. an extension of the maturity dates of mortgage bank liabilities from covered bonds. In the event of bankruptcy of a mortgage bank that is an issuer of mortgage bonds, the maturity of its obligations to creditors under covered bonds will be postponed for a maximum of three years from the latest maturity date of the claim entered in the covered bond collateral register. This solution allows you to conduct a test to check whether the rights and funds entered into the covered bond collateral register are sufficient to fully satisfy holders of mortgage bonds.

Table 1: Polish Covered Bonds Law vs German Pfandbriefe Law

	Poland	Germany
Special Covered Bonds Law	Yes	Yes
Special bank principle	Yes	No
Mortgage Valuation concept	Mortgage lending value	Mortgage lending value
Loan to Value (LtV)	100%	No
Mortgage value refinancing limit	Residential: 80%, Commercial: 60%	60% of mortgage lending value
Geographical scope for mortgage assets	Only Poland	EEA, CH, USA, CA, JP, AU, NZ
Minimum Mandatory Overcollateralization	10%	2%
Legal framework for bankruptcy	Specific legal framework superseding the general insolvency law	
Bankruptcy remoteness	Preferential claim by law and specific cover pool administration	

Source: author's compilation based on European Covered Bond Counsil.

Due to the modelling of legislators on the regulations in force in Germany, it is worth looking at the differences and similarities between the regulations in force in Poland and Germany. As can be seen from the basic data contained in Table 1, it appears that the new legal provisions introduced in Poland are more restrictive than in Germany. Nevertheless, mortgage banks have a lot of freedom in their operations, adequate to the level of development of the domestic mortgage banking market and market opportunities.

Structure of Mortgage Banks

From the very beginning of the mortgage banking market functioning, mBank Hipoteczny has been the unquestionable leader. The bank's market share gradually decreased from 90% to 76% in the period 2000–2015. Late 2016 saw a considerable change of market shares of individual banks (calculated as the value of the issued and not purchased covered bonds). The share of mBank Hipoteczny decreased to 50% and that of PKO Bank Hipoteczny increased to 36% (growth from 0.4% at the end of 2015), which results from the bank's three issues of mortgage covered bonds at more than PLN 3 billion. Pekao Bank Hipoteczny's share, in turn, dropped to 14%. It was also the first year when mBank Hipoteczny lost its dominant position after 17 years. Thanks to the international covered bonds programme, PKO BankIn Hipoteczny in 2017 managed to increase its market share up to 54% and become a leader. In the end of 2019 PKO Bank Hipoteczny became the market leader. The share of this bank increased to 69% and that of mBank Hipoteczny decreased to 23%.

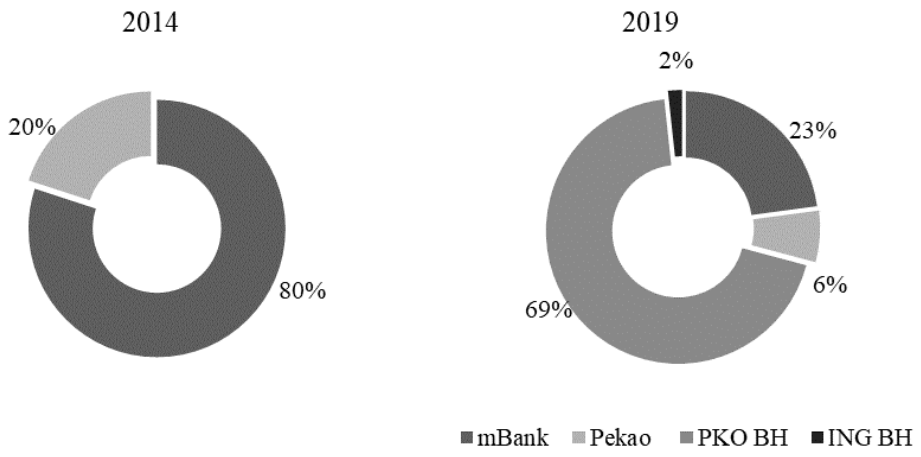

Fig. 1: Structure of mortgage banks in the market in the end of 2014 and 2019

In accordance with the applicable laws, mortgage banks may issue public sector and mortgage covered bonds. The most significant difference between such bonds is the type of receivables which serve as their security. Public sector covered bonds are backed on receivables in respect of loans granted to public sector entities. Mortgage covered bonds, in turn, are secured with receivables in respect of mortgage loans for natural persons and enterprises. As follows from the data presented in Table 2, mortgage banks concentrate on issuing mortgage covered bonds (107 out of 123 issues) in public offerings, that is ones addressed to a large group of purchasers (more than 85% of all issues).

Table 2: Characteristic of mortgage banks' activity in 2000-2019

Banks	**Number of programmes**	**Type of covered bond / number of programmes**	**Number and type of programmes**	**Total aseets (PLN bln)**	**Total assets (PLN bln)**
2000 – 2015					in 31.12.2015
mBank Hipoteczny	60	Public sector / 12 Mortgage / 48	Public / 49 Private / 11	8 051	4 066
Pekao Bank Hipoteczny	21	Public sector / 3 Mortgage / 18	Public / 19 Private / 2	2 489	1 285
PKO Bank Hipoteczny	1	Mortgage / 1	Public / 1	30	30
ING Bank Hipoteczny	3	Mortgage / 3	Private / 3	62	Not applicable

Nykredit Bank Hipoteczny	0	No issues	No issues	Not applicable	Not applicable
2016 – 2019					in 31.12.2019
mBank Hipoteczny	12	Mortgage / 12	Public / 11 Private / 1	3 414	10 365
Pekao Bank Hipoteczny	6	Public sector /1 Mortgage / 5	Public / 6	673	2 858
PKO Bank Hipoteczny	20	Mortgage / 20	Public / 20	16 215	16 245
ING Bank Hipoteczny	1	Mortgage / 1	Public / 1	0,4	0,4

It is worth examining short- and long-term plans of mortgage banks. All three operating banks are to be used as a source of long-term funding for their parent banks. For this purpose, loans are transferred from parent banks to mortgage banks. mBank Hipoteczny introduced in 2014 transfer of existing residential mortgage loans from mBank (immediate parent of mBank Hipoteczny) and in the second quarter of 2017, mBank decided to move sales of retail loans from mBank Hipoteczny to mBank. Moreover, on July 2017, mBank Hipoteczny started international issue covered bonds at the total value of 3 billion EUR completion of 4% at the end of 2019). In turn, PKO BP intends to transfer mortgage loans worth ca. PLN 23 billion to PKO Bank Hipoteczny and actively participate in granting loans at the level of 25-30% of the entire PKO capital group. On June 2016, PKO Bank Hipoteczny assumed the issue worth EUR 4 billion (completion of 69% at the end of 2019) and annual mortgage loan sales at the value of PLN 10 billion. The last bank, Pekao Bank Hipoteczny, continues the issue of covered bonds for PLN 2 billion that was commenced in 2010 (completion of 71% at the end of 2019).

Issue of Covered Bonds

In the period 2000–2019, all mortgage banks issued covered bonds at the total amount of nearly PLN 30 billion, 95% of which were mortgage covered bonds and 5% – public sector covered bonds. To 2016 the prevailing currency of covered bonds was PLN – 68% of the total value of the issued bonds. As regards foreign currencies, bonds were issued in EUR (30.5%) and USD (1.5%). At the end of 2019 the share of covered bonds issued in PLN and EUR was at similar level. Generally, covered bonds denominated in PLN issued for the period of 5 years with a variable interest rate as per the WIBOR3M reference rate were the most common. In turn, covered bonds denominated in EUR – 6 years and fixed rate.

In the initial period (2000–2010), mortgage banks issued 23 series of covered bonds, 17 of which as part of private offerings and only 6 – in the public offering. On average, 3 series of covered bonds were issued per annum, with only one issue in 2006 and 2009. The frequency of issuing covered bonds and their value significantly increased in subsequent years (2011–2015) and has

maintained at the level of 7-10 series a year and exceeded PLN 1 billion since 2011 (Fig 2). The exceptionally high value of bonds issued in 2017 arises from the fact that PKO Bank Hipoteczny had two bond issues worth EUR 1 billion and two at the value of PLN 500 million each. Additionally, mBank Hipoteczny also had two at the value of PLN 1.5 billion. In the following years all mortgages banks issued bonds at the similar level – about PLN 4.4 billion.

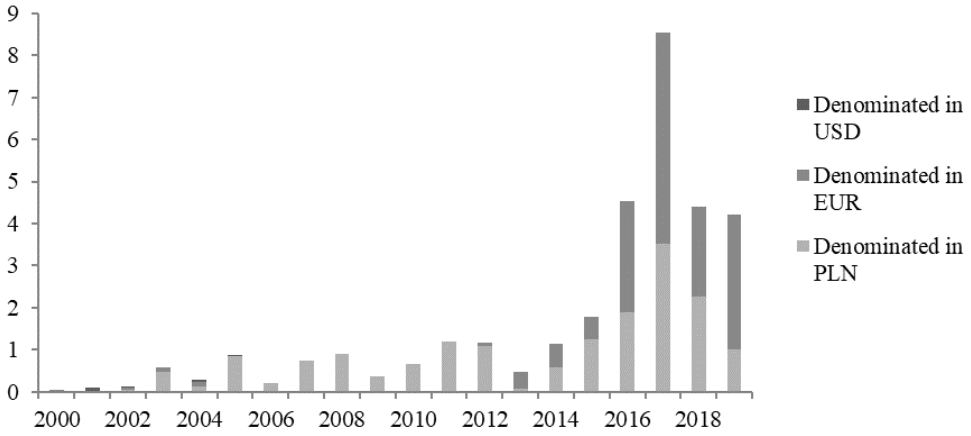

Fig. 2: New issues of covered bonds in 2000-2019 (PLN bln)

It is worth indicating that all issues of covered bonds to date have found purchasers. Additionally, the investors' interest in purchasing covered bonds exceeded the supply each time. For instance, in the case of PKO Bank Hipoteczny's issues of covered bonds denominated in PLN, worth PLN 500 million each, which took place in 2016, 37 and 23 investors declared their willingness to purchase them for PLN 1.24 and 682 million, respectively (PKO Bank Hipoteczny 2016). Or one of the last issues of PKO Bank Hipoteczny (EUR 500 million, 2017), 112 investors wanted to purchase ca. PLN 1.4 billion.

The increase in the frequency of issuing covered bonds translated into a change in mortgage banks' sources of funding. In the period 2000–2009, covered bonds accounted for 40% of the funds for the crediting activity on average. A significant source of funding was liabilities towards the financial sector. Mortgage banks had not begun to replace the cash loans taken out in equity affiliates with covered bonds until 2010, which resulted in the growth in their share in the financing structure to over 50%. The increase in the number and value of the issued covered bonds contributed to the gradual increase in mortgage banks' indebtedness arising from the issued covered bonds, which amounted to over PLN 23 billion at the end of 2019 (Fig 3). Given the plans of mortgage banks for the coming years, it can be assumed that the indebtedness arising from covered bond issues will continue growing. In the period 2021–24, covered bonds worth circa PLN 5 billion will be redeemed every year. Covered bonds at the value about PLN 1 billion will be redeemed only in 2020 and 2025.

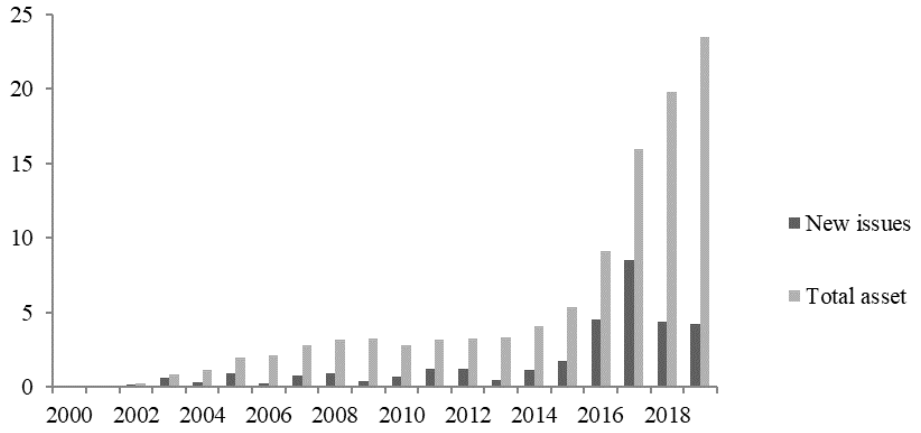

Fig. 3: New issues of covered bonds and total assets of covered bonds in

2000–2019 (PLN bln)

Apart from changes in the structure of mortgage bank financing and covered bond issues, the rules of charging interest on mortgage covered bonds with a variable interest rate (the reference rate + margin) were also amended. From the beginning of 2000 to mid-2015, the basis for charging interest on bonds denominated in PLN was WIBOR6M, and later – WIBOR3M. In the case of bonds denominated in EUR, the basis for charging interest changed earlier – in mid-2014 EURIBOR6M was replaced with EURIBOR3M. The mentioned changes were introduced by mBank Hipoteczny only. Pekao Bank Hipoteczny did not abandon the 6M reference rate. PKO Bank Hipoteczny, in turn, also based the issued covered bonds on WIBOR3M.

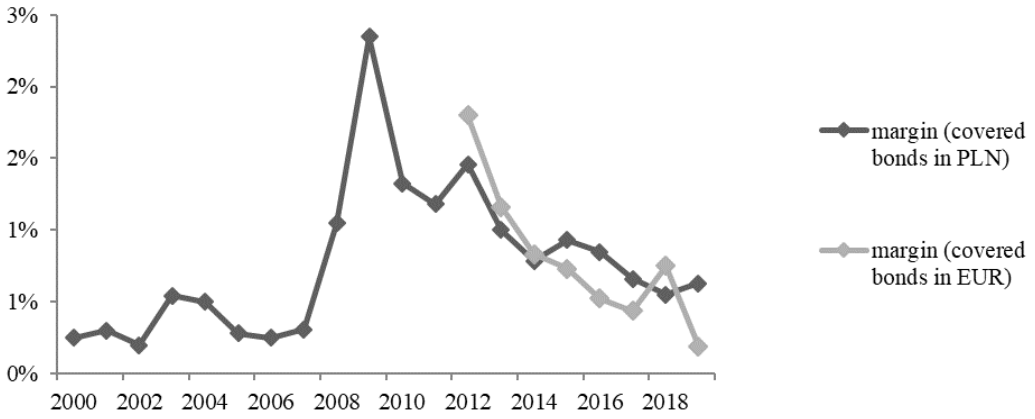

Fig. 4: Average margin covered bonds in PLN and EUR in 2000-2019

The margin level was adapted to the situation on the financial market. In the period 2000–2007, the margin of the covered bonds denominated in PLN was 0.3% on average. The margin growth lasted from early 2008 (the average of 0.74%) to 2009, when two series of covered bonds with a record-breaking margin level (2.1% and 2.59%) were issued. In the next period (2010–2012), the

margin, following a temporary decrease from 1.3% to below 1% in 2011, grew to the level of 1.7%. A gradual drop in the margin level, from 1% in 2013 to 0.6% at the end of 2017 (in PLN) and from 1.8% in 2012 to 0.4% at the end of 2017 (in EUR), can be noticed.

Primary Covered Bonds Market

By the end of 2015, that is the end of the period when the Act of 1997 was in force, only some institutional investors were allowed to become domestic purchasers of covered bonds:

- banks,
- investment funds (up to 25% of NAV and up to 5% of NAV in one issuer or two or more issuers being affiliated entities),
- and open-end pension funds (from 2004, as part of the subjective limit).

The legal regulations restricting the number of investors translated into the structure of purchasers. According to NBP data (reporting on non-treasury debt securities), in the period 2003–2008, covered bonds were purchased mainly by domestic banks and foreign entities. The share of the latter group of entities started to drop in 2006 in favour of domestic banks (Fig 5). In the subsequent period (2009–2012), over 80% of bonds were purchased by banks, almost 10% by open-end pension funds, and circa 10% by investment funds. Foreign entities had not resumed their activities on the Polish covered bond market until 2013, at the expense of domestic banks.

In the following year, a half of the issued covered bonds were sold to foreign entities, which resulted in a decreased share of banks, pension funds, and investment funds. At the same time, it was the first year when covered bonds were purchased by closed-end investment funds. Before that, only open-end investment funds and specialised open-end investment funds invested in such instruments.

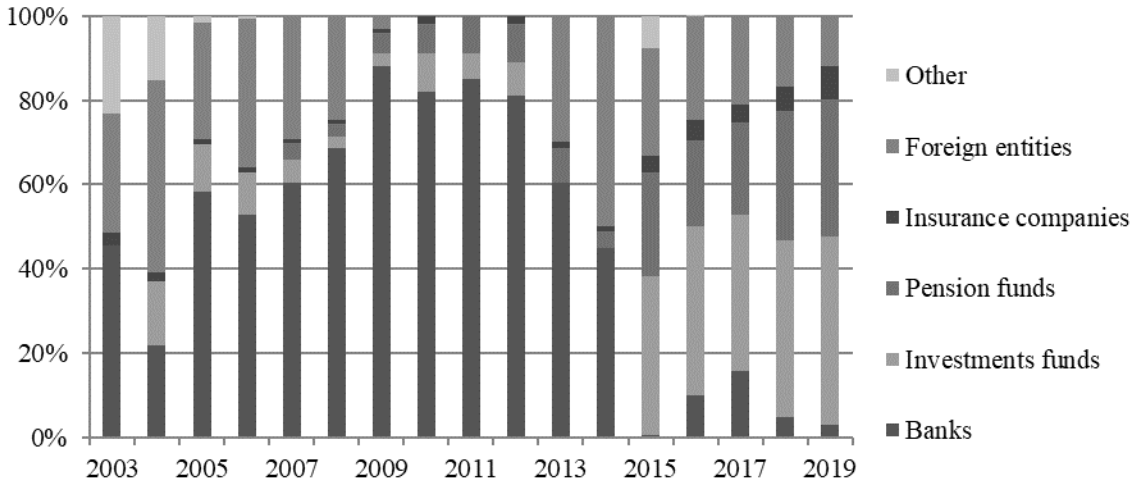

Fig. 5: Purchasers of covered bonds in 2003-2019

In 2015, in turn, the share of banks in the structure of bond purchasers was merely 1%, which was the poorest result in the almost 20 years' history of the covered bond market. The lack of interest in covered bonds on the part of banks arises from the fact that these entities redirected their attention towards corporate bonds. Increased interest was observed among other investors: investment funds (38%) and pension funds (25%).

The amendment to the Act on Covered Bonds and Mortgage Banks of 2015 introduced three crucial changes for prospective investors:

- cooperative savings and credit unions were permitted to invest assets in covered bonds,
- covered bonds were separated from the subjective group of open-end pension funds' investments, and at the same time an investment limit of 5% of the value of assets in all securities of a single issuer or of two or more issuers being affiliated entities was introduced,
- withholding tax was abolished.

At the end of December 2016, insignificant changes occurred in the structure of covered bond purchasers. The share of banks increased to 10%, while that of other entities remained at a level similar to the one from the previous year. The group of covered bond purchasers lacked cooperative savings and credit unions.

To sum up, the domestic covered bonds issued by mortgage banks are purchased mainly by domestic financial institutions. The share of these long-term debt instruments in investment portfolios of purchasers does not exceed 1%, which is influenced by high values of the assets accumulated by individual entities and low amounts invested in covered bonds. For instance, according to GUS (Central Statistical Office of Poland) data, covered bonds accounted for only 1.7% (PLN 4.7 billion) in the investment portfolios of investment funds at the end of HY1 2019, with the major share included in the portfolios of open-end investment funds (2.8%, nearly PLN 3 billion). Closed-end investment funds, in turn, invested less than PLN 263 million (the share of 0.02% in the investment portfolio) in covered bonds.

An exception here is PKO Bank Hipoteczny's covered bonds (EUR) issued in 2016 and 2017, which were addressed mainly to foreign investors. The abolition of the withholding tax and the highest possible Moody's rating for these bonds (Aa3) undoubtedly contributed to the fact that the demand was almost three times higher than the value of the bond issue (EUR 500 million) (PKO BP 2016). It needs to be indicated that the covered bonds of that series made their debut on the Luxembourg Stock Exchange. An analogous situation occurred for two consecutive emissions from 2017. According to PKO BH, buyers of covered bonds were banks (share of around 45%), investment funds (40%) and insurances (12%). Over half of the buyers were from Germany and Austria (55%), France and Benelux (14%). Other investors came from such countries as Switzerland, Italy and the United Kingdom as well as the Scandinavian countries (PKO BH 2018). In mid-2018, mBank as the second mortgage bank issued covered bonds, which are listed on the Luxembourg Stock Exchange.

Secondary Covered Bonds Market

The first covered bond sales and purchase transactions on the secondary market had not been finalised until 2003, that is the fourth year of covered bonds' functioning in Poland. Earlier, covered bonds had been issued only in private offerings addressed to parent banks. In 2003 and 2004, transactions worth PLN 59 and 122 million, respectively, were made, while none were

recorded in 2005. A significant change occurred in 2006, when the first transactions on the regulated securities market (RPW CeTO) market were effected (64 transactions at the value of PLN 6 million). In the subsequent period (2007–2009), trade in covered bonds on the regulated market was low (Fig 6). Significant transactions were finalised on the unregulated market:

64 transactions worth PLN 655 million in 2007,

68 transactions worth PLN 870 million in 2008,

140 transactions worth PLN 584 million in 2009.

The high values of the transactions concluded on the unregulated market could be attributed to the need of releasing the funds invested in covered bonds by foreign entities. Such transactions coincided with the financial crisis of 2007 and the subsequent problems of foreign financial institutions with maintaining financial liquidity. It needs to be added that foreign investors completely withdrew from purchasing Polish covered bonds in the period 2009–2012.

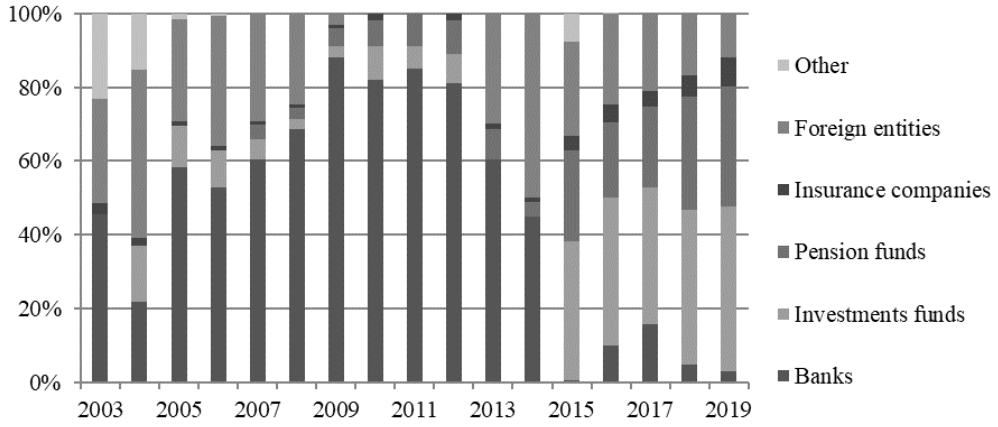

Fig. 6: Number of trades and turnover value (in PLN mln) in Catalyst platform in 2006-2019

On 30 September 2009, trade in covered bonds was transferred from RPW CeTO market to the regulated wholesale market managed by BondSpot as part of the Catalyst platform. The changes in the method of transaction conclusion and the increased security of investors (through approving prospectuses by the PFSA and issuing ratings for each series of covered bonds separately) failed to translate into a higher number and value of covered bond sales and purchase transactions. The record-breaking trade in covered bonds in 2013 arose from effecting 40 block transactions at over PLN 660 million, which can be associated with the return of foreign entities to the domestic covered bond market.

In 2009–2019, that is in the period when covered bonds became available also to individual investors, the total number of 38 transactions were made on Catalyst. More than half of them were transactions of sales and purchase of over 1,000 covered bonds. Despite the introduction of legal changes aimed at increasing the liquidity of covered bonds, their liquidity has not increased. As indicated by the small number of transactions made on the secondary market since 2016. Given the fact that the profitability of covered bonds is higher than that of Treasury bonds with a similar risk level or luck of the obligation to pay the withholding tax, a question arises whether it pays off

to investors to resell covered bonds before the maturity date. In the author's opinion, the answer is negative. The function of the secondary covered bond market is not such important in Poland. Its existence is helpful but not obligatory. In particular when covered bonds remain beyond the reach of a majority of individual investors.

Final Notes

Is the era of mortgage banking coming? The answer depends on the level of plan accomplishment by mortgage banks. If mortgage loans are transfer from parent banks and other commercial banks that are not related to mortgage banks by equity, dynamic changes on the primary covered bond market can be expected. An increased share of mortgage banks in lending and growth in the domestic financial institutions' interest in investing funds in covered bonds is anticipated (as long as they have such possibilities). On the other hand, changes in legal regulations, in particular the abolition of withholding tax, resulted in increased interest in Polish mortgage bonds from foreign investors. All issues of covered bonds in public offerings enjoyed quite a high interest on the part of purchasers, that is entities other than banks which were related to the issuers by equity. The purchasers included mainly foreign commercial banks, investment and pension funds. Since 2014, changes in the structure of buyers of mortgage bonds can be noted. What coincides with the presentation of the draft amendment to the Act on Covered Bonds and Mortgage Banks. Favourable changes in the legal provisions regarding mortgage bonds and bankruptcy law encouraged mortgage banks to issue covered bonds more often. As well as issuing mortgage bonds with a higher value than they have so far. They also have a chance to enter foreign markets. Like PKO Bank Hipoteczny or mBank Hipoteczny have done.

In combination with the implementation of international covered bonds programmes denominated in EUR and directing them to foreign investors, it affected the transformation of the primary mortgage bond market in Poland. There were no major changes in the entity structure except for the creation of one bank. Changes have taken place in the subject structure. Mortgage banks increase the issue of covered bonds in euros and introduce them to trading on the Luxembourg Stock Exchanges, which is associated with a reduction in emissions in PLN.

Acknowledgment

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Water Resources Management in Poland: The Case of Lakes Governance

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Abstract

Poland has about 9 000 natural lakes with an area of over 1 ha. They perform unique ecological, landscape and tourist and recreational functions. The lakes are able to provide the above benefits as long as they maintain their good ecological status. Tens of years of centrally planned water management and dominant state ownership did not prevent poor state of surface water quality in Poland. The new centralist system of management of water resources even more limited stakeholder participation to the level of information exchange and consultation. Grassroots lake associations can help overcome ineffective administrative patterns in lakes management. These organization are able to address issues that state institutions are not well suited to tackle at local scale. The role of government institutions is very important but on the level of preparation relevant policies, strategies, legal and administrative regulations.

Keywords: Lakes, Water Law, Water Management, Lake Governance, Lake Stakeholders

Introduction

Compared to other European countries the Polish fresh water resources are very small. On average, Europe has around 5000 m3 of water per inhabitant per year, while in Poland there is only about 1800 m3 (average value from 1946-2016) (Suchożebrski, 2018). On the contrary among other European countries, Poland is distinguished by a relatively high number of lakes. It is estimated to have 9,000 lakes above 1 ha, covering 1% of the total country's area (Soszka et al., 2003). Most larger lakes are located in the northern part of the country, and they are most numerous in the Land of Great Masurian Lakes, where they make up about 24% of the region's surface area (Lossow, 2011).

Lakes over 10 ha in size accumulate about 18.2 billion m^3 of water, which is five-fold more than the total capacity of all water retention reservoirs in our country. In turn, the water-holding capacity of the lakes seems not so big when compared to the groundwater resources, estimated to reach 6,000 billion m^3 (Diagnoza, 2010). But unlike groundwater, the option of water extraction, so important for conventional water management, is just one of the many services lakes can provide (Turkowski, 2016). The lakes take part in the water cycle - evaporation, retention, purification - and mediate in surface and underground water runoffs. Regardless of their size, lakes are primary repositories of rich aquatic biodiversity, with many having a range of native and endemic species. Water in the lake can become particularly useful during periods of drought and in the event of fires. The lakes can absorb large amounts of heat, soothing the local climate. The risk of flooding in the lake district is relatively low due to the significant retention capacity of the lakes. The usefulness of lakes does not end with hydrological and environmental functions. Not to be forgotten is the intrinsic beauty of lakes, many of which exhibit breath-taking aesthetic features. Lakes evoke a pleasing range of emotional, spiritual and intellectual responses in humans (World Lake Vision, 2003). No wonder that with the surrounding land, the lakes form the basis of the tourist image and the driving force of the dynamically developing lake recreation (Czarkowski et al., 2014) and tourism as well (Hall and Härkönen, 2006).

The lakes will provide the above benefits as long as they maintain their good ecological status. The difficulty of managing lakes is that the source of most of the problems associated with them lies in

the surroundings of the lakes, and not in the lakes themselves. Lake management must be integrative to be successful, given the nature of lakes and their basins. Integrated lake basin management (ILBM) is widely accepted as the best concept to achieve the goals (ILEC, 2005; MoFE, 2018; Zati et al., 2018). In the European Union, a key element of the Water Framework Directive (WFD) is integrated water resource management (IWRM), which has been implemented in accordance with international, national and regional guidelines for water management (Ingold et al., 2016). IWRM serves as the foundations for ILBM and it is defined as 'a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems' (GWP, 2000). However, ILBM is more than a simple application of IWRM (ILEC, 2005). ILBM is an approach for achieving sustainable management of lakes and reservoirs through gradual, continuous and holistic improvement of basin governance, including sustained efforts for integration of institutional responsibilities, policy directions, stakeholder participation, scientific and traditional knowledge, technological possibilities, and funding prospects and constraints (RCSE - and ILEC, 2014).

The article aims to present the current state of water and lake management in Poland and the possibility of stakeholders contribution in the lake management. The stakeholders are defined as group or institutions, either governmental or non-governmental organizations, and also individuals, with the interest or stake in decision-making process or project (according to SADC, 2000, cited by Slawski, 2013).

Legal status of lakes in Poland

Unlike the EU Water Framework Directive (WFD), which clearly defines lake as inland surface standing water (WFD, 2000, Article 2.5), Polish Water Act (PWA, 2017) distinguishes lakes as flowing (Article 22.2) and standing (Article 23.1) water bodies (Fig. 1).

Flowing waters include lakes with a permanent or periodic inflow or outflow of surface waters, while standing waters include lakes not directly and naturally connected with surface flowing waters. All flowing waters belong to the State Treasury and are publicly owned property. In turn, lakes classified as stagnant waters belong to owners of the real estate property. As a result, a great majority of lakes in Poland constitute public (or the State Treasury) property.

The current Polish Water Act has introduced new restrictions on trading in standing waters in the form of a statutory right of pre-emption for the State Treasury with respect to any land under inland standing waters, regardless of the surface area of the water or the land (PWA, 2017, article 217.13). These activities are in line with the development of modern water rights. A characteristic feature of the rights is the participation of all stakeholders in decision making regarding water resources. However, the first step to establishing a water rights system is to put water resources under state ownership or control (Hodgson, 2006). As a result, private water ownership has started to be restricted in many countries.

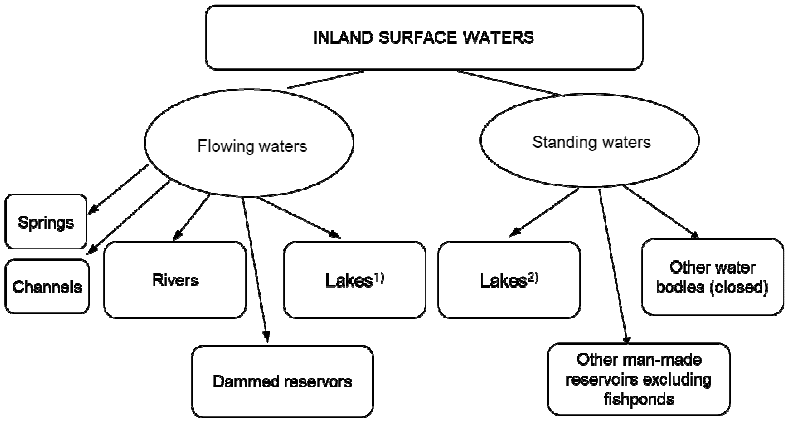

Fig. 1: Classification of inland surface waters according to Polish Water Act (PWA, 2017)
1) lakes that have a continuous or periodical inflow and/or outflow of surface water,
2) lakes that are not directly and naturally related to surface inland flowing waters.
Source: Turkowski, 2017a, modified

Institutions in Water Resources Management in Poland

Having placed water resources under state control or ownership and dealt with the status of existing water rights, logically the next legislative step is to create the institutional arrangements for the management of those resources, including the issue of water rights (Hodgson, 2006).

Current leading political power in Poland returned to the model of centralized management of water resources, neglecting the issue of broader public participation. Officially, the main reason for new water law introduction was to remove the disadvantages of the previous Water Act of 2001, which consisted of the dispersion of water management competences in various institutions and the lack of an appropriate financing water system. The second important objective of the new Water Act was to create a legal basis for the reform of water management that would meet the requirements and the objectives of the WFD and the other related EU directives.

The general control of water management is exercised by state administration, supervised by the minister competent for water management. According to Water Act (PWA, 2017) the administration has overall responsibility for water resources management, including the administration of water rights. The central management body is a state legal entity called Polish Water State Enterprise 'Polish Water'. The structure of the Polish Waters includes 11 regional water management boards, 50 catchment managements and about 330 water supervisions. The relevant bodies of Polish Waters are responsible for such matters as issuing water law permits and water law assessments, perform inspections, and also operate the water registry.

The water management competencies of regional and local self-government authorities were greatly reduced in new Water Act. The local government units dealing with, among others, waters important for agriculture (Voivodship Offices for Land Reclamation and Water Facilities) were liquidated, and part of their staff was employed in the Polish Waters. The basic instrument of water management - permits for the use of water - are issued only by organizational units of Polish Waters, and not as it was earlier by local government units, i.e. by marshals of voivodships or county executives (poviat starosts).

In terms of the quality of water taken to supply the population with water intended for human consumption as well as bathing water and the place occasionally used for bathing, the control is carried out by the State Sanitary Inspection. The protection and use of water are also controlled by the Environmental Protection Inspection. It includes compliance with the conditions set out in decisions issued on the basis of the Water Act and contained in integrated permits, as well as

compliance with the obligations and restrictions imposed on landowners. The controls include also nitrate pollution from agricultural sources.

Lakes Management in Poland

From the hydrological point of view, lakes are primarily water storage bodies. The occurrence and management of lake basin problems is a function of its three distinguishing characteristics: (1) an integrating nature; (2) long water residence time; and (3) complex response dynamics (RCSE - and ILEC, 2014; Chidammodzi and Muhandiki, 2015). Together it makes that lakes are among the most vulnerable and fragile aquatic ecosystems.

Most lake water is renewed on average over a period of 17 years (Shiklomanov and Rodda, 2003). For comparison, for rivers it is on average only 12-13 days (Bajkiewicz-Grabowska and Mikulski, 2005). The capacity of water bodies self-purification strictly depends on the time water exchange (Zubaidah et al., 2019). A long water retention time ensures that, even when remedial programs are implemented to restore a degraded lake, it can take a very long time - if ever - for a lake to recover (RCSE – ILEC, 2014).

In contrast to lotic (river) water systems, lakes do not necessarily respond to perturbations or pollution in a linear fashion. This is due in large part to their stagnancy of impounded water mass held over long time, which allows time delays in response to external disturbances. Hence, they are unpredictable and uncontrollable (RCSE - and ILEC, 2014; Chidammodzi and Muhandiki, 2015).

In European legal regulations lakes constitute one of bodies of surface water – as in Polish regulations. Lakes as other water in Poland are protected, regardless of whose property they are (PWA, 2017, Article 16.20). The main environmental objectives of river basin and particular water bodies management, as well as the measures to be taken to achieve them, have been set out in the river basin management plan (RBMP). The draft RBMP is developed by Polish Waters after consultation with relevant voivode (head of a regional state administration). The overall environmental objective is to protect, improve and maintain at least good biological and chemical status of surface waters, as well as to prevent its deterioration.

The plans are reviewed and updated periodically every six years and constitute the basis for making decisions affecting the state of water resources and the principles of their management in the future. The arrangements for water management plans are included in the country's spatial development concept, as well as voivodship strategy and spatial development plans (https://www.wody.gov.pl/nasze-dzialania/ramowa-dyrektywa-wodna-plany-gospodarowania-wodami).

Only larger lakes are detailed in the plans and usually only the type of the lake and an overall environmental goal are specified. For example, Lake Kośno (569 ha) in the point 'subject of protection' was briefly defined as "mesotrophic lake, plant communities of the class Charetea fragilis, alder, boreal spruce on peat, wetland birds", and the environmental goal has been specified as ‘Preservation of natural vegetation, including the class Charetea plant and lake fauna’ (RBMP Pregoła, 2016). The ILBM approach has not been used mainly due to the lack of relevant provisions in the WFD and the wide scope of the above-mentioned plans covering entire river basins.

An overall assessment of the state of 885 Polish lakes monitored in 2013–2018 showed that 87% of them were in poor condition (GUS, 2019). Inspections carried out in 2017 have shown that naturally occurring clean surface waters can be found in Poland practically only in mountain streams and some lakes, located away from human settlements and industrial plants. Despite spending over PLN 18 billion on the construction and modernization of sewage treatment plants in the last dozen years, almost 90% of the monitored reservoirs remained in poor condition (NIK, 2018). These results are very pessimistic, but while full assessment of environmental changes requires further years of monitoring, the evaluation of the administrative efficiency can be more explicit. Audits (NIK, 2018) showed the situation of discontinuation of supervisory activities, both in the area of water monitoring

and control, assessment of the impact of sewage treatment plants on the environment, and compliance with the requirements set out in permits.

The experience gained in other countries suggests that institutions responsible for the administration of lake catchments need time before they operate effectively (ILEC, 2005). This experience also implies that the above process can be greatly accelerated by the decentralization of some of the competences by delegating them to more local level institutions, and by the inclusion of other interested parties, including non-government organizations and community associations into the decision-making process (Davidson and Loë, 2016; Huitema and Meijerink, 2017).

Lakes Governance

Institutions lie at the core of the management of lake catchments. They perform and supervise the performance of tasks defined by legal regulations; they shape the policy and initiate new legal solutions; but they can also serve as a center for engaging other interested persons and organizations into decision-making processes (ILEC, 2005). The numerous functions and values of lakes make them subject to the use and interest of many people and institutions (Fig. 2).

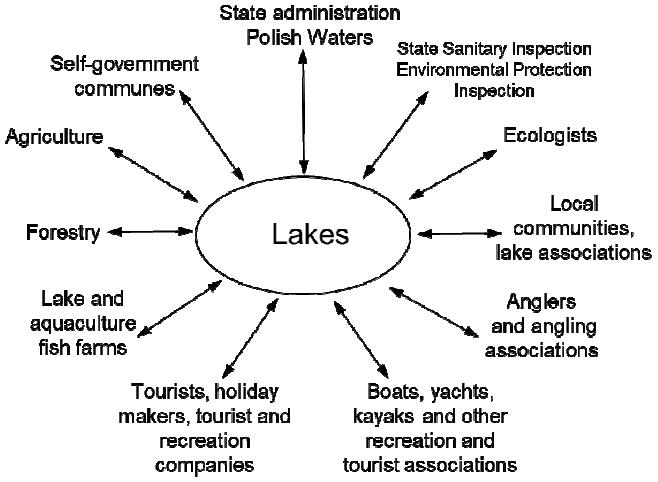

Fig. 2: Main Polish lake stakeholders

Source: own work

The European FWD also emphasizes the need to involve all stakeholders in water resource management –'(14) the success of this Directive relies on close cooperation and coherent action at Community, Member State and local level as well as on information, consultation and involvement of the public, including users' (WFD, 2000). Advancing guidelines for the development of the ILBM platform process, describes four levels of stakeholder participation: information - sharing, consultation, collaboration and empowerment, and constructs an ordering of influence contingent on the nature of communication (one versus two-way communication) and allocation of resources (independent versus shared versus transferable) among researchers, government and non-government organizational staff, and other stakeholders (ILEC, 2005, citied by Bell et al., 2013). Public participation in current Polish water law has been determined at the level of information exchange and consultation. In particular, the water administration is obliged to carry out public consultations on the review of significant problems related to water management and water management plans being developed for river basins.

The opinion, that politicians and government administrations subordinate to them, do not see the need for social organizations to participate in decision making and are afraid of independent assessments (Graniszewski, 2017), confirms the provision regarding the new rules for issuing water law permits

(PWA 2017, article 402). Non-governmental organizations have been excluded from participating in the new proceedings regarding water law permits. As a result, these ecologically relevant administrative decisions will remain outside broader public control.

Regardless of the changing governments and their ideologies, Polish society is becoming more and more civil society (Korolczuk, 2017). Nowadays we can observe a tremendous increase of the number of non-government organizations (NGO). In 2018 there were about 143 thousand NGOs including 117 thousand associations and 26 thousand foundations (Charycka and Gumkowska, 2019). For comparison in 2012 there were about 78,5 thousand NGOs including about 70 thousand associations and 8,5 thousand foundations (Adamski et al., 2014, cited by Brodziński et al., 2017). One of the manifestations of this phenomenon are grassroots lake associations emerging in recent years in Poland. There are still few such associations compared to other countries with long tradition of lake associations as the USA (Thornton, 2013; Rees, 2014). But the reason for creation of lake association is the same. When a community, agency or individual makes any decision regarding land management, it can impact lake water quality by affecting drinking water supplies, ecosystem health, and recreation opportunities. Processes of eutrophication and pollution can rapidly accelerate when the areas are built-up and intensively used in the absence of adequate sanitary installations. When negative impacts become great enough that the public begins to observe them, it can inspire individuals and communities to act to protect the lakes they love and rely upon (Henson et al., 2019).

Local institutions, such as lake associations, are well suited to complement traditional regulatory approaches because the strong connections and relationships developed through these organizations allow for more detailed knowledge of the sources of potential problems as well as greater support for local monitoring and enforcement (Snell et al., 2013). Core requirements for successful collective action of association include the presence of defined group with common interests; repeated, face-to-face interactions among group members, allowing members to share information and devise appropriate rules and norm (Ostrom, 1990; Gardner and Walker, 1994; Poteete and Ostrom, 2004 cited by Baldwin et al., 2018). A good example here can be 'The Ecological Association Łajs 2000' (Poland). The association was founded by the inhabitants of the village of Łajs located on the lakes, befriended anglers and naturalists in 2007. The main motive behind the establishment of the association was to act for the protection of the waters of the Łajskie Lake and the Reserve of Kośno Lake. Both lakes, despite established formal protection areas (protected landscape area, Natura 2000, nature reserve), have been subject to uncontrolled pollution. The residents' initiative resulted in taking specific actions to protect the lakes and their catchments. The association did not limit its activities to education, monitoring and protests, but prepared a lake protection program and has coordinated the most important local and regional institutions around it (Fig. 3).

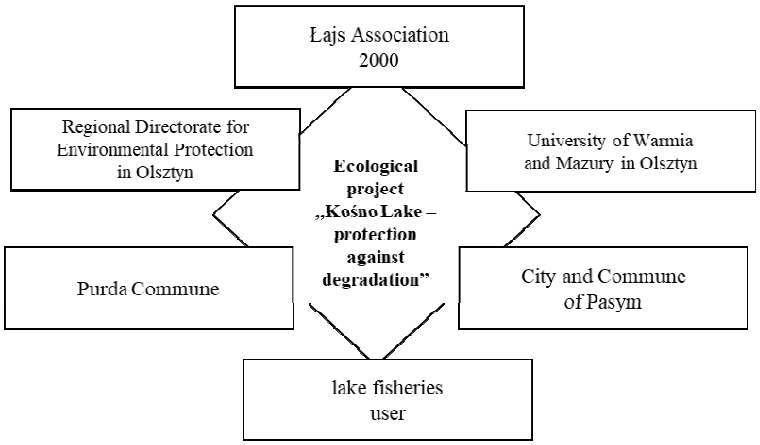

Fig. 3: Main participates of the local project of lake Kośno (Poland)
Source: Turkowski, 2017b, p. 359.

The initiative of residents and supporters of the exemplary village of Łajs and the favorable attitude of the regional and local government administrations as well as the university resulted in actions that in the near future should bring a significant improvement in water status as well as permanent and effective protection of the lakes.

Summary

The lakes constitute a significant part of inland water resources, but their significance goes far beyond the value of the water they accumulate. The lakes are ecosystems, dynamic living ecological systems, as well as elements of the landscape in which the natural and architectural components harmonize with the free space of the lake and change with the current weather conditions and seasons. But the quality of lake waters and their values are closely linked to the land use and other activities carried out by people in the catchment areas of the lakes. For this reason, the sustainable use of lakes is associated with the integrated management of their drainage basins. Actions and strategies in the management of lakes do not differ from similar activities envisaged in the framework of integrated water resource management. The difference lies in the need to focus on individual lakes and their specific conditions. Experience from other countries shows that integrated management of individual lakes and their basins is the best way.

Analysis of legal acts and river basin management plans indicates that lakes and the specificity of their problems are not sufficiently recognized in Poland at the central level of water resources management. Due to the mainly local dimension, the participation of citizens and other stakeholders, including non-governmental organizations, local self-government authorities, entrepreneurs and industrial organizations, as well as educational and research institutions, is fundamental in managing individual lakes. The progressive development of civil society and the increasing readiness of Poles to participate in the life of the state are conducive to these activities and should be properly used. The role of government institutions should focus on the preparation of relevant policies, strategies as well as legal and administrative provisions. These activities should define the foundations of management, including full partnership participation of the local government, private sector and local communities. The changes should begin with the restoration in the water law the possibility of participation of non-governmental organizations in proceedings regarding the water permit. In addition, the exclusion of these organizations is contrary to the provisions of the Aarhus Convention (Convention on access to information, public participation in decision-making and access to justice in environmental matters signed June 25, 1998 in Aarhus). Defining the role and principles of interaction between stakeholders in lake management requires further analysis of solutions used in other countries and the separate own studies.

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Discrepancy Water Rights for 'Marginals' in Water Management : Case Study in Penjaringan, North Jakarta

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Abstract

One crucial element that must consider the welfare of the community is access to water. In this case, access to water that is easily obtained by the community is one of the ideologies in Indonesia. Namely, social justice for all Indonesian people, it mainly applies to water rights in marginalized communities. In North Jakarta, especially in Penjaringan sub-district, people still have difficulty in accessing clean water. Due to the complexity of the problem from the start of land concessions to the elevation of an area. Consequently, it makes it difficult for the government to provide access to water in the form of piped water connections for the community. This research employs a qualitative approach through interviews and literature research. Interviews were conducted in early January 2020 to residents of Penjaringan, North Jakarta, while secondary data obtained from open access PALYJA (water company). The program found at the research location, for instance, is Master Meter. A program intended for people who have a Building Land Tax, so that *de jure* can get access to water at a low price per month. However, the facts found in the field between one village and another village have significant differences; between the cost of payment to the payment method and the installation of waterways. Hence, due to discrepancy, people still pay their obligations in order to get rights to water.

Keywords: Water Rights; Water Management; Marginals; Corporate Social Responsibility .

Background

Water, as a political attribute, has a role in determining people's welfare (Batley & Mcloughlin, 2015; Levy & Sidel, 2011; Rey, Pérez-Blanco, Escriva-Bou, Girard, & Veldkamp, 2019; Wright-Contreras, 2019). Water classified as common goods; thus, there is no room for private ownership desire or personal interests (Sultana, 2018). If elaborated on the economic dimension, water classified as inelastic goods will affect water prices, high water price fluctuations will affect the cost needs in the household (Distaso & Ciervo, 2011). Thus, water management policies based on management based on "common goods" and the economic capacity of the community in consuming water (Agthe & Billings, 2003). Water management primarily managed cooperatively in the local community (Demie, Bekele, & Seyoum, 2016; Hove et al., 2019). Notably, through infrastructure that can distribute water by following the economy of reciprocity rules (Distasto & Ciervo, 2011). However, human integrity in applying the principles of environmental management and creating a sense of security for the capacity of water resources for the long term (Kranz et al, 2004).

Marginals in this research claimed as people who live on a pre-prosperous level. Data shows from Central Bureau (2019), 95.860 people in North Jakarta, as in 2018, live as a sparse population. Indeed, the constraint, in this case, is how to meet the balance between people's purchasing power and water supply (Cosgrove & Loucks, 2015) and then produce the purchase price of water. However, the calculation of water prices should base on customers' economic behaviour to achieve fairness over

marginal society. This research will describe a significant difference in the two neighbouring villages in accessing the water rights of marginals people. Therefore, it gets a real framework of things experienced by the community in accessing clean water as one of the rights of human life and the right as citizens.

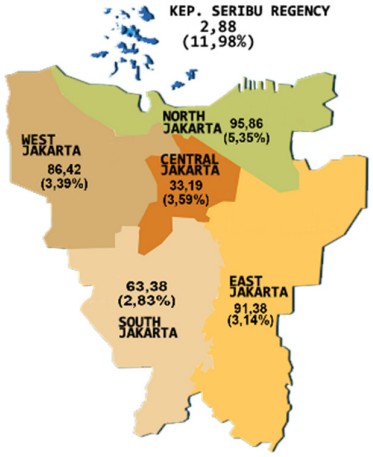

Fig. 1: Poor population percentage (thousand/person) by September 2018.
(Source: Central Bureau North Jakarta)

Method

This research employs a qualitative approach, and researchers state-specific hypotheses completed with quantitative data collection to derive explanations from those data. Primary data collected through interviews and observation in earlier January 2020 with people at two villages; Kembang Lestari and Marlina, at Penjaringan sub-district, North Jakarta, Indonesia. Secondary data collected from Pam Lyonnaise Jaya or known as PALYJA, particularly in water management in North Jakarta, Indonesia. Data analyzed using descriptive analysis, equipped with pictures that have been obtaining at the research location.

Result and Discussion

Water for all is a commitment of the water company by Pam Lyonnaise Jaya in Jakarta to strive for all people to access clean water. The focus of its implementation is on locations that have not yet channeled clean water through pipelines. Hence, with a program supported by corporate social responsibility, it is expected that all levels of society can access clean water, and the company also participates in campaigns to support the conservation of natural resources following the principles of sustainable development. Whereas, some of these programs are still running and some have been terminated, clearly that each program must be reviewed for their effectiveness in on-site implementation.

Corporate Social Responsibility: Water for All

First, GPOBA (the Global Partnership on Output-Based Aid) is an innovative program for better infrastructure development for the underprivileged in developing countries, one of which is providing access to clean water with funding from the World Bank through the reimbursement system. This financial assistance provided with certain conditions based on the results felt by the community. At the beginning of this project, PALYJA, as one of the clean water service providers in DKI Jakarta, is responsible for funding the implementation of the program until the results can be felt directly by the community and an independent auditor has audited the results of this program. Based on the results of the audited program, the cost reimbursement mechanism implemented. The implementation of this program has been taking place since April 2008 and has ended in June 2013.

Now, PALYJA has connected as many as 5,042 households through the GPOBA program. The regions that have obtained clean water pipelines in the GPOBA program are Bengkel Swamp, Menceng, Warung Hang, Swamp Lele, Utan Jati, Muara Baru. These locations were chosen because they are the location of underprivileged communities in the DKI Jakarta area and have groundwater conditions that are no longer suitable for consumption. For PALYJA, this program expected to help the underprivileged communities in DKI Jakarta to get clean water pipelines to homes at affordable prices. Price comparisons show in table 1, before and after the GPOBA program.

Table 1: Comparison Before and After GPOBA

Before GPOBA			**After GPOBA**		
Water usage	**Price USD/L (Rp/L)**	**consumption / home / month**	**Water usage**	**Price USD/L (Rp/L)**	**consumption / home / month**
Cook and drink	US$ 2,71-5,50 (depends on the area)	600 L	Cook, drink, and wash	US$ 0,077-0,26 (depends on the area)	14000 L

(Source: PALYJA)

Secondly, the 'water kiosk' is a program initiated by a state-owned enterprise (PALYJA) in water management. Water kiosk is a water supply program for underprivileged communities or marginal in Jakarta that is outside the reach of the PALYJA network. Water kiosks implemented by building water kiosks, which are then collected and distributed through PALYJA tanker cars. Until now, PALYJA has more than 50 water kiosks spread throughout the areas managed by PALYJA. The existence of these water kiosks expected to make it easier for the community to get access to healthy, clean water at affordable prices. In table 2 shows the water price comparison of water kiosk before and after the program.

Table 2: Water price comparison

	Before Water Kiosk	**After Water Kiosk**	
Water source	*Kiosk Owner*	*Kiosk Owner*	*On the Location*
Price Rupiah/L (USD/L)	US$ 3,66 - US$ 5,50 (depends on the area)	US$ 1,83 - US$ 2,75 (depends on the area)	US$ 1,47

(Source: PALYJA)

Thirdly, the Master Meter is a program carried out by Pam Lyonnaise Jaya (PALYJA) to provide solutions to overcome the problem of access to clean water. In the Master Meter program, one of the requirements that must be met by the community is by providing proof of legal ownership of the house in the form of proof of payment of Building Land Tax. In the Master Meter program, PALYJA provides water facilities in the form of a clean water connection by using a master meter located in a proper location and with an adjustable size. Through the Master Meter connection, the community can channel clean water connections to their respective homes. The arrangement of the Master Meter clean water distribution mechanism is carried out by the Community Based Organization or CBO. Signet Master Meter in Figure 2 located beside the designated community home to regulate expenditure or consumption of water per month. This management is managed by the community, starting from payment and maintenance, as well as registration for installing the meter in each resident's home.

Fig. 2: Signet Master Meter in Kembang Lestari Village, Penjaringan, North Jakarta.
(Source: Authors)

Data obtained from observation and direct interviews with one of the Kembang Lestari Village housewives, Penjaringan Subdistrict, the head of the family work as an Officer in Handling Infrastructure and Public Facilities, with a monthly fee of water consumption approximately US$ 34 or above. The meter as a gauge of water consumption in every corner of the house that already has water channels. Information obtained from the results of the interview that the installation costs around US$ 73 to get to each resident's house. Payment is paid to one of the residents who are the management of the Master Meter, and payment is using cash. If the payment is experiencing problems or is too late from the due date, a payment penalty will be given with a penalty that counts per day. The most crucial thing from the Master Meter program in Kembang Lestari village is that the water flow will be opened in the morning within 3-5 hours in the morning around 7 am until 11 am and then it will be locked again which will be open again at the next day. The informant informed that she had a container to collect water during the access period that was being opened, moreover the whole family can use the water that have been collected.

In contrast to the next village, namely Marlina village, costs to be paid for water consumption per month is US$ 4 or above. Payment can be accumulated to the following month, with payment methods made at convenience stores in collaboration with PAM or Water Companies. Reviewed from two villages, the amount of fees charged by the two villages is not evenly distributing. The financial ability of marginal people was charged mainly for paying their water consumption. Thus, due to discrepancy be a challenge for future improvement strategies to equalize the price of water consumption for marginal communities in Penjaringan, North Jakarta. Therefore, marginal people must get their rights to water at an affordable price. Contrasting with Kembang Lestari village, at Marlina village, people can access water all day long for 24 hours without a certain period to turn on and turn off the water access.

Fig. 3: Meter in every home resident
(Souce: Authors)

Exposure to the findings at the study site above can be one of the strategies for improvement in water management. That, the initiation of the water for all programs is not just a corporate social responsibility but also as one of the prior programs for marginalized communities in obtaining the water rights. Therefore, it is expecting that there will be no discrepancy between the poor and rich, especially the poor with the poor between villages. The problem that must discuss with all related parties is the Building Land Tax because this tax is one of the obstacles for people to be able to access the Master Meter to meet their daily water needs. Emphasizing, in its consideration the 'water for all' programs must adjust to the regional or regional spatial plan; moreover, the community does not suffer losses soon. Furthermore, holistic research on spatial planning and land ownership that has been occupied by marginal communities urgently needed to fight for their rights, particularly water rights. Thus, the challenge for PALYJA in initiating the 'water for all' program is as a form of transparency and an invitation to all parties to work together to save and preserve water resources in order to preserve the environment and the survival of humans and living things.

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Electronic Word of Mouth (eWOM): An Exploratory Literature Review

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Abstract

With the advent of the Internet and especially social media, electronic word of mouth (eWOM) plays an influential role in person-to-person marketing. In this context, this article aims to provide an overview of the current state of eWOM research. Accordingly, we selected 1,033 academic articles from the database Scopus. Next, a latent semantic analysis was applied. The results allow distinguishing three areas of research, labeled as brand image, hospitality/tourism, and product evaluation.

Keywords: eWOM, Research, Latent Semantic Analysis.

Introduction

Word-of-mouth is known as traditional person-to-person marketing with using oral communication that it used to be one of the most worth marketing aspects for business owners. With the advent of the Internet and especially social media, this behavior has changed to a much more public space. Therefore, every kind of comments or posts that users share on the social media could include electronic word of mouth, that is one of the most influential resources of information transmission (Chu & Kim, 2018; Mishra & Satish, 2016). In this context, this article aims to provide an overview of the current state of eWOM research.

Methodology

Since our goal is to explore in the most consistent way possible all academic literature related to eWOM, we choose following the methodology proposed by Sidorova et al. (2008). Below we detail this methodology and elements of the analysis performed.

Data Gathering

This study searched all academic publications in which include “eWOM” or “e-WOM” in their titles, abstracts, or author keywords in the database Scopus between 2004 and 2019. In total, 1,121 peer-

reviewed articles and conferences have been found. In order to distinguish which article's context is related to eWOM, the researchers read the abstracts of publications, and 1,033 papers were identified.

Data Analysis

A text mining technique analyzes obtained data with the help of Rapidminer software. In particular, the latent semantic analysis (LSA) technique was used for this study. LSA can extract essential words and identify the different meanings of a word based on the context; this capability has been famed in different research areas. The 1,033 collected abstracts were imported to Rapidminer in order to start LSA processing in the following steps.

B.1. Term Reduction

Each record is defined by one abstract, and in the first step, all records come into the "tokenize" operator in which each word is recognized by one space called a token. In the next step, the tokens go through the "transform case" operator changes all the letters to lowercase in order to make all tokens integrated. Next, the "stopwords" operator removes all meaningless words in the English language, such as "a," "an," and "is". Due to stopwords are not meaningful enough we remove them from the records. Fourth, all the tokens which have one letter or more than 25 letters are removed because those tokens do not include meaningful information. In the fifth step, the root of words are taken into account and all suffix are removed. For example, all "consume," "consumer," "consuming," "consumable," and "consumed" tokens are considered as "consum" in the result. Sixth, all tokens that only appear in a document are removed. All these procedures eventuated 2,625 tokens. Furthermore, we removed the most common words in academic writing, such as "study," and "investigation." This procedure resulted in 2,063 tokens.

B.2. Term Frequency Matrix

We used the technique of calculating the relatively rare weighting called term frequency-inverse document frequency (TF-IDF). Such transformation promotes the occurrence of rare terms and decreases the impact of more common non-stopwords.

B.3. Singular Value Decomposition

Singular value decomposition (SVD) is a well-known linear algebra decomposition which makes a rectangular matrix A be broken down into the product of three matrices, an orthogonal matrix U, a diagonal matrix S, and the transpose of an orthogonal matrix V as follow:

$$A_{mn}=U_{mm}S_{mn}V^{T}_{nn}$$

With SVD, LSA can identify the different words, which have the same meaning or find one word that may mean different meanings in different contexts (Lin et al., 2017; Sidorova et al., 2008). We consider the first 100 main components that explain a variation of 95% of the total with 794 terms.

B.4 Factor Rotations And Factor Loading Thresholds

Factor rotations and factor loadings help with factor interpretation in order to find simple factors. Therefore, for each factor, we prepared a list with all high loading for both terms and documents and sorted them based on absolute loading value by factor. Moreover, a related threshold value is calculated based on one tail probability of 1/k in order to find the best classification (k is the number of factors). Indeed, this study threshold value is not valuable enough because, for example, it makes

the authors choose 118 tokens in three factors but based on different comparisons, 15 tokens for each k equivalent 2 to 5 were computed.

Results

According to the methodology, the authors determined three factors/categories that explain the best classification in eWOM research from a general perspective. Table 1 shows the classification obtained; this has three categories; moreover, the three articles more related to each category found are represented. The first category describes "Brand Image," in which the most related articles study how eWOM influences the brand image. The second topic as we expected, relates to "Hospitality/Tourism," which is a hot issue on social media nowadays, for example, the third token is TripAdvisor, which is a well-known website in the tourism industry that users can share their comments and experiences on it with each other. The last category is "Product evaluation," in which opinions and online reviews of products are studied.

Table 1: Three general categories of eWOM research

Category Label	High-Loading Terms	Representative articles
Brand Image	brand, imag_, media, commun_, purchas_, intent_, facebook, loyalty, wom, trust, consum_, market, engag_, attitude_, ewom,	Chetna & Amresh (2017), Nuseir (2019), Ullrich & Brunner (2015)
Hospitality/Tourism	Hotel, travel, tripadvisor, custom, satisfact_, tourist, service, onlin_, tourism, star-, guest, website, motiv_, price, industri_,	Blal & Sturman (2014), Casaló et al. (2015), Martin-Fuentes(2016)
Product Evaluation	Product, commerc_, ewom, wom, consum, purchas_, credibl_, perceive-, online-, intent, messag_, shop, behavior, motiv_, trust,	Aihwa et al. (2013), Jafari et al. (2015), Liu et al.(2017)

Conclusions

eWOM has an essential role in marketing. In fact, in our research, 1,033 peer-reviewed studies were associated with this phenomenon. Using LSA for exploring these articles, three significant categories were determined: brand image, hospitality/tourism, and product evaluation. In futures studies, these categories should be explored in detail.

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Analysis of Key Audit Matters in CAC 40 Audit Reports

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Abstract

The objective of this paper is to continue the work of the authors on the key audit matters (further also referred to as "Key Audit Matters" or "KAM") as well summarize and present the results of the research performed in respect of the key audit matters determined and communicated in the independent auditors' reports issued in conjunction with the audit of the annual financial statements of CAC 40 constituent companies for 2018 and 2017. The research focused primarily on reading reporting requirements in respect of key audit matters relating to audits of historical financial information as defined in the International Standards on Auditing (ISA) and examination of the auditors' reports issued in conjunction with the audit of the 2018 and 2017 annual financial statements of the CAC 40 constituent companies listed on Euronext Paris (France). It was tentatively assumed that both (1) the number and (2) the nature of Key Audit Maters identified and reported in conjunction with the audit of the annual financial statements of CAC 40 constituent companies for 2018 and 2017 will not vary significantly. Because Dassault Systemes and Hermes were added to CAC 40 only in 2018, they were not taken for consideration and consequently a total number of companies reviewed was reduced to 38.

Keywords: Audit, Risk, Auditor's Report, Key Audit Matters.

Introduction

In accordance with the International Standards on Auditing the purpose of an audit is to enhance the degree of confidence of intended users in the financial statements. This is achieved by the expression of an opinion by the auditor on whether the financial statements are prepared, in all material respects, in accordance with an applicable financial reporting framework (ISA 200, *Overall Objectives of the Independent Auditor and the Conduct of an Audit in Accordance with International Standards on Auditing*, paragraph 3).

The financial statements subject to audit are those of the entity, prepared by management of the entity with oversight from those charged with governance (ISA 200, *Overall Objectives of the Independent Auditor and the Conduct of an Audit in Accordance with International Standards on Auditing*, paragraph 4).

In conducting an audit of financial statements, the overall objectives of the auditor are:

(a) to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, thereby enabling the auditor to express an opinion on whether the financial statements are prepared, in all material respects, in accordance with an applicable financial reporting framework; and
(b) to report on the financial statements, and communicate as required by the ISAs, in accordance with the auditor's findings (ISA 200, *Overall Objectives of the Independent Auditor and the Conduct of an Audit in Accordance with International Standards on Auditing*, paragraph 11).

Risk Assessment

In accordance with the International Standards on Auditing the auditor is also required to identify and assess the risks of material misstatement, whether due to fraud or error, at the financial statement and assertion levels (ISA 315 (Revised), *Identifying and Assessing the Risks of Material Misstatement through Understanding the Entity and Its Environment*, paragraph 3).

As part of the risk assessment, the auditor shall also determine whether any of the risks identified are, in the auditor's judgment, a significant risk (ISA 315 (Revised), *Identifying and Assessing the Risks of Material Misstatement through Understanding the Entity and Its Environment*, paragraph 27). The auditor shall treat those assessed risks of material misstatement due to fraud as significant risks (ISA 240, *The Auditor's Responsibilities Relating to Fraud in an Audit of Financial Statements*, paragraph 27).

When identifying and assessing the risks of material misstatement due to fraud, the auditor shall, based on a presumption that there are risks of fraud in revenue recognition, evaluate which types of revenue, revenue transactions or assertions give rise to such risks (ISA 240, *The Auditor's Responsibilities Relating to Fraud in an Audit of Financial Statements*, paragraph 26).

Areas of higher assessed risk of material misstatement, or significant risks identified in accordance with ISA 315 shall be taken by auditor into account in order to determine, from the matters communicated with those charged with governance, those matters that required significant auditor attention in performing the audit (ISA 701, *Communicating Key Audit Matters in the Independent Auditor's Report,* paragraph 9).

Determination and Communication of the Key Audit Matters

The auditor shall determine which of the matters determined in accordance with paragraph 9 of ISA 701 were of most significance in the audit of the financial statements of the current period and therefore are the key audit matters (ISA 701, *Communicating Key Audit Matters in the Independent Auditor's Report,* paragraph 10).

In accordance with paragraph 10 of ISA 701, *Communicating Key Audit Matters in the Independent Auditor's Report* the auditor shall describe each key audit matter, using an appropriate subheading, in a separate section of the auditor's report under the heading "Key Audit Matters," unless the circumstances described in further paragraphs apply.

The purpose and the methods of the research

The purpose of the research was to examine whether (1) the number and (2) the nature of Key Audit Maters determined and communicated in conjunction with the audit of the annual financial statements of CAC 40 constituent companies for 2018 and 2017 varied significantly.

It was tentatively assumed that the number (hypothesis 1) and the nature (hypothesis 2) of Key Audit Maters identified and reported in conjunction with the audit of the annual financial statements of CAC 40 constituent companies for 2018 and 2017 did not vary significantly.

The research focused primarily on the examination of the auditors' reports issued in 2019 in conjunction with the 2018 annual audits of the financial statements and the auditors' reports issued in 2018 in conjunction with the 2017 annual audits of the financial statements filed by the CAC 40 constituent companies listed on Euronext Paris (France). Given the empirical nature of the research, priority was given to the reading of the relevant International Standards on Auditing and analysis of the selected auditor's reports. Consequently, the study concentrates less on other theoretical aspects, references to professional literature or other publications.

Results of the research performed

Table 1 attached below summarizes the results of the research performed.

Table 1: Number and nature of Key Audit Matters (CAC 40 constituent companies 2017-2018)

KAM reported / Entity and year	M/V	ACP	IMP	T/L	ACQ	R/I	IFRS	PROV	OTH	Total
ACCOR HOTELS 2018	1	1	0	0	0	0	1	0	0	3
ACCOR HOTELS 2017	1	1	0	0	0	0	0	0	0	2
AIRBUS GROUP 2018	0	0	0	1	1	0	2	1	1	6
AIRBUS GROUP 2017	2	1	0	1	0	0	1	0	0	5
AIR LIQUIDE 2018	1	0	1	0	0	1	0	0	0	3
AIR LIQUIDE 2017	1	0	1	0	0	1	0	0	0	3
ARCELORMITTAL 2018	0	0	1	1	1	0	0	1	0	4
ARCELORMITTAL 2017	1	0	1	1	0	0	0	1	0	4
ATOS 2018	2	1	0	1	0	1	0	0	0	5
ATOS 2017	3	0	0	0	1	0	0	0	0	4
AXA 2018	3	0	0	0	1	0	0	0	0	4
AXA 2017	3	0	0	1	0	0	0	0	0	4
BNP PARIBAS 2018	2	0	1	1	0	0	0	0	1	5
BNP PARIBAS 2017	2	0	1	1	0	0	0	0	1	5
BOUYGUES 2018	1	1	0	0	1	0	0	1	0	4
BOUYGUES 2017	1	1	0	0	0	0	0	1	0	3
CAPGEMINI 2018	1	0	0	2	0	1	0	1	0	5
CAPGEMINI 2017	1	0	0	2	0	1	0	1	0	5
CARREFOUR 2018	1	0	0	0	0	0	0	1	0	2
CARREFOUR 2017	1	0	0	0	0	0	0	0	0	1
CREDIT AGRICOLE 2018	1	0	1	1	0	0	1	0	0	4
CREDIT AGRICOLE 2017	1	1	1	1	0	0	0	0	0	4
DANONE 2018	0	0	1	0	0	1	0	1	0	3
DANONE 2017	0	0	1	0	1	1	0	1	0	4
ENGIE 2018	1	0	0	0	0	0	0	2	0	3
ENGIE 2017	0	0	0	0	0	1	0	0	1	2
ESSILOR INTERNATIONAL 2018	0	1	1	0	0	1	1	0	0	4
ESSILOR INTERNATIONAL 2017	0	0	1	0	1	0	0	0	0	2
KERING 2018	1	0	1	1	0	0	1	0	0	4
KERING 2017	2	0	1	1	0	0	0	0	0	4
LEGRAND 2018	1	0	0	0	0	0	0	0	0	1
LEGRAND 2017	1	0	0	0	1	0	0	0	0	2
L'ORÉAL 2018	2	0	0	0	0	1	0	0	0	3
L'ORÉAL 2017	2	0	0	0	0	1	0	0	0	3
LVMH 2018	3	0	0	0	0	0	0	1	0	4
LVMH 2017	2	0	0	0	1	0	0	1	0	4
MICHELIN 2018	0	0	2	0	0	0	0	0	0	2
MICHELIN 2017	1	0	1	0	0	0	0	0	0	2

Source: Annual Reports of 2018 and 2017 CAC 40 constituent companies

Summary of abbreviations used in Table 1: M/V = Measurement/Valuation, ACP = Accounting Policies, IMP = Impairment, T/L = Tax/Legal, ACQ = Acquisitions, R/I = Revenue/Income, IFRS = Adoption of new IFRS, PROV = Provisions, OTH = Other

Table 1 (continued)

Table 2: Number and nature of Key Audit Matters (CAC 40 constituent companies 2017-2018)

KAM reported / Entity and year	M/V	ACP	IMP	T/L	ACQ	R/I	IFRS	PROV	OTH	Total
ORANGE 2018	1	0	0	1	0	1	0	1	0	4
ORANGE 2017	1	0	0	1	0	1	0	1	0	4
PERNOD RICARD 2018	2	0	0	2	0	0	0	0	0	4
PERNOD RICARD 2017	2	0	0	2	0	0	0	0	0	4
PSA GROUPE 2018	3	0	0	1	0	0	0	0	0	4
PSA GROUPE 2017	2	0	0	0	1	0	0	0	0	3
PUBLICIS 2018	1	0	0	0	0	1	1	1	0	4
PUBLICIS 2017	1	0	0	0	0	0	0	0	0	1
RENAULT 2018	1	0	0	1	1	0	1	0	0	4
RENAULT 2017	1	0	0	1	2	0	0	0	0	4
SAFRAN 2018	1	0	1	0	1	1	0	1	0	5
SAFRAN 2017	1	0	1	0	0	1	0	1	0	4
SAINT-GOBAIN 2018	2	0	0	0	1	0	0	0	0	3
SAINT-GOBAIN 2017	2	0	0	0	1	0	0	0	0	3
SANOFI 2018	1	0	0	0	0	0	0	0	0	1
SANOFI 2017	1	0	0	0	0	0	0	0	0	1
SCHNEIDER ELECTRIC 2018	2	0	0	1	0	0	0	1	0	4
SCHNEIDER ELECTRIC 2017	2	0	0	1	0	0	0	1	0	4
SOCIETE GENERALE 2018	2	0	1	1	0	0	0	0	1	5
SOCIETE GENERALE 2017	2	0	1	1	0	0	0	0	1	5
SODEXO 2018	2	0	0	1	0	0	0	0	1	4
SODEXO 2017	2	0	1	1	0	0	0	0	1	5
STMICROELECTRONICS 2018	1	0	0	1	0	1	0	0	0	3
STMICROELECTRONICS 2017	2	0	0	1	0	1	0	0	0	4
TECHNIPFMC 2018	0	0	2	0	0	1	0	0	0	3
TECHNIPFMC 2017	0	0	1	0	1	1	0	0	0	3
TOTAL 2018	0	0	1	0	1	0	0	1	0	3
TOTAL 2017	0	0	1	0	0	0	0	1	0	2
UNIBAIL-RODAMCO 2018	1	1	0	0	1	0	0	0	0	3
UNIBAIL-RODAMCO 2017	1	1	0	0	0	0	0	0	0	2
VALEO 2018	0	1	1	0	0	0	0	1	0	3
VALEO 2017	0	1	1	0	0	0	0	1	0	3
VEOLIA 2018	0	0	2	2	0	0	0	0	0	4
VEOLIA 2017	1	0	1	1	0	0	0	1	0	4
VINCI 2018	1	0	0	0	0	0	0	2	0	3
VINCI 2017	1	0	0	0	0	0	0	2	0	3
VIVENDI 2018	2	0	0	1	0	0	0	0	0	3
VIVENDI 2017	3	0	0	1	0	0	1	0	0	5
CAC 40 Total 2018	44	6	17	20	9	11	8	17	4	136
CAC 40 Total 2017	50	6	15	18	10	9	2	13	4	127

Source: Annual Reports of 2018 and 2017 CAC 40 constituent companies

Summary of abbreviations used in Table 1: M/V = Measurement/Valuation, ACP = Accounting Policies, IMP = Impairment, T/L = Tax/Legal, ACQ = Acquisitions, R/I = Revenue/Income, IFRS = Adoption of new IFRS, PROV = Provisions, OTH = Other

Evaluation of Results

The posed hypotheses (both hypothesis 1 and hypothesis 2) were tested in the course of the conducted research. Hypothesis 1 (the number of the KAM will not vary significantly in 2017-2018) was verified and Hypothesis 2 (the nature of the KAM will not vary significantly in 2017-2018) was verified positively, except for KAM classified as "Adoption of new IFRS" and "Provisions" that was verified negatively.

The number of the KAM determined and communicated in the independent auditors' reports issued in conjunction with the audit of the annual financial statements of CAC 40 constituent companies for 2018 was 136 and went up by 9 compared to 2017 (when as many as 127 KAM were determined and communicated). This change was evaluated as not significant and hypothesis 1 was regarded as verified positively.

The nature of the KAM determined and communicated in the independent auditors' reports issued in conjunction with the audit of the annual financial statements of CAC 40 constituent companies for 2018 and 2017 did not vary significantly except for the KAM relating to: "Adoption of new IFRS" (8 KAM determined and communicated in 2018 compared to 2 KAM determined and communicated in 2017) and "Provisions" (17 KAM determined and communicated in 2018 compared to 13 KAM determined and communicated in 2017). It is possible though that the increases in these two KAM were to some extent compensated by a decrease in KAM "Measurement/Valuation" (44 KAM determined and communicated in 2018 compared to 50 KAM determined and communicated in 2017).

In general, the changes in nature of KAM determined and communicated were evaluated as insignificant and consequently hypothesis 2 was regarded as verified positively except for the two KAM referred to above that were verified negatively.

Conclusions and definition of further Possible Research Areas

Based on the results of the research the authors of this paper decided to continue their work on KAM determined and communicated in annual audit reports of other companies listed in Europe and perform comparative study for 2017-2019.

In addition to the above the authors of this paper plan to perform more detailed analysis of KAM and response to risk.

References

Auditors' reports

2018 and 2017 auditors' reports of the CAC 40 constituent companies

International standards on auditing

ISA 200, *Overall Objectives of the Independent Auditor and the Conduct of an Audit in Accordance with International Standards on Auditing*,
ISA 240, *The Auditor's Responsibilities Relating to Fraud in an Audit of Financial Statements*
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Effectiveness of Lease in The Light of a Credit – Case Study Using the Discounted Cash Flow Method

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Abstract

This article presents assumptions setting the path for cash flow related with a bank credit and operating lease; calculations were conducted, which account for financial benefits results from the analysed financing sources, and the value of discounted cash flow was compared in order to indicate the most beneficial manner of financing the investment.

Keywords: Financing, Credit, Operating Lease, Effectiveness of Investments.

Introduction

The factor, which conditions the functioning and the development of an enterprise, is the availability of capital. Although own funds are still very often used as a source of financing investments in Poland, a policy in an enterprise consisting of using exclusively this form of financing seems to be economically unjustified and demonstrates a lack of adequate understanding of existing financial instruments. The most common method to obtain external capital is a credit. Such capital time-limited, it is interest-bearing and is returnable. Apart from credits, recently lease became the most frequently used tool for investment financing. The initial lack of systemic regulations resulted in significant freedom of interpreting flawed laws, the consequences of which were difficult to predict. The ultimate regulation of lease in civil, tax and accounting law contributed to making this form of financing investments more popular.

Operating lease, being one of the most popular types of lease from the point of view of legal, tax and accounting consequences, is a form of financing, which allows using fixed assets in return for regular payment of fees. As a method of financing investments, lease was developed in early 1950's in the USA, and it transferred to Europe ten years later (Krzemińska 2002). In Poland, lease is present as from the start of the changes of the social and economic system on the turn of 1980's and 1990's, and codification of lease in civil law (Journal of Laws no. 74, 2000) resulted in a unified definition of lease, as from 9 December 2000, according to which lease has ceased to constitute an unnamed contract concluded in accordance with the principle of freedom of contracts.

The purpose of this article is presenting the specificity of lease as an alternative form of obtaining external capital in comparison with a credit, and analysing the effectiveness of investments conducted with these two sources of financing using the discounted cash flow method.

Characteristics and forms of lease

Lease, being one of the most popular sources of financing investments of business entities, allows using the asset and, ultimately, also purchasing the asset, without the need to engage own funds at once. The contract of lease was defined in the Polish law in the Act of 23 April 1964 – the Civil Code (Journal of Laws from 2018, item 1025 as amended), the Accounting Act of 29 September 1994 (Journal of Laws from 2018, item 395 as amended), as well as in tax law – the Act on Personal Income Tax and the Act on Corporate Income Tax.

Lease means a type of a civil law contract, where one party (financing party, lessor) grants to the other party (user, lessee) the right to use a given material asset for a certain period agreed in the contract of lease, in exchange for agreed instalment fees (lease instalments). The Polish business practice as well as literature indicates two basic types of lease: operating lease and financial lease. The division into financial lease and operating lease should be reviewed separately on the basis of tax laws, as well as the Accounting Act. The basic difference in the division concerns the party to the contract, which is entitled to create amortization write-downs on the subject of lease. If the lessor (financing party) is entitled to create amortization write-downs then for tax purposes the transaction constitutes operating lease. If the lessee is the party entitled, then the transaction constitutes financial lease (Panfil 2008). From the financial point of view, the tax recognition of lease is of critical importance. Operating lease allows increasing tax deductible costs [*k.u.p.*], thus decreasing the taxation basis by the value of the paid lease instalments. Pursuant to Article 23b.1 of the PIT Act and Article 17b.1 of the CIT Act, fees paid by the user during the principal term of the operating lease contract constitute his tax deductible costs, if the subject of lease is used to generate revenues, or to secure or maintain the source of revenues. It the subject of lease is a passenger vehicle with the value exceeding PLN 150,000, then the excess amount of the repayment of the subject of lease as from 1 January 2019 above the indicated value shall not constitute tax deductible costs.

An operating lease contract is concluded for a defined period, not shorter than 40% of the so-called normative amortization period (in case of movable property and intangible assets) or at least 5 years (in case of real property). From the tax perspective, the most significant effects of concluding an operating lease contract for the lessee, being a business entity, include:

- no basis to amortize the subject of lease (this right is vested in the lessor);
- right to include lease instalments in tax-deductible costs in the full amount; as from 2019, including the net value of the lease instalment in tax costs is limited in case of passenger vehicles valued over PLN 150,000 (vehicles with combustion engines and hybrid vehicles) and PLN 225,000 (electric passenger vehicles) (PGP 2(912) 2019);
- adding VAT to each lease instalment for provision of the service, which may be deducted in full if the purchased service is related with taxable activities conducted by the lessee (save for lease instalments concerning vehicles subject to a limitation in the deduction of 50% of the VAT amount).

Upon the end of the operating lease contract and meeting all obligations defined therein, the lessee may purchase the subject of lease for an amount different than its market value (not lower, however, than the so called hypothetical net value), increased by the due VAT (PGP 2(912) 2019).

A financial lease contract also is a contract concluded for a defined period, and the most important consequences of such contract for a lessee being a business entity include:

- including the following in the tax deductible costs: amortization write-downs from the initial value of the subject of lease and lease instalments solely in the part relating to interest;
- single adding of the VAT calculated on the sum of lease instalments covering the principal part and the interest part, due to recognizing the transaction as constituting a delivery of goods against charge; the lessee is entitled to deduct such VAT amounts if the purchased goods are related with taxable activities performed by the lessee (save or vehicles subject to a limitation in the deduction of 50% of the VAT amount).

At the end of the financial lease contract, the ownership of the subject of the contract is usually transferred to the lessee.

Advantages and disadvantages of lease in comparison with other sources of financing

The range of forms of financing investments is currently very wide. Apart from lease, an enterprise may use own funds or obtain funds through a credit, loan, tenancy, or issue or shares or bonds,

although the availability of certain forms of financing may be limited. Often difficulties with obtaining capital from the given source encourage selecting easily accessible sources, although they may not be the most beneficial from the economic point of view.

Lease definitely belongs to popular and easily accessible sources. Due to the fact that the subject of lease remains the property of the lessor during the term of the contract, requirements imposed by lease companies towards a potential lessee are less severe than, for example, requirements of banks which grant credits for purchasing investment goods. Lease surely has many significant advantages, which make it popular. It is undoubtedly a simple and cheap method of using a fixed asset for the purpose of conducting business activity. Financial lease allows increasing the company's assets by components not owned by the lessee. Operating lease does not increase the liabilities of the user, presented in the financial statements, which externally strengthens the financial position of the enterprise, and, additionally, lease fees as a rule constitute tax deductible costs in full amount, which allows decreasing the income tax basis. Moreover, there is no need to purchase the subject of lease at the end of the term of the contract. This is the attribute that differentiates lease from a bank credit, where the subject of the credit contract becomes the property of the borrower. Lease also has disadvantages. Throughout the term of the contract, the owner of the subject of lease is the lease company, which defines the terms of use. In addition, in case of a loss or damage to the subject of lease, the lessee will not be released from the payment of lease instalments for the period remaining until the end of the contract.

Financial effectiveness of an investment with the use of operating lease and bank credit based on the discounted cash flow method

In this article, certain general assumptions have been adopted, which condition the comparability of operating lease and a credit based on the discounted cash flow method. To compare the effectiveness of these two types of financing it is assumed that the enterprise operates in the SME sector and has borrowing capacity and lease capacity. The subject of financing is a new vehicle with the net value of PLN 100,000. Due to the need to expand the research scope, the investment profitability ratio does not include cash flow related with the VAT. The institution, which finances the purchase of the vehicle in case of both operating lease and credit, is mBank S.A. The financial institution allows the entrepreneur to purchase an individual insurance – hence we assume that the amount of insurance is the same in case of lease and credit, and it has not been taken into account in the calculation. The period of the contract in both cases is 60 months. For simplification of conducted calculations, it is assumed that revenue generated by the enterprise amounts to PLN 1,000,000 in each year, and costs will be generated solely by operating lease or credit. Both in case of the credit and the lease, the financing institution does not charge commission, and the rate of the income tax for the enterprise amounts to 19%. Calculations for these two forms of financing were conducted using the MS Excel worksheet, and are presented in tables 1 – 7.

Assumptions in case of financing a purchase of a vehicle in the form of operating lease:

- entry fee amounts to 20%;
- no commission on the conclusion of a lease contract;
- total cost of lease in the no-insurance variant amounts to 110.22% with 60 monthly lease instalments (to total cost of lease means the sum of lease instalments, entry fee, and repurchase amount);
- after the expiry of the contract term, the fixed asset may be repurchased for 1% of its initial value;
- with the parameters assumed above, monthly lease instalments amount to PLN 1487 during the term of the contract.

The process of calculating the economic effectiveness of using operating lease vs. credit should be started with defining the expenses incurred for the investment for each variant, and classifying individual expenses into tax deductible costs in order to determine the expected financial surplus.

Table 1: Calculation of costs and expenditures incurred for an investment financed with operating lease

No.	Specification	Years				
		1	**2**	**3**	**4**	**5**
1	Entry fee	20 000.00	-	-	-	-
2	Commission	-	-	-	-	-
3	Lease instalment	1 487 * 12 = 17 844.00	1 487 * 12 = 17 844.00	1 487 * 12 = 17 844.00	1 487 * 12 = 17 844.00	1 487 * 12 = 17 844.00
4	Amortization	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
5	Repurchase value	-	-	-	-	1 000.00
6	Total investment expenditure (1 + 2 + 3 + 5)	37 844.00	17 844.00	17 844.00	17 844.00	18 844.00
7	Amounts included in tax deductible costs (1 + 2 + 3 + 5)	37 844.00	17 844.00	17 844.00	17 844.00	18 844.00
8	Tax shield 19% * (7)	7 190.36	3 390.36	3 390.36	3 390.36	3 580.36
9	Actual expenditure (6 - 8)	30 653.64	14 453.64	14 453.64	14 453.64	15 263.64

Source: own elaboration

Using a passenger vehicle based on operating lease, the entrepreneur does not enter it in the fixed asset register nor amortize it in time. The amortization of the vehicle is conducted by the lease company, because it remains the owner of the vehicle throughout the lease term. The entrepreneur, who uses the vehicle financed with operating lease while conducting business activity, may include all lease fees along with full lease instalments in tax deductible costs. If the value of the passenger vehicle being the subject of operating lease does not exceed the limit of PLN 150,000, the lessee may include full lease fees in tax deductible costs.

Table 1 presents the calculation of costs and expenditures incurred for the investment financed with operating lease. Expenses of the enterprise include the entry fee, lease instalments, and repurchase. Each of these expenses simultaneously constitutes a tax deductible cost, which is significant in determining the amount of income subject to personal income tax.

Assumptions in case of financing a purchase of a vehicle in the form of a bank credit

- own share amounts to 20%, meaning PLN 20 000;
- credit amount PLN 80 000;
- no commission on concluding the credit contract;
- nominal interest rate amounts to 7.99% per annum – the interest rate comprises the bank's fixed margin and the WIBOR 3M rate for credits in Polish zloty;
- equal monthly instalments throughout the credit term;

– the amortization rate amounts to 20% per annum.

Since in practice banks are not willing to credit 100% of the investment, a condition in the bank credit assumptions is the company's own share in the investment amounting to PLN 20 000. Therefore, the bank grants a credit for PLN 80 000. The credit is repaid in 60 equal monthly principal and interest instalments (payable on the last day of every month). In the book by Brigham (2005) instalments were calculated according to the following formula:

$$PVA = PMT * [\frac{1}{i} - \frac{1}{i * (1+i)^n}]$$

where:

PVA –current value of ordinary pension
i – interest rate
PMT – credit instalment
n – number of periods

Pursuant to the Classification of Fixed Assets (CFA 2010) the annual amortization rate for the vehicle amounts to 20% (line amortization). In case of selecting the line method, the fixed asset with the initial value of PLN 1 000 000 net is subject to amortization for five years, and the annual amortization write-down in each subsequent year is the same and amounts to PLN 20 000.

Table 2: Calculation of costs and expenditures incurred for an investment financed with a bank credit

No.	Specification	Years				
		1	**2**	**3**	**4**	**5**
1	Own share	20 000.00	-	-	-	-
2	Commission	-	-	-	-	-
3	Interest instalment	5 902.63	4 778.77	3 561.75	2 243.85	816.71
4	Principal amount instalment	13 558.13	14 681.99	15 899.01	17 216.91	18 644.05
5	Credit instalment	19 460.76	19 460.76	19 460.76	19 460.76	19 460.76
6	Amortization	20 000.00	20 000.00	20 000.00	20 000.00	20 000.00
7	Repurchase value	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
8	Total investment expenditure (1 + 2 + 5)	39 460.76	19 460.76	19 460.76	19 460.76	19 460.76
9	Amounts included in tax deductible costs (2 + 3 + 6)	25 902.63	24 778.77	23 561.75	22 243.85	20 816.71
10	Tax shield 19% * (9)	4 921.50	4 707.97	4 476.73	4 226.33	3 955.17
11	Actual expenditure (8 - 10)	34 539.26	14 752.79	14 984.03	15 234.43	15 505.59

Source: own elaboration

In case of financing the investment with a bank credit (Table 2) the enterprise mainly incurs expenses related with own share in the financing of the purchase of the fixed asset and repayment of credit instalments (principal amount and interest). Amongst the aforementioned expenses, tax deductible

costs include interest and commission collected by the bank upon granting the loan. However, the largest share in the company's cost belongs to a component which is not an expense – amortization.

Table 3: Calculation of the financial result and the financial surplus in case of financing the investment with operating lease

No.	Specification	Years				
		1	**2**	**3**	**4**	**5**
1	Revenue	1 000 000.00	1 000 000.00	1 000 000.00	1 000 000.00	1 000 000.00
2	Tax deductible costs	37 844.00	17 844.00	17 844.00	17 844.00	18 844.00
3	Gross income (1 – 2)	962 156.00	982 156.00	982 156.00	982 156.00	982 156.00
4	Income tax 19% * (3)	182 809.64	186 609.64	186 609.64	186 609.64	186 609.64
5	Net profit/loss (3 – 4)	779 346.36	795 546.36	795 546.36	795 546.36	795 546.36
6	Financial surplus*	779 346.36	795 546.36	795 546.36	795 546.36	794 546.36

Source: own elaboration
** revenue – income tax – total financial expense on the investment in the given year*

On the basis of calculations presented in Table 3 it may be noticed that in case of financing the investment with lease, the amount of the financial surplus generated by the enterprise in subsequent years of the analysed period has the same value as the net profit of the enterprise. This results from the fact that every expense incurred during this period for the investment constitutes a tax deductible cost.

Table 4: Calculation of the financial result and the financial surplus in case of financing the investment with a bank credit

No.	Specification	Years				
		1	**2**	**3**	**4**	**5**
1	Revenue	1 000 000.00	1 000 000.00	1 000 000.00	1 000 000.00	1 000 000.00
2	Tax deductible costs	25 902.63	24 778.77	23 561.75	22 243.85	20 816.71
3	Gross income (1 – 2)	974 097.37	975 221.23	976 438.25	977 756.15	979 183.29
4	Income tax 19% * 3	185 078.50	185 292.03	185 523.27	185 773.67	186 044.83
5	Net profit/loss (3 – 4)	789 018.87	789 929.20	790 914.98	791 982.48	793 138.46
6	Financial surplus*	775 460.74	795 247.21	795 015.97	794 765.57	794 494.41

Source: own elaboration
** revenue – income tax – total financial expense on the investment in the given year*

In case of financing the purchase of the fixed asset with a bank credit, the net profit of the enterprise does not reflect the free funds generated by the investment (Table 4) like it was during financing the investment with operating lease. Since not every component of tax deductible costs constitutes a financial expense, amortization was omitted during determination of the financial surplus, as it is a non-financial cost which does not incur a financial expense.

Table 5: Comparison of the financial surplus in case of financing the investment with operation lease and bank credit

Years	Operating lease	Credit	Lease – credit difference
1	779 346.36	775 460.74	3 885.62
2	795 546.36	795 247.21	299.15
3	795 546.36	795 015.97	530.39
4	795 546.36	794 765.57	780.79
5	794 546.36	794 494.41	51.95
Σ	**3 960 531.80**	**3 954 983.91**	**5 547.89**

Source: own elaboration

Table 5 compares the values of expected cash flow resulting from operating lease and credit. Cash flow was defined as the value of the financial surplus of the analysed project calculated in table 3 and table 4, meaning the actual value of funds generated by the enterprise during five years. Analysing the data from table 5 may indicate that during the entire period of the analysis, operating lease is cheaper than the credit, since total cash flow generated in case of this form of financing have larger value. The difference in expenses to the benefit of operating lease during 5 years amounts to a total of PLN 5 547.89.

To assess the effectiveness of the discussed investment, the current value of expected financial streams should be determined. For this purpose, calculations should be made with regard to sums discounted separately for every year of cash flow generated by the enterprise upon financing the investment with operating lease and bank credit. The method based on discounted cash flow, which allows comparing and selecting the most beneficial variant of financing the investment, is the DCF method (*discounted cash flow*). This method consists of calculating the current value, which is the sum of discounted cash flow (Brigham 2005):

$$PV = \sum_{t=1}^{n} \frac{CF_t}{(1+i)^t}$$

where:

i – discounting rate
CF_t – cash flow during the period
n – number of periods

A parameter used in this method is the discounting rate. Adopting the manner of determining the discounting rate is one of the most problematic elements of the conducted analysis. The most frequently applied discounting rate is the cost of capital of the given enterprise. Determining the cost of capital may, however, cause many problems. Since enterprises most frequently finance investments with capital from various sources, it is required to estimate the cost of own capital and external capital as the components of the WACC (*Weighted Average Cost of Capital*) expressed by the following formula (Rutkowski 2007):

$$i = WACC = w_d * k_d * (1 - T) + w_w * k_w$$

where:

$WACC$ – weighted average cost of capital
w_d – share (weight) of the debt in company financing
k_d – cost of debt before taxation
w_w – share (weight) of own capital in company financing
k_w – cost of own capital

For simplification, it is often assumed that the cost of own capital of a SME enterprise is equal to the costs of external capital, possible to obtain by this enterprise (Okręglicka 2004). With this solution, the discounting rate in the conducted analysis will amount to 7.99%. The determined discounting rate, as the cost of capital, was used to calculate the current value of each cash flow in the subsequent years. The sum of cash flow, discounted separately for every year, generated by the company in case of financing with operating lease vs. credit will allow indicating the more profitable source of financing.

Table 6: Calculation of the current value of cash flow

Specification		1	2	3	4	5	Σ
Free cash flow	**Lease**	779 346.36	795 546.36	795 546.36	795 546.36	794 546.36	**3960 531.80**
	Credit	775 460.74	795 247.21	795 015.97	794 765.57	794 494.41	**3954 983.91**
Current value of PV	**Lease**	721 683.82	682 179.10	631 705.81	584 966.95	541 686.22	**3162 221.90**
	Credit	718 085.69	681 922.58	631 284.65	584 392.83	540 969.95	**3156 655.70**

Source: own elaboration

During an analysis of the data in table 6 it may noticed that the sum of discounted five-year cash flow is higher by PLN 5 566.20 in case of operating lease. This means that in consideration of assumed parameters lease is a more beneficial source of financing than bank credit. Assuming that financial effectiveness constitutes the basic determinant of undertaking financial investments, in the discussed example the enterprise should finance the purchase of the fixed asset with operating lease.

Summary

The profitability of a bank credit and an operating lease, as alternative manners of financing the investment, is affected by multiple factors, both micro-economic and macro-economic. These include, amongst others: the level of interest rates, inflation, amount of income tax rate, selection of the method of amortization of the fixed asset, term of contract, and many others. This elaboration takes account of the factors, which, in the author's opinion, have the most significant influence on the effectiveness of selected sources of financing. It should be underlined that the analysis of the effectiveness of financing the investment with a bank credit was conducted with the assumption of a fixed WIBOR interest rate, whereas in reality the interest rate on the credit is variable and consists of: a fixed margin, and a WIBOR 3M rate for a credit in Polish zloty updated every 3 months. The base WIBOR 3M rate is examined every quarter (in February, May, August and November) and the rate adopted on the date of the examination will be applicable for the next 3 calendar months until the next examination. thus, the amount of the interest rate on the credit may be changed maximum 4 times per year, which means potential changes in the amount of credit instalments.

The conducted analysis was concentrate around three stages. Stage one covered determining the amount of expenses incurred for the investment for the selected sources of financing and their classification as elements of potential tax deductible costs. Then, the manner of calculating the financial surplus was presented, demonstrating the amount of free funds generated by the given investment. The comparison of discounted cash flow for the examined period allowed indicating calculations as to which form of the investment is more beneficial for the enterprise. Calculations indicated that it will be the operating lease. In the aforementioned example of the analysis of financing through operating lease, we may observe the maximum use of the tax shield. The result is also substantially influenced by the various distribution over time of tax benefits of both forms of financing. The relatively high amount of the entry fee was included in tax deductible costs already in the first year of the analysis, whereas amortization, as a tax cost, is charged equally during the five-year period under examination.

Summing up, it should be noted that the financial effectiveness of a bank credit and lease depends on so many factors that a change of any parameter may indicate the advantage of a bank credit over lease.

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The Essence of Social Security Against the Background of National Security and Its Threats

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Abstract

The summary concerns issues related to the extremely important phenomenon of social security, which ensures the proper functioning of entire social groups, as well as an individual citizen. According to the author, the disruption of this security will have a significant impact on the functioning of the whole state, because it is closely related to a person, a citizen, who, when the security of the state is threatened, is obliged to defend it, protect it by performing various actions. In the substantive part of the article, contemporary threats to social security have been signaled, which would need to be carefully examined in order to counteract them.

Keywords: State Security, Social Security, Social Security Risks, Unemployment, Poverty

Introduction

Security is an extremely important element of the proper functioning of any state and is one of the basic human needs. Abraham Maslow (2016) identified five human needs: physiological, safety, belonging, appreciation, and self-realization. In his theory of the hierarchy of needs, safety is second only to physiological needs, such as getting food or needing sleep. In view of the many and varied factors, including the changing global situation and the development of modern technologies, security should be seen as a continuous process (Stańczyk, 1996), in which the aim is to ensure that security is maintained.

Nowadays, we talk about various kinds of security, which in the subjective dimension is divided into: political, military, economic, environmental, information, social and cultural security (Włodkowska, 2009).

Military security is related to ensuring the inviolability of borders, the constitutional order, the sovereignty of the country, no less important, linked to military security is political security aimed at maintaining the constitutional order, political stability and the development of the political system of the state. Preservation of economic security has an impact on the functioning of the state economy and its development, it is defined as a state in which the economic conditions necessary for the survival and ensuring the welfare and sustainable development of the society living within the borders of a given state, as well as for the survival and smooth functioning of the state institutions are ensured. The economic potential of the state is one of the basic conditions for the state's power and its prestige in the international arena (Kalata and Nowakowski and Protasowicki, 2016). Cultural security, on the other hand, is linked to the cultural heritage of the country concerned, which is currently under increasing threat due to open borders and access to the Internet. Ecological safety is a process associated with the pursuit of maintaining an adequate ecological state, ensuring the functioning of all elements of the ecosystem, contemporary climate change and the results of human activity, its interference with the environment, pose significant threats to the ecosystem. A relatively new concept is information security, which is defined as the legitimate trust of an entity in the quality and availability of the information it obtains and uses, so the concept of information security refers to an entity (person, organization) that may be at risk of losing information resources or receiving information of inadequate

quality (Liderman, 2012). An important type is social security, which will be discussed further in this article.

Social Security and Its Risks

When analyzing social security as a research issue, it should be addressed in the form of the following question. *Why is social security so important in the whole of national security?* In order to solve this important problem, the following two questions need to be answered, such as: who does social security refer to? (individuals, social groups, state) and the second question: what does social security concern? (national heritage, education for security, security media, demography, social assistance or social security). The above questions were briefly answered in the content of this article.

As already mentioned in the introduction, social security is an important area of national security which will affect all social groups operating in the state. In her publication, Aleksandra Skrabacz (2012) aptly described social security as: protecting the existential basis of people's lives, providing opportunities to satisfy individual (material and spiritual) and realize life aspirations by creating conditions for work and study, health protection and pension guarantees. A slightly broader view of social security was presented by Marek Leszczyński (2009), specifying that it is related to legal, organizational activities carried out by various entities, starting with the state, non-governmental organizations and citizens themselves, in order to enable citizens to live at an appropriate level and prevent their social exclusion.

According to Janusz Gierszewski (2018), social security means the activity of the state aimed at neutralizing social problems and aimed at ensuring existence, protecting the national heritage and the quality of life of its inhabitants through the use of internal and external factors that guarantee the nation's unthreatened development and social order, the disruption of which may result in a threat to the state's internal stability.

The current *National Security Strategy of the Republic of Poland* of 2014 defines social security as one of the national security subsystems, so it is an important element of the national security system, ensuring undisturbed functioning of the state together with other subsystems.

The structure of social security in Poland includes *the bodies managing social security*, these are state bodies and local government institutions, which due to the changes taking place in modern times related, among others, to globalization, the opening of borders must constantly adapt their activities to the changing social needs. *The social potential of the state*, i.e. human capital that contributes to the development of the economy, the functioning of the state or the development of civil society (Świerszcz, 2019). An extremely important element of social security is *counteracting demographic threats,* which are associated with insufficient natural growth, an ageing society or high scale of migration of Polish citizens abroad. Actions related to these phenomena should be pursued with an increased focus on family, migration and immigration policies. Another element is *welfare security,* whose task is to provide an appropriate system of social security, through a system of allowances, social benefits and a system of free legal and psychological advice. *Education for security* is a component raising public awareness in the area of security threats (it includes, among others: monitoring of threats, notification, calling the appropriate rescue and law and order services, securing property, self-defense, first aid skills). In the structure of social security, we also distinguish the *system of protection of national heritage,* which is an important element of the Polish identity, the material and spiritual achievements of the state and its citizens. Not without significance in this system is the role of *the media in ensuring social security,* whose main task is to provide information, knowledge, identification and appropriate response to threats (Wojnarowska-Szpucha, 2018 a).

Threats are a constant element in the life of entire communities, of a single person, but due to the changing environment, opportunities, development of technology, the type of modern threats and the consequences they cause are changing. The list of threats to social security is long, often one threat influences or triggers the occurrence of another. Today, the basic conditions for threats to Poland's

social security are unemployment, poverty and the related social exclusion, discrimination (Wojnarowska-Szpucha, 2018 a).

The task of the state and other supporting institutions is to ensure social security at an appropriate level, because an efficient, effectively functioning society influences the development of the national economy and the level of national security.

Unemployment is a multidimensional phenomenon because its effects have a direct impact on the unemployed, but also have an impact on other members of the family, society or, finally, on the state economy. The effects of unemployment are divided into: individual, social and economic (Ayleytner and Głąbicka, 2000). At the same time, as a result of unemployment, other social problems arise, such as the serious problem of economic migration of citizens (Wojnarowska-Szpucha, 2018 a). There are many reasons for unemployment, sometimes it is connected with the choice of a given citizen (e.g. when a job, its remuneration does not meet the expectations of an unemployed person), or it results from coercion caused by the situation on the market, lack of qualifications of a given person. The duration of unemployment is not insignificant, because when it lasts for a longer period of time, the effects of unemployment (social, economic) are exacerbated (Wojnarowska-Szpucha, 2018 b).
In the end, long-term unemployment can lead to poverty and then social exclusion.

Poverty is a state in which a citizen does not have the means to satisfy his/her basic, existential needs. Today, poverty is a phenomenon that occurs in both rich and poor countries. According to Aleksandra Skrabacz (2012) poverty has a major social impact, from the lack of demand for goods, through difficulties in obtaining education, maintaining good health, to the intensification of pathological phenomena such as: crime, drug addiction, homelessness, is therefore a phenomenon that affects the proper functioning of the state.

Social exclusion is a phenomenon whose causes should be seen, inter alia, in the above-mentioned unemployment and poverty, as they can cause other adverse pathological phenomena (e.g. drug addiction, alcoholism), causing the individual to be separated from the rest of the community, to be excluded from life in the human community. Discrimination is a similar mechanism of action that causes different treatment of an individual, but its causes are caused by other factors, such as: origin, education, nationality, sexual orientation or religion.

Summary

Social security is treated as one of the important areas (types) of national security, therefore the state and other institutions should counteract its threats by all possible means available, because social threats affect not only an individual citizen, but entire communities of a given state, which in consequence may lead to dysfunction of its functioning in all states of the state's defensive readiness.

Poland has been struggling with demographic problems for some time and has been recording an increase in labor migration, as a result of which the number of citizens is decreasing, which constitutes a threat to state security.

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Experience in Interactive Services, Computer Games and Specialized Software Applied in Teaching Mathematics

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Abstract

The authors summarize their experience in using current information technologies in teaching mathematics at a technical university. To succeed in mastering vocational subjects, first-year students need to learn the basics of differential and integral calculus. But the special research methods used in the course, such as infinitesimal calculus and the passage to the limit, require high conception thinking to develop, so many students cannot cope with the subject. To overcome this difficulty, in the authors' opinion, it is appropriate to use the opportunities of current teaching technologies (information and communication technologies) when having mathematics classes. The paper provides examples of learning computer games that the authors use to support teaching and learning processes, LearningApps.org web application and Maple computing environment. To carry out the survey, engineering students who are taught at Sholom-Aleichem Priamursky State University and Far Eastern State Transport University are selected. The results of the experiment show a quality progress increase by 15% in the experimental group. Thus, it has been shown by experiment that using interactive technologies in teaching and learning process generates a higher return from education. In addition, a teacher has an opportunity to use the class time more effectively, arrange for personalized and distant educational process.

Keywords: Information technologies in education, educational computer games, LearningApps.org, computer algebra system Maple.

Introduction

The proficiency in differential and integral calculus integrated in the standard course of further mathematics at university ensures a basis for studying numerous vocational subjects majoring in technical curricula. It is impossible to succeed in an engineering career for those who do not have the required skills.

It is necessary to use a mathematical apparatus in order to solve a variety of applied issues. A mathematical apparatus is connected to differential and integral calculus with functions of single or

several real variables. However, lots of freshmen are not good at Advanced Mathematics course and find it one of the most difficult to learn. The reasons for this belief are a lower number of class hours and a much-decreased level of mathematical proficiency among secondary school leavers. In addition, specific research approaches used in the course ('the calculus of infinitesimals', or 'infinitesimal calculus', 'limiting transition'), require students' well-developed abstract thinking for comprehending and practicing. In the authors' point of view, regular use of modern information technologies in the learning process allows to overcome these difficulties.

Many scholars explore the potential for using current information and communications technologies (ICT) in higher education institutions for training. They actually observe advantages and disadvantages of e-learning in teaching in higher education institutions [2, 14]. They evaluate educational resource quality presented on numerous online computing platforms: GeoGebra Materials, LearningApps, I2Geo [19]. The scientists examine the capacity of information and communication technologies for learning, and search for the crucial factors that contribute to use digital technologies in education successfully [7, 13].

Research shows that machine teaching provides a unique approach for improving education and developing optimal personalized lessons [31]. Machine teaching methods can improve student performance [8] and provide a personalized learning process [9, 10, 11].

The authors believe that educational mobile applications that specialize in different contents of studying [4, 20] have really high potential. Mobile learning, aimed at achieving double-subject educational outcomes, encourage the ability "learning for life" [17].

In mathematical education, the practice of using various computer algebra systems (CAS) becomes more widespread. These systems significantly improve the educational impact of teaching aids due to their excellent drawing utilities and symbolic computing techniques [18].

Computer algebra systems Maple and GeoGebra are considered to be the excellent means for performing geometric constructions of the objects observed. The visualization makes solving problems easier [15, 16].

Students are better equipped with animated images designed in computer algebra system (CAS) Maple, in learning the material when studying discrete mathematics [1], and numerical analysis [25].

The visualization capabilities provided by Maple let a learner to choose from several methods for solving a given problem [6]. Integration of Maple software into teaching the topic Integral Calculus at the university enables students to enhance understanding of integral calculus technology [3, 23].

The use of specialized software in educational process makes it possible to apply programming as a modern method of getting mathematical skills, since the algorithm for solving typical problems can serve as an instrument for cognition, control, and development of one's own knowledge of mathematics [27].

In addition, Maple TA software can be used for a catalogue of exam questions, maintain automatic point scoring. Thus, it makes the exam more convenient, as well as reduces examiners' work [30].

The authors also report on the positive effect of using computer games in training [21, 22, 24, 28, 29]. The game influences concentration, logical thinking positively, and suggests problem-solving skills [12]. Students are taught competences and skills when playing games [26]. All these factors are intended to improve their views on academic performance [5].

The purpose of the study is to present the experience of using educational computer games, web services LearningApps.org and CAS Maple.

Methods

When giving classes, lecturers used a specially developed teaching and methodological materials, including workbooks and dynamic presentations. Students were learning the basic integration methods, practicing and mastering their computing skills while doing assignments in workbooks. The lecturer used original interactive computer games to give some definitions. The lecturer also arranged individual work through LearningApps.org web service. The study of geometric applications of double integrals was guided by Maple graphical capabilities.

Original Computer Learning Games

Students learn the definition and geometric value of a certain integral using the interactive computer game Find the cross-section area of the river. First, a player selects the number of depth measurements, and computer displays the depth of the river at the selected points. Then, a student needs to calculate the cross-sectional area of the river according to the formulas of the left, right and middle rectangles. If the correct value is entered, the corresponding step figure is displayed on the screen (Fig. 1). The program checks the entered answers and evaluates the results. The game is available at https://constructortest.000webhostapp.com/gamePixel/river.php.

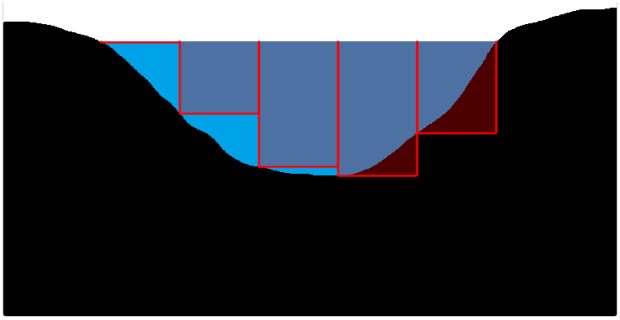

Fig.1: The game for calculating the cross-section area of the river with left rectangles for 5 measurements

Students learn the squarable figures, the Jordan inner and outer measure using Find the area of shadow computer game (https://constructortest.000webhostapp.com/gamePixel/game.php). Students are asked to calculate an approximation of the area of the shadow of different animals, flowers and other images. To do this, the shadow of the figure is split by means of graphical depiction or cell complex (the size of the cells is 1 cm or 0.5 cm for the game). A player can see two similar shadows of the selected picture via cellular decomposition on the screen. A student selects only those cells that are completely of the shadow of this figure in the left picture. And only those cells are selected that has at least one point of the shadow in the right picture (Fig. 2). The program counts the marked cells. Having selected all the cells, a student enters the value of the area, and the computer checks the result. Wrong cells are highlighted in red. The computer shows the points and a final grade.

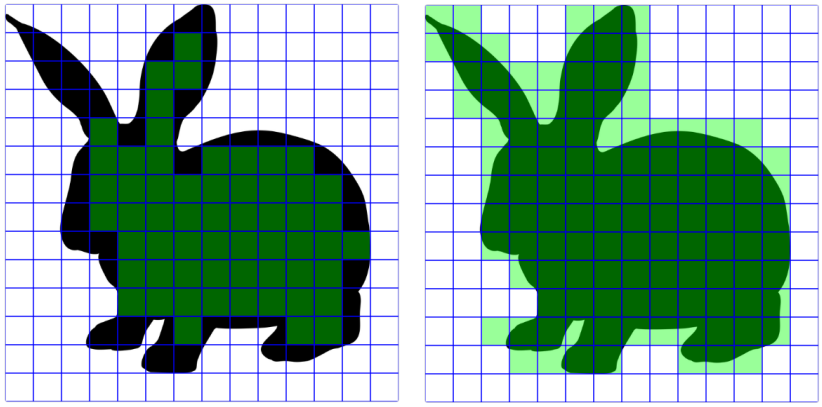

Fig. 2: The game to calculate the area of rabbit's shadow (the side of the cell is 1 cm)

LearningApps.org Web Service

Students' individual work is arranged through LearningApps.org web service. The developers designed various types of self-check assignments. They used this application template to assess students' competence and skills, and test the integration technique (Fig. 3-4).

To test priori knowledge, the authors choose the following templates:

- "Crossword" (https://learningapps.org/display?v=p2ak9zz2v18),
- "Hangman" (https://learningapps.org/display?v=paefvchbn18),
- "Matching Pairs" (https://learningapps.org/display?v=pxgismv3t18).

Students are offered to assess the solving antiderivatives skills (integration). The templates are given below:

- "Freetext input" (https://learningapps.org/watch?v=pjn9neqrk18),
- "Multiple-Choice Quiz" (https://learningapps.org/display?v=pnk2vewe218),
- "Horse race" (https://learningapps.org/watch?v=p8hvc5n5n18).

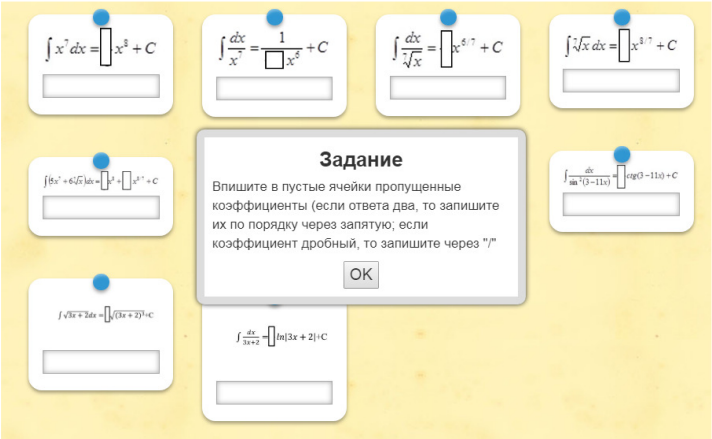

Fig. 3: Freetext input – The task: Enter the missing coefficients in the empty cells (if there are two answers, write them in order separated by commas, if the fractional coefficient, write through '/')

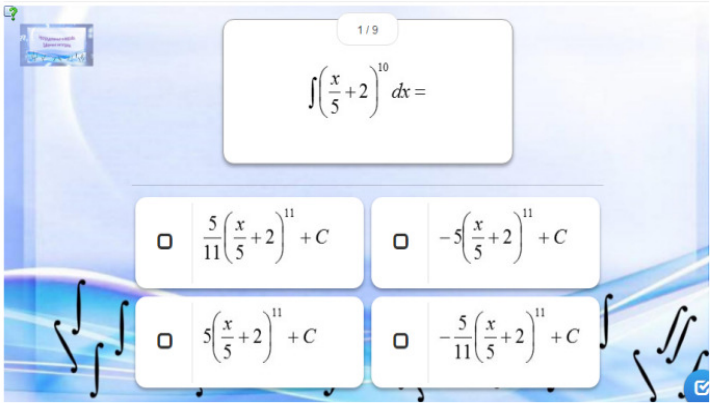

Fig. 4: Multiple-Choice Quiz – Testing the skill to find indefinite integrals

Maple Computing Software

The authors use a computer algebra system Maple when studying geometric applications of integrals. The graphical capabilities of this mathematical software visualize plain domains and space shapes. The areas and volumes of them have to be found through the use of an integral. Finally, students face particular problems with solving similar tasks when constructing known shapes and domains. Let the authors show it by specific examples.

Example 1. Solve the area of a domain delimited by lines by double integration $y = x$, $y = 2x$, $x = 1$ and $x = 2$ (Fig. 5).

Let the authors describe the commands used from the additional software of graphic extensions plots and plot tools:

- unequal creates a graphic object where d is an area delimited by the known inequalities and marks this area with the proper color;

- line creates a graphic object where l are dotted graphs showing the coordinates of the cross point of the given curves.

```
d := inequal({y − x ≥ 0, y − 2·x ≤ 0, x ≥ 1, x ≤ 2}, x = 0 ..3, y = 0 ..5, color
      = "DarkMagenta", scaling = constrained) :
l := line([0, 1], [1, 1], linestyle = 2), line([0, 2], [2, 2], linestyle = 2), line([0, 4], [2, 4],
     linestyle = 2) :
t := textplot([2.5, 4.3,'y = 2 x','font'= ["times", "roman", 17]]), textplot([2.5, 2.2,'y = x','font'
      = ["times", "roman", 17]]), textplot([1.5, 2.2,'Ω','font'= ["times", "roman", 17]]) :
display(d, l, t);
```

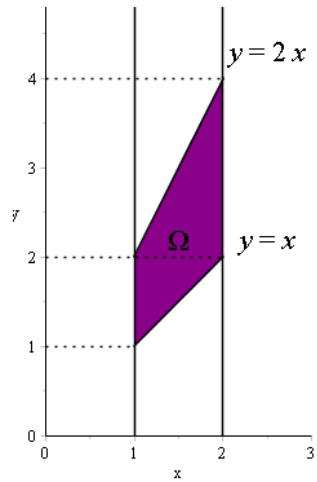

Fig. 5: The domain Ω delimited by the straight lines *y = x*, *y = 2x*, *x=1* and *x=2*

Example 2. Find the volume of a shape delimited by given surface areas by double integration: the paraboloid of revolution $z=x^2+y^2$, Cartesian planes and the plane $x + y = 1$.

First, it is necessary to understand that what the integrand function f (x, y) is in order to 'see' the shape, as well as what the integration domain is, i.e. on which planar domain the integrand function is given.

The first thing the authors begin with is depicting the known surfaces in order to answer all these questions. But each time they choose the best values of boundaries of coordinate changes. They make it possible to design a more informative image (Fig. 6).

```
implicitplot3d([z = x^2 + y^2, x + y = 1], x = −1.7 ..1.7, y = −1.7 ..1.7, z = 0 ..2.5, color = [blue,
     green], scaling = constrained, axes = normal)
```

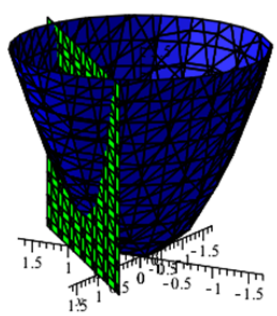

Fig. 6: The domain Ω delimited by the straight lines *y = x*, *y = 2x*, *x=1* and *x=2*

As it is seen from Fig. 6, the known shape is delimited by the paraboloid of revolution $z=x^2+y^2$ from above, and there is a triangle with the lines $x + y = 1$, $x = 0$ and $y = 0$ in the bottom base. The authors draw the lower and upper bases of a cylinder parallelepiped (Fig. 7).

```
> d := plot3d(0, x = 0 ..1 − y, y = 0 ..1, color = "BlueViolet") :
  f := plot3d(x^2 + y^2, x = 0 ..1 − y, y = 0 ..1, color = blue, scaling = constrained, axes
      = boxed) :
  display(d, f);
```

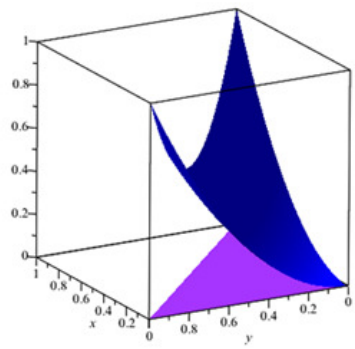

Fig. 7: Upper and lower bases of a cylinder parallelepiped

To add a lateral surface, they draw a collection of lines parallel to Z-axis, and connecting the corresponding points of the lower and upper bases (Fig. 8).

```
> N := 200 :
  for i from 1 to N do x[i] := i/N; y2[i] := i/N; y3[i] := (1 − x[i]); z1[i] := (x[i])^2; z2[i]
      := (y2[i])^2; z3[i] := (x[i])^2 + (y3[i])^2;
                l1[i] := line([x[i], 0, 0], [x[i], 0, z1[i]], linestyle = 1, thickness = 2);
                l2[i] := line([0, y2[i], 0], [0, y2[i], z2[i]], linestyle = 1, thickness = 2);
                l3[i] := line([x[i], y3[i], 0], [x[i], y3[i], z3[i]], linestyle = 1, thickness = 2) od:
  bp1 := seq(l1[i], i = 1 ..N) :
  bp2 := seq(l2[i], i = 1 ..N) :
  bp3 := seq(l3[i], i = 1 ..N) :
  display(d, f, bp1, bp2, bp3, view = [0 ..1, 0 ..1, 0 ..1])
```

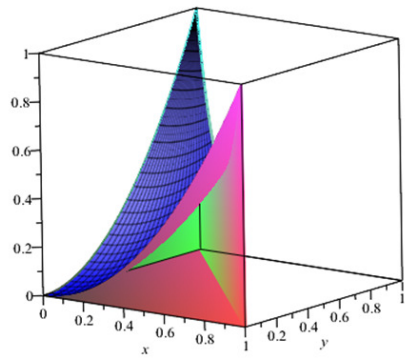

Fig. 8: Cylinder parallelepiped delimited by the paraboloid of revolution $z=x^2+y^2$, by the coordinate planes and the plane $x+y=1$

Results and Discussion

The educational experiment was run at Sholom-Aleichem Priamursky State University and Far Eastern State Transport University. The participants were the students whose major is Building Engineering, Electrical Engineering, Information Systems and Technology, Applied Mathematics and IT.

In the control group there were 69 students, in the experimental group there were 74 students. Before the beginning of the experiment, both groups showed the same proficiency level in general. It is proved by the results of calculus exam during the first examination time (Fig. 9). Scores on a five-point scale are marked along the horizontal axis. Number of students is marked along the vertical axis. Qualitative achievement in the control group is 44.9%, and 44.6% is in the experimental group. According to the results of the exam during the second examination time (in a half a year) (Fig. 10)

qualitative academic performance is 30.4% (in the control group) and 46% (in the experimental group). In the experimental group, qualitative academic performance is higher by 15%.

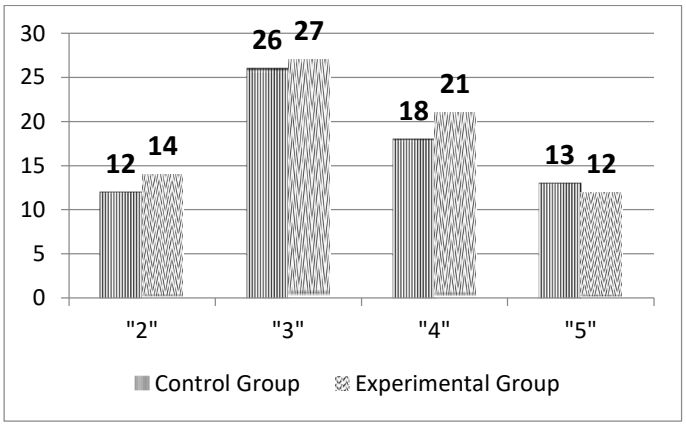

Fig. 9: The exam results at the first session (before experiment)

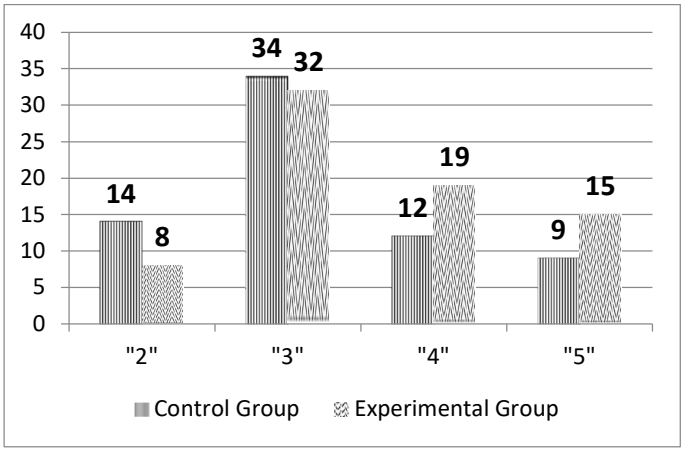

Fig. 10: The exam results at the second session (after experiment)

Conclusion

The research has proved a positive influence of interactive technologies on the educational process. Interactive educational process stimulates students' cognitive activity, contributes to their independent work, and directs them to understand the material they have been studying thoroughly.

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Barriers to Effective Monitoring of Internal Audit Activities. Empirical Evidence from Poland

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Abstract

Recent research on internal audit in Poland suggests that internal audit is perceived as useful by entities of both public and private sector. However internal auditors do not always meet the expectations of their key stakeholders. Although effective monitoring of internal audit activities is regarded by the Institute of Internal Auditors and by the Polish legislators as one of the factors which can ensure internal audit quality, some internal auditors declare that their activities are not subject to monitoring of any kind. This study is aimed at identifying barriers to effective monitoring of internal audit activities from the perspective of the chief audit executives and internal audit staff. Empirical material for analysis was collected as part of interviews conducted in Poland, with respondent base represented by 28 internal auditors employed in 30 organizations. The results of the study indicate that, of all the identified barriers to effective monitoring of internal audit activities, lack of support of the senior management turned out to be the most common. Surprisingly, the respondents did not perceive the relationship between the effective monitoring of internal audit activities and the critical role of CAE and the skills of internal auditors. The respondents also seemed largely unaware of the role and significance of such factors as effective audit committee and board support.

Keywords: Monitoring, Internal Audit, Control.

Introduction

In general, the concept of monitoring is well known. In the colloquial sense of the word, monitoring is associated with constant observation and control of certain processes and phenomena or constant supervision over a protected object. In the area of management, the term is used in reference to activities of the entire organization as well as to individual processes, projects, and organizational units. According to the world's best-known concept of the internal control – the COSO model – internal audit is recognized as one of the elements of the monitoring subsystem (COSO 2013).

International Standards for the Professional Practice of Internal Auditing (IIA, 2016) define internal audit as an independent, objective assurance and consulting activity designed to add value and improve an organization's operations. It helps an organization accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes.

Recent research on internal audit in Poland suggests that it is perceived as useful by entities of both public and private sector (Bartoszewicz, 2009; Ciak, 2016; Ciak, Voss, 2017; Gmińska, Voss, 2018). In particular, the respondents notice that, as a result of implementing audit recommendations, the operating efficiency and value of the organization increases. In municipal governments, one can notice an increase in management rationality, not only in the area of operational activities but also in the sphere of financial management (Bartoszewicz, 2009). In turn, advisory activities, in the opinion of the respondents, guarantee that good decisions are made (Ciak, 2016).

However, research by J. Ciak and B. Voss (2017) revealed that internal auditors do not always meet the expectations of their key stakeholders, because senior management does not use all audit results. On this basis, it can be argued that internal audits, like other processes in the organization, should be monitored to be effective. Recent studies have shown that monitoring is one of the factors to

determine the achievement of desired results by internal audit (Bednarek 2018a). The importance of this process has long been recognized by the Institute of Internal Auditors and by the Polish legislators. The process is included in the International Standards for the Professional Practice of Internal Auditing (IIA, 2016, p. 44) and in the Regulation of the Minister of Finance (2015) on Internal Audit and Information about the Work and Results of the Audit.

Bednarek's (2018b) study has shown that, in practice, monitoring in internal audit is interpreted and practiced in many different ways. Entities of the public finance sector that employ only one internal auditor tend to interpret monitoring as self-control, reporting to the top management of partial audit results and checking the timeliness of the audit recommendations being carried out by the auditees. In multi-person audit functions, monitoring generally includes activities that assure the internal audit manager and his team that their activities are in line with standards. These activities include conversations, document reviews, and tracking of time required to complete each activity. Some practitioners believe that monitoring also involves conducting studies at the end of the audit task in the form of a survey or interview to find out opinions of the audited entities on the degree of meeting the expectations of the organization related to a given audit task, as well as to confirm internal assessments and to identify reasons for negative evaluations (if any). Some external service providers even go as far as requesting the audited entity for audit recommendations to ensure that the results meet the client's expectations. Others perform reviews of compliance between the working documentation and the adopted rules and procedures after each completed audit task. Some internal auditors declare that their activities are not subject to monitoring of any kind (Bednarek 2018a and 2018b; Bartoszewicz 2015).

This paper is an attempt to identify what are the barriers to effective monitoring of internal audit activities from the perspective of the chief audit executives and internal audit staff. Answers to this question will be provided based on opinions from 28 internal auditors employed in enterprises and public administration institutions in 2017.

This study's contribution to subject literature rests with presentation, organization, and evaluation of the current barriers to effective monitoring of internal audit activities. It complements publications on the effectiveness of internal audit in public sector entities by explaining why this function is not always effective. It can also serve as a indication for members of audit committees, senior management, and other personnel responsible for managing internal audit on how to increase the efficiency and effectiveness of internal audit.

The first part of the paper presents an overview of factors determining the effectiveness of monitoring internal audit activities from the perspective of current research. The second part provides a description of the research methodology. The third part presents the research results. The discourse culminates in a summary of fundamental observations and conclusions resulting from the conducted research.

Barriers to effective monitoring of internal audit activities from a theoretical perspective

Since monitoring serves to assure the internal audit team that audit engagements are carried out effectively and in accordance with the plan and standards, it means that there should be a relationship between the monitoring of internal audit activities and the effectiveness of internal audit. Due to the lack of sufficient empirical evidence confirming the existence of this relationship, for the time being, it should be assumed that the factors influencing the effectiveness of internal audit are also barriers to effective monitoring of internal audit activities.

A copious presentation of a wide set of factors determining the effectiveness of internal audit can be found in the latest literature review by Lenz and Hahn (2015). Their analysis shows that the whole set of factors determining the effectiveness of internal audit can be divided into factors of the macro and micro perspective (Table 1).

Table 1: Features that determine the effectiveness of internal audit - a theoretical perspective

Macro factors	Micro factors		
	Category	**IA perspective**	**IA stakeholders perspective**
Coercive forces Normative forces Mimetic forces Other macro factors	IA resources	The crucial role of CAE and skills and competencies of internal auditors	Effective internal auditors require skills and competences
	IA processes	IA is effective when it is risk-based	
	IA relationships	The high importance of the audit committee and the board Support from senior management is critical Serving two (or more) masters	IA is effective when meeting expectations of management IA is effective when meeting expectations of the board/AC IA is effective when meeting expectations of external auditors IA is effective when meeting expectations of auditees
	Organization	Organizational characteristics matter including politics and culture, role ambiguity and role conflict	

Source: own study based on: R. Lenz, U. Hahn, A synthesis of empirical internal audit effectiveness literature pointing to new research opportunities, Managerial Auditing Journal, Vol.30, No. 1, 2015, pp. 5-33.

Determinants identified in Table 1 can be defined as basic, meaning that they do not fully exhaust the possible barriers to effective monitoring of internal audit activities. At the moment, it should also be assumed that continuous analysis of the practice of internal auditors in the form of audits should be an important source of information about these factors. They will undoubtedly constitute a significant supplement to the list contained in Table 1 based on previous studies.

Research Methodology

This study is aimed at identifying barriers to effective monitoring of internal audit activities from the perspective of the chief audit executives and internal audit staff. To this end, the following research question was formulated:

What are the obstacles that impede the ongoing monitoring of internal audit activity in accordance with the 1311 standard or prevent the internal audit activity from allocating its time and other resources to this purpose?

Empirical evidence for analytical evaluation was obtained through interviews with 28 respondents - internal auditors working for 30 organizations in Poland. The choice of respondents was deliberate. To ensure different points of view, respondents were employed in both the private (7 people) and public (23 people) sectors. Both those managing internal audit (14 people) and members of the internal audit staff (16 people). Both internal auditors employed in single-person positions (8 people) and members of multi-person internal audit departments (22 people). Both members of organizations in which the audit committee was created (15 people) and from those where it does not occur (15 people). Most of the respondents had over 10 years of work experience as an internal auditor (21 people).

The organizations included universities, listed and unlisted companies, enterprises with State Treasury as the majority shareholder, marshal offices, banks, audit companies, municipality offices, pharmaceutical companies, ministries, central offices and institutions, courts, commune offices,

hospitals, local government organizational units. The interviews were conducted from March 9 to April 10, 2017, with the average duration of ca. 30 minutes each. The number of respondents was decided on the basis of observations suggesting adequate saturation of the collected research material. After 30 interviews, the observed increase in knowledge was marginal (MacQuarrie, 2010; Eisenhardt, 1989).

The research tool used in the study came in the shape of a partially structured interview questionnaire, with questions construed using a predetermined and unchanging number, order and form. The interview questionnaire consisted of three open questions designed to invite respondents to share their experiences and views on the nature, premises for and barriers to effective monitoring of internal audit activities. The use of open questions served the purpose of eliciting unconventional, original and surprising opinions from the respondents. Due to the extensive subject matter, research results regarding the nature of monitoring internal audit activities have been published in separate paper (Bednarek 2018b), and another paper will be published in near future on the premises for monitoring internal audit activities.

Barriers to Effective Monitoring of Internal Audit Activities

An interesting supplement to the current research on the effectiveness of internal audit is to provide an overview of the chief audit executives' and internal audit staff opinions on barriers to effective monitoring of internal audit activities. Opinions from respondents provide an insight into the daily practice of modern internal auditors, as seen through the eyes of study participants. Despite the threat of subjectivity in these opinions, the attempt to build a picture of monitoring activities in today's internal audit functions allows us to study the real extent of tasks assigned to internal auditors as well as the most important challenges associated with their functions (in their perceived order of importance). The value of this sample is also determined by the fact that the data had been collected as part of interviews, which resulted in a wide spectrum of views and opinions. And despite a certain risk of a lack of objectivity from the respondents, the data offered a peek behind the veil which typically obscures the perception of the chief audit executives and internal audit staff and their duties.

Statements collected as part of the interviews make it possible to identify those barriers to effective monitoring of internal audit activities, which, based on the respondents' experience, were pointed out by the examined the chief audit executives and internal audit staff (Table 2). To a large extent, they are consistent with the factors determining the effectiveness of internal audit identified on the basis of literature review (Table 1). In addition, responses in this segment allowed us to include barriers identified solely on the basis of the respondents' practical experience.

Table 2: Barriers to effective monitoring of internal audit activities, as observed from the perspective of the chief audit executives and internal audit staff

Respondents' views	Barriers to effective monitoring of internal audit activities
[R1] "from the point of view of one auditor, no desire"	- lack of auditors' motivation
[R2] "(...) employees and managers of internal audits change, (...) they come and do something their own way, they do not adapt to our rules, they have experience gained from their companies"	- high fluctuation of the internal audit staff
[R3] "(...) it is not possible to obtain information from an auditee. The biggest problem is the lack of interest in this monitoring, we do it more for our own sake, as no one expects it from us "	- unfavourable attitudes of the auditees - lack of senior management support
[R5] "Inadequate human resources of the internal audit unit"	- inadequate human resources

[R6] "Lack of objectivity of the auditees, for example, there are managers who do not intend to devote their work time to internal auditors, because they believe that internal audit is unnecessary in the organization, then regardless of the efforts of internal auditors, the auditees will misjudge the work of internal auditors, which will not be connected with reality and will not contribute to the improvement of internal audit "	- unfavourable attitudes of the auditees
[R8] "(...) it is impossible to perform audit tasks accurately with a small number of resources and relatively higher expectations of management"	- inadequate human resources
[R9] "Lack of formalization and regulation of formal and legal internal audit in Poland (just like the Act on Statutory Auditors), no audit department in the Ministry of Finance, doctrine is adopted but nobody implements it, the role of the audit department was quite important; an alternative - either a strong executive side based on the executive power or a legislative one, i.e. the Act on Auditing and Auditors (...), internal audit in the public sector, especially in the local government sector, is performed by many people who do not have powers"	- lack of formalization and formal and legal regulation of internal audit
[R10] "(...) surveying speeds up the assessment process, and conversations cost more time, although they are more useful; in conversation, you can always ask about the reason for the assessment and some factors facilitating inference. "	- carrying out only surveys not interviews
[R14] "(...) a situation where someone does not submit the audit questionnaire will not submit comments (...). Units that commission the audit do not contract it in contracts, they only contract the performance of tasks. For this reason, it is not known how to include a quality assurance program if the contract only pays for the completion of two audit engagements. You have to do it either at your own expense or I don't know how. Unfortunately, the entities that commission it do not know that such elements are needed, they cannot value it and they cannot approach it. "	- unfavourable attitudes of the auditees - lack of clauses relating to the quality assurance program in contracts with external service providers
[R15] "Unfortunately, there are too few auditors in Poland. In Poland, auditors are not independent enough, they are not objective enough, and the need for an audit is somewhat discretionary, the auditor is treated here with a grain of salt, nonchalantly, often this auditor makes some compromises with his conscience and with his attitude because he receives from audited entity a clear message about the senselessness of his work, unnecessary, low weight, low weight. (...) An undoubted technological obstacle is the lack of software - monitoring abroad at every step is built into each module (...). Unfortunately, there are no such possibilities in Poland. I know on one hand the units that would have an IT system ensuring internal audit management and, above all, monitoring. "	- lack of senior management support - inadequate human resources - lack of monitoring support software
[R16] "Little understanding of post-audit surveys, because units do not use such tools"	- unfavourable attitudes of the auditees
[R17] "Audits commissioned from the audit committee mean that the annual audit plan does not fulfil its task and cannot be the basis for assessing the effectiveness of internal audit (...). The style of management managing the internal audit - autocratic or loose. Organization management style. Regulations are increasingly inconsistent and imprecise. "	- inadequate human resources - management style in internal audit function - lack of formalization and formal and legal regulation of internal audit
[R18] "If the head of the internal audit is also an operational auditor, then it is difficult to spend time monitoring himself and others."	- inadequate division of tasks
[R20] "The resistance of the auditees, because this cooperation may also vary (...), maybe personal resources in relation to tasks limit these possibilities of full monitoring"	- unfavourable attitudes of the auditees - inadequate human

	resources
[R22] "If someone has more time, they may perform quality checks and other forms of self-assessment, but if someone does not have time, this task would take a dominant role and there would be no time for proper 'production' (...). If most internal audit functions are one-man tasks, then monitoring is an abstract concept. He may (...) think (...) how to monitor his activities, but if he completes the checklist, this point of view is enough for him. "	- inadequate human resources
[R23] "The specificity of our work is that we sometimes struggle to implement the recommendation for weeks, months, and sometimes for years. Others start to notice that we were right when something is broken down in a given plot and it is bad (...); the boss also has a lot of duties outside the hospital (...) and expects us all to do without him. Unfortunately, in reality, some things cannot be done without it. If he took certain actions, it would be more effective to require the implementation of recommendations from the heads of units. "	- unfavourable attitudes of the auditees - lack of senior management support
[R23] "Our work is negatively affected by the fact that we have very poor access to the boss (...). We can't get through with it for weeks or more. "	- lack of senior management support
[R24] "An obstacle may be delaying and extending the time to provide information (...). As a rule, when the results of the audit are reasonably more likely, the auditees cell responds to the survey, whereas when we have the opposite situation, it is very often the case that we do not receive the survey. "	- lack of senior management support

Source: own study.

The key barriers to effective monitoring of internal audit activities belonged to the group representing lack of support of senior management, which translates into the acceptance of internal audit by lower management. This lack of support manifests itself in three ways. First of all, half of the respondents underlined the importance of providing inadequate human resources for the internal audit function in relation to the scale of tasks performed. In particular, this means that the organization should employ at least two internal auditors so that, in addition to performing the tasks provided for in the annual audit plan, they have enough time for activities related to quality assurance, leave of absence, and audits commissioned by the audit committee and management. However, the manager of a larger internal audit team should resign from performing audit tasks in person and only deal with monitoring the work of his/her team.

Secondly, statements from one-third of the respondents also revealed the importance of utility offered by or attached to – the recommendations proposed by internal auditors from the viewpoint of the head of the unit or the management. As put by one of the respondents [R16], a problem arises when "the manager does not really want to use the internal auditor, because he does not see the benefits and the effects of the audit on the entity's activities". If the head of the entity or the management highly appreciates the rank of the audit recommendations, proper responses are duly implemented and effectively monitored. On the other hand, seeing the lack of support from the head of the entity or the management board for audit recommendations, the management displays resistance to their implementation, which significantly extends and complicates the monitoring process.

Thirdly, the auditors indicated the importance of managerial interest in the results of the monitoring of internal audit activities. Senior management should be interested in increasing the effectiveness of internal audit. One respondent characterized this situation as follows [R3]: "the biggest problem is the lack of interest in this monitoring, we do it more for our own sake, as no one expects it from us." One of the reasons for the lack of interest in the effectiveness of internal audit may be the low level of knowledge among managers as to the intended role and significance of internal audit. This is evidenced by the following statement [R14]: "it is difficult to prepare an audit in accordance with the expectations of the head of the entity, who often does not know what audit is, what internal control is,

has a slightly different perception of the world and its organization, and the audit is not quite compatible with how he sees it". Another reason may be the loose management style of the audit team or the organization in general [R17].

One-third of respondents also noted that the effective monitoring of internal audit activities is influenced by the attitude of lower management, which is most often audited. Based on the respondents' statements, a ‘catalogue of sins’ on the part of auditees can be formulated. These include reluctance to spend time on internal auditors and to implement audit recommendations. As a result, the auditees often exaggerate the shortcomings of internal auditors, or choose not to complete post-audit surveys at all.

Other barriers to the effective monitoring of internal audit activities, as indicated by some respondents, include insufficient formalization of legislative and formal regulations of internal audit in Poland, the lack of requirements for quality assurance in internal audit services in contracts with external service providers, and a loose style of management.

Interestingly, the respondents were not observant of the relationship between the effective monitoring of internal audit activities and the critical role of CAE and the skills of internal auditors. The respondents also seemed to lack proper perception of the roles of effective audit committee and board. One of the potential explanations for the observed situation may be the low activity of the audit committee or the board in assessing the effectiveness and efficiency of internal audit.

In addition, respondents pointed to several factors that allow for expanding the current discussion on barriers to the effective monitoring of internal audit activities to include new aspects. These include: high fluctuation of the audit staff (particularly the CAE position), the examination of opinions of auditees only through surveys and not through interviews, lack of formulation of a demanding work environment, lack of use of information technologies, and allocating more than 20 % of time to commissioned audits.

Conclusions

In conclusion, it should be added that the quest for answers to the question posed in this work, "what are the barriers to effective monitoring of internal audit activities?" proved quite challenging. Identification of actors determining the barriers to the effective monitoring of internal audit activities is hampered by the fact that the distribution of data may be the result of a variety of conditions in which internal audit operates, in particular, the expectations of the audit committee, the senior management or the auditees. The lack of support of the senior management is considered a key barrier to the effective monitoring of internal audit activities, which translates into the acceptance of internal audit by lower management and, consequently, the overall effectiveness of internal audit as such. It seems that identification of barriers to the effective monitoring of internal audit activities may constitute an important contribution to the development of our knowledge about the functioning of internal audit.

One obvious limitation of this research is the fact that information comes from only one source. The conclusions of the audit were formulated solely on the basis of what was said by internal auditors during the interviews. In addition, the size of the research sample was limited. Future studies should further confirm the research conclusions, by means of multiple case studies or quantitative studies.

Lastly, it is worth noting that the research results presented in this paper can be perceived as the next logical step in the expansion of knowledge on this subject. As such, they provide an interesting supplement to the existing research. It should be emphasized that previous research was primarily focused on studying the extent of internal audit practices in Western Europe, North America, Africa, and Asia. This study has identified barriers to the effective monitoring of internal audit activities of

both the public and private sector in Poland, i.e. in a country well-representative of Central and Eastern regions of Europe.

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Modeling of the Impact of Investments on The Development of the GDP in Ukraine

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Abstract

The article presents results of the analysis of capital investment in the economy of Ukraine by the kinds of economic activity in the period of 2007-2019. The authors have studied the impact of seven kinds of investment (in agriculture, industry, construction, retail and wholesale trade; repair of motor vehicles and motorcycles, transport, information and telecommunications, financial and insurance activities) on the GDP. The investigation confirms a positive tendency of the GDP growth in 2007-2019. It is argued that investment in information and telecommunications, as well as investment in financial and insurance activities of the economy will provide the highest growth of the GDP per 1 million UAH of the invested funds. The work supplies pessimistic and optimistic forecasts of the impact of capital investment in the economy of Ukraine by the kinds of economic activity on the development of Ukraine's GDP for the period of 2020-2024.

Keywords: Capital Investment, Gross Domestic Product, Modeling, Economy Of Ukraine.

Introduction

From the position of the fundamental economic science, a gross domestic product is considered as a principal macroeconomic index, which reveals conditions and dynamics of development of the economy of any country. Investments are particularly important for the GDP development. The idea is noted in the Reference book NIPA (2019), which mentions four components of the gross domestic product, i.e. personal consumption, investments in business, state expenditures and net export.

Therefore, investments play an important role in functioning and development of the economy, whereas changes in the physical amounts and quantitative correlations of investments influence the volume of public production and employment, structural progress in the economy, development of branches and fields of economy.

Being the most important economic category, investments contribute to a growth of the economy, as well as development of its production potential. Studying the recent positions of Ukraine in terms of improvement of its investment attractiveness, one can affirm that Ukraine has good prospects concerning raise of investment and its attractiveness.

Literature Review

Investments can secure financial sustainability, stimulate economic development, as well as improve living standards of the society (OECD, 2008). Numeorus foreign scientists pay great attention to the study of theoretical and practical aspects of investment processes, impact of GDP on the country's economic development. In particular, general fundamentals of the theory of investment were revealed in the foreign works, written at the end of the 20th century, particularly by Bailey H.G. (1997), Hitman L.G. (1997), Jonk M.D. (1997), Masse P. (1971), Sharp U.F. (1997). Those ideas have been further developed in the modern works. Particularly, Reinhart and Rogoff (2010) argued the dependence between the figure of debt and economic growth, whereas Mehic, E., Silajdzic, S. and Babic-Hodovic V. (2013) studied the impact of GDP on the economic growth. However, those data of the research concerned the Southern-Eastern Europe.

A great deal of researches in the mentioned field has been done by Ukrainian scientists, including Maiorova T.V. (2009). The scientists revealed the essence of the concept of "investment activity", described the structure of investment market; specificity of financial, actual, innovative and foreign investments. Peresada A.L. (2002) suggested the process of improvement of the management of investment process. Reverchuk S.K. (2004) disclosed the ways and mechanisms of improvement of investments on the base of domestic and foreign experience. The scientist generalized and specified the investology as a science. Bochko O.Yu., Podvalna H.V., Kuziak V.V. studied the system of strategic planning of the investment attractiveness of enterprises (2018). Pawlowski G., Bochko O., Sytar L., Noga I., Pavlenchyk A, Zhavnerchyk O., Henyk O., Hladun V. (2019) were engaged in shaping of the financial strategy for the development of Ukraine.

Nowadays, one observes a general improvement of the investment activity of Ukraine. According to the results of 2019, after the many-year cooperation, Ukraine achieved the second position among the countries transacting with the EBRD by the amounts of annual investments. It is declared in the press-release on the website of the European Bank of Reconstruction and Development. Such result has become possible due to the extremely efficient dialogue between the Ukrainian Government and the EBRD, as well as stability of the key approaches of the Government concerning the principal directions of the reforms, i.e. de-emphasis of the state in the economy, improvement of the investment climate.

In Ukraine, the share of investments accounted for 2.7% of the GDP. It is the third position by the volume of direct foreign investments among the 23 developing countries in the period from 2015 to 2018. It is declared by the Rzeczpospolita referring to the global association of banks "Institute of International Finance" (IIF, 2019).

Moreover, in 2019, the EBRD approved 51 projects with the total fund of 1.1 billion EUR, including 680 million EUR classified as "green" investments. According to the share of "green" investments, Ukraine take the first position among the countries receiving funds from the EBRD (MFU, 2019). Having set close relations between the investments and level of the GDP, the authors of the work make calculation of pessimistic and optimistic forecasts of the dynamics of capital investment in Ukraine. According to the results of such calculations, it is possible to make a forecast about the general development of the country. It is also necessary to mention about the research conducted by the analysts of Credit Suisse, who suggest the growth of the GDP of Ukraine by 4% and more in the following year. "We expect that Ukrainian economy will grow by 4% and more in the nearest years" – is noted in the report. In case of a higher growth, the coefficient of repayments by the national liabilities in 2015 related with the GDP, will be higher. Thus, the authors' research about forecasting and relations of the GDP and investments is actual and well-timed.

Methodology

Modeling of the development of the gross domestic product of Ukraine is impossible without application of the modern methods of economic-mathematic modeling, statistical and economic analysis. The correlation-regression analysis supplies use of the regression equation for determination

of the analytical form of a relation between the features x_i and y_i, assessment of the significance of the relation between the efficient and factorial features on the base of the regressive analysis; interpret the results of calculations and their application for the following improvement of operation.

To determine the dependence of the studied economic indicators, the authors of the research conducted a correlation-regression analysis and composed an economic-mathematic model. The analysis of the volume of the capital investment impact on the GDP of Ukraine evaluates the tendencies, which have been established by the economic activity in 2007-2019. The authors made a quantitative assessment of the total impact of the studied factors on the efficient index. The calculation concerned seven essential values of the capital investment in the economy of Ukraine by the kinds of economic activity. A complex interaction of all factors with the effective index can be described by the equation of a linear multi-factorial regression of the following kind (formula 1):

$$Y = a_0 + a_1*x_1 + a_2*x_2 + a_3*x_3 + a_4*_{x4} + a_5*x_5 + a_6*x_6 + a_7*x_7 \qquad (1)$$

The data of the correlation-regression analysis can be used to determine the impact of the following factors on the gross domestic production of Ukraine, y_i:

1) capital investment in agriculture, forestry and fisheries of Ukraine, x_1;
2) capital investment in industry, x_2;
3) capital investment in construction, x_3;
4) capital investment in wholesale and retail trade; repair of motor vehicles and motorcycles, x_4;
5) capital investment in transport, warehousing, postal and courier activities, x_5;
6) capital investment in information and telecommunications, x_6;
7) capital investment in financial and insurance activities, x_7.

Empirical analysis and discussions

Capital investment in the economy of Ukraine by the kinds of economic activity and the gross domestic product in the prices of the previous year for 2007-2019 (Table 1). The mentioned indices are found in the statistical information on the website of the State Statistic Service of Ukraine.

Table 1: Capital investment in the economy of Ukraine by the kinds of economic activity* and gross domestic product in the prices of the previous year for 2007-2019.**

Indicators, million UAH	Years												
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Agriculture. forestry, fisheries	9555	16951	9404	11062.6	16466.0	18883.7	18587.4	18795.7	30154.7	50484.0	64243.3	66104.1	55254.2
Industry	64341	76618	57658	55384.4	78725.8	91598.4	97574.1	86242.0	87656.0	117753.6	143300.0	199896.0	231849.5
Construction	9107	12469	5325	29767.0	31990.8	40760.3	40796.2	36056.7	43463.7	44444.0	52176.2	55993.9	59681.1
Wholesale and retail trade; repair of motor vehicles and motorcycles	17778	24695	14091	18550.4	24067.9	24531.6	22190.3	20715.7	20662.9	29956.8	33664.8	51817.6	43510.4
Transport, warehousing, postal and courier activities	19302	21767	15089	19322.4	25498.2	32413.0	18472.6	15498.2	18704.0	25107.8	37943.5	50078.3	41371.9
Information and telecommunications	12407	10791	9466	8625.8	9730.0	10167.7	9864.0	8175.1	22975.0	15651.2	18395.2	29884.9	20904
Financial and insurance activities	4165	4636	3359	5861.5	5972.3	7353.3	6646.8	6214.5	6448.0	7678.7	8055.3	10652.3	10887.7
Real estate transactions	39415	48840	25678	9861.0	14598.9	12368.6	13550.4	11230.2	11899.0	19665.0	22505.6	27556.8	24084
Others	12416.0	16314.0	11707.0	22140.4	34236.1	35179.4	22191.6	16491.8	31153.1	48475.0	68177.6	86742.5	96905.8
Total	188486	233081	151777	180575.5	241286.0	273256.0	249873.4	219419.9	273116.4	359216.1	448461.5	578726.4	584448.6
Gross domestic product	720731	948056	913345	1079346	1299991	1404669	1465198	1586915	1988544	2385367	2983882	3560596	4080200***

The data are presented with consideration of the temporary occupied territory of the Crimean Autonomous Republic, Sevastopol city, and for the period of 2014-2019 without the area of the temporary occupied territories in Donetsk and Luhansk region. **By the methodology of SNC 2008. * The forecasted GDP for 2019, the expected not final indicator. Source: statistical information of the official website of the State Statistic Service of Ukraine.*

Capital investment in the economy of Ukraine by the kinds of economic activity in the period of 2007-2019 (Fig. 1).

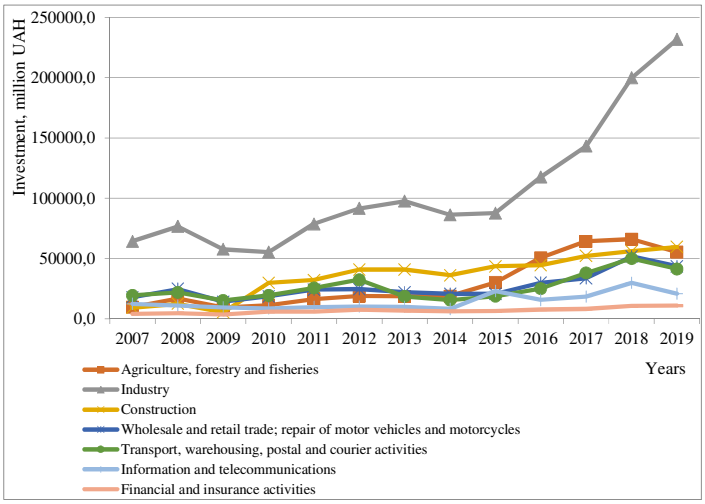

Fig. 1: Capital investment in the economy of Ukraine by the kinds of economic activity in the period of 2007-2019.

Source: developed by the authors.

Using the MS Office Excel, the authors of the work have got a linear multi-factorial equation of regression:

$$Y = -93517{,}720 + 19{,}036\, x_1 + 13{,}913\, x_2 + 3{,}328\, x_3 - 31{,}469\, x_4 - 5{,}815\, x_5 + 12{,}911\, x_6 + 89{,}735\, x_7$$

The presented equation confirms that the impact of 7 factors on the efficient index will be manifested like:

1) investments in agriculture, forestry and fisheries of Ukraine, x_1 – in case the noted index increases by 1 million UAH, the gross domestic product will increase by 19.036 million UAH.
2) investments in industry, x_2 – in case the mentioned factor increases by 1 million UAH, the gross domestic product will increase by 13.913 million UAH.
3) investments in construction, x_3 – in case the mentioned factor increases by 1 million UAH, the gross domestic product will increase by 3.328 million UAH.
4) investments in wholesale and retail trade; repair of motor vehicles and motorcycles, x_4– in case the mentioned factor increases by 1 million UAH, the gross domestic product will decrease by 31.469 million UAH.

5) investments in transport, warehousing, postal and courier activities, x_5– in case the mentioned factor increases by 1 million UAH, the gross domestic product will decrease by 5.815 million UAH.

6) investments in information and telecommunications, x_6; – in case the mentioned factor increases by 1 million UAH, the gross domestic product will increase by 12.911 million UAH.

7) investments in financial and insurance activities, x_7. – in case the mentioned factor increases by 1 million UAH, the gross domestic product will increase by 89.735 million UAH.

The theoretical values of the efficient index Y, i.e. the gross domestic index of Ukraine and its balances are demonstrated in the Table 2.

Table 2: Theoretical value of the efficient index Y, i.e. the gross domestic index of Ukraine and its balances

Observation	Theoretical value Y	Balances	Standard balances
1	876067.359	-155336.359	-1.407
2	988242.070	-40186.070	-0.364
3	797854.530	115490.470	1.046
4	927895.948	151450.052	1.372
5	1177549.723	122441.277	1.109
6	1506621.543	-101952.543	-0.924
7	1671653.861	-206455.861	-1.870
8	1505290.048	81624.952	0.739
9	1960897.913	27646.087	0.250
10	2456044.910	-70677.910	-0.640
11	2977008.492	6873.508	0.062
12	3552106.826	8489.174	0.077
13	4019606.776	60593.224	0.549

Source: composed by the authors

The graphic interpretation of the results of the regression analysis of the gross domestic product of Ukraine is presented by the Fig. 2

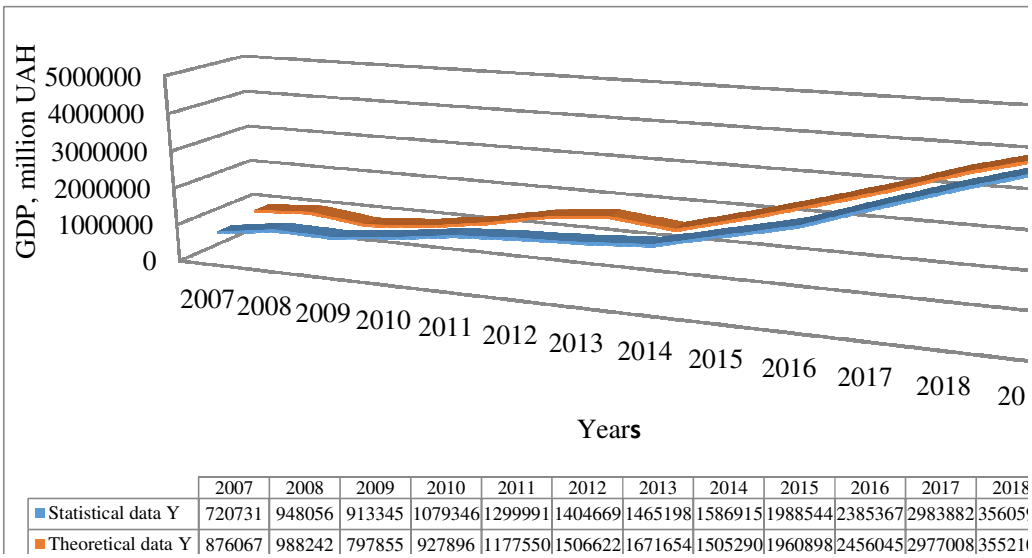

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Statistical data Y	720731	948056	913345	1079346	1299991	1404669	1465198	1586915	1988544	2385367	2983882	35605
Theoretical data Y	876067	988242	797855	927896	1177550	1506622	1671654	1505290	1960898	2456045	2977008	35521

Fig. 2: The graphic interpretation of the results of the regression analysis of the GDP of Ukraine in 2007-2019.

Source: composed by the authors

The obtained results of the regression statistics are presented in the Table 3.

Table 3: Coefficients of density of the relation between factorial and efficient features

Regression statistics	
Multiple R	0.994671429
R-square	0.989371251
Standard R-square	0.974491003
Standard deviation	171022.1255
Observation	13

Source: composed by the authors

The value of the coefficient of multiple correlation R features the quality of the multi-factorial model. Referring to the obtained calculations, the coefficient accounts for R = 0.994671429, confirming a high correlation of the model. It substantiates a close relation between the factorial and efficient features, i.e. capital investment in the economy of Ukraine by the kinds of economic activity and the GDP of the country. The value of R-square, i.e. a multiple coefficient of determination, argues the coherence of initial data and regression model, because its value is maximum approaching the figure 1 and accounts for R^2 = 0.989371251. The linear multi-factorial regression explains 98.94% of variation. It confirms adequacy of the choice of the studied factors of the model. Variation of the value of the gross domestic product of Ukraine is by 98.94% caused by the factors like capital investment by the kinds of economic activity, which are included in the correlation-regression model. The standard R-square = 0.974491003 proves high accuracy of approximation.

The obtained results of the dispersive analysis are composed in the Table 4.

Table 4: The indicators of credibility of the multi-factorial regression model

	Degrees of freedom df	SS Sum of Squares	MS Mean Square	Fisher F-test	Significance F
Regression	7	1.36129E+13	1.9447E+12	66.48889457	0.000124155
Balances	5	1.46243E+11	29248567398		
Total	12	1.37592E+13			

Source: composed by the authors

Examination of the relation essentiality according to the F-test: 66.48889457 > 3.367898748 under the significance level a = 0.1 and figures of the degrees of freedom $k_1 = 7$, $k_2 = 5$. Thus, the relation between the studied features, included in the multi-factorial regression model, is essential and non-spontaneous.

Statistical estimates of the values of the coefficients of multi-factorial regression (Table 5)

Table 5: Statistical estimates of the values of the coefficients of multi-factorial regression

Indicators	**Coefficients**		**Standard deviation S**	**Lower limit 90.0%**	**Upper limit 90.0%**
Efficient feature Y	-93517.720		351079.282	-800959.4559	613924.0165
Variable X_1	19.036		7.825218636	3.267424061	34.80381223
Variable X_2	13.913		3.850821515	6.152917343	21.6721006
Variable X_3	3.328		17.39107855	-31.71622569	38.3715034
Variable X_4	-31.469		26.94565932	-85.76592425	22.82768972
Variable X_5	-5.815		13.84578455	-33.71444985	22.08540143
Variable X_6	12.911		13.3797286	-14.0493909	39.8722098
Variable X_7	89.735		223.9244502	-361.4831235	540.9540748

Source: composed by the authors

We use the Student t-test to assess the significance of the multiple regression equation parameters. The statistical significance of the parameters means their difference from zero with a high probability. The actual value of the t-criterion for the regression parameter a1 = 2.432598887; for the regression parameter a2 = 3.612867779. The tabular value of the t-criterion for df = 5 and the significance level a = 0.1 is 2.01, therefore, the studied regression parameters are statistically significant.

At the current stage, there is a strong tendency to growth of the gross domestic product of Ukraine. The recent six years are characterized by a sustainable rapid growth of that index. It is confirmed by the analysis and forecast, conducted in the research progress, concerning the tendencies of the impact of capital investment in the economy on the development of the GDP of Ukraine.

The forecast of the dynamics of capital investment in the economy during the future five periods is made by applying the functions of TENDENCY and GROWTH in MS Office Excel. The function TENDENCY performs a linear approximation by the least square method. The function GROWTH is based on performance of an exponential trend. The optimistic and pessimistic dynamics of the forecasted indices of capital investment by the kinds of activity are presented in the table (Table 6).

Table 6: The forecast of the dynamics of capital investment in the economy of Ukraine for the period of 2020-2024

Indicators. million UAH	Forecast variant	Years				
		2020	2021	2022	2023	2024
Agriculture, forestry and fisheries	optimistic	76657.3	90782.2	107509.8	127319.7	150779.7
	pessimistic	63721.7	68583.6	73445.5	78307.4	83169.4
Industry	optimistic	197529.2	218718.2	242180.1	268158.8	296924.1
	pessimistic	190031.3	201919.3	213807.4	225695.4	237583.4
Construction	optimistic	91453.0	107611.3	126624.6	148997.2	175322.6
	pessimistic	65185.0	69419.8	73654.7	77889.6	82124.5
Wholesale and retail trade; repair of motor vehicles and motorcycles	optimistic	41997.2	45236.6	48725.9	52484.3	56532.6
	pessimistic	41706.2	43859.5	46012.7	48166.0	50319.3
Transport, warehousing, postal and courier activities	optimistic	38453.1	41041.7	43804.5	46753.3	49900.7
	pessimistic	39745.5	41680.9	43616.3	45551.8	47487.2
Information and telecommunications	optimistic	22720.4	24559.8	26548.1	28697.5	31020.8
	pessimistic	23146.8	24398.1	25649.4	26900.7	28152.1
Financial and insurance activities	optimistic	11104.4	12006.7	12982.3	14037.3	15177.9
	pessimistic	10397.2	10916.3	11435.3	11954.4	12473.4

Source: composed by the authors

Graphic visualization of pessimistic forecasting of capital investments dynamics in the Ukrainian economy by the kinds of activity for 4 future periods (Fig. 3)

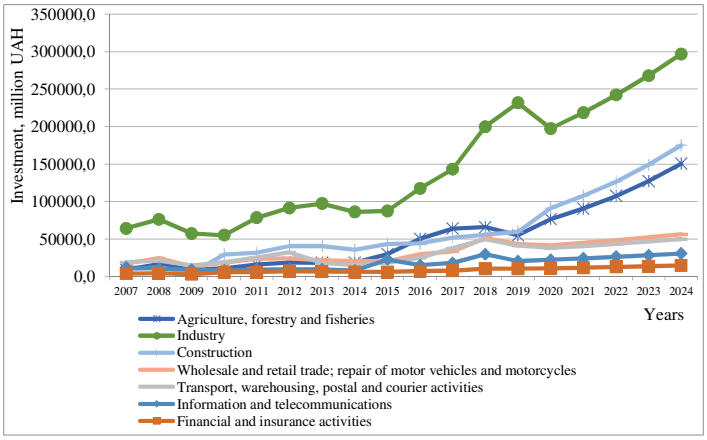

Fig. 3: The pessimistic forecast of the capital investment dynamics in the Ukrainian economy by the kinds of activity for the period of 2020-2024.

Source: composed by the authors

Graphical interpretation of the optimistic forecast of investment dynamics in the economy of Ukraine for the period 2020-2024. (Fig. 4)

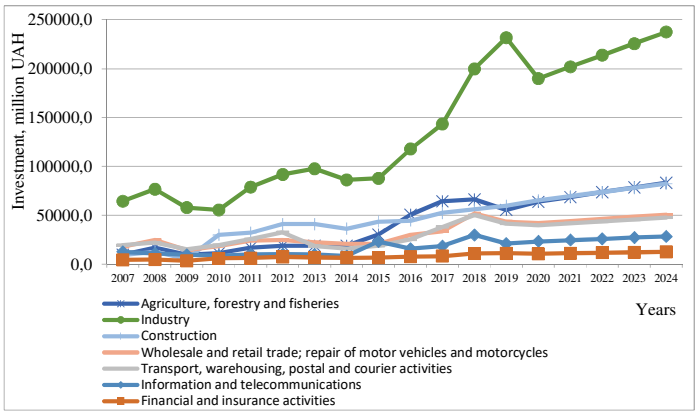

Fig. 4: The optimistic forecast of the capital investment dynamics in the Ukrainian economy by the kinds of activity for the period of 2020-2024.

Source: composed by the authors

The researchers expect a positive dynamics of the indicators of capital investment in the economy of Ukraine.

The authors of the work have composed a forecast of the tendencies in the change of the figure of Ukraine's GDP in the period of 2020-2024 with two possible options of development, particularly pessimistic and optimistic (Table 7). To make the forecast of future indicators, the following equation of regression is used:

$$Y = -93517.720 + 19.036\, x_1 + 13.913\, x_2 + 3.328\, x_3 - 31.469\, x_4 - 5.815\, x_5 + 12.911\, x_6 + 89.735\, x_7$$

Table 7: The forecast of the impact of capital investment in the economy of Ukraine by the kinds of economic activity on the development of the GDP of Ukraine for the period of 2020-2024.

Years	Gross domestic product of Ukraine. million UAH	
	Optimistic forecast	Pessimistic forecast
2020	4162754.706	3668487.227
2021	4767921.154	3924239.908
2022	5463379.742	4179992.589
2023	6263345.673	4435745.269
2024	7184381.373	4691497.95

Source: composed by the authors

Optimistic and pessimistic forecast of the impact of capital investment by the kinds of economic activity on the development of the gross domestic product of Ukraine for the future five periods is presented by the figure (Fig. 5).

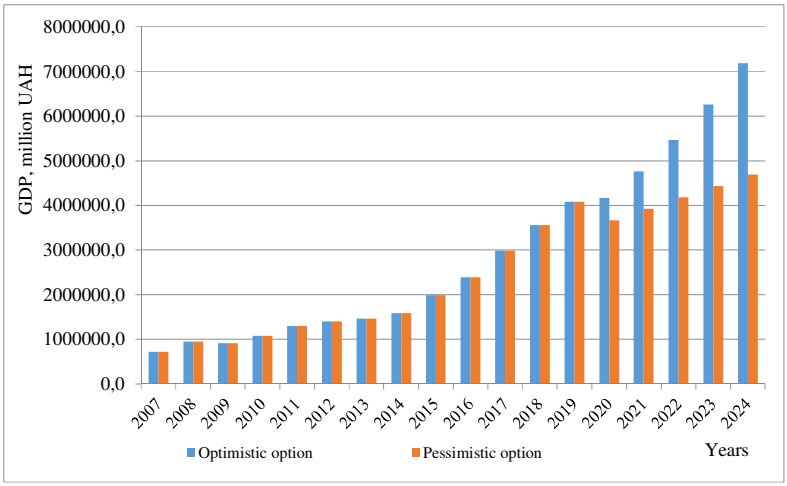

Fig. 5: The forecast of the dynamics of the GDP of Ukraine with consideration of the impact of capital investment for the period of 2020-2024.

Source: composed by the authors

Conclusions

Having analyzed the GDP dynamics in 2007-2019, it is worth noting that it was characterized by a positive dynamics in the studied period. However, the rate of the GDP growth in 2012-2014 was much slower than in 2015-2018, when the rate of growth accounted for almost 22% on average, as compared to the previous periods, although it was the start of the military conflict in 2014. It is explained by the impact of general macroeconomic tendencies at the global markets, characterized by recession conditions. Considering the significant impact of investments on the volume of the GDP of the country, the government of Ukraine is focused on attraction of more financial funds to those branches of the economy, which are capable to generate a higher growth of production and services. Analyzing the general tendencies of the volume of capital investment, it was marked that agriculture, industry, construction, transport services, wholesaling and logistic services were the priority branches the investors were interested. Such fields as information services and telecommunications, as well as financial and insurance activities were not much attractive for investors. Nevertheless, the presented regression model demonstrates that investment in those two fields of the economy will also secure relatively high growth of the GDP per 1 million UAH of invested funds, particularly 12.911 and 89.735 respectively. Thus, it is expedient to make stress on the attraction of investments in those branches.

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Vocationally Active Students Facing the Need for Mentor Support

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Abstract

The aim of this paper is to determine whether people who continue their education and work at the same time show the need for support from a mentor, located in their current workplace (organization). A mentor is defined as an older and more experienced employee who, in a process of intensive interpersonal exchange, provides the protégé (mentee) with support, guidelines and feedback on professional and personal development plans. We conducted the survey in a group of 421 respondents using a survey questionnaire in 2019. Based on the results obtained, it can be concluded that only one in ten respondents felt the need for support from the mentor: men more often than women declared strong attitudes in this respect; in terms of generational differences, the greatest demand was indicated by representatives of Generation Y; differences in the declared level of demand were also revealed depending on the type of secondary school completed by the respondents.

Keywords: Mentoring, Corporate Mentoring, Mentor, Mentee, Graduate, Generations.

Introduction

Mentoring has been used for centuries; it means the relationship between master and student, aimed at developing and discovering the possibilities of the mentee. It is based on inspiration, stimulation and leadership. It consists in the student getting to know himself or herself, his or her abilities, developing self-awareness and gaining confidence in their skills thanks to the appropriate master's efforts. An important goal of mentoring is to eliminate potential fears (concerns) of the mentee in following the path of self-actualization. The mentor helps the mentee choose the right path of development, by transferring his or her experience and knowledge.

In corporate and industry mentoring, the mentor helps the employee to smoothly pass an adaptation period in the new company and achieve high work efficiency faster. As a result, they increase job satisfaction and motivation (Carter & Youssef-Morgan, 2019). Putting a new employee in the care of a mentor significantly weakens the effect of uncertainty and uncomfortable situation of "being new", improves commitment and loyalty to the company.

Studies have shown a number of benefits of a mentoring relationship for both the mentee and the mentor (DuBois et al., 2005; Rhodes et al., 2006; St-Jean, 2009). An important factor for the success of this relationship is the willingness and attitudes of the mentee himself or herself, since the quality and quantity of acquired knowledge depends on him or her; it can be assumed that feeling the need for support from the mentor is a key factor for the effectiveness of the mentoring relationship (Menges, 2016; Kraiger et al., 2019; Allen & Lentz, 2005; Megginson et al., 2008).

The aim of this paper is to examine whether vocationally active students show the need for support from a mentor.

In order to achieve this aim, we used:

- analysis of the related literature;
- a survey of 421 respondents.

Literature Review

The literature describes many criteria for the classification of mentoring. The most frequently emphasized ones include (Baran, 2018, p. 77-86; Allen & Poteet, 1999, p. 48-59; Strom & Strom, 2011, p. 4):

- the degree of the formalization of mentoring,
- the number of people taking part in mentoring,
- forms of meetings, bearing in mind the technological systems used,
- the nature of the relationship between the master and the protégé,
- the direction of links between members,
- the needs of the protégé,
- the kind of help that a mentor offers.

According to the level of formalization, there are the following types of mentoring:

- Casual mentoring – the meeting between master and student (protégé) occurs spontaneously, not necessarily in professional circumstances, and is episodic.
- Informal mentoring – free mentoring of a long-term and regular nature, but still unplanned and without any specific objectives; sometimes a mentoring relationship is established as a result of business contacts. The informal mentoring is based on the trust of both parties, i.e. the mentor and the mentee. It is traditional in nature and there is no need to conclude contracts or keep records. The relationship of people in this type of mentoring is based on mutual cooperation and is often accompanied by a willingness to devote time to the other party (Janssen et al., 2016; Garvey & Alred, 2001).
- Facilitated mentoring – mentoring taking place as part of a specific mentoring programme with a coordinator who combines mentors and mentees in pairs. The facilitated mentoring is used in accordance with the general principles established by the organization, has general objectives and a time frame, and is subject to the evaluation. It is also sometimes certified.
- Non-facilitated mentoring – informal mentoring set in a professional or institutional context with a structure agreed upon by the mentor and his or her mentee (e.g. frequency of meetings, objectives), but not formalized within the mentoring program (Benabou & Benabou, 1999).

Considering the form of meetings, there is direct and virtual mentoring. The former is based on a relationship in which mentor and protégé meet in a previously set physical location and discuss problems or doubts face to face. The virtual mentoring manifests itself in greater practicability, for those who for various reasons are unable to appear in a place more convenient for the mentor. It is certainly a cheaper form of communication, but due to the lack of direct meetings, the relationship between the parties may not be as good as the first type of mentoring. This is the cause of reduced trust

and distance. This type of mentoring also uses a number of technological facilities such as Skype, blogs and Internet forums.

The nature of the relationship between the mentor and the mentee justifies the division of mentoring into further subgroups i.e.:

- Peer mentoring (Collings et al., 2014; Hill & Reddy, 2007): this is a cooperation that does not reveal the superiority of one party of mentoring over the other. Its main objective is to create an atmosphere that will enable mutual support and willingness to help people in similar positions. It mainly covers managers and employees who start their career path. They should be guided in their actions by the willingness to support their colleagues. However, this relationship may lead to a risk of the difficulty in introducing a colleague to a higher position. If everyone wants to treat each other as equals, it is not easy to decide on promotions (Luecke, 2006, p. 183-189).

- Situational mentoring: it means the sudden support of a mentor at a specific moment when the mentee needs it. It is characterized by a short duration because the problem is solved on an ongoing basis.

- Authority mentoring, based on the mentor's primary influence over the mentor. A personal development program is developed for the subordinate. The program contains the expectations for the work the mentor is responsible for. The mentor is responsible for guiding the mentee on current assignments.

- Network mentoring – it consists in the activity of a greater number of mentors who provide help and advice to protégés. It offers a greater scope for action and enables the problem to be solved more quickly due to the possibility to use different tips from different mentors. It is considered to be a very evolutionary model (Luecke, 2006, p. 189).

Mentoring, understood as a system of care of an employee at different stages of his or her professional development and career in the enterprise (organization) from the moment of employment to reaching the top positions, is called corporate mentoring. It represents a transactional arrangement in which values are exchanged between the parties, leading to the creation of value added for the stakeholders, i.e. employees (mentor, mentee), the organization as a whole, and the broadly understood environment (Mazur, 2008).

The benefits that the protégés can derive from a mentoring relationship, regardless of its type, include (Zajączkowska et al., 2016, p. 15):

- access to the mentor's know-how and obtaining informal knowledge beyond the standard knowledge that can be acquired through studies, courses, etc.;

- the opportunity to use the mentor's network of contacts;

- the opportunity to consult and verify ideas and plans;

- an insight into the various options for an individual career path,

- discovering one's own potential, broadening the awareness of himself or herself and their environment (increasing self-awareness);

- identify and develop strengths and reduce the effect of weaknesses on actions taken;

- inspiration, stimulating curiosity and willingness to seek knowledge, and creativity and entrepreneurship (Pietroń-Pyszczek & Golej, 2018);

- increased motivation to work and develop;
- developing social competences.

A mentor is most often characterized as an experienced, highly qualified person, being a teacher for his or her protégés, willing to share his knowledge with someone less experienced, in a relationship characterized by mutual trust (Parsloe & Wray, 2002, p. 78). A mentor is a person who, thanks to his or her competence, experience in a given field, high personal culture and ethical attitude, is a role model for others. Having significant professional accomplishments, the mentor enjoys widespread respect and recognition in the organization, and is an authority, especially for his or her younger colleagues (Baran, 2016, p. 137–138). The main goal of the mentor is to support the personal and professional development of the mentee, to support him or her in the pursuit of becoming the person they want to become (Garvey, 2017, p. 21–24).

The role of a mentor is certainly not the easiest one. The mentor must perform three key functions: a collaborator, educator and role model. D. Clutterbuck (2014, p. 48) is the originator of a model in which he specified more functions of a mentor.

The mentor can also play ab negative role. Negative mentoring experiences in the enterprise are noted in various studies; these problems include (Klasen and Clutterbuck, 2002; Baran, 2016, p. 136):

- Promotion of elitism;
- Exclusion of people on the basis of social bias;
- Manipulation;
- Excessive commitment of mentee to mentor resulting in abdependent relationship;
- Transfer of excessive obligations to mentee;
- Unethical behaviour (sometimes the behavior of the mentor can also be seen as deceitful, sabotaging and harassing);
- No positive performance changes;
- Lack of trust between mentor and mentee;
- Sexual/racial/disability discrimination.

Methodology

An auditorium questionnaire was chosen as a research technique and filled in by respondents on their own in a specific place and time, in the presence of the interviewer. The questionnaire was anonymous. The survey was responded by persons currently studying at the second-cycle studies (the graduates obtain a master's degree). In the introduction to the survey, we included a definition of mentoring, i.e: “mentoring - a developmental relationship between two people, a more experienced older employee (mentor) and a less experienced younger employee (protégé, mentee). Mentor - in a process of intensive interpersonal exchange, a mentor provides the protégés with support, guidance and feedback on career plans and personal development.” Respondents indicated their gender, age, type of secondary school completed (technical or comprehensive secondary school) field of first-cycle studies. There were 421 respondents in the survey carried out in 2019. In Poland, graduates from comprehensive or technical secondary schools are eligible to start university studies after obtaining the secondary school-leaving certificate. A technical secondary school is considered to be a

vocational school whose graduate receives the vocational title of "technician", e.g. an electrician technician.

Results and Discussion

As can be seen in Fig. 1, the answers of all respondents concerning the need for mentoring in the realization of professional careers were distributed in a similar way. Of them, 12% of the respondents declared that the realization of their professional careers did not require this support and 12% answered affirmatively. However, it can be noted that the respondents more often indicated the “Rather yes” (40%) than “No” answers (36%).

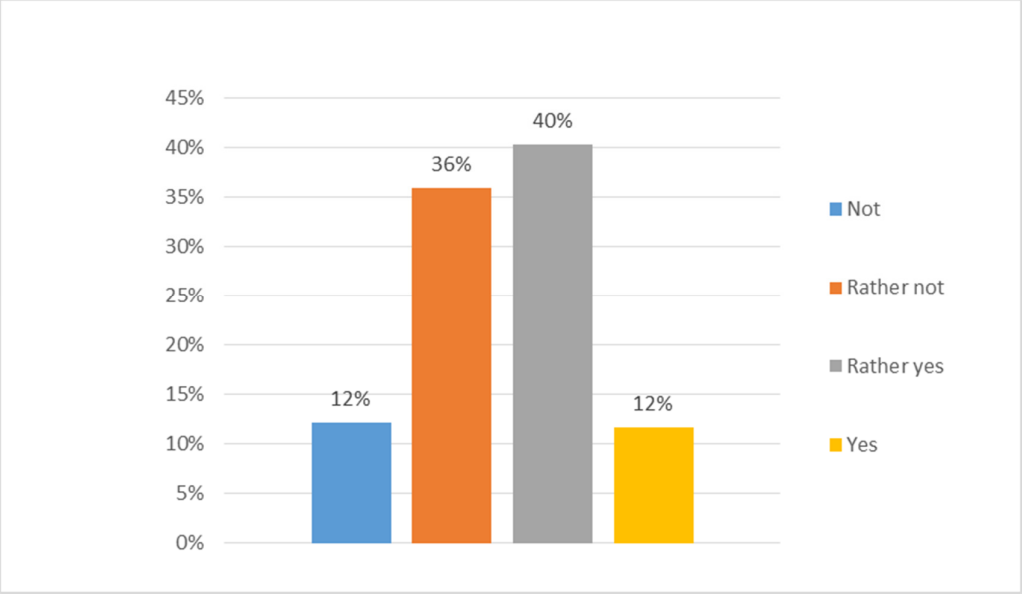

Fig. 1: Distribution of respondents' answers to the question "Does your professional career require support from a mentor?”

Source: author's own elaboration.

Men more often than women declared their mentoring needs (Figure 2), with 14% and 10%, respectively. In the overall assessment (“Yes” and “Rather yes” answers), men showed less needs in this respect (48%) than women (55%). Interestingly, 37% of the female respondents indicated that they rather did not need this support. It seems that this may be due to the growing awareness of women in terms of e.g. providing equal opportunities in business and economy.

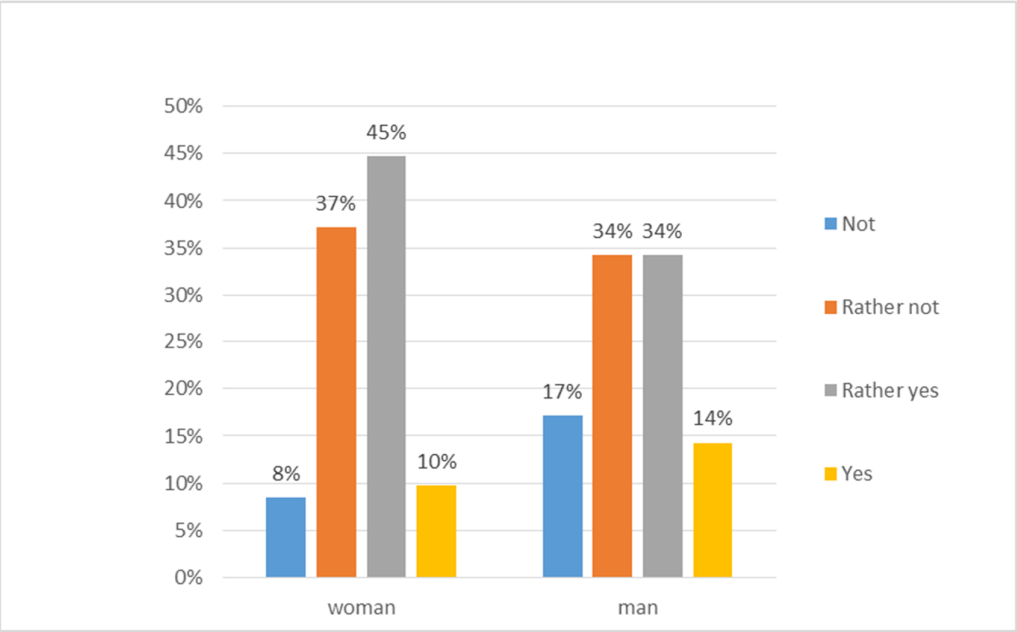

Fig. 2: Distribution of the answers to the question "Does your professional career require support from a mentor?" by gender of respondents

Source: author's own elaboration.

As shown in Fig. 3, the greatest demand for career support by mentors was shown by respondents of Generation Y (17% for "Yes", 39% for "Rather yes") and representatives of Generation Z (12% and 43%, respectively). We assumed Generation X is born in 1970-1983; Y (1984-1992); Z (1993 – upwards) (Lipka, 2017).This seems to be due to the personality traits typical of each generation. For example, it is often indicated that the members of Generation Z often show demanding attitudes, have difficulties with logical thinking and concentration, and consequently, they become independent very late. Furthermore, Generation Y shows the need for independence, but accompanied by someone who could be a mentor for them, and Generation X does everything independently, using the trial-and-error approach (Benson & Brown 2011; Smolbik-Jęczmień, 2013; Lipka, 2017).

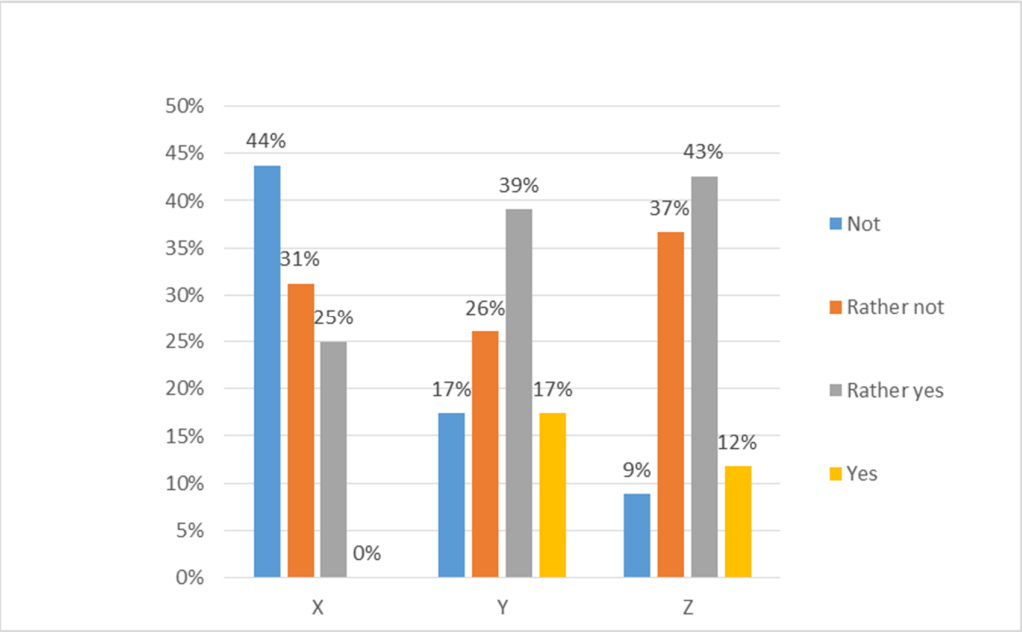

Fig. 3: Distribution of the answers to the question "Does your professional career require support from a mentor?" by being a member of a specific generation

Source: author's own elaboration.

The demand for mentoring in Generations Y and Z was also analysed by gender of respondents. In relation to female respondents, the following pattern was observed: women from Generation Y were more likely to say that they did not need mentoring support (53%) than representatives of generation Z (43%). The situation was different in the group of men. Men from Generation Y were more likely to declare that they needed a mentor (62%) than the members of Generation Z (50%).

Respondents who graduated from comprehensive secondary schools (Fig. 4) more often declared the need for support from a mentor for their professional careers (13% of "Yes", 41% of "Rather yes" replies) rather than those who graduated from technical secondary school. This may be due to the specifics of teaching in comprehensive secondary schools and technical secondary schools. The former schools prepare students for the secondary school final examinations, while the latter educate additionally for the examination confirming professional qualifications, which seems to guide young people to choose a particular profession, and at the same time to be more confident.

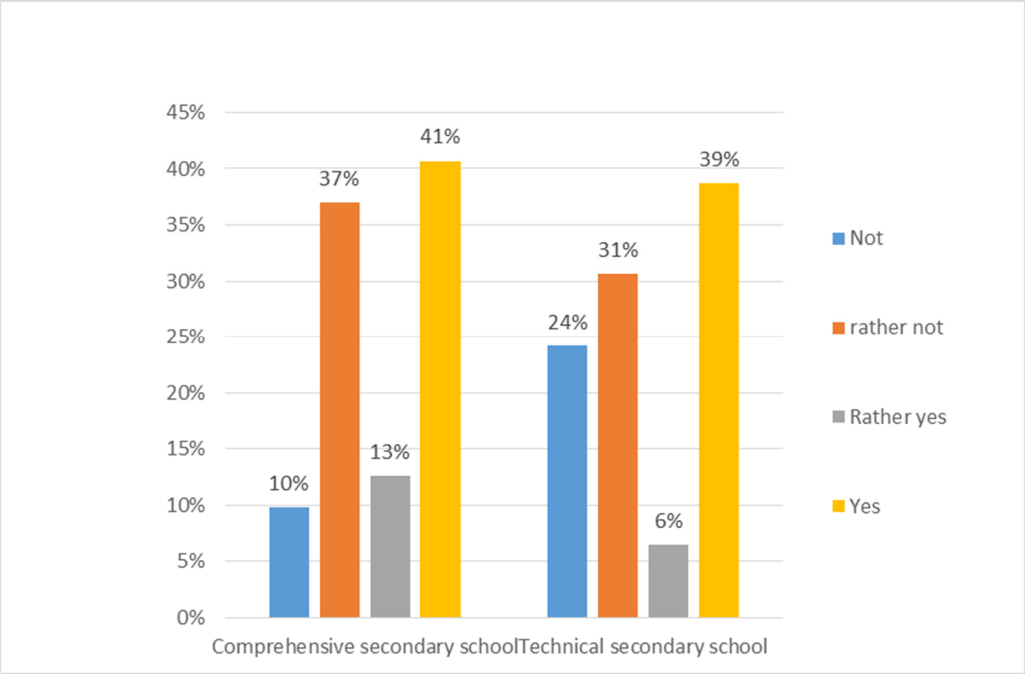

Fig. 4: Distribution of the answers to the question "Does your professional career require support from a mentor?" by the profile of the completed secondary school

Source: author's own elaboration.

As shown in Fig. 5, the profile of the university does not significantly differentiate the expectations of respondents in terms of support from the mentor. 50% of the respondents studying at economic universities declared the need in this respect and only 3% more respondents did so at technical universities.

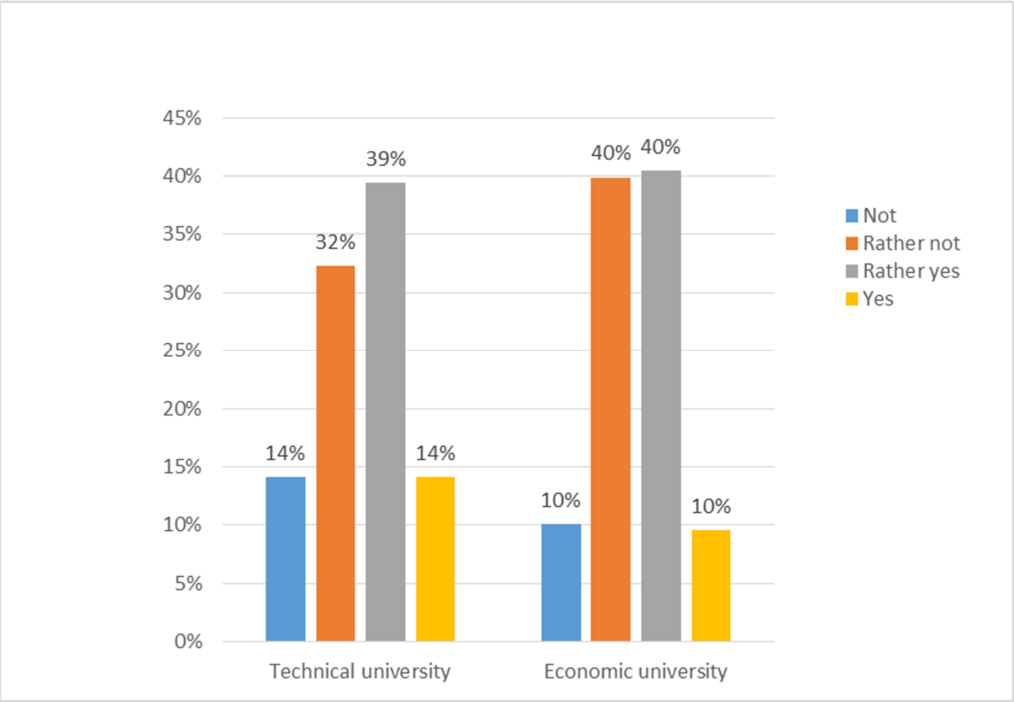

Fig. 5: Distribution of the answers to the question "Does your professional career require support from a mentor?" by the profile of the university

Source: author's own elaboration.

Analysis of the impact of a completed field of study on the needs of mentoring (Fig. 6) reveals, surprisingly, the high number of indications of respondents graduating from the courses related to technology, industry and construction (52% of "Yes" and "Rather yes"). This group consisted of graduates from the majors related to power engineering or construction. Respondents studying the natural sciences showed the least demand in these terms (33% of "Yes" and "Rather yes"). Among them there were mainly graduates of chemical, biochemical and biomedical studies. The same percentage of responses were recorded among the students majoring in the fields from the group of business and administration (e.g. finance, accounting, management and production engineering): 50% of the respondents considered that they needed the support of a mentor in the realization of their careers, whereas another 50% did not express such a need. The group "Others" includes graduates from fields related to education, tourism and recreation, agriculture, and philology. The greatest demand for mentoring was recorded in this group (65% of "Yes" and "Rather yes" in total).

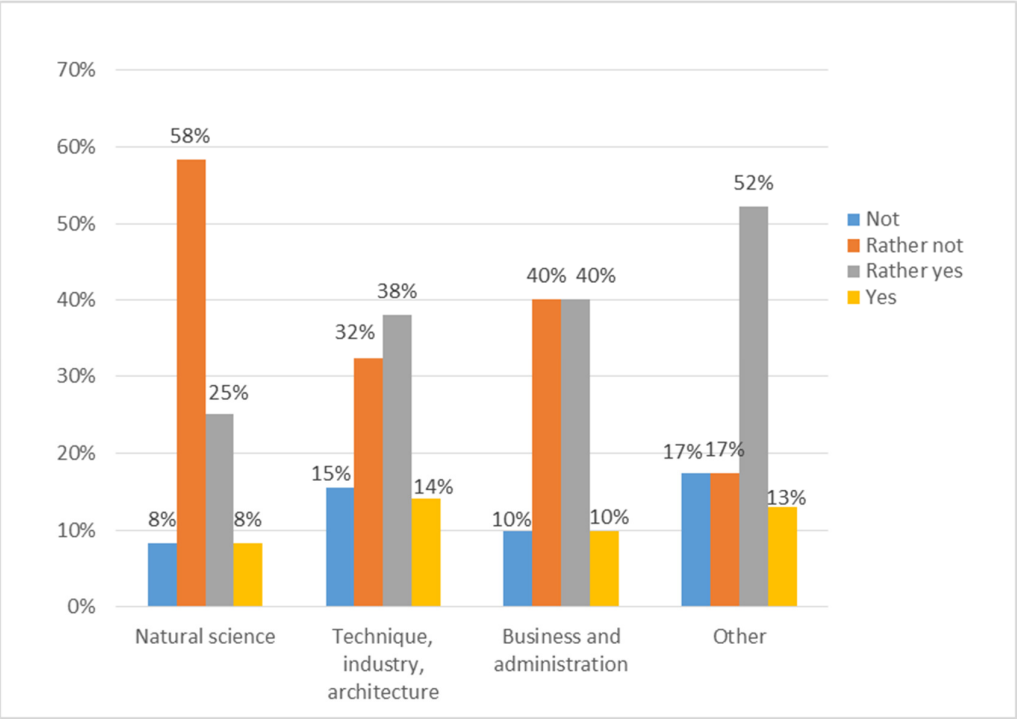

Fig. 6: Distribution of the answers to the question "Does your professional career require support from a mentor?" by the study major of respondents

Source: author's own elaboration.

Among men, the highest demand for mentoring was declared by graduates of faculties majoring in natural sciences (100%), while the lowest - in those studying business and administration (47%). In the group of women, the lowest demand for mentoring support was found for natural sciences (20%), while for other university majors, this ranged between 50% and 60%.

Conclusion

There is a widespread belief in the literature that the precondition for the success of mentoring programmes is the readiness of the potential mentee to communicate openly and his or her conviction (belief) about the high value of the potential mentor's competence. Against this background, the results obtained in the study seem to be worrying as only 12% of the respondents explicitly declared the need for support from the mentor. Superiors should check the quality of mentoring programs in their companies and effectively promote them. Our results also show the need to verify mentoring programs at universities.

We found that further research should focus on searching for links between the lack of the need for support from the mentor and the nature of the mentoring relationship experienced by the respondents, respondents' awareness of the potential benefits of participating in mentoring programs, assessment of the competences of candidates for mentors indicated in the respondent's enterprise, and self-assessed competences acquired by the respondents during their studies. Furthermore, assuming that the lack of interest in the help of a mentor may be due to the high self-assessment of competences, we considered the answer to the question whether people who continue their education and work show the need to take on the role of a mentor in their workplace (organization) as an interesting research problem.

Acknowledgment

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Optimization Model for Relocating Items in A Radio-Shuttle Compact Storage System

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Abstract

In block stacking storage systems, the warehouse management has to decide whether to apply dedicated policy and store only one item in a lane with undisturbed access to it or to apply shared policy and mix different items in a lane. In the former case, the storage space is not utilized at as high level as in the latter one. The radio-shuttle compact storage systems which allow to automatically store and retrieve items can compromise both criteria. In such systems, a lane is divided into channels and a channel is dedicated only to one item. In this way, both: the possible number of stored items and storage space utilization is increased in contrary to traditional block stacking systems with dedicated policy. However, when the channels are quite long the increased potential of storage space can be utilized on a moderate level. The goal of this paper is the analysis of the implementation problems of shared policy in the radio-shuttle compact storage systems. First, a MILP model that minimizes the number of relocated items is presented. Then, using simulations two different layouts of the radio-shuttle system are compared. The equations for storage space utilization for the analyzed layouts are presented. The research indicates that the system efficiency is still the compromise between the accessibility to the items and storage space utilization but the space dedicated for storage can be utilized on a very high level.

Keywords: Warehousing, Dense Storage, AVS/R Systems, Unit-Load Warehouses

Introduction

The warehouse managers face up the challenge of how to effectively use the storage space without losing the accessibility to the items. There are many reasons why the storage area should be efficiently utilized: heating, cooling, lighting and ventilating a warehouse consume a lot of energy, and the firms by costs reduction can improve the financial result and obtain the social perception as environmentally friendly (Boysen et al., 2017). Besides that, the storage space near agglomeration centers is limited and more and more expensive. For this reason, the storage has to be compact and the warehouse infrastructure can be even moved underground (Kaliampakos et al., 2016).

When the storage area is limited the dense storage systems can be applied. The example of such a system is the block stacking system, where pallets with stock keeping units (SKUs) are placed very densely in the warehouse (on top of one another) in lanes on a warehouse floor. In such a system, the items can be stored in pallets, boxes, marine containers, and steel plates (Kim and Hong, 2004). The SKUs are very often placed on top of each other in stacks. Matson et al. (2014) indicate a field where the block stacking is applied: "appliances, beverages, consumer packaged goods, frozen food, intermodal shipping containers, tires, bags of potting mix and fertilizer, and construction materials, such as cinder blocks, bricks, lumber, piping, and tubing". Two different concepts of storage policies can be adopted for block stacking: a dedicated policy and a shared policy. In a dedicated policy in a

lane only one SKU can be stored, while in a shared policy few different items can be mixed in a lane. The former concept guarantees direct access to all SKUs but the storage area is usually utilized on a moderate level. The latter one optimizes the storage area utilization with the risk of an enlarged effort for retrieving the item that is not directly available. In this case, the same SKU can be stored in different locations and lanes. The main goal while picking the ordered items is then the minimization of the number of relocated pallets that interfere the retrieving process.

The radio-shuttle compact storage systems divide lanes into channels and increase the possible number of stored SKUs without the necessity of relocating the interfering items. For layout and material flow purposes the channels are blocked together and all channels in one block have usually the same depth. In the compact radio-shuttle storage system the pallets with items are driven by the electric motor device called a shuttle. The shuttle follows the orders sent by the operator using a tablet with a Wi-Fi connection and runs on rails inside a storage channel. During the storage process, the shuttle automatically deposits the load in the first free placement location. The retrieving process can be performed by the same end of the channel or by the other end.

The inspiration for this paper was a real decision problem noticed by the Polish food industry manufacturer. Although the depth of the lanes was adapted to the production batch sizes, the problem of losing space for potential storage that guarantees the accessibility of items called honeycombing (Bartholdi and Hackman, 2017) occurred. Initially, production batches fill the whole channels, but the particular channel could not be filled again until it was completely cleared. The temporary loss of space in channels averaged on the whole storage system was quite substantial. That was the reason why the warehouse management considered a shared storage policy in a channel. In order to improve the picking process, the optimization model was discovered.

The remainder of the paper is organized as follows. In the next chapter, the literature review concerning both: dense storage and shuttle-based systems is shown. The description of the analyzed in this paper radio-shuttle storage system is the subject of chapter 3. Chapter 4 presents the mixed-integer linear programming (MILP) model for the optimal number of relocations during the picking process. The results of simulations for different layouts and numbers of picking items are included in chapter 5. The paper is concluded in chapter 6.

Literature Review

While order-picking, the main disadvantage of classical block stacking systems is that the pallets are stored on top of one another, and pallets located on the lower floor are not directly accessible. The problem of relocating blocks during the picking process has been analyzed very thoroughly. Kim and Hong (2004) propose the branch and bound algorithm for determining the locations of relocated blocks. Caserta et al. (2012) present the MILP model for solving the relocation problem and prove its NP-hardness. The appropriate heuristics with different sets of assumptions are proposed by e.g.: Caserta et al. (2009), Bortfeldt and Forster (2012), Forster and Bortfeldt (2012), Petering and Hussein (2013), Jin et al. (2015), Tanaka and Mizuno (2018). Quite a different approach to the problem of relocating blocks is presented by Boysen and Emde (2016). They analyze a special case of storage location problem called parallel stack loading problem (PSLP). The goal is to "intermediately store an incoming stream of items in a storage area consisting of parallel stacks so that they can, later on, be retrieved without excessive effort for relocating items".

The answer to the problem of limited accessibility in common block stacking systems is the automated unit-load storage and retrieval system. Considering the classification of automated systems presented by Azadeh et al. (2019), the systems analyzed in this paper are the autonomous vehicle-based storage and retrieval (AVS/R) systems with shuttles performing aisle-based multi-deep storage. In the literature, the single- or double-deep storage shuttle-based systems are better investigated than the multi-deep systems. For example, Malmborg (2012, 2013) presents the equations for a single-command and dual-command cycle times while the semi-open queuing network models for single-deep storage systems are presented by Heragu et al. (2011), Marchet et al. (2012), Roy et al. (2012, 2013, 2015) and Epp et al. (2017). A simulation study of single-deep AVS/R systems is performed by Lerher et al.

(2017). For multi-deep storage, Azadeh et al. (2019) describe the AVS/R systems with the only one-way stream of the items in the channel. The systems analyzed in this paper are more flexible, although for practical reasons the one-way stream is generally in use. The models for travel time are presented by Manzini et al. (2016). Tappia et al. (2017) develop queuing network models to estimate the performance of both: single-tier and multi-tier systems. A deep storage system based on autonomous shuttles and a stacker crane is modeled by Wang et al. (2020). Guerrazzi et al. (2019) use analytical models and simulations to investigate a deep-lane AVS/R system provided with an energy recovery module. The systems analyzed by the mentioned above authors slightly differ from the system analyzed in this paper.

Description of the radio-shuttle compact storage system

The radio-shuttle compact storage system considered in this paper is the system where lanes are divided into channels (each tier in a lane constitutes a separate channel) and in each channel, a different SKU can be stored (figure 1). Such a solution increases the number of different SKUs which can be retrieved without the necessity of relocating the interfering items. However, the problem of honeycombing may appear, especially when the lanes are quite long. In the mentioned in this paper a real case, the storage space has reached only the level of about 60%. This is the reason why the warehouse management considered a shared storage policy within a channel. The shared policy reduces the honeycombing effect and increases the number of different SKUs stored in a system. The lanes are usually the same capacity but the system is so flexible that when some obstacles (e.g. pillars supporting the roof) exclude the same storage depth in all lanes, some lanes can have a different lengths (figure 2). Access to the channels can be single-sided and double-sided. In the first case, the items have to be retrieved only according to the Last In – First Out (LIFO) method. In the second case, the First In – First Out (FIFO) method can be applied, too. For double-sided channels, the storage can be performed from both sides, but in the real storage system analyzed in this paper typically only one side was used. Although the system is flexible to change the location of the unoccupied slots from one side to another, from practical purposes such a process is not commonly used. First of all, the FIFO picking method is preferred. Moreover, the storage is performed at the side of lanes that is closer to the warehouse input point where the items arrive from production.

Figure 1: Compact radio-shuttle system (https://www.mecalux.co.uk/pallet-racking/pallet-shuttle)

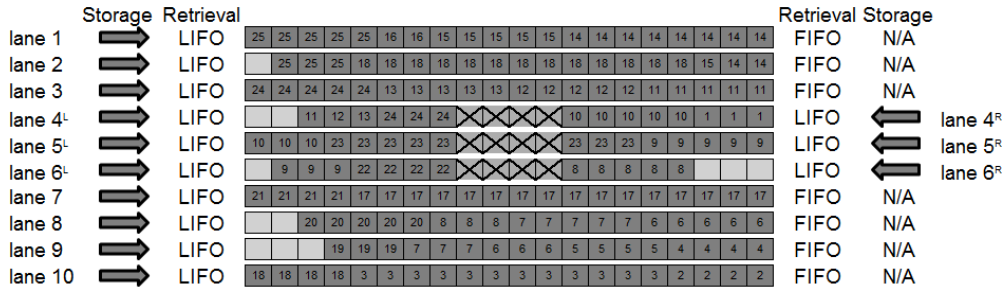

Figure 2: Layout example – 7 lanes with double-sided picking accessibility and 6 lanes with only LIFO access

MILP model for minimal number of relocating items

In the end-of-line warehouses in product flow manufacturing systems, the production batch sizes are often adapted to the depth of storage channels (and vice versa). Initially, the channel is completely filled, but the problem of honeycombing arises when in many channels only a few pallets are stored. In order to decrease the honeycombing effect a shared storage policy at least in some channels can be implemented. A shared storage policy increases the real storage utilization but access to some items can be impeded. In particular, one SKU can be stored in many lanes and channels. Then the decision problem arises on how to get the needed items: the selection of location from which the pallet should be extracted is crucial to reduce the picking effort connected with the need for relocation of blocking items. In this chapter the MILP model that minimizes the number of interfering items while picking a set of needed items (i.e. a customer order or a batch of orders) is presented. It is assumed that the storage of SKUs can be completely random, i.e. the same SKU can be stored in many lanes and channels. The depth of a channel is measured by the number of slots available for storing in this channel. In one slot one pallet with any SKU can be stored. Although the channels can have a different depth, for generalization purposes it is assumed that the depth of all channels is the same and equal to the highest depth value. If a channel is less deep then some unoccupied slots are left free at one of its ends. Similarly, not all slots in a channel have to be occupied by SKUs. For requirements of the model, a freely chosen slots can be empty, although in practice the pallets stored in a channel create a compact area. The picking policy (FIFO, LIFO or both policies) can be adjusted for each channel separately.
The notation used for the optimization model is as follows:

Indexes:

i – channel index, $i = 1, 2, \dots, I$,
j – slot index, $j = 1, 2, \dots, J$,
k – item (SKU) index, $k = 1, 2, \dots, K$,
Parameters:
I – number of channels,
K – number of SKUs stored in the warehouse,
J – maximum number of slots in a channel,
b_i^{FIFO} – FIFO picking accessibility to channel i, $i = 1, 2, \dots, I$,
$b_i^{FIFO} = \begin{cases} 1 & \text{when items stored in channel } i \text{ can be picked according to FIFO method,} \\ 0 & \text{otherwise} \end{cases}$
b_i^{LIFO} – LIFO picking accessibility to channel i, $i = 1, 2, \dots, I$,
$b_i^{LIFO} = \begin{cases} 1 & \text{when items stored in channel } i \text{ can be picked according to LIFO method,} \\ 0 & \text{otherwise} \end{cases}$
a_{kij} – item accessibility in the storage system, $i = 1, 2, \dots, I, \quad j = 1, 2, \dots, J, \quad k = 1, 2, \dots, K$,
$a_{kij} = \begin{cases} 1 & \text{when a pallet with item } k \text{ is stored in channel } i \text{ in slot } j, \\ 0 & \text{otherwise} \end{cases}$
d_k – demand on item k (in pallets), , $\quad k = 1, 2, \dots, K, \quad d_k \in \{0, 1, \dots, \sum_{i=1}^{I} \sum_{j=1}^{J} a_{kij}\}$.
Decision variables:

x_{ij}^{FIFO} – assignment of an item stored in channel i in slot j for picking from the other end of aisle than the storage process performs (binary),

$$x_{ij}^{FIFO} = \begin{cases} 1 & \text{when a pallet stored in channel } i \text{ in slot } j \text{ is picked according to FIFO method,} \\ 0 & \text{otherwise} \end{cases}$$

x_{ij}^{LIFO} – assignment of an item stored in channel i in slot j for picking from the same end of aisle as the storage process performs (binary),

$$x_{ij}^{LIFO} = \begin{cases} 1 & \text{when a pallet stored in channel } i \text{ in slot } j \text{ is picked according to LIFO method,} \\ 0 & \text{otherwise} \end{cases}$$

The MILP optimization model:

$$\text{Minimize} \quad \sum_{i=1}^{I}\sum_{j=1}^{J}\left(\left(x_{ij}^{FIFO}+x_{ij}^{LIFO}\right)\sum_{k=1}^{K} a_{kij}\right) \qquad [1]$$

subject to

$$\sum_{i=1}^{I}\sum_{j=1}^{J} a_{kij}\left(b_i^{FIFO}x_{ij}^{FIFO}+b_i^{LIFO}x_{ij}^{LIFO}\right) \geq d_k \qquad \text{for } k = 1, 2, \dots, K, \qquad [2]$$

$$x_{ij}^{LIFO} - x_{i,j+1}^{LIFO} \geq 0 \qquad \text{for } i = 1, 2, \dots, I, \quad j = 1, 2, \dots, J-1, \qquad [3]$$

$$x_{ij}^{FIFO} - x_{i,j+1}^{FIFO} \leq 0 \qquad \text{for } i = 1, 2, \dots, I, \quad j = 1, 2, \dots, J-1, \qquad [4]$$

$$x_{ij}^{FIFO}+x_{ij}^{LIFO} \leq 1 \qquad \text{for } i = 1, 2, \dots, I, \quad j = 1, 2, \dots, J, \qquad [5]$$

$$x_{ij}^{FIFO} \in \{0,1\} \qquad \text{for } i = 1, 2, \dots, I, \quad j = 1, 2, \dots, J, \qquad [6]$$

$$x_{ij}^{LIFO} \in \{0,1\} \qquad \text{for } i = 1, 2, \dots, I, \quad j = 1, 2, \dots, J. \qquad [7]$$

The objective function [1] minimizes the total number of pallets picked from the channels according to the picking policy (FIFO and LIFO) allowed in a particular channel. The sum $\sum_{k=1}^{K} a_{kij}$ can be only 0 or 1. If $\sum_{k=1}^{K} a_{kij} = 1$ then a slot j in channel i is occupied and the pallet can be picked. If $\sum_{k=1}^{K} a_{kij} = 0$ then a slot j in channel i is empty and does not affect the objective criterion. Constraints [2] guarantee that the demand for each item will be satisfied. The parameters b_i^{FIFO} and b_i^{LIFO} allow for picking items only from the proper side of the channel. As we want to pick an appropriate pallet, all pallets locating closer to the channel's end wherein we start picking have to be taken, too (constraints [3] and [4]). Constraints [5] ensure that each item can be picked only from one side of the channel. The decision variables are binary (constraints [6] and [7]).

Figure 3 shows an example of optimal solution for quite random storage and 14 pallets to be picked (SKU no. 1, 1, 1, 5, 5, 13, 13, 13, 15, 18, 18, 20, 20, 21, i.e. d_1=3, d_5=2, d_{13}=3, d_{15}=1, d_{18}=2, d_{20}=2 and d_{21}=1). The minimal number of retrieved items to fulfill the order is 24, which means 10 interfering pallets have to be relocated. In figure 3, the pallets that need to be retrieved are colored green, and the interfering pallets are colored red.

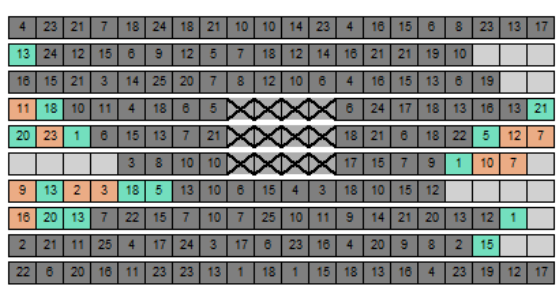

Figure 3: Optimal solution example – dark squares: pallets with SKU number; light squares: empty slots; green squares: needed items; red squares: interfering items; crossed out squares: area not available for storage

Items accessibility and storage area utilization

In this chapter, the simulations are used in order to check out how different warehouse layouts affect the accessibility of items and the storage area utilization. The system with both sides access to the channels is compared with the system with only one end of a channel available for both: storing and picking (LIFO method). The analyzed types of layouts are presented in figure 4. In the first layout type (called one-sided), only one aisle is available, and the lanes begin directly by the walls. In the second layout type (called two-sided), three picking aisles are available to allow picking from both sides of a channel, and a cross aisle for changing picking aisles is added. For each general layout type, five particular layouts with different numbers of lanes and lane depth are generated and compared.

For simulations, it is assumed that for each layout a total number of 3000 pallets can be stored. In each experiment, 300 different SKUs occupy random channels, lanes, and slots. Each SKU is stored in 7-12 pallets (scattered throughout the lanes, channels, and slots). The pick list consists of 10, 20, 30, 50 or 100 pallets with random SKUs. For each layout type, parameters, and pick list size, 10 replications of the simulation were performed. For each replication, the randomization process of storage of items and generation of a pick list was repeated and the optimal solution (using the MILP model presented in the previous chapter) was obtained.

Additionally, the storage space utilization for each variant of the layout was obtained using an analytical formula. For the calculations it was assumed that the slots are squares and the width of aisles is three times greater than the side of a slot.

The area occupied by storage system $V_{storage}$ is equal for both analyzed layouts and can be calculated using the equation:

$$V_{storage} = s_w L \cdot s_l J, \qquad [8]$$

where: L - number of lanes (summarized in both blocks), J – number of slots in a channel, s_w – width of a slot, s_l - length of a slot.

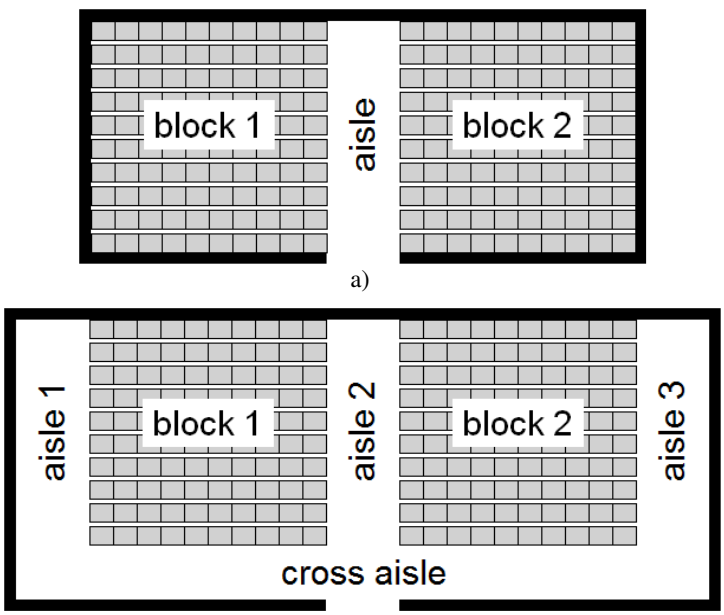

Figure 4: Two warehouse layouts: a) one-sided access to the channels; b) two-sided access to the channels

The area intended for aisles V_{aisles}^{layout} differs for both cases. In the first layout, there is only one aisle and one can use the following equation:

$$V_{aisles}^{layout\ a} = \frac{1}{2} s_w L r, \qquad [9]$$

where: r – aisle width.

In the second layout type, in order to access the channels from both sides, three aisles and one cross aisle have to be arranged. Then:

$$V_{aisles}^{layout\ b} = \frac{3}{2} s_w L r + (2 s_l J + 3r) r. \qquad [10]$$

Storage space utilization can be calculated using a general formula:

$$M^{layout} = \frac{V_{storage}}{V_{storage} + V_{aisles}^{layout}} \cdot 100\%, \qquad [11]$$

where $layout$ can be $layout\ a$ or $layout\ b$.

Table 1 shows the results of simulations for both types of layout. The calculations were performed using Open Solver - an add-on tool for MS-Excel (Mason, 2012). For all analyzed layouts it was assumed that the pallets are stored on five tiers (each lane consists of five channels). The first layout contains 10 quite deep lanes with 60 slots in each channel (this variant is only theoretical study, in practice such long channels are not available). For the one-sided type, the number of relocated pallets was about 3-3,5 times greater than the number of needed items, while for the two-sided type the number of interfering items was about twice greater than the number of items from pick-list. This type of layout had the worse values of the possible number of relocations. The best layout type for the criterion of items availability was, as expected, the one with the greatest number of quite short lanes (60 lanes with 10 slots in a channel). For a one-sided variant, only about 40% of retrieved pallets in the one-sided variant and 10-20% in the two-sided variant were the interfering items.

Table 2 contains the storage space utilization for all investigated layouts obtained using the formula [11]. For one sided layouts the storage space utilization can even exceed 90% and the highest value was obtained for the smallest number of deepest lanes. For two sided layouts the best utilization of storage area is when the blocks have a shape close to squares (the value of 68% of warehouse area dedicated for storage for 15 lanes grouped in a block with 20 slots in a channel). This layout is especially interesting as it has a moderate value of needed relocations.

Table 1: Average number of interfering items obtained for different layouts

Number of lanes	Number of channels in a lane	Number of slots in a channel	Number of interfering items									
			Two-sided	One-sided	Two-sided	One-sided	Two-sided	One-sided	Two-sided	One-sided	Two-sided	One-sided
			10 pallets		20 pallets		30 pallets		50 pallets		100 pallets	
10	5	60	20,8	38,3	41,0	70,0	53,7	105,7	102,7	161,8	206,8	346,0
20	5	30	9,2	19,2	16,7	33,7	24,7	53,5	40,5	87,8	117,7	216,2
30	5	20	3,3	10,5	9,7	23,5	14,0	35,8	28,5	62,5	64,0	134,5
40	5	15	2,7	8,2	4,8	13,7	8,8	26,2	17,2	41,8	47,7	112,7
60	5	10	1,2	6,2	4,0	11,0	5,0	15,0	8,3	36,5	23,3	68,5

Table 2: Storage space utilization

Number of lanes	Number of channels in a	Number of slots in a	Storage area utilization (%)	
			Two-sided	One-sided
10	5	60	58,14	97,56
20	5	30	66,89	95,24
30	5	20	68,03	93,02
40	5	15	66,89	90,91
60	5	10	62,70	86,96

Table 3: Average number of decision variables and constraints in the reduced models

Number of lanes	Number of channels in a lane	Number of slots in a channel	Number of decision variables			Number of constraints		
			From original model	Reduced for two-sided picking	Reduced for one-sided picking	From original model	Reduced for two-sided picking	Reduced for one-sided picking
10	5	60	6000	5760	2880	9200	5731	2851
20	5	30	6000	4880	2440	9100	4818	2378
30	5	20	6000	4120	2060	9000	4036	1976
40	5	15	6000	3620	1810	8900	3518	1708
60	5	10	6000	2693	1347	8700	2578	1231

Although the optimal solution for the MILP model can be obtained quite fast, the number of decision variables and constraints can be limited. It is reasonable to consider for calculations only the decision variables with available picking policy. Furthermore, there is no need to include in the model the channels without needed items. To contain in the model only required decision variables and constraints, a macro in Visual Basic constructing the "minimal size" model was written. Table 3 presents the sizes of original and reduced models. The highest values of reduction were possible for the layout with 300 channels (60x5) where the number of decision variables was reduced by 55% and 78%, while the number of constraints was diminished by 70% to 86% for two-sided and one-sided picking, respectively. For all analyzed problems the size of the model was reduced and the computation time was about 1 second.

Conclusions

The radio-shuttle compact system is a dense storage system in which the increased number of SKUs can be stored and picked in an uninterrupted way through the division of lanes into channels. However, in practice, the real storage space utilization can be limited as the honeycombing effect occurs. Then, the shared storage policy can be implemented and the picking process should be optimized in order to minimize the number of items needed relocation. The presented MILP model is quite fast, but for very large problems it can be adjusted to reduce the number of decision variables and constraints.

The highest values of storage space utilization can be obtained for a small number of quite deep lanes and only LIFO picking policy. Unfortunately, in the end-of-line warehouses in product flow manufacturing systems from the food industry, the LIFO method is not preferred due to the expiration date of items. Considering both side access to the items the area intended for storage should be square-like. In this case, the coefficient of storage area utilization achieves the highest possible value and the accessibility of items is limited in a moderate way.

For future work, we see the potential of the use of the PSLP algorithm for storage optimization. Boysen and Emde (2016) assume that picking priority values are known for all items. However, the storage decision in a radio-shuttle system is made under risk and uncertainty: while storing we can only try to estimate the probability distribution for the demand on SKUs. Although the total avoidance of the necessity of relocating items is impossible, it could be probably significantly reduced through the proper item assignment to the queue in a channel. The more smooth flow of the pallets through the channels can be achieved by order-batching, too. Another way for the reduction of the number of relocations is the establishment of the sequence of processing orders. Then the temporary easy accessible storage locations for relocated items needed for the next order should be thoroughly designated, too.

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Development of The International Business in Post-Industrial Economy

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Abstact

This article examines that transition of world economy to a stage of the post-industrial development, connected with increase in a share of non-material production and growth of information streams, significantly changes conditions of the international business and change logic of its maintaining.

Keywords: Post-Industrial Economy, International Business.

Introduction

The process of establishing a modern economy leads to a qualitative change in the nature of international business. The transition of the world economy to the stage of post-industrial development, associated with an increase in the share of intangible products and an increase in information flows, significantly changes the conditions of international business and, at the same time, the logic of its conduct. This necessitates a critical reconsideration.

At the end of the 20th century, leading developed countries have already formed a contemporary society. In the book by Anderson (2003), moreover, this innovative leap has led to an increase in the gap between the levels of development of the leaders' countries, in particular, between the United States and advanced European countries, on the one hand, and the remaining countries, on the other.

The processes of globalization and the development of information technology have become the basis for changing the logic of thinking from industrial to digital economy. New phenomena (including the monetary expansion, massive financial spillovers between different countries, the consolidation of companies and banks, and the growth of external debt) can no longer be explained by a traditional analysis of the development of the world economy.

Modern telecommunication systems have greatly simplified the problem of contacts between transaction partners and coordination of their decisions, regardless of geographic location. Now distance is no longer a limiting factor in international business.

The range of objects (goods) of commercial transactions is also actively expanding as social production develops, not only due to the emergence of new types of products and services, but also the inclusion of intangible assets, titles of property rights or claim rights in transactions. In the study by Harmon (2019) the fact that usually the consideration of world trade is limited to commodity circulation of goods and services seems to be a tribute to outdated traditions.

Along with states and transnational corporations, new participants are actively operating in the modern world market - international economic organizations, integration unions, international exchanges and auctions, rapidly growing megacities, and various informal economic unions. Many non-profit, public, political, religious organizations and even individual businessmen have a significant impact on the nature of international economic relations and thereby on the conditions of international trade, significantly complicating the process of commercial negotiations, real deliveries, transaction settlement.

Review of relevant studies and problem statement

The process of evolution and development of the world economy after the Second World War has been the subject of a large number of works by Russian and foreign researchers, where the problems of international business are considered in sufficient detail, and an assessment is also given of the features of globalization of the world economy. At the same time, an analysis of the publications of these authors leads to the conclusion that the approaches and conceptual positions that they advocate require a priority rethinking. According to Rana and Morgan (2019) research study, due to the fundamental change in the logic of conducting international business in contemporary economics, it is important to develop evidence-based approaches to forecasting new contours of international business.

In this article, the concepts of international trade and international business are not identical. International business is a broader concept, closer in meaning to the international economy, including, in addition to trade, investment operations, operations for the diffusion of innovations and intellectual activity results. Thus, by international business we mean the production and economic or investment activities of groups of companies, firms and enterprises with common economic or business interests that cover two or more states, or the economic activities of the parent company of the home country and its foreign branches or subsidiaries, as well as dependent enterprises. In this view, international trade is certainly an important, but not the only, part of international business.

Research Methodology

Forms, methods of conducting international trade transactions should naturally change depending on the characteristics of goods, services, and items of trade. These changes apply not only to the external, visible sides of trading operations. The principles of pricing of new goods, and above all, the intangible products of creative and intellectual work, as well as the principles of assessing the economic benefits of commodity transactions are changing, which, in fact, entails a change in the external forms and methods of trading operations. And all these changes relate to the essential, institutional characteristics of international business.

Navrotskaia et al (2018) mentioned that the statistical picture of international commodity flows is constantly changing under the influence of many factors - both the achievements of scientific and technological progress, and the successes of economic development of countries, and market turbulence in world markets, and the specifics of emerging interstate relations.

The volume of world exports as of 2018, according to the UN and the World Bank, exceeded 18 trillion. $ US and makes up about 21% of world GDP (figure 1).

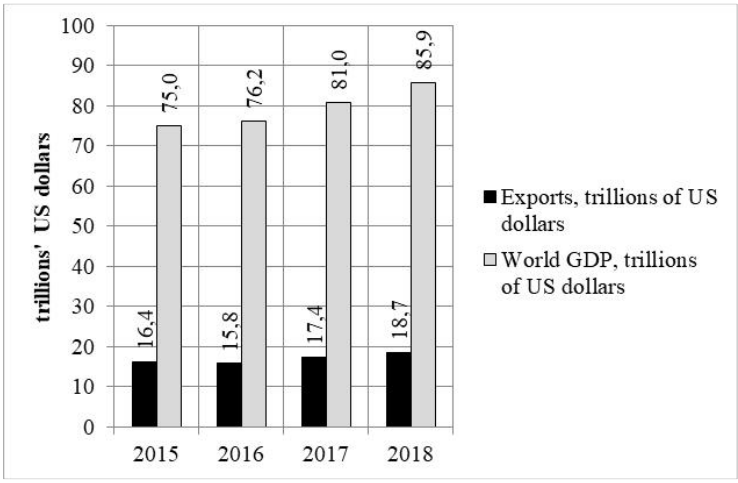

Fig. 1: Dynamics of world exports and GDP (2015-2018) (compiled by the authors; based on the World Bank national accounts data and OECD National Accounts data files (2018), UNSD Databases. International merchandise trade (2018))

As a rule, when considering statistical data on international trade turnover, the first thing that is noted is the high growth rate of its volume, or rather, relatively higher than the growth rate of the world's GDP. Indeed, for almost five post-war decades, world trade grew three times as much as GDP.

Among the main factors of this growth, it is necessary to highlight, first of all, scientific and technical achievements in industrial technology, which stimulated the developed capitalist countries' economy structural reorganization. These are due to the accelerated industrial products obsolescence, as well as the accelerated funds renewal, which entails an increase in international supplies of equipment and technology and an increase in the share (up to 10%) of annual product manufacturing renewal in world markets. According to Kotler et al (2019) the growing variety of products inevitably leads to a deepening of international production's specialisation, since no country in the world can produce the entire rapidly changing product range.

The World Bank national accounts data, and OECD National Accounts data files. Industry (including construction) (2018) show, however, despite such an impressive growth rate in international trade turnover, the share of industry in global GDP is declining (from 31% in 1995 to 25% in 2018),

The regional (country) structure of international trade turnover has not undergone radical changes over the past decades. Still, more than 70% of the total world trade volume is accounted for by the OECD countries, and, above all, by the EU countries, whose share consistently exceeds 30%. U.S. and Japanese exports are about 10%, respectively. For more accurate estimation of the regions' economic role as real world markets subjects, data on intraregional trade turnover within the EU, North America, Australia and New Zealand should be excluded from the general international trade statistical indicators. According to International statistical committee of the Commonwealth of Independent States (2019) the relative shares of the main world trade subjects are converging: the EU's share is about 32% in exports and imports in 2018, the U.S. and Japan's share is about 10%.

The exclusion of economic unions' statistical indicators of intraregional goods flows when considering general trends in the world trade development is methodologically quite justified. Katsioloudes and Hadjidakis (2007) showed that there are practically no customs duties and restrictions on the production's factors movement, and cross-country trade is intra-national in nature. These features are especially noticeable when considering trade in industrial products, in particular, accessories and components in mechanical engineering (for which, as already noted, the difference in statistical accounting in foreign trade and domestic trade turnover is most affected).

Intraregional trade, where the exchanging goods' conditions are more favorable, is growing faster than the world trade, which leads to increased interregional isolation in world trade.

Changes in the institutional structure of the international goods exchange system are no less important for characterising world trade than changes in its goods or regional structure.

An important factor that determined the world trade development at the turn of the 21st century was the active introduction of forward transactions in international trade. Such "fixed-term" contracts were concluded, as a rule, for the purchase of agricultural products, the delivery dates of which are clearly predetermined. In a research study by Blackburne and Buckley (2019) is shown that they spread to logging and mineral raw materials' mining, in order to attract the buyer's funds for their production.

Forward transactions are also used in financial markets. Futures trading, as a modern form of international trade transactions, with standardised conditions for the cost, time of performance and terms of obligations, formed in the foreign exchange market, returned and became the leading form of trade in the raw materials market. Ibrahim et al (2016) mentioned the introduction of the option trading principle, which gave rise to numerous forms of financial derivatives in the money market, is gaining recognition in other markets today.

But today, forward transactions are used for purely speculative purposes, often without any connection with the actual goods' exchange. A lot of contracts are signed by sellers who do not have real goods, and buyers who do not actually have money to pay for them. Such "forward transactions" have become a familiar tool of world trade, opening up the possibility of conducting not one, but a number of trade transactions for the sale and purchase, sale and resale of the same product until its actual delivery to the final buyer. The trade transactions' value is much higher than the specific products' value, that are repeatedly used as the object of trade transactions.

The introduction of the option trading principle, which has given rise to numerous forms of financial derivatives on the money-market, is gaining recognition in other goods markets.

It's not just trade statistics that are changing. The nature of relationships in global markets is changing. The increased forward transactions' risk level required strengthening the institution of intermediaries – market participants, who assume additional responsibility for fulfilling contractual trade transactions obligations. In a research study by Yao (2019) mentioned that the traditional bilateral deal between the product manufacturer and its consumer include new participants, among which an important place was taken by international exchanges and auction markets. They act as intermediaries for trade transactions, taking responsibility for the contracts execution.

Bilateral deals have not disappeared, they are necessary for many products that have individual characteristics. But for standard products that are more or less homogeneous in their quality characteristics (and these conditions are met by a significant part of mineral raw materials and food), selling through an auction market or goods exchange allows you to really expand the range of potential buyers, initiating a competition mechanism. According to Yang and Gabrielsson (2017), at the same time, the risks of foreign trade operations are reduced, due to additional performance bonds by the auction market or goods exchange.

Myasnikova et al (2018) emphasized that on the industrial products market the classic relationship between the seller and the buyer during a trade transaction – the transfer of ownership and responsibility for the product upon receipt of payment – does not stop, but continues in the industrial products' consumption sphere or rather its operation. The conditions of the industrial product's consumption significantly change this product's market value assessment.

Today, the trade transactions' mechanism is invariably integrated with the international cooperation's mechanism, where, as a rule, other tools are used.

The immateriality of new products has predetermined the objective necessity of pricing principles' changing and restructuring the competition's mechanism on the world markets. The absence of a direct relationship between the creative and intellectual products' market price and the direct costs of their production immediately required a change in the pricing logic, shifting the focus from measuring costs to evaluating the products' utility and potential profitability. Kahiya (2020) noted that the expediency of this approach has been confirmed in the currencies and financial assets markets.

The market of material goods still retains its previous pricing principles (at least in theoretical studies), but gradually obeys the new logic of the international goods exchange effectiveness' evaluating. Today, no one disputes the obvious fact that the real utility (and, consequently, the value) of modern industrial products largely depends not on their production's conditions, but on their consumption's conditions. No low price will increase the product's demand if there are no prerequisites for its effective use. The choice of information products, new technologies and engineering services on the market is determined not by cost savings, but by their actual consumption's utility.

Heathcote and Perri (2014) noted that on the non-material products markets, where the problem of effective quality control and the process of property rights' alienation are always most acute, there is a gradual introduction of forms and methods of non-trade relations – lease, hiring, delegations, trust, assignment of rights of claim and obligations, investment, joint production activities. As a result, the line between a classic international trade transaction and other forms of international commercial work and investment is blurred.

Results

Today, there is a problem related to the regulation of non-material goods' flows, because customs instruments are simply not effective for regulating them.

For many services, claim assignment agreements, trading operations on world currency and stock exchanges abroad, etc. there is simply no fact of crossing customs borders, and customs control relies on its registration.

It turns out, that as a result of objective changes in the forms and methods of conducting international business, new tools for international trade transactions regulation are required. Accordingly, the theoretical ideas about the forms and methods of conducting international business should also change. Similarly, states need to adapt to changing international business conditions in order to control the growing volume of commercial transactions involving non-material goods.

Conclusions

To sum up, it should be emphasized, that international business is currently undergoing profound changes, due to the growing share of commercial transactions with intellectual and creative goods, money and financial assets. Dislocations in the commodity composition of international trade change the relative effectiveness of the usual government external economic activity regulation methods and cause the new methods and tools' development and implementation in the international business practice.

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Regulation of Clustering Processes and Innovative Development of The Volga Federal District

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Abstract

The article deals with the analysis of investment, scientific, technical and institutional conditions for regulating clustering processes and innovative development of the Volga Federal dictrict (Volga region). The subject of the study is a modern mechanism for solving scientific and practical problems of clustering. The aim of the work is to summarize the main directions for state support of clusters in Russia and, in particular, in the regions of the Volga Federal district. The scientific novelty of the work lies in the identification of the most effective mechanisms for coordinated innovation and cluster development of regions. Main problems of regulation and factors of clustering processes and innovative development of Russian regions were also highlighted. The advantage of using the mechanisms of state support for innovation clusters that are successfully used in Russian regions is the possibility of forming a set of models for cluster development in order to select the optimal strategy of clustering the economy for each specific territory. It is concluded that the availability of innovative infrastructure and development institutions has a significant impact on the effectiveness of clustering processes and innovative development of economic systems in the Volga region.

Keywords*:* Innovation Clusters, Institutional Environment, Public Investment, Scientific And Technical Development.

Introdution

To date the theoretical and methodological foundations of coordinated regulation of clustering processes and innovative development of regions within the framework of Russian economic science are at the stage of active development. Implementation of the state policy to support innovative clusters based on the experience of successful Russian cluster initiatives, as well as on foreign approaches to the formation and support of clusters. The research is aimed at solving the problem of the absence of a complex model of clustering and innovative development of regional economic systems. Search is focused on identifying promising models of transformation of the economic space of the macro-region (Volga region), taking into account the heterogeneity of the distribution the factors of economic growth and development potential of innovation clusters.

As the most significant European cluster development programs, the leading Russian scientific school for the study of economic clustering processes, established at the Higher school of Economics (Abashkin, V.L., S.V. Artemov, A.N. Gusev, 2018), identifies the following: The Federal program for state support of innovative development of clusters in Germany "Spitzencluster Wettbewerb" (InnoRegio. Bundesministerium fur Bildung und Forschung, 2020); the state program for supporting the competitiveness of French clusters "Poles de Compultitivite" within the concept of "poles of growth" (Competitiveness Clusters in France, 2020). The fundamental contribution of this research team to the solution of this scientific problem is the analysis of the number and quality indicators for the development of innovation clusters in the Russian Federation, as a key aspect of the problem considered the influence of state programs on the processes of innovative development.

At the same time, it should be noted that the unadapted application of foreign experience in regulating the processes of clustering and innovative development of regional economic systems to Russian realities is not a rational approach to the practice of state regulation of the economy. Thus, V.

L. Abashkin, E. S. Kutsenko and E. A. Islankina (2016) note that of the 277 cluster initiatives they identified from 2008 to 2016, 170 (61.3%) were not implemented and ceased to exist, of which 123 cluster initiatives ceased to exist by 2012. Most of these initiatives did not correspond to the cluster model adopted in economic science and international practice and were a reaction of regional authorities and economic development institutions to changes in the market situation, in particular, the priorities of the Federal policy for regional economic development.

The relevance of the development of methodological foundations for regulating the clustering of the regional economy is focused on the following aspects of this scientific problem: determining the risks of implementing existing strategies for cluster development of the region, developing a set of measures to reduce the gap between the economic development of regions and their territories based on the formation of high-tech industries. Thus, the research is aimed at solving the scientific problem of searching for effective institutional forms and mechanisms of state regulation in the framework of the cluster model of development of the Volga macro-region in an innovative economy. Accordingly, the need to take into account both global and Russian-specific problems of improving mechanisms for regulating clustering processes has determined the purpose and objectives of this study.

The purpose of the study is to identify the main problems and effective mechanisms for regulating the processes of clustering and innovative development of regional economic systems. The study set the following **tasks**:

- analysis of the development features of innovation clusters formed in the regions of the Volga Federal district;
- identification of the main problems of regulation and efficiency factors of clustering processes and innovative development of economic systems in Russian regions;
- identification of effective mechanisms for regulating clustering processes and innovative development of economic systems in the regions of the Volga Federal district.

Research Methodology

The study is based on the dialectical method of scientific cognition, which involves the consideration of economic relations within the framework of innovative clusters in their relationship and development. In the course of the study, a systematic approach is widely used, which involves a comprehensive study and structural and logical ordering of the cluster as a complex economic system. The study also sought out methods of structural and comparative analysis, the solution of the scientific objectives of the research demanded the application of such theoretical methods as an abstraction and concretization, analysis and synthesis, induction and deduction, compare and contrast. The solution of scientific problems of the project requires the use of a set of statistical methods used by economic science, in particular methods of summary and grouping, sample observation, index method, the study of statistical relationships on the basis of correlation analysis.

For the regions of the Russian Federation the labor productivity index was calculated for the region's economy as a whole using the following formula:

$$I_{LP} = (I_{GRP} / I_t) \times 100\%,$$

where I_{LP} – the index of labor productivity;

I_{GRP} – index of the physical volume of the gross regional product in the main prices of the period t for the period t-1;

I_t – the index of total labor costs for the region of period t and period t-1.

Indicator of the average degree of depreciation of fixed assets in the region is the ratio of the accumulated depreciation of existing fixed assets by a certain date (the difference between their full accounting and residual book value) to the full accounting value of these fixed assets at the same date, as a percentage.

The methodology for evaluating clustering processes and innovative development of the economy is based on the author's own developments, as well as the following set of approaches to the study of cluster formation and development: cluster model of M. Porter (2009); neoclassical cluster model; Ö. Sölvell (2009) network model of interaction between organizations participating in the cluster; institutional model of the cluster of Ch. Ketels and G. Lindquist (2013). One of the basic concepts of the regional economy is the economic space that develops the initial ideas about the territory. The economic space is a rich territory, accommodating many objects and connections between them: settlements, industrial enterprises, economically developed and recreational areas, transport and engineering networks. Each region has its own internal space and connections with the external space. The main characteristics of economic space are: density (population, gross regional product, natural resources, fixed capital, etc. per unit area); location (indicators of uniformity, differentiation, concentration, distribution of population and economic activities, including the economic existence of developed and undeveloped areas); connectivity (intensity of economic relations between parts and elements of space, conditions of mobility of goods, services, capital and people, determined by the development of transport and communication networks).

The main problems of regulation and factors of efficiency of clustering processes and innovative development of economic systems in Russian regions. The study identified the main factors that influence the results of cluster initiatives in Russian regions. The main factor in the formation and development of innovation clusters is the level of development of the regional innovation system. We would like to emphasize that 27 innovative territorial clusters created within the framework of the Ministry of economic development program are located on the territory of the subjects of the Russian Federation that have a high level of innovative development, including an innovation infrastructure. The presence of science cities, special economic zones of technical and industrial types, and research complexes with the status of a closed administrative-territorial entity in their economic space has a significant impact on the synchronization of clustering processes and innovative development of economic systems in Russian regions (Russian cluster Observatory, 2020).

The key factor of cluster development for the Russian Federation is the implementation of Federal programs for state support of clusters in the region. In the regions of the Volga Federal district, 20 clusters out of 24 (83.3 %) received state support under Federal programs. Since 2010, the Ministry of economic development has launched a program to create cluster development centers in Russian regions. The program covered 33 regions of the Russian Federation where regional cluster development centers were established. In Volga Federal district cluster development centers were created in the following regions: Nizhny Novgorod region, Samara region, Ulyanovsk region, Penza region, Kirov region, Tatarstan, Bashkortostan, Udmurtia; Perm region. These regions of the Volga region have a high level of cluster activity, which makes it possible to include the presence of specialized cluster development institutions in the set of factors for effective regulation of clustering processes in the Volga region.

Note that all 28 clusters that do not participate in state programs to support cluster development are at a low level of organizational development. At the same time, 15 clusters located in 11 Russian regions that do not participate in Federal programs to support cluster development were created in regions where at the time of cluster creation there were no clusters that receive state support and no cluster development centers were created. In the Volga Federal district, there are 2 clusters created on the territory of 3 regions. The Association "Innovative territorial electrotechnical cluster of the Chuvash Republic" includes organizations located mainly on the territory of the Republic of Chuvashia, as well as the Republic of Mari El. Note Zarechenskiy cluster integration technologies (Penza region), created in 2010 and supported by the center for cluster development of the Penza region in the framework of the Ministry of economic development to support small and medium enterprises (Russian cluster Observatory, 2020).
There are also 8 clusters (3 clusters in the regions of the Volga Federal district) that do not participate in Federal programs to support cluster development, while those formed on the territory of the subjects of the Russian Federation, within the borders of which cluster initiatives that receive state support were implemented at the time of their creation, or cluster development centers were created.

The development of an integrated approach to the regulation of clustering processes in the regions of the Volga Federal district is due to the following economic and institutional problems:

– high risks of long-term investment in high-tech production;
– insufficient level of competitiveness of the industry, due to the preservation of a low level of motivation for a serious increase in labor productivity;
– differentiation of development of regional innovation systems, insufficient efficiency of market mechanisms for integration of education, science and business.

Let's look at these problems in more detail. The index of labor productivity in the regions of the Volga Federal district is presented in table 1.

Table 1: Labor Productivity Index in the regions of the Volga Federal district (as a percentage of the previous year)

The subject of the Volga Federal district	2014	2015	2016	2017	2017
Republic of Bashkortostan	104,5	103,4	100,3	101,1	103,0
Republic Of Mari El	104,1	107,9	104,2	96,8	104,9
Republic of Mordovia	103,6	108,3	101,8	104,0	103,2
Republic of Tatarstan	103,1	102,8	100,7	100,8	101,2
Udmurt Republic	102,2	103,4	100,6	101,4	101,3
Chuvash Republic	99,0	101,6	98,9	104,3	104,8
Perm region	101,5	104,0	100,5	95,7	106,3
Kirov region	102,2	102,5	100,3	100,5	101,1
Nizhny Novgorod region	103,8	103,7	98,7	103,9	101,1
Orenburg region	102,3	100,4	98,2	98,6	102,1
Penza region	104,2	104,0	104,2	96,1	104,8
Samara region	105,4	102,5	98,6	98,8	103,1
Saratov region	106,1	102,2	101,6	102,3	105,6
Ulyanovsk region	102,7	101,6	99,5	101,4	101,8

Data from the Federal state statistics service of the Russian Federation

Note the slow pace of productivity growth in the regions of the Volga Federal district, as well as the unstable nature of the dynamics (the presence of values less than 100%) of the index of labor productivity for 2013 to 2017 for these regions: Mari El, Chuvashia, Perm region, Nizhny Novgorod region, Orenburg region, Penza region, Samara region Ulyanovsk region. Also consider the degree of depreciation of fixed assets for the regions of the Volga Federal district (table 2).

Table 2: Depreciation of fixed assets in the regions of the Volga Federal district (%)

The subject of the Volga Federal district	2014	2015	2016	2017	2018
Republic of Bashkortostan	51,6	52,0	51,9	51,3	48,8
Republic Of Mari El	52,5	55,2	55,1	53,0	53,9
Republic of Mordovia	51,0	47,7	48,5	53,3	54,1
Republic of Tatarstan	54,7	48,8	49,9	44,0	41,4
Udmurt Republic	54,3	55,0	56,1	54,4	55,3
Chuvash Republic	48,1	47,3	49,0	50,0	50,3

Perm region	63,6	63,7	65,5	65,3	63,5
Kirov region	53,4	49,4	49,1	48,3	48,5
Nizhny Novgorod region	45,7	26,3	42,1	49,1	50,2
Orenburg region	55,1	54,9	57,1	56,9	56,5
Penza region	57,0	52,0	51,7	46,9	48,2
Samara region	51,4	51,2	51,0	51,1	51,2
Saratov region	50,6	53,0	54,1	53,1	53,7
Ulyanovsk region	43,9	45,2	48,2	48,1	45,8

Data from the Federal state statistics service of the Russian Federation

Note the high level of depreciation of fixed assets (more than 40%) for 2018 for all regions of the Volga Federal district, for the following regions from 2014 to 2018, the degree of wear increased: The Republic of Mari El, the Republic of Mordovia, the Udmurt Republic, the Chuvash Republic, and the Nizhny Novgorod region, Orenburg region, Saratov region, Ulyanovsk region. The need for an active role of the state and a comprehensive approach to the regulation of clustering processes in the Volga region is due to the following restrictions on the formation and development of clusters based only on market mechanisms:

– maintaining low productivity in the economic sectors of the regions that dominate the GRP structure due to the high level of depreciation of fixed assets;
– the predominance of capital-intensive, material-intensive and energy-intensive production capacities in the region's industrial structure;
– maintaining the limitations of the regional policy of improving the investment climate in the field of legal and personnel support.

Mechanisms of state support for clusters

The complexity of the approach to the regulation of regional clustering processes consists in taking into account all the main components of cluster development. As part of the implementation of the cluster policy of the Russian Federation, the author identified three" waves of clustering " of the economic space of Russian regions: the first – 2009-2011, the second – 2011-2013, and the third-2013-2016. In the third wave were created most successfully functioning today clusters (70 innovative and industrial clusters) consider the most effective mechanisms of state support of clusters and their effectiveness based on program data support pilot innovative clusters and industrial cluster support by the Ministry of economic development of the Russian Federation and the Ministry of industry and trade of the Russian Federation. The Ministry of economic development of the Russian Federation used the following mechanisms for state support of clusters:

1. public investment in the creation of innovative and educational infrastructure within the framework of cluster initiatives;
2. implementation of the cluster marketing package: formation of the brand and mission, development of intra-cluster cooperation for the purpose of competitiveness in foreign markets, holding events aimed at promoting the products of enterprises in the cluster of initiatives.
3. organizational and legal support for the implementation of cluster initiatives;
4. information and methodological support of the processes of formation and development of innovative clusters, including the examination of projects and development programs, analysis and forecasting of economic processes;
5. formation of personnel potential of cluster development through programs of professional retraining and advanced training of employees of organizations participating in innovation clusters.

We will also consider the effectiveness of the above mechanisms for state support of clusters for 2013-2015 (the largest number of successfully implemented cluster initiatives) in table 3 (the indicators are given in prices for 2013).

Table 3: Effectiveness of state support mechanisms for innovation clusters for 2013-2015

Performance indicator of state support for innovation clusters	2013.	2014.	2014 to 2013	2015	2015 to 2014	Total for 3 years
Total amount of public investment in the development of innovation clusters, billion rubles.	31,35	34,06	109%	33,21	98%	98,62
Total volume of private investment in the development of innovative clusters, billion rubles.	91,2	132,28	145%	139,4	105%	362,88
The volume of goods, works and services produced by participants of innovative clusters, trillion. rub.	1,54	1,71	111%	1,97	115%	5,22
Number of new (upgraded) high-performance jobs, thousand units.	27,2	32,7	120%	36,1	110%	96
Number of employees of organizations participating in innovation clusters who have undergone professional retraining and advanced training, thousand people	8,29	15,23	184%	16,22	107%	39,74

Calculated based on data from the Russian Ministry of economic development and higher school of Economics

We note the positive dynamics of cluster development indicators against the background of negative trends in the development of the Russian economy in 2014-2015. Thus, with a decrease in the volume of public investment in 2015, this figure was 98% by 2014.) the dynamics of private investment in innovative clusters is characterized by an increase of 5 %. In total, over the three analyzed years, the total amount of public investment in innovation clusters amounted to 98.62 billion rubles, and private investment 362.88 billion rubles. Accordingly, the key indicator of the effectiveness of state support for cluster initiatives, "the volume of attracted private investment per 1 ruble of public investment", is 3.67 rubles.

There was also a steady increase in the volume of production of goods, works and services within the territorial innovation clusters that receive state support, from 1.54 to 1.97 trillion rubles (127.9 %). One of the factors for the growth of production within clusters is the increase in costs for joint scientific and technical projects of organizations participating in innovation clusters. during the analyzed three years, the financing of these projects exceeded 75 billion rubles.

The number of employees of organizations participating in innovation clusters who have undergone professional retraining and advanced training amounted to 39.74 thousand people. The result of the implementation of this mechanism of state support for innovative clusters is an increase in output per employee of organizations participating in clusters from 2630 thousand rubles in 2013 to 2899 thousand rubles in 2014. At the same time, the number of new or upgraded high – performance jobs created at enterprises that are part of innovation clusters exceeded 96,000 in three years, in 2014 this figure increased by 120% and in 2015 by 110%. According to the Ministry of economic development of the Russian Federation, the performance indicators of enterprises in innovative clusters that receive state support significantly exceed similar indicators on average in the region of their localization. The average revenue from the sale of products by enterprises participating in innovative clusters in foreign markets exceeds the same indicator for other enterprises in the region by 20%, while the volume of innovative goods, works and services produced by 60%.

28 January 2016 the Russian Government approved the procedure of competitive selection of joint cluster projects, as well as subsidy costs at all stages of the product life cycle from development to serial production in the implementation of joint projects of enterprises of the industrial cluster (the

Government Decree No. 41 of 28.01.2016). It should be noted that the activities of the cluster participants, which can be used to compensate for the costs of the subsidy, have an innovative and technological orientation, in particular: independent or contract development of design documentation for products; technical testing of prototypes of new products, organization and launch of pilot production of these products; development and introduction of new technologies and technological processes into production; purchase of technical equipment for production facilities; acquisition of specialized software products, including ERP systems and their individual modules. Also, the Federal subsidy can be spent on technological re-equipment of enterprises participating in the cluster as part of payment of lease payments for fixed assets (Abashkin, V.L., S.V. Artemov, A.N. Gusev, 2018). To date, industrial clusters supported by the Ministry of industry and trade of the Russian Federation combine more than 590 industrial enterprises that employ more than 300 thousand people; the average revenue for the year is more than 1.3 trillion rubles, and the amount of tax deductions to the consolidated budget of the Russian Federation exceeds 155 billion rubles.

As a result of the analysis, the following conclusions were obtained. An integrated approach to the scientific problem of regulating the processes of clustering and innovative development of Russian regions is the study of the innovation cluster as a set of infrastructure components and interdependent functional contours. In the course of the study, the following conclusions and results were obtained. The main factor in the formation and development of innovation clusters is the level of development of the regional innovation system's human resources potential. A significant impact on the synchronization of clustering processes and innovative development of economic systems is provided by the presence of a developed innovation infrastructure and a system for training highly qualified personnel.

Based on the dynamics of performance indicators for state support of innovative clusters for 2013-2015, the author concludes that the mechanisms considered correspond to the tasks of regulating clustering processes and innovative development of economic systems in Russian regions at the current stage of cluster policy implementation. The work is addressed to the representatives of academic community and a wide circle of practitioners, scientific and practical significance of the research lies in the possibility of further use of the results obtained in the framework of scientific discussions in a designated field of economic knowledge, as well as the application in practice of management the processes of formation and development of innovation clusters.

The main priority of this stage of the cluster policy was to strengthen the transfer of innovative technologies to the real sector of the economy and the integration of enterprises and scientific and educational organizations of innovative clusters within a single innovation ecosystem. The following mechanisms of state support for clusters were used: public investment in the creation of innovative and educational infrastructure in the framework of cluster initiatives; implementation of a complex of marketing of the cluster: the formation of brand and mission, the development of intra-cluster cooperation with the objective of competitiveness on foreign markets, carrying out activities aimed at promoting the production of enterprises cluster initiatives; organizational support of implementation of cluster initiatives; information and methodological support of the processes of formation and development of innovation clusters; formation of the personnel potential of cluster development through programs of professional retraining and professional development of employees.

Conclusions

In the course of the study, the following conclusions and results were obtained. The main factor in the formation and development of innovation clusters is the level of development of the regional innovation system. The presence of a developed innovation infrastructure has a significant impact on the synchronization of clustering processes and innovative development of economic systems in Russian regions. 27 innovative territorial clusters created under the program of the Ministry of economic development are located on the territory of subjects of the Russian Federation that have a high level of innovative development.

The following mechanisms of state support for innovative clusters that are successfully used in Russian regions are highlighted: state investments for creating innovative and educational infrastructure, building a brand and mission, developing intra-cluster cooperation for the purpose of competitiveness in foreign markets, organizational and legal support for the implementation of cluster initiatives, information and methodological support for the formation and development of innovative clusters, expertise of development projects and programs, analysis and forecasting of economic processes, formation of the personnel potential of cluster development through programs of professional retraining and professional development of employees of organizations participating in innovative clusters.

As a debatable frame of study of the issue, it is necessary to highlight the possibility of building an adequate approach to modern Russian conditions to synchronize the processes of clustering and innovative development of the economic system of the regions. The development of methodological bases of regulation of clustering processes and innovative development of economic systems of Russian regions is focused on the following additional aspects of this scientific problem:

1. The development of a unified system formally clear quantitative criteria for identification of regional industrial clusters, innovation clusters, multi-cluster formations, as well as their differentiation from territorial production complexes, quadilateral etc.
2. Development of an interrelated set of methods and tools for the formation of an empirical base for a coordinated study of the spatial, sectoral, infrastructural and institutional structure of clusters.
3. Development of methods for studying the evolutionary dynamics of clusters through the comparison of changes in the internal structure of the cluster and identification of models for the implementation of these changes in the economic space of the region.

The target group of consumers of the results of scientific activities includes officials, state authorities and local self-government of constituent entities of the Russian Federation, Federal Supervisory authorities, utilities companies and other bodies of coordination and management clusters, the management of industrial enterprises, institutions of territorial and sectoral development. The obtained scientific results will be the theoretical and methodological basis for analytical and project activities in the following areas:

1. methodological support for the formation and development of regional industrial and innovative clusters, analysis of the effectiveness of the implementation of measures of state support for cluster initiatives;
2. organizational design of development institutions and objects of the innovation infrastructure of clusters as the basis of its investment attractiveness;
3. formation on the basis of the cluster concept of an integrated approach to the policy of territorial development of municipalities.

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Towards Smart and Sustainable Manufacturing – an Overview

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Abstract

On the perspective of sustainability the Smart manufacturing (SM) has the potential to bring fundamental improvements. Technology influences and interacts with the economic dimension (e.g. it allows new business solutions), with the environment (e.g. providing solutions to nature and resource conservation) and with the society (e.g. it supports new living models), besides acting as a powerful tool to give resources for "meeting the needs of the present generation without compromising the ability of future generations to meet their own needs". In other words, it is not possible to look for solutions to the sustainability manufacturing issue without considering technology as an integral component of the development. This paper presents a literature review identifying themes and trends of smart manufacturing and their expected effect on sustainable manufacturing. The findings from the literature survey show potential effect of the smart manufacturing technologies on sustainability.

Keywords: Smart Manufacturing, Industry 4.0, Sustainable Manufacturing,

Introduction

Since the end of the 1980s, because of the "Our common future" report published by the World Environment and Development Committee, politics, economy and science have been dominated by the term "sustainable development". In the Report, "sustainable development" has been defined as a "process of change, in which exploitation of resources, new investments, orientation on technology development and institutional changes are focused on the current and future needs of society". In order to deal with serious issues such as environment pollution and global warming the concept of sustainable manufacturing was proposed. Bonvoisin et al. (2017) defined the sustainable manufacturing scope in four areas: (1) manufacturing technologies –"how things are produced"; (2) product development – "what is being produced"; (3) value creation networks –"in which organizational context" and global manufacturing impacts – "how to make a systemic change". For manufacturers sustainability has been emerging as a new competitive requirement. Companies that choose to become more sustainable in their everyday practices adopt goals and targets consistent with sustainable manufacturing principles and develop goals and strategies for their implementation, implement them and measure their effectiveness.

From the other hand, the emerging technologies such as Internet of Things (IoT), wireless sensor networks, big data, artificial intelligence, cloud computing, and mobile Internet) are being introduced into the manufacturing environment. In the literature on manufacturing, the changes are referred to as the next industrial revolution, which is often referred as "Smart manufacturing" (predominantly used in the USA), "Industry 4.0" (predominantly used in Germany/Europe) and "Smart Factory" (predominantly used in Korea/Asia/Europe) (Kang et al., 2016;Thoben et al, 2017). The Boston Consulting Group (BCG) has proposed nine pillars of Industry 4.0 namely the use of the cloud, augmented reality, big data and analytics, autonomous robots, simulation, horizontal and vertical integration, the industrial Internet of Things, additive manufacturing and cyber security (Rüßmann et

al., 2015). According Rüßmann et al. (2015), these characteristics represent the behavioural and other shifts that enable company to operate according to the principles of the new manufacturing paradigm. Manufacturers and scientists alike have high expectations of new technologies of Industry 4.0 including modern modelling methods (Waszkowski, 2018). Industry 4.0 technologies can provide manufacturers with the ability to leverage advanced manufacturing and IT capabilities throughout the entire product life cycle, thus enabling more efficient and sustainable manufacturing processes.

Industry 4.0, and Sustainability are important concerns for the manufacturing companies, principally, the influence of Industry 4.0, in the three main pillars of sustainability: economic, environmental, and social. The purpose of this paper is to present a literature review identifying themes and trends of smart manufacturing and their expected effect on sustainable manufacturing.

Literature Research

Smart Manufacturing

Smart manufacturing, a term originated in the United States has gained significant momentum in industry and academia in recent years. Many manufacturing systems are presenting themselves as SM systems. However, although the term "smart manufacturing"is very often used in the literature, there is still a lack of a unified definition of SM and commonly accepted understanding about what defines a manufacturing system as "smart" (Qu et al., 2019). Intelligent manufacturing, additive manufacturing, digital manufacturing, smart factory, smart manufacturing and Industry 4.0 are actually being used synonymously. Some examples of definitions of SM are introduced in the table 1.

Table 1: Smart manufacturing definition – examples

Author	Definition
NIST	"fully-integrated, collaborative manufacturing systems that respond in real time to meet changing demands and conditions in the factory, in the supply network, and in customer needs"
Wallace & Riddick, 2013	"a data intensive application of information technology at the shop floor level and above to enable intelligent, efficient and responsive operations"
Davis et al., 2015	"is a set of manufacturing practices that use networked data and information and communication technologies (ICTs) for governing manufacturing operations"
Smart Manufacturing Leadership Coalition, 2011	"is the intensified application of advanced intelligence systems to enable rapid manufacturing of new products, dynamic response to product demand, and real-time optimization of manufacturing production and supply chain networks"

According (Qu et al., 2019) the key objective requirements of SM are: autonomous lean operation (Autonomous operation, Lean manufacturing), Sustainable value (Economic value, Environmental value and Social value) and Win-win partnership (Multi-stakeholder such as customer, supplier, communities and manufacturers). Smart manufacturing characteristics include digitalization and service-orientation, smart devices and smart software, collaborative supply networks enabled by advanced analytics tools, with the goal of enabling cost-efficient, flexible, and personalized mass-production (Radziwon et al., 2014, Grzybowska et al., 2014; Lu, et al. 2016). The differences between a today's factory and an Industry 4.0 factory are presented in the table 2.

Table 2: Comparison of today's factory and Smart/Industry 4.0 factory (Lee et al., 2014)

Lewel	Data source	Today's factory	Factory 4.0	
		Key attributes	Key attributes	Key technologies
Component	Sensor	Precision	Self-Aware Self-Predict	Degradation Monitoring & Remaining Useful Life Prediction
Machine	Controller	Productivity & Performance	Self-Aware Self-Predict Self-Compare	Up Time with Predictive Health Monitoring
Production system	Networked manufacturing system	Productivity & OEE	Self-Configure Self – Maintain Self - Organize	Worry-free Productivity

The technology represents main components of SM. Based on literature analysis, Mittal et al. (2019) identified 38 technologies that are associated with SM, for example: Intelligent control; Augmented Reality (AR), Virtual Reality (VR), real-time communication, big data, IoT, Cloud computing, additive manufacturing, smart sensors, data analytics, predictive analytics, data visualization, GIS, RFID, simulation, etc. With the implementation of these technologies, the manufacturing industry will be enabled to dynamically change its performance levels to meet fluctuating customer and stakeholders demand. The examples of definitions of SM/Industry 4.0 technologies are presented in the Table 3.

Table 3: Definitions of Selected SM/Industry 4.0 Technologies

Technologies	Definition	Authors
Additive Manufacturing	"the process of joining materials to make objects from 3D model data, usually layer upon layer, as opposed to subtractive and formative manufacturing methodologies"	ISO/ASTM 52900:2015
Cloud Manufacturing	"a new networked manufacturing paradigm that organizes manufacturing resources over networks (manufacturing clouds) according to consumers' needs and demand to provide a variety of on-demand manufacturing services via networks (e.g., the Internet) and cloud manufacturing service platforms"	Xu, 2012
Predictive Analytics	" the process of discovering meaningful patterns of data using pattern recognition techniques, statistics, machine learning, artificial intelligence and data mining"	Abbott, 2014
(Big) Data Analytics	"the process of applying serious computing power, the latest in machine learning and artificial intelligence, to seriously massive and often highly complex sets of information"	Microsoft, 2013
Augmented Reality	"a real-time direct or indirect view of a physical real-world environment that has been enhanced/*augmented* by adding virtual computer-generated information to it"	Wikipedia
RFID	"is a generic term for technologies that use radio waves to automatically identify people or objects from a distance of several inches to hundreds of feet"	Parkas et al., 2012
Cyber-Physical Systems	"systems that consist of physical and software components that are deeply intertwined, each operating on different spatial and temporal scales, exhibiting multiple and distinct behavioral modalities, and interacting with each other in a myriad of ways that change with context"	NSF, 2010

Smart manufacturing is not only related to the technological development, but also related to the dynamic requirements of stakeholders. Smart manufacturing systems get real-time data which improves the

accuracy of decision making and enhances the efficiency and performance of the manufacturing processes and equipment.

Sustainable Manufacturing

Manufacturing systems have spanned fourth major phases: mass production, lean manufacturing, green manufacturing and now sustainable manufacturing. First, mass production introduced the principle of improving job efficiency in place of improving labor productivity. Second, globalization triggered manufacturers to adopt lean manufacturing principles of waste reduction and continuous improvement. Third, increasing demands for eco-friendly products from customers and environmental concerns triggered manufacturers to adopt green manufacturing principles, and the forth, social responsibility have motivated sustainable manufacturing (Jasiulewicz-Kaczmarek, 2019). According to the definition provided by the Department of Commerce in the US, Sustainable Manufacturing is "the creation of manufactured products that use processes that minimize negative environmental impacts, conserve energy and natural resources, are safe for employees, communities and consumers, and are economically sound". Sustainable manufacturing is defined in many ways (as a strategy or approach, as a paradigm or a system, as a process or a feature), depending on the author and the direction of their research. Examples of the "Sustainable manufacturing" definitions are shown in Table 4.

Table 4: Sustainable manufacturing definition – examples

Authors	Definition
LCSP, 1998	"creation of goods and services using processes and systems that are non-polluting; conserving of energy and natural resources; economically viable; safe and healthful for employees, communities and consumers; and socially and creatively rewarding for all working people"
Garetti & Taisch, 2012	"the ability to smartly use natural resources for manufacturing by creating products and solutions that, thanks to new technology, regulatory measures and coherent social behaviors, are able to satisfy economic, environmental and social objectives, thus preserving the environment, while continuing to improve the quality of human life"
Moldavska & Martinsen, 2018	"a complex behaviour pattern to which any manufacturing organization should tend to evolve"

Rachuri et al. (2010) argue that sustainable manufacturing can be viewed as a systems approach for the creation and distribution (supply chain) of innovative products and services that minimizes resources (e.g., materials, energy, water, and land); eliminates toxic substances; and produces zero waste across the entire life cycle of products and services. According to Lee at al. (2017) "in all definitions, sustainability within a manufacturing system must be considered in the context of a closed system using spatially- and temporally-defined boundaries".

Literature studies indicate that the main expectations of sustainable manufacturing system are (Kannegiesser & Günther, 2014; Gola 2019; Kishawy et al., 2018): to reduce the energy consumption, minimize the waste, improve the product durability, decrease the environmental and health concerns, enhance the quality of the product, and develop renewable energy resources. To meet these expectations, developing adequate strategies, introducing them to the company's everyday practices and measuring the results of their effectiveness are required. Manufacturing strategies based on these pillars of sustainability were the impulse for developing numerous practices and projects undertaken by companies. The majority of studies on sustainability practices have tackled mainly environmental practices such as eco-design, renewable energy usage, energy and material optimization, recycling, product life cycle management, waste minimization and noise reduction (Paszkowski & Sobiech, 2018; Paszkowski, 2019). Regarding social sustainability the most often implemented practices, specifically about workers are: internal safety inspections, external work environment audits, employee training on

hazardous risks, health and safety management systems, training plans and career development programs (Jasiulewicz-Kaczmarek, 2018). With regard to economic sustainability the most often implemented by manufacturing organization practices are e.g. financial KPI measurement, monitoring and assessing the business objectives, and technology investment prioritization.

Despite the fact that the literature provides numerous strategies and practices supporting the implementation of sustainability in manufacturing e.g. based on: TBL (Rosen & Kishawy, 2012), product life cycle (de Bruckeret et al., 2013), stakeholders (de Bruckeret et al., 2013; Matos & Silvestre, 2013), supply chain management (Giovanni & Vinzi, 2012), it is still a significant challenge for practitioners. According Dubey et al. (2017) and Luthra et al. (2016), the main barriers of sustainable manufacturing are, among others,): lack of expertise and experience that people of the organization should have in the field of sustainability, especially environmental sustainability, lack of collected and analyzed data from the flow of materials and energy leading to savings and reduced pollution, lack of sustainability standards and appropriate regulations, lack of top management commitment to initiate sustainability efforts, lack of technology and infrastructure readiness, etc.

Smart and Sustainable Manufacturing

Smart manufacturing and sustainable manufacturing are important themes in manufacturing enterprises. Recently, some studies (e.g. Machado et al., 2019; Varela et al., 2019) have identified several interlinks between Industry 4.0 technologies and sustainable operations. De Man and Strandhagen (2017) discuss the influence of Industry 4.0 on sustainable business models, Kamble et all, (2019) focus on the effects of Industry 4.0 technologies on Lean Manufacturing Practices for sustainable organizations. Figure 1 describes the three application areas and technical enablers from Industry 4.0. The technology enablers (presented in the outer rim of the circle) include smart sensors, smart maintenance, robotics, smart logistics, machine-to-machine communication (M2M), monitoring tools and others.

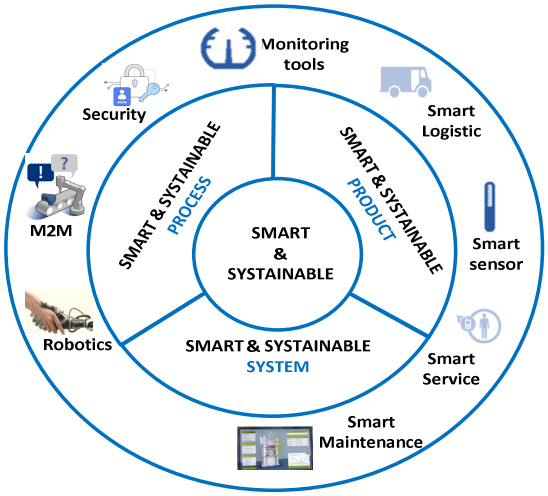

Fig. 1: Opportunities from Industry 4.0 for sustainability, and its key enablers.

In the manufacturing context, a **product is defined as smart** if it has the ability to know its state, position, history, target product and flow alternatives. According Wright (2014) and Almada-Lobo (2016) smart products in manufacturing currently use sensing systems to monitor their behaviour. The 'smart' concept connotes products that are intelligent. Thus, decision-making processes therein use artificial intelligence control algorithms such as fuzzy logic and genetic algorithms, which play a crucial role in information processing (Molina et al. 2014).

An **smart & sustainable (S&S) product** could comprise a physical structure, sensors, actuators, a smart module (for information processing and control), a wireless module, wireless data transmission and user interfaces, which may be even automatically generated (Waszkowski, 2019). The concept of sustainability is represented by a description of the three phases of a product's life cycle: Beginning of Life (BOL), Middle of Life (MOL), and End of Life (EOL). Table 5 shows the lifecycle phases and the related factors that are classified according to the triple bottom line to be considered during an S&S product development process. S&S products are a new generation of products. These products take advantage of the concomitant resources (connectivity, flexibility, customization and environmental care, among others) and consider sustainability in economic, social and environmental terms

Table 5: Sustainability considerations throughout different stages of an S&S product's life cycle

	Sustainability dimension	**Economic**	**Environmental**	**Social**
Phases of a product's life cycle:	BOL	• Raw material cost • Production cost • Packaging cost • Energy cost • Transportation cost	• Production energy • Hazardous wastes • Renewable energy	• Social responsibility • Work safety • Ergonomics
	MOL	• Maintenance cost • Repair cost • Consumer injury • Consumer warranty	• Emissions • Functionality • Hazardous wastes	• Product pricing • Human safety • Upgradeability • Complaints
	EOL	• Recycling cost • Disassembly cost • Disposal cost • Remanufacturing cost	• Recyclability • Re-manufacturability • Redesign • Landfill contribution	• Take back • Reuse • Recover

In **production processes "smartness"** is achieved using electronic hardware/software, as well as networking of production resources. Compared with traditional manufacturing, more ancillary hardware and software, like RFID tags, barcodes, laser markers, sensors, as well as communication infrastructure, will be embedded into the factory to enable machines to collaborate with each other using intelligent analytics.

From the system layer, by collecting, monitoring, and analysing data collected from relevant sources within and beyond the manufacturing system itself, smart manufacturing system provide information to decision makers. In this way, smart manufacturing system can help manufacturers identify and respond to system-level manufacturing inefficiencies (Dornfeld et al., 2009).

According to Kusiak (2019) "the scope and implications of sustainability is much larger than any other attribute of sustainability and it makes an important characteristic of smart manufacturing". Implementations of Industry 4.0 technologies in production processes have several sustainability impacts. The illustration (Figure 2) from the Boston Consulting Group shows some of these possibilities.

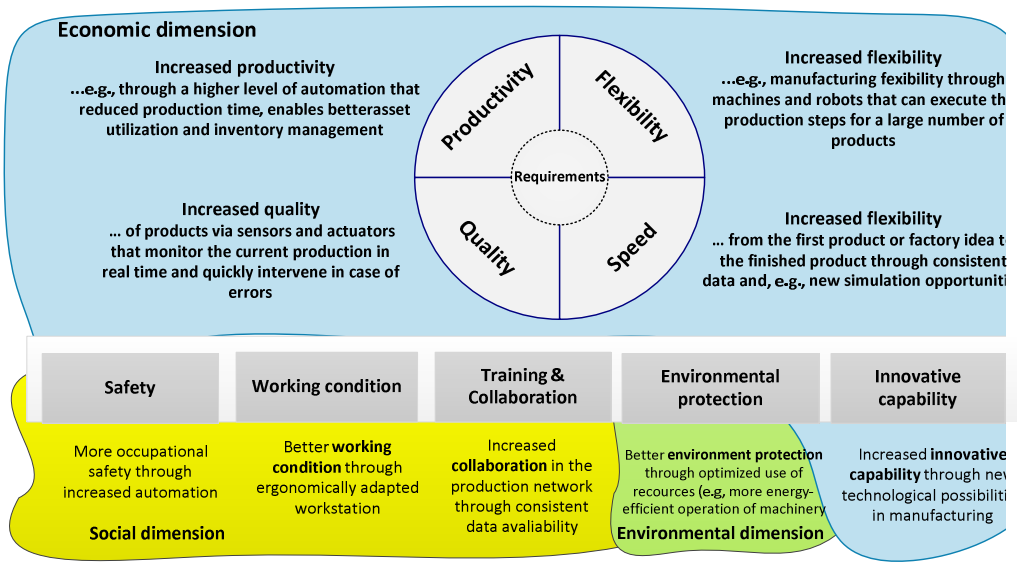

Fig. 2: Benefits from Industry 4.0 technologies (based on Rose et al., 2016)

Referring to the economic perspective of sustainability, transparency and interconnection of processes allow their optimization, increasing efficiency, flexibility, quality, and customization (Demartini et al., 2019; Juszczyński & Kowalski, 2013). Regarding the ecological dimension of sustainability, Industry 4.0 enables several benefits, too (Jabbour et al., 2018). This is based for example on simulation (Müller et al., 2018), digitalization (Burritt & Christ, 2016, Doni et al., 2019) and additive technologies (Bonilla et al., 2018). Finally, with regards to the impact on the social dimension, literature shows that Industry 4.0 technologies support a safer workplace (Müller et al., 2018; Gobbo et al., 2018). A safer workplace is a consequence of the reduction of safety incidents, and the increased morale of the employees (Braccini & Margherita, 2019). According Xu et al., (2018) "the arrival of Industry 4.0 will affect the style of work, transforming the traditional work-as-survival to work-for-life, to a final life-as-work".

Conclusions

In this paper, the authors introduced the basic concepts of the two manufacturing paradigms namely Smart manufacturing and Sustainable manufacturing. Then, the main technologies of smart manufacturing were discussed, which highlighted the benefits for sustainable manufacturing. The traditional manufacturing fails to meet current environmental and social requirements since it consumes the future generations' resources and harms the environment and society. Thus, the importance of new technologies is widely recognized. The application of Industry 4.0 technologies allows organisations to learn more about their manufacturing processes and resources than was previously possible. By simultaneously performing horizontal integration (strengthening the cooperation among companies), vertical integration (integration among different subsystems in company), and end-to-end integration (combination of design, customers' needs, and dynamic adjustment of production), smart manufacturing is able to make the production process more sustainable.

Future studies should de focused on assessing the real manufacturing context through in-depth case studies will be required to gain deeper understanding of how smart manufacturing technologies support sustainability practices in enterprises. Such in-depth case studies will contribute to understanding of how organizations can deploy smart technologies to innovate and transform their business practices to enhance economic, environmental and social performance.

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Formation of Institutional Architectonics of The Regional Industrial Complex

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Abstract

It has been substantiated in the article that institutional architectonics at the level of the economic system is extremely dynamic and changes both evolutionarily and revolutionary. The formation of relevant institutions and institutes occurs in parallel with the development of the economic system. Institutional architectonics defines the structure of institutions, which is formed as a result of coordination of economic entities actions, rules, norms, established traditions and perceptions of economic processes and the existing set of institutions that cause certain impact on the economic environment. It has been proved that in the context of deepening integration processes, the Ukrainian economy is forced to introduce its own market institutions, based on the principles of the Y type matrix, but adapted to Ukrainian realities within a short period of time. Approach to the formation of the institutional architectonics of the regional industrial policy of Ukraine has been proposed, which is based on a set of measures of a regulatory, compensatory and motivational nature aimed at solving applied problems related to ensuring the effective development of the regional industrial complex. It has been determined that an important element of institutional architectonics is the formation of a model of interaction and relationships, as a system of stable functional relationships between the basic institutions of the regional industrial complex. The characteristics of the following models of interaction and relationships have been analyzed: pluralistic, neo-corporatist and patronage. It has been determined that at the moment in the industrial sector of Ukraine the features of the patronage (paternalistic) type of model of interaction and relationships are predominant. The necessity of the

transition to a neo-corporatist model of interaction and relationships has been substantiated, which is associated with the redistribution of powers between levels of government – central, regional and self-government.

Keywords: institutional architectonics, regional industrial policy, institutional matrix.

Introduction

The development of the economic system is based on the results of evolutionary or revolutionary changes in its three main elements: productive forces, economic relations and the management mechanism. An important role in the development of the economic system is played by the existing management mechanism, which is based on a set of institutions that perform managerial and regulatory functions in order to improve and coordinate economic processes.

It should be noted that the content of the concept "*institution*", from an economic point of view, defines a set of laws, norms, "rules of the game" and "rules of behavior" of economic entities that are formed under the influence of currently existing economic relations (technical and economic, organizational and economic, social and economic).

Brief Literature Review

In research study by Kostyrko and Tymofii'v (2014) *institutions* are the material carriers of the functions of institutes (organizations and institutions) that implement these functions in economic life.

In the book by Mel'nychuk (2010) Architectonics (from Greek. αρχιτεκτονικη – construction art, architecture) – is a harmonious combination of parts into one. In addition, this concept can be interpreted as the basic principle of construction, connection and interdependence of the elements of the whole. Institutional architectonics is a complex, multidimensional, multiaspect model and a very capacious economic category that has its own structure and is based on the principle of systematicity**.**

Institutional architectonics at the level of the economic system is extremely dynamic and changes both evolutionarily and revolutionary. The formation of relevant institutions and institutes occurs in parallel with the development of the economic system. Some of them evolutionarily developing, change their shape and structure, "adapt" to existing conditions, others disappear, because their content does not meet the requirements of society.

In research study by Grycenko (2005), institutional architectonics is defined as the structure of institutions, which is formed as a result of the coordination of actions of economic entities, rules, norms, established traditions and perceptions of economic processes and the existing set of institutions that cause a certain impact on the economic environment. Almost at every stage of development of the economic system, certain changes in institutional architectonics occur. The reaction of economic entities to environmental factors, globalization and integration processes, the need to harmonize values and rules of economic behavior, the challenges of the modern model of development of the national economy determine the features of the modern stage of institutional architectonics formation in Ukraine.

Some scholars emphasize that, despite the significant influence of internal and external factors on the process of institutional architectonics, there are certain basic institutions – deep, historically stable foundations of social practice that ensure the reproduction of social infrastructure in different types of society.
In a research study by S. Kirdina (2007), a Russian researcher, uses the notion of an "institutional matrix" – a stable, historically formed system of basic institutions that regulate the interconnected functioning of major social subsystems – economic, political, and ideological.

Bessonova, O. Je. (2007) has formulated the specific historical periods, the institutional matrix is a set of forms of basic and compensatory institutions, elements of which are presented in the form of legislative rules and regulations.

According to S. Kirdina (2007), there are two types of institutional matrix, conventionally called the X and Y-matrices, or "eastern" and "western". Each of these types of matrix is characterized by differences in their institutions:

- for Y (Western) type of matrix the following basic institutions are inherent: in the economic sphere – market institutions; in the political sphere – the institutions of the federation in the broad sense; in the ideological sphere, the dominance of individual, personal values (characteristic of most countries in Europe and the USA);
- for X (Eastern) type of matrix the following basic institutions are inherent: in the economic sphere – non-market economy institutions; in the political sphere – institutes of unitary-centralized state system; in the ideological sphere, the dominance of collective values (characteristic of China, Russia, certain countries of Asia and Latin America).

Problems of development of the Ukrainian economy and complexity of the transitional stage of its development is due to the need to move from one type of institutional matrix (X (Eastern) type to the second (Y (Western) type) and, accordingly, the transformation of institutions in all spheres of life – economic, political and ideological.

The purpose

The aim of the article is to analyze the formation of institutional architectonics regional industrial complex. It is necessary to prove that in the conditions of deepening integration processes the Ukrainian economy is forced to introduce its own market institutions based on the principles of the Y-type matrix, but adapted to the Ukrainian realities in a short period of time.

Results

The need for transition to Western type of institutional matrix is complicated by the tight timing of transformational change. For many years, the formation of the industrial sector of Ukraine, and especially in its most industrially oriented regions (Donetsk, Lugansk, Kharkiv), was under the influence of historically established economic relations and close cooperation of production with the Russian economy. Most industrial enterprises of Ukraine in their production cycle were associated with industrial enterprises of the former Soviet Union, and in the vast majority of economic processes were dominated by basic institutions of the X (Eastern) type. In the context of deepening integration processes, the Ukrainian economy is forced to introduce its own market institutions within a short period of time, based on the principles of the Y type matrix, but adapted to Ukrainian realities. That is why the study of the development experience of the regional industrial complex of countries with Western type of institutional matrix, especially those that in recent years have made the transition using this algorithm, is an important element in the formation of its own effective regional industrial policy.

Research by North D. (1990) is based on the hypothesis that the main factors of development – innovation, economic scale, education and attracting capital, etc. – are not the causes of growth. The development of the national economy is determined by the level of development and character of institutions, because changes occur in certain political, managerial and cultural conditions, which impose certain behavioral constraints and affect the efficiency of economic activity.
In the article "Institutions, Institutional Change and Economic Performance" (North D. Institutions, Institutional Change and Economic Performance, 1990), he argues in favor of reviewing institutions during the transition period. The emergence of institutes and related institutions is explored in another paper by D. North (North D. Understanding the Process of Economic Change, 2005). The author

points out that the development of relationships in the chain of beliefs → institutions → organizations → politics → results can lead to unprecedented economic well-being, and to endless catastrophes and human suffering.

Considering the "new" institutionalism R. Picciotto and E. Weisner (Picciotto & Wiesner. "Evaluation and development: theinstitutional dimension", 1998) identifie institutions and organizations as the basis of economic, social and political development. According to scientists, the important issue is not only the creation of the "right" institutions, but also the assessment of the "correspondence" between institutions and development problems, their "suitability" for solving these problems.

In general, the study of the compliance of institutional architectonics with the requirements and conditions of the development of the economic system, the search for ways to optimize it, is an important element of economic research. Especially its relevance is manifested in the conditions of decentralization of the economic development of the regions in Ukraine, when the question arises of the need to move from the format of centralized public administration to a more flexible form of government, taking into account the particularities of the development of the economic system of a particular region. To date, these issues are not sufficiently covered and require more in-depth research.

From the perspective of regional industrial policy, institutional architectonics is determined by the totality of institutes and institutions that regulate the activity of economic entities in the industrial sector of the region (Fig. 1).

The vast majority of basic institutions are the same for all territorial units at the level of the national economy. They are formed in the form of regulatory and administrative documents that determine the rules and options for the economic behavior of the main participants in economic relations in the industrial sector. In addition, there is a system of institutions of an indicative nature, aimed at forming a vector for the development of economic entities, clarifying the goals and directions of their activities. It is important to use a system of institutions of a motivational nature, the main purpose of which is to create economic, social and other advantages for economic entities that adhere to certain "rules" of economic behavior and prefer a certain development vector.

It is for the industrial sector that the active participation of the state, as an institution-creating entity, is important. In the vast majority of countries, the state of the industrial sector is a factor in the development of the economic system, the formation of income of both market participants and the state.

The purpose of the state is to create a stable model of interaction and relationships between the actors of the industrial sector and to substantiate the orientation and effectiveness of their individual and collective actions.

From the point of view of the industrial complex regulation in the region, the actions of the state should be directed to the formation of a complex of measures of regulatory, compensatory and motivational nature aimed at solving the problems of applied character, connected with ensuring the effective development of the industrial complex of the region.

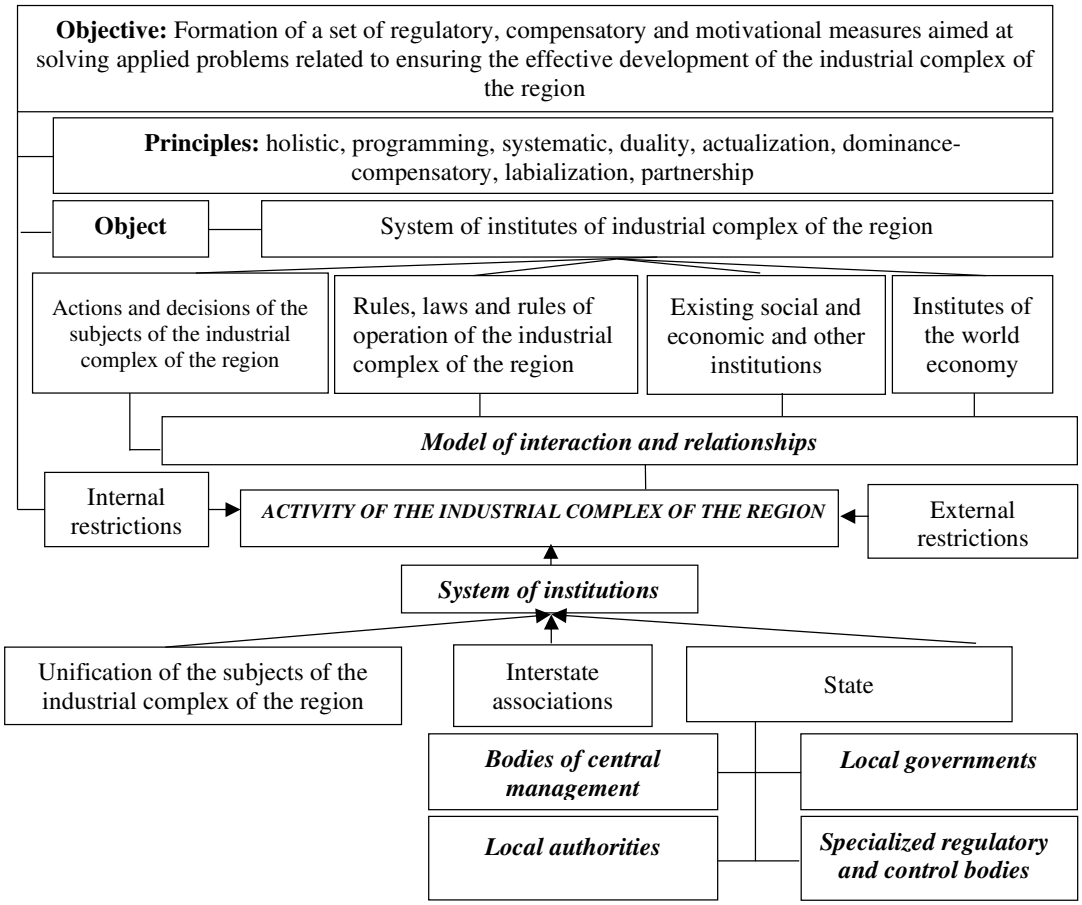

Fig. 1: Conceptual approach to the formation of institutional architectonics of regional industrial policy

An important element of institutional architectonics is the formation of a model of interaction and relationships, as a system of stable functional relationships between the basic institutions of the regional industrial complex. A rational model of interaction and relationships is determined and formed taking into account the type of institutional matrix, which is inherent in the national economic system and goal setting. It is the institution of goal-setting that determines the characteristics of the subject, a set of rules and procedures for determining priority goals and building mechanisms for their achievement.

In addition, the state should establish a set of restrictive institutions, whose actions are aimed at ensuring the balanced development of the industrial sector of the region, as a component of the national industrial complex, in the context of limited economic resources. In modern conditions, in determining the elements of regional industrial policy, it is important to determine the relationship between the subjects of the industrial complex and the state.

In general, at the theoretical level it is possible to distinguish the following models of interaction and relationships: pluralistic, neo-corporatist and patronage. In pure form, none of these models is used, but highlighting the characteristics of each is important for understanding the mechanism, goals and system of communication between business entities and government institutions within the national economy.

The characteristics of the main models of interaction and interrelationships between the basic institutions of the industrial complex of the region are shown in Table 1.

Table 1: Basic models of interaction and interrelations between the basic institutions

Model name	The main features	Advantages	Disadvantages	Groups of countries where applicable
PLURALISTIC MODEL	– high level of competition; – focus on personal success and profit; – the state acts as an arbitrator	– development of competition, ensuring equal access to the distribution of resources; – high level of motivation in development; – state policy of non-interference in economic processes, its orientation on solving social issues.	– development advantages for the most competitive and influential producers; – struggle for the possession of resources, their distribution and redistribution; – inertia of the state as a participant in economic relations; – disinterest in the implementation of active social policies and effective reforms.	Countries with the Anglo-American model of development (United States. United Kingdom. Canada, Australia, New Zealand)
NEO-CORPORATIST MODEL	– state support for the predominantly privatized industry; – focus on the development of the sphere of economic activity rather than a separate economic structure; – the state as a full participant and economic entity; – the opportunity to participate in shaping the basic elements of economic policy of all market participants, regardless of their competitiveness.	– the important role of the state in regulating economic processes; – social orientation of actions with the participation of the state; – expanding the interests of the subjects of the industrial complex by creating associations and unions that represent the main economic interests, receive the privileges and opportunities to participate in the development of standards and conditions for industrial production.	– the ability to restrict competition in order to achieve a certain result; – complexity of the management process and actions in case of urgent solution to the problems of development of the region industrial complex.	Scandinavian countries

PATERNAL (PATRONAGE) MODEL	– existence of hierarchy and inequality in the formation of relationships; – predominance of the regulatory function of the state, the focus of all actions of state institutions in support of balanced development of the region, to ensure the social orientation of business.	– a clear definition of the norms and parameters of the economic behavior of the state and economic entities, based on the reasonable advantages of all parties from the application of this model; – the focus of the institution of paternalism on improving the economic and social situation in the region.	– model of relationships in the plane of dependence-power; – restrictions on competition in the industrial sector; – the possibility of "protection" of business and the formation of "pro-state business"	Countries with X (Eastern) type of institutional matrix (Russia, Ukraine, China, some post-socialist countries)

In a research study by Kaufmann (2007) in accordance with the principles of constructing a *pluralistic model of interaction and relationships*, they should be based on "... permanent opposition of diverse interest groups". The functioning of society and the physiological survival of its members is impossible without ensuring adequate access to the results of material production. It is the industrial sector that acts as the basis for ensuring the growing needs of modern society and all other types of social production should be aimed at ensuring its dynamic development.

In a research study by Schmitter and Streeck (1999) ensuring the equilibrium development of the industrial sector, according to the pluralistic model, is possible only in a highly competitive market in which business "... units are organized into an unlimited number of independent, optional, competing with each other, hierarchically independent structures that are not specifically licensed, recognized and received subsidies and are not controlled by the state in any way".

The predominant position of the state in this model of relationships should be support for the competitive environment and focus on ensuring the interests of the system as a whole. In the event of disturbances in the equilibrium system, or the development of crisis processes, the activity of state regulatory institutions should be aimed at correcting the formed imbalances in the development of the industrial sector and returning the economy to an equilibrium state.

The state, as an element of the system of institutions of institutional architectonics of regional industrial policy, is considered as an external force, the main task of which is to develop, together with subjects of the industrial complex of the region, uniform rules for functioning and regulation, the initiator of resolving conflict situations and supporting national industrial producers in international markets.

Thus, among the main features of a pluralistic model of interaction and relationship are the following: competition is a driving force for the development of the industrial sector, within which there are numerous interest groups competing with each other; the basis of development is a focus on personal success and profit; the state acts as an arbitrator, participates in the development of rules of relations and interaction, and provides support in foreign markets.

Among the main disadvantages of this model of relationships can be identified:

– the predominance of the interests of the most competitive and influential sector entities, their focus on maximizing profits;
– competition is based on the principle of the struggle for the possession of resources, their distribution and redistribution, which leads to the practical elimination of weak and new competitors from the market;

– inertia of the state as a participant in economic relations, the prevalence of compensatory actions in its positions;
– lack of interest in implementing active social policy and implementing the most effective reforms.

The pluralistic model is based on Anglo-American traditions of business-state interaction. Thus, in the UK, the regulation of the industrial complex is carried out only at the regional level (in each enlarged region of the country (England, Scotland, Wales, Northern Ireland), its own departments of industry are established, which use specific industrial regulation instruments for the respective territories. The main thrust of industrial policy is to increase the competitiveness of their own producers through an active innovation and protectionist policy.

The mechanism of regional industrial policy in the US is similar: the main goal is to increase competitiveness and the application of protectionism measures to protect the national market and expansion into foreign markets of industrial goods; decentralization of state regulation functions, expansion of powers of local government.

Shmytter, F. (1992) insists *the neo-corporatist model of interaction and relationships* is based on the system of "... representation of interests, the components of which are organized at several special, compulsory, non-competitive, hierarchically ordered, functionally different levels, officially recognized and resolved (and in some cases created) by the state, endowed with a monopoly for representation in certain industries".

The main features of the model are as follows:

- the system of economic relations is based on state support for the predominantly privatized industry;
- a focus on the development of economic activity, not a separate economic structure, even the most competitive;
- the possibility of restricting competition in order to achieve a certain result;
- the state, as a full participant and economic entity, with the right to formulate requirements to business entities;
- possibility of defining social effect as the main economic result;
- the opportunity to participate in the formation of basic elements of economic policy of all market participants, regardless of their competitiveness.

The state's involvement is not limited to its recognition as an important economic agent and the development of "rules of the game" common to all participants. For this model of relations, it is important to recognize the social orientation of actions involving the state, its significant social obligations to society, and therefore the right to impose certain requirements on business. The state also plays an important role in regulating economic processes.

The model is characterized by the consolidation of the interests of the subjects of the industrial complex by creating associations and unions that represent the main economic interests, receive privileges and opportunities to participate in the development of standards and conditions for industrial production.

Formation of *paternalistic (patronage) models of interaction and interrelationships* is most often supported for the most economically and financially weak and investment unattractive regions.

If we examine the content load of the paternalistic model, it reflects the formation of specific relations between the state, as a subject of regulation and its individual regions, or spheres of activity (industries). The model is based on the concept of hierarchy, vertical orientation, dependency and guardianship. The regulatory and legal activity of the state and its main institutions is reflected in the patronizing attitude to the development of the region or its industrial complex. The purposeful and administrative distribution of resources, the use of an integrated system of directive and indicative

planning, the system of state order, the creation of specific investment and legal conditions for the functioning of the enterprises of the industrial complex of the region are the main elements of the paternalistic (patronage) model of interaction and relationships.

In a research study by Shushkova (2010) From the standpoint of institutional architectonics, paternalism can be defined as "… a social institution constructed by actors who need relationships of interdependence and who need care and guardianship".

It is possible to distinguish the following basic characteristics inherent in the paternalistic (patronage) model of interaction and relationships: the main characteristic is a model of relationships in the dependence-power plane; existence of hierarchy and inequality in the formation of relationships; a clear definition of the norms and parameters of economic behavior of the state and economic entities, based on the substantiated benefits of all parties from the application of this model; dominance of the regulatory function of the state, orientation of all actions of state institutions to support the balanced development of the region and its industrial complex, to ensure the social orientation of business; the paternalism's focus on improving the economic and social situation in the region.

In some cases (especially for post-Soviet countries), the patronage model acquires the signs of "protection" of the business of structures close to the authorities. This type of model consists in the application by the state and state institutions of administrative methods aimed at restricting competition in certain industries in which "pro-state business" is interested.

The possibility of forming economic relations between the state and its components according to the principles of libertarian paternalism extends in modern Western economic literature. The concept of libertarian paternalism was proposed by the economist of the University of Chicago Richard Teyler and professor of Harvard Law School Kas Sunstein and consists in the fact that state institutions have the ability to legally influence the behavior of economic entities without violating freedom of choice. The main goal of their activities is to "push" economic entities in the right direction, direct the efforts of state institutions to identify and substantiate the most optimal options for economic development. The authors of the theory emphasize: "We propose a form of paternalism, which is libertarian in spirit, which should be acceptable to those who firmly believe in freedom of choice on the basis of either autonomy or welfare" (Palermo, G. (2000)).

If we evaluate the current model of interaction and relationships in the industrial sector of Ukraine, the features of the patronage (paternalistic) type are prevailing. Perhaps in recent years there has been a tendency to gradually transform it to the principles of libertarian paternalism and the growing role of such an important market tool as competition. The reason for these trends may be the transfer of the characteristics of economic relations that existed between the state and industrial producers in the former Soviet Union and the significant dependence of Ukrainian industrial producers on Russian partners.

The importance of the latter statement is to preserve the X (eastern) type of institutional matrix within the Russian economy. The coincidence of the specifics of organizational, economic and technical and economic relations and the continuation of contractual relations at the level of subjects of the industrial complex of the two countries, the lack of need for their transformation and the weak access of Ukrainian producers to the world markets for industrial products led to the preservation of the principles of the patronage type of relationship.

In the conditions of deepening of the European integration processes preservation of patronage type of relations is possible only in relation to the development of the weakest, depressed regions. World experience involves the application of two main options for differentiation of approaches and patronage for the development of the industrial sector of the region – regional differentiation of tax rates (or their differentiation by types of industrial production within a particular region) and regional differentiation of the system of public expenditure related to public procurement and social transfers. The main purpose of applying differentiation in terms of stimulating the development of the

industrial sector is to increase the demand for investment resources and the results of industrial production within individual regions of the country.

On the one hand, it is a powerful mechanism for stimulating the symmetrical overall development of all regions of the country and solving the problem of economically backward territories. On the other hand, the economic effect of applying symmetric measures is different in different regions of the country. It all depends on the capabilities of the regional industrial production market, the development and structure of the labor market, the existence of appropriate infrastructure and the potential capabilities of individual territorial units. Therefore, differentiation must be deepened and must take into account the region's capabilities and the specificities of its social and economic development. To do this at the level of central government is extremely difficult and will result in inefficient allocation of financial resources of the state. A separate problem may be the realization of attempts to stimulate the economic activity of individual producers by applying fiscal policy measures. First, it violates the principles of the competitive environment and leads to a change in the system of the industrial complex of the country. Attempts are underway to change the very system of interregional and internal regional interaction. Territories and individual regions of the country, with the most favorable conditions for carrying out economic activity, become attractive for industrial producers, in turn, it leads to an overflow of capital and the emergence of interregional imbalances in the national economy. A separate economic and political problem may be the horizontal differentiation of tax rates. Certain regions or producers who have not received the appropriate preferences from the central government, express some dissatisfaction with the violation of competitive conditions, and in some cases, reduce the volume of their own industrial production.

Summing up, we can conclude that the use of the system of inter-budget relations and the system of state orders in the conditions of the formation of patronage relations between the state and industrial producers is a more flexible tool compared to fiscal methods of differentiation and should be used with the active participation of regional institutions that have the right and ability to implement their own economic policy.

The need to move to the principles of a neo-corporatist model of interaction and relationships is determined not only by the internal need to improve the competitive environment in the middle of the industrial sector, but also by shocks from external (foreign) industrial producers. The “roofing” of individual producers by the state, the opacity of the system of government orders and other features of the existing model of relationships lead to a decrease in the competitiveness of national industrial producers and reduce their stability in the competitive global market. The transition to a neo-corporatist model of interaction and relationships is associated with the redistribution of powers between levels of government – central, regional and self-government. This division is also possible under libertarian paternalism, when the state, represented by central government bodies, determines the use of individual instruments, including the financial and fiscal nature, and local government bodies determine the boundaries and mechanism for their application.

Under the neo-corporatist model of interaction and interrelationship, the object of regional industrial policy changes, from the activity of the subjects of the industrial complex itself to the elements of regional development that indirectly influence the development of the industrial complex of the region.

This model is characterized by a high proportion of privatized industrial enterprises and the participation of the state, as an active participant in economic activity, with the right to make demands on industrial producers regarding the structure of commodity supply and social orientation of business. The state is unable to influence directly the stages of economic activity of privatized enterprises of an industrial complex of a region; instead it has a wide range of economic regulatory instruments (taxes, indicative planning, programming and forecasting an industrial complex development, etc.).

The role of the state as one of the important subjects of regional industrial policy under the neo-corporatist model of interaction and interrelationship is determined by its regulatory influence in the

following main directions (Fig. 2): influence on the regional labor market and raw materials, influence on the regional capital market.

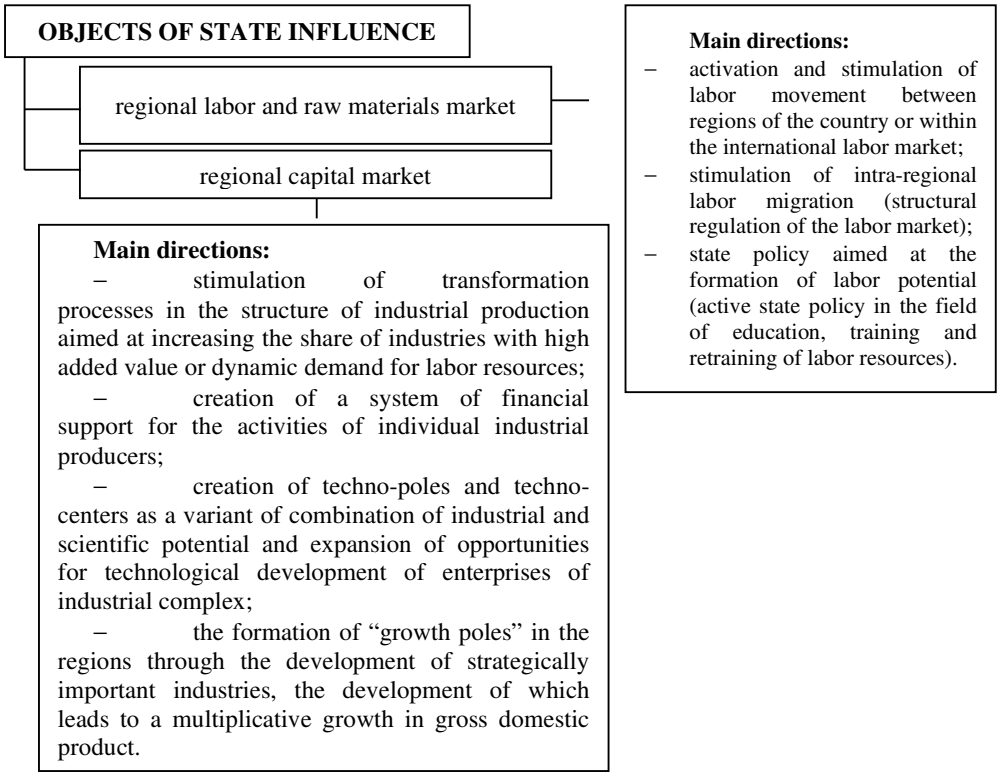

Fig. 2: Objects and directions of state influence in the context of regional industrial policy in neo-corporatist model of interaction and relations

Conclusions of this study

Among the main problems in the formation of the institutional architectonics of regional industrial policy in Ukraine there is the need to switch to the Western type of institutional matrix (a stable, historically developed system of basic institutions that regulate the interconnected functioning of the main social subsystems - economic, political and ideological). In the context of deepening integration processes, the Ukrainian economy is forced to introduce its own market institutions within a short period of time, based on the principles of the Y type matrix, but adapted to Ukrainian realities.

It is theoretically possible to distinguish the following models of interaction and relationships: pluralistic, neo-corporatist, and patronage. In its pure form, none of these models is used, however, the identification of the characteristic features of each of them is important for understanding the mechanism, goals and the system of relations between business entities and state institutions in the framework of the national economy. The role of the state as one of the important subjects of regional industrial policy in the conditions of a neo-corporatist model of interaction and relationships is determined by its regulatory influence in the following main areas: influence on the regional labor market and raw materials; impact on the regional capital market.

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Survey on Minimum Wage in Some Member States of The European Union

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Abstract

The minimum wage is one of the topics on the agenda of the European Union. Debates about the minimum wage between the EU Member States stir controversy and their different positions for the unified implementation of a labor policy. The invitation of the European Commission to discussions on the minimum wage for EU employees is an opportunity to make a comparative analysis between its different states. From the analysis of the data from present time, there are noticeable differences between the Member States of the Union regarding the gross and net monthly minimum wage, the way to determine it, the hourly rate, taxes and social contributions. In this paper I will also focus on analyzing a projection for the researched states regarding the increase of the minimum wage by 60% of the average salary of each country. Establishing clear objectives and criteria under EU coordination for determination the minimum wage that takes into account the economic and social situation of each country and the amount needed for decent minimum living is a necessity.

Keywords: Minimum Wage, Negotiations, EU Social Pillar, European Minimum Wage

Introduction

The purpose of this paper is to analyze the current situation of the minimum wage in some EU Member States, given the EU's intention to introduce a European unitary policy in this area.

In the analysis of the minimum wage at the level of the European Union, we focused on the following states: Belgium, Bulgaria, Germany, France, Hungary, Spain, Poland and Romania. The eight states were not chosen by chance. These are four economically developed states in western Europe with a tradition of wage negotiations and highly developed and applied social protection mechanisms. These states are: Belgium, France, Germany and Spain. The other four Member States were chosen from the former communist countries: Bulgaria, Hungary, Poland and Romania. These states have a high potential for economic growth, but also among the lowest salaries in the EU. The situation of these states is presented taking into account several indicators, such as: percentage of population working, activity rate, employment and unemployment rate, labor cost index, labor productivity, real GDP growth in Euro. All these data are presented to illustrate the rather large economic disparities, but also the different approach of labor relations within the EU member states.

This research analyzes how the minimum wage is set in each of the eight analyzed states. The evolution of the minimum wage in the last ten years in these Member States was followed, the taxes and applied taxes, the differences between nominal minimum hourly payment and the one expressed in purchasing power standard. The study notes the notable differences between these states in terms of economic growth, domestic product, social policies, minimum wage, social inequality and poverty, especially in the former communist states. A projection was made taking into account the proposal to increase the minimum wage as a result of 60% of the average salary of each Member State.

In this regard we presented the negotiations, discussions and proposals regarding the introduction of the European minimum wage. The ways in which Member States will be able to agree on the establishment of regulations, policies and instruments at EU level with regard to the European

minimum wage will be an important point in combating poverty and defending employees with minimum wages, but also for achieving a European cohesion supported from a social and economic point of view.

Short Literature Review

In recent years, due to the increased interest in the minimum wage among EU Member States and beyond, more studies have been carried out on this aspect. Schulten(2008, 2012) mentions that the idea of introducing a unitary minimum wage policy is a topic of discussion among Member States for a long time. Seelinger (2018) mentions the debates regarding the minimum wage but also the role played by the trade union organizations in countries such as Poland and Hungary. In a research study by Socolov and Marinas (2016) in Romania it is shown that the minimum wage can be an instrument of economic growth and the wage inequalities start from the labor market. The study conducted in Germany by Bossler and Greiner (2016) shows that the impact of introducing the minimum wage was at the time of "increase in average wages by about 4.8 percent and a decrease in the affected establishments' employment by about 1.9 percent". Fabo and Belli (2017) analyzes the minimum wage through the minimum living wage in the peripheral countries of the European Union. Schulten and Luebker (2018) point out that increases in the minimum wage in Eastern European states are only a small step, while in Western Europe, minimum wages have increased very little, and in France, growth has barely exceeded inflation. The minimum wage in Germany is measured using the Kaitz index. This leads to an important gap between France and Germany, the French minimum wage being higher in both relative and absolute terms.

Research Method and Methodology

The study is based on the research of domestic and international bibliographic studies, information collection, synthetic data processing and interpretation of results, as well as the formulation of conclusions. This is an image of the current minimum wage situation and is based on an observation and case study for the eight Member States (Belgium, Bulgaria, Germany, France, Hungary, Spain, Poland and Romania). The selected data were sorted statistically and processed. Data analysis presented a number of difficulties. Firstly, the prices in euro were taken into account, but not all the analyzed states have the euro. Resulting a difference in the national currency exchange rate for these countries. Another difference is the price level, the cost of the monthly basket. The nominal official data as well as those calculated were taken into account considering the purchasing power standard (PPS). The data published by Eurostat, the WSI Minimum Wage Database and Eurofound were taken into account in this study.

Results and Discussions

Considering the major economic changes of the last years, globalization, technologicalization, computerization of the society, population ageing, especially in the developed states, change of mentality and profile of the employees, the very large number of employees, the European Union pays special attention to the free movement of the employees and fair remuneration to enable a more consistent and sustainable economic development among the Member States. The economic environment is moving at a rather accelerated pace, which requires a more flexible workforce both in terms of working time, what they work and where they work. For the proper and long-term functioning of the Union's internal market, respect for the principles of free movement of workers, freedom of establishment and freedom to provide services to workers, the right to a fair wage must be unequivocal for all workers within the Union, no matter where they work. The minimum wage must allow all workers to face the daily expenses and allow a decent living.

In order to achieve this concept of decent living, in the Member States the labor policies are different. Some consider economic growth, increasing the number of workers, reducing unemployment. Other countries aim to achieve social equity through their policies. Some countries want both. All these tendencies are normal within a democracy as the European Union wants.

Specialized literature and legislation give different definitions to this notion. But, they all refer to the minimum amount an employee must receive in exchange for the work performed. (KPMG in Romania, 2017). The minimum wage is seen as a trade-off between employment and income equality (Fabo and Belli, 2017). The minimum wage should cover the daily expenses related to gas, electricity, food, clothing, heat, tools, and transportation. The national minimum legal wage can be set per hour, per week or monthly, and this is established by law, after consulting the social partners or by national cross-sectorial agreement. The minimum wage can be indexed to the consumer price index, by economic growth or established periodically by the legislative power was explained by the Eurostat statistics site.

At the European Union level, the question of harmonizing and supplementing the regulations regarding the payment of employees has always been raised. A sensitive point among the Member States of the European Union is represented by the discrepancies between the salaries paid in exchange for the work performed.

We might ask why it is necessary to know the minimum wage for each country or possibly for some branches of the national economy. One answer may be that without knowing the minimum wage or hourly wage payment, investments, developing a business plan, predictability of expenses would be difficult to achieve. In addition, the freedom to provide services throughout the European Union is one of the basic principles of the European single market. Last but not least, the introduction of a single wage at European level is also a concrete action to combat the deepening of social inequalities and poverty.

The choice of states listed was not accidental. Belgium, France, Germany and Spain are part of the developed states, in which the labor relations are well established, with reward mechanisms of the employees that give the expected effects. Belgium is the state that has the minimum wage established through collective bargaining at branch level, and France, Germany and Spain have the minimum wage set both at national level and through collective bargaining agreements. All these countries have a minimum wage of over 1000 euros / month. The four states listed are beginning to face a population ageing and have sought solutions to this effect. The standard of living and wages in these countries are significantly higher than the other four countries that are the subject of the study, which has attracted skilled and unskilled labor to cover the needs of deficient labor in certain sectors such as trade, agriculture, transport, services, industry.

As for the other four states, Bulgaria, Hungary, Poland and Romania, they come from the former communist countries. All these four countries have the statutory national minimum wage. Bulgaria, Romania and Hungary have minimum salaries up to 500 euros/month, Poland has just over 600 euros/month. And these countries are also facing a population ageing and an economic migration to the developed countries.

In table 1 we will present some indicators briefly in order to be able to form an overview of the state regarding the labor relations in the those countries. As for the percentage of the working population, the situation is somehow similar, the differences being relatively small. Among the eight countries analyzed, France is on the last place with 60.8% and Romania is on the first with 66.2%. And as for the unemployment rate, the situation is very different, with Germany having the lowest rate of 3.4% and ending with Spain having the highest 15.3%. We note that Belgium, France and Spain have higher unemployment rates than the developing countries which have between 3.7% and 5.2%.

Table 1: The statistic indicators for work in 2018

Country	Popula-tion working (%)	Activity rate (%)		Employment rate (%)	Employment growth (LFS)	Unemployment rate (%)	Labour cost index (wages and salaries, total)	Labour productivity (GDP/ person employed
		National	Non national					
Belgium	63.9	69.0	69.9	64.5	2.4	6.0	2.2	0.1
Bulgaria	64.3	71.5	55.9	67.7	-0.1	5.2	6.2	3.2
Germany	64.6	80.1	70.0	75.9	0.4	3.4	2.4	0.2
Spain	65.5	73.4	76.1	62.4	2.6	15.3	1.9	-0.1
France	60.8	72.4	66.4	65.4	0.9	9.1	1.7	0.7
Hungary	65.2	71.9	72.0	69.2	0.9	3.7	11.3	2.7
Poland	62.3	70.1	78.3	67.3	0.3	3.9	7.0	4.8
Romania	66.2	67.8	64.8	68.6	0.2	4.2	33.1	3.9

Source: Labour Market and Wage Developments in Europe, Annual Review 2019

In Figure 1 we performed an analysis of the growth of the gross domestic product over a period of 10 years from 2008 to 2018. Correlating the data from the two tables we can see the situation on the labor market of the 8 states under study. It follows that the former communist countries have potential for economic growth and development. The four developing countries, with the exception of the years of economic crisis, in the rest of the years have registered a real growth of the gross domestic product. For example Romania has an increase of 9.3 in 2008 and a 7.1 increase in 2017. Belgium, France and Germany have relative growth after 2009, the best growing in Germany is in 2010 with 4.2%, in the following years having a constant growth of about 2% per year.

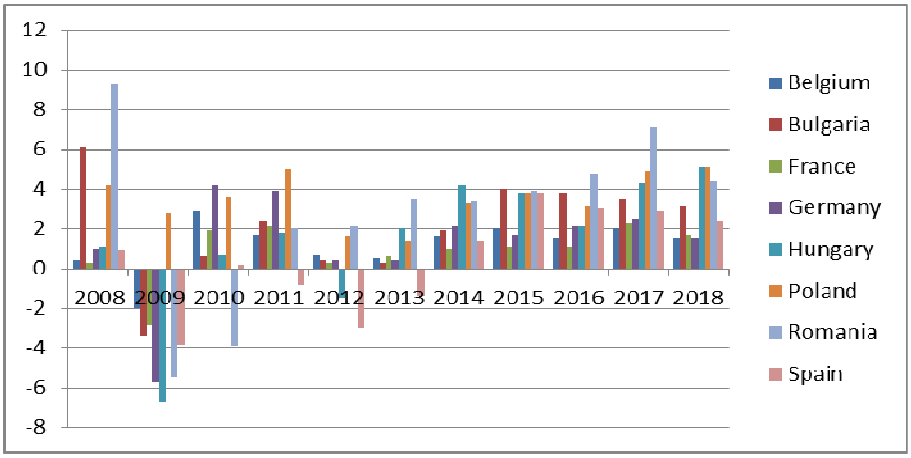

Fig. 1: Real GDP growt in Euro (%)

Source: data processed by the author after Eurostat

The law regulates the minimum wage. In Eastern Europe the minimum wage is discussed within a tripartite body at national level. If these negotiations fail, it is established unilaterally by the government and acquires a legal character. (Schulten et al. 2015). The modalities for establishing the minimum wage within the European Union are set differently (KPMG in Romania, 2019): in 15 Member States, the minimum wage is fixed at national level but also through collective bargaining; 6 (Romania, Bulgaria, Estonia, Poland, Hungary, Portugal) states have set the national minimum wage;

8 states set the minimum wage through collective bargaining; 1 state (Cyprus) has set the minimum on economy only for certain occupations; Sweden has not set a minimum wage.

Eurofound data shows that in January 2020, 22 of the Member States of the European Union have a national minimum wage. We list Belgium, Bulgaria, Croatia, Czechia, Estonia, France, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia Spain and United Kingdom. At present, a number of 6 countries have not set a national minimum wage, such as Austria, Cyprus, Denmark, Italy, Finland, and Sweden.

In analyzing the minimum wage at EU level, we will stop at the following states: Belgium, Bulgaria, Germany, France, Hungary, Spain, Poland and Romania. As can be seen, some of these states have minimum wages set at national level (Bulgaria, Hungary, Poland and Romania), some states have set them within collective bargaining agreements (Italy), some states have minimum wages set at both national level as well as through collective bargaining contracts.

The study presents a research on raising the minimum wage for the analyzed countries, which resulted in the fact that in the group of developed countries the growth in the 10 years was quite small, it was between 10% in Germany, 14.92% in Belgium, 14, 50% in France and 49.93% in Spain. On the other hand, in other countries where the minimum wage was very low, there were quite large increases, which stood at 79.04% in Hungary, 90.34% in Poland, 153.65% in Bulgaria and 228.17 % in Romania. This shows the wage discrepancies between the different Member States within the European Union and largely explains the economic migration that takes place especially from Romania and Bulgaria to the developed countries. (figure 2)

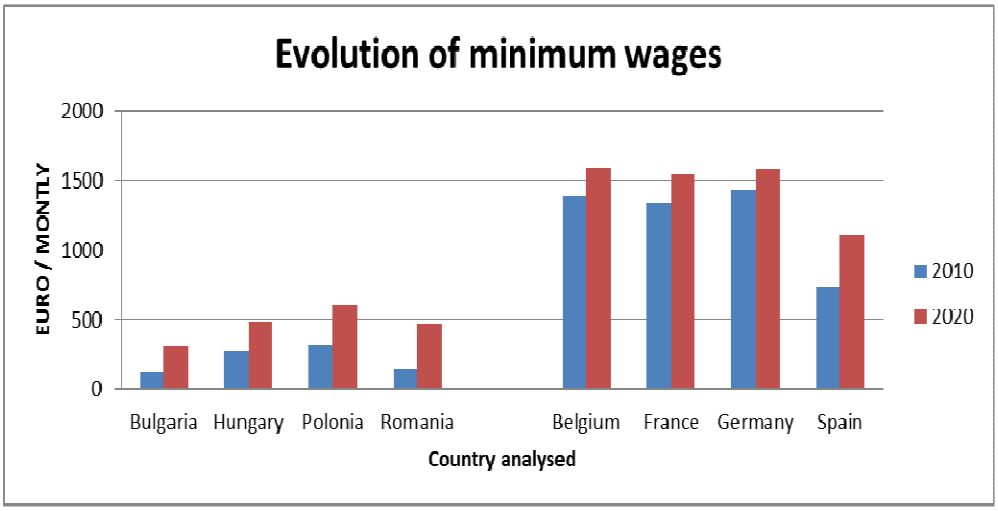

Fig. 2: Evolution of minimum wages

Source: data processed by the author after Eurostat

In what follows we will analyze the eight Member States to see how the minimum wage is set. In Belgium, the minimum wage is set both nationally and through collective bargaining. The minimum wage is agreed within a national collective contract for the private sector as a whole Part of the minimum wage is a fixed amount that depends on the working place, seniority in work and the branch where they work. Negotiations at branch level may cause the minimum to be different in the sector of activity, but not to be smaller than the one provided at national level. The amounts provided for those working outside Belgium, such as accommodation, meals, transport, health insurance, taxes paid for the stay in that country are not included in the minimum wage. The employees work on average 8 hours/day and 38 hours/week, but there may be exceptions. (KPMG in Romania, 2019)

In Bulgaria, the minimum wage is set at national level and depends on the working place, age and branch of activity. The minimum wage is set annually and includes the basic salary, rest leave. In the

case of detachment it does not include the costs for accommodation, transport and meal. The maximum number of hours worked is 8 hours/day, resulting in 40 hours/week. Minimum wage is 560 BGN in national currency in 2019. (KPMG in Romania, 2019)

In France, the minimum wage is set at national level and through collective bargaining for different sectors of the economy. This minimum may include a series of bonuses, but the expenses of accommodation, meal and transport cannot be taken into account. The employees work 35 hours a week, maximum 48 hours, but no more than 10 hours worked per day. The average weekly hours worked may not exceed 44 hours for 12 consecutive months. (KPMG in Romania, 2019)

In Germany the minimum wage is set nationally but also through collective bargaining and with labor agencies. The minimum wage has been introduced since January 2015 and the decisive benchmark for its establishment will be the development of average salaries established by collective agreements. (Schulten et al. 2015) Collective bargaining by branch of activity, even if they set a lower level, takes into account the nationally established level. The differentiation is made between the two zones: in the west the gross hourly rate was in 2019 of 9.96, Euro and in the east it was 9.66 Euro. The employees work 8 hours/day and maximum 48 hours/week six days weekly.

In Hungary the minimum wage is set at national level, usually at the beginning of each year. The maximum legal time is 48 hours/week and 12 hours/day. Minimum wage is 3.750 HRK in national currency in 2019.

Poland is one of the countries that has set a minimum national wage set annually. The minimum wage includes basic salary, seniority at work, vacation bonuses, bonuses, special payments. These refer to seconded employees who may receive travel allowance abroad, distribution allowance, daytime allowance. Extra hours, accommodation, transport and meals are not included in the minimum wage. The employees work 40 hours a week and a maximum of 8 hours/day. Minimum wage is 2.250 PLN in national currency in 2019. (KPMG in Romania, 2019)

Romania has set the minimum wage at national level, usually once a year. At present, there is the minimum differentiated: standard minimum wage (2,300 RON), minimum wage with university studies and 1 year work experience (2,350 RON) and for construction sector (3000 RON). The minimum wage includes base salary, overtime and bonuses. Not included: accommodation, travel awards abroad, special rewards. The employees work 8 hours/day and 40 hours/week.

Spain has the minimum wage set at national level and through collective bargaining. The national minimum wage is set once a year and the exact amount is established. The minimum wage depends on the negotiations that take place between the government, unions and management. It is included in the minimum wage, basic salary and overtime. Accommodation, transportation, daytime, and other additional bonuses are not included. It works 40 hours/week and 9 hours a day. The time worked may also depend on the collective bargaining. (KPMG in Romania, 2019)

The specialist views regarding the level of the minimum wage and its impact on the national economy are divided and still under debate.

In Romania, the impact of raising the minimum wage is mostly felt by SMEs in some sectors where about 40% of the employees have the minimum wage. The increase in the minimum wage has led to a small increase in the average gross wage. However, this may be restrictive for lower-skilled or unskilled employees. A positive impact of raising the minimum wage was poverty reduction. (Socolov and Marinas, 2016).

In Germany, it is shown that there was no negative impact on the small wage sector, as expected, by introducing the national minimum wage. But by introducing it, the number of part-time employees has decreased (Bossler and Greiner, 2016). Other studies show that the introduction of a minimum wage has a positive effect on employees who earn low wages, but the effect is not as good on those who earn higher wages. (Bellman et al. 2017) In a recent study, Bruttel (2019) shows that imposing

the minimum wage in Germany has led to an increase in the hourly rate, especially for those earning less than 8.50 euros/hour. But this did not lead to a monthly wage increase. There are still no measurable effects at the macroeconomic level, nor is there an impact on poverty alleviation. Labor productivity did not undergo any change, but an increase in satiety compared to the increase in the minimum wage was noted.

From the studies published at European level, it was found that a minimum wage increase of 40% has a positive effect on all sectors of the economy, but the increase exceeding 51% has a negative effect on employment. The increase in the minimum wage can lead to an increase in the wage in general, preserving the wage differentiation for older employees and can reduce a number of inequalities between employees. (Fric, 2018). The European trade unions are cautiously favourable to the idea. „Trade unions from countries with weak collective bargaining can be expected to favour the idea of an institutionalized minimum wage, unions from countries with high coverage rates are ascribed a reluctance towards such bottom limits". (Seeliger, 2018)

Figure 3 presents the situation that refers to the nominal increase felt by the employees. There are quite large discrepancies in terms of salary increases. As expected the largest increases are observed in the states with the lowest minimum at EU level. Spain is an exception from the developed countries, the one that increased the most the minimum wage by 22.30%, and the increase felt is almost equal to the nominal increase. The biggest difference between the minimum wage regarding nominal change in euro terms and real change in national currency can be found in Romania from 9.36% at 5.9%. Next is Bulgaria from 9.81% at 7.39%, Germany from 3.96% at 2.19%., France from 1.52% at 0.10%. The following countries show a reverse trend from nominal change to real change: Poland from 4.05% at 6.39%, Hungary from 4.39% at 4.95%. France is the country with smallest growing next to Belgium. What can be seen in figure 3 is that the countries with the lowest minimum wages also have the highest taxes and contributions paid for work. The first place in this ranking of taxes and social contributions is occupied by Romania with 39.28% and the last place is occupied by Belgium with 4.25%.The average of the former communist countries is 28.82% in terms of social security contribution and taxes, and in the developed countries average is of 15.18%. (Aumayr-Pintar et al. 2019)

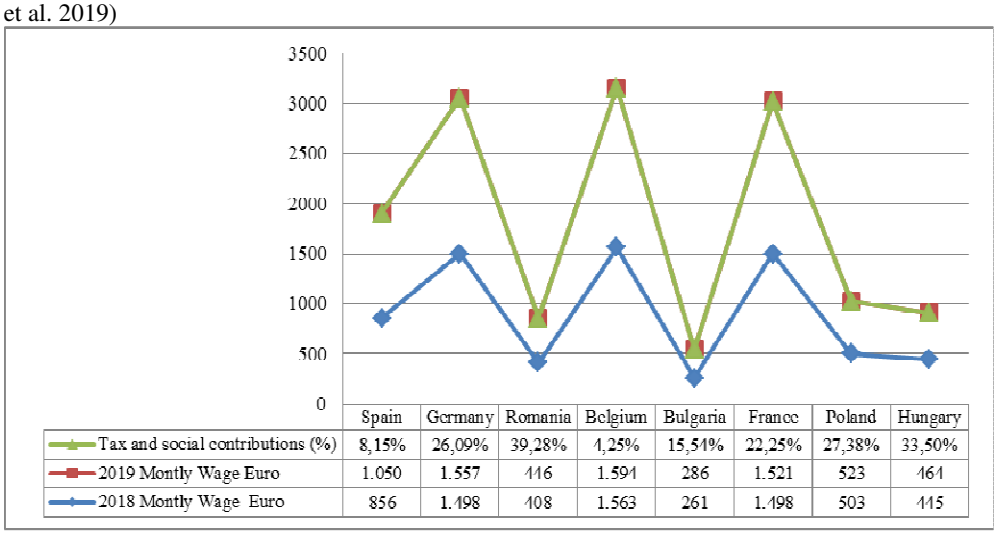

	Spain	Germany	Romania	Belgium	Bulgaria	France	Poland	Hungary
Tax and social contributions (%)	8,15%	26,09%	39,28%	4,25%	15,54%	22,25%	27,38%	33,50%
2019 Montly Wage Euro	1.050	1.557	446	1.594	286	1.521	523	464
2018 Montly Wage Euro	856	1.498	408	1.563	261	1.498	503	445

Fig 3: Monthly minimum wage 2018-2019 and taxes applied in 2019

Source: Aumayr-Pintar et al. 2019, Eurofound (2019), Minimum wages in 2019: Annual review

Taking into account that prices tend to rise, the qantity bought with money from wages is less. Inflation affects the whole world, and even more employees who earn the minimum in the economy. Of course, the differences between the Member States are smaller if we take into account the price level gaps and apply the purchasing power standard (PPS) in terms of final consumption expenditure. The application of this PPS indicator leads to the narrowing of the differences between states. There

is an increase of the minimum hourly rate/euro in 2019 compared to 2018: France +0.15, Belgium +0.19%, Germany +0.35, Spain +0.99, Poland +0.20, Hungary +0.12, Romania +0.18, Bulgaria +0.15. But if we compare the minimum hourly rate/euro taking into account also the PPS, then it is observed that the hourly rate is lower and that in reality the prices have risen together with the purchasing power of the employees. Difference is in France -0.21, in Belgium -0.22, in Germany -0.96, in Spain +0.86, in Poland -1.07, Hungary -0.32, Romania -1.01, Bulgaria 0.14. Dates were processed after WSI Minimum wages report 2018 and 2019 edition. (Lübker and Schulten, 2018, Schulten and Lübker, 2019).

There are discussions regarding the minimum wage and the wage that will ensure the minimum decent living. Studies have shown that Hungary, Bulgaria and Romania have low wages that do not cover decent living conditions. Poland and Spain are at the limit, only France, Germany and Belgium have a minimum wage that is above the minimum decent living conditions. (Fabo and Belli 2017).

Given that 241.5 million people are employed in the EU, they are living in a constantly changing world, moving to a neutral-climate economy, digitization and demographic change. The EU expresses its wish that each of its citizens have a salary that will ensure them a decent living no matter where they live. In January 2020, the European Union launched a first consultation with social partners, businesses and trade unions on fair minimum wages. This initiative is based on the implementation of the European Pillar of Social Rights adopted in 2017. The question that the EU is asking is whether the minimum wage is required at the Union level and whether Member States wish to negotiate with each other.

In connection with the European Pillar of Social Rights, the regulation of the European minimum wage was debated, to reduce poverty among those with low incomes.The increase of minimum wages, especially in low-wage countries, contributes to strengthening the social dimension of the European Union by giving confidence to European citizens for the purpose of this project. (Eurofound, 2018) Discussions on the notion of a European minimum wage have been around for several years and are considering an adequate level of minimum wages for the European Union. (Schulten et al., 2015, Schulten and Luebker, 2019)

Finance Minister Olaf Scholz spoke in November 2018 in favor of a European minimum wage initiative, saying that "thought there was merit in discussing the proposal that national minimum wages should be established at a level of at least 60 percent of the national median wage". The same proposal is also made by the European Trade Union Confederation, which argues that the minimum wage in the EU is at least 60% of the average wage in each country (ETUC, 2017).

The proposal that exists at the moment is to calculate the minimum wage as a result of 60% of the average salary of each country. For the countries chosen for the study we made a projection of the possible minimum wage according to the existing proposal so far. The data are those taken from Eurostat data. As EU representatives have said, they are open to proposals and negotiations. From the data processed it is clear that in all situations the minimum wage that would result would be higher. The approximate raise would be: for Belgium 11%, for France 6%, for Germany 13%, for Spain 6%, for Bulgaria 13%, for Hungary 12%, for Poland 11% and for Romania 12%. (Figure 4)

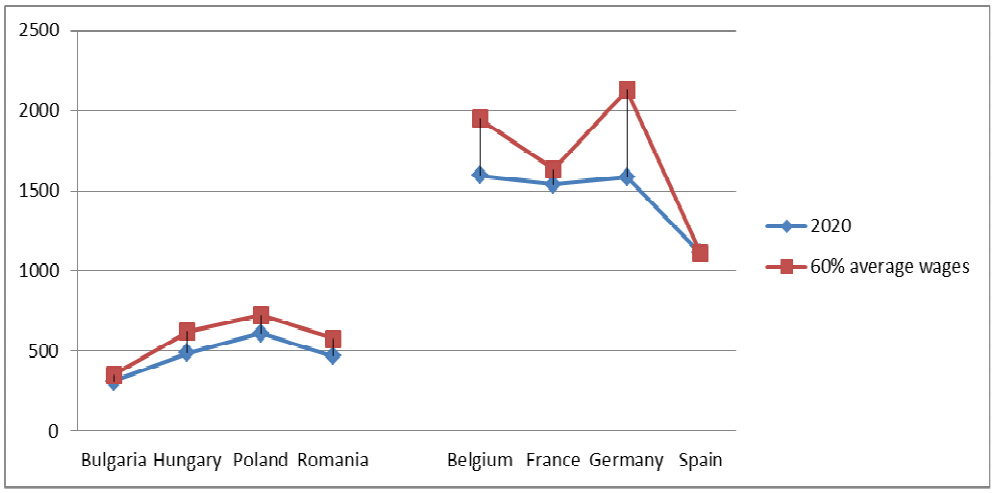

Fig. 4: Projection of the minimum wage according to the proposal of 60% of the average wage
Source: data processed by the author after Eurostat

Conclusions

In the years 2018-2019, the increase of the minimum wage was the main instrument in the countries of Eastern Europe for the wage increases. The fiscal changes by shifting the social contributions from the employer to the employee highlighted a major increase of 22.9% in 2018 compared to 2019. But the real increase of the salary was only 9.1%. In Poland and Hungary there was no wage increase, although the wages in these countries are small compared to those in western Europe. The gap between the minimum wages in the analyzed states remains very large. If viewed as a whole, the increase in the minimum wage had a minor impact on the distribution of added value. Significant increases in the minimum wage in some of the countries analyzed are misleading, with the calculation base being lower than in Western European countries. Based on the above, we can consider that wage convergence between east and west is a difficult objective to achieve. (Spatari and Guga, 2019)

A European minimum wage policy can play a dual role. From a social point of view it can lead to poverty and inequality reduction, and from an economic point of view it can stimulate growth and employment. (Schulten et al. 2015)

The response of companies for increasing minimum wages was raising prices, reporting low profits, trying to achieve better productivity by reorganizing the roles and responsibilities of employees, as well as training or qualifying employees in the workplace.

The discussions at European level should be correlated with those at national level. Important steps were taken by the states with low minimum wages, which increased the minimum wages by an important percentage, as the previous analysis showed. A number of the countries analyzed such as Spain, which registered an increase of almost 21% of the minimum wage, Germany which is one of the highest minimum wages is close to this proposal of 60% of the average wage. The increases in the minimum wage in the countries with the lowest level, such as Romania and Bulgaria, have been viewed with restraint by EU representatives. The tendencies of the companies in these countries were to employ many people with the minimum on the economy. At the same time, the differences between the salaries of older employees are very small. This can destroy the balance between employment and labor productivity.

The discussions should also look at taxes and social contributions related to salaries. Unfortunately, the states with the lowest minimum wage have the highest taxes. This has repercussions on the

number of employees. When the fiscal pressure is too high, firms tend to either hire as little as possible, or pay the minimum wage in the economy, or use illegal work. This is for example the situation of Romania where, despite the efforts of the different governments to clearly regulate the legal situation of the employees, to better collect the taxes and duties of the companies, to carry out more controls, there are still numerous situations in which the employees are paid with the minimum on the economy and quite a lot of people are employed on the black-market. The question arises whether the four Member States with the lowest minimum wages can economically support the increase of the minimum wages as long as the gross domestic product is not at the level of the developed countries and the taxes and social contributions related to the work are quite high.

The EU's initiative to open negotiations on this minimum wage is commendable. The very large differences between the Member States regarding the minimum wage can be mitigated by establishing common criteria, objectives and strategies at European level. The specificity of each country must be taken into account, but also the possibility of reaching the objectives and meeting the established criteria. The minimum wage must be set at a level close to the minimum leaving wage level.

The results of the study will be used for a new research in this field that will have as object if the proposal to increase the European minimum wage by 60% of the average salary ensures a decent living by reaching the minimum living wage threshold in the Member States.

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Banking Systems in the Emerging Economies of Asia: Case Study - ASEAN Banking Systems

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Abstract

The link between the financial sector and economic growth has been debated in the literature and problems in the banking sector are always reflected in the economy. In a world where economic growth is stagnating, Asia's emerging economies stand out. As a dynamic, banking systems in emerging countries have undergone spectacular changes in recent decades. Our paper presents the characteristics of the banking systems in Asian emerging market economies and explores the role of banks in the development of emerging economies, particularly that of ASEAN economies in order to provide a possible explanation for the significant growth rates experienced by these countries. We focus on digital technology and how customers in the ASEAN embrace digital and mobile banking, trends that will affect the industry's regional landscape.

Keywords: Emerging Economies, Banking System, ASEAN, Digital Banking

JEL classification: E02, F63, G21, G23, F34

Introduction

Without the banking system one cannot talk about development and economic growth; the link between the financial sector and economic growth has been heavily debated in the literature. Walter Bagehot (1873) said that during the Industrial Revolution banks supported innovation and financed expensive infrastructure works, for example the railroads. Joseph A. Schumpeter (1912) remarked that financial mediation stimulates technological progress by relocating funds to those entrepreneurs who are oriented towards new technologies and innovation. Raymond W. Goldsmith (1969) highlighted the importance of financing in economic development. His study followed the evolution of 35 countries between 1860 and 1963 and showed the link between the development of the financial system and economic growth.

On the other hand, problems in the banking system are mirrored in economy. Financial system crises impacted macroeconomical stability, the Asian crisis of the '90s being only one example. Costs are supported by everyone, and studies show they are not at all small. In Indonesia, the public debt grew by 67,6%, while costs of the government intervention policies amounted to 52,2% of the GDP. In Thailand, the public debt grew by 42,1% and costs of the intervention in the banking system amounted to 34,8% of the GDP (Laeven and Valencia, 2018, chart 2).

Technology, The Main Challenge of The Banking System in Asian Emerging Economies

When it comes to digitalization, Asia leads the digital revolution in spite of the region's heterogeneousness and of the differences in population incomes. Asian companies have been leaders in almost all aspects of digitalization, while some developed economies are significantly left behind. Automation through the means of industrial robots is one domain where Asia's supremacy is evident.

The density of robots is a comparative indicator that highlights the differences in the automation levels in manufacturing industry in different countries. According to the International Federation of Robotics (IFR), the value of yearly global sales reached 16.6 billion dollars in 2018. 422.000 units were delivered globally in 2018, plus 6% compared to the previous year. The IFR estimates that 2019 delivers will be

lower than the record level of 2018, but they are expected to grow by 12% per year between 2020 and 2022.

Asia is the biggest industrial robots market in the world (Fig.1). In the biggest three Asian markets result are mixed: the number of installations in China and South Korea decreased, while in Japan they increased considerably. Overall, Asia grew by 1%. Robot installations in the second biggest market, Europe, rose by 14% and have reached a sixth annual record in a row. In America, the growth rate was 20% higher than the previous year, which also constitutes a sixth consecutive high. The first five major markets for industrial robots make up for 74% of world installations in 2018: China, Japan, South Korea, USA and Germany. China remains the biggest industrial robots market, at 36% of total installations. In 2018, roughly 154.000 units were installed. This is 1% less than 2017, but more than the number of robots installed in Europe and America together. The value of installations reached 5.4 billion dollars – 21% higher than 2017.

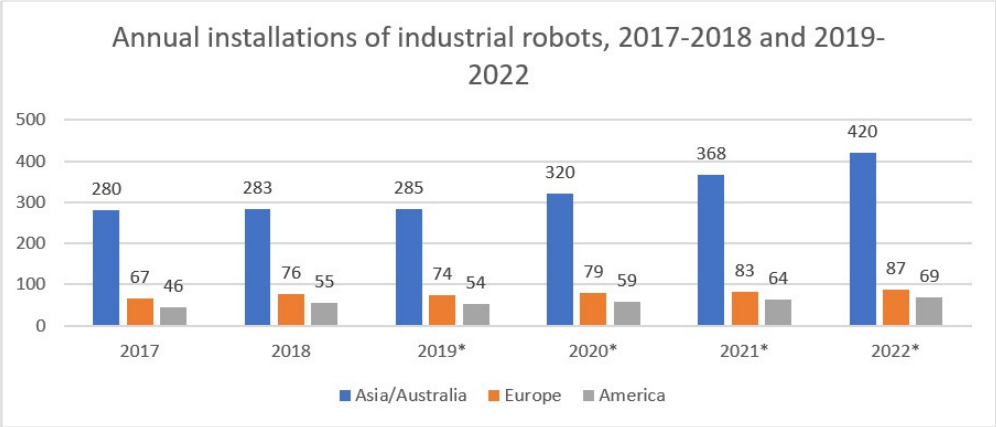

**forecast*

Fig. 1: Annual installations of industrial robots, 2017-2018 and 2019-2022

Source: International Federation of Robotics, 2019

Emergent economies have major implication at world economy level; the banking systems in these countries are fragile. Dinamically, banking systems in emergent economies have gone through spectacular changes in the last decades. A lot of factors have caused these changes (Căpraru, 2014, p. 288): deregulations, banking internationalisation, the changing of political regimes and the fact that some countries went from socialist economy to market economy, the growing financial and banking competition at world level, international financial crises. The evolution of banking systems in the emergent economies came as a result of specific phenomena: the diminishing state ownership of the banking system following privatizations; the growing pervasion of foreign capital into the banking systems; mergers and acquisitions; the increasing degree of banking concentration; banking deregulation and liberalization; the development of the banking sector; increasing banking competition; increasing financial innovation; financial crises and bank restructuring.

The importance of emergent economies increased in recent years, along with the presence of these countries' banks in the world banking sector. Although banks in emergent economies are a relatively small part of the world's banking system, cross-border links between creditors și borrowers in emergent economies are substantial and growing fast (Cerutti, Koch and Pradhan, 2018). In terms of residence, in mid-2018 banks in emergent economies made up almost 8% of the total cross-border loans, compared to 1,5% in mid-2008. When loans are broken down according to banks' nationalities (the jurisdiction in which bank's headquarter is based), emergent economies banks meant more than 12% of world's cross-border loans in mid-2018, compared to 3% in mid-2008, according to the Bank for International Settlements. At the end of June 2018, almost 40% (1,442 billion dollars) of the cross-border loans granted by emergent economies banks were going to the same emergent economies.

In recent years, it was Asia that changed the game and brought innovation in banking services, but now Asian banks have to reinvent themselves in order to face the challenge of digitalization.

ASEAN is a region where is hard to generalize, as it brings together 643 million people from 10 nations whose diversity goes from Laos, an agricultural, mountainous country, to Singapore, a city-state with one of the highest life standards in the world. But studies show the banking system in that region is homogenous (Banna, et al. 2019). In that region banks are the main sponsors of the economy and own more than 80% of the region's financial assets. Also, governments promote the consolidation of the region's banking system by mergers and acquisitions in order to stimulate the stability of the banking sector. Last but not least, countries liberalized their entry barriers for regional banks to promote regional banking integration by adopting ASEAN agreements like the Banking Integration Framework - ABIF (from March 2015), the ASEAN-China Free Trade Area – FTA – agreement (from January 2010), and the ASEAN Plus Three cooperation agreement (from December 1997), that includes China, Japan and South Korea.

The explosive economic growth made the South-Eastern Asian banking industry grow rapidly, fueled by an expanding population that can afford banking services, regional integration and the adoption of the new financial services that fintechs provide. At the same time, the demographics give this region an extraordinary growth potential in the finance and banking sector.

ASEAN group is host to more than 630 million people, half of them below 30 years old. According to UN-Habitat estimations, roughly 47% of the urban population of the region produce 80% of ASEAN's GDP, but disparities can also be seen in the use of financial services. While in Indonesia, Malaysia, the Philippines, Singapore and Thailand – the so-called ASEAN 5 – the banking industry is developed, in the BCMLV group – Brunei, Cambodia, Myanmar, Laos and Vietnam – the banking sector is not at the same level of development.

Singapore has the highest degree of banking penetration, as 98% of the adult population have a bank account, followed by Malaysia and Thailand with 85% and respectively 82%. At the other end of the ranking, the countries with the lowest banking penetration level are Myanmar and Cambodia, with 26% and respectively 22%, according to World Bank data (table 1).

Table 1: Banking penetration in the ASEAN, adults who have a banking account

Singapore	98%
Malaysia	85%
Thailand	82%
Indonesia	49%
The Philippines	34%
Vietnam	31%
Laos	29%
Myanmar	26%
Cambodia	22%

Source: World Bank, The Global Findex Database 2017

The use of smartphones changed the consumer behaviour and increased the usage of digital channels banking. A study by McKinsey on the financial services consumer behaviour in Asia showed that banking penetration in the Asian emergent economies increased three times in 2018 compared to 2014, to 52% (McKinsey, 2018). The percentage of digitally active customers (who use digital banking and bought online at least once in the last six months) doubled in 2018 compared to 2014, to 25% of the population in Asian emergent economies (China, India, Indonesia, Malaysia, Myanmar, The Philippines, Thailand, Vietnam) and grew 1,2 times in developed economies (Australia, Hong Kong, Japan, New Zealand, Singapore, South Korea, Taiwan). Digital banking growth has lead to the decreased importance of the classical brick and mortar branch offices. Only about 21% of monthly

transactions are still being made in offices, as client prefer the digital platforms for simple, routine transactions, like balance check, peer-to-peer transactions or bills payment.

But the greatest challenge for ASEAN banks is fintechs competition, because fintechs are more flexible, unconfined by regulations that banks have to obey and they also offer simple, intuitive and easy to use financial services.

Investment in fintechs in ASEAN soared spectacularly in recent years (table 2). In 2017, for example, they increased by 45%, to 366 million dollars, from 252 million dollars in the previous year, given that internet penetration rate in ASEAN had reached 58%, 391 million mobile users, and a social media penetration rate of 55% (EY, 2018).

Table 2: Evolution of fintechs in the ASEAN

	Number of fintechs	**Investment in 2017/ Investment evolution vs 2016**	**Sectors in which they are active**	**Most active investors**
Singapore	490	141 million dollars, +68%	Asset management, wealth management, loans, mobile payment	Startupbootcamp, GMO Venture Partners, Wavemake Partners
Indonesia	262	26 million dollars, 3,7 times growth	Asset management, wealth management, mobile payment	East Ventures, Kejora, 500 start-ups
Malaysia	196	75 million dollars, 15 times growth	Payment, consum loans	500 start-ups, Cradle, Mavca
Thailand	128	12 million dollars, -40%	Payment	500 start-ups, Golden Gate Ventures
The Philippines	115	78 million dollars, 13 times growth	Payment	500 start-ups, Kickstart Ventures, Spiral Ventures.
Vietnam	77	3 million dollars	Payment	IDG Ventures Vietnam

Source: Tracxn, accessed on December 9, 2017

Banks in the region already work with fintechs or establish innovation hubs in order to be able to provide financial services that can compete against those provided by tech companies. Singapore is also the regions' country with the greatest number of innovation hubs, 52, followed by Vietnam with 24, Indonesia with 20, Malaysia with 10 and Thailand and the Philippines with 5 each (EY, 2018).

Conclusions

The increase in the number of digital channels users led to the emergence of fully digital banks, launched either by tech companies or the classical banks themselves. The company that owned the Kakao Talk messaging app, very popular in the South Korea, launched the Kakaobank digital bank in July 2017, building on the 40 million users of the app. In the first five days the new bank reached 1 million users, in three months it had 3.6 million dollars in deposits, and the value of granted loans reached several million dollars – the fastest growth of a bank. But this isn't the only example. In 2016,

BTPN launched Jenius, the first digital bank in Indonesia, and Singapore's DBS Bank launched digibank in India, that also expanded into Indonesia the next year.

The evolution of technology comes not only with challenges, but also opportunities. Mobile phones and the internet led to the creation of new types of financial services, that are simple, do not require sophisticated devices and increase the financial inclusion level.

Fintechs play an ever growing role in the improvement of financial inclusion. They should be a key element in any national financial inclusion strategy. This kind of strategy should target vulnerable groups, like the population in rural areas, low income households, the elderly and geographically isolated communities. Asia's experience in financial inclusion highlights the advantages of a holistic approach, that contains macroeconomic, financial, banking, and regulation policies and also structural reforms. It also underscores the importance of financial education and the fact that public policy makers should encourage public-private partnerships when striving for the financial inclusion.

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Work Dimensions And Job Satisfaction – What Makes Us Happy at Work?

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Abstract

The article presents research on the perception of work dimensions, which, according to the Peter Warr's vitamin model of well-being in work, should be significantly related to job satisfaction. The presented research was carried out in cooperation with TAW Polska, on a group of 239 diversified in terms of positions, seniority and education employees of a Polish company from the automotive industry. The vitamin model assumes 12 dimensions of work characteristics related to the perceived well-being of employees. The first group consists of factors which both lack and excess carry a lower level of well-being, and even prevent it from being felt. The second group consists of factors that are desired by both the employee and the organization at the highest level, and the perceived high level promotes the well-being of employees. The analysis of the results obtained partly confirms the relationship between the perception of work characteristics and well-being, in addition, the analyzes showed significant differences between groups of employees in the perception of work. Although they work in the same organization, but the different content of their work results in a different evaluations of work dimensions and well-being.

Keywords: Job Satisfaction, Dimensions Of Work, Human Resource Management, Vitamin Model Of Work Well-Being

Introduction

Well-being and quality of life concepts

The concept of well-being in social sciences, including psychology, management, and even economic sciences has noted in recent years an extraordinary increase in researchers' attention and importance in various types of analysis. Probably a specific "career" of this concept is associated with the growing popularity of a positive approach in social sciences (e.g. the development of positive psychology or focus on healthy organizations and institutions in management, education, health protection and other areas of social and economic life). Another reason is the change in the paradigm in economics and politics, which is responsible for shifting attention from economic criteria as indicators of the developmental level of societies to criteria related to the general condition of individuals and communities, and even their sense of satisfaction, happiness or well-being (World Happiness Report 2019; Harford 2019; Joshanloo 2018; Vittersoe 2016; UN General Assembly Resolution 2012).

The definition of personal mental well-being, created by WHO and based on a holistic health model, refers to the subjective sense of happiness and health felt by people. In the shortest diagnosis of well-being, it can be stated that well-being occurs when, people define themselves as “feeling cheerful and in good spirit, calm and relaxed, active and vigorous, waking up with feeling fresh and rested and having daily life filled with things that interest them” (Topp, Østergaard, Søndergaard and Bech 2015, p. 168). Of course, mental or psychological wellbeing is not the only one, because physical, spiritual, social and others also stand out in the literature.

In psychology, especially in its positive trend, several important models and approaches to wellbeing have been created since the 1980s, including subjective well being – SWL. It contains three distinct but often related components of wellbeing: frequent positive affect, infrequent negative affect, and cognitive evaluations such as life satisfaction (Diener, 1984; Diener, Suh, Lucas and Smith 1999).

Another important model is proposed by Carol Ryff (1989, 2008), consisting of six dimensions: Self - acceptance, Personal growth, Purpose in life, Environmental mastery, Autonomy, Positive relations with others. The multi-dimensional approach of Martin Seligman, one of the founders of the positive trend in psychology, called PERM, and containing the following dimensions is also important: Positive Emotions, Engagement, Relationships, Meaning and purpose, and Accomplishments. (Seligman, 2011)

The concept of well-being described above is closely related to the concept of quality of life, which has a similarly wide scope and is used in a wide range of research - from clinical psychology to the application in economics, health or educational policy (Diener and Tay 2015; Dodge, Daly, Huyton and Sanders 2012; Deci and Ryan 2008). As part of research, this trend analyzes the objective circumstances of people's lives and how they perceive these circumstances and their lives. It examines various issues, including employment, income, education, housing, family, health and work-life balance. Subjects of observation are also subjective issues, such as the level of personal satisfaction, level of life satisfaction and perception of the quality of society.

E.g. the results of the 2016 European Quality of Life Survey (2016) show significant progress in three key areas of the review: quality of life, quality of society and quality of public services - although these developments have not been reported in all countries or for all social groups.

Similar conclusions come from global research at the UN or OECD. All these research projects contain analyzes, rankings and conclusions regarding national happiness based on the assessments of the respondents' own lives and also report correlations with various life factors. For example, in March 2019, Finland was twice in the ranking of the happiest country in the world (World Hapiness Report 2019) turn, OECD studies, point to Norway as the country where life is best (assuming equal importance for all analyzed factors) (OECD Better Life Index 2017). In general, on the basis of numerous studies, Scandinavian countries are considered to be the most favorable to the well-being of their citizens.

Well-being at work and job satisfaction

Well-being and quality of life have a strong reference to people's professional activity, and work-related aspects are key in many general well-being models. E.g. Well-being Index Mayo Clinic assumes several key dimensions that create general well-being at work - meaning in work, likelihood of burnout, severe fatigue, work-life integration. In turn, in the above-mentioned Index Better Life published by the OECD, the areas: jobs, income and work-life balance are analyzed. In turn, job satisfaction as one of the direct indicators of well-being at work is a commonly diagnosed and analyzed variable - both in the field of work psychology and management, as well as in the practice of human resource management of numerous organizations. It has been the subject of interest for many years, but recent changes in labor markets and the functioning of many organizations further intensify interest in this area of research and applications (Locke 1969; Wanous and Lawler 1972; Yoone and Thye 2002; Schaufeli, Salanova, Gonzalez-Romá, and Bakker 2002; Luthans, Avolio, Avey and Norman 2007; Chung-Yan 2010; Bajcar, Borkowska, Czerw, Gasiorowska 2011).

This article assumes that job satisfaction is a state of positive assessments of various aspects of this activity (professional work) by employees. In common use, the term is understood as "feeling of pleasure and achievement which you experience in your job when you know that your work is worth doing" (Cambridge Dictionary https://dictionary.cambridge.org/en/dictionary/english/job - satisfaction). At the same time, it is also desired by managers and employers because of the consequences it has for employee engagement, responsibility, loyalty and creativity of employees, or attachment to organizations that reduce employee turnover, avoidance of work, and even counterproductive behavior in the workplace (Ford, Cerasoli, Higgins and Decesare 2011; Irving and Montes 2009).

The search for the causes and consequences of well-being at work is, by its very nature, an interdisciplinary area on the border of social sciences, mainly psychology and labor pedagogy, and management sciences, particularly human resource management. In such an interdisciplinary style, this

problem is dealt with by Peter Warr (1990b, 1994, 2009). In his model, the author presents basic assumptions regarding both subjective and organizational determinants of employee well-being. Organizational and situational determinants of well-being are the dimensions of work related to the specificity of the profession or type of work, but also with the organization. In the latest studies, the author describes 12 work dimensions included in the so-called vitamin model (Warr and Clapperton 2010; Warr 2009; Mäkikangas, Feldt and Kinnunen 2007; ; Jeurissen and Nykliček 2001; De Jonge and Schaufelli 1998). Of these, six should not exceed the average optimal level (at a higher level they are already harmful), and six may (or even should) reach very high values. The name "vitamin model" comes from just comparing working dimensions to vitamins, some of which can be supplied to the body in any amount - these are water-soluble vitamins, and some in too high doses can lead to overdose - fat-soluble vitamins. (Model description and dimension definitions are provided in the section on testing methods and procedures).

Research Method and Tools

The aim of the study

The main research goal presented in this work is the relationship between work dimensions in the vitamin model and job satisfaction. In addition, the analysis took into account important features that differentiate employees, such as seniority or position in the organization.

We have therefore hypothesized:

H1: the higher (or more optimal) the work dimensions, the higher the employees' job satisfaction ratings.

H2: work dimensions differ significantly in employee groups with different seniority and position in the organization.

Participants

The research was carried out on a group of employees diversified as to positions, seniority and education of a Polish company from the automotive industry. The research included 86.5% of the organization's employees (251 out of 290 people). Of those, 161 people worked in the production department and 42 worked in the administration department, and 35 in managers position (the rest were missing data).

The number of collected questionnaires is 251, but due to too many missing data, 239 questionnaires filled with the pen and paper method were adopted for analysis. There were 40 women, 195 men, and no data in 4 cases. The ages of the respondents ranged from 19 to 63 years (M = 34.5; SD = 10.23; 6 missing data). The years worked in this organization varied from one to 11 years (M = 3.06; SD = 2.10; 7 missing data). Most of the participants had secondary and vocational education (67.1%). The rest had higher education (28.9%) or primary education (4%).

Diagnostic Tools

The work dimensions were measured using the *Vitamin TAW Questionnaire* (Borkowska and Czerw 2015). The questionnaire consists of 12 scales which form two groups. The optimal level of the six dimensions included in Group A should oscillated around zero. Both high and low levels of dimensions can cause various types of discomfort to employees and reduce their well-being at work. Part A includes a 7-point scale, from -3 to +3, with 0 in the middle as the optimal point. The participant's task was to respond to statements concerning various aspects of his/her work and select a point along the scale. Thus, for example, the employee was asked to complete the following statement: "*I believe that social*

interaction at my workplace ..." Possible answers fell between the following two extremes: from -3 ("*actually does not exist*") to +3 ("*takes up too much of my time*").

Group B is made up of six work dimensions. In this group, the optimal level is the highest level. The presented theoretical assumptions imply different diagnostic methods for the two described vitamin groups (work dimensions). Therefore, when constructing the questionnaire – from the very beginning – different methodologies were adopted for its two parts: for the response scales, as well as for formulation of the instruction and the individual scale items. Part B includes work dimensions, levels of which should be as high as possible. They are determined using a 7-point agreement scale (from 1 – "*I fully disagree*" to 7 – "*I fully agree*") with the items formulated as affirmative sentences describing various aspects of participants' work, e.g. "*I know what my future career development prospects are in my company.*"

Dimensions in group A

Personal control (α=0.78) - scope and freedom of decisions made by an employee concerning their work, the manner and time of its performance and selection of co-workers, as well as the level of personal influence of the employee on the results of their tasks.

Demanding supervision (α=0.79) - ongoing employee supervision by superiors, evaluation of their tasks based on negative feedback and error tracking.

Work diversity (α=0.84) - level of diversification (repetitiveness vs variety) of tasks, methods and places of their execution, flexibility of thinking and employee behaviour.

Workload (α=0.77) - feeling tired due to work overload, task difficulty and carried responsibility for task execution.

Social contacts intensity (α=0.83) - frequency and quality of the employee's interpersonal contact with others in the context of their work, e.g. co-workers, supervisors, clients.

Development and evaluation (α=0.93) - the importance that employees believe an organisation attaches to their own development, using their potential as well as the organisation's involvement in career path planning.

Dimensions in group B

Supportive supervision (α=0.86) - employees' relationships with their superiors based on diverse feedback from results and work methods, the readiness and willingness of supervisors to provide support and assistance and their knowledge of employees' strengths and weaknesses.

Sense of security in organisation (α=0.79) - efforts of the organisation to ensure the physical safety of its members and the environment, and provide the employees with a sense of dignity and, as well, respect of the organisation for their own rights.

Financial compensation (α=0.82) - level of satisfaction with financial remuneration as well as transparency and fairness of remuneration policy in the organisation.

Significant social position (α=0.75) - purpose and usefulness of work for others and the organisation, importance and prestige of the professional role, a sense of being noticed by others in the organisation.
Organisational ethics (α=0.78) - involvement of the organisation in respecting standards and ethical principles related to risk avoidance, striving for fair and just practices in the organisation.

Career prospects (α=0.80) - the clarity of the organisation's career planning policies and knowledge of the conditions of promotion and pay as well as the personal influence of employees on shaping their own careers.

The questionnaire was tested in two different organisations in the same year. Reliability and validity indicators of the tool were found to be satisfactory (Borkowska and Czerw, 2015).

Employee satisfaction was measured using the Satisfaction with Job Scale (Bajcar et al. 2011). This scale includes nine items related to satisfaction components such as: co-workers, superiors, working hours, type of tasks, etc. (α=0,78). Respondents determine their level of satisfaction with particular categories on a scale from -5 to +5. The negative values refer to the level of dissatisfaction and the positive values to the level of satisfaction. The scale also includes the value 0 for a neutral level. The questionnaire was used in a number of studies where the level of job satisfaction was determined (Czerw 2017; Czerw and Borkowska 2010). The scale showed a satisfactory level of reliability and validity.

Statistical Method

Standard one-way ANOVA and Pearson correlation coefficient were used in the analyzes due to the normal distribution of variables.

Research Results

In the first step of the analysis, due to the assumed curvilinear nature of the variables in the vitamins A group (the closer to the zero point, i.e. the center of the scale, the better), for each of the work dimensions, all respondents were divided into two groups significantly different in terms of assessments of work dimension. Next, analysis of variance was carried out and differences in the declared job satisfaction in both groups were checked. The results are presented in the table below.

Table1: Relationship of job satisfaction with the level of work dimensions (Group A) (*N*=239)
Analysis of variance

	Personal control	Demanding supervision	Work diversity	Workload	Social contact intensity	Development and evaluation
Satisfaction-general	F=23,27 p≤0,001**	F=16,42 p≤0,001**	F=14,89 p≤0,001**	F=2,96 p=0,05*	F=12,29 p≤0,001**	F=12,29 p≤0,001**
Colleagues	F=4,19 p=0,16	F=1,51 p=0,223	F=0,110 p=0,896	F=0,697 p=0,499	F=6,24 p≤0,005*	F=23,99 p≤0,05*
Direct superiors	F=17,48 p≤0,001**	F=6,59 p=0,002*	F=5,46 p≤0,005*	F=2,92 p=0,05*	F=17,49 p≤0,001**	F=14,73 p≤0,001**
Type of tasks performed at work	F=14,07 p≤0,001**	F=8,16 p≤0,001**	F=12,29 p≤0,001**	F=1,38 p=0,252	F=3,34 p≤0,05*	F=20,17 p≤0,001**
Work conditions	F=9,03 p≤0,001**	F=11,21 p≤0,001**	F=11,53 p≤0,001**	F=2,71 P=0,068	F=1,23 p=0,293	F=22,84 p≤0,001**
Professional development	F=16,64 p≤0,001**	F=27,19 p≤0,001**	F=19,89 p≤0,001**	F=1,11 p=0,335	F=0,749 p=0,474	F=73,93 p≤0,001**
Salary	F=14,52 p≤0,001**	F=5,29 p≤0,005*	F=14,76 p≤0,001**	F=0,999 p=0,369	F=1,57 p=0,209	F=32,69 p≤0,001**
Work time	F=0,26 p=0,771	F=1,23 p=0,179	F=1,34 p=0,262	F=6,17 p≤0,005*	F=1,06 p=0,347	F=4,75 p≤0,01*
Stability of employment	F=10,94 p≤0,001**	F=1,55 p=0,213	F=1,34 p=0,333	F=3,08 p=0,05*	F=2,65 P=0,07	F=11,04 p≤0,001**
The company as a whole	F=11,58 p≤0,001**	F=10,62 p≤0,001**	F=8,19 p≤0,001**	F=4,59 p≤0,01*	F=0,298 p=0,743	F=20,13 p≤0,001**

** p≤0,05, ** p≤0,001*

As shown in Table 1, in 5 of 6 dimensions are significantly connected with general job satisfaction. Only *Workload* causes much ore slight differences in satisfactions evaluation. Interestingly, the evaluations of satisfaction of colleagues, working time and stability of employment are least related to the dimensions of work in group A. The results, however, generally confirm the relationship between work dimensions in group A and job satisfaction.

The next step was to carry out an analysis of the correlation of work dimensions from group B with aspects of job satisfaction. It was possible because it was assumed that the higher the results on all scales the respondent achieved, the better, i.e. greater well-being at work. The results are presented in the table below.

Table2: Relationship of job satisfaction with the level of work dimensions (Group B) (*N*=239) Pearson's correlation coefficient

	Supportive supervision	Sense of security in organisation	Financial compensation	Significant social position	Organisational ethics	Career prospects
Satisfaction-general	,584**	,531**	,615**	,455**	,408**	,567**
Colleagues	,262**	,194**	,130**	,191*	,236**	,172**
Direct superiors	,628**	,221**	,399**	,381**	,363**	,357**
Type of tasks performed at work	,406**	,278**	,365**	,438**	,204**	,357**
Work conditions	,367**	,474**	,378**	,250**	,324**	,370**
Professional development	,502**	,434**	,522**	,369**	,230**	,638**
Salary	,395**	,314**	,780**	,378**	,314**	,458**
Work time	0,061	,376**	,130*	-0,002	0,026	,175**
Stability of employment	,345**	,310**	,312**	,287**	,332**	,270**
The company as a whole	,397**	,443**	,427**	,341**	,362**	,410**

** p≤0,05, ** p≤0,001*

Similarly to the A group of vitamins, also in this set of work dimensions, the results show a relatively strong and significant correlation between job satisfaction and vitamins. It is worth noting the strong relationship between vitamins and overall satisfaction and satisfaction with professional development. Work dimensions seem to be correlated the least with satisfaction from working time and colleagues.

As part of the diagnosis, correlation and variance analyzes to indicate differences in the evaluations of work dimensions and job satisfaction depending on several demographic features, i.e. gender, age, but also general seniority and seniority in the company were carried out. Results of the analyzes have shown that men and women evaluate their dimensions of work and job satisfaction in very similar way. In addition, analyzes of correlation with age and seniority showed only two weak relationships between the age of employees and the assessment of work dimensions. The older the employees, the better (higher) they evaluate the importance of their position in the organization and the importance of their work for the company. Moreover, the longer the period of work in the organization, the worse they assess the organization's ethics.

Therefore, it should be emphasized, that these relationships are not very strong and it can be generally stated that demographic variables are generally not significant for the well-being and assessment of organization and work.

This an unintuitive result, indicates the strength of the influence of the characteristics of work and organization, as well ways of managing and organizing work in building employee well-being, rather than their individual characteristics.

However, significantly different in evaluations of the work dimensions were shown in the analyzes taking into account the department in which the respondents work and their position in the company (managerial versus non-managerial). The next four figures show these differences in evaluations.

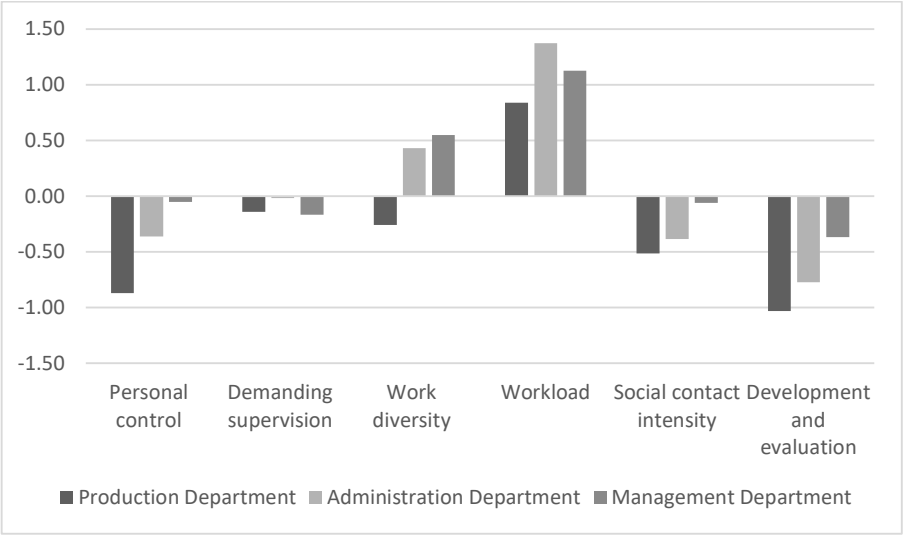

Fig.1: Evaluations of work dimensions (Group A) by employees of various departments

Analyzes of work dimensions from group A show significant differences in the evaluations of these dimensions between departments. They do not appear only on the *Demanding Supervision* dimension, by the way the best rated (the ratings closest to the optimum at the point "0"). The largest differences were recorded in the dimensions of *Personal Control, Work Diversity*, and *Development and Evaluation*. The employees employed in the Production Department declared the most negative (furthest from optimum) evaluations.

It is worth emphasizing that all three groups of employees (from three different departments) rated *Workload* the worst. This is consistent with general data showing a significant work load, e.g. in the number of hours worked, in Poland against other European countries.https://ec.europa.eu/eurostat/statistics-explained/

Summarizing these results, it should be notice that in different places, employees organize work in different ways and in different conditions, so they also perceive these dimensions in a completely different way.

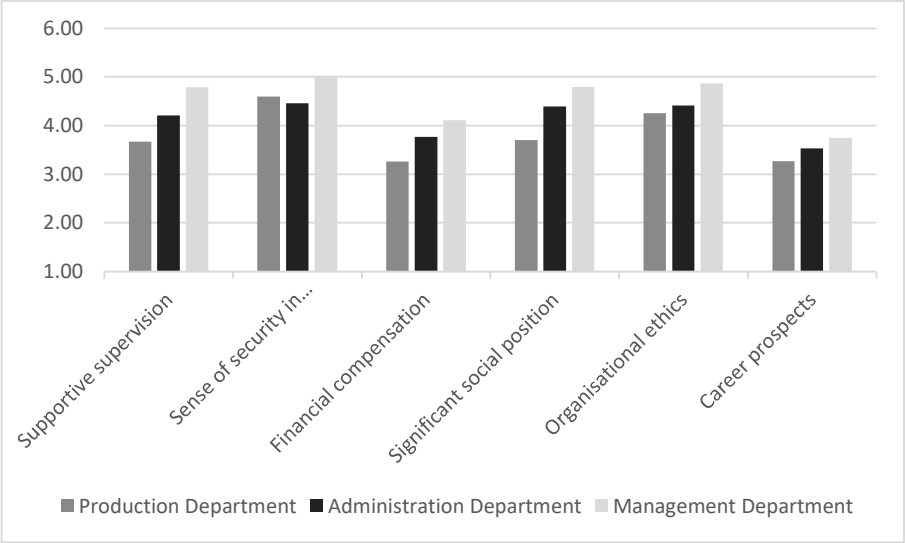

Fig.2: Evaluations of work dimensions (Group A) by employees of various departments

Similarly to the A group of Vitamins, the analyzes of B group showed significant differences between the departments of the researched organization.

The greatest differences concerns: Significant social position, Supportive supervision and Financial compensation. On all of these dimensions, the Management Department rated these dimensions the best, and the Production Department the worst. It is important to emphasize the constant pattern of differences in evaluations: the highest grades for all dimensions of work come from the Management Department and the lowest from the Production Department.

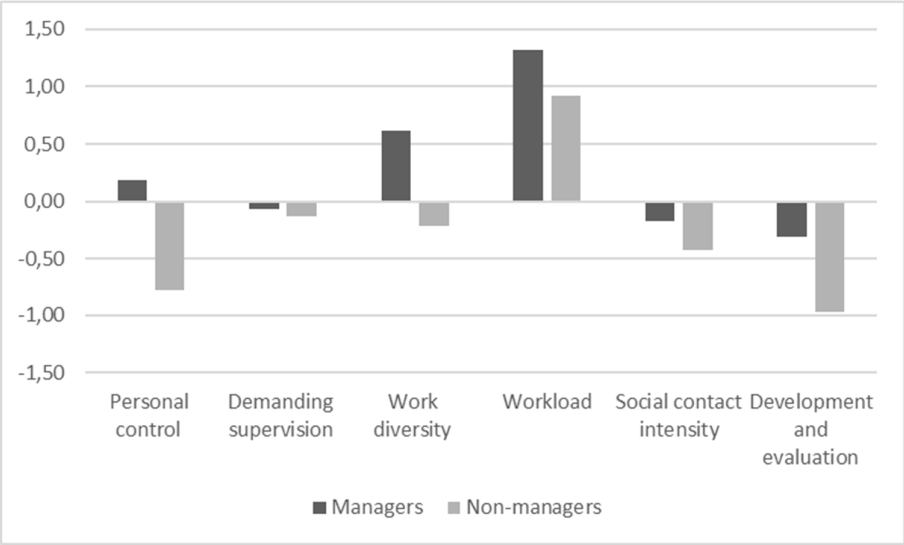

Fig.3: Evaluations of work dimensions (Group A) by managers and non-managers employees

The differences due to the position in organisation in this Vitamin group are very clear. People in managerial positions declare an excessive of *Work Diversity* and *Workload* (but in the second dimension the differences are not as clear compared to other employees).

On the other hand, non managerial employees rate the level of *Personal Control* and *Development* clearly lower

- they consider them too low.

Best (evaluations closest to the optimum at the "0" point) and in a consistent manner are rated dimensions: *Demanding Supervision and Social contacts intensity*.

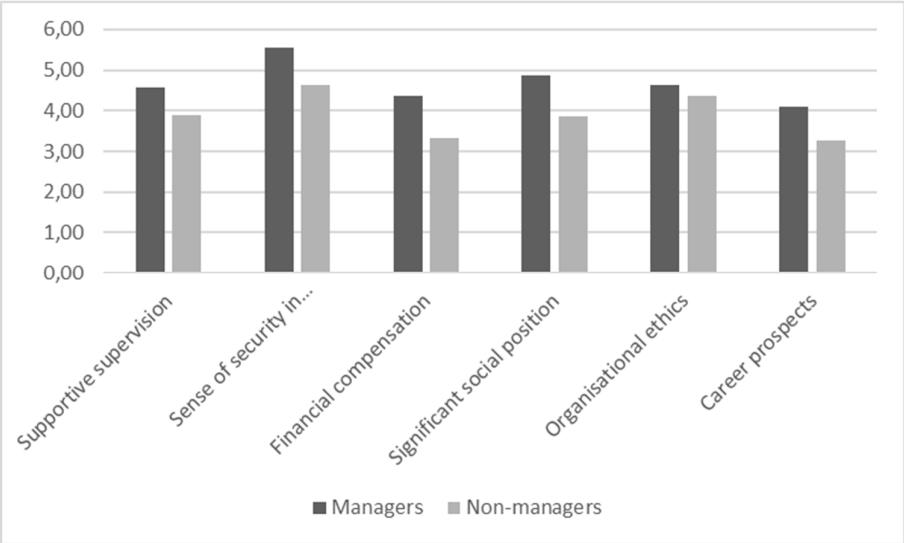

Fig.4: Evaluations of work dimensions (Group B) by managers and non-managers employees

The only dimension whose evaluation does not differ significantly in the group of managers and other employees is the *Organisational ethics*. Other assessments are varied, with the largest differences appearing in *Financial compensation* and *Significant social position.*

In general, a group of people employed in managerial positions evaluates better all dimensions of work in this Vitamin group.

Conclusions

Summing up the results presented above, it should be emphasised that the overall picture indicates that the organisation does not have a very high level of overall "positivity" (in terms support high level of employees well-being). It can therefore be assumed that, according to the workers, this is not a specially supportive or development-stimulating workplace: there are some areas that can be much better managed by leaders providing a higher level of employee well-being or job satisfaction. However, it is worth noting that, in the group of work dimensions which has an optimal point (Group A), three are evaluated quite well. These include *Demanding Supervision*, *Work diversity* and *Social contacts intensity*.

In group B of work dimensions, the *Career prospects* and *Financial compensation* were rated the worst. However, it is somewhat surprising that the best rated were *Sense of security in organization* and *Organisational ethics*. This result seems to be a kind of hope and positive expectation of employees put in the employer and workplace.

The analyzes in a clear and consistent manner confirmed the assumed relationship between the evaluations of work dimensions and the level of job satisfaction. It is relatively strong and significant. However, it should be emphasized that the five dimensions are particularly strongly associated with satisfaction. These are: *Personal control, Demanding supervision, Supportive supervision, Financial compensation* and *Career prospects.* This means that employers, organizations and individual managers are able to significantly increase the satisfaction of their employees thanks to active and thoughtful management of work conditions and features. Of course, not all aspects of work can be changed quickly and easily, but those that relate to control, supervision or employee autonomy are worth thinking and changing within the broadly understood organizational and management culture or types of leadership.

On the other hand, comparative analyzes show that employees of various departments and positions in one company work in completely different conditions and assess the dimensions of their work and the (same) employer in a significantly different way. This is undoubtedly a challenge for many managers as it requires a much more diverse and even individualized approach to motivating and engaging employees of various departments and positions. Another challenge seems to be building a coherent and common identity of employees of one company, since they perceive it in such a diverse way.

Currently, the need to ensure the well-being of employees, seems obvious. Many results of the research, however, suggest also equally importance of this mental state of employees for the functioning of the entire organization. Meatanalysis of various research carried out in this context (Ford et al. 2011) shows that the well-being of employees affects on more effective use of working time, increase in quality of work, improving interpersonal relationships at work, less frequent and better resolved conflicts , loyalty to the employer, civic attitude towards the organization, increased organization's innovation, customer satisfaction, less employee turnover, less work absences, safer work.

Since the well-being of employees brings so many benefits to the organization, actions aimed at raising and nurturing the well-being of its employees should become the norm. It seems that the results and conclusions given above can help achieve this goal in many different organisations.

Limitations

The basic limitation of the presented research is the character of the company in which it was conducted, i.e. the automotive production plant. In this type of company, employees have a very different scope and content of work, depending on the department in which they are employed and their role in the organisation (i.e. managerial or not managerial). As well, the work characteristics evaluation profile given by employees is probably quite specific to the industry itself and type and culture of organisation (i.e. Polish enterprises). Comparative analyses of organisations across different industries and types of activities would therefore be highly recommended.

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Organizational and Economic Aspects of Assessing the Level and Quality of Life of The Population of Regional Economic Entities

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Abstract

In the publication, the author substantiates the relevance of using the indicative organizational and economic approach to assessing the level and quality of life of the population of an administrative-territorial unit, develops tools for applying the indicative organizational and economic approach to assessing the level and quality of life of the population of an administrative-territorial unit, performs practical testing of individual indicators organizational and economic approach to assessing the level and quality life of the population of the administrative-territorial unit. As an object of practical testing of the tools of an indicative organizational and economic approach to assessing the level and quality of life of a population in a scientific study, statistical indicators of the socio-economic development of the Kursk region were used. The advantage of the method of assessing the level and quality of life of the population of the administrative-territorial unit presented by the author is the use of a formalized criteria-based organizational and economic apparatus in the process of research. Based on the results of the study, the author concludes that it is practical to use the presented indicative organizational and economic approach to assess the level and quality of life of the population in order to remove uncertainty when making program-oriented management decisions.

Keywords: Level and quality of life, regional development, management decisions, indicators of quality of life, organizational and economic approach

Introduction

The study of issues of assessing the level and quality of life of the population has the most significant interest. The high relevance of assessing the quality of life of the population is due to the presence of interest in this issue at the macroeconomic, political, and at the public level. In this regard, a large number of methods and tools for assessing the standard of living of the population have been developed in the scientific literature. Most of the presented methods can be divided into two categories: quantitative and qualitative. In our view, the use of quantitative methods to assess the level and quality of life of the population contributes to obtaining a more formalized result and increases its importance as an information base for making management decisions. In this aspect, it can be noted that the relevance of assessing the quality of life of the population is also caused by the need to form a reliable information base for the development and implementation of programmatic and targeted measures to increase this criterion, including at the regional and municipal levels of government. The effectiveness of the implementation of programme-targeted measures to increase the quality of life of the population of a territorial unit also needs the formation of a reliable and formalized assessment apparatus, which would make it possible, on the basis of a reliable statistical base, to form reasonable conclusions on the dynamics of the development of this indicator. We

propose to use an indicative organizational and economic approach to assess the standard and quality of life of the population of the administrative and territorial unit to solve this issue.

The purpose of this study is to develop and test an indicative organizational and economic approach to assessing the level and quality of life of the population of an administrative-territorial unit.

This purpose is achieved through the following tasks:

- to substantiate the relevance of the use of an indicative organizational and economic approach to assess the level and quality of life of the population of the administrative and territorial unit;
- development of tools for an indicative organizational and economic approach to assessing the level and quality of life of the population of the administrative and territorial unit;
- the practical testing of individual tools for an indicative organizational and economic approach to assessing the level and quality of life of the population of an administrative-territorial unit.

The working hypothesis of this study is that the development and adaptation of an indicative organizational and economic approach to assessing the level and quality of life of the population of an administrative-territorial unit will contribute to improving the reliability of the information base for making quality management decisions, including at the regional and municipal levels of management, which will significantly increase the effectiveness of the development and implementation of various target programs.

The main result of this study is the development of a verified indicative organizational and economic approach to assessing the level and quality of life of the population of the administrative-territorial unit, based on the synthesis of the materials of the statistical representative sample. Monographic, statistical, comparative, economic-analytical, representative methods of research are used to solve the problems in the work and achieve its main goal. The development of an effective tool for assessing the standard and quality of life of the population implies, first of all, the concretization of the conceptual apparatus in this field of research. The assessment of the standard of living and the quality of life of the population is given considerable attention in the scientific literature, which once again indicates the relevance of this issue.

Review Methodology

A number of scientific researchers in their publications define the standard of living of the population as a set of factors that contribute to the meeting the necessary needs. The formation of these factors is achieved in the process of creating the necessary criteria for the socio-economic development of the territory and the life of the population.

Based on the above, we can conclude that the standard of living of the population can be determined through the lens of current income and property benefits accumulated by residents of an administrative-territorial unit. An important factor in the development of the standard of living of the population is the range of social services provided to the population by the State free of charge.

L.M. Idigova considers it appropriate to use a standardized approach to reveal the essence of the concept of "standard of living of the population". Taking into account the author 's scientific position, it can be concluded that the level of living of the population can be considered as a standard that should be achieved by the actual conditions of residence of citizens in a particular territory. This author unambiguously treats the standard of living of the population as an economic category subject to certain social standards. A certain group of scientific researchers considers it appropriate to separate such categories as the level and quality of life of the population. Based on the scientific position of L.N. Kravchenko, we can conclude that the standard of living is a quantitative category, and the quality of life is a qualitative category. In addition, the sign of subjectivity is an important factor in separating the concepts of "level" and "quality" of life of the population. In our opinion, the category of" standard " of living of the population has an objective character and can have a certain

quantitative parametric assessment. The category "quality" of life of the population is subjective and in a certain sense can not be characterized by a certain set of quantitative criteria.

Based on the presented comparative categorical analysis and taking into account the goals and objectives of this work, the main object of the study will be the category of living standards of the population. Thus, under the standard of living of the population within the concept of this study will be defined as a system of socio-economic factors of life, contributing to the satisfaction of its material, moral, spiritual, and physiological needs.

The study of the standard of living of the population includes the achievement of a wide range of goals. First of all, among the main targets for assessing the standard of living of the population, the following can be identified:

- the study of the dynamics of the development of the population's standard of living in the formation of General macroeconomic indicators of socio-economic policy;
- the creating a reliable information base for selecting vectors for implementing the program-targeted approach to increasing the level of socio-economic development of a certain administrative-territorial unit;
- the formation of a quantitative criterion for evaluating the effectiveness of certain measures in the area of increasing the level of socio-economic development of a certain territory.

Based on research materials, we can note that the standard of living of the population is an integral indicator. To assess the standard of living of the population, we recommend using a specific set of indicators. Indicators for assessing the standard of living of the population can be dynamic or static. In our opinion, the most relevant is the use of dynamic indicators to assess the standard of living of the population, due to these indicators allow you to track the dynamics of the standard of living for a certain time interval.

The formation of a dynamic integral indicator for assessing the standard of living of the population

The formation of a dynamic integral indicator for assessing the standard of living of the population is based on the calculation of chain indicators of growth of individual indicators for the selected time period. Calculating the value of the dynamic integral indicator for assessing the standard of living of the population requires an analysis of the evolution of the following static indicators:

- Per capita income of the population:

$$PCM_a = \frac{MI_t}{P_a} \quad (1)$$

PCM_a - the average per capita monetary income of the population;

MI_t - the total amount of monetary income of the population of the studied territory;

P_a - the average annual population of the studied territory.

- the share of the population with incomes above the subsistence level:

$$S_{pisl} = \frac{P_{isl}}{P_a} \quad (2)$$

S_{pisl} - the share of the population with incomes above the subsistence level;

P_{isl} - the average annual population with incomes above the subsistence level;

P_a - the average annual population of the study area.

- the total area of residential premises per resident:

$$A_{pr} = \frac{A_t}{P_a} \quad (3)$$

A_{pr} - the total area of residential premises per resident;

A_t - the total area of residential premises for resident to live in this territory;

P_a - the average annual population of the study area.

- the volume of paid services per capita:

$$VS_c = \frac{VS_t}{P_a} \quad (4)$$

VS_c - the volume of paid services per capita;

VS_t - the total volume of paid service to the population in this territory;

P_a - the average annual population of the study area.

Based on the presented four indicators, a dynamic integral indicator for assessing the standard of living of the population is determined. The calculation of the value of the dynamic integral indicator for assessing the standard of living of the population is made using the following formula:

$$DII_{slp} = Kc_{PCM_a} * Kc_{S_{psl}} * Kc_{A_{pr}} * Kc_{VS_c} \quad (5)$$

DII_{slp} - dynamic integral indicator for assessing the standard of living of the population;

Kc_{PCM_a} - the chain coefficient of growth of average per capita income of the population;

$Kc_{S_{psl}}$ - the chain coefficient of growth of share of the population with incomes above the subsistence level;

$Kc_{A_{pr}}$ - the chain coefficient of growth of total area of residential premises per resident;

Kc_{VS_c} - the chain coefficient of growth of volume of paid services per capita.

Statistical indicators of the social and economic development of the Kursk region were used as an object of practical testing of the tools of the indicative organizational and economic approach to assessing the level and quality of life of the population. The advantage of the methodology presented by the author for assessing the level and quality of life of the population is the use of a formalized criteria-based organizational and economic apparatus in the process of conducting research. The initial data for determining the dynamic integral indicator for assessing the standard of living of the population of the Kursk region are presented in table 1.

Table 1: Values of indicators for determining the dynamic integral indicator for assessing the standard of living of the population of the Kursk region

Indicator	2013	2014	2015	2016	2017	2018	The growth rates 2018 to 2013
The average per capita monetary income of the population, rub.	22908,7	23188,1	25801,4	25821,4	26424,6	27218,2	118,81
The chain growth rate, %	-	101,22	111,27	100,08	102,34	103,00	-
The share of the population with incomes above the subsistence level	91,2	91,3	89,8	89,7	89,8	90,1	98,79
The chain growth rate, %	-	100,11	98,36	99,89	100,11	100,33	-
The total area of residential premises per resident, m^2	27,9	28,3	28,7	29,3	30	30,4	108,96
The chain growth rate, %	-	101,43	101,41	102,09	102,39	101,33	-
The volume of paid services per capita, rub.	97,5	99,3	103,6	107,8	110,7	113,2	116,10
The chain growth rate, %	-	101,85	104,33	104,05	102,69	102,26	-

Using formula 4 and based on the initial data in table 1, the value of the dynamic integral indicator for assessing the standard of living of the population of the Kursk region is determined. The results of this calculation are presented in figure 1.

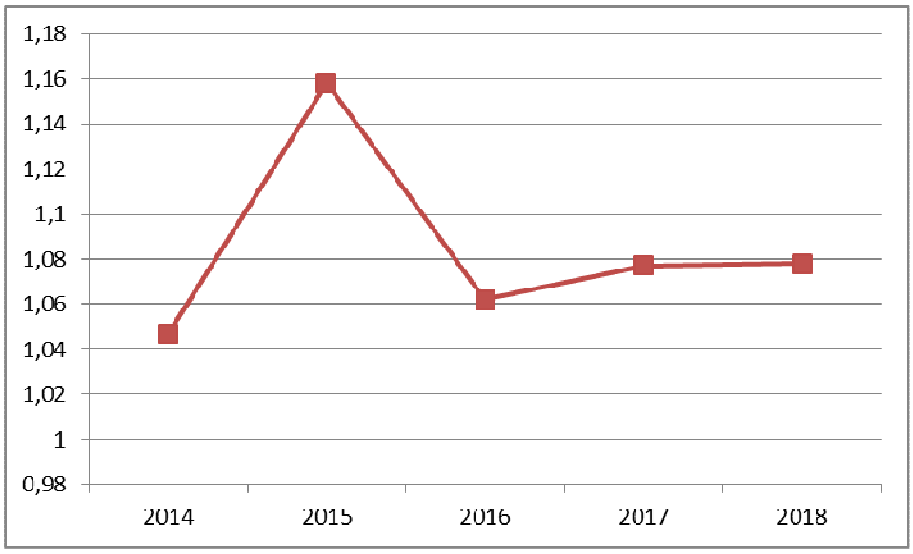

Fig. 1: Dynamics of the dynamic integral indicator for assessing the standard of living of the population of the Kursk region

Conclusion

So, based on the results of the conducted research the following conclusions can be drawn. The value of the dynamic integral indicator for assessing the standard of living of the population of the Kursk region varies unevenly within the studied period of time. The highest value of this indicator was in 2015, and the minimum value of the indicator was in 2014. The assessment of the evolutionary of the dynamic integral indicator for assessing the standard of living of the population of the Kursk region indicates positive changes in the socio-economic development of the region and the correctness of management decisions in this area. The reason for this conclusion is the fact that, starting from 2016 to 2018, the value of the dynamic integral indicator for assessing the standard of living of the population of the Kursk region is constantly increasing relative to the level of this indicator in 2014. The negative point is a significant drop in the value of the indicator in 2016 relative to 2015. The advantage of the performed calculations is the fact that they are based on both a verified mathematical apparatus and a reliable statistical information base. In addition, we can not fail to note the evolutionary nature of the dynamic integral indicator for assessing the standard of living of the population of the Kursk region, which allows to see exactly the temporary development of this phenomenon, which is the main thing for a qualitative assessment of not only the current state, but also the formation of promising management decisions. As a result, we can conclude that it is practical to use an indicative organizational and economic approach to assess the level and quality of life of the population in order to reduce uncertainty in making program-targeted management decisions.

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The Substitution of Labor with Capital from Smith to Schumpeter. Is the Service Sector the Last Chance of Employment? An analysis on the employment in service sector in the EU.

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Abstract

Over the decades, there is an increasing emphasis on the role that technologies play in the production process. The shift of the labor force from agriculture to industry, then from industry to services due to the automation of the first two sectors had a major impact on the development of a country. In the future, the evidence shows that we will face a new sector change. From the classics to the contemporaries, each has expressed his opinion in one way or another on this nodal problem that the economy of each country is facing, from the poorly developed ones to those where, although unemployment is not one of the matter with which is facing, but its lack of labor force to support the production of the respective nation.

Keywords: Employment, Service Sector, Substitution of Labor, Automation

Introduction

The fear of unemployment due to technological changes has been and remains present, debated and analyzed. The Schumpeterian paradigm started from modern industrial organizations and placed companies and entrepreneurs at the center of the growth process. The "creative destruction" explains that in some countries the increases generated by innovation are associated with a higher turnover rate, but also with a decrease in the nation's employment.

Most economists consider employment not only an economic condition, but also a human right. Burgess and Mitchell (1998) claim that the right to work is a fundamental, natural right. Wray (2009) argues that work can be a fundamental premise for social justice in any society, when the income from work is an important determinant for access to resources. Sawyer (2003) claim that obtaining jobs through state intervention creates inflation, motivating that lower unemployment means higher inflation.

Frey and Osborne (2017) consider that half of the labor force face a high risk of automation in the coming decades. Although the economic literature suggests that it is possible these recently evaluations of the risks is an ver-estimation of the potential for automation (Arntz, et al., 2016), until now, only a few studies are referring to the consequences on labor market because of modern automation technologies.

According to existing studies, automation technologies are replacing work in routine tasks. These are tasks that can be performed through algorithms and computer control. Increased processing power leads to a decision to replace individuals with machines in routine tasks (Acemoglu & Restrepo, 2017). Dorn et al (2013) and Cortes and Salvatori (2015) consider local US labor market that specialize in routine tasks didn't registered a decrease in jobs, while Gregory et al (2016) clearly highlight a net positive impact on the demand for work in European regions.

A more recent component of the literature focuses on the effects of robots on the labor market. Graetz and Michaels (2015) regarding industrial robots say that it doesn't have a negative effect on employment in developing countries. A result is somewhat different from a recent presentation for the US, in that the regions which use more robots have had a negative effect on employment (Acemoglu & Restrepo, 2017).

Lee and Kim (2009) believe that an economy can have different paths to economic growth depending on the initial structure of human capital and the nature of technological uncertainties, so despite the widespread new technologies, less developed countries have failed to gain ground. They believe that the right public policies especially in education and technology can make a country's economy adapt to uncertain technological changes. However, the implementation of innovation policies requires a thorough understanding of the characteristics of innovation. This involves understanding the processes of technological change, opportunities for development and use of new technologies and services, as well as the role of specialized expertise and changes in social structures (Hauknes, 1996). Some researchers believe that developing countries, through institutions and policies, should adopt technologies, even if this would lead to market rigidity and a less competitive environment (Acemoglu, et al., 2006).

The Davos Forum of 2016 debated the issue of the "fourth revolution", the digital revolution, which has radically changed the current economic evolution and the labor force disposition. The digitization of activities also makes it much more difficult to get a job. This, being accessible to the developed countries and to the multinational companies, leads to the reduction of the labor force and the narrowing of the demand for it. Automation in the service sector can lead to structural unemployment, just as previous innovations in productivity growth. Those with progressive views might argue for taxation to delay the spread of technologies, and others might think that increased business investments will lead to innovation that, in turn, will create new jobs in an economy that does not yet exist (Marsh, 2017).

This paper aims to make an inventory of the strong contributions of the literature in the field of employment and service sector, to highlight the dynamics of the idea of employment, both under the ratio of content and mechanism as such, along the route of the classics, neoclassic and contemporaries. Substitution of labor with capital in the primary and secondary sector leads to the following question: could this phenomenon also occur in the tertiary sector?

The substitution of labor with capital. The Classical Approach

Adam Smith divides the capital into a part reserved for immediate consumption, in fixed capital and working capital. In turn, fixed capital is divided into four other categories. One is represented by machines "which facilitate and abridge labour" (Smith, 2007, p. 217). The tendency of machines is "to increase the productive powers of labour, or to enable the same number of labourers to perform a much greater quantity of work" (Smith, 2007, p. 222). For this classic, these tools are regarded as an aid in society and that do not in any way cause negative consequences for the workforce.

David Ricardo considers that the use of machines in any way, regardless of the production sector, brings a general benefit with some negative consequences caused by the transfer of capital and work from one job to another. For him, the machines reduce the price of the goods at their cost of production so that the consumer, or the employee, will be able to procure an additional amount of goods and services with the same income. The emergence of the machines will not reduce their salary because the entrepreneur "would have the power of demanding and employing the same quantity of labour as before, although he might be under the necessity of employing it in the production of a new, or at any rate of a different commodity" (Ricardo, 2001, p. 283). Ricardo is in the first phase firmly convinced that replacing the workforce with cars will not result in their dismissal or, if it does, for this workforce there will still be demand for work, if not for that good then for another. But to be able to produce another kind of good, do we need a new set of skills? What about the cost associated with preparing another type of goods / merchandise?

Frédéric Bastiat (1996), in his book, 'Economic Sophisms', observes a similarity between imports and the appearance of machinery. Both are detrimental to the national workforce. Machinery and labor are excluded, but noting that in developed countries inventions and labor coexist, it can be said that the two are not excluded. Those who are opponents of the machinery see the short-term effects, the transient ones, and not the long-term ones, general ones. A machine has the immediate effect of replacing the labor force. But its effect does not stop here. The product, being obtained with less effort, can be sold at a lower price, and the savings obtained from the price difference can be directed to the purchase of other goods and services, which stimulates the employment at a general level, to the same extent of the force. of work released from the sector in which the new technologies were introduced. Thus, the volume of the workforce remains the same, and the needs can be better met.

The substitution of labor at Schumpeter

Starting with the concept of employment, we have in the first place the employee, one of the main actors of the economic life. They are different, both intellectually, spiritually, and bodily. Some are prepared to work, while others are not; that's why "...threats are addressed to incompetence. But though incompetent men and the obsolete methods are in fact eliminated, sometimes very promptly, sometimes with a lag, failure also threatens or actually overtakes many an able man, thus whipping up *everybody*, again much more efficaciously than a more equal and more «just» system of penalties would" (Schumpeter, 2003, p. 74). Therefore, each is placed by the "invisible hand" where it has high efficiency. Through the division of labor, they increase productivity. Smith tells us that there are three circumstances that increase the quantity of work through the division of labor: a) increasing the skill of each worker; b) time is saved due to the fact that one does not move from one job to another; c) the invention of machines that make a single man capable of producing the work of many others with its help (Smith, 2007, pp. 10-12). The third circumstance was considerably dealt with by Schumpeter, the substitution of labor with capital. The "creative destruction" of Schumpeter is related to this process. By technical progress we assure, he tells us, the survival of capitalism because "A first test of economic performance is the total output, the total of all the commodities and services produced in a unit of time - a year or a quarter of a year or a month" (Schumpeter, 2003, p. 63). Thus, what Schumpeter tells us and validates today is that the disappearance of an industry leaves room for new one, more efficient, but less benevolent with workers.

The neoclassical theory explained, at best, how the dynamics of wage and capital have an effect on employment. Thus, we face two situations. First, if wages increase, initially, employers want to adopt technologies to reduce their costs. These decisions have repercussions on the labor force, by diminishing it and substituting it with capital. Secondly, the change of the price of capital, more precisely, its decrease, determines the reduction of the costs of production and a tendency of increase of the production, which will lead to the increase of the demand of work and, implicitly, of the employment. But this is not the only effect of lowering the price of capital. We can also have a negative substitution effect because the demand for labor carriers, in response to the cheaper technologies, will be oriented towards them. The production will thus be obtained with lower costs, but also with a lower volume of work, and the unemployment rate will increase. It is growing exponentially especially during the period of industrial revolutions. They culminated in a period of rising unemployment and then recorded periods of decline until a subsequent revolution. In the long term, unemployment does not have a growth trend. It grows during periods of economic instability "from causes inherent in the capitalist mechanism itself" (Schumpeter, 2003, p. 70). The high unemployment specific to those periods of the industrial revolution is predominant especially during that period of adaptation. Schumpeter asserted that "... the real tragedy is not unemployment per se, but unemployment plus the impossibility of providing adequately for the unemployed without impairing the conditions of further economic development: for obviously the suffering and degradation - the destruction of human values - which we associate with unemployment, though not the waste of productive resources, would be largely eliminated and unemployment would lose practically all its terror if the private life of the unemployed were not seriously affected by their unemployment ” (Schumpeter, 2003, p. 70)

Schumpeter clearly tells us that the entrepreneur plays a crucial role in the market. It is linked to both economic growth and employment. What should prevail in a society that seeks to create wealth is

production. To reach this first point, entrepreneurs, ie the private sector, are needed. It can only be developed on the free market, unrestrained or stifled by government intervention. The essential, crucial role, for a nation to prosper is played by the entrepreneur, who is the creator of these commodities and services, which supports economic growth. But he cannot do this alone; it needs production factors, the man occupying the first and most important place. Therefore, in order for him to create real jobs, supported by the world of goods and services, the state is required to help it. Not through political subsidies or favors, but by ensuring an efficient institutional framework, which will allow him to develop as it employs its workforce.

Although in the developed countries there is an increase in the capital- labor substitution, in the developing countries, I believe, the unemployment due to the technologies and innovations is not yet a nodal problem; when there is no monopoly in the market. But it can be a problem when our leaders intervene on the free market. When, from the desire to enter the graces of the electorate, the minimum wages increase without discernment, without leaving alternatives to the entrepreneur, forced to resort to the machines that replace the man.

Service sector. The last chance of employment?

Known for his Curve, Kuznets describes the steps that need to be taken in order for any country plan to be realistic. The dynamics he describes shows us that he starts from the primary to the secondary, and then to the tertiary one. The problem of productivity in agriculture and industry must first be solved, and then get to the services sector, where over 80% of the active workforce is in developed countries. Indeed, as Maslow's famous pyramid shows us, the strongest need at the bottom of the pyramid is given by physiological needs, food being one of them. To be able to meet the others, productivity prospects in the primary sector need to be considered. "A country's economic growth can be defined as a long-term rise in capacity to supply increasingly diverse economic goods to its population, this growing capacity based on advancing technologies and the institutional and ideological adjustments that it demands" says Kuznets (1973, p. 247). Advanced technologies are the permissive sources of economic growth. Also, in order to be compatible with economic growth, they must be employed in a framework compatible with increasing the stock of human knowledge.

In his Nobel conference, Kuznets summarized six features of modern economic growth that resulted from his analysis of the national product and its components, such as increased labor. The third of its six characteristics states that "the rate of structural transformation of the economy is high. Major aspects of structural change include the shift away from agriculture to nonagricultural pursuits and, recently, away from industry to services" (Kuznets, 1973, p. 248). The most frequent pattern observed over time is characterized by a decrease in the share of the labor force allocated to agriculture and by an increase in the share in services.

The economist mentioned considers that by analyzing the statistical data of the incomes of a generation you can see the level of development of a country; nor by studying two generations. In order to interpret the stage of development of a country, we must also take into account other economic and social factors, to which we do not always have access. Even if we had the statistical data of income fluctuations over a longer period of time, we could not say exactly, only by analyzing them, whether or not that country had experienced economic growth (Kuznets, 1995); a growth that does not want to be artificial. But we can see, however, in what direction that country is heading and perhaps, what measures need to be implemented to achieve sustainable economic growth and a better life. As technology and economic performance grow to higher levels, incomes are less subject to transient disorders, not necessarily of the cyclical order that can be recognized and allowed by reference to the business cycle chronology, but of an irregular type. Kuznets observed, in the past years analyzed, that the economic wealth of the entrepreneurs was subjected to greater vicissitudes - poor crops for some farmers, other natural losses for some business units that do not belong to the agricultural sector - and from the total proportion of the individual entrepreneurs of whose incomes were subject to such calamities, some incomes would have been more affected by the transient disorders.

Kuznets tells us that there are at least two reasons why we have a discrepancy between a country's social groups in terms of income. The first would be that only a small portion of a country's population saves; as his US study shows, where at that time a small percentage of the population was responsible for two-thirds of the individual savings. The second reason is the industrial structure of income distribution. An undeniable reason for growth in developed countries was the shift from agriculture to a process called industrialization or urbanization. Or, in other words, there were two categories of income: urban and rural. The rural ones were smaller than the urban ones, and the percentage inequality regarding the distribution for the rural population was somehow narrower than for the urban population. Thus, an increase in the urban population leads to an increase in inequality between the two categories. Also, the differences between per capita incomes between rural and urban population deepen in the process of economic growth, but they increase as per capita productivity in urban increases faster than in agriculture (Kuznets, 1995). If during the period analyzed, this was accurate, today, a small percentage of the rural population earns their living from agriculture; agriculture with sap and moss. The automation of the primary sector has increased productivity without requiring more labor and time, and those who still use the rudimentary methods of harvesting their fruit from the land do it only for the use of their own households. Indeed, the migration of the last decades of individuals from rural to urban has led to an increased productivity of individuals in cities; especially in the tertiary sector. Also, Kuznets assumes that in the rural sector, most use their skills, abilities and concentration only in agriculture when, in fact, many of them have many other tasks.

Inequality and the slow economic growth may also be exacerbated by legislative and political interference, such as taxes and duties, induced inflation, rent control or artificially low interest rates maintained by the government to protect the market and its bonds, Kuznets says.

A large part of the high revenues accounted for by Kuznets come from the services field, especially those obtained from entrepreneurial activities. The discrepancy between the incomes obtained in different sectors is given by the level of training required to be able to practice in that field. The service sector needs additional training. A substantial part of the rising per capita income trend is due to inter-industry change, a shift of workers from lower incomes to higher income industries.

Kuznes tells us that there are income inequalities between those who work in agriculture and those who work in nonagricultural sectors. These, over time, have grown even stronger as a large volume of the employed population has moved from the primary sector to the others, mainly because of this income difference. Also, in the case of the USA, the differences are explained by the fact that immigrants occupied the lower paid jobs in agriculture, and the native individuals moved to better paid jobs (Kuznets, 1973).

The economic growth of the states is accentuated in the industrialization / pre-industrialization phase, and then it decreases; so, for the developed states, this increase in income can no longer be observed, but for the developing ones, there may still be a chance for increased employment and full employment. Also, the analysis offered by Kuznets refers to the income that is obtained without excluding the taxes imposed by the state, so the tax burden in each country has a word say. Thus, if the tax burden is high, for both employees / consumers or entrepreneurs / producers, we can observe fluctuations in the degree of employment. A state with low taxes promotes entrepreneurship and thus reaches a high level of employment, and another with high taxes damages from the beginning the entrepreneurial activity, and therefore, unemployment increases, and the only "chance" in such states is represented by the public sector.

Employment in service sector in the European Union

Table 1: Employment in services (%of total employment) in EU- 28 countries

Country/Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Belgium	73,78	75,04	75,27	75,47	77,07	76,94	77,39	77,39	77,49	78,08	78,24	78,40
Bulgaria	56,10	57,67	60,21	61,77	62,24	63,15	62,88	63,25	63,46	63,09	63,27	63,44
Czech Republic	56,30	58,31	58,92	58,56	58,83	59,46	59,21	59,05	59,03	59,14	59,36	59,58
Denmark	74,36	77,12	77,97	77,71	77,70	77,99	78,26	78,21	78,82	78,99	79,18	79,37
Germany	68,87	69,52	70,04	70,12	70,25	70,78	70,52	70,92	71,31	71,32	71,60	71,86
Estonia	60,83	64,50	65,46	63,15	64,40	65,46	65,99	65,44	66,38	66,51	66,71	66,91
Ireland	71,43	74,56	76,16	76,82	77,25	77,01	77,26	76,57	76,11	76,12	76,51	76,75
Greece	66,64	67,17	68,02	69,96	70,45	70,75	71,45	72,16	72,38	72,51	72,69	72,88
Spain	68,13	71,29	72,83	74,14	75,11	75,95	76,31	75,97	76,17	75,59	75,81	76,02
France	74,01	74,40	74,84	74,92	75,32	75,62	76,62	76,88	76,83	76,89	77,08	77,28
Croatia	56,33	57,67	58,29	57,46	59,83	61,59	63,50	64,06	65,42	66,61	66,82	67,02
Italy	66,50	67,07	67,62	68,03	68,72	69,35	69,46	69,65	69,99	70,21	70,44	70,66
Cyprus	72,72	74,25	75,80	75,27	76,92	79,33	79,05	79,78	79,31	80,43	80,50	80,59
Latvia	62,64	66,91	68,31	68,20	68,15	68,02	68,65	68,42	68,19	69,82	70,05	70,26
Lithuania	61,42	64,17	66,61	66,96	66,12	66,05	66,11	65,86	66,89	67,08	67,29	67,50
Luxembourg	83,06	85,74	85,55	85,41	86,00	86,37	87,59	86,43	86,93	87,85	88,05	88,24
Hungary	63,46	64,23	64,75	64,28	65,14	65,33	64,82	64,77	64,52	63,44	63,67	63,89
Malta	72,65	73,52	73,15	74,31	76,67	76,86	77,72	78,58	78,88	79,17	79,44	79,69
Netherlands	78,57	79,20	79,29	80,05	80,06	81,39	81,48	81,25	81,25	81,21	81,44	81,63
Austria	68,51	69,71	69,88	69,04	69,25	69,52	69,41	69,71	70,09	71,15	71,43	71,67
Poland	54,14	55,60	56,64	56,42	57,01	57,46	57,97	57,93	57,97	58,11	58,37	58,61
Portugal	59,57	60,75	61,55	62,94	64,04	66,07	67,49	68,12	68,59	68,86	69,09	69,32

Romania	39,69	40,89	40,67	42,18	42,08	42,46	42,72	45,96	47,02	47,10	47,33	47,55
Slovenia	56,29	57,72	58,60	59,74	60,64	60,47	59,44	60,92	61,80	61,19	61,44	61,68
Slovak Republic	55,92	58,49	59,65	59,43	59,23	60,87	61,06	60,71	60,64	60,13	60,34	60,54
Finland	70,33	71,43	72,26	72,78	73,06	73,02	73,85	74,07	73,98	74,08	74,30	74,50
Sweden	76,55	77,66	78,00	78,08	78,30	78,81	79,42	79,68	79,91	80,00	80,21	80,39
United Kingdom	76,92	79,28	79,57	79,60	79,75	80,08	79,78	80,21	80,42	80,60	80,75	80,89

Source: Data World Bank

We can see that during the period analyzed, the services sector is gaining an increasing proportion compared to the other two sectors. Although from the beginning of the reference period we can see that employment in the services sector had a high percentage of the total labor force employed, in the following years it gained ground compared to agriculture and industry. The most significant growth in this branch can be seen in Croatia and Portugal, about 10%. This increase is due to the reduction of barriers and the modification of the legislation regarding the tertiary sector, but also because the tourism has increased. At the other extreme, where there is almost no increase we have Hungary. One of the reasons why the service sector declined since 2011 was the nationalization of private pension funds, which eliminated some financial services providers.

Last year, among the countries with the most developed tertiary sector we can see Luxembourg, United Kingdom and Cyprus, and at the opposite pole we have Romania, Poland and the Czech Republic.

One reason that explains the increasing share of services in developing countries is the fact that some countries, in order to reduce their production costs, especially those with labor force, do offshoring. There is a large gap between salaries, and one phenomenon that has been common lately is the offshoring of computer programming. Workers in developing countries are gradually acquiring the human capital needed to be competitive in this area, which requires a higher level of qualification and education. Although we cannot say that economic growth can be observed in these countries, we can see that employment is increasing.

Conclusions

The vision of economic thinking, when approaching the employment process, ranges from considering automation as a factor that facilitates the work of the individual to the element of labor force replacement. Smith, Ricardo and Bastiat believe that employment is not affected by the introduction of new technologies, but supports the nation's increased productivity and wealth, the use of machines for a general benefit, and the workforce left without work being used again.

Unlike them, for Schumpeter, although the machines replace the workforce, the market sends them where they are demanded and efficient, in the tertiary sector, which is not a cause for concern. The role of the employee in the employment process is given by the training and competence, each being placed by the "invisible hand" where he has the highest performance. He emphasizes, like its predecessors, the crucial role of the entrepreneur in the market. He is linked to both economic growth and employment. What should prevail in a society that seeks to create wealth is production. To reach this point it is necessary to have entrepreneurs, to encourage the private sector.

Kuznets complements the ideas of the ones listed above and "urges" us to note that employment in the tertiary sector is the result and not the starting point.

Regarding the services sector, we are still far from having a satisfactory picture of the size, role and nature of the innovative activities. We noticed that in the last years the tertiary sector has been gaining more and more employees. However, in the last two decades, most of the theoretical and empirical literature on technology and innovation has, in fact, focused on the production sector, which has traditionally been considered the main producer and user of technology. Regarding the relationship between technological changes and employment, the lack of data and systematic analyzes regarding the service sector is even more serious.

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¿Cómo Están Gestionando El Talento Humano Las Pymes Colombianas? Una Revisión Bibliográfica De La Cuestión

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Resumen

La gestión del talento humano como un proceso fundamental para el desarrollo y consecución de resultados de las organizaciones, es un tema de auge reciente en nuestra sociedad cambiante y competitiva, en el que la contribución del factor humano cobra mayor valor. Los procesos y prácticas de administración de personal generan impacto en las pequeñas y medianas empresas (Pymes) que constituyen gran parte del mercado nacional e internacional. Debido a esta cuestión, se lleva a cabo una revisión teórica acerca de los procesos de gestión del talento humano en las Pymes colombianas de acuerdo con la literatura clásica, para lo cual se realizó una búsqueda de publicaciones científicas en español entre los años 2010-2019 en la base de datos Google Académico. Se evidencia como resultado, que los procesos que actualmente adquieren mayor relevancia para estudio de las Pymes son: gestión estratégica, sistemas de información y capacitación y desarrollo de recursos humanos. La revisión muestra informalidad y manejo deficiente de los procesos de gestión del talento humano.

Palabras clave: Gestión del Talento Humano; Pymes; Procesos, Prácticas.

Abstract

Human talent management as a fundamental process for the development and achievement of organizational results is a matter of recent boom in our changing and competitive society, in which the contribution of the human factor takes on greater value. The processes and practices of personnel management generate impact in the small and medium enterprises (SMEs) that constitute a large part of the national and international market. Due to this issue, a theoretical review is carried out about the processes of human resources management in Colombian SMEs according to classical literature, for which a search of scientific publications in Spanish between 2010 and 2019 was carried out in the Google Scholar database. It is evidenced as a result, that the processes that currently acquire greater relevance for the study of SMEs are strategic management, information systems and training and development of human resources. The review shows the improvised and poor management of the human talent management processes.

Keywords: Human Talent Management; SMEs; Processes, Practices**.**

Introducción

La gestión del talento humano según Eslava (2004) es un enfoque estratégico de dirección, que tiene por objetivo obtener el máximo valor para la organización a través de la continua disposición de los conocimientos, capacidades y habilidades necesarias para ser competitivo en el entorno actual y futuro, es decir, permite la selección del personal de alto rendimiento para la organización y busca garantizar niveles individuales y grupales de satisfacción laboral colocando todos los recursos necesarios a disposición del empleado para que así el empleador cuente con una fuerza de trabajo capaz de conseguir los resultados organizacionales propuestos.

Para Chiavenato (2009) el recurso humano es el activo fundamental para el desarrollo de las organizaciones, ya que solo a través del esfuerzo de las personas, se pueden llevar a la realidad las grandes ventajas de otros recursos como la tecnología, la información, las materias primas etc. siendo

ejemplo de esto las grandes compañías del mundo (Google, Windows, Facebook) que cuentan con ambientes laborales diseñados para promover el alto rendimiento y satisfacción de sus empleados, al ser conscientes de que el crecimiento, la innovación y la competitividad se alcanza permitiendo y garantizando la formación, desarrollo y bienestar de las personas. Como se afirma en distintos estudios *"la gestión del éxito de una organización depende de (…) la participación del talento humano, el servicio al cliente, la manera de gestionar los procesos para fidelizar los clientes, y la manera como se valora y reconoce lo que el personal realiza por la empresa"* (Gamboa y Jiménez, 2016, p. 141).

De acuerdo con la Ley Colombiana 590/2000 (modificada por la Ley 905/2004), se entiende por pequeña empresa aquella que cuenta con un número de trabajadores permanentes de 11 a 50 y/o activo total mayor a 501 y menores a 5.001 salarios mínimos legales vigentes, y por mediana empresa a aquellas que ostenten de 51 a 200 trabajadores y/o 5.001 a 15.000 salarios mínimos legales vigentes.

Las pequeñas y medianas empresas (pymes) son entidades orientadas al cliente, poseen un relevante papel en el entramado empresarial nacional pues generan la mayoría de puestos de trabajo en el país, más de un 83% del total y el más del 50% del PIB de los sectores industriales, comerciales y de servicios (Dini y Stumpo, 2018 y Saavedra y Hernández, 2008). Las Pymes son reconocidas también por diversas características propias, por ejemplo: su elevada flexibilidad laboral, su alta capacidad de adaptación a entornos cambiantes o su orientación al cliente por medio de una atención personalizada, lo cual les permite detectar y satisfacer necesidades muy específicas del mercado.

Sin embargo, las pequeñas y medianas empresas también presentan serias dificultades que impiden su adecuado desarrollo y en casos extremos conllevan a su desaparición del mercado, entre las problemáticas se resalta: el bajo nivel de innovación y emprendimiento, el escaso uso de las TIC (Cortés, Páez y Lozano, 2016), a pesar de la existencia de numerosas herramientas tecnológicas de gestión (Riascos y Aguilera, 2011), problemas para la comercialización de los productos, la limitada participación en el mercado de contratación pública y el financiamiento inadecuado (López-González y Robledo-Velásquez, 2014); dichas limitaciones por lo general no son subsanadas por el apoyo público y/o privado colombiano debido a la centralización de, apoyos que tienen que ver casi en exclusiva con aspectos financieros y tecnológicos y no en la potenciación de las habilidades humanas (García, Paz y Cantillo, 2019), obviándose en buena medida lo relacionado con la gestión del talento en este tipo de compañías.

Si bien, con el paso del tiempo el papel de los recursos humanos va adquiriendo mayor relevancia va de manera paulatina (Calderón, Navarro y Álvarez, 2010), es paradójico, evidenciar el escaso interés que tienen las autoridades políticas y económicas de Colombia por el capital humano de las pymes de su nación, pues se ha identificado una relación directa entre el nivel de formación de los trabajadores, la existencia de un departamento especializado en recursos humanos y las acciones conjuntas empresariales que involucran al trabajador (como la capacitación o la formación) con la innovación empresarial (Becerra y Álvarez, 2011), ya que como afirma Fábregas (2013), las inversiones tecnológicas que realizan las pymes no sirven de mucho si las compañías no promueven la cualificación continua y bienestar del talento humano.

Metodología

Se realizó una revisión bibliográfica en la base de datos Google Académico de artículos científicos recientes (posteriores al año 2010) en español relacionados con la gestión del talento humano en las pequeñas y medianas empresas colombianas en función a los diferentes procesos que la componen (Dolan, Valle, Jackson y Schuler, 2007; Chiavenato, 2009), encontrándose más de treinta artículos con estas características, algunos de los cuales exploraron sobre más de un proceso.

Para filtrar la búsqueda de artículos científicos se especificaron una serie de palabras claves asociadas intrínsecamente con la temática de la variable, los conceptos usados fueron "gestión", "talento humano", "pymes" y "Colombia", en el intervalo de tiempo correspondiente a los años 2010-2019. Posteriormente se clasificaron los textos identificados en función de los distintos procesos de gestión del talento humano a los que hacemos referencia, a destacar los procesos de planeación estratégica de

recursos humanos, análisis y descripción de cargos, reclutamiento y selección de personal, contratación y vinculación, inducción y orientación, capacitación y desarrollo, evaluación de desempeño, compensación, reconocimiento e incentivos, bienestar socio-laboral, seguridad y salud en el trabajo y gestión de sistemas de información de recursos humanos, obviando en nuestra búsqueda el resto de actuaciones.

Resultados

A continuación, se presenta un resumen de los resultados obtenidos a partir de la búsqueda de publicaciones científicas en relación a los procesos de gestión del talento humano de las Pymes en Colombia, en la tabla 1 se señalan la cantidad de fuentes identificadas por proceso, los autores con los años de publicación.

Tabla 1: Artículos científicos de gestión de talento en pymes colombianas, en función de los procesos determinados por Dolan et al. (2007) y Chiavenato (2009)

Procesos de gestión del talento humano	N° Fuentes	Autoría
Planeación estratégica de recursos humanos	10	Castaño (2011); Aguilera y Virgen (2013); Casas y Urrego (2013); Bermúdez y Gutiérrez (2012); Pacheco (2013); Solano, Riascos y Aguilera (2013); Pérez (2014); Mora, Vera y Melgarejo (2015); Valle y Niebles, (2017); Rincón y Chaparro (2018).
Análisis y descripción de cargos	1	Blanco y Vera (2019)
Reclutamiento y selección	2	Jaramillo (2011); Naranjo (2012)
Contratación y vinculación	2	De la Hoz, Morelos y Fontalvo (2012); Naranjo (2012);
Inducción y orientación	1	Jaramillo (2011)
Capacitación y desarrollo	6	Franco y Bedoya (2018); Castiblanco (2012); Medina, Delgado y Lavado (2012); Jara, Guerrero, Jiménez, Pinzón y Rubio (2014); Iglesias-Navas, Roseda y Castañeda (2017); Simancas, Silvera, Garcés y Hernández (2018)
Evaluación del desempeño	2	Jaramillo (2011); Del Toro, Salazar y Gómez (2011)
Compensación, reconocimiento e incentivos	3	Jaramillo (2011); Franco y Bedoya (2018); Aguilar (2014)
Bienestar socio-laboral	2	Jaramillo (2011); Mejía, Montoya y Vélez (2013);
Salud y seguridad en el trabajo	4	Jaramillo (2011); Gómez y Herrera (2012); Morelos y Fontalvo (2013); Garcia, Orozco y Torres (2014)
Sistemas de información de recursos humanos	6	Vega y Torres (2010); Riascos, Aguilera y Ávila (2014); Rodríguez (2011); García, Azuero y Salas (2013); Fajardo, Medina y Vargas (2018)

Fuente: Elaboración propia (2020)

Discusión y Conclusiones

A continuación, se señala de manera descriptiva los principales hallazgos obtenidos a partir de la revisión de la bibliografía sobre cómo están gestionando las pequeñas y medianas empresas su talento humano:

Planeación Estratégica De Recursos Humanos

Se logra identificar que una de las limitaciones de las pymes es carecer de una planeación estratégica adecuada que plantee las bases para guiar acciones de mejoramiento y competitividad, el establecimiento de objetivos, procedimiento y métodos para alcanzarlos, así como para la toma de decisiones frente a situaciones de crisis.

Un estudio realizado por Aguilera y Virgen (2013) cuyo objetivo fue aplicar un modelo de formulación de estrategias orientado a la generación de políticas de crecimiento empresarial en pymes, arrojó como resultado que a diferencia de las medianas empresas, las pequeñas tienen dificultades para establecer una misión estructurada correctamente direccionada hacia el crecimiento; también se encontró que aunque las pymes tienen claridad de sus características internas (fortalezas y debilidades para funcionar), no utilizan este conocimiento para definir las estrategias acordes con sus necesidades, además, no tienen claridad sobre el papel de la innovación y el uso de las tecnologías en la actividad de la empresa. Finalmente, se evidenció que no tienen claridad sobre las características del entorno que representan oportunidades y amenazas para su actividad productiva, por tanto, implementan estrategias diversas y poco aterrizadas a lo que requieren sus nichos de mercado.

En su estudio, Casas y Urrego (2013) evidenciaron la ausencia y necesidad de administrar la innovación en las pymes y proponen la gestión tecnológica como medio para vincular la planeación estratégica con la innovación. Al respecto, Bermúdez y Gutiérrez (2012) muestran que la innovación en materia de producción/servicios, procesos, gestión y mercados en un grupo de pymes de Boyacá presenta brechas importantes, encontrándose apenas en fase de despegue. Otro estudio permitió conocer que factores como el crecimiento y la toma de decisiones estratégicas tienen relación con la implementación de planes en materia de sistemas de información, es decir, que el desempeño de las pymes mejora cuando realizan inversiones en materia de tecnología producto de una adecuada planeación de los sistemas de información (Solano, Riascos y Aguilera, 2013). En otras palabras y de acuerdo a los hallazgos, la planificación estratégica se relaciona e influye de manera significativa en el funcionamiento de otros procesos de gestión organizacional y competitividad de las Mipymes (Mora, Vera y Melgarejo, 2015).

Pérez (2014), implementando un modelo de análisis estadístico (MMGO) describe las incidencias de elementos organizacionales (gestión de mercadeo, comunicación e información, gestión de producción, estructura y cultura organizacional, gestión humana, finanzas, asociatividad, comercio exterior, logística, innovación y conocimiento, responsabilidad social y análisis de entorno) sobre la planeación estratégica y esto a su vez sobre el éxito a largo plazo de las pymes, encontrándose que el direccionamiento estratégico es fundamental para el desarrollo empresarial de este tipo de empresas en el país y que depende en gran medida de componentes organizacionales como: la estructura y cultura organizacional, las finanzas, la gestión de mercadeo, la innovación y conocimiento. Estos hallazgos logran explicar las dificultades que presentan las pymes en relación a este proceso ya que como se ha señalado, las pymes presentan debilidades en tales componentes, especialmente en el tamaño reducido, la cultura informal en el manejo de sus diferentes procesos, el bajo nivel de innovación, el escaso interés por el nivel de formación de sus trabajadores, además presentan problemas para acceder a financiamiento y contratación (López-González y Robledo-Velásquez, 2014).

Si bien las pymes son conscientes de la importancia de este proceso, su utilización se hace de manera particular (Castaño, 2011), pues obedece a las decisiones de la gerencia y por lo regular se omite debido a la destinación de recursos a otros proceso de la empresa tal como lo sostiene Valle y Niebles (2017) al afirmar teniendo en cuenta los resultados de sus estudios, que los administradores y la gerencia le otorgan más importancia a aspectos funcionales de la empresa como lo son: la financiación, la imagen corporativa y la productividad, viendo al planteamiento estratégico como un enfoque demasiado complejo que no necesariamente garantiza el éxito de la misma. Se identificó además que la planificación no se hace de manera formal, ocasionando que las empresas sean orientadas de manera intuitiva, lo que puede generar una disminución en la capacidad de respuesta a los cambios y superación de las crisis que llevan a innumerables pérdidas y a una corta estancia en el mercado económico como suele ocurrirles a las pymes colombianas (Pacheco, 2013).

Rincón y Chaparro (2018) afirman por su parte que, entre más experiencia y crecimiento (tanto en activos como en colaboradores) tienen las Pymes, muestran mejores condiciones para formular estrategias. Asimismo, informan la urgencia de que las Pymes sean administradas bajo principios y técnicas administrativas, al igual que las grandes organizaciones, lo cual permita proporcionar a directivos y administradores conocimientos y herramientas básicas para que no prevalezca la escasez de recursos financieros y la falta de visión.

Dado que el propósito de la planeación estratégica es potencializar el desarrollo coherente y coordinado de acciones través de las cuales la empresa organiza y utiliza su estructura, procesos, aptitudes y demás recursos para aprovechar las oportunidades y reducir las repercusiones de las amenazas del entorno con el fin de cumplir sus objetivos, se puede señalar teniendo en cuenta los estudios recientes, que las pymes presentan serias dificultades en este proceso, principalmente porque como indica Dolan et al. (2007), las oportunidades en el mercado solo pueden ser aprovechadas por organizaciones cuyas estrategias se diseñen y soporten en su recurso humano, factor determinante para la competitividad, y como se ha podido evidenciar este factor no es prioridad para las Pymes que màs bien estàn preocupadas por resolver los problemas y necesidades del corto plazo, no logrando ver en las personas una inversiòn a mediano y largo plazo sino en un gasto màs para la empresa.

Análisis Y Descripción Del Cargo

Según Chiavenato (2009), este proceso consiste en un procedimiento de recogida de informaciòn acerca de los puestos de trabajo lo cual permitirà describir un determinado cargo, significa relacionar qué hace el ocupante, cómo lo hace, en qué condiciones lo hace y por qué lo hace, en otras palabras, la descripción del cargo relaciona de manera breve las tareas, deberes y responsabilidades del cargo. De acuerdo con los escasos resultados encontrados sobre este proceso, se puede señalar que no es lo suficientemente atendido por las pymes quienes al parecer no lo llevan a cabo de manera exhaustiva pues se ha encontrado que estas empresas pese a contar con algunos manuales de funciones, estos no detallan lo sufucientemente bien los aspectos referentes al cargo. De acuerdo con Blanco y Vera (2019) en las Pymes colombianas, no se està haciendo uso de los instrumentos necesiarios para recolectar información sobre los cargos, esto se ve reflejado en la ineficiencia de la descripción de las funciones frente al cargo, la organización y clasificación de los puestos (acorde a la estructura organizacional), lo cual impide valorizar los cargos de manera adecuada y adquirir un nivel jerárquico más allá de gerente y demás empleados.

Estos hallazgos resultan preocupantes toda vez que este proceso se relaciona directamente con la adecuada ejecuciòn de los demàs procesos de gestiòn del talento humano que se exploran en el presnete estudio.

Reclutamiento Y Selección

Respecto a estos procesos, los cuales obedecen al lanzamiento de convocatorias internas o externas con herramientas de comunicación que permita la publicación y propagación de la información para escoger al candidato más apto para la vacante ofertada, en los estudios de Jaramillo (2011) y Naranjo (2012) se encontró que la mayoría de estos procesos se dan de manera informal, siendo la principal fuente de reclutamiento la recomendación, lo que ocasiona que estos procesos sean imparciales y no tengan en cuenta las capacidades y competencias reales de los aspirantes, predominando nuevamente la intuición que da paso a acciones poco transparentes que no permiten la realización de un procedimiento justo, claro y confiable para seleccionar a los empleados.

Contratación Y Vinculación De Personal

En lo que respecta al proceso de contratación y vinculación del personal se encontró que dependiendo del producto y/ o servicio que se ofrezca, así como las temporadas altas y bajas en el mercado, las contrataciones pueden ser de carácter temporal (contratos por prestación de servicio) generando así inestabilidad laboral (De la Hoz et al., 2012), lo que a su vez desencadena baja motivación, poco sentido

de pertenencia, alta rotación y baja competitividad de las pymes. De acuerdo con Naranjo (2012), el sistema de contratación también depende del grado de familiaridad, amistad y la recomendación.

Inducción Y Orientación

En relación con el proceso de inducción, las pymes colombianas prefieren que sean terceras organizaciones las que se encarguen de estas actividades y en caso de no contar con recursos para esto, el proceso es delegado al administrador de nómina o quien posea contacto directo con los empleados y se basa principalmente en ofrecer al colaborador unas instrucciones generales verbales sobre los procedimientos de trabajo establecidos (Jaramillo 2011). Se encontró además inexistencia e informalidad de este proceso lo cual dificulta la adecuada adaptación o desempeño de los trabajadores.

Capacitación Y Desarrollo

Con respecto a este proceso, Franco y Bedoya (2018) indican que las Pymes por lo general compiten donde se presenta sobreproducción, es por eso que, la organización tendrá que buscar una estrategia que la diferencie y le facilite permanecer en el mercado, solo hay una posibilidad: talento humano capacitado, formado y motivado. Sin embargo, la realidad es otra, las competencias que tiene un trabajador de Pyme son esencialmente operativas (del hacer), no requiere demasiada formación académica y le exigen poca experiencia laboral, lo que conlleva a una baja productividad del personal y por ende a altas rotaciones.

Los empleadores solo capacitan al personal en procesos específicos vinculados directamente a la organización y que raramente se aplican por fuera de ésta, por lo que si el empleado requiere de una capacitación formal debe ser solventada por su propia fuente, siendo el aporte de la empresa a esto un horario flexible para que pueda asistir a sus clases (Castiblanco, 2012). Sin embargo, la capacitación es un proceso clave para la innovación y desarrollo de la pymes ya que se debe contar con recursos y conocimientos bien estructurados que permitan la facilitación de los procesos, aumento de capacidad productiva y la actualización constante debido a las dinámicas económicas ya sean regionales y/o internacionales (Simancas, Silvera, Garcés, y Hernández, 2018), y no solo que mejore sus conocimientos en cuanto a las actividades propias de su cargo sino también una formación integral y desarrollo personal de los empleados (Iglesias-Navas, Roseda y Castañeda, 2017).

A pesar de las carencias en este proceso de las empresas pequeñas y medianas de Colombia, Jara et al (2014) encuentra en Bogotá que, el crecimiento saludable de las Pymes, permite fortalecer las capacidades de sus colaboradores y mantenerlos creativos y comprometidos. Teniendo en cuenta entonces, la importancia de este proceso para mejorar la competitividad de las empresas, se identificó un estudio en el que se propuso desarrollar los fundamentos de un sistema de gestión humana por competencia basado en la estrategia organizacional de una Pyme en Cali, a partir de la cual se pudo establecer que los elementos a considerar para pasar de un modelos tradicional a uno por competencias son la capacitación y desarrollo, selección y evaluación, específicamente las actividades de planes de sucesión, concurso interno de selección y el uso de la entrevista de incidentes críticos para la evaluación de competencias (Medina, Delgado y Lavado, 2012).

Evaluación De Desempeño

En la revisión de la literatura se encontró que este proceso consiste principalmente en la observación del supervisor a las competencias del empleado y la manera en cómo se desenvuelve en su cargo (tiempo, resultados, cumplimiento de indicadores), debido a que es una observación, los resultados están sujetos a sesgos, el proceso no es formal ni estándar y aunque su finalidad es la mejora de la producción, la calidad del producto y el rendimiento del personal en un cargo, también es visto como un proceso que influye en toma de decisiones relacionadas con las bonificaciones o la renovación del contrato (Jaramillo, 2011). Otros estudios en las pymes por su parte, han centrado su interés en conocer los factores que pudieran influir en el rendimiento de los trabajadores, al respecto Del Toro, Salazar y Gómez (2011) encontraron que el clima organizacional y la satisfacción laboral se relacionan y predicen el desempeño.

Compensación, Reconocimiento E Incentivo

Las Pymes se caracterizan por ser empresas que cumplen con los aspectos fundamentales de la ley (contratación, salario mínimo prestaciones, vinculación a la seguridad social, etc.) sin embargo, al no estar este proceso reglamentado en el marco legal vigente, no se otorgan muchos beneficios adicionales de manera voluntaria a los trabajadores (Jaramillo, 2011). Las pymes tambièn se caracterizan por presentar estructuras productoras y organizacionales pequeñas, lo cual imposibilita la movilidad de los trabajadores, no promueven el ascenso como incentivo (Franco y Bedoya, 2018). De acuerdo con Aguilar (2014), debido a que las Pymes no pueden compararse con las grandes empresas en cuanto a compensación y beneficios, para retener y fidelizar el talento humano deben basarse en establecer un buen clima laboral y estrategias especiales de promoción dentro de la organización.

Bienestar Social Laboral

Según la literatura revisada, los programas de bienestar social laboral de estas compañías se caracterizan por prestar poca atención a las actividades que puedan promover el bienestar general (personal, familiar, social) de los empleados (Mejía, Montoya y Vélez, 2013), centrándose principalmente en la remuneración salarial como único incentivo para generar satisfacción laboral y bienestar, lo cual en muchas ocasiones genera más gastos para la organización y no representa beneficios reales a nivel de bienestar para los trabajadores, ya que se ignora las necesidades a nivel cultural, social, familiar, personal, etc. de los trabajadores y son los programas de bienestar relacionados con estos aspectos los que contribuirán a mejorar las condiciones físicas y la calidad de vida de estos, sus familias y la sociedad (Jaramillo, 2011).

Salud Y Seguridad En El Trabajo

Con respecto al proceso de salud y seguridad en el trabajo se encontró que la mayoría de autores resaltan el hecho de que gran parte de las Pymes no cuentan con un sistema de salud y seguridad bien implementado (Jaramillo, 2011) lo que se traduce en altos índices de accidentalidad, problemas legales e insatisfacción laboral. Se encuentra ademàs, que aunque la empresa cuente con los recursos necesarios para la implementación del sistema, se siguen presentando accidentes o incidentes de trabajo en las empresas debido a la falta de compromiso por parte de los empleados con el uso de los elementos de protección personal (otra causa es el desgaste de las herramientas y equipos de trabajo), es decir, son los colaboradores quienes no muestran conciencia sobre su propia seguridad y no siguen los lineamientos de seguridad para ejercer sus labores (Gómez y Herrera,2012; Morelos y Fontalvo, 2013). La promoción de la seguridad yla salud en el trabajo y la prevención de los riesgos laborales son las principales y más importantes tareas que tienen las organizaciones, pues de ellas depende el mejoramiento de la calidad de vida de los trabajadores (García, Orozco y Torres, 2014).

Pese a que el Colombia este proceso està estrictamente regulado por la ley, llama la atenciòn que las pymes no lo estèn implementando correctamente, una de la causas sin dudas es el desconocimiento de las implicaciones que puede tener la materializaciòn de un riesgo laboral, que va desde sanciones econòmicas cuantiosas hasta el cierre definitivo de los establecimientos, sin mencionar los daños al individuo y la familia. Otra razòn es que no se cuenta con personal especializado o cualificado que lideres las acciones propias de este proceso.Ahora bien, como en los otros procesos, implementar un sistema de seguridad y salud en el trabajo, supone para los empleados de las pymes gastos y no inversiones, es decir, aun no se logra articular los procesos e indicadores procudtivos con los de seguirdad pese a su estrecha relaciòn.

Sistemas De Información De Recursos Humanos

Este proceso aparece como uno de los más estudiados a nivel de Pymes, también es de interés reciente debido al creciente desarrollo tecnológico que facilita los procesos tanto a nivel externo como a nivel interno de la organización (García, Azuero y Salas, 2013), sin embargo, se encontró que estas empresas no cuentan con el desarrollo tecnológico necesario y no utilizan de manera adecuada los sistemas de

información a disposición, manifestándose en la dificultad de intercambio de mensajes, actualización de noticias y desconocimiento sobre el uso adecuado de las TIC´s, se evidencia además, subutilizaciòn de paquetes de software que apoyan los procesos de gestión del talento humano (Vega y Torres, 2010; Riascos, Aguilera y Àvila, 2014).

Las Pymes no consideran la tecnología como punto principal de crecimiento y desarrollo (Fajardo, Medina y Vargas, 2018), aun cuando necesitan utilizar las TIC como apoyo empresarial, pues ellas permiten controlar los diferentes sistemas de la organización y evaluar de manera permanente la planificación de los mismos, facilitan la implementación de políticas y normas de seguridad a nivel tecnológico, aseguran la integridad y la confiabilidad de los sistemas de información de las organizaciones (Rodríguez, 2011)

En conclusiòn, los procesos de gestiòn de talento humano que actualmente adquieren mayor relevancia de estudio para los investigadores y las pymes son: la gestión estratégica, los sistemas de información y la capacitación y desarrollo del recurso humano, evidenciándose de esta manera el reconocimiento de estos procesos como elementos estratégicos para apostarle al fortalecimiento y competitividad de las Pymes en un mercado globalizado, marcado cada vez más por acelerados avances tecnológicos e informáticos en los que el capital intelectual y las competencias del recurso humano son claves para el manejo eficiente y maximización de otros recursos y procesos de las organizaciones, en otras palabras, solo a través del esfuerzo humano puede llevarse a la realidad las grandes ventajas de otros recursos materiales como: la tecnología, la información, las materias primas y el dinero etc. (Robbins y Judge, 2009).

Asì tambièn, se pudo observar que procesos igualmente claves para la consecución de los resultados organizacionales tales como: el análisis y descripción de cargo, inducción y orientación, evaluación del desempeño y compensación, reconocimiento e incentivo, no están siendo objeto de mucho estudio en los últimos años en Colombia. Lo anterior muestra la necesidad de seguir indagando sobre las prácticas de las Pymes en materia de gestión de recursos y las razones que las justifican, con el fin de identificar limitaciones y oportunidades para el mejoramiento, dado la importancia que estas empresas tienen para la economía y generación de empleo en el país.

Teniendo en cuenta la premisa imperante que reconoce a las personas como el activo más importante de una organización, llama la atención de que estos procesos no se esten llevando a cabo de la manera adecuada por las pymes, los resultados muestran claramente una subutilización o manejo deficiente del recurso humano, procesos poco estructurados, màs que procesos sistematicos e interdependientes, las pymes realizan actividades o pràcticas tradicionales de administraciòn de personal, la mayoria reguladas por la ley, sin el reconocimiento del impacto que estas tienen en los resultados finales de las empresas. Estas debilidades o limitaciones de las pymes se pueden explicar por el hecho de que aunque muchas reconocen el valor de los procesos de manejo de personal, al momento de su implementaciòn presentan dificultades para disponer de los recursos (de tiempo, tecnicos, tecnologicos, econòmicos y humanos) que estos exigen. Las pymes estàn inclinadas a satisfacer las demandas inmediatas de sus clientes a traves de procesos operativos y de produciòn, no estàn orientados hacia la atracciòn, fidelizaciòn, desarrollo, motivaciòn y bienestar de las personas que las conforman, ya sea porque no pueden o porque no saben como hacerlo sin poner en riesgo la rentabilidad de la empresa, obviando que el riesgo es mayor si continuan omitiendo o llevando a cabo de forma regular los procesos. Lo anterior resalta la importancia de tomar medidas urgentes de intervención que atiendan a las características y necesidades particulares de las Pymes, medidas centradas principalmente en la sensibilizaciòn y empoderamiento de los lideres o alta direcciòn de las empresas, en la creaciòn y disposiciòn de entidades o centros pùblicos y privados de asesorìa y consultorìa especializada en modelos pràcticos y efectivos para el manejo del talento humano en las pequeñas y medinas empresas.

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The Impact of The Tax Burden on The Economic Growth of BRICS Countries

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Abstract

The modern concept of building a multipolar world provides for the formation of associations of countries that collectively create a synergistic effect due to their development prospects. One of such significant forums is the BRICS, which includes Russia. Due to existing opinions about the vagueness of development and even the existence of this association in the future, connected with a slowdown in economic growth and the volume of mutual trade and investment relations, the issue of alternative factors that can affect the GDP of states becomes relevant. The article considers issues related to the problem of macroeconomic growth, based on the relationship with indicators of the tax burden, such as the volume of tax revenues, the amount of customs and other import duties. As a result of the study, using the correlation and regression analysis, the factors that have the greatest influence on the growth rate of GDP of each of the BRICS countries were identified. The strong differentiation in the historical, economic, and political terms of the countries explains the lack of a single trend in the interconnection of indicators, as well as in multiple and paired regression models of dependence. The structure of tax revenues formation of the consolidated budgets of countries was detailed due to the need to assess the key parameters of tax policy and its orientation towards a particular sector of the economy. The analysis made it possible to determine the importance of improving the tax system of the BRICS countries to accelerate the pace of business activity at the macro level.

Keywords: BRICS, Economic Growth, Tax Burden, Tax Policy, Regression Analysis.

Introduction

The modern world economy is a complex multi-level system, the elements of which-national economies-are linked by international economic relations. An important fact is that the world economy is very hierarchical, where there is a ‘core', the center representing economically developed countries, and the periphery represented by developing countries and countries with economies in transition. This hierarchy and differentiation provides the basis for the emergence of various types of groupings of countries similar in terms of development to solve common urgent problems in the context of the accelerating process of financial globalization. One of these key coalitions, in which Russia plays an important role, is the BRICs interstate transregional association.

Conceptually, the BRIC format was announced in 2001 by Jim O'Neill, an employee of the international investment bank Goldman Sachs. This project was regarded, first of all, as an effective platform for the application of foreign capital. For all their differences in countries located on completely different continents, BRIC members, according to Jim O'Neill, have a key characteristic that can attribute them to a single forum - the presence of a fast-growing economy with a voluminous emerging market, which is so important for potential investors. In addition to high GDP growth rates

(6-10%), among other indicators, there were high export rates from these countries, a growing share in world trade and global FDI.

However, the question remains: what allows countries to maintain their economic growth, in addition to the above-mentioned indicators of international relations? What is the impulse and driving force inside the state's economy itself? Of course, the socio-economic development of a country cannot be separated from its tax policy, which forms the budget and is the basis for the government to fulfill its core functions. (Akhmadeev, 2018; Turishcheva, 2019) In this regard, the relevance of the study is to analyze the role and relationship of the tax burden with the growth rate of the BRICS member countries.

Literature Review

Koomin Kim (2018) explores the relationship between tax burden and American states revenue. Based on the general theory of state tax policy, using a regression analysis, the main factors that affect the reliability of income and the tax burden were identified. In her spatial equilibrium model, Rebecca Lessem (2019), considers the impact of tax cuts and job availability on the territorial distribution of high productivity households that create the region's economic welfare. Role of present development practices for tax, financial and statistical reporting in the Russian Federation reveal in article Petrov, Kiseleva, Kevorkova, Melnikova, Yshanov (2019). The author of the study (Van Kolpin, 2019) on apolitical SALT-free Tax Equilibria demonstrates the reasons for increasing the aggregate equilibrium tax burden and concludes that reducing the tax burden leads to the decrease of economic efficiency. According to Mark Hallerberg and Carlos Scartascini (2017) with a certain probability economic crisis affects the implementation of tax reforms.Iin addition, the authors identify factors that determine the choice of tax instruments for tax reforms. Russian and foreign models of sustainable development at the macro and micro levels are analyzed in their works Sotnikova, Polenova, Mislavskaya, Petrov, Basova (2019). Modern studies (Lumir Abdixhiku, Besnik Krasniqi, Geoff Pugh, Iraj Hashi, 2017) using various modeling strategies analyze the role of institutional factors in determining the tax evasive behaviour of firms in countries with transitional economies. Processed and aggregated innovation data Korableva, Kalimullina, Mityakova, (2018).

Research Question

The tax burden is the share of revenue paid to the state in the form of taxes. The overall accepted indicator of the tax burden is, in general, the share of taxes in GDP: TB = T / GDP·100%, where T is all tax payments to the country's budget. Factors affecting the tax burden are diverse; among them economic, political, and social ones can be distinguished (Malitskaya, 2019).

Along with the tax burden, one should also consider such a significant indicator as customs and other import duties (as a percentage of tax revenues). Customs duties are of practical interest for analysis since they are not part of the tax system embodied in the Tax Code. This indicator, along with the tax burden, will be an independent factor in the regression model, and the dependent variable will be the GDP growth rate at constant prices. For the representativeness of the future model, let's consider the 2001 – 2017 years' time period (due to the availability of data in the statistical yearbooks of the IMF and WB). In order to analyze in more detail the relationship of all indicators in the model, we will construct 5 regression equations corresponding to each of the BRICS countries - Brazil, Russia, India, China, and South.

The first step is to determine the strength of the relationship between the three selected indicators, for this purpose, in accordance with the table of values for the period 2001-2017, matrices of paired correlation coefficients using the MS Office Excel add-in Data Analysis were constructed for 5 BRICS countries. (Table 1)

Table 1*:* Matrices of paired correlation coefficients between factor indicators for the BRICS countries

Russia			
Factors	GDP growth rate	Tax revenues	Customs and other import duties
GDP growth rate	1,0000		
Tax revenues	0,6205	1,0000	
Customs and other import duties	0,1364	0,3183	1,0000
Brazil			
Factors	GDP growth rate	Tax revenues	Customs and other import duties
GDP growth rate	1,0000		
Tax revenues	0,5610	1,0000	
Customs and other import duties	-0,4044	-0,7852	1,0000
India			
Factors	GDP growth rate	Tax revenues	Customs and other import duties
GDP growth rate	1,0000		
Tax revenues	0,1631	1,0000	
Customs and other import duties	-0,2228	-0,6037	1,0000
China			
Factors	GDP growth rate	Tax revenues	Customs and other import duties
GDP growth rate	1,0000		
Tax revenues	-0,4107	1,0000	
Customs and other import duties	0,7181	-0,3718	1,0000
South Africa			
Factors	GDP growth rate	Tax revenues	Customs and other import duties
GDP growth rate	1,0000		
Tax revenues	0,0419	1,0000	
Customs and other import duties	0,3018	0,6917	1,0000

Source: composed by authors on the base of OECDStat, Tax Policy Analysis, Global Revenue Statistics Database [Electronic resource]. – Access mode: http://www.oecd.org/tax/tax-policy/global-revenue-statistics-database.htm

Thus, the strongest and the most direct link between a tax burden and GDP growth rate among all BRICS countries is observed in Russia (correlation coefficient is 0,6205), it is also high in Brazil (0,5610), but very weak in India and South Africa (0,1631 and 0,0419, respectively). China differs noticeably from all countries, where the relationship between tax revenue and GDP growth is reversed (-0.4107). Also in China, the strongest positive relationship is observed between the GDP growth rate and customs duties (0.7181), the same connection is direct in Russia and South Africa. Customs duties and GDP growth rates in India and Brazil are inversely related. That is, in general, the BRICS countries do not have a single trend in the relationship of the selected factors.

A regression analysis allows us to clearly and fully determine the relationship between factors. For this, regression equations were constructed for these indicators using the MS Office Excel add-in. For this purpose, the regression equations were constructed according to these indicators using the MS Office

Excel add-in. Data analysis, where x1 is the tax burden factor, x2 is the factor of customs and other import duties, and y is the effective indicator of GDP growth. (Table 2)

Table 2: Factor regression models in BRICS countries

Countries	Regression equation	R-square	Model significance
Russia	y = -11,1469 + 1,2278x1 - 0,2541x2	0,3892	The MR equation is significant
Brazil	y = -21,1064 + 1,5386x1 + 0,3332x2	0,3181	The MR equation is not significant
India	y = 8,1519 + 0,0737x1 - 0,1277x2	0,0509	The MR equation is not significant
China	y = 6,3692 - 0,7127x1 + 1,9381x2	0,5396	The MR equation is significant
South Africa	y = 7,4493 - 0,4048x1 + 1,5032x2	0,1445	The MR equation is not significant

Source: composed by authors

To objectively evaluate the model of the relationship of indicators, one can use the R-squared (the variance explained, or the multiple correlation coefficient squared, which makes it possible to understand what part of all changes in the effective trait falls on the selected factors in the model) and check the significance of the equation based on the Fisher F-test. Thus, it turned out that the most informative regression model belongs to China, where the equation is significant and the R-square is the largest (0.5396), which means that the equation is suitable for further forecasting (Dubovik, 2018). There is also a significant model of the dependence of economic growth on the tax burden in Russia. In the rest of the BRICS countries, the models are insignificant with lower values of the explained variance.

According to the generally accepted hypothesis, it is considered that the increase in the tax burden has a very negative impact on economic growth (Kalacheva, 2019; Kosolapova, 2019). However, the regression analysis of the dynamics of GDP growth rates and tax burden in the BRICS countries in the 21st century demonstrates an ambiguous nature of the relationship between these macroeconomic indicators. Thus, according to the constructed models, in all countries except China, an increase in the tax burden entails economic growth. The following facts may be the causes of this interdependence.
Firstly, an empirical assessment of the effects of tax reforms on the rate of economic growth is a non-trivial and multi-level task. The scale and complexity of tax policy, the consequences of which affect the behavior of millions of agents and businesses, make it obligatory to take into account a lot of dependent determinants (Lehoux, 2019; Ivanova, 2018). At the same time, even models that are comprehensive in terms of the included variables are characterized by a problem caused by the uniqueness of each tax system of such dissimilar countries from different parts of the world (Kolesnichenko, 2018).

Secondly, the fluctuations in the level of the tax burden all this time were within fairly narrow limits without significant fluctuations and gaps. In Brazil, for the period 2001 – 2017, tax revenues as a percentage were in the range of 12.71-16.53%%, in Russia-9.14-16.62%%, in India-8.08-11.18%%, in China-8.57-10.31%%, in South Africa-23.04 – 27.34%%. It can be assumed that such small changes did not have a significant impact on the rate of economic growth, which would have been reflected in a great change in the rate of GDP growth.

Thirdly, an abnormal deviation from the generally accepted hypothesis may indicate an inverse relationship: that is, a GDP growth" pulls" an increase in tax revenues. In this regard, two-factor models were built for the dependence of tax revenues or customs payments on GDP growth. (Table 3)

Table 3: Two-factor regression models in the BRICS countries

Countries	Model of dependence of tax burden on GDP growth rate		Model of dependence of customs payments on GDP growth rate	
	Regression equation	Normalized R-square	Regression equation	Normalized R-square
Russia	y = 12,4931 + 0,3245x	0,3440	y = 8,2153 + 0,0365x	-0,0468
Brazil	y = 13,8643 + 0,2315x	0,2690	y = 4,0971 - 0,1143x	0,1077
India	y = 9,6057 + 0,0996x	-0,0383	y = 19,0283 - 0,3414x	-0,0137
China	y = 10,6135 - 0,0961x	0,0856	y = 2,7857 + 0,2431x	0,4672
South Africa	y = 25,5781 + 0,0331x	-0,0648	y = 3,5338 + 0,1050x	0,0305

Source: composed by authors

Based on the normalized R-square, which allows us to compare different regression models, it is clear that for countries such as Russia, Brazil, India, and South Africa, an increase in the rate of GDP growth entails, to some extent, an increase in the tax burden. Since the rates of economic growth in these countries did not change significantly during the period 2001 – 2017, remaining approximately at the same level (in Brazil, on average, 2.33%, in Russia – 3.44%, in India-6.78%, in South Africa-2.81%), which means that tax systems do not interfere with the macroeconomic development of the BRICS member states. For China, which is famous for its export-oriented, open economy and foreign trade, the model of dependence of customs and other import duties on the rate of GDP growth is more typical.

The tax system can act as a powerful stimulator of economic development, especially during a difficult geopolitical situation, falling oil prices and increasing capital outflows from the BRICS countries, which for a given time period, are no longer characterized by their former high (about 10%) and attractive economic growth rates for investors. The greater the share of taxes in GDP, the greater the volume of gross domestic product redistributed through the tax system, the more efficient is the tax system.

Global experience shows that as tax burdens on taxpayers increase, the efficiency of the tax system first increases and reaches its maximum, but then drops sharply (Petrov, 2019; Turishcheva, 2019). At the same time, the losses of the budget system become irreparable, as part of the taxpayers goes bankrupt or closes production operations, while the other part finds both legal and illegal ways to minimize established and payable taxes. If the tax burden is reduced in the future, a longer period will be needed to restore disrupted production.

Discussion

An analysis of the tax burden in the BRICS countries is impossible without detailed elaboration of the method of its creation or the structure of generating tax revenues of the consolidated budgets of countries. In Table 4 the data on the specific weight of the most significant taxes and deductions are presented, including corporate income tax, individual income tax, social insurance deductions and property tax, in the tax revenues of the BRICS budget in 2017.Table 4. The budget revenue structure of the BRICS member countries by groups of main taxes and deductions,%

Countries	Corporate income tax	Individual income tax	Social insurance deductions	Property tax
Russia	10,6	10,5	21,9	4,0
Brazil	14,0	7,0	8,4	2,0
India	25,9	10,4	0,3	1,8
China	22,2	8,3	9,1	3,5
South Africa	14,8	39,0	0,4	1,6

Source: OECDStat, Tax Policy Analysis, Global Revenue Statistics Database [Electronic resource]. –Access mode: http://www.oecd.org/tax/tax-policy/global-revenue-statistics-database.htm

A clear comparison of the structures should be presented in Fig 1.

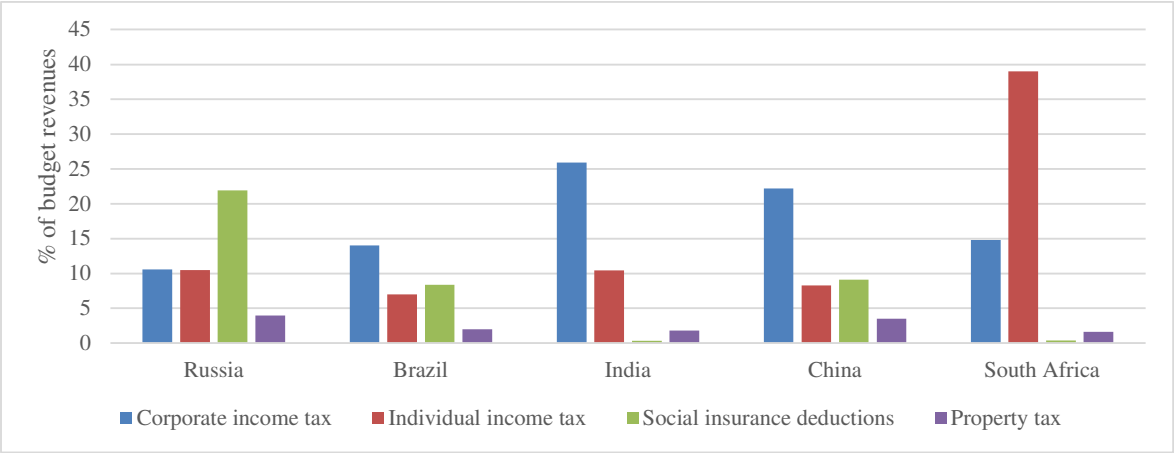

Fig. 1: The budget revenue structure of the BRICS member countries by main tax and deduction groups

Source: OECDStat, Tax Policy Analysis, Global Revenue Statistics Database [Electronic resource]. – Access mode: http://www.oecd.org/tax/tax-policy/global-revenue-statistics-database.htm

Thus, according to the national tax revenue structure, one can see a greater orientation of BRICS members toward the collection of taxes on the commercial sector, which can be caused either by higher profit tax rates for business or by a significant share of legal entities, that is, so-called economies of scale, as in China. However, South Africa and Russia are singled out from this list. In the Republic of South Africa, revenues generated from personal income taxes predominate, while in the Russian Federation social insurance deductions are dominant/prevailing, which in many countries are completely insignificant, like in India and South Africa, which can be a confirmation of an inactive government social protection policy or an encouragement of personal initiative in the formation of their social package through private funds without mandatory contributions. In general, as in the regression analysis of economic growth factors from the tax burden, the BRICS countries do not have a unified model or pattern of the structure of tax revenues, which proves their uneven development and asynchrony.

It is possible to track how taxation is reflected in the most important driving force of modern economic growth - small and medium-sized businesses, using the world's global ranking of Doing Business, based on 10 key indicators that determine the conditions for easy of starting a business and unhindered implementation of business activity. Among these indicators is the tax criterion, therefore, in Table 5 we consider the ratings of the BRICS countries on this

Table 5: Rating dynamics of Doing Business in the BRICS countries as a whole and in terms of taxation, 2015 - 2017

Countries	2015		2016		2017	
	Overall rating	Tax Rating	Overall rating	Tax Rating	Overall rating	Tax Rating
Russia	62	49	51	47	40	45
Brazil	120	177	116	178	123	181
India	142	156	130	157	130	172
China	90	120	84	132	78	131
South Africa	43	19	73	20	74	51

Source: World Bank, Doing Business project [Electronic resource]. – Access mode: https://www.doingbusiness.org/

Based on the rating data, two subgroups can be identified, which should be characterized as follows. Firstly, there are states among the BRICS countries where tax policy is a burdening factor that impedes the development of small and medium-sized businesses on a larger scale. For example, in Brazil, India, China, the tax rating is always lower than the rating as a whole, which means that the tax burden in these countries 'pulls down' both business and economic growth. However, in Russia (until 2017) and South Africa the reverse trend is observed: taxation is always higher than the overall rating, therefore, these countries' higher positions compared to the other three countries are explained in many respects by a more flexible and business-friendly tax policy. On the whole, a positive regression relationship between taxation and ease of doing business can be seen only in Russia. In the other BRICS countries there is no single trend, which means that this criterion is not fundamental to economic growth.

Conclusion

Thus, the study of the importance of the tax burden for the economic growth of the BRICS countries allows us to conclude that, under current conditions at the macro level, optimization and revision of the tax burden will become possible and more effective only if there is a more significant and strong correlation between the growth rate of the gross national product and tax burden. The models for constructing their dependence on each other, as well as the structure of the formation of this burden (or tax revenues and deductions as a whole) in the five member countries of the association, are asynchronous for many reasons: uneven development, different mentalities, historical factor, the role of the shadow economy, which is not reflected in officially published statistical materials and significantly distorting the real situation.

Taking into account these factors, as well as the fact of a global slowdown in economic growth, stagnation, an urgent task for the BRICS countries now is to create such conditions that will simultaneously solve two problems. Firstly, they will provide more comfortable and acceptable circumstances for doing business in the legal economic space.Secondly, that part of the correlation of the tax burden with the GDP growth rate, which is taken away by the shadow sector and is not directly reflected, will pass to the tax system, which means that the regression models will become more objective and real. Only under such conditions it is possible for countries to develop effective tax regulation rules to accelerate and maintain their economic growth.

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Kahoot! A Tool for Making Econometrics More Enjoyable

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Abstract

The aim of this paper is to assess the usefulness of Kahoot! as a formative assessment tool in making learning more enjoyable and in understanding the content of an abstract subject (econometrics); in addition to that, Kahoot! was used for collecting feedback. The study was conducted at the Bucharest University of Economic Studies on undergraduate second year students during the academic year 2019-2020. The results show that most of the students associate econometrics with statistics (followed by mathematics), and think Kahoot! makes learning more fun, though when asked to state which activities helped them most in understanding the content, a large majority perceived exercises and writing on the blackboard as most useful. Moreover, the study reveals that most of the students want to enjoy a course and they love integrating technology within it; as to the integration of Kahoot! within the course, most of them stated that Kahoot! should be played at the end of each lesson.

Keywords: Econometrics, Advanced Statistics, Gamification, Formative Assessment Tool, Feedback.

Introduction

Higher education students are excited when innovative instruments that make learning more enjoyable and help them master the content are introduced, especially in difficult courses like econometrics (Mirica et al. 2019). Gamification apps, especially Kahoot! is one such instrument (Bicen and Kocakoyun, 2017). While this can be subject of a relative fruitful debates, gamification is treated as a scientific area of interest by some researchers and for a detailed description on the subject matter and its history see Landers et al. (2018), Raczkowski (2014) or for a more critical view Dale (2014) or Bogost (2015).

The aim of this paper is to assess the usefulness of Kahoot! in making learning more enjoyable and in understanding the content of an abstract subject (econometrics). The study was conducted at the Bucharest University of Economic Studies on undergraduate second year students during the academic year 2019-2020.

Founded in 2012 as a joint venture between 3 entrepreneurs/programmers and the Norwegian University of Technology and Science, Kahoot! is an online platform for delivering interactive applications in which teaching content is disseminated according to a specified set of rules designed to increase engagement rate through instant gratification [Kahoot!, 2020]. Dellos (2015) provides a rich description of the platform and its core functionalities.

At simple search of 'Kahoot!' keyword using Google Scholar (Google, 2020) we can retrieve approximately 11.000 results containing scientific articles regarding more or less a plethora of assessments in measuring students satisfaction/performance derived from using the online teaching platforms in class. Such studies, as done by Felszeghy et al. (2019) for teaching medicine students histology or Zarzycka-Piskorz (2016) for teaching grammar of a new language, mainly praise the benefits of capturing and maintaining the attention span and stimulating students motivation, through constant interaction mediated by the electronic environment. While solutions to problems old as time in education are welcomed, a critical assessment of the new tools and their impact on long-term effects for students and teachers, alike, is needed and all the praise should be carefully taken into account, given the new cultural environment in which students have to succeed (Toyama, 2015).

The paper is structured as follows. Firstly, we provided a description of the methodological design, secondly we present the results, followed by conclusions.

Methodology

Kahoot! was used within the econometrics course as a formative assessment tool at the end of two chapters: Time Series and Simultaneous Equation models. Also, at the last course, Kahoot! was used as a formative assessment tool for the overall content as well as for collecting feedback on the course. In order to collect students' feedback as accurate as possible, five questions were added after the ones used for formative assessment:

- **Q1.** "State one word to which you associate Econometrics" – this is an open ended question aimed to provide an insight on what students think of the subject;
- **Q2.** "Of all learning activities, which one do you find most joyful?" – prior this open ended question students were asked to think of all the course activities they participated in and state one that made their learning more enjoyable;
- **Q3.** "Of all learning activities, which one do you find most useful for understanding the subject?" – prior this open ended question students were asked to think of all the course activities they participated in and state the one that helped them master the content and make connections between econometrics and other subjects;
- **Q4.** "Of all learning activities, which one would you keep?" – providing that students already thought to the course activities from two different perspectives (the one that brings more joy and the one that is more useful), this open question aimed at providing an insight on which activities should be kept for the next academic year;
- **Q5.** As the feedback from previous Kahoot! games was positive, several students stating that we should play more, one final multiple choice question on this specific activity was added: "We should play Kahoot!: At the beginning of each lesson; At the end of each chapter; At the end of each lesson; Only at the end of the course".

Collecting feedback as an integral part of a Kahoot! game is recommended by Gebbels (2018). In order to be sure that students answer spontaneously, without much prior thinking, the chronometer was set as follows: 60 seconds for questions 1 to 4 respectively and 30 seconds for the last question.

The game was played on two series of students comprising of 32 players in the first series and 41 players in the second one. One must note that students in the second series didn't have any contact

with the students in the first series. Moreover, some students didn't answer to these questions. In the case of the second series, the fourth question was skipped due to lack of time. As the course content was the same for both series and students didn't interact among themselves, the results will be presented globally, for both series.

Results

As follows, we will present the results obtained from the survey to which the students from the two series responded.

Figure 1 presents the number of answers per question. As one can observe the lowest number of answers was registered for the skipped question, while the highest was registered for the one that required students to associate Econometrics with one word. This is natural, as this question was the first in this series of questions collecting feedback. Another reason why we have a smaller number of answers to the question of which they would keep is that decisions are always more difficult to make.

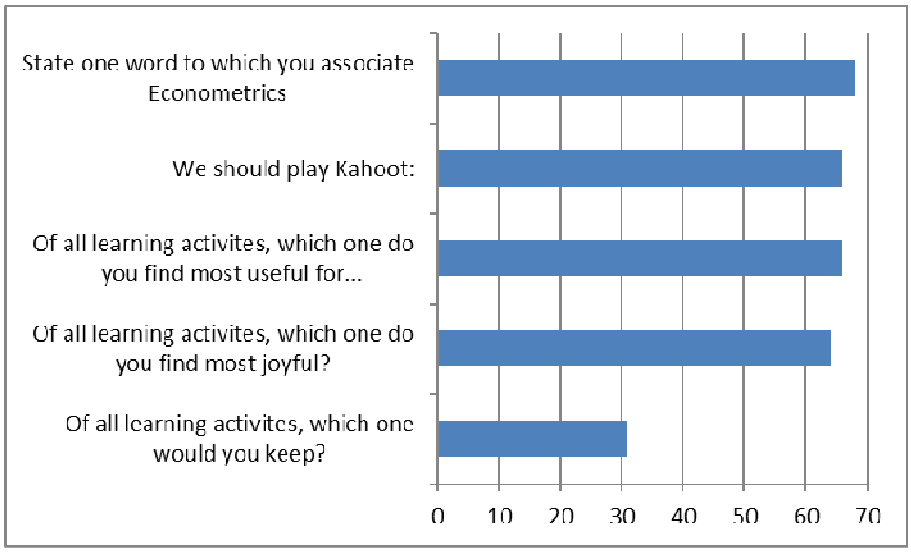

Figure 1 : Number of answers per feedback question; source: designed by the authors

Figure 2 presents the words that students associated Econometrics with. Most of the students stated that econometrics is associated with statistics, followed by mathematics. Indeed econometrics could be called advanced statistics and even if it is based on various mathematical concepts, it has a high degree of applicability. This proves that most of the students gathered a good insight of the subject. However, there are students that still have a certain degree of anxiety regarding econometrics, as some of them associated the course with feelings such as failure (failed exam) and depression (depression, torture, atomic bombs, nasty, an additional year of college). Such feelings of anxiety could be reduced trough integrating joyful learning techniques tailored for econometrics and the specific age group into the teaching process (see Andrei et al. 2019). Other students could not master the material properly, yet they didn't associate negative feelings with it, rather they stated their opinion in an objective manner; such students associate econometrics with the unknown, ambiguity or trick.

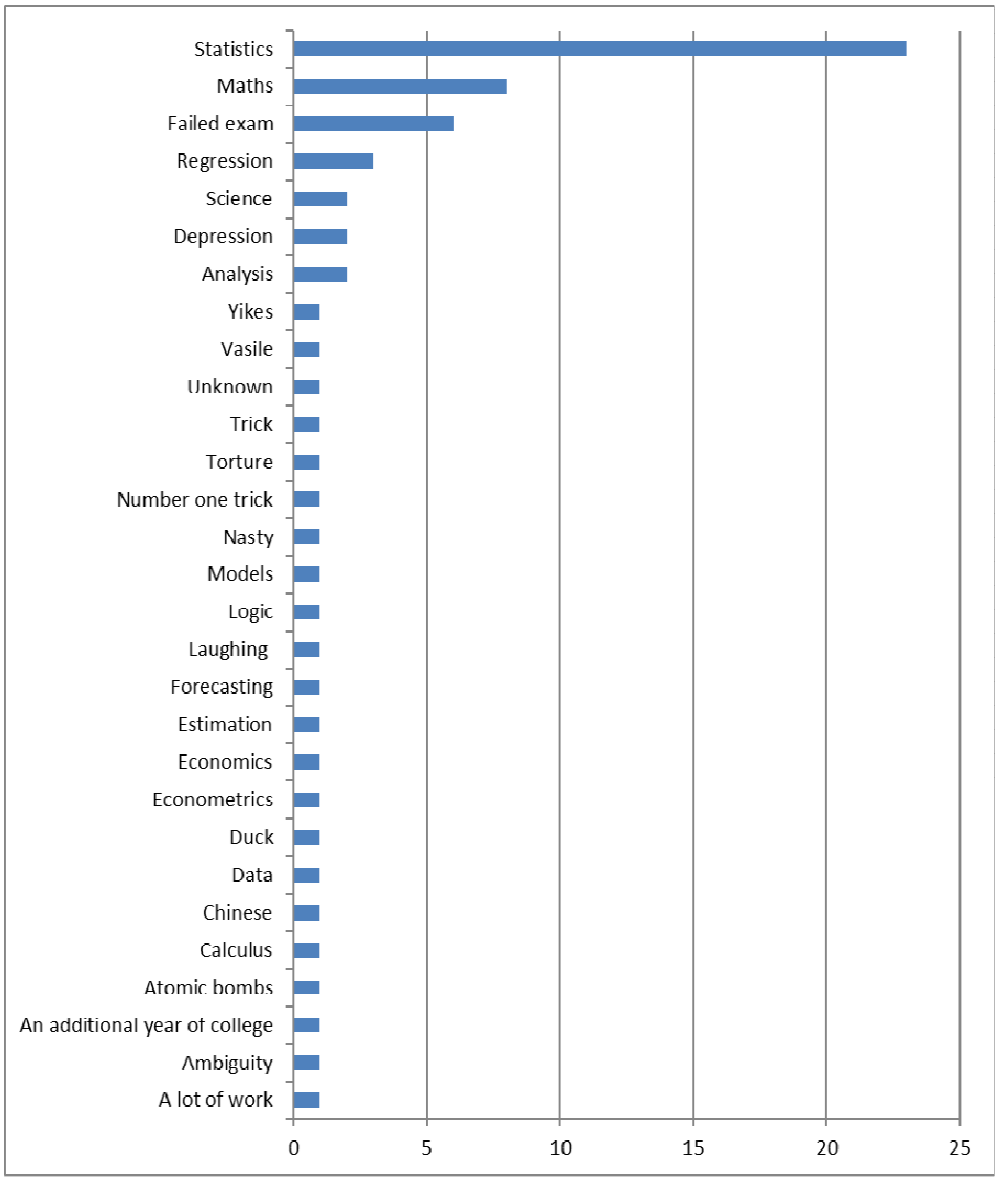

Figure 2 : Distribution of answers to the question "State one word to which you associate Econometrics"

source: designed by the authors

Next, students were asked to reflect upon the course activities from two perspectives: to what extent an activity makes their learning more enjoyable and to what extent an activity helps them in understanding the content. The results are presented in figures 3 and 4, respectively. As one can observe from figure 3, most students stated that Kahoot! makes learning more fun. Moreover, some of them referred to Kahoot! as "this one", suggesting that they were fully engaged in the activity. Very few of them pointed out that the teacher (referred also as "you") made their learning more enjoyable. On the other hand, when they were asked to state which activities helped them most in understanding the content, most of them perceived exercises and writing on the blackboard as most useful. Some students stated that nothing helps in understanding the subject, while some of them also associated negative feelings with this issues (see "prayers" – anxiety, "whatever" – indifference).

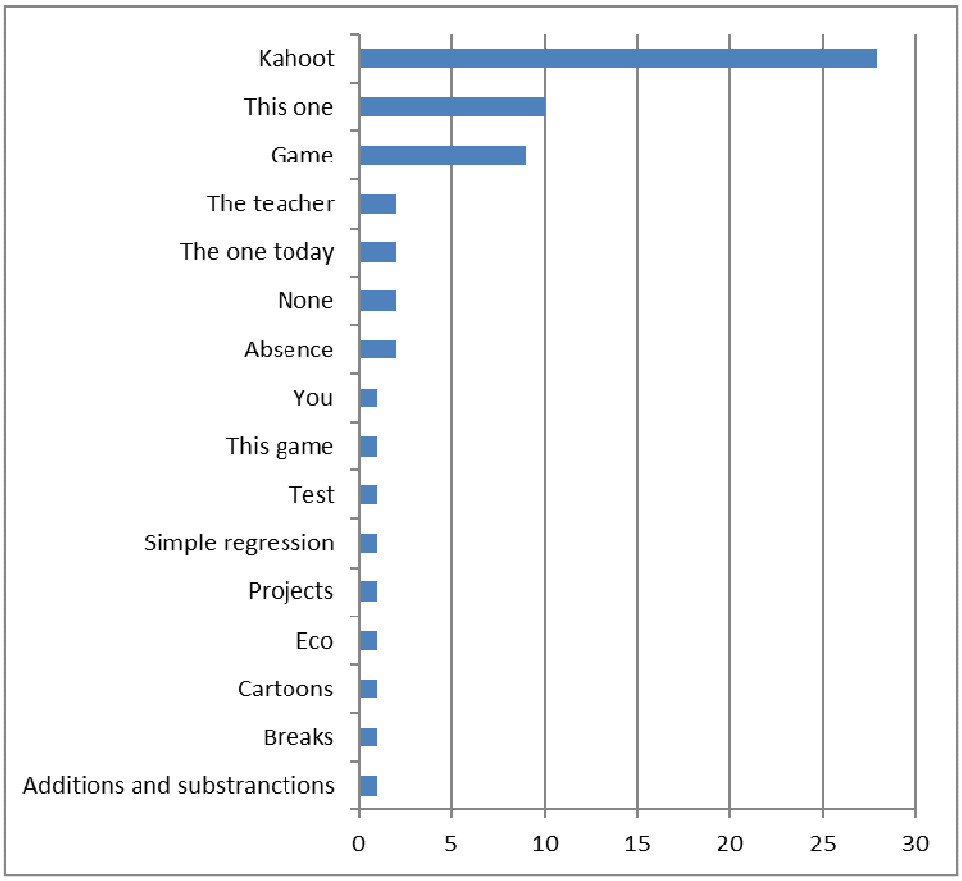

Figure 3: Distribution on answers to the question: "Of all learning activities, which one do you find most joyful?"

source: designed by the authors

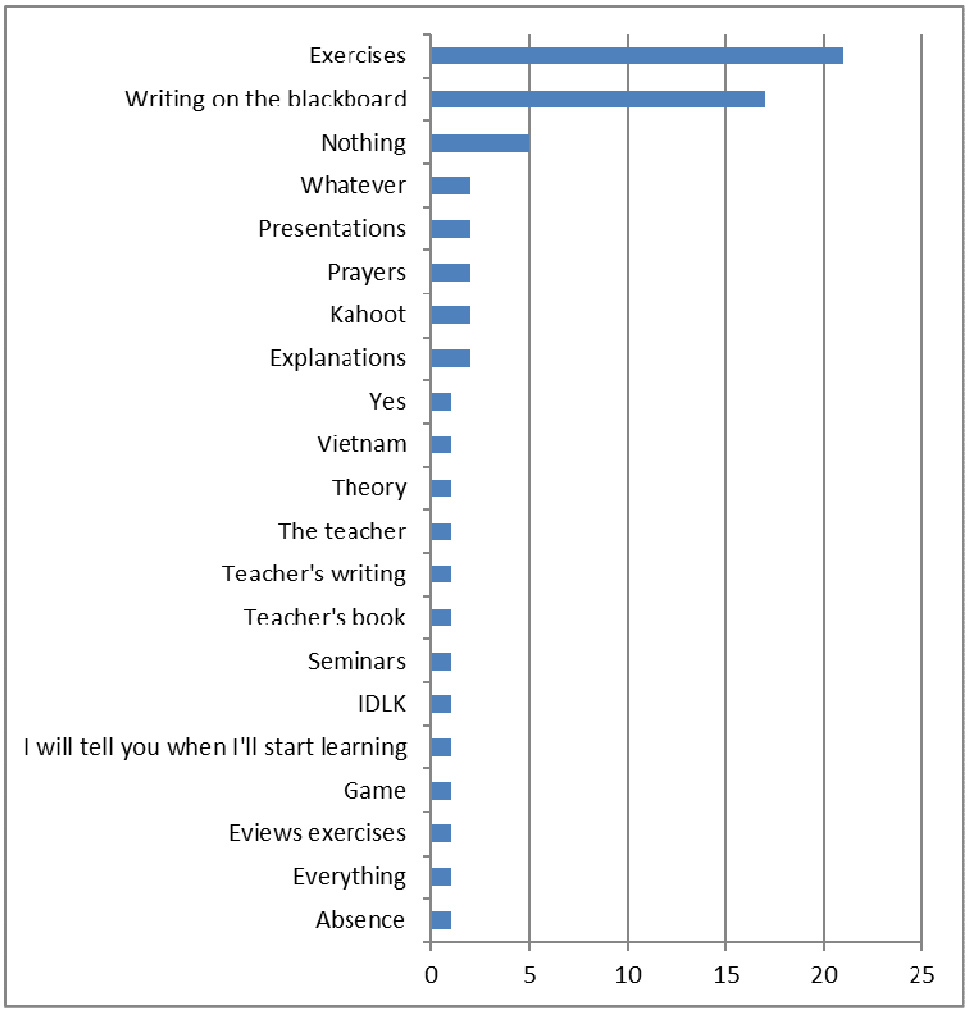

Figure 4 : Distribution of answers to the question: "Of all learning activities, which one do you find most useful for understanding the subject?

source: designed by the authors

Figure 5 shows the distribution of answers to the question: "Of all learning activities, which one would you keep?". This question is important because it provides insights on students motivation for being present to the course. As one can observe, most of them stated that Kahoot! and games should be kept. Moreover, some of them referred to Kahoot! as "this one", once again demonstrating their engagement in the activity. This result shows us that most students want first and foremost to enjoy a course and they prefer integrating technology within it. Our findings are in line with the existing literature. For example Newman et al. (2018) found that students want to have courses that embed Kahoot!, Moodle and Power points.

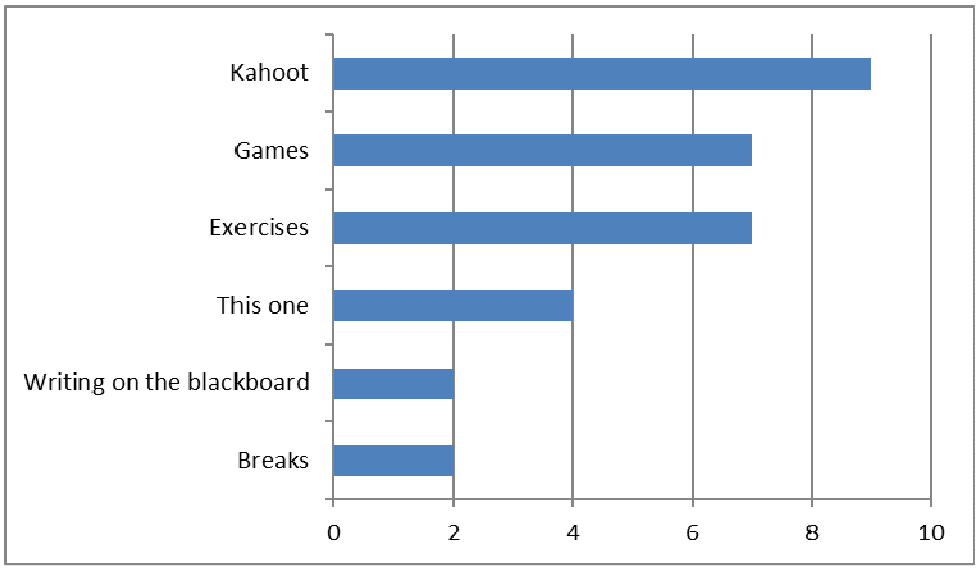

Figure 5 : Distribution of answers to the question: "Of all learning activities, which one would you keep?"

source: designed by the authors

Finally, students were asked to provide their opinion on how should Kahoot! be integrated within the course. As one can observe from figure 6, most of them stated that Kahoot! should be played at the end of each lesson. Some of them also mentioned that we should play at the beginning of each lesson or at the end of each chapter and very few of them only at the end of the course. In the context that the game was introduced at the end of two chapters as well as the end of the course, their answers may suggest that there is a need for making some lessons more enjoyable. Moreover, students may anticipate the various contexts that Kahoot can be used for: formative assessment, review or introducing new concepts (according to https://kahoot.com/schools/ways-to-play/ accessed 2 February 2020)

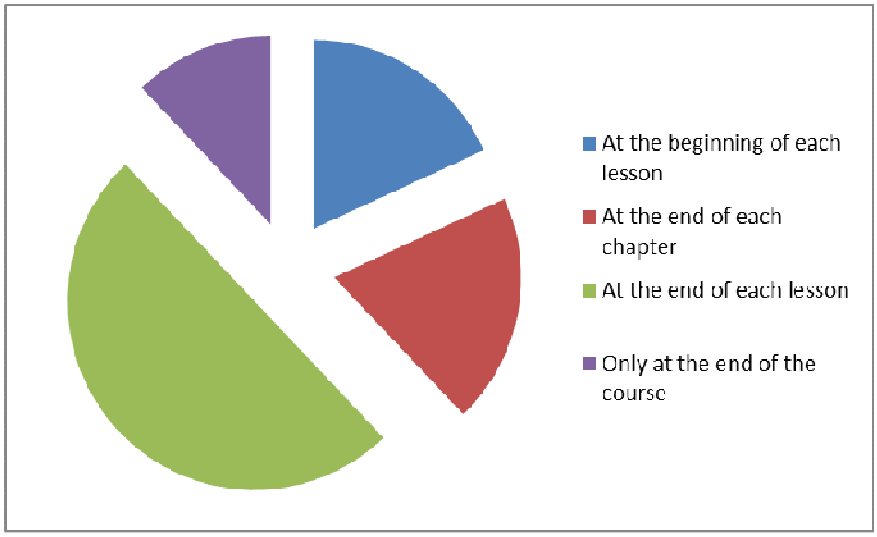

Figure 6 : Distribution of answers to the question: "We should play Kahoot! …"

source: designed by the authors

Conclusions

The assessment of the Kahoot! tool to discover if it makes learning more enjoyable and if it is useful for a better understanding of an abstract subject such as econometrics can bring improvements in the learning process. From student's perspective Kahoot! proves its ability of being an enjoyable way of learning, this could be seen in the figure 3 where the question was "Of all learning activities, which one do you find most joyful?" the majority made reference to Kahoot! ("Kahoot!", "This one", "The today one"). Although apparently Kahnoot! is not perceived by students as useful in understanding the subject matter, this tool offers to teacher a very good opportunity for collecting feedback and improving the learning process. In just a few minutes the teacher gained valuable insight to the associations that students make about econometrics (figure 2), what they consider useful in understanding the concepts (figure 4) and when during the semester is better to use Kahoot! (figure 6).

Kahoot! like tools decrease anxiety caused by a new and complex subject such as econometrics and create a better perception of the "pair" teacher-subject and even help to improve the learning process by collecting feedback. A possible development of the study might be comparing the final results between groups of students (one group that used Kahoot! and another that did not). Moreover, comparative analysis concerning the perception before and after a course where Kahoot! was used should be performed.

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An Evaluation of Counter-Ecological Behaviors of Workers in Relation to Their Sex

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Abstract

The authors of this study undertake to discuss the problem area of evaluation of counter-ecological behaviors in the place of work. The basic goal is to examine whether there exists a dependence between the respondent's sex and their evaluation of selected counter-ecological behaviors. The article is of the theoretical-empirical character. The authors conclude that evaluations of the degree of negativism of counter-ecological behaviors are high, whereas there does not occur any significant dependence between women and men regarding these evaluations. They recommend to Polish enterprises that they should turn socially responsible through implementation of corporate social responsibility (CSR) with the aim to prevent and eliminate the counter-ecological behaviors that are observed by the respondents in their workplaces.

Keywords: Workplace Behaviors, Counter-Ecological Behaviors, Gender Differences.

Introduction

Since times immemorial organizations have been interested in increasing work efficiency. This efficiency is in an absolute way connected with organizational behaviors of members of organizations (stakeholders). Upon applying the bipolar criterion, it needs concluding that organizational behaviors can be divided into purely positive – altruistic, organizational civic behavior (OCB) (e.g., Organ et al., 2006; Jachnis, 2008) and extremely negative – counterproductive work behavior (CWB) (e.g., Marcus & Schuler, 2004; Spector, Fox, Penney, Bruursema, Goh & Kessler, 2006; Trevino et al., 2006; Szeliga-Duchnowska, 2018). Therefore, one of the goals of an organization is creating such a work environment where the former will be willingly taken up and readily increased, while the latter – consciously avoided and consistently eliminated as undesired due to their negative nature (Viswesvaran & Ones, 2000; Campbell & Wiernik, 2015). Relations between social responsibility of business and corporation ethics and OCB were studied from the perspective of workers' identifying themselves with the organization (El-Kassar et al., 2017). Taking into consideration the aspect of behaviors which ought to be eliminated, it needs observing that in the literature on the subject – as far as both theoretical and empirical works are concerned – a lot more attention has been paid to CWB, whereas counterproductive sustainability behaviors (CSB), which can be described as a counterpart of CWB in the sphere of sustainable development, have been treated marginally only (Ones & Dilchert, 2009, 2012; Wiernik et al., 2010). Natural environment is the foundation of sustainable development, the economy – its tool and welfare of society – its goal. Bearing the above in mind, the authors concentrated their research attention on questions connected with ecology in organizations since:

1. The scales which illustrate CWB do not focus on behaviors against ecology. For instance, the scale elaborated by Gruys and Sackett (2003) lists such behaviors as: theft, damaging property, absence, harassment and violence. Only a few authors, including Ciocirlan (2017), deal with the problem of environmental counterproductive workplace behaviors (ECWBs), which – apart from

organizational citizenship behaviors for the environment (OCBEs) as well as environmental in-role behaviors (EIRBs) – make the components of environmental workplace behaviors (EWBs).
2. The stakeholders' behaviors which pose risk of or – in a direct way – result in a harm to the environment stand in opposition to the justified interests of each organization (Dilchert, 2018).

Companies are required to be socially responsible. Therefore, enterprises all over the world undertake to launch a variety projects in the field of environmental protection, which constitutes one of the fundamental elements of corporate social responsibility (CSR) (Śmiechowski, Lament, 2017; Gonzalez, Ling, Glantz, 2012; Joseph, Gunawan, Sawani, Rahmat, Noyem, Darus, 2016; Pierce, Negreiros, Cerabolini, Kattge, Díaz, Kleyer, Buffa, 2017; Mazur-Wierzbicka, 2013; Fukushima, 2013; Valcárcel, Lucena, 2014). The most precise explanation of the notion of corporate social responsibility is presented by ISO 26000 which treats CSR as a company's responsibility for its decisions and – in consequence – activities that are beneficial to society and environment through transparent and ethical behaviors (Polska Norma PN-ISO 26000:2012). Protection of environment is understood here as minimizing the negative impact of the company on natural environment, yet also as communicating with the company's stakeholders (including employees) concerning environmental matters and implementation of pro-ecological actions (Leoński, 2016; Olejniczak, 2013; Lewicka-Strzałecka, 2006; Rybak, 2004; Jabłoński et al., 2010).

The environmental effectivity of an organization to a great extent depends on its workers' voluntary participation in pro-ecological actions. Workers of each organization can undertake to conduct numerous environmental activities, such as recycling or car sharing scheme. Buhl, Blazejewski and Dittme (2009) introduced the concept of employee-driven eco-innovation, specified as "ordinary employees' voluntary engagement in innovation activities within an organizational context that, intentionally or not, lead to environmental improvements."

In this study, the authors used the expression "counter-ecological behaviors" with the aim to examine whether there exists a dependence between the demographic variable, that is the employee's sex and his/her evaluation of counter-ecological behaviors. Obtaining an answer to the research problem defined in this way will allow identifying perception of counter-ecological behaviors on the part of workers of both sexes. As Ratalewska (2013) claims, it turns out that the same situation can be perceived quite differently by two persons, can become subject to different interpretations or descriptions, and that evaluations of this situation offered by its participants can differ considerably, as well. Moreover, solving the research problem will provide organizations which pay attention to the issue of environmental protection with some useful clues that can prove effective in this respect.

In the study, an analysis of secondary sources and scientific literature was carried out, the focal point being the differences and similarities between women and men, with particular attention paid to relations between the sexes and concern shown by their representatives for natural environment. The majority of research dealing with this issue shows females as being more pro-ecological. Next, the analysis of the relevant empirical material collected by the authors is presented. Accordingly, the characteristics of the research sample is given and the results of the examination are presented, followed by a discussion of the findings. The study ends with a summary containing conclusions and recommendations.

Gender and Environmental Concern

The stereotypes of gender resemble one another throughout the world: men are considered to be concentrated on tasks and action, whereas women focus on emotions and social relations. In many studies, very small differences, however, have been found between men and women as regards pro-ecological behaviors and the observed differences depend on location and types of behaviors (Hunter et al., 2004; Briscoe et al., 2019; Desrochers et al., 2019; Vicente-Molina et al., 2018; Chan et al., 2019; Rončević & Cvetković, 2016; Xiao & McCright, 2012). Thus, women typically display a higher level of concern for environment in comparison with men (Briscoe et al., 2019; Lee, 2009; Rončević & Cvetković, 2016; Unanue et al., 2016). Women also appear to be more engaged in

pro-ecological household-oriented activities (e.g., recycling) and men in pro-ecological behaviors oriented towards society (e.g., protests). Differences between the sexes on the level of private environmental behaviors (oriented towards households) are more coherent within nations that find themselves at the upper end of the wealth distribution. Women are more concerned than men with regard to health-related environmental problems.

Glass, Cook and Ingersoll (2016) examined several aspects of gender in leadership on environmental strategy. Firms characterized by gender diverse leadership teams are more effective than other firms at pursuing environmentally friendly strategies.

Witek underlines that a special role in households is played by women. Regarding American retail market, women's expenses determine the allocation of 85 cents out of every Dollar spent (MacEachen, 2008), thus the influential role of women in transforming the market of ecological products must be stressed. Women more frequently than men purchase ecological products (Suki, 2016). Also, the fact of having children is a special factor that stimulates buying ecological articles (Frostling-Henningsson et al., 2014). Research shows that a statistical buyer of ecological products is a woman ranging between 30 and 45 years old, with a high income, well-educated and having children (Nasir & Karakaya, 2014). Strużycki (2004) emphasizes that consumers (primarily women-consumers) make the basic group responsible for creation of the ideological layer of ecological awareness – subjects who exert a direct influence on realization of ecological goals and values within the household and outside it.

The analysis of relevant secondary research points to the fact that women display a much greater concern for ethics than men, which translates into their attitude towards ecology (Zelezny et al., 2000). Moreover, they are more inclined towards accepting the future time perspective, hence their greater engagement for the environment. Women's pro-ecological attitudes are to a broader extent connected with health and safety, especially if there are children who live with them. They are also more willing to engage in voluntary services (Musick & Wilson, 2008). Women show greater interest in living in a safe environment and in health, whereas men display a tendency towards perceiving environment as a resource to exploit (Olli et al., 2001).

Authors also raise the significant question of burdening women with professional work, on the one hand, and their duties connected with running households and bringing up children, on the other one. Bourdieu (2004) draws attention to the fact that job markets are informally regulated and feminine occupations are an extension of their roles in the household and family (teaching, caring, services). Women can be more concerned about environmental issues and engaged in environmental protection, yet regular housework restricts their environmental activism. Still, since many forms of pro-ecological behavior can be undertaken in the context of everyday activities, women can display a number of environmentally-friendly behaviors while doing housework (Tindall, Davies, Mauboules, 2003; Kennedy, Kmec, 2018).

It also follows from the analysis of secondary research that women, especially those having children, are more inclined towards responding to ecological questions. However, it needs underlining that at present the vocational activity of Polish women has been the lowest for years and companies' boards are dominated by men. As many as 42% of the men who took part in the survey conducted by Millward Brown worry that if women are recruited to be members of the board, they will run serious difficulty reconciling their professional duties with those in the family (Dobosiewicz, 2018).

Method

The literature includes many studies on gender differences, however, the impact that gender have in shaping the pro-environmental and counter-ecological behaviors is stil unclear. The basic goal of the study is to examine whether there exists a dependence between the respondent's sex and their evaluation of selected counter-ecological behaviors.

The following hypothesis was formulated:

H_1: Evaluation of counter-ecological behaviors differs with respect to the employee's sex.

The research was conducted between 15 July and 15 August 2019 among students of WSB University in Opole. The first step consisted in sending out information about the realized research to students of the following majors: management, management engineering, logistics, finances and accountancy, administration and internal security. The request to fill in the Internet-based questionnaire of the survey (CAWI) was addressed to students in employment. Participation in the examination was voluntary and anonymous. The research was of the pilot character.

Characteristics of the sample

There were 342 students of WSB University in Opole who participated in the CAWI examination (262 women and 80 men), in employment, at various ages and with different lengths of employment and work experience (Table 1). Over 90% of the respondents live and work in the area of Opole Voivodship.

Table 1: Structure of the respondents due to their sex, age and work experience (n=342)

	Frequency	%
Sex		
Women	262	76.6
Men	80	23.4
Age		
18–23 years	72	21.1
24–38 years	175	51.2
39–53 years	83	24.3
54 years or older	12	3.5
Length of employment		
Up to 1 year (inclusive)	24	7.0
Over 1 year up to 5 years (inclusive)	120	35.1
Over 5 years up to 10 years (inclusive)	55	16.1
Over 10 years	143	41.8

Among the respondents there were three times more women than men. The largest number of the examined (over 50%) were students in the age group ranging between 24 and 38 years. The length of employment of nearly 60% of them was over 5 years. The above is connected with the specifics of the university, which consists in the following:

- The decisive majority of students regarding the structure of the university are women;
- The study courses on offer are dedicated to people who are professionally active, ones that are willing to reconcile studies and regular work (extramural students attend classes every second weekend, while intramural courses are run on weekdays three days a week) – 85% of the WSB University students combine studying with employment.

Results and Discussion

For the assessment of selected counter-ecological behaviors in the workplace 14 items of the survey questionnaire were used. The respondents' task was to evaluate the individual behavior on the 11-degree scale (from 0 – the behavior is not negative to 10 – I regard the behavior as very negative). It was expected that the respondents' sex could have an influence on the evaluation of individual behaviors. The results of the examination of negativism of particular types of behavior are presented in Table 2.

Table 2: How much negative do you rank the following behavior of people in your work place?

	Women		Men		Total	
	M	SD	M	SD	M	SD
wasting food	6.41	3.97	7.22	3.52	6.60	3.88
using more material than necessary	7.61	2.87	7.59	2.74	7.60	2.84
soiling the place of work on purpose	6.40	4.09	7.07	3.96	6.56	4.06
leaving lights on in rooms which are not used	6.49	3.54	6.96	3.14	6.61	3.45
using obsolete energy-inefficient electric bulbs	6.24	3.50	5.41	3.53	6.04	3.52
using obsolete energy-consuming appliances	6.28	3.37	5.56	3.40	6.11	3.38
overusing the stand-by mode in electronic/household appliances (instead of completely switching them off)	6.26	3.14	5.30	3.68	6.04	3.30
not segregating rubbish	7.31	3.41	6.70	3.90	7.16	3.54
burning leaves, grass, tree branches	6.46	4.20	6.22	4.18	6.40	4.19
burning rubbish	6.56	4.35	7.04	3.74	6.91	4.25
taking rubbish to the forest in order to dump it on wild landfills, pouring hazardous waste into the sewerage system	6.59	4.56	7.56	4.18	6.82	4.48
using disposable ball-pens	5.76	3.59	5.11	3.72	5.61	3.63
using plastic cutlery, styrofoam or plastic containers for food or mugs, etc.	6.15	3.70	5.80	3.58	6.07	3.67
not reporting problems or abuses connected with environment, which are noticed in the work place	6.29	3.65	6.14	3.76	6.25	3.67

where: M - mean, SD - standard deviation

In order to verify the hypothesis assuming that perception of negativism of individual types of counter-ecological behaviors in the place of work depends on sex, the single-factor variance analysis (ANOVA) was used. In the majority of cases, comparison of the results points to a lack of significant differences between the sexes. The lack of vital differences concerns such aspects as: wasting food, dirtying place of work, leaving lights on, not sorting rubbish, burning leaves, using disposable ball-pens, using disposable containers for food, not reporting problems and instances of abuse connected with environment, which are noticed in place of work. In both of the examined groups, there dominated a negative assessment of the excessive usage of materials (in the group of women: M=7.61; in the group of men: M=7.59, p=0.972). At the same time, using disposable ball-pens was evaluated the least negatively (in the group of women: M=5.76; in the group of men: M=5.11, p=0.458).

It follows from the conducted analyses that accepting the significance level to be $\alpha=0.10$, statistically significant differences in the assessment of behaviors in dependence on sex concern such aspects as: using energy-inefficient electric bulbs (F=3.489; p=0.063), using energy-consuming appliances (F=2.877; p=0.091), overusing the standby mode in electronic/household appliances (F=5.397; p=0.021), burning rubbish (F=7.562; p=0.006) and dumping rubbish on wild landfills (F=2.905;

p=0.089).

It is worth noticing that 73.4% of the respondents (Table 3) were thinking about the impact of the examined negative behaviors on the environment (72.9% of the women and 75.0% of the men). Still, there were found no significant differences between the sexes in this respect (independence test, p=0.352). It seems that it is generally those workers who pay attention to the influence of anti-ecological behaviors on natural environment who can voluntarily undertake behaviors that are beneficial to the environment.

Table 3: Have you ever pondered over how the negative behaviors mentioned in the questionnaire affect the environment?

	Yes	No	It's hard to say	Total
Women	191	20	51	262
Men	60	9	11	80
Total	251	29	62	

Apart from the employees' negative behaviors mentioned in the questionnaire, the respondents notice also other actions occurring in their places of work, which have a negative impact on the environment. They include, among others, using plastic bags to pack articles in shops, burning plastic bags, excessive usage of water in the period of drought, not shutting windows when the air-conditioning is switched on.

Table 4: Who, in your opinion, is responsible in your workplace for the occurrence of behaviors that are detrimental to the environment (the organization itself; only the employee who applies negative behaviors; both the employee and the organization)?

	The organization itself	Only the worker who applies negative behaviors	Both the worker and the organization	Total
Women	12	15	234	261
Men	3	6	72	81
Total	15	21	306	

The survey revealed that 27.2% of the respondents did not ponder over the impact of the examined negative behaviors on the environment. It is still possible to note a number of instances which are an undesired heritage of the communist system ("The company has been operating in the market for over 30 years and, unfortunately, nothing is changing here.")

How to make employees (and the management) reflect on their conducts and change counter-ecological behaviors? There is a need for building a formalized system of preventing attitudes which impact the environment in a negative way (e.g., in the form of organizational procedures). The decisive majority of respondents (89.7% of the women and 88.9% of the men) were of the opinion that it is both the worker and the organization who are responsible for the occurrence of behaviors that are detrimental to the environment (Table 4). Merely 5.7% of the women and 7.4% of the men attributed the responsibility exclusively to the worker. There are no significant differences between the sexes in this respect.

Conclusion

Concluding, it needs stating that the research goal has been achieved – the question whether there exists the dependence between the respondent's sex and their assessment of selected counter-ecological behaviors has been verified. The obtained results indicate that there do not occur any significant differences between females and males regarding the examined sphere. At the same

time, it should be added that the respondents evaluated behaviors against the environment to be negative, the most frequently given grade being a 6 (on the scale between 0 and 10).

The findings of the research have implications for managers. Respondents of both sexes do notice counter-ecological behaviors in their places of work. It can be inferred from the research done by the authors that pro-environmental motivations in the companies employing the respondents have not been popularized or characteristic yet, and their actions are not consistent. Thus, the recommendation for companies to create environments that are friendly to pro-ecological activities. The pro-ecological activities at the workplace can be used in order to achieve a reduction in the negative environmental impact of companies targeted by CSR.

The results of the research contribute to understanding how to create a positive work environment. In addition, these findings can increases the effectiveness of company in planning, designing and implementing sustainability initiatives.

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The Directions of Development of Public Electronic Services in Poland In Times of Demographic Crisis

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Abstract

The demographic crisis is a problem faced by the authorities of all EU countries and a number of countries in the world. Therefore, in many spheres of social and economic life it is necessary to implement innovative solutions and services supporting the functioning and development of ageing societies and responding to ever newer needs and expectations. In recent years, new technologies and the spread of the Internet have played a major role in the modernisation of services. It seems interesting to see how the rapidly developing computerisation helps modern communities to function. The aim of the article is to present public e-services in Poland that help to combat the demographic crisis. Special analyses were given to e-services in the area of social security, including social insurance, health insurance and family policy.

Keywords: Public E-Services, Public Administration, Ageing Society.

Introduction

Nowadays, one of the most important challenges facing communities and governments is population ageing. Even in countries where fertility rates in recent years were still at a level indicating generation renewal, the latest survey results show very worrying trends[1] [Papon, Beaumel, 2019]. The growing awareness of the negative effects of this phenomenon has led to the initiation of measures aimed at their reduction. The results of social diagnoses and forecasts, as well as objectives and guidelines for action, contained in numerous strategy papers and plans developed at all levels of governance, from international to local, are used as the reference point for combating the demographic crisis. The analysis of numerous strategy papers, normative acts or social policy programmes of an international character clearly shows that they are currently very focused on family, pro-natalist or senior citizen policies.

In pursuing individual policies, at the national level, the states (including Poland) implement specific solutions in accordance with the prevailing models of social policy. First of all, changes aimed at increasing the birth rate are introduced, including in particular financial benefits for children and youth, development of care and educational services, changes in social insurance are implemented, or legal provisions supporting work-life balance are modified. Secondly, states' authorities implement changes in the pension, health care and social assistance systems. There are more and more services aimed at seniors. The solutions implemented in the countries are diverse, depending, among other things, on the needs of specific communities and largely depend on financial possibilities. These services are usually provided by local authorities and central government. Third sector organisations and the economic sector also play a significant role.

[1] In France, where over the years fertility rates have been among the highest in the EU, the National Statistics Institute – INSEE published a report in January 2020 which shows that statistically there are 1.87 children per woman on average and families with children are already a minority among couples living together (45%).

In order to meet social expectations, public authorities try to take advantage of the development of modern information technologies and offer newer and newer e-services, understood in this study as activities undertaken by public entities which consist in enabling citizens to fulfil a specific obligation or entitlement by means of electronic communication at a distance without the simultaneous presence of the parties. Although e-services are usually managed centrally, citizens often use them via platforms and websites of lower-tier territorial units, which are competently responsible for the provision of certain services, as well as of other entities, for example banks offering in Poland services such as setting up a trusted profile or submitting a child benefit declaration. It is also common practice to use national platforms with the identification of entities responsible for the implementation of a specific e-service at lower levels, as exemplified by child benefit declarations under the 500+ or "Good Start" programme – the latter is designed to partially cover the costs of purchasing school kits for children before the start of the school year. Benefits are usually paid by the lowest local government units in Poland – municipalities.

The aim of the article is to show the development of e-services in public administration in Poland, with particular emphasis on services helping to combat the demographic crisis, and to indicate recommendations that will be helpful in creating new solutions in this direction. The article presents mainly e-services addressed to young families, in the first stages of their development, and to seniors.

Numerous research methods were used in the study. First of all, the method of analysis of statistical data, legal acts, documents available on the websites of both government and self-government administration, as well as data obtained from other sources, e.g. Statistics Poland data, reports from public opinion polls, etc. The descriptive and comparative method allowing to achieve the objective and draw conclusions was also used.

Entities Responsible for Providing Public Services And E-Services in Poland

Socio-economic and technological development, observed for several decades now, has led to reforms in many countries, which consisted in a serious systemic and administrative reorganisation. In Central and Eastern European countries in particular excessive centralisation of power prevented verification of community needs and provision of adequate and tailored public services [Terzoli, Siebörger, Tsietsi, Gumbo, 2018, p. 85-98].

In Poland, as a result of natural evolution, progress and the changing needs and requirements of the population, the Act on the Introduction of the Basic Three-Tier Territorial Division of the State was implemented in 1998 [Act of 24 July 1998]. As part of the decentralisation processes local government units received new powers, including those relating to the provision of public services, understood as a whole range of services that are performed within the framework of the state's activities in various fields, for the benefit of all its citizens.

Currently in Poland, the state, at the central level, divides individual tasks in the structure of successive tiers of local government units [Lindgren, Jansson, 2013, p.163-172]. Such a division gives the local government a large scale of independence in deciding on the scope, type or financing of a given measure. The basic level of public administration dealing with the provision of public services is the municipal self-government, whose task is to satisfy the collective needs of the community, in particular in the field of health care, education, culture, physical culture, social assistance, municipal housing, municipal roads, streets, bridges, squares and traffic organizations, local public transport, waterworks and water supply, sewage system, removal and treatment of municipal sewage, maintenance of cleanliness and order and sanitary facilities, dumps and disposal of municipal waste, communal cemeteries, supply of electricity, heat and gas, communal greenery and trees, land management, environmental protection, public order and fire protection [Act of 8 March 1990]. A similar, albeit slightly smaller scope of activities and competencies, and with the reservation that it concerns tasks of a supra-municipal nature, is at the disposal of the county self-government [Act of 5 June 1998]. The province self-government, on the other hand, performs regional tasks, in particular in the scope of supporting the development of science and activities aimed at raising the level of education of citizens, public education, including higher education, health promotion and

protection, supporting the development of culture and the protection and proper use of cultural heritage, social assistance, pro-family policy, physical culture, tourism, maintenance and development of social and technical infrastructure, including public roads and collective transport, water management equipment and public safety [Act of 5 June 1998]. A special role in the provision of public services falls to the state, which plays a triple role – regulator of service activities, direct organizer and an entity offering public services.

The new division of competences and responsibilities has had a positive impact on state management, brought budget savings, and, what is very important, has significantly increased social activity and mobilised society to become more active for the common good than before. The citizens began to express their needs and expectations more actively, and the primary point of contact between the citizen and the state turned out to be the lowest-tier, and at the same time closest to the problems of the citizens, local government units – municipalities, which to this day are responsible for providing most services. In addition, the development of various forms of participatory democracy [see: Ronchi, 2019, p. 59-68] and a significantly greater influence on the development of one's own communities and solving given, often specific problems, are of great importance in shaping public [see: Golubeva, Gilenko, 2019, p. 249 – 264] services tailored to the needs of communities. On the one hand, new opportunities for citizens' participation have forced changes in the tools used, on the other hand, the development of new technologies has increased the need and opportunities for citizens to participate in public life [see: Zheng, Holzer 2019, p. 211-227]. For example, in Poland, when developing strategy papers of local government units, consultations with residents are carried out. In addition to classic debates, panel discussions, meetings, community members discuss using new information technologies. Contemporary, although still crawling, e-participation is not only about casting a vote on-line or participating in a survey. These are also Internet forums, blogs and, above all, discussions in social media. Providing the citizens with a greater opportunity to participate in the performance of certain functions, thanks to, among others, the development of e-administration [Weerakkody, Reddick, 2013; Weerakkody 2012], has led not only to the participation of the inhabitants or better diagnosis of the existing situation in the region, but also to more precise and reliable response to citizens' needs. Although not all local government units use new media, a clear, positive trend is already visible and should be further supported.

The Ministry of Digitalisation, whose mission is to "create a digital impulse for the development of Poland", is responsible for supporting the creation of Internet content and e-services, development of broadband infrastructure and promotion of digital competences among citizens and officials. Legal acts which in any way affect the area of computerisation, before being referred to the Council of Ministers, have been verified by the Committee of the Council of Ministers for Digitisation (KRMC) since 2012. Earlier, since 2007, this body existed under the name of the Committee of the Council of Ministers for Computerisation and Communications. This body is composed of undersecretaries of state of individual ministries and representatives of central offices. The aim of the body is to coordinate the computerisation policy by verifying legal acts as well as issuing recommendations in the area of computerisation. In Poland there is also the Joint Commission of Government and Local Government (KWRiST), which is the most important forum for cooperation between the central and local government administration. Permanent teams dealing with specific thematic areas operate within KWRiST. The Information Society Team is responsible for matters related to computerisation. It proposes and consults legal, organisational and technical solutions in the area of e-government addressed to local governments and develops good practices. The consultative and advisory body of the minister in charge of computerisation is the Council for Digitisation, appointed for a two-year term of office. As regards the distribution of EU funds for computerisation, two bodies are of key importance – the POPC and the Regional Operational Programme Monitoring Committee. The Monitoring Committee shall act as an independent advisory and consultant body. It is appointed by the Managing Authority of the Operational Programme Digital Poland. It is composed of representatives of the government, local government and organisations from outside the administration, in particular scientists, social and economic partners and non-governmental organisations. The meetings of the Monitoring Committee may be attended by representatives of other institutions, including the European Commission, as observers [www.gov.pl; www.archiwum.mc.gov.pl].

Development of E-Services in Public Administration in Poland

In Poland, the development and use of information and communication technologies by citizens, both in individual households and among enterprises, is observed year to year. The latest survey conducted by the Statistics Poland [Information and communication technologies usage in public administration units, enterprises and households in 2019][2] shows that in 2019 there was at least one computer in 83.1% of households with at least one person aged 16–74. This indicator is growing steadily year by year, but its rate is slower every year. In relation to 2018, it increased by less than 0.4%. In 2019, as many as 86.7% of households had access to the Internet, while in the year 2018 – 84.2%. Broadband Internet had 83.3% in 2019 and 79.3% in 2018.

Both the access to the Internet and the type of Internet connections varied and depended to a large extent on the type of household, place of residence and degree of urbanisation. Households with children were more likely to have access to the Internet; the percentage of households with Internet access was higher in cities than in rural areas, and taking into account the degree of urbanisation, most people used it in highly urbanised areas. The reasons for not having the Internet have remained virtually unchanged for several years now. The main reason is the lack of need to use it and the lack of skills. Too high equipment costs and access fees are indicated less and less often as the reason for not having the Internet [see: Manoharan, Holzer, 2012].

The computerisation of the Polish society is also evidenced by the data on the use of new technologies by enterprises. The percentage of companies using ICT security measures, including technologies that process, collect and transmit information in electronic form, was 87.2% in 2019. Almost half of the entities surveyed had practices aimed at raising staff awareness of ICT security issues. A smaller percentage of companies used paid cloud services. In 2019 it amounted to 17.5%, but compared to 2018, a significant increase is observed – by as much as 6%. Among cloud computing services, the most popular were e-mail services, used by 12.9% of enterprises. Robots were used by 7.5% of enterprises, including industrial robots – 5.7% and service robots – 2.9%. The highest percentage of companies using robots was recorded among large entities – 28.4%. The interest of these companies focused mainly on industrial robots (25.3%) and less frequently on service robots (8.1%) [Information and communication technologies usage in households in 2019 – Part 2].

Analysing the results of the surveys, it is clear that the percentage of people shopping online in Poland is also growing year on year. In 2019 this indicator amounted to 53.9% among people aged 16-74. It should be noted, however, that this form of shopping is more popular – by 9.7% – among urban residents compared to rural ones.

For many years now, public administration units in Poland have been making numerous efforts to ensure that as many official matters as possible can be handled over the Internet, without personal contact, which is beneficial to such units themselves, as well as the citizens. In 2018 as many as 96.6% of public administration units offered electronic services to citizens, and among them the largest number of entities provided e-services in the area of civic affairs (81.9%). Access to services via the Internet was made possible by all Marshal Offices. In 2018, 72.2% of local government units – and among them 75.1% of municipal offices – declared access to the Internet through a DSL connection. On the other hand, central government units preferred access to the global network through other fixed broadband connections – 91.1%, and all of them provided employees with remote access to unit resources. Today, mobile technologies are becoming increasingly important. In 2018, this type of access was declared by 70.5% of Polish offices. It is also interesting that in 2018 almost 75% of public administration units employed ICT specialists [Information and communication technologies usage in public administration units in 2018].

[2] The survey covered: as regards enterprises-entities with at least 10 persons employed; as regards households-households with at least one person aged 16-74 and persons of this age, except for persons living in collective households; as regards public administration units-state and local government administration bodies.

In 2019 Poland, people that used public administration services via the Internet in the last 12 months accounted for 40.4 percent of the population aged 16-74. In the last 12 months this percentage has increased by 4.9%. Recently, the group of people who use the option of downloading forms and returning completed ones has been growing every year. In 2019, the percentage of persons downloading forms increased by 2.5 p.p. per year, and of those sending them by 6.8 p.p. per year.

Table 1: Use of e-services in public administration in Poland in 2019.

	Total in %	**Age in years**			**Gender**		**Education**			**Professional status**		**Place of residence**	
		16-24	25-54	55-74	women	men	primary	secondary	higher	active	inactive	city	village
People using the Internet in the last 12 months	82.1	99.6	93.5	55.1	81.5	82.6	64.4	78.7	98.4	91.7	64.7	86.2	75.8
People using public administration services via the Internet in the last 12 months	40.4	29.8	53.3	21.4	41.3	39.6	9.0	32.0	75.6	52.0	19.6	46.6	31.1
- to search for information on public administration websites	24.9	20.3	32.7	12.6	25.4	24.3	5.6	18.7	48.7	31.9	12.2	28.8	18.8
- to download official forms	24.6	16.9	33.8	11.1	24.8	24.4	3.5	17.2	52.4	32.6	10.1	28.7	18.4
- to send out completed forms, including to send tax returns	31.4 27.5	20.8 14.9	42.6 38.0	15.2 13.5	32.0 28.1	30.8 26.9	4.9 3.3	23.2 20.4	63.5 56.0	41.9 37.3	12.4 9.8	37.0 32.7	22.9 19.7
People not using public administration services via the Internet in the last 12 months	41.6	69.8	40.2	33.7	40.2	43.1	55.4	46.7	22.8	39.7	45.1	39.6	44.7

Source: Own study based on: Information and communication technologies usage in households in 2019 – Part 2.

The table 1. clearly shows some important conclusions. Today, the Internet is used by almost all people aged 16-24. It is interesting that in this age group less than 20% use public administration e-services, but as many as 59% do not need to send official forms in general, which may partially justify such a surprising result of the survey. The situation is different among people aged 35-54, where the percentage of people using public e-services is 53.3%. In this age group, 20.1% of respondents declared no need to send official forms. Significant differences in the use of public e-services also occur depending on the place of residence, education or professional status. E-services are used by 46.6% of people living in cities and only 31.1% of people living in villages. People with primary, lower secondary and vocational education use e-services much less frequently (only 9%), while among people with higher education the number reaches 75.6%. Also professionally active people are more likely to use technological facilities – 52%. Among the professionally inactive, only less than one in five use public e-services [Information and communication technologies usage in households in 2019 – Part 2].

E-services Supporting the Functioning and Development of Ageing Societies

Ageing societies have specific needs and problems. In Poland, the duties of public administration include securing expectations and solving social issues. Supporting functions are performed by non-profit organisations, the economic sector and very dynamically developing social economy entities. In recent years, changes can be seen that are aimed at combating the demographic crisis [Sukkird, Shirahada, 2018, p. 214-232]. Financial benefits for children are introduced, the pension system is modified, additional benefits for seniors are provided and laws are amended, in particular those relating to the combination of professional and private life [see: Szczudlińska-Kanoś, 2019]. These changes do not always fully meet the initial objectives, and the costs they generate are a cause for disputes when making changes. While there are still ongoing discussions on the legitimacy and effectiveness of solutions implemented to combat the demographic crisis, the development of public e-services supporting the functioning of an ageing society does not raise such controversies. Modern public services, through the use of the Internet, are being welcomed by an increasing percentage of citizens; these services include in particular: Electronic Platform of Public Administration Services (ePUAP), Electronic Services Platform of the Social Insurance Institution (PUE ZUS), obywatel.gov.pl website, biznes.gov.pl website. Currently, the Portal of the Republic of Poland (Portal RP) – gov.pl is being created, which is to be the basis for all public information and e-services. Work is underway to integrate the websites of ministries and central and voivodeship offices offering digital services to citizens. Currently, public e-services can be used by people who are able to confirm their identity on the Internet, i.a. by means of a trusted profile, a tool which acts as an electronic signature in communication with public administration [Regulation of the Minister of Digitization, 2018]. The trusted profile was established in 2011, and by 2016 it was used by mere 400 thousand people, the vast majority of whom were officials. At the beginning of 2020 more than 4.7 million Poles had a trusted profile, of which more than 2.1 million created it in 2019 [*Oh, what a year it was,* 2019].

In Poland, the catalogue of e-services [see: Goldkuhl, Röstlinger, 2010] that support the functioning of an ageing society has grown significantly in recent years. Table 2 presents selected public administration e-services available in Poland. It includes those that have the greatest impact on the quality of life of the elderly and families, especially those with children. It should be emphasised, however, that e-services which enable checking one's own data in the Register of Identity Cards, confirming identity with a smartphone (mObywatel application), checking if an identity card is invalidated or suspended, confirming student/pupil status, confirming data submitted to the Register of Contact Data (RDK), checking passport readiness status, checking one's own data in the PESEL register, submitting documents for issuing a driving license, settling taxes or receiving individual tax interpretations are also very popular.

Table 2: E-services in Poland supporting the functioning and development of ageing societies

	E-services
Social security	• Electronic Services Platform of the Social Insurance Institution; • Pension – information portal, retirement age calculator; • Submitting applications for 500+ for senior citizens and disabled people;
Health	• e-prescription; list of unrealized prescriptions in the smartphone (mObywatel application); • e-referral; • Patient's Internet Account (IKP); • Patient’s Integrated Guide – service information; • Medicines directory – information portal; • The Disabled – information portal; • Ecoportal – health and environmental information portal;

Family	• Family – information portal; • Reporting the birth of a child; • Obtaining copies of civil-status certificates (birth, marriage, death); • Submitting the "500+" programme applications – child benefit for each child up to the age of 18, regardless of the income earned by the family; • Submitting the "Good Start" programme applications – 300 PLN for a child who starts a new school year; • Submitting the "Big Family Card" applications – a system of discounts and allowances on goods and services for families with three or more children.
Documents	• Obtaining one's own identity card or the identity card of a child or person under one's care; • Reporting or withdrawing the suspension of one's own, child's or another person's identity card; • Reporting the loss of or damage to one's own identity card, the identity card of a child or of a person under one's care; • Reporting the invalidation of one's own identity card, the identity card of a child or of a person under one's care; • Reporting unauthorised use of one's own personal data or that of a child or a person under one's care;

Source: Own study based on: https://www.gov.pl/web/gov/uslugi-dla-obywatela, access: 14/01/2020.

Noteworthy is the latest data published by the Ministry of Digitization, which shows that in 2019 the service introduced in June 2018 – reporting the birth of a child – proved to be particularly popular. By the beginning of 2020, over 45,000 births had been reported. This is a great convenience for parents, as the law requires that the birth of a child be reported within 21 days of the certificate of live birth being issued. The certificate of live birth is issued by an authorised person who has received the delivery – a doctor or a midwife – and, at the latest three days after its issue, it shall be forwarded to the Registry Office. The service enabling address registration or deregistration was also very popular. In 2019, Poles used it over 60 thousand times. Applications submitted online in the 500+ and "Good Start" programmes are also very popular. After the modifications of the 500+ programme, when, from July 2019, all children up to 18 years old regardless of the family income are entitled to the benefit, only during the first week as many as 38.8 percent of eligible families submitted online applications. It was noted that in 2019 there was 7.5 times more interest in applying for 500+ online in the first week of the programme for the new period than in 2018 [www.tvn24bis.pl].

Summary

In recent years, Poland has seen significant development of digital technology, also in the public sector. The need to function more effectively in order to properly perform the assumed tasks and objectives has often forced public administration to computerise many processes and services. The study pays particular attention to services that are most desirable for ageing societies. The implementation of new solutions in the fight against the demographic crisis has entailed some changes, including technological ones. It is clear from the analyses presented above that numerous positive modifications have already taken place in the area of computerisation of public services in Poland; a number of improvements have been introduced, but it should be noted that still a public e-service is identified with a form, application or document that can be sent via the Internet. So this is the first stage in the implementation of the so-called front-office public service. The further process – the actual e-service should take place at the middle-office and back-office level, where services should be combined into packages. It would be advisable that one application for a specific random event should be used to deal with multiple issues. For example, reporting the birth of a child could result in obtaining a birth certificate, giving an individual PESEL number, obtaining benefits for the birth and upbringing of a child, notification to a medical clinic. Only those e-services that meet citizens' expectations will be useful and appreciated in the future. They need to be simplified as much as possible, especially in times of the demographic crisis, when they will be used by increasingly older populations. Therefore, the use of process management methods and techniques is inevitable

when creating e-services, as a precise process analysis of a service allows, among other things, to verify and evaluate subsequent component activities, and to improve them.

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Management of family policy instruments aimed at balancing work and private life - example of Poland

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Abstract

At a time of ubiquitous demographic crisis, family policy issues are becoming increasingly important. The end of the single breadwinner family era and changes in family models have made it necessary to implement instruments that will help to reconcile household duties and professional life. The diversity and multiple dimensions of activities in this area require proper management. The aim of the article is to present both the existing instruments and those that are in the process of being initiated, aimed at achieving a balance between professional and family life in Poland and to indicate the main problems in managing them.

Keywords: Public Management, Family Policy, Life Balance

Introduction

The demographic and economic changes in the family model, which have been observed for several decades now, not only in Poland, but in most countries in Europe and around the world, determine the directions of changes in family policy. The roles of individual family members are changing, as are their needs and expectations. As a result, new challenges are emerging for public authorities and modern family policy, requiring a series of measures and decisions, which in turn are implemented using specific instruments. These measures must be properly coordinated and managed. Their execution is the responsibility of the entities in power, including the legislative authorities, and their implementation is usually entrusted to public administration bodies at central and local government level. In a situation where there is a lack of proper management in the area of family policy and the state's actions for families constitute only a set of various solutions supporting families, it is obvious that reversing unfavourable demographic trends and facing new problems becomes impossible. This is particularly unfavourable in countries where there is no coherent strategy, long-term planning in this area and where responsibility for family policy lies with numerous institutions, supervised by different bodies, between which there is no uniformity of objectives and expenditure for specific tasks. In other words, public management in the area of family policy is not carried out properly.

Today, unfavourable demographic changes, combined with more difficult access to resources, cause a number of other problems that arise, among others, in public finances, pension systems, health systems and the labour market. In order to meet the challenges, thoughtful action is needed on a number of fronts, aimed in particular at increasing fertility rate in the long run. However, procreation decisions are determined by a number of factors, which include, in particular, the financial situation of families, having their own home/flat, the stability of employment and the access to services necessary to raise a child. It is therefore extremely important to implement legal, organisational or technological instruments and solutions which could support the balancing of work and private life and facilitate raising children.

The aim of the article is to present the existing instruments, but also those that are in the process of initiation, aimed at achieving work-life balance in Poland, to indicate the main problems in managing them and possible solutions. The article uses mainly descriptive and comparative methods. Moreover, numerous statistical data, reports, results of inspections of public institutions were analysed, allowing to achieve the objective and draw conclusions. The study can be of particular interest to theoreticians and practitioners in the field of public management, public policies and can inspire professionals in

the technology sector to create tools supporting remote work that is desired by employees and indicated by them as an aid to achieving a "life balance".

Strategic documents and legal acts of international and domestic character regulating family policy in Poland

The implementation of tasks within the framework of specific public policies, including family policy in the European Union countries, takes place taking into account the general objectives, outlined in strategy papers functioning at different levels – from international to local – and respecting basic rules, principles, methods and tools of public management [see: Yang, Huang, 2020].

Family policies, depending on the model that has evolved over the last decades and depending on traditions, needs, financial resources, social approach as well as the expectations of families, are conducted in various ways [see: Eydal, Rostgaard, 2018]. Within the European Union, family policy and the management of its instruments are left to the Member States, with significant support of EU legislation [see: I. E. Kotowska, 2010, p. 59-78.]. The countries belonging to the European Community must therefore comply with the general guidelines contained in the strategy papers. Community regulations have been included in the Lisbon Strategy, the Europe 2020 Strategy as well as in numerous directives and communications. In particular, the provisions of the Europe 2020 Strategy in the section on social inclusion emphasize the need to act for the benefit of family and children in such areas as education and health care. On the other hand, in connection with the efforts to ensure the stability and competitiveness of the economy, there are also demands for active labour market policies, including those related to ensuring work-life balance and conditions allowing participation of both parents in the labour market. Issues concerning the functioning of the family and its members have also appeared in documents aimed at implementing the UN Agenda for Sustainable Development 2030 [Sustainable Europe 2030].

From the point of view of the subject matter of the study, it is important that on June 13, 2019, the European Union countries adopted the Directive on work-life balance for parents and carers [Directive (EU) 2019/1158], and the Member States have 3 years to implement the legislation. The Directive aims to increase women's participation in the labour market by, among others, providing parental leave for fathers, which will give them the opportunity to bond with their children and to become more involved in caring for children after their birth. The assumption is that women will not be burdened with so much unpaid work and will therefore theoretically gain more time for paid employment. This is also intended to help reduce the gender pay gap. The Directive applies to all workers with both employment contracts and other employment relationships, including part-time employment contracts or employment relationships. In addition, the regulations also apply to fixed-term employees, persons employed under a contract with a temporary employment agency or having an employment relationship with such an agency. The current Directive provides for an individual right to four months of parental leave, two of which will not be transferable to the other parent. If the father decides not to exercise this right, the unused leave is forfeited. The Directive aims to harmonise the work-life balance standards in all Member States and stipulates that each country must provide for at least four months of parental leave which can be taken by both mother and father. An additional support in the implementation of the objective of equal opportunities for women and men in the labour market is the implementation of regulations concerning paternity leave. According to the regulations, it is to be at least 10 working days during the period of the birth of the child and it is to be paid at least the amount of national sickness benefit. Another novelty in the "life-balance" directive is the introduction of care leave, the main purpose of which is to facilitate labour market participation for men and women with caring responsibilities. Such leave shall be a minimum of five working days throughout the year, but Member States may decide whether it may be taken in parts, depending on the specific case.

There are many legal acts in Poland which regulate issues related to family policy in its broadest sense. The multiplicity and diversity of definitions of the concept of family itself[1], or family policy, needs to be clarified each time. This article assumes that a family is "two or more persons who are bound together as husband and wife, as jointly living partners (cohabitants) – persons of the opposite sex or – as parent and child" [Households and Families, Demographic Characteristics, p. 21]. Family policy, on the other hand, is considered from a broader perspective and defined as actions taken by the state also in areas not directly related to the family, but which have an indirect impact on its functioning. Instruments that facilitate balancing of work and private life are further regulated by other legislation, including in particular those relating to social security and employment issues [Act of 13 October 1998; Act of 25 June 1999; Act of 26 June 1974].

Among Polish strategy papers, the *Długookresowa Strategia Rozwoju Kraju. Polska 2030. Trzecia fala nowoczesności* [*Long-term National Development Strategy Poland 2030. The third wave of modernity*] deserves attention [Resolution No. 16 of the Council of Ministers of 5 February 2013]. The document assumes an increase in the fertility rate to 1.70 in 2030. In 2018 it amounted to 1.435, in 2017 to 1.453, while in 2016 the rate measuring the average number of children per woman was 1.357 [Population. Size and structure and vital statistics in Poland by territorial division in 2018]. This rate is unsatisfactory, as it is assumed that its value must fall between 2.10 and 2.15 to guarantee simple generation renewal. In *the Long-term National Development Strategy*, the directions of intervention were identified, related to, among others, providing real support for families, large ones in particular, and promoting fertility through reducing costs related to care and upbringing of children, especially those resulting from combining professional career with family life. In this area it is proposed to introduce a number of new organisational and legal solutions and to enable their widest possible use. They include in particular the development of flexible forms of organized child care services of various duration, the development of home care and schooling, the development of multifunctional facilities providing multilateral services to young children and their parents, the development of care services for several families and institutional care services for children under 3 years of age. Reducing costs associated with childcare consists also in improving the availability and quality of care and educational services for children in kindergartens and schools, as well as the use of financial instruments to promote professional activity, inter alia in the tax and family benefits systems [Long-term National Development Strategy Poland 2030, 2013]. Importantly, from a management point of view, these elements are not linked to specific implementation actions, either in this strategy or in the medium term strategies [Coordination of family policy in Poland, 2015].

Issues related to family policy and instruments supporting life balance are also reflected in regional voivodeship development strategies, regional social policy strategies, and strategies developed at the local level, such as social problem solving strategies. Legal regulations clearly define which strategy papers are to be created and implemented in local government units [see: Szczudlińska-Kanoś, Peter – Bombik, 2016a, 2016b]. However, there are many imperfections in these strategies. The errors concern the diagnosis of problems that are specific and characteristic of particular communities. There is also a specific selectivity and focus on certain categories of families, while ignoring and skipping the problems of other categories. Some imperfections, related, among others, to the selection of indicators of achievement of objectives, which are not always practical, are also worth noting. Moreover, it happens that during the course of the strategy, mainly due to changes in the needs and requirements related to social and economic development of communities, new papers are created. Previous objectives and targets remain unrealized. It is also impossible to evaluate them. Although in

[1] The most important Polish legal acts relating to the notion of the family are the following: Constitution of the Republic of Poland of 2 April 1997, Journal of Laws of 1997, No. 78, item 483, as amended; Act of 25 February 1964 – Family and Guardianship Code, Journal of Laws of 1964, No. 9, item 59, as amended; Act of 23 April 1964 – Civil Journal of Laws of 1964, No. 16, item 93, as amended; Act of 17 November 1964 – Code of Civil Procedure, Journal of Laws of 1964, No. 43, item 296, as amended; Act of 28 November 2003 on Family Benefits, Journal of Laws of 2003, No. 228, item 2255, as amended; Act of 12 March 2004 on Social Assistance, Journal of Laws of 2004, No. 64, item 593, as amended; Act of 9 June 2011 on Family Support and Foster Care System, Journal of Laws of 2011, No. 149, item 887, as amended;

local government units most of the activities do not go beyond the statutory obligations, a number of local initiatives and programmes are often noted, which not only aim at social support for families, but also help to reconcile professional work with raising children. These include various workshops, conferences, trainings, but also the organisation of care and educational services for the youngest.

Polish instruments facilitating life-balance – current state and vision for the future

In recent years, Poland has seen a significant development of family policy and instruments which facilitate the functioning of families with children. Among other things, maternity leaves have been extended and numerous changes in their rules have been made, parental and paternity leaves have been introduced, the possibilities of using child-care leaves have been modified, and the provisions on social security contributions in the case of taking child-care leave have been changed. Financial benefits for children have been implemented, tax reliefs for families with children have been modified and mothers (in special cases fathers) who raised a minimum of four children have been given the possibility of collecting the minimum pension. Moreover, in Poland, after meeting the income criterion, various social assistance benefits for giving birth and bringing up children are available. Since 2011, the availability of education and care services has also improved, although there are still huge shortages in this area. From the point of view of the subject matter of this article, only the family policy instruments that have the greatest impact on work-life balance have been analysed in detail. In particular, parental leaves, education and care services and the rights of employees raising children will be presented

Referring to the EU requirements of 2019, most of the above expectations were already met in Poland when the directive was announced.

In Poland, maternity leaves have been extended continuously since 2007. Initially, the length of maternity leave for single birth was 20 weeks. Between 2010 and 2014, an additional maternity leave was introduced, which was gradually extended – from 2 to 6 weeks, and in 2013 a new type of parental leave of up to 26 weeks was introduced. Currently, maternity leave after single birth is 20 weeks. Afterwards, parents are entitled to 32 weeks of parental leave. If a parent declares from the beginning to take 52 weeks, the monthly benefit amounts to 80 percent of the base pay received in the last 12 months. If declarations are made for subsequent periods, the monthly benefit for the first 26 weeks of maternity leave amounts to 100 percent of the base pay, and in subsequent months – 60 percent. For the first 14 weeks, with exceptions, it is the mother who is obliged to take the leave. The rest can be taken by the father on the same terms. Leave can also be taken together by both parents, but then the periods add up. While on parental leave, it is possible to work for the employer granting this leave for no more than half of the full time. Where a worker expresses his or her wish to work, parental leave is granted for the remainder of the working time and proportional extension and payment applies [see: Maternity and paternity leave in the EU].

Irrespective of the maternity and parental leave, the father has the exclusive right to take paternity leave. This leave is up to 2 weeks and can be taken within 24 months after the birth of the child. It is paid in 100 percent.

After the end of parental leave, both the mother and the father can take child-care leave. It is an unpaid leave, but after meeting the income criterion, a parent can apply for a social welfare allowance for raising a child. The child-care leave, with exceptions for disabled children, is 36 months and can be taken up until the child turns 6. It is important that, within this period, 1 month is allocated to the other parent only, without the possibility of transferring it.

Importantly, from the moment of pregnancy until the day of childbirth, and later throughout the whole period of maternity, parental and child-care leave, a female employee is protected by the Labour Code and, apart from exceptional cases, cannot be dismissed from work. Women employed on civil law contracts or when a contract ends during pregnancy or maternity leave, have the

employment relationship extended until the day of childbirth, which, with a few exceptions, makes it possible to take the childbirth leave.

In addition, after the birth of a child, a woman returning to work is entitled to a breastfeeding break, the number and time of which depend on the number of children fed and the number of hours of work per day. Parents can also take the so-called childcare days – 2 days or 16 hours in each calendar year for both parents together, without giving any reason for absence from work, until the child turns 14. These days are 100 percent paid. Without the consent of the employee caring for a child up to the age of 4, overtime, night work, intermittent working hours or posting away from the permanent workplace are not permitted.

The law also regulates sick leave for employees in the event of a child's illness. In general, for the care of a sick child under 14 years of age, both mother and father can use a maximum of 60 days together. However, when a sick child over 14 years old requires care, the allowance lasts a maximum of 14 days. The amount of the care allowance is 80% of the basis of the allowance, which usually equals 80% of the employee's average monthly salary. Employees with children can also use the tax relief for children when submitting their annual tax return, by which the amount of income tax due for the year can be reduced.

In terms of the availability of child care and educational services, clear progress has been made for several years now [see: Report from the Commission to the European Parliament, 2015]. In 2011, Poland introduced the Act of 4 February 2011 on Care for Children under the Age of 3 [Act of 4 February 2011], under which, at present, care for children under the age of 3 can be organised in the form of a nursery, children's club, or it can also be taken by a day carer and a nanny. Following the introduction of this law, both the number of institutions providing care services and the number of places in these institutions have increased significantly. In 2011, there were 571 institutions providing such services with a total of 32,053 places. In 2017 there were as much as 4271 institutions and 111,348 places [see: Report of the Council of Ministers]. There were also changes in the pre-school education prevalence rates for 3-year-olds, which in the school year 2018/2019 amounted to 77.9%, for 4-year-olds – 89.4%, for 5-year-olds – 95.0% [www.eacea.ec.europa.eu].

The instruments presented above are only of a signalling nature, as there are a number of other support, schemes, reliefs and benefits that may help to combine household and professional duties. There are also new ideas that are being considered for implementation in the future.

The political parties currently in power, responsible for the development and management of family policy instruments, also see a need to support both the parents and the employers. The current electoral programmes include a number of new solutions that can be introduced in the future. In particular, it is proposed to take action to close the gender pay gap by introducing new legislative solutions. Major employers are to be required to conduct payroll surveys every two years in order to detect and prevent unjustified bad practices. An obligation to publish reports on equal pay by the largest companies is also to be introduced. In order to create a parent-friendly working environment, solutions will be implemented allowing to combine professional activity with child raising, making it easier to work remotely. In particular the employee being a parent of a child aged 1-3 will be added to the catalogue of cases in which the employer must approve the employee's application for teleworking, work with the use of new technologies, provided that the nature of work allows to perform it outside the employer's premises. Technological and IT innovations that could be applied in the above mentioned situations are therefore important. On the other hand, the state is to support employers in creating so-called company nurseries and kindergartens. Support will primarily consist in easing the procedures for obtaining permits to open such facilities [Law and Justice Programme 2019]. Despite significant improvements in the availability of childcare services, it is still necessary to increase the number of places in nurseries and kindergartens, nursing homes for seniors, including day care homes and day care centres. It is proposed that nurseries, kindergartens and schools should be accessible only to vaccinated children and vaccinations should be free of charge [Civil Coalition Programme]. Care should also be extended to older children and it is therefore expected that every primary school will provide free and professional extra-curricular care for students until their parents

return from work. In addition, it would be helpful to create the possibility of reducing working time by one hour for parents bringing up children under 10 years of age and commuting children to school or kindergarten [Electoral Programme of the Polish People's Party].

The promotion of a family partnership model and a fair distribution of roles in childcare should be supported, among others, by promoting paternity leave and guaranteeing two months of paid parental leave specifically for fathers [Electoral program of the Democratic Left Alliance Electoral Committee]. As far as leaves are concerned, it is also proposed to guarantee one of the parents the possibility to work part-time for 12 months after the parental leave and pay them the additional amount of PLN 1,000 to the salary collected during that time, regardless of the form of employment [Electoral Program of the Polish People's Party]. There is also the idea that sickness benefit for pregnant women, which is currently financed by the employer as sick pay for 33 days, should be financed from the beginning by the Social Insurance Institution (ZUS) in order not to expose employers to additional costs[Civil Coalition Programme].

Summary

In recent years, Poland has seen a significant improvement in activities for the functioning of families and in terms of supporting parents in combining work with household duties. Numerous laws, programmes, children's benefits, etc. have been implemented. In terms of the funds allocated to family policy in relation to the average salary, but also in terms of family spending in social spending in general, Poland has ranked higher and higher in the European Union over the recent years[www.gov.pl; ec.europa.eu][2]. New concepts, visions, ideas arise. However, there is a problem in managing these instruments. State measures for the family are a set of various instruments and there is a lack of a comprehensive family policy that would translate into a permanent change in unfavourable demographic trends, which in turn causes a number of other socio-economic problems. The measures implemented are institutionally dispersed and the minister in charge of the family does not perform the function of a coordinator of family policy, because legal and systemic solutions, with a few exceptions, do not provide him/her with the power to influence the instruments of family support which are the responsibility of other ministers. The lack of a specific strategic and institutional framework for the management of family policy instruments makes it impossible to define and evaluate the achievement of its objectives. The problems are also evident in financial plans and their implementation [see: Coordination of family policy in Poland, 2015].

In order to reverse unfavourable demographic trends, it is necessary to strengthen family policies and implement solutions that will translate into the achievement of the objectives set. For this to be possible, changes must be made to the management of family policy. It is necessary to create coherent strategy papers of national, regional and local character, which would respond to contemporary challenges. Management at the central level requires integration and inter-ministerial cooperation. It should also not be forgotten that the effectiveness of instruments, both those already existing and those planned for implementation, depends to a great extent on statutory guarantees and stability in their use.

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An Analysis of the Dependence Between Customer's Satisfaction and Loyalty (A Case Study of a Higher Education Service)

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Abstract

The article presents an analysis of the dependence between customer's satisfaction and loyalty, carried out with the use of a case study of an educational service provided by a college of higher education. The goal of the first stage of the study was to identify the qualitative characteristics of the service from the point of view of the student. The second stage consisted in investigating whether there occur differences in the evaluation of the importance of attributes of this service between the examined groups of loyal and disloyal students. The students were asked to evaluate the organization of study courses, distribution of classes being part of the curriculum and available facilitations, to comment on the quality of infrastructure and also to provide characteristics of lecturers. The aim of the third phase of the study was to check whether there exists a statistically significant dependence between the student's loyalty and: *primo* – their readiness to take up studies at university because of some earlier recommendations; *secundo* – their readiness to offer such recommendations; *tertio* – their readiness to again choose the same university. The assessment of the educational service is similar in the group of loyal students and in that of disloyal ones as far as the majority of the analyzed features are concerned. There is a statistically significant dependence between student's loyalty and their readiness to offer recommendations and that of choosing the same university for the second time.

Keywords: Satisfaction, Loyalty, Customer, Service.

Introduction

Clients' requirements still rising. It is indispensable to look for effective ways which will serve to identify and satisfy them. Moreover, the fact that competition is getting stronger and stronger forces companies to take care of their clients on an increasingly high level and to strive for their loyalty. This concerns colleges of higher education, as well. Financial results of educational institutions are more and more often determined by customer loyalty. In order to achieve substantial effects, universities ought to update their corrective actions on the continuous basis within the scope of building relations with customers, checking whether they pursue directions compliant with their customers' demands. In view of the above, identification of the qualitative attributes of the service rendered is gaining an increasingly strong significance nowadays. It is closely followed by measurement of the identified characteristics, which makes it possible to present the level of customer satisfaction within the given attribute of the service and to measure loyalty. The latter is most often conditioned by customer satisfaction and is connected with recommendation of the service.

The aim of the present article is to analyze the dependence between student satisfaction, manifesting itself through a high level of evaluation of qualitative attributes of the educational service and student loyalty, conditioned by systematic use of services provided by the same college of higher education in the long run. In order to accomplish the goal, a multi-stage research was carried out with the application of different methods and tools which enabled to identify the following: 1) qualitative features of the educational service from the point of view of students; 2) possible discrepancies between the groups of examined students, both loyal and disloyal, as regards their assessment of importance of attributes of

the educational service; 3) the existence of dependence between student loyalty and the readiness to take up studies at WSB University as a result of earlier recommendations; 4) the existence of dependence between student loyalty and the readiness to give recommendations; 5) the existence of dependence between student loyalty and the readiness to repeat the choice of the same college of higher education.

Hence, we consider the following hypotheses:

H_1: There is a significant association between student loyalty and the readiness to take up studies at WSB University as a result of earlier recommendations

H_2: There is a significant association between student loyalty and the readiness to give recommendations

H_3: There is a significant association between student loyalty and the readiness to repeat the choice of the same college of higher education.

Satisfaction and Loyalty

Satisfaction is a notion deriving from the Latin words *satis* (sufficient) and *facere* (to make) and means meeting one's expectations. The literature does not provide an unambiguous definition of satisfaction, though. This notion is defined differently depending on individual authors and the scientific domain which they represent. In psychology, the term appears as "the emotional state which ensues in the course of doing something or as a result of achieving a goal" (Skrzypek, 2007). Other definitions feature explanations saying that satisfaction is a sensual feeling connected with consumption, or underlining the subjective dimension of it as well as its gradual formation in the course of successive contacts between the customer and the service. Some definitions put an emphasis on the fact that satisfaction means the whole of the client's attitude towards the product, which manifests itself after consumption has been accomplished or the product has been used (Sobczyk, Lipowski, 2002). Such a definition is reflected also in the norm PN-EN ISO 9000:2006, where customer's gladness can be understood as a feeling which the purchaser experiences upon having used the offer which meets their expectations. Customer satisfaction can be treated as their opinion, too, on the degree of agreement of the transaction with reference to their needs and expectations (Skrzypek, 2002).

One of the basic and most complex models describing formation of client satisfaction is the Expectancy-Disconfirmation Model, according to which, the customer makes and evaluation of the level of their satisfaction, based on a clash of their experiences of the product with the earlier expectations. Thus, satisfaction is "…an emotional answer provoked by the cognitive-evaluative process, in which the consumer compares the perceived features of the product with their own vision of value (the desired state)" (Strobacka, Lehtinen, 2001). If the customer's expectations are met, they feel satisfaction. If, however, the product does not match the customer's earlier expectations, they will feel dissatisfaction. If the qualitative features of the product exceed the customer's expectations, then they feel delight. Regarding the category of "satisfaction", the evaluation of the consumer's experience follows in compliance with certain continuum – from the undesired lack of satisfaction up to the expected satisfaction. The theory of customer satisfaction according to the above-described model is presented in Figure 1.

Customers form their expectations on the basis of their earlier experiences of the product, opinions of third parties (friends, acquaintances, promises from sellers and the competition, etc.). A customer who regularly purchases a given industrial product or a service can be called loyal. They can even raise the level of consumption or recommend the product or the service to other people, independent of actions promoting substitute products or services (Stefańska, 2002). It is glad clients who become regular customers and thanks to good opinions on the product they contribute to building a positive image of the organization and to an increase in its profitability. Loyalty, in the literature dealing with marketing often appears as a category of attitudes or behaviors of purchasers and hence it is defined as the customer's inclination toward using services of the chosen company over a long period of time. Such

attitudes on the part of customers, which are formed as a result of emotional experiences and through their state of awareness, remain subjective feelings raising their individual attachment to products, brands and firms (Wojnarowska, Adamska, 2001).

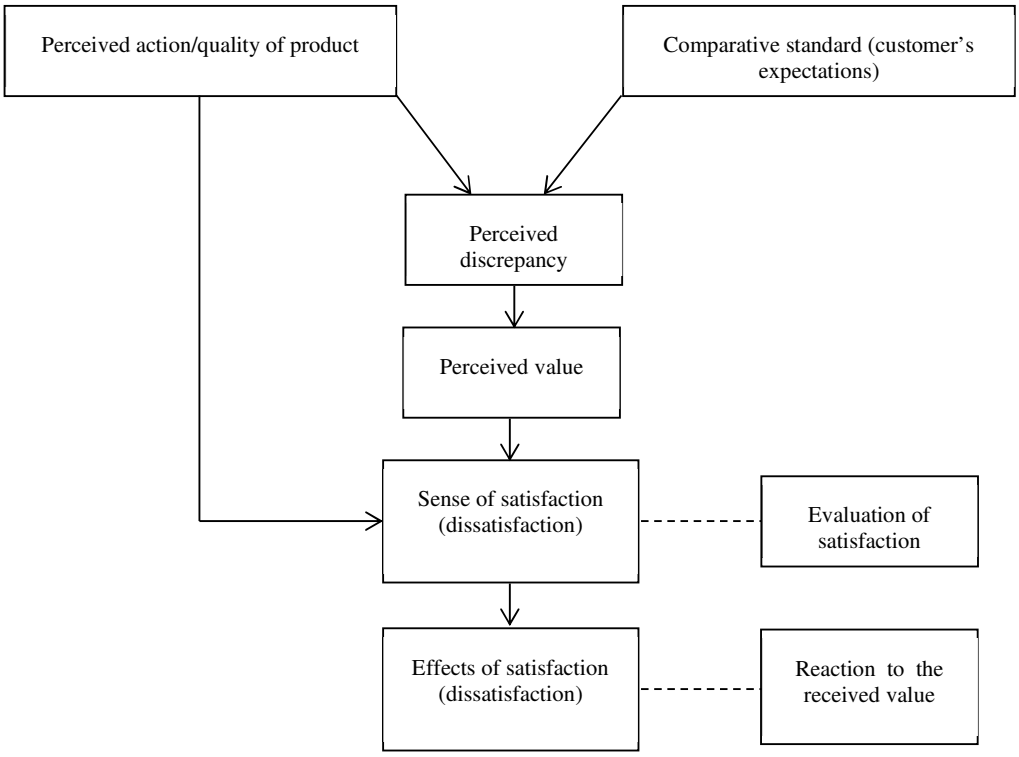

Fig. 1: Theory of customer satisfaction

Source: (Haffer, 2000: 288).

Customers' satisfaction is vital to enterprises of different branches, since it decides their fate, their existence or non-existence in the market, and – as it was mentioned above – to a large extent is deciding in terms of customer loyalty. Similarly, students' satisfaction is important to colleges of higher education not only in view of recruitment of new candidates, but also because of the need to retain students completing the first degree of their studies and to have them pursue their education in study courses of the second degree or post-diploma ones (Appleton-Knapp, Krentler, 2006; Helgesen, Nesset, 2007). As competition in higher education becomes intense, student's satisfaction, and student's loyalty, image of the institution have been widely discussed (Azoury et al., 2014; Balaji et al., 2016; Dejnaka et al., 2016; Psomas et al., 2017; Teeroovengadum et al., 2019).

Kano Method

Kano questionnaire makes it possible to determine individual features/customer requirements as well as references of the these characteristics in the process of perception of quality (Högström et al., 2010; Dominici, Palumbo, 2013). In the majority of cases the perceived quality of the given product or service does not equal the quality that is received.

Kano carried out an analysis of interdependence of customer satisfaction and the quality which is offered. He classified quality attributes of the product into the following categories (Kano et al., 1984):

– *Must be* (M) – they are components which are indispensable to attain satisfaction, a lack of these features causes a drop in satisfaction in customers, while the very presence of them in the product itself will not influence a rise in satisfaction;
– *One-dimensional* (O) – the lack of these attributes results in lowering of the customer satisfaction, whereas their presence causes satisfaction to rise;
– *Attractive* (A) – they are the features which bring a large increase in satisfaction, often deciding with regards to customer loyalty; a lack of attributes of this kind is not of any significance to the customer;
– *Indifferent* (I) – their presence in the product does not cause satisfaction to rise and their lack does not cause satisfaction to decrease;
– *Questionable* (Q) – it is not known when they will become significant to the customer and when their presence can influence a rise in his satisfaction;
– *Reverse* (R) – they are the attributes whose presence brings on customer dissatisfaction, while a lack of them causes satisfaction.

Kano elaborated on a questionnaire which allows determining individual characteristics that are components of the given product and to count them into the given category mentioned above. The respondent gives an answer to questions in two dimensions: 1) the positive one – when the given attribute of a product appears and performs its task, and 2) the negative one – when the defined attribute does not appear or occurs in an unsatisfactory way. Each of the properties of a product is defined by a combination of two replies, which can take five values. As a result, it is possible to obtain 25 variants which are presented in Table 1.

Table 1: Determining the variation of features in Kano method

Feature	**Negative**					
Positive		Like it	Expect it	Don't care	Live with	Dislike it
	Like it	Q	A	A	A	O
	Expect it	R	I	I	I	M
	Don't care	R	I	I	I	M
	Live with	R	I	I	I	M
	Dislike it	R	R	R	R	Q

Source: (Wolniak, Skotnicka, 2008: 144).

It is required that inclusion of the given attributes should be made in the product/service at suitable proportions, both during designing the new product or improving the already existing one. It is vital to be governed by the following principle: the product should contain all the obligatory attributes indicated by the respondents (customers), still the level of these features quality does not have to be the highest possible. On the other hand, in the case of attributes that are expected directly, the level of their quality must be the same or higher than that of products offered by the competition. Attractors, in turn, must reflect the highest possible quality. Only a few attractive features should be chosen and their highest level must be guaranteed. A proper selection of attractive features allows creating a unique product, which results in a competitive advantage (Kano et al., 1984).

On the basis of the highest number of declarations allotted by respondents with regard to the given attribute of the product, one category (A, M, O, R, Q, I) is determined. Such an ordering of attributes makes it possible to develop the appropriate features, that is ones that the customer demands.

Sample and Method

The research was conducted among students of the Department of Economics of WSB University in Opole. For the needs of the examination it was accepted that a loyal student is one inclined toward

systematic making use of services offered by the same university in a long run. A disloyal student – on the contrary – is prone to being persuaded by third parties, like acquaintances or family members; they are interested in offers from other universities which – in their opinions – may turn out better. Loyal students completed their studies of the first grade at the Department of Economics of WSB and pursue their further education in the form of studies of the second degree at WSB. A student who had finished their studies of the first degree at a college of higher education other than WSB University was qualified as a disloyal student.

For the needs of this study, measurement of the effects of satisfaction were made (in compliance with the theory of customer satisfaction presented in Figure 1). The following were examined: readiness to study at WSB University in consequence of earlier recommendations from third parties, opinions delivered (assessment of student's inclination toward offering recommendations) as well as intentions to again choose an educational service provided by WSB University in Opole (assessment of student's inclination towards repeating the choice of the same university).

At the first stage of the research, the technique of "brainstorming" was applied in a group of 20 extramural (weekend) students of the second degree (both loyal and disloyal ones). The examined were requested to point to qualitative attributes of educational service. This method enabled to identify the most important features which, in students' opinions, can be an indicator of the quality of educational services. The results of the first stage of the research were used for elaborating a relevant Kano questionnaire.

Taking into account the above recommendations of Kano method, the authors of this article went on to realize the next phase of the research, in which the respondents-students filled in Kano questionnaire, considering hierarchization of the qualitative attributes of the educational service, which they had identified earlier. That was done in order to qualify individual attributes into the right category of features. The selection of the sample was purposeful and of non-probabilistic character. The survey-based examination covered 218 (76%) students of the first year of extramural studies of the second degree at WSB University in Wroclaw, the Department of Economics in Opole. The respondents attended a lecture being one of the obligatory subjects. The students were asked to evaluate the organization of studies, schedule of classes and facilitations, the infrastructure as well as to give characteristics of the lecturer.

Additionally, the authors made an evaluation of satisfaction (SI) with fulfilment of the given requirement and an assessment of dissatisfaction (DI) with not fulfilment of the formulas given below (Berger et al., 1993):

$$\text{Satisfaction Index } SI=\frac{A+O}{A+O+I+M}$$

$$\text{Dissatisfaction Index } DI=\frac{(-1)(O+M)}{A+O+I+M}$$

The values of SI which are close to 1 mean that meeting the given requirement has a great influence on customer satisfaction. In turn, the values of DI close to 1 mean that not meeting the given requirement has a strong influence on customer dissatisfaction.

Results and Discussion

The technique of "brainstorming" made it possible to extract qualitative attributes of educational service. These features belong to such categories as: organization of study courses, schedule of classes and facilitations, infrastructure and characteristics of lecturers.

The successive phase of the research, which dealt with evaluation of the qualitative attributes of educational service, points to the fact that in the case of most of the analyzed traits this evaluation is similar in the groups of loyal students and disloyal ones (Table 2). It follows from the conducted research that the strongest influence on the student's total satisfaction is exerted by the following: accessibility of lecturers outside classes, the offer by the college of subjects for students to choose and

scheduling of classes in an optimal way. The presence of these components increases the level of client satisfaction to a greater extent than other requirements do. With reference to the customer dissatisfaction index it can be concluded that the lack of information about changes introduced into the schedule is responsible for the highest level of dissatisfaction.

Table 2: Evaluation of the qualitative features of educational service by loyal and disloyal students

Qualitative attributes of educational service	Loyal student			Disloyal student		
	Category	SI	DI	Category	SI	DI
Students' rights and duties are clearly defined.	M	0.44	-0.48	O	0.50	-0.44
Classes are optimally scheduled throughout the day.	O	0.64	-0.26	O	0.62	-0.28
Organization of classes encourages students to be active participants.	A	0.41	-0.21	O	0.50	-0.24
The college offers the possibility of individual curriculum plan/accelerated course of studies.	A	0.46	-0.24	O	0.41	-0.24
The college inform about changes in the schedule of classes.	M	0.34	-0.62	M	0.33	-0.60
Number of people in groups is suitable.	M	0.37	-0.44	M	0.36	-0.46
Contacting individual departments and workers is convenient.	M	0.46	-0.43	M	0.46	-0.47
The college offers subject to choose.	A	0.68	-0.09	A	0.66	-0.16
The college offers paid trainings, workshops.	I	0.34	-0.17	I	0.35	-0.21
The college offers free trainings, workshops.	A	0.56	-0.17	A	0.51	-0.16
Quickness, range and clarity of information given by administrative workers of the college are suitable.	M	0.38	-0.50	O	0.50	-0.38
The college supports students in looking for a job/internship/practice placement.	A	0.56	-0.14	A	0.56	-0.15
Books/journals are available in the college library.	A	0.35	-0.21	A	0.43	-0.23
The college supports students in going abroad to study/serve internship/do practice.	M	0.46	-0.25	M	0.41	-0.36
Classes are held in one building.	O	0.54	-0.26	O	0.50	-0.38
The college provides a suitable number of free parking places for its students.	M	0.48	-0.40	M	0.35	-0.51
The didactic rooms in the college are air-conditioned.	O	0.55	-0.24	M	0.50	-0.36
The college cares for cleanliness in its buildings.	M	0.40	-0.50	M	0.35	-0.57

The college provides access to places of rest between classes.	O	0.54	-0.24	M	0.43	-0.33
The college provides enough computer stations/laptops.	M	0.40	-0.25	M	0.40	-0.40
The college provides access to the Internet.	A=M=O	0.55	-0.27	M	0.46	-0.38
There is a cafe bar/vending machine on the premises of the college.	O	0.61	-0.17	M	0.44	-0.33
There is a photocopy shop on the premises of the college.	O	0.52	-0.30	M	0.46	-0.36
There is a cloakroom on the premises of the college.	O	0.60	-0.15	O	0.53	-0.24
Lecturers clearly define students' duties/obligations.	M	0.40	-0.45	M	0.41	-0.44
Lecturers show a good knowledge of theory.	M	0.31	-0.58	M	0.41	-0.49
Lecturers give good examples from practice.	M	0.49	-0.42	M	0.49	-0.39
Lecturers cover course material preparing students to cope with problems in daily living.	O	0.58	-0.32	O	0.52	-0.32
Lecturers answer questions in an expert way	M	0.48	-0.43	M	0.42	-0.46
Lecturers are communicative.	O	0.51	-0.38	M	0.45	-0.45
Lecurers show a friendly attitude toward students.	O	0.55	-0.38	M	0.48	-0.47
Lecturers allow students to have discussions during classes.	O	0.53	-0.23	O	0.51	-0.27
Lecturers are available to students outside classes.	O	0.64	-0.28	O	0.66	-0.23

At the next stage of the research it was examined whether there exists a statistically significant dependence between student loyalty and firstly – the readiness to take up studies at WSB University (H_1), secondly – the readiness to give recommendation (H_2), thirdly – the readiness to choose the same college of higher education (H_3). The results of the examination (table 3) indicate that there does not occur a statistically significant dependence between student loyalty and their readiness to take up studies at WSB University as a result of previous recommendations from acquaintances or family members (p=0.76). As a consequence, H_1 wasn't supported. It needs underlining that at the same time around 1/3 of the students admitted that studying at WSB University had been recommended to them by an acquaintance of a family member.

Table 3: Loyalty and the readiness to take up studies at WSB upon prior recommendation from acquaintances or family members

Specification		**Did any of your acquaintances of family members recommended to you/others to take up studies at WSB University?**						
		DN	**N**	**RN**	**HS**	**Y**	**DY**	**Total**
Did you complete studies of the first degree (Bachelor course) at WSB University in Opole?	No	4	34	14	7	32	11	102
	Yes	3	39	18	10	28	18	116
	Total	7	73	32	17	60	29	218

where: DN – decidedly not, N – not, RN – rather not, HS – hard to say, RY – rather yes, Y – yes, DY – decidedly yes

The research showed also that 42% of the students who had completed their studies of the first degree at another college of higher education were inclined toward recommending studying at WSB University in Opole (table 4). On the other hand, regarding the group of students who had finished their first degree studies at WSB University in Opole, there were as many as 76% of them inclined toward giving such a recommendation. As a result of the statistical analysis which was carried out, it needs acknowledging that there exists a dependence between student loyalty and the readiness to recommend studying at the same college of higher education (p=0.00; H_2 was supported).

Table 4: Loyalty and the readiness to give recommendation

Specification		**Will you recommend studying at WSB University to others?**						
		DN	**N**	**RN**	**HS**	**Y**	**DT**	**Total**
Did you complete studies of the first degree (Bachelor course) at WSB University in Opole?	No	1	0	35	24	36	6	102
	Yes	0	2	3	23	42	46	116
	Total	1	2	38	47	78	52	218

where: DN – decidedly not, N – not, RN – rather not, HS – hard to say, RY – rather yes, Y – yes, DY – decidedly yes

The examination of the dependence between student loyalty and the readiness to choose the same university showed that 42% of the students who had completed their first degree studies at another college of higher education, if the need arose, would again use the offer of WSB University in Opole (table 5). On the other hand, in the group of students who had finished their first degree courses at WSB University in Opole, as many as 72% were inclined toward using the offer again. It follows from the statistical analysis that there appears a statistically significant dependence between student loyalty and the readiness to choose the university again (p=0.00; H_3 was supported).

Table 5: Loyalty and the readiness to again use the offer of WSB University

Specification		**Would you, if the need arose, use the offer of WSB University again?**						
		DN	**N**	**RN**	**HS**	**Y**	**DT**	**Total**
Did you complete studies of the first degree (Bachelor course) at WSB University in Opole?	No	1	0	18	40	36	7	102
	Yes	0	2	5	25	43	41	116
	Total	1	2	23	65	79	48	218

where: DN – decidedly not, N – not, RN – rather not, HS – hard to say, RY – rather yes, Y – yes, DY – decidedly yes

The multi-stage research enabled to identify the qualitative attributes of educational service, evaluation of its importance and the dependence between student loyalty and the following: the readiness to take up studies following previous recommendations, the readiness to give recommendation as well as the readiness to again choose the same college of higher education.

Conclusion

In this study it was accepted that a loyal customer of educational service is a student to whom the academic offer of the university in the form of study courses of the first degree appeals and satisfies

their expectations, proving attractive enough to make them ready to use the offer of studies of the second degree and then – to further pursue post-diploma studies at the "tested university", independent of offers coming from the competition. Furthermore, they are inclined toward recommending the service they have experienced themselves to others. In turn, a disloyal student is one whose expectations were not met and/or did not experience delight. Such a student is prone to being persuaded by third parties, to being attracted by other colleges of higher education, whose offers (in his/her opinion) may prove better. They are not inclined toward making use of the offer again or recommending the service. One of the ways of winning loyal students is to arrange for their participation in evaluating the qualitative attributes of educational service with the aim to select and group these which are firstly – indispensable, secondly – made conscious and precise, and thirdly – bring delight (are deciding about loyalty to the greatest extent). The technique of "brainstorming" and, basically, Kano Method must be considered to be useful indeed to achieve this goal.

Recapitulating the research that was carried out, it needs stating that loyal and disloyal students, in unison, selected qualitative attributes of educational service of a college of higher education. It follows from the findings that despite the fact that the so-called disloyal students can make comparisons with other colleges of higher education, whereas the loyal ones do not have a possibility of doing so (comparative perception of the importance of attributes), they agreed, as regards qualifying the qualitative features in the scope of organization of study courses, schedule of classes and facilitations, into the appropriate category of attributes according to Kano method (attractive, obligatory, expected directly, etc.). On the other hand, the strongest impact on the total student satisfaction is made by the following: accessibility of lecturers outside classes, offering subjects to choose by the university as well as optimal planning of classes. Their presence increases the level of customer satisfaction to a greater extent than other requirements do. It can be stated that – with reference to the customer dissatisfaction index – a lack of information about changes introduced into the schedule raises the highest level of dissatisfaction among students.

Colleges of higher education ought to pay attention to the fact that attributes of the given service undergo relatively frequent changes for different reasons. The most frequently occurring causes are the continuing growth of customers' (students') expectations. In view of the above-presented considerations, it should be concluded that in order to attain customer satisfaction, a stable increase in the level of services rendered and – in consequence – satisfying client expectations, it is imperative that customers/students should participate in the process of identification and evaluation of the significance of qualitative attributes of educational service, both in the process of its designing and perfecting.

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The Case of The European Manufacturer of Electronic Products – Integration Experiences. Plug & Play Supply Chain Integration Concept - IT Challenge

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Abstract

The paper presents the concept of supply chain (SC) integration by cloud and artificial intelligence (AI) based Plug & Play interface, which could improve the efficiency of SC partners. The case study of the European manufacturer of electronic products was based on an in-depth interview with a purchasing manager with experience in the electronic industry. Despite the enormous technological development of information technology (IT) systems applied in SCs, the level of SC integration is still at a very low level. On the one hand, this is due to the widespread low awareness regarding the untapped potential for improving efficiency through SC integration. On the other hand, there is a strong barrier of human possibilities in the context of the implementation of increasingly advanced and complicated IT systems, as well as high costs of their implementation. Therefore, a cheap and easily available IT tool is needed, which, thanks to the use of AI, will allow overcome human limitations and facilitate the integration of SC partners on a Plug & Play basis. The article is expected to help encourage: (1) software vendors to create a new standard of the cloud and AI based Plug & Play interface giving the possibility for each company all over the world to join an international industrial networking site and integrate its IT system (e.g. ERP with APS) with SCs; (2) focal companies to integrate downstream and upstream, active and passive partners in SCs by implementing the cloud-based Plug & Play interface.

Keywords: Bullwhip Effect, Plug & Play Supply Chain, ERP

Introduction

It is difficult to imagine a modern enterprise without any IT support today. However, the question should be asked whether the currently available technological solutions - IT systems in the context of managing not only the enterprise but SCs are sufficient, and if not, how the development should be directed and what goals should be set for the next decade.

Author will refer to the experience of the electronics industry, describing the case of the meter manufacturer and its experiments related to the supply chain integration (SCI).

Referring to IT systems, the author will focus on strictly logistics-related aspects, excluding areas related to finance, accounting, human resources, etc. which are not directly related to information and material flows in the SC and do not pose so many problems related to timely delivery, inventory management, effective production planning. Of course, financial flows are the fuel of material flows, but their transfer is already very efficient today and is not a problem compared to the allocation of components, which with a strong excess of demand reaches several dozen weeks in the electronics industry. The problem that logistics is really facing is balancing supply and demand. Therefore, one should pay attention to the key problem of "bullwhip effect" widely described by Lee at al. (1997), in push supply chains, and therefore when actual information on final demand is not immediately made available to all participants. This phenomenon means that slight demand changes at the level of the end-customer would increase the order amplitude and shortages upstream the SC. This reason leads to a situation in which, with dynamic market changes, new customer needs, product changes, short product lifecycles, or the components for production are missing and then the company incurs the loss

of sales. Or it remains with overcapacity and excessive inventories, which sometimes need to be scrapped or resold at a loss. The problem is not trivial, because it can significantly reduce the results of enterprises.

Kurt Salmon Associates (1993) estimated that the implementation of ECR (Efficient Consumer Response) was to bring savings of USD 10 billion in the food industry and reduce the inventory cycle by 41% from 104 to 61 days. It is worth adding here that ECR focuses only on the final part of the SC, from the manufacturer, through distribution, to retail. Fuller et al. (1993) confirmed that much of between 75 to 100 billion USD of inventory in the 300 billion USD United States grocery industry sales (per annum) was unproductive - "up to a third of total sales just trapped in the pipeline". Furthermore it was summarized - "In short, logistics are undermanaged. That is the opportunity." Although this reflection took place 30 years ago, it still seems to be right. Despite increased awareness among management and the development of IT systems, integration in SCs is still in its infancy.

In the era of widely available Internet and advanced information technologies, the author is convinced that there is a potential for cost reduction through the integration of information systems of active and passive participants of the SC by using a Plug & Play interface and AI. A proposal for such a solution has been presented in the last part of the work. And while in business practice similar initiatives are undertaken and already bring some positive effects, on the one hand they have very limited industry coverage. Most often they form enclaves of highly integrated business partners who exchange demand information upstream. On the other hand, even they do not provide within the feedback loop - downstream, complete and transparent information about up to date production capacity and how the production order is advanced.

Support of logistics processes by IT systems

Due to the limited scope of this article, the author will refer only to those IT solutions that should support SCI, i.e. primarily ERP II, ERP III, Logistics 4.0 and AI.

ERP (Enterprise Resources Planning) systems focus mainly on internal economic processes and their integration, including product distribution, production and supply planning, as well as finance, accounting, human resources. In turn, "ERP II class system can be identified as one optimizing business processes both internal, and the ones occurring in the company's close environment, by offering ready tools allowing for automation of data exchange with partners along the whole logistic chain" Bejger (2016). Bejger assumes that ERP II "solves a significant part of problems with proper servicing of supply chains" and it guarantees, among others: one source of truth; effective transfer of information; minimizing the time devoted to internal business processes, more resources devoted to customer service; checking variant availability; checking actual availability; generating dynamic BOMs and routings; quick and precise transfer of information to MRP, and further along the SC.

As Parys (2005) notes, the implementation of the integrated system is a strategic decision and the largest IT investment in the entire business of the enterprise. However, in the case of very large IT systems, such as ERP, the percentage of abandoned deployments was as much as 65%, and delayed over 21%. The average delay in implementation on the American market was from 6 to 12 months, and the cost increase was from 50 to 100%. In turn, Morris and Venkatesh (2010) cite studies according to which ERP failures is over 60%, and losses are estimated in the range of USD 6 to 100 million. One can see that the implementation of an ERP class integrated system is very difficult and carries a high risk of failure. All the more so the implementation of an even more extensive ERP II system, which may have modules SRM (Supplier Relationship Management), CRM (Customer Relationship Management), SCM (Supply Chain Management), APS (Advanced Planning and Scheduling), PLM (Product Life Management), SEM (Strategic Enterprise Management) (Adamczewski, 2005), raises the bar. Hence Haddara and Constantini (2017) prove that ERP systems are definitely more flexible and integration-ready than ERP II. In addition, it could be more economically feasible for enterprises to implement separate best-of-breed systems, like CRM or SCM, instead of one large system at once. It is worth mentioning here that the next, even more developed version is ERP III, towards integration between manufacturing enterprises and their downstream partners - mainly customers (also potential),

as well as social groups. The ERP III concept is mainly influenced by SOA (Service Oriented Architecture), cloud computing, business intelligence and knowledge management (Vasilev, 2013). Childerhouse et al. (2011) show that majority of studied organizations (regardless of industrial and business sectors, as well as countries) are "experiencing high levels of uncertainty, and are struggling with the fundamental challenges of removing internal boundaries and communicating order information along the supply chain". They summarize that SCI remains just a dream for many practising supply chain managers with the detriment of themselves and their SC partners.

As Tanajura Ellefsen at al. (2019) note Logistics 4.0 definitions are nebulous and the concept is not homogenous, thus it is already at initial stage of the development. Logistics 4.0 includes sources of data such as smart low battery consuming sensors, GPS, RFID tags, as well as the Internet of Things, drones, and innovative applications, making logistic processes smarter, more connected, automated and robotized, which undoubtedly improves logistic system performance and contributes to improved performance of SCs. The number of papers on Logistics 4.0 in combination with AI in Scopus or WoS by 2018 is only 16 items. Conducted preliminary research in Norway and Poland show that companies are classified as AI Novices. It is also stated that companies are not familiar with Logistics 4.0 solutions as well as they do not take advantage from AI potential.

To sum up, on the one hand the systematic development of IT systems is visible, on the other hand there are huge difficulties with their implementation within individual organizations and SCs. Evidently, the complexity of implemented systems often exceeds human capabilities and the support of AI is definitely needed, which in relation to logistics is only at the initial stage of the development.

Research Methodology

This study is based on a case study. The analysis was carried out on the basis of an in-depth interview with a purchasing department manager in a Polish company producing energy meters. Purchasing manager had almost 25 years' experience in electronic industry and was personally engaged in described below business experiments of integrating supply chain. The respondent played the role of "key informant". At the same time, the "principle in collection of data in case research" was followed using methods such as "direct observations, content analysis of documents, and archival research" (Voss et al. 2002).

Case study

Lost benefits of the energy meter manufacturer in the context of untapped potential of supply chain integration with IT systems and Internet technology support

In the context of the analyzed case, the Polish manufacturer of meters, for which sales depends on the results of tenders, cost management plays a key role. Material costs constitute the largest share among them. Therefore, the ability to obtain components at the lowest possible market costs is a critical condition for survival, especially given the extremely strong competition from the Far East. Thanks to the right purchasing strategy, the Polish producer managed to face Asian competition (Urbańczyk, 2018). It is also worth analyzing how the manufacturer handled logistics processes through the use of computer systems and Internet technology, whether any actions were taken related to SCI and whether were they effective. The audited company uses an integrated ERP management system. The production schedule in the ERP system is not supported by APS and does not provide complete and reliable information in relation to the current state of running production processes. Therefore, in order to check how many pieces are manufactured during the running production order, it is necessary to ask the production department. One can imagine that manual monitoring of hundreds of orders in a large company exceeds the possibilities of human genius. The problem is aggravated when tools or machines fail, when priority orders delay the execution of previously planned ones, when there are problems with the availability of components or semi-finished products, when the demand for products is increased and pressure is put to keep declared delivery times. The resulting chaos is difficult to control, delays

occur in deliveries, and what is worse, the customer is not even notified in advance and it is very difficult to determine a reliable delivery date.

The producer carried out three experiments related to the exchange of data with his suppliers. The first, right at the beginning of this century, was that suppliers were to supplement their inventory data in specially prepared tables available via a web browser. The experiment showed that suppliers supplemented the data sporadically. Entering data manually proved to be too time-consuming and the experiment ended in failure.

The second experiment, which began in 2002, concerned the disclosure of planning data in a web tender application for qualified distributors of electronic components. The distributor who submitted the most advantageous offer had access to information about inventory, submitted purchase orders (approved and sent to him) and planned purchase orders (which, have not yet been sent to him, visible throughout the planning horizon in the ERP system). The data was downloaded from the ERP system once a day and available on-line via a web browser. They were to help the distributor in making decisions when purchasing components with long delivery time so as to secure the manufacturer's needs in the long term. It turned out that the scheduled purchase orders, although subject to relatively low dynamics of changes in the context of quantities and deadlines, on the one hand were not reliable information (lower price could have been offered by another supplier and then the producer was not obliged to purchase the indicated quantities), on the other hand were not transferred directly to the distributor's IT system and hence were only used by him occasionally for decisions related to the creation of stock. In this context, the solution also did not pass the test, especially since the manufacturer did not have the opportunity to verify whether the distributor made the right purchasing decisions in a timely manner, what stock he maintains and what orders he has placed with the component supplier. Ultimately, the web tender application specified a minimum inventory, which the distributor was required to have, for a period corresponding to the production needs in accordance with the delivery time of the component, so usually it was a stock for about three months of production.

The third experiment, carried out in the years 2010 - 2014, involved the exchange of data between the manufacturer's and distributors' IT systems. Once a day (at night), a text file was sent automatically by e-mail, first from the manufacturer to the distributor, which contained all information regarding inventory, placed purchase orders, planned purchase orders (based on planned production orders in the ERP). The text file was downloaded automatically and processed in the distributor's IT system. As a result, a new text file was generated with information about: expected deliveries from manufacturers of electronic components and their current lead time (LT), available inventories for immediate resale, current available inventory dedicated exclusively to the meter manufacturer, as well as being on his way. The generated file was immediately sent by e-mail to the meter manufacturer. After receipt, it was automatically downloaded, and its data were placed in special tables, allowing the generation of freely filtered reports by the manufacturer's supply department employees. The manufacturer's material index was the key linking the manufacturer's and distributor's system data. The implementation cost was negligible, it only required the IT department to prepare e-mail addresses, set up jobs in the system, develop tables and simple algorithms to complete them and create reports. Neither the manufacturer nor the distributor had to hire additional people, and the IT work was carried out by internal IT departments. Unfortunately, the manufacturer lacked another step in the development of the application that would allow for intelligent processing of received data, and therefore the possibility of rapid recognition of LT in the context of customer inquiries for finished products, showing bottlenecks, anticipating the component unavailability issue for future purchase orders and generating alerts. It can therefore be concluded that the third project also ended in failure. Nevertheless, the idea was correct in the context of verification of events in subsequent links in the SC, i.e. distributors and manufacturers of electronic components. The analysis of the reports allowed for ongoing verification whether the distributor maintained the declared volumes of inventories, and above all, well in advance, revealed time gaps between the expected date of delivery of components to the distributor and the planned date of production of meters. Therefore, it gave time to take corrective actions at the current distributor or to organize deliveries from alternative distributors to maintain the flow of meter production. Unfortunately, the necessity to check hundreds of ordered components one by one meant that the

verification was selective and sporadic, thus insufficient, and did not allow for a lasting efficiency improvement.

The meter manufacturer therefore remained with a number of problems arising from the untapped potential of technological possibilities. This is particularly evident in the context of the specificity of the meter manufacturer. Its clients - power plants decide on tenders in which the first delivery of meters usually has to take place within 6 - 8 weeks. While the process of manufacturing of customized components by subcontractors, among others printed circuits, displays, shunts or terminals lasts about 3 - 6 weeks, which, together with a transport time of 4 - 6 weeks from Asia to Europe, makes it impossible to manufacture meters within the required time. Even worse is the issue of ordering electronic components, especially silicon based, whose natural production cycle is a minimum of 8 - 16 weeks, and in situations of increased demand it reaches up to several dozen weeks. In addition to the components delivery times, usually up to 3 weeks is needed to manufacture the meters. In view of such realities, the manufacturer of meters, placing a tender and knowing the date of the tender settlement, in advance, launches component orders so as to purchase them and bring them at the lowest possible cost. This is critically important in the context of a low bidding price due to the very strong competition, especially from the Far East. As a consequence, the manufacturer of the meters bears the risk that the ordered components will remain in stock if the tender is lost. If the tender for a given type of meter is repeated and it is won, then the components are consumed at a later date and the company bears only the costs of storage. Otherwise, components are basically suitable for scrap. Unfortunately, such situations do happen.

Figure 1 illustrates the situation described above, revealing an additional decision option for waiting with the launch of component orders until the tender is resolved.

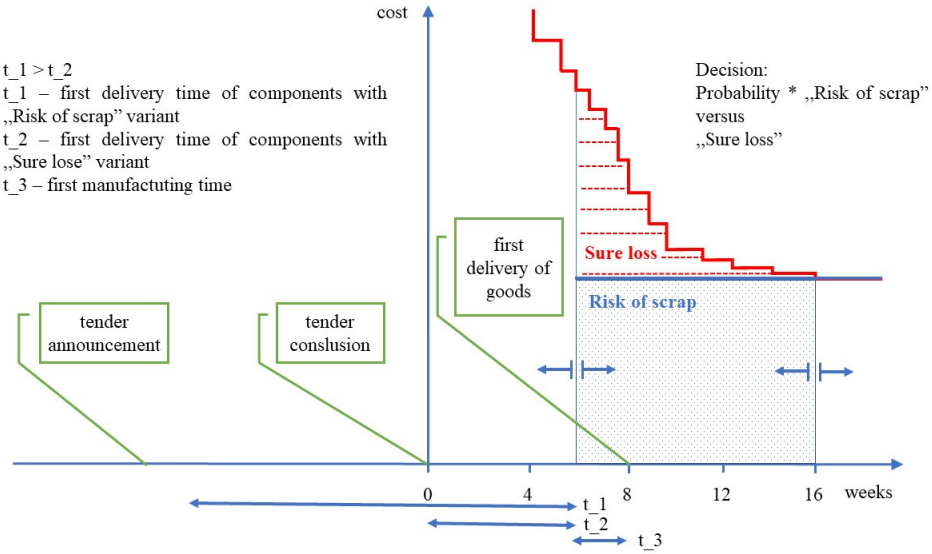

Fig. 1: Trade-off between sure loss and risk of scrap

An additional variant means that the costs of purchasing commodity components are definitely higher due to purchases on spot conditions (electronic components can be up to several times more expensive), while customized ones are slightly higher due to necessary overtime from manufacturers or earlier reservation of production capacity to reduce time delivery. In addition, there are many times higher costs of air transport instead of sea.

In view of the above, two problems are revealed, the first - the manufacturer of meters in practice does not consider the additional option to incur a sure loss for initial deliveries due to the very low sales margin, thus risking the necessity to scrap excessive inventories. This behavior has been explained by Kahneman (2012), a Nobel laureate, who indicates that with high probability of losses, the decision

maker rejects a favorable settlement, showing a propensity for risk seeking. This is economically irrational behavior. When considering the situation of the meter manufacturer, it should be noted that on the one hand, it should analyze both variants. On the other hand, when comparing the results, i.e. a sure loss and cost of scrap (after taking into account the probability of winning a tender), the company should make an economically rational decision, regardless of its emotional attitude. In addition, it would be advisable to configure variants for component types or even individual components, which could further reduce potential losses.

The second problem is that the manufacturer does not have an IT tool to calculate both variants. The purchasing manager is not able to present trade-off in real time in the context of components delivery times and the cost of their purchase. He has the knowledge of LT under normal conditions at fixed prices. These parameters are entered in the ERP system, while LT parameter is not even differentiated in the context of the size of the ordered batch. In addition, any deviations resulting from the dynamically changing availability of production capacity or suppliers' inventories in subsequent links of the chain are no longer visible. Therefore, in order to recognize the real LT, the purchasing department would have to send inquiries to first-tier suppliers, and those to second-tier suppliers, etc. The process of obtaining information would certainly take several days, and at the time of sharing it would be outdated to some extent. The matter becomes much more complicated when additional costs have to be calculated with shortened delivery times. Although the manufacturer would care about gaining every day, obtaining information, identifying bottlenecks and mutual arrangements would take many days. Thus, dynamic consideration of variants, their comparison and creation of different configurations was in practice unattainable.

Only the integration of IT systems of all SC partners upstream, equipped with APS (with monitoring of production processes in real time), through the appropriate interface, gives a chance for effective communication. However, the real challenge for software vendors is the dynamic, without human intervention, introduction into production schedules of additional variants of an earlier production capacity reservation or LT acceleration and their valuation (with the possibility of taking into account previously negotiated conditions). It would also be necessary to include transport services and their dynamic valuation in the context of the selection of different variants.

IT challenge - Plug & Play Supply Chain Integration Concept

Taking into consideration mentioned constraints the new IT challenge appears. There is an opportunity to create the new standard of cloud and AI based Plug & Play interface giving the possibility for each company all over the world to join international industrial networking site and integrate its IT system (e.g. ERP with APS) with supply chains. It should meet several conditions:

- cloud and AI based,
- cost free (source of income for software vendor e.g. from advertising),
- widely available (using Internet, similar to social networking site),
- flexible,
- easy to implement.

Cloud and AI based Plug & Play interface should provide along the entire SC:
- visibility of inventory and available production dates and capacities,
- visibility of current and forecast LT depending on the volume of demand,
- possible variants of capacity reservations, when the demand is unknown (e.g. tenders),
- possible variants of delivery acceleration (shipping or manufacturing),
- possibility to plug in potential participants,
- matching indexes of participants by types, parameters, descriptions,
- possible variants of delivery with active or passive participants,
- cost calculations based on standard or fixed prices,
- possibility of ordering.

Requirements for SC participants would be following:
- sharing inventories and capacities,

- supplying true data in real time,
- sharing price lists of products or services – standard (available for all connected customers) or agreed (only for dedicated customers).

However, the key issue is to disseminate the solution in order to reduce integration costs, and above all through the involvement of all participants of all related industries, to obtain a full dynamically changing picture of the availability of semi-finished products and manufacturing capacity in SCs. Moreover, production schedules of all subsequent participants in the chain would be in line with the final demand at the same time. It is important to ensure interoperability of commonly functioning data formats, so that each enterprise is free to choose the supplier of the IT system. Just as Internet technology had spread around the world, allowing its users to freely use the built-in functions, despite the different web browsers and the vastness of different companies creating websites in different programming languages, so one can imagine that companies that will want to cooperate with each other they will clash together creating a worldwide network of mining, production, distribution, wholesale, retail and transport companies, serving global demand. It can be expected that orchestrators (fifth-party logistics, 5PL) will play an alternative role to the presented concept by providing cloud based IT systems with embedded communication interfaces.

Only the transparency of information and material flows in the production, distribution and transport processes of SC partners in real time would bring milestone in relation to SCM. However Torres and Maltz (2010) state that visibility to market demand is very helpful, but even then, supply chain managers' choices can result in unexpected results. A responsible supply chain manager has to choose not only a strategy (TOC, Kanban, APS, ERP or other), but also inventory targets and a tolerable level of variability in the network. Hence, the role of man would be reduced to connect via a Plug & Play interface with the SC, conducting negotiations, intervening in relation to bottlenecks, parameterizing the system, while artificial intelligence would help man in preparing what-if scenarios and ultimately selecting the optimal trade-off in the context of the delivery time of components and the cost of their acquisition.

Conclusions

In the context of low integration of supply chain partners, and therefore a lack of transparency along supply chains that have the negative consequences of the bullwhip effect, it is necessary to continue the development of IT systems to improve the efficiency of supply chains through their integration. The proposed Plug & Play supply chain integration concept meets this need. Among others, it allows for better risk and cost management in the context of available scenarios of the delivery time of components and the cost of their acquisition, better utilization of production capacity, shortening of purchasing cycles, reduction of production downtime due to stockouts, reduction of excessive inventories and risk of their scrapping. To implement the proposed concept there is a need on the one hand to educate the management in the context of the negative financial consequences of the bullwhip effect (the problem of balancing supply and demand). On the other hand, software vendors should provide widely available, cheap, flexible and easy-to-use cloud-based Plug & Play interfaces using AI to improve the efficiency of supply chains through their integration.

Will software vendors and supply chain leaders see the benefits of such a configured supply network, maybe in a slightly different way? This question remains unanswered, especially since the most technologically advanced automotive industry is mainly focused on integrating flows with first-tier or at most second-tier suppliers, as mentioned by Harrison et al. (2014) in case study about smart cars. Sakuramoto et al. (2019) note that automakers integrating with second-tier suppliers tend to have higher profit margins. Unfortunately, while first-tier or possibly second-tier suppliers work in a pull system, the upstream suppliers in subsequent links still work on the basis of a push system, based on forecasts and exposed to the economically negative consequences of the bullwhip effect. Since car manufacturers, due to the advantage of their bargaining power, have already shifted the burden of maintaining inventory and responsibility for timely delivery of components to first-tier suppliers, will see the benefits of integrating the entire supply chain?

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Emerging Topics in Sustainable Management Research: Management and Economic Perspective

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Abstract

The aim of the study is to identify and explore emerging topics in the sustainable management research field. The research process is driven by the two following questions: (1) are the topics attracting the most of the academia's attention still up-to-date issues? (2) what are the emerging topics of research inquiry in the field? Keywords co-occurrence analysis of bibliometric data retrieved from Scopus points out the following emerging topics: supply chain management, solid waste and recycling, life cycle assessment, climate change and sustainable tourism.

Keywords: Sustainability, Sustainable Management, Bibliometrics, Keywords Co-Occurrence Analysis.

Introduction

Over the last decade, sustainability has become a field of interest for researchers (e.g. Heinberg, 2007; Rainey, 2008; Brown, 2011). Growing attention concerning sustainability issues implies increasingly strong legislation, international environmental management standards, appearance of new responsibility metrics and reporting standards etc. These circumstances force enterprises to adopt different ('greener') approaches not only to retain their licence to operate but also to remain competitive. Sustainability incorporates three dimensions (or value categories): environment, society, and economy, which are otherwise known as People, Planet, and Profit (Porras, 1992). Thus, nowadays the business is increasingly focusing on incorporating a triangle of economic, environmental and social dimensions while making ethical management decisions about corporate growth and development (Łapińska et. al., 2019; Liczmańska-Kopcewicz et al., 2019). In times of such challenges as global warming, pollution and the depletion of natural resources, increasing carbon emission etc., all organizations need to learn how to reduce, reuse and recycle to protect the planet while taking care of society and maximizing profit at the same time. The above mentioned issues constitute a research field of sustainable management. Sustainable management adopts the sustainability idea and synthesizes it with the concepts of management. It means creating the ability to keep a system running without depleting resources, maintaining economic viability as well as nourishing the needs of the present and future generations. In consequence, sustainable management covers many areas and aspects. It refers to applying sustainable practices in the field of businesses, agriculture, society, environment, and personal life by managing them in a way that will benefit current and future generations (Leone & Belingheri, 2017).

The aim of the study is to identify and explore the emerging research topics in the sustainable management research field. Due to the background and research interest of the authors, the study is conducted from the perspective of management studies and economics. The research process is driven by the two following research questions: (1) are the topics attracting the most of the academia's attention still up-to-date issues? (2) what are the emerging topics of research inquiry in

the field? In the research process we employ the method of keywords co-occurrence analysis, which has been found to be effective in mapping neighboring research fields such as e.g. sustainability (Guo, et al., 2017) or the concept of sustainable enterprise / sustainable organization (Lis, 2018).

Theoretical Grounding

Several researchers in the field propose the expression 'sustainability management' in terms of integrating three above said sustainability dimensions into business practices. Starik and Kanashiro define sustainability management as "formulation, implementation, and evaluation of both environmental and socioeconomic sustainability-related decisions and actions" (Starik & Kanashiro, 2013, p. 12), referring to the previous works of Elkington (1998), Stead and Stead (2004) or Bell and Morse (2008). In a similar vein, Hörisch, Freeman and Schaltegger (2014) claim that sustainability management refuses the idea of separating ethical issues from business as the concept does not perceive business and ethics as conflicting but as fundamentally interconnected. They point out that an enterprise does not create economic value simply as an end in itself but also delivers value added back to the whole society. Also Schaltegger and Burrit (2005) argue that sustainable management requires companies to provide an important contribution toward sustainable development of both the economy and the society. Given the above explanations of sustainable management, we can state that the core of the concept is going beyond maximizing short-term profits and instead focusing on long-term gains by creating synergies and mutuality between different interests of business, society and the environment (Hörisch et al., 2014). The holism of the analyzed concept is highlighted by Starik and Kanashiro (2013) who conceptualize sustainability management as a systematic approach towards long-term quality of life improvement.

A growing interest of the academia in exploring the issues of sustainable management is confirmed by the amassing scientific output collected in bibliometric databases. As of 25 January 2020, we retrieved 1,663 Scopus-indexed publications comprising the phrase 'sustainable management' in their titles (Title Search). Extending the scope of search to include titles, keywords and abstracts (Topic Search) brought 11,022 bibliometric records. A similar query conducted in the Web of Science Core Collection database resulted respectively in 1,336 items for Title Search and 8,642 items for Topic Search. What is more, in the 2010s high dynamics of the increase in research production in the field has been observed.

Nevertheless, growing research production in the research field focused on sustainable management has not been profiled and mapped through bibliometric studies. In order to validate that the identified research gap in the body of knowledge really exists, we scanned publications related to sustainable management, indexed in Scopus and Web of Science Core Collection databases. We searched for the following combination of phrases: Title Search ('sustainable management') AND Topic Search ('bibliometric' OR 'bibliometrics' OR 'scientometrics' OR 'informetrics'). As a result of the query, we retrieved 6 items from Scopus and 5 from Web of Science Core Collection (which were duplicates of records indexed in Scopus). One of the retrieved items (Regolini et al., 2013) appeared to relate to library studies, and management of resources of electronic periodicals in particular, rather than sustainability issues. All the remaining publications focus their attention on bibliometric analysis of some specific aspects of sustainable management e.g. sustainable management accounting (Zyznarska-Dworczak, 2018), ecosystems e.g. cork oak (Leal et al., 2019), areas e.g. roadside verges (Bautista Rodriguez et al., 2018), resources e.g. metals (Aznar-Sánchez, Velasco-Muñoz, García-Gómez, & López-Serrano, 2018) or wastes e.g. mining waste (Aznar-Sánchez, García-Gómez, Velasco-Muñoz, & Carretero-Gómez, 2018). It means that the sustainable management research field, considered as a whole, has not been yet mapped with the use of bibliometric methodology, which indicates a research gap. Contributing to filing the discovered gap is the motivation of undertaking this study.

Method of study

Research sample

Scopus was the source of bibliometric data retrieved for the purposes of the sampling process. We searched for the phrase 'sustainable management' in the titles, keywords and abstracts (Topic Search) of publications categorized within the subject areas of Business, Management and Accounting, and Economics, Econometrics and Finance. No limitations regarding the date of publication were imposed. We retrieved 919 bibliometric records (publications), distributed over 20 subject areas. Certainly, Business, Management and Accounting (with 578 publications), and Economics, Econometrics and Finance (459) are the most often represented subject areas. However, they share numerous publications with other subjects areas, among which the most prominent are: Environmental Science (403), Social Sciences (377), Agricultural and Biological Sciences (173), Engineering (155) and Energy (105). The earliest publication dates back to 1992. Nevertheless, in the 1990s, only a few publications were issued every year. In the 2000s, the number increased up to several items per year. The dynamics of growth in research production in the field has been observed in the 2010s – the number of items increased from 38 in 2011 up to 137 in 2019. The majority of the research output is made by journal articles (77%), and is written in English (96%). The detailed parameters of the publications comprising research sample are provided in Table 1.

Table 1: Parameters of the research sample

Category	Items (occurrences)
Date (year) of publication	2020 (16); 2019 (137); 2018 (112); 2017 (94); 2016 (69); 2015 (78); 2014 (61); 2013 (47); 2012 (44); 2011 (38); 2010 (42); 2009 (27); 2008 (25); 2007 (22); 2006 (23); 2005 (15); 2004 (11); 2003 (11); 2002 (12); 2001 (7); 2000 (4); 1999 (7); 1998 (4); 1997 (2); 1996 (5); 1995 (2); 1994 (1); 1993 (2); 1992 (1)
Subject areas (overlapping)	Business, Management and Accounting (578); Economics, Econometrics and Finance (449); Environmental Science (403); Social Sciences (377); Agricultural and Biological Sciences (173); Engineering (155); Energy (105); Decision Sciences (57); Arts and Humanities (33); Computer Science (31); Earth and Planetary Sciences (18); Materials Science (12); Medicine (7); Chemistry (4); Multidisciplinary (4); Psychology (4); Chemical Engineering (3); Mathematics (3); Biochemistry, Genetics, and Molecular Biology (1); Nursing (1)
Document type	Article (708); Conference Paper (66); Book Chapter (55); Review (42); Book (29); Editorial (7); Short Survey (4); Note (2); Letter (1); Undefined (5)
Language	English (880); Spanish (12); Portuguese (11); German (9); French (8); Russian (3); Chinese (2); Lithuanian (2); Ukrainian (2); Romanian (1); Undefined (1)

Source: Own study based on data retrieved from Scopus (25 January 2020).

The retrieved publications include in total 5,466 author and index keywords. Among them, there are 4,262 expressions which occurred only once. Thus, using the formula provided by Donohue (1974; as cited in: Guo et al., 2017, p. 7), we calculated the number of high-frequency keywords (92) and identified a relevant threshold of minimum number of occurrences (10). This threshold is achieved by 106 keywords to be taken for further analysis.

Research Methods and Instruments

In the research process we employed the method of keywords co-occurrence analysis (He, 1999). The process of analysis was supported with the use of VOSviewer software, developed by the researchers of the University of Leiden, the Netherlands (van Eck & Waltman, 2010, 2018). The parameters of VOSviewer used for analysis are presented in Table 2.

Table 2: VOSviewer parameters used for analysis

Item	Characteristic/ value
Type of analysis	Co-occurrence analysis
Unit of analysis	All keywords
Counting method	Full counting
Method of normalization of strength of the links between items	Association strength method
Layout	
Attraction	2 (default setting)
Repulsion	0 (default setting)
Clustering	
Resolution parameter (detail of clustering)	1 (default setting)
Minimum cluster size [N]	1 (default setting)
Merging small clusters	Switched on
Visualization	
Scale	2.00 (Fig. 1), 1.20 (Fig. 2)
Weights	occurrences
Labels size variation	0.00 (Fig. 1), 0.50 (Fig. 2)
Maximum number of lines	1000
High frequency keywords used for analysis [N]	106
Minimum occurrences of a keyword used for analysis [N]	10

Source: Own study with use of VOSiewer (25 January 2020).

Results Presentation

Identifying High Frequency-Keywords in The Research Field

We used the item density visualization function of VOSviewer to recognize the most prominent keywords in the research field representing the leading topics attracting the attention of researchers (cf. Figure 1).

Figure 1: High-frequency keywords in the sustainable management research field

Source: Own study based on data retrieved from Scopus and analyzed with the use of VOSviewer (25 January 2020).

Taking into account the number of occurrences (i.e. the number of documents in which an item is reported) as well as standard weight attributes i.e. links and total link strength, the following expressions are found to be the most prominent keywords in the research field: 'sustainable development', 'sustainable management' and 'sustainability'. As explained by the van Eck and Waltman (2018, p. 5), "For a given item, the Links and Total link strength attributes indicate, respectively, the number of links of an item with other items and the total strength of the links of an item with other items". The top 10 high-frequency keywords in the field and relevant bibliometric data (the number of occurrences and links, total link strength, the average year of publication) are provided in Table 3.

Table 3: Top 10 high-frequency keywords in the sustainable management research field

Keywords	Occurrences	Links	Total link strength	Average publication year
sustainable development	307	105	1159	2013.96
sustainable management	255	101	902	2014.98
sustainability	168	98	528	2013.17
decision making	52	82	262	2013.92
environmental management	49	76	237	2014.57
waste management	46	69	263	2015.33
fishery management	37	32	106	2012.86
biodiversity	36	54	130	2012.89
ecotourism	34	36	106	2011.62
economics	33	63	194	2012.91

Source: Own study based on data retrieved from Scopus and analyzed with the use of VOSviewer (25 January 2020).

In general, the top 10 high-frequency keywords should be considered as mature taking into account the average publication year (ranging in 2011-2015). 'Waste management' (2015.33) is the newest one among them. It means that the expressions characterized by the highest number of occurrences, i.e. manifesting the topics attracting the most of the academia's attention, can hardly be recognized as up-to-date issues. Therefore, in the second step of the study, we used the average publication year as the category to rank the high-frequency keywords in the research field in order to map emerging research topics.

Visualizing Publication Date of High Frequency-Keywords in the Research Field

We used the overlay visualization function of VOSviewer to identify the most up-to-date keywords representing emerging topics in the research field (Figure 2). As explained by the designers of the VOSviewer application (van Eck & Waltman, 2018, p. 9), in overlay visualization scores are assigned to bibliometric items used for analysis. Using the date of publication as such a score, the map visualizes the average publication date for each item (keyword). The colors in the map range from blue (representing the earliest publications) to green and yellow (visualizing the newest publications).

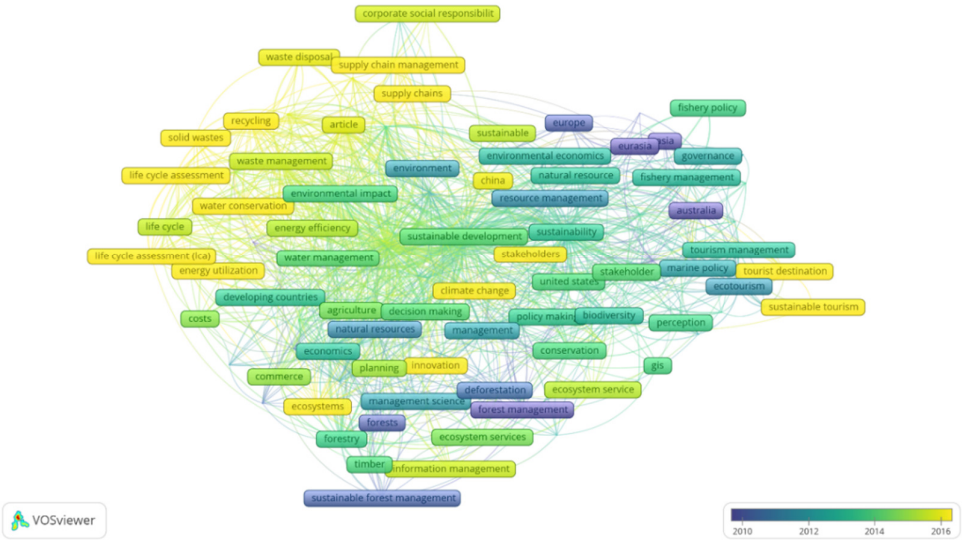

Figure 2: Average date of publication of high-frequency keywords in the sustainable management research field

Source: Own study based on data retrieved from Scopus and analyzed with the use of VOSviewer (25 January 2020).

Among the high-frequency keywords, the following expressions are found to represent the most up-to-date average year of publication (2017.00 and beyond): 'supply chains', 'solid waste', 'risk assessment', 'supply chain management', 'sustainable tourism'. They are followed by 10 other expressions with the average publication year ranging between 2016.00 and 2017.00. All these keywords may be considered as indicators of emerging topics within the research field. Their detailed bibliometric characteristics are presented in Table 4.

Table 4: Bibliometric characteristics of the most up-to-date keywords in the sustainable management research field (sorted by date)

Keyword	Average publication year	Occurrences	Links	Total links strength
supply chains	2017.64	11	32	62
solid waste	2017.44	16	33	86
risk assessment	2017.33	12	31	54
supply chain management	2017.33	15	31	70
sustainable tourism	2017.00	12	9	18
water conservation	2016.92	12	32	86
recycling	2016.88	32	58	211
energy utilization	2016.67	12	27	50
life cycle assessment (LCA)	2016.62	13	36	103
climate change	2016.50	22	41	83
innovation	2016.16	19	29	60
efficiency	2016.12	17	41	85
stakeholders	2016.10	10	17	23
life cycle assessment	2016.07	14	38	105
tourist destination	2016.00	11	19	45

Source: Own study based on data retrieved from Scopus and analyzed with the use of VOSviewer (25 January 2020).

Discussion

The data presented in Table 4 point out five keywords that we consider as worth noticing among emerging research topics, i.e.: (1) 'supply chain management', (2) 'solid waste and recycling', (3) 'life cycle assessment', (4) 'climate change' and (5) 'sustainable tourism'. These keywords, recognized as the emerging topics, prove the complex but at the same time holistic nature of sustainable management. In recent years, implementing sustainability issues has become a major concern for organizations' policies along their supply chains. Also the academia has shown enormous interest in the field of supply chains as confirmed by data presented in Figure 2, pointing out the leading keywords in the sustainable management research field. As already mentioned, a focus on sustainable management means anticipation of future consequences resulting from today's decisions and activities. Given contemporary challenges concerning climate changes, resource depletion, environmental pollution etc., modern supply chain management forces companies to incorporate economic, social and environmental dimensions (Seuring, 2013; Seuring & Müller, 2008) along the whole supply chain. In turn, in recent years the academia has shown growing interest in sustainable supply chain management that interlinks the concepts of supply chain management and sustainability (Pagell & Wu, 2009). It has been already recognized that supply chains are dynamic systems still evolving towards more sustainable practices. However, while following the works related to incorporating sustainability into supply chains, one can easily find out several research driven by different subthemes such as: environmental management and, decision making approach, supplier evaluation and selection, risks management, reverse logistics. The problems concerning supply chain management are directly related to another topics attracting the most of the academia's attention nowadays which are solid waste and recycling. The phrase 'solid waste' refers to the useless, unwanted and discarded materials resulting from day to day activities in the community. Solid waste management is explained as the activities comprising the control of generation, storage, collection, transfer, processing and disposal of solid waste. Recycling means separating, recovering, and reusing components of solid waste that may still have economic value. The academia's interest regarding recycling is related to the fact that being a process of converting waste materials into new materials and objects, recycling can help save lower greenhouse gas emissions that is so important today. Nowadays, while the world population grows, the solid waste generation increases as well. Taking into account societies' increasing awareness and concern about the environment, the need for sustainable waste management, including recycling becomes a priority of the 21st century. However, the proper management of solid waste requires an appropriate technology that is economically affordable, socially accepted and environmentally friendly. Collection, transport, treatment as well as disposal of solid wastes, particularly generated in medium and large cities, have become difficult problems to solve for those who are responsible for their management. As noted by several researchers, there is a relationship between public health status and proximity to waste management areas. It has been recognized that sometimes residents of nearby areas suffer from diseases, such as cancer (Rabl et al., 2008; Deacon et al., 2009; Ranzi et al., 2011). Hence, another significant dimension of a sustainable waste management system is societal acceptance (Handakas & Sarigiannis, 2012).

The findings regarding the newest keywords in the studied research field confirm that issues related to life cycle assessment and climate change attract academia as well. It is worth noticing that all above said pathways (supply chain, solid waste and recycling, life cycle assessment and climate change) are closely related to environmental issues. **Life cycle assessment** (LCA) is a holistic approach to environmental interactions, which covers a range of activities, from the extraction of raw materials acquisition, the production and distribution of energy, through the use, and reuse as well as waste management (McManus & Taylor, 2015). McManus and Taylor (2015) highlight that sustainability policies around the globe are increasingly turning to LCA to guide difficult decisions and select between technology paths. This results from the fact that LCA is a relative tool designed for helping decision makers compare all major environmental impacts when choosing between alternative courses of action. The aforementioned authors present the scope of use for LCA, claiming that it may be effectively applied not only by the business sector but also by policy makers. Moreover, they emphasize the changing nature of LCA by examining its evolution and pointing out the future directions of the approach development as well as emerging challenges.

The fourth topic recognized as emerging in the field of sustainable management refers to climate change. **Climate change** is one of the most challenging issues faced by mankind in the 21st century. What is important, the assessment of the causes and impacts of climate change goes beyond a single component, sector, field, or discipline. Hence, the issues of economic development and growth as well as climate change are closely related. Economic growth results in resource consumption and creating more and more pollution. On the other hand economic development can promote the popularity of low-carbon and energy-saving technologies. In turn more capital is applied to the clean sectors. Technological progress enables companies to enhance energy utilization efficiency and reduce the discharge of carbon dioxide. Additionally, it has been observed that economic growth accelerates the optimization of the industrial structure and the energy consumption structure (Ma & Jiang, 2019).

As argued by Hafezi et al. (2018), the processes of mitigating and managing the concerns related to climate change, should be considered as a whole system with the inclusion of its wide range of components across social, environmental, organizational, and conceptual boundaries. The impacts of climate change are also considered from the perspective of tourism. Thus, it is not surprising that the last of the topic areas identified as emerging in the research field is sustainable tourism. **Sustainable tourism** is defined as all forms of activities, management and development of tourism aimed at preserving natural, economic and social integrity and ensuring maintenance of natural and cultural resources (Niedziółka, 2012). The research on sustainable tourism is closely linked to the problem of climate change caused by carbon dioxide emissions. As noted by Lenzen et al. (2018), tourism's global carbon footprint has been constantly increasing. Therefore, due to its high carbon intensity and continuing growth, tourism will constitute a growing part of the world's greenhouse gas emissions. This phenomenon implies the change of researchers' interest from the question how climate change will alter tourism into the direction regarding the impact of tourism on climate change and general environmental protection.

Conclusions

Concluding, the study has identified and explored emerging topics in research on sustainable management. Thanks to applying the analysis of co-occurrence of high-frequency keywords in the research field combined with their time distribution and total links strength, five areas have been identified as emerging topics: 'supply chain management', 'solid waste and recycling', 'life cycle assessment', 'climate change' and 'sustainable tourism'.

The keywords recognized as the emerging topics confirm multifaceted and holistic gist of sustainable management. It is a multidimensional concept that limits economic growth to the capacity of nature for self-regeneration as well as places respect for human conditions and environmental quality. Consequently, the idea of sustainable management implies redefinition of several issues referring to decision-making along supply value chains, redefinition of predominant patterns of doing business, redefinition of the relationship between human beings and nature as well as creating social wealth and equity. The study raises awareness of possibility to balance fundamentally divergent requirements related to economic, social and environmental dimensions in the process of development and value creation. The identified emerging topics are interrelated and point the important research trends allowing to ensure that human activities will not erode land, air or water resources. Such research pathways as supply chain management, management, life cycle assessment, climate change or sustainable tourism focus on sustainable use of renewable resources, elimination of harmful materials and technologies, reducing global warming etc. which is nowadays necessary for meeting three-dimensional imperative of sustainable management. The study builds up the added value for the research practice through indicating emerging topics of scientific inquiry related to sustainable management from both management and economic perspectives. Its originality derives from employing bibliometric methodology based on keywords co-occurrence analysis, which has not been done before.

We are aware of the limitations of our study. First of all, the study employs only one research method which may be considered as a weakness. Secondly, the research sample includes publications indexed

in only one bibliometric database – Scopus. We are aware that relying on one database may result in some biases, for example the bias towards publications written only in English. In order to mitigate the aforementioned limitations, in further research it is recommended to employ other research methods to ensure triangulation and increase objectivity of the research findings and replicate the study with the use of data retrieved from other bibliometric databases. Among implications of our study and problems inspiring for further research we point out the issues of sustainable production and consumption allowing to do more with fewer resources. This is related to another significant research pathway referring to technological advances and innovation supporting sustainable management, e.g. applying IT revolution in sustainable management. Furthermore, the research on sustainable infrastructure, energy efficiency and renewable energy seem to be of high importance due to contemporary climate change challenges. Finally, the study inclines to pay research attention to science and policy interface focused on an integrative approach to addressing the contradictory context of economic, social and environmental aspects that can build on their synergies while alleviating their trade-offs.

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The Importance of Investment Consumption in the Deconsumption Behaviourof Polish Consumers

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Abstract

The article describes one of the latest trends in the area of consumption, namely investment consumption. Its assumptions stem from the new culture of consumption which is redefining a person's wellbeing based on non-material values, including the requirements of attending to his/her health and image but also the positive relations with society and the natural environment. The basis for these changes in behaviourresult from moving away from the traditional to the pro-investment system of values. In such an approach there is a changed perception of a human being in the category of social capital, which is subject to investment through educating and increasing skills, as well as creating the conditions required for the protection of health and prevention based on observing the appropriate rules of consumption. Thus work becomes an important source of that capital when treated not as an obligation but an opportunity for self-development.Activities regarding protection of the environment, especially those concerning pro-ecological behaviour defined as investment, guarantee the future development of this capital and provide the basis of deconsumption behaviour, thus becoming the alternative in respect of the values of consumption itself. A consumer interpreted in this way becomes a part of the ecosystem and protects instead of degrading it.The author provides examples from her own research conducted in 2018 using the method of a diagnostic survey applying the technique of a questionnaire to 504 respondents, and qualitative research using the technique of an in-depth interview (IDI) on 56 residents from five regions (voivodeships) in Poland:dolnośląskie, łódzkie, śląskie, lubuskie and opolskie. The aim of the research was to verify the research hypothesis concerning the influence of independent variables such as age, education and economic status, etc. on the preferences of the specific system of values and modes deconsumptionbehaviour.

Keywords: Investment Consumption, New Culture of Consumption, Life Values, Creating The Identity of the Individual.

Introduction

Investment consumption is one of the latest trends in consumption and involves investing in the individual through consumption. The era of consumerism has severed the ties between the economy, culture and human personality; D. Bell called them the axial principles and values which govern individual subsystems. Instead of dedicating the present to the future, we abandon the future for the present. Concentration on status symbols indicated by hedonism is in Bell's view catastrophic, because no culture can be created on the basis of instant gratification (Bell, 1994). The discussion conducted with that author (see: Aldridge, 2006) does not always condemn pleasure as failure of contemporary consumerism, but can view it as it as a motivator stimulating consumer creativity. Consumption interpreted in this way opens up a new era in consumer behaviour based on the culture of consumption which treats it as an investment in the future, and also a contemporary mechanism of control by society.Researchers linked consumption with investment using a certain semantic construction, in which they include not only education but also health protection, leisure and rational nutrition (Bywalec, 2017). In economics, endowing a personwith characteristics of capital is the consequence of profit and loss account but according to some researchers this does not reveal the numerous complexities of a creative nature (Czetwertyński, 2019).The issue of the mechanistic approach in economics to the concept ofHuman Capital was also pointed outby others (Tomer, 2019).The research on investment in education and other kinds of human capital were criticised for omitting aspects related to consumption (Becker, 1990). Contemporary HC shows a tendencyto migration within the global labour markets which does not allow for the return on investment in its

country of origin. However, transfer of skills between countries may influence thegeneration of external effects (Dustmann, and Glitz, 2011). Unfavourable trends in globalisation at the end of the 20th century resulted in the appearance of the category of social capital on the borderline between economics and sociology, constituting the outcome of interactions which are not only economic but also social. The benefits internalised by society become an asset, and the used resources bring about the effect of synergy (Łobocki, 2019).

The new culture of consumption is connected with revaluating the approach to human wellbeing and redefining its axionormative system. The traditional approach to consumption was dominated by a hedonistic attitude which assumed that a person's wellbeing was dependent on personal possessions and the acquisition of material goods (Patrzałek, 2019). The results of research on human wellbeing (M. Ryan, J. Czapiński, M.Zawadzka and others) imply that it grows under the influence of such non-material values as self-realisation, health, satisfactory social relations and a positive self-image of the individual (Czapiński, 2004).Positive social relations have a significant impact on personal wellbeing. Investment in social relations through consumption is linked witha sharing economy. The fact of sharing means that consumption becomes a form of cooperation (Bell, 2014). Research results suggest that the level of sharing consumption in Poland remains relatively low. However at this stage it is difficult to determine whether this results from the wish to limitconsumption in order to make it sustainable or from the motive of frugality which isa characteristic of developing countries (Rudawska, 2016).

Traditional and Pro-investment Systems of Valuesin Polish Society

The research conducted by theauthor in 2018 regarding the deconsumptionbehaviour in the sample of 504 respondents residing in the dolnośląskie, łódzkie, śląskie, lubuskie and opolskievoivodeships (regions) analysed their axionormative systems.It is used a quantitative method based on a standardized survey technique. Field studies were conducted by sociology students of the University of Wrocław as part of research workshops.The research sample was based on deliberate sampling and quota sampling depending on gender, age, marital status, education, number of persons per household, economic status of the respondent in recent years, net income per household member per month and the place of residence.

The results of the author's research, similarly as with data from the Public Opinion Research Centre (CBOS) in Poland, suggest that Polish society favours traditional values headed by the attachment to the family happiness (82.5% of responses). This was followed by values of a decidedly pro-investment nature such as health (74.9%), work (41.6%), education (23.1%), professional career (19.3%), and by having children – social investment – (18.9%). It is characteristic that protection of the environment was ranked slightly higher (9.4%) than consumption (8.4%), which can suggest the competitiveness of the values of the new consumption culture, linked with wellbeing and quality of life rather than with material possessions, see Figure1.

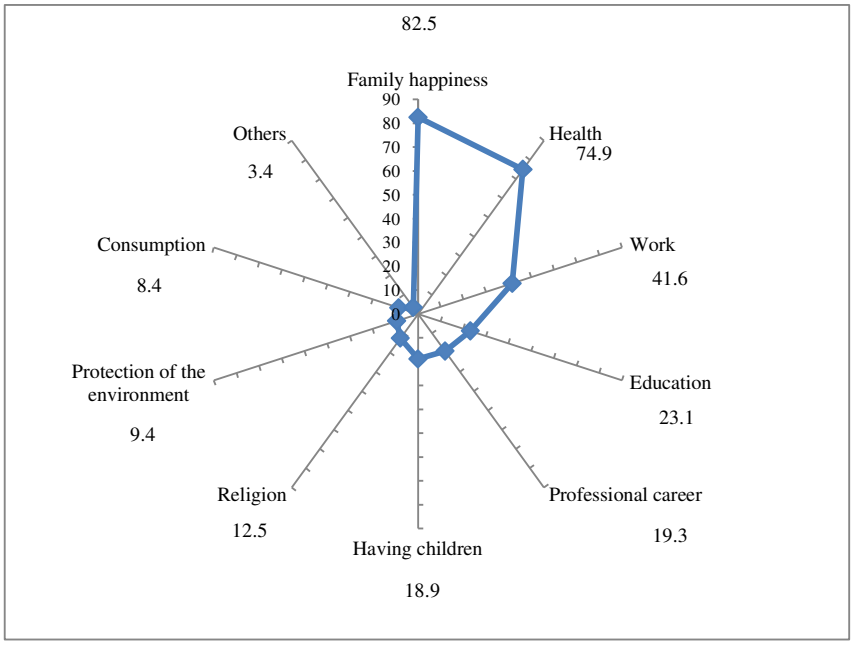

Figure 1: Importance of values in respondents' lives in %, N=504.

Note: the answers do not add up to 100.0% because the respondents indicated their three most important values.

Source: own research.

Importance of Investment Consumption for the Respondents

The system of values is connected with shaping certain attitudes, hence the research analysed the importance of investment consumption for respondents who mostly treat it as 'important' (41.1%), yet more frequently only as 'important' (30.8%) rather than 'very important' (10.1%). This was followed by the preferences which are neutral towards investment consumption, termed as 'neither important nor unimportant' (30.8% of responses), whereas it was classed as 'rather unimportant' (17.7%) and as 'definitely unimportant' (7.2%), see Figure 2.

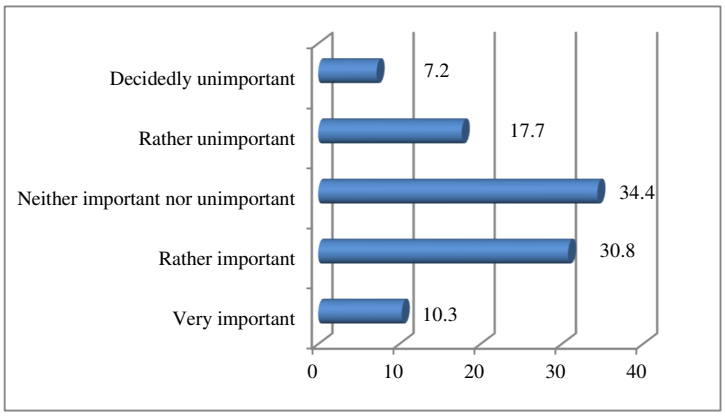

Figure 2: Importance of investment consumption for the respondents in %, N=504.

Source: own research.

The author posed in her own research hypothesis H1stating thatage of the respondentsinfluence the importance placed on investment consumption.. This is very importantfor the persons from the middle age group 36-40 (14.5% of responses) and those aged 31-35 (14.0%) and younger (21-25,

14.3%). Investment consumption is fairly important for persons of a mature age (41-45, 43.2% of responses), older (46-50, 42.5%) and younger (26-30, 39.7%), see Table 1.

Table 1:Importance of investment consumption depending on the age* of respondents

Importance of investment consumption	Age				
	18-20	**21-25**	**26-30**	**31-35**	**36-40**
Very important	3,6%	14,3%	8,8%	14,0%	14,5%
Rather important	20,0%	29,7%	39,7%	28,0%	30,9%
Neither important nor unimportant	30,9%	37,4%	36,8%	24,0%	25,5%
Rather unimportant	29,1%	9,9%	7,4%	30,0%	25,5%
Definitely unimportant	14,5%	7,7%	7,4%	2,0%	3,6%
Total	100,0%	100,0%	100,0%	100,0%	100,0%

Importance of investment consumption	Age				
	41-45	**46-50**	**51-55**	**56-60**	**61-65**
Very important	4,5%	8,9%	12,8%	10,7%	
Rather important	43,2%	42,2%	41,0%	17,9%	15,0%
Neither important nor unimportant	38,6%	26,7%	33,3%	35,7%	45,0%
Rather unimportant	9,1%	15,6%	5,1%	32,1%	25,0%
Definitely unimportant	4,5%	4,4%	7,7%	3,6%	10,0%
Total	100,0%	100,0%	100,0%	100,0%	100,0%

**% of the respondent's age group*

Source: own research.

Investment consumption by generating social capital is today the basis of social well-being.Social capital, as a multidimensional concept, refers to interpersonal relationships, a sense of security, and trust in public institutions. People who have more significant resources of social capital become healthier and happier [11]. Therefore, according to H1, social capital, being the basis of investment consumption, requires shaping in the long-term perspective, and its significance seems to increase with age.

The Dilemma: Current Consumptionor Saving

In respect of the dilemma of current consumption or investment in the future, the respondents more frequently opted for current consumption (35.3% of answers), but also for various forms of investment seen as providing for their old age (28.8%), investment considering the needs of their growing children (22.7%), and investment in the future aimed at maintaining their current levels of consumption (20.5%). A significant percentage of the respondents indicated their inability to save up for their future (16.2%), see Figure 3.

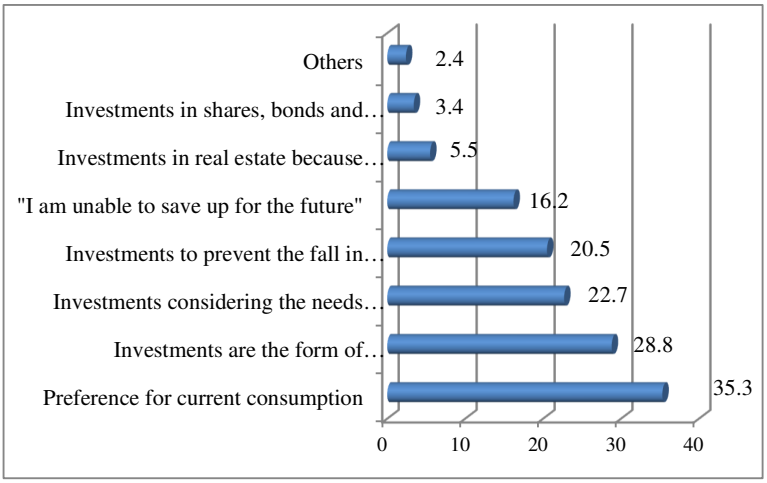

Figure 3. Dilemma of current consumption or investment in the future in the opinion of respondents in %, N=504.

Source: own research.

The author stated in the research hypothesis H2 that the dilemma of current consumption or saving up depends on the respondent's education.Formulating this hypothesis resulted from the earlier considerations according to which an attitude towards saving depends on the course of the process of socialization and education.

The resolution of the dilemma of current consumption or saving for the future which resultsin the lack of savings skillsfrom the inability to save up was most frequent among respondents with primary-school education (25% of responses), followed by those with a secondary-school general education (24.6%) and vocational schooling (21.9%). It was least frequent regarding the respondents with a Bachelor's degree (7.7% of responses) and a Master's degree (9.5%), as shown in Figure 4.

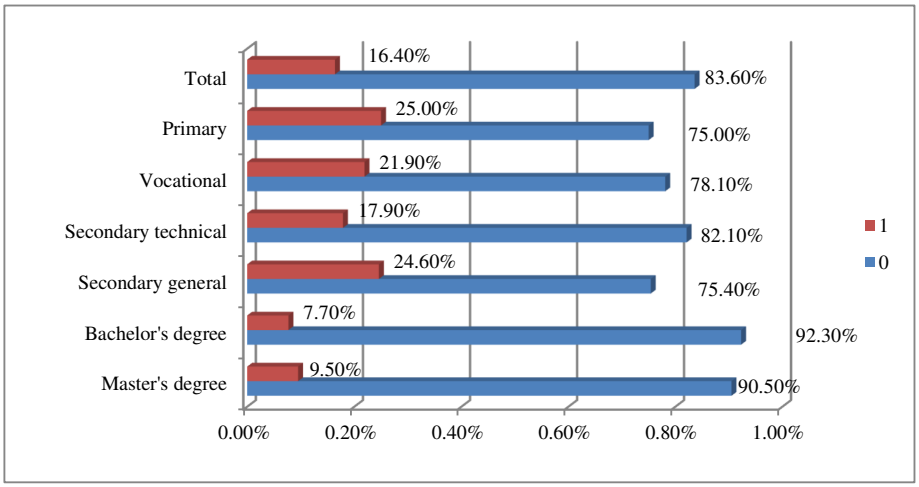

Legend: 1 – future investment, 0– current consumption.

Figure 4: Dilemma of current consumption or investment in the future – "I cannot save up for the future" * and the respondent's age*% of the age group, N=504.

Source: ownresearch

The other hypothesis, H3, posed in the research stated that resolving the dilemma of current consumption or saving which results in the lack of savings skillsfrom the inability to save up depends on the economic condition of the respondent's household.

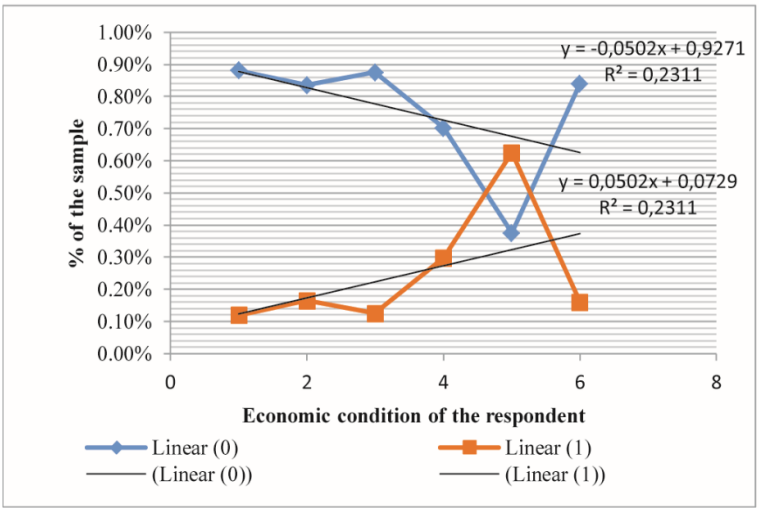

Figure 5: Dilemma of current consumption or investment in the future – "I cannot save up for the future" * and the economic condition of the respondent's household, *% of the economic condition, N=504.

Legend:

Scheme: y – the lack of savings skills, x – economic household'c condition, Linear 1 – future investments, Linear 0 – current consumption.

Source: own research.

The research confirmed the hypothesis regarding the dependence of the ability to save up in the dilemma of current consumption or investment in the future on the economic condition of the respondent's household, shown in the linear function y=0.050x+0.072. Usually resolving the dilemma ofcurrent consumption or saving up for the future which results from the inability to save up applied to respondents whose economic status 'deteriorated significantly' (62.5% of responses) or 'rather deteriorated' (29.8%). The lack of this ability to resolve the analyzed dilemma applied to a lesser degree to those respondents whose economic conditions 'rather improved' (16.5% of responses) or 'decidedly improved' (11.9%), see Figure 5.

The results of the earlier studies carried out by the author also suggest that among the internal factors having the greatest impact on decisions about saving made by households is the level of their income, while among the external factors it is the level of prices (Patrzałek, 2013).

Investment Consumptionas the Creation of Social Identity

Currently, investment consumption is becoming an instrument in creating the identity of an individual within a social strata, and at the same time it determines individual strategies of activity since a personality built with the lack of a clear hierarchy of values becomes internally incoherent. The proliferation of such a model of personality is the consequence of global changes, especially in connection with the development of techniques of virtual communication which exclude traditional methods of socialization (Riesman, 1971).The development ofglobalization and consumer culture meant that we are faced with a reversedsocialisation in which a younger generation creates new rules leading to a devaluation of traditional authority (Welskop, 2019). New forms of investing in oneself appear in this context as a kind of a 'coinvestment' (combining consumption and investment) in the individual capital of the personality, as well as in the case of individuals who are privileged within the scope of this investment such as the children of the respondents. In the author's own research, the respondents included among such modes of behaviour the following:

1. investing in one's education,
2. developing one's competences,
3. investing in the skills and education of one's children,

4. learning foreign languages,
5. taking part in training courses and developing one's competences,
6. investing in beauty care and personal health,
7. active tourism.

Resolving the dilemma of current consumption or investment in the future, considering the needs of one's growing children, depends on the age of the respondent.This was mostly indicated by the respondents aged 46-50 (33.3% of responses) who opted in this dilemma for investing in their children's future, followed by those aged 31-35(30% of responses), and the 51-55 age group(28.2%), see Figure 6.

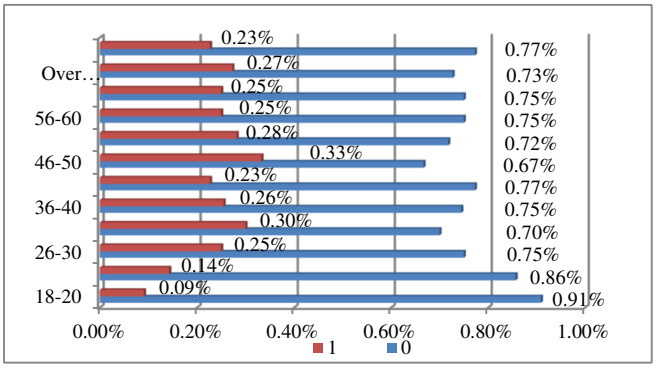

Legend: 1-future investment, 0- current consumption.

Figure 6: Dilemma of current consumption or investment in the future* considering the needs of one's growing childrenand the respondent's age*% of the age group.

Source: own research.

The dependence shown in resolving the dilemma of current consumption or investing in the future considering the needs of one's growing children is linked to the category of the respondent's age and takes on the form of the function of y=0.009x+0.180 where R2=0.249. Although this is not a strong dependence, a growing trend is shown in the groups of middle-aged and older respondents for whom the process of their children growing occurs, see Figure 7.

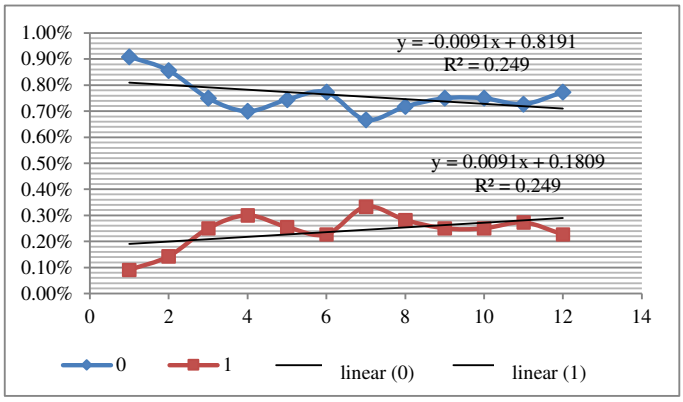

Discriptions:
Scheme: y- indications for the need of adolescent children, x- respondent's age
Legend: Linear 1- future investment, Linear 0- current consumption.

Source: own research.

Figure 7: Dependence in resolving the dilemma of current consumption or investing in the future* considering the needs of the growing children on therespondents age*% of the age group.

Conclusion

In conclusion it should be stated that investment consumption ought to generate growth of social capital and therefore aims to the highest degree at improving relations between the humankind and the environment both on the macro scale, i.e. the broadly interpreted natural environment, and on the micro scale – the social strata. Indicators of social capital in respect of internalized values have an influence on consumer behaviour concerning the development focused on self-realisation and continuous education, but are also based on the acceptance of non-material values as being most important in the creation of individual identities improving human beings' relations with their nearer and further environment, constituting new communities of collaborative consumption. Free advice, the inclusion in the local space of ill and lonely people, care for abandoned and hungry animals and green areas covered with litter, all provide new dimensions of consumption based on mutual obligations which rebuilds trust in the humanity lost in consumerism. One of the most important generators of consumer behaviour is the rise in importance of the value of health which often used to be associated with older age. The research shows that independently of the individual's age, the relation with health has become a determinant of the quality of life. The use of special diets unrelated to age, education and income has become one of the most important indicators of individual wellness. However, the influence of education on social capital is difficult to assess, especially regarding its consequences in respect of social trust, because they do not include the self-supporting mechanisms and impact of other channels of communication. Most of the empirical works point out the positive influence of age on the level of social trust, yet the alternative results do not show a homogenous outcome because they assume a concave relation between social capital and age. The process of ageing at first increases, and then decreases social capital, hence investments in social capital decrease monotonically with age (Becchetti and Michletti, 2008).

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The Potential and Results of Innovation Activities in Ukraine: A Regional Section

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Abstract

The estimation of innovative potential and efficiency of innovative activity of industrial enterprises of Ukraine in the regional dimension is carried out on the basis of modern statistics using the cluster analysis method. Features and tendencies of financing of innovative activity are considered. Dynamic series of R&D expenditures as a percentage of the Gross Domestic Product across Ukraine and the EU and corresponding trend models are constructed. Structural mismatch of financing of innovative activity in Ukraine is emphasized both by sources of financing and European practice.

Keywords: Innovation Activity, Innovation Potential, Efficiency of Innovation Activity, Clustering.

Introduction

In the contemporary conditions, the competitiveness of economics of the country and regions is largely determined by the innovative activity of domestic enterprises. In the achievement of the aforementioned important role is played by the formed innovative potential of business entities and the degree of its realization in the direction of achieving a high level of efficiency of innovative activity. Considering that the region's position in the innovation activity of the country depends on many factors having both economic and spatial origin, we emphasize that assessing the correspondence between the levels of innovation potential and the efficiency of innovation activity, as well as finding ways to optimize them, are important tasks for ways to reach world standards in the field of research and ensure the competitiveness of economics.

Research Results

In order to study the peculiarities of innovative activity of domestic enterprises in the regional context, we used the method of cluster analysis. Clustering allows you to split a sample of objects (in our case, such a sample is a plurality of regions of Ukraine) into relatively homogeneous subsets (clusters) that include similar objects. For analysis, we have formed a set of features by which the innovation activity of the regions of Ukraine was evaluated.

Indicators that allow to characterize the innovation activity of enterprises in each of the areas can be divided into two groups. The first one included those that allow us to assess the potential of

innovation, namely: the number of innovatively active industrial enterprises, the cost of innovation, the gross cost of R&D, the number of employees involved in the implementation of R&D. The second group combined indicators that show the effectiveness of innovation activity: the volume of realized innovative products (goods, services), the number of enterprises that sold innovative products (goods, services), the number of new technological processes implemented, the number of implemented types of innovative products (goods, services), number of industrial enterprises introducing innovations (products and / or technological processes).

The values of these indicators, obtained from the statistics base of the State Statistics Service of Ukraine for 2018 [1], have been taken logarithm to ensure the proportional distribution of the isolated influence of different indicators on the phenomenon under study. Using package Statistica 8.0 on fig.1 is performed the dendrogram of clustering of regions of Ukraine by innovative potential indicators. Our researches allow us to divide many regions of Ukraine into four clusters. The first cluster includes the Dnipropetrovsk, Zaporizhzhia and Kharkiv regions.

These regions show the highest innovation potential, which is provided by a relatively large number of innovatively active enterprises, significant amounts of costs that enterprises allocate to innovation activity, and in these regions active work is carried out on the implementation of research activities, which is the basis of innovation creation and implementation of business entities.

The second cluster was formed by Kyiv, Lviv, Mykolaiv, Odesa and Sumy regions, which are also characterized by sufficiently high indicators of innovation activity of the enterprises of the region. We can state that the remaining regions of Ukraine, which were included in the third (Vinnytsia, Volyn, Donetsk, Zhytomyr, Ivano-Frankivsk, Kirovohrad, Poltava, Ternopil, Kherson, Cherkasy, Chernivtsi, Chernihiv) and fourth (Zakarpattia, Luhansk, Rivne) show low values of innovation and research costs, a small number of innovative enterprises and research institutions, and thus potentially incapable to provide innovative competitiveness of industry production.

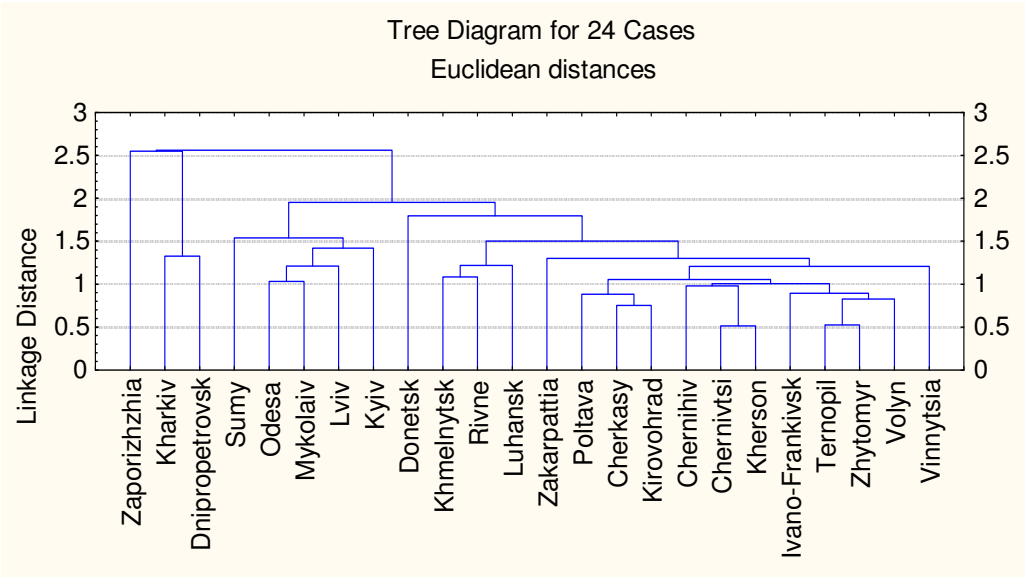

Fig. 1: Dendrogram of clustering of regions of Ukraine by indicators of innovation activity potential according to the data of 2018.
Built by: [1]

It is possible to investigate the efficiency of the innovative potential of the regions of their use in practice by comparing our previously divided regions with their division into clusters based on the

analysis of innovation performance indicators. Figure 2 shows the dendrogram of the corresponding clustering of the regions of Ukraine.

The conducted analysis showed that the first cluster was formed by Dnipropetrovsk, Zaporizhzhia, Kyiv, Kharkiv regions, the second - Donetsk, Kirovohrad, Lviv, Sumy regions. The third cluster includes Vinnytsia, Zakarpattia, Ivano-Frankivsk, Odesa, Poltava, Ternopil, Kherson, Cherkasy and Chernihiv regions, to the fourth - Volyn, Zhytomyr, Luhansk, Mykolaiv, Rivne, Khmelnytsk and Chernivtsi regions.

As we can see, the cluster distribution of regions, which are the so-called "innovation leaders" in assessing the performance of innovative activity of enterprises, quite accurately reflects the totality of subsets of areas distributed according to the existing innovation potential. We can observe the entry into the second cluster of innovatively effective regions of the Kirovohrad region, which, according to the previous clustering, was included in the third cluster, as well as the entering into the third cluster of the Odessa region, which according to the cluster results based on the evaluation of the innovative potential was included to the second cluster. This gives grounds for claiming that the region lacks available innovative development opportunities.
Thus, we can conclude that only a third of Ukrainian regions can be assessed as demonstrating the development of innovative entrepreneurship, which is a threat trend in the context of the need to activate innovative processes in the country's economy.

The scale of research funding is one of the most important indicators in the development of national scientific, technological and innovation potential. World experience shows that the impact of domestic scientific and technological and innovation potential on the socio-economic development of the country depends largely on the share of domestic gross product (GDP) which spent on scientific research. The state provides budget funding for scientific and technical activities of at least 1,7 percent of gross domestic product of Ukraine.

Substantial inter-regional differentiation by individual characteristics of innovation potential is observed. So, in 2018, 777 enterprises (16,4% of the total) innovative activity was carried out, in 2017 - 759 enterprises (16,2%), in 2016 - 834 (18,9%), in 2015 - 824 (17,3%), in 2014 - 1609 (16,1%), in 2013 - 1715 (16,8%). In the regional dimension, most such enterprises are concentrated in Kyiv (the Capital of Ukraine) (101), Kharkiv (119), Dnipropetrovsk (71), Kyiv (54), Lviv (44) and Zaporizhzhia (36) regions.

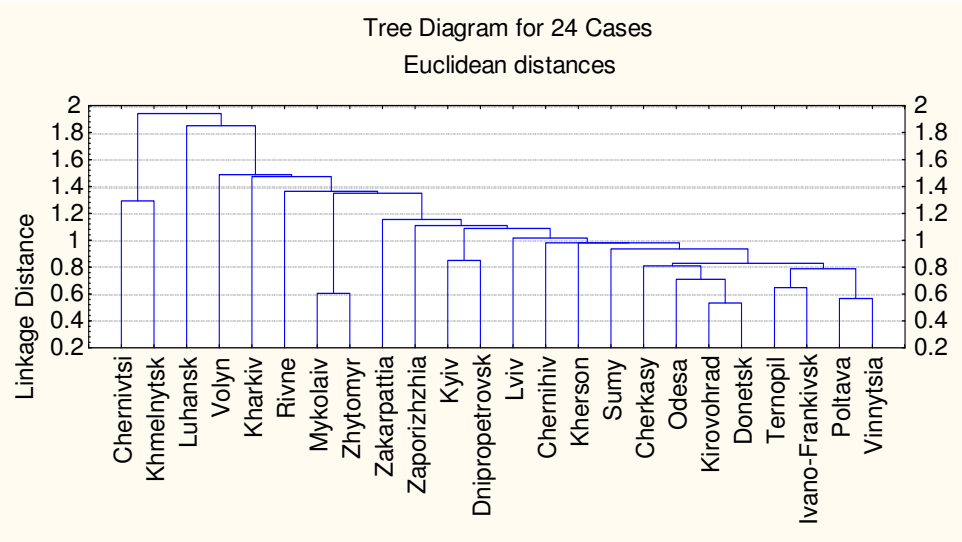

Fig. 2: Dendrogram of clustering of regions of Ukraine according to the indicators of innovation activity of enterprises according to the data of 2018.
Built by: [1]

The own funds of business (88,2% of the total) are significant source of financing for innovation costs in 2017. So, 5,2% of innovative development was financed from the State budget, 0,1% from local budgets, domestic investors spent 0,9%, foreign ones – 0,9% of total expenditures, and the share of loans was 3,9%. Thus, the share of own resources in total financing increased from 59,3% in 2010 to 88,2% in 2018. At the same time, there was a significant decrease in the share of foreign investors from 30% in 2010 to 0,9% in 2016 years.

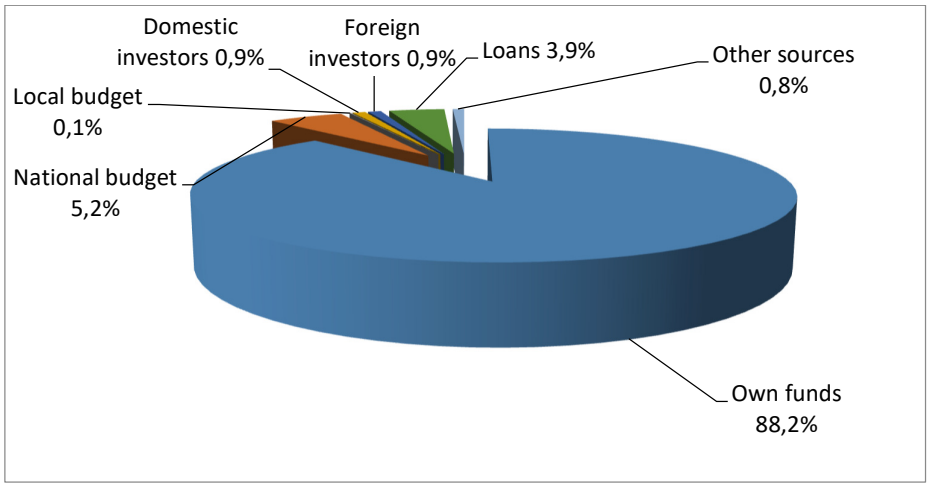

Fig. 3: The cost of innovation in Ukraine by sources of funding

As practice shows, when there is not enough own funds to activate innovation activity, the importance of choosing the sources and effective mechanisms of using financial resources is increasing, especially with limited investment and the lack of institutional and legal environment. The alternative is the rational use of bank loans and funds of foreign investors, but not all enterprises are attractive for bank structures [2, p. 177]. The importance of attracting foreign investment to stimulate innovation is due to the fact that the average Ukrainian company with foreign investment produces 11 times more products than the average national company. Also, in the non-financial sector, there are only 4.6% of enterprises with foreign investments, employing 20.4% of all workers in the sector, producing 34.9% of total gross value added [3].

As we can see, the practical implementation of state funding for this activity differs significantly from the statutory indicators. For the period 2003-2017, the share of R&D expenditure in Ukraine's GDP decreased from 1,19% to 0,45% in 2017, while in the same period EU research expenditure increased from 1,7 up to 2,06 percent of GDP [3]. It is worth noting that in the European Union, in line with the "Europe 2020" strategy, the goal was to increase gross research expenditure from 2% to 3% of GDP [5].

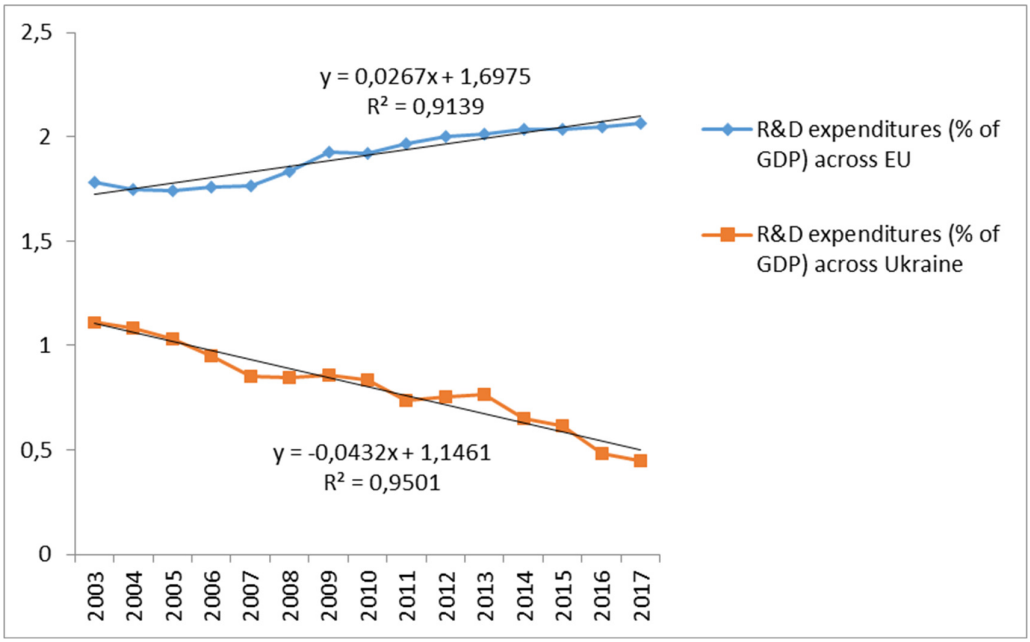

Fig. 4: Dynamic series of R&D expenditures (% of GDP) across Ukraine and the EU and concerning trend models

We smoothed out the dynamic series of the analyzed indicators with the help of trend models. In both cases we can see the linear character of the change in the indicators, the approximation coefficients of the models are quite high (0,91 and 0,95 respectively). But the character of the change is diametrically opposite: there is a declining trend in the share of research expenditures in Ukraine's GDP, which illustrates the negative value of the coefficient in the case of an independent variable in the trend model, while the percentage of spending by EU countries on GDR is increasing. It can also be noted that the unfavorable dynamics of financing Ukrainian research for the Ukrainian innovative entrepreneurship is faster than the rate of increase of R&D expenditures in the EU, since the absolute values of the angles of slope of the trend lines (0,0432 and 0,0267) differ almost twice.

Conclusions

Using cluster analysis, regions of Ukraine were grouped according to the indicators characterizing innovation potential and result of innovative activity. Comparison of the obtained groups of regions shows that the regions that are leaders in innovation potential, as a rule, show the highest level of innovation efficiency. The method used also identified regions that were underutilizing existing opportunities for innovative development, requiring the proper use of existing resources and attracting additional resources. The results of the analysis of financial security show the dominance of own funds in the structure of sources, indicate the lack of financial support for innovation activities by the state, the practical absence of investments of domestic and foreign investors, which is not in line with European practice.

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Multi-Criteria Taxonomy as A Tool to Describe the Sustainable Development Structure in The European Union Countries

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Abstract

The purpose of the paper is to analyze changes in the internal structure of the area's most often considered within the scope of sustainable development. For this purpose the multi-criteria taxonomy was used. Data from 2008 and 2016 were analysed. The results of the research confirm the relatively high level of disparities between EU member states in the area of sustainable development, indicated also by other authors. A detailed analysis also confirmed that in the studied years the similarities of the countries due to the researched phenomenon have changed significantly. It should be noted, however, that the classification obtained in the future may be different if the final set of diagnostic indicators changes. According to the authors, further research should go towards verifying the impact of the choice of diagnostic features on the classification results.

Keywords: Sustainable Development, Multi-Criteria Taxonomy, Typological Groups

Introduction

The term of sustainable development was first formulated during the Third United Nations of Environment Program (UNEP) in 1975 and definied as "(…) such a course of inevitable and desorable development that would not materially and irrevisibly affect the human environment and would not lead to the dagradation of the biosphere and would not undermine the laws of nature, economics and culture" (UNEP, 1975). The most known and very often applied definition is this one from the Brundtl and Briefing Report of the World Commission on Environment and Development United Nations formulated in 1987, in which sustainable development was described as ;sustainable development to meet current needs without the risk that future generations will not be able to meet their needs" (WCED, 1987). Since then, the research and analysis related to sustainable development have been constantly developed on the basis of various types of scientific disciplines (eg. Vashisth, Kumar and Sharma, 2018; Ziolo et al., 2019) and research areas (eg. Scheurer, 2001; Kiba-Janiak, 2015; Pietrzak and Balcerzak, 2016a). The result is both a multitude of definitions of this term and of measurement proposals. The result of this abundance and the lack of agreement as to the most important elements distinguishing the proposed definitions, is also a significant diversity in the sugessted methods of its measurement. The existing definitions emphasize, for example, the static or the dynamic nature of sustainable development, defining this phenomenon as a state or a process and differentiating it in terms of various areas. Strategic documents usually measure the distance separating individual countries from the assumed quantitative goals (see eg. Agenda 2030). Numerous proposals base on various types of synthetic measures, which are determined equally for individual areas (dimensions) taken into account within the framework of sustainable development (eg economic, social and environmental dimensions), as well as for sustainable development described by means of one composite measure (Pietrzak and Balcerzak, 2016b). The issues regarding the relations between

various dimensions of this, after all, very diverse research area are less frequently addressed. This type of research approach based on the study of the internal structure of sustainable development will be presented in the paper.

The purpose of the paper is to analyze changes in the internal structure of the dimensions most often considered within the scope of sustainable development. In the case of research conducted at the macroeconomic level (in relation to countries), these are dimensions such as: economic, social and environmental and, in addition, an institutional and political one, which plays a special role at this level of analysis. Through political decisions regarding e.g. the amount of taxes and their use, permissible pollution standards, etc., the governments of the countries of the world can influence changes taking place also in other sustainable development dimensions. Environmental taxes can be used for activities in the area of environmental protection and income tax reliefs can stimulate the development of entrepreneurship, etc.

It is worth emphasizing that in the literature (Szopik-Depczynska et al., 2018a; Siche et al., 2008) dominates the approach within which sustainable development is described by one synthetic measure determined on the basis of variables characterizing individual dimensions of sustainable development. This creates a danger of averaging the results and overstating or underestimating the position of countries in comparative analyzes. However, previous research of the authors (Bak and Cheba, 2019), shows that in the economic area the results of the most developed EU countries are definitely higher than in the environmental area. This means a situation where the growing pressure of the economies of these countries on the natural environment is observed along with the economic growth. This situation applies primarily to countries located in Western Europe (Belgium, Germany, Luxemburg, Malta, and the Netherlands), to a lesser extent applies to economically developed countries located in Northern Europe. In contrast, the opposite regularities are observed in the case of the least economically developed countries located most often in Eastern Europe. Such large discrepancies are not observed in the studies of the other two dimensions, i.e. social and institutional-political ones. The differences in the development of EU countries within individual sustainable development areas observed by the authors are the starting point for considering the possibility of identifying similar countries due to all areas included in the study, as well as only in terms of several of them.

In the study, the multi-criteria taxonomy method was used to examine the changes taking place in the internal structure of sustainable development and to identify similar countries in terms of considered areas. This is a relatively new proposal in which, on the basis of the results of ordering countries (country rankings) similar countries are sought with regard to all the distinguished dimensions of sustainable development; analyzes in which only some of these areas are included are also possible. Therefore, the research results presented in the article focus on the search for groups of similar countries due to the level of development in all distinguished dimensions simultaneously and in the case of economic and environmental dimensions, between which, at the current level of development of EU countries, the most differences occur.

The indicators used by the European Commission to monitor progress in the implementation of the latest sustainable development strategy - the 2030 Agenda for Sustainable Development are the basis of the empirical research presented in the paper. The authors decided to conduct research at two moments in time, in 2008, i.e. immediately after the outbreak of the global economic crisis and due to the full availability of data for all analyzed indicators – in 2016. The study did not analyze the changes in the results obtained in dynamic terms. The goal was to analyze the changes taking place in the internal structure of the classification of countries in the analyzed areas. The analysis results presented in the work do not include Croatia, which became a member of the European Union only on July 1, 2013 and for which the deficiencies in data for years before its accession to the European Community were identified.

Research Procedure

Selection of diagnostic indicators

The basis of empirical analyzes presented in the work are indicators used by the European Commission to monitor the progress in the implementation of the „The 2030 Agenda for Sustainable Development" in the European Union. In the compilations provided by Eurostat (2018) there is currently 100 indicators describing 17 goals of 2030 Agenda (51 of them are a part of a global list of indicators of the United Nations – the UN, the remaining ones were chosen in such a way as to enable monitoring the direction of changes in accordance with the relevant policies and initiatives of the EU). Whereas in the paper, these indicators were assigned to four sustainable development dimensions: economic, social, environmental and institutional-political, which was separated from the indicators describing the social dimension of sustainable development. The decision to separate this dimension was influenced by its particular importance for the functioning, development and integration of European Union Member States.

It should be noted that not all features included in the Eurostat database are available for all EU countries. 36 of them need to be excluded from further analyzes, mainly due to their availability only at the level of the whole of Europe or the European Union and the lack of data e.g. for indicators describing the protection of the sea in the case of countries which do not have access thereto. The primary database included 64 indicators, 18 of which described the economic dimension, 26 features related to the social dimension, 11 to the environmental dimension and 9 features to the institutional and political dimension. The final selection of features for the study was carried out using the inverse correlation coefficient matrix method. In the literature the detailed information about this method and their application in research can be found in many papers: Malina and Zelias, 1998; Lira et al., 2002; Mlodak, 2006. Due to the fact that the study analyzed features describing changes occurring in individual dimensions of sustainable development of EU countries in two periods of time (years: 2008 and 2016), it was decided that the selection of diagnostic features should also be provided separately for each of these year. The final set was created by those features that were existed in both analyzed years.

The result of applying the proposed procedure for the selection of diagnostic features are four sets of diagnostic features. A detailed list of these indicators can be presented in the following form:

a) in the economic area: agricultural factor income per annual work unit (AWU), (according to prices from 2010, in Euro per annual unit of work) ($x_{1.1S}$), general government gross debt, % of GDP ($x_{1.2D}$), inactive population due to caring responsibilities, % of inactive population aged 20 to 64 ($x_{1.3D}$), young people neither in employment nor in education, (% of population aged 15 to 29) ($x_{1.4D}$), involuntary temporary employment, % of employees aged 20 to 64 ($x_{1.5D}$), people killed in accidents at work, number per 100 000 employees ($x_{1.7S}$), gross domestic expenditure on R&D, % of GDP ($x_{1.8S}$), volume of freight transport relative to GDP, index (2005 = 100) ($x_{1.9D}$), share of labour taxes in total tax revenues, % ($x_{1.10D}$), area under organic farming, % of utilised agricultural area ($x_{1.11S}$);
b) in the social area: people living in households with very low work intensity, % of persons under 60 living in households with very low work intensity, i.e. those in which adults (18-59 years old) have worked less than 20% of their total work potential in the past year ($x_{2.1D}$), housing cost overburden rate, % of population ($x_{2.2\ D}$), population living in a dwelling with a leaking roof, damp walls, floors or foundation or rot in window frames of floor, % of population ($x_{2.3\ D}$), population unable to keep home adequately warm, % of population ($x_{2.4\ D}$), long term unemployment rate, % of active population ($x_{2.5D}$), relative median at-risk-of-poverty gap, % distance to poverty threshold ($x_{2.6D}$), suicide rate, number per 100 000 persons ($x_{2.7\ D}$), early leavers from education and

training, % of population aged 18 to 24 ($x_{2.8\ D}$), tertiary educational attainment, % of population aged 30 to 34 ($x_{2.9S}$), adult participation in learning, % of population aged 25 to 64 ($x_{2.10S}$), population living in households considering that they suffer from noise, % of population ($x_{2.11\ D}$), death rate due to homicide, number per 100 000 persons (standardized death rates calculated on the basis of the standard European population) ($x_{2.12\ D}$), population reporting occurrence of crime, violence or vandalism, % of population ($x_{2.13\ D}$), people killed in road accidents, rate, number per 100 000 persons ($x_{2.14\ D;}$);

c) in the environmental area: primary energy consumption, million tonnes of oil equivalent (TOE) ($x_{3.1D}$), share of renewable energy in gross final energy consumption, % $x_{3.2S}$), energy dependence, % of imports in total energy consumption ($x_{3.3D}$), energy productivity, PPS – Purchasing Power Standard per kilogram of oil equivalent ($x_{3.4S}$), ammonia emissions from agriculture, kilograms per hectare ($x_{3.5D}$), greenhouse gas emissions – tonnes *per capita* ($x_{3.6D}$), recycling rate of municipal waste, % of total waste generated ($x_{3.7S}$), shares of environmental taxes in total tax revenues, % of total taxes ($x_{3.8D}$);

d) in the institutional and political area: seats held by women in national parliaments, % of seats ($x_{4.1S}$), seats held by women in national governments, % of seats ($x_{4.2\ S}$), positions held by women in senior management positions, board members, % of positions ($x_{4.3\ S}$), general government total expenditure on law courts, Euro per inhabitant ($x_{4.4\ S}$), population with confidence in EU institutions: European Parliament % of population ($x_{4.5\ S}$), population with confidence in EU institutions: European Central Bank, % of population ($x_{4.6\ S}$), official development assistance as share of gross national income, % ($x_{4.7\ S}$), EU imports from developing countries by country income groups, million EUR *per capita* ($x_{4.8\ S}$).

The statistical method

One of the assumptions adopted in the work is striving to achieve a high level of development in all dimensions of sustainable development as well as in these one of them whose are characterized by different results achieving by EU countries. This means the need to look for methods that will allow the separation of groups of similar countries due to the distinguished dimensions of this development. The solution in this case may be the use of the multi-criteria taxonomy method, the description of which was presented, among others in Malina (2004). The procedure used in this method involves several successive stages that can be represented as follows:

1. For each of the distinguished classification criteria, in this case, sustainable development dimensions, the normalization of diagnostic features is carried out. The work uses the following transformations (Kukula, 2000):

for stimulant $$z_{ij} = \frac{x_{ij} - \min\limits_i x_{ij}}{\max\limits_i x_{ij} - \min\limits_i x_{ij}}, \quad \max\limits_i x_{ij} \neq \min\limits_i x_{ij}\ ; (1)$$

for destimulant $$z_{ij} = \frac{\max\limits_i x_{ij} - x_{ij}}{\max\limits_i x_{ij} - \min\limits_i x_{ij}} \quad \max\limits_i x_{ij} \neq \min\limits_i x_{ij}\ .(2)$$

It should be emphasized that due to the purpose of the work - the analysis of the internal structure of sustainable development, the normalization of diagnostic features was made separately for each analyzed year (a static approach).

2. Next, distance matrices $\mathbf{D^K}$ are determined**.** In the paper, the median distance proposed by Mlodak (2006) was used to determine the distance between diagnostic features normalized according to formulas 1-7, whose measurement values belong to the range [0, 1]:

$$distance = \underset{j=1,2,\ldots,m}{\text{med}} \left| x_{ij} - x_{kj} \right| . \quad (3)$$

3. Next, the distance threshold d^* is determined, e.g. according to the formula:

$d^* = \min_i \max_j \{d_{ij}\}$; (4)

4. For each classification criterion, the similarity matrix $\mathbf{C^K}$ with dimensions $(n \times n)$ is determined, whose elements $c_{ij}^K (i, j = 1,...,n)$ are equal to:

$c_{ij}^K = 1 \text{ dla } d_{ij} \le d^*$ (5)

$c_{ij}^K = 0 \text{ dla } d_{ij} > d^*$ (6)

If the inequality $d_{ij} \le d^*$ is met, then the objects with numbers *i* and *j* are considered similar due to the considered criterion, if the opposite condition occurs, then the corresponding objects are treated as dissimilar at the level of value d^*. In this case, the similarity measure c_{ij} will be zero.

5. The final similarity matrix $\mathbf{C}_{(n \times n)}$ between the analyzed units is determined.

The elements c_{ij} of matrix **C** are equal to the product of the corresponding elements of matrix $\mathbf{C^K}$ for all considered criteria. This means that $c_{ij} = 1 \, (i, j = 1,...,n)$, if each of the corresponding elements c_{ij}^K in matrices $\mathbf{C^K}$ is equal to one, and $c_{ij} = 0$ if at least one of the corresponding elements c_{ij}^K is zero. Accordingly, two objects are considered to be similar at the same time due to all criteria, if they are similar to each other separately according to individual criteria. However, two objects are considered dissimilar due to all the considered criteria, if they are not similar to each other even because of one of these criteria.

6. The classification and identification of groups of similar entities due to the considered criteria is carried out, using for this purpose, e.g. the *vector elimination method* (Malina, 2004).

At the beginning a replacement of the final similarity matrix $\mathbf{C}_{(n \times n)}$ in the non-similarity matrix $\mathbf{C}^*_{(n \times n)}$, according to the formula $\mathbf{C}^*_{(n \times n)} = 1_{(n \text{ x } n)} - \mathbf{C}_{(n \times n)}$, where $1_{(n \text{ x } n)}$ is a matrix of size *n* x *n* consisting of only ones, is provided. Objects corresponding to non-deleted rows and columns that remain in matrix **C*** form the first subgroup. Other groups are formulated in the same way.

Study Results

In accordance with the adopted assumptions, in the next step, based on the features describing individual sustainable development dimensions transformed in accordance with formulas (1 and 2), distance matrices were determined separately for each of the analyzed years: $\mathbf{D^G}$ - for economic dimension, $\mathbf{D^S}$ - for social dimension, $\mathbf{D^P}$ - for environmental dimension and $\mathbf{D^I}$ - for institutional and political dimension. To determine the distance matrix between the tested objects, a median distance measure with a minimum threshold value (formula 3) was used.

In the next step, these matrices were used to determine the similarity matrix of structures: $\mathbf{C^G}$, $\mathbf{C^S}$, $\mathbf{C^P}$ and $\mathbf{C^I}$. Matrix elements $\mathbf{C^G}$, $\mathbf{C^S}$, $\mathbf{C^P}$ and $\mathbf{C^I}$ determined for 2008 and 2016 were then used to determine the final similarity matrix. These matrices form the basis for the division of the EU Member States surveyed into groups containing similar objects due to two of distinguished dimensions (economic and environmental) as well as all sustainable development dimensions. The vector elimination method was used to isolate these groups. The effect of the application of the described procedure is the division of the studied EU countries into typological groups (Tables: 1 and 2).

When analyzing the received classifications, it is worth paying attention to the results of countries located in Eastern Europe, which are much less economically developed, but which achieve average results in the field of environmental dimension. In these countries, there are no clear disparities between the economic development and the environment. The similarity in the development is evident in view of the results regarding both studied years, where four out of six countries in the region (except for Bulgaria and Romania) were in the same typological group. The results of

countries located in Southern Europe can be interpreted in a similar way. In this case, to the same typological group in 2008 were classified: Greece, Portugal and Slovenia (group I), Spain (group II), Cyprus, Malta (group IV) and in group VIII - Italy, and in 2016 Spain, Portugal, Slovenia and Italy (group I).

Table 1: Comparison of results of EU countries within selected areas of sustainable development in 2008

Group	economic and environmental dimensions	Group	all dimensions
I	Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Poland, Portugal, Slovenia, Slovakia	I	Czech Republic, Estonia, Greece, Hungary, Poland, Portugal, Slovenia, Slovakia
II	Belgium, Germany, France, the Netherlands, Spain, United Kingdom	II	Belgium, France, Germany, Spain
III	Finland, Sweden	III	Finland, Sweden
IV	Bulgaria, Cyprus, Malta	IV	Bulgaria, Latvia, Romania
V	Ireland, Luxembourg	V	Denmark, Netherlands
VI	Denmark, Austria	VI	Ireland, United Kingdom
VII	Romania	VII	Austria, Lithuania
VIII	Italy	VIII	Cyprus, Italy
		IX	Luxembourg
		X	Malta

Source: own research

Table 2: Comparison of results of EU countries within selected areas of sustainable development in 2016

Group	economic and environmental dimensions	Group	all dimensions
I	Austria, Belgium, Czech Republic, Hungary, Italy, Lithuania, Poland, Slovenia, Slovakia, United Kingdom	I	Czech Republic, France, Italy, Ireland, Portugal, Slovakia, Slovenia, Spain, United Kingdom
II	Bulgaria, Greece, Latvia, Portugal	II	Austria, Finland, Hungary, Latvia, Poland, Romania,
III	Finland, France, Netherlands, Spain	III	Denmark, Netherlands, Sweden
IV	Cyprus, Malta, Romania	IV	Cyprus, Estonia, Lithuania
V	Denmark, Germany, Ireland	V	Belgium, Luxembourg
VI	Sweden	VI	Bulgaria, Greece,
VII	Luxembourg	VII	Germany
VIII	Estonia	VIII	Malta

Source: own research

In terms of economic and environmental dimensions, in 2016 these countries were classified into four typological groups, whereas to the same groups qualified: a) group: I - Slovenia and Italy, group II - Greece and Portugal, group III - Spain and group IV Cyprus and Malta.

Tables 1-2 contain the classifications of EU countries in terms of all examined dimensions. It should be noted that only in a few countries similar combinations are noted in typological groups when two dimensions (the economic and environmental ones) and four dimensions (the economic, environmental, social and institutional and political ones) are taken into account. This situation in 2008 concerns a total of fourteen countries: the eight from the first typological group, four from the second group and two from the third group. In 2016, the differences between typological groups are greater and similar results due to two and all dimensions concern ten countries, yet the most of them (five) are in the first group.

Considering all dimensions of sustainable development, the attention needs to be paid to relatively significant differences in the rankings for the examined years. The following groups of countries appeared to be similar:

- the Czech Republic, Portugal, Slovenia, Slovakia;
- Finland, Sweden;
- Denmark, the Netherlands;
- Ireland, the United Kingdom
- Romania, Latvia.

In addition, in both years Malta created independently one of the designated typological groups. The above list clearly indicates the geographical proximity of countries located in Europe, characterized by similar situation in terms of sustainable development.

Discussion and Conclusions

The work presents the division of EU countries into groups similar in terms of sustainable development. The research was carried out at two moments of time, thanks to which it was possible to analyze changes taking place in the internal structure of the area's most often considered within sustainable development. Similarities were sought in two variants, firstly analyzing only the two most different dimensions, i.e. related to economic growth and man-made pressure on the environment. Secondly, taking into account all sustainable development dimensions the indicators used by the European Commission to monitor progress in the implementation of the latest sustainable development strategy - the 2030 Agenda for Sustainable Development are the basis of the empirical research presented in the work.

The method used in the work, multi-criteria taxonomy, is a relatively new proposition, already successfully used by the authors (Zopounidis and Doumpos, 2000; Bartelt and Lamersdorf, 2001), in which, on the basis of the results of the rankings, similar countries are sought due to all distinguished dimensions of sustainable development or in terms of only some of them, which is included in this study. As a result of the applied method, one composite measure is obtained, the interpretation of which allowed the identification of objects (the EU countries) similar to each other due to the examined areas. Furthermore, conducting research in two research moments, allowed us to grasp whether the changes took place and how deep they were in the internal structure of sustainable development.

The obtained results show that the internal structure of the division into typological groups of EU countries due to their level of all four sustainable development dimensions, as well as the two distinguished ones (the economic and environmental ones) are significantly differentiated. Only in a few countries similar combinations are noted in typological groups when two dimensions (the economic and environmental ones) and four dimensions (the economic, environmental, social and institutional and political ones) are taken into account.

No clear disproportions between the economic development and the natural environment were found in countries located in Eastern Europe (except for Bulgaria and Romania). These countries are also similar in all areas of sustainable development. Having analyzed the countries located in Southern Europe bigger differences were observed. In this case, to the same typological group in 2008 were classified: Greece, Portugal and Slovenia (group I), Spain (group II), Cyprus, Malta (group IV) and to group VIII - Italy, whereas in 2016 Spain, Portugal, Slovenia and Italy (group I). However, in 2016 these countries were classified into three typological groups, yet to the same groups were classified: a) the group: I - Slovenia and Italy, group II - Greece and Portugal, group III - Spain and group IV Cyprus and Malta. Due to both analyzed (economic and environmental) dimensions, Romania and Italy turned out to be unlike all other analyzed countries and in 2016 separate groups were formed by: Sweden, Estonia and Luxembourg.

A detailed analysis of the countries in terms of all sustainable development dimensions indicates that in the studied years the similarities of the countries due to the researched phenomenon have changed significantly. This situation in 2008 concerns a total of fourteen countries: the eight from the first typological group, four from the second group and two from the third group. In 2016, the differences between typological groups are greater and similar results due to two and all dimensions concern ten countries, yet the most of them (five) are in the first group. Nevertheless, despite the differences in the classification of the studied EU countries in both years, the impact of the location of countries in the geographical regions of Europe and of direct neighborhood on the results achieved in the field of sustainable development is still visible. The similarities of the following groups of countries lead to such conclusions: the Czech Republic, Portugal, Slovenia, Slovakia; Finland, Sweden; Denmark, the Netherlands; Ireland, the United Kingdom; Romania, Latvia.

The advantage of the multi-criteria taxonomy approach used in the paper is the ability to simultaneously analyze changes due to the situation of individual EU member states. This method allows conducting multilateral analyzes and can be used to study development disparities occurring between EU Member States not only in the area of sustainable development.

The results of the research presented in this article confirm the relatively high level of disparities between EU member states in the area of sustainable development, indicated by other authors (Ariely, 2012; Szopik-Depczynska et al., 2018). It should be noted, however, that the classification obtained in the future may be different if the final set of diagnostic indicators changes. According to the authors, further research should go towards verifying the impact of the choice of diagnostic features on the classification results.

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Examining Cultural Paradigms of Ethical Finance in Europe

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Abstract

Ethical finance does not have one uniform history. Depending on the geographical area and cultural background in which it is practiced, differences in its development can be observed. Taking this into account, the aim of this study is to examine the development of ethical finance in Europe from the perspective of cultural paradigms as proposed by M. Gallicani in the research project "Analytic Atlas of Ethical Finance in Europe". The authors' intention is not to undermine the paradigms, but to show the development of ethical finance in relation to these paradigms. We limited our research to a quantitative analysis of the value of socially responsible investments, some SDGs indicators, bank statistics, and others indicators that define the socio-cultural factors. In some cases, only general directions of the development of ethical finance were presented. To solve this problem, descriptive and multivariate statistics (correspondence analysis) were used. The research results show that contemporary ethical finance in European countries only partially corresponds to the cultural paradigms presented in the "Analytic Atlas of Ethical Finance in Europe".

Keywords: Socially Responsible Investments, Ethical Finance in Europe, Sustainability in Finance

Introduction

According to the definition given by the PRICE project (Promoting Responsible Investment and Commerce in Europe), ethical finance is "any activity that invests money in people and the environment, supporting actions for social and/or environmental enhancement. […] Ethical finance aims to develop a fairer and more equitable interaction between humanity and the environment through the global economy". Ethical financial institutions – be it banks, investments funds, cooperatives, consortia or microcredit cooperatives – are a part of the economic system in which they have developed and thus vary across the world, depending on its prevailing cultural, social and normative characteristics.

Taking into account socio-cultural, economic and ecological differences between the countries, we focus on finding similarities they share. The aim of this study is to examine the development of ethical finance in Europe from the perspective of cultural paradigms. When analyzing the culture of national groups, we also analyze regions which are not necessarily contained within the borders of one country.

What makes the cultural aspect so important? In the course of our research, we formulated the following hypothesis:

H: *Social and cultural differences between European countries determine the directions of ethical finance development.*

Cultural values directly or indirectly reflect shared abstract ideas about what is good, right and desirable for the society (Williams, 1970). Values such as freedom, prosperity and safety constitute the foundation for specific norms which guide people's behavior in different situations. We share essential cultural values, but the way we understand and implement them depends on numerous factors connected with history, law, religion, etc. The members of the society become acquainted with the accents characteristic of their culture by being exposed daily to the customs, laws, norms and organizational practices which express the dominating cultural values (Bourdieu, 1972). We could say that culture is a set of behaviors, values and habits instilled in us by our family and the society which differ depending on the country or region. According to S.P. Huntington (1997), it is precisely culture and cultural identity that shape coherent patterns and thus create a civilizational identity.

In the literature, we can also come across a view that the effect of macroeconomic factors, measured e.g. as the economic growth dynamics of a given political and administrative area, does not necessarily reflect the dynamics of the quality of life of its citizens. According to S. Kiełczewski (2004), assuming the existence of such a causal relationship is a serious methodological error.

The starting point for this research is the division of Europe proposed in the "Analytic Atlas of Ethical Finance in Europe", whose authors distinguish six regions with different approach to the concept of ethical finance based on six distinct cultural paradigms (PRICE, 2014):

1. Mediterranean area, influenced by the Catholic culture;
2. Central Europe, with a Steinerian influence;
3. Francophone area, in which there is a stronger mutualistic and cooperative matrix;
4. Northern Europe, with a clear focus on social and environmental responsibility;
5. Anglo-Saxon countries, characterized by the development of responsible investment fund management;
6. "Former Warsaw Pact" countries, where the economic and social necessities after the fall of the USSR have favored the diffusion of microfinance.

In principle, the concept of ethical finance arose from the modern approach to finance and the concept of ethical business. However, not all responsible financial activity emerged from this source. For instance, the concept of socially responsible investment is strongly rooted in religious movements (Kinder et al. 1994; Kinder, Domini, 1997; Kreander et al. 2003; Sparkes, 1995). An ethical approach is a part of many religions. A strong interpenetration of finance and religion can be observed in Islamic finance, whose central principles are a just division of wealth, care for the wellbeing of the community and economic stability. Moreover, Islamic finance promotes consumer protection and prevent investments into enterprises considered to be "harmful", i.e., in gambling, arms, alcohol and sex industries (Obaidullah, 2005). Enterprises are also forbidden from issuing interest-based loans or keeping their surplus in an interest-bearing account, since income from interest is considered "unclean". This is why enterprises that offer financial services (e.g. banks) that do not comply with these rules are usually excluded from investment portfolios in which the assets are selected in accordance with Sharia law. Nothing suggests that the Catholic religion has an equally strong influence on finance in Europe.

What is worth mentioning in this context is the approach centered around the thought of R. Steiner, founder of the movement called anthroposophy, which in its social aspect is characterized by prosocial individualism. At the base of this idea are two maxims: "I work for you, you work for me" and "to each according to his needs" (Prokopiuk, 2003).

The development of ethical finance in post-communist countries has a more social than cultural character (with political roots) resulting from the social policy of those times; it still, however, bears the mark of the long-held perception of the economy as a common good that thus belongs to no one, that no one needs to manage or look after. This is, of course, reversible, and today, nearly thirty years after the political, economic and social reformation, we notice an increase in civic awareness and civic attitudes (Czapliński, Panek, 2015), which is a natural process, but can take decades.

Research Method

The research is based on Eurostat and Eurosif data. The Eurosif data enabled the analysis of institutional assets from 13 different European markets (Italy, Finland, France, Switzerland, the United Kingdom, Spain, Germany, Belgium, the Netherlands, Sweden, Austria, Denmark and Poland). A set of variables for the analysis was selected based on Eurostat data; SDGs indicators and Europe 2020 indicators . The study applies descriptive statistics and multi-dimensional statistical analysis (MCA – Multiple Correspondence Analysis). The analysis of quantitative data with high dispersion often is hindered by the requirements and limitations of many common research tools. Correspondence analysis is a versatile analytical method that enhance research in detecting and explaining relationships among complex phenomena. In order to preliminarily assess the relations between Socially Responsible Investments and selected variables in the analyzed countries, the Spearman correlation coefficient was used.

The study attempted to find answers to the following research questions:

1. What values of the Catholic culture have had an influence of finance in Mediterranean countries?

2. In the context of ethical finance, what differentiates Central European countries from other European countries in the context of ethical finance?

3. Is the mutualistic and cooperative matrix strongest in the Francophone area?

4. Is environmental responsibility characteristic only of Northern European countries?

5. Are Anglo-Saxon countries characterized by strong development of socially responsible investment funds and SRI management?

6. What are the reasons of the marginal development of ethical finance in the “Former Warsaw Pact” countries?

The research results show a significant diversification of the countries from the socio-cultural and environmental perspective; not in all cases, however, in a way corresponding with the cultural paradigms presented in the “Analytic Atlas of Ethical Finance in Europe”.

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Webcam Eye Tracking Platforms for Usability Testing

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Abstract

Eye tracking is very effective tool in usability testing and provides additional information on user behavior. It is also very expensive due to the cost of eye trackers and in many cases web application developers and/or web-site owners could not afford to use them. So in the recent year appeared several webcam eye tracing platforms. This paper presents the results of verification of two free versions of webcam eye tracking tools: RealEye and Gaze Recorder in usability testing of websites in comparison with standalone eye tracker Tobii TX300 used with Tobii Pro software.

Keywords: Eye Tracking, Webcam Eye Tracking Applications, Usability Testing

Introduction

In recent years, the importance of designing user-oriented interfaces has increased significantly. The research tools used in the design process allow examining the needs of potential users and verifying the correctness of designed user interfaces. Researches carried out by Schall, A. et al. (2014), Horsley et al. (2014) and Bojko (2006) present availability of eye tracking in usability testing of web pages as well as in comparison of web page designs at different maturity levels. User tests on prototypes or ready-made solutions allow us to verify the usability of the layout of individual interface elements. The use of eye tracking registration during user tests enables to gather objective, non-declarative data. Such an examination consists of tracking the fixation points of the examined person during a standard usability test. Rogos-Turek, B. et al. (2015) showed that fixation point determine user interface elements that attract attention and that are invisible or incomprehensible during the completion of the task on the tested web page.

In a book by Bojko (2013) it was shown that application of eye tracking in usability testing is very effective and provides additional information on user behavior. However, this is also very expensive due to the cost of eye trackers and in many cases, web application developers and/or web site owners could not afford to use them. Recently, it is also possible to use eye tracing in user test by means of webcams and special web applications, which are usually available in the subscription system. These applications tracks both the user face and the user eyeball position to determine the user gaze on the screen. This paper presents the results of verification of two webcam-based eye tracking tools: RealEye [RealEye, 2019] and Gaze Recorder [Gaze Recorder, 2019] in usability testing of websites in comparison with very precise standalone eye tracker Tobii TX300 used with Tobii Pro software [Tobii Pro, 2103].

An overview of webcam-based eye tracking applications

Nowadays there are at least dozen different webcam-based eye-tracking applications available over the Internet. They may be used in user testing without the need for installing any software on the computer and they do not require application of any specialized devices except standard webcam. This type of solution is cheaper than application of specialized eye trackers and dedicated software and also is quite easy to use and does not require IT skills to handle them. In this chapter, the following webcam-based eye tracking applications will be presented: RealEye, Gaze Recorder and Eyes Decide.

RealEye

RealEye is a product of RealEye developed in years 2017-2019 [RealEye, 2019]. The tool enables to create a user test (experiment) with additional text description. It enables examination of a photo or a page/webpage in the form of a screenshot. The test conducted using RealEye may be recorded. RealEye offers the ability to invite testers through the web. The test results are presented in the form of a heat map or a reverse heat map, as defined in book by Bojko (2013). Prices depend on the type of use (individual or within organization) and vary from $ 59 to $ 599 per month.

The creation of a new study with RealEye is divided into stages, in each of which you can adjust the settings to suit your preferences. First the name of a test is given and then a photo or a webpage that will be tested. The application will take a screenshot of the page provided. Such a projection, i.e. a static website, will be displayed to the user, which makes it impossible to perform full usability tests, because the respondents will not be able to click on the elements placed on the webpage.

To conduct the test the user must be in a good light and the user may not wear glasses, which is really a big constraint. During the test, users cannot move their heads. Then the test starts with eye tracking calibration, where users should follow the pulsing white dot. After calibration, the examined page or photo is displayed. After the test, along the test results it is possible to save the name, age and sex of the tester. The results are available in the form of a video and standard, or inverted heat map. The following stages of results analysis and completion of the project are available only after purchasing the subscription.

Gaze Recorder

Gaze Recorder is a product of GazeRecorder developed in year 2017 [Gaze Recorder, (2019)]. The tool enables to test photos and interactive webpages. The tool shows eye movements in real time. The test results are presented in the form of a heat map or a reverse heat map, however they could not be saved. The application is available for free. Gaze Recorder does not require any registration. The application requires camera sharing. Immediately after loading the webpage, a red box is displayed with a frame in which the user's face should be placed. There is no information regarding using the glasses, but during the test they may distort the image due to the reflection of light in the lenses. Calibration is based on tracking the red dot with the crosshair, it has two stages, first the screen is bright, and then the background turns black. In the next step, you can choose two types of research, upload a photo or browse the website.

In case the photo option was selected, it is possible to set the length of the recording, you can also stop the test at any time by clicking "stop recording". When browsing the page, the button “stop recording” should be used. After the examination, the result is available in the form of a heat map but it cannot be saved.

EyesDecide

EyesDecide is a product of xLabs developed in 2016 [EyeDecide, (2019)]. The tool enables to create an experiment with a description, a script and questions. It enables to test a photo, webpage in the form of a screenshot or a video on YouTube. With EyesDecide we can conduct test on the local computer, invite selected individuals to the test from the Internet or even hire EyesDecide testers. The test results are presented in the form of a heat map, and a mouse-tracking path [Sobecki, et al (2009)]. Prices depend on the number of tests and ranges from $ 750 to $ 1500.

EyesDecide requires registration prior to the use. The free version allows you to carry out one project and five tests. In order to do more the tool have to be paid. To facilitate the implementation of the own project it is possible to view other completed projects.

The project building is divided into several parts. First, the test (project) should be named, described and the scenario should be defined. In the next step, the object that will be examined should be added to the project. These can be photos, as well as websites that will be displayed in the form of a screenshot, however clickable elements could be also added. An additional option is to add questions to the tester, which may appear before and after the test.

Description of experimental comparison of webcam eye tracking platforms with specialized eye tracker

In this chapter an experimental comparison of the two webcam eye tracking platforms, i.e. RealEye and Gaze Recorder, with professional Tobii TX300 based platform will be presented. They were chosen because they were the only solutions found that allowed for simultaneous research, besides these webcam platforms were available for free.

Tobii TX300 eye tracker platform

Tobii TX300 eye tracker is a hardware equipment that has a very good quality cameras and additional an infrared light source. The application of infrared light enables to record eye movements using corneal reflection [Tobii Pro, 2016]. The recording quality depends on the sampling frequency, which for this eye tracker has a maximum value of 300 Hz and for webcams it is usually 30 Hz (30 fps frames per second) up to 60 Hz. Together with the hardware Tobii provides also specialized software Tobii Pro enabling conducting, recording tests and analyzing results data. There are many other manufacturers of eye tracking systems on the market, however Tobii is definitely the leader.

Tobii TX300 is a tool connected to the monitor screen, it has a camera and a speaker that allows you to record tests with sound. Tobii has built-in infrared LEDs that emit light during testing, which is reflected on the cornea of the eyes. With the help of image sensors and advanced algorithms, the tool can identify the movement of eyeballs with a frequency of 300 Hz. The device is very accurate and does not require a fixed position from the user, which increases the comfort of use [Tobii Pro, (2016)].

Tobii TX 300 does not excludes the participants wearing lenses or glasses, the tool copes in such conditions without much problem. Tobii Pro software allows you to generate different types of output data such as heat map, view path and video recording. It also allows you to generate quantitative data based on recorded eye tracking data using different metrics, e.g. time to first fixation or time spent on specified Area of Interest (AOI) [Tobii Pro, 2019].

Experiment Description

The aim of the study was to compare webcam eye tracking platforms RealEye and Gaze Recorder with Tobii platform, in terms of quality and accuracy of recordings and generated data, during the usability tests of webpages.

The hardware eyetracker used in the research was the Tobii TX300 eye tracker, which records data with a resolution of 300 Hz. Further solutions were free software available online, using a webcam, RealEye and Gaze Recorder. They were chosen because they were the only solutions found that allowed for simultaneous research. Tobii Pro software and RealEye web application were used for data analysis presented in the form of heat maps and video recordings. Gaze Recorder does not allow saving the generated recording, but thanks to the video recording from the Tobii Pro you can compare the results.

The research was carried out in two stages. The first on 29/10/2019 and the second on 13/01/2020, both at the Wrocław University of Science and Technology (WUST) in the research laboratory of Service Oriented Systems. In the first stage, Real Eye and Gaze Recorder were compared with Tobii platform. In the second stage, Gaze Recorder was compared with Tobii platform using chin rest device. Chin rest is a tool used also at optics laboratories for eye examination.

At the first stage participated eight people and at the second stage participated seven people. All the participants were the students of WUST. At the first stage the participants performed the following two tasks:

Task 1. You need to contact the head of the dean's office, find the information you need at the webpage of the Faculty of Computer Science and Management of WUST Content [Faculty of computer science, 2019].

Task 2. Find information about the training offer Website at the webpage of WUST library [Library of Wroclaw University of Science and Technology, 2019].

The Task 1 was recorded using Gaze Recorder and Tobii platform and the Task 2 was recorded using RealEye and Tobii platform. At the second stage only the Task 1 was done.

Experimental Comparison Results

In this section the results of the experiment comparing Gaze Recorder (Task 1) and RealEye (Task 2) with Tobii without application of the chin rest (stage 1) and results of the experiment comparing Gaze Recorder (Task 1) with Tobii with application of the chin rest (stage 2).

Results of the Task 1 – Stage 1

The Task 1 that was performed using Gaze Recorder and the Tobii platform. The results for eight participants are presented in fig. 1-3. The fixation path (fixations and saccades) was determined with the Tobii and the heat map was determined with Gaze Recorder. We can conclude that the areas marked by Gaze Recorder have a much wider range than the fixations from the fixation path determined by Tobii platform. The discrepancy is so large that the information provided by TestGazer is of little use. We can also noticed that the heat map for some participants (i.e. fig 3) is shifted from the fixation path determined by more accurate Tobii platform. We can also notice that only the results for two participants are satisfactory.

Results of the Task 2 – Stage 1

The Task 2 was performed using RealEye and Tobii platform. The experiment results is presented in fig. 2 in form of heat maps for selected four participants. The readability of the heat map generated by the examined RealEye application is very poor for all participants. The gaze areas are superimposed so that the image becomes illegible and it is not known where the respondent actually focused his eyes. The heat map is so inaccurate that reliable and useful information cannot be drawn. Such data cannot be used for effective usability analysis.

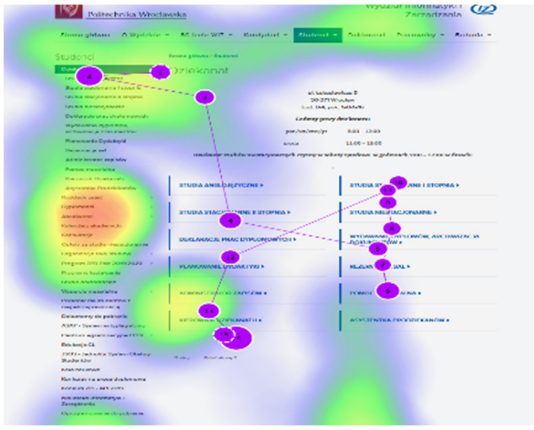

Fig. 1 Results of the Task 1

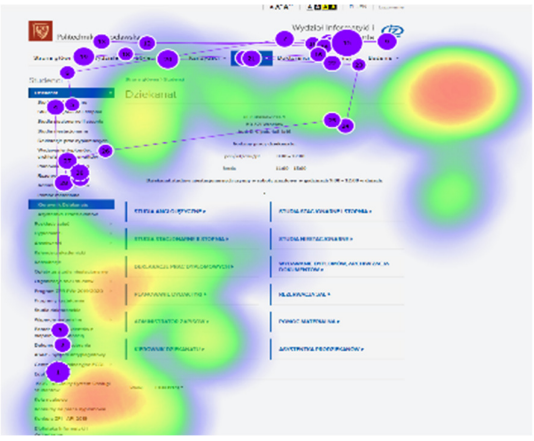

Fig. 2 Results of the Task 1

Fig. 3 Results of the Task 1

Fig. 4: Results of the Task 2 for four selected participants. Results from Tobii on the left and RralEye on the right.

Results of the Task 1 – Stage 2

In the second stage, experiment with Gaze Recorder and Tobii was repeated using the chin rest that immobilize the head. The results are shown in figures 5-7. The RealEye application was not retested due to the very low quality of the results in the first stage and unavailability of the free version at that time.

Because of the fact that between experiment at the stage 1 and 2 lasted almost three month so the Teat Gaze Recorder application version has changed. The results are presented in a different way than for the stage 1. The left column shows the results from Tobii, the right column from Gaze Recorder. The comparative analysis shows that the data from Gaze Recorder are more accurate than in the case of the study without application of chin rest, in most cases, they identify the same areas as Tobii, see fig. 5.

However, horizontal and vertical shifts also occur sporadically (see fig. 6) and with a longer look period at specific web page element, during the visit they become less accurate (see fig. 7).

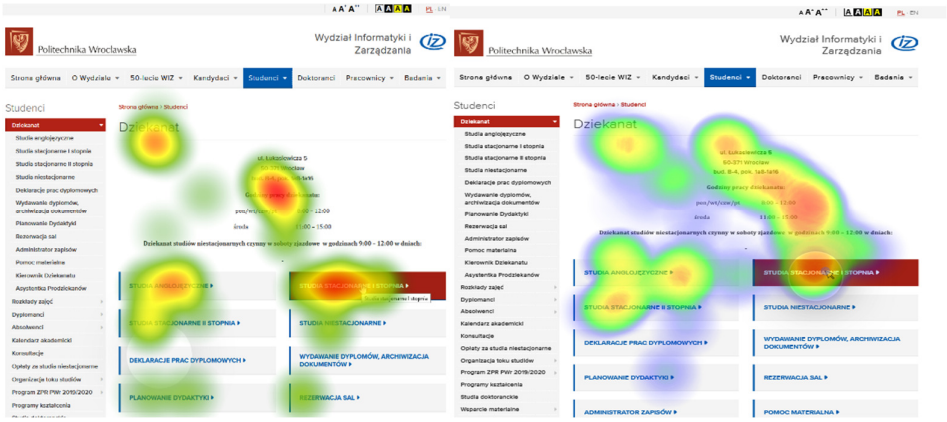

Fig. 5 : Results of the second stage of the Task 1. Results from Tobii on the left and Gaze Recorder on the right.

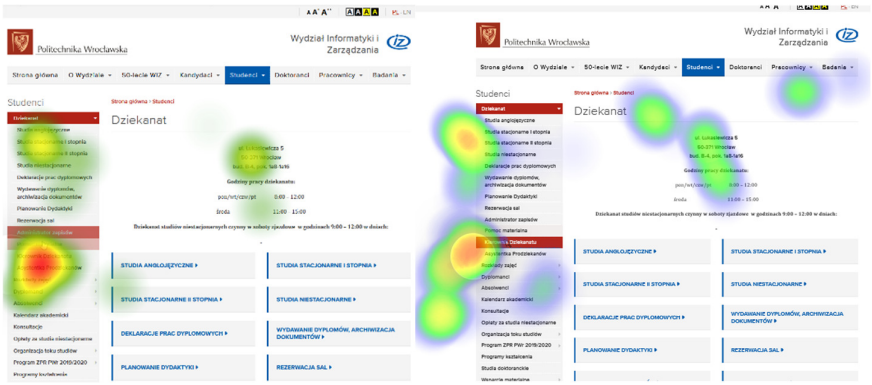

Fig. 6 : Results of the second stage of the Task 1. Results from Tobii on the left and Gaze Recorder on the right.

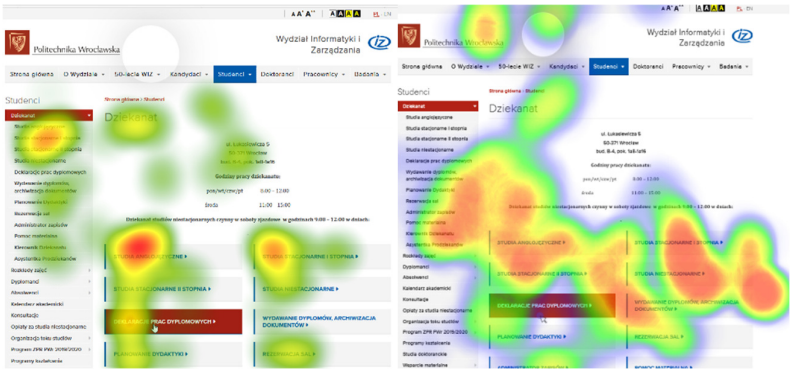

Fig. 7: Results of the second stage of the Task 1 for 7th participant. Results from Tobii on the left and Gaze Recorder on the right.

Summary

Based on the research that were performed at the first stage (without using the chin rest), it can be concluded that webcam eye tracking platforms are not as accurate and precise as hardware eye trackers. Quite often the area the user actually looked were quite distant from the one recognized by the webcam eye tracking platforms. Usually it was shifted to different sides or was not recognized at all.

The fields on the heat map from RealEye software were so large that it was impossible to check where the subject's gaze was concentrated. The generated data was illegible, making it difficult to analyze and extract useful information in the form of user behavior. Therefore, we can conclude that without using the chin rest, what is standard in the case of all webcam eye-tracking platforms, this type of eye trackers do not give satisfactory gaze paths and gaze areas and so could not be used in UX research with satisfactory effectiveness, as defined in work by Chynal, et al, (2018).

In the case when the chin rest is applied, the results are more accurate, but still not precise enough to determine which specific elements on the screen have been noticed and for how long. We must remember however, that professional chin rest could be more expensive than the cheap, but still quite accurate hardware eye trackers. It is also not realistic to hire testers from the internet that will have a chin rest at their disposal.

It also turned out that wearing glasses was a significant limitation that excluded many potential test participants. Webcams basing on visible light are not able to overcome light reflections from the glasses. Moreover, the test participants must have perfectly visible all the time, which is not the case of the specialized eye trackers. However, the biggest disadvantage was the ban on moving the head and torso, only eye movements were allowed, that reduced the participants comfort pretty much.

Using webcam eye trackers is risky, but it can be helpful at the initial design stage, when the prototype or the website is not ready for final acceptance usability tests. However, when deciding on such a step, it is necessary to take into account a large margin of error when analyzing data. The better decision is to apply professional eye trackers or test usability Without costly eye tracking data registration.

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The Changes in Communication Patterns After Accrual Accounting Adoption – The Case of An Italian University

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Abstract

This paper explores the changes in the information presentation after the adoption of accrual accounting. The adoption of accrual accounting is an important institutional change that should lead to better communication of the performance and outcomes as well as resources that are at the disposal of the economic entity. The adoption of accrual accounting should lead to greater accountability reflected in the new approach to reporting. However, accrual accounting, especially in the public sector, is associated also with greater complexity of information. In this article, it is verified if the introduction of accrual accounting changed the communication patterns of the university in Italy. The case study methodology was adopted. The results obtained indicate that together with the reforms of the higher education institutions in Italy, including also the transformation of the accounting information presentation, the significant changes in the information presentation occurred. The university analyzed within this study reacted actively to the request of greater accountability and better communication and together with the adoption of accrual accounting, it changed the way of information presentation. The change in the visual forms of information presentation applied by the analyzed university deserves special attention. The new ways of communication via visual forms adopted by the university may be a confirmation for the standard-setters that their efforts concerning more accountability are reflected in the voluntary approaches to information presentation adopted by the analyzed university that can be a proof of a successful compilation of the formal request and voluntary acting towards better communication.

Keywords: Accrual Accounting, Communication, Stakeholders, Universities

Introduction

The last few decades have seen unprecedented pressures to reform universities worldwide geared mainly towards an outcry for better accountability of resources consumed by higher education. The most relevant reasons of the need to bring changes into the governance of the universities are a shift from an elite to a mass higher education system; cuts in state funding, rising costs, difficultly financing the institutions exclusively with public funds; and greater competition between universities for funding and students (De Boer et al., 2007; Ferlie et al., 2008). Moreover, since the early nineties universities in Europe have started to focus their activities on the so-called "third mission" (the first two are teaching and research), which is related to knowledge transfer, commercialization and innovation (Laredo, 2007, Secundo et al. 2017, Zomer and Benneworth, 2011). As a result, increasing cooperation among universities, industries, and territories may be observed. It is followed by the expectations for wider disclosure of value creation and universities' outcomes presentation that would follow the practices of the private sector (Bezhani, 2010; Secundo et al. 2015; Siboni et al., 2013; Ramírez et al., 2016; Rossi et al. 2018). These expectations are boosted also by the growing autonomy given to universities that is however connected also with the greater accountability requirements. Together with the changes in environment, structures, strategies and processes, universities have received more autonomy on the one hand, but on the other, the new model, which shifted the decision-making power towards universities management (Parker 2011), requires new management and reporting systems to lower information asymmetry between universities and their stakeholders (Secundo et al. 2015). Universities must communicate effectively with a wide range of their stakeholders also to compete for grants, funding, students, professors. Universities are also obliged to prove compliance with a growing array of national regulations and guidelines. One of the main tools that universities use to communicate with the stakeholders and therefore to execute these accountability expectations are the annual reports.

At the same time, the prevailing tendency of the past few years that may be observed, has been that of implementing in the public sector, therefore also in the universities, typical private sector management and accounting practices, among the most important – the accrual accounting concept (Chan, 2003; Broadbent and Guthrie, 2008). Already in the 1990s, the adoption of accrual accounting in the public sector was considered to be self-evident: it was viewed as a good tool to realize New Public Management (NPM) principles such as public sector efficiency, effectiveness, transparency and accountability (Lapsley et al., 2009).

In this study we focus on the impact of the transition of Italian universities from the cash to the accrual accounting on the communication with their stakeholders that is a principal theoretical idea of this accounting change. The scope of our research is to analyze how universities present their results in narrative parts of annual reports dedicated to stakeholders and whether there are some changes in communication patterns within time, that indicate the improvement of information quality in presenting a performance by universities' managers.

There are several issues, that motived our research. First of all, in line with the New Public Management approach, results of public administration activities and funds spending (including those of Higher Education Institutions) should be disclose with the efficient accounting information to deliver the highest level of transparency (Gigli et al 2018). Second, in the increased accountability requirements that are geared towards universities, we intend to analyze how the universities address this challenge and if together with the accrual accounting adoption they also introduce new ways of information presentation.

The main aim of this paper is to explore the changes in the information presentation after the adoption of accrual accounting. We choose an example of an Italian Public University as the Italian higher education sector deserves special attention due to the deep transformation from a completely centralized one to the autonomous at the management, organizational and partly at the funding level. Until the end of the 1980s, universities in Italy were managed by governmental administration, not delegating powers to lower levels. The decision-making processes were not related to the assessment of effectiveness and efficiency. From the mid-nineties, many changes have been introduced in Italy to move from the bureaucracy to the managerial system in higher education (Aversano et al. 2017).

Different reforms (like Brunetta and Gelmini Reforms) introduced also rules towards transparency reporting and understandable for stakeholders (Dal Molin et al. 2017) including a change from cash to accrual accounting.

In this paper, we analyze the part Summary of information of interest to citizens and external stakeholders (*Sintesi delle informazioni di interesse per i cittadini e gli stakeholder esterni*) of the Italian University disclosed in the Performance Reports (*Relazione sulla Performance)*. We use a case study approach in order to investigate what are the patterns of presenting a performance by universities. We focus mainly on the visualization methods included in the information presented to stakeholders with special attention to the innovative infographics included in the communication of the university with stakeholders.

This paper contributes to the broader research studying the effectiveness of the accounting transition in the public sector, from cash accounting to accrual accounting. The previous research focuses mainly on consequences of the transformation (Chan, 2003; Parker and Guthrie, 1990; Hood 1995, Mellett, 1997; Lapsley 1999; Lapsley and Oldfield, 2001) and difficulties in the implementation process (Guthrie, 1998; Carlin, 2005; Hodges and Mellett, 2003). There are however no studies that would empirically research the impact of the application of the new rules on the universities' communication with their stakeholders. The main contribution of this work, therefore, is the analysis of the changes in the communication patterns that are a result of the accounting rules transformation in universities.

The Third Mission, Accountability and Accounting in The Communication Of The Universities

As it is underlined by Secundo et al. (2017, p. 229): "since the 1990s, European universities have moved from focusing exclusively on the two core missions, teaching and research, to gaining a leading role in economic growth and regional development". This movement has been frequently described as the "third mission", that is concerned with the "generation, use, application and exploitation of knowledge and other university capabilities outside the academic environment" (Molas-Gallart et al., 2002, p. 2). This third mission is the role of the university that goes beyond teaching and research and centers specifically on the contribution to regional development (Charles and Benneworth, 2002; Chatterton and Goddard, 2000) and strengthening interrelations with the local community, business and society as a whole. This requires an effective dialog of universities with their stakeholders. Universities have a wide spectrum of stakeholders i.e. governors and legislators, funders (government, donators), internal governing bodies of universities, professors, researchers, the general public, the community in which the university is located, accrediting bodies, media, students, their parents, alumni, business representatives, sponsors, social and civic organizations. All of these stakeholders are potentially interested in the performance of universities, their outcomes, the effective money spending. They want to be informed, they request accountability and transparency. The intensified interrelations of universities with the society result in increased accountability requirements geared towards universities (Parker, 2011) e.g. concerning funds spending and university outcomes. In its broadest sense, accountability refers to the obligation to provide an account to a superior or least someone with a legitimate stake (Boven et al, 2014, p. 3). Stensaker and Harvey (2011, p. 1) focus on accountability at universities stating that "one of the most profound changes in higher education during the last couple of decades is the increasing interest in accountability". Universities, their faculty and staff increasingly held accountable to internal and external stakeholders with governments in many countries introducing rules to further enhance accountability (Melo et al., 2010, p. 237). The first area of interest is the use of public and private funds. Accountability and transparency regulation are to ensure the efficient allocation of funding and allow potential sponsors, cooperators, and students to make decisions concerning relations with universities. The second area of interest is assuring that stakeholders move towards their desired goals (Leville, 2005, p. 10). Consequently, accountability at universities comprises the systematic collections of input, process, and outcome data, their analysis and information dissemination, contributing to internal and external decision making by the policymaker, educational leaders, and other stakeholders in the higher education institution. Accounting is one of the key elements needed to assure accountability (Boven, 2006, p. 6). Accounting tools are seen as the

fundamental means through which managers or external agencies and bodies are made accountable for the results attained (Liguori et al, 2012, p. 906). To achieve that, accounting, which used to be focused on providing information to national budgetary and financial authorities, needed to integrate the notion of accountability to external stakeholders (Coy et al., 2001). This lead to the emergence of a new format of public reporting that increasingly took a shape similar to that found in companies (Christiaens et al., 2010; Bergmann, 2012). Accounting practices in the public sector have been undergoing some radical changes to adapt to the reforms in public management (Hood 1995; Lapsley 1999). Especially, public sector reporting has been undergoing significant reforms in the last few decades (Christiaens et al., 2010; Bergmann, 2012). Around the world, the most significant reforms concerning public sector accounting and reporting included proposals for the adoption of accrual-based accounting (Aucoin, 1990; Barzelay, 2001; Hood, 1995; Cohen and Karatzimas,2015). Financial reporting by public sector institutions traditionally centers on the receipts and disbursements of cash, while assets and liabilities are reported in separate systems and formats. The key product of such accounting is a cash-based financial statement that indicates whether an institution meets its budget, runs a deficit or achieves a surplus of cash during the accounting period (IFAC 2000, p. 47). In contrast, accrual-based accounting is built on conceptual frameworks developed for the private sector, which links the different types of accounts in one system (Hodges and Mellett, 2003, p.102). The transition from cash-based systems to accrual accounting is motivated by the need to improve public sector reporting, but the consequences of the switch are far-reaching (Cohen and Karatzimas, 2015). Accrual-based accounting offers benefits to organizations that need an accounting system that performs many roles, such as detecting errors or fraud, measuring performance, and accounting for the depletion of the capital stock. Grossi and Soverchia (2011) underline: "accrual accounting is expected to provide more useful information for long-term assessment of public policies' financial sustainability, both for internal use (for cost and price calculation, make-or-buy choices, outsourcing, etc.) and for external use, thus improving government's transparency, accountability and performance evaluation". However, accrual accounting is at the same time more complex, because of the various links between accounts and elements, which makes it difficult to understand (Diamond, 2002), especially when it comes to public organizations that do not aim to deliver business-like performance (Šević, 2006). Previous research confirms also that public managers also find it difficult to understand and use accrual-based financial reporting (Grossi and Soverchia, 2011). However, public sector reporting may overcome some of the difficulties associated with the complex nature of accrual-accounting by improving the manner of presenting information to the public.

The Adoption of Accrual Accounting by Italian Universities

New public management principles inspired Italian trajectories of reforms from the beginning of the 1990s, when the country started to implement the first tranche in three interconnected areas, namely organisation, finance and decision-making (Anessi Pessina, 2002). As it is underlined by Mussari and Sorrentino (2017, p. 146): "On the financial management side, all these initiatives translate into a small slow move from input-oriented to output-oriented budget procedures and adoption of accruals reporting as a means to achieve more effective decision-making, so as to enhance control over public expenditure and increase transparency and external accountability". These reforms referred also to Italian universities.

In Italy, research and teaching activities are delivered by state and non-state universities approved by the national Ministry of Education. In 2019 the university system comprised 89 universities, classified into 68 state with all together 1.495.561 students and 31 non-state universities with 195.273 students (Ministero dell'Istruzione dell'Università e della Ricerca, 2019). Even though universities are vested with some autonomy, all universities in Italy must comply with accounting rules set by the state; their teaching and research activities are firmly regulated by the Ministry of Education, and they are accountable to the Ministry of Economy for all their financial activity (Agasisti, et al., 2015; p. 495).

In 2010, the Italian Parliament approved a reform of public universities. As one of its important elements, the higher education system was compelled to introduce full accrual accounting and budgeting, following the approval of the Law n. 240/2010 in December 2010, with 2015 set as the

deadline for the adoption. This was further supported by Legislative Decree n. 18, dated 27 January 2012, which formulated precise implementation guidelines and indicated the deadline of 2015 for making the change and some subsequent regulatory provisions. Universities shifted to the accrual regime at different times, partly due to the five-year time span required to develop the overall regulation. Few universities made the switch before the deadline approached. The Association of University Managers formally asked Parliament for an extension of the deadline, arguing that legitimate technical issues arose and due to the lack of additional resources and competencies the reform cannot be effected in time (Agasisti et al., 2015, p. 496). In consequence, universities in Italy transitioned to accrual accounting in different years, depending on how quickly a university tackled the problem.

Empirical Research

Methodology

In this research, as the main methodology, the case study has been applied (Yin, 1989). Case studies are widely used in organizational studies in the social science disciplines (Hartley 1994). A case study is expected to capture the complexity of a single case, which should be a functioning unit, be investigated in its natural context with a multitude of methods, and be contemporary (Johansson, 2007). Case studies are tailor-made for exploring new processes or behaviors or ones that are little understood (Hartley 1994). In this research, we follow the design of case study choices proposed by Meyer (2001). The university that was chosen is Tor Vergata Univeristy of Rome. Sampling time follows the change from cash to accrual accounting in this institution, therefore 2014 and 2015. Data was collected from the annual performance report, with a focus on the syntactical part dedicated to stakeholders that is included in the performance relation called Relazione sulla Performance. This is a special part designed to present the most important performance data in a numerical and descriptive way that the university publishes every year presenting in it the range of information on a voluntary base, however with a focus to be accountable towards stakeholders.

Case Study Description

Tor Vergata University of Rome was established in 1982 and is a public research University located in Rome. It is structured in 6 Schools (Economics; Law; Engineering; Humanities and Philosophy; Medicine and Surgery; Mathematics, Physics and Natural Sciences) which are organized in 18 Departments. Tor Vergata currently offers 106 graduate programmes (Bachelordegree, Master degree, One-cycle degree) and 32 PhD courses, with the total number of students close to 34,000 and 1,694 academic faculty staff members (en.uniroma2.it).

Tor Vergata University of Rome changed from cash to accrual accounting in 2015. *Relazione sulla Performance* 2014 was the last annual report published following cash accounting principle and 2015 was the first one after the accrual accounting system implementation. In both reports, their first parts consist of information for external stakeholders (*Sintesi delle Informazioni di Interesse per i Cittadini e gli atri Stakeholders Esterni*).

In *Relazione sulla Performance* 2014 there are:

- 1 table with numbers with the information about staff distribution from 2011 until 2014 (Picture 1),
- 1 table with numbers with the information about staff distribution in 2014 regarding age and sex,
- 1 table with numbers with the information about the cost of labour from 2011 until 2014.

In *Relazione sulla Performance* 2015 there are:

- 5 visualized number iconographic with the information about: (1) students distribution, (2) research projects, (3) internationalization, (4) services for students and (5) academic staff (Picture 2),
- 6 lists with iconographic, where information about achievements of improvements in six different areas where disclosed: internationalization of research projects, the attractiveness of the programs offer, development of services supporting didactics (3 achievements), development of customers services, elimination of corruption,
- list with S.W.O.T. analysis.

As it can be noticed in the *Relazione sulla Perfomance* of 2015, together with implementing accrual accounting system, Tor Vergata University of Rome changed the way of communication towards stakeholders. First of all, more visual forms were presented in 2015 comparing to 2014 (3 visual forms in 2014 and 12 visual forms in 2015). Second, in 2015 the University eliminated the traditional visual forms of presenting information and focused on iconographic. Third, in 2014 only one type of visual form was used, while in 2015 three types of visual forms were presented (in 2014 tables and in 2015 visualized number iconographic, lists with iconographic, list). Finally, in 2015 more types of information were presented within visual forms: in 2014 the infographic related only to the information about staff distribution and labour costs, whereas in 2015 the colorful and more user-friendly visual forms were applied to information about: students distribution, research projects, internationalization, services for students and academic staff; about achievements of improvements in six different areas (internationalization of research projects, attractiveness of the programs offer, development of services supporting didactics (3 achievements), development of customers services, elimination of corruption) and S.W.O.T. analysis. The pictures below present some examples of infographics used in 2014 and 2015 documents.

Personale a tempo indeterminato al 31.12	2011	2012	2013	2014
PROFESSORI	716	687	694	691
RICERCATORI	721	695	662	630
DIRETTORE GENERALE	1	1	1	1
DIRIGENTI di 2° FASCIA	5	4	4	4
CEL	15	15	14	15
CATEGORIA EP	49	48	47	45
CATEGORIA D	432	424	419	417
CATEGORIA C	463	455	454	449
CATEGORIA B	67	65	65	64
Totale	2469	2394	2360	2316

Picture 1: Table regarding stuff distribution from Relazione sulla Performance 2014.

Source: Relazione sulla Performance 2014, Universita degli Studi di Roma "Tor Vergata", amministrazionetrasparente.uniroma2.it

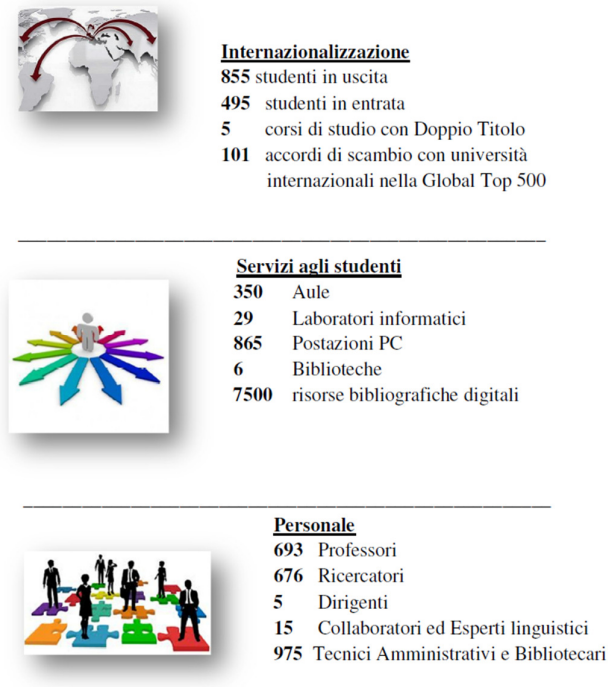

Picture 2: Three lists with iconographic regarding internationalization, services for students and academic staff from Relazione sulla Performance 2015.

Source: Relazione sulla Performance 2015, Universita degli Studi di Roma "Tor Vergata", amministrazionetrasparente.uniroma2.it

Discussion and conclusions

It can be clearly observed that the implementation of accrual accounting changed not only the accounting information presented in the annual reports of the analyzed case but also introduced other important changes in the way the information is presented to the stakeholders. It may be observed that together with the accounting rules also the change in the reporting policy was altered. The results of this study suggest that after the accrual accounting adoption, the university analyzed engaged actively in communication with the users, rather than limit itself to reporting the minimum required. The results may support the arguments concerning a negative effect of accrual accounting on communication performance since the researched university appear to respond to this reform with increased efforts in a textual section of the annual statement. This suggests, it finds more issues need explaining than under the previous system, which was familiar to the users. The implementation of accruals in the public sector is generally expected not only to increase the information content of communication but also its complexity. Therefore, what was observed is that the university analyzed tried to make the information presentation more user-friendly, introducing visual forms and infographics. The communication with stakeholders via performance report, a part of the reporting that is not subject to strict regulation, allowing organizations to freely combine the various dimensions of performance presentation to become more colorful and more intelligible. The approach of visual forms introduction follows the notion that human brains are hard-wired for processing visual information. Since ancient times, human brains have stored memories visually and worked creatively through mental maps, patterns and images. The very architecture of the visual cortex provides direct access to human consciousness (Clark & Mayer, 2011). People learn and remember more efficiently and effectively through the use of text and visuals than through text alone (Dunlap and Lowentha 2016). With the developments in internet technologies, organizational communication with and between stakeholders must become far more

sophisticated. In an era of data overload, however, visual forms offer to the audience of the information a format that is easy to consume and share (Smiciklas, 2012). Therefore, the visual forms that the universities, or other institutions adopting accrual accounting, may be a perfect way to overcome difficulties concerning the accrual accounting information complexity as they make the information more comprehensive, understandable and user-friendly. With the changes in accounting that increase the complexity of reports, public institutions may benefit from using visual forms more extensively. The practices of the analyzed universities may be used as an answer to all the opponents of the accrual accounting implementation. It could serve as a benchmark to other institutions in adhering to the communication with stakeholders after the adoption of the more powerful but also more complex and therefore also for some more difficult to understand accounting approach.

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Integrated Territorial Investments as An Instrument for The Development of Polish Functional Areas

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Abstract

Integrated Territorial Investments (ITI) is an instrument introduced by the European Union, which is intended to support spatial cohesion and territorial development. Particular importance is attached to planning development processes based on the principle of an integrated territorial approach in the EU financial perspective 2014-2020. The main task of ITI is to reduce differences in the level of socio-economic development of individual regions of the Member States by stimulating the potential of a given region in strategic areas. The aim of the article is to define the functions and principles of functioning of Integrated Territorial Investments and their use in Polish regional policy. ITI facilitate the development of urban functional areas through the cooperation of local government units comprising these areas and the implementation of joint integrated projects included in the ITI strategy. In Poland, the largest number of ITI projects pertains to the increase in energy efficiency of public infrastructure as well as improvement of education, urban transport, the labour market and access to public services. An undeniable benefit of the introduction of ITI is the increase in the diversity and availability of financial resources for the implementation of operational programmes in a cross-cutting manner. Among the advantages of the integrated territorial approach, one can also mention the possibility of using the local and regional development potential, as well as favouring the development of cooperation and integration of local governments with other entities.

Keywords: Integrated Investments, Regional Operational Programmes, Territorially Oriented Development, Urban Functional Area.

Introduction

Integrated Territorial Investments (ITI) are an instrument introduced by European Union to boost territorial cohesion and development. Their main task is to bridge the gap between the levels of socio-economic development of the different regions of the member states by boosting the potential of a region in a number of strategic areas. Investment in particular regions of the member states of the European Union is a huge driving force behind the development not only of the economy, but also of innovation, new technologies and education. ITI are to have an impact on the development of the region, and thus raise the standard of living of the inhabitants. ITI projects are aimed primarily at creating a competitive economy by dynamizing the functioning of enterprises, social capital, educational entities and the broadly understood research and development area.

Integrated Territorial Investments are an opportunity for more effective growth of competitiveness and attractiveness of regions. ITI's main task is to increase the development effectiveness by implementing integrated investments not only territorially, but also thematically. Drawing on the ideas of partnership, the cities, the surrounding municipalities and voivodeship authorities set objectives and investments to enable exceeding the administrative boundaries of local governments, which will strengthen the impact of collaboratively implemented projects.

The aim of the article is to define the functions and principles of functioning of Integrated Territorial Investments and their use in Polish regional strategy. The article also compares the amount of allocation for Integrated Territorial Investment implementation within regional operational programmes of individual voivodeships and indicates the actual directions of intervention. Was based on literature studies, a descriptive method and comparative analysis. The time span of the research covers the years 2014-2018. The analysis was carried out on secondary data.

Integrated Territorial Investments as an instrument for the development of urban functional areas

Integrated Territorial Investments are an instrument which enables the implementation of territorial strategies in an integrated way. For the years 2014-2020 European Union has attached particular importance is attached to planning development processes based on the principle of an integrated territorial approach. It entails the adaptation of interventions and activities to the needs of geographically defined areas, whose boundaries are determined by common development conditions as well as strong and multifaceted functional links. Territorially oriented policy takes into account social, economic and spatial changes that occur in the regions and growing expectations towards the effectiveness of undertaken measures and disbursement of public funds (*Strategie*..., 2015). Such approach necessitates the design of the so-called integrated investment package, which should be based primarily on the use of endogenous resources specific for each region. The aim of a territorially-oriented strategy is to support external development through actions tailored to the specific situation and the particular territory. Territorially targeted policies aim to reduce persistent development inefficiencies and inequalities in a given area. Such policies mean a long-term development-oriented strategy aiming at overcoming underutilisation of development potential as well as reducing social exclusion in certain regions through external intervention and the application of multi-level public management (Barca, 2009).

This approach has been more broadly defined in the premises and objectives of the regional policy in Poland included in the National Strategy for Regional Development 2010-2020 (KSRR 2010-2020). The provisions of the document regarding territorially oriented development imply, among other things, the need to achieve development objectives related to cohesion, as well as a multi-sectoral, multi-annual and decentralized approach to development problems that takes into account the diversity of individual areas (Krajowa..., 2010). This model of managing regional development is conducive to improving the effectiveness of cohesion policy in terms of both inputs and outputs. It requires coordination and complementarity of support from various sources, but also refers to the specificity of the area, in particular to its natural growth factors, which are both certain resources and strong functional links. Directive provisions of the document refer to the use and development of internal growth factors of specific territories (the so-called endogenous resources), supporting the spread of development processes from growth centers to other areas, as well as the introduction of new instruments of partnership and coordination of actions between different levels of public authorities. Integrated Territorial Investments are one of the available instruments for the implementation of the territorial dimension of development policy and at the same time they are the platform for cooperation between local governments. According to the European Commission proposal, by increasing their involvement in the management of EU fund ITI should be of particular use in the development of cities and their functional areas (Słodowa-Hełpa, 2014).

Integrated Territorial Investments are a new form of cooperation of territorial local government units from the area which is characterized by functional links, common potential and willingness to engage for the benefit of implementation of coherent and complementary development projects.

It is an EU instrument for promoting regional cohesion. It aims to bridge the gap between the levels of socio-economic development of the different regions of the member states by boosting the potential of a region in a number of strategic areas[1]. It aims to bridge the gap between the levels of socio-economic

[1] The implementation of ITI in Poland was regulated by the provisions of the Act of 11 July 2014 on the principles of implementation of programmes in the field of cohesion policy which have been financed in the 2014-2020. Dz.U. 2014 entry 1146

development of the different regions of the member states by boosting the potential of a region in a number of strategic areas. This instrument can significantly affect the scale and pace of development in the spatial structure of the economy in regional terms, contributing to the improvement of competitiveness and socio-economic development (Sikora-Gaca, Kosowska, 2014).

The most important aims of ITI include (*Zasady*…, 2013):

- promoting a partnership model of cooperation between different administrative units in urban areas;
- increasing the effectiveness of undertaken actions through the implementation of integrated projects which comprehensively respond to the needs and problems of cities and areas functionally related to them;
- increasing the influence of cities and functionally linked areas on the design and implementation of actions supported by cohesion policy in their territories.

Integrated Territorial Investments can be considered to be a territorial development instrument based on the cooperation of local government units. ITI constitute a new model of cooperation between units of local government (Chrisidu-Budnik, 2016).The main function of ITI is the cooperation of local governments in order to make the most of the advantages of local governments and to jointly solve problems. Therefore, the co-financed projects should be integrated and influence the development of the whole area.

ITI is a new form of support for urban areas, which perform key functions in the settlement system of Polish voivodeships (Kisielewicz, 2016). The formal separation and establishment of functional areas in the functional and spatial structure is one of the conditions for the implementation of the territorial dimension of the development policy. ITI were dedicated to functional areas, especially urban ones. Under the current approach to development policy the functional area has become the unit to which development funds are to be allocated. Functional area is a compact system of spatial arrangement consisting of functionally related areas, characterized by common conditions and uniform development goals. It is separated for the use of its geographical potential for the developmental purposes of the country and regions. In line with the principles of the municipal policy, cities and areas subject to urbanisation processes are the particular recipients of territorially oriented development (*Krajowa*…, 2010). In the National Spatial Planning Concept 2030 (KPZK 2030), urban functional areas (MOF) are defined as spatially continuous settlement systems composed of administratively separate units. An urban functional area comprises a compact urban area and a functionally related urbanised area. The strength of internal links between the core city and its functional area plays an important role. This strength can be shown particularly in: commuting to work, intensity of development, volume of goods and services flow of a diversified nature, interconnection of the labor market and the housing market, technical infrastructure and natural habitats. Administratively, urban functional areas may include both urban, rural and urban-rural municipalities. The MOF typology refers to the function of urban centres in the settlement system of the country and is based mainly on the size of the centres. In Poland, 4 types of urban functional areas have been identified, which have been shaped around centres (*Koncepcja*..., 2012):

- voivodeships, including metropolitan ones;
- regional - i.e. cities not fulfilling the function of voivodship centres, but performing important administrative, economic and social functions, as well as having a great potential for development from the point of view of the objectives of the country's spatial development policy;
- subregional - i.e. cities with a population between 50,000 and 100,000, performing important functions in the socio-economic and spatial development of voivodships;
- local - i.e. cities of less than 50,000 inhabitants, concentrating economic functions and serving rural areas with their service facilities.

Central units, which link and integrate functional areas, comprise cities of different sizes of the human potential and various levels of development of various degrees of functional hierarchy. Practically, ITI

regional policy is implemented in the case of functional areas shaped around voivodship and regional cities. This results from the privileged method of financing ITI tasks by reserving funds for this purpose in regional operational programmes for 2014-2020 (RPO). Two most important conditions for ITI implementation are preparation of ITI strategy for established functional areas and allocation of funds from the basic allocation of RPO (as a supplement to funds from the programme reserve) for ITI implementation in the region. Such assumptions lead to the fact that ITI supports primarily the largest cities and their functional areas. It can therefore be expected that by 2020 they will become real poles of regional development (Szafranek, 2015).

In the 2014-2020 financial perspective, Integrated Territorial Investments are implemented in Poland by 17 voivodship cities and areas functionally related to them (urban functional areas of voivodship centres) and by 7 subregions (urban functional areas). In total, in Poland ITI will be implemented in 24 functional areas which have been granted ITI funding under RPO *(Monitorowanie…*, 2016). The largest number of functional areas financed under RPO funds was observed in Silesian (4) and Lower Silesian (3) voivodships. These are simultaneously the voivodships with the highest level of urbanisation in the country – the urbanisation index in 2016 for Silesian was 77.6%, and for Lower Silesian - 69.4% (Table 1). The demographic potential of urban functional areas is strongly differentiated in the regional structure. The largest part of the population (more than half of the region's population) living in functional areas is located in the following voivodships: Silesian, Western Pomerania, Pomerania, Mazowieckie and Lower Silesian. Voivodeships in which functional areas gather a lower share of the population of the region are the areas of eastern Poland (Podkarpackie, Świętokrzyskie, Warmińsko-Mazurskie, Podlaskie), as well as the Kujawy and Pomerania Voivodeship. The diversity of the areas covered by the ITI, both in terms of population and size, results in different needs and challenges for their development as well as the scale of funding.

Table1: Functional areas implementing ITI in Poland

Voivodeship	Name of the functional area	Population of functional areas	Population of the voivodship	Rate of urbanisation of the voivodship (%)
Lower Silesian	Wrocław Functional Area Jeleniogórska Agglomeration Wałbrzyska Agglomeration	1394020	2903710	69,4
Kujawy and Pomerania	Bydgosko-Toruński Functional Area	313885	2083927	61,1
Lubelskie	Lubelski Functional Area	548525	2133340	46,5
Lubuskie	Gorzów Wielkopolski Municipial Functional Area Zielona Góra Municipial Functional Area	119001	1017376	63,5
Łódzkie	Łódzki Metropolitan Area	1098222	2485323	63,8
Małopolskie	Krakowski Functional Area	1034051	3382260	49,4
Mazowieckie	Warszawski Functional Area	2699891	5365898	64,7
Opolskie	Opolska Agglomeration	337383	993036	63,5
Podkarpackie	Rzeszowski Functional Area	356231	2127656	41,6
Podlaskie	Białostocki Functional Area	412741	1186625	60,3
Pomeranian	Gdańsk-Gdynia-Sopot Metropolitan Area	1267288	2315611	65,0
Silesian	Central Subregion of the Silesian Voivodeship South Subregion of the Silesian Voivodeship North Subregion of the Silesian Voivodeship West Subregion of the Silesian Voivodeship	3093128	4559164	77,6

Świętokrzyskie	Kielecki Functional Area	332486	1252900	44,8
Warmia and Mazury	Olsztyn Municipial Functional Area	447589	1436367	59,3
Wielkopolskie	Poznań Municipial Functional Area Kalisko-Ostrowska Agglomeration	1372694	3481625	55,2
West Pomeranian	Szczeciński Metropolitan Area Koszalińsko-Kołobrzesko-Białogardzki Functional Area	986826	1708174	68,9

Source: Based on: Ministry of Investment and Development and Local Data Bank.

The basic objective of ITI is to promote the development of the urban functional area through the facilitation of cooperation between the administrative units comprising its composition and the implementation of joint integrated projects responding in a comprehensive way to the needs and problems of a given area. The implementation of ITI consists primarily of the cooperation between local government units that are part of the functional areas and the implementation of joint integrated projects included in the ITI strategy. In line with the assumption adopted by the EU for the implementation of regional policy, ITI should be applied in situations where urban development strategies or other territorial strategies require an integrated approach involving investments in more than one priority area, one or more operational programmes (*Zasady*..., 2013, p. 8). With the help of this tool, partnerships between local government units, cities and functionally related municipalities and voivodeship authorities establish common development goals and then identify integrated projects necessary to achieve them. It is estimated that ITI will lead to increased cooperation and integration in the functional areas of the largest cities in Poland. ITI can help in the implementation of integrated projects and increase the participation of cities and their functional areas in the management of operational programmes.

In Poland, ITI deploys resources from two funds - the European Regional Development Fund (ERDF) and the European Social Fund (ESF). ITI is implemented within a specially separated allocation in each of the 16 regional programmes and indirectly within the Infrastructure and Environment Operational Programme and Eastern Poland Operational Programme. This will allow the implementation of integrated projects which are financed from various sources. The provision of diversified streams of funds provides a better opportunity to finance integrated actions. This would enable more effective handling of issues affecting individual urban centres and functional areas. This formula makes it possible to go beyond the rigid administrative boundaries of local governments. It will lead to greater impact of collaborative initiatives.

Usage of ITI in Polish Regional Policy

Mobilization of funds needed for ITI depends on fulfillment of certain factors. Local governments wishing to implement ITI are obligated to establish an institutionalized form of partnership (*Zasady*..., 2013). It means that, apart from spatial processes which were fundamental for establishing of municipal functional areas, willingness to join that organizational structure expressed by governments of each city and municipality (gminas) creating this specific form of partnership is necessary. To implement ITI territorial units which are creating municipal functional area have to implement institutionalized form of partnership – have to create so-called ITI union, which could be association, municipality union or it could take form of intercommunal agreement.

Second requirement which have to be fulfilled is creation of ITI strategy. A cross-sectoral strategy for integrated development is needed, which covers the development needs of a given area. In this strategy principles of cooperation, directions of development, analysis of potentials and barriers for the area as a whole and the most important planned joint investments, have to be established (Zakrzewska-Półtorak, 2013). ITI strategy in particular should (Programowanie…, 2015):

- be consistent with national and EU strategic and planning documents,
- indicate the area of support and contain diagnosis for that area
- indicate territorial boundaries of support,

- indicate development objectives and investment priorities to be achieved by ITI,
- define the rules of project selection and a list of projects to be implemented in the ITI formula, as well as a list of strategic projects of complementary nature possible to be implemented outside ITI,
- contain financial plan,
- describe the implementation system,
- contain a report on the progress of work and the involvement of partners from the functional area in the implementation of the strategy.

Another requirement for realization of projects contained in ITI strategy is an agreement between the entity representing communities (gminas) and voivodeship self-government, in which a detailed scope of tasks to be performed in connection with the implementation of ITI is established. It is also necessary to include relevant provisions in the RPO (regional operational programme), meeting the requirements of the European Commission and in accordance with the provisions of the Partnership Agreement. At the same time it is worth noting that ITI are implemented in Poland as part of Regional Operational Programmes. It should be noted that all ROPs have planned the implementation of measures in the ITI formula.

The allocation from the EU funds for the implementation of ITI under the 16th ROP amounted in total to PLN 13 117 million. Support for ITI implementation in individual voivodeships is very uneven - from PLN 3460 million in the Silesian Voivodeship (which accounts for 22.8% of the ROP implementation funds) to PLN 256 million for ITI in the Warmińsko-Mazurskie Voivodeship (3.4% of the ROP implementation funds). In comparison with all the voivodships, apart from Silesian, three more voivodships stand out - the Lower Silesian, Pomeranian and Małopolskie (Table 2). Different scale of funding for Integrated Territorial Investments projects in individual voivodships is primarily due to the high diversity of areas covered by the ITI, which results in their needs being different.

Table 2: Value of allocation to ITI under the ROP - as of 30 June 2018

Voivodeship	ROP allocation amount in million PLN	ITI allocation amount in million PLN
Lower Silesian	9 828	1 212
Kujawy-Pomerania	8 305	728
Lubelskie	9 734	460
Lubuskie	3 957	472
Łódzkie	9 843	986
Małopolskie	12 558	1 032
Mazowieckie	9 118	729
Opolskie	4 123	313
Podkarpackie	9 225	365
Podlaskie	5 295	332
Pomeranian	8 136	1 076
Silesian	15 170	3 460
Świętokrzyskie	5 954	362
Warmińsko-mazurskie	7 541	256
Wielkopolskie	10 690	858
Western Pomeranian	6 986	476

Source: Own study based on data from the Supreme Chamber of Control (2019).

Territorial measures implemented within ITI should take place in three basic dimensions (Szafranek, 2015):

- intelligent economic growth (e.g. strengthening of functional dependencies, benefits of agglomeration, increase in importance of social capital, networking);
- sustainable economic growth (use of space resources for renewable energy sources, shaping of compact, sustainable cities, development of pro-ecological transport, ecological corridors);
- economic growth conducive to social inclusion (activation of the population and facilitation of access to jobs and services).

These dimensions are indicative of the possibilities of financing the tasks to be carried out in specific areas. Moreover, in the Polish regional policy it is recommended that ITI be focused in particular on (*Zasady...,* 2013):

- development of sustainable, efficient transport connecting the city and its functional area (implementation of strategies of public transport that are both environmentally friendly and low-carbon as well as common to the whole functional area – thematic objectives 4, 7);
- restoring socio-economic functions of the degraded areas of the urban functional area (implementation of a common functional revitalisation plan for the entire functional area in an integrated manner, which takes into account the infrastructural, economic, social and environmental aspects of the functional area – thematic objectives 6, 8, 9, 10);
- improvement of the condition of the natural environment in the functional area of the city (among others, waste management measures, waste water treatment, protection of both biodiversity and existing green public places in urban areas – thematic objectives 4, 6);
- supporting energy efficiency and promoting low-carbon strategies (initiatives related to the measures for energy efficiency in both the public buildings and the housing sector as well as public infrastructure – thematic objectives 4);
- strengthening the development of symbolic functions that build the international character and supra-regional rank of the urban functional area and improving the accessibility and quality of public services in the whole functional area (projects should use the common features/potential of the functional area and contribute to strengthening of its character and adaptation and expansion of the range of available services in the entire functional space of the city – thematic objectives 2, 6, 8, 9);
- strengthening research, technological development and innovation (implementation of projects related to the increase in innovativeness of enterprises, implementation of research results and development of services offered by Business Environment Institutions – thematic objectives 1, 3).

Every ITI Union should choose at least two of the following intervention directions. Furthermore, in justified cases, there is an opportunity for an extension of the following list of actions. Actions taken within each of the following ITI are the result of actual needs of functional area and also determined by catalogue of available actions defined in general principles.

Table 3: Quantity and value of contracts under ITI instrument – as for 31st January 2018.

Thematic objective	Number of projects	Value of projects in PLN million
01 Strengthening of scientific research, technological development and innovation	13	3,1
02 Improving access, usage and quality of information and communication technologies	51	158,4
03 Strengthening of competitiveness of small- and medium-sized business	133	415,2
04 Supporting the transition to a low-carbon economy in all sectors.	691	6764,3

05 Promoting adaptation to climate change, risk prevention and management	4	36,4
06 Conservation of natural environment and support for effective resource management	152	850,6
07 Promoting sustainable transport and removing bottlenecks in the operation of key network infrastructures	31	730,5
08 Promoting quality and sustainable employment and supporting labor mobility	228	565,5
09 Promotion of social integration, combating poverty and all forms of discrimination	316	1613,7
10 Investments in education, training and vocational training for skills acquisition and constant learning	566	1485,7

Source: own study based on: Ministry of Investment and Development.

Actual thematic distribution of interventions can be estimated with quantity and value of signed contracts. Majority of projects (32%) and at the same time the most valuable ones (53% of the total value of projects) are concerning thematic target no. 4: Supporting the transition to a low-carbon economy in all sectors. Projects in this theme are mostly concerning public transport, bicycle infrastructure, energy efficiency and air quality. Numerous and valuable projects also are connected to theme no. 9: Promotion of social integration, combating poverty and all forms of discrimination (14% of all projects and 13% of their value) and also theme no. 10: Investments in education, training and vocational training for skills acquisition and constant learning (26% of quantity, 12% of value). 28% of the total number of projects and about 20% of their total value accrue to other seven thematic targets (Table 3).

Considering thematic area of investments we can determined that the most of ITI projects are concerning recovery of public infrastructure for energy efficiency (notably thermal insulation of buildings), education from preschool to high school level, public transport, labor market and public services access (including healthcare). Value-wise the most predominant theme is public transport and in lesser way energy efficiency of public infrastructure (*Ewaluacja…,* 2018). It is worth noticing that the most relevant areas of support are those in which cooperation is necessity and where there is opportunity for synergy effect – it is especially apparent in public transport, natural environment quality and supralocal public services.

Conclusions

The EU definition of investment priorities financially supported under the ITI has imposed certain restrictions. Despite that, in each of urban functional areas there are activities addressing both their developmental needs and challenges posed by the national and EU economies.

An undoubted benefit of implementing ITI is an increase in the diversity and availability of financial resources for integrated activities. ITI promote the integrated use of European funds and has the potential of achieving better results with the same costs of public investment. Moreover, the advantages of an integrated territorial approach include the opportunity to apply the local and regional development potential, as well as fostering the development of cooperation and integration of local governments with other entities. Another element worth of notice is the positive impact of the body in terms of activating a number of relations between partners of ITI unions (local government units in urban functional areas).These include, among others, increasing integration, building trust between partners, limiting unnecessary rivalry and competition, defining and attempting to solve common problems. In creating cooperation, it is very important to notice and understand the challenges that the partners face and to jointly develop a coherent vision, create a strategy and set priorities.

ITI should contribute to an increase in the effectiveness of regional development policy by integrating different instruments that are managed at national and regional level. ITI allow the implementation of operational programmes in a cross-sectoral manner and combining funding from different programmes

and priority axes. It ensures the implementation of an integrated strategy for a specific territory and thus the translation of strategic thinking into the operational level by the implemented projects. Effective cooperation of territorial self-government units in the implementation of joint undertakings should enable the implementation of all planned investments under particular ITI. It will undoubtedly contribute to the balanced development and improvement of spatial cohesion of a given functional area, at the same time having a positive impact on the implementation of regional development policy. According to their premise, ITI should become an instrument for the implementation of the voivodeship development strategy in terms of supporting the areas of intervention defined in it (including the areas of strategic state intervention), as well as an instrument created for a territorial approach to development, which can help unlock unused potential at the regional level.

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Adaptive Network-Based Fuzzy Inference System for The Operational Planning at The Enterprise

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Abstract

Information flows within the organization are often characterized by a low degree of formalization and different kinds of uncertainties. Fuzzy expert systems are widely used for the processing of expert opinions under condition of uncertainty but have a significant disadvantage – high level of subjectivity. Models of adaptive neuro-fuzzy expert system may be effectively used to decrease the level of subjectivity. Subject of research is the construction of expert system, which allows to optimize the planning of the labor intensity and scheduling and also has the ability to further training and adaptation in accordance with the newly emerging actual results of production activity of the company.

Keywords: Neuro-fuzzy systems, fuzzy expert systems, operational planning

Introduction

The presence of a corporate information system is an essential condition for the successful development of the modern organization. Business activities, including the implementation of strategic planning, operational control and interaction with partners contributes to the development of the complex information system within the company.

Inside the company appear various information flows which have different characteristics, directions and end users. Flows which correspond to the decision making process in the organization, are characterized by a low degree of formalization and a different kinds of uncertainties.

Choosing the best solution among the alternatives is a key task of management and the quality of the solution determine the success of the company. That is why within the enterprise can be created the specialized decision support systems, whose main aim is to help the decision-maker in making reasonable managerial decisions.

The data mining methods correspond to the principles and purposes of the systems which support managerial decisions under conditions of high uncertainty which is inherent to the business activities. These methods allow to process inaccurate and non-formalizable information, to identify patterns and to generalize knowledge, to simulate expert activities.

To solve management problems encountered in the real world, very often is not enough to take into account only classic models, based on the use of precise values and a detail description of the domain objects. Human thinking process has a deal with imprecise, vague, qualitative categories which are necessary to carry out generalization function, to identify the most relevant information and knowledge from the large amount data sets. There are a lot of works devoted to the methodological basis of the fuzzy set theory, artificial neural networks such as Cheng and Titterington (1994), Hagan et al (1996), Haykin (1999), Jamshidi (2003), Lin and Lee (1991) and practical application of neuro-

fuzzy approaches to enterprise planning issues, for example, Juang et al (2007), Ren et al (2019), Rodrigues and Carpinetti (2020), Sabah et al (2019).

The Neuro-Fuzzy Networks

The main areas, where for many years have already effectively applied data mining methods based on hybrid systems (artificial neural networks, fuzzy set theory, genetic algorithms), are first of all such directions as engineering science, medicine, automatic control. However, in recent years these methods of data analysis have been quickly implemented into the social sciences, including the economics. Methods based on the of fuzzy sets theory, are widely used for the processing of expert opinions and creating of management decision-making systems. The methodology of artificial neural networks is used in the banking business for the segmentation of borrowers. More and more attention of researchers attract approaches to the analysis of the behavior of the stock markets on the basis of a synthesis of the theory of chaos and neuromathematics whose practical application is possible in the portfolio risk management as mentioned in Botvin et al (2009).

The current research presents an example of the practical implementation of one of the approaches to the use of soft computing in the economic analysis, which consists in the construction and training of a neuro-fuzzy network. Neuro-fuzzy networks - one of the possible types of hybrid systems, the use of which allows, on the one hand to reduce the role of the expert in the development of the system, on the other - to create a neural network architecture, each component of which is possible to precise interpretation. In this case, the parameters of fuzzy inference system is automatically modified during the training process, and also in the structure of the neural network, each layer of neurons performs its predetermined role, and as a consequence parameters of network acquire a clear sense for the researcher.

Indeed, the creation of the rule base is built on expert opinions which can be more properly expressed in a natural language, rather than in a numeric, strictly mathematical form. This phenomenon is due to peculiarities of human thinking process. In this case tools of the fuzzy sets theory can be used within the hybrid system and allow to construct an expert systems, which are based on fuzzy logic methodology.

In addition, requirement of the high level of automation of decision making process is implemented within the framework of building a computing system based on artificial neural networks, which are capable to self-learning, adjusting parameters, taking into account new available statistical information without the participation of experts.

Example of practical application of the neuro-fuzzy system for the operational planning at the enterprise

Statement of the problem

The subject of study is the process of managing the operational activities of the industrial enterprise, whose purpose is the optimal resource planning and more efficient use of production capacity.

The main objective of the research is to construct a model of an expert system with the architecture which is able to automate expert reasoning in a particular subject area and to take into account the statistical data.

Considered company produces and implements the hardware-software systems which consist of different modules. The systems require complex installation, and adjustment works on the territory of the customer object. The most precisely planning of the laboriousness of these works is an important

task, allowing to maximize production and to carry out scheduling of the occupation level of specialists.

An expert group identified the following main factors that determine the laboriousness of the works:

- the scale of the installed system;
- the type of the operations;
- the level of technological complexity of modules (indirectly expressed through the cost of the hardware-software system).

All three factors at the stage of technical design are inherently fuzzy values, because of during the process of negotiation of the final features of the delivered system specification of equipment and a detailed list of works are not exactly determined. Thus, to obtain an estimate of the value of laboriousness effectively to apply approaches based on fuzzy logic and fuzzy inference systems. It is assumed that each of the three factors and the estimated laboriousness are the linguistic variables and as a result can be characterized using fuzzy sets and membership functions. There are five membership functions for the second factor and the estimated "laboriousness of the works" at the same time for a description of the first and third factors – there are three membership functions; also assumed that experts defined the type of the membership functions based on a Gaussian function. Parameters of the linguistic variables are shown in Table 1.

Table 1: Parameters of the linguistic variables

Linguistic variables	Values of the linguistic variables (fuzzy sets)	Type of the membership functions	Parameters of the membership functions
the scale of the installed system (modules, pcs)	separate modules small complex standard complex large complex automated system	Gaussian membership function	[2 5] [3 10] [6 20] [6 35] [8 65]
the type of the operations (score)	modernization extension new system		[1 3] [2 5] [2 7]
the level of technological complexity of modules (RUR)	low below the average average high very high		[2000000 4000000] [2000000 7000000] [5000000 20000000] [1000000 30000000] [1000000 50000000]
laboriousness of the works (man-day)	small average big		[3 10] [15 50] [20 170]

To form the base of fuzzy rules in this situation, experts can formulate vague statements, like the one shown below which corresponds to Mamdani algorithm of fuzzy inference:

IF	the scale of the system	***small complex***
AND	the type of the operations	***modernization***
AND	the level of technological complexity	***below the average***
THEN	laboriousness of the works	***small***

The maximum number of the rules within above mentioned fuzzy expert system - 225, but in practice as a result of a survey of employees the rules base can be decreased and consists of a much smaller number of rules, because of in this base will not be included rare or obviously unrealistic

combinations of the values of input factors and dependent variable. The main parameters of the fuzzy inference algorithm are the following: aggregation of fuzzy premises is implemented by using the minimum function, accumulation of conclusions of fuzzy rules represents by the maximum function, defazzification is carried out using the center of gravity method.

The use of neuro-fuzzy system

The process of implementation of fuzzy inference systems often connected with difficulties in creation of the rule base and the determination of the parameters of membership functions of fuzzy sets. The rules are formed by specialist in a particular sphere, but it is not always possible to organize the work of a highly qualified expert group, and it is very hard to avoid the negative impact of the subjective opinions. However, more difficult problem is to construct membership functions which reflect the specificity of the parameters of fuzzy system enough accurately. Often the membership functions can be distributed only uniformly within the variables domains. Even more hard for experts to design a system of fuzzy inference based on Sugeno algorithm where the output variables must be determined not in the form of fuzzy sets but as functional dependencies or constants.
There are various methods of constructing membership functions described in Khalin (2016):

- direct method - an expert directly determines the membership function;
- indirect - often presented by the methods of pair comparisons;
- the use of standard forms of curves to create the membership functions;
- statistical methods.

However, these methods have significant disadvantages, consisting either in the expert's inability to adequately estimation of the membership function’s parameters or the lack of the statistical database. In case when the developers of expert system have a training set of examples with the values of the input variables and the corresponding output values, then this knowledge can be used to train the fuzzy neural network with a special structure, which parameters will allow to generate the rule base and fine-tune the membership functions.

As a tool of construction of neuro-fuzzy systems can be chosen software environment Matlab and its application Fuzzy Logic Toolbox and editor ANFIS (Adaptive Network-based Fuzzy Inference System), described in the book by Yarushkina (2004), which allows both using the graphical user interface or from the command line to create a fuzzy inference system and configure it to get value of unknown variable “laboriousness of the works” in fuzzy or in numerical form.

The process of fine-tuning of the parameters of membership functions is based on the neural network training using the back-propagation algorithm or its modifications.

An example of fine-tuning of membership functions presented in Fig. 1, where compares the graphics of functions for the first factor – “the scale of the installed system”. As a result of training of neural network parameters of membership functions of variable optimally adjusted and differ from the original values which by default have been distributed uniformly.

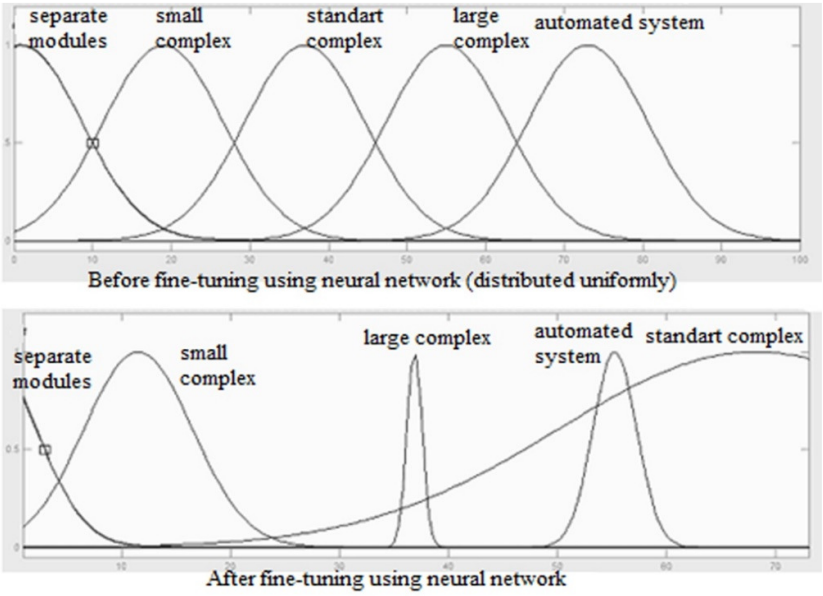

Fig. 1: Fine-tuning of membership functions

Fuzzy inference system, modified by using neural network modeling, shows better results both relatively training set of examples and for examples from the test sample.
The structure of the obtained neuro-fuzzy network is presented in Fig. 2.

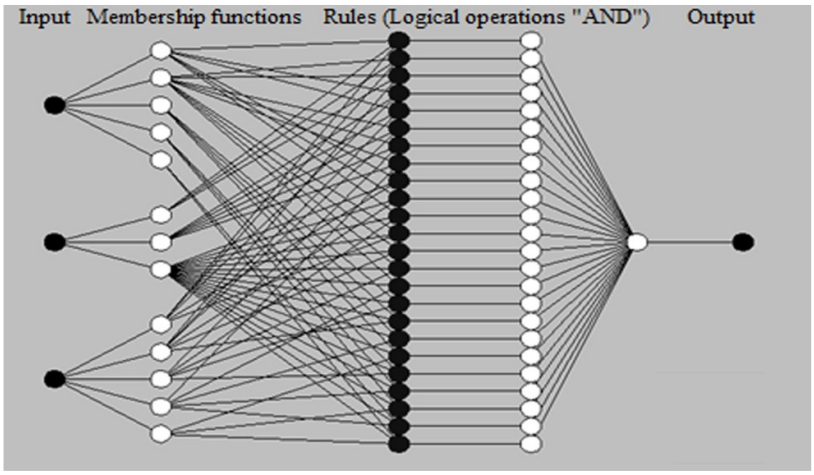

Fig. 2: Architecture of the neuro-fuzzy network

In this architecture the first layer of neurons transmits the input signal, performing transit function. The second layer of neurons carries out fuzzification, i.e. it simulates the membership function, so it contains the number of neurons equal to the total number of fuzzy sets describing the possible values of the input variables. The third layer is responsible for determining the degree of truth of the rule and consists of 24 neurons (24 rules were determined by experts), each of which receives input signals from neurons of the second layer and implements a logical bunch “AND”. The neuron of output layer with the vector of weights, connecting it with the outputs of the previous layer, acts as an adder, to determine the exact value of the output variable.

Conclusion

The above-described automated system allows quickly obtain the desired estimate of laboriousness, at the same time having the ability to further learning and adaptation options in accordance with the newly emerging actual results of operational activities of company. Advantages of modern automated decision support systems are obvious. The use of the maximum amount of available information (not only documented or numerical information, but also expert's opinions, inaccurate preliminary data, assumptions, etc.) and modern tools of analysis are necessary for sustainable economic development of companies in the face of high level of competition and high uncertainty of the external environment. However, even perfect information system should not be overestimated, it must be remembered that the final decision should belong to decision-makers - high qualified specialists.

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Modelamiento De Ecuaciones Estructurales Aplicado Al Ámbito De Los Sistemas De Información Y El Rendimiento Organizativo En Establecimientos Educativos

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Resumen

Este estudio explora la relación entre el éxito de los sistemas de información, la satisfacción y compromiso laboral, y el rendimiento organizativo en establecimientos educativos de nivel primario y secundario, utilizando modelamiento de ecuaciones estructurales. A partir de encuestas aplicadas a directivos, administrativos y profesores con conocimientos y experiencia en gestión de establecimientos educativos, se evaluó un modelo de comportamiento. Los resultados muestran que el éxito de los sistemas de información incide en el compromiso laboral, presentándose un efecto en el rendimiento de la organización, pero la satisfacción laboral no muestra efectos significativos.

Palabras Clave: Modelamiento, Sistemas De Información, Comportamiento.

Introducción

Los Sistemas de Información (SI) son utilizados por personas de distintas organizaciones, como las entidades educativas, las que esperan que satisfagan sus requerimientos, traduciéndose en una satisfacción del usuario, constituyendo un factor clave para el éxito de los SI, contribuyendo al logro del rendimiento de la organización (Calderón y Rodríguez, 2010).

Este estudio busca establecer si el éxito de los sistemas de información afecta a la satisfacción y compromiso laboral, incidiendo en el rendimiento organizativo de establecimientos educativos de enseñanza primaria y secundaria.

Antecedentes E Hipótesis

El modelo de DeLone y McLean (2003) mide el éxito de los sistemas de información por medio de seis variables relacionadas con el efecto que estos sistemas pueden tener en el desarrollo de las actividades de sus usuarios, afectando la percepción de estos sobre aspectos relacionados con su trabajo, los que se relacionan con la satisfacción y compromiso laboral de las personas, lo que puede tener un efecto en el rendimiento de la organización (Sánchez et al., 2013).

Chiang y San Martín (2015) consideran la satisfacción laboral (SL) como “un concepto globalizador con el que se hace referencia a las actitudes de las personas hacia diversos aspectos de su trabajo”, mientras que el compromiso laboral (CL) puede entenderse como “la fuerza con la que un individuo se

siente vinculado a una organización y que implica el seguimiento de un curso de acción relevante para la organización" (Juaneda y González, 2007).

El rendimiento organizativo (RO) ha interesado permanentemente a las organizaciones, donde las entidades educativas no se encuentran ajenas. De acuerdo a Hepp et al. (2017), en Chile el uso de sistemas y tecnologías de información para apoyar la gestión en el sistema escolar es diverso, identificándose herramientas de este tipo que buscan colaborar con aspectos relacionados con la gestión de los establecimientos en distintos ámbitos.

Sobre la base de los planteamientos anteriores, se proponen las hipótesis:

H1: El EXSI incide en la SL de las personas, en establecimientos educativos.
H2: El EXSI incide en el CL de las personas, en establecimientos educativos.
H3: La SL de las personas incide en el RO, en establecimientos educativos.
H4: El CL de las personas incide en el RO, en establecimientos educativos.

Metodología

Se aplicaron encuestas a directivos, administrativos y/o profesores que utilizan y/o conocen SI para apoyar la gestión de establecimientos educativos de enseñanza primaria y secundaria, en Chile.

Siendo el éxito de los SI un aspecto que presenta cierta complejidad social dadas las variables involucradas, resulta conveniente la utilización de modelos de ecuaciones estructurales (SEM), ya que permite incorporar variables no observables medidas indirectamente por variables observables (Hair et al., 2014). PLS-SEM es principalmente utilizado en el desarrollo de teorías en investigaciones exploratorias, enfocándose en explicar la varianza de las variables dependientes que examina el modelo de investigación, de manera de probar las relaciones entre variables latentes en el nivel teórico, constituyendo una herramienta de utilidad en investigaciones en el campo de las ciencias sociales (Hair et al., 2014), ajustándose a las características de este estudio. El análisis estadístico de los datos utilizó SEM basado en PLS-SEM y el software SmartPLS.

Resultados

Los resultados presentados corresponden a 50 encuestas válidas. Los datos obtenidos validan satisfactoriamente el modelo de medida, cumpliéndose las condiciones exigidas según la literatura. La evaluación del modelo estructural se presenta en la figura 1, soportándose las hipótesis H1, H2 y H4. Los resultados señalan que la variación del Rendimiento Organizativo es explicada en un 58,5% por el Compromiso Laboral, mientras que el Éxito de los Sistemas de Información explica en un 44,4% la variación de la Satisfacción Laboral y en un 54% la variación del Compromiso Laboral.

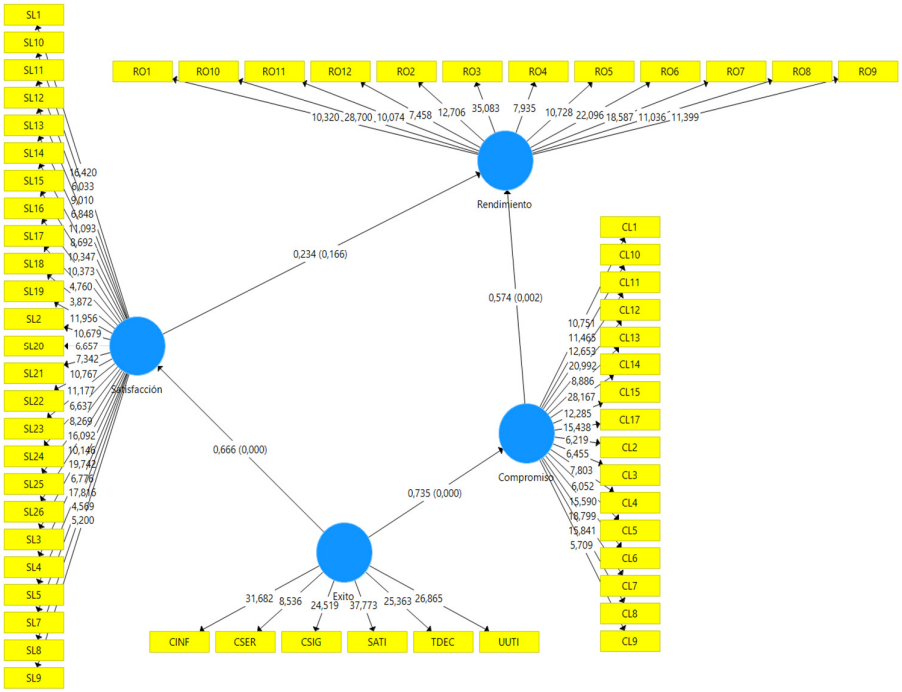

Figura 1: Modelo Estructural

(Fuente: Elaboración propia)

Conclusiones

Los resultados muestran que, en establecimientos educativos de nivel primario y secundario, el éxito de los sistemas de información incide positivamente en la satisfacción y compromiso laboral, existiendo una fuerte relación positiva entre el compromiso laboral y el rendimiento organizativo, mientras que la satisfacción laboral no presenta una incidencia significativa en dicho rendimiento.

La utilización de PLS-SEM ratifica lo señalado por diversos autores, como Cepeda et al. (2017), ya que constituye un medio útil para efectuar análisis de variables en un contexto complejo, facilitando el desarrollo de estudios en distintas áreas de las ciencias sociales.

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Post-Marketing
(Creating Reliable Information About A Product)

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Abstract

Stimulated by development of information technology, numerous changes taking place in the public space result in the fact that customers more and more often search for some reliable information about the goods they purchase. They do not expect enhanced advertisement any longer but they want some reliable presentation. New forms of market behaviour have been identified during the research carried out with the method of the grounded theory and they have been referred to as post-marketing.

Keywords: marketing, needs, expectations, perception, information, fiction, reality

Aim: presentation of a concept increasing reliability and efficiency of marketing in the future

Research Method: The Grounded Theory, Focus and Elements of Ethno-Methodological Research

Introduction

The current methods of product promotion based on copied ideas and emulation of other companies are slowly being abandoned. Stereotypical advertisement is not appreciated by customers any longer because, most frequently, they search for reliable information about products. At present, it is also possible to observe that the amount of various manipulation with buyers' emotions based on presupposition (Batko, 2005), implicature (Puczyłowski, 2014) and rhetoric has been considerably decreased. Furthermore, it is also possible to observe the following trends in the current marketing operations:

- abandoning the primacy of needs (Maslow, 2006) over expectations (Foster, 2003). The variety of products and services allows customers to satisfy their needs in any way they wish; however, it does not equal to meeting customers' expectations, which will be of the key significance to the further development of companies in the future (Lachiewicz and Matejun, 2007);
- replacing *have*-oriented behaviour patterns with *be*-oriented behaviour patterns (Fromm, 2007). *Have*-oriented advertisement encourages customers to have things, most of which will find their final destination in a lumber room, together with pieces of some old equipment, clothes and publications. *Be*-oriented behaviour implies activity, fertility, transformation, openness, spontaneity in expressing one's feelings (Fromm, 2010). It is also associated with creative processes, expressed with the following phrases: to be responsible, to be reliable and to be honest. *Be*-oriented marketing puts customers' belongings aside, which is usually expressed with the following phrases: to live in healthy environment, to be satisfied with the purchase, to feel safe during the exploitation of particular equipment;
- minimising the power of the dead over the living (Kaczmarek, 2007). It means limitation in references made to tradition in various situations because tradition often deactivates logical thinking and replaces it with stereotypical perception of the world, in a way which has been imposed on the living by previous generations[1]. It also refers to burdening customers with all the trauma related to the characters

who endorse some particular products[2]. In many cases, following traditional ways results in the purchase of disposable products which are of little or no use at all in our everyday life;

- abandoning the primacy of fiction over reality (Marquard, 2007). Based on a more or less credible vision presented in literature, movies, which are constantly interrupted with advertising spots offering very little reliable information about products, do not provide entertainment and they contribute to viewers' apathy, actually discouraging them from any purchase. The modern, educated and well-organised society does not expect any abstract slogans or celebrities' opinions. The society expects reliable knowledge which can be helpful in making rational choices in wide ranges of products of the same assortments;
- excluding domination of time over space in marketing (Buczyńska-Garewicz, 2006). It means minimisation of time during which goods are consumed at the cost of increased amounts of various waste and used packaging which end up at rubbish dumps and landfill sites but also in seas and oceans. As responsible citizens, we can actually spend more time to consume goods which are easily recyclable or biodegradable after the use;
- reversing a distressing phenomenon of the primacy of gain over ethics. Printed in a tiny font on packaging, product ingredients can surely contribute to a short increase in the revenues from sales, however after a longer time they discourage customers from buying particular products again. Being aware of problems which senior citizens may have with their eyesight, producers do not make it easy for them to obtain reliable information. Nevertheless, such practice is legal, even if it is highly questionable in terms of ethics;
- abandoning the primacy of a monologue over a dialogue. Advertisement besets all of us. Producers send their messages to potential clients who do not need them and who often ignore them. This fact turns customers into mere addressees who must have such messages imprinted into their awareness and who must remember that there are advertised goods on the market which should be bought;
- abandoning the primacy of the paradigm over emergence. The paradigm is an accepted way of perceiving the reality in a particular field; it is a pattern, a stereotype or a model of behaviour. Emergence is defined as completeness which is more than just a sum of its parts; intuitively it refers to the emergence of new qualities, forms and behaviour referring to interaction between simpler elements (Poczobut, 2006). Information about products can be defined as emergent when it "forces" customers to look for some additional knowledge about how to recycle particular goods and it contributes to the decision about purchasing products provided by particular manufacturers.

Characteristics of Post-Marketing

Content marketing (Sękowski, 2018) can be viewed as a premise of the advent of post-marketing. It refers to constantly improved, reliable and scientific content presenting products with the use of manuals, articles, webinars, blogs, expert opinions, models, drawings, photographs, films, charts, graphs, schemes, projections, cross-sections, projects, plans, tables and other forms of spatial visualisations. Also, it is possible to observe some other innovative market operations focused on expectations expressed by buyers towards products, physicians towards patients, academic teachers towards students, politicians towards voters, priests towards their congregation members and, first of all, the society towards corporations.

In order to obtain as many prompts how to increase credibility in post-marketing operations as possible, the grounded theory has been used because due to its procedures, we are able to search for phenomena we did not look for at the beginning of the research (Konecki, 2000). The authors of the grounded theory indicate that systematic and consistent quality analysis can become a source of new ideas (Glaser and Strauss, 2009). The research carried out among a group of students (200 respondents, approximately) sensitised us to some questions which were worth asking about the subject of the research (Charmaz, 2009) and it allowed the research team to identify the characteristics of good product presentation in order to meet expectations of local communities.

The respondents of the research survey observed that in the future, it would be possible to provide product presentations in social, political, ecological, religious, professional and family contexts, with consideration of the following:

- **anticipation**, which is a capability of pre-empting, early performing or assuming some opinions in advance. In post-marketing, anticipation refers to activities which prepare customers to buy som□d□sig□□d products which hav□□ot b□□□ma□ufactur□d y□t;
- **perception**, which is the way of thinking based on logic and on one's own emotions. It forces customers to evaluate products with the use of comparison by various criteria. This process is acquired and trained in everybody's life and, as a result, it is possible to control customers with the use of the criteria passed o□th□m b□for□;
- **attitude** which results from the cultivation of stereotypes – in other words, acting in a "simplified" reality based on the knowledge which refers to things, people, social groups or institutions – an attitude has been reinforced by experience and tradition. Thanks to a change in one's attitude, a decision which has been impossible to accept, can be diametrically changed because a customer will b□abl□to □valuat□products from a diff□r□□t p□rsp□ctiv□;
- **associations** which result from a customer's individual experience that can be a reflection of their previous experience from various stages of their life. Patriotic and religious symbols which will be associated by a customer with particular products are also significant. They result from the meanings which go b□yo□d th□physical f□atur□s of particular products;
- **sensitivity** which is defined as a capability of quick response to external stimuli. It is closely related to empathy which is a capability of establishing and maintaining various partner relationships (Goleman, 1999). Thanks to such features, customers may adjust their behaviour to any situation which ca□guara□t□□th□m satisfactory r□sults;
- **customer segmentation** – if based only on some demographic features, it has ceased to be a sufficient condition for making marketing decisions. Similarly, behaviouristic criteria do not provide an unambiguous answer to the following question: why do buyers purchase a particular product? In post-marketing sensory differences are important as they divide consumers into visual, auditory and kinaesthetic types of people.

Furthermore, development of various forms of information about products will also require (as the respondents observed) consideration of ethno-methodological aspects of communication in groups (Garfinkel, 2007). It will involve adjustment to the universal ways of communication based on:

- **inter-subjectivity**, in other words, searching for ways of communication which are common for all communities, regardless of their culture, religion, social status and beliefs (Gard□□fors, 2007);
- **indexicality**, in other words, unambiguous understanding information which is sent and received in a particular time. It means that if we want to grasp the meaning of a message, it should undergo not only the processes of conceptualisation and operationalisation but it should be also given i□a situatio□al co□t□xt, d□p□□di□g o□th□□□□ds;
- **typicality** which r□f□rs to th□r□curr□□c□of som□activiti□s; it m□a□s impl□m□□tatio□of som□ patterns, standards, models reinforced in a series of similar behaviour patterns, attitudes or events. This feature is related to the presentation of things which are representative and characteristic for a particular tim□p□riod, plac□a□d □viro□m□□t;
- **uncertainty**, in other words, a situation in which activities performed under the same conditions can bring about various results. The source of uncertainty is the fact that the occurrence of singular events is determined by numerous factors and only some of them are known and possible to be taken into consideration while making purchase decisions.

Conclusions

In order to plan the improvement in the efficiency of various presentations provided by a company in post-marketing, the following integrated model of action has been proposed (Table 1).

Table 1: Integrated activities in post-marketing

Process of providing customers with significant information in post-marketing
Step 1. In marketing operations, it is necessary to minimise the primacy of needs over expectations, to have over to be, the power of the dead over the living, fiction over reality, time over space, gain over ethics, a monologue over a dialogue, a paradigm over emergence.
Step 2. It is necessary to consider the following determinants which can increase customers' interest in particular products: anticipation, perception, attitude, associations, sensitivity and sensory segmentation.
Step 3. While developing the method of product presentation in media, it is necessary to consider the following factors: inter-subjectivity, indexicality and uncertainty, because thanks to them it is possible to develop a credible image of a company and its products.
Step 4. In post-marketing, all activities related to pricing policy, designing and using products, presenting products in media and distributing should meet requirements which are set for entrepreneurs by the modern society and which include broadly understood recycling and disposal.

Source: the author's own study

Conclusions

To sum up, it is possible to state that the on-coming time of establishing relations between producers and consumers, or even between corporations and the society, will be referred to as post-marketing. It will reverse primacies which have already been articulated and which characterise contemporary operations undertaken by companies on the market. The above-mentioned process will allow companies to adjust themselves better to changes taking place in the environment which has been heavily polluted by vast amounts of used packaging and thoughtless consumption of goods.

Marketing methods which have been applied so far to affect customers have also resulted in numerous adverse changes. Now the time has come to change the forms of pricing, producing packaging materials and ways of distributing goods not only from producers to consumers but also packaging and used-up and worn-out products from consumers to disposal and recycling centres. This is a challenge that must be faced by post-marketing, the significant features of which have been identified during the research carried out with the use of the grounded theory.

Endnotes

[1] The problem also refers to the names of streets, squares and districts.

[2] It particularly refers to streets and schools which are often named after famous but traumatic characters or events.

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Robotic Process Automation: Mapping the Emerging Research Field

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Abstract

The aim of the paper is to map the emerging research field focused on robotic process automation. The study employs bibliometric methods of research profiling and keywords co-occurrence analysis. Data for analysis are retrieved from the Scopus database. VOSviewer software is used to support analysis and visualize the findings. First of all, the leading contributors to the development of the research field are identified, including the most productive countries, research institutions, source titles, authors, and core references. Secondly, the leading research topics and thematic areas in the field are discovered and explored. The study shows that discourse in the field focuses around four issues that are related to information management systems, cognitive automation, productivity oriented automation and business model innovations.

Keywords: Robotic Process Automation, Bibliometrics, Research Profiling, Keywords Co-Occurrence Analysis.

Introduction

Robotic process automation (RPA) as an intelligent form of automation is designed to transform processes through partial or comprehensive replacement of traditional solutions with digital ones. In particular, it refers to redirecting repetitive and mass tasks performed by humans (Agostinelli, 2019) to programmed robots imitating their work (Cewe et al., 2018). Many organizations and researchers consider RPA as a new technological solution that increases efficiency (Fernandez & Aman, 2018) and flexibility of operation (Burgess, 2018), improves quality (Vanmali, 2017; Kokina & Blanchette, 2019), and also reduces costs (Hallikainen et al., 2018) and risk (Deloitte, 2018). However, the effects of implementing RPA in business practice can significantly extend beyond the area of functioning of a given process or specific organization and have a global dimension. Therefore, their impact on sustainable development (Owen et al., 2013), the labor market (Frey & Osborne, 2017) and security (Cearley et al., 2019) is not without significance. The popularity of various automation tools, including RPA, has been increasing (Deloitte, 2018). Its advantages in terms of flexibility (IRPA, 2015), ease of configuration (Anagnoste, 2017; Agaton & Swedberg, 2018) and short implementation time (Asatiani & Penttinen, 2016) are pointed out in literature. Therefore, RPA and its various contexts - conceptual, methodological, behavioral, technological, business, organizational or macroeconomic - appear as an important and interesting research field.

The issue of RPA is considered to be an emerging field of scientific inquiry. This thesis is confirmed by scanning high quality bibliometric databases. As of 19 January 2020, in Scopus, there are found are only 104 publications including such a phrase in their titles, keywords and abstract (topic search). The same query in Web of Science Core Collection brings only 41 items. The earliest publication dates back to 2009, while the vast majority of the scientific output has been amassed since 2018. What is more, so far, research productivity in the field has not been mapped with the use of bibliometric methods. The topic search for the following conjunction of phrases: ('robotic process automation')

AND ('bibliometric' OR 'bibliometrics' OR 'scientometrics' OR 'informetrics') brings no results either in Scopus or Web of Science Core Collection databases. Such an observation indicates a gap in the body of knowledge related to the research on RPA. Therefore, the aim of this study is to map, from the bibliometric perspective, the emerging research field focused on RPA. The following research questions are set in order to organize the research process: (1) who are the main contributors (countries, research institutions, source titles, authors, core references) to the development of the research field? (2) what are the leading research topics and thematic areas in the field?

Method of study

Research sample

We collected bibliometric data for analysis from the Scopus database. As of 19 January 2020, we queried for the phrase 'robotic process automation' in the titles, keywords and abstracts (i.e. topic search) of Scopus-indexed research publications. As the topic under the study is very up-to-date, we refrained from any limitations regarding the dates of publications and the subject areas they belong to. We retrieved 104 records (publications) distributed over 16 subject areas. Publications in Scopus are categorized on the non-exclusive basis i.e. one publication may be assigned to two or even more subject areas. Among the subject areas represented in the field, those including the highest number of publications are: Computer Science (71), Engineering (36), Business, Management and Accounting (32), Decision Sciences (23), and Mathematics (21). Conference papers (46) constitute the leading type of documents. They are followed by journal articles (38). This should be considered as a distinctive feature of the sample, as journal articles usually make up the majority of Scopus-indexed publications. For instance, as of 19 January 2020, among more than 77 million records in Scopus, 72% are journal papers, while conference papers (the second top category) constitute 13%. All the papers comprising the research sample are written in English. The detailed parameters of the sample are displayed in Table 1.

Table 1: Parameters of the research sample

Category	Items (occurrences)
Date (year) of publication	2020 (6); 2019 (55); 2018 (31); 2017 (6); 2016 (5); 2009 (1)
Subject areas (overlapping)	Computer Science (71); Engineering (36); Business, Management and Accounting (32); Decision Sciences (23); Mathematics (21); Economics, Econometrics and Finance (10); Social Sciences (9); Environmental Science (3); Medicine (3); Arts and Humanities (2); Energy (2); Health Professions (2); Materials Science (2); Pharmacology, Toxicology and Pharmaceutics (2); Physics and Astronomy (2); Agricultural and Biological Sciences (1)
Document type	Conference Paper (46); Article (38); Conference Review (9); Book Chapter (4); Review (4); Editorial (2); Undefined (1)
Language	English (104)

Source: Own study based on data retrieved from Scopus (19 January 2020).

Scanning the publications in the research sample brings 632 keywords. Among them, 9 expressions achieved 10 occurrences, while 18 of them are reported for the threshold of 5 occurrences. There are 533 keywords which occurred only once. We calculated the number of high-frequency keywords in the sample (32) using the formula provided by Donohue (1974; as cited in: Guo et al., 2017, p. 7). Then, we established the minimum number of occurrences (3) corresponding to the identified number of high frequency keywords. Within the research sample, there are 47 keywords with at least 3 occurrences. Among them, we excluded generic expressions related to the writing process such as: 'article' and 'teaching case'. Finally, we included 45 high-frequency keywords in co-occurrence analysis.

Research Methods and Instruments

We applied bibliometric methodology in order to explore research questions and achieve the aim of the study. Firstly, we identified leading contributors to the research field with the technique of general publication profiling, which is a component of the research profiling method (Porter, et al., 2002). Secondly, we scanned the leading thematic areas within the research field with the use of co-occurrence analysis (cf. He, 1999) of high-frequency keywords included in the publications comprising the research sample. This part of the study was supported with VOSviewer software (van Eck & Waltman, 2010, 2018). In the process of analysis, we identified high-frequency keywords in the research field, categorized them into thematic clusters and visualized them (van Eck & Waltman, 2014). We used item density visualization and network visualization functions of VOSviewer. The parameters used for analysis are displayed in Table 2.

Table 2: VOSviewer parameters used for analysis

Item	Characteristic/ value
Type of analysis	Co-occurrence analysis
Unit of analysis	All keywords
Counting method	Full counting
Method of normalization of strength of the links between items	Association strength method
Layout	
Attraction	2 (default setting)
Repulsion	0 (default setting)
Clustering	
Resolution parameter (detail of clustering)	1 (default setting)
Minimum cluster size [N]	5
Merging small clusters	Switched on
Visualization	
Scale	1.00
Weights	occurrences
Labels size	0.50
Maximum number of lines	1000
High frequency keywords used for analysis [N]	45
Minimum occurrences of a keyword used for analysis [N]	3

Source: Own study based the use of VOSiewer (19 January 2020).

Results Presentation

Publication Profiling

The research field focused on RPA is profiled from the perspective of the most productive countries, research institutions, source titles, authors and core references. The data for publication profiling of the RPA research field are presented in Table 3. In all the categories, with the exception of core references, the threshold of 3 publications was used to select relevant contributors. Among core references, there are listed the research papers which received at least 10 citations in other Scopus-indexed publications.

Table 3: General publication profiling of the RPA research field

Category	Top Items (number of publications)
Country	United States (17); Germany (13); India (13); United Kingdom (9); Australia (8); Netherlands (6); Canada (5); Japan (5); Finland (4); Czech Republic (3); Estonia (3); France (3); Poland (3); Portugal (3); Taiwan (3)
Research Institution	Nagasaki University, Japan (3); University of Melbourne, Australia (3); University of Missouri-St. Louis, United States (3); University of Tartu, Estonia (3); Aalto University, Finland (3)
Source Title	CEUR Workshop Proceedings (12); Lecture Notes in Business Information Processing (11); ACM International Conference Proceeding Series (4); Journal of Information Technology Teaching Cases (4); Advances in Intelligent Systems and Computing (3); International Journal of Engineering and Advanced Technology (3); International Journal of Innovative Technology and Exploring Engineering (3)
Author	Reijers, H.A., Utrecht University, Netherlands (4); Arai, K., Nagasaki University, Japan (3), Dumas, M., University of Tartu, Estonia (3); La Rosa, M., University of Melbourne, Australia (3)
Core references	Aguirre and Rodriquez (2017) (22); Lacity and Willcocks (2016) (22); van der Aalst et al. (2018) (19); Asatiani & Penttinen (2016) (15); Ljungholm (2018) (11)

Source: Own study based on data retrieved from Scopus (19 January 2020).

The United States, with 17 publications, is found to be the leader among the most productive countries. Germany and India, each of them contributing with 13 papers, are the runner-up nations. Other followers represent Anglo-Saxon countries (the United Kingdom, Australia, Canada), Asian economies (India, Taiwan) and the EU countries, including both West European as well as Central and East European countries. The most productive research institutions in the field are: Nagasaki University, the University of Melbourne, the University of Missouri-St. Louis, the University of Tartu, and Aalto University. *CEUR Workshop Proceeding*s and *Lecture Notes in Business Information Processing* are recognized as leading source titles giving focus to the issues of RPA. Together, these two source titles published around 20% of scientific production in the field. H.A. Reijers from Utrecht University, Netherlands is found to be the most prolific author in regard to the number of publications. The followers are: K. Arai representing Nagasaki University, Japan, M. Dumas from the University of Tartu, Estonia, and M. La Rosa affiliated at the University of Melbourne, Australia. The catalogue of core references includes the works of Aguirre and Rodriquez (2017), Lacity and Willcocks (2016), van der Aalst et al. (2018), Asatiani & Penttinen (2016) and Ljungholm (2018).

Leading Topics and Thematic Areas

The number of occurrences received by a keyword may be considered as an indication of the interest of researchers in a given topic. The prominence of high-frequency keywords in the RPA research field is presented in Figure 1 with the use of item density visualization function of VOSviewer. Top 10 high-frequency keywords in the research field and their bibliometric characteristics are enumerated in Table 4.

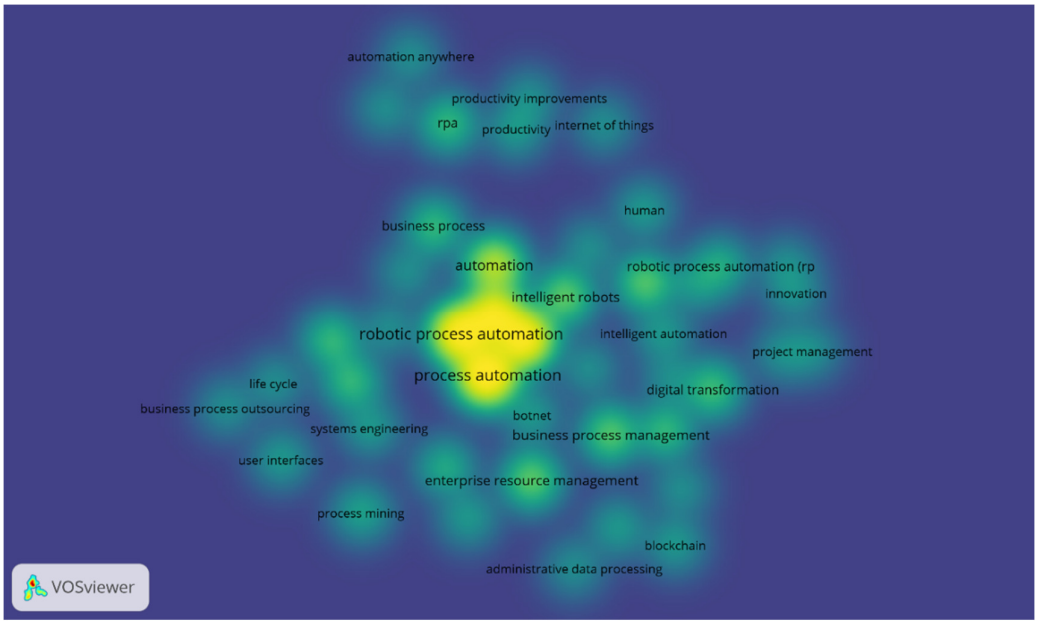

Figure 1: High-frequency keywords in the RPA research field

Source: Own study based on data retrieved from Scopus and analyzed in VOSviewer (19 January 2020).

Table 4: Top 10 high frequency keywords in the RPA research field

Keywords	Occurrences	Links	Total links strength	Average publication year
process automation	48	42	257	2018.33
robotic process automation	43	38	200	2018.44
robotics	40	42	239	2018.55
process control	36	42	240	2018.64
automation	22	35	129	2018.18
enterprise resource management	12	27	84	2018.75
intelligent robots	12	34	85	2018.83
artificial intelligence	11	25	58	2018.36
business process management	11	25	64	2018.82
digital transformation	9	19	34	2018.78

Source: Own study based on data retrieved from Scopus and analyzed in VOSviewer (19 January 2020).

In order to identify the leading thematic areas in the field, we conducted the co-occurrence analysis of high-frequency keywords. Thematic clusters presented in Figure 2 are the outcome of this analysis. The list of keywords assigned to each of the clusters is provided in Table 5 (top 10 high-frequency keywords, enumerated in Table 4, are bolded).

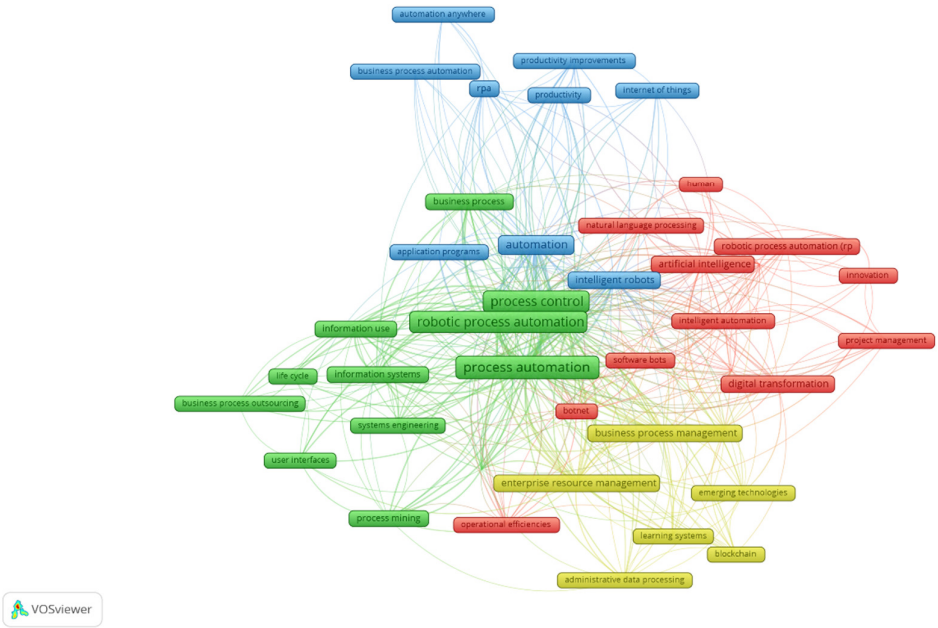

Figure 2: High-frequency keywords clusters in the RPA research field

Source: Own study based on data retrieved from Scopus and analyzed in VOSviewer (19 January 2020).

Table 5: Composition of high-frequency keywords clusters in the RPA research field

Cluster label /color	**Items (N)**	**Keywords**
information management systems /green	14	business process, business process outsourcing, data mining, decision making, information systems, information use, life cycle, **process automation**, **process control**, process mining, **robotic process automation**, **robotics**, systems engineering, user interfaces
cognitive automation/ red	15	**artificial intelligence**, artificial intelligence (AI), big data, botnet, **digital transformation**, human, innovation, intelligent automation, natural language processing, operational efficiencies, project management, robotic process automation (RPA), robotics process automation, software bots, technology
productivity oriented automation /blue	9	application programs, **automation**, automation anywhere, business process automation, **intelligent robots**, internet of things, productivity, productivity improvement, RPA
business model innovations /yellow	7	administrative data processing, blokchain, **business process management**, emerging technologies, **enterprise resource management**, learning systems, machine learning

Source: Own study based on data retrieved from Scopus and analyzed in VOSiewer (19 January 2020).

Discussion

The previous literature reviews in the field of RPA focused primarily on conceptual and implementation analysis. Ivančić and associates (2019) reviewed the definitions and effects of implementing RPA in practice. They also explained the difference between RPA and business process management. Syed et al. (2020) identified current scientific achievements and to indicated gaps and research challenges in the field of RPA: starting from conceptual aspects (definitions and

methodology), through the stage of designing RPA solutions, determining the preconditions for implementing RPA, organization of the implementation process and its effects. Our analysis presents the main directions of authors' interests from a cluster perspective. We have identified key research contexts defined by the objectives and areas of RPA application. We have determined that discourse focuses around four issues that are related to information management systems, cognitive automation, productivity oriented automation and business model innovations.

An important area of interest of the authors turned out to be the use of RPA for obtaining, processing, analyzing and interpreting information. Organizations are currently struggling to efficiently manage databases (Vilminko-Heikkinen & Pekkola, 2017), and informational needs of management exceed the capabilities of traditional technology. By accessing one or more non-integrated systems, RPA allows to conduct multidimensional data analysis, enabling managers to make decisions. Therefore, RPA supports the organization's development and improvement of its results through comprehensive and critical business process engineering (Aguirre & Rodriguez, 2017; van der Aalst et al., 2018). Kattepur (2019) presents the possibilities of using RPA to analyze and improve resource efficiency based on the example of the use of automation in Industry 4.0 workflows. It simulates throughput, response time, utilization and operational costs using average value analysis algorithms (MVA). Other authors describe the system approach to information systems, examining the optimal configuration of performance systems and hybridization of information system technologies to increase the flexibility of the enterprise (Williams et al., 2020). It should be noted that the increasing amount and complexity of data creates the need for new methods of the business process analysis to assess process optimization options. Methods for analyzing processes using routine, semi-cognitive and cognitive levels of decision logic are proposed in the subject literature (Rizun et al., 2019). In addition, to improve decision-making processes, solutions for visualizing business processes on the basis of data downloaded from a computer are also proposed (Urabe et al., 2019).

Agostinelli (2019) noticed that the current generation of software robots is guided by procedural rules rather than artificial intelligence. The inclusion of cognitive methods makes it possible to use RPA more extensively. Our analyses show that this aspect of research is most often undertaken by authors. Algorithms derived from artificial intelligence, and used by cognitive automation, allow to analyze large sets and interpret data in real time. Thanks to data mining, the use of machine learning or natural language processing, RPA can support and develop analytical or predictive processes (Davenport & Kirby, 2016; Galusha, 2018) that are increasingly based on artificial intelligence. The forecast directions of technology development include hyperautomation, which, in turn, includes a combination of such tools as RPA, intelligent enterprise management software (iBPMS) and artificial intelligence (Cearley et al., 2019). The implementation of digital innovations and their impact on humans has been studied in literature primarily in the organizational, technical and behavioral context in various industries (e.g., health care (Wiljer & Hakim, 2019), banking (Romao et al., 2019), shared services (Naga Lakshmi et al., 2019)), pointing to their extensive applications and yet unidentified consequences. The aspects of RPA impact on humans are also discussed. Key challenges requiring in-depth analysis relate in particular to employment, ethics, acceptance of technology, customer experience, work planning, social integration and regulation (Mendling et al., 2018). The issues of risk management created by new technologies and building trust in new technologies in the community also seem to be interesting (Owen et al., 2013).

As a result of research, it was established that there is a clearly separated area of considerations devoted to the phenomenon of using RPA to improve productivity. Radke et al. (2020) note that manufacturing companies now have to deal with the increasing speed and complexity of change to manage their global supply chains. The significance of this context of RPA is also indicated by empirical studies, whose authors signal that the main reason for automation is not cost pressure but the need for a specific process efficiency (e.g. production volume) that people are unable to achieve (Deloitte, 2018).

The next issue undertaken by researchers is the use of RPA in creating process innovations and managing an organization's resources. Researchers focus on the issues related to the importance of technological innovations, such as e.g. blockchain, learning systems, machine learning, and other emerging technologies, for managing company resources and processes. The implementation of these

innovations in the RPA ecosystem (as an integral part of RPA or as complementary solutions) can create resource and process innovations in the business model. Digital transformation and closer integration progressing in both vertical and horizontal value chains (cooperation with suppliers, customers, partners) have a significant impact on changes in business models. High potential is indicated primarily in back-office processes. Mishra et al. (2019a, 2019b) studied the technological aspects that affect automation initiatives from a deployment perspective as well as people and process dimensions of automation in the business process management industry. The importance of robotization and artificial intelligence for changes introduced in business models was highlighted by Met et al. (2020). First of all, they emphasized the impact of new technologies on the transformation of the customer service model and internal operational processes in the financial sector. Syed et al. (2020) raised the issue of 'an organization's readiness' for RPA implementation. They indicated that effective automation depends on business drivers, the nature of existing technology and degree of maturity, as well as on the appropriate selection of processes for the implementation of robots. Hartley and Sawaya (2019) listed the need to identify a technology visionary and develop a digital technology road map for processes in addition to the need to update information systems and among the important conditions for the adoption and effective use of RPA. Literature review by Syed et al. (2020) also revealed that there was no universal research-based successful implementation methodology for RPA, although attempts to develop it based on the experience of specific industries or companies were made. One of the first attempts to define the methodological framework for the implementation of RPA was made by Sönmez and Börekçi (2020). They presented RPA in a broader context - from an industrial engineering perspective, taking into account the ecosystem and the RPA life cycle for the extended automation process.

As a result of our analyses, we find that the following contexts of RPA considerations can be distinguished in the literature: analytical and management, cognitive, productivity, and resource and process. The findings add yet another perspective to the considerations by Syed et al. (2020). Therefore, these studies can be considered as mutually complementary.

Conclusions

The study has mapped the research field focused on the issues of robotic process automation. First of all, the leading contributors to the development of the research field have been identified, including the most productive countries, research institutions, source titles, authors, and core references. Secondly, the leading research topics and thematic areas in the field have been discovered and explored.

The study contributes to management theory through mapping the RPA research field. It creates the added value for researchers interested in this emerging area of scientific inquiry. Its originality and novelty results from describing the research landscape in the field with bibliometric methods, which has not been done before.

The findings of the study should be considered in the context of its research limitations. First of all, the sample used for bibliometric analysis is very small due to the fact that the research field is within its emergence phase. As the topic is very 'hot', we expect a very dynamic increase in the number of publications. Therefore, in the future, bibliometric studies should be replicated in order to map the development of research in RPA. Secondly, the study employs the perspective of the whole research field, neglecting the differences among subject areas. Following the amassing research output, it seems to be interesting to explore the differences in the approaches typical of leading subject areas. In particular, comparing and contrasting between the computer and technical perspective versus the business, management and accounting perspective could be an interesting and inspiring piece of research. Thirdly, formal limitations regarding the length of the paper forced us to focus only on major trends and tendencies and refrain from a 'deep dive' in the research field. Therefore, we recommend to extend our project, to develop a full-scale research profiling study, and to confront its findings with comprehensive literature reviews (e.g. Syed et al., 2020).

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Selected Aspects of Internet Marketing Processes Automation in Enterprise Management

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Abstract

The paper presents the issues related to automation of selected internet marketing processes. A vital aspect of contemporary enterprises functioning is a properly defined and selected marketing theory implemented within the virtual information space. This is a component of communication between potential customers and the enterprise. This space requires that marketing processes are automated. This is carried out based on the mechanisms available in such solutions as: Marketing Automation and Programmatic Marketing. An important role here play: artificial intelligence, machine learning and software bots. The underlying objective of the paper is the investigate the interest of commercial enterprises that operate based on the traditional-internet business model in implementing solutions in the scope of e-marketing processes automation. The pilot research was conducted with the use of a survey questionnaire and additional phone conversations as a free-form interviews among the enterprises of the gardening industry in the selected EU countries. Within the research the authors have distinguished three components of solutions applied in optimising marketing processes: Marketing Automation, Programmatic Marketing and chat bots. The results demonstrate a significant interest in the discussed solutions, in particular in implementing them on social media portals, communication with clients as well as customer behaviour analysis and monitoring. The results of the research also include opinions of entreprenuers, which indicted the potential benefits of the presented solutions pertaining to marketing processes optimisation, such as: reduced cost of service, a possibility of acquiring additional data indispensable to segment and analyse loyalty of customers.

Keywords: Marketing Automation, Programmatic Marketing, Online Marketing, Chat Bots.

Introduction

Development of Information Technologies has become one of the fundamental factors of economic growth and appearance, both in the scientific discourse as well as business practice, terms such as: digital economy, digitisation and automation of business processes. The present state of knowledge indicates that the concept of cyberspace has actually begun to function, which in turn has created a demand for developing new approaches to entities, which can dwell and operate in this space, and also methods of creating them. The literature on the subject frequently indicates in this context solutions termed as software robots, chat bots, software agents – and in more general terms: solutions that allow to automate processes and apply, among others, agent technologies to reach this goal. Simultaneously, it has been

stressed that human beings are replaced by robots not only in "routine" tasks, but also in "predictable" ones.

The areas of enterprise functioning, which – as numerous publications indicate – are particularly susceptible to proces digitisation and automation include: online marketing (e-marketing) and customer service and consultation. Additionally, simulation of the human factor in software solutions of this type is of vital importance, an important function of which is to strengthen the relationships with customers.

The objective of the paper is to evaluate the interest of gardening industry enterprises in the solutions in the scope of e-marketing processes automation, including application of chat bots. In order to achieve the set objective the authors have conducted a pilot research. It concerned the analysis and evaluation of marketing strategies regarding e-marketing processes automation, carried out by economic entities in the member countries of the European Union. The research was conducted in commercial enterprises operating based on the traditional-online business model with the use of a survey questionnaire and additional phone conversations as free-form interviews.

Realising the significance of e-marketing processes and their automation for commercial enterprises, and also considering the strength of the competition on the market the authors have formulated the following research questions:
1. *Are the commercial enterprises that operate based in the traditional-internet business model interested in implementing solutions in the scope of e-marketing processes automation?*
2. *What benefits are expected as a result of applying chat bots in online marketing?*

The paper constitutes a contribution to the literature in implementing solutions in the scope of automating online marketing processes.

Online Marketing

The specificity of the contemporary marketing and strategies applied within its confines have been subject to constant evolution. This situation has been determined by a dynamically changing expectations of consumers, Big Data phenomenon (expansively growing amount of information) and emerging on the market innovative technologies that condition evolution of processes with regard to their digitization and automation. Ever newer, alternative forms of communication (content marketing, native advertising, etc.) are appearing alongside the traditional forms of advertising (e.g. banner one) (Rowley, 2008). An important reason behind the intensification of the latter is crisis of banner advertising (among others, a phenomenon of so called "banner blindness") (Benway, 1998). It should be stressed here that there exists a global trend to minimise the participation of the human factor in the area of brand advertising and promotion. Such a trend determines the implementation of new domain solutions. A wide range of automation regarding undergoing processes can be indicated in the area of marketing, both in the context of optimising sales and purchases of advertisements on the Internet (Programmatic Marketing), as well as analysing and monitoring the behaviours of Internet users with regard to the course and implementation of these processes.

Programmatic Marketing defines a certain scope of technologies as well as forms of their adoption in the processes of automating sales and purchases of advertisements, allowing for delivering the message to a properly personalized group, and in a more detailed form even to a specific, precisely determined customer (Busch, 2016). The philosophy of an approach of this type presents the ecosystem structure (*Programmatic Buying ...*, 2014). It consists of the following components, representing the process of automated sales and purchases of advertising space (including the nature of purchasing models) (*What is Programmatic Advertising...*, 2020):

- Advertiser/Media Agency – a customer directly involved in the campaign, who participates in the purchasing processes of advertising space.
- Adserver – a dedicated IT system that supports emission and management of online advertising campaigns.
- Trading desk – a media agency or a specialist unit in the agency whose task is to optimise and purchase a campaign based on Programmatic assumptions.
- DSP (Demand Side Platform) – a platform within the confines of which the advertiser (or agency) makes the purchase of advertising space. The undergoing processes are also directed at comprehensive actions regarding parameterizing the campaigns being carried out, defining the form of targeting, monitoring and reporting their course. Examples of such solutions are platforms evaluated in the report of the Forrester research company: - Adform, Adobe, AOL, AppNexus, DataXu, Google, MediaMath.
- AdExchange – an agreggated set of tools and techniques dedicated to publishers, by means of which they execute processes of advertising space sales in the RTB (Real Time Bidding) protocol. Within this element of the ecosystem integration of characteristic components of advertisements sales and purchases processes occurs – that is a connection of demand (DSP) and supply (SSP – Supply Side Platform).
- SSP – a technology addressed at publishers. It allows for execution of sales processes regarding advertising space in the programmatic model.
- AdNetwork/Sales, Affiliate Network, Network/Publisher – these are affiliating, advertising networks, publishers, which make advertising space available in the ecosystem.
- DMP – Data Management Platform – aggregating, processing, analysing and consolidating personal data on the users. The DMP platform utilises various types of data on users (information related to actions that have been performed by users, conversion, demographic data, buying intentions, etc.)
- RTB (Real Time Bidding) – carried out in real time auction model of advertising space sales.
- Metrics – tools applied to measure the output.

The popularity and growing importance of Programmatic in the marketing area can be confirmed for instance by the research of the marketing agency Zenith presented in the report „Programmatic Marketing Forecasts 2019". According to this research the value of advertising in the programmatic model in 2020 will amount to USD 98 billion. This will account for 68% of total expenditures for advertising in digital media (Khandelwal, 2019). The report also indicates the technologies that intensify the development of programmatic advertising. Artificial Intelligence, machine learning and 5G technologies implemented within the Programmatic influence its efficiency. Yet, introduction of new advertising channels and media such as Digital Out Of Home (DOOH), podcasts, audio programme advertisements, intelligent devices and AR/VR ensure freedom of personalising this form of marketing communication.

Another example of proces automation in the presented area is Marketing Automation (LeSueur, 2007). It allows to improve and optimise marketing actions (with a stress on sales processes), thanks to monitoring users and their behaviour on websites. This is done through implementation of web applications, artificial intelligence methods, software bots. Complex behavioural profiles are created with the use of proper aggregation of data acquired from the Internet. These structures allow for segmentation of network users in any manner, beneficial with regard to the assumed goals of an advertising campaign or marketing actions – e.g. with respect to: identifying buying preferences, individual interests, etc. (Heimbach, Kostyra and Hinz, 2015).

The Marketing Automation technology is widely applied in various areas of digital marketing, supporting the efficiency of the achieved results. An example can be **e-mail marketing**. Personalisation of sent contents increases its added value, which can be represented by coefficients that define triggering actions by potential recipients. A vital attribute is adjustment of displayed contents to the preferences of adequately profiled groups of recipients, which increases the attractiveness of provided in the

communication process key information. These processes can be parallelly (in real time) accompanied by tests of particular creations, which are also a component of strengthening the relations with potential recipients. Marketing Automation is also utilised in the area of content presentation on web portals. Mechanisms aimed at content adjustment are implemented on them (contents – advertising banners), which convergent with the buying history of users, therefore reducing unnecessary or redundant information. Other examples of automated marketing application include also the following areas:

- Advertisements in RTB networks and a possibility to personalise retargeting.
- Social media and application of tools for monitoring interactions between customers and the brand so as to adjust a proper offer.
- Monitoring behaviours of mobile applications users. The objective of such actions may include, among others, personalisation of push messages and email messages.
- Analytics and reports so as to determine the efficiency of actions. The tools applied in this area allow to identify in detail the outputs of the implemented solutions, campaigns and automation rules, which provides an opportunity for optimising the costs of operations.

Marketing automation more and more frequently employs the solutions based on artificial intelligence and machine learning (Sterne, 2017). These tools support the processes of customer data exploration. Based on their results it is possible to create, for example, optimised recommendations of communication channels with potential customers. Artificial intelligence also effectively fits into the area of automated marketing through supporting segmentation processes. An example here may be Netflix (virtual rental of DVD movies), which presently applies machine learning in the system of recommending movie titles to its users (Tien, 2017). Such recommendations are formed based on the previous habits and individual preferences (segmentation of user groups) (Gomez-Uribe and Hunt, 2016). Results of this solution's application have been confirmed by the fact that 75% of all the movies are selected by users of the portal thanks to the intelligent recommendation system (Roetzer, 2014).

Chat bots in the Virtual Environment

Information Technologies allow to transfer a number of business activity areas into the cyberspace. This, in turn, is a natural, virtual environment for functioning of various types of software robots, including solutions developed based on agent technology. Such a technology is defined as computer software for independent operations in the specific environment and achieving set goals.

The main area of agent technology application is the area of information management – most frequently in the context of supporting managers in the decision-making process. Popularity enjoy applications of software agents in the form of so-called chat bots. The primary motives behind their implementation in enterprises include reducing the cost of customer service and increasing the stickiness of websites. Chatbots on social networking sites are a recent innovation in computer-mediated marketing communication (Van den Broeck at al., 2019, p. 150). From the managerial point of view chat bots are treated as tools facilitating the use of websites and contribute to an increase in the number of positive opinions about their usefulness, building trust and growth of customer satisfaction (Mimoun and Poncin, 2015, p. 70; Przegalinska at al., 2019, p. 785). Chat bots as also calle lingubots, chatbots, conversation agents, virtual advisers, personal assistants (Gentsch, 2019, p. 81; Corti and Gillespie, 2016, p. 431). Developers of chat bots aim at creating solutions in such a form that the communication resembles the human dimension. The high level of message interactivity compensates for the impersonal nature of a chatbot. (Go and Sundar, 2019, p. 304). Interactions between users and chat bots may occur with the use of communicators embedded on social media platforms, on websites or through SMS. The construction of bots frequently incorporates elements of artificial intelligence, which support them in recognising the context of the conversation with a human. Thanks to data that is acquired during the conversation with human users and its further analysis it is possible to intensify the personalisation of the message.

As chatbots have become increasingly popular over the past years, most social networking sites have recognised their far-reaching potential for commercial purposes (Zarouali et al., 2018, p. 1). Presently, by any means the most popular environment of chat bots operation is the internet communicator *Facebook Messenger* (Araujo, 2018, p. 183). Enterprises increasingly often use social media in communication with customers – for example the abovementioned *Facebook*. Customers in turn use social media to seek for specific information regarding a product and direct access to services. A chat bot that operates within the *Facebook Messenger* enables to generate automatic responses. A communicator of this type is classified as a solution the belongs to the area of conversational commerce.

Bots applied in the area of conversational commerce, thanks to the automation of performed tasks, make it possible to function in the global dimension, are active and responsive 24/7, support customer service and acquisition of new ones, strengthen the attachment of customers to a given brand, may be fitted with an ability to learn and adopt to the needs of customers, influence the increase of satisfaction and trust on the side of customers (Rauthan, 2019; Bakhshi et al., p. 5; Chung et al., 2018). Based on the conducted research (Chattaraman, Kwon and Gilbert, 2012, p. 2055) it has been stressed that chat bots are especially useful while supporting elderly customers (whose average age in the research was 69) in online shopping. Data acquired by chat bots is used for various types of customer analyses – for instance for customer segmentation, loyalty analysis or basket analysis. Results of analyses are transferred to the managerial staff, supporting it in making decisions in the area of marketing, sales, but also employee recruitment.

Research Methodology

Sales of plants in Western Europe generates over a half of the turnover in the whole gardening industry. This is an industry characterised by a large potential of growth. This can be confirmed by the fact that ever more people move to detached houses and create their own gardens. Presently, the promoted healthy lifestyle and trend of growing own bio-products are also important. It is worth stressing that customers of the gardening industry constitute a very diversified with regard to age, location and preferences, which is associated with the necessity to optimise sale and purchase processes. The abovementioned insights constitute a justification for conducting research in the enterprises of the investigated industry pertaining to application of e-marketing processes automation.

The research was conducted with the use of a survey questionnaire in the group of 23 enterprises that represented the gardening industry – shops conducting stationary sales and offering sales of products by means of the Internet. Sending the survey questionnaire was preceded by a telephone conversation, which constituted an invitation to participate in the survey and become acquainted with its subject matter. A phone conversation was also conducted with each of the participating in the survey enterprises one the obtained results had been analysed – so as to acquire additional opinions, not directly included in the survey questionnaire and related to widely understood problem domain of internet marketing processes automation. The range of the research covered four selected countries of the European Union – Poland (7 enterprises), the Netherlands (6 enterprises), Germany (5 enterprises) and the Czech Republic (5 enterprises). The selection of the industry was not random and resulted from the need to incorporate into the research group representative of several European countries who would function within a market of a similar specificity. The abovementioned industry is an answer to this premise as the gardening market in the selected countries – among others due to the climate, soil conditions and plant life – is of similar characteristics.

Research Results - Discussion

In the course of analysing the undertaken research problem the authors conducted a pilot research. This research constituted a cognitive study focused on the analysis and evaluation of marketing strategies carried out by economic entities in the European Union member states. In the paper the authors will

present the results obtained for one of the areas covered in the research – the section regarding e-marketing processes automation.

The goal of the research was to acquire information about interests and needs in the scope of marketing processes automation in the group of investigated economic entities. In this context the authors formulated a set of questions, which constituted the basis for further analysis of the subject information. One of the initial questions in the survey questionnaire, presented in the form of 5-point Lickert scale, concerned a reaction to the statement that it is necessary to introduce solutions in the scope of marketing processes automation in the gardening industry enterprises. In this aspect the great majority of the respondents agreed with the statement (22 respondents), and one person had no opinion about this issue.

Such a juxtaposition of the obtained answers correlates with information obtained from the respondents in one of the subsequent questions regarding applying by them the said solutions – among 23 surveyed enterprises a significant majority (19 entities) declare implementing tools from this area within the conducted business activity. However, it needs to be stressed that a dominant solution in this domain is the basic solution, which is a profile in social media.

In the course of the conducted research the authors also turned their attention to the fact whether the solutions in the scope of *Marketing Automation* found practical application in the selected areas of internet marketing in the enterprises. For this reason, the respondents were asked to evaluate a set of selected factors. This evaluation consisted in determining the importance on the scale from 1 to 10 (where 1 – the least useful criterion, 10 – the most useful one). The survey respondents gave highest marks to presentation of contents on the web portals and email marketing, the lowest marks received monitoring the behaviour of mobile applications users (Fig. 1). It is worth noticing that the factor that received top marks – presentation of contents on web portals – concerns the implementation of mechanisms that adjust the contents convergent with the buying history of users, reducing in this way unnecessary or redundant information.

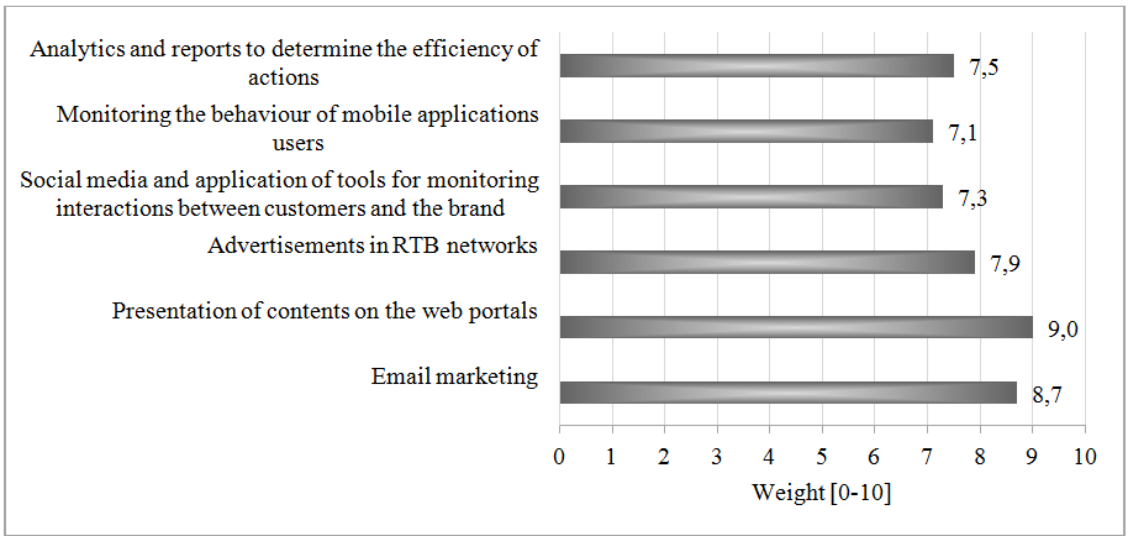

Fig. 1: Usefulness of solutions in the scope of Marketing Automation
Source: own analysis.

An extension to this issue was evaluating by the respondents (within an analogous 10-point scale) the necessity to introduce process automation in other areas of internet marketing, which in the vast majority of the investigated entities (20 enterprises) are not supported by tools of *Marketing Automation*. The

highest level of usefulness was attributed to communication with customers (9.3). Next positions were occupied by optimisation of sales and purchases of advertisement on the Internet (7.2) and the analysis and monitoring of user behaviours with regard to the course and execution of sales and purchasing processes (6.8).

The research also addressed the issue of usefulness of utilising in enterprises chat bots in the area of online marketing. In this aspect the respondents were asked to attribute weights for particular benefits resulting from their implementation. The survey respondents attributed the highest weight to the functionality related to embedding bots on communication platforms itself. This results primarily from the fact that the investigated enterprises do not apply this solution, but at the same time they are aware of the benefits that it can offer. At the other extreme was the functionality related to acquiring data by chat bots, which can be further used to conduct various analyses of the customers, which would provide the managerial staff with broader knowledge while making marketing and sales decisions (Fig. 2.).

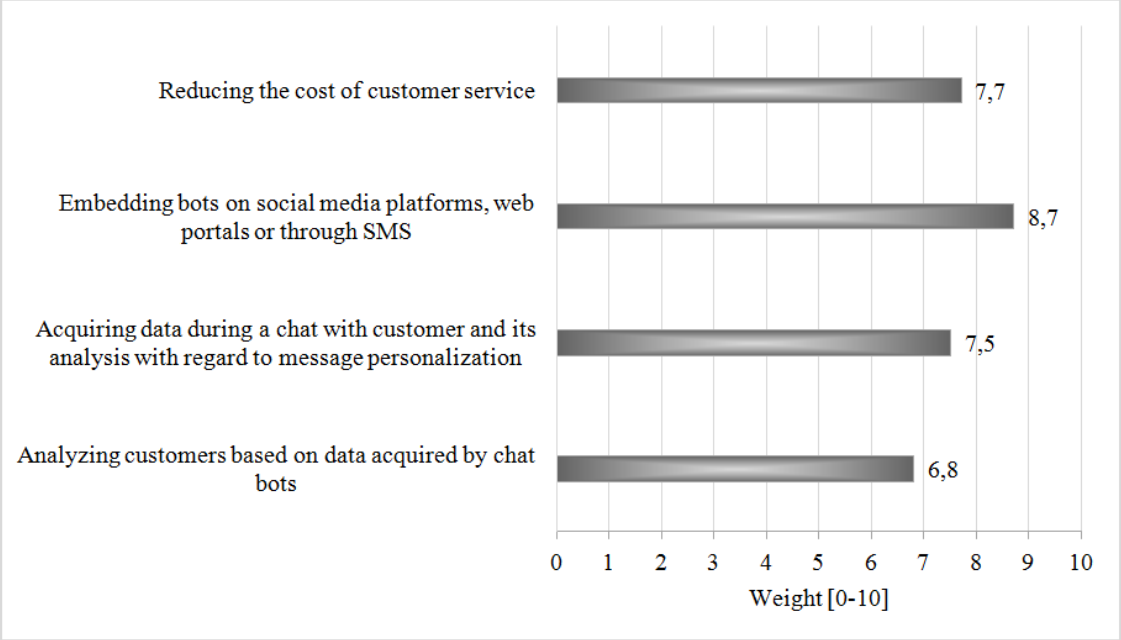

Fig. 2: Evaluation of benefits resulting from implementing in enterprises chat bots.
Source: own analysis

Due to a universal nature of marketing processes automation in managing enterprises the obtained results of the pilot research conducted among the gardening industry enterprises can be referred to economic entities in other industries. The results of the pilot research are convergent with numerous analyses in the scope of online marketing presented in the literature on the subject.

According to the research published in *State of Marketing Automation 2019* 75% of enterprises utilise in their operations solutions that automate marketing processes (*State of Marketing…,* 2019). Another research conducted by *House of Marketing* demonstrates that 48% of the investigated enterprises that apply the solutions in the scope of marketing automaton evaluate them as one of the most useful tools for customer behaviour analysis (*Yearly Marketing…*, 2019). The research presented in the report *Email Marketing and Marketing automation Excellence 2018*, unequivocally show that enterprise owners indicate time saving, acquiring new customers and growth of incomes as the greatest benefit of implementing the solutions in the scope of marketing automation (*Email Marketing…*, 2018).

The greatest challenge that marketing automation is facing include search for proper tools, business processes integration with the use of available solutions and managing the acquired data (*Marketing Automation…,* 2019). *State of Marketing Automation Survey Report 2019* stresses the fact that the most useful solutions for digital marketing automation is application of communicators and chat bots, which was indicated by over a half of the respondents (*State of Marketing…,* 2019).

The conducted literature review and pilot survey allow to make an attempt at answering the first research question formulated in the introduction to the present paper: *Are the commercial enterprises that operate based in the traditional-internet business model interested in implementing solutions in the scope of e-marketing processes automation?* The results of the survey indicate that a possibility of automating processes of this type received great approval and interest. However, it needs to be remembered that these are just the results of a pilot research. It is worth stressing that that such a result may derive from the specificity and effects of the automation issue – that is, among others, increased process efficiency, decrease in its cost, time saving, decreasing the load of employees. On the other hand, it must be remembered that automation is accompanied by the costs of implementation and possible reduction of work positions. Other fears regard a short life-cycle of specific IT solutions and emergence of new technologies that in a relatively short time will replace the presently existing solutions.

What benefits are expected as a result of applying chat bots in online marketing? The answer to the second research question is not obvious. The pilot research did not allow for investigating the measurable effects of applying chat bots in online marketing, but only the opinions of the respondents regarding potential benefits of their practical implementation. One of the greatest benefits of implementing chat bots is reducing the cost of customer service and possibility of computer analysis of data acquired from customers – among others, to segment customers, analyse their loyalty. However, despite the numerous benefits it is also necessary to remember about the necessity to comply with the requirements concerning protection and confidentiality of the acquired data, and from the customer perspective also potential problems related to trust in solutions in the form of chat bots.

It should be expected that in the years to come one will observe a significant growth in the number of implementations of solutions in the area of marketing processes automation, including chat bots. This opinion results primarily from the possibility of applying these solutions within the platforms of social media and internet communicators that are integrated with them.

Conclusions

A fundamental element of contemporary enterprises functioning is a properly determined and selected marketing strategy carried out within the virtual information space. This is a component of communication between potential customers and the company. This space requires marketing processes being automated, which is done based on the mechanisms available within the presented in the paper Marketing Automation and Programmatic Marketing. A vital role is played here by artificial intelligence tools, machine learning and software bots.

The presented in the paper considerations comprise the results of pilot research. These indicate a necessity to continue the research works. The potential present in the identified benefits resulting from e-marketing processes automation justifies further research regarding in particular the economic and organisational aspect. It also seems interesting to consider the elements related to technical, social and legal conditionings.

Based on the research results one can observe a significant interest of the gardening industry entrepreneurs in implementing solutions regarding automation of processes related to marketing communication. This area can be effectively supported with the technologies - Marketing Automation,

Programmatic Marketing and chat bots. Various methods of creating the content on the websites and e-mail marketing still enjoy large interest. Therefore, it is possible to extend their functionality through applying the elements for automating the tasks they carry out. An important factor that improves the efficiency of communication is the presence of conversation interface. This is of particular importance if it takes over the advisory function in the form of a virtual consultant. This can strengthen the involvement of potential customers, increasing the conversion coefficient, optimise the flow of marketing processes with regard to measurable benefits for customers as well as enterprises.

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Software Robots in Business Process Automation

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Abstract

The issues of business process automation and robotic process automation are usually associated with using physical solutions in production processes. These solutions enable performing activities independently of human participation. Such an approach limits the possibility of applying automation and robotization mainly to manufacturing and the IT processes which are performed as predefined in software used by organizations. A separate category of IT solutions is the technology of automation of repetitive business processes by means of computer programs — robots emulating human work the so-called Robotic Process Automation or RPA. The aim of this paper is the assessment of the usefulness of application of software robots cooperating in business process optimization. For the purpose of this paper, capabilities of software robots were determined, an implementation was carried out and 3 scenarios of robot work were developed. On the basis of the analysis of implementation works and effects of robot work during the studied period, possibilities and potential applications of solutions automating (supporting) business IT processes in public and commercial institutions in Poland were determined.

Keywords: Robotic Process Automation, Software Robots, Automation of IT Processes

Introduction

Business process automation as an area of management is relatively well described in the literature, however, the vast majority of studies refer to the robotization and automation of processes understood as the application of hardware solutions on production lines. However, over the past few years, solutions related to the use of specialized software that emulates the work of a human have appeared.. The software robot market is currently undergoing changes. This is because the concept of software robots cooperating as assistants to the computer operator has emerged. These changes, combined with a reduction in the prices of the solutions and a shortage of specialists, make the use of RPA economically viable, even for small businesses.

The concept of robotic process automation is based on the use of software robots, otherwise known as artificial intelligence workforce. The RPA technology is used to perform repetitive tasks such as application control, data collection, transfer of data between applications without the use of internal data exchange interfaces, and data operations. In the literature, the concept of RPA is considered in two aspects. The first regards software robots as a piece of software that can be configured by a computer to perform computing tasks. Whereas the second approach considers a software robot as a process consisting of a sequence of actions taken in a logical order, the aim of which is to automate tasks performed without human intervention. According to the available analyses, the main purpose of using such solutions is to save time, costs, improve productivity and increase the quality of work. Hence the need not only to define new areas of software robots' application, but also to determine their suitability for process optimization in terms of cost, time and quality. Therefore, when planning out the study, the following research questions were asked: what areas of activity of the organization's financial services can be automated, how the quality and efficiency of work of employees supported by software robots will change and how long it will take to see the return on the cost of purchasing a license and implementing the software in a small enterprise and public institution.

For the purpose of this study, the areas of application of software robots in public institutions and private enterprises was analyzed in only one area — accounting. The usefulness of application of robots for data transfer, creation of managerial reports, and performing repetitive accounting work was investigated. On the basis of the conducted research, potential areas of supporting work were identified, the quality and efficiency of work were assessed and the economic, time and quality benefits of using software robots as tools supporting accounting work were determined.

The software used for the research was provided by First Byte, under the commercial name — Wizlink. The research was conducted in cooperation with SenseMaking Automation and Robotics, a partner of First Byte, which deals with the implementation of RPA and BPA solutions.

Software Robots

The term robot comes from the Slavic word "robota" which means hard work, effort. Originally, it was used in reference to living beings — artificially produced humans intended for hard work. The term appeared in 1921 and was popularized through Karela Čapka's play entitled "R.U.R". Currently, the term robot refers to a device whose operations can be controlled directly by a human being, or by a pre-defined program, or by defining a set of general rules according to which the robot performs its tasks. The defined rules are translated into the performance of activities using artificial intelligence techniques and methods. The primary idea of using robots is to replace a human being in monotonous, repetitive, fixed actions or those hazardous to human health and life. In such situations, a robot performs work more accurately and more efficiently than a human would. As time passed, the concept of robots began to be applied to autonomously operating devices that receive information from the environment by means of appropriate sensors that process the information and determine the robot's behavior (Linner, Pan, Georgoulas, .2014). Currently, the term robot is used to describe automated machines that perform specific tasks in a real or in a virtual environment. Thus, it can be assumed that a robot is an electronic or electromechanical device programmed by a computer and capable of automatically performing a series of actions regardless of whether these actions are of physical or virtual nature. The condition for the robot to function is an intelligent link between the recognition of environmental conditions, the analysis of information received by the sensors and by means of artificial intelligence transformed into a sequence of activities performed by the effectors. The field of science which deals with the design and construction of robots is called robotics, and it also covers such areas as electronic engineering, computer science and mechanical engineering.

The idea behind software robots used in robotic process automation shall be explained in this paper. Software robots are virtual creations, applications whose task is to support and assist people in activities related to software operation and data analysis (Willcocks, Lacity, 2016). The primary purpose of using such technology is to gain a competitive advantage by eliminating the human labor element in repetitive monotonous activities based on clearly-defined rules. Importantly, these activities do not necessarily have to be directly related to the production of material goods or products, but can also be applied in the processing of information in its broadest sense. Examples of such activities include processes such as: invoicing, shipment tracking, inventory management, report generation and data transfer.

The 2017 research conducted by the Info Global Research Services Group indicates that the use of software robots is aimed at minimizing costs, shortening transaction processing time, increasing productivity and improving compliance in business processes (Brandon Buccowich, 2016). Software robot-based solutions are preferred over dedicated applications due to the immediate and low-cost approach to process automation based on structured rules. The use of software robots does not require re-engineering of the processes, and the result of their implementations is an increase in the quality and efficiency of the processes. The reorganization of databases, modification of applications or use of additional IT solutions is also unnecessary when using software robots. As the research (Moffitt, Rozario, Vasarhelyi, 2018) cited above suggests, software robots are used in all areas of activity, and are particularly useful in the areas of finance, accounting, e-marketing, banking, audit and HR.

The research carried out by Deckard (2018) indicates that the use of software robots allows to eliminate the element of human error in repetitive activities based on business rules and thus achieve an accuracy rate of 100%. In data processing, an additional advantage of a software robot is the robot's short learning time. A digital robot is often referred to as an intelligent, easy to use and cheap workforce, it emulates the actions performed by human resources and, in combination with artificial intelligence, can use learning algorithms in the scope of the tasks performed. Interestingly, in the public sphere, software robots can be used to handle unstructured data with the purpose of detection of fraud, such as money laundering. In the field of computer science, software robots can be used both to perform routine activities such as software configuration and installation or damage detection, and can also serve as tools to test applications for errors as well as efficiency and resistance to human error. Such a wide range of applications is possible due to the fact that software robots, unlike other solutions, emulate the work of a human and perform activities in the same way as a human operating a computer (Willcocks, Lacity, 2015).. Additionally, application of such solutions results in an increase in the quality of performed work through total elimination of irregularities and relatively low cost of work preparation. Taking into account the characteristics of modern software robots, it should be assumed that this market will develop and the solutions will find an ever-increasing range of applications.

Robotic process automation sees practically no use in Polish public sphere institutions. Considering that Polish public institutions make very limited use of standardized interfaces for data exchange, a software robot can be an ideal tool for transferring data between different systems. Currently, most of this type of operations are carried out manually by officials, which results with a large number of errors and a relatively long task performance time.

In case of small businesses, the use of software robots will become possible due to a radical reduction in costs. The implementation of this technology should generate an increase in competitiveness by relieving the workload of employees and management staff. The gained time may be used for other activities. Furthermore, small businesses should be able to increase the quality of products and services and improve customer relations. Typical errors resulting in losses and excessive operating costs should also be eliminated.

Business Process Management

The new development conditions created by the rapidly changing environment of modern organizations give rise to previously unknown risks (Röglinger, Pöppelbuß, Becker, 2012). A stable environment allowing for precise planning of the organization's activities requires the support by dynamic management methods allowing for flexible adaptation to the environment. In addition, the globalization processes observed in recent years, the free flow of knowledge and the development of information technologies form a new digital environment for organizations to function in. All the changes associated with digitization are often described as the digital revolution which leads to social changes, the evolution of the ways organizations are managed, or a new approach to research in management sciences.

A paradigm based on process thinking has become the dominant approach to management in recent years. The existing static, highly structured management thinking has been replaced by a dynamic approach, focused on change and the flow of information. These were already visible in the 1990s in organizations operating in rapidly changing market sectors. In this period, Hammer defined the process as a set of actions requiring input and output with a customer-specific value (Hammer and Champy, 1996). The then-new approach assumed that an organization is a set of processes that permeate one another and therefore a new perspective becomes necessary which would assume processes as the basis for design and management in an organization.

At the end of the 1990s the concept of Business Process Management was formulated, which focused on the revolutionary ideas of introducing changes and linking business processes with IT systems, resulting in a holistic approach to organizations and the introduction of the concept of process as a

basic reference point for the assessment and management of an organization. Despite the fact that the modern process approach was developed over 30 years ago, the term process is still understood quite ambiguously and often used interchangeably with such concepts as: procedure, action, task. R. Müller and P. Rupper describe the process as a chain of activities aimed at generating values corresponding to the customers' requirements (Müller, Rupper, 2000), thus drawing attention to the importance of processes in shaping the value and quality of goods provided to customers. M. Hammer is of a similar opinion, defining process as a group of related tasks whose common result is added value for customers (Hammer, 1999).

An important feature of processes from the point of view of managers was pointed out by T.H. Davenport, who defined process as measurable, structured actions designed to produce a specific product. (Davenport, 1993). Measurability is a particularly desirable feature from a management perspective. It is the element which allows managers to determine the effects of their actions and make decisions.

The process approach is also applied in normative management systems. For example, a process in accordance with ISO 9000:2006 is defined as a set of interrelated or interacting actions (activities) that transform input into output.

The number and variety of approaches, as well as the practice of implementing a process approach requires the classification of processes. Considering that the basic element of process identification is to define the rules and criteria for distinguishing groups of process types. There are many different criteria for dividing and classifying processes in the literature. According to M. Porter two types of processes can be distinguished:

- primary,
- auxiliary,

The primary processes included, inter alia, the following: — "input" logistics, which includes activities related to production preparation, — product manufacturing, — "output" logistics, which includes activities related to sales, — marketing, — after-sales services. Thus, primary processes are those that create value and quality of goods or services offered to customers. Auxiliary processes include those related to management of the organization and human resources, procurement, development, IT support or traffic assurance (Cushman, Wakefield 2015)
The classification proposed by APQC (American Productivity Quality Center), which is included in the Process Classification Framework (PCF), should be considered as the most comprehensive classification of processes. This classification contains 12 categories of processes grouped in two areas of operational processes deemed as key and supporting processes. The classification and characteristics of process groups are presented in Table 1.

Table 1: Process classification framework by APQC

Process group	**Description**
Operating processes	1.0 — Develop a vision and strategy 2.0 — Develop and manage products and services 3.0 — Market and sell products and services 4.0 — Deliver products and services 5.0 — Manage customer service
Management and support processes	6.0 — Manage and develop human capital 7.0 — Manage information technology 8.0 — Manage financial resources 9.0 — Acquire, construct and manage property 10.0 — Manage environment, health and safety 11.0 — Manage external relationships 12.0 — Manage knowledge, improvement and change

Source: author's own study

The modern concept of process management is based on the assumption that activities should be optimized focusing on processes and not functions. In modern organizations, this provides conditions for achieving specific goals, providing effective services and using the potential of employees and other resources. Implementation of process management also requires implementation of IT systems supporting management and automating data processing tasks.

Creating a coherent subsystem in the area of management of process organization, it is necessary to identify those concepts which in a complementary way support the process concept, facilitating its implementation and then reaching process maturity, and as a result — the current management of process organization. The list of selected management concepts complementary to process management is presented in Table 2.

Table 2: Selected key concepts supporting process management

Concept	Description of key competences
System concept	Application of basic recommendations of the concept: multidirectional analysis, static and dynamic system optimization, analysis of subsystems and supersystems, perception of seemingly distant variability, analysis of consequences of local sub-optimization, overall perception of the system
TQM	Philosophy of perceiving the functioning of an organization and its optimization resulting in the current approach to organizational optimization and process optimization aimed at increasing the added value for the customer through quality improvement
Lean Management	Optimization of processes in terms of their flexibility and cost reduction
Project management	Implementation of process management and achievement of process maturity seen as a portfolio of interdependent and related projects; ongoing optimization of process organization through the implementation of optimization projects
Network concept	Process structure seen as a network of interconnected intra-organizational processes, a network of links between organizations performing a given process (*exengeneering*) and a network of links between process resource providers and recipients of generated added value
Virtual concept	Perception of process links in terms of available KSFs (key success factors), deterritorialization of the links, flexibility of process configuration, integrator function
Fractal concept	Navigation tunnels between process links and the end customer (micro and macro tunnels), application of in-process marketing (customer-supplier relationship), self-restructuring, self-navigation, vitality, self-control, mentoring, coaching

Source: author's own study.

Among the management concepts commonly used today, at least a few support or even rely on in-organization process management. The management concepts presented in the table and process management set against them is only the author's selection of concepts and does not include all those that make use of process management. The selected concepts, however, are the representation of the connection between processes and information management, and thus also the area of application of software robots as tools to optimize process execution.

One of the most important areas of process management is process optimization, understood as a method of determining the best solution from the perspective of a specific criterion. In the case of business processes, the most frequently used criteria are time, cost and quality. Another definition states that process optimization is an activity of modelling, analysis and improvement of business and production processes in the private sector and administrative processes in the public sector.

Adopting such a defined concept of optimization, it can be considered that every action which results in an improvement in quality, increase in efficiency, or shorten the process time is in fact optimization. The effect of optimization can be achieved by a number of methods, including the use of hardware solutions, change of production technology, changes in the organization of work or changes in information management. This paper focuses on solutions that make changes in information management methods possible, based on software that replaces or assists humans in handling software interfaces.

Robotic Process Automation

Robotic process automation is a relatively new form of improvement of business processes in organizations. Robotic Process Automation or RPA uses a specific technology and methodology of using a computer based on software which, instead of a human operator, manipulates existing software used in processes. Since 2016, there has been a rapid increase in demand for robotic process automation. This increase is particularly noticeable in the area of office work and operations related to data modification in management support applications. Contemporary software robots are an intelligent and easy-to-use digital workforce that, due to new features and integration with the user interface, is able to perform actions that previously could only be performed by humans.

Both management theorists and practitioners see RPA as a tool that will significantly reduce process costs, increase information flow rate and eliminate data processing errors. The use of software robots for process optimization should relieve the employees from performing rule-based activities and give them more time to perform tasks of higher value. It is assumed that the correct implementation of software robots will allow for the creation of process teams based on active cooperation between humans and robots, and as research (Lacity and Willcocks, 2016) shows, people and robots in such teams complement each other perfectly.

The research conducted in recent years indicates that the natural purpose of using software robots is the non-invasive use of software that imitates the activities performed by the computer operator in the execution of business processes. Until now, the concept of software robots was associated with the construction of large data centers (software robot farms) in which applications were maintained and which were performing work by carrying out repetitive tasks in many locations and in different organizations. This concept was associated with the high price of software and the need to employ numerous programmers who adapted robots to customer requirements. These factors made the use of software robots profitable only for large entities and in situations where they could perform work consisting of thousands of repetitions of the same activities. Nowadays, with the emergence of a new generation of software robots cooperating with humans, it has become possible to robotize activities in business processes. Contemporary collaborative robots are characterized by a relatively low price, a fraction of the price of the robots created on software robot farms, and simple learning processes that do not require specialist knowledge to operate. According to the experience of SenseMaking Automation & Robotics, it takes several hours to train a software robot trainer, assuming that they are an intermediate computer operator. After such training, the operator is able to program any software robot cooperating in the execution of business processes.

For the purpose of determining the suitability of software robots for process optimization, a solution by First Byte, under the commercial name — Wizlink — was chosen. This application is classified as a software robot, and because of its capabilities, intended purpose and cost, it can be considered a new generation collaborative robot. Studies on the usefulness and profitability of this solution were carried out on the basis of analyses of robot use in a company managing resources and housing communities. Design works and tests of robot use for the purposes of performing work in the accounting department of one of the city halls were carried out as well. The data obtained for the purpose of this study was provided by SenseMaking Automation & Robotics partner and certified distributor of the Wizlink robot.

The software-based solution was implemented in the company managing resources and housing communities in December 2019. The company used a trial version of the software to evaluate the benefits of implementation and initial training of employees, and since January 2020 has been using a commercial version. Ultimately, the company decided to purchase a license allowing the robot to be installed on the company's internal server and run it from a remote desktop. Such a solution allowed the robot's engine to be used by many employees and for it to work beyond the company's working hours. During the test period, five scenarios were selected for the robot as shown in Table 3.

Table 3: Robot work scenarios in the company managing resources and housing communities

Scenario name	Average number of executions per month	Time of one execution performed by a human [hh:mm:ss]	Total time of execution performed by a human in a month [hh:mm:ss]	Time of one execution performed by the robot [hh:mm:ss]	Total time of execution performed by the robot in a month [hh:mm:ss]	Difference Between total times [hh:mm:ss]
Generation and printout of payment slips for residents	120	00:04:00	08:00:00	00:01:00	02:00:00	06:00:00
Recording of rent payments in the resource management system	1200	00:02:00	04:00:00	00:00:15	00:30:00	03:30:00
Recording of rent payments in the accounting system	1200	00:03:00	06:00:00	00:00:15	00:30:00	04:30:00
Preparation of financial statements for the management board (4 templates)	4	03:00:00	12:00:00	00:05:00	00:20:00	11:40:00
Generation and submission of tax return forms	7	00:05:00	00:35:00	00:00:20	00:02:20	00:32:40
					Total time savings	26:12:40

Source: author's own research

The table summarizes the results collected during the test period. The robot processed about 70% of the documents that are ultimately expected to be automatically handled under the executed scenarios. As the analysis of the data presented in Table 3 indicates, the time savings during the test period amounted to more than 26 working hours. Furthermore, it should be noted that only 70% of the documentation was processed in automatic mode. Thus, the total time savings can reach almost 40 hours with an unaltered scope of the executed scenarios. The total working time of the robot amounted to 3 hours 22 minutes, therefore it made considerable time savings that could be used for further scenarios, and the working time of the human-employee was 29 hours 34 minutes and 40 seconds

According to the data obtained in the company implementing the solution, the whole process of analyzing the robot's work and preparing work scenarios required 32 hours of consultant's work (4 days), which was valued at PLN 5000. Taking into account that the hourly wage of an office worker

performing tasks carried out by the robot is PLN 34.50, the value of working time saved amounted to PLN 1017.00. Monthly cost of using the robot (licensing fee) is PLN 216.00. Assuming the data presented above, the return on the costs incurred for the purchase of the license and implementation of the robot only in the scope presented above will be seen within 6 months. Taking into account the fact that the robot can be used in further scenarios and that during the test period the robot handled only 70% of the assumed number of scenario repetitions, the cost-return time should be significantly shortened.

For the purposes of this paper, the author conducted research in the city hall of a city with poviat rights. The analysis covered three processes performed by employees of the tax and accounting department. The first process was performed only manually, in the traditional manner. The other two were carried out by means of the software. A description of the processes and effects of the software robot use is presented in Table 4.

Table 4: Designed and tested scenarios of the robot's work in city hall tax and accounting department

Scenario name	Average number of executions per month	Time needed for one execution performed by a human	Total time of execution performed by a human in a month	Time of one execution performed by the robot	Total time of execution performed by the robot in a month	Difference Between total times
Signature of tax decisions	72000 per year	30 s	24 days 75 working days	2 s	1 day 16 hours 5 working days	70 working days
Generating and emailing information on salary components	240 per month	4 min	16godz	20 s	2h 35 min	13h 25min
Submission of tax return forms	240 per month	30 s	12 hours	5 s	20 min	11h 40min

Source: author's own research

The data compiled in the table are the results of research conducted by the author. The data on the number of scenario repetitions and the execution time in the current version were obtained by analyzing the number of documents processed in the office system. For the purposes of testing the robot, the author developed three scenarios of execution of these processes for the robot. It took 8 hours to develop the scenarios. The data determining the robot's working times in particular scenarios were measured during the execution of the scenarios prepared by the author. According to the information made available by the city hall, the monthly cost of work of the person signing the decisions is about PLN 9600. Therefore, using a robot to perform this activity will result in annual savings of PLN 27000.

Conclusions

The examples of using software robots to robotize business processes presented in the paper clearly indicate that the use of such solutions for process optimization is beneficial for both public and business organizations. Assigning even a small amount, just a few percent of the monthly workload,

to a robot is sufficient to cover the costs of software licensing and scenario development. An additional premise indicating the advantage of using software robots in improving public administration processes is the fact that these institutions use standardized procedures and solutions, therefore, with a minimum amount of work, a once developed robot scenario can be adapted to work in different institutions. The specificity of the applied solution makes it particularly suitable for work with spreadsheets, web browsers and for work that requires moving or acquiring data from various applications. The only limitation of the tested solution is that it requires the Windows operating system. However, given the widespread use of this operating system, it can be concluded that this limitation is practically irrelevant in Polish conditions.

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Generating Functionalities in IT Systems Used in Public Administration Based on Reference Processes

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Abstract

The efficiency of provision of public services depends to a large extent on the IT systems used. Developing efficient IT systems that would support the provision of public services through electronic channels is problematic in Polish conditions. In addition, public administration is characterized by a lack of standardization in terms of service provision processes and a high variability of legal conditions. Hence the need to develop tools which, using business process models, will generate functionalities in the IT system. The aim of the article is to present and discuss the concept of an intelligent generator of functionalities for public administration IT systems based on models of reference business processes of public administration.

Keywords: Robotic Process Automation, Software Robots, Automation of IT Processes

Introduction

Progressing globalization, easy access to information, and citizens' growing awareness necessitate ever higher standards of functioning on public administration. Also, the limited amount of public funds makes it necessary to seek solutions that improve and raise both the quality and effectiveness of public services. Furthermore, the development of civil society, and in particular the increase in awareness and free access to knowledge about the functioning of public administration, as well as the requirements of EU and state law, make it necessary for contemporary public administration to change and adapt to the surrounding conditions which undergo dynamic changes themselves. Traditional methods of public management cease to fulfil their functions when placed in the new reality and therefore it is necessary to change the methods and forms of management in the public sector. One of the solutions that seems to meet the requirements of the modern society is the implementation of process management methods and tools that will serve as a basis for developing the functionalities of IT systems. This will allow both to streamline the work of public institutions and for a much quicker adaptation of the IT systems to provide next generation public services.

One of the fundamental problems of modern public administration is the low effectiveness of implemented IT solutions. One of the reasons for this state of affairs in Poland is the low level of standardization of public services and the lack of standardization in terms of management and functioning of public institutions.

In an attempt to find tools and methods of improvement of public administration, the author of this study proposes models of reference processes in the creation of IT systems supporting management and implementation of public services. Therefore, the aim of this study is to present and discuss the concept of an intelligent generator of functionalities for public administration IT systems based on reference models of public administration business processes.

The concept presented in this paper is the subject of current conceptual and technical-implementation work carried out by the author in cooperation with the SenseMaker Software company. In the nearest future, the process of concept evaluation will include public offices in which the modeled functions

of IT systems will be tested. This article is the first in a series of publications presenting the technical possibilities of the proposed solutions.

The article presents an analysis of literature in the scope of applied solutions of process modelling, standardization and creation of reference processes and IT systems. It presents a theoretical model of an intelligent generator of IT system functions, and indicates the conditions of its application and implementation.

The State of It Systems Used in Public Administration

The rapid development of information processing technologies led to the transformation of an industrial society into the so-called information society. This modern form of society is characterized by generating a large amount of information in electronic form (Mainka, 2018). This information is processed by high-performance electronic pieces of technology and transmitted via a global computer network. The most important feature of such a society is the blurring of organizational boundaries through the mutual permeation of the organization's IT systems and the creation of global information space (Mansell, Robin 2009). In the creation of a post-industrial society, one of the most important roles is played by public organizations, and in particular public administration units, whose task is to act as a stimulator of the evolution of society (Farazmand, (2018). This role imposes on public institutions the requirement to create a public information space in which IT systems will enable full access to public information.

The public administration units in Poland are currently characterized by a gross maladjustment in terms of participation in the digital economy. This problem is mainly caused by the lack of uniform standards concerning the IT systems used as well as poor coordination of informatization of the state. The departmentally localized use of solutions and the lack of coordination between the implemented IT projects lead to the creation of information islands between which no exchange of information occurs and which do not meet the requirements set for them. Research carried out as part of numerous projects shows that in the entire country, public offices use over a dozen different IT solutions to perform the same functions (Central Statistical Office of Poland, 2013). This situation makes it impossible to create a public information space supporting the development of the information society and at the same time it significantly increases the operating costs of public administration. Another problem is the lack of standardization of processes in public administration (Osborne, Radnor, Nasi, 2013). This leads to a situation in which the same tasks carried out in different offices require the use of different resources, and therefore the efficiency of implementation of these tasks differs as well, which in the public sector, translates to a waste of public funds. The solution to the problems that should be applied as a priority, as it seems, is the development of standards for administration processes, and then modern integrated IT systems should be built on their basis.

Lack of systemic solutions in the area of informatization of the public sector results in electronic public services of low quality. The basic problem in this area seems to be the lack of cohesion of undertaken actions resulting in the creation of “informatized islands” within public administration, instead of an integrated platform. An additional problem is that the objectives of informatization are unclear, formulated in a vague and unmeasurable manner. The analysis of the current state of informatization of the state and analyses of the effects of the implemented IT solutions shows that these barriers still persist, which means that despite the efforts made, the attempts at building a proper concept of state informatization in Poland failed. Sources of problems with effective informatization of public administration can be found already at the stage of developing the Informatization Strategy. The strategy states that the aim of informatization should be to improve the way citizens' expectations are met, which is a very vague and unclear objective (Security and Privacy Controls... 2013). In addition, the authors of the strategy do not indicate the institutions that should implement it, they did not indicate a coordinator of the informatization process and did not define their responsibilities or rights. During the development of the strategy, the optimization of processes from the point of view of computer technology was omitted, while the integration of departmental solutions was

emphasized. This leads to isolation of systems and lack of automatic exchange of information between departments. The lack of an IT framework that would integrate public administration systems, both in practice and in the strategy, means that the introduced sectoral solutions will have to be rebuilt in the future to enable their integration. This will result in unjustified costs for the state budget. The stimulating role of the state in building the information society in theory assumes that public systems (e.g. identification and confirmation of identity) will be a source of information for commercial systems providing electronic services. This issue was omitted from the state Informatization Strategy.

The basic problems of informatization also include the adoption of the superiority of a paper-based information, which leads to the consolidation of traditional inefficient information processes by means of computer technology. The result is double archiving — in paper and electronic form, both containing full information records.

Inconsistency of law or lack of regulations that will allow for a clear definition of the process that constitutes the basis for developing IT systems. The outdated organizational structure, not adapted to the organizational tasks and processes, is also a part of the problem. This causes problems in identifying process owners and makes it difficult, and often even impossible, to formulate requirements for electronic systems correctly (Glińska, 2016). An additional difficulty for companies developing computer systems is the localized specificity of processes which results in identical processes being executed differently in different offices, requiring the hardware and software to be prepared and configured in a different way.

The lack of central repositories of public information means that a client of an office is required to provide a full set of documents each time despite the fact that the office already has their information. This state of affairs not only slows down the organizational processes but also generates additional costs. Therefore, it becomes necessary to change the law to regulate electronic information repositories of public administration.

From the point of view of process management, it also seems necessary to appoint a process coordinator responsible for the smooth running of a process. Currently, each of the organizations (organizational units) is solely responsible for its part of the process. This leads to a situation where all responsibility for the process is transferred to the client (service recipient). This situation makes the citizen a “biological” integrator of the process carried out by the public administration. In such a situation, the administration adopts the principle that if the integrator malfunctions (does not transfer the information in time), they should not file any complaints against the service. This belief makes public services subordinate to the structure of the administration and not, as it should be, to requirements of the clients (Halcombe, 1997).). Therefore, a comprehensive informatization by establishing or determining an organization responsible for the coordination of processes and defining standards for data exchange seems necessary.

The literature stresses that properly carried out informatization requires the adjustment of processes to electronic support, and not the other way round. Therefore, the first step is to reprogram the processes so that they meet the standards for electronic processing of information. Failure to make such a change, or even the inclusion of the current form of the processes in information technology makes it impossible to separate the place of service provision from the premises of the office. Additionally, it results in the lack of possibility to provide the full extent of the services both in internal administration networks and via the Internet. Solutions, common in the economic sector, consisting in centralization of dispersed functions in order to reduce the costs of their performance cannot be used in public administration with its current methods of operation, which leads to incurring unnecessary costs. The experience of the economic sector shows that centralization of e.g. IT services translates to a severe reduction of costs. The analysis of administration costs indicates an opposite trend.

Both modern IT systems and those that are several dozen years old are currently in use in public administration. This state of affairs makes it impossible to assess the state of informatization in the public sector. The implemented modern solutions cannot be fully used due to the impossibility of integration with older systems. The great variety of solutions and the lack of a common concept of system integration also makes it difficult to integrate systems performing the same functions in different offices. Therefore, in the current state of affairs, it seems necessary to develop a coherent concept of state informatization, to identify and document the existing solutions and to develop a model of service integration.

Public Administration Reference Processes

The essence of a public service is that it must be provided in the same quantity to all consumers within the area of influence of the entity established to provide such service. In the case of public administration, this means that all citizens should be able to benefit equally, whether they pay for these services or not. The majority of public services provided by the administration are of an intangible — informational nature. They are connected with information processing and recording in the information registers. Taking into account the growing awareness of the society and the pressure on services to be provided quickly, it is necessary to provide IT support to the processes of providing public services. Therefore, it would to be advisable to standardize the process of service provision and, consequently, to standardize IT systems with regard to their functionality and the way information is processed. Reference processes should be used as the basis for creating such IT systems.

Analyzing the attempts to implement process management in public institutions, it should be noted that these implementations are projects related to the use of IT tools mainly for process mapping. Efforts to optimize processes based on simulation and analysis are rather seldom. However, the specificity of the public sector results in ill-considered implementation of process management meeting with great internal resistance, an increased workload and, as a result, the implementation activities fail. A common mistake is also an attempt to implement comprehensive process management covering all processes of the organization (Batko, Sasak,… 2012). This approach is often based on experiences from the economic sector, characterized by a high degree of repeatability of activities and functions as well as full control over the manufacturing process and individual functions. On the other hand, public offices do not have full control over the order or manner of performing activities, which usually only allows for partial optimization and thus does not fit into the concept of comprehensive process management. At the same time, it should be remembered that public institutions can only carry out the tasks and in the manner prescribed by law. For this reason, the concept, scope and form of implementation of process management must be different in the public and commercial sectors.

Properly conducted process management implementation in public administration should consist of the following stages.

1. Decision to implement process management methods and tools,
2. Establishment of an implementation team,
3. Organization and training of the team,
4. Development of a concept defining the objectives and scope of implementation,
5. Development of a mapping methodology and process definition,
6. Establishment of a list of processes and their owners,
7. Establishment of criteria for the selection of processes for optimization,
8. Establishment of a schedule of implementation work,
9. Conducting implementation activities.
10. Evaluation of the implementation.

As a result of implementation of process management in a public institution carried out in such a way, a database of processes is obtained, which may constitute a basis for generating functionalities

and rules of IT system operation. In the case of the Polish public administration, a problem exists related to the lack of standards of providing public services. In order to improve the quality of such optimized processes, the course of the processes and resources involved should be compared with those of other offices. This can be done using standard process modeling tools utilizing database solutions. Data on the course of processes in various public administration offices were collected in numerous EU-funded projects. Using databases of business process models of public administration and the methodology of creating public administration reference processes presented, among others, in the publication entitled "A *new paradigm of public administration functioning*" (Batko, Sasak,… 2012). The reference models of processes developed in accordance with this methodology should be implemented in IT systems of public offices.

Intelligent Generator of IT System Functionalities

The concept of using reference models to build IT systems is particularly important in public administration. This importance stems not only from the fact that the activities of public institutions become standardized, but also allows for the integration of databases and administration IT systems. A problem commonly observed in public administration is the frequent change of regulations which are the basis for the functioning of offices. Therefore, it is necessary to constantly monitor changes in regulations, modify the processes and introduce changes in IT systems. The course of implementing changes in IT systems is quite time-consuming. This is because it requires not only the work of analysts, coding, but also testing and verifying code correctness. These activities also are quite expensive, therefore the use of intelligent tools that generate system functionalities or only support the process of generating IT systems can significantly reduce the costs of adjusting systems, shorten the time of implementation work and avoid mistakes at the stage of designing and implementing IT solutions.

The implementation of process management results in the fact that making changes in the way tasks are performed entails the improvement of the organization and the efficiency of IT systems. In the case of public organizations which implemented process management, each change of regulations, law or change of the scope or manner of task execution involves a modification of processes. Modification of processes is always directly related to the need to check and possibly reconfigure IT systems. In the case of new tasks or extensive changes in the already implemented ones, it is usually also necessary to modify the IT systems by adding functionalities, modifying database structures and the data itself. The form and organization of processes also requires adapting to the specifics of electronic data processing.

Comprehensive process modelling allows for linking process activities with resources involved in their execution and automatic generation of reports and process documentation. The proper procedure in a situation where the use is IT support for modeling or process improvement assumes that by means of tools supporting modeling, a new process is created with the assignment of necessary resources to it. When modelling or improving processes, it is important to remember that they should be designed with electronic documents as the primary data carrier, which may involve changes in the resources of the organization. On the basis of the modeled process, appropriate UML diagrams can be automatically generated in the modelling support systems to configure or develop the IT systems supporting the process. Such diagrams are analyzed and, on their basis, programmers create or modify functionalities of IT systems. Lack of time and the need to commence processes in a modified version imposed by law, usually results in the omission of a thorough analysis and programmers implement the IT system functionalities according to the guidelines received from the public offices.

Modern programming tools allow to generate applications based on UML models, thus the automatically generated diagrams can be used as the basis for such systems to generate or modify relevant application functionalities. This significantly reduces the time of preparation of IT systems and as a result of implementation of the entire process.

In the proposed model, the process of creating and developing the concept consists of three stages. The first stage consists of analyzing and recording the applied IT and legal solutions, identifying barriers and factors supporting implementation of new solutions. In the second stage, a theoretical concept is defined with the necessary changes. The third stage involves the implementation, monitoring and improvement of the solution.

The need to integrate a number of levels of public administration requires an initiative to develop concepts at the highest levels of government. The team coordinating the development of the concept of informatization should be an interdisciplinary one and have sufficient powers to propose a change in the law. The most important part of the initial stage is to identify information needs. The correctness of performance of this activity depends on the proper development of informatization directions. Mistakes made at this stage can only be corrected to a small extent during public consultations. The initial concept of informatization developed should be subject to public consultation in order to verify the correctness of informatization directions and priorities. The consultations will indicate areas in which the existing IT solutions should be modified first.

In second stage, the choice and definition of the reference structure of the database may be problematic. Currently, in Poland, despite numerous attempts and IT projects, no database exists that could serve as a reference base for all public services

In the third stage, making changes to the law may give rise to certain difficulties, which will be related to the political nature of certain decisions. Building a reference base, as experience in this area shows, may be a critical problem. The process of personnel changes and the elimination of psychological barriers will also require a careful approach. The conclusions from the monitoring of the implementation and the analyses of society's needs should form the basis for future development of the concept.

Implementation of the proposed concept of informatization will enable full integration of public administration services in IT systems. The key element allowing for the integration of services is to provide access to a reference database along with developed ICT standards for public administration IT systems. The model of public administration services integration is presented in Figure 2.

Currently, there are several solutions used in Poland which act as integrators of public administration services. This state of affairs is related to the lack of task coordination between the various departments. This results in “island” solutions that integrate a part of the systems and services. Political criteria, on the other hand, lead to solutions being chosen in accordance with the current policies or lobbies rather than the best solutions in terms of technology.

The proposed model assumes that the Intelligent Public Administration Service Integrator (Pl. *Inteligentny Integrator Usług Administracji Publicznej* or IIUAP) handles the service integration. This integrator is an IT solution using knowledge base solutions, whose task is to standardize and provide access to public administration services. The information contained in the state informatization policy is the integrator's configuration guidelines. On the basis of this information, priorities for the services provided, the directions for their improvement and development are established. This information is transferred to companies offering software solutions so they can make the necessary improvements. Solutions that do not comply with the informatization policy are automatically blocked and in extreme cases removed from the database of possible solutions.

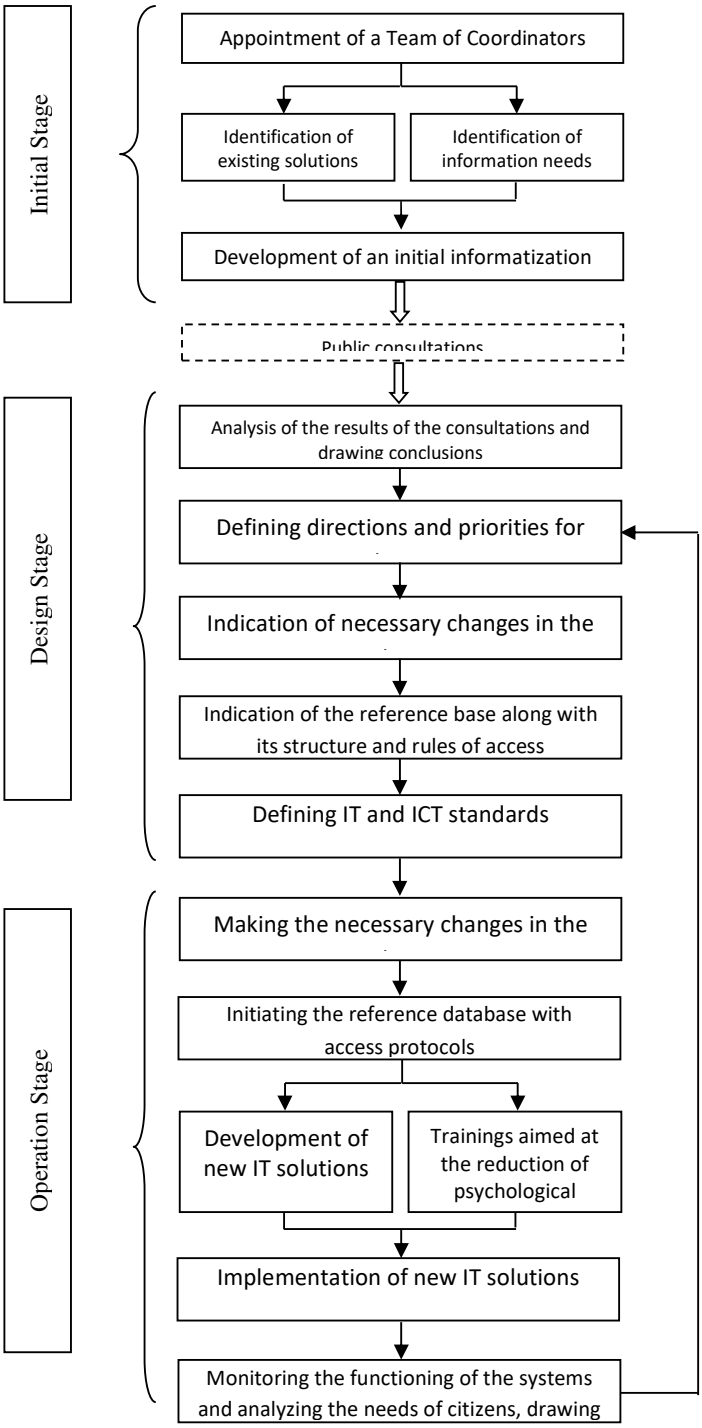

Figure 1: Process of developing an informatization concept.

Source: author's own study.

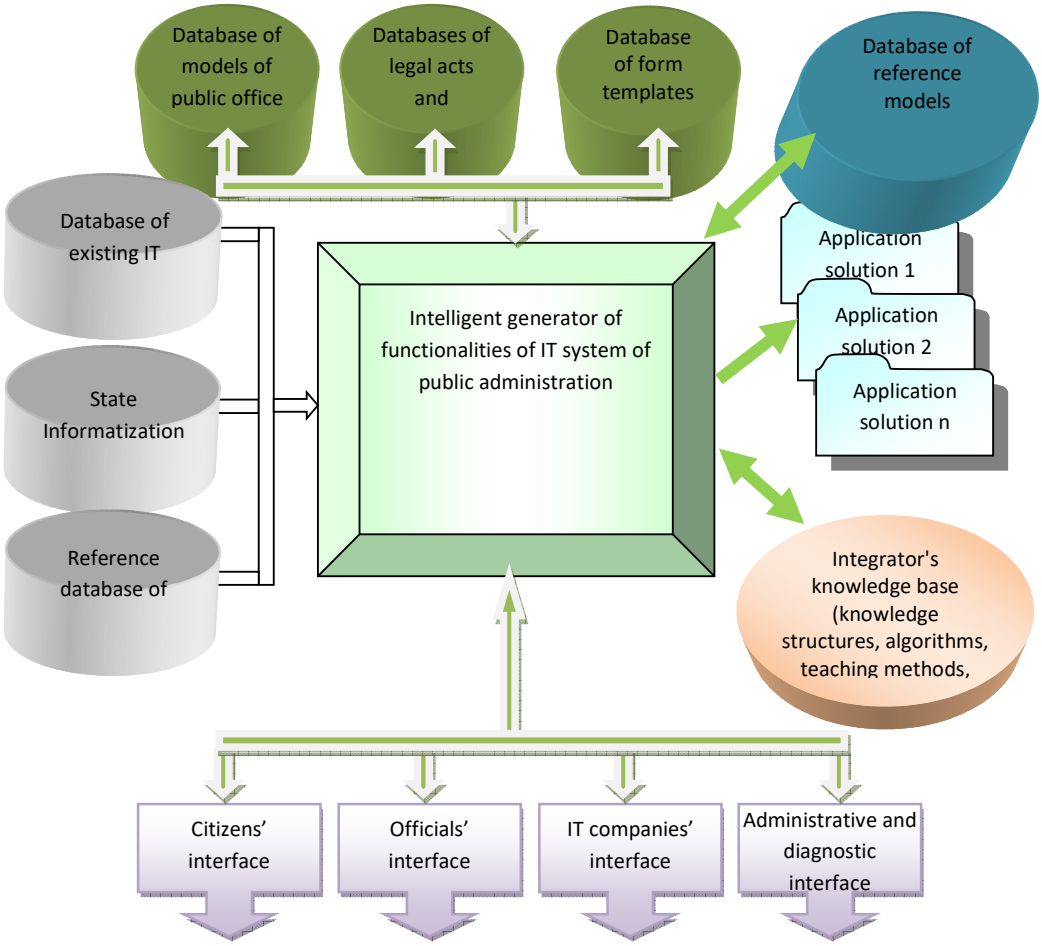

Figure 2: Service integration model

Source: author's own study.

The database of IT standards is developed in the course of creating and modifying the informatization policy. It forms a set of standardized procedures and protocols for information exchange between public administration systems. The role of the integrator is to ensure that the solutions offered within the integrated system are compliant with the standards. The third source of information external to the Integrator is the reference database. This database is used to authenticate persons and institutions using the system. Therefore, it is necessary for it to ensure that the transaction is legally sound. Such a role can only be played by a state-run database.

The Intelligent Public Administration Service Integrator (IIUAP) uses internal databases. The first group of databases are databases of form templates containing official, current and archival document templates, a database of legal acts and interpretations containing legal information about services offered on the platform. These databases are complemented by a database of public solutions that include IT implementations of service provision tools for which copyrights are held by the state or are openly distributed.

The second group of databases are application solutions — programs providing services. This database is updated and supplemented by commercial companies through the commercial companies' interface. Companies wishing to offer their solutions submit the solution to the Intelligent Public Administration Service Integrator, and after verification of correctness and compliance with the standards, the Integrator places the solution in the database and makes it available for use. Companies can remove the solution at any time and the Integrator can block it if it no longer meets the standards. This way, the software made available in this database will always be safe and compliant with the requirements.

The proposed solution uses field-specific public administration databases. Through ICT links it is possible to carry out transactions in these databases without the physical intervention of officials. This solution allows the system users to use the services at any time. The role of the integrator in this case is to verify the rights to take a specific action, provide an IT tool, secure transactions, ensure data accountability.

The efficiency of the integrator is determined by its knowledge base. The knowledge, algorithms, methods, procedures and functions contained therein allow for high autonomy of operation. A properly constructed knowledge base can analyze of offered solutions, monitor users' activity, detect security breaches and suggest changes.

System users connect via group interfaces. First, each user is authorized and authenticated using the reference database. On this basis, they are assigned appropriate rights and level of access to the application and information. Users can use different roles in the system, e.g. officials can also use the role of citizens. The choice of a role is made after the authorization process and before the granting of rights.

The use of the proposed solution is aimed at integrating the solutions used thus far in the provision of public administration services. The multitude of solutions and the lack of standardization make the electronic provision of public administration services more difficult and often even impossible. The implementation of the system should enable the coordination and cooperation of the various systems and their adaptation and integration with international systems.

Summary

The formation of the information society as well as the emergence of state-of-the-art communication solutions necessitate changes in the manner public services are provided. This process has accelerated considerably in recent years. Lack of well-thought-out solutions results in incurring unnecessary costs for informatization, which with limited resources makes the public administration inefficient. Therefore, it is necessary to change and organize the electronic aspect of public administration services. The proposed solution is one of the possible ways to improve the functioning of public administration.

The greatest threat to the implementation of solutions improving and integrating public administration IT systems is the politicization and low IT awareness of public managers. Moreover, it is common practice in the public sector to develop and build IT systems independently. Such activities often lead to the creation of systems using proprietary solutions, which, for many reasons, may become completely unusable and the data contained in them may not be available for use with other solutions.

The process of integrating administration services absolutely requires the development of uniform standards of information management in the public sector. These standards should provide guidelines for building IT systems and automating information exchange between all organizations in the public sector. It is also necessary to appoint an informatization coordinator, who will be responsible for setting standards of information exchange and rules of cooperation of IT systems in the public sector.

The proposed solution is one of the possible implementations of the concept of public service integration.

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Visualization of Knowledge About the Multi-Agent Supply Chain

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Abstract

Knowledge visualization includes, among others, issues such as visualization of scientific research results. It enables creating added value and extracting new knowledge from data sets. Visualization is to help better understand the data, as well as discover new facts and dependencies that have been hidden until now. The purpose of observing and scientific research is to map that will allow determining the existing knowledge and defining the boundaries of this knowledge, and thus determining the further direction of knowledge development about the multi-agent supply chain.

Keywords: Supply Chain, Cluster Analysis, Semantic Maps, International Research Trends, Multi-Agent

Introduction

The use of mapping and visualization opens new research perspectives in inter- and transdisciplinary fields. Thus, the analysis allows you to examine the structure of science or a field or discipline and show its future trends. Semantic maps (concept maps) are a relatively new form of knowledge presentation. They enable the acquisition of both necessary and unique information. Based on one set of resources, you can create many knowledge maps that allow browsing and graphical visualization as well as filtering and searching.

Knowledge visualization is a powerful approach to analyzing various bibliometric networks. Over time, scientists began to analyze larger and larger networks, which led to the use of advanced information technology for visualization (van Eck & Waltman, 2014). The most commonly used unit for mapping or visualizing knowledge are documents, understood as scientific papers, patents, etc. Knowledge visualization maps are developed for various purposes. Let the examples be: mapping the evolution of entrepreneurship as a research field in the years 1990–2013 (Chandra, 2018), analyzing trends in the circular economy (Homrich et al., 2018), analyzing security culture research (van Nunen et al., 2018), analysis of research on multi-criteria decision making (Yu et al., 2018).

The purpose of visualizing knowledge about the concept of supply chains and the multi-agent paradigm is to answer the research questions posed: (1) What are the international research trends in the concept of supply chains and the multi-agent paradigm over the years?; (2) what are the most important conceptual clusters created on the historiographic map of scientific publications, in terms of the concept of supply chains and the multi-agent paradigm, indexed in WoS in the years 1996–2019?.

The structure of work is as follows. Part one discusses the concept of a Multi-agent solutions in supply chain. Part two presents the research method used. The third part contains the results of the visualization of knowledge about the multi-agent supply chain.

Literature Review

Nowadays, changes are faster and more unpredictable. Enterprises must respond quickly to challenges and opportunities in the business world (Saniuk, Saniuk & Caganova, 2014). High speed manufacturing involves significant investment (Jasiulewicz-Kaczmarek & Bartkowiak, 2016; Waszkowski, 2019). Multi-agent solutions have been recognized as a promising area of next-generation knowledge. An important element of survival in these dynamically changing conditions is "agility", in particular by creating flexible supply chains. Agility should be understood here as the rapid creation of a complex supply chain system based on multi-agent technology. The centralized and hierarchical organization of the traditional supply chain means that a significant part of the created system can be limited as a result of one emerging threat or failure. Multi-agent solutions ensure the naturalness of design and implementation of an efficient, intelligent and distributed system. They are by nature strongly time-oriented and highly responsive (Shen, Hao, Yoon & Norrie, 2006, p. 415; Kowalski & Chlebus, 2017). At the same time, they still focus on cost and quality. Multi-agent systems are typical collective behavior in network systems with a group of autonomous mobile agents (Sitek & Wikarek, 2018). These systems strongly rely on communication and cooperation between the involved enterprises (agents, objects). The activities and interactions of each enterprise are clearly represented in multi-agent models. Agent-based solutions are the preferred technology that allows flexibility and dynamic coordination of spatially dispersed business entities cooperating in supply chains. And due to the similarity of the supply chain system and multi-agent systems, the latter can be used to model or actually perform tasks in supply chain management.

Research Methods

Semantic maps are generated from various text sources, based on individual words extracted from scientific titles, descriptive entries or descriptors assigned by the publisher provided by the database provider (e.g. ISI keywords) (Börner et al., 2005). Then the so-called clusters are configured on the created knowledge and science maps. Cluster analysis (CA) is used to create clusters. The result of cluster analysis is the division of a finite set of objects into clusters (subsets). The finite set X consists of n objects and the finite set A contains m attributes that describe the properties of the object $x \in X$. A grouping of clusters is created during grouping (Jain & Dubes, 1988):

$$C = \{C1, C2, ..., Cc\}$$

Grouping is the basic activity that a researcher performs for cognitive purposes. Cluster analysis involves many different classification algorithms that are designed to organize a very large amount of information and data into handy, meaningful stacks or categories, called clusters (Börner et al., 2005). As a result of the cluster analysis, it is possible to divide a heterogeneous set or set of elements into homogeneous, "similar" subsets. As a result, the objects are grouped into set A and the second set not A. Each object belongs to exactly one cluster - this assumption concerns "hard" grouping. The created conceptual clusters are created using the similarity or distance function (Jain et al., 2009). In this case, the goal is to divide the set of objects into the number of subsets.

As reported by Börner et al., Clusters should be internally highly uniform and externally highly heterogeneous. Highly internally uniform clusters mean that the assigned test objects (researcher / documents / magazines) are similar. Externally highly heterogeneous means that the examined objects are not similar to other cluster objects. Hence the similarity function is expressed by the statement: the closer the examined objects are, the more similar they are. Therefore, the goal is to maximize similarity within the cluster and minimize similarity between clusters (Börner et al., 2005). Conceptual clusters are a set of closely related objects, also called nodes, in terms of themes. Each node in the network is assigned to exactly one cluster. The number of created clusters is determined based on the so-called parameter of resolution. The higher the value of the resolution parameter, the greater the number of clusters created (Waltman, van Eck & Noyons, 2010). Each created cluster is marked with a different color, which makes it easier to read the created map of knowledge on the studied topic. As a result of cluster analysis it is possible to: (1) identifying clusters by distinguishing a

group of similar objects that intensively coexist and attempting to generalize their features, (2) designation of objects with isolated values that do not match other objects, (3) the discovery of an unexplored and unknown structure of the analyzed data.

For the purpose of the work, VOSviewer version 1.6.9 was used, which was made available on August 29, 2018. The main advantage of VOSviewer, which decided to choose this and not another IT tool, is the continuous process of updating the software functions and a relatively easy way to use it. A special positive feature is that the program completely focuses on the visualization of bibliometric networks.

Due to the very large number of scientific and research works related to supply chain research, it is almost impossible to review all published research. The literature study defined on the basis of the concept of "Supply Chain" covered 49 331 scientific publications, without taking into account the supplementary words and identifying the type and type of publication. After narrowing searches, 672 scientific papers were obtained.

Based on the bibliometric analysis according to the Systematic Literature Review (SLR) method and the local base obtained, a division into four periods was made regarding the development of the concept: (1) emergence period (1996–2000); (2) definition period (2001–2007); (3) concept maturity period (2008–2009); (4) stabilization period (2010–2019).

These periods were covered by analysis and visualization according to the Systematic Literature Network Analysis (SLNA) method introduced by Colicchia and Strozzi (Colicchia & Strozzi, 2012). This stage of research can be carried out in three steps: (1) review planning, (2) conduct a review, (3) review reporting.

In order to carry out the analysis of knowledge visualization with the help of keyword co-occurrence maps, a set of keywords was separated, which concerns the created local database with a total of 672 scientific papers. A separate set of concepts was subject to the process of "normalization". This means that the specified keywords have been standardized as to form (lowercase / uppercase) and the letter 's' at the end of the keywords has been removed. Noun expressions have been transformed from plural to singular, e.g. "agents" into "agent". This way many plural and singular keywords have been unified.

As a result, a network was created based on keywords that appear at least five times (i.e. according to the default value of the software defining the threshold for the minimum occurrence of keywords). As a result, a total of 1,682 keywords were listed that describe the scientific papers identified in the local database over the years 1996–2019. Among them was a set of keywords that take into account the minimum occurrence of keywords. Their total number is 91 expressions. On their basis, a series of semantic maps were developed for specified periods of concept development and for the entire period under study.

Research Results

Each keyword as an object on the semantic map has a different color. The colors allow you to group keywords that results from the similarity and relationship of concepts and the compatibility of the research topic. Keywords that have the same color belong to the same cluster. So they tend to be more similar, coexistent and matching than keywords of different colors. Thus, each prepared semantic map has its own unique arrangement and grouping.

The first period, the so-called emergence period, was chosen for the keyword-based analysis. It was in the years 1996–2000. During this period, 13 scientific papers from the study area were published. The emergence of the research trend in the concept of supply chains and the multi-agent paradigm falls in 2000. A total of 18 keywords were identified during this period. Due to the fact that the

emergence period concerns few scientific publications for the purposes of building the semantic map, a minimum threshold of keywords has been set at 2. This means that keywords that meet this condition have occurred at least twice in the list. Of 27 keywords related to identified research papers from the emergence period, three met established guidelines.

Keywords that meet the set condition are presented on the semantic map (Fig. 1). One cluster was specified for the examined period, which is a scientific, thematically coherent area. It was based on three identified keywords. These keywords are internally highly uniform. There is a greater co-occurrence relationship between the two keywords "Agent" and "Multi-agent System". This can be identified by the thickness and color saturation of the link that combines both concepts.

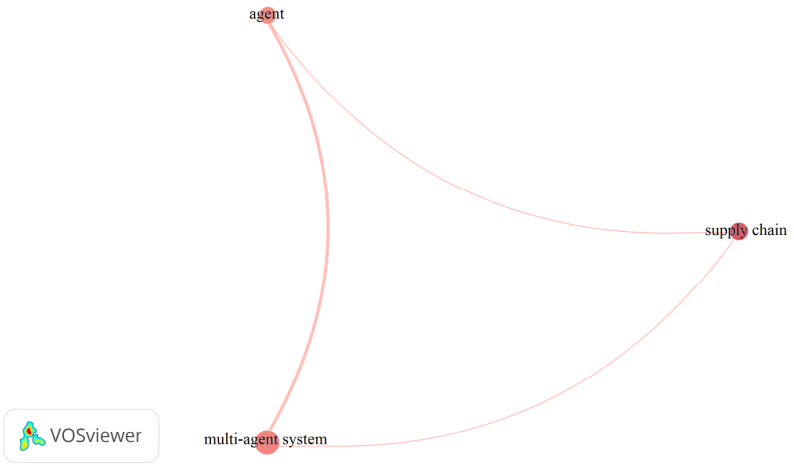

Fig. 1: Visualization of the semantic network in the period 1996–2000; research area for the keywords "Supply Chain" and "Multi-agent"; Own development using VOSviewer

The evolution of the approach under investigation began with the keyword "Agent" (1998), and at the end of the period under study there appears the expansion to the keywords "Multi-agent System" and then "Suppy Chain" (2000). The transition from the term "agent" to the "Multi-agent System" falls around mid-1999. Researchers indicate that the multi-agent system is composed of four components: (1) agents, (2) tasks, (3) organization and (4) information infrastructure.

The years 1999 and 2000 are a period of shifting the multi-agent approach to the area of supply chains. Kaihara points out that every business organization in the supply chain represents independent entities with often conflicting and competing product requirements. It may also have localized information relevant to other interests (Kaihara, 1999, p. 394). During this period, researchers are looking for the answer to the question: how can industrial networks coordinate their activities more effectively? The answer is that collaboration has an evolutionary advantage that is still embedded in social norms. From the indicated period, business units and enterprises should be treated as agents who should be assigned autonomy in making decisions. It was also found that streamlining supply chains is a key mechanism to increase profitability and improve competitive position in the market. The multi-agent paradigm fits into the concept of supply chains.

In the second development period, called the definition period, falling between 2001 and 2007, 461 concepts have already been identified, of which 18 meet the minimum keyword threshold, which was set at level 5. In the period under study, 4 conceptual clusters were identified (Tab. 1).

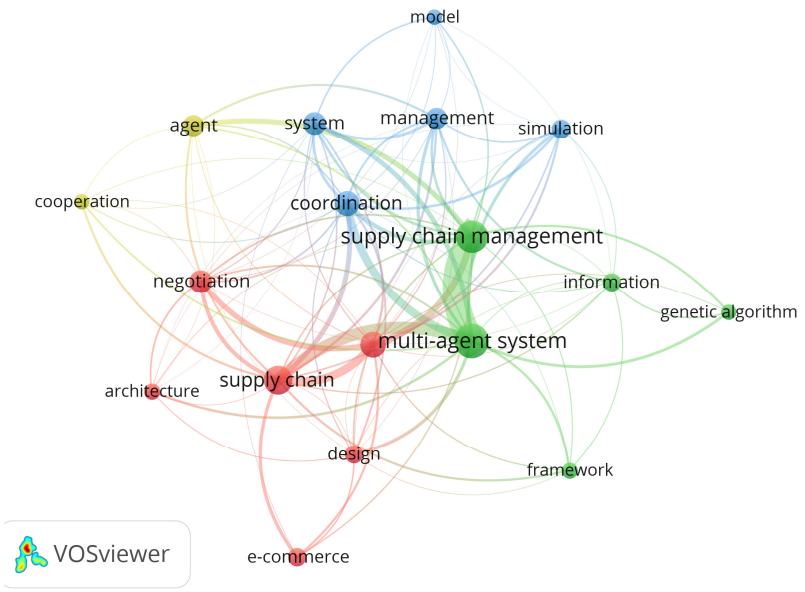

Fig. 2: Visualization of the semantic web in the period 2001–2007; research area for the keywords "Supply Chain" and "Multi-agent"; Own development using VOSviewer

In the second period of concept development, the direct link and coexistence of three keywords identified in the first period was maintained. These are (Fig. 2): (1) "Supply Chain" from cluster 1 (red), (2) "Multi-agent System" from cluster 2 (green), (3) "Agent" from cluster 4, (yellow). Therefore, it should be confirmed that the scientific structure of the studied area is changing. It results from the development of the concept. Three keywords identified during the emergence of the concept, in the next currently analyzed period 2001–2007 are concepts from which there are three differently perceived conceptual clusters. These clusters are internally highly uniform and externally highly multidirectional. On the semantic map (Fig. 2) there are several objects representing clusters - the "best" and reference objects. And so for cluster 1 it is the keyword "Supply Chain", for cluster 2 they are the concepts of "Multi-agent System" and "Supply Chain Management", while for cluster 3 it is the concept of "coordination" and for cluster 4 "Agent ".

Table 1 shows the number of occurrences of the indicated keyword in parentheses. The keyword with the highest number of occurrences is "Multi-agent System" for which the number of occurrences is 72. It is also the node with the largest total strength of 60. This means that this node shows the coefficient corresponding to the total strength of connections between the identified keywords . "Supply Chain Management" is the second strong keyword on the semantic map.

Table 1 : Identified clusters based on keywords in the period 2001-2007

Cluster 1	Cluster 2	Cluster 3	Cluster 4
Architecture (5)	Framework (6)	Coordination (26)	Agent (15)
Design (9)	Genetic algorithm (5)	Management (15)	Cooperation (5)
e-commerce (9)	Information (9)	Model (5)	-
Multi-agent (27)	Multi-agent System (72)	Simulation (11)	-
Negotiation (18)	Supply Chain Management (60)	System (18)	-
Supply Chain (39)	-	-	-

Cluster 1 refers to aspects of the application of multi-agent solutions in distributed systems, which are supply chains. Scientific publications therefore refer to the need to redesign business processes and practices with business partners in supply chains. For this purpose, a general architecture is designed to develop an experimental environment whose purpose is to design and test decentralized and at the same time advanced systems. The architecture used allows combining agent-based technologies and other fields of knowledge, e.g. tools based on operational research (Monteiro, Roy & Anciaux, 2007; Relich, Świc & Gola, 2015), applications of elements of game theory (Choi & Han, 2007).

Scientific publications from cluster 2 touch, among others, problems that solve genetic algorithms. Due to the high complexity and dispersion of supply chains, the use of genetic algorithms is appropriate and guarantees the most reliable solution in the case of: (1) optimization, (2) searching, (3) learning, (4) process modeling. Unlike traditional methods to optimize many partial problems, genetic algorithms (Burduk & Musiał, 2017) allow you to find a better solution that allows you to respond to dynamic environmental changes in real time, and as a result increase the efficiency of supply chains (Park, Choi & Kang, 2007, pp. 705–706).

Coordination and cooperation play an important role in managing complex supply chains. Hence, in cluster 3, concepts are grouped that focus on the topic of coordination and management of distributed systems. Coordination mechanisms are also tested (Yu, Qiu-yue & Ying, 2007). On the other hand, Yang indicates that simulating and then optimizing and monitoring the functioning of the supply chain using an agent has become a method of testing this supply chain (Yang, 2007).

There are 4 keywords grouped in the cluster that touch upon cooperation issues. Research from this period shows that cooperation in supply chains has two different forms. The first assumes that cooperation between business partners can take the form in which each link has equivalent decision-making capacity. All links work together with other links to achieve a common goal. The second form assumes that each link in the supply chain has limited decision-making power that corresponds to its field of activity.

The third stage studied is the concept maturity period. It falls for 2008–2009. It contains, on average, the largest number of scientific publications (60 scientific papers) that take into account the concept of supply chains and the multi-agent paradigm. A total of 358 concepts were identified during this period. Based on these identified terms, four conceptual clusters based on identified keywords are listed.

Continuing the analysis of direct connections and co-occurrence of three keywords identified in the first period on the semantic map for the concept maturity period, it can be observed that: (1) the terms "Multi-agent System" and "Agent" are located in cluster 1 (red), (2) the concept of "Supply Chain" is in cluster 2 (green). The "Multi-agent System" and "Agent" keywords are relatively significantly related. They are directly related to each other and occur in the same cluster 1. There is a relatively high degree of co-occurrence of the indicated keywords in published scientific papers. The presented semantic map (Fig. 3) also shows the connection of the keyword pair "Multi-agent System" and "Supply Chain". They are located in two different clusters, 1 and 2, respectively. These concepts, although they occur in different clusters, are strongly connected. It can also be seen that the pair of terms 'Agent' - 'Supply Chain' has no direct connection. This confirms the supposition that the concept of supply chains and the multi-agent paradigm is still evolving. Thus, the structure of the studied area is changing further.

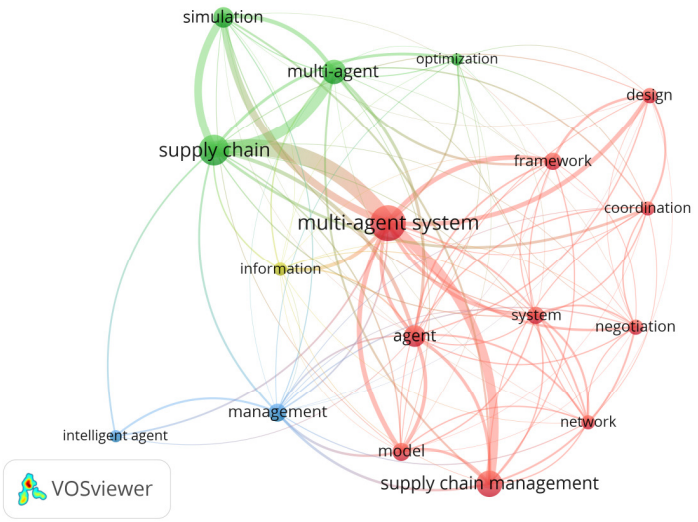

Fig. 3: Visualization of the semantic web in the period 2008–2009; research area for the keywords "Supply Chain" and "Multi-agent"; Own development using VOSviewer

Table 2: Identified conceptual clusters based on keywords in the period 2008–2009

Cluster 1	Cluster 2	Cluster 3	Cluster 4
Agent (16)	Multi-agent (20)	Intelligent agent (5)	Information (6)
Coordination (7)	Optimization (5)	Management (11)	-
Design (8)	Simulation (14)	-	-
Framework (10)	Supply Chain (32)	-	-
Model (11)	-	-	-
Multi-agent System (43)	-	-	-
Negotiation (8)	-	-	-
Network (7)	-	-	-
Supply Chain Management (23)	-	-	-
System (10)	-	-	-

Table 2 presents the clusters identified on the basis of the semantic map (Fig. 3). Four conceptual clusters are listed. The number of objects that make up them varies. There are as many as ten keywords in cluster 1 that are systemically and homogeneously linked. This means consistency, inseparability and complementarity of keywords present in this cluster; the concepts listed complement each other and focus. There is also cluster 4, which is a one-cluster. A one-piece cluster means that no other concepts with maximum similarity and at the same time maximally differentiate them from other concepts from other clusters were not found in the analyzed keyword set.

The set of keywords from the period 2008–2009, called the concept maturity period, can be divided into four clusters (Tab. 3). Cluster 1 contains the most keywords. It also contains concepts of high strength, such as "Multi-agent System" and "Supply Chain Management". Cluster 1 refers to the systematic perception of network modeling and its coordination. Research confirms that the Multi-agent System paradigm used in the supply chain seems to be a natural choice (Wang et al., 2008, p. 2687) to manage this type of distributed, dynamic and complex systems that are inseparably involved in the coordination and coherence of many entities. Is a modern technique of modeling a distributed system.

A growing interest in the problem of supply chain optimization and simulation can be observed in the analyzed period (cluster 2). This is a new area that is gaining importance due to the desire to both locally and globally optimize complex systems (Kazemi, Zarandi & Husseini, 2009).

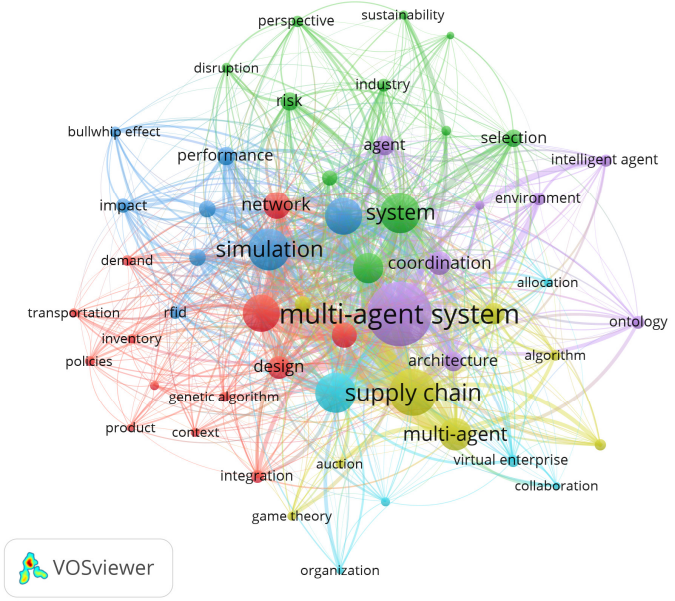

Fig. 4: Visualization of the semantic network in the period 2010–2019; research area for the keywords "Supply Chain" and "Multi-agent"; Own development using VOSviewer

In the last of the specified development periods, which falls in the period 2010–2019, called the stabilization period, 1,171 keywords from the studied area have already been identified. As many as 54 of them meet the minimum keyword threshold (5). During this period, 6 conceptual clusters were identified (Fig. 4). They are presented in Table 3.

In the fourth period of concept development, the direct link and coexistence of the three keywords identified in the first period was maintained. Those are: (1) "Supply Chain", which is located in cluster 4 (yellow), (2) "Multi-agent System", located in cluster 5 (purple) and (3) "Agent", located in cluster 5 (purple). The concept of "Agent" from cluster 1 from the previous period of concept development was reallocated to cluster 4. A similar situation occurs with respect to the concept of "Multi-agent System". This concept in the previous period was also allocated in cluster 1 (currently – cluster 5). It can be assumed that these concepts lose their importance and relevance. Whereas the concept of "Supply Chain" was assigned to cluster 4; in the previous period it was allocated in cluster 2. This shows further evolution of the research structure.

Table 3: Identified conceptual clusters based on keywords in the period 2008–2009

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
Context (6)	Decision support system (14)	Bullwhip effect (8)	Algorithm (8)	Agent (22)	Allocation (6)
Demand (8)	Disruption (7)	Dynamic (17)	Auction (6)	Architecture (22)	Collaboration (5)
Design (28)	Framework (45)	Impact (13)	Cooperation (9)	Coordination (29)	Manufacturing system (6)
Genetic algorithm (8)	Industry (11)	Information (17)	Game theory (6)	Environment (11)	Organization (5)
Integration (11)	Perspective (9)	Management (63)	Logistics (15)	Flexibility (6)	Supply Chain Management (73)
Inventory (6)	Risk (20)	Performance (9)	Multi-agent (51)	Intelligent agent (10)	Virtual enterprise (10)
Model (63)	Selection (18)	RFID (9)	Negotiation (25)	Multi-agent System (154)	-
Network (37)	Sustainability (6)	Simulation (76)	Supply Chain (94)	Ontology (11)	-
Optimization (33)	Sustainable Supply Chain (5)	-	-	-	-
Policies (7)	System (71)	-	-	-	-
Product (5)	Uncertainty (7)	-	-	-	-
Strategy (6)	-	-	-	-	-
Transportation (6)	-	-	-	-	-

The structure of the studied area in the fourth period, called the stabilization period, is spectacularly widening. New concepts appear which have not been used in this area before. As a result, the identified set of keywords shows mosaic different dimensions and areas of the studied area. They form the unity of the studied area, taking into account diversity and multiplicity. This unity creates a complex network of concepts and subject areas. Such a complex structure of knowledge could not exist, function and evolve without being composed of diverse and even opposing concepts. This shows that knowledge is rapidly spreading to other areas of knowledge during this period. There is a very intensive flow of knowledge to other areas of science, which means that existing knowledge is absorbed and applied. As a result, the studied area is significantly enlarged into many conceptual clusters. It shows that the analyzed concepts are well established in science. Table 3 presents the conceptual clusters identified on the basis of the semantic map (Fig. 4). Six were listed in the last analyzed period of concept development. The number of objects that make up them is not as diverse as in the previous period.

Cluster 1 deals with issues of solutions based on agent models, which can be used to analyze solutions at the strategic level as well as policy and infrastructure of logistics systems (Holmgren et al., 2012). In a conceptual cluster, 2 keywords take into account problems of unreliability or reliability of systems. Risk is a common phenomenon and results from uncertainty about the future. Risk, disruption, uncertainty are becoming the main factors limiting the achievement of a high level of supply chain efficiency and disturbing the current functioning of cooperating in supply chains of enterprises.

Discussion of the Results

The concept of the supply chain and multi-agent paradigm has been emerging since 2000. It could not exist, function and evolve without being composed of heterogeneous and interdisciplinary and even opposing concepts. The conducted research shows that in the area of research on the concept of the supply chain and the multi-agent paradigm, the heterogeneity, multi-facetedness and multi-directionality is an unquestioned phenomenon. The question is also a desirable phenomenon? It is highly probable to emphasize that unification of such a complex area of research is impossible. It results from the features of modern science and knowledge, which in dominant cases is interdisciplinary (Mäki, 2016, p. 8). Research shows that the concept of the supply chain and the multi-agent paradigm is from the outset an interdisciplinary area that consists of various research fields and disciplines. The heterogeneity, richness and mosaic dimensions of the study area seem to be a natural solution here, which contribute to the further development of knowledge and science. If there is a concept of diversity in science, then you can expect alternative solutions that: can compete with each other, or can complement each other.

As a result of the conducted research, international research trends for the period 1996–2019 were identified: (1) multi-agent solutions used to optimize and reduce reliability and support a sustainable industry; (2) management and coordination of complex and distributed supply chains; (3) modeling, structure or architecture of multi-agent systems; (4) simulations using multi-agent systems, including complex, adaptive systems; (5) multi-agent solutions and intelligent solutions; (6) integrating solutions for agile and flexible; (7) ontology and semantics; (8) algorithms and allocations.

Conclusions

Visualization of knowledge about the concept of supply chains and the multi-agent paradigm presented in the following semantic maps also shows and confirms the occurrence of the law of progressive differentiation, i.e. complexity. The development of the multi-agent supply chain concept goes from slightly differentiated generality (Fig. 1) towards increasing transparency (Fig. 2) and differentiation (Figures 3 and 4). The transition from one form to another is obviously staggered and can be reconstructed. This evolution requires energy that is associated with the creative efforts of many researchers. Scientific theories and research models are being built and their empirical verification is carried out. This evolution leads to a growing unification and differentiation of knowledge, which at the same time becomes more complex and more precise, and its conceptual casters better communicated.

Acknowledgment

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Formation of A System of Indicators for Monitoring the Sustainable Development of a Mono Town (Company Town)

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Abstract

For almost the entire time the human being has existed as a species, human society has remained in a state that is significantly different from modern reality. So the processes of significant processes of urbanization and enlargement of cities began in Great Britain at the end of the 18th century, in France in the 19th century, in Japan from the second half of the 19th century, in Russia in the second half of the 20th century, and in Latin American, Asian fears continue until so far. Currently, the majority of the world's population 54% currently resides in cities. At the same time, the level of urbanization depends on a specific region and country, so in Japan it reaches 91.3%, and in India 31.3%. Cities become not only the place of compact residence of the majority of the world's population, but also world centers of culture, art, as well as industrial centers and centers of innovative development. Despite the visible benefits of urbanization, there are a number of negative aspects associated with this process. These include the emergence of mono towns (city towns) or company towns, i.e. settlements that were founded by enterprises in order to provide the latter with labor resources. Such settlements are typical for countries that have experienced a wave of industrialization - the United States, Germany and Russia, and after its completion significantly reduced the volume of industrial production. The result of the completion of the wave of industrialization was a catastrophic drop in employment in mono towns (city towns), a sharp increase in social tension. The solution to the problem of mono towns (city towns) is possible by differentiating the lines of activity of the population of these mono towns (city towns), including through the development of innovative processes in these cities. The implementation of this process is impossible without the creation of an effective system of indicators monitoring the sustainable development of a mono town (city town).

Keywords: Innovation, Development, Socio-Economic Development, Mono Town, Company Town, Sustainable Innovative Development, Indicators, Monitoring

Introduction

For almost the entire time the human being has existed as a species, human society has remained in a state that is significantly different from modern reality. So the processes of significant processes of urbanization and enlargement of cities began in Great Britain at the end of the 18th century, in France in the 19th century, in Japan from the second half of the 19th century, in Russia in the second half of the 20th century, and in Latin American, Asian fears continue until so far. Currently, the majority of the world's population 54% currently resides in cities. At the same time, the level of urbanization depends on a specific region and country, so in Japan it reaches 91.3%, and in India 31.3%, figures 1.

Cities become not only the place of compact residence of the majority of the world's population, but also world centers of culture, art, as well as industrial centers and centers of innovative development. Cities grow not only in breadth, but also in height, each year the number of buildings with a height of more than 150 meters or 40 floors increases by 8% per year. Statistics show that the 600 largest cities account for about half of global GDP, while it is planned that the volume of GDP produced by large cities will increase, and these cities will provide up to 60% of future GDP growth worldwide.

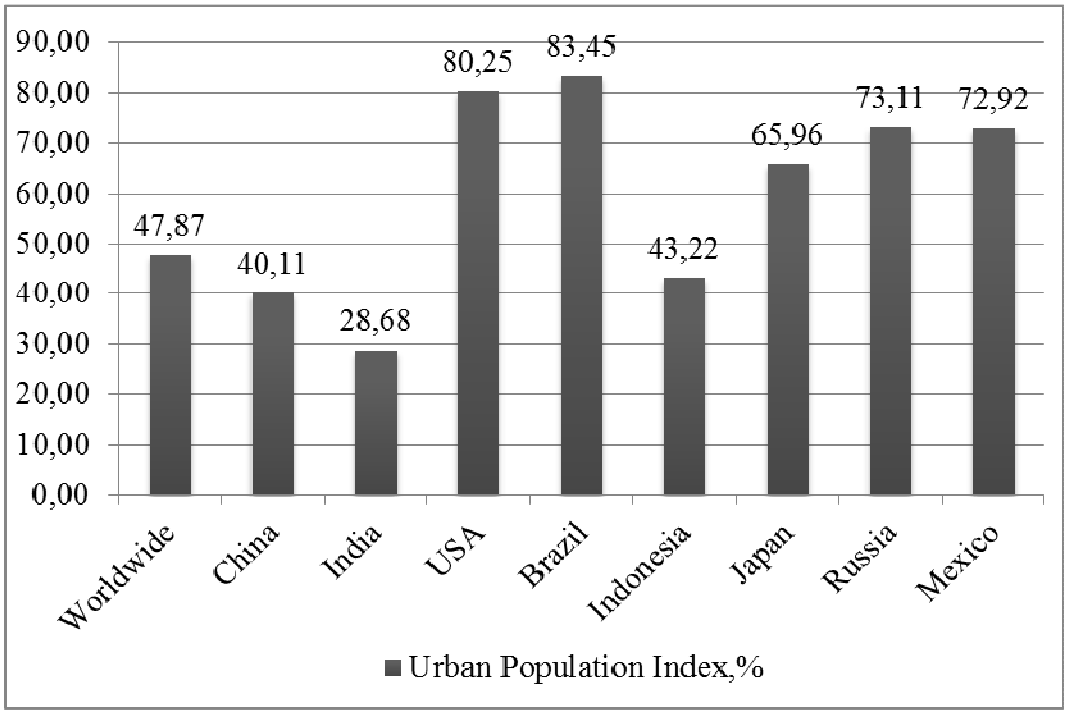

Figure 1: Urban Population Index, %

According to the forecasts of analytical agencies, more than 25% of the able-bodied population of the planet will live in the largest six hundred cities, and also about a quarter of a million households will be formed in these cities, which will create additional demand for consumer goods and services. As for the world population, the UN estimates that, by 2050, 66% of the world's population will live in cities (United Nations, 2020).

Formulation of the Problem

Despite the visible benefits of urbanization, there are a number of negative aspects associated with this process. First, urbanization entails significant environmental problems (OECD, 2012). Also, the rapid urbanization of the world, although it is a symbol of social evolution, poses numerous problems associated with intensive energy consumption, endemic congestion, saturated transport networks, air and water pollution, toxic waste disposal, resource depletion, social inequality and vulnerability, and declining public health and etc. (Bibri, 2013).

Similar conclusions are made (Jabareen, 2006), who notes that the current form of development of modern cities affects people, natural resources, habitat and climate.

The fact that a number of problems associated with the rapid growth of cities have arisen is confirmed by a number of researchers (Neirotti, De Marco, Cagliari, Mangano, & Scorrano, 2014). According to them, the rapid growth of cities threatens the environmental, economic and social sustainability of these social entities.

Also among the problems associated with the growth and development of cities should include the emergence of mono towns (city towns) or company towns, i.e. settlements that were founded by enterprises in order to provide the latter with labor resources. Such settlements are typical for countries that have experienced a wave of industrialization - the United States, Germany and Russia, and after its completion significantly reduced the volume of industrial production. The result of the completion of the wave of industrialization was a catastrophic drop in employment in mono towns, a sharp increase in social tension. The solution to the problem of mono towns is possible by differentiating the lines of activity of the population of these mono towns, including through the development of innovative processes in these cities.

Also, one of the ways to solve the problems of modern cities, including mono towns as their varieties, should include sustainable development. So (Bulkeley & Betsill, 2005) note that in order for cities to better cope with growth challenges, they need to adopt long-term sustainable development approaches. Implementation of long-term approaches to sustainable development, according to (Antrop, 2004), is a prerequisite for mitigating the consequences of the adverse effects that these cities may face as a result of the expansion of the capabilities and structures of urban systems that accompany urban growth.

At the same time, a number of researchers (Colldahl, Frey, & Kelemen, 2013), in addition to the environmental and social problems of modern cities, consider the obsolete (non-automated, non-digital) infrastructure within cities, which creates technical and physical problems, to be an important problem. This is also relevant for company towns, which received the main potential during the industrial era, and in the new era of industrialization are significantly lagging behind in their development (Troyanskaya & Tyurina, 2019).

The proposed approaches to the sustainable development of urban settlements have great potential for solving problems or providing solutions for moving towards urban sustainability. This is noted by researchers such as (Batagan, 2011; Höjer & Wangel, 2015; Kramers et al., 2014). The growing relevance of finding and making smart solutions to the problems of modern cities is noted (Nam, & Pardo (2011).

Sustainable development of a city, including a mono town, is impossible without creating an effective system of indicators that monitor the sustainable development of a mono town.

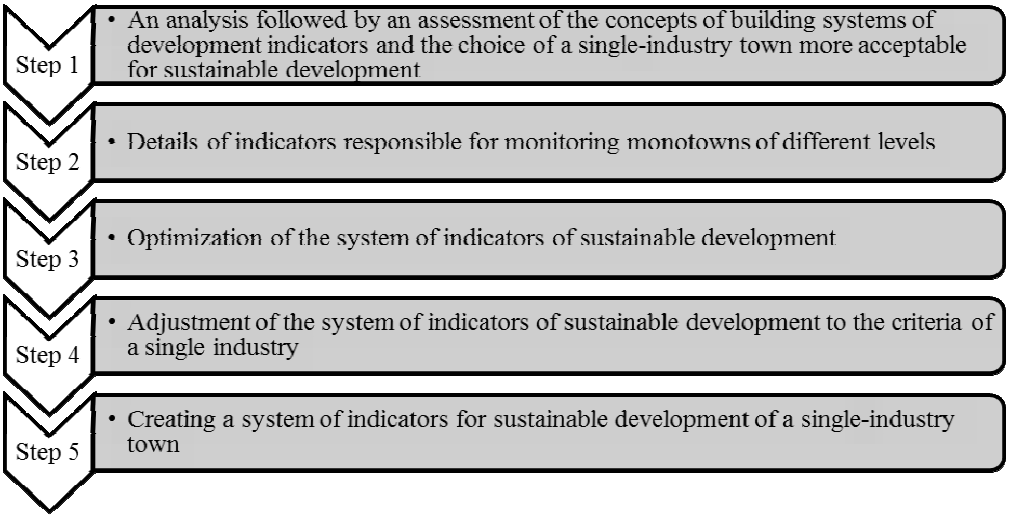

Figure 2: Stages of developing a system of indicators for sustainable development of a mono town (company town)

As practice shows, an effective set of indicators that monitor the sustainable development of a mono town has not yet been developed to assess the socio-ecological and economic situation of individual

industrial cities and determine their development. This, in turn, explains the lack of a well-implemented urban management policy.

The development of a system of indicators for the sustainable development of a mono town should be carried out in 5 stages, figure 2.

Results

We carry out the selection of indicators in accordance with the above stages of the formation of a system of sustainable development of a mono town.

The list of requirements that must be met by a system of indicators of sustainable development of a mono town:

- maximum coverage of the areas of socio-ecological-economic system;

- have a balanced hierarchy of subsystem indicators

- use data from government statistics;

- should include indicators that may be applicable for different levels (state, regional, local);

- have characteristic and sensitive indicators;

Consider the existing systems of indicators of sustainable development that can be applied to assess the sustainable development of a mono town.

At the moment, there are the following scorecards that can be used for this assessment:

- indicators of the UN Commission on Sustainable Development;

- A set of indicators developed by the World Bank;

- indicators of the Organization for Economic Co-operation and Development (OECD) and the World Health Organization (WHO).

Briefly describe each set of indicators.

The UN system of indicators for sustainable development is more consistent with the objectives of the study. This system meets the specified selection criteria, and also contains methodological instructions for each indicator with detailed recommendations for calculation, sources of the required statistical information, criteria for the importance of the indicator in the issue of sustainable development and interaction with other indicators of the system.

The World Bank indicators are more focused on assessing the resource provision of the territory and the efficiency of resource use, therefore, they are unlikely to be suitable for the formation of a system of indicators for the sustainable development of a mono town.

In the framework of this study, the indicators of the standards of Economic Co-operation and Development (OECD) and the World Health Organization World Health Organization (WHO) cannot be called priority, as they reveal only certain aspects of sustainability, namely the stability of demographic development and the sustainability of the social subsystem, respectively.

Consider a system of indicators for sustainable development of the UN

This system of indicators contains:

- input indicators - or indicators of driving force. They characterize human activity, as well as processes and resources that affect the sustainable development of a mono town;

- status indicators. They characterize the current state of those or other components of the development of subsystems of the studied territory.

- output indicators or response indicators. They allow you to make a political choice or some other way of responding to changes in the current state.

It should be noted that earlier the system of indicators of sustainable development according to the UN methodology consisted of more than 134 indicators, however, the complexity of the process of assessing sustainable development by these indicators and its high cost led to the fact that the system was optimized to fifty indicators. Moreover, 50 of these indicators were in turn included in a wider list of 96 indicators of sustainable development.

In our opinion, this particular system of indicators uses the most accessible data of official statistics.

Further, the system of indicators used in the UN methodology had to be adapted for a mono town. For this, it is necessary to analyze other monitoring systems of mono towns in Russia.

Among the systems for assessing cities and settlements, one can single out the indicator system of the Ministry of Regional Development of Russia and the indicator system specially developed in Russia for the implementation of the “Comprehensive Plan for the Long-Term Socio-Economic Development of Novy Urengoy for the Period Until 2020”.

The system of indicators of the Ministry of Regional Development of Russia is built on the principle of “topic / problem-indicator”, in which each problem has a specific indicator.

This system is aimed at monitoring such areas as:

- the possibility of an alternative application of labor released as a result of stopping / reducing the production rate of the city-forming enterprise, labor resources;

- public order, as an indicator of an open form of manifestation of social tension of the population;

- the possibility of diversification of the economy of the city; balance of the city budget.

The disadvantage of the indicator system of the Ministry of Regional Development of Russia is the lack of a subsystem of environmental indicators, which is important for a mono town, since most of the Russian mono towns have environmental problems. Thus, the principle of priority of the problem of mono towns is implemented in the system of indicators of the Ministry of Regional Development of Russia in a truncated form without fully disclosing all the characteristics of the qualitative and quantitative characteristics of the Russian mono town.

The system of indicators for the implementation of the "Comprehensive Plan for the Long-Term Socio-Economic Development of Novy Urengoy for the Period Until 2020" is quite extensive. At the same time, as a more detailed analysis of the ratio of indicators in the system, it can be revealed that this program does not reflect part of the principles for assessing the system of sustainable development, and also does not allow to elicit the result of their interaction.

The analysis of Russian systems for assessing the sustainable development of mono towns has revealed a number of shortcomings requiring improvement.

In accordance with Figure 2, we will adapt the system of indicators of sustainable development to the criteria of a mono town. For this, we use the indicators of the UN Commission on Sustainable Development on Sustainable Development, indicators of the Organization for Economic Cooperation and Development (OECD) and the World Health Organization (WHO), as well as Russian methods for assessing the sustainable development of mono towns.

We outline the most important development factors that should be used in the monitoring system under development: - the quality of life of the population directly affects the level of social tension in the mono town, namely:

- the standard of living of the population;

- the existence of other areas of labor;

- imbalance in the distribution of income;

- the presence of residents of real estate assets;

- working conditions of the population;

- life support.

Thus, the level of social tension can be called an integral social phenomenon, which is formed on the basis of information about the dissatisfaction of the population of the mono town with their social, economic and political situation.

At the last fifth stage, we define a list of indicators of sustainable development of a mono town according to the methodology of H. Bossel (Bossel, 1992).

As a basis, we will use the UN Sustainable Development Commission's system of indicators for sustainable development.

To maintain comparability of sustainable development assessment methods, indicators will be selected based on development factors that were identified in the previous step. figure 2.

As a result of the selection for the system for assessing the sustainable development of a mono town, the following set of indicators can be formed.

We will form the first set of indicators on meringue indicators reflecting and evaluating sustainable development in accordance with the UN sustainable development methodology.

This block will include the following indicators.

1. The poverty index of the population (an indicator of the control of the level of social tension).

2. The provision of comfortable housing (an indicator of the control of the level of social tension).

3. The share of utilized and recycled household and hazardous waste (an indicator characterizing the degree of environmental load as a result of the economic development of the territory of a mono town).

4. The cost of the territory’s internal natural resources (an indicator characterizing the level of the natural resource base of a mono town).

5. Debt burden on the city budget - the indicator is based on the external debt / GDP indicator, adjusted to the level of the municipality.

6. The coefficient of sectorial differentiation in wages is the Gini index, adjusted for the aspects of the municipality;

7. The possibility of employment, taking into account aspects of the municipality;

The next block is based on social indicators of the organization of economic cooperation and development Economic Co-operation and Development (OECD), this block includes the indicator of

the proportion of the population (employed in the city's economy) engaged in professional activities in adverse working conditions.

Also, to assess the well-being of the city from the point of view of public health, we will include in the set of indicators an indicator that is borrowed from the system of indicators of the World Health Organization (WHO) - the dynamics of social diseases.

As a result of the selection, a methodology was developed for assessing the sustainability of innovative development consisting of 9 indicators, which allows one to effectively assess the sustainable innovative development of a municipality that falls under the definition of a mono town.

Conclusions

The current development trend of mankind suggests that the level of urbanization of the population will grow every year, and the role of cities in the production of products and services will grow every year. Cities in the future will be the main centers of cultural and scientific development providing the future progress of human development. However, any socio-economic processes carry two components, one of which is positive, and the second carries a negative component. One of the negative features of urbanization is that any negative changes in the city related to the economy, social sphere and healthcare lead to significant social tension. A special case is a company town specially created for a specific production. The practice of municipalities shows that the emergence of problems in the company of the founder of a single-industry town automatically generates a surge of social tension and the subsequent degradation of the city. At the same time, most sites of company towns (company town) can effectively use their infrastructure for the development of this municipality in a different direction. This process should be accompanied by monitoring the sustainable development of a company town (company town) which is implemented through a system of indicators of sustainable development. The proposed system of indicators will ensure the monitoring of the sustainable development of single-industry towns during the shift strategy of their development and deindustrialization.

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Renewable Energy Sources as An Important Factor for Rural Development in Poland

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Abstract

In Poland, despite a significant change in the quality of life, we still have a problem in this regard in rural areas. This is due to overt and covert unemployment as well as mainly low-margin activities functioning in those areas. Increasing economic development in the countryside requires creating non-agricultural jobs in the area. However, activities undertaken as part of local low-emission economy plans aimed at the development of renewable energy sources may be an opportunity for a positive change in this field. The aim of this study was a synthetic analysis of the situation of rural unemployment and to determine whether the renewable energy sources may create an opportunity to eliminate the problem.

Keywords: Sustainable Economic Development, Renewable Energy Sources.

Introduction

From the beginning of the system transformation, the main goal has been to promptly adjust the standard of living in Poland with highly developed European countries. However, in practice this goal was reduced only to changes in the economic growth rate and no attention was paid to qualitative transition. As a result, the level of economic development is low, which is manifested primarily in:

- poverty level (almost 5,4% of the population is affected by extreme poverty, over 10,9% statutory and almost 14,2% - relative) (GUS, 2019a),
- social inequalities (we have a much larger income gap than other European countries) (Jankiewicz, Pająk 2014, Chancel 2018),
- level of remuneration (in terms of the dominant value),
- difficult access to health care (including prevention and rehabilitation) (Jankiewicz 2016, NIK 2019).

From a spatial point of view, the problem of low income and quality of life occurs in the countryside. Activities undertaken as part of local low-carbon economy plans aiming at increasing the rate of sustainable development of affected areas may create an opportunity for positive changes.

The aim of the study was a synthetic analysis of the situation in the field of rural unemployment and drawing attention to renewable energy sources (RES) as the basis for increasing employment and increasing the income of the population living in the countryside. Particularly because in the current financial perspective, the EU has allocated significant funds to activities related to the broadly understood reduction of harmful gas and dust emissions to the atmosphere. The Government, however, plans to introduce programs to support the development of renewable energy sources.

The work is descriptive and analytical in nature and is based on observational, intuitive and critical analysis methods.

Characteristics of Unemployment in Rural Areas

General data on unemployment in Poland gives a notion that it is low (below 6%). However, there are still many regions where the difficulties in finding a job are significant (in some areas unemployment remains up to three times higher than the national average). It is peculiar that the affected regions remain the same for many years (data CSO and MRPiPS).

Analyzing the labor market in the context of economic development, attention should be paid to the low rate of economic activity of the society (GUS 2019b), relatively high hidden unemployment (Poczta 2013, Jóźwiak, Ziętara 2013, CSO, 2016), low salary, high economic emigration (estimated at 2-3 million people) and a significant (almost 20%) share of employees who have a fixed-term contract (which is usually never turned into a permanent one) and work only on commission or contracts of mandate (approx. 5% in total) (Palczyńska 2016).

The problems mentioned above mainly concern the villages. About 39% of the Polish population lives in the countryside, while among the unemployed they constitute about 43-45%. The only exception are villages located in the proximity of cities, which in fact become urbanized while remaining villages in an administrative sense. The problem does not apply there.

In I quarter 2019, there were 875 unemployed persons per 1000 people working in the countryside. The highest (up to 85%) level of economic activity of the rural area population related to the age group of 40 - 44 years old, relatively low was among the youth (15-24 years old) and the lowest in the post-working age population (>60 for women and >65 for men) (CSO 2019).

In addition, hidden unemployment is high in rural areas. According to estimates, it amounts from 600,000 up to 1,500,000 people (Kołodziejczak 2016, Frenkel 2013, Karwat-Woźniak, Chmieliński 2013, Kołodziejczak 2015, Nurzyńska, Poczta 2014, Bański 2013).

The release of surplus labor supply in agriculture will take place over the next 10 years, regardless of the situation on the local labor market (i.e. whether non-agricultural jobs will be created or not[1]). This will mirror the changes in the already announced European Community's agricultural policy (related to, among others, elimination of direct payments).

Spatial analysis suggests that the "release" of labor resources in agriculture will not be uniform. The highest influx will appear in the Lubuskie, Podkarpackie and Małopolskie voivodships (about 200,000 people each). A large inflow (100-150,000 people) can also be expected in the Mazowieckie, Wielkopolskie, Świętokrzyskie, Łódzkie and Podlaskie.

Without solving the problems of the labor market in rural areas, it will not be possible to significantly increase the pace of economic development and the wealth of the majority of society. The development of renewable energy sources can be a chance in this case, ensuring the development being sustainable.

RES as the Basis for Increasing Employment in Rural Areas

In Poland, primary energy production is based primarily on fossil fuels, which is a problem. Our country has committed itself to reducing production from coal-based sources in favor of ecological ones. By 2030, the share of renewable energy will increase to 20% (Directive 2009). In addition, the European Union wants to ensure energy neutrality by 2050.

[1] In the other case, unemployment will rise and citizens' quality of life will worsen.

Another problem is the current state of electricity generation and distribution infrastructure, which creates a barrier to dynamic economic development. Many areas remote from power plants experience periodic shortages in electricity supply, which effectively excludes them from the modern econmy.

The obstacles indicated above are to be eliminated thanks to the development of renewable energy sources. This will be possible due to technological development, thanks to which more and more efficient power plants of this type are created and investment costs are systematically reduced. Currently, they are relatively high, which negatively influences the profitability of such projects (Ram and others 2019). However, within a few years they should (according to forecasts) decrease significantly (Dziaduszyński, Tarka, Trupkiewicz, Szydłowski 2018).

Similarly to the renewable energy field, the progress will be possible in other areas of activity related to low-carbon economy (especially in the field of waste management) (World Bank 2011).

The conception of energy engineering based on renewable energy sources and low-carbon economy creates an opportunity for the development of many regions in Poland, especially rural areas. These changes would generate the specialists in the field of cutting-edge energy technologies, infrastructure security, logistics and energy agriculture (Jankiewicz 2014).

Increasing investment in the low-carbon economy will require appropriately trained engineering staff and qualified employees. At the same time, jobs will be mainly created in small enterprises and will be characterized by relatively high wages.
There are no obstacles, and it is even advisable that investments in renewable energy be implemented in the countryside. People will not have to move to get a job. This is especially true for young people with a technical degree (even at an intermediate level, because such jobs will not require higher education) will have long-term employment guarantees with a relatively high salary (Węglarz, Winowska, Wójcik 2015). It is estimated that several million new eco-friendly jobs will be created.

People remaining in agriculture, on the other hand, will receive additional income by installing renewable energy sources on their farms. The availability of such a solution will be possible thanks to obtaining financial support from the EU and national funds, as well as assistance from energy companies that are interested in the development of the RES micro-installations market. This will create a positive feedback loop, which will further increase the rate of sustainable economic development in the countryside.

Summary

Thinking about further economic development, increasing innovation, ensuring energy security and meeting obligations regarding environmental protection (especially those undertaken within the European Union), Poland must increase the supply of electricity generated by renewable energy sources. The optimal area for investment in this type of energy source is the countryside, which will allow for long-term increase in employment in non-agricultural field as well as increase in income. In addition, it will affect:

- improvement of the local environment,
- increase of the competitiveness and economic efficiency of the local economy,
- implementation of innovative technical solutions in local energy engineering,
- building social capital,
- development of distributed energy resources and local renewable energy sources,
- reduction of the risk of energy poverty in rural areas.

This will cause a development in which "satisfying the current social needs and the needs of future generations will be treated equally ..." and "... will merge, in a harmonious way, the concern for the

preservation of the natural and cultural heritage of the nation with the civilization and economic progress impressing all social groups" (Rada Ministrów 2017). Therefore one may call such a development balanced.

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Timing in Public Health Policy:

The Case of Polish Policy in The Field of Hospital Care.

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Abstract

The study addresses the problem of optimal public policy timing and in relation to public health policy. There have been presented ways of recognising this problem and the role of public policy timing, which is perceived or can be performed from various economic theories and concepts, mainly: regulation theory, the concept of adaptive public policy, theory of policy timing based on the concepts of option value and the transaction costs of the political process. The approach of methodological pluralism adopted by the authors made it possible to reach for various cognitive inspirations, borrowed from numerous theoretical approaches, in order to create a comprehensive and coherent theoretical foundation for the purposes of analysing the role of timing in applied public policies. Next, an attempt was made to define the role of public policy timing in the applied approach, i.e. on the case of Polish policy towards the public hospital care sector. The general conclusion is that the role of timing is marginalised in Polish public health policy. The time dimension of its creation was ignored or treated as an exogenous event in relation to the rest of the policy formulation process. There is no political approach that adaptively links the right combination of resources and regulatory activity to timing for specific stages of development or growth in public hospital care.

Keywords: Policy Timing, Public Health Policy, Hospital Care.

Introduction

This study assumes the understanding of timing as the ability to do something at exactly the right time. When referring to public policy, the term 'public policy timing' has been used and it means the ability to deal with matters related to public policy at exactly the right time for them.

In economic literature, theoretical thought combining public policy with the timing factor is undertaken rarely and it is not fully developed. This is evidenced by the small number of publications in the Web of Science and Scopus databases with the phrase "public policy timing"; as of February 26, 2020: Web of Science – 0, Scopus (keywords) – 0, Scopus (title, abstract, key) – 2. In economic literature, the issue of public policy timing is being exposed, but mainly in terms of formal deadlines and negotiating ('playing for time') and timing for communicating. Timing has an impact on formal public policy-making processes in specific jurisdictions. However, the right time to communicate with decision-makers about new public health policies (e.g. in the field of hospital care) also depends on other current problems and the likelihood of strong support or opposition to the policy (Kwon, Nelson 2016). In turn, the analysis of "playing for time" suggests that negotiations on divergences, in particular legal regulations, occur not only in time, but in the case of negotiations of harmonization of legal orders of different countries – on the example of the EU and its Member States – also and perhaps above all concern the unity of time (Lindahl 2008). There are also positions which determine the specific benefit for society resulting from making a political decision at the right time in the area of health policy regulation in the field of transplantation (Andreoni 2020) and implementing

environmental regulations at the right time (Asproudis, Khan, Korac-Kakabadse, 2019) . In addition, Solar and Smith (2020) showed the undesirable effects of choosing the wrong moment for decision-making, despite the supportive reforms of the police sector. There are also more, although not yet fully developed, theoretical concepts for public policy closely related to "public policy timing"; these are the concept by Koehler (2003) and the theory by Mittenzwei, Bullock and Salhofer (2012), which will be discussed in more detail in the next part of the study.

Public health policy is closely related to the regulation of the health services industry, especially those that are covered by public funding. The issue of timing in public policy is not exposed in the light of the economic theory of regulation, nor in its positive or normative approach. Public health policy is closely related to regulation in legal terms and connected with the ideology of the guaranteeing state. In the legal analysis of the obligation of public authorities in the sphere of health policy in Poland, which is to ensure equal and fair access, guarantees are understood as dynamic, taking into account the interest of beneficiaries of the system which supervises its functioning. The Constitution of the Republic of Poland imposes on public authorities the obligation to ensure equal and fair access to publicly funded healthcare services. "Ensuring" understood as a guarantee of equal and fair access to health care services (including, for example, hospital care) financed from public funds must include not only the creation of a legal framework for the functioning of the public health system, but also active and dynamic control as well as supervisory activities (however, these cannot be managed by the legislator) (Lach 2011). It is obvious that if the control and supervisory activities are to be dynamic, they must not only be appropriate, but also carried out at the right time (the timing factor is revealed) and in the right way. Ensuring by the regulator (public authorities, centralised and decentralised, conducting health policy) of an appropriate environment for conducting active control and supervision activities include identifying and developing legal and economic tools, as well as principles and mechanisms which provide the greatest chance of obtaining effectiveness and efficiency of control and supervision. It may turn out (and usually it does) that for their completion or improvement, it is necessary to observe the real behaviour of regulated entities under the new / modified health system (healthcare providers and other regulated entities) and to analyse and evaluate the effects of their compliance with the intentions and intended aims of the regulator. Service providers belonging to the same public health care subsector, e.g. public hospital care, despite functioning in the same legal environment and period, may even exhibit quite different behaviours and achieve significantly different economic, social and health effects (one example is Polish public hospitals). This also applies to other entities within the system, such as local government units, which, on the one hand, conduct a decentralised health policy and act as a regulator towards medicinal entities which they own or co-own, but on the other hand are subject to statutory regulation themselves, in order to direct their behaviour or achieve the desired change in behaviour towards subordinate medical entities. One example is the Polish regulation (Act of April 15, 2011) which increased the financial responsibility of local government units for losses incurred by subordinate medicinal entities and thus is expected to lead to a change in the behaviour of local government units relative to subordinate (unprofitable) medicinal entities. This may lead to a further observation that it is necessary to track and coordinate public policy timing with health policy and for specific healthcare subsectors, such as public hospital care.

Optimal Timing Problems in Public Policy (Public Health Policy) In Economic Theories

The last above-mentioned observation relates to the issue of adaptive public policy. As part of the theoretical approach to adaptive public policy, an attempt to associate timing with public policy was presented by Koehler (2003). The author posed the question: Can the development and implementation of public policy be improved by closely tracking and coordinating time with the policy of a regulated sector? The attempt made for such an association is based on the assumption that the asynchronisms between the political process and the regulated sectors or activities may cause unintentional disruptions in the pace of economic changes and development, and thus undermine the original intention of regulatory policy or activities. In addition, such events can lead to unexpected future disruptions. According to Koehler (2003, 99) that is why "A policy approach is needed that adaptively ties the right mix of resources and regulatory activity to the timing of particular stages of

economic development or growth associated with a particular industry." In the issue of adaptive public policy, problems with determining the right time in public policy timing were examined using a new theory based on the concepts of "time-ecology", "developmental change in time" ("heterochrony") and "temporal signature." The author emphasizes that the indicated approach may apply to various organisational issues (organisational skills, organisational culture, organisational structure, life cycle of an organisation) and related to time in various areas of the economy. The full range of space-time network linkages in the cluster government and self-government authorities, i.e. the health service industry or more precisely, e.g. public authority (government, local government) – public hospital care, creates an interconnected unique system of ecology-a time-ecology-of unique between political, economic and other elements, covering a clear time perspective in which the advantages of resource use and delayed responses of participants to ongoing changes in the industry's environment are considered. In such a system, there are more or less intense and often complex rhythmic impulses, occurring in parallel or in a punctual manner, affecting one another on a number of time scales flowing into the future. Each organised entity in the public health care system (each type of entity, e.g. public hospital, local government unit and each existing entity separately) exists in its own past, present and future in a unique way, i.e. it possesses its own "temporal signature" which determines the position of the object in time and is a detectable phenomenon. External bonds mutually affect the structuring (organisational being) by changing the dynamics of development and growth ("heterochrony") and the effects achieved by it. The whole process takes place in the combined adaptive landscapes of public authority (government and local government) or health services industry (hospital care services).

At this point, it is important to add that the "temporal signature" of a particular medicinal entity could be obtained using the benchmarking method of healthcare providers and expressed in the form of a benchmark, which by its nature positions the object (e.g. hospital) relative to other objects (hospitals) in time and can cover various organisational issues and the effects achieved by the facility. As part of the benchmarking study, it is also possible to use the acquired data and information resource to detect e.g. distinguishing features of profitable or unprofitable public hospitals as a unique system in the cluster public authority (government, local government) vs. public hospital care, for the purposes of conducting adaptive health policy (in the public care sector hospital). These are some (proprietary) suggestions for capturing the "temporal signature" and the unique entity in a given period within the "public authority / public hospital care industry" cluster.

In economic literature, theoretical thought combining public policy with the timing factor is also undertaken by other researchers, but is not fully developed. It is well reflected in the work by Mittenzwei, Bullock and Salhofer (2012). Every public authority, whenever making a political decision, must ultimately decide on three separate issues, such as: the choice of policy instruments, the setting of the levels of these instruments, and the timing of their implementation (the issue of public policy timing). However, in both theoretical and applied policy analysis, the time dimension of policy making is often ignored or simply treated as an exogenous event in relation to the rest of the policy formulation process; Policy timing is not an integral part of the public policy process.

Mittenzwei, Bullock and Salhofer (2012) argue that in the literature devoted to the problems of optimal time in politics, it is often thought that a change of policy is irreversible (e.g. Pindyck 2002). By its very nature, politics can change, and policy makers often use this through regular introduction, changing, deleting, and reintroducing policies. Mittenzwei, Bullock and Salhofer formulated their own theory, where the central element is that "Government balances the costs of delaying policy reforms against the benefits. Costs are in the form of welfare losses, brought about by delayed adjustment to changes in the economic and political environment and by the costs of the political process that accompany policy changes. Benefits of delaying policy reforms stem from receiving better information by waiting" (2012, 583). Here, we would like to make two observations of our own. First of all, what has not been said by the creators of this theory but comes to mind (taking into account the concept of proper regulation), it is the default assumption that in the process of preparing political reform, there is used every piece of relevant, cognitively valuable, already existing information (i.e. in detected phenomena in the system affected by the reform). Secondly, in the light of the combination of this theory and Kohler's concept, "better information" can be obtained by

detecting “time stamps” of participants in the health system (public hospital care system) and unique phenomena associated with the “ecology – a time-ecology” system "(e.g. the phenomenon of profitable public hospitals under systemic conditions determined for a given time, etc.). According to Mittenzwei, Bullock and Salhofer, when decisions are made in conditions of uncertainty, and with the passage of time, more and better information appears, I which case the ability to wait before making a decision is highly valuable. The value of waiting for information and the costs of changing policy both shift the balance in political economic equilibrium and cause sporadic policy changes. The model of political economic equilibrium presented by the authors is based on the concepts of option value and transaction costs of the political process.

To sum up, the new economic theoretical thought combining public policy with the factor of public policy timing is shaping towards the theory of policy timing. In general, public policy timing plays the role of an integral part of the public policy process, and is explained in different ways through the prism of an perspective inherent in the formulation and implementation of the so-called adaptive public policy or through the prism of the value of the ability to wait for better information before making decisions in conditions of uncertainty. Both approaches seem coherent and logical. In the concept of adaptive public policy, it is crucial to detect ”temporal signatures” which carry better information and unique phenomena in the “ecology - a time-ecology” system found in a given public healthcare system. This better information combined with the ability to wait for it has the benefit of delaying political reform (to avoid frequent policy changes and irreversible costs of policy change).

The Way of Examining the Case of Polish Policy Regarding Public Sector Hospitals

The study examined the approach to shaping and the realization of policy regarding public sector hospitals in Poland in terms of it being consistent with the concept of public policy timing. This meant deciding whether the approach practised in Poland involves the issue of public timing, and if so, in what scope. The approach was evaluated in terms of three components of public policies based on the concept of public policy timing:

- “temporal signatures” (time struktures) of providers of hospital services financed from public funds (public hospitals) together with their external linkages;
- the appropriate time (kairetsu) for decision-making/policy functioning;
- the ability of policy-makers to wait for better information.

The research was based on providing and explaining (according to the specific criteria) answers to the questions set in the area of each component. The sets of questions are presented below.

Component 1. TEMPORAL SIGNATURES OF PRODUCERS FROM THE SECTOR AND EXTERNAL LINKAGES OF STRUCTURES:

1. Is the sector system in possession of the information helpful in defining temporal signatures of the producers financed from public funds? The criterion: “Information to define temporal signatures of producers”.
2. Is the systematically collected information helpful in defining temporal signatures of the producers financed from public funds? The criterion: “Systematic collecting of information to define temporal signatures of producers”.
3. Are there defined temporal signatures for producers financed from public funds? This means the time delay following the introduction of a change/political initiative and the reactions (undertaken actions) of producers? The criterion: “Temporal signatures of producers”.
4. Is there systematic collecting of information about the relations producers – producing entities (the entities with the functions of ownership and own supervision)? The criterion: “Systematic collection of information about external linkages of temporal signatures of producers in the area of producers – producing entities”.

5. Is there examination of the relations producers – producing entities, and of time changes in the relations under the influence of the introduced changes/policy actions? The criterion: Examining external linkages of temporal signatures of producers in the area of producers – producing entities".
6. Does the policy (decisions, actions) make use of the knowledge about the relations and changes in the relations producers – producing entities? The criterion: "Use in public policy of the knowledge about temporal signatures of producers and their external linkages in the area of producers – producing entities".
7. Is there a systematic collection of information about the relations producing entities – decision-makers at central (national) level? The criterion: "Systematic collecting of information about the external linkages of temporal signatures of producers in the area of producing entities – decision-makers at central level".
8. Are there examined the relations between producing entities – decision-makers at central level, and the time changes in the relations under the influence of the introduced changes/ political actions? The criterion: "Examining external linkages of temporal signatures of providers in the area of producing entities – decision-makers at central level".
9. Does the policy (decisions, actions) make use of the knowledge about the relations and changes in the relations producing entities – decision-makers at central level? The criterion: "Use in public policies of the knowledge about the temporal signatures of producers and their external linkages in the area producers – decision-makers at central level".

Component 2. TIME FOR MAKING DECISIONS AND POLITICAL ACTION (IS IT THE APPROPRIATE TIME - KAIRETSU):

1. Prior to the assumption of a policy solution was it subject to public discussion and received social acceptance (it was not contested by important groups in that sector)? The criterion: "Discussed and socially accepted policy solution during the time before its introduction".
2. Before making a decision/implementing action is there a complete set of means, prepared and analysed by experts, indispensable to effectively conduct a change (in the sphere of the provision of goods and the supervision of producers)? The criterion: "The complete set of political means, analysed and prepared by experts prior to implementation of the change".

Component 3. ABILITY TO WAIT FOR BETTER INFORMATION:

1. Are the policy decisions/actions taken in the keiretsu type time? The clear proof of the existence of the ability to wait for better information are decisions made/actions taken on the basis of better economic information. Two criteria: "Comprehensiveness of the legal solutions prepared before introducing a decision about policy change" and "Comprehensiveness and sufficiency of the prepared set of policy means, before its introduction".
2. Is there the political will to wait for better information? Two criteria: "Developing informational backup for politics"; "Domination of political rationale over economic and social rationale in the process of public policy-making" (this criterion covers two aspects: political solutions based on political rationale; accountability and economic sanctions regarding political decision-makers).

The fundamental objective of healthcare policy in the area of hospital care based on the principles of universality, equality and free access for all citizens, is highly problematic in the conditions of the permanent shortages of public funds in the health service. Since the 1990s, the key problem has been the high and growing level of financial expenditure in the public hospitals sector and the financial ineffectiveness of the great majority of the service providers in this sector. The specificity of the key sector is taken into consideration in the study, as well as the specificity of the functioning of the health service in Poland in the aspect of the provision of hospital care financed from public funds, presented in the next section of this paper.

Defining the role of public policy timing in Polish policy towards the public hospital care sector

Activities focused on the public hospital care sector fall within the scope of health policy. The role of health policy is to create development directions for the entire health care system, including health care, constantly ahead of modern times so that changes in the environment and the system itself do not surprise its unprepared participants. It should also be remembered that the area of interest in health policy is extensive and a broad perspective should be used, capturing the instrumental role of many sectors of the economy. Health policy because it affects many areas. These include, among others, family and child protection policy, agricultural and food policy, industrial policy, environmental protection policy, education policy, employment policy and protection of working conditions, housing policy, other policy areas.

Determining the legal framework and directions of action in health policy is conducted by the legislative authority, government administration, local government administration. Each of the links, formulating and creating conditions for action, directly influences the shape and organisation of the health sector, including public hospital care. The legislative authority sets the legal framework for the functioning of the healthcare system. Exercise of this kind of power includes introducing new legal regulations, but also changing the current law. This area will include, among others, decisions on the broadly understood organisation of the health care system, decisions on the arrangements contained in the Budget Act, decisions on tax rules, in particular exemptions and deductions as well as health expenses obtained from the collected medical services, as well as arrangements regarding the amount of the health insurance premium (part of the tax). Government administration strengthens strategic functions and limits the functions of day-to-day management by claiming central government administration in Poland, including non-integrated administration in the voivodship and local government administration. The government administration body in the field of health care is the Ministry of Health, which, among others, has control rights over other entities operating in the system, but also sets the directions of the country's health policy. One of the most important roles in the healthcare system, however, is played by local government administration performing the functions of the so-called creating entities. As the special owner of public entities providing medical services, it accepts responsibility for incorrect activities of its subordinate entities. The most important competences of local government units as forming bodies towards independent public health care facilities (i.e. entities performing medical activity, which are not entrepreneurs) is exercising appropriate supervision over them. In the current legal framework, the principles of supervision are regulated in the Act of April 15, 2011 on medical activities (Section VI "Control and supervision"; Articles 118-122). Control and evaluation of the health unit's activity and the work of its manager is carried out in particular in such areas as: the proper management of property and public funds, financial management, as well as the implementation of tasks specified in the organisational regulations and the statute as well as in the scope of availability and quality of health services provided. Especially important is the supervision over the financial economy, which is exercised by controlling and assessing its legality, economy, purposefulness and reliability. On the other hand, supervision over the correctness of property management is carried out through control and assessment, in particular of the use of medical apparatus and equipment, the application for the purchase or acceptance of a medical apparatus and equipment, the application for the sale, lease or rent of fixed assets, or the transfer of such assets to companies or foundations.

This multi-level decision-making has caused in the activities of hospital medical entities theemergence of varying attitudes and behaviours of public hospitals in the face of changes taking place. An important source of information on the problems undertaken in the framework of health policy is the analysis of activities carried out in connection with the implementation of health care system reforms. In Poland, these reforms were usually based on organisational changes in the system, often without touching upon previously diagnosed problems. It was intentionally assumed that the new solutions would improve the situation, mainly the bad economic situation, with which hospitals had the biggest problem.

An expression of the poor economic situation of public hospitals is the high level of liabilities due to independent public health care facilities in subsequent years (2002 - 2018), which is shown in Table 1.

Table 1: Due obligations of independent public healthcare institutions in the years 2002 - 2018 (in thousand PLN). The dynamics of changes

As of:	Independent public health care facilities created by local government units and central units		Independent public health care facilities created by local government units and central units	
	Liabilities due		Liabilities due	
		including supplies and services	dynamics in % previous year - 100%	including supplies and services
December 31, 2002	3 248 783	2 084 406		
December 31, 2003	4 732 974	2 480 863	146	119
December 31, 2004	5 684 426	2 839 630	120	114
December 31, 2005	4 875 372	2 310 073	86	81
December 31, 2006	3 603 739	1 912 989	74	83
December 31, 2007	2 627 427	1 664 235	73	87
December 31, 2008	2 379 577	1 510 519	91	91
December 31, 2009	2 340 755	1 579 090	98	105
December 31, 2010	2 258 826	1 657 537	96	105
December 31, 2011	2 281 329	1 844 829	101	111
December 31, 2012	2 360 475	1 961 131	103	106
December 31, 2013	1 930 971	1 657 225	82	85
December 31, 2014	1 807 185	1 603 217	94	97
December 31, 2015	1 758 890	1 564 129	97	98
December 31, 2016	1 739 476	1 555 351	99	99
December 31, 2017	1 407 669	1 273 712	81	82
December 31, 2018 r.	1 622 299	1 547 128	115	121

Source: (Regulation of March 4, 2010).

The implementation of tasks adopted by the state as part of health policy is related to the amount of financial resources which can be allocated to maintaining or improving the health of society. Not only their size and structure are important, but also the use by individual institutions that provide health services. The consequences of the reforms introduced, and the financial effects of these changes are also significant. There were many significant reforms in Polish healthcare. In 1999, independent public healthcare facilities were introduced in place of health care facilities. In 2005, the place of sickness funds was taken by the centralised National Health Fund, and in 2011 the system was further organised by introducing the Act on medical activities. Each of these changes was accompanied by a strong pressure of success regardless of the degree of preparation for the transformation process. Due to the usually very short adjustment period to the new conditions, additional support for the system was organised. As a consequence, the Polish health care system has been repeatedly "deleveraged", which clearly influenced the attitudes of managers managing public hospitals and their owners assuming in their activities "tacit agreement" for further deleveraging of entities and uncertainty as to the future of entities. It should be remembered that the processes of debt deleveraging was basically not conditioned by any real economic, organisational or medical requirements. In view of the above, the Ministry of Health carried out the aforementioned process of deleveraging hospitals several times. The first debt relief took place after the health care reform in 1999, which was when sickness funds were created. The reform assumed that the facilities most frequently visited by patients would receive funding. In order to provide equal opportunities, all hospitals have been deleveraged. The Treasury took over 7 billion PLN in debts. However, hospitals started to get into debt again. The next stage of health care healing was to replace the Health Funds with the institution of the National Health Fund in 2004.

Since 2004, the National Health Fund has been dealing with the pricing and contracting of services in hospitals. Despite such a significant change, an increase in general debt of hospitals was still observed. One of the reasons was the change in legal regulations affecting the level of expenditure of public hospitals without indicating specific sources of coverage. The so-called Act 203, adopted in 2000, was a special one. It forced health care facilities to increase the staff salaries by 203 PLN. Total debt increased rapidly during this period. In 2005, the government adopted the Act on state aid and restructuring of public health care institutions. It enabled public hospitals to take loans from the state budget to repay outstanding liabilities. At the same time, the act allowed hospitals to write off public liabilities after the restructuring process was completed. Since then, the dynamics of the increase in liabilities has clearly decreased (see Table 2), which was associated with the decision-makers refraining from introducing further unannounced changes. Stable working conditions caused the settling of public hospitals in economic reality.

Table 2: Total liabilities of public hospitals by voivodships (in million PLN)

Voivodeship	December 31, 2005	December 31, 20017	2017/2005	Ranking 2005	Ranking 2017
Lower Silesia	1 488,7	703,9	47,3%	1	8
Masovian	1 217,0	1790,9	147,1%	2	1
Silesia	993,7	1402,6	141,1%	3	2
Lodz	978,8	672,4	68,7%	4	9
Pomerania	836,7	184,6	22,1%	5	16
Lesser Poland	673,3	1007,2	149,6%	6	4
Lubuskie	599,0	62,4	10,4%	7	18
Lublin	531,7	1047,1	196,9%	8	3
Kuyavian-Pomeranian	464,0	966,4	208,3%	9	5
Greater Poland	376,4	771,6	205,0%	10	7
Holy Cross	374,9	397,4	106,0%	11	11
Podkarpackie	340,7	832,9	244,5%	12	6
West Pomeranian	318,1	412,9	129,8%	13	10
Podlasie	279,5	367,6	131,5%	14	12

Ministry of Interior and Administration	234,5	342,2	146,0%	15	13
Warmian-Masurian	220,6	237,8	107,8%	16	15
Ministry of National Defense	180,1	271,9	150,9%	17	14
Opole	165,8	142,2	85,8%	18	17
TOTAL	9 450,0	11614,1	122,9%		

Source: (Regulation of March 4, 2010).

The data contained in the table above shows the effects of actions taken by hospitals in individual voivodships and central units (Ministry of National Defense, Ministry of Interior and Administration). The relative stability of organisational and legal conditions and the relatively long period of stabilisation have allowed for the implementation of real remedial measures in hospitals that improve their economic results. An important success is a significant change in the ranking of hospital liabilities of the Lower Silesian, Lublin or Podkarpackie voivodships obtained as a result of numerous, often unpopular, actions. The consolidation of hospitals, changes in business profiles, or the transfer of part of unprofitable ranges to other hospitals resulted in a clear improvement of their economic situation and better ranking. Among the 18 study participants, the aforementioned voivodships have significantly improved. Lower Silesia (from position 1 – the weakest – in 2005 to position 8 in 2017), the Lublinvoivodeship (from no. 8 to no. 3), or Podkarpackie voivodeship (from no. 12 to no. 6). This demonstrates the clear need for stable operating conditions and the need to be well prepared for future tasks, i.e. timing, which is jointly responsible for success in planned projects.

Good action means the opportunity to develop, compare the effects of one's actions with the effects of others. Unfortunately, even during a period of exceptionally stable conditions, no system of universal information on phenomena occurring in the healthcare sector, a catalogue of "good practices" or system of warnings about anticipated difficulties has been introduced in Poland. The market environment encouraged hospitals to make independent decisions (not enforced by the system) resulting, for example, in the process of ownership transformation. As a result, many hospitals changed the legal form of business, usually to companies with the majority share of local government units. This form was economically justified, because it gave the right to conduct activities going beyond the system financed by the payer (National Health Fund). The year 2011 brought further turmoil in the economic situation of public hospitals, which was normalised by transferring the obligation to compensate the hospital deficit (net losses) to the forming entities, i.e. local government units. Agreeing with Kosycarz (2015) this decision was a surprise not only for hospitals but also for local government units themselves. The need for information on the situation of other hospitals and attitudes of individual LGUs has become extremely important. However, for the purposes of performing control and ownership supervision functions, individual LGUs only had their own information systems or control support tools (or did not have them at all). These systems were not consistent in any way, which absolutely limited their comparative functions. As a result, there was no available and reliable information collection that would allow rational decisions to be made either at a given moment or in the future. Only within the framework of scientific research conducted by scientific centres one can find selective or comprehensive studies on this issue. A special place is occupied by unpublished statistical reports based on data covering all voivodships, and collected as part of an innovative research project carried out in 2011-2015 by the Wroclaw University of Economics, entitled "Portraits of hospitals – maps of possibilities, i.e. monitoring the quality of public services and benchmarking with scope of supervision over the functioning of hospitals for which the territorial self-government unit is the founding body" (see: Korenik and Węgrzyn 2015). These studies have identified the distinguishing features of profitable and unprofitable hospitals. Nevertheless, interest in the results of the study was negligible, both on the part of hospitals and decision-makers. Other interesting research by Miszczyńska (2017) was conducted only fragmentarily, e.g. in the Lodz or Pomeranian voivodships. They also remained only in the sphere of scientific inquiry.

The need for good information turned out to be necessary at the time of introducing another very important reform of the so-called "hospital network" in 2017. The hospital network has been

operating since October 1, 2017. The Act of March 23 (2017) introducing this organisational change in the system was prepared in March 2017 and signed in April 2017, and the classification of hospitals into the network was announced on June 27, 2017, without prior information on planned conditions necessary to be met. Thus, hospital owners did not have enough time to prepare for this change. It means the lack of optimal time designed for hospitals, the so-called timing, thanks to which they could better prepare for entering the network. It is also worth noting that at the time the network was introduced, hospitals were at various stages of economic growth (even if they remained at their profiles, they differed in their efforts to improve their profitability) or were at various stages of economic development (some expanded the range benefits to ensure better profitability, and others that have changed their legal form). This did not affect the decision to qualify for the network.

Along with the introduction of the hospital network, the method of obtaining funds for hospital operations from the public payer, i.e. from the National Health Fund, was also changed (see Regulation of the Minister of Health of September 22, 2017). The new method of financing benefits was based on a lump sum covering existing contract performance, but without taking into account the previous numerous so-called oversupplies, i.e. necessary medical services provided by hospitals despite the lack of financial coverage in the contract with the National Health Fund.

In general, hospitals were surprised by the pace of introducing the "network" solutions and the shape of the reform discriminating against hospitals that were on the development path (not matching the concept of a general hospital or operating as commercial companies). It should also be emphasized that the intention of the domestic decision-maker regarding the profitability of contract-financed hospitals is not clear, since they had had information on the specific properties of profitable and unprofitable hospitals and information from the hospital environment about potential negative consequences for hospitals and their patients in the context of rapid entry into force of legal regulations regarding hospital networks.

As a consequence, the quickly implemented changes have not brought the expected effect so far. The introduction of the network together with the change in the financing method based on the lump sum calculated according to the algorithm did not change the decisions taken in hospitals. The assumption that by limiting the number of service providers (network of hospitals) and transferring funds at a level that takes into account the current overall performance of services (only services settled with the payer) but without additional incentives, visible improvement in the operation of public hospitals has not been proven. Public hospitals, especially those subordinate to district self-government units are reporting increasing losses and a higher level of liabilities due. The lack of real preparation for action in the new conditions and the lack of real incentives did not lead to the decision to change in the hospitals themselves. Simple services were not transferred from departments to specialist hospital outpatient clinics, although this was the decision-maker's expectation. No other explicit changes were made to improve the efficiency of operations, because another mechanism (the obligation of LGUs to cover the hospital deficit) did not inspire them. Lack of comprehensiveness in the last introduced reform as well as the lack of time for good preparation for planned changes did not allow to obtain the most anticipated effects of the reform, which are, on the one hand, an improvement in the economic situation of public hospitals but, on the other hand, an improvement in access to services for patients, including shortening of queues.

The need for public policy timing in Polish policy towards the public hospital care sector is therefore very clear. Its apparent lack means that the ability to for better information has not been developed in public hospitals. Changes in political reforms leading to uncertainty and an increase in financial risk for hospitals and their owners, not creating a system of universal information on phenomena in the hospital care sector, which should be a valuable information foundation in the process of formulating and implementing health policy and to develop proper regulation, as well as the lack of homogeneous systems used to perform the functions of ownership control and supervision in local government units cause constant systemic instability and constant dissatisfaction of the system's beneficiaries, i.e. both service providers and patients.

Results of the research on the role of public policy timing in the policy regarding public hospitals in Poland

The research results are presented in Table 3.

Table 3: Polish policy regarding the public hospitals sector in light of the components of the policy based on public policy timing

Components of public policy	Question number	Answer	Justification
Temporal signatures of the sector producers and external linkages of structures	1	YES, partly	There are defined empirical characteristics which distinguish profitable and non-profitable hospitals but only for the period 2010-2014; there is no systemic way of studying changing characteristic for the former and the latter resulting from introducing changes or the impact of policy; there is ordered and in-depth knowledge on the reactions of hospitals (undertaken actions and their effect) but only for the period 2010-2014; lack of research on the time of reaction to the introduced change, and the impact of policy on the part of these hospitals.
	2	YES, partly	Information is collected useful for defining time structures of producers but it is not being processed. Among the bodies gathering data there are the payee, NFZ, and the agency of the Ministry of Health, Centrum Systemów Informacyjnych Ochrony Zdrowia.
	3	NO	Actions taken by producers are often diverse from the expectations of decision-makers and contrary to policy intentions. Example: flat rate tax system in hospitals was supposed to impact on the change in the way of providing certain services, and transferring them from hospital wards (expensive to run) to cheaper, in-hospital ambulatory care – and this did not happen. Only the successive corrective initiatives resulted in the changes expected by decision-makers.
	4	NO	No targeted information about the relations: producers – producing entities is being collected.
	5	NO	Due to the lack of information about the relations: producers – producing entities, they are not examined.
	6	NO	Knowledge about temporal signatures of producers and their linkages is not being utilised. Example: without going into the relations and their changes, a legal regulation was introduced imposing the accountability of producing entities for the bad financial condition of hospitals.
	7	NO	No information is being collected about the relations: producing entities – decision-makers at

			central level.
	8	NO	Due to the lack of information about the relations: producing entities – decision-makers at central level, there are not being examined.
	9	NO	Solutions/changes are introduced without the knowledge about these relations.
Time of making decisions/ taking political action (Is it the appropriate – kairetsu – time)	1	YES, partly	As a rule, new solutions are subject to public consultation, but the lack of approval on the part of important groups in the sector does not always result in rejecting the change. Example: NFZ replacing the Kasa Chorych system.
	2	NO	There is a common shortage of executive acts referring to a significant part of actions, independently of the currently ruling political party/coalition and inadequacy of material, human and financial resources in the scope of the functions of production, as well as supervision and control over producers. Example: the introduced regulation regarding the increase of nursing services for patients in the context of the sharp decline in the general number of nurses.
Ability to wait for better information	1	NO	Frequent loopholes in the prepared legal regulations and their insufficiency result in the lack of ability to wait for better information. Example: detailed changes in the way of running cost accounting obligatory for hospitals appeared much later than the actual legal regulation which introduced them.
	2	YES	Actions targeted at a momentary success, without any relevance for a real permanent solution of the problem. Example: writing-off hospitals' debts without deciding about the form of future hospital work and its results; at the same time there are no significant financial sanctions planned for making wrong decisions and harmful actions.

The carried out research included three components of public policy regarding the sector of public hospitals in Poland, indicates the absence of conducting policies based on the public policy timing. Most of the criteria determined for individual components were not met, or only in part. The only absolutely positive answer appeared in the component "Ability to wait for better information" in the second criterion but since that criterion is of a negative nature, therefore this is not, in fact, a positive reply.

The approach used by public decision-makers in the policy regarding public hospitals created several effects which do not bring a positive contribution to the concept of a policy based on public policy timing; the remaining results are described below.

1/ In the period preceding the reform based on "hospital networks", there were numerous and inconsistent changes in difficult and poorly predictable reforms. They were chaotic, frequent, undertaken under the influence of current political issues and pressing financial and infrastructural problems in the health system, without a clearly defined vision. At national level, there was no waiting for 'better information', nor was it essentially sought in a methodical and reproducible manner that would allow the detection of unique phenomena in given conditions and time. Additionally, at the regional (local government) and local (district, communal) levels, interest in obtaining better information as part of the function of controlling and supervising subordinate hospitals is different. The ability to wait for better information at national and lower levels did not exist. This means that the dimension of the optimal time for creating health policy, including in hospital care, was ignored or treated as an exogenous event in relation to the rest of the policy formulation process.

2/ As a result, hospitals operated in conditions of uncertainty and growing financial risk. This forced hospitals and their owners to take some specific approach to solving the general problem: size, quality and structure of services versus hospital economic profitability. Over time, hospitals created their own survival solutions. Scientific research conducted in the environment has led to the detection and transfer of unique information to decision-makers, e.g. the properties of profitable and unprofitable hospitals, which can be treated as valuable (better) information in the understanding of theories combining timing with public policy. Before the development and implementation of the reform related to the "hospital network", it was possible to use, according to the authors' knowledge, better information, which in practice was, however, omitted.

3/ The method and scope of the reform of the operation and financing of hospitals included in the so-called the public hospital network contradicts, in the light of adaptive policy theory, a policy approach that adaptively links the right combination of resources and regulatory activity to timing for specific stages of development or growth in public hospital care.

3.1/ Public hospitals, which were included in the "hospital network", at the time of the introduced reform were at various stages of development in connection with various adopted directions and ways of adapting them to changes in the operating environment, in conditions of uncertainty and growing financial risk. Hospitals that were at a low stage of growth or at a higher level but were not sustainable - it concerns financial and production aspects which are significantly unsustainable (hospitals did not develop the quality of human resources and / or did not develop their activity to improve the quality of services, poorly responded to the intention of the previous legislator regarding economic rationalisation of operations, they did not develop the structure of the assortment of services) -, but fulfilled the specific condition of being a four-profile hospital, were granted more complete access to public funding. Hospitals which entered a higher stage of development (developed a socially desirable offer of services subject to public funding and the ability to provide these services) found themselves in the so-called trap of strategic surprise as a result of a sudden cut of some benefits financed through a public contract. Additionally, public hospitals which, according to the intention of the previous legislative authority, were transformed into commercial companies with the ownership of local authorities and modernized (with significant investment outlays) were suddenly in a difficult financial situation; their business continuity was threatened by virtually being cut off from financing health services by the National Health Fund. The omission of the timing factor in the reform related to the "hospital network" leads to the fall of some hospitals into a strategic trap, and this particularly applies to those that previously actively adapted to changes in the environment. This also jeopardizes the effectiveness and efficiency of health policy pursued by local / regional governments to which hospitals falling into a strategic trap are subject.

3.2/ The lack of an adaptive political approach is expressed in the failure to make use of the existing, even at the time preceding the communication of the new reform, unique information on the factors and sources of economic viability in connection with the qualitative elements of the operation of public hospitals and their changes over time, and thus information that could allow for the development of better regulation of the "hospital network" (i.e. one which does not ignore the importance of the profitability aspect of hospital medical entities for the health system).

4/ Ignoring or not using the already existing "better information" indicates that the decision-makers' approach in Polish health policy deviates from what is desirable in the theory of policy timing, i.e. the government balances the costs of delaying political reform with benefits (resulting from receiving better information by waiting). The introduced reform carries social and economic losses. The resources of hospitals included in the "public network of hospitals" are not better (more efficiently, rationally) used, the problem of financial debt of hospitals is growing (only partly resulting from the increased wage pressure in public hospitals at that time), there is a growing negative pressure in hospitals on treating patients not as customers but as a cost to be minimised, the management's motivation to improve the economic viability of hospitals without at the same time having a negative impact on changing the perception of the patient has been weakened. These losses could be avoided or reduced by prudent – based on valuable information, already available to decision-makers – consideration of the issue of the economic viability of healthcare entities.

Conclusions

The final conclusion is that the time dimension of Polish public health policy creation was ignored or treated as an exogenous event in relation to the rest of the policy formulation process. There is no political approach that adaptively links the right combination of resources and regulatory activity to timing for specific stages of development or growth in public hospital care. The result is a continuous lack of a long-term (or even short-term) solution to the public health problem in Poland.

Acknowledgment

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The Directions of Counteracting the Bankruptcy of Enterprises in the Polish Economy in the View of the Implementation of the Restructuring Law in the Years 2016-2018

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Abstract

The insolvency of enterprises constitutes an inherent component of any market economy. You can respond to a business crisis in two ways, either by saving it *i.e*. restructuring or remodelling the company and limiting, at least temporary, creditor rights, while preserving the jobs and assets of the restructured entrepreneur or by liquidating it *i.e*. by realization of the estate and thus liquidation of the economic entity with a partial satisfaction of creditors and simultaneous return of tangible assets to trading. Thus, both liquidation and reorganization are possible in most countries. The problem of the accuracy of choice between the liquidation of an enterprise and its restructuring is one of the main topics of interest for practitioners and theorists dealing with the bankruptcy of enterprises.

Keywords: Bankruptcy of Enterprises, Restructuring of Enterprises, Second Chance Policy, Bankruptcy Law, Restructuring Law.

Introduction

The problem of the accuracy of choice between the liquidation of an enterprise and its restructuring is one of the main topics of interest for practitioners and theorists dealing with the bankruptcy of enterprises (Fialkovska, 2015; Hashi, 1995; Prusak, 2018; Tokarski, 2018).

The solutions adopted by the legislator should therefore combine a particular individual element (the interest of the debtor and its creditors) with the interest of the society which should be understood as the safety of all market participants, including consumers, and thus affecting the wider the general public.

The state plays a particular role as it is responsible for shaping the legal environment for bankruptcy, which influences, inter alia, the possible scenarios of bankruptcy proceedings or the balance between the powers of debtors and creditors.

The decision to restructure a business entity constitutes an alternative to filing for its bankruptcy. This decision must be a thoughtful one because it creates an opportunity for entrepreneurs to continue their business activities without detrimental effects to creditors (Csikosova, Culkova, Antosova, 2016; Altman, Hotchkiss 2007).

In recent years, the approach to doing business has also changed. The general public understood that financial problems of entrepreneurs do not always the result from the bad will of managers. Many of them should be granted a second chance with the support of the legal system of the country (Tokarski, A, Tokarski, M, 2018).

The main aim of the article is to make an assessment and to show the directions of counteracting the bankruptcy of enterprises in the Polish economy with respect to the implementation of the restructuring law (remedial restructuring) in the years 2016-2018.

The descriptive analysis, the analysis of legal provisions and statistics on the functioning of the bankruptcy of enterprises as well as the implementation of the provisions of the restructuring law or the remedial restructuring in Poland and the analysis of literature on the subject were adopted in the article as the principal methods.

Supporting Enterprises in Crisis Situations – the Implementation of Second Chance Policy (Law)

The opinion that people who failed in business earlier constitute unexploited potential in the area of the development of entrepreneurship was the reasoning behind the implementation of selective instruments supporting "second chance" entepreneurship in the European Union Member States. These instruments include facilitating insolvency proceedings so that an entrepreneur can settle the past quickly and then concentrate on developing a new business (Mączyńska et al., 2015).

Business failures are and will be a permanent element of the functioning of companies, and reduction of their scale, but not their elimination, is only possible (Jenkins, McKelvie, 2016).

Professor E. Mączyńska draws attention to a stigmatising bankruptcy syndrome (Mączyńska, 2015). It is thought that only weak enterprises go bankrupt. A strong enterprise, like a person who has always been wealthy and finds it hard to imagine being poor, generally cannot imagine going bankrupt. Public opinion often associates bankruptcies with frauds and loss of confidence. However, sudden and profound civilizational changes increase the risk of failure even among perfectly working companies. Fast identification of chances and threats for enterprises becomes necessary for adopting relevant strategic decisions as is a change of the attitude of the society to entrepreneurs. The stigma of business failure can be found in the business community, legal measures and cultural and social bahaviours (Mączyńska, 2013; Ucbasaran, Westhead, Wright, et al., 2010; Simmons, Wiklund, & Levie, 2014).

Since 2001 the European Commission has been undertaking actions aiming at starting new policy which would solve the problem of threatened enterprises and negative effects of their bankruptcies. (Lukáč, Kmeťová, 2019; Mączyńska. et al, 2010). Such actions would involve collecting data on legal and social consequences of business failures, facilitating identification and dissemination of good practices and working on early warning tools as a means of reducing the stigma of business failure. Those activities helped to initiate reforms in the whole European Union. Within the Stigma of Failure and Early Warning project, an early warning tool has been developed for small and medium-sized eneterprises which enables preliminary assessment of their situation and the threat of a crisis situation and bankruptcy (Mączyńska. et al, 2008).

On 25th June 2008 the European Commission published a document entitled "Think Small First". In the "Small Business Act" for Europe, among ten main principles for the policies of the European Union and the Member States in relation to the SME sector principle number 2 there can be found one which ensures that honest entrepreneurs whose entreprises have been declared bankrupt are quickly given a second chance. The European Commission requested the Member States to do the following: (European Commission Communication, 2008).

1. promote a positive attitude of the society towards entrepreneurs returning to the market;
2. enable finishing all legal procedures leading to bankruptcy within one year in the case of bankruptcy not resulting from fraud;
3. ensure identical conditions of economic activity for both returning and new entrepreneurs.

In November 2016, the European Commission proposed a package of European legislation concerning enterprises threatened with bankruptcy. The suggested directive focuses on three elements: (Directive of the European Parliament and of the Council, 2016)

1. common rules for a framework for restructuring at an early stage, which helps enterprises to continue their activity and preserve job;
2. provisions allowing entrepreneurs to take a second chance as they will be able to relieve themselves from libilities within a period of up to three years;
3. allocating resources to Member States to increase the efficiency of the procedures in connection with bankruptcy, restructuring and relieving from liabilities.

The Dysfunctions of the Bankruptcy System in Poland in the Years 2011-2015

The model of the bankruptcy proceedings which functions in Poland does not fulfil its major goal *i.e.* the elimination of the unprofitable entrepreneurs. Thus, the model does not perform its preventive function – it does not preclude further insolvencies, which happen in the aftermath of the unpaid liabilities by the debtor (Babiarz-Mikulska, Czarpacka, Morawska, 2012).

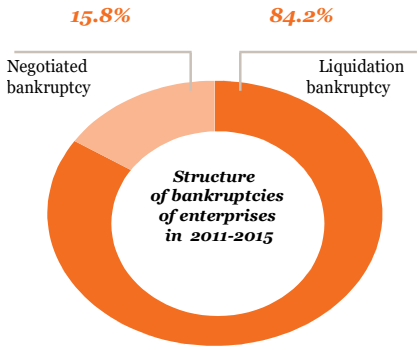

Graph 1: The structure of corporate bankruptcy in Polish economy in the years 2011-2015

Source: (PwC 2017), Report: Upadłości i restrukturyzacje w Polsce. Wskaźniki prognozujące trudności finansowe oraz wybrane skutki zmian w przepisach z zakresu upadłości i restrukturyzacji, (Bankruptcies and Restructuring in Poland. Indicators Forecasting Financial Difficulties and Selected Effects of Changes in Regulations Concerning Bankruptcy and Restructuring), Warsaw, p. 5.

The degree to which the creditors are satisfied in the course of the conducted bankruptcy proceeding, including the liquidation of the bankrupt's assets, is minimal.

Consequently, the functioning model does not perform its debt recovery function. The cost of the bankruptcy proceedings exceed 40% of the bankruptcy estate and the average time of the proceedings, counted from the moment the petition for bankruptcy is filed to the moment the bankruptcy is declared, is two years (Masiukiewicz, Morawska, 2012). Therefore, from the point of view of the creditors the bankruptcy proceedings prove ineffective. They freeze the funds and the capital for the period of two years and they do not ensure their quick relocation Furthermore, they do not perform their debt removal function as well.

The restrictive and pro-creditor model of the bankruptcy proceedings does not develop among the entrepreneurs patterns of behaviour, which might be defined as the reliable entrepreneur attitude (the preventive function), because it does not take into consideration the fact that its recipients are

economically rational (homo economicus) units which calculate both the risk and time of the proceedings as well as their costs (Morawska, 2013).

The repressive system of the bankruptcy law that was in force in the years 2003-2015 along with the stigma of failure result in the fact that entrepreneurs conceal their financial problems so long as it is impossible to solve them. Many entrepreneurs are deficient in the necessary means and experience for the effective solution of the crisis situation.

On the basis of the conducted research E. Mączyńska shows that the Bankruptcy Law and the Reorganisation Law in the Polish economy in the years 2003-2015: (Mączyńska, 2013).

- did not guarantee any transparency or efficiency of the bankruptcy proceedings,
- did not perform their purging functions *i.e*. removing the insolvent entities from the market,
- did not prevent to the proper extent the so-called "staged" bankruptcies *i.e.* the ones which were oriented on bringing benefits to the narrow groups of stakeholders while purposefully infringing the interests of other creditors,
- did not conduce to the proper identification of the "staged" bankruptcies,
- they brought about the dominance of the bankruptcy aspects over the recovery aspects which in practice were marginalised against the principles of the bankruptcy proceedings.

Despite the European Commission's recommendations in relation to adopting the second chance policy by the Member States, in the Polish economy in the years 2003-2015, the scope of implementing so called second chance policy recommended by the EU was limited (Mączyńska et.al, 2015). In the analysed period of time, Poland both lacked a developed strategy of implementing such a policy, and those whom such a policy concerned were not precisely defined despite information included in the documents of the Ministry of Economy (Kowalewska, 2011).

It was not until 22nd July 2014 that the Council of Ministers adopted the New Chance Policy document, which provides many instruments for limiting the risk of liquidation and efficient conduct of corporate bankruptcy (Reccomendations, 2012).

The main aim of the New Chance Policy in Polish economy is to counteract corporate bankruptcy and facilitate restarting of economic activity. This objective shall be achieved with the support of the following activities: (New chance policy, 2014).

1. Preventing crisis situations in enterprises (early warning systems),
2. Limiting the risk of premature liquidation of enterprises (non-judicial and judicial forms of repair and restructuring),
3. An orderly winding down of enterprises (judicial forms of restructuring and liquidation),
4. Supporting restarting of economic activity – so called new start.

Effectiveness of the law regulating bankruptcy and restructuring procedures should be measured with the recovery ratio for creditors in such procedures. An average recovery ratio in proceedings in Poland is lower than that noted in the European Union countries (Morawska, 2011; Morawska, 2015).

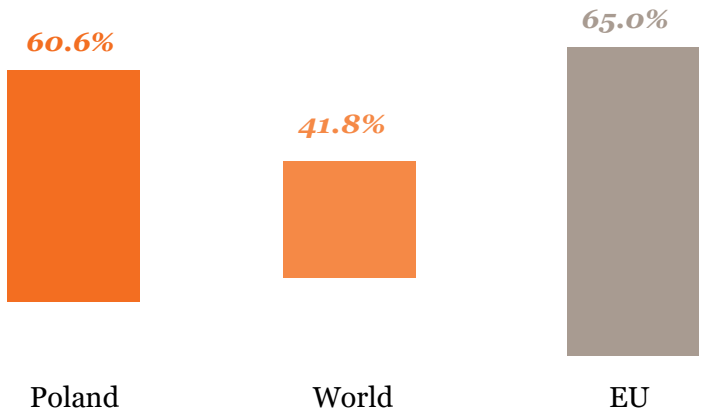

Graph 2: Recovery ratio of receivables (%) in bankruptcy proceedings in 2016 – a comparative analysis

Source: PwC (2017, p.6).

According to World Bank data, in 2016 the recovery ratio of receivables in bankruptcy proceedings in Poland amounted to 58.3% (Kupis, 2017). A significantly better level of recovery marked not only the strongest European economies (e.g. British economy – about 89% or German economy – about 84%), but also some countries of Central and Eastern Europe (e.g. Slovenia – over 89%). World Data demonstrate that an average recovery ratio for all the European Union countries amounts to 65%, whereas the world average reaches the level of 42%.

Poland is located below the EU average also in terms of the time needed for recovering receivables from an insolvent debtor. According to World Bank data it is three years on average in our country, whereas in the EU it is two years and two and a half years in the world (Morawska, 2012).

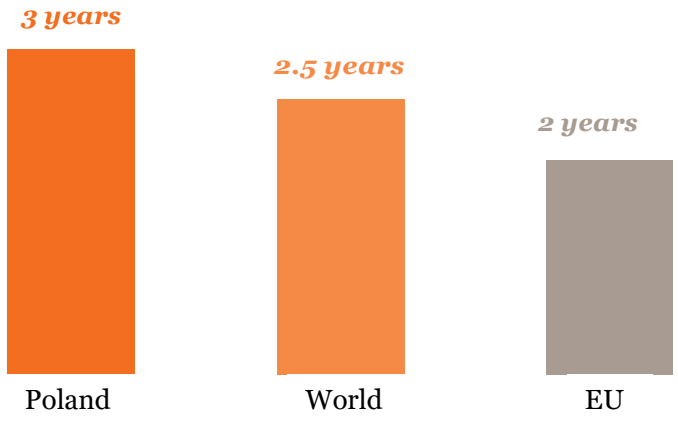

Graph 3: Time for recovering receivables (years) from an insolvent debtor in 2016 – a comparative analysis

Source: PwC (2017, p.6).

Poland does not compare favourably when comparing the costs of bankruptcy proceedings in relation to a debtor's property either. It amounts to 15% on average, and in EU – 10.3%; the indicator of the costs in the world is comparable with the Polish one and it amounts to 15.7% (PwC 2017).

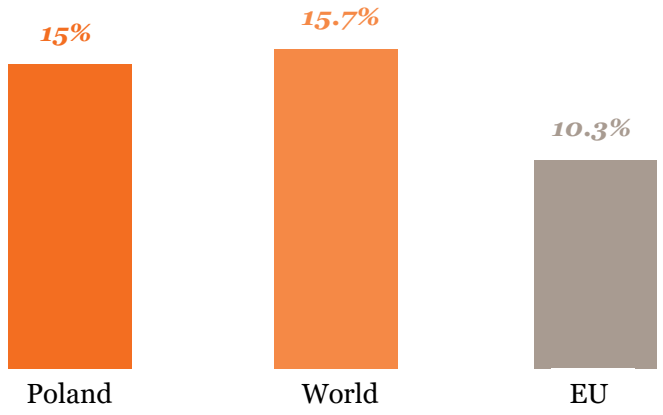

Graph 4: Cost of bankruptcy proceedings in relation to assets (%) in 2016 – a comparative analysis

Source: PwC (2017, p.6).

The analysis of bankruptcy proceedings in individual Member States in the years 2003-2015 concluded that Poland was a country with a not very effective bankruptcy system. It is indicated by among others a low ratio in bankruptcy proceedings with its high costs and a long period of enterprise liquidation. The figures for Poland are significantly different from average figures for the EU-15 countries, and even an average time and cost of proceedings are higher than an average for the countries which joined the European Union with Poland (Szmal-Kaptur, 2016).

The amendment of the bankruptcy law in Poland was justified as seen in the aforementioned statistical data, which clearly demonstrates that Poland was left behind by the majority of European economies in terms of the effectiveness of bankruptcy proceedings. Properly targeted legislative changes were necessary for improving mentioned parametres of conducted proceedings and in the long run improving the functioning of the economy.

New regulations were designed to improve proceedings and extend the possibility of restructuring with emphasis on preventing liquidations and maintaining the functioning of an enterprise experiencing financial difficulties and continuing its activity.

Legal Regulations in the Area of Bankruptcy and Restructuring in the Polish Economy

At the beginning of 2016, when Restructuring Law came into force, previously existing Bankruptcy and Reorganisation Law was amended. As a result, two separate laws regulating two types of proceedings for economic entities experiencing problems with settling liabilities have been in force. (Tokarski A., Tokarski M., 2019; Banasik, Morawska, 2016).

To put it simply, it can be said that restructuring law aims at saving and bankruptcy law at liquidation of a debtor's enterprise.

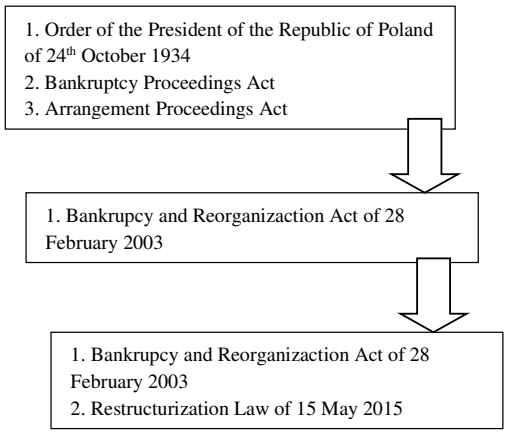

Graph 5: The process of changes in the bankruptcy and arrangement law in Poland

Source: own study

Separating bankruptcy proceedings, aiming at liquidation of assets, and restructuring proceedings whose objective is to maintain an enterprise's activities, constitutes the main change. The separation created a clear framework for both sides, which in its construction is similar to solutions from for instance the United States (Chapter 7 – bankruptcy and Chapter 11 - restructuring), (White, 1989).

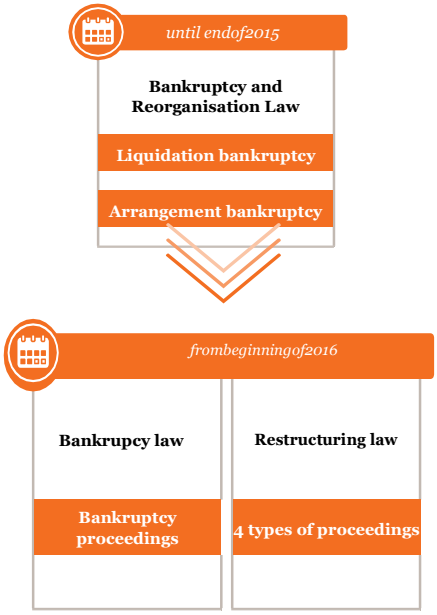

Graph 6: Bankruptcy and restructuring proceedings

Source: own study

The restructuring law changes entirely the attitude towards an entrepreneur experiencing financial difficulties. It introduces four restructuring procedures, including sanative ones, and it changes the definition of bankruptcy of an entrepreneur .

The restructuring law with the bankruptcy law aim at creating a coherent system of regulations.

The main goal of the restructuring proceedings is the avoidance of the declaration of the debtor's bankruptcy in the course of enabling them to restructure by means of an agreement with the creditors, and in the event of the recovery proceedings also through the curative actions while simultaneously securing the valid claims of the creditors. As the new restructuring proceedings we include: (Act on the Restructuring Law, 2015; Tokarski, A., Tokarski, M., 2019a).

a) the proceedings on the approval of the arrangement,
b) the accelerated arrangement proceedings,
c) the arrangement proceedings,
d) the recovery proceedings.

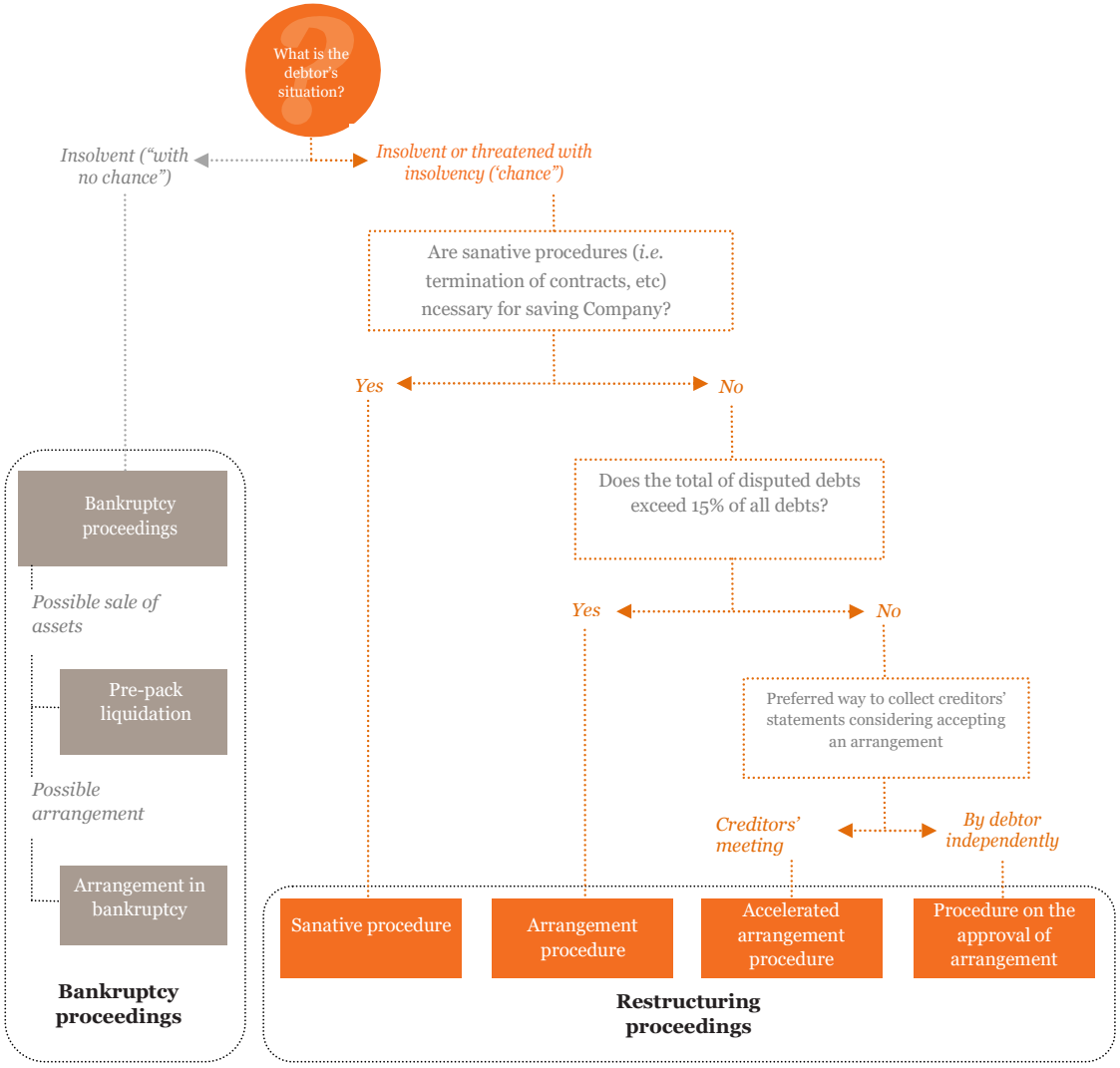

Graph 7: „A decision tree" of bankruptcy and restructuring proceedings

Source: PwC (2017, p. 8).

Therefore, the new restructuring regulation – law is consistent with the new attitude to a failure in business activity and insolvency. The objective of the European Commission is to ensure that viable

enterprises in a difficult financial situation, regardless of their location in the European Union, can access national framework of bankruptcy proceedings enabling restructuring at an early stage to prevent their insolvency thereby ensuring maximising the whole value for creditors, employees, owners and the whole economy. The aim of the recommendation is also to enable honest entrepreneurs declared bankrupt to use a second chance in the area of the Union.

The Influence of Legal Regulations on the Phenomenon (Statistics) of Bankruptcy and Remedial Restructuring in Polish Economy

Analysing the effects of the introduction of restructuring law, two effects are worth distinguishing (Zimmerman, Filipiak, 2018). On the one hand, **a displacement effect** occurred, that is using a restructuring procedure by those companies which in the status quo conditions would have to go through a bankruptcy process. On the other hand, **a creation effect** occurred, as the new law encouraged attempting to restructure many companies which, without this law, would not have decided to negotiate with their creditors. The reason for introducing the new regulations was exactly to encourage faster restructuring of companies which do not want to enter the bankruptcy process. Separating those effects is not easy and it requires an econometric analysis, whereby it is estimated that out of 585 proceedings, about 40% (almost 250) are the effect of displacement and about 60% of the creation effect (over 330).

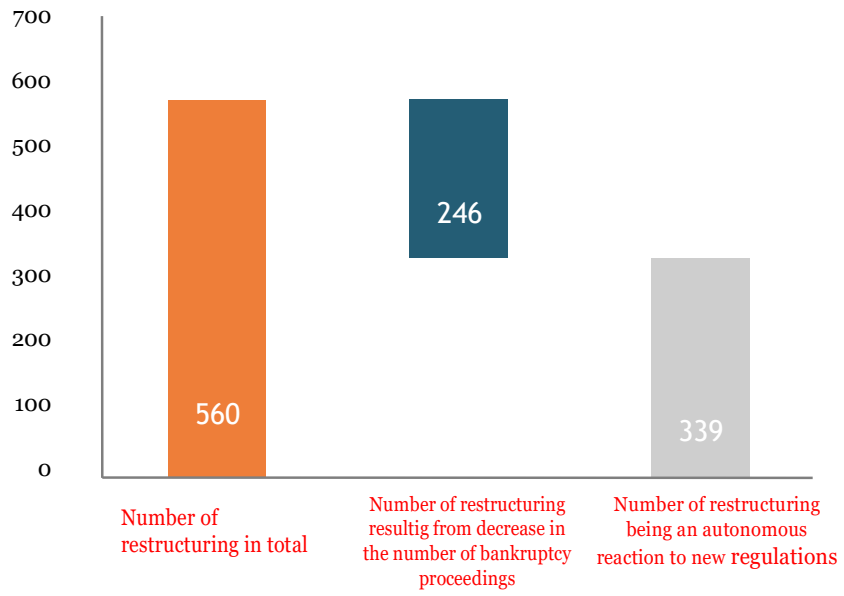

Graph 8: Number of open restructuring proceedings in Polish economy in the years 2016-2017 divided for an displacement effect and a creation effect

Source: (Zimmerman, Filipiak, 2018, p. 14).

Table 1: Number of bankruptcy proceedings in Polish economy in the years 2013-2018

Number of bankruptcy proceedings						
Month	**2018**	**2017**	**2016**	**2015**	**2014**	**2013**
January	54	50	49	60	60	82
February	48	46	42	62	65	76
March	62	41	63	83	63	71
April	49	45	55	61	62	84
May	42	43	51	75	78	67
June	59	47	49	61	74	86
July	47	58	53	67	81	89
August	50	55	38	64	61	67
September	33	56	61	44	71	68
October	65	50	53	56	82	79
November	52	54	44	57	49	63
December	54	46	48	60	61	56
Total	**615**	**591**	**606**	**750**	**807**	**888**

Source: The Central Economic Information Bureau [www.coig.com.pl/2018-restrukturyzacje-firm-wrzesien.php]

In 2017 in the Court and Commercial Gazette bankruptcies concerning 591 companies were published. In 2016 606 bankruptcies were announced. If those figures are compared with the numbers of bankruptcies in previous years, a decreasing trend is observed.

In order to specify a real trend, it must be taken into account that since January 2016 companies experiencing serious problems with liquidity and paying liabilities had been able to initiate restructuring proceedings instead of declaring bankruptcy. 234 such proceedings were observed to 30th June 2018 (there were over 460 of them in 2018) with 348 in 2017 and 212 in 2016.

Table 2: Number of restructuring proceedings in Polish economy in the years 2016-2018

Number of restructuring procedures			
Month	**2016**	**2017**	**2018**
January	-	24	37
February	2	29	32
March	12	35	46
April	10	23	33
May	13	21	37
June	18	24	48
July	18	33	29
August	28	29	48
September	31	27	36
October	19	32	52
November	31	32	34
December	30	39	32
Total	**212**	**348**	**465**

Source: The Central Economic Information Bureau [www.coig.com.pl/2018-restrukturyzacje-firm-wrzesien.php]

When it comes to the type of procedures, debtors most often decided on restructuring within the frames of accelerated arrangement procedure – 134 proceedings in 2016, 198 in 2017 and 346 in the period between January and November 2018.

Table 3: Type of restructuring procedure in Polish economy in the years 2016-2018

Type of restructuring procedure	2016		2017		2018	
	Number of procedures	Percentage structure	Number of procedures	Percentage structure	Number of procedures	Percentage structure
Accelerated arrangement procedure	134	63.21	198	56.90	294	63,23
Sanative procedure	48	22.64	87	25.00	121	26,02
Arrangement procedure	30	14.15	53	15.23	46	9,89
Procedure on the approval of arrangement	-	–	10	2.87	4	0,86
In total	**212**	**100.00**	**348**	**100.00**	**465**	**100,00**

Source: The Central Economic Information Bureau [www.coig.com.pl/2018-restrukturyzacje-firm-wrzesien.php]

As far as the type of ownership is concerned, from the point of view of the number of restructuring procedures in the years 2016-2018, most of them concerned limited liability companies and individual economic activity.

Table 4: Number of restructuring procedures considering the type of ownership in Polish economy in the years 2016-2018

Type of restructuring procedure	2016		2017		2018	
	Number of procedures	Percentage structure	Number of procedures	Percentage structure	Number of procedures	Percentage structure
Limited liability company	87	43.50	144	41.38	153	32,90
Individual economic activity	67	31.60	114	32.76	156	33,55
Joint-stock company	32	15.10	44	12.64	49	10,54
Registered partnership	15	7.10	16	4.60	26	5,59
Farm	-	-	9	2.59	38	8,17
Limited partnership	-	-	8	2.30	27	5,81
Limited joint-stock partenrship	9	4.20	5	1.44	2	0,43
Shareholder in a partnership	-	-	4	1.15	8	1,72
Cooperative	-	-	2	0.57	2	0,43
Civil law partnership	-	-	2	0.57	1	0,22
Chamber of commerce	1	0.50	-	-	1	0,22
Physical education association	1	0.50	-	-	-	-
Foundation	-	-	-	-	1	0,22
Higher education institution	-	-	-	-	1	0,22
In total	**212**	**100.00**	**348**	**100.00**	**465**	**100,00**

Source: The Central Economic Information Bureau [www.coig.com.pl/2018-restrukturyzacje-firm-wrzesien.php]

As far as the branches of economy are concerned, the highest number of restructuring procedures in the years 2016-2018 concerned the entities involved in construction, industrial processing and trade.

Table 5: Number of restructuring procedures considering Polish classification of economic activity

Polish Classification of Activity	2016		2017		2018	
	In total	%	In total	%	In total	%
INDUSTRIAL PROCESSING	46	21.70	85	24.85	112	24,62
WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES INCLUDING MOTORCYCLES	42	19.80	82	23.98	103	22,64

CONSTRUCTION	51	24.10	56	16.37	66	14,51
AGRICULTURE, FORESTRY, HUNTING AND FISHING	4	1.90	18	5.26	53	11,65
PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITY	10	4.70	18	5.26	21	4,62
INFORMATION AND COMMUNICATION	9	4.20	15	4.39	12	2,6
TRANSPORT AND WAREHOUSE MANAGEMENT	6	2.80	13	3.80	20	4,40
ACTIVITY IN CONNECTION WITH ACCOMMODATION AND CATERING SERVICES	5	2.40	8	2.34	13	2,86
FINANCIAL AND INSURANCE ACTIVITY	6	2.80	8	2.34	9	1,98
ACTIVITY IN THE AREA OF ADMINISTRATIVE AND SUPPORT SERVICE	4	1.90	8	2.34	10	2,20
PRODUCTION AND DISTRIBUTION OF ELECTRICITY, GAS, STEAM, HOT WATER AND AIR CONDITIONING	7	3.30	7	2.05	5	1,10
WATER DISTRIBUTION, WASTE AND WASTE WATER MANAGEMENTAND REMEDIATION ACTIVITIES	5	2.40	7	2.05	2	0,44
ACTIVITY IN CONNECTION WITH REAL ESTATE MANAGEMENT	3	1.40	6	1.75	8	1,76
HEALTHCARE AND SOCIAL SECURITY	2	0.90	5	1.46	9	1,98
MAINING AND QUARRYING	3	1.40	4	1.17	1	0,22
EDUCATION			1	0.29	2	0,44
ACTIVITY IN CONNECTION WITH CULTURE, ENTERTAINMENT AND RECREATION	1	0.50	1	0.29	5	1,10
OTHER SERVICE ACTIVITIES	2	0.90	-	-	4	0,88

Source: The Central Economic Information Bureau [www.coig.com.pl/2018-restrukturyzacje-firm-wrzesien.php]

Moving on from the liquidation to restructuring model of bankruptcy requires changes adopted by lawyers, economists, managers, business representatives and represetatives of the State because they create a group of interest whose main objective in this case is to conduct skilfully a bankruptcy process which leads to paying liabilities to creditors with simultaneous preserving a good economic and financial situation of an enterprise.

Conclusion

In practice, there is an urgent need to examine the phenomenon of bankruptcy in the aspect of creating rules of procedure necessary for rational regulation of this phenomenon by the legal system.

The economic sense of bankruptcy involves maintaining an entrepreneur temporarily experiencing the loss of financial liquidity or in liquidating an entrepreneur permanently unable to settling their liabilities.

The role of the State should be to minimise negative effects of a crisis situation in an enterprise, and the objective of the New Chance Policy is not to prevent bankruptcy at any cost, but, when business activity must be terminated due to financial difficulties, to conduct the process quickly and inexpensively.

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Commercial Exchange of Innovative and Knowledge-Based Services with EU States: Case Study of Poland

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Abstract

The article presents the issue of trade between Poland and EU member states. Its main focus is on innovative and knowledge-based services. The aim of the research was to identify the tendencies in the trade in innovative and knowledge-based services between Poland and the countries of the EU. The temporal scope of research includes the years 2010-2017. This results from the availability of cohesive and latest statistical data. The study is based on data published by the National Bank of Poland and the Central Statistical Office. For the purposes of this research, simple statistical methods, desk research, and graphic methods were used. Between 2010 and 2017 the value of innovative and knowledge-based services in the Polish foreign trade with EU countries increased. The generic structure of services changed. IT services and services provided by professionals predominated. Germany remained Poland's key commercial partner in the discussed category. However, its participation in the Polish exports diminished in terms of innovative and knowledge-based services, while it increased in the case of imports. The development of Polish foreign trade, trade in services included, has a positive impact on the economy. Nonetheless, Poland remains dependent on imports, including that of innovative and knowledge-based services.

Keywords: Intra EU-Trade, Polish Foreign Trade, Services, Innovative And Knowledge-Based Services

Introduction

International trade is one of the most important and fastest-developing economic activities. Foreign trade, exports in particular, is still viewed as an essential determinant of economic development. Over the past few decades, however, the manner in which its substantive scope is perceived has changed. In many economies trade is still dominated by the exchange of goods, albeit with a simultaneous growth in the significance of services. Additionally, the role of innovation in shaping the structure of trade is increasing, as well. Trade in services has been expanding rapidly, at a faster pace than trade in goods since 2011. Services currently account for around three quarters of GDP in developed economies, up from 40 per cent in 1950, and many developing economies are becoming services-based . In some cases, this is occurring even more rapidly than in developed economies (WTO, 2019).

Such trends are also observed in Poland. Despite this, there is a gap in the knowledge of commercial exchange of services, including the lack of a comprehensive analysis of the types of services involved and their impact on the functioning of the Polish economy. This has been caused by researchers rather focusing, most often, on developing only a generic description of exports and imports of services. The limited access to statistical data and their frequent lack of cohesion, particularly hindering long-term analysis, is another problem.

The aim of this research was to identify and assess the trends in the trade in innovative and knowledge-based services between Poland and EU member states. Also, an attempt was made to

assess the significance of and roles played by EU member states in the trade in such services for the functioning of the Polish economy.

Literature Review

Since 1980s, the significance of services for international trade has been on the rise. Hence, this phenomenon has been more and more often the focus of scientific research, although there is still a considerable gap in the knowledge gathered to date. This gap mostly relates to the lack of a theory of the international trade in services (Misala, 2005). Therefore, attempts are being made at explaining the international flow of services using the achievements of the theory of international trade in goods. According to van Welsum (2003), this approach is admissible as the literature does not provide for any formal or empirical barriers. However, it is required that the specific features of services and the incompleteness of statistical data be taken into account. Thus, for instance, it has been shown that the comparative advantage applies to the trade in services, as well (Stern and Hoekman, 1987). Sapira and Winter (1994) have proved that the international trade in services and goods share the same determinants. Kimura and Lee (2006), on their part, have shown the complementary relationship between the exports of goods and the imports of services. Despite this, according to Mongiało (2007) it is unlikely that a comprehensive theory explaining the international trade in services will be developed, and the reason for that is the multitude of factors affecting the shape, structure and directions of the exchange of services.

The factors determining the international trade in services constitute an important part of the research undertaken in this field. One of such factors is the question of the given country's participation in a regional trade agreement (RTA). A fairly comprehensive approach to describing this aspect has been adopted by Mattoo and Sauvé (2008), Hoekman and Mattoo (2013), and others. A positive link between the existence of regional trade partnerships and the trade in services has also been pointed to by Ceglowski (2006). Additionally, she has proved that the sizes of and the distances between the countries play an essential role in the international trade in services. Mirza and Nicoletti (2004), on their part, have confirmed that the given country's membership in a regional partnership causes the bilateral exports to grow.

Some studies on services focus only on industrial countries, although in many developing countries services are already the largest sector in the economy and an important determinant of overall productivity growth (Zahler, Iacovone & Mattoo, 2014). The positive effects of international trade on countries' economic development are thoroughly described and well-proven in the literature (Krugman et al., 1999; Jones & Kierzkowski, 2018; Malkowska, 2018). The role of services in the international trade is growing, especially with regard to innovative services. Services are much more active with respect to innovation than is widely thought (Hipp et al., 2000). In turn, innovation is frequently an essential foundation of the economy's competitiveness (Porter, 2011). Therefore, empirical studies on the international trade in innovative services within the frameworks of regional trade partnerships, for instance the European Union, should be considered as important and necessary.

Methodology

This article focuses on the international trade in services. It discusses Poland's trade in services with EU member states. Poland has been a member of the European Union since 2004, which is why the trade analyzed herein is of an intra-EU nature. The substantive scope of the research included innovative and knowledge-based services.

The study used a general description of Poland's trade in selected services with EU member states as a starting point. The three main categories of exports, imports and trade balance were analyzed. The temporal scope of the research was chosen to include the years from 2010 to 2017, a decision driven by the availability of cohesive and latest statistical data. This, in turn, allowed the author to observe the changes occurring over time and enabled both assessments and comparisons to be made. The general description was expanded by an analysis of revenues from international sales of the services concerned, and of the expenditures on all the components, including the service types classified

within them. In this case, the years 2010 (the base year) and 2017 (the target year) were assumed as the time frame.

The core part of the paper covers an analysis of the significance of EU member states for Poland's international trade in innovative and knowledge-based services. In order to specify the EU's role in this respect, a number of indicators, important from the perspective of the topic discussed herein, were chosen. The analyzed and assessed aspects included, inter alia, the following: revenues from and expenditures on services traded in with EU member states, Poland's main trade partners, the ratio of Poland's exports and imports value to its gross domestic product, the value of the Polish trade in innovative and knowledge-based services with the EU per capita, and the activity of Polish international service providers, including those with foreign capital. These indicators were analyzed for the period from 2010 to 2017 or – where appropriate – individually for 2010 and 2017.

The analysis was carried out on secondary data. For the purposes of the study, four main groups, or the so-called components, of such services were selected in line with the distinction made by the National Bank of Poland (NBP) in its reports. They were: (1.) Telecommunication, IT and information services; (2.) Research & development services; (3.) Services provided by professionals; (4.) Fees for intellectual property rights.

For the purpose of drawing conclusions, inductive and deductive methods based on desk research were used. Predominantly, data from the National Bank of Poland online database were used. Additionally, information was drawn from the public statistical database of the Central Statistical Office (GUS), including the Local Data Bank. The results were presented graphically in the form of tables and figures.

Statistical data were a significant limitation of the study. The analyzes mainly used NBP data, which are published only in Polish Zloty (PLN). Lack of homogeneous data in another currency, especially in EUR, made it impossible to compare Poland with other EU countries.

Results

Poland's trade in innovative and knowledge-based services with European Union member states between 2010 and 2017

The years 2010-2017 saw dynamic development of Poland's trade in innovative and knowledge-based services with European Union (EU) member states. The value of exports of the services in question grew from PLN 12.8 bn in 2010 to PLN 37.3 bn in 2017. Thus, revenues from the international sales of these services grew three-fold. As for the imports of such services, an increase of almost 200% was observed. During the period concerned, expenditures on acquiring the analyzed services from EU member states grew from PLN 15.8 bn to PLN 37.1 bn (see Figure 1). Therefore, the growth rate of exports was notably higher than that of imports as far as innovative and knowledge-based services are concerned.

Fig. 1: Poland's trade in innovative and knowledge-based services with European Union member states between 2010 and 2017 (in PLN bn)

Source: the author's own study based on: the National Bank of Poland (NBP, 2018).

Only once, namely in 2017, was Poland's trade balance with EU member states in respect of innovative and knowledge-based services positive, reaching over PLN 230 m. In the rest of the period, the balance was negative every year, deteriorating systematically until 2013 when it reached its lowest level of - PLN 5.1 bn. After 2013, the trend reversed and the trade balance improved continuously (Figure 1). It should be noted that the trade surplus of 2017 was owed mainly to IT and R&D services. The latest – though still incomplete – statistical data on Poland's trade in services indicate that this surplus will probably have maintained in the following year, as well. However, it is difficult to judge whether or not this trend is a long-term one. For the time being, we are only able to talk of a short-term nature of such surplus. Importantly, however, the surplus developed mainly as a result of a much higher growth rate of revenues from innovative and knowledge-based services rather than expenditures on the same. This is of significance in the context of assessing the functioning of the Polish economy.

Detailed conclusions can be drawn from a deeper analysis of the structure of revenues and expenditures. In this context, the research showed that considerable changes had occurred. Poland's largest revenues from the sale of such services to EU markets were from IT services (PLN 2.9 bn in 2010 and PLN 12.5 bn in 2017) and services related to marketing, market surveys and public opinion polls (PLN 3.7 bn in 2010 and PLN 6 bn in 2017), as well as business consultancy and public relations services (PLN 6.2 bn in 2017) (see Table 1). Jointly, these components accounted for almost 52% of the value of the Polish exports of innovative and knowledge-based services to the EU in 2010, and as much as 66% in 2017.

Table 1: Poland's trade with EU member states by the main components of innovative and knowledge-based services in 2010 and 2017 (PLN bn)

Service	2010	2017	Net exports	2010	2017	Net exports
	Exports	Imports		Exports	Imports	
Telecommunication, IT and information services	**4.3**	**4.9**	**-0,6**	**15.2**	**10.3**	**4.9**
including: telecommunication	1.1	1.3	-0,2	1.7	2.0	-0.3
IT	2.9	3.4	-0,5	12.5	7.6	4.9
information	0.3	0.3	0	0.9	0.7	0.2
Research & development services	**1.2**	**0.4**	**0,8**	**3.3**	**1.0**	**2.3**
Services provided by professionals	**6.9**	**6.0**	**0,9**	**17.9**	**17.0**	**0.9**
including: legal	0.6	0.3	**0.3**	0.7	0.3	0.4
accounting, auditing and tax consultancy	1.3	0.3	1.0	5.0	0.8	4.2
business consultancy and public relations	1.4	4.2	-2.8	6.2	11.7	-5.5
marketing, market surveys and public opinion polls	3.7	1.2	2.5	6.0	4.2	1.8
Fees for intellectual property rights	**0.4**	**4.5**	**-4.1**	**1.1**	**8.8**	**-7.7**

Source: the author's own study based on: the National Bank of Poland (NBP, 2018).

As for services acquired from EU member states, Poland's largest expenditures were on those related to business consultancy and public relations (PLN 4.2 bn in 2010 and PLN 11.7 bn in 2017) and fees for intellectual property rights (PLN 4.5 bn in 2010 and PLN 8.8 bn in 2017) (Table 1).

Between 2010 and 2017, the largest increase in exports of innovative and knowledge-based services to the EU was observed for the service components of business consultancy and public relations (by 339%), IT (by 327%) and accounting, auditing and tax consultancy (by 300%). In the case of imports, the largest growth was in respect of such service components as marketing, market surveys and public opinion polls (by 240%) and accounting, auditing and tax consultancy (by 232%). Apparently, apart from IT services, Poland's trade with EU member states was characterized by the fastest growth in significance of selected services provided by professionals.

The Roles of EU Member States in Poland's Foreign Trade in Innovative Services

The European Union is Poland's most important trade partner, also in the case of the services discussed herein. The Union's share in Poland's trade in innovative and knowledge-based services accounted for approx. three-fifths for exports and over three-fourths for imports. During the period concerned, EU member states' share in the overall exports of the services in question dropped by 2.5 p.p. (i.e. from 67.7% in 2010 to 65.2% in 2017), but its share in the imports of such services grew by 4.1 p.p. (i.e. from 74.7% in 2010 to 78.8% in 2017) (see Table 2).

The data shown in Table 2 indicate the enormous significance of the EU markets for the Polish trade in innovative and knowledge-based services. According to the latest data for 2017, the share of revenues from the sales of individual service types to the EU ranged from 47.7% for fees for intellectual property rights to as much as 83.4% for telecommunication services. As for expenditures on such services, these shares were even larger and ranged from 61.8% for IT services to 87.8% for R&D services.

Table 2: The share of Poland's trade with EU member states in innovative and knowledge-based services in the country's overall international trade in innovative and knowledge-based services

Service	2010		2017	
	Exports	Imports	Exports	Imports
Telecommunication, IT and information services	70.4	74.9	63.1	75.5
including: telecommunication	78.9	78.9	83.4	75.0
IT	69.9	77.2	61.8	77.1
Information	62.8	47.7	55.1	61.8
Research & development services	68.6	84.4	63.8	87.8
Services provided by professionals	66.3	82.3	68.8	83.5
including: legal	72.5	81.3	71.0	79.0
accounting, auditing and tax consultancy	66.3	83.3	69.9	75.4
business consultancy and public relations	58.5	82.1	66.3	83.4
marketing, market surveys and public opinion polls	68.9	82.6	70.4	85.9
Fees for intellectual property rights	61.9	65.6	47.7	73.7

Source: the author's own study based on: the National Bank of Poland (NBP, 2018).

In terms of exports, the only component that increased its share was that of services provided by professionals (by 2.5 p.p.), while the shares of the other three main service components discussed herein were seen to fall. The largest drop was observed for fees for intellectual property rights (by 14.1 p.p.), followed by telecommunication, IT and information services (by 7.2 p.p.) and research & development services (by 4.9 p.p.). In terms of imports, an upward trend was identified for all the four main service components, the largest being for fees for intellectual property rights (by 8.1 p.p.) (Table 2).

Also, Poland's most important trade partners changed with regard to the different types of innovative and knowledge-based services. Generally speaking, however, the most significant geographical directions for both imports and exports were such EU member states as Germany, the UK, the Netherlands, Sweden and Ireland. Notwithstanding, it must be noted that non-EU partners, such as the United States and Switzerland, occupy high-ranking positions in this respect, as well. Polish exports of innovative services to these markets increased. Poland's trade in the services concerned took place mainly with strong and developed economies.

The United Kingdom was an important partner both in terms of exports and imports of most innovative and knowledge-based service components (Table 3). The UK has left the European Union on January 2020, after almost half a century of membership. Brexit may have an impact on Poland's foreign trade in such services. To date, no final conditions for the UK leaving the EU have been established, which is why any direct consequences of such a move are difficult to make. Membership in the EU is known to reduce trade and investment costs (Dhringa, 2016). The basic data on trade in goods and services and investment between the two parties suggest that the cost of "Brexit" could be substantial. Trade between the UK and the EU-27 is large. All available studies concur that a significant disruption of trade links will impose economic costs on both sides (Belke & Gros 2017).

Table 3: Poland's most important trade partners in the exports and imports of innovative and knowledge-based services in 2010 and 2017

	Service	2010		2017	
		Country	Value (PLN bn)	Country	Value (PLN bn)
Exports	Telecommunication, IT and information services	Germany Switzerland USA	0.7 0.7 0.6	Germany Sweden Ireland	3.0 1.4 1.3
	Research & development services	USA Finland UK	0.4 0.3 0.2	USA Finland UK	1.1 no data 0.9
	Legal, accounting, management consulting and public relations services	Switzerland UK Germany	0.8 0.7 0.5	Germany Switzerland UK	2,3 2.2 2.2
	Fees for intellectual property rights	Ukraine Hungary USA	0.1 0.07 0.05	USA UK The Netherlands	0.7 0.3 1.0
Imports	Telecommunication, IT and information services	Germany USA Ireland	0.9 0.7 0.5	Germany UK USA	2.6 1.5 1.3
	Research & development services	Germany France UK	0.1 0.08 0.08	France Germany UK	0.3 0.2 0.1
	Legal, accounting, management consulting and public relations services	Germany UK France	0.8 0.8 0,6	Germany UK France	2.8 1.9 1.7
	Fees for intellectual property rights	Germany Switzerland USA	1.3 1.0 0.8	Germany Switzerland Ireland	1.8 1.5 1.5

Source: the author's own study based on: GUS 2011a; GUS 2018a.

The role of trade in individual economies can be assessed using the export and import ratios. Due to the nature and scope of the research, the former of these indicators was calculated using revenues made by Poland from international sales of innovative and knowledge-based services to EU member states and the value of the Gross Domestic Product (GDP). The ratio of the two figures depicts the degree to which the Polish economy is open to foreign markets (in this case the EU markets). Also, the same ratio allows for assessing how much export-oriented the economy is, as basically the higher the ratio the better.

A comparison between the base and target years clearly reveals a change that occurred in respect of Poland's export partners as regards the "fees for intellectual property rights" component. In 2010, Poland's largest revenues from international sales of services came from fees for intellectual property rights from the neighboring Ukraine and from Hungary, while in 2017 they came from the USA, the UK and the Netherlands. This may mean that the Polish services provided within this component became so competitive that they could be successfully supplied to wealthy countries. Also, trade diversion form a non-EU country to an EU member state was observed here, which is characteristic of integrating organizations such as the European Union.

During the period concerned, Poland's ratio of exports of innovative and knowledge-based services to the EU grew continuously from 1.1% in 2010 to 1.9% in 2017. This means that, slowly but regularly, Polish economy was becoming more and more open to trading in these services with other EU markets. At the same time, the economy's competitiveness can claim to have improved during this period, as well. The ratio of the imports of innovative and knowledge-based services from the EU to the Polish GDP was 0.9% in 2010 and grew to 1.9% by 2017, i.e. by 1 p.p. This indicates that during this period Polish economy's dependence on importing the services concerned from the EU increased gradually (see Figure 2.).

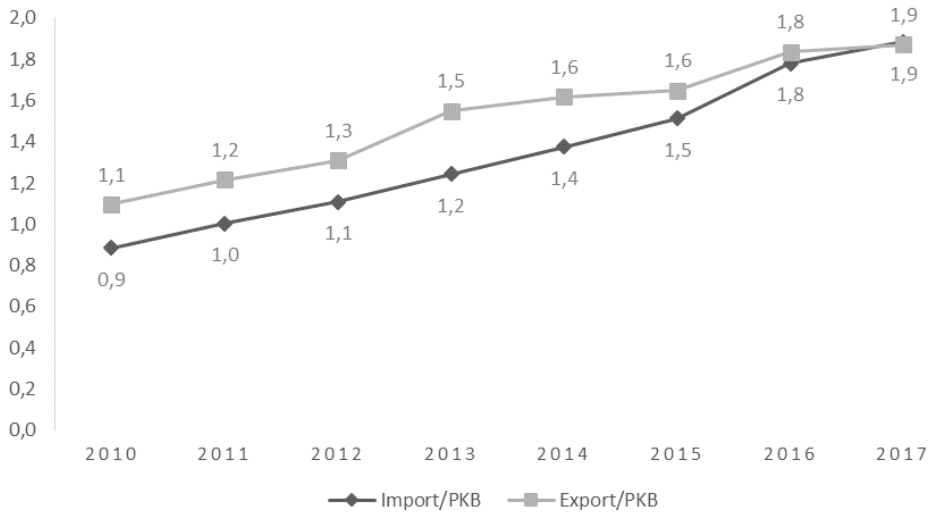

Fig. 2: The Polish ratio of exports and the ratio of imports (%) with regard to trade in innovative and knowledge-based services with EU member states

Source: the author's own study based on: NBP (2018); Local Data Bank of the Central Statistical Office (2010-2017).

An analysis of the value of exports and imports over time allows for two conclusions to be drawn. Firstly, that the Polish economy's openness to trading with other EU member states is of a relatively permanent nature. This is vital from the point of view of the development and functioning of the given economy, and should be view positively. Secondly, the dynamics of the ratio of exports in innovative and knowledge-based services to the GDP was higher than it was for the ratio of imports. Here, any attempt at making an evaluation would be difficult and render an ambiguous result. This is so because, as it is known, export is the driving force of the given economy's development and the state's trade policy should be mainly oriented on supporting international sales. Any surplus of exports over imports brings economic benefits from international trade. However, innovative and knowledge-based services are quite specific and should be examined from a wider perspective. In their case, a growth in imports may also bring benefits – be it technical or technological, especially to poorer or developing countries that are characterized by lower levels of economic and technological development. Importing is an opportunity (and frequently the only one) to gain access to innovative services or services based on specialist knowledge developed in other countries, or to be the beneficiary of the transfer of new technologies in services. Therefore, an increase in the GDP share of the imports of innovating and knowledge-based services may undoubtedly have a positive impact on Poland's development.

The given country's economy can also be assessed by analyzing the value of the exports and imports of innovative and knowledge-based services per capita. Revenues per capita from international sales of this type of services to other EU member states grew by 193% (i.e. from PLN 0.34 m in 2010 to

PLN 0.99 m in 2017). A somewhat lower increase, i.e. by 135%, was observed for expenditures (from PLN 0.42 m to PLN 0.98 m). It can, therefore, be assumed that trade with EU member states brought growing economic benefits.

Any analysis of trade with foreign partners must take into account the business activity of enterprises trading internationally. Unfortunately, in the case of business activity related to the provision and acquisition of innovative and knowledge-based services the available data are incomplete. According to the Central Statistical Office (GUS), for example, in 2017 there were over 14.1 thousand Polish importers of services related to professional, scientific or technical activity, including over 11.4 thousand (i.e. 80.7%) trading with other EU member states. At the same time, those involved in exports amounted to almost 5.9 thousand, including almost 4.6 thousand (i.e. 77.4%) trading with other EU member states. In turn, as for businesses trading in the information and communication component of services, there were over 8.6 thousand importers and almost 2.6 thousand exporters. 76.1% of importers and 75.2 of exporters were involved in international trade with the EU. These data allow for the conclusion to be drawn that three-fourths of Polish businesses operating in different fields related to innovative and knowledge-based services traded with partners from other EU member states.

However, it should be stressed that the Polish international trade in services is characterized by the dominating role of foreign capital companies (NBP, 2017). During the period concerned, the number of such companies grew, with the number of exporters increasing by 13.7% (i.e. from almost 9.5 thousand in 2010 to 10.8 thousand in 2017), and the number of importers increasing by 7% (from 10.6 thousand to 11.4 thousand) (GUS, 2011b; GUS, 2018b). One problem that the Polish international trade in services is still struggling with is the relevantly low innovation of service sector businesses. Main problems are: regard to innovative culture, evaluating and planning innovative activities, communication and organization and financing (Norek, 2012).

Poland is an active participant of the processes of internationalization of production. More than half of Polish exports takes place within the framework of gross value chain. The data indicate that in 2016 the value added created in the service sectors accounted for 53.3 per cent of gross exports from Poland. Almost 40% of the value added of the exports of services was related to industrial goods, and 60% came from the service sectors (Mroczek, 2019). The tendency of increasing the participation of economies in the global value chain follows the trends observed in EU countries. Although, in the case of Poland the speed of index's growth is nearly the highest among EU countries. On one side, it has a positive effect on innovation creating, both on the level of companies and the entire economy (Gołębiowska, 2017).

Poland, together with the other countries of the Visegrad Group, is giving an impulse for the European economy. In 2019, Poland surpassed Great Britain and became the sixth biggest economic partner of Germany in the world. Eastern members of European Union are becoming increasingly important for EU innovation.

Conclusion

Between 2010 and 2017, Poland's trade in innovative and knowledge-based services with other EU member states was subject to much change. Both the exports and imports of the services concerned grew, with their international sales being more dynamic than their acquisitions. Apart from an increase in the trade in IT services, the exchange of selected services provided by professionals was observed to be growing, as well, with improving results of the exports of business consultancy and public relations services and the imports of services related to marketing, market surveys and public opinion polls. As a result of this, the trade balance started to improve as from 2014 to reach a trade surplus in 2017.

The development of Poland's international trade also caused its structure to change. Within the Polish overall exports of innovative and knowledge-based services, the largest growth in exports to the EU

was enjoyed by services provided by professionals, and the largest growth in imports by fees for intellectual property rights. It can be concluded, therefore, that Poland's trade with other EU countries is being reoriented from the exchange of low-complexity services to more advanced and – at the same time – knowledge-based ones, where human and intellectual capital is essential.

The analysis confirmed the enormous significance of the EU market for Poland's international trade in innovative and knowledge-based services. In 2017, the Union received over 65% of Polish exports and provided almost 79% of Polish imports. Simultaneously, Poland's sales to non-EU countries were growing, supported by the improved competitiveness of Polish services and increased acquisitions from EU markets, which could be explained by the importing of essential commodities and services and by the technical and technological benefits drawn.

Poland's most important trade partners within the EU were Germany, the UK, the Netherlands, Sweden and Ireland. As the UK's has a large share in Poland's trade in innovative and knowledge-based services, the former country's looming departure from the EU under still unspecified conditions may affect the latter state's international trade in such services. Although the exact consequences of this eventuality are hard to envisage, they should be subjected to thorough analysis aimed at identifying and preventing potential risks, both on the EU and domestic levels.

Poland's international trade in innovative and knowledge-based services was dominated by EU member states, and their role was growing. This research showed that the Polish economy was becoming more and more open to the international trade in services with other EU member states. The growing role of services was also reflected in the increasing trade revenues and expenditures per capita. Additionally, a vast majority of Polish businesses, including foreign-capital companies, had trade ties with EU partners. Therefore, it can be assumed that Poland's trade in services with EU member states had a substantial impact on the country's economic development.

Acknowledgment

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World Trends in Human Resources Management in The Context of Digital Economy and Business Processes Transformations[1]

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Abstract

In the context of the rapid development of digital technologies, modern companies need to be flexible and constantly adapt to new trends. The ability of an organization to exist and compete in the conditions of scientific and technological development also depends on the choice and development of the main value of any company - a person with his knowledge and capabilities. The external environment forces HR managers to change constantly their approach to deal with personnel. Routine processes recede into the past, giving way to digital operations. Technologies are developing very fast, but even the most advanced HR-IT system is not able to keep up with changes in the business. In the digital age, business demands higher standards not of systems, but of people. So HR managers will have to give up hope that they will be able to continue working with the existing knowledge and technologies.

Keywords: Human Resources Management, Digital Economy, Digital Transformation, Business Processes.

Target Setting

Nowadays, in the age of scientific and technological progress, a new economic structure is being actively formed – digital one. The introduction of digital technologies in enterprises allows to use available resources more efficiently, as well as significantly increase the productivity of enterprises themselves.

According to the experts, every year there will be an increase in the digital transformation of the personnel policy, modern HR trends will be included in the everyday life of a large number of business companies. In modern practice of human resources management, archaic procedures are closely intertwined with modern digital technologies, with the help of which the process of finding and integrating the right employees is greatly simplified. In this connection, questions of assessing the impact on the personnel policy of economic entities and taking into account global economic trends require scientific justification.

It is impossible to imagine the modern development of world space without the development of information and communication technologies, the Internet of things in the context of the digital economy. This problem is interdisciplinary in nature, because to solve it one has to use knowledge of

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computer science, electronics, sociology, economics and the whole complex of special types of management (strategic, personnel, financial, innovative, investment, etc.).

A special contribution to the study of the digital economy, the formation of new technological structures, electronic business models, the introduction of digital technologies and the development of digitalization was made by the works of the following scientists and professional communities: Don Tapscott, Boston Consulting Group, International Bank for Reconstruction and Development.

Issues of increasing labor productivity, human resource management, challenges and risks in the development of the labor market are considered by Digital McKinsey specialists, foreign scientists F. W. Taylor, P. Drucker, leading scientists of the Laboratory of Economic Forecasting of the Russian Academy of Sciences.

Moreover, in existing publications and scientific developments, the issue of the development of the digital economy is mainly considered as a whole, without studying global trends in human resource management in the context of the digital transformation of business processes.

Foreign countries are currently implementing digital transformations in all sectors of the national economy in order to increase their global competitiveness index and form Industry 4.0 (the implementation of the fourth industrial revolution), which provides for the complete digitalization of business processes, transformations in the personnel policy, and the search for new approaches to the training system and staff retraining.

The purpose of the research is to study global trends in human resource management in the terms of digital economy and business processes transformation, and to substantiate tools and technological solutions for its improvement.

Key Findings

In today's world, a person is a valuable resource of the company. His knowledge, skills and experience constitute the competitive advantage of the enterprise. In this regard, it is necessary to approach responsibly the organization of the personnel management system, improve it continuously, create favorable working conditions for employees, coordinating the tasks and content of the personnel policy with the goals, strategy and constantly changing structure of the organization.

The digital transformation of an enterprise consists not only in the installation and use of modern software, automation of all processes, but also in increasing the speed of decision-making, as well as in improving the efficiency of the personnel policy of the company [5]. In the context of the development of digitalization, the requirements for the needed set of competencies among HR specialists will increase year by year, transferring part of the service functions to information systems [8].

One of the most important technological trends is Big Data. They significantly affect the ability of HR-services to work with information for further use. Nowadays, big data in personnel management is used in 2 directions: for staff selection (analysis of terms for selecting new employees, percentage of successful completion of the probationary period, etc.) and talent management (analysis of personal characteristics of employees, their work efficiency, formation of talent pool, etc.).

Working with Big Data helps HR specialists to pay attention to existing shortcomings or problems of personnel policy, helps to eliminate them, analyze the degree of attractiveness of the company for applicants, work on the brand and ultimately increase the efficiency of the business as a whole. An important goal of HR specialists is the selection of personnel who are motivated for high personal results, thereby ensuring the growth of the company [2, 10].

The most promising area of recruitment managing is the use of artificial intelligence and robotics. A virtual recruiter - Robot Vera, who is actually a cloud technology operating on the basis of the voice menu, gained wide popularity in the Russian market.

The robot has the following key options: it finds independently suitable CVs on job search sites and calls candidates; on the principle of Skype, conducts a brief interview with the applicant for an open vacancy, asking simple questions that need to be answered either in the affirmative or negative, since the system recognizes the voice, but understands only monosyllabic answers; according to the results of such a survey, it records in its database the information about each phoned candidate [13].

The business processes digitalization allows HR managers to focus on HR tasks, finding talents for higher positions, conducting trainings and staff incentive programs, rather than selecting hundreds of candidates to fill mass vacancies. A significant advantage of digitalization is the ability to remotely search and select personnel. Such technologies significantly reduce time costs and create comfortable conditions for both recruiters and job seekers.

A fairly common service for conducting a video interview is the VCV platform. In this system, it is possible to create comments, conduct competency assessments, as well as form feedback with applicants. The HireVue platform, using artificial intelligence to read the emotions of candidates, conducts an On Demand interview and draws up interview planning [13].

At this stage, it is important to identify the motivation of the candidate and his expectations from a new job [11]. Human resources services record, analyze and store this information about candidates, on the basis of which the staff analysis and planning are carried out. To automate this process, various accounting systems for personnel services are used.

Let us present in Figure 1 the reasons for the implementation of HRM processes in large organizations, holding structures and in medium-sized companies.

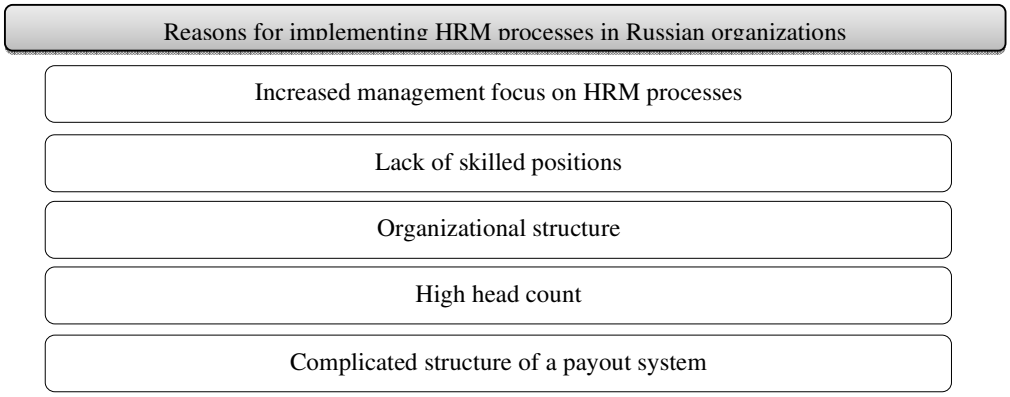

Fig. 1: Reasons for implementing HRM processes in Russian organizations

The reasons given for the introduction of HRM processes in Russian organizations require explanation. Thus, the interconnection of the components of the organizational structure of the personnel management system ensures high functionality of the company, guarantees further development and coordination of various forms of managerial work. With a large number of staff, there is an overload of personnel service specialists due to the need to maintain appropriate documentation for all employees with manual registration of all necessary papers, as well as due to the large volume of calculations related to payroll, determining tax payments, etc. As a rule, the number of errors in personnel accounting increases with the growth of the number of personnel, the reliability of the results of payroll calculation decreases, and there may be delays in its payment.

The introduction of HRM-system allows you to maintain personnel documentation and document flow in electronic form, minimizing manual data entry, eliminating duplication of employee accounts, ensuring their blocking for dismissed staff, as well as quick calculation of wages and all related charges and deductions with a high degree of confidence in the results obtained.

Performance Management in the classical sense, when a manager meets with an employee once a year, sets goals for him, and then evaluates achievements, is already out of date. In the current situation, the annual cycle is too long: during this time, the external environment of a business can change beyond recognition, so that by the end of the year those goals that a person worked on can completely lose their relevance [7].

Today, HR managers use a different practice. Some call it Continuous Performance Management, others call it Real-Time Feedback. In fact, this is a frequent and systematic (for example, once a week) feedback, which is also multilateral, not limited to the direction from the head to the subordinate. Such a practice is in line with the spirit of the digital age: a person must promptly receive corrective signals about his activities. In order to reduce the number of transactions, the introduction of new goal setting and evaluation systems requires appropriate IT resources. Mobile applications become an indispensable element of HR systems, since many employees work in project teams and network structures, often remotely [12].

Immediate feedback increases the involvement of people and improves the quality of their work (companies that have adopted the Scrum and Agile project management methodologies have already evaluated this practice) [7].

HR managers are increasingly talking about Social Learning - this is learning from person to person, when the mentors are not professional teachers, but expert practitioners.

Nowadays, during the formation of Industry 4.0., employees with their knowledge and abilities are especially valuable resources of a company. It is due to their intellectual potential and experience that the organization can develop and occupy worthy positions in the market. In order to provide the company with personnel with the necessary competencies, it is necessary to pay great attention to the personnel policy, develop and improve it constantly. One of the catalysts for the transformation of personnel policy is global digitalization.

Currently the innovative technologies in HR are actively implemented and used not only by IT companies, but also from completely different fields of activity. Some of them completely reconsider their views on the current personnel policy, others introduce individual technologies and tools. Based on the experience of companies, it was possible to identify 5 features of modern companies that use digital technology in HR:

1. Maximum centralization of personnel accounting and control based on digital technologies. The knowledge dispersed in different meta (regions, divisions, etc.) gives less result out of the working on a project or key areas than a large number of specialists concentrated in one place. Thus, this feature implies that the success of the organization lies in the centralization of technologies for accounting and control of personnel in one place. Centralization helps to minimize unnecessary interactions and iterations. At the same time, communication with reality is maintained at a high level due to the fact that automation and analytics are being introduced at the enterprise.
2. Maximum processes automation. Automation and digitalization of the ordinary functions of human resources emplyees (and of any other field) makes the HR policy of the enterprise more efficient thanks to: minimizing manual labor, resources saving, minimizing risks associated with staff recruitment, etc.
3. The ease and flexibility of the organization while implementing changes [16].
4. The maximum concentration. This feature means that companies that use digital technology focus on few services.

5. Maximum simplicity. The hinge of this issue is that the company should maximally simplify the communication processes within the organization, with customers, partners and suppliers. The simplification of operations reduces the load on the entire system [16].

The digitalization trend in the field of human resources management has been discussed for several years. Thus, according to research by Grand View, the global market for technical innovations in HR has reached $ 14 billion and is supposed to grow by $ 30 billion by 2025. Coleman Services (one of the leading consulting companies providing comprehensive HR solutions for clients) conducted a study "The level of development of digital technologies in HR" and found out how and why its clients use digital technologies in human resources management [4].

Let us imagine on Figure 2 the levels of digital technology development in HR.

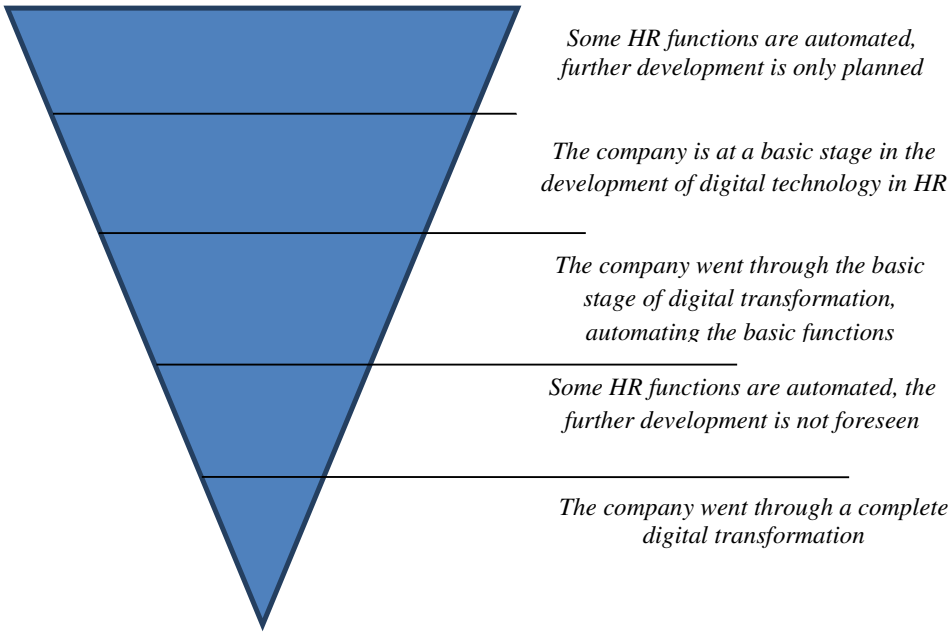

Fig. 2: Development level of digital technology in HR

Let us consider the automated functions of HR specialists in companies.

Among the HR functions that have automated the companies, the personnel administration prevails. An automated system has a number of advantages and can greatly facilitate the work of HRs and human resources specialists. For example, it keeps records of employees, registers orders, monitors the granting holidays, and also makes it possible to get the necessary analytical data in a couple of clicks. Thanks to this, the HR can perform a number of tasks, avoiding mistakes and optimizing their work. For example, it is possible to exclude the repeated entry of the same data into the accounting system or to minimize the risks of penalties from the fiscal authorities, to bring the "purity" of documents to the appropriate level.

The function of evaluating company personnel has been automated. The main goal of this action is to form a high-quality personnel reserve, which will increase the efficiency of the company and its production capacity. With the help of the system, human resource management specialists identify the strengths and weaknesses of employees, determine the most qualified personnel, and on the basis of the data obtained form an individual development plan for each promising specialist.

The system for calculating and paying compensation and benefits has been automated. The automation makes it possible to create an optimal and effective package of benefits, based on the needs of employees, and at the same time controls the costs of the company. The C&B system motivates employees to increase their productivity. As a result, the staff turnover is reduced and the loyalty of the organization's staff is increased.

The training and development functions of the staff were automated. This function already includes the personnel assessment, which was discussed earlier. Based on its data, the system helps to form an individual or group training program for employees, including analytics based on the results.

The automation of companies internal communications. The company management is trying to make the work of employees more coherent. In order to do it, it creates the conditions for quick and convenient communication - it introduces messengers, IP-telephony, and conference calls.

The management also implements corporate portals with company information. There you can find out news about the organization's activities, as well as find information about a colleague, get his contact details and quickly get in touch with him. Moreover, the automation helps to organize the remote work of employees.

In the century when almost everyone has a smartphone, chat bots - corporate analogues of Siri or Alice - have been added to a new trend of the internal communications automation. They know everything about the company and are always ready to help with current issues of employees.

The recruitment function has been automated. Special recruitment programs make it possible to systematize data on candidates, track the statistics on individual vacancies and job seekers. Very often, recruiters maintain a database in Excel, spend a lot of time analyzing information and transferring comments and notes from paper to electronic form. The automation of personnel selection minimizes routine operations and frees up time for searching and selecting candidates.

In the nearest future, an increase in global digitalization and in customer focus in the field of personnel management can be expected.

HR trends, which play an important role today while the formation of an HR strategy for the coming years.

1. Trend 1 – a person is at the center of everything.

HR gurus predict: the customer take centre stage in the company. And not only an external one, but also an internal one. The company employee is a client of an HR specialist. The main task of HR specialists is to reveal the potential and abilities of employees. Human capabilities are becoming one of the main resources of the company. Thus, the HR services have a complex task: HRs will need to create an environment in which talented employees can be raised. It is possible that it will be necessary to update the values and mission of the company, to rebuild the corporate culture. This work will make the foundation for the next important task.

2. Trend 2 - digitalization and automation of HR processes.

Some HR specialists are scared of technology. However, experts are sure that digitalization is inevitable. It will help to simplify not only the work of HR-specialists, but also make life of company employees more comfortable. For example, thanks to mobile applications.

Thanks to these applications, the employees will navigate easier in the office, communicate with colleagues and departments, and be involved in business processes. They will also be able to develop - remotely, quickly and conveniently for themselves. Internal specialists will have to introduce and develop new technologies. HR specialist will have to create an effective team, as well as to motivate it, create a comfortable working environment. In this regard, the following task arises. This trend contributes to other important tasks. For example, assisting in the employment and development of employees whose jobs are occupied by robots. Digitalization and automation have also a negative

side - according to the forecasts of labor market experts, some employees may lose their jobs due to bots and robots. But HRs urge not to despair: companies can help their employees [6].

3. Trend 3 - Elimination of bureaucracy.

To organize effective work, it is necessary that everything is simple, clear and understandable. And since the time is a key resource of a modern person, it is important to ensure the speed of routine operations.

4. Trend 4 - organization of a comfortable environment in which the generations X, Y and Z will be able to work together.

Xs (X) belong to the older generation. They are workaholics who are ready to solve the most complex projects, to deal with each problem in detail. Representatives of the Y generation are those who were born in the early 1980s, and of Z generation are those who were born after 1995. They are more individualistic, narcissistic, they are not interested in diving "deep", only the result is important.

They are not equal to anyone, unlike people of generation X. It is useless to compare them with others. A modern young man is indifferent to everything external and does not think that he should be like someone else.

Today, people of Y and Z generations in developed countries account for more than 70% of the total economically active population. As for their number in the staff of organizations: Ys account in average 30%, and the Zs are just starting to get a job [9]. Soon, the representatives of these generations will make up the bulk of the staff and it will be important to deal with them.

The worldview of the modern generation has its own characteristics, the main of which is the concept of freedom, that is, achieving the perfect balance between work and personal life.

Therefore, the companies need to create certain conditions, distribute the load between employees in such a way that a person does not spend at his workplace more than it was agreed.

Thus, one of the most important tasks of HR for several years to come is to ensure successful work and healthy climate in the team, by joining interests and approach to managing different generations. Therefore, it is necessary to introduce the H2H-approach - human to human (from person to person) in the company. Its hinge is that managers of all levels build human relations with employees. This does not mean that you need to indulge in everything. Managers and the company show that they value each employee, make it convenient and comfortable for everyone, but they are also expected to give good results.

5. Trend 5 – the forecast of employee behavior in the company and management of their performance.

People Analytics and Big Data are more relevant than ever. In personnel management, three tools which make it possible to study and compare information about employees are now in demand. HR Big Data - full data management.

Talent analytics is the analysis of the development of talent careers in the company. People analytics is the study of the qualitative composition of employees. By analyzing information in these areas, HR-specialists will receive data that will maximize the use of information about employees. These are demographic parameters, records about studies, appointments and promotion.

Having delved into this information, you can track the negative trends in HR processes in the early stages and quickly respond to them.

6. Trend 6 - Additional functions of HR specialists.

In order to keep pace with the market and respond to its requests, companies are forced to change quickly their business goals and diversify their activities. There are more and more tasks that arise from time to time. Keeping regular employees under them is not practical.

Therefore, the companies are increasingly outstaffing a part of the employees. Either they attract temporary employees, or they initially look sometimes for freelancers who perform specific tasks.

Let us imagine on Figure 3 the leading providers of digital HR services [7].

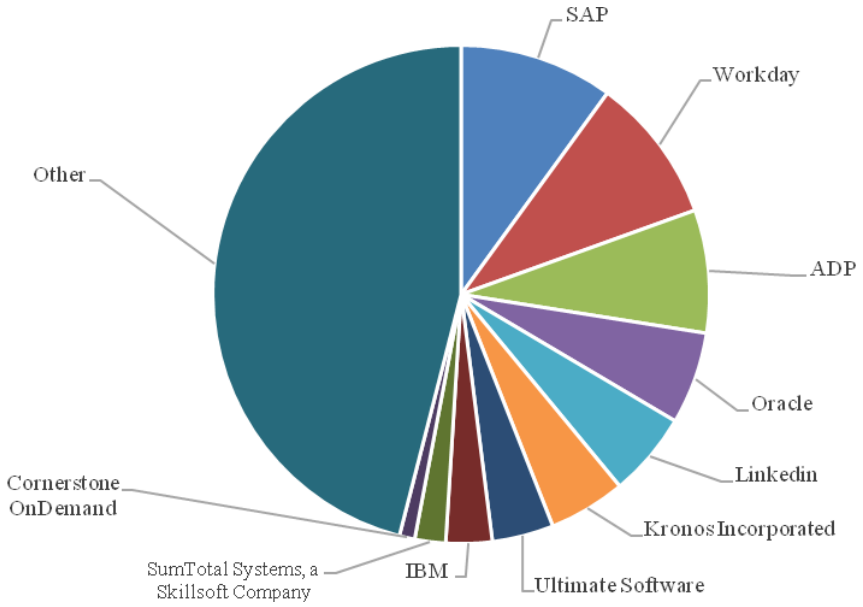

Fig. 3 : The leading providers of digital HR services in 2018

In 2018, SAP became the first company with a market share of 10% and revenue from HR-Digital products of $ 1.7 billion, which led to a jump in income from licenses, services and subscriptions by 19.8%. In 2017, Workday became the second ranking company, followed by ADP, Oracle and Linkedin (which is today a part of Microsoft) [3].

SAP has built one of the most popular ERP products in the history of enterprise applications with broad support from some of the largest companies in the world. Over the years, they have entrusted SAP with their complex business processes, which often include the use of internal systems that process everything from financial management to production planning. With the advent of cloud computing, these customers, including HSBC, Nestle, and Siemens, are following SAP as they transfer their internal systems to cloud services such as e-commerce, recruiting, sourcing, and more recently, vendor ERP [3].

Using its widely popular social network, LinkedIn has become a major force in the HR application on the market, offering more and more talent management products for recruiters and professional users.

LinkedIn enterprise solutions include the following six products: LinkedIn Recruiter, Job Slots, LinkedIn Referral Engine, LinkedIn Recruitment Media, LinkedIn Career Pages, and LinkedIn Talent Pipeline. All of them are closely integrated into their cloud platform, which serves the profiles of

more than 400 million people, as well as their daily interaction with each other, which at one time led to more than 109 billion page views per year [3].
Using nearly 65 years of outsourcing experience, ADP offers a wide range of HR solutions: salaries, taxes and benefits from a single source. The company serves more than 565,000 employers.

Since 2011, ADP has invested more than a billion dollars in acquisitions, as well as in internal developments to increase the volume of its HCM-offers (HCM-system, personnel system) - replicated or custom application software for automation of personnel management). In addition to its success in payroll services, ADP is expanding today in various segments of the HCM market with global solutions for recruiting, training, benefits and compensation calculating, productivity and succession planning.

Spark hire is a video stream platform and a good example of how various technologies are combined into one digital solution. Candidates can schedule their own interviews, conduct real-time interviews, and interviews can be easily accessed by other hiring managers for immediate feedback.

Access is a digital self-service company. Employees self-service (ESS) allows them to access and manage wage information, leave inquiries and other personnel information.

Impraise is a performance management tool that provides 21st century managers and employees with digital feedback.

Further on we are going to consider the examples of Russian companies:

1. Mirapolis is a Russian company that develops automated personnel management systems and their further technical support. The main solution is a platform for distance learning. However, in general, the company provides its customers with all types of HR solutions: from recruitment to planning and career development. Today, Mirapolis has more than 1.5 million users. The company's experts calculate the return on the project for customers during maximum 3 months.

Today, the users of Mirapolis services are: ECCO, Mail Group, Gazprom, Sberbank and other Russian companies [14].

2. IBS is an IT technology developer in Russia since 1992. Recently, it has become a developer of IT solutions for the personnel management sphere. HR departments of many companies use company services, which include digitalization of processes related to mass hiring, personnel analysis and training [15]. IBS clients are large Russian and foreign companies, such as: Rosatom, Gazprom, Sberbank, Aeroflot, Rosavtodor and others.
3. Ecopsy is a leading company of HR consulting on the Russian market. Ecopsy works in several areas, such as: staff training and assessment, staff development, and most importantly today - HR digitalization. The company's customers are: Coca Cola, Nestle, Heinz, OJSC Gazprom Neft, Castorama, Metro and others [14].
4. Seendex is a company which is primarily engaged in the development of B2B products for large businesses. The company introduces the following digital infrastructures:

– Seendex – Org is a tool for initial personnel analysis and assessment;

– Seendex – Human is used to assess with the help of a flexible approach the level of flexibility or agility of an employee;

– Seendex-team is a tool for assessing the agility of not one, but several employees – departments or project teams;

– Seendex – Network makes it possible to evaluate the organization as a whole.

In addition, the company includes other HR products: gamification and motivation, exchange of ideas, analytics, administration, security and access, integration.

Seendex customers are more than 150 companies in the world - Rosatom, Microsoft, Inditex, M. Video and others.

Conclusions

Summarizing the above stated, it should be noted that today there is an increase in HR trends, which are playing an important role in the formation of a business strategy for personnel management for the coming years. Among them, we can note the minimization of bureaucracy by automating the workflow system, introducing HR-Digital tools for analyzing and processing big data, simplifying some personnel functions and optimizing employee time to focus on more important tasks. Much attention is also paid to the development of human potential in view of the rapid transformation of the global economy and the development of personnel processes in relation to new generations of young people (Y and Z).

Acknowledgement

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Social CRM as a Customer Engagement Approach in Social Media

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Abstract

SCRM as a new approach connecting social media and customer relationship management, whose main goal is to engage customers and encourage them to talk so that they feel unique throughout the process of creating a business relationship with them. Therefore, the main goal of this article is to present the Social CRM potential in company environment and its impact on customer engagement and building relationships which are key important to the company's competitive position in contemporary realities. The conducted research were based on the literature review and empirical research. The material used for the analysis was collected on the basis of an online questionnaire, placed on a social networking site. The empirical research had an explorative character rather than descriptive due to the small research sample. The analysis showed that the awareness of the respondents about the actions taken to engage them is still very high, yet some area of SCRM solutions that require improvement in the opinion of the respondents. Therefore, the above subject requires further analysis.

Keywords: CRM, SCRM, Customer, Customer Engagement, Social Media

Introduction

The Social CRM (SCRM) concept indicate many different but important aspects in management of client engagement. Taking into consideration the modern lifestyle for the social customers and organizations is very essential to have opportunity creation of relationship follow in real time anytime and anywhere. The possibility of constant reactions permits the organization to manage their customers retention and acquisition them. It appears that presence in the social media is important in building open and honest relationship with customers and also to build competitive value, what have measurable influence on customers satisfaction and company reputation. The SCRM concept allows the organization building a network of the followers who promote company companies' products and services. They are the best promoters of goods, because they do it from their own beliefs. The followers can go shares on the users' experiences and recommendations. Features such as "likes", "shares" or "tweets" are very useful in creating social signals about which content is valuable and provide to visibility potential reach out to millions of Internet users. In comparison with other types of communication channels the social media allows to direct and immediate response capability on customers' needs, requirements, problems and complaints (Pilav-Velic et al., 2015). The automatization of the processes considerably optimizes time of operating procedures, increasing the effectiveness of activities and number of opportunities (Cerchia, 2015). From the company side the SCRM provides tools for brand monitoring and analysis which enable receive feedback on what users think about their products, services, client services and brand. The organizations have possibility to response immediate on the users feedback. Furthermore, in addition to tracking and influencing on attitudes of *opinion makers* and their followers, the organizations are continuous orientated toward customers and social media communication channels helps establishing a strong, positive and transparent relationship between customer and company (Pilav-Velic et al., 2015).

The SCRM enables better search engine positioning (Search Engine Optimization -SEO), what allows the organization to build brand image and increase credibility. What is more, it boost the brand recognition and sales. It worth to emphasis that sharing content through social media is free advertising and influence on companies' online visibility and promote organizations on top search engines such as Google, etc. Moreover, the SCRM allows use collected data and knowledge about customers obtain

based on reports and data which are include in one centralized system which provide many useful information after detailed analyze like users habits, their specific preferences, relations and the dynamic communication on social networks and identification of target groups of customers on various level of personalization and use them to appropriate categorize, which can be useful in future interactions to deliver what consumers expect, want and require (Baabdullah et al., 2018).

Nowadays, it`s absolutely necessary to appreciate the role of SCRM by that organizations. It shows that they listen to the voice of their customers, are interested they opinions, they solve customers` requests, they implement customers' recommendations and also are trying to improve the customer experience. The organizations have to start treating SCRM as useful tool which enable to conduct market research by collecting customers' details, identifying target groups, optimize campaigns and gives opportunity to rethink or improve their marketing strategies to meet their customers` requirements. Nevertheless, implementation of the SCRM certainly takes a lot of time and it is a long process which gives results in time and just from the beginning of implementation it implies employees from different departments. However, it is worth to implement such solution because SCRM allows to feedback and follow up, it generates reminders and helps the specific departments to schedule activity (Cerchia, 2015; Alt, Reinhold, 2012).

Literature Review

Social Customer Relationship Management (SCRM)-definition

In response to the problems related to the lack of possibility to obtain information from the client, the awareness of changes in their thinking and making purchase decisions and the lack of opportunities to create more attractive products, as well as the implementation of more effective marketing instruments which have impact on the market has appeared a modern concept of customer relationship management so called Social CRM (SCRM) (Sudolska, 2013).

The concept of the Social CRM is based on the traditional CRM strategy which indicate that CRM is a management philosophy on the basis of which companies' common goal can be achieved through identifying and satisfying defined and undefined customers' needs and wants (Masterman, Wood, 2006). The traditional CRM concept primarily focuses on customer retention, not just on getting new ones. What is more, it is vital to build a long-term relationship with clients and to gain loyalty through the brand's image and effective actions (Dyche, 2002).

SCRM is defined by Paul Greenberg as a philosophy and a business strategy, supported by a technology platform, business rules, processes, and social characteristics, designed to engage the customer in a collaborative conversation in order to provide mutually beneficial value in a trusted and transparent business environment (2010). According to a different definitions the SCRM is a new approach which connecting social media and customer relationship management which the main aim is engage customers and encourage them to conversation to make them feel as a key part of the entire business relationship (Yawised, Marshall, 2015).

It should be noted that the weaknesses of traditional CRM is the fact of one-way communication between the enterprise and clients and potential customers. This is a significant problem, because the lack of communication leads to the customer dissatisfaction, as well as the lack of feedbacks for the company about the products or services provided (Sudolska, 2013).

CRM and SCRM-Differences

The basic definition of traditional CRM is focuses on an operational, transactional approach to customer management that was focused around three key areas targeted the customer—sales, marketing and service and support (Greenberg, 2010). What is important, the CRM allows the company to effectively manage the customer in order to keep them purchasing a product or service (*Guide to*

Understanding Social CRM , 2010). The companies collect as much as it is possible date and information about customers in an attempt to get to "know" their clients and better target various customers (Palonka, Porębska-Miąc, 2012). The CRM relationships are more structured and revolve around traditional channels such as e-mail or call center. Although CRM has always been about the customer, however a collaborative relationship with the customer never existed and the customer was never actually a part of CRM. It is worth emphasizing that the thinking behind traditional CRM is inside-out - it means that the company creates products or services, marketing campaigns, decides about sales channels based on the data collected about customers and potential customers. It means that the traditional approach rely on the one-way communication between company and the customer and the goal is complete the transaction.

The SCRM approach is differ from CRM in few essential ways. With the increasing usage of new technologies and appearing new communication channels as world wide web and social media networks the customer expectations are higher than even before (Samer et al., 2010). The SCRM strategy is emerging as a approach to managing the dialogue, not the customer. Therefore, the main important change in SCRM approach is the addition and inclusion of the customer as a key component and foundation of SCRM.

SCRM assumes exchange of experiences continuously, not only between company and client, but primarily take place between customer and company and also from customer to customer (Sheykhlar, Shahbaz Keshvari, 2015). It is possible thanks to social network which offer dealing with conversations and building relationships with social customer. Drawing attention to customer is necessary because provides an effective result of conducting activities in all company departments. The company has the ability to build relationship with followers but also listen the customer needs and engage them to collaboration (https://searchcustomerexperience.techtarget.com/definition/social-CRM).

The SCRM is a pathway to potential customers, provides fast customer service through a consumer's preferred social media platform and enables customers to share their experiences others. The customer matters are no longer just support issues like was in traditional CRM approach but they are now also marketing and PR issues which has a very active role and is a part of SCRM (Malthouse et al., 2013). In the majority of organization, PR departments manage the social presence of brands and handle the customer engagement (Ang, 2011). In the Table 1 are presented crucial differences between traditional CRM and SCRM.

Table 1: Fundamental differences between the traditional CRM approach and Social CRM approach

	Traditional CRM	**Social CRM**
Context	• focus on individual relationship • messages are the value generators	• focus on collaborative relationships • conversations are the value generators
Channels	• single Customer View, based on the history of operations, stored in the internal information systems	• this single view is harder to achieve, since it includes the need to complement the information residing in internal systems with profile information and behavior in social networks
Processes	• customer service processes developed from the institution's standpoint • process-focused: To adapt and optimize processes to support interactions and transitions with the customers	• customer service processes developed from the customer's standpoint • conversation-focused: To include the "conversation" factor in order to establish in institution community, capture the new ideas and improve segmentation • it requires the generation of dynamic processes that provide the institution with capability of reaction towards organization what has been identified in social networks
Organization	• innovation comes from one specialized source within the entity (innovation team)	• innovation is gathered from all the employees that are closely connected with the end customer and among them via Web 2.0 tools

	• frontline employees communicate the targeted messages for transactional operations	• new skills and roles are required oriented at behavioral and Sentiment Analysis. • these roles require the analysis of information and feedback to the sector involved or immersed in the conversations in social networks • customers are in the center of the innovation cycle
Technology	• CRM solutions focused on automating and supporting internal business processes	• capture of network information in order to know the customer in his social milieu. • need to include Social Networks tools, both created and managed by third parties, which interact with CRM solutions and meet with existing security standards and regulations in each country
Communication image and brand reputation	• massive face-to-face client communications depending on business needs • segmented direct communications from the analysis of structured information • image and reputation analysis from traditional market research	• communication designed and supervised on the basis of the analysis of structured information involving the "social" traits of the client • image and reputation analysis from metrics accounting for number of followers, type of comment or impressions and influence on the Networks • need to establish communication in times of crisis or unexpected circumstances requiring timely and wise reactions

Source: own research based on: CRM 2.0 or Social CRM for Financial Industry, http://www.deloitte.com/assets/DcomCroatia/Local%20Assets/Documents/2012/FSINews03.02-Social_CRM.pdf, accessed 01.09.2019 [reviewed on January 20th, 2019]

Customer Engagement in Social Media

Customer engagement has been defined by many scientists and business practitioners but there is no still clear definition and there is a lack of consensus regarding the conceptualization of this emerging concept. According to Bowden customer engagement is presented as a psychological process that models the underlying mechanism by which new customers and regular customers become more and more loyalty towards a brand by developing mechanisms for new customers and maintaining for existing customers through repeat purchase (Bowden, 2009).

Hollebeek defines the customer engagement as "consumers' proactive contributions in co-creating their personalized experiences and perceived value with organizations through active, explicit, and ongoing dialogue and interactions" (2011). This concept definition of customer brand engagement indicate that for customer engagement very important is interactions between customers and brand, levels of cognitive and emotional and behavioral activity. Emotional activities link with individual's pride and inspiration. Whereas behavioral activity reflects individual's interaction in different forms on various levels with the brand and engagement positively make for customer's loyalty towards a brand.

Higgins and Scholer present the concept of customer engagement that recognize that individuals can be engaged on different levels, the more engaged they are the more intensive their experience will be. If a customer experiences negative engagement with the brand, the intensity of the negative experience is proportional to the level of involvement and engagement. On the other hand, a customer will have more positive experience as a result of more engagement. Thus, customer engagement consists of both positive (e.g. attraction) and negative (e.g. repulsion) elements of engagement (2009).

In 2013 Brodie proposed the dynamic conceptual model of the consumer engagement process in the online brand community. He created following definition: "Consumer engagement in a virtual brand community involves specific interactive experiences between consumers and the brand, and/or other members of the community. Consumer engagement is a context dependent, psychological state characterized by fluctuating intensity levels that occur within dynamic, iterative engagement processes.

Consumer engagement is a multidimensional concept comprising cognitive, emotional, and/or behavioral dimensions, and plays a central role in the process of relational exchange, where other relational concepts are engagement antecedents and/or consequences in iterative engagement processes within the brand community" (Poor Rezaei, Heinze, 2014). He also distinguish five dimensions of customer engagement behavioral sub-processes in online brand communities: learning, sharing, advocating, socializing and co-developing.

The first sub-process of customer engagement is *learning* characterises the vicarious acquisition of cognitive competencies that consumer apply to purchase and consumption decision-making (Brodie et.al, 2013; Poor Rezaei, Heinze, 2014). In this stage, customers share their questions with others to be informed about their issue by other customers.

The other sub-process of customer engagement is known as *sharing* stage. It includes the sharing of personal relevant information, knowledge and experiences through the process of active contributions to the co-creation of knowledge within the online community (Poorrezaei, 2016). The behavioral and cognitive dimension of customer engagement is reflected in this stage.

When customers actively encourage other members to buy a specific brand and recommend a service or product to them, this is known as the *advocating* stage. Brodie et al. suggest that advocating is an expression of customer engagement. This dimension includes the degree to which a community member wants to express the brand recommendation through engagement in the online brand community.

Socializing is the third dimensions of customer engagement in the online brand and community which is defined by Brodie et al. as two-way, non-functional interaction through which customers acquire and/or develop attitudes, norm and/or community language (2014). The degree to which a community member is interested in communicating and talking with other community members is reflected through the socializing dimension.

The last one dimension of customer engagement in online brand communities is *co-developing*, which is defined as a process where customers contribute to organizations and/or organizational performance by assisting in the development of new products, services, brand or brand meaning (Poorrezaei, 2016).

Social media has revolutionized customer engagement. Companies can engage in a wide variety of social media platforms to attract customer attention and build awareness to increase revenue or customer loyalty. The growing number of users of online platforms encourages companies to actively engage in social media. The huge scale of the reach of customers of these platforms promises countless possibilities if it is successfully implemented.

Customer Engagement Approach in SCRM

According to review of literature there can be distinguished four key constructs of customer engagement with SCRM: communication with customers, engaging in online customer communities, management of online customer communities, and mobile technology usage. Communication with customers is possible due the social media technologies to create spheres for interaction between the customer and the businesses. The recent developments of the social media technologies, enables to post opinions and discussions on blog sites, forum boards, and discussion websites, add their feedback and reviews, what indicates of engagement in online communities by users. It requires that companies have to create a strategy plan and proactive actions and control of activities in the online communities. Lack of proper management online community engagements may lead to negative word-of-mouth being spread in an uncontrolled pattern with the social media (Harrigan, Choudhury, 2012; Goldenberg, 2015). Through the dimension for customer engagement may be interpreted amount of the mobile technologies users, because thanks to smart phones they can browsing the internet and access to social networking websites like Facebook, YouTube all time.

The customer engagement in SCRM is achieved through customer relationships orientation, communication with customers and management of online customers through social media, mobile technologies and web-site usage. Customer relationship orientation includes dimensions such as perceived ease of use, perceived usefulness and attitudes towards use of SCRM. Other factors important for social media adoption are infrastructure for using social media, social influence and experience of using social media. It is likely that these factors also influence the readiness and attitude of customers towards Social CRM. The relational information processes include analysis of customer characteristics through customer transactions and activity analysis. The final outcome can leads to increased levels of trust, loyalty, co-creation and customer empowerment. Companies aiming to use SCRM need to be aware of the target group characteristics regarding degree of social media access (Paliouras, Siakas, 2017; Harrigan, Choudhury, 2012).

Analysis of The Customer Engagement in Social Media

Research Methodology

The purpose of the research is to present and evaluate customer engagement in social media in the context of SCRM. The material used for the analysis was collected on the basis of an online questionnaire placed on a social networking site. The survey was received by 74 random respondents. The condition for its fulfillment was the use of social media and entering online interaction with the selected company when making a purchase transaction or permanent use of the services of the selected (preferred by the customer) company. The research technique used in the online survey allowed for direct acquisition of information and opinions of respondents on the subject. The empirical research had an explorative character due to the small research sample.

The survey was conducted on a group of 74 respondents: 54 women, 20 men. The respondents were divided into 4 age groups from 18 to 25 (36%), from 26 to 35 (46%), from 36 to 45 (15%) and from 46 to 55 and more (3%). The questions focused on customer engagement in social media and how companies use they SCRM to build the relationships with client. It is commonly believed that women are more likely to get engaged on activities on social networks than men. Based on the survey, it can be stated that as many as 73% of women engage in social media on brand profiles. Nonetheless, the study showed that men (27%) also engaged in brand profiles in social media, but definitely less often than women. The most frequently mentioned companies, whose services or products are usually used by the respondents, include companies from the clothing (46%), cosmetics (25%) and catering (29%) sectors.

Analysis

People are aware of the purpose of the activities carried out by brands on social media profiles. The company's presence in social media is a key factor in the brand's existence on the market. By conducting activities encouraging interaction, the brand becomes more competitive. Often, such activities do not require too much financial resources, and thanks to them, the company lets you get to know each other better and builds a relationship with followers. On the other hand, other users can learn about the existence of the brand, observe the profile, and also become customers. Publish content should always be consistent with the brand strategy, because it influence on the perception of the brand by customers and affects the brand image and recognition.

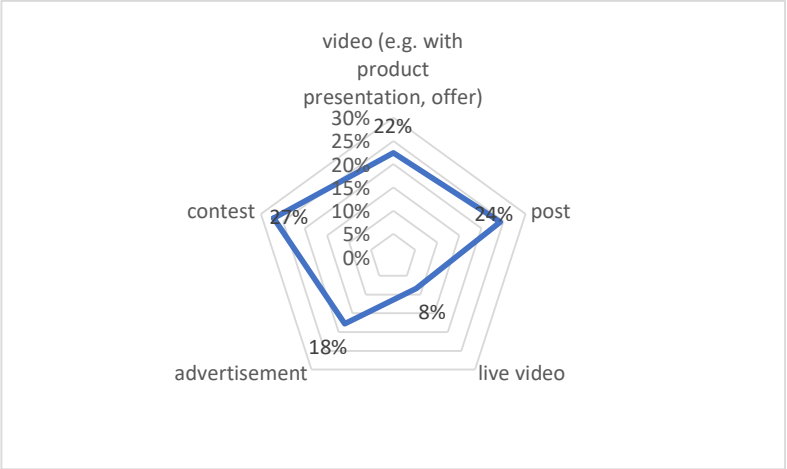

Fig. 1: Forms of communication in social media

Source: Own study

In the first question respondents were asked about their favorite form of communication in social media (fig.1). The respondents opinions are divided, it cannot be clearly indicated which forms of communication in social media the most engage users. Respondents said that the most engagement in social media is contest (27%). On the second place is posts and thus brand content (24%). The 22% of respondents thought that videos about the presentation of new products or offers are engaging. According to the respondents, advertising and live video turned out to be the least engaging form in social media.

In the next question, as the respondents have indicated, the most influential factors in their purchasing decisions are (fig. 2): attractive prices (17%), high quality products (16%), a wide range of products (12%) as well as order completion and delivery time (13%).

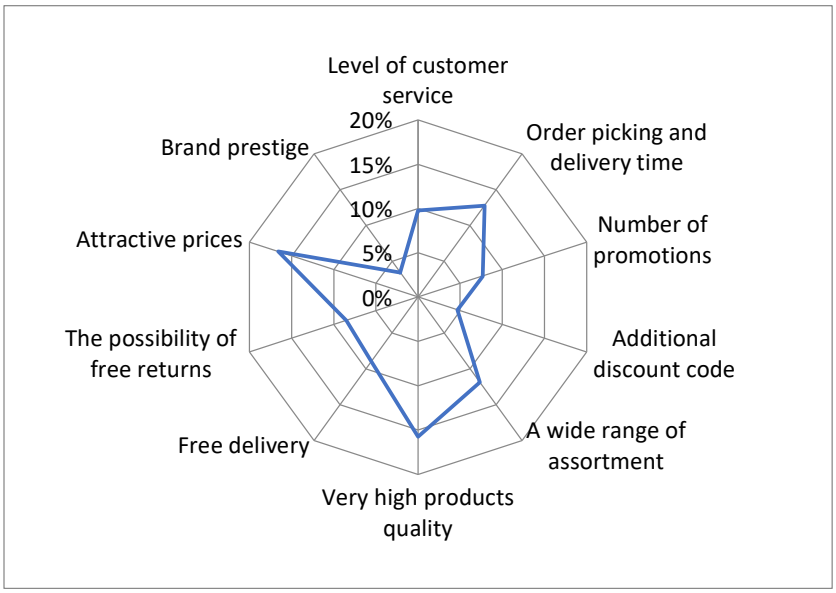

Fig. 2: Factors influence on purchasing decisions of the respondents

Source: Own study

Customers want to buy high-quality products at an affordable price. Only 10% of respondents considered that customer service is important to them, although it may seem that it is one of the most important factors when making decisions about purchasing products. Free delivery and the possibility of free returns was considered an important factor only by 9% of respondents. Based on the results of the survey, it can also be concluded that for customers the brand prestige and additional discount codes are not significant.

In the next question respondents were asked about: do the appearing sponsored ads/posts encourage them to visit the brand/fanpage profile or take advantage of the prepared offer? Appearing sponsored ads or posts only in 18% of respondents bring the intended goal. Over half of the respondents, as much as 64%, only visit the brand's website or fanpage sometimes, or use the prepared offer. It means that the content presented does not always influence on the behavior of the target group. Only 19% of respondents answered 'No'. It means that appearing content does not influence on consumer behavior. Perhaps, this is due to the improper conducting of the marketing campaign or inadequacy content to the age group.

What is worth to mansion, surveyed customers have replied that they only occasionally receive information about new products or discounts (68%). In contrast, 32% said they always receive information. The difference in respondents' answers may be due to the fact that not all customers are subscribed to the newsletter, so they do not always receive up-to-date information about new products or the mentioned discounts. This situation can be caused by too frequent messages sent to customers , so that is reason why they are reluctant to subscribe to the mailing list. On the other hand, if customers are subscribed to the newsletter and receive too many emails, they consider to be spam and in most cases do not read the message.

The respondents were also asked about how often the company offers discounts or discount codes. The highest percentage received the answer "only on celebrate holidays or special occasions for the brand" (42%). It means that in case when the company want to increase sales of products before the holiday periods or in the event of important moments in the brand's activity, e.g. anniversary, finished projects offers customers discounts that are to encourage them to buy products. Considering the loyalty program, in which customers can receive additional discounts for last orders or reviews about products it can be assumed that 38% of respondents receive an additional discount every month because they make purchases quite often, while the others make purchase rather rarely and receive discounts every 2 months.

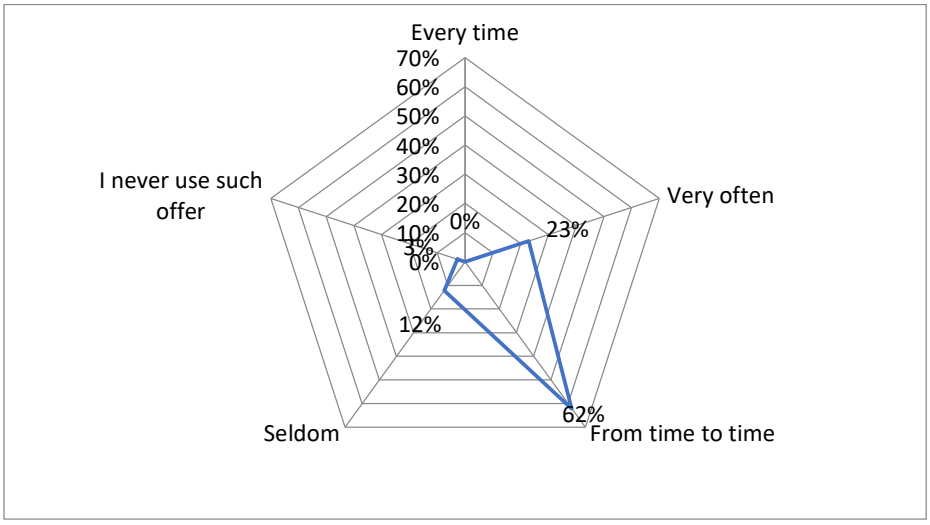

Fig. 3: Using promotions or discounts

Source: Own study

Based on the above data (fig.3), it can be concluded that the majority of respondents only use the promotions and discounts offered by the company from time to time. It is probably results of their economic situation and needs. A minority part of respondents (25%) often use discounts and promotions - perhaps they are people who are impressionable to marketing activities carried out by the brand, aimed at encouraging customers to place orders more often. 12% of respondents rarely use the promotion, and 3% do not use it at all. It means that respondents place orders when they need something and do not wait for promotional opportunities. What is more the majority part of respondents 72% are encouraged by the company with additional discounts by subscribing to the newsletter. 28% of respondents were not encouraged to subscribe to the newsletter through additional discounts. Perhaps the amount of discounts offered for this group of respondents is not favorable.

When it comes to expressing opinions about the purchased product, respondents in over 70% responded "Yes". It means that the brand takes into account the opinions of the customers. On the one hand, it is an excellent source of information about customer satisfaction with purchased products and on the other hand, customers feel valued by being able to express their views and more often they are eager to engagement to such activities. The vast minority of respondents (27%) replied that they were not asked to express their views. This situation may also result from the lack of a loyal customer account or not subscribing to the mailing list, because the company usually asks for opinions in that ways. Sometimes it happens that they put a post in which users are asked for opinions on the products selected by the brand but necessarily about products those that the respondent bought. In addition, adding the posts with the possibility to add comment with opinion about the products is quite risky, because in the case of a large number of negative reviews, it influence on the perception of the brand by other customers.

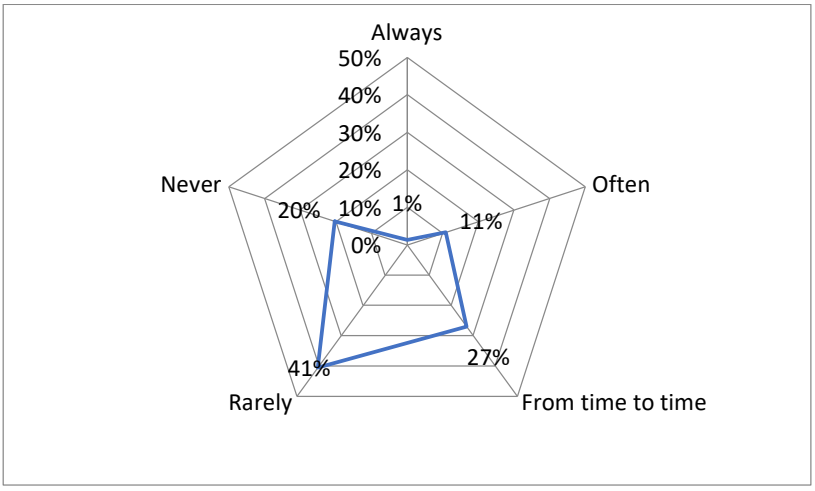

Fig. 4: Frequency of expressing opinions in posts about product or service

Source: Own study

Only 1% of respondents always express their opinion in comment under the posts on brand profiles, and only 11% add opinions "Often". However, as many as 20% of respondents declared that they never add their opinion. Despite the request, over 40% percent of respondents interact with the "Rarely" brand. Other respondents express their views from time to time (27%). Take into consideration, this question, it can be seen how difficult it is to engage customers and receive feedback from them. It can be assumed that users rarely respond to this type of marketing activity, because they prefer to remain anonymous on the web and are afraid of other users' reaction to their comment, and they are aware that their friends can see it.

In other question respondents were asked about frequency of visiting the profile/fan page of their favorite brand (fig. 5).

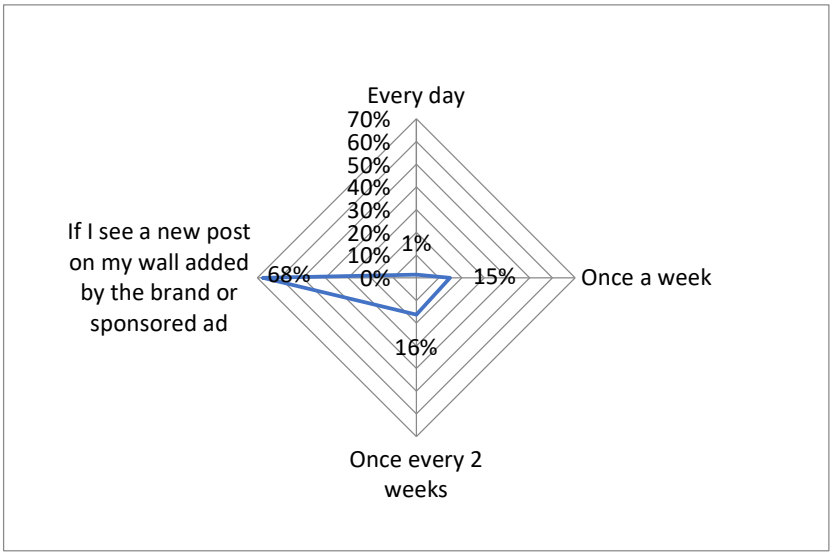

Fig. 5: Frequency of visiting the profile / fan page of your favorite brand

Source: Own study

As can be observed, more than half (68%) of the respondents indicated that they only visit the company profile when they see a new post or sponsored ad on the wall. The rest of respondents visit the profile every 2 weeks or often. Certainly these are people who follow the brand's activities on social media and want to be always up to date with emerging news.

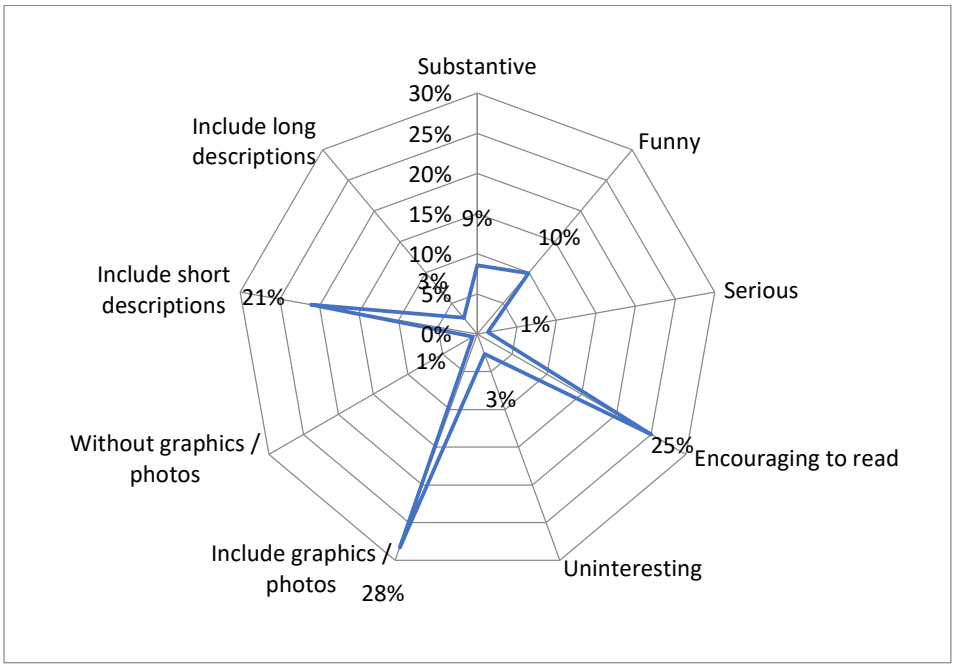

Fig. 6: The content presented by brand

Source: Own study

Take into account the above data (fig.6), it can be seen that the respondents' feelings are as the follows: 9% of respondents said that the content involved are substantive, this result indicates that the brand

should improve the quality of the content posted. Importantly, only 10% of respondents answered whether the content is fun or serious (1%). Based on the small number of responses provided, it is difficult to interpret the above data. We can only assume that most of the content is "funny". The presented content is encouraging to read (25%), contain graphics (28%), and descriptions are short (21%).

The companies also use the options of adding live video to engage customers - indicated 74% of respondents. Users, thanks to this form of communication, can view the video and respond immediately, thanks to the option of adding comments. This is one of the most used forms of communication and engaging clients in brand activity in social media. The downside of this form of communication is the ability to view recordings only for 24 hours, after which they are removed but if the brand would like save the video it is possible thanks to add to stories on the brand profile. Perhaps 26% of respondents have never seen the video life before, or they do not have an updated application that allows to see these relations.

The analysis of the last question shows that there are still some areas of SCRM service (in the respondents' opinion) that require improvement, e.g. almost 55% of responses show that the company (using the services / products it uses) does not answer the submitted questions. 45% of respondents declared that they do not always receive answers to posted comments or questions.

Conclusions

The above analysis of data has shown that the respondents' awareness of the activities carried out to engage them is very high. Nevertheless, the engagement of clients in social media is a challenge for the analyzed companies, because they are still some area in their SCRM solutions which need to be improved. Therefore, the above subject requires further analysis. It would be worth for the company to get to know clients better and adapt the engaging activities to their needs, because as the research shows users often are not interested despite incentives. In addition, the company should draw special attention to the form in which the brand communicates with customers, because they are very often uninformed, perhaps this is due to the form or method of communication that does not reach the recipients. All actions aimed at improving the efficiency of customer engaging activities should be implemented to improve the company's image and opportunities for further development.

The SCRM provide more relevant information for sales and marketing teams because they can collect more confident information about users and customers take into account integral view of customers and communication enabled through online conversation and digital channels such as website visits, Internet searches, e-mail, mobile activities, etc. and existing SCRM activity history. The organizations planning, implementing and evaluating marketing campaigns, through SCRM activities task and marketing budgets can be planned and followed up for each activity. Marketing staff can meet potential customers at their point of need, and engage much earlier in the buying process by leveraging real-time listening and monitoring of social media activities. Marketers can better control the effectiveness of their marketing and communication efforts to their customers and prospects. They can compare different types of social media channels, forums and communities in order to statement which are the most effective in generating positive word of mouth and in the result desirable actions on an organization’s website or on other digital channels. It is helpful in calculation the ROI of their content marketing and outreach efforts by connecting associated social media activities to website traffic, downloads, sales, or other desired actions. Additionally, the direct communication with product teams create added value. Product development staff have ability to collaboration with customers and prospects throughout the development phases in from the initial generation of ideas, design, prototyping and testing products or services or modified them. Thanks to it they know the users experiences and thought. It increase considerably customers' satisfaction, advocacy, engagement and loyalty. What is more, it can drive down costs and deliver significant advocacy and positive marketplace word of mouth.

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Enterprise Resource Planning / Manufacturing Execution System – Industry 4.0 management systems on the example of the polymer processing industry

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Abstract

The article presents the use of ERP/MES systems in the environment of smart devices of the fourth industrial revolution. The analysis of literature sources concerning the examined subject matter was carried out in the paper as well as the practical example of the integration of the presented software with the technologies of Industry 4.0 was depicted. The research objective was to analyze and assess the impact of the integration of ERP/MES information systems with the devices of Industry 4.0 on the growth in the performance of the cyber-physical system. The case study was conducted based on the research materials shared by the company manufacturing machinery and equipment for the polymer processing industry, i.e. Wittmann Battenfeld, applying intelligent solutions for Industry 4.0.

Keywords: ERP, MES, Industry 4.0, Big Data,

Introduction

The emergence of a new digital industrial technology, commonly known as Industry 4.0, was first launched at trade fairs in Hannover in 2011. This revolutionary breakthrough has brought huge changes in the processes of production, consumption and supplies. Due to modern machinery and equipment, which increasingly require less workforce and operate independently of humans, technological production processes have become intelligent and self-contained systems (Görçün, 2018). They enable horizontal and vertical connection of people, machinery and objects via the Internet in real-time and information and communication technologies allow for dynamic management of complex business processes (Bauer, Hämmerle, Schlund, Vocke, 2015). Researchers and practitioners express different opinions on which components make up Industry 4.0, which relationships they enter and where they are applied in Industry 4.0. Moreover, the research indicates that few practitioners are able to provide a specific definition of Industry 4.0 (Heng, 2014), some even deny the value added by Industry 4.0. and state that, as a concept, it is ill-defined and suffers from unrealistic expectations, and others claim that fully digitized products and value chains are still "pipe dreams" for some (Davies, 2015). Nevertheless, the components of Industry 4.0 are basically Big Data, autonomous robots, augmented reality, additive manufacturing, cybersecurity, Internet of Things, operating on the principle of integration and simulation in the cyber-environment (Liao, Deschamps, Loures, Ramos, 2017). It is also reasonable to combine the above components of Industry 4.0 with ERP (Enterprise Resource Planning)/MES (Manufacturing Execution System) systems used in enterprises. Obviously, it would be easy to assume that Industry 4.0 solutions will replace the above systems, however, on closer examination, the existence of synergy is noticeable, indicating the potential of a strong partnership between them. Indeed, Industry 4.0 may increase the likelihood of spreading equipment in production companies due to the inherent capacities of most ERP/MES systems. Many of these systems have already had and are still establishing communication with IoT in their contents. While relating to the statements by some scientists – the vision of Industry 4.0 is to create a highly integrated global network

where machinery, equipment, entire factories, warehouses are connected via the Cyber-Physical System and the use of artificial intelligence allows machinery to adapt to various circumstances and conditions (Gilchrist, 2016).

Literature Review

The last industrial revolution, known as Industry 4.0, is perceived as a comprehensive integrated system of two worlds connected with each other, real and virtual, to increase the efficiency of operational and technological activities. In the literature exploring the issue of Industry 4.0, there is no clear definition of what Industry 4.0 is. The most common definitions indicate that it is a holistic system of information technologies, people, machinery and equipment which enable the flow of goods, services and data in a controlled manner through the value chain, with operations with a high degree of autonomy and a high capacity to transfer useful information for decision-making (Dombrowski and Wagner 2014; Hermann et al., 2016; Mazak and Huemer 2015; Qin et al., 2016; Wolter et all., 2015; Botthof 2015). Therefore, the basis for the operation of Industry 4.0 is intelligent manufacturing; its main technologies include the Internet of Things (IoT), Cyber-Physical System (CPS), the cloud, artificial intelligence (AI) etc., which integrate production resources with sensors, cloud computing, communication technology, control, simulation, intensive data modelling and predictive engineering (Kovács, 2017b; Nagy et al., 2018; OECD 2016; Kinsy et al., 2011; Bahrin et al., 2016; Lee et. al., 2015), e.g. cyber-physical systems use Information and Communication Technology (ICT) to monitor and control physical processes and systems through built-in sensors, intelligent robots. Industry 4.0 is wireless and Internet technologies which are used to connect machines, products, systems and humans, both within the production plant and suppliers and distributors and provide an opportunity to collect vast amounts of data to analyze and use them directly to improve work in the production hall or through the analysis of Big Data and their cloud computing – for access for other entities.

The analysis of literature sources concerning the examined subject matter was carried out in the paper as well as the practical example of the integration of the presented software with the technologies of Industry 4.0 was depicted. The research objective was to analyze and assess the impact of the integration of ERP/MES information systems with the devices of Industry 4.0 on the growth in the performance of the cyber-physical system.

Industry 4.0 – new generation prospects for information systems

Smart Factories require the ability to predict machine failure and to remove the root cause of problems. As an example, SAP has developed a comprehensive framework for predictive maintenance which is able to integrate different diagnostic and prognostic models for the wear of equipment (Zacharewicz, et al., 2017). Among key technologies that contribute to the implementation of the concept of Industry 4.0 is the analysis of Big Data.

Big-Data, which is collected from ERP systems, sensors, statistics and social media, is processed and modelled in order to provide sufficient and useful visual information that can be used for different qualitative purposes, for example, historical data on customer behavior could be used to improve production flow charts to support the changing demand and to ensure balance with other production flow charts. Moreover, Big-Data can be used to develop models of artificial intelligence to ensure the ability of the machinery to make an immediate decision in the production hall; Big-Data can also warn operators in terms of recommended operations, such as predictive maintenance or better production arrangements.

Information is streamed from end customers and markets to Big Data, where it is analyzed and transmitted to production systems as production orders including instructions, quality and size specifications. The production system will automatically transfer the received orders from ERP to CPS to suggest optimum production flow charts in which process relocation may take place, based on new production orders. During production, sensors transmit data to Big Data and ERP systems; these data include material orders, maintenance orders, quality reports in the course of the process and analysis of production. Any immediate changes occurring during production (e.g. detected manufacturing

defects or machine failure) will be analyzed immediately and responses will be automatically sent to the relevant parties.

From the point of view of quality management, in the course of the process, sensors and quality control equipment will send information in real time to the global system of Big Data and locally, at the level of intelligent machinery, which will be able to analyze and adequately take right decisions in order to avoid defects, the system failure or downtime. The production system may communicate with ERP and CPS in order to analyze production flow charts, define production priorities and level resources. Quality control in real time will help ensure that qualitative requirements are met and any reasons for defects or production failures will be eliminated.

ERP/MES – the role of the systems in the era of Industry 4.0.

The combination of the world of production machinery with the world of information technology is possible, among others, due to ERP and MES systems. ERP allows for management of the company and MES is the link between the world of machines and business systems. ERP systems were initiated as integrators of the flow of information coming from various functional units of the same company. While implementing the ERP system, enterprises expect increased performance, access to information and efficiency of management in the decision-making process (Pellerin et al., 2007). Therefore, the challenge associated with management of data, their transformation into knowledge and making intelligent, automated decisions has attracted a lot of attention in recent years. At the same time, an opportunity to integrate many different devices and new services with the existing systems, e.g. ERP, MES has become important (Theorin et al., 2016). Most industrial companies have already benefited from advanced IT systems (Dai et al., 2012), however, many lack essential aspects simplifying integration.

In order to meet market requirements, ERP has undergone multiple modifications in the last 3 decades in order to improve the use of this system (Fig. 1).

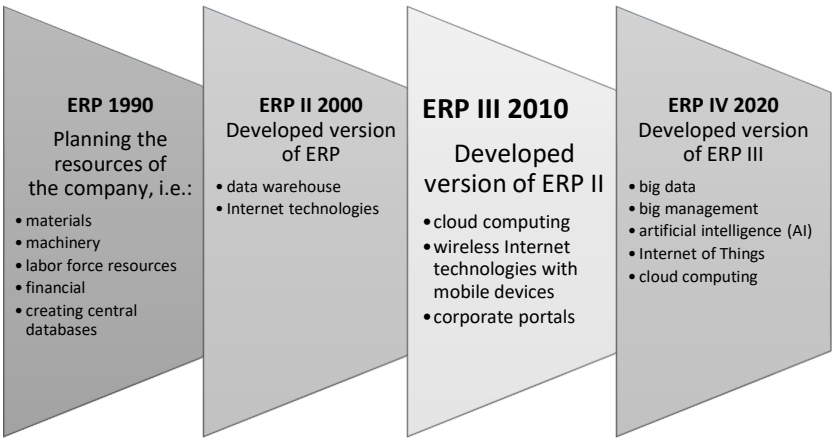

Fig. 1 : Evolution of the ERP system

Source: Own study based on Lech P. (2003): Zintegrowane systemy zarządzania ERP/ERP II, Wykorzystanie w biznesie, wdrażanie. Difin, Warszawa 2003.; Parys T. (2008), System ERP III przykładem zintegrowanego systemu informatycznego ery mobilnej komunikacji, [in:] Innowacje w Zarządzaniu i Inżynierii Produkcji, Ryszard Knosala (ed.), Wyd. PTZP, Opole 2008.

From the point of view of IT, management can be interpreted as the processing of information. An efficient flow of information is the essence of the operation of contemporary enterprises, therefore, there is a growing need for an increasingly closer connection between IT and manufacturing systems. An ideal consequence of such a desideratum is the change in the substantive status of the production system so that it generates, possibly automatically, the database transaction in the combined computer system. ERP systems should integrate with Big Data and they have already done (Bi, Cochran, 2014)

in order to take into account not only structured data but also data which are semi-structured or unstructured. ERP and Big Data are already increasingly integrated and interoperable. Sustainability and flexibility in the constantly changing environment is the requirement of the new generation EIS (i.e. NGEIS) (Chofreh et al., 2014; Elragal, 2017; Lazaro, Gonzalez, and Sola, 2015; Panetto et al., 2016; Zacharewicz et al., 2017). Full implementation of the relationships described constantly imposes new IT requirements on ERP or MES.

The MES system provides common interface of the user and the data management system and the concept of this system has arisen due to the need of the production company to meet the requirements of markets in terms of reactivity, quality, standard compliance, cost reduction and deadlines (Ugarte, Artiba and Pellerin, 2009).

Both ERP and MES systems are to perform a very important role in each production plant. In view of new business requirements, the range of use of ERP has significantly increased in recent years, going beyond the boundaries of a single company for contact with others (Møller, 2005); the scope of MES is also growing, including supplies, planning and business functions of the production plant. In practice, the use of only one of the above solutions is impossible since these are not substitutable solutions but complementary. It should also be remembered that ERP does not perform tasks closely linked to production processes (Møller, 2019). These are tools for settlements and general management of the company's assets, but they do not actually support decision-making in terms of production optimization. Even the modules provided, dedicated to the production area, will not be able to visualize the process properly and directly connect to the machine park. ERP systems are undoubtedly the IT basis for contemporary enterprises, but they cannot be treated as comprehensive solutions that support complete business activities. The ERP system is not able to provide the three key capabilities of MES systems, dedicated specifically to production (https://queris.pl/...):

- Reflection of the whole production process – the function performed by the MES system, which supports decisions on improvement in performance at the specific place, the moment of the entire process. It allows for accurate identification of the problems affecting the low value of Overall Equipment Effectiveness (OEE) and taking effective actions to remove them.
- Direct connection with machinery – MES systems are integrated directly with the machine park and collect data directly from machinery and equipment. ERP systems are not integrated with equipment and the machine park.
- Data visualization in real time – is the result of the aforementioned connection of the IT system with the machine. Thus, the data are reliable and up-to-date at all times (real-time update). It is one of the characteristics of MES systems, which makes them an indispensable tool in collecting data on manufacturing processes.

Organizations should specify their business requirements well so that they could rationally select the software which helps automate key business processes adequately to the needs. The ERP software is now used by most organizations, regardless of their size. ERP "manages the whole organization", but production is not a part of its modules. In turn, MES primarily focuses on production functions, therefore, its integration with the machine park is so important so that it would be possible to freely manage departments in the production hall. Therefore, the MES system is used to monitor and generate documentation of the whole production cycle of the product itself, from the raw material to the finished product. The MES system provides information in real time, which supports decision-making in order to streamline production processes and enables the control of all the components of the production process (Kletti, 2007; Meyer, Fuchs and Thiel, 2009).

ERP/MES – the role of the systems in the production process in Industry 4.0 on the example of the polymer processing plant

Research Methodology

To conduct the research, a case study was used, developed due to the information shared by the company manufacturing machinery and equipment for the polymer processing industry, in which intelligent solutions of Industry 4.0 are applied. The data for the research were transmitted via direct contact and e-mail from the Wittmann Battenfeld company, which is one of the leading manufacturers of robots and peripheral equipment for the plastics worldwide. The research was conducted on the basis of information and materials provided by the top level manager of Wittmann Battenfeld Poland. The received materials were analyzed by the authors of the article in December 2019. The construction of the research instrument has been created in one step data collection.

Research Results

Management of the production process is no longer an isolated operation, this process is becoming a complex issue inextricably linked to technology, material, machinery and production equipment. The process is also extremely strongly related to the acquisition and management of the vast amount of data obtained from individual stages of the production process and management of its various stages.

ERP/MES systems are particularly widely used in the polymer processing industry. This branch of industry has become extremely interdisciplinary and combines the issues in the field of material engineering, mechanics, fundamentals of machine design and complex processing tools (injection molds, extrusion heads etc.), processing technologies, metrology, IT, measuring systems and broadly understood quality control.

Polymer materials have been effectively displacing the applied engineering materials (and not only) existing in the market for many years. They are used in every area of life, starting with the food industry, through the aerospace industry and ending with the medical industry. However, regardless of the industry in which these materials are used, the same principles and management systems apply.

The diagram of the process of using the ERP system in the process of management of the plastic processing industrial plant is presented in Figure 2. The system is oriented to the customer, it flexibly and quickly adapts to changes and new requirements at each level of management. Due to open communication channels, not only the control but also changes in the technological process and the properties of the finished product can be controlled at the level of the production machine and the cooperating devices (just after the change in production assumptions). The systems of this class can be divided into several levels (Fig. 2).

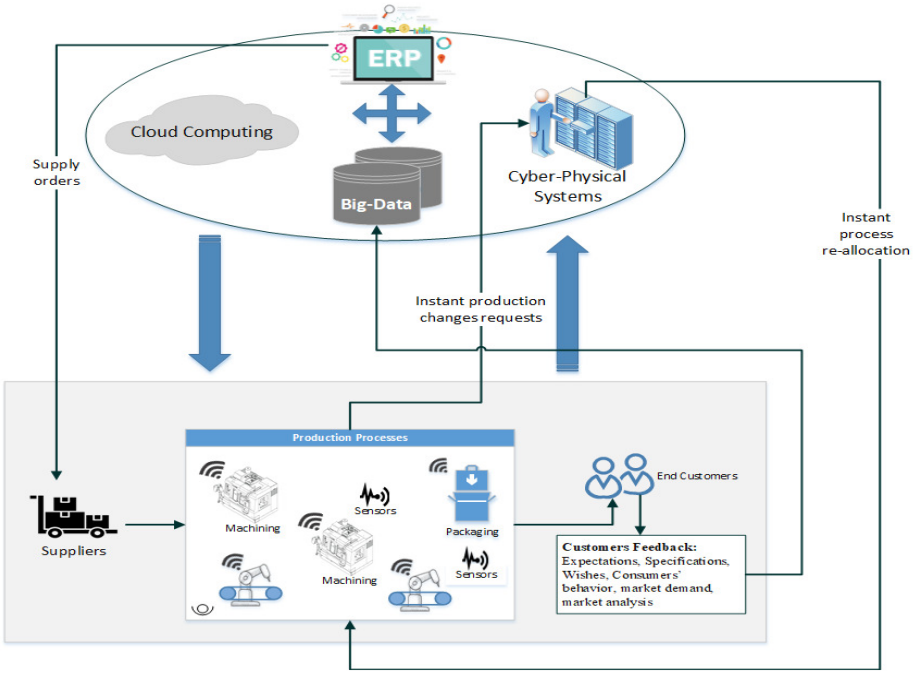

Figure 2: Integration of Industry 4.0 technologies in the value chain
Source: Own study based on the materials by Wittmann Battenfeld

The system is based on the chain of suppliers (this applies to primary materials supplied to the production process, secondary materials – regrinds, regranulates and semi-finished products, also the ones which are not made of polymers). Another link is the technological process of processing the materials and semi-finished products supplied. Each stage of this process is monitored and supervised and various devices are connected to the industrial network and subsequently to the corporate network enabling their management, storage and subsequent analysis (with the possibility to relate to these data in the future if it is necessary to reconstruct the history of the selected detail – the data include information concerning not only the production process or the device used but also the material type and accurate information on the specific batch with the information on the operator and the person controlling the quality and approving the detail).

All the devices taking place in the production process (in this case, the example of the injection molding plant, plastic processing plant, with the activity based on thermoplastic plastic injection technology is analyzed), i.e. an injection molding machine or machines, peripheral devices, such as manipulators, drying, conveying and packaging equipment communicate with the processing machine itself or the server including performance data through appropriate interface (some controllers of the selected peripheral or processing devices are still programmed manually and communicate with the injection molding machine only via the EUROMAP interface – however, innovative and modern injection molding plants, in order to gain control over the process and minimize volatility factors, introduce solutions enabling the connection of various devices to the network and their management).

This system is also and primarily based on the customer requirements, related to the condition of the market, behavior of final customers and variability of their behavior.

Another layer, linked to all the other layers of the management system is the physical IT layer, containing physical data carriers, covering servers and other information storage or processing systems.

The top layer is the management layer and the ERP/MES system interface which the end user has access to. It is only from this level that the tools and capabilities introduced by the systems of this class can be used, including solutions enabling dealing with Big Data and comprehensive solutions allowing for cloud computing (in the case of these systems, the attention should be drawn to two surprising

opportunities – the first is the simulation of cloud computing and the second is the adaptation of augmented reality in the construction and maintenance of machinery and processing equipment – both factors will be discussed in the subsequent part of the article).

The most important factor responsible for the correct course of the entire ERP/MES system is multi-level communication and exchange of information. Communication protocols between basic processing cell devices (driers, manipulators, feeders, transporters, etc.) and machinery (injection molding machines, extruders) are responsible for the success of the project. Another level is communication between various processing cells (if the organization is large enough, communication is developed at a higher level, between various locations - factories).

It should be noted that it is rare for plastic processors to possess machinery and equipment coming from one manufacturer and thus possessing the same communication protocols. The dominant situation in the broadly understood polymer processing industry is the one in which even global industrial plants, depending on the area, use machinery and equipment of various manufacturers. The downside of this image is the fact that these devices have different types of ports and communication protocols which impede their control and management and data acquisition.

Modern solutions introduce the unification of communication solutions ensuring compliance with protocols and communication interfaces used so far (this allows for maintaining full functionality of older devices without the need for costly replacement of the machine park). Such standardized interfaces enable fast and easy implementation of ERP/MES systems and Industry 4.0 solutions. Industrial networks applied currently receive new functionality and greater opportunities for the operation of new technological devices as well as transmission of larger amount of data.

The basic manufacturing cell of a typical polymer processing plant is presented in Figure 3. The primary device is the injection molding machine (depending on the demand, the devices of this type differ only in terms of the driving unit – there are hydraulic, electric and hybrid devices) equipped with the controller and a range of communication ports, including the solution allowing for communication with the industrial network. The machine itself and its communication protocols are so versatile that they enable the connection of a number of peripheral devices and appropriate communication with them.

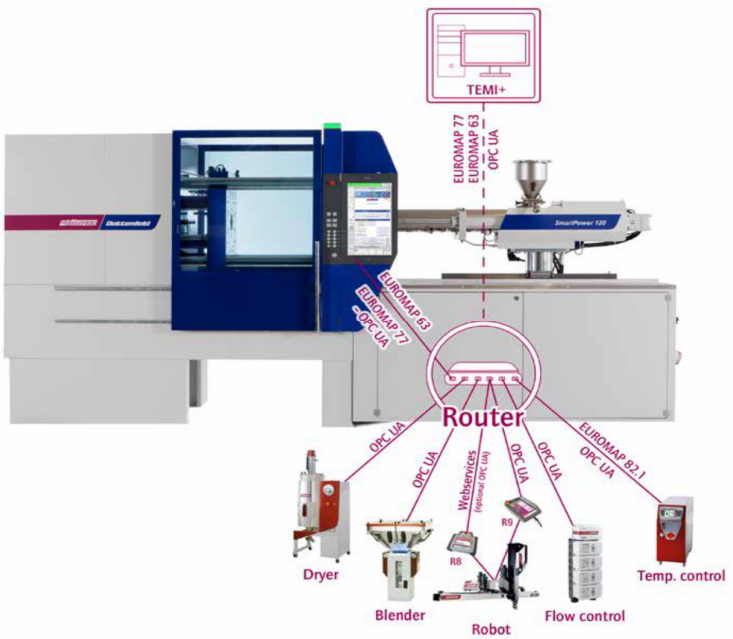

Fig. 3: The basic processing cell: the injection molding machine along with peripheral devices and communication solutions

Source: Own study based on the materials by Wittmann Battenfeld

Individual processing cells and even industrial networks connect to each other and enable the exchange of information or control of individual machines and equipment. The diagram of the mode of communication at the level higher than the processing cell is presented in Figure 4.

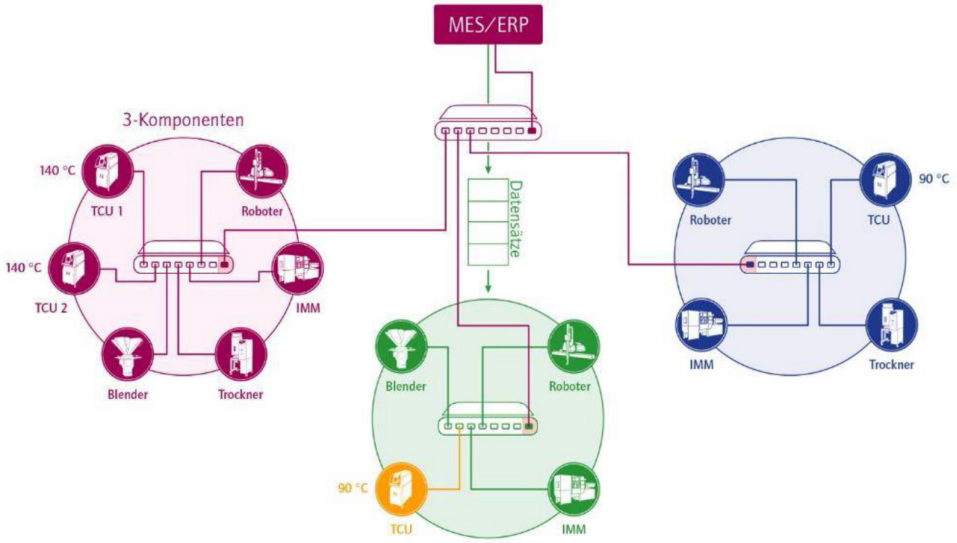

Fig. 4: The diagram of the communication of cells and networks with the ERP/MES interface
Source: Own study based on the materials by Wittmann Battenfeld

Individual cells or entire networks provide information to ERP systems using communication protocols, which leads to their transparency, easy data acquisition, rapid and flexible management and implementation of production changes on-line.

An intermediate platform between industrial networks and end-users can be, among others, the TEMI platform supplied by Wittmann Battenfeld for minimizing the downtime of machinery and production equipment and thus maximizing production capacity (Fig. 5). This solution allows for rapid and barrier-free exchange of information while simultaneously ensuring security of the information provided.

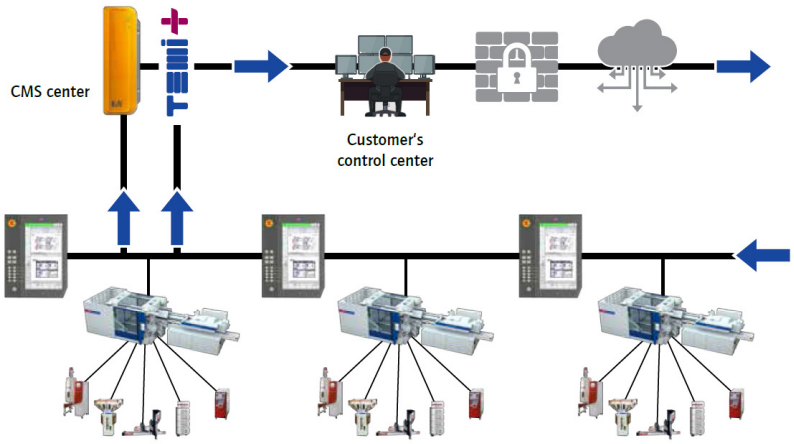

Fig. 5: The use of the TEMI intermediate platform for communication between the industrial network and the end-user.
Source: Own study based on the materials by Wittmann Battenfeld

Another aspect of ERP/MES systems is an opportunity to use two tools which are cloud computing and an opportunity to adapt augmented reality at different stages of the production process (construction of machinery and equipment, their maintenance, advanced training).

Cloud computing may be used for work with large files, databases, for statistical processing of the obtained (process, product, quality) data in order to predict trends and establish the development strategy based on actual data received from individual devices and on the basis of the customer requirements. Moreover, cloud computing capabilities can be used to perform advanced numerical calculations. This work can be done in order to build CAD models of the future products manufactured in the company, to conduct analyses aimed at determining their mechanical properties as well as to implement advanced numerical calculations aimed at the simulation of actual technological processes (simulations of the injection molding process to determine the mode and time of filling the molding cavity or cavities, distribution of temperature, pressure, fillers, deformation of the injection mold and many other factors which the user may wish to analyze prior to the tool manufacture and implementation of the detail/details for mass production).

One of the most recognizable tools is the MOLDFLOW package. The exemplary results of the calculations are presented in Figure 6.

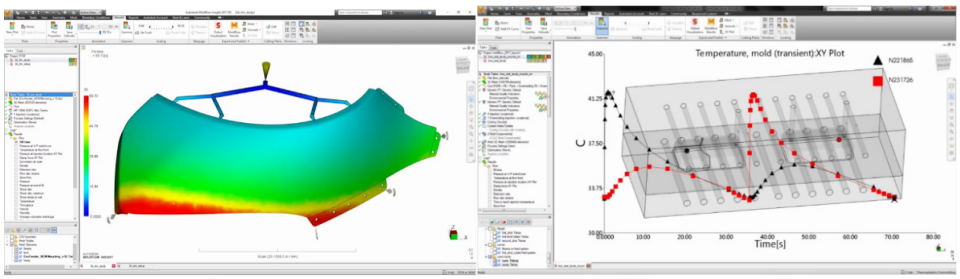

Fig. 6: Numerical calculations made using the advanced simulation software in the cloud (as an example of calculations carried out with the use of the MOLDFLOW – AUTODESK software)

Source: Own study based on the materials by Wittmann Battenfeld

In the user layer, it is possible to analyze the results obtained in the course of calculations, which not only accelerates the production process from the moment of the design of the molding but also leads to cost reduction and the possibility of generating errors (which are also the source of significant costs).

Fig. 7: Augmented reality systems.

Source: Own study based on the materials by Wittmann Battenfeld

Systems supporting management and the technological process through IT support and augmented reality in the area of the maintenance of machinery and equipment, training and logistics service (in terms of the amount of the space occupied in the hall and management of the available production space) – Figure 7.

Augmented reality in ERP/MES systems can be used for even better distribution of technical data, in particular concerning the construction of machinery and equipment used in industrial plants. The solutions primarily promoted by the Siemens company allow for a virtual journey to the interior of selected production equipment in terms of both the design and usability and training (at the stage of the operation of the device).

A virtual model of the injection mold (detail), machinery and equipment can be placed in the cloud and be remotely available for multiple locations.

Conclusions

ERP/MES systems, like industry and rapidly developing plastic processing technologies, are evolving. Not only the interface of communication with the end-user is subjected to changes but, most of all, their growing capabilities. Due to the integration and unification of systems and communication protocols, it is possible to combine a range of machinery and equipment and even industrial networks in one system rapidly exchanging information and adapting to changing and growing requirements of customers. Moreover, the introduction of cloud computing enables an unlimited increase in their functionality and flexibility of operations, not only in the area of acquisition and presentation of data but also in their processing, drawing conclusions and predicting future trends. Moreover, numerical calculations significantly contribute to the growth in the overall system performance and reduction in financial expenditures arising from the generation of errors.

The research goal of the presented article was to analyze and assess the impact of integrating ERP/MES systems with Industry 4.0 devices to achieve increased cyber-physical system performance. The literature review and case study were used to conduct the research. The above analyzes led to the conclusions that both systems, i.e. ERP and MES, used jointly by the company and integrated with many devices and hardware and information platforms (e.g. using Big Data tools) give better results in terms of managing the organization and its production cycle. ERP manages the entire organization, while MES focuses primarily on production functions, which is why its correct integration / communication with the machine park is so important that it is possible to easily manage activities in the production hall (taking into account material facilities, logistics, use of semi-products and maintenance used) in the production of machinery and tools). MES monitors and creates documentation of the entire production cycle from raw material to final product. As the both systems evolve, adapt to ever newer conditions, further research on this topic is advisable and will be continued by the authors of the article.

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Digital Skills, Gender and Earnings: Evidence from The Polish Labor Market

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Abstract

The purpose of this paper is to evaluate associations among digital skills, gender and earnings in Poland. The research is based on individual data from the Polish survey on human capital (2017). Elementary and advanced digital skills are regarded. Earnings and salary expectations are taken into consideration. The empirical findings suggest that both digital skills and gender affect earnings as well as financial expectations. However, no evidence is found of the interaction effect. The associations between digital skills, earnings and salary expectations are strong and positive.

Keywords: Digital Skills, Gender, Earnings, Salary Expectations.

Introduction

Human capital, which includes competencies, is an essential element of the modern economy. In the era of technological progress, digital skills are becoming one of the most important and desired competencies. In the face of quick changes, the demand for high skilled workers increases. In Poland, which has undergone a political and economic transformation, the labor market is currently characterized by a low unemployment rate. This results in increasing difficulties in recruiting employees with appropriate skills. Wages and salary expectations are rising. The subject of interest of this paper is whether and how digital skills are related to the received remuneration and the expected salary. Gender is considered as a second factor. It should be underlined that there is no universal, objective data enabling such comparisons. Therefore, the paper is based on the results of a nationwide survey on human capital, which provides data relevant for the analysis of the problem. The study verifies the following research hypotheses:

H1. There is a relationship between the level of digital skills and gender.
H2. The level of digital skills and gender are determinants of earnings.
H3. The level of digital skills and gender affect salary expectations.

The analysis is conducted referring to elementary and advanced digital skills. The hypotheses formulated above are verified using statistical methods supported by data visualization techniques.

Background

Skills are necessary for functioning on the labor market and in everyday life. Nowadays, skills requirements are growing due to structural, demographic, technological changes and globalization (Martin, 2018). In modern economies, skills, knowledge and information based activities have an essential role in economic growth and contribute to competitive advantage (Ducatel, 1998). As the importance of skill increases, it may be expected that they have a significant effect on labor market outcomes. Despite the significance of the problem, the literature on this topic is not exhaustive. Many previous works analyzed the impact of education and work experience and were not focused on the influence of competencies (Blázquez et al., 2018). A common approach was the Mincerian model explaining the skill premium by years of schooling and potential work experience (Mincer, 1974, Heckman et al., 2003; Heckman et al., 2005; Lemieux, 2006; Polachek, 2008; Purnastuti, 2012;

Patrinos, 2016; Psacharopoulos and Patrinos, 2018). Although frequently applied, Mincerian model is a general one and lacks detailed information on skills. Another conceptual framework is described by Hanushek and Woessmann (2008), where earnings are a function of skills necessary on the labor market. Such a research approach can be found, among others, in works by Green and Riddell (2003), Carbonaro (2006), Heckman et al. (2006), Barone and Van de Werfhorst (2011), Cobb-Clark and Tan (2011), Lindqvist and Vestman (2011), Deming and Kahn (2017), Hanushek et al. (2015), Hampf et al. (2017), Hanushek et al. (2017), Edin et al. (2018), Grundke et al. (2018). The results show that both hard and soft skills are rewarded in the labor market.

As a widespread diffusion of ICT occurs, special attention is paid in the literature to computer usage and digital skills. The Survey of Adult Skills reveals that usage of ICT results in higher wages and increases the labor force participation (OECD, 2015). Many earlier studies focused on the importance of computer usage at work, not on the skills directly. The first influential paper on the impact of computerization on earnings by Krueger (1993) revealed that computer usage at work was associated with higher wages. Some authors agree with that statement (Liu et al., 2004; Arabsheibani et al., 2004) while others not (DiNardo and Pischke, 1997, Borghans and Ter Weel, 2004, Krashinsky, 2004). In further studies, digital skills, not only the fact of computer usage, were considered (Peng and Eunni, 2011; OECD, 2015; Falck et al., 2016; Liu and Mithas, 2016). The authors argue that digital skills are strongly rewarded in the labor market.

Although determinants of earnings are analyzed in the Polish economic literature, the role of skills is not often discussed. Relations between competencies and earnings are investigated in papers by Czarnik et al. (2011), Burski et al. (2013), Czarnik and Turek (2015), Grześkowiak (2017, 2018), Palczyńska (2018). As there is no detailed analysis concerning digital skills, this paper undertakes this topic. Additionally, gender is introduced as a factor contributing strongly to the gap in wages.

Data and Methods

The analysis is based on data from the last wave (2017) of a nationwide survey on the human capital in Poland (designed and carried out by PARP and Jagiellonian University). This survey is conducted on a representative sample of Poles of working age. In 2017, the survey covered 4056 respondents – individual persons. The questionnaire contained questions relevant to the subject. Firstly, respondents were asked about the average net monthly earnings in the last 12 months. Secondly, respondents specified salary expectations formulated as the net monthly salary considered as quite satisfactory if they were offered a job. The answers to these two questions were given in the national currency, i.e. PLN. Thirdly, respondents were asked to assess 25 different competencies, including digital ones at the elementary and advanced level, defined as:

- usage of computer, tablet, smartphone,
- use of specialized computer programs.

In further analysis, especially in tables and figures, these two skills are called *general usage* and *specialized software usage*. Every respondent rated each skill on a 5-point scale defined as follows: 1 - low level, 2 - basic, 3 - medium, 4 - high, 5 - very high. There were missing data in the source material, in particular regarding earnings. Only records with complete data were considered in the analysis (i.e. persons who revealed the net monthly earnings and specified salary expectations and declared the level of digital skills), what limited the set to n=1814. The structure of the complete dataset is balanced for gender. 50.8% are women, and 49.2% are men.

Several data analysis techniques were used, enabling a multi-faceted approach to the research problem. The calculations were carried out using the R environment and the SPSS program. Besides, various visualization methods were used as an important way of statistical communication. The first part discusses the distribution of the levels of digital skills and their associations with gender. Because the level of competencies is measured on the ordinal scale, standard bar charts were used to visualize the results. Although the distributions of the variables representing skills level are an essential aspect, cross-classifications with gender are also in the scope of the interest. The

associations between them were evaluated by the independence test and special graphical presentations as circularly arranged charts and association plots. Circular plots are a relatively new visualization method based on a circular layout and used mostly in genome analysis. This graphical approach is available in DescTools R package and is designed to represent "the unidirectional relationship between the rows and the columns of a contingency table" (Signorell et al., 2020). The categories of each variable are presented on one side of the circle. The marginal densities corresponding to the variables are represented by the division into segments around the circle. The relationships among the categories are reflected by ribbons inside the chart.

Chi-square test of independence was applied to assess the association between the declared level of competencies and gender. Since chi-square statistic is strongly affected by sample size (Frankfort-Nachmias and Leon-Guerrero, 2016), and a large sample was under consideration, the assessment of the strength of the relationship was done by the contingency coefficient, which takes values from 0 to 1, where zero means no association and 1 indicates total dependence (Kraska-Miller, 2014). A more detailed analysis based on the Pearson residuals was carried out if the dependence existed. A graphical method called the association plot was used for this purpose. It was proposed by Cohen (1980) and summarized and developed by Friendly (2000) and Meyer et al. (2003). The idea of this visualization is to represent each cell of the contingency table by a rectangle with "height proportional to the corresponding Pearson residual" and "width proportional to the square root of the expected counts"; the color and the position to the baseline reflect the sign while the area gives the information of the raw residual (Meyer et al., 2003). Thus, the association plot gives the understanding of the nature of discrepancies resulting in rejection of the null hypothesis of independence.

The second part of the analysis concerns the relationships among skills level and gender (treated as explanatory variables – factors) and earnings or salary expectations (dependent variables). ANOVA is used to determine if the levels of the independent categorical variables (called factors) are accompanied by different means of the numerical dependent variable. As the number of observations in the cells was unequal, it was necessary to use type III ANOVA sum of squares in calculations (Elliott, 2007, s.170). The first step in the testing procedure was to test for the interaction between factors, the second to evaluate the main effects (under the condition that the interaction was not statistically significant). However, the results of ANOVA give only the information about the overall status of differences among groups (Fink, 1995). Details must be evaluated by post-hoc comparisons. Various tests are used for this purpose, among them frequently applied methods proposed by Tukey, Bonferroni, Sheffe and Dunnet's, but they are appropriate if the assumption of the homogeneity of variance is held. As ANOVA is considered a robust statistic, it can also be used in the presence of unequal variances, but specific post-hoc tests are necessary in such a case, including Games-Howell test which has some advantages over other procedures (Shingala & Rajyaguru, 2015) and therefore was used in the analysis.

Results

Digital Skills and Gender

In the first step of the analysis distributions of the evaluation of elementary and advanced digital skills (i.e. using a computer, tablet, smartphone; using specialized computer programs) are presented. Then relationships between digital competencies and gender of respondents are assessed. Figure 1 presents the frequencies of skills levels calculated on the base of the self-assessment of respondents.

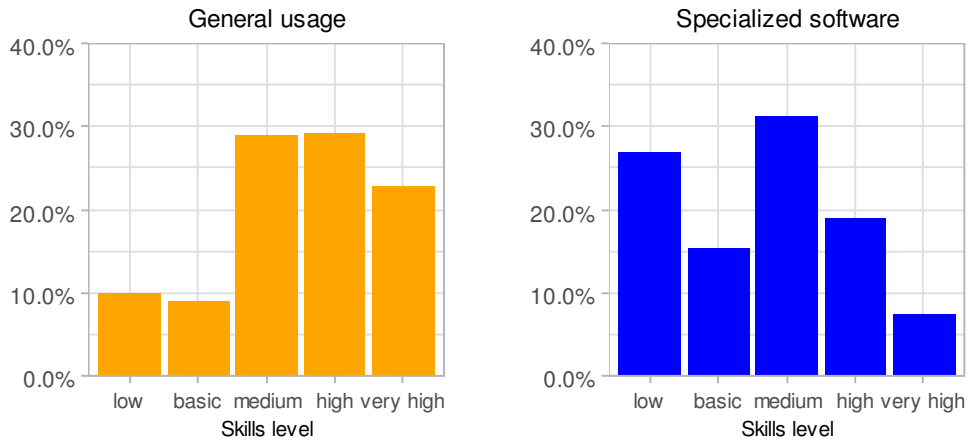

Figure 1: Distribution of self-evaluation of elementary and advanced digital skills

In the case of elementary skills, the answers 'low' and 'basic' were given relatively rarely (10% and 9%, respectively). People declared that they use a computer, tablet, or smartphone at the 'medium' or 'high' level (58.2% together). 22.8% of respondents evaluated their competencies in this field as very high. The distribution of the answers concerning the question about advanced skills is not similar. The dominant category is 'medium' level, which was indicated by 31.3% of respondents. Over ¼ of Poles have low skills in the use of specialized computer programs. Only 7.4% of people assess skills in this field as 'high'.

In the distributions of responses, there were also some differences in the assessment with respect to gender, which are shown by standard bar charts (Figure 2) and circular plots (Figure 3) in order to get a better insight into the data. Women more often indicate the 'medium' and 'high' levels both for elementary and advanced skills. In contrast, men's responses are more polarized. Particularly substantial differences were observed for 'low' general computer usage skills – 12.4% of men and 7.7% of women as well as for 'high' category declared by 26.2% of men and 32.1% of women. In the case of specialized software, men dominate in 'basic' category (17.1% while women 8.6%) and 'very high' (9.5% while women 5.3%).

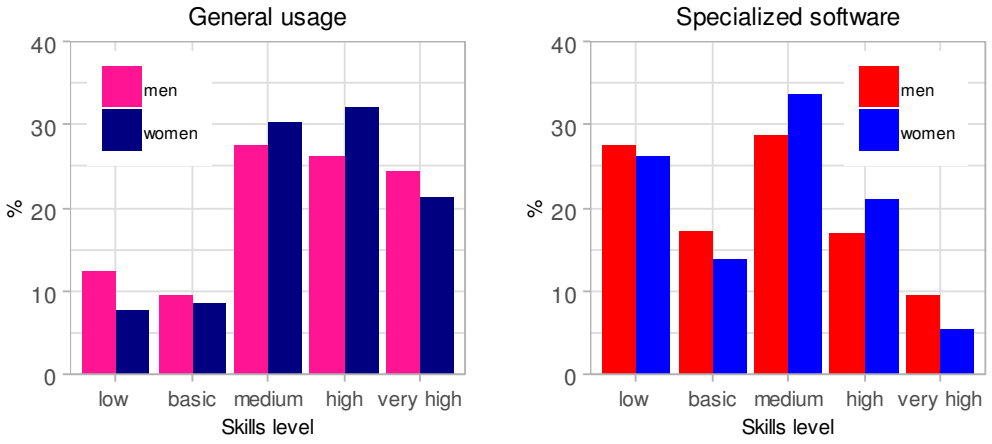

Figure 2: Distribution of self-evaluation of elementary and advanced digital skills with respect to gender

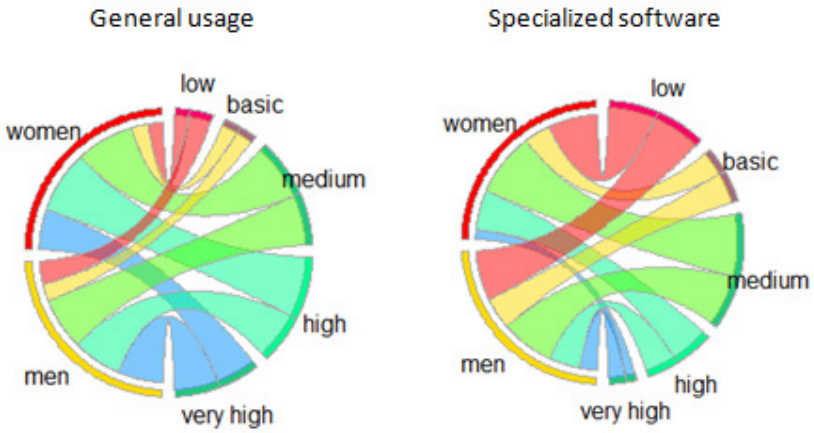

Figure 3: Relations between self-evaluation of elementary and advanced digital skills and gender

The above-presented results indicate that the differences between the digital competencies of men and women may be significant. The chi-square independence test was used to verify this hypothesis, and the strength of the relationships was assessed by the contingency coefficient. The results are summarized in Table 1.

Table 1: Results of chi-square tests and evaluation of the strength of associations

Skills	Chi square statistic	df	Contingency coefficient
General usage	19.248***	4	0.102
Specialized software	21.763***	4	0.109

*** $p < 0.001$

The results of the chi-square test lead to the conclusion that there are significant relationships between gender and skills level. However, contingency coefficients are low, which should be interpreted as weak relationships. In order to check what has the biggest impact on the values of chi-square statistics, Pearson residuals are used and visualized by association plots (Figure 4).

The area of rectangles reflects values of raw residuals, and the color indicates positive (black) or negative residual (red). In the case of general computer usage skills, the biggest contribution to chi-square measure is represented by categories 'low' and 'high' while the smallest by 'basic'. A different pattern is observed for competencies related to the usage of specialized software. Most residuals are influential except for the 'low' category. These results prove that although both chi-square tests indicate the dependency between gender and digital skills, the discrepancies in the case of the knowledge of specialized software are higher.

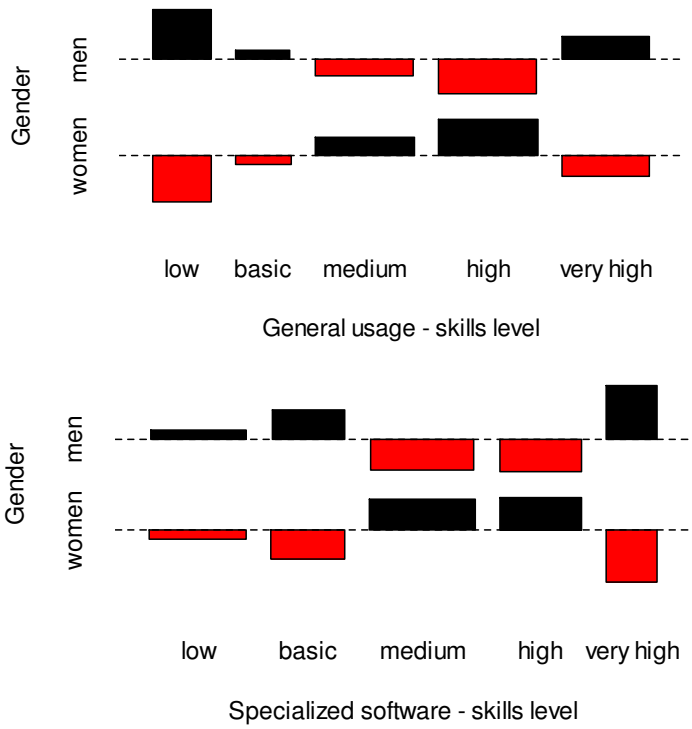

Figure 4: Association plots illustrating Pearson residuals in contingency tables concerning gender and skills levels

The next steps of the analysis concern the relationships among gender, skills level and financial aspects of work, i.e. earnings and salary expectations. The dependencies are considered for general computer usage skills and specialized software knowledge separately.

General Computer Usage Skills

A two-way ANOVA was carried out to determine if there are differences in earnings and salary expectations for men and women declaring various levels of general computer usage skills. Multiple comparisons (Games-Howell tests) were performed in the presence of significant differences. The summary of the ANOVA outcomes is presented in table 2. Profile plots (Figure 5 and Figure 6) were created to facilitate comparisons of the marginal means in the models.

Table 2: Results of two-way ANOVA – general usage skills

Effect	Dependent variable			
	Average earnings		Salary expectations	
	F statistics	p-value	F statistics	p-value
Gender	58.381	0.000	45.115	0.000
Skills level	22.995	0.000	12.942	0.000
Gender*Skills level (interaction)	1.892	0.109	0.490	0.743

First, the interaction test was performed. The null hypothesis is that there is no interaction effect, the alternative that the interaction exists. The results in Table 2 show that there is no interaction effect neither in the case of average earnings as dependent variable (F = 1.892, p-value = 0.109) nor in the

case of salary expectations as dependent variable (F = 0.490, p-value = 0.743). The lack of interaction is confirmed by the lines in Figures 5 and 6 that look rather similar, and no intersection occurs. It leads to the conclusion that the impact of one factor on wages does not depend on the level of the second factor, i.e. the impact of the general computer usage skills level is not related to the influence of gender.

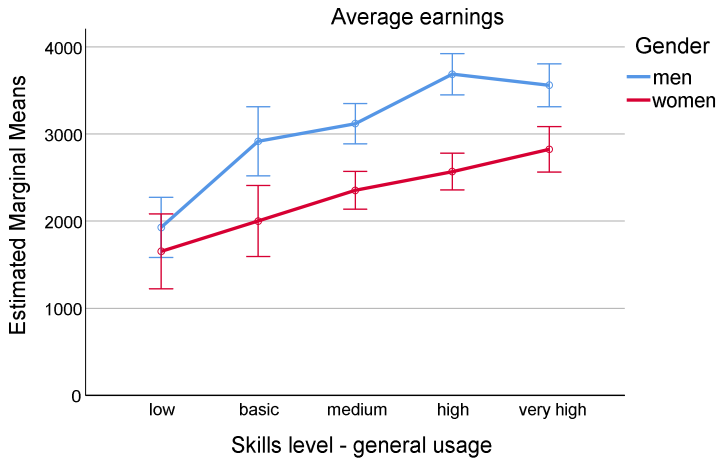

Figure 5: Profile plot: means of earnings according to gender and general computer usage skills level

Figure 6: Profile plot: means of salary expectations according to gender and general computer usage skills level

As there is no significant interaction, main effects can be considered separately. The main effects for gender are significant (F = 58.381 and p-value 0.000 in the case of average earnings as the dependent variable, and F = 45.115 and p-value 0.000 in the case of salary expectations as the dependent variable). The main effects for skills level are also significant (F = 22.995 and p-value 0.000 in the case of average earnings as the dependent variable, and F = 12.942 and p-value 0.000 in the case of salary expectations as the dependent variable). Hence, both gender and general computer usage skills have a significant influence on earnings and salary expectations. Interesting conclusions may be drawn from the location of the lines in Figures 5 and 6. First, each line rises as the level of skills increases, which indicates a positive relationship. Second, the wages or their expectations are always higher for men. Third, the discrepancies between men and women are higher for real earnings than for salary expectations.

Multiple comparisons using Games-Howell test were carried out to identify the skills levels for which the means differ significantly. The tests indicate (p-value < 0.05) that higher levels of general computer usage skills are generally accompanied by higher earnings and salary expectations. However, there are some exceptions to this rule. There are no significant differences between levels 'basic' and 'medium' as well as 'high' and 'very high'.

Specialized Software Usage

In this case, the same procedure as in the previous paragraph was used to determine if there are differences in earnings and salary expectations for men and women declaring various levels of specialized software usage. In the presence of significant differences, Games-Howell tests were applied to perform multiple comparisons. The summary of the ANOVA outcomes is given in Table 3. Profile plots (Figure 7 and Figure 8) present the comparisons of the marginal means in the models.

Table 3: Results of two-way ANOVA – specialized software usage

Effect	Dependent variable			
	Average earnings		Salary expectations	
	F statistics	p-value	F statistics	p-value
Gender	60.452	0.000	44.544	0.000
Skills level	33.555	0.000	21.554	0.000
Gender*Skills level (interaction)	1.449	0.215	0.494	0.740

The interaction test reveals that there is no interaction effect neither in the case of average earnings as dependent variable (F = 1.449 and p-value = 0.215) nor in the case of salary expectations as dependent variable (F = 0.494 and p-value = 0.740). The same conclusion may be drawn from profile plots (Figures 7 and 8). The lines are parallel, and they do not intersect. It shows that the impact of the advanced computer skills level on wages is not related to gender influence.

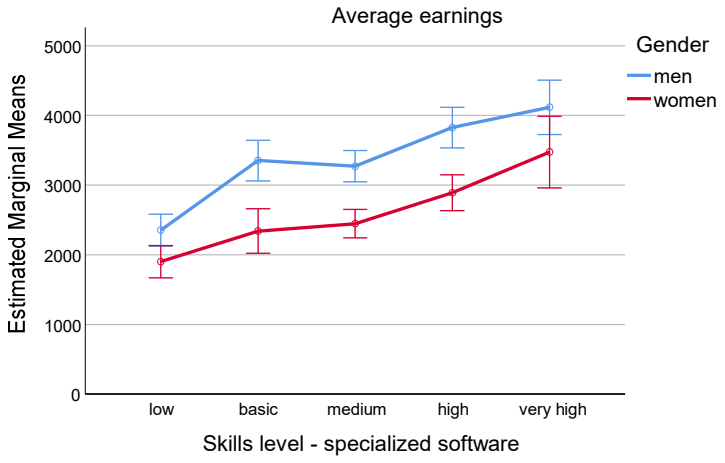

Figure 7: Profile plot: means of earnings according to gender and specialized software usage level

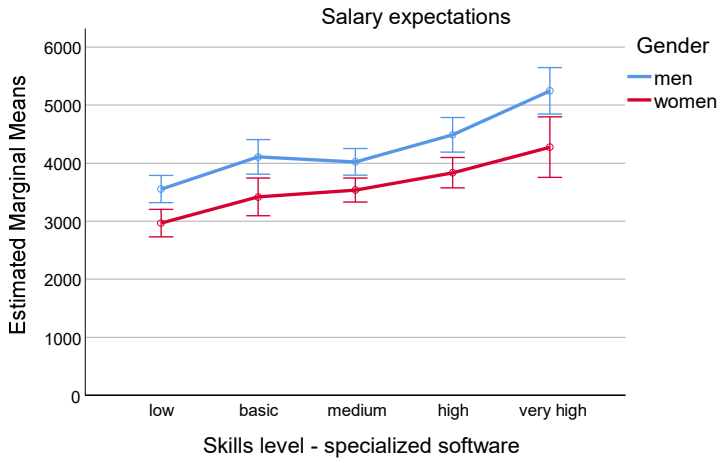

Figure 8: Profile plot: means of salary expectations according to gender and specialized software usage level

The absence of significant interaction means that the main effects can be tested and interpreted. The main effects for gender are significant (F = 60.452 and p-value 0.000 in the case of average earnings as the dependent variable, and F = 44.544 and p-value 0.000 in the case of salary expectations as the dependent variable). The main effects for advanced skills level are also significant (F = 33.555 and p-value 0.000 in the case of average earnings as the dependent variable, and F = 21.554 and p-value 0.000 in the case of salary expectations as the dependent variable). Hence, both gender and specialized software usage skills have a significant influence on earnings and salary expectations.

The same conclusions as in the previous paragraph may be drawn from the location of the lines in Figures 7 and 8. First, the general rule is that the higher skills level, the higher earnings and salary expectations. Second, both wages and their expectations are lower for women. Third, there are smaller differences for expectations than real earnings if we compare men and women.

Post-hoc Games-Howell tests were performed to identify the skills levels for which the means differ significantly. The results of pairwise comparisons (p-value < 0.05) indicate that higher levels of specialized software usage skills are, in most cases, accompanied by higher earnings and salary expectations. However, there are no significant differences between levels 'basic'-'medium', 'basic'-'high' as well as 'high'-'very high'. This is a slightly different pattern than in the case of general computer skills. Surprisingly, there is no difference in the dependent variable with respect to the declared 'basic' and 'high' level of competencies, and this is true for both earnings and salary expectations.

Discussion

The results of the study show that the earnings and earnings expectations in Poland depend on digital skills and gender but there is no interaction between these two factors. The gender pay gap is a well-recognized phenomenon in many countries, including Poland and widely discussed in the economic literature. According to Eurostat, the gap in Poland exists but is one of the lowest among European Union countries. In 2017 the unadjusted indicator (i.e."difference between average gross hourly earnings of male and female employees as % of male gross earnings") was equal 7.2% in Poland while the EU-28 average was equal to 16% (Eurostat, 2017). The findings concerning the impact of digital skills on earnings are not fully comparable with the early papers in this field of study which were focused on the influence of computer usage at work, not on the level of skills. However, the findings are consistent with the results presented by researchers who considered digital skills and found that employees are rewarded financially for them (Peng and Eunni, 2011; OECD, 2015; Falck et al., 2016; Liu and Mithas, 2016). The outcomes stay to some extent in line with the works of Hanushek et al. (2015) who identified the positive impact of problem solving skills in technology-

rich environments on earnings (using data from Programme for the International Assessment of Adult Competencies for OECD countries).

Conclusion and Final Remarks

Digital skills play an important role in the knowledge-based economy, but there are not many studies which discuss their associations with labor market outcomes in Poland. This research was designed to detect and evaluate differences in earnings and salary expectations with regard to gender and digital skills level.

The analyzes provided grounds for verifying the research hypotheses. Firstly, there is a significant statistical relationship between gender and digital skills level, but the association is very weak. Secondly, gender and digital skills level affect the pay gap. However, no interaction was found between these two factors. Thirdly, similar conclusions have been drawn for wage expectations. Analysis of variance showed that gender and the skills level should be treated as the main effects, without the interaction effect. Both earnings and salary expectations are higher for men. Post-hoc tests show that the higher the declared skills level, the higher the wages and expectations.

This research encounters certain limitations. First of all, it is based on survey data which are subjective. The level of skills comes from the self-assessment and may be biased. On the other hand, this is the best source of data possible as there are no objective and nationwide information on digital skills. Another problem is that net not gross wages were considered, which may also affect the results. It should also be mentioned that methods and outcomes do not necessarily imply causal conclusions. Nevertheless, in the author's opinion, this study uses the best data possible at the moment and allows evaluating the relations among digital skills, gender and earnings. Another limitation is that this study is limited to persons who declared net monthly earnings in the last 12 months and does not include salary expectations of those who did not provide such information. Thus, the results refer to those who had paid employment, not to the whole population of working age.

The scope of the study and the results presented in this paper indicate certain opportunities for further research. The survey on human capital includes an extensive list of respondents characteristics so that the analysis may be extended to other socio-economic factors. Various levels of salary expectations (minimal, very satisfactory) may also be taken into consideration. Further studies may concentrate on changes over time as the survey is carried out periodically. Finally, other statistical methods, e.g. non-parametric ones, may be used for more comprehensive analysis.

Acknowledgments

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A Multivariate Approach to Evaluation of Advancement to Circular Economy in European Union Countries

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Abstract

The purpose of this paper is to evaluate the degree of transition to circular economy in European Union countries. The study is based on official data from Eurostat (2016). As circular economy is a complex idea, various multivariate statistical methods are used to analyze the problem: linear ordering, cluster analysis and multidimensional scaling. The results allowed for identifying the leaders and laggards of the process. However, no distinct clusters were detected.

Keywords: Circular Economy, European Union, Indicators, Multivariate Analysis.

Introduction

Recently more and more attention is being paid to Circular Economy (CE), which is associated with the concept of sustainable development. Its importance is underlined in strategies and action plans adopted by the European Commission. In formal documents, the European Commission specified indicators that are used to assess the situation in the field of CE. Since CE is a complex idea, it must be considered in many dimensions. Hence, specific methods should be applied to evaluate the progress of countries in this domain. This study, exploratory in nature, is an attempt to assess the applicability of various multivariate analysis methods to assess the CE progress in EU member states.

Background

Circular economy is a concept which gains more and more attention since it is perceived as a way to implement the idea of sustainable development (Geissdoerfer et al., 2017; Murray et al., 2017). The concept may be an alternative to the current production and consumption economic system model and lead to '*balance and harmony between economy, environment and society*' (Ghisellini et al., 2016). Although the topic is often raised and important worldwide, there is no conceptual clarity of this term in the literature. Kirchherr et al. (2017) provide a vast literature overview by analyzing 117 different definitions and underline that the meaning is ambiguous and differs from author to author. Eventually, the authors conceptualize circular economy as an economic system oriented towards '*reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption process*', operating at various levels (micro, meso and macro), introduced by '*novel business models and responsible consumers'* and giving a chance for sustainable development (Kirchherr et al. 2017). There are also attempts to make the term more precise, e.g. García-Barragán et al. (2019) suggest a mathematical approach based on 'well-defined material flow and value system' to define the concept. Regardless of the definition, the strategy underlying circular economy assumes the transition from a linear model based on the *make-use-dispose* flow to loops in which goods at the end turn into resources for others either by repairing, remanufacturing etc. or by recycling the materials (Stahel, 2016).

As the circular economy includes policies and strategies related to a more efficient way of consuming resources, it becomes necessary to design indicators which measure the performance of a given process leading to the achievement of the desired model. Correctly constructed indicators and appropriate measurements allow not only to examine progress in implementing the strategy, but also provide guidance to improve specific CE policies. Saidani et al. (2018) conducted a thorough literature overview and proposed a detailed taxonomy of CE indicators described and used by other researchers. The authors collected 55 sets of CE indicators which can be grouped, among others, at the micro, meso and macro levels. An important contribution to the development of indicators at the business (micro and meso) level is the Ellen MacArthur Foundation report (Ellen MacArthur Foundation and GRANTA DESIGN, 2015). Likewise important, but at the national level, was the adoption of Circular Economy Package by the European Commission in 2015, including Action Plan for the Circular Economy (European Commission, 2015). As a consequence, the European Environment Agency in the Report No 2/2016 presented some potential indicators which '*would give insight into whether or not the European economy is becoming more circular*' (European Environment Agency, 2016).

Data and Methods

This study is based on official data from Eurostat designed for monitoring CE. Indicators with missing data were omitted in the analysis. The following variables are considered: *generation of municipal waste per capita* (X1), *generation of waste excluding major mineral wastes per domestic material consumption* (X2), *generation of waste excluding major mineral wastes per GDP unit* (X3), *recycling rate of municipal waste* (X4), *recycling rate of plastic packaging waste* (X5), *recycling rate of wooden packaging waste* (X6), *recycling rate of e-waste* (X7), *recycling of biowaste* (X8), *recovery rate of construction and demolition waste* (X9), *circular material use rate* (X10), *patents related to recycling and secondary raw materials* (X11). All analyses are carried out on data from 2016, except for X11 (2015 – newest information available).

Various multivariate analysis methods are used: linear ordering algorithms (cf. Hwang and Yoon, 1981), clustering methods (cf. Kaufman and Rousseeuw, 2009) and multidimensional scaling (cf. Borg et al., 2018). The purpose is to identify leaders, followers and laggards in implementing CE policy as well as to gain an insight into the data structure.

Empirical Results

The first part of the study is oriented towards the evaluation of the degree of implementation of CE policy in EU countries by linear ordering methods, i. e. TOPSIS used in multi-criteria decision analysis and standardized sums method. The rankings obtained by these procedures are presented in Table 1. Results of both methods are quite similar, what is confirmed by the Spearman correlation coefficient equal to 0.99.

According to both rankings, the Netherlands may be described as the leader in implementing CE objectives, followed by Lithuania, Belgium, Luxemburg and the Czech Republic. Estonia takes the last position in the ranking, followed by Greece and Cyprus. It should be noted that the TOPSIS method uses the development pattern, and the calculated measure (index) indicates the distance of a particular observation from a vector of the best indicators values. The index does not exceed 0.6 (except for the Netherlands), suggesting significant differences in the achievement of the CE effects in EU countries.

Table 1: Results of linear ordering

Country	TOPSIS		STANDARIZED SUMS	
	Ranking place	Index value	Ranking place	Index value
Austria	7	0.54	7	0,55
Belgium	4	0.56	5	0,57
Bulgaria	16	0.50	17	0,49
Croatia	23	0.48	23	0,44
Cyprus	25	0.43	25	0,38
Czechia	3	0.56	4	0,57
Denmark	13	0.52	10	0,54
Estonia	28	0,38	28	0.32
Finland	15	0,50	15	0.50
France	21	0,48	21	0.47
Germany	6	0,54	6	0.56
Greece	26	0,42	26	0.38
Hungary	19	0,49	20	0.47
Ireland	17	0,49	16	0.49
Italy	10	0,53	11	0,53
Latvia	22	0,48	19	0,48
Lithuania	2	0,56	2	0,59
Luxembourg	5	0,56	3	0,59
Malta	27	0,41	27	0,35
Netherlands	1	0,60	1	0,63
Poland	11	0,53	12	0,53
Portugal	8	0,54	8	0.55
Romania	24	0,46	24	0.43
Slovakia	20	0,48	22	0.46
Slovenia	9	0,53	9	0.54
Spain	18	0,49	18	0.48
Sweden	14	0,52	14	0.51
UK	12	0,52	13	0.52

The second part of the study aims at revealing the structure of the dataset. Cluster analysis methods are used to identify groups of countries with similar achievements in the circular economy field. The result of the agglomerative hierarchical procedure is presented in Figure 1.

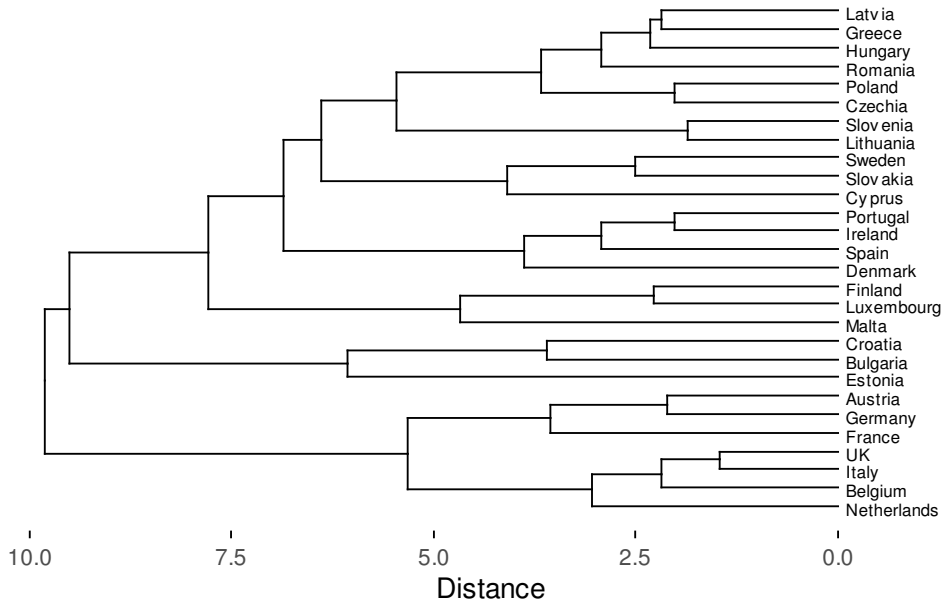

Fig. 1: Results of hierarchical cluster analysis

The dendrogram in Figure 1 shows that there are no big clusters in the dataset. The agglomeration scheme indicates that the division should be made into at least ten groups consisting of several countries.

Very similar results were obtained by the partition around medoids method, which is robust to outliers. The assessment using the silhouette index suggests the division of the set into nine groups. Heterogeneity was also confirmed by fuzzy clustering (c-means method). The degree of membership between data and clusters is close to 1/k (where k is the number of clusters), and Dunn's index is close to zero.

The set of considered indicators creates an 11-dimensional space. In order to explore the relationships between individuals, classic multidimensional scaling is used, whose results for 2-dimensional space are shown in Figure 2.

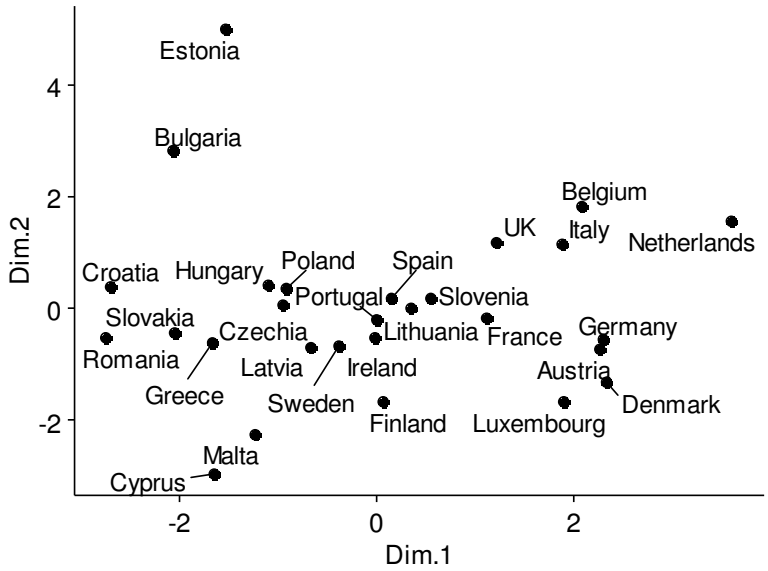

Fig. 2: Results of classical multidimensional scaling

The first dimension is strongly positively correlated with X1, X4, X8 and X10. The second dimension is strongly positively correlated with X2, X3, X7 and negatively with X11. The configuration of points does not suggest distinct clusters. Two points representing Estonia and Bulgaria are situated far away from the others when considering the second dimension, due to high values of generation of waste excluding major mineral wastes per GDP unit, high rate of e-waste recycling and no patents in the subject matter.

Conclusion and Final Remarks

The results of both rankings (TOPSIS and standardized sums) are very similar. Therefore, countries that are more and less advanced in achieving CE objectives can be indicated. Various cluster analyses showed that it is not possible to distinguish big distinct clusters on the base of the set of circular economy indicators for EU countries. It can be deduced that the situation in this field is very diverse, and the characteristics differ substantially across the countries. The results of multidimensional scaling also confirmed this conclusion. Although the problem in question is multivariate in nature, no evident broad patterns were detected.

The study has certain limitations. The number of characteristics treated as circular economy indicators is limited, and they do not reflect all aspects of the problem. The measurement of progress towards circular economy is a multi-faceted task. Thus, further research in this field is indispensable. The authors suggest expanding the number of indicators taken into consideration and applying feature selection methods. Another approach may concentrate on how the phenomenon develops over time.

Acknowledgments

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Innovation as a determinant of enterprise value increase

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Abstract

Building the enterprise value in a turbulent environment forces companies to introduce innovations that secure the effective creation, provision and communication of the value to the customer. The changeability of customers' attitudes and behaviour not only results in the need to identify factors determining an increase in the enterprise value, but it also necessitates evaluating their significance in terms of their influence on future capital supply.
The key goal of the article was to identify the intangible factors that secure the enterprise value growth, with a particular focus on the sphere of innovation, and to indicate barriers and ways of creating innovativeness in the future.
Literature studies enabled the authors to present the already identified factors and barriers in the innovation process. Empirical research has demonstrated that although these factors are relatively permanent, their significance with regard to increased enterprise value is dependent on changes in the environment, including in particular changes in customers' attitudes and behaviour.
Requirements and expectations of the contemporary customer force entrepreneurs to socialize the innovation process. It involves the necessity to develop lasting relations with customers, based on: cooperation, partnership, trust and commitment. It is possible only if both sides expect to win. The main barrier to the socialization of the innovation process is the apparent rooting in the mentality of managers of the necessity to pursue the customer's interest. The results of theoretical and empirical investigations conducted by statistical analysis methods, including the Anova test, have allowed for updating the information on the innovation process barriers.

Keywords: innovation, enterprise innovativeness, enterprise value

Introduction

Changes in the contemporary environment make innovation a natural process, which is necessary for enterprise functioning (Androsch, 2019). The goal of enterprise operations is to thoroughly identify the needs and expectations of customers, that is, potential users of innovative products and services (Ngo and O'Cass, 2010; Sjödin, Parida and Parida, 2019). Accurate assessment of customers' expectations is related to the usefulness of a product offered on the market (Teres, 2003; Böhrs, 2004; Rust et al., 2005). This usefulness is crucial in relations with the customer and constitutes its business value, i.e. the value of cash flows generated by the enterprise as a result of creating and developing relations with the customer (Tomczak and Rudolf-Sipötz, 2006).The value is determined by the profitability and duration of these relations, as it is a capital supply for the enterprise (Eggert and Ulaga, 2002; Helm and Gűnter, 2006; Stűker, 2008; Ngo and O'Cass, 2010). Innovativeness is considered to be an important factor of increased competitiveness and economic growth. Contemporary economy is increasingly dynamic (Stec, Filip, Grzebyk and Pierscieniak, 2014). Companies that are able to process knowledge and information, and utilize them for their purposes achieve success and cross technological, financial and institutional barriers. On the other hand, companies which cut themselves off from information society and reject innovations are doomed to slow agony (Jonek-Kowalska, 2019; Krawczyk-Sokołowska, Łukomska-Szarek and Caputa, 2018).
The aim of the article was to identify the intangible factors that secure the enterprise value increase, with a particular focus on the sphere of innovation, and to indicate barriers and ways of creating innovativeness in the future.

Innovations and enterprise value in subject literature

Irrespective of the conditions of exchange, the customer is an essential element of the functioning and development of an enterprise, and, at the same time, a guarantor of its capital supply. The problem of innovativeness in terms of establishing relations with customers and creating the enterprise value, has been widely discussed in science (Ngo and O'Cass, 2010; Navarro, Llinares and Garzon, 2016; Bruce, Wilson, Macdonald and Clarkec, 2019; Sjödin, Parida and Parida, 2019). This is confirmed by the number of scientific studies. A review of international databases (SCOPUS, WOS, Springer, EBSCO) has revealed that these issues enjoy unwaning popularity, and the systematic exploration of innovations and enterprise value constantly reveals new problems and new interesting phenomena.

Innovation, i.e. any intentional and beneficial change, is made in a specific dimension (3P): subjective (innovative enterprise), objective (product, process and organizational innovation) and spatial (region, country, world) (Krawczyk-Sokołowska, 2012).

Innovation allows enterprises to increase business profitability, enter new sales markets as well as adjust to limitations and make use of possibilities related to the changing market (Szwajca and Chovanovà - Supekovà, 2018).

Innovativeness means a tendency to create new and improve existing products, technological processes, new organizational and management systems, as well as other creative and innovative changes leading to the creation of new values (Caputa, 2018). It should be emphasized that innovativeness is also the ability (Burgelman et al., 2004) and motivation of innovative entrepreneurs to seek and introduce changes in real activity in various areas of socio- economic life in order to improve the conditions for creating knowledge and innovation. The ability to create innovation and establishing an efficient system of innovation diffusion are important elements of increasing the enterprise value and socio-economic development (Fabova and Łukomska-Szarek, 2018;).

In addition, access to information on new manufacturing technologies, the organization of production processes as well as customer expectations and preferences is particularly important for the innovativeness of enterprises. A special role in the exchange of knowledge and information should be assigned to the Internet, which among others enables establishing interactive communication and creating transactional relations online (. Understanding and awareness of customer-business relations affects their form and nature, as they are shaped by close synergies and mutual benefits. For enterprises, the customer and his demand for products and services is a promising prospect of increasing their value and development opportunities. For the customer it means that his expectations regarding the usefulness and uniqueness of the products and services offered can be met at a satisfactory level.

The approach to innovation should only be associated with the dominant role of the buyer (who expects that his preferences will be taken into account); other participants (owners, producers, agents) cannot do anything but accept this situation. Customers decide what products and services on the market they choose.

The value of enterprises and development opportunities under uncertainty are largely determined by their endogenous activity, based on specific exogenous resources (Gholamreza, et al., 2011; Slusarczyk and Grondys, 2019). It seems important to focus not only on unique resources but also on arising opportunities. The high costs of creating unique resources require different entities and institutions to build resources together, that is, to create a "group competitive advantage".A network organization can be seen as a kind of structural solution allowing the strategy to be effectively implemented in turbulent conditions thanks to the mutual utilization of network participants' competences (Sopińska and Jakubowska, 2013). Building a relationship based on cooperation (partnership) (Pierścieniak, 2015) is a response to the challenges faced in business practice, as it has been noticed that solving complex problems more and more often requires a variety of skills and resources, which are usually possessed by many entities of economic life.

Innovation and innovativeness should be treated as a set of various factors serving to improve management efficiency and increase the value of enterprises as well as economic and social benefits (Fasnacht, 2018).

Both the premises and factors of the innovation process are classified differently (Kraśnicka, 2018; Kłosiewicz-Górecka, 2016; Loren, 2011). However, regardless of the classification adopted, these premises can be divided into two groups: internal premises (factors) and external premises (factors). The group of internal factors of enterprise innovation should be associated with the productive

potential of the enterprise, i.e. creative employees and owners as well as material and financial conditions (Krawczyk-Sokołowska, Pierścieniak and Caputa, 2019). Internal premises are related to the course of the innovative process itself as well as the organization and implementation of the company's operational and R&D activities. These premises result from the need to influence three basic variables determining the value of an enterprise: revenues, costs, including costs of innovative activities and risk, including the risk of running innovative projects. The most common include:

- the possibility of increasing the sales of new products, extending the range of existing products or equipping them with new features/functionalities, which may be related to the forcing of innovation by customers,
- the opportunity to attract new customers, improving access to sales markets,
- the need for an effective use of technological and research potential,
- better utilization and faster development of the internal potential of knowledge, and thus triggering the learning effect,
- weaknesses of an enterprise forcing it to acquire knowledge from the environment,
- the need to develop the company's social influence potential,
- reduction of adverse environmental impact,
- shortening the time of product manufacturing, innovative process implementation, quality improvement, including the necessity to implement standards and adjust them to current legal regulations,
- reducing the costs and risk of the innovation process,
- streamlining the processes of production, marketing, purchasing and logistics,
- benefiting from economies of scale,
- willingness to internationalize,
- the need for protection against competitors,
- willingness and ability of the enterprise to establish relations based on cooperation, readiness to share knowledge and co-create new values (West and Bogers, 2013; Fu, Li, Xiong and Chesbrough, 2014; Lewandowska, 2018).

In the set of internal factors determining the desire to generate and implement innovations, attention is also paid to: company profile, managerial qualities, organizational culture or management style (Kraśnicka, 2018).

External factors of enterprise innovation include the purchase of licences or/and cooperation with research institutions or other business entities (Krawczyk-Sokołowska, Pierścieniak and Caputa, 2019). These factors are directly related to changes taking place in the internal and external environment of the enterprise. The set of these factors includes, among others:

- pressure from the environment, including competitors, customers and other entities in the value chain,
- availability of qualified employees, knowledge and venture capital,
- the growing barrier of demand on the internal market,
- the ongoing digitization process and progress in the development of information and communication technologies, which enables the sharing of knowledge and utilization of external effects,
- government activities, including the possibility of obtaining financial support from public institutions, among others from the EU,
- increasing emphasis on protecting the environmental and ensuring a sustainable development, forcing enterprises to search for and implement new ecological solutions,
- shortening the product and sector life cycle,
- willingness to share knowledge and co-create new values,
- willingness and ability of the company to establish relations based on cooperation, readiness to share knowledge and co-create new values (Harter et al., 2012; Fu, Li, Xiong and Chesbrough, 2014; Lewandowska, 2018; Frey et al., 2019)

Each of the indicated factors may affect the course of the innovation process, except that the strength of this impact may vary. As a result, the company faces the need not only to identify these factors, but to find an answer to the question which of them are fundamental to the innovation process efficiency, the achievement of future benefits and maintaining the ability to generate them in the longest possible period.

Research methodology

Concentrating the company's activity on value creation entails the need to identify key factors determining the achievement of this goal. In consequence, the first stage of research was based on a review of the output published in international databases in the years 2010-2020, especially Springer and SCOPUS. This review was mainly focused on identifying the factors which, being related to the company's innovative activity, determine the value of its relations with customers, and, by extension, the value of the company itself. The numerical effect of this review, presented in Table 1, indicates that innovation problems are widely commented in science. The conducted review resulted in the choice of 70 articles for analysis, the subject of which their subjects was focused on the issues discussed in the study, in particular stimulants and destimulants of innovation.

Table 1: Publications in the field of innovation in databases in the years 2010-2020 "innovation and cooperation and digitalization"

Years	WOS	Springer	EBSCO	SCOPUS
2010	0	36	0	0
2015	2	94	2	1
2017	5	352	3	5
2018	6	505	7	8
2019	13	809	12	13
2020	0	330	0	0

Source: own study

The conducted studies revealed that in knowledge-based economy it is non-financial factors that play a key role in enterprise value creation.

The empirical research results presented in the study were focused on the identification of intangible factors determining the current and future increase of the company's value, with a particular focus on the field of innovation.

Bearing in mind the need to concentrate processes and activities in a company on the creation of value for the customer, while securing the company's interests, these factors were analysed with regard to changes on the market, including changes in the attitudes and behaviour of customers.

The identification of factors was based on investigations carried out by experts representing the managerial staff of companies in the brewing industry (25).

In the analyzes carried out in 2011/2012, the experts represented 3 brewing companies whose combined market share exceeded 80% in both analyzed periods (15 experts). In the analysis of repetitions concluded at the turn of 2018/2019, an expanded group of experts and managers representing the group of beer producers (average availability). 10 managers with the participation of companies were invited to the group of experts.

To take advantage of the offer of invited related experts involved in building accessibility strategies, including: related marketing activities, finance, production, logistics and sales transactions. In the analyzes carried out in 2012, each of the above services represented 3 people, employed in various companies (research 2012). A similar selection of actions in the process carried out in 2018/2019.

Such selection of experts, allowing the identification of intangible values of data value increase, with extended various attribute coefficients assigned by persons representing different ranges of availability.

Performing the operation of including the results in the analysis of references to results carried out on the basis of literature studies, as well as other studies that are studied, and then analyze the results. As a result of the consultation, a questionnaire was developed, which was used in the course of applying the research.

The conducted research has resulted in the identification of 41 factors which in the experts' opinion determine the current and future increase in the company's value. These factors were divided into two leading groups: external (a total of 21) and internal (20) factors. Next, based on the concepts

contained in Balanced Scorecard (Kaplan and Norton, 2002) within each group the following factors were distinguished:

1. factors directly connected with relations with recipients (16 – area of customers) and relations with suppliers (5 – areas of suppliers and supply markets),
2. factors focused on the field of processes and innovation (12) as well as human resources and management (8).

This provided a basis for creating a questionnaire in which the same group of experts was presented with the distinguished factors in terms of their current and future significance for creating the company's value. The evaluation was conducted using the 5-point Likert scale, in which 1 indicated an insignificant factor, and 5 – a very important one. The reliability of the form was assessed with Cronbach's alpha, which in this case reaches 0.95. The questionnaire was used to conduct similar studies at the turn of 2011 and 2012 and at the turn of 2019 and 2019. In repeated studies, managers had the possibility of adding a factor which in their opinion should be taken into consideration as a determinant of creating the current and future value of a company. Therefore, the number of identified factors rose to 44. It is worth noting that the new factors were related to the area of both customers and innovation, while at the same time they referred to the most desirable competences.
The research results were subjected to statistical analysis based on the ANOVA test. This allowed for identifying the factors which in a given period are crucial for the implementation of directions beneficial from the perspective of value increase and for the methods of implementing the innovation processes.

Research results

Determinants of value increase for brewing industry companies in the field of processes and innovation.
Factors that determine non-financial factors of growth in a company's value were divided into four groups. The ranks assigned by experts to factors describing individual groups allowed for the ranking of these areas. The evaluation conducted in 2012 clearly indicated the increasing significance of factors describing the sphere of innovation and processes in the building of enterprise value (Table 1). The average rank assigned to this sphere increased by 0.41, while the average rank assigned to factors describing the customer area increased by a mere 0.16. (Table 2)

Table 2: Ranking of factors determining the value of an enterprise by area

Average ranks	Studies 2011/2012					
	Current			Future		
	Xśr	SD	Me	Xśr	SD	Me
Total	**3.96**	0.70	3.95	**4.20**	0.70	4.39
Customers	**4.15**	0.69	4.19	**4.31**	0.69	4.50
Human resources and management	**4.10**	0.75	4.00	**4.28**	0.74	4.50
Innovations and processes	**3.91**	0.67	3.92	**4.32**	0.65	4.58
Suppliers (supply markets)	**3.29**	0.73	3.20	**3.45**	0.82	3.40

Explanations: Xsr – arithmetic mean, SD – standard deviation, Me –median
Source: own study

In the presented research results, the area of processes and innovations has been described by a set of twelve factors (Table 3).
The group of the highest rated factors determining the current growth in enterprise value included: product and process quality (4.67±0.47), service and product error rate (4.33±0.70), revenues from the sales of previous products (4.27±0.57), investments in R&D (4.27±0.68) and order lead time (4.13±0.81). In the experts' opinion, the importance of the above mentioned factors in the building of the future enterprise value will increase.

Table 3: Factors determining the current and future value of a company – the area of innovations and processes

PROCESSES AND INNOVATIONS	CURRENT					FUTURE					ANOVA
	Xśr	SD	Me	Xśr-SD	Xśr+SD	**Xśr**	**SD**	**Me**	**Xśr-SD**	**Xśr+SD**	p
Quality of product and process	**4.67**	±0.47	5.0	4.20	5.14	**4.87**	±0.34	5.0	4.53	5.21	NS
Revenues from the sales of previous products	**4.27**	±0.57	4.0	3.69	4.84	**4.07**	±0.68	4.0	3.39	4.75	NS
Revenues from the sales of new products	**4.00**	±0.73	4.0	3.27	4.73	**4.73**	±0.57	5.0	4.16	5.31	0.006
Order lead time	**4.13**	±0.81	4.0	3.33	4.94	**4.47**	±0.72	5.0	3.75	5.18	NS
Level of production capacity utilization	**3.80**	±0.75	4.0	3.05	4.55	**4.27**	±0.85	5.0	3.41	5.12	NS
Investments in R&D	**4.27**	±0.68	4.0	3.59	4.95	**4.80**	±0.40	5.0	4.40	5.20	0.023
Service and product error rate	**4.33**	±0.70	4.0	3.63	5.03	**4.53**	±0.62	5.0	3.92	5.15	NS
Number of new products	**3.67**	±0.70	4.0	2.97	4.37	**4.47**	±0.62	5.0	3.85	5.08	0.004
Share of new products sales	**3.53**	±0.72	3.0	2.82	4.25	**4.13**	±0.62	4.0	3.52	4.75	0.023
Investments in IT expenses	**3.47**	±0.88	4.0	2.58	4.35	**3.73**	±1.12	4.0	2.61	4.86	NS
Average service response time	**3.80**	±0.65	4.0	3.15	4.45	**4.20**	±0.54	4.0	3.66	4.74	NS
Number of patents and licences	**3.0**	±0.47				**3.53**	±0.40				0.017

Source: own study

This statement is not true for the third of the quoted factors (revenues from the sales of previous products). In the opinion of the experts, the significance of this factor will decrease. The production capacities of the analysed enterprise allow concluding that the future value of the company should be correlated to product innovations. The validity of this conclusion is confirmed by statistically significant differences in the evaluation of the rank assigned to these factors, such as: revenues from the sales of new products (p=0.006), share in the sales of new products (p=0.0023) or the number of new products (p=0.004). The growing importance of this factor means, in consequence, the need to extend the sales offer. As a result, the significance of this factor was also reflected in the set of factors describing the customer area. In the analysed area, one of the factors identified by experts was product mix width. (Table 4).

Table 4: Factors determining the current and future enterprise value – customer area

FACTORS	CURRENT					FUTURE					P
	Xśr	SD	Me	Xśr-SD	Xśr+SD	**Xśr**	**SD**	**Me**	**Xśr-SD**	**Xśr+SD**	
CUSTOMERS AND SUPPLY MARKETS											
Customer retention	**4.67**	±0.60	5.0	4.07	5.26	**4.80**	±0.40	5.0	4.40	5.20	NS
Customer satisfaction	**4.60**	±0.61	5.0	3.99	5.21	**4.73**	±0.57	5.0	4.16	5.31	NS
Market growth	**4.00**	±0.82	4.0	3.18	4.82	**4.20**	±0.75	4.0	3.45	4.95	NS
Product mix width	**3.40**	±0.71	3.0	2.69	4.11	**4.00**	±0.97	4.0	3.03	4.97	NS
Number of newly acquired clients	**3.87**	±0.81	4.0	3.06	4.67	**4.27**	±0.85	5.0	3.41	5.12	NS
Brand image	**4.67**	±0.47	5.0	4.20	5.14	**4.80**	±0.40	5.0	4.40	5.20	NS
Profitability of new customers	**4.07**	±0.85	4.0	3.21	4.92	**4.13**	±0.88	4.0	3.25	5.02	NS
Product and service image	**4.73**	±0.57	5.0	4.16	5.31	**4.73**	±0.44	5.0	4.29	5.18	NS
Customer structure	**3.47**	±0.72	3.0	2.75	4.18	**3.67**	±0.70	**4.0**	2.97	4.37	NS
Market share	**4.20**	±0.83	4.0	3.37	5.03	**4.33**	±0.70	4.0	3.63	5.03	NS
Number of current customers	**4.00**	±0.63	4.0	3.37	4.63	**4.00**	±0.73	4.0	3.27	4.73	NS
Brand value	**4.47**	±0.72	5.0	3.75	5.18	**4.60**	±0.71	5.0	3.89	5.31	NS
Distribution channels	**4,00**	±0.73	4.0	3.27	4.73	**4.27**	±0.85	5.0	3.41	5.12	NS
Dependence on individual customers	**3.20**	±0.83	3.0	2.37	4.03	**3.20**	±0.91	3.0	2.29	4.11	NS
Expenditure on advertising and marketing	**4.13**	±0.81	4.0	3.33	4.94	**4.33**	±0.79	5.0	3.54	5.12	NS
Customer relations	**4.87**	±0.34	5.0	4.53	5.21	**4.87**	±0.34	5.0	4.53	5.21	NS

Source: own study

It should be emphasized that although experts' opinions on the current importance of factors such as the number of new products (innovation area) and product mix width were different (p=0.0408 and p=0.048, respectively), no significant differences in the creation of future enterprise value were revealed by the Anova test. The average rank of the indicated factors increased by 0.8 and 0.6, respectively. Therefore, the experts agreed that the future strategy of the enterprise should be based on product innovations. The implementation of this goal involves the need to invest in R&D, or the acquisition of licenses or patents. In both cases, differences in assessments in the examined perspectives turned out to be statistically significant (investments in R&D - p = 0.023, number of patents and licenses - p = 0.017).

The conducted studies also revealed an increased significance of the following factors: order lead time, level of production capacities utilization, average service response time. Experts see the necessity of introducing product innovations as well as process innovations. These innovations will be focused on the optimization of three process parameters: time, quality and costs; they translate into: product and service image, brand image, customer satisfaction, customer retention, brand value, and, finally, relations with customers (fig. 1).

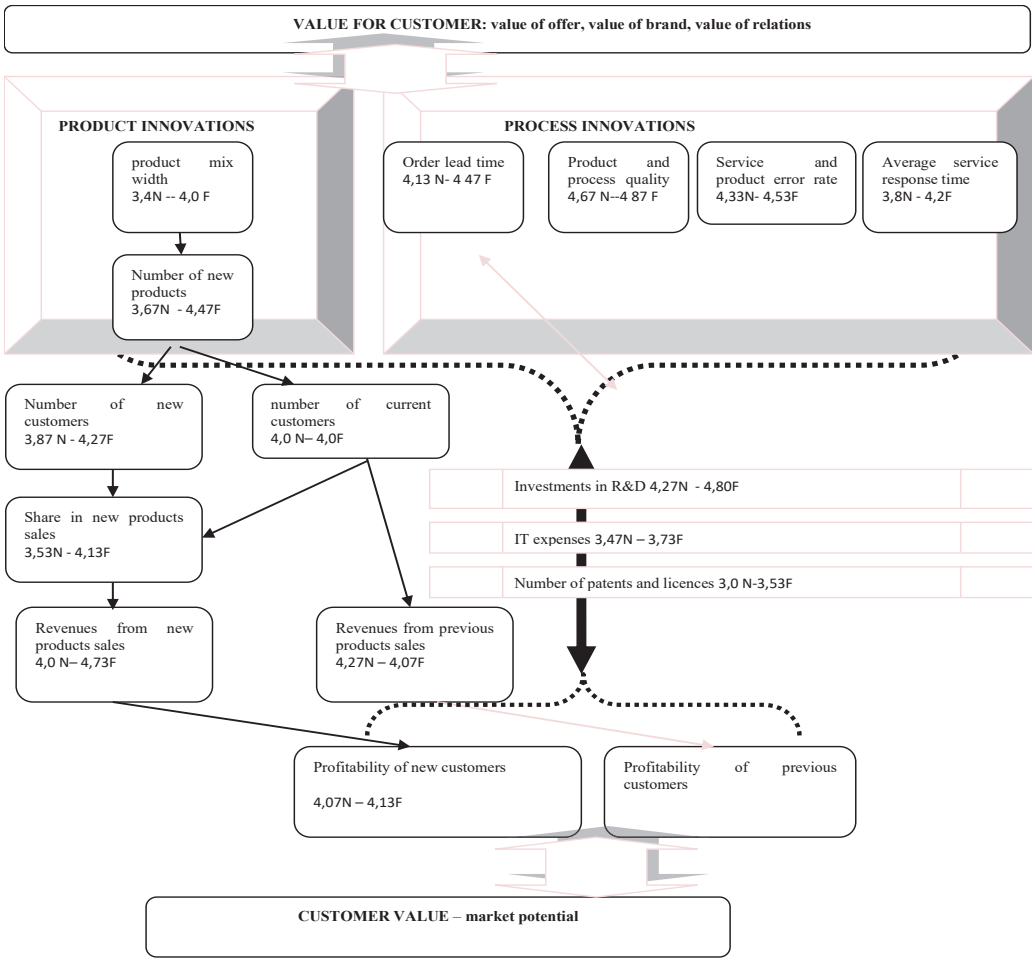

(N- nowadays, F - in the future)

Fig. 1 Innovations in the creation of value for the customer and enterprise

Source: own study

The conducted research results allow for outlining a strategy, that is, a manner in which enterprises in the branch subjected to analysis are going to create their value. Another research based on the above quoted questionnaire was conducted at the turn of 2018 and 2019. In the majority of cases, it did not

reveal any statistically significant differences between the rank assigned to the indicated factors in the period of previously conducted studies. The rankings of factors did not change either. However, it is noteworthy that although the enterprise value increase is related to a number of new products and revenues from their sales, its rank remains on the same level. The factors indicated by experts extending the previously created questionnaire also turned out to be interesting.
The vast majority of the experts pointed to: the creation of platforms enabling interactive contact with customers, the necessity to develop digital competences, the use of social media for communication with the market, or references, recommendations and ecological activities as separate factors determining both the current and future value of an enterprise.

Summary

The research results clearly demonstrate that managers were aware of the fact that the strategy concentrated on profitability, costs and enhanced efficiency by improving internal processes and activities was not and could not be the only way of acquiring customers. They saw new possibilities in product innovations that would enable extending the range of products so as to satisfy the needs of a wider public, while at the same time creating chances for filling market niches. This course of action turned out to be right.
After EURO 2012, the beer market in Poland stabilizes. The product offer is extending. Consumer preferences are clearly shifting towards low-alcohol and flavoured beers, which is also influenced by the actions of producers themselves, who try to implement CSR concepts (Monitoring Branżowy, 2017; Caputa 2013).
Product innovation very quickly translated into the filling of market niches and extending the market offer. However, customers were not only given a possibility to choose, but they also received support limiting the risk of taking a wrong decision. The development of the Internet and information technology enabled them to obtain and send information as well as creating virtual communities (Harter et al., 2012). Such a situation is both an opportunity and a threat to the enterprise. This has been noticed by experts, who, extending the set of factors given in the assessment, clearly indicate the need to create and use the potential of the web. In the conditions of progressing digitalization, this course of action determines not only the process of innovation implementation, but also the way of building relations with customers (Harter et al., 2012).
In a flat world, where the place of production has nothing to do with the place of consumption, and the multi-dimension relationship with the customer is increasingly often based on the transfer of information in a “man-machine”, “machine-man”, or even “machine-machine” system, it becomes impossible to establish traditional relations (Kotler and Caslione, 2009; Manu, 2012; Dornberger et al., 2018).

This, however, does not change the fact that the unique value for the customer must comprehensibly solve the customer’s problems at a given time, or even at the moment when the customer makes purchasing decisions. All this means that accurate definition and effective creation of a distinctive value for the customer requires not only systematic acquisition of information and knowledge from the customer and building one’s own competence resources on this basis, but it also necessitates engaging the customer and other stakeholders of the company in the process of value creation (Storbacka, et al.,1994; West, et al, 2006; Bruhn, 2001; Krafft, 1999; Arbor, 1995). Such activities are a foundation of customer’s real loyalty, which among others provides protection against activities of competitive enterprises. It should be emphasized, however, that it can only occur when both sides expect to win (Kotler and Bliemel, 2001). Customer engagement in the process of value creation should entail a reward for the contribution made. In consequence, the customer not only wants to be a co-author of the value, but also its co-owner, who is entitled to receive adequate benefits. He/she demands a fair distribution of the value not only as a customer, but also as an employee, supplier, business partner and a member of society. Thus, the enterprise’s willingness to share the generated value becomes the subject of evaluation. In our view, this is a fundamental problem, especially for brewing market leaders, whose strategies of operation, despite declarations, are still corporate in nature rather than relation-based.

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Disaster Communications to Support Mitigation of Future Wetlands Fire

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Abstract

Fire disasters occurred in developing countries and developed countries including Indonesia. The frequency of peatland fires has increased every year. Thus, communication is needed to support disaster mitigation program. One form of communications is the mass media. The mass media can serve as an early warning system and education for the community. The purpose of this research is to provide an overview of the disaster communications to support mitigation wetlands fire in the future by applying research methods study literature and text analysis framing the news on disasters both in print and online media. The findings of the study reveal that disaster communications can support peatland fire mitigation with the government's support in providing information on fire disaster. Optimization of disaster communications in an integrated manner is essential in disaster mitigation. Successful disaster mitigation is expected to minimize the peat fires in the future. Synergy of mass media and the public are also indispensable in the distribution of fire disaster information.

Keywords: Disaster Communications, Fire Mitigation, Peatland.

Introduction

Climate change is a challenge in developed and developing countries (IPCC, 2014). Caston Broto and Bulkeley, 2013; Warmsler et al, 2014 states that cities play a higher considerable role against climate change. Research development of climate mitigation policies ranging city continues to grow (Gopfert, 2014; Reckien et al, 2014) and climate change can lead to disaster all over the world which is interdependent (Masozera et al, 2007;Juneza et al, 2016).

Fire is one kind of disaster due to climate change. Mitigating climate change is one of the strategies to address future fire (Christian G et al, 2019). Society, scientific institutions, political institutions of local and international scale began to discuss the existing strategy (McKibbin and Wilcoxen, 2003; Laukkonen et al, 2009; Locateli 2010; Schule and Lucas, 2011; Dymen and Langlais, 2013). The synergy between policies, strategies and measures are to mitigate the more important scientific and practical effect (Goklany 2007; Moser, 2012; Landauer et al, 2015; Sawert, 2016; Zentrum Stadnatur

and Klimaanpassung, 2017). More and more research on climate mitigation plans and strategies will greatly assist in the mitigation of disasters (UN-Habitat, 2014; Reckien et al; 2015; Runhaar et al, 2017).

Indonesia is a developing country that is prone to various types of disasters including fire (Wardyaningrum, 2014). The frequency of catastrophic fires increases every year that requires serious treatment as the country is the location of most Reduction of Emissions from Deforestation and Forest Degradation (REDD+) projects (Rajiani & Pyplacz, 2018) as well as to manage people in preserving the environment (Mohtar & Rajiani 2016). Catastrophic fires generally occur every dry season where South Kalimantan is an area that is prone to peat fires (Wahyu et al, 2004). The problem that often arises is that every area is not prepared for disasters (Badri et al, 2008).

Information and communication are important needs for people in disaster-prone areas including fire disasters (Juneza et al, 2016; Risduansyah, 2019). Communication is the process of delivering a message that can be as formal as in the dissemination and extension (Flor and Cangara, 2018; Kamil, 2018; Bayu et al, 2019). Information and communication is not a problem anymore in line with technological developments. The rapid development of technology makes people innovative (Sartika et al, 2019). Innovation is to get news information and literature. Media information such as online media is more advanced than simply pass information to the media with business competition. Business situation is unique and competitive synergy with advances in internet and technology (Sarbaini et al, 2019; Rajiani & Ismail, 2019).

Sharing information and knowledge on disasters and mitigation is crucial. The introduction to the disaster or disaster information is needed to minimize the impact of post-disaster (Rahman, 2012).The lack of communication and coordination in disaster management impacts the rehabilitation and reconstruction. Disaster communication studies during emergency response in order to accelerate the process of construction and rehabilitation, is very important (Lestari et al., 2018). Innovations in disaster mitigation activities, especially in communicating to the public (Abbas et al., 2018) are needed besides the communication network in all phases of disaster mitigation (Wardyaningrum, 2016). As such it is necessary to do research with the aim provides an overview of the disaster communications to support mitigation wetlands fire in the future.

Literature Review

Media properties are able to reach the masses in large numbers and wide (universality of reach), as well as the public are able to give popularity to anyone who appears in the media (McQuail, 2000). Facts show with the development of technology it is easier for social interaction. Online media that is able to convey messages quickly and is able to influence society. Events there then framed media online and then delivered as quickly as a necessity to society.

Online media is the result of a study of communication technology that offers to users as a medium that acts as a communication tool. Online media can accommodate such news e-journal article. Online can be defined as the language of the internet, which means the information can be accessed anywhere and anytime as long connected to the Internet network (Aisha et al., 2015). The basis for researchers choosing online media as the object of research is based on data from the Ministry of Communication and Information (Communication and Information) in the year 2010 showed 39 million of 245 Indonesians were internet users and 64% of them are young people aged 15-19 years. This data shows that young people have great access from the internet. This statement is also supported by the fact that customers state that accessing the internet via mobile phones reaches 25 million customers. (Siregar, 2016).

Media communication as a means of supporting the disaster information system has an important role in preparedness and early warning to the public. (Lestari et al., 2018). Disaster communication carried Online Media consists of peat land fires related information and education on disaster mitigation (see Figure 1). In the study, only four online media were studied, because the four online

media selected in this study were sufficient to represent the whole of the news that appeared in the media related to information on forest and peatland fire disasters.

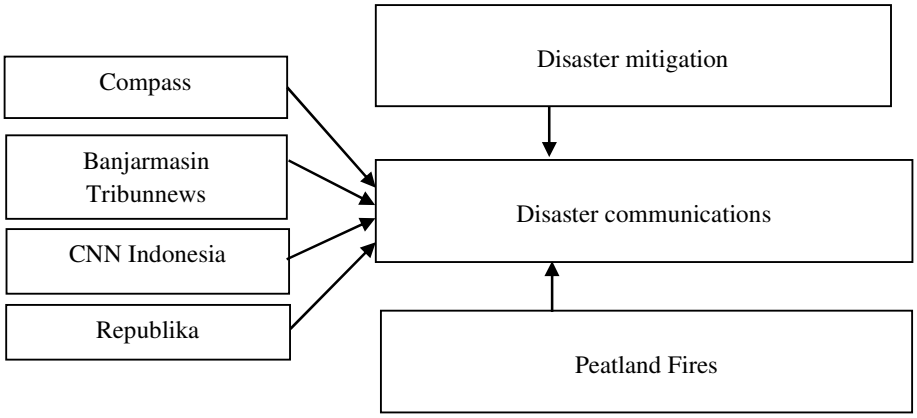

Figure 1: Communication Disasters

Method

This type of research uses qualitative and descriptive approach. The collection of data is through documentation study by collecting news text purposively. The unit of analysis is the news about the peat fires in South Kalimantan. The media selected is Kompas.com online media, Barjamasin.tribunnews.com, Cnnindonesia.com, and Republika.co.id in September and October 2019 (see Table 1). Determination of criteria for the month included the peak occurs peat fires in South Kalimantan. The reasons for selecting media for the four media are some of the online media concerned with fire-related news. In addition, news in the online media have good news standards according to the rules of journalism.

Table 1: Variable Research

Purpose	Variables	Data collection
Disaster Communications to support the Fire Disaster Mitigation Wetlands in the Future	Kompas.com	Secondary Data
	Banjarmasin Tribunnews.com	Secondary Data
	Cnnindonesia.com	Secondary data
	Republika.co.id	Secondary Data

Source: Walgito 2003; Sugihartono 2007

Framing analysis techniques apply analytical models Robert M. Entman. Analysis framing is trying to uncover the disaster communication in online media. The concept of framing to describe the selection process aspects of fire disasters wetlands constructed reality of the mass media (Eriyanto 2011; Asteria, 2016). The study uses the element of credibility which the observations in the study is based by taking reference from books and previous research credible used as a reference (Asteria, 2016). The researcher choose Entman framing device because the device is able to assist investigators in describing the disaster communications conducted by online media. Framing is seen as the placement of information in the context of more specific so that the issues addressed obtain a larger portion of the other issues (see Table 2).

Table 2: Analysis of Framing

Define Problems	The first element as master framing. Here, we can see how an event is understood. Whether the news is positive or negative.
Diagnose Causes	Find and estimate the source of the problem. This dimension seeks or seeks to know how the event is understood, occurs and what or who is considered to be the source of the cause.
Make moral judgment	An assessment of the moral values of used to legitimize or argue for an action or idea being made
Treatment recommendation	What efforts or solutions are offered and done to resolve the problem. This settlement depends on the issue and who the caused the problem (the first element)

Source: Eriyanto 2011

- Define problems or define problems, that is to determine what agents do with prices and profits, generally measured in the form of cultural values.
- Diagnose causes or diagnose the cause that is identifying the strength of creating the problem.
- Make moral judgments or make moral judgments, namely evaluating causal agents and their effects.
- Suggest remedies offer and assess treatment for various problems and predict the same effects.

The author uses the four dimensions of framing analysis above because based on these four dimensions, in conducting research related to the construction formed by the media can cover the problems discussed in the news to the possible effects arising from information disseminated through the media.

Results and Discussion

The study examined how the media do framing news of the disaster in wetlands. The mass media are researched online and print. The study was conducted from September and October 2019 for the month is the peak of the fire in the wetlands. Fires that occur in the month a lot happening in the area near the airport so as to disrupt flights. The media's role is indispensable in providing Early Warning System. The media's role is to frame the news about the fire disaster (see Tables 3, 4, 5 and 6).

Table 3 is the result of analysis on a daily compass framing. The results show a compass newspaper more news about a fire that occurred in the area near the airport. Framing Entman based approach illustrates that the direction of the news of Kompas.com in the framing of fire-related news. Fires emphasize largely a community role. Kompas.com successfully framing to resolve cases of fires should begin to change people's habits in interacting with the environment. Kompas.com also more interested in preaching the impact of the fires that disrupt public facilities in the public area.

Table 3: Framing Analysis on Media Compass

Title News	Date	Time	Explanation
Despite mobilizing 5 Heli "Water bombing", the smoke from wildfires begin to cover the airport in South Kalimantan	5 September 2019	13:48 pm	Land and Forest fires in South Kalimantan are widespread. What was done to anticipate this, five water bombing helicopters were deployed by BPBD of South Kalimantan to extinguish.
Land and Forest fires in South Kalimantan Threatens Aviation Traffic at the Airport	13 September 2019	11:34 pm	Smoke haze as a result the forest fire encroached the airport and 6 points in the city Banjarbaru fire spread
WALHI call *karhutla* (Land burning) occurred because people do not want to adapt to the natural world	21 September 2019	13:53 pm	Land and forest fire as a result of the attitude of man. People do not want to adapt to nature, especially with peat. Ecosystem. The campaign of WALHI said that peat ecosystem that is occupied with the approach adaptive are not going to like a forest fire**.**
BNPB: widespread land burning achieved about 857.000 hectares	22 October 2019	15:46 pm	The head of the data information and communication disaster of BNPB, Agus Wibowo stated that The same area of land burn in the entire territory of indonesia reached 857.000 hectares. This figure identified from January to September 2019.

Source: Primary Data, 2019

Framing Analysis on Media Banjarmasin Tribunnews is a fire that occurred in the area around the airport and a few other areas in South Kalimantan (see Table 4). Analysis of framing used approach *Make moral judgments* taken from the model framing Robert Entman. The analysis showed Media Banjarmasin Tribunnews in news framing emphasizes humane touch in fire-related news. Banjarmasin Tribunnews trying to show the fires, the penalty for burning and deliver the message to the reader so that it will form a new information and opinion in the community is more than just the fire.

Table 4: Framing Analysis on Media Banjarmasin Tribunnews

Title News	Date	Time	Explanation
Land Fire in banjarbaru and peat, officers being shut out of farmer when he want to extinguish the fire in the field	23 October 2019	18:57 pm	The land and forest fire growing in the last one week in south kalimantan. Especially in two locations which are in Liangangang Banjarbaru, south of the circumference and the kilometers 17 A. Yanni, Gambut, Banjar Regency.
Severe penalties waiting for incendiary players land it has been six the suspect arrested by the police of Kapuas	20 september 2019	15:40 pm	There are 6 in 2019 at karhutla (Land burning) suspects who are secured by police. Severe penalties waiting for incendiary players land. They will be subject to article 108 Jo article 69 paragraph verse (1) of the letter H UU RI no 32, 2009 on the protection And environmental management and or Article 78 paragraph (3) Jo article 50 paragraph (3) letter D UU no. 41 of 1999 concerning

			forestry.
Children in rural areas it is the spirit help the extinguishing of fires of forests and land areas	16 October 2019	12:02 pm	As with spirit, children who sat on the bench most primary school shut down the fire by simple tools, in Subdistric of Pelaihari, Tanah Laut Regency, South Kalimantan

Source: Primary Data, 2019

Table 5 Analysis of Framing in CNN Media Indonesia explained the fire occurred near Syamsudin Noor Airport and near the settlements.CNN Indonesia in framing the news presented to readers is more comprehensive. From the Define Problems side, we have provided detailed news related to the fire incident. Another article corroborates information on how the role and performance of the government for handling fires has affected the disruption of public services in the community. Existing conditions are further strengthened by Treatment recommendations that illustrate the government's follow-up in finding the root causes of fires and crack down on Burners in South Kalimantan Province.

Table 5: Framing Analysis on Media Cnn Indonesia

Title News	Date	Time	Explanation
The empty land near the airport Banjarmasin are burning	13 September 2019	14:46 pm	Land fire near the Syamsudin Noor airport and the residental area of risky disturb flight as those which have occurred in a few days
The government of the Province of south Kalimantan deploy birds ababil team to handle Land and Forent Fire	20 September 2019	9:08 pm	The government of the province of South Kalimantan sent their personnel special volunteers that was given the name which ababil to handle Land and Forest Fire. This is because karhutla (Land burning) are getting worse and made a number of areas besieged smoke haze harmful to people
The police catch hand a burner land in South Kalimantan	21 September 2019	19:53 pm	The suspect a burner land caught hand by police in the village of Sungai Kupang, South Kalimantan.

Source: Primary Data, 2019

Framing Analysis on Media Republika in Table 6 provides information on the extent of land burned near an airport is quite extensive. Online Media Coverage in the Republika very informative, backed by further strengthen the image information for the reader to be visualized condition Forest and land fires in South Kalimantan province. Conditions seen from *treatment recommendation* already covered in the news media, where one of the articles describe government South Kalimantan Province has been determined to deal with fires. Fire mitigation is done by presenting team of experts to investigate and find out the root of the problem and solutions fires.

Table 6: Framing Analysis on Media Republika

Title News	Date	Time	Explanation
In Picture: Peat fire reached population areas	14 September 2019	23:59 pm	The same area of land which is burned in south Landasan Ulin, Subdistrict of liang anggang, in the form of brushwood predicted about 400 hectares
People homes are prevented in Banjarbaru peat fire	21 September 2019	20:40 pm	The task force land and forest fire of the forestry office south Kalimantan used a syringe peat while trying to extinguish fires peat in Syamsuddin Noor area, Banjarbaru, South Kalimantan

Local police forces in South Kalimantan bring a team of experts ipb to check karhutla (Land burning) in corporate	25 September 2019	22:55 pm	Local police forces in South Kalimantan Polda bring a team of IPB's experts to an inquiry land and forest fire.
In picture: Karhutla (Land burning) in South Kalimantan burned the house of residents	23 October 2019	23:34 pm	Land and forest fire in South Kalimantan not only burn the forest and shrubs Subdistrict of Gambut, Banjar Regency, Kalsel, Tuesday (23/10) but also Burned the house of an urban center far from fire location.

Source: Primary Data, 2019

Results of several media framing is emphasizing the role of the government to anticipate and cope with the impact of fire disasters occurring wetlands. Fires lead to people losing good material, safety and health. Emphasis important value in some media that there is:

a. Coverage compass describes a fire broke out at most in the area near the airport and consequences of human behavior;
b. Tribunnews explained fire broke out in the area around the airport and a few other areas in South Kalimantan. Severe punishment will be given to arsonists;
c. Cnn Indonesia explained that the fires occurred near Syamsudin Noor Airport and near to residential areas. Fires disrupt flights and endanger public health. Special forces set up to extinguish the fire;
d. The mass media Republika burnt land near the airport reached 400 hectares. A team of experts for the investigation was imported by land and forest fires. Fire fighting with a syringe peat.

Photos in some mass media emphasize the impact of fires information affecting aviation and public health. The fire occurred around the airport and close to residential areas. Besides the photos also give information to the fire-fighting effort peat injecting technique (see Figures 2 and 3). The problem that arises is the presentation of the photos is not yet supported by the geographical location information so that the reader guessing if the location near the airport. In addition caption on the news that there is still in general.

Figure 2: A Photograph of peatland fire suppression with peat syringe technique in the area of Syamsudin Noor Banjarbaru, South Kalimantan in Republika, September 14, 2019 (23.59 GMT) (Pic: ANTARA FOTO)

Figure 3: A photograph officers BPBD South Kalimantan with MPA extinguish the fire in peat near the Airport Syamsudin Noor on CNN, September 13, 2019. (14.46 GMT) (Foto: ANTARA FOTO/Bayu Pratama)

Conclusion

a. Online media is the object of studies that have provided impartial information related to news Fires in Wetlands
b. Emphasis framing on each of the different media is appropriate from media perspective,
c. Socializing is needed by society as a medium of information to determine the extent of catastrophic conditions that occur in an area.

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Branding Management in Mergers of HEI's in EU

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Abstract

Mergers among public universities have been taking place in recent decades just as often and on a larger scale as private universities. However, many management processes related to mergers of public universities vary between public and private universities. One of such cognitive and practical gaps in managing university mergers is brand management in both public and private universities. The aim of the article is to examine various strategies, methods of managing university brands in merger processes, as well as differences between public and private universities in the field of brand management. The research methods will be: literature review and comparative analysis of 3 cases of mergers of universities implemented in two European countries in the years 2000-2016. Mergers of private universities, according to the literature on the subject, are more conditioned by economic goals and implemented using business methods of brand management. In the university sector we are dealing with both acquisitions and mergers. However, the term fusion is more often used for public universities, as usually the merger of universities does not change radically the founding and ownership structures. Public mergers have their own characteristics that are different from private universities. They occur quite often in recent decades as the implementation of public policies. They have various goals, including: qualifying for world university rankings, strengthening their position in international research networks, increasing the efficiency of university management and increasing the quality of education.

Keywords: Brand, University Mergers, Brand Management, University Management

Introduction

"Merger mania" in the higher education institution sector has been an ongoing phenomenon in numerous countries for a few decades and in other educational systems consolidation experience dates back one hundred or even more years (Sulkowski, 2017). Mass merger programmes have been or were implemented in, e.g. China, the Republic of South Africa, the USA, France and Norway. Strategic mergers among large public higher education institutions, in their turn, are implemented in many countries. This has happened in Finland, Sweden, France and even in Vietnam (Pinheiro, Geschwind, Aarrevaara, 2016). In most countries the consolidation of higher education institutions is implemented at the bottom-up level but tendencies for mergers between higher education institutions at the central level reflected in public policies are also visible. Moreover, in certain countries, e.g. in the Republic of South Africa, Russia, China and Norway, top-down consolidations, which create more controversy, occur (Karodia, Shaikh, Soni 2015). Thus, the objectives of mergers are diverse and may include becoming "world-class universities", the rationalization of education and research networks and restructuring aimed at increasing the effectiveness of the educational process (Cai, 2016). Improving

the access to and quality of higher education targeted at disadvantaged groups may constitute a specific objective achieved thanks to mergers. This has been the idea of the higher education consolidation and transformation in the Republic of South Africa.

There are several reasons why brand management is of strategic importance in university merger process. One perspective is that university brand is significant for students and other stakeholders as it influence international and national recognition of universities (Sulkowski, 2016). Consolidated universities, that used to be separate institutions, now operate under one name in national and international rankings. The name of the university contributes to the creation of its image through the message reflecting the identity of the university. Cultural dimension of the university brand adds to the identity of the very organization, its staff and contributes to building the external image of the institution (Sulkowski, Seliga, Wozniak 2016; Sulkowski, Seliga, Wozniak 2018). Academic world is increasingly recognizing building reputation through intensive communication, marketing and activities related with internal branding (employer branding). Concepts such as brand and image are close to reputation, they are also associated with culture and organizational identity (Aula, Tienari 2011). All these areas of the activity of universities are subject to deep transformations in mergers and acquisitions. The concept of brand, although important for many different aspects the activity of the organization, is usually analyzed on the grounds of marketing.
The aim of the article is to show the role and importance of the university's brand management in the process of merger of higher education institutions. The article provides a review of the literature and positions contained in the literature on the subject and contains case study comparative analysis of three cases of brand management of HEI's.

Literature Review

According to the American Marketing Association (AMA), a brand, is "a name, term, design, symbol, or any other feature that identifies one seller's good or service as distinct from those of other sellers" (AMA). H. Mruk presents a different approach to this concept - the brand can be particularly identified with the notion of a trademark (Mruk 2002). Also, the concept of brand is combined with the product (Altkorn, Kramer 1998). Clients who make the decision about choosing a university increasingly take into account the value of the brand, the benefits that may result from receiving the final degree. The Aaker model can be used to verify the value of the brand. This model assumes five basic elements related to the brand's value: brand relationships, other brand-related assets, loyalty, brand awareness and perceived value of the brand.

Other assets related to the brand include for example certificates, accreditations, signed cooperation agreements, where accreditations and certificates reinforce the name, logo and brand. Loyalty is manifested in the attachment to the university through brands directed to the society, students and employees that shape ties with the university. The practice of implementing loyalty programs among students and graduates is more and more common in higher education sector. Brand awareness is the brand recognition, the number of associations with a given brand are analyzed, the bigger it is, the stronger the brand's position is. In the case of universities, these may be such features as: top quality of education, a diploma that is recognized in the labor market, good infrastructure for studying, professional scientific and didactic staff, but it may also be a well-known sports team for example. As far as perceived value of the brand, in this case the perception of the university as an institution that offers products and services is measured. It very often happens that the perception of the quality of education at a given university is a determining factor of the choice of a particular university (Sulkowski, Seliga, Wozniak 2017).

The position of the brand depends largely on the way in which consumers perceive the quality of a given brand, its advantages and disadvantages, price and value (Dibb, Simkin, 1993; Ries, Trout 1993). More and more often producers of the highest quality products must introduce elements that distinguish their product from the competition – the ranks of the growing number of international brands (Agrawal et al. 2011; Morhart, Herzog, Tomczak 2009; Henkel et al. 2007; Kaufmann, Cajthaml, Meier 2007). The

same happens in the higher education sector. Universities are seeking to obtain international accreditations from foreign, sectoral and international partners in order to differentiate themselves from other schools on the market (Hogan, Lucke 2006). Higher schools attempt to measure the satisfaction of students and graduates regarding, for example, the quality of education or conditions at the university by means of quantitative methods (e.g. surveys) and qualitative ones (such as in-depth interviews). The research outcomes are used not only to verify the university's management methods, but also to assess the effectiveness of marketing activities carried out by specific organizational units.

The university's brand also has a direct impact on the university diploma. In the literature of the subject, attention is drawn to the four terms of the brand, which can be successfully applied to both the university's brand and its diploma. According to D. Antonowicz, M. Krawczyk-Radwan, D. Walczak, the brand can be distinguished as: a utilitarian sign, a commercial sign, a social sign and a cultural sign, a sign that reflects a certain symbolic, but also mythical value of the product (Antonowicz, Krawczyk-Radwan, Walczak 2014).

The practice of management distinguishes four basic brand strategies: individual brand strategy, family brand strategy, common brands for product groups and mixed strategies. Individual brand strategy is characteristic for individual products with different brands. In the brand family strategy, all products of the company enter the market under one brand. In this strategy brand functioning involves lowest costs. Common brands for groups of products is a strategy based on entering a group of products under one brand. The mixed strategy with respect to the brand is, among others connected with combining the brand itself with the name of the company.

Methodology of Research

The research methodology used is qualitative and is based on a comparative analysis of enterprises case studies. The sample of enterprises cases was selected deliberately, the selection was based on the following criteria: data availability, literature on the subject and authors' experience. The sample is heterogeneous because different university cases are compared, both by type, size and country. The selection of qualitative data for comparative analysis was conducted with the use of the following techniques: free interviews with a list of open questions, documentation analysis, participant and non-participant observation, as well as autoethnography (the universities described are the places of work of the authors of the article) (Sulkowski, 2013).

Conducting comparative studies, based on comparative analysis of case studies, serves to better understand the dynamics of personnel processes at universities and is the starting point for further explanatory research.

The study was carried out in 3 stages leading to an attempt to solve the research problem and answer six research questions formulated in the introduction to the monograph.

Stage 1. Conceptualization, preparation of research methodology and piloting.

Stage 2. University case studies.

Stage 3. Comparative analysis of university case studies.

In the first stage, based on the literature analysis, the problem and research questions were formulated, research methodology was planned, free interviews were conducted and appropriate research tools were prepared. After a series of 3 free interviews conducted with key informants at three universities and a preliminary analysis of documentation, research areas, research indicators and questions the interview questionnaire were formulated. The research tool in the form of an interview questionnaire consisted of 5 open research questions, which were used to conduct an in-depth interview in the next stage of the research. Already in the first stage, a targeted sample of 3 cases was identified *a priori*.

The structure of the sample was based on two criteria: 1) secondary data allowing to describe the personnel processes at universities, 2) availability and possibility of obtaining data in primary research.

In the second stage of the research, qualitative study was conducted, based on the methodology of grounded theory, including: in-depth and narrative interviews, documentation and text analysis, as well as participant and non-participant observation. The research methodology uses the methodological assumptions proposed as part of grounded theory, which allows for deep exploration of the problem, while maintaining methodological rigor (Glaser Strauss 2006). The methodology of grounded theory can be described as "qualitative comparative analysis of case studies" (Baxter, Jack 2008). The method used allows for careful generalization of the results, while maintaining: methodological pluralism, openness, reflectiveness and flexibility of grounded theory (Sułkowski, 2013). Methodological triangulation is to be achieved through the use of a multitude of complementary research methods and techniques. The most important ways to collect data are: in-depth interviews, participant observation, non-participant observation, documentation analysis, auto-ethnography (stage 2).

The organization of the third stage of the study involved study visits at universities (observations), collecting documentation and 3 in-depth interviews. Some of the interviews were conducted directly, in other cases they were done on the telephone or online. Case studies, prepared according to the assumptions of the "thick description", were subjected to comparative analysis (stage 3). Primary and secondary data from the study and the literature were used for this analysis. An attempt was also made to provide an initial answer to the problem posed and research questions that were discussed with three participants in previous studies.

Results and Discussion

Jagiellonian University

The example here is the 1993 incorporation of the Medical Academy into the Jagiellonian University. Because of its history and its significance in Polish culture and national identity, the name and symbolism of the Jagiellonian University are invaluable. It is symbolic capital that could and should also be used to make the university a global brand. Until now, the Jagiellonian University has been better recognized by the letters ‘UJ’ (for its Polish name, Uniwersytet Jagielloński). Interestingly, apart from preserving the brand of the Jagiellonian University, which is probably the strongest university brand in Poland, the internal and dual branding of the Collegium Medicum was created. This worked in favour of both organizational continuity, and the organizational identity of the former Medical Academy.

The Université Grenoble Alpes

This example of rebranding is the creation of a federated university in France at the beginning of 2016. The Université Grenoble Alpes was founded in Grenoble with the merger of three universities in the region. The creation of its new branding was accompanied by similar dilemmas as the Aalto University. The branding was new, which meant initially low recognition. Employees of the merging universities may have had a sense of acculturation and loss of continuity. The name of the university was thought up from scratch, which allowed use of the concepts of effective marketing communication and public relations. It is a simple brand, easy to remember and readable not only in France, but also in many other cultural contexts. The name and logo of the university are rooted in the local context, which at the same time has a significant level of recognition in the global context. The Alps evoke an unambiguous association with one of the most beautiful and culturally interesting regions of Europe. The logo is minimalistic and shows the mountains drawn with one line. From the marketing point of view, the new branding and logo of the consolidated university provide a basis for success, although of course the success of the merger depends on many factors, most of which are unrelated to communications.

University of Social Sciences

An example of brand building through mergers of universities in the non-public sector is the University of Social Sciences. It is a university that occupies leading places in the rankings among Polish non-public universities and is one of the largest non-public universities in Poland. This university, due to the adopted strategy of territorial diversification and a highly recognizable brand, successfully conducted the merger process by taking over a local university (University of Business in Kielce, Department in Tarnobrzeg) with a significant position in the region in 2016. As a result of the acquisition, the acquired university adopted name and logotype of the Social Academy of Sciences. In this way, USS recognition on the new local market was strengthened.

Comparative analysis of three cases

Table 1: Comparative case study analysis

Criteria	Université Grenoble Alpes	Jagiellonian University	University od Social Sciences
Brand strategy	New	Old	Upgrade for stronger HEI
Brand creation	Competition, consultations, voting, approval of: Presidents, senates, Ministry of Education	Traditional, approval of: rectors, senates, Ministry of Education	Academy status, approval of: founder, rector, senates,
Stakeholders' participation	High, open consultations and voting	Limited, 'obvious choice'	Limited, 'obvious choice'
Image of the university	New regional association – the Alps, reference to tradition (U de Grenoble)	One of the oldest universities established by the kings, proof of the historical might of Poland	New regional university
Conscious choice of brand strategy	Yes, branding based on managerial objectives	Partially, striving after re-integration	Branding based on managerial objectives
Participation of the 'weaker partner'	Very high, joint consultations and decisions	Considerable, joint consultations and decisions	Limited, expressing opinions
Criteria for brand selection	1. A compromise between stakeholders 2. Image enhancement 3. International recognition	1. A compromise between stakeholders 2. 'Unification'	1. Decision of the stronger partner 2. Image enhancement through acquisition.

Source: own study

Analysing the results, one can also identify the overall strategy of the entities in question. Public universities merge in order to increase their scientific potential, and in consequence improve their positions in international educational rankings. Non-public universities merge in order to diversify their educational programme in terms of territory, and to strengthen their position in the national (local) sector of higher education institutions. Both strategy types are closely linked to development of the university's brand. The analysis also found major significance in the work of HEIs creating the brand image of a new university. The university's brand image, the awareness of it and its value are all particularly important when thinking about initiating a merger. The research demonstrated that these are some of the main criteria adopted by a university's authorities when selecting their merger strategy. When describing brand management in mergers of public universities, the point of reference should be the stakeholder model. A newly-merged university's name is a compromise between different internal and external stakeholders. Brand management in public universities also reflects the merger type, and so the branding strategy references the consolidation strategy. At the other end of the scale are integration mergers, as a result of which two or more HEIs create one organizational entity under one brand. An example of this from the research is the University of Social Sciences in Łódź. The typical branding strategies selected by public universities are maintaining the previous, usually stronger brand, and the umbrella brand strategy. Both cases can lead to strengthening of the brand awareness of the new university and its position in the international environment. The most important criteria for HEIs choosing a branding strategy include: compromises between stakeholders, mostly internal; image enhancement and better brand recognition, and strategic allocation of the university's existing resources to strengthen its position in the global scientific and research context.

Conclusions

The importance of mergers in the university sector is increasing in many countries. Public universities participate in consolidation processes due to the possibilities of: implementation of public policy, moving up in national and international rankings, rationalization of science and education networks, and strengthening economies of scale. The reasons for the popularity of consolidation among private universities are market and organizational sources. Thanks to mergers, private universities can achieve economies of scale, and in the case of many smaller schools, which face lower demand for higher education, avoid bankruptcy.

To sum up brand management contains: marketing strategy, branding (usually name of HEI) and partnership marketing. In addition there are different methods of brand management of HEI's depending on strategy and tradition. In our cases Jagiellonian University represent strong traditional name from medieval times that dominates the merger. Université Grenoble Alpes represent new attractive marketing name and logo, joining city name with main recognition point (Alps mountains). For described merger of two private universities, the name of stronger partner (University of Social Sciences) was dominant brand. To conclude, both for private and public universities, the name of a stronger and more prestigious partner of merger is chosen as name for merged HEI's.

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How New Technologies Change the School Education

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Abstract

Electronic devices, the Internet, artificial intelligence are elements of every person's life. The paper puts forward a dissimilarity between technologies for acquiring knowledge and technologies for learners to give an explanation for how technologies effect teaching and learning. The development and dissemination of modern technologies changes the context and way people function. The paper reflects on how sorts of technology application will form schools and learning.

Keywords: New Technologies, Information Society, Education, Curriculum

Introduction

From the point of view of the sociology of education, school education has a complementary function to that of the family in preparation for functioning in social life. Emille Durkheim (1984) pointed out that the purpose of formal education is to shape the moral community and prepare for the roles in the social division of labour. Earl Hopper (1971) on the other hand, pointed out that education has four key functions in modern society: competence training, selection on the basis of mastered skills, allocation in paths leading to specific social and professional positions and regulating aspirations of young people. From this perspective, education is a function of social demand - it is supposed to prepare young people to function in specific cultural (norms and values), professional (jobs to be undertaken) realities, which is connected with taking a specific place in the social structure.

The Role of School Education

The characteristics of the world to which the school prepares for set its tasks, which translates into the expected way of its work. This happens both through purposeful actions (the so-called overt school curriculum) and through non-intentional mechanisms, a kind of side effects of purposeful actions taken at school (the so-called hidden school curriculum).

What is more, technological development accelerates social and cultural change. Modern forms of communication are changing the nature of communication and redefining key social values and norms. A contemporary person must therefore be prepared to acquire new skills, not only technical, but also socio-emocional. This leads to an indication of the range of key skills necessary for the functioning of the contemporary world: *communications skills*, *the ability to learn independently*, *ethics and responsibility*, *teamwork and flexibility*, *thinking skills* , *digital skills*, *knowledge management* (see more: https://opentextbc.ca/teachinginadigitalage/chapter/section-1-3-the-skills-needed-in-a-digital-age/)

Technological development therefore changes the reality of school work. Moreover, the school is supposed to prepare individuals to function in a social world saturated with modern technologies, i.e. within specific forms of social relations possible and often enforced by modern technologies (e.g.

specific relations mediated by social media). Finally, modern technologies are a new instrumentation of school work - tools for working with students. How can we describe this change?

Technology Reshaping Teaching Process

New technologies are changing school reality by allowing teachers to use more attractive methods for students, using online materials and ready-made lesson plans. Not without significance is the possibility to consult with other teachers through social media. Dedicated educational platforms enable effective distance learning.

One of the most visible aspects of the implementation if the modern technology is the change of the dynamics of education, especially the relationship between teachers and students. Teachers are using technology to replace old models of standardized learning and create more personalized, self-directed experiences for students. There's more multi-device synchronization with software that supports collaboration and more support for virtual conversations, both within and beyond a classroom. Blended learning programs combine online and face-to-face interaction. Furthermore, it changes the wider educational community – as blended learning changes the role of the educator to become more of a facilitator and coach, there's a growing use of para-educators who work alongside teachers to manage online learning and help with classroom activities.

Teachers are responsible for managing knowledge of where students are and where they are supposed to steadfastly press; having insights into students' particular requirements and development; selections of curricular activities and materials; procedures that govern students' involvement; expectations from parents and communities; and the standards and guidelines that govern them as teachers.

The use of new technologies allows for the implementation of new pedagogy – it seems that technological saturation allows for a real transition from the traditional model of education, with the central role of the teacher as the owner of knowledge and responsible for passing it on, towards pedagogy focused around the student and his/her activity, staffing the teacher as a stimulator, coach, guide.

This corresponds to the importance of inter- and intrapersonal competences in education. The so-called *21st century competences* presuppose having skills in group work, effective communication, problem solving, perseverance, conscientiousness, etc. The methods of projects with the use of Internet resources, according to Finegold (2010), trowel in groups with the use of remote links are only the most common examples of this type of activities.

Generally speaking, education comprehends all technical innovations at its own slow pace. As it comes to IT, this process has gone fairly quickly. It is worth recalling the great organisational and financial effort that was needed to create IT labs at schools.

Technology Reshaping Learning

New technologies are therefore seen by educators as an opportunity for an educational revolution. Advanced technologies enabling the use of virtual reality in educational settings open new fields for the training of skills so far limited by the physical attributes of a given school - its location or equipment. Virtual reality enables "leaving school" and "entering" into the "reality" of the realm we are learning about. This creates conditions for education through immersion.

According to Collins and Halverson (2009) learning technologies have taken different developmental routs inside and outside of schools. Some technologies thrive in schools; other technologies that seem to argue the purposes of schooling now prosper outside of schools and bring to existence new learning environments, like home schooling, video gaming, or social networking sites. Virtual and augmented reality allows students to travel to ancient history, explore the universe and

visit museums in different countries without leaving class. One of the greatest achievements of such technologies is that they make science more engaging and inspiring. They allow us to change attitudes through engaging experiences. It is assumed, that these immersive experiences can contribute to faster learning.

Finally, the development of technology enables a progress of lifelong learning. The requirements of the modern world cause that education should not be something that is done in a specific institution for a certain period of time. Equally important is the fact that the labour market requires repeated retraining and adaptation to the reality of work, which is changing due to technological progress.

The world hit the digital age particularly hard in the last decade of the 20th century, triggering the sequence of events changing the nature of human's work and life. From the analog society the idea of digital society has been realised in a relatively short time. We are increasingly surrounded by digital products using the up-to-date electronic, information and communication technologies.

The Need for IT Preparation

According to amateur public and to a greater part of teachers, the term educational technology refers to the didactic use of computers, television, and other kinds of electronic hardware and software. Authorities in educational technology, especially college and university faculty who teach courses on educational technology, select the term *instructional technology* as it emphasises the instructional use of educational technology. Ely D.P. and Plomp T (1996) states that one of the main competent connotations characterising educational scientists, "*Instructional Technology is a complex, integrated process involving people, procedures, ideas, devices, and organization for analyzing problems, and devising, implementing evaluating, and managing solutions to these problems, in situations in which learning is purposive and controlled."* Educational technologists often make use of the expression instructional media to exemplify all of the devices that tutors and students employ to reinforce learning. As Molga (2003) states, the effectiveness of computer-assisted education determined by the expected attitudes, skills and knowledge, is tremendous and simply justifies the use of a computer. Furmanek (2011) points out that even the most flawless computers and the most genius software cannot replace a form of communication with a teacher who apart from knowledge, contributes his or her own personality and value system, which is related to the introception of values in the student. It means assigning value to one's own consciousness; approving as their own aims, standards and convention not created by themselves but recognised by the environment.The current paradox is that information and communication technologies that were shaped with a view to bringing people together actually move them away from each other.

Conclusions

To sum up, technological devices introduce a dare that educators cannot afford to neglect. Properly integrated into a regulated environment, these tools need not accomplish any dehumanization of the schools. Conventional teaching methods, classrooms systematised by grade level may let control over what is acquired, but not over what is learned. Hence, the schooling machinery must be entirely transformed. While the suitable sides of education's common methods must be preserved, the technology must be properly combined into a man-machine system.

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Forecasting Electricity Prices in Poland

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Abstract

The aim of this article is to assess short term electricity prices in Poland and to compare the forecast accuracy based on ex post errors. We estimate the ARDL (autoregression models with distributed delays) models to calculate forecasts. The motivation to undertake the research is the demand for such forecasts reported by the wholesale electricity market in Poland. As a result of analyses for shorter forecast horizons, i.e. one and two-week forecasts, the simplest AR model gave the lowest forecast errors. For longer horizons, better results are obtained from model with additional variables.

Keywords: Forecasting, Electricity, Prices

Introduction

The history of the free energy market in Poland is not long and is associated with the raising the demand of demand for electricity and other fuels or heat due to economic transformation in 90's of 20th century. A turning point for full liberalization of the power sector was the launch of the Polish Power Exchange - Towarowa Giełda Energii S.A. at the end of 1999. One of the main tasks of the electricity exchange is to provide market participants with information on electricity and natural gas prices.

Knowledge of price forecasts on competitive electricity markets is crucial for wholesale consumers and producers in planning activities and managing risk and also plays a significant role in economic optimization in the electricity sector.

The purpose of the following paper is to determine short-term electricity forecasts and to assess their ex-post errors. The goal is achieved by using econometric regression models with distributed delays. The motivation to undertake the research is the empirical need for such forecasts reported by the wholesale electricity market in Poland.

Works, which are dealing with forecasting energy prices on the Polish stock exchange are, for example papers Fijorek et al. (2010), Ejdys et al. (2015). The forecasting of energy commodity prices is dealing by Śmiech, Papież (2015). There is a gap of comprehensive research which uses econometric methods to forecast electricity prices in Poland.

The Energy Market in Poland

The beginning of the liberalization in energy trading is associated with Chile in 1982, the next was England in 1990, the third Nordic market was developed in 1992. The first professional power exchange was called NordPool (Weron, 2006).

Electricity prices in Poland are mainly due to its listing on the Polish Power Exchange (Towarowa Giełda Energii - TGE). Energy prices is listed in the form of the next day's market index. From 2008, POLPX (Polish Power Exchange Index) also launched the Electricity Derivatives Market. Futures for the electricity supply allow to determine the price of electricity for a long time horizon. This allows sellers and large energy consumers to forecast prices and optimize their electricity costs. In 2010, there were significant changes in the structure of electricity sales in Poland. The so-called the "stock exchange obligation" and price setting method on the market became more transparent and the stock market became more important. Since then the producers were required to sell at least 15% of the energy produced on commodity exchanges. From this change, the price can be considered as a reference

price and began to function in Polish energy trading (Grudziński 2011). Currently, TGE is owned in 100% by the Warsaw Stock Exchange.

The longest-functioning market on the Polish Power Exchange is the Day-Ahead Market (DAM). This market was created on June 30, 2000 and is a real spot market for electricity. Prices on this market are the basis for other contracts on the wholesale energy market in Poland. The most important contracts are Base and Peak with the index prices: IRDN (Day-ahead market index) and sIRDN (weighted average day-ahead market index).

Futures (RTT - Commodity Forward Instruments Market) is another important market. Currently, RTT trading is based on four types of instruments due to their maturity: weekly, monthly, quarterly and annual. Contracts executed on RTT allow setting the price of electricity for a longer horizon - up to three years ahead.

Forecasting energy prices is well known issue. A wide literature dealing with different methodologies for forecasting electricity prices is contained in Weron (2014), related to dynamic factor models Maciejowska, Weron (2015), quantile regression Nowotarski, Weron (2013), Hodrick-Prescott filter Weron, Zator (2015), regime-switching models Janczura, Weron (2010) or ARMA models Nowicka - Zagrajek, Weron (2002). It should be noted that these items do not exhaust the spectrum of methodological approaches to forecast energy prices. In addition to the above-mentioned, Largo (2018) and Bunn (2004) also deal with this topic. They are considering international electricity market.

Attempts to forecast electricity prices in Poland have been made in Ejdys, Godlewska, Halicka (2015) or Fijorek et al. (2010). Analytical studies dealing with prices and their structure are also available, without setting forecasts - Grudziński (2011). Analyses for Central and Eastern European countries like Bulgaria, the Czech Republic, Estonia, Hungary, Poland and Slovakia for energy production costs is presented in Maca, Melichar, Scasny (2012).

The energy market is a basic element of each country's security policy. Energy is fundamental element and therefore is in the center of interest of the highest level decision-makers.

The key legal acts regulating energy issues in Poland include:

i. The Act of 10 April 1997 - Energy Law
ii. The Act of 20 February 2015 on renewable energy sources
iii. The Act of 20 May 2016 on energy efficiency
iv. Act of 8 December 2017 on the capacity market.

The binding strategic document for the energy sector in Poland remains the Polish Energy Policy until 2030 adopted by the Council of Ministers in November 2009, as well as the Energy Security and Environment Strategy - the perspective up to 2020 adopted by the Council of Ministers on April 15, 2014. In 2019, the draft of Energy Policy for Poland until 2040 was created. It has not been entered into operation. However, it seems justified to refer to this document as the most recent in this subject. One of the most important issues raised in the above document and also related to the subject of this analysis is energy consumption of GDP.

Data and Methodology

The study use a daily time series dataset containing 3 variables. Data concerned the period from February 6, 2006 to May 31, 2017 inclusive, so each series consist of 4,133 observations. The day-ahead market price index was chosen as the dependent variable representing energy prices in Poland (irdn). The data was taken from the commodity energy exchange website. The following processes are considered as potential explanatory variables:

- average EUR / PLN exchange rate from the National Bank of Poland website (euro),
- energy prices on the British market made available by NordPool (UK).

The EUR / PLN exchange rate was chosen because of Poland's membership of the European Union. The British market was selected as the most developed electricity market in Europe. Descriptive statistics of the variables are presented in Table 1. Their variability is relatively small, as indicated by the values of the coefficients of volatility.

Table 1: Variable descriptive statistics

	Mean	Median	Standard deviation	Volatility
irdn	166,76	166,2	39,76	0,24
euro	4,08	4,14	0,27	0,07
UK	52,36	52,03	9,45	0,18

All data were tested for integration using the ADF test and differentiated if necessary. The first differences were determined for the average EUR / PLN exchange rate (p value – 0,17). Then, using the classical least squares method, the corresponding models with distributed delays were estimated. The choice of the autoregressive delay order was based on the analysis of the partial autocorrelation function.

A set of potential models describing energy prices in Poland was obtained based on following specifications:

1. Autoregressive model for the irdn variable (Model 1)
$$irdn_t = const + \sum_{k=1}^{40} \alpha_k irdn_{t-k} + \varepsilon_t$$
ε_t – random component
2. Autoregressive model for the irdn variable with seasonal variables (Model 2)
$$irdn_t = const + \sum_{k=1}^{40} \alpha_k irdn_{t-k} + \sum_{s=1}^{6} \delta_s dummy_s + \varepsilon_t$$
dummy – seasonal week dummy variable
3. Autoregressive model with delays in the euro exchange rate (Model 3)
$$irdn_t = const + \sum_{k=1}^{40} \alpha_k irdn_{t-k} + \sum_{k=1}^{40} \beta_k euro_{t-k} + \varepsilon_t$$
4. Autoregressive model with delays in the euro exchange rate and seasonal variables (Model 4)
$$irdn_t = const + \sum_{k=1}^{40} \alpha_k irdn_{t-k} + \sum_{k=1}^{40} \beta_k euro_{t-k} + \sum_{s=1}^{6} \delta_s dummy_s + \varepsilon_t$$
5. Autoregressive model with delays in the euro exchange rate and energy prices in the UK (Model 5)
$$irdn_t = const + \sum_{k=1}^{40} \alpha_k irdn_{t-k} + \sum_{k=1}^{40} \beta_k euro_{t-k} + \sum_{k=1}^{40} \gamma_k UK_{t-k} + \varepsilon_t$$
6. Autoregressive model with delays in the euro exchange rate, energy prices in the UK and seasonal variables (Model 6).
$$irdn_t = const + \sum_{k=1}^{40} \alpha_k irdn_{t-k} + \sum_{k=1}^{40} \beta_k euro_{t-k} + \sum_{k=1}^{40} \gamma_k UK_{t-k} + \sum_{s=1}^{6} \delta_s dummy_s + \varepsilon_t$$

Results and Discussion

All estimated models contain statistically significant variables at a level 10% and are characterized by the lack of autocorrelation of the random component as indicated by low rho1 values. The coefficients

of determination R - square are at levels above 50%, which the author considers to be satisfactory for the data under consideration. The results of estimated models are shown in Table 2

Table 2: Results of estimated models

	Coefficients estimates					
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
const	6,602	3,5797	29,567	-6,0596	22,0277	-2,1076
dummy_1		38,1339		20,4039		36,2043
dummy_2		30,4175		13,6327		29,1114
dummy_3		30,1026		15,0095		28,6586
dummy_4		24,7012		12,6217		22,8806
dummy_5		30,5884		15,0406		27,6867
dummy_6		13,445		9,8751		13,7023
d_euro_10					119,8753	
d_euro_12			-139,707		-150,2021	-126,3132
d_euro_14			114,8187		114,1668	112,4075
d_euro_24				-23,7545		
d_euro_30			112,2088			
UK					0,4259	0,261
UK_3					-0,2417	
UK_7						-0,2421
UK_13					-0,245	
UK_18					0,3378	0,2739
UK_19					-0,4846	-0,3829
UK_21					0,3517	0,2239
irdn_1	0,625	0,5589	0,5386	0,6333	0,546	0,5647
irdn_2	-0,0409			-0,0411		
irdn_3	0,106	0,108	0,1007	0,113	0,1046	0,1046
irdn_4	-0,0334	-0,0644	-0,0732	-0,0414	-0,0772	-0,0698
irdn_5	0,0452			0,0519		
irdn_6	0,0331	0,0548	0,0505	0,0392		0,0582
irdn_7	0,2617	0,1557	0,2297	0,2059	0,2511	0,1628
irdn_8	-0,1238			-0,0856		
irdn_9	-0,0319	-0,0618	-0,099	-0,036	-0,0936	-0,0653
irdn_12	-0,0312					
irdn_13	0,0407	0,0887	0,0666	0,0364	0,0826	0,0919
irdn_14	0,1331		0,11	0,0833	0,0974	
irdn_15	-0,136	-0,0603	-0,1263	-0,0959	-0,1284	-0,0648
irdn_16	0,0311					
irdn_17	-0,026					

irdn_19			-0,0519			
irdn_21	0,0895		0,0721	0,0368	0,0458	
irdn_22	-0,0501					
irdn_23			-0,0522		-0,0534	
irdn_24	-0,0389			-0,0356		
irdn_25	0,0459			0,0371		
irdn_26	0,0299	0,0546	0,0464	0,031	0,0415	0,052
irdn_27	-0,0354					
irdn_28	0,1057		0,0944	0,0459	0,0835	
irdn_29	-0,077		-0,0847	-0,0511	-0,078	
irdn_32	-0,0422			-0,0326		
irdn_35	0,1265			0,0683		
irdn_36	-0,0459					
R^2	0,764	0,5447	0,5092	0,7744	0,527	0,5562
rho1	0,0011	0,0031	0,0074	0,0037	0,0037	-0,0011

All of the above models, were compared using the Davidson-McKinnon test for non-nested models according to seasonal issues. The p-values for the test are shown in Table 3. The results of the performed procedure show that additional information improves the degree of explanation of the dependent variable in each case.

Table 3: Davidson - McKinnon test results

	Model 3	**Model 5**
Model 1	0,0011	1,45E-12
	Model 4	Model 6
Model 2	0,0914	1,57E-07

The final stage of the analysis was to determine forecasts and their ex post errors based on estimated models. Daily energy price forecasts have been set for one, two, three weeks and a monthly forecast horizon. On their basis, selected ex-post errors were estimated: root mean square error (RMSE) and mean absolute percentage error (MAPE). The results of forecast errors are presented in Table 4. The Diebold-Mariano (1995) test (DM) was also carried out for the significance of differences in forecast accuracy obtained on the basis of various models. The p-value of DM test are given in Table 5. The results confirm that the differences between the forecasts obtained on the basis of different models significantly differ from each other.

Table 4: Forecast errors obtained on the basis of models 1 – 6

Error	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	1 week horizon					
RMSE	**23,115**	33,044	28,887	25,624	31,609	31,801
MAPE	**15,96**	21,706	20,89	16,724	21,293	21,13
	2 week horizon					
RMSE	**18,165**	25,412	21,223	20,097	18,97	24,53
MAPE	**10,647**	14,999	12,435	11,319	10,846	14,386
	3 week horizon					
RMSE	18,709	21,935	19,695	19,278	**18,13**	21,428
MAPE	10,384	12,162	11,209	10,251	**10,115**	11,868
	1 month horizon					
RMSE	18,305	19,2	17,819	18,048	**17,203**	18,706
MAPE	10,08	9,9794	9,696	9,6902	**9,4915**	9,6728

Table 5: Diebold - Mariano test results

Model	Model 2	Model 3	Model 4	Model 5	Model 6
Model 1	0,0212	0,0104	0,0107	0,0148	0,019
Model 2		0,2445	0,0373	0,0855	0,1322
Model 3			0,0211	0,0506	0,2496
Model 4				0,0827	0,0299
Model 5					0,0798

Based on obtained results, the best from the forecasting point of view, for shorter forecast horizons (one and two weeks), is the simplest model. It is model with autoregressive variables only. This model has a high coefficient R^2 – more than 76%. For the longer horizon model 5 should be indicated, which includes the largest variable structure but disregarding seasonal factors. And this one is similar to model 1.

Conclusions

Knowledge of price forecasts on competitive electricity markets is key information in risk management, and also plays an important role in economic optimization in the electricity sector as confirmed by the publications cited in the study. The aim of the article - estimation of short-term electricity forecasts and assessment of their ex-post errors - has been achieved.

As a result of the analysis, it was not possible to obtain a clear indication of the best tool from a prognostic point of view. For shorter forecast horizons: one and two weeks, the lowest forecast errors were obtained on the basis of the simplest AR model, for longer horizons, model which take into account additional explanatory variables gives more accurate forecasts.

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Green Economy and Innovation in The European Union Countries

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Abstract

The main purpose of the study is to identify the European Union countries similar in terms of one of the most important development directions of the world: innovation and the green economy. In the paper for this purpose PROMETHEE method was applied. The results of the analyses allowed to separate groups of EU countries characterized by similar level of development in the green economy and innovations. The results of the study confirmed the previous research of Authors, according to which the EU countries should be still divided in the better developed objects located in Northern and Western Europe and others – located in Southern in Western Europe. Despite the support that the European Union countries receive from the Structural Funds, differences between countries located in these parts of Europe are still significant. The research results presented in the paper can be mentioned as one of the first studies analysed at the same time the level of development in the field of: green economy and innovation in EU countries.

Keywords: Green Economy, Innovations, Similarity Of Development, PROMETHEE Method.

Introduction

In the study of progressive processes of social, economic and cultural areas, the development of innovative activities that significantly affect the competitiveness of countries and regions plays an important role. Therefore, research on innovation should be treated as particularly important, because an innovative economy is an essential key to economic growth and raises the level and the quality of life of a society. Countries in the world are currently facing a double challenge: on the one hand, it is necessary to stimulate economic growth because it is necessary to provide new jobs and the well-being of their citizens and on the other hand, the quality of this growth should lead to a sustainable future.

The deteriorating condition of the environment that has taken place since the mid-twentieth century has focused the activities of countries on paying special attention to issues related to raising environmental awareness and counteracting environmental threats. As a result of these activities, issues related to environmental protection (with particular emphasis on issues related to Effective Energy Use and Renewable Energy Sources) were reflected in the provisions of many strategic documents. Sustainable development is a central priority that permeates all spheres of social and economic activities. The expression of sustainable development is a green economy that combines its current goals, i.e. sustainable economic development (sustainable production and consumption); the word "green" includes all environmental aspects in production, transport, energy but also values such as respect for the environment, ethicality of actions, responsibility, justice within and intergenerational (Ryszawska, 2013).
The purpose of the paper is to identify the European Union countries similar in terms of one of the two most important development directions of the countries of the world: innovation and the green economy. The research used seven main indicators characterizing the green economy and ten

indicators related to the level of innovation in 2016. The PROMETHEE method belonging to the group of multi-criteria decision methods (MCDA) was used as a research tool. It made it possible to classify EU countries in terms of the level of development of the studied areas, as well as a detailed analysis of the results obtained in the perspective of the areas analyzed separately for each concerned country.

The article has the following structure: the first part includes an introduction, the second one reflects on the economic development of EU countries including innovation and the green economy, the third part presents research material and description of the method, the fourth covers the results of the research and the last fifth part presents conclusions.

Innovation, green economy and economic development of EU countries

The world economy is characterized by high diversity in the level of development of countries. This problem is particularly evident in the list of highly developed and developing countries. However, highly developed countries are not a homogeneous group and the degree of diversification in the level of their economic development is so important that it is easy to identify both leaders and countries that are separated from them by a considerable distance. An extensive network of commercial and investment connections, integration processes, flow of production factors and technologies between highly developed countries should lead to blurring the differences between them. At the core of the idea of European integration is the equalization of the level of economic development of the Member States. The significance of this problem increased especially after 2004 together with the eastern enlargement of the EU (Maciejewski, 2017).

The European Union is the result of a long process of economic and political integration between Member States. It began with a free trade zone, over time covering other spheres of the country's economy. It was aimed at leveling the economic situation of the regions, but there are still noticeable differences in terms of economic growth. Differences in the economic situation of EU countries have been the subject of many authors, including: Tupy (2016), Maciejewski (2017).

Gross Domestic Product (GDP) is the most frequently used indicator to assess the level of the economic situation of countries. It is a monetary measure of the market value of all final goods and services produced within a given period of time (Chappelow, 2019). Nominal GDP *per capita*, however, does not reflect differences in living costs and inflation rates across countries; that is why GDP *per capita* according to purchasing power parity is used to compare living standards between nations. However, the nominal GDP *per capita* value can be used to compare the levels of national economies on the international market. Fig. 1 compares GDP *per capita* (in euros), which illustrates the significant diversity of EU countries in this respect. In 2018, the richest EU country was Luxembourg, which compared to 2010 recorded an increase in the value of GDP *per capita* by almost 25%. In the entire 2010-2018 period, the country was characterized by the highest value of the described indicator, exceeding in 2010-2014 more than twice, which came in second place, Ireland. Bulgaria came last in 2018 with an index of EUR 7955.6 *per capita*. However, the increase of the indicator by over 55% as compared to 2010 deserves a positive assessment. In the analyzed period, the highest progress (increase by over 80%) was recorded in countries such as Ireland and Lithuania. Of all EU countries, only Greece did not record an improvement in 2018 compared to 2010. In this country, the value of the gross domestic product *per capita* decreased by 15.4%.

Measuring the economic development of countries is one of the most complex issues in economics. The assessment of the economic development of countries solely based on the value of GDP and its change in the years is insufficient because it is responsible for many different economic, social and environmental factors. Economic development includes not only quantitative changes in the economy expressed by means of economic growth indicators, but also qualitative changes in the socio-economic structure of the country. The multidimensionality of this phenomenon leads to the use of complex indicators in research that require weighting for individual components (Bandura, 2008; Moreira, Simoes and Crespo, 2012; Balcerzak and Pietrzak, 2017; Pietrzak, 2019; Balcerzak, 2020).

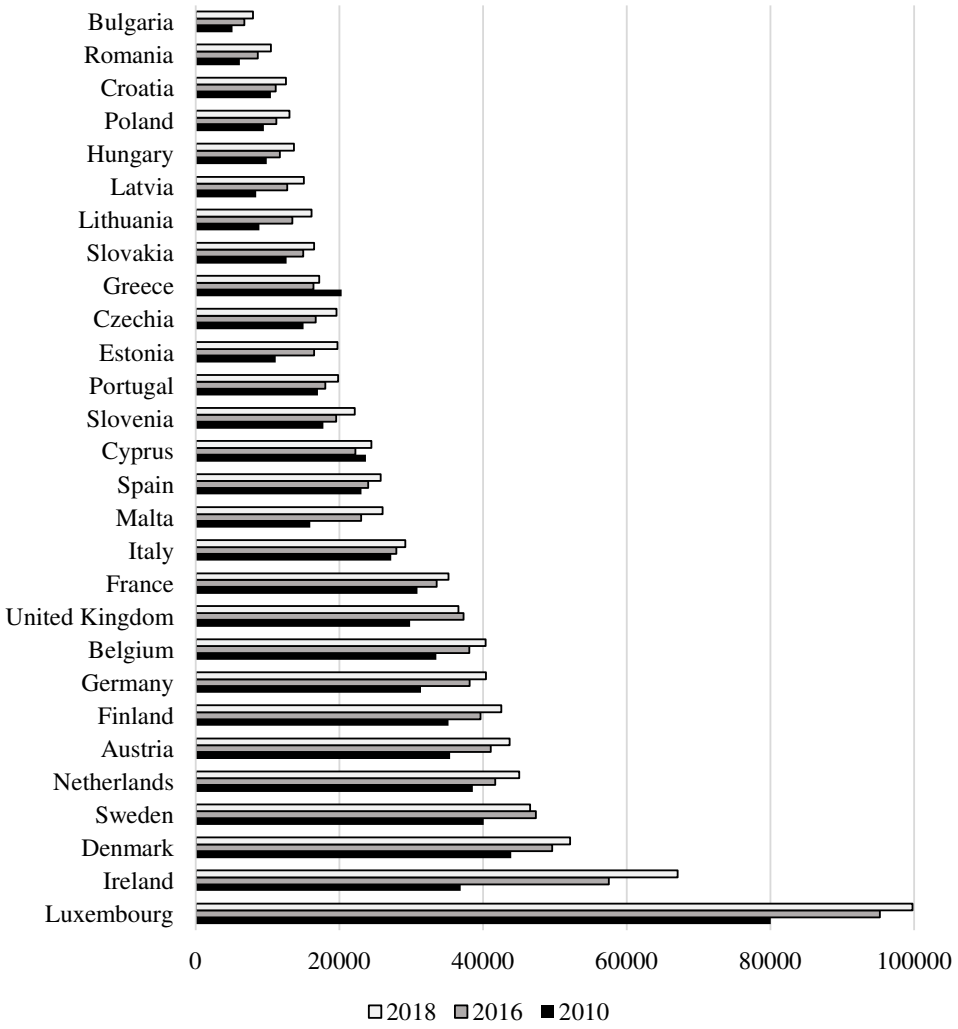

Fig. 1: GDP *per capita* (Euro) in 2010, 2016 and 2018 in the European Union countries
Source: own study based on Eurostat data.

In recent years, in the literature on the subject a lot of space has been devoted to various areas describing the development of world economies, the aim of which is to increase innovation. Different ways are sought to identify the current level of innovation in national economies on the one hand and establish true leaders in this area on the other.

Innovation is a complex economic issue whose definition and research depend on the level it is intended to cover. That is why it is possible to analyze innovations introduced in the operations of enterprises, as well as those that concern regions or countries. Their common feature is that they affect economic development. Innovative economy is a knowledge-based economy, seeking new ideas, concepts and results of scientific research and then using them in practice (Stec, 2009). Implementing great ideas is a key to staying ahead in a rapidly changing world, which is why innovations are factors affecting competitive advantage. Economists of innovation believe that what primarily drives economic growth is not the accumulation of physical or financial capital but the innovative ability stimulated by knowledge and technology development (Lambin, 2014).

A comparative analysis of countries in terms of innovation performance can be done using the Summary Innovation Index (SII). This indicator takes values from 0 to 1, but if the value of the indicator increases, it means improvement and a better level of innovation of a given country. In most EU countries, the efficiency of innovation increased in 2011-2018 (Fig. 2). The highest increase, by over 30%, was recorded by: Lithuania, Latvia and Greece. The deterioration of the level of innovation in 2018 compared to 2011 concerned three countries: Romania (decrease by 23.8%), Slovenia (decrease by 10.8%) and Germany (decrease by 0.7%).

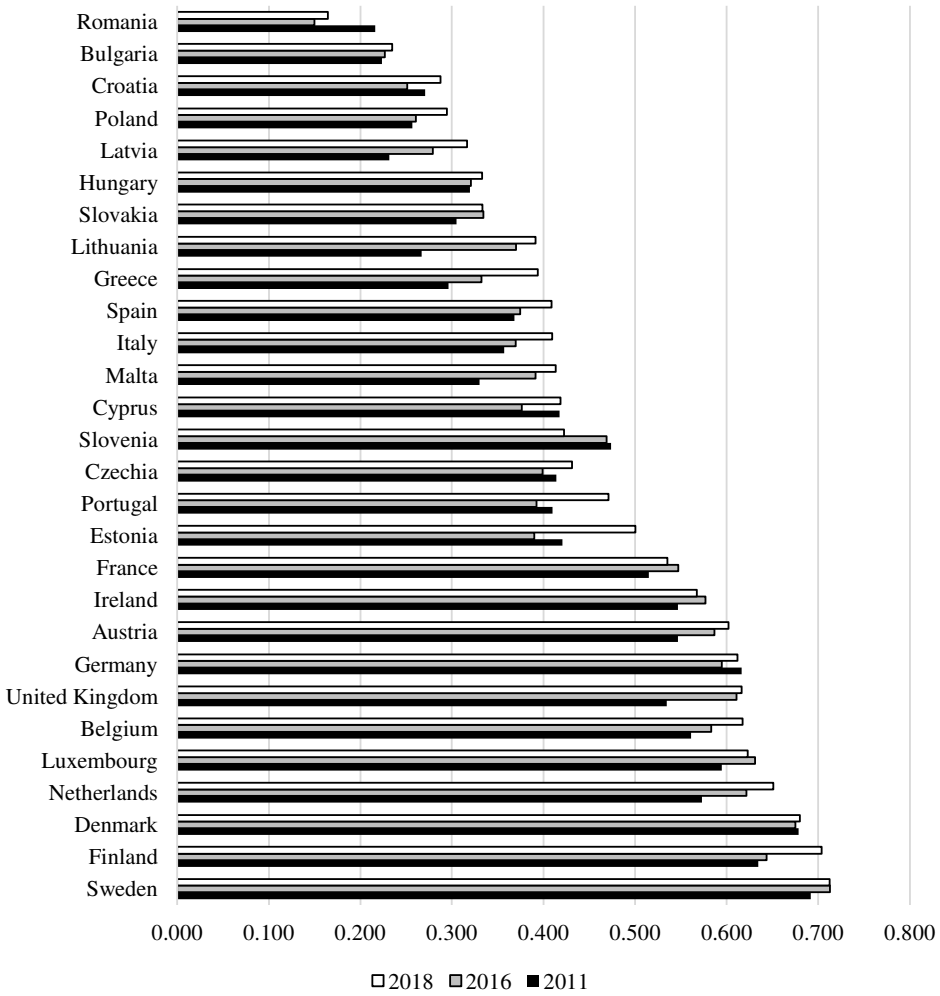

Fig. 2: European Innovation Index in 2011, 2016 and 2018 in EU countries
Source: own study based on European Innovation Index Reports 2011, 2016, and 2018.

The diagnosis of the situation made after the financial crisis in 2008 showed a great diversity in the economic, social and environmental situation of individual countries (Fig. 3). Attempts were made to reach the sources and causes of the crisis and programs for overcoming this crisis were developed. Describing the state of imbalance in so many dimensions has made politicians and decision-makers aware of the systemic links between contemporary problems. The analysis of the causes and effects of the global financial crisis has shown that the features of the current economic system based on economic growth (measured by GDP) generate imbalances (Ryszawska, 2013).

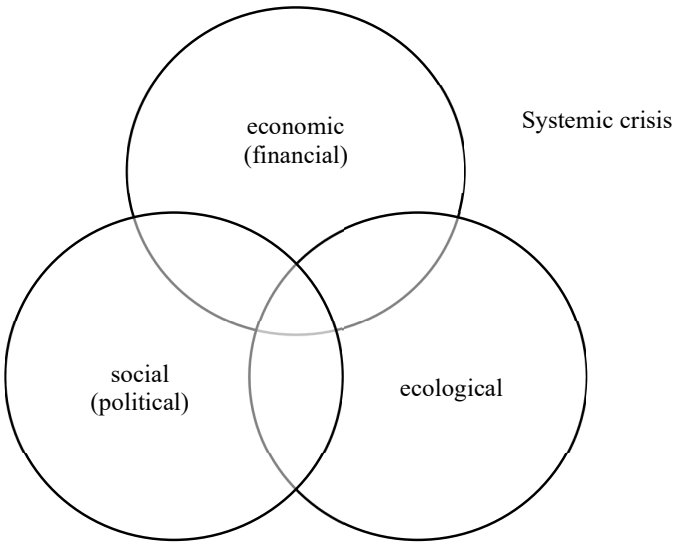

Fig. 3: Crisis areas in systemic terms

Source: Ryszawska (2013), p. 20

It was recognized that the return to economic, ecological and social balance would take place through the use of opportunities offered by the concept of the sustainable development leading to sustainability transition. Three options are possible within its framework (Ryszawska, 2013):

- a serious transformation of the current capitalist economic system,
- green industrial revolution,
- green growth (Geels, 2013).

All these possibilities actually mean a green (sustainable) transformation of the economy. The concept of the green economy was first formulated in a report for the United Kingdom Government in 1989 by a group of leading environmental economists, entitled "Blueprint for a Green Economy". The report aimed to find a compromise between the sustainable development and economic growth. However, in this study, apart from the title, there is no reference to the green economy. The continuation of the first report: Blueprint 2 "Greening the world economy" and Blueprint 3 "Measuring Sustainable Development" was an extension of the message that economics can and should help environmental policy (Allen and Clouth, 2012). This deadline was renewed in 2008 in the context of overcoming the financial crisis and introduced into the recovery programs of several countries. Since then, more and more publications on this topic have appeared. In the literature on the subject, the green economy is often treated as a tool for the sustainable development (Rabe, 2016).

According to European criteria, so-called the green economy is moving towards better resource management, the use of economic instruments conducive to environmental protection, supporting innovative projects, increasing the efficiency of water and waste management policies and the development of the sustainable consumption and production. This category includes renewable energy sources, biodiversity protection, clean production technologies, energy and material efficiency as well as corporate social responsibility. This comprehensive approach takes into account some important aspects of growth, including trade-offs arising on the edge of production capacity. Exceeding the critical thresholds in environmental resources may, on the one hand, cause an increase in human well-being and on the other, a biological threat. Natural capital contributes to production providing key inputs, some of which are renewable and others not. Therefore, public policy intervention is necessary because the contribution of natural resources to production and living standards is not at all, or is incorrectly valued (EaP GREEN, 2016).

The United Nations Environment Program (UNEP, 2011) defines the green economy as one that improves the well-being of individuals and societies, while significantly reducing environmental risk and environmental shortages. The easiest way to describe it is as a low-carbon economy, resource-efficient and conducive to social integration. Development in line with the green economy should maintain, increase and rebuild natural capital as a key economic resource and source of public benefits, especially for the least prosperous societies whose livelihoods depend on nature.

The document "Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication" (UNEP, 2011) describes in detail the stages of implementing the green economy by identifying green investments targeted mainly in the areas of: supply and sustainable use of natural capital and energy. Susta (2011) notes that this document does not cover all elements of the green economy specifying so-called the green growth as opening up new markets and technological innovations that can separate the dependence of economic growth from natural capital.

The European Commission defines three main goals in the Europe 2020 strategy – A European strategy for smart, sustainable and inclusive growth (2010):

- intelligent growth - development of the economy based on knowledge and innovations,
- sustainable growth - promoting more resource-efficient, greener and competitive economy,
- increase in social integration - supporting the economy with a high level of employment, ensuring economic, social and territorial cohesion.

They coincide with the assumptions of the green economy and cover all elements of the international value chain, from an access to raw materials to an after-sales service. The European Commission guarantees cooperation with stakeholders from various sectors (business, trade unions, academia, NGOs, consumer organizations) in developing a modern industrial policy that uses globalization and the green economy (European Commission, 2010).

Green growth policies aim to support people's economic development and the standard of living through the preservation and proper use of natural capital, i.e. natural resources and ecosystems that provide raw materials, energy, water and a wide range of other services that affect well-being (The Organisation for Economic Co-operation and Development - OECD, 2011a; 2011b). These policies must be based on a good understanding of the determinants of the green growth and their links. They also need relevant information and indicators to monitor progress and evaluate results. These indicators must be embedded in the conceptual framework and should be selected in accordance with well-defined criteria (EaP GREEN, 2016).

The implementation and monitoring of the green economy in individual countries requires tools to measure progress along this path, as well as international comparisons in this regard. Therefore, there is an urgent need articulated by international organizations (OECD, United Nations Environment Programme - UNEP, World Bank) and the European Union to create a synthetic indicator of the green economy.

The Relationships Between Green Economy and Innovativeness on The EU Countries Level – Research Procedure

To study results of the EU countries in the field of green economy and innovativeness two data sets elaborated based on the information from 2016 were applied. To the first one the indicators used by European Commission to describe the results of EU countries in term of innovation level and presented every year in the reports entitled The European Innovation Scoreboard Reports (EIS) were used. For this purpose the results in following areas were applied: x_{11} – human resources, x_{12} – research systems, x_{13} – innovation-friendly environment, x_{14} – finance and support, x_{15} – firm investments, x_{16} – innovators, x_{17} – linkages, x_{18} – intellectual assets, x_{19} – employment impacts, x_{110} – sales impacts.

The second database was created by main indicators applied by OECD to assess the level of development of the green growth were used, as follows: x_{21} – production-based CO2 intensity, energy-related CO2 *per capita*, tonnes, x_{22} – demand-based CO2 intensity, energy-related CO2 *per capita*, tonnes, x_{23} – non-energy material productivity, GDP per unit of DMC, US dollars per kilogram, x_{24} – environmentally adjusted multifactor productivity growth, %, x_{25} – loss of natural and semi-natural vegetated land, %, x_{26} – gain of natural and semi-natural vegetated land, %, x_{27} – mean population exposure to PM2.5, micrograms per cubic metre.

In the paper to identify the EU countries similar in terms of both: green economy and innovation the PROMETHEE method was used. The detailed description of this method can be found in many papers e.g. Kiba-Janiak (2019), Zioło et al. (2019).

The basis of the PROMETHEE method are thresholds of equivalence and preferences, on the basis of which comparisons of two analyzed variants are made (in this case 28 countries), taking into account the analyzed criteria (in the study a total of 17 different criteria assigned to 2 areas were analyzed). The main stage in the PROMETHEE process is comparison of negative and positive preferences flows that allow you to determine the degree of overstepping a given variant over others and the extent of yielding to other variants. This is the basis for determining optimal decision alternatives that can be presented in partial (PROMETHEE I) or complete (PROMETHEE II) order. After defining the set of criteria– K for the surveyed countries – V and developing the coefficients of importance for individual criteria (in the study it was assumed that all analyzed criteria are equally important, hence $V = 1$) the function and preference thresholds should be also defined. In the paper for analysed criteria linear functions were adopted. In the next stage comparison of individual variants in pairs is carried out. For this purpose the multi-criteria preference index π, by the following equation is calculated:

$$\pi(a,b) = \sum_{j-1}^{k} w_j \times P_j\,(a,b) \qquad (1)$$

where: $w_j > 0$is the normalized weight assigned to the K_j *criterion* (the more important f_j, the greater w_j), $P_j\,(a,b)$ is the value of the preference function for the Kj criterion when variant a is compared with variant b.

The index, whose value is between 0 and 1, indicates how much option a is preferred to option b, taking into account the criteria and standardized weights. Therefore:

$\pi(a,b) \approx 0$means that there is a weak advantage of variant a over b,
$\pi(a,b) \approx 1$means that there is a strong advantage of variant a over b,
Finally, the ranking based on negative and positive preference flows in Visual PROMETHEE computer software is calculated.

Study Results and Discussion

The final ranking of the results of EU countries in term of: green economy and innovations level is presented in Table 1 which contains the information about the preference flow values calculated on the basis of pairwise comparisons of individual criteria. They made it possible to determine the order (ranking) in analysed areas, taking into account assessments made for all criteria. There are three types of preference flows (Kiba-Janiak, 2019):

1) Phi + (Ø +), a positive flow: it indicates to what extent the results in green economy and innovation level of a given country is preferred over the results of other countries. The higher the value of Ø + (a), the better the position of the analysed country:
2)

$$\varphi^{+(a)} = \frac{1}{n-1}\sum_{b\neq a}\pi(a,b) \qquad (2)$$

3) Phi- (Ø-), a negative flow: it indicates to what extent the results in green economy and innovation level of a given country are preferred over the results of other countries. The lower the value of Ø- (a), the better position of the analysed country:

$$\varphi^{-(a)}=\frac{1}{n-1}\sum_{b\neq a}\pi(a,b) \qquad (3)$$

Phi (Ø): a net flow: Ø (a) = Ø + (a) - Ø- (a); a net preference flow is the difference between a positive and negative flow. Thus, it takes into account the strengths and weaknesses of a given country in term of: green economy and innovation level, which are expressed by means of one indicator. The higher the Ø (a) value, the better the position of analysed country:

$$\varphi(a) = \varphi^{+(a)-\varphi^{-(a)}} \qquad (4)$$

The top of the ranking is occupied by three Scandinavian countries characterized by the highest positive net flows (phi): the Netherlands, Finland, and Denmark. Positive net flows were also obtained for another 8 countries located in Northern and Western Europe. In the case of all of these countries the positive flows (phi+) exceeded the negative flows (phi-), which should be associated with higher level of development in the areas of: green economy and innovation.

To the second group with the negative net flows (phi) which mean that the value of negative flows (phi-) are higher than the positive flows (phi +), countries located in Sothern (Slovenia, Spain, Portugal, Italy Greece, Cyprus, Malta, and Croatia) and in Eastern Europe (the Czech Republic, Slovakia, Poland, Bulgaria, and Romania) were assigned. A development in the analysed areas in the case of these countries is not so high as in the first group. The worst situation with the results of the net flow below -0.2 for Latvia, Croatia, and Romania is observed. In the graphic form the results of ranking are also presented on the Figure 4.

Table 1: Full and partial ranking of the EU countries according to the PROMETHEE method

Rank	Group	Country	Net preference flow (phi)	Positive flow (*phi+*)	Negative flow (*phi-*)
1	I	Netherlands	0.2608	0.3045	0.0437
2		Finland	0.2439	0.3120	0.0681
3		Denmark	0.2437	0.3135	0.0698
4		United Kingdom	0.2357	0.2989	0.0632
5		Sweden	0.2234	0.3627	0.1393
6		Luxembourg	0.214	0.2893	0.0753
7		Germany	0.1846	0.2351	0.0506
8		Belgium	0.1426	0.2124	0.0698
9		Austria	0.1247	0.2042	0.0795
10		Ireland	0.0959	0.2354	0.1395
11		France	0.0766	0.1774	0.1008
12	II	Czech Republic	-0.0073	0.1196	0.1269
13		Estonia	-0.0285	0.1640	0.1924
14		Slovenia	-0.0288	0.1201	0.1489
15		Lithuania	-0.0315	0.1428	0.1743
16		Spain	-0.0805	0.0786	0.1591
17		Portugal	-0.0915	0.0998	0.1913
18		Italy	-0.0938	0.0851	0.1788
19		Greece	-0.0984	0.1067	0.2051
20		Hungary	-0.0995	0.1021	0.2017
21		Cyprus	-0.1029	0.1155	0.2184

22		Slovakia	-0.1418	0.0639	0.2057
23		Malta	-0.1514	0.1763	0.3277
24		Poland	-0.1635	0.0937	0.2572
25		Bulgaria	-0.1882	0.1116	0.2998
26		Latvia	-0.2082	0.0649	0.2731
27		Croatia	-0.2603	0.0268	0.2871
28		Romania	-0.2699	0.0875	0.3574

Source: own elaboration with application of Visual PROMETHEE software.

It can be said that the authors of this work expected similar results and the division of countries into two groups: more developed countries located in Northern and Southern Europe and less developed countries from Southern and Eastern Europe. Similar results were also obtained in previous papers on research on the sustainable development (Pietrzak et al., 2017) and the sustainable competitiveness (Cheba, 2019) in European Union countries. The obtained results also confirm the previous observations of the authors (Bąk and Cheba, 2019) regarding the impact of geographical proximity on the results of classification. It can be seen that countries located in the same parts of Europe represent a similar level of development and form homogeneous clusters, in this case in terms of development in the areas of: green economy and innovation level. Despite the support that the European Union countries receive from the Structural Funds, differences between countries located in these parts of Europe are still significant. This is also confirmed by the results presented in graphic form in Figure 4. It shows two separate clusters of more developed countries in the upper part of the graph and less developed ones located in the lower part.

It is also worth paying attention to Sweden, which despite high results like other Scandinavian countries, forms a separate group distant from other countries of the region. This means that the development of this country in the studied areas, therefore, is different. The same situation can be observed in the case of: Malta, Ireland, and Romania. The detailed results of these countries in all considered areas are presented on the Figure 5.

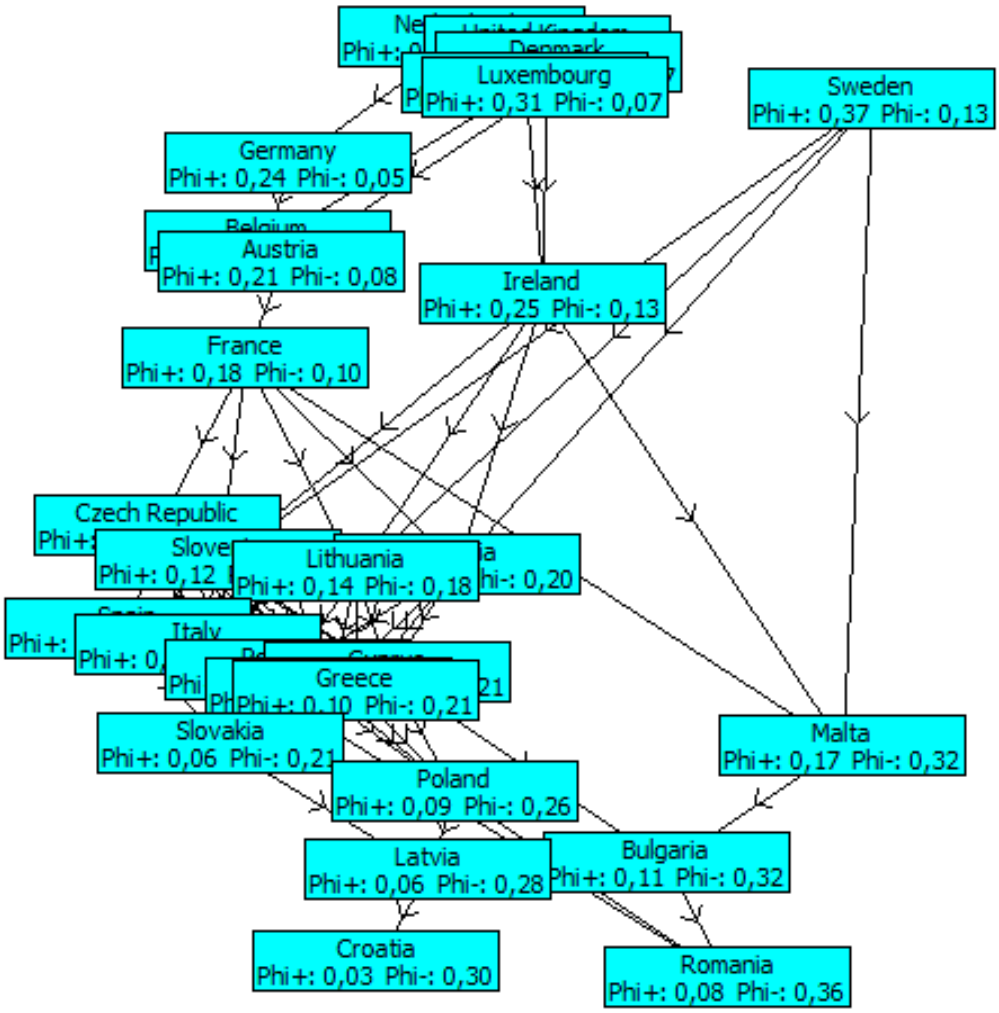

Fig. 4: PROMETHEE ranking as a network

Source: own elaboration in software: Visual PROMETHEE.

The results presented in the above figures confirm significant development differences of the analyzed countries. Sweden performs the best but also in this case the results in terms of the green economy are not the highest. The high place in the country's ranking was primarily due to high results in terms of innovation. The situation of other countries is different. Romania was definitely the worst in terms of innovation. However, its results in terms of the green economy are definitely better. The results of other countries are more diverse.

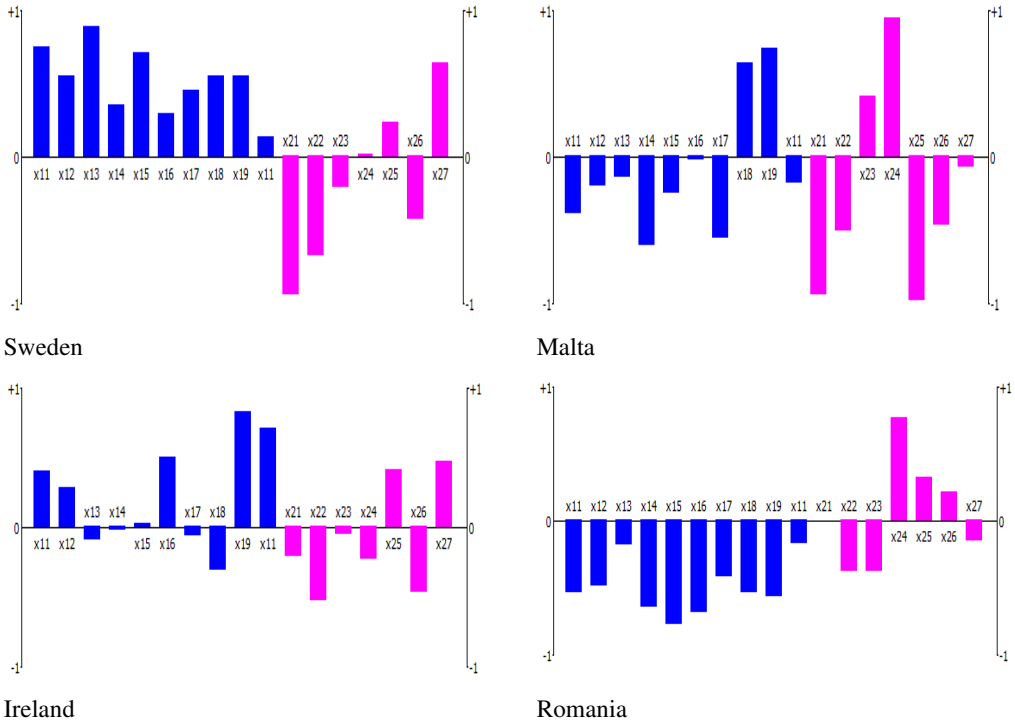

Fig. 5: Profile of selected countries: Sweden, Malta, Ireland, and Romania according to the analysed areas

Source: own elaboration in software: Visual PROMETHEE.

Conclusions

The results presented in the work on the study of the level and similarity of the development of EU countries in the field of innovation and the green economy confirm, also observed in other areas, the division of EU countries into better developing ones: North and West and less developed: East and South of Europe. The results of the surveyed countries in the areas in the assessed areas vary significantly, even in the case of countries occupying the highest places in the rankings. Even in the case of the Netherlands, which ranked first, taking into account both its development in the framework of the green economy and innovation, the results obtained by this country vary. It is also worth emphasizing that none of the surveyed countries obtained unambiguously good or bad results in all considered areas. The group of countries with positive net flows is less numerous than the one in which negative net flows were identified. 11 out of 28 countries qualified for the first of them. It is worth noting the good position of the Czech Republic which ranked 12. For several years, this country has been indicated as the fastest growing among the countries of the former communist bloc. Its partial results are at a similar level, often negative values with a small range. It means a similar pace of development in all analyzed criteria.

The research results presented in the work are the first analyzes of this kind. In the literature on the subject the development of EU countries in the field of green economy and innovation has so far been considered separately. Studies are available that compare areas such as the green economy and the sustainable development. Due to the intensive development of world countries towards innovative technologies that most often take care of the natural environment, the research problem undertaken in the work is becoming increasingly important.

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Basic Approaches in Interpreting Marketing Effectiveness

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Abstract

Effectiveness is one of the most important categories for marketing. Currently, following numerous interpretations, it is quite ambiguous as an assessment criterion. Subject literature, gives two approaches to the interpretation of marketing effect. They can be described as the behavioral and the result-based approach. They present a different attitude to marketing evaluation. Behavioral marketing effectiveness is seen as a system of standards based on the philosophy of marketing orientation. Grasping the essence of the result-based approach is more difficult, because theoretically there are many possible measures to marketing assessment. This paper is based on a literature review. It includes a review of the theoretical and empirical research achievements regarding the interpretation of the category of marketing effectiveness. This paper aims to systematise the achievements in interpreting marketing effectiveness, and to evaluate the directions of changes for these interpretations.

Keywords: Marketing Effectiveness, Effectiveness, Efficiency, Marketing Productivity, Marketing Performance

Introduction

Theoretical achievements of business and management sciences (including marketing) offer many categories related to the assessment of organisation, processes and human activities. Most often, various types of theoretical studies and empirical studies concern categories such as effectiveness, efficiency, productivity and performance. These categories represent two major management problems, i.e. the measurement problem and the assessment problem. Effectiveness is a category primarily related to the assessment of organisations, processes and human activities. This category is also particularly important for marketing. Marketing effectiveness has been the subject of studies since the 1970s. The importance of research on marketing effectiveness results from the fact that, from the very beginning, marketing has been one of the possible alternatives to the market. The higher value of marketing as a concept was to result from its effectiveness. A number of interpretations of marketing effectiveness appeared during this period. The aim of this paper is to systematise the achievements in the field of marketing effectiveness interpretation and to evaluate the directions of changes for these interpretations. The rationale for this systematisation of achievements is that marketing as a concept of action is subject to constant evolution. The variability of the marketing concept could be observed over the last several years, manifesting in its various forms (varieties), e.g. relationship marketing, value marketing or digital marketing. This is undoubtedly a reason for numerous reflections on the essence of marketing effectiveness. Another justification is the usefulness of marketing for an organisation (enterprise) itself, i.e. the problem of marketing value for an organisation. This issue seems to remain unsolved (see Hanssens and Pauwels, 2016). Based on these assumptions, two basic questions arise:

RQ1: Does the development of marketing affect the assessment of its effectiveness?
RQ2: Which interpretations of marketing effectiveness become dominant as a result of the development of marketing concepts?

The Essence of Organization Assessment

Talking about marketing effectiveness is not possible without reflection on the essence of organization assessment. Interchange of knowledge between management and marketing has often been noticed in the past. The basis for identifying the essence of organisation assessment was the analysis of such categories as effectiveness and efficiency in relation to organisation or management (see Drucker, 1967/1988; Ghorpade, 1970; Price, 1972; Steers, 1975; Cunningham, 1977; Hall, 1980, Kanter and Brinkerhoff, 1981; Koontz, O'Donnell and Weihrich, 1984; Cameron, 1986; Lewin and Minton, 1986; Simons, 2000; Davis and Pett, 2002; Shaw, 2009).

The above overview of the theoretical achievements allows us to distinguish two approaches to interpretation of organisation assessment. Effectiveness or efficiency can be interpreted on the basis of outcomes (effects) or organisation or even manager behaviour. Therefore, there are many varieties of effectiveness in literature, such as organisational effectiveness, management effectiveness or managerial effectiveness. This is a premise for identification of two approaches to organization assessment, i.e. the results-based approach and the behavioral approach (Kowal, 2015). The most numerous and earliest examples of interpretations are based on the results-based approach. As the name suggests, the results-based approach takes as its basis the assessment of the organisation's results, i.e. the set of goals and outcomes. (see fig. 1).

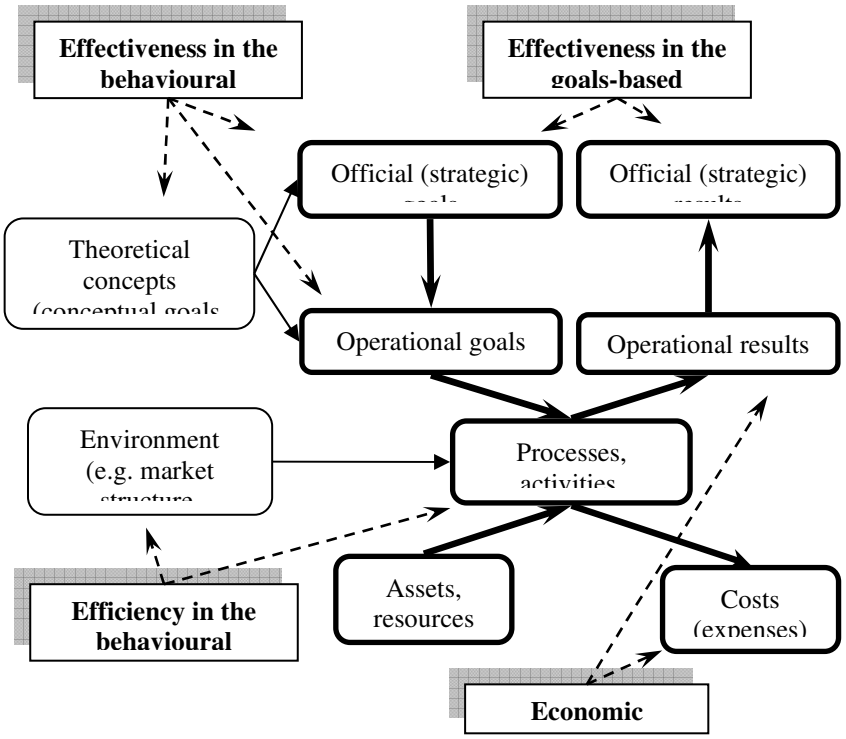

Fig. 1: Complementary interpretation of organisational efficiency and effectiveness – the results-based approach and behavioural approach

Source: see W. Kowal (2015)

The common assumption for the interpretation of effectiveness and efficiency is that the activity of an organisation manifests itself in its results. An organisation that wants to create results has two reference points: goals and costs. On the one hand, an organisation sets goals for itself, providing the basis for its existence and regulating its activities. On the other hand, members of an organisation are aware of the

operational costs that determine its existence. These goals and costs are the quintessence of result-based evaluations. Thus we could interpret effectiveness as the relationship between an organisation's official (strategic) goals and their results, and as the relationship between the official goals and other results that are identified with operational goals. Later, this type of interpretation became the basis for the development of research on company performance.

The behavioral approach is primarily related to Drucker's (1967/1988) interpretations of effectiveness and efficiency. Drucker defined effectiveness as 'doing the right things,' and efficiency as 'doing things right' (Drucker, 1988). The behavioural approach to organisation assessment involves the interpretation of organisational behaviour (activities, processes, and transactions) and of all the elements determining this behaviour. In this type of assessment, the dominant problem is the choices made within an organisation concerning its goals and the activities and processes associated with these goals. Literature shows that the factors determining the behaviour of a firm include market structure and theoretical concepts. The assessment of these choices (goals and activities) is a key problem for efficiency and effectiveness in behavioural approach. Effectiveness involves evaluating the choice of strategic and operational goals, which are governed by theory. Later, Drucker's interpretations formed the basis for the development of managerial effectiveness.

Breaking an organisation down like this can be useful in many ways. The most important justification is probably the problem of interest. The results-based approach refers to the specific outcomes while behavioral approach refers to the choices made within the organisation. This becomes particularly important if we highlight the time factor in these assessments. The result-based approach provides the basis for forming an ex-post assessment based on the actual outcomes of organisation actions. Behavioral approach is more conducive to ex-ante assessments, although it is also used in control (e.g. audits). Part of the results-based approach is numerical outcomes evaluation, which allows for more explicit and final organisation assessments. However, both approaches can be treated as complementary assessment systems, assuming the significance of the time factor as a criterion for dividing the organisation's assessment.

Marketing Effectiveness - Behavioural Approach

The category of effectiveness has also become a subject of interest for marketing. As with organisation assessments, there are different approaches to interpreting marketing effectiveness. In general, they fit into the diagram presented above (see Fig. 1). Based on literature studies, marketing effectiveness can be identified:

- with marketing orientation (behavioral approach),
- with specific market effects, outcomes (results-based approach),
- with the organisation's goals (results-based approach).

The last two interpretations of marketing effectiveness should be considered examples of the results-based approach. Their division is based on the fact that the assessment of marketing effectiveness can be associated with other types of results (outcomes) of marketing activities.

In marketing, marketing orientation has become one of the most original areas of research. It provided the basis for distinguishing what is known as marketing effectiveness. Kotler (1977), equated this type of assessment with marketing orientation. He defined it as specific organisation behavior, a feature of marketing processes within the organization. He described marketing effectiveness in reference to another market orientation, defined as sales effectiveness. Marketing effectiveness, as described by Kotler,

became an assessment criterion based on an *a priori* assumption that market orientation reflects the firm's most effective market behaviour. Both marketing effectiveness and sales effectiveness are based on the description of different criteria reflecting the company's way of thinking and actions. According to Kotler, marketing effectiveness depends on a combination of five elements: customer philosophy, integrated marketing organisation, adequate marketing information, strategic orientation and operational efficiency. In this interpretation, marketing effectiveness is a general assessment based on multiple criteria. This interpretation of marketing effectiveness can be found in other publications, including Norburn, Birley and Dunn (1988), Eckles (1990), or Bradley (2003). For example, Norburn, Birley and Dunn (1988) used the marketing effectiveness ranking to assess the relationship between strategic marketing effectiveness and corporate culture and beliefs. The concept of marketing effectiveness makes an ideological assumption that marketing is the most effective orientation of market activities. This effectiveness assessment is based on behavioural norms (standards). A similar assumption has been used to characterise various marketing control tools, especially strategic control (e.g. marketing audit). In retrospect, marketing audit has demonstrated the greatest utility. From the beginning, marketing audit was associated with behavioral assessment: for instance, Shuchman (1959) described the audit as 'review and appraisal of the marketing operation: of the basic objectives (...) of the methods, procedures, people, and organization employed to implement the policies and achieve the objectives' (Cunningham, Cunningham and Swift, 1987). Literature notes that audit is the dominant tool for marketing effectiveness assessment, but is also a 'subjective normative checklist' (see Kahn and Myers, 2005).

From today's perspective, assessing marketing effectiveness based on marketing orientation is more difficult. First, research marketing orientation lost some popularity . Secondly, marketing has changed, as evidenced by many concepts known as relationship marketing, value marketing or digital marketing. At a time when Kotler (1977) defined marketing effectiveness, the concept of marketing was much more explicit.

When describing the behavioral approach to marketing effectiveness assessment, it is worth presenting another proposal presented by Kahn and Myers (2005). On the one hand, they drew attention to the common definition of marketing performance assessment with results. On the other hand, they pointed to the process approach as a proposal for marketing effectiveness assessment, using cybernetic control concepts. In their interpretation, the assessment of marketing effectiveness is a process involving: goal determination, monitoring and interpretation, and regulating action (Kahn and Myers, 2005). Analysis of this process leads them to the conclusion that the assessment of marketing effectiveness should be seen as achieving the goal at the stages of the goal setting process, monitoring and interpretation as well as regulation of the activity. This is a very universal approach to defining the essence of marketing effectiveness that does not associate it only with results.

Marketing Effectiveness - Results-Based Approach

Literature also provides examples of effectiveness equated with specific outcomes (effects). This approach comprises various trends in interpreting the essence of marketing effectiveness assessment. At first, the problem was associated with the general goal of marketing, meaning producing a specific market outcome (results). Effectiveness was a function of the company's ability to compete, or with customer responses. Later, effectiveness came to be identified with other outcomes (measures) - financial and non-financial metrics. The second approach was reflected, among other things, in the category of marketing performance.

The first of these trends in defining marketing effectiveness, which we have defined as the result-based approach, is based on the assumption of producing specific market results. Initially, it was associated with competitive advantage (Ambler and Kokkinaki, 1997). This direction of interpretation was indicated by Walker and Ruekert (1987). They addressed the problem of the effectiveness of marketing strategy

implementation. They defined three categories as marketing evaluation criteria, i.e. effectiveness, efficiency and adaptability. They interpreted marketing effectiveness as 'the success of business products and programs (...) measured by such items as sales growth in comparison with that of competitors or a changes in market share' (Walker and Ruekert, 1987). As we can see, the synonym of effectiveness is success, interpreted in the context of comparing the company sales with the sales of its competitors. Metrics that were indicated as measures were typical measures of a company's competitive strength (e.g. market share). Szymanski, Troy and Bharadwaj (1995) and then Morgan, Clark and Gooner (2002) constructed a marketing performance assessment system based on the interpretation of Walker and Ruekerta. They proposed a normative marketing performance assessment system based on the theory of competitive advantage, thus also linking marketing effectiveness to competitive advantage.

Other examples are defined by the relationship between marketing effectiveness and the client. Sheth and Sisoda (1995) interpreted marketing assessments in the context of marketing productivity. In their opinion, marketing productivity covers two dimensions, efficiency and effectiveness. For them, marketing effectiveness is associated with 'long-term impact on relationships with customers'. The final result of this impact is customer satisfaction. For Shetha and Sisoda, an ideal condition for marketing (high efficiency and effectiveness) is a situation where customer satisfaction accompanies low marketing costs. Adcock (2000) took a very similar position. The very concept of marketing is associated with customer satisfaction.

Literature also provides examples of effectiveness equated with more outcomes. The proposed sets of effectiveness assessment measures are diversified in terms of both the number of outcomes and the type of metrics themselves. This kind of interpretation of marketing effectiveness considers it a multi-criteria category. Such a concept has already appeared before in defining organisational effectiveness. In marketing, such assessment criteria include: customer satisfaction, ROI, ROS, quantitative sales, customer loyalty, etc. This is, therefore, a group of results identified most often with competition, customers and company goals. For example, Green, Barclay and Ryans (1995) referred effectiveness to the benefits (effects) implemented in the most favorable phase of the product life cycle and defined it as 'the degree of market success attained by a product at market maturity'. Varadarajan (1986) and McKee, and Varadarajan and Pride (1989) recognise ROA, ROE, and ROC indicators, share growth, profit ratio on share growth, and percentage change in market share as metrics of marketing effectiveness. Brooks and Simkin (2012) reviewed marketing classification effectiveness and distinguished 13 criteria (metrics) for such assessment. These measures were divided into four categories (Brooks and Simkin, 2012), i.e. financial (ROI, DCF, brand valuation, CLV, economic value add), quantitative (market share, customer satisfaction, customer loyalty - retention, price premium), qualitative (perceived quality, brand awareness, customer satisfaction) and hybrid (brand equity and customer equity). An analysis of these measures shows that most of them are not related to the official goals of the organisation

The authors of these interpretations usually base them on quite different sets of outcomes (or metrics). In this research, marketing effectiveness is moving closer to marketing performance. In the early 1990s, research was undertaken on the relationship between marketing orientation and company performance (see. Narver and Slater, 1990, Diamantopoulos and Hart, 1993, Greenley, 1995). At the end of the 1990s, explicit descriptions of the marketing performance started to appear and attempts began to be made to indicate and classify the metrics associated with this category (see Clark, 1999, Morgan, Clark and Gooner, 2002; Vorhies and Morgan, 2003, Ambler, Kokkinaki and Puntoni, 2004; Katsikeas, Morgan, Leonidou and Hult, 2016). These studies resulted in quite extensive theoretical achievements related to measuring marketing performance. Moreover, this output is constantly updated, largely because of the development of new marketing concepts (especially digital marketing).

Publications on marketing effectiveness usually relate it to the achievement of the company goals. According to Kerina and Peterson (1990) effectiveness refers to the problem of ‘whether the organisation is achieving its intended goals, given environmental opportunities and constraints and organisational

capabilities'. In this case, the organisational prospects and resources have become the benchmark for marketing effectiveness. Ambler and Kokkinaki (1997) indirectly referred to the problem of marketing effectiveness. In their analysis, they indicated effectiveness - meaning the ability to achieve the goal - with the concept of success as an assessment criterion (in conclusion they identified it with the term effectiveness). Continuing interpretations of marketing effectiveness in terms of achieving goals appear in subsequent publications of Clark (2000), Vorhies and Morgan (2003). In their interpretation, marketing effectiveness is 'the degree to which desirable market-based market goals are achieved'. In this case, it is worth noting that the goals to which this effectiveness relates relate to the market performance of the organisation.

This interpretation also includes a number of publications dealing with the problem of marketing productivity. Literature gives examples of identifying various types of relationships between organisational goals and marketing results (see Rust, Ambler, Carpenter, Kumar and Srivastava, 2004; Gronholdt and Martensen, 2006). The problem of interpreting effectiveness as a step to achieving the organisation's goal is quite a challenge for marketing. The reason for this is the variability of organisational goals and the variability of marketing concepts (see Kowal, 2015). This is a big field for research not only on the problems of organisation assessment, but also marketing performance and marketing productivity. An example of this impact can be the concept of value marketing according to Doyle (2000). This concept entails different organization goals, different marketing goals, and a different marketing productivity models. The simple example shows the possible impact of the development of marketing concept and the adopted product marketing model on the criteria of marketing effectiveness assessment.

Conclusions

This article summarizes past and current trends in interpreting marketing effectiveness. There are not many publications that summarize the state of understanding on this category. As we can see, the development of interpretations of marketing effectiveness has its historical context. Analysing the development of marketing effectiveness studies shows several trends in its interpretation.

First, the marketing effectiveness research has shifted from behavioral approach to results-based approach. Initially, effectiveness evaluation based on the assumptions of marketing orientation was an important subject of study. Over time, results-based interpretations gained importance (although there are no explicit assessment criteria). This last approach (the results-based approach) may dominate in the future.

Secondly, at least two fields of study can be distinguished within the results-based approach. Marketing effectiveness refers to organisational goals or specific marketing outcomes (results). Nowadays, identifying marketing effectiveness with organizational goals is a premise for interpreting marketing productivity. On the other hand, relying on marketing outcomes (results) as the basis for marketing effectiveness is a premise for interpreting marketing performance. The dynamics of marketing concepts development - especially those based on new technologies - have an impact on the interpretation of marketing performance. It will be interesting to see to what extent will these changes affect the assessment of marketing effectiveness. In the past, there have been many examples of interpretations of marketing effectiveness based on marketing outcomes (results).

Thirdly, marketing effectiveness is defined not by individual criteria (e.g. market share or customer satisfaction) but by a multi-criteria assessment. It is worth considering whether the development of

interpretations of marketing performance shall affect the complexity of marketing effectiveness assessment in the future. This problem seems to arise already. Comparing performance marketing related to offline and online marketing concepts, we can see the complexity of the marketing evaluation system.

In the light of the analysis above, it is justified to see the results-based approach as the future direction of marketing effectiveness development. With this kind of assessment, its fundamental problem is whether marketing effectiveness is to be based on marketing outcomes (results) or organizational goals. This is probably the most important problem for future marketing assessment.

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On the Possibilities of Halting Global Warming and Potential Courses of Action

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Abstract

Global warming is one of the greatest contemporary challenges for the international community. Research indicates that only an immediate and widespread change in the global economic model can lead to the inhibition of this process. However, are radical changes in the economic policy of states possible? This text is an attempt to indicate the answer to this question and indicate potential directions of alternative actions.

Keywords: Global Security, Global Warming, Climate Policy.

Introduction

Both the past and the present century are the period of the greatest scientific achievements and innovations in history. However, that progress has been made at the expense of huge amounts of energy produced mostly from non-renewable raw materials rich in carbon. Although in the second half of the twentieth century the danger of this practice became clear, by participating in a constant race for economic and political domination countries have continued to use these resources unrestrained. That is why today we are facing one of the most serious global challenges - climate change. Attempts are being made to reach an international agreement to reduce the impact of civilisation on the atmosphere. The transformation of energy systems in different countries into renewable energy technologies is often proposed as a remedy. However, such changes are costly from economical and political perspective. It may, therefore, appear that attempts at reform are doomed to failure. If that is so, are we prepared to function in a world with altered climatic conditions? Should we not, in parallel with our efforts to reduce our impact on nature, finally start preparing for the impending climate disaster?

Outline of the problem of contemporary global warming

The link between the increase in the concentration of carbon dioxide in the atmosphere and contemporary global climate change has already been proven beyond doubt. The content of this gas has significantly increased, especially over the last two centuries (particularly in the 20th century). The average atmospheric concentration of carbon dioxide in 1765 was 280 ppm (*part per million*). However, at the end of the twentieth century (in 1990) it already amounted to 354 ppm, while in 2011 it was 391 ppm, with a further upward trend (Stocker et al., 2013, p. 11). Earlier, before the last century - over the period of 650,000 years - concentration of CO_2 in the atmosphere had not exceeded 300 part per million. For this reason, carbon dioxide is considered one of the main factors in the current warming. There is also a noticeable correlation between the increase in CO_2 content in the atmosphere and technological progress. The concentration of this greenhouse gas in the atmosphere has started to increase since the Industrial Revolution in the second half of the 19th century, when coal (and other hydrocarbon fuels) began to be used for energy and transport purposes. It was not until the end of the twentieth century, that changing this universal energy production formula, mainly due to the increasingly noticeable negative effects of global warming, started to be seriously considered on the international arena.

The significance of the risks resulting from climate change is still growing and today it should undoubtedly be treated as one of the most important challenges of the contemporary world. In documents that identify global risks this problem appears to be important, and often constitutes a key dilemma. This is particularly evident in the regular reports of the World Economic Forum on global risks. It should be emphasised that these documents do not focus on ecological issues, but rather, based on various - mainly economic and geopolitical indicators - they search for the most important challenges for contemporary markets and their potential destabilizers. Even here, the dangers resulting from climate change are gaining in importance every year. While in 2008-2010 the risks of economic and geopolitical nature dominated, and there were no ecological threats, since 2011 environmental risks have been gaining in importance (along with social and, more recently, technological ones) (*The Global Risks Report 2017*, Figure 2). In the latest issue of *The Global Risks Report 2019. 14th Edition*, among the five most important risks presented in two categories of assessment - "likelihood" and "impact" - three concern environmental disorganisation. These are "extreme weather events", "natural disasters" and "failure of climate-change mitigation and adaptation" (*The Global Risks Report 2019*, p. 4). All of the risks listed result from increasing global warming.

Such a high position of risks resulting from climate change is not surprising when the forecasted consequences of this phenomenon are known, especially since, according to the scenarios of environmental change presented in recent IPCC reports, further warming of the climate will continue. By 2100, the global average temperature is likely to rise by 1.5 to 2 degrees Celsius (Stocker et al., 2013, p. 20). The expected consequences of this will be tragic. In the context of national and international security, the following factors are of particular importance: the risk of rising levels of the world's oceans (which will lead to the loss of a significant part of land inhabited today); the prevalent, albeit regionally varied, change in hydrological cycles, resulting both in the intensification of desertification processes and more frequent droughts and the increase in the risk of storms and floods; and finally, the increase in the frequency and intensity of natural disasters, particularly hurricanes. This will affect the ability of many countries to provide access to fresh water, maintain efficient agriculture, and protect against natural hazards. In particular, it will affect poor countries with low economic potential and weak systems of power organisation. Some of them will struggle with internal destabilisation and anarchy. Undoubtedly, millions of people will suffer, and the next waves of migration will flood highly developed countries.

Possibilities of Limiting Global Temperature Increase

Because of these risks, attempts are being made to reach international agreements focused on reducing the impact of civilisation on climate change. The last significant attempt to reach a global consensus on this issue was the Paris Agreement made in 2015. It brought hope that joint action can be taken against global warming, because most countries have committed themselves to taking action to suppress temperature increase, also by reducing carbon dioxide emissions. However, it has not been three years since the agreement came into force (in 2016) and the willingness to withdraw from it has already been expressed by the United States, which will ultimately take place in 2020 (Friedman, 2019). The question remains when other countries fighting for global domination - for instance China - will join the US.

The situation seems all the more serious when statistics, showing the leaders of global energy consumption and their sources, as well as the main emitters of carbon dioxide, are considered. According to data from the International Energy Outlook (IEO), the largest share in the production of CO2 is held by China, responsible for more than 28% of global emissions of this compound (Key world energy statistics, 2019, p. 55). According to BP's calculations, the next largest share is held by the United States, India, Russia and Japan. At the same time, these countries are the largest consumers of primary energy. China accounted for nearly 24% of all energy consumed in 2018, followed by the USA with 16.5%, India with 6%, Russia with 5% and Japan with 3%. In total, these countries use about 55% of the world's total primary energy (BP Statistical Review of World Energy 2019, p. 8). Their energy systems are mostly based on hydrocarbon fuels, with a significant share of oil and natural gas in particular, but also coal. It should also not be forgotten that China consumes almost half of the world's coal used as a source of energy. It should also be noted that, according to the *International Energy Outlook 2017* report, the demand for energy will grow, and until 2040 it will increase by 28% compared

to 2015 (*International Energy Outlook2017*, p. 9). Asian countries, including China and India, will have the largest share in this growth. Even if they continue their extensive renewable energy development programmes, the possibility of fully meeting the energy needs of such large economies without a significant share of hydrocarbon fuels seems unlikely.

Conclusions

International initiatives aimed at limiting or halting global warming constitute an extremely important and necessary pursuit. The consequences of this process will affect people living in poor developing countries (e.g. in central and northern Africa or southern Asia) to the greatest extent. However, it is not poor developing countries that are responsible for the emissions of the key carbon dioxide, but wealthy countries located in a safer, temperate climate zone. Among the main emitters of greenhouse gases are the three main political and military powers of today's international scene - the United States, China and Russia, but also India aspiring to this role (which is most at risk of climate change in this group). It is difficult to imagine that any of these countries, in the face of strong competition for global domination, would decide to take action that would weaken their potential in this quest, especially since current economic and political challenges still shape public opinion of these countries more than future environmental risks. Therefore, the fight against global warming may ultimately prove ineffective. Since such a scenario is possible, appropriate actions must be taken in advance to prepare us for life in difficult climate conditions.

Therefore, we need to take actions now to better adapt to the new reality in the future. Changes should take place in the areas of architecture, agriculture and water management both in terms of approach and planning. Building awareness in societies also seems to be an important element - although, depending on the region, it should take into account different issues. In Europe and other highly developed parts of the world, it seems particularly important to teach tolerance. It may be expected that some parts of land will be replaced by oceans, which, together with the intensification of natural disasters, will cause increased migration flows. Both finding a living space for a significant number of residents in a limited space and feeding them and providing other goods, will become an important element. The above topics and many others should, along with climate protection, become the subject of international debates and conventions.

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Sustainable Innovation Management Concepts

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Abstract

Significant changes took place throughout the world in the 20th century. This period was the most productive in relation to the process of implementing many scientific discoveries that were made as far back as the 19th century. The achieved results provided a technological breakthrough in many sectors of the world economy. Significant development of the economy and the processes of production of goods and services were also ensured. Statistics show that in one working day the world economy produces a volume of goods and services equivalent to the volume of their production at the beginning of the 20th century. The planet's population is growing at a faster pace, while until 1970 the world population grew by hyperbole, but since 1990, there has been a slowdown in growth. At the moment, the world population is about 7 billion people. According to various researchers, the population will increase by 2100 and amount to 11.2 billion people. A significant increase in population and industry is already exerting significant pressure on the biosphere of the planet, while the amount of animal matter in the biosphere in accordance with the law of V. Vernadsky constantly, therefore, the significant dominance of one kind of "man" over another can lead to significant changes in the life of the entire planet. Such changes can have a catastrophic effect on the entire dominant species, leading to its mass extinction. Therefore, it is relevant to change the current paradigm of economic development of society to a new one, balanced and taking into account social and environmental aspects. Changing the existing paradigm and focus of innovative processes will ensure the sustainable development of human society in the future.

Keywords: Innovation, Development, Socio-Economic Development, Biosphere, Era Of Mass Extinctions, Population, Sustainable Innovative Development

Introduction

The issues of the methodology of sustainable development began to interest the civilized world, starting from the second half of the 20th century under the influence of environmental problems. Namely, faced with the limited and fairly close onset of exhaustion of sources of non-renewable (core) resources, as well as with the appearance of a number of signs of a global environmental crisis. These signs include the rapid increase in the concentration of carbon dioxide in the Earth's atmosphere by 25%, methane by 100%, the appearance of new gases in the Earth's atmosphere that were absent in the atmosphere such as chlorofluorocarbons (Freon). It should be noted that the growth of land cover degradation processes is fast, since from 1970 to 1990, about half a million tons of the upper soil layer was lost on Earth. There is also a loss of natural ecosystems in different countries, see figure 1.

These trends are confirmed by reports of international organizations, including United Nation (2019). Negative trends associated with environmental problems have a significant pace, and can lead to

environmental and social disasters both within individual regions and around the world as a whole. One of the reasons for this situation is the use in its development of a model of unsustainable development, which is characterized by the extensive use of all available natural, biological and social resources. The imperfection of an unsustainable development system is reflected in the study (Cohen & Winn, 2007).

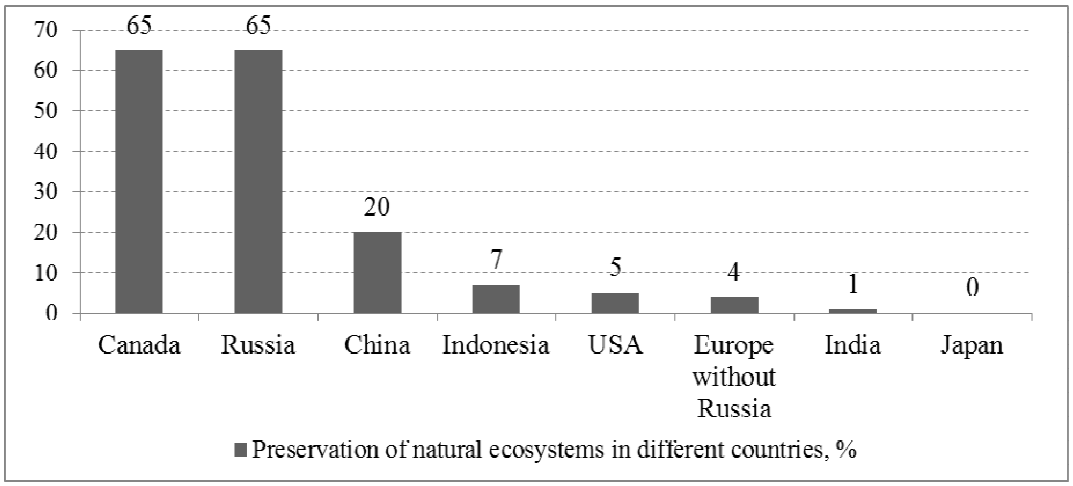

Figure 1: Preservation of natural ecosystems in different countries, %

The unsustainable development model has long served the interests of mankind, but is more economically centric, including, for example, the occurrence of some negative consequences in the economic spheres of human activity in the social and environmental spheres (Olawumi & Chan, 2018). Society focused more on issues of industrial relations and did not take into account social, environmental and other consequences, which, nevertheless, continued to exist and exert an influence on the economy. Already in the 19th and early 20th centuries, this led to aggravation of social problems, strikes and revolutions, and by the middle of the 20th century to a significant aggravation of environmental problems. At the same time, the sharp increase in the cost of resources, caused by the decrease in oil production by OPEC countries, led to the fact that mankind was forced to think about ensuring and maintaining the sustainable development of states (Arrow, Dasgupta, Goulder & Other, 2007).

Therefore, unsustainable development implies development in the context of growing imbalances between available natural and social resources and the desire for profit.

First of all, the world community drew attention to the solution of environmental problems that hinder the socio-economic development of the world economy. One of the ways to solve these problems was the creation of international non-governmental scientific organizations.

Such organizations are:

International Federation of Advanced Research Institutes;

International Institute for Systems Analysis;

Club of Rome

Serious concern about the state of the ecosystem and the possibility of the safe development of civilization in the context of the constant population growth of the planet was also expressed at the UN conference in Stockholm in 1972, which led to the formation of a special structure for further study of the identified problems - the UN Environment Program.

The United Nations Conference on the Human Environment, held in Stockholm in 1972, and the creation of UNEP marked the beginning of the development of environmental policy and diplomacy.

In 1987, the UN raised the question of the need to find a new model for the development of civilization, as well as the transition to solving the problems of systemic globalization, since environmental safety is only one component of sustainable development.

Currently, there are several approaches to the concept of sustainable innovative development of macroeconomic facilities.

The concept of economic social dynamics by (Rubinshtein & Grinberg, 1998) is based on two main working hypotheses. Firstly, this is the idea of the impossibility of reducing the needs and interests of society to the total result of the individual preferences of its members and the existence of special public interest and needs in this regard, and secondly, the following is the concept of the social role of the state.

The concepts of R.S. Grinberg and A.Ya. Rubinshtein speak about the constant participation of the state, through public-private partnerships and indicative planning, in the market process, the size of which can be determined by the regulatory interests of society and the resources available to them.

Theories of cumulative growth F. Perru

The French economist F. Perroux first proposed the concept of “poles of growth”, which - economic growth is reflected at certain points (growth poles) and with certain variables - spreads the intensity and effect through various channels to all areas of the economy. The decisive role in the formation of “growth poles” belongs to the state, whose tasks include a balanced growth policy based on indicative planning, which ensures a combination of interests of various functional groups. Indicative planning is the basis for the development of all types of managerial decisions in the form of forecasts, strategic programs and plans aimed at ensuring sustainable development of the territory (Perroux F., 1954).

We should also single out T. Hegerstrand's theory of the spread of innovations; in accordance with this theory, one generation (generation) of innovations includes four phases: emergence, diffusion, accumulation and saturation. In addition, according to T. Hegerstrand, diffusion can be of three types in the whole range of different innovations, and this depends on the distribution method - uniform (expansion diffusion), a certain direction (movement diffusion) and mixed (Hägerstrand Torsten, 1976).

Separately, the "volcano" model of H. Hirsch deserves. This model considers innovative development as the frequency of innovative impulses. The weakening of the innovation climate due to the influence of negative factors leads to the transformation of the once developed center into the old industrial depressive zone. Nevertheless, this does not deny the possibility of forming new centers of innovation at the end of large business cycles conducted by N.D. Kondratiev and J. Schumpeter.

The essence of the phenomenon of sustainable development is difficult to define terminologically unambiguously. This is due to the use of the concept of sustainable development in various fields of science. The first group of scientists connects the phenomenon of sustainable development and the need to change the nature of the economic growth of civilization, the second is the same phenomenon and the preservation of biospheric equilibrium, the third is the phenomenon and modernization of relations between economically developed and developing countries, etc.

The International Commission on Environment and Development has defined sustainable development as a development that meets the needs of the modern population, enabling future generations to meet their own needs. This definition is especially valuable in the sense that it recognizes the need for a strategic approach to managing the region’s sustainable development, focused on the long term, since the socio-economic system is very dynamic and subject to the influence of external and internal factors. factors that constantly deform the structure and deprive sustainable development (Lazareva, 2016).

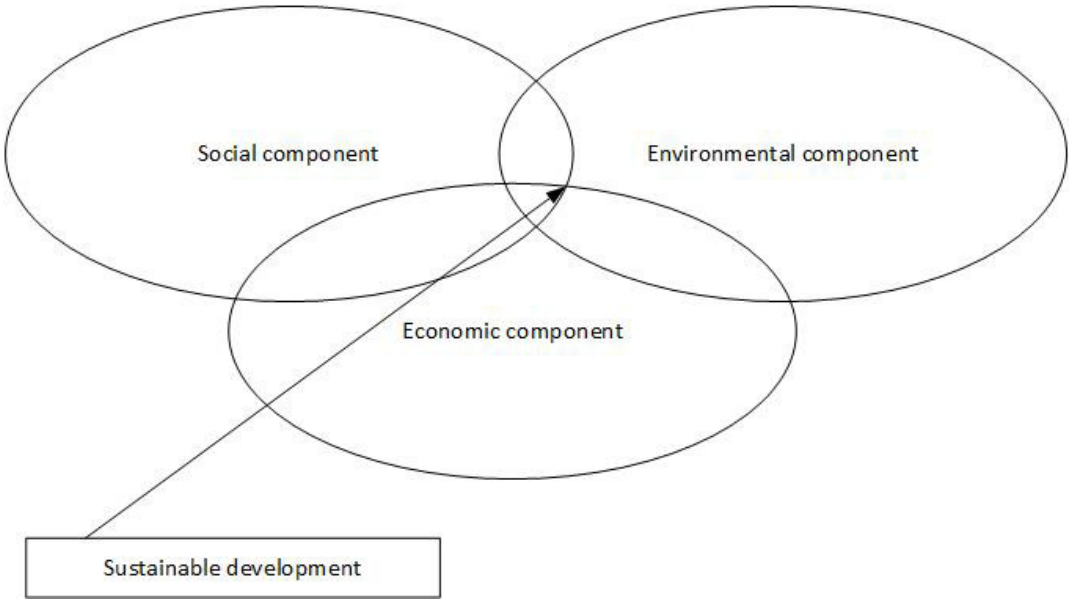

Figure 2: Elements of sustainable development, prepared by the author

Formulation of the Problem

The need to overcome the unbalanced economic development of the world economy makes it necessary to select a number of indicators that would characterize the innovative development of the region from the point of view of its sustainability on the basis of existing concepts describing sustainable development. This set of indicators will allow you to determine the criteria for sustainable or unsustainable development of a macroeconomic region. The formation and use of this set of indicators will ensure sustainable development of both large macroeconomic regions and individual industrial clusters (Vorozhbit O.Yu., Terentyeva T.V. & Titova N.Yu, 2016).

Results

The analysis of the existing concepts of sustainable innovative development allowed us to form a set of indicators to assess the sustainability of innovative development.

Firstly, it is relevant to assess the economic efficiency of the implemented model of sustainable innovative development. It should be noted that the transition from one development to a sustainable development model involves the imposition of certain restrictions on spontaneous (naturally) successful market processes. At the same time (transition) is intended to reduce the negative impact of natural processes on society and nature. This problem can be expressed as a mathematical model represented by the objective function:

$$\begin{cases} Cost - effective\ business\ process \rightarrow max \\ Impact\ on\ the\ biosphere \leq Biosphere\ limitations \\ Social\ Impact \leq Social\ restrictions \end{cases} \quad (1)$$

The economic efficiency of the business process is the ratio between the results of economic activity R and costs C (2).

$$Cost - effective\ business\ process = \frac{R}{C}; \quad (2)$$

Biosphere restrictions are natural resources and environmental components. In turn, the components of the environment are all options for the relationship between society and nature. Based on this, we can say that environmental management is an integral element of environmental relations. At the same time, nature management should still be considered more as a process of the relationship of nature with society, since humanity extracts natural resources from ecosystems and uses them in its economic sphere.

Biosphere restrictions are understood as ensuring sustainable nature management by gradually changing the use of non-reproducible resources (IR) to reproducible (RR) and are reflected in formula (3):

$$Biosphere\ limitations = \frac{IR}{RR}; \quad (3)$$

Social restrictions associated with the need for human survival and its preservation (anthropocentric factor of the social and natural system) is reflected in the formula (4):

$$Social\ restrictions = \frac{B}{Contr}; \quad (4)$$

A key factor in social constraints is social justice, which, in turn, represents the corresponding contribution (Contr) of humanity's direct activity to the level of benefits it receives (B). At the same time, the equal distribution of basic goods (human rights and freedoms, the environmental situation in the vicinity, etc.) is considered true.

The use of these indicators in assessing the proposed transformations of socio-economic systems, by which we mean a country, region or city, would, in our opinion, allow for the effective transformation of existing socio-economic systems and at the same time avoid catastrophic changes in the biosphere.

Conclusions

Considering Fig. 1, as well as the data given above, the following conclusions can be drawn.

At the moment, mankind, despite the successes achieved in the field of scientific and technological progress, has faced significant biospheric changes that threaten the further successful life of both human civilization and all life on earth. Further development according to the existing model can lead to global environmental collapse, which can lead to the collapse of human civilization or its degradation. The existing history does not yet know such examples, but the history of ancient civilizations testifies to the catastrophe of the Bronze Age that occurred in the ancient world, one of the possible reasons for which was the disturbed ecological balance of the ancient world.

One of the ways to prevent a possible collapse is the transition from the strategy of extensive development of the world economy, in which the world economy consumes more and more non-renewable natural resources to an intensive economy that allows rational use of biosphere and social resources. For this, in its development, mankind must use in its development the concept of sustainable innovative development, which would support the rational use of all resources to achieve a certain socio-economic result. To evaluate the proposed transformations, a special set of indicators is proposed. Its use, according to the authors, will greatly simplify the decision-making process in the process of socio-economic change. Also, this set of indicators will make it possible to formulate a policy of public entities effective in the field of sustainable development (Nekhaychuk, Tarasova, 2016).

The introduction of the concept of managing sustainable innovative development into the socio-economic processes taking place in the world economy will allow mankind to reduce its impact on the Earth's biosphere in a short time and provide the existing population with acceptable living conditions even with the existing increase in the level of the world population.

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Development of Economic Complex of The Tourism Industry in Ukraine

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Abstract

This article explores that tourism is an important part of the country's economy. The current state of tourism development in Ukraine was determined and practical propositions on ensuring of economic development of the country owing to tourism were offered. The competitive advantages and weaknesses of tourism industry in Ukraine were studied. The tourism sector is increasingly seen as a specific, ecological and attractive sector of the economy and a component of state and regional policy on which the social and economic development of the country depends to a large extent, its image on the international scene has been formed. Ukraine, having a considerable tourist potential for the formation of tourist flows, is ranked 78th among 140 countries of the world in terms of tourism attractiveness.

Keywords: Tourism, Competitiveness, Development, Potential.

Introduction

Tourism is a sphere of life that includes millions of people, many branches of economy, contributes to international exchanges and human contacts. The dynamism and scale of tourism development explain the fact that this type of economic activity, even taking into account unfavorable situation on the tourism market, is capable of preserving positive trends of development due to the multifunctional nature of economic activity, the high degree of autonomy and universality of all components of the tourism phenomenon as a socio-ecological and economic phenomenon. Its social, economic, environmental and political significance is universally recognized.

The multifunctional value of tourism is manifested in the fact that it is simultaneously a type of economic activity, leisure, consumption, cultural phenomenon and component of social development. In addition, tourism affects the ecological state of the environment determining the level of permissible ecological burden on a particular tourist region (destination). Consequently, an important ideological keystone for understanding the socio-economic essence of tourism is its interdisciplinary nature, since tourism is characterized by specific functional and sectoral features of the production chain in relation to the creation of a tourist product that are related to the inter-industry nature of economic activity. This fact manifests itself in the fact that in tourism, the production and consumption of tourist products is a whole production process, which complicates the application of managerial technologies that are successfully used in other branches.

Literature Review

The significant contribution to the development of theories and solving problems of economic trends in the tourism industry were made by our scientists: D. Basiuk, M. Bondarenko, S. Melnichenko, G.M. Boyko, V. Kyfiak, V.A. Kravtsov, O. Liubitseva and others. Although are large number of papers on the problems and trends of tourism in Ukraine, and some successes in the study of the tourism industry as an engine of socio-economic development of the country remains relevant research questions of the current state of tourism in Ukraine and prospects of his development in the future.

Methodology in Research

The theoretical and methodological background is the fundamental principles of the systematic approach, the methods of scientific abstraction, analysis and synthesis, induction and deduction, the dialectical method of knowledge of economic phenomena, the corresponding provisions of economic theory in the study of economic processes, scientific works of domestic and foreign erudites, which cover the fundamental positions, the main problems of tourism enterprises.

The purpose of the research is studying a current state of the tourism development in Ukraine and development of practical offers for ensuring economic development of the country with the help of tourism.

Results

Nowadays, tourism is an integral part of the global economy. The industry employs more than 265 million people, which is 2.8% of the number of employees (Khollovai H. Kristofer, 2016). The share of tourism in 2018 in world GDP was 10% and 34% of world exports of services. The total turnover of world tourism is USD 1.03 trillion. Tourism has become one of the priority areas of the global economy, creating development in specific areas. Overall, the tourism industry and related sectors of the economy employ 2.8% of the working population (UNWTO, 2018). The average annual growth rate of tourist profits is 8%. According to the State Statistics Service of Ukraine: number of Ukrainian tourists are catered subjects of tourist activity in 2018 was 2.8 million people and foreign tourists were 40 thousand. While in 2015-2016 these figures were 2 million and 15 thousand people and 2.5 million and 35 thousand people, respectively (Official site of the State Statistics Service of Ukraine, 2019).

Tourism is esspeially importante for Ukraine, because it is an supportive environment for small businesses that are able to operate without significant budget allocations, and a perspective for attracting foreign investment on a large scale and in the short terms. The tourism business stimulates the development of other sectors of the economy and contributes to meeting the needs of people in learning about the history, culture, customs, spiritual and religious values of different regions of the country.

Tourism has both a direct impact on the social parameters of life (improving health and human development in general) and indirect effects through improving the economic development indicators of the country: GDP growth, income, employment, etc. Improving all parameters of economic life the population is the basis for improving its well-being, improving health and increasing life expectancy. In income increasing of the population in the future becomes a factor of accelerated development, including tourism.

The development of tourism is not only an important factor in the economic development of the country, but also social, cultural and spiritual. It is recreation and tourism that can actively contribute to the effective implementation of the concept of sustainable development, which is aimed at both economic growth and social progress, the environment and, in general, humanistic, ethical and

cultural development. Therefore, the impact of recreation and tourism on the social indicators of economic development of both individual territories and the whole country is particularly relevant.

Potential tourism possibilities of Ukraine are endless, but tourism industry for a long time has the influence of such negative factors as a lack of state policy in the field of tourism, strategies and programs for the development of tourism and resorts; multiple transformation of the central executive body in the field of tourism; passivity of the Coordinating Council on tourism activity formed under the Cabinet of Ministers of Ukraine; neglect of international experience in tourism development; as well as territorial losses and military actions in the country, instability in political and economic life.

Nowadays, the political factor in Ukraine has a negative impact on the tourism industry. Due to the self-proclaimed world annexation of the Crimea, has suffered direct impact on the economy of Ukraine. Since, in the summer of Crimea was very popular among tourists. However, after the annexation of almost 90% of Ukrainian tourists declined principally from trips to the Crimea and chose to go on holiday abroad or spa resorts of Zakarpathia.

Full value development of tourism and recreational sphere has a significant impact on such sectors of the economy as transport, trade, communications, construction, agriculture, production of consumer goods and is one of the most promising areas for structural reorganization of the economy. The development of tourism at a regional level is based on both traditional resources and on the capability of creative economy, and this allows attracting such non-material factors as local ethnic characteristics, regional mental image, unique local historical-and-cultural heritage.

Growth of competition in the market of tourism demand occurs under the following factors: appearance of an increasing number of countries with ambitious expansive plans for tourists attracting; reaching the peak of saturation of some forms and types of tourism offered by tourist centers and countries (for example, in the beach holiday market). In turn, it requires the following actions from the countries seeking to preserve their tourist attractiveness: to try to keep a balance between demand increasing and supply growth; to plan tourism development in accordance with the principles of sustainable development; to foresee long-term investments in tourism sphere; to ensure availability of clear national strategies for tourism development, flexibility and efficiency in decision-making.

Ukraine has sufficient potential to make tourism one of the main drivers of its economy. Tourism should be a national priority for the development of Ukraine. It attracts foreign investment, foreign exchange and it is part of the marketing and branding strategy. This sector would boost creation of jobs, SMEs and infrastructure development, especially in depressed regions. Growing necessity to attract tourists would result in better services quality and better hospitality culture.

Competitive advantages of the tourism industry of Ukraine are beneficial geographical location, considerable recreational potential: favorable climatic conditions, healing mineral springs, diverse flora and fauna, rich historical-and-cultural heritage and high educational level of the population. The unique natural resources and cultural heritage belonging to the country cannot be considered as a single and sufficient condition for the successful development of tourism in the country because they are only one of the elements of tourism supply. Qualitative tourism infrastructure is the important component of the successful development of tourism. For the most part, tourist preference of both foreign tourists and domestic ones is connected with a high level of service and a reasonable ratio of price and quality. These conditions are the key ones while choosing tourist trips now and in the near future.

The following factors can be attributed to the competitive disadvantages (weaknesses):

- corruption and unfavorable conditions for entrepreneurship and tourism business;
- insufficiently developed tourism infrastructure in most regions of the country; a small number of hotel facilities for tourists' accommodation with a modern level of comfort and their non-compliance with world standards;

- high cost of living in the hotels, food, transport and other services offered to the tourists greatly exceeds the average European level;
- hindrance in attracting investments to tourism infrastructure, consisting of the lack of ready investment sites, existence of administrative barriers, unfavourable conditions for land lease;
- shortage of skilled personnel which is seen on the whole determines low quality of service in all sectors of tourism industry;
- poor state non-commercial advertising of tourism opportunities of the country both in foreign markets and within the country which complicates the activity aimed at the purposeful formation of the positive image of Ukraine as a country favourable for tourism which is connected with limited budget financing.

Thus, a systemic problem is that the possibilities of development of the domestic tourism market will be insufficient for raising the living standard and increasing employment among population, meeting the growing demand for qualitative tourism services while saving the current level of Ukraine's competitiveness in the world tourism market.

Analysis of competitive advantages and disadvantages of Ukraine in the market of inbound and domestic tourism shows the need for active actions, first of all from the country aimed at creating conditions for the sustainable development of tourism in Ukraine.
Intensification of the development of priority inbound and domestic tourism for Ukraine is possible only by tax and financial stimulation of the exports of tourism services and domestic tour operators that carry out these activities, as well as combining the efforts of state authorities, representatives of tourism business and civil society institutions for popularization of Ukraine in the world and promotion of brand-messages "Ukraine is an attractive country for tourism".

The mechanisms to promote Ukraine as a tourist country in the European market, and attract more European tourists include: participation in the largest European tourist and other exhibitions with the single national booth for presentation of the tourist product with involvement of the executive authorities of Ukraine; preparation of non-commercial advertising and informational printed matter and other products for distribution at the largest European tourist exhibitions and through Ukrainian foreign representations; engagement of domestic and foreign experts in tourism sector in the creation of tourism development programs with the aim of using the best European experience; dissemination of information about Ukraine as an attractive tourist country in the Internet; information support of various events held in Ukraine; organization of informational tours for European and national mass media; holding international conferences, symposiums, congresses and other events devoted to the tourist attractiveness of Ukraine.

Tourism sector depends not only on state deposits, but also on innovation. In tourism, innovations are systemic measures that have novelty and lead to positive changes, ensuring the competitiveness of the services offered. The commercial benefits of implementation of innovations are provided by their recognition of the tourism market and considering the degree of customer satisfaction. Market innovation and intellectual property products today characterize the transition from the economy of proposals to the economic demand (Holovinets V., 2018). According to the World Tourism Organization UNWTO, Ukraine’s share is only 4% in tourist flows in Europe, which demonstrates the low efficiency of Ukrainian tourism industry. Therefore, the formation of the business environment for the development of tourism in Ukraine opens up wide opportunities for creating the attractiveness of tourist products (Melnychenko S.V., 2018).

Prospects for the effective development of the tourism industry in Ukraine are related with the formation of appropriate information, scientific and technical support of this area, which at the national and regional levels should be associated with the activation of the following areas:

• development of application programs for the development of the nature management, promotion and realization of tourist product;
• development of inventory of tourist resources;

• development of a complex of scientific knowledge in the field of tourismology and tourism management;
• development and publication of manuals and directories (tourist routes, places of rest, food, etc.);
• creation of rating of all travel companies of Ukraine on the quality indicator of fulfilled obligations;.
• development of automated booking and reservation systems.
In Ukraine, the advantageous geographical location of the country is not supported by the infrastructure on the corresponding level. The main obstacles to the development of Ukraine's tourist infrastructure are poor road quality and unjustified price policy in the hotel industry. In our opinion, the following measures will have priority for infrastructure development:

• integration of Ukraine into a single European railway network, which involves the country's inclusion in the European program for the construction of high-speed railways (speed - 200-300 km / h);
• participation of our country in the network of strategic transport corridors of Central and Eastern Europe;
• attraction of funds by international credit programs at a rate of 5-7% per annum;
• ensuring the possibility of free treatment of insured tourists in city hospitals and clinics;
• introduction of innovations in the development of tourism infrastructure;
• organization of tenders and targeted investment competitions for the right to reconstruct and build new tourism objects.

The realization of listed tasks and creation of competitive Ukrainian Infrastructure of Tourism needs a lot of investments and creation of specific order for investment and business activity realization.

Conclusions

The analysis of international experience in the field of development of international tourism business shows that the increase of competition level in the international tourist market for the redistribution of tourist flows necessitates to conduct measures to strengthen the role of executive authorities in the formation and promotion of a national tourist product.

In many countries of the world, the relevant state programs are being developed and implemented, the legal framework is being improved, and the tax regime is introduced, which is favorable for the development of tourism industry, attracting investment in the development of tourism infrastructure. It should be noted that it is necessary to increase the competitiveness of the domestic tourism industry in the international tourist market and to ensure the quality of the national tourist product. In particular, the issue of proper adaptation of natural territories, objects of cultural heritage for visiting tourists, appropriate infrastructure facilities and information provision is needed to be solved.

The economy of Ukraine that aimed at active integration into the world economy, the tourism industry is becoming a determinant of social-economic development, but the pace of change remains unsatisfactory, as it is evidenced the lowest position in the world rankings tourist market. The development of tourism in the country is a basic element of ensuring the competitiveness of the country and regions in particular.

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Research of The Use of on-Line Platforms by Commercial Companies of The Russian Federation

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Abstract

The article analyzes the key trends typical of Russian retail and servicing firms' operations as digital technologies are introduced everywhere. It considers the omnichannel approach to the sales of goods and services as a convenient method of interaction with the consumer. It considers the integration trends, creation of online platforms and aggregators as a systematic phenomenon of commercial activities in many industries. We focused on the positive aspects of interaction with the consumer via retail aggregators and on the fallout of this method of commercial operations. The possible economic threats linked to high activities of foreign digital integrated platforms on the territory of the Russian Federation are outlined.

Keywords: On-Line, Omni-Chanel, On-Line Platform, Taxation.

Introduction

Most companies, which offer services to the end user, find themselves in fierce competition. Many instruments are used to attract and keep the consumer. Companies are forced, first of all, to focus on their price offers. However, this is not the only aspect impacting success of their sales of goods or services. Of course, the modern retail and service companies pay much attention to the so called individualization means for companies, goods, works and services, promotion of trade marks. A modern customer, as a rule, prefers a recognizable brand and buys goods or services in well-known companies with a good reputation. Finally, the consumer preferences and choice in favour of a company today are dictated not only by their price or assortment policies, but also by the company's popularity on the market. The bulk of organizations have to pay attention to the changes, which are happening thanks to growing business digitalization. The omnichanel concept, i.e. interaction with the consumer via integration of real and virtual processes is now a necessary condition of maintaining the market position. Besides the traditional forms of commercial work and interaction with the consumer, various integrated business methods, including the use of digital technologies, are spreading widely. The online instruments in retail and services are primarily the possibility to increase the sales channels. Secondly, it is a convenient way of working both with the end user and with partners and counteragents, with the state. Apart from the above, it is also a way to cost cutting, effective financial management.

Literature Review

Modern digital transformation of retail and servicing is the subject of scientific discussion of many researchers all over the world. Digital instruments are now used in all types of commercial activities of companies.

The consumer expects comfort, modern technologies used by the commercial organizations in all aspects of their activities. The spread of digital technologies covers most spheres of commercial operations of companies from many industries with the retail and servicing companies being no exception. Modern companies introduce innovations into the digital technologies in many channels of interacting with the client – (in a research study by Wagner et al, 2020). Introduction of digital instruments influences decision making about the purchase of goods or services. As the number of electronic commercial interaction, mobile purchases and intellectual technologies increase, the methods of commercial operations change - suppose (Reinartz et al, 2019). This statement is true for many Russian enterprises think Kuznetsov et al, (2017) and Korableva et al (2019). The advantages of innovative technological solutions are obvious, especially as the market environment changes. The researches discover the key factors influencing the change of client needs (digital services, digital marketing, intellectual data analysis and online communities) written in a study Reichstein and Härting (2018). There are also several researchers Kollmann et al (2019) reflecting the special features of entrepreneurship as digital technologies are introduced . (Briel et al, 2018) demonstrate that commercial processes are becoming more complicated, have an impact on the results and the risk, and develop the entrepreneurial spirit on the whole. Changes are inevitable and they occur in most sectors of the state economy (Kosov et al, 2016.) Changes in commercial activities are caused not only by digital solutions, but also by changes in legislation, especially taxes, because it affects the size of the final profit. And that means commercial efficiency. (Lehoux et al, 2019) and (Morozova et al, 2019)

Of course, the conceptual changes in transformation of the retail, servicing, touristic and other services are linked to the integration trends, creation of united industry services, which offer personalized requests. (Hänninen et al, 2019) and (Casais et al, 2020). The possible models of interaction on platforms-aggregators were also considered in detail (Chen et al, 2019). Since modern commercial operations mean interaction in the external environment, i.e. with partners, consumers as well as the state agencies, the researches pay special attention to the use of digital technologies in commercial activities when interacting with the government (Mergel, 2019). Currently, ways of interacting with fiscal services are changing and improving. (Petrov et al , 2019).

Some researchers focus on individual instruments to stimulate customers as an individual vector of commercial operations as the world goes digital. (Garaus and Wagner, 2019).

Materials and Methods

To reveal the specific trends of the use of digital technologies and the specific features of modern commercial operations in retail and services, the research used different methods of scientific information collection and processing. Data collection about the use of digital platforms in different industries, its further processing, the use of specific analysis procedures, including bibliographical sources have revealed the key trends in the use of digital platforms in different industries. A qualitative estimate of the phenomenon and the possible threats of further introduction of digital platforms as a systemic phenomenon with a wide spread regardless of the industry on the basis of logical analysis were formulated.

Research Question

At this time various aspects of the macro environment of enterprises are dynamically changing in all sectors. Although there have been a lot of changes, across industries and for many organizations (Yukhimov et al, 2019)

Digital technologies in retail and services are now widespread. At that, digital solutions cover all spheres of commercial operations of an enterprise, especially in retail and services. They focus on the segment of commercial operations, which stimulate sales, bringing the goods or product to the end user. On the other hand, digital instruments are popular among the B2B segment representatives, since they cut costs significantly and reduce accounts receivable by increasing the payments speed (Malitskaya et al, 2019) and (Lehoux et al, 2019). Traditionally, bringing the goods or services to the end user required a 'physical' enterprise, a chain store, participation of professionals in commercial retail operations.

However, modern commercial electronic activities in the trade of goods and various services, the results of intellectual activities has undergone significant change. Physical enterprises or companies, which only use remote interaction ways (we can cite the catalogue companies without a physical shop or office. Even separate online catalogues are an exception and they do not guarantee a victory in the fierce competition.)

If we consider traditional retail, the current share of electronic retail in Russia amounts to 4 % (1,150 bln rbl) of total turnover as of the start of 2019; the share is forecast to rise to 6% by 2023.[1] This indictor is significantly higher in tourism, where about a fourth of all services there is sold via online instruments. In most cases, regardless of the industry modern commercial companies have to influence their clients by creating conditions to acquire goods or services following market trends. It is the sale of goods or services that is their key function. International globalization and integration trends cover all types of commercial operations, while development of communications and digital means of data transfer have created a united information environment triggering transformation of business methods. The use of digital technologies influenced information exchange between the participants of commercial activities, transformed business processes, changed the communications means and organization of interaction with the customers. The well spread practice of omnichannel commercial sales standard can be considered as modern commercial functions, which impact and develop the sales channels of goods and services and their promotion in condition of overwhelming digitalization of all the branches of economic interaction between organizations. (Zvereva and Leonova, 2016). The omnichannel sales offer the customer an opportunity to define the interaction model when making a purchase. The cycle of acquiring goods or services can be performed virtually, or the customer can build a convenient route of getting acquainted with the goods or services before the purchase transferring some operations to the physical environment using available technologies or instruments of the environment.

The next step in the development of digital technologies was creation of online platforms and their active use by the customer; the business model of interaction between the end user and the seller of goods or services as a consequence.

Aggregation of goods of different brands or services of different suppliers on one platform creates lots of advantages for the client:

- systematization of information about the goods and services from different suppliers;
- creating a search query, selecting and comparing positions;
- automated creation of personified offers and recommended lists based on the analysis of habits and history of queries;
- higher awareness about the goods and services based on the exchange of reviews and recommendations.

[1] Retail digitalization: technologies and leadership. The St Petersburg International Economic Forum 2019. PWC [electronic resource]. URL: https://www.pwc.ru/ru/spief/2019/digital-retail.html

The modern digital platform is the basis for company transfer to the digital environment, automation of business operations, which enhances the quality and reduces the importance of middlemen in the chain, which brings goods and services to the customer. United retail platforms (we can cite as examples such retailers as Amazon, eBay and Aliexpress, and various tourism services like Booking, etc (experts put its share on the Russian booking market at about 60%). Such organizations are successful, while the interaction model is still the most lucrative business in e-commerce. Also, as economic ties are optimized and the number of intermediary links decreases, there appears a chance of using flexible pricing methods, which diminishes the cost of goods or services making them more attractive for the end user.

Transformation of services in the digital environment has formed an understanding with the business community that having a website is no longer sufficient for successful commercial operations, because the key goal of any commercial enterprise is satisfaction of the need for goods or services of a certain type and as a consequence development of competitive advantages.

Optimization of interaction with the client on the online platforms-aggregators via concentration and systematization of information can be done on the basis of different models – resale or offer of intermediary and agency services, or independent commercial operations with preservation of some features of omnichannel sales.

Talking about an online platform, where the producers sell their products of services directly to the client without the middlemen, the issues of responsibility between the operator and the supplier become very important. This interaction model requires special control. Good operations of an online platform means responsibility of the aggregator for the quality and seamless processing of orders, their delivery, for the quality of the service. There are many cases when the consumer makes a purchase on the platform-aggregator instead of a website of the brand producer or an owner, offering placement services thanks to the trust to the platform or guarantees its offers (for example, Yandex.market). This trust is mainly formed thanks to the possibility to compare the goods of different brands before making a purchase. Reviews of the customers who have already bought and used the goods or services are often of a higher importance than the characteristics announced by the producer or seller.

The digital websites are often visited more frequently than autonomous websites, while conversion rates are higher thanks to the search focus.

Along with the rising loyalty of the consumer and attraction of new buyers, an aggregated platform is a way of raising quality of the goods or services as consumer reviews are collected. Besides, it is a good chance to organize stimulation events because marketplace events are much cheaper than development of an individual program. This helps the company to use and save economic resources in the optimal way. And the last, but not the least, the potential audience, at which the advertising messages on the website are targeted, are wider than in independent promotion.

Discussion

A modern consumer has to make a choice among numerous offers from competing companies. Digital technologies and the internet environment help the consumer make purchases regardless of the geographic location of the enterprise. It is obvious that consumer's access to the international market is fraught with threats thanks to the economic policy of some states, including the Russian Federation. However, the spread of such form of interaction is understandable, because a marketplace offers a wide range of goods and services as well as good terms of the purchase and quality guarantees. At that, there is a downside to the wide spread of platforms, which offer goods or services on the territory of the Russian Federation. The volume of cross-border e-commerce (imports) or the purchase of touristic services in organizations with no Russian registration demonstrates significant stable growth. The foreign companies located outside the Russian jurisdiction but having commercial operations in the Russian Federation has no fiscal burden. This means that the government has to restrict their operations. Although the problem is the same, its solutions differ depending on industry.

For instance, foreign retailers using online platforms cap in the cost of packages for the Russian Federation. In tourism, a possible prohibition of the services aggregating offers both from the national and foreign companies, on the contrary, provoked criticism from the business community. At the same time, changes were made in Russian legislation regarding the procedure of VAT (value added tax) payment. (Akhmadeev, 2019.). It would be reasonable if the countries share their experience on introduction of control and influence measures by slapping duties and VAT[2] on the shipments of goods to individuals at the location of the buyer and profit forming. The tax claims of the state are reasonable, while introduction of fiscal restrictions could ensure balance in the competitive economy of a state.

Conclusion

The use of online platforms in commercial operations of companies is a market trend, which cannot be ignored. Along with their own websites, most companies have to use platforms-aggregators, which help them increase effectiveness of their commercial activities on the whole, boost potential revenue and help profit grow.

A retail platform is undoubtedly good for the participants of interaction. For the companies, it is a way of cost cutting on acquisition of new consumers, increasing their loyalty. For the consumer, it is a reliable neutral platform, where he can find various goods, review and compare prices. The use of digital technologies helps to increase effectiveness and flexibility of the companies' operations.

However, this global trend under review, which is typical of most industries, including retail, services, tourism, changes the system of economic ties between the producers, suppliers, consumers and the state. The government needs to restrict goods and services' access to the national markets.

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Review of Capital Budgeting Techniques: Where Can Research Add Value in the Omani Context?

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Abstract

This paper surveys research on capital budgeting techniques (CBTs) with special attention to the Sultanate of Oman, an emerging market within the Persian Gulf region striving towards a more sustainable post-carbon economy. CBTs represent organisations' aggregate activities undertaken for approving capital investments in pursuance of growth strategies. Given global oil prices' volatility and public finance deficit pressures, oil-dependent countries like Oman aim to diversify their economies by investing in strategic projects that produce a flow of benefits over the long term. Content analysis tool is deployed along with authors' involvement in various projects in Oman and elsewhere to provide some integrated conceptual and theoretical perspectives. The relevance of traditional non-discounted cash flow (DCF) approaches, the DCF models, and alternative capital budgeting techniques (ACBTs) such as modified internal rate of return, real options valuation and Monte Carlo simulation are highlighted while recognizing the growing desire for proper integration of financial and non-financial considerations across the markets. Multiple capital budgeting approaches are used in several economies, but the empirical evidence of capital budgeting applications in the Omani context is rather sparse; ACBT application appears to be rare as managers prefer to rely largely on the non-DCF techniques. DCF approaches such as net present value (NPV) and internal rate of return (IRR) are more favoured in the developed economies, thus pointing to the resilience of the capital-income theory. The need for further research in the Omani context and its overall implications for the country's strategic research and knowledge development are stressed.

Keywords: Alternative Capital Budgeting Techniques (Acbts), Capital-Income Theory, Oman Manufacturing Sector, Risk Analysis.

Introduction

Capital budgeting techniques (CBTs) refer to the plethora of analytical management tools for making capital investment decisions under conditions of risk and uncertainty. Capital investment involves a large sum of cash outlay in expectation for future stream of benefits/income/return. Thus, robust capital

budgeting would entail a proper understanding of the financial market dynamics, business environment, funding sources, financial mathematics and consideration of non-financial factors (Umoh, 1997). Whatever capital appraisal model the manager chooses should align with corporate strategy, save time, money, optimize resources and guarantee sustainable benefits or income realisation.

Multiple capital budgeting approaches are used across the globe (Ross et al, 2004; Desai, 2019; Pandey, 2004, Parasuraman, 2019), but research has yet to reach an accepted comprehensive model that effectively describes the processes a capital budgeting must go through in order to transition from idea, information, to decision and funded implementation (Cleland, 2004). Moreover, empirical evidence of applications in the Omani context looks rather sparse (Al-Ani, 2015), particularly in the non-oil manufacturing sector, a capital-intensive sector requiring significant capital investment. Previous research so far has paid little attention to critically examining the degree to which managers utilize advanced or sophisticated techniques such as real options valuation in making capital budgeting decisions. Answers to this enquiry are considered to be fundamental to crafting a desirable innovation strategy (Drucker, 2007).

Overall, it is expected that the findings obtained from a contextual research would provide useful empirical guide on the practice of private-sector capital budgeting in a wide variety of applications in Oman, considering the government's drive towards sustainable economic diversification, the success which arguably rests on robust private enterprise decision-making process/models that adequately reflects optimal capital allocation dynamics (The World Bank, 2018; IMF, 2018; Hindle, 2008; Nagarajan, 2014; Desai, 2019; SCP, 2016).

Two key perspectives highlight the range of economic management issues motivating this review. First is the significance of wealth, risk and capital and the problems associated with measuring them (Piketty, 2014). Second, capital investment as a significant part of a country's gross domestic product (GDP) (Picketty, 2014). Previous studies have focused rather more on the oil sector and basic CBTs like payback period (Al-Ani, 2015). Other contributions have reflected varying practices in different jurisdictions such as the Middle East (Chazi *et al,* 2010), Canada (Bennouna & Meredith, 2010), Nordics (Brunzelli *et al*, 2013), or India (Batri & Verma, 2017). Thus, given that CBT body of knowledge has implications for industrialisation drive of a nation and quality of managerial decision-making process, research has significant role to play in bridging higher education-industry knowledge, particularly in the Oman case where robust CBT knowledge and expertise might be invaluable for reducing the country's high (49%) youth unemployment rate (The World Bank, 2018).

As part of a larger project (TRC, 2019) currently investigating capital budgeting practices in Oman manufacturing sector (CBPOMS) in support of the country's new economic diversification agenda (Oman Vision 2040), this paper is designed to provide an overview of the current state of capital budgeting research in the country. This contextual review is expected to facilitate further research at the subsequent phase of the project by bring out the key elements for further empirical investigation and analysis, with special attention to the manufacturing sector where research seems to be currently sparse.

The specific objectives are:

1. To critically review the major aspects of global capital investment techniques that managers use for screening and selecting project options.
2. To evaluate the relative role of financial and non-financial considerations in managers' choice of capital budgeting techniques.
3. To explore the development of a coalescent capital budgeting decision model for improving the quality of capital expenditure decision-making.

The paper is divided into five sections, starting with this introduction. This will be followed by section 2 where key underlying theories and concepts in capital budgeting practices are briefly highlighted. Section 3 highlights the outcome of the global literature survey including an outline of the potential

contribution of further research in the Omani context. Section 4 highlights the project's methodology and limitations, while the paper ends with some concluding remarks in section 5.

Overview of capital budgeting theories and concepts

There is a raft of theories dealing with the evolving question of 'capital' and the 'income' or benefit associated with it. At the root of our understanding is the economist idea of capital as a 'stock' or 'real assets' as distinct from "income" which is a flow or "financial assets" (Capital and Interest, 1976). Capital budgeting is grounded in the production and time structure of the economic process, suggesting there is a time-lapse between decisions and its consequences. The time value of money is long related to the classical thoughts of Adam Smith, David Ricardo, Nassau Senior and John Stuart Mill in the "annual agricultural cycle" era. Perhaps, Picketty (2014: 114 & 800) has summed up the whole capital-income idea aptly thus: "what could be more natural to ask of a capital asset than that it produces a reliable and steady income", and "the value of a piece of physical capital should be less than the total of the future values that are expected to accrue from it". The Austrian theorists ("latest thinkers"), notably, Eugen Von Bohn-Bawerk, P. H. Wicksteed, Knut Wicksell, and Irving Fisher, along with the "Marginalists" provided the mathematical expression to the time factor associated with modern capital budgeting ideas. From an economic standpoint, interest as a reward to providers of capital giving up immediate use of their funds, is regarded as the gross rate of growth of capital. This informs the liquidity preference theory of J. M. Keynes of the people's tendency to hold most of their assets in the form of money. However, the flip side is the time-preference theory which urges moderating interest rate in order to motivate people to postpone enjoyments to the future, with possible fiscal policy / political implications.

Other key explanations include pecking-order theory, risk-return trade-off hypothesis, agency cost theorem, shareholder-stakeholder trade-off, and shareholder wealth maximization, but it is yet unclear the extent to which these and other related theories can be said to validate capital budgeting practices in the Omani context.

Capital budgeting is a pivotal topic in the realm of corporate finance because of its high usefulness for project evaluations, tool for achieving strategic organisational success, and to maintaining market position or competitiveness (Nishat & Haq, 2009; Chen, 2008; Bukvic *et al.* 2016). As earlier noted, there is a plethora of quantitative (investment analysis, setting the discount rate, risk analysis) and qualitative actors distilled from the literature (De Souza & Lunkes, 2016). Qualitative approaches seem to be gaining some research attraction. For example, in responding to the challenge of differing risk perceptions among managers, Karanovic and Gjosevska (2012) provided a fuzzy logic concept for modelling the linguistic variables, in order to provide a robust quantification of the manager's opinion.

Research to date has identified three categories of capital budgeting techniques (CBTs). The first group relates to non-discounted cash flow (non-DCF) practices that do not incorporate the concepts of time value of money and business uncertainty, such as payback period (PBP) and return on investment (ROI). The second category is the DCF practices premised on the use of time value of money and business uncertainty concepts, such as internal rate of return (IRR), discounted payback period, net present value (NPV), Profitability Index (PI), accounting rate of return (ARR) and etc. The third category refers to alternative capital budgeting practices (ACBTs) which do not utilize either of these two concepts (Neelakantam, 2015). Some of such ACBTs include the Game theory, Monte Carlo simulation, Capital Asset Pricing Model (CAPM) Economic Value Added (EVA), and various integer linear programming models (ILPM) (Gustafsson *et al,* 2000; Horn *et al*., 2015; Nagarajan, 2014).

The widely-used methods for screening projects are the payback period (PBP), the accounting rate of return (ARR), and Benefits-Cost Ratio (BCR). Screening investment practices are less robust, since they do not use the concept of the time value of money and they are described to be accounting measures such as the payback period and accounting rate of return. Furthermore, the payback period disadvantages small projects that have the potential of growth beyond the initial investment recovery period. Simply, the payback period disregards the information beyond the recovery period. To

overcome the drawbacks of the payback period, the introduction of discounted payback period at the present time offers the chance of better investment decision.

Project options are typically ranked according to a chosen criteria –pay-back period (PBP), profitability index (PI), net present value (NPV), internal rate of return (IRR), etc.; projects with the highest criterion is assigned a topmost rank, followed by the next highest value, and so on. Some mathematical models for addressing identified ranking problems are documented in the literature (Nagarajan, 2014). The DCF approaches – notably, discounted PI, NPV, IRR - basically accounts for the time value of money, that is, a unit of money is more value in the present time than the same unit in the future. The NPV approach allows you to discount all future cash inflows and cash outflows using a particular discount rate to the present date, while the IRR is concerned about the rate of return whereby the future cash inflows equal the future cash outflows; that is when the NPV equals to zero.

There is evidence that the use of IRR could result in the problem of having multiple IRRs within a single investment appraisal (Gitman & Smith, 2010). To overcome such a problem, the use of modified IRR (MIRR) is often suggested as a suitable alternative. However, some authors (Ross et al 2004) have suggested that the NPV could be more robust technique than IRR, since NPV eliminates the issue of reinvestment assumption. Thus, other advanced techniques such as real option value and modified rate of return (MIRR) are evolving to complement the DCF methods (Souza & Clemente, 2008), but the actual deployment of these capital appraisal tools varies from one industry to another and even from one country to another.

A major parameter in the DCF method is the selection of discount rate (or cost of capital), the percentage used by companies to discount future cash flows over a period of time. The different ways of calculating the cost of capital include cost-debt (CD) model, weighted average cost of capital (WACC), considered the most favoured method used by firms to discount the cash flow (Batra & Verma, 2017; Graham & Harvey, 2001), the cost of equity models such as Gordon Dividends Model and Capital Asset Pricing Model (CAPM) (Damodaran, 2002; Brigham & Ehrhardt, 2002; Block, 2011).

How to effectively handle capital investment decisions under conditions of uncertainty has attracted notable research into non-deterministic, alternative approaches to capital budgeting. Risk-taking and risk management remain at the core of a finance manager's job (Gitman & Smith, 2010). Risk management practices include sensitivity analysis, scenario analysis, decision tree and Monte Carlo simulation, among others. These risk analysis practices are typically based on the probabilistic technique to estimate the risk associated with a particular investment decision (De Souza & Lunkes, 2016). Moreover, the use of real option value (ROV) for capital projects received a wide theoretical support (Pandey, 2004), as such technique offers the flexibility to the managers to either expand or abandon the project at any point of time during the project implementation.

The effect of variation in a parameter on project viability is examined in what is called sensitivity analysis, (Nagarajan, 2014). Scenario analysis works on the same principle; with this type of risk analysis, you pre-judge the viability of a capital investment proposal in a simultaneous variation of key investment parameters. Similalrly, decision tree analysis, a graphical depiction of different probability of a certain event to happen, can provide you with different consequences under different consideration of risk factors (Ross *et al*., 2004). Additionally, the Monte Carlo simulation, a stochastic simulation that covers wider applications and areas, can be deployed to analyse the effects of uncertainty (Hromkovic, 2001; Friedenthal et al, 2015; Parasuraman, 2019).

There are other complex risk-analysis techniques such as real options valuation (ROV), modified internal rate of return (MIRR), earnings multiple approach (EMA), and economic value added (EVA) that could be theoretically sound project evaluation techniques, but they might not frequently be used in practice (Block, 2007; Gustafsson *et al,* 2000; Siziba & Hall, 2019). In fact, for example, only some 8 per cent of sample firms use the more advanced ROV method in Canada (Bennouna & Meredith, 2010).

There is a large amount of research pointing to a relatively less usage of real option valuation (ROV) across economies (Siziba & Hall, 2019; Batra and Verma, 2017; Block, 2007; Graham & Harvey, 2001; Baker *et al*, 2011; Hanaeda & Serita, 2014). Horn *et al*. (2015) argued that ROV encourages managers to think broadly, and the practice offers to the managers the flexibility to evaluate the future investment return at any point of time during the project implementation. However, it was admitted that alternative capital budgeting techniques (ACBTs) including ROV are complex and that the practitioners are not familiar enough to use them when compared to a simple DCF approach, such as NPV and IRR. The use of ROV requires extensive computation, whereas practitioners desire more understandable and convenient practices having relative ease of formulation and interpretation (Cheng *et al*, 1994). While ACBTs could cost time and effort, the sound decision therefrom might bring good returns that offset such costs (Verbeeten, 2006), hence, Baduns (2013) has proposed a comprehensive ROV model aligned with the DCF techniques.

In essence, while ACBTs such as modified internal rate of return (MIRR), earnings multiple approach (EMA), economic value added (EVA) and other complex risk techniques such as Monte Carlo simulation analysis, predictive analytics (Davenport, 2014), decision tree analysis and linear programming (Gustafsson *et al,* 2000), could be theoretically sound project evaluation techniques, they are not frequently used among practitioners around the world.

Global capital budgeting practices– Mixed findings

Ample studies suggest a variety of CB practices are in use in developing and developed countries of Europe, U.S, Canada, the UK, Japan, Finland, Sweden, Australia, East Asia, Brazil, India, Pakistan, and South Africa. Hastie (1974) advised firms to be prudent on their investment decision by avoiding the use of a single capital budgeting technique. However, most firms in the developed countries are more favourably disposed to using DCF techniques (IRR and NPV) over the non-DCF; average rate of return approaches (ARR) are still used but far less than the DCF techniques for firms due to the former's slowness, among other possible reasons (Siziba & Hall, 2019).

Capital budgeting research in the developing economies such as Malaysia, India, Pakistan, Brazil, Indonesia and other Latin American countries, appears to be relatively sparse compared to the developed countries (Nishat & Haq, 2009; Al-Mutairi *et al*, 2018; Mubashar & Tariq, 2019). It is a noteworthy evidence in the developing countries' context that multiple use of CBTs are common and the NPV and IRR seem to be the most popular among managers, while ACBTs appear uncommon. This tendency towards using more DCF techniques was confirmed by various contributions in the Indian context (Batra &Verma, 2017; Bennouna, *et al* 2010; Cherukuri, 1996).

However, studies conducted in the more developed countries have somewhat shifted from a mere description or cross-sectional surveys to longitudinal analysis of CBTs limitations so as to capture the changes happened over the time in using CBTs in the same firms (Rigopoulos, 2014; Kengatharan, 2016; Siziba & Hall, 2019). Thus, in terms of descriptive models designed to ease knowledge of the relationship among selected entities, (Friedenthal et al 2015), current research in the Omani context has been indicated for non-DCF techniques (Al-Ani, 2015). Yet, given the increased uncertainties in the global oil markets, there might be opportunities to explore risk-analytics models such as integrated ROV-DCF approaches (Baduns, 2013) and ILPM (Nagarajan, 2014).

Overall, financial factors including DCF PBP, NPV, IRR, EVA, CAPM, CD model, WACC hurdle rates, Monte Carlo simulation, and so on appear to be prominent in Canada (Bennouna & Meredith, 2010), Pakistan (Mubashar & Tariq 2018; Nishat & Haq, 2009), Brazil (De Souza & Lunkes 2016), and South Africa (Correia & Cramer, 2008). However, non-financial considerations such as age, educational qualification, management levels, years of experience, company size, and CEO education, have also been reported among managers in the US (Gitman & Forrester, 1977) and Kuwait (Al-Kulaib *et al*, 2016). Notably, mixed considerations of both financial and non-financial factors have been reported among Nordic and Indian firms (Brunzell *et al*, 2013; Batra & Verma, 2017).

Overall, the following inferences could be drawn from the research to date regarding general capital budgeting applications:

i. Managers use multiple CBTs when evaluating capital projects, but, despite the divergent views on the relative utility of the NPV-IRR (Al-Awaid, 2014), the DCF techniques are more commonly applied than the non-DCF techniques. Managers still rely on non-DCF techniques such as PBP, to screen the capital project options. The use of alternative CBTs (ACBTs) is rare and to some extent not applicable, particularly in the Omani context (Siziba & Hall, 2019; Bennouna & Meredith, 2010).

ii. Capital budgeting research in the Omani context looks rather limited largely to the oil and gas sector (Chazi *et al,* 2010; Al-Ani, 2015), thus presenting the need for further research to support evidence-based capital investment policy and practices, particularly in the country's priority manufacturing sector.

iii. The adopted research design is generally cross-sectional, suggesting the prevalence of wide range of practices, but limited knowledge on trends or changes in CBT applications. It is therefore noteworthy that longitudinal surveys and modelling systems are gaining traction in trying to capture the emerging dynamics in capital budgeting (Gustafsson et al, 2000; Friedenthal et al, 2015; Siziba & Hall, 2019)

Thus, further CBT research documenting baseline data, policies and contextual decision-making models, is expected to support Oman's transition from oil-based to a knowledge-based economy by connecting the country's manufacturing secto with the growing global capital budgeting practices knowledge.

The imperatives for industrial capital budgeting research in the Omani context

The Omani context is deserving of special attention because of the country's new economic diversification strategy which places private-sector capital investments at the centre of the country's reform efforts to deal with the challenges of oil-dependency, notably its relatively high (49%) youth unemployment rate (The World Bank, 2018).

Moreover, scientific and professional consensus appear to be lacking regarding the use of some CBTs as evidenced by the paucity of empirical studies in the Omani context (Al-Ani, 2015; Chazi *et al,* 2010). This paper has also hinted on the continuing divergent view regarding the use of NPV and IRR among academics and executives, and it remains unclear what the situation really is in the Omani context (Cheng et al, 1994; Al-Awaid, 2014).

The present project focuses on the Oman's manufacturing sector, particularly firms providing packaged foods and basic construction / building materials, because industrialization has been a top priority for Oman's sustainable development. The manufacturing sector is rather capital-intensive and remains crucial for attaining the country's Vision 2040 agenda towards achieving sustainable revenue diversification and post-carbon prosperity (TANFEEDH, 2017; IMF, 2018; Kamoonpuri, 2016; MoCI, 2014).

Methodological Aspects and Limitations

The present aspect of the research has not employed any empirical approach as it is only conceptual in nature, the study being part of a larger project designed to provide an overview of the current state of capital budgeting research in Oman. This paper is therefore designed to facilitate the identification of possible scope of future studies in the Omani context, bearing in mind the country's renewed emphasis on the manufacturing sector where empirical research seems to be currently lacking.

The empirical phase of the research project is expected to adopt a mix-method approach to achieve CBPOMS' diverse objectives. Using a combination of primary and secondary data collection methods

to investigate both quantitative and qualitative factors surrounding the complex management activity that is capital budgeting would be apposite. For instance, a descriptive quantitative study would be helpful to establish some useful baseline data and the extent to be which ACBTs are used by corporate managers and investors in the manufacturing sector. Furthermore, following the insights gained from previous studies (notably, Brunzell et al 2013; Batra & Verma,2017), such cross-sectional approach would also be useful in investigating future advances in CBTs in Oman. Qualitative research design is expected to feature online questionnaires, focus group discussions and interviews with corporate managers. This is necessary, not only to better understand the prevalent non-financial elements thought to be influencing the choice of capital budgeting techniques by managers in Oman, but also to document the current state of underlying policies and procedures designed to ensure a systematic approach to CBT selection and application, as well as gauging sustainability implications.

Consequently, using the non-probability purposive sampling technique, the study will focus on the listed manufacturing firms at the Muscat Securities Market (MSM), notably those companies in the industrial sector of the MSM30 index. The MSM30 index contains a combination of services and industrial firms that have a common charateristics, such as comparatively high profit levels, high liquidity, and largest market capitalization. Using the purposive sampling technique would enable expert capital budgeting practitioners, strategy managers, CFOs, and other stakeholders to be the primary target respondents of this project. Thus, following standard practices to minimize bias (Kothari & Garg, 2014), the use of trained and experienced investigators assigned to this project would ensure that the selected samples are tolerably reliable.

Conclusions and Recommendations

This paper represents the first step of the methodology for a larger project currently investigating capital budgeting practices in Oman manufacturing sector (CBPOMS). It has attempted to provide an overview of the current state of global capital budgeting research in order to identify the scope for further research supportive of the government's new vision for a more diversified, post-carbon industrial market and sustainable economic growth. By so doing, the paper has also provided a kind of global conceptual framework for reviewing the implementation progress of the next phase of Omani caital budgeting research project: empirical investigations.

While the relevance of non-DCF approaches, the DCF models, and alternative capital budgeting techniques such as modified internal rate of return, and real options valuation has continued to attract research globally, current results point to the need for further evidence regarding the relative influence of financial and non-financial considerations in the choice of CBTs, among other knowledge gaps in the Omani manufacturing sector context. Notably, the use of alternative capital budgeting techniques such as real options valuation models appears to be non-existent. Reinforcing academic-industry collaboration to develop robust, evidence-based industrial capital investment practices towards achieving Oman's National Research Strategy to support her Vision 2040's sustainable income-diversification agenda thus becomes imperative.

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Assessment of The Effectiveness of The Interaction of Elements of Innovation Infrastructure

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Abstract

Statistics show that Russia is one of the largest countries in the world in almost all indicators. The problem of Russia's unbalanced economy, with significant positive achievements, was clearly manifested during the global crisis of 2008-2009 and the crisis of 2014 associated with the imposition of sanctions. It is important to reduce the impact of the global market situation on the Russian economy due to the innovative development of the Russian economy. The Russian government has been paying attention to the successful innovative development of Russia. As an example, we can cite the "strategy for innovative development of the Russian Federation for the period up to 2020" approved by the government of the Russian Federation in 2011. Nevertheless, the crisis of 2014 showed insufficient development of innovative processes in Russia. Therefore, it is important to assess the Russian innovation infrastructure in order to identify its strengths and weaknesses.

Keywords: Innovation, Efficiency, Innovation Activity, Factors, Structure, Infrastructure for Supporting Innovation.

Introduction

Data on socio-economic development show that Russia is one of the largest countries in the world in almost all indicators. For example, Russia ranks first in the world in terms of area, ninth in terms of population, and fifteenth in terms of exports. Nevertheless, the dynamics of Russia's development shows an insufficient level of scientific and production base and export orientation of the Russian economy. The problem of Russia's unbalanced economy, with significant positive achievements, was clearly manifested during the global crisis of 2008-2009, when the fall in energy prices, along with the increase in the cost of financial resources on the world market, had a significant negative effect on the Russian economy. The second example of problems in the Russian economy was the Crimean crisis of 2014, when the introduction of sanctions and falling energy costs caused the collapse of the Russian financial market and significant problems in the economy. Recurring crises make it urgent to reduce the dependence of the Russian economy on the world market conditions. This is possible through the development of the domestic market and increasing the share of the innovative economy in the economic balance of Russia. It should be noted that the Russian government has been paying attention to the successful innovative development of Russia. As an example, we can cite the "strategy for innovative development of the Russian Federation for the period up to 2020" approved by the government of the Russian Federation in 2011. Nevertheless, the crisis of 2014 showed insufficient development of innovative processes in Russia. Therefore, it is important to assess the Russian innovation infrastructure in order to identify its strengths and weaknesses.

At the moment the Russian innovation support infrastructure consists of the following three main elements:

I. The Banking sector:

VEB. RF - Russian state development Corporation, a state investment Bank 100 % owned by the state;

VEB Innovations LLC - a limited liability company established under Russian law, is a kind of single window for contacting a group of companies owned by VEB. RF for support of innovative projects, 100 % owned by VEB. RF;

SME Bank JSC is a Russian Bank that provides support to small and medium-sized businesses, as well as support for innovative projects of these economic entities. It belongs to the joint-stock company "Federal Corporation for the development of small and medium-sized businesses" which is 100 % owned by the state.

II. Venture capital companies that invest in innovative technologies:

RVC JSC is a venture capital company whose sole shareholder is the Russian Federation;

RUSNANO JSC is a company that invests in nanotechnology and venture capital investment, the sole shareholder of which is the Russian Federation;

JSC "Rosinfocominvest" is a company engaged in the development of the Russian industry of information and communication technologies by investing in innovative projects in this area, the only shareholder is the Russian Federation.

III. Specialized funds that invest in innovative technologies, enterprises and industries:

The Development Fund of the Center for the development and commercialization of new technologies (SKOLKOVO Foundation) is an innovative complex for the development and commercialization of new technologies

The Fund of assistance to development of small forms of enterprises in scientific-technical sphere (Fund of assistance to innovation) — state non-profit organization that provides financial support to young researchers in the field of innovation and small enterprises that are engaged in high-tech developments with potential for commercialization.

The Russian Fund for technological development (RFTR) is a development Institute that provided financial support for scientific and technical projects and experimental developments, providing targeted loan financing.

Fund for infrastructure and educational programs - the purpose of this Fund is to develop innovative infrastructure in the field of nanotechnology, including the implementation of educational and infrastructure programs already started by JSC Rusnano.

The Foundation for advanced research is a state Fund that aims to promote research and development in the interests of Russian defense and state security, which is associated with a high degree of risk of achieving qualitatively new results in the military-technical, technological, and socio-economic spheres.

Formulation of the Problem

The above structure of innovation infrastructure objects allows us to conclude that Russia has formed a sufficiently powerful infrastructure that allows supporting innovative projects and innovative development in Russia as a whole. At the same time, it is important to assess its effectiveness, as well as the effectiveness of interaction of elements of this infrastructure with economic entities.

The effectiveness of the Russian innovation support infrastructure can be measured by indicators such as knowledge, usage, and potential readiness to use services. The characteristics of interaction between beneficiaries and development institutions are presented below. The analytical report "on interaction of elements of innovative infrastructure" prepared by the analytical center for the Government of the Russian Federation (2020) can serve as an information base for the research. The basis for the preparation of this report was the data from a survey of respondents, participants in economic relations in the field of innovative development in Russia. It should be noted that many papers are devoted to the evaluation of innovative development, including (Banu, 2018), (Himenez, 2015), (Bekkers, Bodas, 2008) and other authors.

Results

This indicator reflects the popularity of each element of infrastructure among the subjects of economic relations. At the first stage, we will assess the infrastructure for supporting innovations through an indicator that reflects the awareness of economic entities about them. This indicator reflects the popularity of each element of infrastructure among the subjects of economic relations.

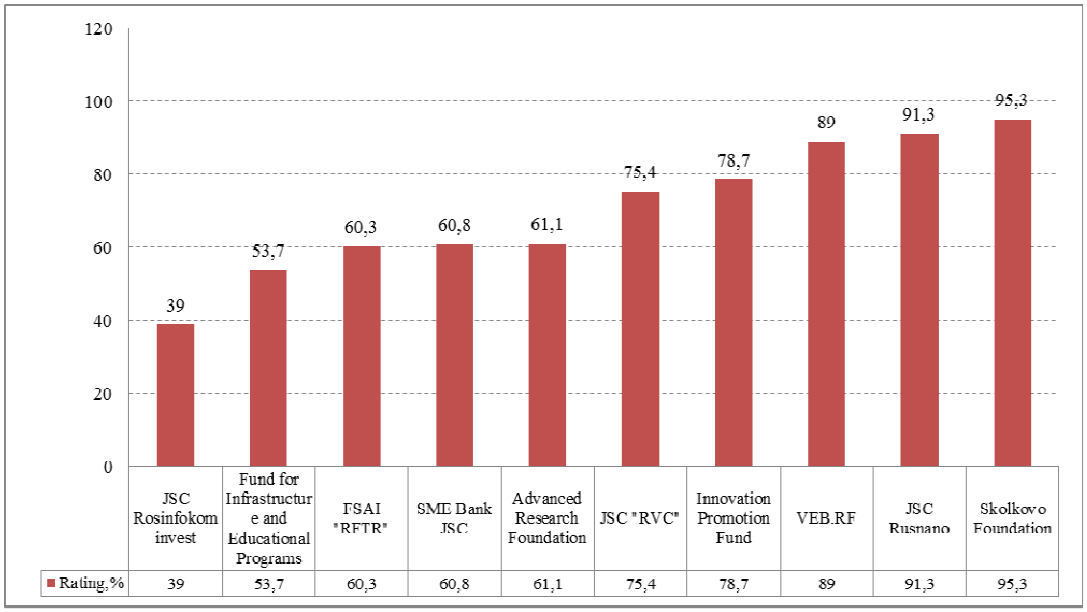

Figure 1: The popularity rating of each element of infrastructure among subjects of economic relations, %

As shown in Fig.1 the highest popularity rating is held by Skolkovo Foundation, JSC Rusnano and VEB.RF.

A fifth of them do not know about the activities of RVC and the Fund for the promotion of small-scale enterprises in the scientific and technical sphere. It should be noted that more than 20 % do not know about the existence and activities of RVC JSC and the innovation assistance Fund.

More than 40 % do not know about the activities of SME Bank, the advanced research Foundation, and the Russian Fund for technological development.

More than 60 % of respondents do not know about the activities of Rosinfokominvest. The value of this indicator can be explained by the existing condition of the investment Declaration of Rosinfokominvest JSC, which establishes that the object of investment can only be shares and bonds of Russian economic companies, as well as foreign Depositary receipts for these securities. At the same time, the Declaration does not contain information about the possibility of making contributions

to the authorized capital of limited liability companies, and it is in this organizational and legal form that the majority of small business entities are created. Thus, the Rosinfokominvest Fund's financing of innovative projects is directed towards medium and large businesses, which makes it problematic to Finance innovative projects implemented by small businesses.

Summing up the results of the rating, it should be concluded that most elements of the innovation development infrastructure are known to a wide range of participants in economic relations. At the same time, a significant number of innovative development infrastructure projects with an awareness rating below the average of 70% draw attention to this issue.

For a deeper assessment, we will rank the elements of the innovation development infrastructure according to the rating of popularity and appeal to development institutions, see Fig. 2, while analyzing the answers "we know, but did not apply".

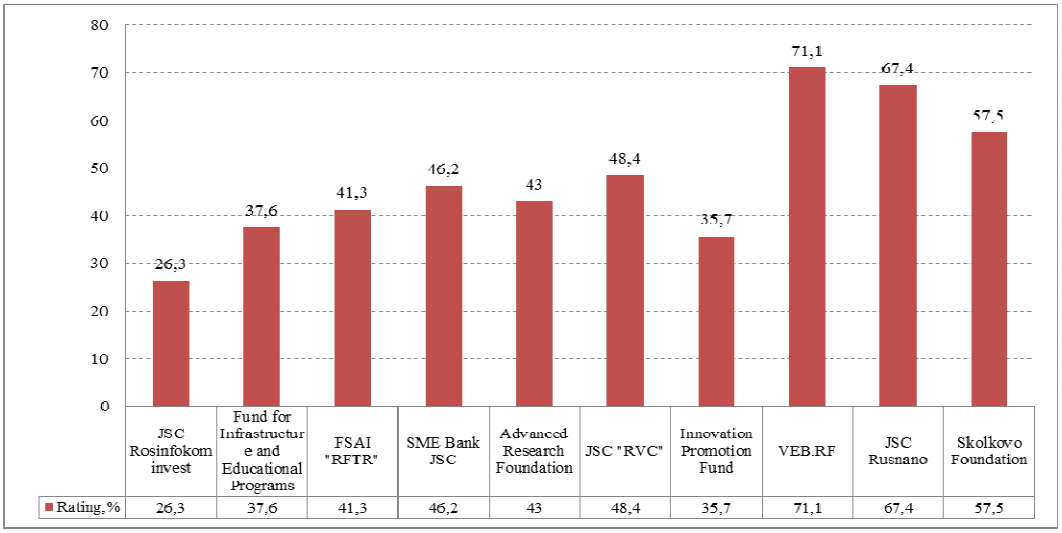

Figure 2: Rating of fame and appeal to development institutions, %

The results of the evaluation of the rating of popularity and appeal to development institutions and appeals to innovation development institutions in Russia showed that, despite the significant awareness of the elements that make up the structure of innovative development in Russia, the share of economic entities that applied for help or for funding in these organizations is quite small. This makes it necessary to take steps to increase the involvement of economic entities in innovative development, including with the participation of elements of the Russian innovation development structure.

Conclusions

The assessment of elements of the Russian system of innovative development has shown that it is characterized by the following features:

1. The main three components are the banking sector, venture capital companies that invest in innovative technologies, and specialized funds that invest in innovative technologies, enterprises, and industries.

2. The total number of main elements of the Russian innovation development structure is more than 11 elements.

3. The main participation in the functioning of the Russian innovation development structure is carried out by the state through direct participation in banks, venture companies and funds. There is

no significant participation in the development of innovation infrastructure at the expense of private national capital and foreign capital.

The evaluation of the effectiveness of interaction between elements of the formed innovation infrastructure and economic entities of the Russian economy showed that despite the significant popularity of innovation development institutions such as VEB.RF, the Skolkovo Foundation does not actively interact with these institutions. The main possible reasons for this may be a significant number of bureaucratic procedures, the lack of information from economic entities about the positive experience of other entities when applying to these institutions of innovative development, as well as other reasons.

In order to accelerate the innovative development of the Russian economy, the following measures can be recommended:

dissemination of information about the positive experience of interaction between enterprises and organizations with innovative development institutions among economic entities;

the establishment of institutions for innovative development with the involvement of private and foreign capital;

reducing bureaucratic procedures.

Innovative development of the Russian economy will reduce Russia's dependence on foreign economic factors, increase the added value of products produced by the Russian economy, and create prerequisites for the transition of the Russian economy to a sustainable development model.

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Sustainable University Development: Concepts, Initiatives, Results

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Abstract

The paper presents an analysis of approaches, tools and initiatives aimed at the formation of concepts of sustainable development in the field of education, as well as the active inclusion of all university stakeholders in solving the problems of the world community. The results obtained during the analysis show that higher education institutions around the world are actively involved in the process of forming the concept of a sustainable university and make a significant contribution to the implementation of the UN Sustainable Development Goals. Based on the example of foreign and Russian practices of introducing the concept of sustainable development of education into the strategy of modern universities, it substantiates the need to create sustainable university campuses in Russia, which will allow to solve up-to-date world problems. The results of this study may be of interest to government authorities, university management, teachers, researchers, postgraduate students of Russian and world universities, as well as to all those interested in education for sustainable development.

Keywords: Universities, Concept, Sustainable Development, UN Sustainable Development Goals, World Rankings, Education for Sustainable Development (ESD).

Introduction

At the present stage of development, there is a steady increase in the concern of the world community regarding the further paths of human development. Changes caused by the development of science and technology, globalization and the creation of a global information space, environmental degradation and deepening social contradictions are characteristic features of modern society (Grishin, A.I., Mel'nikov, M.S., & Stroganov I.A., 2015; p. 9).

Crisis have further revealed the economic, social and environmental problems of modern society. All these new challenges for the world community are connected with the main question: how will a growing population live on a polluted and changing planet, in the face of limited resources?

This study attempts to substantiate possible solutions to global environmental, economic and social problems by actively involving modern universities in this process. Today, thousands of world universities are included in international and national initiatives to introduce the principles of sustainable development in the activities of modern higher education institutions.
The topics of such university initiatives include various sets of sustainable development goals (SDG) from 17 directions of the UN Agenda for Sustainable Development until 2030. In addition, many projects take into account all three groups of factors of the Triple Bottom Line concept and are aimed at finding ways to solve global problems of the world community.

Research Methodology

The research methodology includes theoretical analysis of literature, comparison, generalization, content analysis, as well as data processing of rating systems for assessing the sustainable development of higher education institutions.

Theoretical Ground for The Research

The theoretical model of the study is based on the Triple Bottom Line concept and the concept of education for sustainable development (ESD). The UN sustainable development goals are analyzed in terms of the involvement of modern universities into their implementation.

Triple Bottom Line Concept

The origins and mass discussions of the concept of sustainable development are associated with the theory of "limits of growth" put forward by D. Medouz and her colleagues in the early 1970s, which predicts an inevitable increase in environmental pollution, depletion of planetary resources and the onset of a "global catastrophe" (Medouz, D., & Randers, I., 2007).

Thus, the challenges facing modern society have led to the emergence of a new global concept of human development, known as the "sustainable development concept". The report "Our Common Future" by the International Commission on Environment and Development, created by the UN General Assembly (Commission G.H. Brundtland), defined the definition of sustainable development: "it is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Our common future: report of the International Commission on Environment and Development, 1989).

Sustainable development is seen as a necessary process of change, in which the exploitation of resources, areas of technological development and investment, as well as institutional changes are consistent not only with the present, but also with the future needs of mankind. This concept is based on the notion of a "wicked" problem. This is a problem that is difficult or impossible to solve due to incomplete, contradictory and changing parameters, which include economic, environmental and social challenges facing modern society, and the solution of which can be based on the implementation of the concept of sustainable development.

Moreover, achieving sustainable development is impossible without long-term thinking and reliance on the Triple Bottom Line concept. The Triple Bottom Line concept was first mentioned by John Elkington, the founder of the British consultancy agency SustainAbility, in 1994 (Elkington, J., 1994).
This concept combines three elements: economic, social and environmental. John Elkington introduced the "Triple-P" (People, Planet, Profit) concept, in which sustainability is seen as a harmony between economic sustainability, social sustainability and environmental sustainability (Elkington, J., 1997).

People (or the social dimension) are focused on the influence of organizations on the local community within which they operate, also known as corporate responsibility. The planet (or the environmental dimension) is focused on the direct impact on ecosystems, soil, air and water, based on production inputs and outputs. Profit (or economic dimension) is focused on the financial impact on the overall level of entrepreneurial activity, usually expressed in monetary terms, such as resource efficiency, sales / profits, cost reduction, job creation or product benefits.

This model implies a close interconnection of environmental, social and economic goals, the satisfaction of which in the complex is aimed at sustainable development. Moreover, a similar approach is applicable both to humanity as a whole and to lower-level communities - individual nations, cities, organizations, etc. (Grishin, A.I., Mel'nikov, M.S., & Stroganov I.A., 2015). Thus, we can say that the goals of sustainable development coincide with the goals of civilization as a whole.

The Concept of Education for Sustainable Development (ESD) and Its Role in The Implementation of The UN Sustainable Development Goals

Sustainable development goals for 2016-2030, set at the UN Summit, imply the coherence of economic growth, human development, and environmental protection. The 17 Sustainable Development Goals (see Fig. 1) (Sustainable development goals, 2015) and 169 goals were adopted by 193 Member States of the United Nations at the historic Heads of State Summit held in New York in September 2015. The key goal is to ensure quality education and lifelong learning opportunities for all (goal # 4).

Fig. 1: The UN sustainable development goals

New goals and objectives for 2016 - 2030 cover a wide range of problems of social, economic, environmental development. The goals of sustainable development are global, the joint efforts of governments, international organizations and world leaders are necessary to achieve them.

However, the implementation of all 17 UN sustainable development goals facing the world community largely depends on education quality and requires the transformation of the existing educational model (Saginova, O.V., Saginov, Yu.L., & Grishin, A.I., 2012). Indeed, highly qualified specialists, business and government leaders are come out from educational institutions and demonstrate a socially responsible attitude to global problems.

At a conference in Bergen in May 2005 was adopted the Bergen Communiqué, which emphasized the need to build higher education systems on the principles of sustainable development. The transition to sustainable development in the education system involves fundamental changes in the worldview, priorities, values and ethical standards of employees, teachers and students. The new educational system should be aimed at training people who can ensure sustainable development for future generations.

The main goal of education for sustainable development is associated with the need to form a new person, comprehensively educated, socially active, able to understand new phenomena and processes in society. A person guided by a system of modern ideological, moral, cultural and ethical principles, norms of behavior; prepared for socially responsible activities and lifelong education in a rapidly changing world (Fakhretdinova, G.N., 2018).

The analysis of the international documentary base regulating the activities of universities that have embarked on the implementation of the concept of education for sustainable development (ESD) is presented in the scientific work of Ursul, A.D., & Ursul, T.A. (2015).

A meeting of representatives of the ministries of environment and education adopted the "Strategy of the United Nations Economic Commission for Europe for Education for Sustainable Development" in 2005 in Vilnius.

The overall objective of the strategy is to provide people with knowledge and skills in the field of sustainable development, which allow them to acquire additional competence and self-confidence, while at the same time expanding their opportunities for a healthy and productive lifestyle in harmony with nature and in accordance with social values, principles of gender equality and national and cultural diversity (UNECE strategy for education for sustainable development, 2005).

The Global Program of Action for Education for Sustainable Development was endorsed by UNESCO in 2014 (Roadmap for the implementation of the global program of action for education for sustainable development, 2014). This program is accompanied by a roadmap for its implementation, which outlines five priority areas for its implementation.

Education for sustainable development is critical for both developed and developing countries. Concepts, approaches to the organization of the education system in each country are different. They are determined on the basis of national priorities, local characteristics, as well as environmental, social, economic problems that need to be solved. Therefore, a universal model of education for sustainable development does not exist.

Nevertheless, the formation of an education system for sustainable development (ESD) requires a transition from traditional teaching to a model that should be based on broad interdisciplinary knowledge based on an integrated approach to such aspects as the environment, ecology, socio-economic development, ethical and cultural issues (Shimova, O.S., 2017).

The National Education Strategy for the Sustainable Development of the Russian Federation is aimed at creating a concept that encompasses related environmental, economic and social problems.

Professor T.N. Gavrilyeva emphasizes that "the concept of education for sustainable development takes into account that education, leading to the acquisition of knowledge and skills, contributes to the formation of the views, positions, values of educating a person and citizen". Thus, it directly affects the achievement of the long-term goals of the UN (The project "Sustainable campus" has begun work in NEFU, 2016).

International and national education initiatives for sustainable development. Nowadays thousands of world universities are included in international and national initiatives to introduce the principles of sustainable development in the activities of modern higher education institutions.

USA and Canada

1. Enactus (Official website of Enactus Worldwide). This international social entrepreneurship program is the world's largest platform for learning through action, united by a common vision: creating a better, more sustainable world. Enactus is the largest non-profit organization that brings together students, business leaders, and universities. Enactus teams develop and implement projects aimed at improving the quality and standard of living of people.
Started in the USA in 1975, the Enactus program is successfully developing and currently covers 1730 universities from 36 countries of the world. The scope of Enactus projects includes all 17 areas of the UN Agenda for Sustainable Development until 2030. In addition, each of Enactus projects takes into account all three groups of factors of Triple Bottom Line concept and aims to create a more sustainable world.

The authors of this article compiled a classification of the draft teams according to the UN sustainable development goals based on a study of the official Enactus website, as well as a content analysis of the annual reports of the Enactus teams (Dalibozhko, A, Krakovetskaya, I., 2018).

2. AASHE. The Association for the Advancement of Sustainability in Higher Education (Official website of Association for the Advancement of Sustainability in Higher Education. Sustainability Tracking, Assessment & Rating System (STARS)). This association is established and successfully operates in the USA. Today, AASHE notes universities and colleges that have achieved outstanding success in implementing green initiatives not only on campus, but also in the communities around them.

To assess the contribution of the university campus to environmental conservation, the STARS rating system is used. Sustainability Tracking, Assessment & Rating System (STARS) is a voluntary certification system that allows colleges and universities to evaluate their efforts to implement sustainable development initiatives on campuses. This program allows to comprehensively look at issues of sustainable development of the university, compare the results of different universities, motivate universities to improve the quality of their work, and exchange information and experience.

3. ISCN. International Sustainable Campus Network (Official website of International Sustainable Campus Network). Founded in the USA in 2007, ISCN is a not-for-profit association of colleges and universities committed to sustainable development. The mission of ISCN is to provide international collaboration to support universities and to receive information, ideas and best practices for achieving sustainable campus and integrating sustainability in research and teaching. Currently, ISCN registered more than 90 universities from more than 30 countries on 6 continents.

European Countries

1. EAUS. Environmental Association for Universities and Colleges (Official website of Environmental Association for Universities and Colleges). EAUS, founded in 1996 with the aim of increasing the importance of environmental management and contributing to the improvement of environmental performance. EAUC is the champion of environmental and sustainable development in higher education in the UK and Ireland.

2. COPERNICUS-CAMPUS (Gough, S., & Scott, W., 2007). It is a pan-European university network created to mobilize the efforts of universities and research organizations to implement the objectives of education for sustainable development. The COPERNICUS-CAMPUS network developed and published in 2007 strategic recommendations for implementing the principles of sustainable development in European universities. To date, more than 320 universities from 38 countries have signed the COPERNICUS Charter, thereby proclaiming their commitment to the goals of ESD.

3. AISHE. Auditing Instrument for Sustainability in Higher Education. It is an instrument for assessing sustainability in higher education. Using AISHE, it is possible to audit universities (and other higher education organizations, such as the Dutch Hogescholen and German Fachhochschule)

or their units (for example, faculties or individual courses). Both internal and external audits are possible.

4. SDRN. Sustainable Development Research Network. The research network on sustainable development stimulates the incorporation of research results in the field of sustainable development into university policies and strategies. The goal of the SDRN is to promote and strengthen the link between universities and the state to achieve sustainable development goals.

Asian Countries

1. KAGCI. Korean Association for Green Campus Initiative (2008) (Korea's Green Growth Experience: Process, Outcomes and Lessons Learned, 2015). The South Korean Association is one of the world centers for the development of international higher education for sustainable development. Students and teachers play a key role in the research, educational, and practical projects needed to build sustainable development approaches. KAGCI currently includes 40 universities and colleges across the country.

2. CGUN. China Green University Network (2011) (Official website of China Green university alliance). In 2011, the China Green Universities Network (CGUN) was established to strengthen communications, integrate resources, and promote the development of green campuses in China. It is a platform for exchanging data on energy conservation mechanisms at university campuses; promoting innovation, collaborative research and the promotion of green architecture; nurturing advanced talents and involving students and teachers in the implementation of goals for sustainable development.

3. CAS-Net JAPAN. Campus Sustainability Network in Japan. CAS-Net JAPAN was created in Japan in 2014 with the aim of developing inter-university cooperation. The goal of CAS-Net JAPAN is to exchange the experience of universities and other institutions that conduct environmental activities to further promote environmental initiatives and principles of sustainable development in the field of education.

Russian Federation

1. Russian program Campus (Campus program launched, 2013). A program for the sustainable development of Russian universities was launched шп 2013 at the initiative of Tetra Pak with the aim of disseminating environmental knowledge among students and supporting environmental initiatives. Information support for the program was provided by the World Wildlife Fund.

2. Association of Green Universities of Russia (Federal Partnership Program Green Universities of Russia). As part of the federal partnership program, educational student quests are organized to reduce the ecological footprint of the university, involve young people in solving environmental problems, and popularize the concept of sustainable development. The most important area is the creation and development of eco-clubs and the introduction of other eco-practices in the process of university management. Today in Russia, 85 eco-clubs have been created in universities in 36 Russian regions, introducing on their basis environmental practices and principles of sustainable development. The program "Green Universities of Russia" involves more than 300 universities. Also, a methodological approach for ranking green universities in Russia was proposed in December 2019.

University Sustainable Development Concept

The Sustainable Campus concept is based on initiatives to integrate sustainable development principles into the management practices of modern universities. Starting in the 1990s at US universities, this movement has become widespread throughout the world and today is gaining popularity in the developing countries of Asia and Africa.

The most interesting and informative scientific publications on the topic under study are the following works.

Analysis of world experience in introducing elements of sustainable development and internal environmental programs in the university management system is carried out in the paper of S.A. Buzmakov, & D.N. Andreev "Principles of Sustainable Development in Leading World Universities" (2012). The key importance in this process of a university's policy, transparent and understandable for all stakeholders, its regular assessment and communication of the results to the external and internal environment is emphasized.

The paper of T.N. Gavril'eva, A. Sugimoto, M. Fudzhi, R. Yamanaka, G.N. Pavlov, & D.A. Kirillin "Sustainable Development of Universities: World and Russian Practices" (2018) presents the results of a study of the practice of introducing the concept of sustainable development in international and Russian higher educational institutions in the case of Hokkaido University, whose teachers initiated the creation of a sustainable campus on the basis of their university (Official website of Sustainable Campus Management Office in Hokkaido. What is a Sustainable Campus?).

The core of the sustainable campus of Hokkaido University is scientific research and the educational process, focused on sustainable development policies. On this basis all the life processes of the university environment are built. No less interesting is the experience of introducing the concept of education for sustainable development at Northeastern Federal University. Hokkaido University is one of the pioneering universities implementing sustainable campus initiatives in Asia.

In the paper of O.V. Saginova, Yu.L. Saginov, & A.I. Grishin "Sustainable development of the university" (2012) identified the basic elements and principles of the concept of sustainable development of the university. In their study, the authors also justify the need for a systematic approach and strategic planning to develop a general development strategy for the university, ensuring its sustainability. According to the authors, this strategy includes a whole range of interconnected concepts: the concept of a "green" university, the concept of a "smart" university, the concept of a "university of a healthy lifestyle," the concept of managing the social and cultural diversity of a university, and the concept of managing a university's historical and cultural heritage.

Sharing the point of view of previous researchers, the authors of this study believe that it is necessary to expand the composition of the concepts that should be taken into account when forming the general concept of development (unique for each university). On the one hand, it ensures the achievement of a high-level university competitiveness, and on the other hand, it makes it possible to make a worthy contribution to solving global problems in the sustainable development of society.

Fig. 2 shows the author's approach to the formation of the concept of sustainable development of the university as a complex system of interconnected elements, achieving a synergistic effect due to their interaction.

Sustainability of the university as a result of the development of a number of interrelated areas described by the following concepts.

1. The concept of the green campus - the initiator of "green" initiatives, actively applying the principles of environmental safety and environmental protection in everyday university life (Official website of BestColleges. Greenest Universities; Buzmakov, S.A., & Andreev, D.N., 2012). This concept involves the formation of a "green", eco-oriented environment, the introduction of environmental practices at the university, improving the eco-culture of students and employees, environmental monitoring and assessing the quality of the environment, with a description of possible environmental risks and ways to reduce them.

2. The concept of a smart campus that effectively uses all kinds of resources and implements modern information technologies to manage its key processes, works ahead of schedule, developing promising areas based on the results of foresight studies in the digital economy (Grishin, V.I.,

Kalinina, I.A., Karasev, P.A., Kulapov, M.N., Shklyaev, A.E., 2018; Official website of SUSU. Key features of the smart university of SUSU). The concept is aimed at achieving the university's goals with minimal resources based on "smart" solutions.

3. The concept of "University of a healthy lifestyle", providing the creation of a holistic, integrated, constantly operating in the university system for the formation of a healthy lifestyle, providing its students, teachers and employees with the conditions for harmonious and comprehensive development, work and leisure, healthy nutrition, sports, refusal bad habits, etc., which makes up a kind of "health code" of modern man (Ivanov, A.I., 2011).

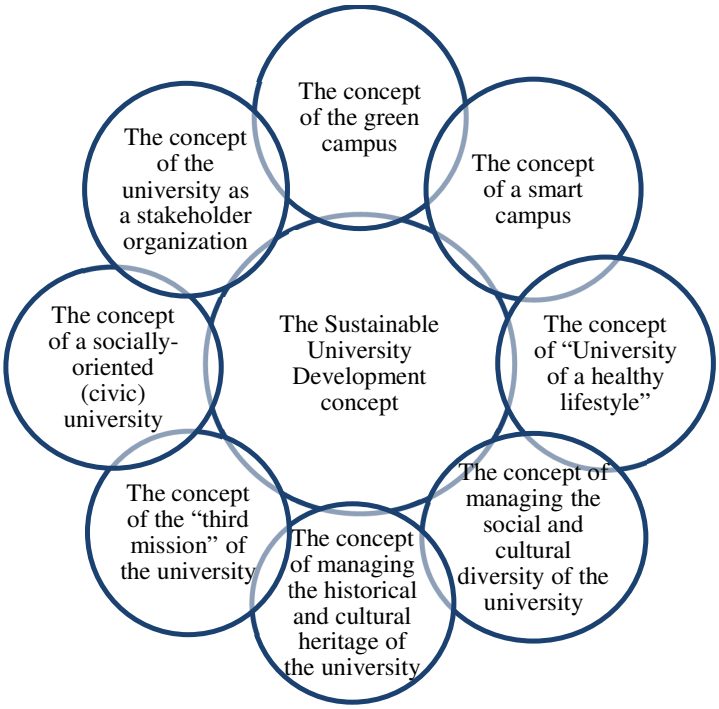

Fig. 2: The Sustainable University Development concept

4. The concept of managing the social and cultural diversity of the university, fostering national, racial, religious tolerance, respect for national traditions, promoting interaction and mutual enrichment of cultures, realization of the equal rights of men and women, etc. based on various types of educational models: intercultural, multicultural, anti-racist (Shtykhno, D.A., & Musatova, Zh.B., 2013).

5. The concept of managing the historical and cultural heritage of the university, aimed at the effective use of historical and cultural values (country, region, city, industry, university) as intangible development assets, which in turn leads to an increase in the social and economic stability of the university. The model of sustainable development of the university in the context of historical and cultural heritage, describing its role for the social, economic and social sphere, as well as the effects of the interaction of elements (Grishin, A.I., 2013).

6. The concept of the "third mission" of the university, which allows the university to actively interact with society as an organization producing knowledge and technology, as well as a set of social, legal, financial institutions capable of ensuring effective cooperation between regional authorities, scientific and educational organizations, industrial enterprises and business -community, non-profit organizations in all spheres of socio-economic and social life (Balmasova, T.A., 2016; Zonova, M.V., 2018).

7. The concept of a socially-oriented (civic) university, aimed at creating conditions that ensure a decent life and free development of the individual (Kirillova, T.V., 2007). The social mission of the university involves the active participation of the university in society. The social relevance and social responsibility of the university are formed on the basis of public expectations and are implemented through various projects: training of highly qualified specialists, retraining of regional personnel, social assistance and social support of students and employees, etc.

8. The concept of the university as a stakeholder organization that understands the importance of building long-term and mutually beneficial relationships with stakeholders: applicants, students, graduates, employees, potential employers, government and administration, etc. (Kovaleva, E.N., 2015). The concept is aimed at coordinating and reorienting the goals and criteria of measuring the effectiveness of the university to the goals of key groups of stakeholders, as well as organizing monitoring of stakeholder satisfaction with university activities.

Each of the above concepts contributes to the sustainability of the entire system, and therefore should be taken into account when forming the general concept of sustainable development of the university. This study also attempted to supplement and clarify the principles of sustainable university development (see Table 1).

Table 1: Principles of sustainable university development

Principles of sustainable university development	Ways to implement the principles
Incorporating sustainable development issues into university curricula.	Training programs and courses on sustainable development of a country, region, industry, enterprise, etc. Training of specialists in cooperation with foreign partners. Development of multidisciplinary educational programs dedicated to integrated research in the field of sustainable development.
Inclusion of sustainable development issues in university research topics.	Creation of new knowledge, subsequently transformed into applied knowledge, activities, programs, promotions, taking into account the profile and specifics of the scientific directions of the university.
Building the current activities of the university on the principles of sustainable development.	Resource management and ongoing processes on a university campus. Energy-saving equipment and technologies, alternative sources and types of energy, economical water consumption, water treatment and its reuse. Development of electronic libraries and workflow, on-line training to minimize the use of paper and photocopying. Sorting and recycling. Use of recycled materials. Purchase of products for dining rooms and cafes from local manufacturers. The use of environmentally friendly cleaning and maintenance products. Environmentally friendly transport.
Creating opportunities for students and university staff to acquire behavioral skills aimed at sustainable development.	Acquisition of green behavior skills by university staff and students. Creation of the necessary infrastructure: waste bins for sorting waste, eco-transport. Promotion of landscaping and cleaning of campus and surrounding areas. Interaction with socially responsible companies to guide students to practice. Organization of eco-clubs, volunteer teams, etc.
Development of cooperation programs and partnerships with other organizations for sustainable development.	Partnership programs and cooperation with commercial and public organizations. Participation in international and national programs and initiatives aimed at supporting the sustainable development of society.
The formation of a social and cultural environment aimed at fostering tolerance and respect	National, racial, religious tolerance, respect for national traditions, promoting interaction and mutual enrichment of cultures, realization of equal rights of men and women, etc. Historical and

for national traditions of all people and gender equality, preserving the historical and cultural heritage in the interests of sustainable development of society.	cultural heritage, preservation, popularization and use of historical and cultural heritage in the interests of social, environmental and economic development of society.
Active participation in the public life of the country and the region.	Enhanced participation of university representatives in the activities of professional organizations and associations representing the interests of key sectors of the economy. The implementation of lifelong education in accordance with the needs of key stakeholders and the needs of regional development. Participation in public councils at various levels of government and administration, development and examination of key documents of territorial and sectoral socio-economic development.

According to the authors of this paper, the concept of "sustainable campus" means the university's readiness and ability to build within its walls a "prototype" of a sustainable society, through the expansion of education and scientific research aimed at solving social, environmental and economic problems, organizing and developing all processes in university on the principles of sustainable development, the transfer of knowledge and technology for harmonious interaction with the environment, as well as the involvement of university staff and students in the decision of the problems of the world community.

Conclusion

The results of the study allow us to conclude that international and national initiatives in the field of education for sustainable development have contributed to the fact that today many universities in the world have actively engaged in the formation of sustainable campuses and demonstrate results confirming their contribution to the long-term goals of the UN.

An analysis of the 2019 results of the UI GreenMetric World University Rankings rating, aimed at assessing the commitment of higher education institutions to the ideas of sustainable development of the society and the formation of the green infrastructure of university campuses, shows that the leading positions are occupied by countries such as the Netherlands (1st, 7th and 8th places), Great Britain (2nd, 4th, 5th and 10th places), USA (3rd place) and Germany (6th place) (Official website of UI GreenMetric. UI GreenMetric World University).

Peoples' Friendship University of Russia (RUDN) has increased its competitive position in the WUR (Green Metric World University Ranking) relative to the results of 2018 and has rightfully earned the status of the greenest university in Russia. A high result is ensured by the significant competitive potential of RUDN University in the field of education for the sustainable development of ESD.

Today, RUDN is a leading national research university in Russia, developing programs for the conservation of the marine environment and terrestrial ecosystems, for the conservation of species and individual populations of endangered and protected animals, the rehabilitation of agricultural and industrial landscapes, and sustainable nature management in general. The university has formed an ecological culture of responsible consumption and respect for the environment since 2012. Nowadays separate garbage collection programs, energy and resource saving, maintaining the campus green area and other projects are being implemented on campus (Official website of RUDN. RUDN environmental policy).

International cooperation also helps RUDN University to gain valuable experience of colleagues - adherents of the ideas of sustainable development. So, on the basis of the University of RUDN University, a working seminar "UI GreenMetric World University Ranking Methodology" and the first tour on the campuses of universities for sustainable development of the world, headed by the

chairman of UI GreenMetric, Professor Riri Fitri Sari were organized for Russian universities (Official website of UI GreenMetric. The 3rd National Workshop on UI GreenMetric World University Rankings for Russian Universities and The 1st World Sustainable Universities Campus Tour hosted by RUDN University).

The TOP-200 UI GreenMetric World University Rankings for 2019 includes Perm National Research Polytechnic University (133rd place) and Siberian Federal University (179th place).

Further areas of research will be devoted to the analysis of cases of world universities that have achieved significant results in solving the problems of sustainable development of society. The study of the best practices for introducing the concept of sustainable development of education into the strategy of modern universities is extremely important for the formation of sustainable university campuses in Russia, which will allow more efficient solve problems caused by modern challenges at both the national and global levels.

Acknowledgment

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Preliminary Evidence of An Alarming Rise in Teachers Burnout in A Period of Economic Crisis

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Abstract

Currently, the public schools in Greece exhibit lack of resources and shortages in staff whereas teaches faced severe salary cuts after the onset of the current economic crisis in this Country. The hypothesis of the present work is that this condition can bring depletion in emotional support, which will lead to emotional exhaustion of teachers in Greece. The main objective of this paper is to certify the effect of the economic crisis in Greece on the risk of professional burnout for teachers. Published papers were retrieved from the Google Scholar database; keywords used during searching were "Maslach Burnout Inventory", "teachers", "Greece". The research was conducted in December 2019 (first week). The Maslach burnout inventory papers which were used and included in the analysis were either published in 2010-2019 or 1995-2010. The data extracted from the retrieved publications were used to compare the economic crisis in Greece and the level of exhaustion before and after the economic crisis started. Analysis of the results revealed that when the financial crisis began in Greece, there was an increase in the level of emotional exhaustion in teachers. Emotional exhaustion is an indicator of professional stress and further research is required to investigate the occupational stress risk of teachers in Greece.

Keywords: Teachers, Emotional Exhaustion, Burnout, Greece

Introduction

Occupational stress can be a chronic condition in the workplace and can eventually lead to burnout. Burnout is a situation brought about from depersonalization, reduced personal achievement, and emotional exhaustion (Rautakivi et al., 2019). Numerous factors affect burnout and job satisfaction. In a workplace job, burnout happens because of prolonged employees' exposure to psychological and physical stress. These exposures eventually lead to a reduced sense of professional accomplishment, depersonalization, mental, and physical exhaustion. Mental and physical stress are contributing factors that employees get to, which leads to a professional burnout zone, characterized by a lack of job satisfaction and a decrease in productivity (Sergiovanni, 1967).

Burnout problems can be seen in schools, with teachers who experience workload and psychological demanding work (Kamtsios & Lolis, 2016; Panagopoulos et al., 2014). Although teachers are well educated and skilled, they are prone to professional burnout. The magnitude of the problem is determined by the length of exposure (the more you are exposed, the more you are likely to professional burn out), burnout symptom problem increases with duration of exposure, working conditions, job demands, which leads to occupational stress (Maslach, 2003).

Low job satisfaction, reduced productivity and low moral are associated with absenteeism, and negatives attitudes towards work. If employees exposed to too much psychological and physical stress, it can result in emotional and physical fatigue. Lack of motivation to socialize and perform a task, mental fatigue, frustration are some of the symptoms of burnout (Maschlach 2003; Mouza & Souchamvali, 2016; Rautakivi et al., 2019). A research carried out by Maslach in 2011 revealed that burnout syndrome based on three principals; first principal reduced personal accomplishment, which is characterized by feeling incompetent at the workplace. Emotional exhaustion is the second

principle described by psychological and physical fatigue. Depersonalization is the principal that is characterized by detachment from work and cynical behaviors.

In Greece, in the past years, different studies have also revealed that teachers' burnout is a significant issue in the teaching profession (Panagopoulos et al. 2014; Kamtsios & Lolis, 2016; Mouza & Souchamvali, 2016).

As a result of the current economic crisis in Greece, austerity measures were enforced in all the sectors of the central government. The actions taken included a reduction in the number of teachers employed in public schools and salaries (OECD, 2014). Teachers' gross income was cut off by 30% and teachers were exposed to job insecurity, rising taxation, and increased working hours. The reduction in the number of serving teachers and their salaries had an impact on teachers' stress and job satisfaction. For instance, reducing the purchasing power imbalance and gross income can increase job burn out (Panagopoulos et al, 2014). A cut in the gross income for teachers has altered the public servant working condition as it was before the economic turmoil in Greece. In the year 2008, when Greece started experiencing financial crisis, teachers' gross income has been drastically reduced. When Greece began experiencing an economic crunch, workers in the various organizations in the public sector were faced with fewer resources and worked with fewer resources and reduced wages. For instance, for hospitals and schools' salaries were cut up to 45% and lack of resources and staff became a norm. Lack of resources and staff can result in depletion of emotional support, which leads to *emotional exhaustion* (Frenkel et al., 2012).

Indeed, some hospitals in Greece experienced medical supply and shortages of staff and their employees exhibited increased levels of emotional exhaustion (Rahiotis et al., 2014). In the same manner, some Greek schools were too faced with similar problem in their resources and their teachers exhibited increase in the level of emotional exhaustion which can be attributed to the economic crisis Greece (Botou et al., 2017).

Under the above economic hardship conditions and the lack of resources and shortages of staff, the risk of teachers to professional burnout is considered very high (Anastasiou & Anagnostou, 2020). Human resource management in Greece should include proactive policy monitoring indicators for occupational burnout. The most widely used estimator to estimate the level of exhaustion is the MBI (Maslach Burnout inventory). The MBI (inventory) has 22 questions, which used to determine three principles of burnout which are; depersonalization, lack of personal accomplishment, and emotional exhaustion — basing on the 22 items the score estimated according to responses of participants to every question using a 7-point Likert-scale ranging from 0 to 6. Each principle is determined from the corresponding questions and is classified either moderate, high, or low level (Mclean et al., 2019). For instance, when the scores of emotional exhaustion ranked high when ≥ 27 and depersonalization $\geq$ ten and lack of personal accomplishment when ≤ 33. Emotional exhaustion comes first before depersonalization, which can subsequently lead to a lack of personal achievement (Babakus et al., 1999). The prolonged economic crisis in Greece has made the public servants (teachers) experience unfavourable working conditions, which lead to occupational burnout and stress.

Methodology

The method used to certify the hypothesis on the effect of the economic crisis on the risk for professional burnout of teachers in Greece was bibliographic research. The bibliographic study analyzed a random sample which reported result in Greece on the levels of teachers' burnout. The first two pages of the bibliographical research used to come with published data from two different periods. The first page was from 1995 to 2010, and the second page from 2010 to 2019. The study was conducted in December 2019, and the first two pages from the google scholar search were screened and published, which used the Maslach Burnout Inventory. The bibliographic research sample paper used to compare and contrast before and after the beginning of the economic crisis in Greece.

Results & Discussion

The results represented in the figure below which shows the comparison between the level of emotional exhaustion before and after the beginning of the current economic crisis in Greece.

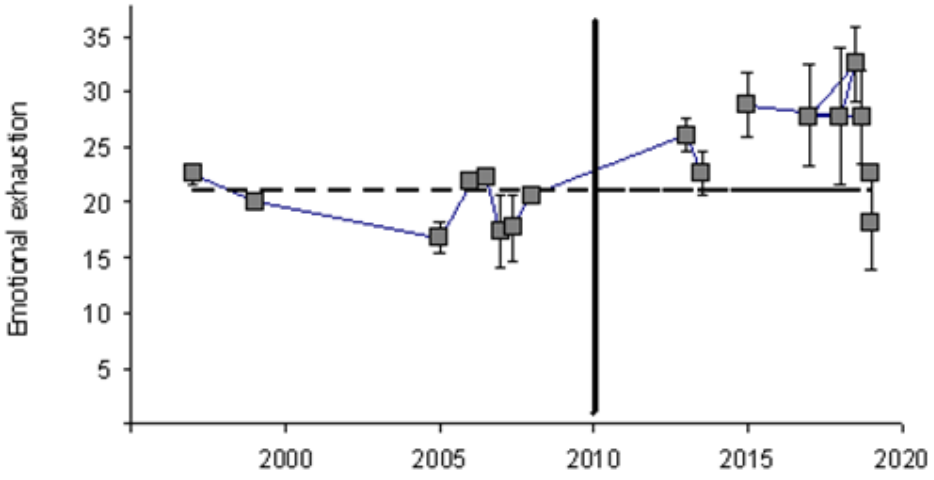

Figure 1: The level of emotional exhaustion before and after the onset of the current financial crisis in Greece. Data extracted from published papers which were either published in 2010-2019 or 1995-2010.

The results presented in Figure 1. A correlation between the level of emotional exhaustion before and after the onset of the current financial crisis in Greece indicates that after the start of the financial crisis, Teachers in Greece exhibit a considerably higher risk of professional burnout. Pre-crisis levels of Emotional Exhaustion (20.12±2.32) were significantly lower (t-test, P=0.042) compared to after the onset of the current economic crisis in Greece (24.33±4.88). The data presented in Figure 1 indicates that teachers exhibit a higher risk of professional burnout after the beginning of the economic crisis as compared to before it started.

As the effects of economic crisis, the education system in Greece has experienced numerous cuts in public spending, including a drop-in of close to 36% of its nominal terms in comparison over the past decade (OECD, 2018). Just like any other public servant, teachers faced "hostile treatment" from other active groups and the general society, perceiving them as "burden" for the public finances of a country that had led to a financial crisis (Zahariades 2016). For instance, a 2013 study portrays a negative picture of the teachers in the social media and shows low morale amongst the teachers. Under the influence of these conditions, wage differences widened in both the public and private sectors, and public employees experience difficulties in performing their skilled tasks under the conditions of limited resources (Christopoulou & Monastiriotis, 2015).

The above described conditions created unfavourable working environment which can lead to occupational stress of public servants including teachers in Greece (Mouza & Souchamvali, 2016). After a prolonged period of cuts in salary and underfunding of public schools, the teaching profession does no longer offers the recognition and job security that teachers use to enjoy previously. Teachers can easily feel that their work is not recognised and valued as it was before the onset of the profound financial crisis in Greece. (Panagopoulos et al, 2014).

According to the results of the current analysis, after the start of the Greek economic crisis, teachers' *emotional exhaustion* was increased. *Emotional exhaustion* is associated with occupational stress and can be a precursor of *depersonalization* and should be a matter of concern for School management. Monitoring the levels of *emotional exhaustion* and proactive human resources policies are required (Anastasiou et al., 2014; Anastasiou & Anagnostou, 2020) so as to deal with this issue.

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Developing Dynamic Capabilities: How the Intensity of That Process Affects Businesses in Terms of Their Strategic Maturity

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Abstract

The purpose of this publication is to discuss how the intensity of actions which businesses take in order to develop dynamic capabilities affects their strategic maturity. With this goal in mind, the authors have reviewed relevant literature and refer to the results of their own research. On a theoretical plane, the authors point out the significance of dynamic capabilities in organisations and discuss strategic maturity of businesses, and how to measure it. As presented here, the results of a CAWI survey conducted in 2016-2018 on a group of 458 businesses from various sectors and industries of the Polish economy form part of broader research into dynamic capabilities of Polish businesses (National Science Centre grant decision no. DEC-2013/11/B/HS4/00697). We have used ANOVA to interpret the results of our research and have found that there is a correlation between the intensity of measures taken at each stage of the dynamic capability development process and the strategic maturity of businesses. Our research shows that the greater the intensity of actions in that process, the greater the level of strategic maturity. Based on the results of our analysis, we conclude that the intensity of dynamic capabilities in organisations at a reactive maturity level is average, which means that their organisational management systems have some built-in potential of dynamic capabilities. Our research results also point to the importance of different categories of dynamic capabilities at the different levels of strategic management.

Keywords: Dynamic Capabilities, Dynamic Capabilities Development Process, Strategic Maturity

Introduction

In the last few decades, the crucial issue in management theory has been to identify the sources of sustainable competitive advantages deriving from an organisation's unique capabilities that enable it to receive a maximum economic rent in its specific business environment (Nelson and Winter, 1982; Barney, 1991; Prahalad and Hamel, 1994). In this context, the organisational ability to sustain and renew competitive advantages under conditions of a continuously changing environment becomes a matter of primary importance. This is the area of research within the dynamic capabilities framework (Teece, Pisano, & Shuen, 1997). D.J. Teece, G. Pisano and A. Shuen (1997) define dynamic capabilities as the organisation's potential to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments. Recent years have seen the concept of dynamic capabilities, which places value on organisational ability to recognise in advance and

capture new business opportunities, gaining prominence in the area of strategic management. This is indicated by a rapid uptick in a number of publications analysing the framework underlying the concept.

The link between dynamic capabilities and strategic management, which the existing literature finds to be indisputable (Barreto, 2010), prompts one to search for an answer to the research question which this paper tries to address, namely how the actions taken to develop dynamic capabilities affect the level of strategic maturity in businesses. Given the nature of dynamic capabilities, the assumption behind our research is that by stepping up their use of dynamic capabilities businesses should see their strategic maturity growing.

Review of literature

Dynamic Capability Development Process

A discussion which started after D.J. Teece, G. Pisano and A. Shuen (Teece et al., 1997) offered their definition of dynamic capabilities has led to the emergence of numerous alternative definitions of that construct (Kay et al., 2018). Sometimes, these new definitions would provide a completely different perspective on dynamic capabilities, including in relation to their purpose, character, role, context, origin and evolution, effects or assumptions concerning their nature. In 2009, D.J. Teece self-corrected his earlier proposal (Augier and Teece, 2009) and held that, being higher-order competencies, dynamic capabilities not only provide an opportunity to respond to any changes in the environment but also determine those changes.

N.M. Kay, S. Leih and D.J. Teece (Kay et al., 2018), in turn, point to empirical problems involving the lack of comparability in the cited research findings. Because the approaches to describing the nature and essence of dynamic capabilities are not so much diversified as completely different, contributions from much of research are restricted almost exclusively to listing the assumptions pertaining to the stock of dynamic capabilities and to interpreting research findings, leading some scholars to express doubts about the legitimacy of research on dynamic capabilities (Winter 2003).

Based on their assumption that dynamic capabilities develop under the influence of various variables, which can be both subjective and objective, S.A. Zahra, H.J. Sapienza and P. Davidsson (Zahra et al., 2006) conclude that having dynamic capabilities per se does not necessarily lead to improved organisational performance. Dynamic capabilities must be properly targeted and deployed in order to gain whatever benefits are sought and then transform those benefits into what would be a foundation of sustainable competitive advantage. This shows how critical it is to have a well-configured process for developing dynamic capabilities. T. Eriksson (Eriksson, 2014) points out this aspect when she notes that the literature on the subject describes dynamic capabilities as processes which are dynamic in nature and operate in and develop over time. Some authors (Helfat et al., 2007) point out that dynamic capabilities comprise both organisational and managerial processes the purpose of which is to identify needs or opportunities for change, and to accomplish that change. D.J. Collis (Collis, 1994), on the other hand, makes a point of noting that dynamic capabilities influence the pace of change for simpler capabilities, with account taken of relevant path dependencies and market positions. In discussing their nature, it is generally assumed that dynamic capabilities are a function of learning processes, that to say, of experience accumulation, knowledge articulation and knowledge codification (Zollo and Winter, 2002), and also that dynamic capabilities refer to specific and identifiable processes involved in the integrating, reconfiguring, acquiring and releasing of resources (Eisenhardt and Martin, 2000). According to the approach presented by K. Eisenhardt and J. Martin (Eisenhardt and Martin, 2000), dynamic capabilities affect organisational and strategic routines which underlie resource-base decision-making.

The conclusion from our literature review (Teece et al., 1997; Zollo & Winter, 2002; Zahra et al., 2006; Cepeda & Vera, 2007) is that there are various approaches to describing both the processes whereby dynamic capabilities are developed and the stocks of dynamic capabilities that can be used

to integrate, reconfigure, create or release resources. This paper uses a five-stage model to describe a dynamic capability development process comprising the actions involved in (1) opportunity-sensing; (2) learning; (3) coordination; (4) configuration and reconfiguration; and (5) organisational adaptation (see Figure 1).

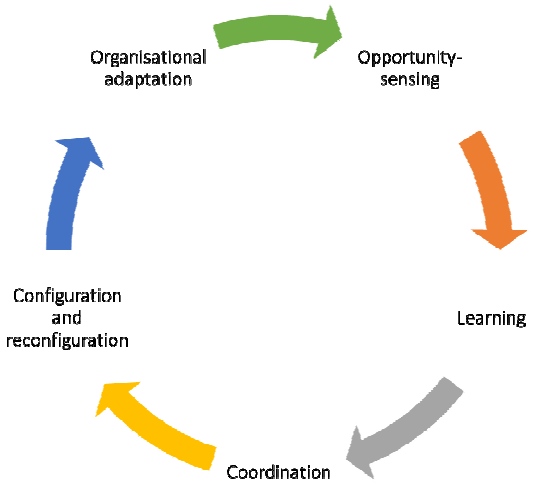

Figure 1: Model for a dynamic capability development process

Source: (Cyfert and Krzakiewicz, 2019)

In the proposed model, opportunity-sensing activities are the starting point in the dynamic capability-shaping process. They involve: (1) analysis of various trends and phenomena in the environment geared at creating new customer needs and anticipating competitor actions; (2) creation of new ideas to mobilise those within the organisation and change their attitudes; (3) identification of the needs for change based on the developments in the environment and the organisation's potential.

Identifying opportunities in the surrounding environment is a starting point for learning processes, which involve the following actions: (1) accumulation of knowledge to form a basis for transformation of dynamic capabilities; (2) intra-organisational knowledge transfers to supply any units involved in organisational change processes with relevant information; (3) intra-organisational knowledge allocation and retention in order to embed relevant knowledge in organisational units and ensure synergy based on the accumulated knowledge; (4) intellectual property management to ensure adequate protection of the organisation's proprietary rights; (5) encouraging employees to experiment and come up with new breakthrough ideas.

Implementing a set of adopted dynamic capabilities into the management system requires coordination of both organisation members and any entities operating in its environment. This involves: (1) creating a vision to integrate stakeholders that would clearly identify what actions are taken for stakeholders and what values are created for them; (2) building stakeholder loyalty as a basis to secure key resources across all dimensions of organisational activity; (3) integrating supply chain activities to provide a framework in which the value generated in that chain can be determined and captured; (4) managing strategic alliances to make sure that key resources can be obtained and secured and to ensure that external entities deliver high-quality outcomes; (5) building employee commitment so that employees can be part of what the organisation does and become more involved in it; (6) integrating and coordinating business processes to support change processes and ensure an adequate level of organisational cohesion.

Once a vision of how dynamic capabilities should be developed is defined and the stakeholders' support and involvement is ensured, the organisation can be re-modelled through configuration and reconfiguration processes. These involve: (1) creating critical resources and skills which the organisation cannot source from its environment or which would be more expensive to source than to generate; (2) securing resources and skills; (3) integrating resources and skills to allow the organisation to make use of its available synergies; (4) creating innovations to enable proper development of dynamic capabilities and build the foundations for competitive advantage; (5) shedding (releasing) superfluous and redundant resources and skills that will generate limited added value for the organisation in a long-term development perspective; (6) deploying new technologies to ensure proper operating and development conditions for the organisation.

Making sure that the benefits of developing dynamic capabilities can be leveraged by an organisation requires it to transform its management system. This is achieved through organisational adaptation and includes: (1) business model transformation to capture the logic behind what the organisation does and, through this, to reflect the modified set of the organisation's strategic objectives and a bundle of its dynamic capabilities; (2) managing organisational boundaries, which includes transforming such areas as performance, authority, competence and organisational culture; (3) ensuring adequately dynamic strategic management processes so that they necessarily affect the organisation from within in such a way that it is aligned with its environment in the best possible way while retaining its organisational identity; (4) organisational improvement, which includes comprehensive and targeted efforts to integrate and alter the arrangements within the organisation so as to ensure a higher level of its alignment with the environment; (5) adapting and implementing best management practices; (6) ensuring flexible organisational structure with a view to implementing cutting-edge network-based organisational arrangements; (7) managing organisational identity.

Strategic Maturity

Initially, maturity models were meant to reduce defects and increase efficiency through greater focus on organisational practices (Blommerde and Lynch, 2016). While the first maturity model in management science was put forward as early as 1973 by L. Nolan (1973), it was not until the late 1980s that we can see a rapidly growing interest in the notion of maturity after programmers from Software Engineering Institute (SEI) at Carnegie Mellon University had developed their Capability Maturity Model (CMM) (Paulk et al., 1993). While maturity as a concept has found extensive use in project management (Hopkinson, 2011; Anantatmula and Rad, 2018; Crispim, Silva and Rego, 2019; Hartono, Wijaya and Arini, 2019), process management (Froger et al., 2019; Krukowski and Raczyńska, 2019; Ongena and Ravesteyn, 2020; Szelagowski and Berniak-Woźny, 2020) or organisational development (Milenković, 2016; Amir and Auzair, 2017; Grossman, 2018), there are relatively few theoretical publications and empirical studies in the field of strategic management that would address strategic maturity in organisations, despite the attraction the concept holds from the management process improvement perspective (Demir, 2018). The Strategic Management Maturity Model (SMMM, BSCI, 2010), which was developed by the Balanced Scorecard Institute, gauges maturity along seven different dimensions (Leadership, Planning & Executing, Processes & Tools, Structure & Model, People & Culture, Performance Management, Innovation) and five different levels (Ad Hoc and Static (Level 1); Reactive (Level 2); Structured and Proactive (Level 3); Managed and Focused (Level 4); Continuous Improvement (Level 5). F. Demir's proposed modification to the SMMM (Demir, 2018), called the Strategic Management Maturity Model for Innovation (S3M-i), assumes that the only way of creating sustainable growth is through innovation. Under F. Demir's model, maturity is assessed along seven dimensions (Leadership, 2. Planning & Executing, 3. Processes & Tools, 4. Structure & Model, 5. People & Culture,6. Performance Management, 7. Innovation) and at six levels (Level 0: Undefined, Level 1: Initial, Level 2: Planned, Level 3: Performed, Level 4: Optimized, Level 5: Excellent).

In assessing organisations for strategic maturity, the starting point could be either the design of their strategic management systems or strategic management processes. While the two dimensions are interlinked (Pearce, Robinson and Subramanian, 2000; Okumus, 2003; Andrews et al., 2009) – how a

strategic management system is structured should be seen as a consequence of what is done as part of a strategic management process – it is worth noting that it would be a more proper path to assess the latter, as is also reflected in the existing literature which is more preoccupied with that dimension ((Demir, 2018), BSCI, 2010, Witek-Crabb, 2016). While this conclusion is correct, one should also note that the components of a strategic management system can also be allocated to other management systems, which makes it more difficult to identify benefits flowing from changes in maturity levels.

The study described in this paper is based on the CCM framework (Paulk et al, 1993) and it proposes a five-stage model of strategic maturity comprising the following levels:

1. Reactive. Actions at any stage in the strategic management process are random and are undertaken in response to changes in the environment. The only people involved in those actions are management executives.
2. Defined. Actions at any stage in the process are defined but are not structurally integrated (each division/function formulates its own strategy). Those involved are management executives and some managers.
3. Integrated. There are specific operational procedures for any stage in the process but actions are not measured for effectiveness. Those involved are management executives and some managers.
4. Managed. There are specific operational procedures and actions are measured for effectiveness. Those involved are managers.
5. Aligned. Actions at any stage in the process are taken continuously and are linked with other components of the organisation's management system. All employees are involved.

As constructed, the model provides for 4 generic stages in the strategic management process (Andrews et al., 2009; Alkhafaji, Nelson and Nelson, 2013) including: (1) Strategic analysis; (2) Strategic planning; (3) Strategy implementation; and (4) Strategic control.

Research Methods and Research Limitations

While noting a considerable variation of research into dynamic capabilities as it relates to organisational performance, T. Eriksson (Eriksson, 2014) stresses that the usual point of reference for researchers is either economic performance or innovative, technological or environmental outcomes (Zott, 2003). T. Eriksson also notes that the studies focusing on economic performance rarely rely on objective measures for outcomes of dynamic capabilities and most of them utilise a combination of the objective and the subjective, or just the subjective measures, with respondents evaluating their company's performance in relation to that of its competitors over the three-year time span, which appears to the right approach in researching dynamic capabilities. In our research, which utilises the dynamic capabilities development model we have described above, we asked the respondents to express their subjective opinions on the levels of organisational maturity at individual stages in the strategic management process and on the intensity of actions taken as part of the dynamic capability development process.

We assessed the maturity of the strategic management process ranking it on scale of 1 to 5, where (1) = Insignificant; (2) = Negligible; (3) = Average significance; (4) = Significant; (5) = Very significant. Similarly, a one-to-five scale was used to assess the intensity of actions taken in the dynamic capability development process, where (1) = Factor does not exist (2) = Low intensity of actions; (3) Average intensity of actions; (4) = High intensity of actions; (5) Very high intensity of actions.

The techniques utilised in our survey were PAPI (for pilot studies) and CAWI (for the study proper) and we used a questionnaire with closed-ended questions. Respondents included staff in managerial positions at the companies surveyed. The questionnaire was designed to illicit two categories of information. Firstly, an attempt was made to obtain general information about the companies surveyed. Secondly, information was sought that would help ascertain what specific dynamic capabilities the companies surveyed had. Interviews were conducted between April 2016 and June

2018 on a sample of 715 specifically chosen Polish companies. On discarding questionnaires that were incomplete or raised concerns as to the accuracy of what was declared in them, the total number of properly completed questionnaires was 458.

As presented here, the results of our survey come with some limitations. On the one hand, the use of the CAWI technique utilising an online version of our questionnaire ensured a satisfactory response rate, allowing for general conclusions to be drawn. On the other hand, it increased the risk that questionnaires would be completed without much thought given to them. In an effort to mitigate both that risk and the risk of incorrect assessments because of difficulties in interpreting the issues under examination, the general part of our survey included questions the answers to which were mutually exclusive. As a result, a number of completed questionnaires from the respondents were discarded at both stages of our study. The answers reported in our survey are subject to the risk of subjective bias by the respondents whose expressed opinions might have reflected their perceptions more than the reality as it is. In their relative assessments of how their companies performed compared to competitors, the respondents might have lacked full information to make those assessments. Also, as is only natural, respondents could have been overly optimistic in assessing performance of their own firms. Another limitation of our study is that it did not focus on analysing dynamic capabilities of firms in specific industries and there was a wide variation in the scope of activities pursued by the companies surveyed. This could have led to different assessments of what in fact was similar performance by companies from different sectors.

Results and Discussion

Actions that the companies surveyed take as part of their dynamic capability development processes can be characterised as above average in terms of their intensity (see Chart 1). The results show minor differences among the various categories of actions. This provides a basis for concluding that the adopted model for the dynamic capability development process is correct. Importantly, too, while the final assessment score is “above-average intensity”, for actions taken at the adaptation stage and the configuration and reconfiguration stage, most assessments point to low or average levels of intensity, while the activities taken at the opportunity-sensing, learning and coordination stages are primarily ranked at high or very high intensity levels. In line with how the model for the dynamic capability development process is configured, this means that the intensity of actions wanes as transitions are made to each subsequent stage in that process.

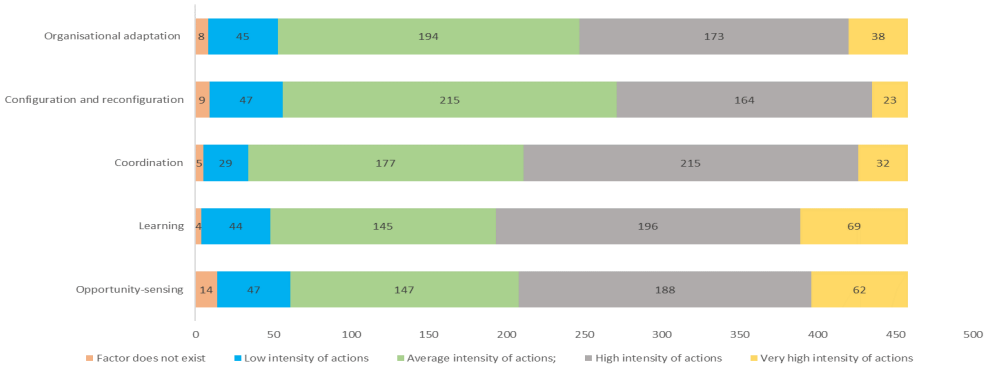

Chart. 1: Intensity of actions in dynamic capability development processes, n=458

Based on their declared levels of strategic activity at each stage in the strategic management process, the companies surveyed show high strategic maturity (Chart 2). The most mature actions are those taken at the strategy implementation stage (71% of maximum response level), followed by strategic control (66% of maximum response level) and then strategic analysis and strategic planning (62% of maximum response level).

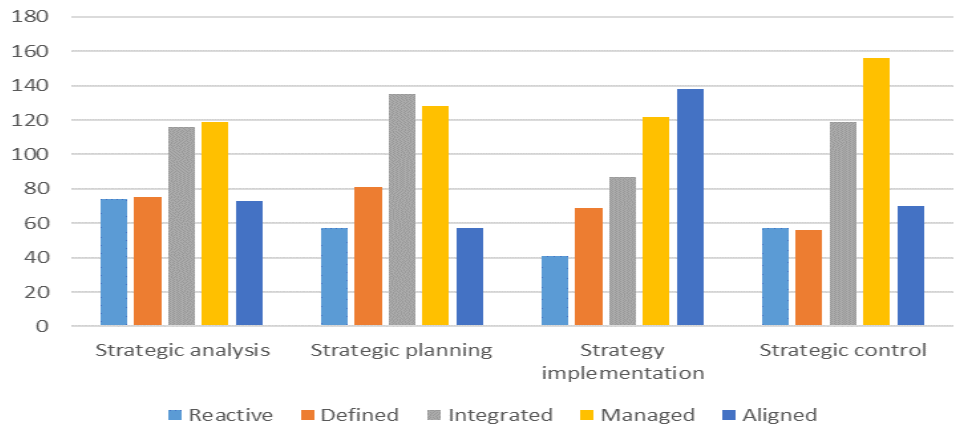

Chart. 2: Declared strategic maturity, n=458

We used the respondents' maturity assessments for individual stages in the strategic management process as a starting point to answer the question of how the actions taken as part of dynamic capability development processes affect the strategic maturity of the companies surveyed. This required us to adopt, as a point of reference, a synthetic measure to assess strategic maturity in those companies. In line with the process-based nature of strategic management, our study assumes that the level of maturity at each subsequent stage in the strategic management process can be at most the same as in the preceding stage. This assumption required modifying the levels of strategic maturity as declared by respondents, revealing that the declared levels are lower than the real ones (see Chart 3). As declared by the respondents, nearly every subsequent stage in the strategic management process was at a higher maturity level (the only exception was strategic control where the companies' maturity was lower than at the strategy implementation stage, albeit higher than at the strategic planning stage). However, once corrected, the strategic maturity assessment (comprising all stages in the strategic management process) shows the maturity of the companies surveyed to be gradually falling.

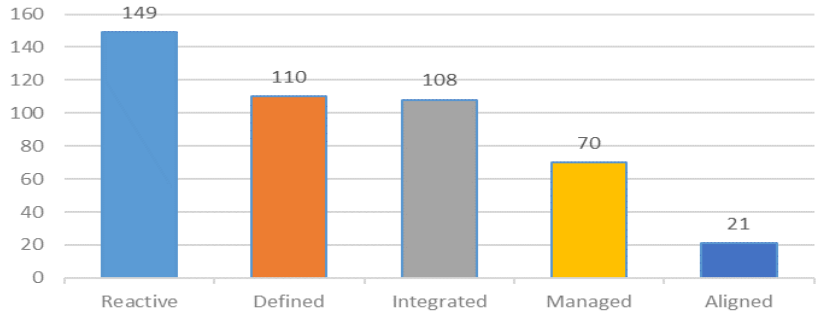

Chart. 3: Corrected strategic maturity assessment, n=458

We have used the ANOVA method to test the corrected assessment of strategic maturity against the intensity of actions at each individual stage in the dynamic capability development process. Three general concussions can be drawn on that basis.

Firstly, the greater the intensity of actions in the dynamic capability development process, the greater the level of strategic maturity of an organisation. This can be observed at virtually all stages of the dynamic capability development process. Small differences, which fall within the acceptable variance limits, are observed at the opportunity-sensing stage (between the integrated and defined levels), the coordination stage (between the integrated and defined levels), and at the configuration stage (between the managed and aligned levels). This means that organisations, which improve their strategic management processes, should pay their attention to activities that develop their dynamic capabilities.

Secondly, the intensity of dynamic capabilities in organisations at a reactive maturity level is average, which means that their organisational management systems have some built-in potential of dynamic capabilities. As regards the opportunity-sensing, learning and adaptation stages in the development of dynamic capabilities, the largest increase in their intensity is observed between the reactive and defined stages, which points to the existence of the initial accumulation effect. For the other two stages (coordination, and configuration and reconfiguration), the largest observed difference in intensity is between the integrated and managed levels. Another observation based on our study is that dynamic capabilities grow at a declining pace (the only exception is the adaptation stage where increases are linear). This means that transitioning to subsequent strategic maturity levels requires less and less intensity of action in the dynamic capability development processes.

Thirdly, different categories of dynamic capabilities are important at the different levels of strategic management. For example, the key actions at the reactive level are those pertaining to configuration and reconfiguration; at the defined level, those concerning coordination; at the integrated level, those relating to learning; at the managed level, those pertaining to opportunity-sensing; and at the aligned level, those relative to organisational adaptation. In trying to explain why this is so, one might posit that, initially in the organisational development, managers believe that activities aimed at securing and creating resources and skills that are critical to organisational development are the key to their organisation's survival in a turbulent environment. Once strategic awareness has increased, raising strategic maturity to the defined level, greater value must be placed on activities that build employee involvement. Moving to the integrated level involves accumulation and transfer of knowledge and encouraging employees to experiment so that they can come up with new, breakthrough ideas. At the managed level, identifying what changes are needed and mobilising organisation members make it possible to transform attitudes of employees. At the aligned level, managers believe that the intensity of learning and knowledge accumulation activities is satisfactory, which is why actions to adapt the organisation in response to changes in its environment begin to play a key role.

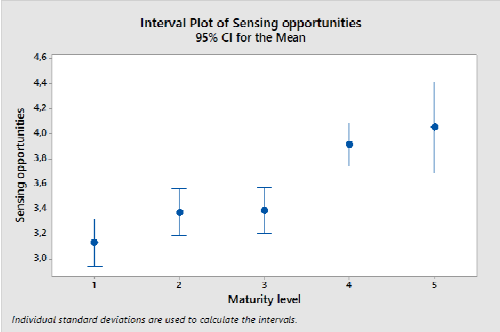

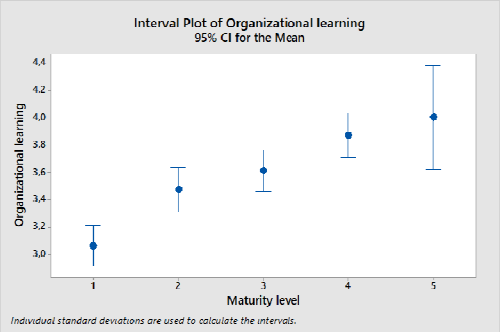

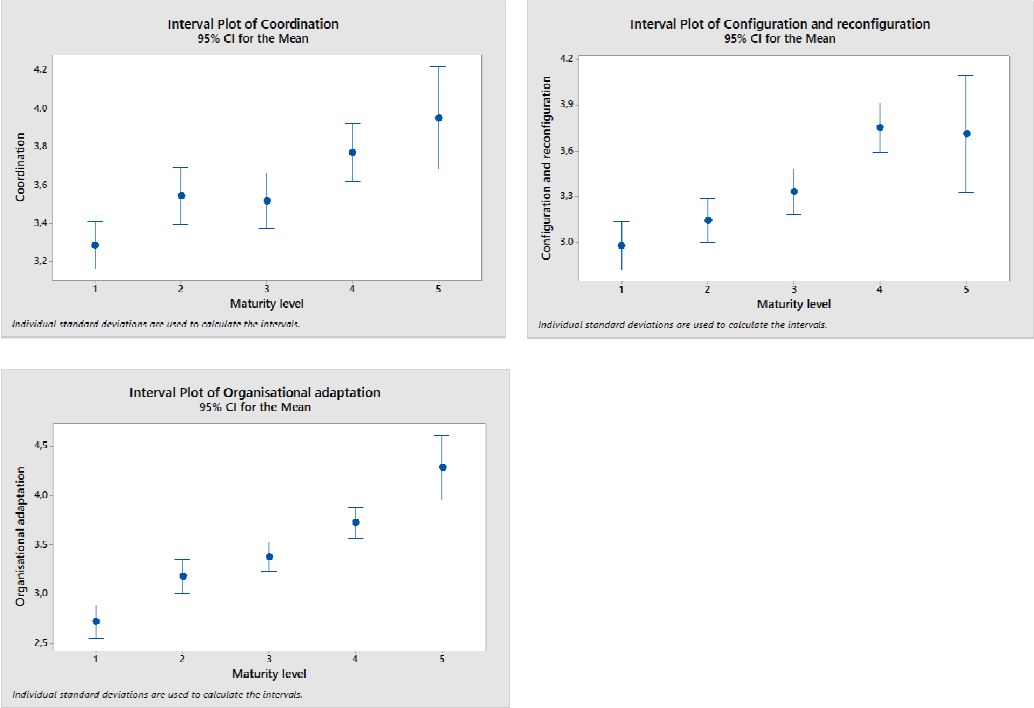

Chart. 4 : Corrected strategic maturity at different stages in the dynamic capability development process

Maturity levels: (1) Reactive; (2) Defined; (3) Integrated; (4) Managed; (5) Aligned

Conclusions

The purpose of this publication is to discuss how the intensity of actions that businesses undertake in order to develop dynamic capabilities affects their strategic maturity. The study has purposefully expanded its scope rather than limiting itself to specific sectors, and the companies surveyed were only assigned to modern, medium-technology and traditional sectors (using the OCED terminology) after the study. We believe it would be advisable to conduct studies with a scope limited to specific industries in order to capture a fuller picture of any potential correlations. Our study has found correlations between the intensity of actions taken as part of the dynamic capability development process and increases in strategic maturity levels. Having said that, the study does not allow for identifying which specific dynamic capabilities should be considered critical for transitioning to specific levels of strategic maturity. We believe therefore that it would be worthwhile to try and identify those dynamic capabilities which determine the effectiveness of transitioning into the different levels of strategic maturity.

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Risk in Supply Chain Management: SME Perspective in Poland

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Abstract

The main aim of the survey is to find causes of risks in supply chain management in small and medium-sized enterprises. This article is also an attempt to determine the level of employee's education in the field of risk identification and prevention, identify sources of risk especially in the links between an enterprise and its suppliers and customers as well as perception of risk among men and women depending on the job position. The research sample of 50 SMEs has been chosen among small and medium-sized enterprises operating in various branches. Finally, thirty-three companies those returned completed inquiry were selected to the analysis. Study results shows different ways to identify and dealing with risk in supply chain management, depending on the size of the company, business area and economic sector in which it is. The results also contain information on the frequency of training on risk in supply chain management and their most common types, and the attitude of respondents to specific risk factors.

Keywords: Risk in Supply Chain, Management Small and Medium Enterprises

Introduction

Due to the increasing complexity and uncertainty of modern supply chains, the type and nature of uncertain developments or the impact of any action have become hard or even impossible to predict, and the importance assigned to risk considerations has grown (Helbing, 2006; Pisar & Bilkova, 2019) Managing risks is a daily issue to supply chain and logistics management. The ability to respond to and mitigate these risk events enables the company to be ahead of its competitors and diminishes the expected long-term damage to its business (Hudakova et al., 2018; Kolupaieva et al., 2019). The critical drivers for supply chain profitability are responsiveness, efficiency, and reliability (Hendricks and Singhal, 2005). The occurrence of risk events in different stages of the supply chain can put negative influences on supply chain performance. The management of risk events is termed as supply chain risk management (SCRM) which has become a key part of the business strategy. SCRM has got more attention with the movement to global supply chains and the increasing occurrence of internal and external risk events that cause disruptions of supply chain operations (Aqlan & Lam, 2015) By developing supply chain management, its content has changed. Traditional supply chains has emphasized on cost and factors such as material and parts flow, information flow and financial flows (Calvomora et al, 2015; Pakurár et al., 2019, Pakurár et al., 2019). Today the market needs to respond faster than past. Traditional factors management is not responsive to current needs of chains. The key to survive in today's world is to have competitive advantage to competitors. On the other hand it is necessary to improve performance for competition. There is a tight interrelation between country's economic competitiveness and a rate of its economic growth (Fyliuk et al., 2019; Kiseľáková et al., 2019). Performance improvement is considered an important topic in today's world. Supply chain is also considered as one of the features of the world (Eidi et al, 2013) Although supply chain risk management has gained attention in the past years in academia, there is a lack of work on this subject matter. There is a need for effective mathematics tools to work in the field of supply chain risk management analyzing the main supply chain risks for an effective supply chain risk management. Supply chains today face greater risks than their supply chain managers could recognize and in fact, Christopher and Peck clearly stated that "in today's uncertain and turbulent markets, supply chain vulnerability has become an issue of significance for many companies and appropriate researches on resilient supply chain are yet to be conducted". The optimal way is to choose flexible enough practices

that easily adapt to the constantly changing market, will be easily available to employees and managers and at the same time will be very effective in terms of their impact in the area of coping with risk in supply chain management.

The purpose of this article is to draw attention to the essence of a properly functioning supply chain in SMEs, to identify sources of risk in the context of supply chain management which in the analysis of entrepreneurs are ignored, and to identify factors that can improve methods of dealing with risk or that eliminate the occurrence of such a threat.

Literature Review

To effectively compete in the global market, SMEs must have effective supply chain management. Conflicting objectives and lack of coordination between supply chain partners may cause uncertainties in supply and demand. Therefore effective SCM is required to streamline the supply chain of SMEs. In general, knowledge management relates to supply chain management by providing the tools necessary to manage large amounts of data generated by supply chain operators and their customers.

(Carlos et al., 2013; Dost et al., 2016; Olson, 2018a, Olson, 2018b; Pérez-Salazar et al., 2017; Schoenherr et al., 2014; Rahman et al., 2019; Svazas et al., 2019). Supply chain management demands managers to understand, monitor and control operations in the entire supply chain, from sourcing, logistics, production and retail delivery to customers (Olson, 2018a, Olson, 2018b; Kovács & Kot, Bilan et al., 2017; 2017; Kot et al., 2018; Krykavskyy et al., 2019).

The term supply chain management is defined as the integration of key business processes among a network of interdependent suppliers, manufacturers, distribution centers, and retailers in order to improve the flows of goods, services, and information from original suppliers to final customers, with the objectives of reducing system-wide cost, while maintaining required service levels (Simchi-Levi et al 1999; Androniceanu and Tvaronavičienė, 2019) Greater risk in supply chain has a poorer result in performance's metrics such as inventory costs, lead-time, flexibility and responsiveness. Several authors have investigated the risk elements using different methodologies seeking to reduce the impact on supply chain performance. An integrated methodology has been proposed to classify, manage and assess inbound supply risk using an Analytical Hierarchy Process, defined as a multi attribute decision-making method. This enables a decision maker to visually structure a problem in an attribute hierarchy (Wu et al 2006) A procedure to manage the risk has also been studied. (Hallikas et al. 2004; Borocki et al., 2019; Suray et al., 2019) Other authors have been focusing on exploring flexibility to mitigate the risk, classifying it in six interruptions: suppliers, process, demand, intellectual property, risk behavior, and political-social aspects.(Tang and Tomlin. 2008) There are several ways to quantify risk such as variance (Markowitz, 1991), downside risk (Eppen et. al 1989), and maximum regret. In this research, we choose the standard deviation of the scenario profits to quantify risk, which allows for a more intuitive interpretation and comparison between supply chain network configurations. Furthermore, risk management is a scientific approach to manage risks by doing anticipating losses, and designing procedures that will minimize financial losses (Vaughan, 2008). These are seven steps of risk management process:

- Communication and Consultation.
- Establishing the context.
- Risk Identification.
- Risk Analysis.
- Risk Evaluation.
- Risk Treatment.
- Monitoring and Review.

Based on (Christopher, 2003), supply chain risks are divided into three categories, as shown below:

- Internal risk, including risks in process and control activities.

- External risk, including sub categories demand and supply risk.
- Other external risk, including sub category environmental risk that affect in upstream and downstream.

Research Methodology

The main aim of the survey is to find causes of risks in supply chain management from small and medium-sized enterprises perspective. Besides that there are some specific aims: determining the level of employee's education in the field of risk identification and prevention; identifying sources of risk between an enterprise and its suppliers and customers; to present the perception of risk among men and women - managers / supervisors / employees. Is it the same? Are there differences? The research tool was an online survey proposed by the Author, the research sample were 50 small and medium-sized enterprises operating in various branches located in southern Poland. The survey questionnaire included various types of questions - single choice questions and those ones used the Likert scale. Finally 33 completely fulfilled questionnaires were selected by students to the analysis. The data were collected in September 2019 from employees and managers of studies SMEs.

Research Results

Data presented in the table 1 indicate that 19 men and 14 women took part in the survey**.**

The largest group among respondents were women with university education 71.5%, and the least of them primary education 7%. The situation is similar among men, the most respondents has university education 68,%, and the least vocational education 5.3%.

Table 1: Distribution of respondents according to education

Education	Female	Male	Structure	
			F	M
Primary education	1	-	7%	-
Vocational education	-	1	-	5.3%
Secondary education	3	5	21.5%	26.3%
University education	10	13	71.5%	68.4%
Total:	**14**	**19**	**100%**	**100%**

Most of female respondents have an employee function in the company 71.4%, the others managerial 28.6%. In addition to these selected functions, among men there was also the function of CEOs and 21% of the answers. The most responses among men concerned 52.6% of managerial functions.

Table 2: Distribution of respondents by function in the company

What function do you perform in the enterprise?	Female	Male	Structure	
			F	M
CEO	-	4	-	21%
Manager	4	10	28.6%	52.6%
Employee	10	5	71.4%	26.4%
Total:	**14**	**19**	**100%**	

Table 3: Structure of respondents according to the enterprise size criterion

Size of company	Answers	Percentage indicator
Micro + Small	10 + 14	72.7%
Medium	9	27.3%
Total:	**33**	**100%**

As the data in the table 3 shows, there are three types of companies in the study sample: micro enterprises can be distinguished: 30.3%, small 42.4% and medium-sized 27.3%.

Table 4: Area of activity and dependencies between them

Area of activity	Answers	Structure
National	29	87.9%
International	4	12.1%
Total:	**33**	**100%**

The largest group of respondents indicated that the area of activity of their enterprises is located on the local market - 87.9%, while the remaining 12.1% of respondents conduct their activities abroad.

Table 5: Activity in the country and international

	Micro+ small enterprises	Medium size enterprises	Structure	
			M+S	Medium
National	23	6	96%	66.5%
International	1	3	4%	33.5%
Total:	**24**	**9**	**100%**	

According to the data in the table 5, it appears that the majority of respondents working in micro and small enterprises - 96% conduct their activities in Poland. However, only 4% abroad. On the other hand, in the case of medium-sized enterprises, greater activity on the foreign market is noticeable than

in micro and small enterprises, as it is 33.5%. However, in relation to the local market, medium-sized enterprises have a share of 66.5%.

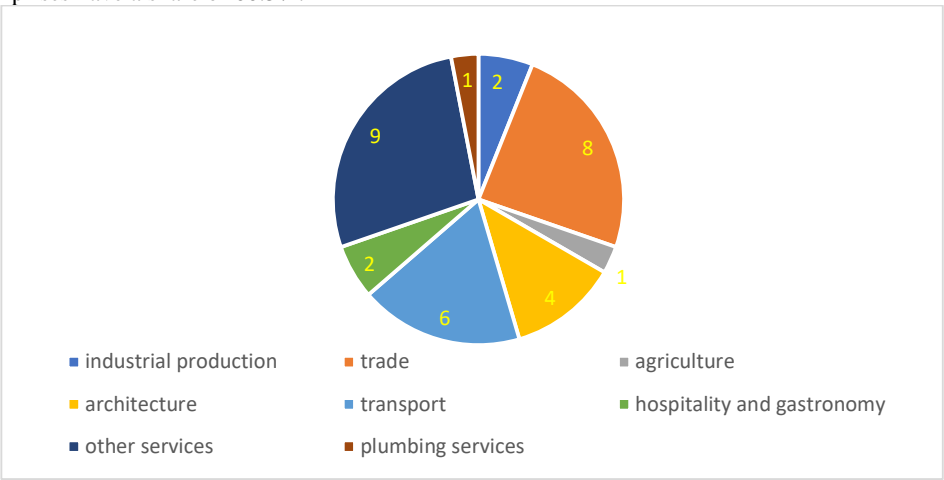

Figure1: Diversity of business sectors of activity

According to the data contained in the figure 1, the majority of respondents surveyed deal with other services, as it is as much as 27% of respondents or 9 people. In turn, 24% or 8 respondents are involved in trade. Transport is handled by 18% or 6 people from among the respondents. Construction companies are run by 12% of respondents, which gives 4 people. The study noted that 2 people deal with industrial production, as well as hotel and catering industry, which gives each of them 6%. In turn, both communication, social networking and hydraulic services are occupied by 1 person, which gives a total of 6% for each of the industries.

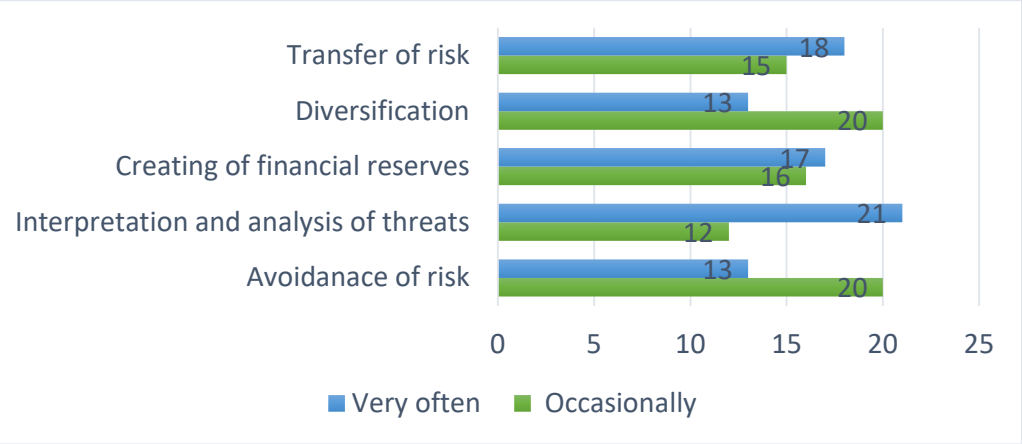

Figure2: Activities carried out in the company in the context of risk management in the supply chain

According to the data contained in the figure 2, the majority of respondents conduct activity in transferring of risk to other business entities -18 respondents, while 15 respondents sporadically carry out activities in transferring of risk to other entities. Diversification aimed at reducing the risk level is rarely carried out by 20 respondents, while very often 13. The creation of financial reserves against the threats in the firm occasionally leads 16 respondents, whereas 17 respondents very often. The interpretation and analysis of the threat as well as employee training to prevent it are dealt with very

often by 21 of respondents and sporadically by 12 of them. while risk avoidance, which is only often addressed by 13, sporadically 20.

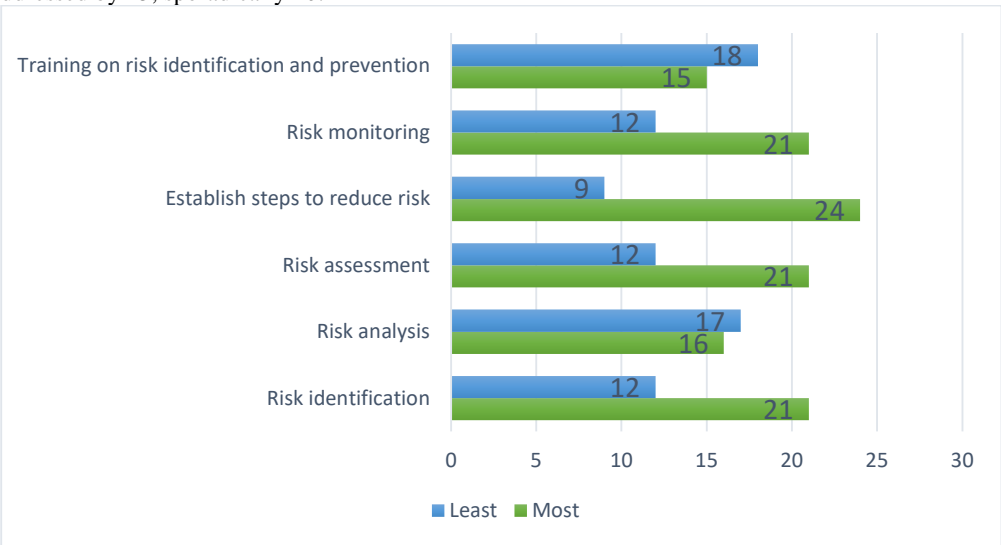

Figure 3: Risk management activities

According to the data contained in the figure 3, the majority of respondents are active in risking other entities, 18 respondents, while 15 respondents sporadically carry out activities involving risking other entities. Diversification aimed at reducing the risk level is occasionally carried out by as many as 20 respondents, while very often 13. The creation of financial reserves in the event of threats in the enterprise occasionally leads 16 respondents, while 17 respondents very often. As many as 21 respondents and 12 sporadically deal with the interpretation and analysis of the threat and training employees to prevent it, while risk avoidance, which is only often addressed by 13, sporadically 20.

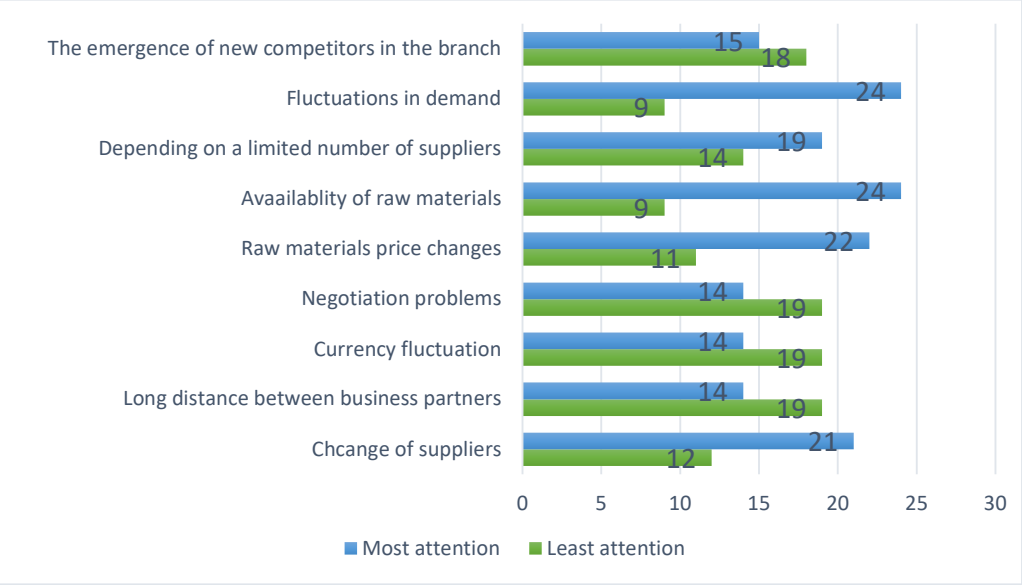

Figure 4: Sources of risk in supply chain management

15 respondents make the most comments related to the emergence of new competitors in the industry, while the least 18. Fluctuations in demand are taken by most 24 and the least 9. Business dependence on a limited number of suppliers the most 19 and the least 14. Availability of raw materials the most 24 and the least 9. Change in raw material prices the most 22, the least 11. Negotiating problems most 14 the least 19. Currency fluctuations the most 14, the least 19. Large distance between business partners most 14, least 19. Change of suppliers most 21, least 12.

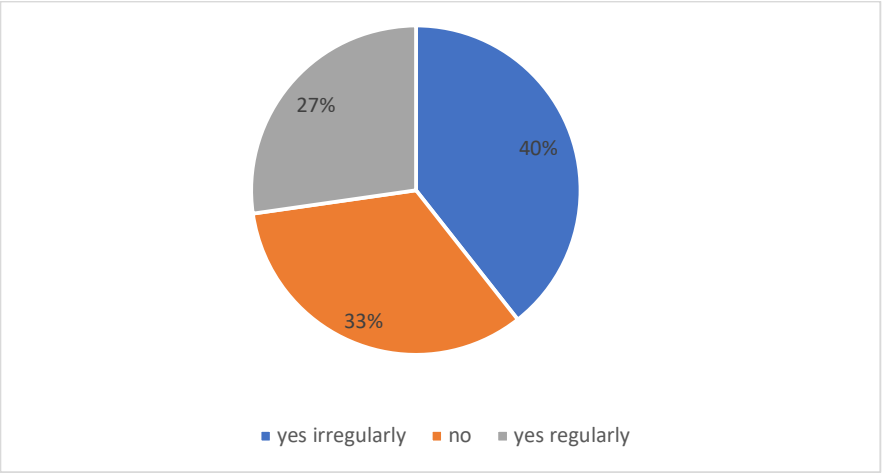

Figure 5: Participation in risk management training

The figure 5 shows that 13 respondents out of 33 participate in risk management training - irregularly, 11 respondents do not participate at all, while 9 respondents participate in training regularly.

Figure 6: Potential selection of the scope of training on risk management

The figure 6 shows that the majority of respondents (15) would introduce training with specific risks: design, financial and security, 11 respondents chose extensive risk management training, 4 respondents chose training in the application of risk management tools. The least respondents (2) would not

introduce any training. The chart shows that 94% of respondents would introduce one of the three risk management training listed above, while only 6% of respondents would not introduce any training.

Summary

The results of the conducted research provide a good basis for formulating the hypothesis that solutions that are most often used as part of solving the risk problem in supply chain management in small micro and medium enterprises are: risk transfer to other entities, i.e. insurance, guarantees, sureties to cover possible damages, interpretation and analysis of the risk and training of employees in this area in order to prevent the occurrence of such risk. Research has also shown that enterprises have a narrow range of risk factors to which they pay a lot of attention. Over 50% of enterprises attach little importance or ignore the threat arising from the emergence of new competitive companies on the local market. The European Community is not indifferent to the potential inherent in SMEs and implements a number of actions aimed at strengthening the role of this sector on the market. It enables activities within the framework of scientific and research development, product improvement, thus strengthening the company's position in a specific sector of operation. In today's world, newly created small enterprises that manage well the resources of intelligence and capital increased by the budget under the European Union assistance are able to be competitive with enterprises already operating on the market. The second source is problems in negotiations. They can have different grounds, i.e. stress, own personality, self-esteem and uniqueness, interpretation, sense of security and lack of initiative. Another negative factor is conducting irregular trainings or conducting trainings on narrow topics regarding risk in supply chain management. Staff with appropriate qualifications, trained and regularly acquainted with rapidly changing risk definitions, new possibilities and ways to prevent it is a guarantee of reducing the risk of its occurrence or faster dealing with its occurrence. Regular trainings focusing on a broader range of risk would be more effective, which would later result in a flexible workforce ready to counteract the approaching unknown risk. Orientation (point of view) focusing only on the functioning of your own business is a mistake. A good solution is to monitor emerging new companies on an ongoing basis in order to prevent any increase in competition. The process of self-improvement should be constantly carried out in the enterprise with the thought that it will soon become unrivaled on the market, although nowadays this moment in the sphere of SMEs may never take place given the very rapid development and increase of quality in enterprises as well as the appearance of new ones on the market .

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The relation of Human Resource Management Aspects and the Business Process Management Implementation in Public Administration offices

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Abstract

The introduction of Business Process Management (BPM) in public administration is determined by multiple factors. According to different studies, the factors related to Human Resource Management (HRM) are among the most important ones. The aim of the study presented in the article was to identify the HRM factors which occur in the community offices. Subsequently, the identified factors were assessed in the context of their significance in the introduction of BPM in the examined entities. As a result of the conducted study, it was concluded that BPM is primarily influenced by the community offices' managers regarding the constant improvement of their competences, ensuring the continuous development of employees within offices, as well as providing an organizational environment that increases their responsibility, independence in operations and acceptance of changes.

Keywords: Human Resource Management; Business Process Management; public organization; community office

Introduction

The general challenge that the public administration (public organizations) is facing was dubbed by F. Patterson as "doing more for less" (Patterson et al. 2009) However, as the examples of various countries show, the approach to managing public administration based on the assumption that it is enough to reduce expenses to increase its efficiency in the long run, did not bring benefits. Therefore, other ways to achieve this result have been sought. One of them is the transfer of solutions from business organizations to the area of public management, including the concept of Business Process Management (process approach, BPM)

The introduction of BPM to the public administration can be based on the New Public Management (NPM) model. The distinguishing features of this model were the introduction of a horizontal structure, characteristic of BPM, and the radical decentralization of public organizations, along with the assessment of activities through achieved results (Hood 1991) However, one of the basic assumptions of NPM was an attempt to implement solutions in public administration that are used in the management of business organizations, the best example of which is introducing BPM to it. With this approach, organizations imitate solutions that appear to bring beneficial results to other organizations (Hensel 2018)

The process approach allows, among others, for a better understanding of the relationships between the activities conducted by an organization. It shifts the center of gravity of management to the coherence of internal elements of an organization, but also shows a new way of thinking of managers, who should pay special attention to horizontal transfers within an organization as well as between organizations.

From the point of view of traditional public administration, this is a revolutionary approach, because it was based on a traditional, hierarchical structure in which no horizontal approach occurred.

Introducing and developing the scope of BPM use in organizations is determined by different organizational areas, such as: organizational structure, IT solutions, organization's strategy, finances, services provided, HRM solutions etc. Bearing in mind that the human factor is often crucial when introducing various initiatives into an organization, the purpose of the research presented in the article is to identify the occurrence of factors related to HRM in public administration offices and to assess them in terms of influencing the possibility of implementing the process approach in these entities.

Theoretical Background

Initially, the process approach was used only in business organizations. Its propagation in public administration started in the early 1990s, with the emergence of the concept by M. Hammer and T. H. Davenport (Reyes 1998) The first studies on the BPM in public organizations include works by G. Bouckaert, A. Halachmi (1995); R. Linden (1993); T. Packwood (1998) and L. P. Willcocks (1997). It is worth noting that in the literature related to the public sector, process approach is defined either with generally accepted terminology, i.e. Business Process Management (BPM) (Gulledge, Sommer 2002); (Niehaves, Plattfaut 2010, p. 389); (Niehaves, Malsch 2009), or the term Government Process Management (GPM) (Tregear, Jenkin 2007, p. 1).

BPM in public administration is based on the assumption that actions should be optimized, taking into account the processes implemented in the organization, not the functions. This approach proved to be helpful in fulfilling managerial roles in public administration during the implementation of reforms aimed at increasing its effectiveness and customer orientation or improving inter-organizational coordination (Ongaro 2004) According to M. Kohlbacher, the process approach is a structure composed of ten dimensions (Kohlbacher 2010). These include ones related to human resources, i.e.: managerial support, organizational structure adapted to horizontal functioning, employees' knowledge, Human Resources Management systems, coordination and integration of all process projects and organizational culture (including its elements, such as teamwork, readiness for change, flexibility and customer orientation)

In their research, T. Schmiedel, J. vom Brocke and J. Recker attempted to identify the features of organizational culture that support the implementation of effective and efficient processes (Schmiedel et al. 2013). They are called CERT values (C - Customer orientation, E - Excellence, R - Responsibility, T - Teamwork) These are elements that are often referred to as factors depending on the human resources of an organization. Other authors, who pointed to the relationship between aspects related to HRM (especially in organizational structure, organizational culture, the role of managers, teamwork or the remuneration system) and BPM, were F. Zucchi, and J. S. Edwards (Zucchi, Edwards 1999; Raczyńska, Krukowski 2019). S. Corrigan conducted similar analyses (Corrigan 1996).

According to the resource approach to the organization, social capital (human resources) is understood as a resource that is valuable, rare, and difficult to imitate and replace, and which, together with other resources, creates organizational capacity (Barney 1991). N. Lin defines social capital as "resources embedded in a social structure that are accessed and / or mobilized in purposive actions" (Lin 2001, p. 29). The social capital of the organization is therefore a resource derived from the relationships between people in the organization. It is related to human capital, which is reflected in education, training, experience or the existence of close interpersonal relationships between individuals (Coleman 1988; Lin 2001). Social capital helps solve problems of coordination, facilitates the flow of information between individuals (Lazega, Pattison 2001; Lin 2001), facilitates collective work (Putnam 1993) and explains problems related to some human behaviors, such as collaboration (Bortkus, Davis 2010, p. 44). J. Nahapiet and S. Ghoshal claim that social capital is also necessary for the development and dissemination of knowledge in organizations (Nahapiet, Goshal 1998).

The factors described above in the scope of the human resources dimension in the organization are also considered to be an important area influencing the introduction and development of BPM in public organizations.

Research Methodology

In order to identify the occurrence of factors from the area of HRM in the public administration offices, perceived as the determinant of BPM introduction, a survey was conducted. It was carried out in the community offices (as an example of public administration offices) of the Warmian-Mazurian voivodship. The survey questionnaire contained questions regarding the occurrence of factors from different areas, including HRM.

In the HRM area the questionnaire contained 17 factors:

F1 – Young age of the office's employees,
F2 – Short work experience of the office's employees,
F3 – Constant improvement of employees' competences (in non-managerial positions),
F4 – Constant improvement of managers' competences in the field of managing the office,
F5 – Precise description of the scope of duties, rights and responsibilities of each workplace in the office,
F6 – Planning employment in the office based on the analysis of the optimal demand for employees in each department (in relation to the amount of work actually performed),
F7 – Conducting employee satisfaction surveys at the office,
F8 – Using the results of employee satisfaction surveys to improve the quality of management at the office,
F9 – Limited formal control,
F10 – Encouraging the office's employees to increase their independence,
F11 – Undertaking actions to increase the involvement of the office's employees,
F12 – Public rewarding and recognition of the achievements of the office's employees,
F13 – Undertaking actions to improve internal communication in the office,
F14 – Encouraging the office's employees to knowledge sharing and teamwork,
F15 – Creating a climate conducive to changes in the office,
F16 – Initiating changes in the office (except for changes imposed by law),
F17 – Building process awareness of the office's employees.

These factors were evaluated on a five-point Likert scale (The respondents could evaluate the occurrence of different factors from the HRM area in a given community office, where: 1— a factor does not occur, 2— a factor occurs to a small extent, 3— a factor occurs to a medium extent, 4— a factor occurs to a big extent, 5— a factor always occurs). The person responding to the questions in every community office was the office secretary (secretary) and a person designated by the secretary, with – in the secretary's opinion – experience in BPM implementation in the office. The factors considered in appointing the secretaries as the respondents included their position in the office organisational structure and the scope of their responsibilities, which often required comprehensive knowledge, among other things, on the office operations, management methods and concepts used in the office or the object of activities of its different units.

The study was carried out in 2017. The questionnaire was sent to the respondents by mail or delivered to the offices personally.

All of the community offices from the Warmian-Mazurian voivodship (116) were included in the survey: 67 community offices of rural type (RCO) (57.7% of the total population), 16 community offices of urban type (UCO) (13.8%) and 33 community offices of urban-rural type (U-RCO) (28.5%) The final study sample included 99 community offices and the RCO were a large majority of them (55.7%) They were followed by U-RCO (28.9%), and the UCO accounted for the smallest group (15.4%) in the sample. So, the responses of various degree of completeness were received from 99 offices (198 completed questionnaires), which gives a response rate of 85%. 194 questionnaires – 97

pairs from different offices – were qualified for further analysis. Therefore, the final number of respondents was 194. The empirical material from the selected questionnaires was entered into an electronic database and analysed in the IBM SPSS Statistics 24.

Considering common method bias (CMB), the Brewer's Split Sample Method was used, when constructing the questionnaire (Brewer 2006). To eliminate CMB, one of the assessed aspects, i.e. the type of the community office, was an objective administrative data and only the assessment of the occurrence of individual factors from the HRM area depended on the respondents' opinions (Podsakoff et al. 2012; Jakobsen and Jensen 2015). Moreover, as it was mentioned before, the questionnaire was addressed to two people (the secretary and the person designated by the secretary) with sufficient specialist knowledge, so that the answers to the questions did not relate to vague concepts (MacKenzie and Podsakoff 2012). Also, the respondents were to assess the present occurrence of factors, which should also reduce the risk of the discussed error. As a next step, the Cronbach's alpha test, the Kaiser-Meyer-Olkin test and the Barlett's test were conducted (Table 1)

Table 1: Measures properties

Variable	Cronbach's Alpha Test	Kaiser-Meyer-Olkin Test	Barlett's Test *
HRM	0.878	0.806	1860.368

** $p < 0.000$.*
Source: Own work based on research results.

Thanks to the Cronbach's alpha and Kaiser-Meyer-Olkin test results obtained, the reliability of the research tool was confirmed. The authors are aware that the factors selected for the study are correlated with one another. However, this is due to the fact that they relate to one phenomenon occurring in an organization. The purpose of the study, however, was not to indicate their relationship but to identify their occurrence and to evaluate them in context of their influence on using BPM in the researched community offices.

Finally, a one-way analysis of variance for independent samples was conducted (by the statistic method developed by R. Fisher) in order to verify whether individual types of community offices differed with respect to the occurrence of the individual factors from the area of HRM.

Research Results

In the Table 2 the results of the one-way analysis of variance for independent samples are presented. The *F* coefficient is slightly higher than 1, which means that it is statistically significant. However, for the Human Resource Management area there are differences at a statistical tendency level, depending on the type of the office (η^2=0,03)

Table 2: The result of a one-way analysis of variance for independent samples

Variable	Type of a community office	M	SD	LL	UL	*F*	*p*	η^2
HRM aspect	urban	3,64	0,09	3,45	3,83	2,86	0,060	0,03
	urban-rural	3,46	0,07	3,33	3,6			
	rural	3,39	0,05	3,29	3,48			

Where: M - mean, SD – standard deviation, LL - lower limit of the 95% confidence interval, UL - upper limit of the 95% confidence interval, *F* - result of the Fisher test, *p* statistical significance, η^2 - effect size.
Source: Own work based on research results.

The average answers given by the respondents were in each case higher in the offices of urban type than in the entities of other types. Also, the respondents from offices of urban-rural type provided, on average, higher answers within the HRM area than the respondents from entities of rural type. In order to depict the disproportions between the offices of different category a frequency analysis for the factors related to HRM was performed. The principle was adopted that a factor is qualified as "being present" in a given type of the office on condition of the sum of respondents' declarations on its big and absolute (the factor is regarded as "absolute" if the response is "a factor always occurs") occurrence (score 4 and 5 on the numerical scale in the questionnaire) being higher than 50% (Table 3)

Table 3: Frequency of indications of the occurrence of specific factors from the HRM area in the community offices from the Warmian-Mazurian voivodship (in %)

F	Type of a community office														
	Urban					Urban-rural					Rural				
	Given answers					Given answers					Given answers				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
F1	-	-	46,7	46,7	6,6	-	3,6	58,9	32,1	5,4	-	6,5	58,3	33,3	1,9
F2	-	26,7	40	33,3	-	1,8	30,4	67,8	-	-	2,8	33,3	45,4	16,7	1,8
F3	-	6,7	23,3	33,3	36,7	-	3,6	28,6	46,4	21,4	2,8	4,6	17,6	63	12,0
F4	-	-	16,7	63,3	20,0	-	7,1	17,9	58,9	16,1	-	-	32,4	53,7	13,9
F5	-	-	3,3	40	56,7	-	3,6	5,4	55,3	35,7	-	1,8	9,3	53,7	35,2
F6	-	6,7	13,3	40	40,0	-	7,1	14,3	57,1	21,5	1,8	5,6	26,8	46,3	19,5
F7	30	23,3	16,7	16,7	13,3	35,7	25	35,7	1,8	1,8	34,3	26,8	17,6	16,7	4,6
F8	26,7	26,7	23,3	10	13,3	35,7	19,7	33,9	8,9	1,8	35,2	25,9	21,3	14,8	2,8
F9	-	26,7	66,6	6,7	-	7,1	17,9	60,7	10,7	3,6	8,4	25	52,8	12	1,8
F10	-	-	26,7	50	23,3	3,6	7,1	25	48,2	16,1	0,9	2,8	39,8	47,2	9,3
F11	-	-	30	50	20,0	-	5,4	35,7	41,1	17,8	-	7,4	34,3	46,3	12,0
F12	-	6,7	53,3	16,7	23,3	3,6	14,3	39,2	28,6	14,3	9,3	17,6	33,3	17,6	22,2
F13	-	3,3	30	43,4	23,3	-	10,7	21,4	46,4	21,5	0,9	13	31,5	38	16,6
F14	-	3,3	16,7	56,7	23,3	-	1,8	14,3	58,9	25	-	8,3	28,7	40,8	22,2
F15	-	-	33,3	46,7	20,0	3,6	5,4	19,6	35,7	35,7	1,8	6,5	29,6	41,7	20,4
F16	-	6,7	30	46,7	16,6	3,6	5,4	41,1	33,9	16	-	10,2	32,4	47,2	10,2
F17	3,3	6,7	33,3	36,7	20,0	3,6	10,7	23,2	37,5	25	2,8	15,7	31,5	33,3	16,7

Where: F- Factor; 1—a factor does not occur, 2—a factor occurs to a small extent, 3—a factor occurs to a medium extent, 4—a factor occurs to a big extent, 5—a factor always occurs. F1–F17—are the abbreviations of the factors listed in "Research methodology" section.
Source: Own work based on research results.

The result of the analysis of variance suggested a relationship at the level of statistical tendency, and the means of answers given by respondents from each type of offices were similar (3.64 in the case of respondents from the community offices of urban type, 3.46 in the case of respondents from the offices of urban-rural type and 3.39 for respondents from the offices of rural type) (Table 2) The obtained results gave rise to the assumption that, most likely, it will be possible to observe slight differences in the occurrence of HRM factors between various types of the examined offices of the Warmian-Mazurian voivodeship. In the course of the analysis, 12 factors characteristic for the community offices of urban type, 10 factors for urban-rural type and 10 factors for type were identified. Factors in the HRM area determining the process management in offices, which, according to the respondents' declarations, were recognized as characteristic for all types of the researched entities, were: a precise description of the scope of duties, rights and responsibilities of each workplace in the office (F5 — 96.7% of respondents from UCO, 91.0% of respondents from U-RCO and 88.9% of respondents from

RCO), constant improvement of employees' competences (in non-managerial positions) (F3 - 70% UCO, 67.8% U-RCO and 75% RCO), constant improvement of managers' competences in the field of office management (F4 - 83.3% UCO, 75% U-RCO and 67.6% RCO), planning employment in the office based on the analysis of the optimal demand for employees in each department (F6 - 80% UCO, 78.6% U-RCO and 65.8% RCO), encouraging the office's employees to increase their independence (F10 - 73.3% UCO, 64.3% U-RCO and 56.5% RCO), undertaking actions to increase the involvement of the office's employees (F11 - 70% UCO, 58.9% U-RCO and 58.3% RCO), undertaking actions to improve internal communication in the office (F13 - 66.7% UCO, 67.9% U-RCO and 54.6% RCO), encouraging the office's employees to knowledge sharing and teamwork (F14 - 80% UCP, 83.9% U-RCO and 63% RCO) and creating a climate conducive to changes in the office (F15 - 66.7% UCO, 71.4% U-RCO and 62.1% RCO)

Factors recognized as characteristic only for certain types of offices were: building process awareness of the office's employees (e.g. making subordinates aware that the work they perform is a repetitive process running across the office) (F17 - 56.7% of respondents from UCO, 62.5% of respondents from U-RCO and 50% of respondents from RCO), young age of office employees (F1 - 53.3% UCO, at 37.5% U-RCO and 35.2% RCO) and initiating changes in the office (apart from changes imposed by law) (F16 - 63.3% UCO, 57.4% RCO at 49.9% U-RCO)

In turn, recognized as factors not appearing in the community offices of the Warmian-Mazurian voivodeship, as determined on the basis of the declarations of representatives were: short work experience of employees in the office (F2 - 33.3% of respondents from UCO, lack of respondents from U-RCO and 18.5% of respondents from RCO), conducting employee survey on satisfaction from work in the office (F7 - 30% UCO, 3.6% U-RCO and 21.3% RCO), using the results of employee survey on satisfaction from work in the office to improve the quality of management in the office (F8 - 23.3 % UCO, 10.7% U-RCO and 17.6% RCO), limited formal control (F9 - 6.7% UCO, 14.3% U-RCO and 13.8% RCO) and public rewarding and appreciating achievements of employees (F12 - 40% UCO, 42.9% U-RCO and 39.8% RCO)Similarities and differences in the occurrence of individual HRM factors in the community offices from the Warmian-Mazurian voivodship, depending on their type, are presented in Figure 1.

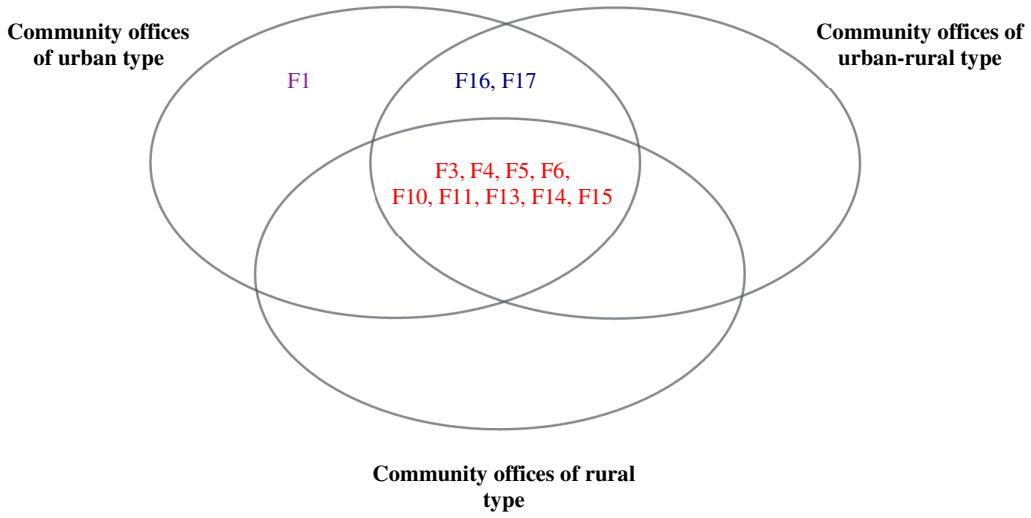

Fig. 1: Similarities and differences in appearance of different factors in the HRM area in the community offices from the Warmian-Mazurian voivodship, concerning the office type.
Where: F1-F17 are the abbreviations of the factors listed in "Research methodology" section.
Source: Own work based on research results.

In the area of HRM, one could specify nine factors characteristic for all types of the community offices from the Warmian-Mazurian voivodship. Two factors were specific only for the urban and urban-rural community offices, and one factor only for the urban ones.

Discussion

Based on the research, the occurrence of individual HRM factors in the public administration offices was identified.

The factors present in all types of the community offices in the Warmian-Mazurian voivodship, and thus recognized as characteristic for these entities, included, among others, precise description of the scope of duties, rights and responsibilities of each job position in the office. This is a factor related to the construction of the organizational structure. The analysis of the organizational structures of offices can be made on the basis of such dimensions as: specialization of functions and roles, centralization of power, configuration of structures and roles, formalization of documentation and standardization of procedures (Pugh, Hickson 2007, p. 13). S. Richards drew attention to the importance of this element to the introduction of BPM in public administration. She presented the approach to the structure of offices based on changes in the provision of public services and administrative development (Richards 2006).

Another factor occurring in all types of the examined offices is having the employees (occupying non-managerial positions) continuously improve their competences, and managers continuously improve their competences in the area of office management. M. Hammer drew attention to these factors as important elements when introducing BPM to an organization, describing them as the key organizational abilities determining process advancement. This applies, among others, to skills in designing processes, process reconstruction, process management, as well as the use of process change methods in an organization (Hammer 2007, p. 114).

An important factor influencing the process approach is also having the management take actions to improve internal communication at the office and to encourage sharing of knowledge and teamwork. This can have a significant impact on the transfer of information (Krackhardt, Hanson 1993) and implementation of organizational activities (Shah 2000), which in turn affects one of the elements supporting process management, i.e. team cooperation.

Based on research conducted among public sector employees in Great Britain, R. McAdam and J. Donaghy (1999), found that increasing employee involvement and empowerment was one of the factors contributing to success in introducing BPM into public administration. S. L. Caudle (1995) also points to the importance of having management encourage office employees to increase their independence and take actions to increase their involvement, having distinguished six groups of key factors for the implementation of BPR in public organizations (Caudle 1995; Steiss 2003, p. 144) In the conducted research, these factors were considered characteristic for all types of the researched community offices. S. L. Caudle (1995), and R. McAdam and J. Donaghy (1999) also point to the practice of managing change. It may have a positive impact on the creation of the atmosphere supporting changes in the offices by the management, which, according to the presented studies, is a factor affecting BPM. The organizational culture of the office also undoubtedly influences the atmosphere supporting changes related to BPM in the organization. This is emphasized in many studies presented in the literature (Hammer 2007, p. 114; Siemiński, Krukowski 2011)

Conclusion

Based on the research results presented above, it can be concluded that BPM is primarily influenced by the community offices' management in terms of constant improvement of their competences and also by ensuring the continuous development of employees within offices, providing an organizational environment that increases their responsibility, independence in operation and acceptance of changes.

This is confirmed by high evaluation of occurrence of the constant improvement of employees' competences (in non-managerial positions) as well as the competences of managers in the field of managing the office. This is very important when it comes to implementing BPM within organizations.

The following are less common in the researched community offices: conducting employee satisfaction surveys within offices, using the results of employee satisfaction surveys within offices to improve the quality of management, limited formal control and public rewarding and appreciating achievements of employees. Thus, it can be noted that the municipal offices are characterized by a strong formal control system, the potential for employee satisfaction surveys is unused and people employed within the offices are rarely rewarded publicly for their achievements. This poses a risk of a negative impact on employee motivation to perform their duties required by the positions they occupy. Therefore, these factors can significantly hinder the implementation of process solutions in the researched offices.

Although, in the authors' opinion, the results of the presented study could be used in the assessment of the entire population of the community offices in Poland, the seize of the research sample could be perceived as a limitation of the conducted survey. Thus, the research could also be carried out in other voivodships of Poland, in order to compare the obtained results. Moreover, according to the results of the conducted research, it cannot be said that the type of examined offices differentiates the occurrence of individual features within the HRM. Therefore, an attempt to determine whether e.g., there is a relationship between the level of process maturity of the community offices and the specific features of HRM, could be perceived as an interesting direction of further research.

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Food Cooperatives as A Development Opportunity for Family Farms in The Globalized Economy – Does Size Matter?

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Abstract

Food cooperatives are a kind of informal cooperative whose members collectively buy food products directly from producers, aiming to shorten the supply chain as much as possible and eliminate intermediaries appearing between family farms - the food producer and the consumer. The aim of the study is to analyse and evaluate the functioning of cooperatives as an opportunity for development for family farms in a globalised economy depending on their size and organizational complexity. In order to achieve the objective, a diagnostic survey method was used, in which a questionnaire technique was applied - using a previously validated questionnaire on the functioning of two different cooperatives. The research revealed significant differences between them. The degree of organisation and number of members (the size of cooperative) affects the activity of their members and the effects of their activities.

Keywords: Cooperatives, Food Cooperatives, Cooperative Movement

Introduction

Cooperatives are not new, with a long and rich history globally. The history of cooperative activity, i.e. social, economic cooperation, is more than a hundred years old in Europe. Consumer cooperatives began to emerge in the mid-19th century, near Manchester, England and quickly spread to many countries: Switzerland, Italy, Finland, Slovak Republic, Scandinavia, Great Britain and Poland. By the mid-2000s, food cooperatives experienced growth-driven, intense consumer interest in alternatives to a market system that might not serve their needs. The Silesian region (and especially Upper Silesia) and Opole province in Poland are known for the tradition of a strong and multidirectional association and cooperation movement.

A food cooperative is a kind of informal cooperative where members jointly buy food products directly from producers - mainly farmers and small processors. These cooperatives are bottom-up, informal movements, created on the basis of cooperation of a group of people interested in obtaining natural, healthy, fresh, safe, free of contaminants and preservatives additives, unprocessed food from proven sources. They are becoming more and more popular as consumers nowadays are increasingly putting in the first place requirements for food safety and nutrition, prevention and treatment of diet-related diseases (Hoyt, 1983; Deller et al.,2009).

The purpose of cooperatives is not profit, but obtaining the food of best quality, thanks to trusted cooperation, not necessarily with an ecological certificate. This distinguishes this form of operation from healthy food shops or online platforms that enable the purchase of food from local farms. An important assumption in the cooperative's activities is maximum shortening of the supply chain and elimination of intermediaries appearing on the way between the farmer - food producer and recipient - consumer (Herbst, 2013). For cooperative members, this means direct access to products from

sustainable crops. Family farms, on the other hand, are more likely to sell their crops and have higher margins.

The aim of the study is to analyse and evaluate the functioning of food cooperatives. For this purpose we used the diagnostic survey method with previously validated questionnaire, concerning the functioning of cooperatives from the perspective of buyers. The study involved 50 buyers from two cooperatives – one operating in the Śląskie Voivodeship (20) and one in the Opolskie Voivodeship (30) in Poland. The buyer survey (CAWI) was conducted in: November-October 2018 (Opole cooperative) and April-May 2019 (Gliwice cooperative). Participation in the research was anonymous and voluntary.

Background

The initiators of cooperatives are usually consumer groups interested in obtaining healthy, good quality food from a known source (Fjeld et al., 1983). Through this type of activity, they want to support organic farming, small family farms, promote sustainable agriculture and introduce the principles of deep ecology into everyday activities (Phillips, 2012). Their goal is also to create bonds based on shared responsibility for the environment and respect for the farmer's work. The initiators of the cooperation may also be farmers who will create an initiative group and propose the delivery of goods on the forum related to healthy food, dietetics or childcare. The creation of producer groups dealing with organic production, which have a greater chance of finding regular customers and regular sale, is becoming increasingly common (Jarosz, 2000). Food cooperatives serve as important business organizations that contribute to the increase in the density of local food networks and relations. Food cooperatives can be treated as the implementation of the principle of co-management at the local level, where this concept seems to have the widest field of application (Katchova and Woods, 2011).

The possibility of obtaining products from certified organic farms that provide certainty about the lack of chemical plant protection products and environmentally responsible, sustainable cultivation and breeding plays an important role in the operations of cooperatives. However, the co-operators often also decide to cooperate with farms that are not ecologically certified and declare traditional production. In such cases, however, the farm is verified by the members of the cooperative for compliance with the declared production.

The members of the cooperative act voluntarily and democratically share the functions in the cooperative. Cooperative activities may include: collecting orders, establishing contacts with farmers, farm verification, coordinating orders, picking up goods, delivering to a distribution point, distribution, cleaning works, settlements, website maintenance, etc. The selection of functions can be fixed or rotational. Some cooperatives write in the statute the amount of time a member is obliged to work for a cooperative, others modify their assignments on an ongoing basis (e.g. Cracow Wawel Cooperative, Poznan Food Cooperative). Many cooperatives specify a membership fee or an additional, small fee (voluntary or obligatory) charged for each transaction that is to be credited to the fund supporting the cooperative's activity (Bilewicz and Potkańska 2013).

Cooperatives differ in their operating principles. Some are focused primarily on supporting local agriculture and educational activities, combined with a practical element of buying healthy food. Others focus only on acquiring and distributing products ordered by their members (Cheney, 2001; Azevedo and Gitahy, 2010).

Potential suppliers of cooperatives are sought out through local farmers' associations, agricultural advisory centres, direct contact and websites related to ecological and traditional production. The selected farm is verified in terms of the way in which it operates, the area under cultivation and the variety of products. The farmers cooperating with the cooperative are both large organic farms and small family farms whose owners sell only overproduction from a given season to the cooperative. Some of the cooperatives collect products directly from the farms, others prefer to transport the products to a specific place where they are either directly distributed among the recipients, or divided, packed and picked up at designated times. There are also cooperatives (e.g. Kooperatywa 'Dobrze'),

which run their own shops with products obtained from cooperative activities. From the point of view of some members of the cooperative, it is also important to be able to transport products to the recipient's home. Especially in the case of mothers with small children, the elderly or the disabled. As the results of other authors show, these are groups whose representatives are mainly members of cooperatives (Zepeda and Leviten-Reid, 2004). In addition to food distribution, the cooperative enables its members to establish new social contacts, exchange views and implement joint local initiatives.

Conducting educational activities reduces conflict situations resulting from ignorance of the specificity of crops and their seasonality, improper storage or misuse of products by cooperative members. It also affects the deepening of positive relationships between suppliers and customers.

Research Results

In the Opolskie Voivodeship, there is the "Opole Food Cooperative O-Ko-Spoko", founded in 2015. Initially, it accepted the active participation of cooperative members in cooperative tasks (such as: contact with farmers and cooperative members, creating orders, collecting payments and transferring them to the farmer, controlling order performance). From 2018, the cooperative gave up coordinated orders. Farmers independently, using the order forms on the cooperative's Facebook profile, collect the orders for their products. The Cooperative does not collect compulsory contributions or entry fees from its members. Products are usually delivered by farmers to the delivery place at certain times, where prepayment people can collect them. Since November 2018, there are two parts of the cooperative - the Opole Food Cooperative (traditional cultivation) and the Opole Eco-Cooperative. In the first part, it is possible to offer products without ecological certificates, in the second part, only organic farms can sell. The current number of members of the cooperative is 3.7 thousand in the organic part and 492 in the traditional part (they are also organic).

There is a "Tomata" in the Śląskie Voivodeship - Gliwice food cooperative, which was established in November 2014. It currently has about 60 members, at least 1/4 of whom have been in it since the very beginning. New members are still applying to the cooperative, but at the moment the cooperative does not accept new members, as you can read on the website - for organisational reasons. In the cooperative, each member has an equal say in organisational matters and is obliged to work two hours a month for the cooperative(regardless of the number of products purchased). The basic task that can be performed by a member of the cooperative is to work on packing and releasing parcels during weekly purchasing actions. They are the basis of the cooperative's activity. During these actions, which are carried out every Friday and Saturday, orders are placed via the Internet system and on Thursday evenings the ordered products are collected. The cooperative has a so-called fund of collection, which consists of payments for the entry fee and 10% of the order value, calculated for each purchase. In exceptional cases, this amount is increased, reduced or cancelled according to the regulations. The funds are used to cover the costs of functioning of the cooperative - purchase of scales, crates, bags, bank account costs or refunds of travel costs to suppliers, etc. With the consent of all members of the cooperative, the money may also be used for social purposes. Higher amounts can also be paid into a collection fund on a voluntary basis. Cooperative members pay for their purchases on receipt of products. There is no minimum amount to be ordered per unit of time. The characteristics of the respondents are presented in Table 1.

Table 1 : Characteristics of respondents (buyers)

Specification	Opole coop		Gliwice coop	
	Number	Percentage [%]	Number	Percentage [%]
Sex				
Woman	27	90,00	20	100,00
Man	3	10,00	0	0,00
Total:	**30**	**100,00**	**20**	**100,00**
Age				
up to 20	0	0,00	0	0,00
21-30	10	33,33	0	0,00
31-40	15	50,00	13	65,00
41-50	5	16,67	6	30,00
over 50	0	0,00	1	5,00
Total:	**30**	**100,00**	**20**	**100,00**
Place of residence				
village	12	40,00	1	5,00
city with less than 20 thousand inhabitants	2	6,67	1	5,00
city of 20 to 100 thousand inhabitants	0	0,00	1	5,00
city of 101 to 200 thousand inhabitants	16	53,33	17	85,00
Total:	**30**	**100,00**	**20**	**100,00**
Average monthly earnings per capita in euros				
< 410 euros	5	16,67	0	0,00
410- 470 euros	0	0,00	6	30,00
470 –700 euros	15	50,00	6	30,00
over 700 euros	10	33,33	8	40,00
Total:	**30**	**100,00**	**20**	**100,00**

Source: own study.

In the case of the Opole cooperative, the largest group among the respondents belonged to the cooperative one year and longer (60%), of which 10% were people belonging to the cooperative 3 years and longer. Among the respondents there were 2 people with an cooperative experience of 6 and 8 months. An internship of 2 months was declared by 5 out of the respondents (17%). In the case of the Gliwice cooperative, the largest group among the respondents included people who belonged to the cooperative for a year and longer (90%), of which as many as 75% were belonging to the cooperative for 3 years and longer. Among the respondents there were 2 people with cooperative participation period of 8 months and less.

The respondents in both cooperatives explained the reasons for joining the cooperative in the following way: "access to healthier, organic food", "because it is easier, more reliable and cheaper", "because of the desire to buy healthy food products after the birth of a child", "searching for products good quality from people with passion "," food allergies at home, looking for vegetables without chemicals "," access to healthy food, no intermediaries, quality of products "," interesting / unique products ","quality of food and awareness of how, where and by whom it is produced (...) because of the little children I wanted to feed my children healthily "," I have bought some products in organic stores, but due to their high price, I stopped at several products. In the cooperative I buy high-quality products, and due to their "normal" price, they already constitute about 80% of products bought every week ".

The respondents from the Gliwice cooperative also emphasized among the reasons for joining the cooperative its role in creating a community of people who share the same values: "(...) and also to meet interesting, thinking people (what succeeded!)", "Because of the direct access to healthy local food and for the sake of the community "," local suppliers, nice atmosphere, sense of community in relation to the desire to buy better quality food ". This group of respondents also indicated as a motive for joining the cooperative supporting local farms: "we liked the assumptions of cooperation, supporting local farmers and small producers".

As for the frequency of purchases of respondents from the Opole cooperative, 60% of respondents make purchases at least once a week, and 17% on average twice a month. 23% of respondents make purchases less than once a month. None of the respondents gave the answer "once a month". In the Gliwice cooperative, 85% of respondents make purchases at least once a week. Shopping frequency of "twice a month", "once a month" and "less than once a month" indicated by 1 person (5% each).

Among the most frequently purchased products via the cooperative, the respondents indicated fruit and vegetables (100% in the case of the Gliwice cooperative and 83% in Opole) as well as fruit and vegetable preparations (70% in the Gliwice cooperative and 83% in Opole). In this question, the respondents could choose more than one answer, hence the sum of individual responses exceeded 100%. Other products could also be mentioned in the question. Therefore, the respondents of both cooperatives indicated: eggs, meat, sausages, dairy products (goats, cows), honey and bread. In addition, the respondents of the Gliwice cooperatives also ordered sheep's dairy products, xylitol, oils, essential oils, dried fruits, flour, coffee, tea, peanut butter, hummus, dried fruits, groats, rice and even cosmetics, washing and dishwashers powders.

The respondents were also asked if there are products that they want to buy through cooperatives and they are currently not available. The answers to this question in the case of the Opole cooperative included the following products: organic pork and beef, brassicas, butter, sprouts, milk, cow cheese, silage and sliced honey. In the Gliwice cooperative, they were: organic apples, vegetarian patties, fruit vinegars or cranberry. Over half of the respondents (57% and 65% respectively) indicated that there are no such products that they would like to buy and are not available.

The vast majority of respondents in both cooperatives most often orders products via order forms placed on the cooperator's Facebook profile - 77% for the Opole cooperative and 95% for the Gliwice cooperative. Among the respondents, 16% and 5% declared ordering through an intermediary, respectively, by writing in the comments under the post of the person collecting the order. In the Opole cooperative, one person chose the answer "telephone orders" (6.7%).

To the question: "Which form of order pick-up is the most suitable for you?" in the case of both cooperatives, most of the respondents answered: "transport to an agreed place once or several times a week". (66.7% in the Opole cooperative and 75% in Gliwice). Delivery to a local shop or distribution point was indicated by 27% of respondents belonging to the Opole cooperative and 15% to the Gliwice cooperative. One respondent in each cooperative used the option to enter the answer "other" and entered "delivery to the place of residence". One of the respondents in Gliwice chose the answer: "collection directly from the farm".

The respondents were also asked if they were interested in the possibility of ordering products in advance (cultivation on request). Half of the respondents expressed such a desire, while the other half was not interested in this form. In Gliwice, this proportion was 75% and 25% respectively.

To the question "Are you interested in trainings or meetings with farm owners to discuss deliveries, specificity of cultivation or breeding, presentation of the farm, organization of workshops or other forms of cooperation?" in the Opole cooperative a large majority of respondents (87%) answered "no". Persons who are interested in this type of cooperation (13%) indicated the following forms of cooperation: meetings with farm representatives in order to present the offer or establish the principles of cooperation and the specificity of crops and animal husbandry, organization of workshops and visits to farms. Most of the respondents (83%) are also not interested in other forms of activity in rural areas

(herbal and gastronomic workshops, participation in farm work, activities for children). People interested in such activities (17%) indicated herbal and catering workshops, activities for children. Completely different results were obtained in the case of the Gliwice cooperative. Those not interested in training or meetings with farm owners were only 50%. Those surveyed in 85% are interested in additional forms of activity in rural areas. Among the activities that interest them, they mentioned herbal and gastronomic workshops, activities for children, but also cheese workshops, bread baking.

When it comes to the benefits of cooperation between a farm and a food cooperative from the point of view of buyers, all respondents in both cooperatives indicated access to healthy food. Among the respondents, 83% of the Opole cooperative and 95% of Gliwice also indicated the possibility of making purchases from reliable suppliers, and 33% and 70% respectively emphasized the low price. In this question, the respondents could choose more than one answer, hence the sum of individual indications for each cooperative exceeds 100%. In addition to the question, other benefits could be mentioned. This opportunity was used by two respondents of the Opole cooperative who entered the following answers: "shortening food storage time, supporting local initiatives, development of local small farms" and "new acquaintances, cool relations" and five members of the Gliwice cooperative who entered the answers: "emerging community "," a group of friends who is supportive and with which you can take various initiatives "," supporting local farmers ","crops for our needs and guaranteeing their sale (for a farmer) "," advice ".

The respondents were also asked to indicate the biggest inconveniences in the functioning of the cooperative. Purchasing after reaching the minimum number of orders (46.7% for Opole cooperative and 40% for Gliwice) was often the chosen answer in both cooperatives. Every third respondent from the Opole cooperative and 55% of the respondents from the Gliwice cooperative indicated periodic shortages of products as an inconvenience. The need to come to pick up products to a specific place and at a certain time is burdensome for 27% of the respondents of the Opole cooperative and 40% of the Gliwice cooperative. One in ten respondents from the Opole cooperative indicated the need to order larger quantities of products as an inconvenience. In the Gliwice cooperative this is an inconvenience for 40% of respondents. Only for two respondents of the Gliwice cooperative, the variability of suppliers is a problem. In this question, the respondents could choose more than one answer, hence the sum of individual indications exceeds 100% for both cooperatives. In this question, it was also possible to enter the answers in the "other" field. The members of the Gliwice cooperative pointed out: "unpredictable deficiencies in previously ordered goods, and thus difficulties in planning grocery purchases at home" and "sporadic problems with receiving goods from suppliers or lack of hands to work during purchasing actions."

Respondents were also asked to indicate opportunities and barriers to the development of cooperatives. Among the barriers, the respondents from the Opole cooperative mentioned: rising prices of organic food, various member involvement, a limited number of farms cooperating with cooperatives, irrelevancy of buyers, insufficient quantities of products at greater interest, high prices, poor advertising, lack of extensive knowledge in society about the functioning of cooperatives, not convenient forms of receiving orders, preferring to order using forms.

In the case of the Gliwice cooperative, the following barriers were given: "(...) there must be people who manage everything, sometimes it is difficult to find volunteers, because it is really a lot of work", "housing restrictions (...) it would be easier for us to organize ourselves having our own premises (the issue of storage) , storage, packaging, etc.) "," the inability to function as an official, legal entity "," the lack of a sanctioned method of operation of such organizations. Not every cooperative can afford - primarily organizationally (people's working time, accounting, etc.) to operate within an association, cooperative or foundation. Everything also depends on people, because the cooperative is based on cooperation. Despite the fact that on the one hand people want to buy, they don't always want to work for the benefit of the local community "," achieving maximum members (logistic maximum) and inability to accept new members."

Among the opportunities for development, respondents from both cooperatives indicated a desire to lead healthy lifestyles, a fashion for organic farming as an alternative to unhealthy food from

supermarkets, and increasing consumer awareness of product quality. According to one of the respondents, more and more people are using cooperatives and the growth of such initiatives raises the ecological awareness in society. The opportunity for the development of cooperatives is therefore not only to expand the range of food products, but also to "introduce cosmetics, clothes, everyday items, etc.". One of the respondents pointed to the possibility of developing the cooperative by "establishing cooperation with a larger group of farmers and creating a local collection point open several days a week or a special cooperative shop". An alternative solution could be to include small local shops in the operation of the cooperative.

Conclusions

As the results of the research have shown participants in food cooperatives are mostly women between 31-40 years of age, living in large cities with average incomes and higher than average incomes. This is consistent with Tremblay et al. findings (2019). Most of the respondents place their orders once a week. Among the products ordered, fruit, vegetables and products made of fruit and vegetables prevail. The vast majority of respondents in both cooperatives most often order products through order forms placed on the Facebook profile of the cooperative. The preferred form of order pick-up for the respondents is transport to the agreed place once or several times a week. The greatest inconveniences in the functioning of the cooperative were the execution of purchases after reaching the minimum number of orders, periodic shortages of products and the necessity to come to a specific place and time to pick up products.

The main benefits of participation in the food cooperatives on the consumer side according to respondents include: access to high-quality food obtained directly from the farmer; the possibility of verifying the ways in which the food is grown and reared; impact on the quality of the products; direct contact with the producer, possibility of obtaining additional information about the product; lower prices than in healthy food shops; freshness of products - short time from harvest to delivery; permanent cooperation with selected farms and possibility to participate in additional activities on the farm. This is consistent with Djuwendah et al. (2019) results.

The research revealed significant differences in the functioning of both cooperatives. The degree of organisation and number of members (the size of cooperative) affects the activity of their members and the effects of their activities. The creators of the Gliwice cooperative (the small one – only 60 members) wanted to create a group consisting of people who have a chance to get to know each other, cooperate closely with each other and feel responsible for their current activities, which is not supported by the excessive number of members - hence the limitation of the number of members of the cooperative. The members of the cooperative share common values, as well as a desire to support local farmers. In the case of the Opole cooperative, that has about 3.7 thousand members, it should be noted that the role of the cooperative has been narrowed down to a purchasing platform through which farmers can gather orders for the products they offer. Hence the low number of active members and the small number of initiatives concerning jointly undertaken activities. Cotterill (1983) has come to similar conclusions testing the hypothesis for retail food cooperatives that ‘small is beautiful’. Muatip et al. (2019) have also come to this conclusion.

From the farmers' point of view, however, cooperatives are becoming a new and interesting market, not requiring high costs associated with advertising or promotion of products. They allow to build a permanent network of loyal customers and sell excess production for own needs, or even production to order of a cooperative with a sales guarantee. The obtained prices are significantly higher than in the purchase points and fairly reward the farmer's workload; at the same time, they are still lower than in the shops with organic food - thanks to avoiding intermediaries (see Wang et al., 2019). Cooperatives act as social entrepreneurs, effecting positive changes in their host communities. As seen in some cases, food cooperatives serve as a catalyst in their communities, evolving and changing into social enterprises and influencing the economic and community development, helping foster economic self-sufficiency of rural areas (Ertör-Akyazi, 2020). Cooperatives can also contribute to the preservation of traditional farms, traditional and regional products, old plant varieties and animal species. It is important to note

that one crucial part of smart community development is fostering economic sustainability (Phillips, 2014; Asian et al., 2019).

According to Dantas (2020), food cooperatives can be effective in the context of development of family farms and communities in rural areas, but this requires that a number of extremely important conditions in the operation of cooperatives are met in order to build long-term cooperation between farmers and consumers (Gomez et al. 2020). Excessive growth of cooperatives and a high degree of concentration on purchasing activity makes it difficult to build a sense of community and mutual trust (Zepeda and Li, 2006; Enlow et al, 2011; Rosol, 2010).

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Methods of Measuring the Efficiency of Public Administration Activities in The Context of New Public Management – Perspective of Market Participants

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Abstract

The government's task is to shape an effective regulatory system in the economy and in individual markets. This means implementation of tasks supporting markets, aimed at increasing their transparency and efficiency. At the same time, the processes of globalization, technical progress (e.g. the concept of e-government) and new management methods may favor the increase in the effectiveness of the market mechanism and create the need to search for directions of necessary transformations of the public sector. A number of actions are being undertaken to improve the delivery of public services. The aim of the article is to present CAF and BSC as methods of assessment the efficiency of public administration activities from the point of view of market participants. First the impact of regulatory institutions on the markets and enterprises is presented. Secondly we show Common Assessment Framework (CAF) and Balanced Scorecard (BSC) as a tools for achieving high quality of services in public administration. Specific measures are presented to assess efficiency of administration activities from the perspective of business entities. Finally implementation of NPM principles on the example of Social Insurance Institution (ZUS) in Poland is presented.

Keywords: New Public Management, Common Assessment Framework, Balanced Scorecard, Public Administration Efficiency.

Introduction

The efficiency of regulatory solutions depends on the quality of individual institutions and their mutual alignment and interoperability. In terms of the new institutional economy, institutions are understood very broadly as the rules of the game shaping relations between various entities (actors) in the economy. They constitute limitations that shape economic, social and political interactions.

According to North (1990) institutions can be divided into formal and informal. Formal institutions are rules or systems of rules created consciously and intentionally, which control or limit behaviour (legal norms). Informal institutions, on the other hand, are created spontaneously as a result of an evolutionary process and have the character of rules recognised by a given community (customs, conventions and norms, etc.). Formal institutions include regulatory institutions. They support markets and are important for economic development, regulating activities in the field of goods, services, labour, assets and financial markets (Rodrik, 2010).

The creation of regulatory institutions is closely linked to the level of development of a country. There are interrelationships between the quality of regulatory institutions and the degree of development; on the one hand, better regulatory institutions are easier to obtain in well-developed countries, and on the other, the type and nature of the institutional solutions used affect the rate of growth and development (Goranczewski et al, 2016).

As indicated by the results of empirical studies, the quality of institutions (including regulatory institutions) has a much greater impact on economic growth than the type of economic policy implemented (Olson, 1996; Snowdon, Vane, 2003). Behaviour of the actors is not the same in different institutional systems. The appropriate regulatory environment makes their actions largely predictable and reduces transaction costs. Good regulatory institutions should have specific functions, including (Building Institutions for Markets. World Development Report, 2002): supporting information flow - influencing the creation, collection, analysis, verification and transformation of information into a set of data necessary in the decision-making process of economic entities;

1) transparent definition and securing of ownership rights and contracts, taking into account the interests of all stakeholders;
2) influencing the level of competitiveness, willingness of economic entities to invest and economic growth rate.

The proper functioning of regulatory institutions affects the implementation of management processes in enterprises. It enables strategic and operational planning. Better regulatory institutions increase the effectiveness of business entities in achieving their objectives, enable faster and more complete adaptation to changing management conditions. The willingness of economic entities to undertake innovations may also result from incentives created by specific solutions in the area of regulation or deregulation. The measure of efficiency of applied regulatory solutions is the ability to adapt new trends, e.g. technical progress or knowledge diffusion process.

The efficiency of regulatory institutions can be measured in many ways, e.g. by the size of transaction costs, the ability of the system to adapt to new phenomena, generating social benefits or better coordination of economic processes in the social scale (Staniek, 2005).

As the appropriate structure of regulatory institutions forms the basis for sustainable development and economic growth, issues of improving the regulatory capacity of public administration seem important in areas relevant to the functioning of enterprises, as well as improving the quality of regulatory institutions to increase the efficiency of management processes development (Doornbos, 2003).

One of the areas of the institutional efficiency is the efficiency of public administration activities understood as the ability to provide high-quality services to citizens and enterprises.

New Public Management

In the 1980s, on the basis of criticism of Weber's theory of bureaucracy, the concept of the so-called New Public Management was created (**New Public Management, NPM**) and New Public Administration (NPA), popular in the UK, New Zealand, Australia and the USA. It assumed the introduction of management methods used in the private sector into the public sector. According to this concept, service recipients should be perceived not as supplicants but as customers. Its main determinants were (Hood, 1991):

1) professional management, strengthening management powers in the public sector;
2) refine standards and measurement of indicators of effectiveness;
3) checking results;
4) division of institutions - independence, financial autonomy;
5) promoting competitiveness;
6) use of concepts and management techniques from the private sector;
7) rationalization of expenditure.

Therefore, the NMP is a market model (also called a managerial model) in which the existence of independent and equal entities (enterprises, local governments, independent government agencies and citizens) that operate on their own account. Relations between entities are regulated by a formal contract.

From the administration perspective the NMP model is citizen-oriented (a client of public services), focused on effectiveness control (not procedures), that separates strategic and operational functions, transfers services (through public procurement) to competing non-governmental organizations, and introduces social control mechanisms. The discussed concept assumes that the purpose of public organizations is to provide services of the highest standard in the most effective manner. The measure of the quality of services is customer satisfaction, while the supply of services should correspond to the demand, which directly refers to market philosophy. The citizen is identified with the client, the buyer of services (Clarke et al., 2007; Carvalho et al., 2010; Drechsler, 2005). Within the NPM framework, four models were developed (Lisiecka & Papaj, 2008; Młodzik, 2015; Ferlie et al., 1996):

NPM Model 1 – Increase in efficiency – strives at shaping the public sector to resemble the private sector. It includes: increase of financial control; maximizing effects and reducing costs; setting transparent goals and monitoring results; development of financial and substantive audit; setting service standards and the use of benchmarking techniques; the use of questionnaires as an assessing tool; exposing the responsibility of service providers to customers; increasing market and customer orientation; implementing new corporate governance models; limiting the role of representative bodies; management accounting; moving the centre of power towards organizational cells making strategic decisions.

NPM Model 2 – Limiting the size of organization and decentralization – aims at the transition from hierarchy-based management to contract-based management. It includes: development of public service quasi-markets; increasing the role of contracting; limiting the role of hierarchical management in favour of contract management; reducing the size of the public sector and flattening organizational structures; increasing the importance of teamwork; focus on 'management through impact'; providing services characterized by diversity and flexibility.

NPM Model 3 – In search of perfection – emphasizes the organizational culture within public institutions. It includes: radical decentralization and results evaluation; focus on organizational development and organization learning; understanding the role of organizational culture in the change processes; intensive training programs for managers; emphasis on charismatic management methods; determining the mission of the organization and the image of its employee; defining development vision by organization leaders; preparation of social communication strategies.

NPM Model 4 – Orientation towards public services – aims at increased significance of quality management methods. It includes: achieving excellence in providing public services; implementation of quality management; analysis and consideration of service recipients in management; elected authorities (instead nominated); development of knowledge about public services among citizens; implementing public participation mechanisms in service management.

Although, this model met with criticism (Stoker, 1997), among others due to insufficient consideration of the complexity of governance mechanisms, roles and interests of all participants in public policies (Osborn, 2010), one still may see elements of this model in contemporary activities conducted by public sector entities.

The Common Assessment Method (CAF)

The Common Assessment Framework (CAF) is a tool for comprehensive quality management, which was created on the basis of the Excellence Model of the European Quality Management Foundation (EFQM) and a model developed at the University of Speyer. It belongs to the family of the total quality management (TQM) models. The Common Assessment Method is one of the most popular solutions for administration and its importance is still increasing (Kalfa, 2018). In 2019 there are about 4.100 registered CAF users in European and Non-European countries. The CAF is also used to assess the quality of management in police (Tomaževič & Aristovnik, 2019), schools (Ayala et al., 2019) and sports clubs (Mikalauskas et al., 2019)

The CAF model is intended for public administration units. It can be used in various public sector organizations - at national, regional and local levels. It is to support them in understanding and using quality management techniques and to diagnose the condition of the management system. This method focuses on conducting self-assessment, identifying areas for improvement and introducing required improvements. It is based on the assumption that achieving the desired results of the organization, consumers, employees and society depends on the quality of leadership that affects policy and strategy, employees, interpersonal relationships, resources and processes. The use of the CAF model enables public sector institutions to use quality management tools to improve performance (Kalfa, 2018).

The objectives of the CAF method are formulated as follows (Common Assessment Framework, The European Public Administration Network, 2019):

1. introduce the culture of excellence;
2. progressively implement the PDCA (PLAN, DO, CHECK, ACT) logic;
3. carry out the self-assessment process in order to obtain a comprehensive organisation check;
4. come up with a diagnosis that shows the strengths and improvement areas helping the definition of improvement actions.

The latest version of the method (fifth) - CAF2020 strengthens the focus on digitalisation and pays attention to agility, sustainability and diversity regarding the connection of the operational with the strategic levels to support reforms implementation.

The model is based on a system built of nine elements that indicates the most important aspects of analyzing the institution's operation. Criteria 1 to 5 (Leadership, Strategy and planning, People, Partnership and resources, Processes) relate to the institution's enablers. They point to the domain of its activity and how it approaches achieving the desired results. Criteria 6 to 9 (People, Citizens / customer-oriented, Social responsibility and Key Performance Results) are the results measured by perception and performance measurements. Each basic criterion consists of detailed criteria (there are 28 of them in total):

Criterion 1: Leadership - leaders should guide the organization's direction; formulate the vision, mission and values necessary to achieve long-term success. Create, implement and monitor an organization management system and analyze the results obtained. They should be the link between the institution, politicians and consumers.

Criterion 2: Strategy and planning - the organization should implement its mission and vision through a clear strategy focused on stakeholders; taking into account the directions and goals of public policy. The strategy should be translated into specific plans, measurable general and specific objectives.

Criterion 3: People- Effective human resource management allows the organisation to accomplish its strategic objectives, and to take advantage of the strengths and ability of people. Successful human resource management promotes people's engagement, motivation, development and retention. The organisation has to manage the competences and full potential of its people at individual levels to ensure organisational agility.

Criterion 4: Partnerships and Resources – Public organisation should develop and manage partnerships with relevant organisations (e.g. other public organisations, NGOs, education organisations, private providers of services) as well as collaborate with citizens and civil society organisations. Efficient, innovative and transparent resource management is essential for public organisations to ensure accountability towards the different stakeholders on the legitimate use of available resources (such as: finances information and knowledge, technology, facilities).

Criterion 5: Processes – public organisation should design and manage processes to increase value for citizens and customers as well as coordinate processes across the organisation and with other relevant organisations.

Criterion 6: Citizen/Customer-oriented Results - institution should examine the results achieved in relation to the satisfaction of its citizens/customers with the organisation and the products or services it provides.

Criterion 7: People Results - people results are the results the organisation is achieving in relation to the competence, motivation, satisfaction, perception and performance of its people.

Criterion 8: Social Responsibility Results – an organisation working on its social responsibility will improve: its reputation and image to the citizens; its ability to attract, motivate, commit and retain its staff; its relations with companies, other public organisations, the media, suppliers, citizens/customers and the community. These results include ethical, democratic and participative behaviour of the organisation; environmental sustainability; quality of life; economic impacts as effects of organisational behaviours.

Criterion 9: Key Performance Results – an organisation should measure the organization should measure the internal and external results of its activities:

a) external results: outputs and outcomes to goals, focusing on the link with the mission and vision (Criterion 1), strategy and planning (Criterion 2), products and services (Criterion 5), and the achieved results for external stakeholders.

b) internal results: level of efficiency, focusing on the link with people (Criterion 3), partnerships and resources (Criterion 4) and processes (Criterion 5), and the achieved results in building up the organisation towards excellence.

The indicated criteria allow for conducting evidence-based assessments that allow to answer the question which areas need improvement. Adaptation of the model enables the implementation of "good governance" in the public sphere (Jassop, 2007, s. 5-15; Grosse, 2009; Doornbos, 2003, 3-17).

From the point of view of impact on business entities the result in Criterion 6. Citizen/Customer-oriented Results are particularly important. The specification of detailed criteria and example measures are described above. They allow assessing the impact of regulatory institutions on the functioning of economic entities (Table 1).

Table 1: Citizen/Customer-oriented efficiency measures

Type of results	Example of measure
1. Results regarding the quality of products and services	a. Waiting time (handling/processing time of service delivery);
	b. Number and processing time of complaints and corrective actions implemented;
	c. Results of evaluation measures regarding errors and compliance with Q- standards
	d. Adherence to published service standards
2. Results regarding transparency, accessibility and integrity	e. Number of information and communication channels, including social media;
	f. Availability and accuracy of the information;
	g. Availability of performance goals and results of the organisation;

	h. Extent of open data delivery;
3. Results regarding stakeholder involvement and innovation	i. Extent of involvement of stakeholders in the design and the delivery of services and products and/or decision-making processes;
	j. Number of suggestions received and implemented
4. Results regarding usage of digitalisation and e-government procedures	k. Extent of evaluation activities jointly with the stakeholders to monitor their changing needs and the degree to which they are satisfied;
	l. Opening hours of the different services (departments)
	m. Cost price of the services
	n. Availability of information concerning management responsibilities of the different services.

Source: Common Assessment Framework, The European Public Administration Network, 2019.

BSC – Balanced Scorecard

Balanced Scorecard Model was developed by R.S. Kaplan and D. P. Norton in the early 90s (Kaplan, Norton 1992). This tool supports the implementation of a long-term, effective strategy. This system allows orientation on the most important aspects of the organisation and is based on monitoring and control activities, which ensures the efficiency of long-term activities. Focusing BSC on control activities allows faster verification of errors and taking corrective actions. The model was originally created for enterprises but it can also be for public administration entities. It is used, for example, in hospitals (Vitezić et al., 2019) and healthcare sector (Al-Kaabi et al., 2019), commercial banks (Tuan, 2020). The Balanced Scorecard consists of 4 perspectives focused on financial and non-financial elements, enabling the determination of proper goals. BSC perspectives include the following:

- financial;
- client;
- internal processes;
- growth and learning (development).

The financial perspective allows setting financial goals in the strategy ensuring appropriate long-term effectiveness. Indicators of this perspective in public administration include such measures as: maximizing benefits and/or cost reduction.

The clients' perspective uses measures that determine the performance indicators, institution’s targets and level of customer satisfaction. The perspective of internal processes is an element connecting the above two planes. Indicators of this perspective focus on processes that are most important for the organization, and therefore are based on creating the quality for customers. The perspective of growth and learning requires careful and accurate determination of indicators. In this area, particular attention is paid to the qualifications and skills of the organization's employees as well as information system. The measures of growth perspective include, for example: human resources potential, level of motivation, decentralization, possibilities of information systems.

The implementation of the NPM assumptions on the example of the Social Insurance Institution (ZUS)

The Social Insurance Institution (ZUS) was established in 1934 by means of an Ordinance of the President of the Republic of Poland of 24 October 1934 on the amendment of the Act of 28 March 1933 on social insurance. From 1 January 1999, the Social Insurance Institution is the main element in the administration of the Polish social security system. The Social Insurance Institution is a state

organisational unit with its headquarters in Warsaw with its own legal status as an entity. Its tasks are defined in the Act of 13 October 1998 on the social insurance system.

A modern approach to management in administration mainly directed at the needs of citizens and beneficiaries of public services, has become the reason for changes in management at the ZUS. To keep up with the challenges set for transforming ZUS into a modern institution, a new management model has been developed, consistent with the assumptions of NPM. It uses a process approach and is focused on increasing customer satisfaction. Since 2010, management control has been carried out, which supports activities improving the functioning of the institution. The most important element of this control is the system of setting goals, their implementation as well as their supervision.

The main goals of ZUS strategy are: to improve the level of service and to increase the quality of services provided. They were included in the strategy 2014-2020. Keeping in mind NPM, modern technological solutions have been implemented to improve contact with the customer (citizens and business entities). ZUS offers various communication options - paper correspondence, consultations with staff at Customer Service Room, by phone and via the Internet as well as using modern technologies. ZUS Electronic Services Platform (PUE ZUS) is the so-called e-office. ZUS client log in to the PUE ZUS account using electronic banking credentials. Each contribution payer can view an individual account. To improve communication, the number of forms that can be sent via the platform has been developed. To ensure the comfort of services for clients and stakeholders, the website and the language of the correspondence sent have been simplified. There are 83 simplified forms. Ten principles of a simple ZUS language are adopted in correspondence with the clients. The information provided must be clear and legible. Specially designed customer service rooms are prepared with the greatest care for the comfort of use by customers. The number of e-services is systematically increased.

Employees of the Customer Service Room (SOK) and Call Center (COT) regularly take part in series of trainings related to: customer service, changes in regulations, IT tools, as well as sign language The main tasks of SOK employees include customer service, providing information and explanations, as well as providing access to current information materials (leaflets, information newspapers), accepting and verifying submitted documentation.

The institution is socially responsible and expands the clients' knowledge about its activities. Among the information and educational campaigns carried out, the following can be mentioned: “I work legally“, “Lessons with ZUS“, “The Entrepreneur Week action”. The last one is a cyclical event for business representatives. It is organized in ZUS offices every two years. During the weekly campaign, entrepreneurs can take part in free seminars where experts discuss issues related to their rights and obligations. As part of the campaign, the amenities provided by the PUE ZUS profile are presented.

Efficient internal mechanisms are very important in ZUS's activity. Activities have been simplified and standardized by replacing 360 modes of operation with 15 mega processes and 42 processes. Risk analyzes are used to carry out checks on the contribution payers with dedicated software. System solutions have also been created to support and monitor the implementation of projects, as well as to manage them (Project Management Office - PMO). Special management structures, project teams and working teams were established. Changes were made to the organizational structure to unify the functioning of the facilities and increase the it’s transparency. Many organizational units have been combined to provide greater substitutability and a wider range of tasks. By optimizing costs, over 40% savings were achieved.

Table 2 presents selected measures of efficiency of the ZUS strategic goals mentioned in Strategy of the Social Insurance Institution for the years 2016-2020. We selected only measures that value are correlated with the operating conditions of business entities.

Table 2: Selected measures of efficiency of the ZUS strategic goals (BCG analysis)

Perspectives	Purpose description	Measures
Customer	**K.1.1.** Development of electronic access channels and ensuring an appropriate level of maturity of services provided through these channels	**K.1.1.1** The degree of use of electronic services for the submission of applications by customers
	K.1.2. Improving traditional forms of customer service	**K.1.2.1** Efficiency in dealing with matters "on the spot" in the Customer Service Room
	K.2. Development of the system of information exchange and cooperation with other stakeholders	**K2.2.** Indicator of the number of electronic documents received by ZUS from institutional clients
		K2.3. Number of data exchange systems with stakeholders based on standard interface solutions
	K.3. Improving the external communication system and information policy	**K.3.5.** Indicator for the overall assessment of ZUS information materials
		K.3.6. Number of meetings as part of the Counseling Days
Processes	**P.1.1.** Increasing the efficiency of services and processes	**P.1.1.3**. Indicator of timely implementation of applications for short-term benefits
		P.1.1.6. The efficiency ratio of handling applications for co-financing of contribution payers
		P1.1.12. An indicator of the timeliness of printing and sending personalized documents
		P.1.1.14. Indicator of availability of key applications

Source: own analysis based on: Strategy of the Social Insurance Institution for the years 2016-2020.

As one can see in the table, the instruments that we are interested in, from the point of view of the effectiveness of ZUS activities affecting the functioning of business entities, fall into two categories – "Customer" and "Processes". They focus mainly on providing high quality services along with the use of modern communication channels, which is in line with the assumptions of the NPM concept.

Conclusions

The new public management has contributed to strengthening public administration and creating citizen-friendly administration. As a management doctrine in the public sector, NPM is definitely managerial in nature and focuses primarily on marketization, flattening of organizational structures, efficiency and measurable achievements. Because one of its main goals is to ensure customer satisfaction in public administration, which means ensuring the right quality of goods and services provided, management tools such as CAF and BSC can be used here as consumer-oriented. Both of these methods are based on process management, that requires the construction of indicators for the efficiency of main processes.

CAF allows to evaluate the efficiency of activities in public administration by using results measures regarding: the quality of products and services, transparency, accessibility and integrity; stakeholder involvement and innovation as well as usage of digitalization and e-government procedures. As we could see on the example of the ZUS BSC also can be used as a tool for assessing the efficiency of

activities taken in public administration aiming at business entities. Implementing such measures in strategic documents of these institutions may contribute to a real improvement in the operating conditions of enterprises.

In the next study, the authors intend to assess how obtaining the above-mentioned measures of efficiency in public administration affect business entities from their point of view (using the diagnostic survey method). Because the same system is being implemented in other public administration institutions e.g. the NFZ (National Health Fund) in Poland, it will soon be allow to compare the effects of its implementation.

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Financial Regulation of Public-Private Partnerships: Forms, Models, And Use in Reengineering Conditions

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Abstract

One of the key and most problematic areas of interaction between public and private partners in the framework of the public-private partnership model is the sphere of financial relations between the parties. Before participating in a public-private partnership project, both private and public partners must give themselves answers to different questions of a financial and economic nature, most of which are not regulated by national legislation. The purpose of the study is to develop provisions for determining the structure of payments during the implementation of public-private partnership projects in the conditions of reengineering processes of public or private partners. They are based on the game theory tools and take into account options of strategies for private and public partners in the field of financial settlements. Game theory, which formed the basis of the proposed provisions, as well as comparison and systematization were used as research methods. As the result there were developed recommendations for the private partners, which in the framework of the public-private partnerships model have the opportunity to choose the most appropriate absolute value and relative share of initial and periodic payments in the framework of partnership projects depending on willingness to take risks regarding result indicators of the object of such partnership.

Keywords: Game Theory, Public-Private Partnership, Public Partner, Private Partner.

Introduction

In the current model of public management, private business is increasingly being carried out to solve socially important tasks. This is a common thing at both the national and local levels of government. An element of the strategy of many economically developed countries of the world is the self-withdrawal of public authorities from a considerable number of spheres of social, public or economic activity. They are responsible for certain socially significant areas of public administration only. As a consequence we have the liberalization of many markets, meeting the needs of territorial entities and solving their urgent problems. In this context, the new philosophy of public administration, as noted by Bodzoń (2013, p. 6), just provides for the so-called "privatization of state tasks", and the basis for its implementation, according to the author, is the belief that if the said activity can be implemented

without problems on the principles of market relations, therefore, it is groundless to claim that it is performed only by state entities. Taking this into account, state authorities stop (or try to stop) financing of certain events from their own budget, attracting private business for this purpose (Zvarikova & Majerova, 2013). This private business is actually involved in the reengineering of state authorities' processes. On the other hand, public-private partnership is also an effective mechanism for financing the reengineering processes at different levels of state authorities. Given the facts presented, no wonder that partnerships in different forms, both bilateral and multilateral ones are so important nowadays (Kozma, 2017; Sebestova et al., 2017; Ferencikova et al. 2018).

A key condition for the proper functioning of the market economy is a fruitful and constructive cooperation between private business and state structures. As Dmytrychenko et al., (2014) claim, "the nature of this interaction, methods, and specific forms may vary significantly depending on the maturity and national characteristics of market relations in a particular country. In recent years, this interaction is realized in the form of public-private partnerships". Public-private partnership in its content is also an agreement with the specific rules reflected in the texts of the relevant contracts for the implementation of such partnership projects. Such rules should also apply to financial relationships between public and private partners.

Analysis of public-private partnership allows us to state that one of the key and most problematic areas of interaction between public and private partners in the framework of the corresponding model is the sphere of financial relations. Before participating in a public-private partnership project, both private and public partners must give themselves answers to many different questions of a financial and economic nature. For example, a private partner can finance a public-private partnership project on its own in full, in part, or by attracting other investors. Such financing can cover all expenses from investment expenses (construction or repair of the object, expenses related to infrastructure development, etc.) to operational expenses. According to the legislation of many countries of the world, a private partner must at least partially finance a public-private partnership project, since otherwise, the interaction between public and private partners will not have the character of a public-private partnership (Valaskova et al., 2018). On the other hand, the regulatory framework of most countries does not restrict the sources of such financing, which opens up additional opportunities for private partners (grants, loans, etc). So, it is important to determine the structure of payments during the implementation of public-private partnership projects in the conditions of reengineering processes of public or private partners.

Theoretical Background

In the analyzed sources, the forms of financing public-private partnership projects in economically developed countries are classified by their reversibility into reversible and non-reversible (Fig. 1).

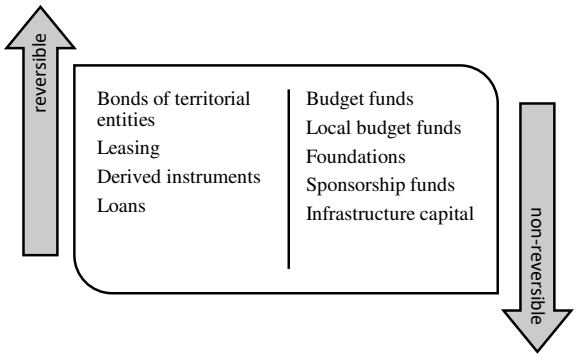

Fig. 1: Reversible and non-reversible forms of financing public-private partnership projects

Source: based on (Brzozowska, 2010; Ortynska and al., 2020)

The most common non-reversible source of funding the public-private partnership projects is an investment. For example, within the EU a certain share of own investments is a prerequisite for attracting EU funds to implement such projects. Thus, within the framework of public-private partnership, both public and private partners have a wide range of actions regarding the definition of financial aspects of the relevant projects.

Summarizing the practice and theory of public-private partnership, it should be noted that one of the aspects of the agreement between the public and private partners at the conclusion of the contract is the way the private partner receives income. For example, this partner has the option to specify in the contract that income is received by a one-time payment or by a combination of periodic payments and a down payment. If the second alternative is chosen, then there is still the possibility of accruing periodic payments in a fixed amount or using a commission rate. It is obvious that a number of different factors influence the decision-making regarding the choice of an alternative in the formation of the private partner's income from the implementation of public-private partnership projects, in particular:

- type of public-private partnership project;
- readiness of a private partner to take risks in the implementation of a public-private partnership project;
- requirements and restrictions of the state partner;
- policy and goals of the parties of the public-private partnership agreement;
- public-private partnership object (for example, water treatment, hospital, bridge, highway, etc);
- planned development (modernization) effects of the object of public-private partnerships, etc.

From the above, it is clear that if a private partner is not prone to risk, but still has the opportunity to choose a way to receive income from the implementation of a public-private partnership project, he will most likely choose to receive income in a single payment on the principle of "work performed – remuneration received". Also, if the contract provides for a combination of periodic payments and a down payment, the risk-averse private partner will insist on a fixed rate for these periodic payments. But, if during public-private partnership project implementation the private partner is still willing to take risks, it would prefer the combination of periodic payments and a down payment to a single one (Androniceanu et al., 2019). Moreover, the periodic payments will create a commission rate, and their amount will be substantial.

It is significant to emphasize another aspect of the private partner's income generation from the implementation of public-private partnership projects. If it prefers a single payment or a substantial share of the down payment in combination with periodic payments, there is a high probability that part of the revenue will be lost due to the fact that the expected effects of the public-private partnership project will be higher than expected. On the other hand, if such effects are lower than expected, then choosing a one-time payment or a significant share of the down payment in combination with periodic payments will minimize the risk of not receiving part of the private partner's income.

If a private partner prefers a single payment or a substantial share of the down payment in combination with periodic payments during the implementation of a public-private partnership project, he ensures himself against its failure. For example, if the object of a public-private partnership project is a highway, the private partner invests its funds, performs the relevant work and in the future wants to receive fixed periodic payments for each reporting period (for example, monthly, quarterly, annually, etc.) and this forms the basis of the public-private partnership agreement. In other cases, the principle of "work performed – remuneration received" is used, which also has a conditional risk character from the point of view of financial relations between the parties of the agreement (Oláh et al., 2019a; Oláh et al., 2019b). At the same time, private partners have another alternative. They can make the amount of income they receive from the implementation of public-private partnership projects dependent on the economic efficiency of such projects: the greater is efficiency (which means the more effective the public-private partnership project will be), the higher income will be received by the private partner.

The study of scientific sources makes it possible to assert that financial and economic management decisions in the field of project management, in particular, during the reengineering of business processes can be made in three states (Fig. 2).

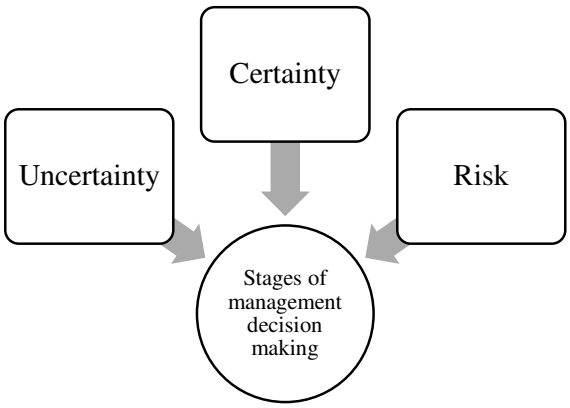

Fig. 2: States of management decision-making in the field of project management

Source: based on (Wajong, 2015; Enoch, 2019; Gilbert Silvius and al., 2017; Irujo and al., 2017; Wang and al., 2004; Kryvinska, 2012; Kaczor and al., 2013; Shpak and al., 2020)

For example, if a manager makes a management decision in the field of reengineering while having complete and reliable information on each identified alternative, then it is claimed that such a decision is made in terms of certainty. The lack of complete and reliable information forces the manager to look for additional information, and if this is not possible – to make a decision at random, in conditions of uncertainty. The greater is uncertainty, the higher is the risk level. If the manager is able to identify the probability of occurrence of a particular scenario, then they say that the decision is made in a risk environment. It is appropriate to note that the modern economy is under the influence of uncertainty factors in various areas. This may be explained by a number of circumstances:

- market factors;
- political instability and imperfection of the legislation;
- natural phenomena;
- scientific and technical progress, etc.

While analyzing the works of different scholars, e.g. Wajong, 2015; Enoch, 2019; Gilbert Silvius et al., 2017; Gregus et al., 2015; Molnár et al., 2014; Borocki et al., 2019 there were distinguished a number of provisions that need to be taken into account when making management decisions in conditions of uncertainty and risk. They include:

- increase in the importance of simulation models that describe different states of systems and transitions to them;
- the basis for making management decisions should not be a probabilistic approach, not deterministic. It allows to explore various possible situations, options for making decisions, as well as the area of their uncertainty;
- it is not enough to use only formalized methods, but they should be supplemented with non-formal methods (expert evaluation method, heuristic method, etc).

It should be emphasized that for each of the above financial and economic management decisions states in the field of project management, theory and practice offer a wide range of approaches, methods, and models.

Management decisions in public-private partnership on its financial and economic aspects are more likely to be made under risk conditions. Private partners, implementing public-private partnership projects, do not have complete and reliable information about the economic effects of the project, about the amount of potential income for each other alternative of periodic payments and down payment. On the other hand, private partners in most cases still have the opportunity to determine the consequences of making a particular management decision regarding the structure of payments for public-private partnership projects (for example, using benchmarking, identifying market trends, empirically analyzing other similar projects).

A study of the scientific sources on risk management problems (Collier, 2009; Hopkin, 2017; Población, 2017; Green, 2016; Hillson, 2016) suggests that concepts such as fuzzy set theory, statistical decision theory, stochastic programming, game theory, and others are most commonly used in risk management decision-making.

Materials and Methods

A thorough analysis of each concept of management decision-making in the context of risk allows to state that it is appropriate to use game theory to determine the structure of payments in the implementation of public-private partnership projects. It involves both the study of operations, and the selection of optimal strategies by mathematical means, and a method for modeling the impact of decisions on the market and competitors, and a method for coordinating the interests of the parties (Binmore, 2007; Burguillo, 2010; Chander, 2018; Androniceanu, 2019; Haseeb et al., 2019).

The basis of game theory in making management decisions is to identify the optimal strategy for each player. The game concept is the key to this theory. It is considered as a process in which at least two players will compete for the realization of their interests. Within the game theory, these players are called participants. One of the important prerequisites for the practical use of game theory for solving management problems is to identify key players from their list by ignoring secondary participants.

In game theory, the parties involved bring their own added value (Cygler and Sroka, 2017; Cygler et al., 2018). The principle of reciprocity which is applied encourages players to give up myopia in their assessment of the situation and reduction in opportunistic behaviour. The payout structure, timeframe of the activities as well as the number of players affect the nature of the activities in the direction of cooperation (Parkhe, 1993). The tendency of players towards cooperation also increases with the importance of future movements and payments and the durability of the relationship. Players will be more interested in the long-term benefits rather than current payments (the problem of greed). Moreover, the payoff structure must encourage the parties to cooperate, such that the benefits of cooperation must be significant enough to limit the parties' motivation and engagement in competition (Cygler and Wyka, 2019). Game theory also provides that each player within the game has its own strategy. It is a set of actions that will allow him, depending on the situation, to choose certain actions that will be the best and competitive with other participants in the game.

The systematization method is used to identify reversible and non-reversible forms of financing the public-private partnership projects, states of management decision-making in the field of project management, as well as a visual representation of the game theory use stages to solve the problem of determining the structure of payments in the implementation of public-private partnership projects. In turn, the comparison method is used to select the most appropriate approach for determining the structure of payments in the public-private partnership model.

Results

Considering the definition of the structure of payments in the implementation of public-private partnerships' projects from the perspective of the game theory, it is worth highlighting that the private partner in our case will be a key player. In the framework of the public-private partnership project, the

partner has an opportunity to elect the way of defining the structure of such payments (i.e., a particular strategy among the alternatives) for maximizing the value of their profits. Another such player will be the state partner, which directly affects the private sector and the potential for them to receive a certain amount of income from the implementation of the public-private partnership project.

Based on the analysis of the sources on game theory (DeVos and al., 2016; Prisner, 2014; Avrachenkov and al., 2019; Li and al., 2019; Chander, 2018), it is possible to identify generalized stages of its use for solving the outlined issue on determining the structure of payments in the implementation of public-private partnership projects (Fig. 3).

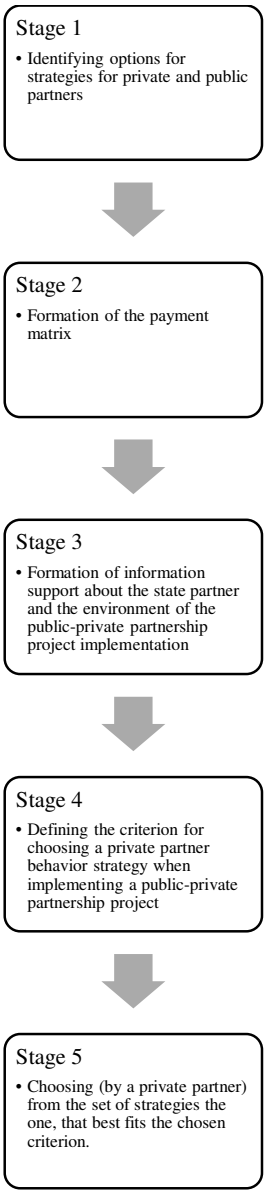

Fig. 3: Stages of using game theory to solve the issue of determining the structure of payments in the implementation of public-private partnership projects

Source: based on (DeVos and al., 2016; Prisner, 2014; Avrachenkov and al., 2019; Li and al., 2019)

So, using the classic game theory denotations and terminology to solve the problem of determining the structure of payments for the implementation of public-private partnership projects, it is important to note that we are talking about a game of two participants: private and public partners. The first player, that is, the private partner, has two so-called alternative "clean" strategies:

$$S = (s_1; s_2) \quad (1)$$

where S – alternative "clean" strategies of a private partner in the implementation of a public-private partnership project;

s_1 – strategy for generating revenue from the implementation of a public-private partnership project in a single payment;

s_2 – strategy for generating revenue from the implementation of a public-private partnership project by periodic payments, depending on the resulting indicator agreed by the parties.

The second player - the state partner - also has its own alternative strategies, which can be displayed as:

$$\Theta = (\theta_1; \ldots; \theta_n) \quad (2)$$

where Θ- a set of alternative strategies of the state partner in the implementation of the public-private partnership project;

$\theta_1; \ldots; \theta_n$ - "clean" strategies of the state partner in the implementation of the public-private partnership project (the resulting indicator agreed by the parties).

In the analyzed context, it is clear that for practical reasons it is difficult, and often impossible, to predict the value of the resulting indicator agreed by public and private partners, so A. Shyyan (2009, p. 56) suggests taking into account the intervals of potential values of such an indicator to solve this problem. Moreover, it is known that it is enough to take into account only 7 to 10 of these intervals, without setting an excessive number of them.

Having identified the players and identified their alternative strategies, it is further necessary to formalize in mathematical terms the probability that the state partner implements such strategies. This formalization will look like this:

$$Q = (q_1; \ldots; q_n), \sum_{j=1}^{n} q_j = 1, q_j \geq 0, j = 1, \ldots, n \quad (3)$$

where Q is an alternative option the probability of reaching a state partner in their "clean" strategies during the implementation of the project of public-private partnerships (that is, options to the probability that creation or improvement of the object of public-private partnership will allow reaching a value of the result indicator (for example, due to construction of toll highway annually can be earned income from the passage through it in the amount of 100 million US dollars));

$q_1; \ldots; q_n$ - the probability of the state partner achieving its "clean" strategies when implementing a public-private partnership project.

The next stage of determining the structure of payments for the implementation of public-private partnership projects involves building a payment matrix that makes up the evaluation functionality:

$$F = \begin{pmatrix} f_{11} & \ldots & f_{1j} & \cdots & f_{1n} \\ f_{21} & \ldots & f_{2j} & \cdots & f_{2n} \end{pmatrix} \quad (4)$$

where f_{kj} is the value of the private partner's income from the implementation of the public-private partnership project, provided that they apply the strategy s_k, and the value θ_j of the resulting indicator agreed by the partners.

The first vector of the above payment matrix $F(s_1) = (f_{11}; \ldots; f_{1n})$ should be interpreted as a vector that makes it possible to evaluate the first net strategy of the private partner in the implementation of a public-private partnership project, provided that any of the set of alternative strategies of the public partner occurs.

The level of effectiveness of another alternative strategy of a private partner in the implementation of a public-private partnership project allows us to identify a different vector of the payment matrix, namely: $F(s_2) = (f_{21}; \ldots; f_{2n})$.

Thus, if a private partner chooses a strategys_1 when implementing a public-private partnership project, the amount of its income within the model of such a partnership will not depend on the value of the resulting indicator (in this case, this indicator may not be taken into account and agreed by the parties). Mathematically it will look like this:

$$f_{11} = \ldots = f_{ij} = \ldots = f_{1n} = V = V_o \quad (5)$$

where V - the expected amount of income of the private partner from the implementation of the public-private partnership project, thousand US dollars;

V_o - the income of a private partner generated by a one-time payment from the implementation of a public-private partnership project, thousand US dollars.

However, if the private partner chooses their second alternative strategys_2, then the elements of the payment matrix are calculated in this way:

$$f_{2j} = D \cdot \mathrm{K} \quad (6)$$

where D is the coefficient for the private partner to receive the expected amount of revenue from the implementation of the public-private partnership project, provided that they apply an alternative strategy s_2;

K – the value of the resulting indicator agreed by the partners for the implementation of the public-private partnership project following the j-strategy of the public partner for the accounting period.

At the next stage of determining the payment structure for public-private partnership projects, you should carefully diagnose the execution environment of such a project. The results of the research allow us to conclude that private partners during participation in the public-private partnership model are mainly influenced by the information situation, when they have the opportunity to more objectively distribute the probability of achieving their strategy by the public partner during the implementation of the public-private partnership project.

Therefore, having identified this information situation as the most common one for which private partners make decisions in the public-private partnership model, the priority criteria for making such decisions are the criteria for the variability of the value of the payment matrix and the Bayes criteria (Sadovin and al., 2011, p. 56). So, in the first case, it is recommended to make a decision for which "the measure of elements' variability of the corresponding evaluation vector relative to the selected grouping center is the smallest" (Kuzmin et al. 2007). According to the Bayes criterion (Prisner, 2014), "optimal solutions (or a set of such solutions) are considered to be those for which the mathematical

expectation of the estimated functional acquires the highest (or lowest) possible value" (depending on the type of functional: with a positive or negative ingredient).

For the best choice of the optimal alternative from the above criteria, it should be emphasized that the optimal income structure (and, accordingly, strategy) for the private partner in the implementation of public-private partnership projects will be one that will be able to get the highest income with the minimum level of risk. So, when deciding on the structure of payments for public-private partnership projects, the private partner is likely to take into account these two criteria:

- the estimated amount of revenue from the implementation of the public-private partnership project;
- the level of risk.

Theory and practice have proved that the estimated amount of income from the implementation of a public-private partnership project can be determined by calculating the mathematical expectation of the amount of this income m. On the other hand, it is proposed to estimate the level of the assumed risk using dispersion σ^2. The mathematical representation of this is as follows (Collier, 2009; Hopkin, 2017; Población, 2017):

$$m_k = \sum_{j=1}^{n} q_j \cdot f_{kj} \quad (7)$$

$$\sigma_k^2 = \sum_{j=1}^{n} (q_j (f_{kj} - m_k)^2) \quad (8)$$

where m_k – is the mathematical expectation of the assumed value of the private partner's income from the implementation of the public-private partnership project, provided that the alternative k-strategy is used;

σ_k^2 – the dispersion level of the perceived risk of a private partner to receive an expected income from the public-private partnership project provided the use of values of mathematical expectation.

The above proposals only addressed the so-called "clean" strategies of the private partner in the implementation of public-private partnership projects. At the same time, it is obvious that there are "mixed" such strategies (s_p) that combine vectors of these "pure" strategies in various combinations. Therefore, the vector of evaluation of the "mixed" strategy $\left(F(s_p)\right)$ by the private partner will have the following form:

$$F(s_p) = p_1 \cdot F(s_1) + p_2 \cdot F(s_2),\ \ p_1 + p_2 = 1, p_1 \geq 0,\ \ p_2 \geq 0 \quad (9)$$

where $F(s_p)$ – is the vector of evaluation by the private partner of the "mixed" strategy in the implementation of public-private partnership projects;

p_1, p_2 – shares of down and periodic payments, respectively, within the framework of the public-private partnership project, part. from.

Thus, using formula 9 allows you not only to formalize any "mixed" strategy of a private partner when determining the structure of payments as a result of public-private partnership projects, but also to mathematically represent any "pure" strategy. Then, provided the partners agree to receive a one-time income (first "clean" strategy of private partner) $p_1 = 1, p_2 = 0$.. If the parties to the public-private partnership agree only on periodic payments, then $p_1 = 0, p_2 = 1$. this means that the task of determining the optimal payment structure for the implementation of public-private partnership projects consists of setting a p_1 and $p_2$for each option of "mixed" strategy.

Vitlinsky (2002, p. 168) focuses on the need for a certain refinement in the mathematical expectation calculation of the estimated amount of income by a private partner from the implementation of a public-private partnership project applying a "mixed" strategy. The author displays such refinements in formulas:

$$m_p = \sum_{k=1}^{m} \sum_{j=1}^{n} p_k \cdot q_j \cdot f_{kj} \quad (10)$$

$$\sigma_p^2 = \sum_{k=1}^{m} \sum_{l=1}^{m} p_k \cdot p_l \cdot \sigma_k \cdot \sigma_l \cdot \rho_{kl} \quad (11)$$

where m_p – the mathematical expectation of the assumed value of the private partner's income from the implementation of the public-private partnership project in the conditions of applying the "mixed" strategy;

σ_k^2 – the dispersion of the estimated risk of obtaining the expected income amount by the private partner from the implementation of a public-private partnership project in the conditions of applying a "mixed" strategy;

m - number of "clean" strategies of the private partner;

σ_k,σ_l – standard deviation, of m_k and m_l elements respectively of the vector of "pure" strategies of the private partner (k and l) according to the mathematical expectation;

ρ_{kl} – a correlation coefficient of the components of the evaluation vectors k and l "pure" strategies of the private partner.

Certain clarifications should be made regarding the calculations above. First of all, the private partner, when establishing the revenue structure from the implementation of the public-private partnership project, considers two of its "clean" strategies as alternatives, therefore $m = 2$. Besides, $m_1 = V$ where V is the amount of income the private partner plans to receive from the implementation of the public-private partnership project. Also $\sigma_1^2 = 0$, since the strategy public partner is not taken into account, provided the first alternative to "pure" strategies of the private partner (it can be explained by the private partner, who will receive the income from the project as a one-time payment). This means that $\sigma_1 = 0$, since $\sigma_k = \sqrt{\sigma_k^2}$ (because $\sigma_1^2 = 0$).

It is worth emphasizing that $\rho_{11} = \rho_{22} = 1$is explained by the characteristics of the correlation coefficient of the component evaluation vectors k and l alternative "clean" strategies of the private partner. Besides, the ratio $p_1 + p_2 = 1$, $p_1 \geq 0$,$p_2 \geq 0$ are also fair.

So, based on the above and presenting $p_1$through$x$, and p_2 respectively through $1 - x$), the ratio of 10 and 11 is reflected in this form:

$$m_p = x \cdot V + (1 - x) \cdot \sum_{j=1}^{n} q_j \cdot f_{2j} = x \cdot V + (1 - x) \cdot m_2 \quad (12)$$

$$\sigma_p^2 = p_{`1} \cdot p_1 \cdot \sigma_1 \cdot \sigma_1 \cdot \rho_{11} + p_{`1} \cdot p_2 \cdot \sigma_1 \cdot \sigma_2 \cdot \rho_{12} + p_{`2} \cdot p_1 \cdot \sigma_2 \cdot \sigma_1 \cdot \rho_{21} +$$

$$+ p_{`2} \cdot p_2 \cdot \sigma_2 \cdot \sigma_2 \cdot \rho_{22} = 0 + 0 + 0 + p_2^2 \cdot \sigma_2^2 = p_2^2 \cdot \sigma_2^2 = (1 - x)^2 \cdot \sigma_2^2 \quad (13)$$

Taking into account that a private partner in the implementation of a public-private partnership project tries to maximize its profit at the optimal level of risk for it, this should be reflected in the strategy for establishing the structure of such a partner's income from participation in the partnership model. Therefore, the corresponding mathematical model should reflect these two criteria:

$$\begin{cases} m_p = x \cdot V + (1-x) \cdot m_2 \rightarrow \max \\ \sigma_p^2 = (1-x)^2 \cdot \sigma_2^2 \rightarrow \min \end{cases} \quad (14)$$

As evidenced by the study of theory and practice, the use of model 14 in establishing the structure of payments in the context of public-private partnership projects is significantly accelerated in practice, since this task will have an unambiguous solution only if an alternative "clean" strategy with zero risks is applied (then m_p will reach maximum values). In other conditions, there is no such unambiguity, which is primarily because in practice, as a rule, an improvement in the value of one criterion leads to a deterioration in the value of another. Therefore, in the case of public-private partnership projects, the optimal strategy for establishing the revenue structure of a private partner is to find a compromise.

The study of theory and practice makes it possible to justify the feasibility of ranking criteria for establishing the structure of the private partner's income from the implementation of a public-private partnership project. In other words, it is about the need to determine the weighting coefficients for both dispersion and expectation. This weighting factor for dispersion λshould be considered as a coefficient that reflects the private partner's risk aversion during the approval of the revenue structure from the implementation of a public-private partnership project: the lower the value λ, the more risk aversion the private partner increases, and vice versa.

In the analyzed context, it is obvious that if the weighting factor of the variance of the income of the private partner from the project public-private partnership is λ, then $1-\lambda$ is the value of the weighting factor of the mathematical expectation the expected value of this income. Therefore, having such information, a private partner can choose the appropriate optimal strategy for itself when determining the structure of income from the implementation of a public-private partnership project, taking into account the criteria for the expected amount of such income and the partner's risk propensity. Based on the sources, this problem of the existence of two criteria for a private partner can be solved using the maximization of the utility function:

$$U(x) = (1-\lambda) \cdot m_p - \lambda \cdot \sigma_p^2 = (1-\lambda)(x \cdot V) + (1-x)m_2) - \lambda((1-x)^2 \cdot \sigma_2^2) \rightarrow \max \quad (15)$$

Using the provisions of the utility theory, a function reaches its maximum when its first derivative $U(x)$ is 0. Given that $x = p_1$, it is appropriate to emphasize that p_1 is the optimal share of the initial payment to the private partner in the framework of the public-private partnership project, provided that the maximum of function 13 is reached.

Discussion

The study allows us to propose provisions for determining the structure of payments for the implementation of public-private partnership projects in the conditions of reengineering processes of public or private partners. In particular, the optimal amount of the initial payment for a private partner in the implementation of public-private partnership projects will be calculated as follows:

$$V_o^{opt} = x \cdot V \qquad (16)$$

where V_o^{opt} – is the optimal value of the initial payment for a private partner when implementing a public-private partnership project.

Besides, the optimal coefficient for a private partner to receive the expected amount of revenue from the implementation of a public-private partnership project within the payment structure for such a project (given that $p_2 = (1 - x)$) should be calculated using the formula:

$$D^{opt} = (1 - x) \cdot D \qquad (17)$$

where D^{opt} – is the optimal coefficient for a private partner to receive the expected amount of revenue from the implementation of a public-private partnership project.

In any case, determining the structure of payments for public-private partnership projects is a complex task that determines the need for careful calculations, analysis of the environment, forecasting market conditions, balancing the interests of various groups of stakeholders, and coordinating discussion positions.

Conclusions

The deliberations presented allow the private partner to determine the structure of payments for the implementation of public-private partnership projects. At the same time, we should not ignore the existing restrictions on the part of both public and private partners. Such restrictions, in particular, may relate to the stability of the market environment, the willingness of the other party to agree to the optimal form and share of payments determined by the other party, restrictions on the legal framework for calculations for specific public-private partnership projects, and so on. Under these conditions, you should adjust the shares $p_1$andp_2 to $p_1{}'$and $p_2{}'$.

The proposed provisions for determining the structure of payments for the implementation of public-private partnership projects in the conditions of reengineering are based on the tools of game theory and take into account the options for strategies for private and public partners in the field of financial settlements. The proposals presented in the study allow private partners to choose the optimal absolute values and relative shares of initial and periodic payments in the framework of public-private partnership projects, depending on their willingness to take risks concerning the resulting indicators of the object of such a partnership. In this case, the generalized sequence in defining the structure of these payments needs to implement the following stages: identification of alternative "clean" strategies of private and public partner in the implementation of public-private partnerships; identification of options the probability of state a partner of their alternative "pure" strategies; the formation of a functional assessment and payment of the matrix; the relationship of the assumed income of the private partner and the predicted level of risk from the structure of payments under public-private partnership when using "mixed" strategies; ranking criteria for establishing the structure of private partner income from the implementation of a public-private partnership project; determination of the parameters of the optimal structure of payments during project implementation a public-private partnership; the adjustment of absolute values and/or relative proportion of initial and periodic payments during the project implementation public-private partnerships.

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Impact of Remittances Inflows on Trend in Country's Exchange Rate

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Abstract

Rapid increase of remittances inflows is inherent for many developing countries. Such inflows affect exchange rate on national currency. Given this fact, the aim of our paper is to analyse the interdependence between remittance inflows and trend of Ukrainian hryvnia exchange rate. The research results of the current article is the model of remittances inflows influence on nominal effective exchange rate of Ukrainian hryvnia built using data from 1996 to 2019 period. We estimate linear regression model with trend component and autoregressive distributive lag model, because of existence of autocorrelation. Research showed that in current situation in Ukrainian economy NEER in previous period (lag 1) depreciates current NEER value as well, as remittances inflows with lag 2. Such results require further investigation as they are contrary to other studies.

Keywords: remittances, nominal effective exchange rate, balance of payments.

Introduction

Over the past two decades, the emerging and developing markets have established themselves as a significant global growth engine. That's mostly due to their consistent and faster economic growth compared with their developed market counterparts. According to the data of International Monetary Fund, since 2000 emerging markets have persistently outperformed the world and advanced markets. By October 2018 their annual GDP growth was 4.1% relative to developed markets' 2.4, and the world's 3.7 respectively (IMF, 2018). One even claims that emerging markets are important because they drive growth in the global economy. Ukraine may be regarded as one of those countries. Though the country faces a number of problems now (e.g. war in Donbas, high emigration to the neighboring countries, insufficient market reforms), it has a very big potential, which, if utilized, may cause a substantial growth of the economy. Its share in world trade should be also much higher in this situation.

There are different factors that play an important role in the development of the country's economy. For sure one of them is the need to promote long-term financial market policies. In addition, policymakers should ensure the appropriate formulation and implementation of short-term financial tools in order to foster economic growth (Mesagan et al., 2019). In turn, Kabaklarli et al., (2018) claim that the export structure has played an important role in the economic growth theories of many countries since the 1960s, as export growth has been associated with faster productivity and GDP growth. Other authors (e.g. Witkowski et al., 2017) mention also the economic, political and social situation of the

country, which is especially important in the context of attracting the foreign investors. However, regardless of the other factors, currency of the country and especially its exchange rates with leading currencies of the world (dollar, yen, euro) plays a very important role in this aspect. A real depreciation of domestic currency compared to the foreign currency may create import goods more expensive and export goods more affordable and simultaneously lead to an improvement of trade balance. However, the effect of the trade balance in a country may not occur immediately at the time of depreciation (Hidayat, 2019).

One should underline that the factors that influence the exchange rate of national currency can be unique. When it comes to Ukrainian hryvnia the definite fact is the constant decrease of its exchange rate since the moment of its introduction into the Ukrainian economy. The latter is due to frequent deterioration of state of Ukrainian economy. In the same time, due to the weakness of Ukrainian economy at present, a noticeable part of Ukrainian population was looking for employment abroad, emigrating to neighbouring countries (mostly Poland but also Czechia, Slovakia). This trend may even rise due to opening of the German market for Ukrainian employees. People employed abroad made substantial remittances to members of their families. No wonder that as the result, there is an ongoing debate whether the people who were working abroad and sending money back to their families in Ukraine support the country's economy. The impact of those remittances of the exchange rate of Ukrainian hryvnia is also analysed in details. Given the facts presented the aim of this paper is to analyse the interdependence between remittance inflows and trend of Ukrainian hryvnia exchange rate.

Literature Review

The impact of remittances on different development indicators of recipient countries is the topic of many analyses in the literature. Remittances have been a major source of economic support for dependents of migrant workers in their home countries (Olah et al., 2019). For example, data shows that remittance flows are the second largest source, behind FDI, of external funding for developing countries. The total amount of remittances received by developing countries has surpassed 300 billion US dollars in 2011, from which almost 61 billion went to Latin America and the Caribbean (Inter-American Development Bank, 2013). Their importance does not only come from their size, but also from their relative importance as a share of GDP in some countries and from their increasing share in all financial flows entering developing countries (Androniceanu et al., 2019; Ciobanu et al., 2019). They now represent approximately 45 percent of net capital inflows in these countries (Jansen, 2013).

Remittances to low-income countries were larger as a share of GDP and imports than were those to middle income countries. Remittances are also more stable than private capital flows, which often move pro-cyclically, thus raising incomes during booms and depressing them during downturns (Ratha, 2003). Neyapti (2004) reports that, during the 1990s, in countries like Samoa, Yemen, Cepe Verde, Jordan, Tonga, Albania and El Salvador, net workers remittance receipts exceeded 10 percent of GDP; in countries like Hungary, Egypt, Moracco and Sri Lanka, they exceeded 5 percent of GDP.

The research of Misati et al., (2019) who analysed he relationship between remittances and financial development using Kenyan quarterly data from 2006 to 2016 is worth considering. Five different indicators of financial development were used in their research: credit to the private sector as a share of GDP, the number of mobile transactions, the value of these mobile transactions, the number of mobile agents, and the number of bank accounts. The results from using an autoregressive distributed lag demonstrated a strong, positive relationship between remittances and financial development in long-run equations. Another country which may be regarded as the very good example is Nigeria which receives the largest amount of remittances in Africa and the third among developing economies; receiving 21 Billion US Dollars in 2015 (Adejumo & Ikhide, 2019). Despite these facts, one cannot, however, forget about some dangers of such actions as large remittance inflows could hurt the recipient economy. It relates to the situation when the flows are significant in relation to the size of the recipient economy. As a result, it could case the possibility of the exchange rates appreciation and a loss of competitiveness (Kliestikova & Janoskova, 2017).

Existence of remittances inflows on exchange rate was supported by different research. Most of them confirmed appreciation of exchange rate of local currency as a result of remittances increase. Some of them also presumed that such impact could be an evidence of Dutch disease existence. In particular, by use of linear regression and set of macroeconomic and technical variables Bourdet & Falck (2006) found Dutch disease effects such as appreciation of national currency in Cape Verde, resulted from increasing remittances inflows.

The similar effect was found for real exchange rate of local currencies in Latin American and Caribbean countries (Amuendo-Dorantez & Pozo, 2004). The article targeted estimation of fixed effects by applying ordinary least squares model and instrumental variables regression. It was revealed that remittances, like capital flows can appreciate the real exchange rate in recipient economies and therefore generate a resource allocation from the tradable to the non-tradable sector (Androniceanu & Tvaronavičienė, 2019). The same results were found for El Salvador (Caceres & Saca, 2006), Jamaica (Bussolo & Medvedev, 2007), Mexico (Vargas-Silva, 2009), 109 developing and transition countries for the period from 1990 to 2003 (Acosta et al, 2009), Bangladesh (Chowdhury & Rabbi, 2014) and Vietnam (Nguyen, 2017). Different result was found by Hien et al. (2019) who reported that in economies with low ratio of remittances to GDP (less than 1%) appreciation of local currency and Dutch disease effects are most likely to occur.

Research of Adejumo & Ikhide (2019) who analysed Nigerian economy revealed that remittance inflows have been associated with a rise in the real exchange rate in Nigeria. This implies that high remittance inflows have exerted depreciating pressure on the country's currency. Thus, contrary to the Dutch disease proposition, high remittance inflows into Nigeria have not resulted in an overvalued exchange rate but a low-valued exchange rate.

Neyapi et al. (2005), who analysed Turkey in the 1979-1993 period, claim that improving financial intermediation and preventing exchange rate misalignments would help increase the inflow of remittances. The researchers also stated that the macroeconomic variables significantly impact on workers' remittances for the Turkish case, indicating that governments of the labor exporting countries can influence the inflow of remittances by means of appropriate macroeconomic policies. In turn, Barret (2013) investigated the impact that remittances have on the escalating exchange rate in the Jamaican economy over the period 1995-2010, controlling for other fundamental variables such as government spending, official aid and the terms of trade. It empirically verified that remittances depreciated the real exchange rate. contrary to other findings, his research showed that that increases in remittances to Jamaica depreciated the real exchange rate. More specifically, an increase in remittances as a percentage of GDP lead to a depreciation of the real exchange rate by approximately 8.26%. He also revealed that official aid has no effect on the real exchange rate.

The analysis of the literature allows us to conclude that the phenomenon has a multidimensional character and is analysed from different points of view. In order to contribute to the discussion, our paper will target the impact of remittance inflows on the nominal exchange rate of Ukrainian hryvnia.

Methodology and Data

Evaluation of remittances inflows impact on trends of exchange rate of Ukrainian hryvnia is our research objective. The important decision for the current research is the choice of type of exchange rate, which demonstrates tendency of Ukrainian hryvnia since its introduction. We decided to use nominal effective exchange rate (NEER) as the variable representing exchange rate, which is explained by the following arguments. First of all, it indicates general tendency of Ukrainian hryvnia exchange rate for the researched period. Next point is the indexed value of national currency by weights of different currencies in international trade. In contrast, real exchange rate only captures effects of inflation and sometimes it is difficult to determine its tendency. Accordingly, increase in NEER value shows appreciation of local currency.

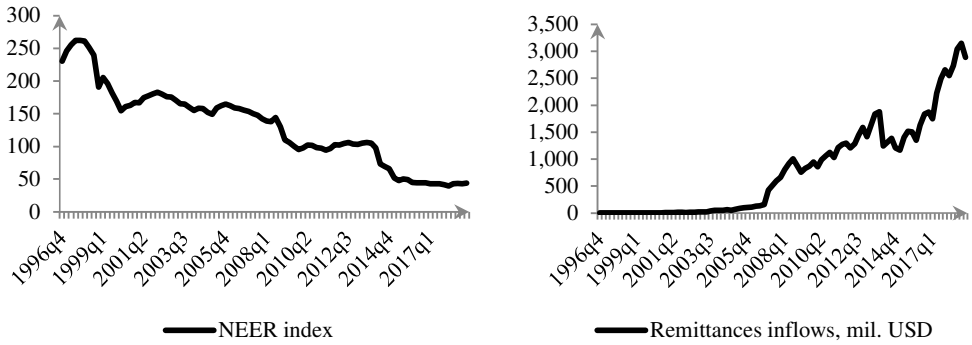

Fig.1: Dynamics of NEER of Ukrainian hryvnia and its relationship with remittances inflows in 1996-2019. Source: IMF International Statistics Database, IMF Balance of Payments Database

NEER index of Ukrainian hryvnia demonstrates descending trend, it has depreciated by 81% since the beginning of the research. Contrary remittances inflows increased significantly. We can assume existence of some kind of relationships between these indicators (Fig.2).

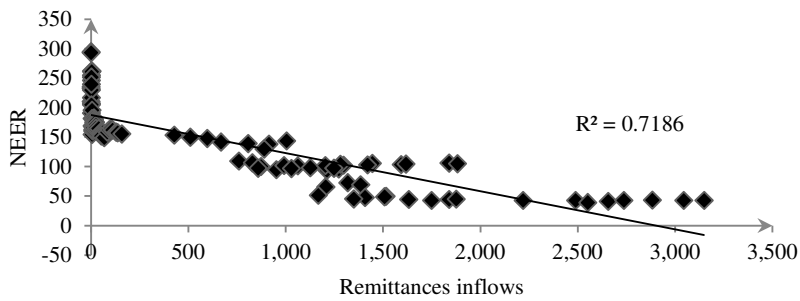

Fig.2: Graphic interpretation of linear relation between NEER and remittances inflows.

Source: IMF International Statistics Database, IMF Balance of Payments Database

Graphic interpretation supports an idea of existence of relationship between NEER and remittances inflows. Consequently, we are going to estimate a linear regression with a trend component using ordinary least squares method (1).

$$NEER = \beta_1 Remit + \beta_0 + t + \varepsilon_t, , \quad (1)$$

where NEER - nominal exchange rate; Remit – remittances net inflows.

In case of presence of significant autocorrelation we are going to check autoregressive distributive lag model (ARDL) or error-correction model (ECM) if data are stationary (2).

$$\Delta NEER_t = \beta_0 + \sum_{i=1}^{n} \beta_i \, \Delta NEER_{t-i} + \sum_{i=0}^{n} \delta_i \, \Delta REMIT_{t-i} + t + \mu_t, \quad (2)$$

where $\Delta NEER_{t-i}$ – change in nominal exchange rate with the time lag; $\Delta REMIT_{t-i}$ – change in remittances net inflows with the time lag.

As exchange rate adjusts to changes in trade volumes relatively quickly, we decided to use quarterly data, which were extracted from International Monetary Fund International Financial Statistics and Balance of payments databases.

Tab. 1: Data summary. Source: IMF International Statistics Database, IMF Balance of Payments Database

Variable	Number of observations	Mean	Standard deviation	Minimal value	Maximum value
NEER	90	131,2871	60,53331	39,58323	262,4165
Remittances inflows	90	807,5111	865,7412	1	3148

Additionally we conducted deseasoning of data and its standardization.

Results and Discussion

The first step is estimation of liner model with trend component. Results showed statistical significance of remittances variable, trend and constant. Regression coefficient showed that steady increase in remittances inflows maintain NEER depreciation. Trend showed inverse relationship with NEER (Table 3). But postestimation for autocorrelation by Durbin-Watson and Breusch-Godfrey LM tests revealed significant autocorrelation.

Also we found optimal lag structure for NEER and remittances inflows variables by likelihood-ratio tests using AIC criteria. In particular, for NEER optimal is lag 1, for remittances – lag 2. Considering obtained lag structure we conducted augmented Dickey-Fuller test (Dickey & Fuller, 1979) and found that data is stationary, as z-criteria for NEER is -1,306 and for remittances 1,929.

In such case we performed bound test developed in Pesaran et al., (2001) to test existence of cointegration. Additionally this test allows defining whether the remittances have short-run or long-run impact on NEER.

Tab. 2: Bound test results. Source: author's calculations.

Value	0,05	0,01
	I0 - I1	I0 - I1
F = 3,903	4,94 - 5,73	6,84 - 7,84
t = -2,785	-2,86 - -3,22	-3,43 - -3,82

At 5- and 1-% level of significance bound test demonstrated absence of cointegration, so we can use ARDL model to estimate short-term impact of remittances. ARDL model was also estimated by OLS method and showed significance of NEER with lag 1 and remittances inflows with lag 2. The other important point is that in ARDL model trend variable is not statistically significant.

Tab. 3: Results of models estimation. Source: author's calculations.

Variable	Model 1	Model 2
$NEER_{t-1}$	-	0,8829 (0,000)
$Remit_t$	0,1433721 (0,03)	0,10295 (0,316)
$Remit_{t-1}$	-	0,19 (0,199)
$Remit_{t-2}$	-	-0,2922 (0,007)

trend	-0,039157 (0,000)	-0,0042 (0,125)
Constant	1,649887 (0,000)	0,7497 (0,113)
F	566,01	909,2
F>0	0,0000	0,000
R^2	0,9224	0,9823
Root MSE	0,266129	0,1241
Durbin-Watson d-statistics	0,258	1,882
Breusch-Godfrey LM test, chi^2	68,185	1,881
Breusch-Pagan / Cook-Weisberg test, chi^2	23,87	21,03

In current situation, NEER with lag1 depreciates current value of NEER. Finally, increasing remittances inflows with lag 2 also depreciates current NEER value, which supports Hien's (2019) suggestion that Dutch disease effects do not occur if share of remittances in GDP is greater than 1%. Other possible explanation for depreciating effect of remittances inflows into Ukrainian economy could be investment of the latter into non-tradable sector of the economy. However, this needs further confirmation.

Conclusion

As the result of conducted research, we confirmed existence of relationship between NEER and remittances inflows. By estimation of linear regression model with trend component and ARDL model we demonstrated that this relation is not caused by trend, but by NEER with lag 1. The result that needs further investigation is the reverse relationship between remittances inflows with lag 2 and NEER in current period. The possible explanation for this could be the fact that remittances are used for investing in a short-run after inflow. Such interpretation was reported by Yang (2008), as the result of research of migrants' exchange rates shocks in Filipino economy. However, when it comes to Ukrainian economy the reasons for such dependence need to be further analyzed and interpreted.

This study contributes to the theory in several ways. First of all, it constitutes the study on interdependence between remittance inflows and trend of country's currency based on the Ukraine and its hryvnia exchange rate. Moreover, the findings of this study can also be relevant to practice as they give - in wider perspective - some recommendations to the governments and policymakers on how to increase the effectiveness and performance of the economy. And this for sure would be very beneficial to the economic development of the country. On the other hand, some limitations of our studyshould also be noted. First of all the situation of the country is - at least to some extent – deteriorated by its internal problems (mostly war in Donbas). That's why it would be really interesting to make some cyclical research (for example every 2-5 years) to check how the situation changes. Despite this limitation we believe that our paper gives a real picture of the situation in the country analysed.

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A System for Generating Accounting in Accordance with International Financial Reporting Standards Based on A Risk-Based Approach

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Abstract

The article deals with the features of assets accounting and valuation, liabilities and capital in the system of formation of risk-based financial reports based on the principles of international financial reporting standards (IFRS). The authors indicate innovations in appraisal of assets value, liabilities and capital, and highlight the accounting innovations arising from this, focused on the task of financial statements generating at fair value. In addition, the authors draw attention to the need to recalculate the fair value of assets, liabilities and capital, and, thus, its gradual approximation to the truth. It performs the need to use tridimensional measurement of financial reports using indicators at fair value, at face value, and deviations between them. Such approach to the formation of financial reports will increase the investment attractiveness and company's creditworthiness. Investors, shareholders and creditors will see the lower and the upper change ranges of financial indicators in the reports and have ideas about how assets, liabilities and capital can change when implementing a risk management system.

Keywords: international financial reporting standards, IFRS principles, financial reports, market valuation, financial accounting, risk-based approach.

Introduction

Global financial crisis has exposed the imperfection and even poor quality of companies' financial reports. Investors, shareholders, and creditors started placing higher demands to companies' financial reports. They talked about the need to take into account risks and formation of integrated reporting, which can combine not only financial but also other types of company's capital. In other words, there was a need for combination of cost and risk-based approaches in the formation of integrated and financial reports of the companies. One way or another, the assessment of all types of capital should be performed through the economic benefit, expressed in the components of financial capital. Therefore, the primary

task is to improve the appraisal of the company's financial capital. New approaches to appraisal of assets value, liabilities and capital predetermine innovations in the field of accounting, focused on obtaining indicators of financial statements in the required dimensions.

Relevance. Formulation of the problem

Global changes in approaches to preparation of the companies' financial reports started together with the global financial crisis *(Application of the IFRS: Part 3, 2016), (Alcantud, Rambaud and Torrecillas, 2017)*. The key point in preparation of financial reports is the need to take into account possible risks during its preparation. In other words, regulatory state and supranational institutions focus on the formation of risk-based financial reports. Fair value measurement standard for assets values, liabilities and capital appeared, the key point of this standard is discounting, due to which it is planned to ensure risks management in financial reports *(Drugilinskya, 2012), (Nauta, 2017), (Trubitsina and Bashkin, 2017), (Clean Technologies and Sustainable Development, 2017) (Perko and Mlinarič, 2016)*. It is clearly seen when we use discounting and form risk-oriented financial statements, it reflects situations with delay in payment (instalment of date), and such situations are widely used in real-world terms of the companies. Discounting is one of the methods of the income approach; it along with the cost and market approaches is used for fair value measurement of assets, liabilities and capital. Tatiana M. Mezentseva, Vladislav Y. Shatyi take notice of the features of discounting in the process of determining the fair value in their works *(Mezentseva and Shatyi, 2017)*. J. Jaunzeme *(Jaunzeme, 2019)* gives particular attention to the holistic approach of fair value measurement.

The authors Vera P. Sidneva, Olesya I. Kostenko *(Sidneva and Kostenko, 2014)* describe the problems of using of fair value concept in Russia, their solutions and further prospects. Loic Belze, Francois Larmande, Lorenz Schneider draw attention to risks modeling in fair value measurement *(Belze, Larmande and Schneider, 2019)*.

The impact of the fair value accounting concept using to the quality of financial statements of business entities is described by S.N. Islambegovic, E. Delic *(Islambegovic and Delic, 2019)*. Insufficient quality of financial reporting is mentioned in the works of NTH Thuong, R.C. Zhang, Z.M. Li, P.T.D. Hong *(Thuong et al., 2018)*, D. Davydov, S. Swidler *(Davydov and Swidler, 2016)*, I. Perko, F. Mlinaric *(Perko and Mlinarich, 2016)*.

Factors affecting the quality of financial statements are described by T.H.U. Akuntansi *(Akuntansi, 2019)*. The relationship between financial reporting quality and debt is described in D.C. Donelson, R. Jennings, J. Mcinnis *(Donelson, Jennings and Mcinnis, 2017)*. The insufficient quality of the notes to the financial statements is indicated by M. Randakova *(Randakova, 2015)*.

Such authors as V.-O. Muller *(Muller, 2012)*, J.E. McEnroe *(McEnroe, 2007)*, talk about the influence of financial statements quality on the company's investment attractiveness.

Improvement of information quality with the help of reflecting risks in financial reports is de-scribed in the work of M. Nichita *(Nichita, 2018)*.

In case with delay in payment (instalment of date) the fair value of assets, liabilities and capital is determined precisely by the discount method within the framework of the income approach. The logic of report preparation follows from the fact that for preparation of risk-oriented financial report it is necessary the related assets, liabilities and capital be in the report at a discounted value. At the same time, the discounted value changes over time, and these changes should include adjustments to the financial statements.

The use of fair value measurements in accounting determines the appearance of a two-component structure of the initial cost of related assets, liabilities and capital:

1) assets fair value is equal to the fair value of liabilities (capital);
2) difference between the transaction price and the fair value of assets (liabilities, capital).

The resulting accounting features on the example of fixed assets and related payables are presented in Table 1.

The emergence of a two-component structure for the initial cost of related assets, liabilities and capital completely changes the accounting system. Therefore, the purpose of this article is to designate the

innovations in accounting and valuation of assets, liabilities and capital in accordance with IFRS in a situation with delay in payment (instalment of date).

Theoretical part

Table 1: accounting innovations in connection with fixed assets evaluation and credit debts at fair value recognition

(Source: compiled by the authors)

No.	Accounting transaction	Changes in the statement of financial position		Comments to determine the amount
		asset	liability	
1. Received equipment that does not require installation				
1.1	The fair value of equipment without VAT (fair value of accounts payable without VAT)	Fixed assets +	Accounts payable to suppliers +	Equipment fair value without VAT (fair value of accounts payable without VAT)
1.2	VAT calculated with equipment fair value (fair value of accounts payable)	VAT on acquired values	Accounts payable to suppliers +	VAT calculated with equipment fair value (fair value of accounts payable)
1.3	Difference between the transaction price without VAT and equipment fair value without VAT (fair value of accounts payable without VAT)		Undistributed profits - Estimated liabilities +	Difference between the transaction price without VAT and equipment fair without VAT (fair value of accounts payable without VAT)
1.4	VAT calculated from the difference between the transaction price and equipment fair value (fair value of accounts payable)	VAT on acquired values	Estimated liabilities +	VAT calculated from the difference between the transaction price and equipment fair value of (fair value of accounts payable)

The innovations in accounting for revenue and receivables under IFRS using the Russian chart of accounts under a sales contract are presented in Table 2.

Table 2: contract revenue and account receivable innovations IFRS sales with valuation of assets and income at fair value

(Source: compiled by the authors)

Accounting transaction	Changes in the statement of financial position		Comments to determine the amount
	asset	liability	
The following operations are carried out in the accounting records for each coming date of payment by the buyer in accordance with the schedule of payments of the contract			
Reflected sales of products	Accounts receivable +	Retained earnings +	Transaction price with VAT
Reflected VAT on sales		Retained earnings - Accounts payable +	VAT, calculated on the price of the transaction
The difference between the transaction price without VAT and the fair value of revenue (receivables) (provision for doubtful debts) is reflected	Accounts receivable –	Retained earnings –	The difference between the transaction price excluding VAT and the fair value of revenue (receivables)

The fair value of assets, liabilities and capital changes over time, therefore, in order to ensure the accuracy of financial statements *(Application of the IFRS: Part 3, 2016), (Alcantud, Rambaud and Torrecillas, 2017), (Drugilinskya, 2012), (Nauta, 2017), (Trubitsina and Bashkin, 2017), (Clean Technologies and Sustainable Development, 2017), (Perko and Mlinarič, 2016)*, it is necessary to recalculate the fair value of assets, liabilities and capital. Recalculation of fair value, for example, of fixed assets, should be carried out according to one of two options:

1) upon the next payment date to the supplier in accordance with the schedule of payments of the contract;

2) at the end of the reporting period due to the need to take into account changes in the time value of money.

Similarly, in the above example, the translation of related credit debt should be carried out.

On the example of fixed assets and related payables, the first version of the accounting policy of the enterprise is presented in table 3, the second version of the accounting policy of the enterprise is presented in table 4.

Table 3: first version of accounting policy
(Source: compiled by the authors)

Additional operations for the first version of accounting policy				
№	Accounting transaction	Accounting treatment		Comments on transaction amount determination
		asset	liability	
The following operations are carried out in the accounting records for each due date of payment to the supplier in accordance with the schedule of payments of the contract				
1	Reflected increase in accounts payable to the supplier (upon maturity)		Estimated liabilities – Accounts payable +	Part of difference between the transaction price with VAT and the fair value with VAT payable at the payment date according to the schedule of the contract (the proportion corresponding to the current payable ratio to the supplier)
2	Reflected increase in the initial (fair) cost of equipment	Fixed assets +	Retained earnings +	Part of the difference between the transaction price excluding VAT and the fair value of equipment excluding VAT (the proportion corresponding to the current payment ratio of payables to the supplier)
3	Accrued depreciation of equipment in connection with an increase in the initial (fair) value	Fixed assets –	Retained earnings –	Additional depreciation based on the increase in the fair value of the equipment without VAT (calculated on the part of the difference between the transaction price without VAT and the fair value of the equipment without VAT (the proportion corresponding to the current payment ratio of payables to the supplier))
4	Paid to the supplier for the equipment (payables to the supplier are repaid on the date of the next payment)			
4.1	Paid part of the fair value of equipment with VAT	Cash –	Accounts payable –	Part of the transaction price with VAT

Table 4: second version of accounting policy
(Source: compiled by the authors)

Additional operations for the second version of accounting policy				
№	Accounting transaction	Accounting treatment		Comments on transaction amount determination
		asset	liability	
The following operations are carried out in accounting 1 time at the end of the reporting year due to changes in the time value of money				
1	Reflected increase in accounts payable to supplier		Estimated liabilities – Accounts payable +	Change in the value of accounts payable due to changes in the time value of money
2	Reflected increase in the initial (fair) cost of equipment	Fixed assets +	Retained earnings +	Part of the difference between the initial fair value of equipment excluding VAT and restated fair value of equipment without VAT
3	Accrued depreciation of equipment in connection with an increase in the initial (fair) value	Fixed assets –	Retained earnings –	Additional depreciation calculated on the basis of an increase in the fair value of equipment, excluding VAT, as a result of a translation based on a change in the time value of money

There are no transactions to pay the supplier in the second case because the situation is not related to settlements with the creditor.
Therefore, the fair value of property, plant and equipment is equal to the fair value of accounts payable at the time of recognition. Subsequently, the difference between the transaction price and the fair value of property, plant and equipment (accounts payable) is recounted.
On the example of receivables and related revenue, the first version of the accounting policy of the enterprise is presented in Table 5, the second version of the accounting policy of the enterprise is presented in Table 6.

Table 5: innovations in accounting for revenue and receivables under a sales contract under IFRS using the Russian chart of accounts (first version of accounting policy)
(Source: compiled by the authors)

Accounting transaction	Accounting treatment		Comments on transaction amount determination
	debit	credit	
The following operations are carried out in accounting at each coming date of payment by the buyer in accordance with the schedule of payments of the contract			
Reflects the decrease in the difference between the transaction price excluding VAT and the fair value of revenue (receivables) (the reserve for doubtful debts in terms of payment received from customers was restored)	Accounts receivable +	Retained earnings +	Part of the difference between the transaction price excluding VAT and the fair value of revenue excluding VAT, corresponding to the share of payment
Payment received from buyers (part of the transaction price with VAT)	Bankroll + Accounts receivable –		Part of payment (part of the transaction price with VAT)

Table 6: innovations in accounting for revenue and receivables under a sales contract under IFRS using the Russian chart of accounts (second version of accounting policy)
(Source: compiled by the authors)

Accounting transaction	Accounting treatment		Comments on transaction amount determination
	debit	credit	
The following operations are carried out in accounting 1 time at the end of the reporting year in connection with a change in the time value of money			
Reflects the decrease in the difference between the transaction price excluding VAT and the fair value of revenue (receivables) (reserve for doubtful debts was restored due to changes in the time value of money)	Accounts receivable +	Retained earnings +	Decrease in the difference between the transaction price excluding VAT and the fair value of revenue excluding VAT due to changes in the time value of money

There are no payment transactions in the second version of accounting policy because the situation is not related to settlements with the debtor.
Therefore, the fair value of revenue equals the fair value of receivables at the time of recognition. Subsequently, the difference between the transaction price and the fair value of the proceeds (receivables) is recounted.
At the next stage, we present the procedure for recalculating fair value using fixed assets as an example.
First version of accounting policy
An increase in the fair value of property, plant and equipment due to the date of payment is equal to the part of the difference between the transaction price excluding VAT and the fair value excluding VAT:

$$\Delta_{FA} = D_{excl\,VAT} \cdot S, \quad (1)$$

where Δ_{FA} is the increase in the fair value of fixed assets in connection with the due date of payment, rubles;
$D_{excl\,VAT}$ is the difference between the transaction price without VAT and the fair value of equipment without VAT (fair value of accounts payable without VAT), rubles;
S is the share of payment amount.
Second version of accounting policy
An increase in the fair value of property, plant and equipment due to changes in the time value of money is calculated using the formula:

$$\Delta_{FV_{FA}}^{D_{incl\,VAT}} = \left[D_{excl\,VAT} \cdot 120/100 - \left(TP_{incl\,VAT} - \frac{TP_{incl\,VAT}}{(1+i)^{n-1}}\right)\right] \cdot 100/120, \quad (2)$$

where $\Delta_{FV_{FA}}^{D_{incl\,VAT}}$ is the increase in the fair value of property, plant and equipment due to changes in the time value of money, rubles;
$TP_{incl\,VAT}$ is the transaction price with VAT, rubles;
i is the discount rate;
n is the period corresponding to the remaining period until repayment of accounts payable.
To assess the degree of influence of factors on indicators Δ_{FA} and $\Delta_{FV_{FA}}^{D_{incl\,VAT}}$ we set out intermediate indicators $D_{excl\,VAT}$ and $TP_{incl\,VAT}$ as follows:

$$D_{excl\,VAT} = TP - FV_{FA} = TP - \frac{TP}{(1+i)^n}; \quad (3)$$

$$TP_{incl\,VAT} = 1{,}2 \cdot TP, \quad (4)$$

where TP is the transaction price without VAT, rubles;

FV_{FA} is the fair value of equipment excluding VAT (fair value of accounts payable excluding VAT), rubles, equal $\frac{TP}{(1+i)^n}$.

Then, taking into account the formulas (3) and (4), formulas (1) and (2) will be:

$$\Delta_{FA} = D_{excl\,VAT} \cdot S = \left(TP - \frac{TP}{(1+i)^n}\right) S = TP \cdot S \left(1 - \frac{1}{(1+i)^n}\right); \quad (5)$$

$$\Delta_{FV_{FA}}^{D_{incl\,VAT}} = \left[D_{excl\,VAT} \cdot 1{,}2 - \left(TP_{incl\,VAT} - \frac{TP_{incl\,VAT}}{(1+i)^{n-1}}\right)\right] / 1{,}2 =$$

$$= TP - \frac{TP}{(1+i)^n} - TP_{incl\,VAT}/1{,}2) \left(1 - \frac{1}{(1+i)^{n-1}}\right) =$$

$$= TP - \frac{TP}{(1+i)^n} - TP\left(1 - \frac{1}{(1+i)^{n-1}}\right) =$$

$$= TP \cdot \left(1 - \frac{1}{(1+i)^n} - 1 + \frac{1}{(1+i)^{n-1}}\right) =$$

$$= TP \frac{i}{(1+i)^n}. \quad (6)$$

Let's consider the influence of the factors "share of payment amount S", "discount rate i" and "the period corresponding to the remaining period until repayment of accounts payable$n$" on the indicators Δ_{FA} and $\Delta_{FV_{FA}}^{D_{incl\,VAT}}$. As factor models (5) and (6) are nonlinear, we use the differential method of factor analysis, based on the expansion of the factor model in a Taylor series and discarding terms containing derivatives of the second and higher orders:

$$\Delta_{FA(1)} = \Delta_{FA(0)} + \frac{\partial(\Delta_{FA})}{\partial S} \Delta S + \frac{\partial(\Delta_{FA})}{\partial i} \Delta i + \frac{\partial(\Delta_{FA})}{\partial n} \Delta n; \quad (7)$$

$$\Delta_{FV_{FA}(1)}^{D_{incl\,VAT}} = \Delta_{FV_{FA}(0)}^{D_{incl\,VAT}} + \frac{\partial\left(\Delta_{FV_{FA}}^{D_{incl\,VAT}}\right)}{\partial i} \Delta i + \frac{\partial\left(\Delta_{FV_{FA}}^{D_{incl\,VAT}}\right)}{\partial n} \Delta n, \quad (8)$$

where $\Delta_{FA(1)}$ and $\Delta_{FV_{FA}(1)}^{D_{incl\,VAT}}$ – are the values of indicators Δ_{FA} and $\Delta_{FV_{FA}}^{D_{incl\,VAT}}$ under final values of factors S, i и n;

$\Delta_{FA(0)}$ and $\Delta_{FV_{FA}(0)}^{D_{incl\,VAT}}$ – are the values of indicators Δ_{FA} and $\Delta_{FV_{FA}}^{D_{incl\,VAT}}$ under the initial values of factors S, i и n;

$\frac{\partial(\Delta_{FA})}{\partial S}$, $\frac{\partial(\Delta_{FA})}{\partial i}$, $\frac{\partial(\Delta_{FA})}{\partial n}$ – are the private derivatives of an indicator Δ_{FA} by factors S, i and n with average values of factors S, i и n, equal $TP\left(1 - \frac{1}{(1+i)^n}\right)$, $TP \cdot S \frac{n}{(1+i)^{n+1}}$ and $TP \cdot S \frac{\ln(1+i)}{(1+i)^n}$;

$\frac{\partial\left(\Delta_{FV_{FA}}^{D_{incl\ VAT}}\right)}{\partial i}$, $\frac{\partial\left(\Delta_{FV_{FA}}^{D_{incl\ VAT}}\right)}{\partial n}$ – are the private derivatives of an indicator $\Delta_{FV_{FA}}^{D_{incl\ VAT}}$ by factors i and n with average values of factors i and n, equal $-TP\frac{i(n-1)-1}{(1+i)^{n+2}}$ and $-TP\frac{i\cdot\ln(1+i)}{(1+i)^{n}}$;

ΔS, Δi, Δn are the intervals of magnitude of factors change S, i and n.

Then factor models (7) and (8) will be:

$$\Delta_{FA(1)} = \Delta_{FA(0)} + TP\left(1-\frac{1}{(1+i)^{n}}\right)\Delta S + TP\cdot S\frac{n}{(1+i)^{n+2}}\Delta i + TP\cdot S\frac{\ln(1+i)}{(1+i)^{n}}\Delta n; \quad (9)$$

$$\Delta_{FV_{FA}(1)}^{D_{incl\ VAT}} = \Delta_{FV_{FA}(0)}^{D_{incl\ VAT}} - TP\frac{i(n-1)-1}{(1+i)^{n+2}}\Delta i - TP\frac{i\cdot\ln(1+i)}{(1+i)^{n}}\Delta n. \quad (10)$$

Practical significance

Let the transaction price without VAT (TP) is 5 million rubles, initial factors: S – 0.4; i – 20 %; n – 2 years, , final factors: S – 0.6; i – 30 %; n – 4 years, middle factors: S – 0.5; i – 25 %; n – 3 years, factor change intervals: S – 0.2; i – 10 %; n – 2 years.

Assessment of the degree of influence of factors on Δ_{FA} will be as follows:

$$\Delta_{FA(0)} = TP\cdot S\left(1-\frac{1}{(1+i)^{n}}\right) = 5\times 0.4\left(1-\frac{1}{(1+0.2)^{2}}\right) = 0.6111;$$

$$\Delta_{FA(1)} = \Delta_{FA(0)} + \Delta(\Delta_{FA})_{(S)} + \Delta(\Delta_{FA})_{(i)} + \Delta(\Delta_{FA})_{(n)} =$$
$$= 0.6111 + 0.4880 + 0.3072 + 0.5712 = 1.9776;$$

$$\Delta(\Delta_{FA}) = \Delta_{FA(1)} - \Delta_{FA(0)} = 1.9776 - 0.6111 = 1.3664.$$

Degrees of influence of factors S, i and n will be:

– factor S: $\delta(\Delta_{FA})_{(S)} = \frac{\Delta(\Delta_{FA})_{(S)}}{\Delta(\Delta_{FA})}\cdot 100\ \% = \frac{0.4880}{1.3664}\cdot 100\ \% = 35.714\ \%$;

– factor i: $\delta(\Delta_{FA})_{(i)} = \frac{\Delta(\Delta_{FA})_{(i)}}{\Delta(\Delta_{FA})}\cdot 100\ \% = \frac{0.3072}{1.3664}\cdot 100\ \% = 22.482\ \%$;

– factor n: $\delta(\Delta_{FA})_{(n)} = \frac{\Delta(\Delta_{FA})_{(n)}}{\Delta(\Delta_{FA})}\cdot 100\ \% = \frac{0.5712}{1.3664}\cdot 100\ \% = 41.803\ \%$.

Thus, under given conditions, the degree of influence of factors on decrease of Δ_{FA} is tantamount, but the greatest impact on the growth of Δ_{FA} is caused with period change n from 2 years to 4 years.

Assessment of the degree of influence of factors on $\Delta_{CC_{OC}}^{P_{cHJC}}$ will be as follows:

$$\Delta_{FV_{FA}(0)}^{D_{incl\ VAT}} = TP\frac{i}{(1+i)^{n}} = 5\times\frac{0.2}{(1+0.2)^{2}} = 0.6944;$$

$$\Delta_{FV_{FA}(1)}^{D_{incl\ VAT}} = \Delta_{FV_{FA}(0)}^{D_{incl\ VAT}} - \Delta\left(\Delta_{FV_{FA}}^{D_{incl\ VAT}}\right)_{(i)} - \Delta\left(\Delta_{FV_{FA}}^{D_{incl\ VAT}}\right)_{(n)} =$$
$$= 0.6944 - (-0.1024) - 0.2856 = 0.5112;$$
$$\Delta\left(\Delta_{FV_{FA}}^{D_{incl\ VAT}}\right) = \Delta_{FV_{FA}(1)}^{D_{incl\ VAT}} - \Delta_{FV_{FA}(0)}^{D_{incl\ VAT}} = 0.5112 - 0.6944 = -0.1832.$$

Degrees of influence of factors i and n will be as follows:

– factor i: $\delta\left(\Delta_{FV_{FA}}^{D_{incl\ VAT}}\right)_{(i)} = \frac{\Delta\left(\Delta_{FV_{FA}}^{D_{incl\ VAT}}\right)_{(i)}}{\Delta\left(\Delta_{FV_{FA}}^{D_{incl\ VAT}}\right)} \cdot 100\ \% = \frac{0.5112}{-0.1832} \cdot 100\ \% = -55.895\ \%$;

– factor n: $\delta\left(\Delta_{FV_{FA}}^{D_{incl\ VAT}}\right)_{(n)} = \frac{\Delta\left(\Delta_{FV_{FA}}^{D_{incl\ VAT}}\right)_{(n)}}{\Delta\left(\Delta_{FV_{FA}}^{D_{incl\ VAT}}\right)} \cdot 100\ \% = \frac{-0.6944}{-0.1832} \cdot 100\ \% = 155.895\ \%$.

Thus, under given conditions, the greatest influence on the decrease $\Delta_{FV_{FA}}^{D_{incl\ VAT}}$ had a change in the period n from 2 years to 4 years.

Based on the presented models (9) and (10), the following conclusions can be drawn:

1) an increase in the fair value of fixed assets due to the due date of payment and due to a change in the time value of money depends on the difference between the transaction price excluding VAT (TP) and the fair value of fixed assets without VAT (FV_{FA}) and the greater the greater the difference between TP and FV_{FA};

2) the fair value of property, plant and equipment and related payables as a result of restatements is gradually approaching the nominal value. The same thing happens to revenue and receivables.

Conclusion

Summing up, we note the following important points.

1. The two-dimensional structure of the initial cost of assets, liabilities and capital in accordance with the IFRS valuation assumes the separation of the difference between the transaction price and the fair value of a separate item of other expenses (retained earnings in OFP) in correspondence with estimated liabilities in the case of acquisition transactions, or under reserves for doubtful debts in correspondence with the sales account (retained earnings in OFP) in case of sales operations.
2. As a result of recalculation of the fair value of assets, liabilities and capital, their value gradually approaches nominal value.
3. The difference between the transaction price and fair value should be considered as an indicator of financial potential (stock of financial strength) for assets, liabilities and capital. Therefore, the financial statements must contain a 3-dimensional measurement of indicators: fair value, nominal value and deviation.

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Product Innovation for Older People - Consumer Requirements on The FMCG Market

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Abstract

Population aging is a multi-dimensional phenomenon considered in terms of demography, medicine, psychology, sociology and economics. Along with the process of human aging, humans are subject to general changes in their bodies in the physical, physiological and mental spheres, all of which changes their market behaviors. The importance of recognizing the attitudes of older people in the process of purchasing products is primarily due to the fact that Poland is the fastest-aging country in the European Union. Poland has a serious demographic problem, as the number of elderly residents is constantly increasing. In 2018, the number of people aged 60 was over 9.5 million, or 24% of the population, and in 2050 it will be almost 14 million, or 40% of the population. In 'The 2015 Aging Report' published by the European Commission, referring to economic and demographic forecasts until 2060, Poland was indicated as one of the countries that will be most affected by the phenomenon of an aging population. A stereotype exists in the media of older people being maladjusted when it comes to any environmental change and not being open to market novelties. Research results, however, show that the senior consumer segment is very diverse. For this reason, the objective of this research was to define the requirements of older consumers for new products. This research was carried out in Poland in 2018 on a sample of 1617 people.

Keywords: Consumer Behavior, Senior Consumer, Product Innovation, Elderly People, Consumer Innovativeness

Introduction

Population aging is considered to be the most significant demographic change affecting all spheres of socioeconomic life, often determining social, economic, cultural and medical consequences of which we are unaware. In many European countries, and above all in Poland, this trend has been on the rise in recent years, and the effects are becoming increasingly noticeable. At the end of 2018, the population of Poland amounted to 38.4 million, including over 9.5 million people aged 60 and over. The share of people aged 60 or older in the general population has increased in recent years by more than 10 percentage points, i.e. from 14.7% in 1989 to 24.8% in 2018. In addition, as indicated by the population forecast of the Central Statistical Office (GUS - Statistics Poland) in 2030, the percentage of older people in the population as a whole will reach 29.8%, in 2040 35.5%, and in 2050 41.4%. (*Information on the situation of the elderly in Poland for 2018*, 2019).

Population aging is a global phenomenon, which is particularly prevalent in developing countries. Therefore, for economists, the role of seniors as consumers has become the subject of numerous scientific considerations; a common thread therein is the statement that the market behavior of older people is highly diverse. At the same time, as is generally believed, the frequent lack of information on how seniors behave leads to the interpretation of their behavior based on specific stereotypes. However, it should be remembered that the actions of enterprises directing their products and services to seniors

based only on a false image may be ineffective, hence the need to permanently deepen knowledge about the market behavior of older people.

Method

Research among older people (it was assumed that a senior / older person is a consumer aged 60 years and over) was conducted with the help of a personal interview carried out in 2018 on a sample of 1617 people in Wielkopolska (Greater Poland). Wielkopolska is one of the largest regions in Poland (the second-largest region in terms of the territory in square meters (m^2)), and with the third-largest population - but with the lowest aging rate in the country (taking into account the number of people over 60). Product innovations appearing on the *fast-moving consumer goods* (FMCG) market were analyzed: food, health products - parapharmaceuticals / medical, cosmetics, and household chemicals.

Sample

The respondents were selected using the quota selection method; the structure of the sample examined according to the criterion of gender and age was the same as the structure of the elderly population in Wielkopolska. Based on the statistical chi-square (x2) test, the p-value was calculated, which was 0.74 (age) and 0.99 (gender) respectively (p-value > 0.005).

Table 1: Structure of the sample in 2018 (%)

Age groups	Together	Women	Men
60-64	36.8	57.5	42.5
65-69	27.3	58.8	41.2
70-74	16.3	55.7	44.3
75-79	9.2	61.5	38.5
Over 80	10.4	72.6	27.4

Source: Own research

Measures

As part of the analysis, descriptive statistics were used to determine the structure of the surveyed population: structure and intensity indicators (proportions, percentages), location and variability measures (mean and standard deviations). The coefficients of variation of two independent variables referred to the correlation between variables measured on a quantitative (student t-test) and qualitative (Kendall) scale (Akoglu, 2018; Croux and Dehon, 2010). While analyzing the information obtained, an exploratory factor analysis was carried out to isolate the synthetic main factors which determine the innovation behavior of senior consumers. The following analytical procedure was used in the article (Larose, 2005; Stewart, 1981):

a) determination of the degree of probability between individual variables - the use of Pearson's linear correlation coefficient as a measure of the similarity of variables of counterparts;
b) calculation of the usefulness of the data using the KMO (Kaiser-Meyer-Olkin) indicator and Bartlett's test;
c) calculation of the total explained variance, which shows to what extent the components explain the resource of common variation and allow the number of components to be interpreted;
d) using the principal components method, factor loadings for individual variables were determined. Varimax orthogonal rotation was used in each of the calculations carried out (significant factor loadings above 0.5).

Product Innovation

Every year, companies spend significant financial resources on research and development activities to create successful product innovations (Henard and Dancin, 2010). However, despite the fact that the innovations introduced on the market are technically and functionally much more effective than the existing versions, many of these innovations do not enjoy broad acceptance by consumers (Chiesa and Frattini, 2011; Cierpicki, Wright and Sharp, 2000). The acceptance of product innovations by consumers depends on their innovativeness and openness to what is new. Research to date indicates that consumer innovation significantly affects the acceptance of new products (Im, Mason and Houston, 2007; Im, Bayus and Mason, 2003).

The development of product innovations for seniors should take their requirements and expectations into account. Preparing innovations for seniors is problematic, because the creation of a new product for older consumers may in fact be categorically rejected by them (Leventhal, 1997). Seniors do not want to be treated specifically because of their age, but at the same time they expect innovations to meet their specific needs. The analyses carried out on the European market indicate numerous expectations which seniors have towards new products (*Etude 2015, Les Baby Boomers et l'innovation en France, Allemagne, UK et Espagne*, 2020). Older consumers expect that, above all, product innovations will positively improve their well-being and comfort, help change the perceived stereotypes associated with age, ensure less effort in the process of consumption and use, reduce energy consumption, simplify everyday activities and lead to time being saved.

The product innovations which are most anticipated by seniors are related to healthcare (Marsh and McLennan Companies, 2016). The future of health product innovation includes the development of medical technologies which facilitate the production of health-monitoring electronic devices that can contribute to the improvement of treatment results through greater commitment related to compliance with doctors' guidelines, the use of "Uber Health" services, i.e. short-term nursing care on request, the development of devices improving the mobility of the elderly, especially in performing activities with their arms and legs, and extending mobile phone applications, enabling seniors to increase their knowledge of preventive healthcare.

The development of product innovations on the food market is also important. As indicated by NIELSEN analysis, among others (*The age gap. As global population skews older, its needs are not being met, 2014*, 2015), healthy nutrition is becoming a priority for 45% of the seniors surveyed. Expert analyses indicate that, in the future, the following food-related innovations for seniors will appear on the market:

- specialized dietary supplements rich in protein and functional ingredients that have been prepared to help rebuild the strength and energy of older people (Deutz, Matheson and Matarese, 2016),
- ready meals adapted to the specific health conditions of seniors (*Community Servings. Food as medicine, medically tailored, home-delivered meals can improve health outcomes for people with critical and chronic disease*, 2013),
- food products with a special smooth texture for elderly people who have problems chewing and swallowing (Arensberg, 2018),
- innovations to help in food consumption, including electric cups and spoons that can create the impression of taste for those seniors who have lost this sense due to old age or during the healing process (Cuthbertson and Murakoshi, 2015).

Results

One of the determinants of shaping attitudes towards innovation is the specific attitude of seniors to changes in the environment. Researchers have noted the diversified approach of seniors to changes in the environment, which are reflected in attitudes of activity or withdrawal (Stuart-Hamilton, 2006, p. 159). Research results indicate that the innovation of senior consumers, measured as interest in new products, should be assessed as moderate. Among respondents, one in three respondents (34.9%) is

interested in new products, but only one in ten (12.2%) looks for additional information and finally makes a purchase. Slightly more than one-fifth (22.3%) sometimes take note of product innovations, but rarely buy them.

Table 2: Interest in product innovations by senior consumers

How interested are you in innovative, new products?	%
I am not interested and I do not buy such innovative products	16.0%
I am not interested, but sometimes I buy such products – as and when I need them	28.2%
I know there are such products, I can see them in stores, but I rarely or never buy them	21.3%
I'm interested, sometimes I take note, but I rarely or never buy (for various reasons)	22.3%
I am interested in looking for information on and buying innovative products	12.2%

Source: Own research

A similar-sized group of respondents (21.3%) notice market novelties in stores, but rarely or never buy them. 44.2% are not interested in new products, although at the same time 28.2% of those not interested declare that they buy new products in certain cases.

The results of the survey clearly indicate the existence of two groups of seniors with different attitudes towards innovation: consciously innovative consumers (engaged in seeking information about new products and active shopping) and market conservative consumers (showing a lack of interest in product novelties). The largest group of respondents is a group which represented a full spectrum of various behaviors that can be characterized from cautiously innovative (sometimes interested but rarely or never buyers) to innovatively unaware (declaring a total lack of interest in new products, but not ruling out making a purchase in specific situations). The degree of interest in and purchase of product innovations is clearly influenced by the specific socio-demographic characteristics of older people.

Table 3: Correlation coefficients between selected variables and interest in product innovations among seniors

Variables	interest in innovation
Gender	$p < 0.05$
Age	-0.137^{**}
Education	0.108^{**}
Health	-0.221^{**}
financial situation	0.151^{**}
Social activity - meetings with family, friends, neighbors	-0.081^{**}
Social activity - meetings organized by the University of the Third Age, a senior club	-0.111^{**}
Social activity - meetings in the organization of helping others, housing estate, religious, volunteering	-0.113^{**}
Cognitive age	0.245^{**}
Optimism about the future	0.222^{**}

*** Correlation significant at 0.001.*
Source: based on research results.

The highest correlation coefficients are seen in the relationship between the degree of consumer innovation and the subjective well-being of senior consumers. Interest in product innovations is growing along with a better assessment of health, a more frequent feeling which seniors describe thus: "I feel younger than my calendar age indicates", as well as an optimistic view of the future. A positive correlation is also seen in the case of senior citizens' education and their assessment of their financial situation: better education and greater financial resources among older people translate into an active

interest in innovation. Complementing the description of the innovators involved in the senior group, it can be said that they are more pro-social (they are active in relationships, not only with family or friends, but are members of some social organizations).

To sum up, the research results indicate a small degree of consumer innovation among seniors, defined as: interest in new products, searching for information about new products, and declaring a willingness to try or include products in consumption (purchase). It seems that certain variables dominate the process of shaping older people's attitudes towards newness; the strong impact of subjective well-being is recognized, including health, age, and future plans. Undoubtedly, boundary conditions for showing interest are the financial situation of older people and social factors, because maintaining social relations at different levels promotes openness to product innovation. Acceptance of innovation often requires changes in existing consumer habits, forcing them to develop new ones.

One of the determinants of the market success of product innovations is the positive perception thereof by consumers and the adaptation of new products to their requirements (Kunz, Schmitt and Meyer, 2011). The results of research conducted among seniors indicate a two-dimensional understanding of their product innovations. Over three-quarters of seniors (75.9%) perceive the new product in absolute (groundbreaking) terms: innovation is a product that appears on the shelf for the first time (new for all consumers). At the same time, a significant proportion of respondents (over half of those surveyed, or 56.4%) interpret innovation as a modified product (incremental innovation) with greater benefits for the buyer (change in product attributes).

A very high degree of diversity in the opinions of seniors is associated with determining what is new in the subjective approach ("product innovation is a new product for me, because I am buying it for the first time"): 46.5% of respondents agree with this opinion, while 43.8% disagree. More than half of respondents (53.8%) do not see innovation in products that have undergone slight modifications to packaging and shape, as in new products (52.5%) targeted at other consumer segments that seniors are not personally interested in.

Table 4: Perception of product innovations by senior consumers

Dimensions of perception of innovation	Definitely	To a certain extent	Probably not	Definitely not	I don't know
New product: I am seeing it for the first time in the store, but I have never heard of it before	40.0%	35.9%	12.9%	4.6%	6.7%
New product: there used to be a similar product, but now it has been changed, modified, improved	13.5%	42.9%	27.3%	9.4%	6.9%
New product: the product is new to me, but I know that others already have it; it has been known to others for some time, but I am buying it for the first time	12.1%	34.4%	30.6%	13.2%	9.7%
New product: a well-known product - was once in stores but the packaging, its shape and label have changed	9.4%	25.3%	32.8%	21.0%	11.5%
The new product is new to me, but I know that others have been buying it for some time and that it is known to others; I do not buy it and I will not buy it	7.9%	24.5%	32.0%	20.5%	15.1%

Source: Own research

Interestingly, the opinions of seniors regarding the perception of market novelties are very similar taking into account the variables characterizing the examined segment of the population; individual

dimensions of product innovation are similarly understood by older people. This encourages the search for possibilities to deepen the inference for statistical analyses - factor analysis was used for this purpose.

Table 5: Matrix of rotated components - perception of product innovations by senior consumers

Matrix of rotated components		
Dimensions of perception of innovation	Component	
	1	2
New product: I am seeing it for the first time in the store, but I have never heard of it before		0.894
New product: there used to be a similar product, but now it has been changed, modified, improved		0.734
New product: the product is new to me, but I know that others already have it; it has been known to others for some time, but I am buying it for the first time	0.619	
New product: a well-known product - was once in stores but the packaging, its shape and label have changed	0.805	
The new product is new to me, but I know that others have been buying it for some time and that it is known to others; I do not buy it and I will not buy it	0.782	

Source: based on research results. KMO = 0,708; total explained variance = 65%.

The abovementioned analysis contributed to a clearer picture of the perception of product innovation; it turns out that seniors interpret market novelties in two dimensions:

a) as absolute innovations and incremental innovations related to the modification of existing products - these are basic innovations that change the perception of the product, provide benefits, but require changes in existing attitudes or behaviors,
b) as minor innovations - understood by seniors as products which had previously been available but which appeared on the market in a different form, or which have so far been available to other consumers.

The clear distinction of two dimensions by which seniors perceive product innovations suggests that they assess market novelties subjectively, through the prism of impact on changing existing habits or providing greater personal benefits.

The results of the study allow us to conclude that, despite the relatively low interest in innovation (as previously demonstrated), seniors formulate strict requirements for market novelties – to them, product innovations on the FMCG market are products which are either not yet on the market or which have been substantially modified. The precise definition of the dimensions of understanding product innovation by the target consumer segments, which will translate into the preparation of the market offer, promotes the acceptance thereof. Research results indicate that, for older people, the necessary features of a new product are: short-term presence on the shelf (new to everyone), product modernity (new formula, shape, appearance, or consistency), visually attractive packaging and innovative composition (new ingredients).

Table 6: Importance of new product components for older people (5 - very important, 1 - very unimportant)

Elements / attributes of product innovation	average
Recent presence in the store (no more than half a year) - new on the shelf	3.23
Modern formula, shape, look - pills, liquid, tablets, balls, leaves etc.	2.94
Visually attractive packaging – colorful, interesting	2.87
Innovative new product composition - new composition, new ingredients	2.85

Ecological raw materials in the product, ecological ingredients, ecological packaging	2.60
Reduced energy content (less caloric - less salt, etc.)	2.58
More health-promoting ingredients, more ingredients for beauty	2.44
Convenient packaging - they can be easily picked up, carried – lightweight	2.37
Beneficial effect on mood - you can feel better, look better, work better	2.36
A more efficient product -	2.09

Source: Own research

Ecological, health-related and ergonomic aspects were mentioned as elements of new products which were of lesser importance to the respondents. At the same time, it turns out that manufacturers' initiatives in implementing innovations based on increased performance are not rated highly by older people as attributes of product novelty.

The perception of product innovations confirms earlier conclusions about the strict requirements for enterprises which implement innovation strategy for the senior market. Two aspects which appear in the presented research results are surprising: the low importance of pro-health values as innovative product attributes (although this can be interpreted as a fear of absolute innovations, the appearance of unknown ingredients, as well as an expression of distrust of such changes) and the low level of significance attributed to the features of efficiency and effectiveness, which are present in many innovations. It would seem that the relatively worse financial situation of senior households prompts them to seek product innovations that allow for savings; perhaps, however, innovations based on aspects of efficiency or effectiveness are hardly understood by seniors and therefore underestimated by them.

The diversity of the understanding of the dimensions of product innovation by older people inclines to attempt to replace them with new synthetic factors.

Table 7: Matrix of rotated components - the importance of new product elements for the elderly

Matrix of rotated components			
The importance of new product elements	**Component**		
	1	**2**	**3**
Visually attractive packaging – colorful, interesting			0.832
Convenient packaging - they can be easily picked up, carried – lightweight	0.544		
Recent presence in the store (no more than half a year) - new on the shelf			0.713
Innovative new product composition - new composition, new ingredients		0.722	
Reduced energy content (less caloric - less salt, etc.)		0.784	
More health-promoting ingredients, more ingredients for beauty		0.673	
Beneficial effect on mood - you can feel better, look better, work better	0.587		
Modern formula, shape, look - pills, liquid, tablets, balls, leaves etc.	0.641		
Ecological raw materials in the product, ecological ingredients, ecological packaging	0.632		
A more efficient product	0.741		

Source: based on research results. KMO = 0.802; total explained variance = 61%.

Factor analysis allowed us to distinguish three coherent groups of ingredients which form the main synthetic types of innovation that are deemed important for older people:

a) functional innovations which increase functional benefits for seniors (light packaging, greater efficiency, changed shape, stronger impact),
b) popular innovations, in line with trends - in newly emerging products, seniors appreciate producers taking changes resulting from the prevailing fashion into account - in this case trends related to health, which is an important element of their lives,
c) innovations of "attractiveness", clearly visible to seniors - described by means of two variables, namely attractive colorful packaging and novelty on the store shelf; for older people, it is important for the new product to stand out either thanks to its new feature - "for the first time on the shelf," or because the visually appealing packaging catches the eye of consumers.

In summary, understanding innovation is a more diverse phenomenon than has been indicated by earlier observations. The attributes of new products which are considered innovative by seniors are assessed according to various criteria. The senior consumer seems to be full of contradictions - on the one hand, he or she has a real and practical view on the functionality of innovation as an indispensable element of a new product; on the other hand, the "perception" of innovation as an emotional dimension is also important for older people.

Research carried out in recent years indicates that it is not only absolute innovation as an attribute of a product that contributes to its effective acceptance by consumers. It is extremely important for consumers to perceive new products characterized by 'sensible' innovation - understandable and important for consumers, consisting of attributes which are attractive to them (Henard and Szymanski, 2001; Im and Workman, 2004). Therefore, it became deliberate to determine the potential changes perceived by older people as innovative, giving existing products the attributes of novelty.

Table 8: Changes to the existing product are rated as new and innovative

Changes	Definitely	To a certain extent	Probably not	Definitely not	I don't know
It is more energy efficient, more efficient	36.6%	40.4%	11.6%	6.1%	5.3%
It is cheaper to buy, and costs less to maintain	37.0%	36.0%	14.4%	7.1%	5.5%
Has additional functions, can be used more often	27.1%	46.5%	10.8%	6.7%	8.9%
Facilitates use, easier to use, simpler	22.4%	48.1%	14.9%	6.4%	8.2%
Changing the packaging for more convenient handling and storage	14.3%	41.6%	27.3%	9.7%	7.1%
Changing the packaging to make it more attractive	12.8%	29.2%	38.3%	13.4%	6.2%

Source: Own research

It is interesting that the vast majority of respondents (77%) assess changes to the product consisting of increasing its energy savings or performance as innovative. In light of the results presented earlier (seniors consider the attributes of energy savings and efficiency as an insignificant element of product innovations), the opinions of the respondents seem inconsistent.

Inherent contradictions in the opinions of seniors - on the one hand, the low rating of the attributes of energy savings and efficiency as important elements of the new product; on the other, the belief that such changes to existing products should be considered innovative - requires additional commentary. This is most likely due to problems with understanding changes, largely technical and technological, which might be unclear to older people; another possible interpretation is that seniors notice the disadvantages of the products used to date related to performance or energy consumption; hence their approval of the development of innovation in these dimensions, but in products already known to them.

Paradoxically, new products appearing on the market that meet the abovementioned requirements may raise doubts and fears related to their use. The specific views held by older people of innovation in this sense may be of fundamental importance to enterprises offering products for seniors: they should focus on modifying existing products in terms of energy efficiency and performance, and not introduce innovations that meet these requirements onto the market.

The second attribute which determines the classification of the product as innovative is product changes, consisting of increasing their functionality for consumers and reducing the price or costs associated with their maintenance. 70% of respondents also assess changes involving the improvement of ergonomic features of the current product as innovative. Diversified opinions relate to changes in product packaging: seniors appreciate changes in packaging consisting of increased ergonomics (55.9%), but also believe that changing to more attractive packaging is not an innovation (51.7%); older consumers perceive only those modifications that provide them with real benefits as innovative.

Conclusion

A declaration of limited interest in new products by the seniors surveyed does not prevent them from assessing innovation in existing and emerging products on the market. Product innovation in the eyes of older people not only means that such changes are noticeable, but above all is associated with providing real and useful new benefits to the consumer. Seniors clearly prefer aspects of the usefulness of innovation over emotional aspects, which are often attributes of new products. It is also possible to draw the conclusion that the clear two-dimensionality of perceiving product innovations (as absolute and incremental) may cause difficulties in interpreting the contents of the shopping basket of these innovations (seniors may experience uncertainty related to determining which products they buy and consume are innovative). This makes having unequivocal opinions on innovation by older consumers problematic. The results of the study confirm the statements indicating the practicality (rationality) of older people perceiving product innovation: changes made by producers must significantly provide "tangible" new benefits or increase existing ones, because only then are they understood by seniors as innovative.

The research and conclusions drawn have their limitations related to the adopted research procedure and the research method and technique used. It is worth emphasizing that the respondents' answers, and thus also the results of the research, are only of a declarative nature. Respondents' statements regarding attitudes are not always identical to subsequent decisions taken in commercial establishments. As mentioned before, a large number of seniors avoided unambiguous answers and it is difficult to predict their real behavior when shopping for product innovations. It should be emphasized that the research of older people is complicated due to the difficulty of reaching them and the small openness of seniors to enter into relationships with strangers, unknown persons.

When generalizing the conclusions on the attitudes of seniors towards product innovations, one should also remember the limitations resulting from the selected spatial scope of the research. They were implemented in Wielkopolska, a region with similar parameters describing the consumption and living conditions of Poles in selected product categories, but differing in many variables, e.g. the structure of the number of households, the amount of income obtained or the diversified supply of new FMCG products. You should also keep a distance to your research and be careful when making final conclusions. Consumer behavior sometimes undergoes dynamic changes in the face of the strong impact of various factors, and the literature underlines the ambiguity in determining the determinants of market behavior of seniors.

Despite the limitations, the research results have undoubtedly a practical dimension and can be useful both at the stage of creating new FMCG products, as well as in the process of managing the offer of products already on the market and their possible changes. Defining the attitudes of older people towards new products may facilitate the implementation of product innovation introduction processes on the market. The application value can be considered primarily to present the direction of changes desired by seniors in current FMCG products on the market. This provides a lot of information

necessary to understand the market behavior of seniors, especially in the context of the intensifying aging processes of the society, which results in an increase in the number of people aged 60 and more. The collected material can be used in the product portfolio management process, both at the stage of initiating and introducing innovations to the market, as well as at the stage of modifying existing products in order to obtain the approval of senior consumers.

In conclusion, it should be emphasized that research does not exhaust issues related to the behavior of senior consumers in the process of purchasing product innovations. It would be interesting to continue research work that will allow us to more accurately identify the following economic phenomena: identifying barriers to the purchase of product innovations, identifying areas of existing consumer risk and possible actions affecting their leveling, or thoroughly investigating hidden motives of senior consumers' behavior towards innovation. It would also be interesting to identify possible actions that change the attitudes of seniors towards innovation, as well as determine the preferred channels of obtaining information.

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The Analysis of The Impact of Selected Elements of Knowledge Management on The Functioning of The Enterprise

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Abstract

Knowledge has become the basis for understanding the processes taking place in the environment, the relationships between individual market entities and the effects of individual resource allocation models – which leads to build a unique competitive advantage. The review of definitions allows to state that knowledge management in enterprises is a complex, multi-aspect process requiring the implementation of a number of interrelated mechanisms and instruments. Only a well-constructed, implemented and modified system of knowledge management can ensure achieving the intended goals. In this paper the attempt of identification and evaluation of selected elements of knowledge management was made. The analysis was conducted in the context of communication and transfer of knowledge in enterprises in Poland in the context of their size and specificity of activity. The study was made in the group of 105 enterprises located in the southern part of Poland. This paper presents the results of research on the area of communication and knowledge transfer.

Keywords: Knowledge Management, Efficiency of Enterprise.

Introduction

Knowledge and its management are key success factors for companies operating on the market nowadays. Drucker (2009) says that one of the main features of good management is the enterprise's ability to learn. At the same time, he notes that, unlike the 20th century, when the most valuable resource of the company was the means of production, in the 21th century the most valuable resource of the organization are a knowledge worker and his performance. In this context, Toffler (1996) states that the value of effective enterprises is primarily related to their strategic skills associated with the acquisition, creation, distribution and use of knowledge. Hu and Randel (2014) emphasize that the ability to learn and development as well as knowledge transfer are recognized as the critical issues from the organization's growth and survival point of view as well as building a competitive advantage.

The importance of knowledge and intangible factors results from, among others, their specific features that can include (Obłój, 2014):

- possibility of simultaneous use in many places, processes by various entities,
- long-term process of accumulation, necessity of building inside the organization, difficulty in purchasing and standardization,
- lack of process of depreciation, development during use,
- inseparable relationship whit human resources; employees create, adapt, implement and use creatively elements of intangible resources.

The importance of knowledge management is demonstrated even by the intensive development and successes of the knowledge-based economy, the basic assumption of which are (Gabryś, 2001):

- treating knowledge as the most valuable resource of enterprises and economies,
- obtaining the highest competitive potential by products that the basic ingredient is knowledge,
- human capital that is the main source of knowledge in an enterprise and the only resource that can use it effectively; is the subject to the largest changes (in organizational, cultural and technical context) among all production factors,
- the highest level of added value occurs in the enterprises that assign a priority role to human capital (and thus knowledge) and possess skills together with the effective mechanisms allowing the use of external knowledge.

The role and the importance of knowledge and knowledge management is confirmed not only in theoretical but also practical context. Knowledge management enterprises are successful because they are strictly focused on a customer (Kaynak, 2003), strive to empower employees and use and develop their potential (Sadikoglu and Zehir, 2010), focus on continuous process improvement (Oke, 2007) and are associated with the development of an open organizational culture focused on learning (Kim et al, 2012). The results of research carried out by the American Productivity & Quality Center in large corporations with a recognized position and market reputation have shown the existence of large impact of knowledge management on the innovation potential of enterprises. This was mainly caused by following factors (Romańczuk, 2003):

- sharing knowledge in problem solving and decision making processes allows to obtain a broader analytical perspective. This leads to the increase of the accuracy of taken decisions, the increase of the efficiency of implemented activities and the increase of involvement of all employees (including managing board),
- high awareness of the importance of knowledge management existing in the enterprises and inclusion it in the strategy of action. This manifests itself, among others, in broad cooperation, knowledge shearing or self-improvement of employees,
- knowledge management requires the modification of existing or implementation new organizational structure and culture based on standards and values, language, management style conductive to building appropriate attitudes and behaviours,
- ways of implementation of work tasks in knowledge management enterprises are based on the mechanisms facilitating knowledge sharing processes and incorporating these issues into the content of work,
- important elements of knowledge management are formal and – especially – informal networks of employees (including experts), that facilitate the creation and rapid dissemination of new knowledge resources,
- employees activities in the context of knowledge management are rewarded with an effective motivating system.

In the source literature knowledge management is defined in a variety ways, often with the different distribution of accents, different components and research perspectives. This is due to the very broad and, to some extent, abstract nature of knowledge contributing to the incomplete transparency and clarity of this issue. Joseph Schumpeter and other representatives of the Austrian school of economics say that knowledge is very subjective and may change over time, and changes in economics depend on the knowledge of individual entities (Brdulak, et al, 2004). Perechuda (2005) even stated that "knowledge management is a very capacious concept, covering basically everything, because knowledge means thought, or immaterial being, from which – according to cosmogony – a universe is formed. Because of this, this concept should not be defined". At the same time, knowledge is an elusive resource of an enterprise, a free good available in information networks, inexhaustible and perfectly renewable resource what makes it a key resource of an enterprise (Koźmiński A. 2005). For this reason it is necessary to manage it, research, search relations between knowledge and other enterprise resources or understanding the mechanisms for building knowledge-based market advantages. Knowledge is perceived as:

- information used in an effective manner (Armstrong and Taylor, 2016),
- understanding, awareness or knowledge of something acquired through education or experience (Awad and Ghaziri, 2004),

- valuable and accepted information, integrating data, facts, information and often hypotheses (Brilman, 2002),
- effective use information in action (Drucker, 2009),
- a smooth combination of expressed experience, values, properly selected information and expert insight into some issue that provides the framework for accessing and incorporating new experiences and information (Davenport and Prusak, 1998),
- the reminder of thinking, more precisely the effect of using information and experiences in thinking process (McDermott, 1999),
- information that was structured so that it can be used in a certain area of activity (all knowledge and skills used by individuals to solve problems) (Probst et al, 2002),
- codified experiences that are needed in mental imaginations (Vorbeck and Finke, 2001),
- it consists of truths and beliefs, views and concepts, judgements and expectations, methodology and know-how (Wiig, 1997).

The diversity and otherness of approaches to knowledge resource are also visible in the context of particularized types of knowledge. Nonaka and Takeuchi (2000) using the results of Polanyi's work (1967) distinguished tacit knowledge (silent, natural, hidden) and explicit knowledge (available, expressive). Tacit knowledge is embedded in the minds of employees, affects the nature of actions and decisions taken by people and its transfer takes place through observation (Lee and Choi, 2003). This type of knowledge is personal, concept-specific, difficult to formulate, grasp and transfer (Karwowski, 2004). Explicit knowledge can be reasonably simply documented, transferred and tracked between organizational units orally, through computer programs or in the form of patents, schemes and information technologies (Calo, 2008). For contemporary enterprises, the tacit knowledge accumulated by their employees is invaluable organisational capital of enterprises (Nonaka and Tekeuchi, 2000). The use of tacit knowledge, by the definition inaccessible for everyone, allows to build more lasting (Teece, 2000) competitive advantages (Boiral, 2002) based on elements difficult to identify for competitors.

B. Lundvall, B. Johnson (1994) divided the knowledge into four categories:

- know-what – knowledge of facts, possession of information,
- know-why – understanding of cause-effect relationships,
- know-how – the ability to implementation specific processes (knowledge available by specialists, so it is difficult to identification and dissemination),
- know-who – knowledge maps, knowledge exchange networks, information about experts and their knowledge resources.

Nonaka and Takeuchi (2000) divide organizational knowledge into three basic categories:

- personalized core of knowledge (explicit and tacit knowledge),
- codified knowledge (documentation, reports, publications, databases, projects),
- applied knowledge of an established nature (processed, services, products, relationships, technologies).

Kwast and Herman (2004), taking into account the perspective of enterprises, specified four types of knowledge:

- about the customer,
- market,
- concerning the product,
- environment.

The implementation of knowledge management in an enterprise can contribute to the formulation of positive effects in the number of areas of functioning of an enterprise (Sperk and Carter, 2003):

- the improvement of processes and operating practices,

- the increase of the level of competences of employees, their motivation and job satisfaction,
- the increase of the level of satisfaction of customers,
- the improvement of image of enterprise on the labour market and, as a result, the possibility of employing a higher class of specialists,
- the expanding the scope of activity of an enterprise, diversification,
- the increase of innovativeness,
- better match of offered products to the real needs of customers,
- the increase of skills and knowledge of employees,
- the increase of the level of efficiency of processes and people,
- more efficient placing of new products on the market,
- the improvement of memory of organization,
- better orientation on research and development activities,
- the improvement of the search of knowledge outside the enterprise and its absorption.

In addition, it should be taken into account that knowledge develops as a result of interpersonal interactions and is, by its nature, very dynamic. It also gives social foundation for management of enterprise directing them to do what is good and appropriate for the enterprise and society.

As Takeuchi (2013) emphasizes, knowledge management complements traditional managements schools, but introduces new perception of three important elements:

- people (they are put in the centre of attention of the strategy),
- strategy (treated not as static but dynamic process),
- social relations (enterprises create social programs).

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New York: NY, 37- 56

The basic goals of knowledge management include, most of all (Grudzewski and Hejduk, 2011):

- knowledge creation,
- identification of owned knowledge resources and selection of useful knowledge,
- knowledge archiving,
- dissemination of knowledge among employees and creation of conditions for its effective use,
- taking action to minimize the risk of loss of knowledge,
- the use of knowledge to build permanent and unique market advantages.

Characteristics of Research Method and Research Group

Taking into account the diversity of activities occurring between various enterprises, the attempt of identification and evaluation of selected elements of knowledge management was made. The analysis was conducted in the context of communication and transfer of knowledge in the enterprises in Poland in the context of their size and specificity of activity. The research results presented in the literature characterize a number of issues related to this search area, however, taking into account the dynamic changes and a certain abstraction of knowledge, conducting further analysis is necessary and needed to fill knowledge gaps and improve practical solutions. The study was conducted in the group of 105 enterprises located in the southern part of Poland, mainly in Silesian and Malopolskie voivodships. The selection of research facilities had a non-random character and was based on several basic criteria: there must be functioning elements of knowledge management in the enterprise; knowledge management must be implemented consciously and located in the operating strategy of enterprise; employment must be stable over a period of at least two years. The study was conducted using a questionnaire of the survey, which was each time filled by representatives of the top management, whose responsibilities and competences were appropriate to answer the questions. The survey consists of 18 questions. Within individual issues, a bipolar scale was used, from -5 to +5, with extrema values corresponding to the indicated variants (e.g. strategic goals: -5: tacit, +5 –

explicit) and values between intermediate variants. This work presents the results for 3 questions regarding communication and knowledge transfer:

1. The preferred type of knowledge transfer: push (predetermined to whom and what knowledge can be transferred, training, newsletters, IT resources) - negative scale (from -5 to -1) or pull (searching knowledge by employees to fill the identified gap, knowledge maps, communities of practitioners) – positive scale (from 1 to 5).
2. Priority memory type: team (negative scale) or individual (positive scale).
3. Method of obtaining information: easy (negative scale) or difficult (positive scale).

The obtained results was subjected of in-depth analysis using six categories of divisions:
– changes in the number of customers complains,
– changes in the number of negative events and accidents at work,
– changes in the level of work efficiency,
– changes in staff fluctuation,
– changes in the number of ideas and improvements reported by employees,
– changes in the number of customers.

Each time the size of change was defined as the effect of implementing elements of knowledge management system (statistical tests of significance of average values before and after system implementation in a two-year perspective).

Analysis of the Results

As a part of the analysis of the area of communication and knowledge transfer in the context of knowledge management, knowledge transfer methods were examined first (Figure 1). Extreme assessment values include: push method (predetermined to whom and what knowledge can be transferred, training, newsletter, IT resources – on a negative scale of values) and pull (searching knowledge by employees to fill the identified gap, knowledge maps, communities of practitioners – on a positive scale of values). The data distribution has left-sided asymmetry (skewness -0.35) and is characterized by lower concentration of data compared to the normal distribution (kurtosis -0.57). The average of the results is -0.55 (for service enterprises it is positive: 0.18) – only 25% of indications were above 1 (with median of 0 and a maximum value of 3), while a greater concentration was observed in the group of service enterprises data (50% indications in the range of -1 to1). The majority of enterprises (52) indicated that pushing knowledge is a priority for them (as many as 18 enterprises did not define clearly the approach to knowledge in the push and pull categories indication the value of 0).

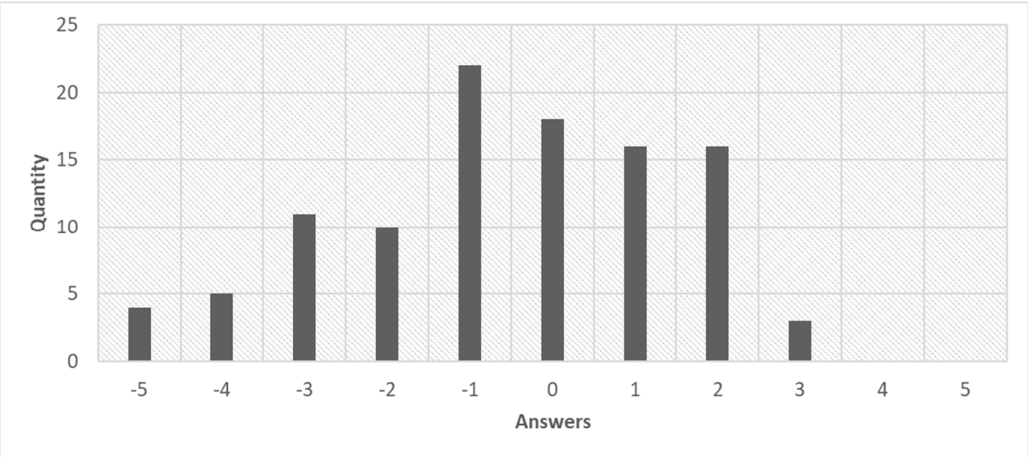

Figure 1: Distribution of answer for question 1.

Statistical hypotheses were tested in the relation of obtained data (Table 1). The results indicate that focus of the enterprises on push strategy (predetermined to whom and what knowledge can be transferred, training, newsletter, IT resource) contributes to:

- reduction of the number of customers complains,
- reduction of the number of events and accidents at work,
- increase of the level of work efficiency,
- limitation in staff fluctuation.

In cannot be unequivocally stated that undertaking such activities contribute to:

- increase of pro-innovative activity of employees,
- increase of the number of customers.

Table 1: Summary of statistical hypotheses testing results for question 1

Category	H_0	H_1	Average	Standard deviation	Number	U test
Number of customers complaints	μ=0	μ <0	-0.50	2.04	46	-1.78
Number of events and accidents at work	μ=0	μ <0	-0.75	1.94	65	-3.05
Work efficiency	μ=0	μ <0	-0.98	0.71	41	-2.90
Staff fluctuation	μ=0	μ <0	-0.57	2.65	44	-1.79

Another examined element was the type of memory preferred in the enterprise (Figure 2). The following values were indicated as the extreme values: team or individual memory. The data distribution has left-sided asymmetry (skewness -0.23) and has a platocurtinal distribution (kurtosis -0.57). The average of the results is 0.27 (for service enterprises it is clearly higher and amounts: 1.54, for manufacturing enterprises: -0.66) – as much as 50% of indication were in the range of -1 to 1 (for manufacturing enterprises 50% of responses in the range of -3 to 0, while for service enterprises only 25% below 0). Most enterprises (54) indicated that individual knowledge (including 68% of service enterprises) is a priority for them.

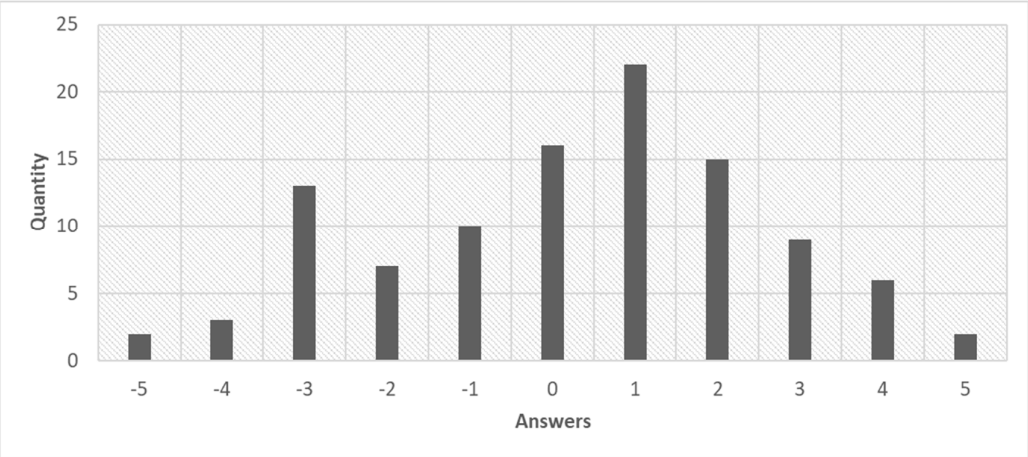

Figure 2: Distribution of answer for question 2

Statistical hypotheses were tested in the relation of obtained data (Table 2). The results indicate that focus of the enterprises on individual knowledge contribute to:

– increase of the level of work efficiency,

In cannot be unequivocally stated that undertaking such activities contribute to:

– reduction of the number of customers complains,
– reduction of the number of events and accidents at work,
– limitation in staff fluctuation,
– increase of pro-innovative activity of employees,
– increase of the number of customers.

Table 2: Summary of statistical hypotheses testing results for question 2

Category	H_0	H_1	Average	Standard deviation	Number	U test
Number of customers complaints	μ=0	μ <0	-0.17	1.98	46	-0.55
Number of events and accidents at work	μ=0	μ >0	0.23	2.31	65	0.77
Work efficiency	μ=0	μ >0	1.34	2.83	41	4.25
Staff fluctuation	μ=0	μ <0	-0.23	1.89	44	-0.75

The ease of obtaining information by employees were another examined element (Figure 3). The following extreme values were indicated: easy or difficult obtaining. The data distribution has slightly right-sided asymmetry (skewness 0.04) and has a platocurtinal distribution (kurtosis -0.52). The average of the results is -0.4 and it is very similar in the groups of manufacturing and service enterprises – even 25% of responses were at the level of -3 and lower, with the median of -1. Most enterprises (56) indicated that their priority is ease of obtaining the necessary knowledge.

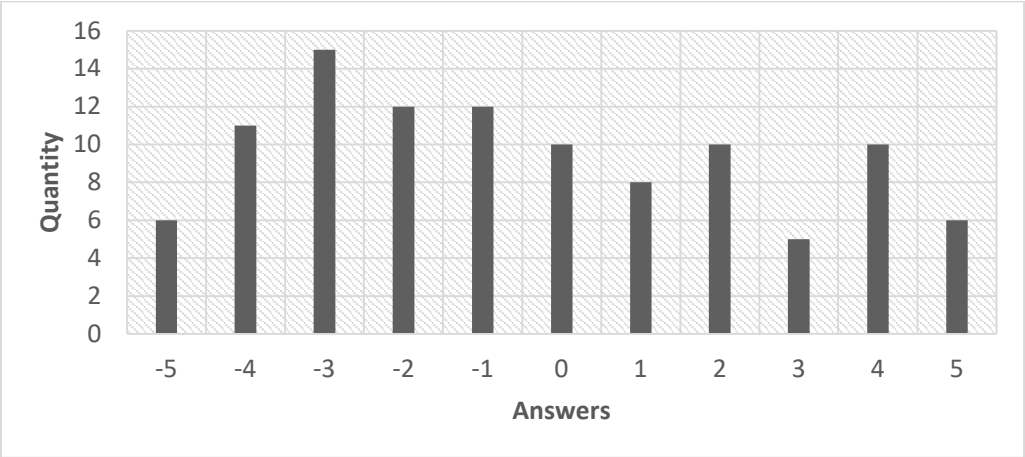

Figure 3: Distribution of answer for question 3

Statistical hypotheses were tested in the relation of obtained data (Table 3). The results indicate that focus of the enterprises on obtaining required information by employees contribute to:

– limiting the number of improperly completed orders resulting in the occurrence of customers complaints,
– reduction of the number of events and accidents at work,
– increase of the value of work efficiency index,

In cannot be unequivocally stated that undertaking such activities contribute to:

- reducing the number of unplanned leaving job resulting in the need to supplement staff urgently,
- increase of pro-innovative activity of employees,
- increase of the number of customers.

Table3: Summary of statistical hypotheses testing results for question 3

Category	H_0	H_1	Average	Standard deviation	Number	U test
Number of customers complaints	μ=0	μ <0	-0,78	2,97	46	-1,89
Number of events and accidents at work	μ=0	μ <0	-1,22	2,19	65	-3,27
Work efficiency	μ=0	μ <0	-1,71	1,41	41	-4,06
Staff fluctuation	μ=0	μ <0	-0,41	3,30	44	-0,82

Conclusion

According to the opinion more and more commonly expressed by specialists, knowledge is nowadays – on a micro scale – a production priority and – on the macro scale – a determinant of technical progress. Potential benefits resulting from the implementation of knowledge management system include (Szara and Pierścieniak, 2007): creation new products and brands, creation a positive image and reputation of the company, optimization of the use of resources, creation of effective internal and external relations, creating innovations and conduction research and development works.

The research showed that:

- the majority of enterprises (54) indicated that individual knowledge (including 68% of service enterprises) is a priority for them.
- the majority of companies (56) indicated that the priority for them is the ease of obtaining the necessary knowledge,
- the company's focus on push strategy contributes to reducing the number of customers complaints, reducing the number of incidents and accidents at work, increasing work efficiency and reducing staff fluctuation,
- the company's focus on individual knowledge contributes to increasing work efficiency,
- focus on the ease of obtaining the required information by customers contributes to reducing the number of incorrectly completed orders resulting in customers complaints, reducing the number of events and accidents at work and increasing the value of the work efficiency index,
- it cannot be unequivocally stated that undertaking actions contribute to the increase of employees' pro-innovation activity and increase in the number of customers.

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Evaluation of The Use of Quality Management Instruments in Selected Organizations

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Abstract

The purpose of the article is to identify the most commonly used quality management instruments and an attempt to determine their usefulness in enterprises operating in accordance with the concept of Industry 4.0 (5.0).The article presents the results of research on the practical use by companies of available quality management methods and tools. The analysis was based on literature data as well as on the results of research conducted at the Institute of Production Management at the Faculty of Production Engineering and Materials Technology of the Czestochowa University of Technology. Both the organizations surveyed for this project and the cases cited in publications indicate that the group of the most commonly used tools and methods is quite limited and, in a sense, is reduced to the most popular ones.Attention was also drawn to the ISO standard, which in many cases defines the quality management system.

Keywords: Quality Management, Methods and Techniques, Industry 4.0 (5.0).

Introduction

There are many indications that the rapid technological development (leap) that has lasted for several decades will continue. The concept of Industry 4.0, a concept born in Germany and has become a fundamental element of the strategy of innovative development of the country's economy in 2011, may be a precursor of the upcoming changes. A similar decision was made by the Polish government, as reflected in the Act on the Future Industry Platform Foundation adopted on 17 January 2019 by the lower house of the Polish parliament. The first assumptions for the practical implementation of the Industry 4.0 initiative were formulated by the German "Industrie 4.0 Working Group" in April 2013. The document that was drafted was then the basis for the "Plattform Industrie 4.0" to provide final, practical recommendations for companies (Bieńkowski, 2019).

Industry 4.0, often referred to as the fourth industrial revolution, is based on automation and digitization of production processes that already exist, and assumes transformation of companies into so-called Smart Factories or Digital Factories. The idea behind this concept is to create intelligent value chains based on self-steering, self-adaptive, and self-organizing systems. This will be possible by using technologies such as Internet of Things, cyber security, Cloud Computing, Additive Manufacturing, augmented and virtual reality, Big Data, intelligent robotics and autonomous vehicles, simulations, and system integration. The resulting new work organization centered around the product will ensure high flexibility and efficiency in production. It will become economically viable to produce individualized, small batch products developed to meet the customer's exact needs (Bieńkowski, 2019; Astor, 2019).

One should keep in mind, however, that the human factor, both as the subject and the object of transformation, is of key importance in the processes in question. On the one hand, people may be a fundamental element of the new working environment, but, on the other hand, there is a concern that technology will dominate people. Concerns about job insecurity, vocational degradation of many groups of workers, development of new human-independent control mechanisms, reduction of workers' decision-making, and excessive expectations concerning productivity of the workers have led to the development of the Industry 5.0 concept. This concept was introduced in 2015 by Michael

Rada, the President of the International Business Center of Sustainable Development. This more humane, in a way, version of the Industry 4.0 initiative assumes that the human aspect and the possibilities of cooperation between humans and robots will be taken into account. Thanks to their competence, people are to be the superior entities and should create a functional whole with machines in the future (Bieńkowski, 2019; Bieńkowski, 2018).

Literature Review

ISO standards

The concept of industry 4.0 (5.0) is a global phenomenon and, therefore, requires international involvement. Standardization work in aspects related to the concept of industry 4.0 is already being carried out, among others, by the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC), the European Committee for Standardization (CEN), and the European Committee for Electrotechnical Standardization (CENELEC). The ISO has already established the Smart Manufacturing Coordination Committee (SMCC) in 2017, which provides coordination for the relevant ISO Technical Committees and is a kind of an information exchange forum and a place to develop assumptions for smart manufacturing standards (PKN, 2019).

The principle that companies should also be judged on how they fulfill their obligations to the society and the environment has been supplemented by the seven largest industrialized countries in the world (G7) with the human factor. After all, the issue of human focus, which is also present in the industry 5.0 concept, has already been reflected to some extent in the standard EN ISO 27500 - The human-centered organization — Rationale and general principles. The aim of this standard is to raise awareness among managers not only in terms of business benefits, but also in the interests of company employees (PKN, 2017; Vosper, 2019). Seven principles characteristic of a human-oriented company are listed (Adenauer and Stowasser, 2018):

- The company perceives differences between individuals (customers and employees) as an asset, not a problem.
- The company applies international standards and best practices to ensure that products, systems, and services are available to customers and employees with the most diverse capabilities and characteristics.
- The company recognizes that people are a part of the system in which they work. When designing new work systems and modifying existing ones, the company takes into account the needs of the users.
- The company takes the necessary steps to protect people from risks to their health, safety, and well-being (actions that go beyond those provided for by law).
- The company offers its employees meaningful work in which they can use and develop their skills.
- The company communicates openly and transparently both inside and outside.
- The company recognizes its social responsibility by implementing the seven principles of ISO 26000 - Social responsibility (responsibility to the society, the economy, and the environment; transparency in decision-making and actions; ethical behavior; respect for the interests of all stakeholders; respect for the rule of law; respect for international norms of behavior; and respect for human rights).

Of course, this standard is one of many in the ISO family of standards. From the point of view of broadly defined quality (Skuza et al., 2011; Taguchi et al., 2005) and management of this aspect, in addition to the already mentioned ISO 27500 standard (man is the key to quality), such standards are important: ISO 9000 -Quality management system, ISO 14000 - Standards environmental management, ISO 45001 - Occupational health and safety management systems, ISO 5000 – Energy management system, ISO 27000 - Information security management system.

Quality Assurance and Control

The stages of the product's lifecycle and quality development cycle presented in Figure 1 consists of three main phases: pre-production, production, post-production. Quality assurance in the following phases (Hamrol and Mantura, 1998):

- pre-production - includes following stages:
  - ✓ Marketing and market research - in order for a product to find a buyer, it is necessary to position it properly on the market (the task of marketing). However, it is not enough to simply identify the demand for products that the company believes it can manufacture. It must be ensured that the company is able to provide the conditions to manufacture products of the required quality in a sustainable manner at a cost which provides an appropriate profit;
  - ✓ product design - practice shows that a large number of defects detected during production, installation, and even only during use of a product have their origin in the design and planning phase (Fig. 2). Consequently, the product design and the production process planning and design should be coordinated as closely as possible;
  - ✓ design of technological processes - its purpose is to ensure conditions that guarantee the quality of workmanship that is consistent with the design quality of the product (while maintaining delivery dates and production profitability);
- production - includes following stages:
  - ✓ purchasing - many materials and services can be purchased outside; their quality often determines the quality of the final product;
  - ✓ production - one should strive to ensure the highest possible fidelity to the transfer of the design quality to the workmanship quality;
  - ✓ inspection, verification - determination of whether products/processes meet the requirements adopted at the design stage;
  - ✓ packaging and storage - ensuring the quality of the product;
  - ✓ sales and distribution - the product's promotional functions, resistance to loss of performance characteristics, facilitation of logistic processes;
  - ✓ installation and commissioning - ensuring proper functioning of the product;
- post-production - includes following stages:
  - ✓ technical assistance and service - improvement of operation processes;
  - ✓ taking care of the product after sales - maintaining contact with the user;
  - ✓ disposal, recovery - assistance in carrying out a liquidation operation of a physically or economically worn-out product.

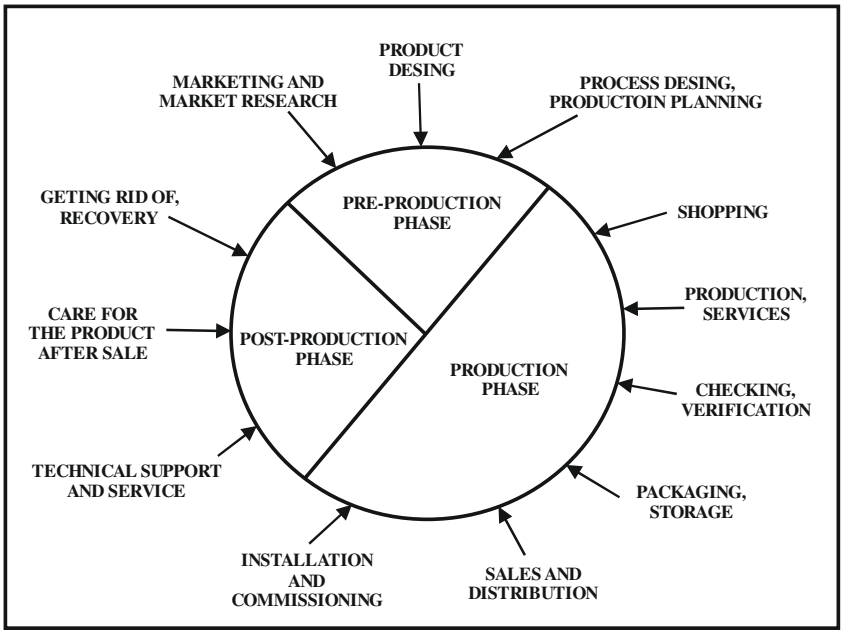

Figure 1: Quality wheel (Hamrol and Mantura, 1998)

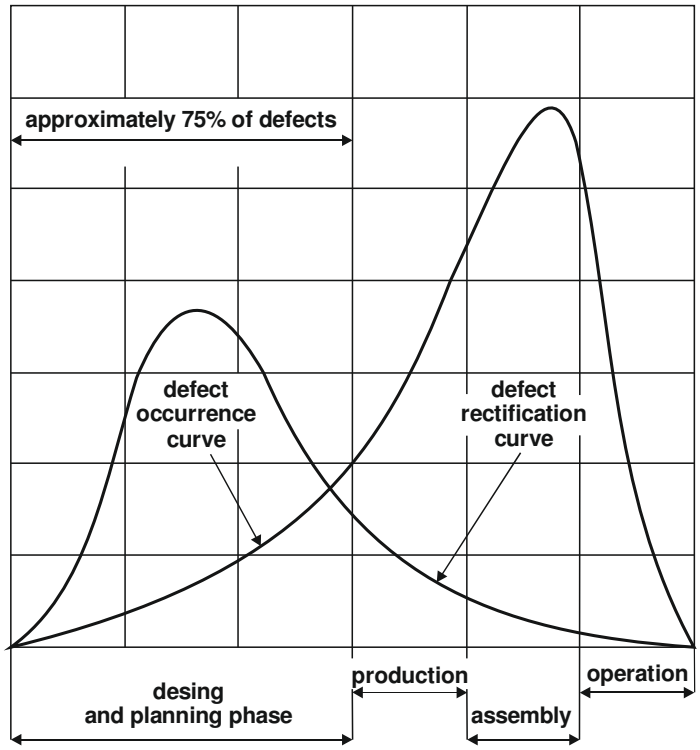

Figure 2: Product defect occurrence and rectification curves in the product's life cycle (Hamrol and Mantura, 1998)

The information in Figures 1 and 2 shows that at the design and planning stage, the implemented creative solutions are the source of most of the defects occurring in the finished product. It is

therefore the stage for ensuring and establishing the design quality. In the next stages, i.e. production and assembly, design quality is transformed into workmanship quality and quality assurance loses its importance to quality control (quality control and correction). The last phase of operation provides data that is used by designers and engineers to continuously improve the product and the production process (Hamrol and Mantura, 1998).

Of course, according to the idea of industry 4.0 assuming low-volume production, design quality is of particular importance.

Research Results

Analysis of the Use of Quality Management Instruments

Publications on this subject include articles on assessing the use of quality management methods and tools. The first analyzed publication (Kafel and Sikora, 2013) concerns the food industry and covers 29 enterprises. Taking into account only the number of full-time employees, this group comprises 11 small enterprises (average annual employment of more than 10 and less than 50 persons), 13 medium-sized enterprises (average annual employment of more than 50 and less than 250 persons), and 5 large enterprises (average annual employment of more than 250 persons). Due to the unique nature of the food industry, most of the surveyed entities had certified quality management systems: ten organizations - ISO 9001, nine - IFS Food Standard, seven - BRC Global Standard for Food Safety, six - HACCP (Codex Alimentarius), and five - ISO 22000. At the same time, 7 companies admitted that they did not use any quality management methods or tools in their daily operations, 14 only pointed to the self-assessment of the organization, 5 - Statistical Process Control (SPC), 4 - Just in Time, 2 - Kaizen, and 2 indicated use of the Lean Management methodology. Ten companies used only 1 quality improvement tool, seven used 2, fourteen used 3, and one used 4.

In the next paper (Zając and Kudła, 2016), 20 production companies were evaluated, mainly from the construction and automotive industries. According to the adopted classification, taking into account the number of employees, the following types of companies could be distinguished: 1 micro enterprise (average annual employment of more than 10 persons), 7 small enterprises, 9 medium-sized enterprises, and 3 large enterprises. In this group, 5 Why, 5S Practices, and statistical process control were identified as the most popular methods of quality management. The most important tools were process flow charts, Control Charts, and Brainstorming.

The last quoted publication (Gudanowska and Olszewska, 2014) showed that in 165 companies of various industries, the action plan, the control sheet, the SWOT analysis, the 5S Practices, the block diagram, and the Control Charts were most frequently used to improve the quality management system.

Similar to the above-mentioned cases are the surveys conducted at the Institute of Production Management of the Faculty of Production Engineering and Materials Technology of the Częstochowa University of Technology. The information presented in the further part of this paper concern only the data collected so far because the research work is still ongoing. So far, data has been collected from 78 randomcompanies, the vast majority of which (88.5%) are involved in production activities. The companies covered by the study include 19 small enterprises, 31 medium enterprises, and 28 large enterprises, located in Poland, mainly in the Śląskie and Łódzkie Provinces. At 59 companies (75.6%) at least one management system certified by an independent certification body was declared to exist. A majority of the analyzed enterprises, i.e. 52 (66.6%), have at least two standardized management systems, 49 (63%) enterprises have three systems, and 14 (18%) have four or more systems. The data presented in Figure 3 shows that the most popular are: ISO 9000 - 59 cases, ISO 14000 - 52 cases, ISO 45000 - 49 cases, ISO 50000 - 14 cases, ISO 27000 - 14 cases, industry standards (e.g. IATF 16949) - 25 cases, and the integrated management system - 42 cases.

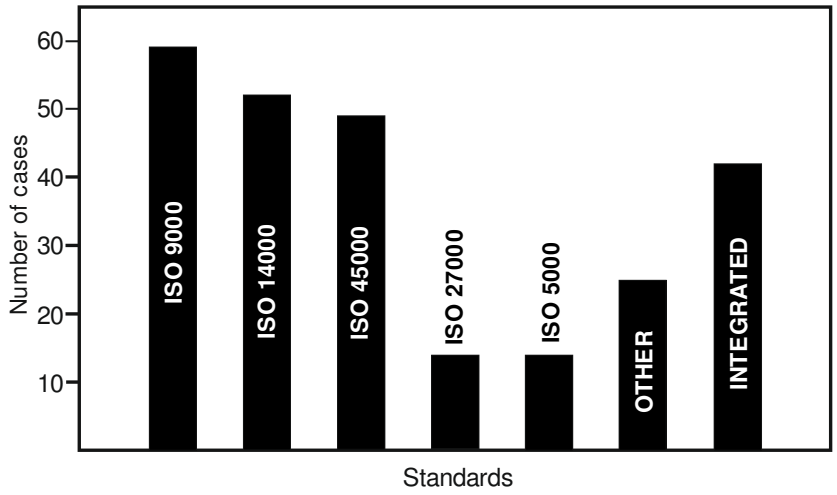

Figure 3: Use of standardized quality management systems in the surveyed companies

The data obtained as a result of the analysis (Figure 4) shows that Brainstorming was the most popular among the research sample - 53 companies (68%), followed by 5S Practices - 51 companies (65.3%), Pareto Analysis - 31 companies (39.7%), Failure Mode and Effects Analysis (FMEA) - 29 companies (37%), Correlation Graphs - 25 companies (32%), Fishbone Diagram - 16 companies (20,5%), 8D - 15 companies (19.2%), 5 Whys (5W) - 11 companies (14.1%), Lean Manufacturing - 3 companies (3.8%), Sheward cards - 3 companies (3.8%), and Six Sigma - 1 company (1.28%). Only seven organizations (8.97%) declared that they did not use any quality management tools or methods in their daily activities. In eight cases (10.2%), one tool for quality improvement was indicated, in twenty-two (28.2%) - 2 tools, in thirteen (16.6%) - 3 tools, in eleven (14.1%) - 4 tools, and in sixteen cases (14.1%) - more than 4 tools (most 9) were indicated - Figure 5.

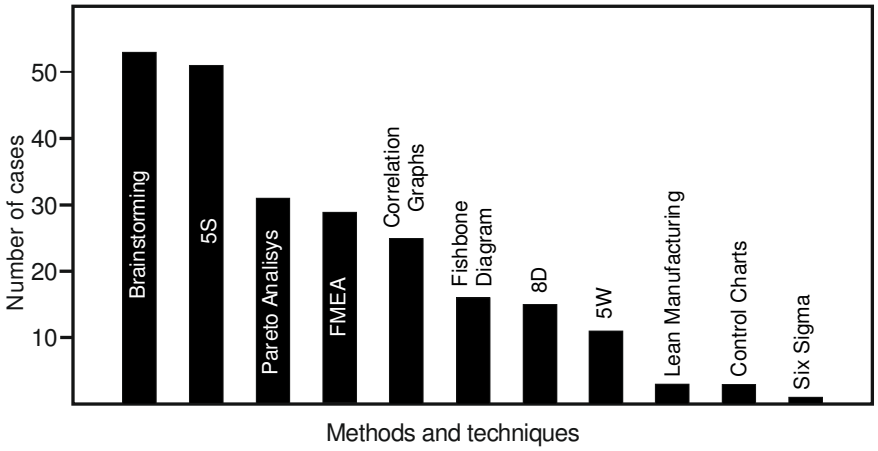

Figure 4: Use of quality management methods and techniques in the surveyed companies

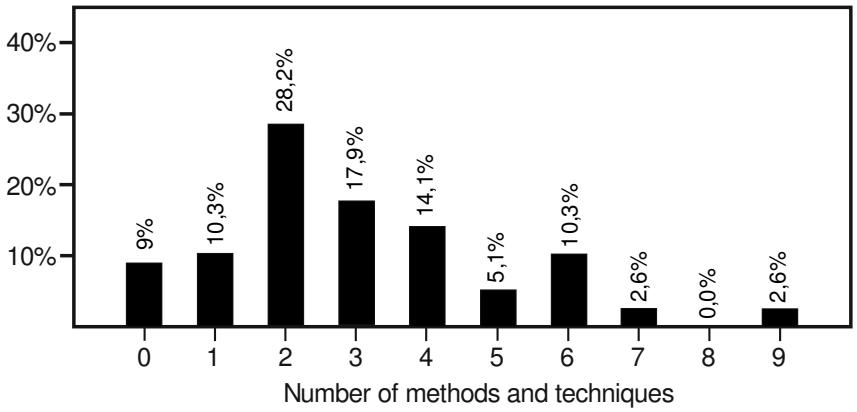

Figure 5: Number of quality management methods and techniques in the surveyed companies

Conclusion

Today's businesses are facing another technological revolution. It is widely believed that concepts such as Industry 4.0 and 5.0 will bring about far-reaching changes in both production and broadly defined management processes (Shafig et al., 2020; Olsen and Tomlin, 2020; Kang, 2018). It is clear that the quality management system must also adapt to the new reality (Ślusarczyk, 2018; Saifuddin and Syaiful, 2020). The current work conducted by the International Organization for Standardization (ISO) indicates that this problem has already been recognized. A separate issue is the method and possibility to take advantage of the broad range of quality management instruments can be used in processes based on self-controlled, self-adaptive, and self-organizing systems. The integration of man, machine, and process will probably contribute to the emergence of new techniques for quality improvement and, in some part, to the adaptation of existing ones. Such trend can already be seen in theoretical studies - e.g. the authors of the paper (Oborski and Bielecki, 2017) consider the possibility of using Statistical Process Control (SPC) for small batch production.

The analysis of both the publications and the authors' own data on the use of quality management methods and techniques in the surveyed companies has shown that the group of the most frequently used tools and methods is quite limited and, in a sense, is reduced to the best known ones (e.g. Brainstorming, 5S Practices, and Pareto Analysis). This may be due to the unique characteristics of the specific industry (e.g. the automotive industry where the FMEA is recommended) and the nature of the production (mass production - possible use of SPC). It is also important to have certified quality management systems which recommend the use of a given quality improvement technique, e.g. IATF 16949 - FMEA in the automotive industry.

There is also a minimal share or lack of methods and tools aimed at implementing change and innovation (Kaizen, Quality Function Deployment, and Benchmarking), the use of which could increase the chances of achieving a more sustainable competitive advantage. Tools such as these and those that can be used at the product and technological process design stage should become more important in the future. The reason for this is that the largest number of the defects (non-conformities) that occur later in the process have their source at this stage of the manufacturing process, and, according to the concept of industry 4.0, it is possible to have a low volume (or even unit) production tailored to individual customer needs, where any improvement activities are severely limited or even impossible ("right the first time

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Strategic Analysis on The Example of a Transport Expertise

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Abstract

The modern market requires enterprises to build lasting and unique market advantages. Therefore, proper strategic planning is needed to allocate resources more efficiently. There are many methods to help an enterprise achieve this goal, one of them is the McKinsey matrix. This method allows for transparent presentation of results and can be one of the elements of the decision-making process leading to the assignment of enterprise products to different groups and matching the most optimal partial strategies to them. The article presents the results of the strategic analysis of a transport enterprise. A strategic analysis has been carried out with the use of the McKinsey matrix, based on SWOT analysis.

Keywords: Strategic Analysis, Portfolio Methods, Mckinsey Matrix.

Introduction

Contemporary enterprises conduct business in the environment characterised with high dynamics of market changes. Success is associated with the necessity to face the challenge of growing competitiveness. Enterprises are forced to draw up long-term plans based on the rational analysis of changing environment in which they operate (Stankiewicz, 2005).

Transport services can be assessed from the point of view of numerous criteria. One of them being the level of competitiveness. The following factors can be considered as allowing enterprises to obtain competitive advantage: the level of the enterprise's costs, the technological level (modernity of the rolling stock, availability and quality of used infrastructure, IT systems), qualifications of employees, organisational efficiency and marketing strategies (Koźlak, 2008).

In literature, there are many strategic analysis methods and strategic planning tools for enterprises allowing analysis thereof and specification of their place in the environment (Budzyńska-Biernat, 2005; Kreutzer, 2019).

Literature Review

Portfolio Methods in Strategic Analysis

The analysis of the subject literature allows locating portfolio methods among integrated strategic analysis methods (picture no. 1). A characteristic feature of integrated strategic analysis methods consists in the assumption that "the strategy is a conception of the organisation's existence and maintenance combining all activities thereof" (Gierszewska, 1993; Ahmadi-Javid, Fateminia and Gemünden, 2020).

Table 1: Classification of analysis and strategic planning methods

ENVIRONMENTAL ANALYSIS METHODS	INTEGRATED METHODS	ENTERPRISE ANALYSIS METHODS
Trend analysis	SWOT analysis	Product life cycle
Delphi method	Strategic positioning	Key success factors
Gap analysis	Experience curve	Strategic balance
Scenario methods	**Portfolio methods**	Value chain analysis
Porter's Five Forces Framework		
Sector's economic portfolio		
Strategic group mapping		

Source: own study

Integrated strategic analysis methods are aimed at confronting opportunities and threats appearing in the organisation's environment with its weaknesses and strengths, as well as enable finding balance between them. Many of these methods are presented in a form of a matrix where one variable is connected with processes occurring inside the organisation and its capabilities, and the other variable is connected with conditions and trends in the environment. Portfolio methods help to build a structure of the assortment of manufactured goods or provided services. A well-chosen structure in the selected sector will ensure strong position of the enterprise (Gierszewska, 1993).

Portfolio methods provide the opportunity of conducting quite an accurate assessment of the enterprise's competitive situation in various market segments. They constitute a universal and useful tool used in the analysis of the company's developmental opportunities, as well as constitute an important instrument of strategic planning. By using them, companies can determine with regard to which products they can have higher hopes for demand in the future and which should be withdrawn from their assortment. Such a choice depends on the company's market position and attractiveness thereof (Antczak, 2010; Vlados, 2019).

Portfolio methods have many advantages. According to K. Obłój, they support the analysis of the strategic groups' environment. They allow conducting a systematic diagnosis of entities, however, they do not replace the process of formulating assumptions and interpretations of results, which each time have to be carried out in a qualitative manner by a manager. Portfolio methods decompose the company into clearly defined business entities and give an overview of those entities' positions in the environment. Those methods have two dimensions: one concerns the condition of the environment and the other, the company's competitive position in a given market. Assessment of the product's or company's position with portfolio methods enables taking strategic decisions regarding fate thereof. As disadvantages of portfolio methods include the static character thereof and the fact that they excessively simplify the image of reality. It should be noticed that matrices are techniques organising the reasoning, yet, they do not replace the latter (Obłój, 2015; Viltard, 2019).

P. Kotler believes that using portfolio methods develops strategic thinking. However, they should be used carefully. Obtained results depend on the applied system of assessment and measures and can be manipulated. Furthermore, the above methods do not show the synergy between businesses (Kotler, 2018).

Types of Portfolio Methods

The following matrices can be enumerated as the most known and practically used portfolio methods:

- growth-share matrix, called the BCG-matrix,
- General Electric Industry Attractiveness and Business Unit Strength (multifactor portfolio matrix),
- ADL market assessment - (Arthur D. Little),
- market attractiveness (Shell matrix),

- industry attractiveness (McKinsey matrix),
- product life cycle (Charles W. Hofer).

The most popular portfolio methods in determining the strategy include the BCG matrix (Boston Consulting Group), McKinsey matrix (GE matrix) and the ADL matrix (Arthur D. Little) (Antczak, 2010; Cieśla, 2018).

Boston Consulting Group (BCG) matrix, developed in the 80s by the Boston Consulting Group, is a commonly used method of the enterprise's portfolio management. This method, also called the growth-share matrix, refers to diversified companies comprising of a certain number of strategic business units. The analysis of the so-called Strategic Business Units concentrates on three aspects: relative share of the SBU in the market, market growth rate of a given SBU and the possibility to generate cash (profit) by a given SBU (Pierścionek, 2011; Fadrian and Arifin, 2018).

Strategic Business Units are separated parts of the organisation that have own strategic analyses and plans, own identified competitors and suppliers, operate in separate markets and have own competitive strategies separate from strategies of other SBUs in the same organisation. Those units are autonomous, independent and equipped with own mission and vision. For example, a SBU is a single product, brand, product line, product composition (product mix) that meet in the common market or satisfy a specific group of needs. The traditional outlook of the BCG matrix classifies particular SBUs by market growth rate and relative market share. It describes the place and role of particular products of the organisation in its current and future incomes and is a tool used for researching strategic potential of the enterprise (Zhenping and Zhanping, no date; Penc, 2001).

Stars are SBUs with a large share in turnovers in fast-growing markets; it is the most convenient situation that promises large profits. However, they require further investment expenditures to maintain the leading position in the dynamically growing market. Thus, "the star" can turn into "a cash cow", when the market enters the maturity phase. There are "young stars" (requiring investment) and "old stars" (self-financing) (Pierścionek, 2011).

Cash cows are SBUs with a high share in the market characterised with low dynamics. Those are profitable products providing a source of financial surplus; they do not require investment, since they have their own highly profitable market share. It is recommended to exploit "cash cows" in order to provide the "stars" with conditions for development and financing other activity segments (Mutandwa *et al.*, 2009; Pierścionek, 2011).

Question marks are SBUs with low profitability, but existing in the fast-growing market. They occur in attractive, developing markets and constitute unused opportunities. Nevertheless, the market growth may require investment expenditures in order to obtain a share thereof. It is recommended to invest selectively or resign from given SBUs before they turn into "dogs" (Pierścionek, 2011).

Dogs are SBUs with a low market share characterised with low dynamics. They hold the least beneficial position in the BCG matrix; they waste and provide small amounts of cash or generate loss. They are unattractive and may become a threat to the company, therefore, it is recommended to eliminate them (Pierścionek, 2011).

Arthur D. Little (ADL) matrix, created in the A. D. Little Inc. consulting company, the conception of the ADL matrix developed by this company is based on the assumption that the product capacity to generate profit for the organisation results on the one hand, from the enterprise's competitive position and on the other hand, from the level of sector's maturity. The stronger competitive position of the product, the greater its capacity to generate a surplus (Krupski, 1999).

The ADL matrix (table no. 2) was built on the basis of two variables: the level of product's competitiveness or the enterprise's competitive position stipulated synthetically, the level of the industry (market) maturity in compliance with the product life cycle. In this matrix the "sector maturity" dimension includes four phases: introduction, growth, maturity and decline. Each of the phases is char-

acterised with various organisational and financial features influencing the selection of a different action strategy. Therefore, assessment of the sector's maturity level has to take into consideration many factors that can influence changing a given sector in the future. The dimension of "a competitive position" has a five-point scale: dominant, strong, favourable, tenable, weak (Krupski, 1999; Zic, Mikac and Dobovicek, 2009).

Table 2: Strategic action lines in the ADL method

Competitive position	Product life cycle phase			
	introduction	**growth**	**saturation**	**obsolescence**
Dominant	acquisition, maintenance of the market share	maintenance of the position, market share	maintenance of the position, growth with the industry	maintenance of the position
Strong	investment aimed at the position improvement, intensive increase in the market share	investment aimed at the position improvement, gaining market share	maintenance of the position, growth with the industry	maintenance of the position, surplus use
Favourable	selectively gaining market share, improvement of the competitive position	attempt at improving the position, selectively gaining market share	minimal investment aimed at maintaining the position, searching for new market niche	good use of the surplus or gradual reduction of activity
Tenable	selective improvement of the competitive position	searching for or maintaining a market niche	searching for a niche or gradual reduction of assets	gradual reduction of activity
Weak	strong improvement or not undertaking activity	strong improvement or withdrawal	gradual reduction of activity	withdrawal

Source: own study

Characteristics of the McKinsey Matrix

The McKinsey matrix, also referred to as the General Electric (GE) matrix, is an analysis tool developed by GE analysts together with the consulting company McKinsey & Company. It is based on the assumption that the greatest significance in taking strategic decisions is associated with two factors: attractiveness of the environment (industry), in which the SBU operates and the SBU's ability to gain competitive advantage in a given market (Penc, 2001; Shen *et al.*, 2015).

The McKinsey matrix, also referred to as the industry (sector) attractiveness matrix, includes 9 fields, where SBUs are located. Columns present the value of a given area and lines - competitive positions. SBU's position is decided by factors stipulating the market attractiveness level and its market power. The size of the circle indicates the size of the sector (market) and the highlighted segments of the circle refer to the studied enterprise's production share in the sector. This matrix will allow comparison of a given enterprise with market leaders. The analysis covers the environment with a particular focus on potential opportunities and threats (table no. 3.) (Penc, 2001).

Table 3: Strategies corresponding with McKinsey matrix cells

	Company's competitive advantages		
	small	**medium**	**large**
Market attractiveness	**Selective measures aimed at improving the market situation** 1. concentrate on using held resources 2. withdraw, if the sales is decreasing 3. overcome weaknesses	**Investment to improve the market position** 1. attack positions of hitherto leaders 2. use held resources to the maximum 3. concentrate on strengthening weaknesses	**Protective position** 1. invest in order to achieve maximum dynamics of sales 2. concentrate efforts on using held resources
	Limited expansion or quick gain 1. search for paths to expansion without high risk 2. minimise investment 3. rationalize activity	**Selectiveness/focus on revenues** 1. concentrate investment on the most profitable and least risky segments 2. protect the existing programme 3. maintain the protective position towards competition	**Selective measures aimed at improving the market position** 1. invest in the most attractive market segments 2. develop the ability to cope with competition 3. increase profitability by increasing efficiency of manufacture
	Divestment 1. sell until profitability 2. limit variable costs 3. avoid redundant investment	**Concentration on revenues** 1. protect strong positions on the most profitable market segments 2. improve the production line 3. minimise investment	**Protection** 1. focus on current revenues 2. protect competitive advantage 3. focus on the most attractive segments

Source: own study on the basis of (Kotler, 2018)

In order to agree on the position in the matrix, external and internal factors should be primarily separated. The external factors related to the industry attractiveness include (Dworzecki, 1992; Penc-Pietrzak, 1998): market size and market growth rates, demand growth rate, technology and its significance, cyclicity, competition structure, sector entry barriers, industry profitability, inflation, legislation, personnel availability, social problems, problems regarding environment protection, political and legal problems.

Internal factors reflecting the company's position in a given industry or the level of products' competitiveness include (Drążek and Niemczynowicz, 2003; Urbanowska-Sojkin, Banaszyk and Witczak, 2007): relative market share, assortment of products, effectiveness of distribution, effectiveness of the marketing department (promotion, advertising), efficiency of the sales department, quality and relia-

bility of the customer service, company brand and image, research and development, production, funds, management competences.

Upon specification of the assessment criteria, a score-based assessment should be conducted, which consists in calculating the value of weighted industry attractiveness and competitive position and proceeds in accordance with the following stages (Drążek and Niemczynowicz, 2003):

- specifying weights for particular factors. Weights stipulate the importance (significance/validity) of each factor. It should be remembered that the total of weights for a given group of factors cannot be higher than 1;
- assessment of particular factors in order to differentiate the impact of each factor. As the scale of grades includes numbers between 1 and 5, where 1 means weak impact and 5 – strong.
- calculating the value weighted by multiplying the weight and assessment;
- calculating the total value weighted by summing up values weighted for particular factors.

In the summary it should be underlined that for a specific enterprise and industry the list of factors and the scale of grades should be agreed on by experts and thus obtained results should be used to mark the matrix axis and stipulate the position of products. An unquestionable advantage of this method constitutes, in fact, the variety of assessment criteria of attractiveness of a given industry, market and potential of the SBU. Depending on the selected criterion, the company can receive a different assessment. With a complex assessment, several matrices should be created to allow selecting a strategy, taking into consideration all interesting aspects of a given organisation (Urbanowska-Sojkin, Banaszyk and Witczak, 2007).

Research Results

The company X was established in 2000. The headquarters are situated in Nowy Targ, in Lesser Poland Voivodeship. For many consecutive years the company has been growing its experience and developing a strong position in the European transport market by increasing its rolling stock from one truck combination in 2000 to 350 combinations in 2018. Since establishment of the enterprise X its aim has been to provide the best services related to transporting goods of its customers.

For the purposes of the portfolio analysis, the McKinsey matrix created on the grounds of the SWOT analysis has been selected (table no. 4.).

Upon determining the main strengths and weaknesses, as well as opportunities and threats, they had been attributed with weights and assessments and then, weighted assessments were determined. Such an analysis allowed entering features into the matrix and then, reading where the enterprise is located in the McKinsey matrix. In order to build the McKinsey matrix (picture no. 1.), calculations were carried out on the grounds of the total of weighted assessment from table no. 4:

strengths – weaknesses = 4.4 – 4.1 = 0.3
opportunities – threats = 4.4 – 3.2 =1.2

Table 4: Criteria for making the McKinsey matrix

CRITERION	WEIGHT	ASSESSMENT	WEIGHTED ASSESSMENT
Strengths:			
specification of individual routes, good quality of services	0.2	5	1.0
large group of regular customers	0.4	4	1.6
short time of transport	0.2	5	1.0
good location	0.2	4	0.8

In total:	1.0		**4.4**
Weaknesses:			
big competition	0.3	4	1.2
high business costs	0.4	5	2.0
several vehicles requiring continuous repair	0.1	3	0.3
high turnover of employees	0.2	3	0.6
In total:	1.0		**4.1**
Opportunities:			
growing transport needs of the society	0.3	5	1.5
large area of operations	0.2	4	0.8
economic development in Poland and the EU	0.2	3	0.6
occurrence of new regular customers	0.3	5	1.5
In total:	1.0		**4.4**
Threats:			
possibility of growing competition	0.3	3	0.9
threat to the environment	0.4	3	1.2
road congestion in the country and abroad	0.1	3	0.3
dropping prices of competitors	0.2	4	0.8
In total:	1.0		**3.2**

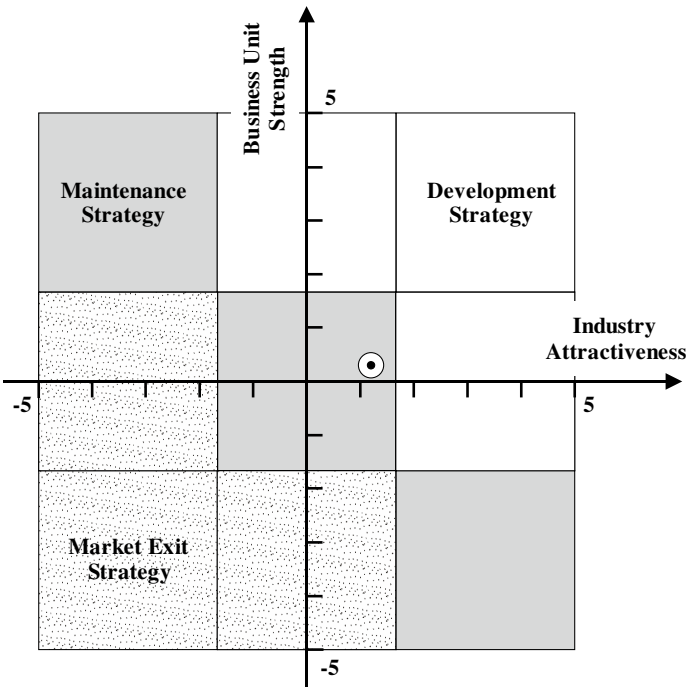

Picture 1: McKinsey matrix for the analysed enterprise

Determining the assessment of the competitive position and market attractiveness allows specifying the strategy recommended for a given entity. In compliance with picture no. 1, it is visible that the analysed enterprise is situated in the middle field of the matrix. This field belongs to the group of the maintenance strategy.

The maintenance strategy, also called the selective investment, is characteristic for SBU with low competitive strength operating in an attractive sector (offensive strategy that requires significant expenditures in order to improve the competitive position) (Kotler, 2018).

Conclusion

Portfolio methods of the strategic analysis constitute a good tool for initial analysis, as they allow stipulating the enterprise's condition. Conducting these analyses accurately and reliably can be treated as a tool supporting selection of the enterprise's strategy.

The article presents results of the enterprise's strategic analysis conducted with the McKinsey matrix. The analysed premises constituted the transport enterprise X situated in Nowy Targ, in the Lesser Poland Voivodeship. To conduct the McKinsey analysis, criteria were selected on the grounds of the SWOT analysis. Criteria weights were assigned to assessments and then, weighted assessments were given. It allows stipulating the unit's strategic strength (0.3) and environment attractiveness (1.2). Determining these values allowed locating the enterprise X in the McKinsey matrix – the enterprise was put in the middle field of the matrix, which means applying the maintenance strategy. According to the literature, the enterprise should conduct the selective analysis of specialisation, investment and market segmentation (Krupski, 1999), as well as focus on revenues, concentrate on investment in the most profitable and least risky segments, as well as maintain the protective position towards competition (Kotler, 2018).

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Labour Mobility of Foreigners in Slovakia

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Abstract

Globalization and the process of European integration facilitate labour mobility. The Slovak Republic introduced several measures facilitating labour mobility of foreigners in Slovakia in accordance with its international obligations. This thesis analyses topical problems of the labour market in Slovakia and points out the process of integration into the labour market. The contribution of this scientific thesis, in terms of both theory and practice, represents the analysis of conditions of employment of foreigners and entrepreneurial activity of foreigners in the territory of the Slovak Republic. At the same time, it indicates the importance of multiculturalism that is becoming part of the labour legal relations in Slovakia.

Keywords: Labour Mobility, Foreigners in Slovakia, Conditions of Employment.

Introduction

From its accession to the European Union, the Slovak Republic is experiencing dramatic changes not only in the field of economic relations, but also in the area of free movement of persons. In this context, we should not forget that the effects of globalization are reflected in the inflow of foreign investment, growth of interdependence, and in the deepening of global division of labour. (Geistlinger, Nováčková 2018) The inflow of foreign investments requires not only the change of structural relations. There is a growing shortage of workforce in certain professions, which has the consequence of limited economic growth, low productivity and absence of innovations. The structural changes in the labour market can further increase the labour force demand, which is not immediately available on the labour market. The insufficient labour force on the domestic labour market is compensated by labour force from abroad. These foreign workers enjoy rights guaranteed by the Constitution of the Slovak Republic, namely the right to equal treatment and the protection against any form of discrimination. The fair and equal treatment represents one of the fundamental rights in the European Union. This institute guarantees equal employment conditions, equal work conditions, same safety at work requirements, equal access to professional training, education and retraining courses, same social and tax advantages. The number of foreigners working in Slovakia has been increasing; however, the number of foreigners is still much lower than the number of Slovaks working abroad. This scientific thesis relates to the labour mobility of foreigners in Slovakia and points out the significance of free movement of persons within the territory of the European Union, because the labour mobility also brings economic advantages.

Aim and Methodology

The choice of our topic is closely connected with the development of globalization and the introduction of the institute of freedom of movement of persons, the removal of barriers on the Slovak labour market and the freedom of doing business. The aim of the study is to analyze the legal system of employment of foreigners in Slovakia, of freedom to conduct business in the Slovak Republic and to open a discussion on the integration of foreigners in the Slovak labour market as well as contribute to a deeper knowledge of foreigners' employment in the Slovak labour market. Subject of the research are the legal relations concerning employment and business of foreigners in Slovakia.

- In view of the stated goal, we set ourselves the first research question: what are the conditions of employment of foreigners in Slovakia and their adaptation?
- Foreigners in Slovakia focuses the second research question on business activities.

- The third research question concerns the issue of whether there are also illegally employed persons on the Slovak labour market.

The methodological scientific study is based on secondary research and has descriptive character. The author drew on available scientific publications, Slovak legislation, legal acts of the European Union, statistics and internet sources. We also used documents of the Slovak Business Agency and the Ministry of Labour, Social Affairs and Family of the Slovak Republic

Literature Review

The era of globalization, unrestricted mobility and migration of foreigners is bringing new phenomena, but is currently being discussed not only at national level but also internationally. Several scientific studies have been published on the subject. E. Ravenstein (1885) was the first representative to conceive the principles of movement between the rural and urban environments and thus began to shape the "laws of migration" in the 1880s. The Slovak author Jurčová (2005) characterizes foreign migration as a migration in which state borders are crossed. According to Hanzelová, Kostolná and Kešelová (2008) migration to work abroad is one of the components of the overall international migration movements, which are multidimensional in nature. It is not easy to clarify the nature and causes of labour migration, although it is generally recognized that the possibility of getting better jobs and higher wages is the "driving force" and "engine" of people's migratory behaviour ”(Hanzelová, Kostolná and Kešelová 2008).

In the scientific literature, we can meet the macroeconomic neoclassical theory of migration, which is based on the imbalance between regional labour markets and migrant migrants as “suppliers” of labour. (Hicks 1963; cf. Krieger 2004) At the macroeconomic level, Massey (1993) in the neoclassical theories cites differences in wages across countries as a reason for migration. According to Galanská (2014), the neoclassical theory is considered to explain mainly migration from developing countries to developed countries, as it determines the initialization of migration based on real wage differences, or based on expected wage differences. We agree with this statement, because there are not enough jobs in developing countries and the development of industrial production is stagnating.

Economically oriented theories of international labour migration see this phenomenon as a form of labour mobility. (Pries 2001) This is also evidenced by the legal instruments of international organizations, which require Member States to remove legal obstacles to freedom of movement and discrimination because of nationality. In the context of labour mobility, the European Union also emphasizes the protection of social rights and the coordination of social security.

Legal Basis of Labour Mobility of Foreigners

In the primary law of the European Union, the regulation of the free movement of labour forces can be found in article 45 of the Treaty on the Functioning of the European Union (TFEU), which guarantees the free movement of workers within the European Union. It includes the abolishment of any discrimination of workers of the Member States of the EU on the ground of nationality related to the employment, salary and other work conditions. In brief, the article 45 TFEU guarantees the right of EU nationals to move with their employment to other Member States. Free movement of persons represents one of the four fundamental freedoms of the European Union and at the same time one of the basic characteristics of the EU citizenship. The primary legal regulation of the European Union is supplemented by a wide spectrum of secondary acts facilitating labour mobility not only nationals from the Member States, but also from third countries. The Slovak Republic has upon its accession to the Union undertook that it will stick to and properly apply the EU primary law, secondary legal acts, as well as other applicable treaties (Wefersová 2016). The Law no. 404/2011 Coll. on Residence of Foreigners as amended is also applicable in the context of employment of foreigners in Slovakia.

Law no. 5/2004 Coll. on the Employment Services as amended guarantees in its article2 paragraph 2 for the national of a Member State of the European Union and his/her family members **equal legal status** in legal relations arising according to the mentioned Law both for nationals of the Slovak

Republic and for nationals of other Member States. The concept of gender equality ranks is one of the reasons why foreigners are arriving to Slovakia in order to work here. In case of employment of nationals from EU Member States as well as from a State that is a contracting party to the Agreement on European Economic Area and the Swiss Confederation, these nationals have the same legal status in the legal relations arising under the Law on Employment Services as the nationals of the Slovak Republic unless this Law stipulates otherwise. In accordance with the article 64 of the Law on Residence of Foreigners the EU national is authorized to stay in the territory of the Slovak Republic without any further conditions nor formalities. The EU national is obliged to have a valid passport or other identity card proving his/her identity and Member State nationality. The EU national is obliged to notify his/her presence in the Slovak territory within 10 working days from the day of entering the Slovak Republic. The EU national is authorized to move around the Slovak territory within the period of three months from entering the Slovak Republic. In case of residence longer than three months, the foreigner is obliged to ask for registration of his/her residence in the Slovak territory using the official document within the respective Police Office.

The national of a third country with the granted residence of national of the third country with the granted status as the person with long-term residence of the EU also enjoys the same rights and obligations as the national of the Slovak Republic. The third country national is every person, who is not the national of the Slovak Republic, nor of other EU Member States. The employer can employ the third country national even when s/he is not holder of the so-called Blue Card. Compared with all EU member states Germany is in the first place as regards the grant of the EU Blue card. (Wefersova 2017) The Blue Card of the European Union represents the temporary stay authorizing the third country national to enter, to reside and to work in the Slovak Republic for performing highly qualified employment, and to leave the Slovak territory and re-enter within the period stipulated. During the period of years 2012-2016, the Slovak Republic issued only 32 Blue Cards. On average Slovakia granted not even three blue cards per one million inhabitants in the year 2018, while the Czech Republic and Poland issued already in 2016 39, or 42, respectively blue cards per one million working persons and thus marked much higher demand. In 2016, Slovakia only issued less than two blue cards per one million of workers. In total numbers in the EU according to Eurostat, the first Member State is Luxembourg granting much higher number of blue cards in proportion than other Member States (Slovak Business Agency 2019).

The Slovak Law on Employment further in its article 23b paragraph 2 stipulates the obligation on the employment to inform competent labour authorities on issues related to the employment of a national of the EU member state and his/her family members. The employer has the duty to inform the competent office of labour, social affairs and family in writing about the start and termination of employment of the EU Member State national and his/her family members within seven working days from the entry into employment and within seven working days from the termination of employment at the latest. The Slovak Republic further to article 45 of the TFEU and to the Regulation (EU) No 492/2011 of the European Parliament and of the Council of 5 April 2011 on freedom of movement for workers within the Union opened its market to the nationals of the newly acceded EU Member States and did not apply any transitional periods in the context of free movement of workers, as notified to the European Commission.

The answer to the first research question is that European Union law influences the Slovak legislation on the employment of foreigners in Slovakia.

Integration of Foreigners in the Slovak Labour Market

European as well as global mobility of active labour force, which is the product of globalization of markets and legislative changes arising in the field of labour relations and labour market, supports organisations and companies in deepening the relations both at the institutional and personal level and raises in companies an increasing need for personal contacts of people with different education and training, with different abilities and skills, with different experience in the functioning of a company and society, with different values, different ways of thinking, and thus a different worldview (Delgůdová 2013).

Integration on the labour market of foreigners coming to Slovakia is of special significance to them as a two-way process. It requires from foreigners to acquire rights and obligations applicable in the receiving state at one side, and on the other side, the receiving state must create conditions for the successful integration of foreigners into the society. Integration represents therefore the strategic process that takes place at all state levels and social life. Integration of foreigners is thus the multilateral process, while access to labour market represents only one of many dimensions of this process (European Commission 2015).

In Slovakia, there are mostly foreigners from Eastern and Southern Europe that are coming within the framework of labour mobility due to their cultural and language proximity to Slovaks. That is why they are mainly nationals from Ukraine, Russia, Serbia and Croatia. One of the problems of integration related to the employment of foreigners is the problem of language barriers within both business and personal contacts, this barrier being much bigger in the countries of Western Europe. For most employers and companies, the knowledge of the foreign language of employees is relatively low. As a result, the communication and cooperation within the whole collective during every day work is more difficult. As for acquiring certain work habits and business culture, the foreigners do not have problems. As the practical experience shows, after a certain period of time foreigners are able to communicate in the Slovak language and they try to integrate their families too. It is common, that after a one-year stay in Slovakia the spouse is following and, in some cases, children are following their parent who is working abroad. In most cases, there are short stays of family members of employed foreigners. The intercultural differences among Slavic nations are minimal, and for this reason, the foreigners from Eastern and Southern Europe contribute to the development of Slovakia. The tolerant attitude of employers suggests that the number of foreigners working in Slovakia is increasing and about 12% of them have got married in.

Shortage of Labour Force and Employment of Foreigners

Economic integration is a process of deepening economic relations and coordinated economic cooperation with the participation of states involved in this process. (Nováčková 2014) Due to globalization changes and the market liberalization, the Slovak Republic has become a suitable country for foreign investors. The introduction of innovative technologies and the automation of production processes are the reason why there are many vacant jobs in Slovakia. The lack of labour force is beginning to be compensated slightly by the labour force from abroad. Within the framework of free movement of persons, the most employees in the Slovak Republic are from the EU/EEA countries. In the year 2018, there were 9.800 persons from Romania, 5.900 from the Czech Republic, 5.400 from Hungary and 4.500 from Poland. This can partially be explained by the fact, that in Slovakia the Euro is used as the currency in the official payment system. This represents the competitive advantage of Slovakia in comparison to these neighbouring countries. If we look at the data from the Statistical Office of the Slovak Republic, in the regions of Bratislava, Trnava and Nitra there are up to 65-67% foreigners from the EU/EEA countries. The biggest number of foreigners from EU/EEA countries is employed in Bratislava and in the years 2012-2018 this proportion even more increased. The highest increase in the number of foreigners employed is in the Bratislava Region, where 17.138 foreigners are employed. There may be several reasons for that, nonetheless Bratislava as the capital city of Slovakia is the centre for business doing for several transnational companies and it also has suitable infrastructure. The number of foreigners working in Slovakia increased record-breaking, while in year 2017 there was an increase of 12.000, i.e. the foreigners occupied every fourth newly created job.

Although the number of foreigners present in Slovakia is increasing, the share of foreigners with long-term residence is low. The total number of foreign nationals performing work in the territory of the Slovak Republic as of 15 August 2019 has been 73.100. The number of employed persons from Serbia increased, at present there are more than 13.000 of them working in Slovakia. The number of Ukrainian nationals working in Slovakia also increased significantly, there are currently 18,200. In December 2018 there were in total 2053 nationals of Croatia employed in the territory of the Slovak Republic (Statistical Office of the Slovak Republic). There were 22.700 foreigners employed in five districts of the capital city of Slovakia, followed by Trnava district with 7.500 employed foreigners in the same

period (Ekonomika, SME 2019). There is a higher number of men than women employed foreigners in the territory of the Slovak Republic. The biggest groups were persons aged from 25 to 30 years. The biggest competition and interest have been noted in the positions of operators and machine and equipment fitters as well as qualified workers and artisans.

The following Chart illustrates the development of employment of third-country nationals in Slovakia. The data suggest that the employment of foreigners is on an upward trend.

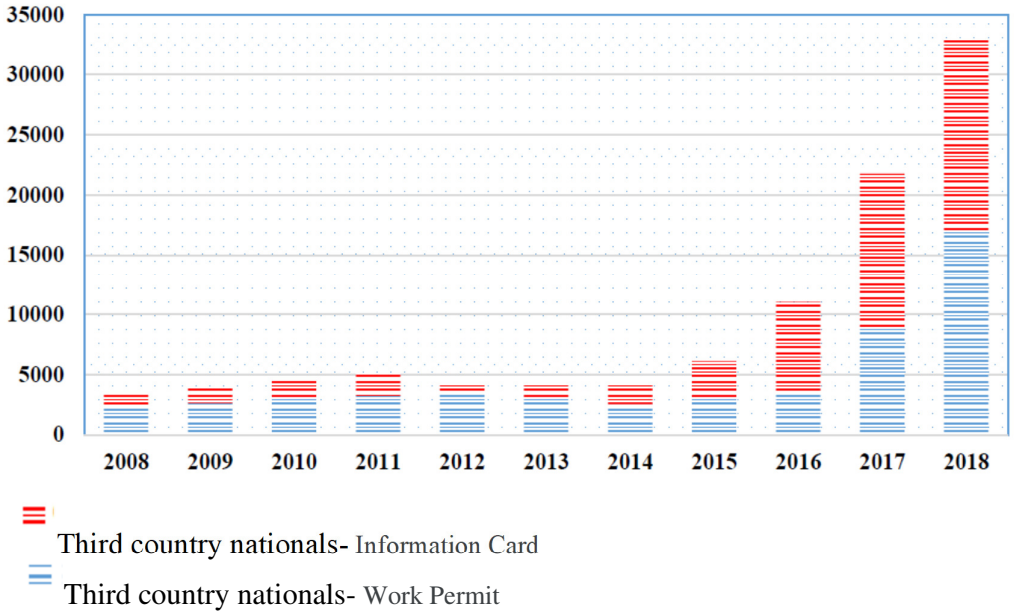

Chart 1: Employment of foreigners from third countries in the SR

Source: Ministry of Economy of the SR (2020), Správa o stave podnikateľského prostredia. [Online], [Retrieved January 23, 2020], https://www.mhsr.sk/podnikatelske-prostredie/lepsia-regulacia/opatrenia/spravy-o-stave-podnikatelskeho-prostredia-v-sr

Conducting Business by Foreigners

The second research question focuses on doing business of foreign subjects in Slovakia. The liberalization of markets, international protection and investor support and respect for competition rules have an impact on the businesses conducted by foreigners in Slovakia

Two laws regulate business conducted by foreign nationals in the territory of the Slovak Republic – the Commercial Code – Law no. 513/1991 Coll. as amended and the Law no. 455/1991 Coll. on Self-Employed Persons as amended. A natural person can act as a self-employed person either as a Slovak person (if he is resident in Slovakia) or as a foreigner (if he is not resident in Slovakia). Further to both the Commercial Code and Law on Self-Employed Persons, the foreigner can conduct business in Slovakia under same conditions as the Slovak person.

A foreign person in Slovakia is authorized to conduct business as of the date of entry into the Commercial Register of the foreign person's business or organizational unit of the foreign person, within the scope of the subject of business entered in the Commercial Register. The basic requirement for running a business as self-employed person is to obtain a certificate of trade license. In case of a foreign person in order to obtain a certificate of trade license, it is required to fulfil other conditions

than in case of a Slovak person. A foreigner can obtain permanent residence or temporary residence in Slovakia for conducting business. In order for any business entity from abroad to be interested in entering the market, satisfactory legal conditions must be created.

The current valid legislation creates conditions for the development of business activities of foreigners who can carry on business activities in Slovakia. Freedom to conduct a business is one of the basic preconditions for the existence of an economy based on market principles. In the Constitution of the Slovak Republic, freedom of doing business is guaranteed within the framework of fundamental rights and freedoms in the second chapter, in the fifth section as a fundamental economic law, and for this reason we can also speak about the constitutional principle of foreign business in Slovakia.

An important determinant for the business of foreigners is that the Slovak Republic protects the rights of foreign investors based on international treaties. International treaties for the promotion of investment provide fair and equal treatment as well as protection against expropriation. The current regime for the development of foreigners' business activities is also determined by the double taxation treaty, which creates a legal framework for the development of universal and mutually beneficial economic relations. Their benefit is a fair tax burden on foreign entrepreneurs and they allow the tax system to create a level playing field for domestic and foreign companies and entrepreneurs, too. The peculiarity of these international treaties is that they take precedence over laws. The largest concentration of foreign companies is in the Bratislava region, which reflects the high economic performance of the Bratislava region.

Illegal Work and Illegal Employment

The third research question concerns illegal work and illegal employment, circumstances that have a negative impact on the employees, the business environment and the whole society. Further to the Law no. 82/2005 Coll. on Illegal Work and Illegal Employment that entered into force as of 1 January 2018 as illegal employment is considered in this connection the use of dependent work of employees having their labour relationship or civil service relationship based on the specific law who are not registered within the register of insured persons and pensioners within seven days. The Ministry of Labour, Social Affairs and Family of the Slovak Republic regularly issues the Report on Legal and Illegal Work. This report for 2018 shows that 2,470 natural persons were illegally employed from among 56,636 persons audited, which represents 4.4% of all audited persons. This summary number of revealed illegally employed natural persons includes 596 illegally employed women and 1,874 illegally employed men. This negative phenomenon present in the Slovak labour market can only be removed by imposing higher financial sanctions for employers, as well as for these illegally employed persons, or by their expulsion from Slovakia, respectively.

Persons who work illegally are exposed to many problems related to their claims to wages, meals, statutory maximum working hours, minimum rest or vacation. They also risk problems in claiming a pension, which they often realize only later. On the other hand, employers who employ illegally distort the level-playing field, distort the market and at the same time they face high fines and other penalties, including revocation of trade licenses.

Conclusion

By analysing the current legislation, it was possible in this scientific study to assess the current legal situation study to demonstrate the increase in labour mobility of foreigners in Slovakia. From an economic point of view, migration of foreigners balances regional labour markets. There are currently two groups of foreigners coming to Slovakia. One group represent made up of foreigners who are looking for a job; this is the group of economic migrants. The second group consists of foreigners who come to Slovakia with the intention of doing business and creating jobs. This group of economic operators is perceived positively in particular in terms of regional development.

Based on concrete facts, we reached the conclusion that the foreign nationals of both, EU Member States and non-Member States are performing working activities in Slovakia. Performing work in a foreign environment is quite difficult and the employee has to deal with intercultural differences and remove language barriers. Due to the increased number of foreigners, the competent authorities also carry out controls and inspections at workplaces and the results of their activities are facts about illegal work in Slovakia, which is forbidden and distorts the labour market.

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An Integral Assessment of The Efficiency of Social Facilities

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Abstract

A balanced system of indicators for assessing the economic efficiency of social facilities should have at least two parameters: informative value and verifiability (empirical testability). The system of indicators forms the basis for methodological approaches to the analysis of economic, social, and biomedical efficiency of sanatorium-resort institutions and organizations.

The problem of studying and assessing the economic efficiency of sanatorium-resort health improvement services and the reserves for its increase consists of how fitting it is to assess economic efficiency separately from assessing social and biomedical efficiency if their efficiency exists at all. Economic efficiency should be studied and assessed independently of other human health components because sanatorium-resort health improvement and treatment services are included in the group of merit goods.

Keywords: natural monopoly, economic efficiency, sanatorium-resort health improvement services, merit good, social sphere, recreation, competition, business activities.

Introduction and review of publications

In the modern economy, an essential prerequisite to promote the competitiveness of any enterprise is the efficiency of its industrial-commercial and financial-economic activities. At the same time, economic efficiency essentially has the same scope, but it is calculated differently at different levels of the economy and is manifested differently both for individual enterprises and their groups by industries and spheres of national production *(Arsaliev, 2012)*. Accordingly, the assessment of the efficiency of an enterprise (a group of enterprises) of a peculiar production type is a rather complicated scientific task due to a number of circumstances and difficulties *(Sukharev, 2013)*.

The economic efficiency of social facilities is the efficiency of service institutions and organizations. Services as market products, unlike goods, have their economic specificity because they exist at the moment when they are provided, purchased, and consumed by consumers *(Dyatel, 2009)*. The economic nature of services lies in the intangible nature of production. Sanatorium-resort health improvement as a recreation and treatment service for a particular person cannot exist separately from him/her as a

consumer, which characterizes sanatorium-resort services from the social and biomedical side, alongside with the economic one *(Lebedeva, Kudrin and Leiserman, 2019)*.
In the conditions of the cutbacks to budget financing, sanatorium-resort institutions vitally need self-sufficiency of their services and self-financing of their sustainable operation as aspects of economic efficiency *(Chuvatkin and Gorobets, 2015)*. In this regard, it is essential to have a business behaviour pattern of the sanatorium-resort institution, which opens the reserves for increasing economic efficiency.
The objective of this study is to develop a system of indicators allowing us to assess the efficiency of a social facility (sanatorium-resort institution), taking into account the field specifics.

Literature Review

Russian and foreign science uses several methodological approaches to studying the activities of sanatorium-resort institutions, which develop, in particular, an assessment of their economic efficiency, including social and biomedical components as part of the integral economic efficiency indicator. There have been extensive studies dealing with the aspects of the mechanism of the sanatorium-resort complex functioning and development, the environmental and economic development of the recreational sphere, and technologies for managing the sanatorium-resort complex development of the RF regions *(Arsaliev, 2012), (Bryman, 1995)*.
Economists identify five economic efficiency criteria: resource efficiency; performance of the enterprise; the competitive advantage of the enterprise; quality of production activities; quality of service; service performance *(Aslanov, 2012)*.
According to foreign studies dealing with the evolution of spatial systems and the social infrastructure of territorial complexes, the implementation of sanatorium-resort health improvement and treatment services has two aspects: societal, which depends on the merit nature of the service *(Becattini, 2017), (Hirsch, 1970)*, and economic related to the prime cost of services, their quality, level, price and availability for the buyer *(Isard and Whitney, 1975), (Porter, 2008)*. Actually, the combination of the societal and economic aspects in sanatorium-resort services gives rise to the problem of their management, assessment of the service quality, and efficiency of sanatorium-resort institutions.

An analysis of specific and summarizing factors affecting the economic efficiency of social facilities

Economics forms a resource-cost approach to efficiency, according to which the efficiency (Eij.) characterizes the ratio of the final results (effects) of production and commercial activities of business entities (Ri) to the costs of resources (Cj) used to achieve them *(Aslanov, 2012)*. In the most general terms, economic efficiency is represented by equation (1):

$$Eij.=Ri / Cj \qquad (1)$$

In this case, when the economic efficiency of an enterprise is assessed according to equation (1), we should distinguish between the efficiency of using a particular resource and the efficiency of actions and operations performed in the process of achieving the economic objectives, for example, to implement a strategy *(Ermolina, 2013)*. We can obtain an assessment of economic efficiency by convolving private and summarizing indicators for individual resources and processes (operations) into a single integral indicator.
The information base for assessing the economic efficiency of a sanatorium-resort health improvement institution is a system of private and summarizing indicators, as well as the economic performance efficiency indicator, the numerical value of which can be obtained based on the model from equation (1).
The critical tool for reforming the efficiency assessment system is the development of a business activity model for social facilities.

It is evident that the theory of business activities of enterprises, institutions, and organizations is conceptually most appropriate for the analysis and assessment of their economic efficiency based on a balanced scorecard.

Economic resource efficiency is revealed and characterized by such indicators as productivity (of labour, capital) and profitability (of funds, non-current, and current assets). Labour and capital productivity are measured by the ratio of the total, average and marginal products measured in physical or monetary units to their strictly fixed volumes in man-hours and/or the number of employees, in machine hours and/or the amount of equipment. Thus, the productivity or performance indicators reveal and characterize economic resource efficiency from the tangible and physical sides *(Ermolina, 2013), (Calabina and Smirnykh, 2005)*.

The profitability indicators disclose and characterize economic resource efficiency from the cost side as the ratio of the value of products in selling or market prices to the value of the enterprise's assets or funds. Profitability ratios are dimensionless values and are taken as a percentage. To assess economic resource efficiency in terms of profitability, it is natural to refer to the enterprise's financial performance: revenue, profit (loss), commercial margin, cash flow, net cash income, etc.

Thus, based on the logic of summarizing economic efficiency indicators, the measure or generalized criterion of the economic efficiency of an enterprise over the reporting period (calendar year) will be the return on its equity (2) *(Calabina and Smirnykh, 2005)*:

$$Et\text{-}1 = Prn. / Cequity * 100\%, \quad (2)$$

where Et-1 is the economic efficiency of the enterprise over the reporting period; Prn. is the net profit of the enterprise over the reporting period; Cequity is the equity (net assets of the enterprise).

Target economic efficiency indicators are disclosed through performance indicators. In the plans of the enterprise, its economic objectives are always represented quantitatively and connected with the growth or reduction of the value of one or another summarizing indicator (for example, profit improvement and/or reduction of the cost of resources). Therefore, when calculating performance indicators, we should apply the formula of basic or chain growth rates (3), (4) *(Dyatel, 2009)*:

$$\text{basic: } \rho 1|0 = (Q1 - Q0) / Q0 * 100\% , \quad (3)$$

$$\text{chain: } \rho t|t\text{-}1 = (Qt - Qt\text{-}1) / Qt\text{-}1 * 100\% . \quad (4)$$

The integral assessment of economic efficiency as a method includes the indicators of productivity, profitability, performance, and, accordingly, the parameters of their permissible changes *(Saaty, 2006)*. However, it is necessary to reduce the number of economic efficiency criteria from five to a single criterion. Such a single criterion will be the return on equity of an organization or institution. It is recommended to convolve the coefficients into one summarizing coefficient using T. Saaty's hierarchy analysis method *(Aczél and Saaty, 1983)*.

The classification of the results of assessing the economic efficiency of sanatorium-resort health improvement institutions and social facilities in the form of summarizing indicators is presented in Table 1.

Table 1: the classification of the results of assessing the economic efficiency of sanatorium-resort health improvement institutions and social facilities
(Source: compiled by the authors)

#	Performance indicators	Calculation formula, units of measurement
1	Growth of labour productivity (Pr.lab.)	$\rho_{t\mid t-1}(\rho_{1\mid 0})_{Pr.lab.} = \partial Pr_{lab.} / Pr_{lab.} *100\%$
2	Decrease in the living labour costs (Payroll)	$\rho_{t\mid t-1}(\rho_{1\mid 0})_{Payroll} = \partial Payroll / Payroll *100\%$
3	Growth of the yield on the fixed assets of the enterprise (YIELDfa.)	$\rho_{t\mid t-1}(\rho_{1\mid 0})_{YIELDfa.} = \partial YIELD_{FA.} / YIELD_{FA.} *100\%$
4	Growth of the product profitability of the enterprise (Rprod.)	$\rho_{t\mid t-1}(\rho_{1\mid 0})_{Rprod.} = \partial R_{prod.} / R_{prod.} *100\%$
5	Growth of the enterprise profitability (Ren.)	$\rho_{t\mid t-1}(\rho_{1\mid 0})_{Ren.} = \partial R_{en.} / R_{en.} *100\%$
6	Growth of the quality of sanatorium-resort activities ($R_{qual.SRA}$)	$\rho_{t\mid t-1}(\rho_{1\mid 0})_{Rqual.SRA} = \partial I_{rhat.} / I_{rhat.} *100\%$
7	Growth of the quality of sanatorium-resort services ($R_{qual.SRS}$)	$\rho_{t\mid t-1}(\rho_{1\mid 0})_{Rqual.SRS} = \partial I_{qual.sat.SRS.} / I_{qual.sat.SRS.} *100\%$

The growth of the quality of sanatorium-resort activities (Rqual.SRA) and the quality of sanatorium-resort services (Rqual.SRS) is assessed by the growth rates of the resort and health improvement attractiveness index (Irhat.) and the sanatorium-resort service quality satisfaction index (Iqual.sat.SRS). Accordingly, Irhat. = The number of people having rest in the current year (half-year, quarter) / The number of people who had rest last year (half-year, quarter). Iqual.sat.SRS = The number of positive reviews on the SRS quality (year, half-year, quarter) / The total number of reviews on the SRS quality (year, half-year, quarter).

Discussion of Results

To develop a unified assessment scale, it is necessary to convert the private scales of economic efficiency assessment for each summarizing indicator into a new (say, 5-point) dimensionless scale: [0; N], where N is 5 points on the scale; N is a number determining the range of the new scale; 0 is the value of the indicator corresponding to the lowest quality of the property; N is the value of the indicator corresponding to the highest quality of the property.
Accordingly, the summarizing economic efficiency indicators are assessed on a scale of [0; N] converted into a unified variable X'.
1. In case of a monotonic increasing dependence (the larger the value of $X^i \mid X^i > 0$, i = 1;7, which represents one of the seven summarizing performance indicators, the higher the quality), the value of the corresponding unified variable X' is calculated by the formula (5):

$$X' = [(X^i - X^i_{min.}) / (X^i_{max.} - X^i_{min.})]*N, \quad (5)$$

where $X^i_{max.}$, X^i_{min} are the maximum and minimum values of the initial indicator X^i.
2. In case the dependence is monotonic decreasing (the larger the value of X_i, the lower the quality), the value of the unified variable X' is calculated by the formula (6):

$$X' = [(X^i_{max.} - X^i) / (X^i_{max.} - X^i_{min.})]*N, \quad (6)$$

where $X^i_{max.}$, $X^i_{min.}$ are the maximum and minimum values of the initial indicator X^i.
3. In case the dependence is not monotonic (there is an optimum X^i between $X^i_{max.}$ and $X^i_{min.}$, the value of the unified variable X' is calculated by the formula (7):

$$X' = [1 - |X^i - X^i_{opt.}| / \max\{(X^i_{max.} - X^i_{opt.}), (X^i_{opt.} - X^i_{min.})\}] * N, \quad (7)$$

where $X^i_{opt.}$ is the optimum of the initial indicator.

As a result, the integral assessment of the economic efficiency ($E_{integral}$) of an institution is calculated based on the values of the unified variables for each indicator from Table 1 using the arithmetic mean formula (8):

$$E_{integral} = \sum^{7}_{n=1} X'_n \ / \ \text{n}, \qquad (8)$$

Conclusions

It is expedient to outline resource and target economic efficiency. Resource economic efficiency is the efficiency of resource use, and target efficiency is the economic efficiency of processes. The economic efficiency of sanatorium-resort health improvement institutions is supplemented by social and biomedical (medical and health improvement) efficiency. The classification of resources, costs, and results for analysing and assessing the economic efficiency of the activities of sanatorium-resort health improvement institutions is based on the criteria accepted in economic science. The comparison of the methodological approaches to assessing the economic efficiency of organizations in the market economy conditions highlighted the priority of the business approach when building a system of economic efficiency indicators and criteria. The integral indicator will allow us to take into account the specifics of the social facility services and determine its operating efficiency reserves.

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Statutory Right of Choice as The Basis for Selected Strategies of Income Tax Minimisation in A Capital Company

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Abstract

The instruments of state influence concerning tax payers include, among others, various tax burden reduction mechanisms incorporated into the system, also known as tax expenditures. They constitute an acceptable exception from the tax standard and the tax payer's reaction to a specific stimulating tool is limited to choosing one of the alternatives specified in the act. Using the right of choice, specified by the given tax expenditure, meets the prerequisite to deem such tax payer's conduct as incorporation of a tax strategy aimed at tax minimisation. As a result of the analysis of Polish legal acts, there were distinguished three groups of the tax strategies based on the right of choice: strategies allowing for tax burden postponement, strategies allowing for reducing the tax base in periods other than those specified in the general rules, strategies allowing for definitive income tax minimisation using one or more rights of choice. Legal research has been confronted with the business practice of large 68 capital companies (located in the Opolskie Voivodeship in Poland). It was concluded that the tax strategies based on the right of choice are viewed in tax terms as safe strategies and the risk of their implementation is limited mainly to the general risk related to the company's market functioning in a specific economic reality. The only negative aspect is that the number of rights of choice constitutes a limited catalogue and the opportunities of income tax minimisation through the incorporation of tax strategies based on the right of choice are limited.

Keywords: Tax Expenditures, Statutory Right of Choice, Tax Strategy, Income Tax Minimisation.

Introduction

One of the primary functions of taxes, aside from the fiscal and redistributive function, is the stimulating function. Its essence comes down to the state's differentiation of tax burdens applicable to entities to evoke a specific impact on their decisions. This means that the state can, through applying various tax technique elements, affect economic and non-economic (including social) phenomena and alter them in the desired directions.

The instruments of such influence include, among others, various tax burden reduction mechanisms incorporated into the system, also known as tax expenditures. The Polish tax law includes no definition for this term, but the tax authorities uses it in the annual report titled "Tax expenditures in Poland". In the report's seventh edition (2018), the Ministry of Finances attempted to clarify the term based on the definitions established by the Organization for Economic Co-operation and Development. In the document titled "Best practice guidelines – off budget and tax expenditures" (2004), the OECD formulates the thesis that a tax expenditure is the transfer of public resources made as result of lowering a tax liability in relation to the adopted tax standard.

The Polish tax authorities expanded the definition by stating that a given mechanism can be recognised as a tax expenditure only when the following two prerequisites are met:

- there is an exception from the tax standard adopted in the given conditions,
- the exemption results directly in a reduction in the tax burden for the expenditure's beneficiary (tax payer).

At the same time, it was recognised that a tax standard is a solution that exercises the concept of the taxation's universality, completeness and equality, without differentiation – both discriminant and favouring (Constitutional Tribunal of the Republic of Poland, decision of 11 April 1994, ref. no. K 10/39). It was also emphasised that the tax expenditure's objectives are as follows:

- stimulation of the desired tax payer actions,
- supporting some sectors of the economy or types of economic activity,
- monitoring the tax burden progressions.

Without a doubt, the condition necessary to deem a specific solution as a tax expenditure is its abstractness and generality, i.e. providing it to an unspecified number of tax payers. In technical terms, the condition is met, for example, by the following: reliefs, exemptions, deductible expenses and lowered rates resulting from acts and refraining from tax collection resulting from a regulation of the Minister of Finances. To make a distinction, the condition is not met by a relief in tax liability repayment, awarded by the tax authorities to a specific tax payer in its individual case.

It is without a doubt that the role of tax stimulation cannot be assessed conclusively. On one hand, the legislator, by using various mechanisms incorporated into the tax system, contributes to shaping specific tax payer reactions, their decisions and actions, while on the other – tax expenditures violate the rule of equal taxation. However, aside from the opinions on the fairness of applying discretional state tax policy tools, it is necessary to note that the tax expenditures' effectiveness depends not only on their legal and tax structure, but also on the capabilities of specific tax payers. This demonstrates that systemic tax expenditures refer not only to tax mechanisms, but mainly to numerous aspects of entity functioning in the legal and economic reality. This especially concerns the entities' ability to use customised instruments (tools) and using them based on specific rules and conditions (Felis P., 2016), including the following:

- financial market instruments, e.g. credit, bonds, property rights, derivative instruments,
- other financing sources, e.g. re-investment, capital contributions, subsidies,
- financial system tools, e.g. present interest rate, discounts.

Furthermore, due to the diverse individual inclination of tax payers to use particular solutions, it is impossible to automatically assume that the tax expenditures' addressees will adequately use the system of stimuli incorporated by the legislator into specific tax structures and react to it according to the assumptions (Famulska T., 1998). This is a result of the tax payers' subjective evaluation, because their reaction to tax expenditures will always be a function of the benefits that can be achieved as result of the adopted tax strategy.

It must be noted that in the case of such defined tax expenditures, the tax payer's reaction to a specific stimulating tool is limited to choosing one of the alternatives specified in the act. Therefore, a tax strategy is based on the right of choice made by the tax payer, whereas the choice is not dependent on the tax authorities' permission and the administrative recognition institution does not apply in this case.

The basics of the division of strategies based on the right of choice

Any conditions required to obtain and maintain the right of choice are specified in the tax act. This means that when meeting and maintaining the discipline resulting directly from the act, the tax payer's choice is binding for the tax payer and the authority within the time horizon specified in the act (e.g. for a fiscal year, three years, five years or longer). Making a choice in a given scope is related to the need of considering future tax consequences assigned to the given option of choice, according to the following rule: the freedom of choice also means the freedom of accepting the consequences (Pratchett T., 2011). Clearly, the main criterion for the tax payer is the recognition of the tax benefits that can be achieved. Thereby, using the right of choice, specified by the given tax expenditure, meets the prerequisite to deem such tax payer's conduct as incorporation of a tax strategy aimed at tax minimisation.

The incorporation of tax minimisation strategies is especially clear in the case of direct taxes which feature an explicit dependency between the tax amount and each specific decision on income and expenses. The studies concerned tax strategies for the corporate income tax, which is a tax imposed commonly by tax authorities of many countries on capital companies and other legal persons conducting economic activity.

The essence of the corporate income tax is that it is focused on the result, i.e. the tax directly reduces the profit generated on economic activity. This simple dependency is reflected in each financial statement, where the corporate income tax is disclosed in the profit and loss account in the second-to-last item as a negative amount. This means that tax minimisation strategies provide a clear effect in this tax title in the form of easily estimated savings on the tax liability payment.

The studies of the polish legal acts have shown that the tax strategies based on the right of choice applicable to entities as part of tax expenditures based on the Polish Act of 15 February 1992 on the corporate income tax (Polish Journal of Laws; Dz. U. of 2019, item 865 with amendments), include the following three strategy groups:

- strategies allowing for postponing the tax burden, with a lack of certainty concerning the future final tax amount (tax postponement),
- strategies allowing for reducing the tax base in periods other (shorter) than specified in the general rules and for minimising the tax in short periods with an unchanged final tax amount (benefits' forward transfer),
- strategies allowing for definite income tax minimisation when using one or more rights of choice, which requires specific tax payer conduct, especially in terms of expenses incurred.

The analysis were based not only on legal acts but also on the interpretations of the National Revenue Information, which are related to the discussed issues. Legal research was also confronted with the business practice of large 68 capital companies (located in the Opolskie Voivodeship in Poland).

Strategies allowing for postponing the tax burden

Capital companies that use tax strategies from the first group see a benefit in short-tem cash acquisition, which would otherwise be expended on the income tax in short (monthly) periods. It is characteristic for this right of choice that the adopted strategy does not affect the final tax amount, because the tax depends on other factors. The primary benefit is the postponement of the duty of paying a substantial part of the tax liability with simultaneous tax reduction in present periods (e.g. particular months) – hence the strategy's identification as tax postponement.

During the studies, it was determined that a typical example of this strategy is the selection of the simplified form of paying monthly income tax advances. The essence of a well-planned strategy of this type is that the tax payer makes advanced payments in a fixed and relatively low amount throughout the year, whereas their sum is lower than the tax due for the entire year. The difference between the sum of the relatively lower advanced payments and the tax disclosed for the entire fiscal year is subject to payment after the end of the year, however the postponement of the duty to pay the amount due for the entire year is a substantial benefit resulting from this tax strategy. This benefit can be described by identifying the differences between the value of advanced payments calculated in the regular (real) manner and the value of advanced payments calculated in the simplified manner, with consideration of the value of money over time. For the first month in the fiscal year:

$$PV_1 = \frac{T_{1real} - T_{simplified}}{1 + (\frac{n_1}{365} \times r)}$$

Table 1: The explanations to the formula

PV_1	present value of the difference between the real and simplified advanced payments
$T_{1\ real}$	regular (real) corporate income tax (CIT) advanced payment
$T_{simplified}$	simplified income tax advanced payment
n_1	number of days counted from the first advanced payment deadline to the date of the annual tax return submission
r	nominal interest rate for working capital facility (this interest rate was adopted because the company increases its current working capital by *PV1* and this amount is not provided in foreign resources)

Source: own elaboration based on the Corporate Income Tax Act and a formula for the time value of money.

The situation is analogous for subsequent months in the fiscal year, which is why for the entire year (with the assumption that the fiscal year includes 12 months):

$$\sum PV = PV_1 + PV_2 + \cdots + PV_{12}$$

therefore:

$$\sum PV = \frac{T_{1real} - T_{simplified}}{1 + (\frac{n_1}{365} \times r)} + \frac{T_{2real} - T_{simplified}}{1 + (\frac{n_2}{365} \times r)} + \cdots + \frac{T_{12real} - T_{simplified}}{1 + (\frac{n_{12}}{365} \times r)}$$

Table 2: The explanations to the formula

$\sum PV$	present value of the sum of the differences between the real and simplified advanced payments for year
$PV_1, PV_2 \ldots PV_{12}$	present value of the difference between the real and simplified advanced payments for subsequent months
$T_{1\ real}, T_{2\ real} \ldots T_{12\ real}$	regular (real) corporate income tax (CIT) advanced payment for subsequent months
$T_{simplified}$	simplified fincome tax advanced payment
n_1	number of days counted from the first advanced payment deadline to the date of the annual tax return submission
r	nominal interest rate for working capital facility

Source: own elaboration based on the Corporate Income Tax Act and a formula for the time value of money

An additional positive aspect of the strategy based on the right of choice is the fact that its incorporation features no expenses. On the contrary, the choice of the fixed income tax advanced payment provides savings due to the reduction in the number of activities performed by the financial and accounting services, which are relieved of the duty of monthly advanced payment calculation in real amounts. The simplified method of settling upon the advanced payments is therefore especially beneficial for entities which have their tax base increased year-on-year, because then the paid simplified advanced payments will be lower than the real advanced payments. This method also eliminates the risk of generating tax arrears resulting from erroneous calculations of the real income tax advanced payments during the fiscal year.

For tax strategies based on the right of choice, allowing for postponing the tax burden, with a lack of certainty concerning the future final tax amount, the expected economic effect is minor, but also the general financial risk is minor, while there is no tax risk at all.

Strategies allowing for reducing the tax base in periods other (shorter) than specified in the general rules

The tax strategies based on the right of choice and classified in the second group also enable short-term (monthly) or long-term (annually) cash acquisition, which would otherwise be expended on the income tax. Similarly to the first group's strategies, the primary benefit is the postponement of the duty of paying a substantial part of the tax liability with simultaneous tax reduction in present periods (e.g. in several months in a year or in several years). It is characteristic for the structure of this right of choice that, on the contrary to the first group's strategies, the changes apply to one of material and legal factors affecting the tax base amount, i.e. income or expenses, income deductions or tax deductions.

Income tax deferral results from the tax base reduction in periods other (shorter) than specified in the general rules, which leads to the benefits' forward transfer. Similarly to the first group's strategies, the liability is only postponed in time and the strategy has fundamentally no impact on the final tax amount estimated in long periods of time (e.g. several years). This group can also include, for example, selected strategies based on the right of choice:

- selection of the method of deducting a tax loss on prior years (deduction amount and year of deduction),
- selection of the fiscal year (utilising a different distribution of income and expenses in a different year than the calendar year),
- selection of the method of settling upon exchange rate differences – according to the accounting
  act or the income tax act (utilising the balance sheet law and internal accounting policy rules' simplifications),
- selection of the method of exercising the right to deduct donations (priority of donation deduction before other deductions).

The studies featured the identification – as a typical example of this strategy – of the selection of a degressive method of depreciating some (acquired or generated) fixed assets (machinery, devices and transport mean with specific features). The benefit of this tax strategy is the tax minimisation in the first depreciation period.

The value of the benefit (postponement of tax-deductible expenses) can be specified by estimating the tax from the difference between the value of particular degressive tax depreciations and the value of the estimated linear tax depreciations – with consideration of the value of money over time. For the first period (month, quarter or year, depending on the adopted periods of burdening expenses with tax depreciations) of degressive tax depreciation:

$$PV_{Tax1} = \frac{t \times (d_{degresive1} - d_{linear})}{1 + (\frac{n_1}{365} \times r)}$$

Table 3: The explanations to the formula

PV_{Tax1}	present value of tax calculated from the difference between the degressive tax depreciation and the linear tax depreciation
$d_{degressive1}$	degressive tax depreciation
d_{linear}	linear tax depreciation
t	tax rate
n_1	number of days counted from the tax advanced payment deadline, including the degressive tax depreciation to the deferred tax payment deadline
r	nominal interest rate for capital facilities (this interest rate was adopted because the entity increases its current working capital and this amount is not provided in foreign resources)

Source: own elaboration based on the Corporate Income Tax Act and a formula for the time value of money

For the next fixed asset depreciation periods:

$$\sum PV = PV_{Tax1} + PV_{Tax2} + \cdots + PV_{Tax\,n}$$

therefore:

$$\sum PV = \frac{t \times (d_{degresive1} - d_{linear})}{1 + (\frac{n_1}{365} \times r)} + \frac{t \times (d_{degresive2} - d_{linear})}{1 + (\frac{n_2}{365} \times r)} + \cdots + \frac{t \times (d_{degresive\,n} - d_{linear})}{1 + (\frac{n_n}{365} \times r)}$$

Table 4: Explanations to the formula

$\sum PV$	present value of the sum of the tax calculated from the difference between the degressive tax depreciation and the linear tax depreciation
PV_{Tax1}, PV_{Tax2}… $PV_{Tax\,n}$	present value of tax calculated from the difference between the degressive tax depreciation and the linear tax depreciation – for subsequent periods
$d_{degressive1}$, $d_{degressive2}$... $d_{degressive\,n}$	degressive tax depreciation – for subsequent periods
d_{linear}	linear tax depreciation
t	tax rate
n_1	number of days counted from the tax advanced payment deadline, including the degressive tax depreciation to the deferred tax payment deadline
r	nominal interest rate for capital facilities

Source: own elaboration based on the Corporate Income Tax Act and a formula for the time value of money

Analogous effects are associated with a similar tax strategy based on the right of choice, which utilises a one-time depreciation, the income deductible expenses of which include the sum of tax depreciation up to the amount of EUR 50,000 in a fiscal year (Article 16k paragraphs 7-11 of the Corporate Income Tax Act). Then there is a one-time expense burden with the fixed asset value and the tax minimisation takes place in the first settlement period.

The use of the degressive tax depreciation or one-time depreciation method includes no risk – neither financial, nor tax-related. Similarly, the methods require no additional expenses, because the only expense is the increased workload required to perform labour-consuming calculations and accountancy.

This means that for tax strategies based on the right of choice, allowing for reducing the tax base in periods other (shorter) than specified in the general rules and for minimising the tax in short periods with an unchanged final tax amount in long periods (benefits' postponement) – the achieved economic effect is minor, but there is no financial and tax-related risk, or additional expenses incurred to implement the strategy.

Strategies allowing for definite income tax minimisation when using one or more rights of choice

The tax strategies from the third group, used by capital companies, based on the right of choice, are more complicated than the strategies from the first and second group, because the income tax minimisation – when using one or more rights of choice – requires specific tax payer conduct, especially in terms of expenses incurred. The primary benefit is not the postponement of the duty of paying a part (or all) of the tax liability with simultaneous tax reduction in present periods (as in the case of the first and second group strategies), but the definitive reduction in the corporate income tax burden. The characteristic feature of this group's strategies is that the change applies not only to one

or more material and legal factors, which affect the tax base amount (as in the case of the second group strategies), but to the company's internal environment. Furthermore, the right of choice is burdened with the duty to meet the requirements resulting from the act and their executive acts and – in some cases – the duty to obtain a relevant permit.
The most spectacular example of this group's tax strategy is the establishment of economic activity in a special economic zone (SEZ). The Polish legislator created special zones as a support instrument with the purpose of accelerating the growth of regions by attracting new investments and promoting workplace creation. Its objective was achieved through administrative separation of country areas in which it is possible to conduct economic activity on preferential terms, including the use of a corporate income tax exemption. The basis for using the income tax exemption is the exemption for conducting economic activity in a special economic zone.

The rules and terms of investing in a SEZ and the scope of benefits deriving from conducting economic activity in one are specified in the Act of 20 October 1994 on special economic zones (Polish Journal of Laws; Dz. U. of 2019, item 482), harmonised with the Regulation of the European Commission no. 70/2001 of 12 January 2001 on the application of Article 87 and 88 of the EC Treaty in relation to state aid for small and medium enterprises (EU Official Journal, series L no. 10/33). The numerous benefits include a wide spectrum, i.e. from aiding local governments to availability of investment areas equipped with full infrastructure. One of the most important benefits is the income tax exemption, whereas the exemption applies to a tax payer solely to the income generated from economic activity conducted within the given zone.

The amount of available tax exemption depends on many factors, the main of them include the following:

- establishment of investment in an economic zone in a specific voivodeship,
- classification of an entity to a specific group – small, medium or large enterprises,
- amount of eligible expenses, i.e. the value of investment incurred by the tax payer or the sum of remuneration paid to employees in a specific period of time.

The maximum value of tax exemption is calculated as the product of eligible expenses (investment or sum of remuneration) and the percentage index reflecting the regional aid intensity in areas belonging to particular voivodeships (10% - 50%). The calculation of the tax exemption amount is represented by the following formula:

$$T = r * PV$$

Table 5: The explanations to the formula

T	income tax exemption
r	tax rate applicable to a specific voivodeship (10% - 50%)
PV	value of incurred expenses - discounted as of the date of permit issue

Source: own elaboration based on the Corporate Income Tax Act and a formula for the time value of money

The expenses incurred are subject to discounting according to the formula specified in the executive regulation to the Act on special economic zone:

$$PV = FV * \frac{1}{1+\frac{r_1}{12}} * \frac{1}{1+\frac{r_2}{12}} * \dots * \frac{1}{1+\frac{r_n}{12}}$$

Table 6: The explanations to the formula

PV	value of incurred expenses - discounted as of the date of permit issue,
FV	value of incurred expenses - as of the day they were incurred
$r_1, r_2, \ldots r_n$	discount rate applicable to the given month (according to the rate specified by the European Commission)
n	number of months elapsed from the date of obtaining the permit to the date of expense incurring

Source: own elaboration based on the Corporate Income Tax Act and a formula for the time value of money

The exemption period depends mainly on the date specified in the permit (tax exemption period limitation) and on the income generated in subsequent tax years, because:

- for each tax year, the tax payer specifies the amount of tax it was not obliged to pay due to the available corporate income tax exemption,
- the specified amounts are deducted by the tax payer from the available amount of exemption (with consideration of the discount) until it is spent.

The expected effect of the tax strategy based on the right of choice exercised by establishing an economic activity in a special economic zone, is the tax exemption on income generated on activity conducted within the zone, which in essence means income tax (only on this specific income) minimisation to zero in the specified amount limit and the resulting time horizon.

This tax strategy requires substantial expenses – both investment expenses and in terms of internal organisation. In practice, the choice means establishing a new enterprise from the ground up (the so-called greenfield investment) at a specific location, size and time, with the duty of maintaining *status quo* in a specific time horizon. In the case of non-maintenance of employment in the designated size and time or infringing the permit terms in a different manner, the tax payer is obliged to pay the tax for which he was granted exemption. Thereby, the strategy is encumbered with high general risk, constituting the sum of all risks applicable to an economic activity conducted in a volatile market. Additional financial risk is posed by the uncertainty concerning the exercise of tax exemption at its full amount. Due to the fact that the exemption availability period is specified both in terms of the generated income and the limit date, it is possible that an entity uses the tax exemption in a partial extent, because it didn't generate enough income to exhaust the relief prior to the limit date (the tax sum in subsequent years will be lower than the exemption limit). In such circumstances, companies strive to expand their tax strategy with new elements aimed at transferring income from the future to the time of use of public aid in the form of a tax exemption (forward transfer). The effect is achieved by delaying the creation of tax expenses in exempted activity or forwarding the time of income generation in the given activity. This ability is given, for example, by the exercise of the right of choice in terms of lowering the depreciation rates for asset components. The tax regulations do not regulate the bottom limit of depreciation rate reduction, which is why it is possible to reduce them to 0%. Similarly, the regulations do not refer to the period for which the rates can be reduced, therefore in consequence the expenses (tax depreciation) can be transferred forward to the period in which the company will not use the tax exemption and only then will it reduce taxable income.

The conducted studies demonstrate that in the case of this strategy, the expected economic effect in the form of tax minimisation seems equally appealing as the economic motive resulting from a non-tax expenditure. On the other hand, the real barrier for using the strategy are the expenses related to its incorporation – covering the investment expenses or level of employment and remuneration of employees at a given level – which is decisive for the acquisition of the permit for conducting activity in a special economic zone.

Conclusions

A specific feature of tax strategies based on the right of choice is the tax payers' undisputable right to minimise the income tax, provided that it is done in the manner and on the terms specified directly in the act. This means that the strategies are viewed as safe in tax terms. Thereby, the risk of tax strategy implementation is limited mainly to the general risk related to the company's market functioning in a specific economic reality. On the other hand, the tax risk covering any additional tax annotations (including interest and other consequences, including fines), constituting effects of a negative strategy assessment by the tax authority, is negligible. It primarily results from the companies' non-compliance of the terms specified in tax acts or in the permits, however it is not generated by any possible allegation of tax law circumvention.

Table 7: Assessment of the effects of corporate income tax strategies based on the right of choice.

	Corporate income tax strategies based on the right of choice	Additional financial effect	Risk		Cost of execution
			business	tax	
1	**strategies allowing for postponing the tax burden**, with a lack of certainty concerning the future final tax amount (tax postponement), e.g. simplified advanced payments	low	none	none	none
2	**strategies allowing for reducing the tax base in periods other (shorter) than specified in the general rules** and for minimising the tax in short periods with an unchanged final tax amount (benefits' forward transfer), e.g. forwarded depreciation	average	none	none	none
3	**strategies allowing for definite income tax minimisation** when using one or more rights of choice, which requires specific tax payer conduct, especially in terms of expenses incurred, e.g. establishment of activity in a SEZ.	high	average	average	very high

Source: own elaboration based on research

Another feature of tax strategies based on the right of choice is their universality, which results from the fact that all strategies in this group are available to any capital company – in a specific situation, within the limits specified in the tax act regulations.

In opposition to the specified positive aspects of the strategies based on the right of choice is a single – and most important – negative aspect, the point of which is that the number of rights of choice is limited. The lawmaker used legislative solutions to encourage capital companies to make specific decisions aimed at minimising the tax burden, but limited the number of mechanisms allowing for the use of the right of choice. Therefore, the scope of tax strategies based on the right of choice is clearly and precisely specified. At the same time, tax interpretations as well as court and administrative decisions include a view that any tax exemptions and reliefs in the Polish tax law system constitute an exception and that the interpretation expanding the statutory scope of tax exemption cannot be applied in this regard.

The negative premise makes the opportunities of effective implementation of (tax minimisation) strategies based on the right of choice not so plentiful as the tax payers expect. Furthermore, aside from statutory limitations, there are also numerous limitations related to the essence of company functioning – including the level of resources – that result in the lack of objective opportunities to use specific strategies. Analogous limitations concern other rights of choice not specified herein.

Thereby, the opportunities of income tax minimisation through the incorporation of tax strategies based on the right of choice are very limited.

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Visualization of Customers Feedback Data on Telecommunication Provider Service in Malaysia Using Sentiment Analysis

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Abstract

Customers feedbacks are important for businesses to provide the best service and to promote their product. In this digital era, people are expressing emotions and opinions via social media towards various issues including the satisfactions of using certain products or services. Since telecommunications companies are competitive, they tend to focus more on which is the best service they can give to consumers, rather than concentrating on what consumers need. In addition, customers require other user reviews to help them choose the most suitable service based on their criteria. This work focuses on obtaining the positive and negative feedbacks by the customers using sentiment analysis method to visualize the data in an informative way. Lexicon-based approach is used during pre-processing phase as it is more suitable to manage abbreviations, symbols and language other than English. Then, Naïve Bayes classifier is applied to classify the positive and negative words. The result is represented in a graphical representation of pie chart and word cloud using Highchart as the data visualization tool. Three top telecommunication providers in Malaysia (Maxis, Celcom and Digi) are used as the case study. From the results obtained, Maxis has the most positive reviews by the customers. In order to focus on the problems faced by their customers, word cloud is used to observe the most common and important keywords used by them. The system is beneficial for businesses and customers to analyze the important features needed to meet their requirements to improve the business management and increase customers' satisfaction.

Keywords: Business, Sentiment Analysis, Telecommunication Provider, Customer Feedback.

Introduction

The advancement of technologies has made people's lifestyle changed abruptly, especially the way of communication (Pinto et al., 2019). Through digitization, it provides telecommunication companies an opportunity to enhance their business management for a better service to customers (Caylar & Ménard, 2016). In order to obtain feedbacks from customers, various types of media are used and one of the most popular platforms to get customer's reviews is the Social Networking Sites (SNSs) such as Facebook and Twitter (Salloum et al., 2017). Hence, it gives opportunity for businesses to promote their products and services based on the customers' need. Advertising is an important aspect in businesses to boost visibility of the industry to expand the business and to widen the word of mouth referrals (Hessinger, 2019), thus, obtaining customers' reviews will assist in marketing the products and services better. The reviews can spread across thousands of people by having customers posting their feedbacks and experiences on their SNSs (Khatoon, 2017).

According to Vidya et al. (2015), SNSs has been used by most telecommunication companies as their marketing strategy in order to improve their services due to the competitions among the other telecommunication industries (Susanti et al., 2018). This has caused the companies to focus more on

gaining benefits by offering numerous offers without concerning on the users' requirements. Although many tempting offers are being advertised to the public, certain group of people have different needs based on their location, internet usage activities, call time and many more (Khatoon, 2017).

Telekom Malaysia is the first telecommunication company in Malaysia that provides land-lines and mobile services (Munyanti & Masrom, 2019). As the technology grows rapidly throughout the years, there are several telecommunication companies such as Maxis, Celcom and Digi providing many types of packages according to the trend during the era. Table 1 shows the comparison of packages offered by the three different telecommunication providers (Maxis, Celcom and Digi).

Table 1: Comparison of Telecommunication Packages in Malaysia

	Maxis Hotlink Red	**Celcom**	**DiGi**
Monthly Internet passes (RM)	35/45/60/70	30/50/79	35/50/70
Base data quota(GB)	6/8/10GB	5/10/15GB	6/7/12GB
Free data(GB)	FREE Non-stop RED(Chat/Social/Video) Unlimited Calls for monthly Internet passes RM60 and RM70 only	FREE Unlimited Late Night Youtube(1AM-7AM) Unlimited Music Walla iflix VIP Access	biGBonus(bonus data from 1pm-7pm) Unlimited Calls

Therefore, this has caused users to find it difficult to choose the most suitable telecommunication packages to suit their needs. A web-based system to visualize customers' positive and negative reviews is developed to assist in choosing the most suitable telecommunication provider.

This paper is organized as follows: Section 2 will discuss on the related work of Sentiment analysis in determining positive and negative texts and Section 3 will explain on the methodology. The results obtained will be described in Section 4 followed by the conclusion in Section 5.

Related Work

Sentiment analysis is a technique that detects people's emotions or attitudes (Liu & Cocea, 2017) which consists of five stages: enrichment, transformation, pre-processing, vectoring and mining. Enrichment stage is to identify and tag name entities to be used during the filtering of words. Next, transformation is the phase that change textual data into structured data to classify positive and negative sentiments. Pre-processing is then performed to clear unnecessary elements such as numbers and symbols in the texts. During the vectoring stage, the data will be transformed according to the number of positive and negative words which leads to the last stage, mining where the texts are classified into positive and negative categories. Text processing and classification techniques are the most important techniques for sentiment analysis. Text processing involves bag-of-word, corpus and lexicon-based method whereas classification involves methods such as Naïve Bayes (NB), Support Vector Machine (SVM) and K-Nearest Neighbour (KNN).

Bag-of-word calculates the appearance of words in text which is also called unigrams. This technique is easier to understand where the process can achieve a higher performance and more efficient in computation (Kolchyna et al., 2015). On the other hand, text corpus is based on large body text for linguistic analysis purposes which is quite difficult to perform annotation process (Dootio & Wagan, 2019). The lexicon-based approach is based on unigram to assign polarity score where dictionary of words is involved and can be created manually or automatically using seed words to increase the list of words (Kolchyna et al., 2015; Goyal & Daume, n.d.; Rajput & Solanki, 2016). Hence, this work used lexicon-based approach for text processing as it does not require any procedure of learning for data labelling as well as identifying the meaning via context and library.

NB is a supervised algorithm with independent feature. It is based on probabilistic classifier using Bayes Theorem to calculate the data that belongs to a specific class (Abdi et al., 2018; Ali et al., 2017). Besides NB, SVM is also commonly used as a classifier that provides maximum separation between classes as it is a technique that finds "maximum margin-hyperplane". In addition, SVM contains more statistical learning theory and method of structural risk minimization which represents two layers of neural network that can be used for linear or non-linear regression. In the binary classification problem, the hyperplane method can be separated and keep as large as possible (Ali et al., 2017). On the contrary, KNN is known as one of the simplest algorithms known as instance learning method. According to Vidya et al. (2015), KNN has some aspects that are easy to interpret the output, calculation time and predictive power. Table 2 shows the three classifiers' performance for sentiment analysis.

Table 2: Comparison of Classifiers' Performance for Sentiment Analysis

	Naïve Bayes (NB)	**Support Vector Machine (SVM)**	**K-Nearest Neighbor (KNN)**
Azizah, Ivan and Budi (2015)	F-1: 89.08% Recall: 81.48% Precision: 91.38%	F-1: 89.33% Recall: 92.61% Precision: 86.26%	F-1: - Recall: - Precision: -
Mustafa, A and Sohail (2017)	-	-	F-1: 75.6% Recall: 76.6% Precision: 75.4%
Jadhav & Channe (2016)	Precision: 81.667%	-	Precision: 100 %

Based on Table 2, each of the classifier has their own advantages and disadvantages. According to Jadhav and Channe (2016), the advantages of KNN are it is easy to understand and to implement because KNN can store all training samples and do not need to create classifiers until a new unlabelled sample needs to be classified. However, KNN has limitations where they need more memory space and it runs slower than NB which has computationally intensive recall (Devika et al., 2016). The advantages of SVM is that it has high dimensional input spaces and the vector of the document is sparse but also requires a large amount of training sets and the data collection of SVM is tedious. Therefore, this work used NB as the classification method since it has a precision of 91.38% in (Azizah et al., 2015) work. Moreover, the speed for computational training by NB is faster than KNN in Jadhav and Channe (2016) study and can deal with noisy data by removing irrelevant features to enhance the classification performance which is suitable for a large dataset.

Several previous studies on measuring customers' satisfaction using sentiment analysis is shown in Table 3.

Table 3: Previous Related work using Sentiment Analysis

	Azizah, Ivan and Budi (2015)	Mustafa, A and Sohail (2017)	Khatoon (2017)	Susanti, Djatna and Kusuma (2018)
Focus Element	To measure customer loyalty using NBR and NPS	Measure English comment of the different telecommunication provider	To enhanced customer with the management	Sentiment Analysis on GSM service based on: - SMS - Data Usage - Service provider
Technique use	Classifier SVM	Classifier KNN	Text Processing lexicon method Classifier SentiWordNet	Classifier Multinomial Naïve Bayes.

From Table 3, the study by Azizah et al. (2015) measures customer loyalty using Net Brand Reputation (NBR) and Net Promoter Score (NPS). NBR is a digitally reputation value of brand. NPS is by asking question or distribute the questionnaire. NPS and NBR is to simplify the measurement of customer loyalty. Measuring brand reputation using positive and negative mention in the Twitter comment. SVM is used to classify NPS while the formula used to calculate NBR is as follows:

$$NBR = \left(\frac{Positive\ mentions - Negative\ mentions}{Positive\ mentions + Negative\ mentions}\right) \times 100\%$$

In Mustafa and Sohail (2017) work, it measures English comment on Twitter based on different telecommunication provider. TF-IDF is used to collect the data from tweets on Twitter, then, KNN is used as the classifier. The scoring of words is calculated as follows:

$$f_{ij} \log \frac{number\ of\ tweets}{number\ of\ tweets\ that\ include\ word\ i}$$

where f_{ij} is the frequency of the word in tweet.

Furthermore, Khatoon (2017) work enhances the telecommunication management for customers in which the Customer Relationship Management (CRM) system maintains information about customers such as the customer behaviours, feedbacks and complaints. Lexicon-based approach is applied to compute sentiment scores from collected tweets, then, SentiwordNet (SWN) is used as a classifier. The calculation is performed as follows:

$$Score(Term_i) = \frac{1}{TotalSyn} \sum_{i}^{n} Score\ (i)$$

The total score term (*Score (Termi)*) calculates average values of all terms that are found in the texts. *TotalSyn* is the total number of sysnset of all possible POS of term *Ti* found, *Score(i)* is the score for each synset. The individual term sentiment score is calculated as the value of all the tweet words.

Moreover, in Susanti et al. (2018) study, sentiment analysis was conducted on GSM service, the telecommunication in Indonesia. The sentiment analysis is based on the level of service data usage, Short Message Service (SMS) and service provider. It uses Multinomial Naïve Bayes as the classifier also on training and testing level.

In order to represent data in an informative way, data visualization is used. Data visualization is a general term that describes any attempt by putting it in a graphical context to help people understand

the significance of the data. Through data visualization tools, patterns, trends and associations that may go undetected in text-based data can be revealed and recognized more easily (Gebremeskel & Biazen, 2019). Nowadays, there are various tools to visualize data. For example, D3.js, Highchart, Looker and Three. To map the graph of relevant data, any programming language could also be used such as python, in which graph can be plotted using classes such as Pyplot() with the aid of certain nested conditions. Another approach for data visualization is to use any pre-existing software such as tableau and Matlab (Vij & Pruthi, 2018). Thus, this work uses Highchart to represent the results of the data.

Methodology

This work performs sentiment analysis using pre-processing, classification, and visualization to deliver the information about customers' feedbacks on the telecommunication provider services. The system architecture is illustrated in Figure 1.

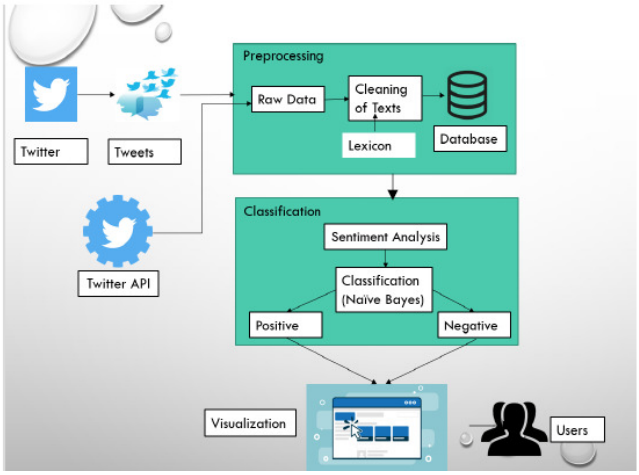

Figure 1: System Architecture

Based on Figure 1, raw data is extracted automatically from Twitter from the three telecommunication providers' (Maxis, Celcom and Digi) Twitter page. Then, pre-processing is performed by using Lexicon-based approach to process the data involving filtering of texts to be stored into the database. By using the cleaned texts from the database, classification is done by applying NB method. Both English and Malay texts are classified into positive and negative categories. Once the words have been classified, visualization of data is then being performed to represent the information in a better view. Data is presented in two different types of chart which are pie chart displaying the percentages of positive and negative comments from customers, and word cloud to view the most common words being used by the customers in their tweets.

Results

Three columns are obtained representing sentiment, tweets and user respectively. The sentiment is mapped automatically for each user based on their tweets. Figure 2 shows the tweets obtained from Maxis Twitter page after pre-processing and classification.

sentiment	text	user
neutral	line maxis 4G tapi kenapa internet nya lembap sangat dari malam tdi?	wfwhda_
neutral	@Simbuilder @Roblox someone else that has an username that come	mehdi0131_
positive	RT @ElliandraYT: the creator who made all these stunning hairs (and r	PoseyGarden
neutral	@mmhmScotty @Maxis anytime bby!!! @TheSecretPotter ðŸ'€ bby I	marfmellow
positive	RT @Swamy39: Now that PC has come out of Tihar on bail Namo mu:	srinathpv71
neutral	@marfmellow @Maxis Thank you â˜ºï¸	mmhmScotty
neutral	@mmhmScotty @Maxis https://t.co/YlsxiHz0xjðŸ˜‡ðŸ'•	marfmellow
neutral	@marfmellow @Maxis What updates ðŸ'€ðŸ'€ðŸ'€	mmhmScotty
neutral	im removing all my cc link me to ur fav maxis match cc creators pls	bikelockmikey
positive	Haha this tweet was bullshit. I wanted to see if any maxis would like i	99Xrp
positive	@BitcoinErrorLog @raulitojordan Lol, maxis now claiming Bitcoin mig	OmerPeleg1
positive	so a few cute updates from @maxis for sims4 but yâ€™all are really p	marfmellow
neutral	Aku nk tgk ko hidup bagaimana. Dgn tiada umobile. Sb aku tak tahu m	Onezack9
neutral	Puaskan hatiku..mula kau suruh aku buka umobile.. Kau paksa aku.. \r	Onezack9
neutral	Rangkaian maxis di kawasan saya petrajaya kuching ia lah paling hara	sammyhardy1
negative	RT @subzgubz: Fuck Maxis data i swear	RaajBaymax

Figure 2: Maxis Twitter Tweets

Based on Figure 2, all tweets from Maxis customers were extracted and categorized into positive and negative sentiments. After classification of sentiments, the data is represented in a graphical representation as illustrated in Figure 3.

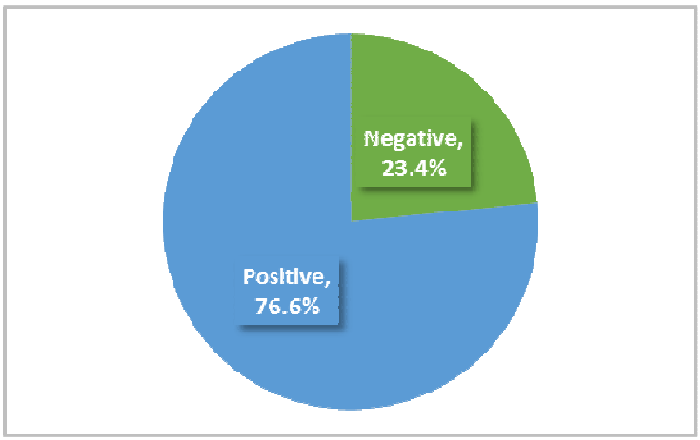

Figure 3: The Percentage of Positive and Negative sentiment for Maxis Provider

From the pie chart shown in Figure 3, positive words are being used more than negative words. This shows that most customers are satisfied with the services provided by Maxis company. However, the company should focus on the percentage of the negative tweets to overcome the problems being experienced by their customers in order to improve their service. On the other hand, customers will refer to the percentage of positive sentiments to assist them in selecting the most suitable telecommunication provider. Hence, the result of positive tweets by the three telecommunication providers are represented in Figure 4.

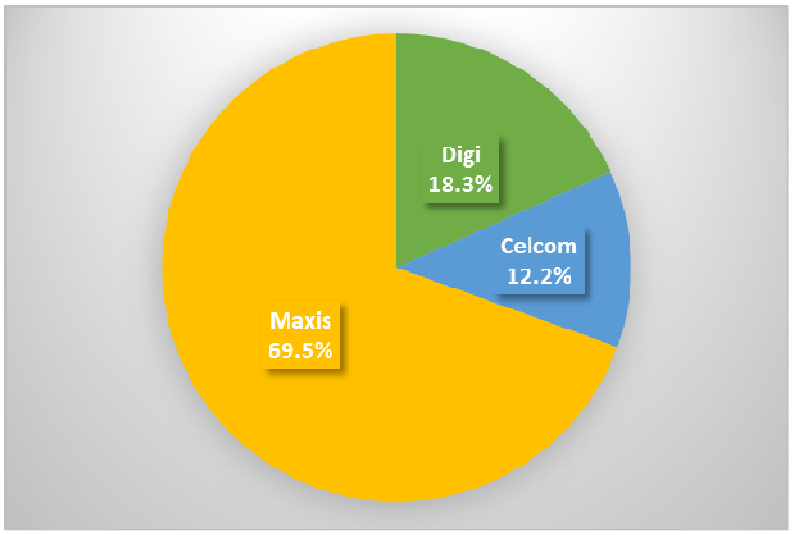

Figure 4: The percentage of Positive Sentiments for Maxis, Celcom and Digi

Based on Figure 4, there is not much difference in percentage between Celcom and Digi provider with only a difference of 6.1% but Maxis has the greatest number of positive tweets. This shows that most customers prefer to use Maxis as their telecommunication provider compared to the other two. Therefore, the good features provided by Maxis should be considered by the other telecommunication providers in order to compete in terms of the line coverage, internet speed, cost and other important features for the customers to be keener in using the service.

To have a detail outlook on the problems faced by the company based on the users' perceptions, word cloud is implemented to represent the results as shown in Figure 5.

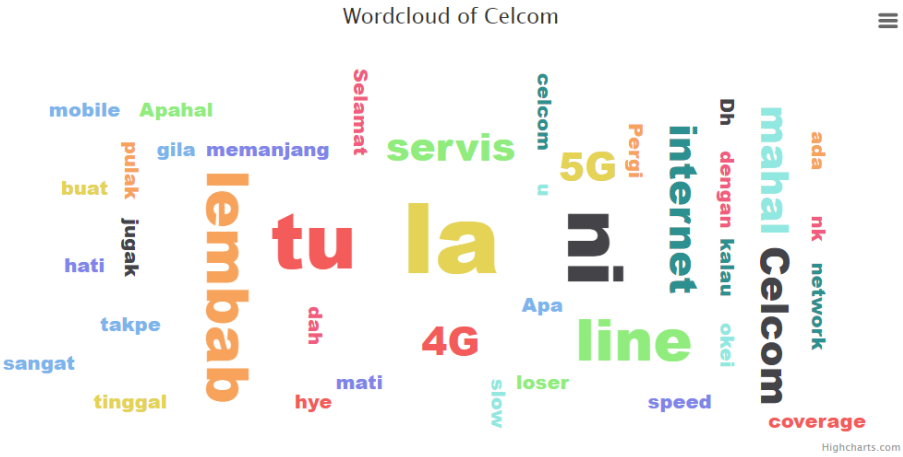

Figure 5: Negative words used by Celcom users via Word Cloud

From Figure 5, there are various of negative words used by Celcom users which needs to be taken into consideration for service improvements. The larger the font size of the word, the more customers are emphasizing on the matter. According to the result obtained, most Celcom users are not satisfied with the internet speed, line coverage and the price. Thus, these features need to be enhanced to provide customers with a better service in the future.

Conclusion

In this paper, a web-based system to visualize the customers' feedbacks using sentiment analysis on three telecommunication providers in Malaysia (Maxis, Celcom and Digi) is presented. Various techniques of pre-processing and classification are being used for sentiment analysis to classify positive and negative sentiment texts. For this work, lexicon-based approach was used for pre-processing as it is more efficient and easier to be implemented due to the language other than English being used in the tweets. Moreover, it is more convenient to filter abbreviations, acronyms, symbols and other non-useful texts during the cleaning stage. NB was applied for classification as it produces a much better accuracy performance to classify positive and negative sentiments. Then, visualization of the data was performed to observe and analyse the customers feedback towards the telecommunication provider services. From the result obtained, Maxis has shown to have the most positive words used by the customers in Malaysia. This portray the good services being provided by Maxis company towards its customers since most of them are satisfied with 69.5% of positive feedbacks compared to Celcom and Digi with only 12.2% and 18.3% of positive feedbacks respectively. However, the negative words need to be taken into consideration by using word cloud as a tool to focus more on the lacking features of the services. It is recommended for the companies to observe the negative feedbacks to improvise their services for the betterment of the business management in the future.

Acknowledgement

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Mobile E-Service Acceptance Based on Modified Technology Acceptance Model (TAM)

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Abstract

Mobile E-Services is becoming the main medium of digital interaction in the modern age digital economy. Currently, Mobile E-Services are widely applicable and useful for: (1) business and industry operations, (2) banking (3) education and (4) health care. This paper presents a mobile E-Services application that provides digital coordination and management of the electricity users' accounts and consumptions in Malaysia. The application was expected to be beneficial to many users as compared to the conventional online management system. However, based on the users rating and preliminary user interview it was revealed that the users' adoption to the mobile E-Services application was low. Therefore, this research was initiated to identify the factors associated with the users' acceptance towards the mobile E-Services application. This research used the Technology Acceptance Model (TAM) to explain intention and usage of technology with an additional determinant of personal innovativeness in technology. This research involved 298 residential customers who participated to answer the survey either through online or printed questionnaires. The questionnaires were formulated based on the proposed TAM constructs and the data collected was analysed based on using descriptive and Pearson correlation analysis. The finding of the research indicates that all the determinants used for the TAM construct have significant relationships towards the mobile E-Services users' acceptance.

Keywords: Mobile E-Service, Users' Acceptance, Perceived Usefulness, Perceived Ease of Use, Personal Innovativeness in Information Technology

Introduction

Nowadays, information and communication technologies (ICT) plays a crucial role in supporting the achievement of corporate goal. The use of e-commerce, e-business, e-education, e-banking, e-services and other kinds of activities have become a vital way of interacting information digitally. Furthermore, with the continues popularity of smartphones, the use of mobile application has given a global positive impact to the today's society, the majority in business management, operation and marketing. A typical mobile application runs on a small handheld mobile device, that is easy to use and accessible from anywhere and at any time. Various business and industries are earning revenue through the use of mobile application, including the service industries such as communication and electricity providers. The mobile e-service is a mobile application which supports business operations within the service industry. This mobile application enables customers to: (1) access their account information (2) manage their account subscription and (3) keeping track of their bill and payment history.

This study investigates the users' adoption and acceptance towards the mobile E-Service application of an electric provider in Malaysia. In 2013, there were about 9.2 million of customers from commercial, industrial and residential that subscribes to the electric utility provider. The number of customers kept growing yearly thus demanded the electric provider to develop a mobile e-service application. The application was expected to cater 8.5 million residential customers in order to allow them: (1) to pay monthly bills (2) to keep track of payment history and (3) to report of service problems. According to the customer service officer from the electric utility provider, the expected returned from the mobile e-service application investment was not yet satisfying, thus it created an important issue to the management. The users' adoption of the mobile e-service application among the customers until recently is very low. From Google Play Store, the number of download hit is less than 500 thousand and the rating by the customers is somewhat discouraging. It only reached 3.5 out of 5 rating value in the Google Play Store and 3.4 out of 5 in the Apple App Store. It is also observed that a few negative comments has been written by the customers on the review comment section. Responding to these issues, there is a need to determine the factors that affect customer acceptance towards the mobile e-service application.

Research on technology users' acceptance that used Technology Acceptance Model (TAM) and its extensions has been widely reported in the literature (Ngafeeson and Sun, 2015). Perceived usefulness and perceived ease of use are the common constructs for the TAM model. As very little research that investigated users' personal innovativeness in IT towards the users' acceptance model, it would be interesting to get insight into this aspect as one of the additional determinants.

Background of Study

Technology Acceptance Model (TAM)

In the study of technology adoption, several theories have been introduced and some of the theories have received much attention by researchers for modification and extension (Durodolu, 2016). Among the existing theory, TAM has become one of the utmost major models for technology adoption. This theory first introduced by Davis (1989) and has been widely used in describing users' adaptation to the new technology. The TAM model focuses on the determinants of Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) in order to study a user's acceptance or rejection of a technology towards the Behaviour Intention (BI). In other words, the attribute of BI is a dependent variable of the acceptance model that relies on the elements from the PU and PEOU variables. Figure 1 below illustrates the original TAM model.

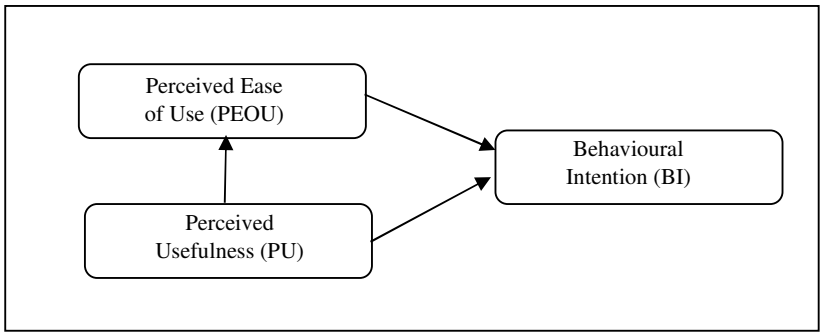

Fig. 1: Original TAM Model by Davis (1989)

Behavioural Intention (BI)

According to Fong and Wong (2015), BI is defined as consumer readiness and likelihood to use the technology (i.e. mobile commerce services). Alharbi and Drew (2014) states in TAM, BI describes the actual use of a given technology. Research by Brusso (2015) demonstrated that BI leads to the development of implementation plans, which then lead to technology usage. Consumer behaviour has changed over the decade and businesses had attempted to comprehend the virtual consumers by understanding consumer online behaviour and factors influencing their behavioural intention to engage in online transactions. Furthermore, some users view the technology will be better in spite of their approach to technology usage if they assume a technology to increase their performance on the job. BI could largely foresee the actual customer behaviour when the behavioural intention was correctly measured (Mutuku, Iravo and Omwenga, 2016). They were associated with the service provider's ability to make its customers responded with a more positive review and tends to recommend the technology to other customers, remain loyal and willing to engage with premium solutions. According to Wahyuningsih and Djayani (2010), BI positively related to customer satisfaction. This leads the customer to likely repurchase products or services from the same company.

Perceived Usefulness (PU)

Many researchers argued that PU is an important factor to rectify the TAM (Bireswar, Mei and Shu, 2018). According to Keswani et al. (2016), PU has been widely recognized as one of the main determinants besides perceived ease of use in the field of technology acceptance. In her research, she discussed the factors influencing consumer intention to adopt online shopping systems and discovered that perceived usefulness significantly associated with the use of the internet. They also integrate the beliefs of TAM with perceived enjoyment as a moderator, which yields a better perspective to use online shopping systems. Research by Cigdem, Aycan and Erhan (2018) revealed that there is a positive relationship between PU with the intention to adopt mobile banking usage. On the contrary, in mobile games application, Khong et al. (2018) identified some beliefs that promote the use and acceptance of the technology. They enumerate perceived usefulness, an attribute of usability and user satisfaction as factors that promote intention to use technology in mobile games. The results of the research by Ali et al. (2017) revealed that PU found as an important factor in fostering a positive attitude towards adopting E-Learning.

Perceived Ease of Use (PEOU)

Intention to use directly influenced by PEOU, which consumers attempt to minimize their effort and try to search the easier process in using technology. Therefore, research by Keswani et al. (2016) found PEOU directly influenced customer's intention to use online shopping. Dutta, Peng and Sun (2018) acknowledged PEOU as the key drivers for the adoption of the personal health record in an information system. In addition, Rashid, Abdulaziz and Yasin (2018) adopted the existing determinants of PEOU with other determinants, namely system quality, information quality, and service quality to explain the acceptance of Health Information System. Similarly, Pedro, Jose, and Anna (2017) reported that PEOU is a significant determinant of BI in location-based service technology. Cigdem, Aycan and Erhan (2018) mentioned in their paper that BI of technology acceptance is incomplete without looking at PEOU as the variable effect user intention to use M-banking or mobile banking. In addition, to supporting the research, the authors added other variables such as perceived risk, mobility access, compatibility, perceived self-efficacy, and subjective norms.

Personal Innovativeness in Information Technology (PIIT)

According to Ngafeeson and Sun (2015), less attention has been given to the technology innovativeness with acceptance or adoption of technology decision. This also supported by Davis (1989), who states, future technology acceptance research needs to address new constructs such as technology innovativeness towards explaining a user's intention to new technology. Further, in the study by Amoroso and Lim (2015), it was indicated that there is a strong relationship between innovativeness towards a user's repurchase intention. This indicates that people with high personal innovativeness feel innovative services are more beneficial when incorporating with the degree of mobility. This is also supported by the research from Mohd Ayub et al. (2018) that indicate, that PIIT and user readiness are the main determinants in an individual technology acceptance behaviour. Recent research by Wijesundara and Sun (2018) has examined PU, PEOU, and PIIT as the three main determinants in social networking sites. The result from this study has revealed that PIIT and PEOU shows a positive relationship towards a user's behavioural intention. Figure 2 below is the proposed research model for this research study.

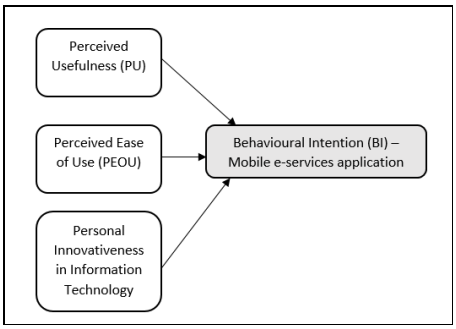

Fig. 2: Proposed Research Model

Methodology

A survey was conducted to gather data for this study. The respondents for this study was residential customers and the electric utility provider staffs. The ideal sample size for this study is 291 respondents base on the recommendation by by Krejcie & Morgan (1970). As the measurement scale items for this study is adapted from several TAM studies, a content validity test. Content validity refers to "the degree to which items in an instrument reflect the content universe to which the instrument will be generalized" (Straub et al. 2004, p.424). The content validity test for this study was conducted by thorough literature review and expert opinion discussion (i.e. academician, and industry experts). The outcome from this content validity test indicates that the proposed measurement scale items for this study is appropriate and reflects each construct of interest. Once the survey data was collected, each respondents input was subjected to data cleaning, upon which only 95 respondents was valid to be further analysed. The analysis in this study first begin with: (1) descriptive analysis (2) reliability test (4) pearson correlations and (5) multiple regressions. Each of the analysis test in presented in the following section.

Results

Reliability Analysis

Reliability test in this study was examined based on the Cronbach alpha score for each construct of interest. Table 3 shows each construct used in this research with the corresponding Cronbach alpha values.

Table 3: Results of Reliability Test and Alpha Value

Variables	Number of Items (Questions)	Cronbach's Alpha
Perceived Usefulness (PU)	5	0.925
Perceived Ease of Use (PEOU)	6	0.950
Personal Innovativeness in IT (PIIT)	4	0.879
Behavioral Intention (BI)	2	0.942

The results from Table 3 led to increased confidence in measurement items of used in this study, therefore further justifies its use in this study.

Descriptive analysis of users' type

Table 4: Awareness about apps (*n* = 298)

Variable	Frequency (%)
Aware about myTNB apps	
Yes	171 (57.4%)
No	127 (42.6%)
Sources of information	
Mass media	13 (7.6%)
Social media	38 (22.2%)
Internet	66 (38.6%)
Friends	45 (26.3%)
Others	9 (5.3%)
Active User	
Yes	95 (55.6%)
No	203 (47.4%)
Frequent use of apps	
Once in few months	27 (9.1%)
Once a Month	45 (15.1%)
More than 2 times in a month	23 (7.7%)
Never use within the last 6 months	203 (68.1%)

Users' type can be active or not active. From the 298 respondents, only 171 of them were aware of the mobile E-Service application which is apps (Refer table 4). Most of them got information on the application through the internet (38.6%), friends (26.3%) and social media (22.2%). The least source of information was from mass media (7.65%) and others (5.3%). Surprisingly, out of these 171 respondents, only 95 of them or 55.6% are active users. Active users are defined as the frequency of using the application for at least once in six months for viewing their billing record or doing a transaction of payment. The inactive users (47.4%) are those who do not download and not use the application for more than 6 months even they are aware of the existence.

Table 5: The association between gender and awareness about the application (*n=298*)

		Aware about myTNB application		χ^2 (df)	*p* value
		Yes	No		
Gender	Male	99 (33.2%)	63 (21.1%)	1.698 (1)	0.193
	Female	72 (24.2%)	64 (21.5%)		

Next, a test was performed to investigate the association between the gender of a respondent and the respondent's awareness about apps using a Chi-square test for independence. Since each variable (gender and awareness about apps) has only two categories, Yates' Correction Continuity was used to compensate the chi-square value. The corrected value (see Table 5) indicated non-significant association between gender of the respondent and the awareness about apps χ^2 (1, n = 298) = 1.698, p = 0.193. This means that the proportion of males that aware about application is not significantly different to the proportion of females**.**

Pearson Correlation Analysis

Table 6 : Results of Pearson Correlation Analysis (n = 298)

		Correlation	PU_Score	PEOU_Score	PIIT_Score
		Pearson Correlations	0.653	0.7111	0.691
	BI	Sig. (2-tailed)	0.000	0.000	0.000
		N	298	298	298

Dependent Variable: BI

Pearson correlation coefficient was computed to assess the relationship between the Behavioural Intention (BI) and the three determinants: Personal Ease of Use (PEOU), Personal Innovativeness in IT (PIIT) and Perceived Usefulness (PU) and the results are shown in table 6. There was a strong positive correlation between BI and PU Score [r = 0.653, n = 298, p = 0.000], BI and PEOU Score [r=0.7111, n = 298, p = 0.000] and BI and PIIT Score [r = 0.691, n = 298, p = 0.000]. The results clarify that perceived ease of use, perceived usefulness and personal innovativeness in IT correlate significantly with customer's continuous behavioural intention to adopt a mobile E-Service application.

Conclusions

The results of this study which focused on mobile E-Service for electric utility has shown that the personal innovativeness to IT as an additional construct to the Technology Acceptance Model has contributed to a significant positive effect to the users' acceptance. Further, the personal innovativeness to IT score is higher than perceived usefulness construct. In response to the low deployment of users, firstly, the services provider should employ strategies which can increase the mobile application usability as this is the most determinant that influences the users. Next, the mobile application user interface can be also be redesign mainly to simplify the registration steps. As for example, the mobile application can use a QR code generator image that can redirect users to the registration page and auto-key in some fields, which carried information from single sign-on mechanisms. Finally, as personal innovativeness to IT also contributes to the users' acceptance, it is essential to employ the individual with good knowledge for IT awareness and skills.

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Polish Transport Companies in View of The Principle of Posting Workers in Road Transport in The European Union

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Abstract

The free movement of goods, persons, services and capital was one of the fundamental objectives of the creation of the European Union's internal market, which was legally anchored in the Treaty on the Functioning of the European Union (TFEU). It states that the freedom of establishment and freedom to provide services is a guarantee for the mobility of EU businesses and workers. In recent years, there have been attempts to interfere with national transport markets in EU countries in order to protect them from transport operators on their territory. Since 2017, the European Parliament has been working on the regulation of international road transport rules in the European Union, known as the 'Mobility Package'. With the same article adopted, the research objective is to identify the probable effects of the implementation of the minimum wage in the EU on the functioning of Polish transport companies. The pragmatic dimension of the research was based primarily on two main research trends, i.e. showing the importance of Polish carriers in the provision of transport services within the Community and the possible consequences of reducing the supply of these services in the EU in the light of the entry into force of minimum wage regulations.

Keywords: Transport Policy, Transport Companies, Posting of Workers, Minimum Wage.

Introduction

The minimum wage is one of the tools of economic policy of countries. This is the minimum wage that an employee must receive for the work he or she has done, set in terms of time (hourly or monthly). It should be stressed that the economic impact of the minimum wage is not thoroughly investigated. Nevertheless, the primary objective of the minimum wage is to safeguard the minimum subsistence level of workers and to avoid them being unable to cover their living costs. The adoption of such a solution is particularly important in markets where the number of active people exceeds the number of job offers. In such case, employees are ready to work for very low wages to maintain their position (Lauresh, Patorska, 2015, p. 19). In April 2014, a conference on the harmonisation of social regulations in road transport was held in Paris, during which the theses were presented (Rydzkowski, 2017, p. 149) related, among other things, to the need to introduce solutions in legal regulations which will eliminate the phenomenon of social dumping and unfair competition from Central and Eastern European countries, including: Poland, Romania and Bulgaria for carriers from France, Germany, Denmark, Belgium or the Netherlands. Polish transport companies have gained their position on the European market thanks to attractive transport rates and good quality services. Thus, 91% of freight forwarders and half of producers and traders (so called shippers) from Western EU countries often use carriers from Central and Eastern European countries (Posting of workers in transport - opinions and concerns of European entrepreneurs, 2018, p. 3). Thus, changes to the EU minimum wage in the transport sector, as implemented in the legislation, may have adverse economic consequences for all Member States as a result of rising transport service prices. These challenges generate questions: what is the importance of Polish carriers in the implementation of the transport work of the Member States, and will the implemented minimum wage regulations imply negative consequences for Polish drivers? These questions will serve as the main research problems.

International road transport services market in Poland

The transport services market is one of the key economic categories. In the literature on the subject, both Polish and foreign is understood quite clearly. In the theory of transport economics, this is considered to be the whole of trade-economic relations taking place in the process of transport services exchange (Koźlak, 2008, p. 209). Another definition is that this is where demand for transport services meets supply. Entities operating on the transport services market are transport, freight forwarding and logistics companies, transport users, as well as units ensuring the flow of information on the market, as exemplified by the transport exchanges (Burnewicz, 1993, p. 121). In research on the structure of transport markets, many criteria for their classification can be found. It is worth noting the division into the area of activity according to which it stands out (Koźlak, 2008, p. 208):

- local markets (e.g. commuting to work and schools, distribution of goods in cities);
- national markets (e.g. express, construction, cabotage markets);
- international markets (e.g. transit traffic).

The research has focused on international markets, which can take three main forms, namely, as destination markets for own-account loads in imports and exports, transit and cross-trade (Koźlak, 2008, p. 209).

Transport is the cornerstone of civilization. The spread of production, trade and ideas and the economic advantage of humanity depend on movement. The mobility of society is one of the most cherished freedoms of democracy, even though a surprisingly large part of our income is devoted to the movement of people and goods (Stubbs, Tyson, 1984). This assertion currently takes on even greater importance, since the free movement of persons within the European Union makes it possible to counteract labour shortages in individual countries and the free movement of goods stimulates the competitiveness of businesses. It should be stressed that today the transport market is a consumer market, which means that it is characterised by an excess of supply over demand'. (Bentkowska-Senator, Kordel, Waśkiewicz, 2012, p. 17). With so much competition in both the internal and Community market, the consumer is free to choose his or her service provider, thus actively contributing to the quality of service provision. On the other hand, in order to win a contract, transport companies compete not only with the quality of service, but above all with price, which may ultimately lead to a decrease in profitability (Łepkowski, Walendzik, 2016, p. 93-94). A transport user wishing to transport his cargo must choose a carrier that goes beyond a simple analysis of carrier rates and rates for the different modes of transport. It should be noted that the criteria for selecting the carrier have been evaluated over the years. Their hierarchy and relevance has been changing. Today, the decision making process for carrier selection includes, in addition to price or delivery time attributes, the identification of relevant variables related to transport performance, quality of service and evaluation of carrier performance (Monczka et al., 2005). In the implementation of the transport process, these are important decisions on which a company's competitiveness in a given market depends.

The idea adopted by the EU on the freedom to provide transport services within its territory has become the basis for the development of this market. The dominant position in the structure of the transport market in Poland is occupied by road transport, characterised by a large fragmentation of entities providing transport services. Since Poland's accession to the EU in 2004 and the opening of European markets, Polish carriers have gradually built their position and competitive advantage in the European arena. Today, Polish transport companies have over 200,000 vehicles and over 1 million people are employed in the transport and logistics sector, generating €55019 million in turnover. This is a consequence of the fact that Poland has been one of the best developing countries of the European Union in recent years. In 2019, the average annual economic growth was 4.3%, which puts Poland in the top of the top of the most economically strong EU countries from the perspective of the dynamics of gross domestic product (GDP). By the end of the third quarter of 2019, Poland's largest share in the export of goods was recorded with the EU countries, among others, with the Czech Republic and Slovakia: Germany, the Czech Republic, Great Britain, France, Italy, the Netherlands and Hungary, representing 79.9%. On the other hand, in the case of imports from EU countries, this

indicator was 57.9%, and Poland's largest partners from EU countries are: Germany, Italy, the Netherlands, France, the Czech Republic, Belgium and Spain. Poland has the largest percentage of trade with its neighbour, Germany. In the analysed period, exports with the largest economic partner, which is Germany, amounted to EUR 54.4 billion, which represented 27.7% of the total economic turnover. By contrast, imports represented EUR 42.9 billion or 21.9%. Trade with France, which also constituted a significant part of the structure of Polish exports in the first three quarters of 2019, should also be taken into account. For exports, it amounted to EUR 11.5 billion, which accounted for 5.8% of the total number of Polish export trade in goods, while for imports, the result was lower and amounted to EUR 7.1 billion, which accounted for 3.6% of domestic import trade in goods (Foreign Trade in Goods, 2019). Constantly growing trade also results in high demand for transport services. In 2018, the GDP was 5.1% higher in real terms compared to 4.8% in 2017 (in constant prices). Taking into account the services sector, including transport and warehouse management, in 2018 the gross value added increased by 9.2% compared to the previous one (Gross Domestic Product in 2018, 2019). Statistics published by the General Road Transport Inspectorate show that between 2008 and 2018 the number of licences issued for the international road haulage of goods increased slightly more than eleven times, while the number of licence extracts increased by more than 18 times over the period under examination. Polish companies currently rank first in terms of share in total transport work in the EU-28, followed by carriers from Germany and France respectively (Transport of the future, 2019, p. 19). The transport work carried out by carriers from all EU-28 countries and the share of Polish carriers in 2008-2017 is shown in Figure 1.

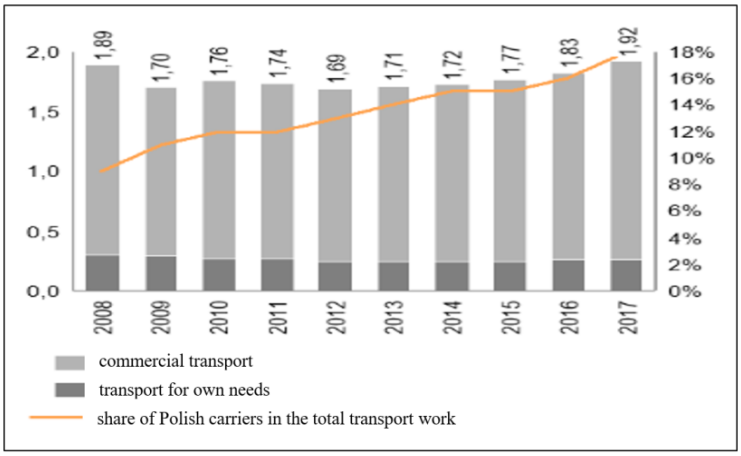

Fig. 1: Transport work performed jointly by all EU-28 countries and the share of Polish carriers, 2008-2017 [trillion tkm] (Transport of the future, 2019, p. 19).

Thanks to competitive transport rates and high quality of offered transport services, Polish road hauliers are among the leaders of EU countries in cargo transport. Both carriers and their associations shall demonstrate the implementation of the provisions concerning the posting of workers and payment of the minimum wage of the country in which they provide transport services.

Essence of the minimum wage in the context of the occupation of carrier

In this respect, European Union legislation has not fully unified national legislation. Directive 96/71/EC on posted workers introduced the obligation to provide such workers with minimum rates of pay, including overtime, but the determination of the minimum wage and its definition was left to the national discretion. Article 3(1)(g) of Directive 96/71/EC reads as follows: '(...) the concept of minimum rates of pay is defined by the national law and/or practice of the Member State to whose territory the worker is posted'. Serious concern arose in broad circles when the German government administration presented a broad interpretation of the new regulations that came into force on 1 January 2015 in the German Minimum Wage Act (MiLoG). The new rules have made it compulsory

to apply the hourly minimum rate for road hauliers established outside Germany and carrying out transport operations within Germany. The introduction and broad interpretation of these provisions has made the free provision of services more difficult, if not impossible, in Germany or, for example, in France, where similar provisions known as 'Loi Macron' have been introduced. Similar actions have also been initiated by countries such as: The Netherlands, Italy and Austria. These provisions, which are often emphasised in employer circles, constitute a very serious interference with labour law relationships that are in force in the European Union Member State concerned.

Countries introducing laws on minimum wages, which also apply to drivers employed in foreign companies, base their actions on the provisions of Directive 96/71/EC of the European Parliament and of the Council of 6 December 1996 concerning the posting of workers in the framework of the provision of services (Directive 96/71/EC). The provisions of Directive 96/71/EC apply to undertakings which are established in the Member States of the European Union and post their employees to temporary work in the territory of another country in the European Union. According to the provisions of the Directive, a "posted worker" is one who, for a limited period of time, carries out his work in the territory of a Member State other than the one in which he habitually works (Directive 96/71/EC, Article 2, paragraph 1). In the light of Article 1, paragraph 3, the provisions of the Directive apply to persons employed in an employment relationship, whereas the Directive does not apply to persons who are self-employed. According to the adopted provisions, the conditions to be met are, among others: maximum working time and minimum rest periods, minimum paid holidays, minimum hourly rates for work done, equal treatment of men and women. Thanks to these provisions of the Directive, every posted worker is entitled to the minimum wage that applies in the country to which he is posted, if it is higher than the minimum wage applicable in the country of origin. The same rules apply to other terms and conditions of employment, e.g. holiday period, working time, safety at work. Directive 96/71/EC upholds fair competition between companies registered in one country and companies from other Member States. This is to prevent the latter from trying to take unfair advantage of circumstances where there is a higher level of social protection in the host country than in the country of origin.

An important piece of legislation in the context of this study is the Directive 2014/67/EU of the European Parliament and of the Council of 15 May 2014 on the enforcement of Directive 96/71/EC concerning the posting of workers in the framework of the provision of services (Directive 2014/67/EU of the European Parliament and of the Council, OJ L 159/11). Its main objective is to provide guarantees in respect of an adequate level of protection of the rights of posted workers for the cross-border provision of services while facilitating the exercise of the freedom to provide services by service providers and promoting fair competition between service providers and thereby contributing to the functioning of the internal market (*Minimum wage in Germany legal basis, 2017).* The controversy arising from the implementation of this legislation is connected with the inclusion of drivers engaged in international transport under the posting of workers rules. The rules on the posting of workers aim at balancing the interests of employers in the posting country who see an opportunity to do business in another European Union country with the fears of countries assuming that wage dumping may harm their industry. Wage dumping may occur due to unreasonably low paid foreign workers. To prevent this, the Posting Directive ensures that all workers posted to the territory of the host country are subject to the 'hard core' rules of the host country, such as the minimum wage principle (*Klaus, 2019, p. 16*). In this context, it should be noted that the European Union's transport policy declares the creation of a single transport area as one of its objectives. Entrepreneurs are bound by the same business rules, regardless of the country in which their companies are registered. Thus, road hauliers may operate not only in the country of registration but also in other European Union countries, thus making it possible for them to avoid return journeys with an empty vehicle (Understand European Union policy - Transport, 2014, p. 13-14).

The European Parliament's Committee on Transport (TRAN) voted in mid-January 2020 on the proposed amendments, inter alia as regards posted workers. It was agreed that drivers would be treated as posted workers, with a minimum wage in line with the rules of the country in which they provide transport services at that time. This means that Polish drivers carrying out transport in the territory of another country will receive the same remuneration as employees of that country. From Poland's perspective, the positive aspect of the adopted amendments is the exclusion of international transit from the regulations, which means that for transport from Poland to Spain there will be no

need to apply separate minimum wage regulations for Germany or France. However, for all other modes of transport, including cabotage, there will be a full posting regime from day one (EP transport committee supported the mobility package, 2020). It should be stressed that the agreement will become law once it has been formally adopted by the Council of the EU and then voted by the plenary of the European Parliament. According to the arrangements adopted in January 2020, companies will have an 18-month transition period to adapt to the new situation, which will take effect at the end of 2021.

Impact of the implementation of the minimum wage on Polish transport companies

The main rationale for applying the minimum wage is the belief that there is a fair distribution of income in the economy, which should be ensured and shaped by the state. On the other hand, the existence of a minimum wage increases the cost to the employer of hiring more employees. This may lead to negative consequences for the employees themselves. Increased employment costs can increase unemployment and reduce social security. In order to avoid additional costs, employers may use civil law contracts that do not guarantee social benefits as a form of employment. In extreme cases, people can be employed without any contracts. A minimum wage can also lead to inefficiency. In some markets the minimum wage may be higher than the market balance wage. The market equilibrium wage is the wage at which labour demand and supply in a given market equalize. Such a phenomenon leads to employment which is lower than market-optimal employment and, consequently, to unemployment. Moreover, a nationwide uniform minimum wage does not take into account regional wage differences (Lauresh, Patorska, 2015, p. 19).

Between 2017 and 2018, the financial indebtedness of transport companies increased by almost 40%, which is related, among other things, to the inability to pay leasing instalments and loans on time. This was reflected in the database of the National Debt Register of the Economic Information Bureau, where in 2018 there were 23.7 thousand transport companies, whose total debt exceeded 925 million PLN (National Report of the National Debt Register of the Economic Information Bureau, 2018, p. 13). The implementation of minimum wage legislation for posted workers will not improve the financial situation of transport companies. The increase in drivers' personnel costs will translate into higher transport rates and thus reduce the demand for transport services and the competitiveness of Polish carriers in the European arena. Micro and small road transport companies will be in a particularly difficult situation, making it more difficult for them to compete with large companies, with the result that they may not survive in the market. This represents a real threat to the loss of thousands of jobs in Central and Eastern Europe. It can be particularly felt in the countries that joined the European Union after 2004. It should also be added that the legal solutions adopted and the related obligations, such as different documentation of working time, communication in multiple languages, calculation of overtime, complicated forms of registration of posted workers, preparation and storage of posting documentation will generate additional costs related to the employment of new office workers dealing exclusively with the minimum wage and posting of workers.

Based on the results of research carried out on 1074 Polish transport companies by the consulting company Deloitte, the aim of which was to clarify the solutions that can be taken by companies in adapting to the new regulations. Several key actions were identified, including (Lauresh, Patorska, 2015, p. 27):

- increasing prices for contractors;
- the search for new transport markets and thus an increase in the supply of transport services in these markets and, consequently, increased competition;
- restricting travel within Germany;
- failure to respect social conditions in the industry, which will mean unfair competition;
- to reduce your own margin.

It should be stressed that wages are treated as a cost element and therefore as a category that should not increase as it harms entrepreneurs. However, wages, including the minimum wage, perform many other functions, including income, social, motivation and demand creation functions. The latter

function is particularly important in the conditions of low propensity of entrepreneurs to invest, which is the opposite of increasing the quality of labour resources and allocating large expenditures to investment activities (Krajewska, 2015, p. 314). These conditions are inherent in building sustainable market advantage.

Summary

Since Poland's accession to the European Union, the branch of international cargo transportation performed by Polish companies has been developing dynamically, thanks to which, in terms of transport work, Polish carriers have taken a dominant position on the European market. The implementation of the posting of workers legislation has been opposed by many communities and countries. This is due to legitimate concerns about the loss of the high position of Central and Eastern European carriers on the Community market developed over the last few years. Carriers will restrict or withdraw from countries where the provision of transport services will be uneconomic.

The new regulations may have a negative impact on the financial condition of Polish enterprises, which is currently not very good anyway. It will also have its social dimension, as the excessive costs of carriers will contribute to the reduction of jobs or entire enterprises, which in turn will increase unemployment in certain regions of Poland. It will no longer be possible to compete with carriers on the basis of price criteria as before. It should also be added that the effects of the new regulations will also be felt in EU countries where the costs of transport services will increase.

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Unpaid Tax Debt as a Threat to Russia's Economic Security

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Abstract

Economic security is essential for any society since it is only by ensuring the enduring prosperity of the country that the government can fulfil its obligations towards the citizens by providing them with high standards of living, opportunities to obtain education, to establish and operate a business.
This study aims to purpose of the survey was to identify the main reasons for tax evasion and non-compliance among young, socially active Russian citizens aged 20-24 a serious threat to the country's economic security. Young adults in Russia doubt that the principle of social justice is actually applied and think that a more differentiated approach to personal income taxation is necessary depending on people's income, the number of dependents, and the non-taxable minimum subsistence income. Their answers can be seen as predictors of tax non-compliance. Over a half of respondents (62.7%) believe that non-compliance is caused by the inefficient use of budget funds by the government, the lack of state support for private entrepreneurs and other groups, the lack of tax incentives for start-ups and tax breaks for entrepreneurs, tax credits for child and dependent care, for the elderly, disabled and individuals suffering from a serious medical condition or injury. Respondents were announced and ranked by the degree of significance of the event, which will reduce the amount of tax debt among taxpayers: conduct a public awareness campaign for personal property taxpayers; use text messaging and e-mail to inform taxpayers about important tax deadlines and due dates for filing income tax returns.

Keywords: Economic Security, Tax Debt, Survey, Tax, Tax Receipts.

Introduction

According to the law 'On Security', national security encompasses economic security; protection of the rights of individual citizens and society in general; detection, analysis and assessment of threats; allocation of funds to meet the needs of national security; and control over the spending of these funds. It should be noted, however, that the terms 'security' and 'economic security' have no agreed definitions not only in Russian but also in international research literature.

Oleynikov E.A. (1997) defines economic security as 'a condition of economy and government institutions that would guarantee the protection of national interests and ensure harmonious, socially-oriented development of the country as a whole, sufficient economic and defense potential even in the occurrence of adverse domestic and international scenarios'. Senchagov V.K. (1995) gives a similar interpretation of economic security, adding that it is not only 'the protection of national interests but also the readiness and ability of the government institutions to establish mechanisms of realization and protection of national interests in terms of economic development, social and political stability'.

In the current economic conditions, the imbalance of the national budget creates new challenges and threats to the country's stability. In accordance with the Budget Code of the Russian Federation, the country's budget system comprises the federal budget, regional budgets, local budgets and budgets of state extra-budgetary funds. All citizens have the duty to pay taxes as prescribed by the Constitution of the Russian Federation ('everyone shall be obliged to pay the legally established taxes and dues'). The key principles of the taxation system are described in the Tax Code of the Russian Federation, which specifies the types of

taxes and fees, special taxation schemes for certain groups of taxpayers; defines the rights, responsibilities and duties of taxpayers, tax authorities and other parties; and sets penalties for violations of the tax legislation. Nevertheless, situations when taxpayers conceal or misreport their income and assets or when families, struggling to pay for basic necessities, fall behind on their taxes occur quite frequently. The mounting problem of unpaid taxes and non-compliance poses a serious threat to the country's economic security.

This study aims to consider the causes of non-compliance and tax evasion, which lead to erosion of federal and regional tax revenues and, therefore, may be considered a serious threat to the country's economic security.

Tax revenues of Sverdlovsk region in 2016-2018

To this end, we analyzed the data provided by the Administration of the Federal Tax Service of Sverdlovsk region on tax revenues in 2016-2018 by the type of taxpayers (physical persons or legal entities) (see Table 1) (Form 1-NM Report on the accrual and receipt of taxes, fees, insurance premiums and other mandatory payments to the budget system of the Russian Federation for 2016-2018).

Table 1: Tax revenues of Sverdlovsk region in 2016-2018

Indicators	Budget revenues by type of tax, bln rbs						Growth in tax payments, %	
	2016	Percentage, %	2017	Percentage, %	2018	Percentage, %	2018/ 2017	2018/ 2016
Corporate income tax	2279.1	30.2	2527.6	30.9	3104.5	33.0	122.8	136.2
Personal income tax	3017.3	40.0	3251.1	39.7	3653.0	38.9	112.4	121.0
Excises on products manufactured in the Russian Federation	661.7	8.8	611.7	7.5	632.4	6.7	103.4	95.6
Biological resources use fee	68.9	0.9	72.6	0.9	71.6	0.8	98.6	103.9
Stamp duty	18.8	0.2	18.9	0.2	20.4	0.2	107.9	108.5
Tax on the use of objects of animal world and biological water resources	2.1	0.03	2.2	0.03	2.3	0.02	104.5	109.5
Corporate property tax	764.5	10.1	856.1	10.5	985.2	10.5	115.1	128.9
Transport tax (legal entities)	29.9	0.4	27.3	0.3	29.2	0.3	107.0	97.7
Transport tax (physical persons)	109.2	1.4	127.6	1.6	132.0	1.4	103.4	120.8

Gambling tax	0.8	0.01	1.0	0.01	2.0	0.02	200.0	250.0
Individual property tax	36.1	0.5	52.2	0.6	61.3	0.7	117.4	169.8
Land tax (legal entities)	141.0	1.9	140.7	1.7	142.0	1.5	100.9	100.7
Land tax (physical persons)	35.4	0.5	45.3	0.6	45.1	0.5	99.6	127.4
Sales tax payable in the territories of cities of federal significance	8.0	0.1	7.9	0.1	7.7	0.08	97.5	96.3
Other taxes and fees	380.5	5.0	436.9	5.3	510.4	5.4	116.8	134.1
Arrears for cancelled taxes	0.2	0.003	0.07	0.0009	0.3	0.003	428.6	150.0
Total	7553.7	100.0	8179.1	100.0	9399.4	100.0	114.9	124.4

As Table 1 illustrates, revenues from the personal income tax account for the largest share in the structure of tax revenues of the consolidated budget of Sverdlovsk region – 38.9-40.0%. The second main source of revenue for the regional budget is the corporate income tax – 30.2-33.0%, followed by the corporate property tax, 10.1-10.5%; and excises, 6.7-8.8%. Revenues from the other taxes and fees are insignificant. In 2018, in comparison with 2017, there was a certain decline in the revenues from the biological resources use fee (by 1.4 pp); land use tax (physical persons) (by 0.4 pp); and the sales tax (by 2.5 pp). As for the other taxes and fees, there was a general increase in the revenues of the regional budget. At the same time, in comparison with 2016, in 2018, there was a fall in the revenues from indirect taxes: excise tax revenues decreased by 4.4 pp; revenues from the transport tax collected from legal entities, by 2.3 pp; sales tax revenues, by 3.7.

The decline in the tax revenues from specific tax types has raised some serious concerns about tax security, which makes it necessary to address the problem of the reasons for taxpayers' non-compliance.

In their **analysis of the problem of unpaid taxes**, Russian scholars focus on the ways to raise the level of tax culture, even though there is a lack of unified understanding of what tax culture actually is. Much less attention is paid to such questions as the development of tax consciousness and tax awareness (Bogoslovec, 2015; Smirnov, 2013; Samsonova, 2010). The term 'tax awareness' was proposed by the leading Russian expert on taxation Mayburov I. (2012), who defined it as the 'level of social and state development that determines the public awareness of the inextricable connection between society and the state and awareness of the citizens of their rights and the need to perform their duties in the sphere of taxation'. Most importantly, 'taxpayers cannot be requested to fulfill their duties unless similar demands are imposed on all the parties involved in the taxation process (tax inspectors, police, judges, bailiffs, financial authorities, deputies, heads of ministeries and other government bodies, chairman of the government and the president)'.

International scholars are more interested in the quantitative evaluation of the connection between tax consciousness, tax awareness and the probability of tax evasion (Chawla, 2013; Dup, 2014). They believe that enhancement of tax literacy will result in a better understanding of tax law among the population and, therefore, will improve tax compliance.

The study of Indonesian taxpayers by Arum has shown that taxpayer awareness has a positive effect on compliance behaviour.

Overall, there is sufficient evidence provided by Russian and international studies that people' inclination to cooperate with tax authorities and their willingness to pay taxes in general depend on the level of taxpayer awareness and tax literacy in society. Citizens' knowledge of tax law and their understanding of the benefits of taxation are important preconditions of tax compliance and effective prevention of tax fraud and corruption. Failure-to-file, failure-to-pay and accuracy penalties also have a preventive effect.

To this end, we conducted a survey among the 3rd-5th-year students of universities in Ekaterinburg (Sverdlovsk region) majoring in disciplines 'Economic Security' and 'Customs Administration'. The purpose of the survey was to identify the main reasons for tax evasion and non-compliance among young, socially active Russian citizens aged 20-24.

The questionnaire consisted of two parts: the first part comprised closed-ended questions with a list of answer options and the second part, ranking questions. In the second part, respondents were asked to rank in order of importance the measures that could raise the level of tax literacy among Russian taxpayers and help solve the problem of unpaid taxes. We used the rating scale of 0 to 5, with '0' corresponding to the least important measures and '5', to the measures deemed crucial.

Student questionnaire

1. Describe (in one word) a person who evades taxes (select one of the options below). He/she is
a) a cheat;
b) sly;
c) smart;
e) hard-working;
f) resourceful;
g) a criminal;
h) selfish;
i) a corruptionist;
j) thief

2. Describe (in one word) a person who is a law-abiding taxpayer (select one of the options below). He/she is

a) honest;
b) lazy;
c) stupid;
e) hard-working;
f) resourceful;
g) cowardly;
h) a patriot;
i) an altruist;
j) a bankrupt

3. How just is the Russian tax system in setting the same income tax rate at 13% for all tax residents regardless of their income?

4. What age, according to the Tax Code of the Russian Federation, is the age of tax liability (select one of the options below)?
a) 18;
b) 14;
c) 16.

5. Using the 0-3 scale below, indicate your agreement with each statement:
0 - strongly agree;
1 - slightly agree;
2 - slightly disagree;
3 - strongly disagree

The scale is used to assess respondents' agreement with the following statements:
a) A taxpayer must comply with the law regardless of his or her financial situation.
b) If there were no punishment for tax evasion, the majority of taxpayers would not comply.
c) Small and medium-sized Russian businesses are struggling to meet their tax obligations, because if they fulfil their tax obligations fully and on time, they may be left with no funds to stay afloat.
d) Russian people evade taxes because the funds from tax revenue are used inefficiently.
e) The Russian tax system is oriented towards large businesses, which are allowed to dodge their tax responsibilities.

The survey covered 251 respondents, including 70 students majoring in 'Economic Security' (37.1% men and 62.9% women) and 181 students majoring in 'Taxation' (32.6% men and 67.4% women). The unequal gender distribution in our sample stems from the gender-specific differences in major choices at Russian universities (see Table 2).

Table 2: Respondents' opinions about the characteristics of a law-abiding taxpayer and tax evader

Tax evader	Percentage of responses in the total number of responses, %	Law-abiding taxpayer	Percentage of responses in the total number of responses, %
Cheat	57.8	Honest	97.6
Sly	41.6	Lazy	1.8
Smart	22.3	Stupid	9.6
Hard-working	2.4	Hard-working	39.8
Resourceful	28.9	Resourceful	12.0
Criminal	42.2	Cowardly	12.0
Selfish	13.9	Patriot	47.6
Corruptionist	16.3	Altruist	15.1
Thief	16.9	Bankrupt	7.2

As Table 2 illustrates, students generally give negative evaluations to tax evaders ('cheat', 'criminal' and 'sly'), thus displaying their awareness of the negative implications of tax evasion for the country's economic development and for vulnerable population categories dependent on state support. Surprisingly, in 28.9% of cases, a tax evader was given positive characteristics, for instance, such person was described as 'resourceful'; in 22.3% of cases; as 'smart'; and in 2.4%, as 'hard-working'. These answers can be seen as significant predictors of tax non-compliance within this age group.

In most cases, a law-abiding taxpayer was described as 'honest' (97.6%), ‘patriot' (47.6%), and 'hard-working' (39.8%). In 9.6% of cases taxpayers were described as 'stupid' and in 7.2%, as 'bankrupt', which may be considered as an alarming trend, since such responses reveal the negative attitudes towards the fulfilment of one's tax responsibilities, that is, the respondents who gave such answers are more likely to evade taxes.

One of the key principles of an efficient tax system is the social justice principle, which, if applied consistently, will keep the level of social tension low. The results of our survey are shown in Figure 1.

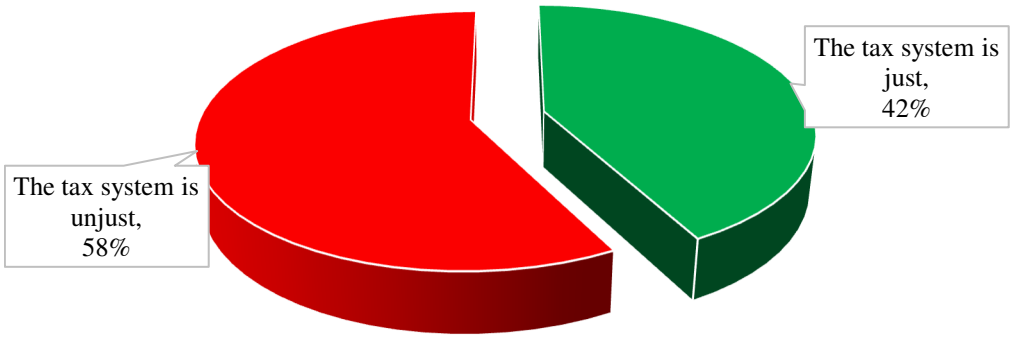

Fig. 1: Percentage of responses, %

As Fig.1 demonstrates, young adults in Russia doubt that the principle of social justice is actually applied and think that a more differentiated approach to personal income taxation is necessary depending on people's income, the number of dependents, and the non-taxable minimum subsistence income. Their answers can be seen as predictors of tax non-compliance. Thus, our findings may be used by tax authorities in designing their policies of non-compliance prevention for this age group.

The next question in the questionnaire concerned the age of tax liability set by the Tax Code of the Russian Federation. Survey results are shown in Figure 2.

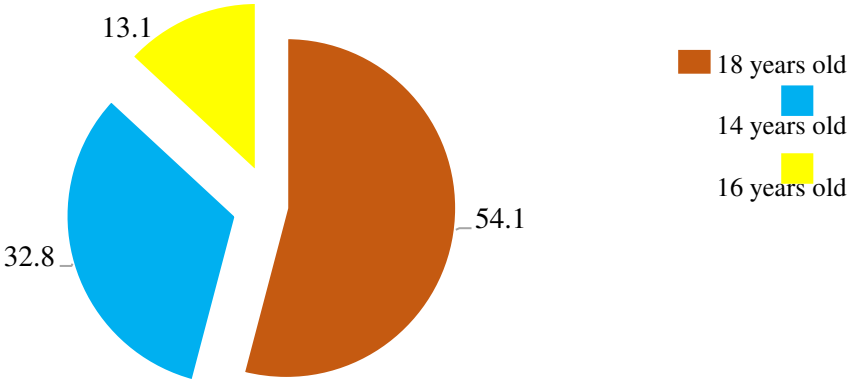

Fig. 2: Percentage of responses, %

Figure 2 demonstrates the answers our respondents gave to the question about the age of tax liability in Russia (according to the Tax Code of the Russian Federation, natural persons can be held liable for tax offences starting from the age of sixteen). Only 13.1% respondents answered this question correctly, which reveals the lack of tax knowledge among young adults in Russia, who have reached the age of tax liability.

In the second part of the questionnaire, students were asked to express their agreement or disagreement with several statements (the results are shown in Table 3).

Table 3: Respondents' attitudes to the Russian tax system and views on taxation

Questions	Distribution of scores			
	0	1	2	3
A taxpayer must comply with the law regardless of his or her financial situation	22.9	40.4	29.5	7.2
If there were no punishment for tax evasion, the majority of taxpayers would not comply	56.6	28.9	12.7	1.8
Small and medium-sized Russian businesses are struggling to meet their tax obligations, because if they fulfil their tax obligations fully and on time, they may be left with no funds to stay afloat.	20.5	30.1	32.5	16.9
The Russian tax system is oriented towards large businesses, which are allowed to dodge their tax responsibilities	18.7	32.5	31.9	16.9
Russian people evade taxes because the funds from tax revenue are used inefficiently	24.1	38.6	30.7	6.6

Table 3 demonstrates young people's attitudes towards the Russian tax system and provides some insights into the reasons why Russian taxpayers fall behind on their tax payments.

63.3% of our respondents agreed that everybody should pay taxes regardless of their financial situation; the third of our respondents disagreed with this statement, pointing out that people should have financial resources to meet their basic needs, which means that low-income households will owe taxes as they can't afford to pay them. Our respondents see this situation as an indication of the state's failure to fulfill its obligations towards the citizens.

Interestingly, 85.5% of students are willing to comply with tax regulations even in the absence of punishment for non-compliance, which shows a high level of civic responsibility among young adults in Russia.

In Europe, SMEs are considered the backbone of economy because private entrepreneurs combat unemployment by creating new jobs. In Russia, tax compliance places a large burden on SMEs, many of which are family businesses. This, in turn, leads to rising rates of tax evasion and higher levels of unpaid tax debt. This problem can be addressed through special tax schemes and by reducing the number of field tax audits conducted by local tax authorities.

Large enterprises generate most income for the state budget and, therefore, draw most of the attention of the tax authorities. In case of disagreement with the tax audit assessment, large businesses may file an appeal and the findings of the original audit may be overturned or modified in the taxpayer's favour. Smaller enterprises, however, often cannot afford to do that.

Over a half of respondents (62.7%) believe that non-compliance is caused by the inefficient use of budget funds by the government, the lack of state support for private entrepreneurs and other groups, the lack of tax incentives for start-ups and tax breaks for entrepreneurs, tax credits for child and dependent care, for the elderly, disabled and individuals suffering from a serious medical condition or injury.

The second part of the questionnaire included a list of measures to reduce tax evasion and non-compliance as a threat to national economic security. The respondents were asked to rank these measures in order of importance. The ranking results are shown in Table 4.

Table 4: Ranking of measures in order of importance

Measures	«5»	«4»	«3»	«2»	«1»	«0»
Conduct a public awareness campaign for personal property taxpayers	+					
Use text messaging and e-mail to inform taxpayers about important tax deadlines and due dates for filing income tax returns	+					
Conduct anonymous taxpayer satisfaction surveys	+					
Organize taxpayer loyalty programs		+				
Organize on-line (via Skype) tax counselling		+				
Organize social media campaigns 'Pay your taxes and sleep peacefully!'				+		

Overall, the data illustrated by Table 4 show the importance of establishing a fruitful and effective dialogue between Russian taxpayers and tax authorities, which would help raise taxpayers' trust in the government and enhance tax compliance. It is necessary to raise public awareness of the fact that both sides – taxpayers and tax authorities – are working towards a common goal of improving the living standards and general welfare in Russia and ensuring the country's overall prosperity.

Discussion and Conclusion

The majority of respondents in our survey demonstrated a rather high level of taxpayer awareness and willingness to raise their level of tax literacy. This confirmed our initial hypothesis about the possible causes of non-compliance in Russia.

Our research has identified the following causes of non-compliance in Russia:

1) young adults lack tax literacy and capacity to meet taxpaying requirements;
2) they doubt the fairness of the processes of taxation, especially in relation to low-income taxpayers;
3) respondents see centralisation of tax revenues in the federal budget as a drawback of the Russian tax system;
4) respondents believe that the replacement of different types of taxes with one, mandatory for all categories of taxpayers, would enhance compliance;
5) the survey detected the influence of cultural norms and values on taxpayers' behaviour.

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E-learning in Education of Convicts

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Abstract

In the following article the use of e-learning in education of convicts is discussed. E-learning comes as a modern form of education and vocational training which contributes to the development of contemporary culture of education and which is also applied at penitentiary institutions to educate convicts. E-learning allows prisoners to acquire education and to complete education gaps that they may have, regardless of the length of their imprisonment sentences. This method of education is largely focused on independence and self-discipline of users who learn with the use of digital platforms. Education – including, perhaps, first of all, education of people who are exposed to social exclusion, such as convicts – must meet various needs expressed by the developing society. It results from the necessity of solving problems related to the growing possibilities of media in the field of generating, processing and creating information.

Keywords: E-Learning, Education, Convict, Readaptation.

Introduction

At present, new media come as an important factor in the process of learning community formation. In the near future, education – especially education of adults – will be based on various forms of distance learning. Having become a component of modern social communication, it considerably determines education processes. Activities fostering distance education are undertaken in various environments, including the penitentiary system.

E-learning is the latest generation of education products. It comes as a form of education provided with the use of electronic means, the Internet in particular. E-learning is an attractive alternative for traditional learning; it allows students and teachers to learn and teach at a high level, at any time and at any place they choose. It provides people who are socially withdrawn, unemployed or who wish to improve their knowledge with a lot of opportunities. It can reduce costs and provide access to relevant information at a proper time and place (Wieczorkowski, 2015, p. 24).

E-learning provides education and training with the use of information technologies. New technologies provide learners with vast possibilities. E-learning allows them to take advantage of distance and flexible learning methods. It is often combined with traditional learning in a form of combined courses. E-learning exploits possibilities provided by the Internet for the requirements of knowledge dissemination.

Development of scientific research in the field of distance education allows us to think that, in numerous cases, this education method can bring about much better outcomes. It may turn out to be more interesting and motivating for learners; it provides us with a possibility to invest in the development of the information society; it allows learners to acquire skills required to use modern information technologies (Wieczorkowski, 2015, p. 32).

In search of answers to the questions how to design digital environments which will be efficient in terms of didactics and learner-friendliness, e-learning specialists refer to the current learning and teaching theories, such as behaviourism, cognitivism, constructivism, to an education theory referred

to as instruction designing and to some psychological theories related to development of emotions and human motivation (Szczepaniak-Sobczyk, 2016, p. 111; Bednarek, Lubina 2008, pp. 31-39).

It can be assumed that e-learning has become a contemporary form of education and professional training which creates a modern culture of education and which proves to be perfectly efficient for penitentiary institutions. It is education which is focused on independence and self-discipline of digital platform users.

Elaboration

Implementation of e-learning is a complex process, however it provides convicts with an opportunity to acquire education and to fill in any education gaps they may have, regardless of the length of their imprisonment sentences; even convicts with short-term sentences can learn because after leaving prison they can still continue their education in freedom. Frequently, e-learning also comes as an alternative for people with short-term sentences who wish to learn at their penitentiary institutions but who cannot start learning at prison school because their sentences will soon end.

E-learning allows people to learn what they need at any time, place and pace which are the most convenient for them. Furthermore, it allows learners to enjoy enriched and varied traditional courses and it eliminates factors which can restrict learners' education potential. The advantages of e-learning in education of convicts undoubtedly include reduction in education costs, standardisation of knowledge, convenient implementation of education processes, introduction to self-reliance and self-discipline. However, there are also some disadvantages, such as high investment costs and some possible resistance of convict learners to whom the contact with modern technologies may negatively affect the course of education (Hyla, 2005, pp. 25-27).

On one hand, application of e-learning in education of convicts, who serve their imprisonment sentences at penitentiary institutions, seems to be a very modern and efficient solution; on the other hand, however, considering the specific character of convicts who are educated with the use of this method, it might also seem highly controversial. It is difficult to obtain data on the use of e-learning in education of convicts. Some very scarce research indicates that e-learning applied to educate convicts is not competitive to prison schools at all. E-learning is an alternative for convicts with short-term sentences who wish to learn but who cannot be qualified for education at prison schools. E-learning becomes an important resource also for convicts who cannot be moved to another penitentiary institution in order to start their education because of the distance from their places of residence (Szlęzak-Kawa, 2011, pp. 10-11).

In the Polish penitentiary system, e-learning takes two paths and it is addressed to two groups of convicts: to convicts and to the Prison Service staff members. There are not any separate legal regulations in that field for convicts. Education at penitentiary institutions is provided in accordance with the Education Act, in the same way as it is provided at any other school outside prison. Each penitentiary institution is responsible for providing convicts with such a form of education. The authorities of the Prison Service do not keep any records referring to convicts who use this form of education and to penitentiary institutions which are interested in providing e-learning education.

A good example of using e-learning in education of convicts can be a project entitled *A Checked Notebook*, initiated in 2009 and implemented by the Prison Service in cooperation with the European High School for Adults in Warsaw. At the beginning, it was a pilot programme and it was initiated at two custody suites in the capital city of Poland. However, in 2011 some other penitentiary institutions from other regions joined the e-learning programme. Eventually, over 35 penitentiary units in Poland implemented e-learning projects.

In the years 2012-2014, e-learning in education of convicts was implemented under the cooperation of the Regional Inspectorate of the Prison Service in Warsaw and the Alcide de Gasperi University of Euroregional Economy in Józefów and, since 2015 in cooperation with the Stanisław Konarski Foundation in Warsaw which runs the High School for Adults No. 3 and the Institute of Life-long

Learning. At present, e-learning is implemented at two penitentiary institutions where the convicts obtain their education at the secondary school level. The number of penitentiary units which provide this form of education is regulated by the current demand in the field of supplementing education for convicts who meet the above-mentioned requirements.

E-learning in education of convicts is implemented through an Internet education platform which has been developed by an external entity, namely a school providing education. Each penitentiary unit participating in the project provides a prison room equipped with computers for learners. At the initial stages of the project implementation, a project coordinator from a particular school or a teacher providing substantive help are always present in the room. Classes are held systematically, in accordance with a schedule sent by the school to the prison. Apart from the classes implemented through the use of the education platform, convict learners solve tests and pass exams. Learners are given their logins and passwords in order to use the platform and to access particular modules with the topics discussed during particular semesters. Learner groups are recruited once a year, in accordance with the school year schedule. It should be emphasized that the documents sent by the school are a formal basis for convicts to continue education at other education institutions. Convicts pass their secondary school-leaving examinations in compliance with the general regulations, in front of the relevant examination board, in prison environment (Trela, 2016).

A research survey carried out at penitentiary units, where - as a result of some organisational changes - prison schools have been closed, indicates that over 95% of convicts wish to improve their education. The results of the survey indicate convicts' positive attitudes towards the system if there is no prison school at the penitentiary institution where they serve their sentences. Convicts express their interest in the continuation of their education in the form of e-learning. Convicts' aspirations may be related to inaccessibility or limited accessibility to education, but still, their declarations considered in the context of e-learning, which has been developing as an alternative form of education, can instil a lot of optimism. E-learning education is addressed to people of various age groups, including juvenile and minor convicts. In a situation where there is no prison school at a particular penitentiary institution, or convicts cannot learn in an open environment, e-learning is certainly recommended. Most convicts indicate their positive attitudes towards participation in classes where some cameras are installed in the back of the classroom to provide current monitoring of education processes, making notes, performing tasks, active listening. (Szecówka, 2011, pp. 234-242).

Implementation of e-learning is not an experiment but a fact well-approved by all the participants of education processes. The need of life-long learning means that distance learning will become more and more common (Bednarek J and Lubina E., 2008, p.7). Convicts form a very specific group of learners. Optimisation of prison education can allow convicts to acquire knowledge in a more efficient way, to obtain qualifications required to enter the labour market, to meet growing requirements of employers and to continue a coherent process of their social re-adaptation (Szecówka, 2011, pp. 234-242).

Closing

More and more often, E-learning becomes an opportunity for convicts serving their imprisonment sentences at penitentiary institutions to fully participate in social life. Some examples of good practice indicate that the possibilities to use e-learning forms of education in order to improve accessibility of education are exploited more frequently.

The resources implemented with the use of e-learning in education of convicts include various components which allow learners to acquire and to consolidate their knowledge. E-learning in education of convicts comes an opportunity for providing equal chances in education, it also provides education which can be adjusted to convicts' needs. It also seems that e-learning in education of convicts is inevitable, considering the vast advancement in technology, the necessity to prepare convicts for living outside prison, for finding their places on the open labour market and for continuing their life-long learning.

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Socially Responsible Investments in Spain and Poland (ES&PL) compared to other European countries

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Abstract

The objective of the article is to assess the activities and conditions for the development of Socially Responsible Investments (SRI) within Spain and Poland. These two countries were chosen intentionally. Both experienced prosperous periods in the 16th century followed by a decrease in political importance, and then dictatorships in the 20th century. Another factor is the prevalence of the catholic religion, which may affect the decisions of socially responsible investors. In order to realize the objectives of the research, the focus was placed on the comparison of the socio-economic and cultural aspects of both countries and the size of sustainable markets against the backdrop of other European countries. In the study, descriptive and multidimensional statistical methods were used (i.e. correspondence analysis - CA). The results indicate that Poland and Spain have relatively similar socio-economic conditions compared to other EU countries, but this does not seem to be the result of historical conditions. It can be concluded that this similarity is the result of a similar commitment to socially responsible investing.

Keywords: Socially Responsible Investments, Ethic Finance, Sustainable Investments in Europe

Introduction

Socially responsible investing (SRI) is any investment strategy which seeks to consider both financial return and social good to bring about a social change.

The distinction between those different objectives of social (sustainable) investment is a part of a more general "division of moral labor" (Porter, 2009; Scheffler and Munoz-Darde, 2005). Responsible investors are those who recognize their share of moral labor and manage their role in social, economic and environmental development.

The classical approach to investment in financial markets does not take into consideration the idea of social responsibility, which is becoming more and more popular and commonly implemented in economic practices. According to the concept of social responsibility, the selection of companies made by an investor to be included in the investment portfolio, takes place first of all by means of so called positive selection (the best companies in the group if such factors as quality, social, ecological and corporate governance are considered) or negative selection (the elimination of the companies which have a negative influence on the environment or society). The second criteria considers quantity factors (the relationship between rates of return and risk). It is a completely different approach from the classical one, which assumes that the rate of return is strictly connected with portfolio risk and a rational investor allocates capital on the basis of the preferences specified in the utility function. Another pattern of the approach of socially responsible investors to the concept of assets allocation is implied by portfolio behavior. Hence, portfolios including the shares of socially responsible companies may be characterized by a higher risk (by a smaller spectrum of selected companies and simultaneously limited possibilities of portfolio diversification).

SRI may be made by socially responsible investors as well as conventional ones. However, while SR investors expect maximum income only if quality criteria are met, conventional investors expect high rates of return.

Even though the concept of SRI itself is rooted in religious movements, (Kinder, Lydenberg and Domini, 1994; Kinder and Domini, 1997; Kreander, Molyneaux and McPhail, 2003; Sparkes, 1995), and consequently should be very similar, it developed differently in the United States as opposed to Europe. These discrepancies concern the objectives, definition and use of the basic terms, diversified structure of the entities operating on the market or applied investment strategies. The American approach emphasizes social goals, whereas European markets concentrate on financial effects (Louche and Lydenberg, 2006). The American market belongs mostly to individual investors and the state's involvement in such investments is minimal if any. In Europe, on the contrary, the market is dominated by institutional investors [1], and the state's engagement is much bigger because it is responsible for pension systems. The American approach favors negative selection (exclusion and elimination strategies), which is not such a common investment strategy in Europe (Giamporcaro-Sauniere, 2004). Also, the SRI market in Europe is about 25% bigger than in the United States (GSIA, 2018).

Louche and Sakuma (2014) have undertaken an assessment of the SRI concept in Japan, comparing the Japanese model with the American and European models. Chapple and Moon (2005) evaluated the Asian market.

In Europe the approach to ethics finance including SRI also differs depending on cultural context and geographical location. Palmisano (2015) defines it as cultural paradigms on the basis of Ethical Finance. Poland and other post-communist countries are in one group: the "Former Warsaw Pact" countries, where the economic and social necessities after the fall of the USSR have favored the diffusion of microfinance. Spain and other Mediterranean countries (apart from France) belong to the group of Mediterranean countries, influenced by Catholic culture. France is within the countries possessing a stronger mutualistic and cooperative matrix (Palmisano, 2015).

Such a different approach to SRI on the European financial markets, as a result of cultural models conveyed in the process of primary socialization, may influence the dynamics of such investment developments.

From the investor's point of view, the performance of SRI is important. Despite the fact that it is difficult to point out the advantage in SRI performance above conventional investments, the SR concept is gaining more and more popularity worldwide.

According to the data by Morningstar, assets accumulated in SRI funds grow faster than in conventional funds (Hale and Gries, 2016). Thus meaning that this growth does not result from investors' expectations concerning high rates of return on invested capital, but rather the number of 'conscious' investors is increasing.

Research Methods

The objective of the paper is to assess the activities and conditions for the development of Socially Responsible Investments within Spain and Poland. Among many similarities between Spain and Poland, the following may be mentioned: similar population numbers until recently, peripheral geographical location within the EU, prosperous periods in the 16th c. and a dramatic fall of their importance one hundred years later (Poland), and two hundred years later (Spain), authoritarian system in the 20th c.; a strong influence of the Catholic Church on policy, education, and value systems preserved both by Spanish and Polish nations. Despite the fact that Spain and Poland have a lot in common, every time we become absorbed in the history of both countries, obvious similarities seem to be more problematic. The analysis of the culture of national groups living in selected regions

is often applied. The country's borders, however, are not necessarily equivalent to the borders of an organically developed, relatively homogenous society sharing the same culture. Nonetheless, strong bonds of integration may bring about a significant process of shared cultural ideals found in both nations, which have existed for a while (Hofstede, 1990). Usually there is one dominant language, educational system, army and political system, common mass media, markets, services and national symbols.

Nonetheless, the authors of the article assume that societies sharing similar features and systems of values may make similar investment decisions.

The studies conducted so far on this research problem allow us to formulate two research hypotheses. They assume that:

H1: *Spain and Poland are similar in economic and social spheres in comparison with other European countries.*

H2: *Socio-economic similarity affects the similarity in the volume of SRI and applied investment strategies.*

The comparative analysis of Spain and Poland was performed according to the following criteria: population, geographical location, policy, economic development, religion and volume of SRI.

The similarity of socially responsible assets structure in Spain and in Poland was assessed by Cluster Analysis (CA). The agglomerative hierarchical clustering procedures, (Ward's method with Manhattan distance metric) was adopted. The results of the countries grouping is presented in the hierarchical tree plot.

The data collected by Eurosif and presented in the European SRI Study 2018, enabled the analysis of institutional and retail assets from twelve different European markets (Italy, France, Switzerland, the United Kingdom, Spain, Germany, Belgium, the Netherlands, Sweden, Austria, Denmark and Poland). In order to assess the preliminary relations between SRI volume and selected variables in the analyzed countries, the Spearman correlation coefficient was used. The analysis was made on the set of variables based on Eurostat data; SDGs indicators [2] and Europe 2020 indicators. The SRI per 1000 inhabitants (SRI/1000) was used.

Results

Socio-economic factors and policy

Population

The population of a given country surely is not a factor in determining the development of any financial investments, hence such a factor should not be analyzed independently, still it is of some importance since it shows, in general, the potential of a given society to develop financial investments, including socially responsible ones.

Spain and Poland are countries which as early as at the beginning of the 21th c. had similarly sized populations. However, due to a mass inflow of immigrants, the Spanish population increased by 6 million people. In 2017 there were 46.5 million citizens in Spain (INE), compared to January 1, 2001, when the population of this country equalled 40 million people (INE). This population growth was directly connected to an influx of immigrants from Latin America, Morocco, Pakistan, Indian, Bangladesh. According to the data from 2017, Poland is inhabited by 38.5 million citizens (CSO). Since 2000 the population of Poland has remained relatively stable. It is highly probable that Poland

will face a similar growth in its population soon, although it may not occur in the near future despite a huge influx of immigrants from the Ukraine.

Geographical location (peripheral location within the EU)

Even though Spain and Poland are EU members, i.e. a relatively strongly integrated social and economic area, none of these countries participated in the process of forming the European Community in the 1950s, hence they were not founding members. Spain joined the EU in 1986, whereas Poland joined in 2004.

Similar to Spain, Poland is at the gateway to a Europe identified as the EU. So, the consciousness of both Poles and Spaniards is consumed by the 'problem' of a being a border state. In the case of Spain, the border is not only a physical one due to historical, economic and family relations being the result of former colonies. In the case of Poland, the borders are rather physical. Polish participation in the Eastern Bloc made the Poles unwilling to integrate socially with former members of the Eastern Bloc because of painful memories of oppression under communists' ruling.

Policy (authoritarian system in the 20th century)

A non-democratic political system was the reality of the 20th c. in both countries. In Spain after the civil war (1936–1939), Francisco Franco came to power. His authoritarian ruling ended when he died in 1975. At this point it should be mentioned that the dictatorship, though led by one person, was the most drastic at the beginning of his ruling, in the 40s. After some time there came slight relief allowing for the creation of a strong underground movement. A similar situation could be observed in Poland. Still, the two countries followed absolutely different paths of economic development in the non-democratic systems of the 20th c. After introducing the stabilization and liberalization plan of 1959, Spain opened the possibility of integration with the economy of other European countries (Sarda 1970; Varela Parache 2004; Fuentes Quintana 1984; Gonzalez 1979; Prados de la Escosura, Rosés and Sanz Villarroya, 2011). In the case of Poland, until 1989 the country was totally separated from the Western bloc.

After some time Spain opened a new chapter of its history after the death of Franco and became a democratic state (in a long process of political transformation), and 11 years later it joined the EU. Nevertheless, ghosts from the past did not stop haunting them. Similar to Poland, the representatives of the political class, performing prominent roles in the previous system were not punished for their deeds.

Religion (the influence of the Catholic Church on the society)

The Catholic Church has significantly influenced the policies, values, and education in both countries, although the process of secularization is accelerating. The Catholic Church, until the death of Francisco Franco, had a much greater influence on Spanish policies than in Poland. It was the Iberian Peninsula where the Spanish Inquisition began in 1478, acting against the enemies of the catholic religion. According to the Catholic Church representatives, the Jews apparently converted into Catholicism after 1492 only under the threat of being expelled from Spain. It was the church which accompanied Franco's dictatorship after 1939. In Spain Opus Dei enjoyed huge power, which in the 60s penetrated political structures. In spite of the fact that both countries are characterized by a strong influence of the Catholic Church, currently there is only one extremely important difference in the perception of this institution in Spain and Poland. Behind the Pyrenees, after Franco's dictatorship, a withdrawal from church institution took place due to its support given to Franco, whereas in Poland the church was a defense against the totalitarian system and did not lose the trust of its followers.

Economic Development

In Poland, after the economic, political and social transformation initiated in the 80s, and after helping to dissolve the communist regime of the 20th c. (Przybylska-Kapuścińska, 2007; Kowalski, 2013; Ponczek, 2007), the financial sector of Central and Eastern Europe underwent a complete transformation. After free elections many socialist market economies collapsed, national banks and insurance companies were privatized, stock exchanges were reactivated and some countries formed private pension systems as an alternative to state systems. The economic needs of post-communist countries were initially concentrated on economic growth more so than social development (Stiglitz, 1996).

In Spain the economic transformation started much earlier, as early as during Franco's regime, whereas social transformation took place after his collapse in the mid 70s. The above mentioned economic transformation, more specifically the process of economic institutionalization and entering mature markets provided Spain, which joined the EU in 1986, with a much higher level of economic development than Poland, enabling it to regain its liberty from the communist regime in 1989. Nonetheless, this differentiation diminished over the course of time.

The differences in the level of development of Spain and Poland are reflected in the value of gross domestic product per capita calculated according to the Purchasing Power Parity – PPP against the EU average which amounts to 100 (EU28=100) [3] . According to the economic growth, Spain significantly exceeds Poland. The indicators in 2017 amounted to: 92 and 70 respectively, nevertheless simultaneously both countries were below the average in the EU member states (see Fig. 1). It is worth noticing that in the years 2003-2017, the economic distance between the countries was regularly diminishing – in 2003 Spain was ranked 13 among the EU member states and in 2017 – 14, whereas Poland went from 24th position in 2003 to 22nd in 2017.

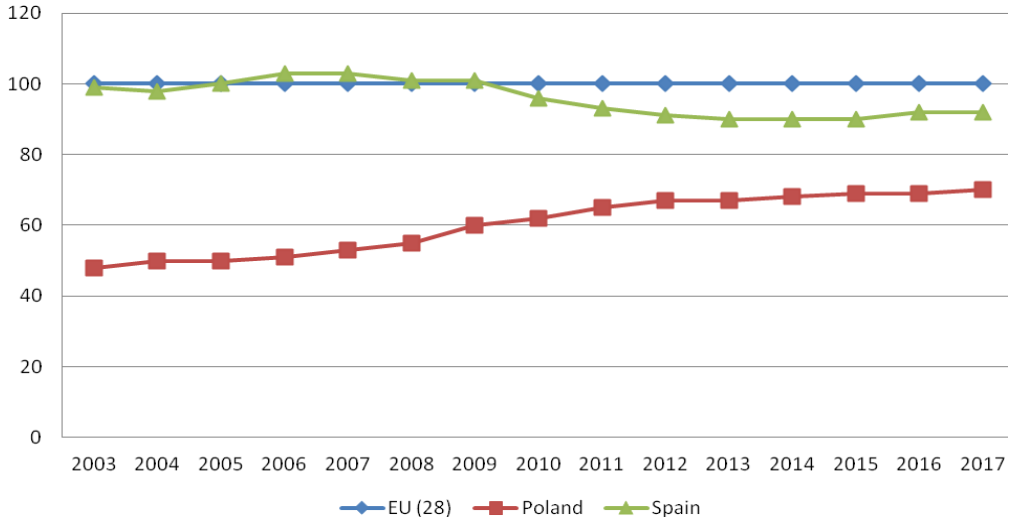

Fig. 1: Gross Domestic Product (GDP) per capita at PPP (EU28=100) in Spain and Poland and in EU countries in 2003-2017 (strateg.stat.gov.pl)

Spain and other EU member states recorded a clear decrease in the dynamics of GDP after 2008 due to the world economic crisis. However in Poland, in spite of the crisis, GDP was on the increase.

The similarities and differences in the values of selected indices for Spain and Poland were presented in Fig. 2 by means of uniformed values (normalized within the range 0 to 1 as compared to the EU).

Considering the general economic situation (GDP per capita at PPP), Spain achieved better results in 2017 compared to Poland. The regulatory quality index was slightly higher when compared to Poland, whereas the index of material deprivation (reflecting the level of poverty and social exclusion) is significant higher in Spain. The phenomenon of corruption perception in Poland in 2017 was lower than in Spain (CPI is higher). In the economic sphere, both countries were ranked almost the same in terms of social development – as confirmed by the Human Development Index.

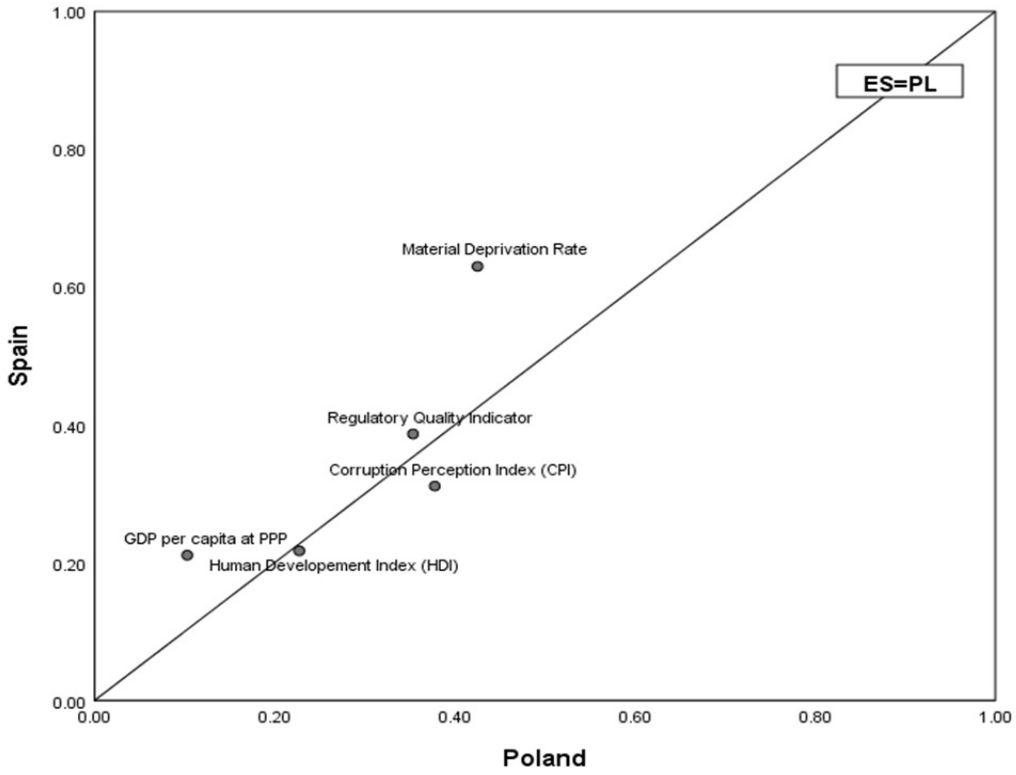

Fig. 2: Similarities of Spain and Poland according to selected indices in 2017 (normalized values) (strateg.stat.gov.pl)

SRI Analyzes

According to the data from 2017, the value of socially responsible investment amounted to 23 493 billion EUR. The investments in Poland, according to the data from 2017, amount to 22 billion EUR, and Spain 300 billion EUR. Investment in Poland constituted 7.32% of the investments in Spain (Eurosif, 2018).

In both Spain and Poland the level of socially responsible investments is low compared to the remaining European countries where this market is most developed. In western European countries such as the UK and France, the volume of socially responsible funds was a dozen or so times higher (see Fig. 3).

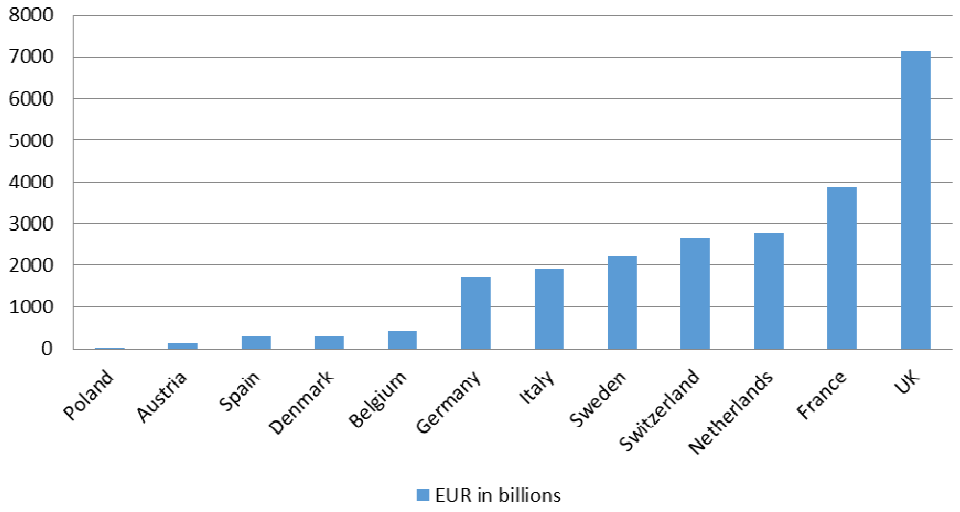

Fig. 3: Socially Responsible Investments in Europe per country, 2017

In order to assess the similarity between the countries according to the size of the assets within particular strategies of investing in socially responsible funds, hierarchical Cluster Analysis (CA) was applied. According to the Eurosif classification (Eurosif, 2018), the following division of investment strategies was adopted: Best-in-Class; Sustainability Themed; Norms-based Screening; ESG Integration; Engagement and Voting; Exclusions; Impact Investing.

As a result of agglomerative grouping, we can identify groups of countries that are similar according to the volume of investment within particular strategies. The structure of data agglomeration is presented in the hierarchical tree plot below – see Fig. 4. The grouping effect is formed by cutting the hierarchical tree plot at any level. Assuming, as the horizontal cutting line, the distance of 12.5 (the vertical line on the graph), three focal points were achieved: 1. Austria, Poland, Belgium, Spain, and Denmark; 2. Germany, Italy and Switzerland; 3.the Netherlands, Sweden France and the UK. The graph confirms that, on the basis of the analyzed European countries, Spain and Poland are most similar.

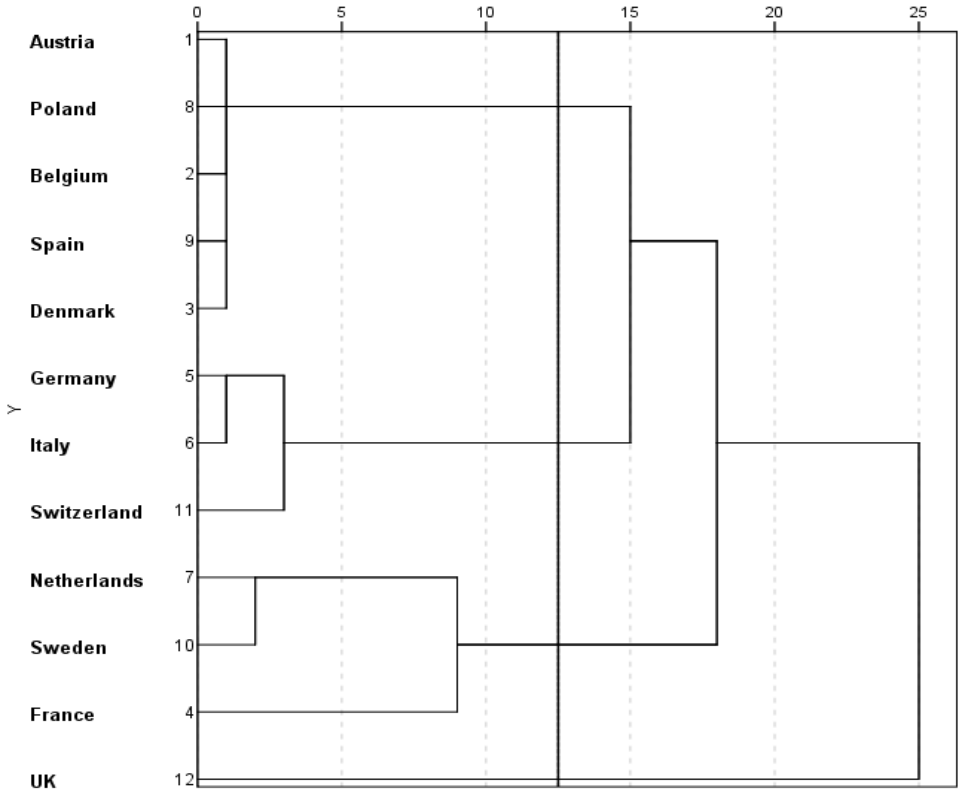

Fig. 4: Dendrogram (similarity structure) of 12 European countries in terms of SRI strategy in 2017

Spain and Poland are in the group of countries with the exclusion strategy as the dominant one (Eurosif, 2018). Simultaneously, it is the simplest and the oldest strategy used by investors.

In order to indicate if there are similarities between all the analyzed countries and to group them according to the volume of SRI and selected socio-economic variables, a multidimensional correspondence analysis (MCA) was used.

First, the macroeconomic situation was analyzed. The following variables were chosen: GDP per capita at PPP (GDP), index HDI (HDI) and Material deprivation rate (DR). Fig. 5 presents a multidimensional dependency between SRI/1000 and the above - mentioned variables.

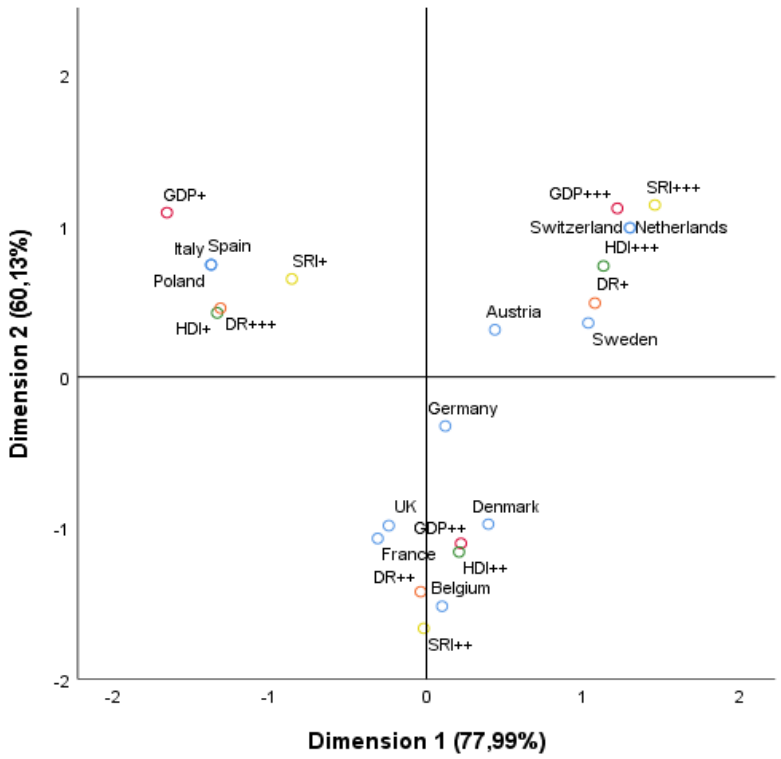

Fig. 5: Correspondence diagram (MCA) of: SRI/1000 [SRI]; Gross Domestic Product [GDP]; Human Development Index [HDI], Material Deprivation Rate [DR]

There are three clearly separated groups of countries seen in the correspondence diagram (see Fig. 5), which indicates a strong relation between the variables of particular countries. The value of SRI/1000 reached the highest level in the countries characterized by high (GDP) per capita, high (HDI) and low (DR): The Netherlands, Switzerland and Sweden. Austria is also grouped among strong countries though its absolute value of SRI is low.

The value of SRI/1000 was the highest in the countries characterized by a lower level of (GDP) per capita, (HDI) and high (DR): Poland, Spain and Italy.

Next, the level of CSR was analyzed including the transparency of a state's activities in terms of bribery perception. Here, the following variables were selected: index measuring Corporate ethics (CE), Perception of corruption (PC) and Legal Transparency (TL). The purpose of such a selection was to check if the ethical standards of companies are related to legal transparency and the perception of bribery by a society.

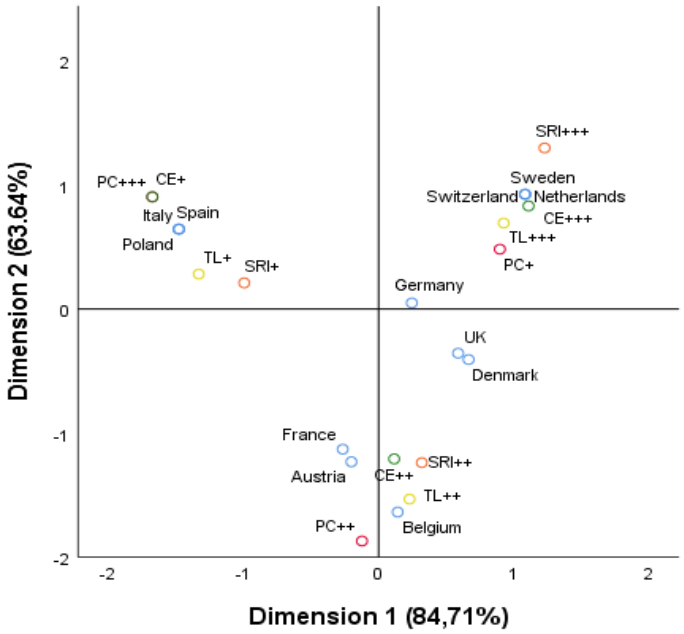

Fig. 6: Correspondence diagram (MCA) of: SRI/1000 [SRI]; Corporate ethics [CE]; Perception of corruption [PC], Legal Transparency [TL]

There are three groups clearly distinguished in the correspondence diagram (see Fig. 6), which indicates a strong relation between the variables of particular countries. The value of SRI/1000 was the highest in the countries characterized by high (CE) and low (PC) as well as low (TL): The Netherlands, Switzerland and Sweden.

Relatively low (CE) and high (PC) and low values of (TL) were observable in Italy, Spain and in Poland – i.e. in the countries of the lowest SRI/1000. Interestingly, Germany, the UK and Denmark are not related to any group.

The last illustrated correspondence is the relationship between SRI/1000 and Innovation Index (INN), Quality of Education (QE) and R&D expenditure as a percentage of GDP (RD). Such a selection of variables for the analysis is justified since the objective here is to show the relationship between the quality of education in particular countries with innovativeness and R&D expenditure against the volume of SRI. The correspondence diagram (see Fig. 7) shows a multidimensional dependency between SRI/1000 and these variables.

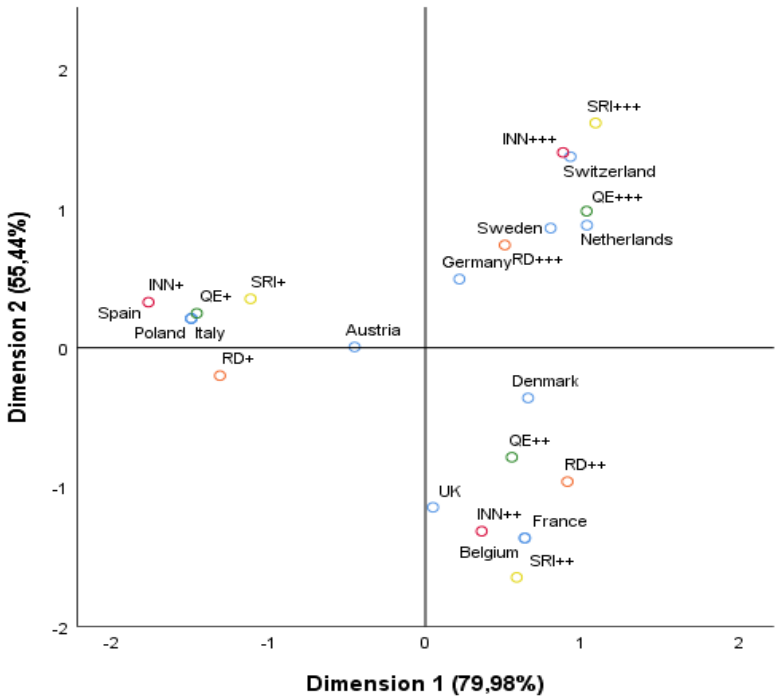

Fig. 7: Correspondence diagram (MCA) of: SRI/1000 [SRI]; Innovation Index [INN], Quality of education [QE], R&D expenditure as a percentage of GDP [RD]

The correspondence diagram (see Fig. 7) clearly distinguishes three groups of countries, which indicates a strong correlation between the variables of particular countries. The value of SRI/1000 was the highest in the countries with high (INN), (QE) and (RD), namely Switzerland, Sweden and the Netherlands. Germany, despite average SRI/1000 values, was included in the strongest group due to the fact that the remaining variables are strong.

Low values of the variables are observable among the countries with low SRI/1000, such as: Spain, Poland and Italy – the countries of the lowest SRI/1000 (with the exception of Austria – despite low SRI/1000, it is included in the group with average values of the respective variables.

Conclusion

The attempt to find some common values which would be the basis for further analysis in the context of taking investment decisions by socially responsible investors from Spain and Poland was ineffective. Although it is claimed that the roots of social responsibility in contemporary history reach the 18th c. and were motivated by religious values, the different paths of the Catholic Church in the analyzed countries resulted in a different perception of the church, and as such the promoted values. In Spain, the church supported Franco's regime, which consequently pushed people away from the church, whereas in Poland the church opposed the ruling power, and hence enjoyed huge support.

Big differences were especially observable in the economic dimension. Franco's regime, as well as the regime in post-communist countries finished not only at various points in history, but also had completely different courses. At the beginning of the 60s, Spain was entering the economic mainstream opening itself to foreign markets. In Poland at this time, socialist economy was prevailing, where the process of exchanging goods and services took place only between the post-communist bloc and its economy was subordinated to the apparatus of State. After Poland's accession

to the EU, the observable distance between Spain has been diminishing both in the social and economic dimensions. As far as the social and economic situation is concerned, Spain and Poland, when compared to other European countries, are similar to a great extent.

The analysis of socio-economic factors from 2017 data indicate that Spain and Poland, in comparison to other EU countries, are very similar. Spain, however, is relatively more advantaged due to the economic growth measured by GDP per capita, whereas the material deprivation rate is almost the same. The biggest differences concern the level of development in social and economic factors measured by the Human Development Index. The index is a summary measure of basic achievement levels in the fundamental dimensions of human development, crucial in terms of motivation to invest in a socially responsible manner. The regulatory quality indicator is slightly higher in Spain. The last discussed indicator is the Corruption Perception Index, reflecting the level of trust in the public sector. The index confirms higher levels of trust in Poland compared to Spain, but the differences are not enormous.

The analysis of the nominal value of SRI and SRI per capita show differences between Spain and Poland. Even though the two countries are in the weakest group, Poland has the lowest nominal value of SRI out of the twelve analyzed European countries. Nonetheless, it should be emphasized that Poland is the only country from the post-communist bloc which is involved in SRI. The analysis also shows that countries of low nominal values of SRI have similar investment strategies usually dominated by the exclusion strategy, which is the oldest and simplest investment strategy.

The analysis results show that not only Spain and Poland, but also Italy constitute one group of countries with low values of analyzed variables and low values of SRI/1000. It concerns both the variables indicating the level of economic growth, legal transparency, bribery perception, quality of education, innovativeness or R&D expenditure as well as the differentiation of the quality of life, social development or corporate ethics. Low SRI/1000 are also noted in Austria and Germany, however the high values of other variables qualifies these two countries to join other groups as they are located close to the center of the diagram. They show high SRI/1000 and at the same time are grouped among strong variable values represented by the Netherlands, Switzerland and Sweden. Despite apparent similarities, Spain and Poland are motivated by different historical backgrounds. Still, currently the similarities are visible in socio-economics, the value of SRI and applied strategies if compared to the twelve analyzed European countries.

It may be assumed that social, economic and political factors (such as membership in the EU) mainly contribute to the development of ethical finances. The cultural factors are significant, which may strengthen or diminish social awareness.

Notes

[1] It results somewhat from a legal obligation, namely pension funds in some EU countries are obliged to publish information pertaining to the involvement in sustainable investments (Solomon, Solomon and Norton, 2002).

[2] Sustainable Development Goals.

[3] If the indicator is lower than 100, then the level of GDP per capita in a given country is lower than the mean values un the EU and vice versa.

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Logistics Maturity in Service Enterprises – Research results

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Abstract

The service industry is the basis of the economy in the European Union in terms of its share in GDP and the employment rate. The said fact makes the service industry attractive to investors, which results in growing competition within it. One of the key factors of company success is logistics. Properly performed logistics activities guarantee the achievement of a high level of customer service. At the same time, however, they generate high operating costs. The described trade-off relationship is known in the manufacturing industry and has been an object of scientific research for years. However, the author noticed a research gap related to this question in the area of logistics in the service industry.
The aim of this article is to present selected results of research on the logistics maturity of service enterprises. An original Logistics Maturity Model for Service Industry (hereinafter LMM4SI) was used to assess the logistics maturity of the service industry. Research methods applied in the presented study include surveys used to obtain primary data from 2,000 Polish service enterprises, mathematical analysis used to determine the level of logistics maturity and statistical analysis which allowed to draw conclusions about the logistics maturity of the Polish service industry.

Keywords: Logistics Maturity, Service Industry.

Introduction

The service industry is currently the dominant source of GDP in the EU-28. According to Eurostat data, the share of services in the total gross value added for the EU-28 amounted to 73.2% in 2018 compared to 72.2% in 2008 (2020), According to the quoted Eurostat data, the relative importance of services was particularly high in Luxembourg, Malta, Cyprus, France, the United Kingdom, Greece, the Netherlands, Belgium, Portugal and Denmark. In Ireland, Slovakia and the Czech Republic, the share of services in GDP averages around 60%.

The growing importance of services in the European economy is the result of technological progress, changes in the level of relative prices, outsourcing and globalization. According to Eurostat data, in 2018 all types of industries in the EU-28 recorded an increase in gross value added compared to 2017. The industries that recorded the largest increase were information and communications services (4.7%), construction (3.6%) and business services (3.3%).

The above information proves that the service industry has a strong impact on the EU economy. It should therefore become the subject of scientific research and whose results should contribute to the continuous growth of this kind of economic activity.

In her research, the author focuses on assessing the logistics maturity of service enterprises. Therefore, the subject of research is the logistics activity of service providers. In this context, the author notices a research gap. A low number of studies on logistics in service enterprises result primarily from the research entity itself. Service enterprises experience difficulties in performing logistics activities due to the following features of service: Lack of ownership, Intangibility, Inseparability, Variability, Perishability and User participation, which render the service, treated as a product, non-susceptible to logistics activities. Despite this fact, service enterprises implement logistics processes by storing stocks of materials needed to perform services and then transporting them to the place of service, cooperate

within supply chains and use IT solutions associated with logistics. It can therefore be assumed that logistics activity is undertaken in the service industry. Its character, although fuzzy and hidden, is necessary for doing business.

Juxtaposing the two topics under discussion, bearing in mind the importance of services in the modern economy and viewing logistics as one of the key success factors for companies, the author is of the opinion that the assessment of logistics maturity in the service industry is a justified subject of literature and empirical studies.

This article is devoted to the logistics maturity of service providers. Manufacturing, trading and service enterprises, regardless of their business line and size, strive to improve their operations in order to become competitive in the market and increase profits. Kosieradzka and Smagowicz (2016) mentioned, maturity models allow to assess the current situation of the organization and determine the direction of further development. Over the years, depending on the areas of management, many different maturity models have been devised, for exemple in research studies by: Lathi et al. (2009), Steenberg et al. (2010), Janse et al. (2010), Eadie et al. (2011), Jasiulewicz-Kaczmarek and Drożyner (2011), Cao and Jiang (2013); Bemelmans et al. (2013), Jellouli and Abdel-kadhi (2013), Looy (2014), Mazur and Stachowiak (2014), van Lith et al. (2015), Benmoussa et al. (2015), Tontini et al. (2016), Modrák and Šoltysová (2020). In addition, in a research studies by Battista et al. (2013) and Battista and Schiraldi (2013), logistics maturity models have been developed to analyze logistics processes taking place in enterprises of one business line. In recent years, researchers have also shown interest in the subject of digital maturity, also in relation to logistics, the so-called Maturity Logistics 4.0, incl. in research studies by Oleśków-Szłapka and Stachowiak (2019), or in the aspects of sustainable development, incl. in research studies Golinska et al. (2015). In this article, the author proposes a maturity model dedicated to the service industry, in which the areas of logistics activity, and not logistics processes, are assessed. This is due to the fact that service enterprises, unlike manufacturing enterprises, rarely have precisely defined logistics support processes.

Theoretical Background

Research on developing a logistics maturity model for the service industry was preceded by literature studies on the logistics maturity of service enterprises. The object of the research was scientific articles on logistics maturity. The research was conducted in the first quarter of 2017. The following databases were used in the research: Web of Science, SCOPUS, Emerald Insight. In total, 11 publications were analyzed. The conclusions of the study were the basis for further research. The most important conclusions (hereinafter C1- C5) from the literature review can be formulated as follows:

C1: there is a research gap in the definition of "logistics maturity"despite growing interest in the issue, which is manifested in the increasing number of publications on this subject.
C2: logistics maturity models developed so far in 45% concerned enterprise logistics in the overall (systemic) approach, while the remaining 55% was associated with maturity models dedicated to a single subsystem, e.g. a supply subsystem or a distribution subsystem.
C3: models developed the most frequently have 4-6 levels of maturity. Limiting their number seems justified from the perspective of the need to indicate factors determining a specific level. The more levels, the harder it is to describe a given model.
C4: most maturity models subject to inference allowed for assessment in specific dimensions by using specially developed questionnaires. The assessment of the achieved level was carried out in a strict way, which meant that in order for a given level of maturity to be assigned, all requirements indicated at this level should be met. As a result, information was obtained about the extent to which achievements at a given maturity level were met.
C5: each level of maturity should be identified by requirements indicated at an adequate level, not level descriptions, as this may raise doubts during the maturity examination.

The above conclusions became guidelines for the authors in building the logistics maturity model of the service industry. The model is based on the authors' proposition of the definition of logistics maturity understood as: the organizational level of an enterprise indicating the extent to which logistics tools are used in the areas of logistics activity of a service enterprise.

In the proposed model, the authors departed from known maturity models related to the process approach. The authors do not question process maturity models, yet their goal was not to develop a process maturity model in the field of logistics in service enterprises. The authors' aim was to develop a model that in a broader context, not only in the context of the process, would assess the logistics maturity of the service industry. Therefore, individual logistics processes implemented in the enterprise are not assessed in the model. What is being examined is the area of logistics activity. The authors identified the following areas of logistics activity of service enterprises:

Warehouse management - all activities related to the storage and management of the storage space of materials needed to provide services,
Transport management - all activities related to the transport of human and material resources to the place of service,
Supply chain and distribution - all activities related to cooperation within the supply chain and distribution of services,
Stock supply and management - all activities related to supplying the enterprise with materials necessary to perform services and related to management of these materials, if such exist,
IT solutions - understood as the use of IT tools in the enterprise to support the implementation of the previous 4 logistics activities.

The developed model assumes the individual assessment of logistic maturity in the above areas of activity, assuming that in each of these areas this level may be different. However, the model does not allow to determine the overall level of logistics maturity of the service enterprise. This can be considered as the biggest disadvantage of the proposed model. However, the lack of aggregation allows to indicate those areas of logistics activity that in the first place should be improved if a low level is recorded.

In their research on LMM4SI, the authors assumed that the level of logistics maturity achieved by the service enterprise corresponds to the phase of logistics evolution in which the enterprise is located. However, to prove which phase the enterprise is in, it is necessary to perform a measurement. Therefore, it was assumed that the measure will be the use of logistics tools by the enterprise, commonly known and used in manufacturing enterprises. For this purpose, the authors used a list of 90 most popular logistics tools proposed by Richards and Grinsted (2016). A selection of tools was made by choosing those that can be used in the service industry and complementing it by the authors' own proposals. In this way, a list of 65 logistics tools was created, which, in the authors' opinion, can be used by service enterprises during the performance of logistics processes. These tools were assigned to the areas of logistics activity of service enterprises

Due to the assumption that individual levels are evaluated by logistic tools that are used in the enterprise and which determine the level of logistics maturity of the research object, it was necessary to specify which tools from the set of defined logistics engineering characterize a given level of logistics maturity and to what extent a given logistics tool determines the level of maturity. To this end, the authors used expert research to minimize the subjectivity of the assessment.

Research Method

As part of the research, a model was developed to determine the logistics maturity of each service enterprise - LMM4SI.

The Logistics Maturity Model for Service Industry presented in the paper includes the following elements which are proposed in research by Werner-Lewandowska and Kosacka-Olejnik (2018):

- 6 maturity levels (L1-L6), which correspond to the particular phase of industrial logistics development (Fig.1), which are proposed in research by Ballou (2007);
- 5 logistics system areas (hereinafter LA) under assessment including: warehouse management (hereinafter: WM), transport management (hereinafter: TM), supply and inventory management (SIM), supply chain and distribution (hereinafter: SCD), IT support (hereinafter: IT tools);

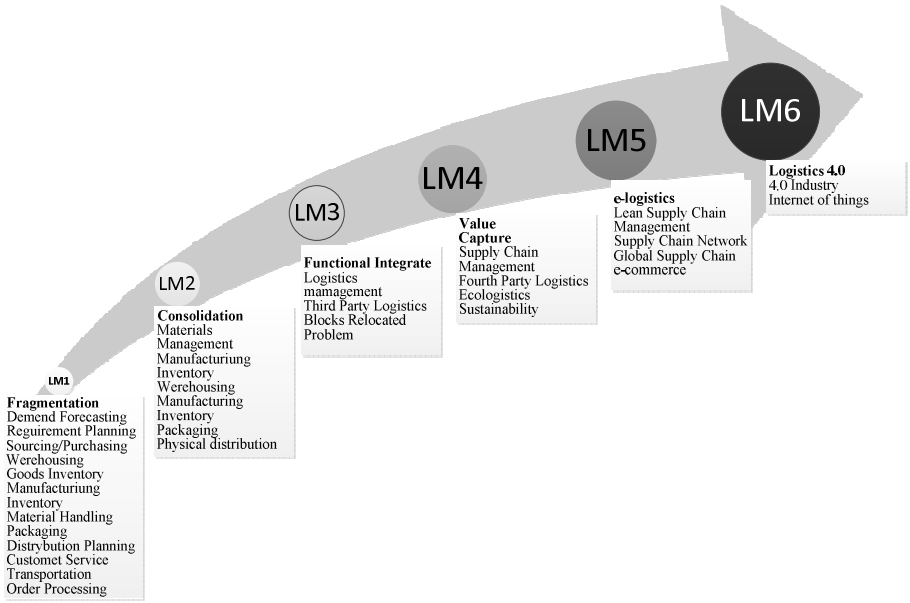

Fig. 1: Phases of logistics evaluation and connection with LMM4SI

- the given levels are evaluated by 65 logistics engineering tools used in the enterprise (Tab. 1), that determine the level of logistics maturity of the research object. Table 3 presents the strength of the impact of individual tools on the level of logistics maturity.

Table 1: Logistics tools for LMM4SI

LA1: Warehouse Management (WM)		LA2: Transport Management (TM)		LA3 Supply and Inventory Management (SIM)	
Logistic tool of LMM4SI	**ID**	**Logistic tool of LMM4SI**	**ID**	**Logistic tool of LMM4SI**	**ID**
Pareto analysis /rule, ABC analysis or the vital few analysis	WM01	Calculating road freight transport charges and rates	TM01	ABC Pareto analysis for inventory management	SIM01
Selecting warehouse storage equipment	WM02	Transport management system (TMS) selection process	TM02	Cycle counting or perpetual inventory counting	SIM02
Selecting warehouse material handling equipment (MHE)	WM03	Transport problems – matching customer demand with supplier capacity	TM03	Replenishment order quantities	SIM03
Warehouse location	WM04	Transport audit checklists	TM04	Stock counting	SIM04
Warehouse space calculation	WM05	Calculating emissions in freight transport	TM05	Ballou's inventory-throughput curve	SIM05
Warehouse location numbering	WM06	Vendor assurance of transport logistics service providers	TM06	Maister's rule or the square root rule	SIM06
Warehouse audit	WM07	Performance measures for freight transport	PM01	Measuring demand variation	SIM07
5S or 5C, also known as Gemba Kanri	WM08	**LA5: IT support (IT)**		Periodic review inventory management system	SIM08
Resource planning (including MRPII)	WM09	**Logistic tool of LMM4SI**	**ID**	Reorder point inventory management system	SIM09

Task interleaving	WM10	Enterprise Resource Planning – ERP	M01	Economic Order Quantity (EOQ),	SIM10
Using warehouse management system (WMS)	WM11	EDI	IT01	Managing spare parts inventory	SIM11
Warehouse maturity scan, by Jeroen van den Berg	WM12	RFID	IT02	Material Requirements Planning (MRP)	SIM12
Warehouse risk assessment	WM13	Purchasing by internet	IT03	Inventory management audit	SIM13
How to 'green' your warehouse and save energy and CSR	WM14	Supplying by internet	IT04	Consignment stock	SIM14
Outsourcing warehouse 3PL or 4PL	WM15	Truck&Tracing	IT05	Combining Pareto with EOQ to enhance group analysis	SIM15
Warehouse KPIs	PM02	WiFi	IT06		
LA4: Supply Chain& Distribution (SCD)		Bluetooth	IT07	Safety stock calculation	SIM16
Logistic tool of LMM4SI	**ID**	NFC	IT08	Vendor-managed inventory (and co-managed inventory	SIM17
Demand forecasting	SCD01	Z-WAVE	IT09	Identification and disposal of surplus stock	SIM18
Supplier relationships	SCD02	Smartphone	IT10		
Calculating ordering cost	SCD03	Cloud	IT11		
How to calculate stockholding cost	SCD04	Apps	IT12		
Sales and Operations Planning (S&OP)	SCD05				
Supply chain risk assessment Time-based process mapping	SCD06 SCD07				
Omni-channel distribution	SCD08				
Strategic procurement	SCD09				
Supply chain management audit	SCD10				
Collaborative, Planning, Forecasting and Replenishment (CPFR)	SCD11				

Table 2 presents the impact forces of individual logistics tools on maturity levels. The values come from conducted expert research presented in Werner-Lewandowska and Kosacka- Olejnik (2019b).

Table 2: Determinants of logistics maturity

LA	ID	LM1	LM2	LM3	LM4	LM5	LM6	LA	ID	LM1	LM2	LM3	LM4	LM5	LM6
WM	**WM01**	0,35	0,25	0,20	0,10	0,05	0,05	TM	**TM01**	0,10	0,10	0,15	0,35	0,25	0,05
	WM02	0,35	0,20	0,25	0,05	0,00	0,15		**TM02**	0,00	0,00	0,00	0,50	0,30	0,20
	WM03	0,35	0,30	0,20	0,05	0,00	0,10		**TM03**	0,00	0,40	0,35	0,20	0,05	0,00
	WM04	0,25	0,20	0,15	0,15	0,15	0,10		**TM04**	0,30	0,35	0,30	0,05	0,00	0,00
	WM05	0,40	0,35	0,15	0,10	0,00	0,00		**TM05**	0,00	0,00	0,00	0,40	0,35	0,25
	WM06	0,40	0,15	0,30	0,10	0,00	0,05		**TM06**	0,00	0,00	0,05	0,50	0,25	0,20
	WM07	0,30	0,15	0,45	0,05	0,05	0,00		**PM01**	0,25	0,05	0,10	0,20	0,30	0,10
	WM08	0,55	0,10	0,20	0,10	0,05	0,00	SCD	**SCM01**	0,00	0,15	0,15	0,50	0,20	0,00
	WM09	0,15	0,20	0,35	0,05	0,20	0,05		**SCM02**	0,05	0,05	0,05	0,60	0,25	0,00
	WM10	0,25	0,25	0,35	0,15	0,00	0,00		**SCM03**	0,30	0,20	0,25	0,15	0,00	0,10
	WM11	0,00	0,10	0,55	0,15	0,20	0,00		**SCM04**	0,15	0,15	0,15	0,25	0,20	0,10
	WM12	0,00	0,00	0,00	0,20	0,30	0,50		**SCM05**	0,05	0,15	0,45	0,20	0,05	0,10
	WM13	0,20	0,25	0,20	0,15	0,10	0,10		**SCM06**	0,00	0,00	0,00	0,55	0,25	0,20
	WM14	0,00	0,00	0,20	0,45	0,20	0,15		**SCM07**	0,00	0,00	0,25	0,50	0,25	0,00
	WM15	0,00	0,00	0,00	0,50	0,30	0,20		**SCM08**	0,00	0,10	0,30	0,15	0,25	0,20
	PM02	0,30	0,15	0,25	0,15	0,10	0,05		**SCM09**	0,10	0,10	0,35	0,20	0,15	0,10
SIM	**IM01**	0,40	0,25	0,25	0,10	0,00	0,00		**SCM10**	0,00	0,00	0,00	0,80	0,20	0,00
	IM02	0,55	0,15	0,25	0,00	0,05	0,00		**SCM11**	0,00	0,00	0,00	0,75	0,20	0,05

	IM03	0,45	0,15	0,30	0,10	0,00	0,00		**IT01**	0,00	0,10	0,30	0,20	0,25	0,15
	IM04	0,45	0,25	0,10	0,20	0,00	0,00		**IT02**	0,00	0,10	0,25	0,20	0,30	0,15
	IM05	0,15	0,25	0,40	0,15	0,00	0,05		**IT03**	0,00	0,00	0,00	0,15	0,55	0,30
	IM06	0,15	0,15	0,55	0,10	0,00	0,05		**IT04**	0,00	0,00	0,00	0,10	0,55	0,35
	IM07	0,10	0,20	0,20	0,30	0,10	0,10		**IT05**	0,00	0,00	0,10	0,20	0,50	0,20
	IM08	0,00	0,25	0,40	0,30	0,05	0,00		**IT06**	0,00	0,00	0,00	0,00	0,40	0,60
	IM09	0,20	0,20	0,20	0,25	0,15	0,00	**IT**	**IT07**	0,00	0,00	0,00	0,00	0,40	0,60
	IM10	0,50	0,10	0,05	0,25	0,05	0,05		**IT08**	0,00	0,00	0,00	0,00	0,30	0,70
	IM11	0,25	0,25	0,20	0,10	0,20	0,00		**IT09**	0,00	0,00	0,00	0,00	0,10	0,90
	IM12	0,20	0,20	0,35	0,10	0,10	0,05		**IT10**	0,00	0,00	0,00	0,00	0,50	0,50
	IM13	0,30	0,25	0,35	0,00	0,00	0,10		**IT11**	0,00	0,00	0,00	0,05	0,40	0,55
	IM14	0,15	0,15	0,35	0,15	0,15	0,05		**IT12**	0,00	0,00	0,00	0,00	0,45	0,55
	IM15	0,35	0,15	0,25	0,10	0,10	0,05		**MO1**	0,00	0,00	0,25	0,50	0,15	0,10
	IM16	0,35	0,20	0,15	0,10	0,10	0,10								
	IM17	0,05	0,15	0,40	0,10	0,30	0,00								
	IM18	0,25	0,20	0,20	0,15	0,15	0,05								

The assessment of logistics maturity according to LMM4SI is carried out according to the procedure presented in Fig. 2.

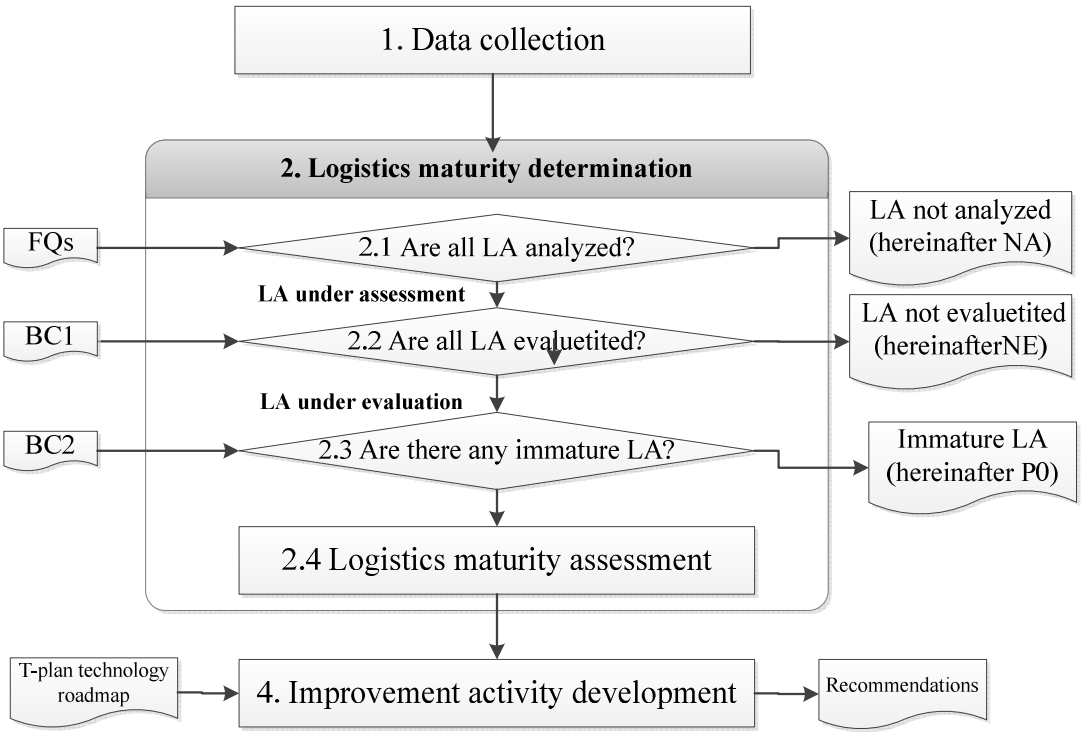

Fig. 2: Stages in logistics maturity assessment with the use of LMM4SI

Source: own elaboration based on Werner-Lewandowska and Kosacka –Olejnik (2019b).

The subject of the presented research was the logistics maturity of service enterprises. Logistics maturity dedicated to the service industry was used in the research. The detailed description of this model may be found in research studies by Werner-Lewandowska and Kosacka-Olejnik, (2018, 2019a, 2019 b).

To collect information, the CATI (Computer-Assisted Telephone Interviewing) method was used along with a questionnaire. The questionnaire contained 65 questions about logistics engineering tools, formulated as follows: "Does the company use the following tool ....?" Acceptable answers were "Yes," "No," or "The tool is not known in the company."

Some questions were filtering questions which are used to verify logistics areas that should be assessed (as FQs on Fig.2):

FQ1 (WM): Is there any place for storing materials needed to provide services in the future?
FQ2 (TM): Is any means of transport used for the service?
FQ3 (TM): Does the company have its own vehicle fleet?
FQ4 (SIM): Does the company collect materials needed to provide services in the future?

In the case of a negative answer to a filtering question, a given area of logistics activity was not analyzed in terms of logistics maturity assessment (as NA - no analysis on Fig. 2).
The maturity level from L1 to L6 is determined in accordance with the LMM4SI assumptions described by Werner-Lewandowska and Kosacka –Olejnik (2019b). In the model, each logistics area is verified in terms of immaturity, which was expressed by the following boundary conditions (as BC1 and BC2 on fig.2):

BC 1: if more than 50% of all logistics tools determining a given area of logistics in a service enterprise are not used, then the area is not subject to evaluation (NE no evaluation).

BC 2: if more than 50% of all logistics tools assigned to a given logistics area are not known, then the enterprise represents level L0 of the logistics maturity. Consequently, in this situation the enterprise is immature because employees do not know the basic logistics practices in this particular area.

Research Object

The research, whose results are presented in this article, covered a population of 2,000 Polish service companies. The characteristics of the studied population by the type of service according to NACE (French Nomenclature statistique des Activités économiques dans la Communauté Européenne, Statistical Classification of Economic Activities in the European Union) are presented in Fig. 3.

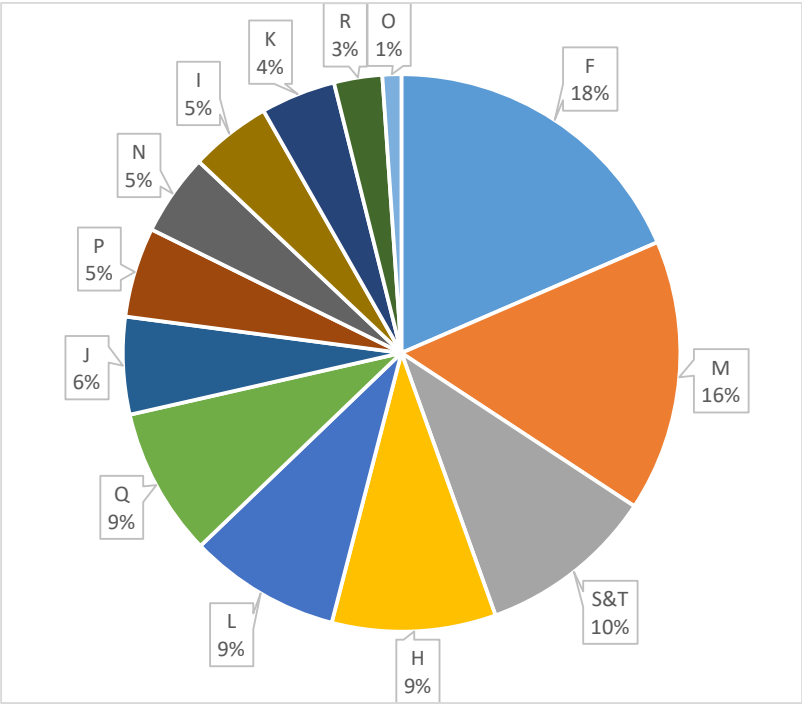

Fig.3 : Structure of the surveyed population by industries according to NACE Rev. 2

In Fig. 3, the individual letters are codes of service activity sectors, meaning in turn: F- construction, H- transportation and storage, I- accommodation and food service activities, J - information and communication, K-financial and insurance activities, L- real estate activities, M- professional, scientific and technical activities, N- administrative and support service activities, O- public administration and defense; compulsory social security, P- education, Q- human health and social work activities, R-arts, entertainment and recreation, S&T- other service activities and activities of households as employers; undifferentiated goods- and services-producing activities of households for one's own use.

As can be concluded from the data presented in Fig.3, the most studied service in-dustries were: construction (18.5%), professional, scientific and technical activities (15.8%), other service activities and activities of households as employers (10.3%). The remaining sectors of service activity are represented in the studied population in a share less than 10%.

According to Eurostat (2020) data, in 2008-2018, in services such as transport, accommodation and catering services, the share in total gross value added remained at the same level and amounted to 19.1%. The share of public administration, defense, education, healthcare and social welfare in the total added value increased and reached 18.5% in 2018. The next largest sectors of service activity in gross value added in 2018 were professional, scientific, technical, administrative and auxiliary services - hereinafter referred to as "business services" - (11.2%; share increased by 0.9 points between 2008 and 2018), real estate market activities (11.1%; decrease by 0.1 points), followed by construction (5.6%; decrease by 0.8 points), ICT services (5.1 %; increase by 0.2 points) and financial and insurance services (4.8%; decrease by 0.4 points). The smallest share was recorded by services related to arts and entertainment and other services (3.4%; unchanged) followed by agriculture, forestry and fisheries (1.6%; decrease by 0.1 point).

Research Results

According to Eurostat data, in 2018 all types of industries in the EU-28 recorded an increase in gross value added compared to 2017. The industries that recorded the largest increase were information and communications services (4.7%), construction (3.6%) and business services (3.3%), that is why the author decided to devote to them this part of the article regarding the results of research on logistics maturity. In the analyzed population, these enterprises constituted 113 economic entities, which is 5.7% of the population.

According to the Statistical Classification of Economic Activities in the European Community, Rev. 2 (2008), this section covers the production and dissemination of information and cultural goods, the transfer or dissemination of these goods, information technology service activities, data processing and other information service activities.

Service providers in this sector conduct:

- publishing activity, including software publishing,
- activity related to the production of films and sound recordings,
- radio and television activity,
- telecommunications,
- information technology activity,
- other information service activity.

Analyzing the scope of services in this sector, it seems that logistics is an indispensable element of business activity. It is in particular visible in the case of film production companies, where the service provided requires the use of materials and their storage and transport. Companies providing services in the field of information and communications are companies that provide business services, thus playing an important partner role in supply chains.

Werner-Lewandowska and Kosacka-Olejnik, (2019b) mentioned, that LMM4SI assumes that the level of logistics maturity is determined by the logistics tool used in the company Therefore, in the first place, when presenting the results of the research, the focus was on indicating which of the 65 tools subject to research are, and to what extent, known to the population of service companies. The research results are presented by individual areas of logistics activity undertaken by service companies.
In the area of warehouse management (WM), only 8 (7%) companies were analyzed, because only such a number of them declared that there is a place in the company to store materials needed to perform services in the future. Fig. 4 presents the level of use or unacquaintance with logistics tools affecting the level of logistics maturity.

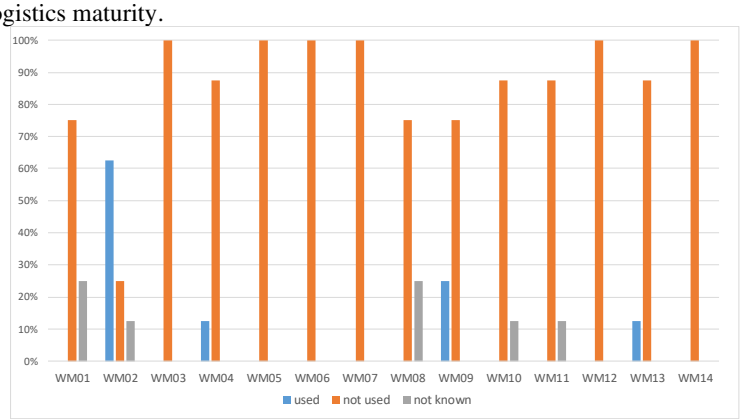

Fig.4 : Level of use and knowledge of logistics tools in the area of Warehouse Management (WM)

As it results from Fig.4, companies providing information and communications services do not use logistics tools in the area of warehouse management. The exception is the WM02 tool - Selection of storage solutions (e.g. a rack, a type of pallet) based on various criteria, which are used in the warehouse by 63% of those assessed in this area.

The research shows that in 93% of the surveyed entities, there is no warehouse for storing materials for future services, and none of these companies outsource storage by a 3PL or 4PL operator.

At the same time, 19% of the surveyed companies declare in their responses that they collect materials needed to perform services in the future. The fact that 7% of the companies have a warehouse for this purpose indicates that companies providing information and communications services do not store their stock in a designated place, which may negatively affect the quality and, consequently, value of materials stored.

Fig. 5 presents the level of use or unacquaintance with logistics tools affecting the level of logistics maturity in the area of Supply & Inventory Management (SIM).

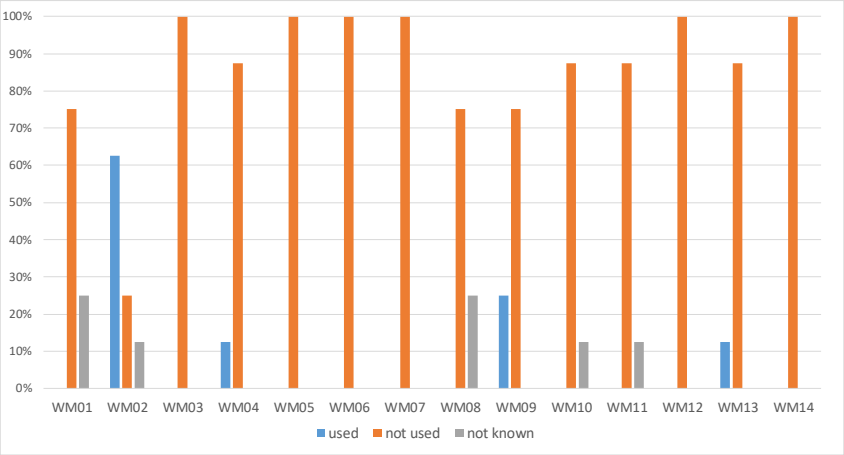

Fig.5 : Level of use and knowledge of logistics tools in the area of Supply & Inventory Management (SIM)

Although 19% of the surveyed information and communications service providers maintain a supply of materials to perform future services, most of them do not use or do not know the tools for managing inventory.

In the studied population, 40% of the companies use internal means of transport to carry out their services, and 51% of this share have their own vehicle fleet for this purpose, which indicates that every 5th surveyed company providing information and communications services uses its own vehicle fleet to provide its services. In the case of the surveyed companies which use external transport companies to perform services, 5% assess the transport service provider using various criteria, 77% do not know such a tool. Such a situation may contribute to delays in the service provided due to the use of unreliable carriers.

Fig. 6 presents the level of use or unacquaintance with logistics tools affecting the level of logistics maturity in the area of transport management (TM). The presented values apply only to those companies which have their own vehicle fleet.

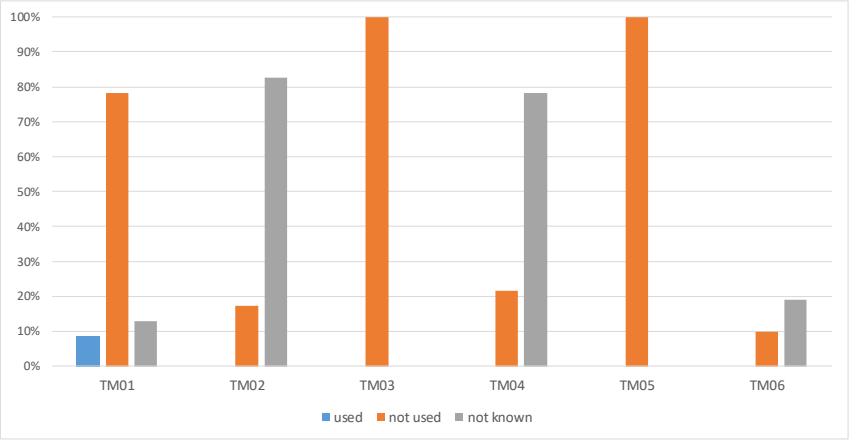

Fig.6: Level of use and knowledge of logistics tools in the area of Transport Management (TM)

Most companies that provide information and communications services do not use or do not know the tools to manage means of transport or the transport process despite their fleet. This factor probably affects the high level of operating costs associated with transport. Unacquaintance with the TM02 tool: Transport Management System TMS) and not using the TM03 tool: Calculating the demand for transport services taking into account the size of the load and transport capacity, undoubtedly generates the phenomenon of the so-called dead running, which is a manifestation of waste and irrational actions taken.

Due to the scope of services rendered, the analyzed group of service providers acts as a partner within supply chains. This is manifested in the answers provided by the respondents, with 41% of them indicating that they maintain long-term relationships with suppliers, but unfortunately only 9% plan, forecast and replenish inventories together with suppliers and customers. The low percentage of using the CPFR tool may be due to the fact that only 19% maintain a supply of materials needed to perform the service and that the service, due to its features, is not kept in stock. It probably translates into the fact that CPFR is not used by 84% of the surveyed companies.

Fig. 7 presents the level of use or unacquaintance with logistics tools affecting the level of logistics maturity in terms of cooperation in the supply chain and distribution (SCD).

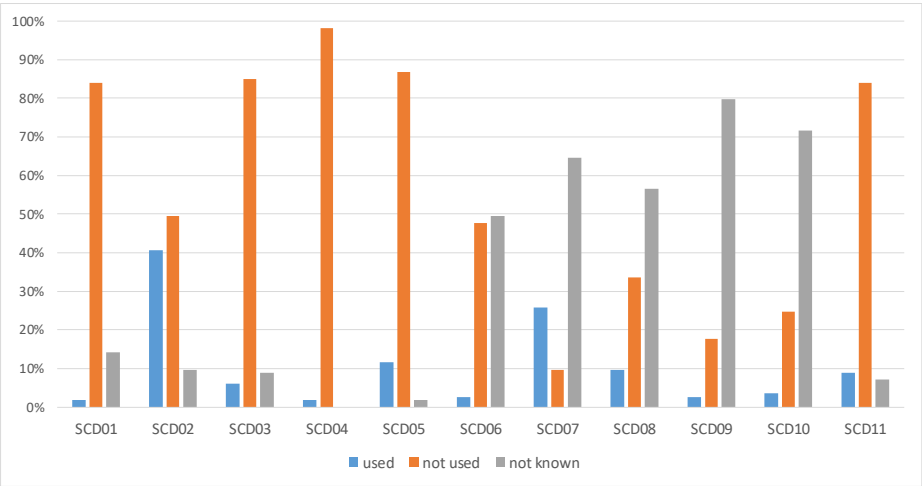

Fig.7: Level of use and knowledge of logistics tools in the SCD area

The last examined area of logistics activity of service companies was IT solutions, which in the opinion of the creators of the LMM4SI model can support the logistics of service providers. Due to the type of services provided, the results in this area are completely different from those presented so far. Most of the tools are used in companies and only one is definitely unknown - IT09: Z-WAVE protocol (Fig. 8).

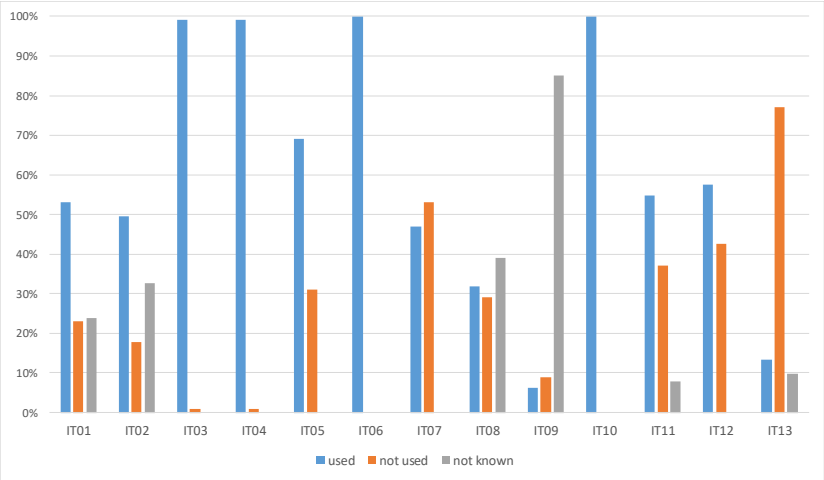

Fig.8: Level of use and knowledge of logistics tools in the IT area

Based on the hitherto considerations, it can be argued that the type of services provided determines the type and level of tools used to support the logistics of the service industry. In the case of the group of companies discussed in this article, this thesis is confirmed. However, Werner-Lewandowska (2019c) mentioned similar analyses of service and transport providers have not proved it.

In accordance with the LMM4SI procedure, after the stage of data collection from service companies and their analysis, the stage of logistics maturity assessment and the determination whether the test object is immature (L0) or whether it has reached the level of maturity between L1 and L6 take place. The WM area was assessed only among companies in which a warehouse exists. In the scope of SIM, only those companies that maintained stocks of materials to perform services were subjected to assessment. In the scope of TM, only those companies that use means of transport to perform the service were assessed. Based on the results of the research presented in Fig. 9, it can be stated that service enterprises providing information and communications services do not create stocks of materials needed to perform services in the future, which means that there is no space in the company for storing goods for services.

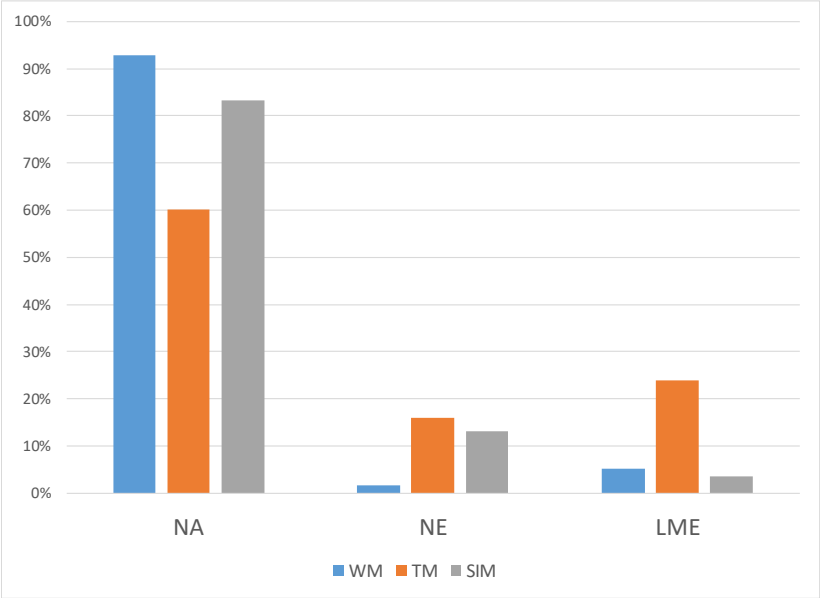

Fig.9: The scope of logistics maturity assessment in service companies

In the range of WM, TM and SIM, 5%, 24%, and 4% of the companies respectively were subjected to the assessment of the level of logistics maturity (as LME on Fig.9). These companies were not rejected at the stage of determining NA and NE. In the SCD area, 72% of the surveyed population was evaluated (the remaining was rejected because they do not use over 50% of the logistics tools that were assessed - BC1). In the IT area, all the enterprises were subjected to the assessment of the level of logistics maturity.

The area covered by the research affects the level of logistics maturity in companies providing information and communications services (Fig. 10).

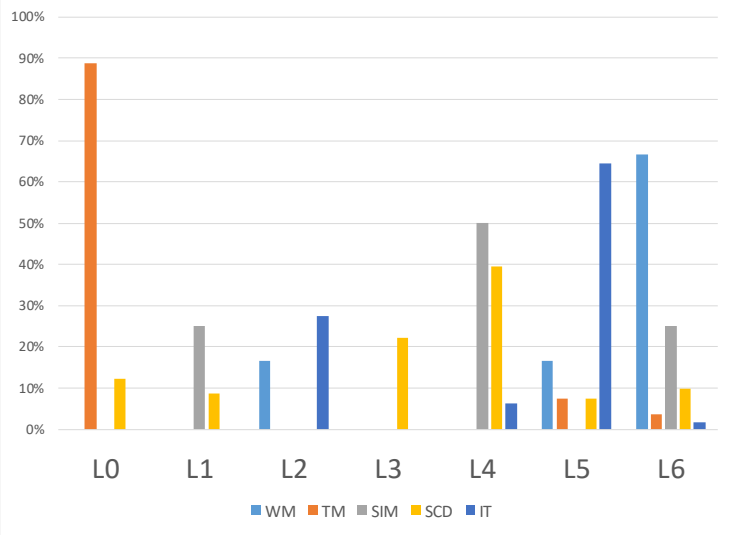

Fig. 10: Logistics maturity in the sector of services related to information and communications.

Enterprises providing services in the field of information and communications, despite the fact that they use means of transport to perform the service, are not mature in terms of logistics, which results from their unaquaintance with the tools used to manage transport. The likely reason for this is the treatment of transport as an auxiliary process to the main process. However, the transport process may affect the quality of services rendered, e.g. their timeliness, costs. Ultimately, the lack of transport management can translate into the level of customer service and their perception of the company as a service provider.

In the area related to warehousing (WM) as well as supply and inventory management (SIM), the surveyed companies achieved levels 5 and 4 of logistics maturity respectively. It should be remembered that these areas do not relate to the storage of service supplies, as it is excluded due to its immateriality, but relate to materials necessary to perform services in the future. From a logistic point of view, this is a satisfactory result. It demonstrates the understanding by service providers in this sector that the availability of materials needed to perform the service translates into the level of customer service, and their lack may result in non-performance of the service or its delay. Due to the lack of proper materials, the service performed may fail to comply with the order, which affects further cooperation with the customer.

In the area of cooperation within supply chains and distribution (SCD), level 4 of logistics maturity dominates. However, it was only achieved by 2 out of 5 surveyed companies. In this sense, the result is not optimistic, especially since service providers operating in the area of information technology are partners in the chains of the supplier playing a role supporting the flow of streams between particular links of the chain. Their support provides access to real data in the supply system links regarding e.g. customer orders, stock levels, availability of transport means. The surveyed companies should therefore increase the effectiveness of cooperation in supply chains in which they function as links.

In the area of using IT solutions related to or dedicated to logistics, companies providing information and communications services achieved 6 - the highest level of logistics maturity. In this area, almost 6 out of 10 surveyed companies reached the level of the digital industrial revolution in logistics - Logistics 4.0, which results from IT solutions used (Fig.6).

Conclusions

Logistics is an inseparable element of every business activity. It may be treated as a key success factor. A large body of research has so far been devoted to logistics in the manufacturing industry. Unfortunately, only a few studies concern logistics in the service industry. The author of this article provided an original model for assessing the level of logistics maturity - LMM4SI. The article presents the results of research on the logistics maturity of enterprises providing information and communications services. Future research should focus on the development of a road map for the described type of industry, taking into account the results of the research presented in this article.

Acknowledgements

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The Political and Military Situation in The Baltic Sea Region at A Time of Bipolar Division of The World

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Abstract

This article provides a political and military analysis of the Baltic Sea region from the end of World War II to the break-up of the Soviet Union. This chapter presents a period called the "Cold War", in which two opposing blocks tried to win an advantage over the enemy. In addition, there is a clear distinction between democratic and undemocratic countries. The chapter describes the purpose and tasks of the military blocks, which were based on specific alliances. Studies on the degree of militarisation of the Baltic Sea region were also presented. An important stage in the work in this chapter was to present the Soviet Union's dialogue with the United States of America AP and the impact it had on the region. The information obtained from the research created a geopolitical picture of the Baltic Sea region during the "Cold War" and became the starting point for research and reflection in the next chapter.

Keywords: Political, Moli Tary, Situation, Baltic Sea, Biopola Division

Introduction

This article presents the period referred to as the "Cold War", in which two opposing blocks tried to win the advantage over the enemy. In addition, there is a clear distinction between democratic and undemocratic countries. The characteristics of the purpose and tasks of the military blocks, which were based on specific alliances, were made.

Author's studies on the degree of militarisation of the Baltic Sea region are presented, as well as the Soviet Union's dialogue with the United States of America and the impact it had on the region. On the basis of the information obtained as a result of the research, a geopolitical picture of the Baltic Sea Region during the "Cold War" period was created and an initiative to conduct further research in this area.

The following were used to achieve this objective.

The military importance of the 20th century Baltic Sea

From a military point of view, the Baltic Sea is considered an inland, semi-enclosed epicontinental sea of the Atlantic Ocean (Encyclopedia of Gazeta Wyborcza, vol. 2, 2007, p. 123). It is located between the Scandinavian Peninsula and the central and eastern part of the European continent. It has a natural connection with the Atlantic Ocean through the North Sea, Skagerrak and the straits: Great and Small Belt, Sund and Kattegat (Będźmirowski, *op. cit*., p. 33). In addition, it has an artificial connection, which allows to shorten the route from the White Sea through the White Sea Canal and to the North Sea - through the Kiel Canal (Mickiewicz, 2012, p. 116).

The advantages of sailing on the Baltic Sea undoubtedly include its geographical dimensions. The short distances between its opposite sides make it possible to cover the route quickly, even under unfavourable weather conditions. On the other hand, short distances can make large ships an easy target for shore-based missile systems and aviation. This is due to the shape of the coastline - especially the Polish coast - which thwarts the silent passage of the ships. Consequently, small ships that are less resistant to ice must be used in combat operations.

The Baltic Sea region is a special kind of area

The Baltic Sea region is a special kind of area. Despite its location outside the main communication routes, the Baltic has been an important area of political and economic relations since the beginning of time (*Ibidem*, p. 5). For centuries, it has been an area of trade and struggle for the rule of its waters. It is from this period that "XV - XVI" originates - initiated by King Sigismund Augustus - the idea: "*dominion of Maris Baltici*". Denmark, Sweden and Poland were all striving for Baltic domination at that time. However, these countries did not focus on political dominance in the region, but on equality of rights: "free navigation, maritime trade and ownership of its own territorial waters" (Mickiewicz, *op. cit*., p. 5).
It is worth noting that, with few exceptions, the hegemony in the Baltic Sea was not associated with the need to exclude the role of other countries.

The departure from a kind of "balance of power" in favour of military blocs resulted in an imbalance of power in Europe, which resulted in the outbreak of the First World War. In 1914, two empires and two kingdoms came into contact in the Baltic region, after the end of warfare and the ratification of the last peace treaties in the south, the situation changed radically (Palmer 2008, p. 326). To the east and south, seven new countries appeared, and the Free City of Gdansk administered by the League of Nations Commissioner. Autocracy is over (*Ibidem*, p. 326). Located in the centre of the events of that time, the Baltic Sea became an area of competition not only for the hegemony in the region, but also for the dominance over the whole world.

The representatives of the USA and Great Britain, considering it realistic and justified to adopt the "Curzon line" as the basis for determining the future Soviet-Polish border, practically agreed to include the liberated Poland in the 2nd zone of influence of the USSR (Fenby 2007, p. 149). Such a decision was undoubtedly influenced by the rapid movement of the Red Army towards Berlin, which worried British Prime Minister Winston Churchill, who tried to protect the largest part of Western Europe from Soviet influence (Będźmirowski 2011, p. 23). In turn, US President Franklin Delano Roosevelta did not protest about the shifting of Poland's borders to the west or about the Baltic States, since his main goal in Tehran was to outline the concept of "Four Police Officers". (See H. Kissinger, *Dyplomacja*, Warsaw 2002, p. 429) for the world (Kissinger 2002, p. 448). Over time, the "Big Three" began to show more and more divergences of interest, and so on plans for the future of Europe, a full agreement was never reached.

The new order was definitely different from the pre-war one. The most important difference was the collapse of the existing balance of power in Europe. The Third Reich ceased to exist, France's defeat lost its former superpower, and Britain, although it emerged victorious from the war, ruined its economy with a five-year war. An economically weak and defenceless Europe has become an area of confrontation between two winning countries: United States and Soviet Union (Mączak 2006, p. 753). The two powers had a completely different view of the creation of a new order. This was reflected in the decisions made in Yalta (4 - 11 February 1945) and later in Potsdam (17 July - 2 August 1945), which divided the world into zones of influence.

Joseph Stalin's assets during the Yalta Conference were unquestionable, while the Western Allies did not have much to offer and needed a lot. Especially the United States, which counted on the Red Army to help end the war in the Far East. Moreover, they believed that obtaining Joseph Stalin for cooperation will be necessary to establish the United Nations (*Ibidem*, p. 130). In return, the West was able to offer

the recognition of Soviet territorial achievements and the allocation of part of the USSR's war booty. Thus, Soviet control over Eastern Europe - except for Poland - was not questioned by the Allies. The division of Europe into spheres of influence, resulting from the agreement of the great three, caused Stalin to obtain the territorial acquisitions he wanted.

The Anglo-Saxon powers have accepted the situation, hoping that the area of influence that has emerged in Europe will be exclusive and not dominant. That's the idea that prevailed in the United States camp. The prevailing view among President Franklin Delano Roosevelt was that after the end of the war with the Soviet Union it would still be possible to live in friendship and cooperate (Holzer, *op. cit*., p. 21). It was hoped that the Soviet influence would have an impact on the international arena of the countries under its control, but it was not thought that it would be deprived of its own internal policies, especially economic and cultural policies. The promises of the Soviet Union that democratic politicians would be able to join the communist government intensified the impression that it would be possible to cooperate with Stalin. That idea, it turned out to be wrong. This was indicated by a note he wrote down - even before the end of the war, at the end of January 1945 - during a meeting with Stalin, the former General Secretary of the Communist International, Bulgarian activist Georgi Dmitrov: "The crisis of capitalism is manifested in the division of capitalists into two factions, fascist and democratic. This is how our alliance with the democratic capitalist faction, which was interested in ending Hitler's reign, came about,because such brutal rule led to the extremes of the working class and consequently to the fall of capitalism. Now we're against the other faction, but in the future we'll be against it too." (*Ibidem* p. 24) The Soviet leader's statement predicted a future Cold War.

The Potsdam Agreement has confirmed the Yalta provisions. The facts were as follows; the borders of the Soviet Union included the territory it reached during the 1939/1940 campaign, plus Zakarpattia Ruthenia; the border with Poland was drawn on the basis of the Curzon line (outlined on the Bug River and east of Bialystok). This meant that the USSR's influence reached as far as the Elbe and Marice territories. Such a zone of influence did not have, even Russia from the times of the Tsarist empire (M¹czak, *op. cit*., p. 748). The outcome of the Potsdam conference was not satisfactory, either party. The division of Europe into East and West was slowly becoming a fact.

The situation was best described by the former British Prime Minister Winston Churchill, who announced the situation on March 5th 1946 during his speech at Westminster College in Fulton (USA, Missouri): "from Szczecin on the Baltic Sea to Trieste on the Adriatic Sea, an iron curtain sank across the continent. Beyond this border lie all the capitals and ancient lands of central and eastern Europe - Warsaw, Berlin, Prague, Vienna, Budapest, Belgrade, Bucharest and Sofia (...) This is certainly not the liberated Europe for which we have fought. (Davies 2005, p. 1134). The Iron Curtain, a British politician became reality after 1947, as a result of three events: the creation of the Communist and Workers' Party Information Office (Kominformu), the communist coup in Prague and the Berlin blockade.

Churchill, during his speech in Fulton, called on the United States to oppose Soviet policy. He thought that they should take decisive steps to this end, he spoke about the "right moment" of such an action, which a few years earlier had not been carried out in relation to Hitler's Germany.

Churchill's speech is widely regarded as the beginning of the "Cold War.

The Cold War grew out of the World War, which explained the confrontation that emerged so quickly after the old one. The post-war arrangement made it impossible to keep the war dinner because there was a security dilemma. As a result, a spiral of mistrust was unleashed, from which it was difficult for even the best-intentioned leaders to break free (Gaddis, *op. cit*., p. 41). The United States and Great Britain wanted to base the order of the post-war world on a balance of power, while respecting certain principles. This was to be achieved through cooperation between the powers, in the form of a new collective security organisation, the United Nations. Moreover, they believed that, thanks to economic integration, of

individual countries, the allegations of conflicts would be eliminated. Therefore, the primary goal of the Americans and the British was to reconcile their own ideals with the territorial claims of the Soviet Union.

Despite pressure on Stalin to allow free elections in the Baltic States and Poland, the leader of the USSR did not respect previous arrangements. The Kremlin's vision was to ensure his own safety, while at the same time fuelling rivalry between capitalist states (*Ibidem*, p. 41). Thus, he confirmed that all that matters is power and influence (Będźmirowski.,s. 23). Both visions turned out to be incompatible.

The first sign of this was the "long telegram" published in February 1946 by the United States Ambassador to Moscow, George Kennan (*Ibidem*, p. 22). The main thesis of the famous telegram was that the foreign policy towards the USSR during the Second World War was completely wrong (Gaddis 2007, p. 32). Kennan emphasized that the issue of cooperation with the USSR is impossible because of the leader Joseph Stalin, who, for the legitimacy of his own power, created a sense of external threat, created by the USA and Great Britain. Divergent goals and the needs of the great powers led to the poisoning of the war order and the subsequent division of Europe.

To sum up, the "Cold War" can be defined as a complex and lengthy process, characterised by states of increased hostility, tension and crises intertwined with states of international relaxation, which, under the influence of factors determining it, ran from one to the other culminating point (Malendowski 2007, p. 11).

The distance between the two blocs - Western and Eastern - was further widened by each of them belonging to supranational military structures: The North Atlantic Alliance (NATO) 1949 and - since 1955. - The Warsaw Pact (UW).

The North Atlantic Treaty itself consisted of 14 articles which set out the most important mutual obligations of the allies, such as: cooperation between Member States, objectives of joint action. Moreover, it has become a pillar of the allied strategy, establishing a new defence framework in the North Atlantic area (Zarychta 2012, p. 43). The most important article of the Treaty is Article 5, which says: "The parties agree that an armed aggression against one or more of them in Europe or North America will be considered an aggression against all of them and therefore agree that if such an aggression occurs, each of them, in the exercise of their right of individual or collective self-defence under Article 51 of the Charter of the United Nations, shall assist the party or parties assaulted (the so-called Musketeer Principle, one for all, all for one)".

Truman's doctrine was initiated by the message of the American President on March 12, 1947.
He proclaimed the United States' engagement against Communist forces in Greece
and Turkey as part of the global fight between democracy and dictatorship. In Greece guerrilla warfare was developing, supported by the communist bases of Yugoslavia and Bulgaria, which were satellites of the USSR. The Kremlin, on the other hand, made territorial demands on Turkey concerning the Bosporus and Dardanelles straits. The USA's interest in these countries was inspired and proposed by Great Britain. In the winter of 1946 to 1947, the British Government informed Washington that it would cease military and financial aid to Greece on 1 April (Kissinger, *op. cit*., p. 493). By that time, 16 thousand British soldiers stayed there and the financial support for the royal government in the years 1945-1946 amounted to about 700 min. dollars (Kukułka, *op. cit*., p. 39). The United States, at London's suggestion, has taken steps to strengthen countries threatened by Soviet aggression.

On March 12th 1947 Truman presented the new principles of American politics by announcing: "United States policy must include assistance to free nations that resist attempts by armed minorities or external pressure to subdue them. (Davies, *op. cit*., p. 1132). The doctrine of the American President has been

defined as "deterrence" consisting in acting with appropriate force whenever the Communists show a desire to violate the interests of a peaceful and stable world (Kissinger 2002, p. 496).

The new strategy was most fully expressed in Truman's doctrine, while the person who developed it, making it an interpretation of national strategy was an American diplomat George F. Kennan (Gaddis, p. 37). At the end of 1948, he presented three main objectives for the creation of international order: "the first was to restore the balance of power by helping to restore self-confidence among the peoples threatened by Soviet expansion; the second was to reduce the Soviet capacity to expand its influence beyond its borders; the third was to modify the Soviet understanding of international relations in order to negotiate an agreement on key issues" (Ibidem, p. 57).

This meant that the United States voluntarily assumed the burden of leadership and defense of every free (non-communist) nation in every corner of the world. The doctrine of suppression was a cornerstone, becoming a permanent principle of the policy of the USA and countries threatened by communism (Zarychta, *op. cit*., p. 45). Thanks to it, Truman strengthened anti-communist and anti-Soviet positions in Western Europe. He has implemented them both in the military and economic fields. The first goal was served by the North Atlantic Alliance, and the second was Marshall's plan to rebuild Europe by means of American supplies and loans.

The introduction by the United States of the Truman doctrine, the Marshall Plan, and later the creation of NATO clearly influenced the fate of Germany. It was decided, above all, by the lack of agreement between the winners of World War II: The USA, the USSR and Great Britain. According to the decisions taken at the Potsdam Conference, Germany was divided into four occupation zones: Eastern-Soviet, North-Western-British, South-Western-American and Central-Western-French. Despite this, there was a consensus among the western countries that Germany should be one. Unfortunately, it turned out to be only a fantasy, and the American-Russian rivalry led to the creation of dividing lines.

On January 1, 1947, Bison was formed from the American and British zones, and on April 8, 1949, it was agreed to include the French zone, which gave rise to Trizonia.

The transformation of the North Atlantic Alliance in relation to the increase in armaments in Europe has led to the initiation of actions aimed at remilitarising Germany. The aim of the great powers was to link Germany more closely to the western countries through rapid militarisation and its introduction into Atlantic structures. Under longer negotiations, a series of agreements were signed on 23 October, which went down in history under the name of the Paris agreements. These included: full German autonomy, the creation of a West German army with 12 divisions, Germany's accession to the North Atlantic Alliance and the creation of the Western European Union (Kukułka, op. cit., p. 41). The Paris agreements entered into force on 5 May 1955, thus making Germany a member of NATO and the Western European Union. This has changed the political and military situation in Europe.

Functioning of the North Atlantic Alliance

Meanwhile, the functioning of the North Atlantic Alliance was subordinate to successive strategic concepts that were adopted and introduced (Ciszek, *op. cit*., p. 131). Since 1952, the concept of a new strategy, described as asymmetric deterrence, began to be promoted in administrative circles - Dwight D. Eisenhower, applying for the presidential seat (Gaddis, p. 179). Its architect was, the future U.S. Secretary of State John Foster Dulles, who pushed for American politics with "more courage". The strategy of asymmetric deterrence, over time, has been described as "mass retaliation". The term was popularized after the famous speech - January 12th 1954 - to the US Foreign Affairs Council, Secretary of State Dulles, who said that: "the only way that free societies are able to deter aggression is for them to react decisively in their own chosen place and with their own choice of means". (Ibidem, p. 203). As a consequence, the strategy was based on US readiness to use nuclear weapons (Ibidem, p. 203). Dulles

himself, in Foreign Affairs magazine, said that the essence of the new strategy is to make the potential aggressor aware, "that he can lose much more than profit from aggression. (Ibidem, p. 207).

The strategy assuming nuclear deterrence, put great emphasis on increasing the number of carriers of this kind of weaponry, both bombers and ballistic missiles based on the Earth's surface (Silence, *op. cit*., p. 132). It should be noted that the Americans did not have a monopoly on this kind of weapon.

At that time there were also major transformations, in the North Atlantic Alliance. It was about building integrated military structures and establishing command bodies (*Ibidem*, p. 131). The adoption of an integrated command structure by the member states resulted in the subordination of individual NATO countries to the Supreme Allied Commander Europe (SACEUR).

At the same time as Western Europe was changing, the central and eastern part of the continent was also changing. The processes taking place in the Western bloc led Moscow to seek institutional structures for integration. The result was a military pact: "the Friendship, Cooperation and Mutual Assistance Agreement" referred to as the Warsaw Pact.

On 14 May 1955, 8 countries signed it in Warsaw: Albania, Bulgaria, Czechoslovakia, the GDR, Poland, Romania, Hungary and the USSR. After its entry into force on 4 June 1955, it was to remain in force for 20 years, assuming that this period may increase to 10 years for member states that have not terminated it by that time (Ślusarczyk 1992, p. 37). It was given the status of a political-military alliance.

The deadline for signing it was not accidental. By decision of the great powers the day after - 15 May 1955 - a state treaty with Austria was to be signed. According to it, the armies of the four powers were to withdraw from Austrian territory and consequently recognise its neutrality. This meant - in accordance with the post-war provisions - that the Soviet troops left Romania and Hungary. The Warsaw Pact justified the need to maintain Soviet troops in the member states (Holzer, op. cit., p. 36).

Officially, the Warsaw Pact was created to defend against the German threat, which according to the signatories increased after Germany's accession to NATO (Jarząbek, 2008, p. 9). Its creation was preceded by a Moscow conference (29 November - 2 December 1954), during which it was assessed that the "Parisian systems" were a threat to a new war in Europe. Formally, the Warsaw Pact, like NATO, was of a defensive nature, as evidenced by Article 4 stating that: "...each State Party to the Agreement shall, in the event of armed aggression in Europe against one or more States Parties to the Agreement (...) provide immediate assistance to the State or States, including the use of force". (Nowak 2011, p. 912). Its main task was to use appropriate means to ensure security and peace in Europe. To this end, the signatories of the pact have committed themselves to basing their policies on the prevention of the threat of the use of force, the settlement of disputes by peaceful means and participation in international conflict prevention projects (Ibidem, p. 912). In fact, the Warsaw Pact served the interests of the Soviet Union, which, through its structures, had political and military control over the member states. This was mentioned in Article 3, which requires consultation on all relevant international matters (*Ibidem*, p. 47).

The development and use of the multilateral structures of the Agreement began only in 1969, when the Committee of Defence Ministers and the Technical Committee and Military Council of the University of Warsaw were established. The Defence Committee of Ministers, meeting twice a year, was a body subordinate to the Soviet General Staff. The sovereignty of the Member States was served by the provision that the Advisory Political Committee (APC) would be the centre of coordination of foreign and international security policy. The statutes of this body stipulated that it would meet twice a year. But the reality was quite different. During the first six years, he gathered only four times (Holzer, *op. cit*., p. 342). The Secretary-General of the Advisory Political Committee was in practice only a technical

official who was responsible for the organisation of meetings of that highest authority. Two standing instances of the Committee: The Commission and the Secretariat are located in Moscow.

The Warsaw Pact was a powerful military force that consisted of: 200 Soviet divisions and 80 member states divisions. As a result of bilateral agreements that the Soviet Union concluded with: In the Polish, Hungarian, Romanian and GDR, his troops were stationed almost all over the eastern block. The largest number of them stayed in the GDR, where until January 1958 there were 425 thousand soldiers (Holzer, *op. cit*., p. 342). According to the "*Agreement between the Polish People's Republic and the government of the USSR on the number, deployment and movements of Soviet troops temporarily stationed in Poland and the mode of entry and exit of Soviet units from and to Poland" of 23 October 1957* (See A. Skrzypek 2005, p. 112), 40,000 ground troops, 17,000 air forces and 7,000 navies were stationed in Poland.

The key factor determining the views of the Soviet military thought was the degree of threat from the NATO naval forces. At the beginning of the 1960s, the North Atlantic Alliance began to introduce the so-called flexible response strategy, which emphasized the acceleration of the development of conventional forces, which were to play not only a defensive role, but also perform offensive tasks (Ciszek, *op. cit*., p. 131). This was mainly due to the unpredictable repercussions of using only nuclear weapons. This meant strengthening the combat readiness and the interaction of command and armament systems of the emerging maritime forces of the United Baltic Fleet (Będźmirowski 2004, p. 40). An example is the operational directive from 1964, introduced in the Polish Army. It specified the following tasks for the Navy of the Polish People's Republic: "participation in combating NATO naval forces and preventing them from operating in the central Baltic Sea; participation in defending the coastline of the People's Republic of Poland together with the National Defence Forces; securing transports with supplies for the coastal front; conducting landing operations together with the coastal front troops; participating in organising the system of base of own and allied forces". (Piwnicki, Zalewski 2002, p. 136).

The introduction by the United States of the strategy of "realistic deterrence" forced the Command of the United Baltic Sea Fleet to set a strict division of tasks for the individual allied fleets sailing on the Baltic (Będźmirowski, p. 44). Detailed operational and tactical plans were developed by the general staffs of the allied armies on their own, but they were characterised by common goals such as: "to dismantle the enemy's naval forces in the Baltic Sea, support the activities carried out by the land forces on the enemy's shore and provide tight cover and defence for the coast, sea bases, ports and shipping routes". (*Ibidem*, p. 45).

The area of the development of the United Baltic Fleet can be divided into the following areas due to the combat activities: Missile submarines - the island of Osmussaar (at the entrance to the Gulf of Finland), the northern part of the Gulf of Riga (under the cover of the southern coast of Sarrema Island, the central part of the North Sea, the central part of the North Sea; classic submarines - Gotska Sandom Island, the central part of Gotland Head and Slupsk Bank and the southern part of Skagerrak; reconnaissance and surveillance vessels - the English Channel area, the area north of the port of Cardiff, west of the entrance to the Skagerrak, the Baltic Straits area, the northern part of the Gotland Deep, between the islands of Gotska Sandom and Sarrema; Ship's surveillance area - Pre-strait zone and approach to ports - Baltiysk, Liepaja, Riga, Tallinn, and Sarrema Island Strait; Ship's Exploration and Impact Group - Pre-strait zone, Gotland Island, northern part of the Gulf of Gdansk, approach to the Gulf of Finland; Nida - Nida - Nemunas estuary and towns: Prochładnoje, Zaliwnoje, Poddubie (Kaliningrad Oblast) (Ibidem, p. 138).

The division of Europe into two military blocs was also connected with the formation of specific forms of subregional integration. This resulted in the creation of transnational structures in the economic sphere. The Eastern Bloc was represented by the Council for Mutual Economic Assistance (GCC) and the Western Bloc by the European Economic Community (EEC).

The GCC was created as a result of the convention signed by the GCC: Bulgaria, Czechoslovakia, Poland, Romania and the Soviet Union in Moscow 5 - 8 January 1949. In the following years they joined the organization: Albania (1949), GDR (1950), Mongolia (1962) and Cuba (1972). The creation of the GCC was the Soviet response to the Marshall Plan, which was treated in Moscow as a tool to "respect the sovereignty of European countries". (Calvocoressi, *op. cit*., p. 316). Its main tasks were: collecting and analysing statistics, exchanging technical information, providing mutual assistance in food, raw materials, machinery and industrial equipment, and promoting bilateral and trilateral trade agreements. The first stage of the Comecon's activity can be described as "building socialism" on Soviet fashion (Davies, *op. cit*., p. 1173). At the end of the fifties, the organisation was revived. As a result of this, she was involved in helping Hungary in 1956. She organised loans to the country and promoted extensive investment, for example through cooperation in electricity distribution and pipeline construction. In the early 1970s, a major document was adopted which contained a long-term plan: "the development of socialist economic integration of the Member States". (Calvocoressi, *op. cit*., p. 325).

The problems of the Comeconvivenza were mainly due to the economic strategy chosen by Moscow. It focused on heavy industry and mining, the cost of agriculture and consumer goods (M¹czak, *op. cit*., p. 768). Since 1950, production for civilian purposes was stopped, allocating the entire growth to military purposes (Holzer, *op. cit*., p. 64). In addition to common interests with the Eastern Bloc countries, some countries were also interested in trading with Western Europe. However, under pressure from the USSR, this was impossible, so it was difficult to make the "big leap" of modernization by cutting off from the world economy. This led mainly to a deepening of economic disproportions between the Eastern and Western Bloc.

Denmark is located in the central part of Europe between the Baltic Sea to the east, the North Sea to the west and the Skagerrak Strait to the north (Szyma, R. Łazarz, P. Ostrowski 2007, p. 34). The area of the country is 43 094 km2 and covers almost the entire Jutland Peninsula and nearby 443 islands, 76 of which are inhabited (Zawadzki, *op. cit*., p. 50). In the period in question, the capital city was and is Copenhagen. Denmark is a constitutional monarchy with two autonomous overseas estates: the Faroe Islands and Greenland.

After the Second World War, Denmark entered the path of political, military and commercial integration with Western European countries. Such decisions were undoubtedly influenced by the fact that despite the neutrality of 1940, the country was attacked and remained under German occupation for the next five years (Froese 2007, p. 299). For this reason, in 1949 Denmark became one of the founders of the North Atlantic Alliance. The accession to the Atlantic security structures has broken with the policy of neutrality, which would have been extremely difficult in the Cold War.

Since 1952, Denmark has been strengthening its relations with the Scandinavian countries: Iceland, Norway and Sweden by setting up the Nordic Council. These countries undertook to develop cooperation: legal, culture and science, social, economic and environmental protection (Piwnicki, Zalewski, *op. cit*., p. 144). The Federal Republic of Germany was founded on 7 September 1949 with its capital in Bonn. Situated in central Europe, it bordered France, Luxembourg, the Netherlands and Belgium to the west; Switzerland and Austria to the south; and Czechoslovakia and the GDR to the east. The area of Germany was 248 717 km2 (Zawadzki, *op. cit*., p. 49). In the analysed period, Germany was a parliamentary democracy, which was formed by numerous federal states, among others: Bavaria, Rhineland-Westphalia and Lower Saxony. Its first president was Theodor Heuss, and the executive power was held by a government headed by Chancellor Konrad Adenauer. The Paris agreements concluded between Germany and the North Atlantic Alliance resulted in the integration of the country into the Atlantic structures. As a member of NATO and the European Economic Community, Germany was the second (after the USSR) power of the Baltic Sea region. Although it had the most powerful impact forces on land, sea and air (Będźmirowski, 2005, p. 14). It was believed that in this way the country was seeking to take over dominance in the North Atlantic Alliance on the European continent. In order to rule the sea in the

western and southern part of the Baltic Sea, a theory of so-called advance defence was developed, according to which the German naval forces were to participate in the maintenance of the Baltic straits. As a consequence of this theory, about 70% of ship forces (all rocket boats and submarines) and the entire maritime aviation (*Ibidem*, p. 14) were called up for probable combat operations in the Baltic Sea. This meant that Germany was looking for its own security in gaining freedom of action in the distant foreground (*Ibidem*, p. 14).

Economic importance of the Baltic Sea Region in Russian security policy

The Baltic Sea region is a specific area at the meeting point of conflicting political interests of East and West, which makes it an object of particular interest for the North Atlantic Alliance and the Russian Federation. Today, it is an important area for maritime transport, trade and the acquisition of both living and non-living resources. Moreover, its strategic importance is enhanced by the presence of the longest offshore gas pipeline in the world - Nord Stream. Direct access to the Baltic Sea is not only a space for economic activity but above all an opportunity to shape the regional political situation, thus influencing the neighbouring countries. In recent years, the economic factor has become an essential tool for achieving political goals in the Baltic region. An example of the practical use of economic methods has become the Russian Federation, which has again started to manifest geopolitical ambitions aimed at gaining a dominant role in the post-Soviet area. The demonstration of strength made by Russia is primarily a large-scale economic pressure exercise aimed at changing the security architecture in the Baltic Sea region. Such activities pose a particular threat to the Baltic States, and in particular to the ports and base area.

The Baltic Sea Region is considered by the Russian Federation to be a classical political and strategic maritime region due to the possibility of shaping the political and military situation in Europe. Such an assumption is connected with the possibility of trade with the countries of the European Union and countries of the American continents such as the United States or Brazil. It should be noted that the key role in the Russian transport strategy is played primarily by Germany, which has a permanent connection with the Russian ports of Ust-Luga, Baltiysk and St. Petersburg . As a result, the port of Rostock handles around 70% of the estimated 7 million tonnes of total freight traffic and the port of Sassnitz-Mukran, with Germany's largest ferry base suitable for handling broad gauge wagons, has a quay allowing 80 wagons to be loaded onto the ferry at the same time. This situation has certain economic consequences in terms of Russian ports dominating the overall traffic around the Gulf of Finland. Apart from the solutions imposing the use of the principles of free navigation in the Baltic Sea, the Russian Federation aims to make this area a key route for oil and gas transport. An example is the North Stream pipeline (Nord Stream) running along the bottom of the Baltic Sea, which marginalises transit countries such as Poland and the Baltic republics. A continuation of this project is the extension of the pipeline by two further lines with a total capacity of 55 bcm of natural gas per year. The project, in which Gazprom is the main shareholder, has primarily a political dimension and concerns the strengthening of Russia's position in the Baltic Sea region, and thus the creation of the so-called 'gas loop', which would facilitate bypassing the gas supplies of Central and Eastern European countries. A similar strategy is followed by the transmission of crude oil through the Baltic Pipeline System BTS-2, connecting Unechia in the Brien region with the port terminal in Ust-Ługa on the Gulf of Finland, which is an alternative to the existing transit routes in the form of the 'Friendship' oil pipeline, leading through Belarus and Poland to Germany. The strategic goal of building the BTS-2, whose route can transmit 50 million tonnes of crude oil per year, is primarily to reduce dependence on the transit of this raw material through Belarus, Poland, Ukraine and the Baltic republics. Russian activity in the field of energy security in the Baltic Sea region focuses on dominating the gas and oil supplies of Central European countries and preventing these countries from creating infrastructure to diversify supplies of both raw materials.

Conclusion

To sum up, until 1991, the USSR was at the head of the Warsaw Pact and the Council for Mutual Economic Assistance, and it had the largest area, population, armed forces and was the only one to possess nuclear weapons, making it a superpower and leader among the countries of the Baltic Sea region.

The next country to be included in the Eastern Bloc in the Baltic Sea region was the People's Republic of Poland. After the Second World War Poland found itself in the sphere of influence of the USSR, which began with the announcement of the Manifesto of the Polish Committee for National Liberation on 22 July 1944. PKWN was transformed by the Provisional Government of the Republic of Poland, and in June 1945, as a result of agreements between representatives of this government and some politicians in exile, the Provisional Government of National Unity was formed. As a result, a political system was created on Polish soil, in which the communist party was the hegemon. This involved a loss of sovereignty through control of the authorities, political parties and the economy. Since 1952, the People's Republic of Poland, as a state aiming at socialism, was defined by the Constitution, modelled on the Soviet one from 1936. According to its principles, the Sejm remained the highest authority, the function of the Head of State was held by the Council of State. The Council of Ministers, appointed by the Sejm and headed by the Prime Minister, was the chief executive and administrative body. However, the real power was held by the Marxist-Leninist Polish United Workers' Party (PZPR). From that moment on, all important decisions were made at meetings of the PZPR political office and discussed with the Soviet embassy.

The Polish People's Republic's membership in the Eastern Bloc was consolidated by its accession to the Comecon Council in 1949 and to the Warsaw Pact in 1955. Poland, being a member of the Warsaw Pact, had to adapt to the Soviet war doctrine. The most important role in the offensive activities of the University of Warsaw was to ensure the march of the Soviet Army to the west of Europe. Moreover, according to the "Plan of the ND's organisational plans for the years 1955 - 1960", one of the tasks entrusted to the Polish Armed Forces was to participate in activities in the northern part of Europe aimed at seizing, among others, Denmark. For this task, the Polish army has separated the sea landing units - the 7th Landing Division, the so-called "Blue Berets" (Piotrowski 2002, p.3).

. The main activities in the field of landing operation were contained in the Operational Directive of 1964. According to it, the Polish Navy was incorporated into the operational troops, separated by the Armed Forces of the People's Republic of Poland into the United States of America (Makowski, 2011, p. 9). Polish naval forces peaked in development and combat capabilities in 1980. At that time, the Polish Navy was part of the Polish Navy: 1 destroyer, 13 rocket launchers, eight torpedo boats, two submarines, 24 minesweepers, five minesweepers, 29 PO raiders (eight large, 21 small), 23 medium-sized landing vessels, 176 auxiliary and special vessels, making up a total of 280 vessels with a total tonnage of 85 256 tonnes'. (Ibidem, p.9).

The People's Republic of Poland had a fourth area and a third population of the Baltic Sea region. In terms of the number of soldiers, Poland with 412,000 (1989) was the third force after the USSR and Germany in the Baltic region.

The last state belonging to the Eastern Bloc in the Baltic Sea region was the German Democratic Republic (GDR). It was established on October 7, 1949, on the area of 108.3 km2 of the former Soviet occupation zone. The capital of the state was East Berlin, separated from West Berlin by the Berlin Wall. The German Socialist Unity Party (SED), governed by the communists, played a dominant role in Germany. The party had full control in all aspects of life: political, economic, cultural, etc.

The first president of the GDR was Wilhelm Pieck and thepost of SED prime minister was filled by social democrat Otto Grotewohl. From 1950, the GDR was a member of the Comecon Council and until 1955 of the Warsaw Pact, which meant that in the analysed period it was a state fully dependent on the Soviet Union. The GDR armed forces in 1989 consisted of 173,000 soldiers. The naval forces consisted of 16,000 sailors and were equipped: 19 frigates, 38 patrol and small rocket ships, 42 mine fighting ships, 12 landing ships, 15 support ships (The Military Balance 1990, *op. cit*., p. 124 - 127, 212 -224).

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The Military Balance 1990

Management of International Dialogue and Its Impact on The Security of The Baltic Sea Region

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Abstract

This article indicates the management of international dialogue and its impact on the security of the Baltic Sea Region. The new military situation in the world was pointed out, forcing the Command of the United Baltic Fleet to create a new war strategy assuming that in the event of armed conflict the fleets of the socialist dinner states will carry out combat tasks in the Baltic Sea, in close cooperation with the USSR Baltic Fleet and the land forces. The issue of disarmament was raised at a conference in Geneva. The political changes in Central and Eastern Europe and the phases of the process to achieve independence in the Baltic States were also pointed out. In order to achieve the assumed objectives, domestic and foreign literature was analysed. Its purpose is to assess the political, military and economic changes that have taken place in the Baltic Sea region as a result of the break-up of the Soviet Union. These events have influenced the new situation in the Baltic Sea region. The most important player on the political scene was the United States. The Baltic Sea states have reduced their armies. This resulted in a state of stability in the region. The security of the Baltic States and the whole region increased.

Keywords: Bipolarity, European Order, Monopoly, Weapons, Military Situation, Baltic Sea.

Introduction

The bipolarity shaping the post-war European order caused a clash of opposing visions between the victorious powers, one of which (the U.S.) has had nuclear weapons at its disposal since 1945 (Mączak, *op. cit*., p. 754). The United States - having a monopoly on weapons that can change the fate of the world, and being a financial power - was not able to separate the USSR from the domination of Central and Eastern Europe together with Western countries. It involved a specific understanding of security by Americans. They assumed that security imposes openness on the world, including an open Eastern Europe (Holzer, *op. cit*., p. 62). To put the issue in this way indicated that they would not destroy Moscow and Leningrad with atomic bombs. It was enough for Americans to feel like having a nuclear boron, tested in August 1945 against Japan. The Soviet Union, on the other hand, despite the fact that it had a great deal of conventional forces on the old continent, could not base its security guarantees on the grace of the United States (Calvocoressi, *op. cit*., p. 20).

This extremely frustrating situation for the USSR has accelerated work on the construction of Soviet nuclear weapons. The efforts were successfully completed in 1949[1].
The USSR's mastery of nuclear weapons production has resulted in the achievement of nuclear balance on the European continent and the aggravation of the Cold War. It should be noted, however,

[1] The explosion of the first Soviet atomic bomb took place in September 1949 on a training ground in New Earth

that the atomic power of the United States was definitely superior to the Soviet one, as evidenced by the following data: "The US in 1948 50, 1952 841, 1955 2,000 and 1962 28,000 atomic bombs, while the Soviet Union in 1950 only 5, in the late 1950s 1700 bombs". (Judt*, op. cit*., p. 294).

Between 1952 and 1953 the United States and the Soviet Union carried out the first tests with fusion and hydrogen bombs2. In addition, both countries have worked hard to produce means of transporting the heads. In the context of the Baltic Sea, it is noteworthy that the USSR, like the United States, had first-rate military units of various components of its armed forces in the area. This meant that a possible armed conflict in the area could turn into a nuclear war.

The emergence of nuclear and missile weapons caused significant changes in the implementation of operations and combat activities at sea (Będźmirowski, Polish Navy, p. 44). The military theorists of the North Atlantic Alliance had doubts about the tasks of the fleet in a nuclear war, asking themselves: *Is it supposed to destroy the enemy, or to gain dominion over the water, risking the enemy destroying it faster (Ibidem,* p. 43). Admiral Sergei Gorshkov had a different opinion about it: "*such a category of the art of naval warfare as the conquest of the sea still retains its relevance and therefore studying it in all its aspects from the point of view of its application to the present day is one of the most important tasks of war science*". (*Ibidem,* p. 43).

The new military situation in the world

The new military situation in the world has forced the Command of the United Baltic Fleet to create a new war strategy assuming that, in the event of armed conflict, the fleets of the socialist dinner states will carry out combat tasks in the Baltic Sea, in close cooperation with the USSR Baltic Fleet and the land forces (Ibidem, p.43). In addition, the approved strategy assumed that the main tasks of the fleet would be: "actions against the enemy fleet and coastline" (Ibidem, p.43).
The development of military potential through the imposition of an arms race has resulted in the need for an agreement on the reduction of armed forces between the two superpowers3.
The issue of disarmament was raised at a conference in Geneva (18-23 July 1955). During the meeting, the Soviet Union put forward an initiative for a pan-European collective security pact in Europe. This was linked to the demand that "no member of the Big Four will use atomic or hydrogen weapons first against any country". (Cuckoo, op. cit., p. 82). The United States has requested the establishment of a system of inspections involving the taking of aerial photographs on both sides. At the time of the Geneva Conference, the issue of disarmament imposed a fundamental question: "to what extent should an arms limitation be carried out, total or only to a certain extent? The deliberations did not bring about any agreement because the Western powers wanted the arms restriction zone - which was also the dividing line between East and West - to run on the Oder and Lusatian Neisse, and not on the Elbe.
The main problem in reaching a consensus was the issue of inspection and verification. It was natural for Western countries that the checks had to take place on the spot. The government of the USSR, on the other hand, thought completely different. The Russians were primarily afraid that after such a visit their arsenals of weapons would be destroyed4. Inspectors who carry out inspections were often taken as spies. This lack of mutual trust was extremely dangerous and could lead to a nuclear attack5.

[2] The first hydrogen bomb test was carried out by the USSR on 12 August 1953.
16 April 1953 Dwight Eisenhower, the then President of the United States of America, in a speech to the American press, raised the issue of disarmament talks. This happened in spite of the current doctrine of liberation, which was to expand the sphere of influence on the countries under Soviet tutelage and push socialism to the borders of the Soviet Union. It showed that the American administration saw the risk of world war. See J. Kukułka, *Historia współczesna stosunków międzynarodowych 1945 - 2000*, Warsaw 2007, p. 80.

[4] Until one point in the USSR, it only allowed the control of weapons for destruction
[5] In spring 1961, the US administration withdrew its demands for on-site inspections.

The breakthrough of the nuclear poate took place in the autumn of 1961. At the UN General Assembly, negotiators McCloy (USA) and Zorin (USSR) opened a new stage in the negotiations. It was intended to eliminate all arsenals and means of delivery of weapons of mass destruction from international life and to settle disputes in accordance with the United Nations Charter6. A joint statement by McCloy and Zorin outlined a vision of Europe without an arms race.

On 1st July 1968 in order to maintain the status quo within the nuclear hierarchy, the USA, the USSR and the UK concluded the Non-Proliferation Treaty (NPT). Other countries were also invited to participate: Germany signed the agreement with big objections, while France and China did not agree to sign it. The political atmosphere, after the initialling of the NPT, began to foster further agreements between the USA and the USSR. As a result, both countries have expressed their willingness to initiate a Strategic Armaments Limitation Talks (SALT) dialogue7. Negotiations were launched on 17 November 1969 in Helsinki, and over time have developed into long and arduous negotiations. The results had to wait until April 1972, when the Bacteriological Weapons Ban Treaty was signed. The proper signing of SALT I took place on 25 May 1972 in Moscow. It was a temporary agreement on certain measures to reduce strategic offensive armaments8. It was to be in force for 5 years and obliged the signatories not to start building permanent ground-based Intercontinental Ballistic Missiles (ICBM) launchers, as well as old launchers from before 1964. - were not to be replaced by new ones, and the number of ballistic missile launchers from submarines was to be limited (Kukułka, op. cit., p. 183).
The recapitulation of SALT I was the signing of an agreement on the reduction of anti-missile defence systems Anti-Ballistic Missiles System - ABM, also in Moscow. The signatories have concluded it for an indefinite period of time, with the indication that it will be reviewed every 5 years. On this basis, the USSR and the US have committed themselves to maintaining only two ABM systems. It was a decisive stoppage of the race, as both powers were planning to expand them9.

The signing of SALT I and ABM has contributed to improving relations between the two blocks. This thesis was confirmed by the signing of an agreement on the basis of mutual relations between the USSR and the USA. SALT I also proved to be an important stimulus towards a policy of relaxation, called from the French language - détente. The word detente, used in the international relations of the 1970s, meant "reduction of tension" between the Eastern and Western Bloc (Davies, op. cit., p. 1189). The policy of relaxation - associated with the presidency of Richard Nixon - was aimed at making cooperation an instrument to influence the actions of the USSR in areas where the two powers could not agree.

In the Baltic Sea region as well as in Europe as a whole, the road to an "era of relaxation" was opened by the appearance of Willy Brandton the political scene. This German politician, and since 1969 the German Chancellor, came out with a bold thesis assuming a rapprochement to the Eastern Bloc for those times (Kissinger, op. cit., p. 808). He believed that since the attempts to unify Germany with the help of the West did not bring results, the unification should be pursued by normalising relations with the Warsaw Pact countries. Brandt's proposed Eastern policy (from German Ostpolitik) quickly began to be successful.

On 12 August 1970 in Moscow, an agreement between Germany and the USSR was signed. The aim was to improve relations between the two countries, and to work together to promote peace and security in Europe. The most important provision concerned the recognition of the status quo on the continent and Germany's resignation from its revisionist territorial inclinations towards Poland (Kukułka, op. cit., p. 192).

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[6] J. Cuckoo, *op. cit*., p. 136.
[7] Strategic weapons include missiles or bombs (on board long-range aircrafts, launched from submarines or launchers on land) which, when fired from their own territory, can reach targets lying on enemy territory.
[8] On 25 May 1972 a bilateral agreement on the prevention of incidents in the open sea was signed at SALT I for the safety of navigation of warships and military aircraft.
[9] For example, the US to 12.

The Moscow Agreement led to the signing of an agreement between the People's Republic of Poland and Germany in December 197010. Both sides declared that the inviolability of borders and respect for the borders of all countries is an essential condition for preserving world peace. The key provision of the agreement was Article 1 confirming that the border on the Oder and Lusatian Neisse is legal and inviolable now and in the future (ukułka, op. cit., p. 192).

The Moscow and Warsaw systems became an introduction to the main goal of Ostpolitik, which was: "to halt the growing sense of alienation among the population of divided Germany." (Holzer, op. cit., p. 538). The prelude was to be a solution to the West Berlin question11. The agreement of 3 September 1971 regulated its status. The USSR recognised the sovereignty of the four powers in western Berlin - established after World War II - which confirmed the existence of a separate unit in the western part of the city. Furthermore, the agreement set out the obligations of the USSR to respect the freedom of transit of persons and goods from Germany to Berlin. The consensus reached showed that great powers can solve the tensions at the junction of two blocks.

The deadlock in German relations was broken by the signing of the Basic Agreement on 21 December 1972 in Berlin on the foundations of relations between the GDR and Germany[12]. The problem of Germany has not been solved, the Iron Curtain continued to divide the two countries, but relations between them have been regulated and contacts between them have increased in economic, cultural, scientific, technical and sports fields. Following the signing of the agreement in Berlin by the GDR and Germany, both governments exchanged notes in which they announced that they were applying for admission to the UN. This took place on 21 June 1973.

The agreements signed by the Federal Republic of Germany with the USSR, Poland and the USSR put the past in order. First of all, there was the recognition of the territorial reality in Europe and the normalisation of relations between Bonn and the Warsaw Pact countries (Wolle 2003, p. 83). This meant that *Ostpolitik* achieved success by easing the confrontation between East and West.

Standardisation of relations between the two German states

The normalisation of relations between the two German states has helped to strengthen the *détente* policy. Its most famous manifestation was the convening of the Conference on Cooperation and Security in Europe (CSCE) in Helsinki in July 1973. The meeting was initiated by the Soviet Union, whose aim was to approve the post-war borders in Europe[13]. The second intention was a security issue - "the number and deployment of military bases and the level of the armed forces". (Calvocoressi, *op. cit*., p. 76).

The second stage of the CSCE taking place in Geneva (18 September 1973 - 21 July 1975) was important because of the appearance of the so-called 'third basket'. It contained provisions on humanitarian cooperation and in other areas, such as respect for human rights and fundamental freedoms. For the Eastern Bloc countries, this meant that they would have to choose between respecting the rights of their citizens and the risk of exposing the act of breaking their own serious decrees.

Phase III of the CSCE in Helsinki, ended with the signature on 1 August 1975. The Final Act. The Helsinki Final Act of the CSCE was the greatest achievement of the relaxing policy. From the point of view of the USSR, the success was not unequivocal; on the one hand, it sanctioned the Soviet

[10] The ceremonial signing by the Prime Minister of the People's Republic of Poland Józef Cyrankiewicz and German Chancellor Willy Brandt took place in Warsaw on 7 December 1970.

[11] As a result of the second Berlin crisis, from 13 August 1961, Berlin was divided by a wall, which was the border between the West and the East.

[12] The agreement was signed by the secretaries of state Michael Kohl (GDR) and Egon Bahr (FRG), considered the architect of *Ostpolitik*.

[13] The borders of the Soviet Union were not ratified by any peace conference after World War II.

gains from the Second World War. On the other hand, the signing of human rights concessions by the Russian delegation has resulted in support for the organised opposition throughout the Eastern bloc[14].

The establishment of the CSCE - where aspects of peaceful coexistence were considered - led to the continuation of the relaxation dialogue as a prelude to further disarmament negotiations.

According to the provisions of SALT I, it was to be continued. The SALT II negotiations were aimed at addressing all the issues that have been omitted so far. The negotiations started in Geneva on 21 July 1972 were not easy, due to their very complex content. In addition, discrepancies quickly emerged regarding the different perceptions of security by the two blocks. The dispute concerned mainly the *Multiple Independently Targetable Re - entry Vehicle (*MIRV) (Calvocoressi, *op. cit*., p. 58). In the initial phase of the negotiations, the United States did not want them to be included in the agreement, which was influenced by the fact that they had an advantage in them[15]. The conversations have been dragging on for years and have not been successful. Further negotiations were hampered by another dispute, this time over *Cruise Missiles'* self-steering *missiles*, in which the US again had an advantage. The breakthrough came on June 18, 1979, during the meeting of the First Secretary General of the Communist Party of the Soviet Union, Leonid Brezhnev, with US President Jimmy Carter in Vienna. The leaders of both countries signed the "Strategic Offensive Arms Reduction Agreement" - SALT II. It limited the launchers of: nuclear rockets to 2400, battalion rockets to 1200, and multi-headed independent guidance rockets to 820 (Cuckoo, *op. cit*., p. 186). SALT II has raised hopes for an acceleration of the process of relaxation between the two blocks and for the positive development of the Vienna negotiations for the reduction of the armed forces in Central Europe[16].

The Vienna Disarmament Prognosis

The Vienna disarmament negotiations began on 30 October 1973 with the aim of reducing armaments
in Europe[17]. The Warsaw Pact countries have presented a project involving a "symmetrical reduction" of the armed forces based on the assumption that there is a balance between the two blocks in Central Europe.
In 1975, 20,000 soldiers from each side were to be reduced. The Western countries had a completely different view of this issue. Instead of "symmetrical reduction", they proposed an "asymmetry of reduction" to reduce 2.5 times more Soviet forces than the U.S., explaining this by the numerical superiority of Soviet troops (Kukułka, *op. cit*., p. 200). The first projects outlined showed the dissonance between NATO and the Warsaw Pact countries, which cast a shadow over further Viennese negotiations.
The deadlock in the discussion on the reduction of the armed forces had its causes in the political situation that took place after the end of the seventies. The year 1979 brought two important events that influenced further relations between East and West. The first was the entry of Soviet troops into Afghanistan, the second was the Iranian Islamic revolution. Conflicts in the Middle East have met with a strong response from the United States. The announcement of a new political doctrine by President Jimmy Carterwas an example of this. It assumed immediate US military intervention for any attempt to restrict access to the Gulf (Mączak, *op. cit*., p. 788). For the countries of the Baltic Sea region and the world at large, this has meant that the *détente* policy has given way to a return to the Cold War concept.

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[14] Since then, the Helsinki Final Act has been referred to, among others, by the Polish Workers' Defence Committee (KOR), established in response to the brutal suppression of protests in Radom and Ursus in June 1976, and by the very name of the "third basket" of the Human and Citizen's Rights Defense Movement (ROPCiO)

[15] In 1972 the US had 1710 missiles capable of reaching 3350 targets, the number of which was to rise to 7000 as a result of the MIRV missile upgrade

[16] SALT II was not finally ratified by President Jimmy Carter, who suspended the whole process in the Senate on 3 January 1980 for electoral reasons.

[17] The Vienna negotiations were preceded by a preparatory consultation on the MBFR (Mutual and Balanced Force Reductions) which took place in Vienna in 1973: Germany, the GDR and the PRL.

Inter-Block Arms Race

Carter's successor, Ronald Reagan, continued his return to the interlocking arms race. From the very beginning, Reagan's policy was conducted "from a position of strength". It was supposed to cause nuclear anxiety in the USSR by making it aware of the risks of further expansion (Kissinger, *op. cit*., p. 846). Unlike his predecessors, Ronald Reagan did not hesitate to define the Soviet Union as the "Evil Empire" and pursue the goal of victory in the Cold War (Burakowski, A. Gubrynowicz, P. Ukielski, *op. cit*., p. 24). Time has shown that this rhetoric was at the heart of an unprecedented East-West dialogue.

In 1983, the U.S. administration decided to introduce the *Strategic Defense Initiative* (SDI) into Europe under NATO[18]. The idea of "Star Wars" announced by Reagan heralded a strategic breakthrough in which nuclear weapons would lose all power. In addition, the SDI was intended to lead to a poly-strategic restructuring that would prove to be a nail in the coffin of the Soviet economy[19]. She realized to the USSR that a further arms race would either consume all her resources or end up with the United States winning (Kissinger, *op. cit*., p. 856).

The prospect of profound reforms in the USSR and a relaxed relationship between the two blocs was created by the new head of the Communist Party of the Soviet Union, Mikhail Gorbachev. He was a dynamic politician, the youngest of the management to date (54 years old), aware of the overwhelming stagnation. As a proponent of profound reforms, Gorbachev based his programme on two elements: *perestroika*, i.e. reconstruction, and *glasnost*, i.e. political liberalisation (Kissinger, *op. cit*., p. 876).

The new leader of the USSR has been paying tribute to the efforts to end the Cold War by limiting its most dangerous manifestations and effects: "an arms race, ideologizing and militarizing international relations, promoting stereotypes of images of the enemy, conducting confrontational politics". (Cuckoo, *op. cit*., p. 374). The reorientation of the foreign policy of the USSR, through the creation of subsequent peace and disarmament initiatives, had its resonance in the resumption of Soviet-American talks. The most important manifestation of this was the Geneva summit meeting of Gorbachev-Reagan on 19-20 November 1986.

It was an important stage on the road to global relaxation between East and West. Both leaders stressed that a nuclear war should never happen and there should be no winners (Cuckoo, *op. cit*., p. 268). Both sides declared to make every effort to bring about a positive conclusion to the Stockholm Conference on confidence-building measures and security in Europe at that time.

The Stockholm Conference began on 17 January 1984 at the level of foreign ministers and was a continuation of the disarmament talks in Geneva and Vienna (See J. Kukułka, op. cit., p. 517). The "diplomacy of concessions" began to operate during the meeting, especially in the field of the activities of the maritime and land and air forces. After long and difficult negotiations, an extensive document of *the Stockholm Conference* was adopted in which mutual notification of military manoeuvres of the Warsaw Pact and NATO was established.

The success of the Stockholm Conference

The success of the Stockholm conference was facilitated by the organisation of the next summit meeting with Reagan and Gorbachevin Reykjavik, the capital of Iceland (Gaddis, *op. cit*., p. 268). During the negotiations, Gorbachev presented a proposal to halve the reduction of Soviet and

[18] Ronald Reagan presented his strategic defensive initiative in a television message to the nation on 23 March 1983.

[19] For the period 1984-1989, the SDI program has an expenditure of $25 billion. Overall, it was to last until 2000 and be $125 billion.

American strategic arsenals during the first 5 years. It was basically an acceptance of the American "zero option"[20].

In exchange for concessions, the USSR leader demanded that the U.S. comply with the missile defense agreement for the next ten years, conducting SDI tests only in laboratories (Gaddis, *op. cit*., p. 268).

The resignation from the SDI was unacceptable to Reagan, who ended the summit due to disagreement.

In spite of this, Reykjavik was not a testimony of defeat, and according to Gorbachev it turned out to be:

"a breakthrough that allowed us to look beyond the horizon for the first time." (*Ibidem*, p. 269). Such a statement meant that the USSR and the USA, however, had a common interest in the elimination of nuclear weapons.

Discussions on the control of armaments throughout Europe - since 1986 through the Warsaw Pact - were held at the CSCE forum. The aftermath was the opening of new negotiations in Vienna on the reduction of conventional arms in the Old Continent. During the second round of negotiations in July 1989, there was a breakthrough in the deliberations, which made it possible to draw up the final document. As a result, on 19th November 1990 the *Treaty on Conventional Armed Forces in Europe (*CFE) was signed. It assumed the implementation of five processes, which included: the principles of calculating conventional military equipment and equipment and ways of achieving these ceilings (Mickiewicz, 2005, p. 16)[21]. At the same time, standards and a timetable for the elimination of surplus equipment, methods for observing the reduction process by individual countries and the implementation of stabilisation measures were agreed (*Ibidem*, p. 16). In fact, the Treaty implied restrictions on military equipment in five categories. The signing of the CFE by 22 signatories (sixteen NATO countries and six Warsaw Pact, already without the GDR) meant the renunciation of hostility by both military blocks. This was followed by a declaration that the "era of division and confrontation in Europe" has come to an end (Cuckoo, *op. cit*., p. 384). She also said that from now on both military blocks would not treat themselves as opponents, but more as partners and friends. Such a statement allows us to conclude that the "Cold War" is over.

The end of the Iron Curtain

The end of the "Iron Curtain" started the disintegration of the communist system in Central and Eastern Europe. There were many reasons for this. The Soviet Union's erroneous interpretation of the situation of the world after World War II should be taken first (Pietkiewicz 2007, p. 80). The vision of building a unipolar system of world communism with a decision-making centre in Moscow proved to be a utopia (*Ibidem*, p. 80). The leadership of the USSR recalculated with forces, assuming a rapid collapse of capitalism. This caused the Eastern Bloc countries to stand out more and more over time: economically, technologically and militarily (*Ibidem*, p. 80).

The arms industry slowly demolished the Soviet economy. It absorbed 20 - 25% of the gross domestic product, while in the USA it was 6.5% (*Ibidem*, p. 80). In total, between 1970 and 1990, the Soviet Union spent 700 billion rubles on armaments. Becoming a world market leader among manufacturers of: tanks, artillery, combat aircraft, helicopters, submarines etc. Spending astronomical sums on the military was at the expense of civilian production. The management has allocated funds previously reserved for the engineering industry and science. To sum up, the growing militarised economy has weakened the country instead of strengthening its defence.

[20] It was about the complete elimination of medium-range missiles of the USSR and the USA.
[21] P. Mickiewicz 2005, p. 16.

As a result of a roundtable compromise between the Polish United Workers' Party (PZPR) and the Solidarity opposition, on 4 June 1989, partially free elections to the Sejm and completely free elections to the Senate took place (Burakowski, Gubrynowicz, Ukielski, op. cit., p. 37). The victory of Solidarity resulted in the first non-communist government in the Eastern Bloc in September22. Poland, being the leader of political changes, has paved the way for events in Central Europe, which have been named the Autumn of Nations.

Position of the Soviet Union

The Soviet Union's position was initially reluctant to consolidate the German state. This was expressed by the USSR Foreign Minister Eduard Shevardnadze, who believed that at the beginning it was necessary to create political guarantees that reunification would not pose a threat to other countries and to Europe as a whole. The Soviet diplomat brought the military issues of the new Germany to the forefront and their position towards the allied forces on German territory (Kukułka, *op. cit*., p. 171). Moreover, the Soviet side feared that German reunification would strengthen NATO and at the same time weaken its state.

The position of the USSR changed after Helmut Kohl's visit to Moscow (10-12 February 1990). During the meeting Gorbachev assured the German Chancellor that it is the German side that must decide when and under what conditions it will unite. Despite this, Russian diplomacy maintained its opposition to the future of Germany being part of NATO. The breakthrough came during another conversation between Gorbachev and Kohl, 15-16 July 1990 in Stawropol in the Caucasus. As a result, Gorbachev agreed to the unification and withdrawal of Soviet troops from the GDR and that Germany itself should decide on its attitude towards NATO (Holzer, *op. cit*., p. 832).

The four powers had the opportunity to present their ideas on Germany through "2+4" talks. The idea was born during the open space conference on 13 February 1990 in Ottawa. The "2+4" formula consisted of discussions, two German states with four powers - France, Great Britain, the USA and the USSR. The Polish side also took part in the Parisian talks. The Polish government wanted to regulate the problem, the Polish-German border on the Oder and Nysa rivers. During the Paris round of "2+4", the Polish voice was heard and, as a consequence, the minutes containing the statement that: "the borders of the united Germany will be final, which cannot be challenged by any external events or circumstances" (Praise, *op. cit*., p. 128).

Before the next "2+4" meeting, on August 23, 1990, the GDR People's House of Representatives passed a resolution on the GDR's accession to Germany (*Ibidem*, p. 126). The unification agreement between the two German states was signed on 31 August 1990. The new German Chancellor was Helmut Kohl.

The decisive settlement of the German case ended with the signing of the "Agreement on the Final Settlement of the German Question" during the fourth round of the "2+4" negotiations in Moscow on September 12, 1990. The adopted document established that Germany would be a sovereign state, which could have up to 370,000 conventional forces and belong to the North Atlantic Alliance (Kukułka, *op. cit.*, p. 388). In addition, it was decided that Soviet troops would leave the territory of the former GDR and Berlin within four years (Parzymies, *op. cit*., p. 173). The agreement also clarified disarmament issues, thus the German government committed itself not to have nuclear, biological and chemical boron.

[22] The "Solidarity" was won in June 1989. 161 seats out of 161 possible to win in the elections to the Sejm (the agreement between the PZPR and the opposition assumed that only 35% of the seats could be won in free elections) and 99 out of 100 seats to the Senate (free and democratic elections).

Political changes in Central and Eastern Europe

As a result of political changes in Central and Eastern Europe, the sense of the existence of political and military blocs has been undermined. The matter of the Warsaw Pact, the main instrument of political and military domination in the Eastern Bloc, came to the fore (Parzymies, *op. cit.*, p. 166). In June 1990, at the request of the Member States, a Commission of Government Plenipotentiaries for the revision of the Warsaw Pact was established. Following three meetings of plenipotentiaries, it was agreed that most of the political and military structures of the Warsaw Pact would be liquidated, except for the consultative bodies (Kukułka, *op. cit.*, p. 451). These reforms were to be implemented in the first half of 1991. The course of events was accelerated due to the GDR's withdrawal from the Warsaw Pact on 24 September 1990.

A meeting of the foreign ministers of the UW member states was held on 25 February in Budapest. It turned out to be a breakthrough, as it established a common position on the liquidation of UW military structures by 1 July 1991 (Strzelczyk 2002 p. 183). On the basis of these arrangements, the political structures of the Warsaw Pact were dissolved at the meeting of the Political Advisory Committee in Prague on 1 July 1991. The protocol was initialled there, saying: "on the loss of power of the Friendship, Cooperation and Mutual Assistance Agreement of May 1955" and the document extending its duration of April 1985 (Kukułka, *op. cit*., p. 451).

In November 1991, during the meeting of sixteen NATO member states in Rome, a new strategic concept on peace and cooperation was announced (Zarychta, *op. cit*., p. 97). The new concept emphasized the defensive character of NATO, the collective defence and indivisibility of the allies' security. Moreover, at the meeting it was assumed that the threat of an attack from Eastern European countries, gave way to multi-faceted and multi-directional threats (*Ibidem*, p. 97). The establishment of the North Atlantic Cooperation Council (NACC), the NACC was a forum for consultation and dialogue between NATO countries and the former Warsaw Pact member states. The future tasks of the Alliance with the countries of Central and Eastern Europe were defined by the Rome Declaration, which said that the Alliance would maintain its defensive character and that its policy would be based on: dialogue, cooperation and common defence (*Ibidem*, p. 97). Moreover, the Declaration emphasised NATO's active support for the development of the CSCE and support for reforms in Eastern Europe. An important element of the new strategy were changes in the military field, which included: improving their readiness and flexibility; reducing the number of troops and dependence on nuclear weapons; and changing the integrated NATO armed forces (*Ibidem*, p. 97).

The second pillar of the Eastern Bloc that was falling apart was the Mutual Economic Assistance Council. The main reason was the collapse of trade between the Soviet Union and the satellite states in early 1991. This led to an intensification of the economic crisis and increased unemployment (Kukułka, *op. cit*., p. 452). The problem was further exacerbated by the impossibility to carry out transactions in transfer roubles, - between GCC members - and settlements in dollars were too expensive. Neither did the GCC's attempts to transform it into a market-oriented organisation help. The project put forward by the Executive Committee at its meeting in Moscow on 4-5 January 1991 assumed the establishment of the International Organisation for Economic Cooperation, which was to include the former members of the GCC, Yugoslavia and Germany. The organisation was to be open to integration with the western economy by focusing on consultative and advisory activities, not decision-making.

Phases of the process to achieve autonomy for the Baltic States

However, the deepening recession in Central and Eastern Europe caused a delegation of GCC member states to decide on 28 June 1991, six months after the meeting in Moscow, to cease its activities. According to the protocol signed there, the Comeconry Embassy was to cease to exist ninety days after it was signed (Parzymies, *op. cit*., p. 168).

Since the end of 1987, political national movements have become apparent in Estonia. They put forward demands demanding changes to the USSR Constitution. Protest actions were also held under

ecological and economic slogans. In a wave of thaw in 1988, the ban on the use of the historical national flag was lifted and a year later, Estonian became the official language.

Lithuania woke up from among the Baltic States at the latest. The first demonstrations in this country took place on the fiftieth anniversary of the Molotov-RibbentropPact. About two million Lithuanians, Latvians and Estonians took part in the protests. Relatively late opposition appearances in Lithuania intensified in subsequent demonstrations in 1988, and in July 1989 the leading politician of the Lithuanian Movement for Reconstruction (Sajudis) Kazimir Prunskieneentered the government as Deputy Prime Minister.

The next phase of the process towards independence for the Baltic States was the proclamation of independence by individual republics. On 11 March 1990 it was announced by the Supreme Council of Lithuania, on 30 March 1990 by Estonia and on 4 May 1990 by Latvia[23]. The declaration of independence by the Baltic republics meant leaving the Soviet Union. This met with opposition from President Mikhail Gorbachev, elected on March 15, 1990. This resulted in an attack by Soviet tankers and KGB (State Security Committee) units on the parliament in Vilnius. Despite this, the action failed, and Gorbachev, fearing for his authority in the west, ordered to stop the military action.

Gorbachev wants to maintain the existence of the Soviet Union, he had to decide on reforms. They were to consist in changing the structure of the state from formally federative to actual federation (Holzer, *op. cit*., p. 842). The prologue for these reforms was to hold a referendum on 17th March 1991 in which the people were to say whether they wanted a federal and sovereign state. As a result of a poll, six republics refused to participate in the federation: Lithuania, Latvia, Estonia, Moldova, Armenia and Georgia[24].

The failed coup has accelerated the decomposition of the Soviet empire. Boris Yeltsin came out of this confrontation victorious. Mainly because of the weaknesses and internal conflicts in the putsch camp, and not because of their own strength. Despite this, he became a hero of Russia, which resulted in the marginalisation of the role of Gorbachev, who resigned from the office of President of the USSR on 24 August 1991. From that moment on, Yeltsin could have acted faster and more efficiently, As a result, on 28 August 1991, he ordered the dissolution and banning of the Communist Party of the Soviet Union.

The last act of liquidation of the Soviet Union took place on December 21, 1991 in Almaty, Kazakhstan. The Additional Protocol to the Belarus Agreement on the creation of the CIS was signed there by 11 republics. The meeting established that the Community "is not a State or a supranational formation". (Ibidem, p. 454). In addition, there were more substantive discussions on military and economic issues.

It was decided to preserve the united command of strategic forces, to maintain uniform control over nuclear weapons and to stop the common economic area (Holzer, *op. cit*., p. 848).

The CIS uprising was considered equivalent to the dismantling of the Soviet Union. The former president Mikhail Gorbachev handed Boris Yeltsin over to the USSR president. At the meeting of heads of state - members of the CIS on December 30, 1991 in Minsk, the agreement of Białowieża and Almaty was ratified. The final announcement of the liquidation of the Soviet Union has become a fact.

[23] In addition to the Baltic States, they opted for independence: Ukraine, Belarus, Moldova, Uzbekistan, Turkmenistan, Tajikistan, Azerbaijan, Kazakhstan and Kyrgyzstan.

[24] It also rejected participation in the federation: Armenia, Georgia and Moldova. The other participants in the referendum, among others In the Asian republics and Azerbaijan, there has been an advocacy for maintaining the federation.

Summary

To sum up, it should be noted that until 1989 there were seven countries in the Baltic Sea Region, five of which belonged to different political blocks. The Western bloc consisted of two states - Denmark and the Federal Republic of Germany - which were members of the North Atlantic Alliance and the European Economic Community. The Eastern Bloc was: The Union of Soviet Socialist Republics, the People's Republic of Poland and the German Democratic Republic, which were part of the Warsaw Pact and the Council for Mutual Economic Assistance. There were also neutral states in the Baltic Sea Region: Finland and Sweden, which did not belong to any military and economic agreements.

An analysis of the general political and military situation of the Baltic Sea during the period of operation of the United Baltic Sea Fleet shows that the Baltic region was characterised by a high degree of militarisation, where the potential accumulated threatened to exceed regional armed conflict. On the basis of the events presented and the military arsenals of the two military blocs - NATO and UW - it should be concluded that it was in the Baltic Sea region that the border of the bipolar world ran. Located on a possible direction of the USSR's military action, it would probably be a field of possible confrontation between NATO and UW.

The collapse of the USSR resulted in nine countries in the Baltic Sea basin with different objectives: political, military and economic. Denmark and the Federal Republic of Germany are members of NATO and the European Economic Community (since 1993 the European Union); Finland and Sweden have remained neutral; the former Warsaw Pact states - Russia belongs to the CIS, while Poland is located in the so-called grey security zone; the Baltic republics - Lithuania, Latvia and Estonia have declared neutrality.

Thanks to the changes that took place after the break-up of the bipolar world, the Baltic Sea region became one of the most dynamic developing areas of Europe (Zawadzki, *op. cit*., p. 129).

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Place of Management Mechanism in the System of Ensuring Financial Security of the Enterprise

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Abstract

The importance of the financial security of the enterprise is proved. The main purpose of the article is to determine the management mechanism in the system of ensuring the financial security of the enterprise. The main components of the economic security of the enterprise are characterized. The main resources have been allocated to ensure the financial security of the enterprise. The basic principles of ensuring the financial security of the enterprise are determined. The basic provisions for ensuring the financial security of the enterprise are highlighted. The model of the mechanism for ensuring the financial security of the enterprise is formed.

Keywords: Security, Financial Security, Enterprise, Management, Mechanism.

Introduction

Entrepreneurship in Ukraine today is not going through the best of times. For example, liquidation procedures, poor financial condition - all this gave rise to the phenomenon of “crisis” in the industrial sphere. In addition to the industrial sector, the crisis is also encountered in other sectors of the Ukrainian economy: construction (a critical lack of investment in 2009), agriculture (the 1998 agrarian crisis prompted half-speed food production), and trade (half of 2015 - half as many food products were opened shops, half of which by the end of the year was on the verge of bankruptcy). Such results are due to an ineffective financial security system at domestic enterprises.

The concept of "financial security" today can be put almost on a par with such a concept as "economic security" in terms of research worldwide. Even when scientists undertake to investigate only the system of ensuring the economic security of the enterprise, in one way or another they touch on the concept of “financial security”. In today's economic environment, the study of the concept of “financial security of an enterprise” becomes even more relevant through the political and economic instability in Ukraine that has led to new threats and requires a new look at this concept.

The main purpose of the article is to determine the management mechanism in the system of ensuring the financial security of the enterprise.

Methods

The methodology for constructing support systems, international and country methods is based on: input and departure, systematization and systematization; analysis and synthesis; system analysis and paired porn; Model morphological analysis; graphical; abstract-logical.

Determining the place of management mechanism in the system of financial security of the enterprise

Every day, domestic enterprises are influenced by various kinds of factors that can threaten their existence and lead to the formation of a crisis. Events such as the financial crisis in 2008 and the political instability in the country that has formed since 2014 only strengthened a number of negative external factors causing new financial threats and risks. As a result, domestic enterprises today are characterized by a decline in production, a decrease in key financial indicators of activity, an increase in prime cost, and as a result, all this can lead to bankruptcy. A key role in preventing this is played by the effective system of financial security of the enterprise.

The concept of “financial security” was formed in the process of a thorough study of the concept of “economic security”, when scientists and economists realized how important financial activity plays in the system of ensuring economic security of an enterprise. The situation with the very concept of "economic security" is almost the same. This concept is part of a broader concept, which forms the basis of all safety-free - this is the concept of "security".

Having considered the existing concept of “financial security of an enterprise”, a logical step will be to establish its main subjects and objects.

The main objects of economic security of an enterprise, mainly in the scientific literature, are found in two variations: fragmented when financial resources and basic financial and economic indicators are considered as objects of financial security of an enterprise comprehensively, when the object of financial security is understood as the entire financial activity of an enterprise (K. Goryacheva, 2003).

We agree that financial security should cover all the financial activities of the enterprise.

As for the subjects of financial security of an enterprise, one can meet their division into two groups: scientists (K. Goryacheva, 2003) highlight only the subjects of the internal environment of the enterprise (the management of the enterprise and its personnel) or emphasize (Kh. Mandzibovskaya, 2016) that the subjects of financial security of the enterprise should be both external and internal.

We partially agree that it is necessary to highlight both external and internal subjects of financial security of the enterprise, but, in our opinion, this list needs to be expanded and grouped according to the following criteria:

1. Internal subjects of financial security of the enterprise:

- “management” group: director, financial and commercial director and deputies.

- group “management personnel”: heads of economic, financial or financial and economic security services and their deputies; chief accountant, head of the economic, planning, economic, financial or financial and economic department, head of the internal audit department, head of the human resources department, and their deputies.

- group “personnel, implements measures to strengthen the financial security of the enterprise”: personnel of departments of economic, financial or financial and economic security; personnel of accounting departments, economic, planning, economic, financial or financial and economic departments; staff of the internal audit department.

Agreeing with the list of external entities of financial security of the enterprise proposed by H. Mandzinovskaya (2016) (legislative, executive and judicial authorities; law enforcement agencies; subjects of the non-state security system, auditors), we consider it expedient to expand this list and include the following entities of financial enterprise security: specialists in financial planning, risk management, production and financial management; financial management training practitioners; tax planning experts.

Under the functional components of the financial security of the enterprise should be understood such areas of activity of the enterprise, differ from each other in essence, but ensuring the security of which will lead to an improvement in the level of financial security in general.

The components of the financial security of an enterprise that are found in the scientific literature are fundamentally different from those inherent in the financial security of an enterprise.

After analyzing the scientific literature (Kh. Mandzibovskaya, 2016) regarding the establishment of the main components of financial security, we came to the conclusion that in order to obtain a high level of security of financial interests, it is necessary to ensure the security of the following components:

1. Innovatively investment component. The combination of these components is due to the fact that any innovative activity requires additional investments, that is, ensuring the safety of these two components is a very interrelated factor. Improving the investment security of the enterprise provides for avoiding a decrease in the level of investment attractiveness, which, in turn, will reduce the likelihood of not receiving the necessary investment volume and strengthen financial security. In addition, ensuring the investment safety of the enterprise should provide for the security of all operations related to the investment activities of the enterprise: investing in securities, assets of other companies or conducting deposit operations and the like.

2. Budget and tax component. A significant number of scientific, note that ensuring the financial security of the enterprise cannot be achieved without taking into account the relationship of the enterprise with the state and local budgets regarding taxes and fees, operations to obtain tax benefits or budget financing, and the like.

3. The stock component. Ensuring the stock security of the enterprise provides for the implementation of measures to maintain an appropriate level of security for its operations on the issue of securities and the distribution of dividends between shareholders. A high level of stock security will reduce the risk of a decrease in the volume of capitalization of an enterprise and increase the level of financial security.

4. Monetary component. L. Matviychuk (2011) and O. Malik (2015), offer to distinguish between these components, but, in our opinion, these components are closely related and allow not distinguishing the following components: banking and currency. Since they take into account all cash and non-cash operations of the enterprise and ensure the security of the operation related to obtaining a commercial loan.

5. The insurance component. In carrying out its business activities, the company in one way or another is faced with insurance operations. This may be operations regarding employee insurance, property, liability and the like. Therefore, ensuring the appropriate level of insurance security plays a

key role in strengthening financial security, as it allows you to insure the company from possible financial and only risks.

Schematically, maximizing the financial security of an enterprise by ensuring the security of its major components is shown in Fig. 1.

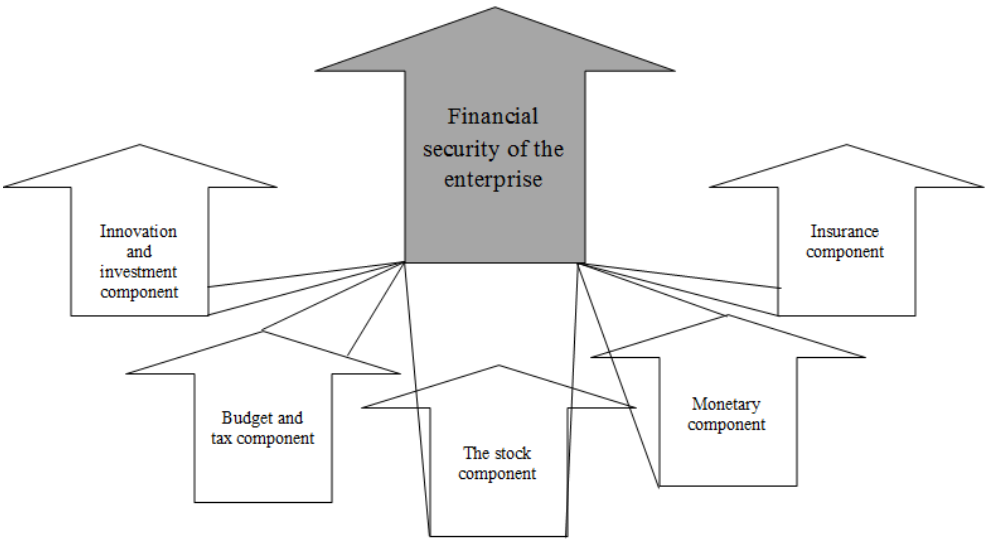

Fig. 1: Maximizing the financial security of an enterprise by ensuring the security of its core components (compiled by the author)

Other components of the financial security of the enterprise, which can be found in the scientific literature, for example, issue, banking, currency, can be attributed to the aforementioned components, since ensuring the security of transactions with these components occurs with increasing investment, monetary, and stock risks, respectively.

Separately, it should be highlighted, such a component as foreign economic (Kh. Mandzibovskaya, 2016), which provides for security during the operation of the enterprise for export and import. In our opinion, this type of security plays an important role in strengthening financial security, but it is not advisable to include it in the general list due to the fact that not all active companies carry out export-import operations.

In addition, to increase the financial security of the enterprise, it is necessary to protect the basic resource-functional elements of the enterprise. Six main elements requiring appropriate protection should be identified in order to maximize the financial security of the enterprise:

- financial resources. To ensure that the basic financial performance indicators of the enterprise are not reduced;

- labor resources. To ensure the necessary working conditions of high qualification, in order to prevent a decrease in labor productivity, which may affect the general activity of the enterprise;

- informational resources. To ensure the protection of trade secrets, contains information on the main financial transactions of the enterprise;

- material resources. To ensure the protection of property values of the enterprise, in order to prevent production stoppage and losses, which may significantly affect the financial condition;

- special and industry resources. To ensure the protection of specific resources available at the enterprise, which are inherent in its industry, and may affect its general financial condition;

- intangible resources. To ensure the protection of the intellectual property of the enterprise (Fig. 2).

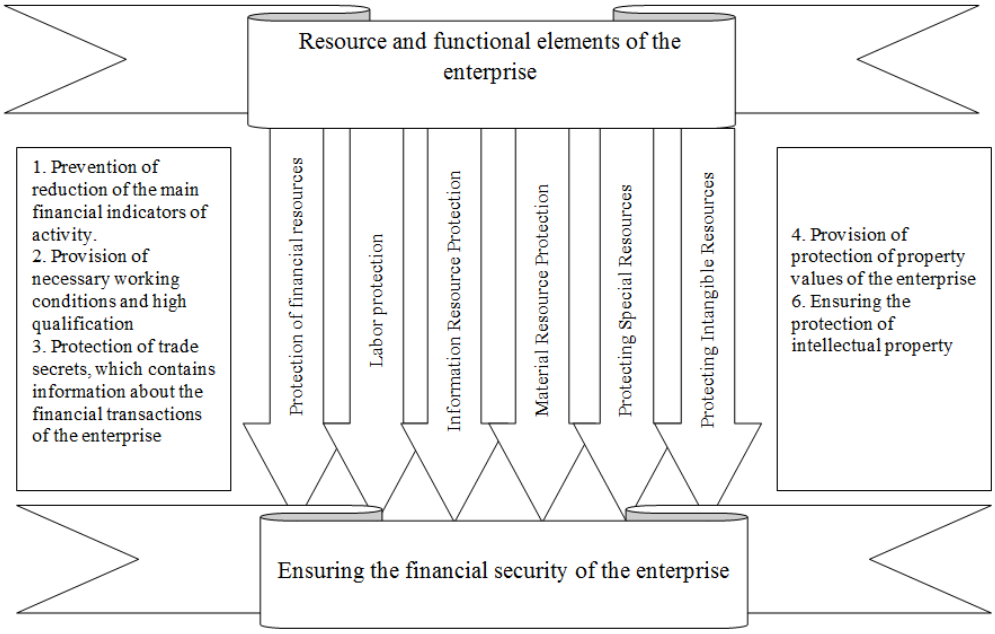

Fig. 2: Priority-schematic representation of resource-functional elements of financial security of the enterprise (compiled by the author)

As in any other science, the mechanism for ensuring the financial security of an enterprise should include a number of mandatory structural elements:

- principles on which the mechanism should be based;

- tools to be applied;

- the main functions that the developed mechanism should perform.

Exploring professional economic literature, we came to the conclusion that today there are a large number of principles, compliance with which is necessary to ensure financial security at the enterprise. We systematized the existing principles for ensuring the financial security of the enterprise and formed the basic principles, compliance with which is necessary for the effective implementation of the mechanism for ensuring the financial security of the domestic enterprise. In our opinion, the existing principles for ensuring the financial security of an enterprise should be grouped into the following categories: principles relating to the structural elements of the mechanism for ensuring the financial security of an enterprise; principles governing the process of ensuring the financial security of an enterprise; principles governing the wording of the main goals and objectives of the mechanism for ensuring the financial security of the enterprise (Fig. 3).

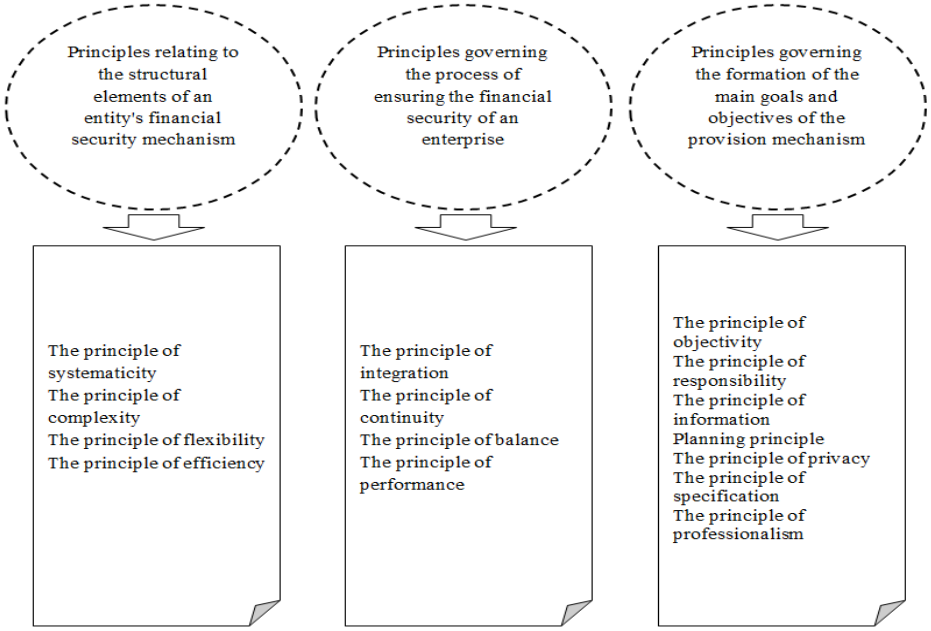

Fig. 3: Priority-schematic representation of resource-functional elements of financial security of the enterprise (compiled by the author)

Consider the principles we have proposed:

1. The principle of confidentiality. Discussed and developed strategies to ensure the financial security of the enterprise should not be disclosed outside the enterprise.

2. The principle of concretization. All goals and objectives facing the mechanism of ensuring the financial security of the enterprise should be detailed and accessible concretized.

3. The principle of professionalism. Personnel establishing and developing a plan and measures to ensure the financial security of an enterprise should be competent in matters of security and financially competent.

Financial instruments are a list of transactions that allow you to increase the assets of one side and financial liabilities of the other. The financial instruments that must be applied in order to implement the mechanism for ensuring the financial security of enterprises include:

1. Payment orders, letters of credit and checks.

2. An agreement with a bank on lending.

3. Received bills from debtors.

4. Various kinds of certificates of deposit and agreements.

5. Shares and investment certificates.

6. Insurance policy or contract.

Scientists [2, p.51] identify four key functions of the mechanism for ensuring the financial security of an enterprise:

1. Planning function. It provides for the formation of operational and strategic plans, programs and forecasts.

2. The function of organization and regulation. Development and implementation of management decisions, the use of financial instruments.

3. Incentive function. Implementation of measures to improve the effectiveness of the administrative apparatus.

4. The control function. The implementation of careful monitoring of the implementation of plans and programs.

According to an environmental analysis, we found that any security mechanism should be as accessible as possible and meet the requirement of the absence of uncertainty. So, you should expand the list of existing functions and add an educational and methodological function, which would provide for the formation of information about the financial security system, in order to conduct training and explain its main process for the enterprise personnel.

Also, it is necessary to highlight the analytical function, which would help to fulfill the planning function, since this function would provide for a thorough analysis and assessment of the current state of the enterprise, with a view to further planning.

For the main studies conducted above, it is possible to formulate the main provisions of the mechanism for ensuring the financial security of the enterprise, taking into account the possibility of using crisis management (Fig. 4).

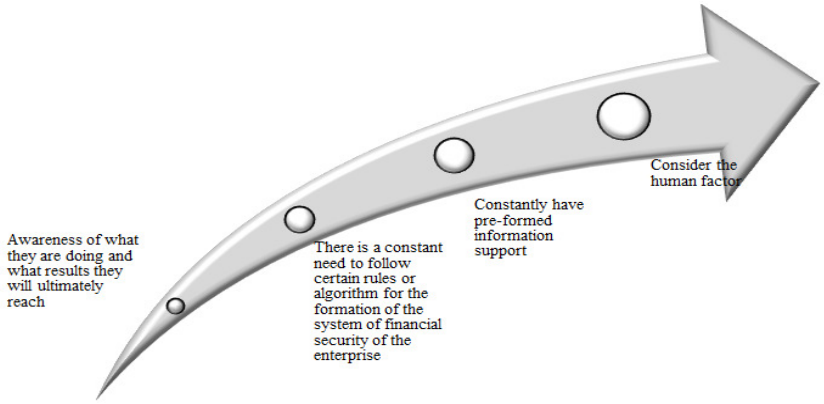

Fig. 4: Basic provisions of the mechanism for ensuring the financial security of the enterprise (developed by the author)

The place of the management mechanism in the financial security system of the enterprise is shown in Fig. 5.

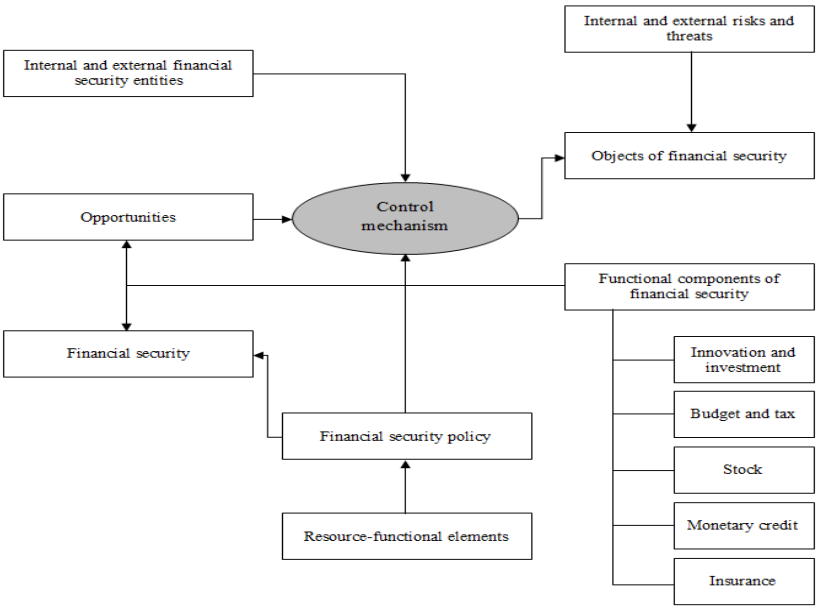

Fig. 5: The place of the management mechanism in the financial security system of the enterprise (developed by the author)

A separate issue is the system and mechanism for ensuring the financial security of the enterprise.

It should be noted that the very concept of "security" is often used in various industries. For example, in the field of law, the term "security" is understood to mean the creation of conditions conducive to the realization and protection of rights. In our opinion, in the field of safety, security should be understood as the creation of such conditions for the implementation of activities, we can talk about a high level of security.

The system of ensuring the financial security of an enterprise is a set of interrelated activities that allow you to create the conditions under which each transaction is conducted will be accompanied by an appropriate level of security.

The system of ensuring the financial security of the enterprise and must meet the following requirements:

- the ability to fully ensure the effectiveness of the functioning of the financial security system of the enterprise;

- the ability to most effectively combine all the key elements of ensuring the financial security of the enterprise;

- the complete absence of any manifestations of uncertainty or spontaneity in application;

- be as low cost as possible;

- be available;

- meet the conditions for the functioning of the enterprise and the specifics of its activities.

This section should follow keywords. This section should provide background of the study and highlight research motivation.

Conclusions

Our proposed scientific and methodological approach to the formation of a system for ensuring the financial security of an enterprise allows us to take a new approach to assessing financial security because of the possibility to regulate the choice of anti-crisis measures aimed at adequately counteracting the negative impact of threats. Summing up, it should be noted that the analysis made it possible to form the theoretical and methodological base necessary for further research to form a system for ensuring the financial security of the enterprise. We believe that only the correct application of all elements of the financial security system will ensure the stability and development of the enterprise in the face of the negative impact of the external environment, and if necessary, apply crisis management in a timely manner.

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Development of Foreign Trade Relations of France at the Present Stage

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Abstract

At the moment, due to the significant openness of the national economy, France is exposed to many global risks - economic, political, environmental, etc. That is why the crisis in the world economy in 2008-2009 had a negative impact on its economy, and the debt crisis in 2011 further strengthened the negative trends in the national economy. The increasing number of non-tariff barriers to mutual trade between France and third countries leads in general to a reduction in total output and a decrease in the well-being of the population, negatively affecting the purchasing power of less affluent groups of the population which, in turn, contributes to the strengthening of socio-economic differentiation and other negative consequences. The policy of partial reindustrialization of the French economy leads to a decrease in total exports. The position of the EU's governing structures on overcoming the crisis and solving the accumulated problems with partner countries is ambiguous and contradictory. Due to the uncertainty in the political and economic course of the US, the EU is forced to look for new markets for its products, including high-tech products. As a result, in the future, the foreign economic policy of France within the EU will face intractable contradictions.

Keywords: Foreign Trade Relations, France, WTO, Price Competitiveness, Sanctions.

Introduction

France, as one of the leading EU economies, has always had mutually beneficial trade, investment and diplomatic relations not only with Russia, but also with other countries (Aghion, 2009). However, in the current context of trade wars, Western countries, including France in the EU, have imposed sanctions against Russia, thereby violating the basic principle of WTO trade - non-discrimination of trade partners. At the same time, the EU's dependence, in particular - France, on imports of raw materials and, first of all, energy resources (up to 45% of the total consumption level) makes the EU conduct a rather cautious and balanced foreign trade policy (Chalmers, 2013). In the current conditions of growing global instability and increasing competition in world trade, France as part of the EU is trying to solve its economic problems mainly by strengthening protectionist measures.

Literature Review

All French foreign trade is regulated under EU regulations. Methods of regulating cross-border trade activities within the EU include the establishment of a common customs tariff; regulation of imports of goods; regulation of exports of goods; quotas and licensing of interstate trade (Akhmadeev et.al, 2018; Becker, 2018). The basis of France's foreign trade activity is laid down in the common rules within the Customs Union (Customs code of 1993), the Common customs tariff (1969), which is

applied in the trade of EU member States with third countries (Beugelsdijk, 2005). The General customs tariff may consist of both ad valorem duty rates and contractual duties (Malitskaya et.al, 2019). The General rules for the export regime in the EU are set out in Council Regulation (EC) no 2015/479 of 11 March 2015, which sets out general export rules based on the principle of freedom of export, and also defines procedures that allow EU member states to implement, if necessary, supervisory and protective measures.

Exceptions to the general export policy are certain types of sensitive goods, such as fuel, coal, agricultural products, raw materials for the production of metals (Kosov et.al, 2018; Turishcheva et.al, 2019). Special export regulations apply to the following types of products: oil and petroleum products, foodstuffs, hazardous chemicals, cultural goods and dual-use goods. The procedure for export control of dual-use goods is defined by Council Regulation (EC) no 428/2009 of 5 may 2009. Export credit insurance is regulated by Council Directive 98/29/EC of 7 may 1998 on the unification of the main provisions concerning export credit insurance for operations with medium and long-term coverage (Korableva et.al, 2018; Glubokova et.al, 2019).

The procedure for exporting cultural property outside the EU is defined by Council Regulation (EC) no 116/2009 of 18 December 2008. At the same time, the list of bodies authorized to issue licenses for the export of cultural values, as well as the list of customs authorities authorized to solve issues related to the export of cultural values, has been defined (Medda, 2020). Council regulation (EC) no 125/2019 of 16 January 2019 on trade in certain goods that may be used for the death penalty, torture or other cruel, inhuman or degrading treatment or punishment prohibits any export or import of such goods (Bykanova et.al, 2017; Cappelen, 2020). To avoid a shortage of a certain vital commodity, the EU Commission can introduce an export authorization system. In the interests of the Union, the EU Council may impose quantitative restrictions on the export of goods. General EU import rules are defined by Council Regulation (EC) no 2015/478 of 11 March 2015, which sets out general EU import rules based on the principle of freedom of import, as well as procedures that allow EU member states to implement, if necessary, supervisory and protective measures.

General rules for the import of goods from third countries are established by Council regulation (EU) no 2015/755 of 29 April 2015 on General rules for imports from third countries. Quantitative restrictions on exports and imports of goods can be implemented through quotas and licensing. The procedure for administering quantitative quotas is defined by Council Regulation (EC) no 717/2008 of 17 July 2008. At the same time, on December 20, 2017, the new approved EU legislation on protection in trade was published, which will change the methods of solving the problems of subsidized imports to the EU from countries with significant market imbalances caused, according to the EU leadership, by state interference in the economy (Petrov et.al, 2019). The legislation introduces a new way to establish the fact of dumping in imports to the EU from countries in the economy of which, according to European experts, there are significant deviations from the generally accepted world practice (Kosov et.al, 2016). After negotiations with the EU governments, the European Parliament and the EC, it was decided that the new EU legislation will make exceptions to the rules and principles of the WTO for cases of so-called "market distortions", which include excessive state intervention in the country's economy (Castellani, 2020).

Theoretical Background

Customs regulations in France are carried out in accordance with the Customs code of the European Community, the Customs code of France (Code des douanes), as well as agreements between WTO members, including the General agreement on tariffs and trade, the Convention on Harmonized system of description and coding of goods, Customs Convention on the international transport of goods (Golubtsova et.al, 2019) the Brussels Convention on customs co-operation Council, the Paris Convention for the protection of trademarks, The postal Convention and other regulations of the EU and the French Republic and bilateral treaties and agreements on customs and trade and political issues (Dorofeyev et.al, 2018). Let's look at the dynamics of France's foreign trade with the WTO member countries in the period from 2008 to 2018 (table 1).

Table 1: Dynamics of French foreign trade turnover with WTO countries, 2008-2018

Year	Turnover (in thousand US dollars)	Absolute increase (in thousand US dollars)		Growth rate (%)	
		basic	chain	basic	chain
2008	1237501133	0	0	0	0
2009	965383973	-272117160	-272117160	-21,99	-21,99
2010	1067087797	-170413336	101703824	-13,77	10,54
2011	1247866455	10365322	180778658	0,84	16,94
2012	1175618357	-61882776	-72248098	-5,00	-5,79
2013	1190568827	-46932306	14950470	-3,79	1,27
2014	1182269934	-55231199	-8298893	-4,46	-0,70
2015	1018694954	-218806179	-163574980	-17,68	-13,84
2016	1008200908	-229300225	-10494046	-18,53	-1,03
2017	1099660859	-137840274	91459951	-11,14	9,07
2018	1186136123	-51365010	86475264	-4,15	7,86

Calculated by the authors on the basis of data published on the official Internet portal of the international trade center UNCTAD / WTO. URL: http://www.intracen.org/itc/market-info-tools/trade-statistics/ (accessed: 05.01.2020)

According to the data in table 1, over the past 10 years, France's trade turnover has decreased, and the country's participation in world trade has decreased. Foreign trade turnover was at its maximum value in 2011, and at its minimum value in 2009, which is due to a reduction in both exports and imports due to the global financial and economic crisis. This drop was the sharpest in the period under review, with exports falling by 22.45% and imports by 21.59%. Further, from 2009 to 2011, there was a gradual increase in trade, caused by both an increase in exports and imports, with the growth rate of imports outpacing the growth rate of exports.

During the period from 2012 to 2014, there was an unstable growth in the country's trade turnover, which ended in 2015 with a sharp decline of 13.84%, which is the second largest reduction in the period under review. Since 2016, there has been an unstable increase in the country's trade turnover, but the level of 2008 has not been reached. France's share of world trade has been declining since 2009. Thus, the share of France in both world exports and world imports fell when comparing the indicators of 2008 and 2017. The exception to the trend of continuous decline was in 2016, when both indicators improved their positions. However, it should be noted that France's share of world imports has consistently exceeded the country's share of world exports. The foreign trade turnover of France over the past 10 years has been characterized by a tendency to decrease. Let us present a more detailed analysis of French exports to WTO countries during the period under review (table 2).

Table 2: Dynamics of French exports to WTO countries, 2008-2018

Year	Exports (in thousand US dollars)	Absolute increase (in thousand US dollars)		Growth rate (%)	
		basic	chain	basic	chain
2008	572783450	0	0	0	0
2009	444187328	-128596122	-128596122	-22,45	-22,45
2010	490679304	-82104146	46491976	-14,33	10,47
2011	564313673	-8469777	73634369	-1,48	15,01
2012	538657682	-34125768	-25655991	-5,96	-4,55
2013	548707057	-24076393	10049375	-4,20	1,87
2014	548835803	-23947647	128746	-4,18	0,02
2015	478047891	-94735559	-70787912	-16,54	-12,90
2016	475159856	-97623594	-2888035	-17,04	-0,60
2017	507888042	-64895408	32728186	-11,33	6,89
2018	552519753	-20263697	44631711	-3,54	8,79

Compared with 2008, exports in 2018 decreased by 3.54%, and during the entire period, it was not possible to achieve the level of exports of the base year. The dynamics of exports in this period of time was unstable: exports decreased in 2009, 2012, 2015 and 2016, but showed an increase in 2010-2011, in 2013-2014 and in 2017-2018, gradually restoring its level. Chain indicators of export growth are characterized by instability. The largest chain growth rate was observed in 2011, and the lowest, as previously noted, was recorded in 2009. Also, a fairly serious reduction in exports to WTO countries occurred in 2015, and only in 2018, France was able to restore the level observed before 2015. Let's consider the dynamics of French imports from WTO countries in 2008-2018 on the basis of the data contained in table 3.

Table 3: Dynamics of French imports from WTO countries, 2008-2018

Year	Imports (in thousand US dollars)	Absolute increase (in thousand US dollars)		Growth rate (%)	
		basic	chain	basic	chain
2008	664717683	0	0	0	0
2009	521196645	-143521038	-143521038	-21,59	-21,59
2010	576408493	-88309190	55211848	-13,29	10,59
2011	683552782	18835099	107144289	2,83	18,59
2012	636960675	-27757008	-46592107	-4,18	-6,82
2013	641861770	-22855913	4901095	-3,44	0,77
2014	633434131	-31283552	-8427639	-4,71	-1,31
2015	540647063	-124070620	-92787068	-18,67	-14,65
2016	533041052	-131676631	-7606011	-19,81	-1,41
2017	591772817	-72944866	58731765	-10,97	11,02
2018	633616370	-31101313	41843553	-4,68	7,07

Compared to the 2008 baseline, imports in 2018 were lower by 4.68%, and throughout the period under review this indicator was lower than the baseline, except for 2011, when imports increased by 2.83% compared to the 2008 indicator, and the chain growth rate was recorded at 18.59%, which was the largest increase in the analyzed period of time. The last 10 years have been characterized by unstable dynamics of imports, so the situation with the dynamics of imports is similar to the situation with the dynamics of exports. Negative chain growth rates were recorded in 2009, in 2012 and in the period from 2014 to 2016. The largest reduction in imports occurred in 2015 (-14.65% increase).

Discussion and Result

Based on data for the period from 2008 to 2018 on foreign trade in France, we will conduct a multi-factor correlation and regression analysis to identify the factors that have the greatest impact on the value of trade turnover between France and the WTO member countries. The dependent variable Y will be the volume of trade between France and the WTO member countries from 2008 to 2017. Let's choose the factors: X1 - the value of the Euro against the US dollar; X2 - the price of a barrel of Brent oil; X3 - the inflation rate in France; X4 - the unemployment rate in France; X5 - an index of business confidence in the French industrial sector. Based on the initial data, we build an auxiliary Table 4.

Table 4: The volume of trade between France and the WTO member countries from 2008 to 2017 and the potentially influencing factors

Y	X1	X2	X3	X4	X5
1237501133	1,47	96,94	2,8	7,4	-10,63
965383973	1,39	61,74	0,1	9,1	-26,34
1067087797	1,33	79,61	1,5	9,3	-9,03
1247866455	1,39	111,26	2,1	9,2	-3,11
1175618357	1,29	111,57	2	9,8	-13,36
1190568827	1,33	108,56	0,9	10,3	-11,63
1182269934	1,33	98,97	0,5	10,3	-9,21
1018694954	1,11	53,03	0	10,4	-6,09
1008200908	1,11	45,13	0,2	10,1	-4,4
1099660859	1,13	54,71	1	9,4	1,59
1186136123	1,18	71,34	1,8	9,1	-1,96

We estimate the tightness of the relationship of indicators using the matrix of correlation indicators obtained as a result of the implementation of the correlation analysis procedure (table 5).

Table 5: Matrix of paired correlation coefficients

	Y	X1	X2	X3	X4	X5
Y	1					
X1	0,46009459	1				
X2	0,81745358	0,7070236	1			
X3	0,7820136	0,50953537	0,61760805	1		
X4	-0,3222784	-0,5572017	-0,1337776	-0,7106529	1	
X5	0,30432234	-0,5683869	-0,1682552	0,19221519	0,10255721	1

Next, it is necessary to select those values of paired correlation coefficients that exceed the $r_{кр}$, that is, values greater than or equal to 0.6. These are the coefficients r_{yx2} and r_{yx3}, which we can consider statistically significant. Let's check the multicollinearity of these factors, since it is impossible to include closely related factors ($r_{кр} \geq 0,6$) in one model. Obviously, there is a multicollinearity between the X_2 and X_3 factors (r_{x2x3}= 0,61760805). In order to get rid of multicollinearity, we exclude the least significant factor for Y from the model, that is, the factor X_3. The next step in the analysis is to build a pair regression model (Table 6).

Table 6: Coefficient of determination

Regression statistics	
Multiple R	0,817453584
R-squared	0,668230361
Normalized R-squared	0,631367068
Standard error	59502749,86
Observations	11

According to table 6, we conclude that the coefficient of determination is equal to R-squared=0.668 and, therefore, the model is adequate for the coefficient of determination, since the R-squared is greater than 0.5. This means that 67% of the variation of the variable Y is explained by a constant regression equation for coefficients having the form 868576979+3163589.53410757*X_5. Let's evaluate the quality of the regression equation (Table 7).

Table 7: Regression coefficients and Dispersion analysis

Y-intersection			Coefficients		
			868576979		
X2			3163589,534		
	df	*SS*	*MS*	*F*	*significance of F*
Regression	1	6,4181E+16	6,4181E+16	18,12726	0,002118585
Remains	9	3,18652E+16	3,5406E+15		
Total	10	9,60461E+16			

Since the significance of F is 0,002118585, which is a smaller number than 0,05, we can conclude that the model is significant (Table 8).

Table 8: Checking the significance of parameters "a" and "b"

	Coefficients	Standard error	t-statistics	P-significance
Y-intersection	868576979	62923966,07	13,80359556	2,31695E-07
X2	3163589,534	743043,25	4,257611564	0,002118585

Based on the fact that the P-value is less than 0.05 (table 9), it can be argued that the parameter "a" and the parameter "b" have significance. As a result of correlation and regression analysis, it can be concluded that 67% of the variation in trade turnover between France and the WTO member countries depends on the level of the price of a barrel of Brent oil, the remaining unaccounted factors account for 33%.

Conclusion

France, as a member of the EU, has a trade policy similar to other member states with a common weighted average EU tariff rate. Also, France's participation in the WTO has an impact on the formation of the country's foreign trade policy as a whole (Petrov et.al, 2019). France's foreign trade policy is primarily aimed at reducing foreign commodity dependence and creating favorable conditions for the growth of export supplies and France's share in the world economy (Emlinger, 2020). During the period from 2008 to 2018, there was a reduction in trade turnover between France and the WTO member countries and a decrease in the share of France in both world exports and world imports (Dellmuth, 2017; Kosov et.al, 2017). According to the IMF, France has lost external competitiveness over the past two decades, reflecting both price and non-price factors. The world market shares of French exports of goods and services have declined more steeply than in many other advanced economies, particularly

in manufacturing where France has been losing its comparative advantage in more high-tech and knowledge-intensive sectors (Zimakova et.al, 2016). Consequently, the contribution of tradable sectors to growth and jobs has been modest compared to some peer countries (Titova et.al, 2019). The loss of external competitiveness reflects several factors. Firstly, relatively slow demand growth of France's trading partners, especially in the high-tech sector, partly explains the erosion of export market shares relative to peers. Secondly, the appreciation of the euro after its introduction affected competitiveness across the currency zone. Thirdly, the pre-crisis period opened a competitiveness gap against Germany, largely reflecting differential wage growth, especially in services (Estrada, 2015).

However, given solid labor productivity growth, France's unit labor costs did not grow faster than in other euro area countries, while firms compressed their margins to protect their price competitiveness. Fourthly, the rapid rise in the relative price of non-tradable, largely driven by public and social services, may have contributed to declining competitiveness by increasing the cost of inputs to the export sector. Finally, total factor productivity growth has declined, as in many other advanced countries, with the slowdown more substantial in services than in manufacturing. In order to solve these problems and increase France's share in the world market, the French government has embarked on a course of reforms aimed at reviving the national economy, restoring industry and attracting foreign investment. However, in order to increase the country's international competitiveness, it is necessary to pursue not only a policy of reducing production costs, but also to pay attention to longer-term measures, such as reforms in education, science and innovation, etc.

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Distance Learning Technologies as the Main Mechanism for Increasing Efficiency Activities of the University

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Abstract

The education sphere of the Russian Federation is at the stage of reform, the main purpose of which is to create a mechanism for its sustainable development and ensure quality training in accordance with international standards. This article deals with the problem of mastering distance learning technologies, which, as a rule, is associated with significant amounts of attracted investments. In this context, in industrialized countries, the policy not only of the state, but also of private business is the principle of priority investment in education. Innovations in educational institutions based on distance technologies are a key mechanism that allows creating advantages in a competitive environment. In this regard, the main activities in the informatization development are to create a reliable and efficient infrastructure, to introduce unified methods of access to data, to improve the management of the entire complex of distance resources, as well as ensuring compliance with the infrastructure of the strategic goals of the university. Distance learning technologies are changing states and societies, which is clearly seen in the example of the Internet development, where there is not just a technological breakthrough, but the inevitable emergence of a new lifestyle and the emergence of a new "network" generation.

Keywords: Distance Learning Technologies, Innovation, Student, Educational Institutions, Activities of the University

Introduction

This article discusses the problem of developing distance learning technologies and university management, which is usually associated with significant amounts of attracted investment. In this context, in industrialized countries, the policy of not only the state, but also private business is the principle of priority investment in education.

Innovations in an educational institution based on distance learning technologies are a key mechanism that allows creating advantages in a competitive environment. In this regard, the main activities in the development of informatization are the creation of a reliable and effective infrastructure, the introduction of unified methods of access to data, improving the management of the entire range of distance learning resources, as well as ensuring that the infrastructure meets the strategic goals of the university [7,13].

Methodology

Analysis of the informatization of higher education institutions shows that in most universities with existing distance learning and interaction systems, the staff suffers from both a lack of necessary information and an excess of incorrect or outdated information [8]. In addition, many employees and students either do not know what resources and services are available, or do not understand how to use them, and sometimes do not have the opportunity to do so. The staff often does not have the ability to quickly publish unstructured data and make it available to a specific target group. In the educational process, there is a clear shortage of high-quality digital teaching materials, and what is available is difficult to "convey" to the student. There are problems with identifying users when accessing resources and managing the actual information resources.

How can we determine the main tasks and methods of increasing, the effectiveness of which in the university is directly related to the use of distance learning technologies [16]? Distance learning technologies make it possible to organize people's access to digital data in the most efficient way. Moreover, if processes are formed that connect logically people and data, then the IT-solution becomes more stable and successful [2-4].

Based on this, there are three main components of IT-solutions in any university that are related closely: people, processes, and data. From the point of management view, the success of the university depends on how well the processes connecting people and data are solved and organized [9].

Informatization of the university is understood as a set of measures aimed at improving the activity of the university as a system. To improve the efficiency of the university, it is necessary to influence comprehensively the system as a whole - the strategy, network infrastructure, organizational structure, management system, motivation system, and corporate culture [10].

We can consider the informatization of the university as the process of transition to a state of the information environment in which users (including students) get access to necessary, relevant, complete, correct and consistent information. So the solutions in the field of information technology is included into the core business processes of the university that staff and students can no longer do without the services provided by the information environment [15]. At the same time, job responsibilities are performed by staff with greater efficiency, and student training is performed with better quality, which makes IT-investments economically justified.

Features of the university as an object of informatization associated with the multidisciplinary nature of the activities, the abundance of forms and methods of educational work, the spatial distribution of infrastructure (branches, representative offices), variety of funding sources, a well-developed structure of support units and services (construction, manufacturing, economic activity), the need to adapt to the changing educational market, the need of analysis of the labor market, the lack of a generally accepted formalization of business processes, the need for electronic interaction with higher-level organizations, frequent changes in the status of employees and trainees, etc. All this makes it necessary [11]:

- comprehensive study of informatization tasks, starting with the concept and ending with the support of software and technical solutions;
- attracting a large number of subject specialists who know the content of automated tasks;
- using the modular structure of the corporate information system, where each module covers an interconnected group of business procedures or information services while ensuring uniform interface requirements;
- documentation of developments based on reasonable application of standards, which guarantees the creation of a successful system.

Activities aimed at the creation of an information infrastructure also require certain cost:

- equipping departments with computer equipment and peripheral equipment;
- designing and creating a structured physical data transfer environment;
- design, installation and administration of server computer platforms, system software and communication equipment of the corporate computer network;
- installation of telecommunication equipment and organization of data transmission channels for interaction with university branches, regional and global information networks.

The corporate information and computing network is a key component of the infrastructure that affects the efficiency of increasing informatization problems in the university. The experience of making a university network shows that in the absence of a common network development project at a certain point the network loses catastrophically control, the flow of user requests to a network service becomes huge, which has to be restrained by all the staff of its departments [12].

The key condition for the reconstruction is to simplify the work of users in the network, starting with registration, organization of access control to information services and applications and ending with interaction with the university's network service.

The effect of electronic resources introduction in the university is as follows:

- ensuring free access of employees and students of the university to digital materials;
- creating effective educational and methodological support for the educational process;
- providing advanced tools for publishing and searching for the necessary material.

The repository introduction of electronic resources reduces the cost of publishing and distributing university literature, provides access to full-text scientific materials for the entire Russian and world scientific community, and provides an opportunity for mutual exchange of educational and methodological materials between universities.

Results

In relation to the educational institutions activities, the concept of "innovative activity" can be considered as a purposeful transformation of the training content and organizational and technological foundations of the educational process, aimed at improving the quality of educational institutions and their graduates, ensuring comprehensive personal and professional development of students. The innovation process at the university involves the gradual implementation of appropriate changes in the educational environment. We propose the following scheme for promoting innovation in higher education (Fig. 1).

For the field of students training, innovations can take the form of new educational programme, educational plan, curricula and teaching materials, new pedagogical, information and organizational technologies or their combination, new educational technologies, new status of the organization, etc. Innovations can be both new products - educational programs, and new technologies used in the educational process, new organizational technologies, new ways of promoting educational services. Innovations are usually the result of research, development, or experimental work aimed at improving the effectiveness of the organization [1, 6].

The authors propose the following criteria for identifying stages: the content of the work, the level of risk, sources of funding, the sequence of work, and the level of costs.

In accordance with the selected criteria, the following stages of the innovation process in educational technologies can be identified:

• Research. Search for new educational methods and technologies, organizational forms, etc. Ideas can relate to all processes occurring in an educational institution, the processes of its interaction with partners, consumers and stakeholders, as well as be aimed at creating new processes [5].
• Design and analytical. Identifying the consumers' needs of an educational institution can be met as a result of innovative activities of the university.
• Experimental. Creating an educational object (for example, an electronic training complex) may include conducting research, developing educational programs or processes, etc., pilot implementation, and generating reports on results. The introduction of innovation involves the creation of technology and implementation procedures for realization of educational programs or the introduction of changes in the structure of the university.
• Promotion. Information activities, market positioning, author's support of an innovative educational object in the educational process improve the quality of work and improve the image of the university.

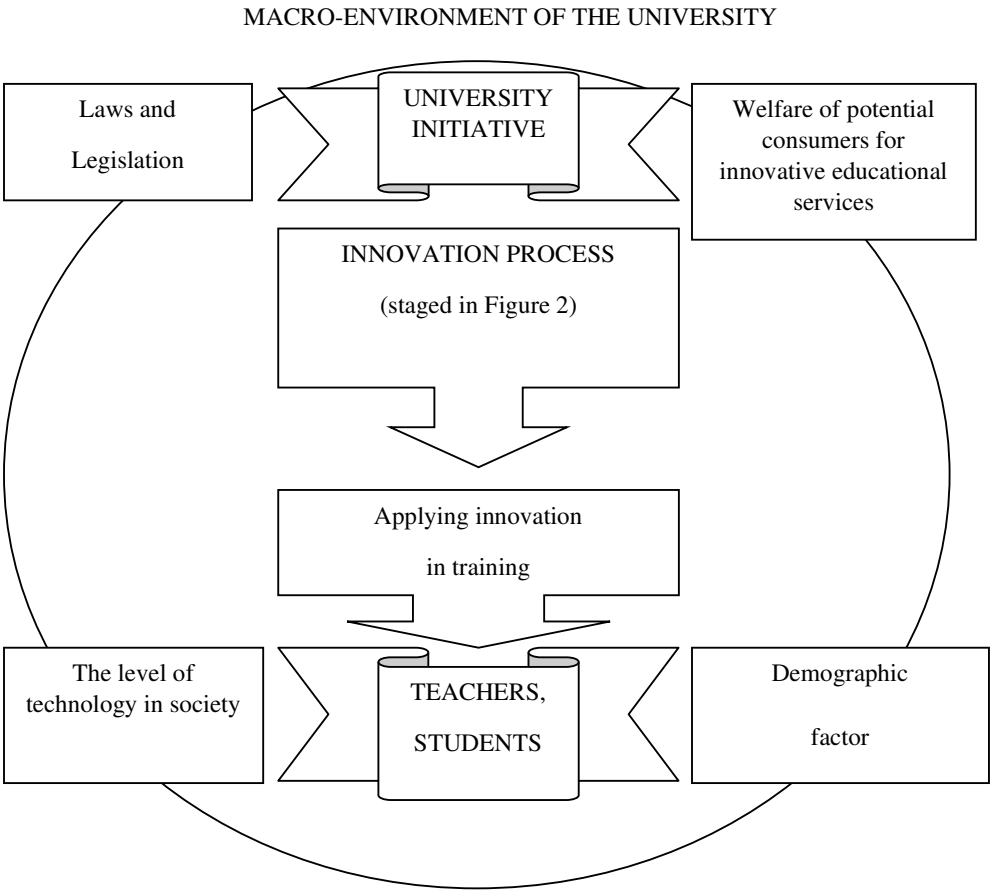

Fig. 1: Scheme for promoting innovation in higher education

The scheme of the innovation process in the university can be presented as follows (Fig. 2).

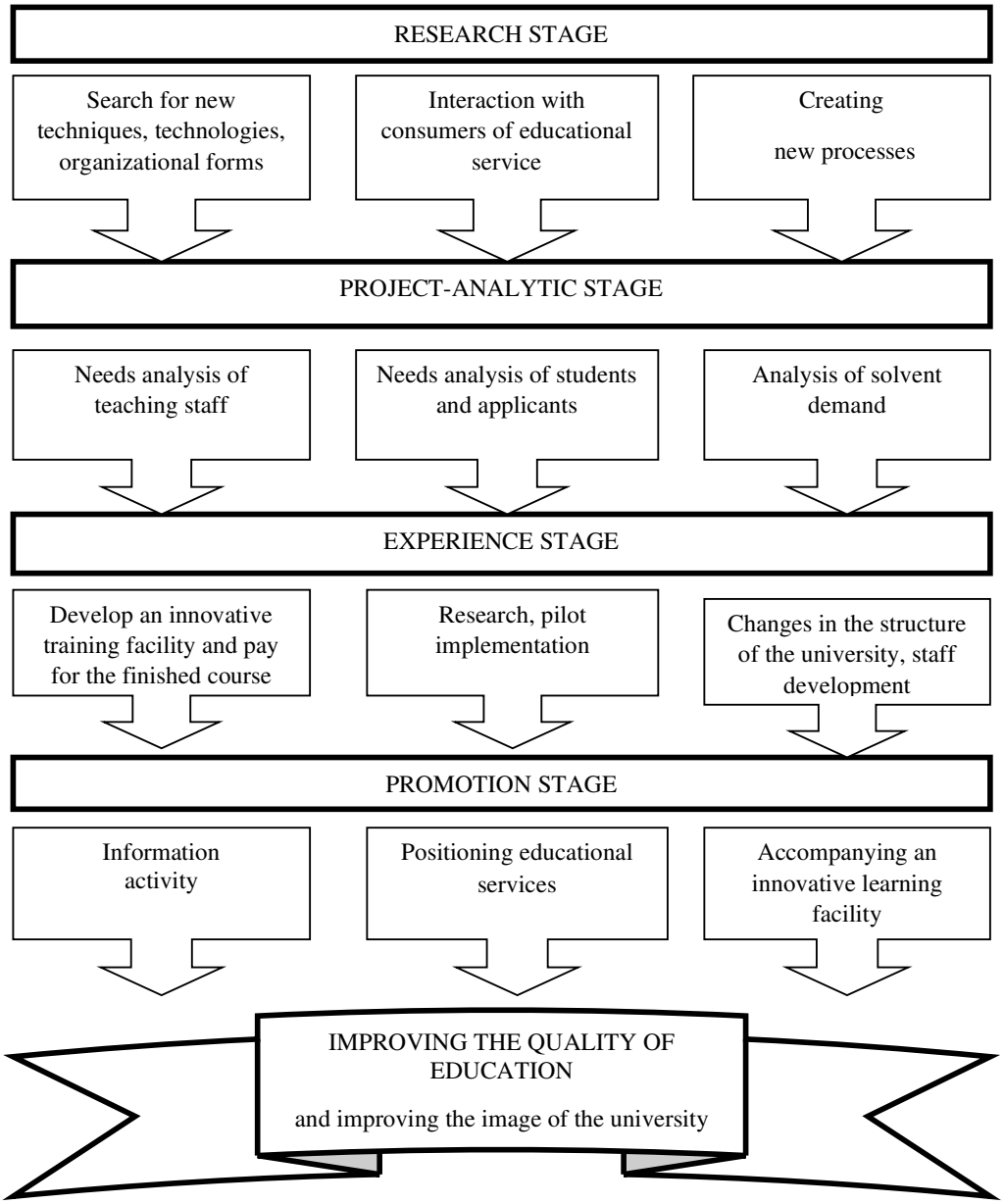

Fig. 2: Diagram of the innovation process at the university

Conclusion

Thus, the allocation of innovation process stages and management objects of innovation activity and their relationships allows creating an effective structure of distance training and fixing the selected management objects to specific structures and officials, as well as creating the necessary internal standards (orders) that regulate the processes of starting, maintaining and controlling remote educational activities.

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Methodology for Evaluating the Effectiveness of Investments in Distance Educational Services

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Abstract

The transition to an innovative economy is changing the role of higher education, placing new demands on the quality of educational services. At the present stage, the leading countries of the world attach special importance to education in the formation and accumulation of human capital. Its level determines the intellectual potential of the state as the most important component of national wealth. Moreover, the effective use of the accumulated scientific and educational potential is the main condition for the economic and social stability of society. The purpose of the university is to provide quality educational services to improve the level of education in society. Therefore, when deciding to invest in the development and implementation of distance education services, first of all it is necessary to assess how its implementation will affect the achievement of the general goal. The practical significance of this article is in the possibility of using materials, conclusions and proposals to improve distance learning technologies. The stages of the innovation process are systematized. The developed methods allow structuring the costs by stages of the innovation process and determining the effectiveness of investments in distance learning technologies on the basis of cost assessment of improving the education quality.

Keywords: Higher Education, Distance Educational Services, an Innovative Economy, Effectiveness of Investments

Introduction

The transition to an innovative economy is changing the role of higher education, making new demands on the quality of educational services. At the present stage, the leading countries of the world attach special importance to education in the formation and accumulation of human capital. Its level determines the intellectual potential of the state as the most important component of national wealth. Moreover, effective use of the accumulated scientific and educational potential is the main condition for economic and social stability of society.

The practical significance of this article is the possibility of using materials, conclusions and suggestions to improve distance learning technologies. The stages of the innovation process are systematized [7]. The developed methods allow structuring costs by stages of the innovation process and determine the effectiveness of investments in distance learning technologies based on the cost assessment of improving the quality of training [15].

Methodology

The object of the research is institutions of higher professional education that carry out remote educational activities. The purpose of the study is to substantiate tools for evaluating the effectiveness of investments in distance education technologies [2-4].

To assess the effectiveness of investments, various methods are used based on criteria and indicators that comprehensively characterize the state of the invested objects. The main problem is the scientific justification of criteria and indicators for evaluating the effectiveness of various investments types.

The variety of effects obtained from learning services, the scale of their impact on a particular individual, the economy and society as a whole lead to the fact that the effect cannot be estimated from market positions and only by the criterion of profit, since profit is not the main goal of an educational institution [12]. If the profit is generated at the university, it should be reinvested in the development and expansion of the production of educational services, improving their quality. Also, we cannot use the criteria for financing education, which is used by the state, because there is no possibility to increase the amount of state funding. The effectiveness of education as a social sphere can be assessed by a set of different criteria. Criteria such as [9]:

- net present value (NPV);
- return index (RI);
- payback period ;
- internal rate of return (IRR);
- modified rate of return.

These criteria are based on the theory of cash flows. The peculiarity of these criteria is that they are based on a comparison of useful economic results and costs determined taking into account the time factor. The NPV criterion is a comparison of the current value of future cash receipts from investors with discounted (current) investment expenses necessary for its implementation. The NPV depends on the discount rate and is calculated using the formula:

$$NPV = \sum_{t=0}^{T} P_t \cdot D_t - \sum_{t=0}^{T} I_t \cdot D_t ,$$

where t – calculation step;
T – duration of the estimated period;
P_t – component of cash flow;
I_t – investments (capital investment);
D_t - discount factor:

$$D_t = \frac{1}{(1+i_t)^t} ,$$

where i_t – discount rate.

The investment realization is reasonable if the NPV > 0, the nonnegative NPV is an obligatory condition for the effectiveness of investments. If there is a set of alternative investment directions, the one, for which the NPV is maximum, is selected (the greater the value of the criterion, the greater the investment effectiveness).

For a number of non-production facilities, for example, increasing the level of population education, for prestigious buildings, the value of this criterion may be negative for the entire calculation period, that is, the cost of construction and operation will exceed the income. Choosing the minimum of the

given (discounted) costs based on the criterion can lead to negative social consequences [8].

The "return index" (RI) criterion represents the relative "return on investment" on invested funds. The ratio of payment flows similar to NPV flows is used to determine the effectiveness of investments:

$$RI = \frac{\sum_{t=0}^{T} P_t \cdot D_t}{\sum_{t=0}^{T} P_t \cdot D_t}$$

it is obvious that if the NPV is positive, then the return index will be greater than one, and Vice versa, if the NPV is < 0, then the return index is less than one. The more the return index exceeds one, the greater the investment effectiveness [10].

The occurrence condition of the payback period is a non-negative NPV:

$$NPV = \frac{\sum_{t=0}^{T} P_t}{(1+IRR)^t} + \frac{\sum_{t=0}^{T} I_t}{(1+IRR)^t} = 0 \ ,$$

at the same time, all the disadvantages of the NPV criterion are inherent in the "payback period with discounting" criterion, which, in addition, are supplemented by the inability to account for cash flows beyond the payback period of investments.

The "internal rate of return" (IRR) criterion is a discount rate, or test discount, in which discounted cash flows are equal to discounted investments. The resulting IRR value is compared with the level of return on investment (E). If IRR < E, then NDI < 0 -- investments are ineffective, if IRR > E > 0, then NDI > 0 - investments are effective, if IRR = E, NDI turns to zero - we can make any decision.

In practice, the IRR is determined by the method of sequential iterations using tabulated values of discounting multipliers according to the formula:

$$IRR = r_1 + \frac{f(r_1) \cdot (r_2 - r_1)}{f(r_1) - f(r_2)}$$

where $f(r)$ is the net present value at the discount rate r;

r_1 – the value of the discount rate at which $f(r_1) > 0$ (or $f(r_1) < 0$);

r_2 – the value of the discount rate at which $f(r_2) < 0$ (or $f(r_2) > 0$).

The shorter the interval length (r_1-r_2), the more accurate the calculated value for the internal rate of return.

One of the algorithms that "improve" the IRR for investments with non-traditional cash flow is the "modified internal rate of return" (MIRR). All negative flow values are discounted at the deposit rate at the beginning of the settlement period. All positive values are compounded at the rate by the end of the billing period. The MIRR defined in this way does not turn into IRR for traditional cash flow. The difficulty lies in the fact that the MIRR value has nothing to compare with (as IRR) and is difficult to use to conclude on the effectiveness of investments [13].

Results

The analysis allows concluding that from the point of view of evaluating results in higher education, the NPV criterion has the following disadvantages:

1) the value of the criterion depends significantly on the accepted calculation scheme, different methods give different results;

2) the criterion depends on the value of the subjective discount rate (DR), the greater the value of the DR, the smaller the value of the NPV;

3) non-objective assessment of the investment direction, which provides for gradual expansion;

4) the final value of the NPV is conditional, since it does not correspond to the real income of investors and creditors;

5) it is difficult to assess the effectiveness of investments in the non-productive sector.

When determining the effectiveness of investments in higher education, an important point is the formation of an integral indicator that reflects the effect of investments in all areas of the investment system [14].

From the point of view of the university's investment effectiveness is evaluated on the activities of the university and is characterized by a set of parameters taken into account for certification, licensing and accreditation of universities. These indicators characterize the quality of the educational process, its provision and educational services. The duration of the beneficial effect is limited to about 2-3 years, and then it stops to act or has a smaller effect.

Calculating investment performance is an extremely multi-faceted process that depends on various factors. These factors often cannot be expressed only in quantitative terms.

According to T. Malyutina, the effectiveness of professional education is associated with the development of new ways of students' intellection and activity.

I. S. Byk gives the coefficient of economic effectiveness in research work as one of the criteria for evaluating the effectiveness of investments, which is calculated using the formula:

$$\rho_{np} = \frac{P}{V} \cdot \rho_1 \cdot \rho_2 \cdot \rho_3 \cdot \rho_4 ,$$

where P is the economic effect obtained from the results implementation of completed research works, rub.;

V is the total volume of expenses for performance of research works, rub.;

P_1, P_2, P_3 - coefficients that characterize the relative number of doctors, candidates of science, teachers without academic degrees and titles, postgraduates and students who participate in research.

World economic practice has long developed methods for evaluating investments that take into account all possible conditions for their implementation and therefore have the property of generality.

Today, various expert methods for measuring complex properties are used: the classification method,

the ranking method, the pairwise comparison method, and the rationing method. The choice of method depends on the supplied task. The rationing method consists of evaluating the values of social performance indicators on a pre-developed scale, for example, starting from zero to one or up to ten. The indicator that has the greatest impact, that is, that has the greatest value, is assigned the highest score.

To assess the effectiveness of investments in educational objects, we can use the rating system. Rating - a term denoting the subjective assessment of a phenomenon on a given scale. The essence of the rating is to derive a final assessment for the effectiveness of investments based on the results of current performance assessments in vocational education objects.

The rating assessment for the effectiveness of investments in the education sphere consists of the effectiveness of investments for each type of the university activity. Performance indicators for the reporting period are used as a basis for determining the rating assessment. These assessments are taken into account when allocating funding to support each type of activity, and based on this; priority areas of funding are allocated. Currently, the methodology developed by the ministry of education in the Russian Federation is the most widely used among rating systems. The system evaluates the university according to 45 indicators that determine the rating of the university's potential and the rating of its activity, followed by calculating the efficiency rating. The authors of the rating assessments are representatives of universities, regional and government structures, media, associations and unions in the sphere of education. The rating method is not widely used when deciding on investments, as the problem of the complexity of data collection and verification of their reliability remains relevant.

The expert survey form, which has been widely used, is of great importance for the results of the generated list of objects (rating). The expert survey form allows conducting:

a) correspondence survey – it involves independent work of the expert;

b) full survey – it involves direct contacts of the analyst with the expert when evaluating the objects listed in the questionnaire.

When recruiting a group of competent specialists, it’s necessary to solve two problems: determine the optimal number of experts in the group and the level of their competence. The economic literature presents a number of approaches for determining the required number of experts. The analysis showed that an increase in the number of experts, starting from a certain point, leads to an increase in the mistake of examination, and it is advisable to include no more than 10-15 of the most competent experts in the expert group. When forming a group of experts, it is necessary to take into account the qualifications and experience of experts, the degree of complexity and severity of the problem under discussion.

Currently, in Russia, the state continues to be the main investor in the sphere of education, so the list of indicators of state accreditation is used everywhere to assess the performance of universities. Indicators of state accreditation determine the status of higher education institutions by type and kind.

When determining the type of education institution is estimated as follows: the content of training, quality of training, information and methodological support of educational process, informatization of the university, material-technical base of educational activities of educational institutions. In determining the kind of higher education institution it’s important to evaluate: facilities implemented the basic educational programs, the opportunity to continue their education in programs of postgraduate and additional professional education, scientific research, scientific-methodical work, the qualitative composition of the teaching staff.

The assessment is carried out by expert means, by preparing an expert opinion based on the results of

comparing actual indicators with the standards approved by the ministry of education of the Russian Federation for accreditation.

The list of indicators of state accreditation covers the main areas of activity, but not all. They do not take into account indicators of the effectiveness in international cooperation, the effectiveness of scientific research, and specific indicators for specialized universities. Therefore, indicators need to be improved in accordance with changes in external and internal factors. Normative values that serve as evaluation criteria, it is also necessary to modify in accordance with the requirements of the market [11].

The competitive evaluation method of accredited universities for placement of the state task for training specialists with higher education is used today by the state to select priority objects of budget financing. Competitive selection indicators are divided into two groups. The first group describes a specific sphere of training. The second group characterizes the university as a whole.

Along with the state accreditation system, some forms of university public and international accreditation and individual programs have been developed. An example is the work of Russian universities with international accreditation agencies, such as GATE, ABET (American). The result in this case is the possibility of recognizing Russian diplomas in this specialty abroad. But the forms of international accreditation were not widely recognized.

Global trends towards the integration of national educational systems are evident at the functioning level of national education quality assessment systems – the common European structure of education quality assurance agencies ENQA, which uses international databases. Russia is a member of the international structure of higher education quality assessment and assurance agencies (INQAAHE), and is a full member of the structure.

Despite the variety of evaluation methods developed in the local and foreign literature, which we have discussed above, the rating method of evaluation based on state standards continues to dominate in Russia, since the main investor in our country was and still is the state. However, today there have been significant changes in the search for and attraction of investments and the need for the participation of the private sector (households) and legal entities (firms, public funds and organizations) in the process of investing in higher education is increasing. Given that the rating system cannot process different indicators in a complex, so it is not always effective. The use of modern methods for evaluating the functioning of complex socio-economic systems is becoming relevant. Modern methods will allow identifying the gaps in our education system from the requirements of social and economic development in the world community and direct investments primarily to the designated priority areas.

A comparative analysis of methods for evaluating the effectiveness of investments in education is presented in table 1.

Table 1: analysis of investment effectiveness assessment methods

Method	Content	Disadvantages
1	2	3
Economic and statistical	On the basis of statistics, a quantitative assessment of the education quality is given, the costs of education through "loss of earnings" are calculated, and the calculation of the profitability of education for an individual and society as a whole is proposed	To evaluate the effectiveness, we need fairly objective information, the calculation is carried out only for one type of efficiency - economic
Index	According to the theory, the effectiveness of investment in education can be evaluated by correlating the corresponding benefits and costs	Only economic efficiency is evaluated, and there is no comprehensive approach to evaluation
Integral	It is proposed to use an integral criterion that includes a set of particular criteria, which, in turn, are expressed in terms of the corresponding indicators	The calculation is carried out only for one type of efficiency – economic, there is no normative criterion for comparison
Expert	Efficiency is evaluated by ranking, pairwise comparison, classification, and rationing. The rating is based on the received opinions	The problem of forming a group of experts. Question of consistency of experts' opinions. Subjectivity of the assessment
Conventionally, the base	To assess the effectiveness of education, it is proposed to use a basic criterion and a set of corresponding indicators	There is no quantitative assessment of effectiveness and it is mainly aimed at the effectiveness of the education quality
Program-target	The problem of criteria and indicators is considered through the prism of the success of educational development programs	The proposed model can only be used for effective educational policy

Having analyzed the existing methods of evaluating the effectiveness of investments in education, proposed by the above-mentioned authors, we can draw the following conclusions:

- many methods can evaluate the effectiveness only verbally, so, they do not consider market conditions;

- one parameter is used as a determinant, or the parameters are only qualitative in nature and do not allow quantifying the quality of the educational process;

- the complexity in assessing the effectiveness of investments in education is not reflected, so take into account the effectiveness of investments in the areas of the university's activities only from the point of view of the state.

Conclusions

Research results indicate that these theories and methods may not be suitable for all occasions. Since the main output indicator in the field of education is the quality of educational services, it is necessary to develop and use a method for evaluating the effectiveness of investments in the field of education, which would allow rational use of funds allocated due to their limitations. Therefore, it is advisable to use a comprehensive approach based on an interrelated indicators system in the effectiveness of financing certain areas of the university's activities, taking into account the requirements of the market. An integrated approach requires the use of a formalized method of

evaluating effectiveness that would take into account the functioning specifics of such a socio-economic system as education (table 2).

Table 2: comparison of methods for evaluating investment effectiveness

Method	**Determination of the effectiveness for**			**Comparison with regulations (standards)**	**Use of accreditation**	**Issue of recommendations for the university**
	as the ratio of results and costs	using university investments in certain areas	functioning of the University in all areas (complex)			
Economic and statistical	+					+
Index	+	+		+	+	+
Integral	+		+		+	+
Expert		+	+			+
Conventionally, the base		+	+		+	+
Program-target	+			+	+	

Thus, most authors consider the possibility of obtaining the maximum economic or social effect as a criterion for evaluating the effectiveness of investments. The main difficulty faced by the researchers is the accuracy of measuring the effect. Obviously, a different type of criterion must be developed and used to measure effectiveness.

In our opinion, the university needs to take into account the needs of consumers, the financial capabilities of the university and the requirements in the state of households, firms, and public funds. The quality of education has been and will continue to be decisive.

It is obvious that for solving the considered problems and evaluating the effectiveness of investments in education must take a holistic approach, whose main objective is to improve the quality of education, competitiveness of the university through more efficient use of the allocated education investment.

Thus, evaluating the effectiveness of investments in distance education technologies is associated with the problem of evaluating not only the costs of innovation, but also, above all, with the cost assessment of the expected effect.

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Case-Study Method as an Educational Technology for Teaching Management Students

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Abstract

This article considers modern innovative technologies as a means of improving the quality of students' education at the university. An important aspect of assessing the professionalism of the teacher is his knowledge of innovative technologies, readiness and ability to apply innovative teaching methods in practice in the conditions of the course held in Russia to improve the quality of education. With the transformation of the educational paradigm, the creative activity of the teacher and the use of innovative methods and technologies in teaching are actualized. The basis of quality education should be such teaching methods that develop students' critical thinking and ability to self-development. The article deals with the current state of Russian vocational education, identified patterns and trends of its development. Various forms of basic methods for active means of teaching students are shown in order to improve the quality of education, the importance of personal and professional teacher's competencies. The application of innovative technologies and teaching methods in the educational process is substantiated.

Keywords: Case-Study Method, Learning Technology, Learning Method, Active Learning Methods, Method of Analyzing Specific Situations, Interactive Methods.

Introduction

The new state educational standards apply the principle of variability now, which allows higher educational institutions to choose and design the pedagogical process according to any model. In this direction, the educational process of the university is underway: the development of various versions of its content, scientific development and practical justification of new ideas and technologies [14]. In this regard, the teacher should be guided by modern advanced technologies, and choose those technologies that meet the requirements of the time and contribute to the training of specialists in the future.

To organize a successful educational process, teachers of Krasnoyarsk state agrarian university from the Russian Federation are searching for effective methods of active learning in their classes with various techniques and methods, because modern society needs professionals who can look for solutions to problems and in the future will be able to make decisions in life. New approaches to learning are needed to address these challenges [1,15].

Methodology

The development of information and communication technologies, and the Internet, has also had a serious impact on the organization of the learning process, as students have new opportunities for information. In these conditions, the roles of the teacher and the student change fundamentally. The student gets the opportunity to select actively a knowledge provider. It becomes very important for

the teacher to provide friendly support for the learning process [4-7]. At the same time, the methods of knowledge transfer are determined by both pedagogical technologies and information capabilities of the student and the educational institution (Fig. 1).

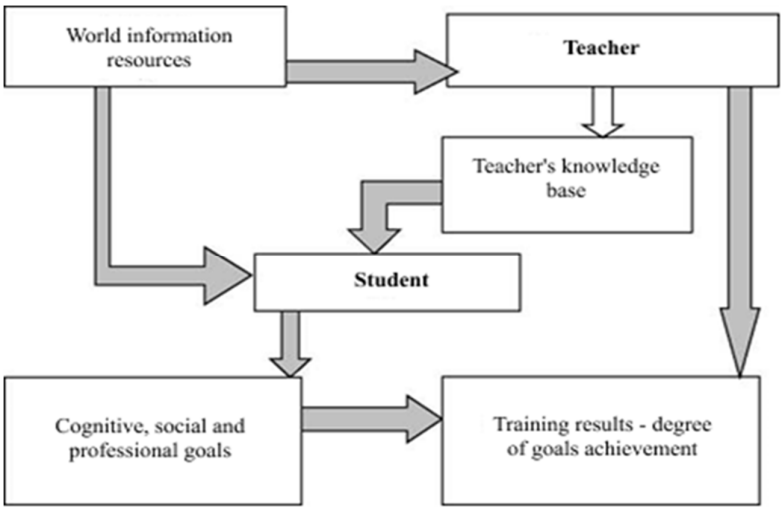

Fig. 1: The role of the teacher and the student in the modern educational space

The main goal of training in economic specialties, as well as master's degree in economic areas, is to develop the knowledge and competencies necessary for a young specialist who is in demand in the modern labor market. The basis for the formation of a given level of qualification is not only the theoretical base obtained by the student at the undergraduate stage, but also a profound study of theoretical disciplines provided for by the master's program.

An important stage in the process of developing system thinking is the use of case-study methods [2]. Case (situation) is a set of conditions and obligations that describe the actual situation at the enterprise in the period under review. The situation involves a management problem and usually includes information about goals, financial status, and relations between management and production staff, market conditions, competitor activity, and other environmental influences.

Methods and techniques for working with various educational and business situations have long been widely used in the educational process abroad and in the leading universities of Russia [16]. One of the main features of working with cases is their broad interdisciplinary nature. At the same time, unlike training tasks, in such situations there is no clearly defined set of initial data that must be used to obtain the only correct solution. Also, in the structure of the case there is no a number of questions that need to be answered. Instead of this, the student should fully understand the situation described in the case, and identify the problem and issues that need to be resolved. This ensures the development of independence and initiative, the ability to navigate a wide range of issues related to various aspects of management and research in the economy. Each economic or managerial discipline uses its own thesaurus, theories, processes, and qualitative and quantitative research methods. Case-study method provides an opportunity to expand this set and go beyond specific disciplines when analyzing the situation [3].

Using case technologies in teaching special disciplines will solve the problem of improving the education and training quality of qualified staff related to work. It’s necessary for the student to require important professional knowledge, standard requirements, employer requirements, practical knowledge for adapting to the conditions of real production. It is quite difficult to have all this

knowledge using traditional technology. Comparison of classical and interactive teaching methods is presented in the table 1.

Table 1: comparison of classical and interactive teaching methods

Comparison criterion	Classical methods	Interactive methods
	Emphasis on formation of knowledge and skills	On the formation of competencies
Logic of the educational process	From theory to practice	From the formation of a new experience to its theoretical understanding
Teacher's role	Source of information	Organizer of the training process, group leader, creator of conditions for student initiative
Students ' tasks	Mastering a certain amount of knowledge	Development of personality, cognitive and creative abilities

Materials and Methods

The case-study method or analysis of specific training situations is a method of active problematic and situational analysis based on learning by solving specific problem situations. The purpose of which is to develop and make a practical decision by students after studying the situation that arose under certain conditions [8-11].

The case-study method refers to interactive methods, the ideas of which are quite simple; the work takes place within groups, through dialogue, mutual cooperation and distribution of roles. The teacher organizes educational activities with the help of training.

Interactive educational practices increase interest in the discipline and allow students to live through the economic situation in a short period of time, pass it through themselves, do conclusions and thus get solid knowledge and competencies. One of the methods which is effectively used for studying organizational behavior is case-study.

Students are asked to understand a real life situation, the description of which simultaneously reflects not only a practical problem, but also updates a certain set of knowledge that must be learned when solving this problem. At the same time, the problem itself does not have definite solutions. Method of conducting classes using the case-study method is presented in the table 2.

Table 2: method of conducting classes using the case-study method

Phase of work	The actions of the teacher	The actions of the student
Before the class	1. He picks up the case. 2. He defines basic and auxiliary materials for training students. 3. He develops the lesson scenario.	1. He gets a case and a list of recommended literature. 2. He prepares individually for the lesson.
During the class	1. He organizes a preliminary discussion of the case. 2. He divides the group into subgroups. 3. He manages the discussion of the case in subgroups, providing them with additional information	1. He asks questions that extend understanding of the case and the problem. 2. He develops solutions, listens to what others say. 3. He makes a decision or participates in its adoption
After the class	1. He evaluates the work of students. 2. He evaluates the decisions made and questions raised.	1. He makes a written report on the lesson about this topic

The case-study method helps to develop the ability to analyze situations, evaluate alternatives, choose the best option and make a plan for its implementation. And if this approach is applied repeatedly during the academic cycle, students develop a steady skill for solving practical problems. Thus, although the case-study method technology itself is quite old, it is innovative for Russia, since it is based on innovative learning principles [12-13].

The case-study method combines features of many training methods. It acts as specific practice organization method of the educational process, method of discussions with the point of view of incentives and motivation in the learning process, method of laboratory control and self-control. From the point of view of binary methods, it combines many types of visualization. But, most likely, it should be considered visually problematic, visually practical and visually heuristic at the same time, since it provides a visual description of the practical problem and demonstrates the search for ways to solve it. Finally, by the criterion of practicality, it is most often a practically problematic method.

The case-study method can be presented in a methodological context as a complex system that integrates other, simpler methods of cognition. It includes modeling, system analysis, problem method, thought experiment; methods of description, classification, and game methods that perform their roles in the case-study method. The main methods that are integrated into the case-study method are presented in the table 3.

Table 3: methodological base of the case-study method

Method integrated in the case study	**Characterization of the method's role in the case-study**
Modeling	The construction of a situation model
System analysis	System representation and analysis of the situation
Thought experiment	A way to get knowledge about a situation through its mental transformation
Description method	Create a description of the situation
Problem method	Representation of the underlying problem
Classification method	The creation of ordered lists of properties, the parties that make up the situation
Game method	Presentation of options for the behavior of the situation heroes
«Brainstorming»	Generating ideas for solving the problems described in the situation
Discussion	Exchange of views on the problem and ways to solve it

When selecting information for a case, it is necessary to focus on educational goals. The data must be real for the study direction; otherwise they will not be interesting to students. When selecting information, teachers can work with companies that are interested in attracting young professionals. Business leaders can clearly explore the possibilities of future candidates, and students will have the opportunity to prove themselves, and the more companies participate, the more often the method is possible and, accordingly, students will receive more skills.

Attracting companies to help with the preparation of tasks can help teachers collect a high-quality and relevant case for work, as well as evaluate the opportunities of future applicants and identify interesting students for themselves. For students, this method makes it possible to practically apply the information they know and consolidate the professional skills obtained during lectures and seminars.

When developing a case, they should take into account the level of complexity of tasks and situations, and observe a strict correspondence between the level of case complexity and the level of students' preparedness. The main stages of creating a case based on the materials of a real enterprise are shown in Fig. 2

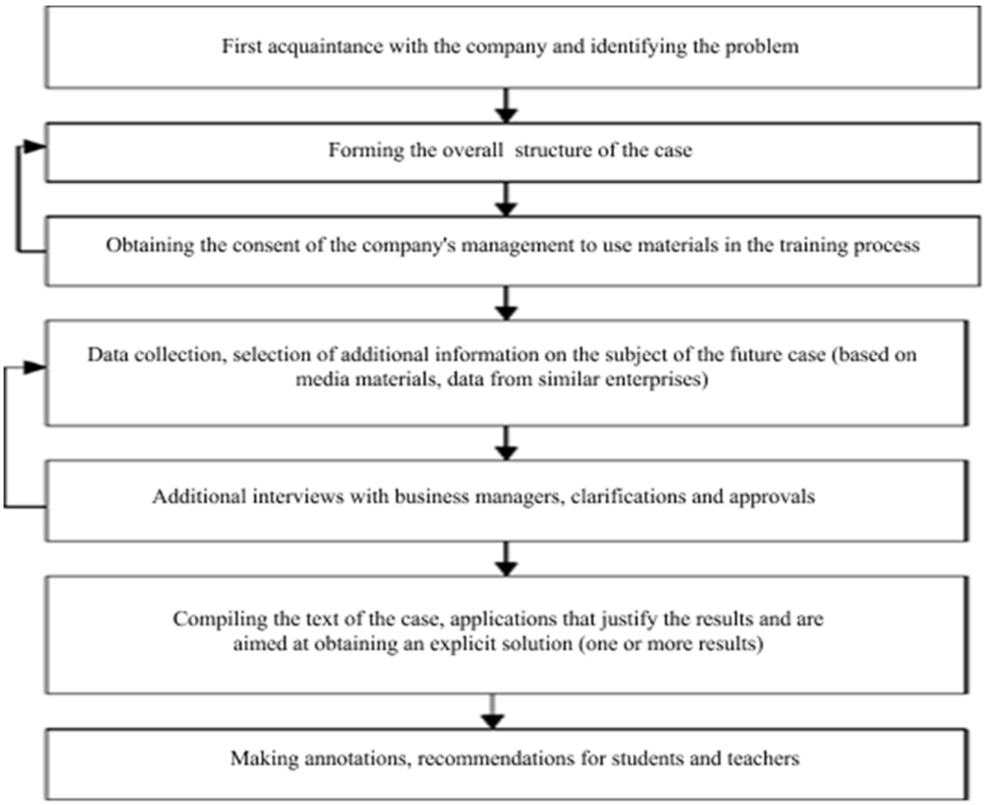

Fig. 2: The sequence of creating a case based on the material of a real enterprise

The general rule for working with cases is that nobody can use "outside" information. For example, if a student reads a message in the Internet about an enterprise whose problems are described in the case, the data from this message cannot be taken into account when completing the task. Since the student who decides this case is in the role of the decision-making manager, he has only the information that is presented in the task. Sometimes, on the contrary, the student may be given the opportunity to add facts from a specific market situation that existed during the time period in question. In such cases, the student's erudition and knowledge of the material should be taken into account.

The students can use the following methods of group discussion: brainstorming and morphological analysis in the implementation of the case. There are some criteria for the assessment of students:

- Professional, competent solution of the problem
- Novelty and originality of the problem solution
- Brevity and clarity of the theoretical part for the problem solution
- Quality of the graphic part in the problem solution design
- Discussion ethics
- The activity of all members in the small group
- Penalty points (violation of the discussion rules, incorrect behavior, etc.)

Results

So, it's better to evaluate the case-study method by students of our university from the institute of economics and management of agriculture, on the example of the disciplines "Fundamentals of management", "Business management", "Strategic management", "Anti-crisis management". The survey was attended by bachelors in the direction of 38.03.02 « Management» (50 people) from the first to the fourth year study. The evaluating the case-study method by students is shown in table 4.

Table 4: evaluating the case-study method by students

The case method contributed to:	Totally agree (person)	Rather agree (person)	I don't know (person)	Rather disagree (person)	Totally disagree (person)
better assimilation of the material	11	18	10	7	4
increasing interest in business topics	9	15	12	9	5
motivation to view business news and search for additional information	18	12	9	7	4
improved understanding of the issues associated with a career in business	20	15	6	6	3
adding confidence during interviews	24	10	8	8	-
development of abstract thinking and integration skills	15	11	12	6	6

There are some recommendations for working with the case method. The best assimilation of the material is promoted by:

- Gradual increase in case complexity
- Data visualization
- Availability of text information
- Time sequence of the material
- Scrupulous elaboration of the discussion strategy
- Setting a clear time frame depending on the complexity of the case
- Creation of conditions for unimpeded communication within the micro-group
- The ability to express their own opinion for each student
- Assistance of the teacher in case of difficulties in solving the case

Conclusions

The education system should be based on the maximum activity of students. Modern society is interested in its citizens being able to independently, actively act, make decisions, quickly adapt to changing living conditions, work with information competently (be able to collect facts, analyze, generalize them, put forward hypotheses for solving problems, making reasoned conclusions).

These problems can be solved if there is:

- involvement of each student in the active cognitive process;

- a clear understanding by the student of where, and how this knowledge can be applied;

- ability to work in collaboration to solve a variety of problems, while showing communication skills.

The main reasons for the introduction of the case-study method in the educational process are the orientation of educational standards on the development of students' practical skills and the formation of students' professional competence.

The case-study method is necessary in the educational process not so much for the development of specific knowledge or skills by students, but for the development of the competence potential of the student and the teacher.

Using the case-study method in the educational process generally has a positive effect on the learning process of students, as they will get relevant skills that will be useful in their work, and students will feel as involved in the learning process as possible, getting real professional skills.

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Determinants of the Behavior of Polish Consumers in the Food Market

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Abstract

Based on the assessment of the current state of knowledge, research premises can be formulated as a point of departure for this study. One is the complexity of consumer behavior, which forces the interdisciplinary nature of analyses and the search for new research perspectives. In the face of permanent changes in the environment, the search for new knowledge about consumer behavior will always be timely and practically useful. It should be emphasized that currently there is no single common stance as to what extent food consumption (level, structure, preferences for the degree of processing, etc.) among Polish consumers refers to global trends, and to what extent it stems from other conditions, e.g. cultural, financial, health, awareness, information or situational. The purpose of this article is to present the identified determinants of Polish consumer behavior in the food market. Secondary data in the form of literature and available statistical data was used in the research proceedings. To supplement these analyses, empirical material was also collected using a questionnaire. To that end, a total of 1,067 adult Poles were surveyed. In determining sample size, the size of the entire population in the study area was considered along with the assumption that the statistical inference regarding the fraction coefficient is set at a confidence level of 0.95 and a precision order of 3%. The initial data analysis included checking the correctness of the measurement tool and carrying out the analysis of internal compliance of the scales using the α-Crombach method. Statistical and descriptive methods were used in the analysis of the empirical material. A statistical analysis of the correlations between pairs of variables was performed using Pearson's chi-squared test of independence. In order to examine the coexistence of the category of more variables, correspondence analysis was performed using Bart tables. The confidence level was assumed at 0.05.
The conducted research indicates that the desired values to be found in a food product are: favorable price, taste values as a source of new sensations, health benefits, ease of use, or broadly understood social attributes. The improving income of Polish households provides opportunities to meet the increasingly sophisticated nutritional needs and contributes to the increased role of quality in consumer decisions. In Poland specifically, the impact of gender blending, which consists in blurring the boundaries between roles and behaviors traditionally attributed to women and men and adopting patterns of behavior of the opposite sex, remains low considering that sex was the variable most often differentiating the attitudes and purchasing behavior of the respondents.

Keywords: Consumer Behavior, The Food Market, Surveys, Statistical Data.

Introduction

The evolution of consumer attitudes and behaviors, both in the market and in other areas of social life, is significantly shaped by the socio-economic development of economies and the changes of structural and technological nature constantly occurring in the environment. Consumer needs and ways of satisfying those needs are transforming, and with them the way consumers make decisions, which is the result of progressing globalization and convergence processes on one hand, and disintegrative and divergent processes on the other hand. New technologies and communication methods also play an important role in this evolution.

Based on the assessment of the current state of knowledge, research premises can be formulated as a point of departure for this study. One is the complexity of consumer behavior, which forces the interdisciplinary nature of analyses and the search for new research perspectives. In the face of permanent changes in the environment, the search for new knowledge about consumer behavior will always be timely and practically useful. It should be emphasized that currently there is no single common stance as to what extent food consumption (level, structure, preferences for the degree of processing, etc.) among Polish consumers refers to global trends, and to what extent it stems from other conditions, e.g. cultural, financial, health, awareness, information or situational, as discussed by Bogdan Sojkin et al. (2009). The conditions underlying Polish consumers' purchasing decisions in the innovative food products market have not been fully identified either.

The purpose of this article is to present the identified determinants of Polish consumer behavior in the food market. Secondary data in the form of literature and available statistical data was used in the research proceedings. To supplement these analyses, empirical material was also collected using a questionnaire. To that end, a total of 1,068 adult Poles were surveyed. In determining sample size, the size of the entire population in the study area was considered along with the assumption that the statistical inference regarding the fraction coefficient is set at a confidence level of 0.95 and a precision order of 3%. The initial data analysis included checking the correctness of the measurement tool and carrying out the analysis of internal compliance of the scales using the α-Crombach method. In the study, the value of the Cronbach α-test was in the range (0.70 - 0.90), which showed that the scales had internal consistency and reliability (Hinton, Brownlow, McMurvay and Cozens, 2004). Statistical and descriptive methods were used in the analysis of the empirical material. A statistical analysis of the correlations between pairs of variables was performed using Pearson's chi-squared test of independence. In order to examine the coexistence of the category of more variables, correspondence analysis was performed using Bart tables. The confidence level was assumed at 0.05.

The essence of consumer behavior in the food market in the light of literature review

The behavior of consumers in the food market depends on various factors, which may be economic (i.e. product price, consumer income, savings, assessment of future consumer income), non-economic (especially personal, socio-cultural or psychological factors) or related to food quality (i.e. appearance, taste, smell, availability, etc.). K. Gutkowska and I. Ozimek (2009, pp. 118-132) argue that food market behavior is the result of factors such as:

- internal stimuli - the level of hunger felt, consumption patterns shaped in the family home,
- external stimuli - factors related to the external environment (fashion, reference groups);
- marketing mix elements

Researchers emphasize that food preferences are the result of genetic predisposition and environmental factors. Preferences for sweet and salty taste, or aversions regarding bitter and sour taste, are often the result of a genetic makeup. Learned preferences arise under the influence of the environment and experience (Niewczas, 2013). Food preferences are determined by (Jeżewska-Zychowicz, Babicz-Zielińska, Laskowski, 2009):

- food characteristics: taste, aroma (smell), texture, appearance;
- individual characteristics of the consumer: age, sex, body weight, personality, worldview, economic status, knowledge of food;
- characteristics of the social environment: family patterns and relationships, peer influence, mass communication, religion.

Consumers are looking for convenience and are increasingly migrating between available suppliers and forms of shopping. They are becoming conscious buyers who value their time. In the opinion of some researchers (Gutkowska 2011, Iwińska-Knop and Zając, 2015; Gregor and Gotwald-Feja, 2017), shopping behaviors are evolving towards a consumer profile that can be called all-channel,

hybrid. In what concerns Polish food consumers specifically, the following changes in attitudes can be observed (Bywalec 2010; Olejniczuk-Merta, 2016):

- rejection of a 'consumer civilization', based on a quantitative increase in consumption, in favor of qualitative aspects improving the quality of life;
- increase of critical attitudes towards the future and the effectiveness of the economic policy pursued;
- striving for personal growth, search for identity and internal balance which encourage greater interest in local food products,
- a return to tradition, which contributes to increased demand for regional products;
- a sense of responsibility for the environment and humans, expectation of sustainable development;
- consumer participation in the creation of innovations.

The consumer evolves from a passive, impersonal entity into an active and demanding partner, a part of the same socio-cultural tissue (Maciejewski, 2012).Differences in consumer market behavior, income disparities or different expectations regarding food products can be an inspiration for managers to increase market saturation with innovations.

Economic determinants of Polish consumer behavior in the food market

Economic conditions, such as the level and source of income or price level (Dąbrowska, 2006; Światowy, 2012; Andrejovská et al., 2015; Kułyk, & Michałowska, 2017) have a direct impact on the amount of individual food consumption and the tendency for it. At the same time it should be noted that the level and structure of consumption reflects the state of economic growth and the economic situation at large. Consumer income determines the ability to meet food needs, while the structure of household expenditure changes along with changes in income. In Poland, the level of average monthly disposable income per person in a household stood in 2018 at PLN 1693.50, up 42% compared to 2010, while the average expenditure per capita was at PLN 1,186.86, with expenditure on food and non-alcoholic beverages making up 24.8% of that - the largest share of the total. Nominal expenses in Poland were PLN 1091.19. The average monthly disposable income per capita in Poland is steadily increasing, while a systematic decrease in the share of expenditure is noted (Fig. 1). Households reported higher incomes with expenses staying at a similar level, pointing to an increased surplus of income over expenses and therefore an improvement of Poles' finances overall. In 2018, expenditure on consumer goods and services reached PLN 1,137 0.8% lower in real terms compared to 2017 (Fig. 1). Consumer income determines the possibility of satisfying food needs. Essential information on the degree of satisfaction of consumption needs is provided by the analysis of food indicators. This can be the share of expenditure on food and non-alcoholic beverages in total household expenditure, calculated on the basis of personal income in current prices. All income theories indicate that consumption follows income. Along with the increase in the standard of living and satisfaction of basic needs, the structure of spending on individual types of purchased goods changes: the share of expenditure on higher-order goods, including services, increases, while food expenditure decreases. The average share of food expenditure in total EU expenditure was 13%, and its lower share in individual countries is an expression of increased prosperity. In Poland, while this share is constantly decreasing, it is still significantly higher than the EU 28. The analysis of consumer income and expenditure confirms the hypothesis that the higher the economic development of a country and the income of its residents, the smaller the share of expenditure on food in total household expenditure (Gutkowska, Ozimek 2009, pp. 118-132). Research by Poland's Central Statistical Office (GUS) on households' self-assessed financial situation also shows that the number of households assessing their finances as either *very good* and *good* is growing, which may strengthen the demand for higher-quality, slightly more expensive but still healthy items. Favorable income changes may explain the observed trend among Poles to move away from quantitative consumption towards pro-quality consumption. As indicated by S. Figiel (2016), higher incomes determine the demand for sophisticated choices of food products geared towards fun, quality, health, personalization and the demand for a diet based on functional, organic, fresh and convenient food.

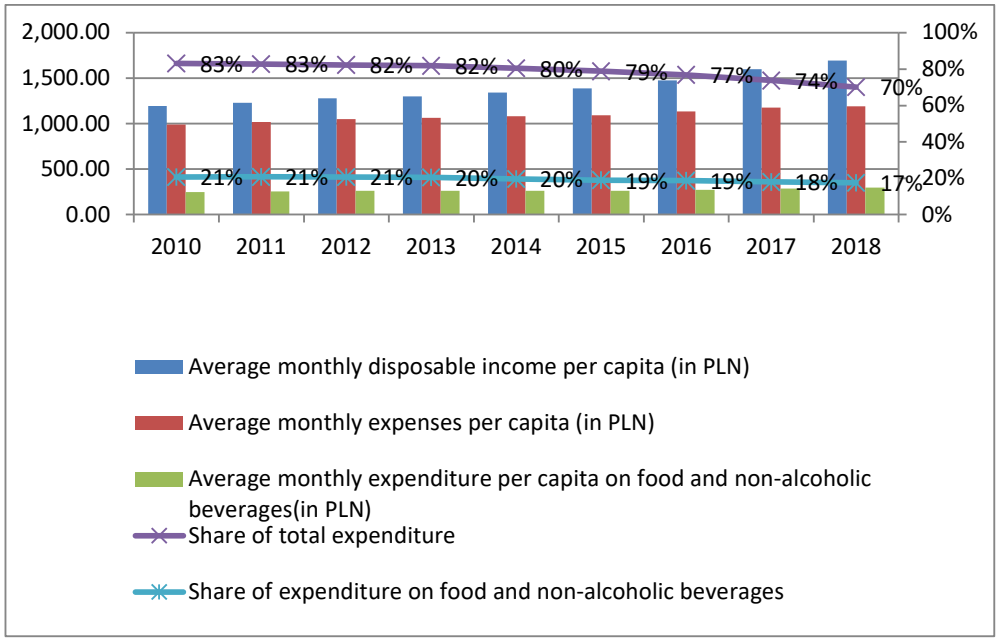

Figure 1: Average monthly disposable income and average monthly expenditure per capita in a Polish household and the share of total expenditure on food and non-alcoholic beverages in disposable income in 2010-2018

Source: Local Data Bank 2020

A certain barrier to the development of demand for higher-quality food products in Poland is still the relatively large diversity of average monthly income and expenses between various socio-economic groups of households. In 2018, the highest average monthly disposable income per capita in households (PLN 2012) and average monthly expenses (PLN 1,400) per capita were reported, as in previous years, in self-employed persons living in a non-rural household. In this group of, compared to the average for all households in Poland, both income and expenses were higher, by 18.8% and by 17.9%, respectively (in 2017) and by 20.1% and 16.3%, respectively. Since 2014, the income gap per capita in households has been systematically decreasing, as expressed by the Gini coefficient, but this trend stopped in 2018 when the coefficient remained at the 2017 level of 0.299 (Fig. 2). In Poland, there is a clear difference in the income situation of households from rural areas compared to those from urban areas (*Sytuacja gospodarstw* ..., 2019).

The share of expenditure on food needs is negatively correlated with consumer wealth. An increase in income triggers a decrease in the share of expenditure on food and a simultaneous increase in the share of expenditure on meeting higher needs (Kieżel, 2010). People with higher incomes are quicker to embrace new food products and adapt their purchasing behavior to current trends (Sojkin et al., 2009).

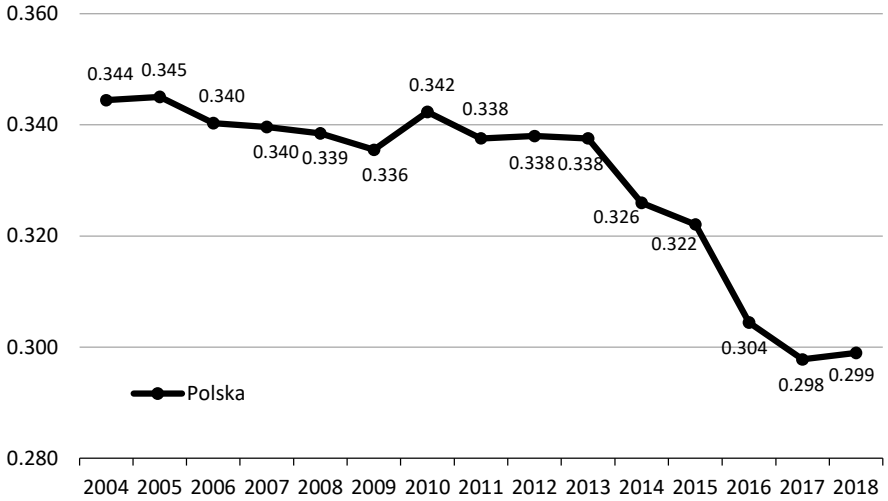

Figure 2: Income differentiation measured by Gini coefficient for Poland in 2004–2018

Source: Local Data Bank 2020

Socio-economic changes have significantly influenced not only the structure of household expenditure, but also the very model of food consumption. Their impact has been both qualitative and quantitative. Qualitative changes in the consumption of daily diet products over the course of twenty years were caused by greater availability and a more diverse range, as well as lifestyle evolution consisting, among others, in the increasing awareness of the role of nutrition in human life. In 2018, as in previous years, the downward trend in the consumption of most basic food products continued. The decrease concerned especially vegetables (by 3.9%), oils and fats (by 3.6%), bread and cereal products, fish and seafood (by 3.4%) and eggs (by 2.9%). In the meantime, fruit consumption increased the most (by 3.0%) (Fig. 3)

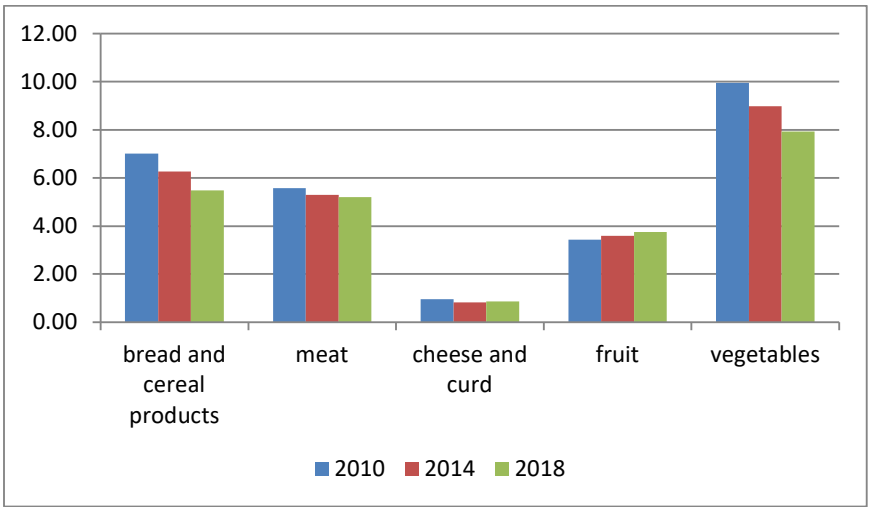

Figure 3: Average monthly consumption of selected food products per capita in 2010, 2014 and 2018

Source: Local Data Bank 2020

The level of consumption of food products is largely determined by household income. Along with the improved financial situation of household, the level of consumption of some food products such as bread and cereals, meat, vegetables, fruit, cheese and curd as well as mineral and spring waters increased. The level of food consumption is also influenced by eating habits, availability and prices of food products, the last being related to the place of residence. Households located in rural areas have a slightly different nutrition model than urban households (*Sytuacja gospodarstw*…, 2019).

The most favorable ratio from the perspective of the consumer, the total price index of consumer goods and services as well as of food and alcoholic beverages, was reported in 2015 and 2016, with the fact that the average monthly disposable income per capita increased (Figure 1) having contributed to an additional increase in the purchasing power. In 2015, consumers could buy more food than in the previous year, but this trend was notably worse in 2017, to improve significantly again in 2018 (Fig. 4).

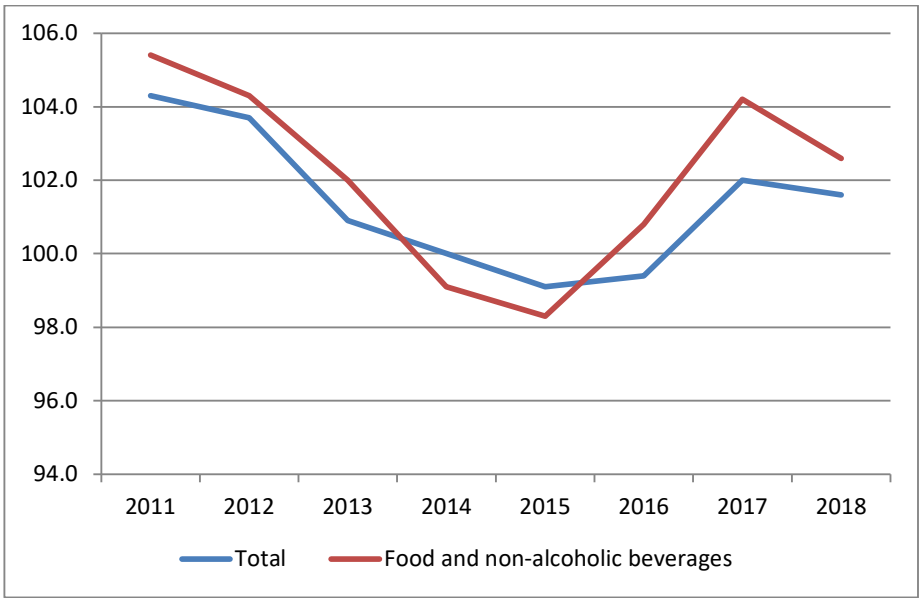

Figure 4: Total price index of consumer goods and services and for food and non-alcoholic beverages (previous period = 100)

Source: Local Data Bank 2020

Non-economic determinants of Polish consumer behavior in the food market

Food demand cannot be seen merely as a function of prices, income and consumer population. Food market consumers are also influenced by social and interpersonal factors. Herman et al. (2003) argues that the choice of food depends on the desire to convey a certain impression or to comply with social norms. There are strong theoretical reasons to suggest that perception of a reference group may affect consumption. The theory of social comparisons (Festinger, Carlsmith, 1959) explains that people compare themselves to others to show that they are fashionable or are keeping up with their reference group. Consumers feel different pressures from other members of the reference groups to suit their individual predispositions (Goldsmith et al., 2010). Scientists indicate that food consumption has the strongest connection with culture at country level, and therefore, compared to non-food consumption, it is less susceptible to the globalization process (Mazurek-Łopacińska, 2006). The influence of culture on eating behavior is reflected in national cuisine, food and nutrition habits, and indirectly finds confirmation in the diet patterns of individual nations. At that time, products consistent with tradition that has been cultivated for years are important. It should be noted that the same

physiological needs are met in different cultures according to current habits and customs. What is more, according to researchers Jan-Benedict E.M. Steenkamp and F. Ter Hofstede (2002), culture influences consumer beliefs and decisions regarding product quality. According to M. van Mesdag (2000), food-related products form part of the so-called culture-bound products.

Analysis of consumer lifestyles makes possible naming the main consumption trends which correspond to the expectations of food products. For example, the tendency to adopt a simpler lifestyle that is closer to nature requires the development of products seen as supporting this new art of living. These can be products such as healthy food, natural fibers, simple furniture and household tools (Mazurek-Łopacińska, 2003). In the food market specifically, fast lifestyle is playing an increasingly important role. It implies behaviors manifested in the preparation of meals using semi-finished products, or reaching for all kinds of ready-made foods.

The research sample was selected from the entire adult population of Poland, i.e. approximately 31,532,048 people. The sample size was set at 1,067 respondents who were selected based on their place of residence (village, towns of up to 30,000 inhabitants and over 30,000), age (up to 25 years old, 26-40 years old, 41-55 years old and 56 or more years old) and sex. Women accounted for 53% and men accounted for 47% of the respondents in the sample. Important factors determining consumer behavior in the Polish food market are also education and professional activity, especially in relation to women whose professional activation has changed the division of household responsibilities in the family. The in-depth analysis of our empirical material showed that gender was a significantly differentiating variable, and therefore the hypothesis about the role of gender in purchasing decisions regarding food products was confirmed (Barska, 2014; Barska and Wojciech, 2014). The identified correlations were expressed by the corrected Pearson C contingency coefficient, whose analysis indicates that gender differentiates the attitude of Polish consumers to information and its sources. Women definitely value personal sources of information, and unlike men, they also show greater sensitivity to other communication activities. Gender differentiated the assessment of the importance of information the most in terms of: expiry date (for women this information had a more important role, the weighted average value in the group of women was 0.66 higher), whether the packaging is biodegradable (also for women this information was more important, the weighted average value in the group of women was 0.61 higher). For women, information on nutritional recommendations (0.57 higher rating) and the content and type of preservatives (0.55 higher rating) were also more important. Men, meanwhile, rated the importance of information about the producer higher (by 0.22 points). The research also shows that eating habits, the fifth most important criterion for food-purchasing decisions, significantly determine the attitudes of Polish consumers.

Both in Poland and other developed countries there is a noticeable trend of the expansion of higher education, which translates into greater awareness in the field of healthy eating. Increasingly educated citizens are becoming aware of their rights as consumers and are able to use available market information to purchase goods that maximize their perceived value. This in turn places higher demands on producers and suppliers, with consumers expecting high-quality food products at a reasonable price. Non-price attributes of food products, which are a source of utility for the consumer, play an important role, too. These include: nutritional values, safety and convenience of consumption, place of production, environmental impact or production technology (Antle, 1999). The conducted survey research shows that quality, taste, freshness and price play a key role (Barska, 2013). It should be noted that Polish consumers are increasingly paying attention to food's nutritional value and its impact on their health. This is due to the increasing knowledge and nutritional awareness among consumers.

The analysis of correspondence in the group of Polish consumers for simultaneous occurrence of variable categories describing expectations towards a food product proves that consumers have high requirements for the broadly understood quality of food, defined as the degree of its healthiness, sensory attractiveness and availability in a wide consumer and social semantic range (Zalewski , 2008). Qualitative attributes are closely related to those of taste (marked as S_W) and they are a variable that least differentiates consumer expectations, as evidenced by the location of this criterion in the immediate vicinity of the projection center (Fig. 5). This means that consumers place high demands on this attribute. When evaluating the quality of a food product, consumers primarily take

into account the element of sensory evaluation, which is palatability and which should be understood as a set of closely interrelated taste, visual and fragrance impressions that the consumer feels at the moment of direct consumption of a product. Taste and aroma helps consumers assess the palatability of a product, while visual impressions are shaped by the consistency and texture of the food. Consistency determines the functional and sensory evaluation of properties related to hardness, brittleness and the shape and size of particles, while texture refers to the surface properties of food - humidity or juiciness. The same applies to the price (marked as C_W), which is an important criterion of choice. A significant group of respondents are linked by the importance of product composition (Sk_W), primarily in terms of health (Z_W) and the so-called fit values (Fit_W). Consumers want to eat not only less and healthier, appreciate quality and originality, but also wish to explore new flavors and share these experiences. These buyers pay attention to the share of ingredients (Sk_W) that have a positive effect on health, reduce the risk of lifestyle diseases, prevent the occurrence of disease threats and aging processes, which is verified by including by them in the purchase process relevant information contained on the label (ZI_E_W) and paying attention to designations (ZI_C_W). For them, a high degree of product processing (St_P_W) is synonymous with a loss of health benefits, which is why a significant share of the consumers prefer traditional products. Another group of important attributes are features related to ease of use and are associated with convenience foods in convenient packaging - disposable, single-serving products to eat on the go or during a lunch break at work (attributes marked as W_U_W, S_U_W, respectively – Fig. 5).

Consistency is significantly influenced by the conditions of product processing and storage, which is why food manufacturers, knowing the importance of texture in consumer choices, use a variety of practices that increase and consolidate food attractiveness (Cyran, 2014). Overall, today's consumers are mostly driven in their food choices by:

- convenience of purchase, use and preparation,
- the opportunity to express their views and professed values,
- maintaining fitness, health and beauty.

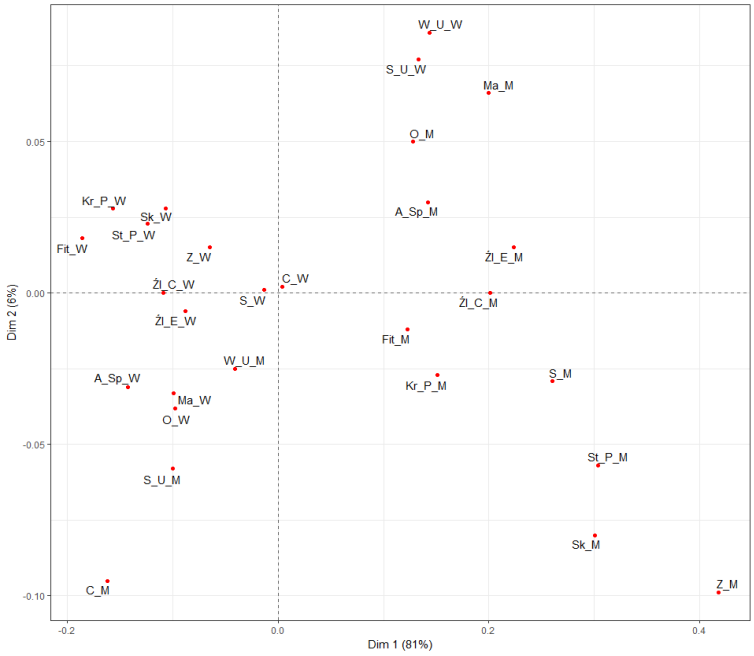

Figure 5: Graphic representation of the results of correspondence analysis for the simultaneous occurrence of variable categories describing the criteria of food product evaluation

Source: own elaboration and own calculations (R 3.1.0 software)

Legend:

W – somewhat or very important criterion in the process of food product evaluation
M – not at all or not very important criterion in the process of food product evaluation
Fit – relates to food properties such as content of ingredients with a positive effect on the body, including anti-aging and beauty-enhancing.
Z – relates to food properties such as content of ingredients that have a positive impact on health, reduce the risk of lifestyle diseases and prevent threats.
A_Sp - social attributes of the product coming from producers who comply with the principles of environmental protection, fair trade and animal welfare
Sk - product composition
Ma - product brand
ZI_E - label as a source of information
ZI_C– food certificates and designations
W_U - disposable single-serving products in special packaging (convenience foods), food products that can be easily used
S_U - processed or semi-processed products, ready to eat without additional treatment, ready to serve
St. P - processing degree of a food product
Cr. P - country of origin of a product
C - product price
O - ecological aspects of packaging

It is worth noting that the relationships between the categories of the indicated variables were mapped in a two-dimensional space, reproducing 87% of the original correlations, which is considered to be a very high value.

Conclusions

Consumer behavior in the food market is determined by the income and family conditions, as well as preferences, habits and culture-bound tradition. The improving income of Polish households provides opportunities to meet the increasingly sophisticated nutritional needs and contributes to the increased role of quality in consumer decisions (Barska, 2014). Modern consumers expect of food products to not only to satisfy their hunger, but also fulfill their hedonistic desires (e.g. products with high-taste qualities). There is now much interest in slimming or weight-loss friendly food (light products) and healthy energy boosters (functional food). Consumers want to save time when preparing meals (convenient, highly-processed or ready-to-eat products). A significant group of Polish consumers are not indifferent to preserving the values of the natural environment, which they express through their interest in organic food. The conducted research indicates that the desired values to be found in a food product are: favorable price, taste values as a source of new sensations, health benefits, ease of use, or broadly understood social attributes. In Poland specifically, the impact of gender blending, which consists in blurring the boundaries between roles and behaviors traditionally attributed to women and men and adopting patterns of behavior of the opposite sex, remains low considering that sex was the variable most often differentiating the attitudes and purchasing behavior of the respondents.

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Speech Act Empowerment for Building Humanistic Teaching

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Abstract

Education is the process of preparing the students so that they can carry out their lives. That goal will be achieved if schools implement a teaching system that uses the power to facilitate the students to participate in the learning process actively. Several experts indicated that the use of power would affect the perception and participation of students in the learning process. However, the results did not depict a representation of power in speech acts used by teachers or students. Based on the fact that this study was conducted to illustrate the representation of power in speech acts of teachers and students in the learning process. This study used ethnographic methods. The results of this study indicate that the use of the following directive represents power. Teachers and students in classroom discourse using four types of the directive, namely the command, request, ban, martial arts, and suggestions. Usage follows the directive of the commands and prohibitions have a level of restriction tends to represent the dominant power, while the use of demand, invite, and advice, have the power to represent the level of restriction humanist. Directive dominance level associated with the use of the type of modality and socio-cultural dimensions that build classroom discourse. The findings of this study imply that to foster active participation in the learning process, teachers should use a command that represents power humanist. Also, the realization needs to consider socio-cultural dimensions that build the discourse of class.

Keywords: Representation, Power, Speech Acts.

Introduction

As one of the educational institutions, the school is the domain that is inseparable from the use of power. In the process of learning in the classroom, teachers (T) and students (S) can not be separated from the use of power. Characteristics of classroom discourse influence the use of power in this domain. For Fairclough (2001) the school has a social order and the order of discourse involving the structure of the social space of its own.

Now the question is how to form the power usage in classroom discourse. Based on a review of the literature that can be reached, up to now, several studies discuss the use of power in the classroom discourse. For example, Abdullah and Hosseini (2012) concluded that teachers play a dominant role in the classroom so that students seem passive and helpless.

With a variety of speech acts, teachers and students build a culture of a particular communication that indicates the process of mutual influence or even dominate. The process indicates the use of a specific power. The speech acts were among the tools that can be used to control and adapt to the environment. Thus, the speech act is the basic unit of power representing the discourse of class teachers and students (Mey, 1996).

In this study, the representation of power in the speech act focused on the giving direction. This speech acts with various kinds constitute speech acts designed to encourage the hearer to do something. For Leech (2014), the speech act is often included in the competitive categories, namely illocutionary goal to compete in the social goals, such as commanding, requesting, and demanding. Power is the potent of a person to affect the thoughts, feelings, and behaviors of others. It is a potential power to influence others for good or evil, to be a boon or a whip Lee (2002).

The construct of the theory of power used in this study is proposed by the Raven (2017) where he divides power into five types, namely coercive power, legitimate power, reward power, power expertise, and power reference. The use of each power is related to the components of speech, among others, the difference institutional roles between teachers and students, the goal said to be achieved in the learning process, and the topics explained as controlling the flow of execution of the learning process, both in the classroom and in the laboratory.

The objective of this study is to determine how the representation of power in directing students as well as which directing reflects dominative and humanist power.

Methodology

The theoretical perspective implications methodology in assessing the power of representation in the discourse of class. Based on the theoretical perspective, this study uses ethnographic research of communication. Ethnography of communication understood as presented by Maschler, & Schiffrin (2015) defining the discourse based on the field of anthropology and linguistics. This approach recognizes the diversity of possibilities and habits of communication (cultural relativity), and the fact each is a custom integrated part of the thing known and do the participants said as a member of a particular culture. This study uses ethnography of communication of Hymes (2003), which saw a variety of shapes and meanings of the components of speech communication.

Collecting data is done through observation and interview techniques. By observation, the researchers conducted direct recording and recording field against a variety of learning contexts high school in Indonesia. This research was interviewing techniques using the technique of in-depth interviews. Data analysis was performed through an interactive model adapted from the model developed by Miles, Huberman & Saldaña (2014).

Result

Power Representation in Command

When compared with other types of directives, commands verbal performance is often regarded as the most explicit directive (Holmes & Wilson, 2017). Explicitness level command characterized by a direct relationship between the command illocutionary power with syntactic structure. These characteristics affect the levels of restriction and the nature of the power that it represents. The command has restriction levels are higher than other types of directives. According to Nugraha et al., (2018), high levels of restriction is because, in order, the speaker is a source deontic which has high levels of restriction to the hearer.

In the learning process, use the command has certain restrictions, whose levels are related to the characteristics of the structure and elements of the command builder. Based on these results the restriction levels associated with the direct command whether or not the command, the modality used, the type of diathesis selected, greeting words are used, and the length of the speech that builds a command. The following quote an example of using direct commands in the context of the initial direction of the semester.

[1] T: You should be able to follow the lessons well! (1) If it is too late, there are procedures that you must do. (2) Do not do mischief. (3) If a fight, who struck first should account for his actions. (4) The others, if there were ill, have permission. (5) Well, it seeks no letter. (6) The exit tries to have the certificate. (7) [...] If the lessons left behind more than one subject, all teachers must be asked for permission. (8)

S: (Students listen to the teacher's explanation and without anyone daring proposal)

Citations [1] contains several direct commands that are used by teachers to guide at the beginning of the semester. Following its role, teachers have the legitimate power to provide guidance and learning programs at the beginning of the semester. Submission of directing it tends to be dominating. The nature of the briefing dominating is shown by restriction level commands used and the direction of the delivery strategy. In the conveying direction of the teacher uses direct orders that tend to have high levels of restriction. The use of modalities to be in order (1), (3), (4), (5), (7) and (8) and modalities try on command (6) enhancing the levels of restriction commandments. Dominating nature directives were also demonstrated by the delivery strategy that tends to be instructive, not dialogue.

Beside related to whether or not the command, power restriction levels are also associated with the use of the modality in a speech that builds a command. Related to this modality, Fairclough (1998) states that the modalities are one of the essential things of value relational and expressive grammar value. Working modalities with the authority or power of the participants said.

The use of modalities in order pertained relational modality or deontic. The use of this modality showing the relationship of authority against counterparts speakers. Thus, the use of relational modality or deontic in power represents a valid command. The following quote proves it.

[2] T: [...] Thus, the smallest unit which? (1)

S: (Students seem afraid to answer so that the sound is not clear).

T: One does nothing, why was not fined. (2) The answer does not have to correct first. (3) Try to learn to express opinions! (4) Yes, who?

In the citation [2] revealed the use of several commands. In this context, the teacher uses the command restriction levels so low that power which is also represented more humane, Low levels of restriction is also caused by the use of the modality that tends to reduce the levels of restriction orders. The use of relational modality or deontic like it does not matter, not fined (in command (2)), does not have to (in the order (3)), and try (in the order (4)) to reduce levels of restriction orders. The students perceive that the order number represents power humanist. Though they are compelled to do something as intended by the amount of the order, they do not feel pressured.

The choice of having diathesis also affects the levels of restriction orders and the nature of power is represented. Judging from diathesis, follow commands revealed in classroom discourse can be divided into two, namely have diathesis command active and passive have diathesis command. When have diathesis active, the command has the restriction levels high, but so is transformed into a passive have diathesis orders, orders that have lower levels of restriction. In order to have passive diathesis, the subject of the sentence is precisely the target of the action, not the perpetrator. In fact, according to Fairclough (1998), lack of subject/agent on the passive have diathesis command causes the causality and the agent did not clear.

The representation of power in command is also influenced by the use of the address in the order. Eckert and McConnell-Ginet (2003), states that the word greeting associated with power and solidarity. The results of this study indicate that the use of an appropriate greeting affects the levels of restriction command and the nature of power is represented.

The findings of this study indicate that the use of the second person said greeting you, you, and the name tends to heighten the levels of restriction command. The following excerpt shows symptoms.

[3] T: Well, now that all kinds of tissues in the organ, you learn. (1) Please discuss, but the first bench! (2) To the upcoming meeting, I hope you had formed ten groups. (3) If I want, you should be ready. (4)

S: (Carry out the command teacher).

From the citation [3] it appears that the teacher uses several addresses so that he uses. In the speech (1) used the second person said greeting you, while in command (2) and (3) use the word greeting you. According to students, the use of both types of address tends to enlarge the dimensions of the social status of teachers as the ruling party and the students as those who are being governed. The word greeting was not to build equality and familiarity in the learning process. Therefore, in general, the students perceive the use of greeting it heightens levels of restriction orders that tend to represent a legitimate power which tends to be dominating.

The nature of the dominating power wane if the command was using the second person greeting you or brother. Although formal impressed, the students perceive the use of the greeting that just build up equity. Thus, commands using your greeting words and you tend to minimize the dimensions of social status thus represents a more human power.

Representation of power in demand

When compared with the command, request to have lower levels of restriction so that the power which is represented also tend to be more humane. Although it tends to be lower than the command, the demand also still has the restriction levels are heterogeneous. Heterogeneous linked to several factors as shown in the command, for example directly or absence of a request, the type used diathesis, modality is chosen, greeting words are used, and the length of speech that build demand. However, of all these factors, three dominant factors are affecting the level of restriction request, direct the least demand, the selected modalities, and the length of the speech that builds a request.

The participants said in the discourse of the classroom using direct request and requests indirectly. Fairclough (1998) states that there is a close relationship between the demand and power when the right to ask someone to do something because there is a power possessed. Forms of direct requests explicitly indicate power relations, while the form of indirect demand is clearly implicit.

The results of this study indicate that the use of the type of request adapted to the said purpose and participant said. For teachers, the main factor taken into consideration is the purpose of the speech. When it intends to provide a restriction that the students do something / do not do something, for example, teachers tend to use direct request. To clarify this exposure, the following quote is worthy of scrutiny.

[4] T: [...] Problems what about much signage in the city? (1)
S: (Respond with a voiceless loud).
T: Ha ..., can sound a bit harsh? (2)
S: Crime. (3)
T: Crime; correct it. (4)

Speech (2) in the above quote request classified as indirect. In that context, the teacher uses the structured interrogative request to ask the student to raise his voice when answering. In order not to give the impression that demand restrictive, teachers use indirect request. The use of indirect requests is usually related to empowerment (empowerment) students to achieve the learning objectives.

For students, in addition to said destination factor, counterpart also a consideration in the use of both forms of the request. When speaking to teachers, they feel more polite to use indirect request. When forced to use direct request, usually they are trying to reduce levels of restriction by using specific modalities or use a query with a longer speech. However, when speaking between them, the students can talk immediately and can also request an indirect request.

In addition to the direct or absence of speech, the degree of restriction related demand also with the modality used. The following excerpt will clarify this exposure.

[5] T: You see Worksheet on page 9 organ systems! (1) Try to give an example one kind of organ and gave an overview of how the organ was called as an organ. (2) Please put the bag! (3) [...]. For example, what? (4)

S: Small intestine. (5)
T: The small intestine's function What? (6) Please, explain its function!

From the quote [5] revealed three acts directive to the query form, namely speech (2), (3) and (6) respectively using the modality try, please, and please. The third use of adverbs modality seems to reduce the concentration of power represented restriction. Without the presence of these modalities, the third speech it becomes imperative request directly with the imperative structure which tends to represent more dominating power.

Representation of power in prohibitives

Directive to forms prohibitives also contains a command, but the command is negative, namely that listener not do anything. Prohibition tends to have high levels of restriction so that the power which represented tend to be dominating. The results showed that levels of restriction associated with the direct prohibition least the ban form and modalities used. Forms have a direct prohibition restriction levels higher than the prohibition of indirect, and restrictions with a particular modality is more restrictive than with other modalities.

High levels of restrictions, it has implications for anyone who has legitimacy ban prohibits and what it has done. The results of this study indicate that teachers use many bans rather than students. Use of the ban could occur in the process of briefing or the learning process. The following excerpt is an example of a ban that is used by teachers to guide at the beginning of the semester.

[6] T: I expected the rules respected. (1) Do not let the picket monopolized one person every task; it was his turn. (2) They already spent some hours, then followed by the others in the next hour. (3) Do not until told to remove by Mr / Ms Teachers without you having own initiative! (4)
S: (Students pay attention diligently).

In the citation [6] above, we see that speech (1) and (3) classified directive to form an outright ban with modalities do. Such prohibitions are likely represented the dominating power. Through the speech, teachers forbid students to make the bad habits in the classroom; the lazy do picket. Teachers submit this prohibition in his capacity as the guardian class, which is responsible for the cleanliness and order of the cultivated classes. Therefore, it is reasonable that teachers use legitimate power to prohibit students to do lazy picket.

The use of forms of this prohibition may occur in a variety of topics and purpose said. In the learning process, for example, teachers also use restrictions. Typically, the ban was related to the prevention and streamlining of deviant behavior, understanding and skills improvement in specific learning topics. Representation of the power generated is dominating.

From the results of this study revealed that high levels of power restriction would increase if used specific modality that shows the attitude of force. When giving a ban on high-yield restriction, in addition to using modalities do, teachers also often use other modalities, such as prohibited, not allowed, not allowed, not allowed. Conversely, if reducing the levels of restriction restrictions placed, in addition to utilizing the modality, the teacher also uses the structure of a specific prohibition, namely (a) using indirect prohibition with structure declarative, interrogative, gestures, and innuendo; and (b) using a certain modality that can reduce the levels of restriction.

Ban the use of the above tends to represent a reference power or power behavior. According to teachers, the use of forms that such restrictions could reduce the threat advance. Although it is indirect, in certain contexts, the use ban as it was very effective. The symptoms are aligned with Kaur & Pahuja (2019) stating that in the discourse of class, there are three prominent power, namely power expertise, legitimate power, and power reference. Power coercion and power prize as supporters of the three main power.

Although rarely use ban, sometimes students also use one form of this directive, especially when spoken between them. The following excerpt shows the symptoms.

[7] S1: Sst ... do not crowded! (1) We will be answering questions The next group 6: what causes the planets and away from the sun? (2)
S2: (Students instantaneous not crowded).

From the citation [7] appears that students using speech (1) to prohibit other students that are not crowded. The speech pertained outright ban that has a high restriction. The use of hush gesture reinforced high levels of restriction ban and modalities are not commonly used to stop the commotion in the classroom. Frequently, the ban was used by speakers that have a social role parallel to or higher than the hearer. Such prohibitions are likely to represent the power of coercion.

Representation of power in invitation

When compared with other forms of the directive, invitation directive forms that have the lowest levels of restriction. Low restriction invitation indicated by the use of the modality. In the Indonesian language, speech discloser form this invitation can use multiple modalities, such as please, let it be, allowed, welcome, and allowed (Rahardi, 2000). In a directive to use classroom discourse invitation shape represents the power of teachers and students. For teachers, the use of invitation to reduce levels of power restriction or build equity with students. However, for students, the use of invitation to show politeness in order not to threaten the teachers face. Citation [8] contains the invitation of speech teacher.

[8] T: [...] How, no one asked this? (1)
S: Question, sir. (2)
T: Yes, please! (3)
S: Meeting the charge that what means.8 (4)
T: Meeting of the charge is the average mean it. (5) Thus, they spread the average of the load. (6)

Speech (3) in the citation [8] belongs invitation. Invitation it as a response to students asking utterances mean he had not yet mastered the material. Forms such invitation much revealed in the speech teacher. For example, the teacher let the students into groups; teachers invite students who want to criticize the idea of another student's role in the discussion; in fact, the teacher let the students when they dispute the idea or presentation. Teachers do not press students to trust what it explains. In that context, the teacher let students develop ideas or thoughts, without intimidation or emphases. Please make use of the modality as a teacher rather than as the dominant nor dominated parties,

Use of the directive with invitation form was not only used by teachers, but students can use the invitation. The following excerpt shows symptoms.

[9] S1: Questions. (1)
S2: Oh, yes, please! (2)
S1: E ..., you see, the sun was right as well as a star, for example a star A and B. Review (3) Now, A can move, why the sun not moving? (4) If the star A is moving, the sun also has the potential to move. (5)
S3: I will try to answer, yes. (6) [...]

In the discussions, utterances like invitation (2) in the citation [9] is often revealed. Usually, the speech used by the moderator or presenter when there are participants in the discussion to ask, deny, or provide clarification. An invitation like utterances (2) tends to represent the power of humanist.

Representation of power in suggestions

As one of the directive, suggestions are also likely to represent power humanist. In the discourse of class, students are a rare act of advising teachers, unless they are asked by the teacher to give suggestions. More advice was given to students or student teachers to other students. This is understandable because based on the data found, suggestions tend to represent a legitimate power and

power expertise of the participants said in classroom discourse. The following quote is worthy of attention.

[10] T: [...] One is not the issue. (1) I remind you now if you go forward to no need to fear any front. (2) One was not anything in the study. (3) But then if replay should not be ...? (4)

S: False. (5)

T: Ha, yes. If the test should not be wrong. (6) Do not reverse: if the exercises are wrong, if not afraid of any test. (7) We are not a good use of these principles. (8)

In the citation [10] that there is a directive to the shape of advice, namely speech (2), (3), (4), (6) and (8). Illocutionary power of speech is not indicative of coercion from teachers. Realization of advice tends to depend on the awareness or willingness of students. The use of several modalities, such as no need to fear either, one does nothing, it is, and no good can lower restriction such suggestions. Therefore, it represents the fifth suggestion of humanist power.

Directive to the shape of the advice also revealed in the speech of students. Following the position and role as a student, the advice they provide is more often directed at other students, not for teachers. In reality, the act of giving advice lot going on when discussions. The following excerpt is proving symptoms.

[11] S1: I'm sorry, from the information we have gone too far. (1) So, here the conclusion that the data you too pessimistic about progress technology. (2) [...]

S2: I think we can think. (3) As a thinker candidate should, we can argue. (4)

S1: Well, we should take the middle course. (5) In the opinion Our group you are asking right in the opinion of our group. (6) [...]

Many suggestions were revealed in quotations [11]. The suggestions came from students devoted to other students after the discussion without having obtained a consensus. The third suggestion was to use different modalities. Suggestions (3) using the modality I guess, suggestion (4) using a modality should be, and suggestions (5) used preferably. Of the three , suggestions (4) seems to have higher power than the second restriction other advice. However, modality restriction levels should remain lower than the modalities should be, which is usually used in the directive with the order form. Thus, all three of these suggestions have lower restriction levels that tend to represent the power of humanist.

Discussion

The findings of this study indicate that the directors of speech acts with various kinds of power represent teachers and students. With a directive speech, acts of the participants said in class discourse interplay of thoughts, feelings, and behaviors to achieve the learning objectives. Thus, the use of directive speech act represents power used by teachers and students to achieve the learning objectives.

The findings of this study in harmony with the opinion of Mey (2012) states that speech acts are among the tools used to control our environment, and conversely also the tools to adapt to our environment. In the process of communication, speech acts are used to control the environment or adapt to the environment representing the domination of power by certain properties.

In the perspective of speech act theory of Austin or Searle, dimensions of socio-cultural materials are not used for prediction and explanation of the characteristics and behavior of speech acts, Lockwood et al., (2019) show some ideas in the development affecting shift in language study, which was focused on studies of the structure of language, then leads to the function of language.

For Thompson (2003), experts speech acts duly into consideration the social a communication, but they rarely acknowledge the social character of these conditions. The conditions of suitability proposed by Austin and Searle refers to 'conventional procedure' to be followed by performative utterances are worth. However, they have never been tested in detail conventional conditions, let alone explore its relationship with the institutions of which they are part.

Wacquant (2019) in analysing the Bourdieu's Dyad: *On the Primacy of Social Space and Symbolic Power*, argues that the effectiveness of performative utterances can not be separated by the existence

of an institution that defines the conditions (such as place, time, agents) must be met. In reality, the institution granting the user authority to bring forth an action language by displaying the speech acts.

Conclusion

Power is an integral part of classroom discourse. All activities in classroom discourse, both in the context of a briefing at the start, learning in the classroom, as well as laboratory experiments are related to the use of power. The use of power is influenced by socio-cultural dimensions (Rajiani & Pyplacz, 2018) that build the discourse of class, especially the differences in institutional roles between teacher and student.

Associated with the representation of power in acts directive, the participants said in a discourse of class uses four types of the directive, namely the command, request, prohibition, and suggestions. The uses of a follow-directive type of commands and prohibitions have high levels of restrictions that tend to represent the dominating power. Meanwhile, the use of demand, invitation, and advice, has lower restriction levels that represent power humanist. Restriction levels and the nature of power that affect the legitimacy of the users follow the directive. Following its institutional role, teachers have the legitimacy to rule and prohibit the student, but not vice versa.

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Modalities for Knowledge Management in SMEs

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Abstract

The main purpose of research presented in the article was the diagnosis of the knowledge management process in small and medium-sized companies in the Lower Silesia Voivodship. To achieve the goal, the first part of the article explains the meaning of the term "knowledge" in the literature of science about management. Next, on the basis of the conducted research (in three Universities), an attempt was made to answer the questions: what are the barriers to the intellectual development of the organization and how companies develop knowledge management. Based on the research, conclusions have been presented and can be used to improve the discussed knowledge management system.

Keywords: Knowledge, Knowledge Management.

Introduction

The development of a knowledge-based economy and globalisation have led to a revolution in management concepts. In its annual report of 1975, Chaparral Steel published an information that its strategy and structure would be based on knowledge management, which was a milestone in terms of knowledge management.

The development of knowledge management concept was first and foremost influenced by modern IT systems used in management. "Bare" data, interpreted appropriately by people enabled distinction of an additional level that became a decisive factor regarding effectiveness, namely knowledge. The possessed knowledge resources began to determine company value. It should be also noted that this resource does not belong to organisations, but to the employees themselves. It is first and foremost the employees' knowledge contained in their minds, which results from their experiences, trainings and talent, and determines the intellectual capital of the organisation. However, accountancy of competence assets and intellectual capital enables introduction of units assessed in monetary terms, employee competence and their source into the books.

Since the end of the 20th century demand for information and knowledge has been enormous. Its possession is related to an increase in effectiveness and, as a result, leads to gaining competitive advantage. It should be also added that products and technologies have become more knowledge-consuming (Dabic, Kiessling, 2019). Contemporary organisations are focused first and foremost on change and innovation that guarantees survival on the global market (Crespo, Griffith, Lages, 2014). H. Tanriverdi showed that IT relatedness plays a role in augmenting knowledge management capabilities and organizational performance (Tanriverdi, 2005). Intellectual capital (the level of possessed knowledge in particular) determines competitiveness of the company and generates its "added value". The phenomenon is unique as it is clear from the quoted definitions that "knowledge carriers" are people, not companies. People have become their most valuable assets. Thanks to people, companies can develop and compete with others. It should be noted, however, that the same people constitute the "critical mass" in every company. Employee competence development has

become the key activity of the managerial staff. Managers realize that the employees should develop professionally along with the organisation, forming a so-called intelligent organisation.

The contemporary, knowledge-based organisations increasingly often seek people who eagerly learn and are open not only to improving their qualifications, but also to the development of the possessed professional competences. Survival of the organisation on today's market and its competitive advantage can be ensured by its employees - experts, people who possess unique knowledge or skills devoted to the company. According to the demographic indices, shrinkage in the resources of the labour market can be predicted. For these reasons, it is preferred to hire employees with the greatest potential in terms of development.

The concept of knowledge management in the literature on management sciences.

Attempts at defining knowledge were already made in the ancient times (Galata, 2004). Greek philosophers, such as Plato and Aristotle, were the first ones to try to define what knowledge was. Socrates, Plato and Aristotle stressed that the measure of wisdom was the ability to show surprise (I know that I know nothing). Attempts to explain this concept were also made by the supporters of idealism (Descartes, Kant), empiricism (Locke, Hume) and the 20th century philosophers (Ryle, Macmurray).

Information (latin: informatio) means representation or image. It is an interdisciplinary term that is differently defined in various fields of science. In managing knowledge, organizations must implement procedures that will allow them to overcome dilemmas related to the observance of secrets. On the one hand, permission to provide data on the other, information provided (Hannah, Parent, Pitt, Berthon, 2017). Employees' obligation to trust confidentiality is forced by contracts concluded with the employer (Liebeskind, 1997).

M. Armstrong defines it stating that "knowledge is an information prolonged for productive use, it is individual and often difficult to grasp, and can be elusive" (Morawski, 2006). He says that "knowledge is exhaustive and comprehensive, blatant and hidden, common and personal, physical and intellectual, static and dynamic, verbal and encoded". Knowledge is a network of connections and interactions. The knowledge network is a dynamic structure, not a static one. The role of knowledge networks is to promote interactions such as knowledge acquisition, knowledge transfer and knowledge innovation, and knowledge transfer by connecting a series of interconnected network nodes (Chen, Xu, Zhai, 2019).

According to K. Perechuda "knowledge management is a process of continuous implementation of management functions, focused on knowledge-related resources (internal and external, existent and non-existent, known and hidden) and the tasks and instruments of organising and communicating" (Perechuda, 2005). Knowledge management systems (KMS) are “information systems that are perceived to facilitate organizational learning by capturing both content and process knowledge and making these knowledge available to all employees (Al-Tal, Emeagwali, 2019). Knowledge management involves four processes: creation process, transfer process, integration process and application process (Asiaei, Bontis, 2018).

L. Wełyczko (like M. Komanda) considers human capital in three levels (Wełyczko, 2012). The first level is management of individual human intellectual capital. The process of developing professionally by participating in courses, trainings or post-graduate studies is important in this case. As a consequence, it leads to a change in the implementation method of such subfunctions of staff management as selection for positions, implementation of professional careers or staff turnover. The second level is managing the intellectual capital of a team of employees. Organisational culture in a given organisational unit, which is the same as human personality, is of utter importance. It distinguishes it from others. Attention should be paid to the developed team work system, participation of the employees in achieving the objectives of the organisation, the current system of motivating the staff, communication and interpersonal relations among the employees. Managing

the intellectual capital of the organisation is the highest level. It is primarily about developing such mechanisms that the synergy effect is the result of each team's work, and it subsequently occurs also in the links between the groups and the environment.

Building the intellectual capital of the organisation becomes possible thanks to knowledge sharing. It depends on many factors: organisational, individual and technical (Figure 20), (Brzeziński, Mietlica, 2011).

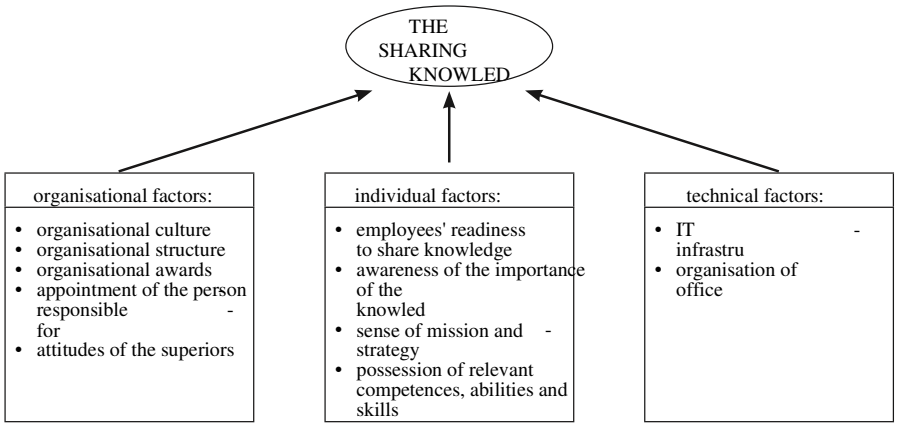

Fig. 1: Factors influencing the process of knowledge sharing
Source: M. Brzeziński, D. Mietlicka, 2011

Knowledge management involves several elements like human resources practices, technology, culture and organizational structures (Abubakar, Elrehail, Alatailat, Elçi,, 2017). The factor that significantly influences knowledge sharing is the organisational factor. First and foremost, organisational culture plays an important role. It primarily comprises the adopted norms and values which distinguish the organisation form others.

Organisational culture also includes ways of communicating, the preferred management styles, the adopted motivational system, teamwork, mutual respect and trust. The attitude of the supervisors towards openness in terms of knowledge-sharing as well as creating proper and friendly atmosphere is also important.

Managers can increase knowledge sharing by creating a less centralized structure that supports communication among employees. Knowledge sharing can increase when it is embedded in the daily work routines and shared in informal meetings in open workspaces (Abdelwhab, Dddp Selvam, Paris, Gunasekaran, 2018). In promoting knowledge management, the manager uses immaterial (recognition, status) and material (financial rewards, bonuses) incentives. In this way, they want to encourage employees to share knowledge (Kianto, Sáenz, Aramburu, 2017).

The individual factors should also not be forgotten. On the one hand, the employees should be willing to gain knowledge, on the other - to share it with their coworkers. They have to be aware of the current importance of knowledge in terms of achieving competitive advantage in development and innovation-oriented business. They must be emotionally attached to the organisation and know its strategy and mission. Efficient knowledge management is possible thanks to appropriate technical infrastructure which manifests itself in proper organisation of office space, but first and foremost in possession of modern IT technologies.

Barriers related to knowledge management should not be forgotten while discussing the matters related to it. Many of them can be attributed to the employees, but a significant amount of the obstacles result from organisational culture and include (Krok, 2007):

- fear of losing the position at the organisation (the "knowledge is power" syndrome is revealed);
- underestimation of oneself, lack of belief in one's ideas and in oneself;
- isolation in sharing;
- lack of appreciation from the superiors;
- lack of time for both increasing the level of one's knowledge and sharing it;
- lack of positive role models in company's managerial staff in terms of knowledge sharing;
- lack of trust in the source of knowledge;
- lack of trust in the potential recipients;
- unfriendly organisational culture aimed at individualism and non-preference of teamwork;
- competition and envy between the employees, divisions;
- unfavorable communication system in the organisation;
- lack of IT infrastructure;

Methods and characteristics of the research sample

A number of research methods were used in the studies:

- studies and analysis of the literature on knowledge management;
- studies and analysis of the results of the conducted studies related to knowledge management;
- participatory observation;
- diagnostic survey;

The leading method in the conducted studies was diagnostic survey. The other research methods applied in the study were auxiliary (complementary).

The survey questionnaire was developed on the basis of literature analysis. Part-time students of three Universities of the Lower Silesian Voivodeship participated in the studies. In the research, the following variables were set as independent variables: the gender of the respondents, the age of the respondents, the size of the company (workplace), the place of residence.

The respondents are part-time students at three Universities in Wrocław and nearby municipalities. A total of 356 students were examined. The studied group was evenly divided on the basis of gender. Women constituted 51% of the surveyed group and men constituted 49% of it. The gender of the respondents is presented in Fig. 2.

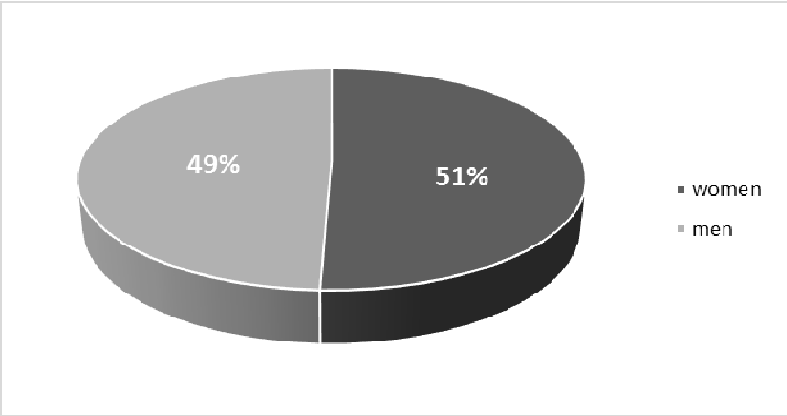

Fig. 2: The group studied according to gender.

Source: own research

About 69% of the respondents were young people aged 19-29. 19.7% of the respondents were aged 30 to 40. The least numerous group were students over 40 years of age (11.2% of respondents). During the analysis of the structure of the group examined in terms of age, it should be noted that the respondents are young people at the stage of preparation for a career or early professional career, during which a crystalisation, the narrowing of the field of exploration and finalisation of the choice of profession take place. They recognise the need for continuous improvement and learning. They want to build their own intellectual capital to ensure their competitiveness on the labour market. It consists primarily of acquired knowledge, skills and experience, which are used in the work performed. They invest in themselves while simultaneously having higher requirements regarding career and professional development. The age of respondents is shown in Figure 3.

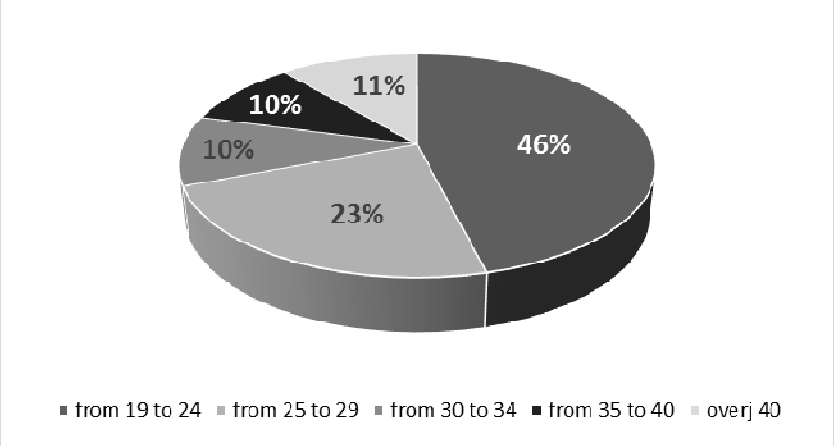

Fig. 3: Group examined in terms of gender

Source: own research

About 35% of the respondents are employees of companies employing more than 100 people. Over 21% of students were employed in medium-sized companies (from 21 to 50 employees) and the same percentage in organisations employing from 6 to 10 employees. The companies employing from 51 to 100 employees account for only 10.1% of the respondents. Respondents are mainly employees of small and medium companies due to the fact that they live in the surrounding villages. The employment of respondents in terms of the size of the company is shown in Figure 4.

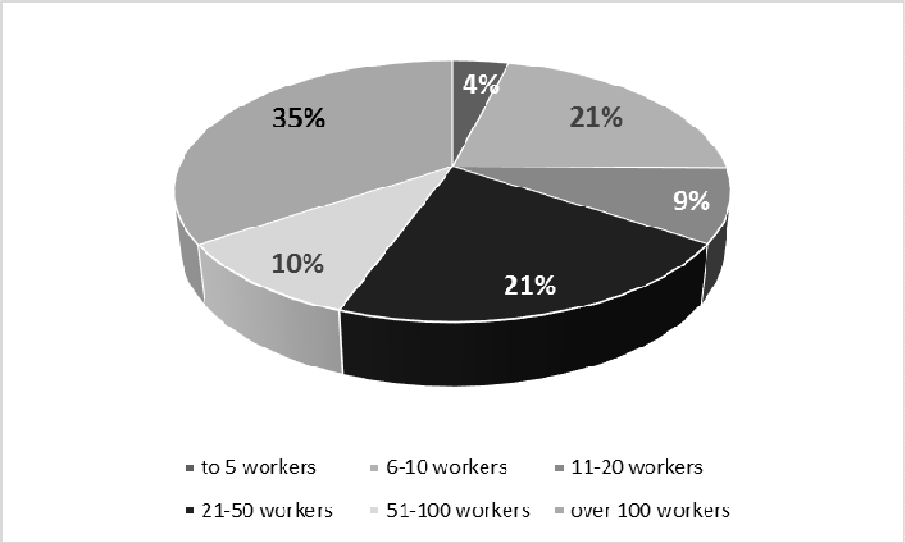

Fig. 4: Employment of respondents due to the size of the company

Source: Own Research

Two of the examined Un**iversities were located in poviat towns in the Lower Silesian Voivodship. Therefore, 43% of the respondents are** inhabitants of small municipalities with up to 50,000 inhabitants (Figure 5). Almost one third of the respondents are rural residents (over 28%). A relatively small group of respondents are inhabitants of municipalities with up to 10,000 inhabitants (7.3%). Only 1.1% are residents of larger cities. Therefore, the respondents are employees at small and medium companies.

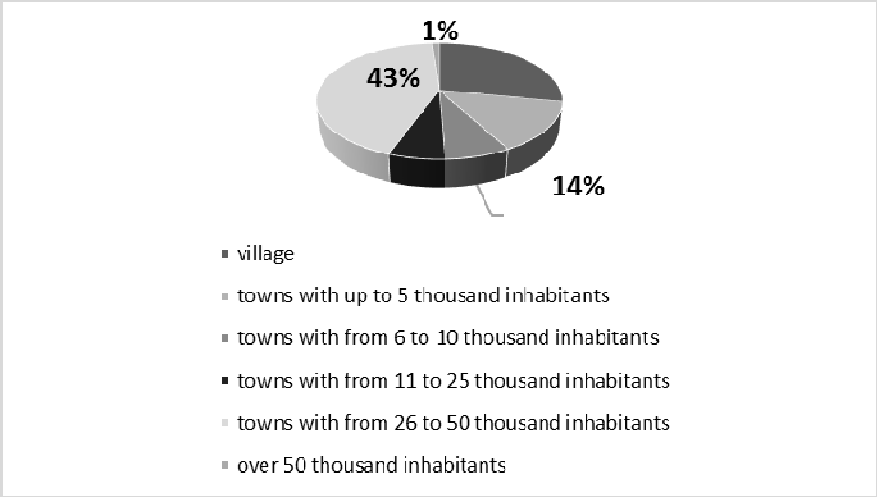

Fig. 5: Respondents' place of residence

Source: Own research

Barriers to knowledge management implementation

Implementation of "knowledge management" in the organisation brings certain benefits which concern three entities: the organisation, the employees and the market. In the survey, the respondents were asked for opinions on how the employees benefited from the presence of "knowledge management" in an organisation. Their opinions are shown in Figure 6.

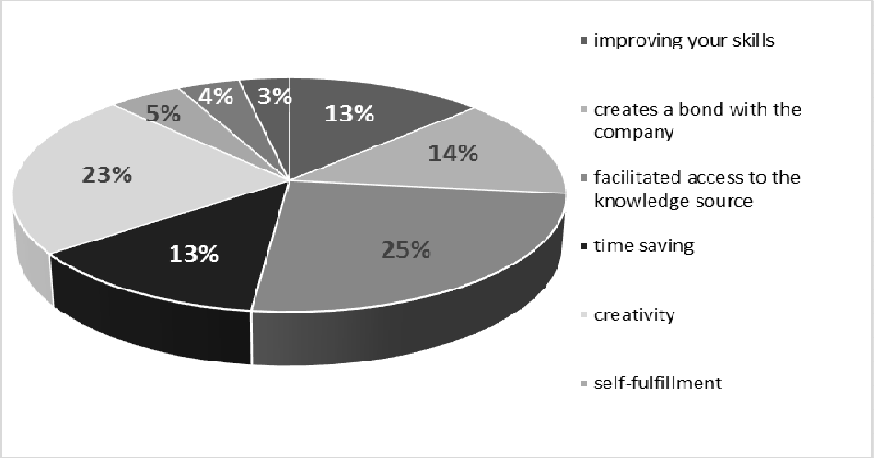

Fig. 6: The opinions related to the employee benefits resulting form "knowledge management"
Source: Own research

Every fourth respondent (25%) believed that "knowledge management" facilitated access to the knowledge source at a company. This entailed optimisation of the work performed and, as a result, its higher efficiency. It can be, therefore, concluded that they value such features of knowledge as transferability. Thanks to it, it is possible to use the knowledge resources in various areas at the same time (simultaneously by individual employees, in various departments or divisions of the company). This results in optimisation of work process.

Approximately 23% of the respondents stated that "knowledge management" positively influenced employee creativity, which resulted in generating new values for the organisation. They probably had in mind such attributes of knowledge as subjectivity or self-supply. While discussing subjectivity it should be remembered that an employee strives for professional excellence. The result is the creation of new concepts and ideas. Using knowledge resources and sharing it within the organisation causes its growth. This, in turn, generates new ideas and innovative solutions.

Almost 14% of the respondents believe that the presence of "knowledge management" attaches the employees emotionally to the organisation, and creates a bond with the company. It results in low turnover of staff. The respondents view this as a chance for organisation functioning in the conditions of limited human resources. In the recent years, more and more companies have been struggling with finding qualified staff. This problem affects practically the entire Europe. Increasingly often, while taking up employment, employees take into account such factors as the atmosphere, the sense of self-fulfillment, or the opportunity for professional development.

For 13% of the students "knowledge management" meant time saving. Skillful knowledge sharing improves virtually all processes in an organisation.

More than 13% of the respondents view "knowledge management" as an opportunity to improve their skills, and treats it as continuous development. For many employees this factor is more important than financial matters. The desire for perfection is a part of human nature.

In the opinion of the employees, less significant benefits included: self-fulfillment (5%), satisfaction with work (4%), increase in the competitiveness of the employees on the job market (3%).

There are a number of barriers in terms of "knowledge management" Some of them are related to the company's own organisational structure and others - to interorganisational cooperation. In the studies, an attempt was made to determine the factors that constitute a barrier to "knowledge management" between organisations. The results are presented in Figure 7.

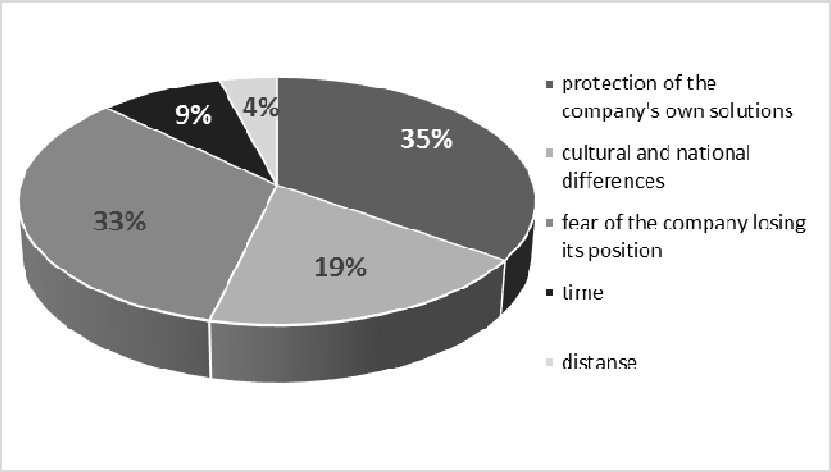

Fig. 7: Respondents' opinions regarding "knowledge management" between organisations.
Source: Own research

According to the opinions of the respondents (35%) the biggest barrier to knowledge management at interorganisational level is protection of the company's own solutions. It shows that the company fears losing its own innovative ideas and solutions before they are patented. New, innovative products and services are the factor ensuring that the company will maintain its good economic condition, and, thus, remain competitive.

The fear of the company losing its position on the market constitutes another barrier (33%). Knowledge acquired by the competition may decrease the bargaining power of the company, and, thus, lead to a decrease in or loss of competitive advantage of the company. In fact, both factors are closely linked. Own, innovative solutions ensure company's survival in such turbulent environment.

Every fifth respondent (19%) believes that cultural and national differences constitute a barrier as well. A considerable part of our behaviours results from the acquired habits or the upbringing characteristic of a given cultural area (ethnic group, region). Cultural differences should be indicated primarily in communication, knowledge, values and attitudes. The possessed knowledge and the context in which it is used can also be interpreted in various ways.

The conducted studies also show that the time spent on building trust and loyalty between companies does not play an important role in "knowledge management" (9% of the respondents indicated time as a barrier).

Distance was believed to be a barrier by 4% of the respondents. Therefore, it can be assumed that it is a completely irrelevant factor. It is transferability of knowledge that makes distance so insignificant in the contemporary world.

Participation in local economics forces Polish entrepreneurs to develop the intellectual capital of organisations. The respondents systematised the biggest barriers of such development, and their opinions are presented in Figure 8.

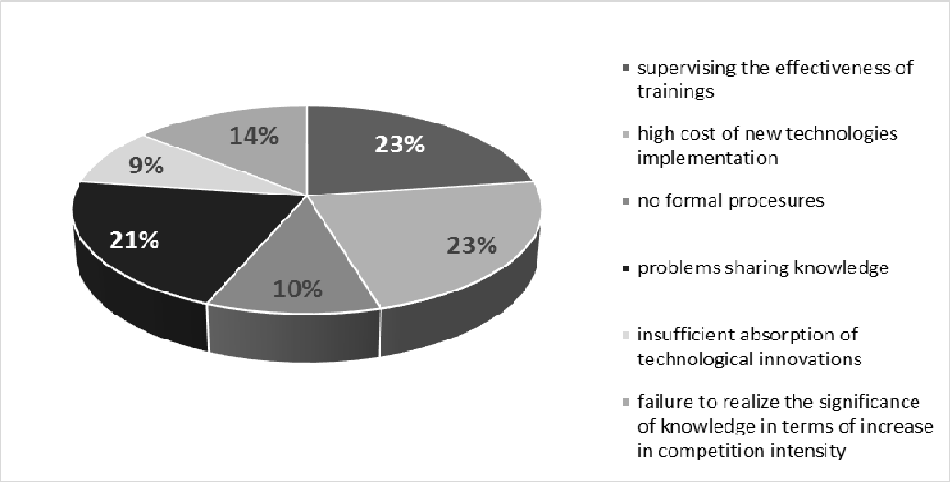

Fig. 8: The opinions of the respondents regarding the barriers to intellectual development of organisations

Source: Own research

According to the respondents, in terms of the development of the intellectual capital of the organisation we are dealing with three main barriers. Around 23% of the respondents considered high cost of new technologies implementation as one of the barriers. It is related to the necessity of ordering business analyses before purchasing technologies, purchasing licences or software, development of the IT infrastructure, adapting the currently used computers programs or training the staff. After the implementation of the new solutions, the cost associated with the maintenance of the new infrastructure and its possible expansion should be added. Most of the studied organisations are small companies which cannot afford to bear such costs.

According to the same number of the respondents another barrier are problems with supervising the effectiveness of trainings, namely verify to what extent the knowledge of an employee increased after the training, and to what extent it was used. It shows that these companies lack staff responsible for the design and implementation of trainings and professional development. Properly conducted trainings translate into increase in product or service sales, increase in the quality of customer service, improvement in the effectiveness of distribution channels or new business partners.

According to around 21% of the respondents problems with knowledge sharing among the oldest and most senior employees constituted another barrier. It most likely results from the lack of proper organisational culture in the studied companies. The employees feel uncertain about their employment, and perceive their co-workers as a competition rather than a team.

More than 14% of the respondents said that failure to realize the significance of knowledge in terms of increase in competition intensity by the employees constituted another barrier. It means that some employees are not interested in the problems related to the global economy. They have no knowledge of economics.

Lack of formalised procedures and standards of knowledge management as well as lack of regularity in replenishing knowledge resources was another barrier according to almost 10% of the students. It means that formalised procedures of knowledge sharing function efficiently in most companies. It enables efficient knowledge transfer between the employees.

Insufficient absorption of knowledge on technical novelties constituted a barrier according to every tenth respondent (9%). The employees are unenthusiastic about changes.

The next question asked to the respondents was to determine the features of the company's organisational structure that hinder the flow of knowledge within the organisation. These features are shown in Figure 9.

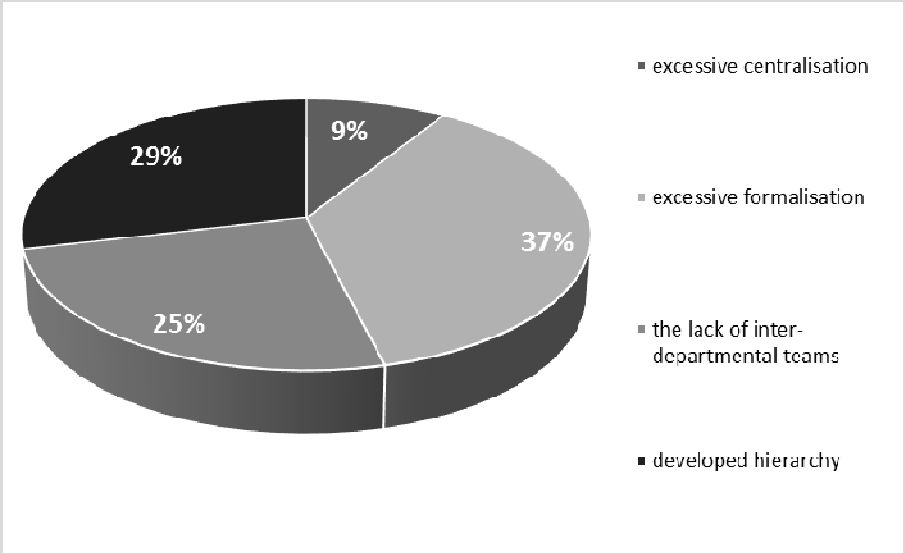

Fig. 9: Respondents' opinions on the features of organisational structure hampering the flow of knowledge

Source: Own research

A significant part of respondents (37%) stated that a feature hindering the flow of knowledge in an organisation is excessive formalisation. The course of implementation processes is strictly defined in procedures, rules or regulations. Rigorous adherence to them is not conducive to transferring knowledge. In the opinion of the respondents, the degree of formalisation in the organisations surveyed is greater than necessary to meet legal requirements or discipline employees in terms of excessive and unjustified freedom of action.

Knowledge sharing is a developed hierarchy (29%) and hampered by the lack of inter-departmental teams established to implement specific processes or projects (25%). The lack of inter-departmental teams is probably due to excessive formalisation, which does not provide for the involvement of employees in working teams outside the parent organisational units. Too many management levels in an organisation's structure make it difficult to communicate information, exchange opinions between various units in the hierarchy and, in particular, share knowledge. The reason for these difficulties is also the fact that each lower-level employee is assigned to a specific supervisor. Only 9% of the respondents said that the barrier to knowledge flow is excessive centralisation. This means that in every tenth company the top management does not delegate authority to lower levels of management, and therefore is not competent to implement the concept of knowledge management, for example in solving problems.

A significant increase in knowledge and information in modern market economy implies creating new methods and tools of management. A "learning organisation" is the answer to such demand. Within the "learning" organisation, the learning process is continuous. It is based on permanent acquisition of knowledge and skills within the scope of functions of management, preparing the management staff for particular positions, development of own professional competences. The

respondents were asked for their opinion regarding the factors that encourage companies to "learn". The results are presented in Figure 10

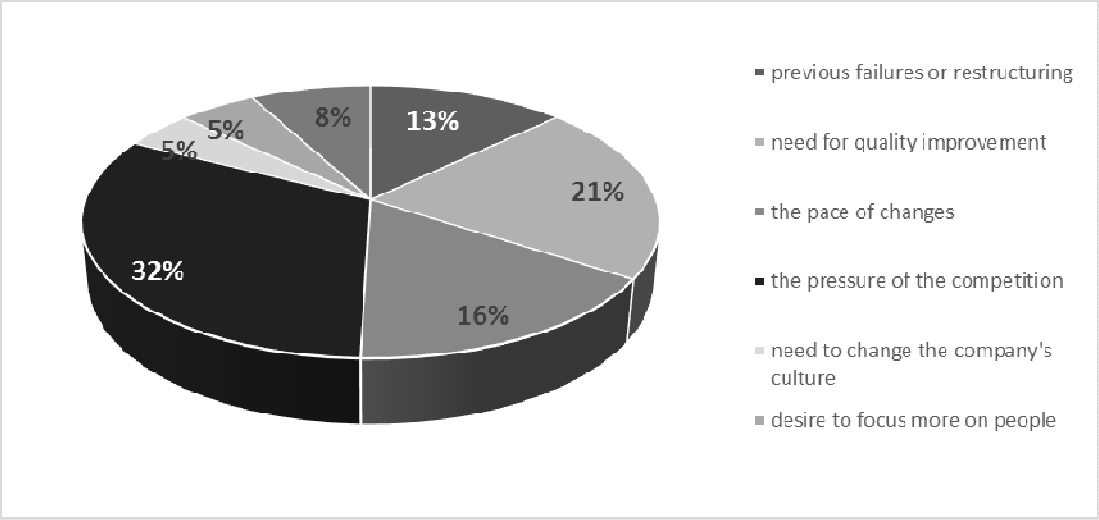

Fig. 10. The opinions of the respondents regarding the factors encouraging the companies to "learn".

Source: Own research

More than 32% of the respondents believe that the main factor that encourages the companies to "learn" is the pressure of the competition, the need to compete and survive on the market. In the era of market economy (which is noticed by the researchers) knowledge becomes the main resource of organisations, and "learning" becomes a necessity. The researchers are aware of the necessity of continuous struggle with the competition by permanent "learning" of the organisation. This should result in promptness of reaction to the changing environment, implementation of changes and novelties, creation of new ideas and knowledge.

More than 20% of the respondents stated that the need for quality improvement encourages "learning". They understand that quality means constant acquisition and development of new knowledge, improvement of products and services. It is a never-ending process. The organisation gains trust of its customers thanks to high quality.

Another fact that determines organisation's "learning" is the pace of changes (16% of employees are of this opinion). Therefore, in their opinion, the message for managers may constitute a statement that managers reduce variability through "learning".

Approximately 13% of respondents believe that previous failures or restructuring force "learning" of the organisation. The group studied is aware of the importance of constant technological or information challenges that the organisation faces in the 21st century. In order to cope with the increasing globalisation, development and adaptation to the environment are necessary. Restructuring changes also concern corrective actions. They consist in the improvement of systems in the company or in the refusal of unfavourable links in the company (reduction of employment or assortment).

Less important factors include the desire to improve the company's image (8%), the desire to focus more on people (5%), the need to change the company's culture (4%).

Conclusions

Summing up, the problem of implementing "knowledge management" should be described as the process involving the benefits for the company, employees and the market. The functioning of "knowledge management" results in an increase in management effectiveness, improves the communication process in the organization, reduces costs, increases creativity and innovation. Efficient use of knowledge resources increases the competitiveness of not only the company itself, but also of its employees. Flexibility to adapt to market needs increases. This also creates a positive external image of the organisation.

The barrier to "knowledge management" at the interorganisational level is protection of the company's own solutions and the fear of losing its market positon. Sharing knowledge between organisations sooner or later leads to a weakening of the organisation's bargaining power (of both supplier and customer) and consequently to a loss of competitive advantage. Innovative products or services (i.e. the organisation's intellectual capital) increase the market value of a company.

The implementation of "knowledge management" is primarily conducive to increasing the company's competitiveness on the market, supporting the organisational culture, retaining knowledge workers, creating a positive image of the organisation on the external labour market.

The conducted research shows that the implementation of "knowledge management" programmes, their preparation and taking specific actions related to data acquisition, processing and "storage" of knowledge turned out to be a considerable challenge for companies.

It seems that in the first place companies wishing to develop "knowledge management" should focus their activities on identifying talents among the people currently employed in the organisation and create them working conditions that will guarantee a chance for development, promotion and implementation of interesting and difficult challenges through sharing knowledge with coworkers.

The turbulent environment is a 21st century challenge for the organisation. Organisations that wish to successfully face it must meet specific requirements. These requirements include constant and very intensified changes, good quality of goods and services provided, novelties and innovations, rapid acquisition of new technologies and ideas, creation of own solutions. This can be achieved through permanent "learning" of the organisation.

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Analysis of Financial Solvency of BRICS And Shanghai Cooperation Organization Countries

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Abstract

The subject of the study is the financial solvency of international cooperation organizations with the participation of Russia-BRICS and Shanghai cooperation organization (SCO). The article presents a factor analysis of the dynamics of financial solvency in BRICS and SCO countries with an assessment of the growth rate (GR) of a set of interdependent indicators- Bank's liquid reserves in relation to assets, broad money supply, exchange rate, deflator index, inflation (consumer prices), interest rate on loans (private sector), trading domestic companies (according to the World Bank Group), followed by a polynomial approximation. As a result of the factor analysis of financial solvency dynamics in BRICS and SCO countries, it was revealed that Russia's cooperation with the BRICS countries leads to greater losses than with the SCO countries. The article identifies promising areas of cooperation between Russia and SCO countries.

Keywords: Amplitude Values, Analysis, Dynamics, International Cooperation, Growth Rates, Financial Solvency.

Introduction

In the conditions of increasing global competition along with the change of leaders of world economic activity and changes in the world order, the need for the organization and implementation of new forms of cooperation between countries increases. Numerous international cooperation organizations are being formed to consolidate their interests in the unstable world order.

The increasing global competition requires a constant assessment of the potential of international cooperation organizations. As a result of the assessment and subsequent analysis it is necessary to review the potential of the organization and its individual participants to strengthen the organization's position in the world economic activity.

Monitoring of the financial solvency dynamics of international cooperation will identify and help to solve the financial problems of the development of its participants. The modern financial world

order is diverse and contradictory. This situation requires accessible and understandable approaches for researchers to identify the financial solvency dynamics of various international cooperation organizations and its participants.

Factor analysis is one of the few approaches that meet these criteria and it is used in the world practice of studying the behavior of cross-border Bank flows (Cerutti, Claessens and Ratnovski, 2017), analysis of IMF forecasts and the EU fiscal contract in a large number of countries (Eichengreen and Panizza, 2016), using various mathematical methods (Cardiel, 2009), (Grigoli, Cesca, Dahm, Krieger, 2012), (Xu and Warner, 2015).There given the analysis of the choice and consequences for types of preferential economic integration agreements (Egger and Wamser, 2013) as well as the analysis of the growth and fall of current account deficits in some countries (Kang and Shambaugh, 2016), (Karlan and Thuysbaert, 2016), (Smirnov and Huraskina, 2018; Smirnov and Filippova, 2019) and assessment of opportunities and final achievements (Peragine, Palmisano, Brunori, 2014; Smirnov and Perfilova, (2019); Smirnov and Dulina, (2019)).

Method and Results

Analysis of financial solvency dynamics in BRICS countries

The analysis of financial solvency dynamics in BRICS countries includes the assessment of a wide range of interdependent financial and economic factors: Bank's liquid reserves in relation to assets, broad money supply, exchange rate, deflator index, inflation (consumer prices), interest rate on loans (private sector), trading domestic companies (according to the World Bank Group https://data.worldbank.org). In the process of analyzing financial solvency of BRICS countries with respect to a complex set of interdependent financial and economic factors, indicators in the associated time series are used, followed by a polynomial approximation, which is the most suitable for describing frequently changing values and for the analysis of a diverse combination of factors with an unstable value. When using polynomial approximation, the sixth degree is applied, having not more than five extremes, which is sufficient for the studied time interval. The analysis revealed the main provisions of financial solvency dynamics in BRICS countries:

1) high GR2006–2018: Brazil – liquid reserves of the Bank in relation to assets GR2006–2018 = 4,18; South Africa – broad money supply GR2006–2018 = 18,44, inflation (consumer prices) GR2006–2018 = 11,34; Russia – exchange rate GR2006–2018 = 9,55, index-deflator GR2006–2018 = 10,96, interest rate on loans (private sector) GR2006–2018 = 3,66; China – trading domestic companies GR2006–2018 = 7,63;

2) low GR2006–2018: Russia – liquid reserves of the Bank in relation to assets GR2006–2018 = -2,98, broad money GR2006–2018 = -9,1; China – exchange rate GR2006–2018 = -1,82, index-deflator GR2006–2018 = -3,75, inflation (consumer prices) GR2006–2018 = -41,44, interest rate on loans (private sector) GR2006–2018 = -1,13; South Africa – trading domestic companies, GR2006–2018 = -1,21;

3) high absolute amplitude values of instability: Russia in relation to the Bank's liquid reserves in relation to assets, in the broad money supply, deflator index, trading domestic companies; India-in the exchange rate, interest rate on loans (private sector); China – in inflation (consumer prices).

4) low absolute amplitude values of instability: South Africa – liquid reserves of the Bank in relation to assets, inflation (consumer prices), interest rate on loans (private sector); Brazil – broad money supply; China – exchange rate; India – deflator index, trading domestic companies.

Analysis of financial solvency dynamics of SCO countries

The analysis of financial solvency dynamics in SCO countries includes an assessment of the growth rate of the GR complex of interdependent financial and economic factors, in accordance with BRICS.

The analysis of the Bank's liquid reserves relative to assets, broad money supply, exchange rate, deflator index, inflation (consumer prices), interest rate on loans (private sector), trading domestic companies, followed by a polynomial approximation, revealed the following provisions:

1) high GR2006–2018: Tajikistan – liquid reserves of the Bank in relation to assets GR2006–2018 = 26,03; Kyrgyzstan – the broad money supply GR2006–2018 = 73,76, inflation (consumer prices) GR2006–2018 = 24,67; Kazakhstan – exchange rate GR2006–2018 = 10,17; Uzbekistan – GDP deflator index GR2006–2018 = 16,36; Russia – interest rate on loans (private sector) GR2006–2018 = 3,66; China – trading domestic companies GR2006–2018 = 7,63;

2) low GR2006–2018: Russia – liquid reserves of the Bank in relation to assets GR2006–2018 = -4,09, broad money GR2006–2018 = -9,1; China – exchange rate GR2006–2018 = -1,82, index-deflator GR2006–2018 = 3,75, inflation (consumer prices) GR2006–2018 = -41,44; Kyrgyzstan – interest rate on loans (private sector) GR2006–2018 = -1,26; Pakistan – trading domestic companies GR2006–2018 = -1,21;

3) high absolute amplitude values of instability: Kazakhstan – liquid reserves of the Bank in relation to assets; Tajikistan – broad money supply; India –exchange rate; Russia –index-deflator; trading domestic companies; China –inflation (consumer prices); Kyrgyzstan – interest rate on loans (private sector);

4) low absolute amplitude values of instability: Kyrgyzstan – liquid reserves of the Bank in relation to assets; China – broad money supply; India – index-deflator; Pakistan – interest rates on loans (private sector).

Analysis of cooperation areas between Russia and SCO countries

To identify the areas of cooperation between Russia and SCO countries, we will analyze the following positions: the results of mining, manufacturing, production as well as distribution of electricity, gas and water, gross disposable household income, final consumption expenditures, social transfers in kind, the real accrued wages of employees of organizations, the number of employees per pensioner, the real size of pensions assigned, the ratio between average pension and average salary of employees of organizations, spending on benefits and social assistance, population rate with money income below the subsistence level, the Gini coefficient (index of income concentration), monetary costs and savings, mandatory payments and diverse contributions of the Russian economy (according to the World Bank Group). When analyzing a polynomial approximation was used. This analysis revealed the following aspects:

1) heterogeneous intervals with major GR2006-2018: mandatory payments and diverse contributions are dominant and related to GR manufacturing, gross disposable household income and final consumption expenditure; social transfers in kind are determinative and correlate with GR cash expenditure and savings, mining, production and distribution of electricity, gas and water; the number of employees per pensioner is dominant and interdependent with the use of the Gini coefficient (income concentration index) and real accrued wages of employees of organizations;

2) the lack of a stable interval with major GR2006–2018: spending on benefits and social assistance is dominant and correlates with GR ratio between average pension and average salary of employees of organizations, the actual size of assigned pensions.

The situation concerning population number with monetary incomes below the subsistence minimum is highlighted. And this insignificant factor for the dynamics of the Russian economy has earned special attention from the country's leadership.

Conclusion

As a result of the analysis of financial solvency dynamics in BRICS countries through a polynomial approximation of the GR complex of interdependent financial and economic factors the following high GR2006–2018 were revealed: Brazil-liquid reserves of the Bank in relation to assets; South Africa-broad money supply, inflation (consumer prices); Russia-exchange rate, deflator index, interest rate on loans (private sector); China-trading domestic companies. There were also revealed high absolute amplitude values of instability: Russia- to the Bank's liquid reserves in relation to assets, in broad money supply, deflator index, trading domestic companies; India-in the exchange rate, interest rate on loans (private sector) and China-in inflation (consumer prices). High GR2006-2018 are stated in South Africa and Russia, low GR2006-2018 can be seen in China; high absolute amplitude values of instability are revealed in Russia and India, low ones in South Africa.

Thus, as a result of the factor analysis of financial solvency dynamics in BRICS and SCO countries, it was revealed that Russia's cooperation with BRICS countries leads to greater losses than with SCO countries.

Promising areas of cooperation between Russia and SCO countries are in the field of solving the following problems: mining and manufacturing, production and distribution of electricity, gas and water; the number of employed persons per pensioner; the real size of pensions assigned (absolute averages); mandatory payments and various contributions, cash expenditures and savings; population growth with cash incomes below the subsistence level and the Gini coefficient (income concentration index).

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Contemporary Geo-Economic Conditions of Capitalism

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Abstract

The subject matter of the research is a modern geo-economic attractor of capitalism; the research is based on the systematic approach applying methods of descriptive statistics and cluster analysis. The article analyses the reasons of the establishment of the modern geo-economic capitalism space and exposes the criteria of its existence. Specifying progressive role of capitalism in the historical development of society is shown, cognitive abilities of people being the driver of capitalist social and economic structure development. The work reveals that capitalism possesses its own geography i.e. spatial extension characterized by development disparity (Anglo-Saxon, Continental Europe, Northern Europe and Eastern Europe). Capitalism geo-economic attractor defining exposed the absence of the USA, Germany, France and Japan, and domination of China and India. China and India do not possess definite features of capitalism demonstrating social color at that. Transition of Russia to the new type of society ranks it with China and India but does not endower it with attractor's features. The research resulted in understanding of development opportunities of the world and national economies concerning geo-economic capitalism attractor. The problem of establishment of geo-economic capitalism space is intensified through entropy of social and economic structures in the modern world order. Globalization became the counteraction against entropy. It resulted in strengthening interdependence of national economies, formation of unified world economy structure within the framework of capitalist social and economic structure focused on satisfaction of natural human instincts of egotism. Capitalism turned out to have specific geography, spatial extent.

Keywords: Geo-Economic Attractor Of Capitalism, Globalization, Of Social And Economic Structure, Progressive Role Of Capitalism, Social Color, Establishment, Unified Structure Of World Economy.

Introduction

The ideas of existence of social and economic structure under the circumstances of legitimate exploitation of working class set forth by K. Marx, a German economist, in his work "The capital. Critique of political economy" (K. Marx, 1867) constitute the basis of classical understanding of capitalism. This scientific study presents the foundation of Marxist political economy containing critical dialectical and materialistic analysis of capitalism. Capitalism is understood as social and economic system based on private property of bourgeoisie for means of production and characterized by working class exploitation.

The principle criteria of capitalism existence are the domination of overall commodity-money relations and private ownership on means of production. Capitalist production is aiming at capital gain through appropriation of unrequited labor (surplus value).

Being a consistent stage in the historical development of society, capitalism played a progressive role breaking patriarchal and feudal relations among people and substituted them for monetary relations. K. Marx and F. Engels stated: "In less than a hundred years of its class domination, the bourgeoisie has created more numerous and more ambitious productive forces than all previous generations combined. The subjugation of the forces of nature, machine production, the use of chemistry in industry and agriculture, shipping, railways, electric telegraph, the development of whole parts of the world for agriculture, the adaptation of rivers for shipping, the whole, as if called out from under the ground, the masses of the population - which of the former For centuries it might have been suspected that such productive forces are slumbering in the bowels of social labor!" (Marx, Engels, 1955).

Under capitalism social progress is implemented at the expense of aggravation of social antagonism, wasting of productive force, sufferings of masses all over the world. The process of capitalism proliferation all over the world resulted in its new essence, i.e. imperialism, monopolistic capitalism (Lenin, 1969).

The process of capitalism proliferation speeded up considerably under the influence of globalization – incorporation of all countries into the world market and strengthening of world economies interdependence. It resulted in the formation of the unified structure of the world economy comprising the aggregate of depersonalized national economies, states with destroyed national sovereignty but connected with each other through the system of various relations.

These relations are based on the principles of the division of labor which made it possible to expose the modern phenomenon of migration on the world capital scale, manufacturing resources, social, economic and technological processes, closer relations and merging of cultures of different countries.

Arguments concerning the choice of large countries to search for capitalism attractor are naturally related to the extent of their economies, to be more exact, to Newton's Law of Gravitation. Capitalism attractor sense is manifested in the idea of gravitation interaction.

Methods and Materials

Large countries (The USA, Germany, France, Japan, China or Russia) were chosen to define Geo-economic attractor of capitalism. The choice of large countries to search for capitalism attractor is related to Newton's Law of Gravitation, i.e. to gravitation interaction. The pointlessness of considering small countries as geo-economic attractor of capital is unconditional, no matter how high the growth rate of their economy may be.

Descriptive statistics and cluster analysis are applied to the research. Descriptive statistics include empirical data processing, their classification, pictorial presentation as charts and tables, presentation through basic statistical indices (Lazar and Feng, 2017) and their interrelation (Schofield, 1993).

Using descriptive statistics, we estimate the data array by statistical indicators - median and variance. Cluster analysis will give proof of the reasons for the change of the geo-economic attractor, identify the main patterns of grouping countries, formulate hypotheses (Adolfsson, and Brownstein, 2019; Favero and Belfiore, 2019).

To define the geo-economic attractor of capitalism from the aggregate of large countries (USA, Germany, France, Japan, China, India or Russia), we apply indicators united by the principles of diversity of unity - nineteen types of indicators of GDP (GDP) and the same amount of Gross capital formation (time) , their growth rate (Rates of Gain, RG). As a tool for implementing descriptive statistics and cluster analysis, the SPSS Statistics application package is used, and the World Bank Group and the International Labor Organization (ILO) are the data source.

Median value (Me) estimation resulted in limited hierarchy (indicators – Me > 1.0E+13; RG – Me > 3.0%) (Table 1): -by indicators: GDP (constant LCU) – China and India; GDP (current LCU) – China, India, Russian Federation and United States; GDP (current US$) – China and United States; GDP, PPP (constant 2011 international $) – China; GDP, PPP (current international $) – China and United States; GDP: linked series (current LCU) – China, India, Russian Federation and United States; Gross capital formation (constant LCU) – China and India; Gross capital formation (current LCU) – China, India, Japan and Russian Federation; Gross domestic income (constant LCU) – India; Gross domestic savings (current LCU) – China, India, Japan and Russian Federation; Gross fixed capital formation (constant LCU) – India; Gross fixed capital formation (current LCU) – China, India, Japan and Russian Federation; Gross fixed capital formation, private sector (current LCU) – India, Japan and Russian Federation.

Table 1: Hierarchy of median values (Me) indicators and increase rates: GDP – (constant 2010 US$), (constant LCU), (current LCU), (current US$), deflator (base year varies by country), deflator: linked series (base year varies by country), growth (annual %), per capita (constant 2010 US$), per capita (constant LCU), per capita (current LCU), per capita (current US$), per capita growth (annual %), per capita, PPP (constant 2011 international $), per capita, PPP (current international $), per person employed (constant 2011 PPP $), per unit of energy use (constant 2011 PPP $ per kg of oil equivalent), per unit of energy use (PPP $ per kg of oil equivalent), PPP (constant 2011 international $), PPP (current international $), linked series (current LCU); Gross capital formation – (% of GDP), (annual % growth), (constant 2010 US$), (constant LCU), (current LCU), (current US$); Gross domestic income (constant LCU); Gross domestic savings – (% of GDP), (current LCU), (current US$); Gross fixed capital formation – (% of GDP), (annual % growth), (constant 2010 US$), (constant LCU), (current LCU), (current US$), private sector (% of GDP), private sector (current LCU); Gross savings (% of GDP), 2010-2018.

Series - Country Name	**Me**	**σ^2**
Indicators, Me > 1,0E+13		
GDP (constant LCU) - Japan	5.19E+14	2.48E+26
GDP (current LCU) - Japan	5.14E+14	4.97E+26
Gross domestic income (constant LCU) - Japan	5.11E+14	2.57E+26
…	…	…
Gross domestic income (constant LCU) - United States	1.61E+13	8.57E+23
Gross fixed capital formation, private sector (current LCU) - Russian Federation	1.21E+13	5.56E+24
GDP (current US$) - China	1.04E+13	5.47E+24
Rates of Gain, Me > 3,0%		
Gross fixed capital formation (annual % growth) - United States	37.17	5904.64
GDP per capita growth (annual %) - United States	33.42	3388.70
GDP growth (annual %) - United States	23.18	1351.50
…	....	…
Gross fixed capital formation, private sector (% of GDP) - United States	3.07	3.54

Series - Country Name	**Me**	**σ^2**
GDP (current US$) - France	3.06	59.16
GDP per unit of energy use (PPP $ per kg of oil equivalent) - India	3.02	2.32
GDP, PPP (current international $) - France	3.01	2.67

Source: computed by «SPSS Statistics» on the data of «The World Bank Group». https://databank.worldbank.org/source/world-development-indicators# (Accessed 01 December 2019).

- by countries: China – GDP (constant LCU), GDP (current LCU), GDP (current US$), GDP, PPP (constant 2011 international $), GDP, PPP (current international $), GDP: linked series (current LCU), Gross capital formation (constant LCU), Gross capital formation (current LCU), Gross domestic savings (current LCU) and Gross fixed capital formation (current LCU); India – GDP (constant LCU), GDP (current LCU), GDP: linked series (current LCU), Gross capital formation (constant LCU), Gross capital formation (current LCU), Gross domestic income (constant LCU), Gross domestic savings (current LCU), Gross fixed capital formation (constant LCU), Gross fixed capital formation (current LCU) and Gross fixed capital formation, private sector (current LCU); Russian Federation – GDP (current LCU), GDP: linked series (current LCU), Gross capital formation (current LCU), Gross domestic savings (current LCU), Gross fixed capital formation (current LCU) and Gross fixed capital formation, private sector (current LCU); Japan – Gross capital formation (current LCU), Gross domestic savings (current LCU), Gross fixed capital formation (current LCU) and Gross fixed capital formation, private sector (current LCU); United States – GDP (current LCU), GDP (current US$), GDP, PPP (current international $) and GDP: linked series (current LCU).

Cluster analysis by countries made it possible to single out the most complex domineering cluster with explicit attractors (Table 2) : China – GDP growth (annual %) и GDP per capita (constant 2010 US$); India – GDP deflator (base year varies by country) и Gross capital formation (constant 2010 US$).

Table 2: Complex domineering cluster of indicators and increase rates : GDP – (constant 2010 US$), (constant LCU), (current LCU), (current US$), deflator (base year varies by country), deflator: linked series (base year varies by country), growth (annual %), per capita (constant 2010 US$), per capita (constant LCU), per capita (current LCU), per capita (current US$), per capita growth (annual %), per capita, PPP (constant 2011 international $), per capita, PPP (current international $), per person employed (constant 2011 PPP $), per unit of energy use (constant 2011 PPP $ per kg of oil equivalent), per unit of energy use (PPP $ per kg of oil equivalent), PPP (constant 2011 international $), PPP (current international $), linked series (current LCU); Gross capital formation – (% of GDP), (annual % growth), (constant 2010 US$), (constant LCU), (current LCU), (current US$); Gross domestic income (constant LCU); Gross domestic savings – (% of GDP), (current LCU), (current US$); Gross fixed capital formation – (% of GDP), (annual % growth), (constant 2010 US$), (constant LCU), (current LCU), (current US$), private sector (% of GDP), private sector (current LCU); Gross savings (% of GDP), 2010-2018.

Cluster		**Square of Euclidean distance**
Indicators		
GDP deflator (base year varies by country) - China	GDP deflator: linked series (base year varies by country) - China	5.11E-25
	GDP deflator (base year varies by country) - France	2.57E+02
	GDP deflator (base year varies by	4.82E+02

Cluster		**Square of Euclidean distance**
	country) - Germany	
	GDP deflator (base year varies by country) - India	2.56E+03
	GDP deflator (base year varies by country) - Russian Federation	4.05E+03
	GDP growth (annual %) - China	7.55E+04
	GDP per capita (constant 2010 US$) - India	2.42E+07
	GDP per capita (constant 2010 US$) - China	3.52E+08
	GDP per capita (constant 2010 US$) - Russian Federation	1.48E+09
	GDP per capita (constant 2010 US$) - Germany	1.61E+10
	GDP per capita (constant LCU) - India	5.86E+10
	GDP per capita (constant LCU) - Russian Federation	2.69E+12
	GDP per capita (constant LCU) - Japan	1.48E+14
	Gross capital formation (constant 2010 US$) - India	3.44E+24
Rates of Gain		
GDP (constant 2010 US$) - China	GDP (constant LCU) - China	1.21E-27
	GDP per person employed (constant 2011 PPP $) - China	5.33E-01
	GDP per capita (constant 2010 US$) - China	2.12E+00
	GDP per capita, PPP (current international $) - China	3.39E+01
	GDP (constant 2010 US$) - India	4.93E+01
	GDP deflator (base year varies by country) - India	9.46E+01
	Gross fixed capital formation (constant 2010 US$) - India	1.12E+02

Cluster		Square of Euclidean distance
	Gross domestic savings (current LCU) - Germany	1.14E+02
	Gross capital formation (constant 2010 US$) - India	1.80E+02
	GDP (current LCU) - China	2.32E+02
	GDP (constant 2010 US$) - Germany	3.83E+02
	GDP (current US$) - India	3.93E+02
	Gross domestic savings (% of GDP) - Russian Federation	5.52E+02
	GDP (current US$) - Germany	5.58E+02
	GDP (current US$) - Japan	8.32E+02
	GDP (current LCU) - Russian Federation	1.07E+03
	GDP growth (annual %) - China	1.21E+03
	GDP (current US$) - Russian Federation	3.21E+03
	GDP growth (annual %) - India	3.88E+03
	Gross capital formation (constant 2010 US$) - United States	1.14E+04
	GDP growth (annual %) - United States	1.84E+04
	GDP growth (annual %) - France	3.03E+04
	Gross fixed capital formation (annual % growth) - India	3.69E+04
	GDP growth (annual %) - Germany	1.28E+05
	Gross capital formation (annual % growth) - India	1.95E+05
	GDP growth (annual %) - Russian Federation	3.61E+05
	Gross capital formation (annual % growth) - Russian Federation	4.57E+05
	GDP per capita growth (annual %) - Russian Federation	7.22E+05
	GDP per capita growth (annual %) -	9.88E+05

Cluster		**Square of Euclidean distance**
	Germany	
	GDP growth (annual %) - Japan	2.09E+06
	GDP per capita growth (annual %) - Japan	5.34E+06
	Gross fixed capital formation (annual % growth) - France	9.41E+06
	Gross capital formation (annual % growth) - Germany	9.82E+06

Note: Hierarchical cluster analysis presents mean distance between clusters, Square of Euclidean distance.

Source: computed by «SPSS Statistics» on the data of «The World Bank Group». https://databank.worldbank.org/source/world-development-indicators# (Accessed 01 December 2019).

When defining geo-economic attractor of capitalism from the aggregate of large countries unavailability of the USA, Germany, France and Japan, and dominance of China and India came as a surprise.

The study resulted in the conclusion on the substitution of geo-economic attractors of capitalism of the USA, Germany, France and Japan having lasted for many years for new ones, i.e. China and India.

Transition to the new type of society characterized by wealth, markets, private ownership, democracy and civil society ranks Russia with China and India. From the point of view of a company structure, economic results and social integration models, elite and class fragmentation, similarity of the Russian economy transformation (Lane, 2000) makes it possible to assert the availability of common features in the models of capitalism characteristic of China and India.

To analyze the establishment of new geo-economic attractors we evaluate the changes in the annual growth rate of production per worker, the share of labor income, the growth rate of the poverty level among workers(the data of International Labor Organization, ILO). Conscious choice of these criteria is related to the idea of capitalism given by K. Marx in his work “The capital. Critique of political economy” (see above) and its major trait that is exploitation of wage workers.

The estimate of the annual production growth rate per worker 2001-2023 (Picture 1)showed high and sustainable median values in China (Me = 7.55%; σ^2 = 4.36). India (Me = 5.35%; σ^2 = 3.76) being insignificantly behind China.

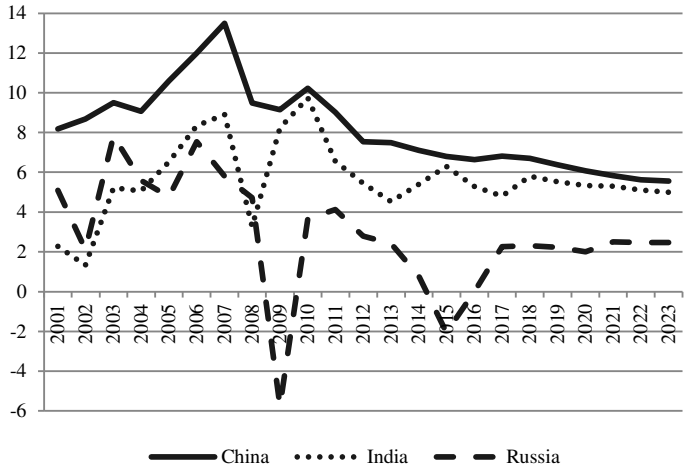

Picture 1: Annual production growth rater per worker, % (GDP, const. $ 2010).

Sourse: on the data of International Labour Organization, ILO. https://www.ilo.org/shinyapps/bulkexplorer25/?lang=en&segment=indicator&id=SDG_A821_NOC_RT_A (Accessed 01 December 2019).

ILO forecasts that by 2023 the trends of China and India will have come closer at a slightly lower level than 6,0% of GDP. Russian economy (Me = 2.47%; σ^2 = 8.69) is lagging behind India two times, let alone China. It reflects high sensitivity of Russian economy to negative changes during cyclical world crises of 2009 (-5.75%) and 2015 (- 2.05%).Moments of Chinese and Indian economies not only reach high values but also demonstrate multidirectionality regarding Russian economy.

Resulting from estimates of the share of labor income as a percentage of GDP in 2004-2017 (Picture 2) there was revealed high volatility in India(σ^2 = 15.75; Me = 54.35%),relative to stable values in China (σ^2 = 1.83; Me = 49.25%) and Russia (σ^2 = 6.86; Me = 50.60%).

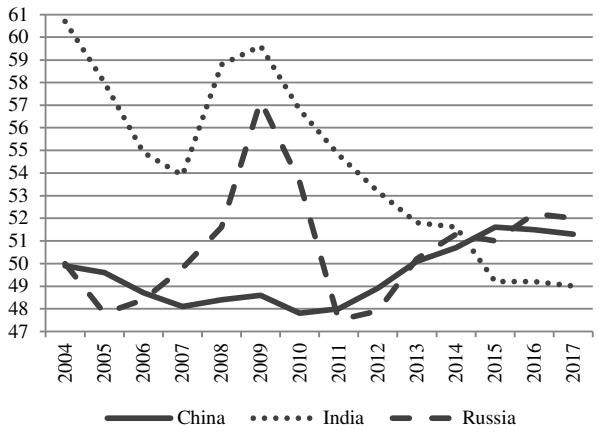

Picture 2: Share of labor income as a percentage of GDP.

Source: according to the data of International Labour Organization, ILO. https://www.ilo.org/shinyapps/bulkexplorer57/?lang=en&segment=indicator&id=SDG_1041_NOC_RT_A (Accessed 01 December 2019).

India enjoying considerably higher levels in 2004-2014 than those of China and Russia loses its advantages after 2014. Russian trend except for the period of financial and economic crisis of 2008-2009 is shown as if encircling a graphic display of dynamics of labor income share of China. Significant deviations in the dynamics of the share of labor income during the crisis confirm the thesis of a high sensitivity of the Russian economy to negative changes.

The growth rate of poverty among working people (percentage of the employed living below $1.90 PPP) in 2000-2023 (Picture 3) exposes significant volatility in Russia (σ^2 = 1100.62; Me = 0%).

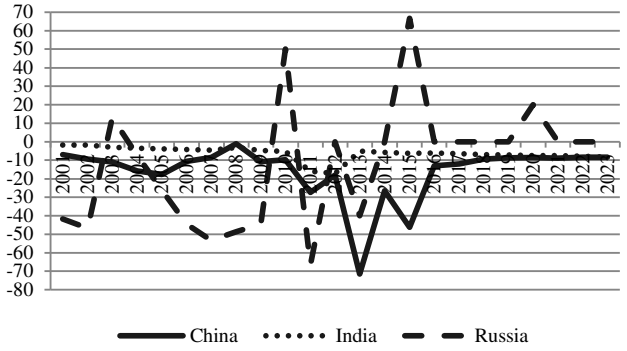

Picture 3: The growth rate of poverty among working people (percentage of the employed living below $1.90 PPP)

Source: according to International Labour Organization, ILO. https://www.ilo.org/shinyapps/bulkexplorer25/?lang=en&segment=indicator&id=SDG_0111_SEX_AGE_RT_A (Accessed 01 December 2019).

The Chinese State Poverty Alleviation Program has reached high, even though volatile, negative median values (Me = -10.63%; σ^2 = 231.89). India is sustainably (Me = -5.73%; σ2 = 14.31) heading for the decrease in poverty growth rate among working people by 10% and coincides with the Chinese decrease trend within the period of 2019-2023.

Russian economy in its wide amplitude demonstrates instability to the process of regulating the growth rate of poverty among the employed. For instance, the 2008-2009 period of financial and economic crisis in the Russian economy shows a significant decrease in poverty growth rate among working people due to natural decrease in the number of the employed (increase in unemployment) (Smirnov and Perfilova, 2019; Smirnov and Huraskina, 2018). The periods of significant economic growth reveal deep connection of this growth with the increase in the growth rate of poverty among the employed (Smirnov and Filippova, 2019; Smirnov and Dulina, 2019 I.e. the decrease in income among the employed constitutes the major driver of the Russian economy growth.

Results

The process of establishment of new geo-economic attractors of Chinese and Indian capitalism possesses a number of different and common characteristic features. China attracts attention through the quality of unity diversity of GDP growth (annual %) and GDP per capita (constant 2010 US$) – GDP (constant LCU), GDP (current LCU), GDP (current US$), GDP, PPP (constant 2011 international $), GDP, PPP (current international $), GDP: linked series (current LCU), Gross capital formation (constant LCU), Gross capital formation (current LCU), Gross domestic savings (current LCU) and Gross fixed capital formation (current LCU).

Indian attractor is defined by the unity diversity of GDP deflator (base year varies by country) and Gross capital formation (constant 2010 US$) – GDP (constant LCU), GDP (current LCU), GDP: linked series (current LCU), Gross capital formation (constant LCU), Gross capital formation

(current LCU), Gross domestic income (constant LCU), Gross domestic savings (current LCU), Gross fixed capital formation (constant LCU), Gross fixed capital formation (current LCU) and Gross fixed capital formation, private sector (current LCU).

Despite the unequivocal dominance of China and India as a geo-economic attractor they are different through the variety of indices unity that impacts the opportunities of reaching their aims. For China these opportunities are linked to c GDP growth (annual %) and GDP per capita (constant 2010 US$) – GDP (current US$), GDP, PPP (constant 2011 international $) and GDP, PPP (current international $), а для Индии – GDP deflator (base year varies by country) and Gross capital formation (constant 2010 US$) – Gross domestic income (constant LCU), Gross fixed capital formation (constant LCU) and Gross fixed capital formation, private sector (current LCU).

It should be highlighted that socialist economic policy, government participating in the private sector, underlies the economy establishment of China and India. For instance, the issue on what social and economic system exists in China has not been solved yet. Chinese authorities assert that it is socialism while economists state that it is capitalism. The traits of socialism are intermingled with main points of capitalism and vice versa creating a new different quality (Kolodko, 2018).

The traits of socialism manifest themselves as a prevalence of state ownership which negatively impacts the inflow of direct foreign investments. It is explained by the state socialism logic that is incompatible with market mechanisms underlying international expansion (Tang, 2019).

The world practice knows that state owned enterprises prove not to be effective enough as compared with privately owned ones. However, Chinese state-owned enterprises, being in control of the Central Government, outperform all types of companies proving to have the highest asset turnover ratio and lowest business administration ratio (Li and Xue, 2018).

Growing geo-economic influence of China related to broader changes in the global capitalism and inability of the US government to maintain trust to the dollar stipulates directed changes of the Chinese economy structure by capitalist type. The process of capitalism structuring in China is based on the Guanxi (Guanxi principle means network or connections – "it's not *what* you know, but *who* you know that's important") and this principle is described through the theory of “discriminating way of union” implementing the concept of “centrally controlled capitalism” (Wang, Rowley, 2017).

Huge dollar reserves and macroeconomic restrictions through maintaining fixed foreign exchange rate are supposed to ensure internal economic security of China (Lim, 2010).

Differences between China and India in the structure of the diversity of unity of indicators characterizing the geo-economic attractor of capitalism affect the possibilities of achieving the goals.

Possibilities of achieving the goals by Indian economy are related to GDP deflator (base year varies by country) and Gross capital formation (constant 2010 US$) – Gross domestic income (constant LCU), Gross fixed capital formation (constant LCU) and Gross fixed capital formation, private sector (current LCU).

In terms of average annual GDP growth, the Indian economy is not much inferior to the Chinese one, that defines it as one of the fastest growing in the world. The main exports of India are machinery and equipment, handicrafts, chemicals, food and agricultural raw materials, ready-made clothing and textiles. The main buyers are the USA, the EU and Japan. The main imports are oil, machinery, fertilizers and chemicals.

The major problem of economy development of India, as well as that of China, is a significant gap between increasing demand for energy and its supply (Kotikalapudi, 2016).

Thus, new geo-economic attractors of capitalism China and India are characterized by a transition moment from the socialist establishment of social structure to the capitalist one. This process is an attractor both for the developed countries which have lost their zeal and for the developing countries.

Conclusion

The deep foundation to the problem of establishment of the geo-economic space of capitalism is the variety of forms of existence of social and economic structures in the modern world order, which allow the possibility of exploitation of wage workers. The main criteria for attractiveness are the dominance of universal commodity-money relations and private ownership for the means of production. Capitalism played a progressive role in the historical development of society destroying patriarchal and feudal relations among people, substituted them for monetary relations. The process of globalization resulted in the strengthening of interdependence of national economies, formation of unified structure of the world economy comprising the aggregate of impersonal national economies, national sovereignty of states being destroyed. Capitalism proves to be the most resilient economic system of all alternatives of social and economic systems. It is attributed to capitalism focusing on the process of satisfying natural human instincts of egotism. Capitalism causes inequality that allows people to maximize their efforts and optimize their activity. Capitalist system raises individualism to the rank of major ideology. Cognitive abilities of people become the driver of individualism development in the capitalist system, and their abilities gain the major role in the accession of economic wealth.

In modern economic science four types of capitalism are distinguished: Anglo-Saxon, Continental Europe, Northern Europe and East Asia. Thus, capitalism has its own specific geography – spatial extent characterized by uneven development.

Identification of the capitalism attractor location is a momentous issue for the states focused on raw materials export, to be more exact on its consumers. The research on geo-economic attractor of capitalism revealed the unavailability of the USA, Germany, France and Japan, and dominance of China and India. These new attractors of capitalism do not possess unequivocal traits of capitalism demonstrating a social color.

Transition to the new type of society, characterized by wealth, markets, private ownership, democracy and civil society puts Russia on a par with China and India but does not endow it with features of attractor. To a large extent it is connected with indifference of the authorities to the process of controlling the growth rate of poverty among the employed. This indifference resulted in the pattern of the Russian economy development when income of the employed is reduced.

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Analysis of The Relationship of Average Consumption Spending Per Capita And Economic Indicators of The Region by The Method of Mathematical Regulation

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Abstract

This article studies the relationship between the main economic and social indicators characterizing the regions of Russia, and their impact on the value of average consumer spending per capita. The main goal of the study is to determine indicators that affect to a greater extent the value of average consumer spending per capita. The main research tools were selected methods of mathematical statistics, linear regression, mathematical regularization and machine learning. As the subject of the study, statistics were used for all 85 constituent entities of the Russian Federation for 2010-2019, provided by an official source, the Federal Service of the State Russian Federation. A large sample of statistical data guarantees the accuracy of the forecast and the reliability of our conclusions, which allows us to judge the scientific approach in our work. The study will make it possible to mathematically precisely substantiate which indicators contribute most to the value of average consumer spending per capita, which enables regional and federal authorities to obtain information on data that will help to better develop regional economic and social policies. Using machine learning methods, a mathematical model will also be developed that allows predicting average consumer spending per capita if other economic and social indicators of the region for the period preceding the study are known.

Keywords: Regions of The Russian Federation; Average Consumer Spending Per Capita; Statistical Data Analysis; Indicator Forecast; Quality of Life of The Population; Regional Policy; Socio-Economic Situation of The Regions.

Introduction

The aim of the study is to find those social and economic indicators that form the value of average consumer spending per capita. It is also necessary to develop and test a mathematical model that can predict the value of the desired region indicator if other social and economic indicators for the region are known. The study used statistical indicators for all subjects of the Russian Federation.

The relevance of the topic can be defined as follows: in most modern research methods of mathematical statistics and machine learning are not used. In this study, actual mathematical methods are applied, which make it possible to obtain accurate data and draw reasonable conclusions from the results. Based on the results, government agencies will be able to more accurately regulate and determine regional policy, which will increase significant macroeconomic indicators and improve the quality of life in all regions of Russia.

For the study we used only relevant statistical data of the Federal State Statistics Service, one of the most reliable and authoritative sources in the Russian Federation. We used the statistical indicators of the regions for 2010-2019, this time period was chosen to ensure the usefulness and accuracy of the study. The article uses the most recent published data for 2019.

Main Part

Average consumer spending per capita is one of the main indicators that are used to assess the quality of life in the region. Most rating agencies in Russia use it as one of the indicators that form an integral indicator of the quality of life or socio-economic well-being of the subject of Russia. The size of consumer spending is directly related to such economic indicators as well-being and average consumer income. Using mathematical methods, it is necessary to check how these indicators contribute to the average consumer spending per capita, which indicators, which are usually ignored, also have a strong effect. When developing local policies and planning the regional budget, regional authorities often rely on statistics and studies made on them, so a technique is needed to identify key indicators that need to be addressed first. To assess the impact of various socio-economic indicators on consumer spending, two correlation coefficients are calculated: Pearson and Spearman.

Pearson's correlation coefficient is calculated using the following formula:

$$r_{xy} = \frac{\sum_{i=1}^{n}(x_i - \overline{x})(y_i - \overline{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \overline{x})^2 \sum_{i=1}^{n}(y_i - \overline{y})^2}} \quad (1)$$

Where x_i, y_i are the elements of the samples from the studied pair of indicators.

To calculate the Spearman correlation coefficient, the concept of the rank of the sample element is introduced - the number of its position in the variational series constructed from the sample. Spearman's correlation coefficient is calculated using the following formula:

$$\rho_{xy} = 1 - \frac{6\sum_{i}^{n}\left(rang(x_i) - rang(y_i)\right)^2}{n(n-1)(n+1)} \quad (2)$$

Where x_i, y_i are the elements of the samples from the studied pair of indicators.

$rang(x_i)$ - the rank of the element x_i.

Both coefficients characterize the strength of the relationship between the two indicators by their magnitude: in the case of the proximity of the coefficients modulo to 1, the indicators are considered to be highly interconnected, in the case of proximity to 0 they are not related.

We conducted a correlation analysis of the impact of various socio-economic indicators on the value of consumer spending per capita. The most significant indicators, which have a significant pairwise correlation with the value of consumer spending per capita, are shown in table 1.

Table 1: The results of the calculation of the correlation coefficients

Indicator	r_{xy}	ρ_{xy}
The average annual population, people	0.57	0.33
The proportion of urban population, %	0.54	0.47
Employment rate, %	0.56	0.54
Per capita income	0.88	0.95
The population with cash incomes below the subsistence level, %	-0.52	-0.53
The number of own cars, per 1000	0.5	0.61
Gross regional product per capita	0.7	0.8
Fixed capital investment per capita	0.51	0.63
Volume of paid services to the population per capita	0.89	0.9

Source: Calculated by the authors on the basis of statistical data for the regions of Russia.

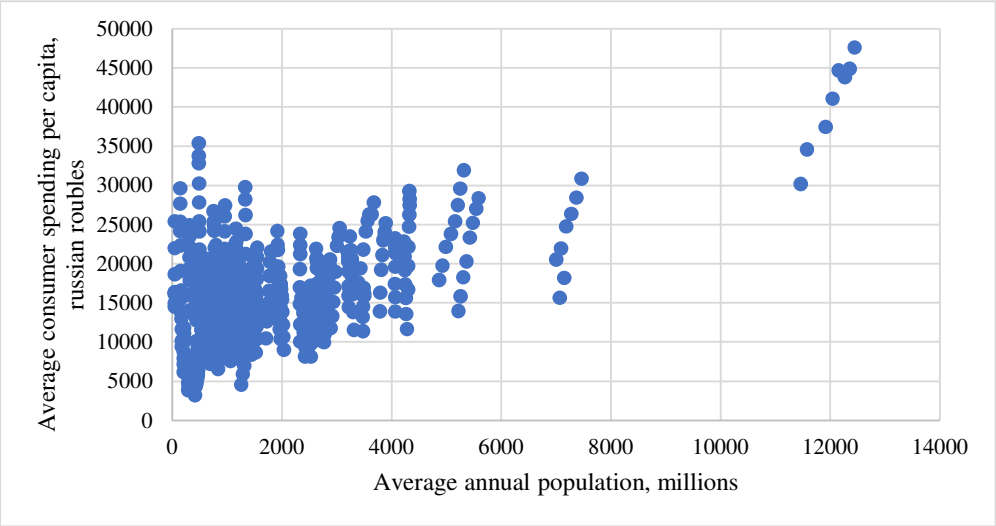

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Figure 1: The relationship of the average annual population and average consumer spending per capita for 2010-2019.

The graph shows many vertical stripes consisting of dots. This is because the average annual number of regions does not change as fast as consumer spending. The rightmost lane, which is characterized by the largest consumer spending, is Moscow, the richest region of Russia. The next lane is the Moscow region, the border region with Moscow. However, in most regions, per capita consumer spending is much less and does not exceed 30,000 rubles per month.

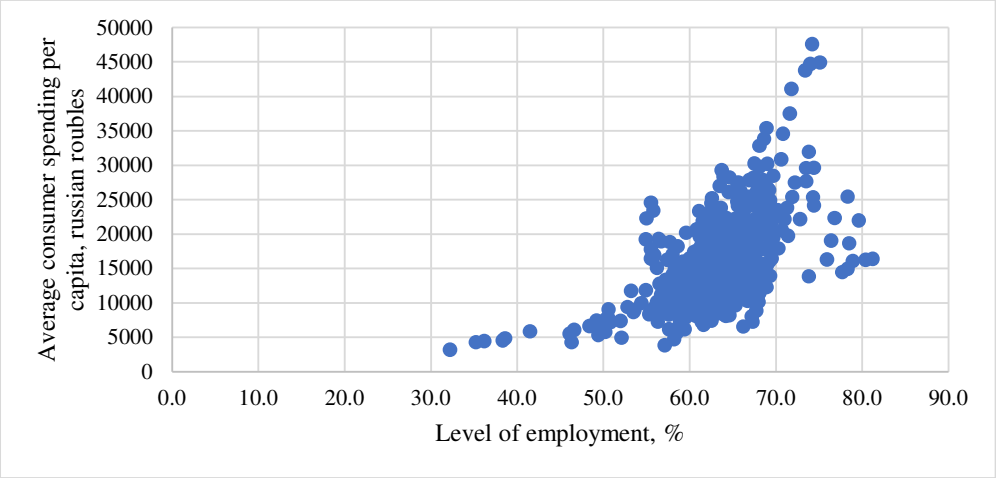

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Figure 2: The relationship between the level of employment and average consumer spending per capita for 2010-2019.

The figure shows a direct correlation between these indicators. in regions where low employment is observed (less than 50%), average consumer spending per capita is small and does not exceed 10,000 rubles. With further growth in employment, expenditures grow in direct proportion. Note that the maximum values are achieved with employment of 70% - in a healthy economic environment, not all people are engaged in active activities. These are the following regions - Moscow, Moscow Region and the Nenets Autonomous Okrug.

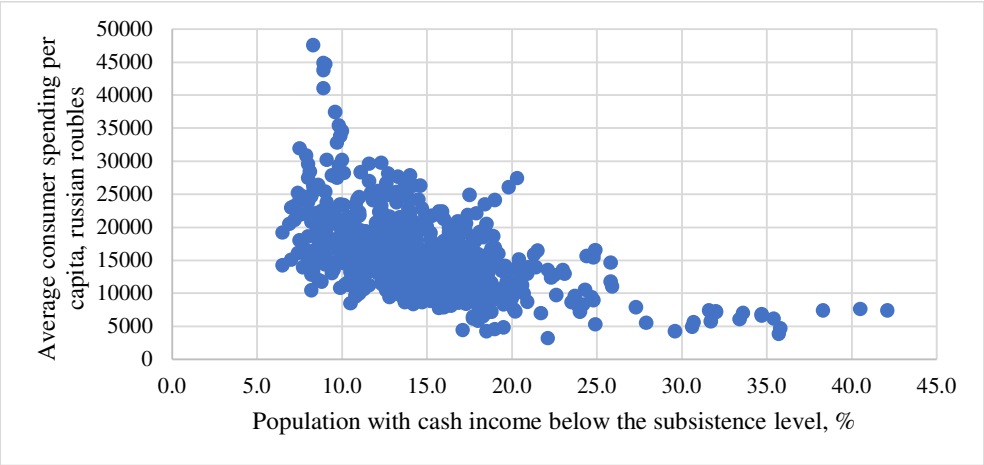

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Figure 3: The relationship of population with cash income below the subsistence level and average consumer spending per capita for 2010-2019.

In Figure 3, we can note a clear example of negative correlation. With the growth of poor people, expenses fall, because people have less money to spend. The largest cluster cloud is in the left corner. The majority of regions are characterized by the number of poor people in the region of 10-20%, the highest percentages being the Republic of Kalmykia and Tuva.

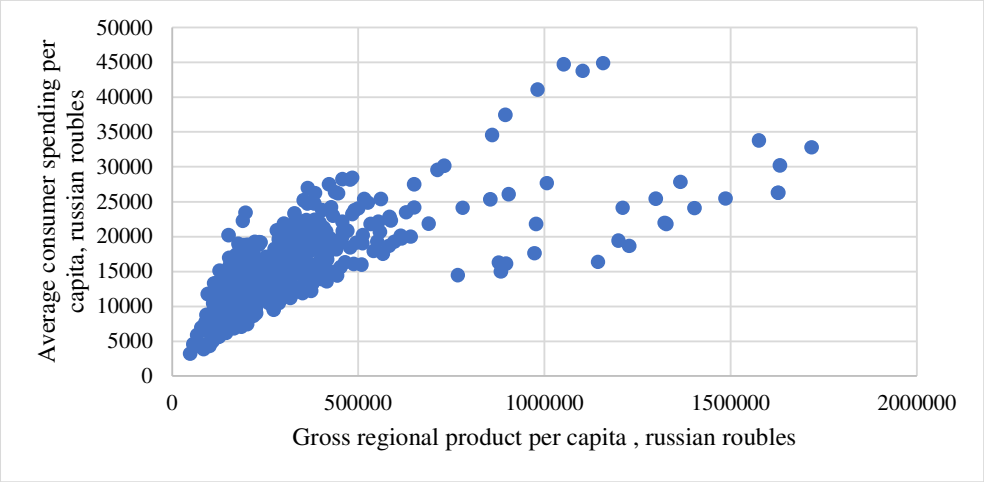

Compiled by authors.

Figure 4: The relationship between the gross regional product per capita and average consumer spending per capita for 2010-2019.

Gross regional product is one of the main economic indicators. In Russia, it can be noted that only a small number have high values for these indicators. A direct correlation of 0.7 is observed with the studied indicators. Again, the main region is Moscow, which is characterized by a high level of GRP per capita. The bands on the right are regions whose main activity is mining (Nenets Autonomous Okrug, Sverdlovsk region).

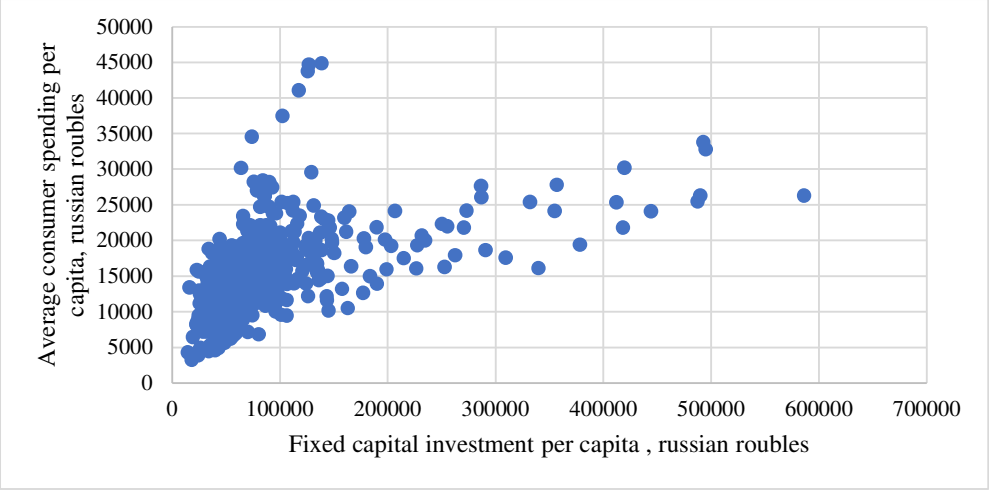

Compiled by authors.

Figure 5: Relationship between fixed capital investment per capita and average consumer spending per capita for 2010-2019.

The size of the correlation between these indicators is 0.51, since some regions of Russia are not directly related. In regions such as the Khanty-Mansi Autonomous Okrug-Yugra, Chelyabinsk region, Sverdlovsk region, etc. there is a large amount of investment in fixed capital per capita, but in these regions, there are many companies that produce oil, gas and other natural resources. These companies actively invest a lot of money in their businesses, but this does not increase the quality of life for most residents of the region.

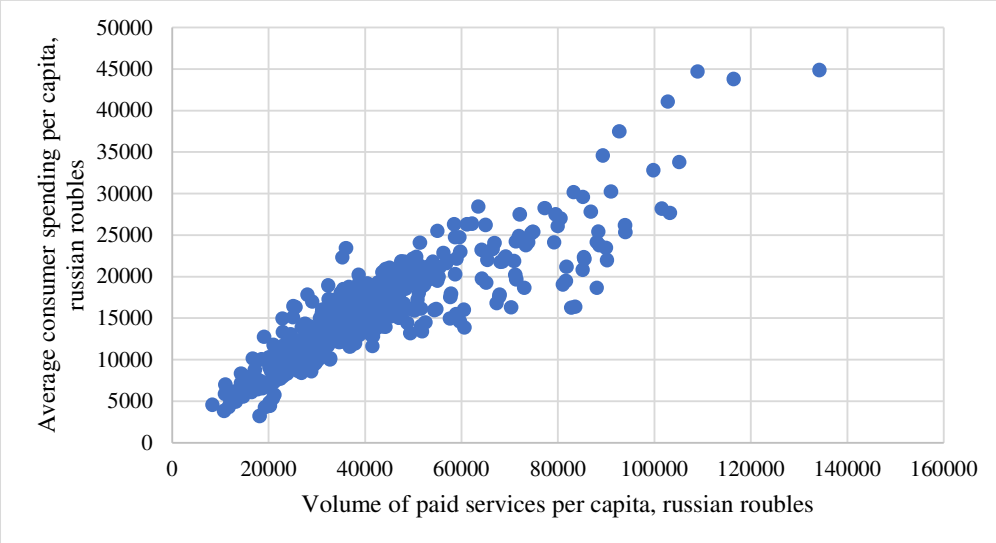

Compiled by authors.

Figure 6: The relationship between the volume of paid services per capita and average consumer spending per capita for 2010-2019.

Paid services per capita partially overlap with consumer spending. However, paid services can be used by companies and government agencies, and consumer spending includes expenditures on material resources. In figure 6, it can be noted that the correlation is strong and almost linear. consumer spending is growing evenly with the volume of paid services per capita, and this is typical for all regions of Russia.

To study the influence of all socio-economic factors in the aggregate on the value of consumer spending, we construct a model of regularized linear regression.

$$y = \sum_{i=1}^{n} \alpha_i x_i + \alpha_0 + \varepsilon \quad (3)$$

Where x_i - the independent socio-economic parameters of the model

y - the dependent variable corresponding to consumer spending in the region
α_i - weighting coefficients of the model parameters
α_0 - free member
ε – error term
n - the number of independent parameters in the model
The coefficients α_i, α_0 are determined in the process of solving the following optimization problem:

$$Q(\alpha, X) = \frac{1}{2l}(y - X\alpha)^T(y - X\alpha) + \gamma\|\alpha\|_1 \underset{\alpha}{\rightarrow} \min \quad (4)$$

Where $y = (y^1, \dots y^l)^T$

$$X = \begin{pmatrix} 1 & \dots & x_n^1 \\ \dots & \dots & \dots \\ 1 & \dots & x_n^l \end{pmatrix}$$

$\alpha = (\alpha_0, .. \alpha_n)^T$
l – sample size
γ – regularization parameter

All available data is divided into 2 parts - training and test samples in the ratio of 80% to 20%. The quality of the constructed model is estimated using the coefficient of determination.

$$R^2 = 1 - \frac{\sum_{i=1}^{n}(y^i - \alpha^T X_i)^2}{\sum_{i=1}^{n}(y^i - \overline{y})^2} \quad (5)$$

Where X_i – i-th row of matrix X

This coefficient (5) shows how much of the variance of the dependent variable is explained by the model.

We made model settings and selected the regularization coefficient γ equal to 100. Then the quality of the model in the training and test samples is 90% and 89%, respectively. This indicates the high quality of the constructed model and allows us to interpret the obtained weighting coefficients as the contribution of relevant factors to the value of consumer spending per capita.

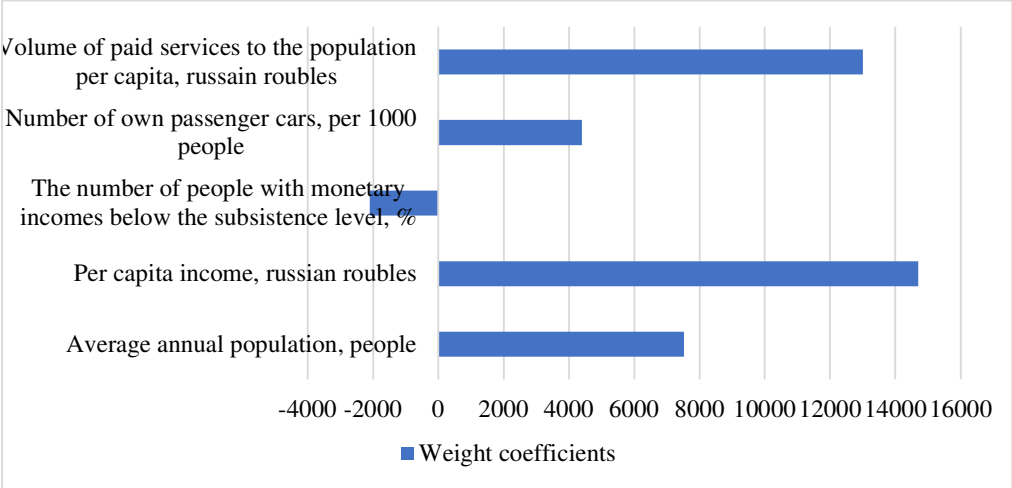

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Figure 7: Weight coefficients of the regularized model.

As can be seen from figure 7, the value of average consumer spending per capita is mainly influenced by 5 factors, with 4 having a positive relationship and 1 having a negative one. The highest contribution is made by the average per capita income of the population. The smallest contribution is the number of people with monetary incomes below the subsistence level.

Conclusion

The results of our study and mathematical models it is possible to identify the main indicators forming the value of the average expenditure per capita, namely: the volume of paid services per capita, average per capita income, population with money incomes below the subsistence minimum, the number of private cars per 1,000 of population, average annual population, people with weight coefficients we can estimate the contribution of each indicator in the final. But despite the fact that these indicators have the greatest share and their improvement will lead to an increase in the studied indicator, which is why they may receive increased attention from the regional authorities, they should also not forget about the improvement of other economic and social indicators of the region, which also form the level of quality of life in the region. The charts that show the correlation between average consumer spending per capita and other economic and social indicators also re-confirmed the existence of a strong economic differentiation of regions in the Russian Federation, which has been repeatedly proved by previous studies. This observation allows us to conclude that the Central

regions are developing faster than the rest, using Finance and other resources from other regions of the Russian Federation. Our mathematical model allows us to determine the average consumer spending per capita with high accuracy, if we know the other indicators of the region, which allows us to forecast the data, as well as more accurately calculate the average consumer spending per capita. The state needs to adjust the current regional policy in order to ensure improvement of economic and social indicators, since without this it is impossible to achieve high indicators in the quality of life of the population of the Russian Federation.

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Estimation of The Influence of Digital Economy on The Competitiveness of The World

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Abstract

The digital economy offers great opportunities for developing a country's competitiveness system. Modern technologies make it possible to use a high-tech digital platform that minimizes the human factor and the associated corruption and errors, automates the collection of statistical, tax and other reporting, and makes decisions based on analysis of the real situation. The state can create the conditions for the development of the digital economy: a legal framework, an appropriate infrastructure in the form of the ubiquitous high-speed Internet and resolve security issues. It is important for the consumer to know that when using a digital product and observing simple safety measures, it will not incur losses.

Keywords: Digital Economy, Competitiveness, ICT Sector, Digitalization.

Introduction

The ongoing complication of social structures and relations, which are increasingly based on modern digital technologies, which cause an exponential growth in data flows, highlights the issue of creating a digital economy. The importance of the ongoing processes has raised the question of the formation of a new type of economy, where relations with respect to the production, processing, storage, transmission and use of an increasing volume of data become dominant. Data becomes the basis of an economic analysis that examines the patterns of functioning of modern socio-economic systems (Abdrakhmanova G., Vishnevskiy K., et al, 2018).

The digital economy is the basis of development for the economy of the country as a whole and has an impact on such diverse industries as banking, retail, transport, energy, education, healthcare and many others. Digital technologies, such as the Internet of things, big data, the use of mobile devices and devices transform the ways of social interaction, economic relations, institutions.

However, based on the events of foreign policy and global trends, each country in the world faces the issue of global competitiveness and national security, and the development of the digital economy plays a significant role in addressing this issue. Some elements of the digital economy are already operating successfully. Today, given the massive transfer of documents and communications to digital media, the permission of electronic signatures, communication with the state is also moving to an electronic platform. All these circumstances indicate the relevance of the chosen research topic (Borkova, E., Chulakova, A., et al, 2019).

The goal is to identify the relationship between the level of digital development of the country and its competitiveness at the global level.

The objectives of the study are:

• Analyze the position of various countries in the world in ratings characterizing the level of digital development of the country's economy.

• Consider world indices characterizing the level of competitiveness of countries.

• To identify the relationship between the level of development of the country and the level of its competitiveness.

The hypothesis of this study is the assumption that the development of the digital economy, through the introduction and improvement of technology, helps to increase the competitiveness of any country.

This study is pilot and requires further detailed study of this issue.

To solve the set tasks, theoretical and empirical methods of scientific knowledge were used. The method of comparative analysis of statistical data comparing individual economic phenomena in order to identify their similarities and differences made it possible to identify the characteristic, features and problems of the Russian information and communication technology sector. An analysis of causal relationships has revealed a relationship between the level of development of the country's digital sector and its competitiveness (Borkova E., Plotnikov V., et al, 2019).

Results and its Discussion

The term “country’s competitiveness” describes a country's ability to produce goods and services that can meet the requirements of the international market and specific consumers. These goods and services must be of high quality and meet the level of world standards.

Any product after entering the global market begins to gradually spend its competitiveness potential. In order to slow down this process, it is necessary to constantly improve the quality and operational characteristics of the product, and the production of a new product should be carried out systematically in order to create conditions for its entry into the world market.

Digital technologies enable enterprises to reduce costs, optimize supply chains and sell goods and services around the world at lower costs. Trade growth while lowering costs can have a positive impact on the economy as a whole, for example, due to increased competition, increased labor productivity and innovation, as well as increased opportunities for the use of qualified personnel. In other words, the digital economy makes the products of the country of origin competitive compared to countries that do not use digital technology. The ability of countries and enterprises to use new digital resources is becoming a key factor in competitiveness. Access to data and its analysis are becoming strategically important to increase the competitiveness of countries in different sectors (Selishcheva T.A., Sopina N.V., et al, 2018).

Consider the state of the indicators of the digital economy in various countries of the world (Tab. 1). This allows you to analyze the level of development of the digital economy and its impact on the competitiveness of the countries of the world, using developed indices. The level of development of the digital economy and the country's rating are measured based on various composite indices that integrate individual sub-indices that are responsible for the digital transformation of individual sectors of the economy and society.

Table 1: Countries of the world in the ratings of the development of the digital economy.

Country	IDI 2017	DESI 2018	WDCI 2018	DEI 2017	NRI 2016	EGDI 2016	EPART 2016	GCI 2018	GII 2018	Average
UK	5	7	10	8	8	1	1	5	4	5,4
Sweden	11	2	3	2	3	6	27	3	3	6,7
Finland	22	3	5	3	2	5	10	6	7	7,0
Denmark	4	1	4	4	11	9	22	7	8	7,8
Germany	12	14	18	17	15	15	27	14	9	15,7
Estonia	17	9	25	21	22	13	55	22	24	23,1
Lithuania	41	13	29	–	29	23	17	24	40	27,0
Poland	49	24	36	35	42	36	14	38	39	34,8
Czech Republic	43	17	33	27	36	50	76	29	27	37,6
Latvian	35	19	35	28	32	45	84	–	34	39,0
Russia	45	–	40	39	41	35	32	36	46	39,3
China	5	3	2	6	4	18	25	12	4	6,9
Japan	5	2	4	6	2	5	9	11	7	5,3
Korea	22	3	6	7	5	9	16	21	10	6,1
Singapore	21	5	4	8	6	9	12	18	13	7,8
Hungary	48	23	46	32	50	46	91	30	33	44,3
Bulgaria	50	26	43	41	69	52	43	43	37	44,9
Kazakhstan	52	–	38	–	39	33	67	45	74	49,7
Romania	58	28	47	–	66	75	60	39	49	52,8
Belarus	32	–	–	–	–	49	76	42	86	57,0
Armenia	75	–	–	–	56	87	84	–	68	74,0
Kyrgyzstan	109	–	–	–	95	97	67	–	94	92,4

Compiled by authors from the data of the ICT Development Index – IDI; Digital Economy and Society Index – DESI; IMD World Digital Competiveness Index – WDCI; Digital Evolution Index – DEI; Boston Consulting Group (e-Intensity); Networked Readiness Index – NRI; The UN Global E-Government Development Index – EGDI; E-Participation Index – EPART; Global Connectivity Index – GCI, Huawei; The Global Innovation Index – GII.

These indices consider various aspects of the development of society: institutional, economic, technological, social, and economic integration. At the same time, some indices to a greater extent reflect the level of development of the information society, while others - to a lesser extent. Therefore, comparing them, it is difficult to give an accurate description of the level of digitalization of the economy of a country. Let us turn to the index of national development of the digital economy, which was calculated by Rosatom State Corporation. The National Digital Economy Development Index is a measure of the degree of preparedness, use and impact of digital technologies in developed countries.

Table 2: National Digital Economy Development Index.

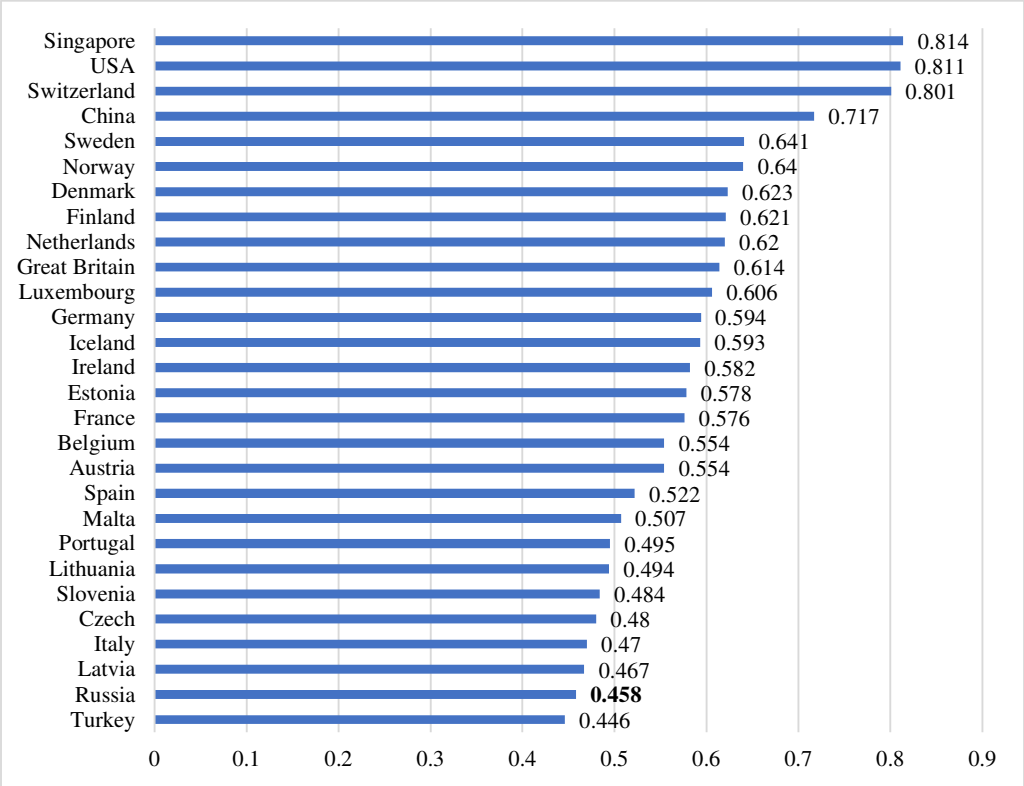

Compiled by authors from the National Digital Economy Rating.

The most developed among European countries in the field of the digital economy are Sweden, Norway, Denmark and Finland, Switzerland. Singapore and the United States should be singled out separately. Low index values are - Hungary, Greece, Bulgaria and Romania. Russia takes only 23rd place. Its strengths are cybersecurity, digital government and digital health. If we compare countries by the level of development of individual industries, the leading countries also have high index values. Particularly noteworthy are the high values of the index in the digital business (Netherlands - 0.486, Finland - 0.486, Norway - 0.475) and information and communication technologies (Netherlands - 0.629, Finland - 0.669, Norway - 0.650). Russia in these sectors has the following values of 0.334 and 0.494.

The considered indices are inextricably linked with such indices as the Global Competitiveness Index and the Global Competitiveness Rating. Comparison of the positions of countries in these indices will reveal the relationship between the level of digitalization of a country and its competitiveness.

Table 3: Global Competitiveness Index IMD 2014-2018.

Year	1-place	2-place	3-place	Place of Russia
2014	Hong Kong	USA	Singapore	49
2015	Hong Kong	USA	Switzerland	48
2016	USA	Switzerland	Hong Kong	42
2017	Switzerland	Singapore	USA	38
2018	USA	Hong Kong	Singapore	45

Compiled by authors from the IMD World Competitiveness Rankings 2018 https://www.imd.org/wcc/world-competitiveness-center-rankings/world-competitiveness-ranking-2018/

Table 4: The Global Competitiveness Index WEF 2014 – 2018.

Year	1-place	2-place	3-place	Place of Russia
2014	Switzerland	Sweden	Singapore	63
2015	Switzerland	Singapore	Sweden	66
2016	Switzerland	Singapore	Finland	67
2017	Switzerland	Singapore	Finland	64
2018	Switzerland	Singapore	USA	53

Compiled by authors from the - Global Competitiveness Report- 2018. https://www.weforum.org/reports/the-global-competitveness-report-2018

Comparing the values of the indicators on the national index of the development of the digital economy and the Global Competitiveness Indexes, we can see that the same countries occupy leading positions in them. This testifies to the relationship between the level of digitalization of the country and its competitiveness. The more developed the country's digital sector, the more competitive products it can provide to the world market (Gontar, A., Plotnikov, V., et al, 2019).

Today, the country's competitiveness is determined by the level of its technical development. The level of technical development depends on the ability to use modern achievements of science and technology in production. And as a result, global competitiveness requires investments in R&D and innovation, which are determined by the scientific potential, scientific effectiveness and innovative activity of the business sector. Which, in our opinion, are the most important factors for the digitalization of the economy, which are considered by the National Rating for the Development of the Digital Economy in a separate rating.

Table 5: Rating for R&D and innovation.

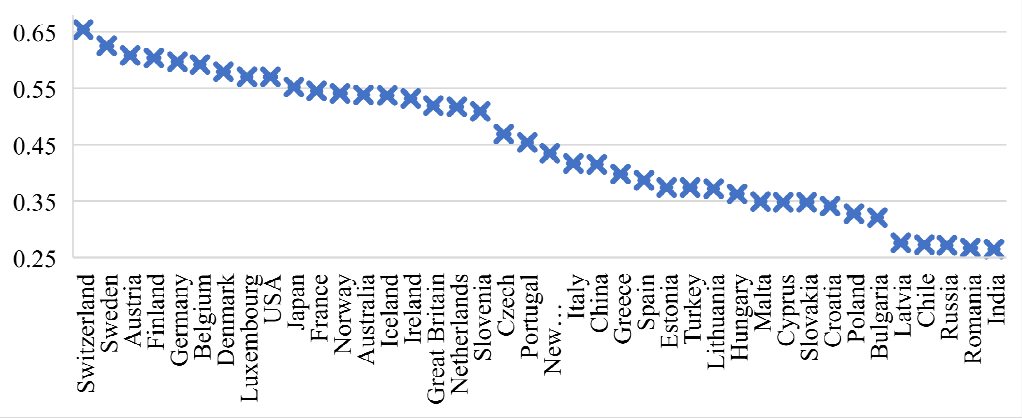

Compiled by authors from the National Digital Economy Rating.

Among the countries included in the rating, Russia has a very low value of the integral index "R&D and innovation", ahead of only Romania and India (Fig. 5). The vector of state policy of the Russian Federation, taken for the intensive development of scientific and technological fields, has not yet led to a tangible change in diagnostic indicators. At the same time, according to a number of indicators, Russia's lagging behind the leading powers does not seem insurmountable.

In Russia, a relatively small share of domestic research and development costs in GDP remains, which in recent years has been about 1.1% of the country's GDP, which corresponds to 33rd place in the ranking of the Global Innovation Index 2018 for this indicator - 40. For comparison: in Canada this share is 1.61%, in China - 2.1%, in Germany - 2.9%, the leader (Israel) - 4.3% - 41. This indicator determines the security of research activities with financial resources. Its low value is explained, in particular, by the insufficient interest of national business in the development of new technologies — the share of business spending on R&D in Russia is small and amounted to only 26.5% in 2015 and

28.1% in 2016, which is significantly less than in such innovative economies as German (more than 65%), Chinese (almost 75%) or Japanese (78%).

For a more detailed examination, the leading countries of the world in terms of R&D expenditures and innovations.

Table 5: Leading countries in R&D expenditures 2018

NO.	The country	Billion US $	Attitude to GDP, %
1	USA	511,1	2,74%
2	China	451,2	2,12%
3	Japan	168,6	2,02%
4	Germany	118,5	2,02%
5	Korea	79,4	4,24%
6	France	62,2	1,54%
7	India	50,1	2,56%
8	Great Britain	47,2	3,21%
9	Brazil	41,1	2,5%
10	Russia	39,9	1,1%

Compiled by authors from the Rating of the countries of the world in terms of global competitiveness, 2018.

To note that countries that regularly invest in science occupy leading positions in the index of development of the digital economy and the ranking of global competitiveness. It is also worth noting that patent statistics are the main indicator of innovative potential and one of the key indicators of technological development of countries and regions.

Table 6: Leading countries, but the number of patents 2018

Rating	The country	Applications Total	Applications residents	Applications non-residents
1	China	526 412	415 829	110 583
2	USA	503 582	247 750	255 832
3	Japan	342 610	287 580	55 030
4	South Korea	178 924	138 034	40 890
5	Germany	59 444	46 986	12 458
6	India	42 291	8 841	33 450
7	Russia	**41 414**	**26 495**	**14 919**
8	Canada	35 111	4 754	30 357
9	Australia	25 526	2 383	23 143
10	Brazil	22 686	2 705	19 981

Compiled by authors from the Rating of the countries of the world in terms of global competitiveness, 2018.

Conclusion

Based on the study, we can conclude that the level of development of the digital sector of the economy, of course, affects the degree of competitiveness of the country. It was determined that the countries

that are leaders in the development of the digital economy occupy leading positions in global competitiveness ratings; moreover, they spend the most money on R&D and innovation.

Acknowledgment

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Determining Factors of Crop Patterns in Dobrogea

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Abstract

The paper analyses the main determining factors of crop patterns in Dobrogea, the most droughty region of Romania. Before 1945 extensive agriculture with more or less resistant species to the drought was practiced. In the period of socialist agriculture (1945-1989), the crop pattern was established by plan. After 1990 the crop pattern is established at the farm level by a manager depending on several factors such as land reclamations, sorts or hybrids, resistance to drought, market demand and others.

Keywords: Crop Pattern, Drought, Biologic Materials, Manager, Land Reclamations

Introduction

Dobrogea is a Romanian province located at the southeastern extremity of the country. The agricultural area, 897,206 ha represents 6.1% of the total in the country and the tillable area 764,578 ha, 8% of the total in the country, area that constitutes the main agricultural resource of the region. From an orographic point of view, Dobrogea is a sum of plateaus. From a climatic point of view, it is considered the main pole of drought. In the past, the low population rate related to the land resource favored a system of agro-pastoral agriculture in which the pastures dominated, and the structure of the crops in the little cultivated tillable land was composed of cereals in which the barley dominated - over 40% of the tillable land, followed by wheat and later, corn. This in a growing arable area. Although Dobrogea was a dry region in the more distant past as well, as Ionescu from Brad stated in 1850: *The surface of Dobrogea being open makes the climate of this country dry* (Ion Ionescu from Brad, 1968), the main argument for establishing the structure of cultures was another one revealed by the same Ionescu from Brad: *Dobrogea has a huge stretch of land and very few arms. This circumstance created the system of rural economy that dominates there. The inhabitants cultivate what they can, but this does not stop the extent of land affected by the crops being very small* (Ionescu de Brad, 1968). It seems that in this period when the pastoral farming system based on animal husbandry predominated, the arable area did not exceed 10,000ha. Later, in the last quarter of

19th century and especially after the union of Dobrogea with Romania in 1878, the tillable area increased greatly reaching almost 300,000 ha in 1900, and 757,474 ha in 1927 (Brătescu, 1928). During the Romanian rule over Dobrogea, the arable area of the two Dobrogean counties Constanta and Tulcea totaled almost 720 thousand ha, approaching tillable surface area at present. During the period of planned-socialist agriculture the arable area increased further due to the regime's ambition for the arable land of Romania to reach the figure of 10 million hectares, a figure reached at least on paper, 10,080.4 ha in 1987 (Statistical Yearbook, 1988). In fact, the figure designating the arable area at the end of 1989 was 9,458.3 thousand ha, with 622.1 thousand ha less than the arable area reported by the statistics in 1987 (Statistical Yearbook 1990). The present cultivated arable area of Dobrogea amounts to 754,872 ha (Statistical Yearbook 2017).

Materials and Methods

The used materials include, besides the papers on the statistical data on the structure of the crops in different periods in Dobrogea, some bibliographic data on the history of agriculture in this Romanian province. The research method is specific to the economic exploration: the collection and selection of the material, the processing by appropriate means, synthesis, conclusions and proposals. The comparisons relate to three distinct periods in terms of the influence of the main factors on the structure of the crops: a) the period before 1945, when the planned economy was introduced; b) the planned economy period 1945-1989; c) the market economy period after 1990.

Results and Discussions

a) The pre-1945 period. It is a very long period, practically starting with the first agrarian structures in the region. We have somewhat significant data regarding the structure of the cultures from the middle of the 19th century and we owe them to the agronomic scientist Ion Ionescu from Brad, who was tasked by the Ottoman Empire to write the famous *Agricultural excursion in the Dobrogea Plain in 1850*. In its text, Ionescu from Brad says only that the soil of Dobrogea is more favorable to spring crops and that the law of crop alternation, respectively of the crop rotation that would suggest a certain crop structure does not exist (Ion Ionescu de Brad, 1968). We will have more clear data on the structure of cultures in the Dobrogea after 1878 when Dobrogea had a Romanian administration. The engineer C. Filipescu, in the chapter dedicated to Dobrogea agriculture in the volume *50 years of Romanian life in Dobrogea,* will make an average of the structure of cereal crops for the 1894-1927 period, grouped by cycles, from which we extract the 1894-1927 period (table 1). The way in which the structure of cultures in arable land evolved during the first 50 years of Romanian administration in Dobrogea is presented in table 2.18. However, we only have accurate statistical data for the whole period for cereals, which on average accounted for 90.9% of the arable area of Constanta county and 87.0% of the arable land of Tulcea county. The extension of cereal culture as a result of the growth of arable land constituted the great technological revolution from the end of the 19th century and the beginning of the 20th century in Dobrogea.

Table 1: Structure of cereal crops in Dobrogea's tillable land in the 1894-1900 and 1920-1927 periods

Culture	1894-1900		1920-1927	
	ha	%	ha	%
Grain	89551	19,8	76083	13,6
Corn	59404	13,1	130453	23,4
Barley	202901	44,8	256673	46,0

Oats	43257	9,6	78755	14,1
Rye	16522	3,7	4311	0,8
Millet	40770	9,0	11879	2,1
T o t a l	*452425*	*1000,0*	*558254*	*100,0*

The area cultivated with cereals reached almost 560 thousand ha in 1920-1927 from 230 thousand ha in 1886, which meant an increase of more than 2.4 times. By species and counties, the evolution of the areas cultivated with cereals during the 1886-1927 period is as follows:

- wheat had expanded almost 2.2 times in Constanța county and by about 20% in Tulcea county;
- the cultivation area for rye was reduced by almost 27.0% in Constanta county and by 42.0% in Tulcea county;
- barley, cultivated on the largest areas, had expanded more than three times in Constanta county and about 2.3 times in Tulcea county;
- oats had, in relative values, the strongest extension of about ten times in Constanta county and over 4.5 times in Tulcea county, the largest areas being cultivated during the 1906-1915 period when it is competing with wheat;
- maize was extended in the reference period by approx. four times in Constanta County and more than three times in Tulcea County.

Among the advances made by Dobrogean agriculture during the 1894-1927 period, we must also mention the extension of food and industrial species. Both in 1915 and in 1927, over 45,000 ha were cultivated with food species in the following order and evolution:

	1915 (ha)	1927 (ha)
Beans	38 178	32 340
Melons	4 886	6 851
Potatoes	881	2 304
Onions	291	918
Cabbage	241	551
Pumpkins	264	159
Lentils	99	362
Peas	235	94
Other vegetables	355	2 002

Some of these species will grow on increasingly larger areas (melons, potatoes, cabbage, onions), others will lose their values (peas, pumpkins). The development and diversification of the assortment of food plants result from the growth of more than 5.6 times of the areas cultivated with other food species (from 355 ha in 1915 to 2 002 ha in 1927).

Industrial plants had increasing importance in the structure of cultivated areas during this period from 15,196 ha in 1915 to 39,792 ha in 1927. These include rapeseed: from 11 302 ha to 22 434 ha; flax: from 2,023 ha to 10 341 ha; tobacco: from 1,827 ha to 3 806.

The next stop in the structure of arable areas will be done in the first half of the fourth decade (1931-1935) for which we have statistical data on the main cereal species for the Dobrogean counties Constanta and Tulcea (table 3).

Table 3: The cultivated area and the share in tillable land between the main cereals in Dobrogea in 1931-1935

Specification		Constanţa county	Tulcea county	Dobrogea
Total	*Ha*	*390 470*	*200 349*	*590 089*
	%	*100.0*	*100,0*	*100,0*
of which: - Grain	Ha	36 081	14 977	51 058
	%	9,2	7,5	8,7
- Barley	Ha	165 865	98 099	263 964
	%	42,5	48,9	44,6
- Oats	Ha	65 143	17 046	82 189
	%	16,7	8,5	13,9
-Corn	Ha	123 381	70 227	193 608
	%	31,6	35,1	32,8

The most important cereal species cultivated in Dobrogea during this period were, in order of the sown areas:

- barley with a share of 36.8% in arable land compared to only 13.4% in the country average;
- maize, cultivated on 26.9% of the arable land compared with the average of 36.8% in the country;
- oats still occupy 11.4% of the arable land in Dobrogea while only 6.2% in the country;
- wheat was still cultivated at that time, only on 7.1% of the arable land (more than three times less than the country average).

Table 2: Evolution of the areas cultivated with cereals in Dobrogea between 1894-1927

Period	Total Cereals		Wheat		Rye		Barley		Oats		Maize		Millet	
	ha	%	Ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
Constanța County														
1886	131343	100,0	21125	16,1	3294	2,5	52731	40,2	6332	4,8	20754	15,8	27106	20,6
1894-1900	297347	100,0	47278	15,9	8786	2,9	134601	45,3	32991	11,1	39183	13,2	34508	11,6
1901-1905	326898	100,0	42486	13,0	2697	0,8	136548	41,8	62361	19,1	56295	17,2	26511	8,1
1906-1910	385143	100,0	62005	16,2	6363	1,6	145286	37,7	96023	24,9	59062	15,3	16404	4,3
1911-1915	390264	100,0	92024	23,6	3282	0,8	144817	37,1	82826	21,2	59658	15,3	7657	2,0
1920-1927	358216	100,0	46345	12,9	2084	0,6	159373	44,5	62595	17,5	79543	22,7	8276	2,3
Tulcea County														
1886	99145	100,0	24833	25,0	3833	3,9	42791	43,2	4587	4,6	16200	16,3	6901	7,0
1894-1900	155119	100,0	42273	27,3	7736	5,0	68341	44,1	10266	6,6	20221	13,0	6282	4,0
1901-1905	168431	100,0	47536	28,2	17722	10,5	60664	36,1	12699	7,5	25267	15,0	4543	2,7
1906-1910	173433	100,0	32251	18,6	31407	18,1	59731	34,5	15944	9,2	29853	57,2	4247	2,4
1911-1915	163448	100,0	27653	16,9	14729	9,0	66608	40,7	18231	11,2	33775	20,7	2452	1,5
1920-1927	200067	100,0	29738	14,9	2227	1,1	97269	48,6	16160	8,1	50910	25,4	3703	1,9
Dobrogea														
1886	230487	100,0	45958	19,9	7127	3,1	95552	41,5	10919	4,7	36954	16,0	34007	14,8
1894-1900	452465	100,0	89551	19,8	16522	3,7	202941	44,9	43257	9,6	59404	13,0	40790	9,0
1901-1905	495329	100,0	90022	18,2	26419	4,0	197212	39,8	75060	15,2	81562	16,5	31054	6,3
1906-1910	558576	100,0	94256	16,9	37770	6,8	205017	36,7	111967	20,0	88915	15,9	20651	3,7
1911-1915	553712	100,0	119677	21,6	18011	3,3	211425	38,2	101057	18,3	93433	16,8	10109	1,8
1920-1927	558283	100,0	76083	13,6	4311	0,8	216642	38,8	78055	14,1	133533	23,4	11979	2,1

Therefore, in the reference years, 1931-1935 in Dobrogea much more barley and oats and less wheat and maize were grown (as a share in tillable land). Overall, the share of cereal species cultivated in Dobrogea is similar, the four crops being sown on 82.2% of arable land in Dobrogea and 80.4% on average across the country. Also, in Dobrogea, rye was also relatively widespread (over 6.0% compared to 2.8% of the country average). In the same period areas cultivated with fodder plants are also mentioned (perennial and annual): 18,769 ha in Constanta county and 11,911 ha in Tulcea county. We will conclude the presentation of the evolution of the plant production profile in Dobrogea before the Second World War by an enumeration of the share in arable land of the main crops and crop groups in 1937: grains - 86.3%, legumes for grains 3.7 % (3.3% beans), potatoes 0.2%, oily plants 4.8% (3.4% rapeseed, 0.8% flax, 0.2% sunflower, 0.4% soy), tobacco 0.1%, fodder plants 3.7%, vegetables 0.3%, melons 0.7%.

In this first analyzed period, which covers practically the whole of the nineteenth century and half of the twentieth century, the determining factors of the structure of cultures in Dobrogea were in order:

- a system of pastoral agriculture with a predominance of breeding animals based on both tradition and low population in relation to the land resource;
- an extensive dual farming system in which the small peasant household practiced a larger crop structure to ensure an assortment of products necessary for subsistence, and on the other hand the export orientation of the large owners with a narrower assortment of crops (cereals);
- throughout the period, both the species and the recognized local varieties or populations, including fodder, were chosen according to their drought resistance.

b) The period of planned economy and socialist agriculture. It includes the chronological interval between March 6, 1945 and December 1989. This period is subdivided in the 1945-1957 period (12 years) until the end of the collectivization process in Dobrogea and the 1957-1989 interval (32 years), the period of socialist agriculture. In the first period, both small and large owners (50 ha after the agrarian reform in 1945), established their own crop structure. After 1957, two are the determining factors for the crop structure in Dobrogea: the central agricultural product fund of the state and the evolution of irrigation arrangements that changed crop structures in the sense of increasing the share of species, varieties, hybrids of high intensity with higher water needs than could only be ensured through irrigation (Table 4).

Table 4: The evolution of irrigation arrangements in Dobrogea from 1960-1990

Specification	1960	1965	1970	1975	1980	1985	1990
Agricultural area - thousand ha -							
Constanța county	8,6	9,1	62,7	199,4	339,5	393,7	422,3
Tulcea county	4,9	5,9	14,0	77,2	112,5	142,5	159,2
Dobrogea	*13,5*	*15,0*	*76,7*	*276,6*	*452,0*	*536,2*	*581,5*
Arable area - thousands ha -							
Constanța county	8,6	7,3	58,0	187,7	326,3	377,1	395,6
Tulcea county	4,9	5,8	11,6	75,6	108,0	137,3	153,8
Dobrogea	*13,5*	*13,1*	*69,6*	*263,3*	*434,3*	*514,3*	*549,4*

To highlight the influence of irrigated areas on the structure of crops, the surface and the weight in arable land of some crops or groups of crops more or less influenced by irrigation in two situations were compared:

a) the year 1968, when the share of landscaped areas was so low that it did not significantly influence the structure of the crops;

b) the year 1989, when the arable land of Constanța county was irrigated in proportion of 82.4%, and the arable land of Tulcea county was irrigated in proportion of 54.2%. The comparison of the two situations is presented in table 5.

Table 5: The surface and weight of arable land for the main crops or groups of cultures significantly influenced by irrigation

Culture	U/M	1968		1989	
		Constanța county	Tulcea county	Constanța county	Tulcea county
Cereals	ha	215381	97762	181602	103321
	%	43,1	38,2	37,5	35,6
Corn	ha	118912	71740	122650	84698
	%	23,8	28,0	25,3	29,2
Sunflower	ha	44559	19118	24997	18394
	%	8,9	7,5	5,2	6,3
Soy	ha	-	-	39674	16348
	%	-	-	8,2	5,6
Sugar beet	ha	969	95	7062	6520
	%	0,002	0,000	105	2,2
Potatoes	ha	2942	2829	8013	4089
	%	0,06	1,1	1,7	2,2
Vegetables	ha	9274	5819	10116	6117
	%	1,9	2,3	2,1	2,1

We note that the group of cereals with lower water needs decreases as a percentage in arable land in 1989, compared to 1968. On the contrary, corn cultivation with higher water needs was cultivated in 1989 in larger areas. The share of sunflower culture is also declining. On the other hand, the proportion of species that more or less depend on irrigation, such as sugar beet, vegetables, potato, increases in the structure of crops.

On the surfaces arranged for irrigation, the culture of soy appears. We mention that in the last years of the socialist economy there have been reasons that have somewhat blurred the influence of irrigation arrangements on the structure of cultures. One of these reasons was the fact that in big productions the irrigation facilities not properly exploited did not give expected results. And also in the last years, the territorial self-provisioning program that obliged each county to produce its entire product range was a second cause for the influence of irrigation to be significant.

c) The market economy period, after 1990. A few years after the *conversion* of the Romanian agriculture to the market economy there were still agronomists who declared: *I know how to produce* and who were soon convinced that they did not know how to sell. We appreciate that the market demand for certain products, including niches, was the determining factor that influenced the crop structure under the conditions of decision-making autonomy at the farm level. Of course, market testing also included the price with different profit margins from one product to another depending on the costs. The offer was also conditioned by certain factors such as:

- large homogeneous exportable parties which imply including association actions, which did not happen;
- the system of subsidies depending on the quality of the product or the impact on the environment;
- restrictive legislation or even the exclusion of products with a certain content of certain genetically modified substances or organisms;

- the possibility of irrigation, mandatory for certain products with higher water needs (corn, for example).

This sum of factors - otherwise incomplete - results in a permanent change in the structure of cultures in which the area represented by the natural framework (climate, soil, relief) or anthropic land management (irrigation, in particular) plays a major role.

For Dobrogea, the specific natural factor (climate, to which recent evolutions are added) and the anthropic one (hydro-ameliorative arrangements) have a decisive role in establishing the culture structure. Synthetically, the characterization of the Dobrogean territory from the point of view of natural water resources accessible to plants is presented in table 6.

Table 6: Humidity resources in Dobrogea

Subzone	Humidity resources				Soil moisture reserves: 0-100 cm in m / ha at 31. III	IV-X deficit at 0-100 cm in mc / ha	Optimum sowing times (average data)	
	Annual	In the following months:					Autumn (wheat)	Beginning of spring (corn)
		IX-III	IV-X	VII				
1	350-400	150-200	200	35-40	1133-1173	4417-4646		
3	400-475	125-175	275	40-50	1137-1273	3857-4472	01-20.X	10-15.IV

The average amount of rainfall is between 350-400 mm in sub-area 1 (the coast) and 400-475 mm in sub-area 2, values that characterize one of the most drought-stricken provinces of the country. The humidity deficit registered in the 0-100 cm layer during the 1.IV-31.X vegetation season is between 4,417 cubic meters / ha in sub-area 1 (coastal) and 3,857- 4,472 cubic meters / ha in the rest of the territory.

The aridity of the area was also the reason why the Dobrogean arable land was arranged in 1989 on an area of almost 40,000 ha in Constanța county and 154,000 ha in Tulcea county. Whether or not these areas were irrigated confirms the results, but after 2003 less than 100,000 ha were irrigated throughout Dobrogea, and in recent years the area actually irrigated (with a minimum of one watering) has not exceeded 5,000 ha.

In 2018, for example, 2,538 ha were irrigated in Constanța county (data from ANIF Dobrogea branch). It is true, there are programs that consider the rehabilitation of the old irrigation systems on surfaces of over 100,000 ha, but for the time being only on paper. In these conditions, the surface and weight in the arable land in the two counties Constanța and Tulcea, for the main cultures and groups of cultures present in 2016 are shown in table 7.

Table 7: The surface and weight of arable land for the main crops or cultural groups in Dobrogea in 2016

Culture	Constanța county		Tulcea county	
	ha	%	ha	%
Cereal	259163	53,5	115254	42,5
Corn	61521	12,8	50360	18,9
Sorghum	832	0,002	-	-
Oleaginous plants	122258	25,3	84446	31,2
Sunflower	76854	15,9	57670	21,3
Soy	180	0,0005	3239	0,12
Rapseed	44509	9,2	22696	8,4
Sugar beet	-	-	-	-
Potatoes	397	0,0008	1431	0,005
Vegetables	3700	0,008	5620	0,02

The share of arable grain in arable land is increasing, the cultivated areas are closer to those of 1968 (with the insignificant influence of irrigation) than to those imposed by the plan in 1989. The areas cultivated with maize have been reduced drastically, and the sugar beet has completely disappeared after the disappearance of irrigation and the beet processing plant in Constanța. Vegetables and potatoes are also grown on minimal surfaces. Instead, the share of oil crops has increased. Sunflower is cultivated on surfaces more than three times higher than in 1989 and more than twice as large as in 1968. Rapeseed, which with some luck has enough moisture to rise in the fall and benefit from a milder winter (characteristic of Dobrogea) has expanded up to 8-9% of the cultivated area, benefiting from an advantageous market both in demand and price. Soybean reappears with some grant facilities.

Sorghum in Dobrogea. The region's recognized aridity, associated with the evolution of climate change, is currently bringing back the crop of sorghum as a substitute for maize, and some of the oilseeds recognized as big consumers of the nourishing substance in the soil. Worldwide, sorghum grains are recognized as a substitute for maize in such as in Africa or other drought-stricken regions of Australia, Asia and even the United States and some countries in Europe. In Africa, for example, 25 million hectares are cultivated with maize and 23 million ha with sorghum. In Oceania, 23 million ha are grown with sorghum, and maize is cultivated on under one million ha. Yields per hectare are higher in sorghum than maize in South Africa or Mexico and close to maize in Tanzania or Thailand (Chirilă, 2000). The movement is greatly favored by genetics, prestigious companies in the field such as *Euralis* or the National Institute for Cereals and Technical Plants Research from Fundulea in Romania, launching a wide range of hybrids of high productivity adapted to practically any conditions. The introduction of sorghum as an alternative or complementary to corn cultivation in dry areas is not new. In Romania, sorghum in the form of grains is statistically mentioned since 1938, with an area of 400 ha. A surface of 68.8 thousand ha is recorded for 1976 (Statistical Yearbook 1981, p.257), and in 1985, 21.3 thousand ha were cultivated with sorghum. After 1989 the average of the years 1990-1995, records an area of 1,703 ha with an average production of 588 kg / ha, and on average for the years 2011-2016 only 675 ha, but with an average production of 2,126 kg / ha. In research, the first experience with sorghum hybrids of American origin received from ICCPT Fundulea was carried out in 1961 at the Agricultural Research Station in Valu lui Traian, Constanța county, by Ing. A. Lup, then a researcher at the plant improvement laboratory at the Valu lui Traian resort (Table 8).

Table 8: The results of the experience with American sorghum hybrids compared to the corn hybrid HD 302 rayoned in the area

Hybrid	Plant height (cm)	Vegetation period (days)	Grain production		Difference from control sample kg/ha
			Kg/ha	%	
NK 210	117	144	8413	166,4	3359
NK 300	156	143	8152	161,1	3098
NK 120	118	128	7905	156,4	2851
X 3000	109	125	7646	151,3	2592
X 3021	129	135	7611	150,6	2557
X3057	170	130	7476	147,9	2422
X 3007	108	148	7322	144,8	2268
NK 310	113	146	7057	139,6	2003
NK 230	103	136	6867	135,9	1813
NK145	225	130	6815	134,9	1761
NK 135	122	131	6670	131,9	1616
NK 135 II	136	145	6657	131,7	1603
X 3037	102	145	6459	127,8	1405
NK 140	118	138	5741	113,6	687
HD 302	220	132	5054	100,0	Mt.

Sorghum hybrids outperformed maize in this experiment with production values between 687 and 3,359 kg / ha of grain, respectively by 13.6-66.4%. The first 5 sorghum hybrids NK 210, NK 300, NK 120, X 3000 and X 3021, exceeded the production of double hybrid maize with increases between 2557 and 3559 kg / ha. In 1961, a number of 6 sorghum hybrids were also introduced into production experiments in state and collective farms, on areas between 1 and 6 ha for each hybrid. Although for the sorghum grain the most suitable agrotechnical system has not yet been established and applied. The most productive sorghum hybrids have consistently surpassed maize production. The NK 210 sorghum hybrid, which proved to be the most productive of the hybrids tested in 1961, outgrew maize with 1,011 kg / ha of grain at G.A.S. Casimcea Tulcea County with 1,055 kg / ha of grains at G.A.C. *August 23*, Constanta County (Tomoroga, 1963). Also, in 1961, engineer A. Lup also established a field of amelioration, consanguinity with a collection of lines in different stages of consanguinity of American origin (obtained through the kindness of the late colleague Sarca). Both the experimental cycle and the improvement field were interrupted due to the transfer to a production unit of the author (figure 1). After a long time, Dr. Eng. D. Manole restores the experiences with hybrid sorghum in 2015, by collaborating with the EURALIS company in his own field of research of SC Sport Agra SRL Amzacea, Constanța county (figure 2). Some of the results obtained are presented in table 9.

Table 9: Production, costs, income and profit for several crops under the conditions of the year 2017 at SC Sport Agra SRL

Specification	U/M	Maize	Sorghum	Wheat	Sunflower	Soy
Average production	Kg/ha	8364	8859	7271	3800	1992
Price	Euro/t	130	130	164,7	294	299
Production value	Euro/t	1087	1152	1197	1117	595
Technical expenses	Euro/ha	789	577	797	764	720
Profit	Euro/ha	298	575	400	353	-125

We mention that both the experimental field and the entire surface of the farm are not irrigated. The high yields are due to the performing biological material, optimum technologies, but especially to the advancement of the sowing times by about a month earlier than the recommendations in specialized literature.

Figure 1: Experiment with sorghum hybrids (top) and the consanguinity field of grain sorghum lines from Valu lui Traian, Constanța county in 1961

Figure 2: The experimental field from SC Sport-Agra SRL Amzacea, Constanța county

Conclusion

In Dobrogea, the main factor that influences the structure of crops in arable land is the drought, associated in recent decades with climate change such as global warming, rhythm disturbances and the amplitude of meteorological phenomena. For a long time, the low population rate allowed the cultivation of a small area in which species, local populations more resistant to drought, needed for subsistence, predominated.

Later, after the establishment of the planned economy system (1945), the structure of the cultures was established by law. During this period, a crop structure which ensured the establishment of the central agricultural product fund of the state was practiced, the crop groups evolving proportionally according to the areas set up with irrigation, the main means of combating drought during this period.

Under market economy conditions sorghum grains can be a real component of crop structure in dry areas such as Dobrogea, both through yields and profit. But this requires a receptive market that could be constituted by a promotion program among pig and poultry breeders.

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The Nature of Momentum Effect in Digital Copyright Assets Portfolio

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Abstract

The momentum effect of assets of various classes has been known and presented in the literature for a long time. However, there is no work confirming the existence of a similar effect on intellectual assets. The reason for this lies in a different mechanism for the trade turnover of such assets. In this paper, the comparable effect of copyright assets traded on modern digital microstock platforms is proved. The paper proposes first a structural model of the portfolio of digital assets of copyright that explains the momentum effect of assets of this class. The revealed effect is then introduced in the hybrid Bayesian network model of digital images portfolio, developed by the authors to study financial risk.

Keywords: Bayesian Network Model, Digital Copyright Asset, Momentum Effect, Portfolio, Risk.

Introduction

The momentum effect in financial assets has been discovered and described for a long time. A lot of works is devoted to the study of this effect, especially in stocks and in instruments built on the basis of stocks (Asness, 1997; Grundy and Martin, 2001). In addition, a similar effect was revealed in government bonds, currencies, commodity futures (Asness, Muscovite and Pedersen, 2013). The results of this discovery are implemented in new financial instruments that are successfully traded on the stock market. Nevertheless, there are no messages about the momentum effect in intellectual assets yet. There are the following possible explanations for this.

First, intellectual property literature generally focuses on patent assets, as patents are of most interest to large technology companies. At the same time, the mechanism for trading such assets does not involve a large number of trading events. As a result, there are no long time series of price movements, quotes and other historical data (performance history) for specific patent assets, and it is impossible to draw a conclusion about their inertia.

Secondly, digital copyright assets have been circulating on the trading floors of aggregators for about 20 years. This applies, in particular, to digital assets such as images (photographs), videos, sound and literary works (Glückler and Panitz, 2013). However, economists have not yet noticed and fully appreciated this powerful investment breakthrough, and have not drawn the appropriate conclusions.

In this article, we reveal the momentum effect in digital copyright assets that we identified as a result of more than 10 years of observation of the digital image portfolio as a whole, and of individual record-holder assets with a very clear performance history. The obtained experimental data were used by us to develop a generalized structural model of the portfolio of digital assets of copyright, as well as to study financial risks using Bayesian network models (Voronov, Kazansky and Davydov, 2018).

The Data

The mechanism of market trading in digital images and similar assets was described in detail in our previous works (Voronov, Ivanov and Darushin, 2016). The main feature of this mechanism is that assets can be sold multiple times, with each sale necessarily generating income. In this sense, there can be no loss on the portfolio. However, the amount of income in each case depends on a combination of several factors that are random in nature and introduce significant uncertainty into the final financial risk and financial result.

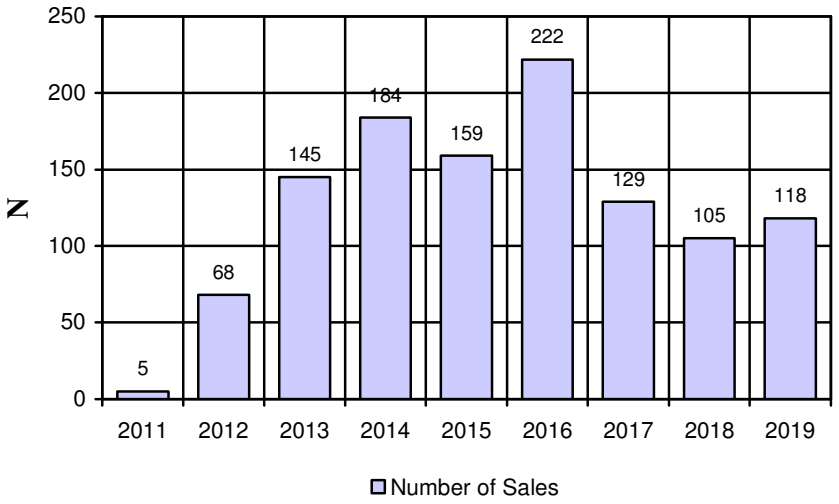

Figure 1: Total number of sales of S-image including subscription, on demand, single and others in 2011-2019.

(Source: compiled by the authors based on own research)

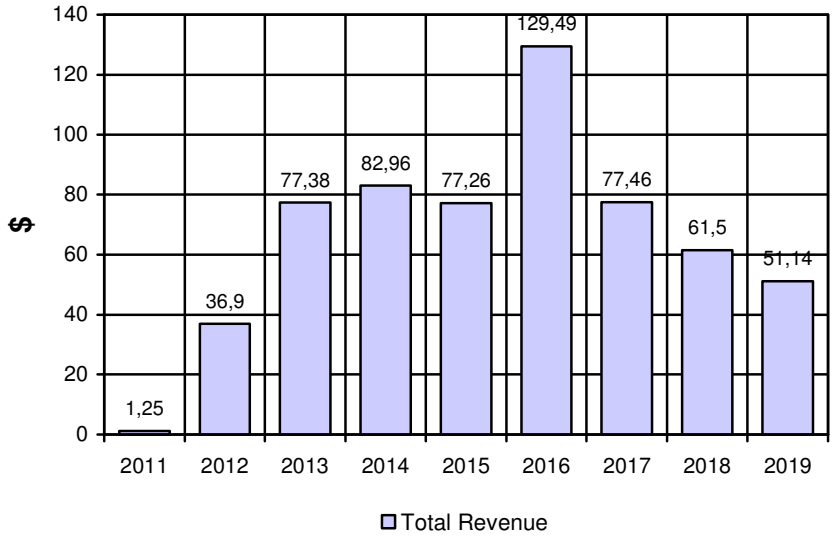

Figure 2: Total sales revenue of S-image in 2011-2019.

(Source: compiled by the authors based on own research)

In particular, the result of this uncertainty can be seen even visually by comparing the diagrams shown in Figure 1 and Figure 2. These diagrams show the sales results of a specific asset that has been demonstrating a clear performance history for 9 years since November 2011, when it was first uploaded to the Shutterstock collection. In 2011, only 5 sales of this image took place. Thus, it can be seen that for about two years it reached a certain level of sales. These observations are quite consistent with the opinion of industry experts that the adaptation of an individual digital asset on the microstock trading platform takes about two years on average. That is, approximately two years of exposure is required on average in order for an asset to attract market attention and begin to generate stable income. However, one should not think that all assets in the portfolio work the same way, and this is another, even more serious reason for the uncertainty of the financial result. The fact is that the creative nature of such assets greatly affects their investment parameters, and no forecasts and predictions made regarding ordinary financial assets work on the intellectual property market.

In order to find approaches to solving the problems of risk and uncertainty of intellectual assets, we have developed our own structural portfolio model (Voronov, Kazansky and Darushin, 2017). In this model, all the assets in the portfolio are distributed among groups showing approximately the same demand. However, one group, representing assets that have never been sold, plays a special role in the portfolio. We called this group as “group of suspense”, and it was this portfolio structure that prompted us to understand the nature and mechanism of momentum effect.

The Model

In our structural model, the process of selling the assets of a real portfolio for a fixed date is illustrated by a cascading diagram, which has some similarities with the sales funnel (Figure 3). The top bar of this horizontal chart represents the aforementioned group of suspense, which includes assets that have not been sold once. Under it is a rod showing the total number of assets that have been sold at least once. The next rod 1+ represents the number of assets that have been sold more than once, so the difference in the values of the second and third rod gives 101 assets sold only once. Then, the 10+ bar represents assets sold each more than 10 times, so the difference in the values of the third and fourth bar, respectively, gives the number of assets (148) sold from 2 to 10 times. Finally, the 5th, last rod 100+ represents a group of record holders - assets sold each more than 100 times. Even a simple averaged calculation shows that the total portfolio income is formed, in fact, by the two lower groups of assets (31 * 10 + 6 * 100 = 910 sales), which make up only about 6% of the portfolio. At the same time, we note that among the six champions there are assets, each of which has been sold more than 250 times and more than 1,100 times, which only strengthens the conclusion.

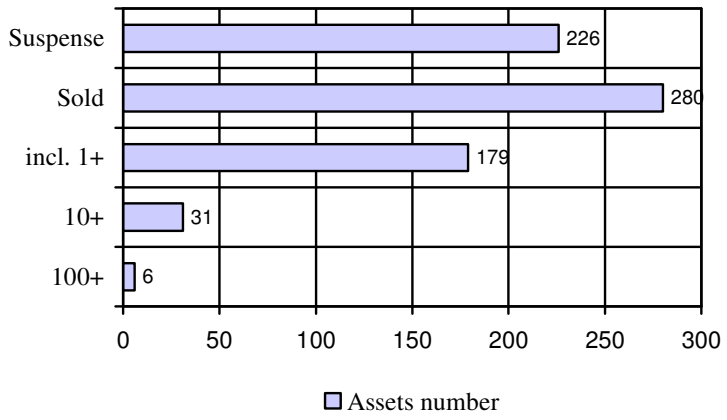

Figure 3: The number of assets in the group of suspense (226), and assets sold at least once (Sold), incl. more than once (1+), more than ten times (10+), and more than a hundred times (100+) in the studied portfolio of digital images.

(Source: compiled by the authors based on own research)

As will be shown below, the process of filling a portfolio with assets is associated with the creative productivity of the author and is not necessarily stable. This process has its own uncertainties depending on the author's strategy. Our studies have shown that portfolios of this type have the property of momentum. It lies in the fact that the portfolio, first put up for sale, after market adaptation begins to generate income, regardless of whether it continues to replenish with new assets or not.

Here we understand momentum as a property to maintain stable functioning and long-term reproduction of achieved indicators, for example, such as the return on financial assets. In addition, structural momentum implies the ability of the system to maintain built-up causal relationships for a long time. For the studied area, the concept of investment momentum is close, as a property inherent in many classes of financial instruments (Grundy and Martin, 2001). Thus, the momentum effect of the intellectual assets portfolio that we have identified is the closest to the concept of momentum investing.

At the initial time, the owner of such a portfolio does not have any frequency or probability characteristics (sales, profitability, etc.) necessary for assessing risk. That is, it does not have any parameters that are usually used by the owners (managers) of portfolios of securities and similar assets. This uncertainty accompanies the portfolio of intellectual assets as long as there are assets in it that have not been sold at least once. In our model, this "group of suspense" plays the role of a kind of capacitor that responds to the impact of market demand with the events of the first sale of assets. The analogy with the capacitor here is not random, because our studies have shown that group of suspense, among other things, provides momentum property to such portfolios.

Each fact of the first sale is a primary indignation, which conditionally moves the sold asset to the next group of the first sale in order. Then, with repeated and subsequent sales, the assets are transferred to the following groups in order, but it is from the first sale that the information flow begins, which, on the one hand, shows the increase in total portfolio income, and on the other hand, a decrease in uncertainty. Note that in accordance with the concept of the cost of information, this flow can also be considered from the point of the cost of uncertainty (Morris, 1968).

Assume that a portfolio that is first put up for sale has an a priori uncertainty value proportional to the number of assets **n**. In this case, each first sale of each asset will reduce this value by an amount proportional to 1 / **n**. For example, if on a specific date 226 of the 506 assets in the portfolio were not sold at all, then the value of uncertainty can be estimated by the probability 226/506. Since, due to uncertainty, we do not know which of these assets will be sold, when this will happen, or whether it will happen at all, then this value is quite acceptable to use to determine the probability of non-receipt of income for this portfolio. Other absolute or relative indicators of uncertainty can be constructed, however, as noted above there is a portfolio management problem that significantly complicates the risk assessment algorithm.

This problem is that the author (owner) of the portfolio can put it up for sale at a time, and then do not take any action, for example, not replenish it with new assets. With this strategy, due to the already noted momentum, the uncertainty will decrease gradually, in the process of forming the first sale group and the further flow of assets in the direction of the record-holders group.

The portfolio works in a fundamentally different way when the author continuously replenishes it with new assets (for example, daily). In this case, it is impossible to significantly reduce the uncertainty, because each new work increases it, but sales, due to momentum effect, can occur much later, or not at all.

Finally, the author, guided by his own strategic motives, can upload new series of works with large time intervals, or vice versa, continuously replenishing the portfolio, periodically take long breaks. Thus, the ability to choose a portfolio management strategy makes it almost useless to use simple probabilistic uncertainty indicators. Nevertheless, observing the sales process for a long time, we can confidently say that a quantitative increase in the group of suspense always positively affects the profitability of such portfolios, and the momentum effect can significantly reduce the negative impact

of interruptions in replenishment of new assets. Moreover, a portfolio brought to a certain level of income, due to momentum, can continue to generate it for a long time with virtually no participation from the author. These observations tell us that the author's creative productivity factor is not critical from the point of the risk of non-receipt of income, but from the point of portfolio volume, it affects the achievement of the required income level.

Figure 4 shows the version of our simple hybrid Bayesian portfolio model that includes variables: Author's creative productivity (Prod), Demand, Sales, and discretised continuous variable of Earnings (Earn). To take into account the momentum effect, a priori probabilities on the bar chart of the author's productivity parental node are set in a ratio of 50/50. Managing of such a node allows us to simulate both a replenished portfolio and momentum effect without replenishment. The ratio of marginal probabilities in the demand node corresponds to our realistic assumption that, in the general case, market demand for assets should rather be characterized as low. Additional evidence for this assumption can be found in Figure 3.

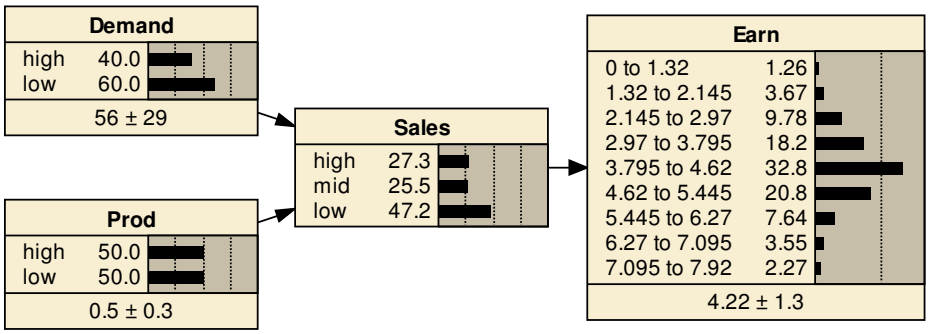

a.

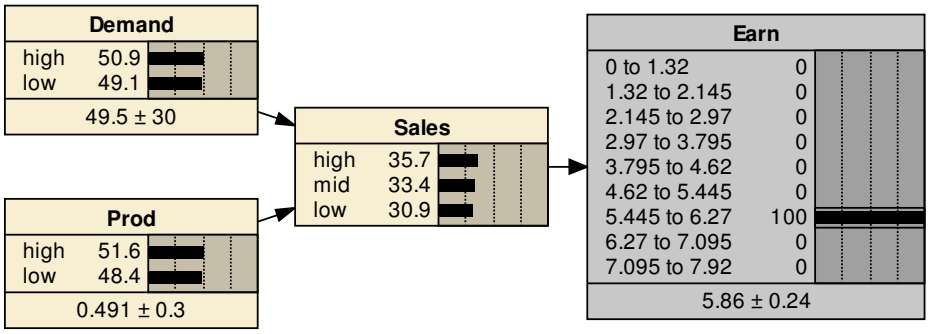

b.

Figure 4: Initial Bayesian model (a) and one possible state of diagnostic inference (b).
(Source: compiled by the authors based on own research)

The probabilities in the earnings node were given by the real continuous distribution that we experimentally obtained in one of the previous works (Voronov, Ivanov and Darushin, 2016). Each interval in this discretised diagram corresponds to one of the probabilistic states of the target variable. This distribution allowed us to test the hypothesis that, with a diagnostic probabilistic inference, the propagation of evidence in the earnings node in the direction from lower to higher values should be accompanied by an increase in probabilities in the sales node and (at least) in the demand parental node. By the selection of values in the conditional probabilities tables, such dependence was indeed

obtained. Actually, after that, direct, inverse and mixed probabilistic inferences with the model became possible (Mittal and Kassim, 2007).

The response of network to the input of evidence that the level of total portfolio income exceeded the expected value is shown in Figure 4 (b). The changed diagrams of the parental nodes indicate that it is more likely that such income is provided less by the author's productivity (probability increased by 1.6%) and to a greater extent by an increase in demand (increase from 40% to 50.9%). With this the total probability of getting sales has increased from 27.3% to 35.7%, and the probability of falling decreased.

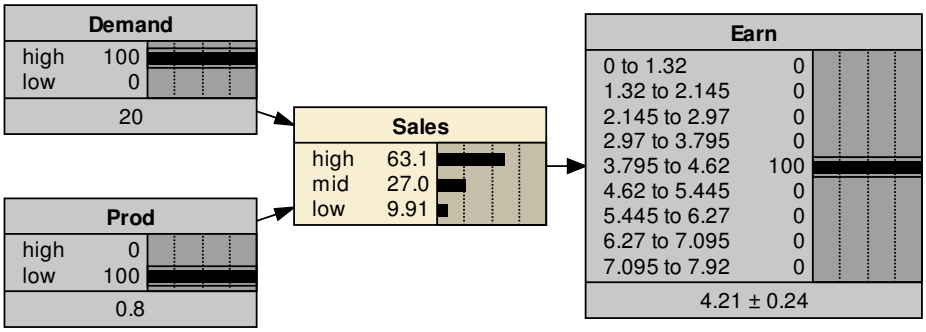

Figure 5: State of mixed probabilistic inference.
(Source: compiled by the authors based on own research)

The modeling of the portfolio momentum effect (Figure 5) is programmed by a scenario in which the author's productivity node is put into a low probability state (low 100%). In fact, this means that the node does not affect sales. If at the same time the demand node is transferred to a state of high probability (high 100%), then even with an income level corresponding to the expected value (33.8%), the network gives a rather high probability of continued sales (high 63.8%). Propagation the evidence in the earnings node to the maximum continues to increase the likelihood of sales. Conversely, switching the demand node to the opposite state of low 100% gives the total probability of low 98.9% in the sales node, which indicates their complete cessation, regardless of the probability state in the earnings node moves to the maximum.

Conclusion and Further Research

The examples shown demonstrate the wide possibilities of network learning during the modeling of various probabilistic states of the portfolio under study. Even a simple Bayesian network allows us to analyze dozens of probabilistic states of the model and gradually reduce the aforementioned uncertainties. In particular, this became possible due to the fact that the earnings target variable is set by the continuous probability distribution obtained by us at the previous stage of the risk study of digital image portfolios.

In the structural model, taking into account the momentum effect of the portfolio, the productivity variable is directly related only to the group of suspense, which is actually not a sales group and makes the largest contribution to the sales uncertainty. Recall that all assets prior to the first sale are assigned to this group. The events of the first sale are not determined in time and are random in nature. For this reason, the group of suspense is the most-at-risk group. In this regard, we argue that the presence of such a group is typical for portfolios of intellectual assets of various classes and radically changes the approach to assessing risks and, in general, to managing such portfolios.

Our further work is aimed at solving the problem of uncertainty in the group of suspense. Preliminary calculations show that for this it is possible to use the algorithms of the theory of random sets (Dempster-Shafer theory, or TDS). The joint use of Bayesian network models and TDS allows us to quantify all possible situations and conditions that experts can foresee.

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Gestión De Talento Humano En PYMES Turísticas, Manufactureras Y Logístico-Portuarias De Cartagena-Colombia: Un Estudio Piloto

Human Talent Management in Tourism, Manufacturing and Logistics-Port SMES In Cartagena-Colombia: A Pilot Study

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Resumen

Las pequeñas y medianas empresas (Pymes) se constituyen en una de las fuerzas de desarrollo económico más importantes a nivel mundial, especialmente en los países en vía de desarrollo como Colombia. Pese a que cuentan con ventajas competitivas, las Pymes siguen desapareciendo fácilmente del mercado. Muy poco se ha indagado sobre los factores internos que pudieran explicar las dificultades que atraviesan actualmente las Pymes, en especial aquellos que involucran al recurso humano, un factor que afecta otros procesos de la empresa. El presente estudio de tipo descriptivo, no experimental y transversal, busca identificar los procesos y/o prácticas más comunes en materia de gestión del talento humano en una muestra piloto de Pymes de la industria turística, manufacturera y logístico-portuaria de Cartagena, Colombia, considerados los sectores económicos más importantes de la ciudad. Los resultados muestran que, aunque las Pymes reconocen la importancia de los procesos de gestión del talento humano y su impacto en los resultados de las empresas, presentan serias limitaciones en cuanto al conocimiento e implementación de los mismos, lo cual se atribuye, en parte, a la falta de personal cualificado que los maneje. En los procesos y prácticas predomina la desarticulación e informalidad, así como la falta de direccionamiento estratégico del recurso humano para el crecimiento y competitividad en el mercado. Finalmente se observa, que, aunque las Pymes tienen un alto potencial para generar empleo, también poseen altos índices de rotación mostrando así sus dificultades para retener el talento humano.

Palabras Claves: Procesos, Gestión, Talento humano, PYMES.

Abstract

Small and medium-sized enterprises (SMEs) are one of the most important global development forces that mark the economy, especially in developing countries such as Colombia. Although they have competitive advantages, SMEs continue to disappear easily from the market. Very little has been asked about the internal factors that could explain the difficulties that SMEs are currently facing, especially those that involve human resources, a factor that affects other processes. This descriptive, non-experimental and cross-sectional study aim is to identify the most common processes and / or practices in the field of human talent management in a pilot sample of SMEs in the tourism, manufacturing and port logistics industry of Cartagena, Colombia, the most important economic sectors of the city. The

results shown that, although SMEs recognize the importance of human talent management processes and their impact on business results, they face serious limitations in terms of knowledge and implementation of human talent management processes, which is attributed, in part, to the lack of qualified personnel to handle them. In the processes and practices the disarticulation and informality predominates, and the lack of strategic direction of the human resource necessary for the growth and competitiveness in the market; with the activities they are currently doing. Finally, it is observed that, although SMEs have a high potential to generate employment, they also have high turnover rates thus showing their difficulties in retaining human talent.

Keywords: Processes, Management, Human talent, SMEs

Introducción

Las Pymes también conocidas como pequeñas y medianas empresas, son organizaciones económicas que desarrollan actividades industriales, comerciales y de servicios con un número limitado de trabajadores y facturación moderada (Jaramillo, 2005; Soto, 2013). Según La Confederación Nacional de Cámaras de Comercio "Confecámaras", en Colombia existen aproximadamente 1.500.000 micro, pequeñas y medianas empresas registradas, las cuales según el Departamento Administrativo Nacional de Estadística (DANE, 2013), representan al menos el 96.4% del parque empresarial nacional, con una participación en el PIB del país que alcanza el 38,7%. Así también, de acuerdo con una publicación de la revista Dinero (2016), el Ministerio de Comercio, Industria y Turismo de Colombia resalta que las Pymes generan más del 80% del empleo en el país.

Las Pymes además son reconocidas por la buena distribución que hacen de sus ingresos, por su agilidad en los procesos, flexibilidad laboral, capacidad de adaptación y aprendizaje, cercanía y orientación al cliente, lo que les permite detectar y satisfacer necesidades muy específicas; así como por su participación en el conjunto de la industria manufacturera y de servicios (Jaramillo, 2005). Estas organizaciones juegan un papel muy importante cuando se trata de hacer frente a retos de desarrollo, sostenibilidad y prestación de servicios. Debido a su importancia y grandes ventajas, el Congreso de la República de Colombia creó la Ley 590 de Julio 10 del 2000 (modificada en 2004 por la Ley 905) conocida como la ley MiPymes, la cual tiene por objeto promocionar y dirigir estas empresas hacia un desarrollo integral, proporcionándole los mecanismos necesarios para que puedan competir con éxito en mercados internos y externos. De igual forma, organismos como el Banco mundial, entre otros, han diseñado y ejecutado programas para hacer más competitivas a las Pymes.

A pesar del reconocimiento y del apoyo del estado, las Pymes están expuestas a riesgos que amenazan su estabilidad, lo cual se ve reflejado en su bajo promedio de vida. El estudio sobre supervivencia empresarial del 2016 realizado por la Confederación Colombiana de Cámaras de Comercio (Confecámaras, 2017), reveló que en Colombia la vida promedio de una empresa es de 5 años y que el 30% de las Pymes no sobreviven antes de este tiempo. De acuerdo con la Organización para la Cooperación y el Desarrollo (OCD), las Pymes enfrentan dificultades internas y externas que las ponen en desventaja frente a las grandes empresas, entre estas, la deficiente administración del talento humano que las integra, caracterizado con frecuencia por bajos niveles de innovación y emprendimiento, poco desarrollo de competencias y el predominio de la informalidad en los procesos (Jaramillo, 2005).

Existen pocos estudios sobre las características de los procesos de gestión del talento humano en las Pymes. La mayoría de los trabajos realizados al respecto estudian solo algunos de los procesos o se basan en las grandes empresas, por lo que la información obtenida no resulta generalizable a las Pymes, las cuales tienen características particulares que deben ser consideradas al momento de idear estrategias de intervención, y que influyen en la eficacia de cualquier metodología de gestión y planificación de los recursos humanos (Soto-Dolan, 2004). La mayoría de estudios desarrollado sobre las Pymes se han interesado en indagar sobre los factores externos que ponen en riesgo su existencia y desempeño (BID, 2002; BID, 2005; El banco mundial, 2008; FUNDES, 2003, 2010 entre otros, citados por Mora, Vera y Melgarejo, 2015), de manera que la participación de los empleados en los procesos de desarrollo y competitividad de estas organizaciones no ha sido suficientemente estudiada. En este sentido, el

objetivo de este trabajo es caracterizar los procesos de gestión del talento humano puestos en marcha por las Pymes de la industria Turística, Manufacturera y Logístico Portuaria y de la ciudad de Cartagena, Colombia, entendiendo que un manejo deficiente de esta área, funciones o actividades, influye en los demás procesos críticos de las empresas, si se entiende que solo a través del esfuerzo humano se pueden llevar a la realidad las grandes ventajas de otros recursos materiales, como la tecnología, la información, las materias primas etc. (Robbins & Judge, 2009).

Diseño Y Metodología De La Investigación

Se realizó un estudio descriptivo no experimental, transversal, en el que participaron 21 Pymes de la industria manufacturera, turísticas y logístico-portuarias de la ciudad de Cartagena. Se caracterizaron seis procesos de Gestión del Talento Humano en estas organizaciones: Planeación estratégica de los recursos humanos, selección de personal, capacitación y desarrollo, compensación, reconocimientos e incentivos, bienestar social labora y seguridad y salud en el trabajo. Para la selección de las organizaciones se realizó un muestreo no probabilístico por conveniencia, dado la dificultad de acceder a este tipo de organizaciones por las demandas que manejan en su operación. Se incluyeron todas las Pymes interesadas en participar en el estudio.

Para la recolección de la información se utilizó un cuestionario estructurado tipo encuesta de elaboración propia teniendo en cuenta una exhaustiva revisión de la literatura. El cuestionario está conformado por 100 preguntas que pretenden indagar de manera rigurosa sobre los procesos de gestión humana y fue diligenciado por un representante de cada organización.

En cuanto a las características de los encuestados, el 61,9% son mujeres y el 38,1% hombres, con una antigüedad de entre 1 y 13 años en la organización. La mayoría ocupan cargos gerenciales y de coordinación, tres encuestados tenían cargos relacionados con la gestión del talento humano y cuatro eran asistentes administrativos y auxiliares contable. Del total de las Pymes participantes, 16 (76,2%) eran empresas pequeñas (10-50 trabajadores) y 5 (23,8%) eran medianas (50-200 trabajadores). En relación al sector económico, 11 (52.4%) pertenecen al sector logístico turístico, 5 (23.8%) al sector logístico portuario) y 5 (23.8%) al sector manufacturero.

Resultados

El 66.7% de las Pymes, es decir 14 empresas, cuentan con un área de recurso humano. Todas las Pymes encuestadas del sector Logístico-portuario cuentan con esta área. Se evidencian oportunidades de mejora al respecto en las empresas turísticas y principalmente las de manufactura.

En relación al responsable de los procesos de recursos humanos (RRHH) en las Pymes, el 33,3% de las organizaciones informan que el gerente general, que además suele ser uno de los socios del negocio, es el encargado de realizar las funciones relacionadas con el manejo del talento humano, en seis de las Pymes (28.6%) estas actividades las lleva a cabo un asistente administrativo y solo cinco Pymes (23.8%) informaron que quién se encarga de tales funciones ocupa el cargo de Director/Coord. de RRHH.

A continuación, se describen las características de los procesos de gestión del talento humanos en las Pymes.

Planeación Estratégica De Los Recursos Humanos

La totalidad de las Pymes encuestadas consideran importante el recurso humano para alcanzar las metas y objetivos de la empresa. Todas informan que cuentan con una declaración explicita y compartida de su misión, visión y objetivos, metas, estrategias, políticas y valores, observándose que menos del 23,8% de estas organizaciones no cuanta con una declaración de estos últimos elementos de la gestión estratégica de la empresa. Lo anterior puede explicarse por el hecho de que los primeros elementos son requeridos por la Cámara de Comercio, entidad encargada de registrar legalmente la razón social de las

empresas en el país. El 81% de las Pymes manifestaron que cuentan con el personal necesario para cumplir sus metas y objetivos y el 76,2% cree que el personal con el que cuentan para ello está adecuadamente cualificado. Cabe resaltar que cuatro de las empresas (19%) señalaron no cumplir con estos criterios de la planificación estratégica del recurso humano. La mayoría de las organizaciones indicaron que en la actualidad un aspecto prioritario para ellos es ser rentables. Muy pocas empresas señalaron como prioridad, ser competitivas o aumentar su valor.

Selección De Personal

El 81% de las Pymes llevan a cabo el proceso de selección de personal, todas consideran que es un proceso necesario para la organización y el 85% afirma que impacta en los resultados de la misma. Dos empresas no realizan proceso de selección y en uno de los casos se desconocía si la organización realizaba este proceso. Los responsable o cargos que suelen participar en su ejecución son psicólogos, gerentes, supervisores y asistentes administrativos. Para este proceso las empresas tienen en cuenta principalmente las actividades que se señalan en la figura 1.

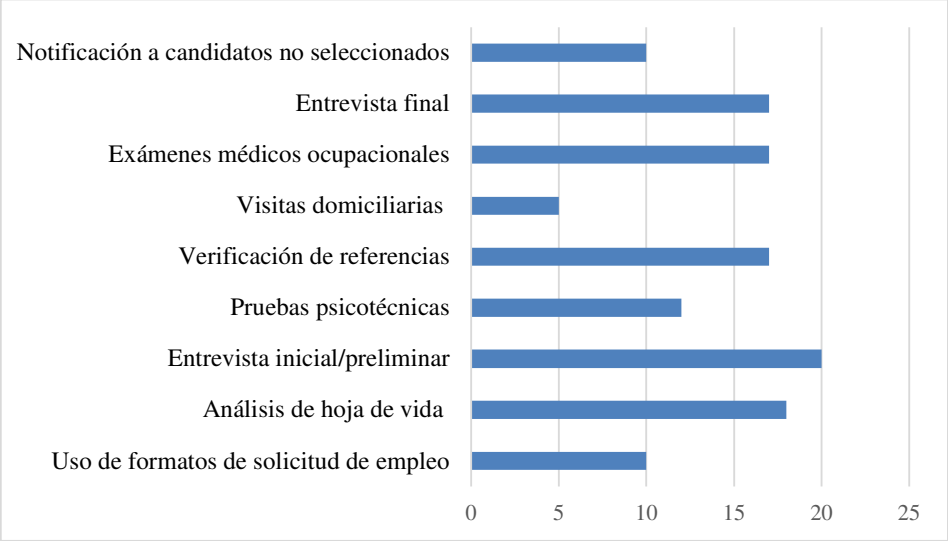

Figura 1: Actividades realizadas en el proceso de selección de personal

Es de anotar que nueve empresas no utilizan pruebas psicotécnicas para sus procesos de selección, sin embargo, las empresas que lo hacen (57,1%) recurren principalmente a las pruebas de tipo técnicas y de personalidad. Finalmente, el 60% de las empresas participantes informaron que en promedio llevan a cabo anualmente de 1 a 4 procesos de selección para cubrir sus vacantes. El 40% restante realizan de 5 a más de 10 procesos de selección al año, es decir, cuentan con una alta rotación de personal, despidos o creación de nuevos puestos. En la mayoría de los casos los procesos de selección duran entre 1 y 2 semanas (76,2%).

Capacitación Y Desarrollo

La capacitación y desarrollo es un proceso que se percibe como necesario para las empresas (85,7%) y que impacta en sus resultados (81%), sin embargo, resulta interesante que cuatro Pymes indiquen que no es así o duden de la importancia de este proceso. La mayoría de las empresas afirman realizar entrenamiento a los nuevos empleados (90,5%) e indagar sobre las necesidades de capacitación de sus trabajadores (71,4%), principalmente a través de la información proporcionada por los jefes o supervisores (57.1%). Muy pocas manifestaron indagar con los mismos trabajadores o considerar la información en los perfiles de cargo (23,8%), apoyarse en las evaluaciones del desempeño (38,1%) o

en las observaciones del desempeño en el puesto de trabajo (28,6%). La mayoría de las Pymes ejecutan planes de capacitación, realizan de 1 hasta 20 sesiones de capacitación al año, sin embargo, seis empresas manifestaron que no hacen capacitaciones o no dieron respuesta a esta pregunta. El 74% dicen disponer de los recursos necesarios para llevarlos a cabo, ya sean económicos, humanos, de infraestructura y equipos; pero no cuentan con el tiempo para desarrollar las capacitaciones. Es importante señalar que alrededor de siete empresas no disponen de ninguno de los recursos señalados. Solo el 52,4% de las empresas realizan estas sesiones de capacitación en el horario laboral, seis empresas capacitan al personal por fuera de su horario y dos no dieron respuesta.

Solo el 61,9% de las Pymes evalúan los resultados de la implementación de los planes de capacitación, pero no son claras acerca de los métodos que utilizan para medir el impacto de estas en los resultados de la empresa. Las competencias que con frecuencia buscan fortalecer o desarrollar en sus trabajadores son las técnicas que se relacionan con el cargo (66,7%), luego las personales o del ser (38,1%), interpersonales (23,8%) y profesionales (19%).

En cuanto al proceso de desarrollo de los trabajadores, la mayoría de Pymes refieren ofrecer oportunidades de ascenso y espacios para el desarrollo profesional (76,2%), por ejemplo, el 57,1% indican dar aviso a sus empleados acerca de oportunidades de becas o cursos. Sin embargo, se observa que la mayoría no realiza diseños de planes de carrera (61,9%) ni identifican las necesidades del personal para establecer estos planes (52,4%), lo cual es razonable si se considera que el tamaño y la estructura de estas empresas no posibilita que se realice con facilidad estas actividades.

Compensación, Reconocimientos E Incentivos

El 76,2% de las Pymes encuestadas consideran que este proceso es necesario y el 85,7% señalaron que este proceso tiene impacto en los resultados de la empresa. La mayoría de las Pymes aseguran contar con un sistema de compensación que estimule el ingreso, permanencia y motivación de los empleados (76,2%), sin embargo, al indagar sobre los elementos que componen el sistema, se halló que solo el 47,6% de estas empresas tiene en cuenta el pago de aspectos legales como salario y prestaciones sociales, y extralegales como incentivos por rendimiento. Solo el 42,9% afilia al trabajador y realiza el pago por concepto de seguridad social, y solo el 38,1% integran los beneficios como medida extralegal.

Aunque no todas realizan los pagos por compensación, al pregúntales si realizaban los pagos de manera oportuna por concepto de salario, prestaciones sociales y aportes al sistema de seguridad social, la mayoría respondió que sí (90,5%). Para establecer los salarios a los empleados, las Pymes tienen en cuenta el contenido y complejidad del cargo, los precios que se manejen en el mercado y el aporte del cargo a la producción. Por otra parte, el 57,1% indica que cuentan con un plan de incentivos por rendimiento que reconoce el desempeño individual y el 52,4% realiza retribuciones en especie para maximizar el desempeño.

Bienestar Social Laboral

Aunque un porcentaje importante de Pymes (85,7%) indicó que es necesario porque impacta los resultados de la empresa, solo el 52,4% señaló que cuenta con un programa estructurado de bienestar laboral para sus trabajadores y/o familia, pese a que el 61,9% de las Pymes señaló que contaban con los recursos para llevar a cabo los programas de bienestar, refiriéndose principalmente a los económicos, pero no así a los espacios de tiempo y la infraestructura física. Aunque la mayoría no cuente con un programa estructurado de bienestar, el 76,2% refiere implementar actividades que contribuyen al bienestar, principalmente las celebraciones; muy pocas realizan actividades recreativas, deportivas, culturales, de salud física, integración, formación etc. Las actividades van dirigidas principalmente a los trabajadores (52,4%), muy pocas involucran a las familias.

Seguridad Y Salud En El Trabajo

El 95,2% de las Pymes consideran que es necesario implementar este proceso porque impacta en los resultados de la empresa. Éstas indican cumplir con los requisitos mínimos para salvaguardar la

integridad de sus trabajadores, principalmente con el registro y reporte de incidentes, accidentes de trabajo (AT) y enfermedad de trabajo (ET) (85,7%), encontrándose mayor debilidad en la verificación de la gestión y resultados del sistema de gestión de seguridad y salud en el trabajo (SG-SST) (42,9%). De manera específica, el 57,1% de las Pymes señala que cuentan con políticas y objetivos en relación al SG-SST, 52,4% dice asignar los roles y responsabilidades al interior de la empresa para que dirijan este proceso, pero solo el 42,9% señalaron que estos roles rinde cuenta sobre su desempeño. Menos de la mitad (47,6%) afirma que cuentan con planes de capacitación y prevención sobre los peligros y riesgos prioritarios de la empresa que se extienden a todos los niveles de la organización, manejan indicadores en relación a este proceso, archivan y conservan los documentos que exige el SG-SST. Por otro lado, la mayoría (52,4%) no cuenta con una matriz legal vigente que aplique a las características de la empresa, no cuenta con mecanismos de comunicación y autoreporte en SST (57,1%), solo entre 10 y 11 empresas identifican y evalúan la adquisición de servicios y proveedores para el SG-SST.

En cuanto a la evaluación de las condiciones de salud de sus trabajadores, solo el 57,1% indicó que le hacen entrega de los perfiles de cargo al médico con la descripción de las tareas y el medio en el cual se desarrollará el trabajo, el 42,9% hace custodia de las historias clínicas a través de una institución prestadora de este servicio o del médico que práctica los exámenes laborales de la empresa, el 47,6% realizan y tienen en cuenta las restricciones y recomendaciones medico laborales y ponen en marcha programas para promover los estilos de vida y entornos saludable. El 66,7% señala que cuentan con el suministro de agua potable, servicios sanitarios y mecanismos para disponer y eliminar residuos sólidos, líquidos o gaseosos peligrosos que se producen y podrían poner en riesgo a los trabajadores. En relación a los mecanismos para la vigilancia de las condiciones de salud, el 81,0% indican que no llevan reportes de incidencia, prevalencia, frecuencia, severidad, mortalidad, ausentismo, e incapacidades por accidentes o enfermedad laboral, y no cuentan con programas de vigilancia epidemiológica.

La mayoría de empresas (81,0%) no realiza mediciones ambientales por riesgos químicos, físicos o biológicos, pero si realizan inspecciones de seguridad (61,9%), hacen mantenimiento periódico de instalaciones, equipos, máquinas y herramientas (71,4%), entregan elementos de protección personal (61,9%), solo un poco más de la mitad (57,1%) cuenta con brigada de prevención capacitada y dotada, realizan simulacros (61,9%), y cuentan con procedimientos para el trabajo seguro (52,4%). La mayoría no realiza auditorias anuales (71,4%) y la alta dirección no hace revisión de las acciones en materia de SG-SST (57,1%).

Discusión

La mayoría de las Pymes informaron contar con un área de recurso humano, principalmente las organizaciones del sector Logístico-portuario, no así las empresas turísticas y las de manufactura, un sector actualmente débil, pero de gran potencial para el desarrollo económico de la ciudad de Cartagena (Reyes & Vergara, 2009). Esto no es usual teniendo en cuenta que un rasgo característico de las Pymes, según la literatura, es que en muchas de ellas no existen departamentos de recursos humanos, ni órganos especializados para su gestión (Dolan, Valle, Jackson y Schuler, 2007). Los gerentes generales, administrativos y asistentes administrativos son los responsables de los procesos o prácticas relacionadas con la gestión del talento humano, lo que pone en entre dicho la existencia real de áreas de Recursos humanos, ya que son cargos que por su formación no deberían ser responsables directos de las funciones, procesos o actividades de manejo de personal.

De manera específica se encontró que, en materia de planeación estratégica de los recursos humanos, las Pymes participantes reconocen que es un proceso muy importante para alcanzar los resultados organizacionales, y cuentan con la cantidad de personal necesario y cualificado para cumplir con los objetivos de la empresa en coherencia con la misión y visión. En la actualidad, un aspecto prioritario para las Pymes es ser rentables, es decir, obtener el beneficio acorde con la inversión realizada. Muy pocas empresas tienen como prioridad ser competitivas o aumentar su valor, lo cual muestra la lucha de este tipo de empresas por adaptarse, mantenerse o sobrevivir en un mercado cada vez más cambiante, entre otras amenazas internas y externas a las que se ven enfrentados, pese a los intentos del gobierno

colombiano (señalados en la Ley 590 de 10 julio del 2000) por facilitar los mecanismos necesarios para que puedan competir con éxito en mercados internos y externos.

En lo concerniente al proceso de selección de personal, se encontró que la mayoría, pero no todas las empresas estudiadas, ponen en marcha este proceso; aunque reconocen que es necesario ya que impacta directamente en los resultados de la empresa. Las actividades menos frecuentes para la selección son la aplicación de pruebas psicotécnicas y las visitas sociofamiliares. Estos resultados coinciden con los encontrado en una muestra de MiPymes de los sectores de alimentos y confecciones de la ciudad de Barranquilla, en las que se evidencia que no contemplan en sus procesos las pruebas psicológicas y las visitas domiciliaria ya sea porque no cuentan con los recursos para contratar a un profesional de la psicología o porque no cuentan con el tiempo para realizar procesos rigurosos de selección (Jaramillo, 2005).

Las empresas participantes refirieron que para cubrir sus vacantes, en promedio llevan a cabo de uno a cuatro procesos de selección al año, aunque una cantidad igualmente importante de Pymes indica llegar a requerir de cinco a diez procesos de selección durante el mismo periodo de tiempo, esto debido a la alta rotación generada en parte por sus dificultades para retener al personal y por los despidos a trabajadores que sorprenden presentando comportamientos desviados, que como ya se ha señalado en la literatura, aparecen ante la insatisfacción de los trabajadores. De esta manera, se evidencia que, si bien las Pymes tienen un alto potencial para generar empleo, también presentan dificultades para mantener o motivar al personal en el que ya han invertido sus recursos económicos y de capital intelectual (Dolan, Valle, Jackson y Schuler, 2007). Por otro lado, la mayoría de las Pymes señalan tomarse entre una y dos semanas para realizar sus procesos de selección, indicando agilidad, pero no necesariamente calidad o eficacia al momento se escoger al personal. El criterio preferido de reclutamiento en estas empresas es la familiaridad o conocimiento previo del negocio (Hernández, Naranjo y Álvarez, 2007; Naranjo, 2012).

Acerca de los procesos de capacitación y desarrollo, considerados claves para el perfeccionamiento de las competencias del personal para mejorar el desempeño en sus labores y aumentar la competitividad de las organizaciones, se encontró que, aunque la mayoría de empresas manifiestan llevarlo a cabo, a diferencia de lo reportado por (Jaramillo, 2005), se identificaron empresas que no lo hacen. Esto llama la atención si se considera que todas las Pymes reportan que este proceso es necesario dado que reconocen el retorno de la inversión por el impacto que tiene en los resultados de la empresa. Las organizaciones que implementan procesos de capacitación se inclinan por métodos que no les representen mayores costos económicos y de tiempo; y las competencias que más buscan fortalecer o desarrollar son las técnicas o relacionadas con el cargo.

Por su parte, en cuanto al proceso de desarrollo de empleados, la mayoría de Pymes refieren ofrecer oportunidades de ascenso y espacios para el desarrollo profesional especialmente cuando dan aviso a sus empleados acerca de oportunidades de becas o cursos. Sin embargo, la mayoría no realiza diseños de planes de carrera y demás acciones requeridas para ello, lo cual resulta razonable si se considera que el tamaño y la estructura de estas empresas no posibilita que se realice estas actividades.

Con respecto al proceso de compensación, reconocimientos e incentivos, se encontró que la mayoría de las Pymes aseguran contar con un sistema de compensación que estimula el ingreso, la permanencia y motivación de los empleados. Solo cinco empresas indicaron que no, lo cual no coincide con los resultados encontrados en otros procesos en los que se evidencia las altas tasas de rotación que manejan las Pymes. Al consultar sobre los elementos que componen el sistema, se evidenció que solo la mitad de las empresas encuestadas manifestaron tener en cuenta el pago de aportes legales y extralegales, y menos de la mitad señalaron incluir la seguridad social y los beneficios, lo cual también difiere de lo encontrado en el proceso de contratación en el que se asegura que la mayoría de empresas detalla en el contrato estos aspectos, lo que indicarían una desconexión entre el proceso de contratación y de compensación o un desconocimiento por parte de los encuestados de los elementos que componen un sistema de retribución.

Por otra parte, solo un poco más de la mitad de las Pymes indican que cuentan con un plan de incentivos por rendimiento que reconozca el desempeño individual y retribuciones en especie para maximizar la eficiencia y desempeño de sus empleados, lo cual se relaciona con lo encontrado por Jaramillo (2011) en su estudio, en el que indica que si bien las Pymes cumplen con aspectos fundamentales de ley como el salario mínimo, las prestaciones y seguridad social, no se otorgan beneficios adicionales voluntarios que apunten a satisfacer y motivar el máximo rendimiento de sus trabajadores.

Por lo que se refiere al proceso de bienestar social laboral, las Pymes señalan que les resulta muy importante su puesta en marcha dado que impacta los resultados de la organización, no obstante, solo la mitad de las empresas encuestadas señaló que cuentan con programas de bienestar establecidos formalmente para los trabajadores, y muy poco involucran a las familias, resultados que se relacionan con lo encontrado por Jaramillo (2011). La mayoría de empresas dicen no contar con políticas de bienestar laboral y tampoco indagan sobre las necesidades y percepciones de los empleados en materia de bienestar.

Con respecto a la Seguridad y Salud en el Trabajo (SST), para las Pymes es indiscutible la necesidad del proceso por las implicaciones que tiene en los resultados de la empresa, pero principalmente porque está regulado por la ley colombiana. Al indagar sobre los requisitos mínimos que deben cumplir en materia de seguridad y salud se encontró que la mayoría de las empresas participantes reportaron contar con un Sistema de Gestión de Seguridad y Salud en el Trabajo. Dado las implicaciones legales, económicas y sociales que tiene la puesta en marcha de estas acciones para las empresas, sus trabajadores y familias, resulta preocupante que seis de las empresas participantes manifiesten no estar adelantando estas medidas y peor aún, no tener conocimiento acerca de ellas.

En relación a las actividades que ponen en marcha las Pymes en cuanto al proceso de SST, solo un poco más de la mitad indicó contar con políticas y objetivos en relación al Sistema de Gestión de Seguridad y Salud en el trabajo (SG-SST). Sin embargo, la mayoría de las empresas coinciden en que no se están realizando las acciones específicas que integran el SG-SST, poniéndose en evidencia la aparición del fenómeno de deseabilidad social o el desconocimiento de la legislación. Finalmente, aunque las Pymes ponen en marcha actividades para prevenir y controlar riesgos que podrían afectar la seguridad y salud de sus trabajadores, estas medidas son insuficientes según los requerimientos de ley.

En general se logra evidenciar que más que procesos articulados entre si y alineados con la gestión estratégica de las empresas, las pymes desarrollan a través de personal poco calificado una serie de prácticas y actividades no estandarizadas, la mayoría regulada por la ley y de naturaleza reactiva. También se encontró que estas empresas no miden el impacto o resultado de las acciones que emprenden en el desempeño de sus colaboradores y en la productividad de la organización, lo cual permite entender la razón por la que la alta gerencia se muestra reacia a invertir mayores recursos, toda vez que tienen dificultades para cuantificar el beneficio de la inversión.

Se puede observar que reconocen, aunque de manera incipiente el valor de la gestión del recurso humano, pero presentan dificultades para planear, diseñar e implementar las medidas necesarias para atraer, motivar, retener y desarrollar el talento, ya sea porque no cuentan con el personal idóneo o compétete para ello, o porque debido a la escasez de recursos económicos, las demandas del mercado y a la necesidad de ser rentables, centran su atención y disponen el tiempo para la operación. Lo anterior se traduce en un círculo vicioso que a su vez resulta en la alta rotación y el bajo aprovechamiento del potencial creativo-innovador del recurso humano característico de las Pymes, condición que finalmente nos les permite mantenerse y competir en un mercado globalizado.

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Ecological and Economic Influence of Excise Taxation on Budget Effectiveness

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Abstract

Unlike value added tax, excise taxation is limited by excisable goods, the list of which each state establishes on its territory and taxes once, or in the case of resale via tax deductions, which undoubtedly meets the requirements of indirect taxation. Our research of excise influence on budget efficiency of a state allowed us to formulate the key provisions. The influence of alcohol and tobacco excises is a disincentive factor, which helps reduce consumption of the harmful goods. Excises on petrochemical goods, whose production hurts the planet's eco system demonstrate the same approach. At the same time raising the state's excise rates on the goods harmful either for the people or the eco system is aimed at looking for alternative ways of attaining our goals and maintaining life. This is the way the government attracts attention of business to ecological problems. When the government sets higher excise rates on the traditionally excisable goods, it reduces revenues of their producers. In the short term, it undermines budget revenue from excisable goods produced in the country. From a macroeconomic point of view, we see a general declining trend of tax revenue on imported excisable goods although the government raises excises on all groups of goods (products) annually.

Keywords: Excisable Goods, Tax Rates, Taxation, Budget, Taxes on Consumption, Functions of Taxes

Introduction

Excises are one of the oldest groups of taxes. At that, excises along with the customs payments, VAT and the retail tax belong to the category of indirect taxes, which are charged to the taxpayers during production or sales of the products (goods). Besides, the excises are paid by the end consumer, because their size make part of the sold products' (goods') price (Zhang, et. al. 2020; Huang, et. al. 2020; Akhmadeev, et. al. 2019).

At the same time, unlike other indirect taxes, the excises are set as a rule on high margin goods (Nwaka, 2020). In this case, part of the tax is paid to the budget from the super profits of excisable goods' producers (sellers).

On the other hand, the excises are seen as a means of limiting consumption of harmful goods (alcohol, tobacco) or polluting substances (petrochemical goods, petrol and its derivatives) by the end consumer (Zeng, 2020).

Literature Review

For practical means of excise taxation, one should single out the obligation to establish the key elements of the tax for each country -- the taxpayers, the subject of taxation and the taxation base structure, the types of rates (specific, ad valorem and combined) as well as the order of their calculation and payment (Lehoux, et. al. 2019; Golubtsova, et. al. 2019).

This in turn means that the excise payers have a statutory obligation to the tax agencies, and the legal content of obligatory, individual and free taxation for the taxpayers to pay money to ensure functioning of the state. Another key difference of the excise type of taxation from other levies and tax payments is the statutory aim of its collection to replenish the state coffers for further distribution (Morozova, et. al. 2019; Petrov, et. al. 2019).

While talking about the key differences of excises from other types of taxes on ultimate consumption, we should note the specific features of their use on the goods from the list of taxable goods (products), which, in its turn, has no expanded taxation base, like, for instance, VAT. Another feature of an excise is its non-equivalent nature of collection (Lehoux, et. al. 2019) which differs them from customs payments and collections on the use of socially important goods.

We can single out several types of excises by their functions in international taxation:

a) traditional groups of excisable goods (alcohol and tobacco products, furs, etc), which have the purpose limitation for the end user and a significant fiscal component for the payers (organizations, small business owners or people carrying out operations with excisable goods), etc.
b) a group of combustive and lubricant materials and petrochemical products, which have a saving and ecological function (Kosov, et. al. 2016; Xin, 2020).
c) a group of expensive and branded goods (vehicles and appliances of the lux segment), which represent the redistributive function of taxation from the individuals' super profits or the encouraging function for local producers of the goods with the help of the excises, taking into account customs payments on imported goods (Petrov, et. al. 2019; Chaudhary, 2020).

At the same time, we should note state support for the cars with petrol and diesel engines with lower CO_2 type emission and the use of necessary catalysts as a promising international trend in the development of excise taxation – the application of lower excises on less pollutive engines and lower coefficients when calculating the taxation base for another tax, the transportation tax (Petrov, et. al. 2019), because different countries use different approaches (Akhmadeev, et. al. 2019; Kosolapov, et. al. 2019). That's why considering the current approach to compiling the list of excisable goods and revealing their budget effectiveness is important.

Theoretical Background

The Russian Federation has been using the following classification of excisable goods by group since January 1, 2020 (Fig. 1).

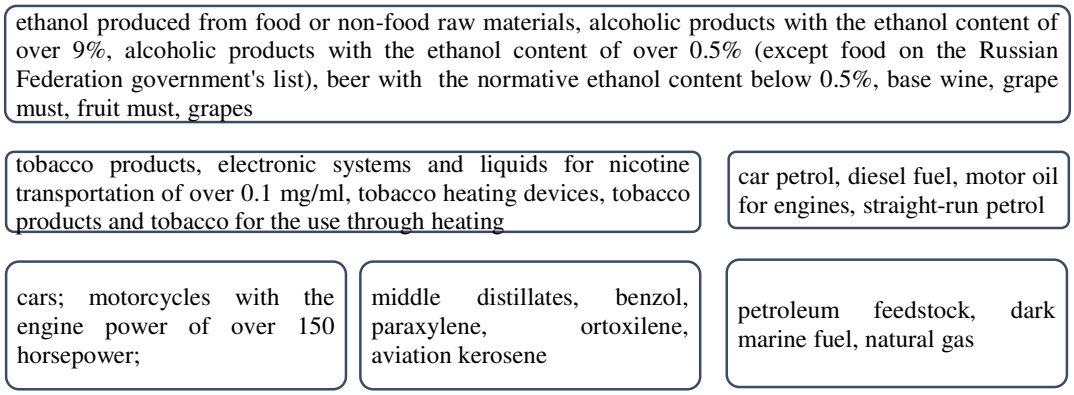

Fig. 1: The current classification of excisable goods of the Russian Federation from January 1, 2020

We should note that straight-run petrol includes any petrol fractions (except car petrol), acrylates produced from:

1) distillation (fractionation) of oil, gas condensate, associated oil gas, natural gas;
2) refining (chemical conversion) of shale oil, coal, oil fractions, gas condensate fractions, associated oil gas, natural gas.

According to the written explanations of the Finance Ministry of the Russian Federation (№ 03-07-06/4458 dated February 1, 2016), the petrol fraction is a liquid hydrocarbon mixture with a temperature ranging between 15 and 20ºC, and pressure of 101.3 kPa. The petrol fraction should meet the following criteria under the current regulations:

a) density in a range of 650 - 749 kg/m^3 and operating temperature of 15 - 20ºC;
b) the temperature, at which no less than 90% of the mixture is distilled (pressure 101.3 kPa) does not exceed 215ºC.

The fractions are not petrol fractions if they are produced as a result of:

1) introduction (alkylation) of the corresponding hydrocarbon gases;
2) content of methyl tert-butyl ether or other ethers and alcohols does not exceed 85% of the volume;
3) oxidation and etherification of olefins, aromatic hydrocarbons, alcohols, aldehydes, ketones, carboxylic acids;
4) hydrogenation, hydration and dehydration of alcohols, aldehydes, ketones, carboxylic acids;
5) the mass fraction of benzene or toluene or xylene should exceed 85%, while the mass fraction of paraxylene, ortoxylene, pentane, isoprene or isopentane should exceed 95% of alphamethylstyrene.

We should note that the current order puts the liquid hydrocarbon mixtures at 20ºC and atmospheric pressure of 101.3 kPa produced as a result of primary or secondary refining of oil, gas condensate, associated gas and shale oil in the middle distillates category. Density indicators should not exceed 930 kg/m^3, temperature to be no less than 20ºC. The high viscosity products category comprises the mixtures of liquid hydrocarbons with the following indicators: temperature 20ºC, atmospheric pressure 101.3 kPa and physical and chemical features as follows:

a) kinematic viscosity at 100º C amounts to 2.2 centistokes and more;
b) flash point in an open cup of over 80ºC and the pour point not exceeding 35ºC (Akhmadeev, 2019).

The excise taxable oil stock includes the following hydrocarbon mixtures:

a) oil and stable oil condensate;
b) vacuum gasoil at a temperature of 20ºC and pressure of 101.33 kPa with density of over 845 kg/m^3 and kinematic viscosity at a temperature 80ºC of over 3 centistokes;
c) tar at temperature of 20ºC and pressure of 101.3 kPa with density of over 930 kg/m^3, and heating oil.

We should note that the current order puts liquid or solid hydrocarbon mixtures (temperature 20ºC, operating pressure 101.3 kPa) into the excisable goods category. These liquids can be produced as a result of primary or secondary refining of oil, stable gas condensate, associated gas, shale oil. At that, the maximum density indicator should exceed 860 kg/m^3, and temperature 20ºC. If there is kinematic viscosity and temperature below 100ºC, centistokes and sulphur content should not exceed 1.2% of the volume. At that, the following goods (products) are not excisable:

1) medicine, including homeopathic drugs, with state registration and included in a special list approved by the customs union of the EAEU states;
2) alcohol-containing products: perfume and cosmetics, household chemicals (in metal aerosol packaging) and perfume products of small volumes;
3) veterinary drugs in tanks with a volume no more than 100 ml with state registration and included in a special list
4) wastes of further refining or use for technical means of ethyl alcohol and ethyl alcohol derivatives;
5) wort.

Results and Discussion

Let's make a comparative analysis of budget income by the tax category: Group A: the goods (works, services) sold and taxable in Russia (VAT and excises); Group B: imported goods subject to VAT and excises; Group C: taxes on income (profit); Group D: property tax; Group E: taxes, levies and charges for the use of natural resources; Group F: other taxes, levies, fines (fig. 2).

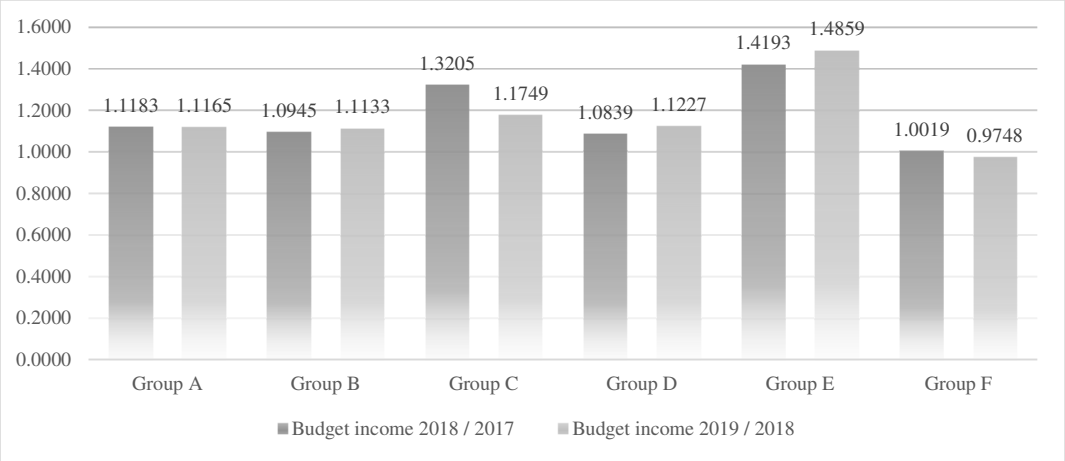

Fig. 2: Budget revenue from taxes by category of taxes and levies

The grand total growth of tax revenue of the Russian Federation budget amounted to 54.44% as of January 1, 2019 compared with January 1, 2018. However, we can see that the growth of tax contributions to the budget of some categories under analysis declines in 2019/2018 and 2018/2017. For example, growth in the B group fell by 0.019%, while in groups D and E by insignificant 0.039% and 0. 067% respectively. This is why the most important aspect of our research is a review of group

B, which analyzes budget revenue from the excises on the goods (products) imported to the Russian Federation and produced in the Russian Federation (fig. 3).

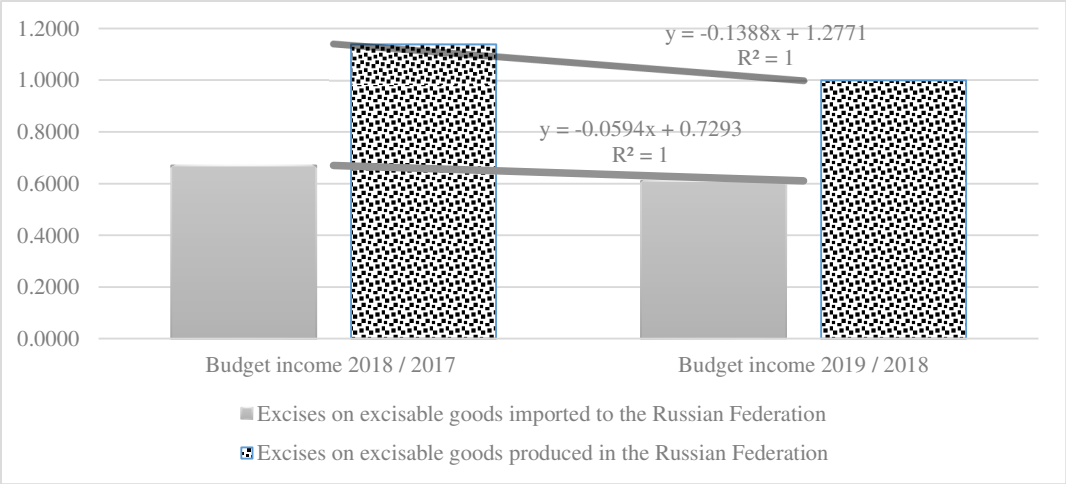

Fig 3: Tax revenue growth from excisable goods

Thus, our research of excises on excisable goods and their contribution to the state coffers for the period under research allowed us to formulate the following statements. The influence of excises on excisable alcohol and tobacco products is a disincentive factor, helping to reduce consumption of the goods. The excises on petrochemical products, whose production harms the eco system of the planet, have the same role (Kuznetsov, 2017; Fitzpatrick, 2020).

Conclusion

Consequently, when the excise rates on the goods harmful for the humans or nature rise, we should look for alternative ways of attaining our goals while safeguarding life. Thus, the state agencies attract attention of business to ecological problems (Korableva, 2019; Loureiro, 2020). One the one hand, higher excise rates on the traditional excisable goods reduce producers' revenue. In the short term, it can undermine budget revenue mainly from the excisable goods produced in the Russian Federation.

At the same time, due to the macroeconomic situation and despite annual indexation by the government of the excises on all groups of goods (products), there is a general falling trend on budget revenue from excisable imported goods. Consequently, the key advantages of the excises on excisable goods in the groups we researched are as follows:

a) stable tax revenues in the group of consumption taxes;

b) a clear list of excisable goods (products), which allows the government to have a direct influence on inflationary expectations in the economy;

c) direct influence on the reduction of consumption of harmful goods from some excisable categories (tobacco products, electronic systems and e-cigarette liquids, alcohol products;

d) state regulation and cost reimbursement for the ecologic component for some types of excisable goods (oil stock, dark marine fuel, natural gas, middle distillates, benzene, paraxylene, ortoxylene, etc.).

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Consequences of Russia's Accession to the World Trade Organization

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Abstract

The article is devoted to the study of the consequences of Russia's entry into the WTO. The main content of the study is an analysis of the positive and negative effects on the economy that followed the country's accession to the WTO. The authors substantiate the idea that at the moment it is difficult to give a clear assessment of the results of Russia's accession to the WTO due to a number of factors, which include the introduction of economic sanctions against Russia and a change in the foreign trade policy of a number of WTO member countries. Nevertheless, the emphasis is placed on the high importance of precisely the positive aspects. The article focuses on the possible reform of the World Trade Organization. The article summarizes the intermediate results of the study of this issue and defines the main introductory provisions.

Keywords: WTO, Russia, international trade, economic sanctions, WTO reform.

Introduction

Currently, the Russian Federation is an integral part of the international trade space, however, Russia's accession to the WTO was preceded by lengthy negotiations for 18 years. The desire of the Russian Federation to join the World Trade Organization has been criticized more than once and contributed to the development of disputes and discussions on this issue. Not all countries that joined the WTO were able to integrate effectively into the global economic space (Pomfret R., 2005); Baccini L., Impullitti G., Malesky E.J., 2019). Seven years have passed since Russia entered the WTO, which allows us to analyze the results of this process. The aim of the study is to study the positive and negative consequences of Russia's entry into the World Trade Organization, which are present in the country's economy. The object of the study is the Russian economy, we do not consider its individual industries or spheres.

The objectives of the work are to consider the goals that Russia set for itself when entering the WTO, to analyze the positive and negative aspects of this process and assess the need for reforming the international trade organization.

The hypothesis is the opinion that the positive effect of Russia's entry into the World Trade prevails over the negative. The scientific novelty lies in the fact that the positive aspects arose not as a result of achieving the set goals of joining the WTO, but as a result of external factors, such as the imposition of sanctions against Russia and the failure of the members of the trade organization to comply with the rules and regulations.

At the present stage, the World Trade Organization, which includes 164 countries, is the only and uncontested regulator of world trade. However, the norms of its activity have not been fully implemented by member countries recently, since trade operations are not based on market rules but considering the political and economic interests of the participating countries. This approach is contrary to WTO standards, and therefore an opinion has emerged about the need to reform the World Trade Organization. This determined the relevance of this study.

The study is introductory, should not have previous scientific work. We define only general provisions and approaches.

Regulatory documents, scientific publications, as well as statistical databases, based on which generalized conclusions of the study were used as sources of information.

The basis of the work is the theoretical methods of cognition: the study of scientific, economic, statistical information and literature regarding Russia's participation in international economic relations, an analysis that made it possible to compare the initial goals of Russia's accession to the WTO with the results achieved, a generalization of which made conclusions.

Reasons for Russia's accession to the World Trade Organization

Russia, being an integral part of the world economic system, is taking key vectors of its development. The world economy is characterized by trends towards globalization, and national economies are integrating into the new system. Obviously, the active economic and political development of Russia is impossible without intensive participation in world integration processes. That is why one of the most pressing and important issues of economic policy is the process of Russia's entry into the World Trade Organization (Lapshina O., 2011).

Russia's desire to enter the WTO is argued by the following factors (Kuhlevskaya A.N., Molodezheva N.S., Brestskaya A.E., 2017):

1. An increase in the pace of Russia's integration into the world economy;

2. Increase in foreign trade by reducing customs duties;

3. Creating a favorable climate for attracting foreign investment in the country;

4. Opening access for Russian investors to the financial resources of WTO member countries;

5. Use of the dispute resolution mechanism within the WTO;

6. Creating conditions for the modernization of production, improving the quality and competitiveness of domestic products as a result of access to the latest world technologies;

7. Getting protection from financial, technical, sanitary discrimination;

8. Improving the country's image at the international level.

All of the above reasons should be considered as the intended goals of Russia's accession to the WTO, and as a prerequisite is the fact that Russia - a country with great economic, resource, scientific potential, participating in international trade, but not having legal protection at the world level, was obliged become a member of the WTO.

An international trade system can provide the following benefits to participants:

- for enterprises that are exporters of goods and services;

There is a guarantee of access for exporting enterprises to world markets as a result of the existence of so-called “frozen” tariffs, which will not be changed as a result of their sudden growth or the introduction of new restrictions by importing countries (Polubotko A.A., Gerasin K.S., 2018). In the

service market, there are also obligations between countries to not restrict access to the market for service providers, which are recorded in the national list of obligations.

In the WTO system, there are uniform rules that make unified the requirements that apply to exporters in various markets, which helps them in their activities.

All these circumstances make it possible for Russian export industries to develop investment and production plans in conditions of instability and uncertainty.

- for enterprises that act as importers of raw materials, goods and services necessary for participation in production.

For such enterprises, a rule applies in the international trade system, according to which it is necessary to issue a permit to import imports without further restrictions after payment of customs duties. There are also guarantees that the rules applied at the border comply with the uniform rules of the agreements. All these measures facilitate the import process. Also, the value of tariffs determined by the framework of the agreements is an indicator of the stability of the costs of importers as a result of increasing customs duties.

As part of the negotiations on goods, 57 bilateral protocols were signed on liberalizing access to the goods market. The parties agreed to reduce the weighted average import tariff rate for all non-agricultural products to 7.3% of the current level - 9.5%. In accordance with the concluded documents, export duties began to apply to about 700 tariff lines, affecting various types of goods.

The agreements concluded as part of the negotiations concerned various sectors of the economy. The agreement on agriculture prohibits WTO member countries from providing any measures of state support for the production and export of agricultural products beyond those agreed upon during accession negotiations. As a result of negotiations, at the time of Russia's accession to the WTO, the level of possible subsidies was determined at $ 9 billion, and by 2018 it was reduced to $ 4.4 billion. However, the green box measures can be used as support, since WTO, their size is not regulated, as well as create regional unions. As a condition for integration, a reduction in import duties on all food products by 30% produced in Russia was adopted. In January 2020, Russia fulfilled its latest tariff obligation to the WTO, setting a flat pork tariff at 25%. Prior to this, a zero rate was in effect, and for pork delivered in excess of the quota, the tariff was set at 65%.

In the field of access to natural resources, Russia has committed itself to increasing the price of natural resources for domestic production (prices for the population are to be temporarily regulated) to the level of export prices for resources.

In accordance with the agreement on the protection of intellectual property rights in the field of trade, a payment is required for the use by a participating country of patents of other countries. As a result, deliveries of equipment and technologies to Russia for the proposed technological re-equipment of the economy will certainly have a “patent” price premium since 97% of world patents are property of highly developed states.

There are obligations to reform legislation and public administration. In accordance with the requirements of normal organizations. Nevertheless, some obligations are still not fully implemented in the field of reforming the public procurement system, transparency of legal acts, responsibility for discrimination abroad, etc. The first two groups of obligations (lowering import duties and removing administrative barriers) will have the greatest consequences for the domestic economy, which will greatly simplify access to the Russian market for foreign goods and lead to a reduction in the market share of Russian enterprises.

Thus, joining the WTO is a significant challenge for the competitiveness of the state as a whole and for individual organizations. But, this should have become a catalyst for the development of the economy, improving the business climate, which in the medium term could enable Russia to take a more advantageous place in the international division of labor, increase attractiveness for investments, and the possibility of taking part in the formation of international trade rules and norms.

Pros and cons of Russia's entry into the WTO.

As positive points, you can specify the following:

- **Now you can use the procedures for resolving trade disputes.** Russia began to file lawsuits against other countries, mainly European, to remove or reduce tariff restrictions. For example, in 2012, 143 restrictive measures were set against Russia, then in 2017 there were already 83. There are disputes that still cannot be resolved: disputes over the Third Energy Package with the European Union, wagons and railway equipment with Ukraine, over the introduction of duties on steel and aluminum by the United States (Sycheva I.N., Tikhomirova Yu.,2016).

- **Improving international trade conditions.** Immediately after joining the WTO, some countries canceled several their protectionist measures against Russia. So, the United States canceled the Jackson-Venik amendment, according to which Russia did not have the most favored nation treatment in the field of trade.

- **The growth of several industries.** The positive effects, according to the goals of the government, should not have appeared immediately, but in subsequent years, but this was prevented by the sanctions imposed against Russia. However, later they had a positive impact on the Russian economy the imposition of retaliatory sanctions had a positive impact on the country's agriculture and auto industry. The import substitution policy, accompanied by significant financing, contributed to the growth of agricultural production in 2016, 2017 by 4.8% and 3%, respectively, in 2019 by 4%. In accordance with its obligations, Russia was supposed to reduce import duties on cars to 15%. The reduction in duties, according to theory, should lead to an increase in imports of products, but this did not happen with respect to the automotive industry, as the Russian government took the following measures: introduced recycling charges for all automakers, facilitated the opening of factories for the production of machinery and equipment in the country.

- **Improving the image of the country.** As a result of joining the WTO, Russia became an equal participant in the global trading system, which in turn significantly reduced the barriers to international trade and the trading market. Also, the Russian Federation has gained absolute access to various international schemes, thanks to which all disputed issues can be resolved. (Sycheva I.N., Tikhomirova Yu., 2016).

Despite the positive aspects, we can state the presence of negative consequences from Russia's entry into the World Trade Organization:

- **Increased competition in the domestic Russian market.** Due to lower duties on imported goods, competition with foreign partners inside Russia has increased. This led to the fact that imports of goods increased, and exports began to fall. In 2013, the balance of foreign trade turnover decreased by 10%. The export structure has also changed. The share of machinery and equipment, metal and chemical products increased, but the share of exports of fuel and energy products decreased. With increasing competition, it became difficult to cope with the agricultural and light industries. However, such a trend existed only at the beginning of the process of Russia's integration into the world trading system, and subsequently, as a result of the reorientation of trade directions, export flows began to prevail over import flows.

- **The lag of several industries.** In many industries, it was not possible to take part in the competition and demonstrate negative dynamics against the backdrop of declining competition with foreign enterprises [7]. The agricultural engineering industry is going through hard times. During the World Trade Organization, they expected problems, and after accession they intensified. In 2017, the share of agricultural engineering products is only 0.1% of the country's GDP, which indicates the unsatisfactory state of the industry and its low position in the economy.

- Agricultural machinery of western producers is more attractive to Russian farmers. Therefore, a decrease in import duties negatively affected the demand for domestic engineering products. At the same time, the low competitiveness of the product itself in comparison with foreign production should be considered. A complete modernization of obsolete moral and physical equipment, infrastructure and production technology is necessary. But this is possible only with the direct support of the state through subsidies, since there is no reason to hope for private investment because of low interest.

Since 2013, the state began to actively subsidize the production of domestic agricultural machinery, which had a positive effect on the trade balance: export and import of products began to level out. Another positive factor for the growth in sales of agricultural machinery was the devaluation of the national currency, which led to an increase in the cost of foreign equipment and the reorientation of Russian buyers to domestic products.

According to analytical data, in 2016, the volume of export deliveries of agricultural engineering products increased by 20%, the St. Petersburg Tractor Plant is the leading supplier of equipment, it accounted for 17% of the increase. The main buyer of agricultural machinery is Kazakhstan, it accounts for about 60% of exports.

- **Failed to achieve all the goals.** The purpose of joining the WTO - to facilitate the access of Russian products to the world market - in fact, has not been achieved. Russia did not gain access to new technologies, for example, the United States banned the import of equipment for oil and gas companies. The sanctions introduced against Russia scared off potential investors. In 2014, there was the largest capital outflow of $ 150 billion, in 2015 - $ 56.9 billion, and in 2018 - $ 60 billion. Also, Russian companies lost access to foreign financial resources. Foreign banks have become more wary of Russian borrowers and tightened credit requirements.

- **Decrease in budget revenues.** The economic losses of the state budget of Russia due to the reduction of import duties on goods amounted to about 800 billion rubles.

- **Growth in unemployment.** The entry of the Russian Federation into the WTO served the closure of about 40 thousand enterprises and firms, as well as an increase in the number of unemployed to 30 million people. There was a reduction in the total number of jobs by 40% in various regions (Tatarkin A., 2012).

The impact of sanctions and changes in foreign trade policy on the consequences of Russia's accession to the WTO

As a result of the adoption of sanctions against Russia in 2014, the main part of the benefits of joining the WTO was lost. These sanctions were introduced by the United States as amended by the GATT article, according to which countries have the right to introduce restrictions to ensure national security (Shigabiev T.N., 2014).

There are different points of view that the sanctions imposed against Russia contradict the WTO rules, which are based on the principle of “free trade”. It seems to us that this is a really difficult question, which is more legal than economic in nature. So, in one of the studies it is concluded that anti-Russian sanctions do not contradict the norms of the World Trade Organization, since they have a political basis, and the settlement of disputes for political reasons is not the responsibility of the organization.

And Russia's appeal to the Dispute Resolution Authority will not force us to lift US and EU sanctions, but it can serve as a starting point for starting the negotiation process. Also, as the authors note, in the regulatory documents of the WTO there is no such thing as economic sanctions, which in turn also makes it difficult to resolve this issue (Travina L.A., Yevtushenko S.A., 2016).

I would like to pay special attention to how the accession to the WTO affected the agro-industrial complex of Russia, since it plays an important social role in the country's economy.

Many experts said that after Russia's entry into the WTO, such a sector of the agro-industrial complex as pig breeding will be at risk. Since Russia reduced import duties from 15% to 0% under the quota and from 75% to 65% outside the quota. This led to an increase in imports of cheap pork from Europe and a decrease in the price of these products to 30%. This, accordingly, negatively affected the domestic manufacturer, many efficient enterprises had to revise their business plans, as they could not win in the competition with foreign suppliers.

However, the situation changed in 2014, when Russia imposed a food embargo on the European Union, the United States and other countries. It was forbidden to import into the country such products as fish, beef, pork, poultry, cheeses, milk, fruits, vegetables. The food embargo was a response to the sanctions imposed against Russia by the United States and the European Union. The impact of retaliatory

sanctions on the agro-industrial complex can be viewed on the positive side, as this allowed the farmers to increase production. In 2013, the volume of deliveries of products from abroad amounted to 43 billion dollars, and in 2016 only 25 billion dollars. Also, the share of imports in pork consumption from 2013 to 2016. decreased by 8%, and poultry meat consumption by 5%, the same situation was observed in 2018. Thus, it turns out that the imposition of sanctions helped the development of this sector of the agro-industrial complex of Russia. However, European manufacturers resorted to WTO tools and demanded that Russia lift the ban on the import of products into the country.

Currently, due to frequent economic and political crises, there are opinions about the need for Russia to exit the WTO. In 2017, a bill on Russia's withdrawal from the WTO was submitted to the State Duma, which was rejected. The authors of the bill referred to the significant negative effects that the Russian economy received from joining the WTO. However, according to experts, the presence of the country in the WTO allowed for a full-fledged foreign trade policy, and to build international alliances. And the exit will only lead to an increase in the influence of international sanctions and to the inability to defend the country's trade and economic interests on the world stage.

Russia's exit from the WTO will lead to isolation from the international market and technology, which in turn will be the starting point for a slowdown in the growth of scientific and technological progress in the country (Sopina N.V., Bliznyuk E.I., 2019).

An alternative to withdrawing from the WTO is the development of internal state policy aimed at stimulating economic activity in order to overcome the negative effects: reduced employment, low labor productivity, etc. (Gubaidullinaa T., Yakupov Al., 2015; Khairullov D., 2015).

According to another point of view, the World Trade Organization should no longer be regarded as the main regulator of international trade. Countries should conclude bilateral joint trade agreements, and this will be more effective.

As a threat to the international trade system today, there are contradictions of a political and economic nature that arise between states. Which in turn can lead to a crisis in the institutions of the international trade system and the WTO.

The multilateral trade negotiations that began in Doha have now come to a standstill, and new acute problems of current trade policy have been added to existing unresolved issues.

US trade policy has a clear protectionist and anti-globalization focus. This can be explained by the fact that China began to claim the role of world leader in foreign trade turnover (which happened in 2012), as well as the US’s reluctance to change its trade policy due to changing external terms of trade (Miropolskii D.Iu., Selishcheva T.A., 2018 et al.,).

In 2018, the United States introduced a series of protectionist measures, citing domestic legislation: the Trade Expansion Act and the Trade Act. The WTO does not prohibit the use of such measures but limits them to a certain scope. The member countries of the organization apply restrictive measures, but they do not comply with WTO standards.

Recently, much has been said about the US withdrawal from the World Trade Organization. According to experts, this is due to the fact that the interests of the leading members of the organization are now diverging. The reason for this was the growing role of China. If earlier the PRC was regarded as a “single assembly shop”, today it is a multidisciplinary industrial power that attracts investment and technology. This makes the United States and Western Europe more difficult to compete with. There is a contradiction in the movement of free flows of goods and free flows of capital, which is now sent to new industrial countries. Controlling them for the United States and Western Europe is becoming increasingly difficult. In this connection, they began to talk about the WTO crisis. For example, negotiations on agricultural subsidies between developing and developed countries have not yet been completed, but this does not mean that if the WTO ceases to exist, these problems will be resolved.

We will have to create new institutions that will regulate trade relations in the world and will take enough time. It seems to us that countries should use existing tools to resolve trade contradictions, and not look for new ones (Selishcheva T.A., et al., 2018; etc).

It seems to us that comparing the positive and negative consequences of Russia's joining the World Trade Organization is currently a complex process. Firstly, in order to better evaluate the results, it is

necessary that at least 10 years have passed since joining the organization. Secondly, the goals and objectives that Russia set upon entering the WTO underwent changes due to geopolitical factors, such as the imposition of sanctions and the implementation of the import substitution policy. However, if we turn to statistics (Fig. 1), we can see that the first two years of Russia's membership in the WTO yielded positive results, and only since 2014, there has been a sharp decrease in indicators.

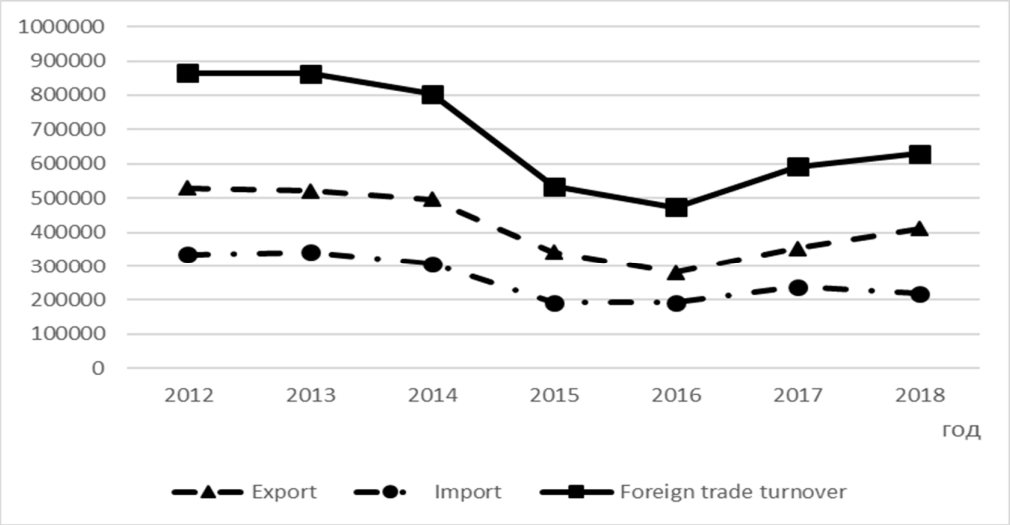

Compiled by authors from the wto.org

Fig. 1: Foreign trade indicators dynamic of the Russian Federation.

According to the World Trade Organization, starting in 2012, Russia's trade balance remained positive, with exports exceeding imports. Starting from 2014, these indicators begin to decline and only in 2016 does the growth trend reappear. The foreign trade turnover of Russia has a similar trend, which falls in 2014 and begins to grow only in 2016. Therefore, we can conclude that over two years the country has adapted to the new terms of trade in connection with the imposition of sanctions against Russia, and only in 2016 did foreign trade indicators show positive dynamics.

Conclusion

On the one hand, the accession to the WTO for the Russian economy had a number of positive consequences: the opportunity appeared to use procedures for resolving trade disputes, the conditions for international trade improved, a number of sectors of the economy were growing, the image of the country in the international arena increased, competition in the domestic Russian market increased . On the other hand, one can note the negative sides of this process: several sectors of the economy lagged, a decrease in budget revenues was recorded, and unemployment increased.

Although the set goals have not been fully achieved, today there is a positive trend in the volume of foreign trade of the Russian Federation. The introduction of sanctions against Russia and the ongoing change in the rules of world trade had a strong negative effect on achieving the goals of WTO accession. All this led to the fact that Russia's trade policy began to move in a different direction.

Over the past decades, the situation in the world has changed dramatically, and the rules and regulations of the WTO have remained unchanged, so it becomes difficult to resolve mutual political and economic issues for different countries. In this connection, there is a need to reform the World Trade Organization. First, it is necessary to improve the legal framework of the WTO, which does not provide enough protection against unfair trade practices in the field of copyright, technology transfer, support for state-owned companies, and industrial enterprises.

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State Support for Green Investments and Market Green Financing in Renewable Energy Sources

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Abstract

This article discusses the trends in the use of renewable energy sources (RES), and the possibility of financing them. Today, the issue of "green financing" is very relevant and is being discussed all over the world at the highest level, since the main advantage of such energy is its inexhaustibility and ecological purity. The use of renewable energy does not change the energy balance of the planet, which is very important in the framework of the concept of sustainable development and for the transition of many countries to reduce the dependence of economies on hydrocarbons. These qualities served as the reason for the rapid development of renewable energy abroad and in Russia. From a practical point of view, the transition to sustainable development means a fundamental change in business and management processes in order to stop the destruction of key ecosystems, the depletion of non-renewable resources and the widening gap between the rich and the poor. The time has come in the field of "green" (clean) technologies and sustainable development. Sustainable development has ceased to be an exclusively academic concept and is becoming mainstream in the world of business and investment.

Keywords: Sustainable Development, Renewable Energy Sources, «Green Financing», «Green» Economy, «Green» Investments, Financing Of «Green» Investments, State Support.

Introduction

At present, both in the world and in Russia, adjustments are being made to previously implemented development management models. After comprehensive liberalization of the turn of the 20-21 centuries, which has captured our country as well, there is an increase in certain conservatism in national economic policies, which is associated with an increase in the level of state interventionism, an increase in the importance of state programming and planning, a course towards reindustrialization, and expansion of social models. responsibility, etc. (Borkova et al., 2019). One of the new phenomena in the modernization of policies implemented at the international, national and regional levels is the implementation of tools for ensuring sustainable development [6-10, etc.].

In connection with the foregoing, today the green investment is considered by the Government of Russia both as a tool for solving environmental problems and as a factor in ensuring sustainable development and achieving economic growth (Vertakova Y., Plotnikov V., 2017). As follows from the Sustainable Development Goals (SDGs), approved by the UN, these two concepts - sustainability and economic growth - are interdependent, while green investment is a prerequisite for the implementation of both directions of development (Vertakova Y.V., Plotnikov V.A., 2019). The concept of a green economy and green financing based on it arose in the process of forming the concept of sustainable development (Porfiryeva B.N., 2018). To date, the process of transition to a green economy has not yet been clearly determined, since the setting up of a national mechanism for financing green investments has not been completed.

So, sustainable development in the modern world has ceased to be an exclusively academic concept and is becoming mainstream in a practice-oriented world of business and investment, which requires the development of management tools of both the market and administrative-state type, focused on stimulating green investments and creating a green finance market.

World Experience of Green Development

In the world, especially in developed countries, considerable attention is paid to green growth and development models. Thus, the countries of Northern Europe and the EU have determined their future based on a carbon-free economy, so they focus on carbon-free / low-carbon finance. At the same time, it is obvious that the transition of traditional energy systems from fossil fuels to renewable technologies will require significant financial investments. Figure 1, to illustrate this conclusion, presents data on investments in renewable energy in the world.

On the graph, we see global investment in renewable technology from 2004 to 2016. In 2004, $ 47 billion was invested in such projects worldwide. By 2016, this figure increased by almost 6 times. In 2019, according to preliminary estimates, green investments amounted to $ 288.9 billion (and even $ 340.9 billion - considering the construction of hydropower plants with a capacity of more than 50 MW). This is 11% less than in 2018 (mainly due to a significant drop in investment in China) (Publishing House "MBI", 2018).

The largest increase in renewable energy investments occurred in China, increasing from $ 3 billion in 2004 to $ 103 billion by 2016 (an increase of 3400%). China is currently the largest investor in renewable technology, investing about as much as the United States, Europe, and India combined. In 2019, investment in China amounted to $ 83.4 billion, which is 8% less than in 2018, and this figure was the lowest since 2013.

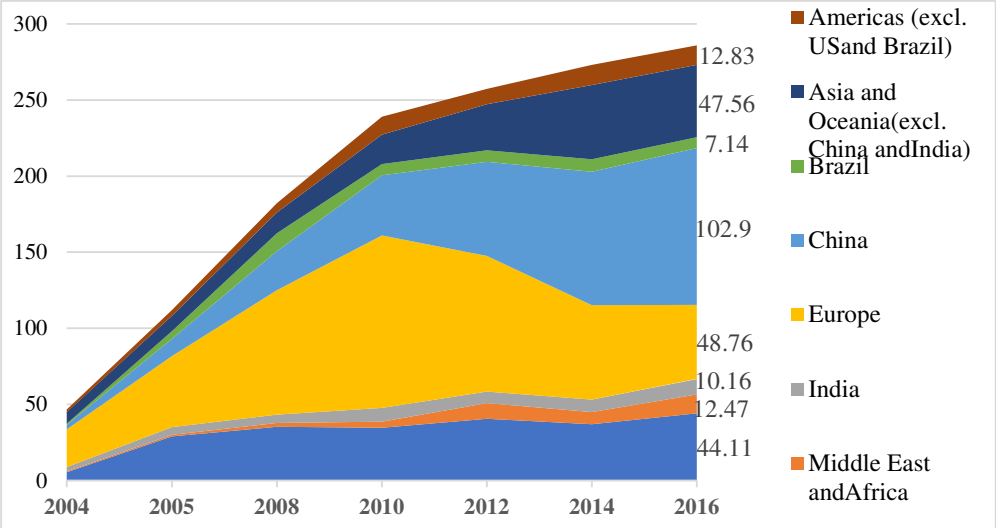

Compiled by authors from the data of the Our World. Sustainable Development Goals Tracker.

Fig. 1: Investments in renewable energy technologies per year by region, $ billion.

It is important to note that for the first time in ten years, investments in wind energy (mainland and offshore) have exceeded investments in solar energy. Investments in wind generation, thanks to the offshore segment, grew by 6% to $ 138.2 billion, and in solar generation decreased by 3%, to $ 131.1 billion. The drop-in capital expenditures in wind and solar energy probably led to by the end of 2019, a total of 180 GW of wind and solar power plants were built in the world, 20 GW more than in 2018 (Forys, I., Cymerman, J., 2019).

Back to fig. 1, it reflects the picture of the volume of investments in absolute terms, which, of course, is very important, but this picture does not consider the size of investments compared to the country's economy. At first glance, it seems that the largest economies will also be the largest investors. If we want to evaluate which countries make a fair “contribution” or “share” of investments in clean energy, then it is important for us to evaluate investment contributions as a percentage of the country's gross domestic product (GDP). We calculated the percentage of investments in GDP as a percentage and reflected on the chart the largest investors at present (Fig. 2).

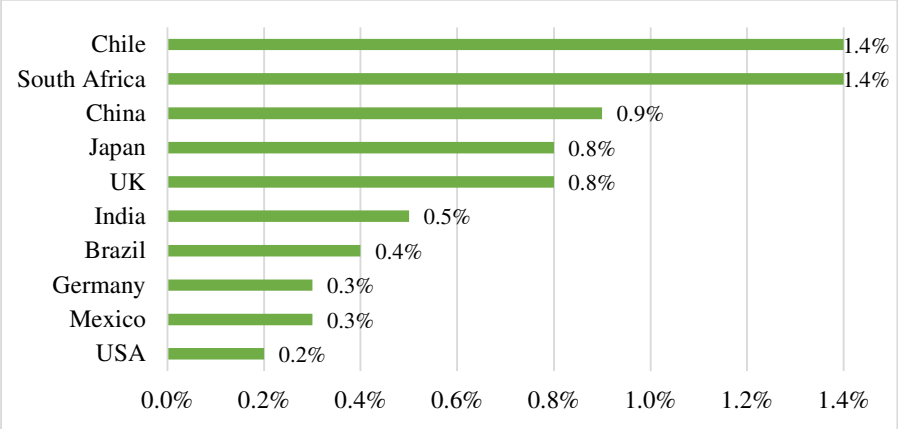

Compiled by authors from the data of the Our World. Sustainable Development Goals Tracker.

Fig. 2: Investments in renewable energy, % of GDP

Thus, you can see that now the picture shows us a slightly different picture. Most countries invest less than 1 percent of GDP in renewable technologies (except for South Africa and Chile, which make an impressive 1.4 percent). However, these countries are not among the highly developed. China has been and remains one of the largest investors, its contribution at the level of 0.9 percent. Interestingly, the United States in absolute terms is the second largest global investor, but in relative terms their contribution is relatively small: in 2018, the United States invested only 0.2 percent of its GDP in green energy projects.

Not only our analysis, but also a study of the literature and evidence shows that when it comes to the relative costs of investing in renewable energy sources, countries with economies in transition, as well as developing low- and middle-income countries, usually invest more than countries high income. This may be partly explained by the fact that these countries are likely to invest a higher percentage of their GDP in total supply and expansion of energy consumption (whereas high-income countries usually have well-developed energy systems).

However, most high-income countries have set ambitious targets for reducing greenhouse gas emissions in their commitments under the Paris Climate Agreement. For example, China has set as its goal to reduce carbon dioxide emissions per unit of GDP by 60-65% from the 2005 level; Japan declared a decrease of 25.4% compared with 2005; The United States intends to achieve the overall economic goal of reducing greenhouse gas emissions by 20-28% below the 2005 level in 2025 and to make every effort to reduce emissions by 28% (while the United States declares its non-participation in further participation in the Paris Agreement) (Borkova E., Plotnikov V., 2019 et al.).

Russian Practice of Regulating Green Development

On September 21, 2019, Prime Minister Dmitry Medvedev signed a government decree on the adoption of the Paris Climate Agreement. The main goal of this agreement is to prevent climate change and to keep the increase in global average temperature by the end of the 21st century at "much lower" 2 ° C in excess of pre-industrial indicators (the parties to the agreement intend to make efforts to limit the temperature increase to 1.5 ° C). According to climate scientists, the main anthropogenic factor in global warming is carbon dioxide, which enters the atmosphere mainly from emissions from industrial enterprises. In this regard, it was precisely the reduction of CO2 emissions that became the target indicator for the implementation of the Paris Agreement.

The Kyoto Protocol (1997), which preceded this document, obliged the participating countries to reduce greenhouse gas emissions by 5.2% compared to the 1990 level. The Paris Agreement does not establish global standards for reducing emissions, and each participating country determines its own targets (it is assumed that the parties to the agreement will review them every five years). For countries that do not achieve the stated indicators, penalties are not provided, but such countries are kept in order to provide them with possible assistance. The agreement does not establish strict restrictions on mitigation of CO2 emission targets, however, in case of non-compliance, a participating country may incur reputation costs and be subjected to pressure from the world community and the media. After a minimum three-year membership period has elapsed (not including the period required for legal registration of the issue), a participating country may withdraw from the Paris Agreement (Gorobets, A., Morkovina, S., 2018 et al.).

To fulfill the obligations stipulated by the agreement, Russia set a goal to reduce greenhouse gas emissions “to the level of 70–75% of 1990 emissions by 2030, subject to the maximum possible absorption capacity of Russian forests”. There is an opinion that such a restriction may have significant negative consequences for the Russian economy. These fears are since several researchers noted a low assessment of the absorption capacity of Russian forests, given in the carbon balance of the country.

In addition, the Russian Union of Industrialists and Entrepreneurs expressed concern that the introduction of a “carbon tax” could harm Russian industry. According to ACRA, an assessment of the

potential risks of economic slowdown in connection with the adoption of the Paris Agreement should be carried out considering the correct assessment of the absorption capacity of Russian forests.

According to Roshydromet, in 2017, greenhouse gas emissions in CO2 equivalent were 2.2 billion tons, which, considering carbon sequestration by the country's forests (580 million tons), is equivalent to 1.6 billion tons. If we compare this with the volume of greenhouse gas emissions in 1990 (according to various estimates, from 2.3 to 3.1 billion tons), even according to the most conservative estimates, CO2 emissions now account for 69% of the 1990 level, which falls within the above target range of 70–75%.

I must say that 2018 was the year in which carbon emissions over the past seven years became the largest and grew by 2.0% compared to the previous year, experts directly associate this growth with an increase in energy demand.

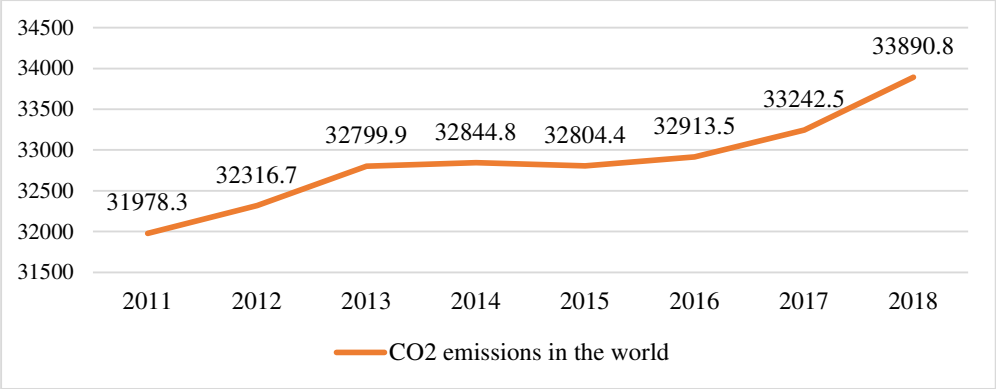

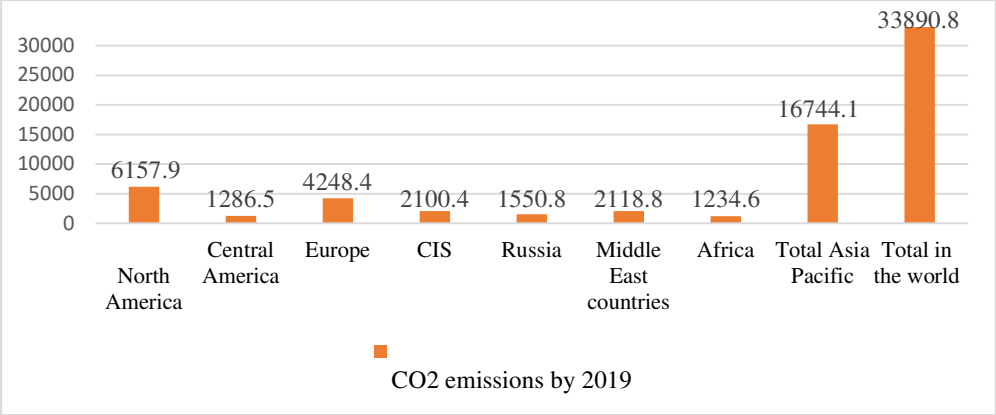

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Fig. 3: CO2 emissions by country per million tons of carbon dioxide.

It is important to note that at the last UN summit on climate change, within the framework of the 73rd General Assembly of this international organization, 77 countries committed to completely stop greenhouse gas emissions into the atmosphere by 2050, another 70 countries promised to expand their national plans on this issue by 2020 year. For example, France stated that it would not trade with countries that did not comply with the Paris climate agreement, Germany would seek "carbon neutrality" by 2050.

The development of the above processes has not spared Russia. In Russia a restriction of anthropogenic greenhouse gas emissions to 70-75% of the 1990 level by 2030 has been declared, this may become a

long-term indicator of state policy, subject to the maximum possible absorption capacity of forests. At the same time, this policy itself, in this regard, requires a fundamental review (Iu, M.D., Selishcheva, T.A., Diatlov, 2018 et al.).

Thus, the Forecast of the Long-Term Socio-Economic Development of the Russian Federation for the Period until 2030, Developed by the Ministry of Economic Development of Russia, suggests that "a set of institutional, legislative, financial and economic measures will be implemented by 2020 aimed at the gradual transition from financing of fossil fuels to financing green technologies.

In addition, it should be borne in mind that Russia has gigantic reserves of geothermal energy, they are estimated to be 10 times higher than the reserves of organic fuel in the country. Already, about half of all new energy capacities commissioned in Russia are hydroelectric power plants, nuclear power plants and renewable energy stations. According to experts, the total energy generation potential of alternative sources is estimated at about 3 billion tons of oil equivalent per year.

Soon, more than 1.5 GW of solar generation will be commissioned in Russia. Over the past year, solar power plants have been launched in the republics of Altai and Bashkortostan, in the Orenburg region. Launched a high-tech production of solar modules in the city Novocheboksarsk. The main task of the state at this stage, according to the author, is to create tools for the transition to renewable energy sources. In the interest of combating climate change, work is underway to reduce the dependence of the economy on hydrocarbons.

By 2035, it is planned to attract $ 53 billion into the renewable energy sector. This requires the development of both special instruments to stimulate green investment and the green financing market. These institutional transformations should become, according to the author, one of the priorities of the current state policy.

Conclusion

The development of the global economy in the 21st century will take place under the sign of increasing social and environmental restrictions, which makes the choice in favor of the sustainable development trajectory uncontested. Continued implementation of the traditional expansionist model of economic growth has gained visible limits. Today, more and more often, politicians and ordinary people ask the question: "What kind of land will our children get?" To maintain and improve the quality of life, a change in the economic model is required, which requires adequate modernization of state policy (Borkova E., Kochkin T., 2019 et al.).

An analysis carried out on the example of renewable energy showed that both in the world and in Russia, in this sphere of green development, there are very important and ambitious tasks, the solution of which requires significant investments. Most likely, public finance cannot be their source, since Governments have many other urgent tasks, including those related to the SDGs, which necessitates the intensification of private investment in green projects. For this, in our opinion, both the creation of new stimulating instruments within the framework of the state investment policy and the development of the green finance market are required.

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On the Causal Dynamics Between Crude Oil Process, Natural Gas Prices and Economic Activity in Poland – Time and Frequency Domain Perspective

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Abstract

Economic activity behavior depends on all the external and internal events that have the potential to disrupt the flow of business cycle. These causes could be related with changes in main macroeconomic processes, economic policy or adjustments in external markets, like world market of energy resource. Prices of oil and gas have a significant meaning for economic development, but the relationship between economic growth and changes in energy resource prices are not always identified. Several studies have focused on the relationship between economic activity and the oil prices in time domain, where authors investigate the dynamic behavior with linear or non-linear approach. In this paper, we use a VECM model and Granger causality test in time and frequency domain to investigate the movements between oil prices, natural gas prices and economic activity in Poland. The findings of research provide evidence that economic activity in Poland depends on oil prices in long term (low and medium frequencies) and short term. In the case of natural gas prices, there is long-term and short-term neutrality of economic activity in Poland, which means that a changes in gas prices have no effect on economic growth.

Keywords: Granger Causality, Time Domain, Frequency Domain, VEC Model.

Introduction

Crude oil, natural gas and coal are main energy commodities for the global economy. All three markets are driven by the imbalances in global supply/demand relationship, which cause increased speculations on energy resource prices. The global character of energy resource markets has an important meaning for the economies of many countries. This economies are highly dependent upon imports of mineral fuel, and thus upon the prices of energy resources. From a macroeconomic policy point of view, the studies of the relationship between energy resource markets and economic activity are a part of mainstream research.

Policy makers rely on empirical research and based on it the hedging strategies against excessive economic activity and oil price movements are build. Most of empirical works were focused on theories with using time series analysis, without considering to test these theories on a context of frequency domain. The analysis of particular economic relationship in the case of time and frequency domain is useful, because the dynamics of any macroeconomic variable can be expected to reflect adjustments to an long-term equilibrium path, whereas the adjustments are due to reaction of main markets, economic uncertainty, and cost of information gathering (Hallett and Richter (2004)). That can suggest the differences in adjustment and behavior of economic processes at different frequencies. To overcome this limitation, the research were conducted both in time and frequency movements in oil prices and economic activity for a small net-importing country.

The main purpose of this study is to examine the dynamic relationship between energy resource prices (i.e. oil and natural gas) and economic activity in small net-importing country, like Poland (i.e. industrial production index, consumer prices index, exchange rate and stock exchange).

The concept of research study is presented on Fig 1.

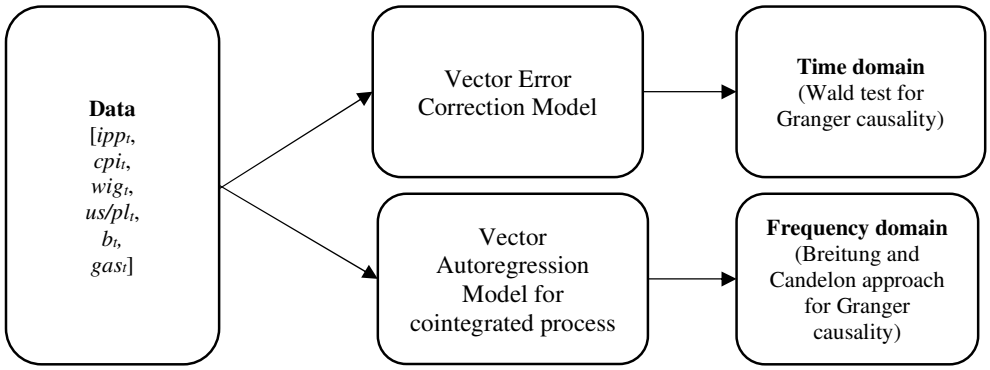

Fig. 1: The concept of studying the Granger causality in the time and frequency domain

The hypothesis is constructed and tested using the vector error correction model (VECM) and the Granger causality in time (Wald test) and frequency domain (Breitung and Candelon approach) for polish economy. We estimate an VEC model. In the analysis the monthly data of Brent oil price, natural gas prices, industry production index, consumer price index, WIG stock market index and exchange rate for a polish economy from January 1995 to June 2019 were used.

This paper is organized as follows. Section 2 briefly shows the relationships between macroeconomic factors and energy resource prices. Section 3 presents the econometric methods used in the study. Section 4 introduce the empirical results of conducted analysis and, Section 5 presents the policy implications and concludes the paper.

Background of The Study – Macroeconomic Factors and Energy Resource Prieces

The linkages between energy resource prices and macroeconomic activity have been studied in the literature from various perspectives. Economists have been mostly analyzed the relationships between oil prices and main economic components (i.e. GDP, production index, exchange rates or stock prices) involving time series analysis. Also, it is worth to notice, that the intensity of the oil price-macroeconomy nexus is related with level of oil dependencies, use of renewable energy sources in economy, oil-importing or oil-exporting type of economy and tax structure in country.

Hamilton (1983, 2003) showed that the economic recession can be predicted by increases in the oil price, suggesting that oil prices as a leading economic indicator predict a slowdown of growth. Also, early studies in the area of relationships among macroeconomy and oil prices support the general view that oil prices were a linear and significant determinant of economic growth (Hamilton (1983); Gisser and Goodwin (1986); Burbridge and Harrison (1984)). Further findings showed that this linear relationship become weaker over time (Hooker (1996)) and the nature of this dependencies is nonlinear (Mork (1989, 1994)). In contrast, Bernanke et al (1997), rejected the hypothesis about significant effects of oil prices on economic activity in the U.S., due to a restrictive monetary policy. However, some recent works showed that the reaction of economic activity to oil price shocks is significant and asymmetric, which means the economic activity react more to increases in crude oil prices than to oil price decreases, and the intensity of reaction differ among net oil exporters and net oil importers (Brown and Yucel (2002); Hamilton and Herrera (2004); Lardic and Mignon (2008); Geise and Piłatowska (2014, 2016); Mohaddes and Pesaran (2017); Geise (2018); Evgenidis (2018)).

Distinction between oil-exporting and oil-importing economies is crucial for understanding the potential effects of oil prices shocks on economic activity. Small oil-importing developing economies are more dependent on external oil supplies which, in effect, means they are more adversely affected by oil price increases, in short- and long-term perspective (Schubert and Turnovsky (2011)). In contrast, Mohaddes and Pesaran (2017), verified that for global economy the net effect of lower oil prices is positive. Researchers showed, that the beneficial income effect for oil importers will show up in higher demand, while the income loss effect for oil exporters will show up in the loss of revenues. However the increases in spending by oil importers will exceeded the decline in expenditures by oil exporters, because it will implies the higher demand for energy and this will put the upward pressure on oil prices, which in turn, will trigger the adjustment process to long-run equilibrium (Mohaddes and Pesaran (2017)).

Using Bayesian threshold VAR model, Evgenidis (2018) concluded that the intensity of reaction in production index, inflation, economic sentiment, interest rate or stock market index to oil price shock is related with the high stress periods. It means that oil price shocks transmission mechanism in eurozone differ in stable (tranquil) and high stress state of economy. Disproportional reaction of economy is especially visible in reaction of inflation (HICP) to a larger oil price shocks. Also economic sentiment and stock market returns decline faster in the stressed period than in stable state of business cycle. Many studies have challenged the notion that fluctuations of oil prices have a significant impact on macroeconomy. For instance, Castro and Jiménez-Rodríguez (2017), based on VAR methodology conclude that European producers can adapt to higher oil price pressures without transmitting higher prices to final consumers. In turn, Diaz et al (2016), showed that stock returns in G7 countries reacts negatively to an increase in oil price volatility. Lee, Lee, and Ning (2017) using a structural VAR model, showed that net oil-importing economies are affected with higher country risk.

All research mentioned above are concentrated on the time domain analysis. Because of the unilateral perspective of analysis, there are some limitations in identification of the relations between energy resource prices and economic activity. Time series analysis may not capture the full links between those variables, while the linkages between oil prices, gas prices and macroeconomic factors may exist at different frequencies. Granger (1969), Geweke (1982), Hosaya (1991) and Breitung and Candelon (2006), among the others, showed that relationships between the economic variables can differ across the different frequencies. Methods of frequency domain analysis, currently, are used more often. Frequency domain is important because the macroeconomic variables can differ in intensity and direction of fluctuations. The sequences of cycle changes are repeatable, but not at regular intervals of time, which means the unobserved cycles have a different lengths of each phases. Also, the business cycle phases can differ in terms of steepness, deepness and sharpness (Clements and Krolzig (2003)). Total identification of relations between energy resource price shocks and economic activity among different frequencies and in time domain can capture the full picture of oil price-macroeconomy nexus.

In general, oil prices-macroeconomy nexus is asymmetric and related with state of economy. In chosen works, this relationship is reexamined with frequency methods. For instance, Benhmad (2013), explored the causality among oil prices and dollar exchange rate at various scales with using a wavelets approach. Oil prices cause the changes in dollar exchange rate at high frequency bands, but at medium and low frequency bands the bidirectional causality was identified. Asguiar-Conraria and Soares (2011), based on wavelets analysis, showed that, the demand-driven oil price shocks have become more important for fluctuations of economic growth than other shocks (i.e. supply side shocks).

Another important contribution is research Wei and Guo (2016), where based on VAR model and Breitung and Candelon (2006) procedure for Granger causality in frequency domain, conclude that oil prices can predict China's export at frequencies larger than 2 years, but there is no strong evidence to support the hypothesis about predictive power of oil prices for China's output. In time domain, authors implied that oil price shocks have a positive effects on output and negative effects on interest rate. Findings in Das, Bhatia, Pillai and Tiwari (2018) implied that in short-term perspective (high frequencies) the supply-side oil shocks are driven the US economic growth. However, in medium and low frequencies (medium-term and long-term perspective) the demand-side oil shocks driven the US economic growth.

The result of frequency domain study adds a new dimension to the literature on the relationship between crude oil prices and economic growth by focusing upon the time-frequency varying business cycle fluctuations (Das et al (2018)). Policymakers need to consider the size, direction (positive or negative), economic situation when oil price shock occurs and some hidden insights about transmission of oil price shocks to economic growth in medium and low frequencies to build appropriate and effective economic policy.

Granger Causality Testing

Time Domain

Operational definition of Granger (1969) causality in time domain is formulated for wide sense stationary time series and it is based on forecasting errors. The VAR representation of the time series can be used in forecasting and has the form (Osińska (2008)):

$$\Theta(L)z_t = \varepsilon_t \tag{1}$$

where $z_t = [x_t, y_t]'$ and $\Theta(L) = I - \Theta_1 L - \cdots - \Theta_p L^p$.

Moving average representation takes the form:

$$z_t = \Phi(L)\varepsilon_t = \begin{bmatrix} \phi_{11}(L) & \phi_{12}(L) \\ \phi_{21}(L) & \phi_{22}(L) \end{bmatrix} \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{bmatrix} \tag{2}$$

The forecast variance of x_{t+1} conditional on X_t is denoted by $\sigma^2(x_{t+1}|X_t)$. Also the forecast variance is calculated with additional information about Y_t and takes the form $\sigma^2(x_{t+1}|X_t \cup Y_t)$. The above allows to formulate that the variable y_t is Granger cause for x_t if (Osińska (2011)):

$$\sigma^2(x_{t+1}|X_t) > \sigma^2(x_{t+1}|X_t \cup Y_t) \tag{3}$$

The hypothesis that y_t does not cause x_t in time domain implies a linear restriction for the coefficients in the regression equation:

$$x_t = \alpha_1 x_{t-1} + \cdots + \alpha_p x_{t-p} + \beta_1 y_{t-1} + \cdots + \beta_p y_{t-p} + u_t \tag{4}$$

Frequency Domain

To testing for causality in the frequency domain we used the framework developed by Breitung and Candelon (2006). The procedure allows us to test for causality between economic processes at some prespecified frequency. Appling a Choleski decomposition to the VAR representation (eq. 1). Then the orthogonalized MA representation takes the form:

$$z_t = \Phi(L)G\eta_t = \Psi(L)\eta_t = \begin{bmatrix} \Psi_{11}(L) & \Psi_{12}(L) \\ \Psi_{21}(L) & \Psi_{22}(L) \end{bmatrix} \begin{bmatrix} \eta_{1t} \\ \eta_{2t} \end{bmatrix} \tag{5}$$

Spectral density of x_t takes the following form

$$f_x(\omega) = \frac{1}{2\pi}\left\{\left|\Psi_{11}(e^{-i\omega})\right|^2 + \left|\Psi_{12}(e^{-i\omega})\right|^2\right\} \tag{6}$$

Based on the measure of Granger causality suggested by Geweke (1982) and Hosaya's (1991), Breitung and Candelon (2006) construct a test for causality in the frequency domain as:

$$M_{y\to x}(\omega) = \frac{\left|\Psi_{12}(e^{-i\omega})\right|^2}{2\pi f_u(\omega)} \quad (7)$$

Where the spectral density of the univariate forecast error takes the form:

$$f_u(\omega) = \frac{\sigma_1^2}{2\pi} + \frac{\left|\Psi_{12}(e^{-i\omega})\right|^2}{2\pi} \quad (8)$$

and can be reduced by using the additional information of the past y_t.

Univariate forecast error (u_t) by the equation (4) relates to the multivariate forecast error (ε_{1t}), and takes the form:

$$\varepsilon_t = \Psi_{12}(L)\eta_{2t} + \varepsilon_{1t} \quad (9)$$

Test hypothesis for Granger causality in frequency domain takes the form (Breitung and Candelon (2006)):

$$H_0: M_{y\to x}(\omega) = R(\omega)\beta = 0 \quad (10)$$

and means that y_t does not cause x_t at frequency ω, where $\beta = [\beta_1, \dots, \beta_p]'$ and $R(\omega) = \begin{bmatrix} cos(\omega) & cos(2\omega) & \dots & cos(p\omega) \\ sin(\omega) & sin(2\omega) & \dots & sin(p\omega) \end{bmatrix}$.

The test statistic has the standard F distribution as $F(2, T-2p)$.

Empirical Analysis of Relationship Between Economic Activity in Poland and Oil Prices and Gas Prices

In order to test the relationship among economic activity and energy resource prices, we employ the macroeconomic variables for Poland, denoted as follows:

- Industrial production index (ipp_t) (in constant price from 2010),
- Consumer price index (cpi_t) (in constant price from 2010),
- Warsaw stock market index (wig_t) (in points),
- Exchange rate (us/pl_t) (in polish zloty for one US dollar),
- Brent oil prices (b_t) (the adjusted Brent spot crude oil prices in U.S dollar),
- Natural gas prices (gas_t) (the adjusted spot prices in U.S dollar).

The data used in the analysis come from the OECD database (http://oecd.org), stooq database (http://stooq.com) and Energy Information Administration database (http://eia.gov). The sample covers monthly data from January 1995 to June 2019 (294 observations). All series were seasonally adjusted, where the TRAMO/SEATS procedure were used. However, only in the case of consumer price index, the seasonal component was significant and removed by the method. It is well known that most of macroeconomic processes are not stationary. To test the non-stationarity of series the ADF (*augmented Dickey-Fuller test*) test was applied. Also to support the results of unit root test, the KPSS test (*Kwiatkowski-Phillips-Schmidt-Shin test*) is used.

Table 1: The ADF and KPSS test results for economic variables

Variable		ADF test				KPSS test			
		Levels		FD	SD	Levels		FD	SD
		c	c+t	c	c	c	c+t	c	c
ipp_t	I(1)	-1,306	-2,23	-26,33 **	-	2,048 **	0,282 **	0,144	-
cpi_t	I(2)	-6,214 **	-6,28 **	-3,766 **	-13,14 **	1,804 **	0,381 **	1,211 **	0,387
wig_t	I(1)	-3,328 **	-3,27	-18,03 **	-	1,120 **	0,220 **	0,193	-
us/pl_t	I(1)	-2,288	-2,24	-15,79 **	-	0,198	0,209 **	0,121	-
b_t	I(1)	-1,713	-2,00	-13,80 **	-	-1,508 **	0,329 **	0,101	-
gas_t	I(1)	-1,953	-1,57	-5,202 **	-	1,309 **	0,342 **	0,222	-

*FD – first differences; SD – second differences; c – test with constant; c+t – test with linear trend and constant; ** - denotes rejection of the hypothesis at the 0.05 level; critical value for KPSS test (with constant – 0,463; with constant and trend – 0,146)*
Source: Own calculation in Eviews11

Table 1 presents the results of the unit roots (ADF) test and stationarity (KPSS) test in log levels and first differences. The results of ADF test confirms that the industrial production index, stock market index, exchange rate, Brent oil prices and natural gas prices are integrated $I(1)$. The ADF test results for consumer price index are inconsistent with the results of KPSS test. The null hypothesis of non-stationarity of consumer price time series in ADF test is rejected for log levels (in both types of test: with constant (c) and test with constant and trend ($c+t$)), what means that *cpi* could be a stationary process. While the KPSS test (where the null hypothesis of stationarity is rejected in log levels and first differences) suggest the second order of integration ($I(2)$) in seasonally adjusted consumer price index (see Tab. 1). Because of the inconsistence in ADF test, we diced to take the KPSS test results under consideration. Hence, all variables, except *cpi*, in log level are $I(1)$ variables, while the first differences of *cpi* are $I(1)$ then the cointegration analysis were conducted in next step.

The vector of variables used in cointegration analysis and VECM model construction takes the form:

$$\begin{bmatrix} \ln_ipp_t \\ \Delta\ln_cpi_t \\ \ln_wig_t \\ \ln_us/pl_t \\ \ln_b_t \\ \ln_gas_t \end{bmatrix} \sim I(1).$$

The cointegration tests based on Johansen's procedure used the Trace test and Maximal Eigenvalue test. The null hypothesis in trace test takes the form $H_0: r \leq q$ against alternate hypothesis $H_1: r = q$. The null means that there exist at most q linearly independent cointegrating vectors. The maximal eigenvalue test has a null hypothesis H_0: there are r cointegrating vectors, against H_1: there are r+1 cointegrating vectors (Johansen (1988)). Since all the used series have a trending behavior, a linear trend is included in cointegration rank analysis.

The results of the Johansen cointegration tests are displayed in Table 2. Both, the Trace test and Max-Eigen value suggest the existence of one cointegrating vectors at 5% significance level (the null hypothesis in the trace test ($H_0: r \leq 0$) and Max-Eigen value test ($H_0: r = 0$) is rejected with p-value, respectively 0,0239 and 0,0318).

Further, using AIC, SC and HQ criteria the order of the VAR model was identified. The criteria shows the different order of VAR model, where Akaike, Schwartz and Hannan-Quin criteria showed respectively lag equals 4, 1 and 2.

Next, the vector error correction model (VECM) with one cointegrating vector and lag order equals 2 was calculated.

Table 2: Unrestricted cointegration rank test (trace test and maximal eigenvalue test) – Johansen's procedure

Trace test				
No. of CE(s)	**Eigenvalue**	**Trace statistic**	**Critical Value**	**Prob.****
$H_0: r \leq 0$	0.135067	100.1753	95.75366	0.0239
$H_0: r \leq 1$	0.093276	58.38552	69.81889	0.2883
$H_0: r \leq 2$	0.061074	30.18529	47.85613	0.7095
$H_0: r \leq 3$	0.026929	12.03606	29.79707	0.9306
$H_0: r \leq 4$	0.014151	4.174246	15.49471	0.8890
$H_0: r \leq 5$	0.000241	0.069548	3.841465	0.7920
Maximum Eigenvalue test				
No. of CE(s)	**Eigenvalue**	**Max-Eigenvalue statistic**	**Critical value**	**Prob.****
$H_0: r = 0$	0.135067	41.78978	40.07757	0.0318
$H_0: r = 1$	0.093276	28.20024	33.87687	0.2044
$H_0: r = 2$	0.061074	18.14922	27.58434	0.4828
$H_0: r = 3$	0.026929	7.861817	21.13162	0.9120
$H_0: r = 4$	0.014151	4.104698	14.26460	0.8481
$H_0: r = 5$	0.000241	0.069548	3.841465	0.7920

***MacKinnon-Haug-Michelis (1999) p-values; * denotes rejection of the hypothesis at the 0.05 level*
Source: own calculation in Evies11

VEC Model and Granger Causality

The VEC model is used to correct the disequilibrium in the cointegration relationship and to test for long and short-run causality among cointegrated variables in time and frequency domain. Vector Error Correction model has the form:

$$\Delta Y_t = A_0 + \Gamma ecm_{t-1} + \sum_{i=1}^{2} A_i \, \Delta Y_{t-1} + \mathrm{E}_t$$

where: $Y_t = [ipp_t, \Delta cpi_t, wig_t, us/pl_t, b_t, gas_t]$ are $I(1)$ variables being integrated to an $I(0)$ vector, A_0 is the intercept, Γ is the matrix containing long-run equilibrium information, A_i is the matrix which reflects the short-run dynamic relationship between variables, E_t is residual and ecm_{t-1} is the error correction term.

Cointegration equation (one cointegrating vector) takes the following form:

$$\widehat{ipp}_{t-1} = 1{,}634 + 14{,}083\Delta cpi_{t-1} - 0{,}369wig_{t-1} + 0{,}177uspl_{t-1} - 1{,}648b_{t-1} + 1.727lngase_{t-1}$$

Based on cointegration equation, it is worth to notice, that the response of industrial production to changes in oil prices is negative (parameter is equal – 1,648) and consistent with economic theory. The

positive response of ipp_t to changes in inflation can be explained by low inflation rate, near to optimal one, where the general price level was comparatively stable (Geise and Piłatowska (2014)).

The Wald statistics for Granger causality in time domain is employed to examine whether all the coefficients of a given first differenced variable are jointly statistically different from zero (short run causality) and whether the γ_i coefficients of error correction term are significant (long-term causality). Coefficients of a given explanatory variable are tested.

Table 3: Short-run Granger causality in time domain (Wald test statistics based on VECM(2))

Parameter	Var.	Effects					
		Δipp_t	$\Delta^2 cpi_t$	Δwig_t	$\Delta us/pl_t$	Δb_t	Δgas_t
		eq(1)	eq(2)	eq(3)	eq(4)	eq(5)	eq(6)
Short-run Granger causality							
$\alpha_{11}-..-\alpha_{1j} = 0$	Δipp_t	-	1,434	5,656 *	3,552	5,198 *	0,430
$\alpha_{21}-..-\alpha_{2j} = 0$	$\Delta^2 cpi_t$	0,883	-	3,924	4,997 *	3,086	4,185
$\alpha_{31}-..-\alpha_{3j} = 0$	Δwig_t	7,933 **	0,629	-	3,750	2,537	1,178
$\alpha_{41}-..-\alpha_{4j} = 0$	$\Delta us/pl_t$	5,868 *	10,47 ***	5,905 *	-	4,605	1,125
$\alpha_{51}-..-\alpha_{5j} = 0$	Δb_t	6,188 **	14,67 ***	4,499 *	4,011	-	3,401
$\alpha_{61}-..-\alpha_{6j} = 0$	Δgas_t	0,666	0,083	0,866	2,102	0,069	-
Long-run Granger causality							
$\gamma_{i1} = 0$	ecm_{t-1}	5,857 **	0,148	1,612	0,053	2,264	17,04 ***

, **, * denotes rejection of the null hypothesis (no Granger causality) at the 0.10, 0.05, 0.01 level respectively*
Own calculations in Eviews11

Table 3 presents the results of the Granger-causality test in time domain for oil and gas prices and economic activity in Poland. The results of Granger-causality test in time domain, show that there is short-run unidirectional causal relationship running from crude oil prices (b_t) to industrial production index (ipp_t), stock market index (wig_t) and consumer price index (cpi_t). Unidirectional causal relationship is also identified among exchange rate (us/pl_t), industrial production index (ipp_t) and stock market index (wig_t). Bidirectional short-run causal relationships is found between industrial production index (ipp_t) – stock market index (wig_t) and exchange rate (us/pl_t) – consumer prices index (cpi_t) – see Table 3. As can be seen, the Granger causality test show the causal relationship from industrial production index (ipp_t) to oil prices (b_t). This weak relation (rejection of H_0: $\alpha_{11}-..-\alpha_{1j} = 0$ in eq(5) for b_t, but the tatter at the 10% significance level) should be treated with precaution because the real impact of Polish economy on the world crude oil prices should be insignificant (Geise and Piłatowska (2016)).

In terms of long-run situation, a unidirectional strong causal relationship running from oil prices (b_t) to industrial production (ipp_t) is found. The results also indicate that is a long-run, unidirectional relationship form stock market (wig_t) and exchange rate (us/pl_t) to industrial production – see Table 3.

To summarize, the discussed results from vector error correction model (VECM) confirmed the previous findings, that the production, inflation and stock market in Poland are related with crude oil prices (Geise and Piłatowska (2014, 2016)). However economic activity in Poland is independent to

changes in natural gas prices. This result is related with that, the Polish economy is more dependent on oil market, than gas market.

Granger Causality in Frequency Domain

As mentioned in main goal of the research, we are interested to compare the results of Granger causality test in time domain with the results of Granger causality test in frequency domain. The part of the Granger causality test results, are presented in Table 4, where we focus only on relationships between oil prices and macroeconomic variable. However, the whole diagram of internal relationships between macroeconomic variables in Poland, in the context of frequency analysis is presented on scheme 2.

Table 4: P-value for Granger causality test statistics (Breitung and Candelon (2006))

Type	Cycle in year	Cycle frequency (month/cycle)	Angular frequency	H_0: B_t No Granger cause for IPP_t	H_0: B_t No Granger cause for CPI_t	H_0: B_t No Granger cause for WIG_t	H_0: B_t No Granger cause for US/PL_t	H_0: B_t No Granger cause for Gas_t
L	24,5	294	0,021	0,028 ***	0,001 ***	0,481	0,483	0,000 ***
M	12,3	147	0,043	0,028 ***	0,001 ***	0,483	0,482	0,000 ***
	8,2	98	0,064	0,028 ***	0,001 ***	0,487	0,479	0,000 ***
S	6,1	73,5	0,086	0,029 ***	0,002 ***	0,493	0,476	0,000 ***
	4,9	58,8	0,107	0,029 ***	0,002 ***	0,500	0,472	0,000 ***
	4,1	49	0,129	0,030 ***	0,002 ***	0,508	0,468	0,000 ***
	3,5	42	0,150	0,030 ***	0,003 ***	0,518	0,462	0,000 ***
	3,1	36,75	0,172	0,031 ***	0,003 ***	0,529	0,455	0,000 ***
VS	2,0	24,5	0,257	0,036 ***	0,013 ***	0,572	0,422	0,000 ***
	1,0	12,25	0,515	0,140	0,965	0,074	0,441	0,006 ***

Source: own calculation in Eviews11,

Tab 4. present only a part of results. Unreported results are available from authors on request; *** rejection of null hypothesis at 1% significance level; L stands for long cycle, M – medium cycle, S – short cycle and VS stands for very short cycle.

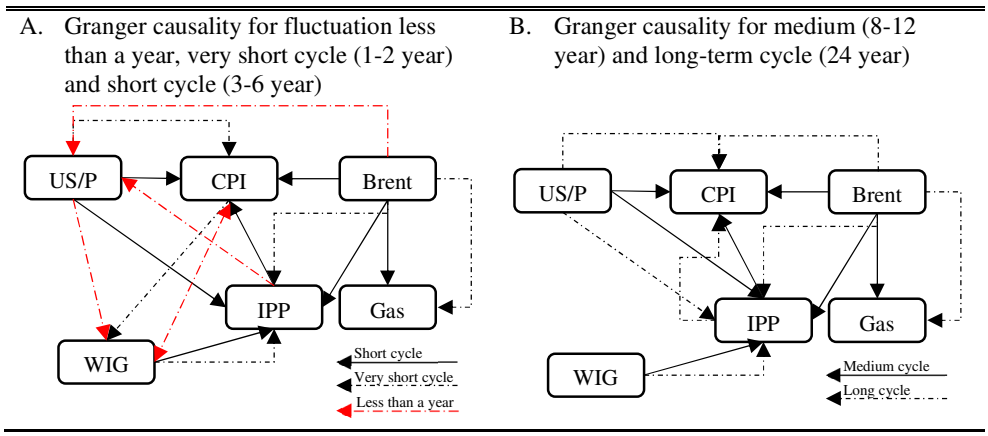

Fig. 2: Relationships between macroeconomic variables in frequency domain

Table 4 shows the results only for chosen frequencies that goes from 0 to 0,52 ($\approx \frac{\pi}{6}$) radians (whole frequency range goes from 0 do π). Chosen frequencies allows to focus on four types of cycle, i.e. very short cycle (1-2 year), short cycle (3-6 years), medium cycle (8-12 years) and long-term cycle (24 year).

The results for Granger causality test, based on the VAR model for cointegrated processes, shows that there is unidirectional causal relationship running from oil prices (b_t) to industrial production (ipp_t) and consumer price index (cpi_t) on frequencies similar to very short, short, medium and long cycles. Both, industrial production and consumer prices index, are related with oil prices on level of higher frequencies, like business cycle (3-6 years) but also on level of long-term trend. That means, the polish industrial production and inflation are driven by long-term and medium-term cycle of oil prices.

This results are consistent with conclusions from time domain analysis, where the significant reaction of industrial production and consumer price index on oil price changes was found. However, time series analysis also showed that stock market is under influence of fluctuation in oil prices, while the frequency domain analysis did not reject hypothesis about no relationship between oil prices and stock market index (compare Table 3 and 4). Also, it is worth to notice, that in the case of time domain analysis, there exist long-run relationship only between oil prices and production.

There is Granger causality evidence for relation from Brent oil prices (b_t) to exchange rate (us/pl_t) in Poland at the higher fluctuation frequencies, which last less than a year[1] - see Fig 2. Granger causality test statistics confirms also that there exist the significant relationship between Brent oil prices (b_t) natural gas prices (gas_t) in whole frequency range (Table 4). But, causality in time domain, running from Brent oil prices to natural gas prices was not confirmed, which means that transmission of oil price shocks to natural gas prices occur on lower frequencies. Granger causality analysis for time and frequency domain allows to identify specific relations between variable.

Based on results we can conclude that oil prices can predict production and inflation at different frequencies (larger than 2, 3-6, 8-12 years), but there is no strong evidence to support the hypothesis about predictive power of natural gas prices for Poland's economic activity.

[1] Available in unreported results.

Conclusions

In this paper, the relationship between oil prices, natural gas prices and economic activity in Poland was studied with a special interest in Granger causality analysis in time and frequency domain. First, the Johansen procedure provided evidence that industrial production, consumer price index, stock market index, exchange rate, Brent oil prices and natural gas prices in Poland are cointegrated. Second, based on VEC model, standard Granger causality tests were able to confirm the long-run and short-run relationship between industrial production and oil prices, stock market and exchange rate. Also, there is short-run causality evidence running from oil prices to stock market index and inflation.

Therefore, the evidence on causality in frequency domain suggest, that oil prices play an important role in driving the economic growth, not only in terms of high frequency fluctuations but also in terms of medium and low frequency fluctuations, which corresponds to slow dynamics in business cycle. Most of all, the results of causality in frequency domain show that, both industrial production and inflation in Polish economy are driven by changes in oil prices, not only in short run fluctuation but also in longer cycle, like 3-6 years, 8-12 years and long cycle (24 years). That means, the changes in oil prices can help to predict changes in polish business cycle. Also, the result of frequency domain study adds a new dimension to the literature on the relationship between crude oil prices and economic growth by focusing upon the time-frequency varying business cycle fluctuations.

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Incentivizing Accessibility Evaluation and Its Role in Understanding Process of Overcoming Barriers

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Abstract

Despite the universally recognized dogma of accessibility and recognition for universal design, on the one hand, there is still a problem of maladjustment of environment for the needs of people with disabilities. This situations happens even in the cases of newly constructed facilities, the small effects of the changes improving accessibility. As a result of the introduced changes should be understood the use of technical facilities by evenly represented groups of people with disabilities. These imperfections of the idea of accessibility and universal design cause a kind of feedback, because the often-occurring lack of clear effects of introduced technical changes in the field of accessibility demotivates their unconditional implementation. The article compares the accessibility requirements, and based on the analysis of the methodology of conducting accessibility audits, the idea of a barrier overcoming model in terms of Incentivizing accessibility is presented. The methodology of audits has been described, which starts with method of assessing accessibility, which consists in identifying barriers by checklists, and then in accordance with the triangulation principle covering environmental check-up with use of representatives of individual user groups. Identified accessibility of limitations (in case of inability to eliminate them) are evaluated in terms of the difficulties that make users and assessed the level of motivation needed to overcome them.

Keywords: Diversity Management, Ergonomics, Accessibility, Checklist, Observation.

Introduction

Accessibility of environment and both physical and digital infrastructure for persons with disabilities (PWDs) is one of the popular issue since at least two last decades. Even though since many years different organizations attempt to make their infrastructure more accessible in context of non-standard users, only since few years organizations are obliged to provide the access for PWDs by international and national regulations. Among them, the most important is Convention on the Rights of Persons with Disabilities (CRPD), ratified in Poland in 2012 (CRPD, 2006). According to Article 9 CRPD, "to enable persons with disabilities to live independently and participate fully in all aspects of life, States Parties shall take appropriate measures to ensure to persons with disabilities access, on an equal basis with others, to the physical environment, to transportation, to information and communications, including information and communications technologies and systems". In the digital area, accessibility assessment is already routinized and evaluation procedures are automated within many programs like Pathfinder. However, for the physical environment accessibility, no uniformed standard are applied, even though some trials were already made, like European Commission M/420 Standardisation mandate to CEN, CENELEC and ETSI in support of European accessibility requirements for public procurement in the built environment (EU, 2007). Different methods of accessibility assessment

function parallel, and their effectiveness is not controlled, however some trials are already made (Jeamwatthanachai, Wald and Wills, 2019). Moreover, the accessibility declared by organizations turns out to be insufficient factor in accessing the labor market for PWDs. According to WHO estimation, about 15% of the world's population lives with some form of disability (WHO 2011). At the same time, the discrepancy in employment rate between people with and without disabilities is still high (WHO, 2011). In Poland in 2018 the employment rate of PWDs at working age was 26,2%, while the general rate was 77,4%. The similar tendency (about three times lower employment rate among PWDs) is observed over the course of last years (GUS, 2019).

Research Method and Objects

The Assessed Objects

The research covered two public buildings possessed by Wroclaw University of Science and Technology (Sobiegraj, 2018; Księżak, 2020). While one of the investigated object (building A) was designed according to accessibility requirements obligatory in contemporary Polish law, another one (building B) is over 100 years old after a large renovation made few years ago. However one of the renovation aims was increasing the accessibility level of the historic building a.o. by adding the elevator, the level of accessibility of both objects was on the quite different level.

Checklist Assessment

The first way in accessibility assessment for both buildings was checklist application. As the evaluation tool, checklists are designed for relatively quick assessment of the level of fulfilling the requirements or recommendations by the evaluated object (Martz, 2010). Their main function is preventing and detection of errors (Hales and Pronovost, 2006). However they are most often applied for medical issues to help in memorizing about single steps in diagnostics and treatment (Gavande, 2009), they are widely used in different areas. For example, in ergonomics they are very popular for rapid and rough assessment of different aspects of work-human relations (Kogi, 2001). Some popular checklists are: Position Analysis Questionnaire (PAQ) focused on the body position at work (McCormick, 1979), so-called Dortmund Checklist or Ergonomic System Analysis Checklist (ESAC) covering different environmental and workload factors (Burger and Boer, 1968) or the Rapid Office Strain Assessment (ROSA) for quickly quantifying the risks associated with computer work (Sonne et al., 2012).

For the accessibility assessment, few checklists are available in Poland (Kowalska-Styczeń and Bartnicka, 2011; Kowalski, 2016; Bartuzi, Bugajska et al., 2014). As all of them base on the same building code regulations as well as ISO 21542:2011 standard (ISO, 2011), they have some common elements. Moreover, they all are dedicated to use by non-professionals. Generally, checklist method is based on a diagnostic table, which includes requirements for different groups of users, including wide range of disabilities. The diagnosis is carried out by completing the table. Usually deviations from the recommendations are registered. In the diagnostic tables specific disabilities are listed for which the recommendations are necessary to be met that the building is perceived as an accessible Poland (Kowalska-Styczeń and Bartnicka, 2011). However, the presented checklists cover partially different issues and point to slightly different users' groups. While Kowalski indicates some recommendations for low height persons, Bartuzi, Bugajska et al. checklist distinguish good practices dedicated for users mental and intellectual disabilities and Kowalska-Styczeń and Bartnicka show some requirements for users with cultural maladjustment. As all the presented checklists are detailed, for the purpose of rough assessment the investigated public buildings some elements regarding only their public functions where chosen. The final checklist counts about 60 elements.

As a second step of the analysis two different methods were selected. The methods' choice was the consequence of the errors found by the checklist analysis.

Observation

Non-intrusive observation is a popular tool in social sciences, including sociology, ethnography, and management (Silverman, 2007). This method assumes the investigator (even though he/she gave some tasks the participant to made) is only the observer and does not interference either with the observed subject or with the investigated object. The researcher is therefore just a witness of the subject behavior, however the subject is aware of being observed and is obliged to give active consent to participate in the study. According to the method assumptions, the observation results can be generalized for all the users (Flick, 2008). Observation can be provided in a passive or an active form. In an active form, the investigator gives subjects some tasks i.e. finding the way to a chosen object, while in a passive form the unprompted subject's actions are watched. Therefore, the active form is simultaneously organized in the form of task analysis. For the accessibility evaluation the active observation form was chosen. The subjects were asking for finding their way to four targets localized in the investigated building. These were: 1. The cloakroom, 2. the lift, 3. main lecture hall, and 4. the library. All the targets act as public places and have unlimited access for everybody. The order of finding targets was not prompted. The paths of the subjects as well as time needed for each task were registered.

Audit

In case of accessibility issues, the audit is a specific kind of observation made usually by a specific users (Nijs and Heylighen, 2015; Ferreira et al., 2012). For example, to access the accessibility level for PWDs, auditors are recruited among persons with different kinds of disabilities. Auditors analyze the accessibility of the object during the site visit. Additionally they can inspect some documentation, e.g. architectural plans (Kowalska-Styczeń and Bartnicka, 2011). In comparison to observation method, audit often gives more detailed and numerous information about possible errors of the investigated object. However, due to the difficult access to the auditors, the audit is usually limited to few subjects. This causes a risk of taking into account needs and requirements the very specific group of users instead of each possible user. Moreover, because of the wide variety of abilities of PWDs, even if they have the same kind of impairment, the recommendations are often unique and nonuniversal (Kroemer, 2006 p. 77).For the accessibility evaluation, the only instruction given by the investigator to the auditor was to find the way to the café localized in the building.

Participants of Observation

The participants of the observation study were 10 students aged 22-25, most female. Seven of them studied at the university, which owned the investigated building and therefore visited the building at least once. Neither of participants had physical impairment. Four participants had vision defect corrected by glasses or contact lenses. Participants were characterized in Table 1.

Table 1: Participants of the observation

No	Gender	Age	Vision defect	Building acquaintance
1	female	22	no	yes
2	male	24	yes	yes
3	female	23	no	no
4	male	25	yes	no
5	female	23	no	yes
6	male	24	yes	yes
7	female	24	no	yes
8	female	22	yes	yes
9	female	22	no	no
10	male	22	no	yes

The Auditor

The auditor was a male, aged 26. He was chosen because of his impairment. As a blind person, he uses a white cane as an assistive. Due to the kind of disability of the auditor, during the audit the investigator act additionally as a safety keeper.

Research Results

Checklist Analysis

For both investigated building, the checklist fulfilling allowed to detect over 10 errors for each analyzed object. However, for the new building A the errors were much easier to correct. Some of the problems found for the historic building B were difficult to solve and expensive i.e. incorrect layout of stair case. In the building A most of the found problems regarded people with visual impairment. In the old one (building B), some problems were assessed as unsolvable due to costs or historical character of building. However, navigation issues were found as the most troublesome for users, even the body-abled ones. As the main reason, the complicated plan of the building B was stated. These conclusions lead to the selection of next accessibility assessment method: the audit given by a blind user for building A, and the observation of building real users for building B.

Observation Results

Time needed for each subject and task is shown in Table 2. For comparison, the reference time of the person who knows the building is presented. It can be noticed that the average time of subjects is over two times longer than reference time, however there was no relation between a subject and performance time. Two relatively easy tasks were task 1 and 3. The reason was easy noticeable, because in the building there are some signposts to the cloakroom and the main lecture hall, but not the either the lift or the library.

Table 2: Participants performance time (mm:ss)

No	1. Cloakroom	2. Lift	3. Main lecture hall	4. Library	Total time
1	00:36	02:14	00:45	03:00	06:35
2	00:40	01:30	00:35	06:20	09:05
3	00:55	02:55	00:26	05:46	10:02
4	01:04	01:40	00:30	04:23	07:37
5	00:35	00:55	00:35	06:43	08:48
6	00:40	00:42	00:30	07:13	09:05
7	00:44	01:54	00:25	03:24	06:27
8	00:32	06:20	00:40	05:37	13:19
9	01:30	01:50	02:10	06:10	11:40
10	00:57	02:01	00:38	05:32	09:08
Average time	00:57	02:32	00:51	05:25	09:05
Reference time	00:23	00:55	00:29	02:20	04:07

However, the performance time discrepancies for single subjects and tasks were much higher. The extreme case was Participant 8 in the task 2 (lift finding). Due to omitting the lift entrance, the subject was forced to make a full circle around the building, which took almost seven times longer than the

reference time. The full path is shown on Fig. 1. Therefore, the lack of appropriate markings resulted in the need to compensate for the extended search time.

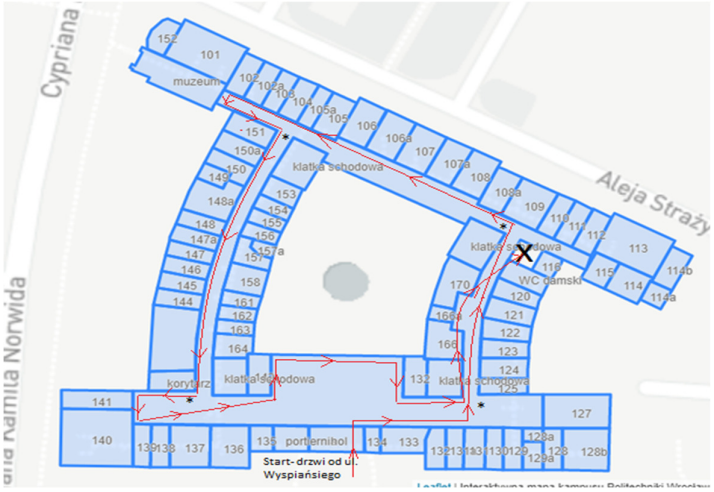

Fig. 1: The path of Participant 8 in the Task 2 (Lift). Source: (Księżak, 2020)

It is worth to notice that besides the performance of single users, observations results were supplemented with subjects' opinions and remarks. This set of information let to check and extend the list of accessibility departures.

Audit Results

The audit was performed in building A by the blind user. He finally checked two alternative ways to the pointed object (cafe) by using an elevator and stair case, respectively. In comparison to the checklist, the audit exposed much more accessibility departures. The found errors were not only important for users with visual impairment, but were decisive for general safety of building users (i.e. the door connecting the parking slot and the staircase opens in the direction of a staircase; if somebody is climbing the stairs there is a strong risk of hit). Additionally, the audit confirmed the results obtained by the checklist. The auditor noticed almost all departures detected by the checklist.

Incentivizing Accessibility

Architectural accessibility, or at least its declaration, turns out to be an insufficient factor in accessing public services and using them, especially by people with special needs. Very often the possibility of using a given solution is associated with a physical, psychological or social burden exceeding the individual user resource intended to overcome the obstacle (Fig. 2)

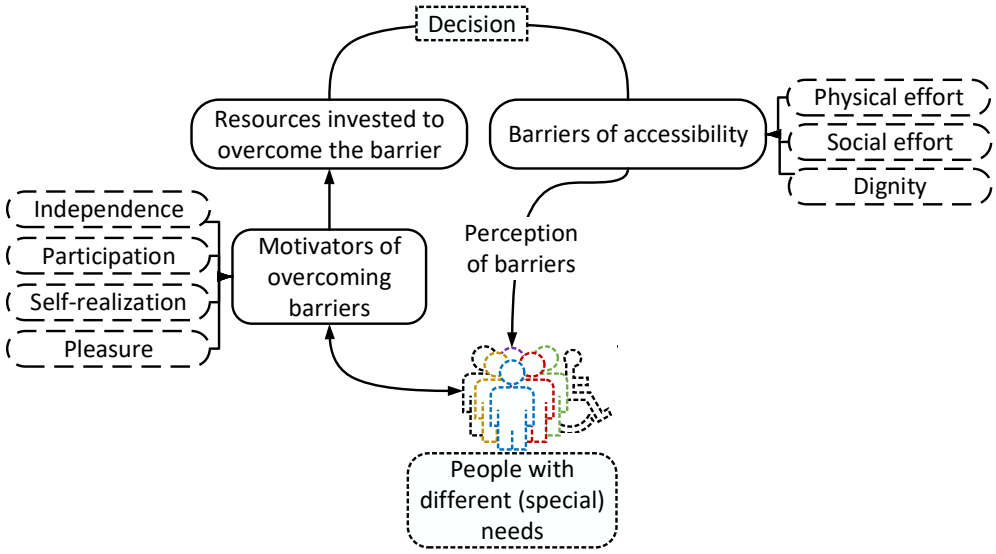

Fig. 2: Diagram of decision within accessibility problems. (own elaboration)

Solutions that support accessibility, if they have not been completely implemented in the spirit of universal design, require a cost. This cost has a physical dimension (force needed to complete the task, increased path, physical coordination), as well as mental and social (even exposure to unwanted help). Comparison of the cost of overcoming the barrier with physical resources supported by a person's motivation leads to decisions regarding activity in a given dimension. Another proof of the need for an incentive quote is a number of approaches such as: Design-for-all, Barrier-free design, Transgenerational design, Accessible Design as well as Inclusive Design and User Sensitive Inclusive Design. They emphasize the need for greater empathy with the needs of users, and giving them satisfactory user experience (Butlewski, 2018). Accessibility alone, in terms of being able to overcome a specific barrier, is therefore not sufficient, as it does not guarantee compensation for barriers of accessibility.

Following an audit of accessibility, countermeasures have been considered for all identified non-conformities. Both proposed and existing solutions that do not completely eliminate barriers (and thus constitute a residual barrier) are assessed in terms of the user's motivation to use them. An example of this was marking the approach to the elevator, which it took a long time for a blind person to find. The examined user stopped searching for markings in the area of their occurrence. Compensating this barrier requires a lot of time. In the presented case, therefore, the demotivating factor will be the time fund of persons with disabilities. Due to the fact that the availability tests were conducted in a simulated manner, the difference between the reference time and the time actually spent by the person on the task did not give rise to the abandonment of the tasks performed. In fact, lengthening time would be impatient. Preventing this impatience would require shortening the search time or making it less annoying, e.g. by audible information indicating the distance to the markings and thus reducing the search duration.

Limitations

Due to the limited access to the auditors with special needs, the audit was conducted by a limited number of people with different disabilities. This can influence on the results. Nevertheless, the conducted research is contributing and the result is an analysis of the methodology of conduct in the field of accessibility audit.

Conclusions

The set of methods used for accessibility assessment, i.e. the combined use of checklist, observation and audit, gave the effect of triangulation (Flick, 2009; ISO 16710; Butlewski et al, 2019). The conclusions obtained by the checklist were confirmed and extended by the applied observational techniques. Considering the general trends of the European Union in the field of non-discriminatory activities the methods evaluating accessibility are a contribution to supporting and creating non-discriminatory solutions, which are important in decreasing the gap between PWDs and able-bodied in context of their social and professional life. However, despite the spread of awareness of the needs of different levels of fitness, we are still far from designing in line with the dogma Barrier Free Design. So, since we are not able to eliminate all barriers in designing, Designing for Dynamic Diversity is a better alternative (Gregor, Newell and Zajicek, 2002; Butlewski, 2019). An effective element of this approach can be Incentivizing accessibility, which can be a way to implement design for Designing for Dynamic Diversity.

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Intra-Organisational Relations and Employee Stress – Relationship Analysis Taking into Account Situation at Workplaces in Poland

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Abstract

The article discusses the relationship between intra-organisational relations and employee stress. The paper is theoretical and empirical. The empirical part was based on an analysis of research reports on employee stress and job satisfaction at workplaces in Poland. For the purposes of the study, the notions of *positive* and *negative intra-organisational relations* were conceptualised. While providing answers to the research questions posed, three dimensions of organisation functioning were distinguished in which the quality of interpersonal relations is important; moreover, consequences of the influence of positive and negative relations on these dimensions were identified. Empirical analysis enabled drawing conclusions on the importance and quality of interpersonal relations and their connection with employee stress at workplaces in Poland.

Keywords: Intra-Organisational Relations, Employee Stress, Job Satisfaction, Employee Engagement

Introduction

Nowadays, in the face of highly competitive markets and rapid pace of change, organisations – more than ever – need committed teams of employees. Despite constant technological progress, man always stands at the centre of change and is the major factor influencing the success of any projects undertaken. The level of involvement of employees and their effectiveness are to a large extent determined by the quality of relations within the employee team, which is at present marked by the phenomenon of stress at the workplace. The article considers the relationship between intra-organisational relations and employee stress. The following research questions were posed:

1. What is the importance of interpersonal relations at the workplace?
2. What is the relationship between interpersonal relations at the workplace and employee stress?
3. What is the importance and quality of intra-organisational relations and their connection with employee stress at workplaces in Poland?

The structure of the paper was subordinated to accomplishment of its objective; theoretical and empirical character of the study was applied. The first, theoretical part of the article discusses the phenomenon of employee stress in the light of interpersonal relations at the workplace. In the second, empirical part of the study, conclusions were drawn about the "interpersonal relations – employee stress" relationship based on reports from research on employee stress and job satisfaction at workplaces in Poland. The summary presents conclusions from the considerations undertaken. In the study author uses interchangeable terms: *interpersonal relations at the workplace* (*in the organisation*) and *intra-organisational relations*.

Employee stress in the light of interpersonal relations at the workplace

Stress is defined as a negative mental condition with cognitive and emotional components (Cox, Griffiths and Rial-Gonzales, 2006). This phenomenon can be viewed in two dimensions: as an interaction – from the perspective of structural characteristics of the interaction between a person and their environment, or as a transaction – from the perspective of cognitive processes and emotional reactions that determine the relationship between the person and their environment (Tabanelli et al., 2008). In the cognitive-transactional perspective, stress is the result of mutual influences between a person and their environment, assessed by the person as burdening or exceeding their resources and threatening their well-being (Lazarus and Folkman, 1984). Similarly, the World Health Organization defines occupational stress as a reaction of the human body that occurs when it experiences work-related requirements and pressures that are not adapted to its knowledge and skills and are challenging for its ability to cope with them (WHO, 2003). Reaction to a stressful situation depends on cognitive assessment and the meaning associated with stress, individual behaviour and the ability to build relationships with others (Terelak, 1999).

Interpersonal relationships in an organisation are composed of a set of mutual relations – both formal and informal – between employees at different levels of the organisational structure, including behaviours, norms of behaviour, the way of relating to others determined by mutual work-related relationships, tasks performed and the scope of care expressed for the welfare of the organisation and its employees (Jakimiuk, 2016). Interpersonal relations in an organisation can be described from an individual and organisational point of view. The individual perspective refers to individual evaluations of such relations by employees, usually by means of a survey questionnaire form. Aggregation of individual points of view allows obtaining an average evaluation of relations in a given organisation. An alternative to this assessment is approaching relationships on the organisational level, by examining strategies and procedures affecting employees, which complements analysed employee experiences (Stoetzer, 2010). In this study – both in its theoretical and empirical part – an individual perspective was adopted for assessment of intra-organisational relations, referring to the results and relationships established on the basis of presented secondary data from employee surveys.

The results of research on intra-organisational relations confirm the relationship between the quality of those relations and the well-being of employees at the workplace, their involvement and the organisation's performance. It has been demonstrated that friendly attitude of co-workers reduces occupational stress, improves communication, helps to do the job, facilitates the achievement of goals and promotes acceptance of the process of organisational change (Berman, West and Richter, 2002). A good relationship with and support from the superior is perceived by the employee as a form of organisational support that becomes a mediator of interest in and identification with the job (*job involvement*), organisational commitment (*affective commitment*), reduces employee stress, reduces withdrawal behaviours (absenteeism, sluggishness), influences the decision to stay in the organisation and increases employee productivity (Rhoades and Eisenberger, 2002). Superior support results in better performance of employees' work related tasks, giving them a positive mood, increasing internal motivation, self-confidence and the added value of their efforts (Adil and Awais, 2016). The support of superiors and co-workers mitigates the negative impact of professional requirements on the employee's well-being (Lilius et al., 2008). In the "occupational stressor-tension" relationship, social support reduces the level of tension, mitigates the perception of stressors and becomes a moderator of this relationship (Viswesvaran, Sanchez and Fisher, 1999). The considerations performed so far provide an opportunity to define the concept of *positive intra-organisational relations* – in this paper, these are assumed to be the relations that act as protection and social support. They are a resource for coping with everyday requirements and commitment to work (Baker, Demerouti and Verbeke, 2004), they are a source of motivation to work and generate employee welfare and, moreover, have a positive effect on the way employees react to other stressors (psychosocial factors) – requirements and problems that arise in the organisation.

As well as recognising many positive effects of good interpersonal relationships at the workplace, the literature also draws attention to the fact that intra-organisational social relationships may become a

source of destructive stress (Nekoranec and Kmosena, 2015). In this negative aspect, interpersonal relationships fit into the concept of "psychosocial threats", defined as those aspects of the design and management of the work process and their socio-organisational context that have the potential to cause psychological or physical harm (Cox and Griffiths, 2005). Psychosocial threats have now become one of the key challenges for the human resources management practice and maintaining satisfactory organisational effectiveness (Matuska, 2017). The following factors have been included in the group of these threats: work content, pace and workload, work schedule, work control, physical work environment and its equipment, culture and organisational function, role in the organisation, career progression, work-home relationship, as well as interpersonal relations at the workplace, which have been given special attention in this study. Interpersonal relationships generating employee stress are attributed to such phenomena as social or physical isolation of a person at work, bad relations with superiors, interpersonal conflicts, lack of social support, intimidation, harassment (Leka, Griffiths and Cox, 2003). The phenomena mentioned above create an image of *negative intra-organisational relations*, which in this study are defined – by way of analogy to the previously adopted definition of positive relations – as relations that do not provide a sense of security and social support.

Contemporary acceleration of the pace of life, including professional life, subjected to constant time pressure, multitasking, the need to learn new things to maintain one's *status quo* (Rosa, 2013) is not without impact on human functioning at the workplace, constituting a "fertile ground" for emergence and growth of employee stress. However, it is not only the organisational culture, procedures and processes, but also the individual characteristics of employees and their perception of the surrounding environment that determine ways of dealing with these challenges. Such personality traits as aggressiveness and excessive emotionality generate tension in relations which results in the withdrawal attitude of some, while provoking others, which encourages intensification of destructive conflicts at the workplace (Stoetzer, 2010). Social support at the workplace also proves useful in the reduction of employee stress resulting from such "difficult" relationships. However, this issue has not been the subject of detailed research by the author.

Studies presented in the literature show that low levels of social support at the workplace are accompanied by high levels of anxiety, emotional exhaustion and work-related tension, as well as low job satisfaction and increased risk of many different diseases, including cardiovascular diseases, deterioration of the immune system, or they may lead to absenteeism from work due to mental illness (Davidson and Cooper, 1981; Warr, 1992; Stansfeld et al., 1997; Sime, 1997; after: Orlak, Gołuch and Chmielewski, 2014). Lack of trust among co-workers is accompanied by lack of communication, a high degree of ambiguity in the professional role, low job satisfaction and low mental well-being (Cooper and Cartwright, 1994). Bad interpersonal relations result in lack of cooperation, employees limiting themselves to fulfilling formal duties only, reluctance to help each other, share knowledge and information, lack of trust, increased frequency and intensity of conflicts at the workplace, greater propensity for counterproductive behaviours (such as theft) and destructive rivalry among employees, also increasing the likelihood of looking for another job by current employees (Szostek and Glińska-Neweś, 2017). Low level of support received from co-workers supports unfavourable psychosocial working conditions or reinforces the negative effect of psychosocial threats (Cohen and Willis, 1985). It is also important for workers how they are treated by their superiors and colleagues. The way they are treated, combined with the degree of kindness and attention among them, is perceived by the employee as an image of relational justice. Low level of relative justice is associated with negative health consequences for employees, often resulting in sick leaves (Stoetzer, 2010). Social or physical isolation at the workplace, which involves excluding a person from access to important information, from participation in meetings, social gatherings or even intimidation, harassment and mobbing, also has an adverse effect on the health and well-being of targets of this type of behaviour, on their productivity, involvement in work, but also creates an unfriendly working atmosphere, worsens relations within the employee team, thus reinforcing the negative effect of social threats.

By analysing the impact of positive and negative intra-organisational relations on the functioning of an organisation, one can draw conclusions concerning the importance of interpersonal relations at the workplace: better quality relations are accompanied by organisational benefits, while negative relations – by a number of negative consequences. Table 1 distinguishes three dimensions of the organisation's

functioning, among which the quality of interpersonal relations is important, and identifies the consequences of positive and negative relations' influence on those dimensions.

Table 1: Consequences of positive and negative interpersonal relations at the workplace

No.	Impact of the relationship on:	Consequences	
		positive intra-organisational relation:	**negative intra-organisational relation**
1.	Work efficiency	- easier and better performance of work related tasks, achievement of goals and coping with the requirements of the job - increased interest in work and increased productivity of employees - increase in the added value of work undertaken by employees - improvement of intra-organisational communication	- decrease in the productivity of employees - increased ambiguity of the professional role - impediments to (or disappearance of) cooperation, reluctance to help one another - increase in the tendency towards destructive competition among employees - unwillingness to share knowledge and information, deterioration or lack of proper intra-organisational communication - increased frequency and intensity of conflicts
2.	Employee engagement	- increased identification with work (job involvement) - increased motivation and commitment to work - exceeding one's obligations - reduction of withdrawal behaviour (absenteeism, sluggishness), increased acceptance of organisational changes - greater organisational commitment (affective commitment), greater willingness to stay in the organisation	- limiting oneself to fulfilling formal duties, decrease in involvement in work - increase in counterproductive behaviour (e.g. theft) - increase in the likelihood of current employees looking for another job
3.	Employee well-being	- reduction of employee stress, reduction of mental tension, alleviation of perception of stressors (problems within the organisation)	- increase in the level of anxiety, emotional exhaustion and mental tension, low level of mental well-being

		- positive mood that increases inner motivation and self-confidence - better physical and mental health	- decrease in job satisfaction - increased risk of disease, including deterioration in mental health

Source: own study.

Stress and intra-organisational relations at workplaces in Poland

In the second part of the article, an empirical analysis based on secondary data from research reports on workplaces in Poland was undertaken to answer the question concerning the importance, quality of intra-organisational relations and their relation to employee stress. Selection of Polish workplaces as the research subject was caused by the fact that (as shown in Table 2) the scale and frequency of experiencing employee stress in Poland has increased in recent years and, compared to selected European countries, both the scale and frequency of stress were the highest in that country. In 2017, almost 1/3 of employees experienced it every day, with over 40% of employees experiencing stress once a week (The Workforce View in Europe, 2017, 2018).

Table 2: Stress at workplaces in Poland compared to selected European countries in 2016-2017

Year	Stress frequency	Percentage of employees experiencing stress in particular countries:							
		Poland	France	Germany	Italy	Netherlands	Spain	Switzerland	Great Britain
2016	Every day	**19**	30	25	21	33	34	30	22
	Once a week	**34**	29	27	35	33	35	31	33
	Once a month	**24**	24	27	25	22	18	24	28
	Never	**22**	17	20	18	12	10	15	17
2017	Every day	**27**	20	19	13	10	16	15	20
	Once a week	**43**	43	55	42	32	43	46	40
	Once a month	**22**	25	20	32	36	32	28	24
	Never	**7**	12	6	14	22	9	11	16

Source: The Workforce View in Europe, 2017, 2018 / ADP Poland; N(2016)=9920; N (2017)=9908.

The national survey "Safety at work in Poland 2019" (N=1517) demonstrated that the aspects describing interpersonal relationships at the workplace had, in the opinion of the respondents, a significant impact on their work efficiency (see Figure 1). Most of the respondents (53%) indicated the importance of work atmosphere for their effectiveness. Work atmosphere means subjectively felt organisational climate associated with established patterns of relations, so this factor was included into characteristics of the importance of relations for work efficiency. Stress was high in the results presented – it took the second position (49% of responses). According to the quoted report, 14% of respondents admitted to experience it practically all the time and that it was inscribed in what an employee does, 29% stated that they experienced stress from time to time in selected situations, 42% – often, in many situations, 13% – very rarely, in individual situations, while only 3% of employees considered that they practically never experienced stress and their work was not stressful. Of the total number of respondents experiencing stress at the workplace, 15% said it was positive – it motivated,

activated, in the opinion of 47% of respondents its impact was neutral (they treated it as a permanent element of their work), while 37% perceived stress as a negative, discouraging and crippling phenomenon. Among other factors describing intra-organisational relations, influencing the respondents' work efficiency, one third of employees in Poland also included relations between employees in the company and relations with the superior, 23% – mobbing, and 14% – discrimination (Bezpieczeństwo pracy w Polsce 2019 / Safety at work in Poland 2019, p. 22-24). The study shows that relational factors (marked in a darker colour on the chart) determined work efficiency to a greater extent than other psychosocial factors (such as the content of work – currently performed tasks, pace and workload – number of duties, overwork, fatigue, physical work environment – working conditions, culture and organisational function – structure, hierarchy in the company) and factors related to individual characteristics of the life situation of employees – health, diet, private problems (Figure 1).

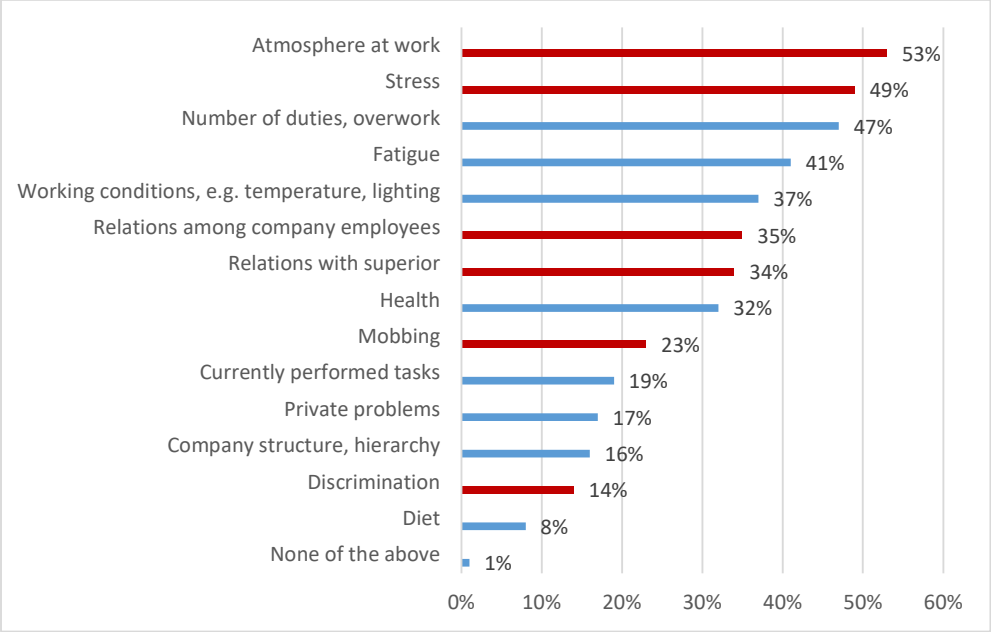

Figure 1: Factors influencing the efficiency of employees at workplaces in Poland in 2019*

** percentage of responses; N= 1517; respondents were asked to indicate factors that affected their work efficiency*

Source: Bezpieczeństwo pracy w Polsce 2019. Mobbing, depresja, stres w miejscu pracy, Koalicja „Bezpieczni w pracy" [Safety at work in Poland 2019. Mobbing, depression, stress at work, "Safe at work" Coalition], 2019, p. 22.

Further on in the analysis, answers were sought to the question concerning the relationship between interpersonal relations and employee stress at workplaces in Poland. According to the "Bezpieczeństwo pracy w Polsce 2019" ["Safety at work in Poland 2019"] report, factors causing the greatest stress to Polish workers included time pressure, overwork, insufficient wages and the sense of work related responsibility (about 1/3 responses for each of these factors). Relational factors turned out to be the determinant causing the greatest employee stress for a smaller percentage of respondents (20 - 25%), who pointed to such causes of stress as: criticism from the superior, general atmosphere at the workplace, relations with the superior, with other employees, criticism from other employees (see Figure 2). One can, therefore, conclude that although the role of intra-organisational relations in creating stressful situations was not marginal, they were not the dominant cause of employee stress in the opinions of respondents (see Figure 2). Pursuant to the analysed "Safety at work in Poland 2019" report, 71% of them could ask their co-workers for help, while 63% could ask their superior. A much

lower percentage of employees who experienced lack of support from their superiors or co-workers, mobbing, physical violence and discrimination was registered. 18% of employees repeatedly experienced inappropriate treatment by their superior. 14% of employees repeatedly experienced verbal violence. 14% of employees repeatedly experienced mobbing. Exclusion, rejection and reluctance on the part of other employees were repeatedly experienced by 10% of employees. Every tenth employee repeatedly experienced discrimination at the workplace. Physical violence was repeatedly used against 3% of employees (Bezpieczeństwo pracy w Polsce 2019 / Safety at work in Poland 2019, p. 29, 42). Having analysed the above data, it should be concluded that positive interpersonal relations prevailed at Polish workplaces.

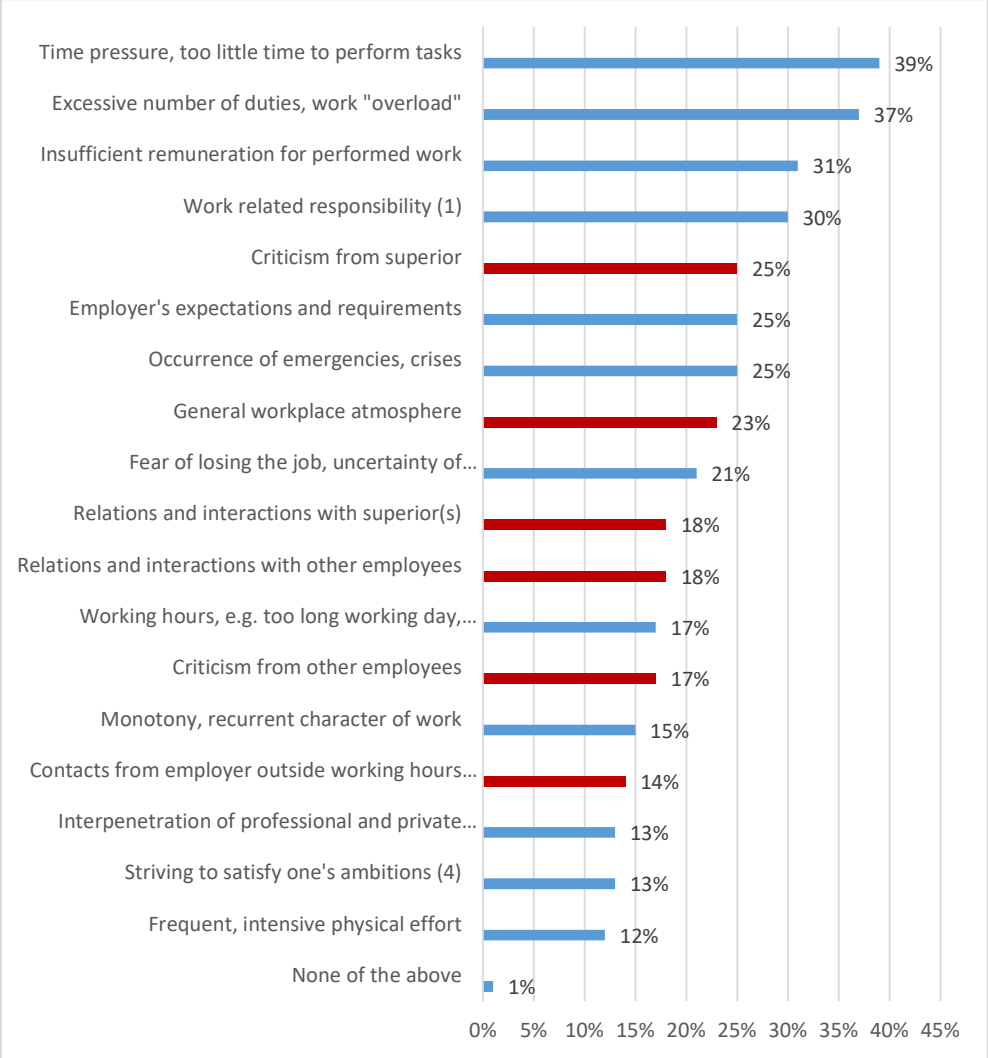

Figure 2: Factors causing greatest stress at workplace in Poland in 2019*

** percentage of responses; N= 1479; (1) - fear of causing damage, loss, harm; (2) - contacts from employer, superior outside working hours; (3) - interpenetration of professional life with private, family life; (4) - e.g. desire for promotion; the chart shows responses concerning interpersonal relations.*

Source: Bezpieczeństwo pracy w Polsce 2019 [Safety at work in Poland 2019], op.cit., 2019, p. 22.

Figure 3 shows that satisfaction with work in 2016-19, which remained at a relatively high level (about 70 percent of the total number of employees), increased slightly despite the aforementioned increase in the level and frequency of experiencing stress. This may have been due to the fact that positive interpersonal relationships prevailed at workplaces. The increase in employees' satisfaction with their work in the years 2010-2019 undoubtedly had its source also in consolidation of the employee market in many sectors of the Polish economy.

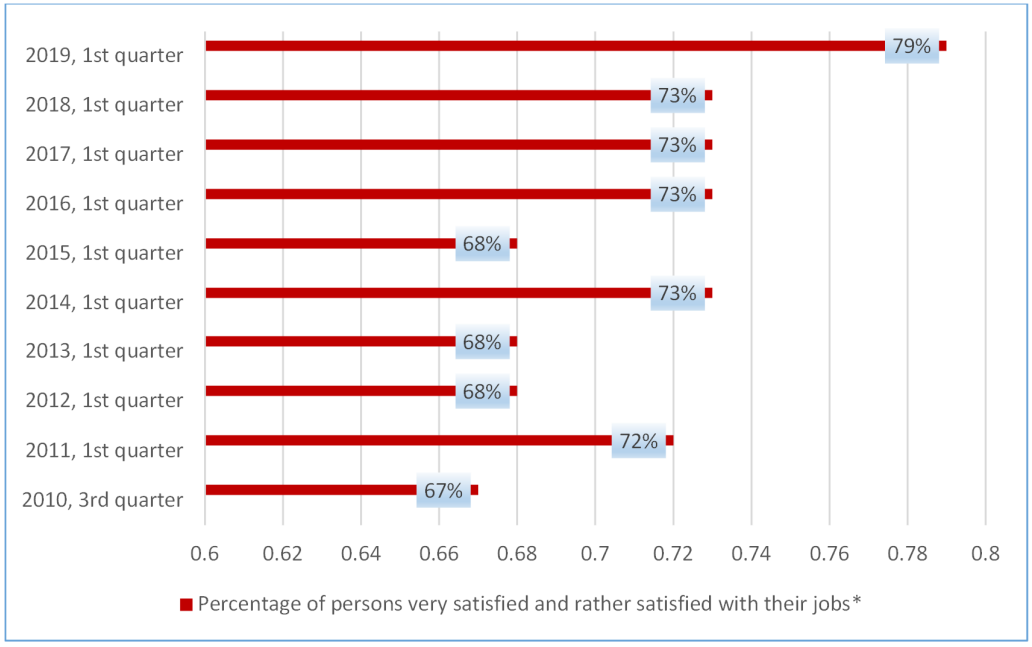

Figure 3: Satisfaction of Poles with their jobs in 2010-2019

** - survey sample N=1000; by 3rd quarter of 2017 – the rate of "very high" and "high" responses (concerning satisfaction level); since 4th quarter of 2017 – the rate of "very satisfied" and "rather satisfied" responses.*

Source: Monitor Rynku Pracy [Labour Market Monitor], 35th edition, Randstad, April 2019.

The Labour Market Monitor also shows that in 2019 as many as 84% of employees received both negative and positive feedback from their superiors, with the vast majority of them showing a positive reception of the feedback: 73% of employees, thanks to the feedback received from their superiors, felt motivated to continue working, while 69% of them noticed that this information influenced the quality of their work (Monitor Rynku Pracy [*Labour Market Monitor*], 2019). This proves good interpersonal communication within organisations in Poland. What is more, analysing results of the "Workforce View in Europe 2018" survey, it can be stated that – in the opinion of Polish workers – relations with co-workers to a much lesser extent (15% responses, similarly to the work-life balance) motivated Polish workers to engage in work than remuneration (53% responses) (The Workforce View in Europe 2018).

Summary

The objective of the study was to analyse the relationship between interpersonal relationships and stress at the workplace. The introduction formulated three research questions. The first one concerned the importance of interpersonal relationships at the workplace. To answer this question, the notions of *positive* and *negative intra-organisational relations* were conceptualised. Then, on the basis of a review of literature on the subject, three dimensions of functioning of the organisation (work efficiency, employee involvement, employee well-being) were identified, in which the quality of interpersonal

relations was important; moreover, consequences of the influence of positive and negative relations on these dimensions were identified. A regularity – positive relation – between the quality of interpersonal relations and functioning of the organisation was noticed: better relations are accompanied by benefits for the organisation in all three dimensions, while the deterioration of the relations results in negative consequences for functioning of the organisation in the identified dimensions (see Table 1).

Another research question concerned the relationship between intra-organisational relations and employee stress. Looking for an answer to this question, it was found on the basis of analysis of the literature presented in this study that there exists an inverse relationship between interpersonal relations at the workplace and employee stress, which means that positive relations with superiors and co-workers reduce stress at the workplace, while negative interpersonal relations in the organisation intensify it, also being a source of additional employee stress.

In order to answer the third research question concerning the significance and quality of intra-organisational relations and their relation to employee stress at workplaces in Poland, available secondary data from current research reports on employee stress and job satisfaction of Polish employees were analysed. The analysis allowed concluding that the aspects describing interpersonal relations at the workplace (in particular, work atmosphere or employee stress, but also relations between employees and relations with their superiors and – to a lesser extent – the fact of experiencing mobbing and discrimination) had, in the opinion of the respondents, significant impact on the efficiency of their work. Factors connected with relations determined work efficiency to a greater extent than other psychosocial factors or factors related to individual characteristics of the employees' life situation. It was also found that, although the role of intra-organisational relations in creating stress situations at workplaces in Poland was not marginal, they were not, in the opinion of the respondents, the dominant cause of employee stress. Still, the main stressors included time pressure, overwork, insufficient remuneration and the sense of professional responsibility. Among the factors connected with relations, criticism, especially from the superior, but also from co-workers, had significant impact on stress experienced by employees. This means that respondents paid attention to "relation fairness", expecting kindness and attention from colleagues, especially superiors. The relationship with the superior also gave rise to more stress than the relationship with colleagues. Positive intra-organisational relations in the form of support from superiors and co-workers as well as good communication between them motivated further work and made it easier for employees to cope with employee stress resulting from various reasons, which certainly contributed to an increase in involvement and high level of employees' satisfaction. In 2016-2019, satisfaction with the work performed even increased slightly, despite the recorded increase in the scale and frequency of experiencing stress. It is worth noting, however, that interpersonal relations at workplaces in Poland had – in the opinions of the surveyed employees – less impact on work involvement than remuneration.

Analysis of data concerning the scale of destructive behaviours (such as inappropriate treatment by the superior, verbal violence, exclusion, rejection and reluctance on the part of other employees, mobbing, physical violence and discrimination) led to the conclusion that positive interpersonal relations strongly dominated at workplaces in Poland. Of course, this does not mean that negative intra-organisational relations that occur on a much smaller scale do not require strong management reactions.

According to the literature and available empirical data (which is also confirmed by the data presented in this study), stress at the workplace is a consequence of a complex set of determinants, including intra-organisational relations. The interaction between these relations and the stress in the workplace, which is the subject of this study, is therefore only a fragment of a complex phenomenon. It should also be noted that other – apart from interpersonal relations – psychosocial factors generate stress in employees, which may result in worsening of relations. The character of an employee's personality, their way of interpreting events in the surrounding environment and their personal ability to build relationships with others are not without significance for the stress reaction. These issues – only signalled in this paper – may contribute to further research on the phenomenon of stress at the workplace. Yet, the empirical analysis performed is limited as a result to reference to Polish conditions only. Extrapolation of the analysis onto other countries would reflect the impact of cultural differences

on the scale and intensity of perceived workplace stress. A comparative analysis could also be an interesting area for further research

In the dynamic environment of the organisation, relations should be subject to a continuous process of improvement and development which involves anticipating and exceeding the expectations of partners (Mlokosiewicz, 2016). The key partner of the organisation are its employees. The quality of interpersonal relations within the organisation should therefore be the constant subject of organisation's interest.

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The Hidden and Seen Crisis in The Healthcare System

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Currently, both doctors as well as people in general support reforms of the healthcare system. However, the main problem of the system remains insufficient allocation of financial resources. What causes patients to give bribes for treatment prescribed by the doctors, because wages are by far under the limit of the decent living, especially in underdeveloped countries like Moldova.

The given research is necessitated by the fact that, not all economic and financial crises are obvious, in other words there are hidden crisis that manifest into a longer period and they are not visible. The hidden crisis is a continuous process, which once manifested is very difficult to treat. It is caused by other crises such as the personnel crisis, the financial crisis, the economic crisis, the drug crisis, the crisis of the performing medical devices.

According to the author, a crisis of health or the crisis in the healthcare system is a difficult situation, the duration of which is complex, and it affects directly the population of a country. Crisis in healthcare system in general has a significant impact on the health of the community, leading to loss of human lives (suicide) and mainly on the economy of any country (high unemployment). All of these derives from diseases, industrial process or from the country's sensitive political system. The harshness of the crisis is often measured by the number of affected people, diseases or death of the pathogenic process that is on its base, or with other words the existence of financial shocks.

Multiple research in health domain, are addressing a series of issues in this system, but remains uncovered the hidden crisis from this system, even though this crisis is manifesting, and we can say that already quite severe, however it's not brought to daylight or even more researched. That is why the given subject is actual and is extremely important through the angle of the hidden crisis from the health system from all the levels.

The current massive migration of doctors and medical stuff (nurses, midwives, etc.) in the healthcare system in Moldova, generates hidden crisis that nobody sees, doesn't study it, but it feels directly, as well on the patients as on the remaining staff in medical institutions. For example, the physicians who remained in the medical institutions have a higher volume of work, which is extremely overwhelming, and the impact is the malpractice. The massive migration of the employees from the health system is determined primarily by the low wages, the working conditions, the aging population, high level of the corruption, etc.

In conclusion, we can state that still exist financial hidden crisis in the system of healthcare, that we can to compare to a volcano, which boils inside the system, waiting for the right time to break out, having a negative impact and effect both on the population as well as on the economy of the country. It should be mentioned, that the elderly is the most exposed to the economic and financial crisis, because the risk of being fired is very high and that the chance of re-employment is very low, therefore their access to accessible healthcare is also limited.
Therefore, since the crisis is an ongoing process, a cycle, the end of a crisis, generates a new one.

Socio-Cultural Sphere as Environment for The Formation Of Human Capital: Russia Against the Backdrop of Global Trends

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Abstract

The relevance of the research is due to the increasing role of human capital in the formation and development of post-industrial society. Physical force was the leading factor of production in pre-industrial society, machinery dominated in industrial society, and human capital became a leading factor in post-industrial society. The social and cultural sphere is the environment for the formation of human capital. Its institutions generate human capital through training, medical care, and cultural development. Thus, the quality of human capital depends on the quality of services provided by social and cultural institutions. Human capital accounts for most of the national wealth of the developed world. In 2014 the share of human capital in the total national wealth of developed countries was 70-75%, while in Russia it was only 49%. In the 2016 HDI ranking, Russia was ranked 49th, and thus was in the group of the countries with a high level of HDI. The world rating of Russia's HDI is declining mainly due to the value of life expectancy. The gap between our country and the leader of the rating on this indicator was 12.3 years. The most important sphere of formation and realization of human capital is the social and cultural sphere. The narrow interpretation of the socio-cultural sphere includes health, education and culture. It is of great interest to assess the effectiveness of the national health system, education and culture and their impact on the quality of human capital.

Keywords: Socio-Cultural Sphere, Human Capital, Public Health, Education, Culture, Efficiency, Level of Expenditure.

Relevance and Statement of the Problem

According to economists, the history of mankind contains such stages as pre-industrial society, where agriculture dominated, and industrial society, where industry played a leading role. They note that many countries today have stepped far beyond the industrial society. The modern economic space is identified as post-industrial.

The formation of post-industrial society meant the transition from material factors of production to

spiritual and intellectual ones. Physical force was the leading factor of production in pre-industrial society, machinery dominated in industrial society, and human capital became the leading factor in post-industrial society. Today, the individual's knowledge and skills are the basis for the formation and development of post-industrial society.

The socio-cultural sphere is the environment for the formation of human capital. Its institutions generate human capital through training, medical care, and cultural development. Thus, the quality of human capital depends on the quality of services provided by social and cultural institutions. The developed socio-cultural sphere has a positive impact on the quality of human capital.

Research Result

In modern conditions, in any sphere of economic activity, human capital, its volume, quality and forms of use are the main factors of economic growth, competitiveness and efficiency. According to the World Bank, human capital accounts for a greater part of the national wealth of the developed world. Table 1 shows the dynamics of human capital per capita in countries in 1995-2014. Data on the volume of national wealth are given per capita. In low income countries, the share of human capital in their total national wealth in 1995-2014 was 34-41%, which is almost half of the amount in the OECD countries. In the reporting period, the share of human capital in the total national wealth of developed countries was 70-75%. Per capita, the total wealth was $169,349 in 2014, while in 1995 it was $130032. In 2014 the human capital amounted to $109424 per person, while in 1995 it was $89977.

Table 1 : Trends in Wealth Per Capita by Level of Development, 1995-2014 (The Changing Wealth of Nations 2017, 2020)

	1995	2000	2005	2010	2014
World					
Total wealth	130,032	138,031	147,107	159,404	169,349
Human capital	89,977	97,445	98,923	103,211	109,424
Human capital as share of total, %	69	70	67	65	65
Low income					
Total wealth	11,601	10,435	10,240	11,802	13,629
Human capital	3,921	4,016	4,046	4,447	5,564
Human capital as share of total, %	34	38	40	38	41
Lower middle income					
Total wealth	17,718	16,745	19,426	23,675	25,948
Human capital	7,992	7,917	9,301	11,421	13,117
Human capital as share of total, %	45	47	48	48	51
Upper middle income					
Total wealth	52,135	58,652	68,118	95,607	11,445
Human capital	32,899	37,746	40,420	56,536	67,390
Human capital as share of total, %	63	64	59	59	59
High income: non-OECD					
Total wealth	165,884	165,561	199,485	245,513	264,998
Human capital	59,376	69,451	84,507	107,518	111,793
Human capital as share of total, %	36	42	42	44	42
High income: OECD					
Total wealth	551,184	617,801	655,228	674,542	709,916
Human capital	412,757	461,959	474,872	472,946	499,927
Human capital as share of total, %	75	75	72	70	70

It should be noted that with a population of 143.8 million people, the national wealth per capita in Russia was 188715 dollars. The human capital was $90,812 (or 49%), which corresponds to the group of low

income countries. For comparison, with a population of 318.9 million people, the volume of national wealth per capita in the United States is $983.280. At the same time, the human capital reaches $766470 (or 78%). In 2014 in China, with a population of 1.4 billion people, the volume of national wealth per capita was $ 108,172, and human capital – $63,369 (or 59%).

The change of the role of human capital, its transformation from an expenditure factor to the main productive and social factor of development, has led to the close interest of theorists and practitioners in the level of its development. The human Development Index (HDI), calculated by experts from the United Nations Development Programme (UNDP), is widely used for international comparisons of the state of human capital.

189 countries participated in the 2018 ranking. Table 2 shows the ranking of some countries in the world on the level of human development in 2018. According to the data presented, Norway ranks first in terms of the level of human capital development, and Niger ranks last. At the same time, the life expectancy in Norway is 82.3 years, GNI per capital is 68059, and in Niger the corresponding indicators are equal to 62 years and 912 dollars. Russia is ranked 49th, being included in the group of countries with a high level of HDI. The closest neighbors of our country in the rating are Argentina (48th place) and Belarus (50th place).

Table 2 : Human Development Index and its components 2018 (Human Development Report 2019, 2020)

HDI rank	Страна	Human Development Index (HDI)	Life expectancy at birth	Expected years of schooling	Mean years of schooling	Gross national income (GNI) per capita
VERY HIGH HUMAN DEVELOPMENT						
1	Norway	0,954	82,3	18,1	12,6	68059
2	Switzerland	0,946	83,6	16,2	13,4	59375
3	Ireland	0,942	82,1	18,8	12,5	56660
4	Germany	0,939	81,2	17,1	14,1	48948
5	Hong Kong, China (SAR)	0,939	84,7	16,5	12,0	60221
6	Australia	0,938	83,3	22,1	12,7	44097
7	Iceland	0,938	82,9	19,2	12,5	47566
7	Sweden	0,937	82,7	18,8	12,4	47965
9	Singapore	0,935	83,5	16,3	11,5	83793
10	Netherlands	0,933	82,1	18,0	12,2	50013
20	Austria	0,914	81,4	16,3	12,6	46231
30	Estonia	0,882	78,6	16,1	13,0	30379
40	Portugal	0,850	81,9	16,3	9,2	27935
49	Russian Federation	0,824	72,4	15,5	12,0	25036
50	Belarus	0,817	74,6	15,4	12,3	17039
50	Kazakhstan	0,817	73,2	15,3	11,8	22168
60	Bahamas	0,805	73,8	12,8	11,5	28395
HIGH HUMAN DEVELOPMENT						
70	Georgia	0,786	73,6	15,4	12,8	9570
79	Brazil	0,761	75,7	15,4	7,8	14068
79	Colombia	0,761	77,1	14,6	8,3	12896
89	Dominican Republic	0,745	73,9	14,1	7,9	15074
89	Saint Lucia	0,745	76,1	13,9	8,5	11528
110	Libya	0,708	72,7	12,8	7,6	11685

MEDIUM HUMAN DEVELOPMENT						
120	Iraq	0,689	70,5	11,1	7,3	15365
130	Namibia	0,645	63,4	12,6	6,9	9683
140	Lao People's Democratic Republic	0,604	67,6	11,1	5,2	6317
150	Cameroon	0,563	58,9	12,7	6,3	3291
150	Zimbabwe	0,563	61,2	10,5	8,3	2661
LOW HUMAN DEVELOPMENT						
159	Tanzania (United Republic of)	0,528	65,0	8,0	6,0	2805
159	Uganda	0,528	63,0	11,2	6,1	1752
170	Afghanistan	0,496	64,5	10,1	3,9	1746
180	Mozambique	0,446	60,2	9,7	3,5	1154
189	Niger	0,377	62,0	6,5	2,0	912

Table 3 shows the components of HDI values for Russia and some countries in 2018. According to the table data, we can conclude that the economic component does not always have a decisive impact on the value of the Human Development Index. The world HDI rating of Russia is declining mainly due to the value of life expectancy. The gap between our country and the leader of the rating on this indicator was 12.3 years.

Table 3: Human Development Index of Russia and some countries in 2018 (Human Development Report 2019, 2020)

HDI rank		**Life expectancy at birth**		**Expected years of schooling**		**Mean years of schooling**		**Gross national income (GNI) per capita**	
1	Norway (0,954)	1	Hong Kong, China (84,7)	1	Australia (22,1)	1	Germany (14,1)	1	Qatar (110489)
47	Oman (0,834)	106	Solomon Islands (72,8)	38	France (15,5)	31	Netherlands (12,2)	49	Latvia (26301)
48	Argentina (0,830)	107	Libya (72,7)	39	Seychelles (15,5)	32	Cyprus (12,1)	50	Seychelles (25077)
49	Russian Federation (0,824)	108	Russian Federation (72,4)	40	Russian Federation (15,5)	33	Russian Federation (12,0)	51	Russian Federation (25036)
50	Belarus (0,817)	109	Grenada (72,4)	41	Costa Rica (15,4)	34	Hong Kong, China (SAR) (12,0)	52	Greece (24909)
50	Kazakhstan (0,817)	110	Saint Vin-cent and the Grenadines (72,4)	42	Brazil (15,4)	35	Hungary (11,9)	53	Turkey (24905)
189	Niger (0,377)	189	Central Af-rican Repu-blic (52,8)	189	Eritrea (5,0)	189	Burkina Faso (1,6)	189	Burundi (660)

Human capital includes the accumulated stock of health, knowledge, skills, and experience that is expediently used for productive activities and increasing a person's income. In theory, there are different approaches to determining the types of human capital that distinguish between health capital, labor

capital, intellectual capital, organizational and entrepreneurial capital, and cultural and moral capital. However, most scientists identify such important components as education capital, health capital, and culture capital, which include a number of their constituent elements (Fig. 1). All these forms of capital can be converted into income in one way or another (Forrester, S.V., 2020).

The most important sphere of formation and realization of human capital is the social and cultural sphere. The socio-cultural sphere (SCS) is a dynamically developing area of the economy. The economic space of the socio-cultural sphere is a set of structural elements of industries and organizations that produce goods and services necessary to meet the socio-cultural needs of people. Performing various functions, SCS branches play an important role both in the life of an individual and in the life of society as a whole. According to most scientists, the socio-cultural sphere belongs to the tertiary sector of the economy – the service sector.

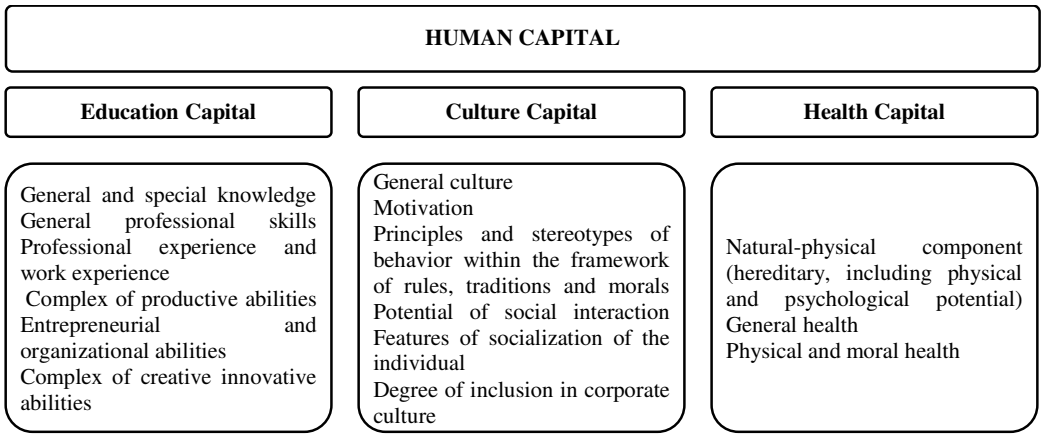

Figure 1: Components of human capital (Solovyeva, T.S., 2016)

Today, there is no consensus on the definition of the essence of the socio-cultural sphere, its structure, a set of criteria and classification features that make it possible to distinguish this industry from the national economy. According to a narrow interpretation, the socio-cultural sphere includes health, education and culture. Therefore, the socio-cultural sphere is the activity of people aimed at the production of educational, cultural and medical services to households (Karanets, S.M., 2004). According to a larger interpretation, the SCS includes science, social security and housing utilities, and a number of scientists think that physical culture, tourism, information technology and the media should also be included.

Economic literature offers several options for structuring the socio-cultural sphere (Fig. 2). These classifications allow us to interpret the socio-cultural sphere as a set of industries whose enterprises produce goods and services required to meet the socio-cultural needs of an individual. It should be noted that the dynamism of socio-cultural needs, due to the development of society, transforms the composition and structure of the SCS.

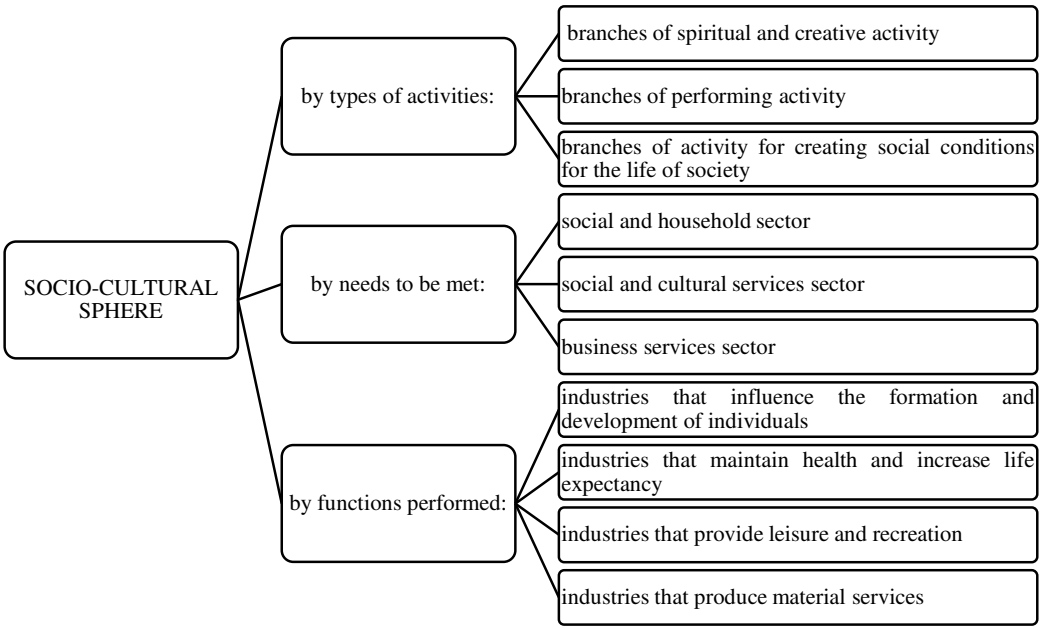

Figure 2: Structuring Options of Socio-cultural Sphere (Naumova, S.A., 2020)

It is obvious that all other types of human capital are based on health capital. Each person is born with a certain genetic set, has a certain level of physical strength, endurance, physical capacity and immunity to diseases. The capital of health is laid long before the birth of an individual and is formed throughout life. A high level of health capital increases individuals' productivity and increases their ability to work. The health of the nation and the reproduction of healthy generations of the population influence the number and quality of labor resources, the effectiveness of the work and, as a result, the pace of socio-economic development of the country.

The emergence of new medical technologies and medicines, caused by changes in the structure of morbidity and demographic problems, requires a constant increase in government expenditures on public health. Health expenditure is one of the main indicators that characterize the level of social development, since it reflects the degree of attention of the state and society to the health of citizens. The level of national expenditures on health is a relative indicator calculated as a total amount of public and private expenditures on health, expressed as a percentage of GDP. Figure 3 shows the top 10 countries in terms of public health costs in 2016. The main data source on government health expenditures is the database of the World Health Organization (WHO).

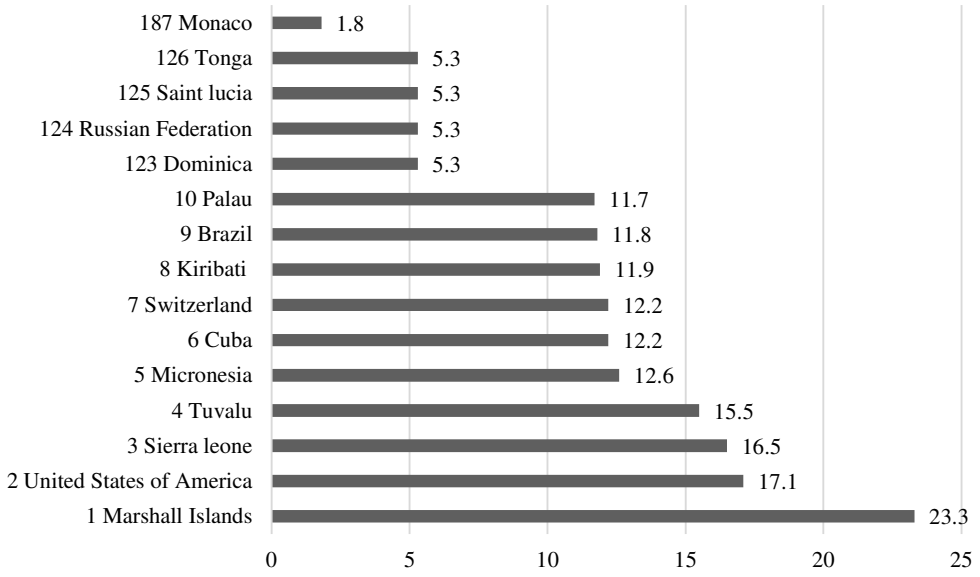

Figure 3: Top 10 countries in terms of health expenditures in 2016, %
(Global Health Expenditure Database, 2020)
(Global Spending on Health: A World in Transition 2019, 2020)

As follows from the data presented, the leader of the rating in 2016 was the Marshall Islands (23.3%), the outsider – Monaco (1.8%). There is a significant differentiation of countries by the level of public health expenditures. It should be noted that the World Health Organization recommends to spend at least 6-6.5% of GDP on public health (Kontsevaya, A.V., 2008). The level of Russian public health expenditures in 2016 was 5.3%, which is lower than the WHO recommended norm. In this indicator, the Russian Federation was ahead of China (5.0%), India (3.7%), Kazakhstan (3.5%), but behind Vietnam (5.7%), Niger (6.2%), Belarus (6.3%), Turkmenistan (6.6%), Georgia (8.4%), Honduras (8.4%), and Zimbabwe (9.4%).

Figure 4 offers the dynamics of expenditures of the consolidated budget of the Russian Federation and budgets of the state's extra-budgetary funds in 2006-2016. According to the data, the share of Russian budget expenditures on public health during the analyzed period did not exceed 3.7%. It should be noted that the share of domestic public expenditures on health in 2016 in the OECD countries was 10.1% (Health Nutrition and Population Statistics, 2020).

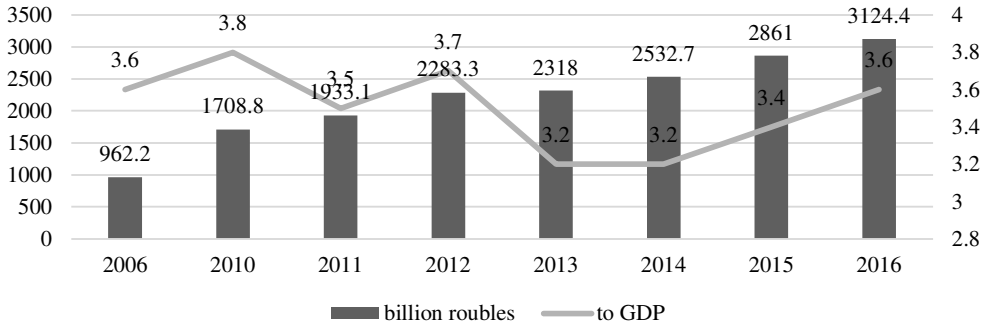

Figure 4: Dynamics of expenditures of the consolidated budget of the Russian Federation and budgets of the state's extra-budgetary funds for public health in 2006-2016
(Public Health in Russia. 2015: Statistics, 2020), (Public Health in Russia. 2019: Statistics, 2020)

The limited economic capacity of the health system requires increasing attention to the problem of the effectiveness of medical care. Figure 5 shows the top 10 countries in the world by the level of efficiency of the public health system. The rating was compiled by Bloomberg analysts based on data on average life expectancy at birth, government public health expenditures, and the cost of medical services per capita.

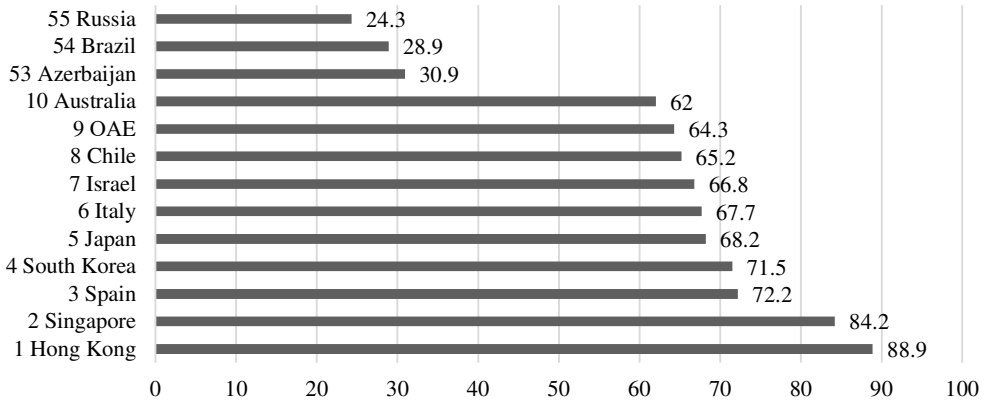

Figure 5 : Top 10 ranking of countries by the level of health system efficiency in 2016 (Miller, B.L. and Lu, W., 2020)

According to the data presented in the figure, the leader of the rating in 2016 was Hong Kong (88.9 points); the outsider was Russia (24.3 points). The Russian Federation was included in the rating for the first time in 2014 and took the last place at that time, gaining only 24.3 points. Two years later, the situation did not change. The last place is due to the low life expectancy of the population (70.37 years); the cost of medical services per capita ($ 893); the share of health expenditures (7.07% of GDP) (The Most Efficient Health Care 2016, 2020).

Education is another important component of human capital. It is a purposeful process of education and training that corresponds to the interests of the individual, society and the state, accompanied by the verification of the citizen's achievement of the educational levels established by the state (Prokopieva, A.V., Rybakov L.N. and Pchelkina, V.V., 2012). It should be noted that education indirectly contributes to the growth of human health capital and social well-being. Education contributes to the growth of the level of intelligence. It has been proven that each additional year of study increases IQ by 3-5 points. And alongside with the growth of intelligence the increase in life expectancy is recorded. People with an intelligence of 150 points have a 44% lower mortality rate than those with an IQ of 135 points (IQ Affects Life Expectancy, 2020).

The level of expenditures on education should also be considered as one of the main indicators that reflect the degree of attention of the state and society to the education of citizens. The source of data on the level of expenditures on education is the World Bank database – World Development Indicators. Figure 6 shows the top 10 countries in the world in terms of public expenditures on education in 2016.This indicator is a relative value expressed as a percentage of the country's gross domestic product.

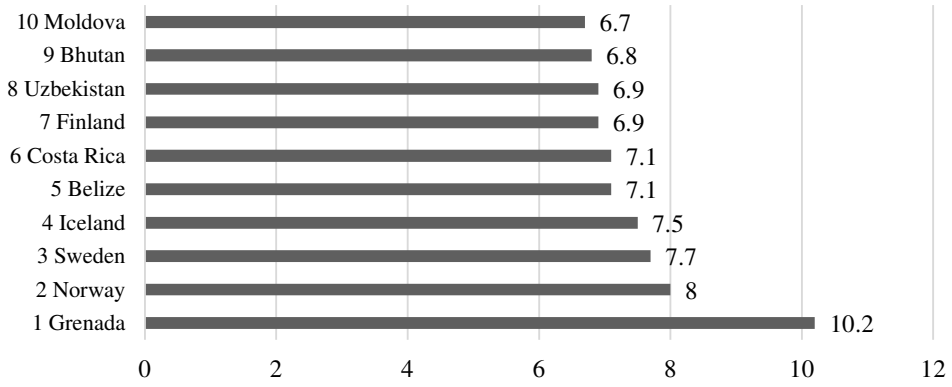

Figure 6: Top 10 countries in the world ranking in terms of the level of public expenditures on education in 2016, % (Education Statistics, 2020)

As follows from the data presented, there are three developed countries in the top five of the rating. It should be noted that the high level of public expenditures on education in some developing economies is due to the implementation of programs to eliminate mass illiteracy. The level of public expenditures on education in Russia in 2016 was 3.7%. In this regard, the Russian Federation follows general pattern: a relatively low level of economic development corresponds to a low level of public expenditures. In terms of public expenditures on education, Russia was behind Honduras (6.3%), Chile (5.4%), Ukraine (5.0%), and Belarus (4.9%) in 2016.

The dynamics of expenditures of the consolidated budget of the Russian Federation and budgets of the state's extra-budgetary funds in 2006-2016 is shown in figure 7. According to the data, the share of Russian budget expenditures on education during the analyzed period did not exceed 4.1%. It should be noted that the share of public expenditures on education in 2016 was 6.9% in Finland, 5.8% in Israel and 4.8% in Germany (Education Statistics, 2020).

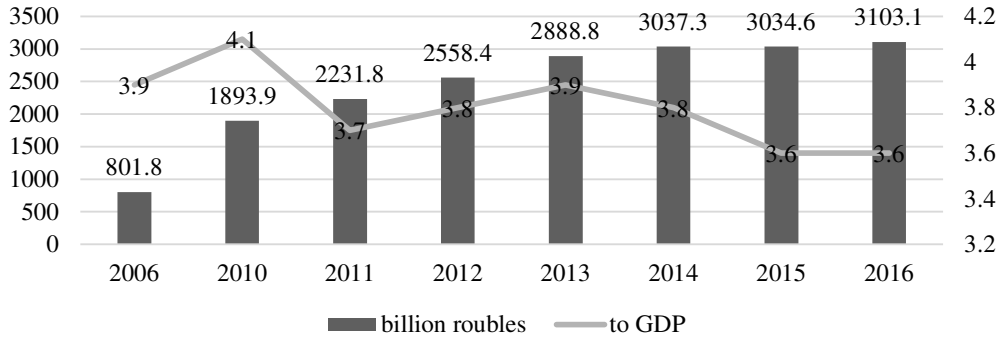

Figure 7: The dynamics of expenditures of the consolidated budget of the Russian Federation and budgets of the state's extra-budgetary

funds on education in 2006-2016 (Bondarenko, N.V., Gohberg, L.M. and Kovaleva, N.V., 2018)
The development of the education system is now a priority of domestic policy in many countries of the world. In this regard, much attention is paid to the effectiveness of national educational systems, which is reflected in the world rankings. Figure 8 shows the top 10 countries in terms of the effectiveness of national education systems in 2016. The first place in the 2016 ranking was taken by the United States (100), and the last place was taken by Indonesia (36.9). The effectiveness of the Russian educational system allowed our country to take the 34th place (49.1). In terms of the effectiveness of national educational systems, our country was behind Hong Kong (15th place), Taiwan (21st place), and Malaysia (27th place).

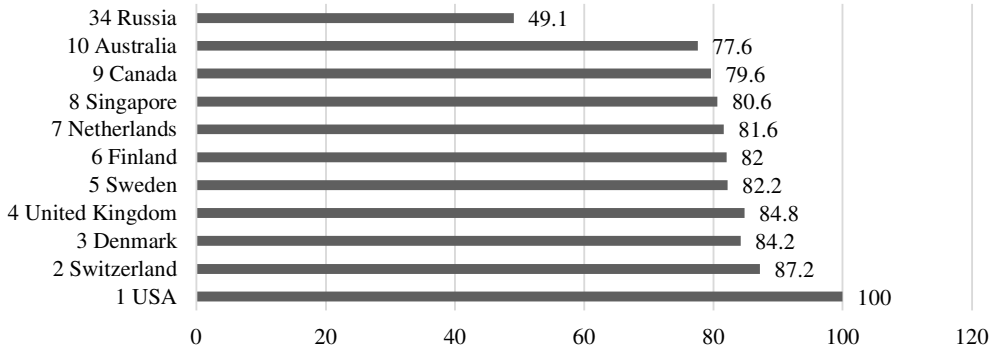

Figure 8 : Top 10 countries in terms of the effectiveness of national education systems in 2016 (Global Index of Cognitive Skills and Educational Attainment 2016) (Ranking of the World's Countries by the Level of Spending on Education, 2020)

The capital of culture acts as a factor of individuals' creative and intellectual potential, thus contributing to the growth of their productive forces. Cultural capital is a person's linguistic and cultural competence that legitimizes status and power and supports the established social order. There is enough research to suggest that people who engage in high-culture consumption are more successful in life than those who do not do it. Activities in the fields of culture are aimed at the comprehensive education of individuals and involve means that are perceived voluntarily, taking into account an individual's interests and free time.

The country's cultural attractiveness to the global community is reflected in the rating of national brands. The methodology of the global study of national brands developed by S. Anholt involves six evaluation parameters: export, management, culture, people, tourism, and migration. 2017 Anholt Nation Brands Index estimated national brands of 50 countries. The top five places in this ranking belong to Germany, France, Great Britain, Canada and Japan (National Brand Index 2017, 2020). In the Anholt Nation Brands Index Russia ranked 25th in 2014, 22nd in 2015, 22nd in 2016, 23rd in 2017.

Russia's positions on some components of the national brand are shown in figure 9. According to the data, in 2014-2017 our country had worst results in the parameter "power": the 43rd place in 2014, 42nd in 2015, 34th in 2016 and 28th in 2017. In 2017 the results remained below the average for the parameters such as "people" (32nd place), "investment and immigration" (28th place), "tourism" (24th place). Russia's best results in the "culture" parameter during 2014-2017 are due to high ratings from residents of foreign countries: in 2014 – 10th place, in 2015. – 8th place, in 2016 – 8th place, in 2017-9th place. Culture is still the mainstay of Russia's national brand: according to this indicator, the country takes the ninth place in the world ranking. Based on the "cultural heritage" criterion, the top five countries in the National Brand Index 2017 rating are France, the United States, Italy, Germany and Switzerland.

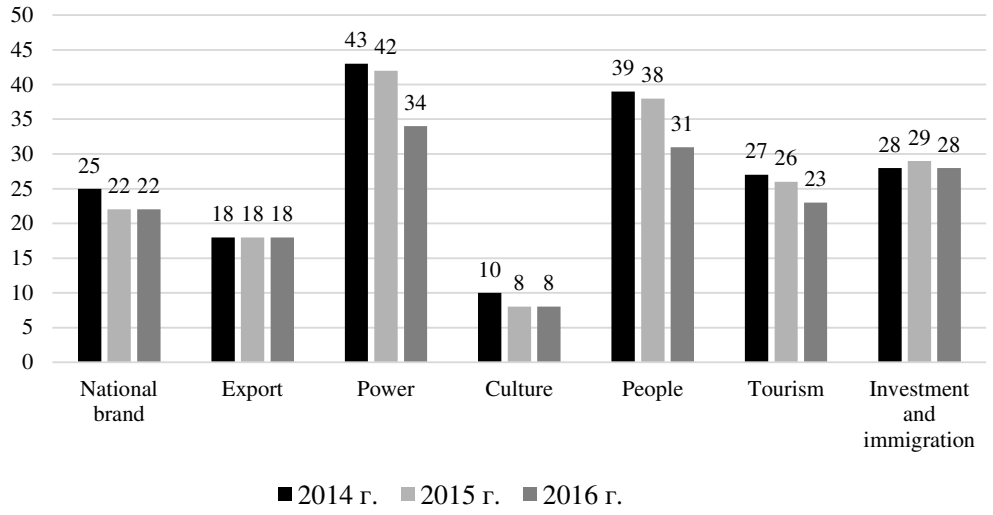

Figure 9: Russia's positions on some components of the national brand, Anholt Nation Brands Index 2014-2016 (National Brand Index 2017, 2020)

Conclusions and Proposals

The functioning of health care system, education, and culture should be aimed at creating a generation of healthy, educated, and cultured professionals. The coordinated development of these sectors of the socio-cultural sphere will ensure the modernization of the country's human capital, and therefore the entire economic system of Russia. For the Russian Federation today, the first priority task is to improve the quality of human capital on the basis of increasing the welfare of the people and ensuring high rates of social and economic development through it.

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Managing the City's Logistics Infrastructure in the Context of Challenges Emerging from the National Defense and Public Security Requirements

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Abstract

The contemporary cities of highly developed countries strive to improve their competitiveness and attractiveness, both on a regional and international scale. This is possible through measures to improve the quality of life QoL. A number of factors influence QoL in cities, predominantly effective logistics infrastructure management. For this reason increasing number of expectations and requirements are being placed on the city's logistics infrastructure. As a result, it becomes necessary to develop new methods of its organization and management, enabling the inclusion of all factors that have a significant impact on QoL in the process, especially increasingly important issues regarding the provision of the optimal level of public security and national defense within the available resources.The purpose of the article will, therefore, be to analyse and discuss the main problems and challenges associated with managing the city's logistics infrastructure emerging from the national defense and public security requirements.

Keywords: Public Security, Logistics Infrastructure

Introduction

Modern cities of highly developed countries strive to improve their competitiveness and attractiveness, both on a regional and international scale. This is possible through measures to improve the quality of life. A number of factors influence the quality of life in cities, including mainly effective logistics infrastructure management. Actions taken in cities are, or should be, implemented in accordance with the principles of building local and regional circular economies. In its communication, the European Commission noted that achieving a circular economy requires "a complete system change and innovation not only in technologies, but also in organization, society, financing methods and politics" (Communication). Therefore, more and more expectations and requirements are being placed on the city's logistics infrastructure. As a result, it becomes necessary to develop new methods of its organization and management, enabling the inclusion in this process of all factors that have a significant impact on the quality of life, including increasingly important issues regarding the provision of the optimal level of public security and national defense within the available resources. The aim of the article will be to analyse and discuss the main problems and challenges related to managing the city's Logistics infrastructure resulting from the need to ensure public security and national defense.

The Scope and Goals of Modern Urban Logistics

Urban logistics is commonly defined as a continuous and multi-faceted process of managing the flow of both goods, cash and information in order to develop the city. Activities undertaken as part of this process should be implemented in accordance with the principles of sustainable development and

assume that the city is a social organization aimed at securing the needs of its clients – the city's residents (Nowakowska-Grunt & Chłąd 2015). The aim of urban logistics understood in this way is optimal planning, management and control of all flows within the logistics network in the city area, as well as integration and coordination between the interested parties (Amaral & Aghezzaf 2015).

Representatives of the parties, which are an inseparable feature of reflections on the city's logistics, represent various, and often contradictory, goals and interests. In the most general division we can classify them according to the economic sectors they represent, i.e. as public and private stakeholders (Lindholm & Behrends 2012). Public stakeholders include municipal self-government and central authorities, while private stakeholders include freight forwarders, carriers and residents (Thompson 2014, Taniguchi 2014).

The main goal of public authorities at the local level is to create the best conditions for the city's development, while in the case of central authorities to minimize the negative external effects associated with the operation of urban logistics and maximize net economic benefits. Quite different goals are pursued by representatives of the private sector, in which (Russo & Comi 2010):

- forwarders, whose main subject of interest is the delivery and collection at the lowest cost of goods at the level meeting the needs of customers;
- carriers whose main purpose is to conduct cheaper but high-quality transport activities that meet the interests of senders and recipients;
- residents whose main goal is the free access to services and goods of the highest quality.

The process of the flow of goods, cash and information requires a variety of measures and techniques. These measures, ways of their use, as well as systems of their application create a kind of infrastructure of processes taking place in cities. In order for these processes to take place, it becomes necessary to equip cities with logistics infrastructure devices that are able to meet the needs of the production and non-production sphere, as well as the individual and collective needs of the population. Therefore, they cover, to a very wide extent, all transport and communication equipment and facilities, water and energy supply, as well as devices for shaping and protecting the natural environment. Based on this infrastructure, the following areas can be distinguished in which it is necessary to introduce new management principles in cities, including in the aspect of challenges arising from the need to ensure public security and national defense. These areas include:

- supplying the cities with basic utilities, in particular water, electricity, heat and gas;
- organization of urban and freight transport including storage processes;
- organization of a telecommunications network in the city;
- organization of the export and utilization of municipal and post-industrial waste and sewage;
- organization of transport connections with the logistics system of other regions.

When analysing the processes taking place in urban logistics, it should be borne in mind that there is a permanent mismatch in the speed of changes that occur in logistics networks and changes that take place in the cities themselves. As a rule, cities are changing slowly compared to the rapid pace of development of logistics systems. Urban logistics, by setting out new communication routes, logistics centres or networks of interconnections, sets the directions for the development of cities. For this reason, factors influencing the direction and nature of changes should be considered in a coherent manner, taking into account the challenges that the modern cities have to face.

Urban logistics is by definition an element of the state's economic policy, hence the long-tern intervention of the state is its permanent and inherent feature. This has a direct impact on the urban logistics model, where a system in which the public sector acts as the main shareholder and operator of the logistics infrastructure is preferred. Another variant, currently widespread, involves the cooperation of the public sector with the private sector and the involvement of the resources of private business entities in investment activities or related to logistics infrastructure service.

Due to the varied scope of activities that the public sector plays in the process of managing logistics infrastructure in cities, it is possible to classify forms of public intervention due to the degree to which cities express their pro-development activity (Noworól 2011):

- regulatory actions which may take the form of: controlling, defining strictly acceptable forms of economic and social activity; border delimitation, permitting socio-economic activity in specific ranges of values;
- activation measures, which may take the form of: animation of cross-sectoral cooperation, in particular the coordination of pro-development activities of economic and social organizations, own activity, using public resources: field, budget, information and organizational.

These forms of public intervention reflect, among others, attitudes of authorities, which can be reduced to management through administration or through active participation in development processes.

Priorities in Managing Logistics Infrastructure in Cities

The socio-economic and technological development taking place in the world leads to a situation in which communities, especially in highly developed countries, have ever higher expectations as to the conditions in which they operate. This raises a number of new challenges, especially for cities which role as economic, service, cultural or social centres is becoming more and more important. Urban centres are therefore facing increasing problems in urban planning, education, housing shortages, transport, economics, health care, ecology, crime, law and order, and immigration. In addition, there are new challenges related to the need to protect residents against terrorism, epidemiological threats or the effects of natural disasters. Cities are making increasing investment efforts in sustainable urban logistics initiatives, such as urban distribution centres, the development of ecological public transport, improving the quality of network services or reducing the nuisance and negative impact of logistics infrastructure on residents and their environment (Taniguchi & Thompson 2002).

Therefore, a key problem appears in the management of logistics infrastructure in cities, consisting in seeking the answer to the question – how with increasing public expenditure related to the need to provide increasingly costly public services to ensure the optimal level of security of their provision and functioning of the infrastructure.

The growing scale of problems causes a number of social tensions and requires a new definition of logistics infrastructure management capabilities in the field of ensuring public security and national defense. It should be clearly emphasized that safety is an element that directly affects the quality of life in cities. It is impossible to effectively develop modern cities without ensuring an adequate level of security. In this respect, the most important priorities in managing logistics infrastructure in cities are:

- expanding the logistics infrastructure in the field of transporting people and goods in a way that ensures maintaining continuity of supplies necessary for the city's functioning and supporting communication routes and connections with other regions;
- expansion of the public transport enabling cheap, safe and ecological transport within the city;
- development of innovative IT systems enabling the functioning of entities operating in the city and carrying out acceptable control of population movement, transport of goods, capital and information;
- building crisis management systems in emergency situations.

Increasing requirements of city dwellers – especially in terms of quality of life – predispose the aspect of sustainable development as decisive in managing the city's logistics infrastructure. Urban logistics is thus becoming both the goal and driving force for the transition to a circular economy. An example of the assessment of cities in terms of quality of life can be the methodology proposed by Eurostat, which has developed a framework for analysing quality of life using eight dimensions for EU Member States, including measuring overall satisfaction with living standards. These multidimensional analyses

can indicate how Europeans think about their daily lives and the cities in which they operate and what sense of security they have (Urban & 2016). The assessments of key factors that are the most important and least important in terms of quality of life in eight dimensions: education, medical services, social services, unemployment, housing, road infrastructure, public transport, air pollution, noise and public safety in the selected 79 EU cities were presented in Table 1.

Table 1: Items perceived as being most/least important for respondents in selected European cities. (% of respondents naming the issue as one of the three most important items for their city in 2015)

Most important issue	**Highest rating (%)**	**Second highest rating (%)**	**Third highest rating (%)**
Education and training	Oulu - 60	Wien and Belfast - 58	Aalborg, Hamburg and Zurich - 55
Health services	Budapest -67	Belfast and Reykjavik - 66	Białystok, Gdańsk and Warszawa - 63
Social services	Leipzig, Vilnius, Groningen - 31	Rostock, Riga and Budapest - 29	Dortmund and Zurich - 28
Unemployment	Napoli - 73	Ostrava - 71	Miskolc - 70
Housing	Stockholm - 61	München - 56	Geneva and Zurich - 51
Road infrastructure	Tallinn - 52	Iraklelo - 50	Praha - 49
Public transport	Helsinki - 49	Oslo - 45	Istanbul - 42
Air pollution	Ostrava - 76	Burgas - 62	Kraków - 60
Noise	Praha - 35	Valletta - 28	Burgas - 20
Urban safety	Marseille - 52	Liege - 47	Rotterdam - 44
Least important issue	**Third lowest rating (%)**	**Second lowest rating (%)**	**Lowest rating (5)**
Education and training	Praha - 13	Miskolc - 11	Ostrava - 4
Health services	München - 21	Praha - 17	Ostrava - 7
Social services	Bruxelles and Napoli - 12	Paris, Malmo and Istanbul - 11	Kraków - 10
Unemployment	Reykjavik - 15	München - 14	Valletta - 5
Housing	Sofia and Napoli -5	Palermo - 4	Burgas - 3
Road infrastructure	Barcelona - 9	Paris - 8	Madrid and Malmo - 7
Public transport	Tallinn - 52	Ostrava - 5	Burgas - 4
Air pollution	Dublin and Tyneside - 7	Belfast - 6	Bialystok - 5
Noise	Roma, Stockholm, Belfast and Oslo - 4	Helsinki and London - 3	Dublin, Riga, Oulu, Malmo and Glasgow -2
Urban safety	Burgas, Rostock, Tallinn and Białystok - 16	Stockholm - 14	Cluj - 12

Source: (Urban, 2016)

The research results presented in Table 1 indicate a significant diversity in the perception of basic problem issues by individual urban communities, which should be resolved in order to improve the quality of life. While, e.g., as much as 76% of the inhabitants of Ostrava considered air pollution as the most important problem for the development of their city, about 73% of the inhabitants of Naples considered the problem of solving the unemployment in the city as the key matter. The study also

shows the multi-faceted nature of the studied phenomenon. While, e.g., the residents of Munich appreciate the quality of medical services and the labour market in the city, they perceive the problem of the lack of availability of housing, which is largely a consequence of the indicated key factors of the city's success (Urban & 2016).

In the concept of the circular economy, urban logistics is very sensitive to changes in consumption patterns (Savini 2019), which means that in order to build optimal and effective logistics systems, it becomes necessary to search for instruments and tools enabling communication between individual stakeholders and coordination of activities between the interested parties. In this regard, the application of innovative ICT and ITS (intelligent transport systems) technologies, new management methods and the development of public-private partnership (Taniguchi 2014) are helpful. The results of these processes include, among others, concepts that are recently developing very dynamically related to the urban logistics based largely on innovative technical solutions that allow solving a number of problems related to the pathologies of functioning of highly urbanized areas (Tundys & 2013)

Logistics infrastructure in cities is a kind of critical infrastructure, which is of key importance for maintaining an adequate standard of living is not widely appreciated by residents. As long as critical infrastructure works as it should, society generally underestimates its value. It is only in the event of a failure that most people find out how important it is (Broemme 2013) and what is its importance for maintaining public safety in cities. Therefore, the challenges arising from the need to build a civil society are becoming increasingly important for the security of modern cities. Residents must accept the fact that they are obliged to comply with public authority to some extent. Of course, degrees of freedom may vary depending on countries or regions and the solutions they adopt. Nevertheless, public awareness and the willingness to participate in initiatives to improve security are becoming increasingly important to build safe cities. This is a difficult issue, because you must be aware that life in modern cities is becoming more and more complicated.

Terrorist incidents or natural disasters that we are increasingly dealing with in contemporary cities significantly affect the priorities of local government and the role of public authorities. The need to ensure internal security and public security in each city require local authorities to shift increasing resources, means and attention of public administration to the issues of proper preparation of logistics infrastructure for these challenges. Therefore, it is desirable to integrate logistics capabilities with public security and security services at the local level (Wallace 2009) with security at the regional and international level.

In order to ensure the optimal level of security of urban logistics, more and more initiatives should be undertaken to coordinate between national and international organizations dealing with security and strive for continuous development of network threat analysis (including the interdisciplinary risk identification and early detection of crisis situations).

It is also important to build a local logistics infrastructure based on private logistics companies, which should also prepare for these extreme cases. To this end, apart from joint actions aimed at preparing the principles of logistics infrastructure management, it is important to familiarize them with crisis management structures and funds of state and private partners that could be used in crisis situations. In addition, undertaking joint exercises strengthens trust-based cooperation between the state and the business world and confirms the belief that crises can only be managed together (Oprach & Bovekamp 2013).

Therefore, new strategies and methods of managing the city's logistics infrastructure should take into account the entire complexity of the city's space, constituting the stage for dynamic economic, social and cultural changes, requiring openness in the sphere of mutual acceptance for diversity. This determines both an understanding of what city management is today and how logistics infrastructure should operate, based on which the development processes can take place.

The role of local communities in shaping public security and national defense

Ensuring public safety is one of the key tasks for all state bodies. It should be emphasized that public security is primarily a constitutional value, for the protection of which it is possible to limit the citizen's exercise of his constitutional freedoms and rights. In the literature on the subject, it is most often defined as such a condition of the state that allows the proper functioning of a state organization, provides the opportunity to pursue its interests and preserve the life and health of citizens with full opportunity to exercise all the rights guaranteed in the Constitution (Zaborowski 1985). In view of the measures taken at all levels of state and local government administration to guarantee security in all its dimensions, it turns out to be crucial to define the most likely threats to national security. Nowadays, these include primarily (Majer 2012):

- terrorism in any form, characterized by an absolute disregard for human life and democratic values;
- organized crime manifesting itself in various forms, regardless of national borders;
- cybercrime that is a global, technical, cross-border and anonymous threat to information systems;
- cross-border crime having a major impact on the daily life of residents;
- violence in itself, increasing the damage already caused by crime and harming the society;
- natural disasters and anthropogenic factors, such as forest fires, earthquakes, floods, storms, droughts, energy failures and large-scale information and communication systems failures.

Apart from the above threats, social, economic and military threats also constitute a significant group of phenomena unfavourable to public security (Table 2).

Table 2: Threats to people, services and the environment

Threats	
Secondary (natural disasters): - human existence, - social, - violation of biological balance, - losses on a massive scale.	**Primary (failures, catastrophes, cataclysms):** - natural, - technical, - military, - extraordinary environmental hazards.

Source: (Jakubczak 2003)

From the perspective of the analyses carried out, the special role of military threats, which are taking on new forms in the modern world, should be indicated. To counteract them, a defense system is created in each country responsible for the so-called state defense readiness. It constitutes a state of stability of the elements of the state defense system to maintain national security, effective operation in emergency situations, including the possibility of opposing any crisis and war threats (Dziubek 2010).

The range of the above threats are determined by the scale of their impact, covering the level from central to local one from the perspective of a given country. Focusing only on the local level, it should be noted that in many local community definitions, there are usually three permanent elements in the literature on the subject: territory, social interactions and psychological bond, expressed in a sense of community with people (individuals and groups) living in a specific territory, and also in a special relationship (often very emotional) perceived as our common place (Szacka 2003). In the literature on the subject of research, the concept of local community originates from two streams of social thought. Representatives of the first orientation (Durkheim, Simnel, Tőnnies) paid close attention to the essence of collective identity, lasting emotional ties, as well as social harmony (a certain state of balance) between individual people who relied on direct contacts. The society interpreted this way is a kind of community, not necessarily associated with a separate territory. Its essence is expressed in:

- experiencing and sharing the same symbols, norms and values that determine the sources of the cultural identity of a given group;
- objective dependencies and relationships that are formed among people;
- respecting mutual principles of agreement, communication and cooperation.

It is emphasized that the above-mentioned three aspects of social reality in the perception of the individual interpenetrate, creating an indivisible whole accepted by it (Starosta 2002). The second orientation places the main emphasis on the place itself and the territory organizing social life (Park, Burgess, McKenzi et al.). A very strictly defined geographical space was introduced into the area of the concept of community, the territory of which became the basis for social, economic, cultural or political organization, constituting an integral part of human existence. In the mind of the individual, it performs the functions of not only the homeland (small homeland), but also the place of civic and political self-realization (Starosta 2002). The local community is considered a relatively durable mesostructured which performs the following functions (Borkowski 2003):

- housing – ensuring adequate housing conditions, including social housing for the poorer part of the community; it is living in a given area that formally constitutes the territorial community;
- self-government – choosing and controlling local authorities, self-determination in issues important for the community, managing common property; it is worth remembering that the local government is the general population of residents, and not local authorities;
- organization of everyday life – suburban "housing estates-bedrooms" can hardly be called communities;
- identity – integrating residents around a common tradition, culture, religion, space, ownership and shaping the released "we" awareness;
- meeting basic needs – consumption, health care, educational, social assistance; it is no accident that we observe the process of "localizing" social services;
- socialization – maintaining and promoting significant social values, teaching social roles, shaping pro-social and civic attitudes;
- culture-forming – cultivating the memory of the past, animating the activities of creative associations and local amateur creators, organizing local cultural events.

In addition to the above functions, we should add a function directly related to shaping public security and national defense by local communities. The development of a local community is primarily a bottom-up activity, consisting in supporting people and shaping their ability to take up activities together with other members of a given community. This approach is based on the belief that people may not only jointly develop skills and knowledge in order to carry out changes serving others, but also create and provide conditions together that guarantee the safety of a given community. In addition, from a national defense perspective, local communities are the first link of responsibility for a given territory, which for obvious reasons is the most important for them.

Conclusion

If we consider that the city is an area integrating any activity related to the management of physical and human resources in socio-economic space, the task of urban logistics is to combine into one the controllable whole of all activities of these economic entities that are responsible for ensuring proper conditions of this management.

When analysing the issues of managing the city's logistics infrastructure in the aspect of challenges resulting from the need to ensure an appropriate level of public and national security, one should be aware that 100% protection of the logistics infrastructure cannot and can never be guaranteed, as well as its absolute trouble-free operation. On the other hand, one can actively and more consciously counteract potential threats and crisis situations. For this to happen, however, the current way of thinking about security must evolve into a new "risk culture" that requires open communication between state institutions, local authorities, residents and businesses. The new way of managing urban

logistics will also require a greater involvement of residents and enterprises in active participation in the prevention and handling of crisis events.

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Information Economic Resources: Analysis of Current Trends in the Russian Federation

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Abstract

The study is focused on the use of information as a specific economic resource. The essential characteristics of the term "information economic resources" are clarified. The assessment of trends in the development of the information society in the Russian Federation was made using blocks of indicators that characterize information economic resources.

Keywords: Information, Information Economic Resources, Information Society.

Introduction

In the modern world, information is the existential basis for the development of human society. Information plays an increasingly significant role in the economy, penetrating into all spheres of human activity. If we consider the subject area of the economy as a system of relations regarding the formation and use of resources and economic goods created with their help, then information can act both as a good and as a specific economic resource. If the first form is more or less clear - information as a good (service) is actively involved in the processes of distribution, exchange and consumption, then the second form is a bit unclear. There is still no consensus among scholars and practitioners on the form of identifying information as an independent economic resource. Various versions are mentioned: scientific and technological progress, knowledge, information, etc. But there is almost no disagreement in the fact that information resources are currently the main driver of economic growth (Kostyuk, 1997).

As early as 1890, A. Marshall introduced the improvement of equipment and technologies as an exception, formulating the law of diminishing returns, justifying the fall in the marginal productivity of capital (Marshall, 2013). This fact can be considered the starting point for including information resources in economic research. A large number of works by various authors were focused on the development of the information society and various forms of using information resources in the economy (Bell (1974); Castells (2009); Kelly (1998); Masuda (1981); Machlup (1962); Stigler (1961); Stonier (1983); Porat and Rubin (1978); Toffler (1970); Varnavsky (2015); Inozemtsev (2000); Konstantinov (1998); Lavrishcheva (2012); Mirzoeva (2014); Nizhegorodtsev (2002); Popov and Semyachkov (2017); Rakitov (1998), Tsyrenova (2011) etc.).

Konstantinov (1998) claims that from an economic point of view, information resources "represent information and knowledge obtained and accumulated during the development of science and technology that can be used in management as a factor in increasing production volumes and increasing its efficiency".

According to Tsyrenova (2011), information resource is a body of accumulated and scientifically systematized individual and collective knowledge that has a certain consumer utility and is in demand

by various economic entities, social and economic systems in order to ensure the effectiveness of their functioning (information factor of development).

The aim of the study is to define information as a specific economic resource and to analyze trends in the development of the information society in the Russian Federation.

Theoretical Background

Despite the large number of economic studies, in practice, the dominant interpretation of the term "information resources" is a set of systematized data placed in information systems or on digital media, which is associated with the rapid development of computer science and computer technologies.

We propose to use the term "information economic resources" (IER) for economic research to eliminate discrepancies. We will understand IER as a set of relevant information involved in economic relations that provides positive changes in the market value of other economic resources and/or the creation of new (improved) economic benefits in order to improve the efficiency and development of the socio-economic system. Moreover, it does not matter in what form and on what media the information will be stored. The main thing is how and in what form this information will be involved in economic turnover.

For example, information on the results of fundamental analysis of the issuer's activities may either remain unclaimed or lead to certain decisions on the stock exchange, which will lead to changes in the market value of securities.

Information on the results of exploration of mineral deposits has significant impact on both the cost of land and the investment attractiveness of the territory. There are many such examples.

Moreover, the specific feature of the information is that it often become available to both counterparties when it is transferred from one economic actor to another. This feature characterizes clearly expressed multiplicative effect of using IER.

The analysis of IER is rather difficult due to the peculiarities of the Russian statistical system. Since 2018 the Federal State Statistics Service of the Russian Federation has been monitoring the development of the information society in the Russian Federation on almost 150 indicators. The authors of the monitoring identified the factors of information society development:

– human capital;

– innovative potential;

– information computer technologies (ICT);

– infrastructure and access;

– economic environment;

– information industry;

– information security;

– e-government;

– e-business;

– e-education;

– e-health;

– electronic culture;

– use of ICT by households and the population.

We distinguished three key blocks of indicators from the monitoring in relation to the IER study:

– level of education and professional training of the population (Fig. 1);

– resource base for research and development and innovation (Fig. 2);

– information industry of the Russian Federation (Fig. 3).

Results and Discussion

When people apply their education to the economy, the knowledge becomes one of the most important types of IER. Fig. 1 shows that three of the four indicators have a negative trend.

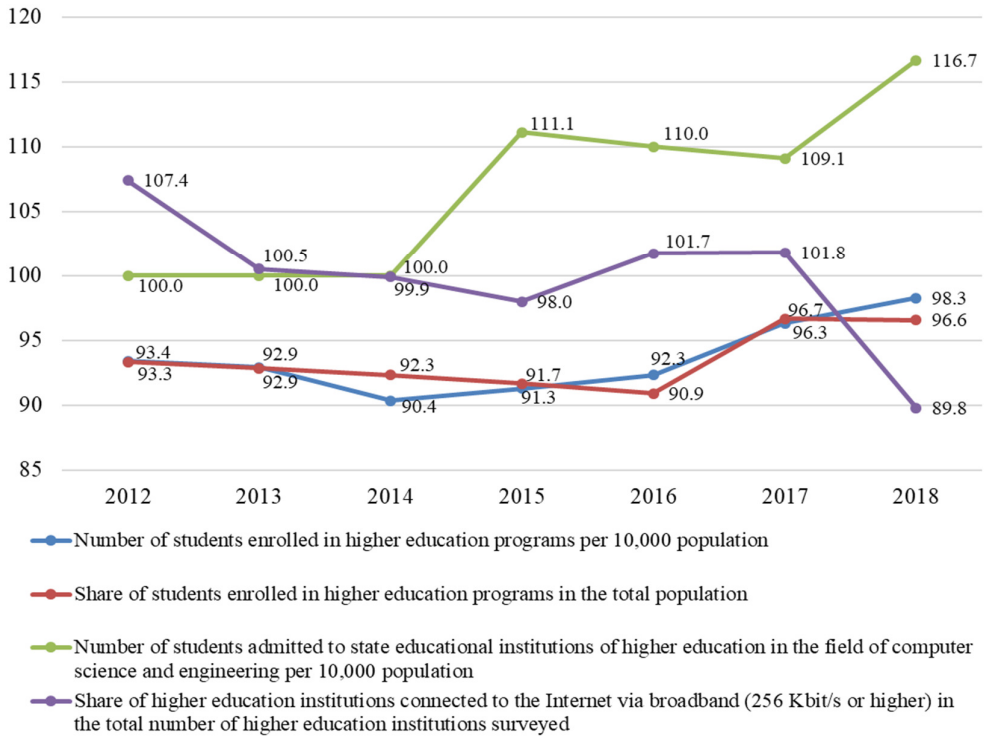

Source: Rosstat

Fig. 1: Dynamics of the information society development indicators of the Russian Federation. Indicators characterizing the level of education and professional training of the population (growth rate compared to the previous year)

Thus, the share of higher education institutions connected to the Internet via broadband access in the total number of higher education institutions surveyed in 2018 decreased from 96 % to 86.2 % (growth rate of 89.8 %), which reduces the possibility of using Internet information in the educational process.

The number of university students who are the main carriers of high-level knowledge in demand by the economy also demonstrated a negative trend. It has decreased by more than a third in the Russian Federation since 2012. It should be noted that the rate of decline in the number of students decreased to 1.7% in 2018; and according to the indicator "share of students enrolled in higher education programs in the total population" to 3.4%. However, these indicators have not yet reached the growth zone.

Only the indicator "Number of students admitted to state educational institutions of higher education in the field of computer science and engineering per 10,000 population" showed growth for the entire analyzed period. It showed maximum in 2018 (14 students per 10,000 population, growth of 16.7%), which characterizes the building up of the human potential of the digital economy being formed in the Russian Federation.

In our opinion, the results of research and innovation activity are the second key block that characterizes IER in Russia (Fig. 2). Indeed, high-tech and innovative products are more competitive due to their novelty and improved characteristics.

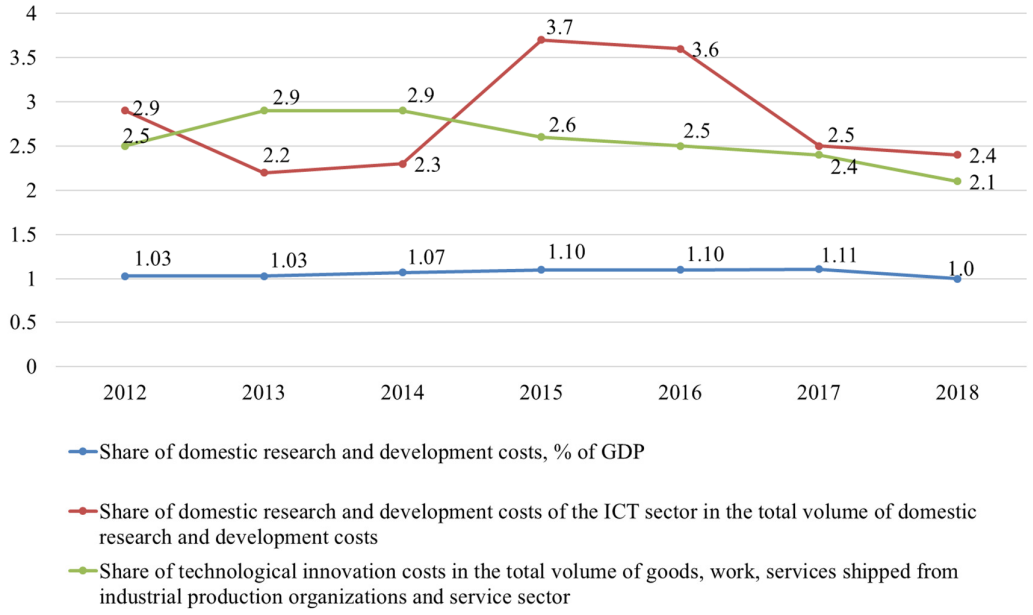

Source: Rosstat

Fig. 2: Dynamics of the information society development indicators of the Russian Federation. Indicators characterizing the resource base for R&D and innovation

Fig. 2 shows that all three indicators characterizing the resource base of R&D and innovation declined in 2018. Especially alarming is the five-year decline in the indicator "Share of technological innovation costs in the total volume of goods, work, services shipped from industrial production organizations and service sector" (from 2.9 % in 2014 to 2.1 % in 2018).

The main reason for this situation is the reduction in the amount of state support for research and innovation activities, as well as the decrease of research funding from the real sector of the economy. Correcting the situation will require a lot of effort on the part of both federal and regional authorities, which is why the national project "Science" has been launched in the Russian Federation since 2019.

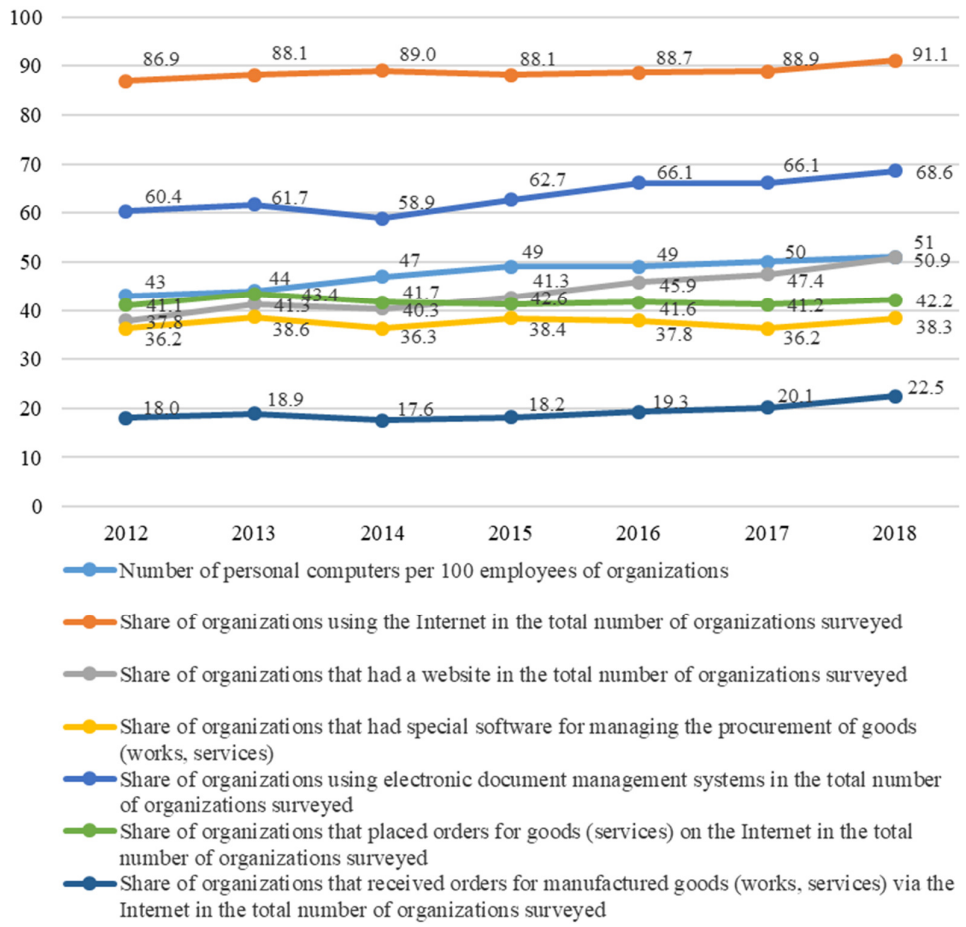

Source: Rosstat

Fig. 3: Dynamics of the information society development indicators of the Russian Federation. Indicators characterizing the information industry of the Russian Federation

The third key block of indicators characterizes the level of the information industry development in the Russian Federation (Fig. 3). All indicators show a positive trend. In this case, information technologies themselves and their contribution to the activities of economic entities act as IER. The positive trends in e-business indicators, such as "Share of organizations that had special software for managing the procurement of goods (works, services)", "Share of organizations that placed orders for goods (services) on the Internet" and "Share of organizations that received orders for manufactured goods (works, services) via the Internet" in the total number of organizations surveyed are particularly noteworthy.

Conclusions

The results of the analysis indicate that the role of information technologies and their direct impact on

social and economic development is currently increasing in the Russian Federation. This positive trend will increase in the coming years. However, other aspects of IER use (research, innovation, obtaining new knowledge in the higher education system, etc.) show certain decline, which, although slowed down in 2018, still characterizes the insufficient efficiency of using the information resource base.

The implementation of the national projects "Science", "Education", "Digital economy", "Small and medium-sized businesses and support for individual entrepreneurial initiative" and "Labor productivity and employment support" in the period from 2019 to 2024 provides new opportunities for digitalizing the economy and increasing the efficiency of using IER. This will require significant efforts both at the level of the Russian state as a whole and in each individual region.

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Balanced scorecard (BSC) Usage and Financial Performance; Examining the Moderating Effect of Intensity of Competition

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Abstract

The study aimed to investigate the extent of BSC usage in a Jordanian context, as well as examining the relationship between BSC usage and organizational performance. Finally, the study attempted to provide empirical evidence regarding the moderating effect of intensity of competition on the association between BSC usage and organizational performance. The response rate was 55%, which is considered highly accepted compared to previous studies. The descriptive analysis indicated that the level of BSC usage was at moderate for all BSC dimensions. Moreover, the study demonstrated that the Jordanian companies were facing a competitive business environment based on the intensity of competition results. Therefore, the study asserted that the BSC intergraded dimensions are necessary for a firm's long-term success in such a competitive environment. The hypotheses results of the study indicated that BSC usage has a significant positive relationship with financial performance, Thus, this result demonstrated that the main role of BSC that has been considered to facilitate organizations activities which leads to improve their overall performance, particularly financial performance. Finally, the study revealed that the intensity of competition influenced the relationship between BSC and the firm's performance and moderate the relationship between BSC usage and firm's performance. Finally, the study recommended extending the implementation of BSC due to its evidenced contributions in terms of enhancing a firm's performance in a Jordanian context by increasing the awareness of attainable benefits of the implementation of BSC. Similarly, the study endorsed the taking into account of the non-financial aspects. Finally, the study suggested employing the mixed method as a fruitful research approach and utilized other research theories such as agency theory and shareholder theory. Finally, it is suggested that other factors are studied that can influence the relationship between BSC and financial performance indicators.

Keywords: Balanced scorecard, Financial performance, Intensity of competition, Jordan.

Introduction

Several studies have argued that using strategic performance measurements systems, such as balanced scorecard (BSC), helps the managers to obtain information about how their organizations have fared in terms of integrating their vision and strategies with organizational performance based on specific metrics (Chenhall, 2005, Jusoh, et al., 2006; Kaplan and Norton, 1992, 1996b). BSC is a logic-based management accounting tool that uses multiple performance measurement and provides a strategy implementation framework. BSC, specifically, introduced both financial and non-financial measures, including four dimensions: financial, learning and growth, customers, and internal business processes in order that firms can implement strategy and evaluate organizational performance (Kaplan and Norten, 1996b).

Through using the four perspectives of BSC as a performance measurement system (PMS), BSC also monitors the performance of the organization by striking a balance between the different perspectives and performance. It provides an accurate set of tools that helps the organization to reach the performance level that it aims to attain. BSC also provides feedback about the organization's performance in order to correct or confirm its goals and objectives (Jusoh et al., 2008). The main reasons behind the need for a strong and effective performance measurement system are according to its ability to assist the company in dealing with different changes in the business environment, as such changes may cause fluctuations in the company's performance. In this manner, the intensity of competition is considered one of the factors that can play a role in using multiple performance measurements (Chenhall, 2003). In addition, companies desire to be leaders in the market where many competitors are present for that the companies are looking to adopt an appropriate performance measurement to face the high competition in the market, and to heighten the opportunities for better financial performance.

Based on contingency theory assumptions, the current study aims to examine the effect of BSC usage on financial performance, as well as investigating the moderating effect of intensity of competition on the direct relationship between BSC usage and financial performance in the context of non-financial companies listed on the Amman Stock Exchange in 2018.

Literature Review and Hypotheses Development

Balanced Scorecard

The BSC provides a framework that encourages the use of both financial and non-financial measures of performance, allowing the organization to pinpoint its strategic objectives via balancing four perspectives – financial, customers, internal business processes and learning and growth – to measure a firm's performance (Kaplan et al., 1992; Kaplan et al., 1996b). The effectiveness of the balanced scorecard is based on its ability to translate a firm's mission and strategy into a comprehensive set of performance measures (Kaplan et al., 2000).

Introduced by Robert Kaplan of Harvard Business School, and David Norton, of Renaissance Worldwide in 1992, the BSC framework is a system that measures both current performance of the firm and drivers of future performance. Specifically, the BSC framework seeks to identify the critical economic activities of the company, which generate current and future cash flows, and to build a causal model of the process by which the company generates profits by focusing on both financial and non-financial indicators of a firm's performance (Al-Mawali, 2013; Jusoh et al., 2008).

The BSC framework is based on the premise that those properties of the financial accounting system, such as conservatism, transaction emphasis, and money base unit of measurement, prevent it from adequately measuring the key activities of the company. Rather, Kaplan and Norton (1992) suggest supplementing the traditional financial measurement system with non-financial measures of customer relations, internal business processes, and organizational learning and growth in order to specify what the organization expects to receive from and give to the various stakeholder groups in exchange for those groups' continued contribution toward the organization's pursuit of its objectives. The BSC is explicitly based on the growing acceptance of two related premises. The first is that future success involves providing superior value to customers, employees and shareholders. The second is that attracting shareholder funds, employee talent, and customers are the three fundamentals of sustainable competitive advantage and superior returns to investors (Hoffecker et al., 1994; Hogan, Gressle, and Neyland, 1999; Huselid, 1995; Ittner et al., 1998a; Johnson, 1998; Kaplan et al., 1996b; Maisel, 1992; Newing, 1995). Within the BSC framework, four perspectives – financial, customer, processes and learning and growth – represent the views of four essential stakeholders in any business. All stakeholders have choices: shareholders can sell stock; customers can buy from another provider; and employees can work for another company. If value is created for each of these three essential stakeholder groups, the company will be more likely to produce a superior return for investors for a longer period (Lockamy et al., 1997; Nanni et al., 1990; Reynierse et al., 1992; Tang and Fuller, 1995).

The Four BSC Perspectives

Within the BSC framework, four categories of measures are identified in order to achieve balance between the financial and the non-financial, between internal and external, and between current performance and future performance (Kaplan et al., 1992). The four perspectives: financial, customer, processes, and learning and growth are discussed in the following paragraphs.

The financial perspective, as reflected in financial measures, is the most traditional and still most commonly used measurement tool. Financial measures are valuable in conveying the readily measurable economic consequences of action already taken. Financial measures are typically focused on profitability-related measures (the basis on which shareholders, in turn, typically gauge the success of their investments), such as return on capital, return on equity, return on sales, etc. (Kaplan et al., 1992; Lipe et al., 2000). These measures are necessary for any organization trying to measure performance for a number of reasons. First, reporting of financial measures is expected and governed under law. Second, reporting of certain types of financial measures of a firm's performance is required by institutional bodies.

The customer perspective normally includes several core or general measures derived from the desired successful outcomes of a well-formulated and implemented strategy. These core measures may include overall indicators such as customer satisfaction, customer complaints, customers lost/won, sales from new products, and on-time delivery (Kaplan, 1996, 1998; Light, 1998). Measures related to customers include results from customer surveys, sales from repeat customers, and customer profitability. The customer perspective is a core of any business strategy which describes the unique mix of product, price, service, relationship, and image that a company offers (Kaplan et al., 2001c). The customer perspective defines how the organization differentiates itself from competitors to attract, retain and deepen relationships with targeted customers. The value of the customer perspective is crucial because it helps an organization connect its internal processes to improved outcomes with its customers (Kaplan and Norton, 2001b). Of the four BSC perspectives, the customer is at the core of any business and is crucial to long-term improvement of company performance (Kaplan et al., 1992; Pineno, 2002). Heskett et al. (1994) point out the customer-based virtuous circle, whereby investment in employee training leads to improved service quality, which in turn results in higher customer satisfaction leading to increased customer loyalty, which boosts revenues and margins.

Internal business process measures relate specifically to the operational processes of the business unit. They represent the perspective of the operations management within the BSC model. The internal process perspective is based on the notion that to satisfy customers and earn a financial return, the business must be efficient and effective at what it does. The internal process measures are typically based on the objective of finding the most efficient and effective way of producing products or services to meet customer needs. For example, such measures may include order conversion rate, on-time delivery from suppliers, cost of non-conformance, and lead-time reduction (Kaplan et al., 1996b).

Learning and growth measures represent the employees as part of the four pillars used to measure performance with the BSC framework. The innovation and learning perspective is all about developing the capabilities and processes needed for the future. In the banking industry, for example, for a business to succeed not only must it effectively carry out daily transactions but it must also continually improve in terms of the value and cost of its offerings. This innovation process can be measured in a variety of ways. These may include the speed of transactions, for example, or the number of people involved in a particular transaction. Again, the choice depends on what is critical for the success of each particular business (Kaplan et al., 1996b). Acknowledging that performance measures relating to learning and growth are the most difficult to select, Kaplan and Norton (1996b, p.127) suggest measures of employee capabilities, information systems capabilities, and employee motivation and empowerment as examples.

The Intensity of Competition

The empires of local and global competition in developed and emerging economies are extending their boundaries to the maximum limits. There is therefore an urgent need to realize the concept of intensity of competition, which refers to the degree of competition that a firm faces as a result of its rivals'

actions/reactions in terms of its attempts to generate profits and returns (Pecotich et al., 1999). The increase in the competition may be an encouraging factor that boosts performance according to the BSC approach (Hoque, 2011).

In order to operate in the existing competitive business environment, there is a real necessity to obtain all relevant, timely and accurate information about the cost, the performance indicators, the firm's activities, the process, the product and the service, as well as about the customer's increasing needs for both commodities or luxuries. From another viewpoint, as a sort of management response to the direction of learning and growth, the seniors require more timely and accurate information to help make the process much more efficient and more customer-focused (Kaplan, 1995, p.6).

A spotlights is to be focused upon the high level of competition since ignorance of such a competitive situation means giving a golden opportunity to competitors to gain a higher market share, improve the quality and the standardization level of their product, and confidently enhance the proportion of satisfied customers. Furthermore, the competition will be alert to the fact that they must look for resources to distinctive and gain a competitive advantage over the other competitors (Adnan et al., 2016).

The conclusions of Al-Rfou et al. (2012) asserted that the organizations that face a higher level of intensity in competition in their operating environments tend to own and develop a higher number of product/service lines. It also reported the positive effect of intensity of market competition on organizational performance. The measures of intensity of market competition comprised six competitive items, including: the number of competitors; the extent of following the modern technological change in the industry; the frequency of producing new products; the extent of price manipulations; the accessibility level of the marketing channels; and finally, the changes in government regulation and policy.

Otley (1980) and Hoque (2001) pointed out that intensity of competition, the BSC and the organization's performance receives the biggest proportion of the interest of management accounting specialists, as the most direct indicators in the realm of controlling the system. Consistent with the study of Chong and Rundusb (2004) – which examined the interaction between the TQM and the role of intensity of competition and organizational performance by scrutinizing the higher degree of market competition – the more positive the relationship between TQM practices of customer focus and organizational performance, and the higher the degree of market competition, the more positive was the relationship between TQM practices of product design and organizational performance. All of the hypotheses were evidenced in accordance with the statistical analysis results.

The Relationship between BSC Usage and Financial Performance

Performance measurement systems (e.g. BSC), along with performance management, are still considered an academic and practical paradox (Melnyk et al., 2014; Malmi, 2016). While they offer management many useful and necessary functions, there is still evidence that they can negatively affect performance under certain circumstances (Melnyk et al., 2014; Al-Mawali and Al-Shbiel, 2013). Several studies (e.g. Chenhall, 2003; Jusoh et al., 2008; Otley, 2016) have argued that using BSC provides ex-post, ex-ante, financial, non-financial, internal and external information that allows stakeholders to evaluate organizational performance from multiple perspectives. In addition to that, it plays an important role in the implementation of corporate strategy (Kaplan and Norton, 1992, 1996). Moreover, Cobbold and Lawrie (2002) have argued that BSC could be used not only as an evaluation of the organization's performance, but also to manage business processes with the organization. Wang et al. (2006) suggest that BSC could be used as a strategic management tool. Kaplan and Norton (1992) also pointed out that different strategies need multiple performance measurement systems like BSC. Olson and Slater (2002) have pointed out that because different strategies have different requirements for success, it follows that performance measurement systems should be tailored to the organization's strategic orientation. Otley (2016) confirmed that no universal management accounting systems can apply to all companies in all circumstances, but it all depends upon the contingent factors which the strategy one of them.

The link between BSC usage and organizational performance has been examined by several researchers. For example, Hoque and James (2000) have pointed to the relationship between BSC and performance while Sim and Koh (2001) have found that there is a relationship between learning and growth perspective and financial performance. The results of their study also show that innovative measurements, new product development time and customer-oriented performance measures are associated with lower manufacturing costs, higher sales and greater market share. In addition, the findings of Maiga and Jacobs's (2003) study show the significant positive effect of the Activity Based Costing System, when joined with BSC and organizational performance. Meanwhile, Davis and Albright (2004) confirmed the relationship between internal performance measures and the implementation of BSC in the banking industry.

However, the studies discussed above have applied the BSC framework to investigate the effect of BSC on organizational performance. There are numerous studies that have examined the association between the usage of multiple performance measurements systems and financial performance (Al-Mawali et al., 2010, 2012; Banker et al., 2000; Droge et al., 2000; Ittner and Larcker, 1998b; Said et al., 2003; Bryant et al., 2004). Banker et al. (2000) showed that there is a positive relationship between customer satisfaction measures and future accounting performance, while Droge et al. (2000) revealed that time-to-market for new products as a measure often leads to higher initial prices, greater market share and customer loyalty, as well as significant cost benefits. Said et al. (2003) revealed that the use of non-financial measures is associated with future accounting and market-based returns. Bryant et al. (2004) also reported that when firms implement a performance measurement system that contain both financial and non-financial measures, they will benefit more than the firms that rely solely on financial measures. Although the previous studies show some positive association between the use of non-financial measures and performance, several other studies reveal the opposite results.

In contrast, Ittner, Larcker and Randall (2003) showed results that contradicted the prior studies by reporting a negative relationship between BSC usage and financial performance. Bastian and Muchlish (2012) indicated that non-financial performance measurement systems were significantly linked to organizational performance, but the usage of financial performance measurements is not significantly associated with organizational performance. Thus, H1 hypothesized that the relationship between BSC dimensions usage and financial performance is as follows:

H1: there is a positive relationship between BSC usage and financial performance.
H1a: there is a positive relationship between financial dimension indicators (FD) usage and financial performance.
H1b: there is a positive relationship between customer dimension indicators (CD) usage and financial performance.
H1c: there is a positive relationship between internal process dimension indicators (IPD) usage and financial performance.
H1d: there is a positive relationship between learning and growth dimension indicators (LGD) usage and financial performance.

The Intensity of Competition as a Moderator

The opportunity to exploit the benefits of the relationship between BSC and organizational performance becomes highly possible when the intensity of competition is higher based on contingency's assumptions (Chenhall, 2003). Since the organization will compete go to significant lengths to obtain a better competitive advantage. This, in turn, rationalizes the increase on the performance (Hoque, 2011). Giantari et al. (2017) indicated that the existing intensity of competition between competitors to obtain the most beneficial position becomes challengeable day after day, and this clarifies the use of diverse techniques to attract the customer. These techniques include: providing high-quality goods or services and reducing prices. Moreover, the competition tends to be an opportunity rather than a threat, used by competitors to improve their position. Asikhia and Binuyo (2012) developed their study by considering the competitive intensity as a moderator variable. They came up with a set of conclusions that indicate a positive association between competitive intensity, customer orientation and a firm's performance relationship.

The study of Adnan et al. (2016) also pays attention to how to assess the moderating effect of competition intensity on human resources management (HRM) practices and organizational performance. The results of Guidara and Khoufi's (2014) study showed that the intensity of market competition is a determinant of BSC usage. Hoque et al. (2001) investigated, in the context of New Zealand's market, BSC usage in controlling environmental factors and achieving a sustainable, fruitful competitive advantage. Thus, based on the contingency theory and related studies, the following hypotheses formulate the moderating effect of intensity of competition on the relationship between BSC usage and financial performance.

H2: intensity of competition moderates the relationship between BSC usage and financial performance.
H2a: intensity of competition moderates the relationship between financial indicators usage and financial performance.
H2b: intensity of competition moderates the relationship between customer indicators usage and financial performance.
H2c: intensity of competition moderates the relationship between internal process indicators usage and financial performance.
H2d: intensity of competition moderates the relationship between learning and growth indicators usage and financial performance.

Methodology

Population and Sample

The non-financial companies listed on the Amman Stock Exchange (2018) were used as the sampling frame for the current study. Questionnaires were distributed to the entire population (N = 129). The overall response companies (n = 71) with 55% of the total targeted companies in ASE. Looking into the similar experiences, Sharabati and Fuqaha in 2014 investigated the impact of strategic management by using BSC in business performance in pharmaceutical industries in Jordan; their study obtained a 64% response rate from the targeted sector. The demographic variables of the sampled companies are illustrated in Table 1.

Table 1: Demographic of Sample Companies

Variable	Categories	Frequency	Percent%
Type of Industry	Real estate	12	17.4
	Health Care Services	3	4.3
	Educational Services	2	2.9
	Hotels and Tourism	2	2.9
	Transportation	5	7.2
	Technology and Communication	2	2.9
	Media	1	1.4
	Utilities and Energy	4	5.8
	Commercial Services	9	13.0
	Pharmaceutical and Medical Industries	3	4.3
	Chemical Industries	6	8.7
	Printing and Packaging	1	1.4
	Food and Beverages	3	4.3
	Tobacco and Cigarettes	1	1.4

	Mining and Extraction Industries	7	10.1
	Engineering and Construction	4	5.8
	Electrical Industries	2	2.9
	Textiles, Leathers and Clothing	2	2.9
Being in Business	Less than 5 years	1	1.4
	6-10 years	6	8.7
	11-15 years	10	14.5
	more than 15 years	52	75.4
Ownership Status	Local-based owned	49	71.0
	Foreigner-based owned	1	1.4
	Mixed	17	24.6
	Family Business	2	2.8
Number of Employees	Fewer than 100	30	43.5
	100-200	15	21.7
	201-300	7	10.1
	301-400	4	5.8
	More than 500	13	18.8

Variables Measurements

The extent of BSC usage – independent variable – was measured by examined based on the four dimensions previously mentioned (Jusoh et al., 2008; Neely et al., 2007). All items relating to the four dimensions of BSC (see Table 2) use a seven-point Likert scale anchored at both ends: 1 = not at all, to 7 = to the greater extent.

The financial performance – dependent variable – was measured using objective indicates (e.g. ROA, ROE, operating profit, sales growth rate), which were extracted from the annual reports of non-financial companies listed on the ASE in 2018. The intensity of competition – moderator variable – was measured based on an instrument developed by Hoque (2011). The measurement includes five items illustrated in Table 2. A seven-point Likert scale was used, ranging from 1 = "negligible" to 7 = "extremely intense".

Results

Goodness of Measures

Firstly, the factor analysis technique was used to evaluate the validity of BSC usage and intensity of competition variables, factor analysis was carried out based on assumptions suggested by Hair et al. (2011) and Sekran (2016). The results of the first run of factor analysis for BSC indicated that the KMO = .842, Bartlett's test of sphericity (p = .00), anti-image correlation (> .50). However, item no.1 form learning and Growth dimension indicated a value lower than the low communities (.370) which should be more than .50, so the item was dropped in the second run. The second run shows a KMO = .846 and Bartlett's test of sphericity (p = .00), anti-image and communities higher than .50, which is considered acceptable (Hair et al., 2011). Moreover, the result of factor analysis for intensity of competition (a moderator), yielded one factor with KMO = .853, Bartlett's test of sphericity (p = .00), anti-image correlation (> .50) and factor loading higher than .50 for all items. Secondly, reliability for the two variables (e.g. BSC and intensity of competition) was evaluated using Cronbach's Alpha (α). The results show that α values for the two variables were higher 0.60 as suggested by Hair et al. (2011); Table 2 shows the reliability for each variable of the study.

Table 2: Factor Analysis and Reliability

		I	II	III	IV	α
Financial Dimension (FD)						.92
EVA		.86				
Generated Cash Flow		.83				
ROI		.81				
Manufacturing Cost		.80				
Sales Revenue		.77				
Customer Dimension (CD)						.86
Percentage of retained customers from prior period			.78			
Customer product satisfaction rating			.74			
Market share			.71			
Customer referrals			.66			
Community satisfaction survey on company's			.63			
Internal Process Dimension (IPD)						.92
On-time deliveries as a percentage of all deliveries				.86		
Time to process customer orders				.83		
Defect-free units as a percentage of completed units				.83		
Annual tons of reduced nitrogen dioxide emissions				.83		
Time to launch new products to market				.80		
Learning and Growth Dimension (LGD)						.90
Total employee suggestions on improving the company					.86	
Hours of training per employee (per year)					.85	
Development of new product / service design					.79	
Total earned employee certificates on environmental emergency responses					.75	
Employee satisfaction					.74	
Eigenvalue		3.997	3.848	3.767	3.545	
Percentage of variance explained		19.98	19.24	18.83	17.76	
Percentage of total variance		75.786				
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.846				
Bartlett's Test of Sphericity	Approx. Chi-Square	1020.822				
	Sig.	.000				
Intensity of Competition (IOC)						.88
Quality and variety of product response		.910				
Price competition in the main line business response		.894				
Promotion, advertising, selling and distribution response		.866				
Technical personnel such as accountants response		.827				
Raw material, parts and equipment response		.762				
Eigenvalue		3.654				
Percentage of total variance		72.870				
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.853				
Bartlett's Test of Sphericity	Approx. Chi-Square	232.341				
	Sig.	.000				

Descriptive and Correlation Analysis

Table 3 represents the correlation matrix for the variables operationalized in this study. The means and standard deviations (SD) of all the study variables were also included in the table. These bivariate correlations allow for preliminary assessment and information regarding the hypothesized relationships. In addition to that, correlation analysis can detect any potential problems associated with multicollinearity among the variables of the study (Sekaran, 2016). The table shows that all the coefficients values are less than (0.75). Therefore, the correlation results indicate that multicollinearity was not a significant problem in this particular data set. The correlation matrix also reveals that the correlations are in a positive direction for the relationship between BSC and FP, and a negative direction for the relationship between IOC and FP.

Table 3: Mean, Standard Deviation, and Pearson Correlation Coefficient for All Variables

Variables	**Mean**	**SD**	**FD**	**CD**	**IPD**	**LGD**	**IOC**
Financial Dimension (FD)	4.78	1.510	1				
Customer Dimension (CD)	4.65	1.200	.620**	1			
Internal Process Dimension (IPD)	4.09	1.705	.297*	.467**	1		
Learning and Growth Dimension (LGD)	3.82	1.515	.501**	.553**	.474**	1	
Intensity of Competition (IOC)	4.62	1.465	.429**	.620**	.395**	.475**	1
Financial Performance	2.08	10.49	.002	.151	.057	.015	-.065

*** P<0.01, * P<0.05*

Hypotheses Testing

The hierarchical multiple regressions analysis was performed to test the direct effect of BSC usage on FP, and it also tested the moderating effects of the intensity of competition on the relationship between BSC usage and FP. This technique, established by Baron and Kenny (1986), and Sharma, Durand and Gur-Arie (1981), was used to test hypotheses in the current study. A three-step hierarchical regression was performed. The independent variables were entered in the first step; the moderating variable was entered in the second step, and lastly, interaction terms were introduced into the equation to test the joint effect of predictor and the moderator on the dependent variable. The interaction terms were calculated by multiplying predictor with moderating variable.

To determine whether the moderator effect on the anticipated relationship existed or otherwise, three maximum conditions were used. First, the final model must be significant. Second, the F change must be significant. Third, the beta coefficient of the interaction term must also be statistically significant. Furthermore, to find out whether the moderator was pure or quasi-moderating, the current study followed the conditions cited by Sharma, Durand and Gur-Arie (1981). If the coefficient of the multiplicative interaction term was significant and the coefficient of the moderator variable effect was not significant, the moderator is a pure moderator. However, if the coefficients of both the multiplicative interaction term and the moderator variable were significant, the moderator is a quasi-moderator.

Table 4: Hypotheses Testing

Variables	DV: Financial Performance		
	Step 1 Std. Beta	Step 2 Std. Beta	Step 3 Std. Beta
Independent variable (BSC Dimensions)			
Financial Dimension (FD)	.149**	.158**	.753**
Customer Dimension (CD)	.155	.014	.348
Internal Process Dimension (IPD)	.247	.273	.544
Learning and Growth Dimension (LGD)	.517**	.467**	.295**
Moderating variable			
Intensity of Competition (IOC)		.295**	.755**
Interaction terms			
FD*IOC			.573**
CD*IOC			-.511
IPD*IOC			.553
LGD*IOC			-.805**
F value	4.569**	4.670***	5.518***
R^2	.225	.274	.461
R^2 change	.225	.049	.188
F change	4.569**	4.158*	5.052***

*Note: Significance levels: *p < .10, **p <. 05, ***p< .01*

Table 4 presents the result of the three-step regression analysis of the four dimensions of BSC usage, IOC (as moderator) and the interaction between BSC and IOC in terms of financial performance. In the first step, only two out of four dimensions of BSC (e.g. FD and LGD) had a significant effect on financial performance. The BSC dimensions together explained about 22.5% of the total variation in financial performance. The introduction of the BSC dimensions in step 1 showed significant model value as indicated by significant F change ($F = 4.569$, $\rho < .05$). The addition of the ICO variable in step 2 explained an additional 4.9% of variation in financial performance. This means that the BSC dimensions and IOC cumulatively explained 27.4% of the variance in financial performance. The result shows that FD and LGD had a positive and significant effect on financial performance at $p < .05$, $\beta = .149$ for FD and, $\beta = .517$ for LGD. This result indicates that the higher the financial indicators (e.g. FD) and learning and growth indicators (e.g. LGD), the higher will be the financial performance. Therefore, H1a and H1d are supported. Meanwhile, other BSC dimensions show no significant relationship with financial performance. Based on this, the proposed hypotheses H1b (i.e., customers' dimension usage positively affect financial performance) and H1c (i.e., internal process usage positively affects financial performance) were not supported.

The hypotheses H2a, H2b, H2c and H2d predicted that IOC moderates the relationship between the four BSC dimensions and financial performance as depicted in Figure 1. To test hypothesis H2, the analysis starts by assessing the beta coefficients for interaction terms in step 3, which shows that IOC moderated the relationship between only two dimensions of BSC usage and financial performance, namely, FD at $p < .05$, $ß = .573$, and LGD $p < .05$, $ß = -.805$. This indicates that H2a and H2d were supported. The introduction of the interaction terms significantly increased the model value (as indicated by significant F change) and raised R squared around 18.8%, and generally the model as a whole was significant ($F = 5.518$, $\rho < .01$). However, IOC showed no moderating effect on the relationship between the other two BSC dimensions (e.g. CD and IPD) and financial performance. Therefore, this result indicates that hypotheses H2b and H2c were not supported.

Discussions

The BSC was introduced as a vital strategic performance measurement and strategic planning matric, which is trusted in achieving the company's goals which include strategic planning, improved communication and improved integrated reporting. Finally it enhances the firm's performance in many respects (financial, operation and control aspects). The BSC shaped based on multidimensional measures that could be utilized to evaluate the company's performance.

This study examined the extent of BSC usage, especially on financial performance. The study indicated that there is a correlation between use of BSC measures and financial performance. The overall result of this study revealed that there is a positive relationship between the overall BSC measures and financial performance. Considering when testing the BSC indicators separately. As the financial dimension was the most used particularly manufacturing cost measurement and the lowest was internal process dimension. This result is in agreement with previous literature; Soubjaki (2019) indicated that Jordanian companies apply both financial and non-financial measures in a balanced scorecard (BSC). Similarly, Jabeen and Behery (2017) revealed that the concept of the BSC is considered good practice in the UAE and the KSA as examples of developing countries, also reflected in other studies such as those by Braam and Nijssen (2009) and DeBarros and Wanderley (2016). Moreover, the moderating effect of IOC through the relationship between the BSC indicator and financial performance was significant. The results indicated that firms will be enhanced financially if they use the financial indicators and learning and growth indicators. The results of customer indicators and internal business process indicators have no significant relationship with or effect on financial performance. According to literature, the study by Zabri and Ahmed (2016) demonstrated that the higher the usage of a non-financial performance measurement system, the greater the effect on the firm's performance. Wang et al. (2013) also revealed that using BSC dimensions has a positive significant influence on a firm's performance. On the other hand, Al-Mawali et al.'s (2010) results indicated that branches of banks with a higher usage of CD and product indicators will have a higher financial performance. The results varied in the study of Jusoh et al. (2008), which indicated that the IND and LGD have a positive impact on a firm's performance, contrary to the FD and CD. The study demonstrated that Jordanian companies faced a competitive business environment based on the intensity of competition results. Therefore, the BSC intergraded dimensions, used as a comprehensive measurement system, are necessary for a firm's long-term success in such a competitive environment. In this regard, the study's results were compatible with the literature review, as Hoang et al. (2018) indicated that the business strategy, perceived environmental uncertainty, intensity of competition and total quality management have significant positive impacts on the usage of BSC. Another study carried out by Braam and Nijssen (2004) revealed that BSC use complements corporate strategy positively and influences company performance, while BSC use that is not related to the strategy may decrease it. Finally, Gomes and Romão (2018) showed that BSC helps to address different environmental and social aspects that are related to the implementation of strategy and their execution within a business unit or at a company level and to meet intensity of competition.

Based on the study hypotheses results, the study indicated that BSC usage has a significant positive relationship with financial performance, which means the capability of BSC dimensions in enhancing the financial performance of the firm. Thus, this result asserted to the main role of BSC that has been considered as strategic management tool that facilitate organizations to align their business activities to the vision and strategy of the organization and improve their overall performance particularly financial performance. The above conclusion is well matched to prior studies; for instance, Alao (2013) examined benefits inherent in applying BSC as against the non- specific approach of appraising employee performance in order to enhance profitability. Likewise, Karasneh and Al-Dahir (2012) indicated that the BSC model is a promising tool for organizations, to assess and evaluate their performance. Soubjaki (2019) the three other perspectives of the BSC less attention. Regarding the examination of the moderator effect of intensity of competition on the relationship between BSC usage and organizational performance, the study revealed that the intensity of competition influenced the relationship between BSC and the firm's performance and moderates the relationship between BSC usage and the firm's performance.

Conclusion and Future Research

In conclusion, the study complies with the contingency theory, which supposes a positive relationship between BSC usage and a firm's performance as a result the enhancement of performance will occur if a good fit occurs between the BSC or measure of performance system and the context variables such intensity of competition.

Based on the study's findings and due to the researching interested nature, the study recommends improving the use of BSC as a strategic performance measurement tool due to its evidenced contributions to enhancing a firm's performance in the Jordanian context by increasing the awareness of attainable benefits of the implementation of BSC. Similarly, the study endorsed the non-financial aspects such as customers, the internal control, the learning and growth as performance measures, and not being limited to the financial measures framework by paying attention to these aspects and the added value that would be gained. In addition, the Jordanian companies need to maintain a higher degree of caution concerning the environmental elements in which they are operating and encourage the firms for more environmental protection instructions. Finally, the study advises that the company will perform better at a high level of intensity of competition if it extends the implementation level of BSC for decision-making purposes; as a result this will lead to better performance. Future research needs to expand the targeted population to cover financial firms, such as insurance companies and the banking sector, which left a gap in this study. In addition, it is suggested that the mixed method is employed as a fruitful research approach and that other research theories are also utilized such as agency theory or shareholder theory. Finally, it is suggested that other factors are studied that can influence the relationship between BSC and financial performance indicators.

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Organizational Performance Consequences of Accountant participation in Strategic Decisions

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Abstract

This research examined the mediating role of accountant participation in strategic decisions on the direct relationship between selected Strategic Management Accounting (SMA) Techniques (i.e. Strategic Costing, Strategic Pricing and Brand Valuation) and organizational performance in Jordanian manufacturing companies. Related literatures were reviewed to develop the theoretical framework. Data were collected using survey distributed to top management (i.e. CFO or reprehensive) in 53 manufacturing companies listed in Amman Stock Exchange. The collected data were analyzed using Amos software to examine the validity and reliability first, then, to examine the research hypotheses. The results support the mediating effect of accounting participation in strategic decisions, and results reported a positive effect for SMA on organizational performance. This study contributes to the body of knowledge in management accounting in the context of developing countries.

Keywords: Strategic Management Accounting, Organizational performance, Jordan.

Introduction

Over the years, the business setting has undergone successive changes because of the huge boom in reliance on information systems, the use of modern means of communication and openness to world markets. Such changes have led to the increasing significance of accounting information, the vital nerve in the decision-making process, which has resulted in attention being paid to the concept of strategic accounting, as this is the area that shows how the strategic management methods reflect the information that accounting seeks to provide. Therefore, there has been a growing call for the need to enhance the information characteristics provided by management accounting to achieve justifiable competitive gain for organizations. Moreover, there have been many attempts to link the developments of accounting with strategic management. In this aspect, accounting literature has included various definitions of strategic management accounting (Al-Mawali, 2015; Tout et al., 2014; Kariyawasam, 2016; Ajibolade, 2013).

Simmonds (1981) initially introduced strategic management accounting (SMA) as a set of management accounting activities that he recommended, in order to include the work of an accountant who provides the necessary information to implement the strategic management of organizations. SMA is based on an analysis of the competitive situation that represents a departure from the general trend towards modern administrative accounting issues at that time. This was because the majority of the information amounted to that which SMA seeks to provide-costs, brand portfolio valuation, and product pricing decisions (Simmonds, 1982). Cravens and Guilding (1999) see SMA as a complement to a range of topics, including cost accounting and management accounting. They also considered the overall focus of management accounting to provide accounting information that supports an organization's

competitive advantage. Bromwich (1990) believes that SMA is administrative accounting and, therefore, Accountant is interested in providing information regarding the final product market. However, SMA is considered to be the product of combining strategy with management accounting.
Grundy (1992) argues that strategic financial accounting incorporates the procedure of examining the financial statements and reports of an organization using both financial and strategic methods. It focuses on the interaction between marketing and management accounting functions, as well as paying attention to the element of competition and external aspects, in order to achieve a competitive advantage in an organization. The researcher tends to brand valuation as one of the SMA techniques, based on Grundy's definition. The emergence of SMA methods has been in line with developments in the modern business setting. These developments have led to increased attention to and focus on accountability concepts by management, in order to discover areas of improvement and add value to the development of accountability systems as well as to support competitive advantages. Strategic accounting involves carrying out sufficient analysis to obtain real results. The ability to extract account results at any time without waiting until the end of the year helps to obtain immediate results and budget reports without the need for closure restrictions. Therefore, the financial statements prepared in the field of financial accounting include information that is financially and strategically useful. Benefit can also be gained from the methods of analysis and ratios that provide a more thorough and comprehensive view of an organization's performance, including its quantification and analysis, as well as its position and future, to show the continuous improvement that strategic management pursues. The rapid variations and growth in a modern business setting have affected the quantity and quality of information that enterprises need in order to quantify and evaluate performance, and hence achieve strategic objectives through specific SMA techniques related to strategic decision-making. There is an urgent need to develop financial performance measurements to handle the rapid and progressive variations in a modern business setting, as well as modern trends of performance extent and appraisal. Performance measurement is essential and one of the key elements of the success of an enterprise in a modern manufacturing environment. It is useful to focus on non-financial performance measures rather than exclusively on financial measures. A comprehensive picture of the entity's presentation should be given in an integrated manner.

The main goals of strategic management are to attain a full understanding of what the organization is doing and why, the degree of commitment of managers and employees, and their relationship in terms of strategic decision-making, which gives them a feeling that they are a part of a firm. In turn, these goals promote a sense of effectiveness among employees though their participation in the decision-making process. Accountants are considered as the most important employees and must be involved in the decision-making process, because of their role in strategy implementation (Cadez & Guilding, 2008). However, there is a shortage of studies that investigate the relationship between accountant participation in the strategic policymaking process and SMA usage related to organizational performance in developing countries such as Jordan (Al-Mawali, 2013). For SMA to be taken into consideration as an intermediary between accountant participation in the strategic decision-making process and organizational performance

The importance of this study stems from its role in indicating the nature of the relationship between accountant participation in strategic decision-making and organizational performance when using SMA techniques. There are many studies that have discussed the relationship between SMA techniques usages on organizational performance (e.g. Al-Mawali et al., 2012; Tout et al., 2014; Becker and Gerhart, 1996). However, the current study examines the role of the accountants' participation in strategic management decisions such as pricing decisions, investment and its impact on organizational performance, taking into consideration the use of specific SMA techniques (strategic pricing, strategic costing, brand valuation) as a mediator variable. Cadiz and Guilding (2008) confirmed the participation of accountants in strategic decisions, and the SMA practice of management-oriented accounting with a focus on operational issues. The researchers agree that this shift has led to several new terms such as "strategic accounting." They have also identified new active roles for accountants such as being key players in broader business analysis and advising clients. Previously, these roles were not assigned to them.

This study is motivated by the scarcity of its subject matter, given the importance of accountant participation in strategic decision-making by way of SMA techniques—strategic costing, strategic pricing and brand valuation, in particular—including SMA effect on organizational performance. In addition, this study is differentiated from previous research as it has used diversity in measuring organizational performance (financial and non-financial), employing three instruments in methodology by way of a mixed method. In addition, limited research has been conducted about the subject of strategic decision-making.

Literature Review and Hypotheses Development

Accountant Participation in Strategic Decision-Making Processes

There is an important role for accounting information in business management 1) verbalizing strategies; 2) collaborating those strategies throughout the organization; 3) emerging and carrying out maneuvers to implement the strategies; and 4) evolving and executing controls to screen the success of the implementation steps, thus enjoying success in achieving the strategic objective (Shank and Govindarajan, 1989; Cadez and Guilding, 2008). Many studies examine how accounting innovation increases a firm's organizational performance and how it helps firms in decision-making. Abernethy and Bouwens (2005) examined their hypothetical model, illustrating that resistance to accounting innovation is influenced by decentralized choices. They also argued that allocation of decision privileges can limit the potential for resistance in two ways: 1) through allowing managers to confirm that their subunits are flexible enough to adopt novel signals provided by accounting innovations and; 2) by allowing subunit managers to be engaged in the design of such systems. Their model likewise enabled them to evaluate the penalties on organizational outcomes when accounting innovations are resisted by subunit managers.

Management accountants support managers in improving the decision-making procedure through the provision of metrics and analysis, as well as accountant's ability to provide information in a timely and accurate manner. Moreover, they should manage information efficiently, including executing work thoroughly or "partnering" with a corporate to facilitate improved decision-making processes and helping value creation (Christensen and Feltham, 2003).

The main purpose of Abernethy and Bouwens' (2005) study was to ascertain how accounting innovation increases a firm's organizational performance and how it helps firms in decision-making. The study addresses the notion that the failure of accounting innovation was due to weaknesses at the organizational level such as training policies and internal management. In addition, the study examined factors that influence acceptance of innovation in a management accounting system (MAS) among the lower levels of managers.

Strategic Management Accounting Techniques

According to management accounting research, many researchers have applied various theories and paradigms as a basis for generalization (Al-Mawali, 2015; Scapens and Bromwich, 2001; Ajibolade and Ojikutu, 2010; Scapens and Bromwich, 2010; Al-Htaybat and Alberti-Alhtaybat, 2013). Moreover, depending on paradigms (Malmi 2010; Lukka 2010), there are some places, variables, concepts, values and practices that constitute ways of viewing reality. They provide and coordinate efforts that aid researchers in expanding knowledge about such issues of interest. As such, this study depends on the contingency theory, which originated from organizational studies. Many researchers have applied contingency theory (Khandwalla, 1972; Haldma, 2002; Ajibolade, 2013; Al-Mawali and Lam, 2015) in management accounting research. It assumes that no single type of organizational structure can be implemented for all organizations. Moreover, organizational efficacy is dependent on the alignment between adopted technology, environmental volatility, company size, and characteristics of the organizational structure and its information system (Ajibolade, 2013; Al-Htaybat and Alberti-Alhtaybat, 2013; Haldma and Laats, 2002; Islam and Hu, 2012; Otley, 1980).

Meanwhile, Bromwich (1990) gave powerful arguments for SMA utilizing two assumptions property costing and hypothesis of contestable markets. He noticed that in quality costing, items are required for the characteristics that they give. Thus, accountants have a part to play in costing characteristics of different items and observing the execution of such traits after some time. He additionally posits that trait costing would require accountants to hold onto key data and cost data. This would involve costing the traits or qualities possessed by merchandise and checking and routinely revealing these expenses. These characteristics of SMA are inconsistent with strategic directions. As a strategy, SMA's main characteristics involve a lasting future guidance period and an outwardly focused viewpoint. Consequently, the authors argued that these characteristics could be a useful tool in determining the appropriate accounting techniques for SMA. From this perspective, technologies must reflect the degrees of these two trends—the external and/or the long-term (forward-looking) business setting. Cravens and Guilding (2001) added three other techniques.

Cadez and Guilding (2008) further drew 16 SMA techniques from these works, classifying these techniques into five broad categories with three categories embodying the concepts of management accounting discussed in management accounting literatures. They are: costing, planning, control, performance appraisal and decision-making. "Competitor accounting" and "customer accounting" are also two distinct categories Table1 shows the SMA techniques.

Table 1: Strategic management accounting techniques

SMA technique categories	SMA techniques
Costing	Attribute costing
	Life-cycle costing
	Quality costing
	Target costing
	Value-chain costing
Planning, control and performance measurement	Benchmarking
	Integrated performance measurement
Strategic decision-making	Strategic costing
	Strategic pricing
	Brand valuation
Competitor accounting	Competitor cost assessment
	Competitive position monitoring
	Competitor performance appraisal
Customer accounting	Customer profitability analysis
	Lifetime customer profitability analysis
	Valuation of customers as assets

Anica-Popa's (2009) study endeavored to find a coordinated approach with respect to the cost examination display and the utilization of the data provided by administrative accounting and cost count in the usage of the systems for expanding the execution of ventures from the development materials industry. Then again, Jinga (2009) attempted to cover the principal parts of costing management and to clarify the assessments of directors in organizations in terms of the data created by the accounting management.

However, different papers proposed to guarantee the improvement of SMA, which was not generally embraced and connected, in both instruction and practice. Noordin et al.'s research (2015) sought to validate its propositions by two research objectives. The first objective was to investigate the extent of SMA information usage among electrical and electronic companies, while the second was to explore the outcomes of SMA information usage. The survey method was employed for data collection. Ninety-seven (97) usable questionnaires were received out of the 595 mailed questionnaires. The results suggested that electrical and electronic companies used SMA information to a high extent. Also, the results indicated that the extent of SMA information usage among companies was significantly related

to certain aspects of the companies' performance. The research revealed some notable developments in terms of SMA.

One of the papers aims to review the prevailing literature about implementing SMA and its part in providing better information for management. One of the studies, which related to SMA in Nigerian banks, examined the extent of practice and application (contribution) of SMA to strategic decision-making, not as a concept, but as a principle of operation, using the survey data obtained from 71 managers in 20 banks. A simple regression estimation technique and Pearson chi-squared test were used for data analysis. The managers were asked about external parts (customers, competitors, and market), and the study found that an SMA core ensured strategic positioning to gain competitive advantage (Obohn and Ajibolade, 2017).

Theoretical Framework and Hypotheses Development

According to the contingency theory, the successful implementation and use of management accounting techniques depend upon precise contingent factors, which include the environment, technology, size and organization structure as well as its competitive strategy, strategic mission, and culture (Al-Mawali, 2015, Ajibolade, 2013; Islam and Hu 2012). Based on contingency theory, there are many factors carrying significant implications for the SMA structure design, such as business strategy, the extent to which approved strategy is purposely formulated, firm size and market orientation.

In addition, the notion of contingency theory assumes that organizational performance is relevant to the alignment of organizational structure with its context. As a result, there is a difference between the performance of companies (Cadez and Guilding, 2008). In other words, there is a positive association between the level of fit and firm performance. Regarding the decision-making process Bartol and Martin (1994) illustrated that decision-making is the process of acknowledging and resolving organizational issues by managers. Crook et al. (2003) argue that strategic management research aims to facilitate exploring ways for performance enhancement.

As a result, it was found that this research can use contingency theory to justify the relationship between independent variables (accountant participation in strategic decision-making) and dependent variables (organizational performance) when SMA techniques are used to mediate this relationship. In addition, Cadez and Guilding's study (2008) used structural equation modeling to collect the necessary data. However, based on the previous literature review and after analyzing the Jordanian business environment, the hypotheses below were developed and will be examined with proper statistical techniques.

H.1: There is a positive relationship between accountant participation in strategic decision-making and organizational performance.

H.2: There is a positive relationship between accountant participation in strategic decision-making and SMA techniques usage (e.g. strategic costing, strategic pricing and brand valuation).

H.3: There is a positive relationship between SMA techniques usage (e.g. strategic costing, strategic pricing and, brand valuation) and organizational performance.

Research Methodology

Research Sample

The population of this study included all manufacturing companies listed on the Amman Stock Exchange in 2017, because these were the industrial sectors most relevant in order to quantify all variables of this study such as SMA techniques (strategic costing, strategic pricing and brand valuation). Thus, it is important to evaluate the extent of accountant participation in strategic decision-

making and the extent to which it affects the organizational performance. All these companies (66 companies) were used as a sample for this study. As the respondents comprised 53 companies, an 80% response rate was achieved (Table 2). The current study aimed to evaluate the degree of accountant participation in strategic decision-making and to what extent it affects organizational performance, which will be outlined using techniques employed by the accountant for making specialized strategic decisions. However, as mentioned, SMA information is generated from accounting. Therefore, the CFO or his/her representative—for example, controllers and CFO are the appropriate respondents to answer the questions.

Table 2: Response Rate of Companies

Type of company	Number
Electrical industries	10
Engineering and construction	4
Chemical industries	6
Mining and extraction industries	19
Pharmaceutical and medical industry	5
Cardboard and paper industries	1
Printing and packaging	2
Textile, leather and clothing	3
Tobacco and cigarettes	1
Food and beverages, class and ceramic	2
Total	53

Variables Measurements

The instrument contained survey items regarding the respondents' participation as accountants in strategic decision-making, organizational performance and utilizing SMA techniques. The details of each variable are explained as follows.

Accountant Participation in Strategic Decision-Making Processes: The current study has used five items to measure the extent of involvement that accountants have in many aspects of their organization's strategic decisions. The items are listed with a seven-point Likert scale (1 indicating not at all involved to 7 indicating fully involved) to determine the level of involvement that accountants have in many aspects of their organization's strategic management processes (Cadez and Guilding, 2008). The five items found in Section B, part two, of the questionnaire were classifying problems and offering objectives, producing options, assessing options, emerging details about options and taking the required actions to put strategic changes into place.

Strategic Management Accounting Techniques (Usage): the current study has applied a measurement used by previous research such as: Cadez and Guilding (2008). Twelve SMA techniques were listed with a seven-point Likert scale ranging from 1= not used at all, to 7= used to great extent.

Organizational Performance: A modified instrument based on previous studies was used to assess company performance. Each manager was asked to evaluate her/his company's performance level by comparing it with the major competitor for eight organizational performance indicators (financial and non-financial). Managers responded to each of the items of performance on a seven-point Likert scale anchored at both ends such that, 1 = Poor and 7 = Excellent (Grafton, Lillis and Widener, 2010). However, in response to possible problems with self-reporting measures, to make sure the reliability and the validity of the indexes and to minimize random fluctuations and anomalies in the data, the respondents were asked to report performance over the past three years (Katou and Budhwar, 2010).

Hypotheses Testing

Hypotheses testing includes assessing statistical relationships between accountant participation (ACPA) in strategic decision-making, SMA techniques and organizational performance. Three SMA techniques groups are used in this case, which includes strategic pricing (STRP), strategic costing (STCO), and brand valuation (BRVA). The analyses are performed in two parts, which involves statistical evaluation with respect to organizational performance measures.

Accountant Participation, Strategic Management Accounting Techniques And Non-Financial Performance

Figure 1 presents the basic structural equation modeling (SEM) path analysis, using a PLS algorithm. It shows the standardized regression weights for effects, factor loadings and R Squares. The standardized regression weights are shown in the following path coefficients table. SEM is defined a technique that analyzes structural relationships (Byrne, 2016).

A path coefficient was used to determine the level of possible relationships between the variables so the figure explains the relationship can be arranged as follows: Firstly, there is a strong relationship between ACPA and STRP; secondly, the relationship between ACPA and STCO; thirdly, the relationship between ACPA and ORPE; fourthly, the relationship between STCO and ORPE; fifthly, the relationship between ACPA and BRVA; sixthly, the relationship between STRP and ORPE.

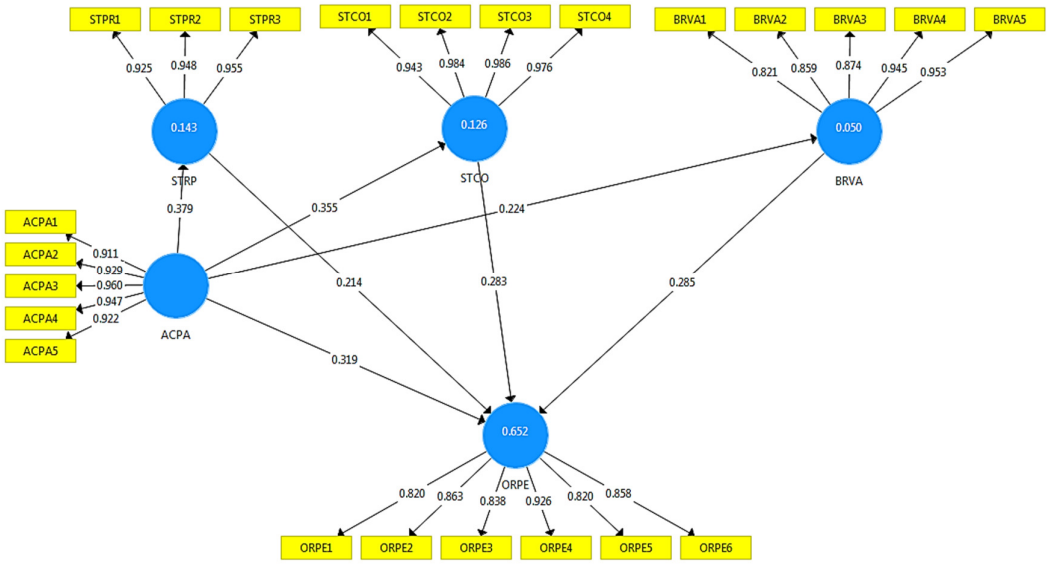

Figure 1: Path coefficients (organizational performance)

In the SEM approach, the path coefficients are standard versions of the linear regression weights that examine possible causal associations. The path coefficient between ACPA and STRP is the highest, i.e. 0.379. In order to determine the statistical significance of each causal association, t-statistic and p-values are used (see Table 3).

Table 3: Testing significance of path coefficients (organizational performance)

Relationship	Sample Mean	Standard Deviation	t-values	p-values
ACPA -> BRVA	0.243	0.155	1.443	0.15
ACPA -> ORPE	0.325	0.119	2.675	0.008
ACPA -> STCO	0.358	0.148	2.397	0.017
ACPA -> STRP	0.385	0.13	2.92	0.004
BRVA -> ORPE	0.308	0.119	2.403	0.017
STCO -> ORPE	0.278	0.17	1.665	0.096
STRP -> ORPE	0.196	0.151	1.411	0.159
Note: ACPA is Accountant participation, BRVA is Brand Valuation, ORPE is Organizational Performance, STCO is Strategic Costing, STRP is Strategic Pricing.				

It was found that the impact of ACPA is statistically significant on ORPE, STCO and STRP at 0.05 level. Moreover, the relationship between BRVA and ORPE is also significant.

The mediating effect or the indirect effect of ACPA (independent variable) on ORPE (dependent variable) is significant. Since the direct effect from ACPA to ORPE was also significant, there is only "partial mediation."

Table 4: R Square Values Statistics

Variables	R Square	R Square Adjusted
BRVA	0.05	0.032
ORPE	0.652	0.623
STCO	0.126	0.109
STRP	0.143	0.127

Discussion

This section evaluates the proposed hypotheses to determine whether they are accepted or rejected.

H1: There is a positive relationship between accountant participation in strategic decision-making and organizational performance.

In this hypothesis, the direct impact of accountant participation (ACPA) in strategic decision-making is examined on the firm's performance. The statistics (t-statistics and p-value) reveal that ACPA in strategic decisions has a significant positive influence on non-financial organizational performance (ORPE) at 0.01 level. The result supports the previous literature, which argues that participation and engagement increase a firm's performance (Barrick, Thurgood, Smith and Courtright, 2015).

The tests reveal that ACPA has a significant influence on strategic costing and strategic pricing at 0.05 and 0.01 level respectively. The path coefficients in both relationships are positive, which suggest a positive impact of ACPA in strategic decision-making on strategic costing and strategic pricing. However, the impact of ACPA on brand valuation is statistically insignificant. It means that the results support the hypotheses 2.1 and 2.2, and do not support 2.3 as per Tables (3 and 4) Based on the SEM approach, the study examines the statistical impact of the three SMA techniques on organizational

performance using t-test and p-values. It is revealed that only brand valuation has a significant impact on organization performance (non-financial) at 0.05 level. While both strategic costing and strategic pricing are statistically insignificant in explaining a firm's performance. The path coefficient in the relationship between brand valuation and performance is positive, indicating a positive influence. This shows that the results only support H3.3. In the case of performance measures (ROA, ROE, and ROI), no significant relationships. These results suggest that SMA techniques, to some extent, are significantly associated with an organization's performance.

For determining the mediating effect of SMA techniques in the relationship between ACPA in strategic decision-making and organizational performance, the research study examines the "indirect effects." The test reveals a significant indirect effect of ACPA on organizational performance at 0.05 levels. Since the direct effect of ACPA on organizational performance was also significant there is only "partial mediation." Therefore, H4 is accepted for organizational performance only. The following table highlights the results of the study:

Table5: Summary for Hypotheses Results

	Accepted/Rejected
H1: There is a positive relationship between accountant participation in strategic decision-making and organizational performance.	Accepted
H2: There is a positive relationship between accountant participation in strategic decision-making and SMA techniques.	Partially Accepted
H2.1: There is a positive relationship between accountant participation in strategic decision-making and strategic costing.	Accepted
H2.2: There is a positive relationship between accountant participation in strategic decision-making and strategic pricing.	Accepted
H2.3: There is a positive relationship between accountant participation in strategic decision-making and brand valuation.	Rejected
H3: There is a positive relationship between SMA techniques and organizational performance.	Partially Accepted
H3.1: There is a positive relationship between strategic costing and organizational performance.	Rejected
H3.2: There is a positive relationship between strategic pricing and organizational performance.	Rejected
H3.3: There is a positive relationship between brand valuation and organizational performance.	Accepted
H4: The SMA techniques mediate the relationship between accountant participation in strategic decision-making and organizational performance.	Partially Accepted

Conclusion

Based on the results of this research, it is concluded that companies are required to set long-term strategic goals since they are influenced by competition and environmental variables. For gaining competitive advantage, companies need to access varied and large amounts of information and allow all members to contribute to achieving the objectives. Numerous studies have explored this phenomenon in relation to the credibility of the organizational information system (Otley, 1980; Duursema, 1999; Schuliz, 2001; Drury, 2002; Haldma and Laats, 2002; Bhimani and Langfield-Smith, 2007; Dumitrana, et al., 2008; Islam and Hu, 2012; Ajibolade, 2013; Al-Htaybat and Alberti-Alhtaybat, 2013). Accordingly, it is apparent across the industry sectors that organizations are adopting and using strategic management concepts of different kinds to cope with environmental variables and developments in economic systems.

Since traditional accounting systems no longer provide a detailed picture of organizational performance, strategic change is also required in accounting systems to reflect the performance of

contemporary organizations. This means that accounting orientation towards strategic thinking in accounting systems is important. The study findings of Al-Maryani and Sadik (2012) reflect this prospect, specifically highlighting the contribution of management accounting information towards strategically directing organizational performance. Accordingly, the current study has further refined this relationship of management accounting information and organizational performance in terms of highlighting the process of decision-making. The study also observed that, apart from the main function of the accounting unit, i.e. systematic recording, analysis, interpretation and summarizing of accounting information These findings are significantly in agreement with the research outcomes of Schuliz (2001) and Kariyawasam, (2016). Schuliz (2001) has clearly articulated the positive influence of information on firms' decision-making, and Kariyawasam (2016) has presented a strong correlation between accounting information and organizational decision-making that particularly fosters performance of the organization. Moreover, it is contended that accounting innovation promotes decision-making and improve a firm's performance (Abernethy and Bouwens, 2005).

Additionally, it was found that accountants support managers in improving the decision-making process by providing useful metrics and analysis (Christensen and Feltham, 2003; Abernethy and Bouwens, 2005). In this regard, the current study applied a number of techniques, such as frequency analysis, graphical analysis, descriptive statistics, factor analysis and structural equation modeling (SEM) to explore the relationship between accountants' participation and organizational performance. The study of Bushraand Masood (2017) also employed the SEM technique to assess the impact of employees' participation and organization performance; however, the identified variables are different. The current study considered manufacturing companies listed on the Amman Stock Exchange. CFOs or their representatives were taken as the appropriate respondents. A 36-item questionnaire was initially distributed to 66 participants and the study included 53 complete/usable responses.

According to the findings of the study, the majority of the respondents fell within the 35-40-year age bracket and have an "accounting" specialty in their last qualification. The general employment tenure of the accountants in the industry with a specific job title is long. A high majority have a bachelor's degree as their highest academic qualification and they work in mining and extraction sectors.

The frequency analysis reveals that accountants consider strategic pricing as an SMA technique and list various factors, including the competitive factor, market growth factor and experience factor. This particular finding is supported by the study results of Guilding, et al. (2000). Guilding, et al. (2000) have also presented "strategic pricing" as the most effective and recognized SMA technique in relation to a firm's performance. Another identified SMA technique involves analyzing cost data based on strategic information to develop and identify strategies to a large extent, which is supported by the findings of Manyaeva, Piskunov and Fomin (2016), Oboh and Ajibolade (2017) and Pavlatos (2011).

Moreover, researchers also examine the financial valuation of a brand through the assessment of leadership and marketing as an SMA technique (Guilding, 1992; Cravens and Guilding, 1999; Tout et al., 2014).

The research study performed SEM to analyze the statistical relationship between accountant participation (ACPA) in strategic decision-making, strategic management (SM) accounting techniques and organizational performance (non-financial and financial performance). The financial performance has been measured in terms of "return on equity" (ROE), "return on investment" (ROI) and "return on asset" (ROA), which is in accordance with the study variables of Venkatraman and Ramanujam (1986) and Al-Mawali, et al. (2012). Meanwhile, the non-financial constructs have been: margin on sales, capacity utilization, customer satisfaction, product quality, development of new products, and market share, adopted from the study recommendations of Cadez and Guilding (2008).

According to the results, there is a positive impact of ACPA on organizational performance (ORPE). This particular assertion supports the findings of Barrick, Thurgood, Smith and Courtright (2015), highlighting the influence of participation and engagement on a firm's performance.

Moreover, the mediating impact of SMA techniques was also evaluated in terms of the relationship

between the ACPA and organizational performance. The results showed that there is partial mediation that is explained by SMA techniques; thus, this supports the findings of Cadez, and Guilding (2008). The researchers agree that accountants must consider strategic pricing and strategic costing as SMA techniques because the accountant can present information that influences a firm's performance in terms of competitive factors and market growth. The researcher also agrees that non-financial indicators are more related to decision-making processes, especially when applied to contingency theory and the variance of the financial ratios between companies.

Recommendations

Based on the results of the study, the following recommendations are made for the management and for future research. Since there is a significant positive impact of ACPA on organizational performance, manufacturing firms should promote and increase participation of accountants in strategic decision-making. The insignificant relationship between ACPA and financial performance may indicate lack of alignment between ACPA in strategic decisions and organizational performance. Therefore, it is recommended that the management align the two constructs. Management may consider ACPA in decision-making to improve strategic pricing and strategic costing. Also, since SMA techniques partially mediate the relationship between ACPA and organizational performance, it is important for manufacturing firms to focus more on strategy costing, strategic pricing and brand valuation. Future research on the topic may take into account other industries and use a larger sample size to achieve more reliable results.

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The "Cost of Accidents" In Public Administering and Strategic Management of Road Transport Safety

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Abstract

The article deals with the economic aspect of motor traffic safety on roadways. Relevant problems on calculating economic losses related to road accidents are outlined. The importance of accurate determining of social and economic parameters of motor road accidents has been emphasized on. It has been also stressed that only reliable statistics data can be objective instrument for estimation the Motor Traffic Safety (hereinafter MTS) guarantee system effectiveness, establishment of its functioning regulation, and formulation of realistic concept of its development. In many countries of the world the national systems for collection, systematization and generalization of motor transport safety information have been recently characterized by insufficient accuracy and inefficiency ways. The analysis of the main MTS indicators has been performed according to outdated methods. For decades in a row the condition of MTS has been assessed by narrow range of parameters that are unable to represent comprehensive picture of the socio-economic aspect of motor transport safety. In its turn it causes the poorness of the original statistical material and the imperfection of the concepts, plans and programs of sectoral development having been worked out on its basis. Taking the above mentioned into consideration, it is obvious that the article contains analysis of modern methods for calculating economic losses caused by road accident, as well as formulation of a set of recommendations for their use in public administering and strategic management on motor transport safety.

Keywords*:* road safety, economy, accident, direct and indirect losses, material damage, cost structure.

Introduction

Strict determined conditions of macroeconomic indicators for traffic regulation level special importance acquires "cost" aspect of its safety. Exclusively on the clear definition basis of amount of material damage (i. e. notional value) from road accidents one can judge the profitability of certain preventive measures and, in general, the effectiveness of the corresponding direction of state policy. Compulsory guarantee of the completeness and objectivity of calculating the economic consequences of the road accidents are the correct determination of their structure. In addition to the obvious losses (damage to vehicles, cargo, road infrastructure, payment for treatment and medical rehabilitation of the victims, etc.) almost every accident causes a number of incidental and consequential costs, which in their totality have a significant impact on the state of the economy (both local and national). Without taking these costs into account it is very difficult

to find out the real economic scale of an accident, to identify priority areas for accident prevention, and to evaluate the profitability of road safety measures and programs.

Having grounded on the mentioned above, herewith should be confirmed that a number of "related" international organizations and foreign scientific-research institutions have conducted series of studies over the last decade aimed at establishing comprehensive list of the harmful (firstly, from economical point of view) consequences of an accident. Based on their generalization, we can distinguish the following components of economic damage from road accident: damage to property; losses related to the death of accident participants; losses related to injury of road accident participants; traffic congestion losses; administrative and legal expenses.

Estimating the Cost of Human Causalities: The Issues of Methodology

Losses related to the death of road users in traffic accidents. Beginning from the 1990's of the 20th century, a series of specialized studies were conducted by US and Western European experts to determine the economic impact of road mortality. By the information of Blincoe, Seay and Zaloshnja (2002), the US Department of Transportation released data that estimated the death of one road user costs $ 957,787. This amount includes: first extra medical aid costs – $ 833; outpatient treatment costs* – $ 22,095; loss from termination of professional activity of a person – $ 595,358; family loss (calculated basing on the market value of childcare services, persons requiring, housekeeping, etc.) – $ 191,541; insurance payments to the close ones and relatives of the deceased – $ 37,120; vacancy replacement costs (this includes the expense for recruiting new employee, the cost of overtime required to complete unfinished projects, and related administrative costs) – $ 8,702; court charges and other civil costs – $ 102,138.

Using the same methodology (referred to in special literature as RME)** Wijnen (2008) estimated one life lost in Netherlands at € 2.4 million (i. e. about $ 3.4 million). By Heslett (2006), in Great Britain the losses related to the death of road users reaches £ 1.4 million. According to Giles (2010), in Australis such losses are about 2.25 million Australian Dollars (approx. $ 2.0 million). The discrepancy between these indicators and the USA data is explained by the later terms of conducting relevant socio-economic studies (obviously, the increase in the amount of losses was significantly influenced by the general inflationary processes) as well as by the introduction of additional criteria for estimation of losses from lethal accidents, such as: age, costs for psychological help to relatives, etc.

It should be noted that many European countries (in particular, Italy, Norway, France, Sweden) use fundamentally different method of taxing the fatal accident, which is based on an assessment of society's willingness to pay for the reduction of risks to life. The mechanism of this technique (commonly known as "Willingness to pay" (WTP)) is as follows. Through a series of sociological surveys, it is to be figured out what amount of money the average citizen of the country is willing to pay in theory to reduce the risk of death in the road accident as a certain amount (let's say, n%). Multiplying the corresponding amount by the number of able-bodied populations, we get socially determined "price" of reducing road traffic mortality by n%. Since the percentage reduction in mortality is just the prevention of a certain number of accidents, it is easy to determine the "weighted average cost" of individual's life, based on available data. For this reason, it is just enough to divide the estimated cost of reducing the risk by the number of deaths to be avoided (Gurzhii, 2018).

As Beckmann (2007) admitted, the WTP methodology has gained wide spreading within advanced economies countries and relatively high standards of living, which has led to the willingness of their citizens to donate large sums of money for their own safety. Taking this into account, the cost of human life calculated by the method of "Willingness to pay", significantly (at least twice) exceeds the amount of direct economic losses from lethal accidents. In the research study of Rodney (2018) are shown

* It goes about people died in hospital within 30 days from the date of the accident.

** of Eng. "Real Money Estimate" – calculation of real money value.

different WTP-based estimations, according to which the cost of human losses caused by road accidents vary from 6 to 11.3 million Euros (approx. 8.5, 12.7 and 16 million USD).

Both of the above-mentioned methods (RME and WTP) have certain advantages and disadvantages. The first is based on objective figures, but does not take into account the aspect of road mortality such as "pain and suffering". Sometimes this leads to the paradoxical conclusion, for example, that the cost of human life interrupted by a road accident may be less than the damage caused by large-scale traffic congestion. The second is devoid of such a flaw, but has a hypothetical essence: it is based not on facts, but only on the intentions (moreover, unconfirmed by practice) of ordinary citizens.

Nevertheless, from the point of view of domestic socio-economic realities, the WTP technique seems more promising. First, in all its conventions, it gives a fairly clear idea of the socially-determined "price" of a person's life (road user). Second, it has been sufficiently tested by European practice and, admittedly, has proven itself well in formulating a number of sectoral strategies. Third, unlike RME methods, the results of which depend on the specifics of national systems of loss calculation (and they are different in each country), WTP methods are characterized by great versatility. Fourth, the WTP technique carries on positive psychological message: it determines the cost of a saved life, while the RME method calculates the cost of death. On the whole, the “Willingness to pay” method has numerous advantages, in particular that it is compact, cheap, relatively simple, and therefore it’s more convenient for immediate implementation;

Losses related to injury to road accident participants. According to statistics, one of the most common consequences of accidents is injuries to road users: pedestrians (up to 40% of the total number of injured), drivers (30%), passengers (15%), cyclists (10%), etc. One in five accidents caused by a road accident, results in permanent disability, one in ten leads to disability of the victim.

The nature and severity of these injuries varies widely. The greater bulk of them are bruise, hematomas, concussions (70%), damage to bones, tendons and joints (12%), traumatic brain injuries (9%), spinal injuries (4%), visual and hearing loss (3%). According to the International Classification of Injuries (MAIS), about 90% of accidents caused by road accidents are related as non-grave (MAIS 1 and MAIS 2 levels), 8% are mid grave severity traumas (MAIS 3), the remaining 2% are serious grave traumas (MAIS 4 and MAIS 5).

Taking into account the high graduation of road injuries, finding out its economic consequences through sociometric techniques (in particular, the WTP technique) it seems very problematic. The vast majority of citizens are not aware of medical classifications for human injury and therefore cannot form a clear opinion about the “price” of reducing correspondent risks (for example, the risk of non-grave trauma, moderate injury, severe trauma, or the like). In this regard, the economic range of road traffic injuries is determined by calculating the cost of the costs incurred. By Thomas, Wozdin, and Mackay (2007) these include: – emergency aid expenses (consisting of the cost of working hours of resuscitation crews, used medicines, fuel, etc.); – costs for outpatient treatment; – expenses for medical rehabilitation; losses from temporary or permanent disability; – insurance and social payments; – loss of life expectancy (calculated as the cost of social services related to the performance of lost childcare and household functions); – expenses caused by the performance of professional functions of the victim during the period of disability; – court expenses.

Analyzing the structure of these costs, Blincoe, Seay and Zaloshnja (2002) concluded that in USA depending on the severity of the injury, their amount can range from $ 170 (minor injuries: bruises, scratches, minor bleeding) to $ 1 million (injuries that result in permanent loss of essential functions of vital activity: damage to the spine, brain, loss of vital organs, etc.). According to estimates by New Zealand experts, the average “cost” of one traumatic accident in road transport is $ 100,000 *(see: The Social Cost of Road Crashes and Injuries, 2019)*. At the same time Wijnen (2010) estimates corresponding damages on 0.25 million Euros ($ 0.35 million).

Along with it, none of these amounts can serve as a reliable benchmark for the economic justification of activities (concepts, plans, programs) in a particular country. The output data of those studies is

strictly determined by the peculiarities of national economies and their basic parameters, such as: the national currency, the market value of goods and services, household income, etc. Therefore, even in countries with approximately equal level of economic development, the same method of calculation gives quite different results. And what is to be said about leaders and "outsiders" of the world economy: their losses from road injuries differ in several orders of magnitude.

The above-mentioned points to the necessity for the introduction of "own" mechanism in each country for assessing the consequences of an accident – a mechanism that would meet generally accepted world standards and, at the same time, fully take into account the domestic economic realities (price situation, level of social security, medical development, etc.).

Direct and Indirect Material (Non-Human) Losses Related to Road Accidents

Damage to property. According to statistics, up to 95% of road accidents finish up by more or less serious damage to vehicles, about 15% – by destruction of elements of road infrastructure (pillars, borders, bumpers and other protective structures), more than 5% – by property defilement of pedestrians rights, cyclists, animal chasers; 1,5% – by damage to valuable, expensive cargo. In addition, some car accidents (0,1-0,2% of the total number) cause damage to objects that are not integrated into the road-street system: residential buildings, farm buildings, yards and the like.

Keeping in mind the absolute dominance within the structure of property losses from road accidents, the costs associated with the repair of vehicles (according to various estimates, their share reaches 95-98%), Burch (2019) finds it inappropriate to calculate the damage caused to other property accurately. In the whole, this approach seems justified. Firstly, the information on the total "cost" of damage to vehicles is sufficient to cover the overall extent of property losses in the road and transport sector. Secondly, the damage caused to the cargo or property (excluding technical means of transportation) by road-traffic users is extremely multidimensional and complex. Therefore, its estimation requires enormous resources, which are not comparable to the weight of the specific result.

However, it is not reasonable to reject the idea of calculating losses from road equipment damage. The amount of these losses is rather large, but the calculation procedure is relatively simple (since the respective objects are on the balance sheet of state and communal enterprises, their current price is determined by universal formula, and all expenses for their renovation are clearly recorded in the budget documentation). Although this issue is worthwhile in-depth consideration; in this case the calculation of property damage is supposed to be economically grounded;

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However, it is not reasonable to reject the idea of calculating losses from road equipment damage. The amount of these losses is rather large, but the calculation procedure is relatively simple (since the respective objects are on the balance sheet of state and communal enterprises, their current price is

determined by universal formula, and all expenses for their renovation are clearly recorded in the budget documentation). Although this issue is worthwhile in-depth consideration; in this case the calculation of property damage is supposed to be economically grounded;

Traffic congestion losses caused by road accidents. A large number of car accidents (especially those occurring in cities) lead to a rapid decline in traffic dynamics and mass congestion of vehicles. Failure of road and street infrastructure, critical damage to vehicles, localization of the accident scene before the arrival of emergency or ambulance vehicles, medical and other services – all this significantly reduces the capacity of the respective sections of roads and streets, disrupts the normal rhythm of traffic flow. As a result, tens, hundreds, or even thousands* of cars are blocked in traffic jams and their passengers are forced to wait for hours to eliminate the effects of a road accident.

In practice, the period of forced downtime results in serious economic losses. Due to constant acceleration of speed, deceleration and the usage of idling of the engine (this is the nature of the movement in conditions of excessive concentration of transport), the wear rates of the main units of the car increase by 10-15%, the average fuel consumption is almost twice. The volumes of exhaust gases and, consequently, their harmful effects on the environment increase proportionally. Drivers and passengers spend free and working hours in traffic jams, which causes a decline in production, reduced productivity, and the application of disciplinary sanctions for late work. Long stay in the car traffic jam and related conflicts cause mental fatigue, irritability, stresses, which is not only harmful for the health of road users but it also sometimes serves as a catalyst for further social behavior (accumulated fatigue can may subsequently result in a domestic altercation, eventually break into profession, or even provoke illegal actions). Traffic congestion is often an insurmountable obstacle for medical, ambulance and other emergency vehicles, including those being in a hurry to the traffic accident scene. As a result, the probability of fatalities increases: according to Smith (2009), long (more than 20 minutes) delays in ambulance crews become an indirect cause of the death of 34.3% of seriously injured road accident participants.

Due to the widespread and multifaceted nature of the damage they cause, traffic jams (especially those occurring at car accidents) have repeatedly been the subject of special economic research. In the course of the latter Garcia (2017) estimated that the total amount of correspondent losses for Western Europe is calculated on the level of about 3.5 billion Euros per year (that is about 150 million Euros per country). Road congestion is thus a major economic problem that needs urgent consideration and resolution on the national state level.

Administrative and legal expenses (costs related to administrative or criminal proceedings). Traffic accident is not just an accident resulting in material damage. It is also a legal fact that "brings to life" a wide range of legal relationships, and causes the launch of a complex legal and procedural mechanism. Depending on the nature of the damage caused, each accident serves as a basis for initiating and considering legal case. This process involves a set of procedural measures and a number of legal documents. It involves statutory entities funded by the state budget (inspectors, investigators, judges, attorneys, etc.). Therefore, legal proceedings always have a certain “price”, which includes: a) the cost of working time for judicial and law enforcement personnel spent on the road accident case; b) the cost of the procedural steps taken in the relevant administrative or criminal proceedings; c) the cost of legal services provided to the parties involved (defendant, victim, etc.).

Considering the relative complexity of the correspondent proceedings and the cost of individual procedural actions (registration of the accident or crime scene, technical expertise, etc.), administrative and legal costs occupy prominent place in the structure of the economic consequences of the road accident. According to Downey and Coalman (2004), the preliminary (police) investigation of one road accident "costs" about $ 120, and the trial of the criminal case, taking into account the services of a lawyer is almost $ 1.3 thousand. The annual expenses involved in implementing the relevant

* The largest traffic congestion in the world was recorded on November 2013 on the streets of the Brazilian metropolis of Sao Paulo. Its total length was 309 km, and the number of participants exceeded 4 million people.

jurisdictions are: 80 million dollars for Australia (Global Status Report on Road Safety, 2015); for the UK it is $ 55 million (Road Casualties in Great Britain, 2019); for the US - over $ 300 million (Jameson, Lesley, and Smith, 2008). Obviously, the amount of this level can significantly affect the profitability of sectoral plans, programs and projects, and therefore should always be taken into account when developing them.

The list of economic consequences of the road accident can be continued. In addition to the above indicated expenses it includes: the cost for fuel and deterioration of vehicles for special purposes (rescue, fire, ambulance ones and the like), for environmental ecological damage from getting of toxic substances into the soil, for the effects of psychological stress caused to road users, for the diseased of fauna objects, and so on. Taken together, they cause a major threat to national interests and civic well-being, which requires road safety to be raised to a higher, overall economic level. The state strategy of traffic safety should be developed and implemented within the framework of economic policy, the main priorities of which are the socio-economic stability of society and state, following the Constitutional rights and freedoms of citizens, legality, and law-abiding of all.

Conclusions

Summarizing the analysis of socio-economic characteristics of the road traffic secure, we can affirm the following. Road safety is a complex, multi-faceted phenomenon that has a tremendous impact on the demographic situation and the global economy. The scale of this impact far outweighs the effects of international terrorism, natural disasters or military conflicts. Considering social "dimension" it is comparable to the loss of mankind from the most dangerous diseases: cardiovascular disease, AIDS, pneumonia. Road accidents are the leading cause of death among young people between the age of 15 and 29, and governmental expenses in approximately 3% of GDP [17, p. 7].

Regarding overwhelming importance of the road safety, global international structures and the world's leading powers include it into the list of major political priorities. Road safety is recognized by them as a key criterion for the efficiency of transport connections, a key to the dynamic development of the economy (in particular, the manufacturing sector), and, at the same time the guarantee of human rights for the protection of life and health (Global Status Report on Road Safety, 2015).

Prioritization of the road traffic secure issues is embodied in the formulation of national strategies and the adoption of long-term targeted programs designed to ensure steady reduction of road accidents and injuries. Each of these programs is the result of complex calculations (estimating, forecasting, calculating), the accuracy of which depends on the completeness and objectivity of information on the socio-economic parameters of the road safety. It is like in general planning, and the rule here is as follows: the more authentic is the initial data, the higher is the reliability of the corresponding calculations. Therefore, the most developed countries pay the utmost attention to the issues of collecting, processing and organizing information that characterizes key aspects of the road safety: technical, social, economic, etc.

Many countries of the Western Europe, North America, as well as of the Asia-Pacific region use comprehensive informational and analytical systems for assessing the state of the road traffic secure, grounded on modern progressive methods and integrated into a nationwide network of statistic accounting. These systems ensure continuous monitoring of the road accidents; provide comprehensive information on its scope, structure, dynamics, socio-economic implications; guarantee prompt updating of relevant statistics; enable synchronous correlation of data obtained through different channels of national statistics. Their introduction not only improved the accuracy of sectoral planning, but also ensured reaching a new level of reliability, efficiency and effectiveness.

Unfortunately, in many countries (including European) such a system has not yet been established. The analysis of the state of road safety is carried out according to outdated methods. The subjects of statistical report operate in separately and in non-coordinated manner, lacking consistency among their structural units. The depth of analytical “processing” is very far from the required level: for decades in a row, the status of the road traffic secure has been estimated by a narrow range of parameters (mostly

the total number of car crashes and their victims) unable to give a comprehensive picture of the socio-economic aspect of the road safety. This, in its turn, causes poor "output" of statistical array and the neglect of the concepts (plans, programs) of sectoral development grounded on its basis.

In the light of the above mentioned, it is necessary to introduce modern methods that are to allow the calculation of expenses on human life and health, as the basic indicator of the budget estimates of national targeted programs, national and regional development programs. Their arsenal should be continuously enriched, but the procedural mechanisms, on the contrary, should be unified and simplified. Appropriate techniques are to include: a) estimation of direct economic losses (property damage, medical expenses, legal expenses, insurance payments, environmental damage, etc.); b) estimation of lost benefits (wages of the victim, GDP per capita); c) the cost of moral and physical suffering; d) estimation of the "willingness to pay" approach (i. e., the amount of money that the average citizen of the country is ready to pay for the risk reduce of the road accidents). The calculations proceeded on this basis should form the foundation of the calculation of the economic part of all national and regional road safety programs, being mandatory criterion at the same time for determining their effectiveness.

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Cooperative Potential as a Key Element of Modern Organization

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Abstract

The purpose of the article is to present the cooperative potential model as a new theoretical concept. This is orderly configuration of eleven elements forming critical factors for collaboration success related to organization has been proposed. These include strategic planning of collaboration, system of communication, gaining financial resources for the partnership, decision-making process, organizing the collaboration unit, assigning tasks, duties and responsibilities, recruiting process of employees involved in cooperation, competences and attitudes of employees, leadership, external support, and goodwill. The criterion of arrangement is five organizational dimensions designated by H.J. Leavitt. The methodology of creating organization's cooperative potential based on inductive top-down theorizing concept. The value of cooperative potential concept is confirmed by the universality and fits each organization, which is a condition of comparability of research results.

Keywords: Cooperation, Collaboration, RVB, Potential, New Theory Management.

Introduction

Rapid changes in the environment, globalization and development of technology mean that there is a need for businesses to adapt to new conditions. They take place in modern organizations that are defined in literature, from a broader perspective, by Marques as (2016) any organization developing its roles in a contemporary society and adopting proactive attitudes to adapt to changes through continuous learning and innovation as organizational culture. A narrower perspective, is suggested by Jahan (2016) describing it as borderless organizations, networking together and collaborating more than ever before. The research shows that in order for a business organization to become successful and strong, it absolutely must have some form of skilled management in line with global development trends (Strielkowski et al., 2016; Łukomska-Szarek & Włóka, 2013; Krawczyk-Sokołowska & Ziółkowska, 2013; Haseeb 2019). A similar trend is cooperation related to specific activities and activities of the organization (Pierscieniak 2014), often implemented to a greater or lesser extent by each organization. In analyzing this global perspective, a question often asked is what the cooperation potential of modern organization involves? What elements make them up? **The purpose of this paper is to present a theoretical model of modern organization's cooperative potential.** It was assumed that potential is unique for each one organization and can be understood as its characteristic feature. Proposing such a purpose is logical, assuming the universality or truthfulness of the thesis that each organization has a cooperative potential that can be determined and compared. The context of comparability is also important because it involves the possibility of distinguishing one organization from another.

The cooperative potential model has been developed, based on the author's interpretation of inductive top-down theorizing concept (Shepherd, Sutcliffe, 2011).

Cooperation and Organization Potential - Research Challenges

Cooperation as a concept has not been devoid of ambiguities of understanding. Several authors have focused on varied aspects in defining the phenomenon. An attribute of cooperation is reciprocity, - interaction between parties (Friend, Cook 2000), or the exchange of information, shared vision or common knowledge development and complementarity of skills, efforts and roles, togetherness in the

creation of new values. It is also considered as relationships, international links (Galutskaia et all 2018) or exposure to collective actions (Ostrom, E. 1990), networks (O'Toole et all 2005), or a systemic approach (Pierscieniak 2015). In this context, the identification of the success factors of cooperation is not simple and should be carried out not as an individual study, but based on the literature of the subject.

The essence of the concept – "potential" is hard to explain. Hence, the methodology of systematic literature review by Tranfield D. et al., (2003) was applied in the literature analysis, which revealed that many authors look at the potential of an organization or enterprise from a broader perspective (Pierscieniak 2013, Caputa 2010). They analyze it in various thematic contexts, such as key resources, processes, organizational value (Jagoda-Sobalak D. (2019) and improvement and modification of organizational activities or in the perspective of the theory of adaptability. The concept of potential is also observable in publications discussing the specific features and attributes of the organization. The key elements of potential are resources, capabilities and organizational relationships perceived as factors, whose aim is to reinforce innovativeness and competitiveness. This conclusion is consistent with the resources approach (RBV). For each organization to compete efficiently and effectively it has to create its resource potentials skillfully (Barney, 1991). The second important element is defining the context, namely, the specific area to which a potential applies. Some organizational resources are important from the perspective of innovation (Krawczyk-Sokołowska et all 2018), while others are from the perspective of competitiveness. The awareness of what given organizational resources relate to enhances the propriety of selection of its components.

Organizations partaking in the construct of cooperative potential do so as a subject. H.J. Leavitt's (1964) organizational model, which has been adopted for this study is considered by other researchers to be the most popular and often cited due to its universalism (Cyfert 2006) in the procedure for the morphological analysis of selected organizations' models and have relied on their criteria-based assessment (Pierscieniak 2015).

Another component worthy of emphasis is the understanding of the environment of modern organizations. In literature, attention has been draws to the impact of the environment on the organization's existence by emphasizing linkages between the components and interacting with its environment (Krawczyk-Sokołowska & Caputa 2012).

Methodology

In order to enhance understanding of the logic of designing the new concept.

Step 1. The literature: It is aimed to review existing publications in search of factors contributing to successful collaboration. The methodology of systematic literature review (Jourdan et al., 2008) was employed to enhance understanding. This has enabled the objective selection of a sensory representation. One very important step of the process was the analysis by Mattessich and Monse (2001), which resulted in two issues, crucial for further stages of the research. First, the cited article was a review article, in which the authors did not just define the set of factors, but also combined them into groups in reference to varied aspects of the collaboration phenomenon, which turned out inspirational. The second, key factor was the simplicity of the goal, the cluster-type methodology and the results obtained. The article served as a base for generating knowledge that applied the "snowball" method, concerning factors encouraging collaboration, identifiable in contemporary organizations. A milestone of step 1 was the identification of a set of key factors of collaboration.

Step 2. Sensory representation that consisted of analyzing the research findings of various authors in search for factors contributing to collaborative success. Although the findings of these studies could be generalized, the issue of any unanimously agreed key for classifying success factors remained lacking. The knowledge gained from the current stage, is that research results on success factors are related more or less to the constituents of the organization where collaboration was implemented as well as its environment. The milestone (key achievement) of this step was the adoption of the organization's perspective as the object of research.

Step3. Conceptual representation**,** which involved searching for such an organizational model, whose constituent elements would serve as templates for classifying success factors of collaboration. In order to choose the organizational model, three assessment criteria (Pierscieniak 2015) were adopted. These include its universality, understood as the possibility of its adaptability to the largest population or its partial adaptation by omitting only a few of its possibly most significant features. Secondly, its inclusiveness, ensures that it covers as many elements as there are that exist in organizations or are analyzed in literature, and thirdly its simplicity, which means naming the elements in understandable ways without resorting to definitions, especially in case studies or while presenting findings to personalities in charge of running organizations on a daily basis. A milestone of this stage was the choice of the organizational model designed by H.J Leavitt and the identification of its key constituents as a benchmark for ordering factors of successful collaboration.

Step 4. The new theory that emerged as a result of ordering the success factors of collaboration in accordance with the adopted guide, including the goals and tasks, people, structure and technology. The organizational environment was adopted as the fifth element of the new theory. The development of a model of the organization's cooperative potential is considered a specific achievement of this stage.

Cooperative potential model of a modern organization - theoretical concept

Creating a theoretical model of cooperative potential is an indication of a configuration of 11 elements ordered by designated areas of H.J. Leavitt's concept (Table 1).

Table 1: The structure of the cooperative potential of modern organizations

Organization's element	Elements of cooperative potential
Aim and tasks	E1. Strategic planning of collaboration at the level of an organisational unit
Technology	E2. Communication system
	E3. Gaining financial resources for the partnership
	E4. Decision making process
Structure	E5. Organisation of the collaboration unit
	E6. Assignment of tasks, duties and responsibilities
People	E7. Process of recruiting employees
	E8. Competences and attitudes of employees in comparison to collaboration
	E9. Leadership
Environment	E10 External support for the idea of collaboration
	E11 Goodwill of a company

Goals and tasks. The organization has several goals, which are defined hierarchically, referring to its strategies. The literature review undertaken (step 2) has revealed that defining goals constitute a significant element of successful collaboration. Researchers do pay attention to several key issues such as the identification of a common vision of collaboration, identification of clear and unique goals as well as their specification. Hence, it is undeniably significant to develop employee awareness concerning the status/ significance of goals and related tasks needed to implement collaboration (Patel et all 2012; Salas et al., 2005).

People. The first is the adequate selection of employees for collaboration. The important issues considered herein are a formalized procedure for a purpose-oriented selection of members for the

collaboration team; awareness of the selection criteria; taking cognizance of the specificity of colleagues' work acquired in collaborative work or his experience working elsewhere in the selection criteria (Gabara et all 2016) In the aspect of human capital management, it is important to identify individual objectives of the collaboration team members as well as to align the tasks and objectives assigned each employee with his expectations and preferences. Equally important is the „fit" of employees at levels of personal interactions, for example, age, gender, interests, etc.

The second important area investigated was competences and attitudes (Zeng, Chen, 2003; Al-Sawa'ei et all 2015), for example, encouraging participation in trainings, employee's belief concerning benefits accruable to collaboration, trust and respect within the group, commitment of group members to the process, success orientation of the employees, employee ability to seek compromise, group members' commitment to achieving results (Grzebyk, 2009; Mizera, Pypłacz 2017).

The third area is leadership. The existence of a collaboration leader (somebody charismatic and success-oriented) is a key component of successful collaboration. The leader's diligence in aligning tasks to employee's competences, developing policy of success amongst employees, clear, transparent and understandable system of motivation acceptable to employees concerned, due diligence concerning integration at unit or group levels, procedures for controlling and monitoring support-related activities of a group as well as participation in resolving employees' problems (Bohen and Stiles, 1998, Grzebyk et all 2014).).

Technology included all components that constitute part of the organization, making up its infrastructure or elements in support of collaboration implementation.

The communication ought to be open and implemented at given levels of frequency. Equally important is the comprehension of communication signals by its recipients, a flexible (suitable to the needs of team participants) communication process, diversity of forms of media communication (adapted to the personality, age, position and tasks), formal and informal communication linkages as well as support for informal communication Unions (Mattessicht et all 2001).

Procedures for securing financing for collaboration and active fundraising constitute yet another group (Mattessicht et all 2001; Davey et all 2012).

The third group of factors is the decision-making process, which ought to be transparent and democratic. Every member of the group ought to participate in influencing its shape. Decisions are arrived at in groups, while only critical decisions are subjected to evaluation. The decision process is both rational and based on experience. Although decision-making processes make use of electronic information-flow, it does not neglect personal contacts (Mattessicht et all 2001; Hammond et al. 2001; Klein 2008; Unsworth, West 2000; Weiseth et al., 2006)

Structure. The literature review concerning the structural components essential for efficient collaboration revealed that there are two of such factors important for success (Burton et al., 2005; Conger, Kanungo, 1988; Hinds, McGrath, 2006; Langfred, 2000; Mannix and Sauer, 2006; Weiseth et al., 2006). The first component was the demarcation of an organizational unit that coordinates the entity's objectives at the partnership level. The location of the unit takes into account the limitation of levels of management (decision-making) and is in harmony with other units existing in the partnership. The organization is alert to the adaptability of its structure to changes as well as its flexibility regarding tasks being implemented.

The second component essential for successful collaboration, ascribable to a structure is the distribution of tasks concerning the implementation of the collaboration. It should be monitored by the leader. Another important thing is the mechanism for adapting tasks to the needs of partners or unit, for example, relative to the need, environmental change as well as changes in personnel composition, etc. Tasks ought to be clearly defined. Another important aspect is the role played by experts (persons of merit or well experienced in partnership collaboration) in decision-making

processes, that can be understood as activating functional roles, while curtailing excessive application of hierarchical roles (Cordery, Soo, 2008; Détienne, 2006; Pinelle and Gutwin, 2001)

Other aspects – organizational environment. The activities of contemporary organizations depend on the influence of their environments. The implementation of collaboration is influenced by two issues. The first of such is the external support for the collaboration concept (Mattessicht et al. 2001), which include political decisions, the policies or activities of institutions. The European Union, for example, views collaboration as a requirement for the provision of finances for innovation (Krawczyk-Sokołowska & Łukomska-Szarek 2018), The second issue is organizational image (Wasiluk 2014), namely, its qualitative experience in implementing tasks in partnership. This involves determining what type of organizations or whether the organization is accepted as a leader in a given sector, where the collaboration is to be implemented.

The set of 11 elements presented is to be treated as a system. With regards to the concept of systems theory (Bertalaff L. von 1968), according to which the system is something more than a simple sum of elements, the occurrence of interactions between system elements is characterized by interrelationships and closed chains of causes and effects form the so-called feedback (i.e. people shape goals, but goals influence people, etc.). These couplings, especially in modern organizations, can lead to the growth of desired results or mitigate them causing vicious circle effects (Magnuszewski 2010). Cooperation, like other areas of the organization's functioning, is subject to such mechanisms.

Discussion

Cooperative potential is presented in literature from different perspectives. Most often it is the ability to cooperate of enterprises, identified by the so-called relational competence (Czakon, 2008). The analyzes are related to the theory of transaction costs (Brandenburger & Nalebuff 1995), game theory (Meng et al. 2019) . The perspective presented in this article is about organizational resources and collaboration is more defined as a process than a relationship. The potential model presented in this article can be treated as a refinement of the P.W. concept. P.W. Mattessich, B.R. Monsey (1992, 2001) in which key success factors of inter-organizational cooperation were indicated. It is also similar in nature to the descriptive concept of CCWM (CoSpace Collaborative Working Model) presented by H. Patel, M. Petit, J.R. Wilson (2012). However, these ideas are distinguished from the presented model by means of grouping criteria, which in the cited concepts is not associated with any organization model. Hence these concepts are identified as factors of successful cooperation and not as cooperative potential.

An important element that have to be discussed is the level of cooperative potential. Let us imagine the case of a firm intending to accomplish goals of a partnership. if the company is small owing to its structural constraints (simplicity and homogeneity of tasks), it commits the entire organization in the collaboration. In another case there is the second company with an elaborate organizational structure with varied organizational units such as production, marketing and sales departments. Collaboration in this enterprise, in practical terms, does not involve the entire organization but only at the level of organizational units. The marketing department cooperates with partners in marketing (advertising agencies) and the production department with raw material suppliers. In fact, these are two distinct areas of cooperation. In putting this into scientific context, I observed that both cases are identified, however, they are achieved based on different theoretical concepts.

The first case applies to the perception of the organization from the praxeological view-point. J. Zieleniewski (1969) by relying on the Treaty of Good Work of T. Kotarbiński (1982) which defines organization as a „whole", whose components mutually contribute to the success of the „whole". All collaborative activities, based on this concept, directly relate to the strategic objectives of the entire organization. The second case illustrates the concept of H. A. Simona & Associates, witch in his conception, acknowledges the assumptions of a harmonious synthesis of human and material resources as a result of the need to improve the excellence of its constituent elements (March, Simon 1964). This case illustrates external collaboration involving specific aspects of the organization, owing to the implementation of its specific objectives.

The discussions presented in the previous sections concerning linking goals of collaboration with organizational objectives from a structural perspective are crucially significant for the credibility of the research findings. A proper definition of the object of study (level of organization or organizational unit) enables the researcher to reach the relevant respondents, better characterize the essence of the collaboration being studied, thus making it essential for the conduct of all necessary synthetic and comparative analyses (Pierscieniak 2016).

The presented concept was verified, from the perspective of classification of the theory presented by Corle, Gioia 2011). In their classification, the authors distinguished two areas of originality and utility. Originality the researchers categorized in two areas (1) advancing understanding incrementally or (2) advancing understanding in a way that provides some form of revelation. The utility dimension translates into (3) practically useful and (4) scientifically useful. The presented model of the organization's potential for cooperation has features (1), (3) and (4). It allows a better understanding of existing knowledge, organizes it and generalizes it, indicating a better understanding of what we already know. The presented concept is useful in the area of science and practice. It can be the basis for developing a tool for measuring the organization's potential for cooperation, for example, further development of knowledge related to measuring the organization's potential for cooperation or its deeper analysis (3). It can also have practical significance. Operationalization and interpretation of the organization's potential for cooperation, understood as an organization’s feature can support the process of making managerial decisions (4). Referring to the essence of the area (2), following the critical thinking process, it is argued that this concept rather in this moment not connect to dimension advancing understanding in a way that provides some form of revelation.

Conclusion

The conclusions relate to the purpose of this article and from two aspects. First, that the presented concept is a theoretical model which we can partly explain the real context of every organisation. The second, is the fact that the organisational potential to collaboration can be recognise like a specific characteristic feature for every organisation.

The presented model of cooperative potential is a fictitious object that has been described using real elements of the organization and its environment. It is a concept that indicates and organizes key success factors of cooperation from the perspective of the organization. It can be defined as the configuration of resources, attitudes and experience of organizations used (or which can be used) in acquiring and implementing cooperation between the organization and external entities**.**

Another conclusion is in recognizing cooperative potential as a characteristic feature of modern organisation. Concluding, if the cooperative potential can be recognised for every organisation, it would mean that it is common. The literature review carried out had no restrictions as to the type of organization, and the application of the universal concept of H.J Levitt's organization. The fulfilment of all its dimensions guarantees the universality of the presented theory through analogies. The elements of the model of cooperative potential sought for in each organization, since it is assumed in the H.J. Leavitt concept that every organization has goals and tasks, people, structure, and technology and functions in a given environment. The difficulty lies in identifying each of the elements and assessing them from the success cooperation perspective. If the model could be operationalized, then its unique configuration (from a qualitative perspective) can be determined or a level of cooperative potential as an assessment of the potential elements (from a quantitative perspective) for each organization can be designated. These values are comparable. This comparability is guaranteed within a given type of organization that has a specific configuration of designated elements. It is also comparable at the level of various organizations by determining the overall level of the organization's cooperative potential.

In the light of these premises, it is worth asking (If?) and (how?) contemporary organizations are prepared to implement cooperation? Do organizations with similar cooperative potential work better then organisations with differing cooperation potential? These two questions (and many others that

can be asked here) suggest new research directions that can be implemented using the theoretical concept of cooperative potential presented.

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Drive and Barrier Factors of Waste Segregation Behavior Using the Theory of Planned Behavior: Case Study at Student Dormitory canteen of XYZ University

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Abstract

XYZ University has implemented waste segregation policy, however The Student Dormitory of this university has not implemented this policy. To implement this policy successfully, there was a need to understand and identify drive and barrier factors of waste segregation behaviour. Theory of Planned Behavior (TPB) framework was used in this study. We used mixed methodology between qualitative and quantitative. Study 1 was conducted qualitatively by interviewing 18 participants related to waste segregation behaviour and management at student canteen dormitory. It was found that the waste segregation had been carried out in dormitory but it was discontinued. However, the dormitory management saw that there was still a need to endorse the waste segregation behavior among sellers and visitors. It was found that the aspect of attitude, subjective norm and perceived behavioural control related to waste segregation behavior. Study 2 was conducted to identify variable that affect waste segregation behaviour based on modification of TPB framework, by adding perceived satisfaction of sorting facility. It was conducted quantitatively, using accidental sampling method, by distributing questionnaires to 81 students and 7 canteen sellers. The results of multiple regression analysis show that only subjective norm variables significantly contribute 25% to the intention to sort waste and only intention and perceived behavioral control significantly contributes 47% to the behavior of waste segregation. Subjective norm and PBC could be considered as critical aspect to intervene the waste segregation behaviour in student dormitory canteen.

Keywods: Perceived Behavioral Control, Subjective Norms, Theory of Planned behaviour, Waste Segregation Behavior

Introduction

Waste management is a big problem that is happening all over the world and universities have a strategic role in solving problems arising from these matters. XYZ University produced 12.75 tons/day in 2011 and there was an increment in 2012 which reached 16.65 tons/day (Mu'minin, Hartono and Gusniani, 2013). If it was not handled properly, it would bring negative impact on the environment and surrounding communities. To overcome the problem of waste, XYZ University has implemented a waste segregation program. This program requires each unit under XYZ University to sort waste according to its type, namely organic, inorganic, residue to be processed according to its type.

Students are the biggest waste producer at XYZ University considering they are the majority group (Priono and Kusumayati, 2014). One of the biggest concentration places for students to gather is Student Dormitory of XYZ University. Waste production was even greater considering that the its functions as a residence so that student activities will be greater than if they were in the Faculty. As a unit under XYZ University, the Student Dormitory has received information about waste segregation program. However, it was found that the waste had not been sorted out so that the garbage was not picked up.

Therefore, there was a need to identify the factors that can improve the compliance of waste segregation in Student Dormitory of XYZ University. Compliance with this sorting must start from each of individual at Student Dormitory as a waste producer (Xu, Ling and Wu, 2018). The behavior of sorting trash can be instilled from the Student Dormitory Canteen of XYZ University considering the amount of garbage produced by the canteen is quite a lot and the types are diverse so it requires sorting.

This study exemined the waste segregation behavior based on the framework of the theory of planned behavior from Ajzen (1991). Many previous researches used TPB as framework to analyze pro-environment behavior. However, the study was usually conducted in quantitative approach. In this study, the author intended to understand further and identify what factors of TPB the influence the waste segregation behavior the most. This identification is necessary in determining the things to be targeted in changing the waste segregation behavior, hence the study was conducted using mixed method approach. This study was a baseline study of interventions that will be conducted later to improve waste segregation behavior. This study targeted two types of participants, namely (1) sellers at Canteen and (2) students as Canteen's visitors.

Theoretical Background

Theory of Planned Behavior

Theory of Planned Behavior (TPB) emphasizes the importance of intention to encourage behavior to occur. Intention is assumed to be a motivational factor that influences behavior; an indication of how hard a person will try, how much effort will be expended to behave in certain ways (Ajzen, 1991). Ajzen stated that intentions could change from time to time because there are many other variables that influence the intention (Ajzen, 1991). This intention is influenced by three things, namely: attitude, subjective norms and perceived behavioral control (PBC).

Attitude is a person's evaluation of behavior (Ajzen, 1991). This attitude is influenced by individual's beliefs about the consequences of the behavior and feelings about these consequences (Welcomer et al., 2010). Attitude is the degree of favorable or unfavorable evaluation related to a behavior (Ajzen, 1991) and is usually based on the calculation of the costs and results of the behavior carried out.

Subjective norms are social pressures for someone to behave or not behave (Ajzen, 1991). According to Welcomer et al (2010) subjective norms are individual perceptions of the evaluation of the social aspects of a behavior and how far individuals are motivated to obey. Miliute-Plepiene, Hage, Plepys, & Reipas (2016) stated that the perception of social norms related to waste segregation can influence sorting behavior in countries where sorting facilities are not yet advanced. Norms inform someone about what other people are doing and individuals can make this as a reference for themselves to perform a behavior both in unfamiliar situations (Schultz et al., 2014).

Social norms consist of two descriptive and injunctive norms (Kallgren, Reno and Cialdini, 2000). Descriptive norms are one's perceptions of what the majority of others do while injunctive norms are individual perceptions of what the majority of people agree or disagree (Kallgren, Reno and Cialdini, 2000). Descriptive norms provide evidence for individuals abour the effective and adaptive behavior (Kallgren, Reno and Cialdini, 2000). Descriptive norms inform the individual of what is usually done in a particular context. Cialdini et al stated that descriptive norms would be activated when salience with the situation (Kallgren, Reno and Cialdini, 2000). Schultz et al stated that descriptive norms to prevent the behavior of disposing of rubbish garbage will be activated in places that are already clean

compared to the dirty ones(Schultz et al., 2014). Descriptive norms work with two rationales namely (1) the majority of individuals often overestimate the prevalence of undesirable behavior and (2) individuals use perceptions of their groups as a standard for comparing behavior (Schultz et al., 2007). Descriptive norm messages sometimes carry a boomerang effect (Schultz et al., 2007). In behaviors that are considered negative, descriptive norms will provide information to people who do not do negative behaviors that are common in their groups so there would be a chance they imitate negative behaviors.

In contrast to descriptive norms, injunctive norms are morals that apply in groups and are usually accompanied by consequences when individuals do or do not do these norms (Cialdini, Kallgren and Reno, 1991). Therefore, the use of norms will be more effective if it uses a combination of descriptive and injunctive norms that are in line (Schultz et al., 2014). Motivation for behavior would increase when the behavior to be performed is considered normal to be done and socially agreed upon by the group. In addition, injunctive norms provide direction for individuals whether their behavior is agreed or not approved by the group.

The last, Perceived Behavioral Control (PBC) is the resources or opportunities available for someone to allow behavior to occur (Ajzen, 1991). PBC is also an actual perception of control to behave, this can also affect behavior directly. PBC is a person's personal assessment of his/her ability to do something, an assessment of direct or indirect obstacles that can be perceived as facilitators or inhibitors of a behavior (Welcomer et al., 2010). PBC can be from internal factors (information, personal flaws, abilities, and emotions) and external factors (opportunities, dependence on others and obstacles) (Armitage and Conner, 1998). Several studies have shown that PBC is the biggest contributor in sorting intention and behavior (Knussen *et al.*, 2004; Mannetti, Pierro and Livi, 2004; Botetzagias, Dima and Malesios, 2015). In addition to intentions, the TPB theoretical framework also illustrates PBC's direct contribution in influencing behavior. PBC varies in nature depending on the context in which the behavior will be carried out (Ajzen, 1991). If intentions are constant, the success of predicting one's behavior will depend on PBC.

Perceived Satisfaction to waste segregation facility.

Zhang et al. (Zhang et al., 2016) stated that waste sorting facilities also play a big role in determining someone to sort waste. The theoretical model of TPB could make someone not to do waste segregation when facilities are not available. The lack of effective sorting facilities not only inhibits the possibility of someone to sort but also reduces one's intention to sort them out (Zhang et al., 2016). Zhang stated that if the presence of a facility can influences sorting behavior through two mechanisms, the first is as a determinant of PBC variables and influences behavior through intention. Knussen stated that PBC will be stronger when perceptions of the lack of facilities are low (Knussen et al., 2004). The second is as stand-alone variable and parallel with the intention to influence behavior (Zhang et al., 2019). Sorting facilities not only exist but must also create a sense of satisfaction for individuals who do waste sorting. A study that also uses the TPB framework found that in addition to attitude factors, subjective norms and PBC, satisfaction that the available sorting facilities also influenced sorting behavior (Stoeva and Alriksson, 2017). They compare the sorting conditions in Sweden and Bulgaria where Bulgaria was considered as a country with poor sorting facilities. The results found that satisfaction with sorting would influence sorting behavior. In Sweden, where the sorting facilities are good, the dimension of attitude influences the sorting behavior the most. Stoeva & Alriksson (Stoeva and Alriksson, 2017) stated this was because in countries where the sorting facilities were already advanced, sorting had become a well-internalized value so that attitude would be the greatest determinant of sorting behavior. In countries where the sorting facilities are not yet advanced, satisfaction with the facilities will encourage the people to sort out. Considering that the waste sorting program at XYZ University has only just begun, the researchers are of the opinion that satisfaction with the facility will affect the intention and behavior of sorting.

This research was conducted as a baseline study for intervention programs to improve waste sorting behavior. This is important in order to find the right solution to instill waste sorting behavior in the Student Dormitory Canteen of XYZ University. Therefore, it is important to explore the factors that

can be the driver or barries the behavior of waste segregation. To explore this, researchers conducted two types of studies. Qualitative studies were carried out to to understand the context by exploring the description of waste segregation behavior, the information about sorting program, identifying the factors that can be a driver or barrier in conduction the behavior. Quantitative studies are carried out to identify the factors of TPB has most contribution of the intention and behavior of waste segregation so that they can be used as a reference for intervention methods. Qualitative and quantitative studies were carried out in order to get a comprehensive baseline on the behavior of sorting waste and also factors that need to be improved in the intervention program later.

Study 1: Qualitative Study

This qualitative study was conducted to answer two big questions, namely (1) How does individuals n University Student Dormitory canteen segregate their waste? And (2) What factors influence the behavior of sorting waste in the XYZ University Student Dormitory based on TPBr?

Design

This qualitative research was carried out by *case study design*. Qualitative methods are used to have better understanding about how waste sorting behavior can be formed among XYZ University sellers and visitors (Kumar, 2018). Case studies are one of the qualitative methods (see Willig, 2008, & Glasser and Strauss, 2006). The case study method is a qualitative approach in which the researcher explores a limited system using detailed data collection, abundant sources of information and reports findings in the form of descriptions and themes that are specific to the case (Willig, 2008). According to Willig this method is suitable when researchers intend to look for descriptions and explanations related to certain phenomena (Willig, 2008). The question framework given to participants was prepared using the theoretical framework of TPB from Ajzen (Ajzen, 2006).

Participants

We interviewed 18 participants that were related to process of waste segregation, both at XYZ University and XYZ University Student Dormitory. There were 11 women and 7 men who were willing to be interviewed. 2 participants came from the XYZ University waste management team, 1 participant was the Student Dormitory coordinator who handled waste management in student dormitory, 1 participant was the CS coordinator, 4 participants were CS Student Dormitory, 7 participants were Dormitory students and 3 participants were canteen sellers.

Procedure

The selection of samples was based on purposive sampling from Kumar (2018) which the target participants stakeholders, students and sellers of the XYZ University Dormitory canteen. Interviews were conducted using questions that how individual carry waste segregation behavior, individual opinions, perceived benefits, positive and negative consequences when individuals do not sort waste, the social norms related to the behavior, factors that facilitate and make it difficult for sellers to sort, knowledge about the sorting program, facilities provided and satisfaction with these facilities.

Technique Analysis

The verbatims were made from the recorded interviews. Then the data was processed through a coding process, with steps: collecting data retrieval results, making segmentation of categories, and labeling these categories (Glasser and Strauss, 2006). The author provides coding, then asks an expert in the TPB field to re-check the coding that the author made. The coding process was based on TPB theory adding new categories that were not in accordance with the TPB theory framework. The initial coding process from verbatim shows several similar categories. Similar categories were then grouped into broad themes of the TPB's theoretical framework.

Qualitative Study Result

From interviews with various parties mentioned previously, the writer found several themes related to the behavior. Some of the themes were the description how waste segregation was carried, attitudes towards waste segregation, subjective norms related to waste segregation, and PBC related to waste segregation.

a. Waste Segregation Behavior

From the analysis, it was found that waste segregation is a familiar term among canteen sellers. For the sellers, at least once a year they will receive training from the Occupational Health and Environmental Safety unit regarding the standardization of food and waste management that should be done by the canteen seller.

> *'We usually have training. Got information about the waste segregation between organixs and anorganics. But those behavior was not occurred in Dormitory.'* (D, *Seller*)

They also claimed that there had been an effort to segrgegate the waste in the dormitory in the past but this was continued. They had no idea about the reason why waste segregation is not implemented in the dormitory.

> *'In the past, there was and effort to segregate waste. I have sorted the trash, but somehow in the end, the trash was mixed. I also don't know why the waste segregation program in discontinued.' (O, seller).*

It can be concluded that the XYZ University Student Dormitory had implemented a waste segregation program in mid-2018 discontinued. In contrast to the sellers, the students know how to sort the waste from the waste bin facilities in their faculty. At least there were two types of bins found by students in each faculty, namely organic and inorganic waste bins. Some students have also seen bins for plastic bottles and cups and also for paper. When asked about waste segregation in the dormitory, all students stated that the dormitory had not yet implemented a waste segregation because there was no waste bin to indicate the existence of a waste sorting program.

> *'I am also confused why the dormitory has not started to segregate the waste. Even though in Japan alone it has been separated into category 11 types, but I don't know why this dormitory has not started it yet' (E, Student)*

b. Attitudes of waste segregation behavior

Students and some sellers also know the has some good evaluation related to waste segregation

> *'Yes. good for the environment. Waste that was sorted can be processed again so it does not accumulate in the bin '(K, Seller)*
>
> *'Waste segregation is an effort to protect the environment. Waste that can be recycled so new products can be made (from the waste) and produce economic benefits (Z, students)*
>
> *'Waste does not accumulate and becomes a source of disease* (A, *Students*).

From the statements above, it can be seen that the seller and the student already know the good benefits of waste segregation. The consequences mentioned are all positive so it can be concluded that the evaluation of waste sorting behavior is positive and related to the environment and health.

c. Subjective norm of waste segregation behavior

This knowledge of the benefits of sorting did not make the waste segregation behavior occurs among sellers and students at Student Dormitory Canteen. It could be because of the absence of strict rules for ordering canteen sellers and visitors to segregate the waste.

> *'Yes, if there are written rules from dormitory management, like a letter that was stated that every indvidual were obliged to sort trash, I think all canteen sellers will segregate the waste' (K, Dormitory canteen seller)* (K, *Dormitory canteen seller*)

It can be seen that there was a need for rules as injunctive norms that was stated which bevahior is allowed or not. The consequences and feedback from sorting behavior is also considered important factors in encouraging waste sorting behavior both among sellers and students. These consequences and feedback factors are considered to strengthen the injunctive norms prevailing in the dormitory.

> *'Like a warning letter given to seller, can make them obey to segregate twe waste. For example, there are sellers who don't sort out being reprimanded by the dormitory management via letters, we must be diligent to segregate the waste' (K, Seller)*

> *'If we have done waste segregating, we want to know how well we have performed. For example, could someone from dormitory management can give us input on how well we segregate the waste, if there is something that we still done wrong, so we know what to do' (O, Seller)*

> *'In the dormitory there is a canteen supervisor, the canteen supervisor could be assigned to monitor the waste segregation process. He/she reprimand students when sorting wrong, students then become more aware to sort out (M, Student)*

In addition, the influence of fellow canteen sellers and fellow students was also found. They claimed that they would see and copy what others did. What others did as a source of behavior to occur can be the example of descriptive norm

> *'(I usually) Look at the sellers on the righ or left of my counters, Do they sort the waste? If they did not, then I wouldn't do it' (R, Seller).*

> *'Did other canteen sellers do it? If they didn't, would they get punsihment? If they did not get punishment for not segregating the waste, neither I would do it'(O, Seller)*

> *'The students usually do what other students do. There must be someone who gives an example, the practice to sort the waste, hence the other can follow. But once, there some individuals, who are not obedient, surely others will also follow (not to sort the waste) (R, Students)*

From the above results it can be concluded that there is a need for existence of injunctive norms and descriptive norms in encouraging waste segregation.

d. *Perceived Behavioral Control* (PBC) of Waste Segregation Behavior

The facility factor is also referred to support the waste segregation behavior. When this study was conducted, the author only found one type of rubbish bin provided by the dormitory management and t was used to contain all types of rubbish. From the interview results, it was found that that there was a lack of of waste bins in the canteen to contain all the waste produced.

> *'Not like in the Faculty, the dormitory management only provide one type of waste bin. When the weekend came, the waste bin could not contain all the waste produced since the waste are not picked up by the CS team. It is useless to segregate the waste since it would be mixed up in the end.' (E, Student)*

> *'If the Dorm management can provide more waste bin to segregate the waste, I think we will be more compiled to sort the waste, but the problem at the canteen countes is that there is only one type of waste bin. '(R, Seller)*

The signage on the waste bin was also found as an important factor. One student stated that sometimes she was confused to dispose of waste according to his type because they were in a hurry to segregate the waste. The existing signage position did not make it easy for individuals to see. Usually the position of the signage wass on the body of the waste bin so individuals need to look down to see clearly.

> *'If you are in a rush, we usually can not see what kind of waste bin is. Usually the information is below (on the body of the waste bin, ed.) So you have to bow down first and know what this garbage is. If there is time, you can do it, but if you hurry it is difficult. '(AN, Student).*
> *'It will be easier if the signage can be put in position that is easily seen by people, if possible you don't need to bow anymore'* (E, students)

It can be concluded that the existence of waste bins is important for waste segregation at the Student Canteen Dormitory of XYZ University canteen. In addition, the waste bins needs to be equipped with signage posted in a location that is easily seen by people so that the they know how to segregate the waste based on the type.

The conclusion of qualitative study

It can be concluded that the waste segregation had been tried to be implemented but discontinued because the waste produced was still mixed. We also found that there was a need to instill the behavior of waste segregation given that the garbage was still mixed. In brief, conclusions from the results of the interview can be seen in the table below.

Table 1: The conclusion of the qualitative study

No	Theme	Results
1	Waste segregation behavior	Sellers: • Have training in segregating the waste • They used to do it but currently discontinued
		Students: do not segregate their waste
2	Attitude	All participants have positive evaluation related to waste segregation behavior
3	Subjective norm	There was a need for injunctive norm (such as rule and consequences) and descriptive norms (such as behaviour example from others to implement waste segregation behaior
4	*Perceived Behavioral Control*	Driver factors: • The availability of waste bin to sort with well informed signage
		Barrier factors : • The waste bin is not enough • Hurry situation when disposing the waste • Unclear and confusing signage on the waste bin

Study 2: Method and Result of Quantitative Study

From a qualitative study, it was found that the behavior of sorting waste has not been continued by the sellers and visitors of student dormitory canteen. The number of themes that can be represented in the TPB variable was also found. To identify which factor would contribute most in affecting waste segregation behavior, we conducted quantitative study. In addition to the variables from the TPB theory

framework, researchers also included the variable satisfaction with sorting facilities, considering that XYZ University has provided several facilities in the framework of sorting but not in the dormitory. The hypothesis for this study were

H1: attitudes, subjective norms, PBC and satisfaction with sorting facilities will predict intention to sort waste.
H2: Intention, PBC and satisfaction with sorting facilities will predict intention to sort waste behavior.

Design

This research was conducted using quantitative methods, cross sectional study and non-experimental research. Quantitative cross-sectional study method was done by using a self-report questionnaire using the TPB framework from Zhang et al. (2016) which measured attitudes, subjective norms, perceived behavioral control, intentions and behavior to sort waste and we also added satisfaction with waste sorting facilities from Stoeva and Alrikson (2017) which was adapted in Indonesian.

Participants

Quantitative data were obtained from those who worked as food vendors in the canteen. We also distributed questionnaires to boarding students who were eating in the canteen. It was distributed to 88 participants consisting of 81 students and 7 sellers. Participants weere 52% men and 48% women. For students, the majority came from the Faculty of Cultural Sciences by 19% and Faculty of Mathematics and Science by 16.7%. The age of the participants is in the range of 18-45 years, and the average age (M) is 20.08 years.

Procedures

Sample selection was based on an accidental sample. The data obtained by the author by visiting the XYZ University Dormitory Student canteen and asking the canteen seller or student willingness to participate in research. Before filling out the questionnaire, the researcher explained the purpose of the study and the time needed to fill the questionnaire. An informed consent was signed when they agree to participate.

Measurements

TPB questionnaire that was used in this study using a 6-point likert scales; point 1 shows strongly disagree and point 6 shows strongly agree. From the analysis of validity (internal consistency) and reliability (Cronbach alpha), the authors argue that the measuring instrument used has good validity and reliability, that can be seen as follows:

Table 2: The final validity and reliability in this study

No	Measurement	Items	Reliability (α)	Validity
1	Attitudes	4	0,73	0,41-0,67
2	Subjective Norms	5	0,81	0,20-0,82
3	PBC	6	0,80	0,30-0,74
4	Intention to segregate the waste	3	0,65	0,30-0,54
5	Waste segregation behavior	6	0,84	0,6-0,79
6	Perceived Satisfaction to waste segregation facility	4	0,75	0,53-0,67

According to Kaplan and Sacuzzo (2009) Cronbach alpha values between 0.4-0.75 can be categorized satisfactorily and above 0.75 can be categorized as good. Also according to Urbina (Urbina, 2004) a

minimum correlation value of 0.2 can be categorized as good for the internal validity category. Therefore, it can be concluded that the items used have good validity and reliability.

Analysis Technique

The answers from participants were converted into scores. The total score for each variable was used to analyzed and mean centering was performed for the total scores. Hayes (2013) suggests mean centering when the measured variable does not have a value of zero (0) in facilitating interpretation of the equation. The author conducted a multiple regression analysis in interpreting the relationships between variables by using SPSS 22. This analysis technique was based on research from Stoeva and Alrikson (2017). The first author regresses the attitude, subjective norms, PBC and perceptions of satisfaction with facilities towards intention. The second stage is using multiple regression of PBC variables, perceptions of satisfaction with facilities and intention towards waste sorting behavior. The regression equation can be seen below.

Quantitative Result

The proposed regression model proved significant in predicting the intention to sort waste (F (4.82)=6.94, p=0.00) and this model explained 25% of the variance of waste segregating behavior (R^2=0.25). Only subjective norms contributed significantly (b=0.16, p=0.03) in predicting intention while attitudes (b=0.15, p=0.28), PBC (b=0.14, p=0.14) and satisfaction with facilities (b=-0.01, p=0.91) was not significant in predicting intention.

Table 3: The result of multiple regression to waste segregation intention

	B	**SE B**	**β**
Constant	-0,10	0,27	
Attitudes	0,15	0,14	0,14
Subjective Norms	0,16	0,07	0,26*
Perceived Behavioral Control	0,14	0,09	0,2
Perceived Satisfaction to Facility	-0,01	0,08	-0,01

**significant level of confidence 95%*

For H2 analyisi, we found that the regression model was proven to be significant in predicting the behavior (F (3.83)=24.42, p=0.000) and this equation explained 47% of the variance of waste segregation behavior (R^2=0.47). Only intention (b=0.18, p=0.04) and PBC (b=0.39, p=.00) significantly contribute to waste sorting behavior while perceived satisfaction with facilities (b=0.12, p=0.07) not significant in predicting sorting behavior.

Table 4 : The result of multiple regression to waste segregation behavior

	B	SE B	β
Constant	-0,38	0,24	
Intention to segregate the waste	0,19	0,09	0,18*
Perceived Behavioral Control	0,39	0,07	0,52**
Persepsi Kepuasan terhadap Fasilitas	0,12	0,09	0,18

**significant at level of confidence 95%, ** significant at level of confidence 99%*

The conclusion of Quantitative Study

From the results of the analysis above it can be concluded that only a portion of H1 researchers are accepted, that is, only subjective norms that can significantly influence the intention to sort waste.

Similar to H1, researchers can only accept partial of the H2 hypothesis where only intention and perceived behavioral control affect waste segregation.

Conclusion and Discussion

Based on qualitative results, there were differences in knowledge between sellers and students regarding the waste segregayion program at XYZ University where the seller knew about the program and the students did not know. This could be because the seller had received training about the waste segregation program while the students had noy. It was also found that the seller at student dormitory canteen used to do waste segregation but it was discontinued.

Qualitative results have also succeeded in identifying the existence of TPB factors in waste sorting behavior. From the aspect of attitude, the researcher found if the participant's evaluation of waste segregation was positive. They agreed that sorting out trash is good for the environment. From the aspect of subjective norms, it was also found the role of rules and consequences that apply if individuals do not sort trash in the canteen. This can be identified as injunctive norms (Schultz *et al.*, 2014). Beside injunctive norms, it was also found the factor of the example that was done by other people in the XYZ University Dormitory canteen. Participants admitted that they had to see other people first (such as friends or visitors of the Dormitory) sorting out trash so they were influenced like to sort out trash. This can be identified as a descriptive norm (Kallgren, Reno and Cialdini, 2000; Schultz *et al.*, 2014). In addition, the other factors that support the waste sorting behaviour are existence waste sorting bin with well informed signage, while the barrier factors for waste segregation are rush time to dispose the waste, insufficient number of waste bins and unclear and confusing signage on the trash bin. These factors can be identified as PBC for behaviour to occur.

From the quantitative results, HI is only partially proven, which only subjective norms significantly influence the intention to sort. Subjective norms contribute 25% to explain variants of the intention to sort waste. In contrast to the findings of other research (see Tonglet, Phillips and Bates, 2004; Greaves, Zibarras and Stride, 2013), there was no attitude contribution and this could occur because waste segregation was not being a value for individuals in student dormitory. Awareness of the importance and benefits of sorting still needs to be increased among XYZ University students so that the contribution of this attitude dimension can be increased. This study also did not find a contribution to PBC and satisfaction with waste sorting facilities at intention.

The findings of the contribution of subjective norms are in accordance with the research of Miliute-Plepiene *et al.* (2016) and Niaura (2013) who emphasize the importance of the role of subjective norms. According to Miliute-Plepiene et al., the role of subjective norms is important in the initial phase of the program for the place that has not started the waste segregation program. Individuals will see what others do before they segregate the wase that the examples of other individuals need to be emphasized in terms of subjective norms (Miliute-Plepiene *et al.*, 2016). This is also consistent with qualitative findings that existence of rules and examples from others in influencing individuals to do the waste segregation.

The analysis also shows that only a portion of H2 research has been proven. Intention and PBC contribute 49% to explain the variance of the behavior of sorting garbage Intention and PBC are the biggest predictors in influencing the behavior of sorting garbage. This is in accordance with the theoretical framework of Ajzen (Ajzen, 1991) which states that behavior is influenced by an individual's intention to do something taking into account the perception of control that he has to perform the behavior. However, to increase the intention can be done by intervening the subjective norms.

This finding shows that by increasing confidence in the sorting control in an individual (PBC), it will improve the behavior of waste segregation directly to the behavior. The results of this study are also consistent with the findings of Stoeva and Alrikson (Stoeva and Alriksson, 2017) that PBC is also the biggest predictor in an environment where waste sorting facilities are not yet advanced.

However, finding in this study differs from those of Knussen (2004) and Stoeva and Alrikson (2017) where satisfaction with the waste sorting has not been proven to influence the behavior of sorting waste. This can happen because the emphasis is not on satisfaction but on the availability of trash bins in the XYZ University Student Dormitory Canteen. As long as there are enough trash bins, it will facilitate of the waste segregation. In addition, trash bins with easily-understood signage that inform the type of waste being sorted can also help improve sorting (Zandecki, 2012; Árnadóttir *et al.*, 2019).

Besides the information in the signage, the signage location on the bin also has impacts. Based on qualitative study, we found that it was difficult to see *signage* if they were located on the body of the waste bin. People should bow to read the signage. If the *signage* can be put on the top of the waste bin, it would make people easier reading the signage. The existence of information to sort the waste has been identified to increase PBC according to Ajzen (1991).

The findings in the study make the role of subjective norms and PBC become large because this variable will contribute to the intention of sorting as well as the behavior of sorting garbage in the XYZ University Student Dormitory canteen. To improve subjective norms, approaches through injunctive norms such as rules and consequences can be applied (Schultz, 1999; Kallgren, Reno and Cialdini, 2000). However, the application of this rule requires strong supervision to be able to impelemented. In addition, the selection of models or agents to provide modelling of waste segregation can also be done to intervene in subjective norms via descriptive norms (Schultz, 1999; Zandecki, 2012).This is in accordance with research from Miliute et al., which stated that in an environment that has not sorted waste, examples of behavior from other people can be a trigger for segregating the waste (Miliute-Plepiene *et al.*, 2016).

To further enhancing the PBC, the perception of ease in sorting must be increased. Increased knowledge about how to sort that was easily seen and undestood can be done by putting the signage on the top of the waste bin. Also the provision of waste bin that is enough to contain all the waste produced can be consideded to improve PBC and then will directly influence the behaviour.

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The Analysis and Evaluation of The Functioning of An Employee Suggestion System on The Example of An Enterprise from The Transport Industry

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Abstract

The article discusses the problem of the employee suggestion system (ESS) in production companies. Based on the data from a representative international company, the system performance was assessed. A number of parameters describing the system were presented, among others: a degree of participation – the percentage of employees who participate in the system, a degree of adoption – the percentage of submitted. Over half (58%) of submitted employee ideas can be classified as suggestions referring to organizational areas, followed by ideas related to work safety and the environment 22%, quality 15%, costs of organization 5%. The article is a continuation of research on the subject of the Polish economy.

Keywords: Employee Suggestion System (ESS), lean management, transport company, kaizen.

Introduction

The paper aims to present the quantitative and qualitative data regarding the operation of an employee suggestion system in a transport enterprise. It shows figures relating to the number of reported and implemented employee ideas, a theoretical division of the reported ideas, time for implementation of an employee idea, the data presented on a comparative basis. The end of the paper summarizes and evaluates in general the functioning of an employee suggestion system in a transport enterprise.

The paper aligns with the research on an enterprise, the elaboration [Jagodziński, 2016, p. 201-214] evaluated effectiveness of a production department. The article is also a continuation of the elaboration published by the Central and Eastern European Journal of Management and Economics (December 2017) [Ostrowski, 2017b, p. 259-270] which presented a theoretical approach towards importance of employee suggestions systems in practice. The implementation of continuous improvement for enterprise X was evaluated in [Ostrowski, 2016, p. 27-40] and [Ostrowski, 2017a, p. 99-120]. This paper provides results regarding an employee suggestion system elaborated on the basis of the data received from enterprise X.

Apart from its elaborated ideological fundamentals , the concept of Lean Management includes a wide list of practical tools which enable an effective transformation of an organisation operating on the basis of „lean" management contributing to reduction of manufacturing time, reduction of space occupied by a process, reduction of inventories, an increase in employees' flexibility etc. (a detailed description of Lean tools was presented by: [Czerska, 2014]) Polish enterprises most often use the so called employee suggestions systems enabling employees of all levels and departments (including administration) to report all kinds of ideas, suggestions, remarks etc. which are subject to a specific procedure (reporting, opinion, implementation) contributing to an effective struggle with wastage type 8 (muda) which is unused employee creativity. Systems for reporting ideas generate huge

benefits for an enterprise not only of material nature but also non-financial one. Particular importance is attached to successful usage of Lean tools affected by permanent and consistent creation of continuous improvement environment as well as an ability to fully engage employees in changes. (Benefits of applying lean tools in counteracting wastage are presented, inter alia, in [Byrne A., 2013, p. 15-17]).

The Polish employee suggestion system is strongly embedded in the Japanese philosophy of Kaizen made popular by Masaki Imai in his book „Kaizen. The Key to Competitive Japanese Success" [Imai M., 2007]. This approach mainly the emphasises enhancement of morale and engagement of employees as opposed to an American approach where the main emphasis is put on financial incentives [Gołaś, 2016, p. 2]. Lasrado and associates conducted a valuable review of the literature regarding indicators the effectiveness of employee suggestion systems [Lasrado, 2016 p. 316-330]. As far as the implementation of the Lean based approach is concerned, a valuable elaboration constitutes [Hasle 2014 p. 40-53]. Two approaches to the issue of employee suggestions, a modern and a traditional one, are described by Pakdel and associates [Pakdel, 2014, p. 66-68]. In their work Gołaś and associates have shown how an employee suggestion system influences effectiveness of an enterprise. It was measured by the number of implemented employee suggestions in various areas of operation. The greatest impact referred to the quality i.e. 27%, safety/ergonomics 23% and cleanliness 18%. [Gołaś, 2016, p. 6]. In his work Marx draws attention to the fact how management's involvement is essential to the development of an employee suggestion system, he also proposes factors to be measured in order to evaluate this approach [Marx 1995 p. 17]. Measures like the number of received, implemented or rejected suggestions are key indicators and therefore have been analysed by this paper.

Description of Company Activities

The enterprise under consideration is the biggest international investor in the transport industry. It employs over 1500 people in Poland. It has got 4 production facilities in Poland- in Silesian region, Łódź, Masovian and Lower Silesian regions. The facility in Lower Silesia has continued the tradition of manufacturing vehicles: bodies and bogie frames since 1833. After 1945 the company was one of the biggest in Poland in terms of the production volume and the number of employees. Since 2001 the company has belonged to an international concern based in the North America. Transport companies from Germany, Sweden, Switzerland, USA and Italy use its products. The enterprise employs 700 employees: 200 in administration and 500 in production.

An overall evaluation of years 2006 – 2016

Employee Ideas Reported and Implemented

The employee suggestion system was initiated in the company in November 2006. It was preceded by a coherent information and marketing campaign, production and administration employees were trained. Until May 31st May 2016 (the analysed period) a Continuous Improvement Department (CI) received in total 6282 ideas from the employees. The administration employees reported 2283 (36%) ideas whereas production employees made 3999 (64%) suggestions. Considering the 11-year period, on average 571 ideas were reported. 4062 ideas were implemented over this period. However, 1320 ideas were formally rejected which means that according to an initial analysis carried out by a person taking a reported idea and/or a person giving an opinion, the so called expert, the suggestion was not justified. When gathering the data for this elaboration additional 900 applications which were being elaborated, analysed, approved or abandoned were marked as rejected. An idea abandoned means that when realizing it there were circumstances which in the initial phase had not been identified or there were economic or organizational reasons for stopping implementation etc. Table 1 and Figure 1 present an overall share of reported, implemented and rejected employee ideas. To better illustrate the trends a relation of implemented to reported ideas was presented. The most ideas were reported by employees in 2009 whereas the smallest number in 2007. The biggest number of reported ideas was implemented in 2009. The highest ratio of the implemented

ideas to reported ones was observed in 2013.

Table 1: The number of implemented and non-implemented suggestions made by employees according to departments in company X broken down into years

Year	Number of reported ideas	Number of implemented ideas	Number of rejected ideas	Relation of implemented to reported ideas %
2006[1]	*34*	*27*	*7*	*79%*
2007	*331*	*222*	*109*	*67%*
2008	*790*	*500*	*290*	*63%*
2009	*1133*	*687*	*446*	*61%*
2010	*652*	*431*	*221*	*66%*
2011	*985*	*652*	*333*	*66%*
2012	*408*	*286*	*122*	*70%*
2013	*390*	*301*	*89*	***77%***
2014	*387*	*279*	*108*	*72%*
2015	*811*	*509*	*302*	*63%*
2016[2]	*361*	*168*	*193*	*47%*
Total	***6282***	***4062***	***2220***	***66%***

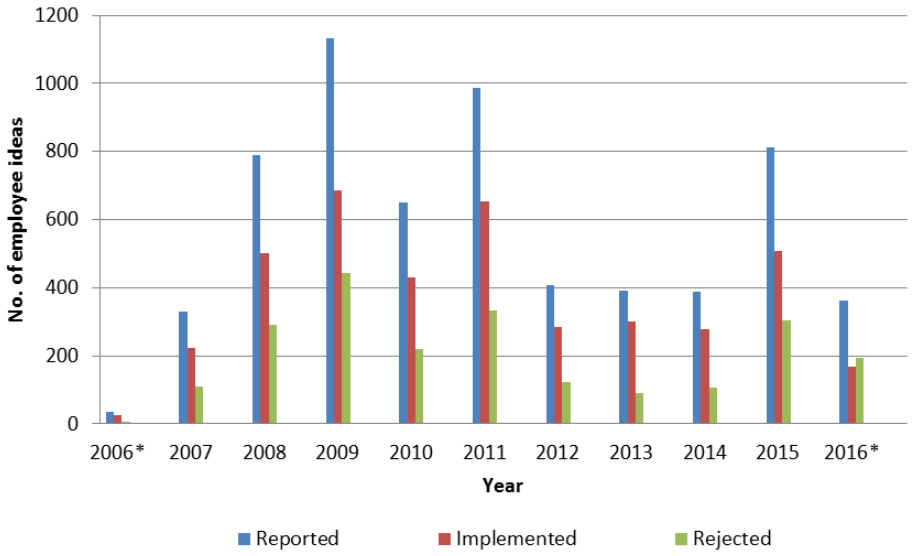

Fig. 1: The number of reported, implemented and rejected employee ideas - an overall comparison of years 2006 – 2016 (source: elaboration based on the information provided by an enterprise)

Thematic Division of Ideas Reported

Considering the topics of the ideas, there were 5 categories (the authors are aware of the fact that the presented division is of arbitrary nature- a particular idea may be assigned to a few categories; this elaboration assumed the solution enabling a free and clear analysis of the data):

a) Safety and hygiene at work- ideas aiming to increase the level of safety,

[1] The period of 1.11.2006 – 31.12.2006 was taken into consideration.
[2] The period of 1.01.2016 – 31.05.2016 was taken into consideration.

b) organizational– ideas aiming at a broadly understood improvement of management way, organization of a production or administration process, information transmission, marketing and social issues etc.,
c) quality- ideas referring to the improvement of quality at work, processes etc.,
d) costs- ideas affecting directly reduction of costs,
e) environment- ideas enhancing ecological protection.

Attention should be drawn to the fact that the above division is of arbitrary nature and results from the available data – organizational hierarchy of ideas. In the international literature environmental improvement usually include elements like a public image of a company or the safety aspect of an employee [Govindarajulu 2004 p. 370]. In this context the comparison with foreign data should also include work and safety at work and environmental issues as one. Table 2 and Figure 2 present a thematic division of reported ideas accounting for 2006 – 2016.

Table 2: Thematic division of reported employee ideas – an overall approach

Year	Organizational	Work and safety	Quality	Costs	Environmental	Total
2006	17	5	7	3	2	34
2007	166	70	47	41	7	331
2008	373	170	**211**	29	7	790
2009	**634**	**324**	115	**56**	4	1133
2010	340	199	73	38	2	652
2011	567	257	92	55	**14**	985
2012	245	67	59	30	7	408
2013	288	2	65	31	4	390
2014	283	2	75	24	3	387
2015	533	140	102	34	2	811
2016	214	110	29	8	0	361
Total	**3660**	**1346**	**875**	**349**	**52**	**6282**

Over a half (58%) of reported ideas of employees may be classified as suggestions referring to organizational areas followed by ideas related to work and hygiene at work (21%), ideas regarding improvement of quality ranked the third (15%), the fourth place was occupied by reduction of costs of company operations (5%), finally the smallest number of suggestions were reported in environment protection (1%). A Chi square test was also carried out, its result was 543.9, d.f. = 40, p-value smaller than 10-7 which indicates dependence between the topic of a suggestion and a year it was reported. Unfortunately, the dynamics of company development does not allow us to define which determinant affects such values. Lasardo and associates indicate 32 factors determining the quality of an employee suggestion systems, the further part of the paper deliberates some of them [Lasardo 2016 p. 14-16].

Fig. 2: Thematic division of reported employee ideas – an overall approach (source: Authors' elaboration based on the information provided by a company

Evaluation of An Employee Suggestions System

The overall number of work days which employees devoted to implementation of reported ideas amounted to: 266 976 considering that a work day is 8 hours – the total hours is 2 135 808. It means that on average implementation of an idea took about 67 days i.e. 536 hours. Another parameter considered involves a coefficient of ideas reported by employees as compared to worked employed broken up into particular years (the specification in Table 3). Formally, the parameter represents the number of employee ideas per one employee – this is one of the basic measurements illustrating the operation of an employee suggestion system in an organization.

Table 3: The number of reported employee suggestion as compared to the number of workers employed

Year	Number of workers employed[3]	Number of reported ideas	Number of ideas per employee
2006	No data	34	No data
2007	692	331	**0,48**
2008	940	790	0,84
2009	836	1133	1,35
2010	522	652	1,25
2011	506	985	**1,95**
2012	395	408	1,03
2013	632	390	0,61
2014	576	387	0,67
2015	690	811	1,18
2016	700	361	0,52

The highest value of the ratio was noted in 2011, on average 2 submissions were made per an employee, the smallest value was reported in 2007 when one employee reported 0.48 idea. Figure 3 presents a scatter diagram illustrating the relation between the number of ideas reported assigned to one employee over the years as compared to the number of employees.

[3] The data refers to workers employed on the basis of the labour law as of 31st Dec of a specific year

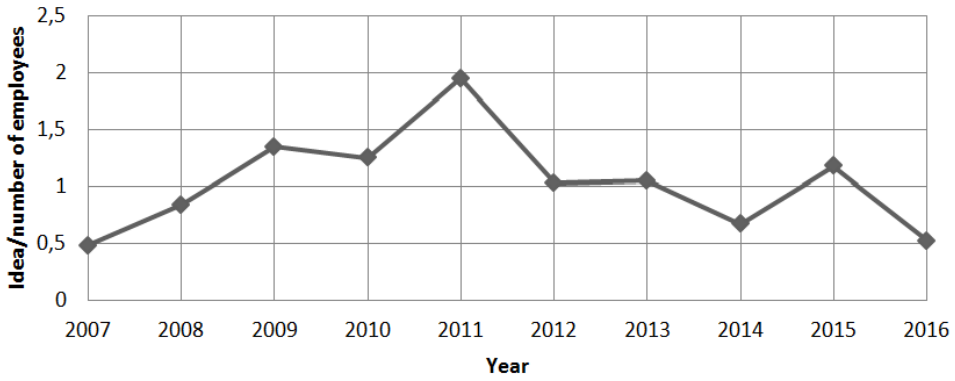

Fig. 3: Number of ideas reported by employees compared to the number of employees (source: Authors' elaboration based on the information provided by a company)

Having considered the entire period of years 2007 - 2016 the research analysis revealed that on average there was 1.03 of reported idea per employee, having eliminated 2016 the analysed indicator amounted to 1.09. A research was made showing that there was no direct interdependence between the number of employees and the number of reported ideas (the correlation ratio 0.34), similarly there is no dependence between dynamics in employment and changes to the number of suggestions (correlation ratio 0.13). It is interesting that the research was made in numerous companies regarding the number of suggestions per one employee and most often the result is within the range 0.5 a 2.0. For instance in [Marin-Garcia 2008 p. 62] the ratio fluctuates between 0.45 and 1.89. Table 4 presents the relations of the number of employees and the number of implemented ideas and this way the number of ideas per employee was calculated.

Table 4: The number of implemented employee suggestions compared to the number of employees

Year	Number of employees	Number of implemented ideas	Number of implemented ideas compared to the number of employees in total
2006	b. d.	27	b. d.
2007	692	222	0,32
2008	940	500	0,53
2009	836	687	0,82
2010	522	431	0,83
2011	506	652	1,28
2012	395	286	0,72
2013	632	301	0,47
2014	576	279	0,48
2015	690	509	0,74
2016	700	168	0,24

The highest value of the ratio was noted in 2011 when on average per employee there were 1.28 submissions, the lowest value was observed in 2007 when one employee reported 0.32 of an idea (2016 observed the lowest value 0.24 of an idea, however due to an incomplete year the result may be lowered). Figure 4 presents a scatter diagram showing a relation between the number of implemented ideas per one employee over the years.

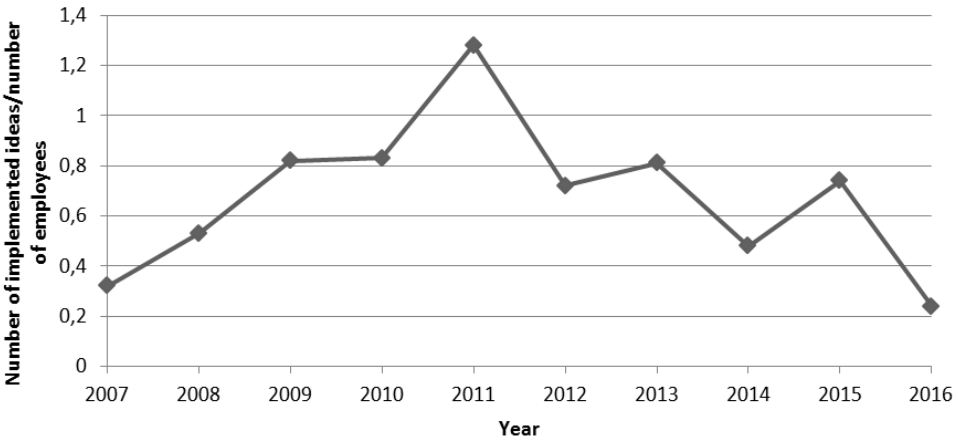

Fig. 4: Number of employee ideas (implemented) compared to the number of employees (source: Authors' elaboration based on the information provided by a company)

The research analysis covered the entire period of 2007 - 2016 and revealed that on average per employee there was 0.60 of an implemented idea, eliminating full 2016 the analysed ration has grown and amounts to 0.66.

When evaluating justifiability of implementing an employee idea, one of the basic criteria taken into account involves costs and independence of implementing a reported suggestion into corporate operations. The most valuable ideas are those implemented by a reporting person and implementation is done using available resources (without the need of incurring additional expenditure). There were 1418 suggestions identified in the company under consideration constituting about 35% of all implemented employee ideas.

By analyzing the data received from the organization it is impossible to evaluate this point accurately due to the lack of precise remarks. The valuation of savings resulting from the operation of the suggestions system made use of a „temporary saving" indicator, which had been used for the first time to describe idea number 4064 (date of reporting: 2012.03.08) and had the value of 20 minutes. It was not systematically updated over the subsequent periods so on the basis of these data the picture of savings is underestimated. According to the possessed information the overall saving of time amounted to 2012 - 2016 53 500 minutes i.e. 892 hours. Assuming a work day of 8 hours it denotes 111 days of saved time.

Conclusions from the research carried out

Since May 2016 (the analysed period) the Continuous Improvement Department (CI) has received 6282 ideas submitted by employees, the administration employees submitted 2283 (36%) ideas whereas production employees 3999 (64%). It can be noticed that:

- the greatest number of reported ideas was observed in 2009 – 1133, at the same time over the years 2008 and 2009 the company employed the biggest number of employees, the smallest number of submissions was noticed (excluding incomplete years of 2006 and 2016) in 2007 – 331 which was at the beginning of the employee suggestion system's operations;
- similarly, the greatest number of implementations was noticed in 2009 – 687, the smallest number of submissions in 2007 – 222, (excluding incomplete years 2006 and 2016);
- The most favourable value of the ration between the number of implemented ideas and reported ones (in 2013 – 77%, the smallest value noted in 2000 – 61%, - for the entire surveyed period the ratio amounted to 66%. The international literature usually defines this parameter as a degree of adoption – a percent of submitted suggestions which were implemented. Example adoption ratios from the literature for tycoons like Xerox Venray amounts to 14%, KPN 11%, Shell 5% [Van

Dijk 2002 p. 391], in this context the performance of the surveyed company may be described as significant;

- Over a half (58%) of submitted employee ideas may be classified as suggestions referring to organizational areas then there were ideas related to safety and hygiene at work (21%), quality related ideas occupied the third place in ranking (15%), reduction of operational costs took the fourth place (5%), whereas the smallest number of suggestions was included in category of environment protection (1%), however considering safety and hygiene at work and environment as one category would constitute 22%;
- on average it took 67 days to implement one idea - ok. 67 – the fewest number of days was noticed in 2015 – about. 40 days whereas the greatest value was observed in 2007- over 129 days, it should be emphasised that over the years the number of days needed for implementing an idea since its submission has decreased which illustrates that an enterprise is smoothly improving procedures of implementing an employee suggestion into business practice;
- the ratio of reported employee ideas compared to the number of employed workers amounted to 1.09 in the analysed period, the smallest value was observed in 2007 – 0.48 whereas the biggest in 2011 – 1.95 of an idea;
- the ratio of implemented employee ideas compared to the number of the number of employed workers amounted to 0.66, in the analysed period, the smallest value was observed in 2013 – 0.47 whereas the biggest in 2011 – 1.28 of an idea;
- employee ideas were implemented by the authors of suggestions by themselves - 1418 i.e. about 35% of all implemented employee suggestions.

The research results presented in the article confirm a certain regularity (trend) outlined in the theory of operation of employee suggestion systems in enterprises. The moment of suggestion system begins the process of generating a huge number of ideas submitted by employees. The launch of the suggestion system begins the process of generating a huge number of ideas submitted by employees and implemented by the company. It is called quantitative period and in the described company it covers the years 2006 – 2009. During this time the submitted ideas constitute a very small contribution to improving the functioning of the organization, i.e. their added value is small. Company policy should enable support and promotion of the existence of an employee suggestion system during this period. When so-called the quantitative period passes, the suggestion system is transformed into a qualitative period (in the described company it covers the years from 2010). The number of ideas submitted and implemented by employees decreases, while their qualitative value increases. Ideas generate so-called added value, bringing great benefits to the company in terms of reducing operating costs, increasing the quality of processes, production of services, etc. Employees familiar with this tool are more aware of their impact on the process of participation in organization management. Of course, the trend outlined does not always fully reflect the above-mentioned regularity, in 2011 and 2015, an increase in the number of ideas submitted and implemented was noted. This was also due to the greater number of employees and a larger number of production orders.

Benchmarking of an employee suggestion system's operation in enterprise X

Carrying out a comparative analysis of the system is only possible after choosing the right model which will constitute a reference point. The elaboration has assumed that such a comparative point will be constituted by the complex research conducted by Łukasz Dekier and Adrian Grycuk called "Employee suggestions programmes. Experience of Polish enterprises" carried out in 2014 as commissioned by the Association of Management Poland. It was conducted on the sample of 249 representatives of continuous improvement department from manufacturing and service companies taking part in 3rd Open Lean Conference in Poznań in 2013. [Dekier 2013]. The obtained research results were accepted as the national average illustrating the operation of employee suggestions systems in Poland. The comparison is presented in the table including comments.

When analysing the comparative data one may claim that enterprise X ranks significantly higher than the national average taking into account effectiveness of an employee suggestion system's operation.

When benchmarking four indicators, higher values were obtained as compared to other surveyed enterprises, only as regards time of receiving the feedback by an author of an idea the result for enterprise X was lower than the enterprises in Poland.

The above diagnosis allows us to draw a final conclusion:

The employee suggestion system is a permanent element of a continuous improvement process in enterprise X, the employees know its principles well, effectiveness of the system is strictly related to an overall condition of the manufacturing facility. A tendency is noticed as regards the number of workers employed in the enterprise and the number of reported and implemented ideas (although formally it is not a correlation). The analysed indicators suggest that the implementation stage of this tool of continuous improvement is on the medium level and exceeds average indicators for representative enterprises in Poland. It should be noticed that certain areas, elements need improving.

Table 5: Comparison of indicators included in the report "'Employee suggestions programmes. Experience of Polish enterprises" and the indicator characterizing the employee suggestion system in enterprise X. Source: Authors' elaboration based on the information provided by a company and [Dekier 2013]

Description of an indicator	Indicator value from the Report	Enterprise X
Possession of an employee suggestion system	82.3 % of manufacturing enterprises in Poland have an employee suggestion system	The system has been operating since 2006.
Participation in an employee suggestion system	36.2% reports at least 1 idea	In total: 47.3% Production workers: 54.3%, administration: 40%
The number of reported ideas compared to employment	0.65% of an idea	1.09% of an idea
Relation of reported to implemented ideas	60.2%	66%
Feedback received by the idea's author (days) regarding implementation of an idea or its rejection	17.1 days	67 days is the value of the indicator illustrating the number of days from submission to implementation – the authors assumed 1/3 of this value was the time for making a decision and in the discussed case it amounted to 20 days

An effective employee suggestion system should have the following elements:

1. Employee interest in submitting ideas.
2. Simple ideas submission.
3. Quick and effective evaluation of ideas.
4. Constructive and comprehensive feedback.
5. The idea is implemented as soon as possible.
6. Ideas are reviewed for additional benefits.
7. Employees deserve recognition and the program celebrates its successes.
8. The program is measured and constantly improved. [Robinson, 2006]

In the described enterprise, the following recommendations were developed to improve the operation of the employee suggestion system.
Practical recommendations:

- adding the "consequences arising from the observed problem" box to the application form,
- on the boards of the CI department located in production halls and in administrative buildings, it is advisable to place completed "ready" prints as so-called template for correct completion similar to administrative offices, post office, etc.
- encouragement of so-called"Groups of observers", i.e. employees who are inactive participating in the employee suggestion program,
- emphasis on increasing the involvement of administrative staff,
- showing benefits for employees resulting from submitting and implementing ideas in the form of illustrative comparisons - by visualizing the message it is easier to reach employee awareness than by providing "dry" data on achieved financial or time savings,
- modernizing the IT system to make it more transparent and user-friendly
- propagating group ideas, i.e. at least two employees,
- intensifying marketing activities promoting the employee suggestion system - using e.g. the company newsletter,
- creation of an acceptable measure enabling an objective (counteracting subjectivity) evaluation of a specific idea by a CI department employee or expert, taking into account examples of elements: ease of adaptation, originality, creativity, independence of implementation, economic factor, impact on other operating areas, etc. Assigning appropriate weights to individual ingredients, you can create an indicator that clearly decides whether or not the idea is implemented according to the principle stated by P. Drucker "if you can't measure something, you can't manage it."

Recapitulation

The paper presents results of research on the employee suggestion system in one of the biggest international companies in the transport industry. Ideas of employees were first used in 2006, the presented data describe a 10-year history of operation. In the company over a half of suggested solutions is placed in the organizational area, to a lesser extent in the safety and hygiene at work aspect, costs and environment (c.f. Fig. 2). A management change is usually easier than physically rebuilding an entire process e.g. a manufacturing one thus solutions regarding this aspect are dominant.

Detailed conclusions and the comparison of enterprise X with the conditions of the Polish economy have been presented in chapters 3 and 4. The number of employee suggestions per one employee ranges from 0.48 to 1.95 with an average above one idea per employee. Despite the fact that no direct correlation between the number of employees and the number of reported ideas was noticed, the boom of the suggestion system occurred over the years when employment was the highest. The analysis of dynamics also indicates that a big rotation among the staff has a negative influence on the number of new solutions.

The average time between submission and implementation is 67 days in the company under consideration. In extreme cases this time extended to over a year. It reveals the complexity of the process of evaluating and implementing a new project, a solution as every idea is unique. The transition from the hidden knowledge into open knowledge is of enormous importance even if ideas have a limited scope and are implemented by their authors themselves and that was the case in the researched company in 35% cases.

This paper is a continuation of the research on application of lean tools in Polish companies and contributes another view on the Polish economy. Polish companies with foreign capital do not fall far from the European standards but in some cases they exceed them. The paper also aims to display basic indicators applied in this operation area to managers willing to implement an employee suggestion system.

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La Educación Para La Niñez Y La Juventud: De La Exclusión De Saberes A La Construcción De La Interculturalidad En El Suroccidente Colombiano

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Resumen

Este trabajo presenta un avance del estudio sobre la educación para la niñez y la juventud: de la exclusión de saberes a la construcción de la interculturalidad en el suroccidente colombiano. Este territorio posee espacios rurales geoestragicamente ubicados y ancestralmente privilegiados por su diversidad cultural, paisajística, biológica y epistémica y requiere que sus comunidades y las instituciones educativas institucionalizadas y no institucionalizadas se piensen y construyan proyectos comunes hacia la construcción del tejido humano. Esta investigación tiene como propósito reconocer la heterogeneidad de pensamientos y subjetividades, a través de la estrategia de investigación- acción-participación(IAP), en dos instituciones educativas, las cuales abarcan 15 sedes y 140 niños, niñas y jóvenes, con quienes se viene trabajando en proyectos de aula, diálogos escolares, espacios de reconciliación entre otras acciones y lenguajes no monoculturales. Con esta apuesta, se espera la desnaturalización de la indiferencia, escuchar sus voces, validar experiencias y construir trayectos para pensar en el verde esperanza, el verde de la naturaleza y el verde de la humanidad.

Palabras Clave: Educación, heterogeneidad, Interculturalidad, subjetividades.

Abstract

This paper presents an advance of the study on education for children and youth: from the exclusion of knowledge to the construction of interculturality in the southwest of Colombia. This territory has geostragically located and ancestral privileged rural spaces for its cultural, landscape, biological and epistemic diversity and requires that its communities and institutionalized and non-institutionalized educational institutions think and build common projects towards the construction of the human fabric. The purpose of this research is to recognize the heterogeneity of thoughts and subjectivities, through the research-action-participation strategy (IAP), in two educational institutions, which cover 15 locations and 140 children and youth, with whom we worked in classroom projects, school dialogues, spaces for reconciliation among other actions and non-monocultural languages. With this commitment, the denaturalization of indifference is expected, listening to their voices, validating experiences and building paths to think of the green hope, the green of nature and the green of humanity.

Keywords: Education, heterogeneity, Interculturality, subjectivities

Introducción

La invisibilización de las diversidades culturales, sociales y personales afecta múltiples espacios y territorios (Barriga, 2015), uno de estos, es el de la educación donde a pesar de los avances sobre

nuevas concepciones para entender a la juventud y la niñez en la contemporaneidad y sus múltiples capacidades para pensar, reflexionar, dinamizar, agenciar , argumentar y relacionarse; aún prevalece el énfasis en la educación asistencialista y de transmisión de conocimientos . De esta forma se corre el riesgo de eliminar las capacidades de los niños, niñas y jóvenes para pensar, relacionarse, planear y soñar por vía de la estandarización de los conceptos, de los currículos, homogeneizando el pensamiento e impidiendo que aflore lo diverso.

Así, desaparece el espacio para lo diverso(Castro-Gómez, 2005) y, a través de prácticas escolares instrumentales se naturaliza la etiquetación, la exclusión de lo diferente en relación al pensamiento y la cultura y la escuela como un lugar pluriespacial de múltiples lógicas, acciones y relaciones (comunidad- escuela, maestro- estudiante, maestro- familias, comunidad – maestro) como uno de los pocos espacios que para los niños para lo común , lo cooperativo y solidario y que provoca pretextos, textos escritos orales y corporales como hilos para la construcción del tejido humano.

Esta investigación tuvo como propósito reconocer la heterogeneidad de pensamientos y subjetividades en niños, niñas y jóvenes que asisten a dos instituciones educativas en la ciudad de Cali, suroccidente colombiano para la comprensión y la transformación de los eventos y fenómenos expresados en el ámbito de la educación intercultural(Arnaiz y De Haro 2004) ; ámbito donde se transita para aprehender, aprender, comprender, interpretar y transformar la realidad y el mundo de la vida; reconociendo así que los eventos y sucesos educativos sociales, culturales, humanos se dan en y por interacciones asimétricas, polivalentes, heterogéneas e impredecibles.

Reflexión Teórica Para El Análisis De Resultados

En este momento, el proceso se encuentra en un análisis de los datos a partir de una reflexión teórica que se viene haciendo entorno a varios ejes:

1. La invisibilización de las diversidades que afecta múltiples espacios (Barriga, 2015) ,uno de estos es el de la educación donde a pesar de los avances sobre la construcción de una episteme de la juventud y la niñez en la contemporaneidad y de los múltiples acentos en el reconocimiento de sus capacidades para pensar, argumentar y relacionarse; aún prevalece el énfasis en la educación transmisora de conocimientos en escenarios educativos donde se borran saberes, sentires y deseos por la vía de la estandarización de los conceptos.

2. Se cuestiona a una escuela actual con aulas donde no hay espacio para lo diverso (Arnaiz y De Haro, 2004), con prácticas escolares instrumentales, donde se naturaliza la etiquetación, la exclusión de lo diferente en relación al pensamiento y la cultura. Así, la escuela va dejando de ser ese lugar pluriespacial de múltiples lógicas, acciones y relaciones (comunidad- escuela, maestro- estudiante, maestro- familias, comunidad – maestro); pierde el atributo de ser uno de los pocos espacios que permite a los niños aprender valores como la solidaridad y la cooperatividad para la construcción del tejido humano.

3. La juventud y la niñez en Colombia crece en medio de profundas transformaciones como los enfrentamientos insurgentes, la desterritorialización, el abandono, el abuso infantil, los desastres naturales, las hambrunas, los lenguajes digitales y la emergencia de la configuración y organización de familias desde la heterogeneidad (Britto, 2010). Acontecimientos que no solo configuran otras formas de ser joven, niño y niña sino también otras subjetividades que provocan otras formas de acceder y procesar la información, de relacionarse con las personas adultas, de reconocer estéticas y otras formas de estar y ser en el mundo (De Sousa, 2003).

4. Existen otros hechos que producen afectaciones en la construcción del ser, saber y sentir juvenil e infantil, hechos que devienen de las formas de relacionamiento y de socialización mutantes en el siglo XXI. Vale la pena destacar la forma como conforman su círculo de amigos y amigas a modo virtual, asunto que coloca en tensión la presencialidad. De igual manera, se resalta su capacidad de interacción con el exterior impactada por los medios de comunicación masivos y el desarrollo de sus habilidades para asceder a ellos. Así, construyen otras lógicas, otras formas de comunicarse y de relacionarse no lineales ni preconfiguradas.

5. La capacidad de riesgo y aventura de niños, niñas y jóvenes en tiempos de la tecnología, les hace ir más ligeros y asegurarse más en el mundo; lejos de la sociedad del miedo y el castigo instituida desde el judeocristianismo. Hoy en la sociedad del poder, están inscritos en grupos sociales o culturales, participan en movimientos para el cuidado del planeta como grupos ambientalistas al igual que se caracterizan por los deseos de transformación y participación.

6. Las prácticas educativas e institucionales se presentan en su mayoría, desde la fórmula del método de enseñanza unido a una serie de pasos para llegar a resultados; de acuerdo a unas etapas de desarrollo parametrizadas en las que las edades cronológicas se sobreponen a sus niveles de conceptualización, deseos y ritmos de aprendizaje; espacios donde se producen relaciones y discursos fundados en una imagen de niños y niñas de otros siglos y procesos generados desde acciones que colocan en sospecha las capacidades infantiles.

7. Aunque los niños y niñas de la contemporaneidad institucionalizados escolarmente, se declaran con capacidades mayores ,en algunas instituciones, aún no se logra interiorizar que sus subjetividades están permeadas de textos, hipertextos y de realidades asimétricas, desde la desterritorialidad, las emergencias climáticas entre otras; logran conocer contextos - otros que traspasan las fronteras de su escuela y de su hogar, sin censura, hasta conformarse grupos de niños/ niños, niños/adul tizados, niños/adolescentes habitantes de un mundo basado en lo disímil, lo complejo, lo emergente, lo instituyente o no lo homogéneamente instalado (Flekman, et al.2015).

8. En sus discursos con los que nominan los colores, olores, sabores, encantos, desencantos, con los que argumentan , proponen y participan su mundo , demandan ser incluidos en las prácticas educativas a partir de sucesos de la vida con significados y sentidos relacionados altamente desde su cultura y en diversos espacios donde es posible la movilización de lenguajes, en ocasiones, distante de los protocolos adul tizados. Sus textos orales se convierten en puentes vinculantes para transitar por los múltiples espacios, campos y rutas donde logran manifestarse como seres éticos-políticos a través de sus historias de vidas (Mato ,2008).

9. Los espacios escolares (Guzmán, Cely y Salazar, 2015), pueden convertirse en territorios donde se hilan oportunidades para resignificar los turnos de habla, los silencios y las puestas en común; esto es, como lugares para el encuentro con el otro (Martínez, 2016). Por ello, en este estudio se trabaja a través de actos de palabra/vida como la construcción de asambleas pedagógicas donde se coloca en común las contradicciones, el análisis de los sucesos, la reflexión, la crítica, las inquietudes, hechos de la vida diaria soluciones y propuestas. Como discurso pragmático construido en la vida diaria, toma para un tú y un yo de la vida íntima y social, hace manifiesto los lugares de interpretación, comprensión y refutación de fenómenos. La oportunidad de la existencia de esta capacidad, viabiliza el dialogo con su pensamiento, con su idea enunciada hasta alcanzar la transformación de opiniones atadas a contextos, un acto de habla que lleva en su interior una recomendación o una petición.

10. La escuela debe encontrar pretextos donde los niños y las niñas logren explicitar su pensamiento a partir de lenguajes y ejercicios de ciudadanía que les permitan participar, y proponer todo aquello que quieren, saben y piensan. Espacios de palabras, saberes culturales (Walsh, 2011), se van encontrando regiones colmadas de significados, políticas, gramáticas y campos semánticos con los que logran expresar lo que saben, piensan, construyen con razones y donde pasan de una opinión a otra. Es en estos espacios dialogizante donde proponen, imaginan y logran desde sus concepciones leer las intenciones de los otros. (García, 2015).

Este proceso de investigación se ha realizado desde la perspectiva de la complementariedad investigativa la cual hace posible que las realidades sociales y humanas sean interpretadas desde lo cualitativo (Creswell, 2007), más específicamente desde –IAP – Hermenéutica Diatópica, esto es, que la investigación se lleva al plano de la interpretación, la comprensión y la transformación de los eventos y fenómenos expresados en el ámbito de la educación intercultural y la diversidad (Arnaiz, 2004); campos y ámbitos donde se transita para aprehender, comprender interpretar y transformar la realidad

y el mundo de la vida; reconociendo así que los eventos y sucesos educativos sociales, culturales, humanos se dan en y por interacciones asimétricas, polivalentes, heterogéneas e impredecibles.

Concluyendo

Los avances afectivo, cognitivo y corporal de los jóvenes, los niños y las niñas son posible en ambientes escolares donde los discursos y las prácticas reconocen las experiencias de los niños y las niñas como lugares de acontecimientos, los contextos como nacimientos de hallazgos y las tareas como pretextos para discutir sobre los eventos de la cultura y la vida. Así mismo, cuando es posible crear pretextos escolares que se vinculen a los procesos de participación, al que, al cómo, y al cuando aprender proyectos de aula , cuando los límites de la escuela se rompen y es posible conocer el mundo a modo holístico, así mismo, cuando se rompe con los diálogos formateados dados en largos tiempos donde el maestro pregunta y el estudiante responde , cuando desaparecen las preguntas como comprobación de un saber y emergen como punto para construir. Los diálogos escolares entran por vía de construir colectivamente imaginarios y saberes, en solidaridad de acompañar los silencios, los no saberes y los saberes desiguales, desde asuntos, problemas o temas de intercambios comunicativos donde la maestra a través de palabras de largo aliento permite construir operaciones de análisis , comprensión , interpretación, de secuencialidad que les permiten argumentar.

Sus capacidades logran darse cuando son enseñadas y se construyen conjuntamente a partir de la incorporación de temas relevantes para los integrantes de la clase, así como los textos para leer, las temáticas abordadas para trabajar la argumentación deben tener sentido, significado y funcionalidad para su vida, emergen producto de la reorganización y organización conceptual de los estudiantes, de la flexibilización de tiempos y espacios dentro del proceso de aprendizaje, la valoración del medio social, la identificación de la escuela infantil como un lugar pluriespacial, la autorregulación en los procesos de aprendizaje y personales, la valoración del niño y la niña como seres humanos activos tanto en el proceso de aprendizaje y enseñanza como en sus proyectos de vida en concordancia con sus ritmos de aprendizaje y las condiciones sociales y familiares de los niños y niñas.

A muy temprana edad son capaces de exponer sus opiniones, lógicas e hipótesis y de interpretar, analizar, argumentar, clasificar, inferir, contrastar, confrontar y anticipar. Las estructuras argumentativas infantiles pasa por las hipótesis y las justificaciones a partir del lugar de verdad otorgado a un conocimiento ; las justificaciones son razones de credibilidad de las hipótesis; las razones son consideradas sus argumentos, al igual que en las ciencias sociales, están expuestas a la inefabilidad y la incredibilidad a decir de Peronard, (2002) la argumentación no demuestra sino que persuade psíquica y socialmente, "(…) toda argumentación pretende la adhesión de los individuos y, por tanto, supone la existencia de un contacto intelectual." (p.48)

Ahora bien, para el desarrollo y permanencia de sus capacidades es preciso constituir transformaciones escolares en las que se avizoren prácticas pedagógicas fundamentadas en romper con la monotonía escolar instalada en la educación desde el siglo IXX, con acento en la agregación de temas, la parcelación de los conocimientos, los tiempos y los espacios casi inflexibles. Ambientes escolares de enseñanza y aprendizaje diseñados, planeados y ejecutados a partir de los deseos y la participación de los niños y las niñas, de la conjugación del conocimiento y el lenguaje escolar con el cotidiano. Las trasformaciones, en las relaciones entre profesorado y el estudiantado y las formas de seleccionar, organizar, construir y evaluar el conocimiento pueden generar prácticas genuinas (Rosero, 2014)

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A Sustainable Management Lean Model Based on Circular Economy for the Treatment and use of PET Plastic for Ecotourism Services

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Abstract

This research focuses on the implementation of a sustainable management model based on circular economy for the treatment and use of polyethylene terephthalate (PET) plastic in ecotourism services. Thus, we address the need for a management model that can be implemented into a pre-established scenario such as the Pachacamac district located in Lima, Peru. We decided to create this model because the aforementioned district has certain ecotourism characteristics; moreover, there are no such models at present in this Peruvian district. This is an adaptable and flexible model depending on the proposed scenario, as it makes use of the three stages of waste management and is supported by the Lean Six Sigma methodology and circular economy. Furthermore, it is a comprehensive model because it is based on dimensions such as the environmental culture, the social dimension, and the economic dimension. The model was implemented in three different scenarios in the Pachacamac district in Lima, Peru. In conclusion, the proper management of the three model approaches generates a highly positive economic and environmental impact, and it brings benefits to both the population and its resources.

Keywords: Lean Management, Circular Economy, Ecotourism, Environmental Management Municipal Solid Waste Management.

Introduction

Plastic is one of the most used materials across the world, mainly because of its practicality and low cost, and most products that are used daily by people contain plastic, which represents a danger for the environment. Currently, 500 billion polyethylene terephthalate (PET) plastics

are generated and consumed annually on a worldwide basis, of which only 9% is recycled, 12% is incinerated, and 79% is accumulated in landfills (OECD, 1961). A similar situation exists in Peru, where 3 billion PET plastics are generated annually, of which only 12% is recycled (MINAM, 2016). These numbers become even more worrisome because plastic does not biodegrade but rather breaks down into smaller particles without changing its chemical composition, which can be invisible to the human eye. When plastics decompose, they release a wide range of chemicals that have a negative impact on organisms and ecosystems.

Plastic is one of the most used materials across the world, mainly because of its practicality and low cost, and most products that are used daily by people contain plastic, which represents a danger for the environment. Currently, 500 billion polyethylene terephthalate (PET) plastics are generated and consumed annually on a worldwide basis, of which only 9% is recycled, 12% is incinerated, and 79% is accumulated in landfills (OECD, 1961). A similar situation exists in Peru, where 3 billion PET plastics are generated annually, of which only 12% is recycled (MINAM, 2016). These numbers become even more worrisome because plastic does not biodegrade but rather breaks down into smaller particles without changing its chemical composition, which can be invisible to the human eye. When plastics decompose, they release a wide range of chemicals that have a negative impact on organisms and ecosystems.

There are few sustainable management models based on the use of soft and hard engineering tools. Likewise, the models that currently exist do not use circular economy as a pillar. Therefore, this research contributes to optimizing the existing models by using hard engineering tools and methodologies to reduce operating costs, maximize employee productivity, and raise public awareness about the importance of reusing PET plastic.

State of the Art

Sustainable Management Models in Ecotourism Services

These authors agreed that conventional models must be replaced by sustainable development models and that innovative strategies for the management of natural resources went far beyond the economic scope, reaching the social and environmental dimension (CEWEP, 2002) (MINAM, 2016). They concluded that the ecotourism sector can be enhanced by a management model based on well-defined objectives and goals that maintain innovation and generate growth opportunities (CEWEP, 2002) (Rivas, 2011).

Lean Methodology Applied to Sustainable Management Model Sin Ecotourism Services

These authors, through different case studies, reach the same conclusion, namely, that the Lean methodology provides a continuous process improvement because it focuses not only on the product but also on human talent, since as in sustainable development, humans are the beginning and the end as well as the subject and the object of their own development (Ortega, 1994) (Seiffert, 2005).

Furthermore, these authors argue that the Lean methodology can be used to properly build and implement a sustainable management model in ecotourism, thereby resulting in the continuous improvement of ecotourism processes (Seiffert, 2005) (Prieto et al, 2017) (Galvez et al, 2020).

Circular Economy Applied to Sustainable Management Models in Ecotourism Services

In this typology, the authors agree that the circular economy is regenerative and efficient. It allows for a switch from a linear production model to a continuous sustainable development model and enables one to take advantage of new business opportunities (Samaniego & Rodriguez, 2009) (Lendínez, 2019). These other two authors agree that the circular economy is not something new because it starts from what is already established, consequently bringing modifications for a model that improves the quality of life (Tzuc, Chablé & Yuyub, 2018)

Lean Methodology and Circular Economy Applied to Sustainable Management Model in Ecotourism Services

These authors, through various business cases such as the textile factories, agree on the benefits of the Lean methodology in any process because it increases agility and flexibility; improves the value creation capability, work welfare, teamwork, and innovation; and encourages employees to be more committed and proactive. Finally, this author concludes that the circular economy can be implemented in both business and household environments, thereby enhancing environmental sustainability by extending the useful life of products.

Contribution

Rationale

This research proposes a sustainable management Lean model based on circular economy for the treatment and use of PET plastic waste applied to ecotourism services. This model is based on research regarding sustainable management models applied to existing ecotourism services, through which we identified the existing models that combine innovation with environmental spaces (Seiffert, 2005). Based on the aforementioned, we sought to implement the Lean methodology to reduce errors and establish the continuous improvement necessary for the proper use of ecotourism services (Lendínez, 2019). Moreover, in the search for a philosophy that moves from control to proper sustainable management, we investigated how circular economy could support the model. Thus, we were able to switch from a linear model to a continuous sustainable development model. Finally, according to each pre-established component and scenario, we built a sustainable management model aimed at a comprehensive implementation of each component as well as at continuous process improvement.

Proposed Model

First, MLE comprises the implementation of a waste management system dedicated to the control and management of the entire lifecycle of household waste in terms of waste collection, transport, processing, treatment, recycling, and transfer until the final deposit. This is achieved through three stages while measuring and analysing the quality of the service level.

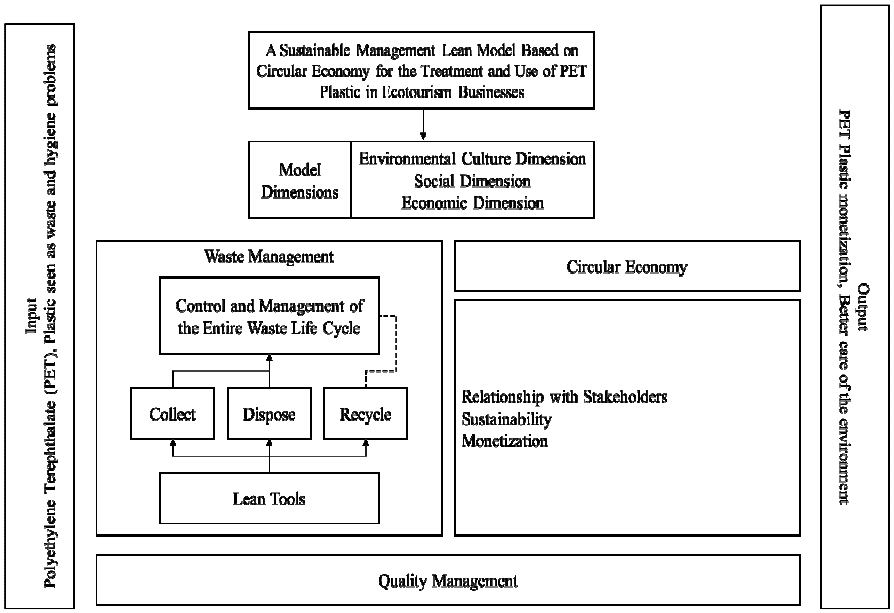

Fig. 1: Components and description of the lean sustainable management model

Validation

Case Study

This model will be applied in three scenarios in the Pachacamac district, which already counts on a cultural, ecological, and recreational landscape and research elements. These elements represent a national identity, Peru's great tourism potential, adapted to the scenario proposed in this research. The district has large clubs, estates, and restaurants that offer recreational areas for rest and the tasting of traditional dishes. It also allows the practice of adventure sports, such as paragliding, cycling, mountain biking, horseback riding, ATV riding, and trekking. Likewise, the area counts on varied flora and fauna, typical of coast valleys, which promotes ecotourism as an alternative. In addition, it has predominantly agricultural and farming areas; however, it does not have an organizational system for grouping together most of the local micro entrepreneurs.

Results Analysis

- The statistical analysis shows that for indicator 1, the mean of the recycling percentage presents a favorable result following the implementation of the proposed model.
- In terms of standard deviation for indicator 1, the variability is more dispersed with respect to the mean.
- The analysis shows that for indicator 2, the mean of the processing time in scenarios is higher than 1, i.e., it shows a successful result. However, its standard deviation is higher than the rest of the indicators, i.e., there is more dispersion around the mean.
- For indicator 3, the mean evinces a favourable result of more than 50% satisfaction in relation to customers attending ecotourism services, i.e., an optimal and lower variability.

- The various scenarios carried out that take different services in the district of Pachacamac into account demonstrate the successful model implementation into the ecotourism areas.

Table 1: Statistical analysis by scenario and indicator

	Indicator 1	Indicator 2	Indicator 3
Scenario 0	76.00%	11.50	78.00%
Scenario 1	84.00%	10.0	25.45
Scenario 2	50.00%	7.00	15.60%
Scenario 3	75.00%	15.00	80.00%
Mean	71.00%	10.88	50.00%
Median	76.00%	10.75	52.00%
Standard deviation	15.00%	3.33	34.00%
Max	84.00%	15.00	80.00%
N	4	4	4

Conclusions

This study provided a more in-depth understanding of waste management implementation in the ecotourism services sector. The results have shown a considerable improvement with respect to the indicators that were proposed initially. The conclusions that have been identified are given as follows:

The volume percentage of waste recycling increased by 50%, which is a positive indicator because before it was only discarded.

The implemented model showed that the customer satisfaction has been increasing according to the scenario, entailing an improvement in the model each time it was implemented and assessed.

To create an innovative model of solid waste management, a literature review was conducted to identify the existing solid waste collection management models.

The 5S methodology should be carried out before the implementation of or simultaneously with the Lean tools because many of the processes or improvements intended to be carried out with these tools should be developed in a controlled environment and with easy process supervision for each employee.

The circular economy was proposed as the basis for the model to achieve an extra income and thus financially support the ecotourism area, in turn improving the solid waste management and contributing to the environmental culture.

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The Concept of Path Dependence: The Relationships Between Absorptive Capacity and The Development of Technology in A Company

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Abstract

The purpose of this publication is to assess the mutual impact of the level of development of the absorptive capacity of financial companies in Poland and the degree of advancement of their technological portfolio in the context of the transfer of innovative technologies. In the theoretical part, the authors synthetically present the essence of the concept of path dependence and absorptive capacity in the process of technological development and discuss potential relationships occurring within these constructs. In the empirical part, based on the results of their own surveys, they verify the occurrence of mutual dependence between the degree of development of the absorptive capacity of financial companies in Poland and the level of their technological advancement, as well as identify the effects that have been obtained and are innovative. Ultimately, the authors confirm that the technological development of financial companies in Poland is carried out in accordance with the assumptions of the concept of path dependence, affecting the increase of their innovation in operations.

Keywords: path dependence; absorptive capacity; innovative technologies; technological development; financial services companies.

Introduction

A prerequisite for survival, and even more so for the market success of a company operating in a dynamically changing environment is to ensure its development in various areas of activity, but above all in those where customer value is generated that determines the level of competitiveness obtained. These areas are in particular creating, producing and providing the customer with a complete market offer. Technologies and the effects of their application play a crucial role in them. Therefore, their development is particularly important and thus desirable.

As is commonly known, not all companies are successful. One answer to the question - why is this happening? - is the diversified capability of companies to cope with changes in the environment, and especially with technological changes, which is a manifestation of the huge progress occurring in this area (Lucas and Goh, 2009). What matters in particular are dynamic capabilities (Makadok, 2001). It turns out that successes are primarily achieved by those companies that are able to adapt, renew and discover new opportunities through implemented technological innovations, allowing for pro-development reconfiguration of their business model (Hedman and Kalling, 2003).

Companies treat technological progress differently. The same changes are perceived as opportunities by some companies and as threats by others (Sabherwal, 2001). The former proactively implement

technological innovations in order to gain a competitive advantage, while the latter adopt reactive attitudes in this respect (D'Aveni, 2010). However, regardless of their attitude, while operating in turbulent changing conditions, companies are increasingly compelled to reach for the resources of specialized knowledge and modern technological solutions that already exist in the environment. However, successful transfers of knowledge and technology also requires a company with highly specialized and demanding capabilities.

Given the scope and significance of the issue, the main research objective of this article is to assess the mutual impact of the level of development of the absorptive capacity of financial companies in Poland and the degree of advancement of their technological portfolio in the context of the transfer of innovative technologies. Its implementation, based on the results of a survey conducted in the Polish financial companies sector, is to provide an answer to the question whether the absorptive capacity of financial companies has a real impact on the degree of technological advancement they gain, and then - in accordance with the concept of path dependence, whether a higher degree of technological advancement affects the development of their absorptive capacity and the effects of its use in the transfer of innovative technologies. So, do historical decisions regarding the development of absorptive capacities and the technologies obtained thanks to them really mark the technological development path, limiting future possibilities of making different decision choices in this respect?

Theoretical Background

At the initial stage of its development, the company has a wide range of decision options and scenarios to develop its technological portfolio and, consequently, the achieved effects owed to it (Sydow, Schreyögg and Koc, 2009). At this stage, they are not limited by their previous decisions or experiences. It turns out that subsequent activities undertaken in the course of business become mutually dependent. Every action taken at a given moment is imprinted in the past and will be reflected in the future. It can also begin at some critical juncture, lasting even many years, the process of self-reinforcing, thus creating path dependence (Garud, Kumaraswamy and Karnøe, 2010; Zhang, Yu and Hu, 2018). The choices or actions taken at that time will determine future arrangements while limiting awareness or the ability to make others, thereby reducing flexibility in action through targeted decisions and experiences. Historic decisions limit the ability of policy makers to see and understand the role of others, especially emerging technologies. At some point, it may turn out that there are only few decision options available for further technological development, as previous activities have created a path which the company can no longer abandon or break through to another, or can do it, but only with great and often capital-intensive efforts, which is not always justified (Sydow, Schreyögg and Koc, 2009). Path dependence is the combination of historical contingency and the emergence of self-reinforcing effects that steers a technology along one 'path' rather than another (Tsiapa, Kallioras and Tzeremes, 2018).

The concept of the critical path is also the result of an attempt to explain the lack of a rational response to technological changes taking place in the environment (Wang, Hedman and Tuunainen, 2016; Greve and Seidel, 2015). It assumes that previous actions, decisions or events, for example, the choice of technology, standard, or product portfolio, can gradually create an organizational block, narrowing the scope of potential decision variants. These processes are cyclical and last for a long time, and their effects intensify, creating more and more restrictions for the further development of the company. They set the direction for subsequent decisions, actions and results, including primarily the development of technology and the market offer obtained through it. The technological development directed by path dependence is self-reinforcing and intensifying, hence the consequences of the established path dependence can have a significant impact on the fate of an enterprise, and, moreover, they may also be irreversible (Garud, Kumaraswamy and Karnøe, 2010).

In this article, the concept of path dependence is undertaken on the basis of the theory of learning organization and knowledge management, and refers to the development of technology in a company. It is based on a simple assumption, according to which the current knowledge allows to identify, acquire, assimilate and use new knowledge, while defining its scope (Cohen and Levinthal, 2019). At the same time, for a company to be able to effectively absorb new useful knowledge, part of its existing

knowledge should be closely related to this new knowledge to allow its acquisition, while the other part must be different, although still somewhat related to allow creative use of newly acquired knowledge, even to create incremental innovation (Talat and Bhaduri, 2017).

The knowledge resources that have been accumulated in the company so far, including technological knowledge, are a key component of its absorptive capacity, which has important implications for the further development of the potential itself, as well as for the scale and scope of effects obtained, including new knowledge and innovative technologies. It should be explained here that absorptive capacity, according to Cohen and Levinthal (1990) (the pioneers of the concept), should be understood as the ability of the organization to recognize the value of new knowledge, assimilate and use it commercially, i.e. in a way that is oriented towards generating new value in the company's market offer. As a consequence, the absorptive capacity in the transfer of new technologies is, according to the authors, a bundle of specialized resources, especially intangible ones, that allow the company to successfully acquire, assimilate and use new and strategically valuable technologies to achieve the intended results (Glabiszewski, 2016).

The actual size and usefulness of the company's absorptive ability is primarily dictated by the current abundance of knowledge related to that absorbed, or in other words – to the level of basic knowledge (Jiménez-Barrionuevo, García-Morales and Molina, 2011), as previously acquired knowledge allows an organization to acquire, assimilate and exploit new knowledge, more developed and in a wider context (Zahra and George, 2002). In order to adapt the newly acquired knowledge and then be able to use it appropriately, the company must assimilate it (Glabiszewski and Zastempowski, 2017). This requires integrating the existing knowledge with new knowledge, as a result of which the level of the organization's knowledge increases, including the basic knowledge used in subsequent cycles of knowledge transfer from the environment. Thus, the ability to absorb even more advanced knowledge increases. Moreover, when combining basic knowledge with new one, we should expect a synergy effect. Such enriched knowledge resources in an organization increase its ability to create and implement innovations based on it (Pypłacz and Liczmańska-Kopcewicz, 2018).

Lack of proper involvement in organizational learning, reduces the effects of knowledge absorption, reduces future absorptive capacity and, as a consequence, may lead to the phenomenon of closing to new technologies (Lane, Koka and Pathak, 2006). Closing to new technologies, or at least limiting the possibilities of using emerging technologies, may also be a consequence of improving knowledge and technology, if it is made in a clearly oriented way in accordance with the established path dependence in a continuous, self-reinforcing and intensifying way (Garud, Kumaraswamy and Karnøe, 2010).

To sum up, the use of absorptive capacities as part of the transfer of innovative technologies initiates at the same time the process of their improvement, creating an organization-specific path dependence that determines the future state of absorptive capacity and the level of technological advancement to be acquired in the future (Todorova and Durisin, 2007). Hence, the low level of investment in absorptive capacity to date may reduce the attractiveness of investing in it at a later stage, even if the company becomes at some point more aware of the need for technological development (Cohen and Levinthal, 1990). It turns out that the new generation of technology, as a rule, is built on the achievements of the previous generation, hence it is difficult for a company to make a leap of competence by several cycles of technological development.

Research Objective, Methodology and Data

The empirical part of the article was prepared based on the results of the survey carried out in the time period 2018-2019, which is a repetition of the author's research done in the years 2015-2016. The study used an online survey method using the CSAQ technique (Computerized Self-Administered Questionnaire) in which the respondents filled in a digital version of the survey questionnaire available online (Tourangeau et al, 2013). It was sent to the heads of 163 commercial financial sector companies registered in Poland, namely all banks, property and life insurance companies, investment funds (TFI) and universal fund management companies (PTE). In total, 106 entities filled in the online survey

questionnaire, constituting 65% of the population under study. Analysis is based on the results from 36 TFIs, 25 banks, 20 property insurance companies, 17 life insurance companies and 8 PTEs.
The study carried out was the basic source of data necessary to achieve the main empirical goal of the article, which was to assess the mutual impact of the level of development of the absorptive capacity of financial companies in Poland and the degree of advancement of their technological portfolio in the context of the transfer of innovative technologies. To achieve the main goal formulated in this way, the author set the following four specific goals:

1. assessing the impact of the degree of development of the absorptive capacity of financial companies in Poland on the level of technological advancement;
2. assessing the impact of the level of technological advancement of financial companies in Poland on the level of development of their absorptive capacities;
3. assessing the degree of the impact of the development level of three separated segments of absorptive ability of financial companies in Poland on the level of technological advancement;
4. assessing the degree of the impact of three separated segments of absorptive ability of financial companies in Poland on the level of their innovation in operations.

In order to achieve the specific objectives, and thus the main research objective posed in the article, the author formulated and empirically verified the following four research hypotheses:

H1. The degree of development of the absorptive capacity of financial companies in Poland has an impact on the level of their technological advancement;
H2. The level of technological advancement in financial companies in Poland has an impact on the degree of development of their absorptive capacities;
H3. The degree of development of all three separated segments of absorptive capacities of financial companies in Poland has an impact on the level of their technological advancement;
H4. The degree of development of all three separated segments of absorptive capacities of financial companies in Poland has an impact on the level of growth of their innovativeness in operations.

The hypotheses formulated above refer to the concept of path dependence that emerged from the sphere of knowledge management theory and learning organization, according to which the existing knowledge and technology resources dictate directions for their further development, thus determining the company's future technological and innovation opportunities.

The following two methods were applied: the ordered logit model and multiple regression methods. In the first part, the ordered logit model was used the specification of which is an extension of the binary model specification to more threshold. The model is described by the following equation:

$$y^* = x'\beta + u$$

where y^* is the exact but unobserved dependent variable, x' is the vector of independent variables, u is the error term and β is the vector of regression coefficients which are intended to be estimated. The maximum likelihood estimation method and the STATA.16 software are used to estimate the model.

Multiple regression was used in the second part. This regression is described by the following equation:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k + u$$

where β_0 is the point of intersection of the regression surface with the ordinate axis, and each β_i for i = 1, … k is the slope of the regression surface relative to the axis corresponding to x_i. The STATA.16 software was also used to estimate this model.

The subject of the analysis were six variables - two dependent variables and four explanatory ones. To determine level Y_1, the top management of the surveyed enterprises was asked to assess the level of advancement of the technologies they were currently using against their competitors, giving them four choices, namely: (1) pioneering technologies, (2) technologies with a high level of advancement, (3)

technologies with a standard level of advancement, (4) technologies with a low level of advancement. To determine level Y_2, the top management was asked to assess the degree to which the company had achieved the desired level of innovation growth in its business over the past three years using a scale from 0 to 100%, where 0% meant that the desired increase in innovation was not achieved at all, and 100% meant that it was achieved completely. To estimate the size of the explanatory variables, the top management of the surveyed companies was asked to assess the degree of development of individual capacities, using a scale from 0 to 100%, where 0% meant that the given ability was not developed at all, and 100% meant that it was developed to a maximum, and therefore fully. Table 1 presents the description and scales of all variables of the model.

Table 1: Description of variables

Variables	Description	Scales
EXPANATORY VARIABLES		
X_1	the degree of development of the ability to acquire new technologies	Quotient (0-100%)
X_2	the degree of development of the ability to assimilate newly acquired technologies	Quotient (0-100%)
X_3	the degree of development of the ability to implement newly assimilated technologies	Quotient (0-100%)
X_4	the degree of development of absorptive capacities	Quotient (0-100%)
EXPLAINED VARIABLE		
Y_1	the level of technological advancement	Quotient (0-100%)
Y_2	the level of innovation growth in conducted activity	Ordinal (1, 2, 3, 4)

Source: own research.

Results and Discussion

To diagnose the impact of the explanatory variable (X_4) on the dependent variable (Y_1), a linear regression model was used. The model estimation results are contained in Table 2.

The conducted plausibility test (F (1, 109) = 23.84; Prob>F, 0.0000) indicates the significance of the whole model, which gives grounds for further interpretation of the results obtained. R^2 is the measure of the quality of the fit of the model to the data. It is 0.1795. This means a low level of explanation of the dependent variable. The variable X_4 - the degree of development of absorptive capacities is statistically significant.

While interpreting the results obtained, it should be concluded that the higher estimation of X_4 (the degree of development of absorptive capacities) increases Y_1 (the level of technological advancement) by 0.02.

Table 2: Results of the regression model estimation

Y_1	β	SE	t	P > |t|	[95% Conf. Intervall]	
X_4	.0213827	.0043794	4.88	0.000*	.0127028	.0300626
_cons	1.160623	.2950493	3.03	0.000*	.5758452	1.745401
N	111					
F (3, 107)	23.84					
Prob > F	0.0000					
R^2 Adj R^2	0.1795 0.1719					

**. Statistically significant at the level of 0.01.*
Source: own study.

In turn, to diagnose the feedback dependency, *i.e.*, the impact of the explanatory variable (X_{Y1} - the level of technological advancement) on the dependent variable (Y_{X4} - the degree of development of absorptive capacities), a linear regression model was used. The results of the model estimation are presented in Table 3.

The conducted plausibility test (F (1, 109) = 23.84; Prob>F, 0.0000) indicates the significance of the whole model, which gives grounds for further interpretation of the results obtained. R^2 is the measure of the quality of the fit of the model to the data. It amounts to 0.1795. This means a low level of explanation of the dependent variable. The variable X_{Y1} - the degree of the level of technological advancement is statistically significant.

Interpreting the results obtained, it should be concluded that the higher estimation of X_{Y1} - the level of technological advancement, increases X_{Y1} - the degree of development of absorptive capacities by 8.39.

Table 3: Results of the regression model estimation

Y_{X4}	β	SE	t	P > |t|	[95% Conf. Intervall]	
X_{Y1}	8.39264	1.71892	4.88	0.000*	4.985797	11.79948
_cons	44.24963	4.588622	9,64	0.000*	35.15513	53.34413
N	111					
F (3, 107)	23.84					
Prob > F	0.0000					
R^2 Adj R^2	0.1795 0.1719					

**. Statistically significant at the level of 0.01.*
Source: own study.

Further in the analysis, absorptive capacity is perceived as a combination of three separated segments (X_1, X_2, X_3) (Glabiszewski et al, 2018). To diagnose the effect of explanatory variables (X_1, X_2, X_3) on the ordered dependent variable (Y_1), the ordered logit regression model was used. Its specification is an extension of the binary model specification to more thresholds. Model estimation results are presented in Table 4.

The conducted plausibility test (LR chi2 (3) = 28.40; Prob>chi2, 0.0000) indicates the significance of the whole model, which gives grounds for further interpretation of the results obtained. McFadden's pseudo-R^2 is a measure of the quality of the fit of the model to the data. It amounts to 0.1162. This means a low level of explanation of the dependent variable. However, it should be remembered that in the case of logit models this is typical and in empirical studies the McFadden pseudo-R^2 values are closer to 0 than 1.

Table 4: Estimation results of the ordered logit model

Y_1	β	SE	z	P > |z|	[95% Conf. Intervall]	
X_1	.0458845	.0171556	2.67	0,007*	.0122602	.0795088
X_2	.0138524	.0126934	1.09	0,275	-.0110263	.0387311
X_3	.0077396	.0173592	0.45	0,656	-.0262839	.041763
N	111					
LR chi2 (3)	28.40					
Prob > chi2	0.0000					
Pseudo R^2	0.1162					

**. Statistically significant at the level of 0.01.*
Source: own study.

As follows from Table 4, in the presented model, the estimated parameters take positive signs. In other words, the diagnosed impact of the explanatory variables included in the model on the dependent variable raises the chances of Y_1 growth, *i.e.* a higher level of technological advancement. The variable that turned out to be statistically significant is X_1, *i.e.*, the degree of development of the ability to acquire new technologies. Therefore, the variables X_2 and X_3 do not have a statistically significant effect.

The model obtained can be assessed based on the odds ratios (see Table 5). When interpreting the odds ratios for the *i*-th variable (taking into account the assumption of *ceteris paribus*, *i.e.*, other variables of the model unchanged), it should be concluded that the X_1 rating higher by one unit - the degree of development of the ability to acquire new technologies, increases the chances of achieving a higher Y_1 level - technological advancement by 4.6%.

Table 5: Estimation results of ordered logit model - odds ratios

Y_1	Odds Ratio	SE	z	P > |z|	[95% Conf. Interval]	
X_1	1.046953	.0179611	2.67	0,007*	1.012336	1.082755
X_2	1.013949	.0128705	1.09	0.275	.9890343	1.039491
X_3	1.0077	.0174941	0.45	0.656	.9740585	1.042647

**. Statistically significant at the level of 0.01.*
Source: own study.

To diagnose the effect of explanatory variables (X_1, X_2, X_3) on the dependent variable (Y_2), a linear regression model was used. The estimation results of the model are presented in Table 6.

The conducted plausibility test (F (3, 107) = 28.17; Prob>F, 0.0000) indicates the significance of the whole model, which gives grounds for further interpretation of the results obtained. R^2 is the measure of the quality of the fit of the model to the data. It is 0.4413. This means an average degree of explanation of the dependent variable. The variables that turned out to be statistically significant are X_1 - the degree of development of the ability to acquire new technologies and X_2 - the degree of development of the ability to assimilate newly acquired technologies.

Interpreting the results obtained (taking into account the assumption of *ceteris paribus*, *i.e.*, other variables of the model unchanged), it should be concluded that the higher (by 1) estimation of X_1 - the degree of development of the ability to acquire new technologies, increases Y_2 - the level of innovation growth by 0.34. In turn, the higher (by 1) rating of X_2 - the degree of development of the ability to assimilate newly acquired technologies, increases Y_2 - the level of innovation growth in conducted activity by 0.37.

Table 6: Results of the regression model estimation

Y_2	β	SE	t	P > |t|	[95% Conf. Intervall]	
X_1	.3433692	.1133303	3.03	0,003*	.1187051	.5680333
X_2	.370155	.088989	4.16	0,000*	.1937448	.5465653
X_3	.0717499	.1246177	0.58	0.566	-.1752902	.31879
_cons	24.80005	6.871944	3.61	0.000*	11.17722	38.42287
N	111					
F (3, 107)	28.17					
Prob > F	0.0000					
R^2 **Adj R^2**	0.4413 0.4256					

**. Statistically significant at the level of 0.01.*
Source: own study.

Interpreting the results obtained, it should be concluded that the increase in the degree of development of absorptive capacities increases the level of technological advancement. Therefore, there are no grounds for rejecting the H1 hypothesis. Therefore, the dependence resulting from the assumptions of the theory of absorptive capacity has been confirmed. In addition, the results obtained show that an increase in the level of technological advancement increases the degree of development of absorptive ability, and therefore there is no reason to reject the H2 hypothesis. Thus, the existence of path dependence in the technological development of the surveyed companies was confirmed.

By diagnosing the impact of individual ability segments identified as part of absorptive capacity, it was diagnosed that only the degree of development of the ability to acquire new technologies has an impact on the level of technological advancement in financial companies in Poland. Such an impact was not found in relation to the ability to assimilate newly acquired technologies and the ability to implement newly assimilated technologies, either. Therefore, the H3 hypothesis has been falsified, as there are grounds to reject it. It turns out that financial companies in Poland do not improve technologies transferred from the outside at the stage of their assimilation and implementation - thus they do not increase their technological advancement. They probably do not have sufficiently developed technological competences to transform them into a higher level of innovation, which seems natural due to their different domain of activity. Therefore, their technological advancement depends merely on the ability to determine their choice at the acquisition stage.

The research and analyses carried out were also to answer the question whether the three separated segments of absorptive ability affect increases in the level of innovation of financial companies in Poland. It was found that only an increase in the degree of development of the ability to acquire new technologies and the ability to assimilate newly acquired technologies causes an increase in the level of innovation. Therefore, the H4 hypothesis has also been falsified, as there are grounds to reject it. It turns out that the more developed the company's ability to acquire technology, the more advanced technology it has and the better it can implement innovation. The capacities to assimilate technologies are primarily to facilitate proper adaptation of the acquired technology to specific use, and thus ensure its complementarity with existing resources and activities. They are also responsible for adapting technologies to the individual needs of the company, which also relate to their innovative use. The increase in innovation is not ensured by the ability to implement newly assimilated technologies. At this stage, companies must be focusing their attention only on ensuring the proper use of the technology in accordance with its original purpose.

Conclusion

According to the theoretical assumptions, companies with a higher level of development of absorptive capacity, including more developed resources of basic knowledge, are able to search, acquire, assimilate and use new achievements of technological progress more effectively. In turn, the acquisition of new knowledge and advanced technologies strengthens absorptive capacity, and thus determines the company's ability to acquire and use in the future even more developed knowledge resources and innovative technologies, allowing it to achieve a higher level of innovation and competitiveness (Glabiszewski et al, 2020).

Therefore, shaping the technological portfolio in the company should be subject to long-term planning, as according to the concept of path dependence, the existing technologies determine the possibilities of their development in the future. In other words, the company's desired technological growth may not be achievable in the future if adequate investments in its absorptive capacity and technological portfolio are not made at earlier stages of its development. Therefore, the current neglect in relation to the improvement of the pro-technological absorptive capacity may prevent the use of emerging future technological opportunities. However, one needs to be careful, because unfortunately the same effect can be caused by a well-established path dependence, which has the character of a narrowly focused self-reinforcing and intensifying process.

The results of own research performed confirm that the technological development of financial companies in Poland is carried out in accordance with the assumptions of the concept of path

dependence. Thus, the scope and level of previously acquired knowledge and technology condition the scope and level of their future development. The awareness of the occurrence of this dependence should have a real impact on the quantitative and qualitative dimensions of current investments in development of the staying in close relation absorptive capacity and the technological portfolio possessed.

In order to increase the application value of the recommendations formulated above, it seems necessary to continue empirical research aimed at identifying specific absorptive capacities that, in the context of path dependence, play a key role in acquiring, assimilating and implementing innovative technologies desired for the company.

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Social Competence of Employees Working in Intercultural Teams

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Abstract

Employees' social competence is at present a very topical issue which is extensively analysed from various angles. Social competence above all affects employees' ability to build relationships with other people, co-workers and customers. This means that it is one of the factors that influence the speed and scope of the functioning of teams and entire organizations, the achievement of their goals, flexibility and effective implementation of changes, and adaptation to diverse cultural conditions. However, building lasting positive relationships in intercultural work environment is often a great challenge. The aim of the paper is to discuss the role and significance of social competence of employees working in intercultural teams and to demonstrate the links between the level of their social competence and their effective functioning in such teams. The study described in the paper was a qualitative study (58 individual in-depth interviews and 3 focus group interviews) conducted within the project: Social Integration Leaders (Liderzy Integracji Społecznej). The model programme for the improvement of migrants' social competence under the Operational Programme Knowledge Education Development (Program Operacyjny Wiedza Edukacja Rozwój) 2014-2020, co-financed by the European Social in the field of social competence of migrants.

Keywords: Competences, Social Competence, Intercultural Teams, Intercultural Management

Introduction

At present there is no doubt that human resources are one of the most important elements of any organization. Therefore, the recruitment of competent employees, especially in the context of their social competence, is a vital tasks of human resource management.

Social competence, understood primarily as relational skills thanks to which a person is able to initiate, transform and terminate a whole range of interpersonal relationships, facilitates the establishment and maintenance of positive interpersonal relationships in work environment and is of vital importance in the effective functioning of both the individuals working in intercultural teams and the entire teams.

In the area of multicultural teams management, employees' social competence can significantly influence not only relationships between employees, but also the work of such teams, the quality of their performance, and their openness to change, new challenges, or innovation.

In the theoretical part of the paper the authors define the concept of social competence and discuss its role, significance, and impact on work and on the functioning in multicultural teams. The study to which the authors refer analysed the level of selected facets of migrants' social competence (as

migrants, they were potential members of intercultural teams), with reference to the model of social competence proposed by Argyle (Argyle, 2002). The impact of respondents' social competence on their effective functioning in such teams was also determined.

The study was conducted with the use of individual in-depth interviews, which were carried out on the basis of an interview scenario developed by the authors of the paper, and focus group interviews conducted by the moderator.

Considering the above premises as well as the purpose of the paper, the following research hypothesis was formulated - the level of employees' social competence has an impact on their effective functioning in intercultural teams.

Social competence – the concept and its meaning

Due to the changes taking place on a global scale, contemporary organizations - in order to function efficiently, develop and build their position on the market in the long run - must apply effective solutions for successful human resource management. Human resources are vital in gaining a competitive advantage on the market (Hendricks, 2002). As an organization develops and functions on the changing and dynamic global market, its employees become exceptionally valuable resources, and the demand for competent human resources is bound to increase (Wardani, 2018).

In the knowledge-based economy employees are considered to be a factor conductive to success of an organization, and not a source of its costs. Being aware of employees' competences, including their social competence, forms the basis for shaping relationships within teams and within inter-team cooperation and for building positive relations with the surroundings. Employees and their competences increase the company's competitive advantage, mainly by improving efficiency and effectiveness of teams and the entire organization, by capitalising on opportunities and avoiding threats (Choudhury and Mishra, 2010).

"Many authors (Arghode, 2013; Lang, 2010; Stump, Ratliff, Wu, & Hawley, 2009) notice that there is no universal definition of social competence" (Gedviliene, Gerviene, et al., 2014, p. 37).

For example, social competence is defined as the ability to effectively deal with social interactions. This term embraces understanding other people, being able to establish and maintain close relationships, also in work environment, and reacting in an adaptive way in social environment. Social competence covers a wide range of cognitive abilities, emotional processes, behavioural skills, social awareness, and personal and cultural values related to interpersonal relations (Orpinas, 2010).

Boyatzis (1982) defines emotional and social competence as knowledge, motives, qualities, attributes and skills that are causally linked with effective or better performance in a particular job or role. In his opinion, the most important facets of social competence are social awareness and relationship management.

Social competence is also understood as a set of elementary, equivalent social skills that determine the effective functioning in certain types of interpersonal situations (Tomorowicz, 2011).

Social competence is described as knowledge and skills that people develop to cope with life choices and challenges. The components of social competence include: adoption of social values, development of a sense of personal identity, acquisition of interpersonal skills, learning how to regulate personal behaviour in accordance with societal expectations, planning and decision-making, and development of cultural competence (Kostelnik, Whiren, et al., 2002).

It is worth mentioning here that one of the first authors who analysed the concept of social competence was an American scholar from Arkansas University, T.A. Cavell. According to him, social competence, which determines a person's effective functioning within their social contacts, consists of three key components: social adjustment, social performance, and social skills.

Another attempt to systematize theoretical assumptions regarding social competence resulted in the Argyle's Method, in which its author defines the notion of social competence as the ability to possess or acquire skills used in social and antisocial situations necessary in achieving desired goals within interpersonal relations (Argyle, 2002). According to Argyle, social competence is a set of different skills used for strengthening social interactions, among which he distinguishes the following: rewarding (i.e. motivating, using different incentives), assertiveness (the ability to exert influence without resorting to aggression or without causing harm to a given social interaction), self-presentation (attempts aimed at creating a certain impression), verbal and non-verbal communication, empathy (the ability to perceive and understand other people's point of view and to share and take their feelings into account), familiarity with the rules governing social life, i.e. the so called social intelligence, which also covers knowledge on how to improve interpersonal contacts (Argyle, 2002).

Three important facets of social competence should also be listed: the ability to build positive and healthy interpersonal relationships and to resolve interpersonal conflicts, the development of self-identity and group or collective identity (e.g. national identity), and orientation towards becoming a responsible citizen in one's own society and - in the perspective of intercultural relations - a citizen of the world (Hing Keung Ma, 2012).

The impact of employees' social competence on the work of intercultural tea

Cullen and Parboteeah observe that managing people in international organizations, that is managing intercultural teams, is inextricably linked to the area of cultural behaviours, as culture is represented in common beliefs, standards and values which form the basis of life for different groups (Cullen and Parboteeah, 2008).

"Multinational organizations have to understand that their managers need to always take into account cultural differences in their management practices" (Vlad and Stan, 2018, p. 407).

Cultural diversity is defined as "the existence of two or more persons from different cultural groups in any group or organization" (DeSimone and Harris, 1998, p. 1485). Multicultural work environment is a place where employees from different cultures meet and become members of multicultural teams. Managing such teams, which are characterised by employees' cultural diversity, poses considerable challenges to managers. The fact that different cultures must coexist within one organization or team means that it is necessary to build relationships between employees based on such values as understanding, acceptance, respect, and tolerance for otherness.

The modern manager is a person who can effectively manage employees in multicultural work environment taking cultural diversity and cultural context into account. Employees' social competence is particularly relevant in culturally diverse teams. Social competence determines the quality and quantity of human relationships in work environment and the results achieved by multicultural team.

Referring to Argyle's explanations and his assumption that social competence is a set of skills that strengthen social bonds (Argyle, 2002), the authors of the paper focused on those social skills which - in their opinion - are of great value in multicultural work environment. These are, above all, the ability to use various incentives to achieve team goals and to build good atmosphere at work; assertiveness, i.e. the ability to exert influence without resorting to aggressive behaviours directed at representatives of other cultures; self-presentation, understood as the ability to build a positive image in multicultural work environment; communication, which is of utmost importance in intercultural relationships; empathy, i.e. the ability to understand the point of view of employees from other cultures; and social intelligence, which allows for the successful functioning within complex intercultural relationships and interactions.

These facets of social competence undoubtedly exert an impact on the efficient and effective functioning of multicultural teams. Positive outcomes of cooperation within such teams include increased creativity, more complex, multi-faceted thinking in search of solutions, greater awareness

and responsiveness, improved quality, the ability to learn and to share experiences, and increased communication efficiency (Cheng et al., 2008a; Cheng et al., 2008b; Benet-Martinez et al., 2006; Davidson and James, 2006; Stevens et al., 2008).

As far as performance is concerned, a positive impact of social competence of employees from intercultural teams consists in: increased creativity and innovation, better decisions, more effective problem-solving and coping with difficult situations, an increase in tolerance and acceptance of otherness, and greater flexibility in communication (Trefny, 2001).

On the other hand, inadequate social competence of employees working in intercultural teams may exert a negative impact on more complex cooperation and interactions between employees. Such teams may work more slowly, the time needed to build relationships may be longer, communication may be more time consuming and more difficult, and the achievement of common goals may require much more effort. Moreover, different expectations of employees from different cultures can lead to conflict and misunderstanding (Trefny, 2001).

It should be noted here that social competence of employees working in intercultural teams, especially if supported by involved managers, can significantly improve creative problem solving, methods used in searching for new solutions, and greater openness to new challenges from the perspective of diverse experiences.

Contemporary organizations must be more flexible, able to respond to increasingly complex and unpredictable changes in the environment, and recruit employees from different countries and cultures in order to develop a multi-faceted approach to their activities and to increase the speed of response on the basis of their employees' competences (Mockaitis, Zander, et al., 2018).

A growing number of researchers emphasise the dependence of the organization's competitiveness on its strategic resources, especially the intangible ones. Strategic resources include know-how, innovations, patents, brand, organizational culture, good name, and reputation. Customer satisfaction or employee morale are the resources that competitors are unable to copy or imitate (Gorondutse, Ali, et al., 2017). The same applies to employees and their social competence. Employees' potential and social competence can be used by an organization to build its competitive advantage through unique social relationships inside and outside its structures.

Nowadays, people who manage organizations must possess specialist knowledge in the field of human capital management in order to implement suitable solutions within human capital management strategies. Therefore, special attention should be paid to the systems of human resource management, as they ultimately lead to increasing the company's competitive advantage (Delery and Roumpi, 2017). It is necessary to develop employees' social competence, especially in intercultural work environment, in order to build positive relationships within teams and with customers, which can have a considerable impact on the company's long-term growth opportunities.

It should be noted here that "employee competencies are considered by literature as one factor that contributed most to the sustainable creation of organizational excellence (Vathanophas, 2007; Cummings and Worley, 2001). Thus, competent employees are needed in order to increase the business success (Grigoryev, 2006)".

Methodology

The techniques used in the qualitative study described in the paper were an individual in-depth interview and an in-depth focus group interview. The individual in-depth interview was partially structured and included only open questions. In order to conduct the study, the authors developed a research tool, i.e. a scenario of an individual in-depth interview. Respondents were recruited through social networks and snowball sampling, which was initiated in several independent points in order to avoid obtaining respondents from one social circle. The actual individual interviews were held between March and May 2019, and focus group interviews - in December the same year. One

interview lasted from 45 to 85 minutes. The study was conducted in Krakow in the buildings belonging to the Jesuit University Ignatianum. Before the interviewers started asking questions, all the respondents had been informed about the purpose, procedure and confidentiality of the study and the possibility of terminating it at any point. All the respondents agreed to have the interviews recorded on a voice recorder. During the interviews, the interviewers tried to create friendly atmosphere and not to impose any opinions or knowledge on the respondents, so that they could feel comfortable. The interviews were transcribed, coded, and categorised in order to analyse the respondents' answers in a qualitative manner. The quantitative analysis of the empirical material was also conducted.

58 Ukrainians participated in the individual interviews. The group of respondents consisted of 36 women and 22 men, aged between 17 and 50, with 31 being the average age. 42 respondents held university degrees, 13 were high school graduates, 1 began university education but did not complete it, 1 graduated from a vocational school, and 1 from a junior high school. The respondents worked in intercultural teams, i.e. teams in which employees represented at least two different cultures. Most of the respondents (38 persons) worked in international corporations, in teams of high national diversity. The positions held by the respondents included: project coordinator, human resource specialist, human resource manager, EU project specialist, development manager, technical director, and regional manager.

The focus group interviews were held in three groups consisting of 6 participants, and included questions regarding the impact of employees' social competence on their functioning in intercultural teams as well as various forms of support and assistance offered to immigrants and aimed at their development and improvement of social competence. All the respondents were Ukrainians who worked in multicultural environment. The average period of the respondents' professional activity in Poland was 3 years.

The authors assumed that social competence of the respondents employed in culturally diverse teams significantly affects their effective functioning in such work environment. Therefore, the aim of the study was to determine the level of the respondents' social competence (in-depth individual interviews) and to identify the impact of their social competence on their functioning in intercultural teams (focus group interviews).

Employees' Social Competence – The Results of The Study

The aim of the study was to determine the level of the following facets of social competence: motivation, assertiveness, self-presentation, stress management, conflict management, and emotional intelligence. The choice of these areas of social competence was dictated by the analysis of the subject literature, which revealed that they were the ones in which most deficits in employees' social competence appear (Lesińska and Grzymała-Kazłowska 2017; Kindler and Górny 2016; Fomina 2016).

The first facet of social competence examined in the study was motivation (the ability to use various incentives). The respondents were asked whether they liked taking up new challenges and whether it was easy for them to find motivation to face difficulties they encountered in life. The analysis of the results indicated that 49 respondents were highly motivated to take up new challenges and deal with difficulties. One of them said: "If I have a cool team next to me, then yes, if not, I think it over whether I should do the task or rather find the right people" (Respondent 16, male, aged 38). This indicates a link between motivation to act and the group of people with whom cooperation is to be undertaken. Many respondents (25 persons) stated that they were not afraid of new challenges and could cope with difficulties effectively, and here is an example of their statements: "I like challenges (...) I'm not afraid of changes and take them lightly" (Respondent 25, female, aged 29). Some respondents (9 persons) declared low levels of motivation to take up new challenges, listing both, internal factors, existing inside them, and – mostly – external factors, which demotivated them (bureaucracy, a lack of language skills, a stay in a foreign country).

The respondents were also asked about the ways in which one can increase motivation and whether they had ever tried to work on their motivation. 43 respondents listed various ways of improving motivation ("I observed people who were developing themselves" (Respondent 26, male, aged 28); "It is good to travel because then one learns wisdom, to read books, to observe the world" (Respondent 40, female, aged 35); "I think it can be developed, I believe there are methods and techniques helping to become more open to the world" (Respondent 43, woman, aged 27); "I think I have tried, because motivation, lifestyle is discipline" (Respondent 51, woman, aged 23); "It seems to me that the answer is complex, because people are certainly born with certain temperament, with an attitude towards life, and, on the other hand, I become aware of my shortcomings and can improve them (...) surely such reflection and work on my weaknesses is important (...) yes, I have definitely tried to make such attempts, I try to observe myself and observe my reactions, and I do my best not to make them mechanical" (Respondent 56, female, aged 25)). These sample statements demonstrate that the respondents were aware of the importance of motivation in their lives and knew how to improve it. However, there was also a group of respondents (15 people) who claimed that there were no ways in which motivation could be increased. This was most often combined with innate abilities ("Parents must bring up their children, teach them skills (...), later if you don't have these abilities, you have to try to meet challenges somehow" (Respondent 7, male, aged 21).

Another facet of social competence which was analysed in the study was assertiveness (the ability to exert influence without resorting to aggression). The vast majority of the respondents (43 persons) described themselves as assertive. Here are several examples of the respondents' statements: "I have to think about it myself, and if I am sure, I say what I think" (Respondent 43, woman, aged 27); "I used to let other people talk. That's why I felt angry and then I decided it's enough" (Respondent 26, male, aged 28). 15 respondents admitted they lacked assertiveness ("No, not always. To say what I think is not so easy") (Respondent 3, male, aged 34); "I sit quietly and rather do not say anything to anyone" (Respondent 50, female, aged 26).

Self-presentation (the ability to build a positive image) was another facet of social competence examined in the study. The respondents were asked to list the factors which contribute to effective self-presentation. 49 respondents were able to answer this question, while 9 of them admitted possessing no knowledge in this area. Those who enumerated factors important for effective self-presentation agreed that the most significant thing is to be yourself and to present yourself as you are ("Being yourself above all, not to lie, not to pretend") (Respondent 43, woman, 27 years old); "To present yourself well requires long and hard learning and work. The most important thing is to be yourself, so as not to exaggerate in any way, culture" (Respondent 22, female, aged 31); "Show just what kind of a person you are" (Respondent 26, male, age 28). Almost all the respondents (55) considered self-presentation important in social contact ("Yes, it is important for relationships with other people" (Respondent 3, male, aged 34); "Yes, very important, because the future depends on it (...) the first impression is important. If someone is sad, it's bad (...) because later people judge us this way" (Respondent 58, female, aged 24)).

In order to diagnose the ability to manage stress and conflict, the study analysed, among others, the ability to identify the causes of stress and conflict. Stress and conflict management skills are vital elements of social intelligence allowing people to deal with e.g. intercultural relationships, which can be a challenge.

The respondents did not find identifying the causes of stress and conflict difficult and all of them listed several causes, including their whole range typically encountered at work, at home, in the local community, as well as the ones connected with global problems. Here are several examples of the respondents' answers: "Anyone can have a bad day, some misunderstanding, little money" (Respondent 43, female, aged 27); "A lack of self-confidence, misunderstanding other people, or expecting too much from people" (Respondent 22, female, aged 31); "People, their expectations cause stress (...) When there is an internal conflict - meditation, communication with people, talking to them" (Respondent 58, female, aged 24); "I am always stressed, the language barrier" (Respondent 26, male, aged 28).

51 respondents, so a large group, claimed to be able to cope with stress ("I try to understand (...) I don't shout and know that tomorrow will be better" (Respondent 5, male, aged 22); "I want to be alone in such situations and think it over" (Respondent 50, female, aged 26); "I try to understand, I try to control myself (...) I breathe, I avoid conflict" (Respondent 22, female, aged 31). 7 respondents declared that they had a problem with coping with stress and conflict.

Another facet analysed in the study was emotional intelligence, i.e. a way of dealing with one's own and other people's emotions. Empathy (the ability to understand the point of view of another person) is one of the components of emotional intelligence. 43 respondents claimed that they can adequately react to other people's strong emotions. One of the respondents said: "Maybe the moment was bad. I don't take it personally, I just talk calmly, ask why (...) the emotions are there, but things calm down and I take it easy" (Respondent 22, female, aged 31). 15 respondents claimed that they could not adequately respond to other peoples' strong emotions. Many respondents admitted being empathetic, e.g. "I always try to put myself in another person's shoes to understand what the cause of this, this situation, this conflict, this stress may be; I don't know what it may be there, and, well, I try to understand, to get along, to talk, to advise" (Respondent 24, male, aged 31).

All the respondents participating in the focus group interviews admitted that they were aware of the role and significance of social competence and its impact on the effective functioning in the teams in which they worked. The respondents' statements revealed that social competence of employees working in intercultural teams affects interpersonal relationships (15 persons), effective communication (16 persons), effective cooperation (151 persons), the ability to look for constructive solutions (12 persons), and the ability to resolve difficult and conflict situations (15 persons). Most respondents mentioned the cultural context (15 persons), indicating that social competence facilitates establishing positive intercultural relations (14 persons), characterised by respect for and understanding of employees from other cultures. In the respondents' opinion, social competence also influences the speed of tasks execution in a team (12 persons), the quality of work (15 persons), openness to changes (12 persons), and creativity and innovation (11 persons).

The respondents admitted that they had deficits in social competence (12 persons), of which they were aware and which considerably limited their effective functioning in intercultural work environment. They also pointed to the need to actively look for ways in which they could improve their social competence (11 persons) and reported their willingness to participate in training courses aimed at developing it (15 persons).

All the respondents taking part in in-depth focus group interviews stressed the particular role played by the facets of social competence which had been analysed in individual in-depth interviews (motivation, assertiveness, self-presentation, stress management, conflict management, and emotional intelligence). The respondents added that their effective functioning in intercultural teams also depended on other competences, among which they mentioned communication (15 persons), change management (13 persons), influencing people (14 persons), time management (12 persons) and leadership (10 persons).

Discussion

The results of the individual in-depth interviews revealed that the respondents had the greatest problems with the following areas:

- a lack of assertiveness - 15 persons,
- a lack of ways to increase one's motivation - 15 persons,
- the inability to react to other people's strong emotions - 15 persons,
- a low level of motivation to undertake new challenges - 9 persons,
- a lack of knowledge about factors contributing to effective self-presentation - 9 persons,
- the inability to react appropriately to conflicts within a team - 9 persons,
- the inability to deal with stress and conflict situations - 7 persons,
- the inability to identify the causes of stress and conflict - 6 persons,

- a lack of understanding that self-presentation is an important element of social contacts - 3 persons.

In the course of the individual in-depth interviews the authors determined the level of the respondents' social competence, and the results obtained indicate that the vast majority of them (75%) use a set of social skills particularly important in working in intercultural environment.

However, the results of these interviews also reveal the respondents' deficits in the area of their social competence, which may significantly hinder their effective functioning in intercultural teams in which they worked. In the authors' opinion, these deficits may have a negative impact on the functioning of not only individuals but also entire teams operating in intercultural work environment.

The results of in-depth focus group interviews demonstrate that the respondents were aware of the role and importance of social competence and its influence on effective functioning in such teams. The respondents emphasised the positive impact of social competence on many aspects of work in intercultural teams, such as the speed of task execution and the quality of work or interpersonal relations.

The results of the study confirm the hypothesis put forward by the authors of the paper, which stated that the level of the respondents' social competence has an impact on their effective functioning in intercultural teams.

Conclusions

On the basis of subject literature and the study described in the paper, the authors have demonstrated the role and significance of social competence of employees working in intercultural teams and have shown the links between the level of their social competence and their effective functioning in such teams.

Summing up, social competence affects the effective functioning of employees in intercultural teams and the functioning of intercultural teams themselves. The positive outcomes of work done by culturally diverse teams whose members are characterised by a high level of social competence, include greater creativity, multi-faceted thinking in search of new solutions, the ability to react quickly, improved quality, the ability to learn and to share experiences, and increased communication efficiency. On the other hand, the low level of employees' social competence may adversely affect cooperation and interpersonal relationships within intercultural teams, and lead to slower team performance, ineffective communication and the inability to achieve common team goals.

The authors are aware that that fact that the interviews were carried out in a nationally homogeneous group (Ukrainians) is a limitation of the study, however, such an assumption was the aim of the project within which the study was conducted. The fact that it is the largest group of immigrants in Poland justified choosing the respondents of this nationality. During the further stages of the project, the same in-depth individual interviews and focus group interviews will be used to determine the level of social competence among immigrants of other nationalities who live in Poland and their impact on the effective functioning of members of intercultural teams.

According to the authors, improvement and development of employees' social competence is a must as far as working in culturally diverse environment is concerned. The level of employees' social competence also depends on their openness towards representatives of different cultures, their acknowledgment of diversity in the context of values, their motivation to work, their ability to share knowledge and experiences, their ability to motivate others to take up new challenges, and their effectiveness in conflict resolution, all of which lead to improved team efficiency, especially in case of intercultural teams.

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Social Expectations in The Process of Creating the Offer of Cultural Institutions

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Abstract

The article underlines the changing role of cultural institutions in shaping the habits of participation in culture. An attempt was made to assess social expectations towards public organizations. The level and scope of involvement of external stakeholders in the service creation process were examined for this work. The range of the research is the result of the conclusion that the engagement of direct recipients of services is one of the critical conditions of efficiency of the surveyed organizations.

Keywords: Cultural Institutions, Services, Public Organizations, Participation in Culture

Introduction

Cultural institutions, as public organizations, have a unique role in society. The establishment and purpose of such organizations are based on widely recognized and disseminable values such as culture and national identity.

A society, which is a collection of people with a common culture (passed on to future generations), shared territory, and collective identity, is a specific structure of human relationships that is the center of human existence (Goodman, 2009). According to Giddens (2008, p. 45), society is nothing more than a system of dependencies in which individuals are linked to each other. Traditional social networks usually develop over time under the influence of customs and habits.

In the past, families, close relatives, neighbors satisfied most of the individual's needs. Today, many of the needs are met by people one does not know or has never met before and who are part of the organization. Modern industrial and post-industrial societies form organizations to achieve specific objectives and place them in specially created places or buildings (Giddens, 2008, p. 783). Nowadays, these organizations play a greater role than ever before, while the society is aware of this and has growing expectations of such systems.

In the ever-changing world of modern technology, cultural institutions are the backbone of tradition, culture, and attachment (Azis 2019, Nort 1990). Paradoxically, these - often overly bureaucratic - institutions are an unquestionable determinant of the culture of a given society and are still perceived as carriers of the so-called higher (elite) culture that is generally approved in opposition to mass culture (Kłoskowska, 2007, 2005). They have been assigned an important role in numerous sectors of institutions belonging to the creative economy, which is currently becoming a powerful force of change in the modern world (CER, 2013; KEA, 2006; Throsby, 2008). The primary task of cultural institutions is to fulfil their mission of creating, preserving and disseminating cultural goods and services, rather than maximising the financial payoff or value generated from tchem (Wnuczak, Osiichuk 2019, Throsby 2003). Cultural institutions must go beyond their existing functions and open to changes in the environment without losing their identity; hence they should continue to carry out their activities to satisfy social needs without being profit-driven.

The work aims to assess the level and scope of external stakeholders' participation in the service creation process.

Research Methodology

The content of the article is a part of broader research on the activities of cultural institutions in the field of the offer for children carried out in 2014/2015. The research used a diagnostic survey complemented by desk research, upon which basis Wroclaw public institutions offering services to children were selected in the first stage. The survey was carried out through a questionnaire addressed to the management of previously selected cultural institutions located in the city of Wrocław. The cultural and scientific institutions with an offer addressed to early school-age children were selected based on the data obtained from the Public Information Bulletin of the Municipal Office of Wrocław (RIK, 2014) and their websites. The research covered four Youth Culture Houses: Fabryczna Youth Culture Center, Krzyki Youth Culture Center, Śródmieście Youth Culture Center, and Nicolaus Copernicus Youth Culture Center (another name: Zespół Centrum Edukacji Kulturalnej Dzieci i Młodzieży) (EDU, 2014); theaters: Puppet Theater and Polish Theater, and music scenes: Capitol Musical Theatre, Wrocław Opera House, Witold Lutosławski Philharmonic (since 2014: National Forum of Music); museums: Wroclaw City Museum, National Museum in Wroclaw (and its two branches), Museum of Post and Telecommunication, and cinemas: Multikino (two branches), Helios, CinemaCity and New Horizons Cinema. Also, the Wrocław-West Cultural Center, Agora Cultural Center, and Centennial Hall Cognitive Center were taken into consideration. As much as 90% of surveys, which is a very high percentage, were filled in. That may partly be explained by the fact that the surveys were carried out in person, and the completion of the questionnaires was monitored. In total, the survey covered 20 cultural institutions located in the city of Wrocław.

The surveyed institutions were categorized into five groups depending on the specificity of the activity. The first group included Youth Culture Houses, the second - theatres and music scenes, the third – museums, and the fourth one - cinemas. The most diverse group in terms of the nature of its activities was called others and consisted of cultural centers and cognition centers. Such a division made it possible to analyze the results of the research taking the specificity of the examined institutions into account.

Characteristics of The Institutions Under Examination

The research covered mainly public institutions established by state and local government bodies to perform specific social tasks. The open character of the surveyed institutions is an important attribute that makes them entities undertaking activities for the common good (Kozuch, 2011,p. 49).

In addition to the identifying name, the essential characteristics of the studied institutions include the year of establishment, location, and distance from the others. As shown in Figure 1, the breakthrough years in the history of Polish culture were the criterion for their division: 1945 - the end of the Second World War and 1991 - the enactment and introduction of the Act of 25 October 1991 on the organization and conduct of cultural activity (Journal of Laws 1991 No. 114 item 493), and then the Regulation of the Minister of Culture and Art of 17 February 1992 on the manner of keeping the register of cultural institutions (Journal of Laws 1992 No. 20 item 80). Given the year in which the institution was established, it can be noted that theatres and music scenes, as well as some museums, are the oldest. They were often created in the 19th century. The Wrocław Opera was founded in 1874, and most of the organizations were set up after World War II. The period from 1945 to 1990 was beneficial not only for the creation of Youth Culture Houses but also for the cultural institutions of great stages: the Polish Theatre and the Wrocław Philharmonic.

Contemporaneity, after the political transformation and the enactment of legal acts regulating the activity and registration of cultural institutions that are still in force today: The Act of 25 October 1991 on the organization and conduct of cultural activities and the Regulation of the Minister of Culture and Art of 17 February 1992 on the manner of keeping the register of cultural institutions, abounds mainly in the creation of Wrocław cinemas and cultural centers. Contemporary times also include the year 2000, when the City Museum in Wrocław was established, and the year 2012, when the Cognitive Center at the Centennial Hall was set up.

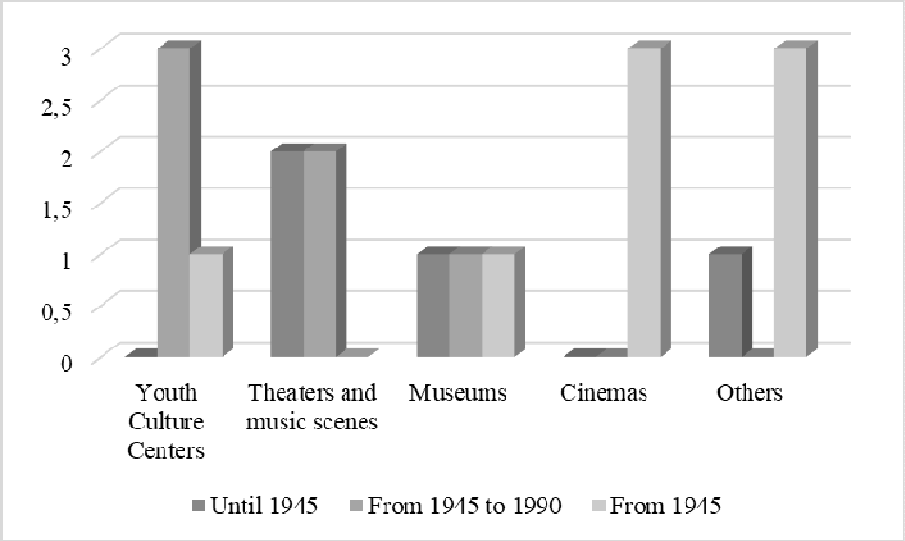

Figure 1: The number of institutions established in selected periods according to their category
Source: Own study

The studied cultural institutions, such as theaters, music scenes, and museums, are located mainly in the central districts of the city. That is because these are the areas of the Old Town, but also Śródmieście and Krzyki districts.

There is no public cultural institution of this type in the Psie Pola district, which covers an area outside the central part of the city. There is the AGORA Culture Center, which is a commercial institution conducting cultural and entertainment activities not directly using public funds. Similarly, not every district of Wrocław has a Youth Culture Center on its territory.

The situation is different for the location of cinemas - there is at least one in each district. However, it should be noted that they are private institutions (the so-called free market). Hence, a recipient of public cultural institutions must make an effort to move to the city central areas of the city.

Monitoring of Demand for The Offer Conducted by Cultural Institutions

Cultural institutions, which perform social functions, operate thanks to society and carry out specific tasks for it. Thus, it seems inevitable to act not only to enhance the service offer but also improve its quality. One of the ways to increase the quality of service is to target the offer to the recipient. The problems in the conducted research included learning about the actions taken by an institute of culture and science before planning an offer addressed to children at early-school age. This problem was divided into two issues: earlier monitoring of the demand for leisure time facilities for early school-age children and getting to know the factors that the examined cultural institutions consider when designing such an offer.

The results of the survey indicate that 80% of the examined cultural institutions monitor the demand of children at early school-age for performances, events, and other leisure time activities. To this end, they undertake various measures, including mainly: surveys and interviews with parents and teachers, as well as meetings with school principals. Also, the respondents follow the content of the core curriculum, conduct research on the demand for a specific offer (e.g., number of bookings, attendance at classes, and the like). Additionally, to obtain information about the offer desired by early school-age children, the respondents organize family workshops at weekends and festivals. Besides, during the classes, children or their caretakers are interviewed by animators or institution staff. The surveyed

also follow and are interested in Polish and foreign market novelties addressed to children, such as books, poetry, films, CDs with music, various forms of entertainment, which they can incorporate into their activities.

Gathering information on the services provided to early school-age children, and its analysis is undertaken by the surveyed cultural institutions in various forms. The fact that most respondents undertake such activities should be assessed positively. On the other hand, one fifth of the examined cultural institutions does not monitor the demand of early school-age children for performances, events, and other activities filling their free time.

When analyzing respondents' answers concerning the issue of monitoring the demand of early school-age children for the offer of cultural institutions, the account was taken of the category of examined entities (results are presented in Figure 2).

The data obtained indicate that all Youth Culture Centers and cinemas monitor the demand of children at early school age for an offer that can attractively fill their free time. The vast majority of 80% of Wrocław's museums conducts such observation. The institutions classified in the other category in a large number (75%) also research the same scope. Half of the institutions in the category of theatres and music scenes see the need to monitor the demand of early school-age children for their offer.

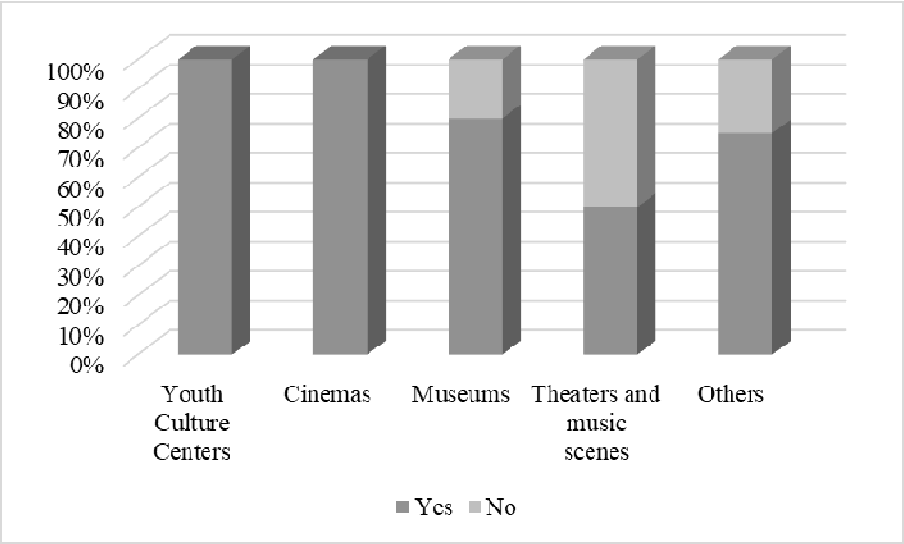

Figure 2: Monitoring the demand of early school-age children for performances, events and other activities and the categories of institutions under investigation

Source: Own study

The research assumed that in the process of the preparation of the offer addressed to early school-age children; other factors are probably considered in addition to the assumed goals. Respondents were prepared a cafeteria of probable rationale (factors) which they could refer to when planning an offer and then asked to assign values to them, hierarchically in numbers from one and above, with one being the most important. The weighted scale was applied to interpret the results, and individual places were given ranks from 1 to 6. Table 1 displays the results.

Interests are the most substantial factor that the respondents recognize when preparing an offer for early school-age children. As the results of the ranking indicate, the respondents declared that they contemplate the proposals of schools when designing an offer for children in the second place, while the proposals of their employees in third place. The parents' proposals occupy fourth place. Financing

takes the penultimate place in the ranking of the importance of rationale regarded in the process of preparing an offer for early school-age children. The least essential reason turned out to be following the offer of other cultural institutions.

Table 1: Rationale considered by cultural and scientific institutions when planning an offer addressed to early school-age children

Ranking Rationale	**1**	**2**	**3**	**4**	**5**	**6**	Calculation of weight	Ranking
Students' interests	8	7	2	0	1	2	95	**I**
Offer of institutions of culture and science	0	0	3	3	3	11	38	VI
Parents' proposals	0	2	3	4	1	10	46	IV
Financing	0	3	1	2	4	10	43	V
Workers' proposals	2	4	5	1	1	7	64	**III**
Proposals of schools	6	3	2	4	0	5	76	**II**

Source: Own study

The outcomes of the research show that the examined cultural institutions contemplate the needs and interests of their audiences when planning an offer addressed to early school-age children and consult with their closest circle of experts. They consider schools and employees whom they contact most frequently to be a reliable source of information. At the same time, research shows a certain regularity of children's participation in culture. Children take advantage of the cultural institutions' offer mostly among the classmates during school trips and outings rather than with their parents or grandparents. Undoubtedly, this is a picture of a social phenomenon in which parents ruthlessly transfer the fulfillment of their roles and tasks towards children to organizations.

Parents Towards Cultural Institutions in Regard of Preparing an Offer Addressed to Their Children

It is well-known that society creates organizations to achieve specific objectives and tasks. The reason behind their establishment is, among other things, to support a society member in the performance of certain functions. Today's parents are a commercial generation, able to search for information but also to take advantage of ubiquitous services. Therefore, it can be presumed that in recent years the level of parents' expectations towards institutions regarding the organization of the offer for early school-age children has significantly increased.

The research carried out has confirmed the assumption. As shown in Figure 3, in the opinion of most respondents - directors of the examined institutions, the level of parents' expectations towards cultural institutions regarding the service offer addressed to children at the early school-age has risen to a greater or lesser extent. Among them, 50% of the surveyed declare this level has somewhat increased.

On the other hand, 30% of them are more decisive in their opinions, as they believe that the level of parents' expectations towards them has increased considerably.

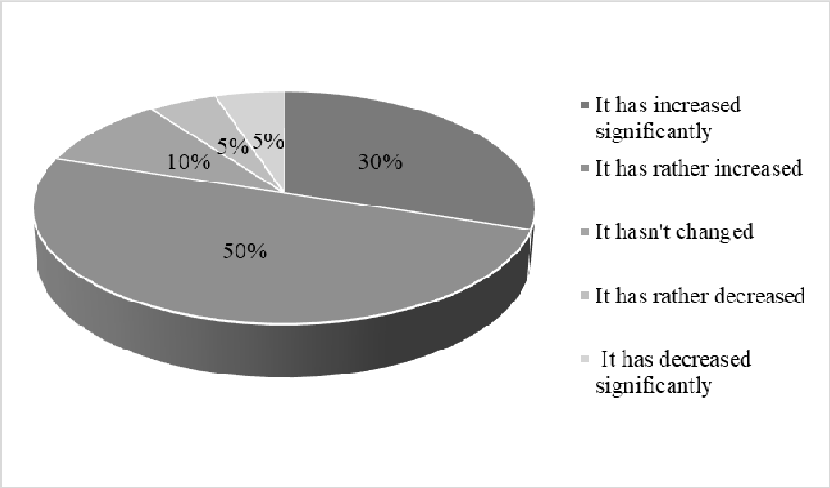

Figure 3: Respondents' opinion on the level of parents' expectations towards cultural institutions regarding the offer for early school-age children

Source: Own study

Only 10% of the respondents take the view that parents have not changed their attitude towards their institution in terms of expectations concerning the offer addressed to children at early school-age. On the other hand, 5% of them even think that the level of parents' expectations in this area has rather decreased, and another 5% - that it has slumped significantly.

Figure 4 presents the dependence of respondents' answers on the level of parents' expectations towards cultural institutions as regards the offer for children at early school-age depending on the category of the examined cultural institutions.

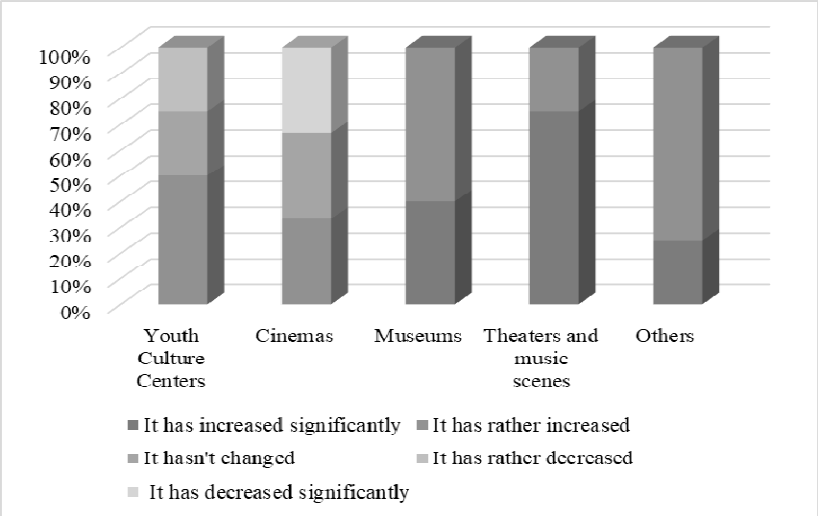

Figure 4: The level of parents' expectations towards cultural institutions regarding the organization of the offer addressed to early school-age children depending on the category of the examined cultural institutions.

Source: Own study

There are apparent differences in the levels of assessment, depending on the categories of the surveyed entities. Nevertheless, the opinions are strongly oriented towards increasing the level of parents' expectations towards them. The respondents from museums, theaters, and institutions classified in other categories, i.e., the Centennial Hall, Agora Culture Center, and Wrocław-West Culture Center, believe that the level of expectations towards their organizations has increased considerably.

Only a few respondents in the category of cinemas and Youth Culture Houses declare that the level of parents' expectations towards their institutions regarding the organization of leisure time activities for early school-age children has not changed. There are also exceptional opinions among the directors of Youth Culture Centers, who believe that the level of parents' expectations has risen.

The surveys carried out in cultural institutions located in the city of Wrocław confirm that their perception by society has changed. In comparison to previous years, the examined entities saw a much higher level of parents' expectations towards them regarding the organization of the offer addressed to early school-age children. Such findings can be interpreted, first, as shifting the parents' responsibility for introducing their children to culture to the institutions and, secondly, as an increase in the level of trust that parents place in cultural institutions in terms of reliability and certainty of the message of culture. It might be that it is a concern for the quality, form, and safety of the message of culture and national heritage as well as participation in the culture of the youngest generation.

Conclusion

The importance of cultural institutions as creators of non-monetary value contributing significantly to people-centered sustainable development is increasingly recognized (CER, 2013). Governed by the analysis of the KEA research report, cultural institutions can be attributed to the non-industrial sector, which includes entities that produce non-reproducible, non-returnable goods and services that can be "consumed" on site. Such an approach determines the specific nature of the examined institutions functioning next to the industrial sector responsible for the manufacture of cultural products aimed at mass reproduction or mass distribution and export (KEA, 2006). Cultural institutions belong to public organizations. Their major task is to provide public services that are generally accessible. The public character of these organizations is manifested in the offering of goods and services, their financing and, taking responsibility to the public for their quality (Kożuch B., 2011; Kożuch B., Kożuch A., 2017). Cultural institutions as public organizations are open systems that interact with their environment. Not only do they exist in a given environment but thanks to it they also function in it (Urbanowska - Sojka E., Banaszyk P., Witczak H., 2007). Therefore, openness to the expectations of their surroundings should be one of the most crucial attributes of cultural institutions.

The surveys conducted among cultural institutions located in the city of Wrocław allow for the presentation of a positive image of their activities undertaken for openness. The role of the institutions under study in monitoring the demand for children's offers is particularly noticeable. It should be stressed that in social awareness, most of the examined cultural institutions function as ones directing their offer to adults. Nevertheless, the social role entrusted to cultural institutions is treated very seriously and is fulfilled reliably. The depth of activities aimed at meeting social expectations may be evidenced by the results of the research that was supposed to specify the rationale and factors analyzed by the institutions when preparing the service offer. They show that it is the recipient's interests that are most substantial in designing the future offer. That means that the institutions have made an effort to contact the recipient - participant of culture directly. It is puzzling that the surveyed institutions operating on the market next to the commercial sector consider the offer of other cultural institutions to a minimal extent.

Unfortunately, the analysis of the results allows us to notice the phenomenon of transferring to the institutions the role once attributed to the family: introducing into the culture, participation in culture, or cultivating heritage. The research indicates that children participate in culture brought by their guardians, and the initiators of the use of cultural goods are teachers - not parents. The results show

that the representatives of the examined cultural institutions take into account the school's proposals before those of the parents when planning the offer addressed to the children. Moreover, the research analysis indicates that in recent years, parents have significantly increased their expectations towards cultural institutions in terms of preparing an offer addressed to children. Recommendations are proposed to consider more activities undertaken by other institutions operating in the environment of the surveyed. The information would make it possible to assess, for example, where the proposal of a given institution is placed, or at what level, and others. Such information seems to be useful, especially when one intends to develop the quality of services and meet customer expectations.
The conducted research implies a conviction about a significant role of social expectations in the activity of cultural institutions. The more so because these expectations are continually growing and cultural institutions are not only obliged but should be sensitive to the changing needs of society.

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Entrepreneurial Attitudes Among High School Students as A Source of Future Economic Initiatives

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Abstract

The purpose of this publication is to identify the factors affecting the willingness of high school students to start their own business in the future. In the theoretical part, the authors synthetically present the essence of entrepreneurship and its manifestations among high school students against the background of the educational process. In the second part of the article, based on the results of their own surveys conducted among students of selected Polish high schools, they verify the impact of ten explained variables determined by the students' self-assessment made through the prism of their entrepreneurial attitudes and experience in the field of entrepreneurial activity on the explained variable determining their propensity to launch their own entrepreneurship. The analyses carried out as part of the article led to the conclusions that students who perceive themselves as entrepreneurs are more likely to consider setting up their own business. Identifying (as part of self-assessment) two entrepreneurial qualities, *i.e.*, openness and willingness to undertake risks, by the surveyed students plays a special role in this respect. Moreover, the real factor in which students declare that they will start their own business in the future is the growing experience obtained as a result of the practical use of entrepreneurial features they perceive in themselves.

Keywords: Entrepreneurship; Development of Entrepreneurial Attitudes; Innovations; Education; High School Students.

Introduction

Today, there is a widespread belief that entrepreneurship is one of the most important factors influencing the processes of socio-economic development, including in particular the increase in the competitiveness of enterprises and entire economies. The belief is based on many years of observation of economic reality as well as on the results of numerous empirical studies, although there is a clear shortage of research on entrepreneurship in relation to youth (Geldhof et al, 2014). Due to its significance, entrepreneurship is a very desirable attitude and by all entities, regardless of the sphere of functioning, which is of great interest to scientists and practitioners. Sources of entrepreneurial attitudes are sought at the early school stage, when the youngest representatives of society learn creativity and initiative from their loved ones at home and at school. The key factor in the development of entrepreneurial attitude is the appropriate education process implemented at all stages of education. However, it becomes especially significance at the level of secondary and higher education, when pupils and students shape their entrepreneurial attitudes by actively participating in socio-economic life (Marona and Głuszak, 2014). However, despite highly developed education, many countries have struggled and are still struggling with high unemployment rates among high school and college graduates (Setiawan, 2014). Schools, in addition to transferring knowledge, should therefore prepare future graduates to effectively take on the challenges posed by the modern labour market, providing

them with the right competences, including primarily practical skills and proactive attitudes. Entrepreneurship as a school subject has gained significantly in popularity over the last decades - in Western European countries in the last decades of the last century, and in Poland in the first two of the current century (Rosendahl-Huber et al, 2012).

This article focuses on the essence of entrepreneurship and its role in starting own business activity, as well as on shaping entrepreneurial attitudes among young people in the process of school education. The main research objective of the article is to identify factors influencing the tendency of high school students to start their own business in the future. Its implementation, based on the results of a survey conducted among students of selected high schools, is to answer the question whether the willingness of students to set up their own business in the future is impacted by the fact of perceiving oneself as an entrepreneurial person, attributing individual characteristics of entrepreneurial attitudes and by the fact that they have already had the opportunity to use entrepreneurial attributes assigned to them in specific actions?

Theoretical Background

The Concept and Essence of Entrepreneurship

Entrepreneurship is a complex, multidisciplinary and multi-faceted concept, which is why it is ambiguously defined in the subject literature (Daszkiewicz, 2013). This article adopts the concept of entrepreneurship in a broad sense, according to which it is defined as a process of discovering, assessing, developing and expanding opportunities that allow to create a specific value, thanks to an innovative approach to using opportunities and resources (Bruyat and Julien, 2001; Glabiszewski et al, 2020). It should be added, however, that according to the basic theoretical assumptions, entrepreneurship is most often treated in two dimensions, *i.e.,* as a special type of process consisting in creating something new and as a set of selected features characteristic of an entrepreneurial attitude (Bruyat and Julien, 2001). This means that the implementation of this particular type of process is not possible without the use of these selected features, and in turn these features have no reason or chance to verify their existence if they are not used in a specific entrepreneurial process. Only together, while co-creating an integrated construct, do they determine the essence of entrepreneurship.

P. Davidsson (2003), proposed a three-dimensional approach, in which he explains the concept of entrepreneurship by referring to three separate categories: results, processes, and skills. Directly to the first of the cited categories, *i.e.,* results, refers, for example, F. Knight (2012), who presents the concept of entrepreneurship as a profit that is obtained in exchange for acting in conditions of uncertainty and risk taking. S. Schane and S. Venkataraman (2000) refer directly to the processes in their definition, for which entrepreneurship is a process during which the newly acquired knowledge is transformed into a new product, or D.F. Kuratko (2008), who treats entrepreneurship as a dynamic process that combines vision, implementing changes and creating. Certainly, the procedural approach to entrepreneurship is most often found in the subject literature. In turn, J.A. Schumpeter refers to the category of entrepreneurial skills in his definition, according to which entrepreneurship is a trait attributed to an entrepreneurial person who is a natural person and who uses market opportunities through technical and/or innovative organizations/activities (Eroğlu and Piçak, 2011).

In addition to the skills acquired, the entrepreneur should also have specific characteristics, including personality traits, that are not easy to shape. P. Davidsson and B. Honig (2003) claim that regardless of the way schools teach and regardless of the degree to which the topic of entrepreneurship in the curriculum is implemented, the issues of translating this topic into the real zone, *i.e.,* the economy, can be achieved only to a basic degree. Universities or schools aim at teaching their students mainly by passing on theoretical knowledge, at most supported by practical examples. And entrepreneurship - in accordance with the above-mentioned definitions - is not learning the rules of conduct, but actual activity assuming an innovative approach to the surrounding world based on specific competences, especially such as readiness to take risks, creativity in the search for and improvement of ideas, openness to perception in surrounded by opportunities and needs as well as activity and commitment to seizing the opportunities that arise (Glabiszewski et al, 2018; Pypłacz and Liczmańska-Kopcewicz,

2018). An entrepreneur can see challenges and take action to achieve his ambitious goals, regardless of the resources at his disposal (Amolo and Migiro, 2014). He is optimistic about the surrounding reality, in which he does not look for difficulties and justification of his passivity, but rather opportunities and possibilities of using them. He pursues his goals with commitment, perseverance and passion. He works dynamically, is constantly striving to be better and is not afraid of competition (Amolo and Migiro, 2014).

Signs of Entrepreneurship Among Young People

In accordance with the Recommendation of the European Parliament and of the Council of the European Union from 18 December 2006 on key competences for lifelong learning (2006/962/WE), eight key competences were identified that combine the knowledge, skills and attitudes considered necessary for the needs self-realization and personal development, active citizenship, social integration and employment. Entrepreneurship was recognized as one of these key competences in the education system. High school students, thanks to the support of educational, sporting, cultural, and other facilities, can take advantage of many additional classes organized by teachers and cooperating entities to develop their practical skills and entrepreneurial attitudes. Significant opportunities for students can be provided, for example, by participating in scientific clubs, ventures, events, charity campaigns, computer games imitating economic reality, special lectures with motivating people, which encourage young people to look for their own path on various levels. Schools also place emphasis on competition by encouraging students to take part in numerous competitions, contests and sports events. By organizing various additional extracurricular activities schools aim at the following (Sołek-Borowska and Laskowska-Chudy, 2017):

- developing the traits and skills of students that form the basis for undertaking entrepreneurial activities;
- raising awareness of the concept of self-employment and its values, and entrepreneurship as an opportunity for the development of one's professional career;
- providing business skills that are necessary to run and develop one’s own business and deal with various difficulties resulting from running a business activity.

The period of education is the time when high school students take the first forms of employment, though undoubtedly university students do it more often. Looking for an entry-level job in order to earn their first money and gain their first experience, they are already manifest their entrepreneurial attitudes and, on the other hand, develop them by performing various real tasks as part of their work. An entrepreneurial attitude is also manifested by managing one’s own budget, saving money, making even small investments. The conscious and deliberate use of specialist clinics or career offices, which help identify strengths and plan a career path, should also be considered an entrepreneurial attitude. An extremely important manifestation of entrepreneurial attitude, *de facto* arising from the essence of entrepreneurship, is building a network of relationships that can pay off in the future, and this is not just about the closest group, the school community, but also about outsiders - for instance, through participation in various events organized outside the school walls.

At the stage of secondary school education, attention is primarily focused on shaping entrepreneurial attitudes in non-business areas, but the main application of entrepreneurship is starting your own business (Geldhof et al, 2014). This is also indicated by selected definitions of entrepreneurship. For example, for G. Onuoh (2007) entrepreneurship means the practice of establishing new organizations, especially new companies, or revitalizing mature organizations in response to identified opportunities. Therefore, the educational process in the field of entrepreneurship should be focused on building business competences, or at least anticipate their significant elements. From this perspective, it seems desirable to study the attitudes of pupils and students to setting up their own business and their approach to the labour market at various stages of education. This diagnosis is even more justified because the results of other studies indicate that the attitudes and interests of young people shape their future plans for their own entrepreneurial future (Geldhof et al, 2014). It is also so due to the fact that in Poland there is still a belief that starting your own business is not the best way to success and career, especially for graduates (Safin, 2014). It is true that the position of the entrepreneur enjoys a good reputation in

society, but this applies to big entrepreneurs who achieve spectacular market successes. People undertaking activities on a smaller scale (they constitute 90% of all entrepreneurs) are perceived similarly to people without a profession, which is not a convincing incentive to start their own business at the initial stage of their professional career (Safin, 2014). This is confirmed by the results of studies according to which only 11-13% of graduates of Polish universities are interested in starting their own business after graduation (Sołek-Borowska and Laskowska-Chudy, 2017). It should therefore be assumed that not only teaching entrepreneurship but also cultural aspects are an important incentive to invest in your own business (Eroğlu and Piçak, 2011), This indicates that Polish people are not willing to take risks, and the status of a novice entrepreneur is even depreciated in Polish society.

Research Objective, Methodology and Data

The study, the results of which are presented later in the article, was carried out in 2018-2019, using the method of auditorium survey. It was attended by 290 first and second grade students aged 16 to 18 of selected Polish secondary schools in the *kujawsko-pomorskie* province (159 students in 2018 and 140 students in 2019) participating in a scientific and didactic project of the National Centre for Research and Development (NCBiR) entitled 'Entrepreneurship and communication in the process of creative and innovative problem solving', no. POWR.03.01.00-00-C031/16. This project was implemented by the Nicolaus Copernicus University in Toruń under the Operational Program Knowledge Education Development implemented by the NCBiR, and co-financed by the European Union.

The characteristics of the persons participating in the study are presented in Table 1. The sample selection in the study was non-random. Schools participating in the project were identified by Business Support Center Sp. z o.o., a unit representing the City Hall in Toruń, whose task is to support entrepreneurship and economic activity in the region.

Table 1: Characteristics of people participating in the study (n = 290)

Criterion	Population	Percentage (%)
Respondents by gender		
Women	194	66
Men	96	33
Place of residence		
city over 100,000 residents	134	46
city between 25,000 and 100,000 residents	23	8
city up to 25,000 residents	20	7
village	113	39

Source: own research.

The study was the basic source of data necessary to achieve the main empirical goal of the article, which was to identify the factors affecting the tendency of high school students to start their own business in the future. To achieve the main research objective, the author set three specific goals referring to the high school students questioned:

1. assessment of the impact of perceiving oneself as an entrepreneurial person on their propensity to start their own business in the future;

2. assessment of the impact of attributing individual characteristics specific to entrepreneurial attitudes on their propensity to start their own businesses in the future;
3. assessment of the impact of using self-assigned entrepreneurial features in specific activities on their propensity to start their own businesses in the future.

In order to achieve the specific goals, and thus the main research objective of the article, the author formulated and empirically verified the following three research hypotheses regarding high school students:

H1. Perceiving oneself as an entrepreneurial person means that students consider the possibility of starting their own business to a greater extent;
H2. Attributing oneself individual characteristics of entrepreneurial attitudes means that students consider the possibility of starting their own business to a greater extent;
H3. The use of self-perceived entrepreneurial traits in specific activities means that students consider the possibility of starting their own business to a greater extent.

The hypotheses formulated above are the result of the considerations on the conditions of developing entrepreneurship among secondary school students and the impact of the effects of the educational process on their propensity to start their own business in the future. The desire to verify certain views expressed in entrepreneurship theory in relation to secondary school youth prompted the authors to take up the research problem expressed in the hypotheses assumed above. In order to verify them, econometric analyses of the obtained test results were carried out.

The ordered logit model was used, whose specification is an extension of the binary model specification to more threshold. The model is described by the following equation:

$$y^* = x'\beta + u$$

where y^* is the exact but unobserved dependent variable, x' is the vector of independent variables, u is the error term and β is the vector of regression coefficients, which will be to estimated. To estimate the model, the maximum likelihood estimation method and the STATA.16 software were used.

The subject of the analysis were 11 variables - 1 dependent and 10 explanatory ones (cf. Amolo and Migiro, 2014). The explanatory variable (y1) was the possibility of starting your own company assumed by the students questioned. In order to determine the value of this variable, high school students were asked the answer to the question whether they consider the possibility of starting their own business, giving them five choices, namely: (1) definitely not, (2) rather not, (3) it is difficult to say, (4) rather yes, (5) definitely yes.

The first dependent variable (x1) was the self-assessment made by students about perceiving themselves as an entrepreneurial person. To determine the value of this variable, students were asked to answer the question whether they consider themselves an entrepreneur, and they were given the following three choices: (1) no, (2) not yet, but I am learning how to become such a person, (3) yes. The next eight dependent variables (x2, x3 ... x9) also referred to self-assessment made by students, but in this case they concerned the possession of specific characteristics of an entrepreneurial person. In order to determine the value of these variables, students were asked to answer the question about which of the entrepreneurial qualities listed above characterize them, giving the option to mark either (0) 'no', or (1) 'yes'.

The tenth and the last dependent variable (x10) was the declaration of use of entrepreneurial qualities in the specific action which were selected by students and were declared in the earlier responses. In this case, students were asked whether they had already had the opportunity to use their qualities that testify to their entrepreneurship in some activities and one of the following four responses was expected: (1) no, (2) yes, once (3) yes, sometimes, (4) yes, many times. Table 2 presents the description and scales of all variables of the model.

Table 2: Description of variables

Variables	Description	Scales
EXPLANATORY VARIABLES		
x1	Perceiving yourself as an entrepreneurial person	Ordinal (1, 2, 3)
x2	Possession of the quality of openness	Dichotomous
x3	Possession of the quality of engagement	Dichotomous
x4	Possession of the quality of creativity	Dichotomous
x5	Possession of the quality of being active	Dichotomous
x6	Possession of the ability to solve problems	Dichotomous
x7	Possession of faith in your own abilities	Dichotomous
x8	Possession of risk propensity	Dichotomous
x9	Possession of the quality of showing initiative	Dichotomous
x10	Utilizing the qualities possessed that prove entrepreneurship	Dichotomous
EXPLAINED VARIABLE		
y	Declared possibility of starting your own company in the future	Ordinal (1, 2, 3, 4, 5)

Source: own research.

Results and Discussion

In the first step of the survey conducted among high school students, knowledge of the concept of entrepreneurship was verified. To this end, they were asked to mark, according to their knowledge, one of the three answers. The answers obtained are presented in Figure 1.

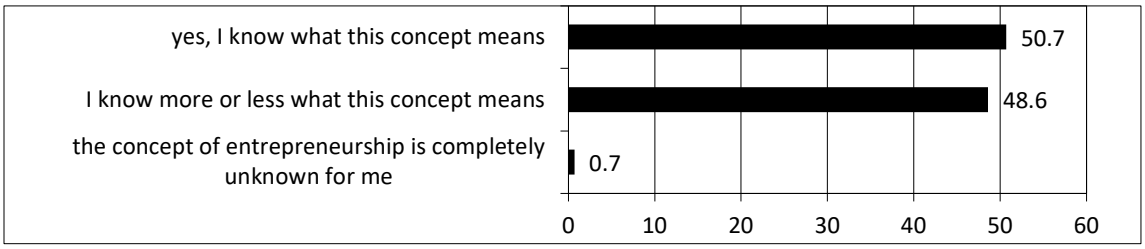

Figure 1: Knowledge of the concept of entrepreneurship (% of responses)
Source: own research.

According to the declaration, basically all students know what the concept of entrepreneurship means, although only half of them answered in the affirmative. Common knowledge of the concept is primarily due to the fact that the subject called entrepreneurship was introduced to the Polish secondary school curriculum as a mandatory one.
In view of the above optimistic result, it seems interesting for students to specifically understand the analysed concept. The survey questionnaire provided for a question in which the respondents were to define what they think entrepreneurship is, indicating one of three available options. The percentage distribution of answers obtained is presented in Figure 2.

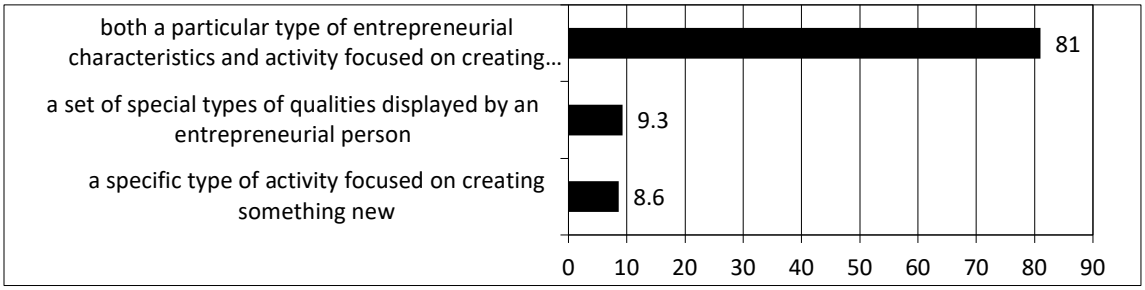

Figure 2: Understanding the concept of entrepreneurship (% of responses)
Source: own research.

According to the presented results, the vast majority, as much as 81% of respondents, perceive entrepreneurship in two dimensions, *i.e.,* as a process of creating something new and a set of features dedicated to this process, which is in line with the basic assumptions of the theory of entrepreneurship (Bruyat and Julien, 2001). This means that students correctly interpret the fundamental issue taken up in the study.

In the further part of the study, the quantities that were the basis for determining the explained variable (y) and the explained variables (x1, x2 ... x10) were identified, which are the subject of further analyses referring directly to the objectives of the article and the hypotheses adopted in it.

In order to know the factors that determine significantly the possibility of a declaration establishing their own firm (s), using the maximum likelihood method and the estimated ordered logit model. Model estimation results are presented in Table 3.

The conducted plausibility test (LR chi2 (10) = 56.58; Prob> chi2, 0.0000) indicates the significance of the whole model, which gives grounds for further interpretation of the results obtained. McFadden's pseudo-R2 is a measure of the quality of matching logit models to data. It is 0.063.

Table 3: Ordered logistic regression and odds ratio

Variables	Coefficients	Std. Err.	Z	P>|z|	95% conf. Interval		Odds. Ratio
x1	.4621853	.2084575	2.22	0.027**	.0536161	.8707545	1.587539
x2	.5375432	.2296024	2.34	0.019**	.0875307	.9875556	1.711796
x3	-.0259356	.2305234	-0.11	0.910	-.4777531	.4258818	.9743978
x4	-.0165487	.2273103	-0,07	0.942	-.4620687	.4289713	.9835875
x5	-.295961	.2407992	-1.23	0.219	-.7679188	.1759968	.7438164
x6	.299027	.2363705	1.27	0.206	-.1642507	.7623047	1.348546
x7	.2523808	.2303665	1.10	0.273	-.1991293	.7038909	1.287086
x8	.4043495	.2269025	1.78	0.075*	-.0403711	.8490702	1.498328
x9	.1692074	.2348533	0.72	0.471	-.2910966	.6295115	1.184366
x10	.5535849	.1495021	3.70	0.000***	.2605663	.8466036	1.739478

** p-Value <=0.1. ** p-Value <=0.05. *** p-Value <= 0.01.*
Source: own research.

As can be observed, in this model parameter estimates take both positive and negative signs. In other words, the impact of the explanatory variables included in the model on the dependent variable causes, on the one hand, an increase, and on the other hand, a decrease in the chances of starting your own business. The variables that turned out to be statistically significant are x1, x2, x8 and x10.

Interpretation of the obtained model can be performed on the basis of odds ratios (see Table 1, column Odds. Ratio). Bearing in mind the assumption of *ceteris paribus*, *i.e.,* other variables of the model unchanged, the following information was obtained:

- considering yourself an entrepreneurial person increases the odds ratio (chance) of declaring establishing your own business in the future by 58% on average,
- having an openness quality increases the odds ratio (chance) of declaring establishing a business in the future by an average of 71%,
- having the propensity to take risks increases the odds ratio (chance) of declaring establishing a business in the future by an average of 49%,
- earlier use of possessed qualities in the activity, indicating entrepreneurship, increases the odds ratio (chance) of declaring establishing a business in the future by an average of 73%.

Interpreting the results obtained, it should be concluded that the more surveyed students consider themselves entrepreneurial (passing from answer (1) 'no' to answer (3) 'yes'), the more they are inclined to start their own business in the future. Therefore, there are no grounds for rejecting the H1 hypothesis, according to which perceiving themselves as an entrepreneurial person causes that students consider the possibility of starting their own business to a greater extent. Therefore, it is worth developing a belief among entrepreneurs about their entrepreneurship, as it turns out that this may result in the future in an increase in the number of started enterprises, which is a desirable phenomenon both from the point of view of the individual, *i.e.*, the entrepreneur, and the entire economy.

In the further part of the analyses, the impact of the students assigning themselves to eight successive distinctive qualities characteristic of entrepreneurial attitudes on their propensity to start their own business in the future was diagnosed. Only two variables turned out to be statistically significant, therefore it should be stated that this impact was confirmed only in relation to the students' feeling of openness and willingness to take risks, which at the same time means that no such effect was found in the case of the remaining six entrepreneurial features. Thus, the H2 hypothesis was falsified because there are grounds to reject it. The cited results suggest that in order to increase interest among young people in starting their own business, it is necessary to focus primarily on developing their willingness to take business risks and openness to the surrounding reality in order to more fully perceive various opportunities and needs in education.

The obtained results also made it possible to refer to the last H3 hypothesis. It turns out that the more often students had the opportunity to use their entrepreneurial features in action, the more they declared their willingness to start their own business in the future. Therefore, there are no grounds for rejecting the H3 hypothesis, according to which the use of entrepreneurial qualities perceived in specific activities makes students consider the possibility of starting their own business to a greater extent. The above conclusion shows another recommendation for the education of young people in the field of entrepreneurship. In the didactic process, entrepreneurial qualities should also be shaped, and perhaps primarily through their initiation and use in real actions of a strictly practical nature. In such circumstances, these qualities are simultaneously used and developed. Then students find that they possess these qualities, have a sense of strengthening them and gain confidence in themselves and their abilities, which motivates them to undertake more ambitious ventures, including business ones.

Conclusion

According to the theoretical assumptions, an entrepreneurial person is able to achieve more. Such a person sets ambitious goals and, to achieve them, undertakes unconventional actions with full commitment, making maximum use of its skills and predispositions, which he/she tries to develop to increase effectiveness in action.

As a consequence, the entrepreneurial attitude has become widely accepted and desired. Hence, it should be shaped and developed at every stage of life from an early age, both at home, at school and in other institutions organizing social activity. An extremely important determinant of the development of entrepreneurial attitudes is a properly planned and implemented at all stages of education educational process that should be subordinated to specific goals. One of them is undoubtedly the development in society of the tendency to undertake economic activity, which is a particularly expected manifestation of the entrepreneurship of the individual.

The empirical research results obtained convince the authors of the legitimacy of shaping entrepreneurial attitudes among young people from the perspective of their orientation towards starting and running their own business. It turns out that the perception of high school students of themselves as entrepreneurial persons means that they consider the possibility of starting their own business to a greater extent, and therefore it is worth developing a sense of entrepreneurship among them. Two characteristics play a special role in this respect, namely openness and willingness to take risks. It is the attribution of these specific entrepreneurial qualities that increases youth interest in starting a company, and therefore it is the shaping of these features that should be focused to the greatest extent, also in the education process. In addition, the real factor in declaring students to take up their own business in the future is the growing experience obtained as a result of practical use of entrepreneurial qualities perceived in specific activities. An obvious conclusion emerges and at the same time a recommendation that entrepreneurial competences should be shaped not only in the teaching process, but also, and perhaps above all during the implementation of real and especially ambitious projects.

In order to increase the practical utility, and thus the application value of the conclusions formulated above, it seems necessary to continue the empirical research on the conditions for developing entrepreneurship among schoolchildren. It is necessary to identify and verify further factors determining the growth of entrepreneurship and the tendency to start one's own business, remembering that it is not enough to learn about those qualities, but at the same time one needs to look for ways and instruments increasing the strength of their impact.

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The Innovation Potential Determinants of the EU (28) Countries: Role of Exports, Imports and High-Tech Exports in The Context of Global Enterprise Development

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Abstract

Innovation is considered as a major driver in improving enterprise activities, with direct impact on the long-term economic growth of any nation. In this backdrop, the study was devoted to examining the impact of the cross-border activity of enterprises on the innovation potential of the EU(28) countries over the years 2011-2018 in the context of global enterprise development. This article was secondary focused on the deeper analysis of the following variables – the Global innovation index, Export, Import and High-tech exports indicators on average during the selected years. Secondary data were retrieved from the publicly available reports, as well as, the Eurostat database. By using the regression analysis, we dedicated to estimating the relationships between the independent variables (High-tech export, Import and Export) and dependent variable (Global innovation index). The medium-strong impact of all independent variables (using linear regression model) on innovation potential was confirmed ($p<0.01$). Moreover, the results suggested that indicator High-tech export have a more significant impact on the global potential of EU member countries (on average 0.4652). In accordance with findings, we recommend improving the business initiatives in the process of creating high-tech products to increase the cross-border country productivity and innovation potential of firms and countries.

Keywords: Global Innovation Index, Import, Export, High-tech exports, Innovation potential, EU (28) countries

Introduction

Nowadays, the factors of innovative potential are analysed by number of researchers from a perspective of enterprise's innovativeness (micro scale) and their impact on the economy (macro scale). As reported by Nonaka et al. (2014), the whole process comes to replacing the obsolete solutions with solutions adapted to the knowledge-based economy as well as innovative economy that is one that is gaining advantage through innovation. According to Galindo-Martin, Mendez-Picazo, Castano-Martinez (2019), economic growth is one the most relevant economic objectives for policy makers. In order to determine the variables that enhance such an objective it is important to consider entrepreneurial activity in relation to innovation activity. As stated in study authors Pukala, Sira, Vavrek (2018), the development of enterprises is often based on new and unique technologies and this is also reflected in gradually increasing expenditure aimed at stimulating the development of innovation and the effects of research and development work that contribute to creating novel solutions and increase the innovation level among enterprises. Malik (2020) presented that innovation is fundamental to the process of an economy's growth and is crucial for its survival in today's dynamic world. Authors Kaynak, Altuntas, Dereli (2017) agree that innovation is important for countries in the competitive global economy. It is

one of the main criteria for countries to be superior, to remain competitive, and to produce high technology products. As well as, the increase in innovativeness is a priority for the EU which for years has been running a policy of supporting the development of innovations in member states (Eurostat 2018).

In this context in accord to research aims of the paper, we paid attention to analysing the interrelationships between innovation potential of EU(28) countries (by means of Global innovation index) and cross-border activity of enterprises (by means of exports, imports and high-tech exports), and moreover, the aim was to investigate the development of above-mentioned variables over the years 2011-2018 in order to improve enterprises position in global environment.

Global Approach to Innovation Potential Measurement of Countries

In recent times, innovation and technological activities have been recognized as a major source of economic growth and have been prioritized in national policy with a greater attention. The advantage of innovation has become a critical determinant to achieve the higher growth rates of countries. As reported by Kowalska et al. (2018), the economic development of every country and its competitiveness on the world market is supported by the creation of innovation (knowledge-based economy), especially from an Industry 4.0 point of view. An almost unanimously accepted issue is that the path to competitiveness of economies, whose companies are exposed to international competition, goes through innovation. This enables companies to adapt quickly to the pace of the technological change, in order to increase competitiveness (Ciocanel, Pavelescu 2015). Authors Mihai, Titan (2014) perceive the innovation as an essential element to generate sustained economic growth. However, we cannot speak of innovation without a high level of education or a high standard of living. According to Yusr (2016), innovation plays a critical role in predicting the long-term survival of organizations, determining an organization's success and sustaining its global competitiveness, especially in an environment where technologies, competitive position and customer demands can change almost overnight, and where the life-cycle of products and services are becoming shorter. Belas et al. (2018) confirmed that innovations are an important part of business activities, because of their impact on financial performance of enterprises and it leads to achieving countries growing competitive environment. As reported by Anton, Bostan (2017), in the extant literature, there is a broad consensus on the positive relationship between entrepreneurial activity, on the one hand, and innovation, job creation, and economic development, on the other hand.

Since the 1980s, experts began to create concepts measuring the innovation performance of countries from global perspective. Many international institutions through reports provide valuable information concerning to the innovation development and competitiveness of countries to various subjects operating in the unstable economic environment in order to compare countries and recognize the future trends and challenges. In this context was launched the ***Global Innovation Index (GII)*** examining the innovation capacity of countries. On the basis of GII conceptual framework, each ranking reflects the relate positioning of particular economy or country, because every year the sample of economies are changed.

INSEAD launched a project in 2007 entitled “The Global Innovation Index (GII)” whose objective was to find the metrics and approaches that might be better to measure the development of innovation in society and across the border (Khalid, Zhiying 2015). As reported by Dutta, Benavente (2011), the project was suggested with a goal to better capture the richness of innovation in society and exceed traditional innovatory measures (such as the number of PhD students, the number of published research articles, patents or the amount of R&D expenditures atc.). In general, the GII assesses the country by exploiting its innovative potential, it means how the countries are able to fulfill their potential. The Global Innovation Index Framework is presented in Scheme 1 below.

The GII relies on two main sub-indices: The *Innovation Input Sub-Index* and the *Innovation Output Sub-Index*. Each of them consists of pillars made up of three other sub-pillars. Overall, the GII indicator examines 81 partial indicators. Four basic values (scores) are quantified (Dutta et al. 2019):

1. *Innovation Input Sub-Index* – representing five input pillars capture elements of the national economy that enable the implementation of innovative activities.
2. *Innovation Output Sub-Index* – innovation outputs are the results of innovative activities within the economy and although the Output Sub-Index includes only two pillars, it has the same weight in calculating the overall GII score.
3. *The overall GII score* – is the simple average of both sub-indices.
4. *The Innovation Efficiency Ratio* – is the ratio of the Output Sub-Index to the Input Sub-Index and indicates how much innovation output a given country is getting for its inputs.

GLOBAL INNOVATION INDEX

Innovation Efficiency Ratio

Innovation INPUT Sub-Index (1st – 5th pillar)	**Innovation OUTPUT Sub-Index** (6th pillar – 7th pillar)
1. Institutions *Political environment* *Regulatory environment* *Business environment*	**6. Knowledge and technology** *Knowledge creation* *Knowledge impact* *Knowledge diffusion*
2. Human capital and research *Education* *Tertiary education* *Research & development*	**7. Creative outputs** *Intangible assets* *Creative goods and services* *Online creativity*
3. Infrastructure *ICTs* *General infrastructure* *Ecological sustainability*	
4. Market sophistication *Credit* *Investment* *Trade, competition & market scale*	
5. Business sophistication *Knowledge workers* *Innovation linkages* *Knowledge absorption*	
Σ 54 indicators	**Σ 27 indicators**

Scheme 1: The Global Innovation Index Framework

Source: authors' processing by Dutta, et al. 2019

As reported by Dutta et al. (2019), all available official data needed for index construction are obtained from international organizations as the World Bank, the United Nations Educational, Scientific and Cultural Organization, the World Intellectual Property Organization, the International Energy Agency, the International Telecommunications Union as well as other private organizations.

Theoretical linkage of the innovation level to export and import activities

During the last two decades, a vast literature has addressed the issue of innovation and their impact on cross-border activities of countries. Today when globalization process is increasing, innovation enable to achieve positional advantages and better economic outcomes (Hasanov, Abada, Aktamov 2015). In this respect, innovation can constitute one of the main channels fuelling a firm's entry in foreign markets (Lo Turco, Maggioni 2014). Tuhin (2016) emphasized that firm innovation and export

behaviour are mutually driven processes. As reported by Andrijauskiene, Dumciuviene (2019), a remarkable increase in the attention devoted to national innovative capacity (NIC) has been noticed over the last decades. An investigation of 28 European Union member states in the period of 2007-2017 shows that the international transmission of knowledge through import spillovers has a positive effect on trademark applications and exports of high-tech products. Authors Chen, Zhang, Zheng (2017) also investigated the relationship between imports and innovation. They constructed a theoretical model in which imports stimulate innovation through cost-reducing knowledge spillovers. High-tech firms tended to experience greater increases in innovation intensity, as do private firms. The issue of cross-border activities in connection to innovation level was analysed also by Pirja (2016). In order to compare the relations, they have with each other, author studied their effect in the innovation and other factors (productivity and technology) related to the total economic situation. The research of authors Li, Millman, Chi (2011) was focused on examining how innovation and exports at the firm-level give impact on their technology imports. Results suggested that innovation is significantly positively associated with its technology imports.

Data and Methodology

The main aim of this paper was to examine the impact of the cross-border activity (representing by the indicators as exports, imports and high-tech exports) on the EU(28) countries' innovation potential (by means of Global Innovation Index) over the years 2011 - 2018. Cross-border activities supported by innovation were perceived as factors of the global enterprise development.

Moreover, this article is focused on the development analysis of EU(28) countries in the context of global innovation potential (represented by GII indicator), cross-border activities (represented by export and import indicators), high-tech exports (represented by high technology products). The briefly description of selected variables is given in the following Table 1.

Table 1: List of variables examined in the analysis

Variable	Description	Unit of measure
Global Innovation Index (GII)	The GII relies on two main sub-indices: The Innovation Input Sub-Index and the Innovation Output Sub-Index. Overall, the GII indicator examines 81 partial indicators.	score
High-tech Export (HTE)	The data shows the share of exports of all high technology products in total exports.	% of exports
Export of Goods and Services (EXP)	Exports of goods and services consist of transactions in goods and services (sales, barter, and gifts) from residents to non-residents.	at current prices in million EUR
Import of Goods and Services (IMP)	Imports of goods and services consist of transactions in goods and services (purchases, barter, and gifts) from non-residents to residents.	at current prices in million EUR

Source: authors' processing

The analyses of the EU (28) countries' innovation position were performed on the basis of secondary data drawn and subsequently processed from the annual reports that are the result of a collaboration between the Cornell University, INSEAD, and the World Intellectual Property Organization (Dutta, et al. 2019). Furthermore, the other needed secondary data concerning the cross-border activities, were retrieved from the Eurostat (2019) database.

In accordance to the above-mentioned theoretical approaches and the main aim of this research paper, the following hypotheses were set:

Hypotheses 1 (H1): *There is a statistically significant relation between the assessment of global innovation potential (GII) and exports activity within the EU(28) countries.*

Hypotheses 2 (H2): *There is a statistically significant relation between the assessment of global innovation potential (GII) and imports activity within the EU(28) countries.*

For the purposes of meeting the goals of presented study, we performed regression analysis presenting one of the multidimensional statistical methods. The role of regression analysis when examining statistical dependence of Y on X is to find a suitable mathematical model (function) in which the idea of this dependence is expressed. This model was adapted to investigate the relationship among one dependent variable (GII indicator) and independent variables (import, export and high-tech export). For analysing the relationship among variables, a linear regression model was used. The linear relation is a mathematical relationship that can be expressed by the regression model (Hendl 2015):

$$y_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_n x_n + \varepsilon_i \qquad i = 1,2,\ldots, n$$

where y_i *- i^th value of variable Y in the basic file,* x_n *- i^th value of the variable X in the basic file,*
B_0 *- intersection of the y-axis with the regression line,* ε_i *- i^th random error of variable,*
B_n *- regression coefficient in the basic file.*

To process the above-mentioned data, the STATISTICA software (13th edition) was utilized.

Empirical Results

The first part of research was devoted to describing the results of performed analysis focused at examining the average values (over the year 2011 to 2018) of the selected variables (global innovation index, export, import and high-tech exports) within EU(28) countries. The intention was to compare individual countries, to identify not/leading countries of EU, as well as evaluate overall innovation potential and level of the cross-border activity.

The analysis of the Global innovation index (GII)

The following part was aimed to the analysis of innovation potential of EU(28) member countries represented by GII indicator. The comparison of average values of GII scores is presented in the Figure 1 below.

Fig. 1: The comparison of the average GII score within the EU(28) countries (2011-2018)
Source: authors' processing

To begin with, it is important to emphasize that the innovation potential of countries is quantified through scores ranging from 0 to 100. Over the reporting period, the innovation potential of EU(28) countries achieved range of values at level 24.9 points on average. Moreover, the standard deviation was quantified at level 7.51, kurtosis at level -1.16 and skewness at level 0.17. Sweden achieved the best innovation performance (62.9) and this country was indicated for the leader country of EU during the period analysed. In contrast, the lowest GII score was reached by Greece (38.0). When comparing the innovation average scores of countries, we can state that only 3 European countries (Sweden, United

Kingdom and Netherlands) achieved the level of innovation over 60 points, while 2 countries (Greece, Romania) had not even achieved a score of 40 points.

High-tech exports (HTE)

In the next section, we pay attention to analysis of the selected determinant of innovation potential, namely the indicator of high-tech exports. In the following Figure 2 we presented the average values of this indicator over the monitored period in order to compare individual EU(28) countries.

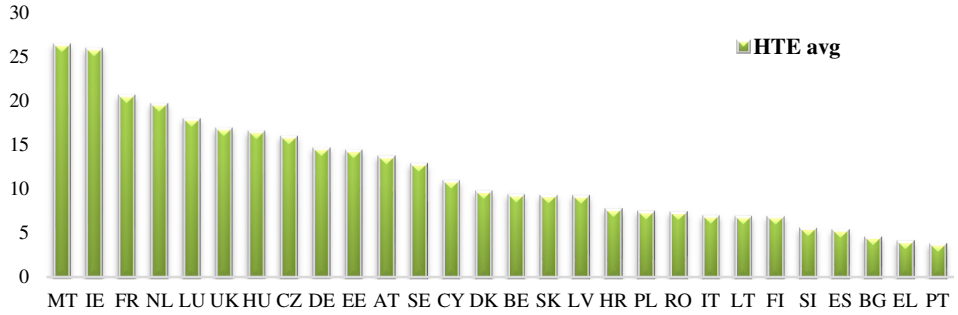

Fig. 2: The comparison of the average high-tech value within the EU(28) countries (2011-2018)
Source: authors' processing

The second indicator that was the object of the realized analysis is called high-tech exports. In this case, it is necessary to state that this indicator is express as share of high technology products on overall exports of country (in %). The results of the analysis showed that Malta was indicated as the country with the highest share (26.3%), while Portugal achieved the lowest share (3.8 %). It follows that the share was in the range of 22.6 %. Furthermore, based on descriptive statistics analysis we identified the standard deviation of values at level 6.31, kurtosis at level -0.06 and skewness at level 0.81. Looking at the results, we also found that only 3 countries (Malta, Ireland, France) within EU achieved a share of high-tech products on exports at level more than 20 %, while up 3 countries (Bulgaria, Greece, Portugal) achieved share below 5 %.

Exports (EXP) and Imports (IMP)

In assessing cross-border activity, at first we focused on exports data analysis of the EU(28) countries over the period of 2011-2018 on average. Based on the results, we came to the following findings. Germany was indicated as the unequivocal EU leader (the only one country of EU that achieved export above EUR 1,000,000 million). The second rank was held by United Kingdom, however this country reached about half lower value of exports. On the other hand, the lowest export value was achieved in the case of Cyprus and Malta. The gap between the country with the highest and lowest export activity was considerable, range at level EUR 1,372,896 million. In connection to the above-mentioned results, we can state that similar findings were revealed for import activity too. The lowest import values were found for Malta and Cyprus again. In comparison, Germany achieved almost 100 times higher import values over the analysed period on average and ranked 1st position in this ranking. In accordance with presented findings, we can conclude that range of imports values between the best and the worst country achieved EUR 1,178,956 million.

In accordance with the above analyses, we also focused on the assessing the individual EU countries (28) in terms of overall cross-border activity. However, in this case, the aim was to compare countries with regard to the achieved values of import and export all at once. In our opinion, this assessment of cross-border activities is most effective as it captures both aspects of the international activities of countries. The resulting average values of above-mentioned indicators in absolute values are presented in the following two-dimensional Figure 3 (in EUR billion).

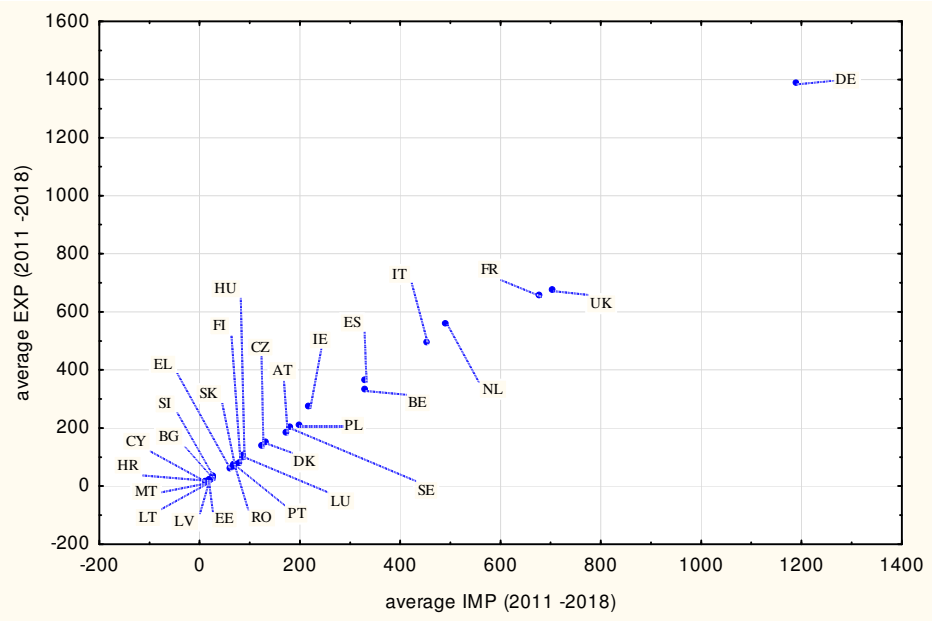

Fig 3: The cross-border efficiency ratio of the EU (28) countries (on average of 2011-2018)
Source: authors' processing

Looking at the above presented Figure 3, we can see that Germany achieved significantly better results than the rest of the European countries during the analysed period. France and the UK also performed very well, taking both indicators into account. For the period under review, among the European countries belonging to the average were included Czech Republic, Luxembourg and Hungary. The group of the least performing countries in view of export and import consisted of Bulgaria, Cyprus, Croatia, Malta, Latvia, Lithuania and Estonia on average from 2011 to 2018.

The cross-Border Activity Efficiency Ratio of the EU (28) countries

Within the export and import evaluating process, it is essential to monitor the ratio of the two variables, not only to analyse the indicators themselves. For this reason, we have decided to examine the relations between these indicators and so to compare the effectiveness of each EU country (28) with a view to better identifying their impact on innovation potential in the next part of the research. Based on assessing the cross-border activity efficiency ratio within EU(28) countries we founded the interesting results. Out of the total number of countries, up to 20 countries achieved the favourable value of the efficiency indicator (higher exports than imports). The remaining 8 countries (Portugal, Croatia, Finland, Latvia, France, United Kingdom, Romania and Greece) reached the values below 1, but at the same time, the indicator range above the level of 0.9, which can be assessed positively. The best results were recorded in the case of Ireland with an efficiency ratio at the level of 1.24. On the opposite, Greece achieved the lowest share of exports to imports (0.93).

Results of Regression Analysis

The next part of this study was dedicated to the analysis of impact the determined independent variables (HTE, IMP, EXP) on dependent variable (GII) using the regression analysis. We decided to create two regression models in order to better differentiate and to examine the impact of export and import on the innovation potential of countries separately. Considering the high-tech exports variable as a key determinant of innovation activities (based on theoretical research), we included it in both regression models. The results of regression analysis are presented in the following tables.

Table 2: Result of regression analysis among the GII, HTE and IMP indicators

	Regression Summary for Dependent Variable: **$GII_{2011-2018}$** R= .6261; R^2= .3921; Adjusted R^2= .3866; F(2.221)=71.261; p<0.0000; Std. Error of estimate: 0.7832					
	b*	Std. Err.	b	Std. Err.	t(221)	p-value
Intercept			0.0000	0.0523	0.0000	1.0000
$HTE_{2011 - 2018}$	0.4659	0.0545	**0.4659**	0.0545	8.5482	0.0000
$IMP_{2011 - 2018}$	0.3103	0.0545	**0.3103**	0.0545	5.6928	0.0000

Source: processing of authors

The analysis of the appropriateness of the created regression analysis (Table 1) showed that the linear regression equation is appropriate with regard to Fisher's test criterion at the selected significance level α = 5% (p = 0.0000). The coefficient of determination (R^2), which explains the variability of the dependent variable (GII), achieved value 39.21%. Moreover, the regression equation confirmed that both independent variables are statistically significant and to determine the score of GII indicator (p=0.0000). While the causal relationship is not strong, but it should be emphasized that this quantification suggests only one unit to change of the HTE and IMP variables. When comparing independent variables, we can state that a higher impact on GII was revealed in the case of the HTE indicator (0.4659).

Table 3: Result of regression analysis among the GII, HTE and EXP indicators

	Regression Summary for Dependent Variable: **$GII_{2011-2018}$** R= .6266; R^2= .3926; Adjusted R^2= .3871; F(2.221)=71.430; p<0.0000; Std. Error of estimate: 0.7829					
	b*	Std. Err.	b	Std. Err.	t(221)	p-value
Intercept			0.0000	0.0523	0.0000	1.0000
$HTE_{2011 - 2018}$	0.4652	0.0545	**0.4652**	0.0545	8.5356	0.0000
$EXP_{2011 - 2018}$	0.3114	0.0545	**0.3114**	0.0545	5.7134	0.0000

Source: processing of authors

In the case of second regression analysis, we detected the following findings. The linear regression equation is appropriate with regard to Fisher's test criterion at the selected significance level α = 5% (p = 0.0000). The coefficient of determination (R^2), which explains the variability of the dependent variable (GII), achieved value 39.26%. Moreover, the regression equation confirmed that both independent variables (exports and high-tech exports) significantly determined the score of GII indicator (p=0.0000). In comparison of independent variables within this regression model, we found that variable HTE have more significant impact (again) on GII indicator (0.4652). Based on performed analysis, we also revealed that correlation coefficient of above-mentioned variables ranged at level 0.6266.

Conclusion

This article was focused on the development analysis of EU(28) countries in the context of global innovation potential, cross-border activities and high-tech exports throughout 2011-2018 to reveal the interdependencies among variables.

At first, attention was paid to development analysis of individual variables entering to our research. The EU countries (28) were gradually analysed in terms of innovation potential, exports, imports and high-tech exports based on the achieved average values over the years 2011-2018. Taking into account the overall results, we can state that Germany, the United Kingdom, France and Netherlands ranked

among the best performing countries. By contrast, Greece, Cyprus, Malta and Bulgaria achieved the lowest levels of innovation and cross-border activities. Also, Germany has been identified as the leader in cross-border activities, and as only one EU country recorded export and import values above EUR 1 billion. To the positive facts belong also that up to 20 countries achieved the favourable value of the cross-border efficiency ratio and the remaining 8 countries (Portugal, Croatia, Finland, Latvia, France, United Kingdom, Romania and Greece) reached the level of the indicator above of 0.9, which can be assessed positively.

Based on the performed research analysis throughout 2011 – 2018 within EU(28) countries, it can be formulated the following findings:

- analysis results confirmed a medium-strong impact of cross-border activity (export and import) on the innovation level of countries,
- in the case of both regression models was revealed the more significant impact of high-tech exports on innovations (on average 0.4655),
- based on correlation analysis results, we can state that both hypotheses were confirmed (at level 0.63), so there is a statistically significant relation between innovation potential of the EU(28) countries and their cross-border activity.

In line with the performed analyses, it is necessary to point the research limitations. To the main limitations of presented paper belong the validity of study findings. In view of the economic disparities and different political interventions of the individual countries in this sphere, it's difficult to generalize research findings for all EU. For this reason, the regression models should be suggested for every country separately. Furthermore, we consider the assessment of the European countries' innovation potential via the cross-border activity as insufficient. Therefore, for future research, we recommend to include other global determinants influencing innovation level of enterprises, as well as, to investigate concrete factors of countries innovation potential.

It´s obvious, that firms and entrepreneurs are at the centre of the innovation process and any innovation leads to a new product or service with an impact on long-term economic growth. In accordance with study results, we recommend improving the business initiatives for creating high-tech products in linkage to increase of cross-border country productivity, as these drivers have a significant impact on improving innovation potential of firms, as well as countries. Policymakers should attempt to make a bridge between and integrate innovation and entrepreneurship policy through interventions.

In the international environment, we can observe that global competition is intensifying, and Europe needs to deepen its innovation and risk-taking capability to compete on a market increasingly defined by new technologies. Despite the fact that Europe accounts for 20% of global R&D investment, produces one-third of all high-quality scientific publications, and holds a world-leading position in the technology sector, Europe needs to do better at turning that excellence into success and generating global champions in new markets based on innovation. This is particularly the case for innovations based on radically new technologies (breakthrough) or markets (disruptive). As reported by the European Commission (2019), the European Innovation Council is part of a wider ecosystem that the EU is putting in place to give Europe's many entrepreneurs every opportunity to become world-leading companies. Other initiatives include a Pan-European Venture Capital Funds-of-Funds programme (Venture EU), the Investment Plan for Europe (EFSI), the work of the European Institute for Innovation and Technology, the Capital Markets Union Action Plan to improve access to finance or the proposal for a Directive on business insolvency.

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Application of the FMEA for Ergonomic Project Management

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Abstract

Ergonomic activities are increasingly being undertaken in production enterprises, aimed at improving working conditions, streamlining processes and adapting the enterprise to applicable legal and normative provisions. However, these activities require evaluation in order to avoid unnecessary implementation costs, errors in their implementation, and to ensure that new solutions will be used by future users (operators). In this article, the FMEA (Failure mode and effects analysis) method was used for such evaluation, using its assumptions to predict potential errors in starting and running projects in the context of ergonomic activities in manufacturing companies. The applied approach has been completed with expert judgment - a selected group of experts assessed the importance of individual errors in project implementation and management, identified on the basis of an analysis of the literature and the authors' experience.

Keywords: Ergonomic Criteria, FMEA Method, Project Management, Proergonomic Project Management, Sustainability in Project Management.

Introduction

In enterprises, a project-based approach to management is more and more often noticed. Problems and new areas to develop are usually included in the project, which requires an appropriate structure and organization at every stage. Projects currently relate not only to engineering tasks, but also to financial, human resources, waste management, marketing, etc.(Huemann, 2014). Project-oriented enterprises are often seen as more innovative, which can contribute to greater success, as well as a better perception of the company on the market in front of competitors (Gemünden, Lehner, Kock, 2017). However, in order for the project- oriented approach to deliver the expected results, enterprise-specific project management methods should be used to prevent undesirable events that could lead to the project failure. Such failures can be, for example: significant exceeding of the assumed budget, exceeding the deadline, failure to implement some of the assumptions, failure to ensure adequate competence of the project group, incorrect allocation of resource (learn.g2.com). For this reason, methods are being sought to identify possible incompatibilities at individual project stages. For such analyzes project-specific risk assessment

methods can be used, for ex ample: the Ishikawa diagram (Arashpour et. al. 2017), Monte Carlo simulation (Agarval, Virnie, 2017), critical path method (CPM) (Floyd et. al. 2017). Increasingly fuzzy reasoning techniques are used, which allow for the identification of the risk associated with the uncertainty of various aspects of project management (Zeng, An, Smith, 2007; Moradi, Mousavi, Vahdani, 2017). In this article, the authors present the application of the FMEA method for risk analysis on various stages of pro-ergonomic projects. Such projects are characterized by an ergonomic approach to the design and organization of the work environment. They are specific from many aspects. First of all, design influence human behavior, its driven by non-technological aspects and in some cases justification of changes, supported by substantive ergonomic analysis is not accepted by employees for whom goods are introduced. Project stages and possible defects were identified on the basis of literature analysis and the authors' experience in conducting projects based on ergonomic analyzes. Individual errors were assessed by experts in terms of their probability of occurrence, significance and detectability using a scale developed for the purposes of this analysis. The results were used to assess the importance of individual errors in the success of the project and indicated at which stages of the project defects have the greatest impact on efficient project management.

Scientific Problem of Ergonomic Project Management

By definition, a project is a time-bound venture that aims to create a unique result with reasonable use of specific resources. To achieve this, proper project management is required, which includes planning, organizing and controlling activities in order to succeed, despite the adversities and various risks arising (Lock, 2016). Projects usually have a specific structure and have a strict budget, schedule and type of competencies required from project group members. The indication of the project stages depends on the approach taken (Demirkesen, Ozorhon, 2017; Cooke- Davies, Arzymanow, 2003), but the following are usually mentioned: defining, planning, implementation, control, closing (Kerzner, 2009). Increasingly ergonomic projects are being noted in companies. Usually they relate to the production sphere, but also projects including office ergonomics or ensuring employee well-being are distinguished (Wang, 2016). They may consist of using ergonomic assessment methods on part of the system and taking measures to improve the ergonomic quality of workplaces and it's a separate project (Sonne, Villalta, Andrews, 2012; Parham, Mirzaei, Ansari, 2016) or ergonomic design is implemented as part of another project, e.g. the creation of a new production line. Therefore, interesting approaches to project management appear, sometimes such projects are called "pro-ergonomic" and attempts are being made to propose project organization structures tailored to such orientation of tasks and activities in the project (project support by Ergonomics Comissions or Euroergonomists, ensuring employees cooperation, information on the ergonomic nature of the project) (Butlewski et. al., 2019). An interesting issue is also establishing new organizational structures for projects in terms of ergonomics based on literature review (Pikaar, 2007).

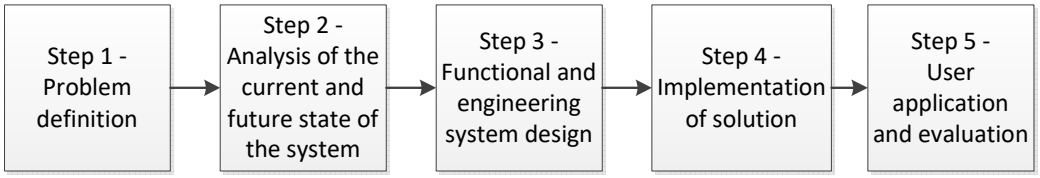

Fig. 1: Ergonomic design steps related to the project structure (own preparation based on: Pikaar, 2007).

This allows to combine the traditional approach to project management with the steps of performing ergonomic analyzes widely recognized by ergonomics practitioners. In this article, project stages identified on the basis of literature analysis have been completed with potential errors that may occur at these stages in the context of ergonomics. The FMEA method was used to structure these issues.

Literature Review on Applying the FMEA Method

The FMEA method is usually used to detect errors in production processes that need to be eliminated to ensure better product quality, higher level of safety of processes or fewer repeated deficiencies. The identified errors are considered in the context of the probability of their occurrence, their effects and the possibility of detecting them (Fig. 1) (depending on the approach, these parameters may be slightly different). The FMEA method can be used in the following cases:

- analysis of existing processes and products to find opportunities for improvement and ensure that they meet better assumed requirements,
- streamlining processes or products to meet quality and safety guidelines or individual customer preferences,
- re-analysis of processes or products after applying corrective actions or increasing their suitability,
- formalizing changes by documenting their analysis and justifying their implementation (Dudek- Butlikowska, 2011).

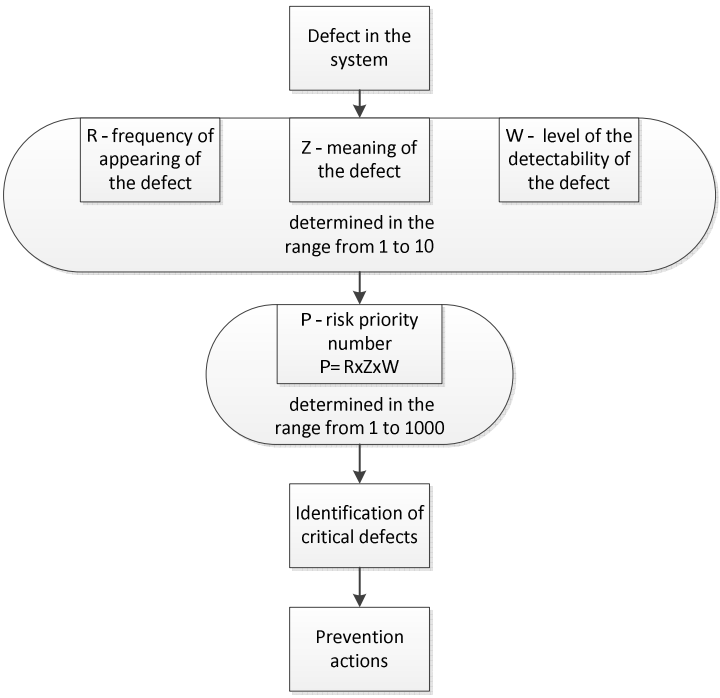

Fig. 1: Assumptions of the FMEA method (own preparation based on: Dudek- Butlikowska, 2011).

There are many types of FMEA method, which include approaches related to: product, process, organization, quality and efficiency, project. They can be applied to existing systems as well as being suitable for assessing errors in products or processes that are not yet physically existing (being e.g. in the design phase) (Solanki, 2015). The FMEA method is currently used to analyze the risk of ventures undertaken in enterprises of various industries. Some examples of such applications are presented in Table 1.

Table 1: Areas of application FMEA method

No	Area of application	Assumptions
1	The use of combined FMEA and FTA methods with computer software assistance to identify safety problems.	In this approach, the authors used FTA method to establish the failure and its potential causes and then assessed the basic events from this analysis by FMEA method. They also used computer software to input data from both FMEA and FTA analysis. Triangulation of methods ensured better identification of threats and potential errors, and computer aided facilitated the collection and processing of data (Liu, Hwang, Lin, 2013).
2	Risk analysis of poultry feed production using fuzzy FMEA.	Application of the modified FMEA method for risk analysis in poultry production. The methodology uses Fuzzy FMEA, which allowed to reduce the threats identified by the traditional method, thanks to which the company could implement corrective actions that hit specific areas of activity (Wessianti, Sarwoko, 2015).
3	The use of FMEA in the process of sustainable production.	An example of using the FMEA method in the assessment of new launches of products in terms of supply, input, process, output, stakeholders. The division of the analyzed areas allowed the identification of various types of threats, the elimination of which can ensure greater success of the product (Ligarski, 2017).
4	Application of the FMEA method to analyze various variants of new products.	The authors presented the concept of a modified FMEA method, supporting the estimation of risk associated with various product concepts. The dependencies of components and functions of the product were modeled into a network. Each of the network elements was subjected to FMEA analysis and on this basis it was possible to select the appropriate variant (Chahin et. al., 2016).
5	The use of a combination of FMEA and AFD (Anticipatory Failure Determination) methods to achieve synergies and advantage of both approaches.	The authors proposed an approach to risk analysis called Failure Mode and Effects Anticipation and Analysis (FMEAA), a hybrid of FMEA and AFD methods. Thanks to this it is possible to detect potential failures of systems, but also initial suggestions for correcting them. It is also possible to build various failures scenarios (Thurnes et. al., 2015).
6	Adaptation of the FMEA method to the requirements of the aviation industry.	Presentation of the FMEA method assumptions in relation to the requirements of the aviation industry (also based on the standards of the railway industry). Parameters are presented in the context of PN-EN 80612 * 2, on the basis of which the probability of error, its effects and detectability were estimated (Fellner, Mańska, 2015).
7	Safety analysis using FMEA and ETA methods supported by computer software.	The article presents an innovative method of making multi-criteria decisions (MCDM) called FlowSort-GDSS. It was proposed to sort failure modes into priority classes by involving many decision makers (Lolli et. al. 2015).
8	Hybrid FMEA and FTA method for risk analysis of safety-critical systems.	The combination of the FMEA and FTA methods to strengthen their applicability and eliminate their drawbacks. It allows the identification of threats in complex multi-element systems, thanks to the modified criteria greater efficiency of assessment accuracy has been achieved. Advantages of using a combination of several methods in risk analysis has been proven (Shafiee, Enjema, Kolios, 2019).

Despite the frequent application of the FMEA method in enterprises, its weaknesses are noticed. These include, but are not limited to, the following issues:

- partial knowledge of the process may result in not detecting significant defects,
- assessors are not always fully familiar with the product or process, which may lead to overestimation or underestimation of defects,
- the structure of the method does not allow the system to be divided into sub-assemblies and components,
- using the traditional approach to the method requires many repetitions in the text and extensive documentation, which means that reliable application is time consuming (Breiing and Kunz, 2002).

In many approaches to applying the FMEA method, it is therefore used in combination with other methods, e.g. Fault Tree Analysis. This allows for a more precise determination of risk factors, but on the other hand, it extends the analysis process time (if computer support is not available). The multitude of applications of the method in various industries and for risk assessment in various types of fields (new products, multi-element systems, occupational risk, system design) indicates its universality and its high availability, therefore it can be used in the preliminary assessment of the probability of faults, their effects and detectability.

Materials and Methods

The FMEA method structure in the context of ergonomics was used to identify defects that may appear at individual stages of the project. Errors were determined on the basis of literature analysis as well as experience and knowledge of the authors. Specified potential failure, effect of failure and causes were presented to the assessment and verification of independent experts implementing ergonomic projects in enterprises - OSH specialist. A fragment of the list being the subject of the assessment is presented in Table 2.

Table 2: Fragment of the matrix development with potential problems of implementing ergonomic projects

No	Project implementation cycle	Project stage	Potential failure	Potential effect of failure	Potential cause of failure
1	Project organization	determination of the project team	lack of an ergonomics specialist (a person with knowledge in this field) in the project team	lack of reliable and complete analysis of ergonomic aspects	company policy and management (lack of knowledge about ergonomic actions that can be taken)
2				….	
3	…	…	….	…	…

Table 3: Rated dimensions of risk

No.	Potential failure	Potential effect of failure	Potential cause of failure
1	Lack of an ergonomics specialist (a person with knowledge in this field) in the project team	Lack of reliable and complete analysis of ergonomic aspects	Company policy and management (lack of knowledge about ergonomic actions that can be taken)
1B	-	Failure to include ergonomic activities in the budget and schedule	-
2	Incorrect selection of support (internal / external)	Lack of reliable and full analysis, factual errors	Lack of knowledge (e.g. About euroergonomists)
3	Support by incompetent people	Lack of reliable and full analysis, factual errors	Many offers - the cheapest choice; staff shortages
4	Support at the wrong stages	Key ergonomic variables are not included in the design	There is an awareness of the need for support, but its type has not been established
5	No decision person on the direction of ergonomic activities (also in financial and implementation terms)	No investment in solutions, no analysis	Usually one decision-making person in the project, without knowledge of every aspect
6	Lack of knowledge of people involved in the project	No support for the project	Insufficient information or in an incomprehensible way
7	No communication of the need to take ergonomics into account in the design	No prioritization of ergonomic goals at the implementation stage	Erroneous communication of ergonomic goals to the manager / decision maker
8	Lack of employee knowledge (key participation)	Lack of employee involvement in analysis and searching for solutions	Ergonomic communication incorrect or missing
9	Lack of ergonomic aspects included	Lack of project implementation in pursuit of ergonomic goals	Lack of ergonomics consideration at the project organization stage
10	Misidentifying goals	Failure to achieve the required level of ergonomic quality	Lack of sufficient analysis by people advising on ergonomics
11	Objectives incompatible with the project assumptions	Lack of opportunities to take actions related to ergonomics inscribed in other project-related activities	No set goals in the project group at the initial stages
12	Selection of incorrect methods - after getting acquainted with workplaces and processes	Failure to achieve project goals, unreliable assessment	Lack of knowledge in the field of ergonomics of persons performing assessments
13	Insufficient number of methods for reliable analysis	Not collecting enough data	Lack of knowledge in the field of ergonomics of persons performing assessments
14	Final report without key information compatible with the project assumptions	Failure to achieve ergonomic goals of the project	Errors at the stage of planning activities related to ergonomics
15	Insufficient research sample	No data from all workplaces	No workstations

			identification by persons performing the assessment
16	No representative group selected	Analysis involving new or unskilled employees	Insufficient knowledge of ergonomics of persons performing assessments
17	Employees not involved in the activities	No cooperation	Lack of information about the project and its ergonomic nature among employees
18	Lack of coordination of the ergonomic analysis schedule with other project activities	Results of the analysis impossible or difficult to implement as part of the project	Scheduling without consultation with all project members
19	No indication of all load factors	Incorrect work process analysis	Lack of knowledge in the field of ergonomics of persons performing the assessment
20	No consideration of employees' personal aspects in the analysis	A quick analysis, without taking into account all relevant personal factors	Lack of knowledge in the field of ergonomics of persons performing the assessment
21	No consideration of contextual aspects affecting employees in the analysis	A quick analysis, without taking into account all relevant contextual factors	Lack of knowledge about the impact of contextual factors on the way work is performed
22	Observation without time to start	Unrepresentative results	Lack of knowledge of ergonomic audit principles
23	Observation without checklist / plan	Collecting insufficient data	Lack of knowledge of ergonomic audit principles
24	Failure to apply observation rules according to applicable standards	Unrepresentative, inadequate results	Lack of knowledge of ergonomic audit principles
25	Evoking a sense of being controlled / lack of cooperation	No information about the process from workers directly involved	No prior training in the principles of interviewing an employee
26	Incorrect use	Unrepresentative, inadequate results	Lack of knowledge of methods by persons performing the analysis
27	No proper conclusions from the analyzes	No problem areas identified	Lack of ability to analyze data resulting from the use of ergonomic analysis methods
28	Incorrect ergonomic risk classification	Misdirection of corrective and design actions	Lack of ability to analyze data resulting from the use of ergonomic analysis methods
29	No relevant conclusions from the analyzes	No problem areas identified	No data analysis forms
30	Indication of wrong areas with not the greatest risk	Targeting activities in inappropriate areas	No knowledge of the description of the used methods
31	Incorrect execution of load maps	Targeting activities in inappropriate areas	Lack of knowledge about the application of results of

			ergonomic risk analyzes
32	Solutions in incorrect areas	Allocating funds for inappropriate implementations	No properly performed ergonomic analysis
33	Solutions without analyzing the possibilities of implementation (including financial)	No possibility of applying solutions in processes	Implementation of idealistic and pilot solutions in other cases (e.g. In other companies)
34	Impossible to implement solution	Incorporation of solutions without reflection in reality	Lack of market analysis and company needs
35	No criteria for assessing solutions were set	Solutions without the possibility of evaluating their usefulness and operation	No long-term planning in the project
36	Selection of a non-optimal solution	Allocating funds for inappropriate implementations	No analysis of the proposed solutions
37	No key data in line with established initial goals	Failure to meet the requirements assumed at the beginning of the project	Errors in the initial stages of project implementation
38	No evaluation method established	Solutions whose validity and functioning are unverified	No evaluation included in the project

The experts used the scoring tables for Probability of error, The importance of error for the project and The ability to detect the cause of the error – on the scale 1-10 each typical for FMEA assessment method (Carbone, Tippett, 2004; Górska, 2012).

Research Results

The given answers were collected and response statistics are presented in Table 4. The assessed risk of individual events for the success of ergonomic projects was also analyzed.

Table 4: Result of the study

No.	Potential failure		Potential effect of failure		Potential cause of failure		Risk for projects	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	5.5	2.5	6.7	1.9	4.0	1.6	131.6	60.2
1B	-	-	6.6	1.8	-	-	-	-
2	4.7	2.0	6.6	1.7	3.3	0.9	97.2	45.5
3	5.3	2.0	6.5	2.1	3.8	1.7	135.5	81.3
4	4.4	1.7	5.9	1.8	3.8	1.4	91.2	44.6
5	4.5	2.2	6.4	1.9	3.7	2.0	113.2	124.3
6	5.1	1.7	6.5	1.8	3.9	1.9	128.8	96.7
7	4.6	1.9	6.3	1.6	4.4	1.6	142.9	125.6
8	5.1	2.3	6.1	1.7	3.8	1.1	117.3	77.0
9	4.7	2.2	6.0	2.1	4.0	1.9	107.9	70.3
10	4.8	1.8	6.4	1.7	3.9	1.4	114.1	78.2
11	4.6	2.1	6.4	1.9	4.1	1.9	129.1	123.6
12	4.8	1.7	6.7	2.2	3.6	1.6	113.6	72.2

13	4.5	1.7	6.9	1.6	3.9	2.1	128.7	116.9
14	4.7	1.8	6.3	2.0	4.1	1.6	127.9	119.0
15	4.6	1.9	6.2	1.7	3.7	1.1	112.0	106.4
16	4.6	1.8	6.2	1.7	4.2	1.8	115.4	74.0
17	5.6	2.1	5.9	1.6	3.6	1.5	119.8	83.5
18	4.1	1.4	6.7	1.5	4.1	2.2	113.8	84.1
19	5.3	1.8	6.5	1.6	4.5	1.7	152.7	94.1
20	4.9	1.9	6.1	1.6	3.7	1.3	103.1	54.3
21	4.3	1.4	5.3	1.6	4.0	1.1	94.1	46.7
22	4.8	2.0	5.9	1.8	4.1	1.4	118.1	94.6
23	5.2	1.9	6.4	1.8	4.2	2.1	141.5	131.3
24	4.6	1.7	6.1	1.7	4.6	1.9	146.9	172.6
25	4.9	1.9	5.4	1.5	3.8	1.5	114.4	108.8
26	4.6	1.6	6.2	1.9	4.2	1.2	123.9	108.4
27	4.4	2.1	6.4	1.7	4.3	2.1	134.8	155.1
28	4.9	1.7	6.3	1.9	3.7	1.9	139.7	196.4
29	4.6	1.8	6.1	1.9	4.3	1.7	141.4	155.8
30	4.6	1.7	5.8	1.7	4.2	1.7	120.6	102.3
31	4.3	1.5	5.8	1.2	4.0	1.7	101.6	79.4
32	4.3	1.5	6.2	1.6	4.3	1.7	126.5	120.7
33	4.3	1.5	6.2	2.0	4.2	2.0	115.6	79.3
34	4.1	1.7	6.3	2.2	4.0	2.0	118.1	158.7
35	4.3	1.8	6.7	2.0	4.2	2.0	125.2	153.0
36	4.9	2.1	6.3	2.4	3.9	1.7	130.7	152.0
37	4.4	1.3	6.5	1.9	3.8	1.5	112.9	76.2
38	4.9	1.6	5.9	1.5	3.4	1.5	103.3	85.3

Due to the contributing nature of the research, as well as methodological and explorative rather than knowledge-making, one can only point to some general conclusions. The significant variation in the standard deviation of risk is due to the multiplicative nature of the risk formula. However, both in the case of assessments of individual risk parameters and the collective risk value, high reliability can be observed, which is confirmed by Cronbach's alpha above 0.9. Correlation of Spearman's rank order indicated a correlation of assessments of individual risk factors. Such a statistically significant correlation concerned threats to a similar project. e.g., no communication of the need to take ergonomics into account in the design, correlated highly (more then 0,7) with objectives incompatible with the project assumptions. This can be justified by the interdependence of individual threats, for which one threat results in the next. Due to cross-linked dependencies, however, threats cannot be eliminated because they are both cause and effect at the same time.

Limitations

Due to the exiguous nature of the research, the value of the presented approach is the evaluation of tools and a method of assessing methods for ergonomic projects and risk identification. The presented statistical analysis of the risk level is of an exploratory nature and cannot be regarded as universal, but shows general problem with assessments at different levels of organization.

Conclusions

The presented analysis proves the possibility of using the FMEA method in risk analysis for ergonomic projects. The specificity of these projects is the significant impact of the human factor on the achievement and classification of the positive effect of the project. Hence the need to balance costs with measurable ergonomic quality of the work environment. Therefore, methods of organizing activities are needed, among which FMEA will be a valuable tool to support management of ergonomic processes in the enterprise.

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Comprehensive Evaluation of the Effectiveness of the Financial Mechanism of Higher Education Institutions in Ukraine

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Abstract

All financial and economic activities of higher education institutions should be predictable. It should be based on a multivariate research study of the directions, resources and expected financial results of higher education institutions.The subject of monitoring the efficiency of budget expenditures, financial stability and quality of financial management of higher education institutions is the analysis of their use of financial resources, economic efficiency and results of their financial activity.
The proposed methodology synthesizes the procedures of hierarchy analysis, analytical assessment of the level of process development, statistical methods and methods of market surveys into a single technological cycle. The developed model of complex evaluation of such a system makes it possible to assess the efficiency of the existing financial mechanism of higher education institutions in Ukraine from the standpoint of economy, productivity and efficiency on the basis of a comparative analysis. Also, with the help of this model it is possible to estimate how effective the system was during a certain period.

Keywords: Effectiveness, Financial Mechanism, Higher Education Institutions.

Introduction

The scientists argue that all financial and economic activities of higher education institutions should be predictable. It should be based on a multivariate research study of the directions, resources and expected financial results of higher education institutions. Therefore, the subject of monitoring the

efficiency of budget expenditures, financial stability and quality of financial management of higher education institutions is the analysis of their use of financial resources, economic efficiency and results of their financial activity.

At the conceptual level, the proposed methodology synthesizes the procedures of hierarchy analysis, analytical assessment of the level of process development, statistical methods and methods of market surveys into a single technological cycle (Figure 1).

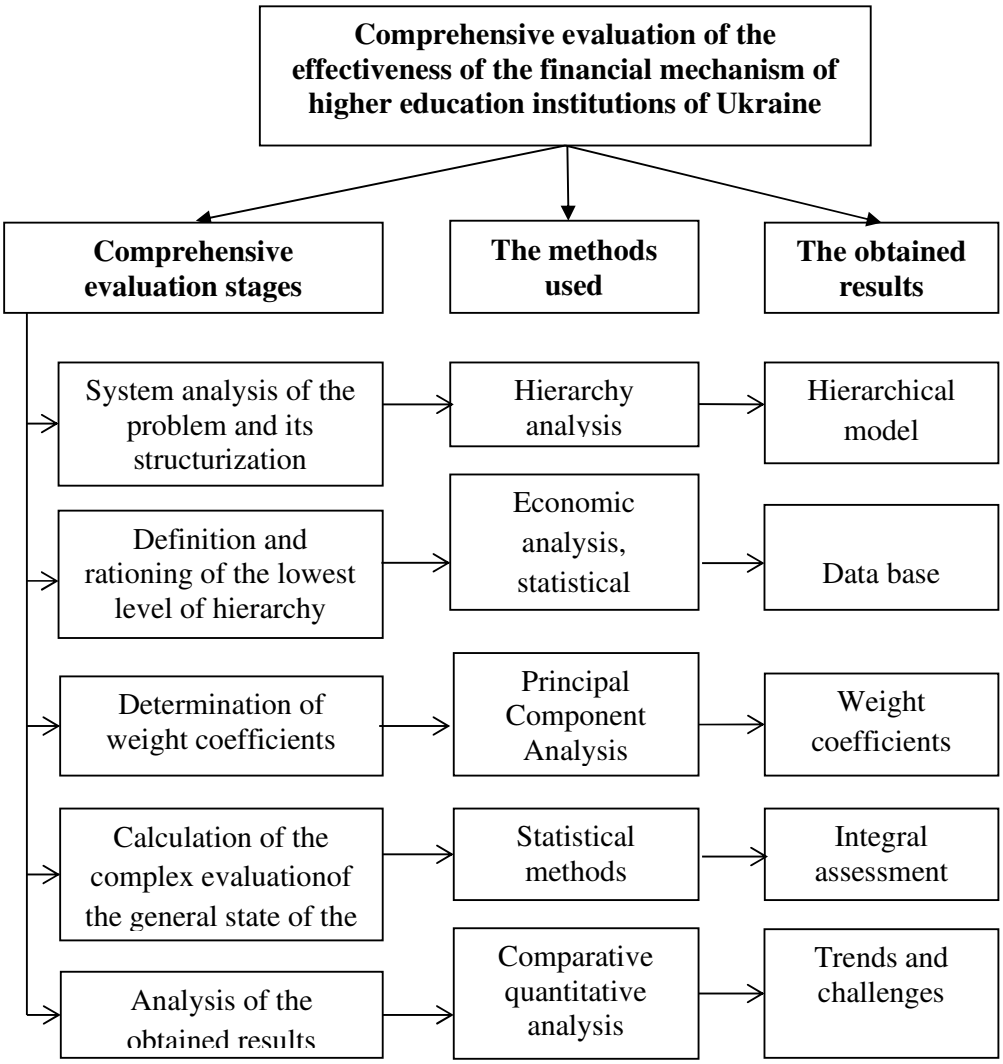

Fig. 1: Stages, methods and results of the procedure for comprehensive evaluation of the effectiveness of the financial mechanism of higher education institutions in Ukraine

Source: compiled by the authors

The proposed approach can be used as a basis for organizing the standing monitoring of the effectiveness of this mechanism in order to identify the problems and define priority areas for overcoming them. Its application assumes realization of the following stages:

1) system analysis of the problem and hierarchical model development;
2) formation of a system of indices and normalization of actual values of indices;
3) determination of weight coefficients;

4) calculation of group and integral estimates of system efficiency;
5) comparative analysis of the obtained results.

Evaluation of the efficiency of formation and functioning of the financial mechanism of higher education institutions requires the definition of a set of indices. Definition of the formalized dependences between primary signs and factors which influence them and results of activity transforms them into the system providing ability to use integral model for introduction of key objectives of financial mechanism management.

Hence, productivity of functioning of the financial mechanism of higher education is defined by achievement of the purposes which stand before system of higher education for the purpose of formation of educational potential of the country and rational spending of resources.

Tkachenko and Proskurovych (2017) are offered to use the following indices for the evaluation of expenses of development: share of capital expenses in the total expenses for higher education (the index characterizes technical possibility of innovative means introduction for educational process) and maintenance/workload of the faculty. Since one of the tasks of higher education institutions is not only the educational services provision, but also research and development activities, the availability of scientific and pedagogical personnel of educational institutions to characterize the possibility of directing expenditures from the maintenance function to the development of higher education in general.

According to certain indices, using the official sources of information of the State Statistics Service of Ukraine, a database was formed to characterize the effectiveness of the financial mechanism of higher education institutions of Ukraine for the years 2012-2018. All the indices that were included in the database are relative, which ensures their comparability.

Obviously, the performance characteristics of the financial mechanism of higher education institutions in Ukraine are the tagged values, so the necessary procedure is a preliminary rationing of the selected indices, which provides comparability of the existing information base.

In contrast to the traditional option, Oharenko (2014) is carried out the rationing of quantitative criteria by a formula:

$$Hi(н) = \frac{(Hi - H\max)}{(H\max - H\min)},$$

where: Hi is the actual criterion value,
Hmax is the maximum criterion value,
Hmin is the minimum criterion value,
Hi(н) is the normalized criterion value.
The selected methodology provides a simplified rationing procedure.
For rationing, a rating scale of the characteristic is defined in the range from 0 to 1. The total absence of a characteristic is equated to 0. Maximum characteristic value in the aggregate is equal to 1.

Burdenyuk and Svirsky (2012) mentioned that the for other objects, rationing is carried out according to formulas:
- for the indices-stimulants, the increase in which contributes to the efficiency of the financial mechanism of higher education institutions:

$$Hi(н) = \frac{Hi}{H\max}$$

- for the indices-destimulants, the increase in which leads to the decrease in the efficiency of the financial mechanism of higher education institutions:

$$Hi(H) = 1 - \frac{Hi}{H\max}.$$

The data, standardized in such way allow direct comparison of individual indices in dynamics and serve for calculation of the financial mechanism efficiency of higher education institutions in Ukraine both for individual groups and in the general measurement.

Further, it is necessary to assess the importance (significance) of each of the structural components of the hierarchy, i.e. to determine the weight coefficients for each of the indices of the last hierarchy level. In order to determine such coefficients there are different approaches, among which the most common are the expert methods (paired comparison method, ranking, direct evaluation, adaptive evaluation etc.) and computational approaches (paired correlation method, main components, etc.).

Taking into account the drawbacks of expert evaluation methods related to the subjectivism, limited application and high costs of conduction, it is proposed to apply a calculation method, namely the principal component analysis , to determine the weight coefficients of the hierarchy elements.

The values of the a_{ij} weights for the indices are determined by the formula:

$$a_{ij} = \frac{c_{ij}|d_{ij}|}{\sum c_{ij}|d_{ij}|},$$

where d_{ij} is the value of factor loads of the i-th index in the j-th period;

c_{ij} is the contribution of the j-th component to the total dispersion of the set of indicators and the i-th feature.

The algorithm for calculating the values of factor loads (d_{ij}) and the coefficient of contribution of each component to the factor load (c_{ij}) is implemented in standard software packages for statistical data processing (SPSS, STATISTICA, SYSTAT, etc.).

The obtained results made it possible to distribute the weight of each of the indicators included in the list on a scale of 1 to 10 (Table 1).

On the basis of the developed system of indices located at the low level of the hierarchical model, their normalized values and weight coefficients, the general estimates of each level of the hierarchy and the general integral assessment of the state of the problem are calculated, which is investigated as a whole. The calculations were made using a formula:

$$Oef = \sum_{i=1}^{n} Pi \times Ki$$

where Oef is the estimation of the financial mechanism efficiency of higher educational institutions of Ukraine;

Pi is the weight coefficient of the i-th criterion;

Kij is a normalized value of the i-th characteristic.

Table 1: Determination of weight coefficients of financial mechanism efficiency indicators of higher education institutions of Ukraine

Показники	F1	F2	Weight coefficients
Number of students per 10,000 population	0,993554	– 0,056084	0,079245
Total expenditure on higher education	0,973640	– 0,108564	0,079165
Percentage of graduates who received a job placement	0,781999	– 0,492036	0,074973
Unemployed population with complete higher education as a share of the total number of the unemployed	– 0,905674	– 0,346847	0,080556
The share of the employed population with full higher education in the informal sector	– 0,915895	0,296346	0,079934
Average cost per student	0,664359	– 0,673715	0,070888
Share of total expenditure on higher education in total expenditure on education	0,936952	0,269359	0,080821
Total expenditure on higher education from the consolidated budget	0,973524	– 0,158697	0,080566
Share of capital expenditure in total expenditure on higher education	0,662265	0,567776	0,067744
Pedagogical staff sufficiency	– 0,984900	– 0,030579	0,077851
Percentage of postgraduate graduates who have defended their thesis	– 0,620858	– 0,642799	0,066618
Percentage of doctoral graduates who have completed defended their thesis	– 0,030459	– 0,830152	0,025737
Level of economic activity of persons with higher education	0,839607	– 0,417431	0,077377
Share of NDR performers in total employed population	0,450611	0,828132	0,058524
Total dispersion	9,175763	3,302483	–
Share of total dispersion	0,655412	0,235892	–

Source: compiled according to the authors' calculations

It should be noted that the specific value of the calculated integral index or indices characterizing certain aspects has no economic interpretation, only its dynamics and comparative value are important.

Thus, the developed model of complex evaluation of such a system makes it possible to assess the efficiency of the existing financial mechanism of higher education institutions in Ukraine from the standpoint of economy, productivity and efficiency on the basis of a comparative analysis. Also with the help of this model it is possible to estimate how effective the system was during a certain period.

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Determinants of Bank Lending in Russia: Industry Aspect

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Abstract

The slowdown in lending to non-financial companies in Russia since 2014 and its slow recovery from the second quarter of 2017 was a result of banks' problems with funding both in the domestic and foreign markets and also growth in overdue loans, which led to an loan rates increase and stricter requirements for borrowers. Instead of looking for relevant factors at the macroeconomic level, this research sheds some light on industry specific determinants of bank lending by types of economic activity. Moreover, this research contributes to the identification of the role of monetary policy for availability of bank loans for industries considering their heterogeneity. I found that industry characteristics explain the dynamics of bank lending by types of economic activity. Unfavorable dynamics of industry specific determinants: growth of overdue loans, increase in debt burden, output decline, liquidity and profitability reduction, cause a substantial decrease in banks' incentives to grant new loans. Economic sectors with weak financial characteristics – construction, manufacture of machinery, manufacture of wood and agriculture – are the most vulnerable in terms of the availability of bank credit resources. This investigation also reveals that tightening of monetary policy leads to shrinkage of availability of loans for all industries, as banks reduce lending due to the expected increase in companies' debt burden and growth of credit risk. Moreover, increase in loan rates reduces the demand of the most liquid industries, such as mining and quarrying, for bank loans, consequently, this leads to an additional reduction in lending growth rates.

Keywords: Bank Lending, Macroeconomic Industrial Structure, Lending Channel, Monetary Policy

Introduction

The sharp increase in overdue loans and the reduction in lending growth rates are the recent trends of the Russian banking sector. The period 4Q 2013 – 1Q 2016 was characterized by a tightening of bank lending conditions for companies, significant increase in the share of non-performing loans and a growth of the demand of companies for prolongation and restructuring of previously issued loans.

The monetary policy shift to the inflation targeting played a special role in the reduction of availability of loans. The decision of the Central Bank to raise the monetary rate by 6.5 percentage points to 17% in December 2014, which was made due to increased devaluation and inflation risks, had a particularly negative impact on the availability of bank loans for Russian companies. The companies' demand for loans, which has already decreased due to the deterioration of economic situation, slumped in response to this decision.

The volume of liquidity in banking sector was insufficient, first of all, due to the transition of the Bank of Russia to the policy of a structural liquidity deficit and an increase in the monetary rate. In addition, there was a problem with access to global financial markets due to sanctions imposed against Russian banks. Thus, the deterioration of resource availability for banks both in the domestic and external financial markets led to an increase in the price of loans for companies and toughening of requirements for the financial position of borrowers.

The demand for new loans from companies declined due to the instability of the economic situation, the slump in production activity and the price appreciation of bank credits. At the same time, the demand for the prolongation and restructuring of previously issued loans increased. The dynamics of lending has started to recover slowly only since 2Q 2017.

Thus, the set of factors influencing the dynamics of lending in Russia in recent years at the level of the economy are clear. However, it is interesting to identify and analyze the impact of specific industry factors that have an impact on the volume of lending to the sectors of the Russian economy. Moreover, this research is aimed to reveal the influence of monetary rate at the industry-level. The results can be useful for the Central Bank of Russia as it can contribute to understand how monetary policy affects the availability of bank loans for industries considering their heterogeneity.

Related Literature

There are several key areas of empirical literature about determinants of bank lending. The first direction of researches by Qayyum (2002) and Calza et al (2003) is focused on the factors affecting only the demand side for loans, in other words, the desire of firms and households to use loans as a financing tool. The second group of researches by Ogawa, Kitasaka (2000), Hou (2007), Tracey (2011), Chernykh, Theodossiou (2011) pays attention only to the factors affecting the supply of bank lending, that is, the ability and willingness of banks to issue loans. However, most of the papers, for example, by Albulescu (2009), Guo, Stepanyan (2011), Tan (2012), Shijaku, Kalluci (2013), Pham (2015) consider both demand and supply factors, which are evaluated in one equation or in system of simultaneous equations. For example, authors of the research Herrera et al (2013) construct a system of Seemingly Unrelated Regressions (SUR), which consists of the equations of supply and demand, to analyze private sector lending. Real loan rate is supposed to simultaneously reflect both demand and supply effects. It is reasonably to point out studies by Djankov et al (2007), Weill (2011), which concern influence of institutional determinants on bank lending. A type of legal system, level of financial sector development and corruption index can serve as examples of institutional factors. Institutional development is attributed both to the demand and to the supply side, because institutions create an environment for bank lending.

In addition to researches that analyze bank lending at macroeconomic level (described above), there are a lot of papers, for example, Chernykh, Theodossiou (2011) and Ladime et al (2013), in which authors examine the impact of banks' characteristics on their willingness to issue new loans i. e. microenomic-level studies. Some of the empirical studies – Kashyap, Stein (2000), Altunbas et al (2000), Drobyshevsky et al (2008), Leontyeva (2009), Cetorelli, Goldberg (2011), Jimenez et al (2014), Perevyshina, Perevyshin (2015), Borzykh (2016) – are devoted to the bank lending channel, which reveal impact of interest rates dynamics on bank lending activity and GDP growth.

Empirical papers about determinants of bank lending at the industry level represent a special direction of studies by Ogawa, Kitasaka (2000), Arnold et al (2006), Sayfieva (2013), Hernando, Villanueva (2014), Fidrmuc et al (2015). Arnold et al (2006) explore the importance of lending to industries and its role in the transmission of monetary policy in Germany. Authors of this research come to the conclusion that the volume of bank lending depends on the sectoral structure of the loan portfolio of German banks and, accordingly, on changes in the demand of industries. Monetary policy has an impact on the supply of loans; however, this influence significantly depends on the characteristics of the bank such as size and liquidity and does not depend on capital adequacy. On the contrary, in papers by Hernando, Villanueva (2014) and Fidrmuc et al (2015) it was revealed that severity of capital requirements substantially determines the availability of loans for economic industries.

Hence, it can be concluded that there is a limited number of empirical researches devoted to determinants of bank lending at industry level and none of these studies were performed using data for Russia. Besides, typical characteristics of industries are industry inflation and output. In this connection, current study contributes to the empirical literature in terms of consideration of specific industry indicators as determinants of the bank lending dynamics for Russia.

Data and Methodology

Monthly data for the period from April 2010 to December 2017 was used to assess the impact of specific industry factors on the dynamic of lending by type of economic activity. The main sources for this data are the following:

- Bank of Russia (volume of issued loans, volume of overdue loans, total loans for industries; inflation, exchange rate, monetary policy rate and loan interest rate for non-financial companies);
- Russian Federation Federal State Statistics Service (profit, costs, current assets, short-term liabilities, total equity and total debt by types of economic activity);
- Joint Economic and Social Data Archive – Higher School of Economics (output indices by types of economic activity).

In this study, industries are key types of economic activity in accordance with the classifier National Classifier of Economic Activities NCEA-1 (Table 1). For industries C (Mining and quarrying) and D (Manufacturing) statistics is more detailed due to the high differentiation between their constituent types of economic activity.

Table 1: Industries of Russian economy (in accordance with NCEA-1)

Code	Types of economic activity (i.e. industries)
A	Agriculture, hunting and forestry
C	Mining and quarrying:
CA	extraction of energy producing minerals
CB	extraction of minerals except of energy producing minerals
D	Manufacturing:
DA	manufacture of food products, including beverages, and tobacco
DD	manufacture of wood and products of wood
DE	manufacture of pulp, paper and paper products, publishing and printing
DF	manufacture of coke and refined petroleum products and nuclear materials
DG	manufacture of chemical products
DI	manufacture of other non-metallic mineral products
DJ	manufacture of metals and metal products
DK	manufacture of machinery and equipment
DM	manufacture of transport vehicles and equipment
E	Electricity, gas and water supply
F	Construction
G	Wholesale and retail trade; repair services for means of transport, furnishings and private used goods
I	Transport and communications
K	Real estate activities

In this paper, two alternative measures which approximate credit granting activity are used. The main dependent variable is a growth rate of the loan portfolio of the Russian banking system by types of economic activity. The alternative measure is the ratio of the volume of loans issued to the volume of repaid loans by types of economic activity, which helps to test the robustness of the results. Higher values of this ratio indicate a revival of lending activity and lower values, on the contrary, reflect a slowdown in lending activity. Set of independent variables is represented below (Table 2).

Table 2: Description statistics for independent variables for 2009 – 2017 years

Independent variables	Number of observations	Mean	Standard deviation	Min.	Max.
Industry					
Overdue loans / Total loans, %	1802	5.5	4.0	0.4	23.5
Leverage, %	1836	161.7	113.8	0.0	660.7
Profit / Debt, %	1836	36.6	42.9	-36.9	290.2
Profit / Costs, %	1836	10.1	10.9	-12.8	68.2
Current assets / Current liabilities, %	1836	160.9	51.5	0.0	399.0
Output index, %	1728	106.3	17.8	47.8	153.3
Banking system					
Equity / Total assets of banking system, %	1836	13.1	2.3	9.1	16.4
Total loans / Total deposits of banking system, %	1836	113.8	11.4	95.2	145.3
Liquid assets / Total assets of banking system, %	1836	5.3	1.5	3.6	9.9
Macro					
Loan interest rate for non-financial companies (up to 1 year), %	108	11.5	2.7	7.9	19.9
Exchange rate UDS/RUB (growth rate), %	108	112.2	23.8	75.6	184.9
Oil price (growth rate), %	108	100.9	35.8	43.3	188.0
GDP (growth rate), %	108	100.4	4.1	88.2	105.7
VIX index	108	18.7	7.5	10.1	45.6

Estimation of models on panel dataset is applied for identification of impact of specific industry characteristics on dynamics of bank lending.

I estimate the following regression (basic model):

$$\boldsymbol{L_{it}} = \boldsymbol{\alpha_i} + \sum_{k=1}^{K} \boldsymbol{\beta_k} * \boldsymbol{I_{k,it-n}} + \sum_{p=1}^{P} \boldsymbol{\gamma_p} * \boldsymbol{B_{p,t-n}} + \sum_{r=1}^{R} \boldsymbol{\delta_r} * \boldsymbol{M_{r,t-n}} + \sum_{s=1}^{S} \boldsymbol{\eta_s} * \boldsymbol{I_{k,it-n}} * \boldsymbol{M_{r,t-n}} + \boldsymbol{\varepsilon_{it}}$$

$\boldsymbol{L_{it}}$ – 1) growth rate of the loan portfolio for **i** industry at month **t**; 2) the ratio of the volume of loans issued to the volume of repaid loans for **i** industry at month **t**

$\boldsymbol{I_{k,it-n}}$ – industry-level variables;

$\boldsymbol{B_{p,t-n}}$ – characteristics of banking system;

$\boldsymbol{M_{r,t-n}}$ – macroeconomic factors;

i – type of economic activity (industry) code, t – time period, n – lag order (3 or 6 months).

Interaction terms $\mathrm{I_{k,it-n}} * \mathrm{M_{r,t-n}}$ allow to test hypotheses about influence of monetary policy on dynamics of lending by types of economic activity depending on industry characteristics.

Characteristics of banking system and macroeconomic factors are used in this research as control variables. As a control factor reflecting the dynamics of the macroeconomic situation, is considered the indicator of macroeconomic conditions, obtained as the first principal component from the set of variables (growth rates for exchange rate UDS/RUB, oil price, GDP and VIX index). The first principal component (PC 1) explains 63% of total variation and correct signs for factor loadings (Tables 3 and 4). The application of the principal component method is an attempt to prevent a multicollinearity caused by presence of a high correlation between macroeconomic variables.

Table 3: Results of Principal Components Analysis

Number	Value	Difference	Proportion	Cumulative Value	Cumulative Proportion
PC 1	2.506	1.584	0.627	2.506	0.627
PC 2	0.923	0.534	0.231	3.429	0.857
PC 3	0.389	0.206	0.097	3.817	0.954
PC 4	0.183	---	0.046	4.000	1.000

Table 4: Factor loadings in principal components

Variable	PC 1	PC 2	PC 3	PC 4
Exchange rate UDS/RUB (growth rate)	-0.564	-0.198	0.492	0.634
GDP (growth rate)	0.540	-0.038	0.824	-0.171
Oil price (growth rate)	0.571	0.260	-0.207	0.750
VIX index	-0.254	0.944	0.193	-0.081

Thus, the first principal component approximates macroeconomic conditions (generally), high PC 1 values correspond to favorable periods and low values, in turn, reflect crisis periods.

Results

Tables 5 and 6 represent model estimation results. For robustness check of industry variables coefficients several specifications of basic model were estimated. In Table 5, there are results for the main dependent variable – a growth rate of the loan portfolio of the Russian banking system by types of economic activity. The difference between columns (1) - (3) and (4) - (6) is an order of lag for independent variables. Columns (1) and (4) represent «short» specifications without macroeconomic

conditions, columns (2) and (5) are specifications with macroeconomic conditions and columns (3) and (6) are «long» specifications with macroeconomic conditions plus interaction terms for monetary rate and industry variables. In Table 6, there are the similar results for the alternative dependent variable – the ratio of the volume of loans issued to the volume of repaid loans by types of economic activity. It is worth noting that this variable is a satisfactory alternative for measuring credit granting activity.

We can see that in all specifications corresponding coefficients are similar to each other.

Table 5: Estimation results: dependent variable is a growth rate (percentage change over corresponding period of previous year) of the loan portfolio of the banking system by types of economic activity

	(1)	(2)	(3)	(4)	(5)	(6)
	lag = 3	*lag = 3*	*lag = 3*	*lag = 6*	*lag = 6*	*lag = 6*
Overdue loans / Total loans, %	-1.693*** (0.397)	-1.711*** (0.445)	-1.655*** (0.434)	-1.565*** (0.437)	-1.552*** (0.457)	-1.465*** (0.433)
Leverage, %	-0.042 (0.030)	-0.044 (0.032)	-0.044 (0.032)	-0.038 (0.027)	-0.039 (0.027)	-0.039 (0.028)
Profit / Debt, %	-0.124** (0.051)	-0.099* (0.052)	-0.119** (0.056)	-0.095* (0.054)	-0.078 (0.055)	-0.097 (0.056)
Current assets / Current liabilities, %	0.043 (0.025)	0.033 (0.028)	0.280** (0.102)	0.027 (0.030)	0.023 (0.029)	0.316*** (0.072)
Output index, %	0.317** (0.114)	0.301** (0.116)	0.371*** (0.092)	0.423*** (0.115)	0.417*** (0.114)	0.505*** (0.097)
Equity / Total assets of banking system, %	1.342 (0.797)	1.676* (0.826)	0.933 (0.807)	1.221 (0.832)	1.489* (0.821)	0.627 (0.747)
Liquid assets / Total assets of banking system, %	-1.022 (0.727)	-0.361 (0.655)	-0.557 (0.615)	0.031 (0.733)	0.573 (0.585)	0.342 (0.550)
Loan interest rate for non-financial companies (up to 1 year), %	-1.059** (0.405)	-1.873*** (0.372)	-1.452*** (0.391)	-1.156** (0.441)	-1.781*** (0.475)	-1.275** (0.507)
Macroeconomic conditions (PC)		1.934** (0.747)	1.901** (0.741)		1.524* (0.842)	1.506* (0.816)
Current assets / Current liabilities × Loan interest rate for non-financial companies (up to 1 year)			-0.025** (0.010)			-0.029*** (0.007)
Constant	91.52*** (17.06)	96.22*** (16.16)	54.29** (20.21)	77.14*** (17.02)	79.18*** (16.50)	28.16 (20.24)
# of observations	1504	1456	1456	1504	1504	1504
R-squared (overall)	0.162	0.165	0.177	0.149	0.151	0.164

Regressions are estimated with OLS, standard errors are robust.
** Significance at the 10% level.*
*** Idem, 5%.*
**** Idem, 1%.*

Table 6: Estimation results: dependent variable is the ratio of the volume of loans issued to the volume of repaid loans by types of economic activity

	(1)	(2)	(3)	(4)	(5)	(6)
	lag = 3	*lag = 3*	*lag = 3*	*lag = 6*	*lag = 6*	*lag = 6*
Overdue loans / Total loans, %	-1.688*** (0.504)	-1.606** (0.568)	-1.545** (0.590)	-1.670*** (0.515)	-1.657*** (0.508)	-1.566*** (0.531)
Leverage, %	-0.060** (0.024)	-0.057** (0.025)	-0.057** (0.026)	-0.054** (0.024)	-0.055** (0.024)	-0.055** (0.025)
Profit / Debt, %	-0.122* (0.062)	-0.100 (0.066)	-0.122* (0.065)	-0.063 (0.061)	-0.046 (0.063)	-0.065 (0.060)
Current assets / Current liabilities, %	0.007 (0.026)	0.004 (0.031)	0.269* (0.127)	-0.015 (0.035)	-0.019 (0.036)	0.286*** (0.068)
Output index, %	0.197 (0.122)	0.185 (0.115)	0.260** (0.094)	0.293* (0.139)	0.286** (0.134)	0.378*** (0.115)
Equity / Total assets of banking system, %	2.518** (0.875)	2.546** (0.945)	1.748* (0.987)	2.086** (0.830)	2.361** (0.894)	1.463* (0.826)
Liquid assets / Total assets of banking system, %	-1.459* (0.698)	-0.812 (0.650)	-1.023 (0.642)	-0.379 (0.728)	0.178 (0.662)	-0.062 (0.636)
Loan interest rate for non-financial companies (up to 1 year), %	-0.708 (0.510)	-1.427*** (0.416)	-0.976** (0.344)	-1.103* (0.526)	-1.746*** (0.388)	-1.218*** (0.354)
Macroeconomic conditions (PC)		1.438	1.403		1.567*	1.548*
		(0.969)	(0.971)		(0.845)	(0.830)
Current assets / Current liabilities × Loan interest rate for non-financial companies (up to 1 year)			-0.027** (0.012)			-0.031*** (0.006)
Constant	94.35*** (23.69)	99.22*** (22.39)	54.20* (29.24)	88.14*** (26.74)	90.24*** (25.20)	37.09 (28.34)
# of observations	1504	1456	1456	1504	1504	1504
R-squared (overall)	0.165	0.162	0.181	0.156	0.156	0.184

Regressions are estimated with OLS, standard errors are robust.
** Significance at the 10% level.*
*** Idem, 5%.*
**** Idem, 1%.*

As a result of the estimation, it was revealed that industry specific characteristics affect both the willingness of banks to provide loans and the decisions of the companies (industries) to use bank loans as a source for financing their activity. Thus, the most significant variable determining features of an industry and possibility of its companies to get a loan is a ratio of overdue loans, which approximates credit risk of an industry. Industries with higher level of overdue debts are less likely to get bank loans, since essential credit risk reduces an attractiveness of such investments for the banking sector. Consequently, banks strive to minimize volume of loans issued to enterprises related to high-risk industries. This corresponds to results of researches by Hou (2007), Shijaku, Kalluci (2013), Tracey (2011). The similar logic can be applied to the leverage ratio (total debt to equity). On the one hand, industries with a lower leverage are more reliable borrowers and they can rely on attracting credit resources from banks. On the other hand, industries with sufficient internal resources have a lower propensity to use bank loans. Thus, this variable can simultaneously reflect the supply-side and the demand-side effects, however, in this study supply-side effect is stronger, and so we have negative sign for the appropriate coefficient (Tables 5, 6).

The profit to debt ratio is negatively correlated with dynamics of bank lending. High profit industries have more opportunities for development relying only on their internal sources or bond issuance; this fact ultimately leads to a reduction in demand for bank loans. At the same time, the impact may be opposite since a larger profit indicates greater stability and efficiency of the company, which are positive signals for banks (supply-side effect). However, in this study the supply-side effect is not confirmed.

Output growth positively affects the willingness of banks to grant credits, because an increase in output indicates a favorable condition for an industry (companies sustainably earn incomes), therefore banks remain confident in repayment of issued loans similar to Arnold et al (2006). Though Arnold et al (2006) noticed that output growth had a negative impact on a dynamics of lending for a number of manufacturing sectors of Germany. Probably, the cause is that industries shrink demand for bank loans when their output increases since they have larger cash inflows.

The ratio of current assets to short-term liabilities reflects a liquidity of an industry. In general, a higher value of the indicator represents more accurate matching of assets and liabilities by maturity for an industry (or companies). As a result, the higher is the proportion of current assets, the more persistent are companies of an industry, consequently, it leads to credit expansion (banks strive to issue more loans to the most liquid industries). It must be emphasized that the ratio of current assets to short-term liabilities turns out to be statistically significant only in those specifications of the model, which also include the interaction terms with loan interest rate.

In addition to the analysis of impact of specific industry factors on the dynamics of lending by types of economic activity, an important role in this research is assigned to the study of interest rate influence on growth rate of lending by industries. Since the dynamics of loan interest rate for non-financial companies (up to 1 year) fully correspond to the dynamics of the monetary policy rate, thus it reflects the importance of monetary policy of Central Bank of Russia for development of lending. An increase in loan interest rate causes a slowdown in credit growth, for example, in paper by Perevyshina, Perevyshin (2015) as banks constraint granting of loans at a higher price due to expectations of growth in overdue debt, which is similar to Arnold et al (2006). Hence, higher costs of credit resources reduce their availability for industries of Russian economy and, thereby, it limits growth opportunities for the economy. Moreover, it is interesting to test whether interlinkages between industry-specific characteristics and the influence of monetary policy on dynamics of lending by industries exist. For this purpose, interaction factors between industry variables and loan interest rate were estimated. The only statistically significant interaction factor is cross-product for liquidity ratio (current assets to short-term liabilities) and loan interest rate. The increase in loan rate for non-financial companies leads to the occurrence of additional costs for more liquid industries. In this case, the most liquid industries can attract financing from other sources (including internal funds).

Conclusions

This research examines the influence of specific industry factors on the willingness of banks to grant loans and on the industries' (companies') decisions to use bank loans as a source of financing. Also an attempt to study the impact of monetary policy on the dynamics of lending depending on specific industry indicators was made.

Applying estimations of panel data models to Russia for the period April 2010 – December 2017, I found that industry characteristics can explain the dynamics of bank lending by types of economic activity. Unfavorable dynamics of industry specific determinants: growth of overdue loans, increase in debt burden, output decline, reduction of liquidity and profitability, cause a substantial decrease in banks' incentives to grant new loans to industries. Economic sectors with weak financial characteristics are the most vulnerable in terms of the availability of bank credit resources and, as a result, they have the lowest potential for further development (other things being equal). Such sectors of the Russian economy include: construction, manufacture of machinery and equipment, manufacture of wood and products of wood and agriculture.

In addition, this paper reveals that tightening of monetary policy leads to shrinkage of availability of credit resources for all industries, as banks reduce lending due to the expected increase in companies' debt burden and growth of credit risk. Moreover, increase in loan rates reduces the demand of the most liquid industries (mining and quarrying) for bank loans, consequently, this leads to an additional reduction in lending growth rates.

Some possible extensions to this study include more detailed search and analysis of additional industry-level determinants and influence of their dynamics on linkage between monetary policy and credit growths by industries. Also, applying the proposed methodology to data for Russian regions (i.e. industry-region level research) is potentially useful.

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The Importance of Information Literacy Skills in the Learning Process

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Abstract

This paper is discussing on the information literacy skills in enhancing the learning process among undergraduate students. The deliverance of information literacy instruction to students is becoming progressively more significant due to the proliferation of electronic resources and the increased usage of the net as an information source. Information literacy is a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information. Information literacy has also become more and more significant in the contemporary environment of rapid technical change and proliferating information resources. Because of the escalating complexity of this environment, individuals are faced with diverse, abundant information choices: in their academic studies: in the workplace, and in their personal lives. Information is available throughout the libraries, community resources, special interest organizations, media, and the internet.

Keywords: Information literacy, information literacy skills, learning process, undergraduate students

Introduction

Information literacy is one of the most important elements in enhancing the ability of the students to excel in their studies. According to the American Library Association (2019), "Information literacy is defined as a set of abilities requiring individuals to 'recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information.'" To be information literate, one is required to have the skills not only in research but in critical thinking. Besides that, ALA also referred information literacy as "Information Competency" or "Information Fluency". With those statements, it is undeniable that information literacy can be considered as an essential factor for the information seeking discoveries among all students in their studies. Igwe, Emezie & Uzuegbu, (2014) highlight that, a high obligation of education system in associating students' journey of discovery as they advance through the institutions of higher learning in the 21st century. This indicates that all educational activities should emphasize on emerging students' ability for inquiry, independent learning, innovation and critical discourse, with stress on generating graduates that are self-directed and lifelong learners. Therefore, they believe that inquiry-based learning is the trend of teaching and learning in the contemporary information and knowledge society that is focused by eruptions on data, information resources, scholarly outputs and knowledge assets.

Gun & Odafe (2014) inform that information literacy consists of library search, skills and information technology literacy, nevertheless it is wider than these. Information literacy is not only about seeking and providing information, but also related to greater direction of analysis, synthesis, critical thinking and problem solving. It includes retrieving and using information for independent study and learning, lifelong learning, participative public spirit and social obligation. On the other hand, Alkhezzia & Hendalc (2018) mention that, it is predictable that the world is observing the swift progression in the amount of obtainable and reachable information, which consequently nurtures the importance of information literacy in all fields, especially in the academic community. Nowadays, students are fortunate to be part of this information-eruption world. They can retrieve information by using different devices such as their mobile phones, laptops, tabs and more information than former generations obtained, who need to use multilevel libraries. They added that, it is not the information, only that matters, but rather the skill in treating the huge amount of information. Disclosure of information does not make us educated unless we know how to deal with it efficiently.

Literature Review

Numerous definitions of information literacy are presented in the literature. In the past decade, the term 'information literacy' has been used recurrently both in professional literature and discussion. It has become a phenomenon in helping shape and maintains educational system and policies all over the world. Granting to the Association of College and Research Libraries' (ACRL, 2000), "Information literacy is a set of abilities requiring individuals to recognize when data is needed and deliver the ability to locate, assess, and use effectively the needed information" (Ashoor, 2005). The same document points out those information literacy skills are created to reinforce the above powers. The skills of recognizing, locating, identifying, retrieving and evaluating data can be admitted every bit part of the teaching of an existing course or institute an independent course in the course of study.

Information Literacy

The foundation for lifelong learning is information literacy, which is applicable to all disciplines, all learning environments and all levels of education. It facilitates learners to understand better the subject content, extend their investigations, become self-directed, and assume greater control over their own learning. Association of College and Research Libraries' (ACRL, 2015) identifies information literacy as a set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning."

Coonan, & Secker (2014) describe about the Venn Diagram of intersecting literacies that contribute to information literacy. They mention that to become a genuine 'information literate' person, ones has to consecutively improve:

- Awareness of how to engage with the digital world
- How to find meaning in the information ones discovers
- How to articulate what kind of information ones requires
- How to use information ethically
- Understand the role ones can play in the communication in their profession and
- How ones evaluates information for credibility and authority.

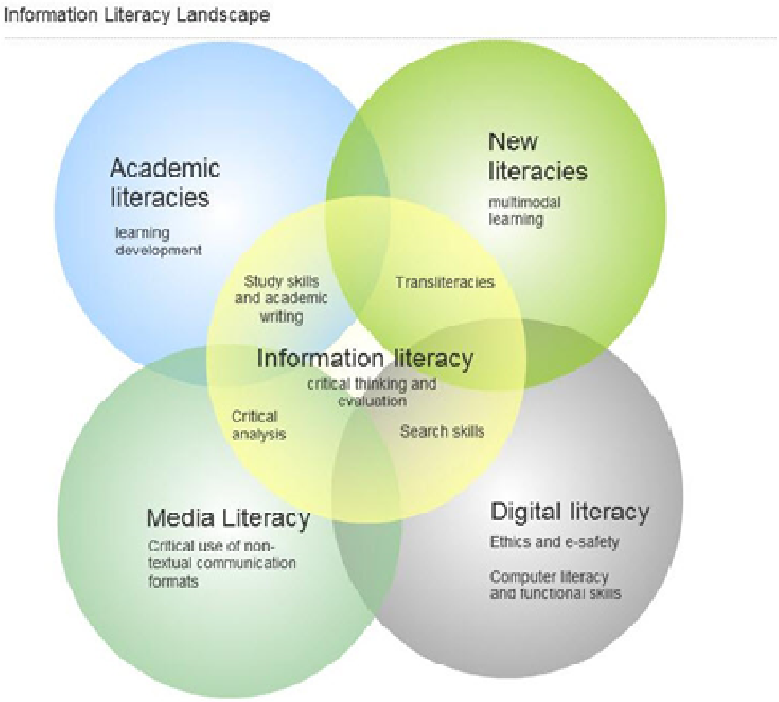

Fig 1. Venn Diagram of intersecting literacies that contribute to information literacy

According to Doyle (2017), in his study conducted in 1992, mentions that information literacy was comprehensively concerned for the first time during that year. He has listed the characteristic of the information literate individual who should be able to:

- Recognizes that accurate and complete information is the basis for intelligent decision making
- Recognizes the need for information
- Formulates questions based on information needs
- Identifies potential sources of information
- Develops successful search strategies
- Accesses sources of information, including computer-based and other technologies
- Evaluates information
- Organizes information for practical application

On the other hand, Naik & Padmini (2014) highlight that in this contemporary era, information is increasing drastically in this world where everyone, no matter men or women, rich or poor, adults or youngsters need information in their daily lives. Those who are information literate, can easily proceed with their lives smoothly once they get the information to do their daily tasks. In the present days, information is compulsory for every aspect of our daily tasks. They highlight, information literacy is the method of knowing when and why information is required, where to find it and how to evaluate, use and communicate it in an ethical way. It is the mixture of all the skills that necessary for the operative and extreme use of information. They added that the information literacy skills have

been used as collective term catering all or several related literacies which comprise of computer literacy, digital literacy, hyper literacy, information technology literacy, interactive literacy, multiple literacy, network literacy, oral literacy, internet literacy, reading literacy, water literacy and visual literacy etc. In this case, every related literacy is required to recognize specific procedure in understanding its specific significance. For that, the users who equip themselves with new and updated techniques to attain the quality of generating significant outcomes. They also added that the whole notion of information literacy is to transfer from text-based education to resource-based education.

Information Literacy Skills

As we all know, there are many information available for the users to employ. The information available are both in the printed and non-printed forms. However, all information available need to be evaluated before ones make the decision to choose or use the retrieved information. To become information literate, ones need to have the information literacy skills. As mentioned by Theme (2019), becoming information literate embraces the capability in differentiating fact from falsehood which is an important skill needed in identifying fake news. Libraries are to be found to help users gaining information literacy skills, as well as educating them on how to recognize fake news sources and stories.

On the other hand, Mohammad Reza Soleymani (2014) highlights that the extensive progression of information and communication technology and its extreme impact on diverse phases of life have affected several activities, particularly educational events like changing students' educational necessities, students and teachers' critical skills, teaching approaches, and the usage of information and communications technology in the method of teaching. Khaleghi & Seiamak (2011) inform that the skill to put up oneself with the alterations, competitiveness, and lifelong learning are the proofs of achievement in the modern society. Watterson (2001) mentions earlier that in reaching the information literate society, extra competencies and skills are required than physical skills and financial assets.

Furthermore, Soleymani (2014) highlights that extreme growths of information resources from one hand and quick progressions of other sciences on the other hand have caused students unable to acquire the whole resources in their normal educational passages. For that, Davarpanah, Ghasemi & Seiamak (2009), say helping students on how to learn, in other words training lifelong learners, is one of the most significant responsibilities of educational institutes. After graduating, students should be able to endure their creativities and reach for higher levels of education by merging their old and new information circles. Having special skills recognized as information literacy is needed to ensure achieving this level. Azin, Kokabi & Bigdeli (2009) stress that information literacy skills are the utmost crucial obligation of students in information society. They claim that these skills undeniably assure students' success in playing their social role.

Naik & Padmini (2014) mention that information literacy is a group of skills needed to find, retrieve, analyze and use the information. As of the beginning of 21st century, the year has been called as the information age because of the explosion of information sources output immensely occurred. It has become progressively clear that students cannot learn everything they need to know, especially in their related field of their studies at the beginning of their college/university years. Information literacy provides them with the critical skills essential to become independent lifelong learners. They added that most of the time many people assume that, when students are able to write research papers and read textbooks they are already achieving information literacy skills, are not so true. To them, information literacy skills may be taught by the educators, but what is important is a strong foundation of their understanding towards the courses they learned is parallel with the curriculum available.

The Importance of Information Literacy Skills

Solmaz (2017) states that information literacy plays very important role in lifelong learning as it increases the value of education both in learning environments and in educational settings. He added,

it is proven that numerous models should be used, various activities should be endorsed, and the effectiveness of these should be examined to ensure the information literacy skills at all levels of education are guaranteed. Educators' role is essential in bringing up individuals who are considered as the lifelong learners and who advance themselves persistently. Ringsted (1998) says that in order for educators to start this role, they have to be individuals who are self-learned in their educational and professional lives hence they have to be leaders in providing their students with studying prospects, retrieving information and manipulate it. In addition, Breivik (1999) mentions that it is essential to embrace information literacy in educator training packages. Therefore, Iannuzzi, Mangrum & Strichart (1999) highlights that it is considered as a significant approach in the enhancement of lifelong learning that individuals are provided with the information literacy skills. Polat (2004) says it is only probable for the teaching candidates to be effective in their teaching path based on a learning process that will continue throughout their life. Consequently the pre-service preparation for teachers must be appropriate for achieving the stated qualities. Solmaz (2017) stresses that, regardless of conceptual research on the connection between lifelong-learning and information literacy, no investigative work has been found. For that, it would be valuable to regulate the relation between their tendency towards lifelong learning and information literacy levels to disclose the learning profile of teaching candidates because by detecting the interest, attitude, ability, expectation and the tendency of them, a healthy needs exploration can be carried out and findings can be used in the expansion of the related programs.

Naik & Padmini (2014) summarize the importance of information literacy as “a prerequisite for participative citizenship, social inclusion, the creation of new knowledge, personal empowerment and learning for life”. They also stated the importance of information literacy as follows:

- Information literature is important to understand the difficult question of ownership of information and copyright
- Students should learn to respect the author’s right
- To be an independent lifelong learner, it is essential to achieve a high level of information literacy
- Information literacy is to help close the gap between the information poor and the information rich
- Information literacy is required to have a critical thinking approach, that would lead to economic and cultural progress of the nation
- A sheer abundance of information in electronic format has made information literacy increasingly important
- To be an independent lifelong learner it is essential to achieve a high level of information literacy
- Equal opportunities among people are important. One of the ultimate benefits of information literacy is to help to close the gap between the information poor and information rich
- Information literacy is required to have a critical thinking approach that leads to the progress of the nation
- Information literacy is required for democracy
- A sheer abundance of information in electronic format has made information literacy increasingly important. Traditional print resources could be subjected to a quality assurance process. Whereas online resources are in the form of electronic resources. With the Internet sources, none of the quality assurance mechanisms can be assumed

- Information literacy is also important to understand the difficult questions of ownership of information and copyright
- Information literacy is a prerequisite for participative citizenship, social inclusion, and the creation of new knowledge, personal empowerment and learning for life.

On the other hand, El Hassani & Nfissi (2015) highlight that information literacy stands at the core of freedom of manifestation and information – in the meantime, it allows people to recognize the functions of media and other information providers, to critically assess their content, and to make conversant decisions as users and producer of information and media content. In addition, information literacy is very importance to the higher learning institutions. One of the reasons is that some undergraduate students at the university have inadequate background of fundamental research and information competency skills. They might not have attained the essential skills to effectively search for information, or evaluate, synthesize and blend ideas; or may not have learned how to manipulate information in original work or give proper citation and reference for information used. They also added that, some students might have developed basic computer skills to send electronic mail, navigate the web, and share files, they may not have been taught on how to efficiently search the internet or effectively use library e-resources for their academic exploration. This is where information literacy skills are necessary and make the difference to the success of the students. If they later are given the chance to follow such programs, they will definitely face less complications while writing papers.

Information Literacy Skills in Education

The reaction of the higher education sector to the need for development of information literacy skills in students is perhaps best reflected in the view of Johnston and Webber (2003), which they pointed out that information literacy is a social response to the demand for effective use of the vast amount of data accessible in today's information society. As interest in information literacy continues to build, the scholarly discussion has started to see how information literacy can be produced employing the latest technology to adapt to the diverse student learning styles. In European countries, academic libraries have played an important role in information literacy development. Information literacy initiatives in higher education have taken a variety of forms: These include stand-alone courses or classes, web-based tutorials, course related instruction, or course integrated instruction. Most authors accept the opinion that information literacy programs be incorporated into open areas (Joint & Kemp, 2000; and Kemp, 1999).

Chu (2009) developed analysis project-based learning in a primary school with the outcome that the joining students acquired greater grades than the other students. The learning method had some positive effects like, for instance, the enhancement of the students' research and problem solving skills. On the other hands, Knautz (2013) introduces a technique to impart information literacy skills on the concept of gamification. The technique is raising learning with the theory of playing which embraces several learning approaches.

In executing the related matter, Heck (2015) has implemented four learning techniques in a retrieval course to nurture the learning process of information literacy skills. The study outcomes show that the students experienced some aspects of the learning approaches quite negatively. Nevertheless, the probability and awareness rates don't change to an excessive degree. Consequently, they accept that learning techniques have the possibility to help raising the learning process of information literacy skills. She added that, the inserting of these techniques in a university course has to properly be done. Group work is identified as rather positive, but in practice there are complications which affect its positive perception. Below are the outcomes tabled for the four learning techniques identified by the study:

Computer-supported collaborative learning	**Team-based learning**
Wiki as supportive platform: • · To foster group collaboration • · As group project storage • · As feedback tool for reviewer • · As tracking tool for teacher	Student groups as project teams: • · Foster collaborative learning • · Foster successful learning process of each student • · Support each other in finding the best solution
Inquiry-based learning	**Project-based learning**
Open retrieval task: • · The Foster students to make own decisions • · Foster self-exploration and self consistent learning	Solve a problem-oriented task • · Foster autonomous work of students • · Support creative problem-solving • · Relation to real life task

Fig. 2: Advantages of the learning methods applied in the course design. (Tamara Heck, 2015)

According to Heck (2015), computer-supported collaborative learning can be useful and backing the work in a course, but its achievement intensely subject to its intervention. The inquiry-based and project based concept was regarded positively. About the effectiveness of the introduced learning techniques related to the enhancement of information literacy skills, forthcoming work is needed regarding the analyses of the Wiki. She says, they will be able to track the history of the pages the groups created. These analyses will help them to make statements about the appropriateness of team-based learning and to conclude on the students' development of their information literacy skills.

Undeniably, students' access to information and their advantage of critical thinking directs to their active participation in educational activities. Duncan & Varcoe (2012) mention that even though there is a direct association between formal and informal information literacy and educational activities, limited studies have been conducted on this matter. Soleymani (2014) mentions that a study on the effects of teaching information literacy on the academic performance of students in Imam Mohammad Baqer Technical Higher Education Center in Sari, Iran has been conducted by Hasanzadeh & Asadi (2007). Later then, Pandpazir & Cheshmeh-Sohrabi (2011) conducted other related research and it was verified that there was a substantial variance between the academic performance of the two groups of testing and control, the ability to recognize and specify information needs, getting skills in locating and accessing information, getting related skills at using information efficiently and responsibly, the way of using information resources at the libraries. Their findings are considered good enough in understanding information needs, strategies for information searching, discovering and retrieving information, using information, combining the new and old information collections, as well as assessing search results to meet their information needs.

Conclusion

Information literacy has also become more and more substantial in the modern situation of swift technical transformation and flourishing information resources. Anafo & Filson (2014) mention that the increasing complication of this situation that need to be faced by everyone with various, plentiful information choices: in their academic studies: their workplace as well as their personal lives. In addition, information is accessible through various mediums, including graphical, aural, and textual which position new challenges for individuals in evaluating and seeing it. Ashoor (2005) highlights that the indefinite quality and increasing quantity of information contribute great challenges to the society. Therefore, it is really important for the undergraduate students to endure at least better information literacy in improving their learning process throughout their courses at the universities. While, Heck (2015) informs that computer-supported collaborative learning can be useful and

backing the work in their courses, but its success intensely influenced by its facilitation. The study found that the inquiry-based and project based theory was regarded positively. Regarding the helpfulness of the presented learning approaches related to the enhancement of information literacy skills, upcoming work is needed regarding the analyses of the Wiki. It is said that they would be able to identify the history of the pages the groups created. These analyses would help them to make proclamations about the relevance of team-based learning and to conclude on the students' development of their information literacy skills.

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Platform Reputation Effects in Lenders' Decisions to Invest in Peer-to-Peer Lending in Indonesia

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Abstract

The advancement of financial technology has given rise to the online peer-to-peer lending (P2P lending) platform to provide loans. P2P lending provides loans without the role of financial intermediaries such as banks. Further, P2P lending is expected to increase access to financing for business, especially for micro and small businesses, which typically find it difficult to obtain funding from formal financial institutions. However, P2P lending platforms include several concerns to lenders, as they can't always find the same guaranteed security in P2P lending as conventional banks provide. Thus, we predict that platform reputation is critical in this sector. Specifically, this study aims to determine what factors form investors' perceptions on P2P lending platform reputation, evaluate the relationship between platform reputation and lenders' willingness to provide loans, and evaluate whether trust will strengthen the relationship. Using 160 lenders as respondents, this study was conducted using the regression analysis method with the help of SPSS 23 software to test the proposed models. The results show that security and protection have the greatest influence on platform reputation. Reputation itself was found to have a positive impact on lenders' willingness to lend; however, trust is found to have no moderating effect and, instead, has a positive influence on the lenders' investment decisions as an independent variable. Considering that P2P lending is able to increase SME's access to finance, the collaboration of conventional financial institutions and technology will create a relationship that benefits both parties. With collaboration, P2P lending platforms can generate a good reputation quickly and economically, while conventional financial institutions are able to increase customer bases to a wider range of borrowers from the SME sector.

Keywords: Financial Technology, Peer-To-Peer Lending, Platform Reputation, Willingness to Lend, Indonesia

Introduction

Online peer-to-peer (P2P) lending allows users to directly borrow and lend funds through a platform without the help of a financial institution as an intermediary (Downes & Goodman, 2019). This method is popular among MSMEs due to its convenient process and requirements to obtain loans, considering that 51% of Indonesia's population remains classified as unbanked (World Bank, 2017). The unbanked population makes up the majority of MSMEs, of which only 18% are bankable. This financial access gap causes a lack of funding for MSMEs, totaling up to Rp1,000 trillion (OJK, 2017). Oliver Wyman and an Indonesian fintech company, *Modalku*, found that the lack of access to credit for MSMEs resulted in losses of 14% of the total national GDP in 2015. With the large contribution MSMEs offer the economy, their access to finance should be attended to. Since the rise of fintech in Indonesia, various companies have taken this financing gap as an opportunity to create access for those who are unbanked but credit-worthy through P2P lending. The main features of a P2P lending platform's role as a dis-intermediary is to reduce transaction costs and increase the flow of information through technology. With that, however, users cannot expect to find the security, guarantee, and high monitoring that a conventional bank typically provides. This situation raises the potential for asymmetric information received by lenders, since the borrower is determined by the platform, and the lender can only rely on the credit score given by the

platform to the borrower. Therefore, the reputation and credibility of the company can be a significant competitive advantage in attracting investments from lenders.

Regarding corporate reputation itself, previous literature has noted that there hasn't been a universal agreement regarding the dimensions of the construct (Fombrun & Shanley, 1990; Walsh & Beatty, 2007). Vasconcelos (2016) states that, especially for fintech, the long-term prospects for alternative finance companies will depend on the credibility of the platform as part of their reputation and will develop according to their proven success, including in terms of products, returns for lenders, and interaction with consumers. Jackal Mal, co-founder of Tongdun Technologies, added that fintech companies should strengthen their reputation in order to be accepted by the market, placing emphasis on technology-based transaction security and protection. Based on the above explanation, the author uses service quality, quality of information available on the platform, transaction security and protection, and social capital as a measure of the reputation of the P2P lending platform. Dowling (2006) found that a good corporate reputation would make it easier for consumers (lenders) to choose service providers. In addition, Johnson and Grayson (2005) found that trust has a positive relationship on reputation, where trust supports overall perceptions of service companies (Lin *et al*., 2007).

This paper is structured as follows. After the Introduction, we present a literature review regarding P2P lending, financial risks, and investor continuance intention to invest in Section 2. We describe data and methods in Section 3. Analysis and discussion are presented in Section 4, followed with a conclusion in Section 5.

Literature Review and Hypotheses Development

Peer-to-Peer Lending

Currently, there are a number of P2P lending platforms in Indonesia, e.g., Investree, Modalku, Koinworks. These platforms use a similar lending mechanism in which prospective users, both lenders and borrowers, must create an account by providing personal information, e.g., name, address, telephone number. When applying for a loan, the borrower will create a profile that includes the amount of funds needed, the purpose of funding needs, and information on financial conditions, including income and debt; then, the borrower will go through a credit analysis process and designated a risk category in the form of a credit score that determines the interest rate on loans (Ika & Gunadi, 2018). Lenders typically make investment decisions based on the credit score that suits their risk appetite. Some P2P lending sites also specialize in providing services to the needs and interests of certain types of borrowers and lenders (Wang, Greiner, & Aronson, 2009). For example, Amartha provides credit specialized for women in rural areas. The peer-to-peer lending platform then brings together the appropriate lenders and borrowers, distributes funds, and collects the loan principal and the interest the borrower must pay and transfers it to the lenders.

Although convenient, the lean nature of the electronic market can cause transaction risks due to lack of information about the quality of services and products or the identities of related parties that can often be anonymous (Ba & Pavlou, 2002). Consequently, P2P lending is faced by asymmetric information problems (Duarte *et al*., 2012; Dorfleitner *et al*., 2016). It is difficult for lenders to ensure the authenticity and integrity of the information (Klafft, 2008). Stiglitz and Weiss (1981) explain that asymmetric information exposes lenders to higher investment risks. Diamond (1989) shows that reputation plays a key role in controlling asymmetric information and moral hazard problems.

P2P Lending Platform Reputation

Crane and Clarke (1988) found that reputation is the most important top-of-mind evaluative criterion in service-based businesses. Numerous literature has also discussed corporate reputation; however, the many variations of this definition are caused by differing perspectives and discipline. However, most definitions refer to social cognitions such as trust, knowledge, and perception. The most frequently cited definition is from Fombrun (1996), which explains that a company's reputation is a perceptual representation of a company's past actions and future prospects that describe the company's overall attractiveness for all its constituents, compared with other leading competitors, whereas Walsh and Beatty (2007) defines it as a consumer's comprehensive evaluation of a company based on their reaction to their products, services, communication, interaction with the company (employees, board of directors, or other consumers), and the company's activities. To manage their reputation, companies using the P2P lending platform need to measure their users' perceptions, specifically the perceptions of lenders as providers of funds. Schwaiger (2004) states that the parameters forming a company's reputation include the quality of products and services, employee quality and management, financial performance, consumer orientation, social and

environmental responsibility, reliability, transparency, and credibility. Emotional closeness, communication, and interaction between the company and the public are also additional parameters (Walsh & Beatty, 2007). These series of parameters are then adapted for this research to adjust according to the relevant aspects of online lending companies and their relationship with lenders, namely, service quality, quality of information provided by the platform, security and protection of online transactions, and corporate social capital.

Service Quality

In the online lending perspective, service quality refers to the quality of functions and supporting activities provided by the platform to make the P2P lending experience run smooth and convenient (Chen, Lai, & Lin, 2014). Numerous literature finds that service quality is an important component in a company's reputation (Walsh & Beatty, 2007; van der Merwe, Puth, 2014; Han *et al*., 2015). One way the P2P lending platform can improve the quality of its services for lenders is to guarantee the quality of the products it offers, namely, the quality of borrowers provided on the platform's marketplace. With this, the platform can minimize the risk of default on lenders and increase the satisfaction of their transactions.

Crane and Clarke (1998) found that reputation is the most important top-of-mind evaluative criterion in assessing service-based business, and numerous literature has found that service quality provided by a company is important in creating added value and increasing customer satisfaction (Parasuraman, 1998; Wixom *et al*., 2005). In the context of P2P lending, the quality of services provided by a P2P lending platform depends on the guarantee regarding the quality of borrowers in the marketplaces through the selection and screening of prospective borrowers (Pavlou & Gefen, 2004). More importantly, high-quality services will lead to lender's confidence in platform reliability, capability, and integrity (Eisingerich & Bell, 2008). For this reason, lenders will expect a satisfying experience in the future, so that they are more likely to invest through P2P lending services. Thus, the researchers propose that intermediaries who consistently provide high-quality service have a positive influence on the reputation of the P2P lending platform.

H_1: *Service quality of P2P lending platforms positively affects platform reputation.*

Security & Protection

Security and protection in the context of P2P lending refer to the perception of lenders that security requirements will be met by the platform, including authentication, integrity, and encryption. Lender's perception of security protection in online transactions depends on how clearly individuals understand the level of security measures carried out by the platform (Gefen & Straub, 2003; Wixom & Todd, 2005). One of the safety and protection measures commonly understood by the public and applied by many companies is the privacy policy. Kim *et al*. (2008) explained that perceived privacy protection is a perception of the possibility that the platform will try to protect the user's confidential information collected during online transactions from misuse by unauthorized parties. Given that the protection of personal data is a relevant concern in this digital era, safety and protection become an important aspect of a company's reputation.

*D*ue to the high risks borne by lenders, the security and protection of lenders are among the main priorities of the P2P lending platform as an intermediary. A lot of sensitive information is collected in online transactions, i.e., information that is prone to abuse. The act of spreading illegal personal information can significantly harm the parties concerned (Ratnasingham, 1998). Notably, in the digital age, data protection has become a sensitive issue. Thus, when the platform has sufficient security features and protection mechanisms on its site, lenders can see the efforts made by the platform in fulfilling the security requirements of online transactions (Chellappa & Pavlou, 2002). This makes it easy for consumers to make investment decisions by looking at the efforts that platforms deploy to reduce the risks that lenders face.

H_2: *Security and protection provided by P2P lending platforms positively affects platform reputation.*

Social Capital

According to OECD (2007), social capital can be considered as links, values, and shared understanding in society, which fosters trust and cooperation between individuals and groups. In terms of the P2P lending platform, Kim *et al.* (2008) describe social capital as a resource that can be accessed through social networks. The platform as a member of a social network with a good reputation will be more respected and its online activities will be considered more trustworthy. Social capital can function as a signal that

can play an important role in the market, as it is difficult to develop but easily accessible to lenders (Collier & Hampshire, 2010).

Overall, the platform as a member of a social network with a good reputation will be more respected, and his or her online activities will be considered more reliable. Given the vast access to information and the strong influence of social networks, the platform should build its social network to increase its social capital. Platform actions that harm consumers will bring sanctions from members of their social networks, drain their social capital, and can even cause reputation damage.

H_3: *P2P lending platforms' social capital positively affects platform reputation.*

Information Quality

Information quality refers to consumers' perceptions of the accuracy and completeness of the information provided on websites related to products and transactions (Kim *et al*., 2008), including loan amounts, interest rates, loan duration, and credit rating. This information is all relevant in assessing credibility and trust in borrowers (Chen *et al*., 2014). Because loan transactions are the most prone to asymmetric information for lenders, high-quality information can significantly help lenders minimize the chance of experiencing bad credit. The authenticity and integrity of information in the P2P network platform affects the level of perceived information asymmetry and trust in the platform (Wang *et al*., 2015).
The quality of information available on the Internet varies, ranging from accurate and reliable to deliberately misleading. Pack (1999) suggests that it is often difficult to know how often website information is updated and whether or not the facts listed have been checked. Quality information can help to reduce the level of perceived uncertainty and perceived risk related to electronic transactions like P2P lending, because high-quality information can make transactions more controlled, thereby reducing uncertainties and risks contained therein (Kim *et al*., 2008). Thus, it is suspected that high-information quality is a factor that influences the reputation of the P2P lending platform.

H_4: *Information quality provided by P2P lending platforms positively affects platform reputation.*

Trust in P2P Lending Platform

Pavlou and Gefen (2004) describe a lender's trust on the P2P lending platform as a lender's belief that the platform will follow regulations, procedures, and yield fair results in the marketplace as a competent and reliable platform with integrity. A lender's trust in a platform consists of two aspects: (1) technical protection of the platform and (2) good reputation from the borrower and strict transaction rules. Zand (1972) states that trust in a business is an important factor in determining the effectiveness of various relationships and is one of the main motivators of behavior in general (Konovsky *et al*., 1994; Schurr *et al*., 1985). Lack of trust will reduce the effectiveness of communication and distort important information (Gibb, 1961), resulting in reduced risk-taking behavior. Chang (2013) states that trust, together with reputation, has an influence on consumer consumption behavior, in a relationship where trust creates positive expectations in the intentions or behaviors of related companies (Singh & Sirdeshmukh, 2000), thus increasing purchase intention.

Willingness to Lend

One important aspect of success in adopting new technologies is willingness to engage. Fukuyama (1995) describes willingness to engage as a willingness to be involved in an activity in which a person is exposed to risk without having the ability to control the behavior of other related parties. Regarding P2P lending, Wan *et al.* (2016) states that willingness to lend refers to lenders' intention of providing loans to borrowers. This statement is relevant in the context of P2P lending, considering that lenders have no control over borrowers, thus exposing lenders to financial risks, security risks, and operational risks. Hence, willingness to lend is a key variable in this study.

The reputation of the company acts as a form of information that is validated by the market (Hansen, Samuelsen, & Silseth, 2008) and which can signal the quality of products/services offered (Rose & Thomsen, 2004). Thang and Tan (2003) show that companies with a good reputation are preferred by consumers, so that, in the case of P2P lending, platforms will be easier to attract lenders to invest. This is because consumers will trust a company with a good reputation for the guarantee of quality services. For this reason, it is suspected that the reputation of a good P2P lending platform will increase the lenders' willingness to lend.

***H5**: Platform reputation positively affects willingness to lend.*

Numerous literature has also shown that a company's good reputation is associated with consumer satisfaction, loyalty (Fombrun & van Riel 1997; Hall, 1992), and trust (Doney & Cannon, 1997). Johnson and Grayson (2005) found that the trust consumers have toward a company has a positive relationship with a company's reputation as a service provider.

***H6**: The effects of platform reputation toward willingness to lend is stronger in lenders who trust the P2P lending platform.*

Method

Research Data and Sample

This study uses a nonprobability sampling method, specifically judgment sampling, where the respondent must meet criteria set by the researcher (Malhotra, 2010). Respondents of this study must be above the age of 17 years and have invested at least once in a P2P lending platform in Indonesia. The samples collected were 160 respondents who used nine different P2P lending platforms (Investree, Koinworks, Akseleran, Amartha, Uang Teman, Modalku, Danamas, Modal Rakyat, and Crowde).

In order to guarantee validity, this study adapted variable indicators from several previous studies and tested them first using a pre-test. Finalized instruments consist of two core parts: the first is the main construct that includes service quality, security and protection, information quality, social capital, platform reputation, trust, and willingness to lend. Each item uses a Likert scale from 1 (strongly disagree) to 6 (strongly agree). The second section covers respondents' profiles, including the P2P lending platform used, frequency of investment on platforms, time of platform usage, gender, age, last education, employment, income, and sources of information about P2P lending.

Research Model

We develop two models for this research. The first model aims to determine the dimension of the platform's reputation variable itself, considering the previous literature suggests the nature of dimensions that are specific to each industry. We evaluate how service quality, security, and protection, social capital, and information quality variables affect platform reputation variables. The second model aims to analyze the effect of the reputation on lender investment decisions, which is measured using the willingness-to-lend variable and also whether trust can strengthen or weaken the relationship.

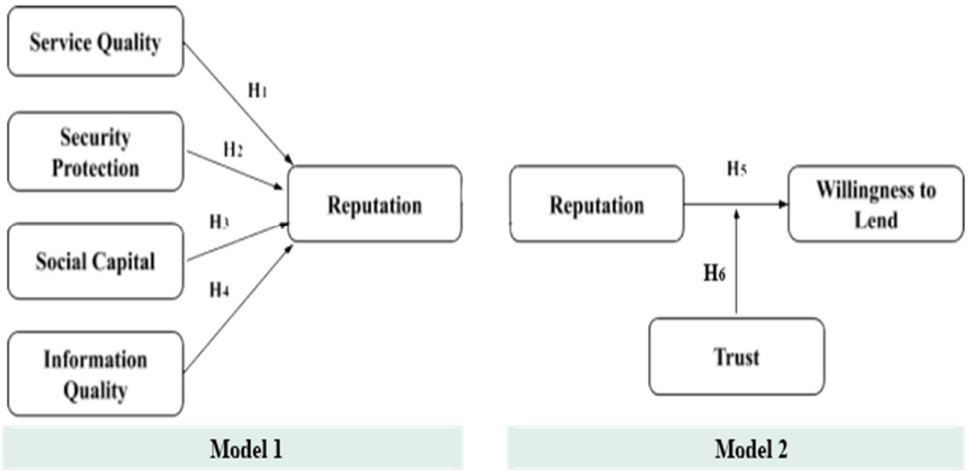

Figure 1: Research Model

Data Analysis

Data were analyzed using multiple linear regression to see the relationship of service quality, security and protection, social capital, and information quality variables with reputation platform, and moderation regression to see the influence of trust on the relationship between platform reputation and willingness to lend with the help of SPSS 23. Before being processed, the pretest results showed all variables and indicators used reliably with Cronbach's alpha > 0.6, and valid with KMO > 0.5 and Bartlett's test < 0.05. The classic assumption test also shows all multicollinearity free variables with VIF < 10 and tolerance > 0.1. In addition, the data proved to be homoscedastic with a significance Gjerser test > 0.05.

Result and Discussion

The first regression analysis was performed using four reputation factors as independent variables (Service Quality, SQ; Security Protection, SP; Social Capital, SC; and Information Quality, IQ). The effect of each variable on platform reputation as the dependent variable (Platform Reputation, PR) can be viewed via the figures below.

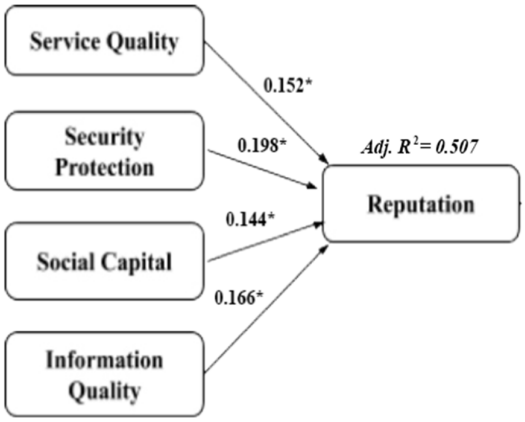

Figure 2: Determinant of Platform Reputation (Model 1)

The model can explain as much as 50.7% of the reputation platform variance. Of the four reputation predecessors, service quality (b = 0.152), security and protection (b = 0.198), social capital (b = 0.144), and information quality (b = 0.166) have a positive and significant influence on the reputation platform, supporting four hypothesis H1, H2, H3, and H4. Then, the result of 2nd model presented as follows.

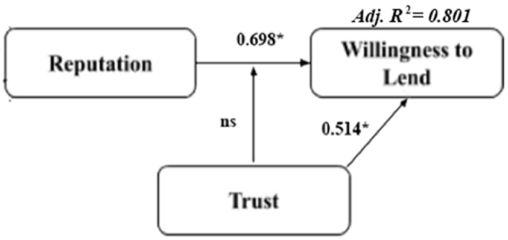

Figure 3: Willingness to Lend (Model 2)

The second model shows regression result about how platform's reputation influence on investor willingness to lend. The regression is carried out by adding interaction variables to see if trust variable is moderate the relationship or whether trust variable can strengthen the relationship between the platform reputation on willingness to lend. Figure 3 shows that the model can explain as much as 80.1% of the

willingness-to-lend variance. The reputation of the platform (b = 0.698) has a positive and significant influence on willingness to lend, so H5 is acceptable, whereas trust as a moderating variable is found to be insignificant, so that the hypothesis H6 rejected. However, we found that trust has a positive and significant relationship as an independent variable on willingness to lend.

Platform Reputation

Platform reputation is significantly affected by service quality, which is consistent with several previous studies (Crane & Clarke, 1998; Walsh & Beatty, 2007; van der Merwe & Puth, 2014). Parasuraman (1998) and Wixom *et al*. (2005) suggested the importance of the quality of services provided by a company in creating added value for its consumers. The screening and selection of borrowers registered in the marketplace platform is a guarantee of the quality of borrowers in accordance with the risk appetite of lenders, resulting in satisfying transactions and adding to a company's good reputation. Security and protection of transactions that take place through the platform also have a positive influence on the reputation of the P2P lending platform. With consumer concerns increasing regarding abuse of personal data, companies are increasingly pressured to adopt privacy protection practices to encourage online transactions. The efforts that are deployed by the platform to minimize risk will certainly be an input to the views and ends of lenders' investment decisions. A company's reputation has a positive relationship with its social capital. Social media as one of the most popular social network instruments also plays an important role in this regard, namely, as a window through which users can access social capital information. In these containers, lenders and borrowers can interact with each other, and both can interact with the platform. Platform actions that harm consumers will bring sanctions from members of their social networks and drain their social capital, where one result can cause damage to reputation, so that, indirectly, social capital acts as an important signal in the market (Lin *et al*., 2009). Finally, there is a positive relationship between the quality of information from the P2P lending platform to the reputation of the platform. With the amount of information circulating on the Internet, it is difficult for lenders to determine the integrity of the information found on the platform, especially when the information will be used as a relevant basis in assessing lenders' credibility and trust in borrowers (Chen *et al*., 2014). Inaccurate or unclear information can lead to misconceptions and adverse selection that will generate the potential for default transactions. Lenders will certainly not be satisfied with these results, and the company's image can be tarnished.

Willingness to Lend

The reputation of the P2P lending platform (platform reputation) has a positive influence on willingness to lend. This is due to the fact that reputation is a form of information that is validated by the market (Hansen *et al*., 2008), which functions as a signal for consumers (Rose & Thomsen, 2004); hence, it will certainly influence willingness to lend. Especially in the context of P2P lending, given that lenders have no control over the borrower, this reputation signal will be a major factor in lender investment decisions in the platform. This finding is consistent with that of previous literature, including Thang and Tan (2003) and Chang (2012), who conducted similar research in the retail context. The authors found that a good corporate reputation would be preferred and lead to willingness, even loyalty to consumers. One of them is influenced by word-of-mouth recommendations from friends and relatives, which is an indicator of reputation measurement in this study; thus, in the case of P2P lending, platforms will be easier to attract lenders to invest.

Related to trust in a business, this factor is important in determining the effectiveness of various relationships and is one of the main motivators of behavior in general (Konovsky *et al*., 1994; Schurr *et al*., 1985); further, lack of trust will reduce risk-taking behavior. Fombrun (1998) found that consumer trust in a company was facilitated by the company's reputation drawn from service quality and market performance or media reports. Then, that trust creates positive expectations of the intention or behavior of the related company (Singh & Sirdeshmukh, 2000), so that it increases purchase intention. In other words, trust acts as a mediating variable. Supporting this theory, the findings of Mui *et al*. (2002) and Chang (2013) also revealed the mediating effect between reputation and willingness to pay in the retail context. This could be the reason why the moderating influence of the trust variable is not significant. However, although the moderation effect is not significant, trust has a direct and positive influence on willingness to lend as an independent variable. This finding is consistent with the findings of Chen *et al*. (2013), which shows a significant relationship between trust in platform and willingness to lend on P2P lending platforms in China. On the other hand, there may be limitations to the model, approach, or sample characteristics

used in this study, so that the moderating influence of trust variables is not caught in the relationship between platform reputation and willingness to lend as expected at the outset.

Managerial Implications

In order to carry out its functions, the P2P lending platform, as an intermediary, needs to attract active lenders who are willing to lend to borrowers in the marketplace platform. In accordance with the results of this study, it is important for the platform to improve quality and ensure the security and protection of transactions that significantly affect the reputation and availability of lenders to lend. In addition, the completeness and clarity of the information contained in relation to borrowers and transactions are also important factors in reducing asymmetric information from the lender side. Finally, the company's social capital must also be considered, especially in terms of social networking. Given the strong influence of social media today, the platform must reflect good relations with relevant parties. Because P2P lending services in Indonesia are still at an early stage, the reputation of the platform can build a foundation for reflecting the benefits of investing using this instrument and building lender confidence and prospective lenders who are interested in trying.

Furthermore, considering that one of the objectives of P2P lending as an opening access to finance for MSME players and financial inclusion instruments, the collaboration of conventional financial institutions and technology will create a relationship that benefits both parties. Banking institutions can join hands with fintech companies such as peer-to-peer lending to expand the scope of their customers. Supporting this idea, the OJK Financial Market Sector Development Team has also encouraged the distribution of a micro credit program (KUR) by the government through fintech peer-to-peer lending.

Conclusion

The four company's reputation variables used here (i.e., service quality, security and protection, social capital, and the quality of information) show a positive and significant relationship in the platform reputation. The influential strength of these four factors is quite similar, with security and protection showing a slightly stronger influence. In the context of P2P lending in Indonesia, a lender's willingness to lend is positively influenced by the reputation of the platform as an intermediary. The implication is that a lender's positive perception of a platform plays an important role in the decision to lend through P2P lending. Given lenders' limited control over borrowers, reputation plays a role as a signal, which will be a major factor in lender investment decisions in the platform. Regarding trust, this study did not find enough evidence to show a moderating influence on the relationship between platform reputation and willingness to lend of a lender. Instead, trust in a platform variable shows a direct positive effect on willingness to lend. This finding implies that lender trust in the platform does not affect the strength of the relationship between reputation and willingness to lend but, rather, has an independent influence on lender investment decisions through P2P lending. Considering the conclusions and limitations of this study, it is expected that, in the future, there will be further research related to P2P lending in Indonesia. Future research can include lender experience as an additional variable, considering that P2P lending is still uncommon in the community. Besides, because willingness to lend is a dynamic behavior, respondents' responses can vary according to the duration and frequency of use of P2P lending services.

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Evaluation Criteria of High-Flyer Tech Startup Investments by Venture Capital Firms in Indonesia

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Abstract

This study aims to analyze what criteria are used by Venture Capital (VC) firms to value Indonesian tech startups as high-flyer investments. We define high-flyer investment here as start-ups projected to generate return five times or more than its initial investment. We evaluated what criteria are considered more important than the others by VC's. Research carried out on variables that considered as main aspects evaluated by VC firms are: company, product, and market factors. We used mixed qualitative and quantitative primary data collected through questionnaires for quantitative data and interviews for qualitative data. Logistic regression results revealed that companies with product performance passed the minimum viable product (MVP) phase have a significant chance to value as high-flyer investment compared to those who offer products or services that are not market-proven yet. Sequential qualitative interview findings indicate VC preferences for companies that are fast followers over the pioneers and also suggest that the founder, or human-related aspect, is a critical factor in investment decisions made by VCs.

Keywords: venture capital firms; tech start-ups; investment criteria; high-flyer investment; Indonesia.

Introduction

The global startup economy continues to grow, valuing US $ 2.8 trillion between 2016 and 2018, indicating a 20.6% increase over the previous period and more than double the growth five years ago. The creation of this value is equivalent to G7 and higher than the annual GDP of the UK. Until 2018, VCs worldwide have invested a total of US $ 220 billion on one occasion. (StartupGenome, 2019). In mid-2018, Southeast Asia was home to eight unicorns. Compared to other Asian regions, Southeast Asia has had a thriving success. China dominates this list with 90 companies, India has ten, and only three unicorns in South Korea. Japan, Australia, and Hong Kong each have only one. Jakarta is the base of operations of four Indonesian unicorns: Tokopedia, Go-Jek, Traveloka, and Bukalapak. With a population of 260 million and smartphones reaching Indonesia having reliable internet and cellular adoption, with around 75 percent of online purchases made via mobile phones. With this, Indonesia becomes a promising business landscape compared to other ASEAN ecosystems (Nordin, 2019).

The presence of four unicorns in Indonesia is also the growing trend of the company, which continues to grow until now has helped increase economic growth for the community. Besides employment and broader business opportunities for conventional MSMEs, the role of startups is also crucial to the process of developing competent human resources to encourage advanced transfer technology (Ministry of Industry, 2018). In the long term, companies break down based on potential utilization and represent the core of a healthy national economy. With the support of becoming "Digital Energy of Asia," the Indonesian government is trying to support e-commerce and digital services. As quoted from the Ministry of Industry's report on the Industrial Revolution 4.0 roadmap, what was included in the national priority for developing the digital economy was the development of ecosystems and incentives for technological investment, where the role of VC becomes essential in fostering the event of a new invention or business model.

Well-developed venture capital networks provide tremendous incentives for entrepreneurship by reducing the difficulty of entering the industry (Winton & Yerramilli, 2008). VC can also use their experience and contacts to reduce the amount of information costs and the opportunity costs associated with forming new businesses. Availability of venture capital also attracts high-quality entrepreneurs and personnel to an area that then accelerates the emergence of new companies, innovation, and economic development. Both the private sector and the state through state-owned enterprises are increasingly increasing their role in providing venture capital and stimulating the establishment of startups.

However, until now, the level of risk faced by venture capitalists was still quite high, with 70% of technology-based startups failing within 20 months of their first funding (Bhardwaj, 2018). This reduces the incentives of venture capitalists to invest in Indonesian startups due to the enormous risk. Thus, understanding of the way VC evaluates pilot companies is essential so that startups can find out what criteria considered crucial so they can make them a priority. Information about the VC decision-making process can be useful to increasing the potential of startups to be funded so that the digital economy can continue to grow exponentially. This research will also attempt to find out how VCs build a system that can help them in deciding that a startup is feasible to invest. This belief system also influences the way they value the leverage of one startup company compared to another, which is a 'premium' factor in a company.

This paper is structured as follows. After the introduction, we present a literature review regarding P2P lending, financial risks, and investor continuance intention to invest in Section 2. We describe data and methods in Section 3. Analysis and discussion are presented in Section 4, followed with a conclusion in Section 5.

Literature Review and Hypotheses Development

Characteristics of VC Financing

Financing in Several Stages

Venture Capital companies do not provide on time financing for start-ups, preferably multi funding in several stages. In every stage, venture capital firms evaluate the start-ups and then decide whether to provide additional investment or liquidate their interest in the start-ups. Generally, financing amount in the next step is more significant than before, and the amount of funding in investment stages may be dozens of hundred times compared to early stages. Venture capital firms provide financing in several stages to minimize adverse selection problem typically inherent in a start-up. (see Senalasari et al., 2019).

However, in very early stages, only limited number venture capitals may be willing to provide financing due to high uncertainty regarding survival and potential growth of a business. In this stage, a start-up sometimes generate fund from angel investors. In this stage, stocks are usually cheaper to obtain, but the risk is very high. Angel investors are better known as altruistic investors compared to venture capital

and tend to pursue goals such as personal satisfaction, opportunities to influence new business development, and job creation in addition to maximizing economic value (Harrison & Mason, 1992; Landström, 1993)

Support from Incubators and Accelerator

Along with funding, VC companies provide managerial support and network for a start-up to incubate or accelerate business for success. The managerial and network support usually through cooperation with the incubator and accelerator institution developed by a university or corporation. But recently, incubators and accelerator developed program (SAO program) to 'create' start-ups products and founders, not necessarily as part of the cooperation with a venture capital firm, but from the venture capital firm perspective, the existence of incubator and accelerator institutions benefits the focus of their investments to pilot companies that have emerged as some of the 'graduates' from SAO programs, especially in the biotechnology industry, since the pilot companies, incubator, and accelerator have the potential to have valuable intellectual property (Baum & Silverman, 2004). But on the other hand, SAO usually gets a return on the amount of an ownership for the services to help pioneer a company (Munari, Odasso, & Toschi, 2011; Wright et al., 2006).

Seek for Strategic Partners

Another characteristic in VC financing is a need to find strategic partners. VC firms are financing company by nature, but they are highly involved in a managerial aspect of the business. Strategic partners refer to companies operating in relevant sectors, usually a significant or leading player in it. Previous literature concluded that partnerships created benefits, especially in technology-based startups, because reduced uncertainty, while managing dependence on external institutions, obtaining access to partner-owned resources, and obtaining the benefits of learning from experience from partner's expertise (Pangarkar & Wu, 2013). Besides, establishing strategic partnerships with the right parties is an important for company's positive reputation, indicate that startups received positive evaluations from industry players with more knowledge (Baum & Silverman, 2004).

Venture Capital Investment Selection Criteria

Bank financing is known to be evaluated based on 5C criteria (character, capacity, capital, collateral, and condition). However, 5C criteria are not applicable in VC financing for start-ups. Start-ups founders usually has nothing credit record to assess character and start-ups business lack fixed assets to use as collateral. Thus, VC firms evaluate start-ups based on different criteria consisting of human or founder related, product related, market-related, or potential cash-out (Tyebjee & Bruno, 1981; MacMillan, Siegel, & Narasimha, 1985). In Indonesian context, Widyanto et al. (2019) found six criteria considered necessary by VC firms to evaluate their investment, consisting of five human or founder-related criteria (capable of sustained intense efforts, able to assess and react to risk well, thoroughly familiar with the market the VCF targets, demonstrated leadership ability in the past and have a track record relevant to venture capital investment) and one product-related criteria; target market has enjoyed a significant growth rate.

However, human or founder related is one of the most essential fields but also most difficult to quantify when evaluating startups (Kozmetsky, Gill, & Smilor, 1985). Thus, the investment criteria analyzed in this study is related to the aspect of the company, product, and market of the pilot company. These criteria assumed to represent the trade-off between risks and opportunities for success of start-ups and is analyzed by paying particular attention to exits with high valuations.

High-flyer Investments

High-flyer investment is defined as high-quality investment, a type of stake in a startup company expected to provide return five times or above of the amount invested in the beginning (Streletzki & Schulte, 2013). As can be indicated from its name, investment with a return of more than five times is an excellent value investment and not all startup companies can achieve similar valuations. Regarding the age of investment companies in Indonesia, which are quite young and no startup companies are entering the IPO stage or can realize an exit with high returns for any VC (Alessandro Gazzini, 2017), then analysis on VC funding that invests in the Indonesian startups is done by looking at the valuations

of each VC in the startup company in its portfolio, using multiple valuation methods (numerous estimates) used by VC operating in Indonesia.

Method

This research is conducted using mixed between quantitative and qualitative data generation method. At the first stage, we performed quantitative analysis and developed hypotheses to test the data collected. Then, in the second stage, we interviewed a significant person to confirm findings in the first stage. The overall conclusion provided is based on both types of data collected. This purpose to employ this method is to carry out qualitative interviews to explore and discover the intent of quantitative findings (Banyard, Williams, & Siegel, 2001).

Research Design

We evaluate three aspects of investment criteria for VC firms financing; company-related aspect, product-related aspect, and market-related aspect. Previously, Streletzki and Schulte (2013) evaluated three points also, but variables used is quite different due to different investment environment. For example, Streletzki and Schulte (2013) assess patent and prototype as relevant product-related variables, which are considered not crucial for Indonesia case (see Widyanto et al., 2019). Instead, we use product performance variable for this study. Table 1 present differences in variables used in Streletzki and Schulte (2013) and this study for each aspect of evaluation criteria.

Table 1: Comparison Variables Used

Aspects	Streletzki dan Schulte (2013)	This study
Company	Stage Cluster Distance Academic Spin-off Corporate Spin-off Strategic partners	Stage/*Pre-funding* SAO Spin-off Strategic partners
Product	Patent Prototype Product diversity (*single*) Product diversity (*multiple)*	Product performance Product diversity
Market	Market segment Pioneer strategy	Market fragmentation Market segment Pioneer strategy

We define variables used in this study as follows:

Product Performance

In previous research, significant differences have found between businesses that have developed their products into prototypes that function with companies that have not arrived at that stage (Kakati). At the initial stage, the focus will be on Minimum Viable Products that can be created by the company. MVP is a useful tool to solve all these gaps, both within the pilot company team and also between the group and external stakeholders (Duc & Abrahamsson, 2016). At a further stage, namely in the Series, A series, and so on, Product-Market Fit (PMF) becomes very important. It is defined as a condition where the company plays in a good market with products that can satisfy the market (Andreessen, 2007).

Product Diversity

In the context of pioneering corporate funding carried out by VC, it found a tendency for some VCs to choose their portfolio companies based on the diversity of products or services they offer (Hall & Hofer, 1993). It also found that portfolio company strategies that target a broad market scope are significantly superior to those that target the Sandberg and Hofer focused markets (Sandberg & Hofer, 1987). Also, product diversity leads to relatively more significant sales because the broad market that can be captured increases business competitiveness by creating customer value and meeting different customer needs

(Wally & Baum, 1994). Previous research also proved the existence of a positive relationship between the diversity of products or services with the performance of technology-based companies. (Zahra, Sapienza, & Davidsson, 2006)

Market Fragmentation

A fragmented industry is defined as a business environment with the majority of small companies spread geographically. There is no market leader, nor is there a company that has the power to shape industrial events (Porter, 2008). So, Porter stated that overcoming fragmentation could be a very significant strategic opportunity. Rewards for consolidating fragmented industries have the potential to be very high because the costs of entering the sector tend to be low, and there are no specific arrangements because there is no market leader to shape working conditions in a trade, so the situation becomes very competitive (Carpano, Chrisman, & Roth, 1994; Porter, 2008).

Market Segment

This difference between the two types of buyers, namely B2B and B2C customers, will require a different response. From the perspective of VC, Muzyka, Birley, and Leleux (1996) show that the preferences of European VC companies for B2B or B2C portfolio companies based on their own experiences. In other words, they prefer market segments that they already know well (Brettel, 2002).

Pioneer Strategy

Although synonymous with high risk-taking and preference for industrial disruption, most research on VC investment selection criteria found that startups targeting mature markets were more attractive to VC than startups that had new target markets (Brettel, 2002). The risk of failure with the first movers strategy is high because new markets are full of uncertainty, and VC tends to want to avoid the risk of failure of portfolio companies that target uncertain new markets. But in terms of performance, pioneer companies were found to outperform competitors who imitated them, with the finding of a positive correlation between pioneering strategies and business success (Sandberg & Hofer, 1987).

Data and Participants

Data for quantitative analysis are management of venture capital firms who provide financing for start-ups in Indonesia. We evaluate quantitative data using logistic regression to find out whether there is significant valuation based on each independent variable analyzed. Valuation here is defined as whether a start-up is categorized as high-flyer investment or not or whether it is assessed as a start-up expected to generate at least five times return or not.

Meanwhile, data for qualitative analysis are management of venture capital firms who are willing to participate in interviews. In-depth interviews are designed based on two main objectives, namely to confirm the results of quantitative data processing, and the second is to answer research questions that are created from the beginning as part of qualitative analysis so that researchers can have an in-depth understanding of the topic of funding by the VC. To form these questions, the researcher also made a comparison between the findings obtained with the previous literature and the situation of the Venture Capital investment industry. The participants were picked using the *snowballing* sampling technique by leveraging the researcher's network. Of the six participants in the questionnaire contacted by researchers, all of them stated that they were willing to be resource persons in further qualitative research with interview methods. However, considering that the majority of interviewees in this interview were bound by non-disclosure agreements (Carpano, Chrisman, & Roth, 1994) with their respective companies, the results of interviews were presented by disguising both the names of individuals who were the speakers and the VC they represented.

Result and Discussion

Table 2 presents logistic regression results.

Table 2: Wald Test Results

	B	S.E.	Wald	df	Sig.	Exp(B)	Conclusion
Pre-funding	-0.483	1.789	0.073	1	0.787	0.617	Not significant
Incubator/accelerator program participant	-0.806	1.802	0.2	1	0.655	0.446	Not significant
Strategic partners	-1.329	1.189	1.248	1	0.264	0.265	Not significant
Product performance	3.61	2.147	2.828	1	0.093	36.961	Significant
Product diversity	1.241	1.545	0.646	1	0.422	3.461	Not significant
Market fragmentation	2.114	1.881	1.264	1	0.261	8.282	Not significant
Market segment	-1.766	1.582	1.246	1	0.264	0.171	Not significant
Pioneer strategy	-1.079	1.932	0.312	1	0.577	0.34	Not significant
Constant	-0.216	1.714	0.016	1	0.9	0.806	Not significant

We generate 22 responses from VC firms who were answer questionnaire we sent, and each response represented one venture capital firms. These firms focus on different investment stages, with the prevalence of being multi-stages focused from Seed to Series B stage and with the geographical focus of mainly ASEAN and around a quarter of them specifically only investing in Indonesia.

Company's Aspect

Company's aspects consisted of stage/pre-funding variables, incubator/accelerator participant variable, and the presence of strategic partners variable. Logistic regression for stage/pre-funding variables shows that odd ratio or Exp(B) is 0.617, indicate that if a company gets pre-funding, it's opportunity to value as high-flyer investment is 0.617 times compared to a start-up who does not get pre-funding, while logistic regression for incubator/accelerator participant variable shows that the odd ratio or Exp(B) is 0.446, indicating that if a start-up was an incubator/accelerator program participant, it's opportunity to value as high-flyer investment is 0.4446 times compared to a start-up who ddi not participate, and logistic regression for the presence of strategic partner variables shows that odd ratio or Exp(B) is 0.265, indicating that if a start-up was an incubator/accelerator program participant, it's opportunity to value as high-flyer investment is 0.265 times compared to start-ups who do not have a strategic partner. However, p-value for all variables higher than 0.1 indicates that those findings are not statistically significant.

From an in-depth interview, we found that the pre-funding status of a startup company do not determine whether VC will invest or not, let alone give a high valuation. One of the informants explained that the company did not make the startup company's pre-funding status a benchmark because it could cause them to conduct FOMO "Fear of Missing Out" "Fear of Missing Out" Investment as described in (Collewaert & Manigart, 2016). Meanwhile, even though it has proven before that in a more niche industry such as biotechnology associations with the program was considered as proof of the legitimacy of the company (Baum & Silverman, 2004), in Indonesia the existence of a program was not considered a significant value enhancer. Most informants acknowledge that accelerators that have been established for a long time will have advantages — the only program mentioned in the US accelerator, Y Combinator. Y Combinator is the most prestigious accelerator in the United States (Stross, 2013). However, this finding might indicate that absence of the SAO program in Indonesia associated with the ranks of graduates who are ready to capitalize. However, regarding the presence of a strategic partner is contrary to previous studies (Malecki & Tootle, 1996; Easingwood et al., 2006) who stated that the presence of strategic partners so becomes a point that needs to be re-confirmed in the venture capital industry in Indonesia because for startups at a very early stage, the nature of strategic partners is essential. From in-depth interviews, we found that participants are very concerned about the influence that can be quantified from the existence of strategic partners, as seen in (Faems et al., 2010) and Pangarkar & Wu (2013).

Product-Related Aspect

Logistic regression for product performance variable shows that odd ratio or Exp(B) is 36.961, indicating that if start-ups with proven product performance, it's opportunity to value as a high-flyer investment is 36,961 times higher compared to a start-up who does not have a strategic partner. And the p-value indicates that this finding is statistically significant. This finding confirms Streletzki and Schulte (2013) and Widyanto et al. (2019) results and proves its role as the primary indicator used in the venture capital industry. However, the results related to product diversity is not statistically significant. The latter consequence confirmed in interview processes in which participants did not think that product diversity was a substantial factor in evaluating startups and confirm to Sandberg & Hofer, 1987; Wally & Baum, 1994) who stated that investors prefer a product-focus start-up.

Market-Related Aspect

Logistic ratio for three market-related aspects – market fragmentation, market segment, and pioneer strategy – indicate that the finding was not a statistically significant factor to assess a start-up as high-flyer investment. Regarding pioneer strategy, this finding suggests that venture capital firms are not excited with first-mover start-ups rather than market leaders. This finding supports Brettel's (2002), who stated that startups competing in mature markets are more attractive to VC than companies that operate as first-mover.

Premium Factor

In summary, all participants have the same view that the founder is a crucial factor in determining investment. It is believed that a capable founder is able to gain investor's confidence. In assessing the initial stage of the company, the due diligence that can be done by VC is limited to the validation of the founder's competency and integrity. Therefore, at this stage, the focus is to bridge the 'perception asymmetry' (Wirtz, 2011) rather than 'information asymmetry.' Interviews found that VC helped startup companies in different capacities and intensities. There are incentives that VC can get by helping to accelerate the growth of the company, but the significance of share ownership and understanding of the VC team regarding the pilot industry is a significant consideration. Both will shape the VC's confidence. Fiet (1995) found that there are two forms of beliefs from the VC point of view, namely (1) the trust given to the founding team, and (2) the confidence that the VC has in the possibility of business success based on factors not related to human resources such as product attributes (Jones & George, 1998). So the discussion from the results of the above research indicates that the premium factor that will make one startup company superior to any other is the founding factor, so VC then tries to shape the perception of the startup founder's ability to execute the business plan, either by directly participating in minimizing asymmetry information regarding the performance of startup companies and depends on their high level of confidence in startups.

Conclusion

This research found that market performance is the most crucial factor used to evaluate a start-up as high-flyer investment or not. We do not see other factors, such as having pre-funding, participating in incubator or accelerator program, the existence of strategic partners, product diversity, market fragmentation and segmentation as well as pioneer strategy, as factors crucial to categorize as high-flyer investment for Indonesia context. However, we recognize that this study only covered limited number of venture capital firms as respondent due to limited number venture capital firms provided financing for Indonesian startups. Moreover, this study does not highlight the importance of human-related factors, which were found as an essential aspect for VC financing.

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Does Organization-Based Self-Esteem Mediate the Relationship Between Servant Leadership and Job Social Support to Family Life: Indonesian Civil Servant Case

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Abstract

Conditions in an employee's family life affect his or her work performance. Conversely, conditions in workplace also effect on one's family life. This study aims to determine the level of servant leadership and social support at work from the family environment and whether organization-based self-esteem mediated those relationships. We defined family environment here as family satisfaction and quality of life. Most of the existing research discusses how the working environment affects employee performance, but this study discusses how working conditions affect employees' family lives. This research covers Indonesian civil servants explicitly at the headquarters of the national civil servant personal agency (Badan Kepegawaian Negara, BKN). We collected data from 100 respondents who are married and who worked for more than one year. Data was processed using the regression method with help of SPSS software. The results indicated that organization-based self-esteem fully mediates the relationship between job support on both family satisfaction and family quality of life but only partially mediates the relationship between the serving leadership on family satisfaction and family quality of life.

Keywords: Servant leadership, job social support, organization-based self-esteem, family satisfaction, family quality of life

Introduction

Work and family have emerged as two essential domains that exist in one's life. They evolved into different and inseparable fields (Beach, 1989). In the past, a person's role in work and family expected to be separated and carried out by different individuals, but now it is important to note that both parts are interdependent with one another. If an employee holds a double role but has difficulty achieving a balance between the two roles, it could potentially affect both sides of life negatively. Conversely, if a person can manage various roles well, this can add to the satisfaction and quality of family life.

An organization can help improve the satisfaction and quality of one's family life. A pleasant working environment can affect the favorable conditions of the employees (Pierce, 2004). The presence of proper environmental conditions can provide an implicit signal to employees that they are respected, valued, and trusted by the organization and that the organization sees them as capable and competent members of the organization. Positive working environment factors can come from colleagues and employers.

Employment as a civil servant (Aparatur Sipil Negara, abbreviated ASN) is still the dream of most of the workforce in Indonesia. However, the thought of being a civil servant is sometimes not accompanied by the moral awareness that, when a person passes through selection and is appointed as a civil servant, he or she is a servant. One might even assume that he or she is the one who rules over their subordinates, and sometimes ASNs forget the functions and duties of serving the people. The Indonesian civil servant personnel agency (Badan Kepegawaian Negara, abbreviated as BKN) is a non-ministerial government institution in charge of implementing government duties in the field of personnel management of civil servants. BKNs tend to have the notion of serving employees implanted in their minds from an earlier age. Then, later, when the young officer becomes a leader, the officers can demonstrate leadership to help subordinates and other officers.

The leadership model strongly affects the environmental conditions of the organization. Walumba (2010) raised a new perspective on traditional leadership theory on organizational behavior, referred to as servant leadership. Implementing a servant leadership is expected in order to create a positive working environment, as stated by Pierce (2004), who noted that an excellent environment communicates to employees that they are respected, valued, and trusted by the organization and that they are capable and competent members of the organization.

In addition to leadership style, several studies reveal that social support in the workplace also brings a positive working environment (Carlson and Perrewe, 1999). Social support at work can also create a more positive work environment in which employees are more likely to feel valued and beneficial. Wiesenfeld (2001) found that, when individuals perceive themselves as supported in the workplace, they are more likely to think "central, in it, valued, and respected" within their organizations and experience higher organization-based self-esteem (OBSE).

In this study, we analyze how servant leadership and social support on the job affect employees' family satisfaction and quality of life. This study is critical because, as we stated previously, family life and work life strongly influence each other. Many studies have revealed how family life affects employees' work performance, but the research on how working conditions affect family life is limited, despite the fact that family file is still a significant concern for Indonesians. Specifically, in this research, we analyze how organization-based self-esteem (OBSE) mediates the relationship between servant leadership and job social support on the family environment. We evaluate two aspects of the family environment: family satisfaction and family quality of life. In this study, we analyze employees from the head office of the national civil servant personnel agency of Indonesia (BKN) as the case for this study, because typically civil servants are required to implement service leadership.

This paper is structured as follows. After the introduction, we present a literature review in Section 2. We describe data and methods in Section 3. Analysis and discussion are presented in Section 4, followed by a conclusion in Section 5.

Literature Review and Hypotheses Development

Organization-Based Self Esteem

Organization-based self-esteem (OBSE) is reflected as a value perceived by a person belonging to an individual as a member of the organization acting in the organizational context (Pierce et al., 1989). Pierce and Gardner (2004) conducted a literature review in this concept and stated that, in reference to Pierce et al. (1989), OBSE is defined as the degree to which an individual believes him/herself to be capable, significant, and worthy as an organizational member. OBSE is a self-evaluation concept regarding one's adequacy in the organization. Employees with high organization-based self-esteem believe that "I matter around here." Pierce and Gardner (2004) also stated that self-esteem is affected by several forces based on one's work and organizational experience regarding (1) the implicit signals sent by the environmental structures to which one is exposed, (2) messages sent from significant others in one's social environment, and (3) the individual's feelings of efficacy and competence derived from his/her direct and personal experiences.

Servant Leadership

Greenleaf (1970) states that serving leadership begins with the natural feeling that a person wants to help. Serving leadership is characterized as "beyond self-desire" (Greenleaf, 1977). It confirms the moral behavior of taking responsibility for the success of the employee development (Enhart, 2004). Rather than prioritizing the organization, such as motivating **employees** to achieve performance that exceeds expectations, servant leadership focuses more on the holistic needs of subordinates (Graham, 1991; Sendjaya and Ethics, 2010). The servant leadership is also associated with ethics, virtue, and morality (Parris and Peachey, 2013). One of the themes for ministering leadership is ethicality, which concludes that the ministering leader must interact with his subordinated fairly and honestly (Liden, 2008).

Serving leaders are welcomed in the organization, because they focus on the interests of others rather than self-interests (Hale and Fields, 2007). The servant leadership creates a prominent context for learning and development for employees (Luthans and Avolio, 2003). Employee skills and competencies are enhanced by observing leaders as showing and spreading knowledge at work. Furthermore, serving leadership encourages employees to learn by providing opportunities and empowering employees to make their own decisions (Konczak, 2000) from which they develop the skills needed, knowledge, and abilities to achieve their career objectives.

Pierce and Gardner (2004) stated that good workplace conditions can provide signals to employees that they are respected, valued, and trusted and that the organization sees them capable and competent members of the workplace. When an employee is given autonomy and support by superiors, for example, this positive working environment can help the employee feel that he or she is indeed competent in the workplace. Hence, our first hypotheses constructed as follows:

Hypothesis 1 (H1): Servant leadership affects organization-based self-esteem.

Job Social Support

Social support is an interpersonal transaction involving emotional attention, instrumental assistance, information, and appreciation (House, 1981). Social support in the workplace can arise from sources such as co-workers and superiors, which can create a more positive working environment (Roskies & Lazarus, 1980). According to the research by Wiesenfeld (2001), when individuals perceive themselves as gaining support in the workplace, they are more likely to feel central to their organization, and this can lead to self-improvement. Social support at work can also create a more positive work environment (Carlson and Perrewe, 1999) where employees are more likely to feel valued and beneficial. Because job social support can provide a more positive working environment, it can affect the OBSE, according to Pierce (2004). There is also the possibility that the environment and relationships with supervisors and co-workers has direct involvement in or provides clear signals to employees about their competence and specificity. Hence, our second hypotheses constructed as follows:

Hypothesis 2 (H2): Job Social Support affects Organization-Based Self-Esteem.

Family Satisfaction and Quality of Life

Family satisfaction can be defined as a level in which one is generally satisfied with a person's home family and a constituent relationship embedded within it (e.g., parent-child, sibling) (Carver, 1992). Family satisfaction is defined as "The affective state resulting from a person's judgment of the family aspect of his life in general" (Karatepe & Baddar, 2006). Therefore, similar to life satisfaction (Pavot & Diener, 2003), family satisfaction is defined as a conscious cognitive assessment of a person's family life in which the criteria for judgment depends on the individual (Zabriskie, 2013). Patel et al. (2018) found a positive relationship between self-esteem and satisfaction and verified this result among male and female respondents. Hence, our third hypothesis is constructed as follows:

Hypothesis 3: Organization-based self-esteem affects family satisfaction.

Zuna (2010) identified several common themes among the definition of family quality of life. First, satisfaction as a concept communicates three meanings. The first is a sense of family welfare, indicators of perception, and judgment by personal values, also referred to as component definitions. The second theme that arises from this definition is the idea of meeting the needs of individual family members. The third theme is that the family as a unit has characteristics that cannot be described simply by understanding the respective family members. Based on these three themes, the definition of family quality of life is a dynamic feeling of family welfare, collectively and subjectively defined and informed by its members, in which individuals and family levels must interact (Zuna, 2010).

Individuals with high self-esteem tend to experience lower levels of stress in their roles at work and in their families, perhaps because they are committing their roles confidently under favorable psychological circumstances (Greenhaus and Powell, 2006). Also, people with high OBSE are more hesitant to respond to negative information (Hui and Lee, 2000), and therefore tend to communicate negative information and discuss it with family members, thereby increasing the anxiety of concerned family members. In the long run, all of these positive consequences of OBSE represent the favorable treatment of family members, increasing their feelings and positive emotions and leading to a positive reciprocal attitude (Carlson, 2011).

Hypothesis 4: Organization-based self-esteem affects family quality of life.

OBSE as mediating variables

As previously explained, Bowling (2010) asserted that a good working environment is a crucial predictor of OBSE. Meanwhile, Greenhaus and Powell (2006) stated that self-esteem has been identified as a vital psychological contributor to an enriching family life.
Hypothesis 5: OBSE mediates the relationship between servant leadership and family satisfaction.
Hypothesis 6: OBSE mediates the relationship between servant leadership and family quality of life.
Hypothesis 7: OBSE mediates the relationship between job social support and family satisfaction.
Hypothesis 8: OBSE mediates the relationship between servant leadership and family quality of life.

Based on hypotheses developed, the model of this research is shown in Figure 1.

Method

This study provides conclusive research on design. We collect data using questionnaires distributed to the respondents at the Indonesian civil servant personnel agency (BKN) head office. The collected data is then tested for validity and reliability and is processed using the SPSS program.

Research Model

In the first model, we evaluate here how the servant leadership and social support on the job relate to family satisfaction and how OBSE mediates that relationship. In the second model, we evaluate how servant leadership and social support on the job relates to family life quality and how OBSE mediates that relationship.

Figure 1: Research Model

Data and Pretest

We use the non-probability sampling method with purposive sampling procedures. Non-probability sampling is a sampling method that provides certain opportunities to only certain population members who are likely to exclude other members, whereas purposive sampling is a method of non-probability sampling conducted based on specific criteria (Cooper & Emory, 1995). The number of samples specified in this study was 100 civil state employees at state personnel agency headquarters.

We use five variables here: (1) the servant leadership measured by the servant leadership questionnaire developed by Ehrhart (2004); (2) Social support on the job, which is measured using four questions designed by Van Yperen and Hagerdoom (2003); (3) organization-based self-esteem (OBSE) measured by OBSE-scale developed by Pierce (1989); (4) family satisfaction measured by the scale developed by Kopelman (1983); and (5) family quality of life measured using a scale developed by Summer (2005).

The results of the validity and reliability tests based on the collected data show that all data is valid and reliable. Validity is displayed based on the value of the loading factor, while reliability is tested based on Cronbach's alpha value. The results of the validity and reliability tests can be seen in Table 1.

Table 1: Validity and Reliability Test

Variables	Validity	Reliability
Servant Leadership	0,893	0,955
Job Social Support	0,625	0,821
Organization-Based Self-Esteem	0,814	0,940
Family Satisfaction	0,723	0,867
Family Quality of Life	0,768	0,916

Result and Discussion

The total respondents were 100 people consisting of 54% women and 46% men. The majority of respondents were from 26 to 30 years (71%), while the second most populous age group was 18 to 25 years (15%). The rest are those who are over 30 years old. Respondents mostly have been working in the BKN head office for 1 to 5 years (79%), followed by 6 to 10 years (19%), and only 2% who have worked for more than 11 years. The average value for each variable can be seen in Table 2.

Table 2: Average number of variables

Variables	Average numbers
Servant Leadership	3,47
Job Social Support	3,86
OBSE	3,85
Family Satisfaction	4,37
Family Quality of Life	4,27

The average value divided into three categories consists of low (1.00-2.33), medium (2.34-3.67), and high (3.68-5.00). For example, the average value of servant leadership is 3.47, which means that its value goes into the medium category, while the other variables go into the high category.

The results of the regression calculations from the variables in this study are shown in Table 3. The servant leadership and social support on the job variables have significant effect on the OBSE variables that, in this study, are the variable mediators. Hence H1 and H2 are accepted. Furthermore, the OBSE variable regresses to the family satisfaction and family quality of life variables, and the results indicate that the OBSE variable significantly affects the two variables. Hence, H3 and H4 are accepted.

Table 3: Regression Results

Hypotheses	Beta	Sig	Conclusion
H1	0,578	0.000	Accepted
H2	0,628	0.000	Accepted
H3	0,314	0.001	Accepted
H4	0,340	0.001	Accepted
H5	SL-OBSE: 0,578 OBSE-FS: 0,314 SL-FS: 0,258 VAF = 42%	SL-OBSE: 0.000 OBSE-FS: 0.001 SL-FS: 0.009	Reject mediation role
H6	SL-OBSE: 0,578 OBSE-FQL: 0,340 SL-FQL: 0,327 VAF = 35%	SL-OBSE: 0.000 OBSE-FQL: 0.001 SL-FQL: 0.001	Reject mediation role
H7	JSS-OBSE: 0,628 OBSE-FS: 0,314 JSS-FS: 0,046	JSS-OBSE: 0.000 OBSE-FS: 0.001 JSS-FS: 0.652	Accept full mediation role
H8	JSS-OBSE: 0,628 OBSE-FQL: 0,340 JSS-FQL: 0,095 VAF = 70%	JSS-OBSE: 0.000 OBSE-FQL: 0.001 JSS-FQL: 0.346	Accept full mediation role

Test the mediating role conducted by comparing the VAF values to 0,5, in which the value of higher than 0,5 indicates a fully mediating role. Based on the results of the calculations, OBSE does not mediate the relationship among servant leadership, family satisfaction, and family quality of life. Regarding the influence of job social support on family satisfaction and family quality of life, OBSE fully explains the relationship of the two variables. The result of the calculation is shown in Table 3.

Based on the results of the test, the servant leadership can directly influence the family satisfaction and family quality of life variables from the employees at BKN head office. Conditions in the work environment are closely related to leadership or superiors' roles. Superiors, as role models, give psychological impact to the subordinates. This psychological impact can also affect the conditions of the family environment. For example, if an employee at the office gets less pleasant treatment from his superiors (such as being given a different treatment from another employee), it will affect the employee's psychological condition. In this case, employees or in this case as subordinates will feel depressed, uncomfortable, and unimportant in the organization. Mental health can carry over into the family environment. Serving leadership is as an independent variable that can influence family satisfaction as a directly dependent variable. This finding supports the research conducted by Tuckey (2012), who found that leaders may have a significant impact on the family environment conditions of their followers, not only in terms of creating psychological effects and other positive outcomes but also by improving mental well-being.

Employers and co-workers play an important role in creating a positive work atmosphere. Favorable conditions in the workplace have a good impact on an employee's psychological well-being. For some employees, the support of co-workers feels more important than the support from superiors regarding work satisfaction, which leads to an increase in self-esteem in the work environment (OBSE).

Conclusion

From this study, we conclude that OBSE fully mediates the relationship between social support on the job and family satisfaction and also fully mediate the relationship with family quality of life. However, we have no enough evidence that OBSE mediates the relationship between serving leadership on family satisfaction or family quality of life. However, this finding might be affected by the serving leadership variable, which has a moderate average value, and there is still room for improvement. However, further research is needed, especially among broader Indonesian civil servants, not only who serve in the head office of BKN.

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Waste Management: The Relevance of Economic Motives, Environmental Concerns, and Convenience in Processing Household Waste

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Abstract

Our study aims to evaluate how economic motives affect a household's intention to participate in waste management, along with environmental concerns, waste processing convenience, and household exposure to waste management campaigns. We also evaluate how the existence of waste collection and attitudes toward thrift moderate those relationships. We conducted research, specifically in Depok, West Java, Indonesia, on household participation in a 2019 community program carried out by the Universitas Indonesia. The households were trained to utilize composter kits to process household waste to a liquid and solid compos fertilizer. We compared their intention to waste process with households not participating in the program. We found that households that participated in the program did not show higher intention to process their household waste compared with the group not participating in the program. We then found that environmental concern is among the strongest factors that determine household intention to process waste, while economic motives negatively correlate to household intention to process waste.

Keywords: household intention to process waste; community program; economic motives for waste management; waste processing convenience; exposure to waste management campaign.

Introduction

Indonesia is the second-largest contributor of plastic waste to the world's water after China; according to Conserve Energy Future, the Citarum River is the second most polluted river in 2019, after the Gangas River in India. Households contribute significantly to a country's waste problem through certain behaviors (Mattar et al., 2018).

Household waste management behaviors and factors determine the participants who have been analyzed and evaluated since the early 1970s, both in developed and developing countries. Barr (2007) evaluated three management behaviors, i.e., waste reduction, reuse, and recycling, stating that environment values, situational characteristics, and psychological factors play significant roles in prediction of waste management behaviors. Miafodzyeva and Brant (2013) conducted meta-analysis from 63 empirical studies based on published research from 1991–2010 carried out in 17 countries and found that the strongest predictors of households' recycling behaviors were convenience, moral norms (i.e., personal concern about waste management), information, and environmental concern.

Despite studies regarding household waste management behaviors, rare studies have evaluated how economic benefits affect household intentions for waste management. Among these is research carried out by Owasu, Adjei-Addo, and Sundberg (2013) in Ghana, Bergeron (2016) in Geneva, and Nainggolan et al. (2019) in Denmark.

One form of waste management behavior is self-processing household food waste into liquid and solid fertilizer. This fertilizer, i.e., compost, can be used for household needs or to sell to the market. The process technology is affordable and easy to implement. Universitas Indonesia, through a community engagement program in 2019, trained about 40 households in this program and provided them with

composter kits needed to self-process their food waste. This group was expected to process their food waste and generate economic benefit from compost produced, thus reducing the need to send the waste to a final disposal field. We then analyzed the results of the program toward household willingness to process the waste.

Specifically, this study aims to evaluate how economic motives affect a household's intention to participate in waste management, along with environmental concerns, processing convenience, and exposure to waste management campaigns. We also evaluate how existence of waste collection and attitude toward thrift moderate those relationships.

This paper is structured as follows. After the introduction, we present a literature review in Section 2. We describe data and methods in Section 3. Analysis and discussion are presented in Section 4, followed with a conclusion in Section 5.

Literature Review and Hyphoteses Development

Household Waste Management

Household waste management is implemented in several forms, e.g., waste reduction, waste reuse, waste recycling, waste separation, and waste disposal. Further, discussion regarding waste management takes on various forms. Barr (2007), for example, discussed three kinds of waste management behavior, i.e., waste reduction, waste reuse, and waste recycling. Kaplan et al. (2019) defined two waste management behaviors as minimization and recycling in which recycling involves separation (distinguishing recyclables from the rest of the waste) and throwing items into the right bin. Matter et al. (2018), Kaplan et al. (2019), and Farni et al. (2019) mainly discussed waste reduction behavior, while Owusu, Adjei-Addo, and Sundberg (2013); Aprile and Fiorillo (2019); and Nainggolan et al. (2019) discussed waste separation behavior. However, most studies concern recycling practice (see Miafodzyeva & Brandt, 2013; Yokoo et al., 2018; Sorkun, 2018).

Which waste management type is the most important? Kaplan et al. (2019) stated that waste minimization is more effective than recycling in terms of environmental impact. Similarly, Farni et al. (2019) suggest that waste management behavior should emphasize waste reduction partly because the authors found that, in Tehran, Iran, every consumer wastes about 27.6 kg of edible food annually. However, Yokoo et al. (2019) focused on recycling behavior in their study and notes the importance of voluntary recycling. The authors found that the majority households in Hanoi, Vietnam, recycle all the recyclable materials they consume, even though such recycling is not obligatory. Half the recycling households sell their recyclables to informal junk buyers, whereas the other half provides recyclables without monetary compensation.

Factors Determining Household Waste Management

What factors determine household behavior in waste management? Barr (2007) stated that the links between household attitudes and environmental behaviors are complex and interrelated but can broadly be attributed to three groups of independent variables, i.e., environmental values, situational variables, and psychological factors. Miafodzyeva and Brandt (2013) classified four variables affecting the recycling behavior of households as socio-psychological, technical-organizational, individual socio-demographic, and study-specific.

Aprile and Fiorillo (2019) evaluated how environmental concerns affect household waste management behavior in Italy during a government campaign and a program to raise public awareness of the importance of waste prevention, disposal, and recycling. The authors found that lifestyles mainly influenced the public's sensitivity and behavior toward waste issues. Mattar et al. (2019) found that lifestyles such eating out frequently and buying best offers increase food waste while feeling guilty

about wasting food reduces this waste. Similarly, the authors found that rural households contributed less to food waste compared with those in urban areas. In sum, Sorkun (2018) confirmed the influence of social norms on household recycling behavior; however, this influence was found not to occur through internalization processes.

The literature analyzes how economic benefits affect household waste management behaviors. Owusu, Adjei-Addo, and Sundberg (2013), in their study in Ghana, evaluated how cash incentives affect waste management behavior. The authors revealed that about 80% of households are willing to accept a cash incentive of GH¢1.6374 (US$1.6347) per month to participate in source separation. Further, Bergeron (2016) evaluated tax incentives in Geneva. The authors found that tax incentives are effectively encouraging the Genevan municipalities to implement and improve sorting infrastructures and services, but it must be combined with infrastructural (e.g., collection points) and persuasive (e.g., awareness-raising campaigns) instruments. In research in Denmark, Nainggolan (2019) revealed trade-offs between household preference to waste management type to time spent sorting and estimating the value of time for this activity of between 2.8 to 6.3 EUR per hour. However, a studied conducted in Vietnam by Yokoo et al. (2018) found that voluntary recycling behavior is more effective; however, this behavior is associated with altruism.

Methods

Research Data and Sample

This study was conducted on households participating in the Universitas Indonesia community engagement program. The program consists of training and technical assistance for households willing to participate in food waste management processing. Participants were selected by community leaders (Pak RT/guru ngaji). Each household participated in the program then granted with composted kits consisting of drum and EM4 needed to process food waste to liquid and solid fertilizer called compos. The program distributed 40 composter kits, 34 of which were surveyed. For study purposes, we also evaluate 30 households that did not participate in the program to determine whether there are differences in each group intention to implement food waste processing.

Respondents were interviewed on their intention to process waste, along with their motives behind the intention, which are economic motives (EM), environment concerns (EC), easiness to process waste (PC), and whether or not they are exposed to a government community program to process waste or not (EXP). The instrument used five-point Likert scales, ranging from totally disagree to totally agree. Data were processed using SPSS. Some operating variables are omitted due to their validity and reliability problems. The succeeding operating variables are processed to test the hypothesis.

Results and Discussion

Sixty-four respondents were chosen, 34 people received a composter to process their household waste while 30 did not. There are no significant differences in their intention to process waste (average values are 6.9 vs. 6.7)

Validity and Reliability Tests

All operating variables are reliable and valid to measure the concepts used (Table 1). Validities were measured using Pearson correlation, while reliabilities were measured with Cronbach's alpha. All the operating variables used to test the hypothesis are reliable for gathering all respondent's data and valid to measure concepts used in this research. Results of the validity and reliability of the data in this research are presented in Table 1.

Table 1: Validity and Reliability test result

Variable	Cronbach	Validity	Result
EM1		0.615	Valid
EM2		0.874	Valid
EM3		0.836	Valid
EM4		0.788	Valid
EMTOT	0.767		Reliable
EC1		0.725	Valid
EC2		0.8	Valid
EC3		0.723	Valid
ECTOT	0.602		Reliable
PC1		0.918	Valid
PC2		0.888	Valid
PCTOT	0.771		Reliable
EXP1		0.774	Valid
EXP2		0.828	Valid
EXP3		0.769	Valid
EXP4		0.849	Valid
EXPTOT	0.818		Reliable
IP1		0.813	Valid
IP2		0.833	Valid
IPTOT	0.524		Reliable

Results

Twelve hypotheses are tested. Four hypotheses are tested to discern the relationship among independent variables and dependent variables, while eight hypotheses are used to determine the effect of moderating variables in coupling the relationship between independent and dependent variables.

A summary of the hypotheses testing is presented in Table 2, which shows that the first three hypotheses are accepted, while the fourth hypothesis, government program to promote household waste management, does not influence the intention to process waste by the respondents. Economic motives and degree of difficulties in processing waste are negatively affected in the intention to process waste (Hypotheses 1 and 3).

We also tested the moderating variables that jointly affect the impact of independents toward dependent variable; tests show that variables, i.e., environmental concern together with government program to induce waste processing, are not jointly affected with the existence of waste collection and attitude toward thrift (Hypotheses 6, 8, 10, and 12). The moderating variables work on only the relationship between independent and dependent variables described in Hypotheses 1 and 3, which are Hypotheses 5, 7, 9, and 1. A summary of the results is presented in Table 2.

Table 2: Summary of hypotheses testing

Hypothesis	Research Hypothesis	Beta	Significance	Result
h1	Economic Motive correlate with Intention to Process	-0.19	0.007	accept h1
h2	Environmental Concern correlate with Intention to Process	0.238	0.066	Accept h2
h3	Processing Convenience correlate with Intention to Process	-0.429	0.001	Accept h3
h4	Expose to Government Program correlate with Intention to Proc	0.113	0.108	Reject h4
h5	Existance of waste Collectore moderates the relation of h1	-0.257	0.002	Accept h5
h6	Existance of waste Collectore moderates the relation of h2	0.238	0.068	Reject h6
h7	Existance of waste Collectore moderates the relation of h3	-0.435	0.001	Accept h7
h8	Existance of waste Collectore moderates the relation of h4	0.075	0.498	Reject h8
h9	Attitude toward Thrift moderate the correlation of h1	-0.186	0.021	Acept h9
h10	Attitude toward Thrift moderate the correlation of h2	0.265	0.063	Accept h10
h11	Attitude toward Thrift moderate the correlation of h3	-0.417	0.004	Accept h11
h12	Attitude toward Thrift moderate the correlation of h4	0.115	0.127	Reject h12

Discussion

The results of testing Hypothesis 1 seem naturally accepted; further, the results corresponded to Zhaohua et al. (2016) in reverse order, while result of Hypothesis 3 is in contrary to that of Kumar (2019). Zhaohua found that, in China, the recycling behavior (which is parallelized to waste process behavior) is positively driven by economic motives, while this study revealed a negative correlation. It should be noted that throwing garbage wherever one wants to is a non-costly activity in Indonesia; hence, the waste processing behavior is negatively impacted by cost and revenue considerations.

The result of testing Hypothesis 2, i.e., environmental concern work on the intention to process waste, parallelly indicates that people concerned with environmental issues are willing to process waste. This finding is parallel to Barr (2007) and Wang, et al. (2016). The two moderating variables jointly impact the relationship of economic motives and process convenience on intention to process waste, respectively, both in a contrary order. This means that the two moderating variables couple the effect of those independent variables.

Conclusion

From this study, we found that environmental concern is the strongest factor in determining household intention to process household waste, while economic motives negatively correlate to household intention to process waste. One interesting finding in our study is that participants acknowledged that household waste processing is a convenient and positive effect in their intention to implement waste processing, but the existence of a waste collector reverses this intention.

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Influence of Subliminal Messages in Television Advertisements on Adolescents Behaviour: A Study of Coca-Cola

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Abstract

Subliminal messages are gaining prominence in contemporary advertisement globally. This study examined the influence of subliminal messages in Coca-Cola advertisements; its effect on adolescents; the utilization of subliminal messages by the advertising agency of Coca-Cola. The study was anchored on individual differences theory and media bullet theory. The quantitative method of research was utilized. A total of 250 copies of questionnaire were distributed to Coca-Cola consumers in Ikeja, aged between 10 to 25 years. The study showed that 78% and 76% of the respondents have never heard of the term subliminal messages and did not know what they were respectively. Furthermore, while 47.2% of the consumers affirmed they have not been influenced by subliminal messages embedded in Coca-Cola television advertisements in their purchasing decisions, 32% of the respondents were not sure of the influence. The study therefore recommended a responsible utilization of subliminal messages by advertising agencies and advertisers to prevent the dissemination of messages that would negatively influence consumers' attitudes.

Keywords: Consumers, Influence, Knowledge, Subliminal Messages, Utilisation, Adolescents, Behaviour, Coca-Cola, Advertisement

Introduction

The purchase of goods is determined by the need of the consumers and sometimes the materialistic level of some consumers. The successful emergence of advertising led to the growth and adoption of advertising by organizations and product producers for increase in sales. Advertisers have taken different steps in winning the interest of their product consumers with the use of the different media, ranging from word of mouth, print, billboards, and audio to audio-visual.

The mythically-believed James Vicary's study of 1956 on persuading the buying behaviour of consumers, led to the adoption and knowledge of subliminal messages and subliminal advertising by different organizations over the years. According to Ahmed, KhurshidMian, Buzdar, Ali and Irshad (2014), subliminal advertising has progressed as a noticeable tool used by the media to entice consumer attention and greatly funded the advertising agencies of the present age. The understanding of subliminal messages in advertisements by products consumers as well as the knowledge of utilising advertising brands of products initiates this study.

Dating back to the 1950s, subliminal advertising had its limelight from James Vicary's study on a mass of movie viewers in a theatre through the use of an advertisement that inscribed hidden words " 'Eat Popcorn' and 'Drink Coke' " (Vokey, 2013, p. 287). These words were believed to have been flashed "for a third of a millisecond every five seconds during the film" (Vokey, 2013, p. 287). Though this study occurred and was recorded by psychologists and scholars, the belief and disbelief of different scholars and psychologists in the existence of subliminal advertising has led to controversies with experiments backing up their principles. This study has led to the rebirth of subliminal messages in films, advertisements, radio and television programmes. Rebirth, because subliminal messages as well as subliminal advertising has existed before Vicary's study.

The history of individual persuasion can be seen from the era of the Ancient Greece but instead of the name 'subliminal', it had the name 'rhetoric'; the art of persuading people through speech. Having the

Sophists in the Ancient Greece, to Cicero in the Ancient Rome, persuasion has been in existence for decades. "The proliferation of mass media in the 20th century caused another shift in the study of rhetoric. Images in photography, film, and TV have become powerful tools of persuasion." (Mckay, 2018, para. 23).

The word subliminal was introduced by Vicary during his experiment. "Subliminal advertising was infamous in 1957 as a result of publicity of James Vicary, a researcher, who claimed to have significantly improved sales of Coca Cola and popcorn in a movie playhouse, by covertly and subliminally blinking the content 'Drink Coca Cola' and 'Eat Popcorn'". (Karremans, Stroebe, Claus, 2006, p. 792). Notwithstanding the opinion of scholars on Vicary's real or apocryphal study, the exposure of consumers to the new turn to advertising which is the use of subliminal messages, has left consumers to ponder on the persuasion of their unconscious minds by brands and their advertisements.

Though the study is significant, there are different points of views on subliminal messages and Vicary's experiment by different scholars ranging from that of Wilson Bryan Key, John Vokey, Don Read, Timothy Moore, Hal Becker, to Gary Greenwald, some supporting and others opposing the theories of subliminal persuasion.

Contradicting the existence of subliminal messages and the occurrence of Vicary's 1956 subliminal study, "Notwithstanding obvious use of subliminal means in different media, there is no indication for effective subliminal inducement in video, advertising, and there is no theoretical justification to expect it."(Vokey, 2013, p. 301).

Conversely, Moore defends the notion that subliminal messages in advertisements are effective in influencing consumer behaviour and choices. He believes that the "practices are supposed to stimulate consumer action by subconsciously changing preferences in the direction of consumer products".

Therefore, this study is initiated by product consumers' knowledge of subliminal messages in ads as well as the utilization of subliminal advertising by brands of products.

Statement of The Problem

Advertisements are conducted with the main purpose of influencing consumers' decisions but advertising agencies seem to have taken a step further to persuade the buying decisions of their product consumers. This is the emergence of subliminal contents in advertisements.

Though it is believed that subliminal messages exist, some theories by authors deny the existence of this advertising technique. It is believed that there are little or no proofs of the efficiency of subliminal messages in influencing an individual's buying behaviour or decision (Vokey, 2013, p. 21).

Although studies have shown that there has been an increase in the purchase of some products perceived to be backed up by subliminal messages, controversies exist on the belief in subliminal persuasion and its comparison with selective attention. Creed (1987) states that "what Key appears to mean by 'subliminal perception' is more akin to the processes of selective attention, not perception without awareness" (as cited in Vokey, 2013, p. 293).

The placement of subliminal in advertisements may be seen as a negative effect on the consumer since "it often do occur without our awareness, and without our having to or, in many cases, even being able to consciously control them."(Vokey, 2013, p. 21). On the contrary, some stores have testified on the use of subliminal messages behind songs played in the stores to prevent or reduce theft.

For this purpose, the study will identify the usage of subliminal messages in advertisements by Nigerian advertising agencies, the knowledge of consumers on subliminal messages in advertisements and examine its effectiveness in the promotion of products.

Research Questions

1. To identify the knowledge of product consumers of Coca-Cola on subliminal messages in advertisements.

2. To recognise how subliminal messages in Coca-Cola adverts influence the purchase behaviour of product consumers.

Theoretical Framework

Individual Differences Theory

This study will be making use of the individual differences theory. Individual differences theory can be traced back to the existence of modern psychology. This explains that individuals react and respond in different behaviours to messages disseminated through the mass media. The differences in consumers' perception of subliminal advertising, will be studied based on their experiences.

Magic Bullet Theory

"The Magic Bullet theory graphically assumes that the media's message is a bullet fired from the 'media gun' into the viewer's 'head'" (Berger, 1995). Individuals react to a stimuli uniformly. The media creates a large effect as it influences the activities and decisions of consumers. The media inserts its messages in the audience making the latter vulnerable to the messages. It is referred to as the shot gun that injects bullets (messages) in the minds of the audience. It is also known as hypodermic needle theory. It is very important to this study to find out if indeed the messages have an effect on the buying decision of the consumers.

Methodology

This study adopted the quantitative method of survey to elicit the knowledge and the influence of subliminal messages in Coca-Cola television advertisement on adolescents. This population of study are citizens of Lagos State who are product consumers of Coca-Cola. In relations to Wimmer and Dominick (2003), the study adopted a sample size of 250 respondents based on the authors' claim that a sample size of 200 is fair, a sample size of 300-500 is good and a sample size of 1000 is excellent.

Result

RQ 1: To what extent are Coca-Cola product consumers knowledgeable of subliminal messages?

Table 1 : Are Subliminal Messages used in Coca-Cola Advertisements in Nigeria (N=250)

Responses	Percentage (%)
Yes	28.0
No	10.4
Not sure	61.6
Total	**100.0**

In table 1, 28% of the respondents believe that Coca-Cola makes use of subliminal messages in their advertisements, 10.4% of the respondents believe that Coca-Cola does not make use of subliminal messages in their advertisements while 61.6% are not sure of the usage of subliminal messages by Coca-Cola.

Table 2: If Yes, how frequent does Coca-Cola Use Subliminal Messages in their Advertisements (N=250)

Responses	Percentage (%)
Very often	6.4
Often	17.2
Rarely	5.2
Never	0.8
Total	29.6
Missing Info	70.4
Total	**100.0**

The table above identifies the question of how frequent Coca-Cola uses subliminal messages in their advertisements. Due to the information in table 2, there were some missing information in table 4.8 because the question referred to those who chose the option "Yes" in table 2

For the respondents that chose "Yes" (they believe Coca-Cola makes use of subliminal messages in their advertisements), 6.4% of the respondents believe Coca-Cola use subliminal messages in their advertisements **very often**, while 17.2% of the respondents believe that Coca-Cola **often** make use of subliminal messages in their advertisements.

Moreover, 5.2% of the respondents believe Coca-Cola **rarely** uses subliminal messages, while 0.8% of the respondents believe Coca-Cola **never** uses subliminal messages in their advertisements.

The missing information includes the respondents that do not think Coca-Cola makes use of subliminal messages in their advertisements (No), and those who were not sure.

RQ 2: How have subliminal messages in Coca-Cola adverts influenced the purchase behaviours of product consumers?

Table 2: Do you think Coca-Cola Subliminal Messages Influence Your Purchasing Decision (N=250)

Responses	Percentage (%)
Yes	20.8
No	32.0
Not sure	47.2
Total	**100.0**

In table 3, 20.8% of the respondents believe that Coca-Cola subliminal messages influence their purchasing decision, 32% of the respondents do not believe that Coca-Cola subliminal messages influence their purchasing decision while 47.2% are not sure.

Table 4: Would you Continue Watching (N=250)

Responses	Percentage%
Yes, I would continue watching	56.8
No, I would stop watching	43.2
Total	100.0

In table 4, 56.8% of the respondents replied that they would continue watching a television advertisement even after discovering that subliminal messages are embedded in it. 43.2% responded that they would stop watching the advertisement or programme as soon as they detect subliminal messages in the advert.

Table 5: Degree in which Coca-Cola Subliminal Messages Affect People's Attitudes or Beliefs (N=250)

Responses	Percentage (%)
Very large extent	11.2
Large extent	20.4
Moderately	43.2
No effect	25.2
Total	**100.0**

In table 5, the degree in which Coca-Cola subliminal messages affect people's attitudes or beliefs were reviewed. 11.2% of the respondents believed it affected people's attitudes in a very large extent, 20.4% believed it affected people's attitudes in a large extent, while 43.2% believed it affected people's attitude moderately. However, 25.2% of the respondents believed that there are no effects on the attitudes and beliefs of people.

Conclusion

The findings of this study shows that a large number of consumers consciously feel influenced by the advertisements seen on the television, but a large number of consumers believe they do not consciously feel that their purchasing decisions are influenced by the television advertisements. However, most consumers have not heard of subliminal messages and have no knowledge of what subliminal messages mean. Another finding shows that most consumers believe subliminal messages are used in Coca-Cola advertisements in Nigeria and they are often used in the brand's advertisements. On the contrary, they believe that the Coca-Cola advertisements do not influence their purchasing decisions and they would continue watching a television programme that is subliminally embedded after their awareness of its presence.

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The Mediating Role of Foreign Aid on The Relationship Between Human Capital Factors and Poverty Reduction Strategy Implementation in Republic of Chad

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Abstract

Poverty is a worldwide phenomenon that affects continents, countries and people differently; it affects people in both urban and rural areas. This study investigated the mediation role of foreign aid on the relationship between human capital factors (i.e. education, health and vocational training) and poverty reduction strategy implementation in republic of Chad located in the sub-Saharan Africa. Thus, a total of 550 questionnaires were distributed to the target respondents which were community leader, member of independent association, foreign aid representative and non-governmental organization (NGO). After data cleaning, a total of 537 questionnaires were used for the analysis. Structural Equation Modeling (PLS-SEM) software was used as the tools for data analysis. The findings show that there is direct effect from both education and vocational training on poverty reduction strategy implementation. But health does not have positive effect. In addition, the result revealed that foreign aid mediates the relationship between education and poverty reduction strategy implantation and also it mediates the relationship between vocational training and poverty reduction strategy implantation.

Keywords: Education, health, vocational training, foreign aid, poverty reduction, Chad, Africa

Introduction

The issues of poverty have become a serious concern worldwide, especially in Sub-Sahara Africa (Joseph, 2014). Olawole et al. (2016) citied that the World Bank (WB)(2004) defines poverty as that level of income below which a certain percentage of the population lives in. The WB described it in terms of the inability of a person to earn a daily income of USD2, poor health services, not having access to safe drinking water, having a high rate of illiteracy and high infant mortality rate. Similarly, The World Health Organization(WHO) defined poverty as a condition where one lacks basic human needs such as nutrition, shelter, healthcare, and access to clean water (Durak, 2017). This is definitely true as most people in Sub-Saharan African countries live on less than US$1.25 per day (World Bank and IMF, 2015). Among the countries in Sub-Saharan Africa, Chad Republic's socio-economic indicators rank among the worst in the region. In the early 2000s, 54 percent of the population in Chad lives below the poverty line (Apenteng, 2004). Meanwhile, in the republic of Chad, the poverty chart indicates that 46.7 percent of the country's population of over 14 million people were extremely poor (United Nations, 2017). Although, republic of Chad has drawn up and executed numerous national economic and social development plans since its independence in 1960. The overall listed objectives of these plans were to improve the standard of living of its citizens. However, the population has become poorer over the past three decades (Alkire and Santos, 2010).

For almost more than 5 decades, poor countries are receiving aid from developed countries and agencies to encourage economic growth, and consequently to reduce poverty and income disparity (Magnon, 2012). Muftau (2018) noted that the high rate of poverty in most of the African countries could be related to the lack of management and misuse of the international aid that many of the African states received. Furthermore, in less developed countries, there is a lack of substantial inflow of financial resources which affect the successfully implementation of poverty alleviation plan (Kilama, 2013; Pedrosa Garcia, 2017). Hence, Ardl et al. (2017) added that aid flows to developing countries is ultimately intended to support recipient countries to attain sustainable development especially in the area of human development, sustained economic growth, poverty reduction as well as in reducing the mortality level. The Republic of Chad is among the African countries that received a huge financial assistance from international development organizations such as the United Nations (UN), United Nations Children's Fund (UNICEF), United Nations Development Program (UNDP) and the World Bank Group (WBG), African Development Bank Group (AfDB), International Fund for Agricultural Development (IFAD), European Union(EU), International Monetary Fund (IMF), Islamic Development Bank (IsDB). Although Chad gained a high amount of foreign aid, the country still remains poor. For instance, in 2016, the largest official aid was received from the European Union institutions in a total of US$37.8 million, as shown in Figure 1.

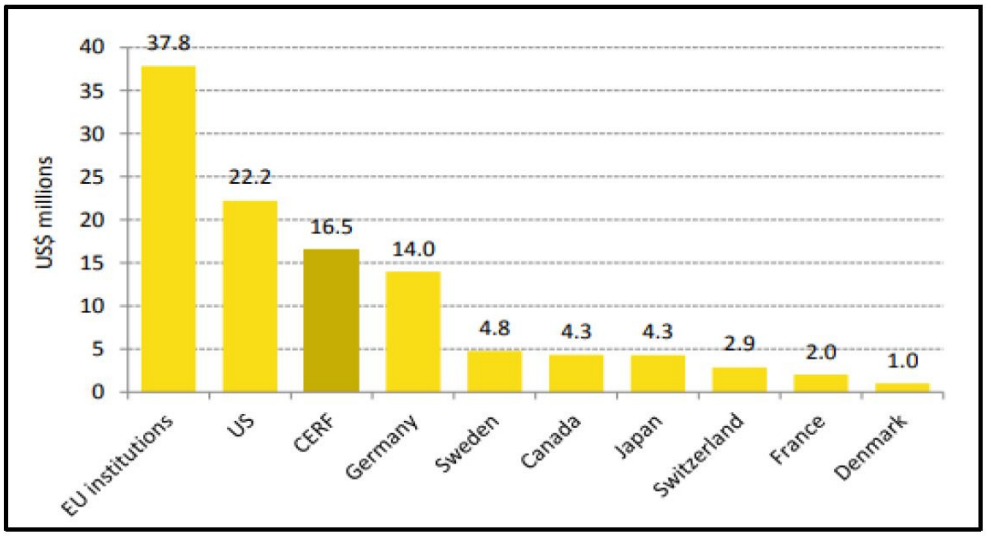

Figure 1: Top10 Foreign Aid to Chad in 2016

Source: OCHA (2016)

Alimi Shina (2018) argued that the interaction of foreign aid with public investment reduces the level of poverty in high, low and middle-income categories. However, foreign aid has a negative influence on the level of poverty reduction in high-income countries whilst in less or low-income countries, foreign aid has a positive effect on the status of the poverty rate. In Sub-Saharan African countries, foreign aid inflows with lower stages of poverty as the aid inflow is directed to public investment rather than consumption (Alimi Shina, 2018). In addition, Ardl et al. (2017) mentioned in his study on aid, growth, and poverty reduction that there are more than 1 billion people still living under absolute poverty. Donors and countries that receive the aids should monitor the implementation of the strategies which are formulated to reduce poverty carefully. Although the official aid has a positive impact on poverty reduction, its impact is not significant (Ardl et al., 2017). As population growth exerts a negative influence on poverty reduction in the long and short-run (Ardl et al., 2017). Ardl et al. (2017) recommend that international aid organizations and aid donors should allocate for specific needs and take prudential actions in making sure that recipients' countries utilize the aid for the targeted objectives with fact-based appraisals and execution reports (Ardl et al., 2017).

Although Chad is one of the richest countries in Africa generating high revenue from oil exploitation, exporting livestock to neighbouring counties like Nigeria, Niger, Central Africa Republic and Cameroon. However, the poverty rate has not been reduced significantly over the years (Sabina Alkire, 2018). In Chad, the percentage of people living below the Multidimensional Poverty Index (MPI) is 87.1 percent in 2014-2015 (Alkire, Jindra, Robles, and Vaz, 2016). Therefore, in 2011, the percentage of poor people living with less than USD1.90 a day income was 38.4 percent and USD3.10 a day income was 64.8 percent. The overall percentage of the poor national poverty line was 46.7 percent in 2011 (Oxford, 2017).

The main factors that led to this failure were due to weak leadership and management as well as the lack of commitment to and ownership of economic activities. The social reforms have slowed the implementation of the poverty reduction programs (World Bank, 2009 and IMF, 2010). African Development Bank and African Development Fund (2015) stated that the National Development Plan strategies failed to achieve its expected goals due to unclear shift from past strategies and outlines. In addition, the lack of strong leadership, poor roads and infrastructure, lack of training programs for teachers as well as poor financial resources in the implementation of the strategies (AfDB and ADF, 2015; Mohammed, 2011; and Kanagaratnam, 2018) is also one of the cause of the failure. In addition, the large

size of the country associated with the weak road infrastructure was among the biggest challenges to meet during the implementation of the projects (AfDB and ADF (2015).

Literature Review

The Relationship of Education, Health and Poverty Reduction Strategy Implementation

In relevant to poverty reduction, health plays a very important role and it is a vital human right. Healthy bodies permits or allow people to work and children to learn (Chung et al., 2018). In the other word, health is the key element for societies to lift themselves out of poverty Mohammed (2011). Hayyat & Chughtai (2015) health is the major challenge on effectively addressing poverty is to help powerlessness people and enhance their abilities and capabilities so that they can take more control of their lives. Further, poverty and ill health are extremely connected with disempowerment, marginalization and exclusion. Thus, poverty is progressively being addressed as the absence of power to enjoy an eclectic range of freedom and human right, cultural, economic, political and social (Hayyat & Chughtai, 2015).

Furthermore, without money to purchase medications, to form and prepare hospital facilities, to ensure sufficient and acceptable workers to manage effectively the health system in the nations and therefore to increase investments in other sectors important for health such as transportation, building equipment and other necessary staff (Aitsi, Egawa, and Sasaki, 2015; Chung et al., 2018). In addition, to enhance the health condition and avoid the spiral from ill health to poverty, the national governments with the collaboration of the international development organization particularly the world health organization need to give priority to promoting, protecting and improving the health of poor communities. This includes the establishment of public quality services in health and personal cares, with reasonable financial tools (Luiz and Salazar, 2014). Furthermore, without potable water and sanitation health is at risk (Woo and Chung, 2015). In short, development agencies should help partners' nations develop pro-poor health systems by strengthening local capacity in numerous areas (Aitsi et al., 2015).

Education and poverty are reciprocally linked. As mentioned by Addo (2017) the higher the level of educated people the lesser number of poor people will be, because education teaches knowledge and skills which is helpful. In the other word, the impact of education on poverty alleviation is through increasing the income or salaries of the population (Addo, 2017). The education helps in the success of basic needs such as water and sanitation, utilization of health facilities, and shelter (Awan, Malik, Sarwar, and Waqas, 2011). Moreover, education aids the availability, therefore provision of education and achievement of basic needs both support each other (Jung, Cho, and Roberts, 2013). Nonetheless, Incompatibility of the education policy, Absence of preprimary education, limited teachers training programs and lack of basic school facilities and education materials, shortage of teachers and low quality of the existing ones as well as poor financial resources all these challenges have direct effect on effectively executed the poverty reduction strategy in many developing counties (Kolstad and Wiig, 2014; Assefa, Damme, Williams, and Hill, 2017).

Based on empirical evidence from Arias Rafael (2016) uses data from the Population Census of 2011, he conclude that succeeding greater levels of education helps people from urban and rural areas and those who live in the different planning regions to fight poverty. Arias Rafael (2016), reported that people who finish secondary education reduce poor shelter between 8.0% and 33%, reduce low levels of knowledge between 26% and 44%, and reduce poor consumption between 12.0% and 30.0%. In urban areas those who finish secondary education would have a significant effect on poverty reduction 36% in shelter, poverty of access to knowledge in 48%, and in 22.0% regarding access to other goods and services. Similarly, completing secondary education in rural areas would reduce poverty of shelter in 18%, poverty related to access to knowledge in 30%, and poverty in consumption capacity in 32% (Arias Rafael, 2016).

The Role of Foreign Aid on Poverty Reduction Strategy Implementation

Many countries in Africa, remain surrounded in extreme poverty and dysfunctional social services amid continued increase in foreign aid (Seedee, 2018). Given the importance of foreign aid for poverty reduction strategy implemenation effectiveness, it is evident that foreign aid may play direct and indirect roles in influencing poverty reduction strategy. There are serval scholars who have studied the effectiveness of foreign aid on poverty reduction strategy. As cited by Mahembe and Odhiambo (2019) earlier theorists like Rosenstein-Rodan (1943); Nurske (1953); Lewis (1954) have suggested that foreign aid provides the necessary capital to enhance developing countries into self-sustaining economic growth. Clunies-Ross, Forsyth, and Huq (2009) argued that big push is needed for the poor countries to free themselves from the constraints of the low-level setup. Thus, foreign aid jump starts economic growth, and initiates a righteous cycle whereby investment generates income and therefore increase the economic return to further investment (Shleifer, 2009; Clunies-Ross et al., 2009). Moreover, Hirano and Otsubo (2014) stated that foreign aid has an indirect effect on poverty and well-being if it is spent on disadvantaged poor people. Likewise, Woldekidan, (2015) studied "The role of foreign aid in reducing poverty in Ethiopia" he (Woldekidan) has reported that foreign aid has a significant effect on poverty reduction, by reducing infant mortality rate and increasing household consumption expenditure. However, its impact found to be negative when poverty is measured by gross primary enrollment ratio.

Henceforth, based on aforementioned statement foreign aid influence poverty reduction through economic growth. In general, the increase in foreign aid has had a positive impact on investment and growth; this evidence came from numerous empirical studies outcomes (Rajan, and Subramanian, 2008; Arndt, Jones and Tarp, 2010; Clemens, Radelet, Bhavnani, and Bazzi, 2011; Alvi and Senbeta, 2012; Kaya and Gunter, 2013; Arndt, Jones and Tarp, 2015; Appiah-konadu, Shitsi, Abokyi, and Twerefou, 2016 and Odhiambo, 2017; Minasyan, Nunnenkamp and Richert, 2017; Mahembe and Odhiambo, 2019). Although those scholars have agreed that aid promotes either directly or indirectly impact in reducing poverty. However, the impact is depending from one country to another, regions, recipient country policies and the level of aid given by the donors to targeted sectors in the specific country or continent.

For instance, Hirano and Otsubo (2014). used the conceptual framework of globalization and the poverty-growth-inequality (P-G-I) relationship to examine the effectiveness of aid to development. Their analysis revealed that social aid such as education, health and water and sanitation spending significantly and directly benefits the poorest in the society and economic aid on the other hand, like transportation, energy and communication and financial infrastructure spending increases the income of the poor through growth (Hirano and Otsubo, 2014). Likewise, another study done by Arndt et al. (2015) who measured the impact of foreign aid on economic growth, social welfare used indicators (poverty and infant mortality) and intermediate outcomes (health, education and agriculture, consumption, investment). They concluded that foreign aid does encourage growth, improve social welfare indicators and reduces poverty. However, Arndt et al. (2015) have also indicate that aid does not have a significant effect on inequality, it was discovered that aid can raise investment, improve school enrolment, boost life expectancy and reduce infant mortality. Notwithstanding, many scholars concluded that foreign aid or official development assistance (ODA) has direct or indirect influence on reducing poverty; others state that it does not affect poverty reduction strategy for example, Briggs and Briggs (2015); Appiah-konadu et al. (2016); Ugwuanyi, Uche Boniface, Ezeaku, Hillary Chijindu (2017); Chikwede, (2017); Muftau, (2018); Pedro Gil, (2018) and Shitile and Abubakar (2019).

Kaya and Gunter (2013) used a sample of 46 developing countries between 1980 and 2003 to investigated whether aid allocated to the agricultural sector has an impact on poverty. They conclude that, in fact, aid given to agriculture is effective in poverty reduction, likewise it has positive effect in other sectors as well (Kaya and Gunter, 2013). Likewise, Alvi and Senbeta (2012) analyze the impact of foreign aid on 79 developing countries between 1981 and 2004, findings confirm the existence of a direct poverty reduction impact of assistance, since the assistance coefficient appears to be negative and significant for all measures

of poverty used. Juselius et al. (2014) who have found that foreign aid contributed to long run growth in 36 sub-Saharan countries between the mid-1960s to 2007. This conclusion was reached through the use of an autoregressive (VAR) model. Also, Walin (2014) conclude that foreign aid promotes positive economic growth and enhanced in a stable macro-economic policy environment in sub-Saharan Africa.

Human Capital Theory

Human Capital Theory explains the dynamics of incomes/wages which is one of the most common poverty determination (Kasali, 2016). The human capital theory notes that the individual's decision to invest in education, training or any other long-term personal development is depends on his/her lifetime incomes earned. Hence, people investment in education and training according to the future anticipation of the return from the investment that they made. Direct and indirect cost of investment can solely be determined by the nature of the investor to the labor market (Mohammed, 2011). However, people who invest less long-term self-development are likely to be trapped in poverty; because they received less payment (salaries/wages) and yet the payment that they received is not match with the life condition. According to the human capital theory the younger ones tend be poor because they invest heavily on education and training and forgo the present earnings. Similarly, old people reaching the retirement age receive less wages and remain poor as they retire (Chakravarty and Tavoni, 2013).

The human capital theory displays how increase in education leads to rise in productivity and efficiency of workforces by increasing the level of their intellectual skills (Alor and Udeorah, 2018). People invest in education thus as to increase their stock of human capabilities which can be formed by combining native abilities with investment in human factors (Alor and Udeorah, 2018). The establishment of education is seen as a productive investment in which the promoters of human capital theory considers to be worthwhile than the physical capital. Human capital theorists have established that basic literacy enhances the productivity of labors low skills professions. In addition, human capital (health, education and skills) is vital to economic growth. Hence, development strategies that lead to greater human capital, improve access to new technologies, produce better quality public goods, improve market functioning, address deep-rooted problems of poverty; besides, it improves access to finance, prevent environmental degradation and foster a vibrant civil society all promote development of the nation. For instance, investments on education, on-the- job training, health, and nutrition. The Millennium Development Goals (MDGs) and the Poverty Reduction Strategy Paper (PRSP) considered human capital is as a weapon against poverty reduction. Therefore the idea that education is a determinant of poverty captures much attention in recently (Awan and Waqas, 2011). Therefore, a country that have high percentage of educated people but lacking of good health cannot be productive effectively. Thus, both health and education investment are desirable in order to increase productivity and reduce the level of poverty of the country.

Research framework and Hypothesis of the study

H_{1a}: Education has a positive effect on poverty reduction strategy implementation.
H_{1b}: Health has a positive effect on poverty reduction strategy implementation.
H_{1c}: Vocational training has a positive effect on poverty reduction strategy implementation.
H2: Dose foreign aid mediate the relationship between health, education, vocational training and poverty reduction strategy implantation

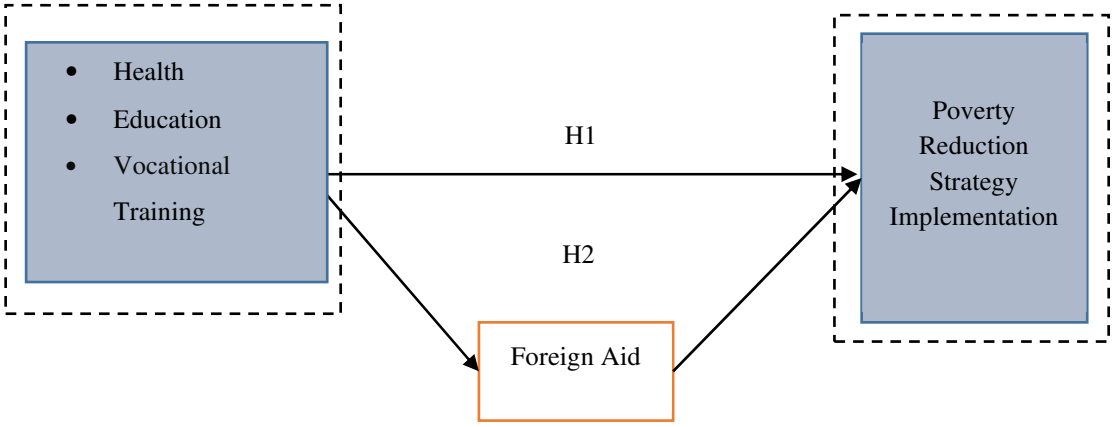

Figure 2: Research framework of the study

Methodology

This section focuses on the methodology adopted in this study, in an attempt to find answers to the questions raised in this study. The study investigated the mediating role of the foreign aid between human capital factors (i.e. education, health and vocational training) and poverty reduction strategy implementation in Chad republic. Thus, the study used a quantitative method to achieve the objective of the study. Gray (2017) stated that the quantitative approach is the most suitable for the questions that rate the degree of agreement, or views.

Therefore, a convenience sampling technique was used, as recommended by Etikan, (2016). convenience sampling is a type of nonprobability or nonrandom sampling where members of the target population that meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate are included for the purpose of the study (Etikan, 2016). Thus, a total of 550 questionnaires were distributed to the target respondents which were community leader, member of independent association, foreign aid representative and non-governmental organization (NGO). After data cleaning, a total of 537 questionnaires were used for the analysis.

Analysis and Findings

The analyses were conducted with the aid of partial least squares (PLS) structural equation modeling (SEM) software and also known as (SmartPLS-SEM). Partial least squares structural equation modeling (PLS-SEM) has become a popular method for estimating (complex) path models with latent variables and their relationships (Sarstedt, Ringle, & Hair, 2016). This software application has become a popular method for complex path models with latent variables and their relationships (Wong, 2019). According to Carrión, Nitzl, & Roldán (2017) PLS-SEM is a variance based structural equation modeling technique that has been used to model latent variables. precisely, composites and the relationships between the variables (Henseler, 2017).

Convergent Validity and Reliability

Reliability is the extent to which an assessment tool produces stable and consistent results. While validity refers to the extent to which the construct measures what it is supposed to measure (Valle & Assaker, 2016). Hence, convergent validity is the extent to which the indicators of a specific construct converge or share a high proportion of the variance for that construct (Hair, Ringle, & Sarstedt, 2011).

Table 1: Convergent Validity and Reliability

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Education	0.864	0.897	0.600
Foreign aid	0.884	0.903	0.584
Health	0.851	0.891	0.581
Poverty reduction strategy implementation	0.938	0.947	0.643
Vocational training	0.700	0.807	0.555

To achieve convergent validity, the constructs should have an AVE of ≥ 0.50, and the factor loadings should be preferably greater than 0.70. However, Byrne (2013) recommend that factor loadings of 0.50 are acceptable if the summations of the loading results in high loading scores contributing to AVE scores of 0.50 or greater. Thus, as presented in Table 1 the convergent validity is sucessfuly achived.

Discriminant Validity

Discriminant validity is one of the key building blocks of model evaluation (Henseler et al., 2015). Henseler et al (2015) sated that discriminant validity analysis ensures that a construct measure is empirically unique and represents phenomena of interest that other measures in a structural equation model do not capture.

Table 2: Discriminant validity

	Education	Foreign aid	Health	PRSI	Vocational training
Education	0.774				
Foreign aid	0.602	0.695			
Health	0.488	0.362	0.762		
PRSI	0.752	0.700	0.352	0.802	
Vocational training	0.503	0.457	0.645	0.441	0.675

Legend: PRSI= Poverty reduction strategy implantation

Besides, the cross-loading criterion, advocated by Chin (1998), required that items are required to load higher on their own construct that their cross-loadings on other constructs. This approach is considered liberal in determining discriminant validity (Hair *et al.,* 2014). The discriminant validity is presented in Table 2 and Table 3 present Heterotrait-Monotrait Ratio (HTMT) to support the achievement of the discriminant validity.

Table 3: Heterotrait-Monotrait Ratio (HTMT)

	Education	Foreign aid	Health	PRSI	Vocational training
Education					
Foreign aid	0.621				
Health	0.565	0.395			
PRSI	0.804	0.696	0.381		
Vocational training	0.626	0.542	0.800	0.531	

Legend: PRSI= Poverty reduction strategy implantation

Table 3, all the values in the HTMT table are below both 0.85 and 0.9. Furthermore, after all the possible discriminant validity tests, it has been found out that discriminant validity is not a problem in this study. In addition, Table 4 shows the factor loading criterion to evaluate discriminant validity.

Table 4: Outer loadings

	Education	**Foreign aid**	**Health**	**PRSI**	**Vocational training**
E1	0.874				
E2	0.804				
E3	0.892				
E4	0.836				
E6	0.593				
E9	0.584				
FA1		0.736			
FA10		0.737			
FA2		0.661			
FA3		0.621			
FA4		0.661			
FA5		0.701			
FA6		0.700			
FA7		0.670			
FA8		0.685			
FA9		0.769			
H2			0.793		
H4			0.858		
H5			0.789		
H6			0.854		
H7			0.655		
H8			0.584		

PR1				0.802	
PR10				0.695	
PR2				0.811	
PR3				0.713	
PR4				0.875	
PR5				0.751	
PR6				0.848	
PR7				0.774	
PR8				0.868	
PR9				0.859	
VT11					0.677
VT2					0.657
VT5					0.630
VT8					0.727
VT9					0.679

Legend: PRSI= Poverty reduction strategy implantation

After the validity and reliability of the measurement model established, it then follows that the structural model needs to be measured. Hair et al (2011) stated that the structural model provides a means of assessing the interconnections in the measurement model to establish causal relationships or simply show the relationships between the exogenous constructs and the endogenous constructs. Likewise, structural models provide answers to the objective research and the developed hypotheses. Thus, the main goal for measuring the structural model is to determine the quality of the model in terms of its ability to explain the variance of the endogenous variables (Götz, Liehr-Gobbers, & Krafft, 2010). Therefore, Figure 3, shows the measurement model of the study.

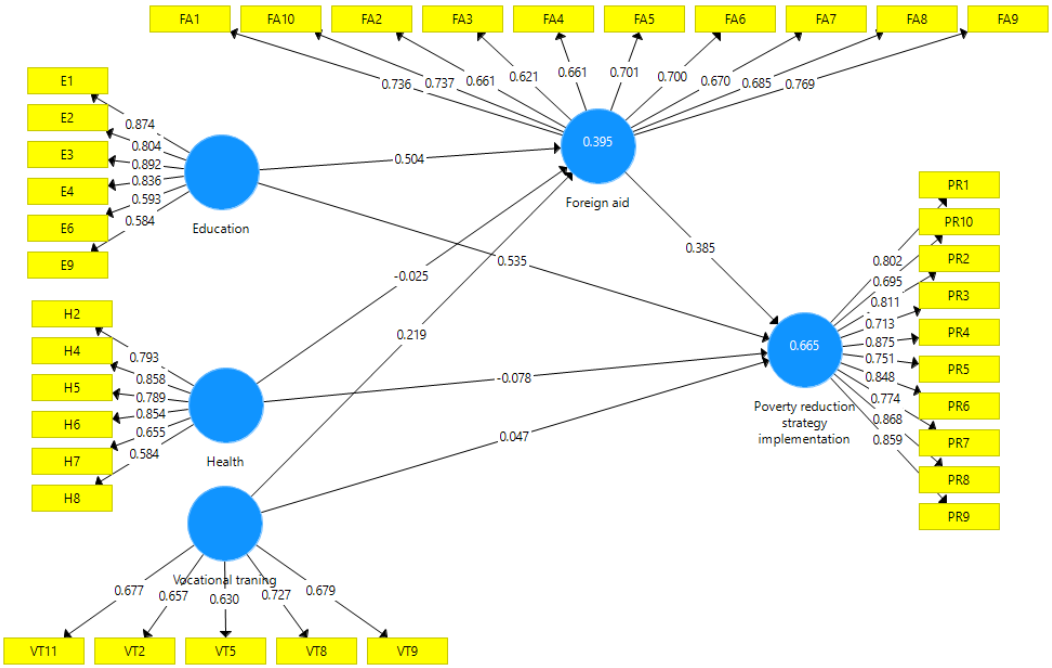

Figure 3: Measurement model of the study

Collinearity Assessment

Hair et al. (2016) defined collinearity as a condition in which some of the independent variables are highly correlated. Two variables are said to collinear when there is an exact linear relationship between the variables. It is identified by examining the correlation coefficient between each pair of independent variables. Hair et al (2006) stated that collinearity exists in a model when its variance inflation factor values exceed 5.00. Likewise, Diamantopoulos and Siguaw (2006) recommended more stringent criteria based on Average Variance Extracted (AVE) with the values of 3.3 or greater as a possible indication of collinearity. As shows in Table 5 all the values are less than 5 and 3.3, indicating that multicollinearity was not an issue in the model of this study.

Table 5: Evaluation of Collinearity based on the Variance inflation factor (VIF)

	Education	Foreign aid	Health	PRSI	Vocational training
Education		1.426		1.846	
Foreign aid				1.652	
Health		1.823		1.824	
Poverty reduction strategy implementation					
Vocational training		1.860		1.939	

Legend: PRSI= Poverty reduction strategy implantation

Path Coefficients

The bootstrapping analysis in Partial Least Squares (Structural Equation Modeling) was used to examine the effect between the variables and the investigate the mediation role. According to Hair et al (2014) Path coefficients that are close to +1 represent strong positive relationships while those that tend towards -1 represent strong negative relationships. Hence, the structural model is an essential instrument for evaluating the significance level of the path coefficients. The level of strength of a relationship is measured by the magnitude and significance of the estimates as suggested by Hair et al (2014). Table 6 shows the path coefficients for the various path model hypothesized in the study.

Table 6: Significance test for the structural model path coefficient, t-statistics and p-values

	Original Sample (O)	Sample Mean (M)	T Statistics (|O/STDEV|)	P Values	Decision
	Direct Effects				
Education -> Poverty reduction strategy implementation	0.535	0.534	19.732	0.000	Supported
Health -> Poverty reduction strategy implementation	0.078	0.078	2.465	0.014	Supported
Vocational training -> Poverty reduction strategy implementation	-0.047	0.048	1.367	0.172	Not supported
Specific Indirect Effect					
Education -> Foreign aid -> Poverty reduction strategy implementation	0.194	0.195	10.560	0.000	Supported
Health -> Foreign aid -> Poverty reduction strategy implementation	-0.010	-0.009	0.611	0.541	Not supported
Vocational training -> Foreign aid -> Poverty reduction strategy implementation	0.084	0.084	4.164	0.000	Supported
Foreign aid -> Poverty reduction strategy implementation	0.385	0.386	13.161	0.000	Supported

As present in Table 6, education and health have positive and significant direct effect with on poverty reduction strategy implementation with t-values above the t-critical value of 1.96 and p-values value less than 0.05. However, vocational training has negative effect on poverty reduction strategy implantation. Thus, it can be said that there is a positive effect of human factors (education and health) on poverty reduction strategy implementation in Chad republic. Likewise, Table 6 shows the mediating effect of foreign aid on the education, health and vocation tanning and the implantation of the poverty reduction strategy. The result shows that foreign aid mediation the relationship between education and PR strategy implantation and also it mediates the relationship between vocational training and PR strategy implantation with (t-value <1.96, p-values > 0.05). But foreign aid dose not mediates the relationship between the health and PR strategy implantation in Chad republic.

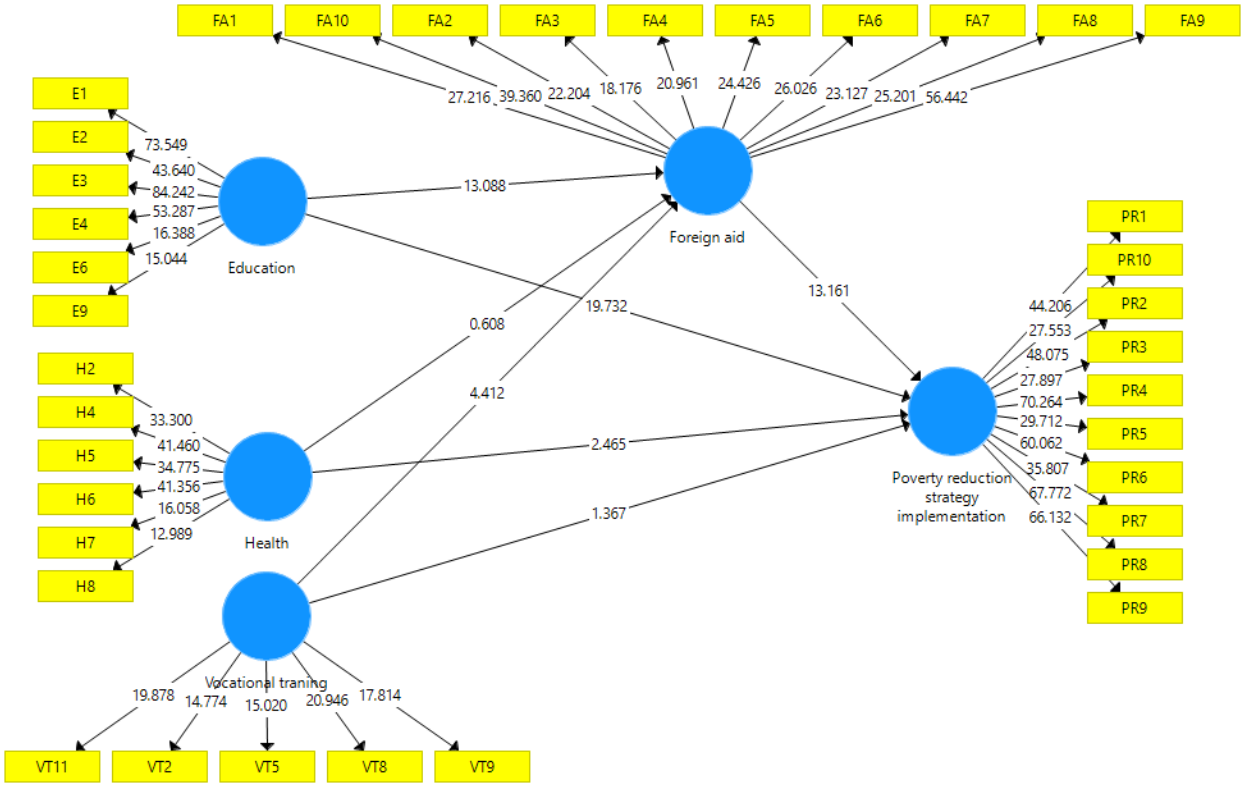

Figure 4: Structural model of the study

Discussion on the study findings

In this study three hypothesizes were developed examine the effect of the education, health and vocational training on poverty reduction strategy implementation in Chad. The results from the analysis support the hypothesizes that there is significant positive relationship between education and poverty reduction strategy implementation and between health and poverty reduction strategy implementation. But vocational training has negative relationship on poverty reduction strategy.

Based on empirical evidence from Arias Rafael (2016) uses data from the Population Census of 2011, conclude that succeeding greater levels of education helps people from urban and rural areas and those who live in the different planning regions to fight poverty. Arias Rafael (2016), reported that people who finish secondary education reduce poor shelter between 8.0% and 33%, reduce low levels of knowledge between 26% and 44%, and reduce poor consumption between 12.0% and 30.0%. in addition, as mentioned by Addo (2017) the higher the level of educated people the lesser number of poor people will be, because education teaches knowledge and skills which is helpful.

The health finding of this study is corroborated by argument of Braveman and Gruskin (2013) they have argued that health associations can deal with poverty problems and health within outline or structure surrounding equity and human rights concerns in five general ways. Namely, applying reasonable health care financing, which should help to reduce poverty while increasing access for the poor community. Secondly, institutionalizing the systematic and routine application of equity and human rights perspectives to all health sector actions. Next, strengthening and extending the public health functions, other than health care, that create the conditions necessary for health. Next, ensuring that health services respond effectively

to the main reasons of preventable health among the poor and disadvantaged; and finally, monitoring, advocating and taking action to address the potential health equity and human rights implications of policies in all sectors affecting health, not only the health sector (Braveman and Gruskin, 2013). In addition, the findings also in line with the results of David and Bloom (2018) who examine the relationship between health and poverty, the review obtained to determine the extent to which the factors contacts between health and poverty and between good health and poverty reduction are scrutinized.

The results also raveled that foreign aid mediate the relationship between education and vocational training and poverty reduction strategy implementation in Chad republic. This study finding is in line with some scholars' findings and contradicting others results. For instance, Hirano and Otsubo (2014). used the conceptual framework of globalization and the poverty-growth-inequality (P-G-I) relationship to examine the effectiveness of aid to development. Their analysis revealed that social aid such as education, health and water and sanitation spending significantly and directly benefits the poorest in the society and economic aid on the other hand, like transportation, energy and communication and financial infrastructure spending increases the income of the poor through growth (Hirano and Otsubo, 2014). Likewise, another study done by Arndt et al. (2015) who measured the impact of foreign aid on economic growth, social welfare used indicators (poverty and infant mortality) and intermediate outcomes (health, education and agriculture, consumption, investment). They concluded that foreign aid does encourage growth, improve social welfare indicators and reduces poverty. However, Arndt et al. (2015) have also indicate that aid does not have a significant effect on inequality, it was discovered that aid can raise investment, improve school enrolment, boost life expectancy and reduce infant mortality.

Conclusion

This study scrutinized the mediating role of the foreign aid between human capital factors (i.e. education, health and vocational training) and poverty reduction strategy implementation in Chad republic. Quantitative analysis was used to answer the raised questions of the study. The results show that education and health had significant positive effect of poverty reduction strategy implementation in Chad republic. Although vocational training dose not has effect on poverty reduction strategy implementation, we can conclude that human capital factor (education and health) play a vital role in poverty reduction strategy implantation in the republic of Chad. In addition, the result revealed that foreign aid mediation the relationship between education and poverty reduction strategy implantation and also it mediates the relationship between vocational training and poverty reduction strategy implantation. However, foreign aid dose not mediates the relationship between the health and PR strategy implantation in Chad republic.

Limitation of the Study

Regardless of several significant results this study achieved; there are few limitations that must be highlighted; below are the limitations of this research:

- The study is limited to examining the mediating role of foreign aid on the relationship between education, health and vocational tanning and poverty reduction strategy in republic of Chad.
- The also limited in collecting the data was taking from the few districts in N'Djamena.
- Lastly, the study employed quantitative research methodology, Smart-PLS was used for data analysis.

Implications and Future Research

The findings from this study show that there is significant relationship between education and health on poverty reduction strategy implantation in Chad. Thus, the study recommends that one of the ways by

which government should reduce poverty is to focus on education and health. In this study vocational training shows a negative effect on poverty reduction strategy implementation in chad, therefore, the government should invest and focus more on vocational training. Previous studies have proven empirically that vocational training play a vital role in reducing poverty. For instance, Hayyat & Chughtai (2015) found a significance impact of vocational training on poverty alleviation and also generated competitive human capital for economic development. In addition, further researchers can consider on examining the moderating and mediating role of foreign aid and the relationship between human capital and poverty reduction implementation.

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Do Change-Related Anxiety and Employee Engagement Mediate the Relationship Between Training and Development on Intention to Stay Working?

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Abstract

Two perspectives have been proposed to explain how a company should invest in employee training and development. The first theory, the human capital theory, states that training and development (T&D) increase the market value of the employee and thus affect employee intention to stay negatively. On the other hand, social exchange theory argues that T&D contribute to employees' positive perception of the company's commitment to their development and thus positively affect employees' intention to stay. This study aimed to evaluate how T&D affect employee intention to stay in their job in Indonesia. Derived from the social exchange theory, we evaluated two possible work attitudes, change-related anxiety and employee-engagement variables, as mediating variables. We used primary data collected using a closed-ended questionnaire administered to employees of various companies in the Greater Jakarta area, Indonesia. We collected 125 datasets from employees who worked for two years or more and used multiple regression analysis to analyse the data. We found that in Indonesia, the social exchange theory can explain the relationship between T&D and employees' intention to stay. We found a positive relationship between perceived T&D and employee intention to stay. Regarding the mediating effect of work attitude on the relationship between T&D and employee intention to stay, we found that while change-related anxiety only partially mediated the relationship, employee engagement variable fully mediated the relationship between T&D and employee intention to stay.

Keywords: Intention to Stay; Mediating Variables; Work Attitude; Change-Related Anxiety; Employee Engagement; Training and Development; Indonesia

Introduction

Change is an inevitable part of life, including work setting. For many people, changes in the workplace may be challenging to manage, as they may worsen one's career as well as life. Employees might fear losing their jobs or being transferred to unfavourable positions. Changes may trigger increased uncertainty, tension, and other job stress. Several studies have suggested that companies should understand the emotional landscape of changes and provide employees with tools to address related issues.

Training and development (T&D) equip employees with skills and competencies to better carry out their duties. T&D may also help employees develop the adaptive capacity to cope with changes in the business environment that drive changes in the workplace; as Robertson et al. (2015) claimed, a resilience training increases personal ability to cope with changes and consequently subjective wellbeing. For companies, it is essential to maintain high-skilled employees. Many companies need to deal with voluntary employee turnover, which can have severe consequences for a company's strategic and operational plan. Maintaining high-skilled employees is challenging not only for western

companies but also for Southeast Asian corporations, such as those in the Philippines with the highest rate (14.8%), followed by Malaysia (about 14.8%), and Singapore 14.1% (Memmon et al., 2017). Ultimately, T&D need to be designed to retain employees in an organization effectively.

Thus, researchers have questioned how T&D affect employees' retention. Fletcher, Alfes, and Robinson (2018) suggested that studies examining employee retention should include a broader range of work attitudes. From previous studies, several work attitudes, such as intrinsic motivation (Dysyik & Kuvaas, 2008), job satisfaction (Koster, de Grip, & Fouarge, 2011; Fletcher, Alfes, & Robinson, 2018; Zhang et al., 2018), employee engagement (Eltaybani et al., 2018; Fletcher, Alfes, & Robinson, 2018; Zhang et al., 2018), and perceived career opportunities advancement (Stamolampros et al., 2019), have been found to mediate the relationship between T&D and employee intention to stay.

From theoretical perspectives, two theories predict T&D's effects on employees' intention to stay. The human capital theory states that T&D increase the market value of the employees and thus encourage employee turnover. Meanwhile, the social exchange theory states that T&D increase the positive organizational perception of employees and thus increase their commitment to stay and work better in the organization. Moreover, a rare study has evaluated empirically the mediating effect of this work attitudes on the relationship between T&D and employees' intention to stay, especially among Indonesian workers. This study aimed to fill this gap. We hypothesized that two work attitudes, change-related anxiety and employee engagement, mediate the relationship between perceived T&D and employee intention to stay.

This study used primary data collected using a closed-ended questionnaire containing items measured on a 5-point Likert Scale ranging from strongly disagree to strongly agree. The questionnaire was administered online using Google form to employees of various companies in the Greater Jakarta area. The data were then analyzed using multiple regression analysis in SPSS 22.

The rest of this paper presents a literature review followed by hypothesis development in part two and research methods in part three. The results of the regression are summarized in part four, while the discussion is presented in part five and the conclusion in part six.

Literature Review and Hypotheses Development

T&D and Intention to Stay

Koster, de Grip, and Fouarge (2011) offered two theories, the human capital theory and the social exchange theory, on how a company should invest in employee training and development. The human capital theory predicts a negative relationship between T&D and employees' intention to stay. This theory states that training and development increase the market value of the employees and create more opportunities outside the organization. A changing environment tends to create more opportunities for high-skilled employees. The human capital theory suggests that a company should not invest too much in employee training and development because high-skilled employees tend to look for a better opportunity offered outside the organization. Contrary to the human capital theory, the social exchange theory predicts a positive relationship between T&D and employees' intention to stay. The social exchange theory argues that T&D contribute to employees' positive perceptions of the company's commitment to their development, increasing their attitude and commitment to work better in the organization.

Several studies have examined the mediating role of work-attitude in the relationship between T&D and intention to stay. Koster, de Grip, and Fouarge (2011) found that T&D reduce employees' turnover because perceived T&D increase employees' positive perception of the organization and increase job satisfaction. Fletcher, Alfes, and Robinson (2018) examined Russell's model that included job satisfaction, job engagement, change-related anxiety, and emotional exhaustion as mediating variables. They found that job satisfaction, change-related anxiety, and job engagement fully mediated the relationship between perceived T&D and intention to stay while emotional exhaustion did not mediate this relationship. A recent study conducted by Stamolampros et al. (2019) highlighted the importance of career progression in employee retention and suggested that employees leave a company primarily

due to the lack of opportunities for career advancement. Thus, this idea supports the social exchange theory.

Work-Related Attitudes: Change-Related Anxiety and Employee-Engagement

Zalewska (2011) defined job-related anxiety as perceiving a job-related situation that is potentially threatening and reflects the quality of the person-environment relationship. Job-related anxiety consists of situational anxiety (emotional reaction to current situations) and persistent anxiety (perceiving the job as a source of potential threats). Haslam et al. (2005) stated that anxiety affects work both at an individual level through, e.g., impaired work performance, accidents, and sickness absence and at the organizational level through reduced productivity, worsened staff morale, accidents, absences, and staff turnover, among others.

Eltaybani et al. (2018) defined work engagement as a positive, fulfilling work-related state of mind characterized by three dimensions: vigor, dedication, and absorption. A recent study conducted by Zhang et al. (2018) further divided employee engagement into job engagement and organization engagement and found that employees' organizational engagement has a stronger effect on their intention to stay compared to job engagement. Based on the previous studies, in this research, we hypothesized that;

H.1: Perceived training and development have a positive relationship with employee intention to stay.
H.2.1: Change-related anxiety mediates the relationship between perceived T&D and employees' intention to stay.
H.2.2: Employee engagement mediates the relationship between perceived T&D and employees' intention to stay.

Research Methodology

This study used a quantitative method. Our respondents were employees from various companies in the Greater Jakarta area. We choose this area because most companies in Indonesia are located in this area. We used primary data collected using a closed-ended questionnaire containing items measured on a 5-point Likert scale ranging from strongly disagree to strongly agree. We developed three questions assessing how those employees perceived T&D in their working place or to construct perceived T&D variable, three questions assessing change-related anxiety variable, six questions measuring employees' engagement variable, and we added two questions measuring intention to stay variable.

Results

Before conducting the main test, we examined the validity and reliability of variables using 30 respondents. Following *Bartlett Test of Sphericity,* several invalid questions removed. Subsequently, we included data from all 125 respondents for the multiple regression analysis using SPSS 22. Reliability test results for all variables show in table 1.

Table 1: Reliability Test

Construct variables	Cronbach's alpha	conclusion
Perceived T & D	0,782	Reliable
Change-related anxiety	0,828	Reliable
Employee engagement	0,902	Reliable
Intention to stay	0,729	Reliable

Furthermore, all assumptions of regression, including normality test, multicollinearity, heteroscedasticity test, and the DW, were met, indicating that the model can be used for hypothesis

testing and analysis. From the regression results, we found that the direct relationship between Perceived Training and Development and Intention to Stay was significant, with a coefficient of 0.455 and a p-value of 0.005. The indirect relationships among variables are presented in Figure 1.

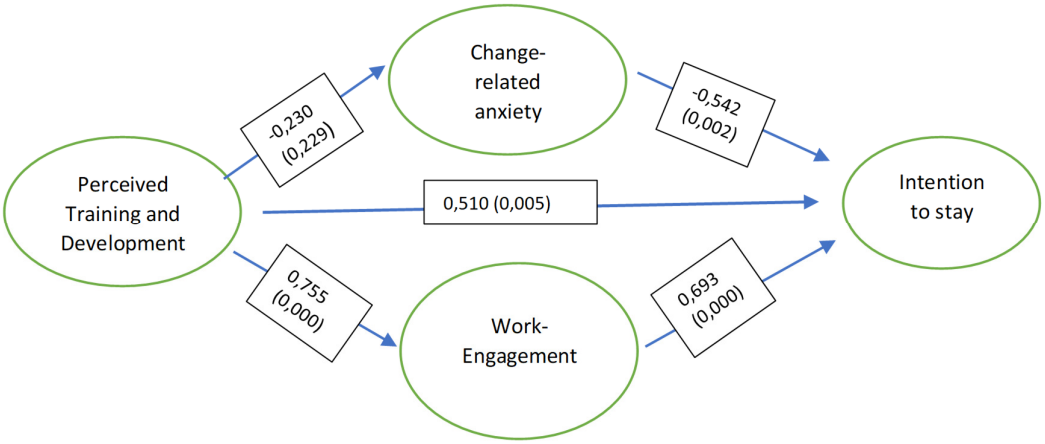

Figure 1: The regression results

Regression results supported the first hypotheses proposing a positive relationship between T&D and employee intention to stay (with beta coefficient 0.510). We also found a negative relationship between change-related anxiety and intention to stay (with beta coefficient -0.542), a positive relationship between employee engagement and intention to stay (with beta coefficient 0.693), and a positive relationship between perceived T&D and employee engagement (with beta coefficient 0.693). However, the data did not support the hypothesis that proposed a relationship between perceived T&D and change-related anxiety.

After calculating both direct and indirect effects of perceived T&D on the intention to stay through change-related anxiety, we calculated the coefficient VAF of 0.196 or 19.6%. It means that change-related anxiety did not mediate the relationship between perceived T&D and intention to stay, disproving hypothesis 2.1. Calculating both direct and indirect effects of perceived T&D on the intention to stay through employee-engagement yielded the VAF coefficient of 0.506 or 50.6%. It means that employee engagement fully mediated the relationship between perceived T&D and intention to stay, following the criteria developed by Hair et al. (2013) and hence supporting hypothesis 2.2.

Discussion

Our findings here are in line with Koster et al. (2011), who stated that the company's investment in T&D significantly contributes to the perceived support in employee development, as predicted by the social exchange theory. In other words, T&D increase not only employees' skills and their market value but also their loyalty to the company. This finding does not support the human capital theory, which argues that skilled employees will tend to seek another opportunity outside the company.

However, two important work attitudes, change-related anxiety and employee engagement, explained the positive relationship between perceived T&D and employees' intention to stay reveal differently. We found that employee engagement variable fully mediated the relationship between T&D and intention to stay while change-related anxiety did not mediate this relationship. This finding is inconsistent with Fletcher et al. (2018), who found that both employee engagement and change-related anxiety fully mediated the relationship between T&D and employees' intention to stay. In other words,

in the case of Indonesia, T&D were positively related to employees' intention to stay if the T&D program were able to facilitate employees' engagement with their job and company. Meanwhile, the T&D program that is purposely designed to minimize change-related anxiety will not provide the same result, even though change-related anxiety tends to encourage employees to leave their jobs.

Conclusion

This study concludes that for cases in Indonesia, the social exchange theory can explain the relationship between T&D and employees' intention to stay. We found a positive relationship between perceived T&D and employees' intention to stay. However, the two variables examined, change-related anxiety and employee engagement, played different roles in mediating this relationship. Change-related anxiety did not mediate while employee-engagement fully mediated this relationship. We suggest that when designing a T&D program, a company should address how the program will increase employees' commitment, not just their job-related capability. Another conclusion, we do not suggest that companies should invest in a T&D program to mitigate change-related anxiety, even though change-related anxiety appears to have a significantly negative effect on employees' intention to stay. However, further research is needed with broader respondents to evaluate this finding.

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Entrepreneurial Orientation toward Access to Finance of Start-ups in Indonesia

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Abstract

This paper aims to evaluate how entrepreneurial orientation affects the access a startup has to financing, from both angel investors and venture capital firms. Entrepreneurial orientation in this context consists of risk-taking, proactiveness, and innovativeness. We also evaluate whether a company's growth mediates those relationships. For this research, we use primary data from surveys distributed to the CEOs or managers of startups in Indonesia collected through e-mail, WhatsApp, and social media. The data collected is then processed using the multiple regression and binary logistic methods with the help of SPSS software. Linear regression reveals that risk taking positively affects startup growth, as does innovativeness. However, there is no evidence that proactiveness affects the growth of startups. Furthermore, our logistic regression showed that startups with high growth had a much greater chance of generating funds from venture capital firms. However, growth alone cannot attract angel investors for provide financing for startups. This finding indicates that start-up founders should highlight different aspects of their operations when seeking suitable investors.

Keywords: *Start-up financing; entrepreneurial orientation; start-up growth; innovativeness; risk-taking.*

Introduction

According to the Google and Temasek report regarding the economy in SEA 2018, the size of Indonesia's digital economy market is estimated to have a value of US $27 billion, which is almost 40% of the entire Asia Pacific market, and is expected to reach US $100 billion in 2025. In 2018, the same report stated that Indonesia's gross merchandise value (GMV), or total sales of all goods on the e-commerce platform during a certain period, reached 2.9% of its GDP. Based on the data from the Indonesian Creative Economy Agency (Bekraf), there have been 992 startups spread across Indonesia's provinces. Previously, Indonesia presented a new vision of becoming the most significant digital economy in Southeast Asia in 2020. Of course, in order to achieve that vision, it must make the most of local products and actors.

Even though entrepreneurs have strong ambitions to build startups and can provide ideas and innovation, entrepreneurs still encounter many obstacles as they continue to grow their startup companies. According to a survey conducted by Bekraf in 2018, the main problem faced by entrepreneurs is obtaining capital. Startup financing has unique characteristics, since this type of business brings high risk and a lack of collateral to access funding from commercial banks.

Widyasthana et al. (2017) stated that investors who finance start-ups require high and fast growth. When funding a startup, investors tend to be willing to invest in businesses with high growth rates.

Firlana et al. (2019) also found that, in the context of digital startups in Indonesia, growth is an important factor for investors.

Although there is still limited research that identifies a direct relationship between the two variables, Covin and Lumpkin (2011) state that the dimensions of entrepreneurial orientation can support the acquisition of capital or funding for companies. Megha et al. (2016) then stated in his study that one of the indicators of growth for a startup is the value of entrepreneurship. Venture capital firms usually provide financial assistance for creative and innovative young entrepreneurs who want to build their businesses (Calopa et al., 2014). Common reasons for angel investors to invest include earning profits, encouraging business activities, creating value, and also encouraging entrepreneurial values (Calopa et al., 2014), thus indicating the importance of entrepreneurial orientation for angel investors.

Many other researchers have carried out studies on the relationship between entrepreneurial orientation and company performance or growth and have analyzed the relationship between access to corporate funding for the growth of individual companies. However, research related to the relationship between the three variables, namely entrepreneurial orientation, growth rate, and access to the financing from startup companies, is still limited, especially in Indonesia. Based on the lack of research related to the three variables above, this study seeks to identify whether access to funding from a startup company is supported by entrepreneurial orientation and the growth of the company. In this study, we evaluate two primary funding sources for a start-up: venture capital firms and angel investor.

This paper is structured as follows. After the introduction, we present a literature review regarding startup financing and entrepreneurial orientation in Section 2. We describe the data and methods in Section 3. Analysis and discussion are performed in Section 4, followed by a conclusion in Section 5.

Literature Review

Start-ups Access to Finance

Financing for start-ups different from funding of for business in general, even since seed stages. In seed stage, a new company need to develop business plans, making prototypes, and conducting additional research (Barell et al., 2015). As companies grow and the need for funding increases, generally, they seek funding through commercial banks. Usually, lenders need a definite business plan, a positive record of achievement, and collateral with high value (Bista, 2016).

The startup financing process is different. According to Calopa et al. (2014), most startup companies try to avoid bank loans; instead they seek financing from angel investors or venture capital firms. Angel investors are individuals or groups of individuals who invest during the initial stages of new high-risk businesses with the hope of receiving a high rate of return (Bovée & Thill, 2014). Also, angel investors help entrepreneurs to realize the business ideas of entrepreneurs by sharing knowledge and experience (Calopa et al., 2014). They also bring connections, relationships, and expertise in specific sectors or business areas (Bista, 2016). A venture capitalist (VC) is often known as an investment specialist who collects funds from many sources (both private and institutional) to fund new businesses that have high growth potential. VCs require capital and often receive a proportion of ownership instead (Barell et al., 2015). Their main objective is to invest in companies with high levels of risk and growth in the hope of gaining tremendous profits (Bista 2016).

Entrepreneurial Orientation

According to Covin and Wales (2012), entrepreneurial orientation (EO) is "*managerial disposition rooted in decision making*." Previously, Covin and Slevin (1986) outlined three dimensions of entrepreneurial orientation: risk taking, proactiveness, innovativeness. Risk-taking refers to the behavior of an entrepreneur in the face of uncertainty. Without readiness to take risks, innovation and opportunities for success in the future will not be easily obtained (Caruana et al., 2002). The action of risk-taking is considered very important in order to maintain the position of the company and

performance in a dynamic and extraordinary business environment (Kreiser & Davis, 2010). Proactivity or proactiveness refers to the ability of an individual to foresee problems in the future. Proactive behavior is considered an initiative by an entrepreneur to exploit opportunities and then introduce new products and services to be able to overtake competitors (Rauch et al., 2009). A proactive nature reflects the importance of taking the initiative in the entrepreneurial process, which can then create a competitive advantage so that companies can influence their environment by actively observing the pressures that arise (Grande et al., 2011). The dimensions of innovation are described as behaviors that are bound by creative and experimental characteristics that generate new products or services based on research and development (Rauch et al., 2009). Innovativeness reveals the tendency of companies to use and maintain procedures, new ideas, originality, and experiments, which then lead a company to produce new products, services, or operational processes (Lumpkin & Dess, 1996).

Start-up Growth

Davidsson et al. (2005) argue that it is difficult for us to capture a clear picture of all of the literature about the determinants of company growth. According to Davidson et al. (2005), the growth of small companies should be based on the perspective of amount-change perspectives, such as revenue growth and a measure of size change, such as market growth. Lechner and Dowling (2003) state that the contribution of business partners is significant for companies to achieve their strategic objectives and then measure growth based on the number of business partners it exhibits. Firlana et al. (2019) measured a start-up's growth based on the number of acquisitions undertaken and the number of monthly user visits on the platform or application.

Methods

Research Data and Sample

In this study, the quantitative data used was obtained through surveys in the form of questionnaires that the authors distributed to the respondents. The questionnaire was compiled using forms which then spread to respondents through e-mail, Whatsapp, and LinkedIn. The questionnaire includes questions that aim to measure each research variable addressed to the CEO/Board of Directors/Managers of startup companies in Indonesia. In collecting samples, this study adopted a non-probability sampling technique. Based on the needs of this study, researchers have set specific criteria to be met by prospective respondents, so the researchers adopted the judgmental sampling method. When determining the sample, researchers make specific considerations that were adjusted to the criteria set (Malhotra, 2006). The requirements set by the researchers include that the respondents must occupy positions of CEO/Director/Manager of startups in Indonesia that have IOs and Android applications.

Because the performance and growth of the company can be assessed using a variety of indicators, to anticipate variations in performance and growth assessments in this study, researchers define company growth as the extent to which financial and non-financial goals, compared to competitors, are achieved based on the perception of the business owners and Chief Executive Officers (CEOs) surveyed.

Results and Discussion

Validity, Reliability, and BLUE Test

We conducted a pre-test for the data consisting of KMO to evaluate the adequacy of the data used, Bartlett's Test and component matrix to evaluate questionnaire validity (we found values above 0.5), and Cronbach's Alpha to evaluate the reliability construct used for each variable (we found values above 0.6). As we use regression method to test our hypothesis, we also conducted a statistical (BLUE) test, including the normality test using the Kolmogorov Smirnov test (the result of 0.20 indicates that the model is normally distributed), a multicollinearity test using VIF (with a VIF value for each variable of less than 10), a Glesjer test for heteroscedasticity (value above 0,5, indicate homoscedastic residual).

We also found the DW to be 1,879, indicating that the model does not contain misspecification errors or autocorrelation. All tests were passed, suggesting that the model met the goodness of fit criteria.

Results

We conducted three regressions for data processing. The first regression is a multiple linear regression to evaluate how entrepreneurial orientation affects start-up growth. The second and third regressions are logistic models to evaluate the likelihood of a start-up to gain access to venture capital financing or not (2nd regression) and the likelihood to gain access to angel investor financing (3rd regression). A summary of the results are shown in Figure 1.

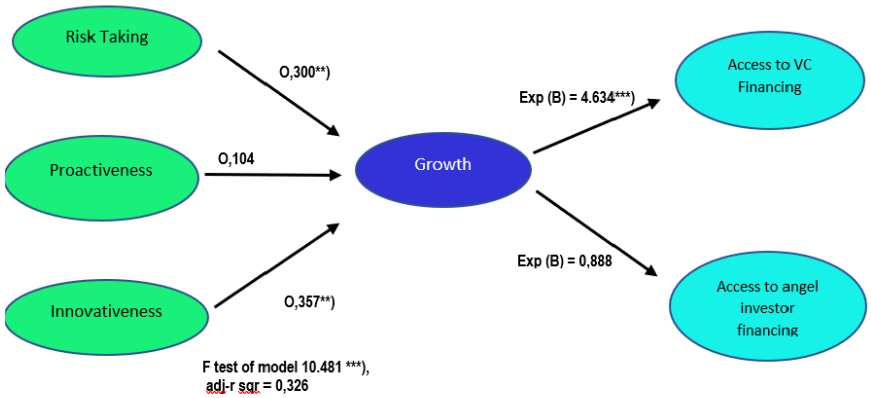

) significant at 5%, *)significant at 1%

Figure 1: Summary of regression results.

The results of the first regression show that two dimensions of entrepreneurial orientation – risk-taking and innovativeness – positively affect start-up growth, while there is not enough evidence that another dimension – proactiveness – affects startup growth. Innovativeness shows better to explain startup's growth. The model itself indicates that both risk-taking and innovativeness can explain 32.6% of a start-up's growth.

The second logistic regression shows that start-up growth significantly explains its access to venture capital financing. A startup with high growth has a much greater chance of generating funding from venture capital compared to start-ups with low growth. However, the third regression shows a different conclusion, since there is not enough evidence that a startup growth affects its access to angel investor financing. A startup with high growth has only a 0.88% chance of generating funding from an angel investor compared to startups with a lower growth rate.

Discussion

The results of data processing show that two aspects of entrepreneurial orientation – risk-taking and innovativeness – have a significant effect on startup growth, while proactiveness shows no effect on startup growth. While this result is contrary to that of Megha et al. (2016) and Sidek et al. (2016), the results are in line with Filser and Eggers (2014). This finding is reasonable because, according to Kreiser and Davis (2010), the optimal level of each dimension of entrepreneurial orientation is different based on each company's environment. Therefore, environmental factors could explain why proactiveness does not significantly affect the growth of all startup companies in Indonesia.

The logistic regression revealed that a startup's growth has a significant effect on its access to venture capital funding but has no significant impact on its access to angel investor funding. These findings

supported the work of Van Osnabrugge and Robinson (2000), who stated that angel investors tend not to carry out professional due 2diligence but act more on their instincts in the financing process. Most angels use their funds to invest based only on personality, despite the fact that it can lead to poor investment decisions (see Sudek, 2006).

Conclusion

This study aims to evaluate how the entrepreneurial orientation of startup companies affect their access to financing from angel investors and venture capital firms. We found that two dimensions of entrepreneurial orientation – risk-taking and innovativeness – affect start-up growth. However, the third aspect of entrepreneurial orientation – proactiveness – does not have an effect on start-up growth. We then found that the proven growth of a start-up significantly increases their chances of obtaining funding from venture capital firms but not from angel investors. This finding indicates that venture capital financing representatives significantly consider a start-up's growth for their investment, while angel investors do not emphasize the same element. We suggest that founders of start-ups who seek source of financing, especially those in Indonesia, consider these differences.

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Exploring the Karl Marx Guild System in Relation to the Indigenous Igbo Business Mentoring for Raising Entrepreneurs

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Abstract

In every society, the idea could be regarded as a component of development in as much as its source could be associated with human thinking for solutions to combat problems confronting human existence. From time immemorial, it is evident in the literature that every invention and innovation that has resulted in the transformation of human lives and society is traceable to a conceived and explored the idea. The exploration and documentation of such an idea have engendered positive creativities in all spheres of life for the betterment of the human race. In other words, an undocumented idea, no matter how brilliant, can be decimated and eventually become useless. In the same manner, the ancient guild system conceived by Karl Marx in the medieval period could be regarded as one of such notable ideas in human history. Guild system is the union of craftsmen for communal assistance and fortification in furtherance of professional benefits. Also, it could be regarded as the process of training "a new generation trader" between the 11th and 16th centuries in Europe. The system was said to have formed a vital aspect of the economic and social fabric of the era before it was later discarded or consumed by the propensity of capitalism. Either by acculturation or academic linkages or most especially the poor economic development of Nigeria that has resulted in the high rate of unemployment and abject poverty, the practice of indigenous Igbo business mentoring has brought to bear the relevance of the ancient guild system in recent times, as a cogent solution to job creation to reduce the plague of unemployment and abject poverty confront the youth population in the Southeast Geopolitical Zone of Nigeria. The present paper intends to explore secondary data and content analysis as a methodology to examine the connection between the guild system and indigenous Igbo business mentoring and illustrates its usefulness in raising entrepreneurs. In addition to the above, it tries to discuss the possibility of developing the practice to engender, human and economic development in Nigeria

Keywords: Guild system, relation, indigenous Igbo business mentoring.

Introduction

In every society, ideas of human beings could be regarded as components of development. This is because the source of every notable development could be traced to human thinking and the inspiration of God to provide solutions to various problems confronting humanity and to make existence comfortable (Rodeny, 1972). From time immemorial, human ideas explored and documented have resulted in invention and innovation that has stemmed from the transformation of human lives from poverty to affluence. Also, many such ideas have engendered social change that has propelled human society from agrarian societies to a more civilized type, characterized by Information Science and Technology (ICT). In other words, an undocumented idea, no matter how brilliant it could be, can be decimated and eventually become useless.

In human history, the ancient guild system conceived by Karl Marx in the medieval period could be regarded as one of such notable ideas that has influenced human lives positively in the area of raising entrepreneurs to alleviate unemployment, abject poverty and to encourage job creations, production of goods and services for exportation and home consumption, and to facilitates economic development (Suvittawat, 2019).

Guild system is the union of craftsmen for communal assistance and fortification in furtherance of professional benefits. Besides, it could be regarded as the process of training “a new generation traders” between the 11th and 16th centuries in Europe. The system was said to have formed a vital aspect of the economic and social fabric of the era. According to Bruno (2017), its decline was expedited by patents provided by royal families of the era and it later facilitated the rise of industrial revolution and capitalism, which has been responsible for the dilapidation of human labour, social, physical product and the environment in the present age Bruno, (2017) as the capitalists' established industries for the production at the expense of human safety, life, and decency.

The negative effect of capitalism has continued to generate an extensive argument in academia, mostly on its drive for maximum profits and enslavement of manpower, which seems to have resulted in the poor economy of most developing countries and also aggravates joblessness and abject poverty in such countries. As a way out of this situation, the guild system suddenly reemerged as a strong strategy for raising entrepreneurs in the Southeast Geopolitical Zone of Nigeria in a new form of indigenous business mentorship. With this development, it appears the idea of Karl Marx on the guild system has become inconsumable and a strong strategy to be reckoned with in raising entrepreneurs in the contemporary.

The practice of indigenous Igbo business mentorship could be regarded as an informal business education to lunch people, mostly the youth into the world of business transactions. Apart from that, the concept could be considered another form of apprenticeship that ensures skill acquisition for the incursion into trade and commerce. Furthermore, it is a special idea conceived by “Ndigbos” for rising young entrepreneurs (Udeze, 2014).

Apart from comparing it with the ancient guild system, the practice of indigenous Igbo business mentorship could be linked with various strategies emanated from developed nations for raising funds to establish small-scale enterprises. Such include Venture capital (Alexy and Block, 2012; Obi-Anike, Okafor and Adeleke, 2020), Crowdfunding Mollick, 2014; Ali, 2020), bootstrapping Lahm and Little (2005), angel investors Ramadani, (2012). While some authors have explored some of the above strategies in developing countries, approaches originating from a traditional background in developing countries such as Nigeria have not been adequately addressed in academic literature. Such include the practice of indigenous Igbo business mentorship for establishing small scale business in contemporary Nigeria. Although, some scholars have carried out studies on this strategy Orugun and Nafiu (2014), its connection with the ancient guild system in respect of raising entrepreneurs is seemed to have been neglected.

The neglect in business and academic literature in academia in Nigeria could be regarded as a serious flaw in the knowledge that needs to be corrected. This is because it could create an impression that Africans do not value their ideas, not to talk of developing it, but ideas and concepts developed in

Western nations, which seems to have failed in engendering national development (Akeredolu-Ale, 1975).

Had it been that various indigenous entrepreneurship in Nigeria has been properly developed, the scheme might have attracted global influence, job and wealth creation as well as improvement in the standard of living of many Nigerians. Thus, the high rate of unemployment and abject poverty (Akinbobola & Saibu 2004; Eweniyi, 2019) which some authors have associated with criminality among the youth population, could have been avoided.

This paper is sub-divided to discuss the concept of mentoring and guild system, indigenous Igbo business mentoring, its origin, nature, translation to small-scale business and relevance to youth development, etc.

Literature Review

The Concept of Mentoring

The term mentoring according to Bozeman and Feeney, (2007) cited in Idemudia, (2011) is a process involving the transformation of knowledge (formal or informal), social capital and psychosocial backing, which beneficiaries (mentees) considered appropriate to work or business transactions. This author also argues that it entails face-to-face informal communication during a sustained period, between persons who are considered to possess cognate knowledge and individuals who are novice (protégé) Idemudia, (2011).

Dwelling on the above definition, mentoring could be considered a process that involves time, assistance, process, the relationship of self-development between a mentor and protégé Idemudia, (2011). The mentor is generally expected to mediate on expert knowledge for the novice, help develop the novice's full potential in areas of human endeavours (Ilieva-Kolev, 2015; Kunaka and Moos, 2019). For Kunaka and Moos (2019), it has successfully been engaged as a valuable private development instrument in both business and academic environments as it bridges between business and academia. However, the thrust of this paper is on the indigenous Igbo business mentoring which could be akin to the Cognitive Apprenticeship Theory developed by Collins, Brown, and Newman (1989) as the process where a principal of a skill teaches that skill to an intern to develop the potentials in him or her.

Kram, (1985) cited by Okurame, (2011) identifies four stages of mentoring, which include: the initiation stage, usually between 6 months and 5 years; the cultivation stage which is usually between 6 months and 2 years, a separation stage that falls within 6 months and two years and lastly redefinition stage where the relationship is redefined and partners see each other as contemporaries.

According to Kram (1985), mentors perform two main functions. These include career development and the provision of psychosocial needs (Noe, 1988b; Schockett & Haring-Hidore, 1985). While studies have shown several instances of mentoring in all spheres of life, the aspect involving the practice of indigenous Igbo business mentoring has not been adequately addressed in academic and business literature in Nigeria. Nevertheless, a few existing pieces of literature on the subject has shown that its influence in transforming the lives of youth has remained impressive. In present-day Nigeria that most families and government, at all levels do not have plans for the youth, indigenous Igbo business mentoring seems to have provided a possible solution to the escalation of unemployment and abject poverty among the youth population.

The Concept of Guild System

The guild system is strongly associated with (Marx, 1954). Based on his notion, it means the amalgamation of craftsmen for communal support and strengthening of professional benefits. As indicated in several studies globally, Karl Marx (1818–1883) is extensively known as the originator of scientific socialism and one of the best revolutionary critics in human history (New World Encyclopedia, 2020). The system aimed at training "a new generation traders" in the medieval period, between the 11th and 16th century in Europe. Marx (1954), argues that it formed a vital aspect of the economic and social fabric of the era. The system operated in the following three stages: Master, Journeyman, and apprentice. The system emerged due to the need to safeguard commerce and industry

in rural areas that were outside the scope of feudalism since there were no laws or customary laws directing economic activities in the era. In many places, town charters specifically stated that the inhabitants of a town could form a guild (New World Encyclopedia, 2020).

The Concept of Indigenous Igbo Business Mentoring and its Origin

Indigenous Igbo business mentoring could be regarded as a traditional form of business skill and acquisition in the form of an apprenticeship or mentoring for establishing SMEs. It could also be regarded as a scheme or service that entails financial rewards to complement the skill acquired to settle oneself in a business of a lifetime with the possibility of transcending into generational ventures. According to Dibia (2013), this apprenticeship scheme is considered an unstructured training or scheme arranged for a definite time, which youth undergo to gain a desirable aspect of entrepreneurship skill through the development and automation of the Igbo Trade Apprenticeship System (ITAS).

Its origin could be associated with the negative effect of the Nigerian civil war on Igbos in the Southeast Geopolitical Zone of Nigeria. The quest of many of them for survival after the war seemed to have prompted them to look inwards for what they could do to attract affluence and greatness outside white-collar jobs. As illustrated by Aremu and Buhari (2017), the acute problem of starvation experienced in the course of the war negatively affected them and it prompted them to device ways of settling themselves through the indigenous business mentoring. The concept according to Orugun and Nafiu (2014), later became an indigenous apprenticeship model for raising entrepreneurs through the Igbo business learning culture otherwise known as (ITAS).

The Nature of Indigenous Igbo Business Mentoring

According to the popular dictum, nothing good is easy to come by, the practice of indigenous Igbo business mentorship is not without cost. The cost involving youth forfeiting early marital pleasure in life for this training, which could enable them to settle down permanently. This is because the opportunity to acquire training for personal development for the betterment of one's career is better acquired at an early stage when the strength and time suitable for it are available. Apart from this, the Igbo nation believes that marriage attracts heavy responsibilities from men and that it is better to acquire skills needed to acquire wealth before marriage. The aim of this is to enable Ndigbos to perform obligations relating to family affairs properly.

The significance of this strategy in many communities in Igbo land necessitates traditional ceremonies on two major occasions. The first has to do with the induction of "Nwa Boy" into mentorship. The occasion necessitates the presence of the parents of "Nwa Boy" to hand over their sons to his "Nna Ukwu" (mentor). The importance of Igbo culture is usually brought to bear on such occasions as cola nuts are broken and shared with decorative rituals beseeching the spirits of the assembled ancestors or with prayers to bless the occasion. Palm wine drinks are served and the oral agreement is made after the prospective "Nwa Boy" has been advised to imbibe qualities such as diligence, uprightness, and veneration (Agozino and Anyanike 2007). The ceremony also allows Nna Ukwu to state his expectations and give the parents of "Nwa Boy" his assurance about the welfare of their son under his tutelage. Upon the completion of mentoring, a freedom party, normally regards as a graduation ceremony and the commencement "Nwa Boy" business in life.

Although, "Nwa Boy" is in categories but there is a clear difference between a businessperson who engaged in indigenous Igbo business mentoring and others who engage in just serving the master in his or her house. Women are in such a category. They are either paid or unpaid in the service of their mistresses at home. However, studies have shown that some of them are permitted to partake in skills of their choices while living with their mentors, depending on the agreement, after which they are properly settled but those who engaged in paid services never participate in any skills acquisition, except if their mentors permit them to do so (Obunike, 2016).

Translation of Indigenous Igbo Business Mentoring to Small-Scale Business

As soon as "Nwa Boy" completes the period of mentorship, he receives "Idu-Odibo" (the financial assistance) to complement the skills acquired (Obunike, 2016). However, it should be noted that "Idu-Odibo" could either be in form of a cash reward to enable him to open his own business and run it by

himself or a new business entirely set up for him by his mentor. The family of both the mentor and "Nwa Boy" as well as their community members usually see the day of settlement as a great day because both the mentor and "Nwa boy" are perceived as being faithful and responsible to each other. In such an occasion, people wine and dine, as it marks the graduation ceremony of "Nwa Boy" and his inauguration into business world Obunike, 2016).

The Relevance of Igbo Business Mentoring to Youth Development

Dwelling on UNESCO (2018), the most accurate description for youth is young persons transiting from the dependency stage to adulthood. The period marks the commencement of awareness of interdependence as affiliates of a given community (UNESCO, 2018). Besides, age, education, and employment are other concepts that are similar to the above description. Thus, youths are generally specified as persons between the age of leaving compulsory education and entering their first employment UNESCO (2018). However, our focus in this study is hinged on age and employment. Age is crucial to the indigenous Igbo business mentoring, as persons engaging in the scheme do so early in life and their time of graduation could be regarded as the period of entering the labour market for productivity for personal and societal development, which concurs with Seers (1969), who argues that development entails a given country's capability to reduce or eliminate her experience on poverty, inequality, and unemployment

Just like other careers in every human society, business is regarded as a lucrative adventure that enables the youth to develop business potentials for income generation and job creation to reduce poverty (Igwe, Adebayo, Olakanmi, Ogbonna and Aina 2013). Thus, it could be observed that success in life is not tied down to one profession and education may not determine it, but it could be used to aid the attainment of success. However, what matters is the development of potentials in one life and business acumen or entrepreneurial skills could be regarded as parts of them.

At a tender age, most "Ndigbos" youth, especially those who do not have an interest in education or those who lack sponsorship engage in business mentoring to settle the issue of employment in life. The training and financial assistance received at the end of mentoring allow them to set up their businesses. In such SMEs, income could be generated and it could be used to expand the businesses and to perform sociological obligations in the family and the society. These include getting married to settle down. Based on African traditional belief, getting married is regarded as the first step to becoming responsible in life and the responsibility is determined by how a man makes provision for his family members. This involves sponsoring children in educational institutions where quality education could be obtained, granting adequate treatments to members of the family during sickness or disease, ensuring befitting accommodation and nourishing meals three times daily, etc.

In addition to the above, a part of such income could be used to assist members of the extended family, most especially one's parents. At old age, decent accommodation could be built for them while provision could also be made for their upkeep. Further to that, the income could be used to pay the school fees of those in educational institutions, opening the business for others who are into vocational business. In addition to the above, it could be used to assist in community development. In as much as Obunike, (2016) argues that wealth is determined in Igbo land via some factors, out of which the number of communal development projects launched per time contributes significantly, and it is only those who are successful in their pursuits, business inclusive, who could contribute to such projects. Such persons do so because they share the belief of Ndigbos on "Aku ruo ulo, o kwuo ebe o si", meaning developmental projects pronounce one wealthy and they cherish being called wealthy persons in their communities.

According to Obunike, (2016), such projects include the erection of beautifying edifies in rural areas to replace the old and dilapidated ones which support comfortable accommodation that is considered as one of the major determinants of a standard of living that influences peoples life expectancy ratio, as often indicated in development index. The income derived from Igbo business mentoring could be used to influence facility development in the educational sector to promote literacy. It could also be used to support orphans and indigent students, either in education or vocational trainings, support electrification projects and grading of roads in communities, which are major determinants of development using the United Nations development index.

Besides, the number of "Nwa Boy" trained in a given community by "Nna Ukwu" is also been used to determine their wealth in Igbo land. As argued by Obunike (2016), Igbo nationality is an aggressive communal setting rather than individualistic and wealth is, therefore, the only means of attaining social prestige. In African settings, money determines the acquisition of social prestige which includes respect, the invitation to ceremonies and the conferment of chieftaincy titles on people. The highest of such titles in Igbo land is called Ozo titleholders and it is being given to wealthy persons in their professions, irrespective of education. Among Igbos, obituary, naming and marriage ceremonies are held in high esteem. Concerning obituaries, the wealth of persons in the family is shown when parents are about to be buried. It involves the killing of cows, engaging popular musicians, purchasing of "Aso Ebi" (family clothes) and spraying of money in parties to accord due respect to the death. Hence, income from businesses set up through indigenous Igbo business mentoring could be used to fulfill the above mentioned obligations in the family and community.

In addition to the above, the practice of Igbo business mentoring could enable some youth who possess entrepreneurial skills to acquire training and financial assistance to develop their potentials and prevent such potentials from decadence. The training and financial assistance received to setup business could prevent such youth from indulging in criminal activities that undermine national development.

Lastly, as a concept that is strictly associated with Igbo extraction, indigenous Igbo business mentoring provides a planform for orienting youth from one immediate and extended family into business transactions (Obunike, 2016). Given this, entrepreneurship drive has been running through families in many towns and communities in Igbo land. **Table iii** shows a few of such families, their communities and line of businesses. Therefore, cases of children towing the footsteps of their community mentors or siblings or parents in business from one generation to another have been gaining ground in Igbo land for the past few decades (Egwu, *et al.*, 2011).

Table iii: Some "Ndigbo" Family Names, Line of Business and Sources

SN	Family Name	Line of Business	Sources
1	Akokwa local entrepreneurs	Kitchen utensils and household equipment	Obunike (2016)
2	Nando indigenous traders	Pharmaceutical drug business	Obunike (2016)
3	Nnewi indigenous entrepreneurs	Motor parts and transport business	Egwu, Ogbu, Ogunji, Oselebe & Udu (2011)
4	Alor indigenous entrepreneurs	"ogbo abada" (wrappers),	Obunike (2016)
5	Abiriba indigenous traders	Okirika" (second-hand materials)	Obunike (2016)
6	Agulu indigenous traders	Bread making	Obunike (2016)
7	Ebonyi indigenous traders	Petty businesses and farming	Obunike (2016)
8	Awka-Etiti people	Cosmetics line of business	Obunike (2016)
9	Uke people	Tobacco stuff and articles	Obunike (2016)
10	Nsukka entrepreneurs	Palm wine	Obunike (2016)
11	Awka indigenous traders	Blacksmithing	Obunike (2016)
12	Others		

Source: Researcher's Compilation, (2019)

The Connectivity Between the Ancient Guild System and Indigenous Igbo Business Mentoring

The ancient guild system could be compared with the practice of indigenous Igbo business mentoring in the following ways:

Firstly, the two schemes aim at achieving objectives bothering on raising a new generation entrepreneur. In the medieval era, the system formed a vital aspect of the economic and social fabric (Bruno 2017). Also, indigenous Igbo business mentoring is considered a platform for expanding entrepreneurial development in contemporary Nigeria.

Secondly, as the guild system protected the business professionals in its time, indigenous Igbo business mentoring has been protecting the business profession among "Ndigbos". This is evident in the formation of the Igbo Trade Apprenticeship System (ITAS) (Orugun and Nafiu, 2014).

Thirdly, when the guild system was in place, it impacted business skills on prospective entrepreneurs, indigenous Igbo business mentoring has been impacting business skills and financial assistance on "Nwa Boy". The most critical aspect is the recycling of "Nwa Boy" in various communities in Igbo land, which has been responsible for transforming lives from abject poverty to affluence (Obunike, 2016).

Fourthly, both systems aim at protecting the business interest of the mentors and mentees at the same time. The two were put in place to assist both the mentors and mentees. As mentees continue to serve his master, they are acquiring business skills while the service they sender goes to promote the mentors' business.

Fifthly, in its era, the guild system was considered a vital aspect of economic development and in the present generation, indigenous Igbo business mentoring is considered a powerful system of building the economy in Nigeria where the economy is poor. It is also regarded as a weapon for job and wealth creation amidst the present rate of a high level of unemployment and poverty.

Further to the above, both systems (guild and indigenous Igbo business mentoring) could be traced to capacity building and transformation of society from one level of development to another. The contributions of guild system to economic development before the advent of capitalism could be difficult to ignore while the contributions of the indigenous Igbo business mentoring in transforming the Igbo nation to the epicenter of business transaction in Nigeria has been strongly illustrated in previous studies (Orogun and Nafiu, 2014).

The Challenges of Indigenous Igbo Business Mentoring

Since the indigenous Igbo business mentoring is a loose or unstructured form of skill acquisition, it appears the agreement binding the practice is verbal and yet to be entrenched in the customary law in the practicing communities in the 21st century where business laws guide economic activities and make parties involved in transactions secured against fraud. Although some studies have shown that it relates to the culture of Igbo nation Orogun and Nafiu (2014), the failure to formalize the practice in the customary laws guiding custom and tradition of Igbo people may present it as a primitive system which could undermine justice, a cogent aspect of development in contemporary societies. The modern business transaction is being guided by some laid down rules and regulations to enforce justice whenever there is a breach of contracts. In the absence of such, an unfaithful "Nwa Boy" who steals "Nna Ukwu" money may be difficult to prosecute except if the "Nna Ukwu" wants to obtain justice by consulting an oracle or by forcing such "Nwa Boy" to swear before his deities.

Apart from the above, the probability of some "Nna Ukwu" being greedy by paying "Nwa Boy" an insignificant "Idu-Odibo" (the official settlement) that may not be sufficient to run his proposed business may not be ruled out. Such "Nwa Boy" may need to source additional funds elsewhere to augment his "Idu-Odibo". Applying this to the Surplus Value theory of Marx (1954), a part of the success of "Nna Ukwu" is related to his ability to expropriate the surplus-value of the power of labour of the "Nwa Boy" who served and received an insignificant "Idu-Odibo" under him. In so doing, the labour of "Nwa Boy" creates value and if it were to be paid in wages, the "Nna Ukwu" could still retain the proportion of the profits produced as surplus value.

In addition to this, Obunike, (2016) argues that some "Nna Ukwu" belong to occult groups and usually initiate their "Nwa Boy" to such groups to extend their social networks for a greater economic impact in their areas of influence. Also, it has been argued that some "Nna Ukwu" usually force their "Nwa Boy" to swear before their deities to prevent them from stealing their money and goods. And in an attempt to secure greater economic and social impact some "Nna Ukwu" use their "Nwa Boy" for ritual to convert their potentials to their Obunike, (2016). These activities impede the fundamental human rights, economic and religious development of "Nwa Boy".

In another development, some studies have shown that most "Nwa Boy" work long hours and under unsafe conditions. These include working 16 hours a day and all through the week and residing inside "Nna Ukwu" shops. The negative implication of residing in business premises could be grievous on the health and safety of "Nwa Boy". Authors such as Omonijo, Adetola, Lawal, Odukoya, Olowookere, Okunlola, and Rotimi, (2019) argue that if not well managed, it could jeopardize the "Nwa Boy" intending economic feat and human development Omonijo, Uwajeh and Anyaegbunam, (2019).

Furthermore, one of the two parties ("Nna Ukwu" or "Nwa Boy") could die in the process of mentoring. In such a situation, the purpose of engaging "Igba-Odibo for establishing small scale business and development is defeated (Agozino and Anyanike, 2007). Although, if "Nna Ukwu" is affected, the probability of "Nwa Boy" switching over to another "Nna Ukwu" may not be ruled out it may amount to forfeiting "Igba-Odibo" for the years he had served his "Nna Ukwu", and starting a new term of mentoring with the new one could be frustrating. As it could be regarded as labour lost and the prolonged years of mentoring which could cause unnecessary delay in setting up his business. Similarly, if "Nwa Boy" is affected, his "Nna Ukwu" may not want to compensate his family which means labour lost to both "Nwa Boy" and his family.

Apart from the above shortcomings, "Nwa Boy" has been condemned on anachronistic sexist stereotype due to the inability of its practitioners to extend it to female fold (Obunike, 2016; Agozino and Anyanike, 2007). As demonstrated by the above scholars, the practice is common among males than females. Apart from that, it could be argued that the practice is a primitive system that encourages modern slavery and child labour. Since most youth usually engage in the practice early in life, the probability of it contradicting the law of child labour may not be ruled out.

Recommendations for Further Studies

In order to determine the true position of critics on the ground that indigenous Igbo business mentoring is a primitive system and modern time slavery that encourages child labour, the paper recommends further studies to either support these criticisms or negate them.

Concluding Remarks

This paper compared the ancient guild system of Karl Marx in the medieval period with the practice of indigenous Igbo business mentoring in Southeast Geopolitical Zone of Nigeria. Although its emergence in the Southeast Geopolitical Zone of Nigeria that has no link with the medieval period could be regarded as a mystery, it goes to illustrate that a notable idea originated and documented in a part of the world could be revisited in another part of the world, either through social change or advancement in science and technology or education, for the betterment of the human race. Thus, the comparison becomes essential due to the cogent roles the two systems play in the impartation of business skills, provision of financial support for mentees to commence their businesses and the protection of mentors' business interests and the profession involved. The paper is of the view that if the system could be properly organized, it could be a major source of economic development and a weapon of human transformation in Nigeria, where the level of unemployment and abject poverty is unusually high.

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Examining the Conditions of Service in Indigenous Igbo Business Mentoring: Implications for Human Development

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Abstract

In every work organization either formal or informal, the conditions of service are usually put in place to ensure human development. While its importance in the lives of workers and apprentices has been expressed in the literature emanating from developed nations, mostly in areas of health and safety, studies in many developing countries have shown otherwise, especially in modern and traditional vocational jobs, like motor repairs and indigenous Igbo business mentoring. This could give an impression that health and security of workers and apprenticeship are not considered very important; whereas studies have shown the expediency of health and safety not only for workers and apprentices but the entire populace. Thus, it is the responsibility of the government of every nation to make adequate provision for them. The level of development in developing countries coupled with poor leadership that is self-centred with little concern for the well-being of its citizens/followers have created an impression that health and safety of people are not important. In Nigeria, it appears the situation is more horrible in some apprenticeships in some private organisations such as motor, bicycle repairs, and business transactions such as indigenous Igbo business mentoring. But this study limited its scope to indigenous Igbo business mentoring which entails mentoring the youth for business skills and financial support to establish small-scale enterprise for a time frame. The article examined the condition under which apprentices-"Nwa boy" serve and the implications it portends to human development. The study used data from a secondary source and also engaged with content analysis as a methodology. The article, in its concluding remarks, commended the practice due to its contributions to job creation to reduce the high rate of unemployment in Nigeria. It also commended its contributions to the social and human development of "Nwa boy" (apprentice) that have enrolled in the practice. Despite these, the study argued that if the conditions of service of indigenous Igbo business mentoring could be improved so that the purpose of indulging in the scheme could be properly established and also influence its sustainability

Keywords: Conditions of service, indigenous Igbo business mentoring, implications, human development.

Introduction

Dwelling on several pieces of literature reviewed on work organisations, (the Brazilian Ministry of Labour and Employment 2013; Sani, 2013; Junaidu & Aminu, 2015; Naz & Sharma, 2017), Conditions of Service (CoS) could be regarded as special terms designed to ensure fair treatment between

employers of labour and employees in work organisations. Thus, in both developed and developing countries, other studies have shown that it is a vital aspect of work and its expediency could be attributed to the following factors:

- Granting workers a befitting treatment at work;
- Enabling the workforce to develop potentials for fulfillment;
- Granting manpower a sense of belonging in work settings;
- Providing workers with an opportunity to be effective and efficient at work;
- Granting workers an assurance of sustenance after retirement;
- Enabling employees to contribute immensely towards actualizing the goals of the organization; and
- Enabling training and to retain experienced manpower, which is essential for economic development (The Brazilian Ministry of Labour and Employment, 2013).

As CoS service is regarded as work settings global phenomenon, research has shown that its applicability to workers varies between developed and developing countries, probably due to different countries' level of development, the type of government in each of them and the nature of the elites in power. Thus, some authors have argued that good and attractive CoS exist in developed nations while that of developing countries is characterized by unattractive and unimpressive. This according to them has been responsible, majorly for the menace of brain drain in developing countries and brain gain in the developed world.

This is not surprising, studies have shown that the economy of developed nations is good Nnadi, (2014) and that their elites and government functionaries are responsible to the masses Stiglitz, (1993). Thus, they perceive governance as an opportunity to serve humanity. Besides, it appears the nature of human beings in developed nations tends towards having considerations for the masses. This could be used to explain the minimal level of siphoning the resources meant for national development in their countries. But in developing countries, the reverse is the case; most of the elite and government functionaries are irresponsible to people in order to be selfishly responsible to themselves (Nnadi, 2014). Thus, they perceive an opportunity to serve as an occasion to siphon the resources meant for development. Besides, it appears they lack any concern for the plight of the masses as they often loot the resources of the nation and stockpile the loot in developed nations. Apart from the above, it appears developed nations ensure compliance to CoS in various organisations in their countries while developing countries are less concerned, judging from the way human capital is being treated with contempt in various organisations (Nnadi, 2014)

In developing countries, studies have shown that CoS exists in both the formal and informal sector. In informal organisations, such as vocational or apprenticeship centres, the application of CoS to training apprentices may not be prominent like formal organisations. This could be attributed to the fact that the products or services of such centres are extremely different from that of formal organizations. Besides, most formal organization operate on profit-making while the informal centres like apprenticeship focus on skills impartation. Thus, the CoS of profit-oriented organisations may be different from the non-profit oriented version.

In Nigeria, some authors have argued that the focus of people for work is gradually been shifted from formal organisations to vocational occupations due to the prevalence of high rate of unemployment that impacts negatively on lack or wants among the populace (Muraina and Bawalla, 2019). Thus, articles on means of creating self-employment in craftsmanship and artistry such as sewing and tailoring, bricklaying, shoemaking Schmitz (1995), bicycles and motor repairing, black-smiting, carpentry, weaving pottery and dyeing, hair plaiting/dressing/barbing Onyechukwu, (2006) have featured prominently in academic literature.

In recent times, some others have focused on trade, commerce (Hodge & Smith, 2019) and others relating to small, medium and large-scale businesses, which involves the practice of indigenous Igbo business mentoring. The practise according to the few pieces of literature in its favour in business and academic literature involves the youth enrolling in business mentoring early in life in order to acquire

skills and funds to set up SME as a profession of a lifetime Udeze, (2014) cited in Omonijo, Adetola, Lawal, Odukoya, Olowookere, Okunlola, Rotimi, (2019).

The Igbo nation is the third large ethnic tribe in Nigeria (Findlay, 2016). The nationals occupy the southeast region of the country but spread across Nigeria engaging in business transactions. Their presence is obvious in towns, villages and cities in the country promoting economic development through small and medium enterprises (SMEs) that has its origin in mentoring. Despite this, indigenous Igbo business mentoring is yet to be adequately addressed in the literature. Although the works of (Agozino and Anyanike 2007; Orugun and Nafiu 2014; Obunike, 2016; Omonijo et al., 2019) are related to entrepreneurship in line with the practice but none of these studies investigated the conditions under which intending or prospective entrepreneurs undergo mentoring, which may not be appropriate for human development. The present study was therefore conceived to address this gap in knowledge.

As a country that is being confronted with poor economic development, restricted access to funding business in both short and long terms, inadequate institutions for training a skillful class of businesspersons and workforce, a small revenue, and poor guidelines to aid economic and social upgrading of SMEs, Herr and Nettekoven (2017), the practice of indigenous Igbo business mentoring could be a welcome idea but the CoS guiding the practice needs to be discussed to ensure its survival and contributions to human and national development in Nigeria. This paper addresses this flaw in knowledge gap and the mentoring process.

Although, authorities on the subject of entrepreneurship, such as (Wilken, 1979; Schumpeter, 1983; 1989; Davidson & Wilkins, 2001 & Storey, 2003) and have illustrated the importance of entrepreneurial activities to developed and developing countries but the work of Schumpeter (1983) on SMEs, in particular is more relevant to this discourse. As argued by Schumpeter (1983), SMEs is designed to help the masses in developing countries due to the prevalence of unemployment and poverty in such countries. Nigeria is one of such countries, where the economy is poor, coupled with the high rate of unemployment NBS (2019), poverty Eweniyi, (2019) and lack of welfare system (Rudra, 2007). Since its inception, the practice of the indigenous Igbo business mentoring, has been assisting some of the youth to setup their personal businesses to get rid of unemployment and poverty.

This paper is sub-divided to discuss the exposition of research on the conditions of service, research on human development, indigenous Igbo business mentoring etc.

Literature Review

Exposition of Research on the Conditions of Service

In several studies, various terms have been used to describe CoS. These include Terms and Conditions (T & C), Terms of Service (ToS) etc. Such conditions are regarded as legal treaties between employers of labour and employees but it could be amended at any time as stakeholders deem fit, most especially the employer of labour Kornblum, (1997). In Brazil, such CoS is generally regarded as an apprenticeship contract which means a special work-related agreement created in writing for a specified period not more than two years. However, it should be noted that CoS are in different categories, depending on positions being occupied. Thus, while there are CoS for a fixed employments there are for temporary ones, but all of them are illustrated in the staff handbook.

In most organisations CoS include salary, benefits and allowances which include medical, life and disability insurance, savings fund, dependency benefits and education allowance, rent, annual leave and bonus, maternal and paternity leave, installation allowance, resettlement allowance, home care, removal expenses-leave and leave to travel abroad.

In business transactions that deal with mentoring, mentors should be able to come up with CoS for the mentees with the aim of providing them methodical technical and vocational training measurable with their moral, physical and psychological development. In turn, it should contain the mentees obligations to act diligently in carrying out all the necessary tasks for the training. However, it appears such

provisions have not been adequately expressed in academic literature with respect to the indigenous Igbo business mentoring.

Examination of Research on Human Development

United Nations Development Programme, (2019) view human development as a means of expanding the abundance of human life, instead of the economy in which people live. Moreover, it could be regarded as a strategy channelled at creating fair opportunities and choices for humanity. UNDP, (2019) stipulate the following approach to human development:

- People-in this approach, the emphasis is placed on how to improve the lives people and not on economic growth. Income growth is therefore perceived as an important means to development rather than an end in itself;
- Opportunity- this approach is concerned with how more freedom and opportunities could be giving to people to live lives that they value. This connotes granting people ample opportunity to develop their abilities and chance to use them. For Instance, educating a girl child could enable her to build her skills and with the skill, she should be giving an opportunity to display the skill in the labour market; and
- Choice- This approach is hinged on making choices available for people and not insisting that they must make use of them all because the choices that people make are their own concern.

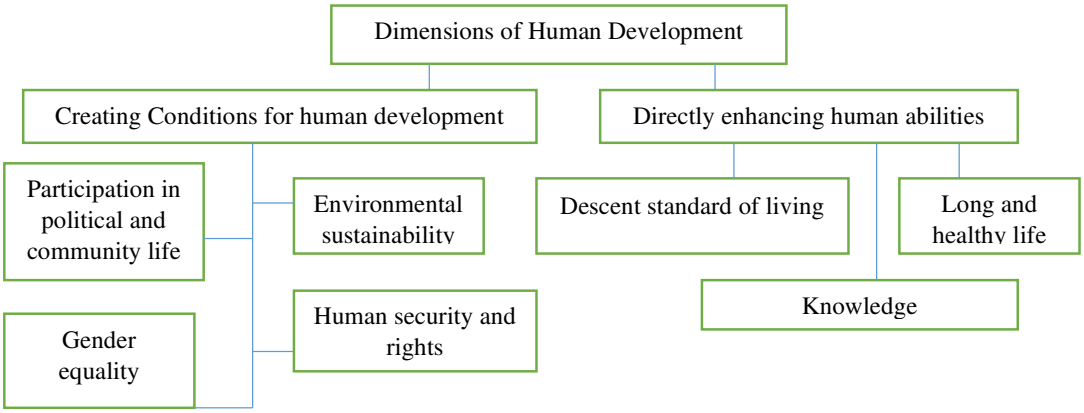

Fig. i: Approaches to Human Development

Source: *UNDP, (2019)*

These approaches could be viewed in line with Sen, (1989) work on human capabilities which is hinged on whether human beings are able to "be" and "do" desirable things in life, which expresses if people are well fed, have sheltered, and living a healthy life. It also includes being educated and working, voting, participation in community life.

Indigenous Igbo Business Mentoring (IIBM)

IIBM, according to Udeze, (2014) cited in Omonijo, et al., (2019) is regarded as an informal apprenticeship system specially designed to impact business skills and also grant financial assistance to prospective entrepreneurs among youth in the southeast geopolitical zone of Nigeria (Just like other informal vocational training, it is a loose form of acquiring skills where serious conditions of service may not be considered essential, except the agreement policy, which is not supported by the legal system, that binds "Nna Ukwu" (mentors) and "Nwa Boy" (mentees) throughout the period of mentorship.

"Nna Ukwu" usually acts as the mentor and the owner of the SME while the "Nwa Boy" is the mentee who enrolled in mentoring. The role of "Nna Ukwu" has to do with what Bozeman and Feeney, (2007)

cited in Idemudia, (2011) refers to as imparting informal knowledge relating to economic, cultural, political and psychosocial backing relevant to a particular business. It entails face-to-face informal communication during a sustained period of time, between the mentee and his mentor. Moreover, it goes with financial assistance to enable the "Nwa Boy" to establish his own business, which could reduce the rate of unemployment and poverty.

The process commences when the intending entrepreneur (mentee) identifies a successful entrepreneur in his locality either through his parents, friends or siblings and approaches him for mentorship. The mentor, in turn usually organizes an initiation ceremony where the mentee is handed over to his mentor in the presence of village Chiefs for a couple of years for mentoring (Obunike, 2016)

As soon as "Nwa Boy" ends the period of mentorship, his "Nna Ukwu" grant him "Idu-Odibo" (the financial assistance) to complement the skills acquired under him (Obunike, 2016), either in form of cash reward or a new business open in his favour. The family of both the mentor and mentee as well as their community members usually see the day of settlement as a great day because both the mentor and mentee are perceived faithful and responsible to each other. In such occasions, people wine and dine at the settlement party, which serves as a graduation ceremony and the inauguration of the mentee into his personal SME (Obunike, 2016).

SMEs according to the development plan of the Nigeria small scale industry (1980) as cited by Ayozie (2006) are either service industries or manufacturing processes that have investments not more than one hundred and fifty thousand naira in manufacturing and equipment alone. However, for the purpose of this study, SMEs are regarded as service industries which engage less than ten workers to run the business (Ayozie 2006). As the rate of unemployment and abject poverty keep on escalating in Nigeria as indicated in **Fig. ii and iii**, the drive towards the engagement of SMEs through IIBM is gradually gaining ground among the Igbos

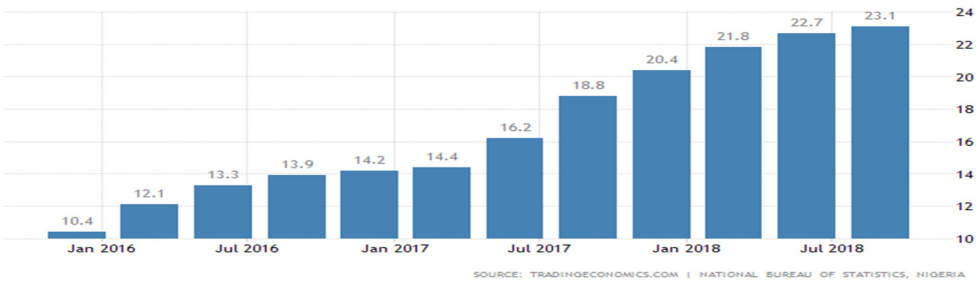

Fig. ii: The Rate of Unemployment in Nigeria

***Source**: NBS, (2019)*

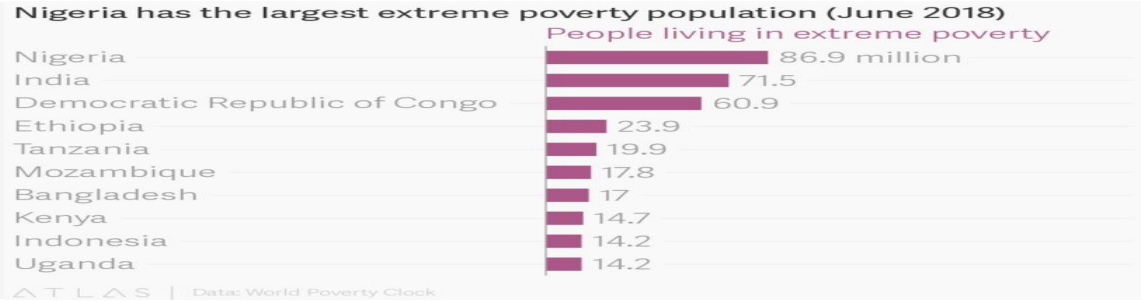

Fig. iii: The Rate of Poverty in Nigeria

Source: Culled from Eweniyi, (2019)

Contributions of IIBM to Human Development in Nigeria

IIBM serves as a source of funds and skill acquisition for intending entrepreneurs, irrespective of social-economic, background. The "Idu-Odibo" received at the end of mentoring could be successfully used to set-up small scale businesses. In such enterprises, incomes could be generated for re-investment and revenue to the government. The income from such business could also be used for human development of "Nwa Boy" to the level of being able to cater for his family, in term of sociological, educational, cultural and economic obligations. It could also be used to assist in building community projects.

The expansion of such businesses could also provide an opportunity for recycling of "Nwa Boy" within the family and in the community and also provide job opportunity for some persons. These include the clerk, driver, administrative officers, security guards etc. (Ayandibu and Houghton, 2017). In such businesses, goods produced could be exported to other countries in order to earn foreign exchange which could help the government to get rid of the balance of payment deficit. Apart from that, good produce in such enterprises could contribute to the Gross Domestic Product (GDP) Opafunso and Adepoju, (2014).

Examining the Conditions of Service in IIBM and Implications on Human Development

Just like most organisations, formal or informal in developing countries, the conditions of service is usually poor Asogwa (1981) and it could impact negatively on human development of mentees/employees. Factors such as biological, chemical, social and chemical are normally encountered at work Asogwa (1979) and they should be categorized along with conditions of service. Further to that, working hours involving duty shift and off, quality of residence, feeding and environment where the work takes place are essential parts of the conditions of service which could be used to determine peoples wellness and life expectancy. And if they are not properly managed, they could cause disorder and occupational diseases Sambo and Shamang, (2012) in the lives of workers/mentees.

With reference to IIMB, Obunike (2016), argues that many "Nwa Boy" work long hours every day, including weekends. This means staying in "Nna Ukwu" shops or premises for more than necessary and it goes to contradict the European Commission's Working Time Directive which stipulates proper time out periods' to maintain health Working Time Directive (2003). In the course of rest, Meijman and Mulder (1998) argue that the recovery, that occurs when people rest is vital for the maintenance of their health. The period is considered the return to and steadiness of psychophysiological systems at a starting position of stimulation in the period of lack of demand for work.

Although, the continual availability of members of staff in some organisations outside the nine to seventeen hours working-day is necessary but such is regarded as a nonstandard working schedule that is detrimental to human health. According to Merkus, Holte, Huysmans, Mechelen and van der Beek (2015) nonstandard schedule connote any roster that is different from forty-hours of engaging in work-related activities per week. This includes working for eight hours a day, from Monday to Friday; employments relating to shift-from six am to six pm, extended hours of working for weeks (> 5 days), on-call duties, etc. In most businesses involving the indigenous Igbo business mentoring, the description of nonstandard hours of engagement of Merkus, et al., (2015) could be applied to "Nwa Boy" who are observing their mentorship in enterprises located in popular cities and junctions, where commuters stop to refresh themselves before proceeding on their journey to their final destinations.

In Southern Nigeria, such include Lokoja, Ore, Aba, Oshodi, Okene, Oluku, Auchi and Aviele junctions etc. In such locations, "Nwa Boy" could engage in nonstandard training schedule since customers are constantly patronizing the business 24/7. The negative implication of engaging in nonstandard training schedule lies in depression Merkus, Holte, Huysmans, Mechelen and van der Beek (2015), harmful health effects like sleep disturbances (Amagasa and Nakayama, 2013; Kato, Haruyama, Endo, Tsutsumi and Muto (2014) and other occupational diseases like fatigue Muller,

Carter and Williamson (2008) and coronary heart disease Bannai and Tamakoshi (2014). The probability of "Nwa Boy" who fall victim getting treatment promptly may be doubtful, due to the cost of treating such ailments and the poor condition of health centres across Nigeria. Besides, some "Nna Ukwu" may not want to spend their money treating him or her.

Besides, it could be observed that most "Nwa Boy" dwells in their "Nna Ukwu" shops which undermine the quality of residence as illustrated by Ayedun, Omonijo, Durodola, Akinjare and Akannni, (2019). This means places, where business transactions take place, could also be used as "Nwa Boy's" residential quarters. Also, such places could be used for cooking, eating and sleeping. Apart from these, bathing, watching of plates and clothes etc. could equally be taking place in the same shop. The implication of using one shop for these activities could be grievous for "Nwa Boy" health and security mostly when chemicals and biological substances are involved. In respect of security, "Nwa Boy" dwelling in "Nna Ukwu" shops stands a great risk in contemporary Nigeria that the rate of armed robbery, ritual killing, kidnapping are exceptionally high Omonijo, Obiorah, Uche, Anyaegbunam, Shaibu and Ogunwa, (2017).

Apart from the fact that shops could be broken into in the night, and goods worth thousands of naira stolen away, "Nwa Boy" residing in the shop could either be maimed, killed or used for ritual purposes. In the course of the robbery, it could be very intricate for "Nwa Boy" to escape since he resides in the premises. If he survives, the probability of his "Nna Ukwu" accusing him of being an accomplice could be very bright. Such a wrong accusation could prompt "Nwa Boy" to develop psychological trauma which may likely affect his social relationship with his "Nna Ukwu"

In another development, the IIBM condition of mentorship is said to entail an agreement for settlement in term of funds to complement the training received, but the probability of some greedy "Nna Ukwu" exploiting their apprentice by paying them an insignificant "Idu-Odibo" at the end of mentoring may not be waved aside. Any business, either small, medium or large that is not controlled by the government is governed by the core principle of capitalism- minimization of cost for actualizing maximum profit and since profit is one of the purposes of setting up the business, hardly can any capitalist be found solely committed to benevolence in business transactions? "Nna Ukwu" are private businessmen who are out to make a profit. Before such entrepreneurs could grant their "Nwa Boy" enough funds to set up their businesses, they must have used them to make a huge profit. In case, some of them fail to make a huge profit in the course of mentoring a greedy "Nna Ukwu" may find it difficult to honour the term of service properly. In such a situation, Marx (1954), position on exploitation could be justified. The major implication of this is that "Nwa Boy" may need to source for additional funds from elsewhere, to commence his business which may not be forthcoming. In such a case, he may find it difficult to find his footing in business for a very long time.

The probability of such "Nwa Boy" being subjected to depression and psychological trauma may not be ruled out. It may be very difficult to get rid of the pains incurred in the process of trying to struggle to raise enough funds to commence his business. If he eventually succeeds, he may likely use it as a yardstick to exploit "Nwa Boy" who pass through him and may likely become a vicious circle of exploitation which could be very difficult to get rid in IIBM.

Concluding Remarks

This article discussed Condition of Service (CoS) with a special reference to the Indigenous Igbo Business Mentoring (IIBM). It illustrated the existence of nonstandard training schedule in IIBM and its implications on "Nwa Boy" in terms of social, economic, health and security. Also, the article commended the practice due to its contributions to job creation to reduce the high rate of unemployment and poverty in Nigeria. The paper is of the view that if the CoS of the indigenous Igbo business mentoring could be improved, the purpose of indulging in the scheme could be properly established. It could also engender efforts to sustain the practice for the betterment of the Nigerian youth.

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The Influence of Social Media Marketing on Brand Equity in Evoking Brand Choice Intention Amongst Smartphone Brands

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Abstract

This study aims to provide further insight into how Social Media Marketing (Twitter, Facebook, Instagram, Youtube) may affect ones brand choice intention mediated by the level of consumer value in the brand or Brand Equity (Perceived Quality, Brand Awareness, Brand Image) of Samsung and Apple users as they are notably similar brands which sell smartphones at a relatively premium price compared to its rivals. This research compiled 160 respondents for each brands Samsung and Apple, wherein the writer had simply aimed to provide a general overview of whether the model may be applied to such context and each brand individually. Hence, having processed the data through a Structural Equation Model approach using SmartPLS the writer had found that for both brands there is a significant positive impact of Social Media Marketing Efforts on evoking ones brand loyalty and its outcome brand choice intention; with a higher indirect effect when considering the role Brand Equity has on Brand Loyalty.

Keywords: Social Media Marketing Efforts; Brand Awareness; Brand Image; Perceived Quality; Brand Choice Intention

Introduction

By definition, "social media marketing are processes or events that use social media in an attempt to positively influence consumer's purchase behavior" (Dann, 2010). Such marketing channel already reaches more than two thirds of all Internet users; provides unparalleled opportunities for brand and reputation building (Zuniga, 2010). Specifically within Indonesia, based on a survey conducted by Hootsuite; social media usage has reached almost 48% of the total population indicating that the potential market for businesses to implement digital marketing strategies is widespread (Hootsuite, 2019). Among those who access social media, 130 million Indonesians use their mobile devices implying that the country is well technologically savvy and that 150 million people are active in exchanging and activating their social media as users. Among the 150 million people active in using social media, data from Hootsuite as of January 2019 indicate that the top 4 social media platforms used by Indonesians by rank respectively is YouTube, Facebook, Instagram, Line, Twitter

In response to such growing usage of social media, a growing number of businesses are using social media namely Social Media Marketing as a new of interacting with its consumers in various industries. Among the many industries contributing to Indonesia's GDP/national income in 2019, data from BPS/Badan Pusat Statistik abbreviated as the Central Statistical Body indicates that within the Non-Oil & Gas Manufacturing industry, both the Electronic and Food/Beverage Sector are major contributors to the nation's GDP each amounting to 65 575,9 and 253 583 billion respectively. the smartphone industry primarily makes up for the electronics sector in terms of web traffic usage. In accessing such digital content and social media marketing efforts, shown through web traffic by the latest Global Web Index (2017) 69% of Indonesian's use their mobile phones while the remaining 31% make use of their laptops and tablet devices. Such data implies that many consumers have preference in using mobile phones or smartphones in engaging with social content.

Research from the Statista Research Department, shows that the expected smartphone penetration rate as a share of the total population in Indonesia may reach 33% in 2023 (Statista, 2019). Because of such high potential in market size and current demand for smartphones in Indonesia, smartphone brands must provide for effective social media marketing efforts to engage and retain its consumers in the long run. It is for this reason that this paper will examine further such industry, specifically Samsung and Apple as these two brands are notably known to be premium smartphone brands with a relatively high standing in market share as of September 2019 ranked respectively based on research conducted by Statcounter. To elaborate further on the object brands of this research that is Apple and Samsung, generally the prices set for its smartphone products are higher than other competitors within the Indonesian market. As of 2020, based on data from Price Price.com new Apple smartphone products for generations released from 2014 up until its newer products in 2019 are priced ranging from Rp 1,660,000 for its Iphone 6 with 16GB capacity up until its newest model Iphone 11 Pro released in 2019 priced at Rp 11, 950,000 (Editor)Such prices, are retrieved from various online and offline vendors which are then averaged to provide a glimpse into the market price ranges for such products. Samsung on the other hand, up until such similar period for its product released in 2014 that is Samsung Galaxy Note 5 with 32GB capacity at today's market price is set at Rp 1,000,000 with its most recent model launched that is the Galaxy Fold priced at a staggering Rp 28,000,000. Both brands, have products categorized as its relatively cheaper models that is the A and J series for Samsung whilst Apple reaching such category through their R and C smartphone versions of their flagship series the Iphone.

Based on the issues and findings aforementioned in the previous paragraph, the writer then intends to continue such research. For the purpose of this paper, the writer would further analyze the impact of social media marketing efforts (Entertainment, Interaction, Customization, Trendiness, EWOM) brand loyalty and its impact on brand choice intention as its outcome as a criterion variable. More dimensions of measuring ones brand equity is also taken into consideration by perceived quality to further provide insight. Also, to fulfill limitations set within the previous study the writer will incorporate social demographic variables such as ones gender, age, income in order to identify whether such factors may have an influence on the proposed model and others. In addition to this, research examining social media marketing effects from the perspective of branding literature is also still mainly exploratory and lacks empirical studies (Boride, 2014). Hence, the object of this research would be focused on a different industry that is on premium selling smartphone brands (Samsung and Apple) wherein, smartphone usage is exponentially on the rise and that social media engagement is done primarily through mobile phones/ smartphones in Indonesia. As Indonesia is currently ranked third in Southeast Asia for its use of smartphones, such study on such brands would have to employ effective SMME to engage its consumers. Following the main journal by B Godey, as the writer has made general explanations as to why the object of this research would be focused on Smartphones such change in focus is justified as in short compared to the luxury fashion brands, smartphone brands are naturally more competitive thus contributing to a shorter life cycle for its products than the retention of luxury fashion items. The writer wishes to explore such different nature of product through this research compared to luxury fashion brands, which are complementary in nature. Based on an article by Kompas, Indonesian consumers in Indonesia have become more critical when opting to choose Samsung products in the midst of the growing number of Samsung brands.

Generally, smartphone brands are substitute products wherein the characteristics have positive cross price elasticity, which measures the impact of the demand of a product towards the relative change in price of a another competing brand. Compared to luxury fashion brands, the nature of such products are complementary in nature as consumers are less sensitive to price changes due to their understanding that such products are meant to be priced at high levels. This as a result, contributes to its negative cross price elasticity, wherein a change in price of a rival fashion brand will not necessarily impact demand of another competing product.

Literature Review

Digital Marketing

By definition, the American Marketing Association's firm denotes that Digital marketing is seen as 'activities, institutions and processes facilitated by digital technologies for creating, communicating and delivering value for customers and other stake holders. In other words, digital marketing is marketing done online whether via websites, online ads, opt in email, mobile apps or other emerging platforms (Smith, 2017). The development of technology has allowed firms to create more value through new customer experiences and interactions by known digital platforms. Data indicates that sales made through mobile devices are increasing at a rapid rate to between 22% and 27% of all online sales (L, 2015). Corporations now highlight the importance of creating a "digital relationship" with customers (E, 2015). In other words Digital Marketing is an umbrella term wherein the process of using digital technologies to acquire customers and promote sales is measured. With a more customer centric focused approach of marketing its products, firms will face the shifting of younger customers to use digital platforms wherein "younger, digitally oriented consumers enter the ranks of buyers" (Bughin, 2015).

Complementary and Subsitute Products

Generally, within marketing literature product categories must be defined so that proper analysis of an inter category relationship may be identified. In short, products are considered a substitute if lowering the price of a product leads to an increase in sales of its rival product within the same category (A, 2004). Contradicting, Complementary products are those whose demand are not elastic to changes in price of a another similar brand. Generally, strong substitutes should be offered separately whereas complements are advised to be offered to consumers in a bundle so that it may maximize its profit (A, 2004). Complementary goods are divided into those with weak and strong relationships wherein it is judged by its cross elasticity of demand; changes in the price of one good will not neccesarily cause a demand decrease of another good. If such good is used parallel with another product, its overall value is deemed to increase hence the higher offering.

Social Media Marketing Efforts

For the purpose of this study, the research of Kim and Ko (2012) provides a framework of understanding factors within SMME namely entertainment, interaction, trendiness, customization and word of mouth (Ko K. &., 2012). As each consumer has differing preferences and experiences to perceiving ones SMME, enterprises must organize marketing activities according to different user needs and that they must understand users' needs earlier than the users themselves and learn which products users need in order to organize events that leave lasting impressions

Entertainment

Entertainment is the result of the fun and play emerging from the social media experience (Gionis, 2008). Users who are having fun and experience a lot of enjoyment are basically the pleasure seekers on social media sites (Tang, 2013)

Interaction

Interaction is the act of involving consumers and communicating with consumers through the use of social media. It can offer the exchange of ideas and create a room for dialogue between brands and its consumers. Social media interaction is a platform where the users interact with each other, contribute to the discussion, give suggestions on specific products or services and likeminded people meet to express their views on issues (Smit, 2011)

Trendiness

Social media as a channel for communication should provide the latest news and hot discussion topics to the public (Gravano, 2011)Consumers consider the information which is given on social media to be more trustworthy than information provided by the traditional sponsor of the brand (Precourt, 2008).

Customization

The level of *customization* describes the degree to which a service is customized to satisfy an individual‘s preferences (Schmenner, 1986). Having elements of personalization incorporated within the firms SMME would evoke a degree of individuality hence potentially creating stronger brand loyalty (K M. , 2010

e-Word of Mouth (eWOM)

Within SMME, when implemented effectively it is a great tool for evoking *eWOM,* as consumers may spread information and brand ideals to their friends, peers and other acquaintances without constraints (Ko K. &., 2012).

Brand Equity

For the purpose of this research, Brand Equity is measured in terms of consumer based brand equity wherein it acts as the impact of consumer knowledge on a specific brand given the set marketing activities.

The model of brand equity that Keller (1993) proposes is dominant, providing the link between its two dimensions- brand awareness and image. According to him*, brand awareness* refers to the strength of the brand node specifically the consumer’s ability to identify the brand under different conditions. Keller describes brand image as ‘Perceptions about a brand which the brand association in consumers memory reflect (Keller, 2003).

Perceived quality refers to “ a consumers judgment resulting from comparisons made by consumers between expectations and the perception of the service performance” ((Chambers, 1989). The term perceived quality might be gathered through both prior use of a certain product and clues such as brand name price and brand advertisements (Dodds, 2002).

Brand Loyalty

From previous journals, as suggested by Oliver (1999) Brand Loyalty is regarded as a customer’s “deeply held commitment to rebuy a preferred product or service consistently in the future, despite situational influences and marketing efforts having the potential to cause switching behavior” (Oliver, 1999). In addition to this, he suggested that brand loyalty means the strong trust of customers in a specific product or brand which leads to reduction in the probability of customer’s brand switching.

Brand Choice Intention

Brand choice intention refers to the preference of consumers to choose a certain brand over rivals given the information and knowledge presently available. In other words, it is a “consumer outcome to a certain brand wherein brand loyalty is a determinant” . According to Keller (2003), brand choice intention is the consumer intentions to still choose a brand in the midst of other competitor brands. Also, Keller states that consumers would prefer brands to which they are familiar in recognition.

Methodology

According to Malholtra (2010), a research design is a framework or blue print necessary for conducting a marketing research project as it explains the necessary steps in obtaining desirable information to solve research problems (Malholtra, Marketing Research: An Applied Orientation, 2010). Specific for this research, the writer would use a conclusive approach to solving the subject at hand. This is due to the reason that a conclusive approach provides a more formal and structured manner in reaching conclusions and aid in providing information reliable for decision making. As the writer intends to examine the relationship between SMME and its ultimate impact on ones brand choice intention as an outcome from loyalty, the structure of research would be Causal

Table 1: Operationalization of variables

Item	Definition	Operational Variables		Likert Scale	Source
Entertainment	Entertainment is the result of the fun and play emerging from the social media experience			**Likert 1-7**	Kim & Ko (2012)
		Using X Brand Social Media is Fun			
		Content of X brand's social media seems interesting			
Interaction	It can offer the exchange of ideas and create a room for dialogue between brands and its consumers				
		X Brand's social media enables information sharing with others			
		Conversation or opinion exchange with others is possible through X Brand's social media			
		It is easy to provide my opinion through X brand's social media			
Customization	The level of customization describes the degree to which a service is customized to satisfy an individual 's preferences				
		X brand's social media offers a customized information search			
		X brand's social media provide customized service			
e-WOM	Consumer gesture to spread information and brand ideals to their friends, peers and other acquaintances without constraints as a consequence of Brand X social media.				

Item	Definition	Operational Variables	Likert Scale	Source
		I would like to pass information on brand product or services from x brand' social media to my friends		
		I would like to upload content from X brand's social media on my blog (Any active social media platform currently used by the respondent; either Twitter/Facebook/Instagram/ / YouTube)		
Trendiness	Social media as a channel for communication should provide the latest news and hot discussion topics to the public (Naaman, Becker & Gavano 2011			
		Content of X brand's social media is the newest information search		
		Using X brand's social media is very trendy		
Brand Equity				
Brand Awareness	Refers to the strength of the brand node, the consumer's ability to identify the brand under different conditions			
		I am always aware of X brand		
		Characteristics of X brand come to mind quickly		
		I can quickly recall the symbol or logo of x brand		
Brand Image	Perceptions about a brand which the brand association in consumers memory reflect			
		X brand is a leading smartphone company		
		X brand has extensive experience		
		X brand is a representative of the smartphone industry		
		X brand is a customer oriented company		
Perceived Quality	The term perceived quality might be gathered through both prior use of a certain product and clues such as brand name price and brand advertisements			
		Brand X offers very good quality products		Buil et al (2008), Yoo and Donthu

Item	Definition	Operational Variables	Likert Scale	Source
		Brand X offers products of consistent quality		(2001) and Netemeyeret al (2004)
		Brand X offers very reliable products		
Brand Loyalty	Loyalty means the strong trust of customers in a specific product or brand which leads to reduction in the probability of customer's brand switching			
		I regularly use this brand		Kim and Kim 2004
		I will repurchase such brand		
		This brand is my first choice compared to other brands		
		I am satisfied with my experience in using such brand		
Brand Choice Intention	Brand choice intention is the consumer intention to still choose a brand in the midst of other competitor brands; denoting ones preference to repurchase an outcome of brand loyalty.			
		Even if this brand has similar features to others, it seems smarter to choose this brand		**Hsu et al's (2012)**
		This brand is always a better choice compared to its rival brands		
		It makes sense to choose X brand instead of any of the other brands		
		This X brand is my favorite smartphone brand among all other competing smartphone brands out there		

For the purpose of this research, the writer will conduct its method of collecting data in a manner that is generally preferred by the writer. In total, the research would collect 320 responses from respondents wherein the questionnaire would be distributed to an equal proportion amongst the two brands so then the data retrieved would prove for a more detailed analysis of latent variables per brand. However, the collection process would be aimed to be representative of the intended age group population.

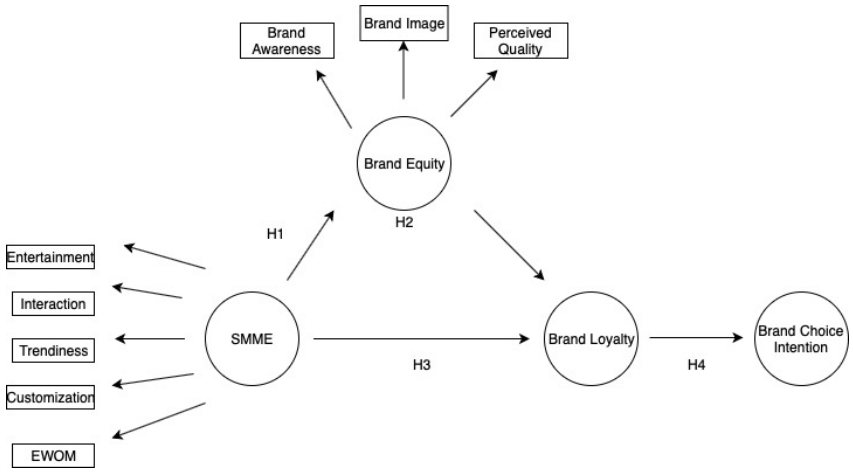

The researcher has adopted and referenced two research models for this study. The first model was retrieved from a journal in Journal of Business Research Vol. 69 entitled 'Social Media Marketing Efforts Of Luxury Brands: Influence on Brand Equity and Consumer Behavior' by researchers Bruno Godey (2015). Parts of the second model were retrieved from a Journal in Journal of Business Research vol 101 entitled "The effect of authenticity perceptions and brand equity on brand choice intention" by authors Minh Tuan Phung and Pham Thi Minh Ly (2019). The journal aimed to examine the relationship of Customer Authentic Perception mediated by Brand Equity (Brand Awareness, Brand Image and Perceived Quality) on Brand Loyalty as an antecedent to Brand Choice Intention as an outcome to loyalty.

Based on the previous literature and established research models, as a form of novelty the writer has decided to implement minor alterations to the used research model by partially combining components from both two previous models as the writer had found it to better fit the object and nature of this research. The writer therefore had primarily adopted the first model by including dimensions of SMME and two dimensions of Consumer Brand Equity (Brand Awareness, Brand Image). From the second reference journal, the writer had combined relationships between Brand Loyalty and its outcome variable Brand Choice Intention as prior literature had affirmed its relationship between the previous endogenous variables as notably Brand Loyalty is a form of behavioral consumer response as applied in the first journal. However, as the first journal had used three dimensions to measure consumer response that is Preference and Price Premium the writer had simply decided to incorporate Brand Loyalty as the endogenous variable due to the objectives and fitting nature to the object of this research.

Hypotheses

Within the context of social media, SMME enhance customer based brand equity (Bruhn, Schoenmueller & Schafer, 2012; Kim & Ko 2012). Bruhn et al. (2012) disclose that traditional as well as social media communication have an impact on brand equity; though its degree of influence is yet to be as significant. In a social media setting, (Bruhn, Schoenmueller & Schafer, 2012; Kim & Ko, 2012) may enhance the customer based brand equity.

H1 Marketing efforts on social media (Entertainment, Interaction, Trendiness, Customization and e-WOM) have a positive and direct influence on Customer Based Brand Equity

How consumers perceive a brand as denoted by Brand Equity, positive and stronger brand equity contributes to increased brand preference which may heighten ones willingness and preference to purchase the product. The level of perceived brand equity is the result of SMME and is positively related to future purchase behavior (Kim and Ko 2012).

Based on Oliver (1999) brand loyalty is referred to as the 'deeply held commitment to rebuy a preferred product or service consistently in the future. It is also suggested that the brand loyalty means the strong trust of consumers in a specific product or company brand which leads to a reduction in the probability of customers brand switching (Oliver 1999. In providing for the linkage between brand equity namely (Brand awareness and Brand Image), Brunner, Stocklin and Opwis (2008) and Lai Griffin and Babin (2009) argued that brand loyalty is a consequence of such brand equity dimensions.

Kayaman and Arasli (2007) found that dimensions of perceived quality and its relationship on brand loyalty are revealed to have positive influences on service brand loyalty. The existence of relationship between perceived quality in evoking customer loyalty is affirmed in the study by Gallarza and Saura (2006)

For the purpose of this study, the mediating effect of Brand Equity and its dimensions on each relations between SMME and Brand Loyalty is evident as Bruhn et al (2012) disclosing that traditional as well as social media communication have a significant impact on brand equity. Quite similarly, most scholars agree that stronger brand equity contributes to customer loyalty (Aaker, 1991). Thus, affirming the mediating effect it has on the relations between SMME's and Brand Loyalty.

H2 Brand equity (Brand Awareness, Brand Image, Perceived Quality) has a mediating effect on the relation between marketing efforts on social media and brand loyalty

Various statistics have shown the importance of social media marketing efforts on evoking certain consumer responses wherein they act as platforms to develop certain preferences and information sharing amongst consumers. A study published by eMarketer, has shown that 81% of teenage girls use their peers as source of information and decision making. According to Laroche, Habibi and Richard (2013), social media activities help build relationships with the brand and their product hence evoking certain consumer responses such as brand loyalty. Therefore, such influence is examined further for this study.

H3 Marketing efforts on social media (SMMEs) have a
Positive and direct influence on the consumer preference specifically brand loyalty

Oliver (1999), brand loyalty means the strong trust of customers in a specific product or company brand, which to leads to a reduction in the probability of customers brand switching. Other studies such as Brunner, Stocklin and Opwis (2008) state that it is a consequence of the dimensions of brand equity and that they also tested whether it has a significant influence on brand choice intention.

H4 Brand loyalty has a positive influence on brand choice intention amongst smartphone brands analyzed

Discussion and Analysis

Before the writer may proceed further with the structural equation modeling method analysis of this research, a measurement model analysis is conducted to determine the validity and reliability specifically between latent variables shown in the model and its corresponding indicators. The validity test is conducted to measure the degree of how the indicators may present valid results; which is condcuted by establishing convergent validity and discriminant validity. Specific for this research, convergent validity will be established by means of analyzing the Average Variance Extracted and discriminant validity by use of cross loading. In establishing reliability, the writer will use the value of outer loadings as a threshold and composite reliability for measuring internal consistency reliability.

Table 2: Apple

Latent Variable	Indicators	Outer Loadings	Composite Reliability	AVE	Discsriminant Validity
Entertainment	E1	0,878	0,867	0,766	Yes
	E2	0,873			
Interaction	I1	0,862	0,894	0,738	Yes
	I2	0,852			
	I3	0,863			
Customization	C1	0,888	0,874	0,776	Yes
	C2	0,873			
EWOM	EWOM1	0,879	0,860	0,754	Yes
	EWOM2	0,858			
Trendiness	T1	0,740	0,763	0,618	Yes
	T2	0,830			
BA	BA1	0,837	0,839	0,636	Yes
	BA2	0,822			
	BA3	0,729			
BI	BI1	0,769	0,847	0,582	Yes
	BI2	0,764			
	BI3	0,808			
	BI4	0,707			
PQ	PQ1	0,823	0,861	0,675	Yes
	PQ2	0,781			
	PQ3	0,858			
BL	BL1	**0,694**	0,833	0,556	Yes
	BL2	0,783			
	BL3	0,718			
	BL4	0,784			
BCI	BCI1	0,771	0,880	0,648	Yes
	BCI2	0,825			
	BCI3	0,811			
	BCI4	0,811			

Table 3: Samsung

Latent Variable	Indicators	Outer Loadings	Composite Reliability	AVE	Discsriminant Validity
Entertainment	E1	0,928	0,829	0,853	Yes
	E2	0,919			
Interaction	I1	0,887	0,823	0,738	Yes
	I2	0,841			

Latent Variable	Indicators	Outer Loadings	Composite Reliability	AVE	Discsriminant Validity
	I3	0,849			
Customization	C1	0,877	0,741	0,792	Yes
	C2	0,903			
EWOM	EWOM1	0,932	0,835	0,857	Yes
	EWOM2	0,920			
Trendiness	T1	0,832	0,572	0,700	Yes
	T2	0,842			
BA	BA1	0,754	0,724	0,645	Yes
	BA2	0,817			
	BA3	0,836			
BI	BI1	0,846	0,839	0,674	Yes
	BI2	0,842			
	BI3	0,805			
	BI4	0,789			
PQ	PQ1	0,891	0,830	0,747	Yes
	PQ2	0,858			
	PQ3	0,843			
BL	BL1	0,765	0,807	0,638	Yes
	BL2	0,837			
	BL3	0,817			
	BL4	0,773			
BCI	BCI1	0,758	0,854	0,693	Yes
	BCI2	0,868			
	BCI3	0,823			
	BCI4	0,877			

Table 4: Hypotheses Apple

Hypotheses	Path Coefficient	T Value	Conclusion
Marketing efforts on social media (Entertainment, Interaction, Trendiness, Customization and e-WOM) have a positive and direct influence on Customer Based Brand Equity	**0,656**	**10,873**	**Accept**
Marketing efforts on social media (SMMEs) have a Positive and direct influence on the consumer preference specifically brand loyalty	**0,174**	**1,765**	**Accept**
Brand loyalty has a positive influence on brand choice intention within the analyzed smartphone brands	**0,841**	**39.216**	**Accept**

Hypothesis	Direct Effect	Indirect Effects	Conclusion
Brand equity (Brand Awareness, Brand Image, Perceived Quality) has a mediating effect on the relation between marketing efforts on social media and brand loyalty	**1,765T Value**	**5,749**	**Accept (Partial Mediation)**

Table 5: Hypotheses Samsung

Hypotheses	Path Coefficient	T Value	Conclusion
Marketing efforts on social media (Entertainment, Interaction, Trendiness, Customization and e-WOM) have a positive and direct influence on Customer Based Brand Equity	**0,790**	**21,038**	**Accept**
Marketing efforts on social media (SMMEs) have a Positive and direct influence on the consumer preference specifically brand loyalty	**0,404**	**3,883**	**Accept**
Brand loyalty has a positive influence on brand choice intention amongst smartphone brands	**0,709**	**10,292**	**Accept**

Hypothesis	Direct Effect	Indirect Effects	Conclusion
Brand equity (Brand Awareness, Brand Image, Perceived Quality) has a mediating effect on the relation between marketing efforts on social media and brand loyalty	3,883	4,117	Accept (Partial Mediation)

Table 6: Social Media Marketing Effectiveness

Brand	Lowest Loading SMME /Path Coefficient	Highest Loading SMME /Path Coefficient	Brand Equity (R Square)
Apple	0,759 EWOM	0,845 Customization	0,430
Samsung	0,781 Entertainment	0,866 Trendiness	0,624

The SMME activities employed by the brand are seen to have the highest coefficients towards the customization variable. This indicates that changes in SMME are greatly caused by the level of customization of the activities employed by the brand. In other words, Apple consumers have found the social media marketing activities of the brand to be highly tailored to their needs individually hence the highest coefficient compared to other dimension features of SMME.For instance, as the majority of its marketing campaigns compel a pull approach to social media postings; the firm puts emphasis on attracting its customer segment that is the tech savvy and the productive. Therefore, it focuses on posting content which showcase photos which may appeal for the hobby of consumers. The lowest path coefficient however, lies within the EWOM variable wherein it only contributes to a value of 0,759 indicating that usch variable is perceived by consumers to be less effective in raising cahnges in SMME. This would be evident, due to the possible unattractiveness or desire for Apple consumers to privately share content regarding the brand on their social media platforms. This may be caused by, the lack of innovation content or campaigns provided by Apple to provoke incentive or interest to spread social medai sharing by its consumers.

Contradictingly, for Samsung the highest path coefficient lies within the dimension of Trendiness wherein it attributes 0,866 indicating that such dimension has succesfully be deemed effective in highlighting Samsung's social media marketing efforts. This may be true, as in contrast to Apple the brand has employed a localized social makreting strategy wherein it is managed by the country individually indicating the possibility for delivering relevant and up to date information to its respective Indonesian consumers. Also, Samsung as a brand is known to constantly post social media content which are hard selling in nature consisting of promotional offers and firm driven features of its product. These may include, weekly promotional offers for its products and seldom events which may attract a large following. The lowest path coefficient reflected in SMME of Samsung however, is Entertainment indicating that the brand has yet to employ social media marketing activities, which are fun and entertaining in engaging its consumers as it has only a value of 0,781. This could be explained, as the brand has employed a less pull strategy and more of a push approach to social media activities when compared to Apple wherein they have yet to establish many posts or compaigns to provoke personal interest from consumers to the brand hence contributing to the element of fun. For instance, the brand has yet to encourage its consumers to actively participate in its campaigns by personally posting user generated photos which may drive curiosity and fun when exposed to its social media.

Conclusion

Firstly, the overall findings of the research found that for both Apple and Samsung consumers Social Media Marketing Efforts are seen to have a significant and positive impact towards the latent variable brand equity. Thus, social media marketing reflected through its dimensions is crucial for Indonesian consumers to have heightened brand equity specifically resulting in positive perceptions on the perceived quality, strength of the brand node and its brand image.

Second, the findings showed that SMME reflected by its dimensions for both brands are seen to impact brand loyalty significantly and in a positive manner. The social media activities employed by the brands have successfully promoted consumer trust in the brand which could lead to brand preference in the midst of other rival brands.

Third, a consumer brand equity approach to measuring overall brand value is found to have a mediation effect towards the impact of brand loyalty amongst both Apple and Samsung Consumers. This shows that the importance of Brand Equity as a latent variable is crucial as it measures the overall perceived quality, brand awareness and brand image of both Apple and Samsung thus potentially causing changes in ones consumer response to choose the brand in the midst of competitors.

Fourth, findings affirm of the impact brand loyalty has on ones repurchase intention amongst Apple and Samsung Consumers wherein its values are significant and exceed the threshold. This would indicate that heightened increases in ones trust in brand, may positively impact the decision of Indonesian consumers to repurchase their smartphone

Limitation and Reccomendation For Future Researcher

1. As the research mainly relied on response mainly distributed from a focused region and less random distribution that is Jabodetabek, future researchers may perhaps aim to gather respondents from a more diverse demographic in terms of domicile and age group so that furtuer insight and variation may be retreived as to how perspectives differ in agreement of the role of social media in evoking ones brand loyalty..
2. The research was unable to thoroughly examine and identify the role of each of these specific social media platforms and its contribution to brand loyalty hence future research should consider incorporating and specifically analyzing ceertain social media platforms as their object of the study instead of a general approach.
3. The researcher has only used two brands of similar category to justify and be used as the object of the research hence for further insight future researchers may also consider incorporating more than two brands as their object of the study so that it may provide a more hollistic generalized view of the smartphone industry in Indonesia.
4. In order to build on the theoretical model and the implementation of it on different contexts, perhaps researchers may consider applying such a modified research model to different consumer oriented industries in Indonesia specifically within product categories which require more product learning and purchasing effort for its consumers due to the nature of a more expensive price point.
5. The pooling and findings of this research may be at some point bias in terms of the respondent's recollection of the media posts of their respective brands. In order to better limit the bias of findings related to perceived social media sightings and interaction, perhaps the future researcher may specifically generate a screening question which would effectively display ones recent sighting and interaction with a specific social media post by giving a time constraint and also by rephrasing the question structure its social media post.

Managerial Implication

As the writer has elaborated on its findings, there are several managerial implications to which may be offered for relevant business enterprises to follow through on the conclusions drawn.

1. From a business perspective, brand managers operating within the FMCG dealing with Business to Consumers products may expand its efforts on marketing through a social media standpoint. As the study has ultimately affirmed the impact of ones SMME has on brand choice intention for both brands, the utilization of social media strategies through a firm driven approach are crucial to generating consumer trust and ultimately preference for repurchase in the midst of rival brands.

2. According to the research, brand managers may also employ extensive efforts maintain its level of brand equity or value in the perceived eyes of its respective consumers as it is found to be an important factor to mediate between the impacts of brand loyalty and employed social media efforts. Indonesian consumers from this research have shown that they are social media savvy with the majority of both Apple and Samsung consumers to access social media 4-6 hours daily. This indicates that they are perceptible and readily accessible to information which may be shared online. Also, firms may opt to employ consumer oriented marketing strategies to actively engage and improve the perception of brand equity amongst its consumers.
3. From the nature of the respondent profiles gathered, for both brands the role of Social Media is seen to significantly aid in ones product learning of the brand itself. Acknowledging such result, perhaps firms may provide social media content more oriented on the ways of consumer use and on the features of the products. Also, the firm should maximize its activities on its social media platforms to generate content daily so that its consumers are actively engaged and provide product learning. In addition to this, it is also seen that for both brands the majority of Indonesian consumers are sought to still use the conventional approach to purchasing its product that is through traditional shopping centers and shops
4. In terms of gauging the effectiveness of the current social media marketing effectiveness employed by the brands, insight is retrieved that both Apple and Samsung must still improve its social media posts by maximizing the dimension EWOM for Apple and Entertainment for Samsung. As explained earlier, these two dimensions perceived by consumers have relatively the smallest impacts towards SMME as a whole. For Apple, managers must employ social media content, which better provide initiative for the consumer to share the brand's social media posts by perhaps providing more interesting marketing campaigns, and viral content which would draw the willingness to post something unique for consumers. For Samsung, managers must optimize to provide more content which are more entertaining innature by perhaps employing social media posts which may raise the awareness of the product whilst packaged in a mini game and interactive manner therefore driving the level of fun experienced. The results of such research hence would provide marketers of the respective brands to further their efforts in social media by enhancing the relevant lackluster dimensions as their next strategy.

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Factors Affecting Economic Development in Republic of Chad: A Review Paper

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Abstract

The main aim of this paper is to review the literature related to the factors affecting economic development in relation to Chad. As there is lack of studies conducted in this area, the paper also focuses on the empirical review based on economic development around the world as well as reports from World Bank. The paper attempts to identify why despite effort made throughout the years, economic development is still very critical in the country. Although many studies have examined issues and challenges of economic development in sub-Saharan Africa, most have been conducted within SSA countries, making it difficult to identify the scenario of Chad position in this part of the world. The paper highlight the following arguments are the main challenges of economic development in Chad such as lower human development index, increase in the population and the level of poverty, inequality, lower health and wellbeing factors, unemployment, growth, decline in oil price, weak security environment, decline in the business freedom. Thus, in order to overcome the different challenges and issues of economic development in Chad, it is strictly important that national governments and the international development organizations around the world together working very hard to achieve the objectives.

Keywords*:* Economic Development, Poverty, Productive employment, Republic of Chad.

Introduction

Economic development is a systematic process that influences growth and economic reform (Todaro & Smith, 2011). Economic reform involves three major areas which are government policies undertaken to meet inflation targeting, high employment, and sustainable growth. Secondly, policies and services vis-à-vis infrastructure, public transport facilities, and healthcare access to the poor. The last area involves policies and programs clearly designated to improve a country's business climate from finance, marketing, neighbourhood development, business retention, the business expansion, technological transfer, and real estate development (The International Economic Development Council's, 2018). In other word, economic development must therefore be regarded as a multidimensional process comprising of major changes in social structure, national institutions, the

acceleration of economic growth, the poverty reduction and eradication, as well as the reduction of inequality (Todaro & Smith, 2015). Hence, it is important to note that economic development is a critical indicator affecting countries around the world (Feldman et al., 2014; The International Economic Development Council's, 2018).

The issue of economic development has long been globally discussed among scholars and policy makers (e.g. Otto & Ukpere, 2014; Amaya Muñoz et al., 2016; Ray, 2019; Saxena & Bansal, 2019). Nevertheless, more than half of the world population have no access to social protection, continuing high level of subsistence activities, etc. This problem has further pushed the target level of poverty and inequality with decent jobs creation to be achieved as argued by scholars (Luebker, 2012; Ridzuan, Ismail, & Che Hamat, 2017; Stewart, Ranis & Samman, 2018). For example, the United Nations (2019), stressed that low income growth can jeopardize sustainable development goals due to low infrastructure, inadequate health improvement, failure to upgrade human capital and broaden opportunities such as FDI (Danquah & Ouattara, 2014; Jaiblai & Shenai, 2019).

More specifically, in regions likewise Chad where poverty level and inequality are high, as well as fragile income per capita growth acts as a severe obstacle to social development. Alongside the social dimension including economic growth usually fails to reach those who need the most. As a result, despite considerable progress over the last two decades, more than 700 million people still remain below extreme poverty line, where more than half are in Africa including Sub Saharan Africa (SSA) and Chad in particular. Hence, among the factors affecting economic development in Chad including human development, human development index, economic performance, socio economic level, economic globalization, economic decline, uneven economic development, economic freedom, poverty at different level, as well as population, relative poverty and absolute poverty are accounted for the economic development of the country. However, despite the contribution of the economic activities of the country and the World bank as well as others interventions; Chad's economic development has not significantly improved even ever since the country is an oil exporter since 2003.

Literature Review

There exists no single definition to incorporate all the various stands of economic development. Hence, economic development or development economics can be described as a systematic process that influence growth through restructuring an economy in order to enhance the economic welfare of a society. It also involve the process of creation of jobs and wealth, as well as the overall improvement of quality of life of a given community or nation as a whole (The International Economic Development Council's, 2018). Moreover, a similar definition by Feldman et al. (2014) decsribe economic development as the development of capacities that expand the capabilities of individuals, firms, industries as economic actors. This section aims to review the factors affecting economic development from previous studies and reports. However, prior to liteerature and reports, there contribution of these factors have not significantly improved the oveeral econimic and social dimension of the country (Chad).

Table 1: Definitions of Economic Development

Authors	Definition
Robbins (1968)	Increase in the absolute size of capital or annual production regardless of the population size.
The U.S. Economic Development Administration (1999)	It is the expansion of capabilities that contribute to the Improvement of a society through the realization of the potential of community individual, and firms.
Lakeland (2011)	It involves programs, and activities seeking to create jobs that facilitate growth undertaken to improve well-being and quality of life for a given community.
Bob (2011)	The increase in sustained growth from a simple, low-income economy to a modern, high income economy. It includes the process and policies a nation improves its people's economic, political, and social wellbeing.
Haller (2012)	Economic development is a process that generates economic, social, quantitative, and qualitative changes, which cumulatively lead to the durability of national economy to increase its real national product.
Ray (2019)	Development involves the removal of poverty and undernutrition. It is an increase in life expectancy through the access of clean water and health services; it is the reduction of infant mortality and decrease in illiteracy rate involving increased access to knowledge and schooling.
Sun (2002)	Economic development is an all-encompassing concept. It centers on economic and social progress, but also entails many different aspects that are not easily quantified, such as political freedom, social justice, and environmental soundness.

Table 1 summarises, the various definitions given to economic development throughout the years. It is universally accepted that economic development involves not only income, but also human welfare. Economic development is therefore the process of increase in a country' output in real term in order to achieve society welfare. Todaro & Smith (2011) argued that although development economics often appeal on relevant principles and concepts from different branches of economics either in a standard or modified form, more often, it is rather a field of study that is faster growing its own distinctive analytical and methodological identity.

Economic Development Indicators

One way to measure the development progress of a country is to look at its economic indicators. Hence, there exist main dimensions of development.

Table 2: Dimensions of Development

Economic	Social	Political
Standard of living through household purchasing power	Health	Individual freedoms and human rights
Distribution of wealth through poverty and inequalities	Education	Political freedoms and democracy
	Social protection	Quality of regulation and corruption

Source: Silve (2013)

Among the above indicated dimensions of development (Table 2) the following indicators include economic and social dimensions;

Gross domestic product (GDP) is the market value of all final good and services produced on the national territory within the period of one year. Real GDP growth also known as GDP growth; it is the nominal GDP adjusted for inflation. Unlike GDP, GDP growth takes into consideration the effect of inflation from consumer price index (CPI) (UNCTAD, 2019).

Gross national product (GNP) comprises the products and services produced from labour and assets by the citizens of a country. It is the sum of GDP plus income factors on abroad minus the non-citizens in a country (World Bank Group, 2016).

Gross national income (GNI) is GNP minus indirect taxes. It refers to the sum of a nation's gross domestic product and the net income received from overseas (Silve, 2013).

Unemployment refers to the number of people who do not have a job, and who are currently looking for a job or start a business. Employment also occurs when people who are actively searching for employment and who are unable to find a job (South Africa Planning Monitoring and Evaluation, 2013).

Poverty and inequality. The World Bank defines poverty as a pronounced deprivation in people's well-being (Haughton and Khandker, 2009, p.1). Hence, *Absolute poverty* refers to the level below the standard of what households should be able to count in order to meet their basic needs. The most commonly used global comparative poverty line is usually between $1.25 and $2 or $3 per day (Hulme,2010). *Relative poverty* is defined in relation to other people in a given society. For example, in high income countries, people are part of a society and consider broader quality of life issues (Hulme,2010). Meanwhile, *poverty as well-being* is related to the lack of specific type of consumption of commodity. It is defined by the extent to which people have poor shelter similar to slum, poor food, poor health and asset. For instance, it is concerned with household's education or nutritional level (Haughton & Khandker, 2009, p.2-3).

Inequality refers to the disparities and discrepancies in areas such as health, income, wealth, education, space, nutrition, politics and social identity. Hence, intersecting occurs when people face inequality in various aspect of their lives. While vertical inequality occurs between individuals in a society, horizontal inequality occurs between groups. The inequality of outcome is the difference in what people achieve in life such as the level of income. Another type is the inequality of opportunities which refer to the differences in people's background or circumstances that condition what they are capable to achieve. Similarly, global inequality is the difference in income between all households in the world rather than inequalities between countries (Milanovic, 2012; UNDP, 2013).

The human development index (HDI). Countries are ranked based on their score and split in categories suggesting how well the country is developed. While infant mortality rate is the number of infant dying below one-year-old per 1,000 live birth in a given year. Literacy rate is the percentage of people who are able to read as a useful indicator of the state off education within a country. Life expectancy is an indicator of healthcare quality in a country or province; the level of sanitation and the provision of elderly care. Usually, when these conditions are met, the higher the life expectancy. Developed countries have high expectancy rate compared to under developed countries (UNCTAD, 2019; World Bank Group, 2016; World Population Review, 2019).

Factors Affecting Economic Development

The study of economic development is one of the recent, most exciting, and yet, the most challenging branches of the field of economics (Todaro & Smith, 2011; Okeke, 2020). The systematic study of issues and processes of economic development in Africa, Asia, and Latin America has only emerged over the last five decades (Lee & Lloyd, 2016). Among the factors affecting economic development in it is important to consider poverty, health and wellbeing, productive employment, clean water sanitation, growth, inequality reduction, demographic transformation, and primary school completion.

Poverty

Many countries have made dramatic progress in reducing extreme poverty. Table 1 illustrates the percentage of population living below $1.90 a day, the percentage of population living below $3.10 a day, and the percentage of poverty gap at $3.10 a day among selected countries around the world excluding Europe.

Table 3: Population below International Poverty Lines

Countries	Reference year	Population below $1.90 a day %	Poverty gap at $1.90 a day %	Population below $3.10 a day %	Poverty gap at $3.10 a day %
Albania	2012	<2.0	<0.5	6.8	1.4
Argentina	2013	<2.0	1.0	3.6	1.6
Brazil	2013	4.9	2.8	9.1	4.3
Cameroon	2007	29.3	8.3	54.3	21.7
Chad	2011	38.4	15.3	64.8	29.7
Gabon	2005	8.0	1.9	24.4	7.2
Kenya	2005	33.6	11.7	58.9	25.5
Malaysia	2009	<2.0	<0.5	2.7	<0.5
Nigeria	2009	53.5	21.8	76.5	39.1
Thailand	2012	<2.0	<0.5	<2.0	<0.5

Source: World Bank Group (2016)

Overall, in 2012, 13% of the world's population lived below the international poverty line of $1.90 per day. While in the year 1990, the percentage was far below, around 37%. The significant decline in all regions contributed to the early target of the millennium development goal of reducing extreme poverty all over the world. As a result, over the past 25 years, the number of the population suffering from hunger in the world has declined (World Bank Group, 2016) which implies a significant progress toward development although not sufficient.

Good health and wellbeing

Good health and wellbeing indicators in low income countries show that more than half of the population die from communicable diseases, nutrition conditions, maternal and prenatal deprivation.

Similarly, in middle- and high-income countries, more than two third of the population die from non-communicable diseases over the last 25 years. Hence, the 3rd sustainable development goal which focuses on improving well-being at especially the most vulnerable stages of life, providing health care service and improving the imbalances between the poorer and richer countries is getting restored (United Nations Inter-Agency Group for Child Mortality Estimation, 2015). For instance, this objective was achieved by reducing dramatically the rate of global maternal mortality between the year 1990 and 2015.

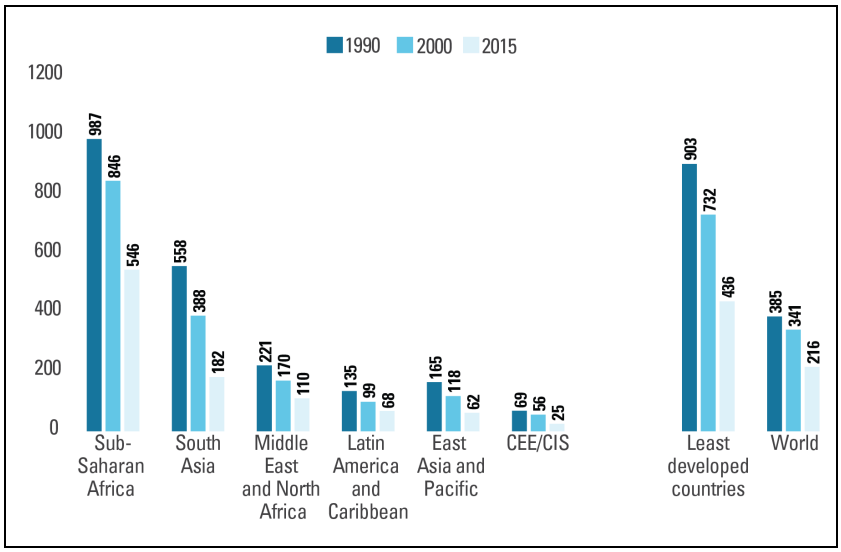

Figure 1: Maternal Mortality rate from 1990-2015

Source: Say et al. (2017)

Among the rate of mortality illustrated in the Figure 1 above, least developed and sub Saharan African (SSA) countries have the highest rank of mortality rate between the year 1990 to 2015. From the maternal death rate of 385 per 100,000 live births to only 216 per 100,000 live births. In 2015, the global under-five mortality rate was less than half the rate in 1990. Despite these effort, the global mortality ratio is still below 44 percent goals (Say et al., 2017).

Productive Employment

Productive employment remains one of the key driving indicators to economic growth, considered as the bedrock of both economic and social development (Al-Habees, 2012). Awolusi et al. (2017) argued that enhancing economic productivity and value added for labour-intensive sectors to sustained economic growth is achieved through higher productivity within sectors. It allows shifting to sectors that generate higher value added and yield benefits not only to workers, employers, but to the economy as a whole. As a result, the variation between sectors is higher in countries with low labor productivity can then lead to higher inequality. For instance, in many lower income countries, one way to achieve sustainable development through poverty eradication is by leveraging labour where both individuals and households have a sustainable pathway out of poverty. According to the World Bank (2019), more than 200 million people were still unemployed in 2015 globally, and several more were underemployed in low-productivity informal sector jobs.

Clean Water Sanitation

Clean water sanitation as another factor affecting economic development which remains one of the greatest challenges the poorest countries who are still struggling to sustainably provide safe water and adequate sanitation to all (UNCTAD, 2016).

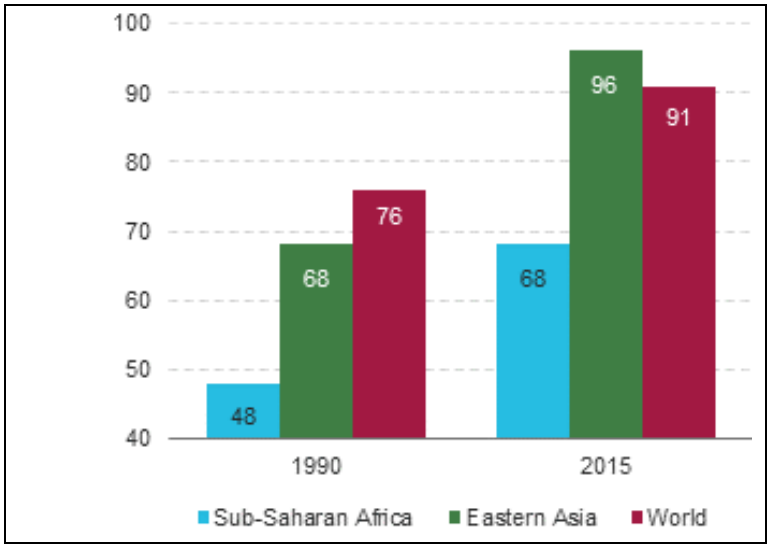

Figure 2: Population access to clean water from 1990-2015
Source: UNCTAD (2016)

In the meantime, Figure 2 illustrates clean water sanitation shows that only over a quarter of people in low income countries have access to an improved sanitation facility despite halving the number of people worldwide without access to an improved water source over the past 25 years. This compared with just over half in lower middle-income countries. World Health Organization (2015) and UNCTAD (2016) argued that distribution of water supply and sanitation is not just a challenge of service provision; it is intrinsically linked with climate change, water resources management, water scarcity, and the water quality.

Growth

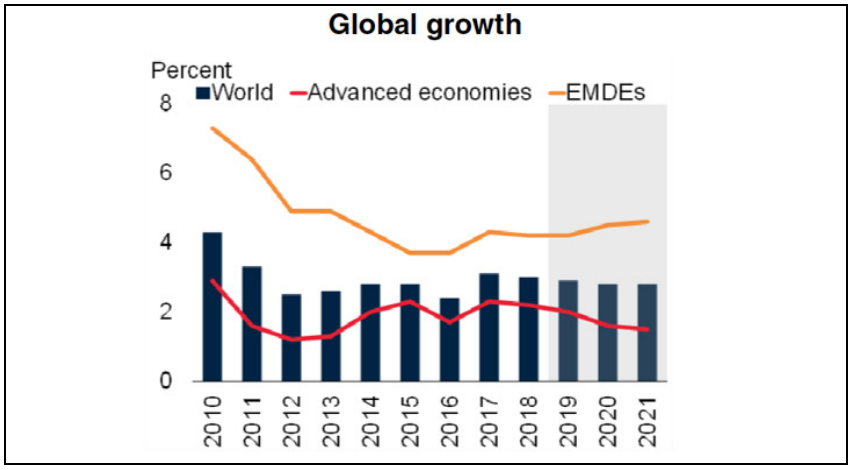

Figure 3: Projected Global Economic Growth from 2010-2021
Source: World Bank (2019)

The global growth illustrated in the Figure 3 indicates that the world's economic growth is dramatically experiencing slight improvement of growth and recession between 2010 to 2017. Figure 3 illustrates shows that GDP increased by 2.4% in 2015, to about $74 trillion in current prices, and is

projected to grow to 2.9 percent in 2016. Besides, low- and middle-income economies accounted for 33% of the global economy in 2015, an increase of 1 percentage point. Their growth is estimated at 4.3 percent in 2015 and is projected to grow 4.8 percent in 2016. In high income economies, expected growth has been revised from earlier forecasts to 1.6% in 2015 and 2.1% in 2016. According to the global economic prospects report, in 2017, the growth in advanced economies is estimated to recover to 2.3% while emerging and developing economies (EMDEs) were projected to have higher than-expected growth of 4.3%. Overall, global growth is projected to edge up to 3.1% in 2018 (International Monetary Fund, 2019). While after recovery, overall growth is expected to slightly decline from 2018 to 2021. As such, in order to regain sustainable recovery from the recession, some 600 million new jobs need to be created by 2030, in order to maintain balance with the rising population. For instance, the 8th sustainable development goal aims for higher economic productivity and at least 7% annual GDP growth in the least developed countries.

Surprisingly, both the IMF world economic outlook and the World Bank global economic prospect show that the worldwide economy is at recovery. Furthermore, it is expected that the upturn is broad-based as the growth is increasing in more than half of the world economies (World Bank, 2019; International Monetary Fund, 2019). Among the developing economies, the East and South Asia regions remain on a relatively strong growth trajectory, expanding by 5.8% and 5.6%, respectively in 2018. While economic prospects at the global level have improved over the past two years, several large developing countries have seen per capita income decline (United Nations, 2019).

Inequality Reduction

Among the main factors of economic development, remain the reduction in inequality. Such as the context of income inequality within a country including gender, age, religion, opportunity, ethnicity, and social class. As such, the 10th sustainable development goal focuses on to tackle inequality between countries in terms of voice, international aid, and migration. A study conducted by the United Nations (2019) found that a total of 56 out of 94 countries with data collected from 2007 to 2012 show that the per capita income of the poorest is 40% growing faster than the national average for the countries. This including the high-income countries likewise the United Kingdom, the United States and the middle-income countries such as Guatemala and the Kyrgyz Republic. The results implied that higher growth among the poorest 40% does not necessarily lead to prosperity.

Demographic Transformation

The United Nations human settlements programme estimates that the proportion of urban population living in dwellings lack access to an improved drinking water source, improved sanitation facilities, sufficient living area, durable structure, or security of tenure (Ritchie and Roser, 2019).

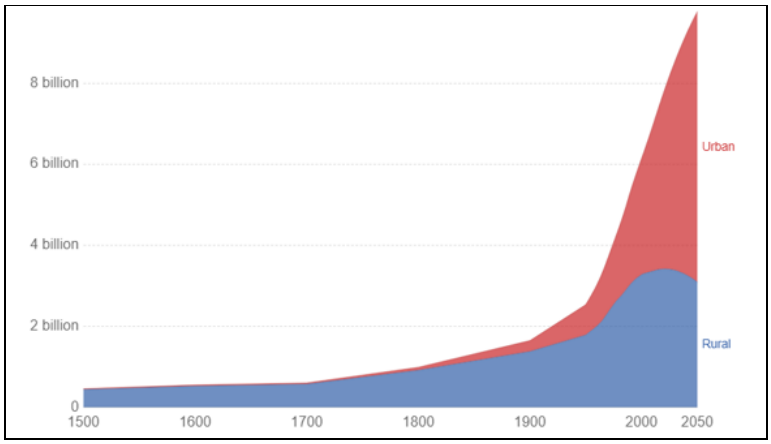

Figure 4: World Urban and Rural Population Projected to 2050

Source: United Nations (2018)

As such, this aspect will affect and slow down the proper development of a nation. Beside, factor such as the UN projections of the world's total urban and rural population estimated for 2016, are based on the UN world urbanization prospects and its median fertility scenario (United Nations, 2019).

On the other hand, in the Figure 2.4, by 2030, an estimate of 60% of the world's population will live in urban areas and most of the expected 1 billion increases in urban dwellers between 2015 and 2030 will occur in Africa and Asia. This demographic transformation will affect not only the economic, environmental, social, but also the political futures of individuals everywhere. Hence, improving the quality of housing, access to adequate, safe, and affordable housing and basic services are the focus of the 11th sustainable development goal on making cities and other human settlements safe, inclusive, resilient, and sustainable in addition to slum upgrading, which are found to be critical to sustainable cities (United Nations, 2018).

Primary School Completion

The 4th objective of sustainable development goal focuses on education quality, proficiency in key subjects at various ages, and the access to modern education facilities. With 92% worldwide children completing primary education, and 74% of children completing lower secondary education implies that progress has been made toward global education system and alphabetization. Nevertheless, the universal gross tertiary enrolment ratio still remains around 30%. Increased access to higher education is needed to achieve a productive, talented, and diverse labour force and an empowered citizenry (Ray, 2019). Between the periods 1990 to 2013, the completion rate of primary school education in the Middle East and North Africa increased from 76% in 1990 to 94% in 2013. While in the Sub Saharan African (SSA) region the scenario is questionable. For instance, the region has the lowest primary education completion rate in the past decade has shown significant progress recently (Say et al., 2017). The primary completion rate increased from 15% (during the 1990s) to 69% in 2013. Hence, Latin America and the Caribbean regions are among the faster growing. The primary education completion rate reached up to 101% in 2013, following the East Asia and Pacific which achieved a higher rate of 105% (Ritchie and Roser, 2019).

Meanwhile, other parts of the world have also achieved significant progress over the past two decades (Ntuli & Kwenda, 2020). In total, three (3) countries have quadrupled their primary school completion rate. For example, in 1990, the percentage of primary school completion in Benin is 19 percent and 76 percent in 2014; while in Ethiopia, the percentage vary between 14 percent in 1994 to 54 percent in 2014; followed by Bhutan having a rate of 24 percent in 1993 and 97 percent in 2014. Despite these substantial progresses made, inequality still remain high in under developing countries (United Nations, 2018; Ritchie and Roser, 2019).

Economic development in Chad

Oil and agriculture are the main drivers of the Chadian economy (BBC News, 2018; World Population Review, 2019). Ever since Chad has joined the list of oil producing countries in 2003, the economy has been heavily dependent on oil and the GDP per capita has increased from $497 in 2001 and 2002; to $967 in 2014. The per capita GDP) of USD 1768.15 at purchasing power parity (PPP) in 2017. However, the decline in oil price in 2014 and weak security environment has driven Chad into a deep recession with expected poverty to increase to 39.8% in 2019. Due to decline in public expenditure, and loss in income reflected by the disruption of cross-border trade with Nigeria in livestock (The Economist Group, 2019). Similarly, due to the current economic and financial crisis the country (Chad) is facing, the World Bank Group projected an increase in the poverty level and the absolute number of poor to increase from 4.7 million to about 6.3 million between the year 2012 to 2019 (Knoema.com, 2019).

Besides, economic development progress has also been hindered by several other limitations. The country has suffered from a long-term violence and political instability which damaged the

infrastructure and seriously impeded its development. For example, the country land locked situation seriously handicaps exports and imports which must pass through Cameroon where corruption inflates transportation costs (Theodora, 2019). The overall growth increased by 0.6 %, with improvements in labour freedom, fiscal health, and monetary freedom exceeding a decline in the freedom of the business sector and trade freedom in Chad. This implies that the country is ranked 36th among 47 countries in the Sub Saharan African region, and its overall score is well below the regional and the world averages (World Population Review, 2019). As a result of the increase in the population and the level of poverty.

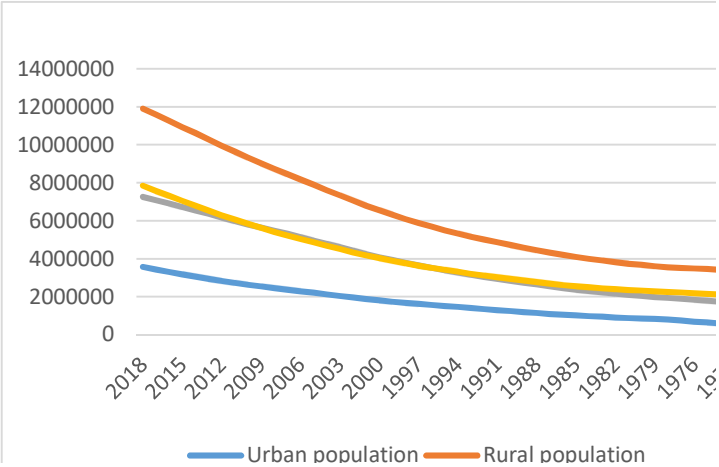

Figure 5: Population of Chad from 1970-2018

Source: The World Bank (2019)

The Figure 5 estimated population of Chad to 15.95 million in 2019 (World Population Review, 2019), thus considered as the 72nd world most populous country. Nevertheless, given its large size, the country is separated with only 8 people per square kilometre (21/square mile) in the world, and the average population growth of Chad is 3 % per year and is expected to continue further rapid growth yet unstable economic growth that will strain country (World Population Review, 2019). On the other hand, the capital city of Chad, N'Djamena covers an estimated population of below 1 million in 2019. Which means only 26% of Chadian live in urban area, and almost half are under of 15. According to the World Health Organization, the life expectancy in Chad is just 55 years in 2016, (World Health Organization, 2019).

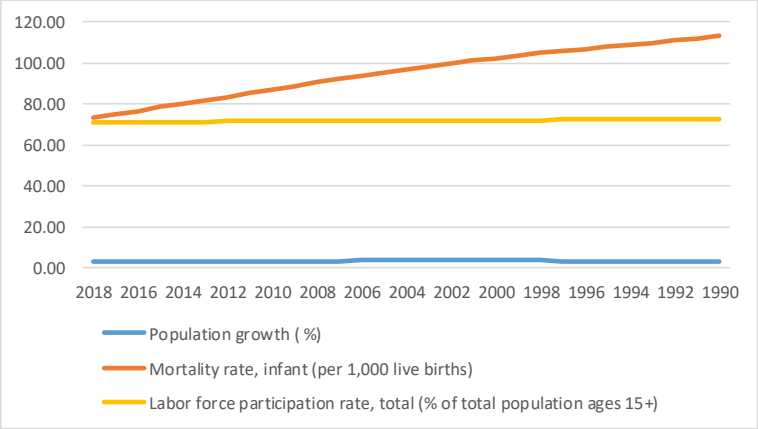

Figure 6: Population Growth, Mortality Rate, and Labour Force Participation rate of Chad from 1990-2018

Source: The World Bank (2019)

Figure 6 shows that a decline in child mortality between 79% to 65%, maternal mortality has also decreased from 1,099 per 100,000 births to 860 to per 100,000 births (World Bank Group, 2018; The Global Fund, 2018). Despite these challenges, there is a constant disruption in the service provision due to strikes in the public health indicators and a decrease in the labour force participation over time. Which means Chad lacks physicians (The World Bank, 2019). In addition, between 2005 and 2009, the rate of infant mortality has declined from 91% and to 72% between 2010 to 2014 according to the Demographic and Household Survey (DHS) and the Multi-Indicators Clusters Surveys (MICS). The Human Development Index (HDI) of Chad was ranked at 185 out of 188 countries in 2015 according to United Nations Development Program (UNDP).

However, in 2016 the country's HDI was ranked 186 out of 188 countries with a Human Development Index value of 0.396, indicating that the country is lagging significantly in this area (United Nation, 2015). Thus, the greatest challenge of Chad remains the lack of human development factors. Therefore, most Millennium Development Goals (MDG) were not met in 2015, as a result, many Chadians people are still facing severe deprivation. Notwithstanding, the national poverty rate has declined from 55% to 47% between 2003 and 2011 which implies that Chad achieved moderate but significant level of progress in poverty reduction (African Development Bank Group, 2019). For instance, the percentage of poor people living with less than $2 per day has significantly declined over the years (2003 to 2011). Nevertheless, the number of poor living between $3.20 to $5.20 per day has dramatically increased over the years (Knoema.com, 2019).

Conclusion

In conclusion, Economic development towards growth and improvement of social dimensional conditions are the main objectives of all developing and underdeveloped nations around the world. Government and non-government organizations are facing greatest challenges to overcome issues related to slowdown of economic growth and economic development of struggling nations. Although many studies have examined issues and challenges of economic development in sub-Saharan Africa (Blekking et al., 2020; Romdhane, Loukil, & Kammoun, 2020), most have been conducted within SSA countries, making it difficult to identify the scenario of Chad position in this part of the world. This paper provides a critical review of the extant literature on economic development factors and indicators and briefly scrutinizes the focus of Chad. It examines, in the midst of considerable economic development indicator and factors affecting economic development. The review attests that the pattern and the relationship of the gaps are somehow similar across countries, broadly pointing towards policies that contribute to the achievement of the Sustainable Development Goals in order to remedy to the issues and challenges (the gaps). Besides, the area of concentration of economic development in Chad among various that are taken into consideration clearly indicate there is lack of significance in human development as well as the socio economic and economic performance of Chad.

In the short run and medium-term outlooks, the instability of oil revenue is a treat to the fiscal management and budgetary planning as it affects the economic activity by disturbing public expenditure, trade, and private investment. In terms of social context, there is a decrease in the government employees' salary since January 2019 due to the Budget Act 2018. This budget act has stripped away some of these employees' bonuses and allowances. Another issue facing the country is the refugees from Sudan, Central African Republic (CAR), and Nigeria about 400,000 representing 4% of the country's total population (The Global Fund, 2018). Thus, in order to overcome the different challenges and issues of economic development, it is strictly important that national governments and the international development organization around the world together working very hard to achieve the objectives.

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Intuitionistic Fuzzy Synthetic Measure as A Method of Employee Satisfaction Benchmarking

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Abstract

The satisfaction of employees is one of the key determinants of the effectiveness of an enterprise, thus it is often the subject of measurement and benchmarking. The result of measurement and comparative analysis of the satisfaction of employees is the basis for making management-oriented decisions and as such they should be properly designed and conducted. The article proposes the method of benchmarking the satisfaction of employees while utilizing an intuitionistic fuzzy synthetic measure. This method allows for the inclusion of the degree of uncertainty in the evaluation of each aspect related to work satisfaction. The utility of the proposed method has been presented through an analysis of the results of the study of the satisfaction of employees conducted in an international enterprise from the automotive industry. The analysis includes the opinion of 323 employees from 18 departments. The results of the analysis indicated a large differentiation in the level of satisfaction of employees with regards to the assumed benchmark.

Keywords: Employee Satisfaction, Benchmarking, Fuzzy Sets, Intuitionistic Fuzzy Synthetic Measure

Introduction

Satisfaction surveys are some of the most commonly used tools of measuring the opinions of employees at enterprises. Their wide utilization is a result of the numerous benefits, which they can deliver for organizations. They are an aid for management boards and managers in making decisions related to different aspects of management. The interest in the topic of work satisfaction stems from the fact that the phenomenon is related to different aspects of the functioning of enterprises. Regularly conducted satisfaction surveys contribute to the increase of the engagement of employees and the effectiveness of their work through recognizing what is most important for employees, what motivates them and what is a source of their frustration. The actions undertaken by management boards of enterprises based on the results of satisfaction surveys of employees can contribute to reducing the turnover of employees or minimizing the risk that key employees will leave. Conducting satisfaction surveys reinforces the image of the enterprise, as one, which takes care of its employees through a constant monitoring and recognition of their needs.

One of the first and most important papers on work satisfaction has been written by Vroom (1964) and Locke (1969, 1976). In accordance with Vroom's definition, work satisfaction is a positive attitude towards work (towards the nature of work), which requires meeting expectations. Locke (1976) defined work satisfaction as a result of perceiving one's own work as one, which enables achieving important values from work, granted that these values are consistent or reinforce the fulfillment of basic human needs (Biesok and Wyród-Wróbel 2018). Other definitions of work satisfaction have been proposed, i.a. by: Brief (1998), Agho et al. (1993), Schulz and Schulz (2002) and Robbins (2004).

One of the key stages in the process of managing employee satisfaction is measuring the construct itself. Given the complex character of the term *work satisfaction*, this area is dominated by methods of multidimensional statistical analysis. Of particular value are methods of measurement, which yield

synthetic measurements, as they allow for conducting comparative analysis, and as such, they can be utilized i.a. for benchmarking achievements. Methods of measuring the satisfaction of employees are constantly developing and one of the latest achievements in this field is the application of fuzzy sets theory. A fundamental benefit of such an approach is accounting for the uncertainties in the evaluations of each of the elements of work satisfaction expressed in terms of word categories, which constitute the points of ordinal measurement scales. Given the multidimensional character of the term *work satisfaction* itself, fuzzy sets are most commonly used in conjunction with multicriteria methods. The result of such an approach is most often the construction of a synthetic measure allowing for the evaluation of the level of work satisfaction and conducting a comparative analysis of its value. Examples of the application of such an approach in the field of work satisfaction surveys can be found in the following publications: Masouleh et al. (2013), Aouadni and Rebai (2016), Aouadni et al. (2014), Li and Wang (2014), Abijev et al. (2016), Denavi et al. (2018), Gębczyńska and Kwiotkowska (2018), Kumar (2018), Maghsodi et al. (2018).

The main goal of the article is presenting new method of satisfaction benchmarking with the application of a intuitionistic fuzzy synthetic measure (IFSM). The proposed approach – in addition to including the uncertainty associated with the interpretation of each of the elements of ordinal scales – allows for the additional inclusion of an extra element of uncertainty in the evaluations of employees, namely when respondents indicated that it was "difficult to say". It should be noted that the proposed approach assumes that such a category does not constitute a point on the ordinal scales of measurement as applied in employee satisfaction surveys.

Methodology

Benchmarking is one of the most commonly used methods of managing an organization. It is a constant and deliberate process of identifying, analyzing, designing and, as a consequence, implementing better solutions in the scope of processes, products and problem-solving methods as well as realizing goals while utilizing recognized and verified internal and/or external templates of an organization, the result of which should be an increase in its effectiveness (Węgrzyn 2000). Other definitions of benchmarking can be found i.a. in publications by: Harrington (1991), Karlöf and Östblom (1993), Pieske (1994), Balm (1996), Watson (1996). Benchmarking is applied i.a. in areas of managing an organization such as: manufacturing, finances, logistics, IT, quality management and process management. It also finds applications in the evaluation of managing human resources and team work, which makes it possible to compare one's own performance with benchmark performance (Gajda 2015).

One of the commonly applied types of benchmarking is internal benchmarking. Its popularity is a result of the ease of obtaining information critical to carrying out comparative measurements. In general, internal benchmarking deals with conducting comparisons between units, departments, branches and subsidiaries within one organization. If the subject of benchmarking is a complex phenomenon, for instance the level of employee satisfaction, in this case, synthetic measures prove useful. If the issue of work satisfaction is in question, an additional difficulty in performance benchmarking is posed by applying it at the stage of measuring ordinal scales, since they limit the range of allowed arithmetical operations necessary for conducting comparative analysis. A solution in this case can be setting the benchmark and conducting a comparative analysis in accordance with the method of an IFSM described in the publication by Jefmański (2020). This method allows for measuring the satisfaction of employees with the utilization of a synthetic measure, the values of which will be utilized in comparing objects with regards to the applied benchmark. The formal description of the construction of an IFSM has been presented in three stages:

Stage 1. Determining the pattern object with the "most favorable" values for each variable. Depending on the variable preference function, the coordinates of the pattern object will have the values:

$$O^{+} = (<\mu_1^{+}, \nu_1^{+}, \pi_1^{+}>, <\mu_2^{+}, \nu_2^{+}, \pi_2^{+}>, \ldots, <\mu_m^{+}, \nu_m^{+}, \pi_m^{+}>), \quad (1)$$

where:

$$<\mu_j^{+}, \nu_j^{+}, \pi_j^{+}> = \begin{cases} <\max\{\mu_j\}, \min\{\nu_j\}, 1-\max\{\mu_j\}-\min\{\nu_j\}> \text{ when } X_j \text{ is a stimulant} \\ <\min\{\mu_j\}, \max\{\nu_j\}, 1-\min\{\mu_j\}-\max\{\nu_j\}> \text{ when } X_j \text{ is a destimulant} \end{cases}$$

X_j variable is a stimulant, when for every two of its observations x_{ij}^S, x_{kj}^S referring to objects O_i, O_k take $x_{ij}^S > x_{kj}^S \Rightarrow O_i \succ O_k$ ($\succ$ means O_i object domination over O_k object). Variable X_j is a destimulant, when for every two of its observations x_{ij}^D, x_{kj}^D referring to objects O_i, O_k take $x_{ij}^D > x_{kj}^D \Rightarrow O_i \prec O_k$ ($\prec$ means O_k object domination over O_i object) (Walesiak 2016, p. 11).

On account of the ordinal measurement scale in the proposed method there is no need for the normalization of variables.

Stage 2. Determining the distance of individual objects from the pattern object using the Euclidean distance measure for intuitionistic fuzzy sets:

$$d_{iO^+} = \sqrt{\frac{1}{2}\sum_{j=1}^{m}(\mu_i(X_j)-\mu_{O^+}(X_j))^2 + (\nu_i(X_j)-\nu_{O^+}(X_j))^2 + (\pi_i(X_j)-\pi_{O^+}(X_j))^2} \tag{2}$$

Stage 3. Calculation of the intuitionistic fuzzy synthetic measure according to the formula:

$$S_i = 1 - \frac{d_{iO^+}}{d_0}, \tag{3}$$

where: $d_0 = \bar{d}_0 + 2S(d_0)$, $\bar{d}_0 = \frac{1}{n}\sum_{i=1}^{n} d_{iO^+}$, $S(d_0) = \left[\frac{1}{n}\sum_{i=1}^{n}(d_{iO^+} - \bar{d}_0)^2\right]^{\frac{1}{2}}$.

The measure takes values from the interval $< 0 - 1 >$. The higher values of the measure the less the object is away from the pattern object.

In the presented method, the object can be a department, branch, branch of the enterprise etc. The reference object in this case should be understood as the benchmark for the objects which are subject to a comparative analysis. The presented method enables the estimation of the synthetic measure, allowing for evaluating each of the objects with regards to the level of work satisfaction against the reference benchmark.

Results

A practical application of the method of benchmarking work satisfaction based on the IFSM has been presented based on an analysis of employee satisfaction at a branch of a large international automotive company. The study utilized an ordinal measurement scale with the following categories: “highly unsatisfied”, “unsatisfied”, “satisfied”, “highly satisfied”. Additionally, employees had the opportunity to answer with “difficult to say”. Employees of 18 departments partook in the study. A total of 323 employees participated in the survey. The results of the measurement shared for the purposes of this article were expressed as numerical totals of the categories of the 4-point ordinal measurement scale for each of the analyzed variables, as indicated by employees. This is a fairly common practice when it comes to international corporations, where the HQ of the enterprise conducts a survey of employee satisfaction, whereas individual branches, receive aggregated results in the form of the percentage of answers in each category, which are points of the measurement scales. In the analysis conducted for the purpose of this article, 8 variables identifying the general level of satisfaction among employees in the areas of activity of the enterprise have been included: x_1 – satisfaction with work performance, x_2 – satisfaction with workplace safety equipment, x_3 – satisfaction with the ability to develop one’s career path within the enterprise, x_4 – satisfaction with cooperation with other employees, x_5 – satisfaction with cooperation with direct superiors, x_6 – satisfaction with information flow at the enterprise, x_7 – satisfaction with the ability to implement new ideas within the enterprise, x_8 – satisfaction with the enterprise’s responsibilities towards employees. Given the wide data set, only the set of answers for variable x_1 has been presented in Table 1, which includes the number of indication of particular points of the measurement scale in a cross-section of enterprise departments.

Table 1: Data set for variable x_1

Departments	Measurement scale points				
	1	2	3	4	N
D1	1	-	9	1	21
D2	1	-	5	2	10
D3	-	4	10	1	29
D4	-	-	7	1	13
D5	-	-	7	1	13
D6	1	-	6	-	15
D7	-	-	10	2	17
D8	1	1	1	2	8
D9	5	-	8	3	27
D10	1	-	21	2	35
D11	-	-	4	-	8
D12	1	-	6	3	15
D13	1	-	9	1	22
D14	-	-	9	3	12
D15	1	-	14	-	21
D16	-	-	10	1	14
D17	3	-	13	1	35
D18	-	-	6	-	8

Source: own computations.

Utilizing the proposed benchmarking method, in the case of each variable, requires the estimation of the parameters of the intuitionistic fuzzy set, which will contain employees satisfied with their work. Similarly, for each variable the level of membership in the intuitionistic fuzzy set has been determined as the share of the total number of answers of "satisfied" and "highly satisfied" for all responses of the employees. In a similar manner, the level of non-membership in the intuitionistic set has been determined, with the difference that the total number of responses has been used as a reference point for the total sum of answers of "unsatisfied" and "highly unsatisfied". The third parameter of the intuitionistic fuzzy set, the level of uncertainty has been calculated as the difference between value 1 and the sum of the degrees of membership and non-membership. This operation has been conducted separately for all 18 departments of the enterprise, which were the subject of benchmarking. The formal notation of the proposed approach has been presented in the paper: Jefmański (2019). The obtained results have been presented in Table 2 (only for variable x_1 due to a large size of the data set).

Table 2: The parameters of intuitionistic fuzzy sets (for variable x_1)

Departments	$\mu_{A_j'}(X_j)$	$\nu_{A_j'}(X_j)$	$\pi_{A_j'}(X_j)$
D1	0,476	0,048	0,476
D2	0,700	0,100	0,200
D3	0,379	0,138	0,483
D4	0,615	0,000	0,385
D5	0,615	0,000	0,385
D6	0,400	0,067	0,533
D7	0,706	0,000	0,294
D8	0.375	0.250	0.375
D9	0.407	0.185	0.407
D10	0.657	0.029	0.314
D11	0.500	0.000	0.500
D12	0.600	0.067	0.333
D13	0.455	0.045	0.500
D14	1.000	0.000	0.000
D15	0.667	0.048	0.286
D16	0.786	0.000	0.214
D17	0.400	0.086	0.514
D18	0.750	0.000	0.250

Source: own computations.

The proposed method assumes that the reference object contains the values most desired for the variables stimulating the level of work satisfaction as well as the least desired values for the variables, which have a negative impact on the level of work satisfaction. Keeping in mind that the coordinates of the pattern object have the form of intuitionistic fuzzy sets, this determines that in the case of variables, the stimulant should be found in the data set – the maximum value of membership in the intuitionistic fuzzy set and minimal values for the levels of non-membership and uncertainty. In the case of variables, which have a negative impact on the level of work satisfaction, an opposite course of action is required. This should be carried out separately for each variable. In the analyzed example, there are no variables, which have a negative impact on the level of work satisfaction. The coordinates of the pattern object in the form of intuitionistic fuzzy sets have been presented in detail in Table 3.

Table 3: Coordinates of the pattern object

Variables	Parameters		
	$\mu_{A_j'}(X_j)$	$\nu_{A_j'}(X_j)$	$\pi_{A_j'}(X_j)$
x1	1	0	0
x2	0.943	0	0.057
x3	0.667	0	0.250
x4	0.923	0	0.077
x5	1	0	0
x6	0.750	0	0.125
x7	0.786	0	0.214
x8	0.769	0	0

Source: own computations.

For each department of the enterprise, the distance from the pattern object, in accordance with the formula (2) should be calculated. Having obtained the distances calculated as such, the next step should be calculating the IFSM for each department of the enterprise, in accordance with the formula (3). The values of IFSM are the basis for ordering the departments based on the level of satisfaction of employees employed within it. The higher the value of the IFSM the higher the level of satisfaction among employees. The distances and values of the IFSM for each of the evaluated departments have been presented in Table 4.

Table 4: IFSM values for the evaluated departments of the enterprise

Departments	Distance (2)	IFSM	Departments	Distance (2)	IFSM
D1	0.940	0.363	D10	0.688	0.533
D2	1.112	0.246	D11	1.033	0.299
D3	1.386	0.060	D12	0.883	0.401
D4	0.984	0.333	D13	1.107	0.249
D5	0.668	0.547	D14	0.239	0.838
D6	1.152	0.219	D15	0.949	0.357
D7	0.771	0.477	D16	0.687	0.534
D8	0.869	0.411	D17	1.251	0.152
D9	1.235	0.162	D18	0.486	0.670

Source: own computations.

Conclusions

The satisfaction of employees, given its relationship with several other aspects of the operation of enterprises, is part of the group of constructs, which should be periodically monitored. Utilizing tools of measuring the satisfaction of employees in conjunction with the method of internal benchmarking allows for an effective identification of the group of employees with a low level of work satisfaction as well identifying the reasons for being dissatisfied with work. One of the proposals in this area is the measurement of the satisfaction of employees and setting benchmarks with the application of the IFSM.

The analytical approach proposed in the article allowed for the determination to be made that the analyzed enterprise is dominated by departments with a low level of satisfaction among employees as compared with the benchmark. The values of the IFSM for 72% of departments have not exceeded the level of 0.5. The observed spread of values of the IFSM is significant. The group, which was the subject of analysis, contained departments with both an extremely low and extremely high level of the IFSM. The highest level of satisfaction among employees has been observed in department D14. The value of the IFSM for this department amounted to 0,838 – a result that is close to the benchmark. The second department with the highest level of satisfaction among employees is D18. The value of the IFSM in this case is significantly lower at 0.67. The method applied in the article also allows to identify the departments with a low level of satisfaction among employees. This pertains in particular to departments D3, D9 and D17. In each of the mentioned cases the values of the IFSM did not exceed the threshold of 0.2.

The proposal of the method of work satisfaction benchmarking with the utilization of the IFSM allows for conducting comparative analysis with the inclusion of the degree of uncertainty in the opinions of employees, which are based both on raw data and aggregated data. The presented IFSM can be based on other complex measurement scales dedicated to the satisfaction of employees. It can be also constructed for the so-called sub-scales that create the hierarchical structure based on the shape of composite indexes.

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Approach to Control Meters Use in Management of Logistic Customer Service

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Abstract

The article presents the results of research on control of the level of logistic customer service using the meters of this service in the surveyed freight transport enterprises in southern Poland, as well as control of the level of logistic customer service offered by competitive enterprises. Moreover the distribution of the use of the meters of logistic customer service level in the surveyed enterprises and the frequency of surveys of the level of logistic customer service offered by competing enterprises in dependence on the size of enterprises were presented.

Keywords: Logistics, Control Meter, Management, Transport Enterprise.

Introduction

Logistics competences enable more efficient use of the enterprise's potential inherent in its resources and logistic capabilities conditioning the creation and delivery of values in reference to the customer expectations. Customers should be the focus of every business. What counts for the company is the value generated by them, often resulting from customer satisfaction with the services offered.

By purchasing a specific product, the customer takes into account not only its features, but also the standard of service offered by a company. Logistic customer service refers to the ability of a logistic system to meet the needs reported by customers. These needs can be defined as a set of wishes and expectations of buyers regarding the logistic attributes of the delivery of a good or service. Customer service is not limited to the transaction phase, but also includes the pre-transaction and post-transaction phase.

A requirement for providing high-level logistic service is its regular verification. The main problem that arises in this matter is the appropriate selection of meters as well as control of the level of service elements significant from the point of view of the company's clients. The purpose of the paper is to present research results on control of the level of logistic customer service using the meters of this service in the surveyed freight transport enterprises in southern Poland (Jacyna, 2009; Wojewódzka-Król and Załoga, 2016), as well as control of the level of logistic customer service offered by competitive enterprises. Moreover, the distribution of the use of the meters of logistic customer service level in the surveyed enterprises and the frequency of surveys of the level of logistic customer service offered by competing enterprises in dependence on the size of enterprises were presented.

Literature Review

Logistic customer service is an element of the utmost importance for management of many business operating systems. From the perspective of logistics, customer service focuses mainly on the real distribution of goods taking into account the right condition, place, quantity and time, simultaneously achieving a profit (Witkowski, 2002).

According to the definition proposed by Bowersox et al. (2012), logistic customer service should be understood as many mutually linkaged logistic activities that determine customer satisfaction when

purchasing a product or service. Logistic customer service is usually associated with activities related to the performance of a specific delivery, however, the quality of service depends on the course of proceedings throughout the entire supply chain (Długosz, 2010).

According to Gołembska (2009), logistic customer service focuses on enabling the customer to purchase the offered product in the right place and time, and the measure of this service is the ability to perform orders from current reserves.

Further examples of defining customer service in logistics are the terms presented by Coyle et al. (2010). These are all necessary activities related to the acceptance, preparation and implementation of orders while ensuring its correctness and intervention in the event of errors to compensate for damage (Ciesielski, 2011). It is also a reliable delivery of products to buyers, according to their requirements. Its essence can be defined as an action involving all areas of business which goal is customer satisfaction while achieving the goals of suppliers (Hartmann and de Grahl, 2012; Mesjasz-Lech, 2015; Niemczyk and Stańczyk-Hugiet, 2014).

Elements of logistic customer service (so-called features) can be described as those parts of the service that are of particular importance to customers, whereby the weight assigned to them by customers may change depending on the market segment, type of products, distribution methods or the size of competition (Kempny, 2001).

Customer service is of interest to many areas of enterprise management (Jelonek and Bylok, 2017; Jędralska and Dyduch, 2017; Lichtarski, 2015; Nogalski and Ronkowski, 2007; Osbert-Pociecha and Nowosielski, 2016; Romanowska, 2001), however from a logistics point of view we can analyze it with its division into four main elements (Christopher, 2011):

- time (delivery time control, order submission, order processing, transport time);

- reliability (inventory level and costs of exhaustion, complaints, proper order processing);

- communication (order information between the seller and the customer in both directions);

- convenience (flexibility).

To sum up, logistic customer service consists of many elements, which in turn are influenced by many different factors. When designing the company's logistic system, all the components described above should be taken into account. The company must take into account both its own point of view and the perspective of customers, only then try to find the optimum operation (Kempny, 2009; Sharma and Lambert, 2013).

The logistic customer service process should be constantly monitored to fulfill its basic task, i.e. satisfy customers (Saif, 2012). Based on the results obtained during this audit, the company may make adjustments to improve the structure and essential elements of the customer service system.

The starting point for determining the control measures of the customer service logistic system should be setting the required service standards (Twaróg, 2005). It’s main element is identifying customer needs regarding the level of performance of individual service elements. It is also important to analyze competition activities in this area and to examine the relationship between customer satisfaction and the implementation of standards. Standards should not be easily reached - there is a risk that such standards will be too low for service at their level to meet the needs of the company's customers (Heskett, 1994). Even setting standards at a satisfactory level may not be sufficient in the struggle against competition (Hasan et al., 2014). Some of the management philosophies (e.g. Deming's quality assurance method) assume that an acceptable level of quality should be set at 100%.

This is not really synonymous with 100% performance of the service, but with the attitude expected of the company in relation to the issue (Coyle et al., 2011).

The main elements of logistic customer service and the possibilities of their measurement enabling control are characterized in Table 1.

Table 1: Elements and measurement of logistic customer service

Elements	Element description	Objective of measurement
Product availability	- the most common customer service indicator; defined as the percentage of products in stock (target level of performance) in several different units (e.g. according to product orders, by value)	- percentage of availability in selected units
Delivery time	- the time from the moment the order is placed until the receipt of the goods; usually measured in units of time, target delivery times or variants of accepted standards; delivery frequency, product availability and delivery time are combined into one standard (e.g. 95% of orders delivered within 10 days)	- promptness and compliance with the declared standard
Flexibility of the distribution system	- the system's ability to respond to special and / or unexpected customer needs, including the ability to substitute and expedition	- lead time for special requirements
System for removing errors and dysfunctions in distribution	- the efficiency of the procedures and the time necessary to remove the dysfunctions in the distribution, such as: errors in invoices, shipments, damages and complaints	- error response time and dysfunction removal time
Information system	- the company's information system's ability to provide accurate and fast information to customers as required	- promptness, accuracy and detail of information
After-sales service	- the efficiency of after-sales service after product delivery, including technical information, spare parts or modification of equipment	- response time and quality of response to customer requirements

Source: own elaboration on the basement of Kempny (2001).

For a logistic customer service control system to be useful in business practice, it should include (Ballou, 2003):

- defining the needs related to the level of service required by customers in a way that takes into account their point of view;

- measuring the number of lost and acquired customers and this reference to their service policy;

- measurement of the currently offered level of customer service in a way that takes into account information accuracy, time aspect and its availability for competent employees;

- comparison of own service with competitors' offer.

Methodology Research

The research was realized on a sample of 147 respondents employed in freight transport companies, mostly third party logistics providers, with their registered premises in southern Poland. The survey method of the research was used for collecting data through the standardized survey questionnaire. The primary information were gained from pre-defined group of respondents, i.e. representatives of the management board of the surveyed entities. It's purpose was to obtain data on chosen problems in the field of logistic management of customer service in these enterprises. As a result of obtaining, processing and analyzing empirical material received from the survey using the questionnaire, the conditions of the logistic scope of customer service in the surveyed freight transport enterprises are presented. This paper demonstrates two chosen problems indicated in the questions of the survey questionnaire, which are part of a broader survey. The areas of interests introduced in the paper referred to the preferences of controlling the level of logistic customer service in the opinion of respondents using measures of this service and examining the level of logistic service offered by competing companies.

Subsequently, taking into account the overall research proceeding, the results of research in area of two above mentioned problems were referred to the size of the enterprises. For this purpose, in the aspect of marked issues in the performed statistical analysis, the Pearson's linear correlation coefficient was used (Sobczyk, 2017).

Results and Discussion

Preferences for the control of the logistic customer service level in the opinion of respondents

The methodology of specifying the level of logistic customer service within the enterprise, its monitoring and control using appropriate logistic categories, i.e. measures of logistic customer service, was the point the surveyed entrepreneurs were asked in the questionnaire survey. Among all 147 enterprises surveyed, the level of logistic customer service was controlled using appropriate measures of this service in 29 enterprises (19.7%) at regular intervals, and in 45 entities (30.6%) the control was carried out occasionally. As many as 73 companies (49.7%) never used this form of controlling of the level of logistic service. Therefore, the majority of respondents did not monitor the logistic level of customer service or, to assess the level of logistic customer service within the enterprise, adopted a different control model, including more or less appropriate service standards, procedures to ensure correct and systematic level measurement and taking regulatory actions. Research of logistic customer service measures conducted among the customers of transport enterprises in relation to the needs in the field of logistics service management depending on the market segment to which the customer belongs, would provide information that on the one hand enable entrepreneurs to better conform the level of service to the most important strategic customers, on the other enable to estimate the costs of the level of service received. Also divisions of the transport services depending on the customer's level of wealth, and thus its potential profitability, turnover and distribution considerations (Ballou, 2004) would useful in researching the level of logistic service offered among enterprises customers. Figure 1 presents the distribution of answers to

the question about the level of logistic service offered by the surveyed entrepreneurs using the service's metrics.

Fig. 1: Control of the level of logistic service using the meters of this service in the surveyed enterprises

Source: own study.

Determining the position of the company in terms of key factors of logistics service compared to the competition, requiring research on the level of logistic customer service offered by competing companies, was the subject of the next question of the research tool. The surveyed entities declared regular consideration of the position of the level of logistic service offered by the enterprise to competitors in 27.9% of cases (41 enterprises). Occasionally, 74 entities (50.3%) conducted surveys on the level of service to competitive enterprises, and 32 enterprises (21.8%) admitted that they were not interested in this area. Thus, the dominant group of entrepreneurs showed an understanding of the implication necessity of this element of the logistic customer service policy, using the obtained information to compare the level of service for competing companies in the transport sector, and then probably considering taking over the benchmarking solutions due to mobilizing effect of benchmarking on the increase in the value of the measure of elements of services. Knowledge about the competition is often the basis for transport companies to create their own logistics service strategies, or allows them to eliminate some mistakes due to very important skill possessed by the best entrepreneurs which is learning not only on their own mistakes, but much less costly learning from the mistakes of competing enterprises. Having information about competitors' shortcomings can be used both to improve the functioning of the company and to implement a customer acquisition policy in which competitor's mistakes should be used. In the current conditions of market competition, a chance for a company's success appears only when it has features that place it before its competitors. Figure 2 presents the distribution of answers to the question about the level of logistic service offered by competitive enterprises by the surveyed entrepreneurs.

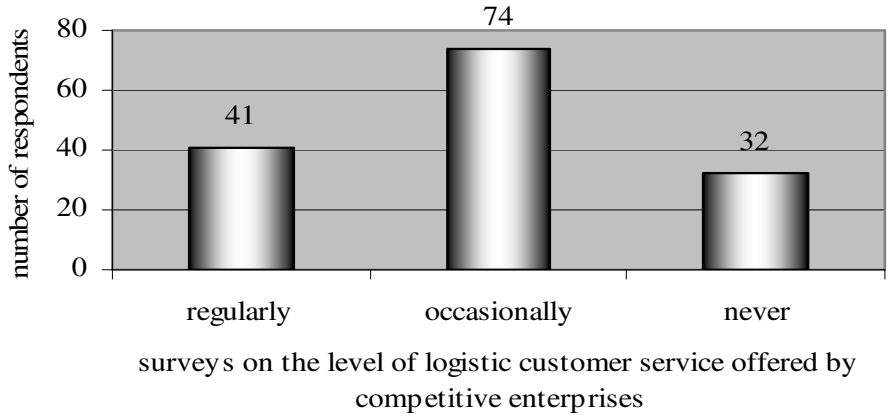

Fig. 2: Research results on the level of logistic service offered by competitive enterprises
Source: own study.

Control of the logistic customer service level in dependence on the size of enterprises

Among 147 enterprises surveyed, micro entities dominated, constituting 76% of the research sample (112 enterprises). The share of small entities constituting 16.5% of the total number of respondents (24 enterprises) was also significant. A small share in the research was recorded at the same time by medium and large enterprises, together constituting 7.5% of the research sample (11 enterprises).

Table 2 presents the distribution of the compliance of the control measures of logistic customer service level in the surveyed enterprises in dependence on the size of enterprises, which showed a statistically significant relationship between the use of appropriate measures and the size of entities. A correlation of -. 0.710 indicates more frequent use of these measures by large and medium-sized enterprises. The result indicates a higher level of development of these enterprises, awareness of the essence of logistics customer service control, as well as greater investment opportunities in the R&D sphere. Frequently, the control of the logistic customer service level in large and medium-sized enterprises is carried out using more advanced information technologies than micro and small enterprises are able to dispose.

Table 2: The distribution of the use of the meters of logistic customer service level in the surveyed enterprises in dependance on the size of enterprises

Application of the meters of logistic customer service level	Type of enterprise			
	micro	small	medium	large
regularly	1	18	7	3
occasionally	39	5	1	0
never	72	1	0	0

Source: own study.

Determining the position of the company in terms of key factors of logistic service compared to the competition, requiring surveys on the level of logistic customer service offered by competing companies, was the subject of the next question of the research tool. Respondents' responses presented in Table 3 showed a significant, high (- 0.716) relationship between the size of enterprises

and surveys of the level of logistic customer service offered by competing enterprises. Enterprises as they grow more and more often notify the need to analyze the actions of competitors. Also noteworthy is the significant, at 73.2%, share of the smallest enterprises in observing competitive entities. The results confirm greater awareness of competition analysis as needed and necessary process. Aiming to create a stable company and the best offer on the market, the entrepreneurs understand they need to get to know and control those who are also active on the market. Then they should improve, develop and introduce changes that allow achieving better results.

Table 3: Distribution of the frequency of surveys of the level of logistic customer service offered by competing enterprises in the examined enterprises in dependence on the size of enterprises

Frequency of surveys on the level of logistic customer service offered by competing companies	Type of enterprise			
	micro	small	medium	large
regularly	9	22	7	3
occasionally	71	2	1	0
never	32	0	0	0

Source: own study.

Conclusion

The results of the research on on control control of measuring of the level of logistic customer service identified among the representatives of freight transport companies in the southern Poland, allow for the conclusion that their sphere is recognizable in the management processes of the surveyed enterprises, although to a little extent.

Entrepreneurs showed minor understanding for the needs related to the control of measuring of logistic service level desired by customers and taking into account their opinions. Apprehension may cause an inclusive decline to discern the need to recognize the level of logistic service with the participation of its consumers, close to nearly three-quarters of the whole of companies in the research sample. Merely insignificantly fewer representatives of the firms, as almost half of them, did not took monitoring of the level of logistic service of their customers into the consideration in the management processes, or another models of control could be selected and implemented for their common use in estimation of the level of logistic customer service. At the same time the foremost group of the research companies, as more than three-quarters of whole research sample, stated to recognize the prerequisite of determining the position of the enterprise in terms of key logistic service factors compared to the competitive entities, and to estimate the level of logistic customer service offered by competing companies.

With regards to the size of entities in the research sample, the distribution of the information obtained from their managers most often confirmed the tendency to increase the focus on carrying out the above-mentioned measurements along with the increase in the size of the firms. Large and medium-sized companies more frequently and in depth examine the issue of conducting control surveys determining the level of logistic service both among recipients of their services and within the organization.

Polish enterprises marginalize the role of customer service in their management processes, mostly in reference to suspection that contemporary efforts are simply competent and decent enough. Nevertheless, as theoretical and practical background a number of times indicate, such an approach is a short-term solution. In reference to nowadays struggle on national and international market the transport companies should try find reliable areas of attracting their current and future customers, establishing higher standards of logistic service, measuring their levels and regularly controlling.

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Quantitative Study Regarding Advantages and Disadvantages Perceived by The Employees from Romania Concerning Cloud Services

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Abstract

Cloud computing is a modern mean that offers high complexity solutions comparing to the traditional calculation center. A major advantage for the beneficiary is the fact that the cloud services provider is directly responsible for the acquisition and maintenance of the infrastructure. Within this work we have initiated a quantitative research which has targeted the identification of the advantages and disadvantages perceived by the employees from Romania regarding the cloud services that they use in their current activity, inside of the company where they professionally activate. The study has been conducted among 315 respondents, using an online questionnaire. It was used as a selective statistical research method and posted on an online platform which allowed the access of potential respondents to the survey during the entire data collecting assigned, regardless of the time of the day or the utilized device. As a main result, all the cloud services users that participated at this research were able to identify them after visualizing the proposed definition and declared themselves very satisfied with these services. All the respondents claim that they personally use cloud services in their professional activity. The research also has precision limits, one of them being represented by the data collecting method, the online environment, which offers no guarantee for the respondents' honesty. The survey was applied to workers in major corporations.

Keywords: cloud computing, online survey, IT&C.

Introduction

Cloud computing can be defined as an amalgam of hardware resource, networking, storage capacity, services and interfaces (Shah, Vyas, 2015, p. 5702). Cloud computing represents the technology that changed the IT&C domain in a dynamic way. Everyday an impressive amount of information is generated; making storing and processing necessary as soon as possible. (Greavu-Șerban, 2015, pp. 8).

The hardware and software components from the IT&C domain have suffered a dynamic evolution. In order to keep up with it, considerable initial investments in infrastructure and services, as well as subsequent for modernization are necessary. The informational system is limited by the processing capacity (CPU and RAM) and by the storage space (HDD/SSD). Furthermore, in order to establish or

modernize a local center (on-premise) periodical investment in operating systems, applications, network elements, as well as additional costs are necessary if the ISO quality standards' implementations are pursued.

A version for the future investment costs' reduction is the initial overcollateralization with processing capacity (CPU and RAM), as well as the storage space (HDD/SSD), however, implying much higher initial costs. Although, in reality, the majority of computing systems are rarely used at their maximum capacity, requiring their replacement due to obsolescence, to the software and hardware incompatibilities with the new versions or the lack of support from the producer. (Greavu-Șerban, 2015, pp. 8-9).

Cloud computing is a modern mean that offers high complexity solutions comparing to the traditional calculation center. A major advantage for the beneficiar is that the cloud services provider is directly responsible with the acquisition and maintenance of the infrastructure. Cloud services acquisition transforms the equipments' investments into operational costs for companies. In addition, a major advantage is that through cloud services the prompt access to certain resources (hardware and software) is allowed, much affordable to ″rent″ than the investments in a data center. Furthermore, there is the possibility that these will be used only occasionally, as a consequence an investment in infrastructure won't be efficient from the economic point of view. The resources and licenses acquisition is done promptly and paid only when they are used which represents another advantage of the cloud services.

Services and cloud resources' (network, storage, processing) managing is made with the help of certain web instruments. Connection from any location is allowed, regardless of the time of the day and computer, with any operating system that allows Internet access through a stable connection.

By using these services, companies have the possibility to reduce expenses as the IT&C services and infrastructure can be externalized towards another entity, that will provide cloud services. In this way, the company does not invest in infrastructure, but only contracts the services. In the private sector, the usage of cloud services allows the improvement of the method of resource use, access, as well as the users' availability to a higher quality than the local ones.

Dumitrache (2014) illustrates several cloud computing initiatives at the European Union: G-Cloud (Great Britain), Andromede (France) and Trusted Cloud (Germany), all these projects have streamlined the cloud services at the European level. Furthermore, in the article the "EUROPEAN UNION OPEN DATA″ is mentioned as well, single point at the level for the institutions and bodies of the European Union, that offer a simple and efficient access to data.

Cloud technologies at the European level

According to the Eurostat Digital economy and society statistics – enterprises (2017) report, almost all the companies from the European Union had Internet access in 2016, but only 21% of these used cloud computing services. To be mentioned the fact that, services use differs among companies depending on the number of employees: approximately 45% of the large companies (over 250 employees), 29% of the number of employees between 50 and 249 and only 19% of the small companies (10-49 employees). In comparison with 2014, a general 2-point percentual growth has been registered (from 19% to 21%), with growths on each segment individually, like so: (2%increase), medium companies (5%increase), large companies (10%increase).

With regard to the assimilation degree of the cloud services in 2016 within each of the countries contained in the European Union, it can be concluded that in the Nordic countries, cloud services are the most used (over 40%), with the highest degree of usage in Finland (57%), while the lowest degree (less than 10%) is observed in Greece, Poland, Bulgaria and Romania. Several data referring to the use of cloud services (in percent) at the European Union level in 2014 comparing to 2016.

The most used cloud services at the EU level in 2016 were the e-mail and the digital information storage, services used by over 60% of the companies that use cloud services, 44% of the companies use cloud services to keep data bases, 41% for software and 32% for financial and accounting services. Approximately 1 of 4 companies use cloud services at an advanced level (for example, customer services relation) and 21% of these integrate personal developed softwares in the cloud platform. In general, at the European Union level, the use of e-mail service doesn't register a significant increase between 2014 and 2016, but the storage service of the cloud files has increased with 9% in only 2 years.

Cloud computing, mobile devices and their applications and Big Data analysis represents approximately 20% of the expenses allocated to IT at the level of 2012 and it is estimated an exponential till 80% in 2020. The majority of the users estimate a decrease of the costs with 10-20% in the case in which they use cloud services (Gabriella Cattaneo, 2012).

At the level of 2016, research show that 45% of the activities developed in companies have migrated to cloud (public, private or hybrid) and it's projected that till 2018, to reach 60%. The biggest companies allocated a quarter of the IT budget for the costs related to cloud services, however, the companies under 1000 employees are much more cautious in allocating budget towards cloud services. At the international level, in 2016 the companies with less than 1000 employees preferred public cloud services, and the ones over 1000 employees adopted private cloud methods. In addition, from the budget allocated to cloud services, the companies direct 45% to SaaS (Software-as-a-Service), 30% to IaaS (Infrastructure-as-a-Service), 19% to PaaS (Platform-as-a-Service), the rest of 6% being directed towards the implementation of certain data storing operations for an improved security and for other types of data storage (Cloud Computing Survey 2016, IDG enterprise).

In the Right Scale report (2016) several aspects regarding the main public cloud providers at the international level are presented. The report concludes that the main cloud services provider for companies with over 1000 employees is AWS, followed by Azure (IaaS and PaaS) and Vmware vCloud Air. In what regards the companies with less than 1000 employees, the main providers are AWS, Azure and Google. The same report highlights the fact that the main private cloud providers for companies with over 1000 employees are VMware, Microsoft and OpenStack, and the companies under 1000 employees use services provided by Vmware, OpenStack and Bare-Metal Cloud.

It is to be mentioned that, in 2016 the adoption of the hybrid cloud has registered a significant increase among companies, which was caused by their awareness in what regards the advantage of this type of cloud in front of the public one. Moreover, an ascendant migration tendency of the cloud services is remarked, as well as the companies' opportunity to further reduce the costs for service use through investments in costs' management departments.

In 2017, RightScale has made a study in which innovations regarding cloud computing are presented, mainly at the level of the IaaS sample (infrastructure as a service). Interesting conclusions resulted following the study, in the sense in which private cloud use is decreasing, companies more and more pick to use the hybrid cloud (aspect resulted also from the RightScale 2016 study), and in what regards the public cloud, it is defined by several representative services providers. The study also shows the fact that persons who use cloud services for personal gain use in average 1.8 public cloud services providers.

Quantitative study. Methodology and Main Results

Within this work we have initiated a quantitative research that has targeted the identification of the advantages and disadvantages perceived by the employees from Romania regarding the cloud services that they use in their current activity, inside of the company where they professionally activate. The study has been conducted among 315 respondents, through the sample survey. It was posted on an online platform that would allow the potential respondents to access it during the entire

period assigned to data collecting, regardless of the time of the day or the utilized device. The obtained results were analyzed with the help of the IBM SPSS Statistics 20 software.

At the research level, almost all of the participants are full-time employees at the company where they work. (94,5%).

In this research, we have concluded that 2 out of 3 employees spontaneously associate the term "cloud" with a storage space, meaning a server, of data storing or with an external space of data storing. The respondents have also delimited the cloud in the area of the benefits obtained after using them, namely: access to stored data from any location (11,4%) and from any device (9,8%). However, it is also remarked through the way in which the access to these services can be made, via Internet (10,2%). Among the most common associations it is noticed an aspect linked to data safety, at which 8,3% from employees choose to store their data in cloud for additional safety. The employees from various domains have also associated this term with the one of "clouds", while the workers in the IT&C domain have given specific answers for the technical domain, as: public/ private/ hybrid data storage space, technology, on demand infrastructure, SaaS/PaaS/IaaS, API (Application Programing Interface) or Hosting (the allocated hosting space).

The notoriety of the cloud services' providers comes in the support of 7% of the employees to help them at the level of association with the cloud term; 6% of the respondents claim that the better association with the term cloud is the scalability feature (its capacity to sore a large volume of data).

Cloud computing is associated with the term "cloud" only by 3,2% of the employees, that especially come from the IT&C domain. Another aspect of interest that was identified among the answers was the fact that only 1,6% of the employees have chosen the "I don't know "option, which shows that almost all of the respondents know information about cloud.

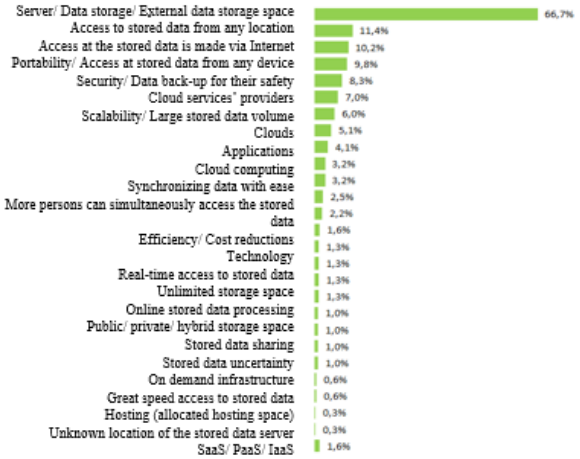

Figure 1: Spontaneous association of the "cloud" term

Source: Statistical survey made by the authors

Approximately 9 out of 10 respondents know very well the term "cloud", meaning that they have the capacity to offer more details in this context. 11,1% of the total employees detain information about the researched subject, however without knowing its meaning. Only 1% of the employees that participated at the research don't know this term.

Figure 2: The spontaneous notoriety of the "cloud" term
Source: Statistical survey made by the authors

The notoriety of the cloud services is high due to the large variety of online sources at which the employees had access to and consulted them in this way.

Most commonly, the employees informed about cloud services by accessing providers' websites from the domain. The following two information sources preferred by the employees are the forums/ blogs from the domain and social networks, which have cumulated percent of 43,5, respectively 41,9. The knowledge received from friends/ colleagues/ family regarding cloud services represent an informational source for 38,4% of the respondents.

In this research, resulted that 3 out of 10 employees have found out about cloud services during their specialty trainings that they followed. Within some events as, specialty conferences, fairs and exhibitions from the domain, the employees have acknowledged information about cloud services.

Mass-media represent a high-potential informational source in what regards the communication of cloud services due to the fact that 16,8% of the employees acknowledged more information via this communication method. It is noticed that cloud services don't enjoy the high visibility in the traditional environment, only 2,2% declaring that they acknowledged information about the investigated subject via street advertising.

Only 1% of the employees don't know the method through which they acknowledged various information about the investigated subject.

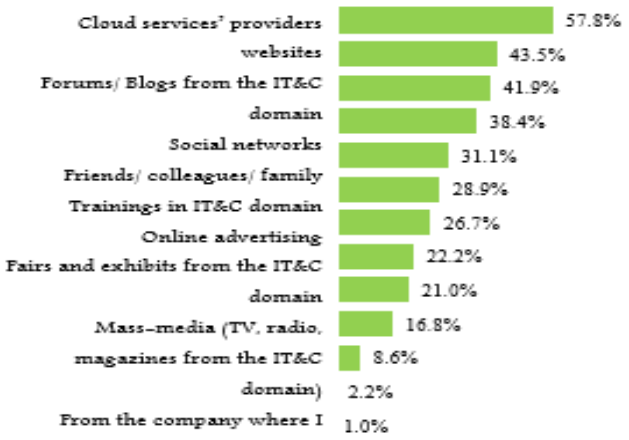

Figure *3*: Information sources regarding cloud services
Source: Statistical survey made by the authors

All the participants at the research recognized the cloud services after visualizing the definition proposed in the research instrument.

All the respondents claim that they use cloud services in their professional activity, 7 out of 10 respondents use private cloud services, where the resources are managed by a private company and are exclusively allocated to companies where respondents work.

In what regards the use of public cloud services, where the resources are allocated by the providers only when it is necessary, it is observed that only 5,4% of the employees have this service at their disposal in the company where they work.

Approximately 1 out of 4 respondents use hybrid cloud services in their professional activity, having control only over data security.

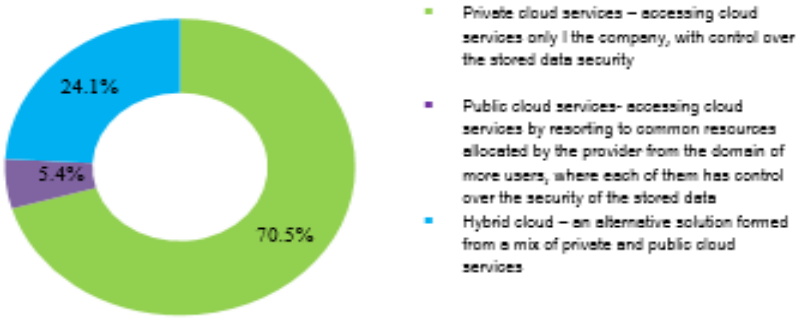

Figure 4: The type of used cloud service, regarding on the data storing method
Source: Statistical survey made by the authors

In what regards taking decisions regarding data storage in cloud, it is noticed that the IT department's representant is the person appointed in percentage of 31,7%. The person with leading position and the IT department's representant equally decide, respectively in approximately 18,7% of cases and the person with leading position, but with support from the IT department in 16,5%. The

manager/department manager is responsible for taking decisions regarding storing data in a cloud in percentage of 15,9.

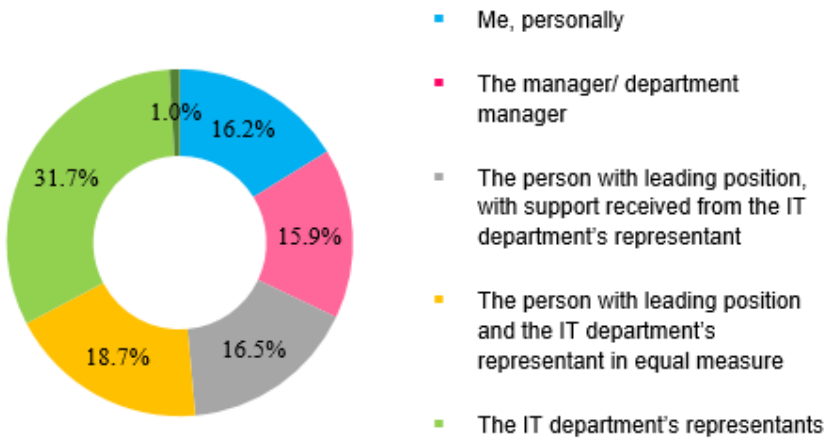

Figure 5: The person responsible for taking dictions regarding storing data in cloud
Source: Statistical survey made by the authors

From the type of used connection point of view, it is noticed that the one via cable (Etherenet) and the wireless one (Wi-Fi) are used in similar percentages 43,5%, respectively 46,3%, while the mobile data is used by 10,2% of the respondents.

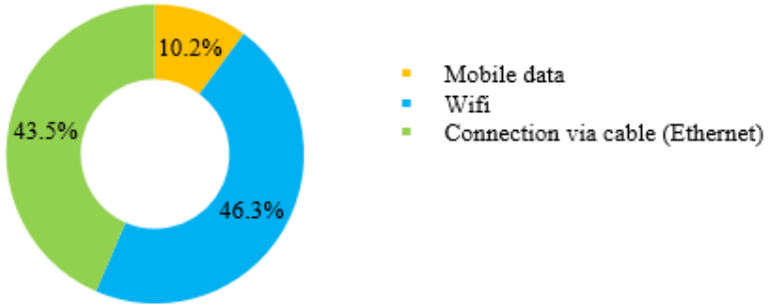

Figure 6: Type of used connection
Source: Statistical survey made by the authors

In what regards the main cloud services used in general, it is noticed the fact that files sharing is used by 86% of the employees, the e-mail service by almost 3 out of 4 respondents, and data bases by 62,9% of the total employees.

58,1% of the employees use the applications, while 42,5% of the total employees use web hosting as cloud service. Only 37,1% use cloud services ass internal messaging service.

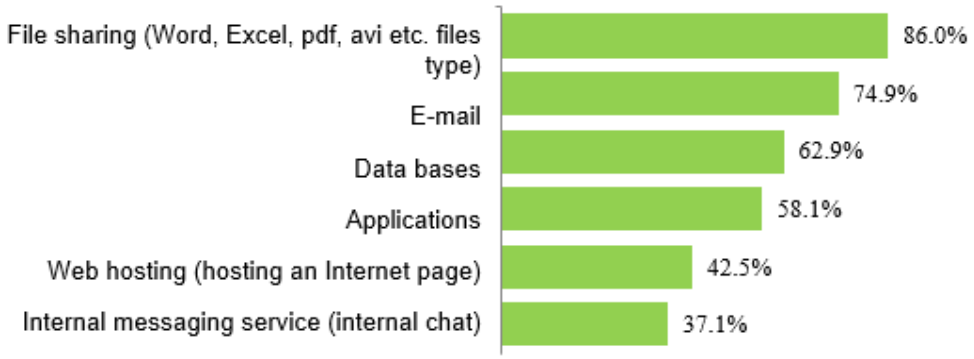

Figure 6: Cloud services used in general
Source: Statistical survey made by the authors

At the level of the most often used cloud services, the leader is the e-mail service accessed by the employees in their professional activity, being followed at short distance by the cloud files sharing (38,4% vs. 35,6%). 1 out of 10 employees use to work most frequently in cloud with various applications or data bases.

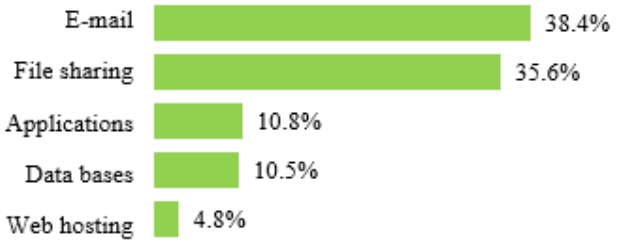

Figure 7 : The most often used cloud service
Source: Statistical survey made by the authors

By analyzing the main purpose for using cloud services it can be noticed that 4 out of 10 employees use cloud services to meet the internal needs of the company and only 1 out of 10 employees to meet the external needs. 47,3% of the respondents use cloud services both with internal purpose and external as well.

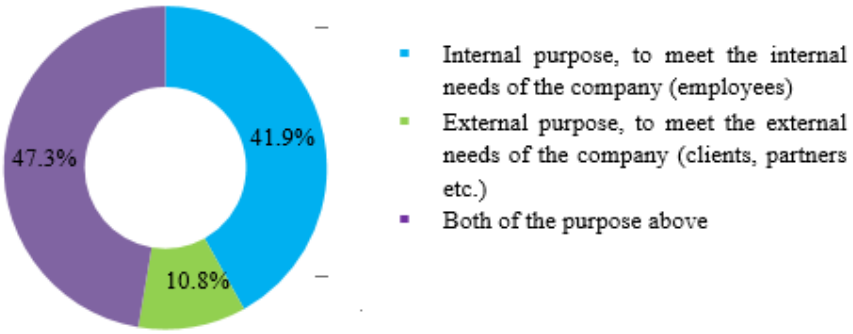

Figure 8 : The main purpose of cloud services use
Source: Statistical survey made by the authors

3 out of 10 employees use Google as cloud services provider in the company where they work, while 14 % of the total respondents use Microsoft. IBM offers cloud services for 9,2% of the persons that took part at the research, and Oracle for 5,4%. 3,8% of the respondents claim the fact that they use a cloud internally developed by the company where they work. It is remarked that approximately 2 out of 10 respondents don't know the cloud services provider used in the company where they work.

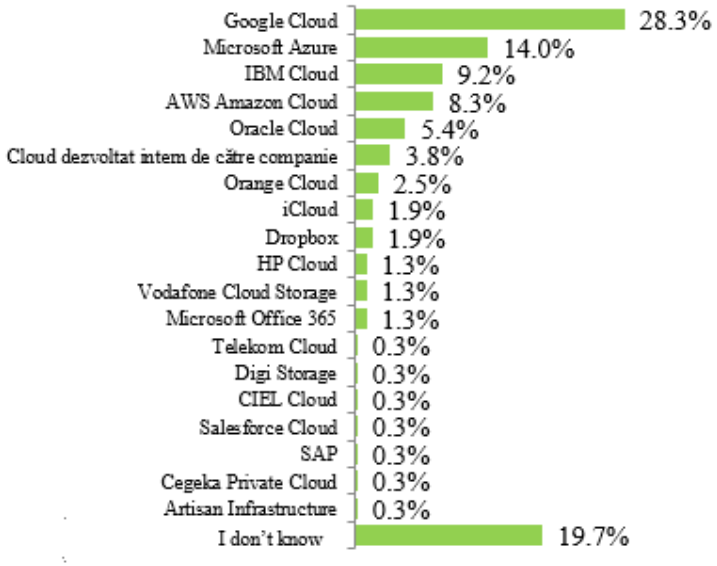

Figure 9: Used cloud services' provider
Source: Statistical survey made by the authors

Approximately 3 out of 4 employees get used to use cloud service multiple times per day, while the rest of the participants at the study use cloud services once per day or rarely.

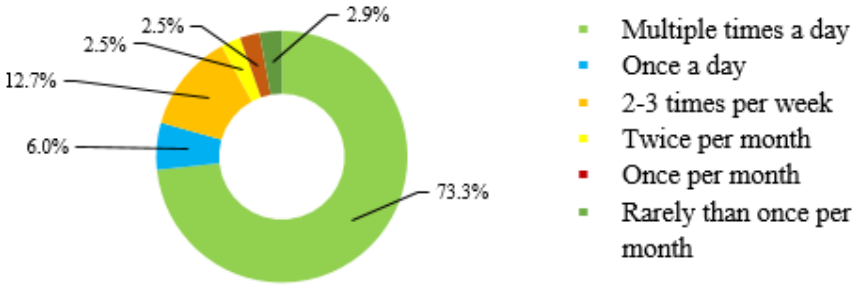

Figure 10: The frequency of cloud services' provider use
Source: Statistical survey made by the authors

By analyzing the most representative benefits of cloud services, it is remarked that the great majority of employees, approximately 90%, agree with each of the ones written in the figure below.

Over a half of the research participants totally agree with the fact that cloud services allow them the access of multiple persons at the same time to visualize the stored data (59,7%), they give them the

possibility to access in real-time the stored data (58,1%), as well as their capacity to store a large volume of data (53,7%).

Almost 50% of employees totally agree with the statements regarding which cloud services allow the access to stored data to any device that has an Internet connection (48,9%), as well as eliminating restrictions regarding the locations from where the cloud services are used (47,9%).

38,7% of the total employees totally agree that the data stored in cloud is much better structure in a way that it is much easier to view, and 35,2% totally agree with the fact that cloud services allow a higher speed of work with the stored data.

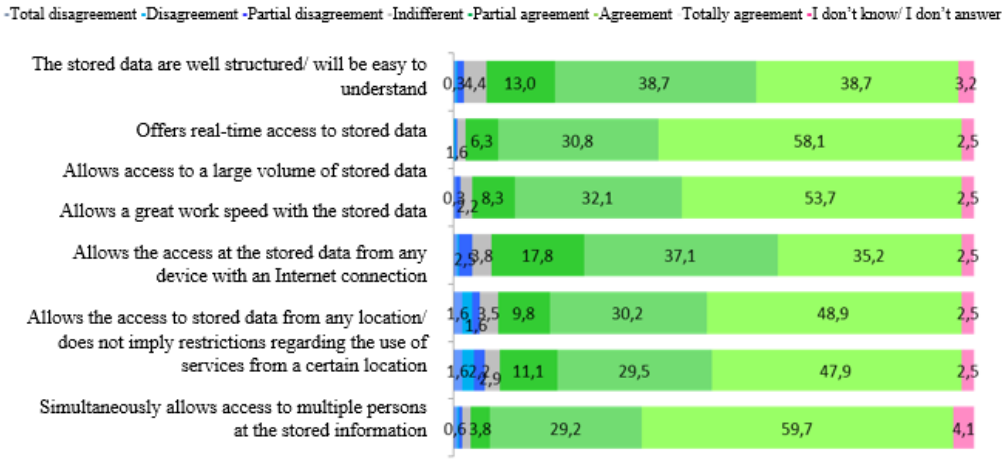

Figure 11: The benefits perceived by the respondents regarding cloud services used in the company where they work

Source: Statistical survey made by the authors

By analyzing from the disadvantages existent at the cloud services' level, the opinions are divided among the persons who took part at the study. Most of the employees (78,4%) think that accessing data with the help of cloud services can be made only via a stable and fast Internet connection.

In addition, 43,2% of the participants agree with the fact that a cloud services disadvantage is represented by not knowing the geographical location of the servers that store data, while 11,7% of the total respondents didn't decided in this way, choosing the answer option "I don't know/ I don't answer". However, over half of the respondents don't have concerns regarding the security and integrity of data, and 47,3% of the employees are confident in what regards cloud integration in the activities used in the professional activity.

For 44,1% of the employees, the cloud services' providers made available specialty trainings and offered them the necessary support when they had difficulties in what regards the use of cloud services.

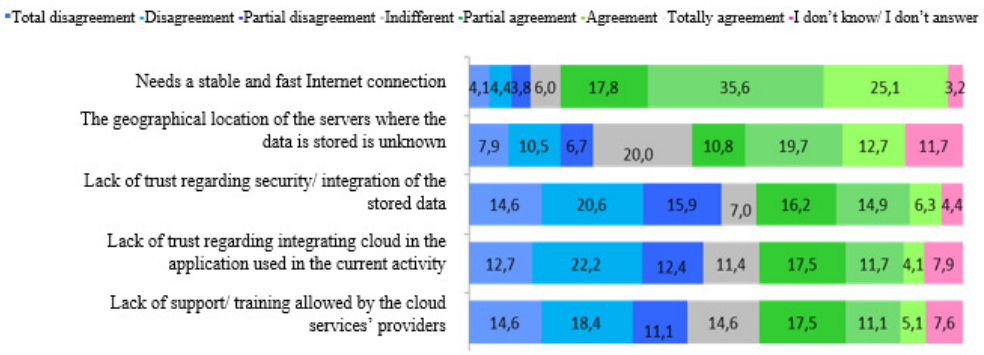

Figure 12*:* The disadvantages perceived by the respondents regarding the cloud services used in the company where they work

Source: Statistical survey made by the authors

Conclusions

Generally, when a research is made, regardless if it's quantitative or qualitative type, the limits are also mentioned, which the marketing researchers must take into account. In this context, the research made in the present paper, sums up a series of specific limits, that have to be mentioned.

The first limit of the research is represented by the method through which data was collected, meaning the research instrument was projected on an online platform and then distributed to the respondents. In this way, there is no guarantee on the fact that the person who takes the online survey is the respondent eligible for the study, regarding of the selection criteria.

Another important limit targets the fact that the research is not representative because from the secondary resources the general dimension of the researched collectivity. Therefore, a research on a sample with 315 respondents was made.

Taking into account the structure of the sample, mainly formed by persons that had graduated at least university studies and work in companies where cloud services are regularly used, the notoriety of cloud services is very high. If the sample would have a different structure, the cloud services wouldn't enjoy such a high notoriety. However, the main findings of this research was significant and had implications for the companies' activities which asked for the analysis of this report contained in the paper.

The future main research directions target the elaboration of certain research representative from a statistical point of view, centered on certain activity domains that are of interest for the beneficiary, segment delimitation of the cloud services' users so that the companies would integrate as efficiently the current web technologies and instruments, to offer very attractive, customized promotional solutions that would answer their needs even more and to overcome their expectations.

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Study on The Romanian Employees' Opinion Regarding the Cloud Services They Use in The Company

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Abstract

Once with the accelerated technological evolution, the society needs to adapt to the changes that appear everywhere, through integrating new innovative technologies in the current activity. Although, the technological barriers of Internet are not precisely delimited, it is obvious that it will further represent an unlimited source of information, where new technologies fit very well in the great majority of the activity domains. It is noble the fact that, modern technologies play a very important role in the contemporary economy, which implies the idea that, it is hard to draw certain directions specific to their development, because they have an incredibly fast rhythm of development. In this paper I conducted a quantitative study at the level of which I've proposed to identify the perception of the employees from Romania regarding the cloud services they currently use. The research was made on a sample of 315 persons and the data was analyzed with the help of the IBM SPSS.

Keywords: Cloud Computing, Services, Quantitative Research, Web Technologies.

Introduction

In order to observe the difference between the services and applications that appeared over time on Internet, first it is necessary to define the Web 1.0, Web 2.0 and Web 3.0 concepts and definitions. The first generation of the Internet is referred to as Web 1.0 or WWW (World Wide Web) and it is defined as being the informational environment in which aspects of interest (called resources) are identified by global identifiers called Uniform Resource Identifiers (URI) (Davis, 2010, p.1). These are also found in the subsequent generations of the Internet, however, what distinguishes the first generation of the Internet from the others is that in that period the Web was static and it could be only "read" by the large public. The only persons who could add content on Internet were web designers or persons who had HTML knowledge.

The following step of the Internet was a transition period (Web 1.5), period in which Internet content started to be dynamical generated from databases. In this way, people began to interact with the Internet, and the concept was named reading/writing (Hend, Abdul Malik, 2006).
Web became in this way to transform itself in a platform and made its transition towards the Web 2.0 generation, which distinguishes through technologies such as blogs, RSS feeds and social platforms. The need for the machines to understand the information found on the Internet and not only process it

led to the apparition of the third generation of Web, called Semantic Web. This is an extension of the Web 2.0, being considered an evolution and not a competitor (Hend, Abdul Malik, 2006).

The Web 1.0 generation was represented by the unilateral concept of placing information on the Internet, while at the level of the subsequent generation, Web 2.0(Roebuck, 2011, p. 10), the main attribute was the connection between human beings. Nowadays, we fit in the subsequent generation of Internet development, Web 3.0 (Passin, 2004, p. 3), also called the Semantic Web. This is framed by the specialists as being the extension of the Web 2.0 generation, because it uses the previous web technologies that reached maturity, at which new technologies specific to Web 3.0 are added (Davis, 2010, p.3).

Of course, the "web services are both an evolution of distributed computing and the launch point for a revolution in the way we think about building large-scale systems." (Glass, 2002) The steps that lead to Cloud Computing are Cluster, Grid Computing, Generation 2 – with merging among Grid and Web Services.

At this moment, the Internet captures an ascendant tendency with an accelerated development rhythm in what regards the used band width, the number of interconnected users, the usage of different types of devices connected to Internet, the impressive volume of stored data, the used applications, various types of mass-media, etc.

From this perspective at the global level, the needs of the Internet users utterly exceed the communication technologies, the capacities and capabilities of the current information found on the Internet. In this way, the Web 3.0 generation offers intelligent connectivity solutions through some technologies that will support the current issue of the Internet (Pollock, 2009, p. 16) in which the system's capabilities (security, complexity and data mobility) are overcome (Davis, 2010, p. 4).

Presently, with the help of the Internet, any user has the possibility to access data stored in cloud from any location and at any moment. The infrastructure behind the applications used by the user is complex and consists of data centers located geographically different, that are permanently monitored by the cloud services provider. Cloud computing could be considered as being the use of the capacity for the digital transformation process.

The development of the processing capacity allowed the cloud services' providers to offer the users the possibility to install virtual machines (VM), with the purpose to allow any application wanted by the client. In this way, a client installs the virtual machine on the server, later he installs the wanted application and benefits of a very large processing power (both CPU and GPU), but also of sufficient storage space. The cloud services' providers as Amazon, Google, Salesforce, IBM, and Microsoft have data centers spread worldwide, to allow both the redundancy of the offered services, but also data safety through multiple storage in different locations. In addition, this way of using multiple data centers, geographically spread, allow a lower time to answer a request, the information not being required to cross great distances, only to the nearest data center or till the most performing one. Creating this type of cloud implies large investments and needs a complex application of administering data feeds (Buyya et. all, 2009).

Cloud computing is a must have in the framework of digital transformation of businesses, regardless of their size or the number of employees (Misra, S., Mondal, A., 2011). Using these services brings many benefits, among which we remember the lack of investments in the infrastructure, costs only at the use of services, very large storage and processing capacity, lack of maintenance costs of services and the availability of the services at any hour and from any location. Using cloud computing services also implies using some information encryption services, to have the safety of the data, those being stored/processed among other users' data by the cloud providers' servers.

Methodology research and key findings

In order to establish the perception of the employees from Romania regarding the cloud services they currently use in their activity domain, a quantitative study was made. Data collecting was made with the help of a survey that was posted on the LimeSurvey online platform. Data collecting was made during March – June 2017. The data was analyzed with the help of the IBM SPSS Statistics 20 programme. In what regards the process of data analyzing, it has to be mentioned that firstly the data base from the online platform was downloaded, lately the data base cleanup, eliminating the non-answers as well as the incomplete answers. After the data base cleanup process, the final number of respondents was 315.

Looking from the communication process perspective implied at the cloud services, used by employees in their professional activity, level they think that they received support, mainly from the company personnel (78,4%), that was supported by the personal documentation effort from the online environment (70,5%). Once again, the employees think that personal documentation regarding cloud services heads for analyzing some information particularly transmitted from the virtual environment and not from the traditional one, where the investigated subject is poor in visibility (46%).

62,2% of the respondents agreed with the fact that they received information from friends, colleagues or family about the cloud services that they use in the company here they activate.

The communication with the direct provider, respectively indirect of cloud services is benefic for 61,6%, respectively 52,1% of the respondents from considerations linked to the availability of some resources transmitted via e-mail, specialty trainings regarding the services used in the professional activity.
In what regards the communication process via online advertising, opinions are divided among experts, in the sense that 37,5% of the subjects think that in this way they managed to identify more information about cloud services, while 36,5% claim the contrary.

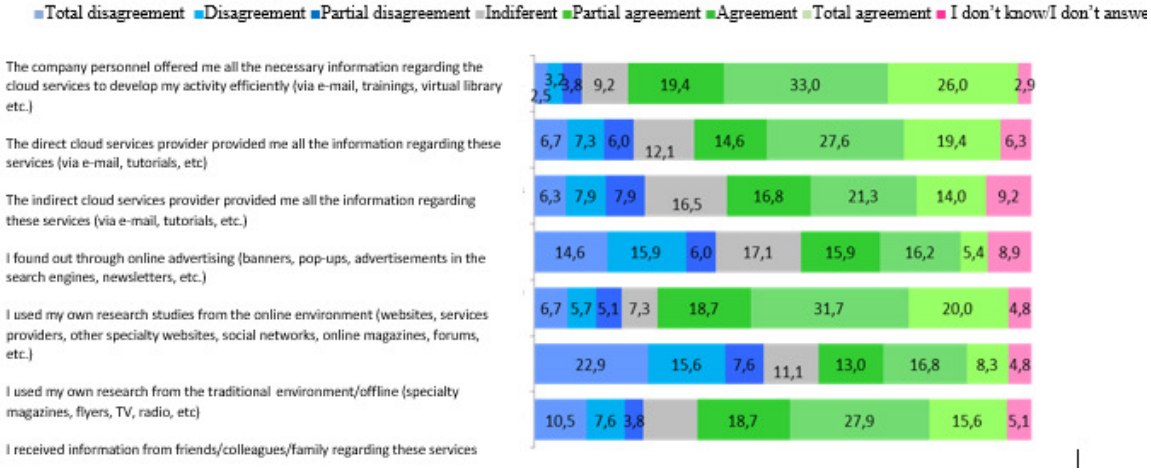

Figure 1: The perception of the respondents regarding the communication process implied at the cloud services level used in the company where they work

Source: Statistical survey made by the author

Looking from the respondents' work experience with cloud services perspective, more than half of them claim that the previous studies regarding the investigated subject, as well as conferences and socialization sessions from the domain supported them in the efficient use of these services in the company where they work.

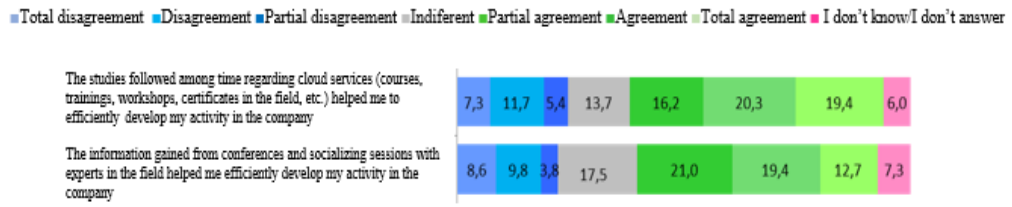

Figure 2: Respondents perception regarding their work experience with the cloud services they use at their workplace

Source: Statistical survey made by the author

Another researched aspect captures the respondents' perception over the risks of the cloud services they use in their professional activity. From the figure below it is observed that almost 60% of the employees don't consider that the data stored in cloud have a lower safety, in the sense that there can be data losses or on the contrary, they could be stolen. Also, they don't think there are risks regarding the access of personal data stored in cloud by unauthorized persons. Moreover, 52,1% of the total respondents don't agree with the fact that data storage is made on a single server.

At the level of the server's functionality, it is noticed that 33,3% of the respondents agree with the fact that in the period when the server is unavailable, the data stored in clouds can be accessed, while 39,4% claim the contrary.

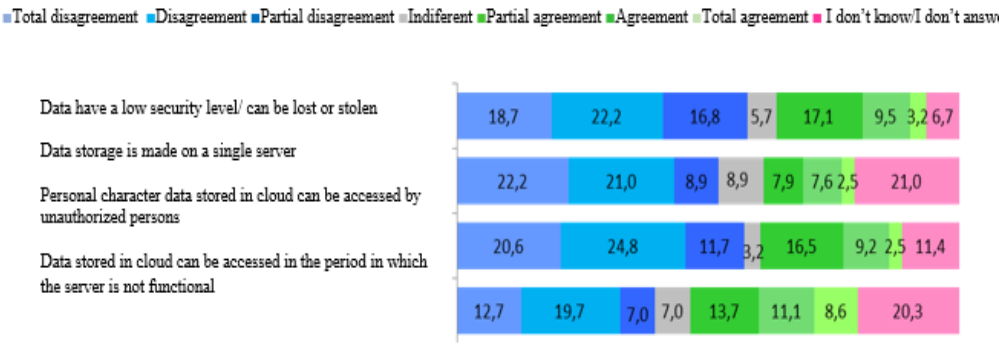

Figure 3: Risks perceived by the respondents in what regards using cloud services at their workplace

Source: Statistical survey made by the author

In what regards the demographical data of the employees it can be noticed that, 53,3% are women, while 46,7% are men.

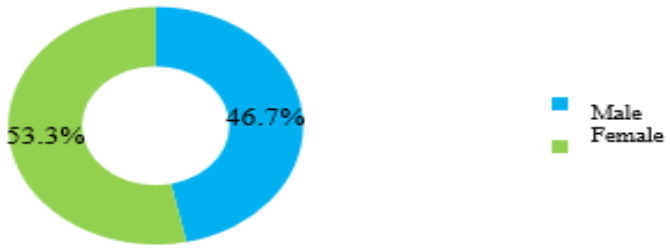

Figure 4: Gender

Source: Statistical survey made by the author

8 out of 10 employees are between 18-39 years old, while the rest of the participants at the study are 40 years old or above.

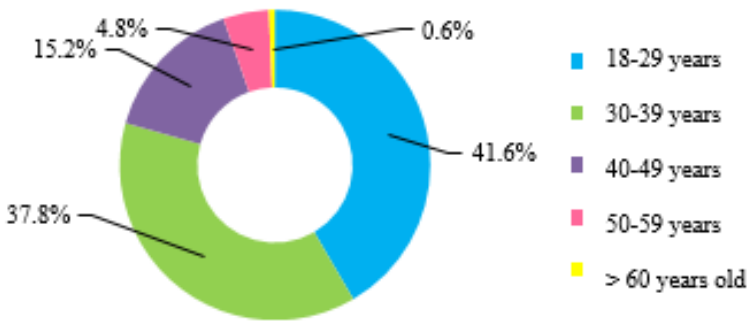

Figure 5 -Age

Source: Statistical survey made by the author

The majority of the persons who took part at the study (57,5%) have post-graduation studies as last graduated educational form, 4 out of 10 being university graduates, and 3,2% of the employees claimed that they most recently graduated high school, post high school or middle school.

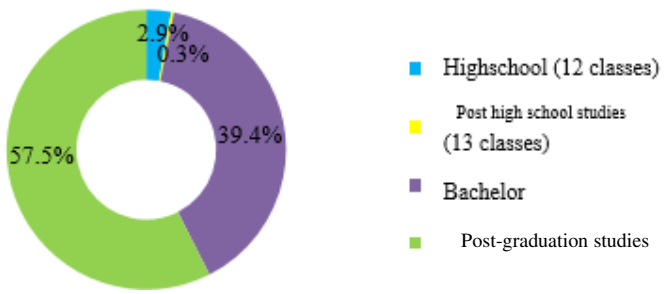

Figure 6: Last graduated form of education

Source: Statistical survey made by the author

In what regards the occupational status, 6 out of 10 participants are employees have higher education, 3 out of 10 have a managing position as managers or CEOs and only 6,3% of the total participants are entrepreneurs. Less than 3% of the employees have graduated secondary education or administer the company where they work.

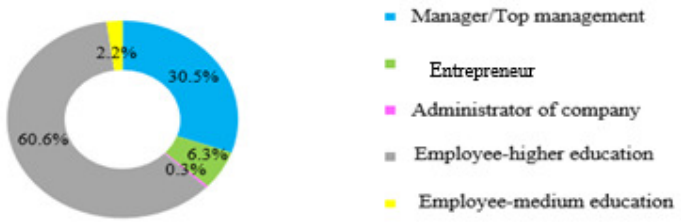

Figure 7: Status on the labor market

Source: Statistical survey made by the author

Conclusions

The impact of modern technologies is vital is what regards the economic development of the current society and directly influences the capacity of the companies to resist on the market. The emergence of the Internet, a source with an incredible informational potential, has open new dimensions in what regards the discovery of development opportunities for the companies in the marketing communication process. This has led to the fact that the Internet is a very important influence factor when the marketing communication activities established in the companies is taken into account.

Web technologies among with advanced computer systems help to efficientize the process of tasks fulfilment from the marketing communication activities to give an immediate feedback to consumers and prospectors. Moreover, in the companies managers constantly appeal to Web technologies with the purpose of efficiently relation both with employees and consumers and prospectors. Companies want to promote as efficiently as possible their products and services available in the portfolio, via technologies and last generation Web instruments and initiates efforts to create the most suitable promotional mix so that it would meet the needs and the demand of the target public by offering some customized high-level solutions and also to obtain a high position in the competitive environment.

The quantitative study was established with the purpose of determining the employees' perception from various activity domains in Romania regarding the cloud services used in the professional activity. The research was made with the help of applying a research instrument, the survey, that was projected on an online platform and its URL was shared via e-mail to the respondents for answering. At the level of this study some limits were also identified.

One of the research limits is concluded by the fact that in the preliminary phase of the research there haven't been secondary sources found that will support the dimension of the researched general collectivity and in this way, the opportunity to make a research with representative character didn't existed anymore. Therefore, the efforts were directed to the achieving of an empirical study developed at the level of the companies that have their social headquarters in the country. Moreover, the survey was shared online and from this cause we don't have the certainty of the fact that it was written by the persons to whom it was assigned.

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Review on Effectiveness of Insecticide Mosquito Nets and Indoor Residual Spray In Fighting Malaria

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Abstract

Due to the growing number of actions and interventions reporting the effectiveness of vector control in malaria protection, there is a need to systematically review the literature on indoor residual spray and insecticide mosquito nets to examine the effectiveness and identify research coverages in the area of the topic. A systematic review of over 579 scholarly articles published since the year 2013 was conducted. The final dataset included 100 articles; consequently, the research shows significant improvements in the coverage of malaria intervention tools since 2000. This resulted in following the Abuja agreement that targeted to increase the coverage of insecticide mosquito nets by 60% for children under five years of age and pregnant women and target spray of households in malaria areas with indoor residual sprayings. While there is substantial heterogeneity in study characteristics and effect size, the decline in malaria mortality and morbidity rates achieved throughout the continent. However, malaria continued as a public health challenge, particularly in Sub-Saharan Africa. Lack of knowledge about malaria and its prevention methods, negative attitude on the use of interventions, and problems with intervention access to high malaria-endemic regions identified as a challenge in many study communities. Besides shape preferences and the limitations to protect malaria outdoors cited as a challenge with the intervention approach. Generally, the report recommended policymakers, and health planners think extra efforts with the existing strategy that fosters different vector habitats in different communities at various sites.

Keywords: Malaria, Indoor residual spray, Insecticide mosquito nets, Systematic review

Update about Malaria

With approximately 214 million cases in 2015, malaria is a global health challenge where most cases estimated to occur in the African Region (World Health Organization, 2015), with 88% cases, and causes an estimated death of 438 000 patients, of which 90% of death's reported to have occurred in African. Similarly, 198 million cases of malaria occurred globally in 2013, and the disease led to 584 000 deaths, with more than three quarters (78%) of malaria deaths occur in children aged < 5 years (World health organisation, 2015). Malaria is a vector-borne infectious disease caused by protozoan parasites of the genus Plasmodium, which is transmitted to human beings by the bite of infected female anopheles' mosquito (DFID, 2010). There are currently over 100 countries and territories where there is a risk of malaria transmission and visited by more than 125 million international travelers every year (World Health Organization, 2010). At which over 10,000 are reported to become ill with malaria after returning home; despite the real figure may be considerably higher due to underreporting. There were an estimated 660,000 deaths from malaria disease in 2010, where 81% of cases and 91% of deaths estimated to have occurred in the WHO African Regions, and globally 86% of the victims were children under five years of age (Animut, Negash and Kebede, 2014). Though the effectiveness of the IRS in controlling malaria has been reported (Johns *et al.*, 2016; Oxborough, 2016; PMI, 2016; Magaço *et al.*, 2019), the spread and intensification of pyrethroid resistance in malaria vectors and other factors hinders their long-term usefulness. Besides, the effectiveness of conventional ITN in malaria

prevention revealed (Arroz *et al.*, 2017; Ernst *et al.*, 2017; Taremwa *et al.*, 2017; Tassew, Hopkins and Deressa, 2017; Taffese *et al.*, 2018), problems regarding the continuous use of ITN, limited knowledge about malaria and its prevention and misperception reduces its efficiency in protecting malaria. Malaria is a maternal and child health global concern, with a high impact on the economy, which costs African nations alone $12 billion each year (Turgeman, 2011). This figure factors in costs of health care, absenteeism, days lost in education, decreased productivity due to brain damage from cerebral malaria, and loss of investment and tourism. Successfully addressing these threats will require strategies that expand access and use of existing control methods, and evaluating challenges regarding vector control tools. This paper investigates the effect of insecticide mosquito nets and indoor residual spray on malaria and its prevention. The result of the research is beneficial for policymakers, researchers, and other stakeholders working on this area for program development, and evaluation of its impacts.

Methods

Published reports and scientific publications reviewed. The web search engines Google, as well as the electronic databases PubMed and Springer Link of Systematic Reviews, searched for relevant documents. Keywords/phrases used in the web search included: “malaria,” “ITN,” “IRS,” and terms reflecting “topics of interest.” These keywords/phrases were used in a variety of combinations and included synonyms, alternative terminologies, related terms, and variation in word endings. Example of topics explored included: household, knowledge, treatment-seeking, knowledge, attitude, practice, perception, usage, indoor residual spraying, bed net, policy, community health workers, vector control, burden, transmission, prevalence, mortality, plasmodium, Ministry of Health, world health organization, and others. We included references published mostly from 2013 until 2018. But for guidelines, we used the 2009 and 2010 as well. All publications resulting from these searches were screened and pertinent records collated using Mendeley, a web-based bibliography database manager. Documents that met the inclusion criteria of the review paper were retrieved and evaluated by the authors. Inclusion criteria for this review: (1) it must be English-language. (2) published primary and secondary literature, guidelines, and technical reports, and. (3) Recent publications providing context on the following three pre-specified related topics in the area of malaria program: news about vector control strategies, global and sub-Saharan Africa, and the current challenges to malaria protection. The review primarily focused on Ethiopia and Sub-Saharan African though it gives insights to global vector control strategies. A data extraction form used to extract and record findings from each paper related to the topics. Fig. 1 illustrates the search strategy for this review from a pool of searches.

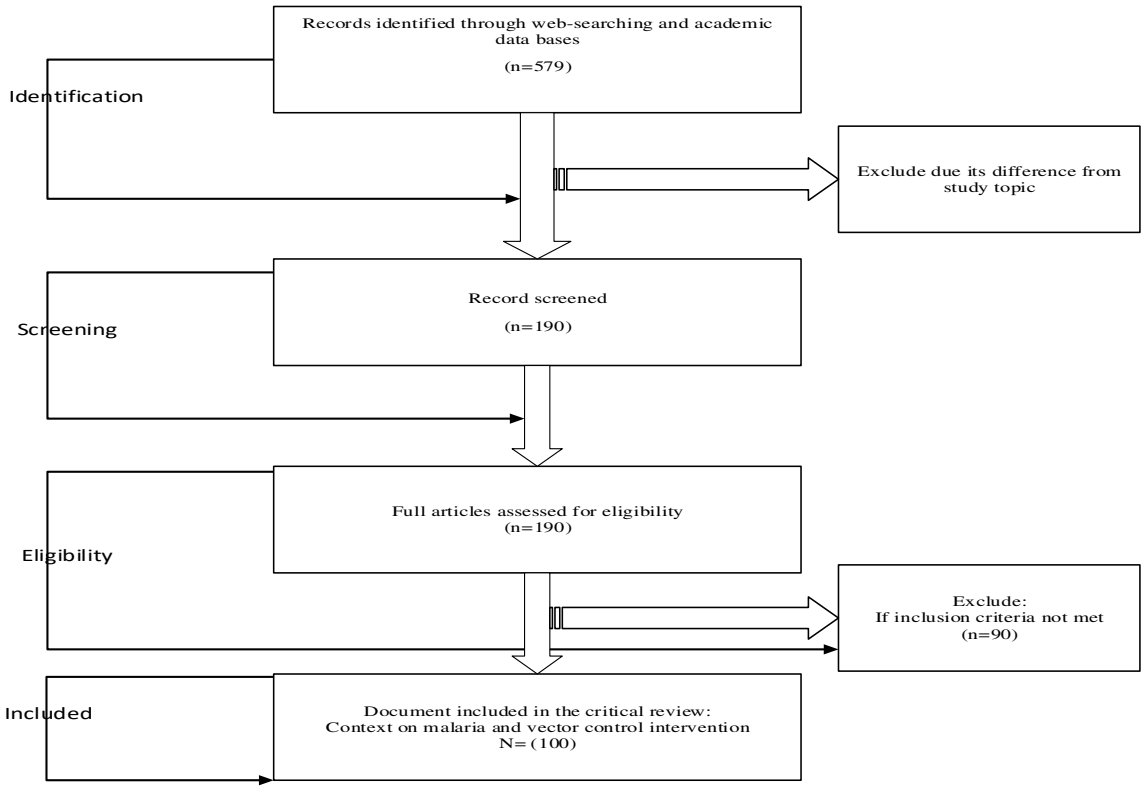

Fig.1 : Search strategy for systematic review

What is new in vector control strategies?

Countries must hit all persons at risk with insecticide mosquito nets and indoor residual spray to meet the malaria goals of world health organization-roll-back malaria. Also, provide laboratory tests for malaria suspected cases and effective treatment of all confirmed cases (Aregawi *et al.*, 2009). Insecticide mosquito nets (ITNs) and indoor residual spraying (IRS) identified as the principal methods used for the prevention and control of malaria. These strategies remain as the backbone of vector control intervention policies. Which are recommended by WHO as a key intervention in the critical reduction of the malaria disease and interruption of its transmission and accounts for 60% of the global malaria investment and control (PMI and Operations, 2009; World health organisation, 2013a, 2013b; World Health Organization, 2015; Madani *et al.*, 2017; Masaninga *et al.*, 2018). Insecticide-treated nets are mosquito nets that are treated with insecticides to repel, disable, or kill vector mosquitos that transmit malaria (OSSAI, 2014). Strong evidence exists about ITN at the individual level that its proper use substantially lowers the risk of contracting malaria (Nankabirwa *et al.*, 2014). The study also shows the low use of insecticide-mosquito nets by school-age children. This is due to the less control of the family to children while going to bed as they become older, which is the other challenge in malaria program to focus. The study in Nigeria reported substantial knowledge of study participants about ITN, IRS, and intermittent preventive treatment as malaria prevention methods. But the report shows a suboptimal practice of sleeping under ITN (Uv *et al.*, 2014). On the other hand, the study in Rwanda shows the community's knowledge about malaria and its prevention methods (Asingizwe *et al.*, 2015), the research also reveals an optimistic community for malaria elimination. The other study demonstrates the involvement of citizens in monitoring mosquito dynamics, habitats, nuisance, and malaria episode to create potentially more sustainable vector control interventions (Domina Asingizwe, P. Marijn Poortvliet, Constantianus J.M. Koenraadt, Arnold J.H. Van Vliet, Marilyn M. Murindahabi, Chantal Ingabire, Leon Mutesa, 2018). The other study also reported knowledge about malaria complemented with ownership and use of ITNs in the study sites (Onwuka, 2015). The finding of the study gives insights to policymakers on how appropriate knowledge impacts the prevention and control

of infectious diseases besides the malaria program. African heads of governments targeted achieving 60% coverage of bed nets to use by 2005 for pregnant women and children aged 5years following a summit in Abuja in 2000 (Odoko, Nwose and Igumbor, 2017). Using ITN has been shown to reduce malaria case incidence rates by 50% in a range of settings. And reduce malaria mortality rates by 55% in children under-5 years in Sub-Saharan Africa (World Health Organization, 2017). In 2015 the World Health Organization's (WHO's) Roll Back Malaria Partnership set a goal to reduce global malaria cases by 75% from 2000 base. And to reduce malaria deaths to near zero through universal coverage by effective prevention and treatment interventions. Likewise, WHO recommends the use of insecticide-treated nets (ITNs), particularly long-lasting insecticidal nets, which have shown to be cost-effective. Also, reduces malaria episodes among children < 5 years of age by approximately 50% and all-cause mortality by 17% (Willey *et al.*, 2012; Zhou *et al.*, 2014). The impact of ITN/IRS coverage for under-five mortality was significant among major child health interventions such as immunization. Showing a 10% increase in households with ITN/IRS would reduce 1.5 child deaths per 1000 live births (Akachi and Atun, 2011). Besides, remarkable achievement towards the reduction of malaria cases and malaria-related deaths explained in the global world due to the introduction of ITN and IRS (World health organisation, 2013b; Initiative, 2015). However, a low level of willingness to take up the IRS reported compared to the target (Wadunde *et al.*, 2018). The other study shows insecticide mosquito nets repellent with chemicals can protect the user and those who sleep around but not under the net (Ochomo *et al.*, 2013). The study conducted in Uganda reported that a 100% increase in the coverage of insecticide-treated nets was associated with a decline in the incidence of malaria by 44% (Ssempiira *et al.*, 2018). However, in other African countries such as Malawi, the report shows high coverage of insecticide mosquito nets, but malaria burden remains high(Coalson *et al.*, 2018). The Ethiopian study report also reveals, though, the Abuja declaration targets agreed to provide at least 80% of pregnant women with ITNs by the year 2005; only 63% of pregnant women presently make use of ITN, which hampered its effectiveness(Fuge, Ayanto and Gurmamo, 2015). And it expresses the idea that access to intervention doesn't mean its use, which needs another effort to take place (Russell *et al.*, 2015). Also, a significant reduction reported on malaria positive case, the magnitude of the disease as a public health challenge is alarming (Tesfa, Bayih and Zeleke, 2018). Which needs extra efforts to strengthen the prevention and control mechanisms in the community. The study in Malawi revealed that ITN was recognized as important malaria prevention generally, but the access and use reported as differed across various sites (Pell *et al.*, 2013). Despite the availability of ITNs, malaria remains a foremost public health concern in Uganda; this is due to respondents' negative attitude towards ITN and low usage to protect malaria (Taremwa *et al.*, 2017). Lack of education and non-use of insecticide mosquito net also associated with malaria prevalence (Fana *et al.*, 2015). Furthermore, challenges regarding attitudes towards ITN and its use to protect malaria also identified (Kramer *et al.*, 2009; Tesfa, 2012). The study conducted in Senegal demonstrates the complexity of the malaria context. Showing the need to study the genetic structure of Anopheles populations to evaluate the effectiveness of vector-control tools and the successful management of malaria vector control (Sougoufara *et al.*, 2017). Insecticide mosquito nets are the primary tool for vector control, and optimizing its use is a key concern of national programs. However, preferences of certain net shape attribute exits (Dhawan *et al.*, 2014; Koenker and Yukich, 2017). The study in Yemen reported low knowledge about the importance of insecticide mosquito nets and indoor residual spraying of malaria prevention (Bamaga *et al.*, 2014), which needs an effort towards awareness creation programs in the community. The study of Sudan also shows a negative attitude of ITN and low utilization, despite good knowledge about ITN (Tayseir T. M. Masaad, Yousif M. Elmosaad, Abd Elbasit Elawad Mohammed, Ahmed Elnadif Elmanssury, Mahmoud Jaber, Mustafa M. Mustafa, 2017). Distance from health facilities also affects the utilization of intervention tools in line with other contributing factors (Nkoka *et al.*, 2018). Furthermore, the government can solve the issue with the deployment of trained community health workforce at the local level. Good progress regarding the use and ownership of bed nets to prevent malaria reported in Ethiopia than had previously (Tassew, Hopkins and Deressa, 2017);. However, poor knowledge about malaria transmission mechanisms and symptoms were also reported (Delil *et al.*, 2016). Also, another study revealed good knowledge about malaria and strategic interventions, but the compliance rate was low in study communities (Animut, Negash and Kebede, 2014). On the other hand, problems regarding awareness about prevention and control of malaria reported in study participants (Karunamoorthi and Bekele, 2012). Low access to ITN and low utilization also reported in another study area (Watiro1 and Awoke2, 2016). Environmental management also reported as the most popular method to protect malaria in line

with ITN and IRS (Dejene, 2016). The other study in north-west Ethiopia reported the absence of the reduction of malaria prevalence annually (Alelign, Tekeste and Petros, 2018). And the result of this study paves the way for future researchers to explore intervention utilization in the area, to assess strategic impacts. Similarly, the study in Burkina Faso reported low knowledge about malaria prevention practices in a large proportion of study participants (Yaya *et al.*, 2017). The study in Colombia reported a high level of knowledge about malaria in study regions. but identified gaps persisted relating to practice (Forero *et al.*, 2014); also, ITN does not protect malaria infection outdoors. An impressive report showed by the study in Myanmar at which higher level of malaria-related knowledge reported with excellent use of intervention strategies, ITNs (Liu *et al.*, 2015). This is maybe due to the fact that the provision of reliable education to the community and sustainably using particular approaches. The other report in Iran shows awareness of the community about symptoms and causes of malaria, but the majority has misconceptions about LLINs (Soleimani-Ahmadi *et al.*, 2014), which calls for appropriate educational intervention to be developed by trained health workers. On the other hand, good awareness of the community towards means of malaria transmission and ways of prevention reported but the ownership and utilization were not as high as their knowledge (Fuge, Ayanto and Gurmamo, 2015) (Haile *et al.*, 2015), in addition myths and misconceptions about malaria reported as a challenge for ITN use (Tobin-West and Kanu, 2016). The other study finding shows the association of knowledge with the utilization of the prevention interventions, where good knowledge level leads to better use of insecticide mosquito nets to protect malaria(Kimbi *et al.*, 2014). For every infectious disease prevention and control, including malaria to succeed, the ownership and involvement of the society is at the forefront. As ITN programs depend on the acceptance and active involvement of individuals and communities, human behavioral and social factors impacts ITN use (Watanabe *et al.*, 2014; Nwokolo, 2015). Knowledge about the preventive measures of malaria reported as an important preceding factor for the acceptance and use of malaria preventive measures like Insecticide Treated Nets (ITN) by community members (Adebayo, Akinyemi and Cadmus, 2015), however, the result shows low knowledge about malaria prevention in study participants which is the challenge for the program success (Molla Gedefaw, 2013), and lower number of people who slept under ITN was revealed in study. As part of the efforts for universal coverage of vector control measure government of Nigeria, at various levels of governance, has embarked on free distribution of ITNs to caregivers of children younger than five years of age; however, research outputs have consistently shown limited access to ITN, and most parents across the different Nigerian communities have negative attitudes towards the use of the treated nets(Cecilia Van Zyl-Schalekamp, 2013; Ogbonna*, 2015), poor malaria knowledge also reported in the study sites (Inah *et al.*, 2017; Ukpai *et al.*, 2017). Likewise, insecticide mosquito nets explained the most preferred malaria prevention strategy, but a history of malaria still exists (Animut, Negash and Kebede, 2014). Similarly, the study showed ITN, IRS, and larval source management as malaria vector transmission reducing agent with differences in residual efficacy in indoor residual spraying at different housing standards, With high efficacy of painted wall surface and low effectiveness of rough surface housing standard (Eckert *et al.*, 2017; Desalegn, Wegayehu and Massebo, 2018). The study conducted in sub-Saharan Africa on vector control intervention effects reported that, in all countries, the probability of a decrease in parasitemia varied substantially between regions. Insecticide-treated bed nets were an important intervention for reducing malaria risk, according to different definitions of coverage, but, an overall effect of insecticide-treated bed nets at country level was significant only in Angola (–0·64, 95% credible interval –0·98 to –0·30) and Senegal (–0·34, –0·64 to –0·05); however, in all countries, we detected significant effects of bed nets and indoor residual spraying at local level (Giardina *et al.*, 2014), which may be due the differences in the coverage of interventions, or differences in information provision about the program, and other related determinants to affect the use and access. The other study in Nigeria pointed out associations between knowledge and intervention use to protect malaria, where those who know use of ITN can protect from malaria were almost two times more likely to use ITN than those who do not know (Nwokolo, 2015; Uzoamaka and Onyemaechi, 2016), this study shows that increasing the number of nets owned per household might not be a critical decider on whether the net will be used or not. The other study reported a negative attitude and low self-practice of pregnant women in the study sites(Adibe *et al.*, 2017). So, policymakers, program planners, and concerned stakeholders have designed the way to facilitate its use while providing ITN for malaria prevention. Perceptions and health-seeking behaviors are critical for malaria prevention and control. and can be achieved with valid and effective provision of information with trained health workers, and the study in Ghana reported how awareness of the

communities conducted by health professionals impacted the malaria preventive practices (Alexander Suuk Laar, Amos Kankponang Laar, 2013). Community engagement for malaria elimination also reported (Adhikari *et al.*, 2017), which can be achieved with the implementation of community mobilization from the ground level via trained health workers. The other study reported, the timing where malaria survey conducted influences the estimates of the geographical distribution of the disease risk, particularly in settings with the seasonal transmission (Tonye *et al.*, 2018). The other study in Nigeria reveals the decline in the use of insecticide mosquito nets from 86.2% to 71.5% in the study population (Ogunsanmi *et al.*, 2016), misconception about malaria transmission, and its cause also reported (Singh *et al.*, 2014). The result calls for urgent need to identify the barriers to use the intervention and the changes in the outcome of the malaria disease. The study conducted in four African countries pointed out that improving healthcare providers' knowledge and practices is an untapped opportunity for expanding ITN utilization and preventing malaria (Hoffman *et al.*, 2011). The study finding shows the association between malaria protection and the health workforce in such a way that strengthening the workers' capability facilitates the use and access of the community for an existing strategy. Though malaria identified as a major health challenge, particularly for children and pregnant women, only one-fourth of the study participants in India named malaria among top health issues for pregnant mothers (Sabin *et al.*, 2018). The study in Mali shows substantial improvement in access and ownership of the study community for malaria prevention and control measures. Also, the continuous decline in the outcome of malaria disease due to the intervention tools reported (Kayentao *et al.*, 2018). Though it is interesting progress to reveal, as discussed in various literatures in different parts of Sub-Saharan Africa, such cases are rare to generalize the findings. Hence mostly, various challenges reported with the access and utilization of intervention to protect malaria that needs novel efforts at grass root-level. The study in Ghana reported caregivers' understandings about malaria and its transmission modes, but the study reveals the need for education on preventive methods implementation (Ameyaw, Dogbe and Owusu, 2015). Likewise, the study in Bangladesh reported gaps in communities' knowledge regarding aspects of malaria transmission (Saha *et al.*, 2019), which need effort on increasing knowledge, attitude, and practice regarding malaria prevention methods in the society.

Challenges and Way Forward

Recent declines in malaria-related morbidity and mortality resulted due to the scale-up of ITNs and IRS. However, different factors like the behavior of the mosquitoes, which bite outdoors, problems with proper utilization of nets. Nets preferences in various communities and holes or tears in nets, knowledge of the community about malaria and its prevention have impacted the effectiveness of control interventions targeting mosquitoes entering houses. From 2001 to 2015 in Sub-Saharan Africa, the report shows 663 million an averting case malaria out of 943 million. At which 69% is averting rate reported to be due to ITN use (World Health Organization, 2015). The study of Nigeria reported problems with access and use of ITN in the high-risk region of the study community (Odoko, Nwose and Igumbor, 2018). The research in India also informed inadequate coverage of malaria intervention tools to households (Raghavendra *et al.*, 2017). Although morbidity and mortality due to malaria declining, malaria case incidence described being high in Ethiopia (Taffese *et al.*, 2018) (Alemu *et al.*, 2012), which occurred due to the gap in the ownership and obedience in malaria areas. Besides differences in the outcome, malaria species types reported where Plasmodium vivax improved in one site than the dominant plasmodium falciparum, which is unchanged in other study areas. The other challenge is low knowledge about net care and repair, besides negative perception to repair (Zewde *et al.*, 2017). So it needs to enhance education through different channels, and community health workers, as reported in the research, conducted Zambia (Shimaponda-Mataa *et al.*, 2017). Similarly, the study in Ethiopia reported poverty and socio-cultural diversity as the primary influence of the community to use the intervention in the right-way and other (Doda *et al.*, 2018). And housing structure also identified as a bottleneck for intervention use (Carter, 2014). The other study in Namibia pointed out the universal coverage of ITN and IRS supplemented by larval source management for malaria elimination (Chanda *et al.*, 2015), but the national capacity to plan, evaluate, implement and monitor will require adequate and sustained technical professional support. So, to solve the malaria issue in line with its prevention and control, the involvement of intersectoral collaboration and community

engagement is essential. To do this, the partnership of policymakers and program planners from governmental and non-governmental organizations as well as research development to show the gaps and recommend the strategies is substantial. It is also important to note the incorporation of major infectious disease programs, including malaria, into the education curricula to assure sustainable achievement in the wellbeing of the society. To improve the success in the malaria program, we have to assure the program related knowledge to the community level. Likewise, it must also be appropriate to approve the strategic implementation regarding the use of IRS and ITN. Supported by the study in Mali, with high national net use, at which comparatively higher in the region covered by the universal distribution campaign than in the region not yet covered with correct communication messaging (Leonard *et al.*, 2014). And the need to enhance information using available channels such as health facility and community health workers to improve utilization as reported in Zambian study (Shimaponda-mataa, Tembo-mwase and Gebreslasie, 2016). This is because, as cited in different studies conducted in Africa among non-medical students of higher education, knowledge regarding malaria preventive measures and practice reported (Saheed O Usman *et al.*, 2015; Saheed Opeyemi Usman *et al.*, 2015; EdetUtan *et al.*, 2016; Sumari *et al.*, 2016). Although various problems directly aligned with the community's practice regarding intervention strategies for malaria protection, access to the intervention is also another challenge for malaria programs to achieve. As cited underworld health statistics, though an impressive increase in malaria intervention coverage, in 2013, out of at malaria risk population of 840, an estimated 278 million was in Sub-Saharan Africa, lived without a single net in their house(World health organisation, 2015). Furthermore, various challenges regarding malaria and its prevention cited in different countries and within a country in different study sites. Similarly, numerous problems regarding intervention strategy for malaria protection raised in diverse populations discussed in the literature of various countries. As the study in Rwanda, identification of behavioral determinants about LLIN use, IRS acceptability, and health care seeking is a critical step. Supports the development of effective and targeted interventions, aiming to reduce malaria transmission and elimination (Ingabire *et al.*, 2015) further. So, the idea expresses and calls the policymakers and health planners to think beyond the traditional way of program implementation. Also, to believe in the expansion of extra efforts with new tools in line with the existing strategy, and to get out of one-fit all approach and customization can play an immeasurable role in attaining the malaria targets. Most of these researchers focused on the relationship between ITN and IRS in malaria protection, but they're in need to refer other dimensions in the relationship such as household income and knowledge role.

Conflict of interest

On behalf of all authors, I am declaring that authors have seen and approved the final version of the manuscript, and warrant that the article is original work.

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The New Industrial 4.0 Revolution, Eco-Innovation and the Environmental Approach

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Abstract

Technological progress is the basis for sustainable and inclusive economic development. It is possible to identify several needs to implement sustainable solutions in all sectors of the economy, such as eco-innovation and green jobs or environmental protection. The purpose of the article is to discuss and examine the environmental and business factors for the development of such solutions. A qualitative study was conducted based on a structured literature review to gather information on business ecosystem factors affecting the use of eco-innovation and their impact on sustainable development and transformation towards the green economy. This study will provide a hint for the understanding of business mechanisms of implementing eco-innovation that can allow them to build a sustainable business network. The article uses qualitative methods and contains ideas for future research. A quantitative study can be carried out to develop a business model for the eco-innovation system using inter-organizational network models.

Keywords: Business Ecosystem, Eco-Innovations, Inter-Organizational Network, Sustainable Development

Introduction

Currently, one of the fundamental objectives of the European economies is to reduce the negative impact of human activity on the natural environment (European Commission, 2020). European Union action towards a setting a balance between economic growth and environmental protection needs. One of its action is the creation of eco-innovation and green hobs that promote environmental protection and to restore the environment to its natural state (Sulich et al., 2020). Transformation towards the green economy is based on the multiple stages and one of their dimensions is progress (Sulich, 2018; Tarnawska, 2014).

Technological progress, measured by the Eurostat by the number of the patents dedicated to the Environmental Goods and Services Sector, is the basis for the sustainable growth and inclusive economic development (Cecere and Mazzanti, 2017). There are examples of the spectacular implementations of the newest technology to reduce the anthropopressure and enhance the innovativeness among green enterprises (Tutaj et al., 2019).

The purpose of the article is to discuss and examine the environmental and business factors for the development of such solutions. A qualitative study was conducted based on a structured literature review to gather information on business ecosystem factors affecting the use of eco-innovation and

their impact on sustainable development and transformation towards the green economy. This study will provide a hint for an understanding of business mechanisms of implementing eco-innovation that can allow them to build a sustainable business network (Bogusz and Sulich, 2019).

Eco-Innovations

The concept of ‘eco-innovation’ is relatively new. The prefix 'eco' comes from the word ecology, while by the 'innovation' we mean everything new (Tarnawska, 2014). It is generally acknowledged that the eco-innovations generate new products and processes which provide the consumer and business with values but also reduce environmental impact (Rutkowska-Podołowska, 2016).

The eco-innovation is the production method, assimilation or exploitation of the product, production process, service or management, or business method that is innovative for the organization, regardless of whether the organization is developing or adopting it (Tutaj et al., 2019). Eco-innovations at the design, research or trade stage also take into account the idea of sustainable development in environmental, social and financial aspects (Graczyk, 2013; Sulich and Zema, 2018). This, in turn, reduces the risk to the environment, pollution and other potentially negative effects of resource use (including energy consumption) throughout the life of the product, process or method cycle compared to traditional alternatives (Kemp and Pearson, 2007).

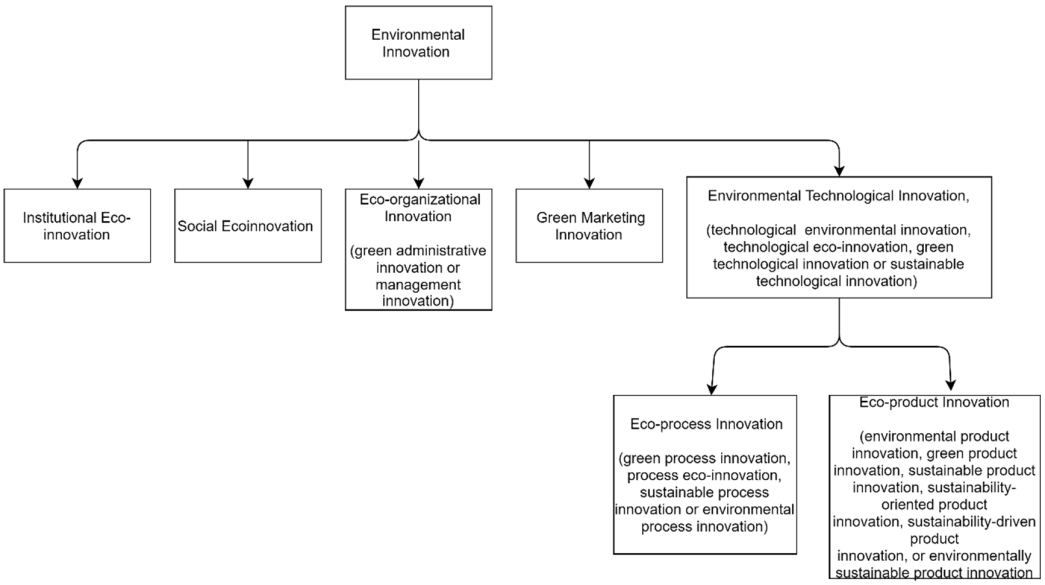

Fig. 1: Typology of eco-innovation

Source: (Yusuf et al., 2018).

It is possible to single out the category of eco-innovation based on the technological or non-technological purpose is involved. ET innovations include eco-product innovations and eco-process innovations, while non-technological innovations include marketing, social, organizational and institutional activities (Yusuf et al., 2018).

Eco-innovation compared to innovation requires more external sources of knowledge and information. Thanks to this, eco-innovations have a positive impact on the environment (Kammerer, 2009). Often the introduction of an eco-innovation policy can be seen as an introduction of environmental policy. Such policies can help reduce costs at the institutional and enterprise level and increase environmental efficiency (Rennings, 2000). Early research has shown that market demand, as well as scientific and

technological factors, are determinants of innovation (Mowery and Rosenberg, 1979). Currently, technological innovations are in high demand (Gontarz and Sulich, 2019; Yusuf et al., 2018).

According to many scientists, eco-innovations have the greatest impact on the energy sector (Leach et al., 2012; Popp, 2002; Wüstenhagen et al., 2007). Reports also emphasize the importance of implementing energy eco-innovations as "breakthrough energy technologies" with great innovation potential (Holliday, 2012).

Table 1: Innovations in energy technology examples

Solutions	Description and development forecasts
Public electric transport	Electric public transport has become a standard in many cities around the world. Although these eBuses have higher purchase prices due to upfront battery costs, their total cost of ownership is lower due to their independence from expensive diesel. They also eliminate local solid particles, including SOx, NOx and CO2, all major problems in most of today's cities.
Cheap energy storage	A new era of electric vehicles has rapidly expanded the lithium and cobalt battery market and drastically reduced its price. Industry and utilities are increasingly used as energy storage solutions. As battery prices fall sharply, they prove valuable to reduce energy costs, increase reliability and resilience, and make power systems more flexible.
Plastic recycling	The plastics industry is increasingly using a circular model that aims to eliminate waste in various sectors while providing economic, social and environmental benefits. The benefits are both economic and environmental, with a profit pool based on recycling estimated at 55 billion dollars for the next decade.
Solar energy available	Renewable energy is becoming cheaper and more available, it has serious consequences for almost 1 billion people around the world without access to electricity looking for renewable solutions such as solar energy to provide energy to millions quickly and cheaply. Innovative financing plans can make previously unavailable solar home systems an intelligent solution for communities that are too far from a reliable network connection.
Hydrogen in the energy transition	Hydrogen is projected to power over 400 million cars, 15 to 20 million buses and over 20 per cent of passenger ships and locomotives by 2050. Hydrogen fuel can help the world meet its goal of reducing carbon emissions by 60 per cent. Although the necessary technology exists today, the costs of hydrogen production must fall significantly, and the infrastructure that supports it needs growth. Hydrogen could facilitate a smarter use of other renewable energy sources by acting as a long-term solution for the transport and storage of electricity from renewable sources. It can be a key factor in the transition to energy.

Source: (Holliday, 2012).

The OECD report identifies ground-breaking eco-innovations from various industries (OECD, 2009). The authors point out the importance of comprehensive solutions consisting of individual eco-innovations, such as one of the earliest and best-known eco-industrial parks in Kalundborg in Denmark. As a result of the preparation process, eco-park developed gradually thanks to the cooperation of many neighbouring companies. The main participating companies are the coal-fired power plant (Asnæsværket), refinery (Statoil), pharmaceutical and industrial enzyme factory (Novo Nordisk and Novozymes), plasterboard factory (Gyproc), soil remediation company (AS Bioteknisk Jordrens) and the municipality of Kalundborg through municipal heating installation. This industrial cooperation has led to significant economic savings and reduced environmental impact (OECD, 2007).

Environmental Impact on Industry 4.0

Environmental problems such as air and water pollution and toxic waste disposal are common in all industrialized countries (Melchert, 2005). Research into the relationship between the environment and technology can be approached in many interdisciplinary ways. Many specialists in the field of social sciences also take part in these discussions, because the analysis of environmental changes mainly includes political and social causes (Tutaj et al., 2019). The extent of human intervention in the environment and its management are of particular importance since people are currently the main causes of environmental changes (Van den Bergh, 2001). The need to adapt care for the environment to social life was raised by research scientists, policymakers and consumers who change their consumption habits to more sustainable ones (Geels et al., 2016; Tutaj et al., 2019). In the 1990s, governments, businesses and consumers were increasingly worried about environmental protection, which accelerated social and environmental marketing research. However, research has been fragmented and needs to develop further (Saari et al., 2017).

The environment creates innovative needs. The needs result from the increase in population, urban development and growing energy consumption, and the main effects are deterioration of the environment, urban displacement and changes in urban infrastructure (Roosa, 2009). These needs can be met through sustainable integrated development between ET innovation-oriented business, authorities, society and the environment (OECD, 2009), and the use of technology as a tool to solve environmental problems (Pansera, 2016).

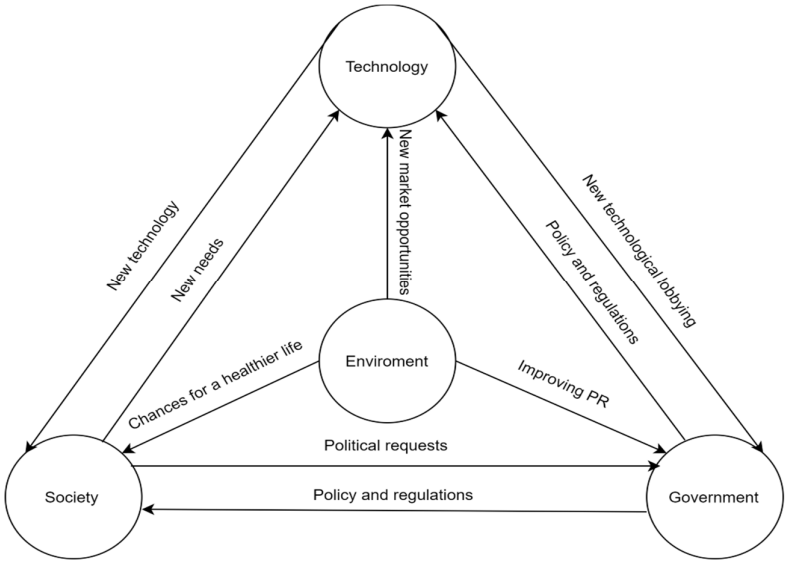

Fig. 2: The impact of the environment on innovations

Source: author own elaboration based on (OECD, 2009).

Technology companies are developing an eco-product for measurable business benefits (Yusuf et al., 2018). In general, customers do not have a natural need to buy eco products (Kearney, 2014). That is why companies must pay special attention to customer satisfaction and immediate needs towards their eco-product and gain a market advantage (Lin, 2019; Lin et al., 2014). Cost-saving also motivates companies to implement eco-innovation (Del Río and Linares, 2014). This can be achieved through an efficient process. However, saving must come later. The economic success of eco-innovation will be preceded by internal research and development and high investment intensity (Tarnawska, 2014).

Brand reputation and image enhancement also drive the implementation of eco-innovation (Ishak and Ahmad, 2011) or the implementation of the pro-ecological strategy (Macalik and Sulich, 2019).

Eco-innovations have a large social impact, whose mission is to promote organizational innovation and entrepreneurship and to provide solutions to social problems (Olsson and Galaz, 2011). An emerging eco-innovation society can be distinguished in which the knowledge triangle has been identified: Knowledge and Innovation Communities (KICs) (Constantinescu and Frone, 2014). These societies are in favour of the transition to ecological modernization of industrial societies through eco-innovation (Pansera, 2016). The factor that differentiates KICs from other research and innovation communities is the more traditional character, there is a clear link between all elements of the knowledge and innovation cycle, from education and new knowledge to market opportunities and support for innovative business (Constantinescu and Frone, 2014).

Governments and local authorities must take an active part in this eco-innovation process (Pansera, 2016). Pro-innovative legislation can contribute to this participation (Dillard, 2007). More and more initiatives of public-private partnerships are emerging regarding innovation as well as governmental and non-governmental partnerships (Lin, 2019). Such initiatives usually occur in sectors where initial capital is high, investments offering reimbursement are required, private funding initiative requires a wider risk-sharing option (Ministry of Foreign Affairs of the Netherlands, 2013).

Conclusions

Sustainable economic development includes, inter alia, promoting technological innovation. Particularly valuable are those that contribute to improving the environment. The basis for change is the mode of innovation (knowledge, science and research). Also, the attitude of the society conducive to eco-innovation conditions, as well as relevant political decisions regarding sustainable development, development and extension of the scope of economic opportunities for the technology industry. It is believed that technological innovation can provide added value through their role in global science, technology and innovation, but also in the delivery of public goods. It can also serve as a key factor in increasing the prosperity and competitiveness of the country.

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The Organization of Reverse Student Mentorship in Scientific Sphere

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Abstract

At present the issue of involving students in research and development activities is topical for every university. It is noted that mentoring is a well-known method of professional formation and development both for workers and specialists. In recent years it has also become applied in the system of student self-government: senior students help junior students. At the same time, even well-proven forms of work need to be updated and modernized. In this connection, a form of reverse student mentoring has been proposed for application: its essence and features have been revealed. The method of organization of this form of student mentoring is presented, each of the four stages of the method is revealed. The necessity of using the matrix of identifying potential mentors, which is based on two bases: the level of competence and motivation, is justified. The necessity to consider the competences for each particular type of research work is especially noted, since one type of work can be very well mastered by students, while the other cannot. An experiment was conducted in which 2-4 year students took part. The objective data obtained after a year of purposeful work allowed to ascertain the improvement of the number of research works of students, their quality, as well as the increase of interest and involvement of students in the scientific sphere.

Keywords: Mentoring, Student Mentoring, Reverse Student Mentoring

Introduction

Education in higher school is an important stage on the way of formation and development of a qualified specialist, a professional of his business. Changes in the world are also responsible for changes in higher education. For a long time, we lived in the world of "SPOD" (Steady, Predictable, Ordinary, Definite), in which universities have accumulated a giant psychological and pedagogical experience for effective education of students. Now our world is the world of Volatility, Uncertainty, Complexity, Ambiguity. And the pedagogical community of higher schools has to develop new models of education, to update the existing methods and forms of work. At present, the model 1.0 is still used in practice, which is a classic model (a teacher broadcasts information and students have to remember it by turning it into their knowledge). At the same time, model 2.0, which is a group work

on case technology, is intensively used. However, teachers are tasked with the transition to Model 3.0, according to which each student should have an educational route that outlines individual goals and selects the best ways to control their achievement. In a group learning environment, this is not easy, but possible.

Each higher education institution has student communities working in different areas: leisure, sports and physical education, tourism, creativity, meetings with interesting people, scientific conferences, volunteer work, master classes, etc. With such an intensity of collective work, many students would like to have the opportunity for personal, individual communication with more experienced people in matters of interest to them.

Student mentoring in this context can become a promising learning technology that will allow students to transfer special knowledge acquired by their peers in practice, to form new skills on the principle of "do like me", as well as create a basis for inter-departmental project teams.
Certain work is being done in this direction:

1) A curatorial institute has been creat
ed, which involves communication between senior curators and junior students. Experience shows that such communication is mainly related to general issues of life activities in the university;
2) A national project My-mentor.ru is being implemented, which expands the boundaries of its presence every year. However, this project is aimed at the development of capable, interested students, and quite a significant part of students (less active and motivated) remains outside its boundaries. This is not a minus of the project, this is the reality of competition in our world, which is also characteristic of the student environment;
3) The All-Russian School of Student Self-Government "Leader of the 21st Century" is held, including a competitive nomination "The best system of student mentoring".
However, the mentoring system itself does not change and, in our opinion, it does not always yield the expected results. Therefore, it is necessary to look for new forms of its construction.
One of the most difficult, but very important, areas of training of future specialists is the research activities of students. This activity is manifested in educational and extra-curricular research work. Academic research work is related to the subjects studied, where term papers, laboratory papers, academic projects and diploma theses are written. The extra-curricular research work of students is, as a rule, related to the scientific interests of the didactic staff or to the department scientific subject. As part of such work, students prepare reports, write essays and articles, and carry out project work commissioned by enterprises.

The tendency to involve all students in research work exacerbates the problem of teachers' time constraints, as it is in research work that personal meetings and consultations with an experienced mentor are so important for students. We believe that the establishment of a reverse mentoring system in the university environment will alleviate this problem.

The aim of the study – to develop and justify the feasibility of applying reverse student mentoring in the scientific field.

Objectives of the study:

1) to determine the types of students to choose a mentor;
2) to develop a methodology for determining a mentor;
3) to conduct experimental work;
4) to evaluate the success of applying reverse student mentoring in research activities of students.

Literature Review

The concept of "mentor" (from Greek: Μέντωρ: Men - "he who thinks", "tor" is a suffix for the male sex) *(Klein, 1967)* came to us from Homer's "Odyssey". The mentor was a friend of the Odyssey who was the tutor and guardian of his son, Telemah. The idea of mentoring as the transfer of experience to others was also present in the works of philosophers of ancient Greece. Thus, Socrates set the task of educating and awakening in the ward spiritual forces, conscious acceptance of the values of society. At the same time, an elderly man could be a mentor in this matter *(Maxwell and Runnette, 2014)*.

The modern use of the term "mentor" is associated with the book by Francois Fenelon "Les Adventures de Telemaque" (1699), which noted the importance of professionalism and experience of the mentor, while noting the importance of transferring the necessary skills to the ward.

Later on, mentoring was widely used at production enterprises, in which Russia was the first. The system of mentoring, didactically verified and justified, was created in the Moscow Technical School and gained international recognition in the late 19th century in Austria, France and the USA *(Fomin, 2013)*.

In Soviet times, mentoring was supported and encouraged by the state: "Youth Mentor" badges of honour were introduced (1975) and "Honoured Mentor of Youth of the RSFSR" (1981).

Scientists also paid much attention to the phenomenon of mentoring: in Russia it is Soya. Batiste *(Batyshev, 1985)*, V.A. Mitrofanov *(Mitrofanov, 2016)*, V.V. Nikitina *(Nikitina, 2013)*, A.R. Masalimova *(Masalimova, 2012)* and others. Abroad, such work was conducted by: G. Lewis *(Lewis, 1998)*, L. Gareth *(Gareth, 2002)*, J. T. Bennett *(Tepper, 1995)*, G. Crisp *(Crisp and Cruz, 2009)*, R. Collings *(Collings, Swanson and Watkins, 2014)*, B. Leidenfrost *(Leidenfrost et al., 2014)*, and others.

The analysis of the works of the above mentioned authors made it possible to state that the concept of "mentoring" is constantly evolving in its substantive aspect, and let us cite several fragments of the definitions offered by scientists:

– a set of useful behavioral methods *(Brod, p. 58, 2005)*;

– the complex of measures promoting professional formation *(Bevz, p. 10, 2011)*;

– social institute that transfers social experience *(Zolotareva, p.10, 2012);*

– "health of organization", investments in its long-term development *(Maister, 2014)*;

– the system of relations and a number of processes when one person helps, guides or supports another person *(Lewis, 1998)*.

In general, the definitions made by the authors do not contradict each other, they only reflect the specifics of mentoring application in a particular industry.

We were interested in the question of scientists' vision of the mentor. It should be noted that there have been no evolutionary changes in this issue. All authors note that the mentor is:

– an older person *(Bevz, 2011), (Brod, 2005), (Masalimova, 2012), (Mitrofanov, 2016), (Nikitina, 2013), (Zolotareva, 2012);*

– a more experienced person in solving a certain problem *(Bevz, 2011), (Brod, 2005), (Lewis, 1998), (Tepper, 1995), (Mitrofanov, 2016), (Nikitina, 2013), (Zolotareva, 2012).*

At the same time, the observations of D.D. Clutterbuck, who recorded the existence of two mentoring models: European and North American, are interesting for our study *(Clutterbuck, 2002)*.

The European model - "Developmental mentoring" - is based on the fact that the mentor is more experienced in the relevant issues, and he builds partnership, equal relations with his wards. The mentor can apply different forms of interaction: coaching, tutorship, facilitation, and others.

The North American model - "Sponsoring goring" - is based on the fact that the mentor is a more status person, giving some patronage to his protégé. In this case, the direct leader is the mentor of his subordinate, and a one-sided training takes place, based on the unquestioned submission to the authority and power that the mentor has *(Clutterbuck, 2002)*.

For the organization of student mentoring it is more appropriate to use the European model, as it fully corresponds to the partnership between students, the possibility of learning from each other.

Methods

The proposed author's methodology consists of 4 stages. We will describe each of them.

The first - propaedeutical - stage is organized with the aim of promoting student mentoring, increasing students' confidence in their scientific strength and capabilities. Its recommended duration is 1-3 months, depending on the interest of students. The activities of this stage are as follows:

– lecture on "History of student mentoring in Russia and abroad";
– a business game "I am a mentor";
– quest-like game "What kind of mentor do you need?";
– seminar "Research work of students at the university: requirements, organization and probable problems";
– the "Let's Help Each Other" conversation-dispute;
– individual conversations (on request of students);
– information meeting on "Student Mentoring System".

The result of this stage is students' interest in the system of interaction in the form of mentoring.
The second - diagnostic - stage is held to assess and self-evaluate students' potential in research activities. For this work it is necessary to prepare handouts, which include:

1) questionnaire for recording the existing experience in conducting research activities (including school years), the results achieved and the desire to do such work in the future;
2) a SWOT-analysis form on the possibilities of scientific and research activities. This analysis allows students to assess their strengths and weaknesses in the field of science, as well as to show their views on the opportunities for continuation / beginning of such work, available at university, in addition, students can express their fears or doubts about the success of research activities.

Then, the competence tables are compiled in cooperation with the supervisor. Their number is determined by the student's area of interest, in other words, by the number of research areas in which the student has previously worked. If we evaluate the school years, the diversity of scientific interests can be found in most cases. The competence tables include the information on the available experience of each type of scientific research and development work of students: report, essay, presentation, message, article, essay, term paper, project, preprint, etc.

On the basis of all diagnostic procedures, consolidated matrices for scientific direction (corresponding to students' training) are compiled. The experience of such work has shown the expediency of compiling the matrix on two grounds: the level of competence and motivation for this type of activity (Fig 1).

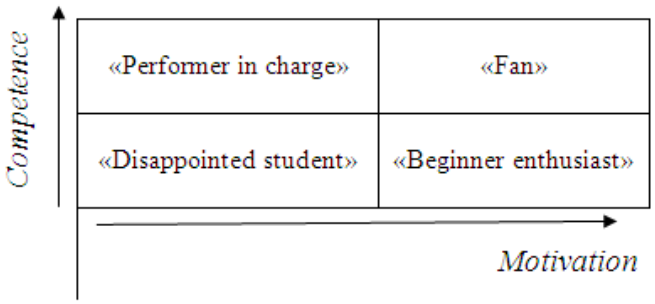

Fig. 1: Consolidated matrix for scientific direction
(Source: compiled by the authors)

And each student is determined by his or her location in the matrix for each type of research work. For example, a student has prepared reports many times and his competence in this type of research work is high, but the student has never written an article, so his competence in this type of research work is low.

The third - activity - stage implies direct mentoring of a more experienced student (in a certain type of research work) over a less experienced one. Since each student appears to be both experienced in

some type of research work and inexperienced in another type of work, it is easy to select "paired students". By "paired students" we roughly refer to students who have mirror competences. For example, one is competent in making a presentation - the second is not; the second is competent in writing an essay and the first is not. In this case, their cooperation in research works is obvious: one of them helps and teaches to make good presentations, and the second one teaches the rules of essay writing. This is the essence of reverse mentoring.

The fourth - analytic-corrective - stage includes the assessment of the success of student mentoring and, if necessary, the construction of new pairs of students to master other types of research and development work.

Results

Testing of the described method was carried out on the students of the direction "Personnel management" two years (2017-2018 and 2018-2019 academic years). In total, it was attended by72 people studying in the 2nd-4th years.

It was unexpected for us that positive changes occurred among both students and mentors. We see the explanation for this in the fact that each student was both a trainee in one type of research work and a mentor in another. The changes are graphically presented in a table where we have recorded the behaviour of students as mentors in both academic research and extracurricular activities as well as the behaviour of students when they were students (mentors) in both academic and extracurricular activities. For convenience, the percentages received are presented in rounded form.

Table 1: changes in student behaviour one year after participating in student reverse mentoring (%)

№	Changes in student behaviour	Trainees (Guided)		Mentors	
		before	after	before	after
Educational research activity of students					
1	Compliance with deadlines	69	98	72	100
2	Quality of work	54	72	66	79
3	Performing tasks "as desired"	12	28	15	32
4	Acquaintance with scientific issues at thematic webinars	5	18	7	22
Extra-curricular research activity of students					
1	Preparation of report for conference	37	59	40	62
2	Preparation of scientific article	18	25	12	22
3	Participation in various conferences (listeners)	54	59	55	65
4	Participation in scientific seminars	5	19	9	22
5	Participation in scientific webinars	9	22	7	19

(Source: compiled by the authors)

If we compare the data, on average the application of student reverse mentoring in the educational process of higher education allowed:

a) to improve the performance discipline of students, in terms of compliance with deadlines and delivery of works by 28.5 per cent;
b) to increase the quality of performed research works by 15.5%;
c) to increase the interest of students in execution of additional works in the format "at will" by 16.5%;
d) participation in thematic webinars increased by 14%;
e) increased the number of reports prepared for student conferences by 22%;

f) a slight increase in the number of scientific articles written by students (8.5%);
g) students participated in various conferences with great interest, although the total number of participants increased by only 7.5 per cent;
h) there was a 13.5 per cent increase in involvement in scientific seminars;
i) participation in scientific webinars increased by 12.5 per cent.

Conclusions

Many universities have a student mentoring institute. The essence of it is that senior students organize and conduct trainings, thematic evenings, seminars, round tables with junior students. The benefits are mutual: senior students gain organizational, pedagogical and communicative experience, while junior students gain new competences or develop existing ones. However, the existing system can and should be updated with new forms of mentoring.

1. It was proposed to use reverse mentoring as a promising form of activating student research work.
2. The essence of reverse mentoring was revealed in the form of several statements:
– the mentor is selected for the task on two grounds: competence and motivation;
– the competence of the future mentor is determined by his successful experience in such tasks;
– the motivation of the future mentor is determined through conversation and personal observation;
– the mentor can be a student of any course and of any age, including the ones younger by age and from a junior course.
3. A reverse mentoring methodology has been developed consisting of four interrelated stages.
4. A matrix for determining students' readiness to be mentors has been made on two grounds - the availability of competence for the relevant research task and the available motivation.
5. It has been experimentally proved that the organization of the system of students' reverse mentoring at the university allows solving several tasks: activation of students' scientific research, stimulation of interests to modern scientific problems, involving students into the system of scientific exchange of opinions, involving them into the project work, development of business communication skills, etc.
6. Further research on the influence of reverse student mentoring on the training of modern specialists can be devoted to the formation of inter-departmental project teams, as well as the participation of such teams in the performance of contractual work with industrial enterprises.

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Inter-Organizational Network Performance: Hospitals and Diagnostics of Patients with Pacemakers

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Abstract

Cardiovascular diseases are one of the most common health and life threats in the human population. In the case of a patient with arrhythmias in the form of heart blocks, doctors implant a pacemaker. However, permanent electrostimulation is an important contraindication to many medical procedures - in particular, the Magnetic Resonance Imaging (MRI). The purpose of the article is to understand the mechanisms of cooperation in the field of magnetic resonance imaging between different elements of the inter-organizational network in the case of patients with pacemakers. The article presents the results of the author's survey among diagnostic units in Poland. Besides, the difficulties faced by patients with pacemakers are discussed, as well as the reasons for refusing magnetic resonance imaging procedures for these patients. The main finding of this paper is that there is no specified mechanism inter-organizational cooperation in any case which can be implemented in specific medical situations, although interactions between hospitals are extremely important nowadays.

Keywords: Hospital Units' Cooperation, Inter-Organizational Network, Network Performance

Introduction

There are two types of network structures: internal networks and inter-organizational networks (Niemczyk et al., 2012). The second network type refers to the concept of outsourcing and is considered rational in the case of enterprises or organizations, not only in the medical sector. Cooperation between organizations or between different units of different entities (it is assumed that units of the same organization work together in harmony, otherwise it is not one organization) is caused by the high variability of implemented processes. This is can be a result from the client's increased emphasis on change, innovation and creativity, knowledge creation and experience sharing, or dynamization of business model systems, combined with blurring organizational boundaries (Sus et al., 2019). Principles of building a process approach and related challenges are widely described in management sciences and do not cause major implementation problems in enterprises or organizations in the medical sector (Demir and Mukhlis, 2017; Fiałkowska-Filipek, 2019; Sus, 2019). These principles and mechanisms of cooperation can be more visible if the specific hospital departments or medical processes are investigated (Sus et al., 2019). On the other hand, specific health problems diagnostics like common obesity, heart-related diseases or cancer,

which are sometimes compared to the epidemics (Heymann and Shindo, 2020), and their treatments can be recognized as a set of medical processes (procedures) based on the cooperation multiple units of the same or different medical organization (clinic, hospital). A business process is a combined set of activities in an enterprise, along with a description of their logic, creating order and dependency (Bojewska, 2015, p. 34), the goal of which is to achieve the desired result, focused on building value for both the client or patient and the organization (Sus and Organa, 2020; Wawrzynek, 2019). In the case of hospitals involved in specific procedures dedicated to patients with pacemakers, medical processes (business processes) consist of plenty of elements related to the physics and mechanics issues. This specific sector requires then attention from all kinds of science, to solve serious and urgent problems, which needs to come up with an adequate and fast response.

The purpose of the article is to check if there is a mechanism of cooperation in the field of Magnetic Resonance Imaging (MRI) between different elements of the inter-organizational network. In the first part of the article, the definition of the inter-organizational network in the medical sector is presented. Then a chosen physical phenomenon revealing the nature of the Magnetic Resonance Imaging are introduced together with the medical procedure description. In the third part of this study, the results of the survey dedicated to the cooperation mechanisms between hospitals or their units dedicated to patient diagnostics and control are presented. In this paper, some limitations related to the difficulties faced by patients with pacemakers are discussed.

Inter-organizational Network

"The inter-organizational network, as it happens in every initial stage of development of the next paradigm, is a not fully defined concept. Authors writing about networks adopt such different viewing perspectives, it is difficult to state unequivocally whether everyone is writing about the same" (Niemczyk et al., 2012, p. 9). Inter-organizational networks emerged form autonomous units (enterprises) joined together to create coherent, sustainable and well-functioning business communities (Zema and Sulich, 2019a). It is in the networks located in the organization that one can look for opportunities to improve business processes, especially by identifying patterns of relationship systems and roles performed by individual organizations involved in processes, and then taking actions to shape network relationships analogously to the selected patterns (Daszyńska-Żygadło and Ryszawska, 2015; Wawrzynek, 2019). Then the cooperation patterns from internal perspective are transposed into cooperation in the external business environment.

Social networks, of interest to modern scientists, exist both at the organizational level and between organizations (Wawrzynek, 2019). Inter-organizational networks in the medical sector are created in search of organizational perfection and medical process excellence, which is focused on issues related to organizational resources and coordination of activities. Both indicated elements - organizational resources and coordination of cooperation - are part of the network approach to organizational analysis. This approach refers to observed trends in scientific research on the organization, its complexity and specific mode of operation, and is increasingly becoming the subject of research (Niemczyk and Stańczyk-Hugiet, 2014). Network research helps explain the essence of business phenomena, from organizational creativity to corporate profitability and risk analysis in a business environment (Kulhanek and Sulich, 2018). The increase in the number of studies and research areas related to the idea or definitions of the network, unfortunately, brings a great variety of use of this concept in research theory and practice (Wawrzynek, 2019). The challenge for both researchers and apprentices is the multidimensionality of understanding and ambiguity of the concept of network. In this paper, we assume that there are several approaches to a network organization that allow us to introduce our definition of an inter-organizational network and therefore a network organization. We assume the existence of a deliberately selected, durable and structured set of autonomous entities (hospitals are independent) involved in the creation of

goods and services, which is based on default and indefinite agreement (patient's wellbeing and health), ensuring flexible adaptation to changes in the environment and using coordination and protection mechanisms exchange transactions (the healthcare system is subject to many regulations and agreements).

Referring to the theory describing the operation of the organization, as well as looking at the activity of medical sector companies in a more pragmatic way, it can be assumed that today all areas of the organization contain references to the network and in its context, networks are or can be analyzed (Kulhanek and Sulich, 2018; Organa, 2018). Organizations create various types of networks and operate within them (Sus and Organa, 2020). In this sense, a modern organization is not isolated from surrounding entities (Stańczyk-Hugiet, 2012). Organizations are creating networks based on external and internal cooperation and based on relational relationships (Rashid, 2020; Zema and Sulich, 2019b). Organizations communicate via network-connected devices, and business processes, such as those in purchasing or sales, are often implemented through a variety of network connections (Niemczyk, 2011; Wawrzynek, 2019). Medical organizations and hospitals are characterized by the fact that they are particularly related because each of their activities results in influencing other elements.

The networking relationships found in medical sector organizations are so important that they form an integrated business structure - both strategic and operational (Wawrzynek, 2019) - of current businesses, and the perspective of the network affects business architecture (Sus, 2019; Sus et al., 2019). Not all activities of the organization are part of the inter-organizational network, however, it can be considered that the network serves to improve medical processes.

Adopting a broader approach to defining inter-organizational networks allows these networks to be defined as a mechanism for regulating relationships between companies that differs from both hierarchy-based coordination and market-based coordination (Stańczyk-Hugiet, 2012). According to this approach, networks can be distinguished based on 1) quasi-integration processes, assuming no control over the ownership of the process while maintaining control over the entity's assets; 2) using elements of cooperation based on a new production organization. It should be emphasized that the analysis of the organizational and management features of network structures is carried out in a narrow approach to individual scientific disciplines: economics, sociology of organizations and computer science or econophysics.

Characteristics of the Healthcare System in Poland

Many terms are referring to the “medical system” or “medical inter-organizational network”, the most popular are two: the health system and the healthcare system (Fiałkowska-Filipek, 2019). In the literature on the subject, these concepts are often used equally and refer to an inter-organizational network (Niemczyk and Stańczyk-Hugiet, 2011). Such a system is defined as a system of mutually coupled elements showing a specific structure, fulfilling a specific function and treated as separated from the environment for a specific purpose - health protection (Flieger, 2016; Klimas, 2014).

The primary purpose of the health care system is to provide medical services in response to specific health needs. This goal is implemented by, among others (Fiałkowska-Filipek, 2019):

1. ensuring access to the full range of medical/health services possible, resulting from the actual health needs of individual patients, circular populations and the whole of society;
2. ensuring the highest possible quality of health services, adequate to the state-of-the-art medical knowledge, respecting the dignity of patients and caregivers,

3. organizing healthcare in the best possible way, rationally using resources, including infrastructure and staff, so that it is effective and efficient;
4. systematic implementation of improvement actions.

Health care can be distinguished (Fiałkowska-Filipek, 2019) in two terms: a) the place of providing health services (outpatient/open and stationary/closed), b) the scope of health services (basic and specialist) and delivery time (short-term and long-term). Services are provided by directly or indirectly related healthcare organizations of so-called healthcare providers (Parkitna and Gądek, 2020). The service provider can be, for example, a hospital, a clinic, a nursing house, and care institution, or group practice of medical professionals (Figure 1). Health care organizations are also called medical facilities, health care facilities or medical entities (Fiałkowska-Filipek, 2019).

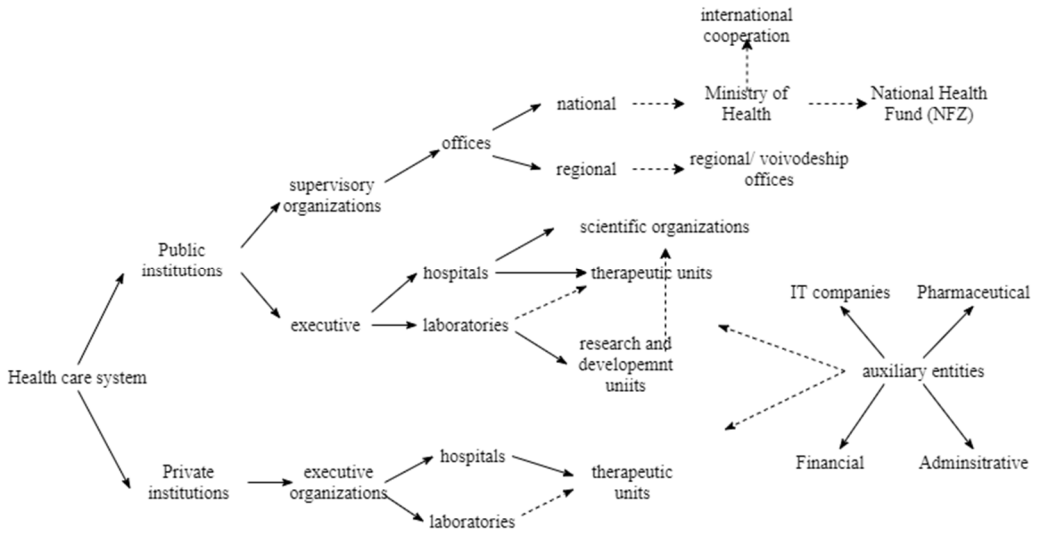

Fig. 1: Health Care System in Poland organizational structure

Source: Own elaboration

Medical Processes Related to Diagnostics of Patients with Pacemakers

One of the challenges of modern medicine is detecting lesions at an early stage of disease development. In this regard, the methods used during MRI imaging can meet the high requirements of diagnosticians and patients. “MRI (magnetic resonance imaging) is a noninvasive diagnostic test that takes detailed images of the soft tissues of the body. Unlike X-rays or CT, images are created by using a magnetic field, radio waves, and a computer. It allows your doctor to view your spine or brain in slices as if it were sliced layer-by-layer and a picture taken of each layer. This test can help diagnose tumors, strokes, and disc herniations” (Mayfield Brain & Spine, 2018).

An MRI scan works by using a powerful magnet, radio waves, and a computer to create detailed images. The human body is 80% water, then is made up of millions of hydrogen atoms, which are magnetic. When patients’ body is placed in the magnetic field, these atoms align with the field, much like compass points to the North Pole. A radio wave "knocks down" the atoms and disrupts their polarity. The sensor detects the time it takes for the atoms to return to their original alignment. In essence, MRI measures the water content (or fluid characteristics) of different tissues, which is processed by the computer to create a black and white image. The image is highly detailed and can

show even the smallest abnormality (Mayfield Brain & Spine, 2018). Similar to CT, MRI allows the doctor to see a patient's body in narrow layers, each about one-quarter of an inch thick. It is possible to view layers from the bottom (axial), front (coronal), or sides (sagittal), depending on what your doctor needs to see. A dye (contrast agent) may be injected into a patient's bloodstream to enhance certain tissues. The dye contains gadolinium, which has magnetic properties. It circulates through the blood stream and is absorbed in certain tissues, which then stand out on the scan. MR angiogram (MRA). MRI can be used to view arteries and veins. Standard MRI can't see fluid that is moving, such as blood in an artery, and this creates "flow voids" that appear as black holes on the image. Contrast dye (gadolinium) injected into the bloodstream helps the computer "see" the arteries and veins. Contrast is also used to view tumours and arteriovenous malformations (AVMs).

MRI is very safe, and there are no known health risks associated with the magnetic field or the radio waves used by the machine. Some people are sensitive to the contrast agent and may develop an allergic reaction. All contrast agents are FDA-approved and safe (Mayfield Brain & Spine, 2018). The patient is questioned if has diabetes or kidney problems. In some cases, a kidney function test may be needed before the MRI to make sure that the kidneys can clear the contrast agent from the patients' body. Some special circumstances limit the use of a magnetic field, so the patient needs to tell the doctor if any of the following apply:

- cardiac pacemaker or artificial heart valve;
- metal plate, pin, or other metallic implants;
- piercings (particularly body piercing);
- an intrauterine device, such as Copper-7 IUD;
- insulin or other drug pumps;
- aneurysm clips;
- previous gunshot wound;
- a cochlear implant or other hearing devices;
- employment history as a metalworker (had metal in the eye);
- permanent (tattoo) eye-liner;

Any metallic substance on the patient's body can affect the quality of the images. It can also cause discomfort or injury to patients when placed in the magnetic field and may exclude the patient from the exam.

A patient with a pacemaker who has a referral for an MRI following the recommendations of the Polish national radiology and imaging consultant should report to a cardiological consultation in the electrophysiology laboratory. The purpose of the consultation is to determine the safety profile of the pacemaker model during the test, e.g. having a CE safety certificate, setting for the duration of the SureScane test (if available) and the possible need for cardiological supervision. During the examination, the patient connects to the ECG device to monitor the heart rhythm and respond in the event of cardiovascular events. After the examination, the electrophysiologist inspects the device and restores the starter settings before the examination. After three months, the patient should report to an electrophysiology clinic for pacemaker control.

Artificial Pacemaker

A cardiac pacemaker (or artificial pacemaker, so as not to be confused with the natural pacemaker of the heart), is a medical device that generates electrical impulses delivered by electrodes to cause the heart muscle chambers (the upper, or atria and/or the lower, or ventricles) to contract and therefore pump blood. By doing so this device replaces and/or regulates the function of the electrical conduction system of the heart.

The primary purpose of a pacemaker is to maintain an adequate heart rate, either because the heart's natural pacemaker is not fast enough, or because there is a block in the heart's electrical conduction system. Modern pacemakers are externally programmable and allow a cardiologist, particularly a cardiac electrophysiologist to select the optimum pacing modes for individual patients. The specific type of pacemaker called defibrillator combines pacemaker and defibrillator functions in a single implantable device, which should be called the only defibrillator, for clarity. Others, called biventricular pacemakers have multiple electrodes stimulating differing positions within the lower heart chambers to improve synchronization of the ventricles, the lower chambers of the heart.

Difficulties Faced by Patients with Pacemakers

A patient's lifestyle is usually not modified to any great degree after the insertion of a pacemaker. There are a few activities that are unwise such as full contact sports and activities that involve intense magnetic fields (Hrynkiewicz and Rokita, 2013). The pacemaker patient may find that some types of everyday actions need to be modified. For instance, the shoulder harness of a vehicle seatbelt may be uncomfortable if the harness should fall across the pacemaker insertion site.

Any kind of activity that involves intense electromagnetic fields should be avoided. This includes activities such as arc welding possibly, with certain types of equipment, or maintaining heavy equipment that may generate intense magnetic fields (such as a magnetic resonance imaging (MRI) machine).

If this type of examination is provided to people with pacemakers, it is necessary to reliably document (in writing) what type of pacemaker / cardioverter / defibrillator has been implanted in the patient. This obligation lies with the referring physician and the patient. In addition, it is advisable that the magnetic resonance imaging should take place after cardiological consultation in the Laboratory of Electrophysiology cooperating with the Laboratory of MR. The purpose of the consultation is to determine whether the pacemaker allows magnetic resonance imaging and, if so, what the testing conditions are. First of all, it should be taken into account: should the implanted device mode be switched before magnetic resonance imaging and whether and in what mode the patient should report to the Electrophysiology Laboratory to restore the correct starter mode, and whether the presence of a cardiologist in the MR Laboratory is required during research. It should be noted that performing magnetic resonance imaging without consultation in the Laboratory of Electrophysiology may conditionally take place if the patient presents substantive documentation (confirmed in writing by the referring physician) clearly describing the admissibility and possible limitations as to the methodology of examining the MR examination.

Survey Construction and Results

Hospitals with varying degrees of reference an important factor that distinguishes individual facilities is the degree of reference of a given ward, i.e. the degree of specialized ward, and thus the possibility of providing care depending on the patient's condition. Patients with no complications and no major pathology are examined and treated in hospitals with the first degree of referentiality. Usually these are municipal and district hospitals. Hospitals with the second degree of reference are usually voivodship hospitals. In such units there is a specialized intensive care unit. Hospitals of the third degree of reference are clinical hospitals of state medical universities or state universities conducting educational and research activities in the field of medical sciences.

In addition to the so-called survey metrics, in which managers of medical units determined the level of reference, type (public, non-public) and basic data (voivodship, specialization), the survey examined the examination procedures, and the reasons for refusals of the MRI examination.

The 38 hospitals took part in the study, which number allow to just draw very careful proposition of cooperation mechanisms. 75% of surveyed organizations are public hospitals. Half of the surveyed units (50%) perform magnetic resonance imaging in patients with an implanted pacemaker. All surveyed hospitals have procedures to perform the MRI examination. However, only 50% of units know the procedure for dealing with patients with pacemaker. All organizations stated that there is a cooperation between the MR Laboratory and the Stimulator Control Clinic or the Cardiology Department. The unit carries out: Implantation of Pacemakers Heart (75% response) and Stimulator Control Outpatient Clinic Heart (25% response).

None of the 38 hospitals conduct an MRI examination in the presence of a cardiologist, and the radiologist is qualified for the examination, however, consultation and control of the pacemaker before the examination is required. In 50% of cases such control is performed in a cardiac pacemaker outpatient clinic. There is no information provided to patients whom examination was denied, because as survey presented there is no information exchanged between hospitals and there is no cooperation in this field.

Conclusions

Over the past months and years, the concept of integrated and networked activity has become one of the symbols of global changes in hospital management processes and processes that go beyond their walls. The essence of network structures and inter-organizational networks is reduced to departing from multi-level hierarchy structures and replacing them by clusters, or by specialized business units of hospitals in which market coordination mechanisms are used instead of coordination mechanisms by hierarchy.

When making an overall assessment of the concept of network structures in the medical sector, several conclusions can be made. First, using the concept of strategic networks of modern organizations (hospitals and clinics). Secondly, attempts to conceptualize strategic aspects of the network should be considered significant but considered through the prism of individual disciplines. The development of the network approach needs to combine, in the analysis of network structures, and organizational and economic approach with the rationality of process (procedural) activity. The rationality of the functioning of medicinal entities in the health care system should be the primary goal of all its participants. A well-functioning system and inter-organizational network affect the level of health security of citizens, creates the opportunity to carry out work, increases the desire and need to invest in the future. That is why a well-organized and open to all challenges medical entity is so important. Equally important is the cooperation of many medical entities to provide a specific service (examination, surgery, etc.).

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Contribution Agricultural and Government Actors: Case of Management Biopesticide Acceptance in Indonesia

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Abstract

Sustainability development is considered to have a multidimensional perspective that results in the linkage of scientific knowledge to meet current and future basic needs. Integration between environmental, social, and economic aspects becomes a unity in terms of sustainable development. Agricultural activities are closely related to the three aspects that become sustainable development perspectives. The knowledge of agricultural actors becomes a social input that will directly influence the security of the environment. This research was conducted using qualitative methods with a focus on the share of agricultural actors and the government to support sustainable agriculture by receiving biopesticides. The research data were obtained through in-depth interviews and literature studies as supporting research results. The results of this study indicate that the contribution of agricultural actors and the government is essential in creating sustainable agriculture. Counseling conducted by the government becomes a provision of knowledge for agricultural actors as supporters in carrying out agricultural activities with an emphasis on environmental security. Acceptance of biopesticides by agricultural actors through counseling and training mentioned takes 3 to 4 months. Thus, agrarian activities began to prioritize environmental protection towards sustainable agriculture. This shows that to realize sustainable agriculture, agricultural actors and the government are key actors who play a role in maintaining the stability of environmental and food security.

Keywords: agriculture actors; government; knowledge; sustainable agriculture.

Introduction

Sustainability has been closely related to the theory presented by Miller & Spoolman (2010) to be able to meet the basic needs of the present and the future with community resources that are fair and just without having to sacrifice the ability of future generations. In the context of research, sustainable development is understood as a process of producing scientific knowledge that has a relationship with how to overcome the challenges of sustainability in the real world from concrete problems (Wuelser and Pohl, 2016). Thus, sustainable development is considered to have a multidimensional perspective, namely environmental, economic, and social aspects (Wichaisri and Sopadang, 2018).

Agricultural activities become one of the main topics closely related to sustainable development because balancing current and future needs depends on agricultural production (Mwalupaso *et al.,* 2019). The need for increased resilience of the production system to biotics and abiotic requirements to be considered in environmental aspects. However, to date, the intensification of agriculture in land-based production systems has experienced a degradation of land resources, which has caused productivity to decline (Kassam *et al.*, 2015). This causes the process carried out in agricultural activities to be directed towards sustainable results by combining and intervening from the government, markets, and civil society (Erbaugh *et al.*, 2019).

Generally, agricultural activities cannot be separated from the use of pesticides as a way to prevent and control crop losses due to damage to agricultural production caused by crop pests (Damalas and Koutroubas, 2016). Pesticide dependence on agricultural activities will cause an increase in the dose and frequency of pesticide use. Thus, pest resistance and damage to natural enemies of the environment will be even higher (Popp *et al*., 2013). Besides, intensive use of pesticides will cause ecological disturbances in the form of pesticide residues in the food chain such as fruits, vegetables, milk, dairy products, fish, poultry, and water (Sawant *et al*., 2018).

Farmers' knowledge and perceptions about the risks of using pesticides are a significant problem regarding sustainable behavior with pesticides (Petrescu-Mag *et al*., 2019). Understanding of agricultural actors is needed to achieve sustainable agriculture. However, several studies have shown that farmers in Indonesia still have a lack of knowledge. Several research results prove this based on research Minaka, *et al.* (2016) farmers who have worked more than ten years, 78.2% of farmers use pesticides that are not in accordance with the recommendations contained in the packaging. This will put farmers at risk of being exposed to pesticides, which has an impact on health. In addition, excessive use of pesticides will contribute to the pollution of non-agricultural sources in rivers that will flow from one point to the point of flow throughout the world. If this happens sustainably, it can paralyze drinking water resources and aquatic ecosystems (Jiao *et al.*, 2020).

One alternative to reduce environmental damage due to the use of pesticides in agricultural activities is to use biopesticides (Neshani *et al.*, 2019). Biopesticides provide options to traditional chemicals used in plant protection systems (Pavela and Benelli, 2016). Biopesticides are safer for plants and the environment because they do not leave harmful residues and can be made using natural ingredients (Agus *et al*., 2016). Thus, the use of biopesticides can reduce greenhouse gas emissions. The essence of sustainable agriculture is actually a specialization of engineering and natural sciences and agricultural science (Velten *et al.*, 2015). Sustainable agriculture is based on the concept of organic agriculture, which is agriculture that considers the efficient use of local resources and the use of technology that considers soil fertility, nutrition cycle, and pest control in a natural way (Willer and Yussefi, 2006) — making biopesticides an essential role in providing a picture of sustainable agriculture, including environmental security (Keswani *et al.,* 2019).

Farmers need the training to improve their knowledge of environmentally friendly agriculture. According to Hsu and Lin, people with more advanced levels of experience about carbon reduction have stronger environmental awareness, and this means that farmers' knowledge about the environment needs to be increased (Hsu and Lin, 2015) so that sustainable agriculture can work. To place agriculture in the perspective of sustainable development requires thorough thinking in agricultural orientation. Therefore, it is necessary to have information about the benefits of biopesticides in terms of environmental, economic, and social. Counseling in the form of knowledge about the impact of pesticides and perceptions about biopesticides for agricultural activities is crucial as a basic knowledge of agricultural activities. Knowledge and perception will influence the behavior to choose and apply it to farm activities (Lamichhane, 2017).

The government has a role in terms of knowledge for agricultural actors utilizing agricultural extension. Agricultural extension has a relationship with technical problems in the field and also has a position as a supporter of the social life of the community. Policies issued by the Government of Indonesia based on the Law of the Republic of Indonesia Number 16; 2006 agricultural extension is defined as a learning process for the main actors and business actors so that they are willing and able to help and organize themselves in accessing market information, technology, capital, and other resources, as an effort to increase productivity, business efficiency, income, welfare, and raise awareness in the preservation of environmental functions. This means counseling has a stake in helping agricultural development because this activity is in direct contact with the community, which has the purpose of delivering relevant information to farmers (Vintarno, Sugandi and Adiwisastra, 2019).

Provisioning to farmers with counseling can be said to have a contribution to maintain the quality of production and consumption. This is evident from the results of observations on agricultural activities in Cakung District, East Jakarta, using biopesticides taught by the government. The knowledge provided by the government is one of how agricultural practitioners receive biopesticides. This practice is one of the main concerns in the SDGs associated with the health sector (Pradyumna, 2018). Government support is one of the key factors in the formation and development of an innovation network that connects private components and the public. Thus, they not only focus on capital for development but to produce competitive advantage (Dodgson *et al.*, 2008). From here, the knowledgeable generation will be oriented towards understanding social phenomena to respond to environmental changes (Barragán-Ocaña and del-Valle-Rivera, 2016). The knowledge capital provided will synergize with sustainable agriculture to form a food security system.

Methods

The research method used in this study is a qualitative method with a focus on the contribution of agricultural actors and the government to support sustainable agriculture by receiving biopesticides. This research involved agricultural actors in the District of Cakung, East Jakarta, and the Government in charge of agriculture. Cakung Subdistrict was chosen as the research location because, at this location, the farmer groups were actively formed and used biopesticides in agricultural activities. Research data collection techniques carried out by in-depth interviews with selected informants from the focus of the study. Selected informants are divided into two parts, namely from the side of agricultural actors and related government officials. This is done in order to get views from both sides that are different from one focus of work. In-depth interviews were conducted by researchers within 20-40 minutes to get responses from informants.

In-depth interviews were chosen to answer research questions, namely 1) how agricultural activities are carried out, 2) acceptance of biopesticides in agricultural actors, and 3) the role of government in supporting agricultural activities. The researcher's question will be asked, and if the informant's answer is less relevant, the researcher will ask a question to attract the informant to return to the research topic. The data obtained were analyzed by thematic analysis to verify the recording results obtained. Secondary data were collected through literature studies that function as supporting research results.

Result and Discussion

This study discusses the participation of agricultural actors and the government involved in realizing sustainable agriculture through the acceptance of biopesticides in agricultural activities. This refers to the research question about agricultural activities carried out at the research location, according to the type of agricultural commodity in the data by Balai Pengkajian Teknologi Pertanian Jakarta (2013), agricultural land in Cakung District, East Jakarta is rice and vegetables. The data is in accordance with the current land conditions explained by informant 1, i.e

> *" This is the limit of paddys land ... water spinach, spinach, basil, there are also valves, long beans, eggplants, which are here, like water pumpkin, this is a water pumpkin"*

Agricultural activities at this research site use pesticides and vegetable pesticides (biopesticides) in the treatment process as stated by informant 1 when asked whether to always use pesticides,

> "*Always, even if we use pesticide, we don't always use this. So, we do with see the conditions in the field attacked. Has a attacked by pests or not? if not, we don't use it. If the attack, we are think again need to use pesticides or not. So, somethimes we don't always use what we use pesticides all the time. See the conditions in the field. 'Oh this attack is like this, using biopesticide can also disappear. Well, using biopesticide. If use it can't, we use pesticides"*

Acceptance of biopesticides that occur in farmer groups in the study location is based on the existence of counseling conducted by the relevant government authorities and evidence from the use

of biopesticides. The process of receiving biopesticides introduced through counseling takes 3 to 4 months. This was said by the head of the farmer group .

> "*it's also quite a long time...yes, it's not enough once or twice untuil 3 months and 4 months. Ijust believed. It's because of what vegetables are 25 days or 20 days."*

The statement shows that the acceptance of biopesticides occurs after 3 to 4 harvest seasons. Lack of knowledge is also one of the factors that influence the acceptance of biopesticides by agricultural actors.

In this case, the government plays an important role in increasing the knowledge of agricultural actors so that the process of receiving biopesticides can occur. Through in-depth interviews conducted with government staff in charge of the agriculture section that farmers in the study location get a field school. Informant 2 explains that:

> "*So, here they have been trained in how to make public education, because we also have extension agents and POPT. If the POPT fosters here to the group, like in terms of environmentally friendly control and so on. So that they know SLPHT is an Sekolah Lapang Pengendalian Hama Tanaman (Integrated pest control field school.".*

In accordance with the Policy issued by the Government of Indonesia based on the Law of the Republic of Indonesia Number 16; 2006 that counseling is conducted for learning media given to agricultural actors to increase awareness in the function of environmental preservation. Advice conducted by the government with a program that has been carried out in the form of delivering relevant information to agricultural actors is one alternative that supports agricultural development (Vintarno, Sugandi, and Adiwisastra 2019).

Counseling and field schools implemented by the government is one of the supports for the establishment of sustainable agriculture. This can happen because the government's contribution to provide knowledge and training to make biopesticides will build a perception so that it will affect the behavior to choose and apply it to agricultural activities (Lamichhane 2017). Basically, agricultural actors become key actors of the programs that have been run by the government. The results of counseling that is practiced in the form of the use of biopesticides will reduce environmental impacts such as ecological disorders that will pollute the food chain (Sawant *et al*., 2018). Thus, sustainable agriculture, by considering ecological conditions, will be achieved because of the efficiency that includes environmental security (Willer and Yussefi 2006); (Keswani *et al.,* 2019).

Encouraging sustainable agricultural practices is essential to realize a food system that is also sustainable. The knowledge given illustrates the temporal and spatial interaction can increase the security of resources. In addition, the provision of knowledge can facilitate how decision making between sectors and holistically leads to sustainability (Mahlknecht *et al.*, 2020). The combination and intervention of government, markets, and civil society will lead to sustainable results (Erbaugh *et al.*, 2019). With participation that takes into account institutional, ecological management, and environmental quality will support the second objective of the SDGs in the form of integrated food security solutions (Blesh *et al.*, 2019). The aim of the zero hunger on SDGs is to overcome the challenges of environmental sustainability and food security, simultaneously providing examples that components of the whole must be considered as integrated units. In accordance with the Chappell & LaValle (2011) which conceptualizes that food security is universal access, which describes adequate, safe, and acceptable food in a cultural aspect by considering the adverse effects that occur on interdependent biodiversity.

Conclusion

This research shows that agricultural activities carried out using pesticides and biopesticides. Biopesticides are introduced by the government as environmentally friendly materials through counseling and field schools as training media. The process of receiving biopesticides by agricultural

actors takes a long time after counseling until the agricultural actors finally use it. The knowledge that is used as input to agricultural activities is one way to change behavior in agricultural activities. Thus, agricultural activities that are concerned with environmental security will become a ladder towards sustainable agriculture. This shows that in order to realize sustainable agriculture, agricultural actors and the government are key actors who play a role in maintaining the stability of environmental and food security.

Acknowledgment

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Unsupervised Sentiment Analysis Approach Based on Clustering for Arabic Text

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Abstract

Sentiment analysis is an area of great interest in research because of its importance and its advantages in many different domains. Many supervised methods and techniques are used in the existing literature to analyze the sentiment of texts, which usually needs manual labeling for training data that takes effort and time. In this paper, we propose a new sentiment analysis approach that uses unsupervised learning technique in sentiment analysis for labeling the Arabic text. The mechanism of this sentiment analysis approach is illustrated by applying clustering to detect the polarity of the text on Arabic multi-domain datasets that include positive and negative reviews across multiple domains. The approach involves different phases, preprocessing, feature extraction, applying K-means algorithms and dimensionality reduction. To evaluate clustering, we use external evaluation and apply different measures such as purity, f-measure, and Fowlkes–Mallows index. All experimental results indicate that this approach is promising to be used in labeling Arabic text which is highly desired across different domains.

Keywords: K-Means, Normalization, Stemming, Purity, External Evaluation.

Introduction

The Internet has become an integral part of our lives, and people are more eager to share and express their feelings and opinions on the web through blogs or social networking sites, and share their reviews with services or products offered to them by different sectors such as business and government and towards topics of interest. So with this user-generated content, such as reviews, recommendations, and blog posts, the demand for opinion mining and sentiment analysis is increased to understand and analyze this huge content to extract and discover patterns and aspects that may help in improvement and development in different domains such as business, education, and government.

Sentiment analysis (SA) has become an important field of research. It involves the use of natural language processing and machine learning to determine the polarity of the text, it is a process of detecting and determining whether a given text is positive, negative, or neutral. Sentiment analysis is a subfield of Natural Language Processing (NLP) which is a subfield of artificial intelligence that deals with human-computer interactions and explores how the computer can be used to understand a natural text and manipulate it for useful tasks (Hirschberg and Manning, 2015, Habash, 2010).

Sentiment analysis can be applied on three levels, it can detect the sentiment for the whole document, or for each individual sentence or extracting sentiments from different aspects of objects. In literature, there is a lot of work in the field of sentiment analysis and there are many techniques proposed to

enhance sentiment analysis and classification for document level, these techniques can be classified into two types, machine learning, and lexicon based as shown in Figure1. The machine learning is divided into three approaches, supervised, semi-supervised and unsupervised (Giachanou and Crestani, 2016).

Supervised learning involving the use of classification algorithms such as support vector machines, Naïve Bayes, and neural networks to generate a model based on training labeled data. Unsupervised is used when the information used to train is not classified or labeled, it finds a hidden structure from unlabeled data, The most common unsupervised learning task is clustering. Semi-supervised machine learning is a combination of supervised and unsupervised learning since they use both labeled and unlabeled data for training, typically lots of unlabeled data is combined with a few data which is labeled. The lexicon-based approach to sentiment analysis involves calculating polarity and orientation of the text or document from a predefined list of words or phrases in dictionary or corpus that they are associated with a sentiment value and the polarity of a text can be obtained from the polarity of the words that compose it (Taboada et al., 2011).

Supervised learning is a widely used solution for classification purposes and has been used in most of the sentiment classification techniques (Al-Saqqa et al., 2018, Duwairi and Qarqaz, 2014, Zhang et al., 2018). However, it needs labeled data, which may not easy sometimes to create training labeled data that require lots of human effort. Moreover, the process of data labeling is expensive and time-consuming, so taking advantage of unsupervised techniques can help overcome these flaws, and it can be used in automating processes to extract sentiments from a variety of sources that keep growing in volume. Some research has been proposed different unsupervised methods for sentiment analysis but it focuses on using the unsupervised approach to enhance and improve the classification using hybrid approaches such as using machine learning with lexicon-based approach (Abdulla et al., 2013, Al-Ayyoub et al., 2015) or using clustering as a prior step of classification. However, to the best of our Knowledge, there is a little focus on using a clustering approach in labeling the data for sentiment analysis especially for the Arabic language (Abuaiadah et al., 2017). This motivates us to propose a new unsupervised approach that can help in labelling the data for Arabic text since that the Arabic language is spoken by more than 400 million speakers in the Arab world, making it one of the top ten languages spoken in the world (Istizada, 2020), and it is different from the English language in that there are three main varieties in the Arabic language, which are: Classical Arabic, Modern Standard Arabic (MSA), and Colloquial (dialectical). Moreover, it is a morphologically rich language where the same root word can have several forms depending on its grammatical role, this making applying sentiment analysis on the Arabic language a very big challenge. In this research, we propose an unsupervised sentiment analysis approach for Arabic texts based on clustering, which can detect polarity and labeling the text automatically and does not need labeling effort to provide training data, this means that it is free of human intervention. This paper is organized as follows, background and related works are introduced in section 2. The proposed approach is discussed in section 3. The experimental results are presented in section 4, and section five provides the conclusion and future works.

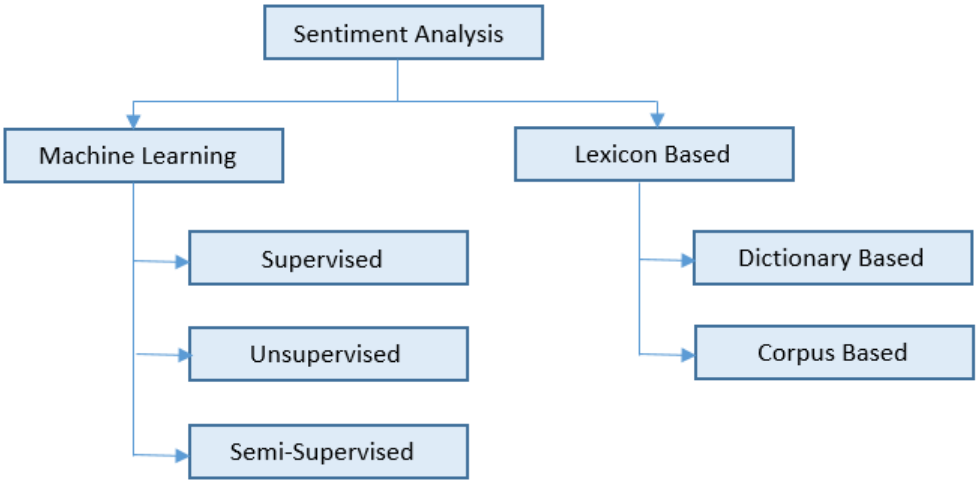

Fig.1: Sentiment Analysis techniques

Background and Related Work

Arabic Language

The Arabic language is spoken by more than 400 million speakers in the world, making it the sixth most widely spoken language in the world (Istizada, 2020). It is a Semitic language with rich and complex morphology. The Arabic language is right to left orientation language that consists of 28 letters. The letters (ا و ي) are vowels, and the rest are consonants. Each letter in an Arabic word may be followed by a special mark called a diacritical mark, there are eight different types of diacritical marks in the Arabic language that are added after each consonant of the word and they play a very important role in fixing the meaning of words. There are two classes of Arabic words: derivative words, and non-derivative words. Derivative words are generated from basic entities called roots, according to a set of derivation rules or a predefined list of patterns called morphological balances or patterns. Non-derivative words are those words that do not obey the standard derivation rules. Functional words and words borrowed from foreign languages are examples of non-derivative words. Most of the Arabic language derivational, several kinds of words such as verbs nouns, adjective and adverb can be generated from one root according to appropriate patterns. The pattern is used for generating a word that determines its various attributes such as gender (masculine /feminine), number (singular/plural), tense (past, present, and imperative), etc. Affixes can be attached to a word to build more complicated derivations and there are three types of affixes: prefixes, suffixes, and infixes. Prefixes are a group of letters that can be inserted at the beginning of the word root or stem. Suffixes group of letters that can be inserted at the end of the word root or stem and infixes which is inserted in the middle. Removing prefixes in Arabic does not reverse the meaning of words this differs in the English language which is concatenative and removing prefixes may reverse the meaning of words (Awajan, 2007).

K-means Clustering

It is an unsupervised learning task that is used to extract hidden patterns from data and it is widely used to explore the data and grouping the data with similar characteristics, it detects the data objects properties and analyze how much these objects are similar or different to each other and then assigned them to clusters that already created based on the similarity relationship. There is various clustering application such as in search engine retrieval, business research regarding customer and products, and information retrieval. There are different algorithms of clustering such as K-means, Hierarchical clustering, and density clustering. In this research, basic K-means is used for the following reasons:

a. The document text is high dimensional data and sparse. Kmeans can be run sparse and high-dimensional data (Karypis et al. 2000).
b. It is a simple algorithm and more efficient and it has less computational complexity less than other clustering algorithms.
c. It is effective and most widely used for documents clustering (Karypis et al. 2000).

Kmeans is one of the partitional clustering methods. Data are classified according to a predetermined number of clusters and each cluster is associated with a centroid. It is prototype clustering techniques that define prototypes in terms of centroids which is usually the mean of a group of data points (Tan et al., 2016).

. The algorithm starts by determining the desired number of clusters, so the number of clusters K is specified and then K initial centroids are chosen. Each data object is assigned to closest centroid then all objects have been assigned, and the centroid of each cluster is then updated by recalculating positions of the K centroids again. This process is repeated until convergence is achieved and no point changes cluster or no longer move or change of centroids. This produces a separation of the objects into groups or clusters. The number of clusters that are considered in this study is two clusters, one for positive polarity and another one for negative. For a good choice of initial centroids instead of using random seeding, we applied kmean ++ proposed by Arthur and Vassilvitskii (2006), it is a variation algorithm of kmeans which is a technique to seed the initial centers for a K-means which would help to improve the results of kmeans clustering.

Related Work

Predicting sentiment orientation or polarity is the task of sentiment analysis. In literature, there are many techniques and approaches proposed to achieve this task. These approaches can be classified into different research tracks, supervised learning (Duwairi and Qarqaz, 2014), Lexicon based (Taboada et al., 2011, Al-Ayyoub et al., 2015), hybrid approach (Aldayel and Azmi, 2016), or clustering approach. Clustering-based approaches to sentiment analysis have been considered in a few research studies, however, there is more research in literature use of clustering to improve the performance of the sentiment classification (Alapati and Sindhu, 2016). This is due to several reasons as discussed in (Li and Liu, 2012). The low clustering accuracy and instability of clustering results due to random initialization of kmeans centroids.

However, they could prove that a clustering-based approach is a feasible approach. They proposed a novel clustering sentiment analysis approach to predict sentiment orientation, they used English movie review data and applied the TF-IDF weighting method with the adjective and adverb features and a voting mechanism. For term score, they used WordNet to enhance the performance they obtained challenging clustering results in comparison with symbolic techniques and supervised learning in terms of accuracy metric. An unsupervised and completely automatic method is proposed by AL-Sharuee and Pratama (2018) for classifying reviews. This method consists of two phases, contextual analysis, and clustering classifier ensemble. The authors could improve the clustering performance in terms of accuracy, stability, and generalization ability by deploying SentiWordNet 3.0 in the contextual analysis phase and ensemble learning method with modified k-means classifier as a base learner in the second phase. All experiments are held using two reviews datasets, Australian Airlines, and HomeBuilders. An experimental study was conducted by (Ma and Wu, 2017), compared some common clustering techniques with respect to the task of sentiment analysis showed that the Kmeans algorithm results differ in the case of the dataset is balanced or imbalanced, and it worked better with the balanced dataset. The effect of preprocessing steps on clustering is also studied. Experimental results indicated that the extraction of adverbs and adjectives positively affect the results, however, stemming and noise removal negatively affect the results. As far as we know, there are relatively few papers that apply clustering to automatically detect the sentiment orientation at the document level for Arabic texts, however, there is research that is related to Arabic text focus on using clustering in text summarization and document topics categorization. An evaluation of the impact of similarity functions and preprocessing such as stemming and stop words removal for clustering Arabic Twitter tweets has been

conducted in (Abuaiadah et al.,2017). To group tweets into two groups, positive and negative, a modified version of kmeans was applied. The research was to study the effect stemming as a preprocessing step and the effect of using different similarity measures. The results showed that root-based stemming is better than light stemming and averaged Kullback-Leibler divergence has an advantage over other similarity measures such as Euclidean distance, Jaccard coefficient, and Pearson correlation. Some research has used clustering as a prior step of classification to improve the performance such as the work done by Alotaibi and Anderson (2017). They applied word clusters that group the words that had the same semantic or syntactic relationship together and used the cluster id as a feature. Arabic corpus of five different domains is used, news, news reviews, user market reviews, restaurants reviews, and movie reviews and the Brown Clustering algorithm was applied to generate clusters for each data domain. They used the support vector machine to evaluate their approach and the results showed improved performance.

Clustering Approach

In this section, we discuss the clustering based sentiment analysis approach. As shown in Figure 2, the approach consists of four main stages, preprocessing, feature extraction, dimensionality reduction, and K-means clustering.

Preprocessing

The preprocessing stage is an important step, as it has the potential to significantly affect the final clustering results (Alotaibi and Anderson, 2017). It involves five main steps: tokenization, noise removal, normalization, stop word removal. In a tokenization step, the text is divided into multiple words, phrases, symbols (tokens) based on separator character such as comma, tab, white space, period, etc. Noise removal step involves removing short vowels and cleaning the text from some irrelevant words or symbols such as emojis, number, and non-Arabic text. Then, remove all stop words which are common words that do not contribute to analysis (such as in في, above فوق, to الى). After that, the normalization process is applied to letters. Normalization is the process of transforming the text in order to be consistent, thus putting it in a common form. In this step:

- Diacritics are removed
- Letters " إ ","أ" "and " آ " are replaced with " ا "
- "ة" is replaced with "ه"
- Letter "ى " is replaced with "ي "
- Letters "ئ", "ؤ" are replaced with "ء"

The reason for such a step is that many users often mistake these similar characters and use them interchangeably. Stemming is the process of removing all affixes (such as prefixes, infixes, and suffixes) from words and reducing the words to their stem. For stemming purposes, we used ISRI Arabic Stemmer (Taghva et al.,2005).

Feature Extraction

Before applying clustering, the text needs to be prepared and represented in a format that is suitable for the k-means to deal with. The document text is converted into a feature vector. The feature vector can be generated by different techniques such as using the term presence (TP), term frequency (TF) and term frequency-inverse document frequency (TF/IDF). In this research, we used TF/IDF which is a commonly used technique in clustering. It uses two techniques, the term frequency (TF) and inverse document frequency (IDF). TF refers to how many times that a word or term occurs in a text or a document while IDF measures the weight that representing how much information the word provides whether the term is common or rare across all documents. So if the word occurs in many documents then TF/IDF will decrease, however, if the word occurs many times in the same document the TF/IDF will increase. In TF/IDF, the terms that appear frequently in a document are less important than terms that are rare (Robertson, 2004). TF/IDF can be computed as:

TF/IDF (t, d) = TF (t, d). IDF (t)
Where
TF (t, d) = term t frequency in document d /total words in document d
IDF (t) = log (total documents/ documents with term t).

Dimensionality Reduction

TF-IDF produces high-dimensional sparse vectors which may not be ideal for K-Means clustering algorithm and may reduce the performance, so dimension reduction is important in clustering. It helps in making the high dimensional data addressable and reduces the computational cost. In addition, it provides the user with the ability to visualize and examine the data (Fodor, 2002). In our approach we reduce the dimensionality of data then we applied K-Means. There are different dimensionality techniques are used to reduce the number of data features. Singular value decomposition (SVD) is an unsupervised learning approach used for dimensionality reduction, it is a linear dimensionality reduction technique that attempts to find linear combinations of features in the original high dimensional data matrix to construct a meaningful representation of the dataset. It is reduced version truncated SVD is commonly used in natural language processing (Dhillon and Modha, 2001), it is efficient and able to handle sparse matrices and even more economic to compute. So for dimensionality reduction purposes we used truncated SVD is used on the TF-IDF vectors to reduce their dimension.

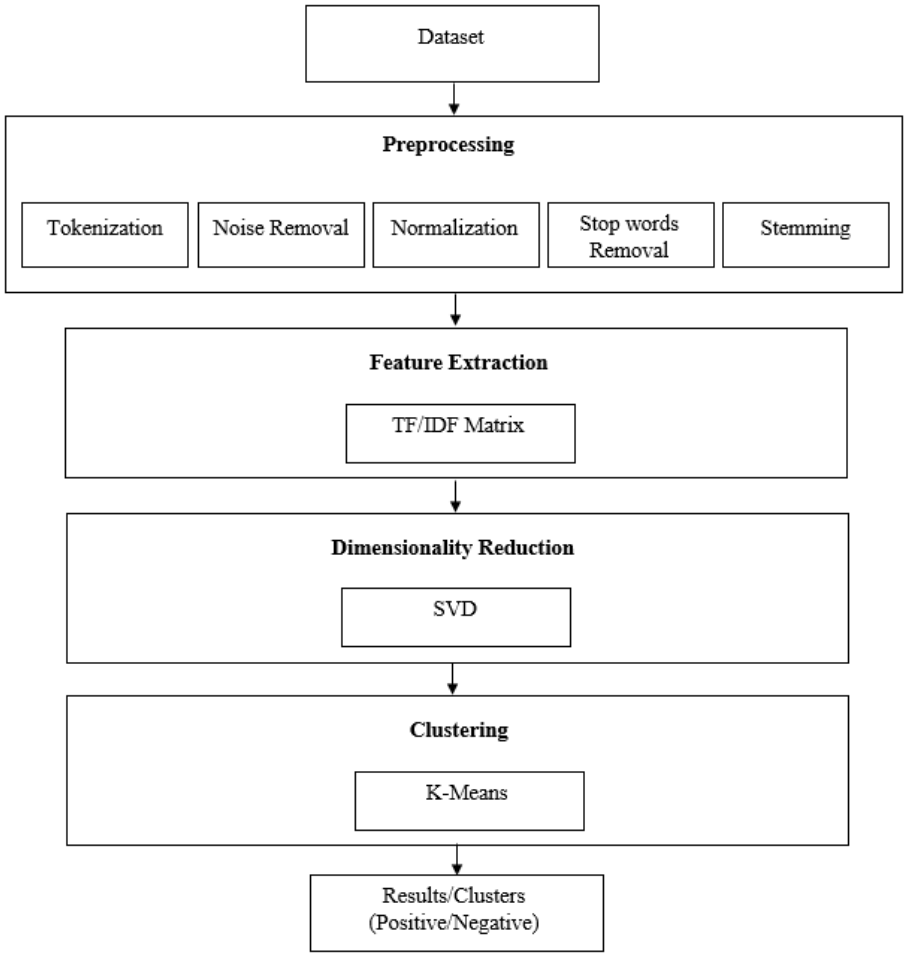

Fig. 2: Proposed approach

Experiments

In this section, the datasets that are used in the experiments will be described. And the experiments that are performed and the obtained results will be discussed to provide an evaluation of the effect of clustering on the Arabic sentiment analysis.

Datasets

We conduct experiments on different reviews datasets. We used five Arabic datasets with different sizes across different domains built by ElSahar and El-Beltagy (2015).They have included reviews across different domains such as hotels, movies, products, restaurants, and books. They are collected from different websites such as TripAdvisor, elcinema.com, and soud.com, their names movie reviews (MOV), product reviews (PROD), attraction reviews (ATT), restaurant reviews (RES), and hotel reviews (HTL). Table 1, shows the details of datasets, domain, source, the total number of reviews, and the total number of positive and negative reviews.

Table 1: Datasets

Dataset Name	Domain	Source	Total No. Of reviews	No. of Positive Reviews	No. of Negative Reviews
Movie Reviews(MOV)	Movies	elcinema.com	1353	969	384
Product reviews(PROD)	Products	souq.com	3964	3101	863
Attraction Reviews (ATT)	Hotels/ Restaurant	TripAdvisor.com	2154	2073	81
Restaurant reviews (RES)	Restaurant	tripadvisor.com/ qaym.com	10704	8030	2674
Hotel Reviews(HTL)	Hotels	TripAdvisor.com	13423	10775	2647

Results

Since all reviews are pre-tagged based on their sentiment classes we used the supervised approach for cluster evaluation which measures the extent to which the clustering structure discovered by a clustering algorithm matches some external structure (Tan et al., 2016). We compared the results of clustering to externally known results which are the class labels of reviews. The class tags for each document were moved at first because they are unnecessary in the k-means algorithm. We then applied the k-means algorithm with python Scikit-learn (Sklearn) library to cluster the documents into two clusters, positive and negative.

The distance measure method in this research is Euclidean distance. All reviews in each dataset were divided into two groups of clustering, cluster1 and cluster 2. We used the actual positive and negative labels of each document to build a confusion matrix. As shown in Table 2, where a, b, c, and d are the number of documents in each cell. Thus, if (a+d)> (b+c), group 1 will be regarded as a positive group, otherwise, group 2 will be regarded as the negative group. Certainly, in the real application, the actual class of the document is unknown. In this research, we used the actual label to evaluate the clustering approach and the following metrics are defined as the following:

$$\text{Precision} = \text{TP} / (\text{TP} + \text{FP}) \quad (1)$$
$$\text{Recall} = \text{TP} / (\text{TP} + \text{FN}) \quad (2)$$
$$\text{F} - \text{Measure} = (2 * \text{Precision} * \text{Recall}) / (\text{Precision} + \text{Recall}) \quad (3)$$

Where TP, TN, FP, and FN are true positive, true negative, false positive, and false negative, respectively.

In addition, we used Fowlkes Mallows Index (FMI), it is one of the methods that can be used in external clustering evaluation. Using this method the similarity between clustering and benchmark classification is calculated, a higher value for FMI indicates a greater similarity between the clusters and the benchmark classifications. FMI is also known as geometric mean (or G-measure) of the precision and recall while the F-measure is their harmonic mean

The Fowlkes–Mallows index is calculated as follows:

$$FMI = \sqrt{\mathrm{TP} / (\mathrm{TP} + \mathrm{FP}) * \mathrm{TP} / (\mathrm{TP} + \mathrm{FN})} \quad (4)$$

To measure the quality of clustering we used Purity measure which is simple and commonly used to measure the clustering algorithm quality (Abuaiadah et al., 2017). Purity can be defined as follows:

$$Purity = \frac{1}{N} \sum_{i=1}^{K} max_j |c_i \cap t_j| \quad (5)$$

Where N is the total number of data points, k is the number of clusters, c_i is a cluster in C, and t_j is the classification which has the majority count for cluster c_i.

In all datasets that are used in experiments, there is a different number of positive and negative reviews and only two clusters are considered. After clustering, we will have two clusters one for the majority of positive reviews and the second one has the majority of negative reviews. The purity is calculated by dividing the total number of correct grouping over the total number of reviews. The purity values must be higher than 0.5 and the purity of 1.0 indicates perfect clustering.

Table 2: Confusion matrix of reviews clustering

	Group1 (cluster1)	**Group2 (cluster2)**
Actual Positive	a	b
Actual Negative	c	d

All experiments were conducted on a PC with 16 GB RAM and Intel Core i7-8550U CPU 1.8 GHz. After applying the approach to all cross domains datasets, the results show that our clustering approach is feasible to cluster Arabic reviews into positive and negative categories for sentiment analysis across different domains as shown in Tables 3 and 4. Table 3 presents the results of the clustering evaluation in terms of precision, recall, and f-measure before applying dimensionality reduction and Table 4 presents the results after applying the dimensionality reduction. As shown in the tables, f-measure of both exceeds 65%, and the results indicate that applying SVD gave relatively good results compared to the approach with SVD not applied in terms of precision metric, however, using other metrics there is no indication of the difference in the results. But by using SVD we get the advantage because it helped to reduce runtime and this is reflected in the overall performance as shown in Figure 3.

Table 3: Clustering results without dimensionality reduction

Dataset	**Precision**	**Recall**	**F-measure**	**FMI**
MOV	0.740	0.881	0.805	0.807
PROD	0.781	0.967	0.864	0.869
ATT	0.962	0.739	0.836	0.843
RES	0.774	0.689	0.729	0.730
HTL	0.898	0.639	0.747	0.758

Table 4: Clustering results with dimensionality reduction

Dataset	Precision	Recall	F-measure	FMI
MOV	0.718	0.929	0.810	0.816
PROD	0.780	0.965	0.863	0.867
ATT	0.963	0.690	0.804	0.815
RES	0.775	0.624	0.691	0.695
HTL	0.899	0.642	0.749	0.759

The results of Fowlkes–Mallow's index (FMI) are represented in Figure 4. As shown from the Figure 4, FMI values indicate good clustering output and this appropriate the f-measure metric. As shown in Figure 5, the purity measure for all datasets is also above 0.5 and was relatively indicated good clustering. This fits with other evaluation measures results that are shown in the above tables. When comparing the results of the different datasets, it is shown that PROD dataset results are better than the results of other datasets, and the results of RES and HTL are worse than other datasets. This indicates that the size of the dataset has an effect on clustering results. As presented in Table 1, PROD dataset size is smaller than and HTL and RES. This can be explained from two different perspectives. From the first perspective, increasing the size of the dataset will increase the number of features and sparsity, which might affect the clustering results. From the second perspective, the large datasets in sentiment analysis especially which have long texts and documents increase the chance of noisy features that may not be handled in the preprocessing step. These features might affect negatively later phases results.

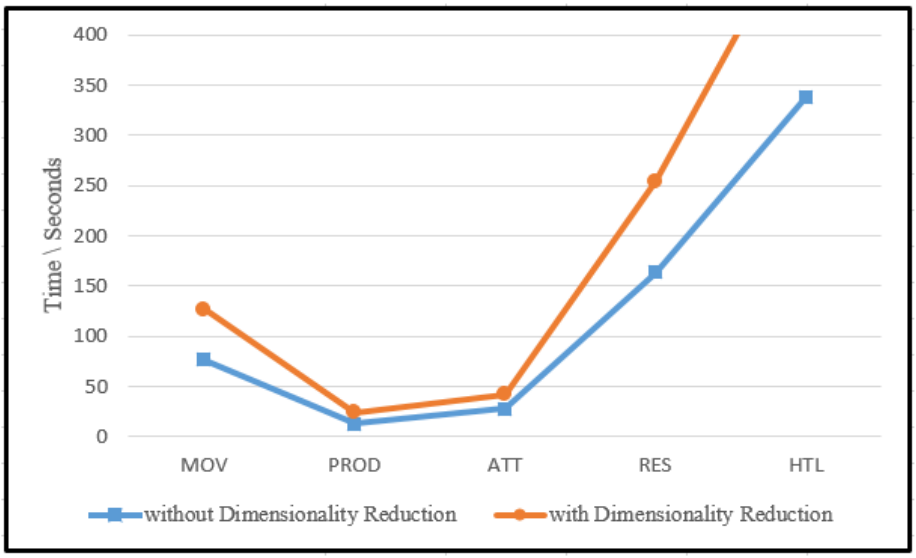

Fig.3: Run time Results of Clustering with Dimensionality reduction

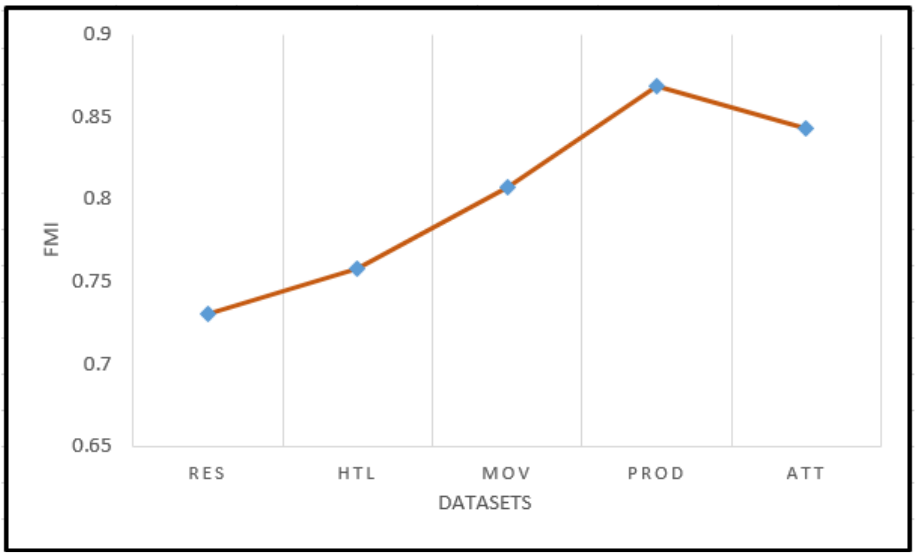

Fig. 4:Fowlkes–Mallow's index results for each dataset

It is not possible to compare results with other current research, for the following reasons. First, there is very limited research applied to the Arabic text. The second reason is that the data sets are different. Clustering approach proposed by Li and Liu (2012) was applied to the English text, the performance that was obtained in terms of accuracy did not exceed 78%, however, in our approach, we obtained good results despite the challenges of the Arabic language.

Fig. 5: Clustering purity for each dataset

Conclusion and Future Work

Sentiment analysis is considered an important field in many different domains. It may help to know about people's satisfaction and may help in the development and improvement of the services. Due to the huge amount of user-generated content, such as reviews, recommendations, and blog posts on the web, the demand for sentiment analysis has increased. This needs to develop new methods to classify the sentiment of these content with low effort and time. In this research, we discussed the unsupervised approach for sentiment analysis for Arabic reviews across multiple domains based on using clustering

for labeling Arabic reviews with positive and negative labels. The approach encompassed four different steps, preprocessing, feature extraction, applying k-means and dimensionality reduction. Various external evaluation measures are applied to evaluate the quality of clustering, precision, recall, f-measure, FMI, and purity. The experimental results showed the goodness of the approach in categorizing the text with no manual intervention. The results indicated that this approach is promising to be used in labeling Arabic text which is highly desired across different domains.

As future work, we will consider the multiclass text and not only consider the positive and negative classes but also the neutral class.

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The Prevention of Students' Academic Procrastination: The Correction of Irrational Attitudes

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Abstract

The higher school has not only large-scale educational tasks but no less ambitious educative ones. In this regard, there is a necessity to identify negative phenomena in students' behaviour with the aim of the correction and prevention of them. Academic procrastination is one of such negative phenomena; the essence of it is to postpone the implementation of training tasks. The purpose of this research is to conduct the theoretical analysis of procrastination, to identify the causes of its appearance and to propose the methods of its prevention. The analysis of the scientists' positions on this issue showed that a unified theory of procrastination has not yet been created. The article reveals the relationship between the reasons for procrastination, irrational beliefs and irrational students' attitudes. The authors propose options for replacing existing irrational attitudes with the new ones. The methods of irrational attitudes corrections in three directions are disclosed and substantiated: work with beliefs, work with emotional reactions and work with behavioural reactions. The experimental work was carried out among several groups of students studying Economics at South Ural State University. The results obtained made it possible to record a decrease in academic procrastination in experimental groups, which provides the basis for the application of the proposed methods in further pedagogical practice.

Keywords: procrastination, academic procrastination, prevention, irrational attitudes, students.

Introduction

"As long as we put off life, it passes."
Seneca

Currently, student life is very dynamic and diverse, due to the presence of several activities such as study, hobbies, additional education, and personal life. Each activity requires a significant amount of time, the resource of which is limited. Of course, if a person receives higher education, then it is appropriate to assume that it is his main goal. However, many students have a lot of interests and that provokes a lack of time situation. Besides the change in social status, the loss of protection by school

teachers, and the expansion of the range of activities cause emotional instability, internal confusion, and disorganization.

It is not easy for yesterday's schoolchildren to orient in student life. The multitasking of the educational process determines the desire of students to reduce workloads and solve problems as they occur. They postpone the tasks for the next day, especially if there is some time reserve. Such behaviour often provokes poor-quality assignments and, as a result, unsatisfactory or low rating points. Students worry about this, promise that "next time they will do everything in advance", however, time passes and everything repeats. This phenomenon is called procrastination.

Such behaviour entails emotional discomfort, stress and depression, which does not add to students' health and satisfaction with life. In this regard, the pedagogical community is looking for ways, means and methods of changing students' behaviour. Any human activity is performed consciously by following the irrational attitudes. It can be assumed that the change of them will entail the change in students' behaviour.

Literature Review

The term "procrastination" came from Latin procrastinationem which meant "putting off from day to day". The scientists study this phenomenon and offer different definitions:

- the voluntary postponement of the planned affairs, with the expected negative consequences due to the delay (Steel, 2007), *(Lay, 1986)*;
- the delay in making decisions, postponing the implementation of works "for later" *(Lay, 1986)*, B.G. Meshcheryakov *(Chun Chu and Choi, 2005), (Meshcheryakova, 2003)*;
- the mechanism for coping with the anxiety associated with the beginning or completion of a task or making a decision *(Ilyin, 2011)*;
- the neurotic form of behaviour in order to protect the personality *(Waitley, 1996)*;
- the irrational delay in behaviour *(Varvaricheva, 2010)*.

We follow the interpretation of procrastination made by Ya.I. Varvaricheva. Irrationality is a phenomenon characterized by emotional sufferings and impressions. If it is connected with activity then positive experiences (joy, enthusiasm, interest, etc.) will be stimulating factors. If experiences are negative (boredom, indifference, etc.), then they will be inhibitory factors of the performed activity. We can conclude that procrastination is one of the types of irrational behaviour, the peculiarity of which is the understanding of negative and undesirable consequences *(Varvaricheva, 2010)*.

Milgram, J. Batoria, and D. Mourer developed the classification of 5 types of procrastination (daily, neurotic, compulsive, academic, and the procrastination in decision making) *(Milgram, Batori and Mowrer, 1993)*. Later, N. Milgram and R. Tenne revised this classification and proposed 2 types: procrastination in the performance of tasks and procrastination in decision-making *(Milgram and Tenne, 2000)*.

The search for positive aspects in procrastination was carried out by A.Kh. Chu and J. N. Choi *(Dorodeyko, 2013)* who divided procrastinators into active and passive. Active procrastinators postpone their affairs due to negative experiences, and passive ones due to the tendency and preference to perform work in a time-constrained environment. In J.R. Ferrari's classification procrastinators are divided into 3 groups according to the type of behaviour: "indecisive", "avoiding", and "thrill seekers" *(Fishbein and Ajzen, 1975)*.

Thus, it can be said that a unified theory of the study of procrastination does not yet exist. In recent years, on-going research is most often associated with an emphasis on one of the three components of

procrastination: behavioural, cognitive, or emotional. And in such cases, the researchers relied on the theory of psychodynamic, behavioural and cognitive psychology *(Lay, 1986)*.

P. Steele in 2007 tried to integrate all existing opinions, creating an integrative theory of temporary motivation *(Steel, 2007)*. He suggested 4 factors that influence students' performance or postponement of activity: expectancy, value, delay, and the level of impatience. Thus, the author focuses on the attitude of the person to the case, in fact, and on the difficulties of this case.

Many scientists believe that procrastination is more characteristic of students. They studied factors contributing to procrastination *(Meshcheryakova, 2003)*; the types and specificity of tasks for learners, the implementation of tasks which tend to be postponed *(Ellis and Knaus, 1977)*; the conditions of fulfilment and requirements of teachers to the assignments for students *(Wolters, 2003)*; and students' motivation *(Karvasarsky, Ababkov and Isurina, 2006)*.

The authors note either negative or positive aspects of procrastination. When conducting practical studies of procrastination, it is easy to identify those students for whom it is a mechanism of protecting the body from excessive loads. The learners for whom procrastination is a consequence of the inability to organize their time or the lack of interest in the corresponding type of activity are also easy to be separated. That is why the numerous recommendations from various scientists to combat procrastination come down to a variety of methods of self-monitoring and written planning.

Procrastination manifests itself in a certain activity which gives grounds for scientists to propose their classification of procrastination or procrastinators. Our interest is connected with the behaviour of students, and this type of procrastination is called academic.

Several studies were conducted to determine the presence of the phenomenon of procrastination in the students' environment. Ellis and Knaus argue that 80-95% of students procrastinate to one degree or another *(Fiore, 2014)*. According to the results of V.S. Kovylin who examined Russian students, the figures vary from 46% to 95% *(Lay, 1986)*.

At the same time, researchers note a strong emotional discomfort from this behaviour:

- anxiety increases when the deadline is drawing on, this anxiety causes a "paralyzing" state *(Varvaricheva, 2010)*;
- gloomy foreboding causes negative feelings *(Ferrari, 1990)*;
- the self-dissatisfaction appears (Khukhlaeva, 2009), *(Lay, 1986)*.

A person's behaviour is caused by cognitive structures formed in his mind, which are his beliefs and "irrational attitudes" *(Kovylin, 2013)*. These two concepts are combined by the emotional behavioural reactions of a person to events, phenomena or objects. However, the internal structure of these concepts is different:

- the attitude include cognitive, emotional and behavioural elements *(Uznadze, 1997)*;
- beliefs can be considered synonymous with the cognitive component of the attitudes *(Karlovskaya and Baranova, 2020)*.

Therefore, it can be said that irrational attitudes are irrational beliefs, emotions, and fixed behavioural reactions. The emotions are the main in the structure. Some scientists combine the irrational attitudes and procrastination. E.P. Ilyin and V.S. Kovylin believe that procrastination is "an emotional reaction to planned or necessary things" *(Kovylin, 2013)*. We support this position and think that procrastination can be controlled by changing irrational attitudes, thereby exerting a preventive effect on possible manifestations of academic procrastination.

Proposed Changes to Irrational Attitudes

It is obvious that for each cause of procrastination manifestation, its own methods of prevention or elimination are required. To determine the causes of procrastination among students, we used the questionnaire method. After the analysis of the results, the four main causes of procrastination were identified:

- the lack of interest in the task or subject;
- the perfectionism with social anxiety (the desire for the perfect fulfilment of tasks, to be better than others);
- the impulsiveness manifested in the irresponsibility and helplessness of the independent fulfilment of tasks;
- the urgent dependence expressed in the desire of students to work in a strictly limited time.

Each cause of procrastination generates students' irrational beliefs, which are the basis for existing irrational attitudes. We have established the connection between the reasons of academic procrastination, irrational beliefs, and students' irrational attitudes. To prevent the manifestation of academic procrastination, we propose the replacement of existing attitudes with the new ones (see Table 1).

Table 1: the connection of the causes of procrastination with irrational beliefs and irrational students' attitudes

№	Causes of procrastination	Irrational beliefs	Irrational attitudes	New attitudes
1	The lack of interest in the task or subject	I do what turns out; I do what I want	Getting pleasure from life	Getting pleasure from activities; Giving the task a personal meaning
2	The perfectionism with social anxiety	I have to do better than anyone; I have to do perfectly	Life is a competition and only victory suits me; I'm better than all / many	Everyone has his own potential; Competing with myself
3	Impulsivity (irresponsibility and helplessness)	Everyone should help me; Every person must have a mentor	External assistance should be provided	I can work without outside help
4	The urgent dependence	All problems must be dealt with quickly; I am confident in my abilities	I can do everything; I can solve problems as they become available	There must be harmony between work and rest

(Source: compiled by the authors)

In other words, the existing irrational attitudes should be replaced by other rational attitudes based on self-acceptance, positive thinking, self-confidence, and self-control. The proposed replacement is quite complicated, as it involves the change of three components: beliefs, emotional attitude and behavioural reaction. However, it is quite feasible:

1) The work with beliefs. The students are encouraged to consciously change their speech constructs. For example, “I must ....” to “I would like .....”; “I owe ...” to “I can ...” etc. In other words, the obligation is replaced with the students' wishes. Beliefs are transformed only when value orientations change, so unobtrusive explanatory work should be done. It is most appropriate to do this at the courses “Introduction to the specialty” and “Personal management”. Discussion of cases, analysis of the successful managers’ activities, drawing up a diary and other written plans, identifying their

strengths and weaknesses, applying the method of SWOT analysis to the effectiveness of studying at the university has a significant impact on the correction of irrational attitudes;

2) The work with emotional reactions. In this case, the teacher plays a special role, since the emotional reaction of students depends on his positive attitude. The majority of students respect their teachers; therefore, the expression of the confidence in students' abilities, the belief in good final results will cause positive emotions among learners. Besides, the increased anxiety of some students can be removed using several methods:

- the fragmentation of the task and its performing in parts;
- an offer to complete tasks in pairs;
- the possibility to submit the assignment ahead of schedule;
- the support for students in the chat, with the provision of advisory assistance;
- the organization of an intra-group conference on the assignment, where students can communicate with each other on a given topic and, possibly, help each other.

The work of teachers is carried out regularly with feedback from both students and colleagues. The irrational attitudes are often replaced by others based on an emotionally positive attitude towards the teacher, to the passion of group mates, to a joint project, etc. Therefore, such irrational methods as infection, imitation, and suggestion in this work will become invaluable helpers;

3) The work with behavioural reactions. It is necessary to talk about the systematic implementation of the task. This problem should be solved by a student himself and his teachers. The teachers can offer a master class for students "Know how to praise yourself" where students should receive tools for self-control and self-promotion:

- "the tomato method" (the breakdown of working time into small segments of work and rest. For example, I work 20 minutes and rest 20 minutes);
- "the method of steaks from an elephant" (crushing a large case into small fragments;
- the ranking of on-going activities;
- the emotional contract with oneself;
- the defining of hated activity and allocation of limited time for its implementation;
- the reward for each completed task;
- the elimination of distractions;
- the use of the "whip" method (punishing yourself for disrupting planned activities);
- the definition of a mentor-student whose actions could be a guideline for the successful completion of tasks on time.

Also, students need to be introduced to the method of conscious switching in the case of breakdown. If this happens, it is necessary: either to sleep, or to go for a walk, or to go for a run, etc.

Reformulation of the goal often helps in the fight against procrastination. This applies to situations where students are not sure what they need. In this case, students should try to find personal meaning in the action being performed. A good effect is given by a daily plan with crossing out completed tasks. In this case, visibility allows you to see what is done and causes a feeling of self-satisfaction.

Results

The experiment was conducted in the period 2008-2019 at the Higher School of Economics and Management of the South Ural State University. The 2nd and 3rd-year students from three training programs (managers, economists, and personnel management) who were interested in the study participated in it.

At the first stage, the 3 experimental (75 people) and 3 control groups (72 people) were determined among the students from each training program. To diagnose the on-going changes in the manifestations of procrastination, the following methods were used: C.H. Lay "General

Procrastination Scale" *(Lay, 1986)*, Miklyaeva A.V., Bezgodova S.A., Vasilyeva S.V., Rumyantseva P.V., Solntseva N.V. "Procrastination assessment scale" *(Miklyaeva et al., 2020)*, as well as methods for observing and analysing performance results.

The comparative analysis of the data obtained before the start of the experimental work was carried out using the φ*Fisher criterion. According to it, the experimental and control groups did not have statistical differences, therefore, they are suitable for experimental work. Diagnostics was carried out 3 times: at the beginning of the academic year, after the first semester, and at the end of the academic year. The most significant differences were after a year of focused work, so the results before and after the experimental work are presented (Tab. 2-3).

Table 2: the change in the level of procrastination in experimental groups during the experiment

Training programs	Levels of procrastination (%)					
	Low		Middle		High	
	before the experiment	after the experiment	before the experiment	after the experiment	before the experiment	after the experiment
General Sample	18.6	36.0	50.9	44.1	30.5	19.9
Managers	15.4	34.6	53.8	46.2	30.8	19.2
Economists	22.2	37.0	44.4	40.7	33.3	22.2
Personnel Management	18.2	36.4	54.5	45.5	27.3	18.2

(Source: compiled by the authors)

Table 3: the change in the level of procrastination in control groups during the educational process

Training programs	Levels of procrastination (%)					
	Low		Middle		High	
	before the experiment	after the experiment	before the experiment	after the experiment	before the experiment	after the experiment
General Sample	19.5	16.7	54.1	51.3	26.4	31.9
Managers	20.0	16.0	56.0	52.0	24.0	32.0
Economists	16.7	12.5	54.2	54.2	29.2	33.3
Personnel Management	21.7	21.7	52.2	47.8	26.1	30.4

(Source: compiled by the authors)

To determine the statistical distinguishability of the results, the φ*Fisher criterion was applied again. According to it the changes that occurred in the experimental groups were statistically significant, while the changes that occurred in the control groups were not statistically significant.

Thus, based on diagnostic procedures the changes in the level of academic procrastination among students were found out. At the same time, the pedagogical observations showed that 87% of students began to do homework on time (before the start of the experiment, there were 68%). Such dynamics were traced in the accomplishment of small tasks, while the accomplishment of larger-scale tasks (term papers and projects) did not have such shifts. We explain this by the fact that the change in

irrational attitudes requires a longer period, possibly 2 years. Therefore we plan to develop a 2-year program and see its effectiveness. Nevertheless, it should be noted that in the control groups, the cases of procrastination manifestation in all positions became more frequent.

At the next stage of research, we compared student performance in experimental and control groups. It turned out that in the experimental groups, the average score according to the results of the session increased by 0.4, while in the control groups it decreased by 0.1. It can be assumed that the level of procrastination has an impact on the quality performance of students.

Conclusions

The analysis of the theoretical development of the phenomenon of procrastination, as well as the results of experimental work on its prevention in the student community, allow us to make the following conclusions:

1) the high dynamics of university life, the wide diversity of students' interests inevitably lead to a shortage of time, which causes procrastination;
2) the manifestation of procrastination in human life has been studied for the past few decades, but a unified scientific theory has not yet been created. That can be explained by the fact that scientists consider this phenomenon from the perspective of different scientific approaches;
3) the procrastination of educational activities is called academic procrastination;
4) the students' behaviour is dependent on a certain position regarding the current situation or subject. In the case of the primary emotional colour of this position, it is customary to speak of "irrational attitudes";
5) the causes of procrastination affect the formation of irrational beliefs that lead to the emergence of irrational attitudes;
6) the irrational attitudes of students that lead to academic procrastination, can be changed in the process of systematic, focused work. Such work should be carried out from two sides: pedagogical assistance and students' work on their behaviour;
7) the experiment has shown the effectiveness of such work and the prospects of its implementation in the student community.

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Ensuring Sustainable Financing of the Reproduction of Fixed Assets

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Abstract

The article reflects the current retrospective situation related to the peculiarities of financial investments in fixed assets of Russian companies for the period 2010-2018. The structure of investments in fixed assets to sources of financing and by forms of ownership is considered. The factors that limit the investment activities of Russian organizations are identified.
A statistical analysis of fixed assets as an essential element of national wealth is relevant not only for solving traditional tasks related to assessing the availability, composition and dynamics of economic assets.

Keywords: fixed assets, investment value, financing of fixed capital, sources of financing.

Introduction and review of publications

Investments are the main source of implementation of the financing strategy. They provide movement in a certain direction. All investments need real money, that is, financing decisions are required to mobilize the required resources.

A sound financing strategy should solve the main tasks of managing the economy and ensure a long-term increase in the value of the company. The desired effect can be achieved through actions that, in accordance with traditional corporate finance management laws, can cause a negative reaction from investors. For example, this is a decrease, a complete rejection of dividends or the repurchase of shares that significantly exceed their market value.

A statistical study on the financing of fixed assets and the long-term capital market is the most important information component in the enterprise financial policy management system.

Materials and Research Methods

Financing the work of the organization is a system of forms and methods, criteria and principles of economic support for reproduction. Financing is the process of generating company capital in all its forms and types. The concept of "financing" is very closely related to the concept of "investment". By financing we mean the process of generating funds for further investment, and by investments we mean the accumulated funds and their application.

These concepts are interconnected, but the concept of "financing" precedes the concept of "investment". A company cannot plan any investments if it does not have the necessary sources of financing. But at the same time, the formation of corporate money is taking into account the preparation and preparation of plans for their use in the future.

Any company, choosing sources of financing activities, must solve the following main tasks:

- identify the needs for short-term and long-term sources of capital financing;
- find possible changes in the structure of assets and capital of the company in order to determine its ideal composition and structure;
- to ensure the financial stability of the enterprise and constant solvency:
- use borrowed and own funds of the enterprise with maximum efficiency;
- reduce the cost of financing the financial and economic activities of the company *(Mirolyubov, 2008)*.

The sphere of interaction of organizations with the capital market is financing. When making a decision on financing, you choose from a variety of possible options the sources of raising funds for the company in exchange for claim rights.

The innovative and economic development of the company depends on the effectiveness of investment activity, which at the same time gives the economy economic growth and is aimed at improving the welfare of society. Proper investment contributes to the dynamic development of the company and strengthens its financial stability *(Khalyapin, 2018)*.

A company that works efficiently is:
a) a reliable taxpayer in budgets of various levels;
b) a progressive economic entity in terms of introducing modern innovative technologies into the production process;
c) an active social subject in terms of labor supply *(Mirolyubov, 2008)*.
The importance of investment activity necessitates the analysis of sources of financing of investment activity, financial investments in fixed assets of the enterprise with a focus on own funds.
Investments in the form of investments are divided into financial and real. Investments in fixed assets of the company are real investments, which demonstrates their fundamental importance for the development of any economy *(Tuyakova, 2009)*.

The competitive functioning of organizations of all types of economic activity is the result of investing in fixed assets. The success of any company is of particular importance in modern economic sanctions against the Russian economy.

Result and Discussion

An analysis of statistics on financial investments in fixed assets of Russian companies for 2010–2018 is proposed. The purpose of the analysis is to identify existing trends to consider a set of measures that can increase the efficiency of investments. The analysis was carried out as a whole, as well as for companies of various forms of ownership, sources of financing, timing.
Table 1 shows the total capital investments of firms for the specified period.

Table 1: overview of investments in fixed assets of enterprises in 2010-2018

year	billions of rubles	% to the previous year (in comparable prices)
2010	9152.10	114.7
2011	11035.65	120.6
2012	12586.09	114.0
2013	13450.24	106.9
2014	13902.65	103.4
2015	13897.19	99.9
2016	14748.85	106.1
2017	16027.30	108.7
2018	17595.03	109.8

(Source: compiled by the authors on the basis of Investments in Russia.2018: stats)

Analysis of this table leads to the conclusion that the dynamics of investment is not stable enough. In 2010–2014, the volume of investments increased by 1.5 times, and in 2014–2018 - by almost 1.3 times. The most intensive investments grew in 2011 compared to 2010 - by 20.6%, and in 2018, compared to 2017, investments increased only by 9.8%. The decrease in investments occurred in 2015 (compared with 2014), by 0.1%.

Table 2 shows an analysis of the structure of investments in fixed assets by ownership, and also defines the shares of the state and the shares of foreign investors.

Table 2: structural review of investments in fixed assets of enterprises of the Russian Federation, distinguished by ownership, 2010–2018,%

	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Investments in fixed assets, total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
including:									
Russian property	86.2	87.8	84.5	85.8	86.1	84.3	83.1	83.8	85.6
including:									
state property	17.2	16.9	16.8	17.2	14.9	14.8	15.2	14.4	13.8
from her:									
federal property	10.9	10.8	10.1	9.7	8.9	9.4	8.8	8.4	7.7
property of constituent entities of the Federation	6.2	5.9	6.7	7.5	5.9	5.4	6.4	6.0	6.1
m municipal property	3.2	3.1	3.2	3.4	3.4	3.0	2.7	2.5	2.2
private property	57.0	54.2	50.7	53.9	56.3	56.8	55.9	58.1	60.9
mixed Russian property (without foreign participation)	7.5	11.9	12.1	9.5	9.7	8.2	7.8	7.5	7.4
consumer cooperative property	0.03	0.02	0.02	0.02	0.03	0.02	0.01	0.01	0.01
property of public and religious organizations (associations)	0.04	0.03	0.04	0.04	0.1	0.1	0.04	0.04	0.03
property of state corporations	1.2	1.6	1.7	1.7	1.7	1.4	1.4	1.2	1.2
foreign property	5.9	6.0	9.1	7.7	7.0	8.3	7.4	7.4	6.2
joint Russian and foreign property	7.9	6.2	6.4	6.5	6.9	7.4	9.5	8.8	8.2

(Source: compiled by the authors on the basis of Finances of Russia.2018: stats)

Analyzing Table 2, we see that the share of financing investments from Russian enterprises decreased slightly in 2018 compared with 2010 from 86.2% to 85.6%, and due to foreign enterprises increased from 5.9% to 6.2 %. We also note the growth of investments of joint Russian and foreign organizations, their share increased from 7.9% in 2010 to 8.2% in 2018. The highest investment rate of such organizations is 9.5% in 2016.

The largest share is made up of investments in fixed assets - from 2010 to 2018, this share increased from 57.0% to 60.9% of the total volume of financing of investments. The growth of this indicator indicates that private owners of various economic sectors are interested in programs for updating and expanding fixed assets of enterprises.

Figure 1 reflects the dynamics of investments relative to the types of fixed assets of the enterprise.

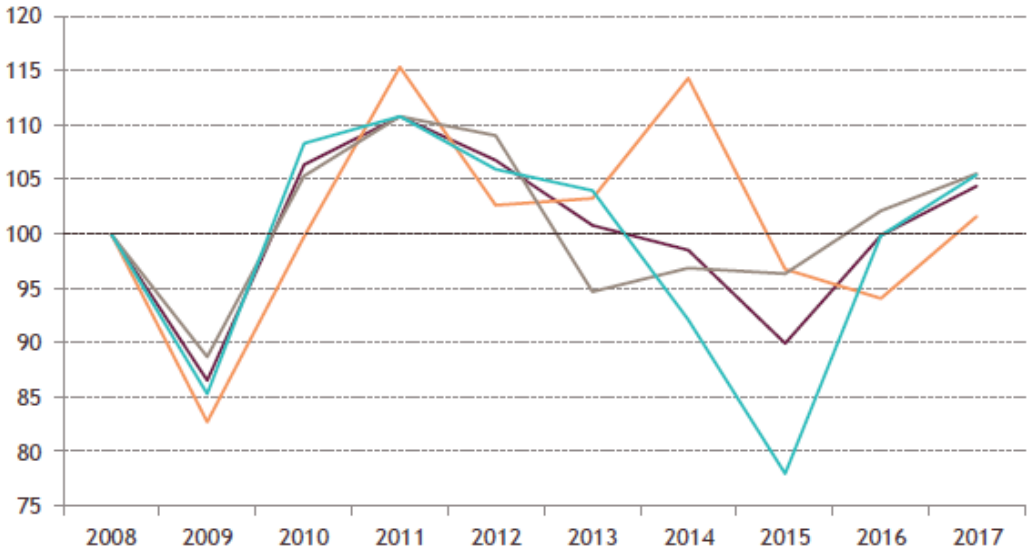

Fig 1. Change in investment by type of fixed assets, at constant prices, 2008-2017
(Source: compiled by the authors on the basis of Investments in Russia.2018: stat)

In the 1st half of 2018, the largest part of investments in fixed assets of large and medium-sized enterprises was directed to the construction and maintenance of non-residential buildings and structures – 48 %, slightly less – to the creation of machinery, equipment and vehicles – 35.6%. The investment downturn in 2015 had a sharp impact on the Machinery, Equipment and Vehicles group: investments decreased by 22% compared to 2008, and 31.5% compared to 2013 (38.8%). The growth of investments compared to 2008 occurred in 2010, primarily in the groups "Machines, equipment, vehicles" and "Buildings (except residential) and constructions" (102.1% of the 2008 level).

- Total
- Home
- Buildings (except residential) and structures
- Machinery, equipment, vehicles

The Housing group was least interested in investors. However, in 2011 and 2014 in this group there was a turbulent activation of investors and the level of investment rose to 115 and 114%, respectively, exceeding in 2011 indicators for other groups; in 2014, investment indicators for other groups were less than 100%. Since 2015, a drop in investments has been observed in the group of dwellings, a low change in the vector of which occurred in 2017.

In 2016, the volume of investment investments was higher than the level of 2008 for the group of buildings and structures (102.1%) in the first place - during this period, the group of dwellings and cars were lower than in 2008 by 6.0 and 0.2%, respectively.

In 2017, there was an increase in the accumulated increase in capital investments for all types of fixed assets of enterprises. The most attention of investors was occupied by the group "Buildings (except residential) and structures" (5.6%), then the group "Machines, equipment and vehicles" (5.4%), the smaller - "Dwellings" (1.6%).

In the 1st half of 2018, investments in capital (large and medium enterprises) decreased by 1.0% in annual terms. Investments in housing decreased by 1.5%, which was a huge decrease in annual terms and by 0.5 percentage points increased the decline in investments in the groups "Buildings (except residential) and structures" and "Machines, equipment and vehicles". 48.0% of the total investment volume under consideration was investments in the construction and maintenance of non-residential buildings (but in the 1st half of 2017 it was 51.1%), 35.6% - in the creation of machinery, equipment and vehicles (first half of 2017 - 34.1%).

Let us consider the structure of investments in fixed assets in Russia by sources of capital investments in the 1st half of 2014 - the 1st half of 2018 in order to determine their structure by own and attracted resources (Table 3).

Table 3: the Structure and dynamics of investment in fixed assets (large and medium-sized organizations) by source of funding, 2014-2018, %

Indicator	1 floor 2014 year	1 floor 2015	1st half of 2016		1 floor 2017 year		1 floor 2018 year		Change in constant prices, I half-year**	
	share	share	billions of rubles	share	billions of rubles	share	billions of rubles	share	2018/2014	2018/2016
Fixed capital investment, total	100.0	100.0	3921	100.0	4300	100.0	4609	100.0	–7.0	1.4
Own funds	52.5	56.2	2217	56.5	2407	56.0	2753	59.7	5.8	7.1
Involved funds:	47.5	43.8	1704	43.5	1893	44.0	1856	40.3	–21.1	–6.1
Bank loans:	10.3	8.9	314	8.0	496.9	11.5	369.5	8.0	–27.7	1.4
in t. h. inostr. of banks	1.4	2.3	71	1.8	267.9	6.2	86	1.9	26.3	7.0
Borrowed funds of other organizations	6.8	5.4	302	7.7	188.2	4.4	190.1	4.1	–43.9	–46.0
Budget resources:	12.4	12.8	482	12.3	575.7	13.4	556.7	12.1	–9.2	–0.3
federal budget	6.0	6.9	260	6.6	304	7.1	265	5.7	–11.6	–12.4
regional budgets	5.5	5.0	192	4.9	243.4	5.7	256.1	5.6	–5.3	15.9
local budgets	0.9	0.9	30	0.8	28.3	0.6	35.6	0.8	–17.3	1.4
Extra-budgetary funds. funds	0.2	0.2	9	0.2	7	0.2	8.2	0.2	–7.0	1.4
Funds of organizations and the population for shared construction	3.2	3.1	136	3.5	106.2	2.5	146.7	3.2	–7.0	–7.3
Other attracted *	13.9	12.4	432	11.0	482.7	11.2	554.4	12.0	–19.7	10.6

** Since 2016, Rosstat has ceased to publish data on the categories of "other".*
*** Dynamics in constant prices to the total volume of investments is calculated from profit. Data for individual funding sources has been recovered by distribution based on specific gravity.*
Source: Rosstat data, analytical centre calculations.
(Source: compiled by the authors on the basis of Dynamics and structure of investments in fixed assets)

The company's own funds (59.7%) are the main source of financing investment activities in the 1st half of 2018. In the 1st half of 2018, the amount of financing from own funds (large and medium-sized organizations) grew by 7.1% in comparable prices from the level of the corresponding period in 2016 and by 5.8% - relative to the 1st half of 2014.

The main elements of the raised funds are the federal and regional budgets, as well as bank loans of domestic and foreign institutions. In general, budget funds management is a socially significant project.

Despite the return of investments in fixed assets to growth at the end of 2016 and an increase in the share of attracted funds in the 1st half of 2017 to 44.0%, in the 1st half of 2018 there was a decrease in the share of attracted funds in the structure of financing investments to 40, 3% In the 1st half of 2018, the amount of borrowed funds decreased by 6.1% compared to the same period in 2016 in comparable prices; the decrease relative to 2014 was 21.1%.

The positive contribution of one of the important categories of external financing - bank loans (+ 1.4% in the 1st half of 2018 relative to the 1st half of 2016 after - 2.3% in the 1st half of 2016 relative to the 1st half of 2014 years) contributed to a slowdown in the volume of borrowed funds in the 1st half of 2017 and 2018. Compared to the period of the previous year (up to 8.0%), the share of bank loans decreased by 3.5 percentage points. The negative dynamics in the structure of funding sources also showed significant component - budget funds, this was due to stabilization of budget expenditures. In the 1st half of 2018, the volume of attracted federal budget funds decreased by 12.4% of the level of the 1st half of 2016.

In the 1st half of 2017, foreign lending of capital investments reached a high value, which is most likely due to a change in the scheme of transnational financing of projects, but according to the results of the 1st half of 2018, the share of this source of financing in the 1st half of 2017 decreased to 1.9% from 6.2%.

Based on the results of the analysis, we draw the following conclusion. In investment activities in the period 2010-2018, there has been some growth restriction. The following factors affect this situation *(Khalyapin and Maslova, 2018)*:
1) the country's economy is unstable;
2) the implementation of investment projects is limited by credit resources with a high cost and a complex mechanism for obtaining them;
3) the implementation of investment projects is also difficult due to the general risk;
4) products manufactured by organizations do not have sufficient consumer demand;
5) the regulatory framework that regulates the investment activities of enterprises is not ideal.
Thus, the reproduction of fixed assets is ineffective if the company does not carry out active investment activities.

First of all, it contributes to the growth of financial indicators and provides great opportunities for the company to use its own sources of financing for development. Secondly, the company is more open to external financing due to its investment activities.

Investment activity, therefore, is an indirect source of financing for the reproduction of fixed assets. The implementation of government contracts also acts as an indirect financial source.

Thus, indirect sources play a large role in financing reproduction processes, so they should be considered together with external and sources of financing. For this purpose, in Fig. 2, we will present a diagram of the formation of the most applicable financial sources in Russia under the conditions of reproduction of fixed assets of companies.

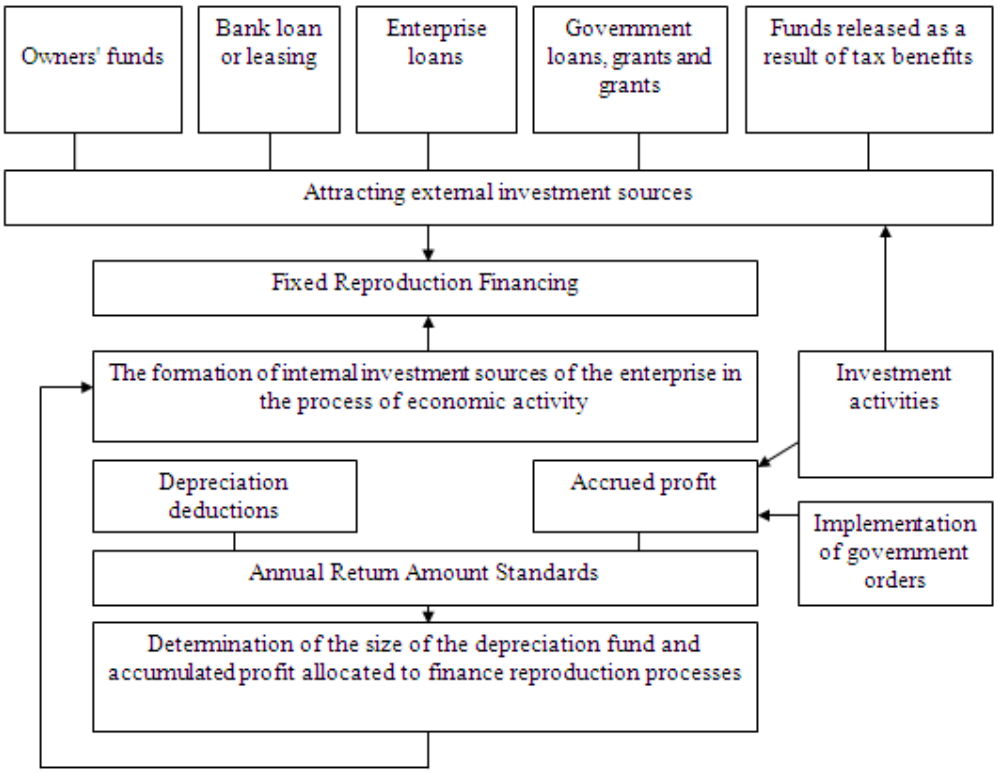

Fig. 2: Formation of financial sources for the reproduction of fixed assets of Russian industrial enterprises

(Source: compiled by the authors)

Fulfilment of the state order is a promising area of support for business development in modern conditions.

Ideally, government contracts for orders should be concluded only with companies that have a modern technological base that allows them to produce a certain amount of products that meet quality standards. In reality, however, supply contracts are often concluded by the state with intermediaries, and not directly with producers of goods.

Since the public procurement system is designed to solve certain social and economic problems, as well as to stimulate the creation of new jobs, increase the competitiveness of industrial enterprises and their development, this approach seems wrong. The same can be said about the approach, which is based only on price criteria, since the low cost of the product may indicate a low quality of the product.

In this context, the acute implementation of government contracts raises the question of which companies have high production potential and are able to sustainably finance reproduction processes. Legislative acts adopted to ensure support for Russian industrial enterprises do not contain clear tools for assessing the sustainability of financing fixed assets reproduction. In the scientific literature, financing of reproduction processes is considered primarily as part of the methods for assessing the innovative and investment potential of a company or analysing the effectiveness of investments and innovative activities. This item requires further study, since it is important to combine both approaches so that it is possible to take into account not only the impact of reproduction policies on the financial results of the company, but also its ability to provide sustainable financing for the reproduction of fixed assets of industrial companies.

At the same time, it should be clear that there is no single method for assessing the sustainability of financing of reproduction processes that would be effective regardless of who the users are and what their goals are.

Since each business entity has individual characteristics, the degree of influence of the same factor on different firms varies significantly. Therefore, this article offers flexible methods for assessing the sustainability of financing the reproductive process, which can be changed in accordance with the objectives of the study.

Conclusions

The analysis of factors affecting the course of reproductive processes showed that most of them change for the following reasons:

- the regulatory framework is imperfect;
- administrative obstacles;
- low return on investment in fixed assets and the lack of financial resources characteristic of industrial enterprises;
- it is difficult to get an investment loan;
- the lack of guarantees for many industrial liquid companies from the point of view of credit organizations;
- The economic situation in the country is uncertain and the risks associated with the market are high.

A change in the situation for the better requires a reorientation of state policy to stimulate expanded reproduction, including reform of the state tax and depreciation policy. The public procurement program, in the implementation of which the proposed methodology can be used, is one of the ways to support industrial companies.

As a brief analytical review of the regulatory results on attracting investments and the practice of using measures, tools and mechanisms shows, the effect on stimulating capital inflows, increasing the attractiveness of investments of producers and their associations is based on the following main points:

- financing based on the capabilities of the consolidated state budget;
- attracted sources of loans and long-term investment funds prevail in the structure of attracted sources;
- at the expense of investors, the amount of funds raised is limited.

Given the limited public resources necessary to support sectors of the economy, the formation and development of a mechanism for regulating the attractiveness of investments of direct producers of goods is an important direction for ensuring the development of the enterprise. To implement this mechanism, it is necessary to create investment institutions that focus on long-term capital investments, it is necessary to facilitate the placement of bonds of large producers to finance investment projects, taking into account the state guarantees provided, as well as guarantee the refinancing of such securities by the Bank of the Russian Federation and capital insurance.

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The Use of The Value-Added Method to Measure Intellectual Capital of Small and Medium-Sized Enterprises of The Russian Industry

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Abstract

The method of measuring the value added of intellectual capital (VAIC) was proposed by A. Pulic in 2000 and is known both to practitioners and researchers. Its main advantages, firstly, include the objectivity of the data used, secondly, their accessibility for calculations and observations, and thirdly, their compatibility for comparison with other enterprises. The article presents the results of measuring the intellectual capital value of a large number of Russian small and medium-sized machine-building enterprises using this VAIC method. The obtained results gave an idea of the existing trends in the development of the intellectual capital of these enterprises in 2014-2018, as well as allowed us to make conclusions on the peculiar features of the intellectual capital development of individual samplings covering small and medium-sized enterprises. We concluded that the method is applicable not only for obtaining the data on the level of the intellectual capital of an individual enterprise but also groups of enterprises. The hypothesis of the research is that due to the increasing complexity of the business environment and production, enterprises will experience a growth of structural capital represented by company assets, such as business processes, digital assets, software products, etc. At the same time, the level of human capital can both remain at a stable level and fall. This assumption is based on the fact that over the past decade, an unfavourable trend of a drop in the actual household incomes was formed in Russia. The basis of the household income is wages as an indicator of investments in the company's human capital. These trends can be manifested differently in different industries and enterprises. The value added of human and organizational capital was measured according to the data on the activities of small and medium-sized industrial enterprises of one of the most industrially developed regions of Russia - Chelyabinsk region.

Keywords: intellectual capital, human capital, structural capital, methods of measuring intellectual capital, value added of intellectual capital

Introduction. Overview of the approaches to the scope and composition of intellectual capital

The concept of intellectual capital is one of the fundamental ones in the terminological field of the knowledge-based economy. Since the middle of the XVIII century, economists noted the role of a human being and his/her abilities to increase productivity. F. Machlup *(Babaev, 2015)* introduced the concept of the knowledge-based economy and identified its relevant fields (education, research, information technologies, and services). The term "intellectual capital" was proposed in 1969 by J. Galbraith *(Gelbrejt, 2008)*, as a set of intellectual activities.

In the modern sense, the concept of intellectual capital was first considered by the American economist T. Stewart; his research determined for many decades the prospect of studying the knowledge and competencies of company employees as a critical factor in the competitiveness of modern enterprises (Stewart, 1997). Further research already deals with the study of intellectual capital elements not in general by fields and markets, but primarily at the company level. Among the most eminent researchers, we should mention Swedish scientists L. Edvinsson and M. Malone (2001), who proposed the classic structure of intellectual capital elements, E. Brooking (2001), who did not only investigate but also put into practice intellectual capital management activities, demonstrated the connection of intellectual capital with intangible assets and indicated that its components are human assets, intellectual property, infrastructure and market assets. J. Roos, S. Pike, and L. Fernstem (2010) propose to consider intellectual capital as a non-monetary and intangible resource, which is controlled by the company, like any other asset, and adds value for it.

In the Russian economic literature, V.L. Inozemtsev (1995), B.B. Leontiev (2002), A.N. Kozyrev and V.L. Makarov (2003) and others paid attention to investigating this matter.

There are still discussions on whether we can separate intellectual capital from the knowledge holder - the company employee. In this connection, the dual nature is inherent in the concept of organizational capital (business processes, infrastructure, databases, etc.) as the part of intellectual capital in general, which remains in the company even when the people who created it left the company. This duality follows from the fact that today's intellectual labour does not produce material objects but intellectual assets, each of which embodies the past labour.

Similar studies were also carried out by Arab scholars in the field of economics and finance. For example, Al-Anzi (2001) defined intellectual capital as useful knowledge that can be used and invested properly in the company's interests. Avad and Ghaziri (2004) believe that intellectual capital is represented by a group of individuals who use mental capabilities to make a company unique.

Dr. Hani Abdu believes that intellectual capital is intangible assets which are part of the company's capital and include human, structural and relational components contributing to the generation of new and innovative ideas, helping to survive. Dr. Savsan Abdulhamid Morsi (2008) defined intellectual capital as "a unique set of assets and knowledge based on innovative human minds, business skills, and customer relationships, which leads to a continuous generation of ideas and new methods adding value to the company and maintaining its competitiveness". Hazem Ali Badarneh defines intellectual capital as actual investments in knowledge and information able to serve an integrated system *(Hazem, 2009)*.

The diversity of interpretations is explained by the fact that different companies of even one industry have a significant specificity preconditioned by its strategy, competencies, material assets, and business model. Therefore, the problem of some unification of approaches is relevant. After substantial research, the Organization for Economic Cooperation and Development (OECD) concluded that "intellectual capital is the economic value of two categories of intangible assets of a company: organizational (structural) capital and human capital" *(Canibano, 2019)*. This approach has become classic, and many researchers consider it to be the most practical and useful *(Petty and Guthrie, 2000)*. The company's infrastructure (software systems, distribution, sales and supply channels, etc.) is included in the composition of structural capital. Human capital consists of the

human resources of the company's personnel, as well as external human resources of buyers and suppliers. This allocation of elements of intellectual capital is necessary for its effective management and increase in the company value.

One of the conditions for the effective management of any asset is its measurability. This issue remains relevant because according to many economists, the complexity of measuring the value of an asset is a characteristic feature of an intellectual asset (Fig 1) *(Caddy, 2000)*. Thus, researchers note that intellectual capital cannot have a direct monetary value. Its other characteristic is the possibility to exist only within an operating business; therefore, such an asset cannot be sold separately from a company, and when the company ceases, the existence of such an asset also ceases. These properties of intellectual capital preclude its direct measurement methods.

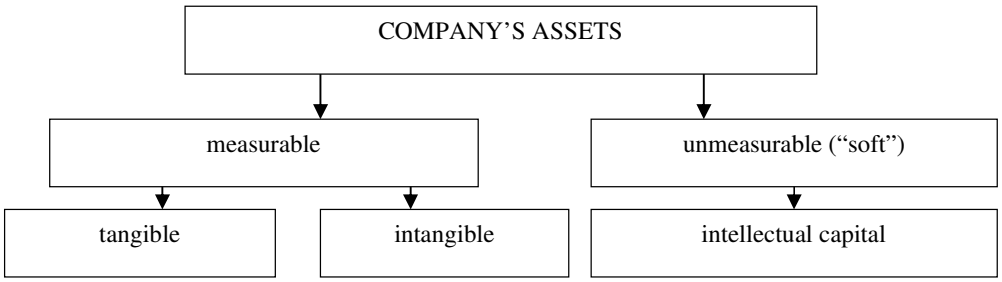

Fig 1. Classification of assets by the measurability feature
(Source: Caddy, 2000)

The study of many intellectual capital measurement methods and models has led us to the conclusion that we can distinguish several groups briefly presented below. Direct measurement methods involve the identification and assessment of individual assets or elements of intellectual capital in monetary terms, while the total value of intellectual capital is summarized. Market capitalization methods define the difference between market value and the value of the company's net assets and are close to the concept of goodwill. Market value is measured by conventional assessment methods (direct capitalization or cash flow discounting). This method is preferable in the presence of market quotes. In particular, in practice, many companies use D. Tobin ratio as the most convenient and understandable. However, these methods are inapplicable to companies not present in the stock market.

The third group is based on measuring the return on assets. T. Stewart proposed a capitalized value of intellectual capital based on the excess of the return on assets over the industry average *(Stewart, 2007)*. The Value Added Intellectual Coefficient (VAIC) method proposed by A. Pulic belongs to this group of methods because the value of intellectual capital is calculated by analogy with the calculation of the return on assets. This model determines the efficiency of using three types of company resources: capital employed efficiency (CEE), human capital efficiency (HCE), and structural capital efficiency (SCE). The VAIC model includes the following formulas (1-4). The higher the VAIC indicator, the higher is the company's intellectual capital and its ability to create added value *(Pulic, 2000)*:

$$VAIC = CEE+HCE+SCE \quad (1)$$

$$CEE = VA/CE \quad (2)$$

$$HCE = VA/HC \quad (3)$$

$$SCE = (VA - HC)/VA \quad (4)$$

where **VA** is the value added,
VAIC is the value added intellectual coefficient (1),
CE is the capital employed (or invested capital),
CEE is the return on invested physical capital calculated by the value added (2);
HC is the human capital,
HCE is the return on invested human capital by the value added (3);
SC is the structural capital,
SCE is the effectiveness of creating the company value at the cost of structural capital (4).

The advantages of this model include the simplicity of calculations and the availability of financial data. The disadvantages include a failure to take into account the time element, which cheapens intellectual capital *(Flamholtz, Searfoss and Coff, 1998).*

This group may also include the managerial efficiency method, which allocates a part of the company's income created by the management's art and intelligence and calculates the ROM (return on management). This method was proposed by P. Strassman *(Strassman, 1987)*.

The fourth group (Scorecard Methods) assumes that various elements of intellectual capital are assessed by expertise, and indicators have the form of indices obtained by scoring. This is a well-known balanced scorecard of R. Kaplan and D. Norton (2003), Intangible Assets Monitor by K.E. Sveiby, IC Index of J. Roos (1997), Scandia Navigator of L. Edvinsson and M. Malone *(Edvinsson and Malone, 1999)*.

The fifth group (intangible asset assessment method) includes a set of methods based on the traditional approach to intellectual property valuation *(Flamholtz, Searfoss and Coff, 1988)*.

The sixth group is a model for Human Resources Accounting, HRA, while their economic value is calculated by capitalizing labour costs *(Flamholtz, Searfoss and Coff, 1988)*, J. Hekimian and C. Jones *(Hekimian and Jones, 1967)*, Baruch Lev and Aba Schwartz (1971, 2013).

Out of the above methods, we should choose a model suitable for measuring the dynamics of intellectual capital for large groups of enterprises and in the long term. This calls for compliance with the following conditions: firstly, necessary available information on a large number of enterprises, and secondly, compatible data for different periods and different enterprises.

The classic work of G. Smith and R. Parr (1994) "Valuation of Intellectual Property and Intangible Assets" gives a table ranging the approaches to assessing intellectual property assets (Table 1). If an asset is recognized in accounting, it is generally recommended to use the income approach. Such assets include patents, copyrights, trademarks, software products with market potential, etc. It is recommended to apply the cost method to assets united in this study by the concept of organizational capital (management's information software, skilled labour force, corporate practice and procedures, distribution networks).

Table 1: preference of approaches to assessing elements of intellectual capital and intellectual property

Types of assets	Primarily used approach	Secondly used approach	Poorly used
Patents and technologies	Income	Market	Cost
Trademarks	Income	Market	Cost
Copyright items	Income	Market	Cost
Skilled labour force	Cost	Income	Market
Management's information software	Cost	Market	Income
Software products	Income	Market	Cost

Distribution networks	Cost	Income	Market
Mineral assets	Income	Market	Cost
Franchising rights	Income	Market	Cost
Corporate practice and procedures	Cost	Income	Market

(Source: compiled by the authors)

Several works, in particular, T.M. Orlova and A.L. Gaponenko (2008), note that the purpose of creating intellectual capital is to provide a company with competitive market advantages and thereby to add value. Thus, the VAIC method is most appropriate for assessing intellectual capital within the framework of this study. It refers to cost methods, which does not conflict with the fundamental approaches to measuring such assets, and is based on the assessment of value added, which meets the goals of investing in the creation of intellectual capital. The method enables to evaluate the contribution of two elements of intellectual capital – human and structural – to add the company's value, which also corresponds to expert approaches to the allocation of elements of intellectual capital.

To identify the dynamics of the intellectual capital value of Russian enterprises, we made a sampling of over 70 machine-building enterprises with revenue from €5 to €50 million. The information was obtained from the SPARK-Interfax database of Russian enterprises for the period of 2014–2018. The use of the primary calculation methodology is shown on the example of TEMZ LLC, which is well-known in the Russian and foreign power engineering equipment market. The calculation algorithm is as follows:

- selection of the necessary data from the company's published statements;
- adaptive calculation of the value added according to the VAIC method (Table 2);
- calculation of the physical, human and structural capital value according to the formulas used in this method (Table 3);
- calculation of the total VAIC amount (Table 3).

Table 2: initial values of the indicators for calculating the value added of intellectual capital according to the VAIC model of TEMZ JSC, thousand rubles (Source: compiled by the authors)

Indicators	2014	2015	2016	2017	2018
1. Owned capital	380.672	397.312	421.981	430.900	425.627
2. Long-term liabilities	384	204	16	0	92
3. Receipts from sales	219.624	379.626	493.044	457.616	355.634
4. Product cost	203.041	315.968	398.041	356.664	305.245
5. Labor costs	84.285	116.822	148.743	206.673	170.069
6. Costs (cl. 4 – cl. 5)	118.756	199.146	249.298	149.991	135.176
7. Invested capital (cl. 1 + cl. 2)	381.056	397.516	421.997	430.900	425.719
8. Value added (cl. 3 – cl. 6)	100.868	180.480	243.746	307.625	210.458

Table 3: the results of calculating the value added of intellectual capital (VAIC) for TEMZ JSC over 2014-2018 (Source: compiled by the authors)

Indicators	2014	2015	2016	2017	2018
Physical capital (CEE)	0.26	0.45	0.58	0.71	0.49
Human capital (HCE)	1.20	1.54	1.64	1.49	1.24
Structural capital (SCE)	0.16	0.35	0.39	0.33	0.19
Value added of intellectual capital (VAIC)	1.63	2.35	2.61	2.53	1.92

The obtained indicators indicate that in the observed period, there is a significant increase in physical capital, while the dynamics of human and structural capital is unstable: after their growth in 205-2017, the indicators almost returned to the level of 2014. Further conclusions can be made when comparing these indicators with the competitors' and industry average indicators.

Results and Discussion

In the course of the study, we made three measurements of the value added of intellectual capital: for the entire sampling (72 machine-building enterprises, Chelyabinsk region, Russia), including small enterprises (49 enterprises with the revenue from € 5 million to € 10 million), and medium-sized enterprises (23 enterprises with the revenue from € 10 to € 50 million). The average indicators are calculated for all the enterprises ignoring their scale and other factors. We had to reject the calculation of revenue-weighted indicators, since the role of small enterprises became insignificant, and the average indicators actually reproduced the trends typical of medium-sized enterprises with significantly larger revenues. The enterprises having a drop in revenue and/or losses in any year of the studied period were also rejected. Thus, all the enterprises in the sampling are more or less focused on their development and growth, and such an approach corresponds to the essence of value added as an indicator characterizing the enterprise's contribution to adding value for the national economy.

The resulting dynamics of the indicators are presented in Table 4 and Figure 2. In the entire sampling of the enterprises over five years, we observed a general increase in the Value Added Intellectual Coefficient; however, this dynamics differs in its various elements. So, there is a slight increase in the Capital Employed Efficiency (CEE) and Human Capital Efficiency (HCE). Still, at the same time, there is a more significant increase in the Structural Capital Efficiency (SCE). On the whole, this confirms the hypothesis of the outrunning growth of structural capital and an increase in its role for the development of companies.

Table 4: the results of calculating the Value Added Intellectual Coefficient (VAIC) for a group of machine-building enterprises over 2014-2018 (Source: compiled by the authors)

	2014	2015	2016	2017	2018
Capital Employed Efficiency (CEE)	1.53	1.75	2.03	1.70	1.63
Human Capital Efficiency (HCE)	2.21	2.23	2.12	2.33	2.36
Structural Capital Efficiency (SCE)	0.39	0.44	0.43	0.51	0.54
Value Added Intellectual Coefficient (VAIC)	4.13	4.42	4.48	4.54	4.60

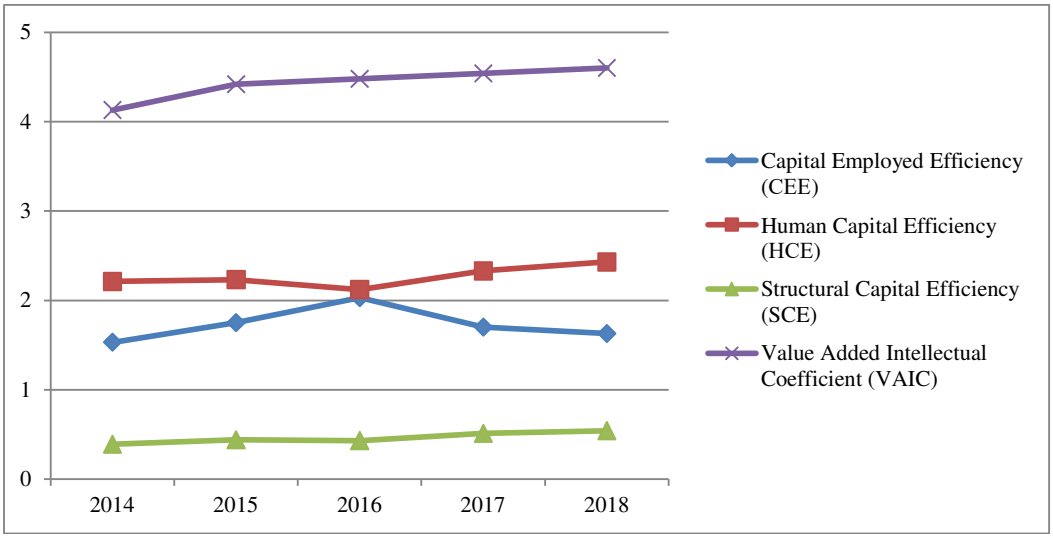

Fig. 2: The dynamics of the intellectual capital efficiency indicators for a sampling of machine-building enterprises over 2014-2018 in Chelyabinsk region, Russia (Source: compiled by the authors)

Then, we built corresponding diagrams for each subgroup in the studied complex. A fairly stable level of the return on value added on invested capital, with its slight growth in the middle of the period, is observed for the group of small enterprises (Table 5, Figure 3). However, there is a significant increase in the efficiency of both human and structural capital. It was difficult to propose this conclusion as a research hypothesis due to the lack of statistical measurements covering separately the groups of small and medium-sized enterprises. The Russian official statistics highlights only a group of small enterprises with revenues of up to 5 million euros, which refers to small business according to the Russian legislation. In our study, we used the approaches to the size of small and medium enterprises adopted in Europe (Annual Report on European SMEs 2013/2014).

Table 5: the results of calculating the Value Added Intellectual Coefficient (VAIC) for a subgroup of small machine-building enterprises over 2014-2018 (Source: compiled by the authors)

	2014	**2015**	**2016**	**2017**	**2018**
Capital Employed Efficiency (CEE)	2.06	2.31	2.36	2.01	1.90
Human Capital Efficiency (HCE)	1.60	1.63	1.72	2.67	2.50
Structural Capital Efficiency (SCE)	0.35	0.38	0.38	0.50	0.55
Value Added Intellectual Coefficient (VAIC)	4.01	4.32	4.46	5.18	4.95

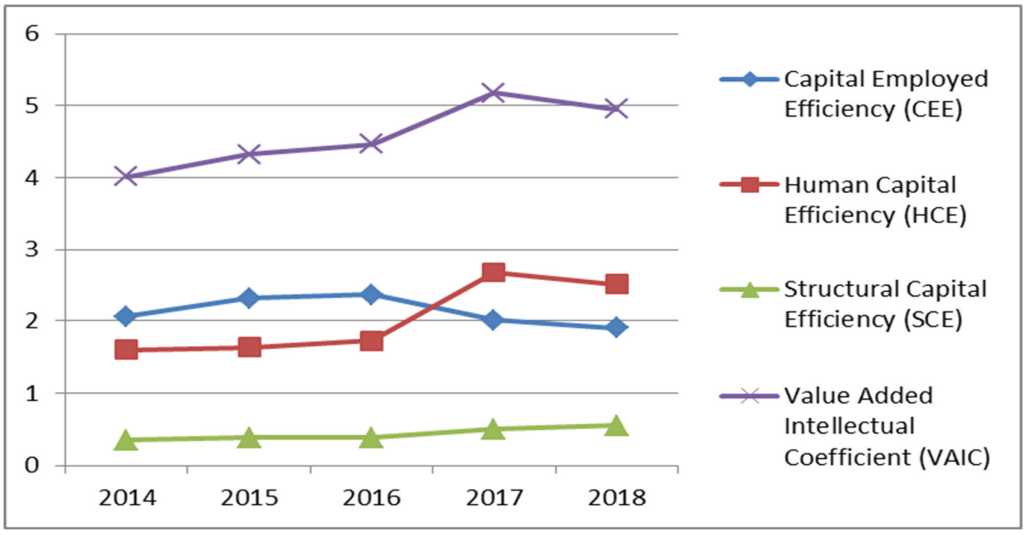

Fig. 3: The dynamics of the intellectual capital efficiency indicators for a subgroup of small machine-building enterprises over 2014-2018 (Source: compiled by the authors)

An analysis of larger enterprises in the sampling (with revenues from 10 to 50 million dollars) led to other conclusions (Table 6). These enterprises are characterized by more substantial growth of the Capital Employed Efficiency (CEE); however, the Human Capital Efficiency (NSE) reduces, and the growth of the Structural Capital Efficiency (SCE) cannot be called significant. In general, the total indicator of the Value Added Intellectual Coefficient (VAIC) almost does not increase. An analysis of this group of enterprises confirmed the research hypothesis regarding the growth (albeit insignificant) of the Structural Capital Efficiency (SCE), however, worsening of the Human Capital Efficiency (NSE), unlike smaller enterprises, cannot be explained logically. In our opinion, we can interpret this situation taking into account the specifics of the analyzed period and suggest that at larger enterprises, the increase in personnel costs was insignificant or was not observed at all over this period. At the same time, the companies did not experience a shortage of labor resources because the employees preferred to work at larger (hence, more stable) enterprises, even at lower wages. On the other hand, smaller enterprises experienced a shortage of specialists, which tends to grow. For this reason, they are forced to raise wages and, therefore, added value to attract specialists.

Table 6: The results of calculating the Value Added Intellectual Coefficient (VAIC) for a subgroup of medium-sized machine-building enterprises over 2014-2018 (Source: compiled by the authors)

	2014	2015	2016	2017	2018
Capital Employed Efficiency (CEE)	0.93	0.78	1.30	0.91	1.27
Human Capital Efficiency (HCE)	2.47	2.45	2.05	2.08	2.12
Structural Capital Efficiency (SCE)	0.46	0.46	0.45	0.53	0.51
Value Added Intellectual Coefficient (VAIC)	3.86	3.69	3.80	3.52	3.90

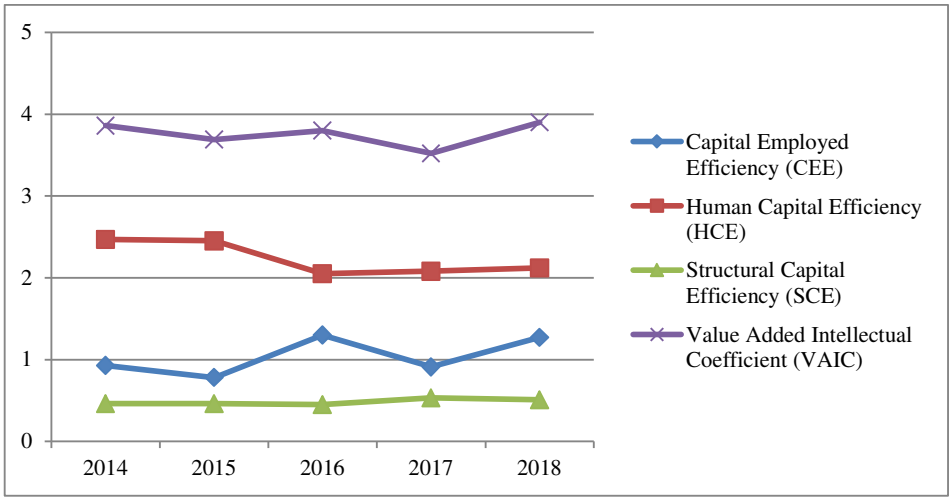

Fig. 4: The dynamics of the intellectual capital efficiency indicators for a subgroup of medium-sized machine-building enterprises over 2014-2018 (Source: compiled by the authors)

Conclusions

The research results led to the following conclusions. The use of the method of economic added value of intellectual capital to assess the dynamics and quality of the growth of Russian enterprises gives satisfactory results, which are well interpreted and allow us to supplement the conclusions of other researchers regarding the growth quality of Russian machine-building enterprises over the past five years, as well as to identify problems. In particular, we can note that in general, the intellectual capital indicators evidence their high role for the growth of enterprises and their market success. The positive dynamics of all the indicators confirm this conclusion. The Structural Capital Efficiency indicator demonstrates the highest growth rates. However, we should note several problems. The Capital Employed Efficiency indicator shows an unstable dynamics; its level of 2018 almost does not exceed the level of 2014. It means that the return in the form of added value per 1 ruble of the invested capital does not have a steady upward trend. First of all, we should look for reasons for the under-capacity of equipment and other active elements of the companies' fixed assets and their inefficient use.

The Human Capital Efficiency indicator shows a weak growth, and this is an alarm signal for managers. This problem can be possibly caused by the lack of any increase in the earning power level. This, in turn, is caused by the lack of a sufficient growth of workers and specialists' wages, which does not create adequate motivation for professional growth. At the same time, the Structural Capital Efficiency indicator shows fairly rapid growth, and this confirms the central research hypothesis. Structural capital grows due to the spread of such a useful management tool as lean manufacturing, which has started to be rapidly implemented in the practice of Russian enterprises.

Finally, the use of the method allowed us to highlight the peculiar features of the development of small and medium-sized enterprises. Thus, small enterprises demonstrate higher and more stable growth rates of human capital (from 1.6 to 2.5 over five years) and structural capital (from 0.35 to 0.55). We can say that more than half of the value added is already created by structural capital (effective business processes, software products, etc.). At the same time, there is no growth in the Capital Employed Efficiency, which can be explained by an insufficient upgrading of equipment and technological processes due to the economic recession, sanctions, etc. However, this may create difficulties for business development in the coming years. An increase in the efficiency of invested capital is a priority task for small enterprises in the following period.

Enterprises with a large volume of revenue show other trends. First of all, the relatively high growth rates of the Capital Employed Efficiency indicator at a decrease in the Human Capital Efficiency (from 2.47 to 2.12 over five years) may indicate that enterprises with larger financial capabilities seek to make physical capital but not the employees qualifications and competencies the main growth factor. Besides, we also stated above that such a situation could be possibly caused by an insufficient growth of the wage level. We believe that this can create significant difficulties for this group of enterprises since human capital is the basis of intellectual capital, all the rest is considered as a result of its labour and qualifications. Therefore, a loss of competitiveness and a slowdown in development may occur in the coming periods. The absence of a noticeable increase in structural capital indirectly confirms this conclusion, since it is also a consequence of human capital development.

The use of the VAIC method has good prospects for measuring the growth quality of various groups of enterprises and timely adjusting of their strategies. Besides, the method allows us to add new variables to the existing models studying the growth and development factors of enterprises. We believe that building economic and statistical models based on the use of the results of the obtained calculations of the companies' human and structural capital effectiveness will be the main line of the further work on the development of this method and an increase in its information content and practical value.

Acknowledgement

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Study on Corruption in Public Procurement in Romania

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Abstract

Corruption in the field of public procurement is of particular importance because approximately 20% of the European Union's gross domestic product (GDP) is spent each year by public authorities for the procurement of works, products and services. Fight against corruption is a priority for all governments, this being necessary for achieving the political objectives by spending public funds as efficiently as possible. The research examines the most important studies regarding the phenomenon of corruption in the United States of America and European Union. The article also presents the results of an opinion survey using a questionnaire. The questionnaire was designed by the authors, consisted of 15 questions and was applied on a sample of 61 Romanian purchasers. The survey analyzes the main characteristics of the phenomenon of corruption in public procurement in Romania, as well as the causes, consequences and main measures to combat corruption.
Also, the survey examines a number of specific topics about the phenomenon of corruption in public procurement, such as: the correctness of winning contracts by economic operators, the degree of supervision of the award of contracts by the state authorities, the efficiency of the use of public procurement funds, financing of political parties in exchange for winning public contracts, the most exposed contracting authorities to the risks of corruption, the procurement procedures most prone to corruption, winning public contracts by using bribery and connections, the most favourable cause of corruption, the pressures of the political factor on the public procurement system and the most effective anti-corruption measure.

Keywords: Public Procurement, Risks Of Corruption, Corruption, Bribery, Conflict Of Interest.

Introduction

Even though the phenomenon of corruption in public procurement is a particularly important one, the specialized literature has not sufficiently addressed this subject. Due to the hidden character, the fears of self-incrimination of the subjects questioned and the penalties provided by the law, corruption in public procurement still seems to be a taboo subject. However, due to the very large amounts spent, complex legislation and relatively reduced controls of the responsible authorities, the field of public procurement remains ideal for corruption.

The major political challenges at European level can be solved by carrying out efficient public procurement. These challenges are: fight against corruption, job creation, sustainable economic growth (social and environmental), the modernisation of central and local public administrations, improving fiscal discipline, facilitating the participation in the procurement procedures of small and

medium-sized entreprises, innovation and increasing citizens' level of confidence in public authorities (European Commission, 2017).

By the reform of procurement systems can be achieved important savings on central and local budgets, because of the size of public funds allocated for public procurement. For example, in the United States in the year 2000, the total of non-military purchases amounted to 1,031 billion dollars (approximately 20% of GDP) (Bureau of Economic Analysis, 2001) and for the year 2019 the United States Senate approved a defense budget of 716.3 billion dollars, growing up with 113.3 billion dollars compared to the 2018 budget, when the budget for the Pentagon was 603 billion dollars. Also, in the year 2002, public procurement in the EU totalled about 1,500 billion euros, which means 16% of EU's GDP, (European Commission, 2007), and in 2016 the total amount of public procurement (including those for utilities) was about 2,300 billion euros, representing 19% of EU's GDP (European Commission, 2017).

There are other areas in which the reform of public procurement systems can achieve important savings such as medicine, the oil industry, the aerospace industry, certain industries that are "reinventing" starting with utilized raw materials, and this interdependence is highlighted in the papers such as "Internal Medicine Papers" (Popescu, A.L., Costache, R.S., Savulescu, F., Jinga, M., Ionita-Radu, F., 2019), "Surgical team and surgical communication" (Dutu, C., Luchian, A., Starcu, E., Savulescu, F., 2015), "Theoretical Aspects, Modern Treatment Options and Practical Case Presentations in Hip and Knee Tumoral and Revision Bone Defect Reconstruction Surgery" (Dinache, G., Drignei, M., Ganatsios, S., Jovent, E., Costea, R., Savulescu, F., Lupascu, S., 2018), "ICT and its impact upon the globalization and the accessibility of the education in health domain" (Alexandru, A., Ianculescu, M., Parvan, M., Jitaru, E., 2007), "Patient-centered innovative monitoring system and smart personalized health care services using ICT" (Ianculescu, M., Alexandru, A., Radulescu, C/Z., 2018), "A Pilot Study on Management Systems Implemented within Romanian Organizations" (Popa, I., Stefan, S.C., Popescu, D.I., 2015), "An Exploratory Study on Knowledge Management Process Barriers in the Oil Industry" (Ceptureanu, S.I., Ceptureanu, E.G., Olaru, M., Popescu, D.I., 2018), "A Parametric Approach for Filling the Gap between Raw Data and Knowledge Based Engineering in the Aerospace Industry" (Alexandru, T.-G., Pupaza, C., 2018), "Green Fashion – a new possible lifestyle for Romanians" (Popescu, D.I., 2013), "Ways for Romanian clothing companies to perform whole exports in the international slump context" (Popescu, D.I., Bagu, C., Popa, I., Hancu, D., 2009)

Unfortunately, in the year 2012, according to governance indicators of the World Bank, from a total of 215 countries analyzed, Romania was in the last place in terms of governance efficiency and control over corruption, bribery being considered the most common form of corruption in public procurement, followed by rigged procurement and conflict of interest (LP, 2017).

Literature Review

The most well-known definition of corruption is "the abuse of power for private gain" (TI - Transparency International, 2015; EC - European Commission, 2014). Another definition mentioned in the literature is "using the public function for private gain" (Gray and Kaufmann, 1998).

The subjects of the acts of corruption in the public administration are the civil servants, who are granted (by election, appointment or law) certain obligations and rights in order to perform the functions in a public institution or public service (Păceșilă, 2004).

Acts of corruption can take place at various hierarchical levels: from state presidents or important politicians (political corruption) to the lowest levels of civil servants in local administration (bureaucratic corruption) (Rahman et al., 2015).

The complexity of the corruption phenomenon is high due to economic, political, cultural and social dimensions of it (Lefter, 2015).

Compared to private companies, the public sector has a number of political and social objectives. The modus operandi and philosophy of the corrupt civil servants are influenced by economic, political and social factors that are determined by the government and society in general (Han and Wild, 1991).

According to Buchner et al. (2008), bribery is a phenomenon difficult to prove and study, due to its illegal nature, which is a contributory factor for hiding it.

TIR - Transparency International Romania (2014) and Evenett and Hoekman (2005) estimated that, due to corruption, public procurement costs may increase by 20-25% (or even up to 50%).

These additional costs are explained by the fact that the bribe given by companies is recovered by increasing the value of public contracts, which leads to inefficient use of public funds.

Moreover, according to a study published in 2013 which analyzed five sectors of activity (waste and water, rail and road transport, vocational training, constructions, research and development) in eight EU Member States (Italy, France, Lithuania, Hungary, Poland, Netherlands, Spain and Romania) the direct costs of corruption have been estimated in 2010 to a value between 1.4 and 2.4 billion euros (Pricewaterhouse Coopers & ECORYS, 2013).

In Romania, the most exposed contracting authorities to corruption risks are local administrative authorities and the most vulnerable areas are waste management, healthcare, energy, telecommunications, information technology, constructions and urban development (Lefter, 2015; CJI - The Clean Justice Initiative, 2015). Furthermore, public procurement for the defense and security sector is considered to be sensitive due to the low degree of transparency (CJI, 2015).

According to Romanian Government Decision no. 875/2011, the most important fraud systems in Romanian public procurement are the following:

- corruption (kickbacks and bribe);
- failure to declare conflict of interest (favouring a certain tenderer);
- practice of secret cooperation which is carried out through submission of friendly/courtesy tenders, market sharing, abstaining from participation, rotation of tenders;
- very different offers;
- manipulation of technical specifications, so that the product specification established by a contracting authority matches the products tendered by a particular bidder or very few bidders;
- disclosure of data from procurement procedures (non-compliance with the confidentiality of tenders) from which benefits a certain tenderer;
- manipulation of offers by the personnel of the contracting authority after the submission of tenders. This system of fraud is eliminated in the case of procedures carried out online;
- fragmentation of procurement in two or more lots/procedures of smaller values to avoid a competitive procedure;
- unjustified award of a procurement procedure to only one bidder through the development of very restrictive technical specifications;
- combination of contracts by carrying out of non-competitive procedures which previously have been carried out as competitive procedures;
- establishment of incorrect costs which do not correspond to the reality or to the contractual conditions;
- price manipulation by offering high prices in comparison with similar contracts;
- failure to meet the contractual requirements by delivering lower quality products or failure to submit test or inspection certificates/documents;
- presentation by the supplier of excessive, fake or double bills;
- the existence of a fictitious service providers;
- product substitution which consists in the replacement of contracted products with others of inferior quality, without the knowledge of the contracting authority.

From the analysis of corruption risks of the three stages of the procurement process (planning of the procurement, actual conduct of the procedure and implementation of the contract) result the following:

- planning stage presents a high risk due to the manipulation of the contracting authority's needs, estimated value of the procurement, establishing technical specifications, award criteria / evaluation factors that are more favourable to a certain tenderer and do not reflect the advantages which the contracting authority seeks to achieve;
- actual conduct of the procedure, which is the most regulated stage in legal terms, has a lower corruption risk. The main risks of this stage are the manipulation of the selection board members, conflict of interest, disclosure of confidential information and agreements between the tenderers;
- contract implementation is the riskiest stage because the contracting authorities don't have control over the execution of the contract - the winning tenderer is responsible for fulfilling the contract. The main risks that may manifest in this stage are the delivery of non-conforming products or do not meet the specifications, using materials of inferior quality, invoicing unreal costs or deliberate and unjustified delay of the payment by the contracting authority.

A less known but highly criticized concept that has been analyzed by other authors was "efficient corruption". According to Leff (1964) corruption is an extra-legal institution that is used by groups or individuals to influence bureaucratic activities, which also has positive effects because it can "grease the wheel" of economic growth, especially where public institutions are weak. The mentioned author considers that the phenomenon of corruption can have a positive impact on economic growth because:

- can make bureaucratic civil servants work harder because they are motivated by bribes;
- can avoid bureaucracy, administrative formalities, because bribery works as money that speeds bureaucracy (speed money);
- can lend a "helping hand" in attracting foreign direct investments;
- can introduce an element of competition in the situation of closed markets (such as natural monopolies) (Leff, 1964).

Also, Lien (1988) believes that the corruption phenomenom can be efficient in the states with weak public policies.

The studies regarding the positive effects of corruption have been severely criticized by other authors. Shleifer and Vishny (1993) highlighted the hidden aspect of corruption that makes it difficult to manage, expensive and distorting. Corrupt civil servants can intentionally increase system delays hoping that they will get more bribes and companies will waste more time in meeting the requirements of the regulations in force (Kaufmann and Wei, 1999). History has shown that when corruption was very well organized or even centralized, the effects on the economy of the respective country were very harmful (Wedeman, 1997).

Wei (2000) studied the effects of corruption on foreign direct investment. The author has shown that corruption negatively affects the capacity of a state to attract foreign direct investment.

Mauro (1998) showed that between the phenomenon of corruption and the investment rate there is a negative correlation and the investment rate is correlated with the economic growth. The author also pointed out that corruption reduces expenditure on education which stimulates economic growth.

Lambsdorff (2003) analyzed the relationship corruption – productivity and determined that an increase of one point on a scale from 0 (reduced corruption) to 10 (high corruption) leads to a decrease in productivity by 2%.

Tanzi and Davoodi (1998) studied the link between project corruption and infrastructure cost and quality. The authors concluded that corruption is correlated with:

- higher public investments;
- inferior quality of the infrastructure;
- lower government revenues;
- higher costs for infrastructure maintenance (Tanzi and Davoodi, 1998).

The Causes of Corruption

According to Aidt (2003) there are three main conditions that favour corruption in any state:

- the discretionary power of civil servants to establish and manage policies and regulations (Ling and Tran, 2012);
- the economic benefits that can be obtained by manipulating decisions by the responsible factors;
- weak government institutions and political processes lacking dinamism (Shleifer and Vishny, 1993).

Unfortunately, the Romanian companies consider that the rules concerning fairness and transparency of the procurement procedures don't work efficiently.

In the year 2012, 90% of the companies considered that Romanian political regime establishes the rhythm of public procurement (IPP - Institute for Public Policies, 2012). The political factor intervened on the public procurement system especially through local politicians pressure over the political leaders and central authorities which resulted in influencing the procurement procedures and amending the legislation (Expert Forum & OLAF, 2014).

The first report on corruption in EU Member States was released in 2014, one of the horizontal themes being the corruption in public procurement. In the report have been included the conclusions of a survey conducted at European level during the period February – March 2013. In the case of Romania, 91% of respondents considered that the level of corruption is high (well above the EU average of 75%), 64% considered that the domain is characterized by clientelism and nepotism, 82% considered that the utilization of "connections" and bribery represent the easiest way to get public service, 42% considered that friends and family are favored in various public institutions and 38% considered that funding of political parties in exchange for influence or public procurement contracts represents a reality (European Commission, 2014).

The main causes of corruption are human greed combined with poor administration of the field of public procurement by the national regulatory authorities (TIR, 2014). A performing public procurement process requires a proper functioning of the ex-ante and ex-post controls, of the system of appeals and remedies and especially of the conflict of interest and corruption prevention system.

Lefter (2015) considered that the most important vulnerabilities of the Romanian public procurement system that emphasizes the corruption risk are the instability of the legislative framework, discrepancies between primary, secondary and tertiary legislation, the shortage of purchasers and poor training of them meaning low administrative capacity of the contracting authorities and quality of competition (reduced competition).

Measures to prevent and combat corruption

The eradication of corruption is one of the great challenges that all countries face.

Rose-Ackerman (1996) believed that the phenomenon of corruption can be diminished by increasing the possibility of identifying and punishing corruption, increasing the transparency of procurement procedures, increasing penalties and benefits for honest civil servants / purchasers.

Auti and Skitmore (2008) and Akbar and Vujić (2014) appreciated that the phenomenon of corruption can be significantly reduced by implementing cultural changes and raising the level of education.

There is also an inversely proportional relationship between the indicators characterizing corruption and those relating to professional standards, transparency, compliance with contractual clauses and the fairness of penalties (Tabish and Jha, 2012). As regards transparency of procurement procedures, Kenny (2012) considered this to be a key element in the fight against corruption.

Păcești lă (2004) considered that the following measures are needed to prevent and combat corruption in the public administration in Romania:

- adopting a clear and efficient legislative framework, eliminating the ambiguities and legislative gaps;
- employment and promotion of civil servants should be done only on the basis of professional criteria (merits and performance) and not on the basis of political criteria;
- promoting a transparent decision-making system accompanied by a correct and complete information of the citizens;
- establishing a decent level of pay that attracts competent officials;
- implementation of anonymous mechanisms for detecting causes of corruption by citizens;
- the selection process of civil servants must be rigorous (transparency of competitions and examinations for employment / promotion);
- training and professionalization of civil servants;
- correlating the level of pay with the responsibilities of the officials and the complexity of the work perform by them (Păcești lă, 2004).

A course of action in the fight against corruption is the professionalization of purchasers. Training procurement experts, which must be continuous, protects the public budget and the head of the contracting authority who signs the public procurement contract and firstly supports all the consequences for any deviations from the legal requirements (Expert Forum and OLAF, 2014).

Another direction of action in the fight against corruption is the establishment and the efficient operation of some mechanisms for reporting the acts of corruption and for the protection of whistle-blowers against any possible reprisals.

According to a study conducted by Milieu Ltd. for the European Commission in 2017, the potential benefits of the protection of whistle-blowers in the field of public procurement for the entire European Union have been estimated between 5.8 and 9.6 billion euros / year (Milieu, 2017).

Moreover, the Romanian National Strategy on Public Procurement regarding the reform of the public procurement system for the period 2015 – 2020 stipulates that a function will be developed on the site of Romanian Agency for Public Procurement (ANAP) by which it will be possible to file complaints anonymously (ANAP, 2015). Currently, this function doesn't exist on the ANAP website.

Research Methodology

The research was conducted by using a questionnaire.

The questionnaire is an investigative tool that consists of a set of written questions and graphic images, logically ordered, which determines answers from the persons questioned. These answers are then summarized and represented in writing. Establishing the order of the questions is made so that

the respondents are as relaxed as possible and the answers received are as sincere as possible (Chelcea, 2001).

The research methodology consisted of the following steps: analysis of literature on corruption, preparation of the questionnaire, identification of the persons to be questioned, submission of questionnaires and receipt of the responses, analysis and interpretation of responses and synthesis of results.

The questionnaire was designed by the authors, consisted of 15 questions and was applied on a sample of 61 Romanian purchasers. The answers are based on multi-variant grids, single-response grids and grading scales.

The target group of the questionnaire consisted of 61 respondents, of which 29 were purchasers from companies and 32 were purchasers from contracting authorities.

The questionnaire was sent to the target group by e-mail between 05.10.2019 and 14.10.2019. The completion period by the respondents was between 15.10.2019 and 13.11.2019 and the answers were also received by e-mail.

The main characteristics of the sample

The sample of 61 purchasers consisted of 55.74% women (34 respondents) and 44.26% men (27 respondents).

The distribution of the respondents by age group were as follows: age group 20-30 years - 8.20% weight, 30-40 years group - 37.70% weight, 40-50 years group - 49.18% weight and age group over 50 years - 4.92% weight.

Regarding the level of general education, 28 of the respondents have a bachelor's degree (46% weight), 6 have post-graduate studies (10% weight) and 26 have a master's degree (43% weight). Only one respondent has only high school education (2% weight) and no respondent has doctoral studies. Thus, the surveyed purchasers have a very good level of general training.

The training of the respondents in the field of public procurement was as follows: 5 purchasers (8.19% weight) have no training in the field, 7 purchasers (11.48% weight) have postgraduate studies in the area of public procurement and 49 purchasers (80,33% weight) have graduated from the Romanian National Authority for Qualifications (ANC) and obtained the qualification of "Public Procurement Expert".

As regards the experience of the respondents in the area of public procurement, 18.03% of the purchasers (11 respondents) have an experience between 0 and 5 years, 32.79% (20 respondents) between 10 and 15 years, 11.48% (7 respondents) between 15 and 20 years and 4.92% (3 respondents) have an experience over 20 years.

Findings

One topic that has been widely discussed in the field of public procurement is the correctness of winning the procurement procedures by economic operators. Although the answers can be "overshadowed" by the fears of the respondents, the question was: "Do economic operators correctly win public procurement contracts?"

11.48% of the respondents answered with total agreement, 40.98% agreed, 37.70% were undecided and only 9.84% expressed their disagreement (Figure 1). No questioned purchaser expressed the complete disagreement.

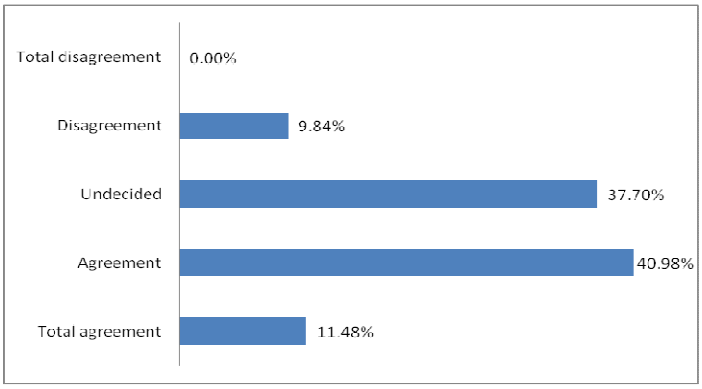

Figure 1: The correctness of winning the contracts

Source: author's conception

It can be concluded that most respondents believe that bidders are winning contracts correctly. However, the analysis of the structure of responses received separately by contracting authorities and economic operators reveals some interesting aspects (Table 1).

Table 1: The percentage distribution of the answers received to the question regarding the correctness of winning the contracts

Weight / response	Total agreement	Agreement	Undecided	Disagreement	Total disagreement
Weights contracting authorities	15.63%	50.00%	31.25%	3.13%	0.00%
Weights economic operators	6.90%	31.03%	44.83%	17.24%	0.00%

Source: author's conception

As can be seen, there are clear differences between the responses of the respondents within the contracting authorities and those of the respondents within the economic operators. Thus, 65.63% of the purchasers from the contracting authorities considered that operators win contracts correctly, while for the purchasers from the economic operators this share is 37.93%. Also, 34.38% of the purchasers from the contracting authorities are undecided or disagree, given that for the purchasers from the economic operators this share is 62.07%.

Therefore, it can be concluded that the respondents from the contracting authorities are more inclined to believe that the contracts are won correctly by the offerors, while the respondents from the economic operators are more inclined to believe that the contracts are not being won correctly by the bidders.

Of course, it must be borne in mind that a total agreement, agreement or indecisive response can also be given due to the fear of the respondents not to incriminate themselves. Thus, it is possible that a large part of the indecisive answers are actually answers of disagreement or even total disagreement.

The supervision of the awarding process by the state authorities can be an important indicator regarding the need to identify and implement additional control measures. Therefore, the following question was: "On a scale from 1 to 10, how supervised is the award of public procurement contracts by the state authorities?"

The answers were given by the respondents on a grading scale from 1 to 10 (1 being "unsupervised" and 10 being "very supervised"). The most awarded scores were 6 (22.95% weight) and 7 (19.67% weight) (Figure 2).

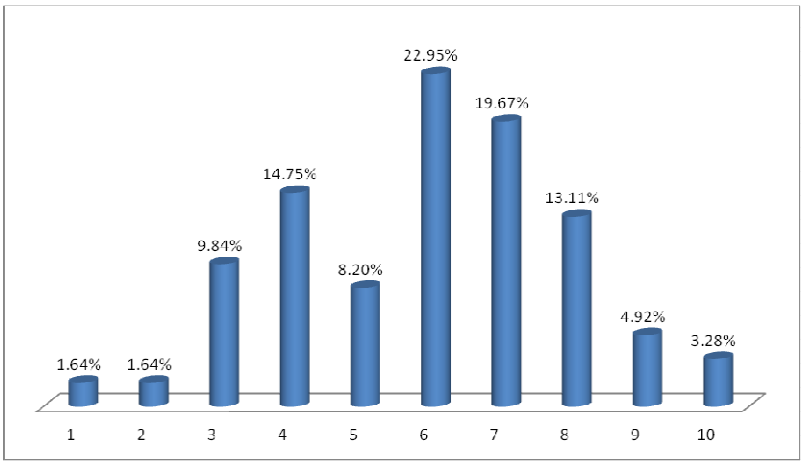

Figure 2: How supervised is the award of contracts by the state authorities

Source: author's conception

It is noted that 63.93% of the surveyed purchasers gave scores over 5, the average score being 5.92.

Thus, the respondents considered that the awarding of procurement contracts is supervised by the state regulatory and control authorities, but not very supervised.

The average score awarded by purchasers within the contracting authorities was 6.66, and the average score awarded by purchasers within the economic operators was 5.10. These results show that purchasers within the contracting authorities considered that the process of awarding contracts is more supervised, because contracting authorities are subject to ex-ante and ex-post controls carried out by various state authorities.

Another widely debated topic in Romania and the world is the efficiency of spending public procurement funds. In the field of public procurement, the efficiency of spending public funds translates into the term "value for money".

A procurement is efficient when the products / services purchased have the highest utility in relation to the amounts of money spent or when the purchase presents the best combination of durability, quality and cost.

In this regard, the respondents were asked the question: "On a scale from 1 to 10, how efficient public funds are spent?"

For the analysis of the answers, a scale of 1 to 10 was used, 1 being "inefficient" and 10 being "very efficient" (Figure 3). The most awarded scores were 5 (29.51% weight) and 4 (22.95% weight).

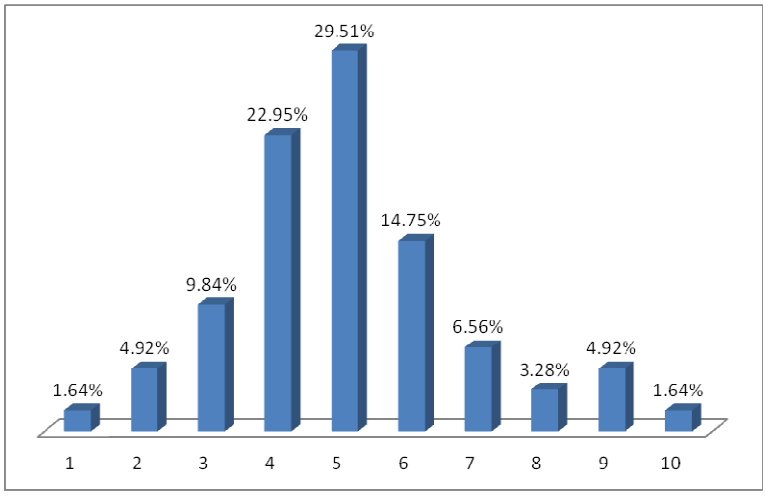

Figure 3: The efficiency of the use of public procurement funds

Source: author's conception

From the received answers we can observe that the scores awarded are low, the average score being 5.02. Therefore, the questioned purchasers considered that the efficiency of the use of public procurement funds is reduced, meaning that the most advantageous combination of quality, cost and durability was not always obtained or the products / services purchased did not always have the greatest utility in relation to the funds spent.

According to answers received on the two categories of respondents, the average score awarded by purchasers within the contracting authorities was 6.03, and the average score awarded by purchasers within the economic operators was 3.90. This difference is explained by the fact that companies participate in more procurement procedures and thus know more about situations in which public funds are not used efficiently (reduced competition, technical specifications that artificially restrict competition, restrictive conditions for qualification and selection, etc).

A broad topic debated in Romanian media is the financing of political parties through public procurement with increased / inflated prices. In other words, some offerors are favored in the evaluation process and win contracts in exchange for the subsequent support they provide to political parties through donations, promotional materials used in the election campaign, etc.

This issue was analyzed by the question: "The financing of political parties is done in return for winning public procurement contracts?"

Most respondents (57%) considered that the financing of political parties in Romania is done in exchange for winning public contracts, and 43% of the surveyed respondents replied that they do not know (Figure 4). Again, due to the fear of the respondents not to incriminate themselves, it is very likely that most of the answers of "I do not know" are actually "yes".

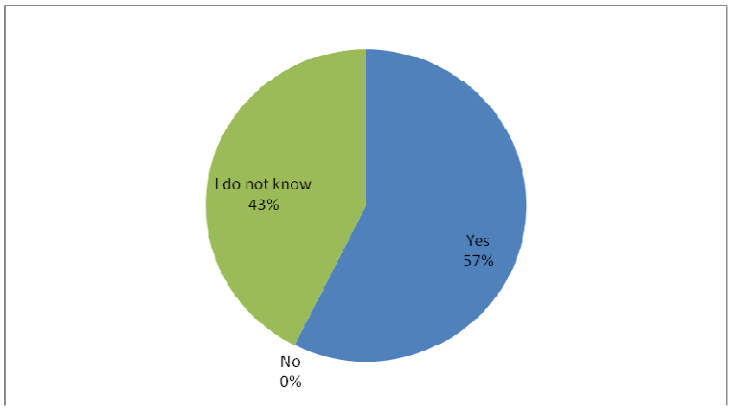

Figure 4: Financing of political parties in exchange for winning public contracts

Source: author's conception

It is important to note that no respondent replied that the financing of political parties is not done in return for winning public procurement contracts.

These results confirm the conclusions of the research carried out by European Commission (2014), which established in 2013 that 38% of respondents in a survey considered **that the financing of Romanian political parties is done in exchange for winning public procurement contracts.** One of the reasons why in this research 57% of the respondents answered positively is that the target group consists only of purchasers who know much more about this area and are aware of cases of financing political parties through public contracts.

The risks of corruption manifest differently depending on the type of contracting authorities. Given this fact, the following question addresses the risk exposure of central and local public authorities: "Which contracting authorities are most exposed to the risks of corruption in public procurement?"

78.69% of the surveyed purchasers replied that the most exposed to risks are local public authorities, and 21.31% considered that the most exposed are central public authorities (Figure 5).

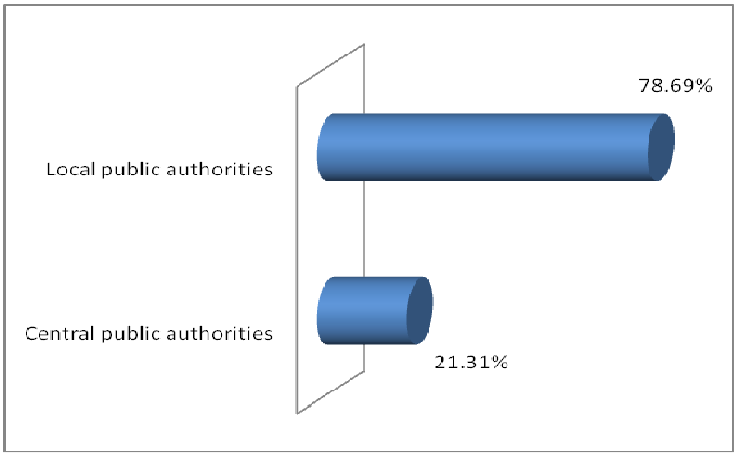

Figure 5: The most exposed contracting authorities to the risks of corruption

Source: author's conception

The explanation for the high risks of corruption at the local level lies in the fact that in small towns, "local elected officials" (vice mayors, mayors, prefects) have a great influence on the beneficiary structures that develop the technical specifications and on the evaluation commissions, given that the vast majority of purchases are direct procurement (non-competitive) or simplified procedures (which have short deadlines for the submission of tenders).

However, it should be noted that a significant proportion of respondents (21.31%) answered that the most exposed authorities are central public authorities, where risks increase because centralized procurement takes place (large quantities of products), procurement procedures are of high value, the bargaining power of the contracting authority increases and is concentrated in the hands of several purchasers, etc.

The answers to this question confirm the conclusions of Lefter (2015) and CJI (2015) who established that the most vulnerable contracting authorities in Romania are local public authorities.

The risks manifestation in the field of public procurement also differs depending on the source of financing of the procurement. The following question analyzes the sources of financing with the highest risks: "Which procurement procedures are most prone to corruption?"

83.61% of the respondents considered that the most prone to corruption are the procurement procedures financed from the state budget, while 16.39% considered that the most prone to corruption are the procurement procedures financed from non-reimbursable European funds (Figure 6).

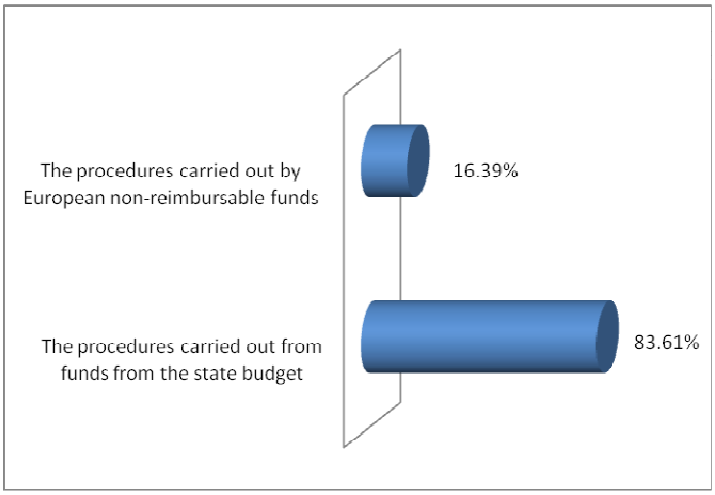

Figure 6: The procurement procedures most prone to corruption

Source: author's conception

It is normal to have such a distribution of responses because the procedures carried out from non-reimbursable European funds are controlled more strictly by a larger number of authorities (managing authorities, Romanian National Agency for Public Procurement - ANAP, Romanian Court of Accounts, Romanian Department for Anti-Fraud - DLAF, which is the national representative institution of OLAF - the European Anti-Fraud Office), so that the corruption risks are greatly diminished.

Often, in Romania, the evaluation commissions are "convinced" that an offer is best by using the bribe or the connections.

Therefore, the next question that needs to be addressed to the purchasers is: "In Romania, using connections and bribery is an easy way to win public contracts?"

63.93% of the respondents (39 persons) replied that the contracts are awarded using the bribe and connections, and 36.07% (22 persons) replied that they did not know (Figure 7).

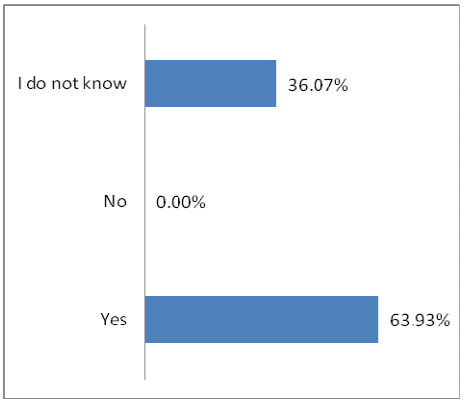

Figure 7: Winning public contracts by using bribery and connections

Source: author's conception

No respondent firmly rejected the idea that contracts are not won by using bribery and connections. Again, due to the fear of self-incrimination, it is possible and very likely that a large part of the "I do not know" answers that were given by the questioned purchasers are actually "Yes".

Therefore, this research confirms the results of the study carried out by the European Commission (2014), which established in 2013 that 82% of the respondents of a survey considered that using connections and bribery is an easy way to win public contracts.

A number of elements / characteristics of supervisory institutions, contracting authorities, evaluation commissions and procurement processes influence corruption in the field of public procurement in different ways.

The question "Which element favors corruption the most?" tried to determine the most favorable element of corruption.

Not surprisingly, 69% of the respondents considered that the most favorable element is the economic advantages obtained by the responsible factors (granting bribes, goods, facilities, free trips) and 16% of the respondents considered that the weak government institutions (supervisory authorities, contracting authorities, other control institutions) favor corruption the most (Figure 8). 13% of the questioned purchasers considered that corruption is most favored by the discretionary power of public officials and only 2% considered that political processes are the most favorable element.

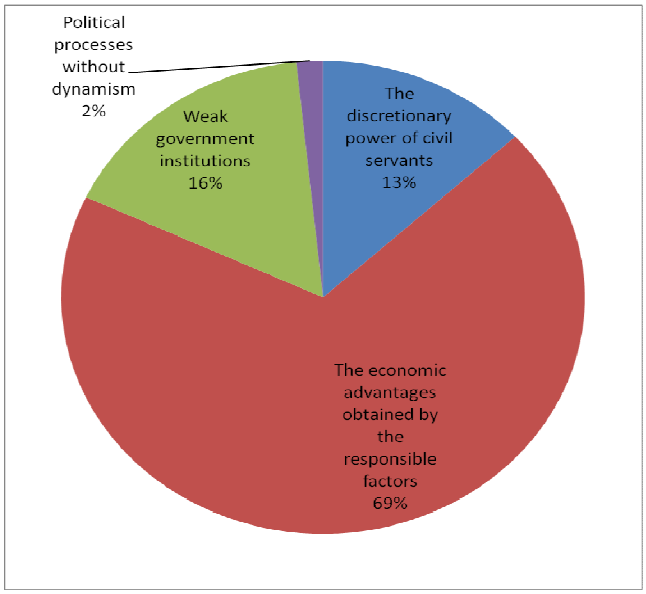

Figure 8: The most favourable element of corruption

Source: author's conception

These results indicate the need for measures to identify and sanction any illegal economic benefits received by purchasers, members of evaluation commissions, managers of contracting authorities and other responsible factors.

The answers received confirm the finding of Aidt (2003) who established that the economic advantages that the responsible factors can obtain favors corruption the most.

The pressures of the political factor on the public procurement system are manifested by influencing the needs of contracting authorities and the decisions of the evaluation commissions, the initiation and implementation of certain legislative changes, etc.

The following question addressed this issue: "On a scale from 1 to 10, how much the political factor puts pressure on the public procurement system?"

The answers were given on a rating scale from 1 to 10, 1 being "very little" and 10 being "very much". The most awarded scores were 6 (24.59% weight), 7 (21.31% weight), 8 and 9 (each with a weight of 18.03%) (Figure 9).

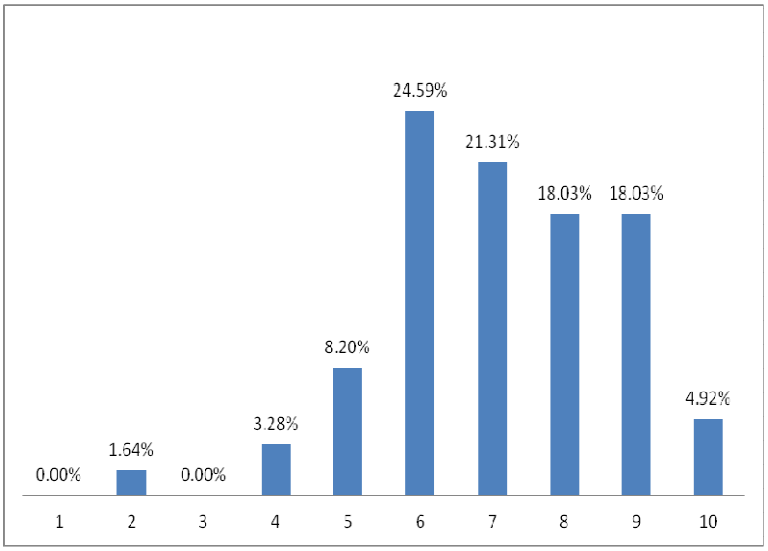

Figure 9: The pressures of the political factor on the public procurement system

Source: author's conception

95.08% of respondents answered with scores above 4, the average score being 7.10. **Thus, the finding of Expert Forum & OLAF (2014) is confirmed that the political factor is putting pressure on the public procurement system.**

The fight against corruption can materialize by taking measures by the regulatory authorities, control institutions or government.

The identification of the most effective anti-corruption measure was analyzed by the question: "What is the most effective measure in the fight against corruption in the field of public procurement?"

61% of the respondents considered that the most effective anti-corruption measure is to increase the probability of detecting and punishing corruption (Figure 10). 18% of the respondents considered that the most effective measure is the increase of the transparency of procurement procedures and raising the level of education. The increase of the benefits for honest purchasers has a share of 2% and the cultural changes account for only 1%.

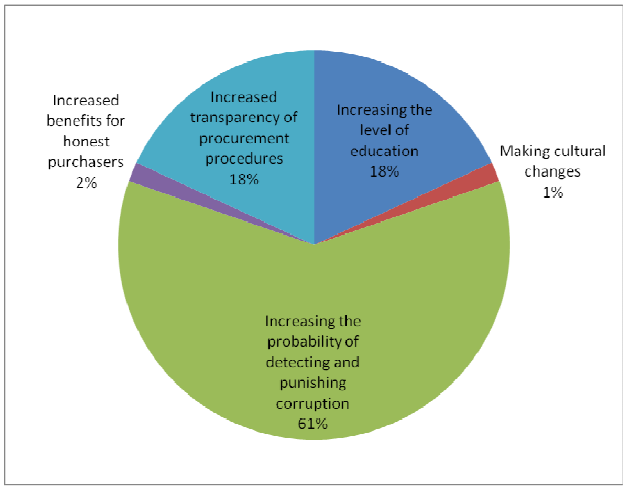

Figure 10: The most effective anti-corruption measure

Source: author's conception

In the current socio-economic context of public procurement in Romania, the majority of respondents believe that the most effective anti-corruption measures are the intensification of controls and sanctioning of irregularities, which are coercive measures.

These results confirm the findings of Rose-Ackerman (1996) and Kenny (2012) that the most effective anti-corruption measures are increasing the likelihood of identifying and punishing corruption and increasing the transparency of procurement procedures.

Conclusions

The study includes an analysis of the literature and a survey examining a number of specific elements of the corruption phenomenon in the Romanian public procurement system.

The analysis of the responses found that the awarding of procurement contracts by regulatory authorities is not highly supervised, the efficiency of the use of public funds is rather low, political party funding is in exchange for winning public contracts and that the most exposed to the corruption risks are the local public authorities.

Also, most respondents believed that the most prone to corruption are the procurement procedures financed from the state budget, contracts are awarded through the use of bribery and connections, the most favorable cause of corruption are the economic benefits obtained by civil servants, the political factor is putting pressure on the public procurement system and the most effective anti-corruption measure is to increase the probability of detecting and punishing corruption.

Future research should analyze the correlation between indicators of procurement procedures that can be used as alarm signals and the intensity of the corruption phenomenon. Such alarm signals may be: small number of offers received, large number of clarifications requested by economic operators, reduced savings resulting from the procurement procedure, large number of contracts awarded to the same economic operator, etc.

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Legal and State Liability in the Field of Environmental Protection

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Abstract

The environmental issues that surge nowadays require higher responsibility in approaching the actions aimed to protect the environmental factors, which implies a need to adopt new policies and strategies, including legal ones, at an international, European, and national level. In our study, we shall focus on some of the problems generated by the deterioration of the natural environmental factors, as their resolution is an important challenge for the decision factors at a world-wide, regional, and national levels – a true test that humankind must successfully and timely solve – as well as on the concrete measures that have been taken and that those leading Earth's destiny have engaged to implement, with maximum responsibility. In nowadays' conditions, given the complex and global nature of climate changes, widespread and consistent cooperation actions are expected from the states and from international organisations, with the final purpose of adopting policies and strategies, a rigorous and efficient environmental legislation, meant to insure the protection of environmental factors, and optimal life and work conditions for present as well as future generations. The legal framework that we mention, the environmental policies and strategies must mainly include measures for reducing greenhouse gas emissions, with some of the main objectives being: consumption based on less polluting energies; ecological means of transportation; new urban planning policies; ecological agriculture, with balanced and rational consumption. In this context, the fate of humankind lies in the hands of those able to design long-term plans to reinstate the natural balance or at least to keep, to preserve the current environmental conditions without making it worse, with the only applicable instruments being urgent political and legal decisions, firmly taken and applied with no delays.

Keywords: Responsibility, Environmental Policies, Legal Protection Of The Environment, Environmental Strategies, Legal Liability, Sustainable Development

The Notion and Nature of Legal Liability in the Field of Environmental Protection

Generally speaking, legal liability is the set of rights and correlative obligations that streams from various deeds, acts, actions, or inaction, including the results of performing an illegal action that causes prejudice, thus requiring the intervention of state measures of coercion. The purpose of the institution of legal liability is to insure the stability of social relations and to stimulate the members of society so that they comply with legal norms. Treated in various branches of law, including in the law of environmental protection, legal liability can adapt according to the actions that trigger it, to their legal regimen, to the sanctions and purposes intended by the lawmakers.

The multiple, complex, and often severe aspects related to liability in the field of environmental law are of great importance from a practical and theoretical perspective; for this reason, we have considered it opportune and interesting to approach this topic, which is the subject of this article. In the field of environment, the issue of liability and responsibility has become ever more present, salvaging nature being a major and permanent concern for everyone, because by destroying the environment, man is destroying himself.

The issue of legal liability for the damage caused by the deterioration of environmental factors is more and more often approached in the legal doctrine and practice, determining the appearance and

consolidation of a new legal institution: ecological liability – whose main role is to prevent, and subsequently to repair the prejudices caused to the environment.

In this field, legal norms must contribute to attaining a concrete purpose, consisting in preventing pollution of any kind, preserving and improving life conditions on Earth. From the decisions and actions (including legal ones) meant to protect nature, a special accent must be placed on preventive, conservation, and ecological reconstruction measures, because once the environment is destroyed, very often it cannot be restored to its normal conditions.

Often, the application of sanctions, even severe ones, is not enough to prevent the deterioration of the environmental factors. For this reason, environmental legislation must establish a series of tough conditions for performing any activity that would imply a risk for the environment. We refer, first of all, to the procedure of authorising economic and social activities with an impact on the environment and responsibility towards the impact study. We can also mention other levers – economic and fiscal ones – for environmental protection, such as: a pricing policy in favour of preserving the environment, subsidies and tax discounts, pollution stipends, etc.

Starting from what already exists in national legislations, we can imagine a space for discussion on the subject of liability, where environmental law presents some differences in relation to civil or criminal law, for example, as a common law. These derogations, as well as the existence of numerous gaps, require jurisprudence to provide innovating interpretations in order to insure the efficiency of the legal and jurisdictional act. In this sense, we aim to identify the peculiarities of legal liability in environmental law, in relation to its classical meaning and to the mechanisms that have determined switching from subjective liability, based on guilt, to objective liability, according to the degree of danger of the produced result.

One of the characteristics of environmental law is that in this context, legal liability intervenes both in case a prejudice occurred through the deterioration of environmental factors, and when, although the environment was not polluted, illegal actions have been performed that infringe legal environmental norms, actions that may create favourable conditions for pollution (E. Lupan, 2009). Thus, legal liability will fall both on the polluter, who is guilty for damaging environmental factors, and on the public workers or any other natural or legal persons who, although not polluting the environment, infringe through their deeds the legislation of environmental protection.

We can thus say that in environmental law, the notion of legal liability has a much broader and widespread application. Legal liability in this sense aims not only to sanction those who are guilty of polluting environmental factors or who, though not damaging the environment through their actions, infringe environmental legislation, but also for the statesmen or state bodies, public or private institutions, to take all measures that would contribute to insuring optimal conditions for performing all economic and social activities, so that the risk for pollution is minimised.

We consider that the role that legislation must play in order to protect the environmental factors is, first of all, a preventive one. People, economic agents, the governmental and non-governmental bodies must adopt a behaviour that insures, guarantees, a healthy and clean environment, and avoid as much as possible any polluting activity. As we know, it is much easier and less expensive to prevent causing a prejudice than to repair it, not to mention that often times, it is impossible to restore environmental factors to their initial condition, to normal parameters.

At the same time, the norms of environmental law must also refer to repairs, in the sense that they must also include dispositions that would make it possible to repair the prejudices caused by the pollution of the environment and people. In this respect, as a guarantee for repairing the damage caused to the environment, economic and fiscal instruments have proven to be very useful: a series of funds constituted in anticipation, in order to improve environmental factors, and also various insurance systems that work in this matter. We can mention in this sense: the national environmental

fund, the fund for improving the land reserve, the water fund, the game protection fund, the special fund for the development of the energy system, afforestation bonuses, etc. (M. Duțu, 2007).

Also, naturally, environmental legislation must have a sanctioning nature, as in our opinion harsher punishment is needed than what is currently foreseen, especially for deeds that seriously and sometimes irreversibly affect various environmental factors.

In order to preserve, improve, and protect the environment, in case illegal deeds are done, which have brought prejudice to the environment or to people, we consider it opportune to increase the span of persons and bodies to whom the law offers active process legitimacy, including here non-governmental bodies, which, as we well know, play an active role in sensitising public opinion and decision factors in relation to the danger represented by various risky human activities towards the environment.

Peculiarities of Legal Liability in Environmental Law

Legal liability is triggered if the conditions foreseen by the law are met – in which the deed or event that negatively affects social relations is done – as well as the protected object or field, in our case, the natural or anthropic environmental factors. Starting from this idea, we consider that the most interesting specific aspects present liability in environmental law from the perspective of the conditions in which it applies.

In this respect, we believe that liability in the field of environmental protection belongs first of all to the state, represented by its specialised bodies. Thus, through constitutional provisions and not only, the state acknowledges the fundamental right to a healthy, high quality environment for all people, providing in this sense several guarantees, including the right to damage for any suffered prejudice.

Liability for environmental protection belongs to an equal extent to the public, central and local administration authorities. These authorities will also answer in case they do not comply with their attributions established by law in this field, or in case they do not take the required measures in order to avoid any situation that might lead to the deterioration of environmental factors.

In the hypothesis that damage is caused to the environment through pollution, the author of the illegal action – the polluter – will naturally be held responsible. This may be a legal or a natural person. We must stress the fact that in the field of environmental law, liability can be triggered both for polluting and non-polluting actions (E. Lupan, 2009). Thus, if a natural or legal person performs an activity that causes the effective pollution of the environment, they will answer – as the case may be – contraventionally or criminally and will also have to repair the ecologic prejudice they caused. Moreover, legal liability is also triggered by actions that, even without polluting the environment, infringe environmental legal norms, thus potentially leading to situations that favour the occurrence of ecological damage. Legal liability thus occurs only as a result of performing an illegal action, be it polluting or non-polluting.

In order to be legally liable, usually a prejudice must have been caused – in our case, *ecological damage*, a term formulated by and taken from the French doctrine (M. Despaux, 1980). In the wish to define the notion of ecological damage, we must ask the question: who can be seen as a victim of ecological damage: man or the environment? In a broad sense, if we consider that man is part of the environment, as an element of it, we are not wrong to say that the victim of pollution, of any destructive action, is the environment as a whole, or some specific affected factors. In any case, directly or indirectly, man will be the victim of any ecological damage and we can even say that often times, man is not only the victim but also the author of damaging the natural environmental factors. He is the victim of his own actions. This is how Romanian lawmakers define the notion of prejudice as the cost-quantifiable effect of damage on people's health, goods, or the environment, caused by pollutants, damaging activities, or disasters.

At the same time, we must point out that within the process of determining ecological damage, difficulties may appear because often, it is not possible to know all the causes and conditions that triggered it and also because numerous of the damaged or destroyed natural elements of the environment – sometimes irreparably – have an incommensurate value.

In a different order of ideas, another prerequisite for legal liability is default, or guilt. In environmental law, the issue of guilt acquires, ever more obviously, new values, in the sense that this subject means switching from subjective liability to objective liability – which is default-free.

At the beginning, the fields that implied objective liability were few; for example, in case prejudices were caused by aircrafts or in the context of damage resulted from activities in the nuclear field. The idea of objective liability in environmental legislation appeared the moment when, being forced to face the current and more complex problems of environmental protection and repairing the damage caused by industrial activities, jurisprudence and doctrine could both note the insufficiency of common law in the subject of liability. There could be noticed a lack of alignment between the conditions for triggering liability for polluting actions and shattering the traditional foundations of liability for polluting actions, with a special stress on the insufficiency of the civil law principles and norms, which are seen as a barrier on the path of finding more efficient solutions that could solve the legal conflicts and protect the environment (G. Martin, 1978).

Liability Specific to Environmental Law (Ecological Liability)

From the beginning, we must say that performing illegal actions that cause prejudice to the environment, and which infringe the norms of environmental law, must bear legal liability – which must be specific to this field, even if it resorts to other forms, already consecrated, of legal liability.

In environmental legislation, there already are institutions that constitute specific forms of liability in the context of environmental law, meant mainly to contribute to preventing situations that may endanger the environment, and also imposing various ways to encourage and insure, which would create opportunities to repair ecological damage.

Environmental law derives from a social compromise between the need for economic growth and the negative consequences of this growth for the natural environment and for the human population. Abandoning the notion of guilt for triggering liability can be applied precisely in the fact that the author of the ecological damage performs an activity that, in most cases, is not only legal but also socially useful, a characteristic that is actually acknowledged by public authorities (G. Martin, 1978).

Regulating the conflictual situation between the polluter and the victim rarely calls for the solution of repairing the prejudice in nature and stopping the dangerous activity. Most often, the activity continues, with some coercive measures, and the prejudice is repaired with a monetary compensation. From this perspective, we could even speak of a form of *expropriation for private needs* in the situation when the activity needs to be started and performed in an area that could present an inconvenient for neighbouring funds, but the activity is legally authorised by an administrative act and thus cannot be forbidden through a jurisdictional action (M. Prieur, 1996).

Repairing the prejudice with a monetary equivalent is a common practice, although it is unjust and inefficient with regards to its possibility to restore the ecological balance, and often repair in nature or bringing the deteriorated natural factor back to its normal condition is no longer possible (D. Marinescu, 2010). As a compromise solution, the legislation of many states institutes for the responsible person (who performs an activity with a risk for the environment) the obligation to contribute either to build specialised compensation funds, or to contract a civil responsibility insurance.

In the hypothesis that it is not possible to identify a subjective patrimonial right that was damaged, although deterioration to an environmental factor or the presence of an inconvenient is obvious, in which case it is not possible to resort to the insurance system, special compensation funds act automatically, facilitating at least a compensation, if it is impossible to repair the damage suffered. The following examples can be given in this respect: the Dutch fund for air pollution, which is in place since 1972; the United States coast protection fund for hydrocarbon pollution damage; the 1973 Japanese law of compensation for physical harm caused by pollution; the compensation fund for crop losses caused by hunting in France, provided by the National Hunting Office; funding operations of diminishing the damage suffered by the residents close to the Orly and Rossy airports (M. Prieur, 1996).

In order to be able to resort to the insurance system and to compensation funds, several conditions must be met: the author of the prejudicial deed must perform a legal activity, socially useful, and the decision to stop their future activity would have much more costly social and economic consequences than repairing the prejudice; the prejudicial deed has occurred in compliance with the legal framework for performing that specific activity; the compensation or insurance mechanism must not exonerate from responsibility and must not be used as a means for enrichment with no just cause, but a stimulant in avoiding or diminishing environmental damage.

Starting from the characteristics of criminal civil liability, with a broad application in the field of environmental protection, with a specific usage in a sustained evolution towards objective liability, independent from guilt, we can speak of constituting a new form of legal liability: ecological liability, a series of lines of reasoning with argumentative value being provided in this sense (Ph. le Tourneau, L. Cadet, 1996).

A first line of reasoning is that of the natural and accelerated evolution, also generated by industrial developments, marked by automation and enhanced digitalisation, which increases the risk for damage, a context in which the nature of the prejudice is often widespread, affecting an entire community or even the entire human population, which demands accepting the inconveniences by the whole group, in compensation for the benefits provided by growth (at all costs).

Another line of reasoning is based on the evolution of mentalities. The increasing value of human personality and its acknowledgement no longer allows accepting the status of non-compensated victim. As the life standards increase, the claim to the right for a compensation becomes natural, but it can only be materialised through the insurance system and a special compensation funds system.

In tight interdependence with the previous lines of reasoning, we bring the argument determined by the development of the insurance systems and their penetration in people's consciousness. Insurance is at the same time the cause and effect of the extension and objectifying of liability, including in the field of environmental protection. It is a cause because the legal courts will not avoid sentencing to repair, even in the absence of guilt, knowing that it will not be the doer to bear the cost of repair, but the insurance company. It is an effect because objective liability determines a responsible attitude, that of resorting to insuring the activity. In other words, the liable person brings insurance for the victim.

The appearance of new instruments for repairing environmental damage, the idea of compromise between the beneficial result of a useful economic activity and the adjacent inconveniences, awareness of and taking responsibility, all characterise the evolution of environmental protection law in current times. In this context, legal (ecological) liability is both a guarantee for fully exerting subjective rights and a means to impose general social interests, both with regards to the deed of the polluter and the right for action of the victim.

In conclusion, accepting the objectifying of liability in environmental law as a necessary evolution in the current stage of economic and social development, we can state that liability is more of an absorption mechanism for external costs generated by activities with a negative effect than an

instrument with an educational role of developing the doers' awareness (legal, if not moral) (G. Martin, 1978).

The Responsibility of States in Preserving, Improving, and Protecting the Environment

It is undeniable that the problems generated by the deterioration of environmental factors follow a rapid and severe evolution, and that their solution is only possible if all states take responsibility, through a combined and agreed will, as international public law subjects, in the direction of establishing and complying with firm obligations engaged at an international level.

In this approach, we are asking the question if, in a context where initiatives in the field are more and more taken by international bodies, based on conventions and other trans-national legal acts, the role played by the states diminishes. We can speak of a transfer of a part of sovereignty, following the model of treatises for joining the European Union, signed by the Member States, at an international level, from the states towards the international bodies, in order to promote and implement measures to fight cross-border pollution.

We can say that, to a certain extent, there occurs a voluntary transfer of the governing constitutional powers of the states towards international organisations. This opinion is supported and defended in the sense that there is a conciliation between constitutional law and international law, consecrating the fact that the states are the ones to support international law, since without them, there would be no international relations and bodies. International organisations would have no status and contents without their member states, which found them and insure their operation (V. Demers, 2005).

We consider that the role of the states, individually and as members of international organisations, is important, since from a legal perspective, their status, authority, and consent is the essential condition in the effort for cooperation and full engagement in the approach needed to protect the environment. At the same time, we cannot deny the role of international body, which, even if they cannot impose a specific sanction to the states, can determine a certain responsible behaviour in various situations and fields, including in the effort to insure real protection and preservation of the environmental factors (M. Duțu, A. Duțu, 2014).

We must stress the primordial role of states in the system of international relations, which is justified at present by other reasons than several decades ago. It stems from the need to insure a coherent and firm position in adopting and complying with norms and engagements concerning the protection of the environment, based on the principles of a tight cooperation between sovereign states.

Implementing the engagements with a role in environmental protection can be done, on the one hand, through international cooperation and shared responsibility between the states, as international law subjects and, on the other hand, through concrete protection measures, which can only be applied through internal mechanisms (political, administrative, legislative ones), which strictly depend on the will of the state, since the state has the constitutional mission to adopt internal measures to achieve its international engagements (S.M. Teodoroiu, 2009).

The responsibility of the states is essential in the combined actions for environmental preservation and protection, in fighting climate change, and is based on three essential pillars. First of all, states participate in the European and international mechanisms to design and adopt legal norms, policies and public strategies in the field, as well as in signing and approving international acts, agreements, conventions, and treatises.

Second, the measures of translating these norms at a national level are fundamental and are the exclusive attribute of each state, in the conditions in which international document offer a better freedom of appreciation, in this sense, of the state benefits. Thus, responsibility for meeting the

internationally set objectives and the manner in which they are attained is exclusively the decision of the sovereign states (V. Demers, 2005).

Third, states have the major responsibility to establish the degree and modalities to implement and correlate national interests with the interests of the international community. In this respect, the UN Framework Convention on Climate Change (UNFCCC) of 1992 mentions that states have the obligation to protect the climate in the interest of present and future generations based on equity, according to their common responsibilities, but differentiated based on the capacity of each one of them.

Considering the current worrisome state of the environment and the evidence of climate change, there is a need for a responsible approach and for taking concrete actions at an international, regional, national, and local level (C.R. Mitroi, 2019). The international community has initiated in time a series of meetings and discussions that finalised with signing international documents with which the member states took oath to implement concrete measures meant to insure the preservation and protection of the environment.

Of these documents, the UN Framework Convention on Climate Change (UNFCCC) of 1992 is the fundamental instrument for the management of this issue. The central objective of this framework convention is to stabilise all greenhouse gas concentrations at a level that would fit within the normal parameters of the climate system, so as to eliminate any risk or threat that would mean a danger for life and health, for food production or for sustainable economic growth.

Another important international document in the subject that interests us is the Kyoto Protocol on Climate Change. The Kyoto Protocol of the UN Framework Convention on Climate Change is the answer of the international community to environmental change. It was adopted, in consensus, within the third session of the Conference of the Parties (COP3) in December 1997. The Kyoto Protocol was closed as an international agreement concerning the environment, with the purpose of reducing the greenhouse effect. The first period of engagement under the Kyoto Protocol closed in 2012, and at the end of the same year, there took place the UN Conference on Climate Change in Doha, in which approximately 200 states participated. The Doha amendment, as the document adopted during this Conference is called, established a new period of engagement under the provisions of the Kyoto Protocol for the interval 2013-2020, when the greenhouse gas emissions should be reduced by 20% in comparison with 1990, as well as an action plan for preparing and closing a new global agreement.

In addition, on December 12, 2015, the Paris Agreement was adopted, within the Paris Conference of the Parties (COP21). The Paris Agreement came into force on November 4, 2016. 170 parties signed the agreement (of the 197 states participating in the Convention), including the European Union and its Member States. Romania signed the Paris Agreement on June 1, 2017. In August 2017, the USA notified the UNFCCC secretariat of their intention to withdraw from the agreement. In November 2019, the USA officially informed the UN of their withdrawal from the Paris Agreement on the fight against climate change. This key stage, which could not have occurred earlier because of a clause included in the text, requires a one-year delay before Washington can effectively exit the Agreement. As a result, their withdrawal will not take place before November 4, 2020, after the next presidential elections in the US.

The Paris Agreement is the first one of a universal nature in the field of climate change, which imposes legal obligations for all the Parties to achieve the objective of limiting the increase in the average global temperature to 2˚C compared to the level in the pre-industrial era, considering additional efforts for this limit to be set to 1.5˚C. The contribution of the European Union and its member states to meeting the objectives of the Paris Agreement is the target to reduce the internal EU greenhouse gas emissions by at least 40% compared to 1990, by 2030.

We must mention that on August 1, 2018, 27 UN member states joined to form a Group of Friends for Climate and Security, with the purpose of finding solutions for the impact of climate change on

the security policy, to improve the attitude and to stimulate the involvement of the United Nations' Organisation in this field.

The 24th meeting of the Conference of the Parties in the UN Framework Convention for Climate Change (COP 24) took place in Katowice in December 2018 and finalised with the adoption, on December 15, 2018, with a consensus, of the package of rules (the Katowice Manual) for the implementation of the Paris Agreement, whose objective is to maintain the increase in global temperature under 2ºC, and, inasmuch as possible, to 1.5ºC.

Under the slogan *A race we can win, A race we must win*, on September 23, 2019, there took place in New York the UN Summit on Climate Action, which gathered together world leaders, from the government, finance, business, and the civil society, in order to support the efforts to apply the Paris Agreement and to enhance the ambition and climate action activities. In December the same year, in Santiago de Chile there took place the Conference of the Parties to UNFCCC (COP 25).

Within the European Union, we can mention the meeting of the European Council in December 12-13, 2019, when EU Leaders approved the objective to make EU neuter from a climate perspective until 2050**,** in compliance with the Paris Agreement. It was stressed that the transition towards climate neutrality would generate important opportunities for economic growth, markets, work places, and technological development.

The European Council also took note of the Commission Communication on the *European Green Deal* requiring the Council to continue its work. The leaders acknowledged the need to institute a favourable framework, which would insure an efficient transition from a cost perspective, as well as fair and balanced from a social perspective, towards climate neutrality, taking into account the different national circumstances. The greatest challenge and opportunity of our times is to become the first continent climatically neuter in the world, by 2050. In order to meet this goal, the European Commission presented the *European Green Deal* as the most ambitious pack of measures that should allow European citizens and companies to benefit from a sustainable ecological transition. The measures, accompanied by an initial action fiche of key policies, varies from an ambitious reduction of emissions to investments in research and last generation innovations, as well as preserving Europe's natural environment.

Conclusions

The deterioration of environmental factors and climate change have become a fundamental priority in the world and on the agendas of European Union policies. Scientific data and public opinion agree that this problem is one of the greatest challenges for the future, from not only a political perspective, but also in the broader socio-economic context. Although seen as a threat for the future of humankind, climate change is nevertheless considered an instrument to stimulate economic growth, reopening the way for a transition towards new bases for socio-economic development.

Through their decisions and legislation, the states must integrate into the existing climate and trends in the field of environmental protection at a worldwide level. Thus, with the appearance in developed societies of the tendencies to improve living conditions and eliminate pollution, all countries should try to integrate and adopt firm measures, often much more restrictive, including in the related legislation, specific to the sectors of energy, transport, agriculture, etc.

Climate change is a global challenge implying a responsible approach, taking concrete actions at an international, regional, national, and local level. A realistic approach of this phenomenon requires the cooperation of all the international actors, in order to identify optimal action paths, the instruments necessary to stop the increase of global temperature, to eliminate all the factors that may negatively affect the environment and the existence of humankind.

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La Administración En Las Curtiembres De Pieles Y Las Repercusiones Ambientales. Caso Barrio San Benito (Bogotá)

Management in The Taneries Companies and The Environmental Efects. San Benito neighborhood (Bogotá) case

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Resumen

El artículo es producto de una investigación en las curtiembres, acerca de las prácticas administrativas y los efectos de estas. Se realizó una revisión documental de la normatividad del sector.
Mediante el trabajo de campo y una revisión de bases de datos, se estableció un censo de las curtiembres del barrio San Benito, estas se visitaron con el objeto de detectar procesos formales con actividades de planeación estratégica. Se realizó una sistematización de la experiencia con relación a aquellas políticas que fuesen resultados de las prácticas administrativas y prácticas empresariales comunes y lo efectos en los ámbitos socio ambientales.

Abstract

The article is the product of an investigation in the tanneries, about the administrative practices and the effects of these. A documentary review of the regulations of the sector was carried out.Through the fieldwork and a review of databases, a census of the tanneries of the San Benito neighborhood was established, these were visited in order to detect formal processes with strategic planning activities.A systematization of the experience was carried out in relation to those policies that were the results of common administrative practices and business practices and the effects on socio-environmental fields.

Palabras Claves: Planeación Estratégica, Normatividad, Efectos Ambientales.

Keywords: Strategic planning, Regulations, Environmental Effects.

Introducción

Como lo menciona (Martínez, 2018) la industria del cuero nació con las primeras civilizaciones. En América, las culturas prehispánicas ya usaban las pieles de los animales como medio de protección. En Colombia se empezó a desarrollar de manera industrial desde la época de la colonización antioqueña de los años 1920 y todo el transporte que se necesitó para ello, aumentó la demanda de las pieles de bovinos curtidas. No fue sino hasta la década de 1950 que se instalaron de manera incipiente las

primeras industrias en el municipio de Villapinzón (provincia Almeidas, nororiente de Cundinamarca) y en los años 1970 algunos de estos industriales se trasladaron al sur de Bogotá (Barrio San Benito, Localidad de Tunjuelito).

Cuando los industriales del cuero se acercaron a la academia lo que encontraron, como lo menciona (Malaver, 2016), fueron cátedras dictadas por docentes de otras profesiones como abogados y/o economistas, que incluían teorías administrativas como las de Taylor y Fayol. En contraste con lo anterior, las industrias del cuero creadas en la localidad de Tunjuelito son en su gran mayoría de carácter familiar y la administración de las mismas, en sus inicios se realizó de manera empírica.

(Omaña & Briceño, 2013) enumeran una serie de características de estas empresas: La Familia tiene el poder total sobre la propiedad y ejerce el control sobre ella, La Alta Gerencia en la organización está dada por una cesión de poder de la familia a un integrante y es una decisión fundamental sobre el futuro de la organización, determinar quién hereda este control y poder a las generaciones familiares venideras.

Las administraciones de estas industrias del cuero tienen efectos importantes en la sociedad y en el medio ambiente (aire y agua), por lo que el desarrollo de la presente investigación trabajó principalmente sobre el manejo e impacto de esta industria sobre el recurso agua.

En este sentido, es necesario mencionar que la ciudad de Bogotá en proporción al número de habitantes es la que más demanda y consume agua en Colombia, sin que en el momento se tengan estadísticas confiables del consumo de los barrios ilegales y los que detentan extrema pobreza. Por otro lado, los barrios ubicados en estratos 2 y 3 consumen el 50% del agua de Bogotá, teniendo en tercer lugar se encuentra el sector industrial con 5.8% del consumo total en cifras del año 2014 aunque con tendencia a la baja; de todas maneras este consumo representa 58 millones de metros cúbicos de agua (Peña-Guzmán, Melgarejo, & Prats, 2016), lo cual es suficiente para abastecer el consumo de agua del departamento de la Guajira (Norte de Colombia) durante todo un año; las cifras fueron calculadas por el autor a partir de estudios realizados por el (DANE, 2018) y (Solano-Vargas, 2014).

Existen iniciativas para el manejo de este recurso, las cuales hacen referencia a que los sectores industriales reutilicen sus aguas residuales mediante procesos físicos, químicos y biológicos que permitan obtener aguas casi potables como lo menciona (Peña-Guzmán, Melgarejo, & Prats, 2016, pág. 67) e iniciativa conocida como "Descarga cero sector industrial" lo que permitiría reciclar el consumo y reducir el impacto potencial sobre la reserva de agua de la ciudad y las fuentes de otras ciudades y municipios aguas abajo.

Fundamento Teórico

Diferentes estudios ambientales hablan de la contaminación del rio Bogotá y como una de sus causas principales el vertimiento de los desechos (sólidos y líquidos) hacia afluentes del río en las empresas que se dedican al proceso de curtición desde Villapinzón (Cundinamarca), hasta el barrio San Benito (Localidad de Tunjuelito, Bogotá), (Artuz, Martinez, & Morales, 2011) mencionan que es necesario crear guías de preservación del medio ambiente en las industrias del sector, pero también mencionan que la relación directa de la productividad con el estado de contaminación del río es importante y vale la pena ser revisada. Por otro lado, hacen referencias a las externalidades entre empresas, y el tipo de aprendizaje laboral de estas industrias como elementos importantes en el tema de la contaminación.
Los valores tomados por esos elementos y otros como la cultura y comunicación organizacional, así como la administración de personal, son consecuencia del tipo de administración que predomina en el sector, como se ha mencionado anteriormente.

Externalidades entre empresas

Son las relaciones que se establecen entre las empresas, (Proveedores – Empresa – Clientes), estos enlaces hacen que las acciones de una empresa tengan efecto en otra, (Olivera & Fernandes, 2014) mencionan que estas externalidades pueden ser negativas porque nadie es responsable por los costos

que eso conlleva pero las buenas intenciones de la gerencia pueden llevar a promover las externalidades positivas en favor del aumento de la productividad de una empresa, para que sea el motor del aumento de otra organización que se encuentre incluida en el proceso.

Aprendizaje laboral(AP)

Es en esencia un proceso que se lleva al interior de las organizaciones, con la intención de capacitar a los empleados en las labores específicas de la organización, métodos y metodología; una misma labor en dos empresas diferentes puede tener procedimientos muy diferentes. Pero para (Cano, Chamizo, & Martín, 2016) el AP, lo caracterizan dos aspectos, un aprendizaje de carácter informal, que se lleva a cabo en la organización de forma empírica, por imitación, por ensayo y error. Y los procesos de capacitación organizacional de carácter estructurado, con objetivos, metas y evaluaciones, donde una vez los empleados superan estas etapas están habilitados para desempeñar dichas labores, así como en el futuro se realizan procesos de reacondicionamiento o de reentrenamiento.

Administración de Personal

Otro de los elementos que se mencionan anteriormente como un componente del tipo de administración de las empresas es el que hace referencia a la administración de personal, en las industrias del sector de curtiembres este se maneja sin detenerse a revisar la actualidad que mencionan (Morales-Calderón & Salvador-García, 2006), donde comentan que las empresas deben estar preparadas para afrontar la era del conocimiento y con esta era, ver que la dirección de los empleados es la dinámica que involucran a las empresas en la vanguardia que les permita una transformación continua al ritmo de la tecnologías actuales.

La cultura organizacional-CO

Constituye en esencia todos los elementos de un sistema, se compone de órganos y enlaces. Si la cultura por sí sola es todo aquello que tenga registros, historia y folclor entre otros; la CO revisa estos elementos al interior de una compañía, (Alvarado-Muñoz & Monroy-del-Castillo, 2013) expresan que las conductas colectivas de toda organización pueden ser de carácter formal, expresadas en un plan estratégico, donde los registros e historia están representados en la misión, visión, metas, objetivos y políticas. En algunas organizaciones existen incluso himnos desarrollados por las organizaciones, así mismo la constituyen otras conductas de carácter informal, como las costumbres que se han anidado en las empresas y en un sentido más amplio, hasta hacen parte de los presupuestos y esquemas contables de las organizaciones.

Comunicación Organizacional

Un elemento integrado dentro de la cultura organizacional es la comunicación organizacional, como lo menciona (Saladrigas-Medina, 2005); la comunicación como disciplina empresarial se basa en tres componentes: la oralidad, la persuasión y el discurso. La oralidad es el día a día de una organización, como un ente social o una agrupación de personas, esta oralidad se transforma en escritura como memorandos y circulares en su aspecto más formal. El segundo componente es la comunicación entre la empresa y sus clientes, todos los elementos de mercadeo y publicidad para promover la persuasión de compra. El componente de discurso habla de la oratoria, este es el poder de “enamoramiento” que la empresa tiene sobre sus empleados

Metodología

La investigación realizada se constituyó a partir de un estudio de casos y análisis mixtos con el rigor y severidad de una investigación científica, de la manera como lo sostiene (Coria, Roman, & Torres, 2013). Donde se debe caracterizar con diferentes aspectos, tal como lo clasifica (Sierra, 2008). Una investigación de corte transversal donde se discurre el momento actual, descriptiva por su profundidad, con fuentes primarias en un enfoque cualitativo donde los autores interpretan los resultados como lo

menciona (Sandin, 2003) y fuentes secundarias de enfoque cuantitativo, en un estudio de tipo exploratorio, aplicado en su totalidad en el campo.

Después de seleccionar la población sujeto de la investigación, la redacción del estudio de caso ayuda a consolidar las buenas prácticas y opciones de mejora en la relación gerencia - entorno del sector de las curtiembres, a través de una muestra bola de nieve, en diferentes sectores geográficos, para lograr una mayor amplitud de la información y datos que fueron recopilados en el estudio.

Las técnicas de recolección de datos utilizadas fueron: observación estructurada, entrevistas, cuestionarios y la revisión panorámica de la información contenida en artículos científicos asociados. (Bernal, 2010). Mencionando las referencias de los temas que son aplicables a administración; se encuentran el estudio de la innovación empresarial de varias empresas y se combina con los estilos de dirección de las mismas, el cual es el objetivo del proyecto que da origen a este artículo

Resultados

A nivel mundial, la industria de las curtiembres es una de las más contaminantes, y cada año se deben destinar enormes sumas de dinero para reparar y en menor grado para prevenir los impactos causados por su actividad. Las sumas de dinero destinadas a la mitigación de dichos impactos tienen como propósito cumplir con parámetros ambientales y evitar sanciones que impliquen impacto económico para las empresas. (Corredor-Rivera, 2006). La investigación de Corredor-Rivera (2006) permitió referirse sobre el tratamiento de los vertimientos que generan las curtiembres y que a su vez contaminan la cuenca alta del río Bogotá desde el municipio de Villapinzon, Cundinamarca, hasta el barrio San Benito en Bogotá, al verter sus desechos líquidos al río Tunjuelito, que luego desemboca en el río Bogotá. En las figuras 1 y 2 se puede observar gráficamente la localización de las curtiembres, de acuerdo a la Corporación Autónoma Regional de Cundinamarca, quien es la autoridad ambiental para el departamento.

Tabal 1: Entrevistas con empresarios del sector

Entrevistado	Coincidencias	Divergencias	Observaciones
Vladimir Fernández (Gerente de Planta de Curtidos la Sabana Ltda.)	Documentación de los procesos para la construcción de los planes estratégicos.	Falta de trabajo colaborativo, mucha competencia desleal entre los industriales del sector	Los procesos industriales los tienen separados, una plata hace el 'wet blue' y otra los procesos secos.
Gloria Silva (Gerente, Cooperativa Integral de Curtidores)	Algunos industriales tomaron conciencia de los impactos en el medio ambiente.	Los costos tan elevados de los insumos, para obtener productos de primera calidad, hace que los empresarios no se fijen en los costos ambientales.	A través de los años la cooperativa ha cambiado su razón de ser, desde intermediación en la compra y distribución de insumos, pasando por 'outsourcing' del proceso industrial, hasta procesos de capacitación a los asociados.
Jairo Roa (Gerente General, Curtidos Universal)	La medidas tomadas por los industriales los hacen parte activa de la solución del proceso	Mucho celo industrial, a la divulgación de los procesos físicos y químicos de tratamiento de vertimientos	A pesar del celo, está promoviendo la creación de un parque ecológico ambiental, con un control de los vertimientos.

Construcción propia de las entrevistas (Fernández, Silva, Roa, 2019)

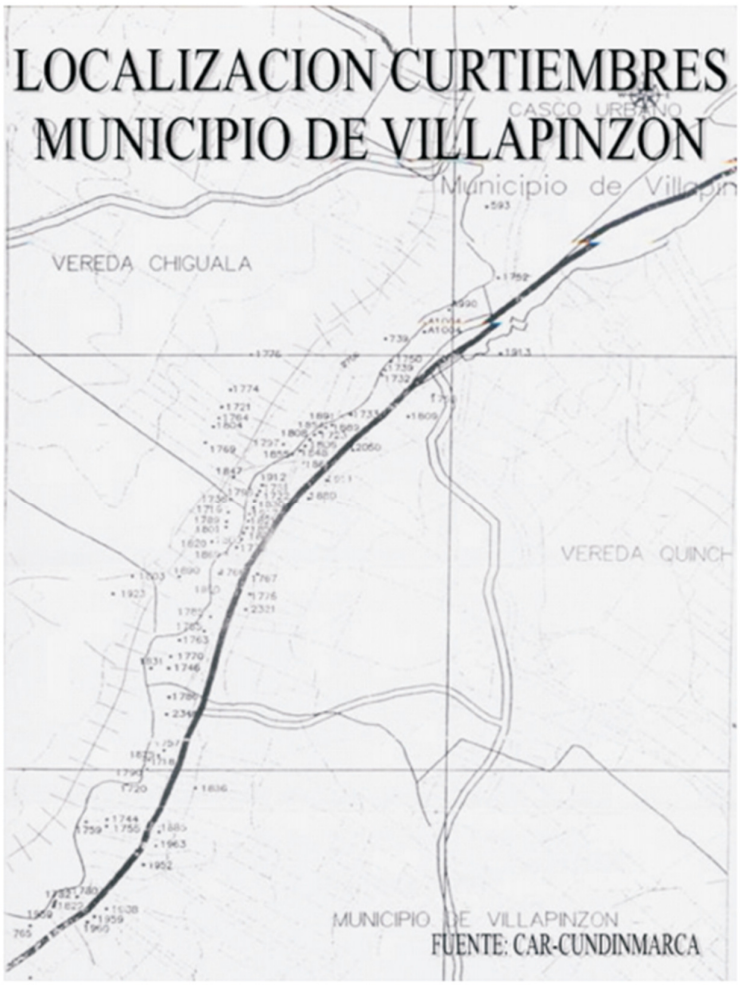

Figura 1: Localización Curtiembres Villapinzón Fuente:(CAR, 2018)

Figura 2: Localización Curtiembres Barrio San Benito (Bogotá) Fuente: (Google-Maps, 2019)

Bogotá está dividida política y administrativamente en localidades, las curtiembres del barrio San Benito se encuentran ubicadas en la localidad 6 (Tunjuelito), que delimita por el sur con la localidad 19 (Ciudad Bolívar). Esta localidad (Tunjuelito) cuenta con muy poca zona vegetal y con pequeñas vertientes de agua –arroyos- que sufren de una alta contaminación producto de la actividad humana, ya que se arrojan todo tipo de desechos sólidos y líquidos, como se describe en la figura 3. "La quebrada Limas con 10.5 kilómetros de longitud recorre gran parte de la localidad de Ciudad Bolívar y desemboca por la parte izquierda del río Tunjuelo. Desde 1994, se reporta la contaminación, en la parte media y baja de la quebrada." (Santos-Rayo, Niño-Sandoval, & Vargas-Puentes, 2017, pág. 98).

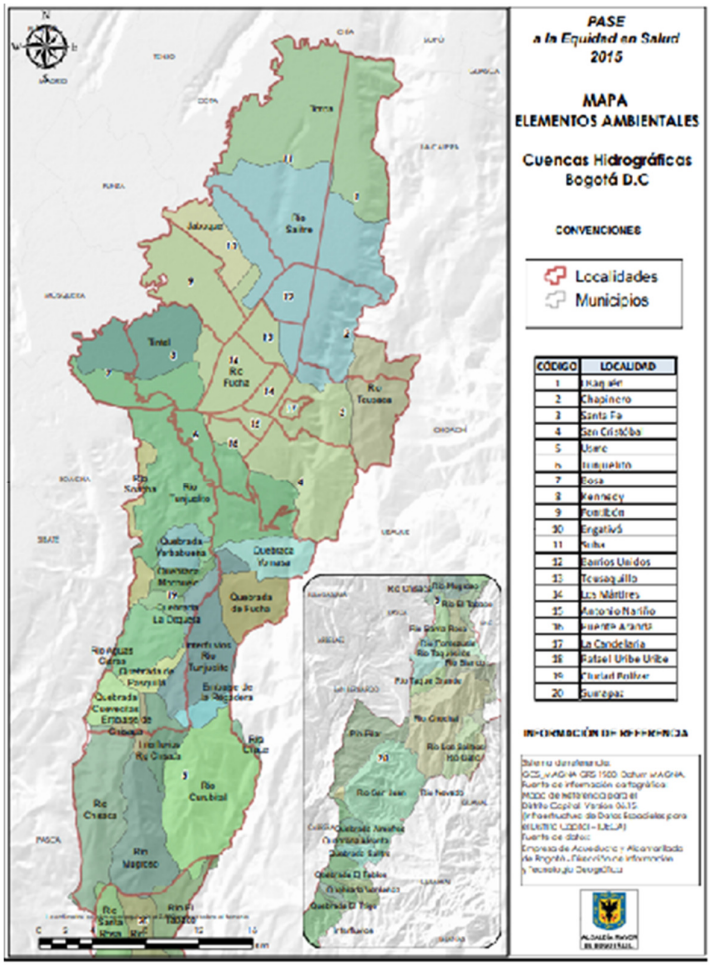

Figura 3: Cuencas Hídricas de Bogotá, Fuente: (ALCALDÍA-MAYOR-DE-BOGOTA, 2015)

Estado Actual

Es indispensable mirar lo que hacen los países desarrollados económicamente en el sector de las curtiembres (Martinez, 2018) menciona que Italia es el país con más producción, abarcando el 60% de toda la producción de Europa y por tal razón, ha desarrollado políticas empresariales muy claras en cuanto a observar "los más altos estándares de calidad en la prevención de la contaminación; realiza buenas prácticas como: sustitución de sustancias contaminantes, integración de procesos, manejo y tratamiento de agua residual y disposición final del lodo." (Martinez, 2018, pág. 115).

Es posible evidenciar que la manera de aplicar la teoría administrativa tiene efectos positivos en la organización empresarial y en sus prácticas, por lo que se hace necesario una revisión de los efectos externos; Martínez (2018) también menciona que, de los costos productivos en las curtiembres italianas, el 30% lo usan en productos químicos, energía y tratamiento de desechos, lo cual permite evidenciar claramente que financieramente las empresas también se ven comprometidas con el entorno donde se desempeñan.

La situación en América Latina es muy diferente, los costos operacionales se consumen en multas, trabajos de recuperación y reparación; sin embargo, la situación no mejora cuando se revisa la participación mundial en el sector, que para el año 2010 en el caso del cuero de bovino en relación a

la producción mundial efectiva prevista fue de 6.214 miles de toneladas, y para el cual América Latina participó con 1.439 miles de toneladas, que representa un 23.15% del total, y donde la participación mayoritaria de ese valor lo aporta en primera instancia, Argentina. (FAO, 2012)

Las prácticas empresariales de las empresas del sector en Colombia se ven afectadas por la producción nacional y la distribución geográfica de dichas curtiembres, entre Cundinamarca y Bogotá concentran el 80% de las industrias del país (Martinez & Romero, 2018), mientras que Barranquilla aporta el 0.30%. En cuanto a la producción nacional de pieles, para el año 2010 fue de 9.487 toneladas que apenas es un 0.66% de la producción de América Latina y un 0.15% de la participación mundial. Los dos primeros aportan el 36% y el tercero participa con el 7%. (CAR, 2015)

La producción del sector en Colombia, está concentrada en Cundinamarca y Bogotá con un 80% de las industrias (Martinez-Buitago & Romero-Coca, 2018), mientras que ciudades como Barranquilla aporta el 0.30% y entre Cali y Medellín un 1%. (Corredor-Rivera, 2006) mencionó que la falta de los tratamientos de los residuos que generan las curtiembres, contaminan la cuenca alta del rio Bogotá en el municipio de Villapinzon, Cundinamarca; Y en el barrio San Benito, Bogotá, que arrojan estos últimos, sus vertimientos al Rio Tunjuelito que desemboca en el Rio Bogotá. Como se vio en las figuras 1 y 2.

Revisión de los planes estratégicos

Las características administrativas de las organizaciones son la respuesta a las políticas adaptadas e implementadas de las teóricas administrativas, estas pueden ser de muchas tendencias, del tipo burocráticas, de bienestar de personal, de calidad total, de la administración científica o del ciclo administrativo. En Colombia hizo carrera el esquema de planeación estratégica como herramienta de control administrativo que está compuesto de los siguientes elementos:

- Misión
- Visión
- Objetivos (General y Específicos)
- Metas (Por área)
- Reglamento de trabajo
- Políticas
- Sistema de Gestión de seguridad y salud en el trabajo

Y cuando la empresa entra en los procesos de certificación de calidad, deben implementar alguna de las normas de los Sistemas de Gestión de Calidad (ISO[1] 9001), los Sistemas de Gestión Ambiental (ISO 14001), los Sistemas de Gestión de Riesgos y Seguridad (ISO 45001) y los Sistemas de Gestión de Responsabilidad Social (ISO 26000)

Características Administrativas de las curtiembres

Cuando los industriales se acercaron a la academia lo que encontraron como lo menciona (Malaver, 2016), fueron unas cátedras dictadas por docentes de otras profesiones como abogados y/o economistas, con las teorías de Taylor y Fayol. Las industrias creadas del sector son en una gran mayoría de carácter familiar y la administración de ellas en sus inicios fue de forma empírica. (Omaña & Briceño, 2013) enumeran una serie de características de estas empresas: La Familia tiene el poder total sobre la propiedad y ejerce el control sobre ella, La Alta Gerencia en la organización está dada por una sesión de poder de la familia a un integrante y la es una decisión primordial heredar este control y poder a las generaciones familiares venideras.

Las empresas aplican las teorías clásicas de la administración en cuanto a lo siguiente:

[1] ISO: International Organization for Standardization (Organización Internacional de Normalización)

- Especialización de las funciones del trabajador, aunque existen empleados de características de nivel de 'súper-numerario', que están capacitados para realizar funciones de diferentes áreas.
- Capacitación estrictamente de nivel práctico, no existen procesos formales de capacitación, en Colombia no existe estudios técnicos ni estudios superiores de la profesión de curtidor. Los procesos tienen unos operarios principales y unos operarios auxiliares, estos últimos mediante la observación y asistencia de los primeros, van 'aprendiendo' la labor.
- La necesidad de un supervisor es evidente, revisando procesos, resultados, seguridad de las labores, programando mantenimientos preventivos, suministrando los insumos (formulas químicas para el curtido).
- El control de tiempos y movimientos es fundamental porque el 90% de la nómina es a destajo, son los mismos empleados los que determinan

En el sector es clara la ausencia de planes estratégicos, falta la asociación, el trabajo se vuelve una solución diaria los problemas, no existe planeación ni presupuestos futuros, los costos de producción son completamente variables al alza.

Características Ambientales

Se identificaron 32 curtiembres dentro de la ronda del Rio Bogotá, 16 con afectación total de las instalaciones y 16 con afectación parcial. 25 de ellas están dispuestas a reubicarse y continuar con la misma actividad, y 7 estarían dispuestas a cambiar de actividad

Las fuentes de abastecimiento de aguas en las curtiembres son por acueducto (58%) y concesión de aguas (31%). Solo a dos empresas les han autorizado los permisos de vertimientos y de ocupación de cauce, el resto de curtiembres no lo tiene, está en trámite o fue negado. El 55% de las curtiembres les han aprobado el permiso de concesión de aguas. El 57% del total de curtiembres no han solicitado el registro Único Ambiental.

83% de las curtiembres descargan sus vertimientos en el Rio Bogotá de forma controlada a través de un sistema de recuperación de sólidos en albercas. 75% de las curtiembres manifestaron hacer clasificación de residuos peligrosos. Cerca de la mitad de las curtiembres (49%) declara vertimientos y un (46%) tiene un punto de control de los mismos. Un 58% de las curtiembres radicaron un plan de cumplimiento, pero al 89% les fue rechazado

Es por esto que el análisis legislativo gira entorno a la sentencia 479 del 2014 del Concejo de Estado, directriz legal principal, que ha permitido adoptar una serie de medidas que buscan la protección de la cuenca hidrográfica del río Bogotá. Conocida como la sentencia del Rio Bogotá. Esta contiene el diseño y la implementación de medidas para descontaminar el río y evitar la contaminación a futuro. La decisión se tomó frente a la catástrofe ambiental, ecológica y económico-social de la cuenca hidrográfica del río Bogotá, causada por el alto grado de contaminación debido a vertimientos de aguas residuales domésticas e industriales, malas prácticas agropecuarias e inadecuado manejo de basuras, por parte de los habitantes e industrias aledañas, así como la omisión de las autoridades frente a estas situaciones por más de treinta años. (Ministerio del Medio Ambiente, 2014)

La sentencia adoptó una serie de órdenes de carácter nacional, regional y local, que involucran diferentes autoridades. Algunas órdenes tienen carácter inmediato y otras se extienden por un plazo máximo de 3 años. La sentencia declara responsables a los habitantes e industrias de la cuenca por la contaminación del río y sus afluentes. También se declaran responsables las autoridades que no han tomado medidas para descontaminarlo y prevenir su contaminación.

Conclusiones Y Discusión

El desarrollo de un modelo de gestión ambiental en los procesos y productos del sector de las curtiembres, implica el conocimiento de los aspectos técnicos, operativos, comerciales, legales y financieros propios de la actividad y fundamentalmente, del impacto que genera la industria de las

curtiembres en el medio ambiente. Las pieles de animales han estado ligadas a la cotidianidad de los seres humanos desde los tiempos prehistóricos; han constituido un elemento fundamental, con múltiples usos en el hogar y en la industria, continuando vigente a pesar de los enormes avances en los procesos tecnológicos que determinan innovaciones en la fabricación y en las características de los productos, incluidos los de consumo masivo como el calzado.

La decisión judicial del concejo de estado busca proteger entre otros algunos de los siguientes derechos:

- Los derechos relacionados con el agua y el goce de un ambiente sano.

- La existencia del equilibrio ecológico y el manejo y aprovechamiento racional de los recursos naturales para garantizar su desarrollo sostenible, conservación, restauración o sustitución.
- La conservación de las especies animales y vegetales.
- La protección de áreas de especial importancia ecológica y de los ecosistemas situados en las zonas fronterizas.
- Los demás intereses de la comunidad relacionados con la preservación y restauración del medio ambiente.
- El goce del espacio público y la utilización y defensa de los bienes de uso público.
- La defensa del patrimonio público.
- La defensa del patrimonio cultural de la Nación.
- La seguridad y salubridad públicas.
- El acceso a una infraestructura de servicios que garantice la salubridad pública.
- El acceso a los servicios públicos y a que su prestación sea eficiente y oportuna.
- El derecho a la seguridad y prevención de desastres previsibles técnicamente.
- El acceso a los servicios públicos y a que su prestación sea eficiente y oportuna.
- Los derechos de los consumidores y usuarios.

(Sentencia del Rio Bogotá, 2014)

Aunque la sentencia con buenas intenciones busca: el mejoramiento ambiental y social de la cuenca hidrográfica, la articulación y coordinación institucional, intersectorial y económica, y la profundización de los procesos educativos y de participación ciudadana. Como se ve las normas jurídicas están concentradas sobre la descontaminación del Río Bogotá, y la responsabilidad es de todos los actores, pero la Magistrada del consejo de estado ha establecido una persecución exclusiva a las curtiembres, que denomina ilegales, que no han trabajado en la implementación de plantas de tratamiento de los vertimientos, cerrando de forma definitiva para agosto del 2018, a más de 40 empresas, sin un plan para mitigar las consecuencias sociales por el desempleo generado y las consecuencias tributarias por los pagos regulares de los respectivos impuestos.

A la fecha no hay planes educativos para la comunidad, sobre el manejo de los residuos del sistema de alcantarillado, y mucho menos sobre la disposición de basuras solidas directamente sobre el lecho del río.

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Realidades Actuales De La Relación Entre Universidad Y Sociedad: De La Proyección Social A La Responsabilidad Social Universitaria.

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Abstract

El presente texto hace referencia a la consolidación de la información recaba en la primera fase de la investigación "comparación de los programas de proyección social en 3 universidades privadas de la ciudad a Bogotá". El escrito da cuenta de un análisis de la realidad actual presentada entre la relación subyacente entre la universidad y la sociedad desde los programas de proyección social y responsabilidad universitaria, se intenta indagar por esa relación desde la llamada tercera exigencia a la universidad y determinar cómo las prácticas y metodologías propias de las universidades impactan dicha relación. La metodología a utilizar estuvo basada en un método mixto de carácter dominante cualitativo, en dónde desde el análisis documental a partir de una malla de retención documental se revisaron los documentos normativos y demás propios de la universidad en relación a la temática y se contrastaron con encuestas y entrevistas realizadas a la comunidad educativa en general.

Keywords : Universidad, sociedad, proyección social, responsabilidad social universitaria.

Introducción

La universidad del siglo XXI está inmersa en un proceso de cambio profundo. A las responsabilidades tradicionales que se le han endilgado durante años, centradas en la docencia y la investigación, aparece en las últimas décadas una nueva exigencia que desborda lo meramente académico o investigativo, y que lleva a pensarla como un espacio más abierto a los procesos sociales y comunitarios que le rodean (Bueno & Fernández, 2007). Es lo que se conoce recientemente con varias designaciones que dan cuenta de un mismo fenómeno: responsabilidad social universitaria, tercera misión o el papel de la universidad en el desarrollo de la sostenibilidad. En últimas, termina configurando un nuevo espacio de exigencias a la universidad en donde, además de los ya tradicionales requerimientos, se demanda ahora la transferencia del conocimiento, la innovación y la contribución al desarrollo económico, social y cultural de las comunidades con las que se relaciona. Por esta razón las instituciones universitarias han requerido áreas o programas que atiendan este tipo de solicitudes y que den cuenta del impacto que tiene la universidad en la sociedad.

En tal contexto surge la necesidad de una investigación que reflexione sobre las dinámicas que se encuentran inmersas en las prácticas de responsabilidad social universitaria. Para ello, dos cuestiones resultan cruciales de ser respondidas: ¿cuál es la fundamentación de las prácticas de responsabilidad social en las universidades privadas objeto de análisis? Y ¿qué rol tiene la docencia en esta fundamentación? Preguntas que orientan las reflexiones a desarrollar en este texto y que son un resultado preliminar de la investigación Comparación de las prácticas en proyección social de tres universidades privadas en la ciudad de Bogotá.

Este artículo se nutre del análisis documental realizado a partir de un formato de retención de información aplicado a registros institucionales como líneas base, decretos de conformación, formatos de impacto, lineamientos generales, acuerdos y documentos generales sobre los aspectos teóricos y metodológicos de los programas de proyección social. Así mismo se complementa con la información recaba de una de encuesta de satisfacción realizada a docentes, estudiantes y administrativos pertenecientes a las comunidades educativas de las instituciones objeto de análisis. Del mismo modo, la reflexión se complementa con la bibliografía revisada, los diarios de campo y la observación sistemática, buscando identificar los fundamentos de los programas y prácticas de

responsabilidad social universitaria y su relación con la docencia como función sustantiva universitaria. Una función que demanda cada vez más de una conducta ética por parte de los profesionales que la ejercen (Kearns, 2019).

Siguiendo dicho objetivo la ponencia se estructura de la siguiente forma: en primer lugar, se realiza un análisis metodológico de la propuesta en el que se explicita la metodología utilizada y sus implicaciones dentro de la investigación; en segundo lugar, se efectúa un breve recuento teórico de los conceptos de responsabilidad social y responsabilidad social universitaria; en tercer lugar, se relacionan y discuten los resultados encontrados en el análisis de la fundamentación de los programas de proyección social; por último, se exponen las principales conclusiones del análisis desarrollado, haciendo la salvedad que aún es un proyecto en ejecución y que se está en proceso de implementar otro instrumentos de recolección de información.

La Apuesta Metodológica: De La Comparación A La Reflexión De Los Programas De Proyección Social

Al pensarse una apuesta metodológica para la investigación *Comparación de las prácticas en proyección social de tres universidades privadas en la ciudad de Bogotá* se pensó en un primer momento en la variable determinante en términos metodológicos "la comparación", de qué manera enfocar los instrumentos para que den cuenta de un proceso comparativo de investigación, pero que no solo quede en él, sino que posibilite reflexiones intrínsecas y ocultas dentro de las prácticas de los programas de proyección social; es así, como aparece en el panorama una fuente eficaz de recolección multivariada de información como la que existe en una investigación de la envergadura propuesta, que pueda dar cuenta de aspectos cuantitativos de los programas de proyección social, pero que al mismo tiempo se permita realizar inferencias y análisis que las meras estadísticas no lograrían dilucidar.

A este tipo de metodologías de reciente calado en los procesos investigativos se le denomina de diversas maneras: investigación integrativa (Johnson & Onwuegbuzie, 2004), investigación multimétodos (Hunter & Brewer, 2003; Morse, 2003), métodos múltiples (Smith, 2006, citado por Johnson, Onwuegbuzie & Turner, 2006), estudios de triangulación (Sandelowski, 2003), e investigación mixta (Tashakkori & Teddlie, 2009; Plano y Creswell, 2008; Bergman, 2009; y Sampieri & Mendoza, 2008). Para el entendimiento de este proyecto se sigue la denominación más común dentro de la bibliografía latinoamericana y los procesos académicos: investigaciones metodológicas mixtas.

Cada vez más investigaciones utilizan este tipo de metodologías ya sea por su elasticidad y multiplicidad técnica o por las mismas temáticas actuales que requieren repertorios más amplios y menos rígidos en la investigación.

Dentro de este contexto, en los años 60 y 70 se realizan una serie de investigaciones que, ya sea por su temática, por sus recursos o por las mismas disciplinas participantes, requieren la utilización de técnicas y métodos tanto cualitativos como cuantitativos. Lo cual lleva a que muchas investigaciones propicien métodos de utilización complementaria de técnicas desde ambos extremos metodológicos.

De esta manera, se comienza a hacer necesaria una reflexión profunda dentro de las mismas dinámicas de la investigación de este tipo de proyectos que integran técnicas y métodos de ambas metodologías, la cualitativa y la cuantitativa.

Con el pasar de los años se hace evidente y necesario nombrar y reflexionar sobre dichos estudios, los cuales comienzan a ser denominados de diversas formas como ya se afirmó, en donde la utilización de técnicas cuantitativas y cualitativas presentan problemas bastante complejos, puesto que, epistemológica y ontológicamente, la cuestión se muestra de formas diversas. Como señala Hernández Pina (2001, p. 54), los defensores de esta postura sostienen que "las diferencias no estriban tanto en los números y en las técnicas estadísticas como en cuestiones más sustantivas como son la objetividad, la validez, la fiabilidad y los criterios de verdad".

Para soslayar la discusión sobre la pertinencia objetiva e investigativa de las metodologías mixtas se postulan tres alternativas. Bericat (1998) identifica tres estrategias de integración metodológica: la complementación, la combinación y la triangulación. La complementación refiere el uso de metodologías cuantitativa y cualitativa con el objetivo de abordar, con cada una de ellas de forma separada, una dimensión diferente del objeto de estudio de una investigación. Esta estrategia conserva la independencia de métodos y de resultados ya que cada método se usa para responder a interrogantes diferentes de la investigación. La combinación indica el uso de un método de manera subsidiaria respecto al otro a los fines de aumentar la validez del último. Aquí sí hay combinación metodológica con el propósito de obtener un solo tipo de resultado, proveniente de la última metodología empleada. Finalmente, la convergencia o triangulación supone el uso de ambas metodologías para abordar el mismo aspecto de la realidad. En este caso, si bien hay independencia en la aplicación de los métodos, existe una convergencia en los resultados. Su utilización implica la aceptación de que ambas metodologías pueden captar iguales aspectos de la realidad.

Desde este tipo de análisis autores como Johnson & Onwuegbuzie (2004), Onwuegbuzie & Leech (2006) y el mismo Sampieri (2008) han entablado una reflexión en cuanto a la utilización de las técnicas, métodos y características propias de las metodologías mixtas en investigación. Resultado de estas indagaciones se ha perfilado la investigación con metodología mixta como un enfoque que propicia análisis fidedignos, válidos y objetivos, desde que su realización esté apegada a los estándares propios de la ética investigativa y de los parámetros generales de la investigación cuanti y cualitativa.

Para estos autores, la postura dominante de una u otra de las metodologías se hace inherente en la mayoría de las investigaciones, razón por la cual se debe desde un inicio postular dicha preponderancia en el proceso investigativo, para de este modo evitar sesgos y problemas metodológicos a posteriori en el curso de la investigación.

La metodología está así basada en un método mixto de recolección de información en donde, según los parámetros de Bericat (1998), se utilizan los métodos a modo de triangulación y se usan ambas metodologías para abordar el mismo aspecto de la realidad: los programas de proyección social de tres universidades privadas de la ciudad de Bogotá. Se busca así la independencia en la aplicación de los métodos, entrevistas y formatos de retención documental desde lo cualitativo y encuestas desde lo cuantitativo, lo cual fundamenta la triangulación.

Siendo así, el proyecto tiene presente dos cuestiones, por un lado, que la utilización de las dos metodologías implica la aceptación de que ambas pueden captar igual aspecto de la realidad, y que se espera que logren de esta manera realizarlo desde el control de los mismos investigadores a partir de la observación y los diarios de campo; por otro lado, se espera que la investigación sea en términos de Onwuegbuzie & Leech (2006) y Sampieri (2008), una metodología mixta con estatus dominante cualitativo, esto por varias razones: por un lado, la investigación, desde su formulación, espera dar cuenta de percepciones, intereses propios de un análisis de ciencias sociales y, unido a la metodología cualitativa, se espera que con las técnicas cualitativas se pueda responder cuestiones intrínsecas a los pormenores de fondo de los proyectos que técnicas de corte cuantitativo netamente no darían cuenta por sí solas.

Percepciones Sobre La Proyección Social En Las Comunidades Educativas

Las prácticas de proyección social son una estrategia que permiten visibilizar la formación integral, compromiso de todas las entidades educativas y bajo el manifiesto que tiene la universidad con la responsabilidad social universitaria, además que permite el retorno del desarrollo académico a la región, por su compromiso en la transformación social (Ziritt y Huerta, 2007) es la manera de evidenciar que la academia no es una esfera aparte de la realidad social, sino todo lo contrario, desde allí se visibiliza y se da respuesta a múltiples problemáticas que enfrenta la sociedad.

Con la intensión de conocer el nivel de satisfacción que percibe la comunidad educativa sobre el programa de proyección social de la institución universitaria a la cual pertenecen, en donde se incluyen profesores, estudiantes, administrativos y egresados se realiza una encuesta compuesta de 17 preguntas con escala de Likert, fue aplicada a 643 personas, de los cuales el 78,6% corresponde a

estudiantes, el 16,1% a profesores, el 4,5% a administrativos y un 0,5% a egresados, con este instrumento se mide las relaciones existentes entre la comunidad que al ser parte de la universidad son beneficiarios directos, pero se quiere transcender y explorar la percepción que se tiene por el trabajo que se hace cuando se realizan prácticas sociales en las diferentes localidades que cada universidad impacta; en este sentido esta la necesidad de reflexionar sobre los procesos que lleva proyección social de las universidades generando conclusiones a modo de recomendaciones que aporten de acuerdo al contexto y realidad de cada colectivo.

Este instrumentos hace parte de la investigación titulada "comparación de los programas de proyección social de 3 universidades privadas de la ciudad de Bogotá", misma que pretende determinar las prácticas, intereses, percepciones, alcances y limitaciones que se manejan en las instituciones estudiadas sobre los programas de proyección social, por ello estamos hablando de una investigación de tipo aplicada, y de carácter descriptivo en donde se recopila la percepción del programa de proyección social en la universidad vista por estudiantes, docentes, administrativos de las universidades Corporación Universitaria Minuto de Dios, Fundación del área andina y Corporación tecnológica de Bogotá.

En cuanto a la recolección e interpretación de los datos el trabajo de campo se orientó a conocer el nivel de satisfacción que tiene la comunidad educativa con respecto a la extensión de proyección social. Se consideró una muestra representativa y aleatoria cuya composición fue la siguiente:

Tabla 1: Muestra de participantes

	Frecuencia	Porcentaje
Corporación tecnológica de Bogotá	82	12,7%
Corporación universitaria minuto de Dios	273	42,5%
Fundación del área andina	288	44,8%

Fuente: elaboración propia.

Se puede destacar que el trabajo realizado por las universidades en cuanto a su responsabilidad frente a los problemas sociales se encuentra con una perspectiva de aceptación entre la población estudio, teniendo en cuenta que el 82,8% lo identifican de esta manera; Si el análisis se hace por universidad se logra evidenciar que es la Uniminuto en donde la gran mayoría lo califican en 5, resultado que está ligado a la misión de la institución, en donde esta explícitamente el compromiso social, mientras en la Andina la calificación se centra en 4; de todas maneras se percibe que realmente existe preocupación por los problemas sociales y a su vez se divulga las actividades que hace proyección social, consecuencia que la universidad cada vez se desliga más de sus aspectos estructurales paredes adentro y tiene un dialogo más real y contextual con la sociedad.

De otro lado, las instituciones educativas universitarias tienen como eje fundamental la formación integral, en donde se logre demostrar que sus estudiantes no solo reciben y generan conocimiento, sino que además tiene conductas individuales y valores que aportan a la sociedad reflejado en una toma de decisiones sociales, por ello se indaga si los proyectos que se desarrollan desde proyección social contribuyen a ese desarrollo integral de los profesionales en formación en donde se obtiene que el 83% de la población que lo visualizan como satisfactorio. No obstante, el 11,7% de la población presenta una opinión parcial sobre este ejercicio, lo que debe llevar a un cuestionamiento y constancia de la necesidad que los proyectos sociales estén inmersos en las competencias que se adquieren como profesionales. No se puede desconocer que el mayor porcentaje tanto profesores como estudiantes de la Uniminuto le dan una calificación de 5, es decir, que están plenamente de acuerdo que proyección social está contribuyendo a esa formación integral; sin embargo, en las otras dos universidades la mayor calificación se centra en 4, lo que indica se está haciendo un buen trabajo no se logra la satisfacción plena aún.

Continuando con la formación integral, no se puede dejar de lado el tema ambiental, elemento que constituye una problemática social a la cual también se debe dar respuesta, atendiendo el trabajo desarrollado se indaga el nivel de satisfacción que se tiene frente a la perspectiva de si la universidad está comprometida con la mejora de la calidad ambiental y actúa con proyectos en áreas protegidas o ambientalmente sensibles en donde se obtiene que la mejora continua como componente principal de la pertinencia y existencia que tiene la ejecución de los proyectos en los temas ambientales y sostenibles tiene un 46,1% como totalmente de acuerdo con su ejecución, adicional a un 32,3% tiene un nivel de percepción de parcialmente de acuerdo, lo que muestra una necesidad de seguir ligando los temas ambientales con la proyección social, garantizando un hilo conductor como respuesta a una problemática a nivel mundial.

Pasando a temas de calidad en la universidad, "En la acreditación Institucional, la calidad se determina por el logro tanto de los fines como de los objetivos de la Educación Superior, por la capacidad para autoevaluarse y autorregularse, por la pertinencia social de los postulados de la misión y del proyecto institucional, por la manera como se cumplen las funciones básicas de docencia, investigación y proyección social, por el impacto de la labor académica en la sociedad" (Consejo Nacional de acreditación , 2019). Por lo que en esta investigación se mide si la diversidad de los proyectos desarrollados desde proyección social no se tiene discriminación de ningún tipo y por ende todos pueden participar como beneficiarios o actores de los proyectos obtenido como resultado obtenido que el nivel de inserción de los proyectos de proyección social es el adecuado, pues el 83,5% no encuentra discriminaciones y si una alta participación de los actores y beneficiarios del mismo, esto indica que las universidades hacen trabajo conjunto estableciendo estrategias que potencia competencias en los actores de los diferentes proyectos sociales involucrando a todos sin que exista discriminación alguna, todo lo contrario el nivel de satisfacción muestra lo incluyentes que son los proyectos.

El abordaje que se está haciendo de proyectos sociales dentro de las universidades debe prologarse una vez se culmina con la formación académica propendiendo que egresados u graduados muestre aptitudes y actitudes de responsabilidad social y ambiental participando en proyectos de esta índole fuera de la Universidad, así que se indaga sobre esta percepción y se tiene que la imagen que tiene el egresado o graduado de la universidad es de personas participativos, que les gusta e interactúan en proyectos sociales esto se refleja en el 67,9% que obtuvo de favorabilidad. Sin embargo, no se puede desconocer el 23,8% que muestra una respuesta neutra, al analizar a toda la muestra participante. Pero es aún más relevante si se analiza las respuestas únicamente de las personas que respondieron y están en el rol de graduado o egresado en donde se obtiene que ellos se centran en el punto neutro, ninguno da respuesta de satisfactorio, lo que debe llevar a un cuestionamiento y resignificar lo que se hace desde proyección social con los estudiantes a lo largo de su carrera profesional y lo que se espera debe continuarse una vez se recibe un grado de profesional.

La articulación de la universidad con otras instituciones que también promueven la proyección social también fue objeto de estudio, y se quiso mirar el nivel de satisfacción que se tiene del contacto entre la institución educativa y actores claves del desarrollo social como lo son empresas, estado ONGs, y otras instituciones de educación, en donde se obtiene un 71,2% de favorabilidad, lo que se traduce en el cumplimiento de logros mancomunados entre proyección social universitario y actores de participación ciudadana, esto se puede traducir en cooperación, en identidad local o regional, en espacios de encuentro focalizados a la participación y trabajo colectivo.

En concordancia con la integración de la proyección social en los proyectos de desarrollo social se resalta que el 33,5% de la población encuestada califica con un alto nivel de satisfacción el manejo de las redes de desarrollo que tienen las universidades para dar solución a las problemáticas que se abordan desde las diferentes temáticas académicas y proyectos de aula, a través de foros, comités, mesas de trabajo, congresos que dan la oportunidad de reencontrar, reconocer la orientación, el apoyo y el trabajo en cada una de las actividades que se realiza desde proyección social universitario para tratar realidades sociales, políticas, culturales y económicas del contexto cercano.

Y cuando se habla de transformar entornos a través de la función de proyección social hace entrada un actor fundamental de todo el proceso formativo, y es el docente, por ello en la investigación también se indaga si los programas de proyección social prestan atención a las necesidades de los

docentes de la institución y promueven actividades encaminadas a ellos, encontrando que tan solo el 3% del total de la población lo ven como totalmente insatisfecho, lo cual puede resaltar el agrado al alcance que ha tenido el apoyo de las diferentes instituciones a sus académicos, aquí es de destacar que la encuesta fue respondida en un alto porcentaje por estudiantes, lo que también muestra una percepción favorable en cuanto al clima laboral al tener al docente en cuenta en proyección social genera motivos de reconocimiento, de apoyo y de sentido humano. Ahora bien, si se analiza solo las respuestas de los profesores participantes encontramos que su calificación se centró en 4, es decir que, aunque están satisfechos no lo están en un nivel pleno, esto es de analizar desde las dos perspectivas, la del estudiante que percibe que la institución presta atención a sus docentes, y la del profesor que si bien no está en desacuerdo tampoco muestra un nivel de aceptación completo.

Debe existir una pertinencia entre lo que enseña en un aula de clase y entre lo que espera la sociedad y el mundo laboral de los profesionales, por ello también se busca conocer la opinión que se tiene al considerar si los planes de estudio están enlazados con proyección social, y desde el ejercicio curricular se logra identificar el nivel de flexibilidad, integralidad, e interdisciplinaridad, con el que cuentan los planes de estudios de los programas académicos los cuales son bien percibidos por su población, pues el 77,5% lo perciben de forma muy satisfecho o pertinente para el proceso de formación.

Como expresión de la responsabilidad social universitaria y como una estrategia para poder asumir el compromiso social, surgen los grupos de voluntariado, "Una Universidad del siglo XXI no puede vivir a espaldas de la problemática global sin buscar solución al incremento de la pobreza, desigualdades, injusticia, violencia, etc. Como generadora de conocimiento, tiene la gran responsabilidad de enseñar a sus alumnos a reflexionar sobre estos problemas y generar investigación aplicada para solucionarlos de modo interdisciplinario". (Manrrique, 2014) por lo que con la investigación también se quiere conocer si conoce la existencia de estos grupos y la manera de poder pertenecer a ellos en donde se encontró que el 65,9% identifican grupos de voluntariado con los que cuenta la universidad, y su manera de acceder a ellos, además que la universidad facilita el tiempo y los recursos para la realización de iniciativas sociales.

Conclusiones

Desde la dirección de proyección social se trabaja y se logra una interacción e integración de la academia con la comunidad de la que se forma parte, en donde la responsabilidad social transciende de los programas académicos y los responsables de la formación profesional y se articula con la realidad social interpretando sus necesidades y generando estrategias de solución interdisciplinares.

Existe un alto nivel de satisfacción entre la comunidad educativa por el conocimiento y las experiencias que se generan desde el desarrollo de proyectos sociales, considerando el gran aporte que se tiene para la formación integral.

Potenciar los espacios de los grupos de voluntariado y visibilizar el trabajo desarrollado por la universidad hacia la comunidad es tarea constante, para cumplir con la misión de articular academia, investigación y proyección social en aras de dar respuesta al contexto y al mundo laboral que exige seres humanos comprometidos con su ser y su saber.

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La Investigación En Los Planes De Doctorado En Educación De Las Universidades Peruanas

The Research On The Doctoracy Plans In Education From The Peruvian Universities

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Resumen

El presente estudio analiza la investigación en los planes de estudios doctorales de educación de las universidades peruanas licenciadas por SUNEDU que suman un promedio de 30 universidades e igual número de programas que han difundido sus planes a través de la web. Se ha realizado un estudio por categorías. Se concluye que los planes de estudio de los programas de doctorado en educación no están estandarizados respecto a los cursos de investigación y los ciclos respectivos, e impiden que exista movilidad estudiantil.

Palabras clave: Investigación, planes de estudio, ranquin, tesis, taller, seminario.

Abstract

The present study analyzes the research of the doctorate study plans in education from the Peruvian universities licensed by SUNEDU which reach at an average of 30 universities and the same number of programs that have disseminated their plans through the website. A study based on categories have been carried out. It concludes that the study plans of doctorate programs in education haven't been standardized with regard to the research courses and the respective academic terms, and stop from appearing student movement.

Keywords: Research, study plans, ranquin thesis, workshop, seminar.

Introducción

La presente investigación analiza, a través de categorías, el uso de la investigación en los planes de doctorado en educación de las universidades peruanas, licenciadas por SUNEDU. La investigación es relevante porque permite acrecentar el conocimiento y resolver problemas, según la naturaleza o los propósitos de esta.

La investigación permite el desarrollo del conocimiento en función de los propósitos de las instituciones o universidades, también con base en la realidad socioeducativa; asimismo, permite resolver los problemas educativos en sus diversos niveles con el propósito no solo de acrecentar la teoría, sino que permita formar un hombre con diversos valores para que construya una sociedad más justa, equitativa, humanizante.

En el nivel doctoral las exigencias son mayores ya que se trata de realizar tesis originales, con mayor profundización teórica o temática. Este nivel requiere competencias investigativas para diseñar proyector y ejecutar la investigación o tesis. Los temas deben ser relevantes, actuales y que aporten a la ciencia. En el posgrado se enriquece y profundiza la investigación que se inicia en el pregrado, como uno de los componentes relevantes en la función del docente (Mirabal y Caballero, 2018).

En este contexto, es importante realizar un análisis de los cursos de investigación que se desarrollan en el doctorado de educación de las universidades peruanas, teniendo en cuenta que no existe un estudio de esta naturaleza, y por tanto urge realizarlo.

Antecedentes Y Fundamentación

Los doctorados en España, a aparte de haberse adaptado a la ley, se orientan a la internacionalización, a la innovación y a la capacidad investigativa pluridisciplinar (Jiménez-Ramírez, 2017).

En los antecedentes, se han estudiado algunos problemas en la investigación doctoral: la falta de coherencia en la metodología, no se asume una postura crítica, inadecuada construcción de la operacionalización de variables (López, Leyva, Zambrano y Quiroz, 2019); la falta de evaluación de pares externos en las tesis, la carencia de investigaciones doctorales originales (Buela-Casal et al. 2011; De miguel, 2010; Álvarez, Mojardín y Audelo, 2014).

Otros problemas están asociados con la certificación de calidad de los programas, tal es el caso de chile que en un 65% no poseen dicha exigencia (Núñez-Valdés y González, 2019). Impide cumplir con estándares de calidad del doctorado en educación.

En función de lo descrito previamente, se ha establecido que se debe fortalecer la alianza universidad-empresa, vincular los conocimientos y la producción de bienes y servicios (Concepción, González, García y Miño, 2019); establecer redes académicas que desarrollen investigación multidisciplinar y que tengan presencia en otras redes o contextos (Sime-Poma, 2013).

En el caso específico del Perú, el doctorado en educación tiene una orientación más de profesionalización que de investigación científica (Dias y Sime, 2016); requiere ser fortalecido con las competencias investigativas para desarrollar trabajos originales y que aporten a la solución de problemas educativos peruanos. Esto se ve reflejado en el ranquin latinoamericano de facultades de educación, entre las 12, no se encuentra el Perú, a diferencia de Chile que cuenta con 4 facultades de educación (Pontificia Universidad Católica de Chile en primer lugar, Universidad de Chile en segundo lugar, Universidad de Santiago de Chile en octavo lugar, Pontificia Universidad Católica de Valparaíso en décimo lugar); Brasil también con 4 (la Universidad de Sao Paulo en quinto lugar, Universidad Estadual de Campinas en sétimo lugar, Universidad Federal de Rio de Janeiro en noveno lugar, UNESP en duodécimo lugar); Colombia con 2 (Universidad Nacional de Colombia en sexto lugar, Universidad de los Andes en undécimo lugar); y México con 1 (la Universidad Nacional Autónoma de México). Sobre revistas científicas, el Perú no cuenta con ninguna en Scopus.

La investigación doctoral como un eje transversal debe desarrollar en el estudiante su capacidad investigativa y la publicación de artículos científicos en revistas indizadas (Gómez, Deslauriers y Alzate, 2010); también competencias y habilidades que generen impacto internacional y permitan la aplicación de conocimientos científicos en contextos pertinentes (Pacheco, 2015 y Rodríguez, 2013).

Los principios y ejes fundamentales del doctorado están centrados en la internacionalización, la convergencia y homogenización de los estudios doctorales (Rodríguez, 2013); asimismo, las competencias en investigación, la interdisciplinariedad y el desarrollo conjunto con las empresas (Jiménez-Ramírez, 2017), es decir que la universidad no esté aislada de la sociedad ni de las empresas, como antes lo ha estado.

Las competencias que se deben desarrollar en el nivel de doctorado en educación se centran en tres: disciplinares: que aporte investigación de alta calidad a nivel nacional e internacional para contribuir a la comunidad científica; competencias metodológicas tanto cualitativas como cuantitativas; instrumentales: que permitan abordar con mayor precisión los fenómenos que se van a estudiar (Núñez-Valdés y González, 2019); no obstante, también sería bueno agregar la competencia comunicativa específicamente en la escritura de la tesis doctoral donde prime la coherencia, cohesión y adecuación del discurso de la tesis.

La tesis no debe estar aislada de la Ley Universitaria peruana nro. 30220, donde se establece que la obtención del doctorado debe realizarse a través de la aprobación y sustentación de un trabajo científico que tenga rigurosidad académica y sea original; asimismo, que aporte a la ciencia y que resuelva problemas del entorno o contexto, con el propósito de que no sea una tesis que solo cumpla el requisito para graduarse y sin posibilidades de que se publicable o carezca de relevancia social.

Método

El presente estudio es cualitativo. Se han seleccionado los programas licenciados por SUNEDU que ha difundido su plan a través de sus webs (consultadas desde enero de 2019 hasta el 25 de octubre del 2019). Incluye a universidades privadas y públicas (42 programas analizados). Se han estudiado los cursos de investigación de los 6 ciclos.

Algunas universidades tienen varias sedes o secciones (UCV cuenta con 4 Administración de la Educación y 4 en Educación; la Universidad de Huánuco 3, la PUCP 2, la U. Marcelino de Champagnat (2), aunque solo una funciona, pero en el portal de SUNEDU figuran 2, la U. Unión 2

Tabla 1: Relación de programas de doctorado en educación licenciados por SUNEDU

Nro.	Universidad	Denominación del programa	Lugar
1	Pontificia Universidad Católica del Perú (2)	Ciencias de la Educación (1); Gestión Estratégica con Mención Innovación y Gestión en Educación Superior (1)	Lima
2	Universidad Andina del Cusco (1)	Ciencias de la Educación	Cusco
3	Universidad Católica de Santa María (1)	Educación	Arequipa
4	Universidad César Vallejo (8)	Administración de la Educación (4, **no se difunde en su portal**), Educación (4)	La Libertad
5	Universidad de Huánuco (3)	Ciencias de la Educación	Huánuco
6	Universidad de Piura (1)	Educación	Piura
7	Universidad de San Martín de Porres (1)	Educación	Lima
8	Universidad Femenina Sagrado Corazón de Jesús (1)	Educación	Lima
9	Universidad Marcelino Champagnat (2)	Ciencias de la educación (1), en Filosofía con mención Educación (1), (**está en la base de SUNEDU, pero no se imparte**)	Lima
10	Universidad Nacional Daniel Alcides Carrión (1)	Ciencias de la educación (**no ha difundido su plan de estudios en su portal web**)	Pasco
11	Universidad Nacional de Cajamarca (1)	Ciencias de la Educación	Cajamarca
12	Universidad Nacional de Huancavelica (1)	Educación	Huancavelica
13	Universidad Nacional de la Amazonía Peruana (1)	Ciencias de la Educación	Loreto
14	Universidad Nacional de Piura (1)	Educación	Piura

15	Universidad Nacional de San Agustín (1)	Ciencias de la Educación	Arequipa
16	Universidad Nacional San Cristóbal de Huamanga (1)	Educación (**no ha difundido su plan de estudios en su portal web**)	Ayacucho
17	Universidad Nacional de San Martín (1)	Ciencias de la Educación	San Martín
18	Universidad Nacional de Trujillo (1)	Ciencias de la Educación	La Libertad
19	Universidad Nacional de Ucayali (1)	Educación	Ucayali
20	Universidad Nacional del Altiplano (1)	Educación	Puno
21	Universidad Nacional del Centro del Perú (1)	Educación	Junín
22	Universidad Nacional del Santa (1)	Educación	Ancash
23	Universidad N. Hermilio Valdizán de Huánuco (1)	Educación	Huánuco
24	Universidad Nacional Jorge Basadre Grohmann (1)	Ciencias de la Educación	Tacna
25	Universidad Nacional Mayor de San Marcos (1)	Ciencias de la Educación	Lima
26	Universidad Nacional Santiago Antúnez de Mayolo (1)	Educación y Docencia Universitaria	Ancash
27	Universidad Peruana Unión (2)	Educación con mención en Currículo y Docencia (1) y con mención Gestión Educativa (1)	Lima
28	Universidad Privada Antenor Orrego (1)	Educación	La Libertad
29	Universidad Privada de Tacna (1)	Gestión Educativa	Tacna
30	Universidad San Ignacio de Loyola (1)	Educación	Lima

Nota: Tomado de https://www.sunedu.gob.pe/lista-carreras-autorizadas/

Total: 42 programas; 30 universidades, de estas 3 no han difundido sus planes en sus webs: UCV con su doctorado de Administración en Educación (cuatro programas), Universidad Nacional Alcides Carrión, San Cristóbal de Huamanga, la Universidad Marcelino de Champagnat, según SUNEDU tiene 2 programas, pero solo imparte uno: Ciencias de la Educación. La Universidad César Vallejo en el programa de Doctorado en Educación tiene cuatro programas, pero para el análisis solo se ha considerado uno. En total son 30 programas analizados.

Análisis De Resultados

En análisis de contenido se ha realizado teniendo en cuenta las categorías, es decir agrupando los cursos que tienen un mismo propósito o fin: cursos orientados a la formación en metodología de la investigación científica (procesos, paradigmas, métodos); cursos que desarrollan la ciencia desde un aspecto analítico, crítico; cursos orientados al desarrollo de la investigación para la tesis doctoral; cursos que se interrelacionan con la investigación, desde un enfoque interdisciplinar; cursos relacionados con la búsqueda de información y la redacción científica o artículos científicos; cursos sobre identificación de problemas relacionados con la educación; cursos orientados a la gestión del conocimiento (tiene como propósito cómo transferir el conocimiento dentro de la organización).

Tabla 2: Primera categoría, cursos, universidad y ciclo

Nro.	Categoría	Cursos	Universidad y ciclo
1	Formación en metodología de la investigación	Metodología de la Investigación Científica	U. Andina del Cusco, Universidad de Piura, U. Nacional de Cajamarca, U. Hermilio Valdizán, Santiago Antúnez de Mayolo (ciclo I); Universidad Marcelino de Champagnat en su mención Ciencias de la Educación (ciclo II).
		Métodos Cuantitativos, Métodos Cualitativos	PUCP en su mención Gestión Estratégica en sus ciclos: I y II.
		Investigación Cuantitativa, Investigación Cualitativa	U. Antenor Orrego, ciclos I y II.
		Paradigmas Metodológicos en la Investigación Científica	La Universidad Nacional Mayor de San Marcos, ciclo I.
		Métodos de Investigación	PUCP (en su mención: Gestión Estratégica), ciclo I.
		Investigación I, Investigación II.	U. Nacional de Trujillo, ciclo I y II.
		Investigación Científica	U. Hermilio Valdizán, ciclo II
		Metodología de la Investigación Educacional, Metodología de Investigación Científica Cualitativa	U. San Ignacio de Loyola, ciclo I y II.

Nota: Elaborado en base a la información de la web de las universidades estudiadas

La primera categoría está relacionada con la metodología de la investigación científica, esta prevé al investigador de conceptos, leyes para desarrollar el proceso investigativo (Viñán, Navarrete, Puente, Pino y Caicedo, 2018). Asimismo, permite mejorar la enseñanza y la pedagogía, al tratarse de la investigación y su relación con la educación.

Tabla 3: Segunda categoría, cursos, universidad y ciclo

Nro.	Categoría	Cursos	Universidad y ciclo
2	Desarrollo de la ciencia desde un aspecto analítico, crítico	Epistemología	Universidad Andina del Cusco, U. César Vallejo, U. Marcelino Champagnat en su mención Ciencias de la educación, U. Nacional de Cajamarca, U. Nacional del Centro, U. Nacional del Santa (ciclo I).
		Epistemología e Historia de la Educación	U. Católica Santa María, ciclo I
		Epistemología y Educación	U. San Martín de Porres, ciclo I.
		Epistemología de la Educación	U. Femenina del Sagrado Corazón, U. Nacional de la Amazonía Peruana, U. Nacional del Altiplano, U. Hermilio Valdizán, UNMSM, U. San Ignacio (Ciclo I).
		Seminario de Epistemología de la Educación	U. Santiago Antúnez de Mayolo, ciclo I.
		Fundamentos Epistemológicos de la Educación	U. Nacional Jorge Basadre, ciclo I
		Epistemología transdisciplinaria y Corrientes Filosóficas en Ciencias Sociales y de la Educación	U. de Huánuco, ciclo I.
		Seminario de Epistemología de la Educación	U. Santiago Antúnez de Mayolo, ciclo I.
		Fundamentos Epistemológicos de la Educación	U. Católica Santa María, ciclo I.
		Epistemología transdisciplinaria y Corrientes Filosóficas en Ciencias Sociales y de la Educación	U. de Huánuco, ciclo I
		Filosofía de la Ciencia, Filosofía de la Ciencia y la Tecnología	U. Nacional de Ucayali, ciclo I (Filosofía de la Ciencia) U. Nacional Jorge Basadre, ciclo II (Filosofía de la Ciencia y la Tecnología

Nota: Elaborado en base a la información de la web de las universidades estudiadas

La segunda categoría se asocia con la epistemología que analiza de manera crítica los problemas que se presentan en la creación o producción del conocimiento científico, entre ellos la construcción de términos, la evolución de las teorías, su contrastación empírica (Damiani, 2005);

la epistemología de la educación estudia los aspectos curriculares, la relación entre disciplinas, la formación docente, la calidad del proceso educativo.

Tabla 4: Tercera categoría, cursos, universidad y ciclo

Nro.	Categoría	Cursos	Universidad y ciclo
3	Desarrollo de la investigación para la tesis doctoral	-Seminario de Investigación (I, II, III, IV, V) -Seminario de Tesis (I y II): -Proyecto de Tesis: -Tesis I: Elaboración del Proyecto de Investigación I -Tesis Doctoral (I y II). -Investigación Doctoral (II y III). -Asesoramiento de Tesis (I y II). -Taller de Tesis (I y II)	La mayoría de universidades las incluyen en sus programas, a partir del II ciclo, de manera gradual o secuencial, con excepción de la Universidad Hermilio Valdizán (no lo incluye ni en el III ni en el V ciclo); tampoco la U. Nacional de Ucayali en su III y IV ciclo; Antenor Orrego en su III, U. Privada de Tacna también no la considera en el III ciclo y la U. Nacional de la Amazonía Peruana en el III ciclo. En los ciclos mencionados no llevan ningún curso de investigación.

Nota: Elaborado en base a la información de la web de las universidades estudiadas

La tercera categoría está asociada con la realización de la tesis doctoral, en este caso específico están los talleres, estos permiten la relación entre la teoría y la práctica en la realización de la investigación (Fernández y Guevara, 2017); los seminarios que forman participantes para la investigación, desarrollan sus competencias investigativas (Universidad Industrial de Santander, 2007). En este caso también se incluyen los seminarios de tesis que es la ejecución de la investigación o del plan de investigación. También los proyectos de tesis, que pertenecen a la etapa previa al seminario de tesis.

Tabla 5: Cuarta categoría, cursos, universidad y ciclo

Nro.	Categoría	Cursos	Universidad y ciclo
4	Cursos con enfoque interdisciplinar	Estadística Aplicada a la Educación	U. Católica Santa María, ciclo II (Estadística Aplicada). U. Nacional del Altiplano, ciclo II; U. Nacional de Piura, ciclo IV. (Estadística Aplicada a la Investigación Educativa). U. Nacional de San Martín, ciclo VI (Estadística Inferencial).
		Ética en la Investigación Científica	U. César Vallejo, ciclo II.
		Responsabilidad Social e Investigación	U. César Vallejo, ciclo II.

Nota: Elaborado en base a la información de la web de las universidades estudiadas

La cuarta categoría está asociada con la investigación desde un enfoque interdisciplinar el cual implica la interacción de varias ciencias para estudiar o resolver los problemas científicos. Va

más allá de las disciplinas y construye un nuevo modo de existir o convivir (Arboleda, Garcés, Sepúlveda, 2018).

Tabla 6: Quinta categoría, cursos, universidad y ciclo

Nro.	Categoría	Cursos	Universidad y ciclo
5	Cursos relacionados con la búsqueda de información y la redacción científica o artículos científicos	Taller de manejo de Información y Redacción Académica	PUCP, Gestión Estratégica, ciclo I.
		Redacción de Artículos en Informes Científicos en Educación	U. Católica Santa María, ciclo II.
		Taller de Investigación I: Búsqueda de Información Científica	Universidad Marcelino Champagnat con mención en Ciencias de la educación, ciclo II
		Redacción Científica	U. Nacional de Piura, ciclo I
		Investigación I (Revisión de Literatura Científica)	U. Nacional de Trujillo, ciclo I.
		La Publicación Científica	U. Nacional de Trujillo, ciclo III.
		Elaboración y Publicación de Artículo	U. Católica Santa María, ciclo VI.
		Investigación VI (Redacción de la Tesis)	U. Nacional de Trujillo, ciclo VI.
		Taller de Producción Intelectual	U. Nacional del Altiplano, ciclo V.
		Seminario de Redacción y Publicación Científica	U. Nacional Santiago Antúnez de Mayolo, ciclo V.
		Taller de Tesis VI: Borrador de la Tesis	UNMSM, VI ciclo.
		Tesis IV: Redacción y Sustentación del Informe de Investigación	Universidad Antenor Orrego, ciclo VI.
		Seminario de Tesis V: Elaboración y Sustentación de Informe de Investigación	Universidad San Ignacio de Loyola, ciclo VI.

Nota: Elaborado en base a la información de la web de las universidades estudiadas

La quinta dimensión está relacionada con la búsqueda de información y la redacción científica. Se trata de una competencia comunicativa (completa) que implica el conocimiento de la competencia lingüística, sociolingüista, discursiva, estratégica y sociocultural (Gutiérrez-Artacho, Olvera-Lobo, Rivera-Trigueros, 2019), el cual incluye el dominio de la lectura y escritura científica.

Tabla 7: Sexta categoría, cursos, universidad y ciclo

Nro.	Categoría	Cursos	Universidad y ciclo
6	Cursos sobre identificación de problemas relacionados con la educación	Investigación Sobre la Problemática Educativa Peruana	U. Femenina del Sagrado Corazón, ciclo I.
		Investigación sobre Problemática Educativa Latinoamericana y Mundial	U. Femenina del Sagrado Corazón, ciclo II.
		Investigación Pedagógica	U. Antenor Orrego, ciclo IV.

Nota: Elaborado en base a la información de la web de las universidades estudiadas

La sexta categoría está asociada a los cursos relacionados con los problemas educativos. El cual permite al estudiante conocer los problemas relacionados con su carrera, en este caso educativa.

Tabla 8: Sétima categoría, cursos, universidad y ciclo

Nro.	Categoría	Cursos	Universidad y ciclo
7	Gestión del Conocimiento	Gestión del Conocimiento Científico	U. Femenina del Sagrado Corazón, ciclo I.
		Gestión de Conocimiento	UCV, mención Ciencias de la Educación, ciclo III.

Nota: Elaborado en base a la información de la web de las universidades estudiadas

La sétima categoría está referida a la gestión del conocimiento, permite mejorar las actividades de los integrantes de la comunidad educativa; en el caso de la educación es relevante porque se puede utilizar para mejorar los procesos formativos, investigativos.

Discusión

Del análisis de los cursos de los programas de doctorado en educación, presentan disparidad, no hay convergencia, homogenización (Rodríguez, 2013).

También, hay evidencias que las facultades y entre ellos los programas de doctorado no están en la escena científica internacional, no aparecen entre las 12 primeras del ranquin Scimago de 2019, en educación. Tampoco se tiene revistas de educación indizadas en Scopus.

Los cursos de investigación (Estadística Aplicada a la Investigación Educativa, Ética de la Investigación, etc.) que desarrollan la interdisciplinariedad, que es un eje fundamental del doctorado (Jiménez-Ramírez, 2017), son pocos, teniendo en cuenta que en la actualidad se requiere desarrollar este enfoque para resolver problemas complejos.

No existe estandarización en los cursos ni en los ciclos que se imparten; por ejemplo, se dictan cursos de redacción de artículos científicos al inicio de los semestres, cuando se deben desarrollar en los últimos ciclos porque tienen la investigación por concluir o finalizada.

Los planes o cursos que se imparten, al no estar estandarizados, impiden que exista movilidad (Rodríguez, 2013) que es otro principio del doctorado.

De los cursos de investigación analizados, tampoco se evidencia que exista o se establezca una alianza o relación de la universidad con la empresa (Jiménez-Ramírez, 2017; Concepción, González, García y Miño, 2019).

Los cursos de ética en la investigación también son escasos, tal vez se desarrollen las temáticas en algunas asignaturas, pero no se imparten como cursos.

Respecto a las competencias metodológicas de investigación cuantitativas, cualitativas (Núñez-Valdés y González, 2019), sí se imparten algunos cursos con ese alcance.

La escritura de artículos científicos muestra diversidad porque algunas universidades la desarrollan en los primeros ciclos y otras al término de la formación doctoral. En realidad, se debe estandarizar en los últimos ciclos que corresponde a la finalización de la tesis que sirve de base para la construcción de manuscrito.

Conclusiones

Los cursos de investigación en los programas de doctorado en la educación peruana no están estandarizados; existe disparidad entre cursos y ciclos.

Los programas de doctorado en educación están orientados a la comprensión de la investigación a través de los cursos de Metodología de la Investigación y de Epistemología, también los que están enfocados a conocer la problemática educativa.

Los cursos que consolidan el desarrollo de la investigación también son dispersos, se desarrollan a partir del segundo ciclo, y prevalecen los seminarios, talleres, tesis doctorales.

También existe presencia de los cursos que están orientados a la consolidación o la publicación de la investigación, como las asignaturas de elaboración o publicación de artículos (pero de manera reducida).

Presentan algunos alcances sobre la investigación interdisciplinar a través de la estadística y la ética.

Los cursos que se desarrollan en los programas de doctorado no evidencian que permitan realizar publicaciones en el ámbito internacional porque las facultades de educación no se encuentran en el ranquin de las 12 mejores universidades en educación de Latinoamérica, tampoco existen revistas educativas indizadas en Scopus.

La falta de estandarización de cursos y ciclos impide que exista movilidad académica.

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Using of The International Experience of Controlling Evolution in Russia

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Abstract

The relevance of the study is confirmed by the fact that the use of controlling potential increases the effectiveness of company management, and the bulk of the additional effect is provided in the production sphere thanks to innovations related to the implementation of controlling. Mutual enrichment of experience, which is actively promoted by controlling, turns it into a multifaceted universal management tool, which becomes an integral part of modern management, contributing to the qualitative improvement of management. The purpose of this study is to monitor the international experience of controlling evolution and its use in modern conditions of Russia. To achieve this goal, the following tasks were solved: to consider the most important fundamental principles, the essence of the development of controlling both in the country and abroad, taking into account the experience of specialists in this field; to reveal the tasks of controlling at the present stage and the problems of its implementation; to consider various approaches of the categorical-conceptual apparatus of controlling domestic and foreign authors; to systematize controlling categories by homogeneous groups. The methodological foundations of the study are the methods of system analysis. These methods are used as a theoretical basis in the works of domestic and foreign scientists on controlling. The result of this study is the conclusions made on the basis of international experience in the evolution of controlling and its use in modern conditions of Russia.

Keywords: Management, Controlling, Management Tool, Controlling Development Concepts, International and Practical Experience.

Introduction

Presence at the enterprise of the developed controlling system carry to one of its most important competitive advantages in the field of management.

Controlling as a business management tool is recognized and used in all developed countries of the world. As a result, there is a mutual enrichment of best practices in this area, although national differences are fully taken into account in practice, which is an important factor in improving the effectiveness of its application. In the context of globalization of the world economy, there is an active movement of capital from one country to another. For example, the Japanese-owned car factories in the United States are actively using controlling instruments developed in Japan, and in Germany at the same time adopted all the positive that has accumulated in this area in the United States of America.

In the modern scientific Arsenal has accumulated a lot of definitions of controlling, each of which reflects a particular concept in the range of a narrow understanding at the level of management accounting options or management tools to recognize its management philosophy. As a result, today in the presentation of the concept of controlling continues to exist variability of its definition.

The list of challenges facing the controlling task details presented by experts, to an even greater extent rassoglasovaniya, even within one and the same purpose. The most interesting is the formulation of tasks with their division into areas of action (strategic and operational).

At the present stage, many scientists pay great attention to the definition and study of the essence of the controlling category. Among the foreign authors are: Butch G., Buchanan J. Here , Van Horn J, Vaitilingam R., J. Gitomer. Daly Stigmator A., Mayer, E., Miles, D., Mann, R., Pietsch G., Sherm E., Robson M., Ullah F., Finkelstein, S., Teyla, Filmot..... Han D., Stigler H., Hofmeister, R., Eddowes M. etc. In their work detail is characterized by the theory and practice of controlling the main approaches to its study, but the authors primarily rely on the national experience, which is significantly different in different countries. Of course, there is an imprint on the theoretical framework and practical tools, which are sometimes very different from authors from different countries. The theoretical basis of the study consists of the works of Russian scientists in the field of controlling, accounting, planning, economic analysis, audit of business, management: Alekseeva O. V., officer Aniskina, Y. P., S. A. Varakuty, Bahrushina M. A., Danilochkina N. G., Egorov Yu. N., Kasyanov G. Yu., Kolesnikov S. N., Nikolaeva O. E., Pavlova A. M., Petrenko S. N., Plotnikov V. S., Sokolov Y. V., stukova, S. A. and Souza V. P., Falco, S. G., Sheremet A. D., Shestakova V. V., Shishkova T. V., V. B. Ivashkevich, etc.

The most important aspect that most authors pay attention to is the systematic approach required in the perception of controlling. So," control system " considers controlling V. B. Ivashkevich. Russian scientist , Professor S. G. Falco clearly formulated the philosophy of controlling, which determined its development for the decade ahead.

Results and Discussion

The reasons for the appearance of such diverse points of view, stem from the classification of controlling functions.

Thus, based on the analysis of the approaches to the definition of the essence of the "controlling" category presented in the scientific literature, it is advisable to systematize the set of controlling definitions, dividing it into the following groups of approaches:

1. System approach (V. B. Ivashkevich, E. Mayer, N. V. Palesheva, S. G. Falco, etc.), referring controlling to a specific systematic activity aimed at achieving the strategic goals of the enterprise.
2. Approach to controlling environmental management tool (I. V. Bartuska, E. K. Vasilyeva, P. Preissler, etc.).
3. A conceptual approach (A. M. Pavlova, Yu. p. Aniskin, A. M. Karminsky, A. G. Primak, HY, Falmouth, etc.), whose supporters include the controlling of the enterprise management concept.
4. Information approach (T. Reichman, S. Y. Yusupova) understanding the main purpose of controlling as information support of the enterprise management with the necessary data for the implementation of management functions.
5. Process approach (A. dyle, etc.), whose supporters attribute controlling to the process of effective enterprise management.
6. Functional approach (p. Horvath, etc.), relating controlling to the management function focused on management support.

It should be noted that the elements of the controlling system are planning, accounting, analysis, control and regulation, contributing to the formation of a more effective strategy of the enterprise, respectively, strategic goals and priorities.

His position is the essence of controlling is seen A. P. Gradov and B. I. Cousin, who define it as a new concept of effective management of the firm to ensure its long-term existence in the market Aniskin Y. P. Pavlov and A. M. consider controlling as a concept aimed at eliminating bottlenecks and future-oriented in accordance with the objectives and tasks to obtain certain results. A systematic understanding of controlling can be observed in The approach of S. G. Falco defines it as a long-term and effective development-oriented system of information and analytical, methodological and instrumental support of the company's managers to achieve their goals, ensuring the implementation of a full cycle of management in all functional areas and processes through the measurement of resources and performance.

However, regardless of the terminology, such a phenomenon as controlling objectively exists and develops under the influence of real factors both in Europe and in the United States (Table 1).

Table 1: Distinctive features of the European and American controlling system

American model	German model
Controlling	Controlling
Planning	Planning
Information management	Information management and reporting
Special economic tasks	Special economic tasks
Internal accounting, Internal audit	Internal accounting
Financial accounting, Taxes and insurance	
The information given	

The difference is in the content of the tasks identified in the controlling:

1) the American task catalogue focuses primarily on accounting, planning, information and analysis.
2) European directory focuses on counseling and coordination of budgeting; the management of internal information service; consultation and coordination in planning and investment; implementation of special economic studies.

Modern development in the Western countries of controlling is characterized by the complexity of the market orientation of the enterprise, which leads to an increasing role of management and a qualitative revolution in the structures and methods of management.

The process of transformation and integration of traditional methods of accounting, analysis, regulation, planning and control into a single system of obtaining, processing information and making management decisions on its basis, a system that coordinates the work of the enterprise, being focused on achieving not only the current goals of profit, but also on global strategic goals: the survival of the enterprise, its environmental neutrality, the preservation of jobs.

The results of the research show that the use of controlling potential increases the effectiveness of the company's management, and the main share of the additional effect is provided in the field of production due to innovations associated with the introduction of controlling. In some States, the most intensively used are some positive aspects of controlling, in others-others, but in all cases it receives positive feedback and good results. Mutual enrichment of experience, which is actively promoted by controlling, turns it into a multi-faceted universal management tool that becomes an integral part of modern management, contributing to the qualitative improvement of management.

The variation of the effect in the management and production reached the following foreign companies in connection with the use of innovative achievements in the field of monitoring and controlling: Sony , Samsung ,LG , Akai , Kodak , Nokia , Mazda , Siemens , BP , Shell , etc.

Otis GmbH plant (Berlin), for example, produces components for elevators. At the enterprise, controllers organize and accompany the management process of selecting goals, planning and regulation, and are responsible for achieving the goals. Controllers provide transparency of strategies, financial results, coordinate intermediate goals and plans within a single whole, provide service support, providing managers with the necessary information. In OTIS GmbH factory act controlling; controlling of the installation; controlling logistics, etc. The plant controlling service is responsible for the planning within the plant, for the calculation of profits and losses of the enterprise as a whole, for the performance of individual plant projects. However, it is not responsible for the balance, taxes, etc. Among the tasks of the factory controlling – planning, results analysis, reporting and development of corrective measures in case of any discrepancies. Otis ' controlling units accompany the company's products throughout its life cycle, from development, research, procurement, production to customer service and logistics.

At the same time, the application of practical controlling tools at different enterprises differs significantly. The organizational basis of such services is also different. Most of the German companies have controlling services primarily engaged in accounting and analysis of costs, as well as the results of financial and economic activities. Specific factual data for analysis are provided to the controlling service by the accounting Department. The controller receives statistical materials, data of the plan and results of comparison of actual values of indicators with planned values from planned and financial services of the enterprise. Based on the calculations, the controller offers recommendations to the top management of the company to reduce costs, increase profitability, profitability of production and sales. On the basis of such recommendations, the best management decision is selected from among the available alternatives. It is very common to use controlling in forecasting prices for products and services, to determine the maximum permissible limits of prices and tariffs, to calculate the estimated profit, tax payments and reserve funds. As part of controlling the effectiveness of different investment options is checked before and during their implementation, the conditions of the project are modeled. Generalized and systematized information provided by the controlling service to the management of the enterprise is of great importance not only for operational, but especially strategic.

Based on the above, in the German concept, the controller specializes in supporting the operational decision-making of the company's management and also provides strategic support to the head. It is focused on the company's development strategy and internal, production, cost accounting. The task of the controller is to ensure the effectiveness and efficiency of management and to support the Manager through the targeted provision of information for decision-making. The controller has a high responsibility, he acts as an internal adviser, consultant of the management team. The tasks of external, financial, accounting, as well as retrospective audit or control, tax audit, are not the tasks of the controller in Germany. In the practice of entrepreneurship, the Manager and the controller have different responsibilities.

The controller in Germany, according to the definition Of the international controlling group, forms, accompanies the processes of managing the achievement of the goal, planning and management and is thus responsible together with the Manager for achieving the goal. This means that the controller:

- responsible for the transparency of the strategies, profit and Finance and thus contribute to enhancing the effectiveness;
- coordinates, summarizes individual goals and plans and organizes a future - oriented report for management;
- moderates and shapes the process of managing the goal search, planning and management so that the decision maker can work towards the goal;
- provides economic data and information for this purpose.
- controlling as a process occurs in the dialogue between the controller and the Manager with the constant economic management of the enterprise. In this sense, the activity of the controller is active:
- to guarantee the effectiveness of management;

- revision of the strategy and its implementation for operational purposes; ensuring sufficient harmonization with the established reporting rules;
- risk and opportunity management;
- improving the efficiency of the enterprise on the basis of financial stability.
- The controlling process is characterized by fundamental principles: transparency, accepted assumptions and applied methods, systems and tools; reliability, reliability and availability of the analysis;
- the existence of relationships between assumptions, systems and results.

The main tasks that can be solved by controlling are to achieve business transparency (to show managers what is happening inside the company), to form an information basis for management decision-making, to develop the goals of the company as a whole and its structural divisions and to ensure the achievement of these goals.

Currently, controlling is implemented in large Russian organizations such as: JSC "Rostelecom", JSC "Russian Railways", JSC "AVTOVAZ", JSC "LUKOIL", JSC "Gazprom-Neft" and others.it Should be noted that the use of controlling covers various areas of business, makes a great contribution to the establishment and improvement of systematic control over the activities of all departments of enterprises for mutually beneficial cooperation with contractors in terms of customer focus.

However, there are a number of reasons preventing the introduction of controlling in Russian enterprises:

1) lack of sufficient information on the Russian practice of implementing controlling systems and its low efficiency;
2) insufficient number of developments in the field of complex information systems that meet the requirements of a particular organization (therefore, Russian enterprises are forced to buy information systems abroad, and this in turn is quite expensive);
3) instability of economic policy of many enterprises, lack of its target orientation;
4) inconsistency in the work of various departments of the enterprise, as well as insufficient transparency of information;
5) ignoring and underestimating the state of environmental problems;
6) high cost of implementation of the controlling system (training of specialists in this field, the acquisition of information systems, restructuring of existing units and the formation of a new Department);
7) the absence of a corresponding normative-legal support of controlling system;
8) the lack of specialists with the necessary knowledge and skills, despite the fact that the MSTU. E. N. Bauman since 1997 prepares students on a budgetary basis in the specialty " Controlling in the enterprise "in order to replenish qualified personnel in the field of"controlling".

Conclusion

Prospects of controlling development both in the medium and long term are connected with the coverage of new areas of activity (intangible assets, network organizations, etc.), as well as with the change in the status of controllers in the organization: the implementation of the functions of internal consultants of the enterprise management in the field of management.

Quite often, even specialists do not distinguish between the concepts of "internal audit" and "controlling". Of course, at first glance it may seem that in both cases there is control over the activities of any organization. However, this is not so, because, for example, internal audit is organized in the company in the interests of its owners control system over compliance with the established order of accounting and reliability of the internal control system of the organization. That is, specialists in the field of internal audit work with the final data (at the end of the quarter), checking and controlling all the economic facts of any activity of the organization. While controlling the main goal-the orientation of the management process to achieve all the goals facing the enterprise. To do this, controlling provides the following functions: coordination of management activities to achieve the goals of the enterprise; information and consulting support of enterprise

management decisions; creation and maintenance of a common enterprise management information system; ensuring the rationality of the management process.

Areas of management activity in the framework of controlling the interaction is a coherent balanced system that includes: Budgeting; Operational planning; Strategic planning; Management accounting and cost analysis; Tax planning; Investment planning and financing; Coordination activity; Insurance activity; Information support; Control of units; Interaction with tax authorities; Control of the production program.

Based on numerous studies, in recent years, controlling has become an integral part of the crisis management system of enterprises associated with the implementation of financial and economic commenting function in management for operational and strategic management decisions. Thanks to the introduction of the controlling tool in modern business practice, many enterprises tend to form an effective management system for all areas of their activities, strengthening not only their own positions, but also the industry as a whole.

It should be noted that controlling in Russia over the past 20 years has evolved from an accounting and analytical function to a provider of relevant information for the Manager. The theory and practice of Russian controlling developed mainly according to the "German model", although in a number of Russian companies, in particular, the fuel and energy sector, there are elements of the "American model".

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Analysis of Iron Ore Production: World Practice

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Abstract

The relevance of the study is confirmed by the fact that iron ore deposits have been identified in 98 countries, and global forecast resources are estimated at 790.9 billion tons. Total iron ore reserves in the world are 464.24 billion tons; confirmed reserves are 206.9 billion tons. the three largest producing countries (China, Brazil, Australia) account for about 65% of global production. But the main leader in the world production of commodity iron ore is China. World consumption of commodity iron ore, including its own production, imports and exports, is distributed very unevenly across countries and is characterized in the leading countries by the following data: China 740 million tons, which is 46.8% of the world level, Japan-8.6%, Russia-5.7%. The purpose of this study is to analyze the extraction of iron ore raw materials in the world as a type of economic activity. To achieve this goal, the following tasks were solved: to examine the industrial types of iron ore; to study the world's resources and reserves of iron ore; to identify the largest producers of iron ore raw materials; to systematize the factors that affect the growth of basic iron ore prices. The result of this study is the conclusions made on the basis of the analysis of the extraction of iron ore raw materials in the world as a type of economic activity.

Keywords: Ferrous Metallurgy, Iron Ore Raw Materials, Iron Ore, Iron Ore Reserves.

Introduction

Iron and steel products are used in all areas of industrial production, but mainly in mechanical engineering and capital construction. Iron ore is a raw material for the production of ferrous metals. Iron ore extracted from the bowels is commonly called “raw ore” in mining. Iron ore raw materials (iron ore) - a type of metallurgical raw material that is used in the iron and steel industry for the production of pig iron and metallized product (DRI and HBI), as well as in small quantities in steelmaking.

Iron ores are natural mineral formations containing iron and its compounds in such a volume that industrial extraction of iron is advisable. Although iron is included in a greater or lesser amount in the composition of all rocks, the name iron ores refers only to such accumulations of glandular compounds, of which metallic iron can be obtained in large sizes and with economic benefits.
The following industrial types of iron ore are distinguished:

• Titanium-magnetite and ilmenite-titanomagnetite in basites and ultrabasites;
• Apatite-magnetite in carbonatite;
• Magnetite and magneto-magnetite in skarns;
• Magnetite-hematite in iron quartzites;
• Martite and martite-hydrohematite (rich ores, formed by iron quartzites);
• Goethite-hydrogetite in weathering crusts.

There are three types of iron ore products used in the iron and steel industry: separated iron ore (loose ore enriched by separation method), sinter ore (sintered, agglomerated by heat treatment) and pellets (crude iron-containing mass with the addition of fluxes (usually limestone); it is formed into balls with a diameter about 1-2 cm).

This section should follow keywords. This section should provide background of the study and highlight research motivation.

Rich iron ore has an iron content of over 57%, and silica less than 8 ... 10%, sulfur and phosphorus less than 0.15%. It is a product of the natural enrichment of ferruginous quartzites created by leaching of quartz and decomposition of silicates during long-term weathering or metamorphosis. Poor iron ores may contain at least 26% iron.

Analysis of the extraction of iron ore in the world

The world's proven reserves of iron ore are about 160 billion tons, which contain about 80 billion tons of pure iron. According to the US Geological Survey, iron ore deposits in Russia and Brazil account for 18% of the world's iron reserves.

Table 1 : The largest derivatives of iron ore in 2019

Company	Country	Productive capacity, million tons per year
Vale	Brazil	422,4
Rio Tinto	United Kingdom	282,8
BHP Billiton	Australia	193,7
ArcelorMittaln	United Kingdom	81,2
Fortescue Metals	Australia	55,5
Evrazholding	Russia	55,8
Metalloinvest	Russia	49,6
AnBen	China	49,2
MetInvest Holding	Ukraine	43,5
Anglo American	South Africa	42,5
LKAB	Sweden	39,7

According to U.S. Geological Survey, world iron ore production in 2019 amounted to 2.3 billion tons (an increase of 3.6% compared to 2018).

Table 2: World resources and reserves of iron ore as of 2019

	Category	Mln. t.
Russia	Category Reserves A+B+C	56114
	Category Reserves C	4464
Australia	Proved + probable reserves	11900
	Measured + indicated resources	26900
	Inferred resources	29800
Algeria	Historical resources	3500
Bolivia	Historical resources	40300
Brazil	Reserval avravel	12470
Venezuela	Measured + indicated + inferred resources	70857
Vietnam	Reserves	4080
Gabon	Historical resources	1290
India	Historical resources	2200
	Reserves	7000
Iran	Resources	25359
	Reserves	2500
Kazakhstan	Resources	4556,30
Canada	Reserves	8300
China	Reserves	1700
Mauritania	Ensured reserves	22364
	Reserves	700
Mexico	Resources	2540
Pakistan	Reserves	700
Peru	Historical resources	908,70
USA	Historical resources	5070
Turkey	Reserves	6900
Ukraine	Proved + probable reserves	113,25
	Category Reserves A + B + C	24650
Chile	Category Reserves C	7195,93
South Africa	Historical resources	1950
Sweden	Reserves	1000
	Proved + probable reserves	1020

Iron ore deposits have been identified in 98 countries, and world forecast resources are estimated at 790.9 billion tons. The total iron ore reserves in the world are 464.24 billion tons; confirmed reserves amount to 206.9 billion tons. The three largest producing countries (China, Brazil, Australia) account for about 65% of global production. But the main leader in world production of salable iron ore is China. The global consumption of salable iron ores, taking into account domestic production, import and export, is distributed unevenly among countries and is characterized in the leading countries by the following data: China 740 million tons, which is 46.8% of the world level, Japan - 8.6%, Russia - 5.7%. However, a significant part of the mineral resource base is represented by poor and medium-quality ores with an iron content of 16–40%, which account for 87.5% of explored reserves. In Russia, the share of rich ores with an iron content of about 60% or more (not requiring enrichment) in

explored reserves is only 12.5%. Over the past 10 years, iron ore output has increased on average by 1.8% per year, and over the past 5 years - by 9% per year. However, demand for iron ore in recent years has outstripped supply. There are a significant number of new iron ore mining projects around the world, the implementation of which will not only compensate for the withdrawing resources, but also ensure the necessary (from the point of view of the predicted expansion of world steel production) output growth. The iron content in industrial ores ranges from 16 to 70%. Given the significant depths of the quarries, the difficult conditions for the development of the underlying horizons, the significant amount of work on the reconstruction of very complex schemes of internal quarry transport and environmental problems, the production volumes of magnetite ferruginous quartzites at KMA quarries will practically remain at the achieved level until 2025, followed by a decrease in production volumes. Currently, the iron content in the developed Russian deposits is low and averages 30%, and this is in the presence of significant reserves of rich ores with an iron content of at least 60%. Therefore, a promising direction for the development of the iron ore sub-sector will be the development of deposits of rich iron ores (up to 70% of iron) located in the KMA region.

Today, the main companies that set iron ore prices are such large companies as: RioTinto, BHP Billiton, CVRD, and Baosteel, the leader in Chinese metallurgy. The trend of recent years is a gradual decrease in the cost of ore, which is extremely attractive for the Chinese. The forecasts of most investment companies and industry experts (even Chinese) come down to higher iron ore prices. But it should be noted that recently many forecasts have been revised in the direction of even greater price increases. And at the moment, the range of price predictions varies from 9% to 35%, which is at least no lower than last year's price increase of 9.5%.

Currently, an increase in basic iron ore prices is affected by:

- high demand from China;
- the increase in production costs of commodity companies;
- rise in price of freight for the delivery of iron ore;
- increase in prices for Indian iron ore.

The main and main reason for forecasting the growth of prices for iron ore raw materials is the steady and high demand for it, especially (and already traditionally) from China.

Conclusion

Despite the higher transportation component, Chinese consumers continue to significant purchases of iron ore in Brazil. This is due to the high quality of Brazilian iron ore.

Chinese metallurgical companies are interested in closer cooperation with Brazilian producers of iron ore. So, WuhanIronandSteel Corporation proposed the fourth largest Brazilian iron ore company MMX Mineracao & Metalicos S.A. redeem more than 9% of its shares. They show interest in cooperation with China and companies in India. GME4 plans to sell 80% of shares of Indian company SesaGoaLtd. announced its intention to buy back a controlling stake in GME4 in a project to develop an iron ore deposit in Piaui with reserves of 800 million tons.

Indian and Chinese steel companies also collaborate with mining companies in Canada. WISCO (China) in July 2009 acquired a 19.9% stake in ConsolidatedThompsonIronMinesLimited for $ 240 million. AdrianaResourcesInc. In July 2009, she signed a letter of intent with two Chinese companies interested in participating in the LacOtelnuk field development project, while the Indian company TataSteel acquired 19.9% of the shares of NewMillennium in 2008. In the future, TataSteel plans to acquire up to 80% of the shares in the project. Iron ore direct supply after the completion of the feasibility study. Canadian iron ore companies in their development projects are not limited to plans for the production of iron ore concentrates or pellets.

The economic crisis led to a decrease in iron ore production in Central and South America and slowed down the commissioning of new iron ore production facilities. JindalSteelandPower has postponed for six months the start of the development of a large EL Mutun iron ore deposit in

Bolivia. Nevertheless, the prospect of developing the production of iron ore in these countries is not bad.

At the same time, the implementation of iron ore projects in Africa is influenced not only by the global economic crisis, but also by the political situation in a number of countries. So, after the change of government in Guinea, RioTinto was practically forced to curtail the project for developing the Simandou field, although RioTinto planned to invest $ 6 billion and already from 2013 will begin production at the first stage of this project with a capacity of up to 80 million tons per year.

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Income Sources of Individual Agricultural Holdings in Poland And the Determinants of Searching Them[1]

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Abstract

Income is an important element of everyone's life. It allows meeting human needs. In the process of carrying out individual needs related to ambitions, independence or earning income, the decisions are taken to search for new income sources. There are many more incentives stimulating such decisions and everyone considers them individually. The standard of living in rural areas is lower than the one in a city, and hence the lower income level of the rural population and higher unemployment rate. Increasingly fewer farms obtain income from agricultural activity alone, thus the importance of other income sources is growing. In addition, a greater willingness to take up hired labour or run non-agricultural business activities is observed among farmers. The purpose of this study was to define and describe the basic income sources of individual agricultural holdings in Poland. In addition, the determinants influencing decisions about searching for other income sources by farmers were briefly characterized. The research problem was addressed based on the subject literature analysis. The basic research methods used by the author were: the critical subject literature review and formal methods including the tabular description method.

Keywords: Income Sources, Individual Agricultural Holdings.

Introduction

Income is an important element in everyone's life. It allows meeting human needs. In accounting terms, income is the difference between the generated revenues and the incurred costs. The category of income, in the legal sense, is defined by tax law and adjusted to the realization of fiscal goals. In the case of agricultural activity, it may be problematic to determine tax deductible costs remaining a part of the agricultural policy – e.g. through regulating the amount of tax support for agriculture. Under the current legal status, the income dependent tax burden rests on farmers conducting economic activity, as well as those running special divisions of agricultural production (the income obtained from such source of income as the special divisions of agricultural production constitutes the basis for calculating income tax. However, pursuant to the provisions of the Personal Income Tax Act, the income from special divisions of agricultural production, if the taxpayer does not keep the books recording income, is calculated using the income estimation standards from a specific utilised agricultural area or a unit of animal production. The minister competent for public finance, after consulting the minister competent for agriculture, announces, by the regulation, the estimated standards of the aforementioned revenues, changing them annually to the extent corresponding to the price increase index of the commercial farming, announced by the President of the Statistics Poland). For the Statistics Poland (https://stat.gov.pl/) purposes, the income earned by an individual agricultural holding was defined as the difference between the value of agricultural production (including natural consumption) and the respective current expenditure incurred (i.e. purchase of

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products and services, remuneration and compulsory social security contributions for hired labour). The discussed income is reduced by taxes resulting from running an individual agricultural holding and, since 2004, increased by the subsidies for agriculture. In accordance with the definition provided by the Statistics Poland (https://stat.gov.pl/), an individual farm, i.e. a farm of a natural person, is the one run by a natural person having 1 ha or more of the utilised agricultural area (UAA) or a farm smaller than 1 UAA (including no arable land), performing agricultural activity at a significant (defined by appropriate thresholds - thresholds for agricultural activities (excluding special divisions): 0,5 ha for: fruit trees plantations, fruit bushes plantations, field vegetables, field strawberries, hops, 0,3 ha fruit and ornamental nurseries, 0,1 ha for: vegetables under shelter, strawberries under shelter, flowers and ornamental plants under shelter, tobacco, 25 m^2 of edible mushrooms, 10 head of cattle total, 5 head of cows, 50 head of pigs total, 10 head of sows, 20 head for: sheep total, goats total, 100 total poultry, 5 total horses, 50 female rabbits, 5 female of other fur animals, 10 wild animals, e.g. wild boar, roe deer, fallow deer, farmed for meat production, 20 bee trunks) scale, including the special divisions of agricultural production. Statistics Poland also defines commercial non-agricultural activities connected directly with an agricultural holding. It was adopted as the production or service oriented activity conducted on one's own account aimed at earning a profit, which uses the resources of an agricultural holding (labour, land, buildings, machinery park, etc.) or the agricultural products it offers (e.g. agritourism, processing of agricultural products).

There are many reasons for running one's own business. Regardless of the type and nature of the business, the motives for undertaking this type of activity may result from positive or negative aspects. Entrepreneurs themselves, as the basic incentives, most often indicate their own ambitions, self-realization, personal fulfilment and satisfaction. In addition, they all point to the desire of increasing their own income and maximizing profit. These motivations are definitely of a positive nature, whereas among the negative ones the following can be listed, e.g.: losing the current job, no prospects for fulltime employment opportunities. In turn, the desire to earn higher income by individual farmers can be identified as the determinant for undertaking hired labour.

The purpose of this study is to define and describe the basic income sources of individual farms in Poland. In addition, the determinants influencing the decisions about searching for other income sources by farmers were briefly characterized. The research problem was addressed based on the subject literature analysis. The basic research methods used by the author were: the critical subject literature review and formal methods including the tabular description method.

All statistical data originate from the Statistics Poland publication entitled The characteristics of agricultural holdings. Due to the fact that they are published every three years, in the presented study the data refer primarily to the years 2010, 2013, 2016.

Income specificity of an individual agricultural holding

Agricultural income is a specific category, compared to the income of other groups of population. This specificity results from several reasons. Firstly, a farmer running an individual agricultural holding takes up a double role – owner of the means of production and, at the same time, an employee. Thus, a farm and a household are coupled in this case. Secondly, agricultural income takes the form of money (sales of goods and services) and also the form of income in kind (consumption for the needs of the farm and the farmer's own needs). It should be noted that along with the general socio-economic and agricultural development, the share of the second part is declining. Thirdly, the structure of farm income shows a clear share of the income earned outside the farm (income from paid employment and social benefits). Some farmers are forced to take up paid employment outside an agricultural holding or perform non-agricultural activity connected with the farm, e.g. agrotourism, agri-food processing, crafts. The final reason is the fact that agricultural income fulfils two functions: production function and a redistributive one. The production function is manifested in the level of agricultural income influencing the level of agricultural production, whereas the

redistributive function consists in the transfer of income (See: Pawłowska – Tyszko J., Soliwoda M., 2017, pp. 22 – 25).

When determining the income earned by an individual agricultural holding, two categories have to be taken into account (as in any other activity), i.e. revenues and costs. Farm revenues are influenced primarily by sales revenues, which can be supplemented by subsidies. In this case costs will mainly be defined as material and non-material costs, but also as expenses in the form of, e.g., taxation costs or other fiscal charges (e.g. social security contributions). The income of an individual agricultural holding will, therefore, depend on the nature of the farm, its economic size, type of production or the share of non-agricultural income.

General characteristics of agricultural holdings in Poland

According to the Statistics Poland data, the number of agricultural holdings in Poland, especially the smallest ones (below 1 ha) declines year by year (Tab. 1). Farmers are not able to make a living from farming activities alone, especially those of them who own small-scale farms. Hence, they are frequently seeking other profit-generating sources of income, thus giving up, in most cases, the entire agricultural activity.

Table 1: Number of agricultural holdings in the years 2010, 2013, 2016 and 2017 (thousand)

Years	Total	Utilised agricultural area of agricultural holdings in ha							
		≤ 1	1 – 2	2 – 5	5 – 10	10 – 15	15 – 20	20 – 50	≥ 50
2010	1509,1	24,9	300,6	489,8	346,3	151,5	72,0	97,0	27,0
2013	1429,0	34,4	277,6	455,3	315,2	141,3	70,2	103,2	31,8
2016	1410,7	22,8	271,2	465,9	309,9	137,3	66,9	102,0	34,7
2017	1405,7	20,5	263,1	449,2	316,0	142,4	70,4	108,3	35,4

Source: The characteristics of agricultural holdings in 2016, statistics Poland, Warsaw 2017 and Statistical yearbook of agriculture 2018, Statistics Poland, Warsaw 2019.

Among the agricultural holdings covering the utilised agricultural area of up to 20 ha (in each identified range), a decline in the number of such holdings was observed (2017 compared to 2010). An increase was recorded at the farms covering the area of over 20 ha of farmland. The dynamics of changes regarding the number of farms in individual years is presented in Figure 1.

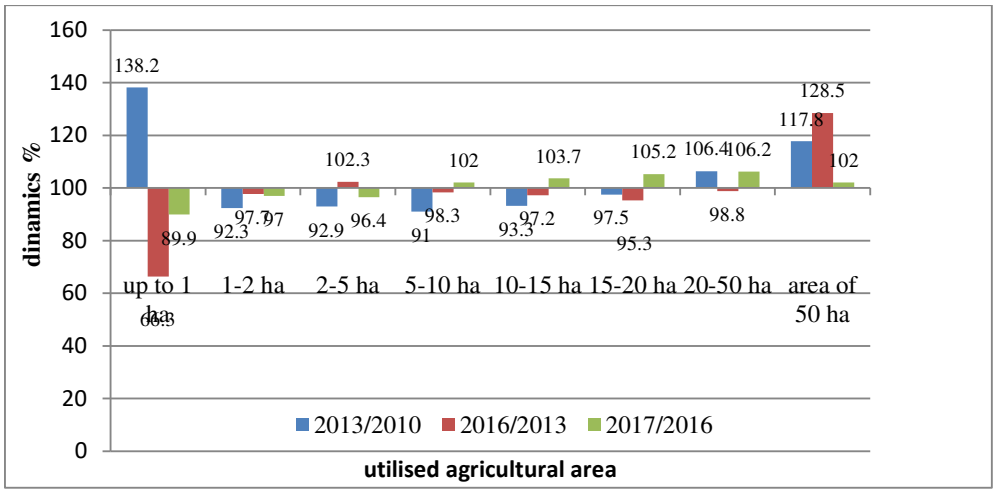

Fig. 1: Dynamics of the number of agricultural holdings in the years 2010 - 2017 (w %)

Source: author's compilation based on Table 1.

The highest decline dynamics was recorded at the smallest farms (up to 1 ha). In 2016 compared to 2013 it reached almost 34%. In 2017 compared to 2016 the respective value was slightly above 10%. The farms covering the area ranging from 1 to 2 ha and from 2 to 5 ha recorded a decline over the years, i.e. (2017/2016) by 3% and 3,6%, respectively. Referring to 2010 as the base year, a decrease of approx. 18% was observed (2017/2010) at the farms up to 1 ha of farmland, a decrease by 12,5% – 1 to 2 ha of farmland, a decrease of approx. 8% – 2 to 5 ha and also 5 to 10 ha of farmland. The farms covering the area of 15 – 20 ha recorded the decline by approx. 5% in this period (2016/2013), whereas in 2017/2016 an increase by 5% was observed, and when comparing 2017 to 2010 a decrease by 2,3% took place. However, an increase in the number of the largest farms, i.e. over 50 ha of utilised agricultural area, as well as the ones covering the area of 20 to 50 ha was observed. In 2017, compared to 2016, the increase was by 6% (farms ranging from 20 to 50 ha of farmland), however, if compared to 2010, it was an increase of almost 12%. In the case of the largest farms, the increase in 2017 compared to 2016 presented the level of 2%, while the comparison of 2017 to 2010 shows an increase reaching 31,1%. In total, however, the number of farms was reduced by 6,9% (2017/2010).

Determinants of searching for earned income sources at individual agricultural holdings in Poland

According to the Statistics Poland data the standard of living in rural areas is lower than the one in a city, and hence the lower income level of the rural population and higher unemployment rate. Increasingly fewer farms obtain income from agricultural activity alone, thus the importance of other income sources is growing, such as e.g., hired labour or running non-agricultural economic activity. Among the determinants of searching for other income sources, the factors of micro- and macroeconomic can be identified (Tab. 2).

Table 2: Factors determining the search for additional income sources at individual agricultural holdings

Specification	Factors
Microeconomic factors	• human factor quality – the education level of agricultural population stands for the factor determining farmer's openness to the changing environment, better educated farmers are more inclined to seek and implement new solutions; • quality of economic, production and technical factors within an agricultural holding; • development of the agricultural environment and the situation on the labour market; • farmer's family life cycle phase; • planned and carried out investments in an agricultural holding; • agricultural type and economic size class of an agricultural holding (economic size is determined by the sum of standard direct surpluses of all activities performed by an agricultural holding).
Macroeconomic factors	• economic growth rate; • credit availability and interest rate; • regional location of an agricultural holding; • subsidizing degree of an agricultural holding; • agricultural policy; • taxation.

Source: author's compilation based on: Czudec A., 2009, Duczkowska – Małysz K., 2009, pp. 19-21, Hybel J., 2000, Kołodziejczyk D., 1998, pp.59-68, Kołoszko – Chomentowska Z., 2008, pp. 79-85, Pietrzyk I., 2006, see: Ostromęcki A., Zając D., Mantaj A., 2015, pp. 40-60.

It should be noted that farmers from mountain areas more often decide to search for additional/other sources of income by, e.g. undertaking non-agricultural economic activity, than those from lowland areas. In addition, younger farmers generally show greater interest in an additional source of income and are more willing to take the risk related to non-agricultural activities or searching for other sources. The planned or already ongoing investments at a farm depend on the type of an agricultural holding (dominating crop or livestock production). In general, the crop production farmers are more likely to take up non-agricultural activities which can support investments at their agricultural holding, whereas the farmers involved in livestock production are less willing to search for an additional source of income to finance investments at their farm (Ostromęcki A., Zając D., Mantaj A., 2015, p. 47). The agricultural policy may also remain an important factor – it is worth mentioning that the Common Agricultural Policy (CAP) supports the activities involving undertaking non-agricultural economic activities by farmers. The Rural Development Programme 2014-2020 (Rural Development Programme 2014 -2020, 2014). identifies the activity and sub-activity within the framework of support for initiating a non-agricultural economic activity in rural areas. After meeting the relevant conditions, it is possible to receive a bonus of PLN 100,000, payable in two tranches – 80% and 20%. This is quite a significant incentive for a farmer or his family to start a business outside agriculture. The agricultural type and the economic size class of the farm (economic size is determined by the sum of standard direct surpluses of all activities performed by an agricultural holding) have a great influence on the decision about searching for additional sources of income – as already mentioned above, farmers with predominating crop production are more willing to undertake, e.g. non-agricultural economic activity, or hired labour, whereas in terms of an economic size of an agricultural holding, this activity is, to a large extent, taken up at farms characterised by the so-called poor economic viability.

Income sources of individual farmers in Poland

Among the sources of income for individual farmers in Poland, two main trends can be identified: gainful and non-profit ones. Among the gainful activities, hired labour and running a non-agricultural economic activity should primarily be mentioned. Non-agricultural economic activity may be associated with an agricultural holding and use the resources of this farm (e.g. agritourism), but also remain completely unconnected from the farm. The development of additional and alternative income sources for farmers in the form of non-agricultural economic activity can be highlighted. The large diversity of agricultural holdings representing the surveyed enterprises indicates adapting to various market needs and realities. However, the dominant form, i.e. a natural person conducting business activity shows a small extent of such activity (Bórawski P., 2009, pp. 15-22*)*. The non-profit sources include pension entitlements and other allowances in the form of benefits (e.g. child-care benefit, benefit under the Family 500+ programme) and alimony. The "Family 500+" programme is the financial foundation to support families in Poland. The programme came into force on April 1, 2016 and contributed to a significant improvement in the financial situation of families. The Family 500+ programme is designed to achieve three basic goals: increase the number of births, reduce poverty, primarily among children, and constitute an investment in the family. Pursuant to the changes introduced in the "Family 500+" programme, starting from 1 July 2019 the parental benefit is granted for every child up to the age of 18, regardless of the total family income [see: https://www.gov.pl/web/rodzina/rodzina-500-plus].

Table 3 presents the number of agricultural holdings and their additional sources of income, apart from agricultural activity.

Table 3: Agricultural holdings and their additional sources of income including utilised agricultural area in the years 2010, 2013 and 2016 (thousand)

Agricultural holdings and their additional income sources from:		Total	do 1 ha	1-2 ha	2-3 ha	3-5 ha	5-10 ha	10-15 ha	15-20 ha	20-30 ha	30-50 ha	50-100 ha	area 100 ha
non-agricultural economic activity	2010	372,5	81,8	67,5	47,0	57,9	64,0	23,8	10,5	9,0	5,5	3,3	2,1
	2013	216,3	5,5	46,6	31,6	40,7	46,4	18,7	8,4	7,5	5,4	3,5	2,2
	2016	214,4	3,1	40,5	32,6	43,4	46,9	19,6	8,5	8,4	5,4	3,7	2,3
hired labour	2010	899,6	211,5	167,3	116,1	144,1	156,9	54,2	21,3	15,4	7,6	3,5	1,6
	2013	709,5	18,0	161,5	116,3	150,3	181,3	44,1	16,6	11,6	5,7	2,7	1,3
	2016	671,3	11,0	153,6	117,8	151,2	146,6	47,6	17,9	12,9	7,6	3,7	1,5
pension entitlement	2010	624,5	188,6	116,6	79,7	92,5	89,3	30,1	12,1	8,9	4,5	1,6	0,5
	2013	440,2	13,0	109,4	76,8	88,7	88,0	31,0	13,5	11,0	5,8	2,3	0,7
	2016	464,6	9,5	117,7	78,3	97,1	92,7	32,5	13,9	11,6	7,2	3,0	1,0
other non-profit sources	2010	129,8	31,2	23,9	17,0	20,9	21,8	7,7	3,2	2,4	1,1	0,4	0,2
	2013	63,6	1,2	16,8	10,5	12,8	13,1	4,5	2,1	1,5	0,8	0,3	0,1
	2016	107,0	2,1	24,0	18,7	22,4	22,0	7,8	3,8	3,0	1,9	0,9	0,3

Source: Characteristics of agricultural holdings. General Agricultural Census 2010, 2012, Characteristics of agricultural holdings in 2013, 2014, Characteristics of agricultural holdings in 2016, 2017.

Generally, in the case of 1/3 of agricultural holdings including the farm user, the income earned by the agricultural holding is the basic source of income, i.e. accounts for over 50% of the entire income generated by the agricultural holding. It is noticeable that the farms with small utilised agricultural area – i.e., practically, up to 2 ha of UAA are primarily looking for additional gainful income sources. Moreover, additional income sources in the form of pension entitlements and the, so-called, other non-profit sources can be observed at the individual farms with the smallest utilised agricultural area. However, in each case – regarding both gainful and non-profit income sources – the smallest number of individual farms is present among the largest agricultural holdings, i.e. over 100 ha of UAA, but in practice, this trend is already noticeable at the agricultural holdings having more than 10 ha of UAA. The percentage of agricultural holdings earning income on agricultural activities only presents a continuous decline year by year. The structure of agricultural holdings by the source of income is presented in Figure 2.

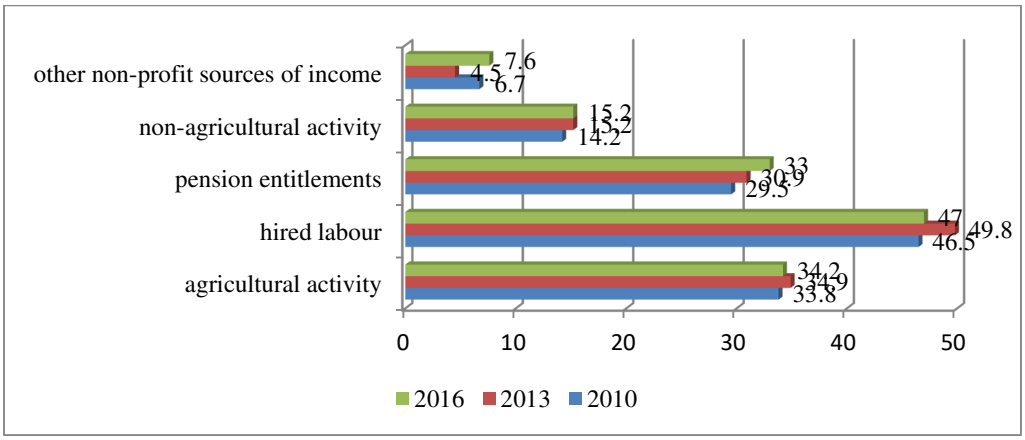

Fig. 2: Households including a farm user by the source of income in 2010, 2013 and 2016 (%)

Source: Characteristics of agricultural holdings. General Agricultural Census 2010, 2012, Characteristics of agricultural holdings in 2013, 2014, Characteristics of agricultural holdings in 2016, 2017.

It can be observed that, apart from agricultural activity, the largest share in the income earned by agricultural holdings is taken by hired labour, followed by pension entitlements, whereas other non-

profit income sources take the smallest share. However, at this point it should be indicated that in this particular case the largest increase was recorded. Having analysed 2016 against 2013, a growth by almost 70% was observed. Payments of benefits under the Family 500+ programme are responsible for such situation. Pension entitlements are the only source of income characterized by an upward trend in the analysed period. It may be the evidence of an aging society in Poland, especially in rural areas, where young people more frequently decide to move and live in a city.

Conclusion

Raising the standard of living is the most frequent reason for seeking additional gainful income sources in Polish agriculture. Among the motives for undertaking, e.g. non-agricultural economic activity by farmers, those resulting from the desire of becoming an entrepreneur can be distinguished, e.g., the need for recognition, personal development, independence, or achieving financial success. Hired labour is most often chosen by the farmers characterised by a much lower willingness to take risks associated with running their own business. Some of the factors determining such choices depend solely on the farmer (e.g. education, size of the agricultural holding, production type) and some remain beyond the farmer's influence, e.g., farm location, distance from large cities. It is clearly visible that the share of income from hired labour and non-agricultural economic activity earned by farmers is becoming increasingly significant in the structure of their household's income sources.

Based on the conducted analyses, it can be concluded that hired labour and non-agricultural economic activity carried out by a farmer are important for the functioning of small agricultural holdings (mainly up to 2 ha of UAA, in some cases 5-10 ha of UAA), constituting additional income source. For the agricultural holdings presenting the same area type, i.e. the smallest ones (up to 2 ha of UAA), non-profit income sources, i.e. pension entitlements and other benefits are listed as an additional source of income.

It is noticeable that, in Polish agriculture, an increasingly smaller number of people are making their living solely from agricultural activity. The number of families whose correlations with agriculture are very small and their interests are no longer focused on the common agricultural policy, but on the rural policy instead, where the multifunctional village development, and thus the development of non-agricultural functions, is growing. Employment outside agriculture in their home or neighbouring municipality is becoming the dream of many rural residents. New jobs are traditionally provided by such institutions as: school, kindergarten, health-care centre, municipal office, etc., but the growing hopes are associated with small rural companies. Rural entrepreneurs and their companies are becoming the essential factor of local development (Kłodziński M, 2009, pp.91-98).

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Interview with Customers in Management of Logistics Customer Service

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Abstract

Research background: Communication with customers on the proper execution and assessment of logistics service is the basis for deepening customer needs, understanding the reasons for customer satisfaction or dissatisfaction with service, conditions accompanying the assessment of logistics customer service. **Purpose of the article:** The purpose of the article is to present the results of research on the implementation of a selected logistic management task of customer service, i.e. conducting of interviews with customers in order to determine the importance of the service itself and its individual components in commercial cargo transport enterprises in the Silesian Voivodeship. **Methods:** The paper is predicated on the survey results of the research realized on a sample of 147 commercial cargo motor transport enterprises situated in the Silesian Voivodeship. Also there has been made an attempt to examine the dependence of the selected areas of logistics customer service, occurring in the surveyed freight transport companies of the Silesian Voivodeship, on the size of these entities. **Findings & value added**: The respondents' answers depending on the size of enterprises usually confirmed that with the increase of the size of the surveyed entities, they showed an increasing tendency to carry out the logistics customer service measurements. Entrepreneurs of larger business units more often and more accurately carry out research determining the scope and level of logistic customer service both among the recipients of their services and within the enterprise, thus they are more determined to perform the task in question, managed by logistic customer service.

Keywords: Management; Logistics Customer Service; Transport Enterprises.

Introduction

Specifying the requests related to logistics customer service in the company preferred by customers and considering their point of view involves identifying customers' expectations towards particular elements of this service. The major assignment areas of management (Krzakiewicz and Cyfert, 2014; Lichtarski, 2015; Nogalski and Ronkowski, 2007) of logistics customer service (Nowicka-Skowron, 2017), suggested by inter alia Ballou (2003), Christopher (2011), Kempny (2001), Kramarz and Slupina (2017), Price and Harrison (2013), Rushton, Croucher and Baker (2014), include:

- establishing the most significant purchase choices and decisions made by customers,

- conducting interviews with customers to establish the importance of service itself and its particular elements,

- conducting group interviews due to the same principles.

Communication with purchasers on the appropriate achievement and assessment of logistics service is consequently the base for intensifying customer requirements, elaborating the motives of satisfaction or dissatisfaction with customer service, circumstances associated with the service assessment (Hasan, 2014; Niemczyk and Stańczyk-Hugiet, 2014; Wiktor, 2016). The aim of the paper is to present the results of research on the performance of a chosen logistic management task of customer service, i.e. conducting the interviews with customers in reference to settlement of the significance of

the service itself and its particular elements in commercial freight transport enterprises in the Silesian Voivodeship region in southern Poland.

Literature Review

The multitudinous area of customer service encompasses the spheres of marketing, finance and other strategic fields of company's management (Murfield et al., 2017; Murphy and Knemeyer, 2018), though, a principally imperative function in providing proper service is realized by logistics (Figure 1). The attentiveness on the dilemma of right customer service is acquiescent with the approach of logistics management which is continually searching for assistance from other areas of the enterprise's activity in reference to offer the right product or service, in the right quantity and quality and at the right place and time, therefore at the same time realizing the most important rules of logistics customer service (Hemmasi, 2015; Mesjasz-Lech, 2015). Customer service adds meaning to the whole activities and logistics processes, as a result currently it is identified as 'customer logistics' (Kempny, 2001).

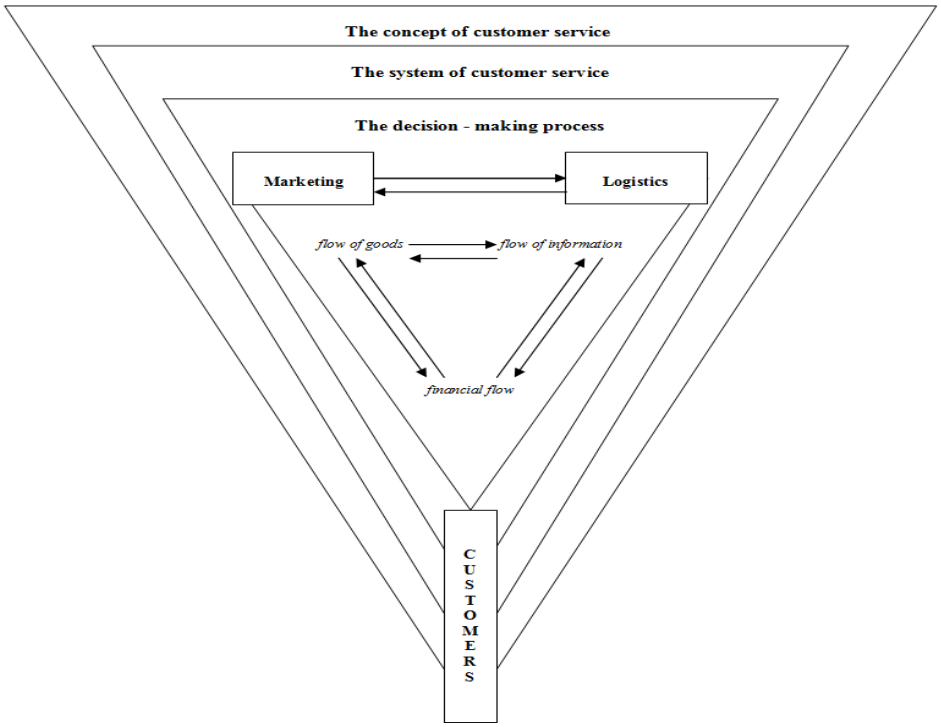

Fig. 1. Multitudinous area of customer service

Source: Own study.

One of the most often quoted definitions of the term of customer service by theorists of logistics subject is the citation of Beier and Rutkowski (2004): "... the aptitude of the logistics system of the enterprise to satisfy customer requests in state of time, dependability, communication and comfort". Consequently, logistics customer service focuses on the physical distribution of products and services accordingly to offer them in the accurate quantity and quality, enabling to acquire advantages from their delivery at a determined place and time. In reference to customer service the products and services of the enterprise obtain the distinctiveness of space and time convenience if, due to proper processes of the logistics system, they are proficient to attain the customer at the required time and space and this aptitude of the logistics system relates to the area of product or service availability (Curcic et al., 2008; Hu et al., 2016; Micu et al., 2013). It is frequently acknowledged with the description of

logistics customer service regardless it is more indiscriminate as it is moreover related to features such as information flow or flexibility of the logistics system and others (Jelonek, 2015; Ritter and Andersen, 2014).

Due to Christopher (2001) the subject of customer service in the area of logistics is to encourage the buyer with the correct product at the correct time and at the correct place. Specifically the goods have no value in anticipation to possibility of being available to the buyer at the correct time and the correct space.

Three directions of perceiving of the fundamentals of customer service in logistics were introduced by La Londe (1985), namely:

1. logistics customer service as an activity, i.e. achievements the enterprise should complete to satisfy the needs of the buyer,

2. logistics customer service as performance levels, i.e. quantifiable standards (norms) of the service features, acquiescent with buyer anticipation,

3. logistics customer service as a management philosophy, i.e. the most extensive explanation of the idea, increased to the stage of obligation of the enterprise to present more advanced level of service than competitive enterprises.

The three-direction approach of awareness of logistics customer service should not be recognized as alternatives to select from however it is indispensable to join them all. The enterprise motivated for achievements in the market in the management progression should implement customer point of reference (Verhoef & Lemon, 2013) consequently indicating its mission whereas simultaneously supervising its accomplishments in the area of standards and arranging the program of the service development with division for precised assignments (Huang, 2008; Rauyruen and Miller, 2007; Zbierowski, Bratnicka and Dyduch, 2014). The quoted distinctive descriptions of logistics customer service do not obtain an extensive variety of preferences of interpretation of this idea. For that reason, it is very complicated to obviously conclude the significance attitude representing proper criteria of logistics customer service for assorted buyers' requirements.

Methodology Research

In reference to establishing the level of accomplishment of the chosen assignments of management of logistics customer service in the performance of commercial freight transport enterprises in the area of the Silesian Voivodeship in southern Poland, the own research was performed. The functional apprehension method was the survey method with reference to the foundation of which the classified technique of attaining primary data was used, i.e. the survey questionnaire.

The survey was conducted among 147 commercial freight transport companies located in the area of the Silesian Voivodeship in southern Poland. As a effect of the attainment, estimating and analysis of the empirical data acquired in the survey, there were obtainable the circumstances in the area of the scope of logistics customer service in the surveyed commercial freight road transport enterprises.

Afterward, whilst taking into account the complete of the accomplished research process, on the basement of the assembled primary data, the trial was made to determine the reliance of the spheres of logistics customer service arising in the surveyed commercial freight transport companies of the Silesian Voivodeship on the size of these enterprises. Due to this principle, in conditions of the highlighted terms, in the accomplished statistical analysis, the following measures were applied (Triola, 2015): the Pearson correlation coefficient, the χ^2 test of independence, φ-Yule'a, Yates' χ^2 and Q – Kendall's coefficient.

Results and Discussion

Conducting interviews with customers in order to determine the significance of customer service in the surveyed entities

The distribution of the attained answers for the question about performing interviews with customers by entrepreneurs in reference to determination of the importance of the service itself and its particular elements is presented in Figure 2. The statement of performing interviews with customers of all business market segments was achieved only from 15 enterprises (10.2%). Most managers of the enterprises, i.e. 84 (57.2%) of the total number of responses, analyzed the importance of logistics service and elements with chosen customers. Contrarily, the method of interview was not practiced at all in 48 enterprises (32.6%). The complete perception of the requirements related to the level of logistics service preferred by the buyers and including their perspective was consequently designated by the smallest number of enterprises' representatives. A total deficiency of insight of the require to identify the anticipations of customers towards particular elements of logistics customer service articulated by nearly a third of the surveyed enterprises is rather alarming.

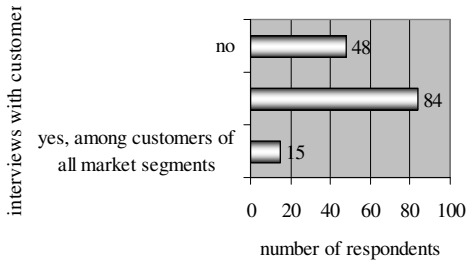

Fig. 2. Interviews conducted with customers in reference to determination of the importance of the service and its particular elements

Source: Own study.

Another three questions were addressed to those 99 respondents who, in response to the first issue mentioned above, confirmed conducting interviews with customers in order to determine the significance of the service itself and its individual components. Therefore, the amount of shares was determined in relation to the number of the obtained responses, limited to 99.

In the first point of the highlighted ones, the question was asked about the frequency of conducting interviews with customers in order to determine the significance of the service itself and its individual components in the surveyed companies. The distribution of the obtained responses clearly indicated the advantage of occasional discussions with customers on the significance of logistics service and its components, conducted by 63 representatives of the surveyed entities (63.6%). The declaration of regularity in the application of the technique of direct interview with customers was made by 36 entrepreneurs, i.e. 3.4% of the total number of responses. The distribution of responses obtained from the surveyed entrepreneurs to the question about the frequency of conducting interviews with customers in order to determine the significance of the service itself and its individual components is presented in Figure 3.

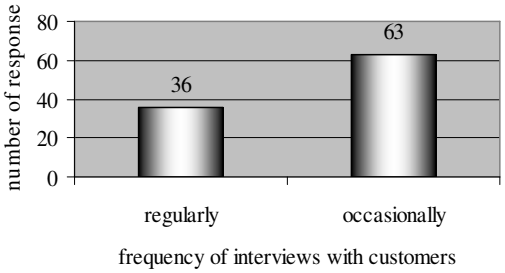

Fig. 3. The frequency of interviews conducted with customers in order to determine the significance of the service and its individual components

Source: Own study.

The subsequent issue related to in the questionnaire is the development of the previous problem by inquiring the respondents as to the way of conducting interviews with customers in order to determine the significance of the service itself and its individual components in the surveyed companies. Among a total of 99 obtained responses there were recorded only 5 economic entities (5.05%) that admitted using the services of the company specialized in the application of the direct interview technique. The other 94 entities (94.95%) conducted interviews with customers on the significance of logistics service and its components on their own. The distribution of responses obtained from the surveyed entrepreneurs to the question about the way of conducting interviews with customers in order to determine the significance of the service and its individual components is presented in Figure 4.

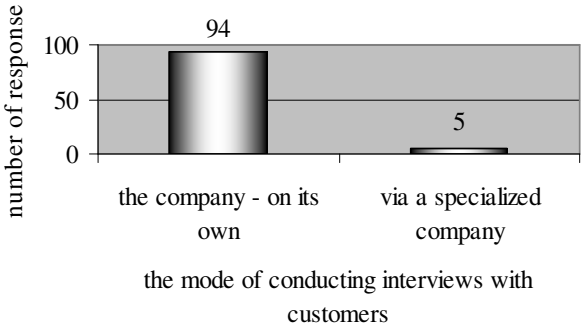

Fig. 4: The way of conducting interviews with customers in order to determine the significance of the service and its individual components

Source: Own study.

The closure of the considerations on the problem of the components of logistics customer service in the surveyed enterprises is the fourth point of the questionnaire, concerning the application of the critical incident technique (CIT) method in order to identify the key components of logistics customer service in the surveyed companies. Interviews with customers in order to determine the significance of the service and its individual components using the CIT method were conducted regularly only in 2 companies (2%) and occasionally in 3 entities (3%). As many as 94 enterprises (95%) never used the indicated method. Low popularity of the CIT method may result from the lack of knowledge among entrepreneurs, anticipating difficulties in conducting it or disproportionally low benefits from the effects of its application in relation to the incurred expenditure. The distribution of responses obtained from the surveyed entrepreneurs to the question about the application of the critical incident technique (CIT) method in interviews with customers conducted in order to determine the significance of the service and its individual components is presented in Figure 5.

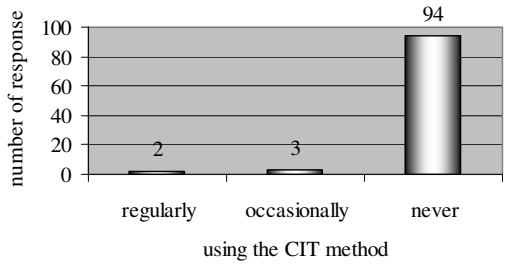

Fig. 5. The application of the critical incident technique (CIT) method in interviews with customers conducted in order to determine the significance of the service and its individual components

Source: Own study.

Interviews with customers and the size of the surveyed companies

As specified by the indication of the demographics attached in the survey questionnaire, among all 147 surveyed enterprises, micro entities predominated, with the amount of 76% of the research entities (112 companies). The division of small-sized entities was also considerable, with the amount of 16.5% of the entire quantity of respondents (24 companies). Simultaneously, medium and large entities, with join amount of 7.5% of the research representatives (11 companies), confirmed a small division in the research.

The maintenance of the reflections on the sphere of conducting interviews with buyers in reference to establish the importance of the service itself and its particular elements is correlating to the size of the surveyed enterprises (Table 1). In relation to the structure of the answers of the respondents, in the research into the participation of the representatives of the companies in realization of the interviews with customers in reference to establishing the importance of the service itself and its particular elements, the negative correlation was anticipated. The accomplished examination established the statistically significant clear correlation at the level of – 0.493. For that reason, it can be deduced that the representatives of the companies in larger entities execute the investigation among buyers more frequently and more systematically. Approximately 40.2% of micro entities do not make efforts to conduct interviews with the buyers.

Table 1: Interviews conducted with customers in reference to establishing the importance of the service and its particular elements due to the size of companies

Are interviews with customers conducted in the company in order to determine the significance of the service itself and its individual components?	Type of the company			
	micro	small	medium	large
yes, among customers of all market segments	2	6	5	2
yes, among selected customers	65	15	3	1
no	45	3	0	0

Source: Own study.

In the subsequent point, the inquiry was carried out as to the frequency of conducting interviews with customers in order to determine the significance of the service itself and its individual components in the surveyed entities. The relationship between the frequency of interviews conducted with customers and the size of the company, although statistically significant, is at the level of - 0.198, which indicates its very moderate strength. Therefore, there is only a symptomatic direction of impact which is stronger with larger enterprises (Table 2).

Table 2: The frequency of interviews conducted with customers in order to determine the significance of the service and its individual components in relation to the size of enterprises

If interviews with customers are conducted in order to determine the significance of the service itself and its individual components, how often are they held?	Type of the company			
	micro	small	medium	large
regularly	24	3	6	3
occasionally	43	18	2	0

Source: Own study.

Another issue discussed in the survey form is the development of the previous issue by inquiring the respondents as to the mode of conducting interviews with customers in order to determine the significance of the service itself and its individual components in the surveyed companies. In accordance with the information included in Table 3, in the group of enterprises carrying out the aforementioned research, the majority conduct it on their own. The predominant part is micro- and small-sized enterprises, whose budget for this type of activities – if specified at all – does not allow the services of external institutions. Therefore, a positive correlation is observed, at the level of 0.640 between the size of enterprises and the willingness to address specialized institutions to undertake market research. At the same time, it should be pinpointed that conducting interviews with customers individually by the surveyed entities also has numerous benefits, among others, correspondingly lower costs, practically any repeatability, much greater flexibility in changes in the type of the collected information, an easier access to customers, the ability to obtain real data through informal contacts. Obviously, there is a risk of errors of interpretation in terms of reasoning, however, they mainly do not depend on the way of collecting information but its subsequent processing and this, in turn, on the skills of the hired staff.

Table 3: The mode of conducting interviews with customers in order to determine the significance of the service and its individual components in relation to the size of enterprises

If interviews with customers are conducted in order to determine the significance of the service itself and its individual components, who conducts them?	Type of the company			
	micro	small	medium	large
the company on its own	67	21	6	0
a specialized company	0	0	2	3

Source: Own study.

The closure of the considerations on the problem of interviews with customers in the surveyed enterprises is the fourth point of the survey form concerning the application of the CIT method in order to identify the key components of logistics customer service in the surveyed companies. Table 4 shows the distribution of the obtained responses to the question about the frequency of using the CIT method in the surveyed entities. In statistical terms, one may talk about a strong negative correlation of –0.635 between the frequency of use of the CIT method and the size of enterprises. This correlation was determined using the Q-Kendall's coefficient, therefore, its value is only of an ancillary nature whereas its direction is more important. It is easily perceived that only few medium and large enterprises apply the CIT method. Single results in the group of microenterprises indicate the existence of enterprises run by people with greater power in terms of the opportunities to use the aforementioned method. Moreover, it can be concluded with a high probability that many respondents did not use this method due to lack of knowledge of its existence.

Table 4: The use of the CIT method in interviews with customers conducted in order to determine the significance of the service and its individual components in relation to the size of enterprises

The frequency of use of the CIT method	Type of the company			
	micro	small	medium	large
regularly	0	0	0	2
occasionally	0	0	2	1
never	67	21	6	0

Source: Own study

Conclusion

In reference of the above deliberations concerning the dilemma of the accomplishment of the chosen assignments of logistics customer service in management processes, i.e. conducting interviews with buyers in reference to establishing the importance of the service itself and its particular elements, it can be achieved that in the habituates of the activities of commercial freight road transport companies located in the Silesian Voivodeship in southern Poland, it endures at the coincidental stage of advance.

The division of the answers of the respondents, relying upon the size of companies, typically acknowledged that along with a raise in the size of the surveyed enterprises, they designated a increasing trend to execute the measurements in inquiry. The entrepreneurs in larger economic units more often and more thoroughly conduct the research into the scope and level of logistics customer service, both among the customers of these services and within the enterprise, at the same time being more determined to perform the discussed task of management of logistics customer service.

The effort made to scrutinize the reliance of the scope of logistics customer service in the surveyed commercial freight road transport enterprises of the Silesian Voivodeship in southern Poland on the size of these companies gathered acceptable result in reference to most of the examined occurrences. The analysis of the primary information, achieved from the answers of the respondents to the questions introduced in the survey questionnaire, in reference to the size of the surveyed enterprises, by means of chosen statistical measures, affirmed the statistically important relations. Considering low values of the achieved statistical measures, the completion remarks are of a relatively hypothetical constitution while the overview originated on the basement of the above information can be analyzed as remarkable research theses, comprising the beneficence to further principle research.

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Entrepreneurship – The Cornerstone of Sustainable Development in Rural Areas

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Abstract

This article presents the state of knowledge in the field of entrepreneurship development in the North-East region; furthermore, indicators of newly created active enterprises in the North-East Region of Romania are evaluated and the evolution of entrepreneurship development in the selected region is studied, through the indicators analysed in the period of 2007-2017. This paper is based on scientific research methods, such as literature review analysis and exploratory research conducted from secondary sources, respectively online accessed data provided by the National Institute of Statistics. The contributions of the article consist of the presentation of the key elements of entrepreneurship and of the link between entrepreneurship and sustainable development, as well as the presentation of the indicators that contribute to the description of the evolution of entrepreneurship in the North-East region. Moreover, the paper offers perspectives for future research in the field of entrepreneurship.

Keywords: Entrepreneurship, Sustainable Development, North-East Region, Rural Areas

Literature Review

At EU level, entrepreneurship is an essential vector for economic growth and the creation of new workplaces, being a generator of economic competitiveness and innovative spirit of all the member economies of the European Union, participating in the fulfillment of several European sectoral policies (European Commission, 2013).

For Romania, the year 1990 signified the freedom of the economic market correlated with the development of democratic political institutions, which supported the development of entrepreneurship. Thus, old communist economic enterprises were restructured - through privatization, re-profiling or closing, and, on the other hand, new entrepreneurial initiatives were realized - most often on the small or medium scale (Rusu, et al., 2015).

The authors (Philipson et al., 2011, Newbery and Bosworth, 2014) note that rural entrepreneurship fosters archaic communities by creating workplaces and supporting a community spirit.

Likewise, Jepson (2007) emphasises that the growth and development of a community is the result of the inextricable interconnection of four factors: population, environment, organization and technology.

The enterprise represents "any form of organization of an economic activity, with patrimonial autonomy according to the laws in force to engage in trading activities, in order to obtain profit by producing material goods and selling them on the market or by providing services, under conditions of competition**",** in accordance with the Explanatory Dictionary of the Romanian language (2016).

In addition, Nicolescu (2001) considers that the enterprise represents "an organization made up of one or more persons who carry out economic activities, usually using economic means, in order to obtain a profit".

At EU level, small and medium-sized enterprises (SMEs) represent the backbone of the economy (European Commission, 2014).

In the Romanian view, SMEs are characterized by innovation, flexibility, close links with the community, optimal use of resources (Ișfănescu, 2005).

According to Istocescu (2003), entrepreneurship is defined as a dynamic process, initiated by people who take important risks, essentially aiming for the establishment of organizations and the creation of workplaces.

The authors (Philipson et al., 2011, Newbery and Bosworth, 2014) state that entrepreneurship furthers sustainable development.

Scorus (2017) considers that innovation plays an important role in the business environment, supports the rise of performance of the goods and services offered, increases competitiveness and creates new markets.

The author Belyaev (2010) points out that there are areas around the world that, in recent decades, have changed their economy from activities mainly in the primary sector (especially agriculture) to activities mainly related to tourism, i.e. from the tertiary sector.

A special contribution in tourism is provided by the cultural capital, this aspect being supported by the authors Saunders and Dalziel, (2010). They underline the importance of cultural capital within rural communities, namely the values, traditions that define certain groups of people, which are passed down from generation to generation.

Moreover, Chang and Huang (2004) believe that a sustainable local community needs a long-term integrated approach to economic, social and environmental issues, both at the microeconomic level of individual characteristics (e.g. tourism which, according to Bălan et al. (2010), has played a major part in the sustainable development of local communities worldwide) and at the macroeconomic level (regarding the community as a holistic system).

The significance of sustainable tourism is highlighted by the authors Nistoreanu et al. (2003), who define "sustainable tourism as an opportunity to develop all forms of tourism, tourism management and marketing, by respecting the natural, social and economic integrity of the environment, while ensuring the exploitation of natural and cultural resources for future generations as well."

An important factor of local sustainable development is represented by non-governmental organizations (Sobol, 2008).

According to the North-East Regional Development Strategy 2014-2020, the development of entrepreneurship and the promotion of entrepreneurial culture in the rural area might be a viable solution for revitalizing the areas that have gaps compared to the urban environment, by diversifying the economic activities carried out, bringing added value and creating new workplaces for the inhabitants of rural areas.

The authors, Mihalache and Croitoru (2011), consider that the lack of entrepreneurial initiatives impedes the development of rural areas, while the scarcity of employment opportunities leads to emigration.

Research Methodology

This article contains an exploratory research based on an analysis from secondary sources, the purpose of which is to interpret indicators that present the situation of newly created active enterprises in the North-East Region and the evolution of entrepreneurship development in the selected region.

The analysis will also make visible the profile of an entrepreneur from the North-East region of Romania.

As far as the origin of the data is concerned, they were taken from the official statistics at regional level, provided by the National Institute of Statistics. Regarding the actuality of the data, they were accessed in December 2019, the most recent indicators being those of 2017.

The analysed indicators of the newly created active companies are: residence areas, gender of the founders, the level of training of the founder and the sectors of activity.

The study is carried out between 2007-2017, the choice of the period having the role of observing the evolution of entrepreneurship over a longer, more recent and relevant period.

Results and discussions

Within this section the results of the exploratory research are presented, the data are displayed in four figures, which are analysed and explained; additionally, are presented certain ways to avoid the negative aspects resulted from the analysis.

According to the National Institute of Statistics (2019), the newly created enterprises comprise the companies and the individual entrepreneurs (individuals, individual enterprises, family businesses, liberal professions) that carry out non-agricultural activities, created in a certain period of time. The notion of "newly created" refers to the inclusion of an enterprise in the statistical register of the enterprise, which is updated monthly on the basis of the fiscal register.

The analysis begins with, the distribution of newly created active enterprises according to residence areas, during the period 2007-2017 at the North-East Region level as shown in Fig.1**.**
The examination of the entire period, as show in the figure below, points to a major discrepancy in the distribution of newly created active enterprises in the rural area compared to the urban environment at the level of the targeted region.

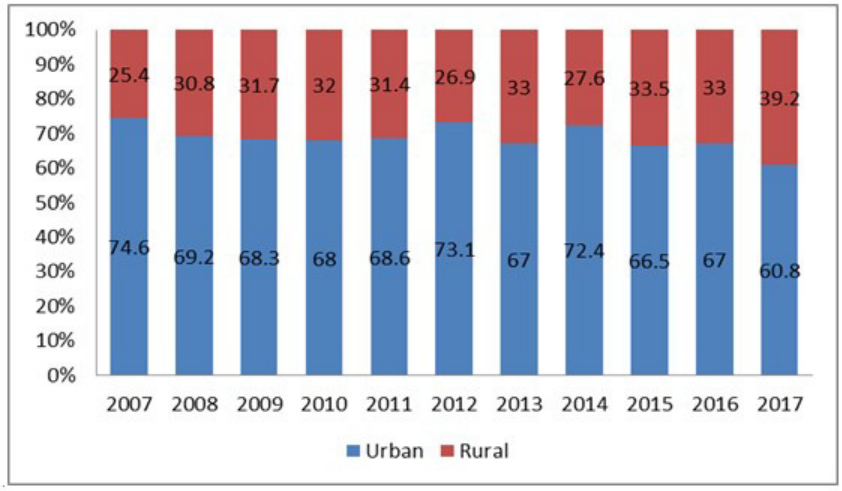

Fig.1: Distribution of newly created active enterprises in the North-East region, by residence area

Source: Authors' conceptualization based on the information extracted from National Institute of Statistics

As emphasised in Fig.1 during the analysed period, the biggest difference was registered in 2007, when 74.6% of the total of newly created active enterprises were established in the urban area and only 25.4% in the rural area. At the opposite end, the lowest difference was registered in 2017, when 60.8% of the newly created active enterprises in the region were registered in the urban area and 39.2% in the rural area. There is an increasing trend in the analysed period of newly created enterprises in rural areas. This may be due to several causes, such as: increasing entrepreneurial spirit in rural areas, increasing involvement of young people in rural areas, participation of rural population in entrepreneurial development courses, possibility of accessing European funds for agriculture and rural development, improving living conditions in certain villages or communes.

A solution to encourage entrepreneurship in rural areas can be its promotion, which would support the economic development of rural communities.

Another analysed variable is the gender of entrepreneurs in the North-East region. Fig. 2 shows that in the North-East region, the highest percentage of entrepreneurs, out of the total active, newly established enterprises in 2007, was that of male entrepreneurs (69.7%). Regarding the female subjects it can be seen from the graph below that in 2014 they had the highest percentage of 48.4% from the total of the analysed period.

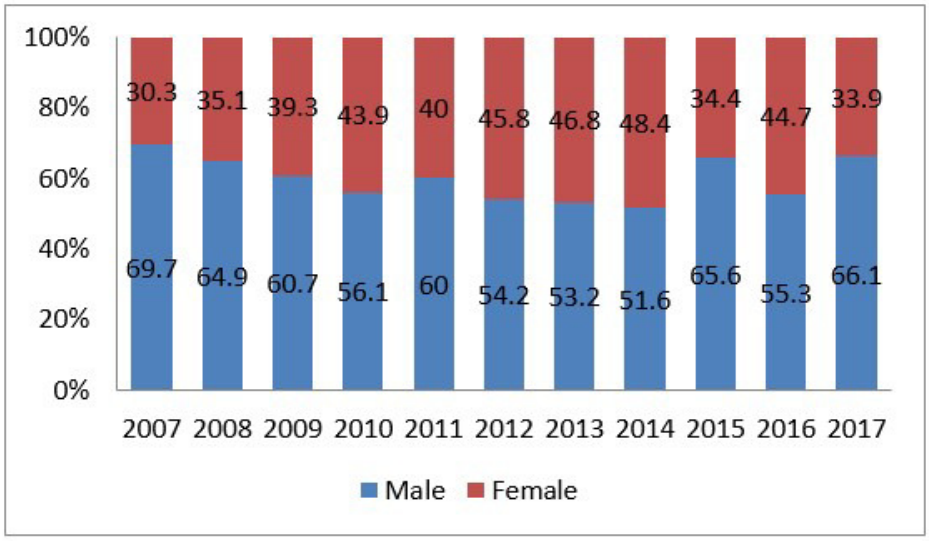

Fig.2: Distribution of newly created active enterprises in the North-East Region, by founder's gender

Source: Authors' conceptualization based on the information extracted from National Institute of Statistics

Furthermore, Fig. 2 displays time spans in which there was no major discrepancy between genders,, such as in 2012, 2013, 2014, when the difference between men and women was of only 8.4%, 6.4% and 3.2%, respectively. A possibility to increase the number of women entrepreneurs could be to provide free funded courses for people interested in starting a business.

An important feature in the creation of the entrepreneur profile in the North-East Region is the education`s level of the founders. In order to interpret the education`s level of managers, we considered the primary, secondary, vocational, high school and university studies. From Fig. 3 it appears that most entrepreneurs have studied at high school and university level with a percentage between 40.8% (2015) and 68.9% respectively (2014).

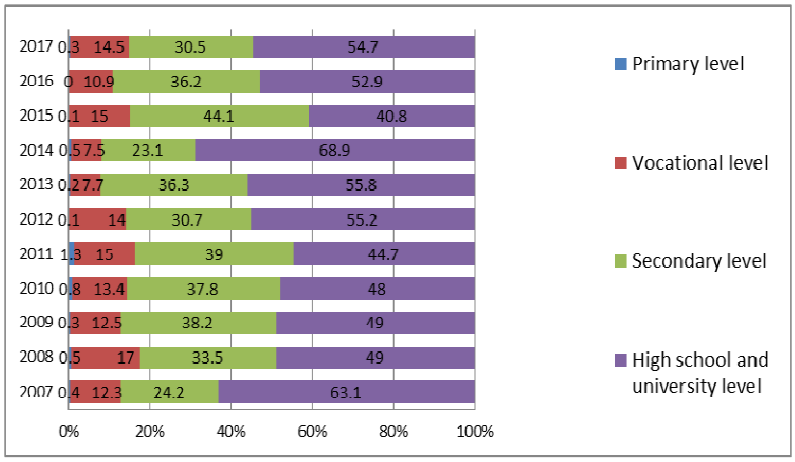

Fig.3: Distribution of newly created active enterprises in the North-East Region, according to the founder's training level

Source: Authors' conceptualization based on the information extracted from National Institute of Statistics

In addition, the percentage of people with secondary education varies during the analysed period. Thus, the highest percentage is registered in 2015 (44.1%) and the lowest percentage is from 2014 (23.1%). The lowest percentages are held by entrepreneurs with primary education, namely between 0 (2014) and 1.3% (2011).

We believe that level of studies should not be an obstacle to entrepreneurs, but they are certainly beneficial for business development. Thus, simple guides which present the steps in launching a business can be instrumental in the development of entrepreneurial initiatives.

An indicator of interest in identifying the profile of the entrepreneur from the North-East region is the activity sector. According to Fig. 4, we can observe that most people became entrepreneurs in the trade sector, the highest percentage being 56.2% in 2010 and the lowest, 22.3% in 2007. The following positions are held by entrepreneurs from other services (51% in 2007 and 3.4% in 2010) and industry (21.8% in 2017 and 10% in 2007).

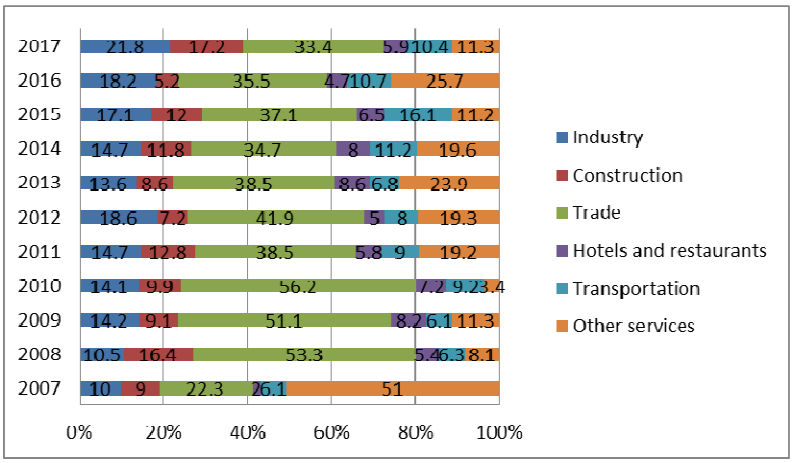

Fig.4: Distribution of newly created active enterprises in the North-East Region, by activity sectors

Source: Authors' conceptualization based on the information extracted from National Institute of Statistics

The research outlines the main characteristics of entrepreneurship in the North-East region, as well as, the profile of the entrepreneur from the selected region.

Thus, from the specialised literature analysed in the article it appears that tourism is a part of the tertiary sector of the economy that has contributed to the sustainable development of local communities. In addition, the article emphasised how the development of entrepreneurship and the promotion of entrepreneurial culture in the rural area can be a viable solution for revitalising the areas that have gaps compared to the urban environment, by diversifying the economic activities carried out, creating added value and providing new workplaces for residents of rural areas.

The weak progress of entrepreneurial initiatives in the rural area can have negative effects on the quality of life of the inhabitants of the rural area. Also, this can cause the stagnation of many rural areas at the stage of underdevelopment.

According to research findings, a potential target group that needs to strengthen the entrepreneurial spirit in the rural area is represented by women.

It can be concluded that, to a large extent, entrepreneurial spirit can be formed, and entrepreneurial education in pre-university and university programs might shape entrepreneurial spirit.

Sustainable development of urban and rural areas is an activity of great importance for Romania; the development of urban and rural economy must be achieved in a sustainable manner through entrepreneurial initiatives and by fostering economic, social and ecological benefits that will be of use to individuals.

Acknowledgment

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Parallel Optimization of Routing and Improvement of the Energy Consumption of an Electric Vehicle

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Abstract

This study tried to optimize the energy consumption of an electric vehicle on a path where there are several available paths. This has been carried out based on metaheuristic methods or more precisely on ant colony algorithms. The used algorithm in this study was implemented in python language or what is called the numpy and matplolib libraries. At first, a schema that contains several paths of different lengths and energy values was proposed. Results demonstrated that the optimal path that can be traveled by the vehicle has two main constraints. The first one concerns having energy consumption although the distance is optimized. The second one has to do with parallelizing the program using the joblib library under python. In general, this provided better results from the point of view of the execution time.

Keywords: Smart City, Logistical Transport, Energy Optimization, Electric Vehicle, Ant Colony Algorithms, Optimal Path, Library Joblib.

Introduction

The Smart City concept knew a great success. In fact, it is used to describe the city where everything is connected in order to provide many advantages for citizens. This facilitates their life giving them more safety and more new economic development opportunities. It seems to be great but it has been very few researchers who interested to the prerequisites of the Smart City model, actually they missed to take into account several things. For instance, the environment sustainability, the individual's health issues, and studies about those people. This has led us to think about an alternative approach that aims not only to optimize the routing, but also to improve the energy consumption of an electrical vehicle which will have an effective impact on both people health and environment.

In these recent years, the emission of environmentally harmful gas and the consumption of energy have triggered some of the recent studies on our transport system. At this stage, scientific research on automobiles has guided researchers' work towards improving and optimizing these two criteria which have become crucial for the design of new vehicles. To meet the challenge of further reducing consumption and emissions, the automotive industry has turned to electric vehicles that eliminate combustion on board and thus no longer produce polluting emissions. However, their main handicap

is the battery, which is still very heavy and very expensive. Even a low-cost driver can expect to achieve only 200 km of range for a very long charging time (6 to 8 hours). In addition, electric vehicles require the installation of specific infrastructure for charging the battery both in private garages and in public stations to allow long journeys.

Based on what was mentioned, two questions arise:

Is it possible to control the energy of an electric vehicle?

What is the right strategy to minimize the journey of a charging station with minimal energy?

Big Data and Logistics

The success of any company stands on the effectiveness as well as on the efficiency of its supply chain and its logistics operations. Companies started to rely on huge sets of extensive and rapid data generated on different stages of their supply chain and logistics operations. For instance, this includes the need to gather data about customers, inventory, commodity, state of road, etc...

For this purpose, professionals and companies realized the considerable impact of data analysis to optimize the different stages of their Supply Chain. They noticed that behind each movement, commodity, or system, bits of information can be collected, stored, analyzed and exploited to draw conclusions that automate processes, facilitate services, or generate annual forecasts. They introduced Big Data in almost all their business domains as it is displayed in Table 1 below.

TABLE 1: BUSINESS DOMAIN BIG DATA

Business Domain	Big Data Contribution (%)
Marketing	45
Operations	43
Sales	38
Risk Management	35
IT Analytics	33
Finance	32
Product Development	32
Customer Service	30
Logistics	22
HR	12
Other	12
Brand Management	8

Source: Forrester Research Inc. How Forrester Clients Are Using Big Data, September 2011.

In This work, we focused on the logistical transport field and tried to implement an optimizing routing system which takes into account the ecology principle by establishing a rationalized way to minimize the energy consumption at the same time.

Methods

Routing Algorithms

Definition

The purpose of routing is to determine a route that meets certain constraints to establish a connection from a source node to a destination node. The purpose of a routing algorithm is to allow the calculation of the route between these two nodes within the meaning of a certain criterion in addition to the dissemination of the information necessary for that calculation. The routing algorithm must find the "best" path to go from a source point (A) to a destination (B).

There are several criteria for defining the notion of a better path (also known as the shortest path): the cheapest (money), the fastest (in time), passing through as few knots as possible, and the shortest (in distance). There is no reason why these different criteria should have the same optimum. It is important therefore to look for a multicriteria optimum such as a more difficult problem which, in general, has no exact solution. Besides, the algorithm of the ant colony developed in a PYTHON environment is the subject of this work.

Mathematical Modeling

The Ant Colony algorithm was used to perform the routing of electric vehicles, which means that this study looked for the optimal route with a minimum level of energy and distance to reach the destination.

A schematic road network with a graph (V, E, C) was considered. Figure 1 demonstrates the travel topology with:

- **V: set of nodes $\vartheta 1, \vartheta 2, ..., \vartheta\, n$ that represents load stations.**
- **E: sets of stops that represent the distance from an i node to a j node.**
- **C: battery power.**

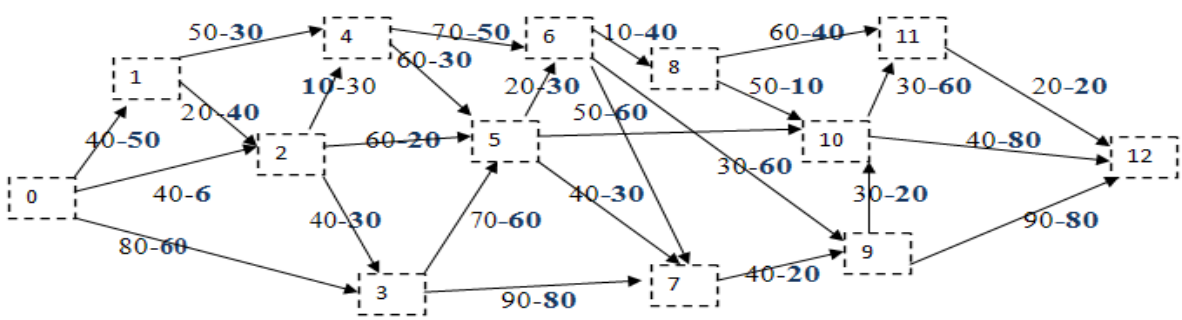

Figure 1: Travel Topology

Different settings were used to find the best path from a source to a destination.

The parameters are as follows:

- **Number of nodes ($\vartheta 1, \vartheta 2..., \vartheta\, n$)**
- **Distance between two nodes**

- **The energy consumed by the electric vehicle battery**

Each node has a set of neighboring nodes defined as follows:

$$N(vi) = \{vj \mid v\,j \in V,\ dij > 0\}$$

With d ij as the distance between "Vi" and "Vj", when the vehicle is in node Vi, the following node must be selected with a maximum probability "Pij" which is calculated using the following formula:

$$Pij = \frac{[\mu ij]^\alpha * [\rho ij]^\beta}{\Sigma[\mu ij]^\alpha * [\rho ij]^\beta}$$

With "μij" as the energy function defined by: μij=1/cij, cij is the energy to reach the node vj from "Vi" and "ρij" which is the location function defined by: ρij=1/dij, "dij" is the distance from "Vi" to "Vj".

α and β are respectively the parameters of factors influencing cost (respectively distance).

Routing Optimization Algorithm

```
Initialization: i, j, count
Inputs: n, dist, energy
Output: probabilities P (ij)
Probe function (m[0][0])
for (i=1; i<=n; i++) doing
for (j=1; j<=n; j++) do
if (m[i][j] = 0) then
x= probability calculation using the formula
node [count++]. φi =i
node [count++] .φj=j
node [count++]. value=x
end if
end for
end for
store (node value)
return i,j
∀ i,j, prob (m[a][b])
```

The above algorithm provides the optimized route from a source to a destination. The number of nodes, distance, and battery power are the input for the algorithm while the probability is the output.

Parallelism of Routing Algorithm Under Python

To parallelize the program in python, the joblib library was used which is a set of tools designed to provide a lightweight python pipeline.

For simple and easy parallel computing, joblib is optimized to be fast and robust, especially for large data. In addition, it has specific optimizations for numpy arrays. Its main role is to provide tools to easily obtain better performance and reproducibility in long term jobs.

Results

The following table shows the different paths taken with their probabilities:

Point i	Point j	Energy	Distance	Probability
0	1	50	40	0.75
1	2	20	40	0.66
2	4	10	30	0.53
4	5	50	60	0.58
5	6	20	30	0.61
6	8	40	10	0.58
8	10	10	50	0.82
10	11	60	30	0.52
11	12	10	20	1

This is the optimal route and way from a source to a destination.

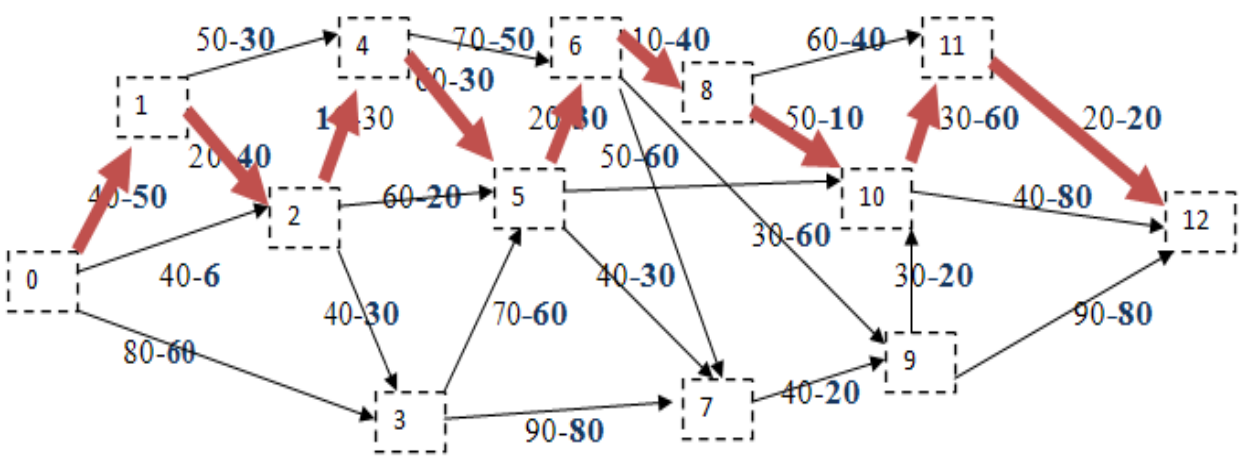

Figure 2: The optimal path/way

After parallelizing the ACO Algorithm, this result was obtained

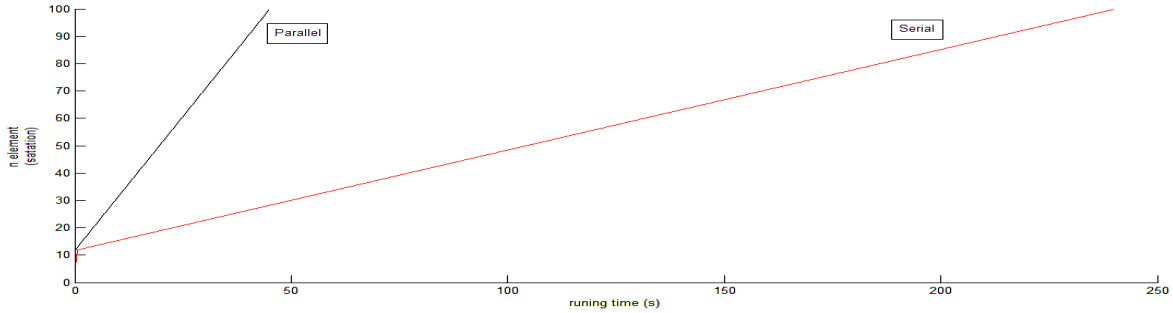

Figure 3: Comparison between sequential and parallel

Discussion of the results

There are several possible paths from a charging station "i" to a charging station "j". The path is chosen according to the one with the highest probability by using the expression mentioned above.

The path found is obviously the most optimal and always considers the two constraints of battery energy and distance.

The adopted path model or way in our project is simple. However, let us imagine that it is a very complex model. This is where the execution time becomes crucial and that is why the used algorithm was parallelized under python.

Conclusion

Battery-powered electric vehicles (EVs) will play an important role in the future's road traffic. The unique characteristics of these electric vehicles - limited cruising range, long recharging times and the ability to regain energy during deceleration require new routing algorithms as the challenge now is to determine the most economical rather than the shortest route. This requires extensions to the general shorter path algorithms that address the problem of energy-optimal routing or more specifically energy-efficient routing.

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Medición De La Sostenibilidad Al Interior De Las Organizaciones: Estado Del Arte

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Resumen

Objetivo: Proponer un esquema de clasificación conceptual (ECC) con el fin de determinar brechas en el conocimiento en cuanto a la medición de la sostenibilidad al interior de las organizaciones. **Materiales y Métodos:** Se estableció un procedimiento estructurado de la revisión de la literatura (RS). Este tipo de revisión fue aplicada usado ecuaciones de búsqueda y la ayuda de los operadores Booleanos. Se diseñó un esquema conceptual de clasificación (ECC) que consideró 41 artículos comprendidos entre 2009 y 2019, a partir de los cuales se estructuraron diferentes categorías de búsqueda y un esquema conceptual basado en preguntas. **Resultados:** Se obtuvo como resultado una estructura detallada de las variables, técnicas empleadas, lugares de aplicación, hallazgos relevantes, ventajas y desventajas de los diferentes estudios encontrados en la revisión de literatura. **Conclusiones:** A partir de dicha revisión se pudo concluir que las investigaciones relacionadas con la sostenibilidad han aumentado en la última década, siendo el período comprendido entre 2009 y 2010 el de mayor incremento de publicaciones con el 61,18%. Este incremento se refleja en los continentes europeo y asiático, encaminándose a ser los pioneros a nivel mundial en desarrollar nuevas técnicas de medición y contribuyendo a un planeta más sostenible. En cuanto a la industria (250 empresas evaluadas), solo el 8% ha establecido acciones relacionadas con los Objetivos de Desarrollo Sostenible (ODS), de ese 8%, el 39% incluyen objetivos globales con los ODS.

Palabras clave: Desarrollo sostenible, sostenibilidad social, sostenibilidad ambiental, sostenibilidad financiera, medición, indicadores de desempeño.

Introducción

La sostenibilidad es una oportunidad de cambio para las empresas, en las cuales ocurre un proceso de transición hacia negocios innovadores, respetando el medio ambiente, ofreciendo nuevas formas de convivir con la sociedad y brindándole bienestar al trabajador (Figge, 2002). Medir el desempeño contribuye a que las empresas mejoren su rendimiento financiero, identificando los procesos internos más eficientes y a su vez aprender de la experiencia de otras organizaciones para no caer en los mismos errores, focalizando esfuerzos en los aspectos medioambiental, social y económico.

El desarrollo sostenible es "el desarrollo que satisface las necesidades de la generación presente sin comprometer la capacidad de las generaciones futuras" (FAO, 1988). En las empresas es, esencialmente, la sostenibilidad económica del negocio, a largo y mediano plazo, lo que permite mantener la rentabilidad económica de sus actividades productivas, contemplando nuevos conceptos de riesgo y oportunidades, asociados a los aspectos medioambientales, al impacto social de la producción o a la calidad de las relaciones laborales (Neredo, 1996), por tal motivo, se evidencia la importancia en la implementación de políticas encaminadas a un desarrollo sostenible, estableciendo

continuamente si se cumplen o no los objetivos propuestos a través de una serie de indicadores de desempeño, contribuyendo a la mejora continua de los procesos.

El presente artículo tiene como objetivo establecer los resultados de investigaciones hechas en los últimos 10 años sobre las mediciones de la sostenibilidad al interior de las organizaciones a nivel mundial, estipulando aspectos como: métodos de recolección de información, metodologías de evaluación, áreas de la sostenibilidad medidas, países con mayor número de investigaciones, y así contrastar dicha información con el compromiso real de medir, evaluar y mejorar las condiciones sostenibles que plantea la industria. Para este propósito se estableció un procedimiento estructurado de la revisión sistemática de la literatura (RS) o meta análisis (MA) con el fin de identificar las investigaciones relevantes e ir descartando las que no lo son. Díaz (2009) propone el siguiente procedimiento: (1) Leer los nombres de los autores, (2) Año en el que fue escrito, (3) Interpretar el título del artículo, (4) Identificar las secciones en que está dividido, (5) Observar los gráficos, figuras, tablas o fotos y (6) Revisar si la bibliografía es reciente o relacionada con el tema. Este tipo de revisión sistemática de la literatura (RS) o meta análisis (MA) fue aplicada usado ecuaciones de búsqueda y la ayuda de los operadores Booleanos en varias bases de datos académicas para seleccionar los artículos más relevantes y aquellos que aportaban al tema de investigación, por último, se diseña un Esquema Conceptual de Clasificación (ECC), para determinar las brechas en el conocimiento e inducir nuevas líneas de investigación.

Metodología

El desarrollo del estado del arte en cuanto a las mediciones de la sostenibilidad al interior de las empresas se realizó de la siguiente manera:

Revisión sistemática de la literatura (RS) o meta análisis (MA)

"Una revisión sistemática se define como una manera de evaluar e interpretar toda la investigación disponible relevante respecto de un interrogante de investigación particular, en un área, temática o fenómeno de interés" (Kitchenham, 2004). Siguiendo el procedimiento propuesto por el autor, se establecieron los siguientes criterios:

- La primera etapa consistió en establecer el tema de investigación a través de una revisión sistemática (RS), fijando como primera medida el problema de la investigación y definiendo los objetivos, luego se instauraron los antecedentes del tema bajo los cuales se derivó la búsqueda investigativa, posteriormente se definió el tema a tratar, haciendo énfasis en su relevancia en el mundo empresarial e investigativo.
- La segunda etapa se basó en cuatro aspectos que garantizan las dimensiones de la revisión sistemática (búsqueda, valoración, síntesis y análisis). Como primera medida, se definió cómo se iba a llevar a cabo la búsqueda de los trabajos objeto de revisión, utilizando criterios bien definidos de exclusión e inclusión para evaluar cada potencial de estudio primario, utilizando la selección de palabras claves y ecuaciones de búsqueda con los operadores Booleanos, además se tuvieron en cuenta los siguientes criterios: fechas de publicación, estableciendo si la bibliografía es reciente o no, títulos y resumen para garantizar que los temas tratados tienen concordancia con el tema de investigación, observación de gráficos, figuras, tablas o fotos, para verificar resultados, así como las tendencias de autores que han investigado sobre la temática.

Cabe destacar que la literatura proviene de bases de datos académicas como Scopus, ScienceDirect y Scielo, seleccionando artículos de alto impacto (revistas científicas indexadas) y utilizando palabras claves para la búsqueda de artículos, como: sostenibilidad, medición, organización y producción, estas fueron interconectadas con cuatro operadores Booleanos: and, or, xor y not, generando las diferentes ecuaciones de búsqueda. La búsqueda aplicó para un período de 10 años, de 2009 a 2019.

Procedimiento De Exclusión De Artículos

Para la exclusión de artículos se realizaron dos filtros, el primero indagaba el cumplimiento de 3 criterios a saber, año de publicación, revisión de títulos y lectura de resumen de los artículos. Una vez pasado el primer filtro de búsqueda, el contenido de los artículos debía responder a dos interrogantes básicos: ¿la investigación establece como tema esencial la sostenibilidad empresarial? y ¿la investigación establece indicadores para medir el desempeño empresarial en cuanto a la sostenibilidad? Teniendo en cuenta los criterios de exclusión para la selección de artículos en las bases de datos académicas antes mencionadas, se obtuvo una revisión inicial de 216 artículos, de los cuales fueron seleccionados 41 artículos relevantes, es decir, solo el 19% aproximadamente de los artículos revisados aportaban como antecedentes al tema de mediciones de sostenibilidad empresarial. El Anexo A muestra los resultados de búsqueda con los operadores booleanos.

Esquema conceptual de clasificación (ECC)

Como fase previa a los resultados de la investigación realizada, se establece un esquema conceptual de clasificación (ECC). Este esquema, como se muestra en la tabla 2, fue creado durante el análisis de los 41 artículos seleccionados, con el fin de proveer a los investigadores un acceso rápido y mayor comprensión de la literatura relevante. Este esquema se planteó para responder a los interrogantes presentados en la Tabla 1:

Tabla 1: Lista de preguntas y posibles respuestas en la metodología ECC propuesta

1. ¿Qué áreas de la sostenibilidad se están analizando? a. Económica, social y ambiental b. Social y económica c. Responsabilidad Social Corporativa con otros aspectos de la sostenibilidad d. Responsabilidad Social Corporativa e. Social y ambiental
2. ¿Qué herramientas se están utilizando para obtener información para el desarrollo de la investigación? a. Búsqueda sistemática de la literatura b. Encuestas c. Recolección de datos cuantitativos d. Entrevistas cualitativas y cuantitativas e. Otros métodos
3. ¿Qué herramientas se utilizan para el análisis y evaluación de los resultados? a. ANOVA b. Regresión lineal c. Análisis cualitativos d. Otras herramientas de estadística inferencial y/o descriptiva
4. ¿En qué lugares a nivel mundial se realiza la investigación? a. Europa b. Asia c. Latinoamérica d. Oceanía e. Norteamérica
5. ¿Cuáles son los resultados relevantes de la investigación? a. No existe un compromiso marcado por parte de la industria a nivel mundial para medir la sostenibilidad de manera interna. b. El alto número de investigaciones realizadas en los últimos años sobre la sostenibilidad a nivel mundial y el aporte que éstas han tenido en cuanto a metodologías utilizadas para la obtención de información y el análisis de resultados.

Resultados

Como primera medida se observaron las tendencias de la sostenibilidad en general durante los últimos diez años a nivel mundial, teniendo en cuenta el número de publicaciones por año, autores principales y países que más investigan sobre el tema, para así relacionar el compromiso a nivel nacional y mundial por el desarrollo sostenible, utilizando como fuente de información la base de datos académica SCOPUS. El gráfico 1 muestra la tendencia de publicaciones realizadas sobre el desarrollo sostenible a nivel mundial en los últimos diez años, para el período comprendido entre 2009 y 2019.

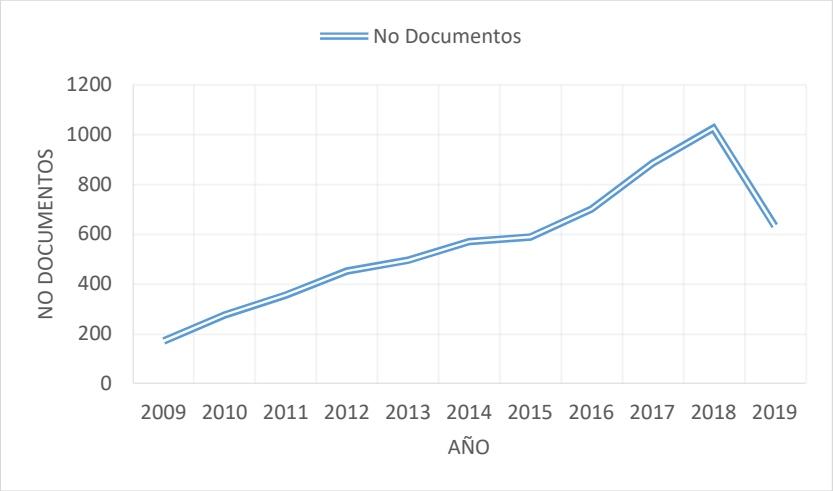

Gráfico 1: Tendencia de publicaciones por año. Elaborado a partir de información extraída SCOPUS.

Como se puede observar, existe una tendencia creciente a la investigación en el tema de la sostenibilidad, teniendo en cuenta el número de artículos publicados por año, lo que demuestra el interés de preservar el medioambiente a nivel mundial, junto con el compromiso social. Para el primer período comprendido entre 2009 y 2010 se obtuvo el mayor incremento de publicaciones sobre sostenibilidad con el 61,18%, y el incremento más bajo fue el comprendido entre el período 2014 y 2015 con un 3,16%, los demás períodos tienen un incremento relativamente constante, mayores o iguales al 10%, lo que evidencia la preocupación y compromiso de la comunidad científica de aportar al tema de la sostenibilidad (medio ambiente, los trabajadores y la sociedad, y las finanzas de la empresa).

A continuación, se responden las preguntas establecidas en el esquema conceptual de clasificación (ECC), establecido anteriormente:

¿Qué áreas de la sostenibilidad se están analizando?

De los 41 artículos revisados, en 15 artículos (36,6%) las empresas miden los tres pilares de la sostenibilidad (ambiental, social y económico), en 15 artículos (36,6%) miden la sostenibilidad ambiental como beneficio económico, en 8 artículos (19,5%) miden la responsabilidad social corporativa teniendo en cuenta otros aspectos de medición a parte de la sostenibilidad empresarial, como la tecnología, recursos productivos, compromiso, innovación, academia, gestión de control, presentación de informes de sostenibilidad, así como normativas nacionales e internacionales y los derechos de los trabajadores, en 2 artículos (4,9%) miden la responsabilidad social corporativa y un solo artículo (2,4%) mide la sostenibilidad social y ambiental, teniendo en cuenta el retorno sobre la inversión. De lo anterior se puede concluir que las empresas tienen un compromiso más marcado por la sostenibilidad, midiendo y evaluando sus tres pilares de forma general, mostrando una responsabilidad con los trabajadores, sin descuidar la parte financiera. Otro aspecto a tener en cuenta es el compromiso de las empresas con el medio ambiente, el 97,6% de las empresas objeto de estudio miden la sostenibilidad ambiental.

¿Qué herramientas se están utilizando para obtener información para el desarrollo de la investigación?

De los 41 artículos revisados, en 6 (14,6%), se utilizaron entrevistas cualitativas y cuantitativas como método para obtener información para la creación del modelo de sostenibilidad, en 9 artículos revisados (21,9%), se realizaron encuestas, las cuales fueron realizadas a diferentes empresas para obtener una información global desde diferentes puntos de vistas, siguiendo modelos de cuestionarios como el hierarchical analysis processes (AHP). En 7 artículos (17,1%), tomaron una recolección de datos cuantitativos a través de indicadores de desempeño ambiental para el análisis del ciclo de vida del producto, estudios y generación de energías renovables, entre otros. En 12 artículos (29,3%), se utilizaron búsquedas sistemáticas de la literatura a través de sistemas meta-buscadores y/o explorando las bases de datos académicas multidisciplinarias (Google Scholar, ScienceDirect, Scopus, entre otras) indagando áreas como la gestión, academia, ambiente, compromiso e innovación, esto se hizo usando palabras claves de la gestión sostenible como economía, medio ambiente, impacto social y tecnología. Por último, en 7 artículos (17,1%), se utilizaron otros métodos para la obtención de información tales como: evaluación relacionada con los productos e instrumentos de evaluación integrados, la evaluación empírica, donde se estudiaron ocho indicadores específicos de eficiencia basados en la relación entre la entrada y la salida de los datos orientados a insumos, comparación cualitativa y cuantitativa, de las revisiones de indicadores ambientales de un grupo de pequeñas y medianas empresas (PYMES), el análisis de inventario, en el que se examina el proceso de recopilación de datos para calcular los efectos ambientales, evaluación exhaustiva y parcial de varias cadenas de suministro (Hassini et al., 2012), y recopilación de información a través de la evaluación de criterios y búsqueda de información en páginas web.

¿Qué herramientas se utilizan para el análisis y evaluación de los resultados?

En la revisión de los 41 artículos seleccionados, Polanco et al (2016) implementaron estándares internacionales a través de la identificación y priorización de aspectos que intervienen en el desempeño de la organización, evaluando las alternativas según el retorno de la inversión aceptable y definido por la compañía. Por otra parte, en un estudio de investigación realizado por Martínez Ferro (2014) se utilizaron datos de panel, es decir, datos que combinan una dimensión temporal con otra transversal por medio de un análisis entre dos variables a lo largo del tiempo, con el estimador propuesto por Arellano y Bond. Sesma et al (2014) establecieron como herramienta estadística, un análisis de regresión en el estudio de big data para correlacionar la responsabilidad social con los stakeholders como parte fundamental en las utilidades de la empresa, estableciendo el papel que desempeñan cada uno dentro de la organización.

En una investigación realizada en responsabilidad social sostenible (RSE) por López et al (2017), se analizó el impacto de la responsabilidad social sostenible midiendo variables tales como: derechos humanos, prácticas laborales, medio ambiente, prácticas justas de operación, asuntos de consumidores, participación activa y desarrollo de la comunidad, teniendo en cuenta el capital humano como medida de valor económico, es decir, los trabajadores como capacidad productiva. Ellos establecieron que dentro de la práctica RSE se debe tener en cuenta aspectos como la globalización, tecnología, enfoques globales sobre la preservación del medio ambiente y compromiso social.

Ghenai et al (2019) plantearon la toma de decisiones multicriterio, para evaluar los cinco criterios de sostenibilidad ambiental en el caso de estudio en cuanto a energía renovable y el método híbrido de análisis de la relación de pasos/evaluación de la relación aditiva (SWARA/ARAS).

Para estudiar la sostenibilidad se pueden considerar tres puntos de vista dentro de la empresa: industria de mercado, basados en recursos y basados en instituciones, para adaptarse rápidamente a las restricciones impuestas por las tres áreas de la sostenibilidad, en aras de buscar valor agregado a sus procesos, a partir de esa premisa Antonio Lloret (2016) creó un modelo netamente analítico para la medición de la sostenibilidad, utilizando como base investigaciones previas, en este se estudiaron diferentes puntos de vistas aplicando información empírica, para saber cómo perciben las industrias la sostenibilidad, teniendo en cuenta las partes interesadas (stakeholders), el liderazgo sostenible y el gobierno corporativo para abordar dichas restricciones. Bajo ese mismo modelo analítico, los autores Sala, Ciuffo y Nijkamp (2015),

establecieron un procedimiento estructurado que abarca diferentes métodos y modelos analíticos específicos de campo, para aplicaciones y contextos de decisión específicos, basados en la revisión bibliográfica, los cuales establecieron como insumos externos de la metodología los "valores" para el análisis y los límites definidos, incluyendo el marco de la sostenibilidad relevante; y los elementos internos comprenden el enfoque que se debe adoptar, como el diseño de posibles escenarios sin descartar los desafíos políticos para el desarrollo sostenible, y a su vez la utilización de un modelo analítico e indicadores medibles para un análisis más operativo, más cuantificable.

En cuanto al análisis y evaluación a través del sistema de indicadores, Ness, Urbel-Piirsalu, Anderberg y Olssonse (2007), encontraron una metodología que se basa en tres áreas: categorización, establecimiento de indicadores o índices (integrados o no integrados), y evaluación del producto, teniendo en cuenta: los flujos de materiales y/o energía del producto desde la perspectiva del ciclo de vida y la evaluación integrada (multicriterio, análisis de incertidumbre, análisis de vulnerabilidad, costo-beneficio, sistemas dinámicos y el modelo conceptual), que son un conjunto de herramientas que normalmente se centran en el cambio de políticas o en la ejecución de proyectos.

Es claro que la medición de la sostenibilidad es una herramienta poderosa para saber qué tan bien se encuentra una organización con respecto a la gestión ambiental, social y económica, tanto interna como externamente, autores como Wan, Mohd y Johan (2017), utilizaron bajo otro enfoque nuevamente el concepto Green Project Management (GPM) P5 para desarrollar su modelo matemático de medición, basados en múltiples estudios de casos (juicios de expertos, entrevistas a los altos directivos, entre otros), el cual va más allá del principio 3Ps (planeta, beneficios económicos y personas), sino que además incluyeron productos y procesos para recoger la mayor cantidad de información posible, la cual fue analizada con una regresión lineal múltiple, para posteriormente realizar el proceso de normalización de los datos como resultado final.

¿En qué lugares a nivel mundial se realiza la investigación?

La revisión arrojó los siguientes resultados en cuanto a la pregunta planteada anteriormente, de los 41 artículos revisados: 17 artículos (41,46%), fueron realizados en Europa, 12 artículos (29,27%), en Asia, 7 artículos (17,07%), en Latinoamérica, 4 (9,76%), en Oceanía y uno en Norteamérica (2,44%). Se puede concluir que los continentes europeo y asiático son los más preocupados por investigar sobre el desarrollo sostenible, encaminándose a ser los pioneros a nivel mundial en desarrollar nuevas técnicas de medición contribuyendo a un planeta más saludable, empresas más eficientes que aumenten sus utilidades a lo largo del tiempo y empleados más seguros y felices. Adicional, sus investigaciones llevan a la creación o modificación de métricas e indicadores, análisis y mediciones de la sostenibilidad, generación de una cultura sostenible, creación de políticas de sostenibilidad, entre otros. De los artículos revisados, España realizó cuatro publicaciones de medición de la sostenibilidad empresarial, lo cual lo hace el país europeo de habla hispana con mayor número de aportes en el tema. En Latinoamérica, países como Colombia y México (4 y 3 artículos respectivamente). De toda la búsqueda realizada, EE.UU. es el país del que menos se encontró investigaciones relacionadas a la sostenibilidad, esto debido a su poco compromiso con los objetivos de desarrollo sostenible (ODS) que contrasta con su desarrollo económico. Según un nuevo informe supervisado por Jeffrey D. Sachs y publicado por la Red de Soluciones Sostenibles de las Naciones Unidas y la Bertelsmann Stiftung de Alemania, EE.UU. ocupa el puesto 42 de 157 países que han puesto en marcha los objetivos de desarrollo sostenible (ODS). En el estudio se estipulan tres colores para las diferentes ejecuciones de los ODS, el color rojo es para aquellos países que no han ejecutado ningún objetivo, amarillo el que los ejecuta de manera parcial, y el verde para aquellos que los ejecutan de manera total, y EE.UU. no tiene el color verde en ninguno de los 17 objetivos de desarrollo sostenible (ODS).

¿Cuáles son los resultados relevantes de la investigación?

Según el estudio realizado por la firma KPMG (Klynveld, Peat, Marwick, Goerdeler) a las 250 mejores empresas a nivel mundial según la revista Fortune (2017), menos del 10% de las grandes empresas se enfocan en los objetivos de desarrollo sostenible y las mediciones de estos aspectos, el 2% no reportan los casos de estudio para tomar acciones (preventivas o correctivas). Se puede afirmar que las empresas

no están midiendo la sostenibilidad, de esas 250 grandes empresas seleccionadas, solo el 8% ha establecido acciones relacionadas con los objetivos de desarrollo sostenible (ODS), de ese 8%, el 39% incluyen objetivos globales con los ODS, es decir, direccionan estratégicamente a la empresa con los objetivos de desarrollo sostenible; y de ese mismo 8% el 75% de las empresas solo discuten el impacto positivo que tienen los ODS en su negocio, pero la parte negativa no la incluyen en sus informes. Además, encaminan los objetivos estratégicos de la organización y los ODS por caminos diferentes.

Basado en la revisión de la literatura realizada en los últimos 10 años (2009 – 2019), se puede afirmar que existe un contraste bastante marcado con el compromiso que tiene la ciencia y la investigación con el medio ambiente y la sociedad, existe una tendencia creciente en la investigación y publicación de artículos científicos con respecto al tema, lo que demuestra un gran interés de preservar el medioambiente a nivel mundial de la mano con el compromiso social, siendo Asia y Europa los continentes que más aportan al tema con un 41,46% y un 29,27% respectivamente. Estas investigaciones utilizaron herramientas para la generación de información relevante para su posterior evaluación y generación de metodologías de análisis a través de las herramientas de estadística descriptiva e inferencial (como el análisis ANOVA, regresión lineal simple, toma de decisiones multicriterio, datos de panel y otros métodos), ayudándose con encuestas, entrevistas, revisiones bibliográficas, metodologías híbridas, entre otras, para obtener datos confiables.

Conclusiones Y Recomendaciones

En la presente investigación se utilizó una metodología de búsqueda basada en un meta análisis (MA), con la ayuda de la metodología de Kitchenham (2004), la cual se centra en el procedimiento de la revisión de la literatura. En dicha búsqueda se utilizaron los operadores booleanos como herramienta de apoyo para ser más eficientes en la obtención de la información. Se revisaron 216 artículos de los cuales 41 fueron relevantes, aportando la información suficiente para identificar, analizar y clasificar la información referente a la medición de la sostenibilidad al interior de las organizaciones. A partir de esta, se obtuvo como resultado una estructura detallada de las variables, técnicas empleadas, lugares de aplicación, hallazgos relevantes, ventajas y desventajas de los diferentes estudios encontrados en la revisión de la literatura. Por tal motivo, el principal aporte de la presente investigación es convertirse en un referente valioso para estudios y aplicaciones asociadas a la medición de la sostenibilidad, con el fin de mejorar la preservación del medio ambiente, el bienestar de los trabajadores y las finanzas de una organización. Dichas investigaciones sirven como base para el mejoramiento continuo dentro de la industria, las cuales no tienen ningún compromiso real para medir y estipular procedimientos de análisis de las condiciones de sostenibilidad internamente.

El contexto de la investigación y la medición de la sostenibilidad al interior de las organizaciones, contrastan, por una parte, las investigaciones que han ido en aumento en los últimos años sobre la sostenibilidad a nivel mundial y países que se han interesado en la investigación del desarrollo sostenible, como lo es el caso de España, Colombia, México, Cuba y Ecuador. Y en el otro extremo, se encuentra la industria a nivel mundial, las cuales no tienen el compromiso real de entrar en un desarrollo sostenible, midiendo, analizando y mejorando la situación problema.

Por último, los lectores deben ser cautelosos en la interpretación de los resultados de este estudio, debido a que las conclusiones se basan en artículos publicados en el ámbito académico y profesional, dejando de lado otro tipo de publicaciones, puesto que se asume que la alta calidad de las investigaciones es finalmente dada a conocer por medio de revistas indexadas nacionales e internacionales.

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The Development of the Entrepreneurship Initiatives in Romania Based on the Principles of the Collaborative Economy

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Abstract

The purpose of this scientific article is to empiricaly analyze the situation of Romania in terms of collaborative economy, the challenges and opportunities related to the development of innovative entrepreneurial initiatives in this field, as well as the role of the new 5G information technologies in supporting them. The research results highlights the benefits that can be obtained within the collaborative economy, as well as the very important role of 5G technology in supporting the development of this type of economy. On the other hand, the research shows that the collaborative economy is not yet well developed in Romania, especially due to the lack of regulation by the national authorities, the increased sense of ownership of the citizens, and also because the companies are still linked to the traditional production model and consumption. Romania has the logistical framework necessary for the development of the collaborative economy, and the main solutions to stimulate it are represented by the creation of a well elaborated legislative framework, the support of the entrepreneurial initiatives in this field and the education of the consumers / users.

Keywords: Collaborative Economy, 5G, Business, Romania

Introduction

Collaborative economy (CE) models have been developed with an accelerated rate globally, especially after the international financial crisis of 2008. This evolution is not only due to people's willingness to spend less, but also to changing consumers' attitude towards ownership of a good.

More and more people, especially from developed countries, are embracing this model of economy, transforming from consumers into users of goods and services. Given these aspects we can consider that this type of economy will become the foundation on which the new entrepreneurial initiatives will be developed.

Thus, the main objective of this scientific research is to analyze what the collaborative economy means, the advantages of innovative entrepreneurial initiatives in this field, supported by the implementation of 5G technology, and what is the situation of Romania in terms of adjustment to this type of economy.

To achieve this objective, the article is structured as follows: in Section 2 we will discuss theoretical issues regarding the principles and benefits of the collaborative economy, and in Section 3 we will try to determine the implications of the new 5G technology in supporting business development within this economy.

Further, Section 4 contains an empirical analysis of Romania's situation regarding the convergence to the principles of the collaborative economy, as well as the determination of the main challenges and opportunities arising from this transition. Finally, in Section 5 we will present the main conclusions drawn from this scientific research.

Collaborative Economy

Although the concept of *collaborative economics* is a debate in many scientific articles, there is no unanimously accepted definition of it.

According to Lamberton and Rose (2012), the collaborative economy represents a complex economic and social system that is based on the principle of shared use of physical and human resources.

Hacker and Pierson (2011) assert that the collaborative economy model appeared in the western countries, with the decrease of the middle class incomes, and implicitly the decrease of the aggregate consumption. People have realized the cost of owning the property and have started to consider their usefulness.

They are authors, such as Sheth et al. (2011), who believe that the basis of the collaborative economy is precisely the responsible attitude of the people towards the consumption practices.

There are several types of business that can be developed in the field of CE, classified according to the type of transactions that are established between the parties involved: rental, loan, sharing, donation, collaboration, exchange, sale or resale.

As Lisa Gansky (2010) states, in the category of the collaborative economy are also registered those businesses that use data from a wide variety of sources (eg social media, web, mobile data) to provide high quality and personalized goods and services to people when they need it. Basically, through these channels the demand is shared at a certain time, and the suppliers are prepared to meet it in accordance with the client's needs.

According to Hamari et al. (2016), the CE evolved due to the innovation in the field of information and communication technologies (ICT), which allowed, through digital platforms, the fulfillment of sales, sharing, rental and exchange activities world wide at very high speeds.

Onete and Plesea (2018) also confirm the importance of ICT in the field of entrepreneurship, saying that access to new technologies motivates small entrepreneurs to reconsider how they manage the relationship with consumers.

A study conducted by the European Commission in 2016, entitled *"Flash Eurobarometer 438 - The use of collaborative platforms"*, showed that the standard user profile of digital collaborative platforms is made up of young people who are employed, with an above average education, and who live in the urban area. The study developed by the European Commission also shows that among the most important advantages of using these platforms we find: more organized and convenient access to services, the fact that it is cheaper or in some cases free, offers the possibility to exchange products or services instead the payment of some money and offers new or different services.

Looking deeper into the benefits of this type of economy, we can see how it support sustainable and inclusive economic growth in the long run through the efficient use of resources, as well as the environmental benefits, especially in the context of crowded cities, where sharing of goods and services would contribute for reducing traffic or pollution. Thus, the CE can make an essential contribution to the development of smart cities and to the living standards of local communities.

On the other hand, the collaborative economy also helps in times of crisis or recession as it contributes to the reduction of expenses especially for those with below average incomes and gives the possibility for the entrepreneurs to rent certain goods, thus saving part of the income lost as a result of the purchasing power decrease.
Besides these advantages, there is another quality advantage, namely that CE supports social interaction. Often, people turn to services associated with the collaborative economy just for the simple fact that in this way they interact with other people in the community or with members of different communities (eg Airbnb).

Furthermore, Park et al. (2016) presents the example of transport companies operating on the basis of collaborative platforms (eg Uber) to highlight another important advantage offered by this type of economy, namely the reduction of sexual crimes with the introduction of the services of these companies.
Given these considerations, we will continue to determine why the new 5G technology is important for the development and innovation of entrepreneurial initiatives in the field of collaborative economy.

The Importance of 5G Technology for Business Development within the Collaborative Economy

Due to the information and communication technologies, access to data and information is unlimited, as well as the ways of processing them. The implementation of the new 5G technologies represents a major upgrade in terms of how the world is connected. 5G is an emerging technology that promotes virtualization, artificial intelligence and process automation.

This new technology will play an extremely important role in the smart cities development by creating new IT systems and improving existing ones, which will revolutionize innovation, communication, learning, health system, transportation, entrepreneurship and the standard of living in general.

The widely spread of 5G technology will support the innovation of traditional industries and many types of businesses, which will lead to the creation of extraordinary facilities for society: smart homes, autonomous cars, virtual reality, telemedicine, artificial intelligence and so on. Regarding the business field, the 5G digital revolution will have three major priorities. The first one is instant connectivity, which allows people to control information in real time.

The second priority is to achieve a high level of decentralization. Given that today's cloud systems are still too centralized, they are not in line with how the global economy is developing, which emphasizes decentralization, because consumer trends suggest instant access to the desired product or service.

Finally, the third priority is the efficient use of data. Once the connectivity is increased and the cloud technologies are more complex, the data will be available in real time, allowing them to be instantly analyzed and used.

Businesses on the Internet that have appeared in recent years, including online commerce and social media, were possible due to the characteristics of 3G and 4G technologies. These types of businesses have created innovation in the areas in which they operate, and this is expected to continue with the introduction of 5G on a large scale (which will offer a speed 10 times higher than the one currently offered by 4G technology).

Thus, the new artificial intelligence will lead to the development of the new type of sustainable and inclusive economy in the long run, namely the circular economy. It is expected that about 70% of the new value created through digitization over the next 10 years will be made up of ecosystem-based businesses. In this way, the companies that operate alone on the market will have to enter into partnerships with companies from other industries, agencies and the state.

According to a report by Infosys (2019), 5G is not just a technology, but an essential component that entrepreneurs will use to create virtual IT environments and software that responds exceptionally to the demands and users experiences.

The new innovative IT environments must achieve a convergence between the need for speed and the user experience, on the one hand, and on the other hand, the level of security and compliance, and the main solution will be offered by 5G.

Thus, the companies that will succeed in establishing themselves in the market will be those that will permanently use innovation to develop their diverse, safer, greener and more sustainable ecosystems for all users.

The Situation of Romania

Romania is currently at the stage where it has many aspects to improve in the field of collaborative economy, a sector that is not yet sufficiently exploited. Currently, most of the collaborative digital platforms in Romania is based on business models run by foreign companies, such as Airbnb or Uber.

In Romania, there isn't any well-defined national strategy to support the development of this type of economy, the sustainability of the collaborative economy being based in particular on the non-profit organizations operating under this concept.

This reality is due, among others, to the fact that the owner mentality in Romania is still very developed, and this is evidenced by the Eurostat statistics, which places this country first in terms of the percentage of the population living in their own dwellings (Chart 1).

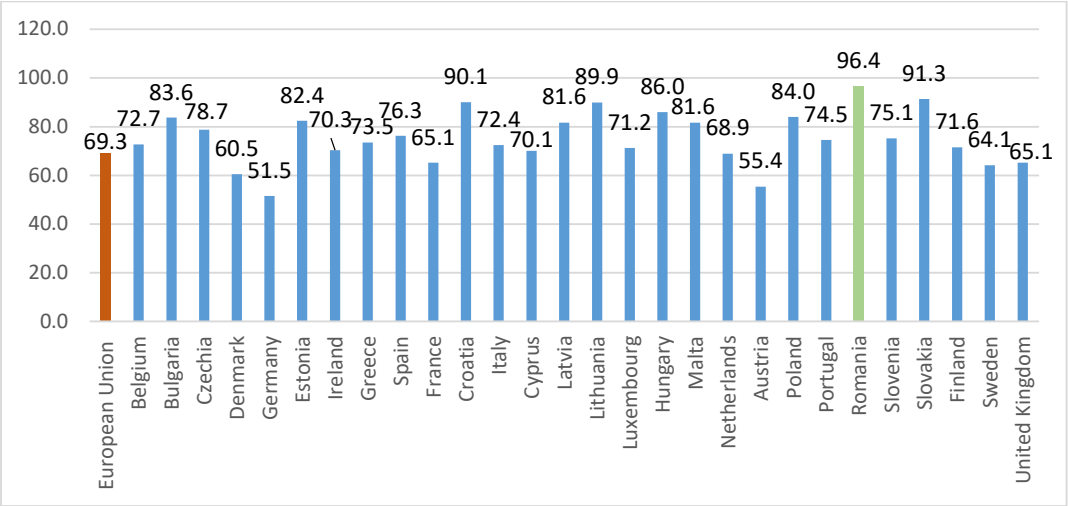

Chart 1: Percentage of population living in private dwellings, EU, 2018

Source: chart made by the author, based on Eurostat data

As we can see from the chart above, Romania far exceeds the average registered in the European Union (EU), where only about 70% of the citizens own a house.

Also, in Chart 1 it is emphasized that the highest percentages of the population living in private dwellings are registered in developing states, such as Romania, Slovakia and Croatia, while at the opposite side are developed states: Germany, Austria, Sweden, France and the United Kingdom.

This allows us to understand that in developing countries there is still a developed sense of ownership, which influences the slow transition to the collaborative economy.

Regarding the Romanian legislation in the collaborative economy field, we note that the national authorities act rather for limiting the digital platforms for collaboration. An example of this fact is the legislative vacuum faced by local authorities regarding the regulation of some platforms, such as Uber or Airbnb.

On the other hand, companies continue to be linked to the traditional production and consumption model. Eurostat statistics show in this case that Romania is the second lowest in the EU in terms of circulating materials utilization (see Chart 2).

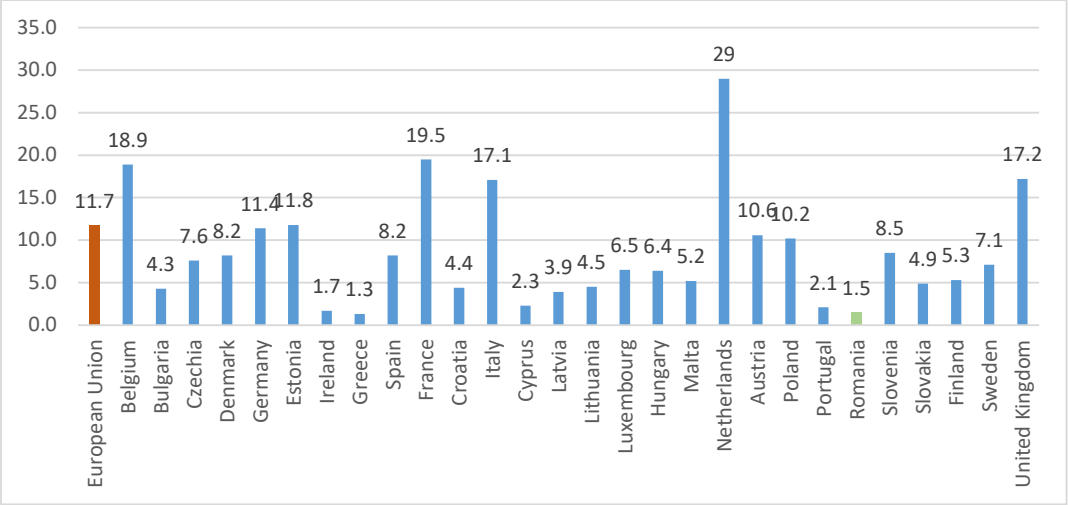

Chart 2: The utilization rate of circulating materials, EU, 2016

Source: chart made by the author, based on Eurostat data

The percentage of 1.5% registered by Romania is well below the EU average (11.7%), and the gap is even greater than the most performing states from this point of view: the Netherlands (29%), France (19, 5%) and Belgium (18.9%).

All these facts are some of the key issues that Romania faces in the process of transition to the collaborative, modern and circular economy, which ranks this country 88th in the world, according to the *Timbro Sharing Economy Index 2018*, calculated by the European Policy Information Center.

As we stated earlier in this article, the collaborative economy is supported by the innovation of the information and communication technologies.

According to the *Speedtest Global Index (2019)*, Romania has the fastest fixed broadband among all European Union states (147.87 Mbps) and ranks 18th among EU states in terms of average mobile Internet speed (37.76 Mbps).

This shows that in terms of logistics, Romania has the necessary means to support the development of the collaborative economy in the near future, as well as the businesses carried out in this field, especially in the context of the introduction of the new 5G technology.
Starting from the results of the *"Flash Eurobarometer 438 - The use of collaborative platforms"* study, described in Section 2, and considering that the use of the Internet is an essential condition for being a consumer / user of the goods and services offered within the collaborative economy, next we will try to determine the profile of the main users of these goods and services in Romania, in order to see who should be predominantly addressed to this area.

Eurostat data shows that, in terms of age, the frequency of Internet use is higher among people between 20 and 24 years old (Chart 3).

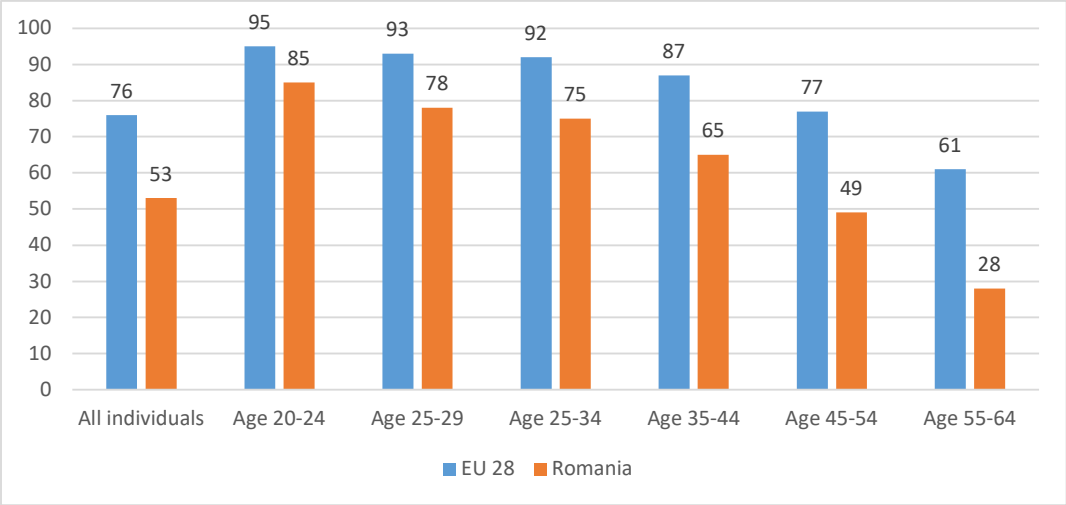

Chart 3: Percentage of individuals using Internet daily, by age, 2018

Source: chart made by the author, based on Eurostat data

We notice that frequency of Internet usage decreases with age, the percentage of Internet usage for people over 55 years old being quite low.

In the case of young people, there are registered small differences between the two areas regarding the percentage of Internet users, but considerable differences are in the case of people over 35 years old.

On the other hand, from the level of education point of view, the data published by Eurostat indicate a high frequency of daily use of the Internet in the case of people with high formal education (Chart 4).

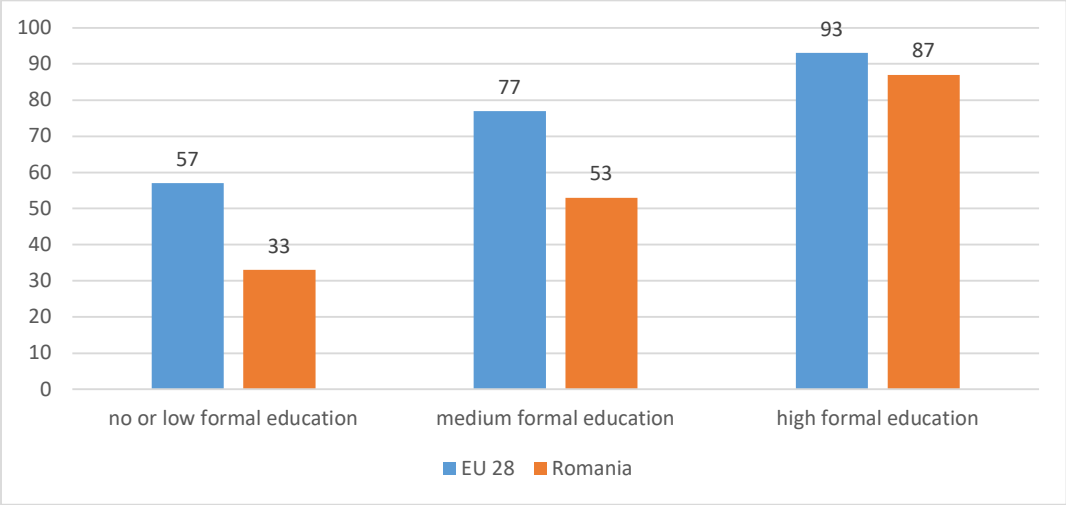

Chart 4: Percentage of individuals using Internet daily, by education, 2018

Source: chart made by the author, based on Eurostat data

In this case, we observe that Romania's gap with the EU 28 average is very small among people with high formal education.

Regarding the classification of Internet users according to the level of income, Eurostat statistics shows that persons belonging to households with income in the fourth quartile register the highest daily use rate of the Internet (Chart 5).

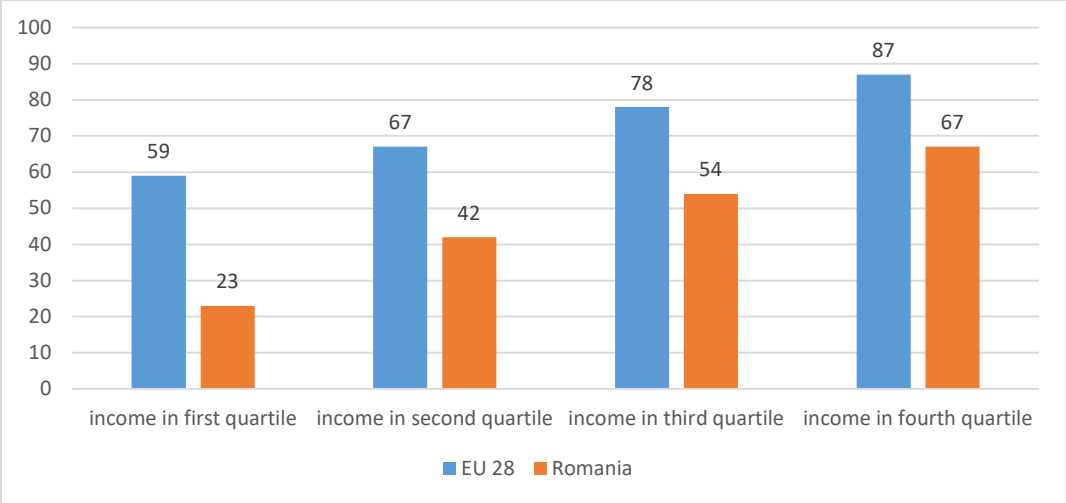

Chart 5:Percentage of individuals using Internet daily, by income, 2018

Source: chart made by the author, based on Eurostat data

Thus, from the chart above it can be observed that the percentage of the population that uses the Internet daily increases directly in proportion to the increase of incomes, but in the case of this indicator the gap with the data recorded by the EU 28 average is high for all 4 categories indicated.

Finally, the last characteristic that we analyze is the percentage of the population that uses the Internet daily, depending on the area where they live (Chart 6).

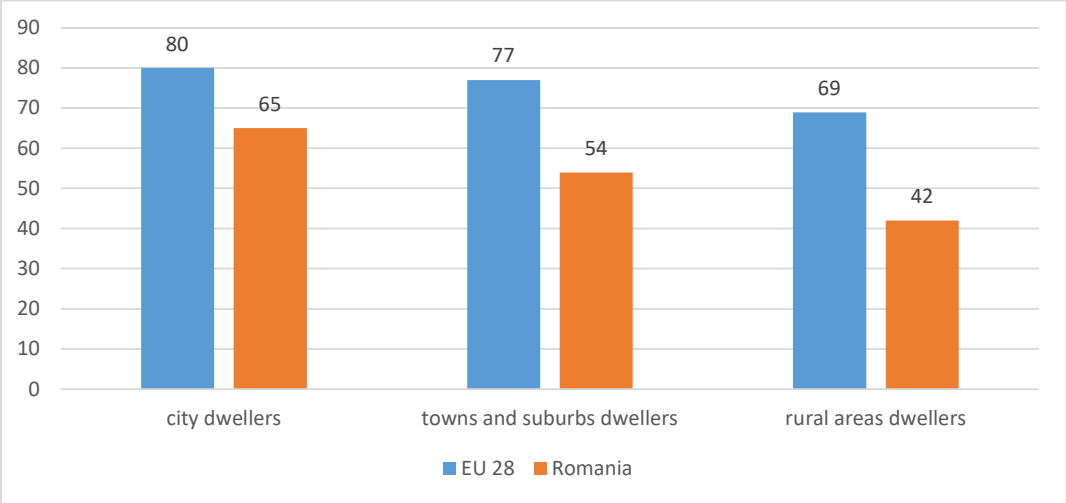

Chart. 6: Percentage of individuals using Internet daily, by living area, 2018

Source: chart made by the author, based on Eurostat data

In the case of this indicator, the data presented in Chart 6 shows that people living in major cities have the highest frequency of Internet use, the difference from the EU 28 average being the smallest for this category.

Summarizing the results presented in charts 3, 4, 5 and 6 we can say that the profile of the main users of the goods and services offered within the collaborative economy are young people between the 20 and 34 years old, with high formal education, who live in big cities and belong to households with income in the fourth quartile.

All these results shows that in Romania there is, on the one hand, the logistical framework necessary for the development of the collaborative economy, and on the other hand the user profile of the goods and services offered by this economic model is in line with that of the users from the developed states.

The problems that arise are related to the way in which the Romanian consumers are educated in order to participate to the development of the circular / collaborative economy, the way in which the entrepreneurs are involved in creating innovative and sustainable businesses in this field and the involvement of the political decision makers in supporting this field.

Thus, for the transition to the collaborative economy to grow, it is necessary for the national authorities to create a well-developed legislative framework to regulate this field, to carry out social awareness campaigns of the benefits of the collaborative economy and to support innovative entrepreneurial initiatives in this field, both financially and bureaucratically.

In turn, according to the main profile of users, entrepreneurs must identify and meet the requirements / needs, thus contributing to changing consumer habits.

They can use best practices from developed countries, but they must be implemented in Romania only after are adapted according to the local specificity.

Conclusions

The statistical data shows that, globally, there is a clear tendency of transition to the circular economy and the development of the collaborative economy, and the pace of this change is accelerating. Meanwhile the gap between Romania and the developed countries is increasing, and this trend will continue if we do not act, both individually and at the enterprise level.

The main solutions to recover this gap are education and investments in innovation, which once realized will help Romania to benefit from the great advantages offered by the sector of the collaborative economy and to increase its degree of competitiveness, generating important benefits for all the economic agents. In Romania, there is the logistical framework for developing entrepreneurial initiatives in the field of collaborative economy, especially in the context in which 5G technology will be implemented soon, as well as the fact that there are potential users / consumers.

The Romanian authorities must proactively analyze the ways in which entrepreneurship can be stimulated in this field, because if no new rules will be implemented in its favor, failing to achieve a favorable ecosystem, there is a risk that entrepreneurs will relocate their businesses, and this is to be avoided.

At the same time, creating a well-developed legislative framework to regulate collaborative entrepreneurial initiatives will help to increase consumer confidence in these businesses, implicitly changing consumption habits.

On the other hand, we consider that all these advantages produced by the large-scale implementation of innovative entrepreneurial initiatives in the field of the collaborative economy are very important sources for supporting the objectives of developing smart cities in Romania, and also cultural-creative communities.

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Spatial Spillover Effects in the Analysis of the Government Bond Yield

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Abstract

The paper presents a spatial approach to the analysis of the phenomenon of contagion, i.e. the so-called spillovers, in the analysis of the financial markets. The spatial spillover effects realized in the form of indirect impacts of a given explanatory variable in a specific spatial location on the explained variable in all other locations are discussed. In the context of identifying the relationships between Treasury bond yields in the world, these effects should be interpreted as information on the extent to which changes in the level of bond yields issued by countries from a given area are caused by change in a specific explanatory variable in the *i*-th country. The dynamic spatial models for pooled time series and cross-sectional data (TSCS) together with dynamic spatial panel models as a tools of determining these effects were considered. The models of government bond yield issued by forty selected countries from different regions of the world in the period of 2008–2017 were estimated and verified. The yield to maturity (YTM) was used as the dependent variable in the models. Indirect effects have been determined in relation to the selected spatially lagged explanatory variable, namely the inflation rate measured in the neighboring regions. Based on the research we have found a clear impact of the inflation rate observed in a given country on the yield of government bonds issued by the other countries.

Keywords: Spatial Spillover Effects, Indirect Effects, Dynamic Spatial Models.

Introduction

The need to cover the objects making up the global financial market with a broader spectrum of analyses, has intensified with the consequences of global financial crisis of 2008-2010. The empirical analyses carried out so far have considered them primarily in terms of functioning and changes over time. Meanwhile, the system of spatial relationships between financial market entities may become a source of systemic risk materialization. The emergence of spatial relationships may undermine the stability of the financial system, increasing the risk that a single economic shock will spread to other interdependent institutions and economies through various channels, thus leading to the phenomenon of 'contagion'.

The susceptibility of economies to the absorption of economic shocks may increase, among others due to the process of diversifying the sources of income in individual countries. National economies, by adjusting the structures of their investment portfolios through acquiring assets from various geographical segments of the world, on the one hand, benefit because of the often higher rate of return, but on the other, as a result of the risk sharing process, they are exposed to an increased risk of the absorption of negative economic impulses.

A rapid increase in yield spreads observed during the period of an outbreak of the subprime crisis of 2008-2009 and its expansion onto international financial markets did not find an adequate or exhaustive justification in the level of real economic growth, the inflation rate or the development of the fiscal situation of indebted countries. Therefore, the question arises as to whether there were any additional factors at that time that could justify the interdependence observed during this period in the

rapid changes in the levels of ten-year government bond yields. A certain spatial pattern of transferring negative phenomena to other countries, signalled at that time, in the absence of premises that can be identified and justified by fundamental factors, can be explained by the occurrence of spatial relationships between them.

In various studies of the phenomenon of contagion, especially with regard to finances, the analyses that use the spatial approach are among few. Meanwhile, the advantage of such approach is the possibility of an interesting and transparent analysis, in the interpretative sense, along with the so-called direct effects, and also indirect effects, which enable spatial spillover effects to be identified.

Empirical analyses which extend the classic approach to the phenomenon of contagion by a spatial aspect derive inspiration from the methodology developed by e.g.: Anselin (2003); LeSage and Pace (2009); Elhorst (2011; 2014); Debarsy, Ertur and LeSage (2012); Gibbons and Overman (2012); LeSage and Chih (2016); Lee and Yu (2016).

One of the more interesting, newer studies that emphasize the legitimacy of using spatial models in the analysis of the contagion phenomenon is the work by Elhorst, Gross and Tereanu (2018). The authors compare two methodologically independent approaches to the contagion phenomenon, i.e. using spatial econometric models, so by identifying spatial indirect effects on the one hand, and using the global vector autoregressive model (GVAR) and impulse response analysis on the other.

One of the first practical applications of the concept of spatial contagion effects is the work of Ertur and Koch (2007). By asking about the reason for the differences in the well-being of individual countries at the very beginning, the authors joined the debate on economic growth that had been going on for decades, while seeking the logical justification for the disproportions observed in this respect. The theoretical construction on which the authors based their research was the spatial Durbin model.

In the context of financial applications it is worth mentioning the work by Kelejian, Tavlas and Hondroyiannis (2006) which examines the impact of contagion arising from a single economy on other emerging economies, as well as the work by Muratori (2015) on contagion in the area of bond market.

The analyses of the financial phenomena that take into account the spatial relationships[1], due to which the spillover effect may occur, constitute a less recognized research direction. Insufficient insight into the analysed issues in rather scant literature on that subject has become the main motivation to prepare this paper, and thus to join the discussion on this important topic.

The paper concerns the interaction between the yields of 10-year government bonds issued by selected international economies (see Table 1) in the period of 2008-2017.

Table 1: Spatial scope of the analysis

Country				
Australia	Austria	Belgium	Canada	Chile
China	Colombia	Croatia	Czech Rep.	Denmark
Finland	France	Germany	Great Britain	Greece
Hungary	India	Indonesia	Ireland	Italy
Japan	South Korea	Malaysia	Netherlands	New Zealand
Norway	Pakistan	Peru	Philippines	Poland
Portugal	Russia	Singapore	Spain	Sweden
Switzerland	Taiwan	Thailand	USA	Venezuela

The purpose of the study is to assess the spatial spillover effects realized in the form of indirect influences of the established explanatory variable in a given spatial location on the explained variable, in this case the yield to maturity of 10-year government bonds, in all other locations. The explanatory variable has been determined by estimation and verification of various spatial models. Therefore, the issue of the occurrence of spatial spillover effects between the analysed markets has been considered.

Methodology

In the investigation there were used the dynamic spatial models for pooled time series and cross-sectional data (TSCS) as well as dynamic spatial panel data models. The justification of the use of the spatial models, i.e. the models containing spatial lags of dependent or/and explanatory variables comes from the specific interpretation of the parameters of these models, which measure the impact of the changes of the variable values in neighboring observations/regions, i.e. y_j, x_{kj}, on the dependent variable observation y_i (LeSage and Pace, 2009, p. 34). The construction of the spatial models in dynamic terms additionally allows us to take into account the time lags of the dependence. In turn, the argument in favour of the construction of spatial panel data models, also of spatial panel models of dynamic character, is supported by the heterogeneity of studied economies (Elhorst, 2011, p. 7).

The construction of dynamic spatial models in the analysis of the Treasury bond market enables a thorough understanding of the spatial patterns of the cause-and-effect relationships between the yield of bonds issued by various countries over time but it also allows us to consider the possibility of delayed reactions.

The following specifications of government bond yield have been considered [2]:

– LM

$$YTM_{it} = \tau YTM_{it-1} + \alpha + \beta_1 Integration_t + \beta_2 VIX_t + \beta_3 Rating_{decrease_{it}} + \beta_4 Rating_{increase_{it}} + \beta_5 Inflation_{it} + \varepsilon_{it} \quad (1)$$

– SDM[3]

$$YTM_{it} = \tau YTM_{it-1} + \rho \sum_{i \neq j} w_{ij,t}\, YTM_{jt} + \eta \sum_{i \neq j} w_{ij,t}\, YTM_{jt-1} + \alpha + \beta_1 Integration_t + \beta_2 VIX_t + \beta_3 Rating_{decrease_{it}} + \beta_4 Rating_{increase_{it}} + \beta_5 Inflation_{it} + \theta_1 \sum_{j \neq i} w_{ij,t} Rating_{decrease_{it}} + \theta_2 \sum_{j \neq i} w_{ij,t} Rating_{increase_{it}} + \theta_3 \sum_{j \neq i} w_{ij,t}\, Inflation_{jt} + \varepsilon_{it}, \quad (2)$$

where: YTM_{it} and YTM_{it-1} denote the yield to maturity of government bonds in country i at time t and t–1, respectively; $\sum_{i \neq j} w_{ij,t} YTM_{jt}$ represents values of the variable in the countries related with i according to economic distance defined by formula (3), at the same time, and $\sum_{i \neq j} w_{ij,t} YTM_{jt-1}$ denotes lagged values of this variable; the others variables are: the inflation rate ($Inflation_{it}$), the

level of integration of government bond markets measured by β-convergence ($Integration_t$), the index reflecting the anxiety in the global financial market (VIX_t), and two binary variables respectively regarding the positive and negative changes in the rating of bonds issued by the *i*-th country of the forms:

$$Rating_decrease_{it} = \begin{cases} 1, \text{downgrading compared to previous year,} \\ 0, \text{maintaining rating or raising it,} \end{cases}$$

$$Rating_increase_{it} = \begin{cases} 1, \text{aising the rating in relation to the previous year,} \\ 0, \text{maintaining rating or downgrading.} \end{cases}$$

The assessment of the impact of the announcements published by the credit rating agencies regarding the positive and negative changes in the credit quality of bonds issued by *j*-th country on the *i*-th country's yield bonds was possible due to the introduction of two additional spatially lagged explanatory variables of the zero-one form, i.e.: $\sum_{i \neq j} w_{ij,t} Rating_decrease_{jt}$ and $\sum_{i \neq j} w_{ij,t} Rating_increase_{jt}$.

The symbols $w_{ij,t}$ appearing in model (2)[4] come from a connectivity matrix **W** quantifying the spatial relations between the yield of bonds issued by countries included in the investigation. The basis for their construction was the economic distance measured by the value of the ratio of a public debt to gross domestic product along with a decrease of which the strength of spatial connections between objects increases.

The procedure of constructing the matrix **W** we repeat after Szulc and Wleklińska (2019, pp. 142-143). The starting point for determining the elements $w_{ij,t}$ consisted in the determination of the economic distance between pairs of objects (economies/countries) according to the following formula (and other formulas see e.g.: Claeys, Moreno and Suriñach, 2012; Asgharian, Hess and Liu, 2013; Asgharian, Larsson and Liu, 2014; Muratori, 2015):

$$d_{ij,t} = \left| \frac{debt_{it}}{GDP_{it}} - \frac{debt_{jt}}{GDP_{jt}} \right|, \tag{3}$$

where: $\frac{debt_{it}}{GDP_{it}}, \frac{debt_{jt}}{GDP_{jt}}$ – public debt share in GDP in country *i* and *j* in the period *t*.

Subsequently, the components $d_{ij,t}$ were inversed and entered into the connectivity matrix, based on which a block matrix of cross-sectional and temporal connections between the yield of government bonds of various countries was constructed.

The models, thanks to the inclusion of spatial and time lags of the dependent variable and independent variables, allow us to quantify the magnitude of the so-called direct and indirect effects, both in the short and long term (see Elhorst, 2011, p. 11). In the paper we are interested primarily in the indirect effects which use to test the hypothesis whether in global government bond market spatial spillovers exist.

To see the way in which the mentioned effects are obtained the general expression of the dynamic model has been transformed, i.e. the model (4)[5]:

$$\mathbf{Y}_t = \tau \mathbf{Y}_{t-1} + \rho \mathbf{W} \mathbf{Y}_t + \eta \mathbf{W} \mathbf{Y}_{t-1} + \boldsymbol{\alpha} \boldsymbol{\iota}_N + \mathbf{X}_t \boldsymbol{\beta} + \mathbf{W} \mathbf{X}_t \boldsymbol{\theta} + \boldsymbol{\varepsilon}_t. \tag{4}$$

By transforming the model to the form:

$$\mathbf{Y}_{\mathrm{t}} = (\mathbf{I} - \rho\mathbf{W})^{-1}(\tau\mathbf{I} + \eta\mathbf{W})\mathbf{Y}_{\mathrm{t}-1} + (\mathbf{I} - \rho\mathbf{W})^{-1}\boldsymbol{\alpha}\boldsymbol{\iota}_N + (\mathbf{I} - \rho\mathbf{W})^{-1}(\mathbf{X}_{\mathrm{t}}\boldsymbol{\beta} + \mathbf{W}\mathbf{X}_{\mathrm{t}}\boldsymbol{\theta}) + (\mathbf{I} - \rho\mathbf{W})^{-1}\boldsymbol{\varepsilon}_{\mathrm{t}} \tag{5}$$

and excluding from the matrix $\mathbf{X}_t$ the vector regarding the variable X_k, i.e. $\mathbf{X}_{kt}$, it is obtained:

$$\mathbf{Y}_{\mathrm{t}} = (\mathbf{I} - \rho\mathbf{W})^{-1}(\tau\mathbf{I} + \eta\mathbf{W})\mathbf{Y}_{\mathrm{t}-1} + (\mathbf{I} - \rho\mathbf{W})^{-1}\boldsymbol{\alpha}\boldsymbol{\iota}_N + (\mathbf{I} - \rho\mathbf{W})^{-1}\left(\dot{\mathbf{X}}_{\mathrm{t}}\boldsymbol{\beta} + \mathbf{W}\dot{\mathbf{X}}_{\mathrm{t}}\boldsymbol{\theta}\right) + (\mathbf{I} - \rho\mathbf{W})^{-1}(\beta_k\mathbf{I}_N + \theta_k\mathbf{W})\mathbf{X}_{kt} + (\mathbf{I} - \rho\mathbf{W})^{-1}\boldsymbol{\varepsilon}_{\mathrm{t}}, \tag{6}$$

where $\dot{\mathbf{X}}_{\mathrm{t}}$ stands for the matrix from which the $\mathbf{X}_{kt}$ has been removed.

The expression $(\mathbf{I} - \rho\mathbf{W})^{-1}(\beta_k\mathbf{I}_N + \theta_k\mathbf{W})$ allows us to determine direct and indirect effects resulting from impact the *k*-th explanatory variable X_k on the dependent variable *Y*.

The short-term effects are designated as the matrix of partial derivatives of Y with respect to the *k*-th explanatory variable of **X** in spatial unit 1 up to unit N at a particular point in time, i.e.:

$$\left[\frac{\partial \mathrm{Y}}{\partial x_{1k}} \cdots \frac{\partial \mathrm{Y}}{\partial x_{Nk}}\right] = (\mathbf{I} - \rho\mathbf{W})^{-1}(\beta_k\mathbf{I}_N + \theta_k\mathbf{W}), \tag{7}$$

which denote the effect of a change of a particular explanatory variable in a particular spatial unit on the dependent variable of all other units in the short term. Similarly, the long-term effects can be determined as (Elhorst, 2011, p. 11):

$$\left[\frac{\partial \mathrm{Y}}{\partial x_{1k}} \cdots \frac{\partial \mathrm{Y}}{\partial x_{Nk}}\right] = [(1 - \tau)\mathbf{I} - (\rho + \eta)\mathbf{W}]^{-1}(\beta_k\mathbf{I}_N + \theta_k\mathbf{W}). \tag{8}$$

Let $S_k(\mathbf{W})$ mean the matrix $(\mathbf{I} - \rho\mathbf{W})^{-1}(\beta_k\mathbf{I}_N + \theta_k\mathbf{W})$. The diagonal elements of the matrix define the direct impacts of change in *i*-th observation x_k (denoted by x_{ik}) on y_i, i.e. on the values of the dependent variable in the same *i*-th spatial unit. The average of the sum across the *i*-th row of $S_k(\mathbf{W})$ represents the average impact on individual observation y_i resulting from changing the *k*-th explanatory variable by the amount across all observations – *Average Impact to an Observation.* In turn, the average of the sum down the *j*-th column of $S_k(\mathbf{W})$ yields the average impact over all y_i from changing the *k*-th explanatory variable by an amount in the *j*-th observation – *Average Impact from an Observation* (see LeSage and Pace, 2009, p. 37). To sum up, indirect effects as the spatial spillovers are identified on the ground of the non-diagonal elements of the matrix $S_k(\boldsymbol{W})$.

Results of the empirical analysis[6]

Empirical Models

The verification of the occurrence of spatial spillover effects realized in the form of indirect influences of a given explanatory variable in a specific spatial location on the explained variable in all other locations was based on the models containing elements of space-time dynamics: a dynamic Durbin spatial model for pooled time series and cross-sectional data, and an appropriate model for panel data. The results of estimation and verification of these models entitle us to formulate the following conclusions[7].

The construction of the empirical linear model was the starting point for assessing the legitimacy of taking into account the spatial relationships between the economies considered in the modeling of the Treasury bond yields issued by them. Based on the results of the estimation and verification of the linear model (LM_pooled), it was found that this model does not meet the basic requirements of statistical verification. The results of the Moran test confirm the occurrence of autocorrelation in the model residuals. This justifies the need to extend the models without spatial effects towards the models that take into account the spatial relationships between the considered markets. The autocorrelation of model residuals constitutes a weakness of the panel data model as well (in this analysis the model with individual effects – LM_FE_IND was considered), which was used to take into account the heterogeneity of the analysed economies.

Taking into account the spatial structure of the relationship between the considered markets, defined on the basis of the economic distance matrix and its inclusion in the construction of spatial Durbin models, in the SDM_pooled version, resulted in the elimination of autocorrelation in the random component, which is confirmed by the lowering of Moran's I statistics and its statistical insignificance. In the panel model (SDM_FE_IND) residual autocorrelation is observed. The abandonment of the SDM_FE_IND model, in spite of the test F result, is justified by the insignificance of the autoregressive parameter ρ and the Chow F test result. Among the statistically significant non spatially lagged explanatory variables, the SDM_pooled model included: the level of integration of the global Treasury bond market and two binary variables reflecting the increase and decrease of rating, respectively. Non spatially lagged inflation rate turned out to be insignificant, while this variable spatially lagged shows statistical significance. The value and significance of parameter ρ indicates some impact on the yield of Treasury bonds issued at a given time by a given economy made by the yield of bonds issued at the same time by neighboring economies. In the light of the results obtained, the statistical significance of the delayed dependent variable was also confirmed, which gave the model a dynamic character. However, among the significant explanatory variables there was no dependent variable lagged simultaneously in space and time ($\mathbf{W}Y_{t-1}$).

Table 2: Results of the estimation and verification (selected diagnostics) of the models considered – the models after reduction of the insignificant variables

Variable	LM_pooled	LM_FE_IND	SDM_pooled	SDM_FE_IND
$Constant$	3.390 (0.000)	-	2.322 (0.000)	-
YTM_{t-1}	-0.069 (0.158)	-0.037 (0.253)	-0.091 (0.049)	-0.057 (0.054)
$Integration$	-30.185 (0.010)	-29.651 (0.000)	-34.419 (0.004)	-34.382 (0.000)
$Rating_{decrease}$	2.893 (0.000)	0.410 (0.401)	2.668 (0.000)	0.242 (0.590)
$Rating_{increase}$	2.388 (0.001)	-0.344 (0.487)	2.163 (0.002)	-0.548 (0.231)
$Inflation_{lag}$	-	-	0.111 (0.001)	0.086 (0.000)
Autoregressive parameter ρ	-	-	0.152 (0.049)	0.063 (0.291)
Autocorrelation of residuals Moran test	0.063 (0.013)	0.064 (0.007)	0.022 (0.206)	0.063 (0.011)
Significance of individual effects Test F	-	17.517 (0. 000)	-	17.789 (0.000)
Spatial dependence Chow test (F)	-	-	2.241 (0.049)	2.044 (0.053)

Note: p-values in parentheses.

Interestingly, there is a significant value of the coefficient standing behind the spatially lagged inflation, which means that changes in the inflation level of countries recognized as neighboring in accordance with the adopted criterion lead to a change in the level of yield to maturity of Treasury bonds issued by other countries related their structure of spatial dependence. The obtained result is confirmed in the theory of economics, because as a result of accelerating price dynamics, and thus an increase in the level of inflation, the competitiveness of a given economy deteriorates, and this, in turn, can stimulate the current account deficit to widen, and thus also the level of the country's debt to increase (De Grauwe and Ji, 2013). This is measured, for example, by the ratio of a public debt to the gross domestic product, and it was this variable that was used to build the economic distance matrix quantifying the links between the Treasury bond markets under consideration.

Due to the inclusion of the elements of the dynamics in the modeling of Treasury bond yield, indicated by the significance of the parameter standing with the time lagged dependent variable, it has become possible to isolate short-term indirect effects as well, next to the so-called long-term indirect effects.

Short-Term Indirect Effects

In this sub-section, we present the results of the empirical short-term indirect effects analysis for the years of the examined period (*t*=10), carried out on the basis of the following transformation of the model obtained in the previous sub-section:

$$\begin{aligned}\mathbf{Y}_t = \mathbf{Y}_\mathbf{t} = (\mathbf{I} - \rho \boldsymbol{W})^{-1}\tau\mathbf{Y}_{t-1} + (\mathbf{I} - \rho\mathbf{W})^{-1}\alpha_0 + (\mathbf{I} - \rho\mathbf{W})^{-1}\beta_1\mathbf{X}_{1t} \\ +(\mathbf{I} - \rho\mathbf{W})^{-1}\beta_2\mathbf{X}_{\mathbf{2t}}+(\mathbf{I} - \rho\mathbf{W})^{-1}\beta_3\mathbf{X}_{3t} + (\mathbf{I} - \rho\mathbf{W})^{-1}\theta_1\mathbf{W}\mathbf{X}_{4t},\end{aligned} \tag{9}$$

where $\mathbf{W}\mathbf{X}_4$ represents the spatially lagged inflation rate values[8].

The $(\mathbf{I} - \rho\mathbf{W})^{-1}\theta_1\mathbf{W}\mathbf{X}_{4t}$ matrix was used to designate the short-term effects with respect to the selected explanatory variable, i.e. the spatially lagged rate of inflation, separately at a particular point in time.

For each of the years covered by the analysis, indirect effects were determined in the form of the average values in the cross-section of rows and separately in the cross-section of columns of a given matrix, excluding diagonal elements. In this way, a measurement of the average impacts (in terms of the analysed variables) of individual countries on a given country, and a given country on other countries, respectively, was obtained.

Figures 1−2 present spatial distributions of indirect effects obtained. Figure 1 shows the distributions of average inflows via the inflation rate in individual countries on the yield of Treasury bonds issued by a given country in 2008 and 2017. It is worth noting that the US and Chinese economies were among the 12 economies that received transmission impulses from other countries in 2008 with moderate strength.

The economies whose Treasury bond markets were least affected by all other economies through the transmission of inflation in 2008 included e.g.: Belgium, Netherlands, Indonesia, Norway, Singapore, Switzerland, Thailand and Great Britain. The above-average indirect impact of average changes in the level of inflation in all other countries on the yield of the Treasury bonds issued by a given economy should be mentioned in the case of half of the countries under consideration, such as e.g. Canada, India, Russia or Australia.

In 2017 there was a slight increase in the sensitivity of individual countries to the external impulses. Moderate feedback was found in fourteen out of forty markets analysed (12 such countries were noted in 2008). For half of the economies under consideration, such as e.g.: China, the Netherlands,

France, Great Britain, Canada and Russia, there is a strong average impact of changes in inflation in all other countries on the yield of the government bonds issued by these countries. It is particularly interesting that while in the United States there was a decrease in the sensitivity of this economy to the average, relative to other economies, changes in the level of inflation on the yield of Treasury bonds issued by them, the reverse trend was observed in the case of China.

(a)

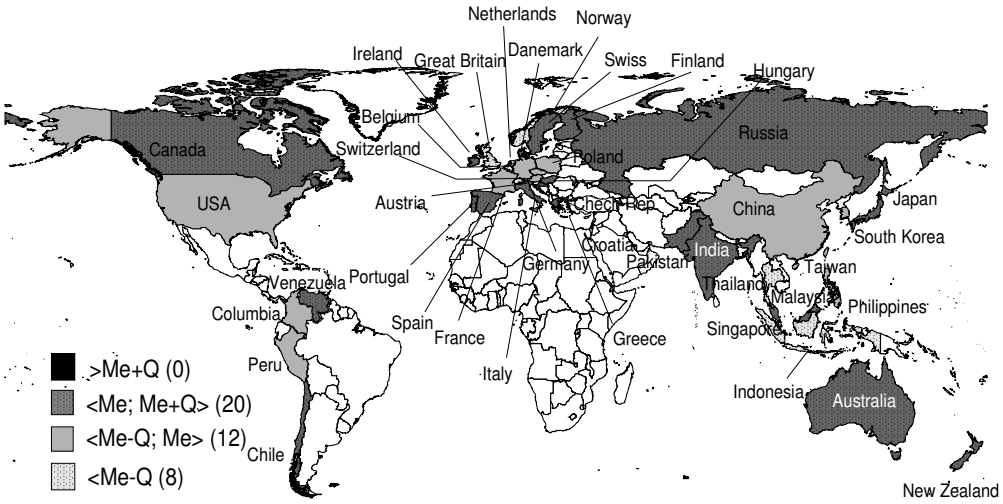

(b)

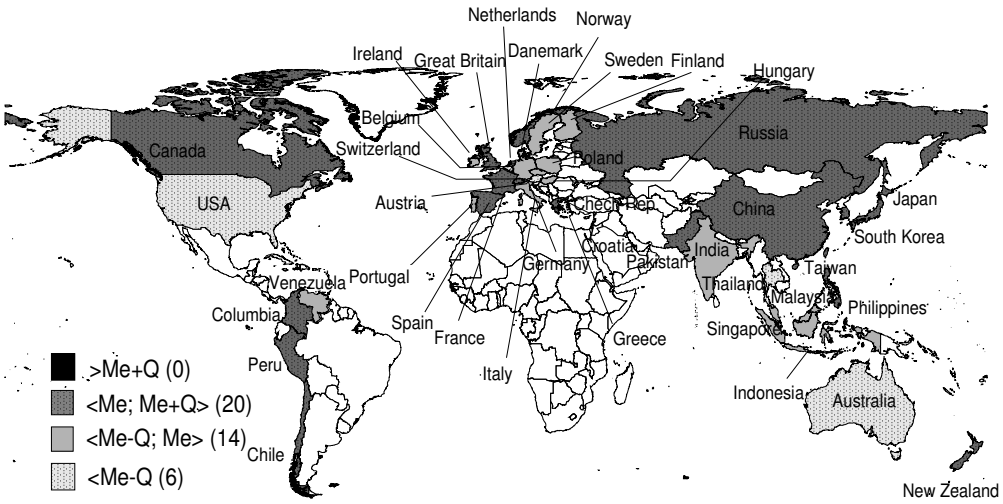

Fig. 1: The distributions of the average impact of the spatially lagged inflation rate on the government bond yield issued by individual economies in (a) 2008 and (b) 2017

Figure 2 shows the distributions of average impacts of a given country's inflation rate on the yield of the Treasury bonds issued by all other economies for the first and last year of the analysis. Among the economies whose impact on other economies was the largest in 2008, we can mention: France, Indonesia, Colombia, Taiwan and the United States. In the case of most of the European economies taken into account, as well as China, there are above-average indirect influences on other countries. In 2017 Australia, Belgium, Indonesia, Thailand, the United States and Venezuela were among the countries most strongly affecting other countries. The impact of the Chinese economy on other

economies has decreased compared to 2008. A similar situation applies to, e.g. Russia, France or Poland.

(a)

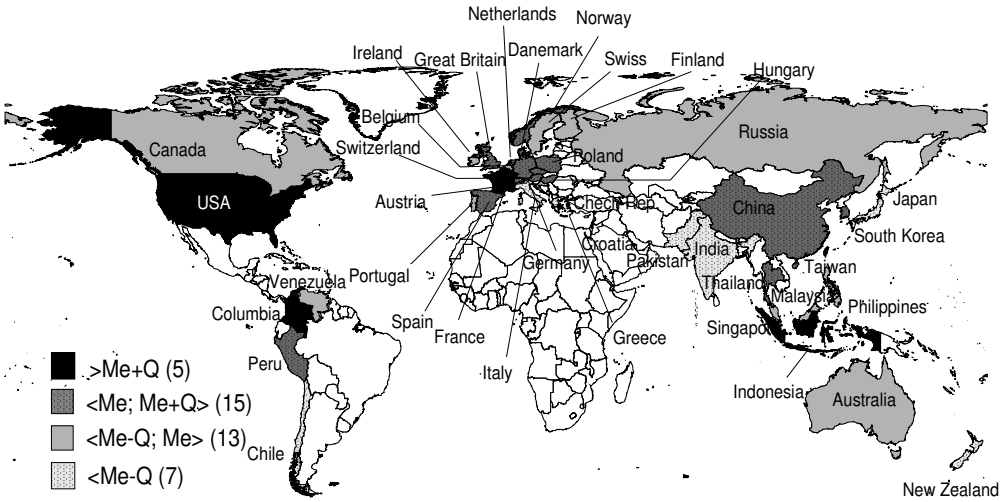

(b)

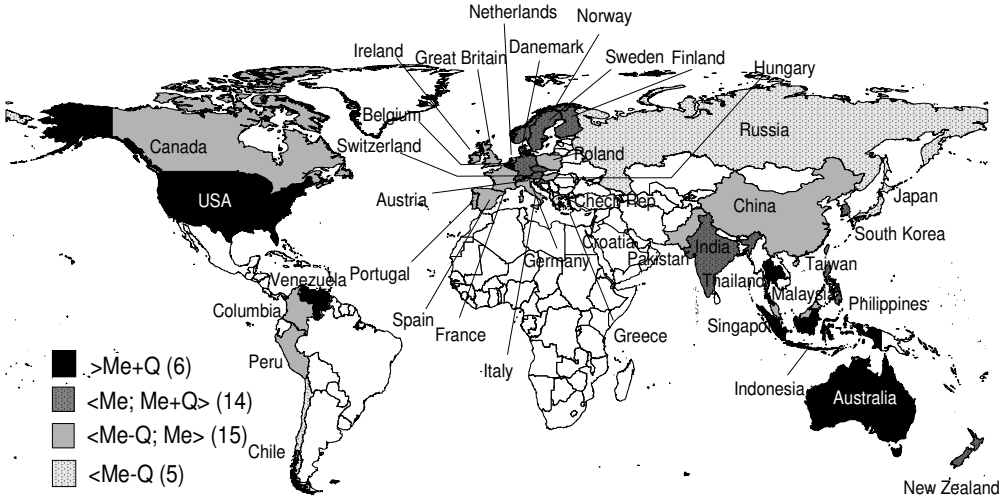

Fig. 2: The distributions of the average impact of a change of the inflation rate in a particular economy on the government bond yield issued by all other economies in (a) 2008 and (b) 2017

Figure 3 shows the impact of the United States on all the other countries, in the range of the variables considered in 2008 and 2017. In 2008 the US economy had the strongest impact on the following economies: France, Greece, India, Japan, Canada, Germany, Pakistan, Portugal, Thailand, Hungary and Italy. Despite the stabilization of the global economic situation, the sensitivity of economies to the absorption of impulses originating in the US economy had not declined significantly. In 2017 the number of economies under the 'strong' influence of the US economy decreased by one, although their composition slightly changed (Belgium, France, Greece, Spain, Japan, Canada, Portugal, Singapore, Great Britain and Italy).

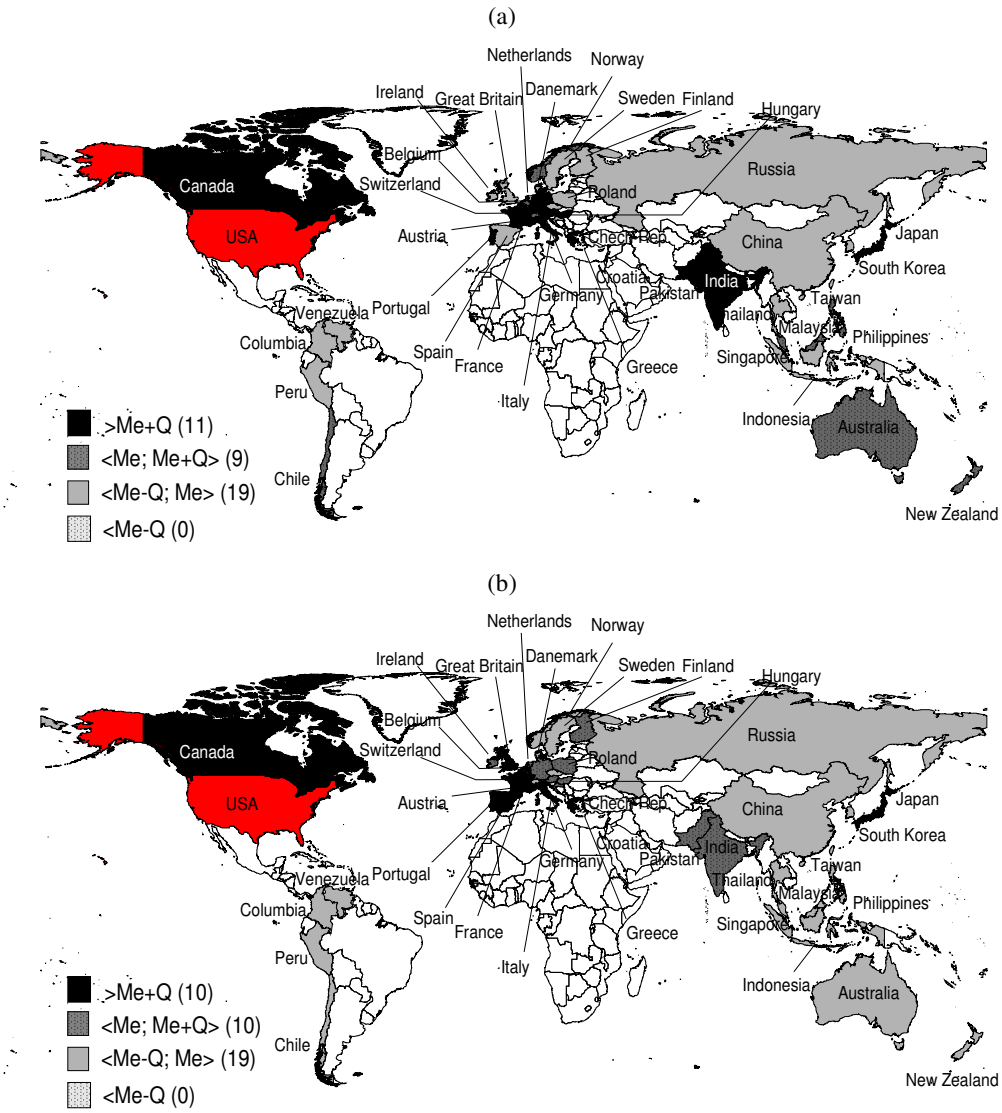

Fig. 3: The distributions of the impact of the inflation rate in U.S. on the government bond yield issued by all other countries in (a) 2008 and (b) 2017

Long-Term Indirect Effects

In this sub-section we present estimates of long-term indirect effects, obtained on the basis of the expression $((1-\tau)\mathbf{I}-\rho\mathbf{W})^{-1}\theta_1\mathbf{W}\mathbf{X}_4$. Figure 4 illustrates the distributions of average long-term impacts achieved through the inflation rate in individual countries on the yield of Treasury bonds issued by a given country in 2008 and 2017.

In 2017 there was a growth in the sensitivity of the global Treasury bond market to impulses originating outside the borders of a given country (compare the maps (a) and (b) in Figure 4). As many as nineteen of the economies under consideration were among the countries with the strongest sensitivity, including e.g.: Austria, Chile, China, Japan, Canada and South Korea. In 2008 there were seven such economies. It is worth emphasizing that China's sensitivity, compared to the initial year of the analysis, increased, while in the United States there was a decline in the sensitivity of the yields

of its treasury bonds to average inflation changes in all other countries. In addition to the American economy, the group of countries with the weakest sensitivity included: Austria, Belgium, Croatia, Indonesia, Portugal, Thailand, Venezuela and Italy.

(a)

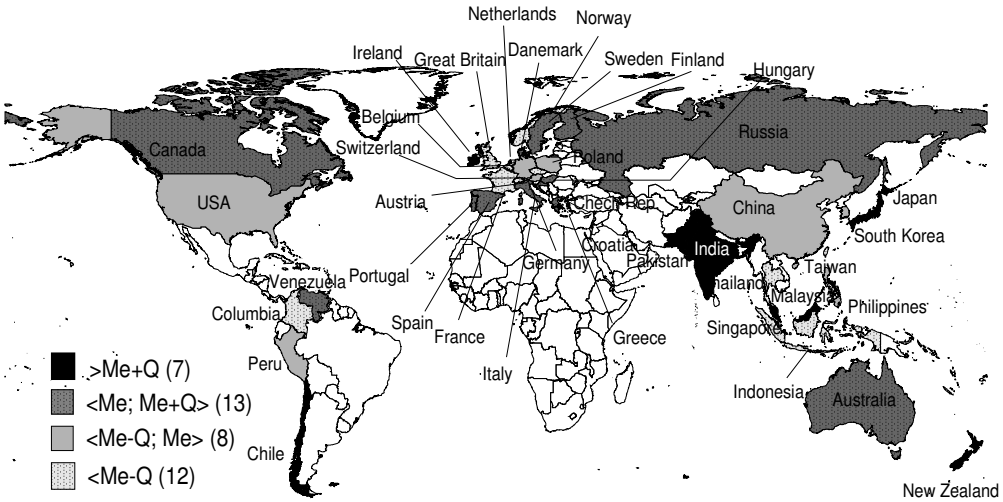

(b)

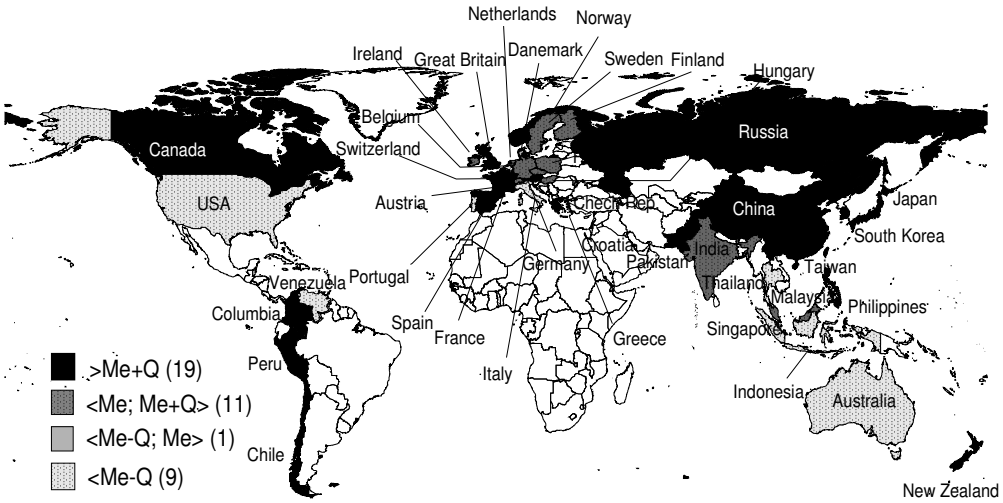

Fig. 4: The distributions of the average cumulative impact of the spatially lagged inflation rate on the yield of the Treasury bonds issued by individual economies in (a) 2008 and (b) 2017

Figure 5 presents the distributions of average impacts of a given country's inflation on the yield of the Treasury bonds issued by all other economies in 2008 and 2017. In 2017 it was ten (rather than nine, as in 2008) economies that had the strongest impact on the yield of the Treasury bonds issued by all other economies, i.e.: Australia, Austria, Belgium, Croatia, the Czech Republic, Denmark, Indonesia, Thailand, the United States and Venezuela. Twelve economies were characterized by the least impact on other countries. Among them, just like in 2008, there was Russia.

(a)

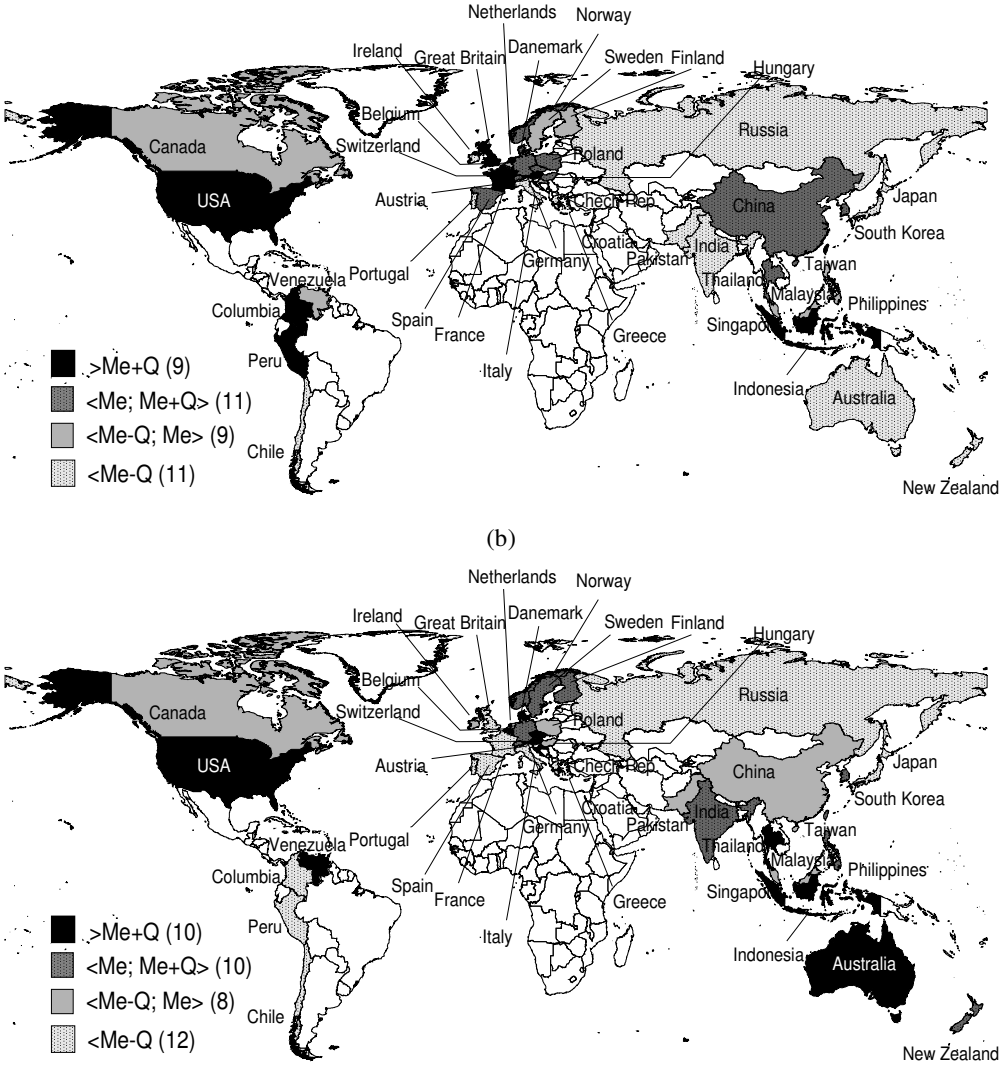

Fig. 5: The distributions of the average cumulative impact of a change of the inflation rate in a particular economy on the yield of the Treasury bonds issued by all other economies in (a) 2008 and (b) 2017

Figure 6 shows the strength of the United States' impact on all other countries in terms of the considered variables in 2008 and 2017.

In 2017, compared with 2008, the composition of the group of countries under the strongest influence of the United States slightly changed, and their number decreased by one. This group included: Belgium, France, Greece, Spain, Japan, Canada, Portugal, Singapore, Great Britain and Italy. Nevertheless, most of the European economies considered were still strongly influenced by the United States.

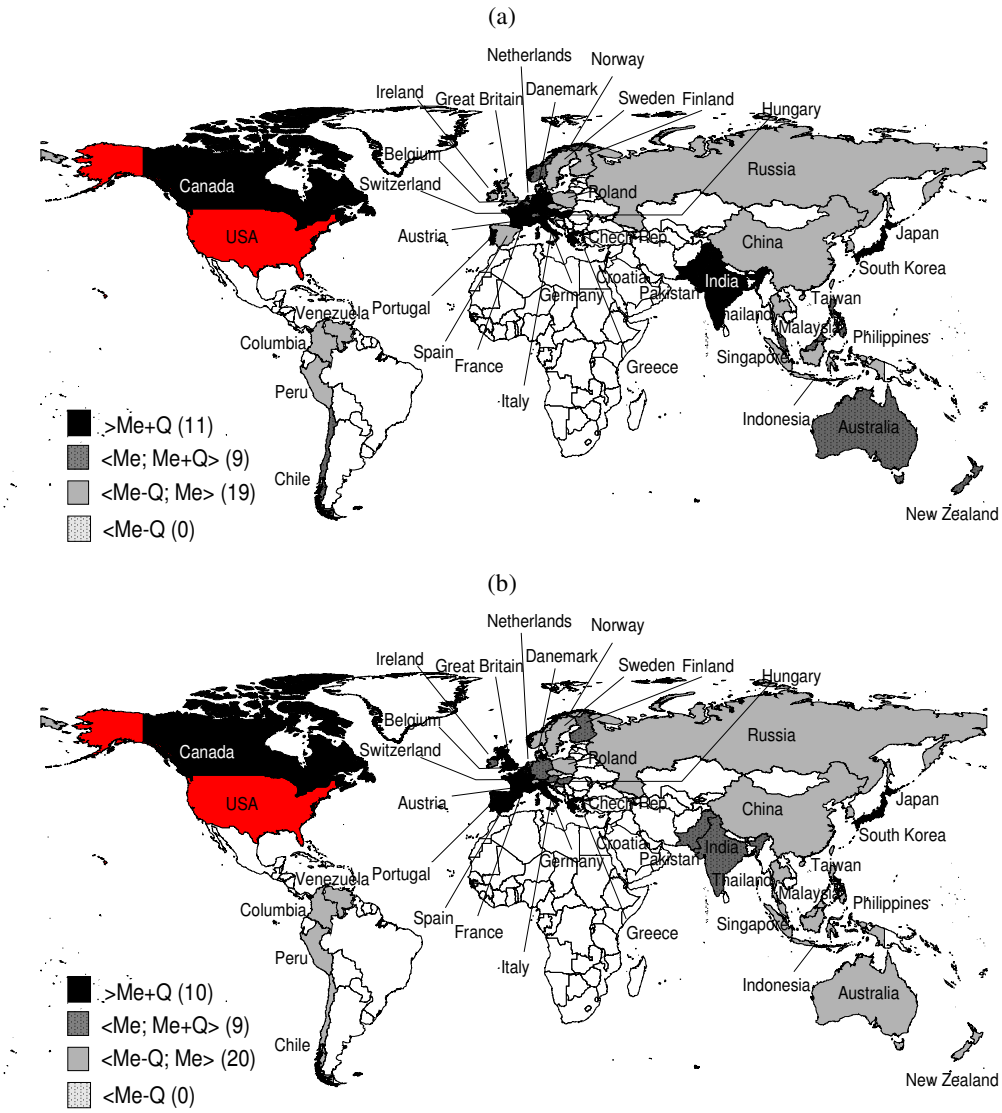

Fig. 6: The distributions of the impact of the inflation rate in U.S. on the yield of the Treasury bonds issued by all other countries (a) in (a) 2008 and (b) 2017

Conclusion

Based on the empirical results obtained, it should be stated that the hypothesis about the occurrence of spatial spillover effects in the area of the Treasury bond markets has been confirmed. These effects were realized in the form of indirect impacts of the inflation rate, observed in a given country, on the yield of government bonds issued by all the other countries. The short-term and long-term indirect effects showed up for the markets analysed to varying degrees at different times.

In further researches on this topic we would like to use next model specifications, and to consider the indirect effects in relation to other explanatory variables.

[1] The matter of importance of space, or more precisely of the distance between entities contributing to the financial market, is not willingly taken topic of theoretical discussion. The few studies in this area are mainly focused on the activities of banks. Among them Coval and Moskowitz (1999), Grinblatt and Keloharju (2001), Knyazeva and Knyazeva (2012) can be mentioned. The theoretical and empirical justification of the role of geographical factors in fiscal policy was sought by e.g.: Cohen (1998), Martin (1999), Laulajainen (2005), Lee et al. (2009), Martin and Pollard (2017).

[2] Model (1) and its panel LM_FE_IND counterpart (in which instead α there is decomposed α_i) only constitute a starting point for the justification of their spatial development.

[3] And its panel SDM_FE_IND counterpart.

[4] Model (2) represents the dynamic spatial Durbin model.

[5] Our attention will be limited to the model TSCS. Transformations relating to the dynamic spatial models for panel data are analogous.

[6] The annual frequency data from the Bloomberg website (https://www.bloomberg.com) were used. The graphs have been prepared using MapViewer program.

[7] The presentation of the results in Table 2 is limited to the final model which contains only the statistically significant explanatory variables.

[8] The spatial spillover effects, both in the short and in the long term, were determined only for the spatially lagged *Inflation*.

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Comparative Analysis of The Impact of Labor Market Efficiency on Economic Growth in Kazakhstan And Developed Countries

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Abstract

The Kazakhstan model of the labor market is formed in the conditions of dominance of the export-raw model of economic development. The problem of modernizing the labor market as a potential driver of economic growth has become relevant in connection with the exhaustion of the potential of the existing model and the reorientation of economic policy towards the industrial and innovative development of the country. The study attempts to conduct a comparative analysis of the labor market efficiency impact on economic growth in Kazakhstan and developed countries. The goal of the paper is to determine what their similarities and differences are on this basis, and to identify opportunities for modernization of the labor market that could potentially qualify as a driver of economic growth in Kazakhstan.

Keywords: labor market efficiency, economic growth, comparative analysis, developed countries, Kazakhstan

Introduction

Developed countries adhere to various models of socio-economic development and in connection with it, corresponding models of the labor market are developing (Kudrov V.M., 2011). In most studies of labor market problems, individual authors are often limited only to the effects of GDP on employment and unemployment (Vakulenko E.S., Gurvich E.T., 2015). Some authors pay considerable attention to the existence of a reverse causal relationship, namely, that the labor market may be a necessary condition for economic development, but without a sufficient quantitative assessment of this influence (Gimpelson, R. Kapelyushnikov, S. Roshchina, A., 2017) .

The developed countries are undergoing technological modernization, structural and institutional restructuring of their national economies under the influence of Industry 4.0. Scientific and technological progress in developed countries leads to a significant change in the "look" of the labor market. It is statistically impossible to establish a direct correlation between measures to modernize the labor market and economic growth due to the large number of factors that determine the growth of the economy. But the practice of a number of leading developed countries shows that as a result of reforming their labor market, they were able to realize its potential for transitioning the country's economy to a development trajectory.

A preliminary analysis suggests that per capita GDP above a certain level is observed only in countries where the labor market is becoming a driver of economic growth. In other words, without improving the mechanism of the functioning of the labor market, development can go to a certain level, but further growth is possible only where the labor market is undergoing modernization.

The potential benefits arising from the export of energy resources and their high prices have declined significantly in Kazakhstan. Slowing economic growth, especially during the crisis of 2015-2016, actualized the problem of finding new drivers of economic growth. The need to transform the existing economic model into a more effective one, characterized by a departure from rent-oriented behavior and an increased role of market incentives, became apparent.

For Kazakhstan, these processes are of strategic importance, it is very important to focus on the study of the relationship between technological modernization of the economy and labor market modernization in Kazakhstan, as well as their impact on economic growth.

Methodology and Analysis

A successful solution to the problem of Kazakhstan joining the cohort of developed countries will be determined by the ability of the country and its institutions to ensure sustainable economic growth. Economic growth is determined by diverse factors affecting the economic systems of the countries in different ways. As practice shows, the economies of those countries that take into account the whole range of factors and the relationship between them achieve successful growth. Labor market efficiency is one of the institutional factors, the strengths and weaknesses of which largely determine the priority areas of economic growth policy.

The problem of the impact of labor market efficiency on economic growth is not adequately addressed in methodological terms. The ultimate goal of Kazakhstan's labor market modernization is to use its future potential to overcome the lag in socio-economic development from the leading developed countries of the world. Therefore, a comparative analysis of the impact of the labor market on the economic growth of developed countries is extremely important.

An examination of the literature on this topic shows that when considering the issue of effectiveness, many researchers often resort to a simple comparison of the implemented measures of state policy in the field of labor and the obtained socio-economic results. The approach is widespread, which consists in comparing actual indicators characterizing the labor sector of the national economy with similar indicators of developed countries. To assess the level of socio-economic development often used the indicator of GDP per capita and the Human Development Index.

To assess the country's advancement in terms of socio-economic modernization, the Index of Economic Freedom (IEF) is used. According to the authors of this index, the country's economic development is directly related to the dynamics of this IES. But as it turns out, the level of protection of property rights has the most noticeable effect on the IES, while other private indices, including the component of freedom of labor that interests us, have a weaker effect. The threshold method proposed by the Russian researcher to assess the effectiveness of policy in the market is also of significant interest (Sobolev E, 2013). In his opinion, threshold values should cover such blocks of the world of work as employment, remuneration of labor, coordination of interests, etc. These and other approaches that consider the problems of the connection between the labor sphere and economic development don`t specify the degree to which the efficiency of the functioning of the labor market affects the dynamics of indicators of economic growth.

The study assumes that the data for determining the Global Competitiveness Index (GCI) provide an opportunity to reflect the ability of the country and its institutions to ensure stable economic growth (The Global Competitiveness Report). Along with macroeconomic stability and technological improvements and others, the indicator “labor market efficiency” is one of the 12 components that determine the value of GCI. Their interconnection is shown in figure 1.

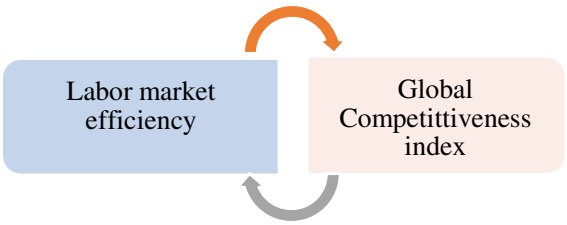

Fig. 1. Interconnection of research variables

Measurement of labor market efficiency by the GCI methodology as a whole shows the presence of certain patterns that reflect the relationship between the parameters characterizing the labor market and the long-term economic dynamics of a country. Thus, the author's hypothesis states that on the basis of the available statistical base it is possible to quantitatively determine to what extent the differences in the dynamics of economic growth of different countries are due to the efficient functioning of their labor market.

If this hypothesis is confirmed, then the next step should be the identification of those variables that determined the high efficiency of the labor market and correspondingly high economic growth. The results of the analysis will also make it possible to determine how far Kazakhstan lags behind developed countries and outline concrete measures to bring the current state of these variables to the levels of leading developed countries.

The proposed comparative analysis technique is as follows:

- to determine the circle of developed countries with different models of the labor market;
- to highlight the quantitative value of labor market efficiency for the analyzed countries from reports on global competitiveness;
- to take indicators of economic growth of the analyzed countries;
- to identify the relationship between the above indicators.

For a comparative analysis, the study tooks six developed countries that represent the most well-known models of labor markets. All of them, along with common features, differ from each other in important features and functioning mechanisms.

In compiling the tables in this study, was used data from OECD.org, The Global Competitiveness Report, The Committee on Statistics of Kazakhstan. The table reflects data on GDP per capita and the rank of labor market efficiency of the analyzed countries in the post-crisis period from 2010 to 2018. As can be seen from it, developed countries are characterized by high levels of GDP per capita. Kazakhstan is significantly behind in this indicator. Previously, Kazakhstan was among the countries with a high level of per capita income (from $ 12,616 and above) for two years (2013-2014). But gradually he lost ground and in this a consistent decrease in the efficiency of the labor market played a role. The study also notes that the labor market in the USA is the most flexible, and labor markets in Spain and Italy are one of the most regulated. Kazakhstan occupies an intermediate position on this indicator.

Table 1: GDP per capita and labor market efficiency rating of developed countries and Kazakhstan (Created by the author based on data from the OECD, Global Competitiveness Reports and the Committee on Statistics of the RK)

	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
USA:									
US dollars / capita	48 396	49 811	51 541	53 046	54 993	56 770	57 884	59 984	62 853
Labor market efficiency (Rank)	3	4	4	6	4	4	4	4	3
Germany:									
US dollars / capita	39 704	42 542	43 360	44 994	47 011	47 684	50 564	53 012	54 457
Labor market efficiency (Rank)	70	70	64	53	41	35	28	22	14
Japan:									
US dollars / capita	34 994	35 775	37 214	39 008	39 183	40 406	40 024	40 827	41 502
Labor market efficiency (Rank)	12	13	12	20	23	22	21	19	22

Sweden:									
US dollars / capita	42 211	44 504	45 304	46 138	47 046	48 975	50 434	52 693	53 808
Labor market efficiency (Rank)	19	18	25	25	18	20	20	18	20
Spain:									
US dollars / capita	31 714	31 872	31 725	32 453	33 544	34 939	37 310	39 627	40 542
Labor market efficiency (Rank)	97	115	119	108	115	100	92	69	70
Italy:									
US dollars / capita	34 857	36 183	36 003	36 068	36 195	36 909	39 918	41 785	42 798
Labor market efficiency (Rank)	117	118	123	127	137	136	126	119	116
Kazakhstan:									
US dollars / capita	9071	11635	12387	13891	12807	10510	7715	9248	9813
Labor market efficiency (Rank)	18	21	21	19	15	15	18	20	35

A high level of GDP per capita is combined with a high rank of their place in terms of labor market efficiency in developed countries such as the USA, Germany, Japan, Sweden. At the same time, there are several examples of countries where such a dependence is not clearly visible. Calculations showed that there is no significant correlation between GDP per capita and the labor market efficiency of developed countries.

The data in Table 2 provide important information that makes it possible to assume that there is a correlation between the growth rate of real GDP and labor market efficiency.

Table 2: The annual growth rate of real GDP (%)and labor market efficiency score of developed countries and Kazakhstan (Created by the author based on data from the OECD, Global Competitiveness Reports and the Committee on Statistics of the RK)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	Annual average
USA:										
The annual growth rate of real GDP (%)	2,56	1,55	2,25	1,84	2,53	2,91	1,64	2,37	2,93	2,3
Labor market efficiency (Score)	5,8	5,6	5,6	5,4	5,4	5,3	5,4	5,5	5,6	
Germany:										
The annual growth rate of real GDP (%)	4,04	3,99	0,62	0,55	2,21	1,49	2,14	2,77	1,54	2,2
Labor market efficiency (Score)	4,3	4,4	4,4	4,5	4,6	4,6	4,6	4,8	5	
Japan:										
The annual growth rate of real GDP (%)	4,19	-0,12	1,5	2	0,37	1,22	0,61	1,94	0,79	1,4
Labor market efficiency (Score)	5,1	5,1	5	4,9	4,8	4,7	4,8	4,8	4,8	
Sweden:										
The annual growth rate of real GDP (%)	5,95	3,11	-0,32	1,03	2,84	4,16	2,2	2,67	2,41	2,7
Labor market efficiency (Score)	4,9	4,9	4,8	4,8	4,9	4,8	4,8	4,9	4,9	

Spain:										
The annual growth rate of real GDP (%)	0,16	-0,81	-2,96	-1,44	1,38	3,84	3,03	2,89	2,35	0,9
Labor market efficiency (Score)	4,1	3,9	3,8	4	3,9	3,9	4	4,2	4,2	
Italy:										
The annual growth rate of real GDP (%)	1,67	0,85	-3,01	-1,86	0,07	0,66	1,39	1,78	0,65	0,2
Labor market efficiency (Score)	3,7	3,8	3,8	3,7	3,5	3,3	3,5	3,6	3,7	
Kazakhstan:										
The annual growth rate of real GDP (%)	7,3	7,4	4,8	6	4,2	1,2	1,1	4,1	4,1	4,5
Labor market efficiency (Score)	4,9	4,9	4,9	5	5	4,9	4,9	4,8	4,6	

The higher the labor market performance indicators, the more noticeable is the success of countries in economic growth. In other words, the effectiveness of the labor market as one of the drivers of economic growth can`t be neglected. The value of labor market efficiency rose from 4.3 to 5 and the average annual growth in real GDP was 2.2% during the period under review in Germany. On the example of Spain and Italy, one can see that without improving the mechanism of the functioning of the labor market it is impossible to achieve high GDP growth rates. Dynamic economic growth is possible when the labor market is undergoing modernization.

Table 3 shows the changes in the efficiency indicator of the labor market and its sub-indicators over a ten-year period in Germany and Kazakhstan. As well-known, Germany has taken serious measures to reform the labor market and this has had a positive effect on economic growth indicators.

Table 3: Change in the rank of Germany and Kazakhstan in terms of labor market efficiency and its sub-indicators (Created by the author based on data from Global Competitiveness Reports)

Country	Ranking by indicators:							
	Labor market efficiency	Labor market performance sub-indicators						
		01 Cooperation in labor-employer relations	02 Flexibility of wage determination	05 Hiring and firing practices	07 Pay and productivity	08 Reliance on professional management	09 Country capacity to retain talent	10 Female participation in the labor force ratio to men
1	2	3	4	5	6	7	8	9
Germany:								
GCI 2008-2009	58	27	131	130	51	9	26	34
GCI 2017-2018	14	21	114	18	7	17	13	39
Kazakhstan:								
GCI 2008-2009	12	63	44	4	33	79	57	13
GCI 2017-2018	35	68	105	41	50	105	80	28

The study reveals a significant deterioration in the situation for almost all sub-indicators that shape the efficiency of the labor market in Kazakhstan. This, at least, allows us to say that opportunities were missed to accelerate economic growth by taking measures to significantly improve the values of such sub-indicators as “Flexibility of wage determination”, “Reliance on professional management” and “Country capacity to retain talent".

Summary

The level of economic development of Kazakhstan so far seriously lags behind the countries that have chosen for analysis, where great importance is attached to the reform of domestic labor market. A comparative analysis of the labor market efficiency of leading developed countries and its impact on the dynamics of economic indicators of these countries revealed a fairly stable relationship between these indicators for the post-crisis (since 2010) period.

The reform of the labor market in these countries towards greater liberalization in the long run had a positive effect on the growth rate of GDP, and the higher the degree of liberalization of the labor market, the better these indicators look. In this regard, Kazakhstan lags behind the leading countries of the world in many variables of labor market efficiency. This affected the underutilization of additional opportunities for economic growth through the modernization of the labor market. The modernization of the labor market in Kazakhstan should incorporate certain elements of the best practices of the functioning of the labor market of developed countries and be carried out simultaneously with the adoption of a new model of economic growth.

Results

An important result is to take into account the close relationship between models of socio-economic development and labor market models during their modernization. Kazakhstan is significantly lags behind developed countries in terms of technological modernization and the development of an innovative economy. Meanwhile, only in the conditions of accelerated introduction of the latest technologies will the reverse effect of the modernized labor market on ensuring economic growth increase sharply. Without labor market modernization, ensuring high economic growth is virtually impossible. The study identified factors that can provide a higher level of labor market efficiency in Kazakhstan. On this basis, specific measures to modernize the labor market can be outlined. The implementation of them will contribute to an additional increase in Kazakhstan's real GDP.

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Social Media and Small Firm Entrepreneurial Network

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Abstract

The objective of the paper is to explore the impact of the use of social media by entrepreneurs on the frequency of discussions about the economy and business with the members of their social network. The subject of the research has been selected small enterprises (including micro-enterprises) due to their share in a total number of enterprises in Poland (nearly 99%) and also a steady increase in their number as well as an increase in the value of production, revenues, number of employees. The research tool was the questionnaire. The results show that the impact of the frequency of the use of social media by the entrepreneur on the frequency of interactions with the members of the analyzed sub-networks of the personal network is statistically insignificant in the case of most sub-networks. Such a situation applies to 10 out of 13 sub-networks. It is worth pinpointing that despite the existence of statistically significant relationships in the case of 3 sub-networks at a low level, it should be assumed that one cannot speak about the existence of relationships of the frequency of the use of social media with the frequency of discussions on the economy and business. Social media are undoubtedly used, to a much larger extent, for formalized communication of the company with the environment, not for holding informal discussions on issues significant for conducting the business.

Keywords: entrepreneurship, Internet, social media, relationships, social network, small and medium enterprises (SME).

Introduction

Information and communication technologies (ICT) are currently the key aspect of communication between people and they also enable the expansion and intensification of relationships as well as movements of capital, people, goods and ideas beyond cultural and state borders. The dynamic development of interpersonal communication using digital technologies is the fact and one may observe an extremely dynamic progress in the information society model. The Internet has become the social space in which most human needs are currently being satisfied (Ingaldi, Ulewicz, 2018; Labajan, Koomsap, 2019).

The co-existence of entrepreneurship and the information society indicates the need for an interest in potential relationships between them. Additionally, globalization, as the common basis for both processes, provides entities with specific operating conditions and directs them to continuous development. In the case of entrepreneurs and entrepreneurship, this development can be implied mostly by the acquisition of information from increasingly new sources which increasingly rapidly and efficiently lead to the transfer of messages to customers. At this point, the issue of the impact of the contemporary ICT on entrepreneurship emerges, and particularly on recognizing, exploring, assessing and grasping opportunities. The mechanism providing information on entrepreneurial opportunities in the contemporary world is, among others, social media. The participation in them is associated with the IT support for personal networks of relationships of the entrepreneur, in the area of both strong and weak ties. The resource of "acquaintances" is a valuable source of information for the entrepreneur, which can be used directly (direct information on opportunities) or indirectly (information allowing for the creation of an opportunity, innovation) in exploiting an opportunity. The existence and use of new dimensions of communication may constitute a valuable addition to "traditional" communication for the entrepreneur.

The rise of social media has led to changes in carrying out day-to-day activities by entrepreneurs. As Olanrewaju et al. (2020) point out, studies on social media and entrepreneurship are relatively new and fragmented in their focus, however there is an increasing interest from academia and practitioners in further research and investigation within this area.

At the same time, many studies concerning the use and role of social media in business relate to professional aspects. However, the area of the significance of social media for informal relationships, created and maintained by entrepreneurs, is also interesting. The question arising in the course of the analysis of the available literature relates to the fact whether, in practice, social media contribute only to generating official effects and publishing information by enterprises or whether they are the medium enabling interpersonal contacts of entrepreneurs, associated with acquiring information and resources essential for the conducted activity (through discussions), which might be of use to get a competitive advantage.

The objective of the paper is to explore the impact of the use of social media by entrepreneurs on the frequency of discussions about the economy and business with the members of their social network. The subject of the research has been selected small enterprises (including micro-enterprises) due to their share in a total number of enterprises in Poland (nearly 99%) and also a steady increase in their number as well as an increase in the value of production, revenues, number of employees. The research tool was the questionnaire. The statistical analyses were conducted using the R Package - a free software environment for statistical computing and graphics. The test probability of $p<0.05$ was found as significant whereas the test probability of $p<0.01$ as highly significant.

Social bonds in the Internet space

The contemporary world is subjected to a variety of changes, in particular socio-economic and civilizational ones, known commonly as the so called information revolution (Rosak-Szyrocka, Blašková, 2016), the immanent component of which is the Internet. The Internet may contribute to restoring the community by providing space for people sharing common interests, while simultaneously overcoming the limitations of time and space (Baym 1997; Wellman 2001). *Social media* have gained immense popularity, among others, due to the fact that they are the response to the social nature of the man.

Online communities may promote an open, democratic discussion (Sproull and Kiesler 1991), promote the diversity of views (Kapor 1993) and mobilize joint actions (Schwartz 1996; Tarrow 1996). Although early explorations of the social role of the Internet focused primarily on creating the *online* community (Rheingold 1993), it became clear soon that most relationships established in cyberspace are continued in the physical, real space, which leads to the emergence of new communities the common feature of which is mixing *online* and *offline* interactions (Müller 2000). Interactions taking place in the network fill in communication gaps existing in the real world (face to face meetings). In addition, the Internet extends the tendency of bonds to expand beyond the local area (Wellman 2001). Therefore, the Internet intensifies both *online* and *offline* communication, thus creating opportunities for the rise of the low-cost contact between friends and relatives and simultaneously expanding direct face to face communication as well as the one using the telephone. The Internet may also contribute to an increase in organizational commitment by supporting the flow of information between direct personal meetings and by arranging such meetings itself.

As stated by Culnan and Markus, communication networks established via computers may create the communities based rather on interests than geographical location, social status or previous acquaintanceship (Culnan, Markus 1987). On the basis of interests, common needs or a commercial venture, weak ties may emerge. The networks of researchers or social or medical support groups may serve as an example (Alexander, Peterson and Hollingshead 2003) as well as discussion groups (Baym 2000), online universities or courses (Haythornthwaite 2005). There are also the cases of transformation of weak ties into stronger ones, due to the Internet, which may take place in virtual communities and through community networks (Baym 2000; Cohill and Kavanaugh 2000). In such

circumstances, some additional connections appear, e.g. direct meetings, synchronous online meetings or sharing private e-mail addresses as a part of a public discussion.

In addition, Haythornthwaite (2005) pointed out that, at the time of the emergence and initiation of the use of a new medium of communication, which connects different entities, it has the potential to create weak ties. It takes place by means of initiating a new social contact between previously separate units. The impact of the new medium or new communication practices relates to the creation of new ties, not existing so far. As a result of the need for communication, strong ties are willing to adapt a new medium. Regardless of the emergence of changes or disappearance of a new medium, strong ties remain unchanged (there is no impact of a new medium). Weak ties may be subjected to destruction as a result of the disappearance of the only medium which is their carrier.

Social media and entrepreneurial networks

All entrepreneurs, while seeking to achieve their own goals, are in permanent interaction with the environment and thus cannot be treated in isolation from others. Daily, entrepreneurs contact their family members, friends, employees, business partners, advisers who form their personal (social) networks, considered as one of the most important sources of resources for the entrepreneurial firm (Bratkovic et al., 2009; Soetanto 2019). The term 'entrepreneurial network' refers to the personal network of information contacts and exchange relationships used by the entrepreneur for creating and nurturing the business (Witt et al., 2008). Entrepreneurs are also linked to people and organizations that interact with each other and these contacts can widen the availability of resources that sustain a business (Hansen, 1995).

The prior research stresses the role of networks as a set of resources that provide a competitive advantage to the firm (Eisenhardt, Schoonhoven,1996; Gulati et al., 2000). According to the resource-based view (RBV), the firm's competitive advantage originates in the resources and capabilities the enterprise controls, specifically the valuable, rare, imperfectly imitable and not substitutable ones (Barney, 1991). Resources obtained through networks share the features consistent with the criteria suggested by the RBV. Other benefits of networks include the access to important and timely information (Adler, Kwon, 2002), financial support, labor and psychological aid (Sanders, Nee, 1996). Moreover, networks provide opportunities for acquiring and exploiting new knowledge required for innovation (Yli-Renko et al., 2005) which is vital for the entrepreneur and the entrepreneurial process. Firms can obtain information, resources and status through network connections, and the understanding of how these ties work is an important goal of the strategic management research (Kim et al., 2016). Additionally, social networks influence internationalizing SMEs business models (Musona et al., 2020).

The most important technological trend of the last ten years has been the rise of social networking systems to social phenomena involving billions of people all around the world, attracting users from several social groups, regardless of age, gender, education, or nationality (Franchi et al., 2020). From the point of view of the operation of small enterprises, it is important that the use of social networks by entrepreneurs can be currently supported just by the use of the Internet communication platforms which social media are.

Social media have changed the way people communicate and overcome restrictions imposed by geographic locations. Social media may provide additional information and broaden the views of users. People can collect information from different resources both domestically and internationally. The influence of social media is also noticeable in how it can shape people's perception of modern business practices. The basic functions of social media are for free, and more and more people rely on social media to communicate and collect information. Information posted on social media can potentially quickly become trendy and influence people's purchasing decisions and career choices (Xu et al., 2019). The arrival of social media has not only transformed the way firms relate to customers. It has also changed internal processes and thus is becoming an important strategic tool. Firms are using these tools increasingly to facilitate intra- and inter-organizational activities with customers, business partners, and suppliers - activities such as collaborative product development, creation of knowledge-

sharing communities, market research, and collaborative learning and creativity (Martin-Rojas, 2019). Social media are the phenomenon that has changed the way the business environment works. Firms are able to gain access to resources that would be otherwise unavailable to them. It has also helped businesses to increase their worthiness, cultivate strategic partnerships and increase their contact with customers and suppliers (Jagongo, Kinyua, 2013). Mangold and Faulds (2009) recognize that social media allow enterprises to connect with both existing and potential customers, engage in them and reinforce a sense of community around the enterprise offering(s).

Social media are being adopted by a growing number of entrepreneurs who seek to deploy them for the benefit of their business. In the relatively few scholarly studies that consider how such social media may benefit firms, the majority have focused on social media as marketing tools. Little is known about how the use of social media may affect entrepreneurs themselves (Fischer, Reuber, 2011). The popularity of online websites for networking is increasing and they provide a new platform for socialization and business. Due to the emergence of online social networks and social media, there are more opportunities for entrepreneurs. Online social networking sites enable the maintenance of existing relationships and also the formation of new connections (Song, 2015).

Social media help conversations to reach a wider audience leveraging the "long tail" concept, which means conversations that can be conveyed to different forums. There are several communication channels in the organization that include meetings, phone calls and emails. The use of social media web sites has increased the channels of communication and its effectiveness in the organization. Social media have also improved collaboration between team members in an organization, which has resulted in a better outcome. The key factor for the success of social media is conversation. When a social media site is used for the business, it enlarges the conversation through buzzes that would call out the brand name. The company must be truly dedicated towards conversation through social media, as much as the customers are (Edosomwan, 2011).

Olanrewaju et al. (2020) state that entrepreneurs use social media for several reasons and purposes, which is vital to their business activities. Social media's openness and connectivity overcomes the inability or difficulty entrepreneurs experience in identifying and reaching out for expert advice, which is particularly crucial in the early stages of entrepreneurship. Furthermore, entrepreneurs use social media mainly to market their products /services. The ability to interact and network with co-entrepreneurs is another vital factor.

Social media enable entrepreneurs to connect and establish relationships based on similar interests (Quinton, Wilson, 2016). The use of social media platforms also improves firm performance (Alarcón-del-Amo et al., 2018) Social media (Edosomwan, 2011): promote open communication between employees and management; allow employees to share project ideas and work in teams effectively, which helps in sharing knowledge and experiences; promote better content, such as webcast and videos, than just simple texts; help to communicate collaboratively between current and potential customers in receiving feedback, product definition, product development or any forms of customer service and support; become a good venue for discussions and become a classic goal of marketing and communication, but companies must ensure that employees are adhering to the rules and etiquettes of social media. Additionally, Drummond et al. (2018) pinpoint that the impact of social media extends that of a virtual communication platform to a resource layer in the creation and maintenance of activity structures in business-to-business relationships and networks.

Research problem and hypothesis

Recognizing the specificity of social media in the context of the issue of the social network of the entrepreneur has led to the formulation of the following research question: RQ: *What is the impact of the use (commitment to social media) of social media by entrepreneurs on discussions on the economy and business which they hold with the members of their social network?* The analysis of the specificity of social media has led to the formulation of the following hypothesis *H: There is a positive impact of the use of social media on the frequency of discussions on the economy and business with the members of the social network of the entrepreneur.*

Materials and Methods

The research, the results of which have been depicted in the present paper, was based on the method of conducting empirical studies by means of managerial perception (Miller, Friesen, 1978), in which data are obtained using the questionnaire.

The respondents of the research were the owners-managers of the analyzed enterprises. The research tool was spread among the randomly selected organizations – due to easy access – from the areas of the provinces: Kuyavia-Pomerania, Lublin, Łódź, Mazovia, Podlachia, Silesia and Holy Cross. 143 copies of the completed questionnaires were received, 14 of which were rejected due to incomplete data. In these circumstances, the research sample amounted to 129 small enterprises.

The majority are the companies running their business activity in cities. These enterprises amount to 84.5%, whereas the companies operating in the country constitute 15.5%. The enterprise operating on the market for the shortest period of time is eight months old. The oldest one has been operating on the market for 26 years. The enterprises under consideration are both the companies characterized by self-employment, the ones not employing workers and the ones employing even 46 people. On average, the level of employment in the analyzed companies amounts to 4 employees (an entrepreneur + 4 employees).

For most of the surveyed companies, the basic activity is production (30.2%). The activity associated with trade was identified as the domain of 33.3% of the surveyed companies. 24% of the surveyed entities operate in the sector of services. The other 12.5% of the companies run their business activity in the field of the following sectors: construction, hotels and restaurants, transport, storage and communication, education and agriculture, hunting and forestry.

The vast majority and simultaneously nearly half of the entrepreneurs declared their age range as 36-45 (46.5%). The people aged 46-55 amount to 20.9% of those questioned whereas the people aged 26-36 amount to 15.5%. The people aged 56 and more as well as the ones aged 25 and less respectively amount to 14% and 3.1%.

Variable Measurement

Entrepreneurial Network Member Interactions

According to Tomski (2016), there were identified the member groups of individual sub-networks of entrepreneurial networks. As a result of the conducted factor analysis, two basic sub-networks of entrepreneurs were identified: the one including entrepreneurs' family members (NET_FAM) – strong ties and the one including other people (NET_OTH) – weak ties.

For the purposes of the thorough analysis and solving the research problem formulated in this study, the decision was made to carry out the analysis of individual sub-networks, constituting two aforementioned groups. The conducted research indicated the existence of the following groups (categories) of people, creating the social network of the entrepreneur: (1) Spouse or partner, (2) Parents, (3) Other family members and relatives, (4) Friends, (5) Acquaintances from former school, courses, present and former place of residence, (6) Customers, (7) Suppliers, service providers, (8) Acquaintances - entrepreneurs, owners and people related to other companies that are not competitors, (9) Acquaintances - entrepreneurs, owners and people related to other companies being competitors, (10) Acquaintances connected with administration, authorities and public sector etc., (11) Acquaintances connected with business support organizations (investors, consultants, bankers, accountants, lawyers etc.), (12) Former co-workers (colleagues), former boss, current co-workers (colleagues), current boss (in the case of simultaneous employment and running a business activity), (13) Acquaintances having significant experience in starting new businesses and running a business activity, scientists, inventors.

In the subsequent step, the frequency of holding general discussions with individual members of the sub-network by the entrepreneurs, concerning issues related to the economy and business, was identified. It was possible to respond using the eight-point Likert scale, where 1 amounted to the fact that the relevant discussions were held rarely, 7 – very often, whereas 0 amounted to no interaction of the entrepreneur with the specific group in terms of discussions on issues associated with the economy and business. Descriptive statistics for the variables characterizing the frequency of interactions of the entrepreneur with the members of individual sub-networks are presented in Table 1.

Table 1: Descriptive statistics of the variables concerning interactions of the entrepreneur with the members of individual sub-networks of the social network of the entrepreneur

Variable – network member group	Variable ID	Median	Mean	Std dev	Min	Max
Spouse or partner	C_MALZ	5	4.57	2.34	0	7
Acquaintances connected with administration, authorities and public sector etc.	C_ADM	4	3.41	2.01	0	7
Acquaintances connected with business support organizations (investors, consultants, bankers, accountants, lawyers etc.)	C_WSP_BIZ	4	3.95	1.92	0	7
Former co-workers (colleagues), former boss, current co-workers (colleagues), current boss (in the case of simultaneous employment and running a business activity)	C_EX_WSP	4	3.55	2.19	0	7
Acquaintances having significant experience in starting new businesses and running a business activity, scientists, inventors.	C_DOSW	4	3.91	2.15	0	7
Parents	C_RODZ	2	2.51	2.3	0	7
Other family members and relatives	C_INNI_RO	4	3.35	2.16	0	7
Friends	C_PRZYJ	4	4.19	2.03	0	7
Acquaintances from former school, courses, present and former place of residence	C_INNI_SL	3	3.47	2.24	0	7
Customers	C_KL_ZL	5	4.4	2.06	0	7

Variable – network member group	Variable ID	Median	Mean	Std dev	Min	Max
Suppliers, service providers	C_DO_US	5	4.38	2.02	0	7
Acquaintances - entrepreneurs, owners and people related to other companies that are not competitors	C_PB_NKON	4	4.19	1.91	0	7
Acquaintances - entrepreneurs, owners and people related to other companies being competitors	C_PB_KON	4	3.88	2	0	7

Social Media Commitment

The commitment of entrepreneurs to social media (the use of social media) was operationalized by recognizing the frequency of their use. The entrepreneurs responded to the question concerning the use of social media on the five-point scale, where the value of 0 meant that the entrepreneurs did not use social media, 1 – that the frequency of their use was so small that it was difficult to determine, 2 – that the entrepreneurs used social media very rarely, 3 – about once a month, 4 – about once a week, whereas 5 – that it was the same as daily use of social media. Descriptive statistics concerning the variable describing the use of social media by the entrepreneurs are presented in Table 2.

Table 2: Descriptive statistics for the variable of SOC_MED

Variable	Variable ID	Median	Mean	Std dev	Min	Max
Social media	SOC_MED	3	2.9	1.88	0	5

Research Findings

In the first stage of the analysis the correlation between the variables under research was identified. The results of the analysis of the correlation coefficients are listed in Table 3.

Table 3: Correlation coefficients of the analyzed variables

	SOC_MED	C_PB_KON	C_ADM	C_WSP_BIZ	C_EX_WSP	C_DOSW	C_MALZ	C_RODZ	C_INNI_RO	C_PRZYJ	C_INNI_SL	C_KL_ZL	C_DO_US	C_PB_NKON
SOC_MED	1	0.101	0.046	0.145	0.149	**0.224**	0.041	**0.290**	0.082	**0.223**	0.101	0.076	0.070	0.060

The obtained results indicate that, in the case of the use of social media, there is a statistically significant relationship exclusively with the frequency of holding discussions with the members of three sub-

networks within the social network of the entrepreneur, i.e.: acquaintances having significant experience in starting new businesses and running a business activity, scientists, inventors (C_DOSW), friends (C_PRZYJ) and parents (C_RODZ).

For the relationships identified in this way, the in-depth analysis based on the results of the linear regression analysis was carried out. Tables 4 and 5 contain the results of the regression analysis for the sub-network of acquaintances having significant experience in starting new businesses and running a business activity, scientists, inventors (C_DOSW).

Table 4: The relationship between the frequency of the use of social media and the frequency of interactions of the entrepreneur with the members of the sub-network of acquaintances having significant experience in starting new businesses and running a business activity, scientists, inventors (C_DOSW) – the regression model assessment

R	0.22428607
R^2	0.05030424
Adjusted R^2	0.04276697
Std error	2.10172577
F	6.67406805
p	0.01092382
n	128

Table 5: The relationship between the frequency of the use of social media and the frequency of interactions of the entrepreneur with the members of the sub-network of acquaintances having significant experience in starting new businesses and running a business activity, scientists, inventors (C_DOSW) – the regression model

	Coefficients	Std dev	t Stat	p-value
Intercept	3.17027032	0.34263942	9.25249743	7.199E-16
SOC_MED	0.25661833	0.09933273	2.58342177	0.01092382

The obtained results of the statistical analysis indicate that 5% of changes in the level of interactions with the sub-network of acquaintances having significant experience in starting new businesses and running a business activity, scientists, inventors (C_DOSW) can be explained by the variable characterizing the commitment of the entrepreneur to the use of social media (SOC_MED). The use of social media positively affects the level of interactions of the entrepreneur with the members of this sub-network. These relationships are statistically significant. The values of the parameters are positive, i.e. along with an increase in the frequency of the use of social media, there is an increase in the frequency of interactions of the entrepreneur with the members of the analyzed sub-network in terms of holding discussions on the economy and business. An increase in the level of the variable of SOC_MED by the value of standard deviation increases the level of the frequency of contacts with the members of the sub-network of C_DOSW by 0.256 of its standard deviation. Summing up the results of the conducted regression analysis, it can be concluded that SOC_MED has a positive impact on the level of interactions of the entrepreneur with the members of the sub-network of C_DOSW of its personal network, operationalized as the frequency of discussions on the economy and business.

Tables 6 and 7 contain the results of the regression analysis for the sub-network of friends (C_PRZYJ).

Table 6: The relationship between the frequency of the use of social media and the frequency of interactions of the entrepreneur with the members of the sub-network of friends (C_PRZYJ) – the regression model assessment

R	0.22314367
R^2	0.0497931
Adjusted R^2	0.04225177
Std error	1.99450464
F	6.60269906
p	0.01134706
n	128

Table 7: The relationship between the frequency of the use of social media and the frequency of interactions of the entrepreneur with the members of the sub-network of friends (C_PRZYJ) – the regression model

	Coefficients	Std dev	t Stat	p-value
Intercept	3.48543706	0.32515941	10.7191642	1.8862E-19
SOC_MED	0.24222118	0.09426519	2.56957177	0.01134706

The obtained results of the statistical analysis indicate that 4.9% of changes in the level of interactions with the sub-network of friends (C_PRZYJ) can be explained by the variable characterizing the commitment of the entrepreneur to the use of social media (SOC_MED). The use of social media has a positive impact on the level of interactions of the entrepreneur with the members of this network. These relationships are statistically significant. The values of the parameters are positive, i.e. along with an increase in the frequency of the use of social media, there is an increase in the frequency of interactions of the entrepreneur with the members of the analyzed sub-network in terms of holding discussions on the economy and business. An increase in the level of the variable of SOC_MED by the value of the standard deviation increases the level of the frequency of contacts with the members of the sub-network of C_PRZYJ by 0.242 of its standard deviation. Summing up the results of the conducted regression analysis, it can be concluded that SOC_MED has a positive impact on the level of interactions of the entrepreneur with the members of the sub-network of C_PRZYJ of their personal network, operationalized as the frequency of discussions on the economy and business.

Tables 8 and 9 contain the results of the regression analysis for the sub-network of parents (C_RODZ).

Table 8: The relationship between the frequency of the use of social media and the frequency of interactions of the entrepreneur with the members of the sub-network of parents (C_RODZ) – the regression model assessment

R	0.28974306
R^2	0.08395104
Adjusted R^2	0.07668081
Std error	2.2101325
F	11.5472335
p	0.0009087
n	128

Table 9: The relationship between the frequency of the use of social media and the frequency of interactions of the entrepreneur with the members of the sub-network of (C_RODZ) – the regression model

	Coefficients	Std dev	t Stat	p-value
Intercept	1.50243443	0.36031271	4.1698069	5.628E-05
SOC_MED	0.35495524	0.10445629	3.39812205	0.0009087

The obtained results of the statistical analysis indicate that 8.3% of changes in the level of interactions with the sub-network of parents (C_RODZ) can be explained by the variable characterizing the commitment of the entrepreneur to the use of social media (SOC_MED). The use of social media positively affects the level of interactions of the entrepreneur with the members of this sub-network. These relationships are statistically significant. The values of the parameters are positive, i.e. along with an increase in the frequency of the use of social media, there is an increase in the frequency of interactions of the entrepreneur with the members of the analyzed sub-network in terms of holding discussions on the economy and business. An increase in the level of the variable of SOC_MED by the value of standard deviation increases the level of the frequency of contacts with the members of the sub-network of C_RODZ by 0.354 of its standard deviation. Summing up the results of the conducted regression analysis, it can be concluded that SOC_MED has a positive impact on the level of interactions of the entrepreneur with the members of the sub-network of C_RODZ of their personal network, operationalized as the frequency of discussions on the economy and business.

The obtained results indicate that the hypothesis is confirmed only partially. The listing of individual groups/members of the sub-network for whom the hypothesis was supported and not supported is presented in Table 10.

Table 10: The verification of the hypothesis for individual groups/members of the sub-network of the entrepreneur

Variable – the network member group	Variable ID	Hypothesis
Spouse or partner	C_MALZ	Not supported
Acquaintances connected with administration, authorities and public sector etc.	C_ADM	Not supported
Acquaintances connected with business support organizations (investors, consultants, bankers, accountants, lawyers etc.)	C_WSP_BIZ	Not supported
Former co-workers (colleagues), former boss, current co-workers (colleagues), current boss (in the case of simultaneous employment and running a business activity)	C_EX_WSP	Not supported
Acquaintances having significant experience in starting new businesses and running a business activity, scientists, inventors.	C_DOSW	Supported
Parents	C_RODZ	Supported

Variable – the network member group	Variable ID	Hypothesis
Other family members and relatives	C_INNI_RO	Not supported
Friends	C_PRZYJ	Supported
Acquaintances from former school, courses, present and former place of residence	C_INNI_SL	Not supported
Customers	C_KL_ZL	Not supported
Suppliers, service providers	C_DO_US	Not supported
Acquaintances - entrepreneurs, owners and people related to other companies that are not competitors	C_PB_NKON	Not supported
Acquaintances - entrepreneurs, owners and people related to other companies being competitors	C_PB_KON	Not supported

The analysis of the above results indicates that, from the formal point of view, the hypothesis was confirmed only for 3 out of 13 sub-networks. Therefore, on the whole, it can be concluded that the hypothesis formulated in this study is not supported, thus, in the case of the surveyed enterprises, there is no positive impact of the use of social media on the frequency of discussions on the economy and business with the members of the social network of the entrepreneur.

Conclusions

Summing up the results of the conducted research, it should be concluded that the impact of the frequency of the use of social media by the entrepreneur on the frequency of interactions with the members of the analyzed sub-networks of the personal network is statistically insignificant in the case of most sub-networks. Such a situation applies to 10 out of 13 sub-networks. The exception is 3 sub-networks: acquaintances having significant experience in starting new businesses and running a business activity, scientists, inventors (C_DOSW), friends (C_PRZYJ) and parents (C_RODZ). However, in the case of these sub-networks, despite the statistically significant positive impact of the frequency of the use of social media on the frequency of interactions with the members of the sub-network, a very small proportion of this factor in forming the level of interactions with the members of the sub-network can be indicated. This impact is at the level of 4.9% to 8,3%. In all the cases, more than 90% of variability in the frequency of interactions with the members of the sub-network is explained by the factors other than the frequency of the use of social media. An interesting result is an 8.3% impact (the largest among the three sub-networks for which the statistically significant relationship was identified) of the use of social media on the frequency of interactions with the entrepreneur's parents. Parents were identified as a group with whom the entrepreneurs hold discussions on the economy and business the most rarely (the average of 2.5, with the maximum possible level of 7).

It is worth pinpointing that despite the existence of statistically significant relationships in the case of 3 sub-networks at a low level, it should be assumed that one cannot speak about the existence of relationships of the frequency of the use of social media with the frequency of discussions on the economy and business. Social media are undoubtedly used, to a much larger extent, for formalized

communication of the company with the environment, not for holding informal discussions on issues significant for conducting the business.

In the context of the rejection of the hypothesis put forward in this study, it is worth pinpointing that Rosa (2013) claims that, in the Polish culture, social media and forums are not business channels. They are used primarily for entertainment and staying in touch with acquaintances. The primary means of communication in Poland is face to face conversations, phone calls, short text messages SMS/MMS, whereas the activity in social media is located in the 8th position in terms of popularity as a means of communication. The development of new communication channels does not result in the disappearance of personal contacts – all the respondents found personal meetings the most essential form of contacts with people. The significance of personal meetings is associated with the conviction of the power of the first impression, an opportunity to respond to non-verbal behavior of the speaker, discretion of the ongoing conversation. This statement, to a certain extent, explains the fact of the rejection of the hypothesis in the case of the surveyed group of Polish small enterprises and justification of the fact that the use of social media does not affect the frequency of discussions of entrepreneurs on the economy and business with the members of their social networks. These subjects are mainly discussed by them directly, without using the Internet communication.

The conducted research does not completely exhaust the problem. Among the directions of the future research, the following can be indicated: the research broken down by age groups, international cross-examination, taking into account the characteristics of individual cultures, which can be significant in the process of informal communication of the entrepreneur with the environment.

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Non-Proportional Allocation of Indivisible Goods

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Abstract

Fair division of goods has been an issue since people began forming communities. This applies not only to physical goods but also to participation in the profits, costs or work. Continuous social and economic development creates further needs to seek new solutions. Diverse forms of shared properties involve using various methods as well. Different solutions have to be applied, among others, while the division of indivisible goods among agents with different claims for the goods is required. In many cases the main emphasis is put on the optimal representation of the structure of claims made by agents participating in division. The exact reflection of this structure is generally impossible, because most often the proportional division is not integer. However, in some instances the structure of claims made by participants in division does not allow to apply the principle of proportionality. In such cases some modified solutions are searched for. One of such modifications is degressive proportionality, which allows unequal representation of the structure of claims. However, this idea turned out to be understood differently, even in its main recent area of application – the apportionment of seats in the European Parliament. Currently the problem of degressively proportional division of indivisible goods is being studied in the framework of fair division theory, with many questions still open.

The paper presents different interpretations of the idea of degressive proportionality together with its practical source, i.e. the allocation of mandates among Member States of the European Union in the European Parliament. Each of the interpretations is formalized and briefly analyzed.

Keywords: Fair Division, Allocation, Degressive Proportionality, Indivisible Goods.

Introduction

Proportionality is one of the main concepts of distributive justice. It assumes that acknowledgement of differences among participants in division is fair and that allocation of goods is performed in proportion to those differences. In other words, participants in division are treated equally as regards the amounts of their claims, i.e. there is an equal amount of allocated goods for each unit of claims. In case of allocation of indivisible goods, when the accurate proportion is not integer, and thus workable – what happens mostly in practical applications – some integer approximations are applied. However, in some cases one consciously gives up proportionality and unequal, with respect to amounts of claims, treatment of participants in division is acknowledged as just. One of such approaches is known as so-called degressive proportionality which allows unequal treatment of agents with regard to their claims whereas the inequality is directed towards favorable treatment of agents with smaller claims. The source of the problem and resulting terms is the European Parliament and the apportionment of seats among Member States, hence a majority of the first subject matter literature considers it in this context. Since the problem was strictly practical, initially the goal was to find a method of determining the degressively proportional apportionment of seats in the European Parliament. Over time, however, it turned out that the problem is much more complex than expected. As a result, no specific method has been indicated so far and in the meantime the term has been redefined three times.

The purpose of the paper is to present different interpretations of degressive proportionality together with the threats and problems resulting from the lack of its strict formalization. Analysis of each of the interpretation indicates the relationships between them.

Strong Degressive Proportionality

The most "radical" interpretation of degressive proportionality not only assumes unequal treatment of agents, but also increases inequality as claims of agents increase. Therefore, this interpretation is called a strong degressive proportionality. It is defined as follows (Cegiełka, 2011).

Definition 1.

A sequence $s=(s_1,s_2,\ldots,s_n)$, $s_i \in \mathbb{N}_+$, is strongly degressively proportional with respect to sequence $p=(p_1,p_2,\ldots,p_n)$, $0<p_1 \leq p_2 \leq \cdots \leq p_n$, if:

(1) $s_1 \leq s_2 \leq \cdots \leq s_n$,
(2) $\pi_1/\sigma_1 \leq \pi_2/\sigma_2 \leq \cdots \leq \pi_k/\sigma_k$,
where for $i=1,2,\ldots,n-1$, $k \leq n-1$,

$$\frac{\pi_i}{\sigma_i} = \begin{cases} \dfrac{p_{i+1}-p_i}{s_{i+1}-s_i} & for \quad s_i \neq s_{i+1} \\ \dfrac{p_{i+j}-p_i}{s_{i+j}-s_i} & for \quad s_i = s_{i+1} = \cdots = s_{i+j-1} \neq s_{i+j} \end{cases}.$$

In terms of division of goods, s_i and p_i denote the amount of allocated goods and the amount of claims, respectively, of the ith participant in division (among n agents). The idea of fairness contained in the above definition simply states that each successive good corresponds to a greater amount of claims. Such approach originates from the first attempt to systemize the apportionment of seats in the European Parliament conducted in 1992 at the meeting of the Council of Europe, where the following algorithm was proposed (Lamassoure, Severin, 2007).

1) Each state receives 6 seats.
2) States with a population of 1 to 25 million receive a mandate for every 500 thousand citizens.
3) States with a population of 25 to 60 million receive a mandate for every million citizens.
4) States with a population exceeding 60 million receive a mandate for every 2 million citizens.

The proposed pattern was never strictly applied (Lamassoure, Severin, 2007), nevertheless it indicated the main idea of strong degressive proportionality – each successive mandate corresponds to a greater number of represented inhabitants (of course, s_i and p_i denote the number of allocated mandates and the population of the ith Member State).

It is worth noticing that the method proposed in 1992 not only tries to give a recipe for the distribution of seats in the European Parliament, but also establishes a lower bound for the number of mandates for the least populated state. According to point 1 of the algorithm each state receives at least 6 seats. Such a limitation is currently called a boundary condition.

Degressive Proportionality

Another interpretation of degressive proportionality no longer increases inequality when dealing with agents as their claims increase. In this approach degressive proportionality is defined as follows (see for example (Cegiełka, 2016), (Cegiełka et al., 2018), (Łyko, Rudek, 2017)).

Definition 2.
A sequence $s=(s_1,s_2,\ldots,s_n)$, $s_i \in \mathbb{N}_+$, is degressively proportional with respect to sequence $p=(p_1,p_2,\ldots,p_n)$, $0<p_1 \leq p_2 \leq \cdots \leq p_n$, if:
(1) $s_1 \leq s_2 \leq \cdots \leq s_n$,
(2) $p_1/s_1 \leq p_2/s_2 \leq \cdots \leq p_n/s_n$.

Such interpretation of degressive proportionality originates from legal regulations concerning the division of mandates in the European Parliament imposed in 2007 by the Lisbon Treaty. Article 1 point 15 of this Treaty states that: "*The European Parliament shall be composed of representatives of the Union's citizens. They shall not exceed seven hundred and fifty in number, plus the President. Representation of citizens shall be degressively proportional, with a minimum threshold of six members per Member State. No Member State shall be allocated more than ninety-six seats*" (Treaty of Lisbon, 2007). The article indicates the form of citizens' representation as degressively proportional, but no precise definition of degressive proportionality is given. A more detailed description of degressive proportionality was contained in the Report of the Committee on Constitutional Affairs and the European Parliament Resolution. According to the Report the principle of degressive proportionality was supposed to be understood as follows.

[European Parliament] *"considers that the principle of degressive proportionality means that the ratio between the population and the number of seats of each Member State must vary in relation to their respective populations in such a way that each Member from a more populous Member State represents more citizens than each Member from a less populous Member State and conversely, but also that no less populous Member State has more seats than a more populous Member State"* (Lamassoure, Severin, 2007).

Definition 2 originates in the interpretation contained in the Report. It may be considered as a formalization of the idea of fairness applied in the European Parliament. In practice there are usually more conditions needed to be taken into account. In case of the European Parliament, these are the boundaries for the minimal (m), maximal (M) and total (H) number of seats pointed out in the Lisbon Treaty. Therefore one usually considers degressive proportionality with boundary conditions (Cegiełka, Łyko, Rudek, 2019).

Definition 3.

Let $(m,M,H)\in\mathbb{N}^3$, $m\leq M$, $m+M\leq H$. A sequence $s=(s_1,s_2,\ldots,s_n)$, $s_i\in\mathbb{N}_+$, is *degressively proportional with boundary conditions (m,M,H)* with respect to sequence $p=(p_1,p_2,\ldots,p_n)$, $0<p_1\leq p_2\leq\cdots\leq p_n$, if:
(1) it is degressively proportional with respect to sequence p,
(2) $s_1=m$, $s_n=M$, $s_1+s_2+\ldots+s_n=H$.

The boundary conditions introduced by the Lisbon Treaty are: m=6, M=96, H=751. Of course the Treaty bounds the minimal, maximal and total number of seats in the form of inequalities, i.e. $s_1\geq 6$, $s_n\leq 96$, $s_1+s_2+\ldots+s_n\leq 751$, but in practice they have always been treated as equalities and since there are official recommendations to "*fully utilise the minimum and maximum numbers set by the Treaty*" (Gualtieri, Trzaskowski, 2013) we assume equalities in point 2 of the definition 3.

Let us additionally make two comments. First of all, a sequence which is degressively proportional is also strongly degressively proportional (for the details see (Cegiełka, 2011)) and the opposite implication does not hold. That is why the idea of fairness contained in the algorithm from 1992 is called *strong* degressive proportionality.

Secondly, in the subject matter literature, degressive proportionality is now called Rounded Degressive Proportionality (RDP). Such terminology results from the assumption that denominators in point 2 of the second definition are integers. This assumption, undoubtedly correct in relation to the 2007 Report, turned out to be troublesome in practice. Hence, the third idea of fairness was proposed – the *weak* degressive proportionality.

Weak Degressive Proportionality

The most "liberal" interpretation of degressive proportionality relates degressive proportionality to a usual conceptualization of proportionality in the problem of division of indivisible goods. One assumes that inequalities in dealing with agents as regards their claims can be related to some base, not necessarily integer, quantities. In case of proportional divisions such base quantities result from

the accurate proportion, which is then suitably rounded. Weak degressive proportionality behaves in a similar manner.

The origin of the weak degressive proportionality is the modified interpretation of degressive proportionality provided by the MEPs, who stated in 2013 in the Resolution of the European Parliament that degressive proportionality means: "*the ratio between the population and the number of seats of each Member State* ***before rounding to whole numbers*** *shall vary in relation to their respective populations in such a way that each Member of the European Parliament from a more populous Member State represents more citizens than each Member from a less populous Member State and, conversely, that the larger the population of a Member State, the greater its entitlement to a large number of seats*" (Gualtieri, Trzaskowski, 2013). According to the above interpretation the following definition may be proposed (Cegiełka et al., 2018).

Definition 4.

A sequence $s=(s_1,s_2,\ldots,s_n)$, $s_i\in\mathbb{N}_+$, is *weakly degressively proportional* with respect to sequence $p=(p_1,p_2,\ldots,p_n)$, $0<p_1\leq p_2\leq\cdots\leq p_n$, if:
(1) $s_1\leq s_2\leq\cdots\leq s_n$,
(2) there exist a rounding rule $[\![\cdot]\!]$ and a function $A:[p_1,p_n]\rightarrow\mathbb{R}_+$ such that $t_i/A(t_i)\leq t_j/A(t_j)$ for $t_i\leq t_j$ and $(s_1,s_2,\ldots,s_n)=([\![(A(p_1)]\!],[\![A(p_2)]\!],\ldots,[\![A(p_n)]\!])$.

Similarly as in the case of degressive proportionality one defines weak degressive proportionality with boundary conditions (Cegiełka et al., 2018).

Definition 5.

Let $(m,M,H)\in\mathbb{N}^3$, $m\leq M$, $m+M\leq H$. A sequence $s=(s_1,s_2,\ldots,s_n)$, $s_i\in\mathbb{N}_+$, *is weakly degressively proportional with boundary conditions (m,M,H)* with respect to sequence $p=(p_1,p_2,\ldots,p_n)$, $0<p_1\leq p_2\leq\cdots\leq p_n$, if:
(1) it is weakly degressively proportional with respect to sequence p,
(2) $s_1=m$, $s_n=M$, $s_1+s_2+\ldots+s_n=H$.

As before, let us additionally make some comments. At first glance it is not clear why the phrase "before rounding to whole numbers" was introduced. The authors of the phrase justify their proposal by the fact that the set of degressively proportional allocations may be empty (Grimmett, 2012). Such justification may raise doubts, as for the data from 2012 there are more than 5 million degressively proportional divisions of seats in the European Parliament (Łyko, Rudek, 2013). On the other hand, as mentioned before, the weak approach is naturally justified. In the case of classical integer proportional allocations it is accepted that approximations of strict proportionality, which in general is not integer, are called proportional divisions, even though they are strictly proportional only before rounding to integers (Cegiełka et al., 2018). However, the justification of the phrase does not raise the strongest doubts. It is the unclear understanding of the added phrase which opens the door to considerable abuse. Formally a rounding rule is defined as follows (Pukelsheim, 2014).

Definition 6.

A *jump-point sequence y(0),y(1),y(2),…* is an unbounded sequence that satisfies $y(0)=0\leq y(1)<y(2)<\cdots$. A jump-point sequence defines a rounding rule $[\![\cdot]\!]$ by setting, for all $x\geq 0$ and $n\in\mathbb{N}$

$$[\![x]\!]=\begin{cases}\{0\}\ in\ case\ x=0\\ \{n\}\ in\ case\ x\in(y(n),y(n+1))\\ \{n-1,n\}\ in\ case\ x=y(n)>0.\end{cases}$$

Note that according to definition 6 we are offered freedom of choice when rounding (for example, for $y(0)=0,y(1)=3,y(2)=4,y(3)=7,y(4)=21,y(5)=21$ we have $[\![6]\!]=2$ and $[\![15,9]\!]=3$ (Cegiełka et al., 2018)). Moreover, it can be shown that for any sequence $p=(p_1,p_2,\ldots,p_n)$ such that for $i\neq j$, $p_i\neq p_j$, any positive,

non-decreasing sequence of natural numbers satisfying given boundary conditions is weakly degressively proportional with boundary conditions with respect to sequence p (the details the reader will find in (Cegiełka et al., 2018)). This means that a weakly degressively proportional sequence may be far from the initial idea presuming that more populated states represent greater numbers of inhabitants than less populated states. Probably the authors of the weakened interpretation assumed the rounding rule to be one of the standard rules, i.e. the floor, ceiling or the nearest integer function. Nevertheless, lack of such an assumption makes the new idea of fairness even less clear. That is why in our opinion the formalization ought to indicate the actual rounding rule. Then, e.g. for the rounding rule equal to the floor function (F), one can define an F-weak degressive proportionality (F-WDP) as follows.

Definition 7.

Let $[\![\cdot]\!]$ be the floor function. A sequence $s=(s_1,s_2,\ldots,s_n)$, $s_i \in \mathbb{N}_+$, is *F-weakly degressively proportional* with respect to sequence $p=(p_1,p_2,\ldots,p_n)$, $0<p_1\leq p_2\leq\cdots\leq p_n$, if:
(1) $s_1\leq s_2\leq\cdots\leq s_n$,
(2) there exists a function $A:[p_1,p_n]\rightarrow\mathbb{R}_+$ such that $t_i/A(t_i)\leq t_j/A(t_j)$ for $t_i\leq t_j$ and $(s_1,s_2,\ldots,s_n)=([\![A(p_1)]\!],[\![A(p_2)]\!],\ldots,[\![A(p_n)]\!])$.

Analogously one can define, for example, a C-weak degressive proportionality for a rounding rule equal to the ceiling function or an N-weak degressive proportionality for a rounding rule equal to the nearest integer function. In such conceptualization F-WDP, C-WDP and N-WDP correspond to standard methods of proportional divisions, i.e. to Jefferson's, Adams' and Webster's methods, respectively.

It is also worth noticing that each degressively proportional sequence is weakly degressively proportional (Cegiełka, 2016). That is why the interpretation accepted in 2013 is called weak degressive proportionality.

In the subject matter literature, weak degressive proportionality is now called Unrounded Degressive Proportionality (UDP). Such terminology results from the phrase "before rounding to whole numbers" and together with RDP terminology allows to distinguish degressive proportionality and weak degressive proportionality in a convenient way.

Searching for solutions

Degressive proportionality, an idea of fairness that seemed to be intuitively clear, proved to be much more complicated than expected. So complicated that for over 20 years it has been interpreted in three different ways. And these interpretations, and therefore definitions, do not specify the method of allocation; they only allow to test whether a given solution is (strongly, weakly) degressively proportional. For the European Parliament, however, the main goal is to find a distribution of seats. This is probably why most of the first literature on the subject proposed methods of allocating mandates. And the vast majority of them put forward UDP solutions, usually with the floor, ceiling or the nearest integer function as a rounding rule (see for example (Dniestrzański, 2014), (Dniestrzański, Łyko, 2014), (Grimmett et al., 2012), (Grimmett et al., 2017), (Martinez-Aroza, Ramirez-Gonzalez, 2008), (Pukelsheim, 2010), (Ramirez-Gonzalez, 2007), (Ramirez-Gonzalez et al., 2012), (Słomczyński, Życzkowski, 2012)). With time, however, the problem began to be considered in a general form. A classification of UDP solutions was made in (Słomczyński, Życzkowski, 2012). In (Cegiełka et al., 2018) the authors formalized weak degressive proportionality.

Studies on RDP have been initiated in the paper (Łyko, Rudek, 2013) which contains an algorithm generating all degressively proportional divisions (for given sequence p and boundary conditions (m,M,H)). Since then the research on RDP has been expanded (see for example (Cegiełka, Łyko, Rudek, 2019), (Cegiełka et al., 2019), (Dniestrzański, 2013), (Dniestrzański, Łyko, 2014), (Łyko, Rudek, 2017), (Łyko, Rudek, 2016), (Maciuk, 2011)). One of the interesting approach was proposed in (Cegiełka et al., 2017). The authors of the paper introduced the so-called transfer order (on a set of

all degressively proportional divisions for given p and (m,M,H)) and for the first time, the structure of this set was studied. However, strong degressive proportionality, according to our current knowledge, has not been investigated.

Conclusions

A simple idea of fairness saying "we need to protect the smaller entities" is, in many cases, undoubtedly justified. But, as it often happens, simple ideas can give rise to difficult problems. The problem of degressively proportional division of indivisible goods is one of such cases. Even though its source is such a prosaic task as the distribution of seats in the European Parliament, the attempts to solve it demonstrated that difficulties start as early as at the point of comprehending the idea. Moreover, enormous differences between those insights generated various streams of research into degressive proportionality. Interpretations presented in this paper indicate the origins of those streams.

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The Concept of Minimizing Master Data in The Production Planning Process on The Example of ERP Software

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Abstract

The purpose of the article is to show the possibilities of reducing master data in the production process and improving their quality on the example of SAP software: S4HANA. The created model was implemented in a large production company and allowed for a significant improvement in the efficiency of managing the master data used in production planning.
The author presents the possibility of a significant reduction in the labor consumption of creating and managing the basic data of semi-finished products, routings and bill of materials. Thanks to the use the object dependency, and production planning based on product characteristics, the number of data has been reduced many times.

Keywords: ERP systems, master data, production planning, CDP

Introduction

Today's dynamic business is becoming increasingly complex with functional units requiring more and more inter departmental data flow for decision making, timely and efficient procurement of parts, management of inventory, accounting, human resources and distribution of goods. In this regard, efficient information systems would improve competitiveness through cost reduction and better logistics (Holland, C., Light, B., 1999). Company management as unified entity is almost impossible without systems which encompass or can encompass all processes that are in progress in a given organization. ERP class systems have been developed since the 80's. The idea behind their creation was that instead of numerous singular IT systems there would be one that could replace them and care for data coherence and processes in a company. Common data, online record of processes, reporting available at any time they all help to make correct managing decisions .The trend, observed in the 80's and 90's, where ERP systems where implemented only in big rich companies, has been complemented by numerous ERP systems implementations in smaller companies (Samaranayake, P., 2008). It proves that those ideas are universal and their goal is to unify the company (Jakubiak, M., 2019), standardize the processes, clarify the data, and to make the information more available for different participants of a business process (Jagoda, K. and Samaranayake, P., 2017).

The implementation of ERP systems apart from changes in the company's organization can have an influence on the way in which the company is seen on the market. According the research by Hayes et al (2001) the capital market increases the value of companies which implemented ERP, because the investors had a positive reaction to the information about the ERP implementation. Similarly, behavioral research done by Huntona et al (2003) confirms this trend. Financial analysts significantly increased the retracement of average profit forecasts, when a company declared to implement ERP systems. Both research showed that the participants of financial market believed that ERP adaptation will increase company's' results , yet the scope in which the results will come true remains unknown.
However, it has to be admitted that apart from many different positive aspects or ERP implementation, there are examples, in the economy, of companies that have a lot of problems after incorrect employment of IT systems. For example, Scott J. (1999) indicates companies like FoxMeyerDrug which as a result of generating wrong orders, problems with shipment and incorrect financial data almost faced bankruptcy and lost their good name on the market. This shows a big importance of

systems which condition company's proper operation on the market and its survival among their tight competitors.

Most respondents indicate that correct system data is necessary and influence a proper operation of ERP systems. Discussion on data quality in IT systems is probably as old as IT (Brodie, ML., 1980) technology itself . Survey concerning data quality in ERP systems show that even the most-cutting edge technological solutions without data and intermediate software do not guarantee a high quality data (Röthlin, M., 2004). The research done by Martin MH. (1998) points out that effort fullness of data preparation needed for ERP systems implementation results in the fact that about 90% of implementations are delayed and go beyond the planned budget.

Mentioned challenges and problems with IT systems implementation ,and in particular with proper and terminable preparation of data for ERP start in a company, bring about a lot of scientific research connected with IT systems implementation in companies (Knolmayer GF., Röthlin M., 2006).

Master Data in Production Planning

Master data is one of the most important elements conditioning the proper functioning of Manufacturing Planning and Execution systems in an enterprise. Master data in production area is defined as the basic characteristics of instances of production process entities such as work centers, products, routings, etc.

Typically, master data is created once, used many times, and does not change frequently hence the companies give special attention to their management (Haug, A., Zachariassen, F., van Liempd, D., 2011). The process of creating and managing master data in ERP and APS systems is very labor intensive and requires a lot of attention from many system users. Along with the desire to better process registration and planning, the need for data creation and quality service is growing rapidly.

Basic data in a production process can be divided into a few main groups: Material master data, bill of materials, routing, work center and production version.

Material master data contains such information like: material type, name and description, its physical characteristics (weight, volume, tenacity), quality characteristics (when quality check should take place, and what should it concern), planning (MRP type, planning cycle, lot size, procurement type, lead time, planning strategy group etc.), additionally all the range of data connected with bookkeeping, supply, all other information significant for company's processes.

Bill of materials is a list of components from which a given product is manufactured, along with the information about their number and elements units used in the production process, the method of elements use in the system (e.g. backflush concept) and variants of their use. In a basic discreet production process, every manufactured material has at least one individual BOM. BOM's are not only used in production process , but in standard cost calculation for finished products by rolling up the cost from raw to semi-finish and then to finished products. A routing is a description showing which operations or list of activities have to be carried out during the production and planning process. Routing also contains information about the order of production operations and their seriality, reorientation times, workstations, information controlling production orders such as type of confirmation, type of scheduling, costs etc.. Just as BOMs in a classic approach to building basic data in discreet production processes, every manufactured product has at least one routing which shows production method.

In ERP systems under the term Work Service there is information about human resources or machine resources that take part in a production process . Working time of given resources is defined there, as well as costs counting method and the way they are ascribed, information about location and people responsible for a given device maintenance, data influencing capacity planning and scheduling process.

Work centers are used in task list operations and work orders. Task lists are for example routings, maintenance task lists, inspection plans and standard networks. Work orders are created for production, quality assurance, plant maintenance and for the Project System as networks.

A production version determines which alternative BOM is used together with which task list/master recipe to produce a material or create a master production schedule. In a production version, you can maintain the combination of BOM and routing. For one material, you can have several production versions for various validity periods and lot-size ranges.

The concept of minimizing master data in the production planning process

The process of minimizing master data in the production was presented on the example of real planning process , implemented in one of the biggest polish enterprises operating in energy industry. During concept works it was observed that there is a need for integrating an ERP system SAP with software for cutting machines. Cooperation with an external system which to a better extent optimizes sheet metal cutting in comparison to standard ERP System, results in dividing the process into two production orders. Both orders are created in SAP, but the first is improved and verified by SigmaNest system (Sheet metal cutting order), second order is fully managed by ERP. The division of process into two production orders requires master data (BOM, Routing, work center and production version) to be created in SAP system for every production stage – cutting (SigmaNest process) and further processing (after cutting process).

The fact, that creating master data used in this production process is very labor-intensive, has forced the author to make an attempt to minimize the data by means of a model based on CDP (characteristic dependent planning) terminology. This functionality allows to run a record as a part of one material index, a lot of SKU, distinguished by their unique characteristics (e.g. one index established in SAP with its features like color, length, etc…can be distinguished as a few variants of the same product. In Planning based on CDP the system books/plans/consumes only the products which have the same values of characteristics. E.G. if red colour is a part of bike's characteristic and this feature is repeated in a bike's component – a frame, then the system will only consume/plan the materials with the same value of characteristics (in this example the colour red). The pattern of CDP functionality in production orders in the examined enterprise is presented below.

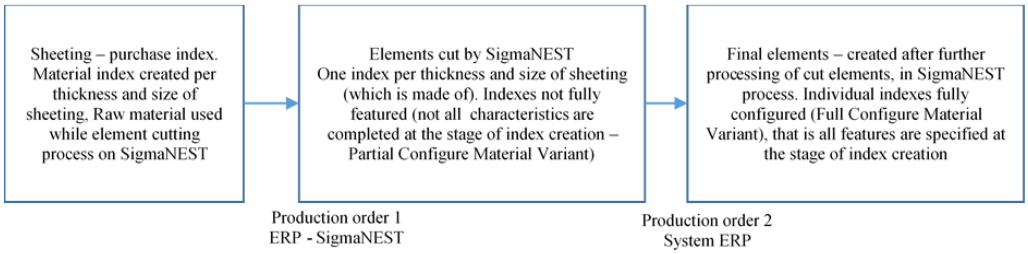

Fig. 1: A production process pattern and master data in ERP –SigmaNEST production process
Source: Own elaboration

Index materials created after the second production order are in system S4HANA identified as fully configured material variants (FCMV) having unique characteristics in the class 400 (it means that all features of those material indexes have their values because of that there is no need to create individual material index for every material combination variant). Indexes started as semi-finished products are materials with characteristics, but these characteristics have not got any values. While planning finished products, the system, based on objects dependencies, passes features from superior positions to products which are the components of the second production order (semi-finished products) and in the same time which are a final product on SigmaNEST (the first production order).

Tab. 1: Characteristics for Finished products

Characteristics	Description
CTT00001	Finished Product number
CTT00002	Semi-finished Product number
CTT00004	Initial sequence in routing
CTT00006	Time of initial sequence in routing
CTT00003	Planned amount of sheet metal
CTT00005	Alternative sequence in routing
CTT00007	Time of alter. sequence in routing

Source: Own elaboration

Tab. 2: Characteristics for Semi-finished products

Characteristics	Description
CTT00008	Finished Product number
CTT00002	Semi-finished Product number
CTT00010	Initial sequence in routing
CTT00014	Time of initial sequence in routing
CTT00013	Planned amount of sheet metal
CTT00005	Alternative sequence in routing
CTT00007	Time of alter. sequence in routing

Source: Own elaboration

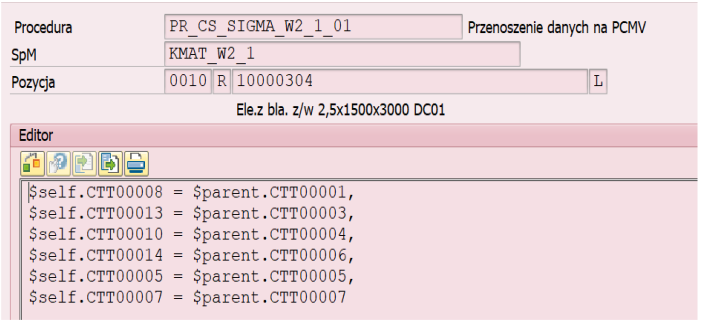

Fig. 2: An example of object dependency written in ERP dependency editor

Source: Own elaboration

Thanks to this approach while planning a final product A, which in its features has a specific semi-finished product included, out of which it should be made, the system chooses a correct semi-finished product giving it all necessary features from a final product. The semi-finished products become fully featured only when the production order is placed for a final product (going through a planning procedure CDP). This method results in the fact that it is not necessary to make individual material indexes for every semi-finished product variant. The correspondence of features created in the planning process is also ensured by an appropriate pegging, which tells what materials are needed for planning and production.

The process of CDP procedure, created characteristics and object dependencies allow to pick correct technological routes and times. The characteristics like CT0004, CT0006, CT0005, CT0007, CT0010, CT0014 controls the choice of a proper machine in routing and the time planned in the production order.

If $root.CTT0004 specified and $root.CTT0004 = '01'
Then select Laser Kimla machine
Else
If $root.CTT0004 specified and $root.CTT0004 = '02'
Then select Laser FL004
…
End if

Object dependencies saved at the level of BOM and routing (so called super structures) do not require to create individual BOMs and routings for every material index . The system based on features and object dependencies can pick and create new master data (BOM ad routing) which will be used individually in the production order.

Results

As a result of created characteristics and object dependencies model and the use of CDP functionality (Planning based on products characteristics) it was possible to minimize master data needed for cutting and further product processing in the examined company. The charts show real master data reduction in the process.

Tab. 3: The number of master data before the implementation of CDP model

Number of finished products	Number of semi-finished products	Number of BOMs	Number of routings
22.341	22.341	44.682	44.682

Source: Own elaboration

Tab. 4: The number of master data before the implementation of CDP model

Number of finished products	Number of semi-finished products	Number of BOMs	Number of routings
22.341	**105**	**22.342**	**22.342**

Source: Own elaboration

Every reduction in master data is a lower risk of making mistakes while creating it, shortening the time for the whole process (not need to wait for creating additional data) and reducing the time needed for implementing the whole process. This approach is possible to be implemented in other companies, not only while integrating ERP with other systems. Object dependencies (in which we specify the form and the way the information is passed from upper to lower levels) and planning based on characteristics (CDP) allow to minimize master data significantly in the production area.

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Marketing Channels for Organic Products: A Cross-National Analysis in The European Union

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Abstract

This article is a cross-national analysis of the marketing channels concerning the organic market from the European Union. The analysis is carried out on the organic markets in Austria, Denmark, France, Germany, Italy and the United Kingdom, countries that at the end of 2017 were in the first positions regarding the size of the organic food market. The article highlights the competition between general and specialized retailers, as well as how their importance evolves over time and in relation to the size of the total organic market. Thus, it is noted that in most of the analyzed countries the importance of general retailers increases over time if the organic market grows in turn, thus managing to weaken the strength of specialized stores or even to stop their growth. However, against the backdrop of a spectacular growth of the market, in France, the specialized organic stores continue their ascent with approximately the same proportion as the general retailers. The article proposes a link between the evolution of the market size and the importance of marketing channels, this topic being a basis for future research.

Keywords: Marketing Channels, Organic Food, Distribution, European Union.

Introduction

The organic food market in the European Union is constantly growing, amid increasing consumer interest for pure, non-counterfeit and sustainable products. The scandals in the food industry (the bovine spongiform encephalopathy crisis - BSE in the United Kingdom, E. coli infections in Germany, the dioxin scandal, etc.) have partly contributed to the development of the organic food market. However, the improvement of marketing channels has played an important role in promoting the purchase of organic products (Canavari, et al., 2007), the distribution being considered a key factor for the growth of the organic sector (Haas, et al., 2010).

Distribution of Organic Products

The distribution of organic products involves choosing the marketing channels in a way that minimizes the damage done to the environment (Arseculeratne & Yazdanifard, 2014; Eneizan, et al., 2015) and the physical distribution, to ensure the availability of the organic products to the customers interested in the problem of environmental protection. Distribution is a key element in attracting the right customers for organic products. Moreover, Singh and Pandey (2012) consider that customers will not go out of their way to expressly buy green products; where possible, products should be distributed through main outlets so that they won't be available just to a small niche market of green consumers. From the consumer perspective, the essential value offered by the distribution process is convenience. Through their efforts, retailers and service providers will seek to bring together a wide range of goods and services in a way that makes them widely available (for example, by importing organic fruit outside the season) and easily accessible (for example, via 24/7 store operation) (Peattie & Belz, 2010).

Marketing channels for Organic Products

Designing and choosing marketing channels is the first decision to be taken by the company. This involves determining the fundamentals of the distribution strategy, more precisely the decision regarding the basic mode of distribution for the organic products (Vicente Molina & Ruíz Roqueñi, 2003). The increase in the number of organic products consumers has also led to changes in the level of marketing channels and thus, it began to be used other channels than the specific ones to these types of products (Ottman, 2011) (see Table 1).

Table 1: Marketing channels for organic products

Marketing channels	Type of trader
Direct channels	box schemes, community-supported agriculture (CSA), peasant markets, farm shops, door-to-door sales, fairs and fair exhibitions, online marketing
Indirect channels	General retailers: hypermarkets, supermarkets, hard discounter, proximity store, traditional store, etc.
	Specialized retailers: specialized organic stores, specialized health food shops, organic supermarkets
	Emerging channels: Ho.Re.Ca (hotels, restaurants, cafes), public institutions (canteens, schools, hospitals, army)

Source: based on Corsi, et al., 2009; Park, 2009; Atănăsoaie, 2011.

The dimensions of the marketing channel are influenced by a series of specific factors regarding the product and the market, but also by the resources and the capacity of the organization. Many manufacturers have realized that each link in the distribution chain compromises the quality of the products, which triggers a shortening of the distribution channel (Espino & Bolívar, 2002, cited in Vicente Molina and Ruíz Roqueñi, 2003). The use of a direct marketing channel generates lower distribution costs, reduces the impact of the organization's distribution activity on the natural environment and gives the company greater control over the distribution activity (Seyfang, 2006). In addition, companies can be distinguished on the market by creating and managing direct marketing channels, whose quality performance is superior to the competition (Vicente Molina & Ruíz Roqueñi, 2003) and through which they can maintain a stronger connection with the final customer, due to the lack of intermediaries (Atănăsoaie, 2011).

On the other hand, in the case of choosing indirect marketing channels, the organization has the distribution of organic products through general and specialized retailers. The distribution of organic products on a large scale is considered as part of a wider strategy aimed at appealing to those consumers interested in green consumption (Oosterveer, et al., 2007). Even if supermarkets are not in the best position of trust, regular consumers of organic food, whose choices are related to their specific values, are willing to enter into a process of negotiation with themselves and, according to circumstance, they end up renouncing to these values for the convenience of the one-stop-shop (Padel & Foster, 2005). Thus, mass marketing of organic products involves selling within a price range that a significant segment of consumers would be willing to pay, without giving up the traditional basic attributes of the product (functionality, ease of use, reliability, etc.) (Izagirre-Olaizola, et al., 2013). Instead, specialized stores adopt marketing strategies different from those of large retailers. They are based on: (1) a specialized assortment of products that focus on the preferences of their regular loyal customers; (2) local and regional products at lower prices due to direct purchases from producers; (3) higher prices for national or international products, due to lower economies of scale and higher administrative costs; (4) a direct relationship with the consumer; (5) qualified personnel providing advice; (6) additional services for customers (e.g. hot lunches); (7) the ability to arouse customers' interest in ethical and environmental issues and (8) more own brands than the manufacturer's brands (Haas, et al., 2010).

Marketing channels for organic products in the European Union

Estimated at over €34 billion, the EU organic food market accounts for 37% of total worldwide sales. Consistent growth continued in most markets in 2017, some countries (such as France and Denmark) reported exceptional growth. However, it should be noted that there are significant differences in the EU between countries in terms of market size and per capita consumption (Willer & Lernoud, 2019). These differences can also be seen in the distribution of sales of organic products across different marketing channels.

In most European countries, non-specialized retail chains have played and are still playing a crucial role in the development of the organic market. Offering environmentally friendly products for retail channels results, in most cases, in the sale of significant volumes brings profitable economies of scale (Haas, et al., 2010; European Commission, 2010). However, the EU has the largest concentration of organic food retailers in the world. Most are located in Germany, France, and Italy (Willer & Lernoud, 2019).

In countries with a tradition of organic food consumption, on-premise marketing channels, such as catering and food service sector that serve organic food, are beginning to grow in importance. For example, public procurement of organic products (for catering in schools, hospitals, etc.) reached 33% of public consumption in Sweden in 2018 and 20% in Denmark (EU Agricultural Markets Briefs, 2019). There is also a growing number of restaurants, cafes, bars and canteens that uses organic ingredients and/or serve organic products.

In the countries of the EU where the share of organic products does not represent a significant percentage of the total food market (Romania, Bulgaria, Poland, Hungary) there are still significant problems regarding the availability of the products, and the supply of products is generally limited.

Research Methodology

The purpose of this study is to identify the importance of marketing channels for organic products in the EU market. This paper focuses on the analysis of the main marketing channels used in 6 countries in the EU (Austria, Denmark, France, Germany, Italy and the United Kingdom) for the marketing of organic products to consumers. The analysis is based on the total sales of organic products registered on each main marketing channel. In particular, indirect marketing channels are presented, focusing on general and specialized retailers, for which there are data on sales evolution.

The study uses statistical materials published by FIBL and IFOAM, as well as those available in the FIBL database. The time frame of the data is 2015-2017, for which sales were available on marketing channels in the analyzed countries.

Results

The Importance of Marketing Channels for Organic Products

In most of the analyzed countries, sales of organic products are made by more than 50% of general retailers, except France, the country where a significant part of sales is registered through specialized stores (see Figure 1). Also, according to data presented in the EU Agricultural Markets Briefs (2019) in many EU countries, including Austria and Denmark, general retailers dominate the market for the distribution of organic products, accounting for over 75% of sales. The report notes that the distribution structure appears to be related to the share of green products in retail areas: while green products are an integral part of the shopping basket for many Austrians and Danish people, they are widely accessible and easily accessible through the conventional distribution chain.

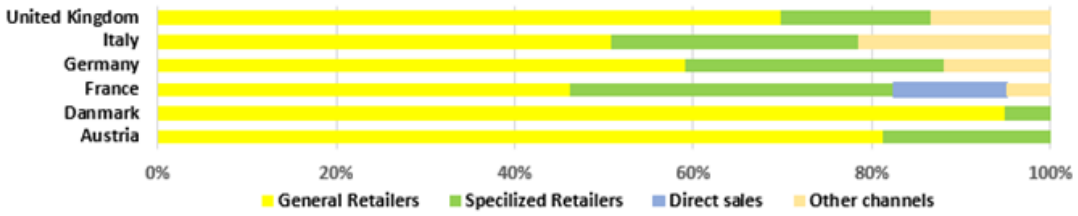

Fig. 1: Share of organic retail sales of different marketing channels (based on retail sales values) in the case study countries (2017)

Source: based on FiBL-AMI survey 2019, cited in Willer & Lernoud, 2019.

The increase in sales of organic products through general retailers was the result of changes that have occurred at the market level over time. Thus, the decision of retail discounters to offer organic food increased the sales volume and the competition for the specialized organic retail sector, especially in the mature European organic markets (Van Osch, 2008, cited in Haas, et al., 2010). Therefore, organic stores were forced to focus on their core competencies and on adopting niche strategies (Haas, et al., 2010).

However, the channel of organic grocery stores has continued to expand at the European Union level. Besides, the opening of specialized supermarkets offering only organic products has been a trend in many EU countries for several years (Haas, et al., 2010; Willer and Lernoud, 2019), this being the answer to increasing the customers' concerns for healthy food.

Evolution of the importance of marketing channels, in relation to the evolution of the total market

Based on available data on marketing channels (see Figure 2), it appears that most of the organic food in many EU countries is sold by general retailers, as a result of the fact that organic chains are integrated into the mainstream food chains (Sanders, et al., 2016). However, it must be recognized that detailed statistical data on the importance of alternative sales outlets for organic food (i.e. such as farm shops, farmers markets) remains limited.

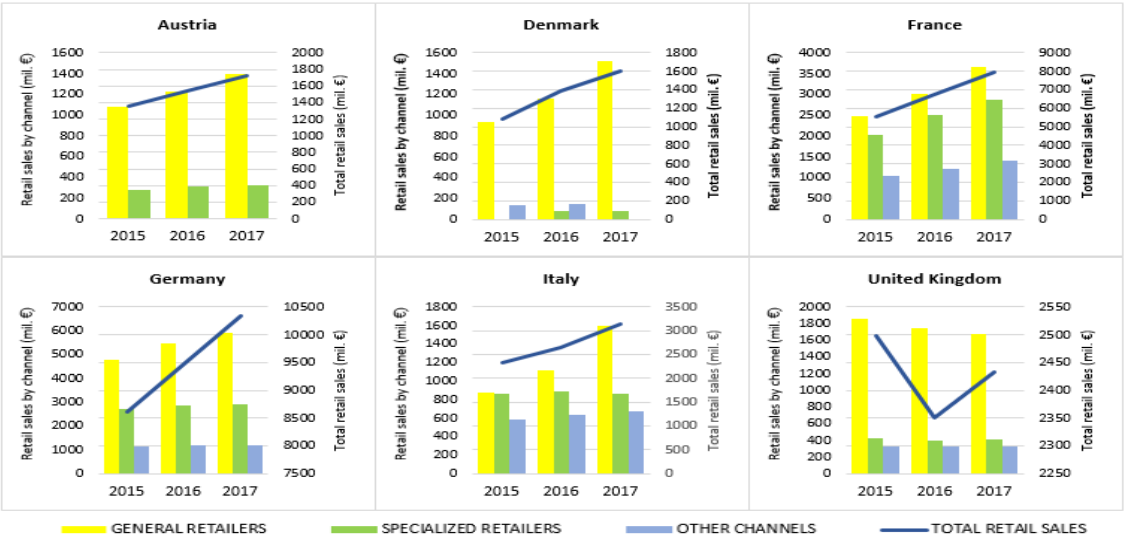

Fig. 2: Growth of marketing channels for organic products 2015-2017, in the case study countries

Source: based on: Austria: AMA Marketing, Denmark: Organic Denmark, France: Agence Bio, Germany: Arbeitskreis Biomarkt,Italia: AssoBio/Nomisma, United Kingdom: Soil Association, cited in Willer&Lernoud, 2017, 2018, 2019; FiBL, 2020.

France is a country where there is strong growth of the market for organic products. Unlike most European Union countries, specialized retailers play a very important role in the market, registering increasing sales every year. Notable is the presence of Biocoop, which has 400 stores throughout France, and total sales in 2017 amounted to $870 million (Journo, 2018). It is also noted that other marketing channels have a higher share of total sales, compared to the rest of the analyzed countries.

In Austria, the REWE retail chain was a pioneer in the organic market, when it introduced its own 'Ja natürlich' green brand in 1994 (Haas, et al., 2010). The major proportion (over 80% in 2017) of organic products is sold through general retail chains, while over 15% are sold through specialized food stores. While sales volume in general retailers is steadily increasing, sales of organic products through specialist stores are stagnating.

Denmark is the first country that in 1987 implemented a regulatory framework for organic farming (Willer & Lernoud, 2019), being today at the top of the consumption of organic foods worldwide. The market is dominated by general retailers, with over 95% of the sales of organic products being registered within the sales areas owned by them. The rise in sales in general retailers is constantly increasing, the value of sales increased by more than 60% from 2015 to 2017 (from €940 million to €1521 million).

In Germany, the organic market entered into a transition period. Supermarkets have become the engine for development, after the market was built and dominated mainly by specialized stores (Haas, et al., 2010; Willer and Lernoud, 2019). In recent years, general retailers have strongly entered the market, managing to have a market share of about 60% by the end of 2017, while specialized retailers are more and more facing competition. It is estimated that there are more than 2,400 eco-friendly retail stores in Germany (Emily & Rehder, 2017). In 2014, 33% of all organic products were sold in organic stores and this number decreased to 29% in 2017 (Willer & Lernoud, 2019).

In Italy, in 2015, the sales of general retailers were at the same level as those of specialized stores (over 800 million euros), but the evolution in the next two years was radically different. Sales of general retailers nearly doubled, while sales in organic stores remained at the same level. It should be noted that in Italy there are more than 1,200 shops specialized in the marketing of organic products (Organic-market.info, 2018), which means 1 store for 50.500 inhabitants. The largest chain is NaturaSì (2020), which had at the end of 2019 over 270 specialized stores.

The most important sales of organic products in the United Kingdom are registered through general retailers. Discount shops, such as Aldi and Lidl, set the agenda for organic products among supermarkets (Soil Association, 2019). Also, the United Kingdom's organic market continues to be dominated by three major supermarkets - Sainsbury's, Tesco and Waitrose (Soil Association, 2019). The specialized stores represent less than 20% of the sales made on the market, being at the same level between 2015-2017.

Conclusions

A breakdown of the different market channels shows that their relative importance differs from country to country. The similarity lies in the fact that in all the analyzed countries the non-specialized retail chains are in the first place in terms of sales of organic products. However, Italy, France and Germany are the only countries where organic food products are sold in a significant proportion through specialized retailers, with a high number of specialized stores on the market.

This analysis should be extended to all countries of the European Union (in the event of data existence), and especially to countries with a market for organic products at the beginning of the road, in order to identify the structure of marketing channels. It is also important to study the changes in the structure of distribution channels on a market, over several years.

Future research should study the hypothesis that once with the development of the market, the importance of general retailers is increasing, while specialized networks are slowing down, stagnating or even falling off, as we can observe in the conclusion of this analysis.

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The Development of The Market for Luxury Goods in China Until 2025

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Abstract

The macroeconomic perspective on China is that the country will maintain growth momentum by transitioning from an investment - led economy into a consumption - driven and service - driven economy by 2030. This aspect has also affected the luxury goods market, which is growing every year. This trend will be continued until 2025. Various studies in this area are available on the market, but the author of the text, not only based on his many year's experience of cooperation with Chinese consumers and representatives of companies operating in the People's Republic of China, will address the most important key issues that initiated rapid the development of the luxury goods market in China as well as will influence its further growth until 2025. The author of the text will answer questions, including how China's internal policy enables the development of the luxury goods market, how and why a new generation of Chinese consumers are powering the global luxury market, and the double-edged sword they present to the world's leading luxury brands. How will global companies influence sales growth and development of this market in China, taking into account the growing consumer expectations regarding the product, price and brand recognition itself. The author put the question if Chinese consumers are able to be the largest buyer of luxury goods by 2025? The article shows that Chinese consumers are set to contribute more than two - thirds of global growth in luxury spending and how Z generations, will power the Chinese luxury market by 2025.

Keywords: Asia, growth factors, consumer market, emerging markets, economies luxury market.

Introduction

Growing at a pace far surpassing expectations, spending by Chinese consumers on luxury products now exceeds that of any other country. Having leapt past Japan's luxury market, which until recently was the world's largest, China has become the paramount driver of growth in this sector, with purchases by Chinese both at home and abroad accounting for 33% of the global in a research study by D'Arpizio, Levato, Prete, Del Fabbro and Montgolfier (2019). China's current economic slowdown has caused the growth rate in the country's luxury spending to subside recently, and another factor leading some consumers to become warier is heightened concern about corporate gifting to government officials. Despite the recent slowdown of economic growth in major markets including China, the Eurozone, and the US, the luxury goods market looks positive. The US' recent adoption of protectionist policies, the implementation of fiscal policies, tighter monetary policy, and restrictive trade policy have resulted in slower consumer spending, higher consumer prices, and disrupted global supply chains. The outcome of Brexit[1] will undoubtedly have an effect on the Eurozone and beyond. The further deepening of the trade struggle between the US and China will be important for the development of the market in China and USA. Other factors impacting the future of the global luxury market include the digital revolution and the impact of technology, the growing global middle class and the influence of Millennial HENRY`s (High - Earners - Not - Rich - Yet) and Generation Z (Gen Z): the customers of the future on the development of the luxury market. China has 12% share in the global billionaires' assets[2] mentioned Hoffower (2019). In China, billionaires live mainly in Shenzhen and Guangzhou. The

[1] The UK's strategy to leave the European Union.
[2] Number of billionaires: 285 Estimated assets: $ 996 billion.

number of billionaires in this country has fallen due to, among others, the US - China trade war, volatility in emerging markets and the weakening of global growth [3] mentioned Hoffower (2019). China is still on the top of the list of billionaires since years.

The Chinese economy slowed down in 2018 for the first time in 28 years. Despite this, luxury goods sales grew in mainland China, as well as, abroad, and Chinese consumers now lead to the consumption of luxury goods both at home and outside. China ranks second globally for the contribution its travel and tourism makes to the GDP, in 2028 it is forecasted to account for 12.9 percent of GDP mentioned Turner (2019). China has transformed itself socially and economically over the last 40 years, as a result of huge financing support by the government. Since then, more than 700 million Chinese people have come out of poverty thanks to this policy, and another 30 million are to be lifted out of poverty by 2020/2021. This has resulted in a high debt to GDP ratio, a structure, which is clearly unsustainable and in need of policy reform. The protectionist policies of the US are a major threat to the economy, and as a result, China is taking steps to insulate itself from the export market. Made in China 2025 is an initiative to make China self-sufficient and a tech powerhouse in the research study by Jalowiecki (2018).

Indeed, the luxury segment remains robust, amid a continuation of a trend in premiumization that has seen sales of premium cars and premium beer, as well as prestige beauty products, outperform the wider market. Young Chinese consumers view ownership and affiliation with designer brands as a form of social capital; not just something to wear, but a lifestyle choice that marks them as part of a distinct and exclusive community. That community is constantly being refreshed via a glittering stream of online content, keeping pace with which demands consumers are “always on", immersed and engaged in a digital world that is nothing short of a way of life. the majority of these young consumers are fresh to the market, presenting both a tantalizing opportunity and an implicit imperative for brands to stay current, or risk losing out to more digitally savvy rivals. What’s more, while some fashion houses excel at various aspects of online marketing and e-commerce, even the most popular luxury brands have yet to establish a comprehensive presence across the digital ecosystem. Consequently, opportunity abounds as brands seek to engage the attention of consumers in the world’s most lucrative and fastest-growing luxury market.

China delivered more than half the global growth in luxury spending between 2012 - 18 and is expected to deliver 65 % of the world’s additional spending heading into 2025, according to research based on UnionPay transaction data mentioned Nayyar and Ingilizian (2018). In 2018, Chinese consumers at home and abroad spent 770 billion RMB ($115 billion) on luxury items - equivalent to a third of the global spend -with each luxury - consuming household spending an average of 80.000,00 RMB per year. Their outlay is set to almost double to 1.2 trillion RMB by 2025 when 40 % of the world’s spending on luxury goods will be conducted by Chinese consumers (Figures 1). That growth will be primarily driven by an explosion of upper-middle-class households, the population of which will rise at a compound annual growth rate of 28 % from 2018 to 2025, taking the total number of people in China earning between $2.600,00 and $3.900,00 per month per household to 350 million. China’s affluent class (households earning above $3.900,00 per month) will almost triple to 65 million people during the same time period in the research study by Jalowiecki (2018)). The majority of them, about 70 %, in fact, will be doing their luxury spending overseas, a result of an increasing affinity for outbound travel and the price differential resulting from China’s import tax regime and brands’ own pricing policies. However, that ratio may shift in favor of domestic spending as a result of moves to cut luxury import taxes mentioned by Nayyar and Ingilizian (2018). While some luxury brands have posted disappointing results due to weak China demand, the likes of LVMH, the world’s largest luxury group, and Switzerland’s Richemont, owner of Cartier, reported their China sales accelerated in the final quarter of last year in a research study by Hammond, David and Nair (2019). This is in keeping with the notion that luxury in China is a winner-takes-all market, a tendency best reflected in the composition of the country’s fashion market. As explored in State of Fashion 2019 report, the vast majority of fashion-industry profit in China is secured by the top 20 percent of companies, creating a polarized

[3] Number of billionaires: 285 Estimated assets: $ 996 billion.

market dominated by a subset of "super winners." The same can be said for luxury, placing the onus on brands to stay at or near the top of the market or risk sliding into irrelevancy in the research study by Amed, Balchandani, Beltrami, Berg, Hedrich and Rölkens (2018 p.11.). This demands an aggressive yet flexible approach, particularly as we expect macroeconomic headwinds will eventually take a toll on wealthy Chinese consumers, or at least the value of their assets.

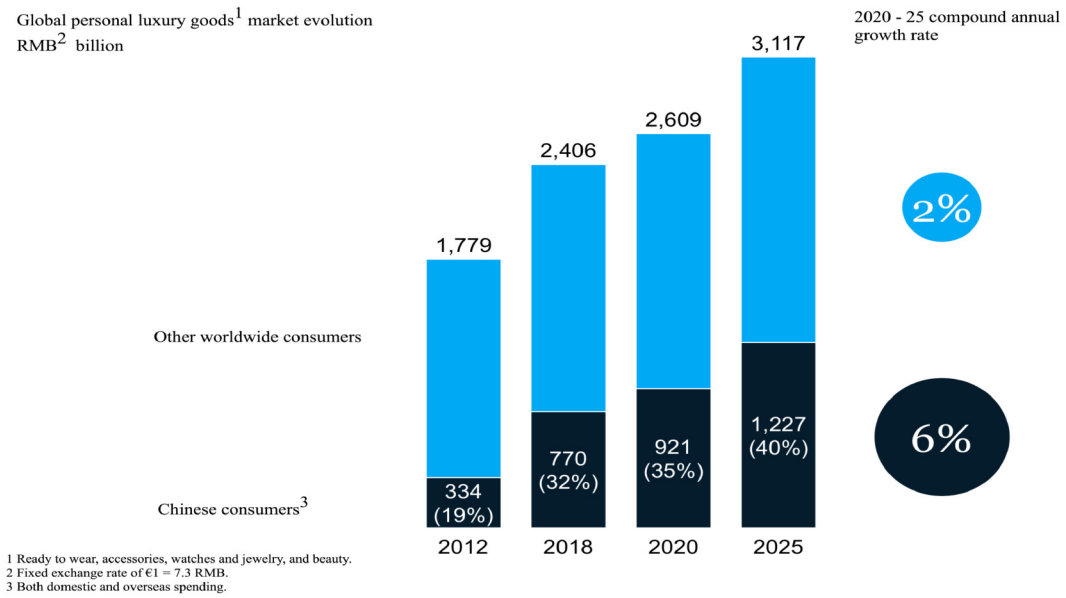

Fig. 1: Global personal luxury goods market evolution including Chinese consumers.

Based on the research study by Luan, Kim and Zipser (2019), by D'Arpizio, Levato, Prete, Del Fabbro, Montgolfier (2019)

Young luxury consumers in China

China's'80s (born in the 1980s) generation, who broadly map to Generation Y, are the driving force of the country's luxury demand. Consisting of 10.2 million luxury consumers, they accounted for more than half the total spending on luxury by Chinese consumers in 2018 (Figure 2). Having grown up in step with China's emergence as a global superpower, they are the primary beneficiaries of the economy's rapid and unbroken growth and spend an average of 41.000,00 RMB per person each year on luxury. Now, at the peak of their career and earnings, and with a passport likely stamped with trips to the world's most glamorous cities, they are spending to show off their success, and to demonstrate individualism in the world's most populous urban landscape. Following in the footsteps of their slightly older peers, China's post-'90s consumers, better known as Generation Z, are delivering the shot in the arm China's luxury market needed to emerge from several years of stagnant growth. Enticed by luxury streetwear and other product lines targeted squarely at their demographic, the post-'90s consumers spend 25.000,00 RMB a year on luxury goods, already as much as their parents - the post-'65s/'70s generation popularly referred to as Generation X. The post-'90s consumers are the vanguard of China's urban middle- class, a dynamic and digitally engrossed cohort that as the "single child generation" are

the recipients of an outsize level of familial support in the research study by Amed, Balchandani, Beltrami, Berg, Hedrich and Rölkens (2018). Two - thirds told us their parents support their luxury spend, with McKinsey Global Institute modeling suggesting that upper-middle - class Chinese families top up their post-'90s children's bank balance by at least 4.000,00 RMB per month, or half their personal income. This financial cushion has a large impact on these young consumers' willingness to spend, and spend big, on luxury.

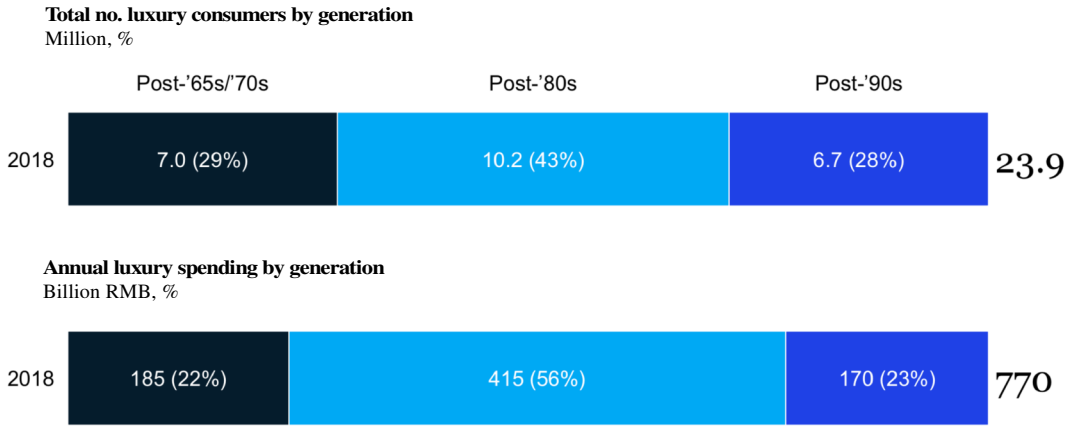

Fig. 2: The largest luxury spending group in terms of both consumer numbers and total spending.

Based on the research study by Luan, Kim and Zipser (2019), by D'Arpizio, Levato, Prete, Del Fabbro, Montgolfier (2019)

Young consumers in China are new to the luxury market, and thus have a less nuanced understanding of the heritage upon which the market traditionally trades. Only 13 % of post-'80s/'90s luxury spenders said they grew up in a family familiar with the finer things in life, while half of the post-'90s, and 31 % of post-'80s consumers, only made their first luxury purchase in the last year (Figure 3). Luxury is also a relative novelty for many of the post-'65s/'70s group - just under half bought their first designer item less than three years ago. Nine out of 10 of the youngest generation and more than two - thirds of post-'80s consumers, also only started their engagement with luxury within the last three years. Instead of legacy reputations established over hundreds of years in Europe, these new luxury consumers are influenced more by what is happening right now, leaving ample room for brands with the right strategy to shape their tastes (Global Powers of Luxury Goods 2019). Young consumers want to show off with luxury brands. They are indebted to show their status among the people who are well off. It is also worth noting that young Chinese do not have any inconvenience. An older group of consumers reduces their savings. Younger generations will be the primary engine of growth in the coming years. Generations Y and Z will represent approximately 55% of the 2025 luxury market and will contribute

130% of market growth between now and then, offsetting a decline in spending by older consumers in the research study by Amed, Balchandani, Beltrami, Berg, Hedrich and Rölkens (2018, p. 23.)

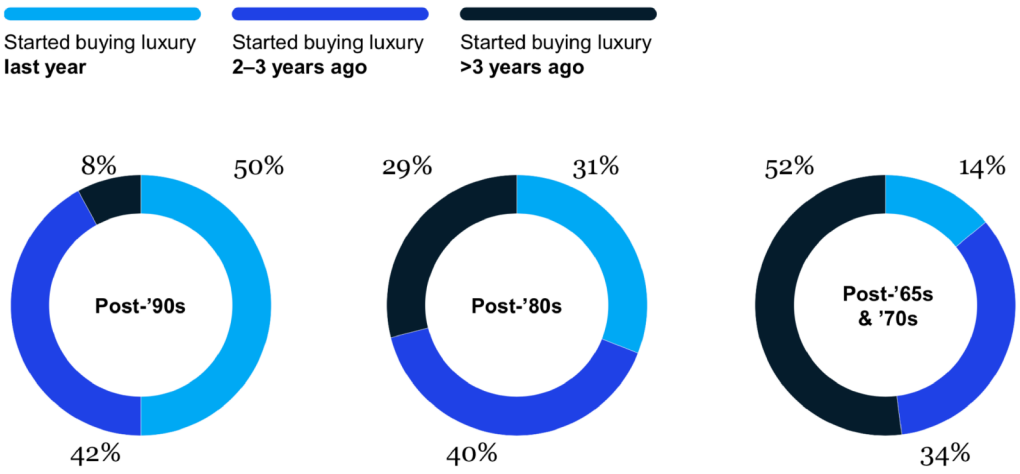

Fig. 3: Chinese consumers buying of luxury goods.

Based on the research study by Luan, Kim and Zipser (2019), by D'Arpizio, Levato, Prete, Del Fabbro, Montgolfier (2019)

Luxury products help young consumers in China feel distinct from the people with whom they live in their cities. They see luxury as a form of social capital that helps mark them apart and achieve personal and social goals. That sentiment intensifies towards the younger end of the spectrum, with well over half the sample, and almost 70 % of post-'90s consumers, showing they buy luxury to "feel different rather than fit in with society." Buying luxury is also a way to convey and enjoy a shared social experience and value system - a lifestyle and community that lives and breathes luxury, online and in the flesh (Figure 4). Young consumers' consumption of media and the luxury lifestyle it portrays is consequently heavily social and trend dependent - a desire to be seen or snapped in the latest styles drives consumption, and with it a need for brands to constantly update their styles or leverage creative marketing to create the illusion of newness. More than 3/4 of young consumers in China are interested in buying iconic styles thus most are easily recognizable, with the trend most prevalent among the post-'65s/'70s consumers. Indeed, the concept of a niche brand has multiple meanings across luxury segments, from one that exhibits unique design to those that are a niche in the sense of being rarely seen on the street, or simply not available in mainland China. In any case, China's luxury market has yet to develop the widespread sophistication necessary to sustain demand for truly niche or boutique brands, as has been the case in the West. The brand remains king when it comes to informing taste across all our surveyed generations, but is relatively less important for younger consumers. For example, the brand was the top reason for the last luxury purchase among 68 % of the post-'90s consumers, compared with 94 % of the post-'65s/'70s consumers (Figure 4).

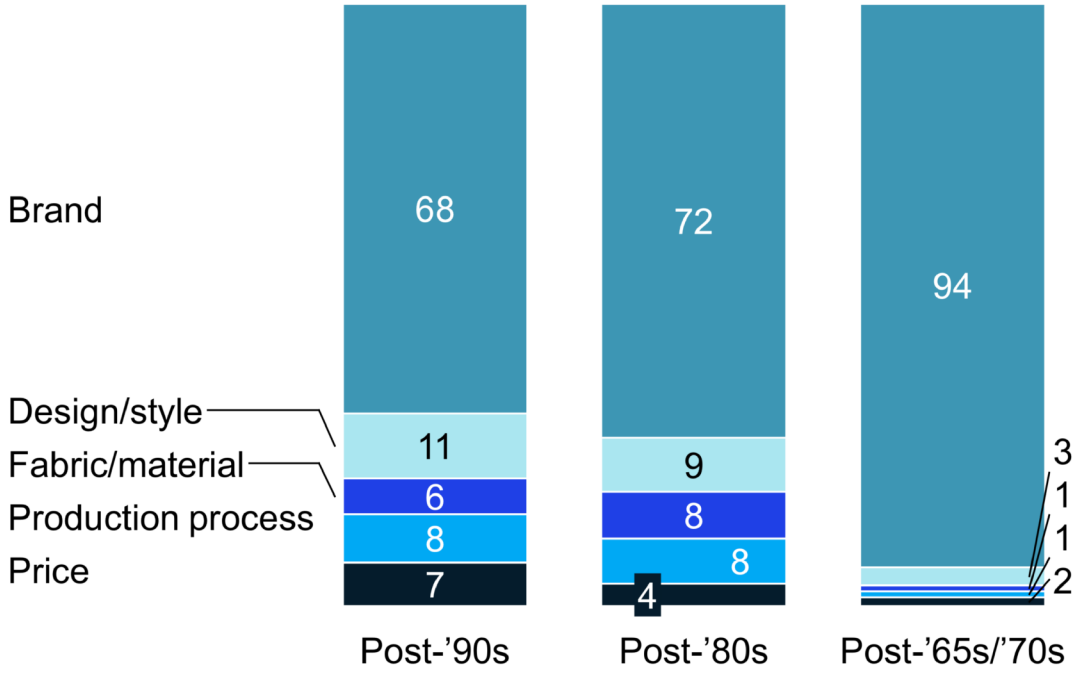

Fig. 4: Top reason for last luxury purchase by generation.

Based on the research study by Luan, Kim and Zipser (2019), by D'Arpizio, Levato, Prete, Del Fabbro, Montgolfier (2019)

Brand loyalty tends to be higher among the older generation, some of whom are likely to be VIPs for various brands as a result of several years sharing their insights with peers as key opinion leaders. The overwhelmingly social nature of luxury consumption in China acts as a catalyst for consumers to learn about and share an appreciation for craft; younger consumers, in particular, tend to value design, fabric, and the production process. Young consumers prefer foreign luxury brands, particularly those from France and Italy, closely followed by Great Britain, with Japanese and American labels also more appealing than homegrown luxury alternatives. In fact, post-'65s/'70s consumers have no interest in buying Chinese luxury brands, but there are signs that such negative perceptions about domestic players are beginning to fade: one in ten post-'90s consumers said they would opt for a high-end Chinese brand, and this likely will increase in the near future as Chinese brands gain greater prominence.

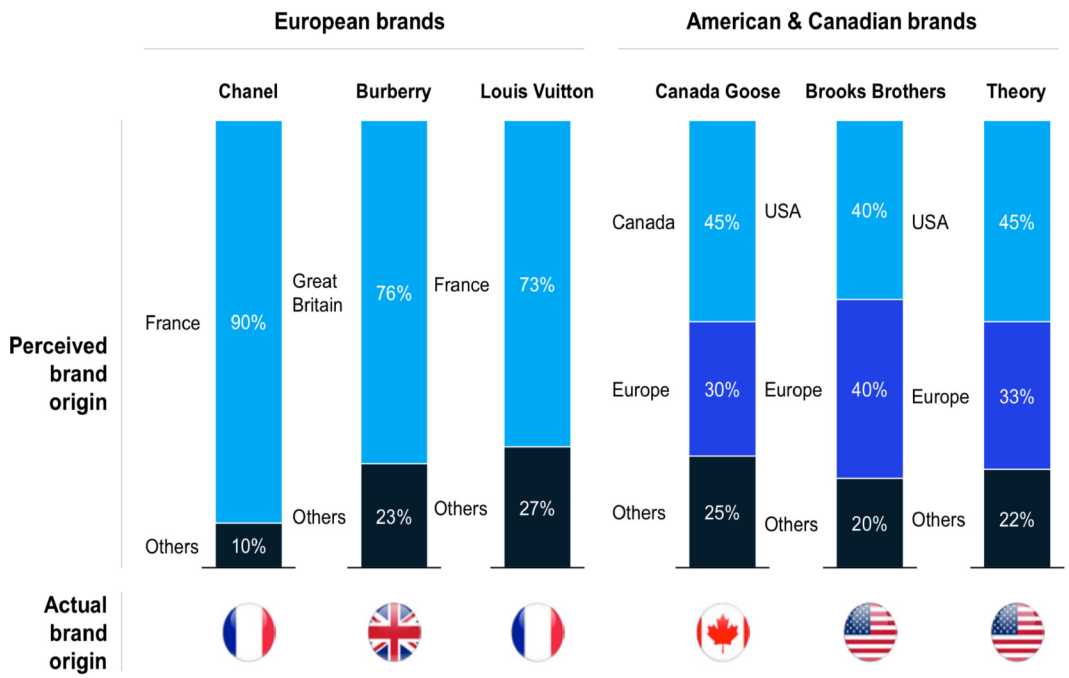

Fig. 5: Perceived country of origin vs actual country of origin.

Based on the research study by Luan, Kim and Zipser (2019), by D'Arpizio, Levato, Prete, Del Fabbro, Montgolfier (2019)

For the time being, it is European brands that command the greatest recognition, and which are most strongly desired by consumers. Less than half of the consumers were able to correctly name the country of origin for selected American and Canadian brands (Figure 5). Young consumers are loyal not to brands per se, but to iconic brand - product combinations.

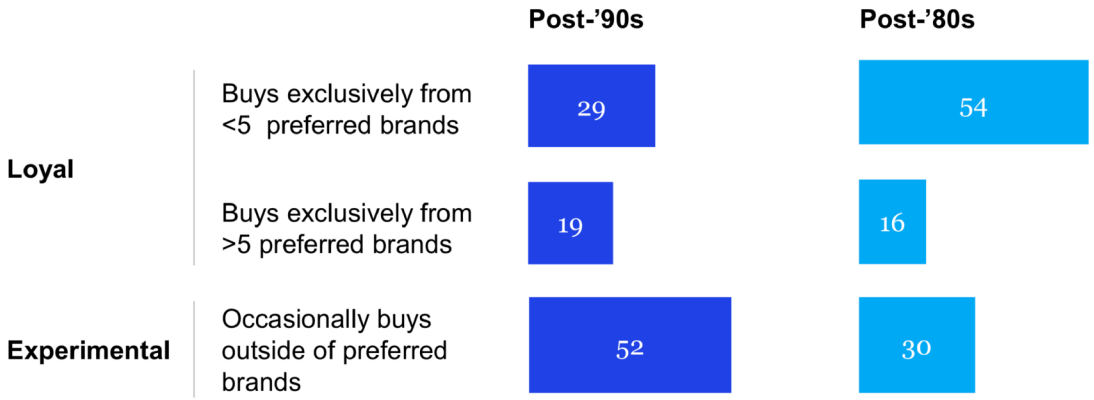

Fig. 6: Brand basket and loyalty of consumers.

Based on the research study by Luan, Kim and Zipser (2019), by D'Arpizio, Levato, Prete, Del Fabbro, Montgolfier (2019)

Everything is media, social is everywhere being relatively new to luxury, Chinese consumers are constantly tapping various forms of content as they strive to improve their awareness of the market. Chinese consumers consult a mix of online and offline sources during the three to five hours per week they spend absorbing information on luxury and fashion, with every single one saying they were exposed to digital influence at some point in their customer journey (Figure 7). At every touchpoint, from e-commerce to in - store, and of course through social media, consumers are seeking to pick up information about the latest luxury products, the celebrities who promote them, and the lifestyles they embody. Only traditional ads fail to command the avid attention of consumers, according to our research (Figure 8).

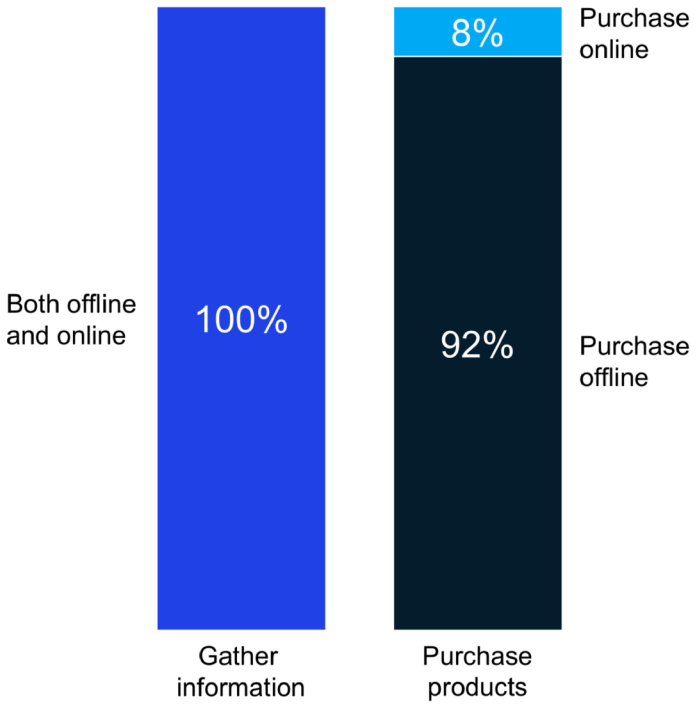

Fig. 7: Information and channel preference of Chinese luxury consumers.

Based on the research study by Luan, Kim and Zipser (2019), by D'Arpizio, Levato, Prete, Del Fabbro, Montgolfier (2019)

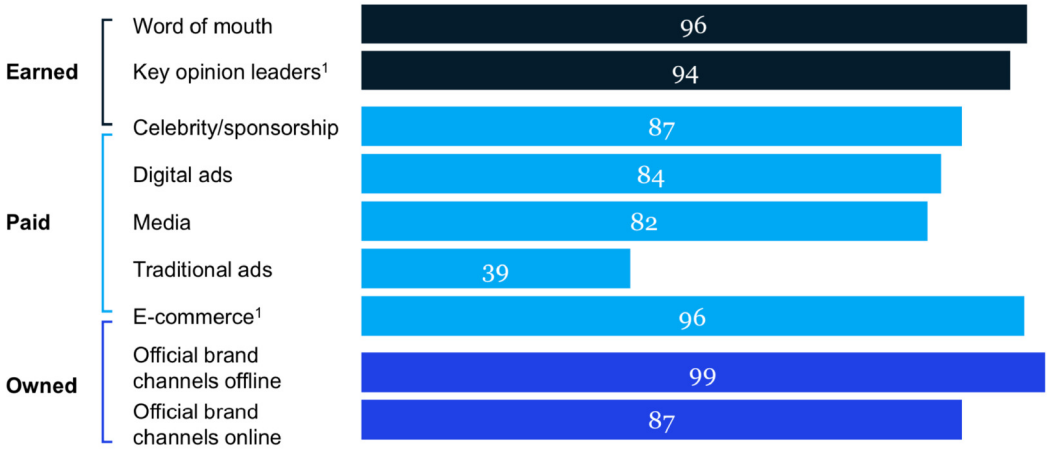

Fig. 8: How Chinese consumers got information about new luxury brands.

Based on the research study by Luan, Kim and Zipser (2019), by D'Arpizio, Levato, Prete, Del Fabbro, Montgolfier (2019)

Despite their affinity for digital discovery, in-person experiences in brand stores are the most impactful when it comes to making a purchase decision for nine out of ten young Chinese consumers (Figure 9). Chinese consumers leverage brands' official channels for information, paid and earned avenues offer a means for brands to differentiate, particularly those trying to expand their reach or alter their image. In keeping with their experience in luxury as social capital, word of mouth is the most commonly accessed source of information on new luxury brands. These channels include cross-border commerce offerings, commonly referred to as Daigou (Bloomberg News 2019). E-commerce, whether third-party or owned, plays a uniquely important role in gathering information. Consumers use e-commerce platforms to source facts about products, as well as reading peer reviews and product experiences. Post-'80s/'90s consumers rely significantly on the kind of online commentary that e-commerce sites provide. Consumer - to - consumer platforms like XiaoHongShu[4] (RED) also allow China's young luxury acolytes to share newly accrued knowledge by posting unboxing experiences, buyer's guides, wearing occasions, and anecdotes.

[4] See: https://www.xiaohongshu.com/

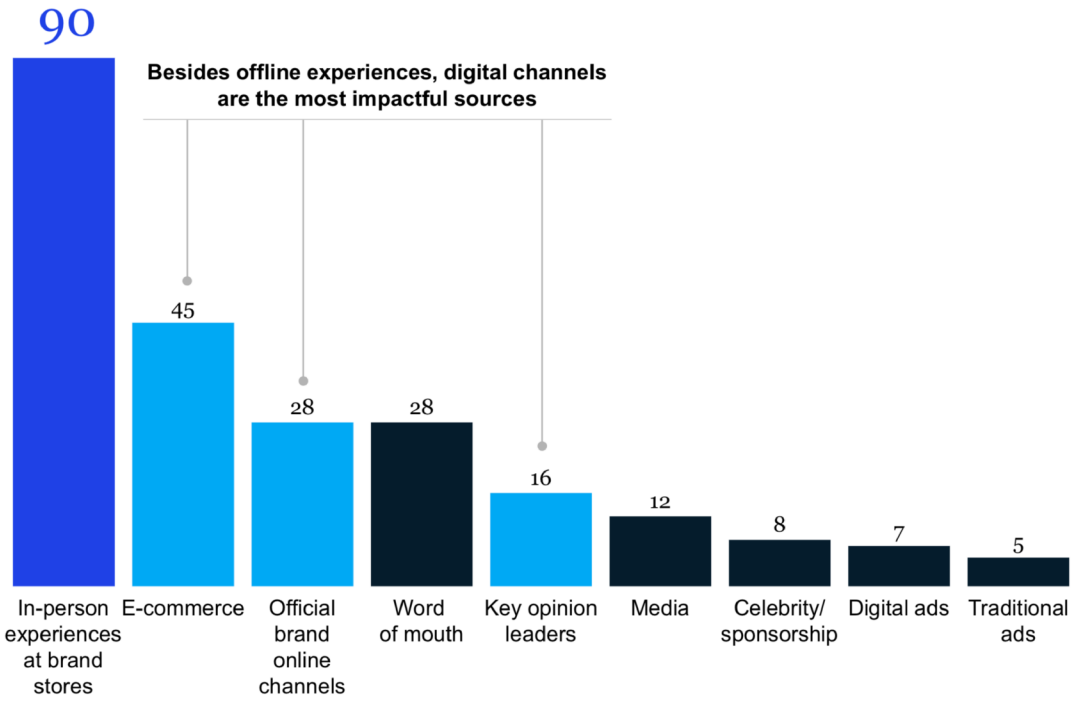

Fig. 9: How Chinese consumers got information about new luxury brands.

Based on the research study by Luan, Kim and Zipser (2019), by D'Arpizio, Levato, Prete, Del Fabbro, Montgolfier (2019)

KOL Kingdom Young Chinese luxury shoppers are heavily influenced by KOLs. Celebrities like Angelababy, Yang Mi, and Tiffany Tang, as well as fashion bloggers like Gogoboi, all play a major role in raising awareness of new products, as they command wider followings than brand-owned channels (Figure 10). They also serve to contextualize luxury products in daily life, making them accessible to the new luxury consumers that constitute the bulk of the China market. Tracking the media journey of Chanel's Gabrielle bag shows how, following the brand campaign launch, celebrity Yang Mi caused a stir by appearing with the bag on the WeChat channel of Mr. Bags[5], another influential Chinese fashion blogger. High-profile local KOLs then took up the reins, serving to deconstruct global high fashion into easily understandable chunks, before a long tail of approximately one million amateur influencers localized the product for consumers all over the country. Successful brands consequently employ a portfolio approach to KOL engagement: working with celebrities and influencers with varying degrees of star power, a trend that has spurred the emergence of online platforms that assist brands with finding suitable KOLs. LV, for example, works closely with a core group of brand ambassadors with global reach such as Chinese - Canadian star Kris Wu[6] but hires others on an ad hoc basis according to the needs of individual events or product launches. The brand also leverages partnerships with KOLs like Mr. Bags, who managed a Beijing pop - up store for a day, and Gogoboi

[5] See: www.mrbags.com 包先生 Mr. Bags.
[6] Kris Wu (吴亦凡).

(Generation T 2019), who ran the brand's Weibo account during the 2017 LV Fashion Week, to help introduce products to the widest possible audience.

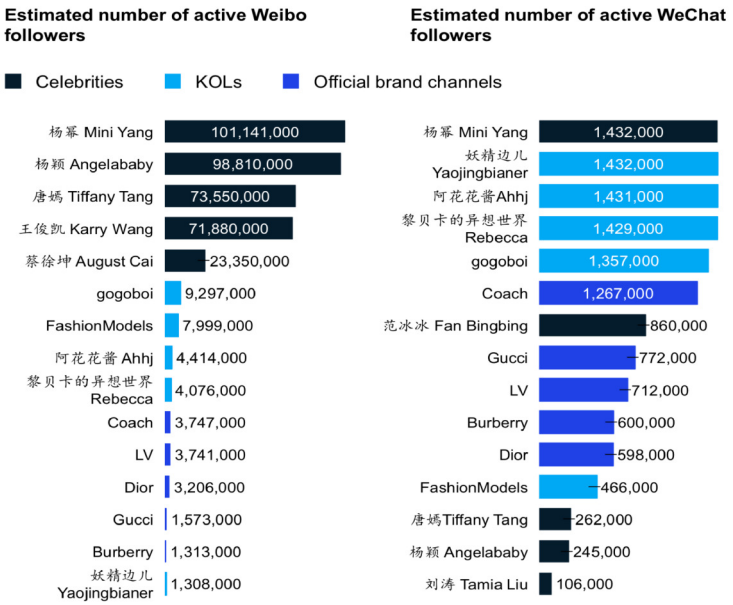

Fig. 10: How Chinese consumers got information about new luxury brands.

Based on the research study by Luan, Kim and Zipser (2019), by D'Arpizio, Levato, Prete, Del Fabbro, Montgolfier (2019)

While WeChat remains the foremost platform for branded media, it is also increasingly used to drive interactive consumer engagement, both through official accounts and through mini-programs within the WeChat ecosystem that host interactive digital games and other experiences such as product trials, service reservations, consumer advice, and more. Other platforms like Baidu, Douyin, and Alipay are now establishing their own mini - programs. Moreover, pioneers are pushing into new mediums such as video-sharing app Douyin, also known as TikTok. American fashion brand Michael Kors partnered with KOLs to create a series of catwalk videos in various city streets, before challenging users to follow suit via their Douyin accounts. The campaign generated 200 million views for the more than 30.000,00 user - generated videos submitted. Successfully launching new products thus requires that brands adopt an omnichannel approach that drives a high level of consumer engagement, demanding new creative campaigns on a regular basis. This flow of paid and earned media coupled with multiple opportunities for consumer engagement helps cement a product's iconic positioning in the digital firmament.

Summary

The imperative for global brands is to become the leading form of social capital for China's young luxury consumers and stay there. This demands an "always - on" approach centered around a rapid cycle of new and refreshed product launches that intimately intertwine with ready - to - go viral media, including "sticky" nicknames and innovative campaigns. Newness and exclusivity could also be fostered through launching limited - editions, collaborations with KOLs and influencers, and hosting

an annual calendar of special events, particularly around art and fashion. China's young luxury consumers are more interested in aspiration than heritage, making it imperative for brands to modernize their stories and deliver them through digital channels. Savvy brands should design an integrated marketing strategy that satisfies young Chinese consumers' appetite for consuming media at every available touchpoint, whether they are online or offline, and whether they are traveling or staying in China. Local digital marketing teams should be empowered to make quick decisions and entrusted to experiment with the new media formats and channels favored by young consumers. Since the majority of luxury purchases are made offline, brands should also reimagine the in - store experience. Catering to young consumers' desire for personalization - to feel different and valued - is key, as is doubling down on the concept of the store as its own media channel. Brands would also be wise to invest in highly trained staff capable of maintaining one-to-one relationships with customers in and beyond the store, in effect becoming their personal stylists, backed by customized narratives and personalized product recommendations powered by AI. There is an unparalleled opportunity to tap demand for luxury among the affluent residents of China's lower-tier cities, most of whom remain underserved by brick and mortar stores. Instead of over-expanding store footprint, brands should devise a targeted travel retail strategy that captures these consumers on the move - and follows them home. Having done so, sales staff can maintain a long - term relationship with the consumer through astute use of WeChat and other social platforms. Reaching young Chinese consumers also requires a considered approach to e-commerce, one which cultivates a rich and consistent brand image on owned platforms, while making sharp choices over whether or not to reach for the eye-popping traffic on mainstream e-commerce platforms. Finally, as young consumers blur the line between engagement and purchase, domestic and overseas, and online and offline, the new battleground for luxury brands requires fundamental organizational transformation. This requires not only winning in digital, but also more seamlessly integrating business units across brands, functions, and regions.

As indicated in the study by Chinese consumers, I will be the largest recipient of luxury goods until 2025. Occurrence related to Coronarovirus in 2020 will have an impact on the reduction of purchases of luxury goods in China in year 2020, but the trend in Chinese purchases will continue until 2025. It would be necessary to thoroughly examine how companies producing luxury goods will cope with the lack of purchases by Chinese consumers and how it will maintain their position on the international market.

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The Business Sector Proactivity as An Economy Modernization Resource

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Abstract

Modern global processes require the implementation of modernization strategies by countries that belong to developing countries and transition economies. In this regard, the relevance of the search and implementation of the modernization strategy on qualitatively new grounds remains. Such a new strategy could be, for example, modernization based on the business sector proactivity. The revitalization of national entrepreneurship and its proactive focus can serve as a method of modernization. The success of such a strategy substantially depends on state policy. The article offers an analysis of the features of proactive strategies, as well as an analysis of the necessary public policy measures in the interest of increasing the business proactivity potential. The directions of adaptation of state regulation for the implementation of such measures are also considered. As an empirical illustration of the use of proactive strategies, the experience of the Rostov factory for agricultural machines («Rostselmash») combine plant is analyzed. This company specializes in the manufacture of engineering products. The work examines the elements of proactivity that the company demonstrates in the markets of Russia and the world. In conclusion, the article proposes measures to improve public policy in the interests of developing business proactivity, including: attracting business to the development of government strategies; the introduction of proactivity in the legislative practice; limitation of tax, tariff and other exemptions from the economy; support for investments focused on innovation and promotion in foreign markets; removal of restrictions on access to advanced technologies.

Keywords: Proactivity, Entrepreneurship, Government Regulation, Modernization.

Introduction

Globalization as a process of constantly changing the balance of forces requires companies and countries to implement strategies to maintain their global position. The tool for such strategies is modernization. Successful modernization strategies should ensure not only the preservation of the existing positions of companies and national economies, but also form their leading dynamics. Among the variety of modernization tools, strategies based on proactivity can be distinguished. The qualities and properties of proactivity are studied in sufficient detail in relation to marketing and management. However, the study of proactivity can be considered in the context of developing strategies for the modernization of national economies. It is important to consider that the modernization of the national economy is based on the transformation of market sector strategies, as well as on the conditions that the state creates. Such a policy should fully take into account the potential for proactivity and provide conditions for the implementation of proactive business strategies. In addition, it is also relevant to introduce, in the interests of modernization, proactive elements in the activities of state bodies themselves.

Brief Literary Review

Theoretical ideas about the key features of business proactivity are a prerequisite for the analysis of modernization strategies at the level of countries and regions. It takes into account that proactivity is characteristic, first of all, for the business sector. At the level of government, it can also occur, but to a much lesser extent. The analysis of proactivity as a mechanism of modernization includes taking into account the conditions of business proactivity formed by national culture and state regulation.

The modern theoretical substantiation of the concept of proactivity is based on the research of such authors as Frankl (1990), Covey (2011), Allport (2002). The development of the concept of proactivity takes into account the importance of proactivity as the personal quality of entrepreneurs, according to Bonnet and Pape (2008), as well as the relevance of a proactive approach to risk management and the analysis of entrepreneurial orientation of a business (see the work of Matthing et al (2004).

The characteristic features of proactive corporate strategies are their proactive nature, the element of predicting the situation and leading actions as an element of such strategies (this distinguishes such strategies from reactive ones that are designed to give an answer to the threats and risks that have already arisen), according to Business Dictionary…,Parker (2010).

Proactivity is seen as an approach that provides flexibility and competitiveness for companies, as well as economies where such companies are well represented, as Accelerating organizations ...says.

Current research on proactivity focuses on a number of key issues. In view of the close connection between the proactivity of companies with personal qualities, proactivity is the subject of research in articles on the characteristics of the entrepreneur's personality, factors of psychological stability, according to Bande et al (2016), Bhaumik et al (2017), Chakraborty et al (2018), Strauss et al (2015). In addition, proactivity is considered as a field of education, and is also analyzed from the point of view of gender.

In business research today, the sphere of environmental policy and related corporate standards of responsibility are important, the implementation of which is associated with the application of proactive policies by companies (see, for example: Marco-Fondevila et al (2018), Carballo-Penela and Castroman-Diz (2015), Ibe et al (2015). Proactivity is also studied as a modern feature of environmental management.

Today, research on proactivity also affects management technologies per se, including entrepreneurship, risk management, and sales management, according to Pereira-Moliner et al (2015), Glaser et al (2016).

It is important that proactivity as a concept and managerial approach is analyzed both in relation to management at the level of government institutions, as well as in relation to regional development, as it is underlined by Robert and Broman (2017), Park and Jo (2018)**.**

The empirical evidence of the effectiveness of proactive strategies on the example of the Rostov factory for agricultural machines («Rostselmash») is supplemented by an analysis of the advantages and risks of the company's interaction with the state during the implementation of the proactive development strategy.

The methodology of studying the impact of business activity on the modernization development of the Russian economy is based on the initial characteristics of the structure of the proactivity phenomenon.

Such an initial study of the structure of the proactivity phenomenon provides for the appropriate correlation of elements of business proactivity and economic modernization.

In the analysis of proactivity factors, special attention is paid to state regulation as a condition for the implementation of business proactivity vectors.

The next stage examines the practice of business (in particular, in the engineering industry, using the example of the Rostov factory for agricultural machines («Rostselmash») from the point of view of

implementing proactive strategies. So, the real policy of the company is compared with the conceptual structure of proactive business strategies.

At the final stage, the work includes an assessment of the risks associated with state support in the implementation of a proactive strategy.

The use of the deductive method of proactivity analysis made it possible to identify practical forms of implementing conceptual approaches, as well as risks and threats that may impede the implementation of appropriate strategies.

Business proactivity: key manifestations and conditions of implementation

As a result of its versatility, a proactive approach can be used by companies of various sizes in various fields - from production management and improving production processes to managing costs and the external environment of a company, as Bezdenezhnykh and Rodionov (2017) says.

In relation to competitors, proactive companies can be characterized as aggressive. However, this property also helps such companies better cope with crisis phenomena in the economy. So, if ordinary companies in times of crisis reduce the marketing activity, R&D, as well as the range of products, proactive companies, according to Tamas and Issues (2015), on the contrary, modernize marketing policies, engage in recruiting, optimize business processes, apply know-how, use crowdsourcing.

Both the scale of entrepreneurship in a particular economy and the realization of its proactive potential depend on national economic and cultural conditions.

In this regard, for example, Sang and Peterson (2000) draws attention to the culture of countries, which leads to differences in the development of entrepreneurship. The reason for the differences is the attitude to the structure of society, hierarchy, job preservation, inequality, individualism and collectivism that is special for each culture.

However, in addition, the presence of macroeconomic incentives for entrepreneurial activity in the economy is of great importance. As an important component of such conditions, for example, UNCTAD calls growth strategies based on domestic demand, as Trade and .. (2013) says. This is possible if the incomes of the population, which are the main source of domestic demand, are maintained and increased. In addition, private investment and public sector spending are driving domestic demand. The growth in the consumption of domestic goods and services is forcing local producers to invest in production capacities. Investment growth contributes to the creation of additional jobs and wage growth, which increases demand, tax fees and public investment.

The state takes the most active role in creating the conditions for entrepreneurship and the formation of its proactive focus. On the whole, two directions of changes in state policy to stimulate business proactivity can be pointed out: reducing its activity in a number of areas while simultaneously increasing its presence in a number of other areas.

In order to encourage proactive business strategies, the state must take into account the role of innovation as a tool for proactivity. Such activities of companies can be implemented in different ways and include: identifying the hidden needs of markets, customer satisfaction, attracting users to model the format of goods and services. In addition, the state must, according to Willis (1985), be competent in protecting rights, especially in the intellectual field.

Ensuring the availability of resources that may be required to implement proactive company strategies includes, for example, a stimulating tax policy, favorable monetary conditions, and a competitive exchange rate mentioned by Trade and .. (2013). In addition, government support for R&D and education, labor mobility, and the import of complex components that are required for the innovative development of companies is important.

On the contrary, government activity should be reduced where it interferes the availability of resources that companies can use to implement proactive modernization. In addition, the use of resources by the state itself should be limited, which reduces the available balance of resources in the markets and increases their value.

So, we can talk about the need to reduce bureaucratic regulation, which generates unproductive time spent on the implementation of regulatory requirements. Here we can mention the need to limit (both in volume and in time) subsidies of companies and regions, since such subsidization is also a factor of unproductive fixing of resources. An important condition for the formation of public policy is its flexibility, as well as the prevention of the risks of turning direct government support into a permanent "rent", mentioned by Trade and .. (2006)

Thus, state regulation not only determines the activities of the market sector and the formation of incentives and resources for the implementation of its proactive strategies, but also forms the modernization development vectors and the status of economies.

The proactive modernization development vectors' formation and implementation (illustrated by the Rostov factory for agricultural machines («Rostselmash»)

The modern practice of managing business processes in market economy demonstrates the companies' proactive behavior possibilities in various business environments. As an example of the proactivity elements spectrum formation, we can consider the the Rostov factory for agricultural machines («Rostselmash», headquarters in Rostov-on-Don in the South of Russia), which is a structural element of the «New Commonwealth» multinational corporation (which also includes «KLEVER», «Buhler Industries Inc.» and others) and occupies a dominant position in the agricultural machinery production in Russia (70%) and a significant share of the world market (17%).

«Rostselmash» includes 13 enterprises located at 10 production sites in 5 countries today. The product line includes more than 150 models and modifications of 24 types of agricultural machinery. In total, by 2019, «Rostselmash» products will be delivered to 50 countries of the world, the company's sales and service network includes more than 500 divisions. «Rostselmash» supplies machinery to 39 countries and is the main supplier of agricultural equipment for agriculture in Russia (mentioned in: About the …).

Due to the agricultural sector's importance in Russia, «Rostselmash» operates in conditions of increased state attention. At the same time, the state regulation conditions are essential for the given plant as well as for other companies.

Speaking about the macroeconomic conditions of the company's development, it should be noted that both the recession in demand in the Russian economy after 2013 and the limited investment are relevant for it. So, according to the Russian Federal State Statistic Service Rosstat, in 2014-2016 the depreciation of investments in Russia exceeded 10%, and it was not offset by the increase in investment in 2017-2018. The FDI surplus in the country's economy in 2014 decreased threefold compared to 2013, after which the average FDI balance during 2015-2018 remained even lower. Incomes of the population in the Russian Federation during 2014-2019 also showed a constant decline.

Resource mobility is also faced with restrictions associated both with the Central Bank's tight monetary policy (a decline in rates was observed only in 2019) and with a significant increase in the tax burden in the economy and investments nationalization. At the same time, the organizing public investment inefficiency has led to the fact that, for example, in 2019, 1 trillion rubles from the funds planned for expenditure was not spent from the state budget, a part of the funds (150 billion rubles) allocated to the National projects in the economy and social sphere, implemented in the country, was not spent.

Thus, there are significant restrictions on both the demand side and the resources availability (in particular, financial resources) that can be used in proactive strategies. The consequence of such restrictions was a decrease in the small and medium-sized business share in the GDP of the Russian Federation in 2017-2018 from 22% to 20,2% (according to Rosstat). This indicates that the opportunities for implementing flexibility and proactivity are retained mainly by the large companies, which is illustrated by the «Rostselmash» example (see Table 1).

Table 1: The proactivity vectors in the Rostov factory for agricultural machines («Rostselmash») policy (compiled from the research materials and the data from the company (see the data in Gontar and Sapozhnikova (2019), About the…)

Proactivity Vectors	**Reflection in the policy of** the Rostov factory for agricultural machines («Rostselmash»)
Creation, search and implementation of innovations, including those involving R&D	Introduction of qualitatively new product lines, production and management technologies Serial production of the ACROS family machines since 2007 In 2014 - a global platform for opening a new agricultural machines galaxy production In 2017 - access to the Agrotronic remote monitoring and control system (developed by «Rostselmash»). Creation of a remotely operated combine harvester, testing an interactive assistance system for the operator in selecting the optimal combine settings «Rostselmash» is the official technical partner of WorldSkillsRussia - the national championship "Young Professionals", the organizer of the agricultural engineering innovative technologies student competition (AEITSC)
Creation, search and expansion of sales markets	In 2005, an innovative rotary threshing and separating device was introduced in Paris (SIMA). In 2018, 2 world records of «Rostselmash»tractor performance were set (RSM 2000 and RSM 1000). TORUM 2nd generation machines, new electronic systems RSM Explorer and RSM OptiMax are presented. Participation in international exhibitions (Kazakhstan), CIAME (China), Moldagroteh (Moldova), AGRO SHOW (Poland), Agro Planta (Romania).
Spatial expansion	Since 2007 - the agricultural machinery manufacturer assets acquisition Buhler Industries Inc (Canada), the tractor production start, the VERSATILE brand presentation. In 2009 - the inclusion of the following sites in «Rostselmash»: for the production of sprayers (Canada), the production of equipment for transshipment, processing and grain storage (USA). In 2011 - the acquisition of equipment production for sowing and tillage (Canada). The full range equipment formation for the entire cycle of agricultural work.
Attention to staffing, including retention in a crisis	Since 2012 «Rostselmash» has been supplying universities with educational materials, equipping classrooms (in 40 leading agricultural educational organizations in Russia), providing agricultural equipment for practical training, paying scholarships and organizing student internships Corporate University - a project within the company («Rostselmash»);
Improving the product line (offering goods and services), including interaction with customers	Since 2004 - the VECTOR family combine harvesters' introduction In 2008 - the release of trailed and mounted equipment for fodder procurement, for processing and storage of grain In 2009 - the start of production of new families of self-propelled agricultural machines In 2016 - the output of fodder harvesters based on the global platform (RSM F 2650). In 2017 - a new tractor building was put into operation; a full cycle of tractor production was launched (model RSM 2375); the release of the new NOVA compact cars. Start of wide adapter production (more than 12 m).

Thus, the in the Rostov factory for agricultural machines («Rostselmash») combine plant is an example of a company with a wide range of proactive policies. At the same time, the strategic importance of the agricultural production sector in Russia determines the company's close interaction with government bodies.

So, the head of the «New Commonwealth» group of companies is the co-chair of the Moscow Economic Forum, heads the Soyuzagromash, the union of agricultural machinery manufacturers in Russia. The «New Commonwealth» Group of Companies concluded strategic cooperation agreements with the regions' Governments and their ministries of agriculture. In 2015, the Rostov Region (Rostselmash-based region) signed a cooperation agreement with the Federal Industrial Development Fund, which offers preferential terms for the co-financing projects' development of new high-tech products, technical re-equipment and the competitive industries creation.

The sales program today includes the state subsidies attraction (by the agency of the state-owned company Rosagroleasing). So, in 2018, «Rostselmash» tractors became cheaper for agriculture, depending on the modification, by 389 - 562 thousand rubles. The company extends a program to reduce the technology cost to the participants in two federal subsidy programs. In general, the cooperation of the plant and Rosagroleasing allowed delivering of more than 5.3 thousand units of «Rostselmash» agricultural machinery under federal leasing (in the amount of 25 billion rubles) to the regions of the Russian Federation. Under the "OPT 2.0 Program", over 50 brands of the company's products are available for purchase. In 2018 the acquisition of equipment by Russian farmers with the help of state subsidies increased by 47%. In 2019 the new leasing portfolio volume was planned at the level of 24-25 billion rubles; Rosagroleasing's plans included the specialized technical modernization programs launch for flax growing, viticulture, vegetable growing and gardening.

At the same time, reliance on subsidies (in the absence of sufficient solvent demand in the economy) is a risk factor. So, the discussion of changing the scheme of subsidizing the purchase of agricultural machinery by the farmers (the abolition of the federal benefits program, according to which the Russian budget allocated funds to the Russian producers of agricultural machinery, which become a discount on agricultural machinery) prompted «Rostselmash» management to declare the possible problems at the enterprise. The discount due to the federal budget reached, according to the program's terms, 15-20%, and 25-30% subsequently. «Rostselmash» and the St. Petersburg Tractor Plant (PTP) accounted for up to 78% of the program's funding, but with the new scheme, a reduction in the companies' market share is possible. The reduction in supplies and profits was considered by «Rostselmash» as a possible reason for the refusal to build a tractor plant in Rostov-on-Don.

Thus, in the absence of sufficient macroeconomic conditions, it is possible to speak about the importance of large producer reliance on direct state assistance to development, which also makes it possible to implement the elements of the proactive company strategy. However, it is also necessary to ascertain the companies' dependence formation on preferential regimes, and the potential decrease in business interest in improving the investment climate quality (trust, interest rates, rights protection, trade freedom, control functions, administrative burden, ensuring the possibility of companies pursuing a flexible policy within the framework of the proactive approach).

Conclusion

Thus, taking into account the characteristic features of proactivity as a resource and a factor of modernization, a productive construction of modernization strategies can be ensured by the market companies proactivity conditions and resources formation. At the same time, the state's function is to remove barriers to the business flexibility implementation (ensuring a sufficient amount of resources and exchange freedom). In this regard, it is possible to speak about the redesign importance, in particular, the modern Russian approach to economic regulation. In particular, the system of government incentive measures for proactive business strategies should include:

• business representatives' participation in the national development strategies development;

• prognostic proactive nature of legislative activity in order to create a system of delimitation and property rights protection in promising economy sectors;

• limitation of tax, tariff and other resources seizures from the companies focused on innovation and promotion in foreign markets;

• removal of trade restrictions denying business access to advanced technologies;

• a radical reduction in the reporting and supervisory burden on the economy (this work was started by the Russian Government in 2019 as a part of the policy to repeal obsolete regulations).

A research vector for realizing the business proactivity potential in this connection should be focused on the formation of a proactive state which activities are aimed at promoting business proactivity. This will provide the modernization problems' solutions, increase the innovative status and competitiveness of the companies and economy as a whole.

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Approach to The Narrative About Gender, Otherness and Violence Gender in Higher Education

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Abstract

The objective of this research is to investigate the narratives about sexual diversity in fourth and eighth semester students of the Antonio Nariño University Universities - UAN (South Campus), Minuto de Dios University Corporation - UNIMINUTO (South Campus) and Foundation Monserrate University - UNIMONSERRATE (San Antonio- South Campus). This issue appears due to needing to take actions and strategies in universities that avoid, mitigate violence and discrimination against young people belonging to sexual diversity in the higher education. This research project emerged as a need for knowledge about this topic in higher education, the first approach is to consolidate the narratives that have the students of teaching career. In this way, this study expected to found that the universities not facing this issue. Therefore, could require a particular management that allows reflection, critical thinking and analysis in the students to approach diversity from their own experiences as university students and as future teachers. In this sense, three categories of analysis were established: gender, otherness and gender violence which were established from one of the initial phases of the investigation. This research uses a qualitative approach mediated by ethnography and semi-structured interviews, it will achieve an approach to the undergraduate students of the mentioned universities, as well as the understanding how they develop, live and build their experiences. The project seeks to have positive impacts, one of them is to recognize the importance of talking point of view the gender in higher education, based on a pedagogy of care for teacher training, because this will allow to promote educational environments free of discrimination and violence.

Keywords: Gender, Otherness, Violence Gender, Higher Education

Introduction

This research project, which is in the process of collecting and analyzing results, has as a fundamental principle to carry out the recommendations made by UNICEF and the Ministry of National Education of Colombia in 2016 regarding the violence reported before different instances and other cases acquaintances who ended up in the suicide of many young people because of their sexual identity. It uses as a guiding axis the pedagogy of care, like that science of education that allows visibility, recognition, inclusion and adaptation in such a way that education is a scenario of peace and social transformation.

For this reason, more research is required to address this issue, one of them is to know the narratives focusing on the teachers in training of some private universities in the south of Bogotá; in order to evidence and promote inclusion (Narváez Gómez, 2014) based on the gender approach (Viveros & Rodríguez, 2017). Of this way we are looking eradicate discriminatory practices towards children and youth belonging to the LGBTI sectors within the universities considering that they are important context where the people can development of training academic, social, ethical and political. Appreciate the universities as scenarios where there is a traditional and modern cultural dynamics from the perspective of gender will allow to recognize the phenomena that occur there and how from research can mitigate aspects related to gender violence and learning and discussing around this issue during the university.

Metodology

The research uses a qualitative approach mediated especially by ethnography, discussion groups and interviews in order to achieve an approach to university students and understand the context in which they function, live and build academically. The project was developed in four phases, each under a methodological rigor that allows to obtain truthful, reliable and close to reality results. The first phase was a systematic review of the literature on the subject of gender in Latin America. The second was the elaboration and validation of the instrument that was used in semi-structured interviews with the study population. Third phase was the implementation of the instrument and systematization of the results and fourth phase analysis of the results, drawing conclusions in relation to the results obtained and the objectives set. All methods that the researches used were based on the literature and in this sense we approach to the phenomenon.

Results

Phase 1: Systematic review of the literature. A search of articles published in Scielo, Dialnet, Redalyc database was carried out since they are sources of information where most studies have been published in Latin America and Scopus because it represents and includes publication of articles in high-impact journal at the level international.

Phase 2: The design of the questions was carried out with the project researchers, who had as a guidance guide a matrix for the elaboration of questions, in it the conceptual information of each category and its indicators was organized in such a way that it guided the design of the questions The purpose of each of the questions was also established in this work tool, which

It allowed establishing a direction and clarity regarding the intentionality of the question regarding the categories of gender, otherness and gender violence. After that, a validation process was carried out that was divided into three stages mainly: validation by four experts, questionnaire adjustment, validation by expert discussion group, questionnaire adjustment, pilot test, questionnaire adjustment to finally have the guide questionnaire of the questions for the interview.

Phase 3: In this phase of the research project, interviews were conducted in three private universities with offices located in the south of Bogotá, Unimonserrate, Uniminuto and Antonio Nariño University, which, in each one, 10 interviews with undergraduate students of Fourth and eighth semester. The duration of the interviews on average was 35 min and in them it was possible to extract the information through audio recordings which later each were transcription.

Phase 4: In the last phase of the project, which is in execution, and consists mainly of tabulation and analysis of data through the technique of narrative analysis according to the principles of textual analysis discursive in the subjective language present in the answers of the students' interviews, which will allow to extract the relevant information and develop a reflexive and general analysis of the results found in the project.

Conclusion

The documentary review has allowed to establish some theoretical traces that are very well restricted in terms of their diverse senses in the face of the research problem. Gender is a human event that has been understood in analogous ways through time and different cultures.

The epistemological tension of the implications of gender acceptance moves, precisely, between the purely biological, and the conventionally socio-cultural, hence the difficulty of pointing out limits that could be taken into account in addressing the central research problem.

Gender violence is a system of power that is exercised in different ways in the university environment where victims mainly refer to women, homosexual and bisexual population; This means that the university education system must employ pedagogical strategies that integrate and attend to gender diversity.

The University and specifically the educational system recognizes a duality between the gender perspective man - woman on which it builds its policies and fundamentals of professionalization, leading to hegemonic views on the construction of identity.

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Effects of Financial Crises on Latin American Economies-Colombia Case and the SMES

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Summary

This article analyzes the most representative international financial crises in Colombia since 1990: the Asian crisis of 1997 and the Sub-Prime crisis of 2008 in the United States. Likewise, the impacts and their effects on national production in some Latin American countries are indicated. Finally, it is shown how financial literacy cushions the negative effects on small and medium-sized (SMEs), which are of vital importance in economic for its contribution to GDP and the generation of formal jobs.

Keywords: Financial crisis; financial literacy; GDP; SMEs.

Introduction

Economies have periods of growth, expansion and boom, as well as periods of slowdown and crisis, which occur over time as part of what in economics are called business cycles, which depend on internal and external factors, political, social, natural and demographic (Samuelson, 1967). Among the main causes for which the economies of the countries, both emerging and developed, are affected and present falls in national production as measured by the Gross Domestic Product (GDP), it has to do with what happens to the financial system and its crises, which are expanding rapidly given the degree of globalization and openness not only of an economic and commercial type but also of a cultural and technological type (Larraín and Sachs 2002).

The functioning of financial markets has been of great importance in explaining the falls in real activity, since in the last 200 years approximately 300 financial crises have occurred, the most critical being that of 1930, also known as the " Great Depression "and that of 2008 or" Crisis subprime ", (Machinea, 2009). This author also identifies the instability of the financial system as the main cause of financial crises.

In the development of this article, we present what happened in Asia at the end of the last century in Asian countries such as Malaysia, Korea, Indonesia, Thailand, among others, and that affected several countries, reaching as far as Latin America, including Colombia where they lived. a very strong economic recession (Cepal, 1998). Likewise, the mortgage or subprime crisis that broke out in 2008 in the United States is presented and expanded worldwide (Titelman, Pérez, and Pineda, 2009) and had strong impacts on the Colombian economy (Ocampo 2009).

From the lessons left in the last 22 years, SMES in Colombia and other Latin American countries should be able to make the best decisions in economic and financial matters, for which a certain degree of financial literacy and economic. In accordance with the above, it is desired to show what the effects of said crises were at the macroeconomic level in Colombia and on the economic results of SMES

Methodology

This article is a literature review on what happened in the aforementioned financial crises, which had strong consequences on the dynamics of the Colombian economy and on that of other Latin American countries, in order to identify the factors that make these economies in the presence of these crises and

what are their effects on small and medium-sized companies, which can use financial literacy as a tool to cushion the strong effects of these crises.

According to Guirao, Olmedo and Ferrer (2008), review articles "is a type of scientific article that without being original collects the most relevant information on a specific topic". In that order of ideas, first of all, inquiries are made about crises as part of a country's economic cycle, what is a crisis in the financial system and how it affects the general performance of a country or group of countries, that at a theoretical level, to At an empirical level, the causes, development and consequences of the two crises studied in this document are analyzed taking as a specific case what happened in Colombia.

As an additional analysis tool to the documentary review, it is presented through a table and a graph which were the effects of said crises in other Latin American economies, where it can be seen that the impact was generalized given the high interconnection of the markets and economies globally.

This research shows how even in Colombia and in other Latin American countries there are shortcomings in financial literacy issues, at the level of the general population, but also in people who are in charge of the administration and finances of small and medium-sized companies. Given this limitation of knowledge in this important area, financial literacy is proposed as a tool for SMEs to face financial crises and sustain themselves in the market over time, since many of them are born, but in less than five years are already out of the market.

Results

Stylized facts of the financial crises of 1997 and 2008 and framework

In Latin America, the financial crises of Asia in 1997 and that of the United States in 2008 have been the most important in terms of their negative effect on the economies of Latin America, as shown in Figure and Table 1, after these crisis the annual variation in GDP reflects slowdowns and in some cases falls in this important indicator of economic activity:

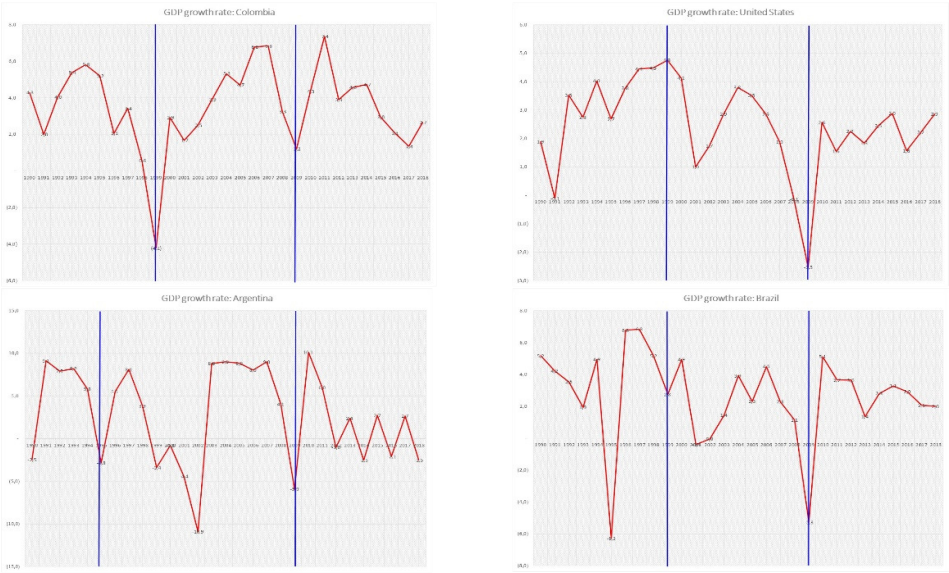

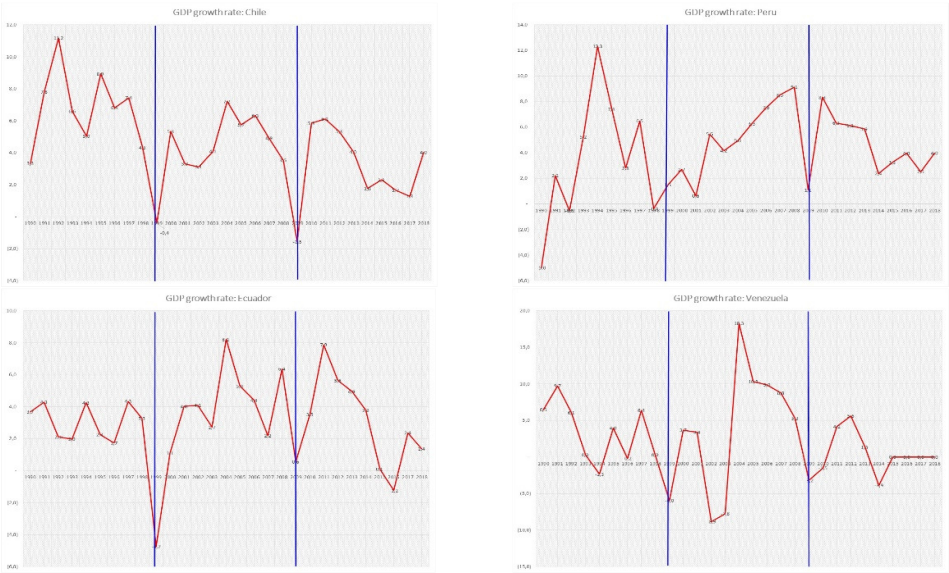

Fig. 1: Variation% of real GDP by country, own elaboration with World Bank data

Table 1 : Annual% change in real GDP, own elaboration with World Bank data

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Argentina	(2,8)	5,5	8,1	3,9	(3,4)	(0,8)	(4,4)	(10,9)	8,8	9,0	8,9	8,0	9,0	4,1	(5,9)	10,1	6,0	(1,0)
Brazil	4,4	2,2	3,4	0,3	0,5	4,4	1,4	3,1	1,1	5,8	3,2	4,0	6,1	5,1	(0,1)	7,5	4,0	1,9
Chile	8,9	6,8	7,4	4,3	(0,4)	5,3	3,3	3,1	4,1	7,2	5,7	6,3	4,9	3,5	(1,6)	5,8	6,1	5,3
Colombia	**5,2**	**2,1**	**3,4**	**0,6**	**(4,2)**	**2,9**	**1,7**	**2,5**	**3,9**	**5,3**	**4,7**	**6,8**	**6,8**	**3,3**	**1,2**	**4,3**	**7,4**	**3,9**
Ecuador	2,3	1,7	4,3	3,3	(4,7)	1,1	4,0	4,1	2,7	8,2	5,3	4,4	2,2	6,4	0,6	3,5	7,9	5,6
Mexico	(6,3)	6,8	6,8	5,2	2,8	4,9	(0,4)	(0,0)	1,4	3,9	2,3	4,5	2,3	1,1	(5,3)	5,1	3,7	3,6
Peru	7,4	2,8	6,5	(0,4)	1,5	2,7	0,6	5,5	4,2	5,0	6,3	7,5	8,5	9,1	1,1	8,3	6,3	6,1
Paraguay	6,8	1,6	4,2	0,1	(1,4)	(2,3)	(0,8)	(0,0)	4,3	4,1	2,1	4,8	5,4	6,4	(0,3)	11,1	4,2	(0,5)
Uruguay	(1,4)	5,6	8,5	4,5	(1,9)	(1,9)	(3,8)	(7,7)	0,8	5,0	7,5	4,1	6,5	7,2	4,2	7,8	5,2	3,5
United States	2,7	3,8	4,4	4,5	4,8	4,1	1,0	1,7	2,9	3,8	3,5	2,9	1,9	(0,1)	(2,5)	2,6	1,6	2,2
Venezuela, RB	4,0	(0,2)	6,4	0,3	(6,0)	3,7	3,4	(8,9)	(7,8)	18,3	10,3	9,9	8,8	5,3	(3,2)	(1,5)	4,2	5,6

Analyzing the data of the percentage growth of the GDP for the chosen countries, it can be inferred that the United States always had growth, except when the real estate bubble burst in 2008 where the GDP fell 0.1% and 2.5% in 2008 and 2009 respectively, a phenomenon that was not observed in other years of the study period contemplated here. When observing the figures it is also evident that countries such as Argentina, Paraguay, Uruguay and Venezuela, present shorter cycles where the fall in production is more frequent taking into account their particular economic, commercial and political structure, however all of them also coincide in to have a phase of economic recession after the crisis of the Asian countries and the real estate crisis except Uruguay, which by the end of the 2000s came with high economic dynamics and did not suffer significant impacts on its economy.

In the face of the crisis in the Asian countries, Brazil and Mexico presented a slowdown in economic growth, but no drop in GDP, contrary to the great impact of the 2008 mortgage crisis, since their production fell by 0.1% and 5.3% respectively, the great impact in Mexico given its proximity to the country where the crisis was born. In the case of Chile, in both crises its economic growth was affected, since for 1999 its economy decreased by 0.04% and in 2009 by 1.6%. Ecuador, like Colombia, presented a drop in production with the Asian crisis of 4.7% and a slowdown in productive activity after the collapse of the mortgage and financial market in the United States, in 2009 its growth was 0.6%, showing a slowed economy.

In Peru, the impact of the Asian crisis came in 98 and not in 99 since for that year GDP fell by 0.4, this result was also due to internal factors concerning mining and the phenomenon of children (Erdmann, Schulz, Richter and Rodríguez, 2008). For 2009, the year in which the subprime crisis hit most Latin American countries, production growth reached a level of 1.1%, showing signs of a slowdown in the Inca economy.

It can be concluded that the international financial crises of 97 and 2008 had a heterogeneous impact on countries in Latin America, since in some there were drops in production and in others not, however, the negative change in dynamics was evidence in almost all.

1997 Asian crisis and 2008 subprime crisis

The Asian crisis originated from "... The exhaustion of the Asian Miracle and the problems of moral hazard", the first refers to the extraordinary economic growth of these nations decades ago, and the second to the opportunistic behavior of financial entities which acted in a manner that their benefits were increasing while the interests of the users of said financial services were left behind (Clavijo, 2000). Esquivel and Larraín (1999) maintain that this financial-exchange crisis that occurred in Asian countries spread to Latin America, affecting the purchasing power of these countries

Regarding the crisis of 2008, Ferguson (2010), affirms that this crisis was conceived from the end of the 20th century, more specifically from the 1970s, when little by little the legislative power of this country began to deregulate the financial system and the transactions led to out on this. All this led to financial institutions making a series of risky investments that made savers lose their investments. At that time, loans were affordable to the entire public, especially mortgages that financed up to 99% of the nominal value of housing, with which house prices tripled, creating a bubble that, after the crisis, burst and left thousands of homeless americans.

The interconnection of institutions that offer financial services caused this crisis to spread rapidly and widely throughout the world, partly because of the so-called "financial innovation" as cited by Uribe (2011). Belda (2008) points out that the failure to pay these mortgages in the summer of 2007 was what triggered the crisis. This mortgage market underwent changes regarding its regulation in the nineties, with which there was a decrease in the supervision of said loans and gave rise to moral hazard. Something that also favored the increase in subprime loans was financial innovations when mortgage and commercial banks merged, the latter took the opportunity to expand with the benefit of not being subject to rigorous surveillance.

The undervaluation of risk, issued by risk rating agencies, played a role in this crisis, since they gave a rating of AAA to some risky investments. In the end, these rating agencies justified their opinion as an opinion that did not involve a numerical and qualitative methodology of rigor. The crisis erupted and several financial entities went bankrupt, including Lehman Brothers and Merril Lynch, and the Federal Reserve had to intervene by injecting millions of dollars into the financial system, so that its negative impacts would not be as dire as those of the Great Depression of 1929 Ferguson (2010).

Machinea (2009) points out that the instability of the financial system was the main cause of this financial crisis and that three factors influenced its great magnitude: firstly, the large size of the international financial system, which according to this author exceeds the GDP of developed countries, secondly the interconnection and globalization of financial institutions worldwide and lastly the penumbra regarding the information that financial institutions manage in the midst of their operation that knows no limits regarding their earnings and the product portfolio it offers. Chor and Manova (2012), point out that those companies with external sources of financing that were seriously affected at the time of the crisis, since that moment did not have financing.

Palomo and Sanchís (2010) show that even old-age pensions were affected since their profitability decreased and their volume also fell as a consequence of the increase in unemployment and informality and the evasion of the payment of this social contribution, all this product of the drop in

the production of goods and services experienced by economies around the world. Zurdo and Palacio (2010) find that at the corporate level, many firms to avoid bankruptcies are restructured or merged with others, which can lead to the dismissal of employees and thus improve financial ratios. Titelman, Pérez, and Pineda (2009) indicate that the effects of this crisis were generalized, profound and long-lasting, and from one country to another they depended on the degree of openness to international trade and the global financial market, macroeconomic and general conditions, and policies carried out by the economic authority.

Colombia Case

In Colombia, the first crisis began to slow down the growth of the economy and the worst moment was experienced in 1999 when production fell by 4.2%, the lowest in many years. This Asian financial crisis began in 1997 and spread to many countries in the world, including Colombia. Johnson, Boone, Breach and Friedman (2000) found that the Asian crisis of 1997 and 1998 was mainly due to macroeconomic reasons and the way the financial market worked at that time and, citing Krugman, say that it was a consequence of the formation of bubbles in the price of assets. They also maintain that in this crisis there was loss of confidence on the part of national and foreign investors from emerging countries, which aggravated the problem since there was a massive outflow of capital from these nations.

According to Uribe (2011), the conditions for this economic crisis have been in place since the early nineties where there was also a financial opening that caused a decrease in domestic savings, high indebtedness, both private and public. By the time the impacts of this Asian crisis arrived in Colombia, mortgage credit was no longer a State monopoly and instead other entities that also granted this type of credit had entered the market, which were now of the “subprime” type, so that this market was exposed to credit and liquidity risk.

In addition to the -4.2% drop in GDP, there was an increase in unemployment, which was close to 19%. In the face of this crisis, the economic authorities of Colombia requested financing from the Multilateral Bank, the World Bank and the International Monetary Fund, according to Clavijo (2000), which cushioned the negative effects of the crisis, along with the help that it received at that time the country of the so-called "Plan Colombia", which sought to eradicate illicit crops, among other things, but which brought with it serious problems such as the violation of human rights (Chomsky, 2000).

After the recession of 99, the Colombian economy had a recovery and even a high growth of 6.8% for the years of 2006 and 2007, especially marked by high aggregate demand. Already in 2008, given this situation and with great inflationary pressure, the Banco de la República began to raise interest rates, this plus what happened in the United States led the economy to a slowdown in growth, and for that year growth was 3.3 %, the following year 2009 was where the impact of what happened in the United States was felt the most since growth was 1.2%. Although growth for 2009 was not negative, after the 1999 crisis it was the smallest expansion in the economy in the reference period.

Regarding the subprime crisis, Banco de la República (2009) affirms that several factors caused a slowdown in economic activity in our country, but the one that was increased by the decrease in remittances sent from abroad to Colombia, accompanied by a decrease in exports as a result of lower external demand for our products, determining factors in the crisis in the real sector of the economy. For his part, Uribe (2011) maintains that the role of financial institutions is of vital importance and that the lack of transparency affects the well-being of investors and, in general, the macroeconomic stability of a nation.

Importance of Financial literacy in SMEs

Álvarez and Abreu (2008) point out that for a small or medium-sized company, financial strategies are of vital importance when it comes to obtaining good economic results and avoiding unfavorable results; in the same way, it is also essential to cover financially in the face of constant fluctuations in the currency, the instability of interest rates and the constant movements of the stock markets, in order to be able to leverage strong financial movements. This in order to minimize the impact that SMEs may

suffer in emerging countries and especially in the Colombian economy. To say that a company is a micro, small or medium company in Colombia according to Law 590 of 2000, one must consider the number of employees and the total value of their assets.

Table 2: Classification of companies according to their size according to law 590 of 2000

	Employees
Micro	E<10
Small	11<E<50
Medium	51<E<200

According to Banco de la República in September 2009, the international financial crisis of 2008 had an impact on companies and their finances since, given the scarcity of resources in international markets, there was a recomposition of the debt, which generated higher interest payments and due to Thus, a lower profitability that went from 6.9% to 6.7%, liquidity indicators also deteriorated. This report quotes ANDI, and says that some companies endured this situation with financial and administrative education strategies such as optimizing their costs, seeking new marketing strategies, innovations and the development of new products, among others.

Regarding the optimization of costs, Gómez (2011) presents the case of children's clothing in Bucaramanga, which are small companies and concludes that most of these companies did not have a modern system to take their costs into account, but they applied some strategies to minimize them, such as taking advantage of the experience of each worker that is obtained after a certain period of time in which they have worked in that work and taking advantage of technological advances to increase production.

The strategies for cost control and minimization are mainly focused on the good performance of human resources through the experience curve, increases in production levels and the technology applied to processes. Most of these organizations lack cutting-edge tools, although they have specialized machines. One of the strengths is that reflected in the knowledge of human resources expressed in high-quality artisan production, with innovative designs, elements that become added value to compete in the market with differentiated products.

In an empirical study, Restrepo (2005) observes that, despite the modernization and the transition to technology carried out by SMEs, they are not yet within their priorities and sometimes they lack resources in terms of information systems, mining data, commercial creativity.

Whatever the strategy used by companies, any positive or negative result affects their finances and economic results, so financial literacy is very important for the proper management of resources. According to García, Grifoni, López and Mejía (2013), financial literacy is a tool that in times of economic growth can improve finances if the financial markets are used when they have favorable conditions, in the opposite of crisis it is also possible to cushion the effects of the fall in production and the worst conditions in the financial markets.

However, in the Colombian business reality, what is observed is a lack of business financial literacy in SMEs, in the special report on Financial Stability published in May 2019 by Banco de la República, it is evident that the majority of companies in Colombia It is financed through the acquisition of bank credit (in Colombia and abroad), with Financial Leasing and Factoring, through credit with the reinvestment providers of the profits and / or through the own resources that are not derived from the profits. Among the companies that use national bank credit as the first option, many use microcredit as a form of financing, which presents problems of over-indebtedness and the portfolio of the entities that provide this service has deteriorated and in general the perceived economic prospects are not the same. top.

Currently, given the recognition that financial literacy has been given as a requirement for SMEs to have better results, programs have been implemented that seek to train companies in these topics, free of charge, as the initiatives of some entities of the system financial of offering this service, through

booklets and virtual programs. Asobancaria (2017) states that financial literacy is very important for SMEs, since among the reasons for bankruptcy of this type of companies is the low level of financial matters that SMEs have.

Regarding the issue of financial crises and the stability and survival of SMEs, Medina (2015) points out that financial crises are often the result of a lack of solid knowledge regarding the services and products that different financial institutions offer to investors and clients, being financial literacy a tool to improve decision making. Likewise, the author points out that the lack of education in SMEs causes them to have to leverage through their own resources or other non-formal sources, which increases the degree of financial exclusion for these companies. For his part, Soto (2016), points out that financial literacy allows companies to be able to face financial crises and to know the risks they may be exposed to.

Conclusions

The crises studied here had strong effects on the economic dynamics of Colombia and the Latin American countries that were taken as a reference, given the influence that financial markets have on real activity, not only of their countries but of those with which it has commercial and financial relationships. The documentary review shows that, in Colombia after the fall and slowdown in production measured through the percentage change in GDP, after the financial crises of 97 and 2008 respectively, it brought other consequences at the macroeconomic level such as inflation, indebtedness, instability in the financial system, volatility in the exchange rate, among others, which internally accentuated the effects of the crisis.

It was also evident that the crises, apart from affecting the Colombian economy as a whole, negatively impacted the most vulnerable companies, which are the smallest, since they have limited information and of which the people who are in charge of its financial management and administration do not have a sufficient level of financial literacy.

This reflects on how limited financial literacy can lead to the effects of external factors such as international financial crises, affecting smaller companies in the country compared to others with technical tools at their fingertips. Taking into account the importance of financial literacy, governments and private entities have chosen to offer free programs, so that people of all ages and educational levels can learn some of the main concepts contained in this term, however, it is evident that At the national and international level so far they are of little scope and that there is a need to formulate more programs that are focused on SMEs and that are tailored to their needs since most of these are oriented to the issue of personal finances that are the foundation of financial culture.

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Manufacturing Output and Labour Productivity: A Comparative Study of Nigeria and South Africa

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Abstract

Increased productivity is necessary for improved manufacturing output, better living standards and sustained competitiveness of any country. Hence, to obtain maximum effect, there must be transition and structural change from traditional and modern economic sectors in addition to within-sector productivity. Given various similarities of Nigeria and South Africa, ranging from same British colonisation to similar labour structure, South Africa is known to be more advanced than Nigeria. Hence, this study aims to examine trends and patterns of both Nigerian and South African economies from 1986 to 2018. Thus, evidence was found that regardless of South Africa's much higher labour productivity, the growth of its manufacturing sector, especially in relation to GDP seems to be declining. Meanwhile, Nigeria has low labour productivity and fluctuating manufacturing output, especially since the nation is yet to fully recover from the last recession in 2015.

Keywords: Manufacturing output, labour productivity, Nigeria, South Africa, trends.

Introduction

Productivity growth is a vital requirement for higher living standards and sustaining competitiveness on a global scale. The issue does not just lie in developing more productive avenues of performing business operations but also involves accelerating structural transformation from lower productive undertakings (e.g. skill-extensive services, petty trade and agriculture) to higher productive activities that optimise specialisation, knowledge intensiveness and technological innovations in manufacturing (Tesfahun, 2015; Krause & Kaufmann, 2011; Rosendahl, 2010; Ogundipe et al., 2019). Labour productivity and total factor productivity are related and often interchanged, whereas they mean different things. The former refers to output by worker (that is, gross value added or output per unit of labour input) while the latter is productivity in terms of all aggregate inputs. Higher aggregate labour productivity is typically thought to be a good sign, but this might not necessarily apply for high unemployment economies like South Africa (Nattrass & Seekings, 2014, 2012) and Nigeria. Such increase in overall labour productivity might emanate from more productive workers or employment reallocation from (or replacement of) lower to (with) higher productive employees within firms. On the other hand, it could be because high labour productivity companies are expanding more rapidly than lesser productive ventures or it could be motivated by growing labour productivity industries. As at 2002, labour productivity per worker was $8800 but tripled to $25,600 by 2012. So, given South Africa's characteristics of high unemployment and low-skilled labour, fewer job types that is accessible to the unemployed or poorly skilled workers will actually negatively impact the economy. Whereas, higher labour productivity that is connected to greater productivity of poorly skilled employees is a positive outcome (Rankin, 2016).

Not much is known about how labour productivity of South African manufacturing firms have grown over the years. Generally, real labour productivity has doubled, however, most of this increase stems from within-industry changes, particularly, 'catch-up' by previously lower productive industries. This increment in real labour productivity has co-existed with higher real wages. Interestingly, within-industry changes appear to vary depending on firm sizes. Surprisingly, smaller firms have gained

greater labour productivity in comparison to bigger firms. It does not look like these changes are propelled by variations in capital intensity among various sized industries, rather it seems to be related to differences in real labour costs. Average real wages of smaller companies appear to be increasing faster than larger firms. Comparable surveys reveal that reduction and exit of lower (unskilled labour) productivity. Moreover, such exit is associated with import competition growth and industrial bargaining structure (Rankin, 2016). Undeniably, the manufacturing sector has been crucial to South Africa's progress over time (McCarthy, 1994).

Manufacturing sector's contribution to GDP has varied vastly over time in Nigeria. It increased from 4.8% to 7.4% in 1960 to 1975. However, it reduced to 5.4% by the end of 1980 but increased to 10.7% in 1985. Ever since then, it has been declined to 7.9% (1992); 6.3% (1997) and its lowest of 3.4% in 2001, before scaling up to 4.21% in 2009 (Central Bank of Nigeria -CBN, 2012). By 2012 and 2013, manufacturing share of GDP had risen to 6.67% and 6.83% in 2012 and 2013 (National Bureau of Statistics -NBS, 2014). Unfortunately, the recent economic recession seriously impaired growth of the manufacturing industry, reflected by 8.7% fall of industrial production in Q4 of 2016 over Q4 of 2015.from 2007 till 2016; average production growth was 1.35% with its highest of 20.10% in Q1 of 2011 and least point of 10.10% in Q1 of 2016. Industrial output increased to 0.1% in Q2 of 2016 from -10.1% in Q1, before dropping to -3.6% and -8.7% in Q3 of Q4 of 2016 respectively (Nigeria Industrial Production, 2017; Ogundipe et al., 2018).

Most prior studies have focused on the relationship between manufacturing growth and economic growth (Tsoku, Mosikari, Xaba & Modise, 2017; Meyer & McCamel, 2017; Cantore, Clara, Lavopa & Soare, (2017;) or in terms of trade (Delivani, 1992), structural change (De Vries, Timmer & De Vries, 2015; Nattrass & Seekings, 2012; Maia, 2011); industrial strategies (Rosendahl, 2010; Bethlehem, 1994; Black, 1993; Ismael, 1993);real wages in relation to productivity growth and employment (Asaleye, Olurinola, Oloni & Ogunjobi, 2017); comparative advantage (Sejkora & Sankot, 2017), determinants of capacity utilisation in Nigerian manufacturing (Adeyemi & Olufemi, 2016) and how fluctuations in macroeconomic factors impact manufacturing sector output (Onakoya, 2018; Ogundipe et al., 2019). Data analysis between Nigeria and South Africa shows that on the average, both nations have been increasing in their labour productivity over the years, however, South Africa has been increasing at a much higher rate and is way higher than that of Nigeria. Surprisingly, manufacturing value added as a percentage of GDP for South Africa has been decreasing over time, despite the fact that it was much higher than Nigeria as at 1986, it is now almost at the same level with Nigeria. Whereas, Nigeria's manufacturing output as a share of GDP has been fluctuating over the years but seems to be on a slight decline since 2015. Additionally, manufacturing value added annual growth rate has been fluctuating over the years but has recently been reducing and is trying to pick up. This begs the question, why is South Africa's manufacturing share of GDP reducing despite its increasing labour productivity? Labour productivity is focused upon because it is a vital influencer of economic performance. Also, both countries belong to the group of developing countries whose economic activities are more facilitated by labour inputs. Moreover, both countries were colonised by the British and gained independence in the 1900s.Hence, this paper seeks to examine the trends of manufacturing output and labour productivity over time in Nigeria and South Africa.

Moreover, wages in South African manufacturing is comparatively high but its labour productivity was found to be incapable of supporting such high costs, so either labour productivity rises or costs importance of moving from deindustrialisation to reindustrialisation to aid long term growth and manufacturing employment. Korean assessment by Sundararajan (1987) adopted dynamic framework across debt-equity ratio of firms, growth, investment, cost of capital and interest rates measured in foreign exchange rates have to drastically reduce. Tregenna (2011) recognises the from 1963 to 1981. Contrasting connection was reported in terms of interest rate and manufacturing productivity.

A comparison of Nigeria and South Africa

Trend Analysis: Empirical Evidence from data of Nigeria and South African Manufacturing and Labour Productivity from 1986 to 2018

This section contains explanations of manufacturing output and labour productivity trends from 1986 to 2018 between Nigeria and South Africa. Manufacturing value added as a percentage of GDP, annual

growth rate and constant 2010 US$ are used to provide vast evaluations. The purpose of these analytical trends is to account for the variations in these variables while applying data results to practical happenings in both countries over time.

Figure 1: GDP per person employed of Nigeria and South Africa

Source: WDI (2018)

GDP per person employed for Nigeria begins from about $10,000 in 1986 and was somewhat stagnant till 2002, after which it increased slightly to almost $15,000 in 2004 and gradually continued to rise in subsequent years. Labour productivity reached its peak in 2014 at approximately $25,000. However, it began declining afterwards and is yet to pick up. This illustrates the slow growth of labour productivity over the years in Nigeria. On the other hand, that of South Africa started out at a much higher rate than Nigeria at about $35,000. Although the nation experienced a slight dip in labour productivity between 1992 and 1995, it picked up and has been increasing on the average since then, recently hovering around $43,000. Thus, in general, South African labour productivity is almost three time more than Nigeria's level, despite occasional dips.

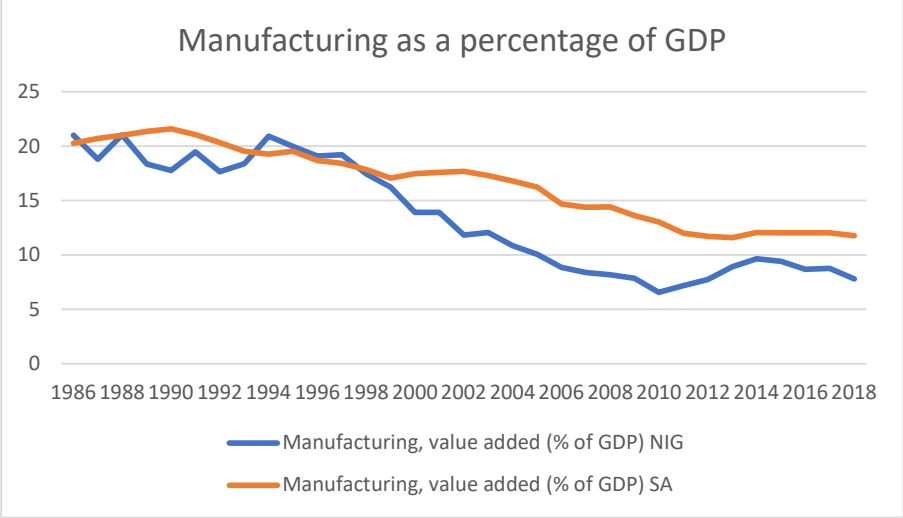

Figure 2: Manufacturing Value Added (MVA- % of GDP): Nigeria vs South Africa

Source: WDI (2018)

Nigeria's manufacturing output as a percentage of GDP was slightly above 20% in 1986 (probably due to the initial success of SAP before the long-term adverse effects kicked in). However, it fluctuated severally, especially before 1994which happened to be the year of the highest value added to GDP at almost 21%. Since then till 2010, MVA % of GDP has been decreasing mostly, except for the brief rise in 2014 at almost 10%, which is much lesser than its level in 1986. This is quite worrisome given that several industrial schemes have been implemented in the past, including import substitution strategy in the 1960s; Indigenisation policy in 1972 and 1977; four (4) National Development Plans of 1962-1968; 1970-1974; 1975-1980; and 1980-1985; SAP of 1986, which included export promotion strategy, followed by the foreign private investment led industrialisation Strategy among others.

Almost similarly, South Africa contributed approximately 20% to GDP in 1986 with a brief rise (peak of 21.6%) in 1990. Unfortunately, this was mostly on the decline till 2017. When rationalised with the fact that SA has much higher labour productivity than Nigeria, one would expect the manufacturing sector to contribute more to GDP, particularly as it is arguably the most developed and largest country in Sub-Saharan Africa. However, this is not the case probably due to the lack of dynamism and slow national growth ever since the end of apartheid which has led to de-industrialisation concerns and reduced shares of manufacturing in GDP and employment (Maia, 2011; DTI, 2010; Rodrik, 2008).

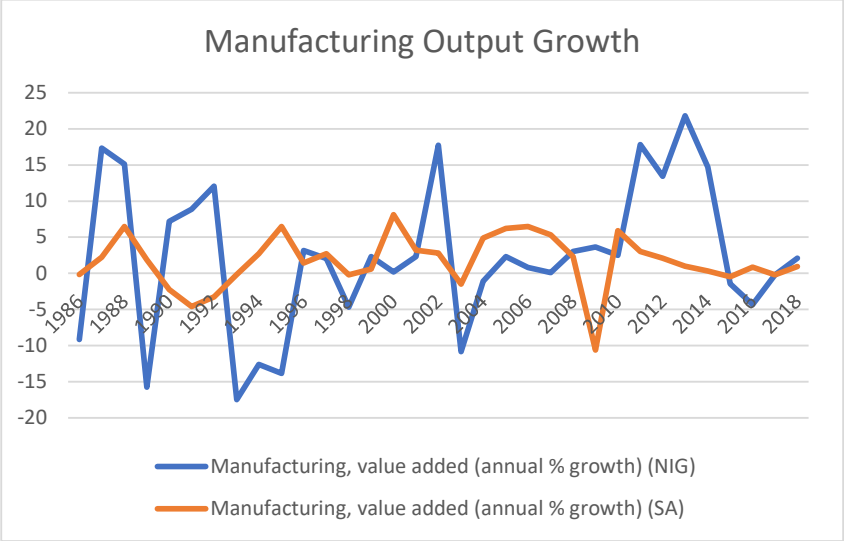

Figure 3: MVA (Annual % growth) of Nigeria and South Africa

Source: WDI (2018)

Manufacturing output annual growth for South Africa stood at -0.16% in 1986 before increasing to about 6.5% in 1988. However, there were several periods of sharp decline in 1992, 1996, 1998, 2003, 2009 and 2016. MVA growth has been rather unstable since 2016 in trying to recover from the 2015/2016 economic recession that affected most African nations. Meanwhile, manufacturing growth for Nigeria was negative at almost 10% and has depicted severe instability and fluctuations over the years. This is regardless of the small and medium Industrial equity investment scheme (SMIEIS) by SMI Development Agency of Nigeria (SMIDAN) in 1973 asides other industrial policies. Nonetheless, in recent times, it appears to be recovering slowly from the 2015/2016 recession at approximately 1%.

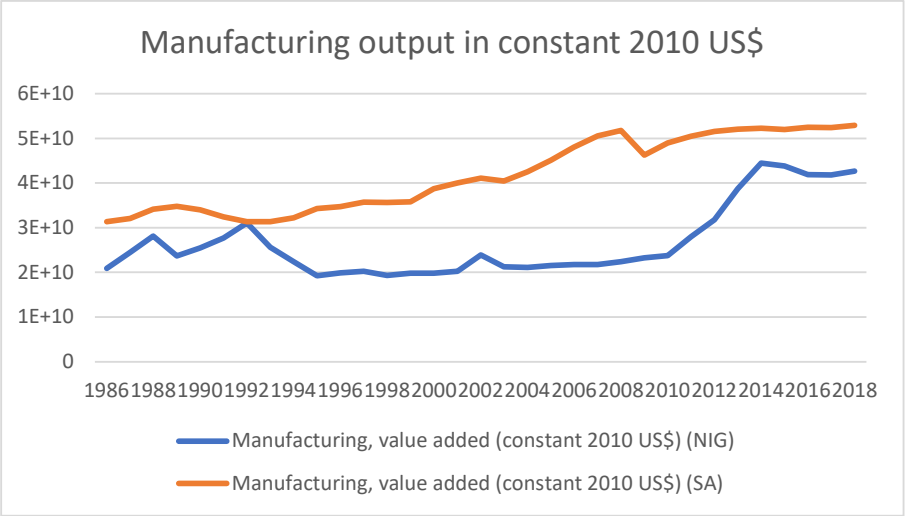

Figure 4: Graphical Illustration of MVA (constant 2010 US$) of Nigeria vs South Africa
Source: WDI (2018)

Figure 4 portrays manufacturing output in constant 2010 US$ (that is, without accounting for asset depreciation) where Nigeria is seen to start from about 20 trillion dollars, prior to rising slightly to almost 30 trillion in 1988 but falling again to about 24 trillion dollars. Since 1993 when it was valued at 31 trillion USD, it experienced major decline and stagnation from then till 2010, when it began picking up to reach its peak in 2014 at $44 trillion. From that time till now, no serious progress has been observed in the manufacturing sector as it appears rather dormant. Conversely, South Africa on the average was rising and recently has been around $52 trillion.

Conclusion and Recommendations

Analyses the above trend depicts that South Africa is better and more stable than Nigeria, probably because of its much higher labour productivity. Although the South African manufacturing sector has room for improvement, Nigeria still has a long way to go. Hence, this paper suggests that enhancing labour productivity, especially in the manufacturing industries will go a long way to boost and sustain manufacturing output. This is possible either by increasing wages, reducing production costs or introducing technology and policies that favour technological implementation. However, it appears that the latter solution will have the most durable effect into the long run (as is already evident in South Africa). Thus, the Nigerian economy can intensify its steps to increasing the availability and accessibility of infrastructural and technological amenities via public-private partnerships. Additionally, for sustained results, both skilled and unskilled workers must be trained to effectively handle such technology infrastructures (Ola-David, Amoo, Olurinola & Fadayomi, 2013; Oluwatobi, Oluwatobi, Oshokoya, Olurinola, & Alege, 2019).

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An Analysis of the Effect of Labour Productivity on Manufacturing Output in Nigeria

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Abstract

Increased productivity is necessary for improved manufacturing output, better living standards and sustained competitiveness of any country. Transition and structural change from traditional and modern economic sectors are needed for maximum productivity effects in addition to within-sector productivity. Human capital theory is used as theoretical framework in addition to empirical studies. Thus, Johansen co-integration is performed to examine the magnitude of labour productivity's long-run impact on Nigeria's manufacturing output from 1986 to 2018. It was revealed that the non-conformity of other explanatory variables seems to counter the significantly positive effect of labour productivity on Nigerian manufacturing sector. Therefore, evidence was found that Nigeria has low labour productivity and fluctuating manufacturing output, especially since the nation is yet to fully recover from the last recession in 2015.

Keywords*:* Manufacturing output, labour productivity, Nigeria, human capital.

Introduction

Manufacturing sector is seen as an extremely key aspect of any economy due to its capability of fostering effective and diverse forward and backward linkages across various economic sectors (Kayode, 2000). Thus, capacity utilisation of industries is a very crucial aspect since positive relationship exists between capacity utilisation and output growth. Fabayo (1981) asserts that the amount of capacity utilised does not affect how much output can be gotten from more utilisation of existent capacity and he went ahead to specify the needed capacity expansion for a projected output. Moreover, capacity utilisation positively impacts employment through industrial growth and stable prices. Skilled labour and capital resources, which are critical for accelerated economic development are expensive and scarce and is rather tedious to complement with technical dexterity time elements and financial resources (Adeyemi & Olufemi, 2016; Ogundipe et al., 2019). Given Nigeria's poor manufacturing optimisation, Structural Adjustment Programme (SAP) was adopted in 1986 to revamp the sector by diversifying industrial operations. However, this did not have the desired effects on Nigerian manufacturing industries and the economy as there has been frequent fluctuations over the years, including the recent economic recession of 2015. This therefore raises concerns on how Nigeria's manufacturing enterprises can be improved through higher labour productivity in the country.

Manufacturing sector's contribution to GDP has varied vastly over time in Nigeria. It increased from 4.8% to 7.4% in 1960 to 1975. However, it reduced to 5.4% by the end of 1980 but increased to 10.7% in 1985. Ever since then, it has been declined to 7.9% (1992); 6.3% (1997) and its lowest of 3.4% in 2001, before scaling up to 4.21% in 2009 (Central Bank of Nigeria -CBN, 2012). By 2012 and 2013, manufacturing share of GDP had risen to 6.67% and 6.83% in 2012 and 2013 (National Bureau of Statistics -NBS, 2014). Unfortunately, the recent economic recession seriously impaired growth of the manufacturing industry, reflected by 8.7% fall of industrial production in Q4 of 2016 over Q4 of 2015.from 2007 till 2016, average production growth was 1.35% with its highest of 20.10% in Q1 of

2011 and least point of 10.10% in Q1 of 2016. Industrial output increased to 0.1% in Q2 of 2016 from -10.1% in Q1, before dropping to -3.6% and -8.7% in Q3 of Q4 of 2016 respectively (Nigeria Industrial Production, 2017). Nigeria's manufacturing output as a share of GDP has been fluctuating over the years but seems to be on a slight decline since 2015. Additionally, manufacturing value added (MVA) annual growth rate has been fluctuating over the years but has recently been reducing and is trying to pick up. Meanwhile, Nigerian labour productivity is rather low. So, this paper seeks to answer the question: why is manufacturing output not progressing as expected despite several industrial policies that have been implemented over the years? Could this be as a result of low labour productivity of Nigerian workers? Labour productivity is focused upon because it is a vital influencer of economic performance.

Most prior studies have focused on the relationship between manufacturing growth and economic growth (Tsoku, Mosikari, Xaba & Modise, 2017; Meyer & McCamel, 2017; Cantore, Clara, Lavopa & Soare, 2017) or in terms of trade (Delivani, 1992), structural change (De Vries, Timmer & De Vries, 2015;Nattrass & Seekings, 2012; Maia, 2011); industrial strategies (Rosendahl, 2010; Bethlehem, 1994; Black, 1993; Ismael, 1993); real wages in relation to productivity growth and employment (Asaleye, Olurinola, Oloni & Ogunjobi, 2017); comparative advantage (Sejkora & Sankot, 2017), determinants of capacity utilisation in Nigerian manufacturing (Adeyemi & Olufemi, 2016) and how fluctuations in macroeconomic factors impact manufacturing sector output (Onakoya, 2018; Ogundipe et al., 2018).

Nonetheless, this research seeks to investigate the magnitude and direction of labour productivity impact coupled with demand and supply-side factors upon Nigeria's manufacturing output from 1986 till 2018. This investigation is also vital as it relates to achieving Sustainable Development Goal (SDG) 9 of building resilient infrastructure, promoting inclusiveness, sustaining industrialisation and fostering innovation by year 2030 so as to boost industry shares, specifically among least developed countries (LDCs).

Literature Review and Theoretical Framework

Odior (2013) investigated how stochastic features of Nigerian macroeconomic variables impact manufacturing sector within the period of 1975 to 2011. Imoughele & Ismaila (2014) portray insignificant broad money supply and interest rate while exchange and inflation rates alongside external reserves were statistically significant and inversely related to manufacturing both in the present time and a year ago. However, there was unidirectional causality between manufacturing output and external reserves, likewise real exchange rate. Amassoma & Nnwosa (2013), Sanusi (2012) and Njoku & Ihugba (2011) asserted the existence of stagflation (high inflation and unemployment) in Nigeria. This adversely impacts the nations' manufacturing industries as policy makers are constrained in implementing stabilisation or expansionary monetary policies. Unemployment responds more to output changes of manufacturing enterprises (Owyang, Sekhposyan & Vermann, 2013).

Anaman & Osei-Amponsah (2009) adopted error correction mechanisms and cointegration to affirm the determinants of Ghana's manufacturing output from 1974 to 2006. It was indicated that long-term nexus is existent between manufacturing output and export-import ratio, levels of per capita real GDP and political stability, which all impact the manufacturing sector. Similarly, Dauda & Risikat (2008) employed ordinary least square to analyse influencers of manufacturing output in Nigeria between 1972 and 2002. Domestic capital formation, exchange rate deregulation policy and openness index were positively connected to manufacturing sector's growth. Also, manufacturing capacity utilisation significantly and negatively impacted manufacturing growth.

Szirmai (2009) views the manufacturing sector as a major growth propellant due to the following reasons: first, empirical correlation exists between industrialisation depth and per capita income among developing economies. Secondly, manufacturing productivity exceeds that of agriculture. Thirdly, manufacturing has greater dynamism relative to other sectors. Fourthly, developing nations that have higher manufacturing and lesser service shares display quicker progression compared to developed countries. Fifth, unlike agriculture, manufacturing renders specialised avenues for capital accumulation and economies of scale. Additionally, it allows for inherent and segregated technological advancement alongside spill-over and linkage effects. Lastly, higher per capita income reduces agriculture's share in

overall expenditure while increasing expenditure upon manufactured products, as indicated by Engel's law.

For this paper, the human capital theory is modified. Becker (1998) broadly presented human capital resources to include education, health, on-the-job and other forms of training. It should be noted that all these human factors determine labour productivity levels, which is in turn capable of impacting the manufacturing sector. Sturm (1993) posits that human capital theory sees such factors to contribute to an individual' productive and pecuniary gains. Welch (1970) termed this sort of productive educational value as the 'worker (static) effect', which is measured as increased output per unit of change of education holding other inputs constant. Allocative or dynamic impact of education refers to the complementary human capital influence, where training and schooling enhances allocative techniques (Bartel & Lichtenberg, 1987; Schultz, 1975). Hence, better learned persons can leverage on fresh service and production potentials or adapt to newly situated methodologies faster than less trained workers. These efficiency benefits are rapidly converted to superior commodities or reduced prices by productive and educated personnel.

However, in considering the human capital framework, 'screening hypothesis' as postulated by Spene (1973) and Arrow (1973) which asserts the role of education in distinguishing implicitly higher and lower productive workers to sort them into suitable industries, rather than improving individual productivity. Notwithstanding, Willis (1986) and Riley (1979) affirmed that both theories are empirically difficult to differentiate given identical correlations among education, productivity and income. Moreover, human capital impacts manufacturing output and general growth via numerous routes, including technological adoptions (Caselli & Coleman, 2006; Acemoglu, 2003; Topel, 1999; Benhabib & Spiegel, 1994; Barro, 1991 and Romer, 1990).

Thus, skilled-labour facilitated by technology ameliorates productive effectiveness of talented and experienced staff comparative to the unlearned ones (Oluwatobi, Olurinola, Alege & Ogundipe, 2018; Oluwatobi, Oluwatobi, Oshokoya, Olurinola, & Alege, 2019). So, human capital effect posits that adopting high human capital alongside technology will induce quicker growth of such labour-intensive enterprises. Additionally, the 'human accumulation effect' postulated by neoclassicals in relation to international specialisation considers human capital as manufacturing inputs where productive resources should be migrated to school-intensive firms, thereby aiding progression in human-capital intensive sectors (Nunn, 2007; Levchenko, 2007; Romalis, 2004; Ventura, 2005, 1997). Anyanwu (2018) adapted UNECA (2015) to proposed that educational status at primary level affects numeracy/literacy, which provides the minimum manufacturing required skills; secondary stage influences creativity, problem solving and conceptualisations for social flexibility and skilled labour; whereas tertiary phase impacts developmental knowledge for developing research and technological capability.

The European Commission (2009a) noted that diverse factors determine manufacturing performance, including supply-side influences such as research & development (R&D), production inputs (labour and physical capital inclusive of ICT-related techniques),macroeconomic conditions (GDP growth, exchange, employment and interest rates), market structures (industry size, distribution, concentration and turnover, political, regulatory era which affect customer welfare and competition among producers) among other demand-side factors such as investment and consumption expenditure.

Recently, Anyanwu & Ozurumba (2017) found significant U-shaped relationship existed with primary education and transport/machinery equipment whereas inverted U-shaped linkage was seen with chemical MVA. Meanwhile, positive connection was apparent with apparel/textiles MVA. On the other hand, secondary education had U-shaped association with chemicals although it was positively related with machineries and negatively linked with beverages, food, tobacco and other manufacturing industries. Notwithstanding, strong non-monotonic, inverted U-shaped relationship is found among tobacco, beverages and food; clothing and textiles; and other manufacturing enterprises with tertiary education. Nonetheless, tertiary education is positively associated with machineries, clothes/textiles and other manufacturing sectors whereas negative linkage is existent for chemicals and food, beverages and tobacco MVA.

Model Specification

The empirical model for the study is developed in the spirit of Chenery (1960) and European Commission (2009a). The specification adopted the variables from the highlighted extant studies which include: manufacturing value added (constant 2010 US$), used as the dependent variable to measure manufacturing output. The explanatory variables included are financial depth, interest and exchange rates, degree of openness and production inputs (capital stock and labour productivity).

The model is specified as follows:

$$\text{MVA} = \beta_0 + \beta_1\text{LABP} + \beta_2\text{GFCF} + \beta_3\text{FDEPTH} + \beta_4\text{LINTR} + \beta_5\text{OEXR} + \beta_6\text{EON} + \mu \ldots(3)$$

MVA = manufacturing output (captured by manufacturing value added)
LABP = Labour productivity (GDP per person employed (constant 2011 PPP $);
GFCF = Gross Fixed Capital Formation (constant 2010 US$);
FDEPTH = financial depth (Domestic credit to private sector by banks (% of GDP);
LINTR = Lending interest rate (%);
OEXR = Official exchange rate (LCU per US$, period average);
EON = degree of openness [$\frac{Import+Export}{GDP}$](all in constant 2010 US$)];

Description of Variables

Table 1: Variables, their Definitions, Measurements and Sources

Variables	*Definition and Measurement*	*Data Source*
MVA	Manufacturing refers to industries in theInternational Standard Industrial Classification (ISIC), revision 3, divisions 15-37. MVA captures sectoral net output after aggregating outputs minus intermediate inputs. It does not deduct degeneration/extinguishment of natural resources and produced assets. Data is reflected in constant 2010 U.S. dollars.	WDI (2018)
LABP	GDP per person employed is GDP divided by overall national employment. Converting GDP to 2011 constant international dollars through PPP rates is Purchasing power parity (PPP) GDP.	WDI (2018)
GFCF	Average yearly growth of gross fixed capital formation based on constant local currency. Aggregates are based on constant 2010 U.S. dollars.	WDI (2018)
FDEPTH	Domestic credit to private sector by banks refers to financial aid (trade credits, purchasing non-equity securities, loans and other receivables which enable repayment claims (which might incorporate lending to public ventures in some nations).	WDI (2018)
LINTR	Lending rate entails the bank rate, usually determined by financing goals, credit standing of borrowers and vary according to different economies. Thistypically satisfies short- and medium-term funding necessities of private enterprises.	WDI (2018)
OEXR	This is the exchange rate in local currency that is ascertained by national officials or lawfully determined within sanctioned exchange market. It is a monthly mean that is summed up into annual averages.	WDI (2018)
EON	This was calculated by the authors via adding imports with exports, then dividing their sum by economic growth, all in constant 2010 US$.	WDI (2018)

Source: Authors' compilation (2019)

Result Presentation and Discussion

This analysis began by examining the time series property of the variables. Table 4.1 shows that all variables became stationary at first order of integration. The evidence implies that a linear combination of the variables could be attempted using Johansen co-integration analysis.

Table 2: Unit Root Result (Summary)

Variables	T-stat	P-value	Order of integration
MVA	-4.0561	0.004	I(1)
LABP	-4.0574	0.004	I(1)
GFCF	-9.2176	0.000	I(1)
FDEPTH	-4.9089	0.0004	I(1)
LINTR	-6.4357	0.000	I(1)
OEXR	-3.9812	0.005	I(1)
OPENNESS	-5.5958	0.0001	I(1)

Source: Compiled by Authors

The co-integration analysis using the trace and max-eigen statistics help to verify long-run relationship among these variables. For Nigeria, both trace-stat and max-eigen value shows that there is one co-integrating equation. Evidence from Table 4.2 indicates that the existence of long-run relationship among the variables.

Table 3: Johansen Cointegration test

Hypothesized No. of CE(s)	Eigenvalue	Trace/Max EigenStatistic	0.05Critical Value	Prob.**
None *	0.867545	155.2332	125.6154	0.0002
At most 1	0.624041	94.58786	95.75366	0.0600
At most 2	0.567027	65.23958	69.81889	0.1098
At most 3	0.430209	40.12721	47.85613	0.2180
At most 4	0.334442	23.25265	29.79707	0.2339
At most 5	0.252376	11.03877	15.49471	0.2091
At most 6	0.074206	2.313121	3.841466	0.1283
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
None *	0.867545	60.64532	46.23142	0.0008
At most 1	0.624041	29.34828	40.07757	0.4675
At most 2	0.567027	25.11237	33.87687	0.3774
At most 3	0.430209	16.87457	27.58434	0.5908
At most 4	0.334442	12.21388	21.13162	0.5267
At most 5	0.252376	8.725651	14.26460	0.3097
At most 6	0.074206	2.313121	3.841466	0.1283
Max-eigenvalue test indicates 1 cointegrating eqn(s) at 0.05 level				

Source: Compiled by Authors

Normalized co-integration estimations:

MVA = 23.45174+ 1.245674LABP –0.500447GFCF – 0.005665FDEPTH+ 0.035302LINTR

T-stat [-16.1657] [4.92024] [1.54725] [-11.2730]

– 0.001633OEXR – 0.766536OPENNESS

T-stat [5.06798] [13.9020]

From the normalized equation above, when all regressors are simultaneously equal to zero, MVA will be positive at about $23.45. This study finds that labour productivity is statistically significant and positively impacts manufacturing output by about 125 percent. This positive relationship conforms to theoretical expectation and indicates how relevant labour productivity is to Nigerian manufacturing industries. Hence, an improvement in labour productivity determinants, such as trainings and education will go a long way to boost the efficiency of labour and consequently Nigeria's MVA. A percent increase in capital stock will lead to about 50 percent decrease in MVA. This negative linkage does not align with apriori expectation, thus reflecting the low level of capital stock and infrastructures within

the country. Meanwhile, greater financial depth by a percentage will yield about one percent drop in MVA. This adverse connection indicates that Nigeria's financial depth is really inadequate to bring about positive changes.

Furthermore, a rise in lending interest rate will positively impact manufacturing output by almost 4%. Such positive linkage directly contrasts theory as higher lending rate is expected to discourage lending for profitable investment ventures of manufacturing enterprises. Similarly, one percent increase exchange rate will negatively affect MVA by about 1%. This opposes theory as higher exchange rate leads to currency depreciation (in this case, Naira), which makes exports cheaper and is supposed to boost exportation for a producing nation. However, the reverse is the case for Nigeria due to low production levels and higher imports, which reduces manufacturing output, exports and revenues. A rank increase in the degree of openness will engender about 77% fall in Nigerian manufacturing industries. Despite its statistical significance, this negates apriori expectations, implying that the nation is not leveraging on its open economy and is probably allowing foreign products to overcrowd its market, thereby deterring the effectiveness of manufacturing sector output.

Table 4: Vector Error Correction Estimates

Error Correction:	D(MVA)	D(LABP)	D(GFCF)	D(FDEPTH)	D(LINTR)	D(OEXR)	D(OPENNESS)
CointEq1	-0.008992 (0.22863) [-0.03933]	0.036314 (0.12116) [0.29972]	0.036314 (0.12116) [0.29972]	5.061590 (5.00492) [1.01132]	12.21235 (7.24721) [1.68511]	131.9718 (35.7067) [3.69599]	-0.910358 (0.38603) [-2.35826]
R-squared	0.225120	0.266979	0.490938	0.351994	0.305451	0.496634	0.344708
Adj. R-squared	-0.070072	-0.012267	0.297010	0.105135	0.040860	0.304876	0.095073

Source: Authors' Computation

From the error correction test above, ECM reveals a negative figure of -0.008992for Nigeria, this suggests that convergence of errors, hence, about 1 percent of errors that occur in the short run will be corrected subsequently in the long run. Moreover, R^2 and adjusted R^2 depict that all explanatory variables jointly explain about 23% of variations in manufacturing output.

In order to confirm the reliability of the parameter estimates, some diagnosis tests were conducted which include serial correlation and heteroscedasticity. Serial correlation test was executed to examine presence of serial correlation among variables. The evidence from Table 5 shows the presence of no serial correlation and also void of heteroskedastic.

Table 5: Diagnosis Tests

Serial Correlation LM Tests		
Lags	LM-Stat	Prob
1	61.53956	0.1078
2	61.06319	0.1157
Heteroscedasticity Test		
Chi-sq	df	Prob
463.4984	448	0.2966

Source: Authors' Computation

Conclusion and Policy Recommendations

Given average low manufacturing levels in Nigeria over the years, especially since the last economic recession that affected most African nations, Nigeria's manufacturing value added is yet to fully recover. Coupled with relatively low productivity over time, this research is spurred to ascertain the impact of labour productivity alongside supply (capital stock and labour productivity to represent production inputs) and demand-side factors (exchange and interest rate as macroeconomic influences;

ease of openness for market structure; and financial depth for expenditure levels) on Nigerian MVA within the scope of 1986 to 2018. Human capital theory is adopted to explain the analytical framework. Indicators are chosen from literatures reviewed and selected based on data availability, so as to ensure sufficient data observations for a single country.

All variables are stationary at first difference; hence Johansen co-integration is employed, which portrayed that long-run co-integrating relationship exists among the variables. It should be noted that only financial depth is statistically insignificant in impacting Nigeria's manufacturing output. Therefore, labour productivity is seen to positively impact Nigerian MVA in data findings. However, in reality this influence is not observed probably due to the major role that other variables play. Capital is found to reflect adverse effects (due to deplorable GFCF levels); FDEPTH portrays insignificant and detrimental impact upon Nigeria's manufacturing output; additionally, ease of openness, lending and exchange rates do not conform to theory, thus reflecting deviation from the norm. However, ECM is negatively signed, thus implying that about 1% of errors which occur in the short run would be corrected in the long-run. R2 indicates that all explanatory variables jointly explain about 23%of disparities in MVA. Additionally, diagnostic tests show that the model is free from heteroscedasticity and serial correlation.

Therefore, for policy recommendations, it is necessary to upgrade tertiary education in terms of vocational scholarships and trainings (Ola-David, Amoo, Olurinola & Fadayomi, 2013) as most existing policies within Africa focus on primary and secondary educational levels which engenders skill mismatch. Moreover, such skill acquisition policies must align with national socio-economic agenda. Consequently, strong coordination and interactions is needed among policy makers and stakeholders in public and private sectors as well as deeper university relations. Furthermore, encouraging foreign direct investment (FDI) inflows will help to expand technological innovations and degree/ease of openness economically. These will all help in boosting labour productivity and subsequently domestic production capacities.

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Trend Analysis of Capital and Labour Productivity in Nigeria and South Africa

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Abstract

A country's growth over time is almost entirely dependent on the size and components of its labour force, which in turn determines its labour productivity levels. Given various similarities of Nigeria and South Africa, ranging from same British colonisation to similar labour force structure, South Africa is known to be more advanced than Nigeria. Hence, this study aims to examine trends and patterns of both Nigerian and South African economies from 1986 to 2018. A lot of stylised facts were revealed for the said time period. Thus, evidence was found that South Africa generally performed better than Nigeria in all indicators of labour productivity, human capital and physical capital. These findings indicated apparent reasons for the latter's superior performance in recent times, despite the fact that both economies were around the same level in the 1980s. It was also revealed that both nations are still trying to fully recover from the last recession in 2015. Hence, this research recommends an increase in human and physical capital investment, entrepreneurial activities and training schemes to boost national productivity levels.

Keywords: Human capital (HC), Physical capital, Unemployment, Labour productivity, Nigeria, South Africa.

Introduction

Nigeria possesses the highest populace of over 190 million people among African countries and is globally the seventh most populated nation with a life expectancy of 49 years (World population review, 2019). However, the country's large labour force has not contributed substantially to her productivity and living standards as more than half of the population still wallow in poverty, unemployment and underemployment. In United Nations Human Development Report (2005; Ogundipe et al., 2019), Nigeria was grouped as a developing nation with regard to uniformity in educational access. In terms of student enrolment, primary school net enrolment rate is 63:59.8 percent; Adult literacy rate is 63:75 percent and 46:57 percent; Youth literacy rate is 77:85 percent and 67:75 percent; Educational attainment is 55:45 percent; while labour force participation is 70.3:64.5 percent for males and females respectively. In terms of infrastructural facilities regarding Nigeria's populace, at least 20 per cent of these nationals usually distrust government as very little have been achieved over 55 years post-independence in providing physical amenities (Ali, 2019).

On the other hand, the South African economy with Gross Domestic Product (GDP) of US$159 886 million in 2003, was by far lesser than Netherlands' US$511,556 million and Korea's US$605,331 million (World Bank, 2005). Conversely, unlike other African states, predominantly Sub-Saharan Africa (SSA), South Africa is comparatively more industrialized and bigger as 6.6 per cent of her populace yields 75.7 per cent of its manufactured exports and 45.5 per cent of sub-continent's GDP. Insufficient skilled personnel, as needed for labour-intensive growth is barely given adequate attention. Under apartheid, restrictions on upward mobility and absence of proper schooling and training for

massively numbered black persons, is apparently a key restraint in the growth of unskilled and higher-skilled labour-intensive firms (McCarthy, 2005).

Over time, there has been numerous contentions over which country is the largest African economy. South Africa was at the peak for a while till 2014 when Nigeria outpaced the former. Ever since then, it has been continuous turbulence between the two giants (Daoui, 2017). Daoui (2017) further noted that a fundamental disparity between Nigeria and South Africa is their economy's attributes. The latter is broadly diversified while Nigeria is mainly a mono-product economy. Initially, South Africa grew around two main pillars: conducive agricultural terrain and abundant mineral reserves. Notwithstanding, her economy expanded to develop tertiary sectors of trade, communications and tourism.Undoubtedly, Africa has made substantial progress over the past two decades, however, she is still backwards in terms of output, productivity, adoption of modern inputs, technology, accessibility to insurance or credit markets which is mostly incomplete or failing (FAO, 2015; Dillon & Barrett, 2014).

The capability of a nation to enhance quality of her labour force is referred to as human capital development (HCD). Human capital comprises education (knowledge), training (skill) and health. It is expected that higher training engenders higher skill of any country's labour force (Ogunleye, Owolabi, Sanyaolu& Lawal, 2017; Adejumo, Olomola & Adejumo, 2013; Ogundipe et al., 2018). Lack of technical know-how (poorly developed infrastructure) as well as insufficient skills to boost technological production and utilization is a key development barrier (Oketch, 2006). Grossman (1972) and Bloom, Canning &Sevilla (2004) have proven that education and health are components of human capital as they directly influence people's wellbeing and increases individual capabilities. Schultz (1993) sees it as an instrument for propelling national comparative edge. Importantly, although human capital is sustainable, it is untransferable e.g. land as a fixed capital (Mba, Mba, Ogbuabor&Ikpegbu, 2013).

Physical capital refers to man-made goods that facilitates production process (Majaski, 2019). Prominent economists such as Adam Smith, Robert Solow, and Harrod Domar all recognized that physical inputs play a vital role in assisting production process. Examples of physical capital include; bridges, machineries, buildings, cash, computers, and so on (Segal, 2019 and Majaski, 2019). It is therefore considered as one of the three major factors of production. After the World War II, Asian nations like South Korea, China and Japan have been able to develop their physical capital and this has proven effective in eliminating poverty and making them some of the world's most powerful economies.

To some degree, human capital's role in Nigeria's growth has been given attention (Ajetomobi & Ayanwale, 2005, Olomola, 2007; Dauda, 2010) but its contribution in different sectoral output is yet to be properly tackled. Some studies have observed education's impact on output growth; other extremes assessed effect of human capital on technological changes by implementing new technologies (Ashish & Badge, 2008); as well as real wages in relation to productivity growth and employment (Asaleye, Olurinola, Oloni & Ogunjobi, 2017). Many have evaluated human capital influences on economic growth (Bloom et al, 2004; Adejumo et al., 2013) analyses human capital in relation to industrial growth while others have considered this topical area from the angle of human capital investment (Lawanson, 2009; Isola & Alani, 2012) as well as government capital and recurrent expenditures on health, education, gross fixed capital formation (GFCF) and labour force (Oluwatobi & Ogunrinola, 2011).

In this paper, we argue that the divergence in gross domestic product (GDP) progression of countries specifically Nigeria and South Africa, whose level of labour productivity varies, can be attributed to contrasting volumes of human and physical capital. Although levels of productivity in these two countries has been similar over the years, their economies have different human and physical asset indicators. We focus on labour productivity because it is a vital influencer of economic performance. Also, both countries belong to the group of developing countries whose economic activities are more facilitated by labour inputs. Thus, this research aims to fill this gap by performing a comprehensive analysis of the by examining combined effects of human and physical capital on labour productivity. This will be done using comparative analysis of two selected countries: Nigeria and South Africa.

Stylized Facts

In aspects of labour productivity, measures like higher investment in infrastructures, schooling access, educational attainment and skill acquisition by National Directorate of Employment (NDE) have been embarked upon to enhance labour quality but have been grossly inadequate to realize full potentials of productivity. For instance, as labour force expanded by about 12% from 2010 to 2014, unemployed persons (those with less than 20 work hours per week) rose by over 40% while fully-employed increased by just 7% (NBS, 2015). Reverse applies for South Africa recognized for her transformed structural production and investment in capital-intensive industries (McCarthy, 2005; Ogundipe et al., 2019).

Generally, developing countries are known for their low levels of low income, literacy, living standards, healthcare systems and gender inequality levels (Todaro & Smith, 2011). These low human capital developmental levels obstruct individual productivity, resulting in socio-economic issues such as unemployment and poverty. Nigeria as an LDC launched her Universal Basic Education (UBE) in 1967 at Sokoto by Obasanjo. That same year, she initiated Universal Primary Education (UPE) which also failed due to corruption and inadequate funds amongst other factors (Ogunleye, Owolabi, Sanyaolu& Lawal, 2017).Since the emergence of a new democratic epoch in 1994, development of education in South Africa has received intense attention in form of government measures such as National Education Policy Act of 1996 which defines the rules that governs educational facilitators; South African Schools Act which provides right to quality education; Annual National Assessment programme which was introduced to monitor learning outcomes, amongst others (SAYB, 2016).

Welcome (2011) and Aregbeshola (2019) stated that Nigerian government have introduced various health schemes which includes a 10-year development plan (1946–1956) with numerous health schools and institutions established, primary health care plan (August, 1987); Midwives Service Scheme (MSS); National Immunization Coverage Scheme (NICS); Nigerian Pay for Performance Scheme (P4P); and National Health Insurance Scheme (NHIS) which had minute influence on health sector, due to persistent personnel and infrastructural deficit, as well as poor public health administration. Whereas, In the last 20 years, despite several challenges, state of health in South Africa has improved as seen in reduced maternal mortality rate, higher life expectancy and public health spending via conscious effort to improve data quality, accessibility and medicinal availability via Central Chronic Medicines Dispensing and Distribution Programme (Measure Evaluation, 2019; Agyepong, Sewankambo, Binagwaho, Coll-Seck, Corrah, Ezeh, Fekadu, Kilonzo, Lamptey, Masiye, Mayosi, Mboup, Muyembe, Pate, Sidibe, Simons, Tlou, Gheorghe, Legido-Quigley, McManus, Ng, O'Leary, Enoch, Kassebaum& Piot, 2017).

Infrastructure Tax Relief (ITR) was introduced in April 2012, Road Infrastructure Development and Refurbishment Investment Tax Credit Scheme in January 2019, Nigeria's National Integrated Infrastructure Master Plan (NIIMP) validated in 2015, likewise Economic Recovery and Growth Plan (ERGP) with aims of providing strategic framework for transformation of Nigeria's weak physical facility base comprising uncontaminated water, hygienic sanitisation, tarred roads and electricity which are deficient due to low income levels and swiftly expanding populace (Bello-Schünemann& Porter, 2017). For 2016/17, World Economic Forum Global Competitiveness Index ranked Nigerian infrastructure among lowest of 132 from 138 countries, this has been said to be one major barricade to doing business nationally. In South Africa, the new growth path was established in November 2010 to drive Infrastructure and Job creation, after which National Infrastructure Plan was introduced in 2012 to create more jobs and promote economic growth. Government also invested 827 Rand to revamp existent facilities. President Infrastructure Coordinating Committee (PICC) was introduced to organise, merge and fast-track implementation. Despite this, a report published by South Africa Reserve Bank in 2017 stated that there has been prolonged decadence infixed capital stock and GFCF, which has affected her economic productivity level.

Low productivity can be attributed to non-augmentation of factor inputs including physical capital, infrastructures, human capital, innovation/technology which affects labour force quality. Average growth rate of 6.53 percent between 2005 and 2010; 6.68 percent from 2011 to 2014. But between 2015 and 2016, it reduced to 2.8 percent and a negative 1.56 percent respectively. This did not provide

relief in terms of unemployment which was about 2.9 percent in 2005; increasing to 5.8 percent in 2008; 11.8 percent in 2009; 21 percent in 2011; 23.9 percent in 2012 and 29 percent in 2015. Nonetheless, this reduced in 2016 to 14.2 percent. Ajakaiye, Jerome, Nabena&Alaba (2015) ascertained that Nigeria's employment elasticity is as low as 0.11.

Nigeria's educational system is plagued with the inverted pyramid. According to National Universities Commission (NUC), there are about 43 Federal, 48 State and 79 Private Universities (Funmilola, 2019), constituting 170 universities in total; over 100 polytechnics, 82 colleges of education comprising 14 private, 46 state and 22 federal colleges, over 50,000 primary schools. Primary school enrolment was about 25.6 million in 2016 (Ajikobi, 2018).

A comparison of Nigeria and South Africa

Trend Analysis: Empirical Evidence from data of Nigeria and South African Capital and Labour Productivity from 1986 to 2018

This section contains explanations of labour productivity (captured by GDP per person employed) as well ashuman capital(gross primary school enrolment, total life expectancy at birth) and physical capital (gross fixed capital formation) trends from 1986 to 2018 between Nigeria and South Africa. The purpose of these analytical trends is to account for the variations in these variables while applying data results to practical happenings in both countries over time.

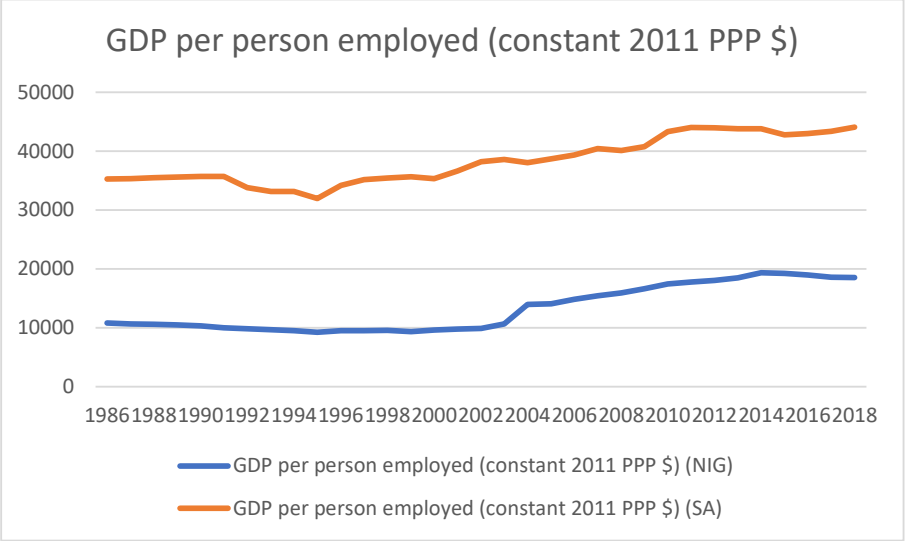

Figure 1: Labour Productivity of Nigeria and South Africa

Source: WDI (2018)

GDP per person employed for Nigeria begins from about $10,000 in 1986 and was somewhat stagnant till 2002, after which it increased slightly to almost $15,000 in 2004 and gradually continued to rise in subsequent years. Labour productivity reached its peak in 2014 at approximately $25,000. However, it began declining afterwards and is yet to pick up. This illustrates the slow growth of labour productivity over the years in Nigeria. On the other hand, that of South Africa started out at a much higher rate than Nigeria at about $35,000. Although the nation experienced a slight dip in labour productivity between 1992 and 1995, it picked up and has been increasing on the average since then, recently hovering around $43,000. Thus, in general, South African labour productivity is almost three time more than Nigeria's level, despite occasional dips.

Hence, graphical illustrations showing labour productivity of Nigeria and South Africa clearly depicts that although both countries have relatively experienced increasing labour productivity over the years, South Africa's speed of growth is nearly twice as much as Nigeria and is comparatively more

stable.Also, Nigeria's labour productivity was rather low and declining for nearly half of the total period and has been rising at a comparatively slow rate, and declining in recent years. Conversely, South Africa has been increasing at a much faster rate. This explicitly establishes the gap.

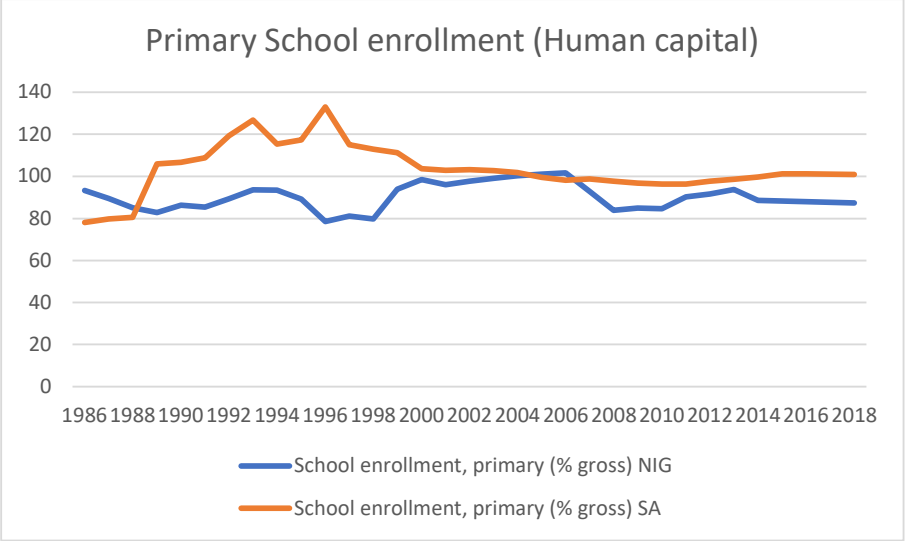

Figure 2: School enrolment, primary (% gross): Nigeria vs South Africa

Source: WDI (2018)

The ratio of primary school enrolment (PSE) to the overall population of Nigerians within this age group started out higher than that of South Africa in the 1980s from almost 100%. However, by 1998, it had decreased to almost 80%. From then till 1994, PSE fluctuated a bit but improved slightly before dropping to its lowest point of 78% in 1996. It hovered around this point till 1998, and afterwards was on an upward trend till 2006 with an average of 98.47. Meanwhile, PSE for South Africa skyrocketed and fluctuated at over 100% from 1988 till 1997. Unfortunately, enrolment levels for South Africa began declining till recently in 2015, when it showed indications of picking up its pace. Sadly, PSE suddenly declined again to about 83.76% in 2008 and remained around that level till 2010. Since 2010, it has been fluctuating but generally been at a low level of approximately 90%. One interesting observation is that despite the fluctuations in both countries, enrolment levels among South Africans is generally higher than that of Nigeria.

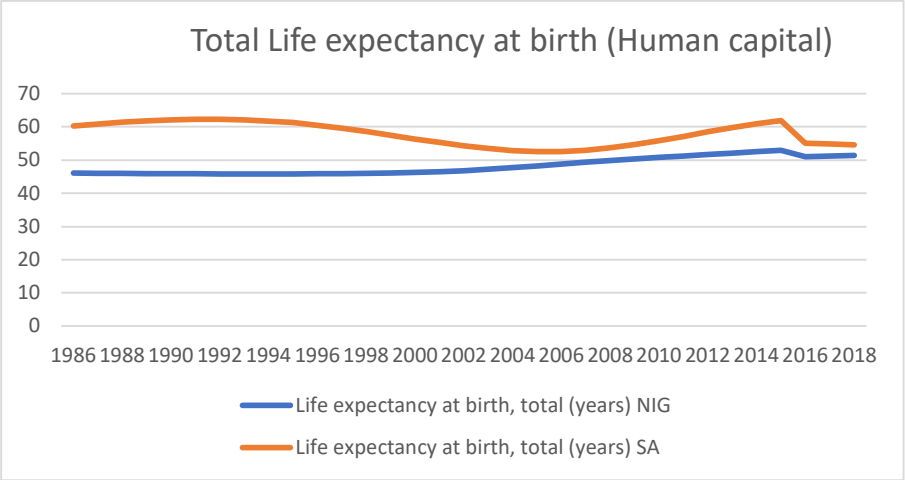

Figure 3: Life expectancy at birth, total (years): Nigeria vs South Africa

Source: WDI (2018)

Total life expectancy at birth for Nigeria was at 46 years and has gradually been rising till 2015 when it peaked at almost 53 years before dropping and being stagnant at about 50 years. Conversely, that of South Africa began at about 60 years before rising and declining from the late 1990s up till 2006. Since then, it has been increasing till 2015 when it reached its highest point prior to reducing and hovering around 54.6 years. Overall, life expectancy for South Africans remains higher than Nigerians.

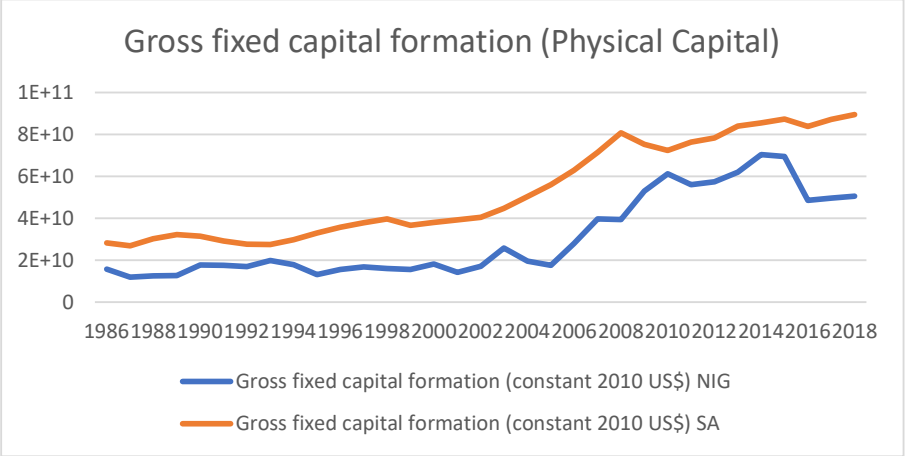

Figure 4: Gross fixed capital formation (constant 2010 US$): Nigeria vs South Africa

Source: WDI (2018)

GFCF started at almost $16 billion and fluctuated till 2005 with an average of $15.6 billionfrom 1986 to 1995. Similarly, from 1996 till 2005, it averaged $17.65 billion. After then, it began an upward trend to $39.6 billion in 2008, $61 billion in 2010 and $70 billion in 2015 despite occasional fluctuations. However, it decreased to $48.5 in 2016 but has been increasing gradually till now. Contrarily, South Africa was initially at 28.3 billion in 1986 and fluctuated till 1999 when it was almost $37 billion, thereby averaging about $31.85 billion within this timeframe. Notwithstanding this periodic

fluctuation, it rose continually till 2008 when it reached its peak of almost $81 billion. Sadly, it dropped again to about $72.3 and has been rising gradually since then.

Reasons for Likely variations in productivity levels between both African countries

Chalfin, Danieli, Hillis, Jelveh, Luca, Ludwig & Mullainathan (2016) recognized rising interests in advancing productivity and production variability in reality illustrates that marginal labour productivity substantially depends on the kind of new hired workers which is based on predictions rather than estimating causal effect. Hence, they show that via machine learning tools, productivities of workers are predictable.

As observed by Ikechi & Anayochukwu (2014), Nigerian government spends rather excessively on recurrent expenditure, rather than channelling such resources to building human capital via health and education (Oladeji, 2015; Olalekan, 2014; and Eigbiremolen & Anaduaka, 2014). Moreover, Ajose & Oyedokun (2018) note that another possible reason for productivity disparity is Nigeria's deplorable GFCF condition, which is nowhere near that of South Africa.

Moreover, poorly skilled personnel and affordability given Nigerians living standards is yet another cause since South Africans are consciously and intentionally making efforts to improve their expertise and professionalism (Ogunleye, Owolabi, Sanyaolu & Lawal, 2017). Thus, such differences must be bridged, possibly through vocational and entrepreneurship training for both skilled and unskilled workers if there is to be substantial improvement in Nigerian productivity(Ola-David, Amoo, Olurinola & Fadayomi, 2013).

Conclusion

This research compared the state of labour productivity, human and physical capital in two African countries (Nigeria and South Africa). From this, we can see that a peculiar problem in South Africa is its high unemployment levels, which is also evident in Nigeria. This is most likely due to low wages, which can be said to account for low skills and efficiency of her labour force (Rodrik, 2008). Moreover, Burger & Teal (2015) found strong schooling effects that are linked to individual earnings.Also, empirical evidence shows that South African physical capital remains the most essential resource accounting for her corporate achievements and efforts (Firer & Mitchell-Williams, 2003).

Policy Recommendation

In view of the observations from stylised facts and trend analysis, this study proposes that the Nigerian government should raise overall educational expenditures of requisite educational amenities for comprehensive education delivery. This should be in addition to ascertaining adequate budgetary allotment for sufficient health care provisions accessible to Nigerians. Also, all educational levels should prioritise qualitative curricula and government should improve health care and schooling via accessibility to many individuals to facilitate national progressions via HCD. Lastly, South African government can keep encouraging innovative ideas which would increase entrepreneurial establishments and provide opportunities for job creation of unskilled and skilled labour.

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The Effect of Strategic Management Practices on Organization Performance in the Public Sector in the United Arab Emirates (UAE)

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Abstract

Strategic management is set up with the main goal, vision, vital targets, and activity arrangements of the firm and the operational plans geared for attaining these goals. Strategic management is important for the employees and ensures to follow a career path and the strategy of the employee changes with the competitors, suppliers, regulators and customers. Once the strategic opportunities have been recognized and potential dangers considered, a list of particular steps that will be taken to actualize the arrangement ought to be shaped. The strategy is devised as a plan which is a set to detailed steps that needs to be implemented in phases to guide the organization in achieving its objectives. The strategic directions give a set of indicators that gives operational processes that are applied to various departments in the organization. The business model and operational plan ensure that the organization creates and distributes the products and services with high operational value and high quality. The aim of this paper is to investigate the strategic management practices especially on the abilities of the public sector to increase the organization performance through engaging in strategic management activities. In addition, this paper contributes to strategic management practices by exploring novel sets of managerial methods to improve public organization innovativeness in the United Arab Emirates (UAE).

Keywords: Strategic management, Organisational, Performance, UAE

Introduction

Fundamentally, the first stage of the strategic management process is commonly known as strategy implementation. In this stage, business strategy is actually implemented. It involves activities such as establishing annual objectives, devising policies for each business function, and allocating resources for the achievement of organizational objectives (David, 2007). The next stage of the strategic management process is strategy evaluation. This stage is aimed at changing or taking corrective actions in strategy and measuring and evaluating the performance. To achieve these purposes, it involves updating key internal and external evaluation matrices continuously, formed in the strategic planning stage, and identification of other internal and external factors emerged. In addition, it involves comparing actual performance with planned. If key internal and external factors change during the continuous assessment of environments or new factors are identified, and/ or during comparison of standard performance with actual performance, actual performance is found less than the standard performance. Then, this calls for corrective actions to be taken in this stage of the strategic management process (David, 2007).

As discussed above, strategic management has been one of the most influential and visible novel approaches to the art and science of management (Mintzberg, 1987; Marlin et al., 2007). Recent research has established that strategic management influences organization performance by providing

organizations with an effective framework to implement their innovation strategies (Ciabuschi and Martin, 2012; Moustaghfir and Schiuma, 2013). Thus, it seems that strategic management is an effective means for increasing the innovation performance of an organization. A great deal of research has focused on issues such as the relationship of generic strategic processes like strategic acquisition, sharing, and creation (Chen et al., 2010; Lee et al., 2013) or strategic-based assets like human, structural, and relational capital (Wang and Chen, 2013; Castro et al., 2013) on innovation performance. Even though some previous studies have examined the association between strategic management practices and an organization's performance, they have either considered only one or a few strategic management practices (Chen and Huang, 2009; Donate and Canales, 2012; Soto-Acosta et al., 2014) or organization's performance outcome indicators aside from those related to innovation (Gold et al., 2001; Lee and Choi, 2003; Atapattu and Jayakody, 2014). Unfortunately, this issue has not been explored or investigated in United Arab Emirates (UAE) yet. So, there is a need for conducting this study.

Literature Review

The word strategy originates from the Greek "stratus" which means the army and "again" assuming to lead or the art of the final (Macmillan & Tampoe, 2000; Quinn, 1988a). Up to now, several principles of military strategy apply to business things. Grant (2000) stated and emphasized that the business strategy and military strategy, allocate a variety of common principles, ideas and characteristics, where the strategy and techniques are the basic issues. However, the understanding and construct of strategy evolved over time to a company (both internal and external) and relevant to the business world. Different researchers have outlined the concept of strategy in many ways that capture its diverse components, functions and dimensions. Chandler (1962) as one of the earliest strategy theorists has outlined and defined a strategy as "the determination of long-run goals associate degree objectives of an enterprise and also the adoption of courses of action and also the allocation of resources necessary for effecting these goals". Chandler's views were later amplified by Andrews (1971) mentioned as the "strategy as a pattern of major objectives for achieving those goals in such some way on outline the type of business the corporate is in or is to be in". Different strategy theorists (e.g. Thompson, 1994; Johnson & Scholes, 2003) focused on the strategy because a company mostly utilized it or it has been thought as the main key for an organization. Besides, Johnson and Scholes (2003) stated that strategy is the direction and scope of a company over the long-run. Thompson (1994) defined strategy as a transparent direction for the organization and a way of obtaining there.

According to Mintzberg, Lampel, Quinn and Goshal (2003), the strategy is difficult to be determined within the period of one year and this includes goals and objectives. The author further elaborated that, strategic often refers to the purpose and development as formulated by some scientists and they refer to it as Advanced Strategy. Porter (1998) said that strategy is a very meaningful thing, with the main purpose is to create a competitive benefit of the organization. According to Quinn (1980), "the descriptive school of thought sees strategy formation as an emergent process where everyone in the organization goes through a process of learning is a strategist". The lesson learnt is incorporated into a plan of action as the whole. It is the belief of this school of thought that strategies must emerge in small gradual steps as the organization adapts and learns what works and what does not. Its contribution to theory is based on the fact that more people learn not just the leader of the firm, hence reducing the complexity and unpredictability in strategy formation. Strategy formulation and implementation are intertwined as they emerge.

It is also difficult to analyze and evaluate the strategy. Management strategy is not always the success of the project. It can also fail, as there are many factors that affect the outcome of the strategic process. Mintzberg et al. (2003) stated that for management strategy to be effective, it must meet specific factors to reduce the negative consequences. Quinn (1980) emphasized that the strategy must have clear objectives and also be flexible and coordinated which indicated the need for management strategy and committed leadership. The author further stated that strategy in business is needed for security (and logistics resources) and also to keep the initiatives during the performance of the tasks of responding to the challenges.

Different views and definitions of "strategy" exist (Porter, 1996). He also pointed to the many ways in which the definition of strategy, citing the common theme underlying all definitions, is a group of deliberate and conscious guidelines that determine the decisions in the future. According to Mintzberg (1978), a strategic pattern is a continuous series of decisions over the long term, holding some kind of consistency. Mintzberg & Water (1985) have developed strategies and implemented them according to the plan set (deliberate) and on the other hand, simply strategies without any form of planning. In Japan, the Japanese contractor's public companies were successful in many markets in different parts of the world due to the attention given to the business strategy (Hasegawa, 1988). U.S. banks show the highest return on equity for banks that have both strategic commitment to the planning and delivery of regular strategic management training. Companies with good performance such as The Body Shop, Sony and Merck have effectively exploited the visionary strategies. Although, the strategic management and, until recently, the activity highlights inside many public companies, today it is more widely used by many large organizations that are allocated substantial resources to the task. Price and Newson (2003) found that methods of strategic management, in general, can improve efficiency in various organizations.

Strategies in natural systems seem to emerge spontaneously from the interaction between the environment and organisms over time. Whether an individual or a population will be more o less successful to cope with environmental changes is determined by their capability to respond to such changes, or in other words, by their capability of adaptation. Therefore, there is an implicit link between strategy and the need to adapt successfully to new conditions in the surrounding environment. In this way, strategy likewise suggests advancement. Regardless of whether an individual or populace will be more or less effective to adjust, survive, and extend its descendants into what's to come in, all things considered, dictated by the historical backdrop of adjustment of their ancestors and the correct. In strategy, time and history matter.

For individuals and their organizations, it is very little unique since strategy additionally respects the mission for survival. Regardless of whether we are pretty much effective in life relies upon how we figure out how to react to the adjustments in the earth we are drenched into. That capacity will be resolved to some extent by the attributes of our identity and by the dynamic harmony amongst circumstances and boundary in our encompassing condition. In this unique situation, the strategy appears to speak to objective decision-production instead of to intuition, in spite of the fact that we typically are slanted to make concurrent utilization of both methodologies. Andreeva and Kianto (2012) defined strategic management practices as the set of management activities conducted in an organization with the aim of improving the effectiveness and efficiency of organizational strategic resources. Strategic management practices refer to the aspects of the organization that can be manipulated and controlled by management activities (Andreeva and Kianto, 2012; Foss and Michailova, 2009). Accordingly, this current research conceptualizes them as the set of management activities that enable the organization to deliver value from its strategic-based assets (Malmi, 2010; Malmi & Brown, 2008). Protecting the strategically significant knowledge of the organization from competitor imitation is a key issue for ensuring the appropriateness of intangibles-based profits (Teece, 1998). Organizations that utilize both informal and informal mechanisms of strategic knowledge protection (Olander, 2011) are likely to be more successful in terms of both competitiveness and innovation performance.

Strategic management can be defined as the strategic planning, implementation, and updating activities related to the strategic-based assets in the organization (Kianto et al., 2014). It taps into identifying the key strategic practices within the organization and building a knowledge-based strategy, as well as activities for monitoring and measuring strategic assets in the organization, and their developmental needs in relation to the business environment (Dalkir, 2005; Kianto, 2008; McKeen et al., 2005). Strategic management activities can increase organizational performance through the following mechanisms: first, they enable the organization to focus on the most value-creating activities of the organization, which is important as researchers have suggested that the intangible assets are the focal sources of competitive advantage (Barney, 1991; Conner and Prahalad, 1996; Grant, 1996; Walsh et al., 2002). Second, strategic management also enables the organization to craft strategies based on the strategic-based advantages they have over their competitors.

The ideas of strategic management issues developed over long ago with an expanded accentuation on a proactive, integrative, and esteem are driven way to deal with strategic management. The field of strategic management sees strategic assets as resources for business and management. Strategic management issues characterize how the organization carries on and tries to adapt to its business condition. Since strategic management depends on strategic management standards it generally fuses the ideas of procedure, which demonstrates that strategic management is really a sound way to deal with the management of individuals (Sims, 2007). Various researchers and professionals have concentrated the strategic management and its appropriate execution in various nations bringing about in achievement and disappointment of strategic management practice. Then again, there is another side of this marvel. Since the pioneering work of Kaplan and Norton (1992) on the balanced scorecard and their later work on strategy maps, academic and practitioner interest in, what has become known as, strategic performance measurement systems and the roles they play in organizational strategy has grown. The potential role of strategic management issues in organizational strategy has been espoused and debated in the literature. In principle, strategic management issues are said to be an important mechanism for translating strategy into objectives and measures which can be clearly communicated (Bisbe and Malagueno, 2012), facilitating the implementation of strategy, tightly aligning management actions with strategic goals, and enhancing organizational performance (Bisbe and Malagueno, 2012; Micheli and Manzoni, 2010). Academic researchers have examined whether and how these potential benefits can be realized in practice, mostly in private-sector organizations. Yet, strategic management issues are also arguably relevant and applicable to public organizations, albeit typically with some modifications that take into account fundamental contextual differences between the public and private sectors.

Earlier research on strategic management issues has concentrated basically on looking at the degree to which these frameworks are received and the variables related to their fruitful implementation (Micheli and Manzoni, 2010). Wheelan and Hunger (2000) define Strategy implementation as "the process by which strategies and policies are put into action through the development of programs, budgets and procedures in an organization. The development of strategic management involves the design or adjustment of the organization through which the varying financial, economic, human and operational changes. There are constant changes to existing roles of people, their reporting channels, their performance evaluation and control mechanisms in the company. Therefore, the environmental analysis and strategic direction have not been addressed as commonly by boards as they are for financial matters. They also establish that government authorities tend to focus additionally on the strategy than for-profit boards, which they characteristic to the government member's consideration to organizational values and mission statement. Prior studies implicitly assume that, after a system has been implemented, it functions in intended ways to generate organizational impact. Consequently, they fail to examine the links between strategic management issues and practical activities of strategizing, with the implicit assumption that performance improvement can be explained by strategic management implementation. As Bisbe and Malagueno (2012) contended, little consideration has yet been paid in experimental reviews to alternate parts that strategic management issues can play past negligible methodology execution out in the public organizations.

Given these major contracts for further research on performance measurement in the general population division, specifically investigate identified with the unforeseen part of different organizational variables (Boyne et al., 2006), this review focuses on the utilization of performance data in strategic basic leadership out in the public organizations (Luft & Shields, 2003; Olson et al., 2005; Lukka, 2010). Considerable recent research on performance information use exists in public management literature, in particular, research related to the determinants of performance information use in decision making, the characteristics of strategic management issues that are capable of producing useful information for this purpose have not been specifically studied. Because strategic management is based on strategic management principles it always incorporates the concepts of strategy; which proves that strategic management is actually a coherent approach to the management of people (Sims, 2007). Furthermore, strategic management practices enable the organization to make strategic decisions of allocation, utilization, expansion and sharing of the company's strategic base that follow the overall strategic aims of the organization. Therefore, by evaluating these all, few variables can be identified for the current study that suits the business setting on the United Arab Emirates (UAE) in terms of the public sector.

Strategic Management in the United Arab Emirates (UAE) Public Sector

Besides this oil industry, agricultural products also play a vital role in the United Arab Emirates (UAE) economy. According to Antipolis (2002), horticulture produces flavouring sustenance for a nearby market, as well as supplies crude material to the nation producing industry. Albeit an extensive variety of mineral assets found in diverse locales of United Arab Emirates (UAE), including iron metal, salt, phosphate, clay and building materials, not every one of them is currently of business significance. Therefore, the new interim government has taken an important step in public development especially for light industries (food, textile, leather, furniture, chemical, basic metal, cement and building materials) which may become more important contributors in the new United Arab Emirates (UAE) economy. Making these modern foundations has been for the most part focused on metal and concoction commercial enterprises. The legislature arrangements accentuated to assign the enormous plants outside the significant urban areas of Abu Dhabi and Dubai and the little public facilities to be appropriated to all towns on the coast or inner part of the nation. So as to create a recently modern culture all through the nation, the state wanted to make a little scale mechanical focus in pretty much all urban areas to utilize between 30 to 50 specialists and to focus basically on ladies workers to build their interests in the job workforce.

United Arab Emirates (UAE) is a developing nation spotted on the shore of the Mediterranean Sea. It is essentially a petroleum delivering nation with a bond industry, needed to build up the nation's foundation (Alghadafi & Latif, 2010). Nonetheless, it is perceived that the concrete business is not able to meet the developing requests of the United Arab Emirates (UAE) and worldwide markets. Hokoma (2010) pointed out that, for proper implementation of such strategic moves for the United Arab Emirates (UAE) public sector needs to confirm the proper practices and help from the senior managers towards usage. The official administration body ought to take genuine activities through applying an agreeable method towards a large portion of the ranges that are considered as being urgent in any compelling usage of the new vital practices. Absence of a point by point arrangement towards attaining to the full usage is impossible. Imparting the vision of satisfying the usage process with all the related representatives and guaranteeing the obliged assets for compelling execution of these practices get to be required. This implies a huge measure of assets will need to be distributed for training and preparing. The vision of enhancing the United Arab Emirates (UAE) modern area can be completely acknowledged just if all the related proficient bodies assume the full liability and cooperate to accomplish this objective.

Organizational Commitment

Mowday, Porter and Steers (1982) described hierarchical duty by (an) "an in number faith in and acknowledgement of the association's objectives and qualities; (b) a readiness to apply extensive exertion for sake of the association; and (c) a powerful urge to keep up participation in the association" (Mowday et al., 1982, p. 27). Tragically, duty has truly been found to apply minimal direct impact on real work execution, albeit reduced turnover aim and steady participation are themselves basically critical star hierarchical demeanour and activities (Mathieu & Zajac, 1990). Authoritative predecessors of responsibility have additionally been the centre of extensive consideration, with different features of the hierarchical society seen as equipped for improving or taking away from the representative's bond with the association. Some exploration on responsibility has centred upon the impact of other remarkable work encounters, for example, the initiative style to which a representative is uncovered (Morris & Sherman, 1981). Positive relationships exist in the middle of responsibility and both pioneer launching structure and pioneer thought. This relationship is obvious in mechanical settings also, with strong practices from the top administration, for example, input, affirmation and collective critical thinking related with more elevated amounts of hierarchical duty (Billingsley & Cross, 1992; Rosenholtz, 1989).

Hall (1968) said that experts ought to be allowed to practice self-sufficient judgment and choice-making in their work, demeanour which by definition would be incongruent with various levelled, bureaucratic authoritative structure. Hall (1968) additionally found that top administration, for the most

part, saw their associations as profoundly bureaucratic, while his exploration likewise uncovered that workers were a standout amongst the most "firmly professionalized" word related gatherings. It is absolutely this mix of characteristics that could possibly bring about contention in the middle of expert and hierarchical premiums, making the way of duty among representatives an essential subject for experimental examination.

Organizational Performance

Each organization has a technique and an inner activity, motivation for executing it, however cognizant or decently considered or flawed they may be (Barney & Hesterly, 2006). Now and again vital arrangements are straightforwardly expressed by the administration and in some cases; they stay verifiable in administration choices and the association's examples of operation (Abell & Oxbrow, 2002). Besides, now and then blueprints are picked after comprehensive investigation and in some cases, vital choices develop indiscriminately from chance events and recorded mishaps occasioned by the encounters and identities of past pioneers, the position of the organization in the business and the monetary circumstances encompassing its advancement (Stewart, 1998). Peng (2007) recognized that maybe, in the most successive case, a venture's menu of vital activities and methodologies is the result of numerous inner investigations and surveys, years of business criticism with respect to what worked and what did not, earlier key moves and choices, evaluations about what the future will bring and a strong measurement of experience and judgment, at the end of the day all the learning increased in time by an association.

As indicated by Hambrick et al. (1982), the points of interest of top-notch vital speculation and a profound duty to the key administration methodology incorporate the direction it gives to the whole administration progression in making clear simply what it is the organization is attempting to do and to accomplish. Henceforth, the commitment it makes to perceiving and reacting to market changes, new open doors and debilitating improvements (Johnson, 1989). The reason it accommodates administration in assessing contending solicitations for venture capital and new staff, the coordination it includes the whole technique related choice-making done by directors over the association and the proactive rather than receptive carriage that it provides for the association (Mathew & Patrick, 2007). As effectively expressed, high-performing organizations utilize their insight and worldwide mastery to deliberately attempt to affect their target markets with a compelling procedure; they attempt to start and lead, not simply respond and guard (Abell & Oxbrow, 2002). In that view, the genuine reason and estimation of the method is to concoct an activity arrange for that will effectively draw in purchasers, deliver a supportable game-changer, support the company's business sector stature, however, included aggressive weight opponents, and push execution to predominant levels (Stewart, 1998). Therefore, the success of the organization deeply relies on the proper strategic formulation, implementation and evaluation.

Conclusion

The strategic direction gives a set of indicators that gives operational processes that are applied to various departments in the organization. The business model and operational plan ensures that the organization creates and distributes the products and services with high operational value and high quality. The strategy is made at the top and executed at the bottom. The strong decision making process with the top management while implementation and execution role with the middle management of the organization, the strategy fails in an organization where the ineffective plans and unproductive work allocation in strategy execution is seen

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The Associated Factors on The Success of Strategic Management Implementation

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Abstract

In cutting edge organizational levels, people do formalize strategies as a capacity to direct and center their endeavors. In a business organization (a firm), such endeavors will concentrate on making an incentive for benefit and directing the organization towards future. In this specific situation, the earth is a market with restricted assets and along these lines in which rivalry exists. This condition may be pretty much steady; however it is in consistent change. Firms will battle to adjust to abstain from being chosen off. Strategy in here turns into a systemic and levelheaded act, a procedure that can be overseen so as to effectively achieve the objectives of the firm. strategy permits an organization to position itself effectively inside its surroundings to succeed in its most potential, whereas perpetually observance those surroundings for changes which will have an effect on it thus on create changes in its strategic set up consequently. The purpose of this paper is to discuss the general context based on the literature review on the key success of factors on the strategy implementation.

Keywords: Strategic management, Organisational, Performance

Introduction

Today, organizations operate in a very competitive global environment along with the focus on employing potential employees. However, sometimes the performance does not really achieve to the expected level due to lack of strategic management. Despite of the importance of policy formulation for business entities, research that studies the impact of policy formulation, implementation and control of strategic management on government sector are limited (Thill et al., 2014). In fact, proper strategy development has evolved from a basic step of any organization, followed by the proper management initiative to become an important technique to support organization, organizational learning, and innovation. Though policy formulation has always been identified as an important tool in the strategic management context, one observable fact is that the usage of these styles among public organizations is very limited; often they are not used to their full potential (Otley, 2003; Ulrich et al., 2013). On the other hand, the organization and public associated with the organization want to see evidence of the efficiency and effectiveness, with particular concern on quality services, service delivery and cost reduction. The public sectors in the United Arab Emirates (UAE), experienced poor reward systems, absence of strategic plan implementation, lacked effective information communication system and so on. According to many researchers and experts, the key research gap in the field of the public organizations is a better understanding of the relationship between strategic management and firm performance (Heisig, 2014; Perez-Arrau et al., 2014). Therefore, a topical issue worthy of further study is the demonstration of how engaging in strategic management practices enhances organization performance in terms of direct financial benefits or indirectly through, such as increased innovation performance.

Strategic management studies across sectors long to response to the market demand and changes in customer demand and also to the continuous changes in technology (Price & Newson, 2003). The adoption of a clear strategy in the area of management organizations at the present time is one of the main factors that influence the organizations performance (Salancik & Pfeffer, 1977). Earlier literature showed that the existence a good strategy in management is one of the significant factors that enable organizations to stay within global competitions. According to Stahl and Grigsby (1992), strategy is a road map or guide by which an organization moves from a current state of affairs to a future desired state. Johnson, Scholes and Whittington (2007) further explained that, it is not an example of daily selection; however this is a tool for future plans and related strategy for an organization. Therefore, strategy permits an organization to position itself effectively inside its surroundings to succeed in its most potential, whereas perpetually observance those surroundings for changes which will have an effect on it thus on create changes in its strategic set up consequently (David, 1988). In short, strategy defines wherever we tend to do, wherever we tend to go and the way we tend to plan to get success.

Phelan and Lewin (2000) further stated that strategic management is a plan of action designed to reach and achieve a specific objective. The strategic plan seeks to always win the position of competitive advantage over its competitors in terms of better exploitation of the existing potential and employment optimization. There is always an element of uncertainty about the future, more strategy on a range of options (strategic options) from a fixed plan (Chandler, 1962). Nag, Hambrick and Chen (2007) pointed out that strategic management is the process of analyzing the major initiatives taken by general managers on behalf of their owners, which focuses on resources and performance in outdoor environments. The authors further came out with that the strategic management determine the organization's mission, vision and objectives, through the development of policies and plans, often in terms of projects and programs, and allocate the necessary resources to implement, policies, plans, projects and programs. And often uses the balanced scorecard to evaluate the overall performance of the business and its progress towards targets.

Associated Factors on the success of Strategic Management

Stoney (2001) stated that management strategy has become more sophisticated and has been considered as a strong potential for organizations in recent decades. Stahl (2002) emphasized on the importance of strategic management process and the necessity to provide individuals concerned to ensure the success of the company. This study also indicated that the senior management of any modern organization has a great responsibility to ensure the success and overcome the high competition from global markets. Meanwhile, Hunger and Wheelen (2003) showed that the organization has to be more effective and people at every level within the organization should follow the strategic way of doing daily jobs and duties, and the process should not be limited to senior management. They also showed that the process of strategic management include environment assessments for critical information, recommend changes to enhance strategic programs and to work with others as a team.

The structure of the business is evolving dynamically not only in the relationship between subsidiaries but likewise, in a shift towards increased market presence. New markets recognize economic benefits, technological advancement and increased opportunities that globalization can bring to them, which encourages attractive global investors and business initiatives. Several specific factors motivated companies to search for business development and growth through global operations, such as markets, monetary value, competitive factors and international business environment. Consumer demand has developed and continues to influence successful economies which in turn sustain our day to day life activities. Goods from all over the universe are almost instantly available at doorsteps with affordable costs. Hence, there is a need to understand the factors associated with the critical importance for the successful implementation of strategic management in the United Arab Emirates (UAE) public sector. For better understanding, these will be discussed in the following section.

Strategy Formulation

Fundamentally, strategy formulation is defined as a process of making a decision on what to do (Carpenter & Sanders, 2009). Consequently, it is necessary for organizations to decide on "what to do" by carrying out a beneficial strategic technique for long term accomplishment (Jiang & Alis, 2009). However, the decision of strategy may constrain a specific market, manufactured goods or service. Likewise, the use of strategy is affected by the decision maker's anticipation. Strategic concern takes into cognizance challenges encountered in the current state of affairs. Thus, organizations should make a decision on "what to do" considering the study of internal possessions, potentialities and external situations (Analoui & Karami, 2003).

This strategy formulation can be identified as an input factor; because this is the foremost step is to identify the mission and vision of the organization. Rieple and Haberberg (2008) said that creating a mission and vision statement is an essential element of strategic management, which should be established before setting up an organization. Vision and mission are the basis for an organization to ascertain what is required in order to accomplish, and it must evidently state in the organization through a way of attaining long-term objectives (Jiang & Alis, 2009). Organizations generally possess a passionate entrepreneurial expectation shared among employees within the organization. They shall be accountable for an increase in the production if they utilize a recognized strategic method in organizational activities (Tikkanen, Nokelainen, Suur-Inkeroinen & Lamberg, 2009). Developing mission and values in any organizations is important. O'Gorman and Doran (1999) concluded from a study, the importance of the mission statement in the interest of the continued existence of a product or services. Hence, the importance of vision and mission actually decides the aim and objectives of the business, and it takes part in an active position in the management for an organization's progress.

Pearce et al. (2005, p. 38) describe the organisation's target as "the basic reason that distinguishes a firm from other forms of its nature and identifies the extent of its functions in product and market conditions". Pearce et al (2005:37) recognise 'mission statement to be comprehensive of the prospects of all shareholders in the organization's assessment over the long run.' Consequently, these necessitate the formulation of a mission declaration; management needs to be highly susceptible arguments shareholders, within and outside the organization. Vision supersedes utterances, it requires practical action. The vision of an organisation needs to be sustained. Once more, "that is not so much through formal plans and programmes as by unofficial activities, the rolling up of sleeves and getting in there with everybody as well" (David, 2009, p. 53). Pearce et al (2005, p. 34) argue that the mission of an organisation is the distinctive reason that places it differs from other similar companies and identifies the capacity of its functions.

Furthermore, the objectives are a universal declaration of aim or purpose (Johnson, Scholes & Whittington, 2007). Top management in any organisations usually tries to find opportunities based on particular resources. David (2009, p. 176) emphasised, "obviously assured and communicated objectives are very important for accomplishment due to the following rationales; first of all, objectives assist stakeholders to recognize their responsibility in the organisation's future and also, they also give a basis for dependable decision making by administrators whose ideals and thoughts differ". He also declared that, "objectives put forward organisational main concerns and inspire effort and achievement. They remain as standards by which individuals, factions, sections, divisions, and the whole organisation can be assessed. The objectives offer the foundation for scheming jobs and sorting out activities to be executed within an organisation. Objectives should be quantitative, computable, reasonable, understandable, demanding, hierarchical, available, and congruent with organisational divisions". Thompson et al. (2003, p. 325), stated that "the reason of setting objectives is to alter professional declarations of strategic vision and mission into precise performance results and outcomes the organisation desires to accomplish". Furthermore, the authors also noted that, when a company-wide aims are explained into precise goal for a specific organisational department and lower- cadre managers responsible for attaining them, a result-orientated environment emerges all through the enterprise. Recognising and assessing external opportunities and risks permits the organisations to come up with an understandable mission, to plan strategies in order to accomplish a long-standing objective and to make guidelines to attain yearly objectives. Pearce et al. (2005, p. 221) concluded that, "In real decision

situation, the strategic option would be complex by a diversity of interactive opportunities, possible company objectives, promising impressive strategic opportunities, and assessment criteria".

Defining strategic choices is an additional way to develop a strategy. A doubtful market situation and rivalry influence business owners of deciding the proper strategy. By applying strategies, they can recognize the weaknesses and strengths of the company which assist the owners of the business to formulate other strategies at the same time predicting potential choices for competing with their competitors. Hence, a strategic option is also required to decide the subsequent steps, "go or no go", by following business opportunities (Analoui & Karami, 2003). Mintzberg (1988) proposed that a strategic decision was governed by the productive exploration of new opportunities. Johnson and Scholes (2003) view strategy formulation as a type of strategic lens, design lens, experience lens and idea's lens. The designed lens is comparable to Mintzberg's preparation mode that observes strategic growth as an intentional placement of the organisation by a logical, critical, planned and instructional process. They also examine strategic growth as a reasonable process whereby economic forces and limitations of the organisation are examined cautiously through critical and evaluative methods in order to set up a clear strategic direction. Quinn (1988 (b)) emphasised the need why management progress can best be explained as reasonably incremental. Those strategic conclusions do not provide the opportunity to combine into a single substantial decision matrix and all reasons will be taken care of comparatively and concurrently in order to achieve a holistic outcome. Hitt, Ireland and Hoskisson (1997) argued that managers decide openly and experimentally from a wide perception in order to achieve precise commitments, making the second tangible as late as probable in order to slim the bands of doubt and to take advantage from the best accessible information.

Another methodology to strategy formulation has created progress in a bid to consider the influence of cultural characteristics in strategy formulation (Webb, 1989). The cultural analysis believes that strategies can be seen as a result of experiences, values and beliefs that are taken for granted statements and practice of the organisations. Those taken for granted statements and practices are likely to be dropped down after some period of time in a group. Thompson (1994), formulated a relationship connecting culture and strategy creation and the courage and extent of strategic transform, either through the resultant from incremental change it will reveal all essential values and culture in the organisation. Johnson (1989) suggested strategy as a predictable result of not only the cultural process but also as a political process in the organisations. He also asserts that "organisational action view" of strategy formulation argues that strategy can best be viewed as a result of the political, cognitive and cultural fabric of the organisation. The political viewpoint is of the opinion that strategy progresses as the effect of processes of arbitration involving prominent internal and external concerned shareholders (Huy, 2001).

Mintzberg (1987) succeeded in postulating a different aspect to strategy formulation by arguing that strategies can structure as well as being planned. Also, he indicated that a recognized strategy may materialize in reaction to a developing condition, or it may be deliberate during the formulation process thereafter by execution. However, when intended objectives do not generate the required actions, organisations aim becomes an unrealized strategy (Wheelen & Hunger, 1991). Moreover, the achievements of the organisation are dependent on a long-term business strategy which recognises its goals, offers a structure for accomplishing set targets and a system for measuring their success (Mintzberg, 1987). Hence, the process of strategy formulation is dependent on an all-inclusive assessment of future requirements, which transform into a cautiously planned and strategy of implementation.

Strategy Implementation

Another input factor, strategy implementation, can be defined as a management process of executing necessary activities to achieve what has been planned (Carpenter & Sanders, 2009). Woods and Joyce (2003) argued that the strategic execution plan is considered as a process which may require alterations relating to the general traditions, arrangement and/or management system of the whole organisation.

David (2009, p. 260) states that strategic management is a continuous process. This signifies that the strategic management process does not come to a conclusion once an organisation has decided on a strategy. Importantly, strategies need to be executed successfully. David (2009, p. 37) accepts that "strategies executed, serve executed serve no valuable reason." Moreover, he suggested that strategy implementation involves an organisation to institute yearly objectives, formulate plans, inspire employees, and assign assets so that formulated strategies will be implemented. Strategy implementation consists of developing a strategy encouraging culture, expanding a successful organisational structure, readdressing market endeavours, planning resources, developing and making use of information workers'ms, connecting workers reward to organisational effective performance. Thompson (1994) reveals the possibility to analyse implementation as an action that is in line with strategy formulation; where arrangements and plans are altered to take into consideration changes in strategy. Though, implementation, as an alternative of formulation, may be considered thoroughly and simultaneously as the recommended strategy is considered through before the concluding decisions are finally decided.

Strategic implementation can also be described as the "action plan" of strategic management. Quality strategy formulation cannot be separated from business entrepreneurship. Wickham (2004, p. 293) generally defined strategy as, "the actions an organisation takes to pursue its business objectives". He also suggested that strategy positively influences performance and useful strategy results for better output. The strategy is described as an assertion that concentrates on the company's aspiration and implementation. The strategy generates a feeling of agreement or reliability of action, all through an organisation. Thompson and Strickland (2003: 1989) suggested use that "good strategy implementation involves a tough fit connecting the method things are completed internally and what it will take for a strategy to do well". A sequence of requirements must be generated which will involve strategy and the organisation's proficiencies, capabilities, policies and structure, budgetary allocation, internal support system, compensation structure and corporate culture (Grant, 2000; Thompson, 1994; Webb, 1989).

The setback that confronts most organisations is the change from strategy formulation to strategy implementation. David (2009, p. 38) stressed in the statement that, "the changeover from strategy formulation to implementation necessitates a shift in responsibility for separations to separation and functional managers" Ehlers and Lazenby (2007, p. 212) defines strategy implementation as, "the development that translates strategic plans into a sequence of action tasks, and guarantees these missions are executed in the strategic plan objectives of strategic plan are accomplished. In other words, strategy implementation is the communication, interpretation, adoption and enactment of strategic plans". It is evident that the strategic implementation interprets idea or strategic into an achievement. The leadership must make certain the incorporation strategy to circumvent uncertainty. An incorporated process to strategy, culture and formation translates to continued improvement. Pearce et al (2005, p. 288) noted that immediately corporate and business strategies have been decided, and long-standing objectives are set, strategic management process progresses into a crucial new segment transforming a strategic idea into organizational achievement. The slayings of two well-worn expressions, they progress from "planning their work" to "working their plan" as they alter their centre of attention from strategy formulation to strategy implementation." In the perspective of the public sector, the responsibility of top management as strategic decision-makers has a superior impact for executing the strategy and they have power in decision making that influences the entire organisational structure (Jiang & Alis, 2009). Managerial expertise is crucial for management to implement strategy accurately and properly. Certainly, successful strategies are dependent on effective implementation (Carpenter & Sanders, 2009).

Strategy Evaluation

Besides a few input factors that can be treated as an independent variable, the final process of strategic management is control and assessment, in which the company performance is evaluated to its prospect (Miller & Friesen, 1984). For the time being, managers receive information from their assistants to take timely and corrective actions to resolve the challenges (Analoui & Karami, 2003). The strategy assessment and control are the final phases in the strategic management model. Consequently, the

comparison results with required performance, managers have to make amendments in the formulated strategy and/or implementation (Karami, 2007). Anderson and Sohal (1999) noted that strategic evaluation and control are significantly significant and should not be disregarded by the organisation. It aspires at investigating the possibility and practicality of strategies that suit in the firms' economic progress or not. However, strategy evaluation consists of three fundamental activities (Aaker, 2001; Andrews, 1971; Carpenter & Sanders, 2009; Chandler, 1962; Hitt et al., 1997; Karami, 2005; Macmillan & Tampoe, 2000):

- Revaluating the possible external and internal reasons attributed to the source of the present strategies,
- Evaluating the performance output, and
- Adopting acceptable actions

The entire progression of strategic management is illustrated on a model chart designed by David (2009, p. 46) and it is incorporated three-phase decision-making structure, as demonstrated in Figure 2.5. The model chart is imitated to develop the structure for this study. Hence, this report will focus on strategy formulation and strategy implementation, particularly with their incorporation. The reason for adopting this option is that strategies cannot be executed successful possesses a crucial problem to strategic leadership and the entire organization. Majority of organizations expends extra assets in the formulation stage and occasionally become unsuccessful in implementing the strategies, thus consequence is unproductive and uneconomical expenses of limited assets.

Formulation of Strategy in an Organization

A policy is a broad guideline for decision making that links the formulation of a strategy with its implementation. Companies use policies to make sure that employees throughout the firm make decisions and take actions that support the corporation's mission, objectives, and strategies. Floyd and Wooldridge (1994) define senior management and the senior director as: "the coordinator between daily activities of the departments and the strategic activities of the hierarchy and organizational structure." They stress the senior director's role as "a link, departmental objectives and operational workers more than the 'hierarchical' definitions." Gilbert (1994) stated that quality management standards provide a common yardstick against which purchasers can check an organization's quality management system, resulting in a quality assured organization. The quality systems in an organization create an environment that supports innovation, creativity, and risk-taking in meeting customer demands, using participative problem solving that incorporates managers, employees, and customers. The adherence to quality management systems ensures that mutual co-operation of everyone in an organization and associated business processes to produce products and services which meet and, exceed the needs and expectations of customers. The strategic management in an organization cannot be successfully used as an aggressive weapon unless quality can be precisely characterized, measured, assessed, and observed over the long haul. Through such investigation, a healing centre can choose how to consume it constrained assets toward those quality change ventures which will affect client impression of administration quality the most.

Conclusion

The development of strategic management involves the design or adjustment of the organization through which the varying financial, economic, human and operational changes. There are constant changes to existing roles of people, their reporting channels, their performance evaluation and control mechanisms in the company. Strategic management are important for the employees and ensure to follow a career path and the strategy of the employee changes with the competitors, suppliers, regulators and customers. Once the strategic opportunities have been recognized and potential dangers considered, a list of particular steps that will be taken to actualize the arrangement ought to be shaped. Quantifiable results are portrayed as described to every target and must be dictated by the statement of purpose. Obligations regarding actualizing the objectives and targets ought to be built. The key

arrangement sorted out through objectives and goals offers an arrangement of quantifiable results which can be assessed.

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Quality of Work-Life and Organizational Culture in the Context of United Arab Emirates

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Abstract

For an organization to attract and retain experienced and qualified employees, smart quality of work life is important. Work-life efficiency is a vital topic with much significance in the life of the employee. Work-life efficiency (EQWL) suggests a good work-life balance that also guarantees organizational effectiveness and job satisfaction for employees. This paper attempted to review literature in the context of UAE on the relationship between work-life experience of the employees and organizational culture. EQWL 's study is very valuable since it can distinguish between high and low performers among organizations. There is, however, a significant gap in studies to investigate the quality of such work-life at UAE. The work-life quality studies conducted in UAE are less and less limited, so it is important to conduct more and more comprehensive research in this area. Especially when the enhancement of work-life quality and its relationship with job satisfaction is advocated is very significant.

Keywords: Quality of work-life, Job satisfaction, UAE, Public sector

Introduction

The United Arab Emirates (UAE) is keen to accept an open market economy that supports free trade, free movement of capital and resources, facilitates investment, and encourages work-life quality to play a greater role in the growth cycle in various economic activities. The country explicitly seeks to take advantage of advanced-state experience in achieving economic growth and development. In line with this strategy and as part of its efforts to broaden and diversify the economic base, the government has taken significant measures to restructure the economy to enhance the private sector's position in the economic and social spheres (Schilirò, 2013). Through widening the reach and duration of the privatization process, which plays a crucial role in the liberalization process and the development of the economy, it has allowed the private sector to take over many of the tasks that the government has carried out itself (Hvidt 2013). This is considered one of the key ways of equal wealth distribution, the widening of the ownership base, the implementation of new management structures and modern strategies for public institutions, and the development of more effective financial policies that minimize spending and help improve the quality of different services (Toledo, 2013). This move will also result in developing and diversifying goods and services at competitively affordable rates. Hence, the national economy's competitiveness will be improved at global and international level. This will also lead to a reduction in bureaucracy, national savings and help eliminate corruption and nepotism, as the private sector, focused on cost and operational economization, will apply appropriate economic standards in the job cycle (Toledo, 2013).

Literature Review

Quality of work life is a broad term covering physical and psychological health, economic circumstances, personal opinion, and environmental engagement (Khorsandi et al., 2010). In existing administration, the perception of the quality of work-life has been transformed to a social issue, while in the past decades only the personal life was emphasized (Mirkamali & Narenji Sani, 2008; Swapna, 2015; Ahmat et. al., 2013). The definition of work-life quality is subjective imagination, and organizational staff's understanding of the physical and psychological desirability of the work environment and their job circumstances (Yavari, Amir Tash, & Tondnevis, 2009). The quality of work-life has been described as the reaction of workers to work; in particular its important outcome in terms of job preferences satisfaction and psychological wellbeing (Mejbel & Almsafir, 2013), in line with this concept, quality of work-life emphasizes personal results, work experiences and ways of improving added order in order to fulfill non-public preferences (Ahmad, 2013). Walton provided a theoretical model to explain the quality of work-life, which consisted of sufficient and fair pay, a secure and healthy environment, constitutionalism in organization, preparing the potential for continued growth and stability, social connection of work-life , social integration, human capacity creation and also the complete house of life (Walton, 1973). A lot of research has been done on the quality of work-life since thirty years ago, and findings suggested that there is a clear positive relationship between EQoWL and employee satisfaction (Adhikari & Gautam, 2010; Fatihe et al, 2015; Ramawickrama & Pushpa Kumari, 2017).

Job satisfaction has been described as information, awareness and positive attitudes and reactions of career personalities that are influenced by factors such as the work environment, the organizational structure, the relationship between the work environment and socio-cultural factors (Mirkamali & Narenji Sani, 2008; Armstrong 2006). Over the last five years , the population of the United Arab Emirates (UAE) has risen to approximately 9.5 million, and the local population constitutes approximately 1.4 million (15 percent) of the country's total population (Snoj, 2015). Having benefited from the government's comprehensive higher education opportunities, Emirates women, with an overall literacy rate of 91 per cent, account for a large portion of the country's graduates and are projected to be actively engaged in the country's economic growth (Jabeen, Friesen & Ghoudi, 2018). Different survey-based evidence has identified Emiratis's strong preference for public sector employment (Al Waqfi & Forstenlechner, 2012).

In UAE, the EQWL is becoming an important human resource management subject and has become a top priority for staff across the world. Some public and private organizations in the UAE are attempting to recruit and maintain their valued workers by introducing and maintaining a successful EQWL system strategy and policies (Jabeen, Friesen & Ghoudi, 2018). It is not enough for organizations to have good visionary leaders; rather, organizations need to build a distinguished work atmosphere to achieve their strategic goals (Zare Janani, 2015), and Quality of Work-Life (QWL) has recently become an significant issue (Narehan et al, 2014; Zare Janani, 2015). In practice, several researchers have agreed on the value of QWL for organizations seeking to boost their employees' levels of job satisfaction and engagement (Normala, 2010; Mirkamali & Thani, 2011).

In addition, Narehan et al. argued that the company should continue with improvement of QWL in order to increase the quality of the product or service to the company. The study stressed the link between work environment and QWL. In reality, some researchers considered QWL as "an indicator for paying attention to the needs of humans and putting them in the content of jobs" (Mirkamali & Thani, 2011). This means that if they want to succeed and thrive in the current competitive environment, management will give high priority to the needs of the most important component of their company, namely, human resources. Job quality is a vital term, having much significance in the life of an employee (Islam, 2012). Work-life quality indicates a good work-life balance which also guarantees organizational efficiency and job satisfaction for employees (Islam, 2012). This research study attempted to find out the relationship between work-life quality of employees and job satisfaction, and also to find factors that influence the quality of work-life of employees in the Abu Dhabi Emirate Scientific Centers & Presidential Camels Market.

Quality of work life in the UAE

Quality in a company is described as a benefit, as a premium, as conformity determination, and as meeting the needs of the consumer. Smart working quality is critical for an organization to attract and retain qualified and experienced employees (Johanim et al., 2018). Employees are any organization 's prime assets and their success or failure depends on their skills and results. In order to survive in the competitive market attributable to liberalization, privatization and globalization and to lower employee rates, the standard of work-life initiatives is vital, motivated employees and happy customers are the backbones of any productive organization (Fauzaia et al. 2018).

Growing demographics in developing countries, and the need to have an attractive business climate, need enhanced infrastructure. There is a growing demand in developing countries for higher quality in the delivery of services, whether healthcare, electricity and telecommunications or transportation, and whether they are delivered to the public or to businesses. And government-wide focus is put on remaining in the management of public finances. The disparity between the burden on the general public purse and also the resources out there to serve them leads governments to appear at whereby infrastructure is built, services are given, and business in collaboration with the personal sector is progressive.

EQWL's study is very interesting since it can differentiate between high and low performers among organizations. There is, however, a significant gap in studies to investigate the quality of such work-life at UAE. This study aims to investigate the relationship between work-life productivity of the employees and work-life satisfaction in the public organization of the UAE. There are good numbers of local and non-local people working in public organizations in UAE, and they contribute to their organizations a certain level of valuable time. We do offer their utmost to gain a responsibility and helpfulness for organization, though.

However, the standard of work-life is such a phenomenon that requires some balance in both professional and personal life (Pio & Tampi, 2018). The goal of this study is to identify factors which directly affect the quality of work life. Getting a good level of work-life experience is very necessary if the employee of every company wishes to give the company its high activity effort. Quality of work life is an attitude or group of leaders that maintains that workers are dependable, accountable and able to make a positive contribution to the company (Gupta & Bag, 2019). However, work-life efficiency is strongly affected by job satisfaction and external environment, as well as personal like.

The work-life quality studies conducted in UAE are less and less limited, so it is important to conduct more and more comprehensive research in this area. Especially when the enhancement of work-life quality and its relationship with job satisfaction is advocated is very significant. There was no research in a UAE public agency on the quality of work-life and job satisfaction of the employees. Furthermore; according to the importance of these two variables for advancing organizational goals and creating greater performance, as well as certain situations in the Scientific Centers & Presidential Camels sector in Abu Dhabi Emirate such as a shortage of amenities, this study aimed at determining the relationship between work-life quality and job satisfaction in the Scientific Centers &

Organizational Culture

Organizational culture consists of the culture of organization through different referents such as managers, superiors, and peers. Knoll and Gill (2011) clarify that organizational culture in peer culture and organizational culture in subordinate is not necessarily related, but the organizational culture in superior is strongly linked to insubordinate organizational culture, and peer organizational culture. The importance of the cultural relationship of organization culture or organization in preserving organizational culture has insisted on engaging in exercises to construct organizational culture (Knoll and Gill, 2011). Positivity in a leader results in followers showing higher leadership organizational culture and a greater appreciation of the efficacy of leaders (Bhandarker and Rai, 2015). It also describes how proactive leadership contributes to a favorable organizational climate. As a consequence,

the positive atmosphere generated within the company produces positive interpersonal relationships. Organizational culture can be regarded as one of the most common and controversial ideas in the study and practice of management. Therefore, there is no widely accepted definition for the word culture of the organisation. First appeared in the 1970s and 1980s, the idea of organizational culture (Hofstede, 1981; Schwartz & Davis, 1981), after which other scholars developed different theories and meanings for this idea.

Schein 's organizational culture model began in the 1980's. In organizational cultures, Schein (2004) identifies three distinct levels: artefacts and procedures, spouse beliefs, assumptions. The three rates allude to how much the eyewitness perceives the complex social marvels. Artefacts incorporate any components which are clear, manifest or verbally identifiable within an organization. Technology, furniture, traditional clothes, workplace jokes, all embody artefacts of organization. Artefacts are the distinct components of a society, and it is not a portion of the way of life that individuals view them. Spouse principles are the embodied beliefs and behavioral standards of the company. It's the way individuals talk to the company about themselves as well as others. This is expressed frequently in official rationalities and open character proclamations. Frequently it may be a prediction of what the individuals want to turn into for the future. Cases of this would be polished employee capacity, or a mantra of "family first."

Inconvenience may arise if the values adhered to by leaders do not obey the deeper implied assumptions of the way of life. For few purposes, this work integrates Schein's concept of organizational culture. The shared basic assumptions in this model are the deeply built, understated behaviors that are typically oblivious; nevertheless, they constitute the substance of culture. Such perceptions are generally embedded so much in the complexities of the workplace that they are hard to detect from inside. This model is therefore one of the appropriate models for the business organizations in the Abu Dhabi government organization to assess the current situation of transformational leadership behaviour, organizational culture, and job efficiency. Jerónimo García et al (2018) proposed that there is a positive relationship between the corporate culture and both consumer satisfaction and corporate efficiency.

The Relationship between EQWL and Organizational Culture

In Islamic Azad University of Tabriz (IAUT), Valizadeh and Ghahremani (2012) analyze the relationship between organizational culture and employee quality of work-life. The findings showed that there is a strong and significant connection between the organizational culture and the quality of the work life of the employees. Each aspect of work-life quality has a direct and significant relationship. -- University controlled community is kind of an intellectual one. Rahmawati and Setiawati (2017), in their study of the impact of work-life quality (QWL) and organizational culture (OC) towards employee efficiency (EP) and job satisfaction (JS), found that QWL and OC had an important and positive effect on EP and JS. JS also had strong and constructive impact towards EP. QWL's indirect impact toward EP through JS was greater than direct effect, and OC's indirect influence toward EP through JS was greater than direct effect. Young and Ruggiero (2011) studied the causes and predictors of organizational performance, with a emphasis on organizational culture and work quality. The findings indicate a strong connection between organizational culture, work-life efficiency, and organizational effectiveness. Vignesh Shankar (2014) defines the consistency of employees ' work-life and productivity, and their effect on the culture of the company. The findings indicate that the quality of work-life and organizational culture are significantly related.

Conclusion

The study was important not only to the Abu Dhabi public organizations directors but also other managers in other industries. The government ministries and policymakers may also gain knowledge of the effect of privatization on public organizational performance of Abu Dhabi Emirate. The government agencies may make use of this study, as it provides complementary knowledge on privatization and organizational performance and uses the knowledge to develop policies that enhance positive participation of such organizations. The study aimed to bridge the gap in knowledge of EQWL

on organizational change and performance of Abu Dhabi public organizations. Such knowledge may be used by researchers and scholars to add to their understanding of WQWL in the Abu Dhabi Emirate. The thesis was to provide the foundations and material for further work related to it. This also presented valuable new comparative insights to tackle problems raised by the relationship between the EQWL and work satisfaction.

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The Relationship between Employee Quality of Work-life and Job Satisfaction

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Abstract

This paper aims to review the body of literature on the relationship between employee quality of work-life and employee job satisfaction, in general, contextualized it with an interest in the process affects employees' quality of life. The available literature varies significantly in approach and emphasis as authors tend to specialize in individual business or macro-economic topics. There is little structured research and much of what is written tends to explain the reluctance of regional government including comprehensive programme. In essence, there has been little academic literature written on the relationship between EQWL and employee job satisfaction both in the private and public sectors.

Keywords: Quality of work-life, Job satisfaction, Employee

Introduction

Job satisfaction is called a good feeling about one's work. Newsstrom (2007), job satisfaction as a set of feelings and emotions with which employees view their work. One of the main factors driving growth efficiency expansion is assumed to be in the health care facilities and job contentment of the female paramedic professionals (Hanan, 2009). Intellectual depiction of the import of values by an employee that vary about job satisfaction or dissatisfaction. For example, some employees in their jobs may exert a sense of accomplishment, as other employees do not. Oldham's and Hackman (1980) were found to be identical, comparing blue and white-collar staff, and categorizing them by the extreme insistence that the ultimate stimulating tasks were not as competitive as job security and blue-collar workers' bonuses. By comparison to blue-collar workers, the determinations also suggested that inspiring and diverse initiatives were of advanced importance to white-collar workers (Hackman & Oldham 1980).

Literature Review

Research findings from Okele and Mtyuda (2017) suggested that a shortage of funding, too many cou rse crowds and indiscipline among pupils were serious sources of dissatisfaction among the teachers. Management effects are other causes of work dissatisfaction among teachers. All of these factors gen erate disengagement among teachers and filled their work with negativity. In second career teachers, Troesh and Bauer (2017) investigated work satisfaction and stress as compared to first career teachers and the role of self-efficacy in this context.

Results showed second career teachers are extremely pleased with their profession relative to first car eer teachers.

Tharikh et al. (2016) analyzed the data, and the findings showed that there is a statistically significant and positive relationship between employee satisfaction, organizational engagement and organizatio nal nationality. Spencer and Byrne (2016) suggested high job satisfaction for senior managers compar ed to junior level managers. Darrat et al. (2016) indicated that organizational job embedding is optimi stically related to organizational deviance, interpersonal deviance and direct client deviance among sa lespersons with lower workplace satisfaction. However, among salespeople with higher job satisfacti on, work embedding is negatively related to organizational deviance and not significantly associated with either relational or client directed deviance.

Robertson and Kee (2016) have studied workplace satisfaction in a computer-mediated context, particularly with social media use. Results showed that employee satisfaction at wo rk is linked optimistically by the amount of moment they spend on Facebook connecting with a collea gue. It also found that part- time employees reported having spent the increasing amount of time with their colleagues on Facebook, and that agreement employees reported the greater degree of job satisfaction at the workplace. Results of Monga et al. (2015) revealed that pay, social association, contact, senior citizens' attitudes, workplace environment and teamwork are more relevant than the factors of training and progress, honor and reward, nature of work, job security, morality and clarity of role in determining bank workers' workplace satisfaction. Saner & Eyupoglu (2015) investigated whether there is work satisfaction amongst bank workers. The study revealed bank workers were moderately filled with their job satisfaction.

The current organization claims the job contentment of female paramedics is the product of rational organization and has a direct link to leadership and work commitment through good management and encouragement to health care organizations (Giallonardo et al. 2010) (Wong & Laschinger 2013). Finally, contentment with the job for female paramedical workers is more closely linked to exact problems such as work-related environment (Hamama et al. 2014) (Kinzl et al. 2004) or ethics (Goldman and Tabak 2010).

Meanwhile, Platis et al. (2015) studied the level of work contentment with female paramedical professionals being happy with self-occupation. Results have revealed that proper management plays an important role in creating superior workplace environments. A current female paramedical professionals management has to face a lot of demanding situations such as fast changes in the area of medical and paramedical services, the difficulty of female paramedical professionals' profession and of course the mental effects incurred by the nursing work. Additionally, the willingness of female paramedical professional managers to speak to the employees and respect their views despite the high importance of the workforce of the female paramedical professional.

The association in the workplace is also measured strongly amid output and contentment. Personal feelings, thoughts and even attitudes of women paramedic's professionals play a critical role in their success, in particular for medical and paramedical services. This research investigation highlights several issues such as intensions, knowledge, individual culture which needs further investigation. Bardan and Youssef-Morgan (2015) found that Psychological Energy, anticipation, endurance and positivity are optimistically related to the work contentment of workers, individually and when developed into a whole in the high order.

Effect on Labour Market

Thompson (2016) highlighted the UAE labour market of the UAE may be characterized as being two-tiered and constitutes one hand expatriates and their subsets of various nationalities and occupational groups on the one hand and the Emirati population segment of the labour market on the other. State-owned assets in the UAE were not established primarily to provide strategic public goods and services to the minority Emirati population but equally as important they fulfil an additional goal of being used as a part of a broader citizen empowerment policy directive. Having said that, it would be remiss to

conclude that privatization would on the expatriate segment of the population more than how it would affect the well-being of Emiratis who essentially the government would not be unwilling to downsize.

Employees Quality of Work Life

Leaders in the new time have been confronting stem difficulties in this bleeding edge of innovative progression and the procedure of globalization. Free market rivalry, open-showcase economy, exchange progression, cross-fringe megamergers and acquisitions, deregulation, satellite media transmission, innovative headways, and developing worldwide financial reliance have brought nations closer than any time in recent memory. Further, online business, Internet transformation, territorial power coordination, regular monetary forms and multifaceted decent variety in the workforce have consistently been changing the conventional business practices and influential positions far and wide. Worldwide challenge and a changing business condition have incited a hierarchical change because of the expanded weights to improve proficiency and execution. As the piece of workforce keeps on changing, organizations concentrating on nature of work-life (QWL) of representatives are depend on to pick up influence in enlisting and holding profitable individuals. QWL is a complete program assigned to improve workers' fulfilment. It is a state of awareness about individuals, work and association and makes a feeling of satisfaction in the brains of the representatives and contributes toward more prominent occupation fulfilment, improving efficiency, adaptability and in general adequacy of an association.

Concept of Employees Quality of Work Life

Job Life Quality carries various consequences depending on different understandings and practices. In 1979, the American Society of Training and Development formed a committee on the QWL, and the committee described QWL as "a work association method that empowers its individuals in all dimensions to take an interest effectively in molding the environment, techniques and outcomes of the association. This esteem-based approach is aimed at achieving the twin goals of improved association viability and improved quality of life at work for members." Nadler and Lawler (1983) have shown that the definition of QWL has undergone a shift of change over time. QWL, which was known as a 'component' in the 1969-1972 period, has become a 'methodology' in the midst of this era.

QWL, as a variable, means a person's response to work or the individual outcomes of the work involves. It concentrated on such individual results as employment fulfilment or emotional well-being, with an accentuation on the effect of the work on the person. As a methodology, QWL concentrated on the individual as opposed to authoritative results, yet the accentuation appeared to be on the joint work the executives' co-usable undertakings, especially those went for improving results for both the individual and the association. QWL is viewed as a lot of strategies, methodologies or advancements for upgrading the workplace and making it progressively beneficial and all the more fulfilling. Here, the QWL is progressively synonymous with so many ideas as self-sufficient work gatherings, work advancement, on the structure of new plants as incorporated social and specialized frameworks. QWL as development is by all accounts a greater amount of an ideological explanation about the idea of work and the specialist's association with the association. At this stage, the terms, 'Participative Management' and 'Mechanical Democracy' ended up perfect frameworks of the QWL development. As an umbrella idea, QWL is viewed as a worldwide idea and all authoritative improvement or hierarchical viability endeavours would, in general, be named as an integral part of QWL.

Factors Influencing EQWL

Work is an integral part of everyday life since it depends on our livelihood or profession or business. We spend about twelve hours a day on average in the workplace which is nearly one. Third part of our life; that influences the overall quality of our life. It is therefore expected that there will be work satisfaction, peace of mind, fulfilment of completing a mission, without any fault, and fruitful, positive and purposeful spending time. While it is a small step towards our lifetime target, it gives us the satisfaction of completing the day's work and the eagerness to look forward to the next day at the end

of the day. If the feeling is good, we love the work-life, we blame the factors responsible for it if it's wrong. The factors affecting and determining the degree of work-life quality are attitude; environment; opportunities; nature of work; people; stress level; job prospects; challenges; growth and development; and including risk and reward.

Attitude: The individual entrusted with a particular job requires sufficient knowledge , skills and abilities, appropriate experience, enthusiasm, level of energy, willingness to learn new things, dynamism, sense of belonging to the organization, participation in the work , interpersonal relationships, adaptability to changes in the situation, openness to creative ideas, competitiveness, zeal, ability These are positive attitudinal factors that decide work acceptance and consistency with improved results, which have a reasonable effect on the QWL

Environment: The job may include interacting with customers with a varying degree of tolerance, interests, behavioral habits, level of understanding; or it may involve working with dangerous machines such as drilling pipes, cranes, lathe machines, welding and soldering machines, or even with animals where full safety measures need to be taken. It's a reality that job requires a lot of focus, alertness, mental awareness, eye coordination, hand and body, often a high degree of flexibility, tactfulness, empathy, and emotional sensitivity and power. If positive, the atmosphere prepares a man to work efficiently both mentally and physically and the opposite is true when negative.

Opportunities: Some jobs offer learning, study, experimentation, self-development and skills improvement opportunities, creativity rooms, public attention, exploration, celebrity status and loads of fame. Others are monotonous, repetitive, slow, predictable, without space for change and dull in any way. Of example, the former are fascinating and also very satisfying in generating value for improved results while enjoying it while the latter demotivates contributing to low QWL.

Relationship between EQWL and Job Satisfaction

Gupta and Bag (2019) analyzed the relationship between job satisfaction and the efficiency of bank employees' work-life factors; their findings indicate the existence of variation in job satisfaction as explained by work-life efficiency constructs. A negative correlation with job satisfaction has been demonstrated by the unconductive work environment. The research envisages bringing valuable knowledge to the organizations' top management level to increase the overall work satisfaction of workers (Gupta & Bag, 2019).

Guzi and Pedraza (2015) examine the role of working conditions and job characteristics in relation to three indices of subjective well-being (SWB): life satisfaction, work satisfaction and work-life balance satisfaction. The findings shed light on the significance of such workplace features not just in assessing work satisfaction but also in other subjective areas of well-being. The findings support the spillover perspective hypothesis, according to which satisfaction in one field influences other domains (Guzi and Pedraza, 2015; Ahmad et. al., 2013).

Pio and Tampi (2018) are researching the impact of spiritual leadership on ethical behavior, work-life efficiency (WLQ), job satisfaction, organizational engagement and performance of the employees. The findings showed substantial direct spiritual leadership effects on work-life quality, spiritual leadership on job satisfaction, work-life quality on job satisfaction, work-life quality on organizational citizenship activity, work-life satisfaction on organizational citizenship behaviour (Pio & Tampi, 2018). Arif and Ilyas (2013) are discussing different aspects of work-life quality (WQL) as it affects the lives and attitudes of private university teachers in Lahore, Pakistan. It was found that perceived job importance, job climate; work-life balance and satisfaction with relationships in life were the major factors that influenced work attitudes and perceptions of overall work-life quality among employees.

Lee and Chan (2015) study the quality of work-life and job satisfaction among frontline hotel employees, their analysis examines perceived quality of work-life (QWL) needs attributes among front-line employees in the lodging industry, assesses asymmetric relationships between QWL attributes and job satisfaction (JS) and prioritizes QWL attributes for successful management of JS (Leee and JS) The

result indicated that each QWL attribute had major asymmetric or linear impacts on JS or work dissatisfaction (JDS) as well as others. Jabeen, Friesen, and Ghoudi (2018) investigate the quality of work-life (QoWL) and its effect on job satisfaction and turnover (job-leaving) intention of Emirates women working in various public sector organizations in the UAE. The results indicated that QoWL was found to have a significant relationship with all variables in the model, and as hypothesized, it was found to have a positive effect on job satisfaction and a negative impact on turnover intention.

Conclusion

This paper explored a multiplicity of areas that interrelated with privatization. The literature on the nature, methods, and the political economy of privatization were explored. In, the chapter delved briefly into how privatization would impact on the lives of employees in general and to a lesser extent in the United Arab Emirates.

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The Effect of Perceived Organizational Support on Job Performance

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Abstract

The idea of perceived organizational support (POS) has gotten extensive enthusiasm among authoritative conduct analysts. They have recognized the precursors and outcomes of POS and its mediating and moderating roles between numerous factors. Perceived organizational support characterized as individuals' worldwide convictions about the degree to which the association thinks about their prosperity and qualities their commitments. Employees may utilize apparent perceived organizational support to pass judgment on the potential increase of material and emblematic advantages that would result from exercises supported by the association.

Keywords: Perceived organizational support, Organization efficiency, job performance

Introduction

There is a strong evidence in the literature that supports the significance of the job performance of workers , which in turn influences professional conduct (Won Kim et al., 2017; Kim & Koo, 2017). Employee performance in government sectors is well thought-out and significant in its relationship to organizational productivity and outcomes; thus, it is expressed as a key factor in enhancing organizational performance (Bridget Rice et al., 2017; Johanim Johori et al., 2019). While the value of employee performance is well understood (Tanya & Nicholas, 2013; Won Kim et al., 2017), less is known about how organizations enhance job performance of their workers through organizational processes (Sununta & Patarakhuan, 2016).

The ability to measure job performance has been considered over the last few years as an important prerequisite for development within organizations, both public and private sector, one of the significant methods utilized to improve competences of organization has been through their implementation of employee job performance and measure their capability (Soumendu & Kapil, 2017). In Human Resource Management, the development and arrangement of current employee job performance is seen as a key factor. A public sector employee success in UAE has many advantages for an organization by having a standardized strategy that allows for a consistent emphasis on programmers, strategic strategies, priorities and results. Additionally, the work output of employees tells workers how they contribute to the organization's success. Employee performance assessment provides organizations – and the different management levels within the company – with details about how well the company performs, whether it has achieved its targets and how consumers are pleased, thus helping the organization enhance what it does (Osman Karatepe, 2012; Mon & Tae, 2015).

Most of all, organizational support; for employee development, such as high equity rates and good working conditions are very critical. When the company's employees are respected and paid, they will be more relaxed and satisfied, and clearly show their loyalty to their organization and perform highly for their employment (Sununta & Patarakhuan, 2016). Despite the fact that organizational respect can be found across a variety of organizational dimensions, the current research focuses mainly on perceived organizational support (POS) for employee effectiveness. This relationship can be logically explained by understanding that POS and its interactions are growth variables that appear for an organizational commitment while employee output is a variable outcome. It is also assumed that the efficiency of organizational processes is likely to influence the performance of employees (Imran et al . , 2018). Taking into account previous research findings indicating important relationships between POS and employee job efficiency, the following study takes a different view as it questions the evaluation of POS' contribution directly to employee work performance.

Literature Review

The effectiveness of an organization, in the end, relies on the quality and productivity of its human resources. Patton concluded that human resource policies should help executives, department heads or supervisors better understand what the human resource team should bring to the successful table. "(2007, p.24) HRM 's role is to turn the company's strategic goals into human resource policies, and to establish human resource activities and strategies that create competitive advantage (Convertino, 2). Organizations have tried to improve their workers' job performance in order to meet high levels of productivity, quality and effectiveness (Awais et al, 2018). Job performance therefore needs to be clearly described and completely understood by the workers who are supposed to perform well at work. Job performance can usually be split into two parts job performance and contextual performance from a more analytical viewpoint (Stacy Ann et al , 2018). Task success refers to the particular roles that are recommended for each work title (Stacy Ann et al, 2018). It includes the activities that help sustain the technological center of an organization or the method of turning inputs into outputs of an organization. In other words, work success includes all actions that are specifically related to primary job functions and, in short, is the abilities of tasks that are officially recognised as part of the job of the employee (Stacy Ann et al, 2018).

The Relationship between POS and Employee's Performance

To contextualize the concept of perceived organizational support and performance of the organisation. Byrne & Hochwarter, (2008) outlines that perceived organizational support is considered a resource that can influence performance positively by reducing stressors and encouraging engagement. Although organizational efficiency is an omnipresent term, management books are defined by Griffins (2006) as the capacity of an organization to acquire and use its limited resources and valuables in the pursuit of its operational goals as quickly as possible. The connection between perceived organizational support and organizational performance was developed based on a recent empirical focused, guided study by Zhang and Tekleab. Some of the research findings revealed: The study reveals that work pressure, work power, and perceived organizational support have a direct effect on in-role performance from the implementation of two theories and the data collected from some 594 employees employed by three companies are based in China. Significantly, two-way and three-way interaction effects show how in-role efficiency is at its best while job control and POS are both high , compared to when one or both is low (Zhang and Tekleab, 2018).

Mohamed and Ali (2015) discussed some of the results from the study conducted among academic and non-academic workers at a Malaysian University in their publication entitled "The Impact of Perceived Organizational Support on Employee Job Efficiency." The inference drawn from the study review is that there was a positive strong relationship between these two variables, since the independent variable POS had a positive effect on the output of dependent variable work. It followed that workers with good views of their employers and perceive their employers as generally caring for their well-being would, that type of attitude would positively affect their job performance. Referring to another earlier piece of study, Isaks' (2002) review of this led to the conclusion that when there is a high degree of

understanding, they would reciprocate to good job results from organizational justice. There are growing empirical studies that have shown a positive relationship between perceived organizational support (POS) and performance of the employees. Conversely, there are other research that have also shown that only a moderate association between support and success has been seen, according to Byrne & Hochwarter, (2008), indicating moderators influence this association. Some of the research 's unexpected findings show that some of the 241 workers surveyed those showing high cynicism personally construe support rates negative. Specifically, performance was best for cynics when perceived support was only at moderate levels.

Conversely, performance was lowest for cynics when perceived support was either high or weak. It detracts from other empirical studies found by researchers including Tansky & Cohen (2001) and opined that they considered organizational support to create organizational engagement among employees. Likewise, Krishnan and Mary (2012) noted that research on perceived organizational support began with the observation that if managers are concerned with the loyalty of their employees to the organization, employees are based on the loyalty of the organization towards them. I claim that perceived organizational support (POS) will enhance the felt responsibility of workers to help their organization / s achieve its goals, their affective contribution to the company and their anticipation that increased performance would be rewarded. From surveying 325 full-time employees at an industrial organization in Iran, Arshadi (2011) also found that POS was positively related to organizational engagement and in-role efficiency, and negatively related to turnover intent. Byrne & Hochwarter, (2008) and Arshaid (2011) note that POS' behavioral findings will include improvements in in-role and extra-role output and decreases in behaviors of tension and withdrawal, such as absenteeism and turnover. Nonetheless, according to Patel and Ankit (2016), irrespective of the clear research findings regarding the positive association between perceived organizational support and organizational efficiency, the relationship between various types of organizational support and pro-active behavior has not yet been investigated.

Enhancing Employee Performance in the UAE Public Sector

The genesis of such a method of performance management derives from a multitude of issues. As for Salem and Jarrar (2009), who observed and noted that the UAE public sector suffered from a reluctance to exchange information and a generally low level of confidence among competing individuals and groups, a condition which is again blamed on the prevailing social and cultural context in Arabia. The viewpoint of Analoui and Al- Madhoun (2016) on a fundamental problem facing managers in the UAE's state bureaucracy and government-related entities (GREs) from a cross-cultural perspective is that Arab managers operate organizations as family units and sometimes take on a paternalistic role within them. They (the managers of Emirates) value loyalty over efficiency.

Al Ghuflio (2012) observed how other emirates implemented the achievement of the Government of Dubai 's system of excellence, triggered similar programs aimed at enhancing employee efficiency in the country. For instance, the Abu Dhabi Award for Excellence in Government Performance came into force in 2007, and the Ajman Excellence Program was introduced in 2008 in the northern emirate of Ajman. Ryan (2018, July 30) points out that, given the good-intentioned nature of the UAE 's attempts to boost employee efficiency through a variety of initiatives, it has not been easy to introduce public sector reform initiatives. This has thus prompted Dubai's Vice President and Ruler to express their frustration with the results of a study showing how low job satisfaction was shown by workers in five departments of government (Ryan 2018, July 30; Al Hammadi, et. al., 2019). Sheik Mohammed said that 'while some satisfaction was as high as 93%, just 60% of workers at five offices said they were happy at their workplace "(Ryan 2018, July 30).

Organizational Commitment

Organizational engagement is not a new Human Resource (HR) Organizational Behavior (OB) concept, and has been at the forefront of individual and organizational success research for many decades. Since this time, much has changed in the way companies treat themselves, including the

emergence of modern ways of workplace relationships and modern contractual contracts (Swailes, 2003, Al wahaibi, 2016). The Organizational Engagement (OC) model was conceptualized in a number of ways. It says "the majority of organizational engagement-related work can be interpreted in terms of attitudinal and behavioral conceptualizations" (Eslami and Gharakhani, 2012, p. 86). Recent theoretical debate was built around Mowday, R.T., Steers, R.M., & Porter, L.W. Morris & Sherman (1981), Morris & Sherman (1981), and Myer and Allen (1997) respectively.

Organizational involvement as observed by Mathieu and Zajac, 1990 cited in Eslami and Gharakhani (2012) has been extensively studied in terms of its elements, antecedents, causes, and implications. Organizational loyalty is considered, according to Roweden (2000), a fundamental element for workers and the organization; it enriches feelings of belonging, career development, job protection, and more intrinsic recompenses. In terms of a thorough reading of publications and literature review on the idea of organizational commitment, Miroshnik (2013, p. 208) defines it as "one of the essential corporate objectives to make." Early definitions of organizational commitment by Mowday, Porter, and Steers (1982) as quoted by Jex, and Britt (2014, p. 269) clarified how "commitment reflects both the feeling"

Factors Affecting Organizational Commitment

Personal characteristics

Age and tenure in previous research organizations found that age and tenure could affect organizational commitment in the three-component engagement; which continuance component has the greatest impact (Suryani, 2018:30). Nifadkar and Dongre (2014) found that age, gender, marital status, and tenure are closely linked to the organizational commitment of girls' college in India; while education level is negatively linked to organizational commitment. Alotaibi (2001) study of public service staff in Kuwait revealed that gender and organizational engagement are closely associated. Opayemi (2004), re-articulated by Eslami and Gharakhani(2012), suggested that there was a substantial relationship between gender and employee organizational involvement in public sector organizations; and that women were more engaged with their organizations than men.

Organizational Climate

From a definitional point of view, James et al. (2008) propose that an organizational climate is the amount of psychological environments which are individuals' acuities regarding their work environment. Mullins (2010) states that an organization's environment is not an easy concept to describe, and is therefore dependent on employee views. And, environment is believed to have a significant effect on the disposition of employees toward their sense of belonging and interpersonal relationships.

Bahrami et al . (2016) indicate that one of the organizational variables that greatly influence employee engagement is organizational environment. Top management therefore has a obligation to consider the organizational environment and its effects to improve organizational engagement among its employees. Managers at various levels should build an atmosphere that is the supportive and acceptable climate for staff members with the view to enhance their willingness to continue with their organization / s and attain the organizational objectives, this is usually considered to be equal normative engagement.

Conclusion

This study covered some of the UAE's public organizations to examine the impact of strategic human resource management on employee attitude and job performance in public organizations across Abu Dhabi. The Abu Dhabi Emirates public organizations are the main players in the Abu Dhabi Emirates government. The justification for this is that they are the engine which is supposed to drive government business and the incompetence of government policies and programs can be traced directly to the actions or inactions of employees working in these Emirates public organizations

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The Impact of Perceived Organizational Support and Job Satisfaction in the United Arab Emirates

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Abstract

Perceived organizational support, which is an indication of the employee involvement of the company, creates a responsibility within the employee to care for the organizations and to reciprocate with dedication and loyalty. Here, it would have an effect on job satisfaction and has been widely studied in the literature as many analysts, managers as well as researchers agree that their patterns will affect and influence work efficiency, employee morale and retention of employees. Expatriate employees mostly from South Asia and UAE nationals dominate the labor market of the UAE labor market. It was estimated that nearly 95 percent of private sector companies absorbed the expatriate labor supply in 2012 and that just 5 percent of the Emirates work in the private sector. In this paper the effect of perceived organizational support and work satisfaction in the UAE will be addressed.

Keywords: Perceived organizational support, Organization efficiency, job performance, UAE

Introduction

The United Arab Emirates (UAE) has been one of the fastest-growing and strongest economies within the Gulf Cooperation Council for Arab States (GCC) and worldwide within a very short time span. The UAE is ranked second in GDP within GCC, third in the Middle East and thirty in the world in 2011 (Askary, Kukunuru and Pech, 2014, p. I. The UAE is a contented location with many expectations. Its inhabitants, who account for less than one-fifth of the 8.2 m residents in the country, are among the most pampered worlds. The population typically enjoys cradle-to-grave welfare; lavished by the oil-rich regime, and the value of what has long been the most open and welcoming way of life in the Gulf "(www.economist.com:2011). Thompson (2016) illustrated how the rapid socioeconomic development of the UAE has drawn an enormous influx of transnational companies and diasporic communities into the county; consisting of expatriate labor from Europe, Africa, Asia, the Americas, Australia, New Zealand, Turkey, the Caribbean and the other Arab States. Within a century, Dubai's once dimly populated Sheikdom has become a melting pot of nearly two hundred nationalities and many more ethnic subgroups. Such a multiplicity of nationalities and races / ethnicities makes the UAE "one of the most ethnically diverse nation-states or city-states worldwide" (Global Compact International Yearbook 2009, p. 61).

Literature Review

Perceived Organizational Support

In the theory of organizational support, it suggests, perceived organizational support, which is an indication of the employee engagement of the company, creates a duty within the employee to care for the company and to reciprocate with dedication and loyalty. Activity by organizations showing care and consideration for employees can enhance commitment by organizations (Krishnan and Mary

2012:60). Similarly, Riggle, Edmondson, and Hansen (2009) have argued how meta-analytical findings show that perceived organizational support has had a solid, positive relationship not only on job satisfaction but also on organizational engagement. Similarly, Vandenburge et al. (2007) found that perceived organizational support and various organizational engagement bases were linked and generated different outcomes among certain employees in the fast-food field. Significant research by Rahman and Karan (2012) entitled Perceived Organizational Support and Organizational Commitment: Bangladesh the study findings confirm the pre-estimated study hypotheses. It found that perceived organizational support was strongly and positively associated with organizational commitment along with its three dimensions, but the relationship between POS and continuing commitment is found to be poorer in contrast with the relationships of POS with affective continuance and normative.

Perceived organizational support (POS) and its antecedents

According to Ali and Mohamed (2015:1-2),' in 1986 Eisenberger et al. introduced the idea of perceived organizational support (POS). It has to do with how workers view their organisations. Any behavior and human resource management practices taken by the organization that affect the expectations of employees about the commitment of the organization to them. According to Eisenberger (1986) quoted in Ali and Mohamed (2015, p.1-2), "the idea of POS relates to workers forming global assumptions regarding the degree to which the company respects their efforts and cares about their well-being." Management theorists and organizational scholars such as Jackson et al, (2004) used conceptually interpreted organizational support to define their efforts. A systematic analysis of POS literature uses social exchange theory definition of organizational commitment to explain how the commitment of an employee to an organization is primarily defined by the engagement of the organization toward its employee. Hutchison, Eisenberger, Huntington, & Sowa, (1986) quoted in Miao (2010) stresses how perceived organizational support (POS) denotes the degree to which an organization respects the efforts of its workers and cares for their well-being.

Antecedents of POS

Rhoades and Eisenberger (2002) argued that perceived organizational support is affected by three basic precedents: incentives and working conditions, support from superior justice and procedural justice. Nevertheless, Zhang, Farh, and WangGuangHua Management College, Peking University, Beijing, P.R. China perceived organizational support in China in their research entitled Organizational antecedents of employees: a grounded investigation has observed and expressed how "perceived organizational support (POS) has gained much research attention since it was implemented into organizational behaviour" The research found that perceived organizational support is a major driver of employee engagement, efficiency, and organizational commitment (Zhang, Farh, and Wang 2011, p.1). A gap was found in the literature and Ahmed (2015) noted that it has been a long seven years since any work was conducted on the results and nearly 12 years since any analysis was conducted on the POS antecedents.

Zhang et al., (2011, p.1) Research findings have showed that 'in contrast with similar findings in Western literature, established organizational antecedents of POS in China, the main precedents of POS in China included certain common factors (e.g. administrative justice and supervisory support) as well as cultural-specific factors (e.g. caring for poor workers and caring for the family of employees).

(i) Equity (e.g., procedural justice in performance evaluation, forum for voicing grievances, etc.)
(ii) Support to supervisors (e.g., work-family community, perceived support to supervisors, etc.)
(iii) Benefits and conditions of employment (e.g., job stress, incentives for development, etc.)

Glorigi, Shoss and Di Fabio (2017) explains that specific combinations of antecedents (such as work pressure, job conditions and social support) are is be expected on the basis of the multiple dimensions and distinguished categories ascribed to the studying of perceived organizational support. Ishfaq and

Muhummad (2015) and Kutessis et al. (2015) combine meta-analysis of over 800 studies come to the conclusion that the antecedents of perceived organizational support fall into the following groupings:

- Justice
- Growth potential
- Superior support
- Support from other co-workers
- Human Resources practices and the conditions of the working environs
- The quality of organization-employee relations
- How employees treat each other.

Based on the earlier literature survey, it can be clarified that the main factor-antecedents of POS are under the headings below. Glorigi, Shoss and Di Fabio sum up appropriately in noting that the variety of stressors and strains will need further investigations in order demarcate clearly the combinations of interconnected processes that may arise in the perceived organizational support construct.

Job Satisfaction

The literature has established the antecedents of various organizational commitments. Variables have been established, such as work satisfaction and job satisfaction is one of the important variables (Khan and Zafar, 2014). Samaratunge's scholarly research, (2003); Kanter, (2004); McNulty and Ferlie, (2004); George and Jones, (2008); Mohamadkhani and Nasiri, (2012) and Kahtani, (2012) have made the connection between job satisfaction leads to worker engagement. Employment satisfaction acts as an intervention variable in the relationship between the relationship between the co-workers and organizational engagement (Lin and Lin, 2011).

Gangai & Agrawal (2014) study the correlation between the three constituents of employee commitment along with job satisfaction, the results revealed that there is no significant nexus between these variables, and noted that the construct of job satisfaction, has no bearing on organizational commitment in such case. However, it might be argued that organizational commitment exists among employees at different levels. The findings of this study is similar to a piece of a research by Lok and Crawford (2001) who established that there is a mind-set that prevails and which echoes the notion that employees remain with an organization simply because they need the work and not because they are necessarily satisfied. In addition, Intan, Munir, Hashim, Mat Ali, Baharom Ab Rahman and Ramlee Abdul Rahman (2014) in their cross-sectional survey that looked at the; relationship between Job Satisfaction and Organizational Commitment at Health Tourism Hospital in Malaysia found that diverse facets of job satisfaction have substantial positive relationships with the three dimensions of organizational commitment.

Markovits, Davis, Fay and Dick (2010) investigated the connection between public sector employees and private sector employees among 617 Greek employees in both industries. The findings showed that workers because workers in the public and private sectors face different working conditions and employment relationships are different in their attitudes towards their jobs and organisations, and in their relationships. According to Markovits, Davis, Fay and Dick (2010), the findings further indicate that extrinsic and intrinsic satisfaction is more closely associated with affective and normative involvement for government workers than with those in the private sector.

Job Satisfaction in the UAE

The definition of job satisfaction was widely studied in the literature since, according to Eslami and Gharakhani (2012:86), many experts, managers and researchers believe that their patterns will affect and influence work efficiency, employee morale and retention of employees. In Brazilian and international literature the concept of job satisfaction is considered complex and difficult to define, partly because it is understood as a subjective condition that can differ from person to individual, from situation to situation, for the same individual over the years, and is potentially subject to the impact of the internal and external powers of the immediate work. The term job satisfaction refers to the

disposition and positive feelings about various aspects of their employment, arising from an appraisal of their characteristics, such as the type of work they do, their co-workers, bosses or superiors and their pay (Robbins & Judge, 2013). Job satisfaction "is itself a multi-layered construction and several hypotheses have been suggested to explain job satisfaction definition. Perhaps the most popular are the theories of Maslow (1954) and Herzberg (1966) who, through meeting human needs, introduced the idea of motivation "(Delobelle et al 2011:372).

As it relates to the study of work satisfaction in the United Arab Emirates, there has been increased studies that spread through both the private and public sector. Employees in the UAE are changing jobs more often than the rest of the world. What's behind all of this? Khalife (May 1-2016). This assertion is further supported by Khalife, whose extrapolation from the "Hays GCC 2016 Salary & Jobs Report shows that in 2015, 31 percent of workers working in the UAE switch employers, with 57 percent preparing to do so in 2016 - a far higher rate than the global one (Khalife, 2016). Shallal (2011) ground-breaking research on employment satisfaction among women in the United Arab Emirates and findings across the private and public sectors revealed a strong association between job satisfaction and demographic components such as age, marital status and gender. The findings also show the correlation between work satisfaction and highly educated and high earning power female Emirati women. Study in Askary, Kukunuru and Pech (2014) in which they investigated employee dedication to work as shown by UAE national men and women across three sectors: public, semi-public and private (specifically in the Abu Dhabi and Dubai Emirates). Research results showed a high degree of job satisfaction in the private sector. In comparison, in the public and semi-public sectors, the main disappointment was that respondents thought that there was generally a lack of appreciation for successful work and that they did not have opportunities to participate in dialogue about the success of the company for which they worked.

In another relatively recent survey conducted by Ababneh (2016), in which data from 249 faculty members working at 26 different universities in the UAE on the effects of expectations met, trust, job satisfaction, organizational commitment, and the availability of job opportunities on faculty intent to stay with their current employers. Research results showed that a large percentage of academic workers perceive their employers as not meeting their expectations about a say in strategic decision-making process (58%), study support (53%), involvement in major institutional decisions (53%), and compensation (47%). Results from path analysis show that expectations achieved have direct positive effects on the confidence, organizational commitment and job satisfaction of employees "(Ababneh (2016, p. ii) Drawing on a research study from Bayt.com and YouGov Siraj that examined employee satisfaction, engagement and loyalty in the Middle East. Significant findings indicate that employee satisfaction in the UAE is comparatively poor in the field, with only 27% of employees being extremely satisfied and 34% of respondents being pleased with their jobs (Bayt.com, May 1 2008). Using the case study of Al-Ain Municipality, Al Jenaibi (2010, p.75) research finding that "the main causes of job dissatisfaction are the volume of work, the disorganized work flow and the heavy responsibility suffered by the employees; the work and working conditions themselves represent major dimensions affecting the level of job satisfaction." The obstacles workers face in attaining promotions often minimize work satisfaction (ibid.: 75). This explains to some degree Biygautane & Al-Yahya's statement (2010, p. 2) that '66 percent of government agencies previously surveyed decided to sacrifice core competences when their staff members move to other organisations or departments or move to the private sector.' Ryan (2018, July 30), further explains HR professionals concerned about the pervasiveness of employee discontent.

Research is conducted in UAE, showing a high level of job satisfaction in the private sector (Askary et al, 2014; Al Hammadi et al., 2019). On the other hand, the greatest dissatisfaction was in the public and semi-public sectors where respondents felt that there was generally a lack of recognition for good work and that they did not have opportunities to engage in discussion about the progress of the organization for which they worked and weak support for the process of performance evaluation (Askary et al, 2014). In addition, UAE research showed that workers in the banking sector in UAE are not inspired to boost their performance in the present situation (Indranil Bose, 2018).

In the fields of HRM labor relations and organizational psychology, the effect of perceived organizational support on employee attitude and work satisfaction and performance is a crucial subject (Othman, 2009; Tzafrir, 2006; Lopez, Peon & Ordas, 2005; McGunnigle & Jameson, 2000; Huselid, 1995; Jones & Wright, 1992; Boudreau, 1991). A that workforce calls for the introduction of inclusive work practices that can improve the talents, abilities and expertise of existing and future employees in a company. Such activities also encourage high performance standards and can be extended to all facets of HRM, such as recruitment and selection of staff, training and development, and evaluation and reward for success (Edgar & Geare, 2005; Guest, 2002; Huselid, 1995).

Therefore, good human resource management strategies improve the morale of workers, enhance their engagement and happiness, shrink staff and improve the retention of professional staff, while allowing non-performers to leave the company (Rad & Moraes, 2009; Petrescu & Simmons, 2008; Mosadeghrad et al., 2007; Huselid, 1995; US Department of Labor, 1993; Jones & Wright, 1993; Nonetheless, HRM has not received due attention in Jordan, especially as it concerns institutional engagement, job satisfaction and performance (Menafn, 2008; Ameinfo, 2006; Weir & Abu-Doleh, 1997). Reports and anecdotal evidence from the Ministry of Trade and Trade indicate that HRM departments appear to lack initiative and neglect their duties and activities during a range of Jordanian organisations (Ameinfo, 2006).

As a result, they face major problems closing the human capital event, together with high turnover rates and a lack of delicate workers. Such issues have been exacerbated by the low disbursement on research, coaching and development (Menafn, 2008). Consequently, to advance our understanding of the effect of HRM on the creation and maintenance of employee attitudes and job performance, more empirical evidence and theoretical development are needed. This would also improve our knowledge of the working-value-to-HRM relationship (Falkenburg & Schyns, 2007; Chang & Hung, 2005; Heraty & Morley, 1998; Huselid, 1995).

Conclusion

This paper has presented a review of relevant literature on the evolution of private sector organizations in the UAE, and how theories of management can be applied to some of the challenges they face. Issues include employee satisfaction, organizational engagement and the interaction between perceived organizational support and organizational efficiency.

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The Effect of Strategic Management Issues in the United of Arab Emirates Public Organisations

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Abstract

This paper investigates the implementation of strategic management issues in public organizations in the United Arab Emirates (UAE). This is the very first chapter that is organized in a few sections. At the beginning of this study briefly presents the background, importance, followed by identifying the current situation of the implementation of strategic management issues in public organizations in the United Arab Emirates (UAE). The management practitioners, especially those who are engaged with implementation in strategic management, need to be involved in applying the strategies to manage the people management techniques to address the dynamic global market trends with the war for talent and competencies. The knowledge economy is booming up and has become trendy for organizational success factors leading to the competitive success of the organizations. The successful management professionals leverage the existing talent and competencies for future jobs by developing them to take up higher responsibilities with the right competencies for organizational success

Keywords: Strategic management, public organization, UAE

Introduction

Wooldridge *et al.,* (2008, p. 1191) pointed out that middle management is required to observe the organizational process associated with related to building and developing capabilities. Furthermore, Bartlett and Ghoshal (1993, p. 44) confirm the horizontal integrators help to ensure the distribution of knowledge-based resources throughout the organization where managers decide which goals need to achieve and determine in order to accomplish the goals of the organization. Concerning that the middle management should plan to determine the team goals and develop comprehensive strategies to enabling change in culture, development and sustainability of quality teams and solving problems (Harrington and Williams, 2004, p. 302). However, in practice the management overlook and have less attention to middle management during the business process which leads to loopholes or delays in efforts towards organizational development. When the organization act as a social unit, it means that it has several employees who have been given a specific role to carry out a task. They have to cooperate and work with each other in order to complete a task. The event that they need to carry out the duties without close supervision. Therefore, it is important to get involved the middle management in the strategic decision-making process (Floyd and Wooldridge, 1994, p. 49). An organization requires middle management to work in a team in order to achieve the desired goals. If there is no solidarity among employees, the organization is not able to carry out its activities effectively properly. The commitment of middle managers is crucial to implementing good management systems. Here, the middle managers need to monitor the strategic goals that they are pursuing the actual performance (Harrington and Williams, 2004, p. 304). This paper seeks to explore how the implementation of strategic management issues take place in public organizations in the United Arab Emirates (UAE).

Literature Review

The notion of strategic management issues started during the 1980s and 1990s with an emphasis on a proactive, integrative, and value-driven approach (Butler, Ferris, Napier & Schuler, 2008). Here, the focus includes the assets and human resources rather than reactive, prescriptive, or administrative in nature (Budhwar, Buyens and De Vos, 2014). Strategic management issues according to Sim (2007) can be defined as the concepts of strategy which demonstrate that strategic management is a coherent approach to the management of people (Sims, 2007). Meanwhile, strategic planning is a long-term planning process where organizations will determine the mission of the objective to achieve a defined mission. Strategic management exists as a result of the planning that being carried out and it has two main components. The first component is the ' strategic issue management ' itself, which is an extension of strategic planning. The second component is to complement an executive of the nature that is always vigilant and willing to be prepared in any situation inside the organization. Due to today's business challenges and changes in demand, organizations need to formulate and assess various alternatives through the best strategy formulation to achieve the vision, mission and objectives.

On the other hand, there is another side to this phenomenon. Since the pioneering work by Kaplan and Norton (1992) the implementation of the Balanced Scorecard is an initiative that can not only measure organization performance as a whole and balanced it with financial and non-financial elements but also align the management towards the implementation of the same strategy. The same thing also applied in the concept of strategic management issues where an organizational strategy has been espoused and debated in the literature. Here, strategic management issues is an important mechanism for translating strategy into objectives and can be communicated (Bisbe and Malagueno, 2012), facilitating, tightly aligning management actions with strategic goals, and enhancing organizational performance (Bisbe and Malagueno, 2012; Micheli and Manzoni, 2010). The researchers have seen the potential benefits in practice strategic management issues, mostly in private-sector. In the meantime, less research of the related issues being discussed in the public organization which than can be a further explorer in the context of academic research.

The previous study indicates that strategic management issues especially factors related to the success of the implementation need to be further confirmed (Micheli and Manzoni, 2010). They found that, after the primary focussed have been examining, the intention should trigger a good impact on the organization. However, up to now there is no confirmation on examining the relationship between strategic management issues and practical activities in the organization strategy, with the implied assumption that performance improvements can be explained by the implementation of strategic management. Bisbe and Malagueno (2012) expressed that attention should be given to empirical studies with a focus on other roles related to strategic management issues before it can play beyond the implementation of strategies in public organizations.

The public sector in the UAE

The public sector including the typical business firm usually considers tree types of strategies such as corporate, business and functional. Corporate strategy defines the overall direction of the company in term of its attitude to the growth management of its various business and product lines (Wheelen & Hunger, 2013; Gautam, 2015) Business strategy occurs at the business unit or product level and it emphasizes improvement of the competitive position of a corporation’s product or service in the specific industry or market segment served by that business unit (Wheelen & Hunger, 2013, p.23). The organizations are mindful of strategizing their strategic intent with the core-competencies available or to create competencies to face the challenges in the dynamic marketplace. To overcome those challenges, the main reasons need to be revealed to the public organization, which is lacking in terms of the UAE perspective. Definitely, this appears as a real-world problem for them.

On the other hand, according to the Sullivan, (2004, p.86) “The ultimate strategic measure is the profit. It is the ratio between profit and total employee costs. Firms that generate more dollars of profit for every dollar spent on employee costs are the most productive”. It was further described stating “This

Measure more strategic because it includes the ultimate bottom line total profit compared to the total employment cost. Managers and human resource department that are effective at managing their human resource will have the highest ratio, the continual improvement of the ratio gives great credence to the argument that workforce productivity is improving. For some organizations, employee costs are actually quite high (relative to other firms) because they decide to offer higher incentives or hire more qualified people. However, costs are only a side of the picture. If the strategy of investing more in your people in order to get more output works, the additional profit generated by hiring these more expensive or more qualified individuals will far exceed their additional costs.

Besides, the impact of policy formulation and management controls include a wide variety of tools/mechanisms designed to ensure that decisions are executed properly; resources are utilized appropriately and used for effective decision making (Armstrong, 2006; Caliskan, 2010). It has been traditionally considered to be the formal feedback and control systems that monitor organizational outcomes and used to correct deviations from standard performance (Zelewski, 2007; Oladipo and Abdulkadir, 2011). However, in recent times, policy formulation and management control systems have been recognized as important tools supporting organization, organizational learning, and innovation in terms of strategic management (Bisbe and Otley, 2004; Chenhall, 2003; Kumar, 2011; Simons, 1990; Chang and Huang, 2005). This is because the essential idea of policy formulation entails ensuring that an organization achieves its goals (Otley 2003), it is mostly applicable to the government sector in the United Arab Emirates (UAE).

Strategic Management Issues in the UAE

In general, there are many difficulties and challenges for strategic management issues that need to be addressed. But the difficulties and challenges showed a roadmap where a strategy should strive to find the solutions. This paper is tentatively recommending that future strategic management issues should be focused on the following aspects.

Good Theoretical Evaluative Criteria

Theoretically evaluative criteria are the basic strategies by which scholars may be directed to work on it. Here, a good theoretically evaluative system is important for theoretical research (Sutton and Staw, 1995; Corley and Gioia, 2011) in order to reduce uncertainty, just as in mathematics, a formula with clear variables can give a conclusion based on the variable values. Moreover, a good theory should not just be proven by practice, it must also be supported by indirect evidence, such as being verified systematically. This means that if its corollaries are not true, the theory will be rejected.

In the meantime, theoretical research should focus on creating on the clarification and understanding, and should also pay attention to the prediction of the business environment (Bacharach, 1989; Corley and Gioia, 2011). There are two main types of explanation: causality and influential relationship. If an influential relationship cannot be used to predict, then the relationship itself must be questioned. Without explanation and understanding, there is no scientific prediction. A good theory must give a better understanding, under more accurate interpretation and forecasts.

If the theory can only clarify the phenomena, which is no better than competing theory, common sense or simple probability prediction, theoretical research will become an entertainment vehicle. In other words, ff the theory cannot be validated, it is also absurd. Based on the complexity of strategic management issues, researchers can not expect strategic management research in UAE to prepare forecasts in the way that the astronomic theory forecast eclipses, but strategic management research should provide theories that are precise enough to guide practitioners in their strategic management in public organizations. Scientific law refers to the cause and effect between certain phenomena and should always be in force under certain circumstances. Core theory is legal; If no law, the result of the study cannot be called theoretical (Mumba et Al., 2009). The law that explains must be able to predict, and the theoretical research mission should expose the law to know scientific law should be a mission

on strategic management issues in the public organization in the UAE even though it is not widely recognized.

Theoretical Critique and Reflection

Strategic management issues require critical realism to make healthy progress to his undivided epistemology and stressed that reality is free from human concept (Thomsen, 1986; Scott, 1978; Järvensivu and Törnroos, 2010; Miller and Tsang, 2011). The critical realists believe that there are unnoticed events that cause them to be observed; Therefore, the social world can be understood only if people understand the structure that generates an unnoticed event (Thomsen, 1986; Scott, 1978; Järvensivu and Törnroos, 2010). While verifying the possibility of knowing the truth, the critical members admitted that the limitations of a human being debilitating claims to the knowledge or objectives of the Know (Miller and Tsang, 2011). Methodologically, critical research emphasizes the dialogic and dialectic methods. Lincoln and Guba (2000) showed that as a way to go beyond the permission taken to be given (Gephart, 2004). From a critical perspective of realism, strategic management issues can be wrong and need criticism to visualize and prevent potential mistakes (Thomsen, 1986; Scott, 1978). Criticism of weight combination factors, both for and against any statement. Its value lies in making us understand the theory more comprehensive and identify their advantages and disadvantages from the third point of view. In fact, without criticism, theoretical research can not be monitored and alarmed freely and errors and errors in theory research will not be able to be tracked efficiently.

Organizations generally possess a passionate entrepreneurial expectation shared among employees within the organization. They shall be accountable for an increase in production if they utilize a recognized strategic method in organizational activities. Developing missions and values in any organization is important. Defining strategic choices is an additional way to develop a strategy. A doubtful market situation and rivalry influence business owners in deciding the proper strategy. By applying strategies, they can recognize the weaknesses and strengths of the company which assist the owners of the business to formulate other strategies at the same time predicting potential choices for competing with their competitors. Besides, strategy implementation can be defined as a management process of executing necessary activities to achieve what has been planned. This signifies that the strategic management process does not conclude once an organization has decided on a strategy. The setback that confronts most organizations is the change from strategy formulation to strategy implementation. From the perspective of the public sector, the responsibility of top management as strategic decision-makers has a superior impact on executing the strategy and they have power in decision making that influences the entire organizational structure, whereas the successful strategies are dependent on effective implementation.

Conclusion

Fundamentally, strategies in natural systems seem to emerge spontaneously from the interaction between the environment and organisms over time. Whether an individual or a population will be more or less successful to cope with environmental changes is determined by their capability to respond to such changes, or in other words, by their capability of adaptation. Therefore, there is an implicit link between strategy and the need to adapt successfully to new conditions in the surrounding environment.

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The Effect of Strategic Management Issues in the Context of the Implementation

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Abstract

The main objective of the current research is to examine the strategic management issues and the implementation in public sector organizations in UAE. The study involved respondents from several organizations. The profile of the respondents is suggestive of valid responses as well as providing better insights on the strategic management issues. It is found that there is a significant positive impact of the Strategic Management Direction on Implementation of Strategic Management issues. The study results have shown that a one-unit increase in Strategic management direction will increase the expected value of the implementation of strategic management by 0.207. It is found that there is a significant positive impact of Strategic Management planning on the implementation of Strategic Management issues.

Keywords: Strategic management, public organization, UAE

Introduction

Regardless of the importance of policy formulation for business entities, research studies on the impact of policy formulation, implementation and control of strategic management on the public organization are limited (Thill et al., 2014; Ahmad et al, 2009). Implementing the proper strategic management should be evolved from a basic step of any organization, followed by the proper management initiative to become an important technique to support organization, organizational learning, and innovation.

Literature Review

Though policy formulation has always been identified as an important tool in the strategic management context, one observable fact is that the usage of these styles among organizations is very limited; often they are not used to their full potential (Otley, 2003; Ulrich et al., 2013). Furthermore, the control system via strategic management used in organizations is most often restricted to the use of traditional (Abdulkhaleq, 2006). This is also a common phenomenon in the UAE context, as well observed through a research study on management and strategic management practices in quoted in organizations in UAE. However, though policy formulations are important, ineffective and inappropriate strategic management control can encourage dysfunctional activities, which will have a negative influence on organizational performance. Therefore, it is useful to identify which strategic management issues contribute to the growth and improve organizational performance as well as achieve its service objectives. Based on these facts and limiting the scope of the study, the problem statement for this study can be presented as what impact the policy implementation in executing proper strategic management in the public sector in United Arab Emirates (UAE)

On the other hands, many researchers have identified the research gap (Wu, 2013; Heisig, 2014; Perez-Arrau et al., 2014; Thill et al., 2014) in the public organizations where the lack of understanding exists

in implementing of strategic management issues in public organizations (Heisig, 2014; Perez-Arrau et al., 2014). The dearth of research in public organizations in the United Arab Emirates (UAE) is even more rampant. Therefore, potential and useful research is needed to bridge this gap in existing knowledge. As a result, this research will determine the implementation of strategic management issues in public organizations in the United Arab Emirates (UAE).

Methodology

The data from the quantitative questionnaire are summarized in Excel (version 2010) and then analyzed by SPSS 22 (updated 2014). SPSS is the Statistical Package for Social Science. In addition, SPSS software can integrate a series of computer programs providing different ways to produce a wide range of reports, models and graphics together with documentation. In specific, as Dale (2003), Cronbach's alpha can be applied to test reliability, an analysis factor to eliminate non-correlative variables, and multiple regression is efficient in examining given hypotheses, etc.

Results and Discussion

A total of 418 respondents participated in the research. The respondents are classified into four age groups. Of these groups, 22.7 percent of the respondents are of less than 30 years of age. 38.5 percent of the respondents are between 31 to 40 years old. 41 to 50 years of age group is represented by 22.2 percent of respondents. 16.5 percent of the respondents belong to the above 50 years, age group. The age group-wise distribution of respondents shows nearly 20 percent representations of all age groups. However, respondents between 31 and 40 years are of a significantly higher proportion (38.5 %). Among the total respondents more than half (54.1 percent) are working at the middle level. Nearly 25 percent of the respondents are working at the junior level. While 16 percent are working at the senior level, only 5 percent of the respondents are at the supporting staff level.

Testing Hypothesis H1 - There is a significant positive impact of Strategic Management Direction on Implementation of Strategic Management issues.

For the path analysis, at first the impact of Strategic Management Direction on Implementation of Strategic Management issues is examined. The path analysis results indicate that, there is a significant positive impact of Strategic Management Direction on Implementation of Strategic Management issues. The path estimates (β =0.207, t=3.163, p<.001) are indicating that a one-unit increase in SMD will increase the expected value of ISM by 0.207. The hypothesis H1 is accepted.

Testing Hypothesis H2 - There is a significant positive impact of Strategic Management Planning on the Implementation of Strategic Management issues.

For the second path analysis, the impact of Strategic Management planning on the Implementation of Strategic Management issues is examined. The path analysis results indicate that, there is a significant positive impact of Strategic Management planning on the Implementation of Strategic Management issues. The path estimates (β =0.407, t=12.253, p<.001) are indicating that a one-unit increase in SMP will increase the expected value of ISM by 0.407. The hypothesis H2 is accepted.

Testing Hypothesis H3 - There is a significant positive impact of Strategic Management Evaluation on the Implementation of Strategic Management issues.

For the third path analysis, the impact of Strategic Management Evaluation on the Implementation of Strategic Management issues is examined. The path analysis results indicate that there is a significant positive impact of Strategic Management Evaluation on the Implementation of Strategic Management issues. The path estimates (β =0.349, t=5.200, p<.001) are indicating that a one-unit increase in SME will increase the expected value of ISM by 0.349. The hypothesis H3 is accepted.

Testing Hypothesis H4 - There is a significant positive impact of Strategic Management Monitoring on the Implementation of Strategic Management issues.

For the fourth path analysis, the impact of Strategic Management Monitoring on the Implementation of Strategic Management issues is examined. The path analysis results indicate that there is a significant positive impact of Strategic Management Monitoring on the Implementation of Strategic Management issues. The path estimates (β =0.222, t=5.009, p<.001) are indicating that a one-unit increase in SMM will increase the expected value of ISM by 0.222. The hypothesis H4 is accepted.

Testing Hypothesis H5 - Internal and External Environment moderates the relationship between the Strategic management Direction and the Implementation of Strategic Management issues.

Moderation analysis was examined to assess whether IEE moderated the relationship between SMD and ISM. The effect of SMD on ISM was examined in the first step of the regression analysis. In the second step of regression analysis, the IEE variable was added and the non-interaction between SMD and ISM was verified. In the last step the interaction between SMD and IEE was added to the non-interactional regression model in the previous step. These regressions are tested at 5% level of significance. SMD was significantly predicted ISM, β =0.725, t=13.022, p<.001. Hence the first condition was satisfied. The non-interaction effect between SMD on ISM was significantly predicted, β =.201, t = 6.447, p<.001. The second condition was also satisfied. The interaction effect of SMD and IEE significantly predicted ISM, β =0.262, t = 6.497, p<.001. So, the last condition is also verified. Thus, it is indicated that the interaction model explains significantly more variance than the non-interaction model based on an alpha of 0.05. In order to visualize the moderation analysis, IEE was dichotomized into high and Low categories using a median split. The High category indicates all observations of IEE above the median, and the Low category specifies all observations of IEE below the median. From the interaction graph, it is clearly visible that, there is a strong positive interaction effect of IEE between SMD and ISM. As the SMD increases from low to high and due to the corresponding interaction of IEE from low to high, ISM is also showing an increase. The hypothesis H5 is accepted.

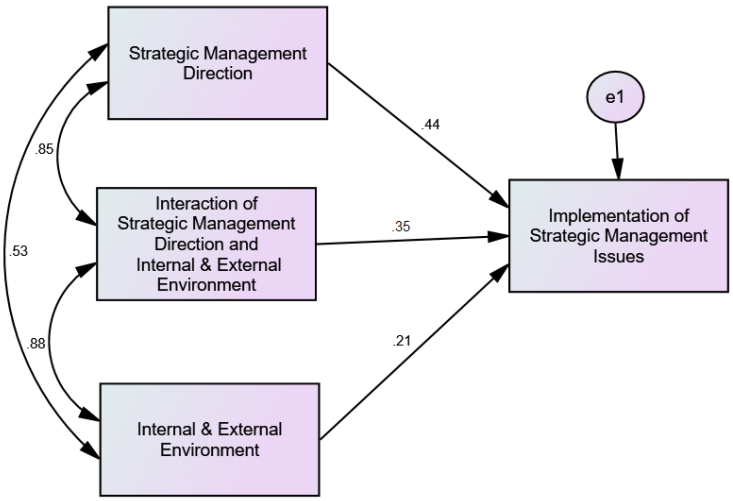

Figure 1: Moderating effect

Table 1: Moderation Analysis with ISM Predicted by SMD Moderated by IEE

			Estimate	S.E.	C.R.	P	Label
ISM	<---	SMD	.725	.056	13.022	<.001	Significant
ISM	<---	IEE (Non-Interactional)	.201	.031	6.447	<.001	Significant
ISM	<---	SMD & IEE (Interactional)	.262	.040	6.497	<.001	Significant

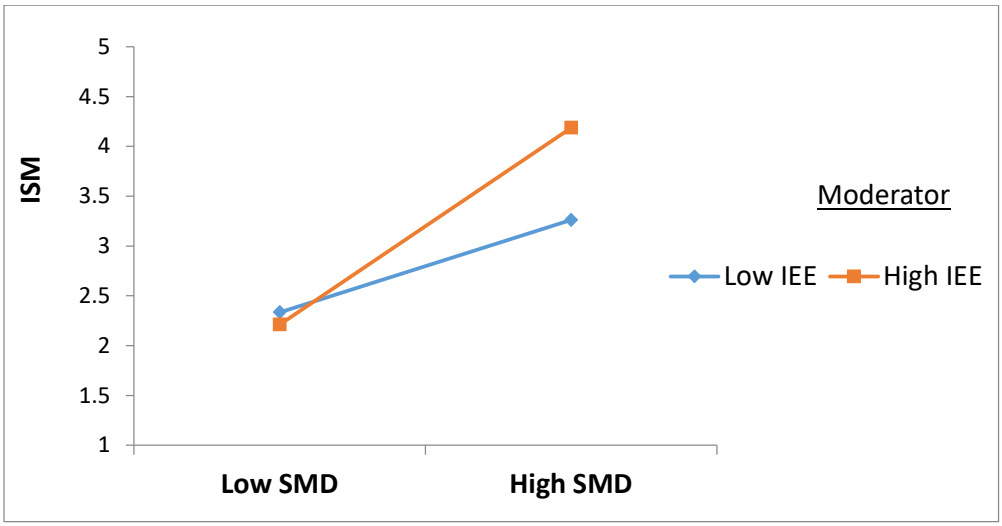

Figure 2: Interaction effect

Moderation effect of IEE between SMP and ISM

Testing Hypothesis H_6 - Internal and External Environment moderates the relationship between Strategic management planning and the Implementation of Strategic Management issues

Moderation analysis was examined to assess whether IEE moderated the relationship between SMP and ISM. The effect of SMP on ISM was examined in the first step of the regression analysis. In the second step of regression analysis, the IEE variable was added and the non-interaction between SMP and ISM was verified. In the last step the interaction between SMP and IEE was added to the non-interactional regression model in the previous step. These regressions are tested at 5% level of significance. SMP was significantly predicted ISM, β =0.965, t=16.801, p<.001. Hence the first condition was satisfied. The non-interaction effect between SMP on ISM was significantly predicted, β =.680, t=2.787, p=.005. The second condition was also satisfied. The interaction effect of SMP and IEE significantly predicted ISM, β =0.757, t = 15.174, p<.001. So, the last condition is also verified. Thus, it is indicated that the interaction model explains significantly more variance than the non-interaction model based on an alpha of 0.05. In order to visualize the moderation analysis, IEE was dichotomized into high and Low categories using a median split. The High category indicates all observations of IEE above the median, and the Low category specifies all observations of IEE below the median. The figure shows the regression lines for ISM predicted by SMP for the High and Low categories of IEE. From the interaction graph, it is clearly visible that, there is a strong positive interaction effect of IEE between SMP and ISM. As the SMP increases from low to high and due to

the corresponding interaction of IEE from low to high, ISM is also showing an increase. The hypothesis H6 is accepted.

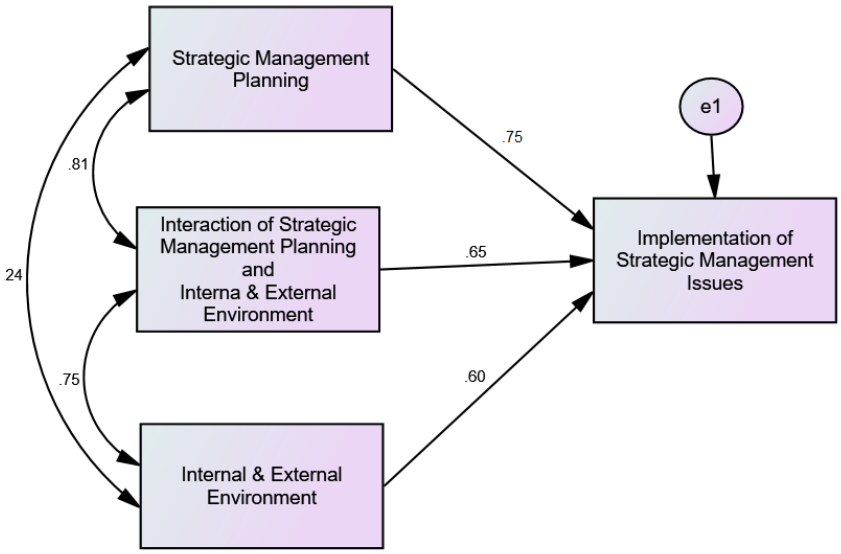

Figure 3: Moderating Analysis

Table 2: Moderation Analysis with ISM Predicted by SMP Moderated by IEE

			Estimate	S.E.	C.R.	P	Label
ISM	<---	SMP	.965	.057	16.807	<.001	Significant
ISM	<---	IEE (Non interactional)	.680	.244	2.787	.005	Significant
ISM	<---	SMP_IEE (Interactional)	.757	.050	15.174	<.001	Significant

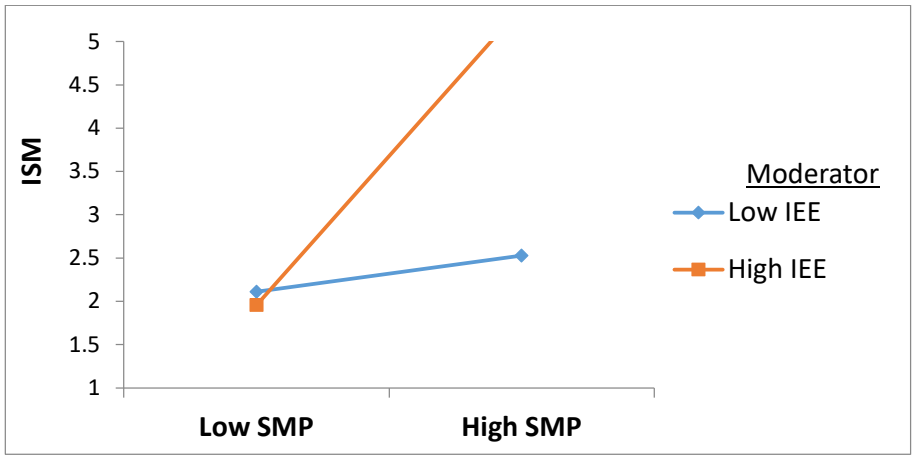

Figure 4: Interaction effect

Moderation effect of IEE between SME and ISM

Testing Hypothesis H_7 - Internal and External Environment moderates the relationship between the Strategic management evaluation and the Implementation of Strategic Management issues.

Moderation analysis was examined to assess whether IEE moderated the relationship between SME and ISM. The effect of SME on ISM was examined in the first step of the regression analysis. In the second step of regression analysis, the IEE variable was added and the non-interaction between SME and ISM was verified. In the last step the interaction between SME and IEE was added to the non-interactional regression model in the previous step. These regressions are tested at a 5 % level of significance. SME was significantly predicted ISM, β =0.389, t=11,851 p<.001.

Hence the first condition was satisfied. The non-interaction effect between SME on ISM was significantly predicted, β =.150, t=3.401, p=<.001. The second condition was also satisfied. The interaction effect of SME and IEE significantly predicted ISM, β =0.504, t = 12.991, p<.001. So, the last condition is also verified. Thus, it is indicated that the interaction model explains significantly more variance than the non-interaction model based on an alpha of 0.05. In order to visualize the moderation analysis, IEE was dichotomized into high and Low categories using a median split. The High category indicates all observations of IEE above the median, and the Low category specifies all observations of IEE below the median. The hypothesis H7 is accepted.

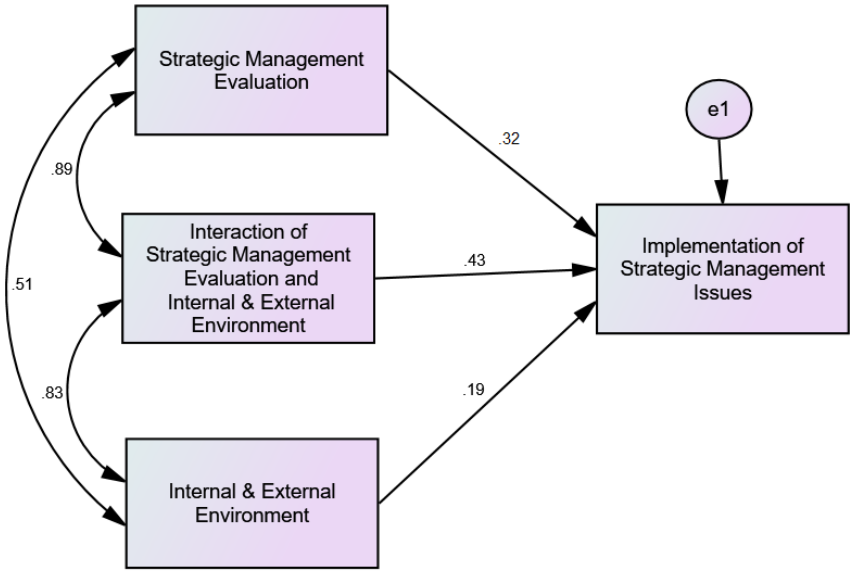

Figure 5: Moderating Analysis

Table 3: Moderation Analysis with ISM Predicted by SME Moderated by IEE

			Estimate	S.E.	C.R.	P	Label
ISM	<---	SME	.389	.033	11.851	p<.001	Significant
ISM	<---	IEE (Non-interactional)	.150	.036	3.401	p<.001	Significant
ISM	<---	SME &IEE (Interactional)	.504	.039	12.991	p<.001	Significant

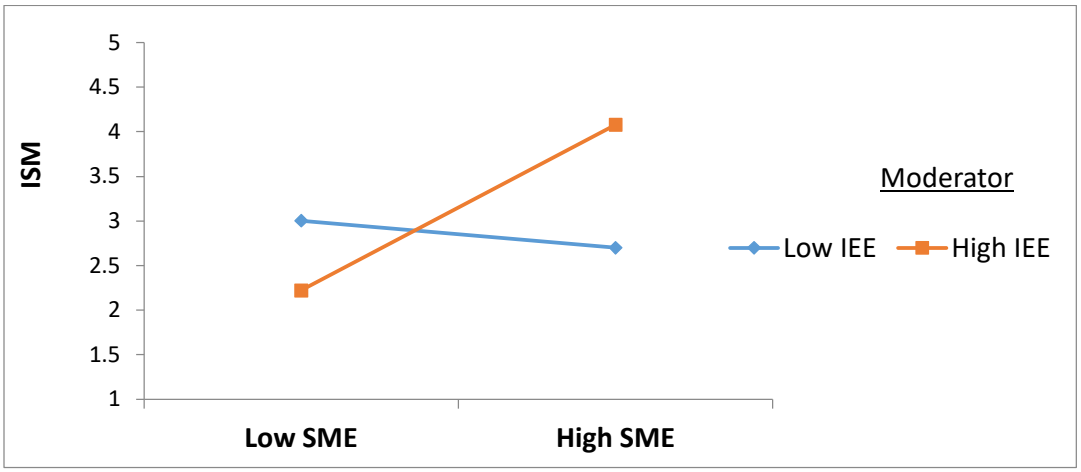

Figure 6: Interaction effect

Moderation effect of IEE between SMM and ISM

Testing Hypothesis H_8 - Internal and External Environment moderates the relationship between Strategic management monitoring and the Implementation of Strategic Management issues.

Moderation analysis was examined to assess whether IEE moderated the relationship between SMM and ISM. The effect of SMM on ISM was examined in the first step of the regression analysis. In the second step of regression analysis, the IEE variable was added and the non-interaction between SMM and ISM was verified. In the last step the interaction between SMM and IEE was added to the non-interactional regression model in the previous step.

These regressions are tested at 5% level of significance. SMM was significantly predicted ISM, β =.409, t=12.333 p<.001. Hence the first condition was satisfied. The non-interaction effect between SMM on ISM was significantly predicted, β =.433, t=3.401, p=<.001. The second condition was also satisfied. The interaction effect of SMM and IEE significantly predicted ISM, β =0.711, t = 13.438, p<.001. So, the last condition is also verified. Thus, it is indicated that the interaction model explains significantly more variance than the non-interaction model based on an alpha of 0.05. In order to visualize the moderation analysis, IEE was dichotomized into High and Low categories using a median split. The High category indicates all observations of IEE above the median, and the Low category specifies all observations of IEE below the median. Figure shows the regression lines for ISM predicted by SMM for the High and Low categories of IEE. From the interaction graph, it is clearly visible that, there is a strong positive interaction effect of IEE between SMM and ISM. As the SMM increases from low to high and due to the corresponding interaction of IEE from low to high, ISM is also showing an increase. The hypothesis H8 is accepted.

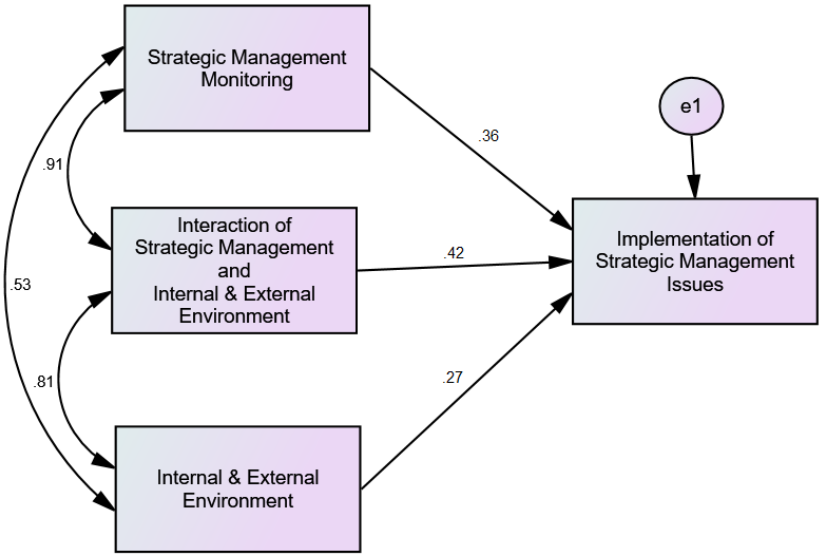

Figure 7: Mediating effect

Table 4: Moderation Analysis Table with ISM Predicted by SMM Moderated by IEE

			Estimate	S.E.	C.R.	P	Label
ISM	<---	SMM	.409	.033	12.333	<.001	Significant
ISM	<---	IEE	.433	.033	12.982	<.001	Significant
ISM	<---	SMM_IEE	.711	.053	13.438	<.001	Significant

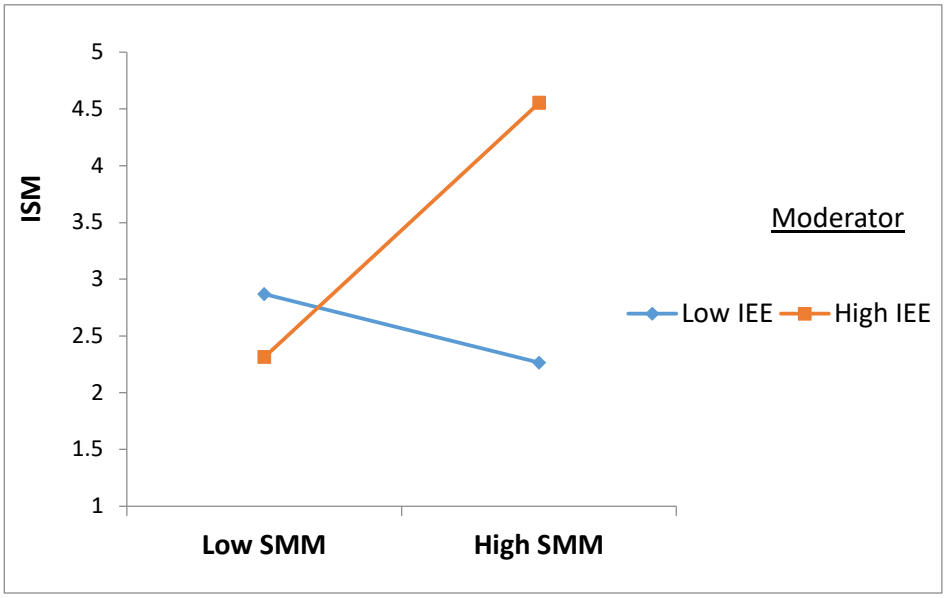

Figure 8: Interaction effect

Conclusion

The present study is carried out mainly to examine the implementation of strategic management issues in public organizations in the United Arab Emirates (UAE). Through the study, it is attempted to understand the factors of strategic management issues and the relationship between strategic management issues and organization performance. The study also focused to assess any moderating effect of internal and external environments between strategic management issues and organization performance in the public sector in the UAE. Through the study, the necessary implications are drafted for strategic management issues. To fulfill the study objectives, an exploratory approach was used initially for clear problem formulation and developing the hypotheses. The study covered various government offices and public sector organizations that are accessible in the UAE for collecting the required data.

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Actualization of Head and Shoulders Price Pattern Statistics for US Equity Market

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Abstract

In this article the process of formation of "Head and Shoulders" graphic pattern as well as further quotes movement after the pattern formation is considered. The purpose of the work is to verify the suitability and efficiency of using the Head and Shoulders pattern in order to make medium-term and short-term investment decisions and to forecast the profitability of trading positions. The paper presents the results of formation analysis of the Head and Shoulders pattern both on the market with an upward trend and on the market with a downward trend. The main emphasis was made on price objectives in the formation, as well as the identification of specific features of the pattern that increase the probability of investment decisions. The results of the study provide the data on the most probable average values of such indicators as: the period of pattern formation, the period of achievement of the absolute and relative H&S target, the average value of price movement after the pattern confirmation etc. Furthermore, our findings can be interesting and useful for technical analysts and portfolio managers in the process of stocks price patterns charting and analysis.

Keywords: Head and Shoulders Pattern, Investment, Economy, Technical Analysis, Speculative Trading

JEL Classification: C15, E17, E44, G11, G15.

Introduction

In recent years, more and more people are getting interested in forecasting the dynamics of asset prices in the medium term. This is caused by the growth of the stock market, which is expressed in the growth of world stock indexes and rising stock prices. Since in such an investment period fundamental analysis gives low rate of return [Twardowski S., Parshikov S., 2012], professional speculators rather use technical analysis methods, particularly visual analysis. Many patterns were described before the 20th century, and statistical testing of these patterns were conducted more than 10 years ago. During this time plenty of new ways to make profit on price fluctuations have appeared. To make forecasting process easier investors created different trading robots and algorithmic trading system using financial and its knowledge. The emergence of high-frequency trading had an impact on trading platforms, and

these two facts could have influenced the formation of price patterns [Volodin S., Kopyrina O. 2015]. In this paper, a study of the Head & Shoulders pattern (H&S) was conducted, based on data for the period of 1994-2019 YY. The results of the research gained additional recommendations for investment and speculative decisions.

Literature Review

The analysis of the Head and Shoulders pattern has been carried out in various scientific works specialized on statistical evaluation of the pattern's suitability [Savin N., Paul A. and Zvingelis, J., 2007; Chang and Osler, 2001; Dawson and Steeley, 2003], as well as studies in evaluating the profitability of using this pattern in various markets [Chang and Osler, 2001; Park and Irwin, 2007]. An important feature of these studies is the estimation base.

Chang and Osler evaluated the pattern on charts of 6 different currency pairs [Chang and Osler, 2001], Dawson and James analyzed shares listed on the London Stock Exchange [Dawson, Edward&Steeley J., 2003], and Andrew Lo conducted the research based on American companies' stocks [Lo A., Mamaysky H. and Wang J., 2000]. These studies were mostly conducted to simulate mathematical patterns of identification of the Head and shoulders pattern [Weller, Paul A. and Friesen, Geoffrey C. and Dunham, Lee M., 2007], while such formations may be incorrectly identified during a chaotic market analysis by analytical systems. The point is that many patterns are set without taking into account other parameters that a professional trader should keep in mind, moreover there are always some specific factors and market parameters which can hardly be effectively integrated in analytical systems and are difficult to consider in one complex analytical approach [Nyangarika A., Mikhaylov A. and Richter U. 2019a; Nyangarika A., Mikhaylov A. and Richter U. 2019b; An J., Dorofeev M. 2019; An J, Dorofeev M. and Zhu S., 2020; Nyangarika A., Mikhaylov A. and Tang B-J 2018; Dorofeyev M., Kosov M., Ponkratov V., Masterov A., Karaev A. and Vasyunina M. 2018; Nyangarika A., Mikhaylov A. and Tang B-J 2018; An J., Mikhaylov A. and Sokolinskaya N. 2019a; An J., Mikhaylov A. and Sokolinskaya N. 2019; Mikhaylov A. 2018a; Mikhaylov A. 2018b; An J., Mikhaylov A. and Moiseev N. 2019; Mikhaylov A., Sokolinskaya N. and Lopatin E., 2019; An J., Mikhaylov A. and Sokolinskaya N., 2019; Mikhaylov A., 2019; Meynkhard A. 2020; Denisova V., Mikhaylov A. and Lopatin E., 2019].

The treatises on technical analysis [Schwager J., 2018; Edwards R., Magee J., Bassetti W., 2007; Pring M. 2002] reveal the idea of when such patterns can be formed and for what reasons they are formed. Thomas Bulkowski in his research also revealed behavioral reasons for pattern formation [Bulkovsky. T. 2003], John Murphy argued that H&S top patterns should appear only after strong growth and at the top of medium-term upward motion [Murphy J., 1986]. Mathematical trading systems cannot take into account such factors and the identification process generate high quantity of false patterns. To reduce the influence of this factor, identification process has to take into account special filters. That is why we decided to analyze the pattern using technics of visual analysis, according to the supplemented principles, which were outlined by Schwager, Murphy, Pring and the others. Indirect factors, which could have influenced the formation of the pattern also were taken into account.

Concept Headings

Head and shoulders (H&S) - the price pattern represented by 3 ascending peaks, the second of which is higher than the others. The second peak is called "head" and the first and the third tops are called "shoulders" and the line joining their bottoms is called Neckline.When the price closes below the Neckline, H&S pattern supposed to be completed and the probability of changing the upward trend to a downward one becomes extremely high. The process of violating the Neckline on the downside is called breakout. Retracement move – price movement after the breakout, usually back to the neckline. After the retracement move, price continues downward trend.

If price closes above the right shoulder level during a day or a week, the pattern is false and most likely the price movement will go in an upward trend. The pattern height is used to determine the absolute target value of price movement. To measure the relative target, the percentage change from the pattern's head to the neck level is estimated and the change is postponed until the neck breaks down. Relative targets trigger more often and faster than absolute targets in this pattern. For an inverted H&S pattern, all rules work the same way, only in reverse.

It was decided to take shares of the American S&P 500 index as a sample set. This index was taken as the most representative one, which is explained by the high liquidity of shares in this basket.

We identified H&S patterns that have occurred since 1994 to 2019. For identifying the patterns, we used logarithmic scales with weekly timeframe. The data provided only closing, opening, maximums and minimums for each week. A weekly timeframe has been chosen, because this time period performs smoothing price changes and represents behavior of market players on medium-term time period.

To determine the main indicators, we measured the following points: start date of formation; pattern breakdown date; head level; breakdown level; 3% level; absolute target; relative target; dates when absolute and relative targets were reached.

In addition to these measurements, we analyzed basic pattern characteristics, such as: type of pattern (top, bottom) type of pattern (top, horizontal, top-down), whether the pattern H&S triggered or not. 3% breakdown level and horizontal level were used as parameters increasing the probability of pattern triggering.

A pattern is confirmed when at least one of the delayed targets, relative or absolute, H&S been reached. Only when prices close at the level which is above the right shoulder amount the pattern can be considered as failed one. This requirement of H&S has been introduced with the purpose to reduce false triggers of pattern cancellation.

On the basis of the data received average statistics and it’s median level for the following group of indicators were formed: pattern formation period; pattern width; number of touches of horizontal level; absolute target achievement period; relative target achievement period; average annual return on relative target; average annual return on absolute target. For comparison of profitableness of each possible transaction, we calculated annual profitableness for absolute and relative targets. The returns have been calculated for working patterns.

To confirm the suitability of the pattern, we used the relative performance criterion, which reflects the ratio of working patterns to non-working ones. If the number of triggered patterns is less than the number of failed patterns, then the relative performance of the pattern is less than 1 and this pattern is not applicable for use in investment and speculative activities.

Discussion

After analyzing the available data on S&P 500 stock quotes, we identified 156 formations that corresponded to the top Head and Shoulders and Head and Shoulders bottom technical analysis patterns. The study found 109 top H&S and 47 H&S bottom patterns. The number of false formations for each pattern was 39 and 5 patterns, respectively. This indicates a lower probability of causing false H&S bottom patterns than for the top H&S patterns, which can significantly increase the profitability of a trading strategy based on the identification of these formations.

Patterns considered at a higher time interval show greater returns than patterns found in other studies [Chang K. and Osler C., 2001; Scott I. & Cheol-Ho P., 2007; Lucke, B., 2003]. Indirect factors increase

the accuracy of forecasting and allows you to get a greater return on investment. Currently, the use of the Head and Shoulders pattern is a reliable tool for forecasting price movements in the medium trading period. Using the data obtained during the study of the pattern formation period, the investor can predict the moment of the pattern breakdown in order to open positions in advance.

Results

To achieve the expected results of the research, first of all, its main parameters were determined. Then, on the basis of in-depth analysis, the average and median values of the indicators were obtained. In the course of the research, 156 patterns were identified, including 109 patterns of the top Head and Shoulders and 48 patterns of the Head and Shoulders bottom. The number of patterns that worked was 112. Totally 44 false patterns, of which 39 are top H&S and 5 H&S bottom patterns.

Table 1: Pattern formation period

Distribution of the formation period, units				
	H&S top	Percentage of the sample	H&S bottom	Percentage of the sample
From 180 to 365 days	37	33.94%	32	68.09%
From 365 to 730 days	49	44.95%	10	21.28%
More than 730 days	23	21.10%	5	10.64%

Our own calculations based on the Research. ICE data base

Mostly all top H&S patterns were formed within 1 to 2 years (about 45% of all patterns), while patterns with the formation period longer than 2 years were twice as rare (21% of all patterns). In the group H&S bottom pattern the objectives with the formation period of less than one year prevailed (68% of observations), while the patterns with the formation period of more than 2 years were extremely rare (10.6% of the subgroup patterns). At the same time, the study results showed that the average period of formation of top H&S is 563 days or 1.54 years. At the same time, 50% of all patterns of top H&S were formed in less than 462 days (1.26 years). As for the H&S bottom pattern, the average formation period of the pattern was 453 days (1.24 years), and 50% of all patterns were formed in less than 315 days (0.86 years). The key calculations are presented in table 1.

Table 2: Analysis of reaching pricing targets and annual return on transactions

Characteristics	H&S top	H&S bottom
Average period for reaching the absolute targets, days	177.12	404.55
Median period for reaching the absolute targets, days	154	304.5
Average period for reaching the relative targets, days	146.91	413.16
Median period for reaching the relative targets, days	91	308

Our own calculations based on the Research. ICE data base

The results of the study showed that the top H&S patterns do not always achieve their absolute targets. Absolute targets for the top H&S pattern are achieved on average within 177 days (0.48 years), and for the H&S bottom pattern within 404 days (1.1 years). At the same time, the relative target for the top H&S pattern is achieved in an average of 147 days (0.4 years), and for the H&S bottom pattern, this target is reached in a period of 413 days (1.13 years). The key calculations are presented in table 2.

From a practical point of view, it is necessary to consider the profitability of opening a trade, based on the recognition of the pattern, to determine the moments for opening and closing trade position. Annual returns on trade position are calculated with assumption that the opening of the trading position occurs at the time of pattern confirmation, and closing at the time of reaching the target, the annual returns on transactions were calculated.

Using the top H&S pattern to open a short position, market participants on average could get 270.9% annual return on invested capital for an absolute target and 273.8% for a relative target. This result will be significantly lower in real trading, because our research did not take into account the cost of servicing a short sale, which requires additional collateral and interest payments. Opening a position on the H&S bottom pattern brought an average of 42.45% per annum for the absolute target and 39.26% for the relative one. Average price movement after the breakout (is lower than the top Head and Shoulders pattern because it takes more time to reached targets. H&S bottom pattern proved to be a tool for long-term investment, since most often prices did not return to the points of this pattern after the breakdown of targets.

This study confirmed the applicability of the patterns, since the ratio of working patterns to (false patterns is greater than 1 (the relative effectiveness of 2.54). In particular, the H&S bottom pattern proved to be more reliable than the H&S top (relative performance of 8.4 versus 1.79 for the top H&S). The key calculations are presented in table 3.

Table 3: Analysis of annual return on patterns

Characteristics	H&S top	H&S bottom
Average annual return on an absolute target	270.98%	42.45%
Median annual return on an absolute target	144.92%	35.80%
Average annual return on the relative target	273.86%	39.26%
Median annual return on the relative target	167.28%	35.86%

Our own calculations based on the Research. ICE data base

The study allowed us to deduce the key features of the formation and recommendations for using the pattern, which can be used in the course of making investment decisions on the stock market.

1. To open or close a position, there is a need to wait until the pattern is confirmed. This approach helps to reduce the probability of loss, especially when the trade relates to the opening of short positions.
2. Depending on the aggressiveness of the market participant's investment policy, we recommend setting the price levels of position cancellation at a level above 3% of the breakout point for less aggressive investors and at the right shoulder level for more aggressive investors. The level of the right shoulder as an indicator of cancellation makes it possible to increase the expectation of a correct forecast, as it provides a margin for the quote rate.
3. Patterns usually reach relative targets, since they are closer to the moment of opening a position.
4. Given the low profitability of using the H&S bottom pattern compared to the top H&S pattern, the use of this pattern can be targeted at making long-term investment decisions.
5. Using the data obtained during the study of the pattern formation period, the investor can predict the most convenient moment of the pattern breakdown in order to open positions in advance. This approach can be used for high-risk speculation.

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Remarks on the Use of an Eye Tracker as a Sensor of a Human Gaze in a Social Robot

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Abstract

This work discuss the concept of use of an eye tracker in the role of a sensor of human gaze in a social robot. The prior motivation is to establish a solid base for development of joint attention competency in a robot. The concept is presented against the background of related solutions. The discussion is conducted from two perspectives: Human-Robot Interactions (HRI) and User Experience (UX).

Keywords: eye-tracker, shared attention, UX study, social robot.

Introduction

In recent years we have seen a significant development of robotic technology aimed at cooperation and assistance to humans. Brief study of the contents of (Siciliano and Khatib 2016) emphasizes an enormous progress in intelligent vehicles, medical, rehabilitation, surgery, health care assistive and social robots. The new robots aren't just doing the job of a human being. They cooperate directly with him/her, accompany him/her, extend his/her independence.

Social robots stand out from other robots with their ability to communicate naturally with humans and with good adaptation to the human social environment (Fong et al. 2003), (Breazeal et al. 2016). The role of multimodal communication in social robots is comprehensively discussed in (Breazeal et al. 2008) and (Breazeal et al. 2016). The authors of the aforementioned works identify a number of factors that are essential in this context, in particular they stress the importance of shared attention. If a robot is capable to identify the current attentional focus of a human then progress in the conversation is more efficient while errors and misunderstandings are immediately identified and corrected. The ability of the robot to share attention with a human facilitates communication in cooperation. In particular, it helps to establish a common ground with others (Breazeal et al. 2008).

The role of joint attention and gaze detection in social robotics is studied in a numerous other works such as: (Huang 2010). Much of them is related to autism, see e.g. (Scassellati et al. 2012), (Xu et al. 2016). The above works can be complemented by activities of the recently completed or ongoing international projects: DE-ENIGMA, DREAM, SARACEN, BabyRobot. Identification of the human attention focus often is based on the human gaze detection and analysis, (Zaraki et al. 2014), Classic RGB cameras are commonly

applied sensors for the gaze detection (Droeschel et al. 2011). Some works reports application of more sophisticated sensors such as eye-tracker, (Courgeon et al. 2014) The use of an eye-tracker for gaze detection seems to be a good idea although the original purpose of these devices is completely different. In recent years, there has been a clear development of them with a simultaneous drop in price. A brief overview and analysis of eye-trackers is done e.g. in (Hume 2016). The one of most common used robotic research platform in HRI research is NAO. It has been used in various HRI studies, (Arent et. al. 2017), in particular in research on autism therapy. In these studies NAO plays a role of a mediator who stimulates a child to engage him/herself in gradually more complex interactions with the robot (Scassellati et al. 2012). Usually such studies are partially based on the WoZ method due to limitations of the sensory system of NAO. The build-in sensors are insufficient for understanding paralinguistic regulatory cues by NAO in the course of communication with a human. However NAO has proven to be very flexible in terms of expansion capabilities.

We believe that under certain circumstances an eye-tracker integrated with a robot might be a valuable source of information for the robot concerning the human attention focus. It could deliver a feedback allowing the robot to adapt its goals and activities to the current perception of a human. In consequence the quality of interactions between a human and a robot could be improved and in turn the user experience (UX) could be gained. This issue is the subject of considerations of this article.

UX can be defined as users' judgment of a product arising from their experience of interaction and qualities of the product, which engender the effective use of the product and user's pleasure (Sutclie 2009). UX evaluation methods for robotic systems with shared attention capability is not obvious. Here we employ and refer to the ideas included in the following works: (Holmqvist et al. 2011), (Lazar 2017), (Chynał et al. 2016), (Chynał & Sobecki, 2016).

Gaze Tracking and Attention Sharing in Human-Robot Interactions

Attention sharing is considered to be the one of crucial elements that are necessary for proper, smooth and meaningful multi-modal communication of a human and a robot (Fong et al. 2003), (Breazeal et al. 2008), which is the distinctive feature of a social robot among other robots. Precursors of a multimodal communication are already present in the first humanoid robots WABOT and WABOT-2. It is a central issue for Embodied Conversational Agents (e.g. Greta). Nowadays, all of the shelf robots designed for Human-Robot Interactions (e.g. NAO, Pepper) as well as new robots developed within the frame of scientific projects (BabyRobot, DREAM, DE-ENIGMA) possess advanced communication capabilities in the context of natural conversation. Despite the high workload, this is still an active research area including sensing, data processing and acting.

A natural conversation involves exchange of verbal and non-verbal information between two or more parties (Fong et al. 2003). This issue is discussed in more detail in (Breazeal et al. 2008). In particular, the non-verbal information, provided by para-linguistic cues, supplement the linguistic information. The para-linguistic cues are expressed by facial expressions, gestures, prosody, etc.. Because the sound has strong property of attracting attention the auditory cues can be used for interruption. But they are not suitable for continuous use. Contrary, visual para-linguistic cues are silent and therefore they can be used continuously. Breazeal et al. 2008 classify the roles of para-linguistic cues into three categories: regulators, state displays, illustrators. The regulators are used in particular to smooth and synchronize the exchange of speaking turns. The state display cues are used to display the conversational or cognitive state. For example, the listener can feedback information to the speaker confirming keeping up the conversation or confusion and loss of the conversation thread. A special display cue is a gaze direction. It can be a silent cue to provide the attentional focus, either to the speaker or to the listener. This is very useful when the speaker is trying to point out a particular object as the attention sharing point. The illustrator cues are used to persuade the

listener to perform joint attention. They involve gaze, head pose, pointing gestures and conversational speech.

Multimodal communication between a human and a social robot requires that they conduct a dialogue as peers who know each other (Fong et al. 2003). In consequence a social robot should be able to read and understand all the linguistic and paralinguistic cues that are used by a human and simultaneously the robot should be able to use the same cues for conveying information to the human.

Due to the current state of the technology, capabilities of robots with respect to reading and displaying various linguistic/para-linguistic cues are diverse. Focus attention recognition on the basis of gaze direction detection by a robot seems to be one of most challenging. This and related problems have attracted a considerable attention in the literature.

In (Xu et al. 2016) the authors focus on gazing at each other face in a course of a human-robot interaction. They try to answer the question *at what moments and in what ways the robot should look at human user's face as a response to the human's gaze behavior*. To this end they developed an experimental system based on NAO robot and ASL head mounted eye-tracker (Applied Science Laboratories, LLC). The idea of the real-time control system was to detect the human-attention based on real-time eye tracking (Holmqvist et al. 2011), and then to generate gaze-contingent responsive behaviors. One of the findings was that the participants demonstrated more coordinated and synchronized multimodal behaviors between speech and gaze when more eye contact was successfully established and maintained. A related research with use of eye-tracking and virtual humans is reported in (Courgeon et al. 2014). The work (Zaraki et al. 2014) presents a context-dependent social gaze control system designed and implemented as a part of a social robot. The gaze-control system employs MS Kinect skeleton tracking together with speech and facial expression recognition. To evaluate the system performance, the authors used a DIKABLIS eye tracking system for measuring and analysis of the participants gaze. The results of the evaluation have shown that the systems replicated human gaze behaviour 89% of the time.

Gaze tracking and shared attention are of particular interest in autism research, (Scassellati et al. 2012), including robot-based interventions for autism spectrum disorders. The work is carried out in many dimensions. For example, in (Cao et al. 2019) the authors compare gaze of children with ASD against gaze of typically developed children towards a robot NAO and a human. For this purpose they use Tobii X3-120 eye-tracker system. One of the results was that both groups of children showed more interests in the robot's face, but the robot induced a lower proportion of fixation time on the target. The work (Esteban et al. 2017) concerned to a supervised autonomous system for robot-enhanced therapy for children with ASD. The core elements of the sensing part of the proposed system are: gaze estimation, human action recognition, facial expression recognition, object tracking and audio processing. It's not difficult to see some similarities here with (Zaraki et al. 2014). The hardware base for the sensory system are three RGB cameras and two MS Kinect sensors. This system was integrated with one of two robotic platforms: NAO (commercially available) or Probo (experimental).

The considerations to date allow to conclude that gaze tracking is meaningful for social robotics. This applies for development of new socially interactive robotic systems capable of highly believable human-robot interactions. Whats more, gaze tracking is essential for further research on attention sharing and related problems in multimodal human-robot interactions.

Selected Technological Aspects Concerning Gaze Tracking in Human-Robot Interactive Systems

With reference to the previous section we are interested in an interactive system consisting of a human and a robot that is supposed to evolve within a predefined scenario where gaze tracking or attention sharing matters. As an example, we can consider an interactive play of the child and the NAO robot, e.g. a child's imitation of a dance performed by NAO (Arent et. al. 2019). Notice, that if the robot is able to monitor the attention focus of a child during the play then it can adapt its behavior to the current subject of interest of a child. In particular, it will be able to wait with the play until the child returns to this play. From the UX perspective the usability of the system with a robot aware of the human focus of attention should be higher in compare to the case of a system with a robot that is unaware of the human focus of attention.

NAO is perhaps the most popular robot used in experimental studies on human-robot interactions, especially when they are addressed to children. It is also used as a therapeutic aid. This is an autonomous, programmable humanoid robot developed by Aldebaran Robotics. Its sensory abilities deserve special attention. The set of hardware sensors include two cameras, one facing forward and the other at a downward angle. Besides, there are four microphones mounted on top of the head. The virtual sensors based on these hardware allow for human posture recognition, face recognition, human tracking by specific body parts, detection of sound direction, simple speech recognition. The hardware parameters are insufficient for gaze tracking, emotions recognition or human actions prediction. Nevertheless, the software architecture allows for integration of external sensors with NAO as well as performing selected computational tasks on external hardware units. The flexibility of NAO in this aspect is widely exploited, e.g. in (Esteban et al. 2017), (Xu et al. 2016). The SDK associated to NAO is very extensive and well documented. It can be used directly in C++ or Python code or indirectly e.g. by means of a NAO robot stack in ROS. The latter is particularly important because ROS has become a standard in robotics. Many sensors used in robotics (MS Kinect, Intel RealSense, RGB cameras) have dedicated nodes in ROS that facilitates integration of these devices with NAO. This applies to selected eye-trackers (e.g. Tobii Pro Glasses 2, Pupil Labs) although they cannot be considered as regular robotic sensors. Thus, NAO is open for specification and implementation of an advanced communication system with numerous external sensors, including selected eye-trackers.

An eye-tracker guarantees the best gaze tracking among currently available sensors. Therefore it is justified to develop experimental testbeds for HRI study by integrating an eye-tracker with an interactive robot (e.g. NAO). However, eye-trackers have also significant drawbacks. They are very expensive, sensitive for damage and allow for limited mobility only. A survey and comparative analysis of various eye trackers can be found e.g. in (Hume 2016). Eye-trackers can be considered as a sensors where the hardware is split into sensory and computational unit. The computational unit can be a regular computer (PC, laptop, mobile phone, etc) while the form of the sensory unit differs depending whether the eye-tracker is stationary or mobile. In the last case the sensory unit has the form of a spectacle frame to which three cameras are attached. One of them (a scene camera) is a forward-facing camera that captures the scene. The next two cameras (eye cameras) focus on the one or both eyes. They record reflections of an infrared non collimated light directed from the source mounted on the frame towards the pupil. The recordings are processed in the computational unit to derive various forms eye movements, in particular saccades and fixations (Holmqvist et al. 2011). Eye-in-head angles are derived in the World Coordinate Frame which is being established during calibration. The human head movements are registered and taken into account in eye-in-head coordinates derivation thanks to inertial unit mounted in the frame. It is also possible to obtain coordinates from other predefined coordinate systems.

Integration of an eye-tracker with a NAO robot faces the designer and programmer with specific problems that are discussed in (Labarussiat 2017). It is a case study but some conclusions give useful intuitions that are not limited for the considered case. The author have used an eye tracking system manufactured by the company SensoMotoric Instruments (SMI): SMI Eye-Tracking Glasses (ETG).

The hardware base consists of SMI ETG Source (a sensory unit) and a SmartRecorder (a mobile phone) or a laptop (a computational unit). The associated software consists of two applications: iViewETG and BeGaze. iViewETG is designed for conducting and management of an experiment (calibration, data processing and storage). BeGaze is intended for analysis of the data acquired in the course of an experiment. The last software is not essential in the considered context. iViewNG SDK is a software that is essential. It includes a RemoteViewer Tutorial that allows among other development of a program for continuous monitoring whether the gaze is within the predefined Area Of Interest (AOI) or not. Note that if the AOI is associated to NAO we can have at dispose current information whether the person involved in the interaction with NAO focuses on this robot or not. Noteworthy is that it is the ETG SMI computational unit that returns the boolean type information (the gaze within AOI/outside of AOI) that is needed to be broadcasted to NAO. This is a low size information that can be easily send via computer network without overloading it. The interprocess communication using sockets is practically the only solution here because the SMI software is written under Windows 7 OS and MS Visual Studio 2008 compiler. NAO runs under Linux Gentoo and NAOqi - a dedicated robot operating system. Technically such a communication can be solved in many ways. One of them is to develop a ROS node that will communicate with the modified RemoteViewer application running at the ETG SMI computational unit. At the same time this ROS node could publish the received information to a ROS topic that is available for the ROS interface to NAO. Labarussiat (2017) in this case study shows that two technically complex devices: SMI Eye-Tracking Glasses and a NAO robot, developed independently, for different purposes, at different times, based on different technology can be integrated in one system that is potentially useful for studies concerning attention sharing in human-robot interactions. The idea such system is illustrated in Figure 1. To the best knowledge of the authors similar integration of NAO with newer mobile eye-trackers is possible and potentially easier. For example, all the software developed for the Pupil Labs is Open Source and available for Linux.

(a) Interactions between NAO and a human wearing SMI Eye-Tracking Glasses

(b) A gaze marker (green) in iViewETGrunning on SmartRecorder

Fig. 1: Illustration of an experimental system designed for shared attention studies in HRI based on NAO and ETG SMI eye tracker.

UX Analysis of a Robotic System Possessing Human Gaze Tracking Capability

In the previous two sections the authors discussed the need and feasibility of developing of robot based systems possessing capability of human gaze tracking. It has been shown that there is considerable amount of research related to such systems reported in the literature devoted to HRI. The considered systems are also interesting for UX research but to the best knowledge of the authors much less studies

in this area has been carried out. Therefore in this section the authors survey and discuss open problems, potential methods and available tools that might be useful of such studies.

Adjustment of the selected social robot applications with application of visual focus of attention

The authors are planning to implement a scenario of human-robot interactions, in which robot's decisions on actions will depend on selected human behavior linked with intentions and/or attention concentration. The scenario will be stationary or will have a restricted realization area, and will be based on the NAO robot (or a similar robot). This scenario will involve a population of children in a preschool age as partners of interactions with the robot. The scenario will refer to known scenarios from a literature such as playing a board game or educational – revalidation games like recognition of body parts or dance in common. The research goal of this task is to determine whether and to what extent it is possible, given the available contemporary technology ground, to elaborate:

- effective monitoring of attention concentration of the user (a child) playing the educational – revalidation game with the robot,
- improvement of concentration duration of the user playing an interactive game task, that is characterized by a short-term attention span,
- incorporation of behaviors into the social robot platform that attract a user attention for a longer periods of time (and in consequence improving usability of a robot as an teacher assistant).

The research goal is to determine whether and to what extent it is possible on the ground of available technology to elaborate:

- effective monitoring of user's attention concentration on selected elements of the environment,
- usability enhancement of a guide robot by incorporating into the robotic platform such behaviors as re-attracting attention of a guided person, adaptation of own position to the current location of human and recognition of his/her interest.

Comparative UX studies of HRI systems concerning the application of visual focus of attention

The general principles for conducting human-robot interaction studies focused on objective observation of user behavior will be developed. These principles will be defined based on the UX methods currently used in the HCI domain, and then will be adapted for our HRI system requirements accordingly. For example, in the analysis of the usability of mobile systems, the research uses observation of behavior of a single user with application of a special stand with an eye tracker or a specialized glasses system (Holmqvist et al. 2011) that enable eye tracking analysis during user's free movements during the use of the verified application. In this case the ready-made procedures and rules for usability evaluation can be used for our HRI system.

The new procedures and principles dedicated to the study of HRI systems are planned to be developed. To measure users' behavior eye tracking devices and other devices will be used that allow to register ongoing psychophysical activity of users, including recognition of their sensations with devices such as: EEG recorder (Falkowska et al. 2016) and (Chynał et al. 2016), thermal imaging camera (Chynał & Sobecki, 2016), heart rate monitor or devices for measuring galvanic skin reaction, as well as FaceReader's software developed by Noldus. The proposed methods and principles will be verified in the experimental manner. The experimental verification procedure will be using comparisons of UX measurements of users'

interactions with the robotic system that have implemented mechanisms of shared attention and the robotic system with no such mechanism. The experiments will consider two scenarios. The first considering teaching of children and the second museum guide for adults. Additionally, as part of the proposed procedure deliberated will be detection introduced disturbances in the researched implementations of human-robot interaction. Depending on the interaction scenarios, intentionally introduced disturbances will include violation of the optimal distance of the robot from the user, frequency and length an "eye contact", sharing of the attention point, etc.

Conclusions

The main contribution of the paper is a proposition and preliminary verification of application of eye tracking to human-robot joint attention control. The paper also discusses motivation, technological aspects and UX perspective to robotic systems, which applies gaze tracking techniques to enable sharing attention. Sharing attention between a human and a social robot is nowadays active but still maturing research field. At the moment there are no off the shelf robots that are ready to support such research without any expansion. Authors have shown that gaze tracking expansion of the robotic system is feasible although it requires to overcome a number of specific technological problems. Finally, it has been shown that it is justified to study robot based systems possessing capability of human gaze tracking from the UX perspective. In particular, it is possible to indicate specific methods and tools that can be used here, however they also should be adjusted to the HRI requirements and sharing attention particularities.

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The New Approach to the Study of Investments Attractiveness of Selected European Countries from Japanese Investors' Perspective

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Abstract

The main purposes of the paper are: the identification of internal and external factors prompting Japanese investors to locate their capital outside of Japan and an assessment of the investment attractiveness of selected European countries, taking into account the relationship existing between the size of the inflow of the Japanese investments to individual countries and factors that may affect this investment attractiveness of the locations. To study the relation between these two areas, econometric models were applied. The results of the adopted research procedure confirmed that even in the case of Japanese investors who usually locate their capital in the most development European countries; there are visible differences between the assessment of the attractiveness potential of these countries and the real value of Japanese investments. Because of that, according to authors, the more advance research procedure to predict the further Japanese investments in Europe should be applied.

Keywords: Japanese Investments, Attractiveness Of Location, Econometric Models, Annuity

Introduction

Increased mobility of foreign direct investment (FDI) has been observed on global markets for many years. It is the effect i.e. of progressive financial globalization and related to it an increased activity of international corporations. These changes hamper the interpretation of data on international financial flows and also affect the quality of forecasts regarding changes in both the value and directions of FDI flow. It is important because these investments are defined in the literature (Sohinger, 2005; Balcerzak and Zurek, 2011; Pietrzak and Lapinska, 2015) as one of the most important forms of capital flow between countries and a stimulus enabling faster economic development. According to Xu and Wang (2007), foreign direct investment is an important factor stimulating the economic growth of host countries due to the export growth, the number of jobs and economic recovery on a local scale. The negative consequences of these investments are also known, which may cause in the host countries: job losses in local plants, depletion of natural resources and degradation of the natural environment. The advantage of benefits over the possible negative effects of foreign direct investment can certainly be seen in the case of Japanese investments, which, apart from considerable technological advancement, are also characterized by a large ability to attract subcontractors and even competitors to the location of capital allocation from that country (Witkowski and Baraniecka eds., 2018). The Japanese culture of business management also includes striving to create close relationships with the environment of the organization, e. g. by acquiring knowledge from clients or cooperators, which is treated as one of the most important elements of the growth strategy of these organizations (Ahmadjian and Lincoln, 2000; Nonaka and Takeuchi, 2000). These companies most often create close relationships with the environment. According to the Japanese management system, the main goal of business operations is to provide customers with the value they expect while using the resources at their disposal as little as possible. The basis of this system is also continuous improvement introduced at all even the lowest levels of the organization. This improvement covers both the cost and functional sphere of the

organization's activities and applies to products and implemented processes, including production lines, warehouses and places of contact with a client and their main effect is to organize and standardize in principle all activities undertaken in organizations (Cheba, 2018). All these elements make Japanese investments perceived as attractive from the point of view of the host countries. It is worth noting, however, that in this case their influx is influenced by both specific internal conditions including i.e.: different culture, social and economic norms and historical past, as well as external conditions perceived from the perspective of the attractiveness of a given investment location from the point of view of Japanese investors. In the literature, a lot of space has so far been devoted to the analysis of internal conditions for the development of Japan as one of the most important investors on global markets. The directions of Japanese investment flow are also known; in Europe these are usually highly developed countries with a stable socio-economic situation (Witkowski, 1998; Ahearne et al., 2002; Cieslik and Ryan, 2005; Somlev and Hoshino, 2005; Fletcher and vin Staden, 2013; Anderson et al. 2014). On the other hand, issues related to the identification of factors attracting Japanese investment to individual European countries are raised less frequently. Such analyzes are usually carried out at a fairly high level of generality; it is checked, e. g. whether geographical proximity has an impact on attracting Japanese investors to particular geographical regions of the world (Asian countries and regions of Europe), (Zhou et al., 2005; Cassidy et al., 2006), opinions are also commonly quoted confirming the high attractiveness of United Kingdom as a location for Japanese investments. However, according to the authors of this study, there is a need for a more comprehensive approach to this issue and attempts to identify factors affecting the perception of attractive location by Japanese investors.

Therefore, the main purposes of the paper can be considered in two ways. The first one concerns the identification of internal and external factors prompting Japanese investors to locate investments outside of Japan. The second one concerns the assessment of the investment attractiveness of selected European countries, taking into account the relationship between the size of the inflow of this type of investment to individual countries in Europe and factors that may affect the investment attractiveness of the locations most often chosen by Japanese investors.

The paper is divided into 5 sections. The first presents the aim of the research and important elements that make up the background for further discussion. Next, there is a review of the literature on the essence and complexity of identification the internal and external factors influencing on expansion of Japanese FDI in the world. The third section is dedicated to the research method. The fourth section contains the research results, and the fifth is devoted to conclusions.

An Identification of Internal and External Factors Influencing on Expansion of Japanese FDI in the World

In economic practice one can frequently come across questions about the reasons for such and not another volume of Japanese investments in different parts of the world (Cieslik and Ryan, 2005; Buckleya et al., 2013). The answer to the question should be sought in the analysis of different determinants existing both in Japan (internal factors), as well as in the target country of an investment (external factors) (Witkowski et al., 2017). In the case of internal factors to the most significant determinants influencing the economic relations of Japan with other countries of the world one should include (Ahearne et al., 2002; data of Statistics Bureau of Japan):

a) the problem of deflation – in November 2019 Japan's consumer price inflation rose to 0.5 percent year-on-year; inflation rate in Japan averaged 2.95 percent from 1958 until 2019, reaching an all-time high of 24.90 percent in February of 1974 and a record low of -2.50 percent in October of 2009.
b) low unemployment rate, standing in Japan around 2.2% (as of November 2019) is one of the lowest in the world.
c) gradual withdrawal of investment funds from Japanese market which might indicate that the market is becoming less attractive for investors,
d) gradual increase of employment in services and fall in production, which in the case of Japanese economy which significantly relies on export is a negative phenomenon (it is more difficult to export services),

e) increase in investments on the part of large Japanese companies in foreign markets causing a decline in orders for small and middle companies in the country, which have been contractors for big companies.

Although Japan's economy is recognized as the third economy in the world in terms of global value of GDP (after the US and China, according to International Monetary Fund in 2019) for over 20 years it has been in a state of economic stagnation. The main reasons for this stagnation are problems associated with an aging population, low rate of fertility of women or mistakes in macroeconomic policy (Bayoumi, 1999; Fletcher and vin Staden, 2013). The decade of the 90s are called the Lost Decade in Japanese economy and the following 10 years, which also have not brought any improvement as the Second Lost Decade (Goodfriend, 2001). There are many reasons for economic stagnation, which has lasted in Japan for over 20 years, from wrong macroeconomic decisions up to demographic environment (Takatoshi and Mishkin, 2006). The experience of recent financial crisis and the following recession changed the perspective of perceiving Japan solely through the prism of errors in macroeconomic policy (such as wrong decisions of Japanese Central Bank and the lack of sufficient coordination of fiscal and monetary policy). Specific environment: geographic, political, cultural, economic and social has made Japan one of the biggest investors in the world for many years. These events coincided with demographical changes connected with aging of the society and as a consequence of a long-term fall of the growth rate *per capita* as a result of for example shortening the time of work, worsening the quality of work or as mentioned hereinbefore, lowering the tax revenue. The economic model dominating in Japan based on mainly export supported by the government and the banks fitting better less developed countries worsened the unfavorable situation. The model did not allow obtaining the same effects in the case of developed countries such as Japan, mainly due to limited possibilities of increasing export along with the increase in economy (Cooper, 2014). A collection of external factors which can also have impact on location decisions considered from investors perspective may include many determinants, such as (Dunning, 2006; Saviotti and Pyka, 2008; Coy and Cormican, 2014):

a) resource sufficiency indicators,
b) general economic development indicators (e.g. market size and growth, GDP *per capita* or GDP growth),
c) structural changes indicators and indicators of changes in efficiency of use and development of production factors, also informing on the freedom of movement of such factors in a given country e.g.: openness, which are positively related to inward FDI, distance and infrastructure (physical and cultural), this is a determinants which encourages FDI, its goal are to attract FDI, corporate tax rates, this is an indicator which have a negative influence on inward FDI, labor market flexibility, the indicator which is seen as a key determinant for attracting FDI,
d) engagement in international trade, pointed out also as the gauge of international competitive position of a given country.

In the case of Japanese investors, this list should also include factors describing the competitive potential of the target investment locations. Although the necessity to seek new markets with lower production costs is shown among the main reasons for taking up foreign business activity by Japan after 2000, Japanese investors as places for their investments in Europe choose primarily high developed countries with stable socio-economic situation. The main reason is the search for locations that will provide Japanese investors with access to highly qualified employees, and access to consumers interested in high-quality, technologically advanced products. (Somlev and Hoshino, 2005; Yoshimatsu and Ziltener, 2010; Witkowski and Cheba, 2016). According to Driffield et al. (2013) the main motivation of Japanese FDI is also to maintain access to the European market through sales networks and by adding production facilities for some manufacturing industries and a range of services subsidiaries, especially in the banking, finance and insurance industries. Currently, the countries with the biggest amount of Japanese investments in Europe are: United Kingdom (163 498 million USD in 2018) and the Netherlands (132 756 million USD) (JETRO data). However, in the last decade Japanese firms are in the process of reconfiguring their U.K. presence. In the last years the number of Japanese firms in the U.K. has declined considerably. In the remaining countries of Europe the volume and the number of Japanese investments is much smaller. In the Eastern Europe it is possible to discuss Japanese investments in the case of Poland and the Czech Republic, in the Southern Europe in the case

of Italy and Spain, and in the Northern Europe, apart from United Kingdom only in the case of Denmark, Ireland and Sweden. Table 1 contains the information about total outward FDI invested by Japanese investors in selected EU countries (International Investment position) in 2008-2018.

Table 1: Japanese total outward FDI by country (investment position) in 2008-2018 in million USD

Country	2008	2014	2015	2016	2017	2018
United Kingdom	32 576	77 533	89 030	123 938	154 037	163 498
Netherlands	72 172	96 745	106 367	105 305	130 410	132 756
Germany	11 992	19 481	21 207	21 709	27 026	29 039
Belgium	14 009	18 550	17 488	17 863	20 714	22 179
France	14 920	13 838	12 882	13 334	16 275	16 392
Luxembourg	4 332	9 502	13 148	9 547	15 242	13 578
Spain	1 276	2 002	2 401	2 945	3 360	7 488
Sweden	3 054	3 088	4 680	4 478	5 699	7 094
Italy	882	3 056	3 577	3 698	3 686	4 436

Source: JETRO data

Research Method

Scope of the study

In the work of Guzik (2008) it was proposed that investment attractiveness should be considered not only from the point of view of the potential of a given location, but also as an effect of the relationship between this potential and measurable effects in the form of the size of investment. Factors describing the location potential may be perceived differently by investors. In the case of higher technological commitment of planned investments, investors will rather look for places where they will be provided with an access to highly qualified employees, university graduates with a specific profile. On the other hand, the expectations of investors seeking middle and lower-level employees for whom a higher unemployment rate will be an attractive factor will be different. However, the literature is dominated by the view that the higher potential of a given location is synonymous with higher investment attractiveness. According to the authors of this study, this approach to studying the factors determining investment attractiveness does not fully exhaust the research problem posed in the work and investment attractiveness, as a complex phenomenon it should be considered from the perspective of the relationship between the potential and the achieved effects.

Research Material

The adopted research assumption required the preparation of two data sets. First of them included the results of competitiveness of national economies published annually by the World Economic Forum (WEF) in the reports: “The Global Competitiveness Index" (GCI). In the paper the results of this study were applied to describe the potential of selected economies to compete on the world markets. In the second one, the information published by Japan External Trade Organization (JETRO) on the annual value of Japanese foreign direct investment in 2008-2018 in European countries was collected. In the paper this data represents the achieved effects of investments attractiveness. The analyzes were conducted in 3-year cycles, it was assumed that the average value of Japanese FDI in European countries for example in 2008-2010 could be related to the level of competitiveness of the host country of those investments.

Econometric modelling of Japanese FDI

The econometric models (regression models) were used to study the investment attractiveness of European countries considered from the perspective of Japanese investors. These models allow to

compare the potential of given country and the obtained results in term of investment attractiveness. The size of Japanese FDI per 100,000 inhabitants can be described as a function of the development of 12 pillars describing the competitiveness of these countries:

a) basic requirements subindex: F1 – institution, F2 – infrastructure, F3 – macroeconomic environment,
b) efficiency enhancers subindex: F4 – health and primary education, F5 – higher education and training, F6 – goods market efficiency, F7 – labor market efficiency, F8 – financial market development, F9 – technological readiness, F10 – market size,
c) innovation and sophistication factors subindex: F11 – business sophistication, F12 – innovation.

The research to date (Cheba, 2018), shows that the so-called basic requirements are the least decisive for the investment attractiveness of a given location for Japanese investors. As already mentioned, in Europe these investments are located in highly developed countries with a stable socio-economic situation. In connection with the above, the first three indicators of basic nature were excluded from further analyzes. Econometric models were estimated taking into account indicators describing the higher level of development of countries (subindices: 2-3). Japanese FDI changes over time have been analyzed considering each country separately. For these purpose the following normative models were estimated:

a) linear model (L): $Y_{ti}=w_1F_{4ti} + w_2F_{5ti} + \ldots + w_8F_{12ti}$,
b) exponential model (W): $Y_{ti}= exp\ (w_1F_{4ti} + w_2F_{5ti} + \ldots + w_8F_{12ti})$,
c) power model (P): $Y_{ti}= F_{4ti}^{w1} * F_{5ti}^{w2} * \ldots * F_{12ti}^{w8}$,

where: $F_{4ti}, \ldots, F_{12ti}$ – the values obtained in each pillar of competitiveness according to the WEF methodology in *t*-year for *i*-th country and $w_1, \ldots, w_8$ – regression coefficient.
The rests of this model estimated for each country are differences between the actual values of Japanese FDI in the selected EU countries and the model values calculated on the basis of estimated models. Positive residuals indicate that, for example, the current investment value is higher than the normative value and the surveyed EU country is more attractive to Japanese investors than it can be estimated according to model and vice versa. To estimate these differences between the values calculated based on models and actual values of Japanese FDI in the reporting economy, the RAI meter can be calculated in the following way (Guzik, 2008):

$$RAI_{ocountry} = \frac{e_{country}}{\bar{Y}}, \quad (1)$$

where: $\bar{Y}$ – mean value of Japanese FDI per 100,000 inhabitants, $e_{country}$ - the residuals of the normative model, the difference between the empirical value and the value from the model.

Study Results

Table 2 presents the research results obtained on the basis of estimated reference models presenting the relationship between the size of Japanese foreign direct investment and measures describing the competitiveness (in the paper it is treated as a synonym of investment attractiveness) of the selected European countries. The criterion for choosing the models was the level of matching to real data measured by the coefficient of determination R^2. Only the explanatory variables that are significant are included in the presented model. Models were estimated using step-wise regression.

Table 2: Reference models for selected EU countries

Country	Estimated model	R^2	S_e	V_{Se} [%]
Netherlands	$\hat{y}_t = -844.82 + 346.47x_{5t} + 229.76x_{7t} + 144.02x_{9t} - 460.097x_{11t}$ $(-0.56)\quad(11.16)\quad(2.98)\quad(1.56)\quad(-1.67)$	0.9858	15.70	2.72
United Kingdom	$\hat{y}_t = -2700.45 + 692.45x_{11t} - 188.54x_{12t}$ $(-6.27)\quad(4.81)\quad(-2.03)$	0.8857	23.93	19.89
France	$\hat{y}_t = -132.80 + 15.76x_{7t} + 12.73x_{8t} + 5.78x_{12t}$ $(-2.60)\quad(3.01)\quad(3.36)\quad(1.30)$	0.7454	1.52	6.25
Belgium	$\hat{y}_t = -1149.21 + 88.43x_{5t} + 40.39x_{7t} - 26.76x_{8t} + 140.18x$ $(-4.43)\quad(4.07)\quad(10.77)\quad(-2.24)\quad(2.96)$	0.9931	3.18	2.05
Germany	$\hat{y}_t = -103.65 + 17.96x_{7t} + 8.05x_{9t}$ $(-9.02)\quad(4.21)\quad(3.69)$	0.9668	0.99	4.26
Luxembourg	$\hat{y}_t = -2479.13 + 1498.86x_{5t} + 1796.55x_{6t} - 2152.47x_{8t} - 2693.39x_{9t} + 2561.62x_{10t} + 1531.13x_{12t}$ $(-0.64)\quad(5.48)\quad(7.90)\quad(-6.70)\quad(-6.42)\quad(-6.70)\quad(4.03)$	0.9937	34.27	1.93
Sweden	$\hat{y}_t = 1833.00 - 114.72x_{5t} - 19.91x_{8t} + 37.52x_{9t} - 274.43x$ $(1.97)\quad(-3.18)\quad(-1.05)\quad(1.10)\quad(-1.79$	0.8253	7.09	18.51
Spain	$\hat{y}_t = 144.47 - 9.77x_{6t} + 17.65x_{7t} - 30.81x_{10t}$ $(2.60)\quad(-5.19)\quad(9.24)\quad(-7.16)$	0.9839	0.36	7.61
Italy	$\hat{y}_t = -0.0065 + 0.007x_{5t} - 0.005x_{8t}$ $(-0.44)\quad(3.21)\quad(-3.68)$	0.9677	0.0001	7.21

Source: own calculation

For all the analyzed countries it was possible to estimate models characterized by a high degree of matching with empirical data. The R^2 determination coefficient for 6 out of 9 analyzed countries was above 0.96. It should be noted that in all cases, linear models were characterized by the highest matching to the actual volume of FDI investment inflow to a given country. In the case of countries such as the Netherlands, the United Kingdom, France, Belgium and Luxembourg, the estimated models include variables that are used to describe the last subindex (innovation and sophistication factors subindex).

It should be noted, however, that in the case of the Netherlands, an increase in the value of F11 – business sophistication, assuming unchanged values of other factors included in the model can cause an average decrease in the FDI value. The same situation applies to another factor describing this subindex: F12 – innovation, in the case of the United Kingdom (while the F11 factor has been positive for this country). The opposite situation was observed in models describing the development of Japanese investments in France and Belgium. Japanese investments in these countries are much smaller and it may mean that the improvement in innovation and business sophistication will have a positive impact on the growth of Japanese investments in these countries. It is also worth taking a closer look at the model estimated for Spain. In this case, the increase in the value of factors: F5 - higher education and training, F8 - financial market development, F9 - technological readiness should cause a decrease in the value of Japanese investments in this country. In this case, a profound analysis of specifics of Japanese investment in this country should be carried out.

In the situation of less technologically advanced production, negative values of coefficients standing next to variables describing the potential of a country in terms of e.g. education and access to less qualified employees is natural. Similar results were also obtained in previous papers published in the literature (Guzik, 2008). Investment attractiveness does not always have to be positively correlated with the level of socio-economic development and the increase in the value of measures in the area of labor resources will not always be treated as attractive from the point of view of foreign investors, as it may also mean an

increase in labor costs (e.g. related to higher salary expectations). The results obtained on the basis of estimated models can be interpreted in a similar way; an increase in the area of higher education (F5) may also mean a decrease in investment attractiveness caused by an increase in expectations regarding remuneration, and it may also mean a decrease in the resources of employees performing work requiring vocational education.

It should be also pointed out that the models were estimated based on the normalized values of synthetic measures, which are usually quite strongly correlated with each other. The study showed that due to the strong correlation of variables used for the construction of synthetic measures in the GCI ranking, only some of them can be used in further analyzes (Cheba and Szopik-Depczynska, 2017). This problem is particularly important for econometric modeling. Hence the step regression, which allows eliminating variables that are too strongly correlated with each other, has been proposed.

In the following, Table 3 presents the values of the investment attractiveness ratio relative to the average value of Japanese foreign direct investment. Positive RAI values apply to countries in which Japanese FDI is greater than the values estimated on the basis of the reference model. These countries obtain so-called attractiveness annuity, while in the case of negative values it is called disability annuity.

Table 3: The RAI value for selected EU countries

Country	RAI (%)								
	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016	2015-2017	2016-2018
Nether-lands	-0.09	-0.26	-2.61	1.08	-0.83	4.29	-0.58	-1.42	0.42
United Kingdom	15.06	4.88	10.36	5.86	-11.86	-22.27	-27.30	0.81	24.46
France	1.69	-1.63	-0.36	1.46	4.94	7.78	-9.68	-2.44	-1.76
Belgium	1.47	-3.00	1.45	-0.36	1.46	-0.50	-0.92	-0.06	0.47
Germany	0.97	2.73	1.49	-3.89	-5.66	0.46	6.76	-0.70	-2.15
Luxem-bourg	0.78	-0.94	1.08	-1.25	-0.23	-0.36	1.59	-0.73	0.05
Sweden	7.37	-13.78	1.34	-11.26	-1.92	12.09	-21.25	16.88	10.53
Spain	-0.72	4.82	-4.45	-0.81	-12.15	7.30	6.65	-0.21	-0.44
Italy	-10.11	7.48	-5.34	8.82	0.01	-2.21	4.18	2.07	-4.90

Source: JETRO data

Positive RAI values (attractiveness annuity) for the last 3 years has been obtained in the case of the Netherlands, the United Kingdom, Belgium, Luxembourg and Sweden. The highest positive value has been obtained in the case of the United Kingdom. The RAI indicator at this level means that the value of Japanese investments in this country is definitely higher than it could result from the estimated model. The attractiveness rate constituted 24.46% of the average Japanese direct foreign investment in this country. These results also confirm the observations of other authors, according to which in the case of this country the overall investment attractiveness perceived by Japanese investors is also influenced by factors other than those, included in the WEF rankings. Most often it is indicated that this is conditioned by tradition and historical factors. Japan has been investing its capital in United Kingdom for many years. This situation has not been changed by the decision to leave the European Union. However, the largest negative difference (-4.90%) between real Japanese FDI and investments resulting from the reference model relative to the average size of Japanese FDI in the last three analyzed years concerned Italy. In this country, the actual volume of Japanese FDI was smaller than the amount of investment that should occur in it, taking into account the level of competitive ability of the country's economy estimated by WEF.

Conclusions

In order to estimate the investment attractiveness of selected European countries from the perspective of Japanese investors the method proposed by Guzik (2008) and Cheba (2018) was used. When considering the investment attractiveness from the perspective of foreign investments one should also take into account certain characteristic regularities regarding these investments. Japanese investors often choose the countries designated as the most competitive with a stable socio-economic situation (e.g. in Europe it is United Kingdom and the Netherlands and the United States in the world) as well as culturally-close or dynamically developing countries (e.g. China). This theoretically means that you can look at the investment attractiveness of a given country also from the perspective of its competitive ability.

In this work, the results of the competitiveness ranking published annually by WEF were used, which were compared with information on Japanese FDI in the analyzed European countries. Although the competitiveness of the economy is one of the factors considered by Japanese investors in making investment decisions, the comparison of competitiveness results with the actual inflow of Japanese FDI to a given country completely changes the results of the WEF ranking.

This procedure allows the estimation of the so-called attractiveness or disability annuity, i.e. the difference, respectively: "in plus" or "in minus" between real Japanese FDI and investments resulting from the estimated reference model relative to the average size of Japanese FDI in the analyzed European countries. Therefore, it is a kind of two-stage procedure for testing investment attractiveness carried out from the perspective of foreign investors, considered in the work in relation to Japanese investments in the examined European countries.

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Análisis Crítico Del Discurso En El Derecho Del Consumidor Desde La Constitución, La Jurisprudencia De Indecopi Y Del Tribunal Constitucional Del Perú

Critical Analysis on The Speech of Consumer's Rights From The Constitution, Indecopi Jurisprudence and Constitutional Court In Peru

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Resumen

El presente artículo tiene como finalidad estudiar la relación entre el consumidor, el proveedor y el Estado. A pesar de que existen los mecanismos legales para proteger los derechos del consumidor, no obstante, este se ve afectado en dos aspectos: el tiempo que dura el proceso para resolver su caso y el pago reducido de costas y costos por el procedimiento. Por tanto, existe una asimetría de poder entre el proveedor y el consumidor como se aprecia en la jurisprudencia analizada del Indecopi y del Tribunal Constitucional peruano.

Palabras clave: Análisis crítico, derecho del consumidor, jurisprudencia, asimetría.

Summary

The present article has the aim to study the relationships among the consumers, suppliers and the state. Despite there are lawful mechanisms to protect the consumer's rights; nevertheless, they are affected in two aspects: time that takes the process to solve the case, and the reduced payment for the costs due to procedure. Therefore, there is a power symmetry between supplier and consumer just like you can appreciate in the jurisprudence analyzed from Indecopi and Peruvian Constitutional Court.

Keywords: Critical Analysis, Consumer's Rights, Jurisprudence, Symmetry.

Introducción

Se han analizado los criterios constitucionales que protegen los derechos del consumidor, desde los derechos fundamentales, el cual implica que debe recibir información veraz y oportuna sobre los productos o servicios que adquiere y por tanto debe existir una relación de simetría entre proveedor y consumidor; en la parte legal sí se mantiene ello, pero no en los casos reales, porque el proceso para resolver algún reclamo demora y además porque las costas o costos a favor del consumidor no cubren lo invertido por este.

En este sentido se requiere un análisis de la normativa, la jurisprudencia y la realidad que se refleja a través de cómo han resuelto las autoridades de Indecopi y del Tribunal Constitucional, en muchos casos a favor del consumidor, pero con algunas afectaciones sobre la compensación económica o el pago de costos o costas del procedimiento que verdaderamente no cubren los gastos realizados por el usuario o consumidor.

El presente estudio se enmarca dentro de la teoría crítica del discurso, en la que se demuestra una asimetría entre el consumidor y el proveedor, entre el Estado y el consumidor. El mayor poder se

concentra en el Estado quien decide a través de las resoluciones que emite. El poder también está en el proveedor quien no realiza el pago justo de las costas o costos; más bien el consumidor se ve afectado por la inversión económica y por el tiempo de espera.

El presente estudio es solo un estado inicial y una aproximación al problema del poder de quienes administran justicia, de los proveedores en afectación al consumidor, que se puede verificar en los mismos casos que se han resuelto; en tal sentido se debe ampliar el estudio a mayores casos y separarlos por áreas o especialidades.

Antecedentes Y Fundamentación

Diversos estudios enfatizan sobre la afectación de los derechos del consumidor, específicamente después del contrato que se da ciertos incumplimientos que se derivan de la buena fe (Isler, 2019); otras afectaciones están relacionadas con la falta de claridad de la información que contiene la publicidad (Fernández, 2019); también sobre la responsabilidad por el incumplimiento del contrato sobre el peso de la prueba y por la imputación de los daños que puede recaer en el acreedor o el consumidor (Erbetta, 2018); otros sobre el consumidor inmobiliario (caso colombiano) que tiene un marco legal para proteger sus derechos en el caso de que se vean vulnerados los derechos del consumidor que a veces es la parte más débil (Villalba, 2017; Momberg, 2015).

De los antecedentes también se puede identificar que el poder lo tiene el proveedor o acreedor; sin embargo, otras posturas establecen que el Estado ha creado ciertas normas que impidan esta asimetría y operen en equilibrio (Alvear, 2016); es pertinente precisar que quienes tienen mayor poder económico, también tienen mayor control (Van Dijk, 2016) como es el caso de los acreedores o empresarios.

El derecho a los consumidores y usuarios protege sus intereses, en base a la recepción de una información veraz sobre los bienes y servicios que se van a adquirir (Landa, 2017). La veracidad y la idoneidad son la columna vertebral del derecho del consumidor (Villalba, 2017).

El contenido fundamental del derecho al consumidor comprende: acceso libre al mercado de bienes y servicios, recibir información idónea, recibir trato igualitario para acceder a los servicios públicos de calidad, derecho a formar asociaciones que defiendan sus derechos, derecho a recibir diversas ofertas, derecho a la protección de su salud, derecho a reclamar sobre los productos o servicios deficientes, acceso a los solucionar sus controversias de manera oportuna, derecho a la protección judicial en caso se vean afectados sus intereses (Landa, 2017).

Por otro lado, el Tribunal Constitucional (Exp. nro. 3315-2004-AA) ha establecido los siguientes principios: proconsumidor donde prevalece el rol protector del Estado frente a desventajas o asimetrías; proscripción del abuso del derecho que protege contra toda práctica contractual adversa y afecte el interés del consumidor o usuario; isonomía real que implica un tratamiento igual ante la ley; *restitutio in íntegrum,* el cual implica que el Estado promueva o asegure el resarcimiento por daños o perjuicios en favor del consumidor; transparencia para asegurar el acceso a la información de los productos o servicios; veracidad que comprende el conocimiento veraz sobre la calidad o propiedad de los productos o servicios; *indubio proconsumidor*, el cual implica que las autoridades interpreten las normas en favor del usuario o consumidor; y proasociativo, el cual permite que los consumidores o usuarios puedan fundar sus asociaciones para defender sus intereses.

Por tanto, el derecho al consumidor y usuario debe asegurar la protección contra riesgos que afecten su salud, proteger sus intereses económicos y sociales, recibir indemnización por daños y perjuicios, recibir información correcta (Casanovas, 2016), a fin de evitar el abuso del poder de las mismas autoridades que tienen el control legal o de los empresarios o proveedores que tienen mayor poder económico.

El aspecto normativo se desarrolla dentro de un contexto social, donde existe poder de ciertos grupos que conocen y utilizan las normas, y son capaces de controlar los actos y las mentes porque tienen acceso a la información, estatus (Van Dijk, 2016). En este contexto los ciudadanos en conflicto se ven afectados por tensiones, y sus expectativas o intereses no se ven satisfechas (Vargas, 2013).

Método

El tipo de estudio es cualitativo, basado en la interpretación documental de contenido desde el análisis crítico del discurso. No tiene propósitos de generalizar por tratarse de un estudio cualitativo, sino solo evidenciar la afectación del consumidor. Se ha tomado en cuenta la norma constitucional peruana, cierta jurisprudencia, de los últimos años, de Indecopi y del Tribunal Constitucional, donde se evidencia efectivamente la afectación del consumidor quien tiene menos poder frente a los empresarios o proveedores y del Estado.

La búsqueda de la jurisprudencia se realizó a través de la página web de Indecopi y del Tribunal Constitucional con los términos clave: consumidor, cotos, costas.

Análisis De Resultados Y Discusión

La Constitución Política del Perú, en su artículo 65 referente al consumidor, establece:

El Estado defiende el interés de los consumidores y usuarios. Para tal efecto garantiza el derecho a la información sobre los bienes y servicios que se encuentran a su disposición en el mercado. Asimismo, vela, en particular, por la salud y la seguridad de la población (art. 65).

Del artículo citado, se establece dos aspectos fundamentales: primero: garantizar el derecho a la información sobre los bienes y servicios que se ofertan en el mercado, centrados en la veracidad e idoneidad. Segundo: velar por la salud y la seguridad de la población, el cual comprende que los productos o servicios que reciba el consumidor no deben afectar a su salud o bienestar. El problema está en el incumplimiento de esta por algunos operadores de justicia quienes tienen el poder de aplicar la ley.

De Indecopi se han seleccionado algunas resoluciones del Tribunal, donde se puede evidenciar que el pago de costos o costas que se le ordena al empresario o proveedor a favor del consumidor es muy bajo, teniendo en cuenta que ha realizado un gasto en el proceso administrativo que ha seguido ante Indecopi. Por ejemplo, tenemos el caso de la Resolución 0039-2019/SPC-INDECOPI (2019, p. 6), en la que resuelven a favor del consumidor sobre un problema con una financiera a la cual le sancionan con un pago de:

costas y costos del procedimiento […] que a la fecha ascienden a S/ 36,00; sin perjuicio de ello y, de considerarlo pertinente, una vez que se ponga fin a la instancia administrativa, el denunciante podrá solicitar el reembolso de los montos adicionales en que hubiese incurrido para la tramitación del presente procedimiento para lo cual deberá presentar una solicitud de liquidación de costas y costos.

De este caso se colige que el consumidor se ve afectado por el tiempo de duración del proceso y por el gasto económico realizado, y que los costos o costas establecidos por Indecopi son irrisorios (S/ 36,00), teniendo en cuenta que el proceso se inició en mayo del 2014 y finalizó en enero de 2019. Este proceso lento y agónico vulnera los principios de celeridad, razonabilidad y eficacia. También se verifica que las faltas del empresario o proveedor están en la carencia de idoneidad (art. 18 del Código del Consumidor), es decir que este no ha cumplido con hacer llegar una información veraz sobre el servicio o producto que ha proporcionado al consumidor.

De esta manera se configura el control del poder legal del Estado, que en apariencia resuelve a favor del consumidor, pero no se consolida plenamente por el monto irrisorio que establece en el pago de las costas y costos del procedimiento y otros gastos que implican este proceso.

Del Tribunal Constitucional se han seleccionado, las resoluciones que han sido publicados en su página web, a través de las palabras clave: consumidor, costas, costos. Se obtuvo 22 resoluciones. Se han seleccionado algunas donde se evidencia la afectación de los derechos del consumidor o usuario. Algunos procesos tienen más de cinco años de antigüedad, lo cual implica que el consumidor se ve afectado por todo el proceso que ha durado para resolverse.

En el Exp. nro. 03310-2015-P1-1D/TC, el Tribunal Constitucional (2019) declara fundado y ordena pago de costos procesales. Se trata de un caso donde se deniega la información de los usuarios sobre información de su padre fallecido. Se genera una asimetría ya que la entidad o AFP sí tiene la información completa y termina negándole a los usuarios, generando no solo la pérdida de tiempo, sino también la inversión que se genera en dicho proceso, aparte de los costos procesales a que alude el TC.

En otro caso, sobre la resolución del Tribunal Constitucional (2019), en el Exp. nro. 05077-2014-PA/TC, se evidencia que la agraviada se ha visto afectada porque no ha cumplido con todo el procedimiento; sin embargo, los magistrados que han declarado improcedente, en sus argumentos, alegan que efectivamente ha existido una afectación a su derecho fundamental sobre dignidad, calidad de vida; no obstante han resuelto declarar nulo todo lo actuado, lo cual implica un mayor alargamiento del proceso y la afectación de la consumidora sobre el acceso a un servicio básico. Solo un magistrado ha actuado de manera pertinente basándose en la Corte Interamericana quien establece que el Estado está obligado a hacer valer sus derechos y defender sus intereses del justiciable de manera efectiva, que en este caso es urgente por tratarse de un servicio básico: acceso a la energía eléctrica; y para que no sea más agonizante la petición de la consumidora o usuaria, se le debe escuchar previamente a las partes y que luego se admita a trámite la demanda, criterio pertinente el cual impide que la usuaria siga sin perjudicar su calidad de vida.

Con ello se demuestra, que quienes asumen la judicatura del Estado, amparados en el formalismo legal, no atienden una necesidad real que requiere ser tratado o resuelto con urgencia, además por tratarse de un derecho fundamental. Con esto se confirma que el poder no solo está en el proveedor, sino que se ve reforzado muchas veces por la actuación de la judicatura.

También se establece el poder de la mayoría de los magistrados, quienes con su decisión terminan afectando un derecho fundamental que requiere ser tratado con celeridad. El hecho de declarar nulo todo lo actuado, implica empezar el proceso de cero, generando pérdidas económicas y afectación a la salud por una prolongada espera, teniendo en cuenta que el proceso se inició en agosto del 2013 y terminó resolviéndose en el Tribunal en junio de 2019.

Otros acciones o inacciones que afectan a los consumidores se dan por la falta de la aplicación de la ley que protege al consumidor, por ejemplo, en el art. 51 establece que el Indecopi, previo acuerdo de su Directorio, puede impulsar acciones judiciales en favor del consumidor o usuario; no obstante, esto no se ve reflejado en las resoluciones de este organismo, más bien a fines del 2019 emitió una directiva (002-2019/DIR-COD-IDECOPI) donde Indecopi debe ejercer atribuciones para realizar acciones judiciales.

Otra limitación legal que existe es que Indecopi no está facultado para realizar acciones que permitan el resarcimiento de daños y perjuicios. Aunque sí es relevante, la inclusión de la resolución de conflictos vía el arbitraje de consumo que sí permite solucionar en forma rápida y sencilla las controversias entre los proveedores y consumidores. En este caso la resolución de conflictos se debe realizar de manera voluntaria a petición o mutuo acuerdo de las partes en someter sus diferencias al arbitraje (Alejos, 2019).

A partir del análisis legal y de la jurisprudencia, de Indecopi y del Tribunal Constitucional, se colige que se vulneran los derechos del consumidor por una falta de claridad en la información que se le brinda a este (Fernández, 2019, art. 18 de Código del Consumidor); por la controversia entre la Ley Constitucional y la actuación de los magistrados, en el caso del Tribunal que resolvió declarar nulo el caso del usuario que peticionó acceso a la energía eléctrica que es un derecho fundamental y como tal

requiere resolución con celeridad, con lo cual se demuestra que controlan el poder a través del conocimiento y la aplicación de la norma (Van Dijk, 2016). Con los hechos concretos analizados se evidencia la vulneración económica de los consumidores y usuarios (Landa, 2017).

A pesar de que, en algunos casos, los órganos han resuelto a favor del consumidor; no obstante, se ve afectado por el paso del tiempo y el reconocimiento económico reducido que recibe de los procedimientos obtenidos a su favor.

Conclusiones

Existe asimetría entre el proveedor y el consumidor, el cual afecta su derecho fundamental a recibir un servicio o producto idóneo, también su economía porque los procesos son largos o agónicos respecto a su resolución; asimismo, los costos o costas que paga el proveedor a favor del consumidor por el procedimiento realizado son irrisorios.

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Investigation of the Spatial Heterogeneity of Economic Security in Certain Regions of Russia Based on the Assessment of an Integral Indicator that Determines the Variability of its State

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Abstract

The scientific novelty of study is to implement a spatial approach to assessing the state of economic security of certain regions of Russia. The content of the economic security of the regions is determined by four systemic projections of the socio-economic system study: industrial, economic, social and innovative. It is of great interest to study for searching spatial patterns the local statistical characteristics of the geo-variation of regional indicators, which allows to assess the spatial trends in the components of economic security. The successful solution of these problems is facilitated by the use of integrated indicator assessment tools using a system of indicators. The state of economic security of the studied regions of Russia is characterized as very variable at the average level of the region with several spatially expressed points of a satisfactory level of economic territories security.

Keywords: Economic Security, Spatial Heterogeneity, Regions Of Russia, Integral Indicator, Statistical Estimation

JEL Classification Codes: E7

Introduction

Regions of Russia as spatial socio-economic systems demonstrate the supporting framework of resettlement, the dynamics of the translation of innovative impulses, the distribution of infrastructure potential and the differentiation in the industrial complex across Russia. In the current circumstances of the external and internal territorial problems existence, it seems necessary to assess the economic security of the Russian regions in order to ensure and improve the mechanisms for developing and making decisions aimed to achieving the priorities for long-term planning and for its provision (Kuzmina Yu. D., Oshchepkov V.M., 2018). Studies of domestic economists in the field of economic security of the regions are not systematic, a universal set of indicators has not been approved, and a single algorithm for assessing the economic security of territories has not been formed.

Today, the economic security of a territorial entity (republic, federal district) is understood as a combination of conditions and factors characterizing the current state of the economy, stability, sustainability and progressive development, the degree of its independence in the processes of integration with the country's economy (Tatarkin A.I.., Kuklin A.A., 2012).

As shown by numerous studies, the most appropriate approach for conducting a safety diagnosis is an indicative analysis. An indicative analysis of the economic security of territories is carried out on the basis of a set of economic security indicators that can signal a threatening decline in its level, quantify the integral indicator of economic security and form a set of program-targeted measures to stabilize the situation.

Materials and Methods

The methodology of the study is based on a comprehensive study of security economic indicators in the Russian regions, and is based on conducting structural-dynamic analysis, building a complex of economic and mathematical models, analyzing economic, industrial, social and innovative processes, using complex integrated indices reflecting the level of economic security in the regional cutaway.

An economic and statistical study of the economic security of regions involves the calculation and analysis of certain indicators that determine the degree of protection against internal and external threats due to a sufficient amount of resources. In this regard, the performance indicators of the economic security of the regions include indicators grouped according to the following four projections (table 1). These indicators are selected by the list of indicators approved in the “Strategy for the Economic Security of the Russian Federation until 2030” (Decree of the President of the Russian Federation, 2017).

Table 1: Economic and statistical research projections of economic security in regions

Economic projection	Industrial projection	Social projection	Innovative projection
Gross Regional Product Volume Index (GDP)	Production index by type of economic activity "Mining" by subdivisions of the Russian Federation	The unemployment rate of the population aged 15-72 years by subdivisions of Russian Federation	Technological innovation costs of organizations by type of innovation activity in subdivisions of Russian Federation
Gross regional product per capita	Industrial Production Index by subdivisions of the Russian Federation	The number of fatal victims’ accidents at work	Developed advanced production technologies in subdivisions of Russian Federation
Government debt of Russian Federation subdivisions and municipal debt	Producer price indices on the type of economic activity "Production of industrial goods" by Russian Federation subdivisions as a whole in accordance with OKVED2	The level of participation in the labor force of the population by Russian Federation subdivisions	The share of high-tech and knowledge-intensive industries in the gross regional product in Russian Federation subdivisions
Energy intensity of gross regional product	Share of investment in fixed assets in gross regional product	The population with cash incomes below the subsistence level as a whole in Russia and in Russian	Information on the use of intellectual property in Russian Federation subdivisions

		Federation subdivisions	
Retail turnover	The share of investments in machinery, equipment, vehicles in the total investment in fixed assets aimed at reconstruction and modernization, by Russian Federation subdivisions	The share of employees in organizations with accrued wages below the subsistence level of the working-age population as a whole in Russia and by Russian Federation subdivisions	The share of domestic spending on research and development in GRP

Descriptive component, and factor methods were used to study economic security in this study. Descriptive methods include: a method of analyzing dynamics and structure, a graphical method. Component methods include the method of determining integral indices, and factor methods include methods for constructing multiple regression models. To achieve the greatest effect, it is necessary to combine various methods (Zuev, V.M., Manakhov, S.V., Gagiev, N.N., Demenko, O.G., 2018).

The information and empirical base of the study includes legislative and regulatory documents of federal significance, data from the Federal State Statistics Service and information portals of state programs. The results of the work are also based on data obtained in the process of independently conducted author's research and conclusions made (Federal State Statistics Service, 2020).

Results

Spatio-Temporal Analysis of Economic Security of Certain Russian Regions by The Methods of Structural-Dynamic Analysis and Forecasting

The gross regional product (GRP) is used to characterize the results of economic activity on a regional scale. In the analysis of GRP, an important place is occupied by the identification of the tendency for a change in the gross regional product per capita. This indicator, to the greatest extent, reflects the dynamics of economic activity unfolding in the region (Figure 1).

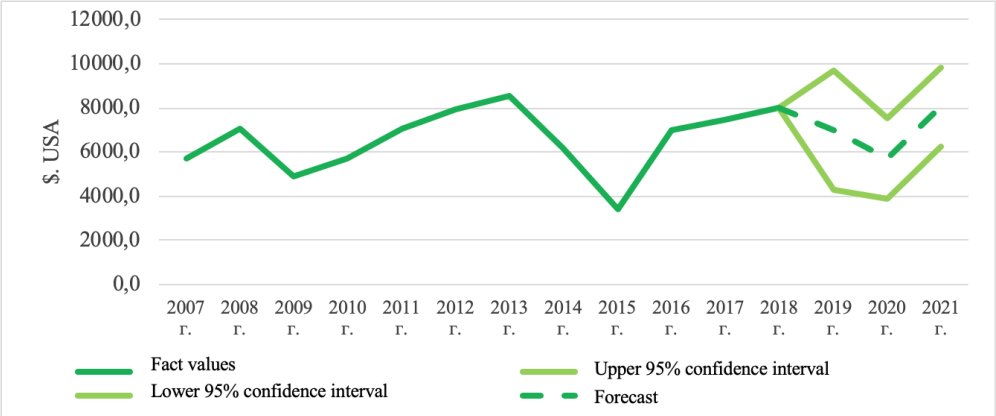

Fig 1: Dynamics and forecast of gross regional product per capita in the Volga Federal District, USD

Compared to 2007, gross regional product (GRP) per capita increased by $ 2,291.3 (40%) compared to 2007, and by $ 572.9 (7.7% compared to 2017) and in 2018 amounted to $ 8,026. Between 2007 and 2018, GRP per capita increased annually by an average of $ 208.3 (3.1%). According to the forecast, a decrease in per capita GRP in the Volga Federal District is expected in 2019 and 2020, however, by 2021, the studied indicator will increase and amount to $ 8058.3.

The index of physical volume of the gross regional product of the Volga Federal District decreased from 109.1% in 2007 to 99.7% in 2018. In 2018, compared with 2017, the index of physical volume of VLR decreased by 1.7 pp This indicator does not have a clearly expressed downward or upward trend, it changes in different ways. There has been a decrease in the index from 2007 to 2009, an increase from 2009 to 2011, the index begins to decline in 2011 until 2015, and from 2015 to 2017 the indicator grows again. In the period from 2007 to 2018, the index of physical volume of gross regional product of the Volga Federal District decreased annually by an average of 0.86 percentage points.

Energy intensity of GDP (Energy consumption per GDP unit) is a specific indicator of energy consumption in relation to GDP, usually measured in tfe (tons of fuel equivalent) per unit of GDP value in national or foreign currency (Figure 2). Based on Figure 2, we can conclude that in all Volga Federal District regions for the period from 2012 to 2018, there was a positive trend towards a decrease in the studied indicator. Based on the forecast, it can be concluded that in the next two periods the volume of retail turnover will grow, but in 2021 another decrease in this indicator is expected. In 2021, retail trade turnover in the Volga Federal District will amount to $ 107.9 billion, which is $ 2.9 billion less than in 2018. During the period under review, the studied indicator grew most slowly in the Samara Region, the fastest - in the Udmurt Republic. In the Samara Region, from 2007 to 2018, retail trade turnover increased annually by 6.9% (by 30.6 billion rubles) on average. In the period from 2007 to 2018, in Udmurtia, retail trade turnover increased by an average of 12.2% (15.2 billion rubles) (Figure 2).

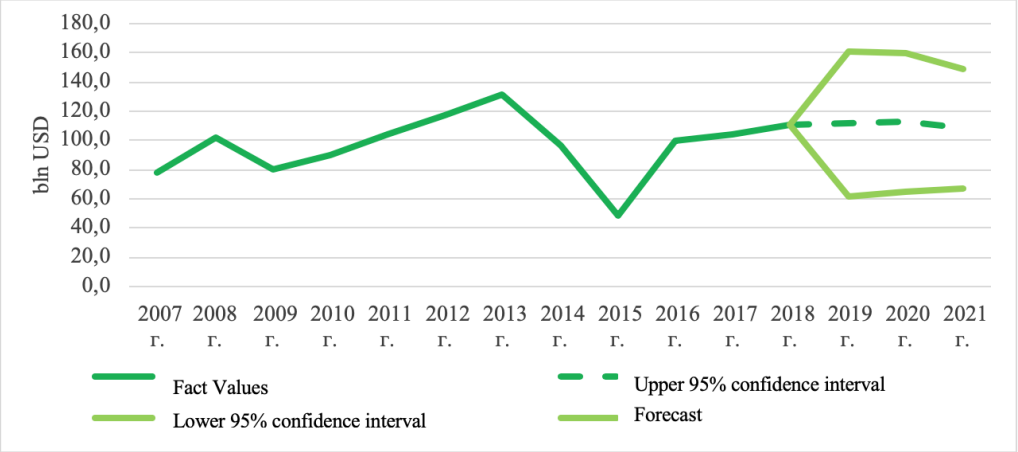

Fig. 2: Dynamics and forecast of retail turnover in the Volga Federal District, billion US dollars

In the period from 2007 to 2018, there was a positive upward trend in municipal debt in the Volga Federal District. In 2018, compared with 2007, the municipal debt of the Volga Federal District grew by $ 1.5 billion (2.8 times) and amounted to $ 2.3 billion. Annually, the studied indicator increased by an average of 132 million US dollars (by 9.8%). When visualizing the levels of the series, it was revealed that there is no clear trend in the indicator's dynamics, therefore, it was decided to perform exponential smoothing, on the basis of which the forecast of the municipal debt of the Volga Federal District in 2019 - 2021 was carried out. Based on the forecast, we can conclude that in subsequent periods an increase in municipal debt is expected. According to the forecast, in 2021, compared with 2018, the volume of municipal debt will increase by $ 396 million and amount to $ 2.6 billion.

The largest growth in the reporting period was recorded in the Republic of Tatarstan: the amount of debt from 2007 to 2018 increased by 21.8 billion rubles. The smallest growth was recorded in the Republic of Mari El: from 2007 to 2018, the amount of debt increased by 0.3 billion rubles.

Let us analyze the dynamics of economic security indicators of the Volga Federal District regions by the social group of indicators.

Consider the population of the federal district with cash incomes below the subsistence level (Shakirova L.R., 2018). In most regions, from 2011 to 2018, there was a positive trend towards a decrease in the studied indicator. Growth was noted only in such regions as the Perm Territory and the Kirov Region. In the Nizhny Novgorod Region, the population with cash incomes below the subsistence level in 2011 amounted to 12.5% of the total region population, decreasing by 3.0 percentage points by 2018. (24.0%), and amounted to 9.5% according to Rosstat. In the Perm territory, the value of the studied indicator from 2011 to 2018 increased from 14.4% to 14.9% (by 3.5%), in the Kirov region it increased from 15.0% to 15.5%, by 3,3%.

Let us proceed to the analysis of the employees share of organizations with accrued wages below the subsistence level of the able-bodied population in the Volga Federal District regions. It should be noted that in the federal district as a whole, in 2005 the value of the studied indicator amounted to 28.6%, decreasing by 4.0% to the index of 86.1% in 2018. This change indicates a positive upward trend in the employees` wages of organizations in Volga Federal District for the study period. Obviously, from 2005 to 2018, the studied indicator was reduced in all regions of the district. So, in 2005, in the Republic of Bashkortostan, the employees share of organizations with accrued wages below the subsistence level of the able-bodied population was 25.5%, decreasing by 1.2% in 2018 (by 95.3%) (Fig. 3).

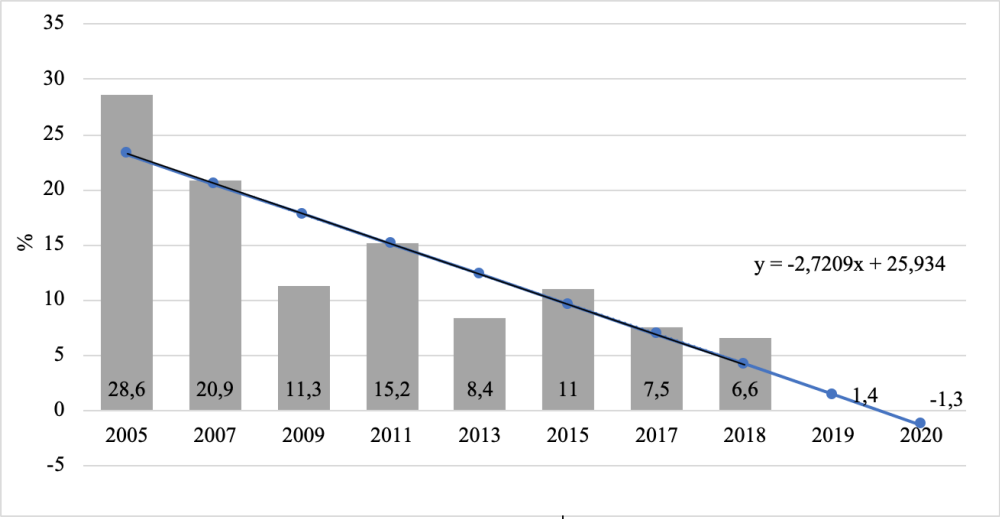

Fig. 3: Forecasted values of the employees share in organizations with accrued wages below the cost of living of the able-bodied population in the Volga Federal District by 2020, %

Next, we analyze the level of unemployment at the age of 15 - 72 years in the Volga Federal District and its individual regions. In the Volga Federal District as a whole, from 2007 to 2018, the studied indicator decreased by 27.9% to 4.4% in 2018.

In 2018, compared with 2007, in all regions of the okrug, the studied indicator was reduced, except for the Republic of Mordovia. There was an increase in the unemployment rate of the population aged 15-72 by 20.0% to 4.2% in 2018. The maximum decrease in the studied indicator for the period from 2007 to 2018 occurred in the Republic of Mari El and the Chuvash Republic - 44.4% from 9% to 5.0%. Provided that the main development trend is maintained, we can conclude that in the studied federal

district the unemployment rate of the population aged 15-72 is expected to decrease to 3.6% in 2020. That is, compared with 2018, the indicator will drop by 17.7% (Fig. 4).

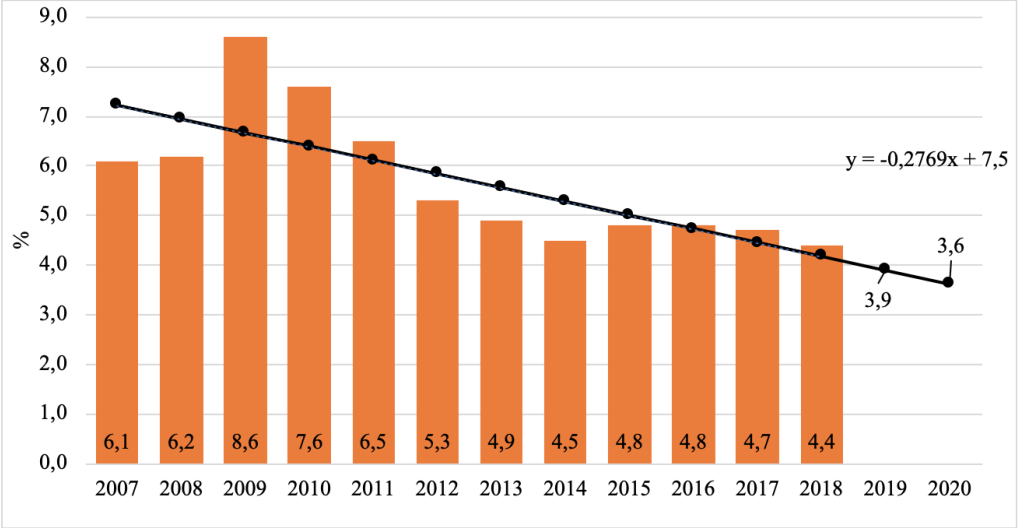

Fig. 4: The forecast value of the unemployment rate of the population aged 15-72 in the Volga Federal District by 2020, %

During the study period, in the majority of the studied regions, there was a decrease in the level of participation in the workforce of the population aged 15-72 years, but it cannot be called significant. Thus, in the Mari El Republic, the studied indicator fell by 6.3%, amounting to 64.5% in 2018, and in the Perm Territory, the level of participation in the workforce of the population aged 15-72 years decreased to 64.7% (by 3.3%). In the Penza region in 2018 compared with 2007, there was an increase in the studied indicator by 8.2%, and in the Republic of Tatarstan – by 6.7%.

In comparison with 2018 the studied indicator is expected to grow to 69.1% - by 2.0% in the Volga Federal District by 2020, considering maintenance of the general development trend (Fig. 5).

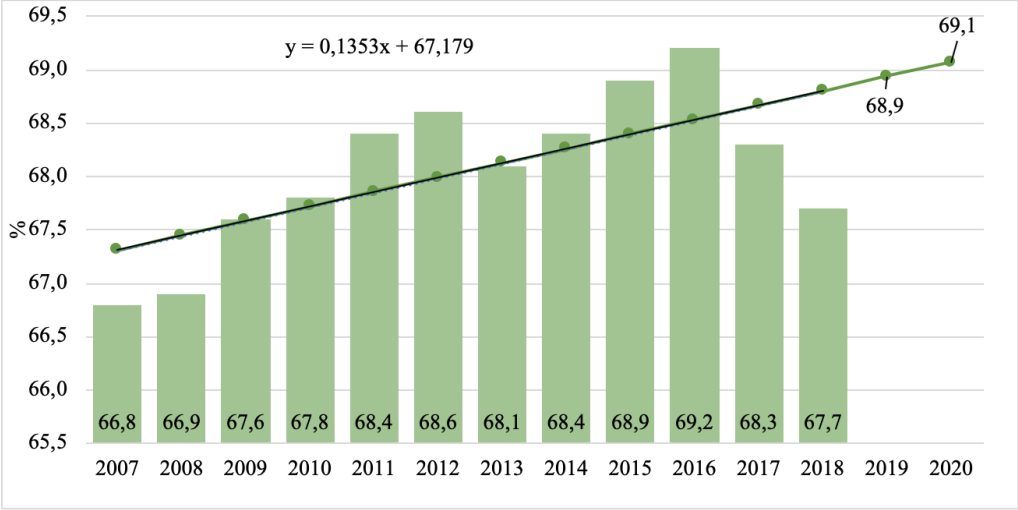

Fig. 5: The forecast value of the level of participation in the workforce of the population aged 15-72 in the Volga Federal District by 2020, %

Finally, we analyze an indicator - the number of victims in fatal accidents at work. In 2007, in the Volga Federal District, the value of the studied indicator amounted to 739 people, decreasing to 211 people by 2018 (fig. 13). A positive trend towards a decrease in the studied indicator was noted in all regions of the district for the period from 2007 to 2018.

The predicted value of the studied indicator for the federal district as a whole for 2020 is amounted to 85 people, which indicates the expected reduction in the number of victims of industrial accidents in the Volga Federal District by 59.5% compared with the same indicator for 2018 (Fig. 6).

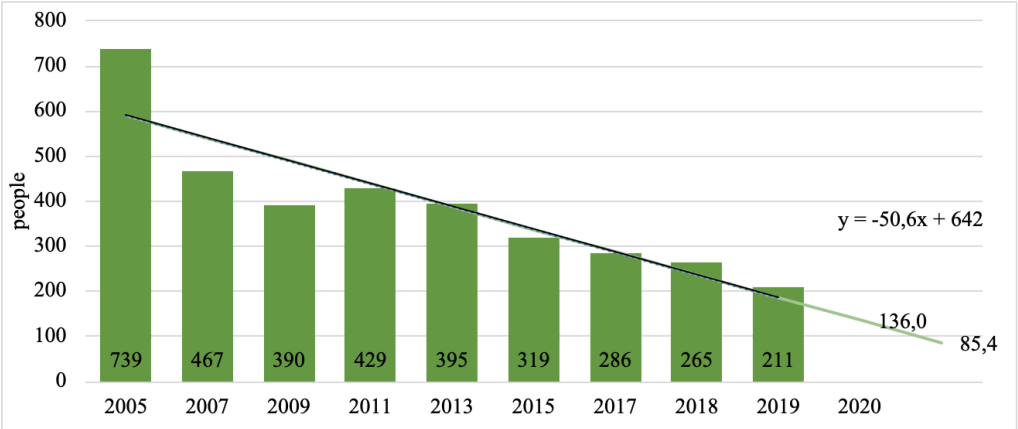

Fig. 6: The forecast value of the number of victims in industrial accidents in the Volga Federal District by 2020, people

To assess the innovative potential of Russian Federation at the regional level, the Association of Innovative Regions and the Ministry of Economic Development of Russian Federation compiled a rating of innovative Russia regions (Rating of innovative Russia regions, 2018). In accordance with the value of the integral index of innovation development, which includes 29 indicators, the subjects of Russian Federation are divided into the following groups: strong, medium-strong, medium, medium-weak and weak innovators (Sadovnikova T.S., 2018). The place of the Volga Federal District regions in this rating in 2018 is shown below (table 2).

Table 2: Rating of the Volga Federal District subjects in the ranking of innovative regions of Russian Federation in 2018

Rank	Region	Index	Group	Rank change to 2017 level
2	Republic of Tatarstan	0.67	strong	1
8	Nizhny Novgorod Region	0.55	strong	3
9	Ulyanovsk region	0.54	medium strong	-1
10	Samara Region	0.54	medium strong	-1
12	Republic of Bashkortostan	0.52	medium strong	0
13	The Republic of Mordovia	0.52	medium strong	0
18	Perm region	0.49	medium strong	0
19	Chuvash Republic	0.49	medium strong	1
29	Udmurt republic	0.43	medium strong	0
31	Penza region	0.43	medium	-6
34	Kirov region	0.42	medium	12
39	Saratov region	0.40	medium	4
41	Mari El Republic	0.40	medium	-3
61	Orenburg region	0.33	medium-weak	1

Thus, the Republic of Tatarstan and the Nizhny Novgorod region are included in the group of leaders in terms of innovative development among other subjects of Russian Federation. Ulyanovsk and Samara regions, as well as the Republic of Bashkortostan, Mordovia, Chuvashia, Udmurtia and Perm Territory are medium-strong innovators. Penza, Kirov, Saratov regions and the Republic of Mari El are characterized by an average level of innovative development. The level of innovation in the Orenburg region is below the average in Russian Federation, and thus, the region entered the group of medium-weak innovators.

Modeling the Economic Security of the Volga Federal District territories

To summarize the spatio-temporal analysis of economic security indicators, we implement a cluster analysis of the regions with the aim of identifying individual groups of entities depending on their socio-economic, innovative and industrial development.

After applying hierarchical methods of clustering, using different methods - the near and far neighbors, the Ward method, the average connection - approximately the same results were obtained. As a result, the subjects were divided into 4 groups. (table 3).

Table 3: Grouping of the Volga Federal District regions by the level of economic security in the social sector in 2018

Regions of the Volga Federal District	Total ranks	Grouping
Saratov region	18	1 group
Mari El Republic	20	
Perm region	26	
Chuvash Republic	28	
Ulyanovsk region	34.5	2 group
Kirov region	35	
Republic of Bashkortostan	36	
The Republic of Mordovia	37	
Orenburg region	41.5	3 group
Penza region	45	
Samara Region	46,5	
Nizhny Novgorod Region	50.5	4 group
Republic of Tatarstan	53	
Udmurt republic	54	

Note that the first group includes regions with the lowest level of economic security in 2018 (total ranks less than 30 units), the second group includes entities for which the average level of the indicator under study was typical. Among them there are Ulyanovsk and Kirov regions, Republic of Bashkortostan and Mordovia. Three regions of the Volga Federal District – Orenburg, Penza and Samara Regions – were characterized by the level of economic security above the average in the social block of indicators. The highest level of the studied indicator in 2018 (group 4) was noted in Nizhny Novgorod region, Republic of Tatarstan, and Udmurt region, for which the total ranks exceeded the value of 50 units.

In the framework of this study, it was decided to build an integrated index of economic security, based on the assignment of weighting factors to individual indicators of economic security, depending on the degree of their significance. In order to solve this problem, it is proposed to use the method of principal components. The advantage of this approach lies in its objectivity in the selection of weighting factors for factors, in the possibility of identifying latent variables that characterize economic security, and also in reducing the dimension of the attribute space.

The construction of the classical regression model in this case is complicated by the presence of high multicollinearity between the characters, which subsequently can cause distortion of the simulation results.

At the first stage of this statistical study, the main components were built on the indicators of economic security of Volga Federal District after their preliminary standardization. The indicators of economic security of Volga Federal District were taken for construction, where: $x1$ – GRP per capita; $x2$ – GRP physical volume index; $x3$ – retail turnover; $x4$ – industrial production index by type of economic activity, "Mining operations"; $x5$ – industrial production index; $x6$ – producer price indices by type of economic activity "Industrial goods production"; $x7$ – share of investments in fixed assets in GRP; $x8$ – the share of internal research and development costs in GRP; $x9$ – costs of technological innovation of organizations; $x10$ – unemployment rate of the population aged 15-72 years; $x11$ – level of participation in the workforce of the population aged 15-72 years; $x12$ – the proportion of the population with cash incomes below the subsistence level. A brief description of the obtained first eight components is given in table 4.

Table 4: Description of the main components of the economic security indicators in Volga Federal District

Indicator	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8
Standard deviation	2.10	1.42	1.35	1.07	0.96	0.84	0.66	0.49
Proportion of variance	36.9%	16.9%	15.1%	9.5%	7.6%	5.9%	3.6%	2.0%
Accumulated fraction of variance	36.9%	53.8%	68.9%	78.4%	86.1%	92.0%	95.6%	97.7%

For the purpose of a detailed study of the constructed main components and their meaningful description, we consider the factor load matrix. The first main component with the highest weights included GRP per capita (x1), retail turnover (x3) and the share of the population with cash incomes below the subsistence level (x12) with a negative coefficient. The first main component characterizes the cash income of the population. The second main component includes the industrial production index by type of economic activity, "Mining operations" (x4), and the industrial production index (x5). Thus, the second main component describes the production activities of the region. The indicators of the index of physical volume of GRP (x2) and the producer price index of industrial products by type of economic activity "Industrial production" form the third main component that characterizes the change in GRP. The fourth main component is most affected by the level of participation in the workforce of the population aged 15-72 years, therefore, the component describes the economic activity of the population in regions (table 5).

Table 5: The factor loads matrix of the main components

Source variables	Main components			
	PC1 income	PC2 industry	PC3 GRP	PC4 economic activity
$x1$	0.387	-0.059	-0.120	-0.308
$x2$	0.008	0.158	0.601	-0.280
$x3$	0.387	-0.172	-0.158	-0.360
$x4$	0.067	0.493	-0.117	-0.220
$x5$	0.103	0.542	-0.206	0.327
$x6$	-0.233	-0.134	0.430	-0.018
$x7$	0.246	0.406	0.365	-0.179

$x8$	0.196	-0.240	0.307	0.239
$x9$	0.418	-0.274	0.125	-0.116
$x10$	-0.311	-0.232	-0.294	-0.392
$x11$	0.259	-0.188	0.045	0.532
$x12$	-0.441	-0.014	0.164	-0.053

To improve the interpretation, it was decided to rotate the main components by the varimax method, maximizes the spread of the squared loads for each factor, which leads to an increase in large and a decrease in small values of factor loads. After rotation, the substantive characterization of the first and second main components remained unchanged; the third main component with the largest weights still includes the index of physical volume of GRP (x2) and the share of investments in fixed assets in GRP (x7); the fourth main component with the highest weight includes the level of participation in the workforce of the population aged 15-72 years (x11) and with a negative weight the unemployment rate (x10) – table 6.

Table 6: Factor load matrix after rotation

Source variables	Components			
	RC1	RC2	RC3	RC4
$x1$	0.882	0.101	0.075	0.109
$x2$	-0.104	-0.127	0.877	0.008
$x3$	0.952	-0.039	-0.007	0.084
$x4$	0.127	0.650	0.230	-0.319
$x5$	-0.065	0.907	-0.052	0.112
$x6$	-0.507	-0.479	0.354	-0.015
$x7$	0.271	0.437	0.770	0.149
$x8$	0.180	-0.272	0.190	0.616
$x9$	0.814	-0.211	0.176	0.480
$x10$	-0.173	-0.425	-0.395	-0.708
$x11$	0.221	0.013	-0.176	0.785
$x12$	-0.790	-0.331	0.064	-0.419

According to the Kaiser criteria, the first four main components should be selected. Moreover, this number of principal components satisfies the rule of thumb, according to which the extracted principal components must describe at least 70-80% of the variance of the original features. In accordance with the "scree" method in the graph below, you can also notice that the bend of the line occurs when the number of clusters is 4.

Thus, at this stage of the statistical study, four main components were constructed as linear combinations of the initial features. Moreover, the first main component characterizes the cash incomes of the population and the financing of innovations; the second component is the level of industrial development; the fourth main component is the economic activity of the population, the third main component is investment in fixed assets and GRP. It is on the basis of these components that an integrated economic security index will be built, which is calculated by the formula:

$$I\text{economic security} = (I\text{inc.} + I\text{industry} + I_{GRP} + I\text{ec.act.})/\ 4$$

where each of the intermediate indices represents the corresponding main components, recalculated in the range [0; 1]. Calculations of the integrated index of economic security of the region are presented in table 7 and fig. 7.

Table 7: Calculation of the integrated index of economic security in the Volga Federal District regions

Regions of the Volga Federal District	*I*inc	*I*industry	*I* ec.act.	I_{GRP}	*I* economic security
Republic of Tatarstan	1.000	0.818	0.584	0.959	0.840
Nizhny Novgorod Region	0.736	0.231	1.000	0.643	0.652
The Republic of Mordovia	0.020	0.993	0.529	1.000	0.636
Orenburg region	0.477	1.000	0.381	0.636	0.623
Ulyanovsk region	0.153	0.836	0.540	0.861	0.598
Samara Region	0.576	0.597	0.546	0.515	0.558
Penza region	0.127	0.881	0.477	0.686	0.543
Republic of Bashkortostan	0.827	0.844	0.130	0.278	0.520
Saratov region	0.327	0.653	0.085	0.932	0.499
Perm region	0.740	0.421	0.000	0.748	0.477
Kirov region	0.167	0.886	0.380	0.464	0.474
Udmurt republic	0.331	0.986	0.548	0.000	0.466
Chuvash Republic	0.000	0.334	0.542	0.504	0.345
Mari El Republic	0.081	0.000	0.218	0.534	0.208

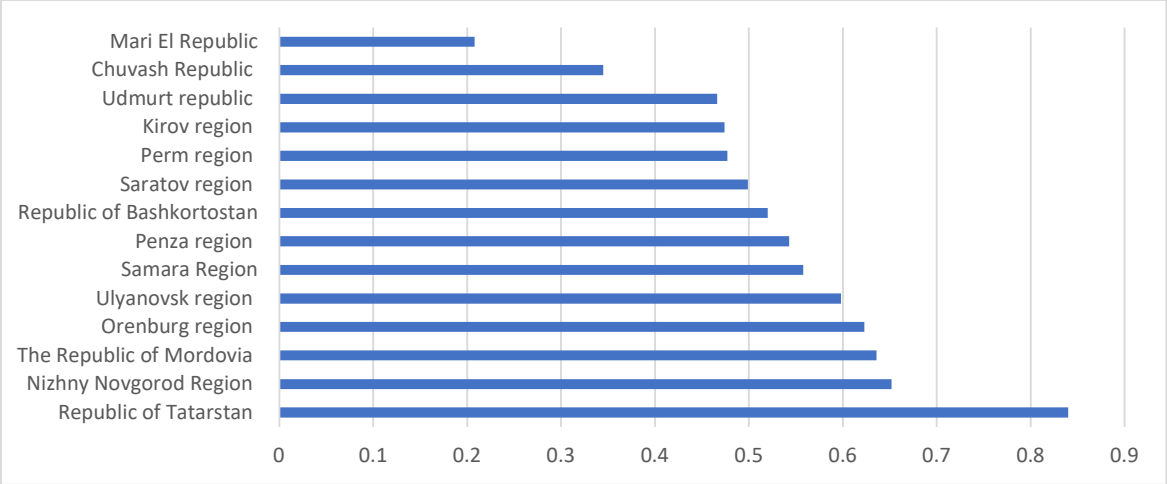

Fig. 7: Integrated economic security index by region of the Volga Federal District

Thus, at this stage of the statistical study, the integral economic security index of the Volga Federal District regions was calculated, which takes into account the cash income of the population and financing of innovations, industrial development, economic activity, investment in fixed assets and GRP dynamics. In general, the results on the integrated economic security index are similar to the results of cluster analysis – Republic of Tatarstan is the absolute leader with an indicator of 0.84; the five leaders also included Nizhny Novgorod region (0.652), Republic of Mordovia (0.636), Orenburg region (0.623) and Ulyanovsk region (0.598). The regions with the lowest level of economic security are Republic of Mari El (0.208), Republic of Chuvashia (0.345), and Udmurt Region (0.466). It should be noted that an adequate interpretation of the integral index can be obtained only by comparing the regions of Volga Federal District.

Conclusion

The results of the economic and statistical study of the economic security in the regions are necessary as a basis for the development and adoption of decisions aimed at increasing its level in various territories and long-term planning for its provision and withstanding economic threats.

Based on the results of a spatio-temporal study of the economic security in Volga Federal District territories, an integrated index of economic security was formed, based on the level of industrial development, innovative, investment potentials, economic activity of the population and its level of well-being. Monitoring and regulating the level of economic security territories favors the formation of a healthy economic environment in the country that can minimize the conditions and causes of challenges and threats in the economic sphere, and ensure the effective development of regional economies through the application of scientific methods.

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Diagnostics and Forecasting of Economic Security Indicators of the Russian Federation territories

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Abstract

The article on the statistical data of the regions of the Ural Federal District of the Russian Federation analyzed the indicators of economic security. The most appropriate approach for conducting and predicting safety diagnostics was the cumulative T-criterion method, as shown by the research. According to this approach, an economic security is diagnosed by groups of indicators, which allow to signal the threatening danger, to assess the level of security threats.

Keywords: statistics, economic safety, diagnostics, forecasting.

JEL Classification: M21; O1

Introduction

The economic security of the Territory was reflected in the efficient use of natural, labour, material and financial resources, as well as the acceleration of economic growth, the improvement of the quality of products, services and competitive production.

The problems of ensuring economic security at the corporate and state levels are reflected in the research Artemova (2010), Beketov (2009) and Burtsev (2003). Research by Fishakov (2012), Gorokhova (2019), Kapkannikov (2018), Arbuzov (2017) and Kuznetsova (2017) is devoted to determining the most significant indicators of territories economic security. Research by Kovalev (2017), Pisarenko (2018), Potrubach (2018) and Vlasenko (2010) confirms the relevance of identifying factors that pose threats to the economic security of the territories of the Russian Federation, including the Ural Federal district (UFD).

Therefore, the problem of economic security of the Russian region is extremely acute, because the developed region of Russia forms the security of the state. The Ural Federal District was a developing and stable region of the Russian Federation, which was able to predict negative impacts and counter internal and external threats.

Methodology

A trend in the original series of dynamics is a prerequisite for time-series-based forecasting. The identification of changes trends in the main factors of economic security of the Ural Federal District was fulfilled by the cumulative T-criterion. During the implementation of this method there was a hypothesis (H0) that there is no trend in the initial series of dynamics of indicators characterizing the economic security of the federal district of the Russian Federation.

In order to carry out a statistical analysis of the economic security indicators of the Ural Federal District, the «Strategy for Economic Security of the Russian Federation until 2030», approved by Presidential Decree # 208 of 13 May 2017, was studied. According to this document, a list of 20 indicators divided into 4 groups – economic (Gross Regional Product Volume Index (GRP)) was selected from 40 indicators of the state of economic security of the territories; Gross regional product per capita; State debt of subjects of the Russian Federation and municipal debt; Energy intensity of gross regional product; Turnover of retail trade), social (Unemployment rate of the population aged 15-72 in the constituent entities of the Russian Federation; Number of victims of fatal occupational accidents; The level of participation in the labor force of the population by the constituent entities of the Russian Federation; The number of the population with monetary incomes is lower than the subsistence minimum in Russia as a whole and in the constituent entities of the Russian Federation; The share of employees of organizations with accrued wages is lower than the subsistence minimum of the working-age population as a whole in Russia and in the constituent entities of the Russian Federation), innovative (Costs of technological innovations of organizations by type of innovation.

Results

The authors studied the «Strategy for Economic Security of the Russian Federation until 2030», approved by Presidential Decree # 208 of 13 May 2017 to carry out a statistical analysis of the economic security indicators of the Ural Federal District. According to this document, we chose a list of 20 indicators divided into 4 groups. The choice of indicators for building models is determined by the availability of official statistics. Among them economic (gross regional product volume index; gross regional product per capita; state debt of Russian regions and municipal debt; energy intensity of gross regional product; turnover of retail trade), social (unemployment rate of the population; number of victims of fatal occupational accidents; the level of participation in the labor force of the population by the constituent entities of the Russian Federation; the population with monetary incomes is lower than the subsistence minimum in Russia and in Russian regions; the share of employees of organizations with accrued wages is lower than the subsistence minimum of the working-age population in Russia and Russian regions), innovative (costs of technological innovations of organizations by type of innovation activity in Russian regions; the developed advanced production technologies for the Russian regions; share of products of high-tech and knowledge-intensive industries in the gross regional product of the subject of the Russian Federation; the information about the use of intellectual property objects by Russian regions; share of domestic expenditures for research and development in GRP) and industrial (production index by type of "Mining" economic activity by Russian regions; an index of industrial production by Russian regions; the producer price indices on the type of "Production of industrial goods" economic activity for Russian regions in accordance with the OKVED2; the share of fixed investment in gross regional product; the share of investments in machines, equipment, vehicles in the total volume of investments in fixed assets aimed at reconstruction and modernization, according to Russian regions). These indicators will be used to predict an economic security parameter in the Ural Federal District of the Russian Federation.

Based on the results obtained in the implementation of the cumulative T-criterion, it can be concluded that at the specified level of significance $\alpha = 0.05$ the hypothesis on absence of trend in the initial time series is accepted: by the group of economic indicators of economic safety ($Tc = 5.49$, $Tc = 2.62$, $Tc = 3.11$, $Tc = 3.59$). At the same time, the indicator "State debt of the subjects of the Russian Federation" was not considered, as it shows data only for 2019, and therefore, it is impossible to calculate dynamics and forecast (Table 1).

Table 1: The Results of the implementation of the Cumulative T-Criterion for the Group of Economic Indicators of Economic Security in the Ural Federal District for 2007-2018

The modelled indicator	T-criteria	Comparison	Acceptance of a hypothesis	Existence of a trend
Ural Federal District				
x1	14,40	Tr>Tcr	it is rejected	exist
x2	14,04	Tr>Tcr	it is rejected	exist
x3	0,71	Tr<Tcr	is accepted	does not exist
x4	3,87	Tr>Tcr	it is rejected	exist
Kurgan region				
x1	14,43	Tr>Tcr	it is rejected	exist
x2	13,96	Tr>Tcr	it is rejected	exist
x3	1,12	Tr<Tcr	is accepted	does not exist
x4	4,83	Tr>Tcr	it is rejected	exist
Sverdlovsk region				
x1	14,36	Tr>Tcr	it is rejected	exist
x2	14,11	Tr>Tcr	it is rejected	exist
x3	1,04	Tr<Tcr	is accepted	does not exist
x4	4,98	Tr>Tcr	it is rejected	exist
Tyumen region				
x1	13,96	Tr>Tcr	it is rejected	exist
x2	14,07	Tr>Tcr	it is rejected	exist
x3	0,83	Tr<Tcr	is accepted	does not exist
x4	4,97	Tr>Tcr	it is rejected	exist
Khanty-Mansi Autonomous District - Ugra				
x1	5,02	Tr>Tcr	it is rejected	exist
x2	13,51	Tr>Tcr	it is rejected	exist
x3	1,71	Tr<Tcr	is accepted	does not exist
x4	4,85	Tr>Tcr	it is rejected	exist
Yamalo-Nenets Autonomous District				
x1	6,22	Tr>Tcr	it is rejected	exist
x2	13,01	Tr>Tcr	it is rejected	exist
x3	2,03	Tr<Tcr	is accepted	does not exist
x4	2,21	Tr>Tcr	it is rejected	exist
Chelyabinsk region				
x1	14,10	Tr>Tcr	it is rejected	exist
x2	12,24	Tr>Tcr	it is rejected	exist
x3	0,77	Tr<Tcr	is accepted	does not exist
x4	4,74	Tr>Tcr	it is rejected	exist

In the same way, calculations were made for the group of social indicators of economic security of the Ural Federal District of the Russian Federation (Tcr = 5.49, Tcr = 4.07, Tcr = 3.11, Tcr = 3.59) (Table 2).

Table 2: Results of the implementation of the Cumulative T-Criterion for the Group of Social Participants of Economic Security in the Ural Federal District for 2005-2018

The modelled indicator	T-settlement	Comparison	Acceptance of a hypothesis	Existence of a trend
Ural Federal District				
x1	3,31	$Tr<T_{кр}$	is accepted	does not exist
x2	-0,01	$Tr<T_{кр}$	is accepted	does not exist
x3	4,27	$Tr>T_{кр}$	it is rejected	exist
x4	5,74	$Tr>T_{кр}$	it is rejected	exist
x5	4,81	$Tr>T_{кр}$	it is rejected	exist
Kurgan region				
x1	5,60	$Tr>T_{кр}$	it is rejected	exist
x2	-0,02	Tr<Tcr	is accepted	does not exist
x3	1,46	Tr<Tcr	is accepted	does not exist
x4	4,85	Tr>Tcr	it is rejected	exist
x5	3,24	Tr<Tcr	is accepted	does not exist
Sverdlovsk region				
x1	2,66	Tr<Tcr	is accepted	does not exist
x2	-0,01	Tr<Tcr	is accepted	does not exist
x3	4,95	Tr>Tcr	it is rejected	exist
x4	5,12	Tr>Tcr	it is rejected	exist
x5	4,94	Tr>Tcr	it is rejected	exist
Tyumen region				
x1	12,45	Tr>Tcr	it is rejected	exist
x2	0,00	Tr<Tcr	is accepted	does not exist
x3	2,35	Tr<Tcr	is accepted	does not exist
x4	3,60	Tr<Tcr	is accepted	does not exist
x5	4,55	Tr>Tcr	it is rejected	exist
Khanty-Mansi Autonomous District - Ugra				
x1	13,81	Tr>Tcr	it is rejected	exist
x2	0,00	Tr<Tcr	is accepted	does not exist
x3	1,13	Tr<Tcr	is accepted	does not exist
x4	1955,14	Tr>Tcr	it is rejected	exist
x5	3,40	Tr<Tcr	is accepted	does not exist
Yamalo-Nenets Autonomous District				
x1	6,55	Tr>Tcr	it is rejected	exist
x2	0,00	Tr<Tcr	is accepted	does not exist
x3	5,95	Tr>Tcr	it is rejected	exist
x4	4,17	Tr>Tcr	it is rejected	exist
x5	3,75	Tr>Tcr	it is rejected	exist
Chelyabinsk region				
x1	3,08	Tr<Tcr	is accepted	does not exist
x2	-0,07	Tr<Tcr	is accepted	does not exist
x3	5,43	Tr>Tcr	it is rejected	exist
x4	5,35	Tr>Tcr	it is rejected	exist
x5	4,75	Tr>Tcr	it is rejected	exist

For the innovation group of indicators, cumulative T-criterion calculations were carried out for all indicators, except "Costs for technological innovations of small enterprises," since there is no required

amount of data for the period under review (Tcr = 5.49, Tcr = 4.07, Tcr = 2.62, Tcr = 3.59, Tcr = 3.11) (Table 3).

Table 3: Results of the implementation of the Cumulative T-Criterion for the Group of Innovative Indicators of Economic Security in the Ural Federal District for 2007-2018

The modelled indicator	T-calculated	Comparison	Acceptance of a hypothesis	Existence of a trend
Ural Federal District				
x1	7,38	Tr>Tcr	it is rejected	exist
x2	1,19	Tr<Tcr	is accepted	does not exist
x3	14,10	Tr>Tcr	it is rejected	exist
x4	3,96	Tr>Tcr	it is rejected	exist
x4.1	0,50	Tr<Tcr	is accepted	does not exist
x4.2	0,44	Tr<Tcr	is accepted	does not exist
x4.3	0,11	Tr<Tcr	is accepted	does not exist
x4.4	3,83	Tr>Tcr	it is rejected	exist
Kurgan region				
x1	0,85	Tr<Tcr	is accepted	does not exist
x2	5,16	Tr>Tcr	it is rejected	exist
x3	2,86	Tr>Tcr	it is rejected	exist
x4	3,56	Tr>Tcr	it is rejected	exist
x4.1	1,49	Tr<Tcr	is accepted	does not exist
x4.2	-	-	-	-
x4.3	-	-	-	-
x4.4	-	-	-	-
Sverdlovsk region				
x1	6,24	Tr>Tcr	it is rejected	exist
x2	1,37	Tr<Tcr	is accepted	does not exist
x3	9,83	Tr>Tcr	it is rejected	exist
x4	1,42	Tr<Tcr	is accepted	does not exist
x4.1	3,49	Tr>Tcr	it is rejected	exist
x4.2	0,09	Tr<Tcr	is accepted	does not exist
x4.3	-	-	-	-
x4.4	4,80	Tr>Tcr	it is rejected	exist
Tyumen region				
x1	4,26	Tr>Tcr	it is rejected	exist
x2	1,15	Tr<Tcr	is accepted	does not exist
x3	10,04	Tr>Tcr	it is rejected	exist
x4	4,90	Tr>Tcr	it is rejected	exist
x4.1	1,33	Tr<Tcr	is accepted	does not exist
x4.2	1,11	Tr<Tcr	is accepted	does not exist
x4.3	-	-	-	-
x4.4	0,91	Tr<Tcr	is accepted	does not exist
Khanty-Mansi Autonomous District - Ugra				
x1	0,54	Tr<Tcr	is accepted	does not exist
x2	4,00	Tr<Tcr	is accepted	does not exist
x3	2,92	Tr>Tcr	it is rejected	exist
x4	-	-	-	-
x4.1	-	-	-	-
x4.2	-	-	-	-

x4.3	-	-	-	-
x4.4	-	-	-	-
Yamalo-Nenets Autonomous District				
x1	4,81	Tr>Tcr	it is rejected	exist
x2	8,02	Tr>Tcr	it is rejected	exist
x3	9,32	Tr>Tcr	it is rejected	exist
x4	-	-	-	-
x4.1	-	-	-	-
x4.2	-	-	-	-
x4.3	-	-	-	-
x4.4	-	-	-	-
Chelyabinsk region				
x1	1,38	Tr<Tcr	is accepted	does not exist
x2	1,55	Tr<Tcr	is accepted	does not exist
x3	14,20	Tr>Tcr	it is rejected	exist
x4	4,12	Tr>Tcr	it is rejected	exist
x4.1	2,83	Tr<Tcr	is accepted	does not exist
x4.2	1,20	Tr<Tcr	is accepted	does not exist
x4.3	-	-	-	-
x4.4	4,72	Tr>Tcr	it is rejected	exist

The same will be done with the indicators of the group "Industrial economic safety indicators," with the exception of "Producer price indices by type of economic activity" Production of industrial goods "according to the OKVED2" due to lack of information on the period under study (Tcr = 5.49, Tcr = 5.02, Tcr = 3.59) (Table 4).

Table 4: Results of the implementation of the cumulative T-criterion for the group of industrial indicators of economic safety in the Ural Federal District for 2007-2018

The modelled indicator	T-calculated	Comparison	Acceptance of a hypothesis	Existence of a trend
Ural Federal District				
x1	10,76	Tr>Tcr	it is rejected	exist
x2	3,86	Tr<Tcr	is accepted	does not exist
x3	1,44	Tr<Tcr	is accepted	does not exist
x4	9,18	Tr>Tcr	it is rejected	exist
Kurgan region				
x1	1,60	Tr<Tcr	is accepted	does not exist
x2	1,15	Tr<Tcr	is accepted	does not exist
x3	1,81	Tr<Tcr	is accepted	does not exist
x4	10,74	Tr>Tcr	it is rejected	exist
Sverdlovsk region				
x1	4,12	Tr<Tcr	is accepted	does not exist
x2	0,58	Tr<Tcr	is accepted	does not exist
x3	1,03	Tr<Tcr	is accepted	does not exist
x4	11,30	Tr>Tcr	it is rejected	exist
Tyumen region				
x1	8,25	Tr>Tcr	it is rejected	exist
x2	0,12	Tr<Tcr	is accepted	does not exist
x3	2,38	Tr<Tcr	is accepted	does not exist
x4	1,20	Tr<Tcr	is accepted	does not exist

Khanty-Mansi Autonomous District - Ugra				
x1	7,14	Tr>Tcr	it is rejected	exist
x2	2,78	Tr<Tcr	is accepted	does not exist
x3	3,49	Tr<Tcr	is accepted	does not exist
x4	1,33	Tr<Tcr	is accepted	does not exist
Yamalo-Nenets Autonomous District				
x1	8,51	Tr>Tcr	it is rejected	exist
x2	9,70	Tr>Tcr	it is rejected	exist
x3	4,80	Tr<Tcr	is accepted	does not exist
x4	5,58	Tr>Tcr	it is rejected	exist
Chelyabinsk region				
x1	3,26	Tr<Tcr	is accepted	does not exist
x2	0,93	Tr<Tcr	is accepted	does not exist
x3	2,31	Tr<Tcr	is accepted	does not exist
x4	10,63	Tr>Tcr	it is rejected	exist

In order to give a forward-looking assessment of economic security indicators in the Ural Federal District of the Russian Federation, forecast values for 2019-2021 were obtained for dynamic series with the presence of a trend by the method of analytical equalization according to the line function.

As a result of the calculations made, it was revealed that since 2007 by 2021 the largest growth of GRP per capita in absolute terms is expected in the Tyumen region by 1504290.4 rubles (2.8 times), and in relative terms - in the Kurgan region (3.4 times) and will amount to 2335595.7 rubles and 293314.0 rubles, respectively. By 2021 compared to 2007 there will be the largest increase in retail turnover in the Sverdlovsk region by 1003952 rubles (3.5 times).

According to the forecast data, the largest reduction in the energy consumption of GRP in absolute terms will be observed in Chelyabinsk region by 326.2 p.p. (0.3 times), and in relative terms - in Yamalo-Nenets Autonomous District (90.8%) (Table 5).

Table 5: Forecast values of economic indicators of economic security in the Ural Federal District of the Russian Federation for 2019-2021

Indicator	Trend equation	Expected value		
Ural Federal District				
x1	y_t=52084,52x+258995,03	2019	2020	2021
		936093,8	988178,3	1040262,8
x2	y_t=140753,57x+1133479	2963276,1	3104029,7	3244783,3
Kurgan region				
x1	y_t=14365,86x+77826,20	2019 г.	2020 г.	2021 г.
		264582,3	278948,2	293314,0
x2	y_t=5135,96x+55487,76	122255,2	127391,2	132527,1
x3	y_t=-23,63x+290,56	101,54	77,91	54,29
Sverdlovsk region				
x1	y_t=32664,04x+132573,19	2019 г.	2020 г.	2021 г.
		557205,7	589869,7	622533,7
x2	y_t=67258,48x+396368,89	1270729,2	1337987,7	1405246,2
x3	y_t=-17,88x+272,33	129,29	111,41	93,53
Tyumen region				
x1	y_t=114784,42x+613829,46	2019 г.	2020 г.	2021 г.
		2106026,9	2220811,3	2335595,7
x2	y_t=45953,15x+388560,63	985951,6	1031904,8	1077857,9

x3	y_t=-12,22x+190,66	92,91	80,69	68,48
Khanty-Mansi Autonomous District - Ugra				
x1	y_t=120511,30x+1380282,20	2019 г.	2020 г.	2021 г.
		2464883,9	2585395,1	2705906,4
x2	y_t=16628,91x+213127,21	429303,1	445932,0	462560,9
x3	y_t=-13,49x+242,06	134,14	120,65	107,16
Yamalo-Nenets Autonomous District				
x1	y_t=494376,47x+1123649,71	2019 г.	2020 г.	2021 г.
		5573037,9	6067414,4	6561790,9
x2	y_t=5126,30x+77477,36	144119,3	149245,6	154371,9
x3	y_t=-11,71x+128,17	34,50	22,79	11,09
Chelyabinsk region				
x1	y_t=24000,59x+111443,06	2019 г.	2020 г.	2021 г.
		423450,8	447451,4	471452,0
x2	y_t=22405,97x+293062,46	584340,1	606746,1	629152,1
x3	y_t=-34,54x+478,67	202,32	167,78	133,23

In order to determine the prospective values by 2021 in the series of dynamics that do not have a trend, the probabilistic method of assessment, namely the method of forecast of a bad trend, was used. So, with the probability of 10.70%, 22.54%, 7.37%, 18.22%, 9.85%, 22.54% and 10.70% can be claimed that the index of physical volume of a gross regional product by 2021 in comparison with 2007 will increase in the Ural Federal District of the Russian Federation and regions entering it, respectively (Table 6).

Table 6: Probability of favourable index trend
Physical volume of GRP by 2021, % to total

Subject	Probability of favorable trend,%
Ural Federal District	10,70
Kurgan region	22,54
Sverdlovsk region	7,37
Tyumen region	18,22
Khanty-Mansi Autonomous District - Ugra	9,85
Yamalo-Nenets Autonomous District	22,54
Chelyabinsk region	10,70

As a result of the calculations made on social indicators of economic security, it was revealed that from 2007 to 2021 the largest reduction in unemployment rate of population aged 15-72 is expected in Khanty-Mansi Autonomous District - Ugra by 6.12 p.p. (by 80.49%).

By 2021, compared to 2011, there will be the largest increase in the number of people with monetary incomes below the subsistence minimum in Chelyabinsk by 4.92 p.p. (per 45.51%).
According to the forecast values, the largest reduction in the number of victims of fatal accidents at work in absolute terms is observed in the Sverdlovsk region by 69 p.p. (0.2 times), and in relative terms – in the Kurgan region (88.31%).

The share of employees of organizations with accrued wages below the subsistence minimum of the working-age population by 2021 according to the prospective values will be reduced in absolute terms by 14.61 p.p. (0.2 times) in Chelyabinsk region, and in relative terms – in Yamalo-Nenets Autonomous District (109.25%) (Table 7).

Table 7: Forecast values of social indicators of economic security in the Ural Federal District of the Russian Federation for 2019-2021

Indicator	Trend equation	Expected value		
Ural Federal District				
x3	y_t=-15,03x+271,28	2019	2020	2021
		121	106	91
x4	y_t=-1,14x+13,65	3,4	2,2	1,1
Kurgan region				
x1	y_t=-0,26x+10,79	2019	2020	2021
		7,4	7,2	6,9
x2	y_t=0,48x+15,91	20,2	20,7	21,2
x3	y_t=-1,28x+17,97	5	4	3
Sverdlovsk region				
x3	y_t=-4,62x+72,86	2019	2020	2021
		27	22	17
x4	y_t=-1,17x+13,78	3,3	2,1	0,9
Tyumen region				
x1	y_t=-0,29x+7,19	2019	2020	2021
		3,4	3,1	2,8
x2	y_t=0,44x+11,02	15,0	15,4	15,8
x4	y_t=-0,72x+7,23	0,7	0,0	-0,7
Khanty-Mansi Autonomous District - Ugra				
x1	y_t=-0,47x+8,54	2019	2020	2021
		2,4	2,0	1,5
x3	y_t=-1,65x+51,14	35	33	31
Yamalo-Nenets Autonomous District				
x1	y_t=-0,18x+4,66	2019	2020	2021
		2,4	2,2	2,0
x3	y_t=-1,10x+22,28	11	10	9
x4	y_t=-0,59x+5,72	0,5	-0,1	-0,7
Chelyabinsk region				
x2	y_t=0,53x+9,91	2019	2020	2021
		14,7	15,2	15,7
x3	y_t=-4,77x+75,61	28	23	18
x4	y_t=-1,32x+17,78	5,9	4,6	3,3

Forward-looking values were also obtained for non-trending series. On their basis the following conclusions were drawn: with the probability of 19.68%, 19.68%, 15.01%, 19.68%, 19.68%, 22.54% and 42.68% the level of participation in labor of the population at age of 15-72 years by 2021 will increase in the Ural Federal District of the Russian Federation and regions entering it, respectively.

The unemployment rate of the population aged 15-72 in the Ural Federal District in central, Sverdlovsk and Chelyabinsk regions with a probability of 15.01%, 19.68% and 19.68%, co-responsibly, will increase.

With a probability of 18.22%, 27.89% and 18.22%, the population with monetary incomes below the subsistence minimum will increase in the Sverdlovsk region, Khanty-Mansi Autonomous District-Ugra and Yamalo-Nenets Autonomous District.

The number of victims of accidents at work with a fatal home will increase with a probability of 8.35% in the Tyumen region.

With a probability of 11.90% in the Kurgan region and Khanty-Mansi Autonomous District-Ugra, the share of employees of organizations with accrued wages below the value of the industrial minimum will increase (Table 8).

Table 8: Probability of favorable trend of social indicators of economic security by 2021, % of the total

Subject	Probability of favorable condition,%				
	Labour force participation rate	Unemployment rate	The number of persons with de-gentle children below the level of	Number of victims of fatal occupational accidents	Proportion of employees of organizations with accrued wages below the subsistence minimum
Ural Federal District	19,68	15,01	-	-	-
Kurgan region	19,68	-	-	-	11,90
Sverdlovsk region	15,01	19,68	18,22	-	-
Tyumen region	19,68	-	-	8,35	-
Khanty-Mansi Autonomous District - Ugra	19,68	-	27,89	-	11,90
Yamalo-Nenets Autonomous District	22,54	-	18,22	-	-
Chelyabinsk region	42,68	19,68	-	-	-

According to the forecast values of innovative indicators of economic safety, since 2010 by 2021 the largest increase in the share of domestic expenditures on research and development in GRP in absolute terms is expected in the Sverdlovsk region by 0.50 p.p. (1.42 times), and in relative terms - in the Yamalo-Nenets Autonomous District (14.63 times).

By 2021, compared to 2010, there will be the largest increase in the share of products of high-tech and knowledge-intensive industries in the gross regional product in the Kurgan region by 2.22 p.p. (by 9.02%).

According to the perspective values of the developed advanced production technologies, you announced that the largest increase will be observed in Chelyabinsk region by 157.6 p.p. (11.51 times). Information on the use of intellectual property objects by inventions by 2021 will increase most in absolute terms in Chelyabinsk region by 233 p.p., and in relative terms - in the Tyumen region (by

168.79%). In the Sverdlovsk region, data on the use of intellectual objects on useful models will increase by 124 p.p. (47.85%) by 2021 compared to 2010.

The largest increase in information on the use of intellectual property objects by computer programs by this period in absolute terms will be marked in the Sverdlovsk region by 151 p.p. (2.85 times), and in relative terms - in the Chelyabinsk region (8.76 times) and will amount to 233 and 140 p.p., respectively (Table 9).

Table 9: Forecast values of innovative indicators of economic safety in the Ural Federal District of the Russian Federation for 2019-2021

Indicator	Trend equation	Expected value		
Ural Federal District				
x1	y_t=0,02x+0,53	2019	2020	2021
		0,71	0,72	0,74
x3	y_t=18,96x+38,61	285,061	304,019	322,977
x4	y_t=51,32x+1073,71	1484	1536	1587
x4.4	y_t=31,61x+413,86	667	698	730
Kurgan region				
x2	y_t=0,25x+23,78	2019	2020	2021
		26,31	26,56	26,82
x3	y_t=-0,03x+2,06	1,606	1,571	1,536
x4	y_t=3,71x+49,14	79	83	86
Sverdlovsk region				
x1	y_t=0,05x+1,15	2019	2020	2021
		1,62	1,67	1,71
x3	y_t=4,96x+35,94	100,394	105,352	110,310
x4.1	y_t=13,04x+252,57	357	370	383
x4.4	y_t=16,82x+65,14	200	217	233
Tyumen region				
x1	y_t=0,01x+0,18	2019	2020	2021
		0,25	0,26	0,26
x3	y_t=2,16x+6,12	34,212	36,373	38,534
x4	y_t=18,96x+79,14	231	250	269
Khanty-Mansi Autonomous District - Ugra				
x3	y_t=0,01x+1,12	2019	2020	2021
		1,212	1,219	1,226
Yamalo-Nenets Autonomous District				
x1	y_t=0,01x+0,01	2019	2020	2021
		0,01	0,01	0,01
x3	y_t=1,39x-1,11	16,939	18,328	19,716
Chelyabinsk region				
x2	y_t=0,07x+20,64	2019	2020	2021
		21,38	21,45	21,52
x3	y_t=11,87x-5,52	148,848	160,723	172,597
x4	y_t=22,14x+325,14	502	524	547
x4.4	y_t=14,64x-6,29	111	126	140

For the series of dynamics without trend got promising values. With a probability of 7.78%, 10.70% and 22.54%, the share of domestic spending on research and development in GRP will increase by 2021 in Khanty-Mansi Autonomous District-Ugra, Kurgan and Chela-bin regions, respectively.

The share of products of the high-tech and knowledge-intensive industries in a gross regional product with the probability of 22.54%, 15.53%, 15.53%, 7.37% and 10.70% in the Ural Federal District in general, the Sverdlovsk, Tyumen regions, the Khanty-Mansi district Yugra, the Yamalo-Nenets Autonomous Area, respectively, will increase.

With a probability of 13.72%, information on the use of intellectual actual objects by inventions in the Sverdlovsk region will increase. With the probability of 10.70%, 10.70%, 22.54% and 10.70% in the Ural Federal District in general, Kurgan, Tyumen and Chelyabinsk regions of data on use of objects of intellectual property on useful models will increase.

By 2021, information on the use of intellectual property objects on industrial samples will increase with a probability of 13.72%, 22.54% and 13.72% in the Ural Federal District as a whole, Sverdlovsk and Chelyabinsk regions, respectively.

Information on the use of intellectual property objects by databases with a probability of 13.72% will increase in the Ural Federal District as a whole and the Tyumen region that enters it.

By 2021, with a probability of 16.73%, information on the use of intellectual property objects under computer programs will increase in the Tyumen region (Table 10).

Table 10: Probability of favorable trend of innovative indicators of economic safety by 2021, in% to the total

Subject	Probability of a favorable trend, %						
	Share of domestic research and development costs in gross regional product	Share of products of the hi-tech and knowledge-intensive industries in a gross regional product	About Using Intellectual Property by Invention	About Using Intellectual Property by Useful Models	About Using Intellectual Property by Industrial Pattern	About Using Intellectual Property by Database	About Using Intellectual Property by Computer Programs
Ural Federal District	-	22,54	-	10,70	13,72	13,72	-
Kurgan region	10,70	-	-	10,70	-	-	-
Sverdlovsk region	-	15,53	13,72	22,54	22,54	-	-
Tyumen region	-	15,53	-	-	-	13,72	16,73
Khanty-Mansi Autonomous District - Ugra	7,78	10,70	-	-	-	-	-
Yamalo-Nenets Autonomous District	-	7,37	-	-	-	-	-
Chelyabinsk region	22,54	-	-	10,70	13,72	-	-

For dynamic series with a trend in industrial indicators of economic safety, forecast values for 2019-2021 were also obtained. Thus, the share of investments in machines, equipment, vehicles in the total volume of investments in fixed assets aimed at reconstruction and modernization will decrease in the largest volume in Khanty-Mansi Autonomous District-Ugra by 13 p.p. (by 69.67%).

The index of industrial production by 2021 according to the forecast values in the Yamalo-Nenets Autonomous District will increase by 26.83 p.p. (1.28 times).

The share of investments in fixed assets to GRP will be most reduced in Kurgan region by 27.4 p.p. (86.9%) (Table 11).

Table 11: Forecast values of industrial indicators of economic safety in the Ural Federal District of the Russian Federation for 2019-2021

Indicator	Trend equation	Expected value		
Ural Federal District				
x1	y_t=-1,50x+41,85	2019	2020	2021
		22,3	20,8	19,3
x3	y_t=-0,43x+31,06	25,9	25,5	25,1
Kurgan region				
x3	y_t=-2,04x+32,67	2019	2020	2021
		8,2	6,2	4,1
Sverdlovsk region				
x3	y_t=-1,25x+28,88	2019	2020	2021
		13,9	12,7	11,4
Tyumen region				
x1	y_t=-0,99x+24,93	2019	2020	2021
		12,1	11,1	10,1
Khanty-Mansi Autonomous District - Ugra				
x1	y_t=-1,27x+24,66	2019	2020	2021
		8,2	6,9	5,7
Yamalo-Nenets Autonomous District				
x1	y_t=-0,71x+28,27	2019	2020	2021
		19,1	18,4	17,7
x2	y_t=2,16x+90,11	118,2	120,4	122,5
x3	y_t=-0,92x+53,74	42,7	41,8	40,9
Chelyabinsk region				
x3	y_t=-1,29x+28,83	2019	2020	2021
		13,4	12,1	10,8

For the series without trend, the following promising values were obtained for the share of investments in machines, equipment, vehicles in the total volume of investments in industrial capital aimed at reconstruction and modernization: with a probability of 22.54%, 13.72% and 11.90 % this indicator will increase in the Kurgan, Sverdlovsk and Chelyabinsk regions, respectively.

In 2021, with a probability of 7.37%, 15.01%, 10.70%, 18.22%, 15.01% and 9.85% in the Ural Federal District as a whole, Kurgan, Sverdlovsk, Tyumen regions, Khanty-Mansi Autonomous District - Ugra and Chelyabinsk Region, respectively, the index of industrial production will increase.

The index of production by the form of economic activity "Mining" by 2021 will increase with the probability of 10.70%, 10.70%, 19.10%, 9.85%, 13.72%, 10.70% and 15.01% in the Ural Federal District in general, Kurgan, Sverdlovsk, Tyumen regions, the Khanty-Mansi district Yugra, the Yamalo-Nenets Autonomous Area and Chelyabinsk region, respectively.

The share of investments in fixed assets to GRP by 2021 with a probability of 19.10% and 18.22% will increase in the Tyumen region and in the Khanty-Mansi Autonomous District-Ugra (Table 12).

Table 12: Probability of favorable trend of industrial indicators of economic safety by 2021, in % to the total

Subject	Probability of a favorable trend, %			
	Share of investments in machinery, equipment, vehicles in total investments in fixed assets aimed at reconstruction and modernization	Index of industrial production	Production index by type of economic activity "Mining"	Share of fixed investment in gross regional product
Ural Federal District	19,68	15,01	-	- -
Kurgan region	19,68	-	-	- 11,90
Sverdlovsk region	15,01	19,68	18,22	- -
Tyumen region	19,68	-	-	8,35 -
Khanty-Mansi Autonomous District - Ugra	19,68	-	27,89	- 11,90
Yamalo-Nenets Autonomous District	22,54	-	18,22	- -
Chelyabinsk region	42,68	19,68	-	- -

Conclusion

Recent political and economic developments in the world show that the task of ensuring economic security is now still relevant at both the federal and regional levels. In the current situation, it is necessary to organize effective monitoring of the economic security of the Territories, including a comprehensive assessment of the state of the economic security system in order to identify external and internal threats. Monitoring is traditionally assessed with the help of indicators reflecting the strengths and weaknesses of the development of regional economics in various spheres (real economy, financial sphere, food supply, etc.). Indicators of economic security should have the following distinctive characteristics: to quantify threats to economic security; Have high sensitivity and variability; Interact with each other to a sufficiently strong extent. In addition, threshold values should be defined for all indicators – limit values, the disregard of which impedes the poor development of the economy and social sphere and leads to the formation of destructive trends in the production and standard of living of the population. The approach of indicators to their thresholds signals the emergence of economic threats without danger, and the excess signals the crisis socio-economic situation.

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Ghosting as a Manifestation of Inversion on the Polish Labor Market

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Abstract

What became the trigger for getting interested in the issue of ghosting in organizations were signals from practitioners about the intensification of this phenomenon. It became noticeable because, for many years, in the area of hiring of employees, we were dealing with the employers' dictate. The purpose research was to deepen the identification of the ghosting phenomenon. The authors used on line their own research questionnaire; they didn't reach secondary date in this area. It focus was on causes, characteristics, conditions of its intensification in Poland as well as steps that could limit its negative effects for companies. The research was carried out in two stages; the first was carried out at the turn of 2018/2019 and took into account the perspective of organizations represented by their owners, managers and HR services. The second stage, carried out at the turn of 2019/2020, concerned the perception of *ghosting* by candidates participating in these practices, who wanted to be recruited, future employees. The research has confirmed the spread of *ghosting* and related problems in companies regarding recruitment of employees and maintaining the level of employment. The results of the survey, justifying the need for further research in the context of its consolidation, allowed to initially address the issue of limiting the negative effects of *ghosting* on companies.

Keywords: Labor Market, Phenomenon of *Ghosting*, Recruitment .

Introduction

For decades, on the labor market (not only in Poland), employers have played a dominant position taking advantage of the relatively well-established prevalence of the labor demand over supply. They the ones who mainly selected employees to meet the needs in terms of work potential necessary to achieve their organization's goals, both in terms of operational dimension, i.e. related to the ongoing performance of tasks, as well as in the strategic dimension, setting the assumptions of the personnel strategy as a component of the organization's development strategy. As part of implementing the recruitment function, it was the employers who would work out the appropriate procedures for recruiting employees by preparing an offer (advertisement) containing the desired employee profile, inviting to interviews during which the details of the job offer were presented and the candidates were verified and finally finalizing employment contracts (addressed to selected candidates). Today, such a scheme of recruiting employees turns out to be ineffective. It is becoming increasingly difficult for companies to meet the challenge of finding and retaining appropriately engaged, loyal and responsible employees who would be ready to stay with the given company for longer.

This is the result of changes in the labor market, which today is becoming more and more often (in specific segments and in specific time intervals) the employees' market. This causes a reversal of roles. Employees become the party making the choice, not the employer as before. After the economic transformation in the 1990s, the Polish labor market remained a market in which there was

a surplus of labor resources for many years, and this situation was reflected in the persistently high level of unemployment. In 2004, at the time of Poland's accession to the European Union, the unemployment rate was over 20% (while in recent years this indicator has been at the level of 2010-12% and in 2019-5%) (GUS, 2019).

Since then, intensive emigration of Poles, mainly to Western Europe, has started. The process of emigrating in search of work was somewhat slowed down in 2008-2010, which was during the economic crisis and then resumed (with less intensity) in 2011 resulting in a flow of 1.5 million emigrants from Poland to the EU.

Changes on the Polish labor market took place also as a result of economic growth (its pace did not slow down significantly even during the economic crisis). Foreign investment proved to be a particularly favorable factor, as it utilized the existing surpluses of labor resources. In the meantime, certain demographic changes have also occurred, including depopulation and aging. All this gradually led to the disclosure of deficiencies in the labor market, initially qualitative (the lack of suitably qualified employees) but with time also quantitative shortages (i.e. people willing to take up employment irrespective of matching in terms of knowledge, skills and experience). The situation on the Polish labor market has also deteriorated through the impact of social policy solutions (e.g. the 500+ program, which corroded the interest in taking up paid employment) or through legal regulations allowing a wide spectrum of forms of temporary work, which, regardless of many positive effects, led to the reduction of young people's (representatives of generations Y and Z) interest in settling in professionally by working with any company for longer.

The cumulative impact of these and other conditions ultimately resulted in the inversion on the labor market, i.e. the loss of the dominant position of the employers who previously abused their position, among others, in relation to job applicants, which was manifested by such phenomena as CV documents, cover letter, etc., "falling into a black hole" i.e. employers not confirming their acceptance, not notifying of the results of the next stages of recruitment or the final selection, or generally not maintaining any contact during the recruitment process (which was proof that the employer lost interest in employing the given candidate).

The labor market in a situation where we are dealing with a predominance of job offers over the actual interest in taking up that job/employment becomes the employees' market. Employees are then those who try to use their bargaining position, try to point out that, in these conditions, they are the ones who make the choice. They often go further, play a kind of game, ultimately "disappointing" the recruiter because they decide to participate in the recruitment process not necessarily respecting the applicable rules/arrangements, e.g. by interrupting this process without showing up for the next stages, or by resigning (giving up work) in a relatively short period of time after finalizing the recruitment process and in this way "turning into a ghost." *Ghosting* is therefore a phenomenon that refers to the practices used by future candidates and potential employees consisting in withdrawing from the intention to obtain a job (employment), i.e. resigning from participation during the recruitment process and not proceeding to its subsequent/final stages, or after having the employment promised/provided, not taking up the job or quitting within a relatively short period of time from the date of employment (premature departure) - without notice, any notification or explanatory information (What is Employee Ghosting ..., 2019).

The Essence of Ghosting and Its Spread

The term *ghosting* derives from psychology and is generally used to describe the phenomenon of the breakdown of relationships in interpersonal relations as a consequence of the lack of communication of one of the parties or its unilateral omission, interruption without warning, notification or explanation (Freedman, Powell, Le, Williams, 2019). As M. Dreger (2017) notes, this happens because a person who withdraws from fulfilling their intentions for fear of confrontation, focuses solely on their needs, does not take the opinion of the other person/party into consideration.

JM. Rosenberg (2018) points out that such ease of cutting off contacts is manifested more by young people, which would indicate that this phenomenon may have a generational context. Wanting to avoid potential conflicts, having less experience in conducting difficult conversations, and at the same time, being assertive (caring for their comfort), not deprived of other alternatives young people simply "break" communication. This behavior is interpreted negatively by older/previous generations as an unacceptable lack of stability and responsibility.

G. Bauer (2005) indicates that the phenomenon of ghosting can also be understood as breaking the terms of the (formal) contract between parties, which may stand for not only the employer and potential employee, but also companies providing each other with specific services.

Both dimensions of the phenomenon of ghosting, i.e. manifesting itself in the termination of contacts as well as the withdrawal from the contract immediately after it came into effect, manifests itself mostly in implementing the recruitment function of the organization (business, public and social). Behaviors consisting of "turning into a ghost" penetrate into organizations and become increasingly difficult to accept, although it is hard to say that the essence of this phenomenon is something completely new.

The ghosting phenomenon occurs in various industries and professions. Previously, it mainly concerned less paid jobs in construction, production and transport. Currently, it also covers administrative employees in many industries (Davidson, 2018). It is estimated that the phenomenon of ghosting in Poland, i.e. situations in which candidates reject an offer after previous accepting it, affects 5-20% of recruitment processes (depending on the industry and type of position) (Stolarski, 2018) and is gaining momentum (Miller, 2018).

Currently, this phenomenon is also spreading to specialists and managers, where the labor market is quite hermetic and the number of employers is limited (Błaszczak, 2017). The intensification of this phenomenon in recruitment activities is caused by factors suggesting that the practices in this field are not adapted to the needs, or even that certain errors are being committed (according to HBRP, errors in recruitment and selection account for 80% of unsuccessful recruitment endeavors) (King, 2018).
Studies mainly indicate the lack of a partner-like relationship between the potential employer and the candidate. 50% of respondents have to wait too long for the employer's decision or for being accepted to the next stage, 34% of candidates do not receive information about the planned recruitment process, 28% of respondents, in the end, receive an offer below their previously presented financial expectations, and 21% of respondents do not receive information on important elements of the job offer (Activity of specialists and managers on the labor market, 2018).

In addition, the growing awareness of the strong position of candidates on the labor market means that the pool of passive candidates increases. Passivity is currently the dominant attitude on the labor market. Nearly 70% of specialists and managers are not actively looking for a job (Activity of specialists and managers on the labor market, 2018). Employees take their carrier seriously and carefully plan its stages, becoming more and more demanding. According to the Antal report (Activity of specialists and managers on the labor market, 2018), the motivation to change jobs is influenced not only by salary, but also more attractive career development opportunities (45%), bad organization management (43%), bad atmosphere at work (33%) or unclear prospect of promotion or lack of it in the company (30%). Therefore, employers need to examine the needs of employees and their expectations more consciously and propose various development opportunities to limit the scope of ghosting.

It is worth noting that ghosting is not only the domain of the Polish labor market. In the United States, in 2018 (MacLellan, 2018) an increase of this phenomenon from 10% to 20% was observed. The problem of "disappearing candidates/employees" was noted by the Federal Reserve Bank of Chicago, which tracks employment trends, confirming that the number of "ghosts" is still growing. Economists report that employees are starting to behave like millennials on Tinder (an application that helps meeting new people) - leaving work without any explanation (Paguette, 2018).

In turn, in France, the industry which is experiencing a lot of ghosting is the IT industry, in which the first half of 2019 saw the phenomenon exceed the result for the entire 2018 (Wolski, 2019).

The emergence of the new trend, as it turns out, causes the launch of professional services in this area. e.g. in Japan, where resignations from long-term employment are quite rare - there are organizations that specialize in "resolving" resignation from employment on behalf of employees (Fogarty, 2019). They exist to meet the needs of Japanese employees who are paralyzed by the fear of confronting with their employer and the traumatic experience related to informing the employer about resignation from the job or employment offer (Ciesielska, 2019).

The dissemination of *ghosting* and its negative effects, when it comes to meeting the needs of recruiting and retaining employees in a company, i.e. shaping the work potential that determines the efficient, effective and effective functioning of the given company, has sparked interest in this phenomenon and the desire to check how it is perceived by the managerial staff, HR services and others who are responsible for the efficiency and competitiveness of their companies, as well as by those who, realizing the practices in the framework of *ghosting*, in a sense, see the chance to "get back at the employers" (also business owners) for the decades of the practice of "dealing cards".

Stage I - *ghosting* from a company perspective (2018/2019)

In the first stage of the survey, the focus was on the perception of *ghosting* from the perspective of an organization that experiences this phenomenon. The recipients of the questions/respondents comprised of owners, managers/board members, HR employees and others who come into contact with this type of practices. The purpose of this research was to identify the premises, scale and conditions associated with the occurrence of *ghosting*, its effects as well as possible actions limiting such practices from the company's point of view. Selected results of these studies are presented below. It has to be noted, however that, due to the unrepresentative character of the sample - the results of these studies do not give grounds to make generalized conclusions.

According to the criterion of the number of employees, among the 84 surveyed entities (n = 84), small enterprises accounted for 29%, medium-sized enterprises - 38% and large enterprises - 33%. As for the coverage (with n = 84), companies with local coverage constituted 25% of the sample, with national coverage - 21%, with international coverage - 16% and with global coverage - 38%. The majority of the respondents were associated with the production industry - 30%, IT constituted 22% of the respondents, personal consultancy constituted 14%, and logistics and automotive representatives both constituted 11%. Other industries, including SSC, call center, construction, real estate, and advertising constituted 3% each.

Approximately 15% of those surveyed were business owners and managers. Employees directly related to the personnel (personnel/recruitment specialists, HR managers / directors) constituted 48%. The remaining respondents were managers of various levels and functional areas - 37%.

Of the surveyed entities, 23% confirmed that they had encountered ghosting once during the last year (before the moment of the study), 50% of entities qualified for the range covering 2-5 of such experiences over the past year and 27% confirmed that in the year preceding the survey ghosting cases exceeded 5 (see Chart 1). As for the latter, they most often took place in large companies from the logistics and manufacturing industry.

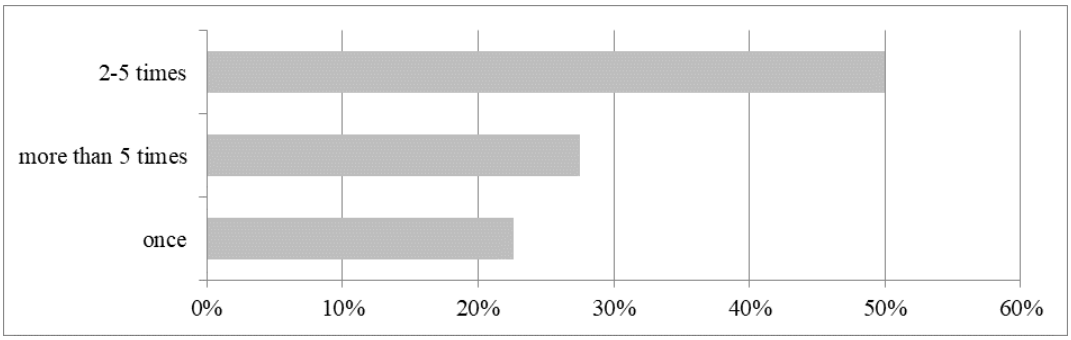

Figure 1: Occurrence of the *ghosting* phenomenon

Source: Table based on author's research.

Identifying *ghosting* symptoms for n = 84 (see Chart 2), it was noted that the most common phenomena experienced in the employee selection/employment process are:

- the fact that the candidate did not appear at the recruitment meeting, despite confirming the date (37%); this mainly concerned production and specialist positions in large enterprises from the manufacturing industry,
- candidates becoming a "ghost" after being presenting the offer (25%); this mainly concerned specialist positions in large IT companies,
- the moment when a candidate does not take up work on the first day of employment (21%); this mainly concerned production and specialist positions in large enterprises from the manufacturing industry.

Figure 2: Manifestations of *ghosting*

Source: Table based on author's research.

Considering the type of position affected by the *ghosting* phenomenon, it can be seen that it concerned more employees applying for production and specialist positions (45% and 30%) and less for administrative (15%) and management (10%) positions.

In an attempt to identify the causes of the ghosting phenomenon, the conditions potentially related to it were divided into three groups, i.e. those related to the organization's environment, organization

itself and candidates. The following tables 1-2 show the first two groups of causes of this phenomenon. When commenting on the above results, it is worth paying attention to the determinant impact of macro conditions, the current relationship between supply and demand for work guarantees freedom of choice for employees. In addition, it is supported by the entire spectrum of system solutions regarding flexible forms of employment and occupation. Retaliation-motivated reasons (2%) should also be noted.

As for the causes of ghosting at the organizational level, they are primarily related to the process of recruiting employees ("recruitment sins"). The issue of setting employment conditions (they are either not sufficiently defined or they do not coincide with those given in the offer, or they are not negotiable, they are too rigid, etc.) has the biggest influence. Communication factors (providing information, respecting set deadlines) also have a relatively large share here. It is worth noting that the image of the employer is an important factor as well, which may confirm the sense of the employers' efforts in this regard.

Table 1: Reasons for resigning from the job application process. Causes rooted in the environment

No.	Reasons for resignation	% share
1	Situation on the labor market - employee market; many possibilities of finding a competitive offer, free choice of employers by job candidates	74%
2	The existence of many alternatives to employment based on an employment contract (forms of temporary work)	14%
3	The lack of any obligations towards a given employer, as well as legal and financial sanctions, no sense of reprehensibility of such behavior, no motivation to take up employment due to the use of social benefits	10%
4	Miscellaneous, including the opportunity to get back at the employer, who made a choice according to his criteria, for the dominant position in the past.	2%

Source: Table based on author's research

Table 2: Reasons for resigning from the job application process depended on the organization/employer

No.	Reasons for resignation	% share
1	Unspecified employment conditions; discrepancy between the terms in the offer and in reality	25%
2	No possibility to negotiate employment/working conditions	19%
3	Uncompetitive job offer (not adapted to current conditions on the labor market)	15%
4	Too long (dragging) and non-transparent recruitment process	11%
5	Unattractive image of the employer (*employer branding*)	10%
6	Being kept unanswered too long about the recruitment result from the recruiter	9%
7	No feedback after each completed stage of the recruitment process	5%
8	Conducting extensive recruitment campaigns (excess of candidates), convincing candidates that the disappearance of one/several of them will not harm the effectiveness of the recruitment process in the company)	1%
9	Organizing recruitment for non-existent positions to expand the database of candidates, an attempt to attract valuable employees to other positions	1%

10	Unilateral use of new technologies in the recruitment process (machine learning) limiting direct contact with the company and people working in it.	1%
11	Conducting passive recruitment (regarding persons already employed and potentially not interested in changing jobs)	1%
12	Miscellaneous: including no feedback, fear of getting an employment contract, inappropriate treatment of candidates, e.g. showing no respect, no time for explanation.	3%

Source: Table based on author's research

The majority of respondents who represented companies stated that the phenomenon of *ghosting* will soon intensify, indicating that we are dealing with:

- a tendency to limit/reduce communication (paradoxically, with growing technological possibilities in this respect),
- ever smaller identification - employees' relationships with the company they are employed at become more and more anonymous (the employee's own development is the priority),
- the ethos of work and responsibility of the generation entering the labor market is lowering,
- thanks to technology, access to job offers becomes easier, but relationships become more anonymous, etc.

Therefore, taking into account the possible effects of the increase/persistence of this phenomenon, respondents/companies intend to act in two ways. On the one hand, improve the efficiency of recruitment processes through, among others, helping candidates for employees to "get closer" to the people with whom they will work in the future (already at the recruitment stage), devote more time for adaptation in the new work environment, etc. On the other hand, curb this type of practices by introducing sanctions for unjustified withdrawal from the recruitment process or premature abandonment of employment.

As part of the general assessment of this phenomenon by employers, it should be emphasized that 66% of the respondents said that the experience with *ghosting*, de facto, saved the company from problems related to uninvolved and not too responsible employees, thus preventing deterioration of productivity and loss of competitiveness.

Stage II - *ghosting* from the candidate/employee perspective (2019/2020)

The survey questionnaire at this stage of the research contained a metric to characterize the respondents as well as questions identifying the *ghosting* phenomenon from the candidate's perspective - its causes and conditions, characteristics and intentions of people using this type of practice and the effects on future human resource management.

Deliberate selection of the research sample was used, inviting people from all over Poland who have resigned at least once during the recruitment process and did not proceed to its subsequent/final stages, or after being promised/provided employment did not take up work or abandoned it in a relatively short period (premature departure) without notice, any notification or explanatory information.

174 respondents took part in the study (n = 174). Such a sample obviously does not meet the criterion of representativeness, thus the results of the study do not give grounds to make generalized conclusions. Nevertheless, the acquired data may contribute to shaping the perception of this phenomenon on the part of people employing such practices.

The scope of this study does not allow for full presentation of the test results however, below are selected results and synthetic findings obtained on their basis.

- In the studied sample, ¾ of the respondents were those who participated in *ghosting* once. On the other hand, less than a quarter were those who repeatedly engaged in activities falling within its scope. Respondents for whom *ghosting* is a permanent practice when applying for

a job constituted 3%. It should be noted that seniority was not a differentiating criterion; the phenomenon of *ghosting* concerned both, those entering the labor market and those with at least 10 years of professional experience. People born between 1980-1999 (generation Y) participated in it to the greatest extent;

- Most often, it concerned administrative service positions at a similar level, i.e. approx. 20% of executive positions, specialists and managerial positions. Candidates with secondary education were almost twice as likely to use it. On the other hand, the level of use of this type of practices by employees with vocational education was relatively low. The above results have not yet confirmed the stereotypes that *ghosting* primarily concerns executive positions and employees with vocational education;
- It is noteworthy when analyzing Chart 3 that, 43% of respondents withdrew after being presented a job offer by a potential employer, and nearly 20% of the respondents quit their job a few days after becoming employed, which would indicate a relatively expensive type of *ghosting* for the employer (after finalizing the recruitment process). It cannot be ruled out that candidates/employees postpone the decision to resign/withdraw until they have full knowledge of the employment conditions;
- The reasons for resigning from the job application process (without explaining/notifying the potential employer) from the point of view of the candidate/employee are presented in Table 3.

Therefore, when it comes to the reasons that candidates/would-be employees claim to motivate them, their subjective (negative) feelings resulting from contacts with the future employer are the most important ones. They also admit that their decisions are too hasty, result from a relatively high risk appetite, willingness to "get acquainted" with the rules and the recruitment process. Finally, there is typical resistance/fear of change (especially if it concerns passive recruitment).

In summary, *ghosting* is able to manifest itself under the influence of a wide spectrum of more or less interdependent factors. Some of them can be shaped through appropriately targeted actions; the organization itself has relatively the greatest scope to act to limit this phenomenon in the context of recruiting employees;

- Referring to the need for specific actions by organizations to build countermeasures to *ghosting* in the study, an attempt was made to check whether, in current practice, companies have tried to launch possible sanctions against candidates/employees falling under the scope of *ghosting*. It turned out that only in two cases sanctions were written in the terms and conditions of recruitment. Nearly 80% of respondents using *ghosting* did not take into account any sanctions from the employer (they behaved with impunity).

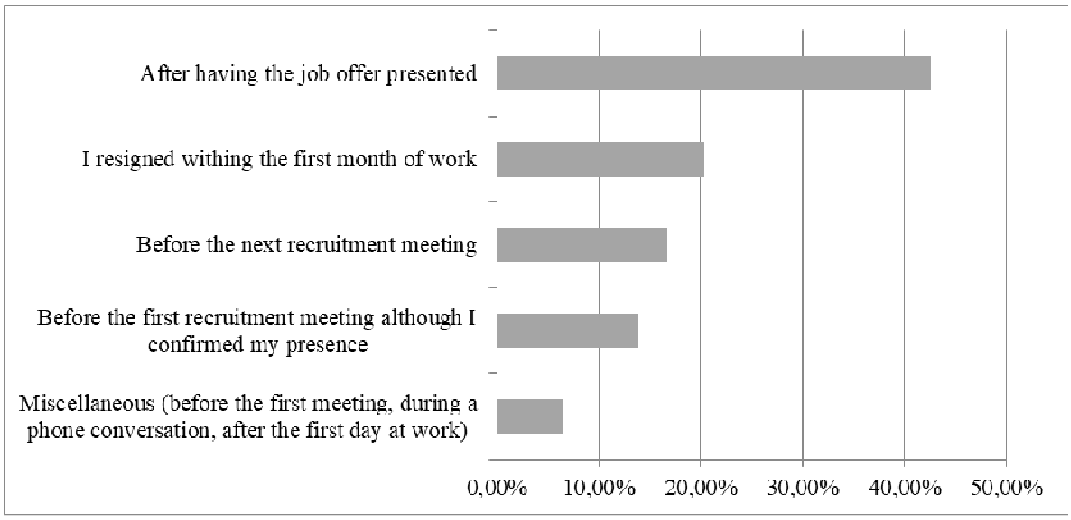

Figure 3: The moment of withdrawal from the recruitment process or resignation from the offer or undertaken job

Source: Table based on author's research

Table 3: Prerequisites for resignation from the process of applying for a job depending on the candidate/employee

No.	Reasons for resignation	% share
1	Unfavorable experience after direct contact with the company/people/recruiter	31%
2	Hasty decision to participate in the recruitment	24%
3	Willing to "test oneself" (gain experience) during the recruitment process without intending to change ones current job	11%
4	Fear of making a change	10%
5	Random events	9%
6	Tendency to take risks related to the opportunity for additional benefits (not available in the current position / workplace)	7%
7	Miscellaneous (choosing a better job offer; stress and lack of self-confidence; suspicion that recruiters are dishonest during the interview)	8%

Source: Table based on author's research

- Ultimately, in 23 cases, the respondents experienced a sanction consisting in the inability to take part in other recruitment processes conducted by the same employer. Although this way of influencing the scale of *ghosting* is rather limited and should be treated as an element complementing the full spectrum of activities, it can deter the irresponsible behavior of those who report their participation in recruitment procedures;
- In the survey, the respondents referred to the nature of *ghosting* in the near future. According to 45% of the respondents, this phenomenon will intensify and spread (as a manifestation of the employees' market associated mainly with a shortage of relevant employees on the labor market). In the opinion of 30% of those surveyed, the phenomenon

will stabilize at a certain level as a "permanent element" of the game on the labor market. According to 20% of the people, it will be associated with the phenomenon of "a pendulum" in the labor market (emergence and disappearance over time). Only about 5% of the respondents indicated that it would decrease (there will be a return to the dominant position of the employer).

- In the light of this research, it appears that the " future" of *ghosting* is determined (this is additionally demonstrated by the respondents' declarations of their intention to use this type of practice in the future, although they have been slightly offset by declarations of non-use of this type of practice). Companies/organizations must take this into account and take specific measures to limit the undesirable effects of this phenomenon;
- according to directed activities related to limiting *ghosting* in the future (i.e. acquiring and retaining an employee in the company), respondents believe, it will be necessary to undertake actions focused on the development of artificial intelligence in order to reduce the demand for people to perform specific tasks (indicated by 45% of respondents). Companies will also be forced to re-evaluate motivators for work (remuneration will lose its power, other benefits will gain in attractiveness, e.g. implementation of non-routine/creative tasks, flexibility of working time) - this is expected by 34% of the respondents). There will be a need for a clear orientation of human resource management towards employee well-being and energy management of people in the organization (this is suggested by 21% of respondents).

Summary - Research Findings and Implications

The first stage of the research (the organization's perspective) has confirmed that ghosting is a real phenomenon increasing its presence in Polish companies, regardless of the size, scope of activity or industry. Most often, it manifests itself in the interruption of the recruitment process (not showing up for recruitment meetings), but quitting the job after being presented the offer or after the first days of employment also have a significant share here.

The decisive condition for the emergence of ghosting is the situation on the labor market, i.e. the free choice of employers by the job seekers and, in addition, a significant extension of various forms of temporary work and flexible forms of employment, which allow people to postpone the decision to start a permanent job until they find a fully satisfactory offer.

The recruitment process that does not meet the expectations of future employees (candidates) also constituted a very important factor triggering ghosting; expectations regarding the manner and frequency of communication, or even "getting to know" (appropriate adaptation) the company by future employees are increasing here. It is also important for them to be able to consistently implement *lifelong learning strategy* in the chosen place of employment.

As for the ghosting phenomenon from the candidate's perspective, the selection of the sample did not allow determining how common such practices are in the entire population of applicants.

However, the research shows that among those using this type of practice, the representatives of generation Y are relatively the largest group. Still, ghosting concerns people of different ages, with different seniority, those looking for a job as a contractors and those who are in the sectors of service, specialists or managers.

Respondents (candidates) see the causes of ghosting mainly on the side of employers, emphasizing the lack of positive attitude towards candidates and the lack of efficiency in the organization of recruitment processes. On the other hand, as reasons connected to themselves they attribute making too hasty decisions about participating in recruitment processes (often on the basis of passive recruitment), typical fear of changing the current status, propensity to take risks, all the more so because such practices still remain "unpunished" - few cases of sanctions e.g. prohibition of participation in subsequent recruitments of the same employer.

Due to the fact that the majority of employees anticipate that this phenomenon will spread/expand or remain stable at some level, it will be a permanent element on the labor market and due to the fact that almost half of the respondents declared their intention to use this type of practice in the future, it would be appropriate to correct the activities of companies/organizations to avoid negative effects (including the costs of unsuccessful recruitment).

It seems that improving recruitment processes may prove to be an insufficient course of action. It seems that it is necessary to create changes in the area of human resource management, including reevaluation of motivators for work (increasing the importance of those that enable development), launching activities promoting employee "well-being" and inclusion of people energy management in the organization in the subject of management in the operational and strategic dimension.

Acknowledgment

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Problems of Tax Competition in The Contemporary Financial System Against the Background of The European Union

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Abstract

In recent years, due to the globalization of the world economy, progressive international economic integration, rapid technological progress and increasing competition, an increase in interest in the problems of taxation of income generated in national economies can be observed. The free movement of goods, services, people and - which is particularly important from the point of view of this article - capital is the basis for the functioning of the European Union. Entrepreneurs have the opportunity to choose the place of business, as well as the method of tax settlement that will be optimal for them - will cause the lowest tax burden. Tax competition is a phenomenon directly related to globalization processes. The liberalization of capital flows and a decrease in transaction costs have caused investors to look for attractive deposits not only in the country but also abroad. In order to increase investments in their countries, governments are trying to make them as attractive as possible from the perspective of entrepreneurs, which they can do, among others, by reducing taxes. Theoretically, a reduction in tax rates does not have to cause a decrease in budget revenues, as the tax base will increase as a result of the inflow of investors. However, if all countries decide to reduce taxes, the relative attractiveness of countries to investors will remain unchanged, while their budget revenues will decrease. The decrease in tax revenues caused by the lowering of rates with an unchanged base means that the state may spend less funds on the implementation of its tasks in the field of providing public goods. This model only presents the general concept of tax competition. In practice, its mechanism is much more complex and ambiguous. Such a process of reducing tax rates resulting in an excessive reduction of budget revenues is often called race to the bottom.

Keywords: Tax Competition, Transfer Pricing, Shifting Benefits

Introduction

In recent years, due to the globalization of the world economy, progressive international economic integration, rapid technological progress and increasing competition, an increase in interest in the problems of taxation of income generated in national economies can be observed. The free movement of goods, services, people and - which is particularly important from the point of view of this article - capital is the basis for the functioning of the European Union. Entrepreneurs have the opportunity to choose the place of business, as well as the method of tax settlement that will be optimal for them - will cause the lowest tax burden. Tax competition is a phenomenon directly related to globalization processes. The liberalization of capital flows and a decrease in transaction costs have caused investors to look for attractive deposits not only in the country but also abroad. In order to increase investments in their countries, governments are trying to make them as attractive as possible from the perspective of entrepreneurs, which they can do, among others, by reducing taxes. Theoretically, a reduction in tax rates does not have to cause a decrease in budget revenues, as the tax base will increase as a result of the inflow of investors. However, if all countries decide to reduce taxes, the relative attractiveness of countries to investors will remain unchanged, while their budget revenues will decrease. The decrease in tax revenues caused by the lowering of rates with an unchanged base means that the state may spend less funds on the implementation of its tasks in the field of providing public goods. This model only presents the general concept of tax competition. In practice, its mechanism is much more complex and

ambiguous. Such a process of reducing tax rates resulting in an excessive reduction of budget revenues is often called race to the bottom.

In order to make any assessment of the phenomenon of tax competition, it should be explained first what tax competition is. This phenomenon, connected directly with globalization processes, in particular with the increase of international capital mobility, liberalization of its flow and decrease of transaction costs causes that investors (both companies and natural persons) look for attractive deposits not only in the country but also abroad . It is common nowadays to pay your tax liabilities where they are lowest. As a result, we are dealing with tax competition defined as inefficient setting of tax rates by independent governments. The choice of a given (tax) policy influences the allocation of the mobile base (especially capital) among the regions (Member Countries) represented by their governments. As a part of tax competition, it is easy to assess differences between countries in nominal tax rates. However, it is difficult to determine the strength of the impact of effective rates differences, which are the main sign of "tax competition" on the phenomena that are considered to be its effects. For example, it cannot be clearly determined what percentage of the total decline in revenues from Corporate Income Tax in a given country is caused by a change in the effective rate of this tax in another country. In addition, the strength of the effect of the phenomenon of tax competition on a given country depends on its specificity, for example the degree of economy opening, as well as on the characteristics of the "tax competitor". After all, even if taxes are radically reduced in a country, but the risk of doing business remains very high, the likelihood of attracting taxpayers from abroad is small.

The OECD is the most important forum for cooperation in tax matters between developed countries. The organization's report on tax competition published in 1998 indicates that harmful tax competition, which is one of the effects of globalization, can lead to trade and investment distortions. By accepting this report, OECD countries have committed themselves to act jointly and individually to eliminate harmful tax practices (applied by those countries).

The purpose of this article is to present an outline of the issues of tax competition of European Union Member States and to describe the mechanisms of shifting income as part of tax optimization used by multinational enterprises (MNEs).

Tax competition in EU Member States - analysis of CIT tax rates

The Corporate Income Tax rate is a very important determinant of economic growth and competitiveness of the economy. The table below presents information on applicable CIT tax rates in European Union countries.

Table 1: Corporate Income Tax rates in EU countries

Country	Last		Previous
Hungary	9,00%	Dec/19	9,00%
Bulgaria	10,00%	Dec/19	10,00%
Ireland	12,50%	Dec/19	12,50%
Cyprus	12,50%	Dec/18	12,50%
Lithuania	15,00%	Dec/18	15,00%
Romania	16,00%	Dec/19	16,00%
Croatia	18,00%	Dec/19	18,00%
United Kingdom	19,00%	Dec/19	19,00%

Slovenia	19,00%	Dec/19	19,00%
Poland	19,00%	Dec/19	19,00%
Czech Republic	19,00%	Dec/19	19,00%
Latvia	20,00%	Dec/18	15,00%
Finland	20,00%	Dec/18	20,00%
Estonia	20,00%	Dec/18	20,00%
Slovakia	21,00%	Dec/18	21,00%
Portugal	21,00%	Dec/19	21,00%
European Union	21,30%	Dec/18	21,90%
Sweden	21,40%	Dec/19	22,00%
Denmark	22,00%	Dec/19	22,00%
Euro area	23,30%	Dec/18	24,10%
Italy	24,00%	Dec/19	24,00%
Spain	25,00%	Dec/19	25,00%
Netherlands	25,00%	Dec/19	25,00%
Austria	25,00%	Dec/18	25,00%
Luxembourg	27,08%	Dec/18	27,08%
Greece	28,00%	Dec/19	29,00%
Belgium	29,00%	Dec/19	29,00%
Germany	30,00%	Dec/19	30,00%
France	31,00%	Dec/19	33,00%
Malta	35,00%	Dec/18	35,00%

The main conclusion from the presented information (Table 1) regarding international tax competition is the fact that differences in tax rates between countries mean that resources can move to areas with low (lower) tax burdens, thanks to which they attract human and physical capital, which is an additional development stimulus for these countries. Moreover, this attraction of capital seems extremely important for countries that do not have enough domestic capital, and therefore have to rely entirely on foreign capital. In such conditions, countries are forced to compete with each other for easily displaceable capital through artificially low tax rates. As a result, globalization has a visible impact on tax structure and government spending. With the increase of international integration, governments in individual countries are losing part of their monopolistic power in the field of fiscal policy. They are increasingly in a situation of being strategically linked to their foreign counterparts. The effect of rivalry between them becomes a game of competing for tax revenues. The consequence of such tax competition may be the difficulty for the state to achieve its goals, including the financing of public expenditures.

The significance and scale of the problem within the European Union is evidenced by the data from Table 2. The content of this table shows, that before the enlargement of the European Union by New Members (2004 and 2007), most of them were subject to tax reforms leading in particular to increasing

the attractiveness of these countries in terms of taxation of corporate income. For the new countries, changes were seen as an indispensable element in preventing capital outflows to more stable Western European economies. On the other hand, for the countries of the "old" Union it was perceived as ordinary tax dumping, which is a form of unfair competition.

Table 2: Summary of CIT rates in the years preceding EU membership until accession to the European Union and the total change in CIT rates in this period for New Members of the European Union

Country	Corporate tax rates (%)				Total CIT rate change (%)
	1995	2000	2004	2007	
Bulgaria	40	32,5	19,5	10	-30
Czech Republic	41	31	28		-13
Estonia	26	26	26		-
Cyprus	25	29	15		-10
Latvia	29	24	15		-14
Lithuania	29	24	15		-14
Hungary	18	18	16		-2
Malta	35	35	35		-
Poland	40	30	19		-21
Romania	38	25	25	16	-22
Slovenia	25	25	25		-
Slovakia	40	40	19		-21

The information presented in Table 2 indicates that almost all countries have reduced their CIT rates before accession to the European Union. The exceptions are Estonia, Malta and Slovenia, which did not change their rates before accession to the European Union. A desirable situation for both the old and new Member States is to develop the Union as a whole in a way that it becomes more financially attractive. It should be noted that the diverse fiscal policy of EU countries is also an element attracting capital from outside the European Union. Although various tax rates are perceived as a sign of harmful competition (among EU Members) but at the level of EU as one economy, it contributes to the prosperity of the entire Union. This variety of tax rates incentives investors (from inside and outside EU) to chose to pay their liabilities in one of the Member States – not outside EU. Therefore, imposing an increase in tax rates on newly admitted states could be detrimental to the entire group. Although it would calm non-competitive countries. In such a situation, the EU would have to do without capital paid in taxes by enterpreneurs, who decided to transfer their income somewhere else, and the development of the poorest regions of the Union, perhaps even more than currently, would have to be supported by the funds of the general budget of the Union. This lack of (potential) source of capitał would effect on higher transfer of Member States to EU budget. From the point of view of benefits for the European Union, in the context of attracting foreign investment it would be necessary to harmonize the tax system not by raising taxes for New Members, but rather by reducing them in some countries of EU. Despite the differentiation of CIT rates in the European Union Member States, the average rate of corporate taxation in the European Union is falling. Figures below show effects of tax competetiveness in European Union.

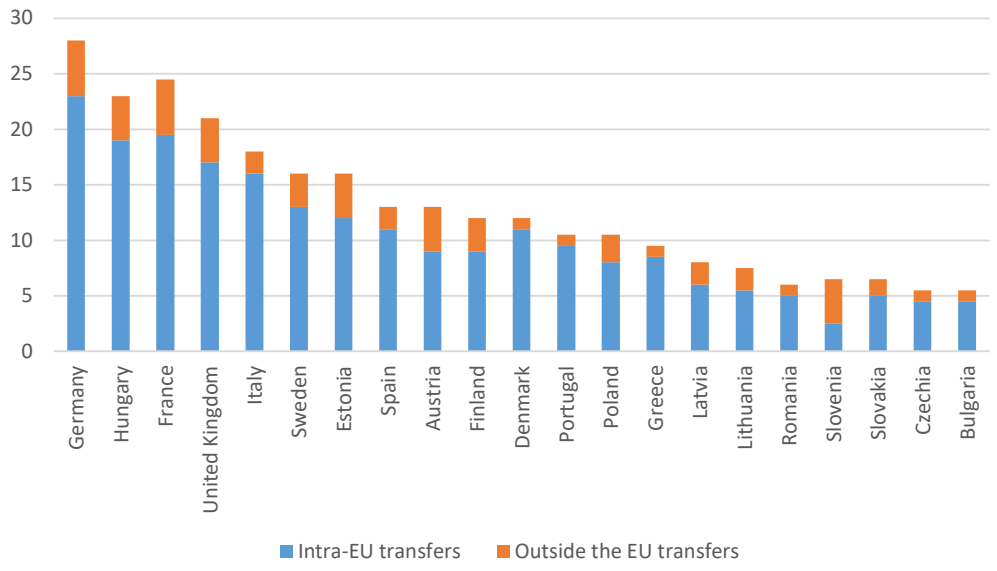

Fig. 1: Revenue loss due to profit shifting as % of CIT revenue (2016)

Data for 2016 (Fig 1) show that the countries most affected by losses resulting from the artificial transfer of profits by corporations are Germany (EUR 18 billion), Great Britain (EUR 14 billion) and France (EUR 11 billion). The result is a serious loss of public revenue, which must be complemented by other sources of funding.

Tax havens existing within the EU apply specific legal regulations encouraging international corporations to artificially transfer their profits to their jurisdictions. One of the most frequently used tools are special purpose vehicles, often founded in the Netherlands or Luxembourg, which are becoming a vehicle for transferring capital. In this way, small businesses employing several people become entities through which billions flow. Companies bend tax law so as to be able to explain themselves to the tax office in the country of operation, while artificially transferring profits.

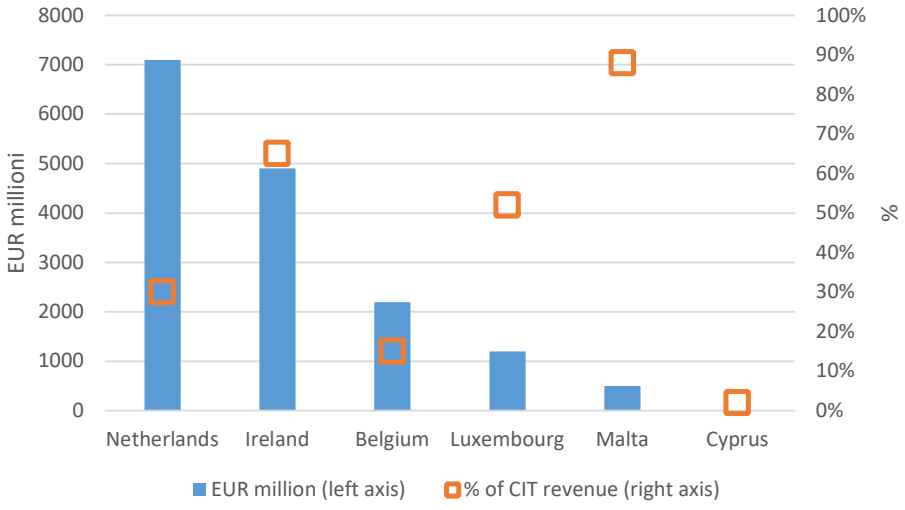

Fig. 2: CIT revenue collected due to artificially attracted profits (2016)

Some EU Member States benefit from artificial profit transfer. The tax gap resulting from the "CIT transfer" reaches EUR 60 billion a year in the EU. Less than EUR 12 billion of this amount is transferred to non-European countries. The lion's share - EUR 48.5 billion per year - is transferred to other Member States. The largest beneficiaries of tax optimization are: the Netherlands, Ireland, Belgium, Luxembourg, Malta and Cyprus (Fig 2).

Shifting Benefits in Economy – Transfer Pricing

Price of merchandise and service is regulated by free market and it is an result of friction between demand and supply. However, there are situations, where price is not determined by its natural factors. When independent enterprises make transaction, the terms of that transaction are determined by financial and trade strengths – especially sale prices are shaped by market. The situation is different when related enterprises make a deal. In this case one enterprise (e. g. seller) can influence on the other side (e. g. buyer). These relations may have an impact on terms of trade and for the price (and for the final amount of paid tax). Finally, transaction between related enterprises may cause aberrations in stating the revenue because one of the companies will not state revenue (cost) as high as it should if it would be an independent enterprise (transaction). In the end, it will induce lower tax paid for the government.

One of the instruments for lowering tax commitments is transfer pricing. Transfer pricing is perceived as a price set between two related companies. The main feature of transfer pricing is they are always established between related companies. Moreover the price is not affected by the market forces.

Organisation for Economic Co-operation and Development (OECD) defines transfer pricing as a price, adopted for book-keeping purposes, which is used to value transactions between affiliated enterprises integrated under the same management at artificially high or low levels in order to effect an unspecified income payment or capital transfer between those enterprises.

Eurostat defines transfer pricing as terms and conditions surrounding transactions within a multi-national company. It concerns the prices charged between associated enterprises established in different countries for their inter-company transactions, i.e. transfer of goods and services.

The definition of transfer pricing by International Monetary Fund says, that transfer pricing is a price used in a transaction between associated enterprises. When independent enterprises transact with another, market forces determine the pricing of those transactions. This may not always be the case in transactions between associated enterprises. Transfer pricing is a legitimate and necessary feature of the commercial activities of multinational enterprises. However, where the transfer prices between the associated enterprises do not accord with internationally applicable norms, they can distor the allocation of profit among the countries in which a multinational enterprise operates.

Another definition of transfer pricing comes from United Nations. Transfer pricing" is the general term for the pricing of cross-border, intra-firm transactions between related parties. Therefore, transfer pricing refers to the setting of prices for transactions between associated enterprises involving the transfer of property or services. These transactions are also referred to as "controlled" transactions, as distinct from "uncontrolled" transactions between companies that are not associated and can be assumed to operate independently ("on an arm's length basis") in setting terms for such transactions.

International enterprises with huge financial resources striving to maximize their profits use the transfer pricing instrument for tax optimization. They are carried out by large international companies but also by middle and small companies. Their aim is to transfer revenues between branches or companies forming part of a multinational enterprise in various countries, so that the largest part of them appears in countries (or areas, e. g. economic zones) in which there are lower taxes or with which a double taxation agreement has been concluded which provides for lower taxation. The figure below shows the mechanism of use of MNEs.

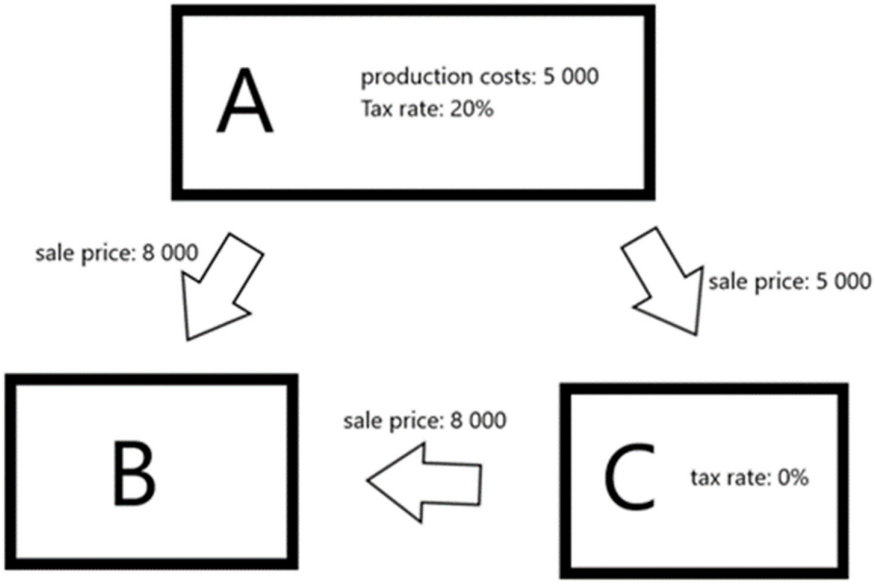

Fig. 3: Themechanism of use transfer pricing by multinational enterprises

For the purposes of this example, let us assume that companies A and B are companies operating in the same tax area (the income tax rate is the same - 20%). Company A is a typical post-production company, while company B deals in selling products to final product consumers. In the example, the production costs in company A are 5,000. If company A sell their products to company B directly - for 8,000, company A is required to pay income tax of 600 [(8,000-5,000) * 20%]. Let us now consider a transaction which, in effect, gives rise to the same result (Company B will buy the goods produced by company A for 8,000). Company A creates related enterprise C in country (or district, tax paradaise etc.) where tax liabilities are lower than in tax jurisdiction where A and B companies are located (in this example tax liabilities for company C is 0%). If company A first sells the goods at production costs to its subsidiary C, it will avoid taxation of income (production costs will be equal to sales revenue). Company C will sell the goods to company B with a 3,000 margin without paying any taxes. The price between related enterprises in multinational enterprise MNE is the transfer price. Thanks to transfer pricing and making a subsidiary C multinational enterprise (A and C) saved 600. The above example shows how MNEs can be used to avoid taxing their revenues. It should be noted that such transactions are one of many instruments that can be used in tax optimization. Table 3 presents other ways of shifting income.

Table 3 : Ways of shifting income from countries with higher taxes to more attractive countries in terms of income taxation

Action	Effect
Overproduction of the foreign company's production costs - a branch of a corporation	Reduction of taxation of income in the company making the purchase
Lowering the value of finished products transferred to the company - a branch of the corporation	Reduction of taxation of profits in a company producing goods
Increase in the value of intangible services that are difficult to be priced (eg know-how, licenses) purchased from foreign subsidiaries.	The value of intangible services is subjective, so the transfer of these services between branches of the same company can easily lead to the transfer of profits
Inflated interest rates and loan guarantees for payments on loans taken from foreign subsidiaries	Interest rates related to loan payments can be tax-deductible, so if they are calculated above the market interest rates, it allows the transfer of profits between different tax areas
Allocation of general business costs of the entire corporation incurred in the head office (such as: management costs, financial services, consultancy in the scope of production, marketing, distribution) and fees in foreign branches	The management of the corporation makes decisions on the distribution of central costs and the selection of profits to be charged to the costs of central services between the members of the corporation. As the cost allocation may be subjective, which in connection with the lack of cooperation between the tax services of different countries gives the possibility of making such an allocation to transfer profits to less taxed areas
Central financial management	As part of the central fund management activities, various branches of the corporation make cash transfers later shown as loans from which interest is not taxable, which gives the opportunity to transfer profits to less taxed areas

As we can see in the table above, generating additional income in an entity whose tax burden is lower leads to a reduction in the total tax burden borne by a group of related entities (MNEs). The institution of income shifting may refer to a situation when one entity belonging to multinational enterprise MNE uses in the country exemptions or tax allowances and this entity transfers profits of other entities in the form of understated prices of goods, products or services. Affiliated entities may obtain benefits also in the case when one unit belonged to MNE incurs high capital expenditures whose aim is to achieve economic benefits by the entire group and this unit is co-financed by other entities from the group by way of inflated prices for goods purchased from it. Another situation is when a subsidiary of strategic importance for the entire capital group incurs losses, the subsidiaries may sell goods for it below the cost of their acquisition or production. Thanks to such transfer pricing, such an entity may take advantage of an additional cash inflow resulting from a higher margin when selling these goods. Transfer pricing may be used by related entities as a fictitious level of costs incurred in the provision of financial, licensing and administrative services, as well as an instrument for distributing profits generated to special economic zones or tax havens.

Conclusion

Taxes are very important tool in competition between countries for foreign investors. Recent studies show that about 40 percent. profits of international corporations are passed through companies registered in tax havens, which allows them to pay very low taxes there. A comparison of corporate income tax rates in European Union countries has shown that the tax rate is undoubtedly an instrument of competition between Member States for investors. The possibility of allocating profit in the so-called tax havens is an example of using an aggressive corporate tax strategy. As a result of tax competition,

there are concerns about a "race to the bottom" with tax rates successively reduced to zero. Some scientists share the fear that low state revenues from taxes may not be sufficient to ensure financing at the appropriate level of public goods and services. However, this allegation cannot be confirmed by observation - an analysis of tax receipts in Europe does not show such trends .

In the opinion of the author of this article, the generally accepted assumption that countries with relatively low tax rates attract "unfairly" a high proportion of global capital, thereby depriving other countries (those in which the capital was generated) of the investments they need is too far-reaching. The author of the article shares the view that places (tax jurisdictions) with low taxation act as a means of relief, enabling capital to flow around the world to the most favorable investment prospects. Capital flows through them rather than remains there for purpose of financing physical capital investments. The realities of the world of business investments (for example, the need to equip with developed infrastructure or proximity to sales markets) mean that most of this investment capital will be directed back to developed countries. So it is not true that tax oases, which are an extreme case of tax competition, capture world capital - they only allow it to flow more efficiently.

However, the fact is, that money not paid in the form of tax is not public money and it is difficult to expect private investors to spend their money for social purposes.

The article outlines the issues of tax competition (at the field od Corporate Income Tax) against the background of European Union countries. The issue of tax optimization is an important area for any economy. From the point of view of an ordinary EU citizen, there is no escape from paying taxes. That is why people find it difficult to understand (and accept) how large corporations can avoid paying taxes without breaking the law. The author of the article hopes, that this paper (being one of many papers), dealing about tax competitiveness among European Union Member States will encourage other researchers to take into account this important problematic.

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The Problem of Financial Bubble Determination in The Market in The Context of Modern Monetary Policy

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Abstract

an early identification of financial bubble in the market is extremely crucial as it allows investors to reduce their potential losses and authorities to prepare for a possible recession in the economy. The last large bubble "burst" occurred in 2007 (the US mortgage crisis), but today the economic system is still not immune to such damage. Most central banks, primarily in the USA, Europe and Japan, execute an ultra-loose monetary policy and will support financial markets in case of collapse. In this regard, some traditional methods for determination of a price bubble does not work accurately, therefore there is a necessity to select the most representative ones and search for better indicators. This paper is presented a classification of various indicators of financial bubble determination with their advantages and disadvantages and the most representative indicators are selected.

Keywords: ultra-loose monetary policy, recession, financial market, financial "bubble"

JEL Classification: E32, E44, E52, G01, G1

Introduction

To begin with, it is necessary to determine what is mean by such a category as "financial bubble" in modern economic science. Despite the existence of various points of view in the scientific literature about what is considered a "financial bubble", the following definition most clearly and fully reflects its essential characteristics. A "financial bubble" is a rapid and steady increase of the asset price (more than 10%; it depends on the type of financial market) during a certain period of time, typically from 1 to 3 years, not associated with a similar growth of its fundamental value, and mostly caused by the irrationality of market participants and investors and (or) the features of the economic policy executed by government and the central bank (ultra-loose monetary policy, debt growth, etc.), after which undoubtedly an opposite movement is accrued - a significant and rapid asset price drop.

Literature Review

C. Kent and P. Lowe (1997) determine that when price bubbles "burst", primarily relate to assets that are used as a collateral for loans, the inflation will below the central bank's target and output will below potential that negatively affects the financial system stability. Therefore, in order to mitigate the consequences of bubble "burst", the central bank should use a more tightening monetary policy (an increase in interest rates), even if the inflation target may not be achieved. In addition, according to the authors, it is necessary to strengthen financial supervision and regulation. In his turn, J. Gali (2014) approves that monetary policy, including tightening one, cannot affect rational financial bubbles. Moreover, any growth in the real rate by the central bank will have a tendency to expand the bubble's size and lead to its large fluctuations.

Having analyzed the bubble on oil market in 2006-2008, D. Sornette, R. Woodard and W.X. Zhou (2009) conclude that geopolitical tensions increase the uncertainty factor, which is good base for speculations and bubble forming, the distinguishing feature of which is the divergence its market price from the fundamental and fair value. regulation and supervision.

We found a number of relevant works related to oil prices analysis: Mikhaylov A. (2018a), Mikhaylov A. (2018b). The predictive models based on the relations between oil futures prices and economic indicators are described and discussed in the following papers: Nyangarika A., Mikhaylov A. and Richter U., (2019a), Nyangarika A., Mikhaylov A. and Richter U., (2019b), Nyangarika A., Mikhaylov A. and Tang B-J, (2018). Further development of their analytical approach was done in [An J., Mikhaylov A. and Sokolinskaya N., (2019a); An J., Mikhaylov A. and Sokolinskaya N., (2019b); An J., Mikhaylov A. and Moiseev N., (2019); An J., Mikhaylov A. and Sokolinskaya N., (2019); Mikhaylov A, (2019); An J, Dorofeev M. and Zhu S., (2020); Mikhaylov A., Sokolinskaya N. and Lopatin E., (2019); Meynkhard A., (2019); Meynkhard A., (2020)]

Some interesting aspects of short-term forex market price forecasting for classical and crypto markets are analyzed in research studies of: Dorofeyev M., Kosov M., Ponkratov V., Masterov A., Karaev A. and Vasyunina M. (2018); An J., Dorofeev M., (2019); Denisova V., Mikhaylov A. and Lopatin E., (2019)

To identify financial bubbles and its time period in developed markets an econometric model can be used and the statement that current market price of asset represents discounted future dividends (B. Arshanapalli, W. Nelson and M. Pollak, 2019). If price bubble phenomena are observed immediately in some countries, then it will "burst" soon because of a lack of time for fundamental indicators to adjust to financial market indicators. S. Wang and L.Chen (2019) conclude that determining factors of financial bubble formation in the stock market are a large trading volume, high asset volatility, as well as increase in money supply and credit.

To sum up, there are different opinions about the correlation between monetary policy and financial bubble in the market in the scientific community, as well as various models have been developed for their identification.

Concept Headings

As a result of analysis of various sources by price bubble identification in the financial market, the author proposed the following classification of methodologies for its determining.

The first group is **macroeconomic indicators**, which includes:

a) *LEI- Leading Economic Index from Conference Board*. It represents the index of leading economic indicators, which is calculated based on ten indicators (average weekly initial claims for unemployment insurance, manufacturers' new orders, nondefense capital goods excluding aircraft orders and others)
b) *labor market indicators*, which are a set of macroeconomic indicators to evaluate the labor market condition. The most widespread are the unemployment rate, average weekly hours of production and nonsupervisory employees in the manufacturing sector and initial jobless claims.

The next group of indicators is called **"financial multiples"** and includes:

a) *R. Shiller 's P/E ratio* (CAPE) that is based on the traditional Price-to-Earnings multiple and calculated as the ratio of the company's market capitalization to the average real profit for 10 years
b) *Q-Tobin ratio* is an indicator according to which the total market capitalization of all companies in the financial market should be approximately equal to the cost of their replacement (book value);
c) *market capitalization to GDP ratio* (MCap/GDP) correlates the total market capitalization of all companies in the stock market with the country's GDP, so ratio compares how much the situation in the financial market relates to the real situation in the economy. It also known as the W. Buffett's ratio.
d) *the total debt to GDP ratio* (Debt/GDP) compares the country's total debt with its GDP and allows to determine the country's debt burden and find out whether economic growth is primarily caused by debt increase.

e) *gold to copper ratio* shows the price divergence between gold and copper and allows to assess the market participants feelings regarding the future prospects of the global economy as during the

recession the gold being a protective asset, its price rises, and the price of copper falls due to a reduction in industrial growth.

The third group is **indicators of interest rates and yield spreads,** including the following ones:

a) *sovereign bond yield curve inversion* which means a change in the slope of the curve, when in one of the sections it takes a horizontal or negative angle of inclination. In this case, market participants expect an early interest rate cutting

b) *the central bank key rate and the spread of stock market returns*. These indicators reflect the additional income for investor for taking on additional risks and consider the current conditions of monetary policy

The fourth group is **corporate indicators** which includes:

a) *dynamics of the number of delinquencies and defaults rate on all commercial bank loans.* The growth rate of the number of delinquencies and defaults on loans is a clear sign of excessive credit expansion and deterioration in the financial condition of borrowers

b) *buyback volume* (share repurchase by companies) allows researchers to take into account the amount of money used by companies that buy their own shares from the market, their growth rate, as well as the ratio between capital costs and dividend payments (Andreou, Cooper, Lopez, Louca, 2018). When the company does not find economically interesting and effective investment projects in the near future, capital investments are reduced, and more money goes to buyback. It pushes stock prices up and they move more away from their intrinsic fundamental value – the financial bubble forms

c) *dynamics of companies' after-tax profit.* In accordance with the fundamental analysis, with the growth of this indicator, the stock price of the company should also show similar dynamics. The divergence between the price indicator (the P/E numerator) and the after-tax profit (the P/E denominator) indicates overbought in the market and the occurrence of a bubble - in case of an outstripping price increase over profit, or about underestimation - when the price growth rate is lower than the after-tax profit growth rate.

The next group of indicators is **technical indicator,** which is represented by *VIX or volatility index (fear indicator).* It is based on the S&P 500 index and estimates expected volatility by aggregating weighted SPX put and call option prices over a wide range of strike prices.

The last, the sixth group is called **"other and exotic indicators"** and includes:

a) *the resignations of leading companies' top management* show on the one hand concern about the further development of economy and company, and on the other, getting a job advance or more favorable working conditions

b) *the dynamics of the number of pregnancies* characterizes the growth rate of the number of conceptions and indirectly shows the economic situation, since the couple will not have a baby if they are not sure that in the future they will be able to maintain him (her) and the family as a whole
However, not all these indicators are appropriate and relevant to apply today, in view of the following features of the economic policy of the leading world economies:

- ultra-loose monetary policy: ultra-low interest rates and the active use of quantitative easing, as a result, lead to an increase of the central bank's balance and money supply growth in economics and stock markets
- an increase in the debt burden both on the part of the government and the corporate sector. These measures are aimed at stimulating economic growth, business activity and achieving inflation targets (Europe and Japan).

Discussion

All of considered indicators evaluate the current situation and market data from different angles with their indisputable advantages, strong economic basis, explaining their wide distribution among financial market participants in making various investment decisions as well as with serious disadvantages that do not allow at any moment in time with 100% of likelihood to rely on the indicator's values. Main advantages and disadvantages of the groups of indicators for financial bubble determination in the market are as follows (see Table 1).

Table 1: advantages and disadvantages of the groups of indicators for financial bubble determination in the market

Group of methods	Characteristic
Macroeconomic indicators	Estimate the economic situation as a whole by analyzing the labor market and the level of debt. The inability to accurately characterize the market situation due to the lack of clear border, critical values
Financial multiples	Allow by calculating a relative indicator to compare two phenomena in the market or economy. The excess of the obtained value beyond the normative borders indicates the occurrence of an imbalance. In connection with the use of historical mean value as a reference for an indicator, the practical value of using indicators under changing conditions in the economy decreases
Indicators of interest rates and yield spreads	The most fully consider and reflect the emotions, feelings and expectations of market participants and investors, take into account the features of the current central bank monetary policy and a situation in the economy. It has positive experience in identifying past crises (inversion of the US government bond curve)
Corporate indicators	Compare the main business indicators with financial market data and take into consideration the financial condition of companies. However, there is an inappropriate comparison of indicators among themselves, which relate and reflect the result of different time periods (for example, P/E: profit is the result of the company's activities in the past, and its future assessment is included in the price), and there is also the possibility of the company intentionally distortions of the information presented in the reports.
Technical indicator	Interprets the expectations and emotions of most market participants regarding the future dynamics of financial markets and economic situation. There is not enough historical data to confirm or refute the findings.
Other and exotic indicators	They help to evaluate the current situation in the economy by analyzing indirect processes and factors. There is no solid economic basis that would explain the observed market phenomena from the standpoint of economic theory. There is a difficulty in collecting primary data and the inability to generally use the results obtained due to the peculiarities of the socio-economic development of other countries

Results

To summarize, the analysis of existing financial bubble identification methods in the context of modern monetary policy has allowed to formulate the following conclusions and recommendations:

1. The most practical and relevant methods for identifying financial bubbles in the markets are indicators of interest rates and yield spreads (a trend to hike/ cut the central bank's interest rate, the inversion of the government bonds yield curve and spreads of stock market returns), the dynamics of the number of defaults and delinquencies in loans, as well as the volume of buybacks of stock repurchases by companies, allowing to estimate the expectations of the company for the future development of the economy and the presence of attractive investments projects in the industry.

2. The least practical are VIX indicator, the dynamics of top management resignations (include in a group of other, exotic indicators) and a number of financial multiples (Q-Tobin ratio, R. Shiller's P/E, MCap/GDP) and representative of the group of corporate indicators - an indicator of the dynamics of companies after-tax profit

3. Now there is no integral indicator in the public domain that could very likely identify the financial bubble in the market in the current economic and political conditions.

Conclusion

To sum up, the identification of financial bubble in the market, which is a complex economic phenomenon and defines as a sharp and unjustified increase in asset price of terms of its fundamental value, is complicated and ambiguous process. There are many different indicators and methods that allow to identify a financial bubble before it "bursts", but it is necessary to take into account the current monetary policy, the level of rates, which significantly affect the behavior of investors and the dynamics of indices.

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Peculiarity of Building Foreign-Language Professional Communicative Competence of Future Non-Language Specialists

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Abstract

Professional communication is a complex, multifaceted process, caused by many factors and its structure is complex. This fact confirms the impossibility of complete and accurate reproduction of the selected type of communication in the classroom. The study attempted to maximize the use of basic components of foreign-language professional communication. Our aim was not to imitate real-life processes, but to approximate learning situations to the natural conditions of communication. The basis for the formation of foreign language professional communicative competence of future non-language specialists is based on the types of work, the form of organization of which implies a reflexive attitude to one's own activities, which focuses not on the form of statements, but on its pragmatic focus. Such competence is both a tool and the essence of the activity. In this study, the concept of "learning to communicate" is filled with its own content, since it is about the formation of foreign-language professional communicative competence of future non-language professionals. Speaking about the requirements for the preparation of a modern specialist, it should be noted that modern programs are increasingly focused on practical training, while the emphasis is shifted from the purpose of teaching to the purpose of learning. Using a problem-based approach to teaching a foreign language for specific purposes not only makes the learning process more effective, it also structures teaching methods in accordance with modern requirements for the specialist training process and contributes to enhancing students' intellectual, verbal, intellectual and creative independence.

Keywords: Interaction, Communication, Professional Communication, Communicative Competence, Non-Language Expert, Problem Approach, Psycholinguistic Analysis.

Introduction

The concept of communication in the contemporary science is considered with close reference to the concept of activity, and such phenomenon as communication was the focus of numerous studies (Vigotskiy, 1982; Zemskaya,2006; Zimnyaya, 1991; Leontyev, 2001 et al.), development of the linguistic activity, studies on functional linguistics (Vinogradov, 1981; Kosenko, 2011; Shcherba, 1974 et al. and culture of speech (Vinokur, 1984; Golovin, 1988; Ozhegov, 1974 et al.). Research into the peculiarities of professional and pedagogical communication (Gumenyuk, 2005), analysis of different aspects of text study (Galperin, 2007; Yeshchenko, 2009; Kochan, 2008 et al.), attention to the issues of speech tiquette (Stakhiv, 2008) provided the possibility to improve teaching methods, allowed to create methodical systems that are able to solve the tasks of building communicative competence.

The terms “interaction” and “communication” being sometimes used as synonymic are interpreted in different ways by various researches.

Thus, the study “Fundamentals of communication theory” (Vasilik, 2006) deals with three approaches to the above-mentioned concepts.

The first approach lies in the identification of these terms (Vygotskiy,1982; Leontyev, 1969)

Supporters of the second approach separate these concepts (Kagan, 1988; Sokolov, 2002).

The third approach is based on the conception of information exchange and its supporters (Lisina, 1997) think that communication doesn’t cover all informational processes in society.

Language communication was singled out as an independent object of the research in the 60-70s of the XX century when structuralism as a dominant approach in language study and teaching methods exhausted its possibilities.

The works of J. Searle and J. Austin and the creation of the speech acts theory allowed to change drastically the way the utterance was considered. Traditionally it was interpreted from the point of the relation of content and expression and became to be regarded from the point of extra-linguistic activity.

In other words, the main issue in studying the act of communication were the questions: “What is one person doing when another one is speaking? What language means does a person try to use in order to achieve pragmatic goals?”

Philosophical encyclopedia gives the definition of interaction as “a process of coordination and interrelation of general subjects, in which the exchange of activity, information, and experience, skills and abilities as well as the results of activity take place; one of the necessary and general conditions of formation and development of society and personality” (…).

Famous psycholinguist A. Leontyev defines interaction as the process of establishing and maintaining purposeful, direct or indirect contact among people related psychologically.

Performing this contact allows either to change collective activity due to the coordination or incoordination of individual activities by certain parameters or perform purposeful influence on the formation and transformation of an individual in the process of collective or individual, but socially mediated activity.

Interaction can have a personal motive, can be directed by a specific communicative need, and in this case interaction serves as an independent activity and represents “the same kind of activity as productive and cognitive and in psychological respect, it has the same principal organization, i.e. it is motivated and has a specific goal” (Leontyev, 1974: 33–47).

Suggested by A. Leontiev the model of speech production includes the following stages: motivation, intention, implementation; comparison of implementation with the intention (Leontyev, 1969: 19–22.).

Correspondingly, the main characteristics of interaction as a type of speech activity are motive, goal, structure, means, subject, product and result.

Motivation forming the basis of language activity is closely related to needs.

From the point of language activity, the needs can be classified in the following way: needs aimed at the object and the goal of interaction; needs aimed at the interests of another person or society as a whole; needs aimed at the interests of the communicator himself (Leontyev, 1974: 111).

Need is objectified in a motive. Motives of interaction can also be divided into three groups.

The first group includes the motives of interaction, whose aim is to establish business relations among people to perform a necessary mutual activity.

These are the motives of business communication.

The motives of the second group imply interaction with another person or a group of people to influence an individual and a group of people.

The motive of the third group is a person's need in interaction, which is manifested in the desire to be understood.

It is the form of interaction that aimed at making closer another person to oneself in the same way as at making oneself closer to others (Graboy, 2002: 65–84).

It was the most important for this research to highlight the goals of interaction, as the curriculum of a foreign language for specific purposes was developed in the way so that students participate in communication with clearly defined goals.

Research Methods

Methodological background of the research consists of the most significant principles about social essence of a person, his or her active nature; unity of theory and practice; unity of empirical and theoretical in scientific research.

Systemic, person-centered, communicative-activity, competency-based, problem-based approaches make up methodological guidelines of the research.

To perform the research a set of theoretical and empirical methods were applied.

In our study the following theoretical methods were applied, such as analysis and synthesis; generalization and interpretation of the literature in psycholinguistics, pedagogy and teaching methods; modeling of the educational process in training foreign language for specific purposes.

To empirical methods used in our research belong social and pedagogical analysis of programs, textbooks, study guides, means and forms of education.

Main Body

Communication can be implemented with the help of different means of expression that allows to divide it into language communication, body language, communication with the help of actions, codes, and symbols.

This study is focused on the types and possibilities of language (speech) communication. In our opinion, to the most adequate types of communication that correspond with the programs in foreign language for specific purposes belong the following: business, emotional, individual and group business communication in the form of the dialogue, argumentative, socially-oriented, group subject-centered and person-centered, pedagogical communication, informative and professional communication (Leontyev, 1996; Skalkin, 1973; Yakobson, 1969).

Traditionally, in methodical literature scientists distinguish three levels in the training foreign language communication: learning a language as a language system; language learning, communication learning (Shcherba, 1974: 219).

In contemporary methodical literature published over recent years it has been stressed that it is necessary to approach communication learning from the point of pragmatics, and the goal "to teach interaction" has become generally recognized (Kuzmenkov, 2013: 169).

"Interaction" as one of the basic concepts of the methods of teaching a foreign language is recognized as a necessary prerequisite of mastering language as means of communication (Shchukin, 1984).

Moreover, interaction in the theory and practice of teaching foreign language is considered as both the aim and means of the educational process.

In our research we draw attention to another aspect, to the interaction as the means for the formation of foreign language professional communicative competence of future non-language specialists.

Specific set of the criteria and requirements to the level of foreign language professional communicative competence, outlined within inter-disciplinary approach, determined the tasks to solve in the organization of classroom studies.

In teaching foreign language communication there are objective limits to the scope of methodical goals and ambitions.

Insufficient language proficiency of students, determined and limited character of the plane of content and the plane of expression, the role of a teacher as a manager, that has to intervene with the process of communication, which can reduce the process of communication to the basic and primitive dialogic communication with the control of lexical and grammar correctness.

Efficiency of communication in the process of teaching foreign language for specific purposes is aimed at the formation of foreign language professional communicative competence, at revealing intellectual and creative qualities and potential of future specialists while discussing professionally relevant information from the point of their future job, using important forms of work organization.

Future specialists should realize the importance and necessity to acquire such forms for their further professional activity.

While selecting dominant types of communication, used at classroom studies, the main criterion is their orientation on the area of activity, thus the preference is given to business and professional communication, teamwork.

In the first place, it implies the selection of relevant areas of communication important for certain conditions of teaching spheres of communication, a number of similar communicative situations, that are characterized by uniform language stimul us of an individual, by relations among communicators and uniform communicative environment; spheres in which the processes of language communication take place in the context of skills and abilities of a certain activity, and its implementation (suggestibility and convictions), in motives and needs, affirmations, values, beliefs (Leontyev, 1974: 35–40).

Spheres of business and professional communication, in which the process of teaching communication is organized, were determined by the course program in a foreign language for specific purposes.

Professional oral communication has its own specific features, it is more strictly regulated, canonized, and what is more important, communicators in their interaction are not free to choose the means: standpoints, that are taken by the participants of spoken interaction, defined by a fixed procedure and clearly defined action framework and modes of expression.

It is important to note that professional communication means to follow strictly defined roles, that imply different communicative intentions of participants.

It is necessary to add, that at the current stage, "competitiveness" is excluded in professional language, which increases the importance of intellectual work at the text.

The speech of an expert in the process of training professional communication, though being beforehand well-thought, is not previously written. Oral speech, unlike written speech, is characterized by a particular addressee, and possibility to influence through the feedback channels; expressiveness and emotional intensity of a message, irreversibility of the message in time; possibility of complex use of different sign systems: linguistic, paralinguistic, psycholinguistic, kinetic" (Komarkov, 1975:19–23).

Professional communication has one more feature, which is polylogue by content and monologue by form. O. Berkalova notes, that "concept of audience can be divided into several types of "interlocutors".

The statement of each participant implies an answer or a question of the other participants of the process.

In contemporary professional communication, we face the dialogue in its broad sense, understanding everything spoken, as well as the dialogue in a narrow sense (Berkalova, 1989: 6).

In our research, we regard the dialogue as a polylogue in a broad sense.

As researchers note, polylogue has its own peculiarities.

Thus, for non-professional communication is inherent the fact that in the process of language communication there is the exchange of information, thoughts, statements, questions, and answers.

In this case, all participants are in an equal situation.

Statements can be exposed to analysis and criticism from another part.

The most illustrative example of such dialogue can be scientific dispute, practical seminar, roundtable discussions, etc.

Any subtype of professional communication is characterized by the fact that addressee of the information, the person for the sake of whom the communication is performed, do not become its participants, but the third interested person.

Thus, the areas of professional communication is regulated by verbal and non-verbal behavior of communicators in the process of communication.

Formation of professional communication implies singling out the training of teaching oral speech according to a strictly defined structure as a separate task.

This circumstance determined the choice of activities dominating at classroom studies in foreign language for specific purposes. The activity that develops and improves the following skills and abilities, such as to analyze, to compare, contrast, prove one's point, confute an argument, work in a team, keep to one's standpoint, becomes dominant.

The types of work that suggest reflexive attitude to own activity, that put emphasis not on the form of speech, but its pragmatic focus (What am I doing while someone is talking?) make up the basis for the formation of foreign language professional communicative competence of future non-language specialists.

This allows to shift professional communication skills and abilities into other areas of activity of future specialists.

Besides, classroom studies, aimed at formation of foreign language professional communicative competence, also leads to the formation of psychological qualities of a personality, his or her awareness and self-awareness (Lomov, 1981).

Formation of foreign language professional communicative competence of non-language future specialists is exercised according to its own rules.

It differs from specific features of natural communication that "develops as a succession of cycles with each cycle being a connected act of communication participants.

In the natural communication, the succession of cycles isn't defined by any previously formed program or determined plan.

It is quite flexible and is directed by the course of mutual activity. The important part of professional communication is the coordination of actions, performed by the participants of the communication in time (Lomov, 1979: 43).

It is also necessary to take into account that there is a great difference between the processes of mastering native and foreign languages, which is noted by many researchers.

For example, "they are separated by the element of awareness and deliberateness inherent to the training of a foreign language and on the contrary, total absence of such elements while acquiring a native language.

"In the process of acquiring a foreign language, more complicated properties of language develop earlier, related to awareness and intentions and only at the later stage more elementary properties develop, that are related to spontaneous, fluent use of speech" (Vygotskiy, 1956: 119).

"A new intellectual base doesn't develop in the consciousness of an individual, that learns a foreign language in the process of speech-mental action, a similar mental content is formed with the means of another language system" (Ignatova, 1997: 13).

Classroom studies aimed at the formation of a foreign professional communicative competence of future non-language specialists should be constructed according to the level of intensification of difficulty.
At the first stage problem-solving tasks should be chosen as the main type of activity, at the second stage – case study, that implies improvement of the following technique as analysis, comparison, argumentation, etc.; at the third stage it is worth using business role-playing game "Professional debates".

We think that the choice of the mentioned activities is adequate to the goals and tasks for formation of foreign language professional communicative competence of future non-language specialists.

Professional business segment of communication, that was singled out as a basic educational unit, defines the choice of certain language and communicative means.

Traditionally, language means include a set of lexical and grammatical units that reflect a certain functional style, language etiquette unites; to communication means belong a number of language actions, communicative tasks and situations, that are implemented within professional area of communication.

The choice of language means can turn out to be quite difficult for the course of foreign language for specific purposes.

Specific character of communication topics for discussion lies in the fact that situations are taken from a real-life and their description cannot be reduced to a closed list of lexical minimum.

In other words, standard language is distinguished by universality in the functional sphere; "scientific papers, publicists papers, scientific and technical tractates are created on the basis of this language, it is the basis of fiction literature, business letter writing" (Kozhin, Krylova and Odintsov, 1982: 23).

It is impossible to ignore the fact that general literary language isn't attached to any professional aspect of the activity of a future specialist.

The most frequent lexicon in a conversational language is a general literary lexicon. The same refers to the non-terminological scientific lexicon and other language means.

Besides, a peculiarity of the language in a professional sphere lies in the fact that it combines prepared and spontaneous forms, clichés that have to be practiced at the lesson.

Oral foreign language professional communication is characterized by a literary nature, caused by its preparedness.

This factor limits the number of functional styles, syntax and grammar structures to be practiced and included in the program.

Violation of the functional style and use of collocations shouldn't be encouraged, but in the case when the general background is followed in the necessary functional style, it is not necessary to lower the mark for the language competence.

During the organization of classroom studies, aimed at the formation of foreign language professional communicative competence of non-language specialists the control of language, communicative and professional competences was conducted separately.

It allows to make the work at every single topic more sensible for a future specialist and allows to implement principles of differentiation and individualization of education and control in practice.

Thus, it is worth evaluating students with different initial language proficiency according to different requirements: "prepared", "average" and "non-prepared".

That is, a student with lower language proficiency can get an excellent mark in case this will show that he made some progress compared to his own initial level of knowledge.

It is often mentioned in methodical and psychological literature that there should be a factor of trust in the organization of classes in language interaction.

Trustful interaction is characterized, on the one hand, by the novelty, importance and informative value of foreign language material, on the other hand, by the trust to a partner or a teacher.

We should not forget about this general methodological principle, which is conformed during classroom studies when the behavior and active participation of a future specialist can directly depend on the choice of a partner in language communication.

Specific character of professional communication of a specialist isn't consistent with the principle "suits – doesn't suit".

Therefore, during the training it is advisable to avoid allowing students to choose the partners according to the interests.

As a rule, a teacher should define the structure of the groups and roles that the participants should follow throughout an organized communication at the lessons.

Methodologists note that to achieve the results in learning, it is important to take into account not only abilities of students, their general knowledge, level of training, but, first of all, to know personal qualities of a future specialist as a personality, to know "the status of his or her personality in a team" (Baranov, Ladyzhenskaya and Lvov, 1990).

In our research, we take into account such methodological principals, but we strive to improve the ability of students to establish new communication relations, teach them to find the contact and to organize the work in a new environment, which is achieved due to a constant change of a group structure, and restriction of position choice.

Such quite strict behavior of a teacher shouldn't exclude respectful and trustful attitude to students, desire to create a favorable climate during the lessons, to provide the cooperation of the partners, on whom the result of training communication depends.

Defining the goals of the classroom and out-of-class studies as well as the choice of communicative tasks is determined depending by the working stage at a certain topic in such a way so that to provide logically justifiable organization of training of foreign language professional communicative competence of future non-language specialists.

In such a way, organization of substantive and language actions at classroom studies becomes the basis for training management of mental activity of a future specialist, as "substantive and language actions that generate thinking and direct it are subjected to management" (Itelson, 1970: 56).

It is possible to achieve this goal by means of correct task setting adequate to the forms of control as well as including analytical and synthetic part in the external plan.

Specific character of a foreign language communicative competence of future non-language specialists can be reflected in the curriculum when problem-solving and competence approaches to the course of foreign language for professional purposes are used.

Conclusions

Modern requirements for education and the qualities of a contemporary specialist imply the change of teaching methods at higher educational establishments.
The issue of methods is especially relevant in training future specialists when the focus is shifted from the traditional methodical question "how to teach" to the question "what to teach" a future expert.

Thus, speaking about language training within a cross-disciplinary approach, the attention should be focused on the fact that the acquisition of professional communication skills becomes the goal of teaching, that is mastering the ability to purposefully carry out communication, following clear formalized (canonized) rules that provide achievement of goals.

As it was stressed many times in our research, foreign language professional communicative competence of future non-language specialists is a tool and simultaneously the essence of activity as the ways of executing communicative intentions in professional communication are limited.

It is important to mention that while developing the curricula on foreign languages for professional purposes it is worth focusing attention on two basic foreign language communicative competences: reading and speaking.

An insufficient amount of academic hours for training a foreign language makes a teaching methodology expert follow the principle of "urgency and sufficiency".

It is necessary to highlight the following criteria as the content of singled out competences: definition of reading goals, choice of search orientation, determination of conceptual information blocks; revealing the sources of available information according to its origin, importance and content, etc.; fixation of retrieved information.

Communicative competence "speaking" correlates with techniques that are used in interpersonal communication and includes: establishing the contact on the basis of the evaluation of the own position, position of a conversation partner and meaning of the conversation; fixation of the position of the conversation addressee, encouragement to information transfer, its distribution, establishing the relation between the subject and the goals of a conversation, its adequacy and truthfulness; formulation and substantiation of the own position; questions, additions, elements of discussion, influence on the argumentation of the addressee, making additions or objections; making general conclusion.

Depending on the goals of a certain curriculum on the training foreign language for professional purposes the content of the levels can be diverse.

In this study, the concept of "teaching communication" is filled with its own content, since this is about the formation of foreign-language professional communicative competence of future non-language professionals.

According to the applied methods and technique, the process of formation of a foreign-language professional communicative competence of future non-language professionals is based on language competence that determines the choice of lexical and grammar material within a certain topic; taking into account psycholinguistic peculiarities of acquiring a foreign language, stage-by-stage formation of language and communication skills, and the choice of adequate means for managing this process.

Speaking about the requirements for the training of a contemporary professional it shouldn't be left without attention that the current curricula aimed at practical training. In this case, the focus is shifted from the goal of teaching to the goal of learning.

The differences in training and learning lie in the fact that the training is aimed at the transmission of knowledge on how to solve a problem, while learning has the goal to develop the skills and desire to solve a problem.

Specific character of the course in a foreign language for professional purposes requires the combination of the elements of training as well as learning.

Transfer of knowledge and skills underpinning a foreign-language professional communicative competence of future non-language professionals implies, in the first place, the application of up-to-date methods of teaching languages.

Such general methodological principle allows to use the working experience of future professionals on the material of a native language, rely on those professional communicative skills that can be

developed and improved by organizing special courses within cross-disciplinary approach, for example, “Business logic and rhetoric”, “Professional debates”, “Business role-playing games” etc., based on the problem-solving approach to the training of future non-language professionals.

Professional communication is a complex, multifaceted process with a complex structure caused by many factors.

This fact makes us admit the impossibility of a complete and precise reproduction of an outlined type of communication at classroom studies in a target language.

Taking into account the fact that training foreign language for professional purposes is aimed at the formation of a foreign-language professional communicative competence of future non-language professionals, which implies the development of communicative skills specific for particular specialities, it is reasonable to pay more attention to a specially organized polylogue communication at classroom studies.

The main criterion in choosing dominant types of communication for classroom studies should be their relevance to the area of activity, that is preference is given to business and professional communication. In our study, the peculiarity of this type of communication lies in the fact that the influence on a conversation partner is achieved due to a special organization of a text, and the behavior of communicators is strictly regulated by their positions.

The most effective types of work in the formation of a foreign-language professional communicative competence of future non-language specialists are those that allow to develop and improve the skills and abilities to analyze, compare, substantiate one’s point of view, to confute an argument, to work in a team, to stick to the position.

Using a problem-based approach to teaching a foreign language for specific purposes not only makes the learning process more effective, but it also structures teaching methods in accordance with modern requirements for the specialist training process and contributes to enhancing students’ intellectual, verbal, intellectual and creative independence.

Specific nature of language as an academic subject requires a corresponding adaptation of general-didactic method, limits it usage and reduces its forms.

The necessity to combine both methodic tasks: improvement of language competence, formation and improvement of a foreign-language communicative competence of future non-language professionals determines the algorithm of working at a topic session that implies gradual increase of difficulty of problem-solving tasks and complication of communicative tasks of professional orientation.

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The 5S Practice as A Condition for Employees' Creativity

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Abstract

The fourth industrial revolution leads to radical changes in production systems. Enterprises are looking for innovation to survive and effectively competition. The number of employees in the service-providing sector and creative industries will be increasing. In this way, creating new research space, especially in the area of the effect of working conditions on workers' psychical health and their creativity. We are already observing more and more research devoted to the individual-level psychological processes implicated in creativity highlights organizational work environment influences on those processes. The aim of this study is to identify the nature of the relationship between working conditions and the way and scope of implementation of 5S practices. This leads to identification of the objectives set for the implementation of 5S in the perspective of working conditions and an analysis of their potential and actual impact on the creativity of employees. The authors conducted bibliographic search, in-depth interviews with company managers and employees, analyzed the implementation of the 5S. Consequently, the practices used in manufacturing companies during implementation of 5S principles were identified. In the analyzed implementations the context of working conditions were not taken into account. The potential effects of the implementations on mental comfort and the creativity of employees also not included. The survey was conducted in several companies from the Lower Silesia region of Poland. In the cognitive layer the research allows for a better understanding of the phenomena accompanying the implementation of 5S practices and their effect on working conditions.

Keywords: creativity, lean management, 5S, working conditions.

Introduction

The research results presented in the article are part of a wider project on the impact of implementing the 5S practice on working conditions, employee health and their creativity. The results of the research in the part concerning the identification of goals set for the implementation of 5S in the perspective of working conditions and the analysis of their potential and actual impact on the health of employees were described in detail in the article by Cierniak-Emerych&Golej (2019). This article presents the rest of the research. This section focuses on answering the potential and actual impact of working conditions on the creativity of employees shaped during the implementation of 5S practices. The aim of this study is to identify the nature of the relationship between creativity and the way and scope of implementation of 5S practices. The analysis the problems arising at the interface between lean manufacturing and working conditions shaping creativity is the main subject of the researches. It can be said that the authors examine the sequence, implementation 5S-working conditions-creativity. Frequent practice is the transfer of LM principles and the adaptation of LM tools such as 5S to non-production areas Becker

(2001) Gapp,Fisher&Kobayashi (2008). There is even a new concept of LEAN OFFICE and a lot of literature promoting this approach, e.g. Schipper (2019).

A question can be asked if such an approach is justified in the case of: creative industries, R & D departments and other organizational units whose aim is to create innovative solutions such as: algorithms, business models, products, sales models and others. Proponents of "ordering everything" states that orderly reality organizes thinking, but the issue related to activate the mind to look for new, unconventional solutions is used in practice in a very small degree. Rather, the organization do orientate towards increasing productivity and improving "what is" Zimon (2012). This concept can be a hidden internal blockade of novelty. Another problem is if the organization wants to be creative, is it going to be a “mess” and what is the acceptable level of clutter and at what positions?

It is also necessary to ask the question: whether excessive organization of the work environment, especially in departments related to creative activity (using creative potential) is not the greatest waste. This waste is not noticeable because it is potential, blurred, and deferred benefits, therefore it is in the nature of lost benefits. The waste LM focuses on is concrete, visible and immediate. It can be said that LM consumes reserves of simple efficiency, long-term effectiveness seems to be the result of creative solutions coming from outside or inside the company. What better stimulates order or mess to create new creative solutions. This question is particularly important at the time of the triumphal march of LM philosophy and its tools by industrial organizations.

Theoretical background

5S practice as a tool for the LM concept

Acting according to the ‘lean’ concept means the most efficient use of available materials and company resources to achieve the best possible results. This mainly means a series of activities aimed at eliminating waste in the broad sense of the term, not only that occurring during the manufacturing process, but also from the entire area around it, including the network of logistic connections.

In the book by Kornicki and Kubik (2008) we read that, in Japan, three types of waste have been enumerated:

-muda (futility) - when production exceeds demand,
-mura (unevenness) - sometimes production exceeds demand, sometimes it does not,
-muri (unreasonableness) - when demand exceeds production.
This method identifies seven basic types of waste: overproduction, excess inventory, improper transport, defects, unnecessary processing, unnecessary downtime, excessive traffic. The literature indicates the entire range of LM tools from basic KANBAN, KAIZEN, TPM, through SMED, JiT, 5S. It is worth mentioning the 5S system is considered to be particularly related with shaping and even improving working conditions. Gapp et al. (2008) proves the 5S system (practice) is considered to be a tool used to support solving problems related to work organization. In the book by Karaszewski (2009) we read he reference to 5S requires consideration of:

- seiri, as sorting and elimination of what's unnecessary,
- seiton, as an expression of systematization, setting in order and segregation,
- seiso, as sweeping and cleaning category,
- seiketsu, which favours standardization and thus order,
- shitsuke, relating to self-discipline.

As a consequence of using 5S practices, safe working conditions result directly from the essence of the discussed system. This system somehow enforces the respect of legal regulations in the field of occupational safety and health, but also determines internal guidelines concerning desirable behaviours and activities at workstations, important from the point of view of providing employees with safe and healthy working conditions. Szatkowski (2014) states, that ‘*Good organization in and around your own workplace*’ is the term used to define the 5S system. To sum up, the 5S concept focuses on

instilling in employees' behaviors aimed at introducing, maintaining and perfecting order. The key concept in this method is ORDER. However, if one looks critically at the objectives and tasks of LM which are commonly discussed in literature, it can be observed without much insight that the dominant objective of LM is to improve only the efficiency of production, and ultimately its effectiveness. Timing and layouts are often defined in the light of performance radicalization, forcing an increase in work intensity and inappropriate, painful and tedious postures or increasing the risk of injuries and accidents caused by physical fatigue or fatigue related to the lack of concentration caused by mental fatigue.

Working Conditions

The analysis of the literature on the subject leads to the conclusion that in practice we are dealing with a very enigmatic approach to the definition of working conditions, which probably inspires some authors to consider the conditions we are interested in mainly or exclusively in terms of their components. Consequently, the conditions discussed are most often considered to be divided into two main groups, i.e. physical and non-physical components, within which individual items are additionally distinguished. The physical components include physical, material, chemical and biological elements such as e.g. workstation and room equipment, lighting, microclimate, noise, etc. The non-physical components mean e.g. working time, interpersonal relations, and social and living activities Cierniak-Emerych (2005).

According to many authors e.g. Krot&Lewicka (2015), the quality of the working environment consists of many elements, including: the level of trust in the organization, fairness in the organization, feeling of support from the organization and support from superiors. However, as usually, the reality is much more complex as it turns out that research demonstrated the psychosomatic character of human health.

The broadly understood work environment that maintains employees in a good psycho-physical condition also means the possibility of realizing their talents and abilities (including those resulting from temperament Strelau (1998). and level of activation). In the perspective of employees 'creativity, we are looking for such elements of working conditions that can facilitate the release of employees' creative potential. The work environment of the creative activity can differ significantly from the working conditions on the production line. In the perspective of employees' temperament, an environment that stimulates innovation can have different characteristics for different people. Searching for a uniform standard seems erroneous and paradoxical and unexpected solutions are possible. This sphere requires further and complex research.

The other side of the coin– Creativity

It is widely recognized that enterprise innovation, which should be defined as the ability to implement new solutions into the organization, is the strategic competence of a modern enterprise. Modern concepts of creativity define it as the ability to create or discover new ideas, solutions and possibilities. Amabile said (1996) *All innovation begins with creative ideas. We define innovation as the successful implementation of creative ideas within an organization. In this view, creativity by individuals and teams is a starting point for innovation; the first is a necessary but not sufficient condition for the second.* Innovation involve the generation of novel ideas. According Amabile (1988), Van de Ven (1986), Kanter (1983) Drazin, Glynn, & Kazajian, (1999) and meny another authors, creativity is usually associated with the generation of new ideas as an end to itself, innovation emphasizes the applicability of new ideas to address particular problems. The creativity of individuals and teams drives organic innovation in organizations. There is nothing to implement without creative ideas. Studies by Gonga, Huang & Farth (2009) show that employee creativity relates to overall work efficiency. This has special and obvious implications for the innovative performance of the organization. The ability to encourage employees to innovate, having the right mechanisms for managing innovation and the resources necessary to develop innovation builds a broadly understood work environment affecting individual and group creativity. At the same time determines the company's ability to use individual creativity. Supplying to the innovation development process with new ideas requires: influencing employee creativity, identifying and using social, psychological, process and other mechanisms to

identify and develop new ideas; using methods of motivation and choosing people whose competences, knowledge and skills are related to the tasks performed. 5S practices directly affect working conditions. The question that can be asked in the light of creativity is whether 5S stimulates or not creativity.

Holistic and cross-sectional studies, proposals for innovation management models, the relationship between individual creativity and innovation of the organization, conducted by Amabile (1988), Amabile & Pratt (2016), Woodman (1993), Geynor (2002), Cooper (2017), Golej (2013).

Winner of The Nobel Prize in Chemistry 2009 (2010), Thomas A. Steitz commenting on his achievements said, looking back over the development and progress of my career in science, *I am reminded how vitally important good mentorship is in the early stages of one's career development and constant face-to-face conversations, debate and discussions with colleagues at all stages of research.* This statement clearly indicates that being creative depends on the conditions and interaction with the social environment. The more social contacts at the level of discussion and ideas, the more inspiration and ideas. In practice, this means the need to create a space for exchange of views and discussions. The discussion often takes the form of which has little in common with order but is filled with passion.

As in the light of previous considerations one has individual creativity, does order and order really improve creativity? Or maybe a little mess can be a creative leaven of creativity. The following are considerations for clutter and creativity. Riposte Albert Einstein which he cited, Fedirko (2009) : "If a cluttered desk is a sign of a cluttered mind, is it a sign of what is empty?" has become the favorite motto of the mess. According to American scientists, the disorder on the desk is to stimulate the mind for hard work. Experiment of researchers Vohs, Redden & Rahinel (2013) showed that people working in disordered rooms invented more uses of the ping-pong ball. Another experience of the same researchers proved that disorder encourages people to leave the beaten path and try new things. The experiment consisted of choosing a fruit smoothie. The respondents in a neat environment preferred classic drinks, while the participants introduced into the disordered rooms decided on new combinations. Researchers Vohs, Redden & Rahinel(2013) concludes that: orderly environments promote convention and healthy choice, which can improve life, helping people abide by standards and increase well-being; disordered environments stimulate creativity, which is of great importance for culture, art and business (eg creative industries).

Fondness for order is conducive to conservatism, and creativity does not like him very much. New ideas are often the result of associating distant elements, finding common features of very different objects, so chaos can provoke you to look for similarities where you would not expect them to be found. A combination of seemingly mismatched elements can be a simple solution to a complex problem. Abrahamson & Freedman (2007) argue that "Organizing and over-organizing entail high costs that we do not notice, while ignoring the fact that people or disordered organizations are often more effective, creative and flexible."

Important from the perspective of the considerations are the studies of Whittaker & Hirschberg (2001), who examined the effects of paper-processing strategies on archive structure. They discovered different paper-processing strategies (filing and piling), filers amassed more information, and accessed it less frequently than pilers. Given the effort involved in organizing data, the filers are also loath to discard filed information, even when its value is uncertain. Filers maintain clean desktops, and do not allow papers to pile up. They systematize their archives (using alphabetical, conceptual or temporal methods for organization). In contrast, pilers have messy desktops cluttered with paper piles, making few attempts to organize stored information.
While filers seem to find it easier to access information, they do so at the cost of acquiring large archives which they then have to organize and manage. The access data suggest that in moderation, piling has the benefits of providing somewhat ready access to materials as well as reminding about tasks currently in process.

One of the basic conditions for being creative is the ability to go beyond patterns and beaten paths. In this context, many methodological suggestions have been made on how to be creative. We include the

basic ones. The concept of horizontal thinking, lateral thinking or creative intelligence. Creativity is often assessed as a function of one's ability to engage in divergent thinking. Divergent thinking can be described as thinking "outside the box;" it allows an individual to arrive at unique, multiple solutions to a given problem.

Research Methodology

Four research questions were asked in the study. The first question was: Were the widely understood working conditions taken into account when implementing solutions of lean manufacturing in companies in Lower Silesia which implemented at least LM elements? The second question was: Were the effects on the physical and mental health of workers before and after the implementation of lean methods studied? A detailed discussion of the research results regarding the answer to the first two questions was presented by Cierniak-Emerych and Golej in a previous article (2019). Another issue taken up in the study referred to the awareness of the impact of working conditions shaped by 5S practices on employee creativity. This study also examined the flexibility of using 5S practices depending on the job title and type of work performed.

This led to two research questions. Was the impact of working conditions on the creativity of employees taken into account when using 5S? Does the shaping of working conditions using the 5S method take into account the goals and specificity of work in different positions? The next part was based on the empirical material related to lean management (LM) implementations collected in three manufacturing companies in Lower Silesia which implemented LM in the form of 5S practices in 2017-2018. Given the qualitative nature of the problems discussed, the case study method was chosen to present them, with a greater focus on their in-depth understanding. Wójcik (2013) claims this was aimed to find what can be only suggested by qualitative results.

Data sources concerned the analysis of documents concerning the implementation of the 5S system in enterprises of three manufacturing enterprises. These implementations were made in 2017-2018. Participant observation and free-form interviews with managers and employees involved in the implementation of the system were also used. More specifically, an in-depth interview (IDI) was used, which is the direct method of the primary survey, with the respondent being an active object of the measurement, and the interviewees being in direct contact with the interviewers (conversation). In detail the interview was conducted in accordance with the principles proposed by Kaczmarczyk (1999). The analysis was conducted using a descriptive method. In the enterprises surveyed, the 5S method was the basic tool to reduce waste. This method was used first. Other LM methods have not yet been implemented.

Results. Analysis of 5S implementations

Performance improvement was indicated as the main goal of 5S implementations. In each of the analyzed implementations, an attempt was made to organize everything perfectly. Starting from the production hall, through the technological process, to the offices of the accounting department, technologists, in laboratories and R&D departments. In first a selection was made, all employees working in the Production, Laboratory and Office Departments marked items with red and green labels. In the next step – seiton, done the right layout to things available at the workplace, shadow tables were prepared, storage places and internal transport routes were designated. Desk photos were taken as a standard and norm.

Standardization, consisted in the development of documents which would enable all procedures to be regulated. Self-discipline: will be implemented include continuous improvement of cleaning methods, caring for the order in the workplace, following the principles of the 5S method. In the research conducted in each enterprise, the instillation of self-discipline in maintaining law and order in each of the areas of the enterprise's activity was recognized as a success. Control methods were defined: regulations, shadow boards, desk order, and other standardizing documents. The non-physical working conditions in the 5S method were shaped by stringent regulations and high expectations in terms of order.

In interviews, terms such as orderliness, order and reduction of waste were repeated. There were no such statements in the interviews as innovation and creativity.

Some employees provided book responses that were literally consistent with the leading training message.

An attempt to stimulate employee creativity was encouraged by their active participation in the 5S implementation project. Which was reflected in the expectations in terms of: identifying things to remove, proposing the organization of the workplace and / or accepting the new layout of the position, cleaning and joyful compliance with many rules (type of court etiquette).

Next, employees (in accordance with the KAIZEN concept) are expected to: propose continuous improvement of "what is" and make them feel responsible for the costs incurred. One could say that the main keynote of the entire implementation of the 5S principles is the constant search for waste.
Before and after implementation, the quantity and quality of ideas submitted were not measured in the surveyed enterprises. Entries describing labor productivity in the non-productive sphere are also not recorded. Lack of this information makes it impossible to objectively assess the impact of 5S implementation on employee creativity.

Some employees indicated that they were very much waiting for systemic settlement of matters related to order. The employees explained that they could not look at the mess in their colleagues' jobs. And they do not want to spoil the relationship with their colleagues by paying attention to the mess. Other people have signaled that the sterile order will de-personalize their workplace and will feel like guests or intruders in the company who create a mess.

The study found that with the implementation of the 5S principles, the employees felt fear:

• that they will not be able to cope with the new requirements;
• that they will not adapt to the new order, that they will have to look for something for a longer time, with the current state considered good;
• that the cleaning process will take additional time and they will not perform their basic assignments;
• that the cleaning will have to be carried out after the working time agreed with the employer (without appropriate overtime).

Conclusions

The first problem examined is the question. Was the impact of working conditions on the creativity of employees taken into account when using 5S? It was identified based on the interviews that most of the activities were aimed at improving efficiency by reducing waste of time. One of the biggest conclusions is that when introducing 5S, enterprises did not aim to support the creativity of employees. With regards to the question whether working conditions were taken into consideration during implementation of 5Ss the working conditions were not indicated as the aim of this implementation. The implementations did not validate the results of the implementation in terms of the effect of the changes on employee creativity, their well-being at work or the level of stress they experienced.

Another issue concerned the answer to the question. Does the shaping of working conditions using the 5S method take into account the goals and specificity of work in different positions? 5S practices applied in all departments did not take into account the specificity of positions and the nature of creative work. In enterprises, striving for standardization, the aspect of adjusting working conditions to various positions in the light of the demand for creativity was omitted. Another effect of standardization and systematization is that the workplace was depersonalized in favor of its standardization. Many researchers indicate that tightening the requirements for order may be associated with loosening employees' ties with the organization. The logical consequence of recognition that, order, standardization, systemization are perfect is uniformity. Such a view can, and should, be disputable. One of the reasons for progress is the tension resulting from diversity. Diversity also means a different

level of arrangement considered by a particular person as an order. Obviously, as a form of place where group activities are performed, company cannot accept excessive disorder.

Further interviews showed that the feeling of anxiety did not disappear but it was replaced by a habit that weakened its effect. They showed that the 5S method, was implemented in a way that raised a lot of concerns among employees. Other results of the 5S implementation observed during the interviews were:

• feeling pressure on perfect order and avoiding clutter at all costs,
• guilt in the absence of order,
• high employee specialization and no immediate substitution, but the possibility of quickly training a new employee,
• high specialization and inability to transfer knowledge from other areas - routines,
• higher assessment by the management staff of employees perfectly ordered than those who solve problems.

It can be said that the implementations have attempted to program employees to maintain perfect order. The 5S control system leads to the consolidation of the belief that only order is the proper state, and a dose of clutter instead of inspiration leads to internal stress, guilt. It also leads to a feeling of anxiety that a person will be judged not on what they did, but on whether they have order on their desk. People who find it hard to maintain order are assessed as those who do not have order in their thinking. Therefore, in line with the need for recognition, they degrade their self-esteem and focus on maintaining order, often wasting their creative potential.
In the area of production, a restrictive 5S approach seems justified, but where the organization needs some creativity and flashes of genius it is not justified.

The assessment of the 5S system implementation is largely determined by the temperament of person making the assessment. There is significant temperament mismatch resulting from different temperaments and personalities of people subjected to 5S pressure. For some, perfect order is not perfect enough for others, knowing what is where is enough. Previous considerations lead to the conclusion that these excessive requirements, especially for creative people, can lead to psychological problems. According to the version of the temperament division introduced by Hippocrates-Galen described by many researchers, among others Strelau (1985). Phlegmatic and melancholy temperaments try to organize everything in the smallest details, devoting a lot of time to this task. Cholerics are goal oriented. Sanguine people are interested in how others perceive them, and the concept of order is incomprehensible to them.

An important conclusion can be derived from the inverted U-theory that indicates that no extremes give the highest efficiency. It would seem that the reverse U theory, which clearly explains that no extremes of the explanatory variable give an optimal long-term effect to the explained variable, is unnoticed Czakon (2012) and Uzzi (1997). In this context, maintaining a workplace in excessive clutter is inappropriate, as is an ascetic and sterile desk.

Returning to the concept of creative thinking, it should be firmly stated that none of the implementations supported lateral thinking, divergent, creative intelligence or horizontal thinking.

We should apply such methods of shaping working conditions that will stimulate the implementation of specific goals. The results of the study encourage development of such solutions in the 5S system that, on the one hand, will ensure stimulating individual creativity, and on the other hand, will provide a level of workplace order. Responsible and safe in production processes and unconventional in creative activities. The 5S method seems too restrictive for creative activities. Such a solution may be offered by the adaptation of 5S principles to individual employees and to their temperament. It can be said that this would mean the development of the 5S+P concept.

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Business model concept in Industry 4.0

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Abstract

Industry 4.0 with its rapid development challenges academic circles to obtain scientific evidence for empirically observed phenomena. Primarily, it relates to traditional business models (BM) conversion processes. The article reveals an attempt to sort out the BM definition problem, mark out the pillars of BM and its typologies as well as BM requirements, caused by Industry 4.0 development. To this end, we analysed recently introduced BM definitions and found out that mainly they are based on either process or descriptive approach. We prove that both approaches are significant for business-model description.The review of literature devoted to business model elements revealed the divergent view of scientists on this issue. We suggest three key elements that are universal pillars for all existing business models: value creation, value capture and value offer. The following issue states the problem of business models typologies. Currently, there are just a few articles dealing with BM types in digital economy. Studied them, we identified four general types of BM: digital communities, service providers, ITCs-based production and digital brokerage. In the end, we claim three key requirements to Business Model in Industry 4.0. To our point of view, the successful business model ought to be flexible, knowledge-based and smart.

Keywords: Business-Model, Industry 4.0, BM Types, BM Definitions, Business-Model Concept.

Introduction

Business model concept is quite new and it has become topical with the development of Industry 4.0 ideas. Academic science still work on revealing the essence of business models, its varieties and its practical use for business since the IT has become widespread. Globalization and digitization are bringing new challenges for scientific circles to stand out the business model evolution specifics in scientific-technical revolution context. Despite the worldwide scientific community express fundamental and growing interest to this issue, common approaches to defining this scientific category are still not elaborated. Moreover, there are no conventional scientific paradigms corresponding to the Industry 4.0 current issues.

We suggest our own view on solving these scientific issues in the article. First, we reviewed the existing approaches to defining business model as a separate scientific category. After that, we represent the classification of these approaches and set forth our own understanding of the business models. Then, we examined the main elements of business models, which are evolved in scientific literature. Finally, the literature review allowed us to identify four most common business model types in digital economy. In conclusion we suggest the requirements that any business model should meet in the context of Industry 4.0.

Relevance. Modern approaches to business model definition

Definitional question is the initial point for any scientific research, and is particularly important for elaborating scientific theories. In fact, there is plenty of literature dealing with "business model" definition. We selected several articles to examine prevailing approaches.

During the business model conceptualization, the issue of distinguishing it from business strategy and business processes and making it a separate category was disputable. So, some authors initially separated business models from strategies. Specifically, Yip G. [2004] noted that "a strategy concerns a firm's positioning in relation to external conditions such as market competition, whereas a business model structures a firm's value-creating capabilities and value-capturing transactions'. Other authors either defined strategy as an element of business model *(Lee Y., Shin J., Park Y. 2012; Chesbrough H., Rosenbloom R. S. 2002)* or used these concepts interchangeably *(Kallio et al., 2006)*. Mutaz Al-Debei justified BM independence stating that just business model narrows the gap between business strategy and business processes in digital economy by "translating business strategy into business process" *(Mutaz Al-Debei et al., 2008)*.

BM-related literature review allows us to conclude, that mainly authors espouse the BM independency concept. There is number of definitions which are quite similar and could be generally formulated as "business model reveals understanding of how a company performs activities (transactions) to provide value to customers or/and stakeholders". The common part for all definitions is that they focus on the main feature of business model, namely creating value. The main differences are closely connected with the awareness of the beneficiary of created value – for customers *(Osterwalder A., Pigneur Y., 2010; Chesbrough H., Rosenbloom R.S. 2002; Taran Y., Boer H., Lindgren P. 2015, Müller J. M., Buliga O., Voigt K. 2018; Demil B., Lecocq X., Ricart J. E. Zott C. 2015; Yip G. 2004)* or shareholders *(Mustafa and Werthner, 2011)*, or for both parties *(Bouwman H., Nikou S., Reuver M. 2019; DaSilva C. M., Trkman P. 2014)*. Besides, it is worth noting that business model should be considered as a process since it is primarily defined as creating value.

In their works Ng I.C.L., Ding D.X., Yip N. [2013], Massa L., Tucci C., Afuah A. [2017] and Bouncken R.B., Fredrich V. *(Bouncken and Fredrich, 2016)* consider business model more widely, defining it as the way of "how organizations interact with their suppliers, partners, and customers".

Clausse T. [2017] in his article, dealing with the issue of measuring business model innovation, examines business model through the BM ability to design and represent business: "configurations, which integrate particular business dimensions". A number of researchers share this approach in their definitions, describing BM as "money earning logic" *(Osterwalder, 2004)*, "abstract representation of an organization" *(Al-Debei, 2008)*, "specific combination of resources" *(DaSilva, 2014)*, "the value logic" *(Fielt 2013; Hartkamp D., Zalewska-kurek K., Loohuis R., Haaker T. 2017)*. All the named authors consider business model as descriptive, structuring category that indicates it as static.

Figure 1 reveals modern definitions roughly divided by us into two approaches. For now, the most common approach is the process one that associates with defining BM as a process of creating a value for companies' clients.

The process approach attempts to reflect the dynamic nature of business model, meanwhile descriptive is aimed at showing it static. Indeed, business model has both properties. Business model, on the one hand, develops in time, evolves, and, on the other hand, can be described by an algorithm of actions as any other process. It manifests this scientific category in dynamism. Besides, business model in every specific moment of time could be described by combined elements or configurations, reflecting 'the value logic of a business'. Due to this, BM could be considered static category. Sociology and economics have many similarities with it. So, human model in socio-economic sciences proceeds from the concept that human is active, performs a defined set of actions that is a set of processes could describe it. Human is described with decision-making algorithms or through economic behaviour, social roles or other behavioural patterns. Meanwhile, human has a set of personality traits, knowledge, abilities and skills, that justifies using static descriptive models. These models are widely employed in human capital theory and goodwill valuation.

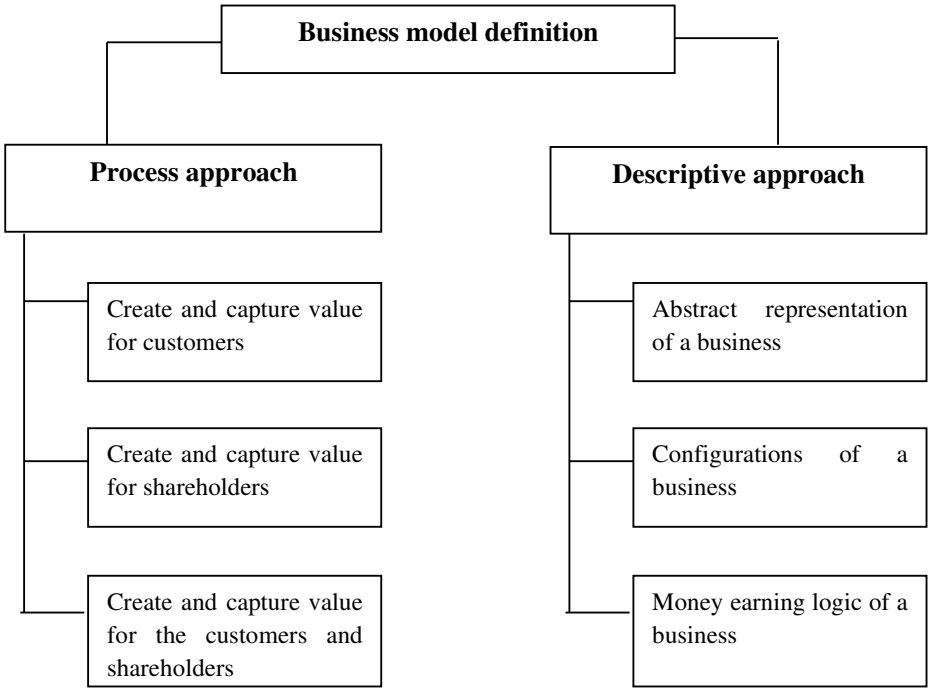

Fig. 1: Viewpoints of authors within BM field researching
(Source: compiled by the authors)

Accordingly, we suggest that business model is a scientific category that can be described by both static and dynamic ways. Besides, the BM's dynamic and static nature is inextricably linked. Its interaction in time forms the basis of business model evolution for single business as well as for the economy itself. So, any business model can be described as a business configuration that combines a set of elements. Evidently, business process implementation within the configuration (in other words, value creation process) is precisely dynamic property of BM. Business configuration and value creation process mutually influences each other. Supplier, client and competitor relationships generate the need in business logic transformation. Thus, business model constituent elements issue is topical from the perspective of descriptive as well as of process approach.

Business Model Elements: Contemporary Approach

Table 1 lists approaches to defining constituent elements of business models, proposed by a range of authors in recent studies. It is clear from the table that the wide gap between authors' views exists. Nevertheless, all approaches have a common element – the customer value element that incorporates

marketing elements (customer segments, value propositions, customer relationships, mission). The second group of elements, proposed by researchers, relate to income generating business processes (financing, the cost structure and profit potential, revenue streams, key resources, the value chain/network, key activities, key partnerships). And finally, the rest of mentioned elements are elements, connected with strategic management (competitive strategy, capability, globalization, organizational architecture).

Table 1: selected Scholarly Definitions of BM

№	Author(s)	Elements / components of BM	Year of research
1.	Osterwalder A., Pigneur Y.	customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships and cost structure	2010
2.	Lee Y., Shin J., Park Y.	mission, offering, strategy, capability, business process, value network, financing and globalization	2012
3.	Gassmann O., Frankenberger K., Csik M.	client (Who is the target customer?), offered value (What does the company offer to its clients?), processes, activities, resources and capabilities of the company (How does the company create and provide value?), income-generating model (What is the firm's benefit?)	2013
4.	Fielt E.	the customer, value proposition, organizational architecture and economics dimensions	2013
5.	Girotra K., Netessine S.	4W approach: «What» strategy (What to sell, What to achieve, What significant issues should the BM help to solve?), «When» strategy (When should the decision be made within BM?), «Who» strategy (Who makes key decisions within BM?), «Why» strategy (Why do the key BM members make these decisions?)	2014
6.	Klimanov D.E., Tretyak O.A.	Value chain structure / inter-firm networks («frame», network); BM members interaction mechanism; BM members interaction outcome	2014
7.	Chesbrough H., Rosenbloom R. S.	BM includes the value proposition, the identification of the market segment, the value chain and value network, an estimation of the cost structure and profit potential and as last a formulated competitive strategy	2002
8.	Müller J. M., Buliga O., Voigt K.	value creation, value capture, and value offer	2018

(Source: compiled by the authors)

From our point of view, the main criteria for referring to BM elements are BM inherent properties, since it logically flows from its functional purpose – value creation. Hence, in case when there is no customer value, it is not possible to create company value and, consequently, stakeholder value.
According to Baden-Fuller and Mangematin [2013] BM's main purpose is "to capture the essence of the cause-effect relationships between customers, the organization and money". Accordingly, we suggest that the most common BM constituent elements are value creation, value capture, and value offer. However, specific content of these elements is still fuzzy, despite its importance.

What business models are corresponding with Industry 4.0?

To answer this question we reviewed recent scientific researches in e-commerce and made a list of business models that are applied in this field. Susan C. Lambert [2015] underscores the importance of justified business model type identification. The author points out that "it is widely recognized that classification is a necessary step in understanding a research area". Sharing her point of view, we find it reasonable to make typologies in the form of traditional (common sense) classifications of business model types that mentions in literature. We found only five studies that reveal e-commerce related business models in Industry 4.0 (Table 2). As indicated in table below, the listed types are lexically different. In fact, every author suggests different ways of doing e-business. In addition, the substantive content analysis of proposed typologies demonstrates significant similarities of them.

Table 2: business model types proposed in e-commerce-related researching

№	Author(s)	BM types in Industry 4.0
1.	Timmers, P. [1998]	E-shops, e-procurement, e-malls, e-auctions, virtual communities, collaboration platforms, third-party marketplaces, value chain integrators, value-chain service providers, information brokerage and trust other third-party services
2.	Rappa M., [2000]	Brokerage, advertising, infomediary, merchant, manufacturer/direct, affiliate, community, subscription, utility
3.	Weill P. Vitale M.R. [2001]	Describe eight so-called atomic business models. Content Provider, Direct to Customer, Full-Service Provider, Intermediary, Shared Infrastructure, Value net Integrator, Virtual Community, Whole-of Enterprise/Government
4.	Osterwalder, A., Pine, I. [2013]	Separation of business models (Zara, Compass Health). "Long tail" (Pulscen.ru, Price.ru and Avito.ru, Drom.ru, Zipcar). Multi-sided platforms (Surveymonkey.ru, 2do2go, Coursera, Afisha.ru). Free as a business model (2GIS, Alawar, Blizzard Entertainment). Open business models (PayPal, Qiwi)
5.	Laudon K., Traver C. [2003]	seven types of business models: portal, e-tailor, content provider, transaction broker, market creator, service provider, community provider.

(Source: compiled by the authors)

According to substantive content proposed BM types can be consolidated into more general types:

- virtual communities, all business model types, that encourage creating communities of different kind – social, professional, business-communities (according to the table 2: virtual communities, collaboration platforms, community, value net integrator, virtual community, community provider);
- service providers: from information to digital environment specific services (e-procurement, value-chain service providers, advertising, subscription, utility, content provider, full-service provider, shared infrastructure, whole-of enterprise/government, content provider, market creator, service provider, portal, e-tailor, information brokerage);
- production using internet technologies (manufacturer/direct, affiliate) – ITCs-based production;
- digital brokerage including different ways to facilitate transactions between counterparties via the Internet, such as infomediary, brokerage, intermediary, transaction broker, value chain integrators, e-auctions, e-shops, merchant, e-malls, transaction broker.

This typology is quite relative because information technologies can be connected with brokering activities as well as production can combine with own e-store.
We were unable to include in the above typology business model types by Osterwalder A., Pine I. They co-created by crowd of 470 practitioners from 45 countries a study "Building of business models" and identified the following types:

- separation of business models - three fundamentally types of businesses (customer relationship businesses, product innovation business and infrastructure business) should be “unbundled” into separate entities;
- "long tail" - offering a large number of niche products, each of which sells relatively infrequently;
- multi-sided platforms - bring together two or more distinct but interdependent groups of customers;
- free as a business model - at least one substantial customer segment is able to continuously benefit from a free-of-charge offer;
- open business models – can be used by companies to create and capture value by systematically collaborating with outside partners.

As described above, all models except for the first one – can be considered as a set of marketing strategies for doing e-business rather than business model in the sense we consider it in this article.

According to Statista [2019] Industry 4.0 in its development in the near future will lead to the emergence of service-based revenue models, mass customization, smart manufacturing, back shoring and modular workstations. Thus, authors of mentioned research outline that service-based revenue models are rapidly gaining ground due to their high return rates. It should be noted that this business model type fits our suggested typology as a form of service providers.

We consider that the need to establish “flexible production process through the use of modularized systems that can be reconfigured in quick time” *(Statista, 2019)* would affect business model development. Particularly, Industry 4.0 will make firms transform their business model in a way that would meet the three key requirements. These are:

- BM should be Flexible – business should be able to reconfigure its value creating processes to meet customers’ requirements as soon as possible;
- BM should be Knowledge-based, using frameworks for handling big data in order to maintain the high level of its flexibility;
- BM should be Smart – business model, being ‘the logic of businesses, should harmonize business processes of different level with business strategy. As we consider, in the near future this task will be accomplished by artificial intelligence that will allow establishing self-adaptive business models.

Conclusion

To conclude, the study demonstrates that there are grounds to consider business models as both dynamic and static phenomena. We also suggest considering business model as value creation process, primarily, for customers, that includes three insight pillars – value creation, value capture, and value offer. These three constitutive elements, from our point of view, are common for business models as such and reflect the static basis of the concept. The analysis of business model types in digital economy proposed in scientific literature helped us to identify four general BM types: digital communities, service providers, ITCs-based production and digital brokerage. Besides, the second BM type is able to make a higher profit. Nevertheless, any business operating in digital economy will challenge to meet the Industry 4.0 requirements. That means, that in the near future we will witness business model evolution under the influence of digital technologies.

Academic scientists will have to develop evidence-based mechanism for accomplishing complicated tasks such as creating fundamentally new business model or transforming traditional ones. In that regard, we suggest that further researches can concern: comparative analysis of business model types using different parameters (transaction costs, value creation to the firm, rate of changes, etc.) and also investigating factors that form business model features for specific sectors of economy.

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Using the DEA Method Based on the Example of Analysing Polish Hospitals from the Mesoeconomic Perspective

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Abstract

Use the word "Abstract" as the title for the abstract section. The abstract should be no more than 250 words. It should capture research motivation, research Design/methodology, and main findings and implications. The abstract should provide an excellent summary of the paper. In Poland, the issue of the situation of health service, hospitals in particular, is always relevant. Despite the fact that debates and conferences on this topic occupy a leading position on TV, the topic remains unsolved. Health service efficiency and its measurement are important subjects as they provide information on the efficiency of the activities taken in each unit, region, borough, borough union, county, sector, i.e. in the mesoeconomic environment. The article presents and verifies research results of several authors who were the first in Poland to measure the efficiency of hospitals from the mesoeconomic perspective using the DEA method, with the outlay-oriented CCR model applied. The aim of the article is also to draw attention to the issues related to using and interpreting DEA results. One of the first mesoeconomic studies, i.e. studies of three authors based on the Centre for Healthcare Information Systems (CSIOZ) data, was analysed. One has to bear in mind the fact that these were built around different criteria and covered the problematic period preceding the implementation of the 2011 act on medical entities and the 2017 act on hospital networks.

Keywords: Efficiency, DEA, Mesoeconomic Perspective

Introduction

The efficiency of health service as well as its measurement are important subjects as they provide information on the efficiency of the activities taken in each unit, region, borough, borough union, county, sector, i.e. in the mesoeconomic environment. Contrary to business entities, medical entities do not compete for clients/patients. These entities have an excess of patients. The situation is completely opposite when it comes to financial resources necessary for completing service. According to experts and hospital directors, these are always insufficient.

In Poland, it is possible to distinguish some periods for the health service that condition legal acts:

- Act of 30 August 1991 on healthcare facilities – used to be the longest valid one; despite its imperfections, it guaranteed wide access to services and the independence of public hospitals called SPZOZ; its problem was growing debt and expenses.
- Act of 15 April 2011 on medical activity – its effect was contrary to the improvement intended. With the commercialization and privatization of hospitals, the state of health service deteriorated, throwing it into chaos due to no minimum norms defined for the number of beds and hospitals (medical entities acc. to that act), initiating uncontrolled limitation of public hospitals, payment for services, i.e. limiting access for patients; growing debt and expenses were not curbed everywhere, in some cases improvement was possible through debt write-off.

- Act of 23 March 2017 was a consequence of suspending the commercialization by the Polish government in 2016. The Parliament passed a bill that created the System of Basic Hospital Protection of Healthcare Services (Polish: *System Podstawowego Szpitalnego Zabezpieczenia Świadczeń Opieki Zdrowotnej*), the so-called hospital network. The hospitals (often the county ones) whose situation was more difficult were incorporated into a network together with larger entities.

The author managed to come across several papers on the efficiency of hospitals from the period of 2009-2012, i.e. one summarising the period of the first bill. It was a period that required changes and forced hospitals to analyse the efficiency of resources. It was concluded that SPZOZ was a deficient and ineffective legal form. It was also important to take into account the issue of rivalry among entities and voivodeships for resources for conducting their activities, which exacerbated due to commercialization. Efficient entities were supposed to keep their high contracts, whereas the less efficient ones faced to risk of being closed down. The patient, however, could not be left without healthcare. At that time, many analyses, including scientifically-based ones, were carried out that indicated how to solve the problems or presented the situation of hospital competitiveness from the mesoeconomic perspective. In this article, the author presents some solutions that were pioneering at that time and that used the Data Envelopment Analysis (DEA) method, as well as compares them and indicates difficulties in implementation.

The DEA Algorithm and The Selection of The Method

The DEA method is widely used to study economic efficiency both in business enterprises and the public or non-profit sector. One should also bear in mind the fact that it has been used to assess organizational efficiency. Undoubtedly, efficiency is one of the categories that influences the essence of an organization as a managing entity, conditions its functioning and determines its growth (Fura B. 2017: 103).

An interesting definition of the areas of DEA application comes from the following authors: John S. Liu, Louis Y.Y.Lu Wen-Min L, Bruce J.Y.Lin. Table 1 presents the results of their research. It shows the total number of academic articles and its sum indicates the main areas of the application of the DEA method.

Table 1: The most frequent areas of the DEA method applications

Real world applications	Total no. of papers	Percentage (%)	No. of papers 2005–2009	Fraction of total papers (%)
Banking	323	10.31	147	45.5
Health care	271	8.65	107	39.5
Agriculture & farm	258	8.23	140	54.3
Transportation	249	7.95	131	52.6
Education	184	5.87	75	40.8
Power	156	4.98	87	55.8
Manufacturing	146	4.66	75	51.4
Energy & environment	109	3.48	75	68.8
Communication	70	2.23	28	40.0
Finance	51	1.63	33	64.7
Insurance	44	1.40		
Tourism	42	1.34		
Petroleum	41	1.31		
Fishery	39	1.24		
Sport	31	0.99		
Construction	29	0.93		
Automobile	28	0.89		
Retailing	28	0.89		
Forestry	27	0.86		
Water	27	0.86		
Real estate	25	0.80		
Software	25	0.80		
E-business	22	0.70		
Mining	22	0.70		
Miscellaneous	351	11.20		
Disciplines	536	17.10		

Source: John S. Liu, Louis Y.Y.Lu Wen-Min L, Bruce J.Y.Lin, A survey of DEA applications, 2013 DOI:10.1016/j.omega.2012.11.004 https://doi.org/10.1016/j.omega.2012.11.004

The results of research presented in Table 1 show that the DEA method is used in health service extraordinarily often around the world and it comes second after banking as far as publications in 2005-2009 are concerned. In Poland, such papers are still scarce especially when it comes to the topic of healthcare.

As far as the essence of the method is concerned, it refers to the function of production which tends to be extremely difficult to define in practice. In such cases, non-parametric solutions based on linear programming are frequently used. DEA stands for Data Envelopment Analysis, and Polish literature uses its direct translation (*analiza graniczna danych*) or less direct terms (*metoda obwiedni danych, metoda otoczki danych*) (Marzec, Pisulewski, Prędki 2015: 7–8).

In the DEA model, the efficiency of the j-th object (j=1,...n) transforming x_{ij} outlay (i=1,…,m) into y_{rj} results (r=1,…,s) is defined by the formula:

$$\theta_j = \frac{\sum_{r=1}^{s} u_r y_{rj}}{\sum_{i=1}^{m} v_i x_{ij}}$$

where:

θ_j – efficiency of the j-th object

v_i – outlay weights (i=1,…,m)

u_r – effect weights (r=1,…,s)

s – number of effects

m – number of outlays.

DEA makes it possible to define the so-called relative efficiency or, in other words, the efficiency of the object as compared to other objects. This method differentiates two main models: CCR and BCC. Both abbreviations are derived from the surnames of the forerunners who proposed the algorithm. The models can be outlay-oriented (they indicate how to reduce outlays while keeping a steady level of effects) or result-oriented (they provide information about the possibility of maximizing effects while keeping a steady level of outlays) (Domagała 2007: 24). In the first model, its creators W. Cooper, A. Charnes and E. Rhodes proposed linear programming whose solution consisted in maximizing the efficiency (i.e. a weighted sum of effects by a weighted sum of outlays) in the form of a CCR model (Charnes et al. 1978: 429–444). As the time passed, further models based on the CCR model were designed, incl. the BCC model (whose name is derived from its authors' surnames: Banker, Charnes and Cooper) (Banker, R.D 1989: 125-129) that allows to define the scale efficiency (Perek 2014: 223). What is characteristic for DEA is the name of the units that are taken into account in a study – they are called Decision-Making Units (DMU). The limited number of input and output indicators is a result of the fact that DEA operates more powerfully when the number of DMUs exceeds the number of the combined total of inputs and outputs by at least two times (Drake & Howcroft 1994).

Due to the mesoeconomic analysis and small number of objects in this study (16 provinces), all authors of the three mesoeconomic analyses (Guzik, Hass-Symotiuk, Biernacki) include only five variables. It is in line with the condition of the DEA model that the number of inputs (m) and outputs (s) in DEA models should be lower than the number (n) of analysed Decision-Making Units divided by 3. As a result, DEA is limited to some extent. Its basic limitation is its redundancy, i.e. overstating the number of objects indicated as efficient (Guzik B 2009: 75). This situation is especially visible in the initial models of the method. Another substantial limitation is also the sensitivity and instability of the results in the situation of using untypical data or their strong correlation. One can also indicate the limiting character of the price relativity, linked to defining efficiency by comparison to other entities. This limitation, however, applies to all multidimensional methods. Due to this feature, these methods are often referred to as benchmark methods.

To avoid redundancy, B. Guzik proposed to modify the DEA method. The model he designed is recommended to evaluate the efficiency of the entities that are not profit-oriented. This is the research area that experiences redundancy most frequently when using the classic model of the method.

Selected Studies Carried Out with The DEA Method in The Mesoeconomic Perspective

Due to their identical number of variables, i.e. 5, source of CIOZ data, similar time of research conducted and of course the mesoeconomic perspective, the analyses published by three authors: B. Guzik (2009), M. Hass-Symotiuk (2010/11) and M. Biernacki (2012) were selected.

The first author, Professor B. Guzik, selected the variables that characterize the results as (Guzik B 2009: 80):

- The percentage of people who positively evaluate their state of health (healthy), and
- The number of people treated at general hospitals (patients).

  On the other hand, the variables that characterize the outlays are:
- The net value of fixed assets in the sector of healthcare per 10,000 people (in thousand PLN) (property)
- The number of doctors per 10,000 inhabitants (people) (doctors), and
- The number of nurses per 10,000 inhabitants (people) (nurses).

Professor's research on the efficiency of healthcare conducted using the DEA method indicated that 9 out 16 voivodeships in Poland were efficient. The same research conducted using a modified method, called NPE (method of defining the efficiency of non-profit institutions) by its author, indicated that only two voivodeships could be deemed efficient in the sense of using the outlays for health service. Even though B. Guzik's proposal is interesting, research results are surprising and, according to the author, can spark some controversy.

Table 2: Comparison of results with the DEA and NPE methods for the health service by voivodeships

Voivodeship	DEA CCR result	CCR rank	NPE rank
dolnośląskie	0.84	15	14
kujawsko-pomorskie	0.98	10	7
lubelskie	0.88	12	11
lubuskie	0.86	14	8
łódzkie	1	1	16
małopolskie	0.66	16	12
mazowieckie	1	1	6
opolskie	1	1	4
podkarpackie	1	1	13
podlaskie	0.87	13	10
pomorskie	0.90	11	5
śląskie	1	1	3
świętokrzyskie	1	1	15
warmińsko-mazurskie	1	1	1
wielkopolskie	1	1	2
zachodniopomorskie	1	1	9

Source: Guzik B (2009, s. 86)

Professor Guzik explains it by the fact that both rankings are very clearly different, especially when it comes to leaders, which is linked to the redundancy of efficient objects that occurs in the CCR method. Still, it is surprising to see that the zachodniopomorskie voivodeship falls from the first position as far down as to the ninth, not to mention the podkarpackie voivodeship.

A similar analysis was carried out by the team of Professor M. Hass-Symotiuk, who conducted a comparative analysis of the measures and indicators of hospital achievements. In the 2010 publication, it was called hospital analysis (Hass-Symotiuk 2010: 271), though it should be called the analysis of the efficiency of healthcare of the sixteen voivodeships, as in the paper by B. Guzik. Due to its mesoeconomic perspective, Professor Hass-Symotiuk's research was presented once again in a publication by a new team (Kocisova, Hass-Symotiuk, Kludacz-Alessandri 2018: 132). Output variables were represented by:

- The average number of patients per bed per year
- Share of accredited hospitals as a proportion of the number of all hospitals, and
- Net profit per physician.

Input variables included:

- Average length of hospitalisation (in days), and
- Average costs of day hospital treatment in each Polish province.

The research conducted by the above-mentioned author made it possible to indicate five efficient voivodeships whose efficiency was 100%, i.e. that were first in the ranking. The list included the dolnośląskie, lubuskie and lubelskie voivodeships that were 15th and 14th (dolnośląskie), 14th and 8th (lubuskie), 12th and 11th (lubelskie) in B. Guzik's study; only the warmińsko-mazurskie and świętokrzyskie voivodeships were listed on the same positions; the wielkopolskie voivodeship had a similar position. All the remaining voivodeships were located more or less on the same positions, but for two other exceptions. The małopolskie voivodeship was classified by Prof. Guzik as last, whereas Prof. Hass-Symotiuk listed it in the upper range of the voivodeships analysed (90.8% on the efficiency scale). The kujawsko-pomorskie voivodeship was deemed as the worst and inefficient in Prof. Hass-Symotiuk's research, whereas it was 10th in Prof. Guzik's analysis. M. Biernacki's analyses also present completely different results, as shown in Table 3.

Of course, they depend on the variables selected, i.e. criteria for evaluating efficiency adopted. Using the same data sources (CSIOZ), M. Biernacki carried out a similar analysis, using the DEA method with reference to voivodeships in three different combinations. The value of the treatment outcome was expressed in each analysis by (Biernacki 2013):

- Infant mortality rate, and
- Life expectancy.

As mentioned above, the value of resources was defined in three combinations, which were (Biernacki 2014: 111):

- The number of doctors and nurses per 10,000 people and the number of hospital beds
- The number of CAT scanners and MRIs, and
- The number of doctors and nurses per 10,000 people and the number of CAT scanners and MRIs.

Table 3: Comparison of results with the DEA method according to M. Biernacki's criteria for health service by voivodeships.

Voivodeship	DEA (1)	Rank	DEA (2)	Rank	DEA (3)	Rank
dolnośląskie	0.77	11	0.64	9	0.83	11
kujawsko-pomorskie	0.94	8	0.47	13	0.83	12
lubelskie	0.64	13	0.81	7	0.81	13
lubuskie	1	1	0.55	11	1	1
łódzkie	1	1	1	1	1	1
małopolskie	1	1	1	1	1	1
mazowieckie	0.6	16	0.3	16	0.64	16
opolskie	0.91	9	1	1	1	1
podkarpackie	1	1	1	1	1	1
podlaskie	0.71	12	1	1	1	1
pomorskie	1	1	0.5	12	1	1
śląskie	0.64	14	0.47	13	0.69	14
świętokrzyskie	0.64	15	0.42	15	0.66	15
warmińsko-mazurskie	0.95	7	0.64	9	0.98	9
wielkopolskie	1	1	1	1	1	1
zachodniopomorskie	0.8	10	0.733	8	0.89	10

Source: M. Biernacki (2013: 259).

Table 4 shows the results of analyses by B. Guzik, M. Biernacki and the team led by M. Hass-Symotiuk. The subject literature does not include any contraindications for aggregating different research results based on different evaluation criteria. It is a considerable simplification, but it gives some kind of multidimensionality, and DEA results (which are in the 0-1 scale) facilitate it. For example, each aspect of a hospital can be evaluated separately and it can gain different results, e.g. in patient service, staff management, finance management, environment protection. The aspects may have a different value at a different moment in time, yet putting them all together provides us with a full picture of the whole entity. One can thus assume that a voivodeship with the highest final score is the most efficient from the point of view of the criteria adopted or that it reached full efficiency in a given evaluation criteria most often. Thus the podkarpackie, łódzkie, wielkopolskie and opolskie voivodeships are characterized with a high total score. On the other hand, the śląskie, świętokrzyskie and mazowieckie voivodeships have the lowest scores.

Table 4 also shows an average for the rankings presented by the authors. This average, however, does not correspond with the results of aggregated efficiency, especially in case of the lubuskie voivodeship whose average is understated by the unfavourable rank in B. Guzik's study.

It is not a perfect solution, but it makes it possible to show how the results may differ depending on criteria and time. Benchmarking can be achieved in this way, and if unified criteria and a 3-year period were applied, the Malmquist index could be used to monitor the increase or decrease in efficiency according to a given criterion.

The aggregated efficiency is shown in Picture 1.

Table 4: Comparison of results with the DEA method according to M. Biernacki, B. Guzik and M. Hass-Symotiuk's criteria for health service by voivodeships.

Results/Rank / Voivodeship	DEA acc. to M. Biernacki (1)		DEA acc. to M. Biernacki (2)		DEA acc. to M. Biernacki (3)		DEA acc. to B. Guzik		DEA acc. to M. Hass-Symotiuk		DEA Σ	Rank $\bar{x}$
dolnośląskie	0.77	11	0.64	9	0.83	11	0.84	15	1	1	4.08	9.4
kujawsko-pomorskie	0.94	8	0.47	13	0.83	12	0.98	10	0.762	16	3.982	11.8
lubelskie	0.64	13	0.81	7	0.81	13	0.88	12	1	1	4.14	9.2
lubuskie	1	1	0.55	11	1	1	0.86	14	1	1	4.41	5.6
łódzkie	1	1	1	1	1	1	1	1	0.905	10	4.905	2.8
małopolskie	1	1	1	1	1	1	0.66	16	0.905	10	4.565	5.8
mazowieckie	0.6	16	0.3	16	0.64	16	1	1	0.828	15	3.368	12.8
opolskie	0.91	9	1	1	1	1	1	1	0.842	14	4.752	5.2
podkarpackie	1	1	1	1	1	1	1	1	0.844	12	4.844	3.2
podlaskie	0.71	12	1	1	1	1	0.87	13	0.865	11	4.445	7.6
pomorskie	1	1	0.5	12	1	1	0.90	11	0.908	9	4.308	6.8
śląskie	0.64	14	0.47	13	0.69	14	1	1	0.844	13	3.644	11
świętokrzyskie	0.64	15	0.42	15	0.66	15	1	1	1	1	3.72	9.4
warmińsko-mazurskie	0.95	7	0.64	9	0.98	9	1	1	1	1	4.57	5.4
wielkopolskie	1	1	1	1	1	1	1	1	0.939	8	4.939	2.4
zachodniopomorskie	0.8	10	0.733	8	0.89	10	1	1	0.908	9	4.331	7.6

Source: own compilation based on: Biernacki M (2013), Guzik B(2009), and Hass-Symotiuk (2010)

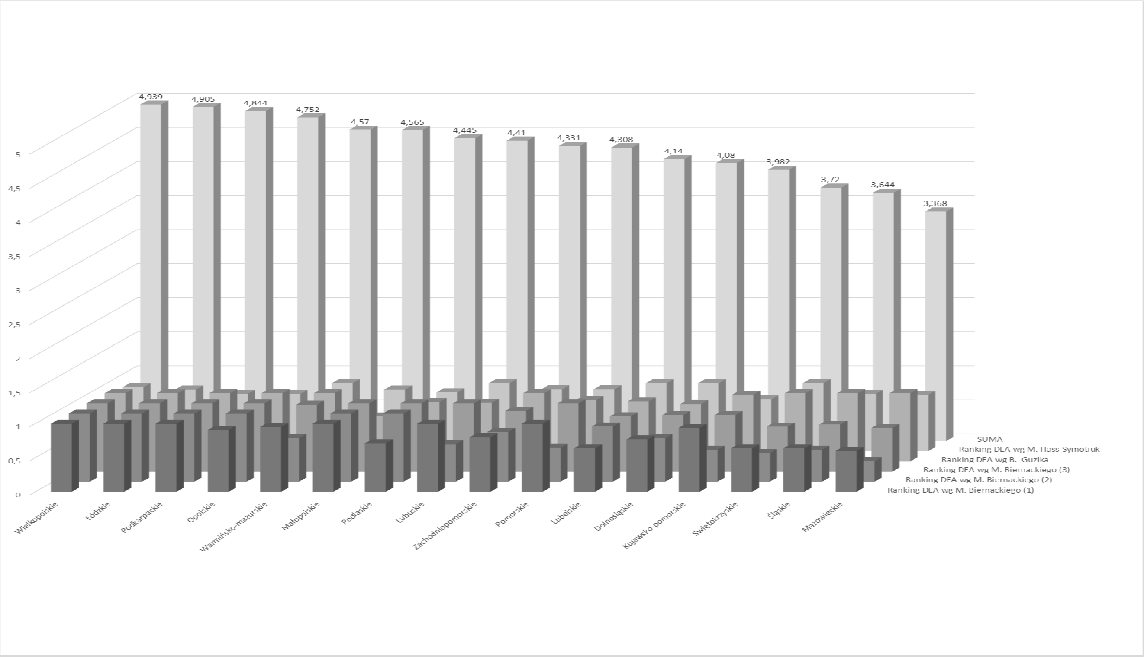

Fig. 1: Results of the DEA analysis in the mesoeconomic environment for the Polish health service.

Source: Own compilation based on the data in Table 4.

In all the three examples, the analyses were carried out from the mesoeconomic perspective, because aggregated data from the region, i.e. voivodeship, were used. What is more, they were carried out on a very small number of factors, i.e. 5 (Hass-Symotiuk 2010: 21).

Many directors who manage hospitals are skeptical about this approach of aggregating data to voivodeships and analysing that, because they would like to receive a detailed analysis of their own hospital as compared to other hospitals in the country, i.e. on the macro scale. In fact, in Poland it is very difficult to come across individual data on each hospital, because they can only be made available with the participation and upon the consent of the director of a given hospital. When one uses voivodeship data, one does not know what the share of a given hospital is in generating the achievements of the entire voivodeship; it is even unclear which hospitals were aggregated. CSIOZ does not make such information available and refers those interested to hospital directors. The CSIOZ statistics do not take into account the hospitals managed by the Ministry of Internal Affairs and Ministry of National Defence. Even though these hospitals are not in majority in Poland, some of them employ over 2,000 people and have over 500 beds, whereas the size of their assets is often 50 million PLN or more (when they are included in a mesoeconomic analysis, they can change the position of a region).

There are still many inaccuracies and crucial topics that should be analysed in depth as far as the issue of hospital efficiency is concerned. The author did not find many Polish publications on the subject. Some publications are outdated and deal with the system of healthcare from a period earlier than 1990s. Even though most papers touch upon the topic of DEA, they do not present the data sets that are owned by individual hospitals. It is probably the result of a lack of willingness and difficulty in obtaining the documentation, especially that including non-financial data of qualitative nature which are not obligatory (but are frequently key for evaluation).

Among older analyses, there is an interesting article dedicated to the DEA method applied with reference to hospitals that was presented by Prof. J. Rój in 2003. The original data for analysis were gathered by conducting a survey study and a questionnaire interview. The author contacted 49 general short-term care hospitals of the 2nd referential level in Poland (whose main objective is to carry out treatment functions of a wide medical scope), belonging to voivodeship self-governments, that used to function as voivodeship hospitals before changes were introduced. Out of the 49 hospitals, 35 decided to share the results; however, there were only 27 hospitals whose scope of data could be deemed fully credible (after verification). Thus, analyses were carried out for 27 hospitals. The period covered by the study was 1996-2001, i.e. three years before and after introducing the system of insurance and budget financing of healthcare in Poland, i.e. healthcare reform (J. Rój: 155). Although the healthcare system changed diametrically after restructuring and appointing the institution of the National Health Fund (Polish: *Narodowy Fundusz Zdrowia*), it is impressive to see as many as 27 hospitals on the list, due to the fact that it is very difficult to establish contact and obtain specific data to analyse a hospital. J. Rój measured the hospital service efficiency only, and in her paper it is assumed that the effect of a hospital operation is a medical service measured with the number of patients being treated, whereas outlays were defined as the number of beds (that are a capital substitute, or to state it in a slightly simplifying way, a hospital's entire technological fittings), the number of doctors and the number of nurses. According to the above-mentioned author, such an approach in selecting outlays and services is commonly used around the world when measuring service (technical) efficiency of hospitals (J. Rój: 155).

Due to the access to data, it is easiest to carry out DEA efficiency analyses on the mesoeconomic level. In practice, it seems important to underline gathering and analyzing macro data. In Poland, attempts have already been made at collecting data, for example in the project by M. Węgrzyn called

Portrety szpitali - mapy możliwości (Korenik, Węgrzyn: 5). This type of data would be perfect for DEA method analysis that researchers in Slovakia are already trying to apply (Hajduova, Herbrik, Beslerová S. 2015: 147)

Going back to the voivodeship analysis based on the Ministry of Health bulletins that do not include Ministry of National Defence hospitals, one has to state that the analysis which can be obtained is rather inaccurate. For example, by excluding the Military Hospital (a very big hospital with 26 wards and serving about 60,000 patients) from the analysis for the dolnośląskie voivodeship, a considerable oversight is caused in analysing the efficiency of healthcare units.

Conclusion

The aim of the article was to present and compare research results of several authors who were the first in Poland to measure the efficiency of hospitals from the mesoeconomic perspective using the DEA method. Problems in using and interpreting the results of the data envelopment analysis were also mentioned. The issue of the flaws of the DEA method was also touched upon; in this respect, one should remember not so much about its redundancy, but about the feature of the DEA method that is frequently forgotten about and that is linked to the difficulties in interpreting the results. Effective units (medical entities or regions) are often those that use small outlays (e.g. staff) to achieve high results (in the form of e.g. the number patients accepted), which means that these units may be heavily overburdened. The author would also like to state that the comparative example in the article is not perfect; it is barely an illustration of simple possibilities that the DEA method allows and of how different the results collected can be when using it.

Results of research into using the DEA method in health service from the mesoeconomic perspective by B. Guzik, M. Hass-Symotiuk and M. Biernacki were presented. Although the authors used the same data sources, they did not apply identical criteria. The results of their analysis of voivodeships are considerably different. It is a consequence of not only years (though similar) but also variables that create different criteria although they come from one source. Even in M. Biernacki's research, there may be different results when the same output variables are used but the combination of the input variables makes the difference. This means that the DEA method is criteria-sensitive. It is enough to remove one significantly differentiating parameter and the result of the analysis can be completely different. This is what actually happened in the research analysed. The zero-one nature of the DEA result makes it possible, however, to aggregate the achievements of voivodeships and show the efficiency stemming from all the achievements of the three studies, which was done by the author of this paper. The author is aware that it is not a perfect solution, but it is feasible and makes it possible to achieve a benchmarking effect of the healthcare efficiency in voivodeships.

This type of research should be carried out according to strictly defined, identical criteria, where the period of data covering three years seems to be optimum for the turbulent environment of health service in Poland. With identical criteria adopted, it is possible to replace simple aggregation with a slightly more complex Malmquist index that works well when comparing DEA results in time, and allows to estimate the improvement or deterioration of a unit's efficiency in time.

One should also remember that the essence of mesoeconomic research passes over significant units that influence the results of a region. This type of research should be conducted again and defined more precisely.

Yet for practice, it would be most important to carry out an analysis on a macroeconomic scale. It is, however, difficult and requires unit data. When submitted to the DEA algorithm, they can provide crucial solutions, benchmarking and results referring to the actual efficiency of individual medical entities.

There are still no clearly defined criteria in Polish research that would be realistic as far as data collecting is concerned and tightly linked to the aim of the research. And yet, the latest publications already include research where, for example, P. Łagowski evaluates the efficiency of providing medical services by hospitals taking into account their organizational and legal form, as well as studies the efficiency of financing selected hospital wards in the dolnośląskie voivodeship in 2012-2014. In this case, the scope of analyses was more precise, and in the other it was limited as far down as to wards. Research similar to that presented in the article was conducted by, for example, J. Kujawska, who analysed hospitals from the mesoeconomic perspective (Kujawska 2013).

Unfortunately, even though the number of articles on the application of the DEA method for the Polish health service is on the increase, it is not as impressive as in Western countries where DEA is widely used. Despite this, however, it is very positive that there are studies like those of J. Kujawska or P. Łagowski, because the DEA method itself is still being developed in Poland, even though in different fields. There are more and more new computer programs for DEA, and researchers gain expertise at interpreting results. Further studies and interesting solutions can thus be expected in the field discussed.

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Influence of The Size of Equity on Corporate Turnover

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Abstract

The correct structure of equity capital in total assets is crucial. In fact, the suitable level of equity in total assets may lead to competitive advantage. On the other hand, the incorrect one may lead up to many problems, among other things, the loss of corporate ability to pay off its debts. Purpose of the article was to identify the impact of a high share of equity in the total assets on the turnover ratios of manufacturing companies. The paper focused on manufacturing sector in the pe-riod of sixteen years (2000-2015). In the examined interval of time over 15 thou-sand companies from the sector in question were flirted drawn from the EMIS. The gathered data enabled calculation of the following financial ratios for the itemized companies total asset turnover (TAT), fixed asset turnover (FAT), days' sales in inventories (IT), average collection period (RT), current liabilities turno-ver (CLT). Next selection of firms was carried out to pick these with a high share of equity in its total assets. The proportion was regarded to be high if it reaches fifty one percent. Businesses with quantities below this threshold have been re-jected from the sample. Later defines intervals (classes) for the equity ratio. De-pending on the value of equity, the remaining enterprise were assigned to their corresponding class. In order to analyze the impact of the size of equity on the level of turnover ANOVA test has been applied. The comparative analysis of the size of equity ratio with the turnover indexes did not confirm that there was a sig-nificant impact on the value of turnover ratios of manufacturing companies with some exceptions.

Keywords: Equity Capital, Turnover Ratios, Manufacturing Sector, ANOVA Test.

Introduction

The level of capital structure in a company concerns many different individuals and groups interested in the success or failure of a given business, the most relevant are managers, investors, lenders and creditors. Managers have a dual interest in the anal-ysis of financial performance. They estimate the efficiency and profitability of a business and assess how effectively the resources of it are being used. In turn, there are also the owners to whom managers are responsible and accountable. The key interest of the shareholders is the return on investment, but also the disposition of earnings that belong to them and the effect of business results achieved as well as future expectations about results. The main concentration of managers as well as investors is toward the business as a going concern. Creditors are focus on funding the needs of a successful business that will operate as expected. Simultaneously, they must deal with the possible negative consequences of insolvency and liquidation (Helferd, E., 2001).

The paper concerns the manager's point of view and most of all the productivity of the used of assets. In measuring the productivity, one tries to find out how hard the assets of the business are employed in generating useful activity, i.e. generating reve-nues. Knowing that the only reason an enterprise ought to own an asset is because the asset boosts incomes growth and consequently profits for the enterprise. Assets that do not directly or indirectly boosts incomes growth have no business being owned by the

company (Priester Ch. and Wang J. 2010). Moreover, the involvement of capital in circulation also affects the efficiency of asset utilization, especially when it comes to inventory manage-ment, debt collection and repayment of liabilities. Inventory management depends on sales, so sales should be estimated before target inventories can be established. The validity of inventory policy is due to the fact that errors in setting inventory levels lead to lost sales or excessive carrying costs (Brigham, E. F., and Houston, J. F. 2012). When it comes to debt collection or receivables management, the aim of collection policy is to cut down the average period of time that receivables remain unpaid as well as lower the percentage of bad debts. If credit sales are a large part of total sales, then receivables management turns to a very crucial part of the running of business. The higher the portion of credit sales, the more serious collectability of receivables is (Priester Ch. and Wang J. 2010). Besides the collection of receiva-bles period, the repayment of liabilities period is also crucial. Especially, when a com-pany is not able to pay back its debts and is trying to arrange a workout with its lend-ers. If the negotiation between the company and creditors fails, the enterprise may become insolvent and file for bankruptcy (Brealey, R. A., Myers, S. C., Allen, F., and Mohanty, P. 2012).

The above-mentioned indicators are used to assess the financial condition of en-terprises, because they have predictive and discriminatory ability in a research study by Tomczak (2014a) (2014b), et.al, (2016), Tomczak S. and Górski A. (2011) or Wilimowska (2016) also Kopiński A., Porębski D., (2015), and Zięba, (2016). Therefore, they occur in prediction bankruptcy models of course by well-known Altman, E (1968) but also Appenzeller (Hadasik), D. and Szarzec K. (2004), Legault, J.C.A. and Score A. (1987). Due 'Warning system for small business failures' by Mączyńska, E. and 'Zawadzki M. (2006), Tomczak S. (2014) for 'The early warning system,' and once again Zięba, M, Tomczak, S. and Tomczak, J. (2016).

The impact of the size of equity on corporate profitability was examined in the re-search conducted by Tomczak, S. K. (2017). Results of his research study concluded that the statistical impact of a high percentage of equity in the total assets on the profitability of manufacturing enterprises was insignificant. He also added that corporate profita-bility did not decline along with the increase equity in the total assets and the busi-nesses with a high percentage of equity in the total assets (almost one) were not char-acterized by lower profitability.

The article struggles with verification of the impact of size of equity in total assets on the turnover of an enterprise. It will allow to give an answer to question: are the companies with a huge share of equity in the total assets characterized by higher efficiency? Statistical significance of the impact of equity on productivity ratios was tested by using ANOVA test. This test is a commonly applied method for analysing dissimilarities between means of two or more groups (in this particular case differ-ences between five defined intervals of values of the indicator). This test one can assess whether the existing difference in means of examined groups is statically rele-vant.

Research Methodology

The paper focuses on production sector. The time period is set to sixteen years (2000-2015). The period is determined by data availability. In the analysed class of time over 15 thousand companies from the sector in question were flirted drawn from the EMIS (86 thousand financial reports were analyzed). The collected data enabled calculation of the following financial ratios for the itemized companies: the sales-to-assets (or asset turnover) (TAT), fixed asset turnover (FAT), days' sales in inventories (IT), average collection period (RT), payables period (CLT). Then selection of com-panies was performed to choose these with a high share of equity in its total assets. The proportion was regarded to be high if it reaches fifty one percent (according to the median of 16 years of a ratio of an enterprise). Businesses with quantities below this threshold have been rejected from the sample.

The next step determines intervals (classes) for the equity ratio. The following were chosen: 0,51-0,60; 0,61-0,70; 0,71-0,80; 0,81-0,90; 0,91-1,00. Depending on the value of equity, the remaining companies were designated to their corresponding interval. For instance a particular enterprise with the value of its equity ratio at the level of sixty five percent is going to be assigned to the interval 0,61-0,70. In addition, other computed indicators of this company will be allotted to the interval representing the size of equity. For example the business is described by the median values of indexes in the research period: ER=58%; TAT= 1,5; FAT=2,30%; IT=30; RT=60; CLT=90. The values of these indicators will point to the class 0,51-0,60 the quality of equity. Each company will be choose to its corresponding interval of the size of equi-ty. Thanks to this one can investigate how the increase in equity will influence the levels of turnover ratios. According to the size of the equity ratio different firms have been assigned to different classes. There are 1131 companies in the first class 0,51-0,60. The second 0,61-0,70 contains 1976 and in the third 0,7-0,8 there are 1847 companies. The penultimate 0,81-0,9 and the last comprise 1452 and 598 firms ac-cordingly.

The aim of setting intervals (classes) of the equity ratio is to identify its impact on corporate turnover. Making use of these classes is to answer the questions: does cor-porate turnover shrink with the increase equity in the total assets? Are the firms with a high percentage of equity in the total assets (nearing one) characterized by lowest turnover ratios?

This paper is written with the following hypothesis in mind:

- H10: A high share of equity in the total assets has statistically significant impact on the turnover of manufacturing companies.
- H1A: A high share of equity in the total assets has no statistically significant im-pact on the turnover of manufacturing companies.

The ANOVA test has applied in order to analyse the impact of the size of equity on the level of turnover (the hypothesis will be tested against the significance of 0.05). This test one can assess whether the existing difference in averages of examined groups is statically significant. The ANOVA test was applied by the use of the Statisti-ca suite.

Results

The reference indicator for turnover ratios to be analyzed with is the size of equity ratio. This index states to what degree company assets is covered by equity capital. Equity capital is needed for setting up a business. The values of this ratio circulate from zero to one, but also can be less than zero. If the value of this indicator are neg-ative the company is in danger of bankruptcy. There is, however, some regularity, the higher value of this ratio the better financial standing of a company is. Thanks to a high value of index of equity capital in financing the assets companies feel more independent of lenders of external sources of financing (Walczak M., 2007)

In order to verify importance of impact of the size of equity capital on turnover the following intervals of this ratio has been defined: 0,51-0,60; 0,61-0,70; 0,71-0,80; 0,81-0,90; 0,91-1,00. In the research sample there have been companies with the share of at least 51 percent equity in the total assets such businesses have been cho-sen. Each firm is assigned to its corresponding class of the size of equity. The ana-lysed turnover ratios are going to be compared with equity. The results are going to be presented on figures 1 through 5.

The first examined turnover ratio associated with the indicator of the size of equity is the sales-to-assets (or asset turnover) ratio (figure 1). Using this indicator, you can examine the value of sales assigned to the asset used one zloty. The increase in the value of this indicator is considered as a positive trend. The higher value of the index, the higher the productivity of engaged assets of the company is. According to the literature value of this ratio should oscillate between 0.5 and 1.5 (Kowalak, R. 2008), but the values depend on the sector (Tomczak S. K., 2014).

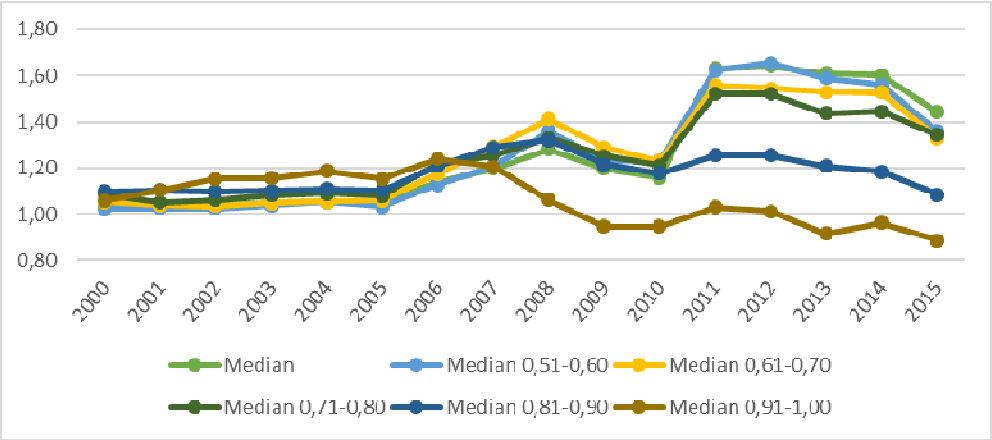

Fig. 1: Yearly values of the indicator of the total asset turnover within the division into classes.

During the analyzed period, the median value of the asset turnover ratio fluctuates in the range of 1,03-1,64. In the first 8 years, the value of the total asset turnover for the companies with a high share of equity in the total assets coincides with the median of the values of the indicator for the whole research sample. However, in the end of the period the values of this indicator are lower for the companies whose shares of equity in the total assets are up to 90% and up to 100%. The second analysed turnover ratio with the connection to the size of equity is the fixed asset turnover (figure 2). It is similar to the already mentioned ratio of the total asset turnover. There is only one difference in the formula. Here the value of sales is to be divided by fixed assets.

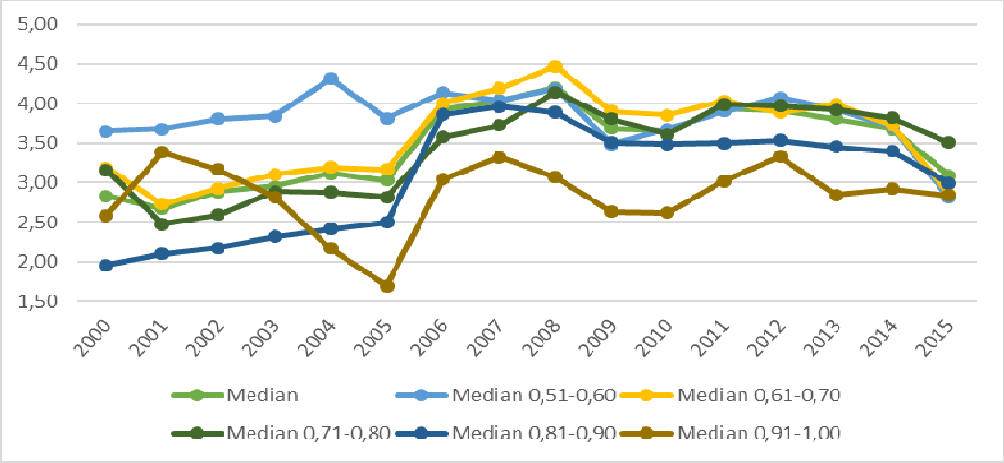

Fig. 2: Yearly values of the indicator of the fixed asset turnover within the division into classes.

By analyzing the second indictor, it can be pointed out that the median of the fixed asset turnover ratio is almost three times higher than the total asset turnover ratio and it takes values within the interval

2,67-4,20 in the period in question. It should also be noted that the value of the median for the whole sample is higher than the value for companies with equity in the assets assigned to the each interval. In addition, it has been observed that the companies that increase the share of equity in total assets have lower efficiency of asset utilization.

The third studied ratio with reference to the indictor of the size of equity is the in-ventory turnover (figure 3). This index indicates the number of days during the period the company renews its inventory. Too high a level of indicator (low inventory turns per year) is judged negatively because it shows the involvement of larger stocks, by freezing more cash. In that case the company does not manage inventory properly (Dudycz, T. 2005). It is noteworthy that innovation performance has a big impact on the inventory turnover (Lee, H-H, Zhou, J. and Hsu, P-H., 2015)

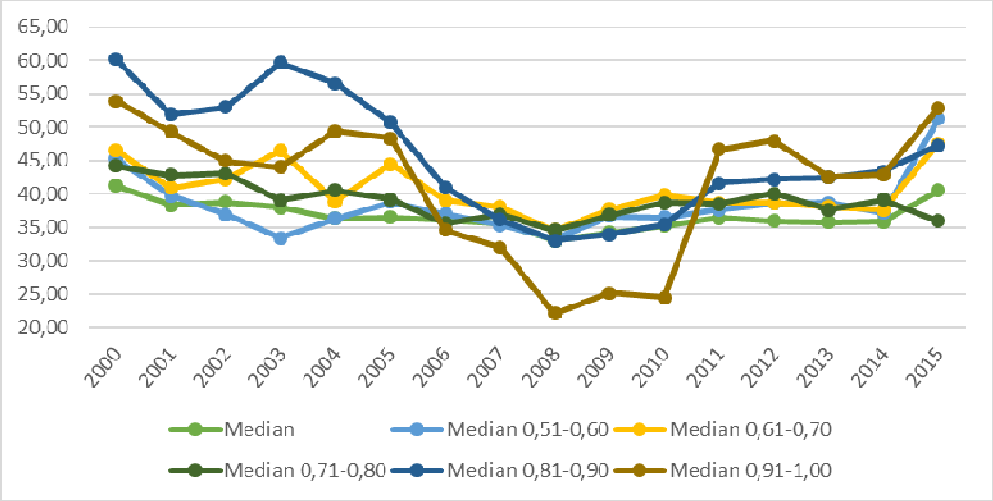

Fig. 3: Yearly values of the inventory turnover with the division into classes.

The values of the inventory turnover ratio are strictly related to the nature of the business. In this industry, maintenance of a stock at the right level is crucial. Based on the analysis of the figure 3, it is found that median value of the indicator for whole sample oscillates between 33-41 days. It can be said that the values of the indicator for the whole sample coincides with the ones for the companies possessing equity in the total assets in the interval 0,5-0,60; 0,61-0,70 and 0,71-0,80. However, the median values are varied for these companies whose shares of equity in the total assets are up to 90 % and up to 100%. Because over the period considered the medi-an value for these companies are either higher or lower than the median value for the whole research sample.

The fourth calculated ratio with reference to the indictor of the size of equity is the receivables turnover ratio (figure 4). The receivables turnover ratio means the average number of days which payment is due from customers (Richard, A. B., Stewart, C. M., & Alan, J. M. (2016). A high level of this index demonstrates sloppy revenue collection policy, which is troublesome for the compa-ny as it means greater involvement of capital in the circulation and higher credit risk. High levels may signal the presence of hard recoverable receivables, uncollectible in the future (Mohr, A. 2006).

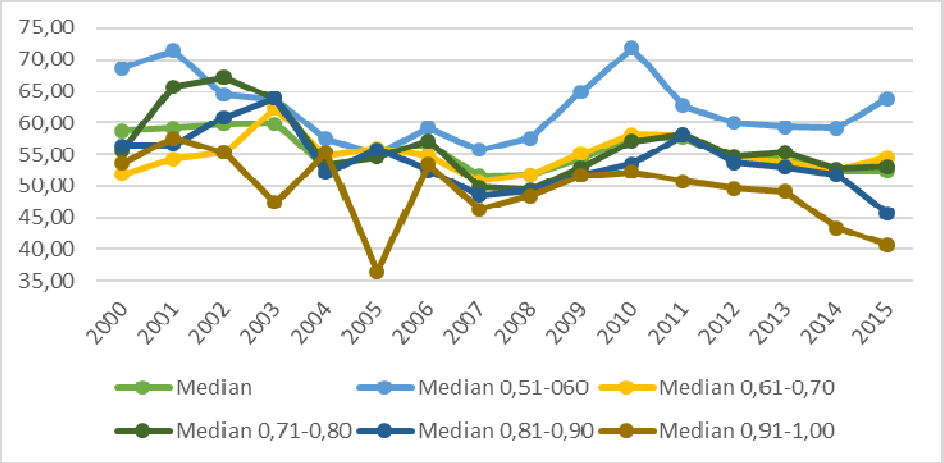

Fig. 4: Yearly values of the receivables turnover with the division into classes.

The median value of the receivables turnover ratio for whole sample during the peri-od oscillates in the range of 52-60 days. In addition, also here the median of the val-ues of the ratio for the whole sample do not coincides with the businesses whose shares of equity capital in the total assets are very near one.

The last ratio that is analyzed in connection with the size of equity is the current li-abilities turnover (figure 5). This indicator is the average number of days during which the obligations towards suppliers is repaid. The value represented by the indicator shows the average number of days that have elapsed from the date of purchase of goods, materials or services to the date of payment. Both the receivables turnover and the current liabilities turnover shall be considered together, especially when the date of outflow liabilities is shorter than the period of inflow of accounts receivable.

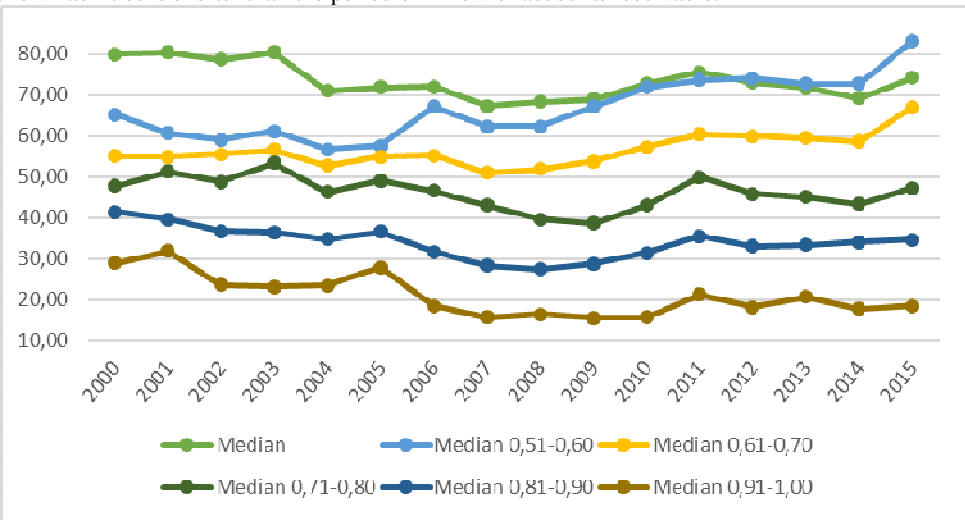

Fig. 5: Yearly values of the current liabilities turnover with the division into classes.

Having analysed the current liabilities turnover ratio, one can conclude that the value of this ratio for the companies with a high share of equity in the total assets is lower than the median of the values of the ratios for the whole research sample that resides in the interval 67-80 days. The companies whose shares of equity in the total assets are very near one generate the lowest values of this indicator. The companies repay its liabilities approximately four times faster than companies in the sector.

It is worth noting that for sector median there is a significant difference between the debt collection and repayment of liabilities. This situation for companies in the sector is very beneficial because at first

businesses in the sector recover its accounts receivables, and then after approximately 18 days pay their own debts. As a result, sector companies have spare cash, which can invest, for example on a bank deposit until repayment of obligations. However, the companies with a high share of equity in total assets do not have the positive trend in collecting receivables and paying their debts. The ones outflow its liabilities on average of 21 days and inflow receivables on average of 50 days. It can be considered as negative phenomenon, as companies have to find the money 29 days before the collection of accounts receivable.

Based on the study it can be concluded that companies with a higher share of eq-uity in total assets are characterized by a lower efficiency in employing assets. De-spite this it cannot determine any level of statistical relevance of the individual clas-ses of the median. Thus the level of relevance of differences between the intervals is going to be verified by means of the ANOVA test (table 1). Before the ANOVA test was used, the values of the indicator were cleared from outliers in order to reach a normal distribution.

Table 1: Results of the ANOVA test for the investigated intervals of values of median for the itemized financial indicators (2000-2015)

Year	Class\ Ratio	TAT	FAT	IT	RT	CLT
2000	1	no	no	no	no	5
	2	no	no	no	no	5
	3	no	no	no	no	no
	4	no	no	no	no	no
	5	no	no	no	no	1,2
…	…	…	…	…	…	…
2010	1	5	5	5	no	yes
	2	4,5	5	5	5	yes
	3	5	5	5	no	yes
	4	2,5	no	no	no	yes
	5	yes	1,2,3	1,2,3	2	yes
…	…	…	…	…	…	…
2015	1	no	no	no	no	3,4,5
	2	no	no	no	no	3,4,5
	3	no	no	no	no	1,2,5
	4	no	no	no	no	1,2
	5	no	no	no	no	1,2,3
legend 1 =0,51-0,60; 2 = 0,61-0,70; 3 = 0,71-0,80; 4 = 0,81-0,90; 5 = 0,91-1,00; no = difference between the compartments are statistically insignificant; yes = difference between the compartments are statistically significant						

By analyzing table 1, it can be stated that the differences between intervals in most cases in the period were statistically irrelevant apart from the current liabilities turnover ratio. From 2006 through 2015 the dissimilarities are statistically relevant for this ratio. The results for current liabilities turnover ratio only confirm that the higher share of equity in the assets the lower corporate turnover will be.

Conclusions

Fifteen thousand manufacturing companies were analyzed in this paper in the pe-riod of sixteen years (2000-2015). The businesses that possessed a high percentage of equity in the total assets were selected among all businesses being examined for fur-ther consideration. The relevance of the impact of equity

ratio on turnover ratios was verified by calculating several financial indicators: total asset turnover (TAT), fixed asset turnover (FAT), days' sales in inventories (IT), average collection period (RT), current liabilities turnover (CLT) and by employing ANOVA test.

Statistical analysis of the data pointed out that values of the median of the tested turnover ratios for the manufacturing firms with high share equity in the total assets were slightly different than the median of values for the whole research sample that equals to fifteen thousand companies. The greatest impact of the size of the equity in the assets on turnover can be observed by analysing the values of current liabilities turnover ratio. The ANOVA test also confirmed that the difference between intervals were relevant for examining dissimilarities between the averages in the selected groups for current liabilities turnover ratio. However, it can be conclude that the sta-tistical influence of a high share of equity in the total assets on the turnover of manu-facturing companies was irrelevant. Therefore, the null hypothesis should be rejected.

It is worth adding that the estimation of median of ratios for the whole research sample can be considered as the standard value for the selected indexes of the man-ufacturing sector. The standard values of indexes for the selected sector oscillate in the range:

- 1,03 – 1,64 for the total asset turnover ratio,
- 2,67 – 4,20 for the fixed asset turnover ratio,
- 33 – 41 days for the days' sales in inventories ratio,
- 52 – 60 days for the average collection period ratio,
- 67 – 80 days for payables period ratio.

Future research will cover a broadened research area of companies – the analyses will go beyond manufacturing companies.

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Examining the Drivers of Human Development in European Union

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Abstract

This paper provides an analysis of the human development drivers in the European Union. The variables used cover the 2010-2017 period, during which the Member States have faced different economic and social challenges generated by the global economic crisis. In the analysis, I used Panel Estimated Generalized Least Squares, weighted with the Period SUR option. The paper confirms a direct relationship between three independent variables (life expectancy, corruption perception index and gross fixed capital formation) and the dependent variable - the human development index. In this context, the study demonstrated that a decrease in the dimension of corruption leads to an increase in the human development, since the growth of corruption perception index is associated with a fall in the corruption dimension. On the other hand, an inverse relationship was identified between the other two exogenous variables (the share of people leaving education and training early, respectively employment in agriculture) and the human development index.

Keywords: Human Development, Corruption, Employment, Education

JEL Classification: O15, D73, I25, J21

Introduction

Economics is a science that generally focuses on maximizing results, and for this reason, sometimes, it fails to address the social challenges that nations are facing with. In some cases, economic policies are targeting utopic results such as economic growth objectives without having in mind any social costs, and do not attach much importance to the fundaments of a healthy economic growth, namely human development.

Especially, human development is related to the quality of health and education systems and standard of living, factors that are also taken into consideration by United Nations Development Programme (UNDP) in computing the Human Development Index, the most used proxy for human development in scientific economic literature. However, the main economic researchers followed the UNDP methodology in their attempts to assess the impact o human development drivers, but in my view there are also other variables that may drive the human development, as is the case of corruption. In this context, I defined the drivers of human development by using corruption, early leavers rate (as a substituent for education), life expectancy (as UNDP methodology indicates - as a substituent for health), and a combination of employment in agriculture and gross fixed capital formation (which may be relevant for standard of living).

The motivation for choosing this topic consists in the lack of studies focusing on the main drivers of human development at a granular level, as I indicated above, but also in the fact that human development is the first thing that economists should have in mind in designing sustainable economic growth policies.

Bearing in mind all the arguments I have mentioned, the main objective of the paper is to determine the impact of human development drivers, which can be ensured by reaching the following specific objectives:

- ✓ estimating the impact of corruption on human development;

- ✓ computing the impact of early leavers rate on human development;
- ✓ estimating the impact of life expectancy on human development;
- ✓ computing the impact of employment in agriculture on human development;
- ✓ estimating the impact of gross fixed capital formation on human development;
- ✓ validating the maximum verisimilitude of the estimators.

Literature Review

The scientific economic literature in the field of human development is vast, and many studies used different approaches to assess the impact of human development drivers. First of all, Dinu (2006) stated that success of modernisation depends on the focus of the economic transformation on the human dimenssion, which can be driven by actions in the field of education, civic participation of the population and political will to promote the values of democracy and legality.

Shah (2016) showed that some determinants of the human development index, including literacy rate and life expectancy at birth, had a positive impact on human development, given that countries with a higher level of the mentioned exogenous variables registered also a higher value of the human development index.

On the other hand, Sangali (2016) demonstrated that life expectancy at birth had a positive impact on the human development index, with the mention that positive evolutions of the the life expectancy shall be promoted by the government through high quality health programs. The author's recommendation is that high quality health programs should be expanded to cover a higher number of the individuals, especially to improve the access of the poor population to high quality medical services. Another author, Crafts (1997) examined the interaction between the index of human development and growth of the gross domestic product per capita for 16 developed countries since 1870, concluding that the conventional measures which had supported economic growth have led to a improvement of the life expectancy. Also, Khodabakhi (2011) examined life expectancy and education in India over the period 2005-2010, finding that low rates of life expectancy at birth led to a decline in the human development index. From another point of view, Farid (2010), stated that since the begining of the Enlightenment, education has been considered the way by which human capital is formed, this being a therapy for the soul - necessary for human development.

Regarding the impact of investments on development, several authors (Jalava and Pohjola, 2002; Daveri, 2002 and Stiroh, 2000) found a positive impact between these two variables in developed countries. Moreover, Bankole et al. (2011) showed that countries investing in technology, information and communication sectors also registered an increase in the human development index, given that this have the ability to improve the standard of living and educational outcomes. Mughal and Manzoor (1999) proved that high quality education leads to social development, given that the educational system will advance high-skilled people to hold responsible positions in public and corporate administrations.

Anderson (2010) analysed the effects of increased trade and investment in the US and Mexico, demonstrating that investment had a major impact on the human development index. Moreover, Arcelus et al. (2005) examined the effects of foreign direct investment on human development in the case of middle - and low-income countries, finding a positive impact for both country groups.

Sharma and Gani (2004) assessed the effects of investment on human development for two groups of countries and found that states with a higher level of human development attract more foreign direct investment, which also positively influences the human development for both country groups. Another opinion is that of Gokmenoglu et al. (2018), which states that foreign direct investments are very important for the host country, contributing to the human development and to the increase of the income of high-skilled graduates. This proves that attracting FDIs should be a priority in the policy-making process.

Mauro (1999) and Robinson (1999) stated that corruption generated high costs for political, economic and social dimensions, respectively lowered the level of investment (Rose-Ackermann, 1996). The direct relationship between corruption and human development was also analysed by Qizilbash (2001) and Akcay (2006) which found a negative impact of corruption on the dependent variable. This hypothesis was also supported by Bscherair and Tahtane (2017), but they argued their conclusion stating that corruption impede human development through the channel of political instability. Other authors (Nielsen and Haugaard, 2000) stated that this inverse relationship also affect the democracy state of play.

Jianu et al. (2019) concluded that linkage between income inequality (a relevant indicator for the social dimension) and its determinants depends on the institutional quality, this kind of inequality being more persistent in countries with extractive institutions that are also associated with states facing high levels of corruption.

Absalyamova et al. (2016) have shown that stability of human capital development is largely determined by the high level of corruption in Russia, the lower values of corruption being associated with increasing human development, reducing income inequalities and increasing economic growth rates.

Methodology

In this section, I have described the techniques used to estimate the impact of the human development drivers, using a quantitative method to provide a rigorous construct for this analysis.

The method used aims to bring an added value in this field by examining the determinants of the human development index (HDI) over the analysed time period. In order to analyse this phenomenon, I started from establishing and verifying the following hypotheses:

- ✓ Human development index is positively influenced by life expectancy;
- ✓ The increase in the number of people leaving early the education and training systems negatively influences the human development index;
- ✓ The growth of corruption perception index (which reflects a fall in corruption level) leads to an increase in the human development index;
- ✓ The increase of people employed in agriculture favors the fall of human development.
- ✓ Human development index is positively influenced by gross fixed capital formation.

In the paper I used the panel technique, given that this approach is considered effective because it improves the robustness of the estimation and increases the degrees of freedom. On the other hand, it may trigger other challenges, such as the correlation between cross-sections and heteroscedasticity.

For testing the stationarity, I have used the Summary window, respectively the automatic lag selection option using Schwarz Criterion, which provides an overview of the following tests: Levin, Lin & Chu t*; Breitung t-stat; Im, Pesaran & Shin W-stat; Augumented Dickey-Fuller - Fisher Chi-Square; Phillips-Perron - Fisher Chi-Square. The technique used indicated that the variables included in the model are stationary at the initial level and at the first difference, which motivates the use of an Autoregressive Distributed Lag (ARDL) model. However, I have tried to isolate the impact of the autoregressive term, taking into account the specific lags of the independent variables in accordance with the economic theory.

To reach the main objective of the paper, I used the Estimated Generalized Least Squares (EGLS) method weighted with the Period SUR option. This option was used to support the efforts for validating the model, respectively to avoid the occurrence of heteroskedasticity and of the general correlations between cross-sections.

In the process of identifying the method for estimating the effects , I initiated the Hausmann test (which verifies the compatibility with the Random Effects Model) and the Redundant Fixed Effects - Likelihood Ratio (which checks the compatibility with the Fixed Effects Model). The probabilities associated with the tests confirmed the compatibility with both models, which did not facilitate the

choice of an optimal estimation method, especially, since the Fixed Effects Model does not allow the use of the Period SUR option. In this context, I used an estimation method without effects that allowed the use of the mentioned option.

The data used in the paper have an annual frequency and covers the 2010-2017 period, for all 28 Member States of the European Union, in order to facilitate a comprehensive analysis of the human development. The statistical data used in the analysis are published by United Nations, Transparency International, Eurostat and AMECO, as shown in *Table 1*. Following the introduction of these variables in the model, 196 observations resulted.

Table 1: Structure of the model

Variable	Source
Human development index	United Nations
Life expectancy	AMECO
Early leavers from education and training (18-24 age %)	Eurostat
Corruption perception index	Transparency Internationals
Employment in agriculture (% of total employment)	Eurostat
Gross fixed capital formation (% of GDP)	Eurostat

Source: *Own processing using Microsoft Office 2016*

In order to verify the heteroskedasticity I used the Breusch-Pagan-Godfrey test, for which I estimated the equation manually, given that Eviews does not display this test result in the panel window. In this respect, I estimated the following equation:

$$hdi100 = \alpha + \beta_0\, life_expectancy + \beta_1\, early_leavers + \beta_2\, corruption(-1) + \beta_3\, \text{employment_agriculture}(-1) + \beta_4\, \text{gfcf} + \varepsilon_t$$

, where *hdi100* is represented by the human development index multiplied by 100, *life_expectancy* is represented by life expectancy expressed in average age at born, *early_leavers* is represented by the share of early leavers from education and traning, *corruption (-1)* is represented by corruption perception index lagged by 1 year, *employment_agriculture (-1)* is the share of employment in agriculture in the total occupied population lagged by 1 year and *gfcf* represents the share of gross fixed capital formation in GDP, while ε_t represents the error ter.

Following the estimation of the equation, I used the "CHISQ.DIST.RT(n*R2, Ω)" function from the Microsoft Office Excel software [where n is the number of observations (in this case, 196), R2 is the coefficient of determination, and Ω is the number of degrees of freedom (in this case, 5)], to determine the probability associated with the Breusch-Pagan-Godfrey test.

In order to check the autocorrelation of the residuals, I used the Durbin-Watson test, even if it is not a significant issue when using panel data (more details were presented in the next section). Lastly, in order to verify the maximum verisimilitude of the estimators, I have examined the Gauss-Markov hypotheses, as expressed in *Table 2*.

Table 2: Econometric tools used for validating maximum verisimilitude of the estimators

Tool used	Hypothesis checked
Fisher test	Valid model
Jarque-Bera test	Normally distribuited residuals
Durbin-Watson test	Absence of autocorrelation
Breusch-Pagan-Godfrey test	Heteroskedasticity
Cross-section Dependence Test (Breusch-Pagan, Pesaran CD, Pesaran scaled LM)	Absence / existence of cross-section dependence
Pearson correlation	Existence / absence of multicolinearity

Source: *Own processing using Microsoft Office 2016*

Results and Interpretations

In this section, I analysed the impact of the human development drivers in all Member States of the European Union, at the same time verifying the verisimilitude of the obtained results, as I mentioned in the methodology.

In *Annex 1*, I have illustrated the situation of human development in 2017 in all the Member States of the European Union. As can be seen, the highest values of human developments index were recorded in Ireland (0.938), Denmark (0.936) and Sweden (0.933). At the opposite pole were Romania (0.811), Bulgaria (0.813) and Croatia (0.831). The main reason for their position consists in the fact that they were the last countries joining the European Union, which had also lower benefits from structural funds, compared to the first blocks of accession. On the other hand, as can be seen in *Annex 1*, the states with the highest levels of this indicator are those from the Western Europe, which have adopted inclusive economic policies, being also supported by the European funds.

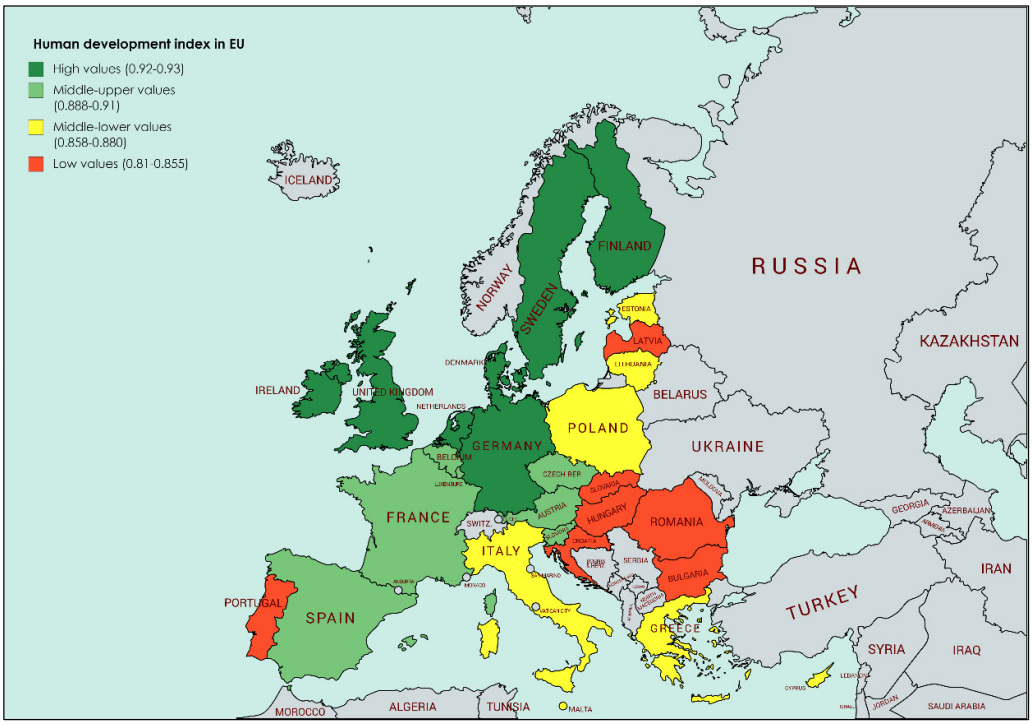

Figure 1: Human development index in the European Union member states in 2017
Source: *Own processing using United Development database*

In *Figure 1*, I have clustered the Member States of the European Union depending on the level of the human development index in four categories, with an equal number of countries. In the first category are the states having the highest values of the human development index, respectively those registering a value between the 0.920-0.938 interval. This category includes: IE, DE, SE, NL, DK, UK and FI. Then, in the next category were included BE, AT, LU, FR, SI, ES and CZ, which registered values between 0.888-0.916. The third category is represented by the IT, MT, EE, EL, CY, PL and LT, with a level of the human development index between 0.858-0.880. The last category of countries (lowest values of HDI, between 0.811-0.855) is composed by SK, LV, PT, HU, HR, BG and RO. As can be seen in *Figure 1*, the northern, western and central states of the European Union are the most developed countries, with the highest values of the HDI, excepting Portugal; Eastern and Southern European Union Member States, respectively Portugal form the group of developing Member States, bearing in mind the lower levels of indicator.

The results obtained following the calculation of the impact of human development drivers were attached in *Figure 2*. As can be seen, the estimators are statistically significant, given that their probabilities are below the significance threshold of 5%. The value of R-squared (0.613271) confirmed the linearity of the regression and the appropriate choice of the regressors, their evolution explaining the fluctuation of the endogenous in a proportion of 61.32%. Also, the probability associated with the Fisher test is 0.00% (below the 5% significance level), which confirmed the validity of the econometric model from a statistical point of view.

Dependent Variable: HDI100
Method: Panel EGLS (Period SUR)
Date: 01/04/20 Time: 14:27
Sample (adjusted): 2011 2017
Periods included: 7
Cross-sections included: 28
Total panel (balanced) observations: 196
Linear estimation after one-step weighting matrix
Period SUR (PCSE) standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LIFE_EXPECTANCY	0.552012	0.077650	7.108990	0.0000
EARLY_LEAVERS	-0.136158	0.028137	-4.839050	0.0000
CORRUPTION(-1)	0.065563	0.009564	6.855240	0.0000
EMPLOYMENT_AGRICULTURE(-1)	-0.156625	0.043391	-3.609649	0.0004
GFCF	0.058070	0.014243	4.077242	0.0001
C	40.30547	6.257173	6.441482	0.0000

Weighted Statistics			
R-squared	0.613271	Mean dependent var	17.58202
Adjusted R-squared	0.603094	S.D. dependent var	18.98045
S.E. of regression	0.913420	Sum squared resid	158.5237
F-statistic	60.26002	Durbin-Watson stat	1.763401
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.809519	Mean dependent var	87.45000
Sum squared resid	550.8759	Durbin-Watson stat	0.075319

Figure 2: ***Estimation results***

Source: *Own processing using Eviews 9.0*

Next, I have presented the impact of exogenous variables on the human development index. According to the results, the increase of life expectancy by one percentage point led to a growth of the human development index with 0.552012 deviation points in the analysed period. The reason is that countries with a higher life expectancy, have also an educated and healthy population, while the situation of developing Member States is at the opposite.

On the other hand, an increase of the early leavers rate by 1 percentage point led to a reduction of the human development index by 0.136158 deviation points. The underdevelopment generates the inability of adolescents to access or continue the university studies, which creates the premises of a lower level of education. Further, this limits the opportunities of people on labour market and, implicitly, the wage expectations, which may cause a fall in human development level.

From another point of view, when corruption perception index register a hike by one deviation point, the human development index increases by 0.065563 deviation points. The high values of the corruption perception index are associated with a lower level of corruption. Reducing corruption leads to a higher confidence of the population in government institutions, which provides economic stability in terms of production, consumption and investment, this favoring development gains. In this context,

high quality government institutions may have an positive effect on different forms of development, implicitly on human development.

As regards the employment in agriculture, expressed as a percentage of the total employment, its increase by one percentage point led to a reduction of the human development index with 0.1516625 deviation points. A high employment rate in the agricultural sector determines a decline in the human development due to the fact that population employed in agriculture is facing issues related to their standard of living. Moreover, in the case of this category of population, human emancipation is limited and stationary, or in some cases, is growing slowly.

This paper, also demonstrated that, an increase in the gross fixed capital formation (expressed as % of GDP) by one percentage point of GDP caused a HDI growth of 0.058070 deviation points. This can be explained by the fact that investments generates higher opporunities on the labour market for the active population by creating jobs and increasing wages channels, which increase the level of development.

The results shows that the greatest impact of HDI drivers was obtained for the exogenous related to life expectancy (0.552012 pp). The increase in life expectancy is achieved by facilitating the access of population to a well-developed health system and, therefore, to a better life, which finally drives up the human development level. On the other hand, the employment rate in agricultural sector has the greatest negative impact on the HDI (0.156625), which confirms that the reduction of the employed population in this sector and their reallocation to better paid jobs leads to an increase in the standard of living, which favors the positive evolution of the dependent variable.

Regarding the autocorrelation of the residuals hypothesis, I used the Durbin-Watson test. In this case, I checked the values of dU and dL for 196 observations with 6 degrees of freedom, as follows:

dL = 1.7035

dU = 1.8296

Given that the value of the Durbin-Watson test (1.763401) is between dL and dU statistics, I concluded that the test is inconclusive, which cannot recommend any decision related to the autocorrelation of the residuals. However, the problem of autocorrelation loses its importance in the case of panel data, and I chosed to ignore it, bearing also in mind the result of the Durbin-Watson.

Further, according to the methodology, I processed the Breusch-Pagan-Godfrey test (*Figure 3*). For 5 degrees of freedom, the result of the test provided a probability of 9.06%, which confirms the hypothesis related to the model homoscedastic feature (the probabilities of exogenous variables have values higher than the significance threshold of 5%), this result being also in accordance with Gauss - Markov theorem.

Dependent Variable: RESID01^2
Method: Panel Least Squares
Date: 01/04/20 Time: 14:40
Sample (adjusted): 2011 2017
Periods included: 7
Cross-sections included: 28
Total panel (balanced) observations: 196

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LIFE_EXPECTANCY	-0.033489	0.040502	-0.826830	0.4094
EARLY_LEAVERS	-0.022507	0.018208	-1.236118	0.2179
CORRUPTION(-1)	0.003814	0.006878	0.554573	0.5798
EMPLOYMENT_AGRICULTURE(-1)	0.011020	0.018429	0.597967	0.5506
GFCF	-0.035550	0.025390	-1.400182	0.1631
C	4.124862	3.256328	1.266722	0.2068

R-squared	0.024236	Mean dependent var	0.808794
Adjusted R-squared	-0.001442	S.D. dependent var	1.142455
S.E. of regression	1.143279	Akaike info criterion	3.135812
Sum squared resid	248.3464	Schwarz criterion	3.236162
Log likelihood	-301.3095	Hannan-Quinn criter.	3.176438
F-statistic	0.943849	Durbin-Watson stat	1.806210
Prob(F-statistic)	0.453810		

Figure 3: ***Heteroskedasticity test***

Source: *Own processing using Eviews 9.0*

I had also calculated the result of the Jarque-Bera test (*Figure 4*), whose associated probability (39.17%) confirmed that the errors are normally distributed.

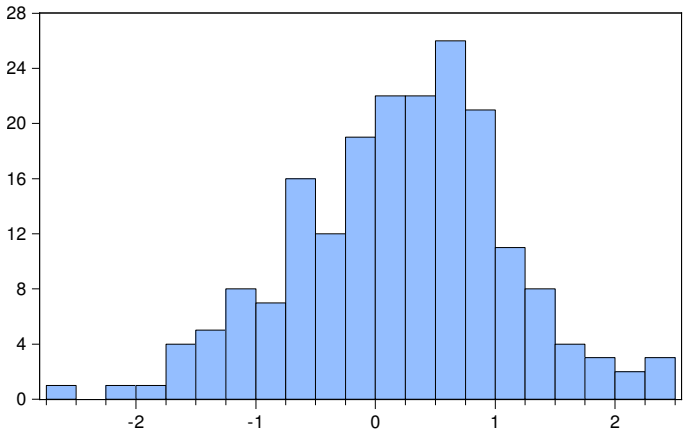

Series: Standardized Residuals
Sample 2011 2017
Observations 196

Mean	0.194846
Median	0.271980
Maximum	2.335967
Minimum	-2.585711
Std. Dev.	0.880217
Skewness	-0.221043
Kurtosis	3.184663
Jarque-Bera	1.874579
Probability	0.391688

Figure 6: ***Jarque-Bera test***

Source: *Own processing using Eviews 9.0*

Finally, I checked the Klein's criterion by comparing the correlations between the independent variables and the coefficient of determination. Given that the values of the correlations were below the level of the reference indicator, I accepted the absence of multicollinearity (*Figure 7*).

	LIFE_EXPE...	EARLY_LE...	CORRUPTI...	EMPLOYM...	GFCF
	LIFE_EXPE...	EARLY_LE...	CORRUPTI...	EMPLOYM...	GFCF
LIFE_EXPE...	1.000000	0.119772	0.525118	-0.501990	-0.249129
EARLY_LE...	0.119772	1.000000	-0.209314	0.125743	-0.124160
CORRUPTI...	0.525118	-0.209314	1.000000	-0.513066	0.132280
EMPLOYM...	-0.501990	0.125743	-0.513066	1.000000	0.013585
GFCF	-0.249129	-0.124160	0.132280	0.013585	1.000000

Figure 7: ***Klein's criterion***

Source: *Own processing using Eviews 9.0*

Conclusions

Through this analysis, I identified a positive relationship between life expectancy and human development. This also confirms the fact that high life expectancy of the population, which can be ensured by reducing poverty, improving the health and education systems determines human development.

From another perspective, I demonstrated that the increase of corruption perception index (which reflects a fall in the incidence of corruption) impacts positively the human development index. In countries where corruption incidence is low, citizens and resident corporates, but also investors have more confidence in the policies adopted by the government, which ensures a favorable environment for development.

Moreover, I found a positive relationship between gross fixed capital formation and human development index. In this case, a high level of investment creates more opportunities for population, which drives human development on a upward trend.

This paper also demonstrated the negative impact of early leavers rate and employment in agriculture on human development. This fact shows that, people leaving studies early are more exposed to a low quality of life and poverty, compared to the young people with higher education. A high employment rate in agricultural sector leads to the categorisation of a significant part of the employed population in a lower income category, which causes a decrease in the standard of living and therefore a reduction in the human development index.

Acknowledgment

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Annex

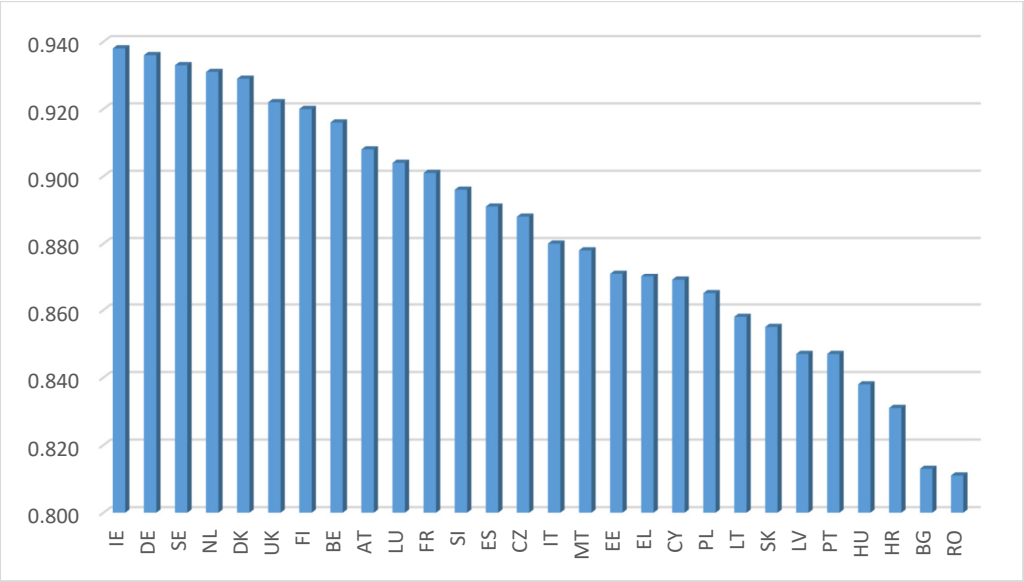

Annex 1: ***Human development index in the European Union member states in 2017***
Source: Own processing using United Development database

Language Competences and Professional Experience of University Students – Conclusions from the EU Project Management Improving Labor Skills

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Abstract

This paper, based on a brief outline of theoretical aspects of competence and project management in public universities – using the methods of analysis, descriptive and graphical data presentation – addresses the problem of the level and expectations of students of the last year of public university studies (studying finance and accounting) in terms of their competences, with particular emphasis on language competences and acquiring / expanding professional experience. The analysis also covered the assessment of the level of fulfillment of expectations in the scope of competences development, resulting from the participation in the „Be Creative – staff development for the business services sector" project, planned for implementation in 2018-2020. The project is co-financed by the European Social Fund under the Operational Programme Knowledge Education Development 2014-2020 and is implemented in a partnership formula by the Częstochowa University of Technology and Syntea S.A.

Keywords: Competences, EU Project, Project Management

Introduction

Competence is a concept of high-capacity meaning with no explicit, universal definition. Given numerous approaches, especially interesting is the one treating competence as a disposition in the field of knowledge, skills and attitudes allowing for the implementation of professional tasks at an appropriate level (Filipowicz, 2016).

The review of the subject literature enables to state, that numerous presented definitions of competences (and also qualifications) depend on the scientific perspective adopted by a given researcher (Kupczyk and Stor, 2017). However, as noticed by J. Rzempała, most of the competence approaches refers mainly to issues related to the effectiveness of using an organization's human capital and should constitute the basis for human resources management (Rzempała, 2017).

It should be emphasized that „competences" and „qualifications" concepts are often used interchangeably, while there are some approaches that significantly differentiate them and indicate that competences are primarily expressed by a strong emphasis on independence and responsibility in task implementation. Thus competence covers those characteristics (knowledge, skills, way of thinking, thought patterns, etc.) which applied in practice (individually or in various combinations) result in a successful completion (of work or task). Qualification, on the other hand, equals a valuable activity, which leads directly to the most efficient completion of organizational objectives. In this approach qualifications are based more on skills while competences (resulting mainly from acquired

qualifications) on conducts (Kupczyk and Stor, 2017; Orczyk, 2009; Mantura, 2016). This is one of the approaches. There are also approaches indicating that qualifications are education, professional experience and skills (confirmed by documents) and competences are a conglomerate of knowledge, skills, attitudes and personality traits (Kubat, 2015).

Competences, related to the human potential, are a dynamic and situational concept. They also constitute a set of knowledge and skills, typical conducts, standard procedures, ways of reasoning that can be applied with no new learning and can be constantly improved (Müller, et al, 2020). They became the key capital and success factor, both on the individual and organization level. Also the awareness of the necessity to acquire/expand (Chadi, et al, 2019) them seems to be more and more common, which is demonstrated by both corporate investment in human capital and individual / employee / staff level initiatives.

An important role in this regard is assigned to educational institutions, including universities, which are increasingly expanding their educational offer with additional programs, co-financed with the European Union funds. Those activities are seconded by the „Be Creative – staff development for the business services sector" (hereinafter referred to as „Be Creative") project, proposed to the students of the Faculty of Management at the Czestochowa University of Technology (studying at the last year of the second degree of finance and accounting studies), aimed at enhancing the competences of 101 students. Project of this type is one of the examples of such the activities improving students labor competences.

Projects, due to the long term associated with the preparation of co-financing application, its evaluation, co-financing decision, implementation and maintenance of results durability, become an element of university strategic management (Szczepaniak, 2017). The common use of projects – not only by universities – forced the searches for adequate methods and tools, which can ensure their effective implementation. Those needs are met by project management, that on one hand is equipped with its own procedures, methods and frameworks, and on the other hand has to be included in the management processes of universities and governing legislation. Project management goal is to ensure the achievement of objectives adopted in the project, measured in this case with product and result indicators, project completion within assumed time, within the given budget while maintaining the eligibility of costs. In addition, given the impact on the effectiveness of the EU funds absorption, it also becomes an element that condition the implementation of the university strategy (Szczepaniak, 2017; Szczepaniak, 2018).

Projects implemented by universities require the engagement of certain resources (material, financial and human), the use of certain management methods integrated with the management processes present at the university, on levels of planning, implementation and performance control (Chluska and Szczepaniak, 2015). Their effective implementation is supported by cooperation with external entities (enterprises and public entities, called the triple/quadruple helix model. It is a specific form of innovation involving, inter alia, the activities of universities and scientific units that adapt their research and teaching programs to national and regional assumptions, smart specializations, responding to contemporary challenges of the labor market (Etzkowitz and Leydesdorff , 2000; de Almeida Borges, et al 2020; Zhang, et al., 2019).

The Aim of the Article and its' Methodical Bases

The purpose of this study was adopted as an analysis of selected competences (expectations and the level of their fulfilment) of public university students – participants of the project co-finances by the ESF funds ("Be Creative"). Due to the fact that motives for undertaking additional activity (besides didactics resulting from the course of the study) emphasized by students included primarily the will to acquire language competences and practical use of acquired qualifications through various forms of cooperation with employers, selected competences were made subject to the main part of considerations. In order to achieve this purpose the paper included mainly the results of questionnaire studies addressing the expectations of students covered by the support and the assessment of the level

of their fulfilment resulting from the participation in the project, using the methods of analysis, descriptive and graphical data presentation.

Presented results were developed on the basis of questionnaire studies addressed to the first group of participants (students of Czestochowa University of Technology: 40 individuals, including 36 women and 4 men). Questionnaire studies were carried out in five stages: after completing the recruitment to the project, but before applying the first form of support (February 2018, initial questionnaire), during the first and the last classes of the module „English for accountants" (February-April 2018), before the start and after the completion of work placements (June-September 2018) and after completing all tasks – completion of the project participation (August-October 2018, final questionnaire) as well as 6 months after the completion of the project (January-March 2019).

The study used anonymous questionnaires including mainly closed questions addressed to all project participants. In the case of trainings (including the module „English for accountants") knowledge and skills tests (initial and final) were also used. This study is also a result of the experience of the authors, who were members of the project management team, responsible primarily for its organizational and financial aspects.

Managing the Competence-enhancing Project – Theoretical and Practical Background

Economic practice, globalization and growing competition confirm the increasing demand for qualifications and competences, which is accompanied by the increase in the importance of projects being the response to those needs. Therefore, the demand for project knowledge and competences in project management grows. The development of competences in the area of project management refers both to the individual and organizational perspectives, which are subject to a mutual feedback: organizational competences are the resultant of acquired individual competences, while employee competences and their development often depend on the organization internal conditions, ie. its needs, organizational culture, management system, resources, leadership. The existing relationship enables the mutual improvement and development of competences (Rzempała, 2017). Such relationship in the assessment of the authors of this study is also present in the case of the described „Be Creative" project. Its scope is the resultant of the cooperation between the university and the employers as well as consultations (conducted before the formulation of the educational scope of individual tasks and the application for the ESF funds) relating to expectations of both students (regarding their needs) and employers in the area of preferred competences of future employees. The project is also correlated with the university's strategy. The fundamentals of the project included proposing additional classes that would allow to acquire/expand competences reflecting the needs of the economy, labor market and society.

The main objective of the project was identified as the improvement of students' competences. Its achievement, while preparing staff for potential employers that is compliant with their expectations, is about to be ensured by the implementation of the support program, covering four consecutive tasks:

- task 1. certified trainings resulting in obtaining professional, language and IT qualifications;
- task 2. additional practical tasks implemented in the project form (workshop classes conducted by the scientific staff of the Faculty of Management at the Czestochowa University of Technology and the employers' representatives, focused on the ability to solve featured problems of a specific company);
- task 3. two-day study visits in companies;
- task 4. 1-month work placement in companies of BPO/SSC/IT industries, allowing to acquire professional experience.

Under the project, the university initiated cooperation with four companies from Czestochowa, which in July-September 2018 provided project participants with the opportunity to increase their professional competences during 1-month professional work placements, namely:

- ZF European Shared Services Center – one of the largest employers in Czestochowa, providing financial and accounting services for the corporation's production plants located in Europe; the countries served include: Poland, Germany, Great Britain, Spain, Portugal, Italy, France, the Czech Republic, Slovakia and Romania,

- S24 Management – a company providing services in the area of law, accounting, finance and management for many entities with production, service, and trade profiles, including large listed companies,

- „LEW" Group SA – a leader on the terminal solutions market, having the status of National Payment Institution and providing financial and payment services; in 2013 the company became the owner of a majority stake in mPay SA and entered the FinTech industry,

- Firma Konsultingowo-Doradcza, Agnieszka Całus – a provider of complex services in the area of accounting, human resources and payroll, as well as tax and economic consulting.

For the proper implementation of the „Be Creative" project a management team was created, and the tasks assigned to its members (and responsibilities) were focused on following issues:

- organizational (securing the implementation of individual stages of the project according to the co-financing agreement, reporting on material progress),

- financial (implementing financial schedule, handling current payments, reporting on financial progress),

- administrative (public procurement issues, proper circulation of documents).

The base of the project staff (trainers) consists of the educational personnel of the Faculty of Management (selected by the management team, on the recommendation of the Dean of teaching, based on acquired competences and the analysis of current didactic workload of individual employees) and trainers (with appropriate university degree, minimum two-year teaching experience and VCC accreditation), selected by the Partner (Syntea S.A.), according to the procedure required in this type of projects. In the case of work placements, each student does it under care of a caregiver appointed by the employer, who provides educational supervision over its organization and course.

Expectations of University Students Related to the Participation in the Project and their Verification – Research Results

Before starting the project the participants determined (in the initial questionnaire; February 2018) their expectations associated with its implementation and the scope of acquired own competences. Then those expectations were verified in the final questionnaire, made after completing all forms of support (August-October 2018). The results reflecting the motives for participating in tasks under the project were presented in Figure 1. According to it the most important incentive was the will to complete professional work placements – 35 individuals out of 40 indicated that reason as the most significant (the possibility of providing more than one answer was assumed). A slightly less importance was assigned to the will to expand knowledge and skills in the area of professional English use. 34 respondents identified the acquisition of English for accountants competences as an important incentive to participate in the project. Given those two factors were the most important for students, the objective of this study was adopted as the evaluation of language competences acquired in the project and the analysis of experience resulting from professional work placements.

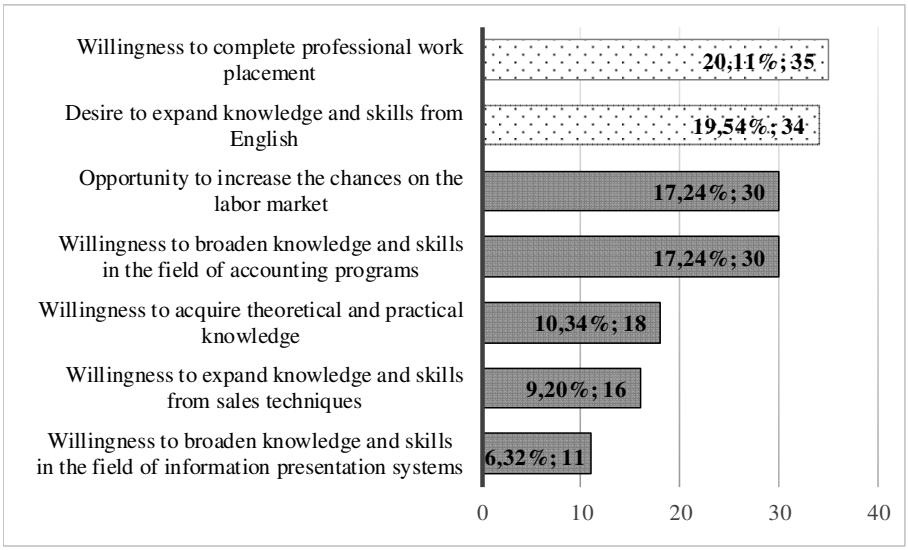

* percentages indicated in the chart represent the fraction of all answers given (174)

Fig. 1: Motives of student participation in the project

Source: Own elaboration.

In this context it is important to closely illustrate the level of knowledge and skills of students at the initial and final stages of the project which was done in Figure 2. Respondents, using a 5-point weight scale, where 1 represented low importance and 5 – high importance, were about to assess their knowledge and skills in seven research areas, thematically related to the scope of tasks the project was dedicated to. The adoption of weights facilitated the evaluation which area of knowledge, according to the respondents, was the most significant in the moment of starting the participation in the project, and which was finally the most improved. This is an important indication for project managers, as it allows to effectively direct the consecutive projects to tasks, that will bring the most tangible benefits to the participants.

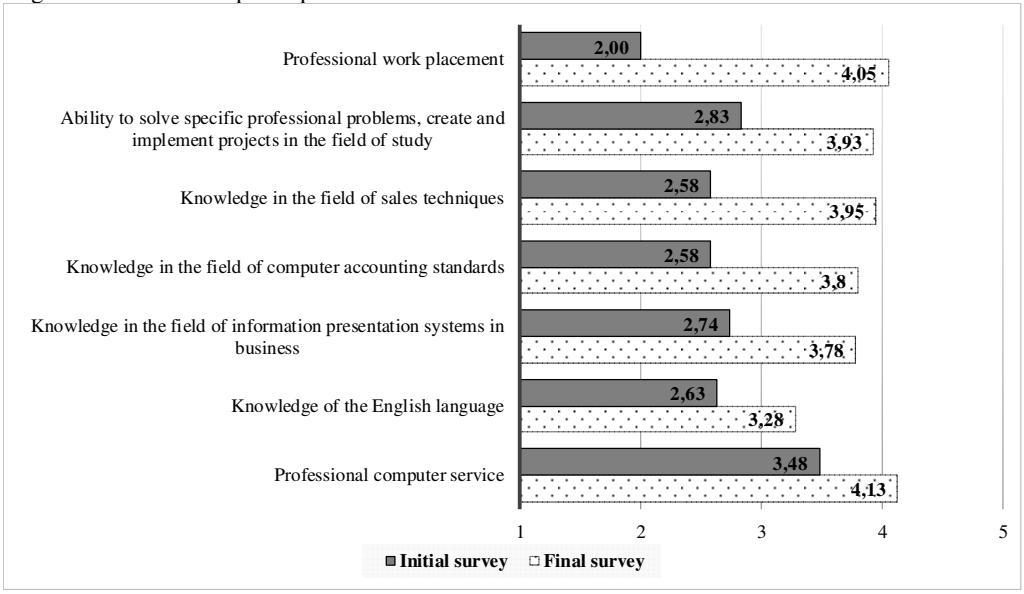

* values indicated in the chart represent averaged results within the 1-5 weight scale

Fig. 2: Assessment of students' knowledge and experience before and after the project

Source: Own elaboration.

Assuming that answers given the weight of 4-5 are the most important for the respondents, it should be definitively stated that greatest development of students' knowledge occurred in areas, where the difference between average importance of a given competence in the initial and final questionnaires was the highest. Those areas included:

- completed professional work placements (difference in average values at 2.05),
- knowledge of sales techniques (1.37),
- knowledge of computer accounting standards (1.22).

The significance of expanding competences in the area of professional English, that was initially signalled important by the students, did not resulted to be the most effective in the end (difference in average values – 0.65), as well as the professional computer skills (0.65). Therefore, a detailed evaluation of completed professional work placements and language classes was made below in order to determine the reasons for this.

Analysis of Students' Language Competences Before and After Participating in the Project

As indicated by the initial questionnaire results, the will to expand knowledge and skills in English was one of the key incentives that made students participate in the project. In the same questionnaire (and again in the final questionnaire) students also assessed the level of their knowledge and professional experience related to professional English. The results of this process are presented in Figure 3.

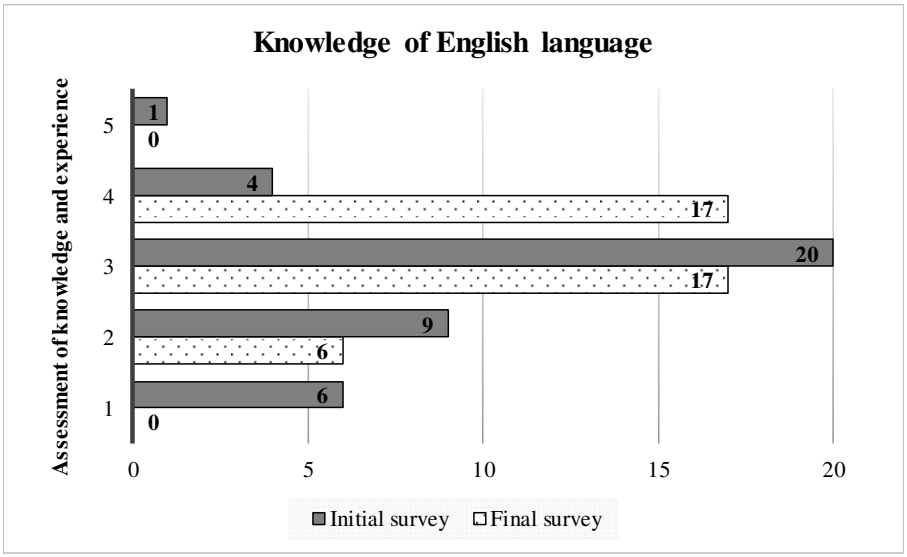

Fig. 3: Assessment of students' knowledge and experience in English before and after the project

Source: Own elaboration.

During the phase preceding the start of the education under task 1 (which included the „English for accountants" module) the participants were evaluating their language competences in the range of weak to average – 87.5% of the respondents (35 of 40 students) declared such level of their abilities, while only 4 individuals considered their knowledge to be good. The results of the final questionnaire confirmed the desired (and assumed in the project's objectives) progress in this area, as there is an evident switch in students' abilities from mediocre and sufficient level to good level – after

completing all the tasks, as much as 17 individuals assessed their language skills as good. It is thought-provoking that before starting the education one person considered his/her abilities very good, while in the final questionnaire there was no such answer, and also that no respondent after completing the education declared very good language skills. It may suggest that already at the start of the project the participants represented poor language abilities, which however were possible to be improved to some extent through the participation in the project.

This fact is also indicated by the analysis of Figure 4, which presents the number of tests with a given score (max 15 points) as well as average results of the initial and final tests.

At the moment of starting the project the average score fluctuated around 4 points and only 3 students achieved the highest at that moment 7-point score. 80% of those who approached the initial knowledge test scored in the range of 2 to 5 out of 15 possible. After completing classes the average score was significantly improved (from 3.925 to 13.075), which was mostly affected by the fact that 23 students achieved a very high 14-point and 15-point score.

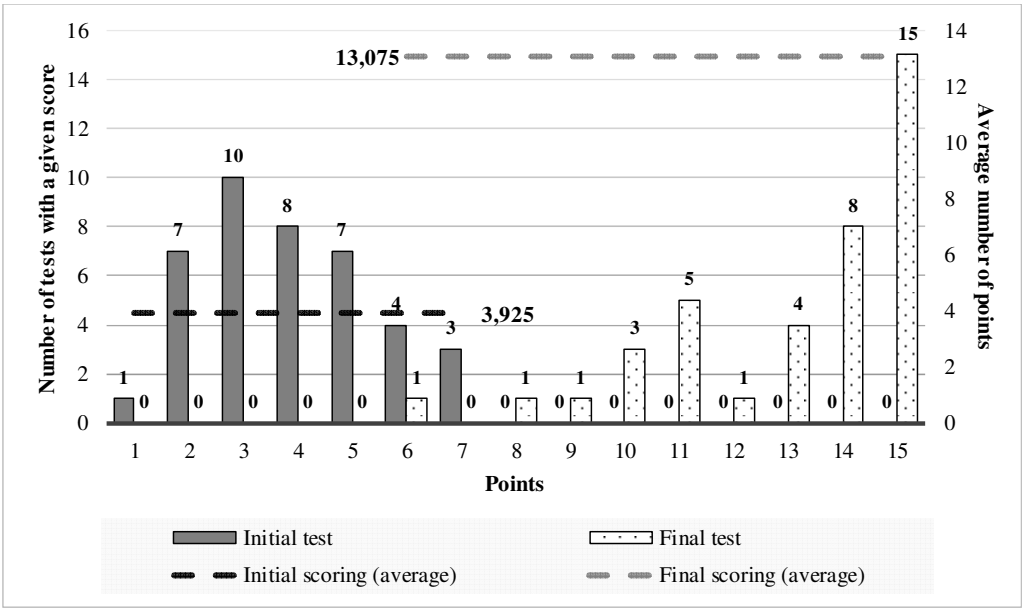

Fig. 4: Results of the initial and final tests checking knowledge in the area of "English for accountants"

Source: Own elaboration.

In summary, the level of students' knowledge and skills since the start of first English for accountants classes in February 2018 (ex ante questionnaires) until their completion in April 2018 (ex post questionnaires), on a 5-point scale, increased to a similar extent – on average from 2.60-2.65 to 3.83 (Figure 5).

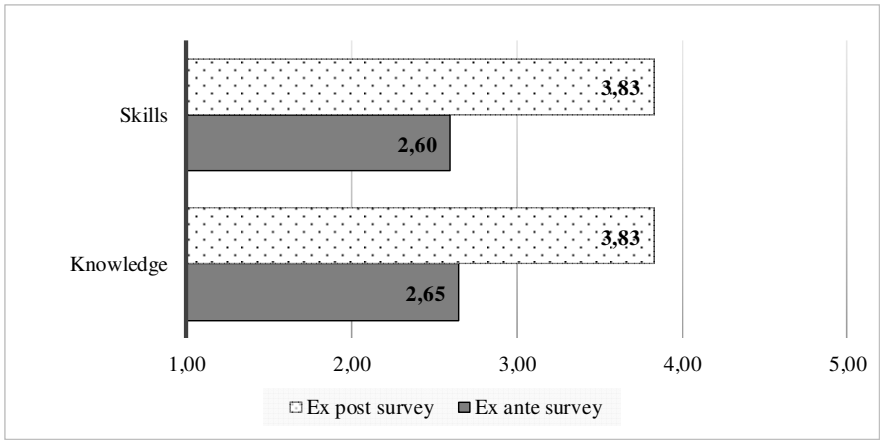

Fig. 5: Results of ex ante and ex post questionnaires in the area of knowledge and language skills of project's participants

Source: Own elaboration.

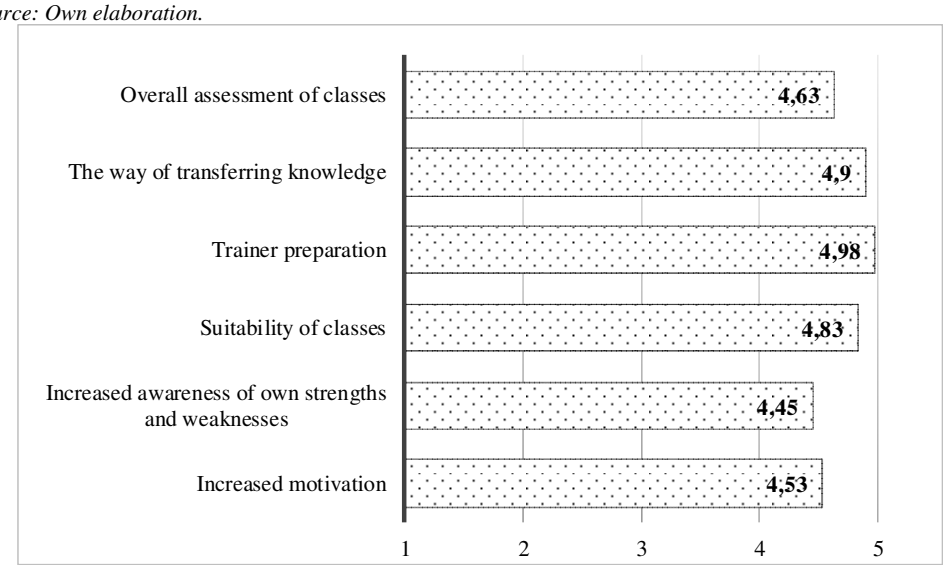

Fig. 6: Results of ex post questionnaires in the area of the "English for accountants" overall assessment

Source: Own elaboration.

In the ex post questionnaire concluding classes of this module the students assessed also the subject in general, expressing their opinion ia. on the method of sharing the knowledge and trainer preparation, usefulness of classes, as well as the increase in the awareness of own strengths and weaknesses and motivation for further development (Figure 6). The most apparent is a very good assessment of the person giving classes as well as the usefulness of those classes, which is a significant indication for the project's management team, signaling the subject is needed and implemented at the high level.

Evaluation of Professional Experience of Project's Participants After Completing Work Placements

In the initial questionnaire 35 of 40 students indicated the will to complete paid work placements as a most important determinant of their decision to participate in the project. Task 4 of the „Be Creative" project provided for the completion of 1-month work placements in companies of BPO/SSC/IT

industries by the participants, which would allow to acquire professional experience even before they enter the labor market.

Given the results of the initial questionnaire regarding the level of students' knowledge and experience before and after completion of the work placements (Figure 7), it is noticeable that probably those 35 individuals who indicated the completion of the work placements as the most important incentive to participate in the project were also the same group, who assessed their professional competences in the range of very weak to average. The analysis of the chart illustrating the students' opinions reveals the occurrence of the desired „mirroring" effect of the bars representing input and output results – acquisition of experience decreases the number of individuals with lower self-esteem at almost the same rate as the number of students with higher self-esteem increases, while the intersection point is the sufficient assessment of their skills. After completing the work placements 37 of 40 respondents declared that 1-month work placement in the company allowed them to increase competences from average to very high level – while 75% of them assessed their competences to be at least good.

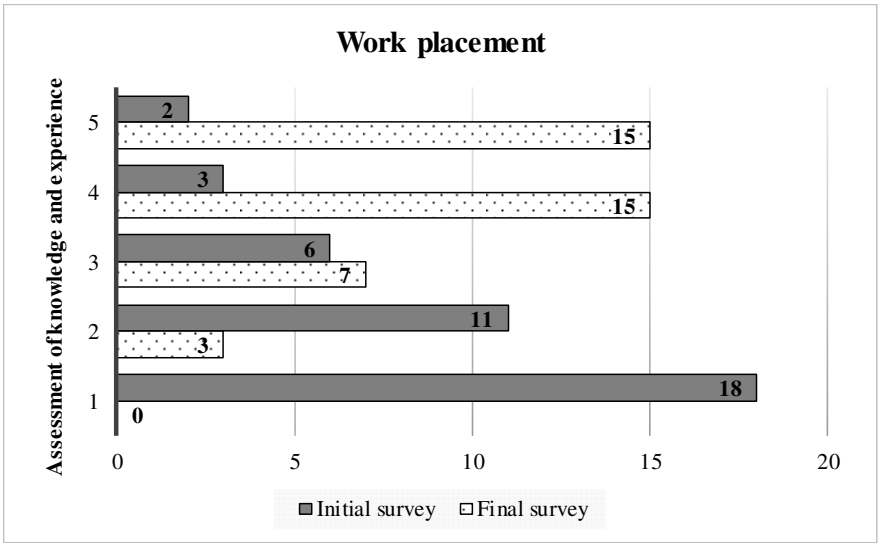

Fig. 7: Assessment of students' knowledge and experience in professional competence before and after the project

Source: Own elaboration.

Finally, the average level of the project participants' knowledge and skills in terms of professional competence was improved, however, to a smaller extent than in the case of English. The outcome of this process were presented in Figure 8. Those results slightly oppose the results of the initial and final questionnaires presented in Figure 2, where work placements were identified as the most developmental. However, it is possible that when evaluating each task individually students were more judgmental than during the total evaluation of all tasks.

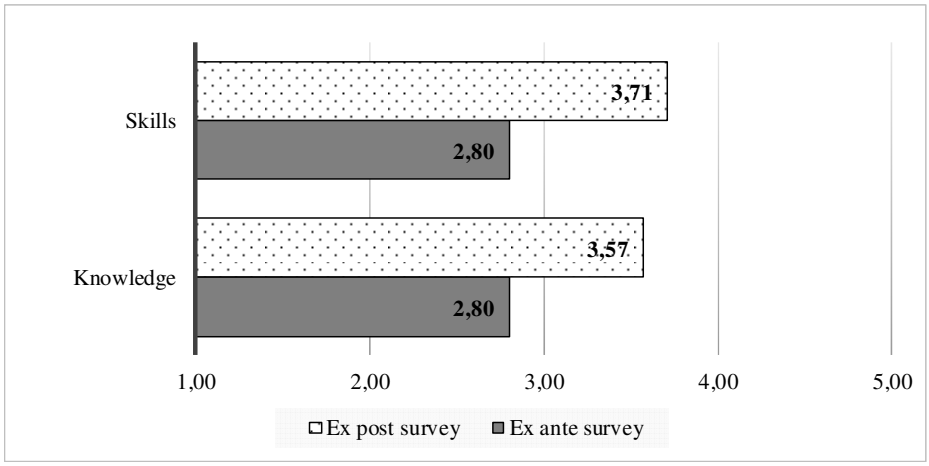

Fig. 8: Results of ex ante and ex post questionnaires in the area of professional skills of project's participants

Source: Own elaboration.

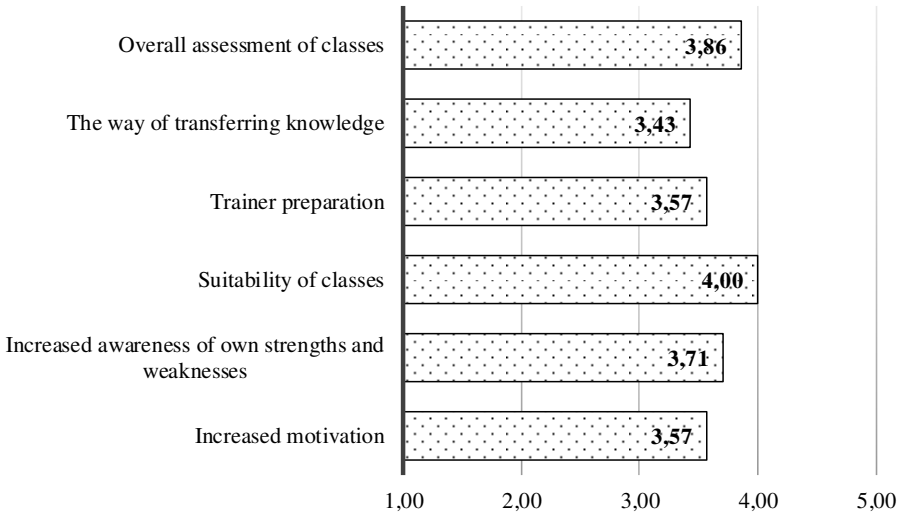

Fig. 9: Results of ex post questionnaires in the scope of the overall work placement assessment

Source: Own elaboration.

The overall evaluation of this task, which results are illustrated on Figure 9, is also lower than in the case of the „English for accountants" module. The usefulness of classes stands out with a good assessment, however the other elements of the evaluation, such as trainer preparation or the method of sharing the knowledge, indicate some disappointment of students with this task. It can be assumed that in a situation where a person responsible for the implementation of the task from the company side is also obliged to perform his/her professional duties at the work placement location, he/she also has higher expectations about the independence and the rate of acquiring new skills by the student – a potential employee. At this stage there occurs a collision of employers and employees expectations. The employer, when employing, expects self-reliance, creativity and willingness to learn, while the employee expects an educational support. Its absence may lead to the loss of motivation, which was also signaled in the results of ex post questionnaire.

Conclusions

The fundamental objective of the implementation of the project described in this paper was adopted as an increase in the competences of 101 students, entering the labor market after completing the project. It should translate into greater ease in finding a satisfying job in the profession, especially with the employers operating in the modern financial services industry. The level of achieving the objective, besides tests and questionnaires which results were presented in the paper, is measured by beginning the work (in particular with an employer operating in BPO, SSC or IT sector – within 6 months from completing participation in the project). Result indicators also include starting employment in other industries and continuing education. Obtained results – despite relatively high assessments by students of individual support forms and educational staff, as well as meeting their expectations, despite the results of competence tests clearly indicating the expansion of knowledge and skills, and a good position on the labor market – place themselves far below expectations, both of students – project participants, and project management team. This is evidenced by the fact. that only 29 project participants (72.5%) started any employment after completing their studies (and the project), and the others (almost 1/3) within 6 months did not show any professional activity, nor undertake education. Only 7 individuals was employed (under a contract of employment or a civil-legal contract) by BPO sector employers, most of them by employers cooperating in work placement programs. Direct interviews with those employers and with students (project participants), conducted by the authors of this study after the completion of the first edition of the project, reveal the still-existing employment needs, however in individual cases job offers presented to students did not meet their acceptance. Existing employment and competence gaps can be potentially „filled" with the participants of the second and third edition of the project (61 students).

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The Impact of Informal Credit towards Poverty: Evidence from Indonesia

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Abstract

Poverty has been a recurring problem in Indonesia, where credit access is one of the determinants that could affect poverty alleviation. However, for most of the poor, the only available credit for them are informal credit, which charges them with a high interest rate. By using Ordered Logit Regression, utilizing data from IFLS 3 & IFLS 4 to evaluate the short-term effect of informal credit towards poverty, and utilizing IFLS 3 & IFLS 5 to see the long-term effect. It is found that credit access decreases poverty incidence in both the short-term and the long-term. However, informal credit in Indonesia increases poverty incidence in both the short-term and the long-term. From these findings, it can be concluded that informal credit in Indonesia is not yet able to make the poor get out from poverty, due to the practice of loan sharks. Should informal credit in Indonesia be regulated to be like Vietnam's for example, then informal credit may be able to help Indonesians to live a better life.

Keywords: Poverty, Credit Access, Informal Credit

Introduction

Indonesia has continuously been trying to alleviate poverty throughout these past years. However, the speed of poverty alleviation has been slowing in the last few years (Exhibit 1.), (y-axis: proportion of poor people, x-axis: year). There are several causes that may affect poverty dynamics, such as household dynamics (Widyanti, Suryahadi, Sumarto, & Yumna, 2009), education (Biewen, 2003), et cetera including credit access (Lal, 2017), which has been overlooked in researches about Indonesia.

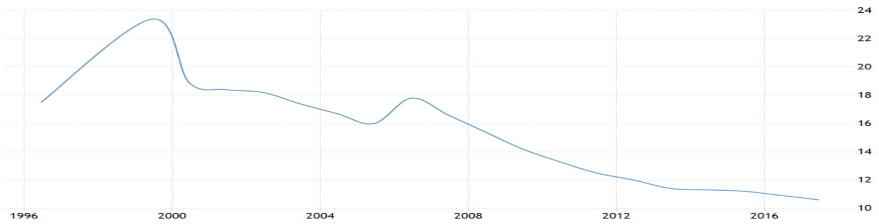

Fig. 1: Poverty Head Count in Indonesia (1996-2014). *World Bank*.

In Exhibit 1, the graph is flattest bewteen 2013-2016, while from Exhibit 2, Indonesia has shown approximately a 10% increase in its financial inclusion index[i]. This indicates more people have credit access, meaning that people should be better off. But in previous studies, lack of credit is proven to be a main cause as why the poor stay poor (Yunus, 1998), yet with the improvement in credit access from

Exhibit 2, poverty alleviation gets slower. This data raises the question whether credit access really helps in alleviating poverty.

There are three credit sources for Indonesians, which are formal, semi-formal, and informal credit institutions. Formal credit institutions include banks[ii], semi-formal credit institutions include microcredit institutions, and informal credit institutions are institutions that give out loans from their private equity (Mohieldin & Wright, 2000). In order to gain credit from banks, it would require collateral and documents as the loan is more secure. The poor cannot fulfill the collateral and could not gain access to formal credit. Semi-formal credit has less requirements, but the lack of regulation allow microloan-sharks to lurk in microcredit firms, which will further hamper the poor (Lewis, 2008). So, the poor turn to the informal sector, where they do not have to provide anything if an agreement is made. As the loan is risky due to the chance of default, the lender will charge high interest rates. However, in Indonesia's Civil Code there are no regulations regarding the interest rate ceiling, which will make borrowers unable to return the loan and be stuck in debt. As their debt increases, they are more likely to be stuck in poverty (Anuchiworawong, 2007). It is interesting to see whether credit access and informal credit specifically affect poverty and may explain the contradiction between Exhibits 1 & 2.

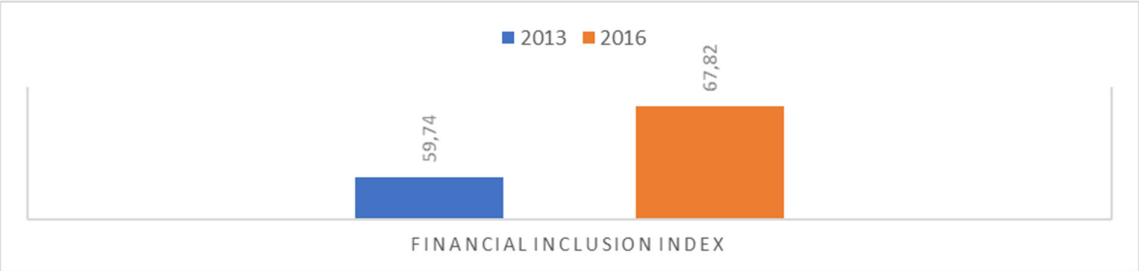

Fig. 2: Financial Inclusion Index in Indonesia in 2013 & 2016. ***Indonesia's Authority of Financial Services***

This research's novelty is derived from other studies regarding formal credit such as Nigeria (Obisesan & Akinlade, 2013), Peru (Schmied & Marr, 2016), India (Lal, 2017) and Indonesia (Sipahutar, Oktaviani, Siregar, & Juanda, 2016), which have all shown that formal credit helps in alleviating poverty. However, contradicting results appear where a study in Vietnam shows that informal credit helps poverty alleviation (Viet & Berg, 2011), and studies in Thailand (Anuchiworawong, 2007) and Ghana (Schindler, 2010) shows that informal credit makes the poor stay poor due to high transaction costs and unpaid debts. Studies about poverty determinants in Indonesia (Dartanto & Nurkholis, 2013; Dartanto & Otsubo, 2016) did not include informal credit. This research aims to confirm the previous studies that credit access in general helps in poverty alleviation and evaluate the impact of informal credit in Indonesia.

Section 2 will include theoretical foundation that is used for this research. Section 3 will elaborate the research data and methodology. Section 4 will explain the result and implications of the research. Section 5 will conclude with recommendations and limitations of the research.

Theoretical Foundation

Poverty

Poverty is deprivation in well-being; the inability to function properly in a society (Sen, 1987). There are different types of poverty based on the spell approach: chronic poverty, transient poverty, and never poor (Jalan & Ravallion, 2000). Chronic poor is people that stay poor for an extended period (Hulme & Shepherd, 2003). Transient poor is the people that move in and out of poverty, which can be divided into transient poor (+) and transient poor (-) (Gaiha & Deolalikar, 1993). Transient poor (+) are people

that got out from poverty. Transient poor (-) is the opposite. The never poor are people who constantly live above the poverty line.

Chronic poor people have a hard time to get out from poverty because they are in the poverty trap. Poverty traps are self-reinforcing mechanism that promotes never-ending poverty (Mas'Oed, 1997). A way to get out from the poverty trap is through credit access (Soederberg, 2013).

Previous studies have found several poverty determinants These can be divided into two categories: demographic and socioeconomic. For the demographic variables, it has been found that household dynamics (Widyanti et al., 2009), gender of household head (Muyanga, 2008), and education (Okojie, 2002), significantly affect poverty. While for the socioeconomic variables, it has been found that employment sector (Rapsomanikis, 2015), proportion of education expenditure (Dartanto & Otsubo, 2016), physical asset ownership (Dartanto & Nurkholis, 2013), and health of household head (Smith, 1999) significantly affects poverty. Credit access was also found to significantly affect poverty (Lal, 2017), but the effect of informal credit towards poverty still differ between researches. In Anuchiworawong (2007) and Schindler (2010), informal credit has negative effects for the poor, yet in Viet & Berg's (2011) research, it was found that informal credit helps the poor get out from the poor.

Financial Inclusion

Financial inclusion are initiatives to eliminate barriers from formal financial services. The barriers mentioned here are either in transaction costs or non-transactional costs for financial services. It has been found that not having credit access significantly affect poor households making them stuck in the poverty trap (Banerjee & Duflo, 2010).

Methodology

This research utilizes data from Indonesia Family Life Survey (IFLS) 3, 4, and 5 to find the effect of credit access and informal credit towards poverty. To evaluate the short-term effect, IFLS 3 and IFLS 4 are used, while for the long-term effect, IFLS 3 and IFLS 5 are used. IFLS is being used due to its high recontact rate. To categorize poverty, additional data from Indonesia Statistic Bureau (*Badan Pusat Statistik)* was used to compare per capita expenditure to areal poverty line.

For this research, two ordered logit regression models will be used, with each model being used twice to evaluate the short-termand long-term effect. The first ordered logit regression will use credit access as the dependent variable. For the second ordered logit regression, the observations that did not gain credit access are dropped, and the dependent variable is people who secured a loan from informal credit institutions. The model used will closely follow Dartanto & Otsubo's (2016), as follows:

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + \varepsilon \quad (3.1)$$

Explanation of the variables are provided in Table 1 below:

Table 1: Description of Variables.

No.	Variable (*Notation)*	Description	Hypothesis	Source of Data
1.	Poverty (Y_i)	The data to calculate this variable is all available on IFLS and poverty line statistics by Indonesia's National Bureau of Statistics. It is to normalize poverty line and household income over time to see	-	IFLS 3, IFLS 4, IFLS 5, Indonesia's National Bureau of Statistics

		households' poverty categorization. Where 0 implies chronic poor, 1 implies transient poor (-), 2 implies transient poor (+), and 3 implies never poor.		
Variables of Interest				
2.	People that successfully secured a loan in 2000 (X_1)	People that successfully secured a loan in 2000 ;1 implies the person succeeded, 0 implies otherwise.	Securing a loan decreases poverty incidence.	IFLS 3
3.	*People Who Secured Credit from Informal Credit Institutions in 2000* (X_1, *Second regression)*	People that successfully secured a loan from informal institutions in 2000; 1 implies the person succeeded, 0 implies otherwise.	Borrowing from informal institutions increases poverty incidence.	IFLS 3
Demographic Variables				
4.	Household size in 2000 (X_2)	Number of family members in 2000.	Larger household size increases poverty incidence	IFLS 3
5.	Age of household head in 2000 (X_3)	Age of the household head in 2000.	Older household head decreases poverty incidence.	IFLS 3
6.	Square of age of household head in 2000 (X_4)	Square of age of the household head in 2000	The nonlinear effect of age increases poverty incidence.	IFLS 3
7.	Household head' education in 2000 (X_5)	Years of household head's education	Household heads with higher education decreases poverty incidence.	IFLS 3
8.	Gender of household head in 2000 (X_6)	Gender of the household in 2000; 1 implies male, 0 implies otherwise.	A male household head decreases poverty incidence.	IFLS 3
Socioeconomic Variables				
9.	Proportion of smoking expenditure to total expenditure per capita in 2000 (X_7)	Proportion of monthly smoking expenditure to monthly expenditure per capita in 2000.	A larger proportion of smoking expenditure will increase poverty incidence.	IFLS 3
10.	Proportion of education expenditure to total expenditure per capita in 2000 (X_8)	Proportion of monthly education expenditure to monthly expenditure per capita in 2000.	A larger proportion of education expenditure will decrease poverty incidence.	IFLS 3
11.	Health status of household head in 2000 (X_9)	Health status of the household head; 1 implies the household head is healthy in 2000, 0 implies otherwise.	A healthy household head will decrease poverty incidence.	IFLS 3
12.	Total physical asset owned in 2000 (X_{10})	Total physical asset ownership in 2000.	More physical asset ownership will	IFLS 3

			decrease poverty incidence.	
13.	Employment sector in 2000 (X_{11})	Household head's employment sector in 2000; 1 implies that the household head was working in agriculture in 2000, 0 implies otherwise.	A household head that works in the agriculture sector will increase poverty incidence.	IFLS 3
Change in Variables				
14.	Larger household size in 2007/2014 (X_{13})	Growth of household size between periods; 1 implies a household is larger in 2007/2014 than in 2000, 0 implies otherwise.	Larger household size in the second period will increase poverty incidence.	IFLS 3, 4, and 5
15.	Increase in household head's education in 2007/2014 (X_{14})	Increase of household head's education between 2000 and 2007/2014; 1 implies there is an increase in parents' education, 0 implies otherwise.	An increase in household head's education in the second period will decrease poverty incidence.	IFLS 3, 4, and 5

Result and Analysis

First Regression (Long-Term): Effect of Credit Access Towards Poverty Incidence

The regression results for the long-term effect of credit access are described in Table 2, while the marginal effect analysis is explained in Table 3 below:

Table 2: Ordered Logit Regression Results for People Who Secured A Loan on 2000 Towards Poverty Incidence in the Long Term[iii]

Variable	Coeff.
Variable of Interest	
People Who Secured A Loan in 2000 (1=Secured A Loan, 0=Other)	0.179**
Demographic Variables	
Household Size in 2000	-0.205***
Age of Household Head in 2000	-0.007
Square of Age of Household Head in 2000	-0.001
Household Head's Education in 2000	0.034***
Gender of Household Head in 2000 (1=Male, 0=Other)	0.249**
Socioeconomic Variables	
Proportion of Smoking Expenditure to Total Monthly Expenditure per Capita in 2000	-0.395***
Proportion of Education Expenditure to Total Monthly Expenditure per Capita in 2000	0.270
Health Status of Household Head in 2000 (1=Healthy, 0=Other)	0.044
Total Physical Asset Owned in 2000	7.26e-10*
Employment Sector in 2000 (1=Agriculture, 0=Other)	-0.124**
Change in Variables	
Larger Household Size in 2014 (1=Larger Household Size, 0=Other)	-0.234***
Increase in Household Head's Education in 2014 (1=Increased Educational Attainment, 0=Other)	0.213***

/cut1	-4.919
/cut2	-3.043
/cut3	-2.201
Number of Observation	10,071
Log Likelihood	-6812.750
Wald Chi Square	.
Pseudo R^2	0.028

Table 3: Estimation of Marginal Effects for Regression 1 in the Long-Term.

Variable	Estimated Marginal Effects			
	CP	TP (-)	TP (+)	NP
Variable of Interest				
People Who Secured A Loan in 2000 (1=Secured A Loan, 0=Other)	-0.030	-1.274	-1.194	2.772
Demographic Variables				
Household Size in 2000	0.035	1.458	1.367	-3.172
Age of Household Head in 2000	-0.012	-0.049	-0.046	-0.106
Square of Age of Household Head in 2000	-3.36e-07	-1.41e-06	-1.32e-06	3.07e-06
Household Head's Education in 2000	-0.058	-0.246	-0.230	0.535
Gender of Household Head in 2000 (1=Male, 0=Other)	-0.421	-1.774	-1.662	3.857
Socioeconomic Variables				
Proportion of Smoking Expenditure to Total Monthly Expenditure per Capita in 2000	0.669	2.818	2.640	-6.128
Proportion of Education Expenditure to Total Monthly Expenditure per Capita in 2000	-0.458	-1.927	-1.801	4.191
Health Status of Household Head in 2000 (1=Healthy, 0=Other)	-0.075	-0.313	-0.293	0.681
Total Physical Asset Owned in 2000	-1.23e-11	-5.18e-11	-4.85e-11	1.13e-10
Employment Sector in 2000 (1=Agriculture, 0=Other)	0.209	0.881	0.825	-1.912
Change in Variables				
Larger Household Size in 2014 (1=Larger Household Size, 0=Other)	0.397	1.670	1.564	-3.633
Increase in Household Head's Education in 2014 (1=Increased Educational Attainment, 0=Other)	-0.361	-1.522	-1.426	3.301

The first regression found that credit access significantly affects poverty at a 5% significance level, which is consistent with the findings of Yunus (1998), Obisesan (2013), Schmidt & Marr (2016), and Lal (2017), and confirms this research's first primary hypothesis. From Table 4.6, we can see that credit

access reduces the probability of being chronic poor by 0.3% and increases the probability of being never poor by 2.77%.

The significant demographic variables are household size in 2000, education of the household head in 2000, and gender of household head. A larger household size reduces the probability of being never poor by 3.17% for each additional household member, which is consistent with our hypothesis and previous studies (Meenakshi & Ray, 2002' Widyanti, et al., 2009; Dartanto & Otsubo, 2016). Meanwhile, when a household head has an increase in his/her education, the probability of being never poor increases by 0.53%. This is also consistent with previous studies (Jansen, 1950; Awan et al., 2011). While gender of the household head significantly affects poverty at the 5% significance level, where a male household head will increase the probability of being never poor by 3.86%, which also aligns to previous studies (Bourreau-Dubois, Jeandidier, & Berger, 2003).

All socioeconomic variables except health of the household head and share of education expenditure to total expenditure significantly affects poverty incidence at 10% significance level, but proportion of smoking expenditure and employment sector in 2000 are significant at a 1% significance level. A higher smoking expenditure increases poverty incidence, since the money used for smoking could be used to increase the quality of human capital. From the marginal effect analysis, a higher proportion of smoking expenditure decreases the probability of being never poor by 6.13%. When people work in the agriculture sector, the probability of being chronic poor increases by 0.2%, and probability of never poor decreases by 1.91%, which is caused by the lower income the agriculture sector has compared to other sectors.

Lastly, the change in variables are all statistically significant at a 1% significance rate. It is shown from Table 4.6. that if a household is larger in the second period, the probability of being transient poor (-) increases by 1.67%, which means a larger household increases the chances of falling into poverty. This is consistent with the findings of previous studies (Meenakshi & Ray, 2002), due to more household members mean a higher living cost. While an increase in parents' education will increase the probability of being never poor by 3.301%, which even emphasizes the importance of human capital investment, and is consistent with the findings of the previous studies (Okojie, 2002; Awan, et al., 2011).

Second Regression (Long-Term): Effect of Informal Credit Towards Poverty Incidence

After the first regression, the observations that did not secure a loan are dropped. The regression results for the second regression are in Table 4, while the marginal effect analysis is in Table 5 below:

Table 4: Ordered Logit Regression Results for People Who Secured A Loan from Informal Credit Institutions on 2000 Towards Poverty Incidence in the Long Term

Variable	Coeff.
Variable of Interest	
People Who Secured A Loan from Informal Credit Institutions in 2000 (1=Informal Credit Institutions, 0=Other)	-0.361**
Demographic Variables	
Household Size in 2000	-0.213***
Age of Household Head in 2000	0.444
Square of Age of Household Head in 2000	-0.001
Household Head's Education in 2000	0.212
Gender of Household Head in 2000 (1=Male, 0=Other)	0.077
Socioeconomic Variables	
Proportion of Smoking Expenditure to Total Monthly Expenditure per Capita in 2000	-0.697***
Proportion of Education Expenditure to Total Monthly Expenditure per Capita in 2000	0.188

Health Status of Household Head in 2000 (1=Healthy, 0=Other)	0.065
Total Physical Asset Owned in 2000	-1.03e-09
Employment Sector in 2000 (1=Agriculture, 0=Other)	0.175
Change in Variables	
Larger Household Size in 2014 (1=Larger Household Size, 0=Other)	0.124
Increase in Household Head's Education in 2014 (1=Increased Educational Attainment, 0=Other)	0.229
/cut1	-4.449
/cut2	-2.311
/cut3	-1.708
Number of Observation	1,064
Log Likelihood	-607.554
Wald Chi Square	0.000
Pseudo R^2	0.038

Table 5: Estimation of Marginal Effects for Regression 2 in the Long-Term

Variable	Estimated Marginal Effects			
	CP	TP (-)	TP (+)	NP
Variable of Interest				
People Who Secured A Loan from Informal Credit Institutions in 2000 (1=Informal, 0=Other)	0.468	2.601	1.585	-4.655
Demographic Variables				
Household Size in 2000	0.276	1.532	0.934	-2.742
Age of Household Head in 2000	-0.057	-0.319	-0.194	0.571
Square of Age of Household Head in 2000	7.13e-06	0.004	0.002	-0.007
Household Head's Education in 2000	-0.027	-0.153	-0.093	-0.571
Gender of Household Head in 2000 (1=Male, 0=Other)	-0.099	-0.552	-0.337	0.988
Socioeconomic Variables				
Proportion of Smoking Expenditure to Total Monthly Expenditure per Capita in 2000	0.903	5.013	3.055	-8.971
Proportion of Education Expenditure to Total Monthly Expenditure per Capita in 2000	-0.244	-1.353	-0.823	2.422
Health of Household Head in 2000 (1=Healthy, 0=Other)	-0.085	-0.473	-0.288	0.847
Total Physical Asset Owned in 2000	1.34e-11	7.42e-11	4.52e-11	-1.33e-10
Employment Sector in 2000 (1=Agriculture, 0=Other)	-0.023	-1.262	-0.769	2.258
Change in Variables				
Larger Household Size in 2014 (1=Larger Household Size, 0=Other)	-0.160	-0.889	-0.542	1.590

Increase in Household Head's Education in 2014 (1=Increased Educational Attainment, 0=Other)	-0.297	-1.651	-1.006	2.954

Informal credit is significant in increasing poverty incidence at 5% significance level. This is consistent with the findings of previous studies (Zeller & Sharma, 1998; Anuchiworawong, 2007), and proves the second primary hypothesis of this research is true. This indicates that informal credit in Indonesia has not reached its full potential in helping the poor to become not poor. From the marginal effect analysis, borrowing from the informal sector increases the probability of being chronic poor by 0.468%, and increases the probability of being transient poor (-) by 2.601%, while reducing the probability of being never poor by 4.655%.

Most of the control variables have become insignificant due to the amount of observations that were deleted. Only two variables remain significant, which are household size and proportion of smoking expenditure to total monthly expenditure, both increase poverty incidence. In the second regression, an increase in the household size will reduce the probability of being never poor by 2.742%, while an increase of proportion of smoking expenditure will reduce the probability of being never poor by 8,971%.

First Regression (Short-Term): Effect of Credit Access Towards Poverty Incidence

The first regression results for the short-term evaluation are explained in Table 6, while the marginal effect analysis is in Table 7 below:

Table 6: Ordered Logit Regression Results for People Who Secured A Loan on 2000 Towards Poverty Incidence in the Short-Term

Variable	Coeff.
Variable of Interest	
People Who Secured A Loan in 2000 (1=Secured A Loan, 0=Other)	0.219**
Demographic Variables	
Household Size in 2000	-0.306***
Age of Household Head in 2000	0.029*
Square of Age of Household Head in 2000	-0.0003**
Household Head's Education in 2000	0.113***
Gender of Household Head in 2000 (1=Male, 0=Other)	0.300***
Socioeconomic Variables	
Proportion of Smoking Expenditure to Total Monthly Expenditure per Capita in 2000	-0.512***
Proportion of Education Expenditure to Total Monthly Expenditure per Capita in 2000	1.645***
Health Status of Household Head in 2000 (1=Healthy, 0=Other)	0.155*
Total Physical Asset Owned in 2000	1.77e-08***
Employment Sector in 2000 (1=Agriculture, 0=Other)	-0.124**
Change in Variables	
Larger Household Size in 2007 (1=Larger Household Size, 0=Other)	-0.331***
Increase in Household Head's Education in 2007 (1=Increased Educational Attainment, 0=Other)	1.022***
/cut1	-3.343
/cut2	-2.278
/cut3	-1.102

Number of Observation	11,436
Log Likelihood	-5709.794
Wald Chi Square	0.000
Pseudo R^2	0.1092

Table 7: Estimation of Marginal Effects for Regression 1 in the Short-Term.

Variable	Estimated Marginal Effects			
	CP	TP (-)	TP (+)	NP
Variable of Interest				
People Who Secured A Loan in 2000 (1=Secured A Loan, 0=Other)	-0.445	-0.648	-1.343	2.436
Demographic Variables				
Household Size in 2000	0.622	0.906	1.877	-3.405
Age of Household Head in 2000	-0.059	-0.086	-0.179	-0.324
Square of Age of Household Head in 2000	-6.79e-06	-9.89e-06	-0.002	0.004
Household Head's Education in 2000	-0.229	-0.334	-0.693	1.257
Gender of Household Head in 2000 (1=Male, 0=Other)	-0.610	-0.889	-1.841	3.340
Socioeconomic Variables				
Proportion of Smoking Expenditure to Total Monthly Expenditure per Capita in 2000	1.040	1.514	3.139	-5.694
Proportion of Education Expenditure to Total Monthly Expenditure per Capita in 2000	-3.342	-4.868	-10.088	18.298
Health Status of Household Head in 2000 (1=Healthy, 0=Other)	-0.316	-0.459	-0.952	1.728
Total Physical Asset Owned in 2000	-3.59e-10	-5.23e-10	-1.08e-09	1.97e-09
Employment Sector in 2000 (1=Agriculture, 0=Other)	0.312	0.455	0.942	-1.709
Change in Variables				
Larger Household Size in 2007 (1=Larger Household Size, 0=Other)	0.672	0.979	2.028	-3.679
Increase in Household Head's Education in 2007 (1=Increased Educational Attainment, 0=Other)	-2.076	-3.024	-6.266	11.366

Credit access significantly affects poverty incidence at 5% significance level. This shows that credit access consistently affects poverty incidence in the long-term and the short-term. Credit access increases the probability of being never poor by 2.43%, while decreasing the probability of being chronic poor by 0.44%, which is approximately the same effect as the long-term effect of credit access.

The demographic variables are all significant in affecting poverty at the 10% significance level. Variables household size and square of age of household head increases poverty incidence, while variables age of household head, gender of household head, and household head's education in 2000 all decreases poverty incidence. It can also be seen that size of the household consistently affects poverty in the short-term or the long-term.

The socioeconomic variables are also all significant on the 10% significance level. Health of the household head is significant on the 10% significance level. This shows that health of household head is significant in the short-term in affecting poverty incidence, but not in the long-term. When the health of a household head is good, then the probability of being chronic poor will fall by 0.452%, and the probability of being never poor will increase by 1.728%. This proves that the hypothesis is consistent with previous studies (Benzeval, Judge, & Shouls, 2001) Proportion of smoking expenditure consistently affects poverty at 1% significance level, making it a consistent poverty determinant. Proportion of education expenditure towards total expenditure is significant in the short-term, but not in the long-term, which differs from Teguh & Otsubo's study in 2016. An increase in proportion of education expenditure will increase the probability of being never poor by 18.298%, showing the importance of investing in human capital. Employment sector consistently affects poverty in the long-term and the short-term at 5% significance level. Total physical asset owned also consistently affects poverty at the 10% significance level. All variables have the same effect as the long-term regression.

Lastly, the change in variables, which are larger household size in 2007 and an increase in household head's education in 2007, are both consistent in affecting poverty incidence in the long-term and short-term regression, making them a good poverty determinant as found in Dartanto and Otsubo's research in 2016.

Second Regression (Short-Term): Effect of Informal Credit Towards Poverty Incidence

The regression results are in Table 8, and the marginal effect analysis is provided in Table 9 below:

Table 8: Ordered Logit Regression Results for People Who Secured A Loan from Informal Credit in 2000 Towards Poverty Incidence in the Short-Term

Variable	Coeff.
Variable of Interest	
People Who Secured A Loan from Informal Credit Institutions in 2000 (1=Informal Credit Institutions, 0=Other)	-0.657***
Demographic Variables	
Household Size in 2000	-0.375***
Age of Household Head in 2000	0.012
Square of Age of Household Head in 2000	-0.001
Household Head's Education in 2000	0.156***
Gender of Household Head in 2000 (1=Male, 0=Other)	0.646
Socioeconomic Variables	
Proportion of Smoking Expenditure to Total Monthly Expenditure per Capita in 2000	-0.602***
Proportion of Education Expenditure to Total Monthly Expenditure per Capita in 2000	-0.954
Health Status of Household Head in 2000 (1=Healthy, 0=Other)	0.136
Total Physical Asset Owned in 2000	1.33e-08***
Employment Sector in 2000 (1=Agriculture, 0=Other)	-0.193
Change in Variables	
Larger Household Size in 2007 (1=Larger Household Size, 0=Other)	-0.454***
Increase in Household Head's Education in 2007 (1=Increased Educational Attainment, 0=Other)	0.914***
/cut1	-4.441
/cut2	-3.245
/cut3	-2.257

Number of Observation	1,353
Log Likelihood	-478.406
Wald Chi Square	0.000
Pseudo R^2	0.1280

Table 9: Estimation of Marginal Effects for Regression 2 in the Short-Term

Variable	Estimated Marginal Effects			
	CP	TP (-)	TP (+)	NP
Variable of Interest				
People Who Secured A Loan from Informal Credit Institutions in 2000 (1=Informal, 0=Other)	0.864	1.562	2.560	-4.986
Demographic Variables				
Household Size in 2000	0.493	0.891	1.461	-2.845
Age of Household Head in 2000	-0.016	-0.028	-0.046	0.090
Square of Age of Household Head in 2000	2.16e-06	3.90e-06	6.40e-06	-0.001
Household Head's Education in 2000	-0.204	-0.370	-0.607	1.182
Gender of Household Head in 2000 (1=Male, 0=Other)	-0.850	-1.537	-2.520	4.908
Socioeconomic Variables				
Proportion of Smoking Expenditure to Total Monthly Expenditure per Capita in 2000	0.792	1.432	2.347	-4.571
Proportion of Education Expenditure to Total Monthly Expenditure per Capita in 2000	1.256	2.269	3.721	-7.246
Health of Household Head in 2000 (1=Healthy, 0=Other)	-0.179	-0.323	-0.529	1.032
Total Physical Asset Owned in 2000	-1.75e-10	-3.17e-10	-5.20e-10	1.01e-09
Employment Sector in 2000 (1=Agriculture, 0=Other)	0.254	0.459	0.753	-1.466
Change in Variables				
Larger Household Size in 2007 (1=Larger Household Size, 0=Other)	0.598	1.080	1.771	-3.448
Increase in Household Head's Education in 2007 (1=Increased Educational Attainment, 0=Other)	-1.203	-2.174	-3.564	6.941

From the second regression, it is found that informal credit consistently affect poverty the same way in the short-term and the long-term, but the short-term effect is more statistically significant, at 1% significance level. Borrowing from informal credit institutions increases the probability of being chronic poor by 0.864%, while reducing the probability of being never poor by 4.986%.

The difference in the short-term second regression is that a lot of control variables are still significant. The demographic variables that are significant in this regression are household size and household head's education. Household size in 2000 is statistically significant in increasing poverty incidence in all the regressions done. Household head's education reduces poverty incidence in this regression, where an increase in the household head's educational attainment will increase the probability of being never poor by 1.182%.

The only significant socioeconomic variable in this regression are proportion of smoking expenditure to total expenditure and total physical asset owned in 2000 at 1% significance level. Proportion of smoking expenditure is significant in increasing poverty incidence in all the regressions done, joining household size in 2000 as one of the best poverty determinants. An increase in total physical asset owned in 2000 reduces poverty incidence, which is consistent with the long-term effect of total physical asset owned.

Change in variables are both significant at 5% significance level, where a larger household will increase poverty incidence, and an increase in household head's education in the next period will decrease poverty incidence.

Conclusion

This study is expected to provide some new insight regarding informal credit in Indonesia, how both credit access and informal credit can affect poverty incidence so the right policies can be made in fighting the malpractices in informal credit that happens in Indonesia.

From this research, the hypotheses that were made were proven to be true. Credit access significantly and consistently affects poverty incidence in the short-term and long-term, where people who has credit access have a better chance of being never poor. Informal credit is found to also significantly and consistently affect poverty incidence in the short-term and long-term, where people that borrow from informal credit institutions are more vulnerable to being poor or being stuck as chronic poor.

Vietnam is a good example that can be followed in regulating informal credit, because in Vietnam, informal lenders are not immune to public policies, which is a major difference compared to Indonesia where informal lenders are invincible. A clear interest rate policy is needed in Indonesia in order to alleviate loan shark practice.

There are several limitations in this research with the first one being the unclear nature of informal credits that does loan shark practice. With the right dataset, a research can dive deeper into Indonesia's informal credit and find out whether these loan sharks are causing poverty. Second, the data being used is not the most recent data, as IFLS is conducted once every seven years. The third limitation of this research is the comparison method in determining poverty, where the comparison was done only using two periods. This research still can be developed, yet hopefully it will shed a light regarding credit access and informal credit's effects towards poverty in Indonesia, and a policy can be implemented to alleviate poverty even further.

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[i] Index used by Indonesia's Authority of Financial Services (*Otoritas Jasa Keuangan)* to measure financial inclusion in Indonesia

[ii] Banks include state-owned banks, commercial banks, cooperative banks, and agricultural banks.

[iii] For this table and the remainder of the research, ***, **, and * indicates significance on 1%, 5%, and 10% significance levels respectively.

Mobile Phone and Internet: The Dynamics of Technology and Financial Inclusion in Indonesia

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Abstract

The use of ICT in the household can be a force to increase financial inclusion. Especially if mobile phone and Internet is used in a way that it will gain user information and knowledge about finance. ICT could create a demand pull from the user side because of its nature to create a massive flow of information and knowledge (Sarma & Pais 2008; Ouma, Odongo & Were, 2017; Kabakova & Plaksenkov, 2018). In 2018 a survey by APJII stated that 64,8% (171.17 million people) of Indonesian have access to Internet with mobile phone as the most popular gadget to access it. The Indonesia's digital base continues to grow. But the digital base mainly uses mobile phone and Internet for a social purposes and entertainment, not really reflecting any information flows about financial education. Therefore, this study is interested in seeing whether the use of mobile phone and Internet in Indonesia households can improve the flow of information and knowledge about finance. That in the end will increase financial inclusion. This study uses Susenas 2017 and 2018 Podes with data at the household level for all cities/districts in Indonesia. The method use in this research are Poisson Regression and Logistic Regression methods. This study found that ownership of mobile phones and Internet access in Indonesian households can significantly increase ownership of savings accounts in formal financial institutions as a proxy for financial inclusion.

Keywords: Financial Inclusion; Internet; ICT; Mobile phone.

Introduction

Financial inclusion or having access to formal financial institutions is an important indicator in determining a country's economic development (World Bank 2014, IMF 2014). This is because an inclusive financial system can help people from all economic level gain the ability to save, develop and improve the assets and improve the quality of living (Demirgüc-Kunt and Klapper, 2012). Financial inclusion can be seen with the three indicators: ownership of the account at a formal financial institution, savings in a formal financial institution, and loan in a formal financial institution (Demirgüc- Kunt and Klapper, 2013).

Not only it will promote economic growth (McKinnon, 1973; Shaw, 1973; Stiglitz and Weiss, 1981), financial inclusion through the instrument Information, Communication, and Technology (ICT) can reduce the gap that exists economically and socially (Hannig & Jansen, 2010). Mobile phones and the Internet are one of the forms of ICT that can be used as a tool in promoting financial inclusion. Here's how ICT affects the financial inclusion: (1) on the supply side in the form of digital financial services to reduce transaction costs of formal financial institutions and (2) on the demand side where ICT can improve the flow of information and knowledge of finance (Sarma & Pais, 2008; Ouma, Odongo & Were, 2017; Kabakova & Plaksenkov, 2018; Demirguc-Kunt et al., 2018). Thus, mobile phones and

the Internet can reduce barriers in the category of unbanked population[1] to gain access to formal financial institutions.

Indonesia has a gap in access to formal financial institutions as well as digital access. The research by APJII (2018) shows the gap. Even though most of the population have access to Internet (64.8%). Java island, where most of big cities are, still hold the highest rate of Internet penetration which is 55,7%. For other area the internet penetration is as big as 21.6% (Sumatera) and as little as 5.2% (Nusa Tenggara). This was previously confirmed of research by Sujarwoto and Tampubolon (2016), where it was found that the spread of Internet access is uneven in every district in Indonesia with a tendency to agglomerate in big cities.

At the same time, there are 62.3 million adults in Indonesia who don't have a bank account but have a mobile phone (Demirgüç-Kunt et al., 2018). Mobile phone with Internet access can be a tool to improve financial inclusion, especially in developing countries (Ozili, 2018).

The digital potential in Indonesia is clearly stated, but the question is whether the ownership of mobile phones and Internet access have some effect on increased financial inclusion in Indonesia? There are previous studies, especially in Sub-Saharan Africa with mobile money services, where the mobile phone and the Internet can be used as a tool to enhance financial inclusion (Dupas and Robinson, 2013; Jack and Suri, 2014; Prina 2015, Brune et al., 2016). China has also proved that the innovation and development of the financial sector by using the Internet will increase the participation of the underbanked and unbanked population in the formal financial services (Guo, Kong, & Wang, 2016; Loubere, 2017; Demirguc-Kunt et al., 2018)

Indonesian who connected to the Internet using most online activity to access social media, entertainment and purchasing goods online (McKinsey, 2016; APJII, 2018). The use of social media can encourage financial inclusion as long as there is a flow of information to educate users about the formal financial institutions and financial services. But these flows are highly dependent on the network and connectivity of users and the country itself (Sarma & Pais, 2008). Since the use is mainly for social purposes and entertainment, not to access financial services, the relation between ICT and financial is still unclear and needed further research.

The Indonesia financial inclusion program by the government prefers banking channels (bank-based digital financial inclusion) to become major players of digital financial services provider (Nuryakin, Aisha, and Massie, 2019). Supply of financial service in Indonesia hasn't been maximized yet. But the high ICT adoption in Indonesia is an opportunity push financial inclusion. The role of information and knowledge flows about finance are becoming crucial to encourage user demand for formal financial services. Thus, it will push the financial inclusion.

In this study the authors will see how owning a cellular phone and Internet access in a household may affect the level of financial inclusion. The research aims to analyze the relationship between financial inclusion and ICT indicator in Indonesia household. With these objectives, this study used national data from the Survei Sosial Ekonomi Nasional (Susenas) 2017 and Potensi Desa (Podes) in 2018 through the household approach. This study has a hypothesis that adoption of mobile phones and Internet access in the household will increase the flow of information and knowledge of finance. In the end it will increase the probability of these households to have a savings account at a formal financial institution as an indicator of financial inclusion

Literature Review

Financial inclusion is a process where there is an ease of access, availability, and use of formal financial institutions for the entire community (Sarma, 2016). Access, availability, and the use of formal financial institutions can be viewed through three indicators, namely: ownership of the account at a

formal financial institution, savings in formal financial institutions, and loan in a formal financial institution (Demirgüc- Kunt and Klapper, 2013). Ownership of an account at a formal financial institution shows the access aspect, while savings and loan show activities in using formal financial service.

According to some studies, there are some factors that could affect financial inclusion in a country. These factors include ICT, age, education, gender, location, and economy (Sarma & Pais, 2008; Ouma, Odongo, & Were, 2017; Kabakova & Plaksenkov, 2018). Elaboration of these factors can be seen in Table 1:

Table 1: Determinant Factors Financial Inclusion

Factor	Description
ICT	ICT or technology can help to reduce the barriers in obtaining formal financial services. It can be influenced by the formal financial institutions that use ICT in offering his services and ICT facilitate the flow of information, thus increasing financial education.
Age	People in productive age increase their chance to save more. Following the Life-Cycle Hypothesis, this situation applies until it reaches non-productive age (retirement). When it reaches the retirement age individual will stop saving and use savings (dissaving).
Education	Education refers to the level of formal education. It is more likely that someone with higher level of education has information/access to information about formal financial institutions.
Gender	There is a greater tendency for men to use the services of formal financial institutions.
Locations	Differences in locations. Such as rural-urban differences and access to infrastructure that may affect the ease of access to services of formal financial institutions.
Economy	There is a positive relationship between financial development and economic growth. Where households with better economic circumstances are more likely to gain access to formal financial institutions.

Source: Sarma & Pais (2008), Ouma, Odongo, and Were (2017), Kabakova and Plaksenkov (2018), produced by the author

Research by De Koker and Jentzsch (2013) found that for some time, the initiation of financial inclusion in developing countries relies on the use of ICT. Some of these initiations are the use of digital payments, mobile banking, and fintech. The use of ICT as an instrument of financial services is one way that ICT can enhance financial inclusion. With the use of ICT in the supply side of financial services, financial institutions can provide services at a lower cost and higher accessibility. Thus, financial institutions can reduce bottlenecks and inefficiencies of the market (Kabakova and Plaksenkov, 2018).

Through the demand side, ICT could increase the demand of financial services for its users. ICT has a nature to improve the flow of information and education. Therefore, the user is more likely to gain a financial education that will increase their chances to use formal financial institution services. This illustrates the flow of an information network that can educate users about financial institutions and financial services. The role of ICT in enhancing demand of financial services depend on the type of information in the user's network (Sarma & Pais, 2008). If people get the right information, then the consumer pull will increase the digitalization of financial services.

There are some impacts to overcome poverty because of digitization in the financial sector for mobile money users: (1) The poor can manage financial risk (Jack and Suri, 2014); (2) The poor can accumulate savings and increase spending on basic necessities (Dupas and Robinson, 2013; Prina, 2015, Brune et al., 2016); (3) The Increase of revenue potential and a chance to reduce poverty (Suri & Jack, 2016). Table 2 elaborates on the findings in previous researches in Sub-Sahara Africa about financial inclusion and ICT.

Table 2: Literature Review

Findings	Author
Research in Kenya. Mobile money users didn't decrease consumption when there was a drastic reduction in income.	Jack and Suri, 2014
Research in Kenya. Market vendors that majority consists of female invest 60% more for their businesses.	Dupas & Robinson, 2013
Research in Kenya. Household of mobile money users with a woman as their head of household increase shopping for nutritious food up to 15% and shopping education to up 20%.	Prina, 2015
Farmers that were mobile money users in Malawi spend 13% more on agriculture equipment and experience increase in harvest price up to 15%	Brune et al., 2016
Research in Kenya. Mobile money user family with a woman as their head of household increase savings by 20%. 185,000 women develop a business or move to retail from sector agriculture. Also, a decrease of extreme poverty to 22%	Suri and Jack, 2016

Source: Produced by the author

For the last few years, financial services via the Internet or Internet Finance (IF) has developed rapidly in China. In 2015, the IF development index reaches 386 with 100 bases, the index showed a rapid growth (Guo, Kong, & Wang, 2016).

Innovation and capitalization of formal financial institutions through ICT in China enhance the development of financial services offered. Financial services are changing the target consumers to enhance financial inclusion. This innovation targeted diverse consumers, starting from the poor people in rural areas to large businesses looking for capital investment (Guo, Kong, & Wang, 2016). Research by Demirguc-Kunt et al. (2018) supports the statement of Guo, Kong, and Wang (2016), it finds that in 2014 there are 77% of the adult population in rural China who have accounts in formal financial institutions. The percentage rose sharply from 2011 which only accounted for 58%.

Fintech Singapore (2018) do a research about the development of fintech in Indonesia. Fintech with payment and loan categories have the largest percentage compared with other categories with 38% and 31%. Other than that, it is predicted that the number of transactions through fintech will grow by 16.3% annually. Fintech company in Indonesia has been concentrated on lending services. This concentration is due to the legal issues in which banking activities primarily in the form of savings is not allowed to be done by a private company (Nuryakin, et al., 2018).

To improve financial inclusion, Bank Indonesia and Otoritas Jasa Keuangan (OJK) issued two types of branchless banking: (1) bank based branchless banking, this program is called Laku Pandai and (2) telecommunication based branchless banking, this program is called Digital Financial Services (DFS). According to OJK regulations POJK No. 19/POJK.03/2014 branchless banking or Layanan Keuangan Tanpa Kantor (Laku Pandai) providing banking services and/or other financial services without having to go through an office. The government design it to go through cooperation of other parties and supported by the use of technology. Meanwhile, according to Bank Indonesia through Bank Indonesia regulation No. 11/12/PBI/2009, DFS is electronic money formally registered and provided by third parties via a mobile phone or website.

Nuryakin, et al. (2018) in his research found that financial inclusion through access and the use of DFS and Laku Pandai reaching 28% and 48%. But the financial inclusion through the ownership of the account only reached 5% and 25%. The study also found that Laku Pandai is more efficient to increase access to financial services for the poor and in rural areas. While DFS have a higher likelihood to be used by people with higher education and incomes. Therefore, the financial inclusion program in

Indonesia tends to be more dependent on bank-based branchless banking than telecommunication-based.

Financial services offered by DFS and Laku Pandai is considered less than ideal, especially because it is not reducing the cost of access and transactions. The cost of branchless banking is relatively still more expensive than informal financial services. This is because DFS and Laku Pandai agents are further away than informal financial services agents. It is also important to note that there is a cost of services that are considered too pricey. In this case, the use of ICT from the supply side is not maximizing the potential for financial inclusion.

Research Methods

The hypothesis in this study stated that the ownership of mobile phones and Internet in the household will increase the probability of these households to have savings account at a formal financial institution as an indicator of financial inclusion. To prove this hypothesis the authors used two methods: Poisson Regression and Logistic Regression.

The model used in this study refers to the model developed by Ouma, Odongo, and Were (2017). The model has the original formula as follows:

$$s_i = \alpha_i + X_i\beta + Zi\gamma + \varepsilon_i$$

In the model, it is explained that the proxy of ability to save in individual i (s_i), can be explained by the digital financial service or the Internet (X_i), and variable control (Zi) such as gender, age, income, and education. This model using logistic regression method to process the data.

In this study, the indicators used are at the household level. The author will look at how the availability of households savings account influenced by household access to mobile phone and the Internet with control of demographic characteristic, an indicator of access to formal financial institutions and indicator of access to informal financial institutions.

Here are the two main models to be used in this study:

1. $SavingAccount_j = \beta_0 + \beta_1 Mobilephone_j + \beta_2 Internet_j + \beta_3 Education_j + \beta_4 Gender_j + \beta_5 Age_j + \beta_6 NonPoor_j + \beta_7 InformalCredit_j + \beta_8 ATM_j + \beta_9 Bank\ Office_j + \beta_{10} Cooperative_j + \mu_{oj}$
2. $DummySaving_j = \gamma_0 + \gamma_1 DummyMobile_j + \gamma_2 DummyInternet_j + \gamma_3 Education_j + \gamma_4 Gender_j + \gamma_5 Age_j + \gamma_6 NonPoor_j + \gamma_7 InformalCredit_j + \gamma_8 ATM_j + \gamma_9 Bank_j + \gamma_{10} Cooperative_j + \mu_{oj}$

- *SavingAccount* : The number of savings per household member
- *DummySaving* : Ownership of savings in the household (1= household have savings account at least one, 0= household don't have a savings account)
- *Mobilephone* : The number of mobile phones owned per household member
- *DummyMobile* : Ownership of mobile phones in households (1= household have mobile phone at least one, 0= household don't have a savings account)
- *Internet* : The number of Internet users per household member
- *DummyInternet* : Internet access in households (1= there are at least one household member who has access to the Internet, 0= household don't have Internet access)
- *Education* : The last formal education attained by the head of the household
- *gender* : The gender of heads of households
- *Age* : Age of head of household

- *NonPoor* : Households with per capita income above the province poverty line
- *InformalCredit* : Households with a loan provided by an individual with interest.
- *ATM* : How easy it is to find ATM in the district (1= easy, 0=hard)
- *Bank* : The number of bank branches office in the district
- *Cooperative* : The number of cooperatives in the district

Model 1 will use Poisson regression while Model 2 use Logistic regression. Poisson method is used because of *SavingAccount* as the dependent variable in Model 1 is a count-data type, namely the amount of savings account per household member. Logistic regression is used in Model 2 dependent variable (*DummySaving*) in Model 2 is dichotomous variables.

Research Analysis

According to Susenas 2017, around 139,989 (51%) households in Indonesia don't have any savings account in a formal financial institution. Even if the household is marked as having access to formal financial institutions, it's not necessarily means that everyone in the family has their own savings account. The average proportion of household members who have a savings account is 0.214, in other words on average only 21.4% of total family members have a savings account. This proportion has a range of zero to one, where zero indicates the absence of household members who have a savings account and a 1 indicates each member of the family is represented by one savings account. Not everyone in the household have a direct access to formal financial institutions.

Authors use two proxies for ICT, the ownership of a mobile phones and Internet use in households. When compared to household access to the Internet, households in Indonesia have more access to a mobile phone. As much as 89.53% of households in Indonesia have access to a mobile phone. This figure is much larger than Internet access, where only 52.26% of households in Indonesia have access to the Internet. The same thing occurred in the proportion of ICT access to household members. The average proportion of family members who have mobile phones is 54.5% while the average proportion of household members who have Internet access is only 15.1%.

Households who have access to ICT is not entirely covered by formal financial institutions. There are households with no savings account but have access to ICT.As much as 47% of households with at least one mobile phone and 34% of households who have Internet access don't have any savings account. These characteristics match with findings by Demirguc-Kunt et al. (2018) where there are people with access to ICT that are still uncovered by the formal financial institutions. It is further explained that the ICT access of household is considered as an opportunity to push financial inclusion from the demand side.

Table 3 lists the results of Poisson and Logistic regression. Model 1 shows the incident rate ratio (IRR) while Model 2 displays the odds ratios of the regression results.

Table 3: Results of Poisson regression and Logit

	Model 1	**Model 1**	**Model 2**	**Model 2**
	Poisson IRR	Poisson Coef.	logit odds ratio	logit Coef.
VARIABLES	Saving Account	Saving Account	Dummy Saving	Dummy Saving
mobilephone	3484 ***	1248 ***		
	(0.0381)	(0011)		
Internet	2256 ***	0814 ***		
	(0.0250)	(0011)		
DummyMobile			2653 ***	0976 ***

			(0.0500)	(0019)
DummyInternet			2622 ***	0964 ***
			(0.0243)	(0009)
Education	1246 ***	0220 ***	1824 ***	0601 ***
	(0.00196)	(0002)	(0.00791)	(0.004)
gender	0898 ***	-0108 ***	1014 ***	0014 ***
	(0.00590)	(0007)	(0.000364)	(0000)
Age	1009 ***	0009 ***	0978 *	-0023 *
	(0.000188)	(0000)	(0.0126)	(0013)
NonPoor	2043 ***	0714 ***	2342 ***	0851 ***
	(0.0296)	(0014)	(0.0403)	(0017)
InformalCredit	0872 ***	-0137 ***	0748 ***	-0291 ***
	(0.0140)	(0016)	(0.0209)	(0028)
Bank	1000 ***	0000 ***	1000 ***	0000 ***
	(1.94e-05)	(0000)	(1.20E-05)	(0000)
Cooperative	1000 ***	0000 ***	1001 ***	0001 ***
	(5.44e-06)	(0000)	(5.50e-05)	(0000)
ATM	0802 ***	-0221 ***	0653 ***	-0426 ***
	(0.00948)	(0012)	(0.0154)	(0024)
Constant	1246 ***	-3868 ***	0.0228 ***	-3781 ***
	(0.00196)	(0020)	(0.000887)	(0039)
Prob> chi2	0000	0000	0000	0000
Observations	272.781	272.781	272.781	272.781

Robust standard errors in parentheses
**** p <0:01, ** P <0.05, * p <0.1*
Source: produced by the author

In both model *p-value* of the chi-squared is 0.000. Therefore, the overall model is statistically significant. In Model 1 All independent variables used, affects the dependent variable significantly up to 99% significance level. In the Model 2 Age variable is not significant at 0.05 and 0.01. Both regression results in Table 3 show that the sign of the variable of interest, namely mobile phones and the Internet, remain consistent after using control variables in the model. The variable of interest remains positively affects dependent variable. This shows that the use of ICT in Indonesian households increases the probability of those households to have a savings accounts, thus increase the rate of financial inclusion.

The majority of the independent variable (ownership of mobile phones, Internet access, educational level of head of household, household poverty level, the number of bank branches, the number of cooperatives, and informal credit) affect the dependent variable in accordance to the hypothesis that has been predetermined. In model 1, there are two control variables with coefficient results that are not following previous hypotheses. These variables are *Gender* and *ATM*. While on the Model 2 variables *Age* and *ATM* have different results with previous hypotheses.

In model 1 coefficient will be interpreted with the IRR. Each variable has an IRR determine the effect of the variable to the dependent variable, with the assumption that all other variables in the model are held constant. Here is the analysis of Model 1 Table 3.

1. For every increase of 1 household members who have a mobile phone, the proportion of savings accounts per household member will be increased by 3,484 times.
2. For every increase of 1 family members who have Internet access, the proportion of savings accounts per household member will be increased by 2,256 times.

Odds ratio in Model 2 explained the probability of household to has access to formal financial institutions if independent variables occur or not. Here is the analysis of the results of the regression odds ratio Model 2 in Table 3, with the assumption that all other variables in the model are held constant.

1. When the household has a mobile phone, then the probability of household to has a savings account is 2.653 times greater than households without a mobile phone.
2. When the household has access to the Internet, then the probability of household to has a savings account is 2.622 times greater than households without Internet access.

Through the analysis, it can be seen that the variable of interest in both models is positively and significantly affect the account ownership in the household. This is consistent with research Sarma & Pais (2008), Ouma, Odongo, and Were (2017), and Kabakova and Plaksenkov (2018). Based on the IRR analysis and odds ratio of mobile phone and Internet, ownership of mobile phone is more likely to enhance financial inclusion of household compared to Internet access. The difference can be seen by the amount of IRR and the odds ratio for each variable. It could be interpreted as Internet is one of the important factors to increase the level of financial inclusion of households, but the mobile phone can improve the level of financial inclusion further.

In this study, the mobile phone and the Internet are a more appropriate proxy for measuring the demand side of ICT influence on financial inclusion. Mobile phones and the Internet represent a form of ICT adoption in the household. As has been discussed previously in research Sarma and Pais (2008), Ouma, Odongo, and Were (2017), and Kabakova and Plaksenkov (2018) ICT can improve the flow of information and education, formal financial institutions and financial services to its users. Mainly in Sarma and Pais (2008) where it was found ICT is network that create connectivity for its users that will allow the mobilization of information.

It is predicted that ICT as its user's network makes education and poverty as variables that have a considerable influence on financial inclusion. Because the level of education and poverty will affect what type of information contained in the network itself. Especially with most of the Internet users in Indonesia use it for social purposes. The content of social media itself depends on the user's social circle, people, communities, and organizations that are available and accessible around the user. Therefore, the type of information and knowledge on social media highly depends on the socio-economic conditions due to different sources of information that will be available in the network.

Authors predicts that there is an endogeneity problem between the dependent variable (*SavingAccount*) and the variable of interest (*Mobilephone* and *Internet*). Through Durbin-Wu-Hausman test, it was found that there is an endogeneity problem in the variable of interest. Therefore, the authors conducted a robust on both models to address the minor violation in the assumptions as of the problems of endogeneity

Conclusions and Recommendations

Using Poisson regression and Logistic regression, this study found that in Indonesia household mobile phone ownership and household Internet access may increase household account ownership in a formal financial institution as a proxy of financial inclusion. Internet and mobile phones as an indicator of ICT affect your ownership positively and significantly. But mobile phone has a greater influence than the Internet. It is concluded without decreasing the important role of the Internet to increase financial inclusion. Mobile phone and the Internet are the adoption of ICT in the household, this study sees the impact of ICT on financial inclusion from the demand side.

The study also found the importance of education and the economic situation of households in influencing the level of financial inclusion. Education has a positive and significant effect to increase account ownership in the household. On the other hand, a household that categorized as non-poor will be more likely to have an account in a formal financial institution. The authors predict that the level of education and poverty influence the type of information in the user's network. Mainly because the

majority of the Indonesian population use the Internet for social purposes. So that the information obtained on the network is strongly influenced by socio-economic characteristics of users of ICT.

Based on the results of this study the authors provide suggestions for policymakers to consider the approach to ICT in the efforts to increase financial inclusion. ICT development in Indonesia is not maximized yet, while ICT become one of the major factors that have a big influence in increasing financial inclusion. ICT becomes an opportunity that has not been completely used. The ICT development needs to be focused mainly on the development of financial services by the formal financial institutions through the medium of ICT to improve the supply side. Also, the development of financial literacy levels of ICT users is badly needed. Especially since many households have adopted ICT in Indonesia. In the end, more education is essential for ICT user, so the use of ICT is not limited for entertainment or social activities, but actually can accelerate financial inclusion,

With the rapid ICT developments on a global scale, more research will be needed to gain a comprehensive understanding of the dynamics of the economy and ICT. Further studies are expected to use proxies better and more accurate. Especially in ICT where the proxy in this research is only limited to Internet and mobile phone.

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The Level and Dynamics of Economic Development Versus Employment Structures in Economic Sectors and Sections in EU Countries

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Abstract

The purpose of the paper is to assess the relationship between the level and dynamics of economic development expressed in GDP per capita, and the employment structure in clusters of EU states in 2008 and 2018. These clusters are formed on the basis of two criteria: the employment share in economic sectors (Agriculture, forestry and fishing, mining and quarrying; Manufacturing; Electricity, gas, steam and air conditioning supply; water supply and construction; Services) and the employment share in industry sections of various technological advancement, and in knowledge-intensive services. The clustering of countrie was obtained by complete linkage method. The average GDP per capita and GDP dynamics were compared between these clusters of countries. The procedure proposed in the paper made it possible to: identify clusters of EU states with similar employment structures in selected sectors and sections, and assess the relationship between the analysed structures and the level and dynamics of economic development.

Keywords: Employment, Structures, Sectors, Sections, EU States, Level Of Development, Clustering

Introduction

Economies of European Union contries differ between themselves with respect to many characteristics. The employment structure is one of the important features, because of its influence on economic development. (Pasinetti, 1981; Laitner, 2000; Hartwig, 2012). The importance is also due to mutual relations between employment structures, their dynamics and technological and productivity development (Fagerberd, 2000). Between 2008 and 2018 slight increase in the employment figures was observed (Table 1), but as far as the sectoral structure is concerned, the only increase happened in service sector.

Table 1: UE employment in economic sectors, in 2008 and 2018

Sector	Year	
	2008	2018
Employment in millions (percentage share)		
Total:	222.8 (100.0%)	229.8 (100.0%)
- services	149.4 (67.0%)	164.1 (71.4%)
- industry	38.1 (17.1%)	35.4 (15.4%)
- electricity, gas, steam and air conditioning supply and in water supply and construction	21.7 (9.8%)	19.0 (8.3%)
- agriculture, forestry and fishing, mining and quarrying	12.3 (5.5%)	9.8 (4.3%)

Source: Eurostat (2019)

Total employment in five biggest EU countries covered 60.7% of EU employment in 2008 and 62.3% in 2018 (Table 2).

Table 2: Five UE countries with the highest employment, in 2008 and 2018

Country	Year	
	2008	2018
Employment in millions (percentage share in UE total)		
Germany	35.8 (16.1%)	41.7 (18.1%)
United Kingdom	29.5 (13.2%)	32.2 (14.0%)
France	26.5 (11.9%)	27.1 (11.8%)
Italy	23.0 (10.3%)	23.1 (10.0%)
Spain	20.5 (9.2%)	19.3 (8.4%)

Source: Eurostat (2019)

Each section of knowledge-based services saw the rise in EU employment, in 2008-2018: less knowledge-intensive market services – from 57.8 million to 62.1 million (25.9% of the total number of employees in 2008 and 27.0% in 2018); other knowledge-intensive services – from 57.3 million to 63.9 million (25.7% of the total number of employees in 2008, and 27.8% in 2018); knowledge-intensive market services (except financial intermediation and high-technology services – from 12.4 million to 15.0 million (5.6% of the total number of employees in 2008 and 6.5% in 2018); knowledge-intensive high-technology services – from 5.8 million to 7.0 million (2.6% of the total number of employees in 2008 and 3% in 2018). The increase of the number of employees was observed also in medium high-technology manufacturing – from 10.7 million to 10.9 million people (4.8% of the total number of people in employment). In other industry sections singled out in terms of technological advancement, the number of people in work decreased: from 14.4 million (6.5% of the total number of employees) to 12.3 million people (5.4%) in low-technology manufacturing; from 10.5 million (4.7%) to 9.6 million people (4.2%) in medium low-technology manufacturing); from 2.5 million to 2.4 million people (1.1% of the total number of people in employment) in high-technology manufacturing.

The average GDP per capita (in purchasing power standards – PPS) in the European Union was 26100 Euro, on average in 2008 and 31000 Euro in 2018. The dynamics of changes in the EU in 2008 as compared to 2000 was 131.8%, and 118.8% in 2018 as compared to the data of 2008.

Changes that occur in the EU labour market are similar in the selected countries both in terms of the number of employees and their share, which makes possible to identify clusters of such countries with the use of multidimensional data analysis methods. Processes that occur in the changes of shares of employees in sectors and sections are, on one hand, the product of the level and pace of development and, on the other hand, they entail it.

The purpose of the paper is to assess the level and dynamics of development measured based on the value of GDP per capita in clusters of EU states singled out with respect to similar shares of people in employment in sectors and sections.

Literature Review

The results of research on the employment structure presented in the literature, show that employment structures in the arrangement of sections and sectors are changing. It results, among other things, from the necessity of the structure to adapt to the changes that occur in manufacturing methods, market needs, challenges of the knowledge-based economy, industry 4.0 and the general condition of the economy (The employment, 2016; Cho et al., 2017; Hofäcker, 2017; van Treeck, 2017; Understanding, 2017; Berg et al., 2018; Building, 2018; Transition, 2018; Paterson at al., 2019; World, 2020). Researchers are particularly interested in changes of structures in the context of their impact on technological development and capacity improvement (Fagerberg, 2000). References to economic growth are of key importance (Pasinetti, 1981; Laitner, 2000; Hartwig, 2012). Studies are conducted on different sets of territorial units: 1/ countries, including EU states, with the use of dynamic multidimensional scaling (Markowska et al. 2014, 2019a, 2019b), dynamic classification

(Strahl and Markowska, 2019); 2/ selected countries, such e.g. Visegrad group states (Hlavacek et al. 2019); 3/ regions, for example in the regions of the Czechia (Markowska, 2017), China (Fan et al. 2003; Zheng and Kuroda, 2012), Great Britain (Chadwick et al. 2008); 4/ cities (Rubalcaba, et al. 2013).

The assessment of change in structures requires dynamic approaches (Strambach, 2008; Strahl and Markowska, 2019). Markowska and Sokołowski (2016, 2017, 2019) assessed employment structures in individual sectors, in EU states, in 2008-2017, and the employment in sectors in Warsaw and neighbouring districts in 2005-2014 - applying the structural change decomposition method.

It has been pointed out that employment structures in sectors or sections may be used to specify specializations (Marelli, 2004; Zheng and Kuroda, 2012; Markowska et al. 2016), concentration (Alecke et al. 2006; Merino and Rubalcaba, 2013) or agglomeration (Zhang, 2016; Alonso-Villar et al. 2004) of countries and regions.

Method

The completion of the goal of the study required a definition of the set of variables for clustering (employment in sectors and sections), the analysis period and study objects. Once data had been collected and missing information imputed, a final data matrix was prepared and a preliminary data analysis was performed. Structure dissimilarity measure (Chomątowski and Sokołowski, 1978) was applied as a distance measure, and it was used separately for each of analysed structures and periods. The complete linkage method makes possible to single out clusters for which the intra-cluster distance is not larger than the cut-off distance which is established through the analysis of dendrogram. Finally we can determine mean values of variables in the clusters as well as calculate reference means concerning the dynamics and pace of development for the identified clusters.

Data and its preliminary analysis

The assessment of the labour market situation from the point of view of changes in the employment is possible on the basis of data available in Eurostat, arranged by sectors and sections (Eurostat, 2019). For the purposes of clustering, the following employment sectors have been taken into account (for years 2008 and 2018) (as percentage of total employment):

P_1 – employment in agriculture, forestry and fishing, mining and quarrying,
P_2 – employment in manufacturing,
P_3 – employment in electricity, gas, steam and air conditioning supply, water supply and construction,
P_4 – employment in services,

and the following sections:

S_1 – employment in medium high-technology manufacturing,
S_2 – employment in high-technology manufacturing,
S_3 – employment in medium low-technology manufacturing,
S_4 – employment in low-technology manufacturing,
S_5 – employment in knowledge-intensive high-technology services,
S_6 – employment in knowledge-intensive market services (except financial intermediation and high-technology services),
S_7 – employment in other knowledge-intensive services,
S_8 – employment in less knowledge-intensive market services.

In order to assess the level of development, data concerning GDP per capita (p.c.) was used (Eurostat, 2020):

GDP_2008 – purchasing power adjusted GDP per capita in 2008,
GDP_2018 – purchasing power adjusted GDP per capita in 2018,

and in order to determine the dynamics of changes, data of 2000 for the first year of assessment and GDP per capita of 2008 for 2018 respectively:

DYN_GDP (2008/2000) – the dynamics of GPP per capita in 2008 (2000 = 100),
DYN_GDP (2017/2008) – the dynamics of GPP per capita in 2018 (2008 = 100).

The ranges of variable values and general differences between 2008 and 2018 are summarized in Table 3.

Table 3: Highest, lowest and median employment shares, in 2008 and 2018

Variable	Highest share				Lowest share				Median	
	2008	Country	2018	Country	2008	Country	2018	Country	2008	2018
P_1	29.8%	RO	23.1%	RO	1.5%	UK	1.0%	LU	4.6%	3.9%
P_2	27.6%	CZ	27.6%	CZ	6.3%	LU	4.2%	LU	16.3%	14.7%
P_3	14.3%	EE	11.5%	SK	6.9%	NL	5.3%	NL	10.2%	8.5%
P_4	83.1%	LU	88.4%	LU	39.8%	RO	47.6%	RO	67.5%	71.2%
S_1	8.8%	CZ	9.8%	SK	0.4%	CY	0.5%	CY	3.7%	3.3%
S_2	2.9%	IE	2.8%	IE	0.2%	LT	0.3%	LU	1.1%	0.9%
S_3	9.7%	CZ	9.2%	CZ	2.5%	IE	1.6%	IE	4.7%	3.9%
S_4	13.7%	BG	10.3%	BG	1.9%	LU	1.3%	LU	7.2%	5.7%
S_5	4.1%	FI, SE	5,3%	IE	1.2%	RO	2.2%	EE	2.5%	3.2%
S_6	8.6%	LU	10.4%	SE	2.4%	RO	3.9%	RO	5.5%	6.2%
S_7	35.0%	SE	36.9%	SE	14.2%	RO	14.7%	RO	23.7%	25.8%
S_8	31.2%	ES	34.5%	CY	19.1%	RO	16.8%	LU	26.6%	27.3%

Source: Eurostat (2019)

Results and Discussion

With cluster analysis, eight groups of countries similar in employees shares in the sectors have been identified for the data of 2008 and six for 2008 (Markowska, Strahl, 2020). The composition of the clusters and mean values of the shares of people in employment in the sectors for the data of 2008 are presented in Table 4, and for the data of 2018 – in Table 5. The average GDP is also provided in both tables, and the clusters are arranged in an order from the highest to the lowest average GDP per capita. The applied cluster numbering is derived from the position in the dendrogram.

Table 4: Classification results – cluster composition and average employment shares in sectors, in 2008

Cluster number (number of countries in brackets)	Countries	Mean values					
		P_1	P_2	P_3	P_4	GDP_2008	DYN_GDP (2008/2000)
7 (4)	LU, NL, SE, UK	2.2	10.5	8.3	79.0	41825	132
1 (9)	BE, DK, FR, MT, FI, ES, AT, IE, CY	3.7	14.3	10.1	71.9	29333	131
3 (3)	DE, IT, HU	3.5	21.0	9.2	66.3	24900	134
2 (1)	EL	11.4	11.8	10.0	66.8	24400	143
5 (4)	BG, SI, CZ, SK	6.4	25.8	11.6	56.3	18775	172
4 (4)	EE, LV, LT, PT	7.9	17.4	13.3	61.4	17725	197
6 (2)	HR, PL	14.2	19.6	10.9	55.4	15450	167
8 (1)	RO	29.8	20.3	10.1	39.8	13300	261

Acronyms: Austria (AT), Belgium (BE), Bulgaria (BG), Cyprus (CY), Czechia (CZ), Denmark (DK), Germany (DE), Estonia (EE), Greece (EL), Spain (ES), Finland (FI), France (FR), Croatia (HR), Hungary (HU), Ireland (IE), Italy (IT), Luxembourg (LU), Latvia (LV), Lithuania (LT), Malta (MT), Netherlands (NL), Poland (PL), Portugal (PT), Romania (RO), Sweden (SE), Slovenia (SI), Slovakia (SK), United Kingdom (UK).
Source: author's compilation.

Table 5: Classification results – cluster composition and average employment shares in sectors, in 2018

Cluster nimber (number of countries in brackets)	Countries	Mean values					
		P_1	P_2	P_3	P_4	GDP_2018	DYN_GDP (2018/2008)
3 (5)	CY, SE, UK, NL, LU	1.7	7.9	7.6	82.9	43640	110
1 (7)	BE, FR, DK, MT, IE, ES, FI	2.9	12.0	7.8	77.3	37086	127
4 (9)	BG, EE, HR, LT, LV, DE, IT, PT, AT	5.2	17.2	9.2	68.4	26356	128
5 (5)	CZ, SK, HU, SI, PL	5.5	24.1	9.6	60.8	24240	130
2 (1)	EL	12.5	9.4	5.6	72.5	21100	86
6 (1)	RO	23.1	19.3	10.0	47.6	20100	151

Acronyms – as in Table 4.
Source: author's compilation.

In both partitions of EU countries identified with respect to the share of employment in the sectors (2008 and 2018), clusters with the highest share of employees in the service sector (P_4) are also characterized by the highest average GDP per capita. Four countries are the core of both clusters: Luxembourg, Sweden, Great Britain and the Netherlands. At the other extreme, there is a single-country cluster with Romania. It has the highest share of employment in agriculture, forestry and fishing, mining and quarrying as percentage of the total employment, and at the same time, the lowest GDP per capita. The low development level in this country in both years is accompanied by very high dynamics, due to low GDP in the base year.

The analysis of section structures produce eight clusters in 2008 and nine in 2018. The xomposition of clusters and mean values of employment shares for 2008 is presented in Table 6, and for 2018 – in Table 7. Clusters have been sorted from the highest to the lowest average GDP per capita, as in the case of the partitions for sectors described in Tables 5 and 6.

Table 6: Classification results – cluster composition and average employment shares in sections, in 2008

Cluster number (number of countries in brackets)	Countries	Mean values									
		S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	GDP_2008	DYN_GDP (2008/2000)
2 (1)	LU	1.0	0.4	5.0	2.7	4.7	12.3	45.5	28.3	68400	141
1 (7)	BE, DK, FR, FI, NL UK, SE	4.9	1.5	4.7	6.1	4.3	8.2	39.8	30.5	31543	128
6 (2)	IE, MT	2.5	3.6	3.4	7.8	4.9	8.1	32.8	37.0	27800	131
7 (4)	EL, CY, ES, AT	3.0	0.9	5.2	8.6	3.2	7.9	29.6	41.7	27750	139
5 (4)	CZ, SI, SK, DE	10.4	2.1	9.8	9.7	3.0	5.9	28.5	30.5	23600	154
4 (6)	EE, PL, HR, PT, IT, HU	5.2	1.6	7.1	12.7	2.7	6.3	28.8	35.6	19050	159
8 (2)	LV, LT	2.2	0.4	5.1	13.9	2.4	5.7	32.3	38.1	15900	221
3 (2)	BG, RO	6.0	1.0	7.5	18.4	2.5	4.6	25.3	34.6	12200	229

Acronyms – as in Table 4.
Source: author's compilation.

Table 7: Classification results – cluster composition and average employment shares in sections, in 2018

Cluster number (number of countries in brackets)	Countries	Mean values									
		S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	GDP_2018	DYN_GDP (2018/2008)
2 (2)	LU, SE	6.5	1.1	6.2	13.7	3.8	6.6	24.4	37.7	59100	115
3 (1)	IE	10.9	2.3	10.6	8.4	4.2	6.4	28.7	28.6	58600	168
1 (7)	BE, FR, DK, UK, FI MT, NL	3.6	1.4	3.7	5.1	4.6	9.5	40.0	32.2	35043	119
9 (3)	DE, HU, SK	2.6	0.6	3.5	2.7	6	12.8	44.9	26.8	27480	126
8 (2)	CZ, SI	1.9	0.5	4.4	11.6	3.6	7.4	31.9	38.6	27450	121
7 (6)	EE, HR, PT, PL, IT, AT	2.0	0.6	3.5	6.2	3.4	9.3	31.2	43.6	26567	125
5 (3)	EL, CY, ES	5.1	1.1	6.8	10.1	3.8	7.4	30.7	35.0	25600	98
4 (2)	LV, LT	10.4	2.4	6.9	7.4	3.3	5.8	33	30.9	23050	145
6 (2)	BG, RO	1.1	3.5	2.0	7.2	6.7	8.9	34.8	35.8	17900	146

Acronyms – as in table 4.
Source: author's compilation.

Two last clusters, (arranged according to the average GDP per capita) include the same countries in both years. The second from the bottom are Latvia and Lithuania (the average GDP per capita of 15900 Euro in 2008 and 23050 Euro in 2018). Thay have one of the lowest shares of employment in knowledge-intensive high-technology services as percentage of total employment and employment in knowledge-intensive market services (excluding financial intermediation and high-technology services) as percentage of total employment). The last group consist of Bulgaria and Romania (with the average GDP per capita of 12200 Euro in 2008 and 17900 Euro in 2018).

In the further analysis, the natural logarithm of GDP was also considered. It mitigates the right-hand asymmetry of the distribution and slightly flattens the effect of the outlier – Luxembourg. The correlation of the structure elements with GDP, lnGDP and dynamics has been calculated separately for the years 2008 and 2018, and separately for sectors (Fig. 1) and sections (Fig. 5). Statistically significant correlation coefficients are marked in red. Scatter diagrams have been prepared for the strongest correlations, and the nature of the relationship has also been checked to assess whether relation is linear or non-linear. Where the correlation is linear, the correlation coefficient (r) is provided, and where it is non-linear, the value of multiple correlation coefficient (R) obtained as a root of a coefficient of determination for parabolic regression is given. The presented diagrams (Fig. 2, 3, 4 and 6) are categorised with obtained clusters marked.

Variable	GDP 08	GDP 08/00	ln GDP 08
P1 08	-,4913	,6472	-,5915
	p=,008	p=,000	p=,001
P2 08	-,6293	,3461	-,6183
	p=,000	p=,071	p=,000
P3 08	-,5238	,5886	-,5729
	p=,004	p=,001	p=,001
P4 08	,7611	-,7160	,8273
	p=,000	p=,000	p=,000

Variable	GDP 18	GDP 18/08	ln GDP 18
P1 18	-,4433	,2968	-,5418
	p=,018	p=,125	p=,003
P2 18	-,5376	,2892	-,5364
	p=,003	p=,135	p=,003
P3 18	-,5182	,4013	-,5592
	p=,005	p=,034	p=,002
P4 18	,6480	-,3978	,7032
	p=,000	p=,036	p=,000

Fig. 1: Coefficients of correlation between the employment shares in sectors and GDP per capita, GDP dynamics and ln GDP in 2008 and 2018.

Source: author's calculations

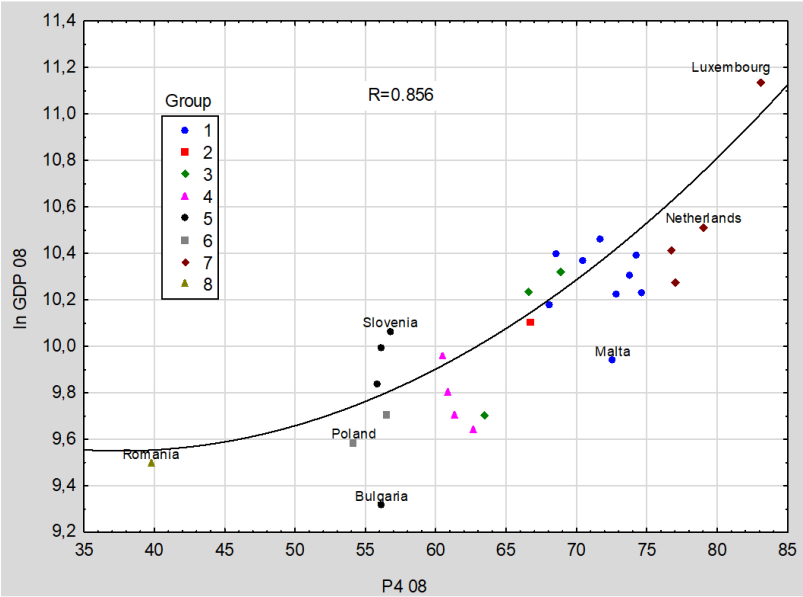

Fig. 2: The employment shares in the service sector versus ln GDP in 2008

Source: author's compilation

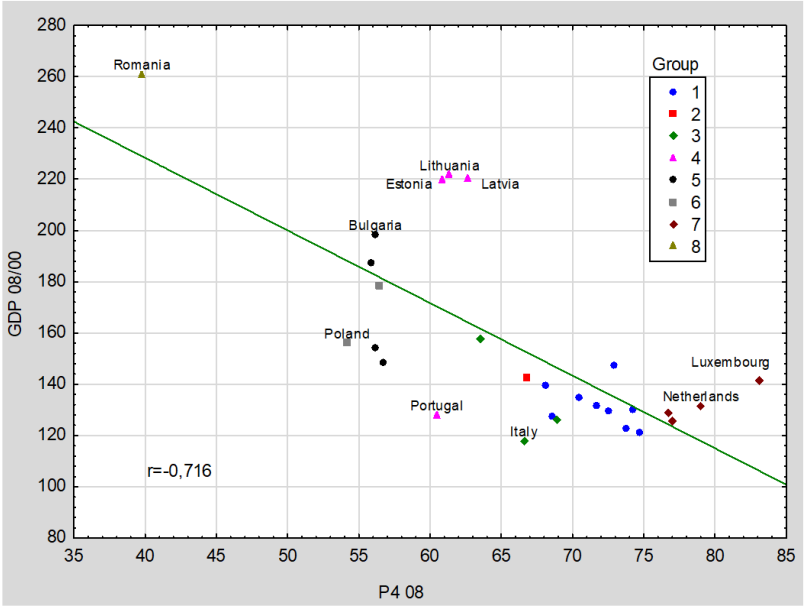

Fig. 3: The employment shares in the service sector versus GDP dynamics (right) in 2008
Source: author's compilation

Countries from the same cluster are usually located close to each other in the scatter diagram. One can conclude that in 2008 universal mechanisms were dominant in the case of shares of employment in sectors and sections, whereas in 2018 the employment structures and GDP per capita were more diversified (Fig. 4). In the analysis of the relationship between employment structures in sectors and income, the share of people in employment in services was the most significant. The relationship with GDP per capita logarithm is non-linear. In Fig. 2 the identified clusters of countries are clearly visible. There are two outliers – Romania and Luxembourg, at the extremes of the variability of the employment share in services. In general, the income is greater in countries where employment in services is higher. However, this effect is visible only when the boundary of 70% of people in employment is exceeded.

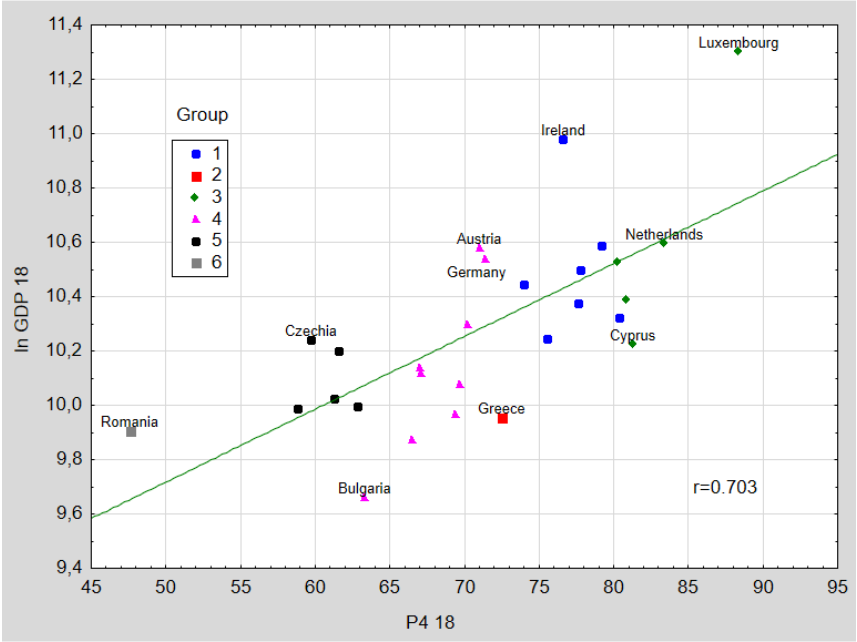

Fig. 4: Employment shares in services versus ln GDP in 2018

Source: author's compilation.

The opposite tendency appears in the the relationship between the employment share in services and income dynamics 2008/2000 (Fig. 3). Here, countries from the same clusters are also visibly located close to each other in the diagram. The negative relationship was caused by the so called base effect. Countries with low GDP per capita in 2000 managed to reach high GDP dynamics at the beginning of the 21st century quite easily, taking into account the base effect, after they had freed themselves from the "fetters" of the command economy.

In section-wise analysis the greatest correlations are observed for S_4 variable (employment in low-technology manufacturing) in both years (Fig. 5).

Variable	GDP 08	GDP 08/00	ln GDP 08
S1 08	-,2149	-,0711	-,1369
	p=,272	p=,719	p=,487
S2 08	-,0551	-,3050	,0383
	p=,781	p=,115	p=,847
S3 08	-,2891	,1402	-,2799
	p=,136	p=,477	p=,149
S4 08	-,8346	,7259	-,9133
	p=,000	p=,000	p=,000
S5 08	,5898	-,6091	,6673
	p=,001	p=,001	p=,000
S6 08	,8197	-,6403	,8622
	p=,000	p=,000	p=,000
S7 08	,6276	-,5655	,6830
	p=,000	p=,002	p=,000
S8 08	-,2783	-,1582	-,1492
	p=,152	p=,421	p=,448

Variable	GDP 18	GDP 18/08	ln GDP 18
S1 18	-,2805	,0206	-,2263
	p=,148	p=,917	p=,247
S2 18	,1158	,3859	,1751
	p=,557	p=,043	p=,373
S3 18	-,4049	,0671	-,4025
	p=,033	p=,734	p=,034
S4 18	-,6837	,5135	-,7631
	p=,000	p=,005	p=,000
S5 18	,5564	,1423	,5804
	p=,002	p=,470	p=,001
S6 18	,5073	-,3827	,5765
	p=,006	p=,044	p=,001
S7 18	,4625	-,2639	,5869
	p=,013	p=,175	p=,001
S8 18	-,4511	-,1351	-,3968
	p=,016	p=,493	p=,037

Fig. 5: Coefficients of correlation between the employment shares in sections versus GDP per capita, GDP dynamics and ln GDP in 2008 and 2018.

Source: author's calculations

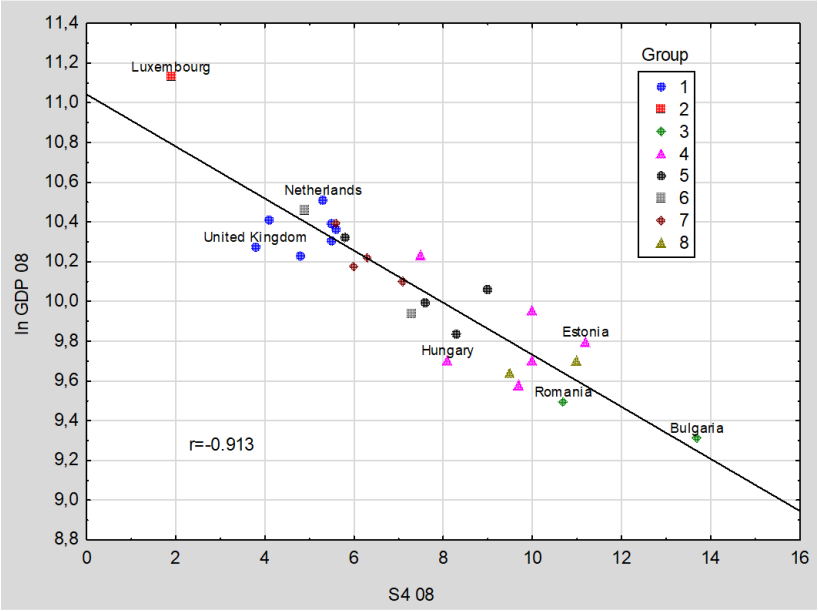

Fig. 6: Employment shares in low-technology manufacturing versus ln GDP (left) in 2008 and GDP dynamics (right)

Source: author's own compilation

The highest, but negative correlation (-0.913) was observed between the employment in low-technology manufacturing and lnGDP in 2008 (Fig. 6). The linear regression provides a very good description of this relationship. Countries even with extreme results, such as Luxembourg and Bulgaria, are located close to the regression line. Generally, the same relation is observed in 2018, but with higher variability around regression line (Fig. 8). Fig. 7 illustrates a curvilinear correlation between the share of people employed in industry sections with poorly developed technology and GDP dynamics 2008/2000. Good dynamics (more than 160) have been observed for low technology countries with shares of people in employment of more than 8%.

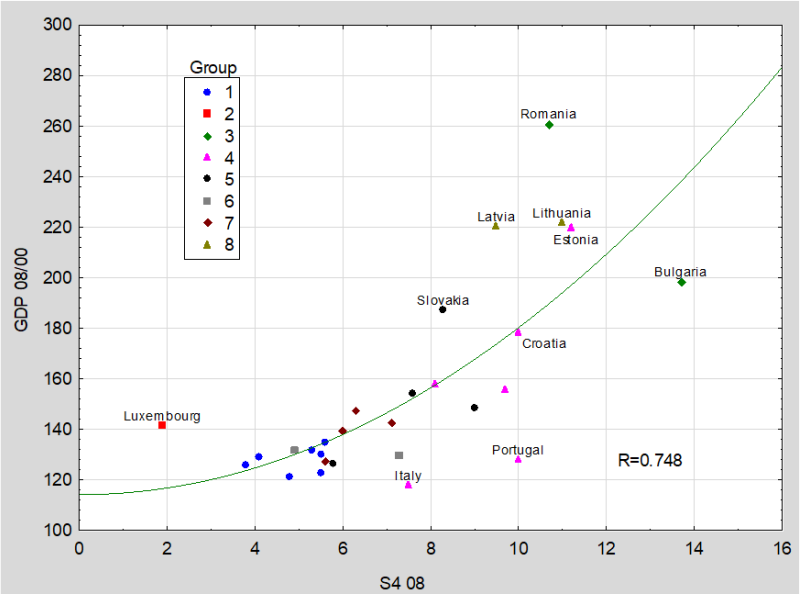

Fig. 7: Employment shares in low-technology manufacturing versus ln GDP in 2008

Source: author's compilation

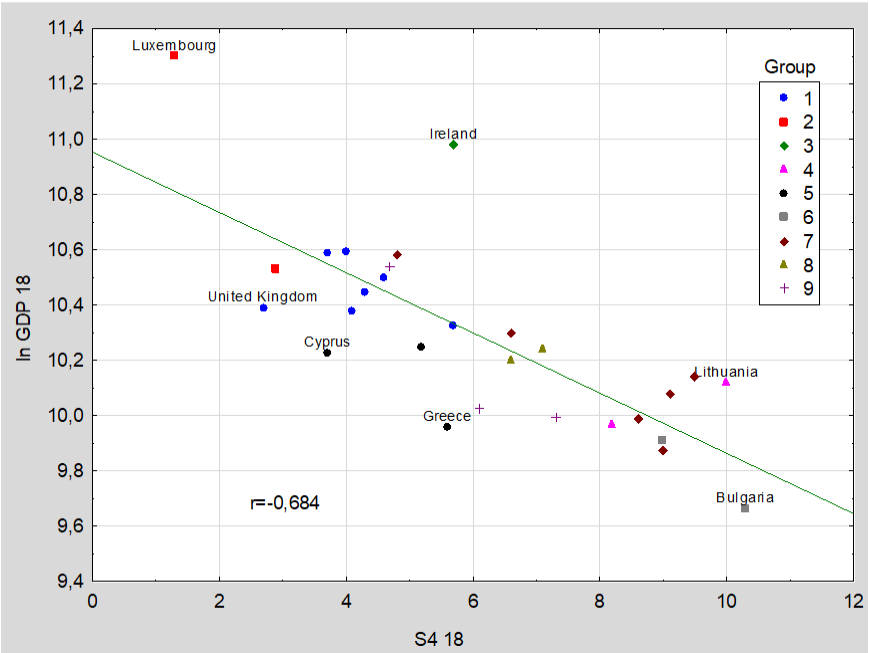

Fig.8: Employment shares in low-technology manufacturing versus ln GDP in 2018

Source: author's compilation

Summary

The similarity of the identified clusters of EU states, both in terms of the shares of people employed in sectors and sections of industry of a different technological advancement and knowledge-intensive services, compared in two years – 2008 and 2018, is high, as stated also in the paper (Markowska, Strahl, 2020). The similarity of partitions measure (Sokolowski, 1976) for the assessed "arrangements" was 0.839 for sector structures in 2008 and 2018 and 0.913 for section structures in 2008 and 2018.

For the analysed sector employment structures, negative and statistically significant correlations in 2008 and 2018 were obtained both for GDP per capita and for the logarithm of this characteristic, with the share of employees in: agriculture, forestry and fishing, mining and quarrying (P_1), manufacturing (P_2), electricity, gas, steam and air conditioning supply, water supply and construction (P_3). Negative and statistically significant correlations are also observed in the employment share in services and in the dynamics of GDP per capita. Positive and statistically significant correlations for sector employment structures were observed for the data of 2008 and 2018 in the case of the relationship between:

– the level of GDP per capita (and the logarithm of this characteristic) and the share of people employed in services in 2008 and 2018,
– share of people employed in electricity, gas, steam and air conditioning supply, water supply and construction as percentage of total employment.

The results were generally similar for the data of 2008 – between the share of people employed in agriculture, forestry and fishing, mining and quarrying and the GDP dynamics.

In both analysed years, negative and statistically significant correlations were obtained for shares of employees in: low-technology manufacturing section and GDP per capita and the same characteristic expressed as a logarithm, and in knowledge-intensive market services as compared to GDP dynamics.

The positive tendency was observed in the relationship between GDP per capita and the logarithm of GDP per capita and the share of employment in the following sections:
– knowledge-intensive high-technology services,
– knowledge-intensive market services,
– other knowledge-intensive services.

Positive and statistically significant correlations are also observed in the employment share in low-technology manufacturing with GDP dynamics.

As a result of the conducted study, one can find that the employment structure in both sectors and sections of industry affects not only the level of GDP per capita and GDP dynamics, but also shows, through the tendency of the studied relationships, a particular role of economic sectors and sections that are based on knowledge and innovative technology.

Further studies may lead to the assessment of dynamic relationships between employment structures and entrepreneurship, unemployment, as in the paper by J.M. Plehn-Dujowich (2010). It is interesting whether the employment structure in sectors and sections of industry is a stimulus for the dynamisation of innovation in economy, and entrepreneurship rise.

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Symbolic Ensemble Clustering And Linear Ordering Of European Countries According To Their Economic Freedom

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Abstract

Economic freedom means the ability and rights of people of a country to take any economic actions. The concept of economic freedom is a key term during many political debates and in the philosophy of economics (see for example Bronfenbrenner 1955). To measure economic freedom whole number of indicators (quantitative and qualitative from four main categories) are taken into account. These indicators are then combined to build an economic freedom index. The main aim of the paper is to present the results of symbolic ensemble clustering and ensemble linear ordering of selected European countries according to their economic freedom. In the empirical part of the paper results of linear ordering and symbolic clustering ensemble are presented (where different clustering results are combined using Leisch's approach). Besides that linear ordering multidimensional scaling for symbolic data (with symbolic-numeric approach) is used to visualize results. Both approaches allow discovering countries that share similar patterns of economic freedom.

Keywords: Economic Freedom, European Countries, Symbolic Data, Ensemble Clustering

JEL codes: C38, C01, O52.

Introduction

Economic freedom in general means the ability of people in a particular country to take any kind of economic activity. The idea of advancing economic freedom is strongly connected to the empowerment of people. Usually stronger and expanding freedom improves chances to archive individual goals (see for example Miller et. al. 2014).

To measure economic freedom whole number of indicators (quantitative and qualitative from four main categories) are taken into account. These indicators are then combined to build an economic freedom index.

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To measure economic freedom whole number of indicators (quantitative and qualitative from four main categories) are taken into account. These indicators are then combined to build economic freedom index. Most important freedom indices include:

1. Index of Economic Freedom developed and published by Heritage Foundation.
2. Indicator of the Economic Freedom of the World developed and published by the Fraser Institute.
3. Freedom survey that is published as World of Economic Freedom by Freedom House.

Besides that, many different authors present different aspects of economic freedom, like concepts of measurement by Gwartney and Lawson (2003), relationship of the income, economic freedom and the BMI by Lawson, Murphy and Wiliamsnon (2016), the role of economic institutions by Dutta and Williamson (2016), and the impact of the crisis on economic freedom by Bjørnskov (2016).

The main aim of the paper is to present the results of symbolic ensemble clustering and ensemble linear ordering of selected European countries (mostly the members of the European Union) according to their economic freedom. In the empirical part of the paper results of linear ordering and symbolic clustering ensemble are presented, where different clustering results are combined using Leisch's approach (Leisch 1999). Besides that linear ordering multidimensional scaling for symbolic data (with symbolic-numeric approach) is used to visualize results. Both approaches allow discovering countries that share similar patterns of economic freedom.

Ensemble Linear Ordering and Clustering for Symbolic Data

As usually in data analysis objects are described by single-valued variables, so they can be represented as a vector of qualitative or quantitative measurements, where each column represents a variable. Such data representation is too restrictive if we want to represent more complex data, that will take into account the uncertainty and/or variability. To represent such data variables must assume sets of categories or intervals, including in some cases frequencies or weights. Such kind of data has been mainly studied in Symbolic Data Analysis (SDA).

The main aim of Symbolic Data Analysis is to provide suitable methods for managing aggregated or complex data described by multi-valued variables, where cells of the data table contain sets of categories, intervals, or weight (probability) distributions, see for example (Billard, Diday 2006; Bock, Diday et al. 2000). Figure 1 presents general information about types of symbolic variables.

In the case of symbolic data, two types of data aggregation can be used to obtain symbolic variables and objects (see Billard and Diday 2006; Diday and Noirhomme-Fraiture 2008; Noirhomme-Fraiture and Brito 2011).

The first one is the temporal aggregation, where information for classical objects (individuals) are aggregated over time. In this case, we have first-order symbolic objects (simple objects, individuals). The second one is contemporary data aggregation, where other information than time is used to obtain symbolic objects (e.g. consumers buying the same product). In this case, we get second-order symbolic objects (super-individuals, complex objects).

In order to obtain the interval-valued symbolic variable, while aggregating the data, four different approaches can be used. The first one is to use minimum and maximum values from the initial data as the lower and upper bounds of the symbolic interval-valued variable. The second one is to take the first quartile from the data set as lower bounds of intervals and the third quartile from the data set as upper bounds of intervals. The third approach is to take the 10th percentile from the data set as lower bounds of intervals and the 90th percentile from the data set as upper bounds of intervals. And the last approach is to use some arbitrary knowledge (e.g. from experts) to obtain lower and upper bounds of a symbolic variable.

In general ensemble learning means combining results obtained by different models in order to get one aggregated model. In that sense ensemble approach can be applied in linear ordering for symbolic data, where multidimensional scaling is used for visualization.

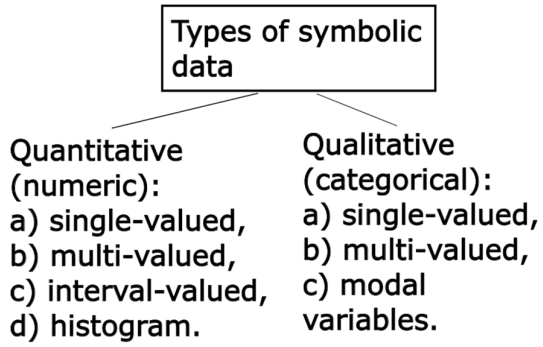

Fig. 1: Types of symbolic variables.

Source: own elaboration based on Bock and Diday (2000) and Billard and Diday (2006).

The concept of the pattern of development and anti-pattern of development as well as concepts of development measurement were proposed by professor Z. Hellwig (see Walesiak 2017a). A two-stage, hybrid, procedure that allows visualizing the results of the linear ordering was presented by professor Walesiak (see Walesiak 2016, 2017b). This procedure can be also applied to symbolic data, were different distance measures will be used, and such procedure involves:

1. Choice of a complex phenomenon that cannot be measured directly. This phenomenon is considered among a set of objects A.
2. Choice of objects.
3. Selection of symbolic variables and collecting the data and the construction of a symbolic data table.
4. Identification of preferential variables – stimulants, destimulants and nominants. Variable is a stimulant when for every two of its observations v_{ij}^{S}, v_{kj}^{S} for two objects A_i, A_k there is a reference $v_{ij}^{S} > v_{kj}^{S} \Rightarrow A_i \succ A_k$ ($\succ$ means that object A_i dominates over object A_k). Variable is a destimulant for every two of its observations v_{ij}^{D}, v_{kj}^{D} for two objects A_i, A_k there is a reference $v_{ij}^{D} > v_{kj}^{D} \Rightarrow A_i \prec A_k$ ($\prec$ means that object A_k dominates over object A_i). A variable is a unimodal nominant when for every two of its observations v_{ij}^{N}, v_{kj}^{N} for two objects A_i, A_k if $v_{ij}^{N}, v_{kj}^{N} \leq nom_j$ then $v_{ij}^{N} > v_{kj}^{N} \Rightarrow A_i \succ A_k$ and if $v_{ij}^{N}, v_{kj}^{N} > nom_j$ then $v_{ij}^{N} > v_{kj}^{N} \Rightarrow A_i \prec A_k$ (where i, k are object's numbers and j is the variable's number).
5. Transformation of nominants into stimulants. There is no need to transform destimulants into stimulants.
6. Normalization of variable values.
7. Calculation of distances between objects. For a symbolic data case many different distance measures can be applied. They are chosen upon the type of symbolic variables.

Multidimensional scaling for symbolic data is done. This method allows representing objects from a *m*-dimensional space on a *q*-dimensional space (usually $q = 2, 3$). In the case of symbolic data two approaches for multidimensional scaling can be carried out:

a) the symbolic-symbolic approach, where for symbolic data a table containing symbolic interval-valued data only, interval-valued distances are calculated. The interval-valued distances are used to carry out multidimensional scaling with one of three approaches – InterScal, SymScal or I-Scal (see Groenen and Terada 2015; Goenen et. al. 2005; Groenen et. al. 2006). This approach allows to represent symbolic objects as rectangles, in the case of a 2 dimensional plane, or cuboids (hyperrectangles) in the case of a 3 dimensional plane,

b) symbolic-numeric approach, where for a symbolic data table containing any symbolic variables distances for all objects are calculated. There are many different distance measures for symbolic data. The choice is usually limited to the symbolic variables (see for example Gatnar and Walesiak (eds.) 2011). The iterative procedure called smacof was used in this paper (Borg and Groenen 2005, pp. 204-205). The symbolic-numeric approach allows representing symbolic objects as points.

In the multidimensional scaling for symbolic data, when using either of the mentioned approaches, multiple distance matrices can be used, leading to an ensemble result of the MDS. To build one distance matrix from multiple distance matrices two approaches can be used. The first one involves using new STRESS function, that allows applying different distance matrices (see Bai et. al. 2017).

This approach has been developed for the classical data matrix. However, it can be also applied for symbolic multidimensional scaling based on interval-valued distances by modifying either STRESS-Sym or I-STRESS functions (see Groenen and Terada 2015; Goenen et. al. 2005; Groenen et. al. 2006 for details on I-STRESS and STRESS-Sym functions).

The second approach uses the approach proposed by Melssen et. al. (2006) to combine dissimilarities. The dissimilarities in each dissimilarity object are scaled so that the maximum dissimilarity in each object is 1. The scaled dissimilarity objects are then weighted according to the supplied weights. If no weights are supplied the dissimilarity objects are weighted equally (Melssen et. al. 2006):

$$D_{fused}(j,k) = \sum_{i=1}^{N} w_i D_{ijk,} \qquad (1)$$

where: $D_{fused}(j,k)$ − combined (fused) distance matrix, obtained by merging distance matrices *j* and *k*; w_i −weight assigned to the *i*-th distance matrices; D_{ijk} −distance matrices *j* and *k* to be combined.

In this paper, symbolic-numeric multidimensional scaling will be applied. Besides that multiple distance matrices will be used (namely: Ichino-Yaguchi, normalized Ichino-Yaguchi, de Carvalho distance based on description potential, normalized de Carvalho based on description potential, de Carvalho distance that extends Ichino-Yaguchi distance and Hausdorff). The final distance matrix will be obtained using the approach proposed by Melssen et. al. (2006).

8. Graphical representation and interpretation of the results (multidimensional scaling and linear ordering results). For the multidimensional scaling results a straight line that connects pattern and anti-pattern (so-called axis of the set) is added. Isoquants of development are determined and based on a pattern object – e.g. by dividing the axis of the set into four equal parts. The objects that are located between isoquants represent a similar level of development that can be archived by different objects.

Normalized distances of the i-th object from the pattern of development are calculated as follows (see Hellwig 1981, p. 62):

$$d_i^+ = \frac{\sqrt{\left(z_{ij} - z_{+j}\right)^2}}{\sqrt{\left(z_{+j} - z_{-j}\right)^2}}, \quad d_i^+ \in [0;1], \qquad (2)$$

where: $\sqrt{\left(z_{ij} - z_{+j}\right)^2}$ − Euclidean distance between the *i*-th object and the pattern object; $\sqrt{\left(z_{+j} - z_{-j}\right)^2}$ − Euclidean distance between the pattern and the anti-pattern object; i is the object's number; j is the variable's number; − means the anti-pattern object; + means the pattern object.

The objects are ordered by the increasing values of distance measure (1). The linear ordering results are presented in the figure.

When considering ensemble clustering for symbolic data following solutions are possible:

1) Clustering based on multiple distance matrices that was proposed by de Carvalho, Lechevallier and de Melo (de Carvalho, Lechevallier and de Melo 2012). Multiple distance matrixes are used to calculate relevance weight vectors. Then these vectors and distance matrices are used to obtain final clustering.
2) Consensus functions that are used in clustering ensembles – e.g. mutual information, co-clustering matrix, hypergraph, finite mixture models (Ghaemi et. al. 2009).
3) Adaptations of well-known bagging procedure for clustering (see Hornik 2005, Leisch 1999, Dudoit and Fridlyand 2003). In this paper, Leisch's adaptation of bagging will be used. This procedure involves (Leisch 1999):

a) division of initial data set into *M* subsets. These subsets a drawn from initial data set with replacement – in this paper 25 subsets with 10 objects each will be used,

b) clustering of each subset. In the classical data case centers of clusters are obtained. In the case of symbolic data medoids will be used,

c) medoids (cluster centers) are used as the data matrix for some clustering method – e.g. *k*-means, pam, DIANA, etc., and final clusters are obtained. In this paper well-known *k*-means will be used with silhouette index for cluster selection (see Kaufman and Rousseeuw 1990),

d) for the final clusters new medoids are obtained,

e) all objects are assigned to the nearest medoid.

Analysis of the economic freedom of selected European countries

The empirical study uses the statistical data obtained from the Heritage Foundation (https://www.heritage.org/index). This dataset is freely available to download on their website. The index used by the Heritage Foundation covers 12 aspects of freedom, from property rights to the financial freedom, for 128 different countries. The measurement of economic freedom done by the Heritage Foundation is based on 12 quantitative and qualitative factors grouped into four categories. The categories (pillars) include rule of law (property rights, governmental integrity, judicial effectiveness), government Size (government spending, tax burden, fiscal health), regulatory Efficiency (business freedom, labor freedom, monetary freedom) and open markets (trade freedom, investment freedom, financial freedom).

In this paper data from 2016-2019 was used to obtain symbolic interval valued data for selected European countries using temporal data aggregation.

The dataset was descried by following variables that covered all pillars of economic freedom (more about all pillars and their more detailed description can be found at: https://www.heritage.org/index/pdf/2019/book/methodology.pdf):

v_1 – property rights is a component that assess the extent to which country's legal framework allows an individual to acquire, hold and utilize property. The final score for this component is derived by averaging scores for the following equally-weighted sub-factors: physical property rights, intellectual property rights, strength of investor protection, risk of expropriation and quality of land administration.

v_2 – judicial effectiveness. This component is derived by averaging scores for equally-weighted sub-factors: judicial independence, quality of the judicial process and favoritism in decisions of government officials.

v_3 – government integrity is a component that covers following areas that were averaged equally: public trust in politicians, irregular payments and bribes, transparency of government policymaking, absence of corruption, perceptions of corruption and governmental and civil service transparency.

v_4 – tax burden is a composite measure that covers the marginal tax rates on both personal and corporate income and the overall level of taxation (including direct and indirect taxes imposed by all levels of government) as the percentage of the gross domestic product (GDP). The component score is calculated from three quantitative sub-factors: the top marginal tax rate on individual income, the top marginal rate on corporate income and the total tax burden as the percentage of the GDP.

v_5 – government spending is the component that covers the burden imposed by government expenditures, which includes consumption by the state and all transfer payments related to various entitlement programs.

v_6 – fiscal health that is associated with macroeconomic instability and economic uncertainty. The score of the fiscal health is based on two sub-factors that were equally-weighted: average of deficits as the percentage of the GDP for recent three years (80% of the final score) and debt as the percentage of the GDP (20% of the final score). In most cases the index covers government deficit and debt data that include all levels of government such as federal, state and local.

v_7 – business freedom is a component measure that captures the extent to which the regulatory and infrastructure environments constrain the efficient operation of business. The final score is based on 13 sub-factors that are weighted equally.

v_8 – labor freedom component is a quantitative measure that considers various aspects of the legal and regulatory framework of a country's labor market, including regulations concerning minimum wages, laws inhibiting layoffs, severance requirements and measurable regulatory restraints on hiring and hours

worked plus also labor force participation rate as an indicative measure of employment opportunities in the labor market.

v_9 – monetary freedom combines a measure of price stability with an assessment of price regulations (controls). The final score is based on two sub-factors: the weighted average inflation rate for the most recent three years and price controls.

v_{10} – trade freedom is a composite measure of the extent of tariff and nontariff barriers that affect imports and exports of goods and services.

v_{11} – investment freedom covers a variety of regulatory restrictions that typically are imposed on investment.

v_{12} – financial freedom is an indicator of banking efficiency as well as a measure of independence from government control and interference in the financial sector.

All key pillars (factors) take value from 0 (minimum) to 100 (maximum). Variables $v_1, v_2, v_3, v_5, v_6, v_7, v_8, v_9,$
v_{10}, v_{11}, v_{12} are stimulants, variable v_4 is destimulant. Variable v_5 (government spending) is a nominant with a nominal level equal to 30. As the government spending is nonlinear, it means that spending that is close to 0 is penalized, while spending that exceeds 30 percent of the GDP leads to much worse scores in a quadric fashion (see https://www.heritage.org/index/pdf/2019/book/methodology.pdf for further details). To change the nominant variable into stimulant following equation was used for initial data:

$$v_{ij} = \frac{min\{nom_j; v_{ij}^N\}}{max\{nom_j; v_{ij}^N\}}, \qquad (3)$$

where: nom_j – nominal value for *j*-th variable; v_{ij}^N – value of the *j*-th variable for *i*-th object.

Figure 2 presents the results of the multidimensional scaling for 29 objects (27 countries, the pattern and the anti-pattern object). Objects 28 (pattern object) and 29 (anti-pattern object) were connected with a straight line to obtain the so-called axis of a set. Seven isoquants were added by dividing the axis of a set into seven equal parts.

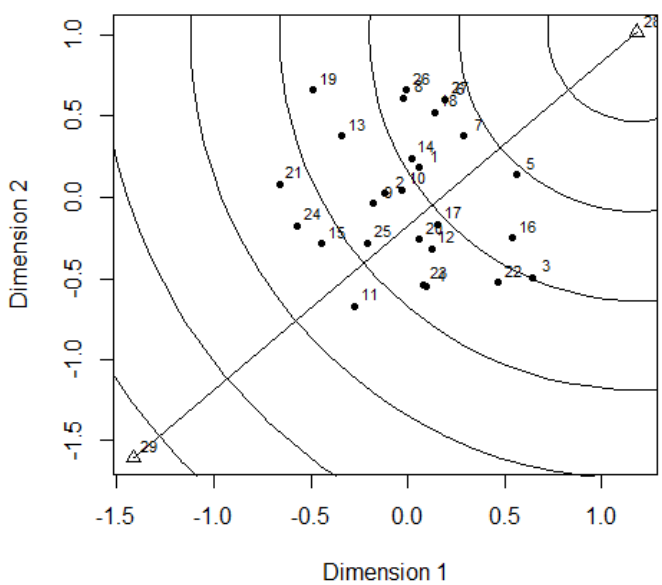

Fig. 2: Results of multidimensional scaling in the two-dimensional space for 29 objects – 27 European countries, pattern object (28) and anti-pattern object (29).

Source: own elaboration using R software.

The distances of each country from the pattern object were calculated according to the formula (2). Countries were ordered by the growing values of this measure. The results are presented in table 1.

Table 1: The ordering of 29 objects regarding their level of economic freedom

Object no.	Object's name	Distance	Object no.	Object's name	Distance
28	pattern	0.0000	10	Germany	0.4166
27	United Kingdom	0.2600	17	Lithuania	0.4231
6	Denmark	0.2608	2	Belgium	0.4362
26	Sweden	0.2772	12	Hungary	0.4565
5	Czech Republic	0.2861	9	France	0.4595
18	Netherlands	0.2864	20	Poland	0.4599
8	Finland	0.2900	21	Portugal	0.4994
7	Estonia	0.2925	4	Cyprus	0.5004
19	Norway	0.3371	23	Slovakia	0.5027
16	Latvia	0.3557	25	Spain	0.5141
3	Bulgaria	0.3670	24	Slovenia	0.5505
14	Ireland	0.3674	15	Italy	0.5566
1	Austria	0.3728	11	Greece	0.6011
13	Iceland	0.3887	29	anti-pattern	1.0000
22	Romania	0.4133			

Source: own elaboration based on R software.

The top five European countries when concerning their economic freedom include United Kingdom, Denmark, Sweden, Czech Republic and the Netherlands. The five worst countries include Slovakia, Spain, Slovenia, Italy and Greece. Poland is not doing so great, as it is the 21-st country in the whole group.

For the same data set symbolic ensemble clustering, that uses Leisch's adaptation of bagging was used. As the final solution, three cluster solution was obtained with silhouette index equal to 0.6287997. The first cluster contains eleven countries: Austria, Belgium, Denmark, Estonia, Finland, Germany, Iceland, Ireland, Netherlands, Norway and Sweden. The second cluster contains ten countries: Bulgaria, Cyprus, Czech Republic, Hungary, Italy, Latvia, Lithuania, Poland, Romania and Slovakia. The third cluster contains France, Greece, Portugal, Slovenia, Spain and United Kingdom.

To find out which variables have the most significant impact on cluster membership a symbolic decision tree was built using symbolicDA package for R software (see Dudek, Pełka and Walesiak 2019). Figure 3 presents the final decision tree.

Variable v_9 (monetary freedom) has the most important impact on cluster memberships. Variable v_8 (labor freedom) is the second one when considering importance and variable v_5 (government spending) is the last one. Variable v_9 (monetary freedom) takes value from 79.8 to 91.6 in cluster 2, 78.7 to 87.1 in cluster 3 and from 74.7 to 87.5 in cluster 1. Variable v_8 takes values from 50.7 to 77.9 in cluster 2, 43.7 to 73.9 in cluster 3 and 47.8 to 86.1 in cluster 1. Variable v_5 takes value 0.45 to 0,98 in cluster 2, 0.08 to 0.92 in cluster 3 and 0.03 to 0.89 in cluster 1.

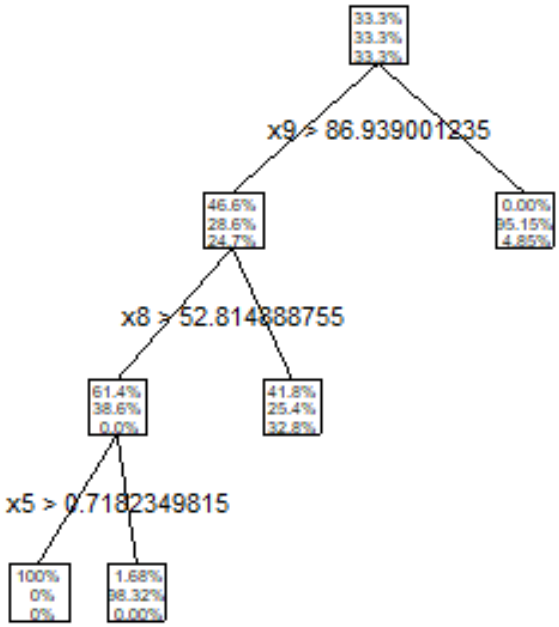

Fig. 3: Decision tree obtained for three clusters.
Source: own elaboration using R software.

Final Remarks

The proposed extension of the linear ordering that is combined with multidimensional scaling allows taking a deeper look into linear ordering results. When merging different distance measures into one (single distance matrix) we allow taking a look from different angles (perspectives) at the same problem. Such an approach allows using different approaches (distance measures) combined with different normalization methods in case of classical data.

When analyzing countries with similar levels of economic freedom three clusters were obtained with silhouette index equal to 0.62879997. This means there is a strong cluster structure in the data set. The most important variable, when considering clusters, is the variable v_9 (monetary freedom), then labour freedom. This means countries with high values of monetary and labour freedom are considered to have higher economic freedom in general and are more likely to be found in cluster 1 ("core UE countries with high economic freedom"). Second cluster contains mainly post-communist countries from eastern Europe that are low- and medium free when considering their economic freedom. The third cluster contains also high and medium-high countries with economic freedom.

When looking at linear ordering results we can find out that there are countries with similar levels of economic freedom, but with different position when looking at the axis of the set (see fig. 2) – for example Czech Republic (5) and Estonia (7), Latvia (16) and Ireland (14), Germany (10) and Lithuania (17), Spain (25) and Slovakia (23), Italy (15) and Greece (11). They share quite similar levels of economic freedom but they have different positions on the map as there are different reasons for them to be on such places.

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Business as A Career Choice for Women

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Abstract

In spite the fact that the entrepreneurship in Slovakia is carried out mostly by men, women have also started to develop entrepreneurial activities in the market as successful entrepreneurs and managers. The entrepreneurship represents the area of the unutilised potential for career self-fulfilment and economical assurance of women. The businesswomen and female managers contribute, specifically by innovations, to business and entrepreneurship. In most cases, the women run business alone or as sole-traders and self-employed persons, mostly in branches as health, fashion, social-work, services, administration, education and training. The study analyses entrepreneurial activities of women in Slovakia and provides information on the system of support on behalf of entrepreneurial activities of women. The paper includes the results from survey on the entrepreneurial activities of women in Slovakia as well as the identification of factors contributing to disadvantaging position of female entrepreneurs and mangers in the market.

Keywords: Women, Legal Acts, Economic Stimulus, Challenging Career

Introduction

The status of women in society has been principally changed. The original role of women as mothers primarily caring after family has been changed and the women have started to act not only as mothers, in numerous cases as breadwinners (Alma Mater) but also as entrepreneurs in the market. The country which is economically successful is characterised by the capability to fully utilise the potential and talents of all population in productive age and at the same time able to raise new generations. The share of women in the labour market in Slovakia is lower than of men. Employed women usually work less hours than fulltime job, in sectors with lower earnings and occupy lower positions compared to men which effects the significant difference in remuneration and incomes between women and men.

The differences can be, to a certain degree, ascribed to deeply rooted, traditional gender roles as well as to economic stimuli. At present, however, the share of female entrepreneurs in the market has increased. They, the women, have often to cope with numbers of problems in the world of business and entrepreneurship which traditionally is the world of men. Women, however, do have an unsubstitutable place in entrepreneurship, management of corporations and politics. They, the women, contribute by their labour, creativity and female esprit to the cultivation of all above areas.

The paper has focused on the issues of entrepreneurship of women in their entrepreneurial activities with the intention to identify individual obstacles that women usually encounter and has identified factors positively influencing the harmonisation of labour (entrepreneurship) and personal obligations (family, further education, leisure time). The primary sources of statistics utilised in the paper were the databases of the Statistical Office of the Slovak Republic.

Representation of women in the market

The Annual Report on the State of Entrepreneurial Environ in the Slovak Republic, regularly elaborated by the Ministry of Economy of the Slovak Republic, provides monitoring on various aspects of the topical state of entrepreneurship environ. The report informs that in 2018 there was an increase by 51 586 entrepreneurs that run business activities in various legal forms as natural persons. The Slovak women entrepreneurs showed the biggest interest in running businesses based on trade certificate. The second place was represented by freelance occupations, i.e. the entrepreneurial activities not based on

the trading authority certificate (3654 persons). The majority of natural persons was registered in Prešov region (9112 subjects) and Žilina region (7529 subjects). On the contrary, the least natural persons were registered in Trnava region (4847). The share of female entrepreneurs and managers represents 29 % on the market. The biggest share of Slovak female entrepreneurs do business in Bratislava region.

The women, compared to men, are underrepresented in central state administration bodies with the exception in the sector of education and justice. The share of women in the sector of justice is 1,7 times higher compared to men. In the Supreme Court the share of female judges represents almost 60 % and the president and the vice-president of the Supreme Court are women. In the Constitutional Court the share of women in the position of judges represented 36,4 % in 2018.

It is a well-known fact that in the top company bodies the men are significantly represented compared to the women, and thus there is a higher probability of the narrow "group thinking" (Commission, 2012).

The representation of women in decisive positions in the Slovak Republic is very different, varying from the total absence of women in top decisive positions (e.g. the Banking board of the National Bank of Slovakia). The political representation of women has reached a turning point in 2018 when during the government reconstruction as many as 5 ministerial chairs out of total 15 were taken by women which was registered so far as the highest share of women in the Slovak Government since 1993, thus representing 33,3 %.

In the management of Slovak business companies the women proved to be competent in personal/human resources departments (82,5 %), informatics departments (56,2 %) and marketing departments (50,7 %). The least share of women was observed in the management of IT departments (6,7 %). Among the most significant 1 375 corporations in Slovakia the share of women in the position of directors general represented only 9 %.

The overall unemployment rate of women in 2019 in all eight Slovak regions was higher than the overall unemployment rate in the country and the unemployment rate of men specifically. For example, the unemployment rate of women in Prešov region (Eastern Slovakia) was three times higher than the rate in the capital Bratislava. Due to the Statistical Office of the Slovak Republic, the highest unemployment rate of women was registered in districts with relatively high shares of Romany ethnic groups, as e.g. Revúca (17,92 %), Kežmarok (17,15 %), Rožňava (16,29 %) and Vranov nad Topľou (15,54 %).

Success stories of women entrepreneurs acknowledged internationally

There are several well-known success stories referring to entrepreneurial activities of women acting and acknowledged internationally. There are, however, few examples of women who founded and managed really big companies, in some cases with international impact. In this group, e.g. Margaret Steiff can be ranked as a well-known German business woman, the founder of a toy factory *Spielwarenfabrik Steiff GmbH.*

Gabrielle Bonheur Chanel, better known as Coco Chanel, can be ranked among well-known female personalities enjoying international reputation. The fashion guru Coco by her talent and creativity created inimitable style of haute couture, perfumes and accessories. As back as in 1936 her company provided employment to 4000 employees and her vogue achievements were the success as she designed outfits for film stars (Audrey Hepburn, Grace Kelly) and the First Lady of the USA Jacqueline Kennedy.

Among the women personalities of the fashion world the undeniable significance is ascribed to Aenne Magdalena Burda who founded in Germany one of the biggest publishing houses for fashion journals, the Burda-Moden. In 1950 the first number of a new edition Burda Moden was published and in the short time the journal achieved the circulation of one million copies. At present, it is printed in 89

countries and 16 languages. Burda media concern publishes 239 journal titles all over the world. The flagship is represented by a news weekly Focus and a societal journal Bunte.

The world of business women with international reputation is represented by Elisabeth Arden, creative, visionary and well-balanced smart entrepreneur who has had courage and talent to transform dreams into reality. She opened her first beauty parlour in 1910. Her business activities included beauty salons and industry in the USA and Europe, with the representation in Australia and the South America, over 100 of Elisabeth Arden salons. The brand name Elisabeth Arden includes over 300 cosmetic products and relaxors.

At present, Victoria Beckham belonging to significant entrepreneurs was awarded by readers of the British Glamour as the Woman of the Year and the symbol of successful business woman and mother. She is active in the field of fashion and cosmetics.

Due to the estimate of the magazine Fortune 500, the share of women in the top management of the most significant corporations and public corporations represents 4,5 %. The ranking elaborated by Fortune includes 500 American private and public corporations due to the annual GDP.

Equal position of women in the market

The European Union and other international organisations, in the framework of their objectives and values, claim to the advocacy of equal opportunities and social rights protection. In their documents, they continuously require from their members to respect the principle to ban any discrimination. Economic integration as the process in which the economic relations are deepened and the economic collaboration is coordinated in the interoperation of all participating countries (Nováčková, 2014).

The European Union requests from its members to respect obligations set in EU primary and secondary legislation. The article 157 para 3 of the Treaty on Functioning of the European Union represents a legislative basis for all obligatory measures which aim to assure the application of the principle of equal opportunities and equal treatment of men and women in the issues of employment and occupation, including the measures of positive discrimination.

Based on the principle of loyal cooperation, embedded in article 4 para 3 of the Treaty on the European Union, the member states are obliged to adopt all necessary measures of general and specific substance, in order to assure the fulfilment of obligations emerging from the treaties and other legal acts of the institutions of the European Union. Pursuant to this principle, the member states must not adopt any other measures which could jeopardize the achievement of the EU goals. In the Slovak Republic, besides the Treaty of the Functioning of the European Union, the Slovak Constitution is applied, where in article 38 the particular status of women is embedded, in relation to the rights for increased health protection at work and special work conditions. The most significant legal act in labour relations is the Labour Code that has embedded the rights and obligations of subjects in labour relations, based on the labour (employment) contracts or emerging from labour relations based on temporary employment contracts.

The Labour Code directly bans the discrimination in remuneration of women and men. Both genders are entitled to equal earnings for equal work or equal value, respectively. The equal work is considered as the work of the same or comparable complexity, responsibility and work difficulty (labouriousness) which is carried out in equal or comparable working conditions, by accomplishing equal or comparable production rate and work accomplishments in labour relation at the same employer.

The principle of equal treatment is also set by the Act 265/2004 Coll. (subsequently amended) on equal treatment in some areas and on the protection against discrimination. Besides that, also the Constitutional Law 460/1992 Coll. (subsequently amended) in article 12, para 2 guarantees fundamental rights and freedoms to all, irrespective of sex, origin, nationality or ethnic group, property, kinship or other status (Bérešová, Nováčková, 2017).

Globalisation and international movement of persons

Globalisation fosters the economic development as well as the movement of labour force. The removal of barriers of free movement of persons is represented as the commitment of numerous international organisations.

Globalisation is the phenomenon of the present era and it effects economic, financial, social and cultural relations as well as the legal relations (Mičátek, 2019). In consequence of globalisation the mobility of labour force of women increases. The effects of globalisation are reflected in particular in the inflow of foreign investments, growth of interdependence, and in the deepening of global division of labour (Geistlinger, Nováčková, 2018). In 2017, the stock of EU-28 movers in the main destination countries increased by 5 % compared to 2016, with an increase of 14 % in the UK, 4 % in Germany, and between 1 % to 3 % in France, Italy and Switzerland. Aside from these, there were large increases in Portugal (12 %) and Poland and Lithuania (both 14 %). Hungary saw an 8 % decrease in EU-28 movers residing there (European Commission, 2018).

Entrepreneurial activities of women in Slovakia

In spite of the fact that the Slovak Republic by its territory is a rather small country, the regional disparities are manifested, including geographic and economic differences. Thus the conditions for entrepreneurial activities of women in Slovakia also differ. Therefore we will consider and analyse basic factors influencing women in professional life. The entrepreneurship of women in Slovakia is determined by several determinants, including the capital, without no doubts. Women can be motivated to start entrepreneurial activities also by ambitions to actualise themselves in labour markets.

The necessary prerequisites of entrepreneurial activities include:

- Social maturity: character maturity, will-power ripeness, cognitive maturity, creative maturity, the ripeness of temperament, emotional maturity, physical maturity, spiritual maturity.
- Cognitive efficiency: general and vocational knowledge efficiency related to the object of the work and the management and their substance, knowledge proficiency on management functions, knowledge on sources, contents and classification of information in management processes.
- Application skills: communication skills, motivation skills, team work skills, self-management and time-management skills (Slovenská akadémia manažmentu, 2019).

The decision to become an earner is an act of self-actualisation requiring a high level of commitment. Increased level of responsibility usually leads to the longer working time. The advantage of a woman in entrepreneurship is the possibility to harmonise the family life and the work, provided the external circumstances permit.

Table 1: Comparison of shares in female entrepreneurs in 8 Slovak regions

Region	2018	Age interval (Biggest share)	Branch	Average monthly salary in region (in euro. 2017)
Bratislava region	17 181	24-56	Services Industry Education	1 243
Trnava region	10 295	30-45	Services	903
Nitra region	12 591	40-49	Services	852
Banská Bystrica region	10 892	33-45	Industry Services	868
Trenčín region	10 378	34-45	Services	868

Žilina region	12695	40-49	Services Industry	864
Prešovský region	11 440	40-49	Services	819
Košický region	10 987	35-50	Services	912

Source: author, based on statistics of the Statistical Office of the Slovak Republic (cut-off day 31 December 2018)

The Table 1 illustrates the numbers of women who carry out entrepreneurial activities in 8 Slovak regions. Considering the acquired data, it is possible to say that there is a certain degree of dynamics in wiping away regional differences in earnings. Women carry out entrepreneurial activities mainly in the sector of services (such as gastronomy services, cosmetic services, garment repair, bakery services, auditing, accountancy, legal advice, health care, education, etc.). In the sector of industry the women mostly act in chemical industry.

In relation to age cohorts of women in entrepreneurial activities, the largest number of women is active as entrepreneurs in the age interval 40 to 49, which can be assessed as a ripe age.

Compared to other statistical sources we can formulate the assumption that in Slovakia with its 5,3 million of inhabitants, women in productive age compared to men show the tendency to prefer the status of employees. Out of 1 251 000 economically active women only 106 000 (8,4 %) carried out entrepreneurial activities in 2018, compared to 260 000 men entrepreneurs.

Identification of factors disadvantaging the position of women in the market

As one of the aims of the paper is to identify problems and obstacles in entrepreneurship of women, we administered a questionnaire in order to obtain relevant information. The questionnaire was administered from October 1, 2019 to December 31, 2019 to 330 participants. The respondents provided replies which were analysed and evaluated. The outcome of survey facilitated the identification of factors disadvantaging the position of women in entrepreneurial activities. We identified the following factors:

a) The traditional form of entrepreneurship in many women is the self-employment which usually neither brings big earnings nor profits. This group of women is at risk during their working life as well as in the old age as they are exposed to the risk of poverty.
b) Compared to men, women in entrepreneurship are not willing to get into debt or broaden the portfolio of entrepreneurial activities, probably because of lower level of self-confidence.
c) A significant problem of women in entrepreneurship is the access to finances and loans.
d) Women were primarily motivated to entrepreneurial activities because of the dissatisfaction at work. At present, they are motivated by acquired independence and possibility of autonomous decision-making.
e) They carry the entrepreneurial activities in majority cases in their own premises.
f) They offer their goods and services by internet and by other ways of marketing.
g) The branch of study (at secondary school or university) is usually not connected with the substance of their entrepreneurship.
h) They encounter and have to cope with traders in the market.
i) They are affected by unstable legal environ.

Based on the answers, the typical female entrepreneur in Slovakia could be characterised as a woman of 35, married, living in a municipality, mother of children, graduate of a secondary school or a university, carrying out entrepreneurial activities namely in the sector of services. The women usually act as natural persons, in some cases as legal entities. The entrepreneurship of women flourishes in municipalities and in the countryside where the focus of entrepreneurial activities lies in agricultural production and processing goods from biomass and relatively high share of services.

The support to entrepreneurship of women

The Central Office of Labour, Social Affairs and Family of the Slovak Republic is entitled to provide financial allowances to start entrepreneurship, namely the self-employment that will partly cover expenses associated with the business. The amount of the allowance is determined by several factors as e.g. the unemployment rate in the region and the overall cost of labour. The allowance is not paid out to full extent. At the start of the entrepreneurship, the 60 % of the approved allowance is paid out, the rest 40 % is paid after 12 months of the operation of self-employment. The women with the entrepreneurial activities based in the Bratislava region may receive the maximum allowance of 3 325,90 EUR. The women in regions with the average registered unemployment rate which is lower than the Slovak average unemployment rate and with the triple overall cost of labour may receive the allowance of 3 991,08 EUR from the governmental scheme as the entrepreneurship support assistance. In Slovak regions with the average rate of registered unemployment which is higher than the overall average in Slovakia and with the quadruple overall cost of labour the entrepreneurs may obtain the starting capital. The necessary condition for all above financial stimuli and allowances is the continuous operation of business for minimum three years (Central Office of Labour, Social Affairs and Family, 2019).

Conclusions

The entrepreneurial activities of women in Slovakia are effected by several determinants. The scope and the way of operation of economic activities is also determined by the harmonization of family and professional life and the amount of authorized capital. The relatively short history of entrepreneurship of women in Slovakia shows that women carrying out entrepreneurial activities do not give up and in spite of obstacles do persist in their entrepreneurial activities. They significantly contribute to the creation of new development opportunities, the decrease of social exclusion and the strengthening of social cohesion. We also identified that the share of women in entrepreneurship is still lagging behind in Slovakia as well as in many of EU member states. They, the women, they all represent the hidden, unutilised potential of growth and prosperity. The women in entrepreneurship often focus on branches which are less profit-making which was confirmed by statistics on entrepreneurship of women in Slovakia.

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Influences and Motivations of The North Portugal's Tourist Regarding Local Accommodation

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Abstract

Nowadays, Local Accommodation is one of the main types of accommodations, not only seen in Portugal, but also worldwide. The huge growth of this subject and the strong commitment to new concepts has fostered new trends and needs in the consumer. The present study aims to identify the national tourist perception, living in the North of Portugal, in relation to local accommodation, characterizing the main influence and motivation factors in the choice of this type of accommodation in Portugal and abroad. Taking this into consideration, after a literature review, an inquiry was carried out through an online questionnaire, composed mostly of closed questions and evaluation scales, to all Portuguese living in the north of Portugal, who had travelled at least once over the past 5 years. A random sample of 239 participants was collected, between May and July 2019. The collected data was treated through the SPSS software. An exploratory descriptive analysis, an inferential analysis and a factor analysis were then conducted using the information gathered. The study seems to point out that there is a significant relationship between the national tourist's adhesions to touristic accommodation in Portugal with the national adhesion to touristic accommodation abroad. The adhesion to local accommodation in Portugal is not related to the reasons for the trip/travel and the adhesion to local accommodation abroad, is mostly motivated by leisure. In what concerns the perception of the national tourist about touristic accommodation the location (Portugal/abroad) is not relevant.

Keywords: Tourism, Local Accommodation, Touristic Accommodation, Motivations

Introduction

Tourism is a social phenomenon defined by the consequence of the temporary movement of people, from one place to another, far from their usual place of residence (Sharpley, 2014). The study of tourism involves the motivation and experience of tourists, as well as the expectations and adjustments on the destination community, adding all stakeholders. Foreign tourism and domestic tourism are an integral part of people's lives (Chang & Katrichis, 2016) and tourism products should exhibit solutions oriented to customers/market, with focus on quality and designed in an innovative way to satisfy needs and expectations of tourism/travel and increasing intentions of return and loyalty (Mwinuka, 2017). Tourism is a strategic sector, considered as an economic giant and the most important factor of social and economic development in the world (Weaver & Lawton, 2010), with unavoidable and transversal impact to several sectors, creating jobs and wealth. Technology applied to the tourism sector is able to achieve results that exceed people's expectations, allowing big connections, exchange of information and achievement of results in real time (International Tourism Highlights, 2019 Edition, 2019). In Portugal the tourism sector is the largest export economic activity in the country, being responsible, in 2019, for 52.3% of exports of services and for 19.7% of total exports, with tourist revenues registering a contribution of 8.7% in Portuguese GDP (Turismo de Portugal,

2020). The Northern Region of Portugal (NUTS 2) accounts for 23% of the country's total surface area and approximately 35% of the national resident population. This region concentrates in itself 18.4% of the Local Accommodation units of Portugal, clearly highlighting the district of Porto, with 69.4% of the units in this region (INE, 2018). The promotion of tourism in the North as a whole is based on five strategic products namely: i) business tourism; ii) city breaks; iii) touring and cultural landscape; iv) heritage; v) gastronomy and wine; vi) health tourism; vii) nature tourism and viii) religious tourism (Oliveira, 2014). New patterns and new profiles of tourists appear, requiring research in order to analyze whether the evolution of tourism and the new forms of accommodation accompany the needs of the portuguese tourist. The present study aims to understand the perception of the national tourist in relation to local accommodation in Portugal and abroad and also to understand what motivates and influences them, when choosing accommodation while travelling.

Literature Review

Tourism

Tourism is a service industry with high potential growth and a major concern in the international community as a whole (WTTC, 2017). The concept has evolved over the past few decades, being tourism evolved as a decisive link in accelerating the pace of global socioeconomic development (Joseph, 2013). It has different meanings for different people (Pruthi, 2004) and may be seen as the total sum of phenomena and relationships triggered from trips and stays of non-residents, insofar as they do not lead to permanent residence and are not linked to any earning activity (Robison, 1976). In a more holistic approach, referring to an integrated and complete analysis of tourism, Leslie (2000) defends the need to include all the key characteristics of tourism, namely, movement of people, transport, stay and activities at destination and determinants of demand and supply. In a first instance, the tourist is influenced by the destination itself, and the destination encompasses the regions, countries, cities and other areas that attract tourists. However, tourist destinations suffer great impact from tourism including economic, social, environmental and cultural, among others (Chetthamrongchai, 2017).

Collaborative Economy

The concept of collaborative economy is widely used in literary with multiple interpretations, often appearing as the sharing economy or collaborative consumption (Botsman & Rogers, 2010). Accordingly to Lamberton & Rose (2012) collaborative consumption is a system in which consumers enjoy a certain good without actually owning it. Collaborative economy is an economy built on individual or community knowledge networks *versus* centralized institutions (Botsman & Rogers, 2010) and can be defined in four dimensions: i) collaborative production, ii) collaborative consumption, iii) collaborative financing and iv) collaborative education. In essence, collaborative economy is based on transactions that happen between business-to-business (B2B), business-to-consumer (B2C) and peer-to-peer (P2P), where the contact between the service provider and the final consumer is established through a digital and online medium (Botsman & Rogers, 2010). Some examples of collaborative economy platforms or "peer-to-peer accommodation" are, among others, Airbnb, Stayz, 9flats, alterkeys and Roomorama (Mahadevan, 2018). In recent years, the local accommodation market has been growing sharply and this new economic concept presents the Airbnb platform as a leader in the local accommodation market (Mahadevan, 2018) with more than 2 million properties spread across the world (Airbnb, 2015). Although there is no consensus, researchers like Zervas et al. (2017) defend that the existence of platforms such as Airbnb that provide low-cost accommodation, encourage tourism and the consequent increase in the number of travellers, as well as opportunities for new jobs. On the other hand some other researchers argue that the impact is low or null (Haywood, Wilson, Hennis & Alvarado, 2016; Wroten, 2017).

Consumer Psychology

Consumer psychology is the scientific study of the behaviour of consumers (Mullen & Johnson, 1990, p. 1). Foxall (1990) and Foxall &Goldsmith (1994) emphasize the significance of the cognitive consumer as a basis for this scientific understanding of consumer behaviour in that "consumer choice

is portrayed as an ego-involving sequence of cognitive, affective, and cognitive changes which precede and predetermine the purchase/no purchase outcome" (Foxall 1990, p. 9). The practice of tourism is entirely related to the act of meeting new people, sharing customs and cultures that can often result in conflicts between tourists and also between tourists and inhabitants of the visited places (Šimková, 2014). it is crucial to understand the factors that influence consumer behavior when choosing a product or service, subdividing them into 6 different steps for their acquisition: i) the recognition of the need, the search for information, iii) the alternative assessment, iv) the acquisition, v) the post-acquisition assessment and vi) the divestment (Blythe, 2005). These steps have the presence of cultural, social, personal and psychological factors that determine the choice of a product/service over another (Kotler, 2000; Kotler & Amstrong, 2011). In light to the above it seems possible to argue that the competitiveness of a destination depends largely on the experience that the tourist had in that same destination (Pavlovic, 2016).

Motivations and influences when choosing accommodation

For tackling the hotel establishments scarcity on times of great affluence and events in cities, new types of accommodation inserted in a collaborative economy have emerged (Bardhi & Eckhardt, 2012; Botsman & Rogers, 2010), becoming major competitors of hotel establishments and the services they provide (Freitag & Haywood, 2015). There are many reasons that lead consumers to opt for this type of hosting. There are authors who argue that the main reason that leads consumers to choose this type of collaborative economy is their monetary benefits (Bellotti et al., 2015; Botsman & Rogers, 2010; Gansky, 2012; Lamberton & Rose, 2012; Möhlmann, 2015; Sacks, 2011). But many more factors are relevant as social needs (Botsman & Rogers, 2010; Möhlmann, 2015), good quality services, amenities and location (Tussyadiah & Zach, 2015), sustainability and authenticity (Hamari, Sjöklint, & Ukkonen, 2016), reduction of environmental impacts and relationship with communities (Botsman & Rogers, 2010; Gansky, 2012). In fact, authenticity and the sharing of new cultures are something that is in high demand (Lewis & Bridger, 2000) and local accommodations such as hostels and "Airbnb" highlight those concepts. The behaviors of tourist is changing and tourists when staying in private and local housing tend to stay more nights, spend more money and travel more frequently (Tussyadiah & Pesonen, 2015). Larger hotel establishments need to adapt their services to this new reality (Byers, Proserpio, & Zervas, 2013) and these new accommodations are seen as places where tourists have the opportunity to make new friends, creating connections that can stay for life (Botsman & Rogers, 2010), socially interacts with the host of the accommodation and have opportunity to explore places that are outside the conventional routes (Guttentag, 2015). Local accommodations also allow being in contact with historical landmarks works as an important mechanism to experience the authenticity of the heritage (Chhabra, Healy, & Sills, 2003).

Research questions, Hypotheses and Methodology

The main objective of the study is to characterize the influences and motivations of the national tourist, residents in the North of Portugal, when travelling while choosing accommodation in Portugal and abroad. To complement and sustain the main objective, the secondary objectives were also identified as follow: i) describe the motivations of the national tourist in the North area when travelling in Portugal and abroad, relating them to the type of the chosen accommodation, ii) describe the influences in the choice of accommodation in Portugal and abroad by the national tourist and iii) describe the differences and relationships in the search for local accommodation and touristic accommodation in Portugal and abroad. Taking into account these objectives, following Research Hypotheses (RH) were defined:

- RH1 - The adhesion of national tourists to local accommodation abroad is related to adhesion to local accommodation in Portugal.
- RH2 - The adhesion of the national tourist to touristic accommodation abroad is related to the adhesion to touristic accommodation in Portugal.
- RH3 – The adhesion to local accommodation in Portugal is related to the motivations of the trip.
- RH4 – The adhesion to local accommodation abroad is related to the motivations of the trip.

As a methodology a quantitative study was used and a single duly designed questionnaire survey was applied according to the collected literature on the subject. All the survey questions were closed-ended, including dichotomous questions, multiple-choice questions, rank order questions and Likert-type scales in a five-point scale of agreement (from 1-Strongly disagree to 5- Strongly agree) and of frequency (from 1 – Never to 5 – Always). A random sample was collected, between May and July 2019, from national tourists residing in Porto and north of Portugal, over 18 years old and who had travelled at least once in the last 5 years in Portugal or abroad. The questionnaire was conducted through the Limesurvey and distributed to a list of more than 5,000 personal e-mails. It was also publicised through *social media* as Linkedin and Facebook. 239 of the collected questionnaires were considered valid, representing a sampling error of 6,3%, assuming a 95% accuracy level.

The questionnaire was divided into three sections, namely: i) information about respondents, supporting the relation between the components of the individual profile with local accommodation; ii) characterization of respondents, according to what motivated them to travel in Portugal and where a question based on 14 items was applied, aiming to identify the greatest motivations for travelling in Portugal in the last 5 years, iii) understanding what type of accommodation respondents looked for the most in Portugal in the last 5 years, with application of a question about the frequency with which they stayed in local accommodation in Portugal in the last 5 years and another question about how often they stayed in touristic accommodation in Portugal in the last 5 years. All questions from section two and three are repeated in sections four and five, but specifically for respondents when travelled abroad. The collected data was treated through the SPSS software. The exploratory descriptive statistical analysis allows to study the observed characteristics, as well as to analyse the main influences on the choice of accommodation, in Portugal and abroad, and the motivations while travelling.

To analyse the validity of the hypothesis of the research, an inferential analysis was chosen and different tests were used to confirm or refute the hypotheses of investigation. The chi-squared independence test allowed us to understand whether or not there is a significant relationship between two or more categorical variables and the non-parametric Mann-Whitney U test to compare differences between two independent groups. The considered level of significance throughout the analysis was 5%. To uncover the underlying structure of a set of variables it was applied a factorial analysis, a multivariate statistical method, with the purpose of identifying the key factors that determine the motivations to tourist travel in Portugal and abroad. To check the reliability of the questionnaire, the internal consistency was analysed using Cronbach's Alpha coefficient.

Results and Analysis

Sample Characteristics

In what concerns gender, 58.2% of the respondents were female and 41.8% male. With regard to age, 71.9% of respondents belong to age group from 18 to 35 years old, where the most representative are respondents between 18-25 years (37.2%). Only 8.0% of the respondents have more than 65 years. Respondents showed high levels of education: bachelors (49.4%), masters (22.6%), and PhD (3.3%). About 40.6% of the respondents have a monthly net income between 501€-1,000€ and 24.3% between 1,001€-2,000€. However, 15.5% of respondents have incomes less than €500 monthly and only 10.1% more than 2,001€. 9.6% of the respondents did not want to answer this question. Respondents are mostly single, with 95.5% of singles between 18 and 35 years old and 79.5% between 26 and 35 years. Most of them do not have children (between 18 and 25 years old, 98.9% and between 26 and 35 years old, 89.2%).

All respondents live in the North of Portugal, comprising 8 sub-regions or level III units (NUTS III). The majority, 70.2%, live in the metropolitan area of Porto, 11.8% in Braga and the remaining 18% in the remaining sub-regions.

Figure 1 shows the frequencies of accommodation in local accommodation in Portugal and abroad by the respondents. The values indicate that 113 of 233 respondents (48.5%) did not stay in local accommodation in Portugal, and 110 of 212 (51.9%) have not stayed in local accommodation abroad.

They stayed in local accommodation in Portugal 120 (51.5%), and 102 (48.1%) in local accommodation abroad. The data indicate that the percentage of individuals who did not stay in local accommodation in Portugal is close to the percentage of individuals who did not stay in local accommodation abroad, with the same trend for those who have already stayed in local accommodation in Portugal and abroad.

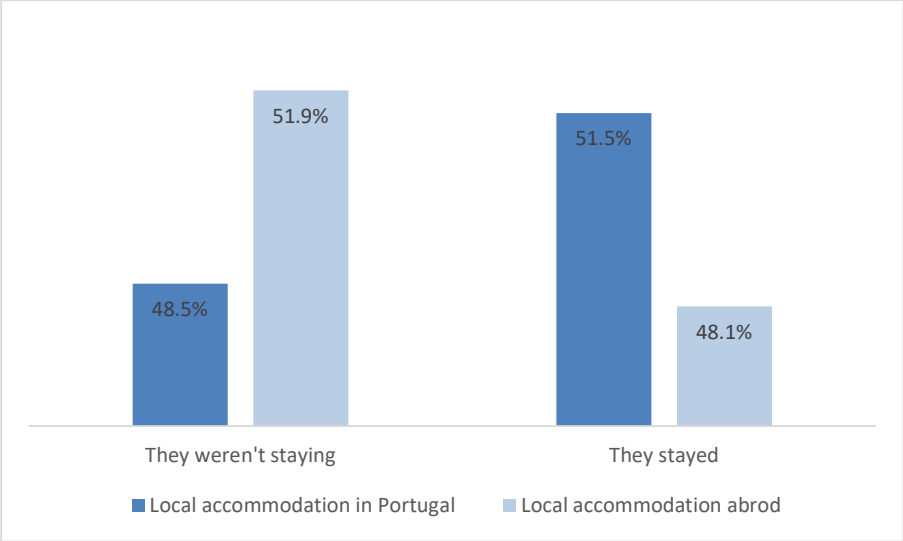

Figure 1: Frequency of accommodation in local accommodation in Portugal and abroad
Source: Own elaboration

In spite of not having relevant differences, a higher percentage value of the sample under study chose to stay in local accommodation in Portugal, in contrast when travelling abroad. Comparing the frequency of accommodation between touristic accommodation and local accommodation in Portugal, there were significant differences in their adherence. In fact, in Portugal only 47 (20.2%) of the respondents did not stay touristic accommodation, while 48.5% did not stay in local accommodation. Figure 2 shows the comparison between those who have stayed and those who have not stayed in local accommodation and touristic accommodation in Portugal.

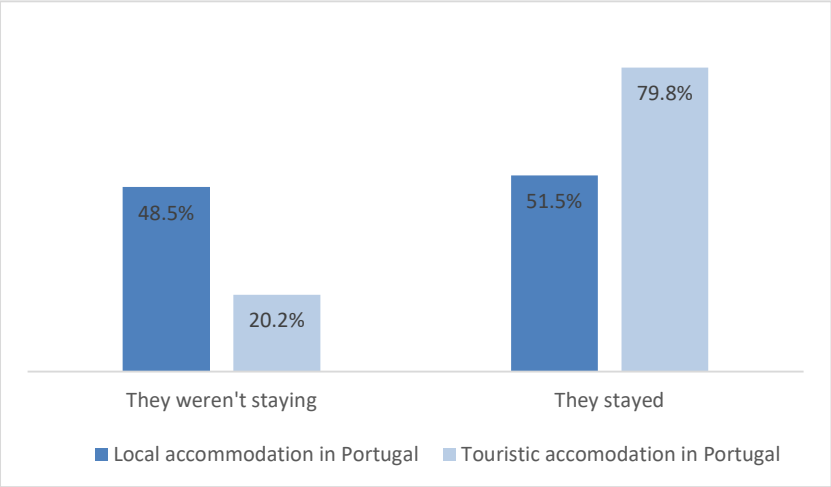

Figure 2: Frequency of accommodation in local accommodation and in touristic accommodation in Portugal
Source: Own elaboration

It was also made a comparison between those who have stayed and those who have not stayed in local accommodation and in touristic accommodation abroad. Abroad, only 24.1% of respondents' didn´t stay in touristic accommodation, while 51.9% didn´t stay in local accommodation.

Regarding the factors that the national tourist from the North most valued when staying in local accommodation in Portugal, the price stood out with 43.4%, followed by hospitality (23.4%) and location (6.6%). Those same factors when abroad are also price and location (respectively with 44.3% and 37.1%), followed by facilities and support conditions, with 28.6%. The study seems to point out that the most valued factors by the national tourist in the northern zone are very similar when looking for local accommodation in Portugal and abroad. An attractive price and a favourable location of the accommodation at the destination place largely influence the adhesion by the local accommodation. In fact, price was chosen as the main factor that influences the national tourist from the North to stay in local accommodation in Portugal and abroad. This is supported by other studies, evidenced in the bibliographic review, namely by Hamari, Sjöklint, & Ukkonen (2016), Möhlmann (2015), Botsman & Rogers (2010), Gansky (2012), Tussyadiah & Zach (2015), Guttentag (2015), Bellotti et al. (2015), Lamberton & Rose (2012) and Sacks (2011). As opposed to what happened with the price, authenticity was the least valued factor in the choice of local accommodation in Portugal and abroad, by the national tourist. This result highlights non concordance with what previously was mentioned in the literature review and following Bardhi & Eckhardt (2012), Botsman & Rogers (2010), Gansky (2012) and Hamari, Sjöklint, & Ukkonen (2016). It seems to demonstrate the existence of some conservatism as well as the weight of cultural values in Portugal' society (Kotler, 2000), making it impossible for individuals to live the experience in an authentic way.

Regarding the motivations for the national tourist in the northern zone to travel in Portugal and abroad, the study shows that in a general way they feel motivated to travel, presenting an average of 3.60 for Portugal and 3.39 for abroad, on a scale 1-5. Table 1 shows the obtained percentages for each of the variables and by level of satisfaction, for Portugal (P) and for other countries (O), as well as the average degree of satisfaction and the standard deviation.

Table 1: Motivations for the national tourist to travel in Portugal and abroad

Level of satisfaction	1		2		3		4		5		Mean ± SD	
Item	P %	O %	P %	O %	P %	O %	P %	O %	P %	O %	P	O
Price	9.4	6.6	6.9	17.9	24.9	26.4	40.3	31.1	18.5	17.9	3.52 ± 1.15	3.36 ± 1.16
History/Culture	4.3	1.9	6.9	1.9	16.7	10.8	45.1	38.7	27.0	46.7	3.84 ± 1.04	4.26 ± 0.87
Acommodation	6.4	6.6	6.0	17.9	27.5	39.2	43.3	23.6	16.7	12.7	3.58 ± 1.04	3.18 ± 1.08
Gastronomy	5.2	9.9	5.6	13.7	18.0	38.2	38.6	26.4	32.6	11.8	3.88 ± 1.09	3.17 ± 1.12
Hospitality	5.2	7.1	4.7	11.3	15.0	42.5	42.5	29.7	32.6	9.4	3.93 ± 1.06	3.23 ± 1.01
Sun and beach conditions	3.4	9.9	1.7	10.4	14.6	25.9	39.5	25.9	40.8	27.8	4.12 ± 0.96	3.51 ± 1.27
Accessibility & ease of travel	2.6	4.2	1.7	7.1	11.6	25.5	35.6	40.6	48.5	22.6	4.26 ± 0.92	3.7 ± 1.03
Country's safety	3.4	4.2	1.7	7.5	11.6	28.8	31.3	36.8	51.9	22.6	4.27 ± 0.97	3.66 ± 1.04
Attractive climate	3.0	6.1	1.3	6.1	9.9	21.2	45.1	39.6	40.8	26.9	4.19 ± 0.89	3.75 ± 1.11
Search for adventure	10.3	11.8	14.2	6.6	38.6	25.5	27.0	27.8	9.9	28.3	3.12 ± 1.10	3.54 ± 1.29
Health reasons	34.8	49.1	26.6	22.6	24.9	22.2	9.9	3.3	3.9	2.8	2.21 ± 1.14	1.88 ± 1.04
Need (work, visiting family, an/or business	29.6	38.2	18.9	15.1	21.0	23.1	21.0	15.6	9.4	8.0	2.62 ± 1.35	2.40 ± 1.34
Attractive airline prices	30.0	7.1	13.3	4.2	30.5	16.5	17.6	38.7	8.6	33.5	2.61 ± 1.31	3.87 ± 1.14
Nature/Landscape	2.6	4.7	0.9	4.2	14.2	13.7	39.5	41.0	42.9	36.3	.19 ± 0.90	4.00 ± 1.05

Note: P – Portugal; O – Other country; SD – Standard Deviation
Source: Own elaboration.

Analysis of Research Hypothesis

Answers to the hypothesis of research were obtained through non-parametric tests in accordance to what was previously mentioned. Responses for joining local accommodation and joining touristic accommodation were grouped into two groups: No (1-never; 2-rarely) and Yes (3-sometimes, 4-often and 5-always). The results of the chi-squared independent test (Table 2) suggest that there is a significant relationship between the national tourist's adhesion to local accommodation abroad with the adhesion to local accommodation in Portugal ($p < 0.001$) (RH1).

Table 2: Chi-squared independent test

		Local Housing Accommodation abroad		
		Not Hosted n(%)	Hosted n(%)	p - value
Local Housing Accommodation in Portugal	Not Hosted	68 (69.4%)	30 (30.6%)	< 0.001
	Hosted	40 (37.0%)	68 (63.0%)	

Source: Own elaboration based on SPSS output (N =206, due to omitted cases)

The results of the chi-squared independent test allows us to concluded (RH2) that there is a significant relationship between the national tourist's adhesion to touristic accommodation in Portugal with the national adhesion to touristic accommodation abroad ($p < 0.001$), as is shown in Table 3.

Table 3: Chi-squared independent test

		Touristic Accommodation abroad		
		Not Hosted n(%)	Hosted n(%)	p - value
Touristic Accommodation in Portugal	Not Hosted	19 (48.7%)	20 (51.3%)	< 0.001
	Hosted	31 (18.6%)	136 (81.4%)	

Source: Own elaboration based on SPSS output (N =206, due to omitted cases)

To validate RH3 and RH4, it was applied a factorial analysis in order to find dimensions not directly observable, but maybe able to explain what motivates the tourist from the North of Portugal when travelling in Portugal and abroad.

For motivations to travel in Portugal, the factorial analysis (Table 4) showed that the 14 studied initial items were explained in 59.13% for 4 common factors obtained from a Varimax rotation with Kaiser Normalization, indicating a reasonable correlation between the items (0.798). Also the Bartlett's Test of Sphericity showed that variables under analysis are statistic and significantly correlated (p-value < 0.001). The analysis can explain that the Portuguese tourists' motivations for travel in Portugal are: Leisure (30.02%), Attractiveness (10.67%), Reason for travel (10.54%) and Price (7.90%). Cronbach's alpha is 0.798, indicating good internal consistency reliability.

Table 4: Factorial Analysis

Factor	Variable included in the factor	Loadings	Eigenvalues	% of explained variance
1 (Leisure)			4.20	30.02
	History/Culture	0.740		
	Nature	0.684		
	Gastronomy	0.648		
	Hospitality	0.613		
	Search for Adventure	0.565		
2 (Attractiveness)			1.49	10.67
	Accessibility and ease of travel	0.771		
	Attractive climate	0.762		
	Sun and beach conditions	0.733		
	Country's safety	0.595		
3 (Reason for travel)			1.48	10.54
	Need (work, visiting family and/or business)	0.753		
	Health reasons	0.661		
	Attractive airline prices	0.653		
4 (Price)			1.11	7.90
	Price	0.799		
	Accommodation	0.706		
Total				**59.13**

Source: Own elaboration based on SPSS output

To see if there are significant differences in each of the factors that motivate tourists to travel in Portugal by joining local accommodation in Portugal (RH3), the Mann-Whitney nonparametric test was used (Table 5).

Table 5: Mann-Withney tests

		Leisure	Attractiveness	Travels' Purpose	Price Accommodation
Frequency in Local Accommodation	Yes	3.84 ± 0,.06	4.26 ± 0.06	2.52 ± 0.09	3.63 ± 0.08
	No	3.74 ± 0.07	4.16 ± 0.07	2.44 ± 0.08	3.46 ± 0.09
		MW-U	MW-U	MW-U	MW-U
		7039.500	7394.000	7039.500	7364.500
		(0.399)	(0.228)	(0.612)	(0.247)

Note: MW- U – Mann-Whitney U test
Source: Own elaboration based on SPSS output

For motivations to travel abroad, the factorial analysis showed that the 14 studied initial items were explained in 66.49% for 5 common factors obtained from a Varimax rotation with Kaiser Normalization, indicating a reasonable correlation between the items (0.7368). Also the Bartlett's Test of Sphericity showed that variables under analysis are statistic and significantly correlated (p-value < 0.001). The analysis can explain that the Portuguese tourists' motivations for travel abroad are: Attractiveness (27.51%), Hospitality (10.67%), Price (10.01%), Leisure (9.48%) and Reason for Travel (8.21%), as seen in Table 6. Cronbach's alpha is 0.798, indicating good internal consistency reliability.

Table 6: Factorial Analysis

Factor	Variable included in the factor	Loadings	Eigenvalues	% of explained variance
1 (Attractiveness)			3.85	27.51
	Sun and beach conditions	0.852		
	Attractive climate	0.843		
	Nature/Landscape	0.664		
2 (Hospitality)			1.57	11.21
	Accommodation	0.770		
	Gastronomy	0.751		
	Hospitality	0.712		
3 (Price and facilities)			1.41	10.01
	Price	0.599		
	Accessibility and ease of travel	0.790		
	Country's safety	0.647		
	Attractive airline prices	0.560		
4 (Leisure)			1.33	9.48
History/Culture		0.671		
Accommodation		0.768		
5. (Reason for travel)			1.15	8.21
	Health reasons	0.726		
	Need (work, visiting family and/or business)	0.854		
Total				66.49

Source: Own elaboration based on SPSS output

To what concerns RH4 the only validated factor is "Leisure" and may, in fact, interfere in the choice or not of a local accommodation abroad, as seen in Table7. The remaining motivating factors for traveling abroad are significantly different between the people who joined and those who did not join the local accommodation abroad.

Table 7: Mann-Withney U tests

		Attractiveness	Hospitality and Gastronomy	Price and facilities	Leisure	Reason for travel
Frequency in Local Accommodation - abroad	Yes	3.75 ± 0.09	3.22 ± 0.08	3.67 ± 0.07	4.18 ± 0.07	2.22 ± 0.10
	No	3.76 ± 0.10	3.16 ± 0.09	3.61± 0.08	3.65 ± 0.08	2.07 ± 0.10
		MW-U	MW-U	MW-U	MW-U	MW-U
		5295.000	5595.000	5805.500	7668.500	6079.500
		(0.477)	(0.973)	(0.660)	(0.000)	(0.282)

Note: MW- U – Mann-Whitney U test
Source: Own elaboration based on SPSS output

Conclusion

The study seems to point that the adhesion of tourists from the north of Portugal to local accommodation in Portugal is related to adhesion to local accommodation abroad, with the existence of a relationship between the demand for local accommodation in Portugal and abroad. It was observed that 63% of the respondents who stayed in local accommodation in Portugal also stayed in local accommodation abroad and 69.4% who were not staying in local accommodation in Portugal also did not stay in local accommodation abroad (Table 2). The national tourist's perception of local accommodation does not change depending on the location (Portugal/abroad).

In what concerns the adhesion of tourists from the north of Portugal to touristic accommodation in Portugal, it was also found that it is related to the adhesion to touristic accommodation abroad, verifying the existence of a relationship by the demand for touristic accommodation in Portugal and abroad. Of the 81.4% respondents who stayed in touristic accommodation in Portugal, also stayed in touristic accommodation abroad and 48.7% who were not lodged in touristic accommodation in Portugal also did not stay in touristic accommodation abroad. It was again checked that the perception of the national tourist about touristic accommodation does not change depending on the location (Portugal/abroad).

It was also verified that the adhesion to local accommodation in Portugal is not related to the reasons for the trip/travel. This means that none of the four travel motivation groups appear to interfere with the demand for local accommodation. Regarding the adhesion to local accommodation abroad, only Leisure appears to be a relevant motivation group. The other remaining motivation groups were not validated.

With this study it was possible to have a sampling of the global perception about the new type of accommodation that is rising nowadays: the local accommodation. It was possible to portray the sample through an exploratory descriptive analyzes and statistical tests, demonstrating the behaviors, motivations and influences of the national tourist in the northern part of Portugal when adhering to local accommodation in Portugal and abroad. The study aims to support local accommodation owners and managers who wish to strategically attract the national tourist by going against what they are looking for when looking for this type of accommodation both in Portugal and abroad.

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Digital Economic Infrastructure as A Necessary Condition for Technological Development

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Abstract

The digital infrastructure of the economic system is viewed as one of its subsystems, enhancing the innovative activity of economic entities and ensuring the emergence of a new economy. The advocates of the key role of digitalization in economic development argue that innovation and digital technology are at the core of technological advances and economic growth. This article presents evidence of the fact that digital infrastructure is a prerequisite for the country's innovation policy implementation to obtain a technological breakthrough and the transition to a new type of economy.

Keywords*:* Innovation infrastructure, digital infrastructure, digital technologies, technological breakthrough, digital economy, digital resources, digitalization, digital sector, economic development.

Introduction

Russia needs to make a technological breakthrough and implement transition to the digital economy to become a leader in the global economy. The massive application of digital technology can be expressed in qualitative changes in business models, the nature of doing business, its manageability and flexibility. Addressing the challenges related to the expanded application of digital technologies requires a favorable environment - a specific infrastructure, promoting the formation of a new type of economy, which is built in accordance with the tasks being performed. As an economic system element the infrastructure is a favorable environment for shaping and developing the digital economy that is formed while innovation process is regulated and innovation activity is activated (Vavilina A.V., Kalashnikov I.B., Gladysheva I.V. (2018)). It becomes especially acute in case of a high level of technical, industrial, financial, commercial and other risks. Thus, the study of the digital infrastructure content comes down to determining its structure, which is able to ensure the technical and technological development of the electronics industry and IT technologies, the implementation of professional competencies by the entities and institutions that are parts of its structure. A more profound understanding of digital infrastructure involves clarifying areas for reducing risks that arise during the transfer of the economy to a new technological base and ensuring its innovative and competitive advantages. A special feature of the fourth industrial revolution is Smart Manufacturing, which is possible through the convergence of key digital technologies. Today, smart manufacturing is a new paradigm for business development. The rapid development of smart manufacturing technologies leads to a widening of the digital divide between developed and developing countries. At the present stage, many areas of the development of smart industries are at the level of conceptual

models, which suggests that the digital divide is only just beginning to take shape. That is why it is so important for Russia not to miss irrevocably the opportunity to integrate into the processes of the initial stages of the formation of Smart Manufacturing taking place in the global world.

Research Methodology

Literature Review

The influence of infrastructure and its assets on the development of economic systems has been studied in various aspects since the middle of the last century; but this issue has been most vigorously discussed in the scientific literature since the late 1980s. Technological innovation has always been considered the main driver of economic growth. High-speed Internet access through broadband infrastructure has developed rapidly since the late 1990s. due to the deployment of both stationary and mobile technologies. The ongoing transformation of economic relations supported by information and communication technologies (hereinafter - ICT) - primarily the Internet - is termed as digital economy. This "digital" transformation is undergoing a certain evolution, influencing in some way various aspects of the socio-economic activity in the society. The main studies and the results of assessing the impact of ICT infrastructure development based on publications by Kramin, T.V., Klimanova, A.R. (2019) are presented in Table 1.

Table 1: Research into the impact of ICT infrastructure evolution on economic development

Authors	Object of research	Findings
Roller & Waverman (2001)	21 OECD countries, 1970 -1990	It was demonstrated that GDP growth per capita (0.59 out of 1.96% per year) is explained by investments into telecommunication infrastructures.
Datta & Agarwal (2004)	22 OECD countries	It estimated the impact of telecommunication infrastructure (accesslines per 100 inhabitants) on economic growth.
Gillet et al. (2006)	USA 1998-2002	It proved the fact that broadband connection can explain significant gaps in growth and employment.
R. Crandall et al. (2007)	USA, 2003-2005	A strong link was identified between the introduction of broadband (BB) and economic prosperity in the United States. According to their estimates, an 1% BB increase in its introduction led to an increase in the annual rate of employment in industrial sectors from 0.2 to 0.3 percentage points regarding the impact of the BB deployment on GDP.
Castaldo at al. (2018)	23 OECD countries 1996-2010	It was shown a continuous numerical relationship between broadband diffusion and economic dynamics in the short, medium and long terms.
D. Nipo at al. (2018)	149 countries divided into five regions (in Africa, America, Arab, Asian and European regions), 2006-2014	ICTs have a significant impact on economic growth, especially in regions such as America, Asia and Europe.

R. Pradhan, G. Mallik, T. Bagchi (2018)	G-20 countries, 2001-2012	The development of ICT infrastructure - both for fixed broadband users and for Internet users - leads to an increase in per capita GDP.
T. Niebel (2018)	59 countries, 1995-2010	The impact of information and communication technologies on economic growth in developing, developed countries and transition economies.
E.A. Kolomak (2011)	Russia	The contribution of transport infrastructure is insignificant, the influence of communication infrastructure is positive and significant, the effects of spatial externalities differ for the western and eastern parts of the country.

The general conclusion made by authors studying the role of the infrastructural factor in the development of economic systems is that the use of the Internet, new technologies and, in general, "digitalization" broadens the range of forms and directions of socio-economic development.

Data Processing Methods

The methodological basis for the study of digital infrastructure is seen as the provision that it acts as an integrated part of the infrastructure of the national innovation system, which in turn is a combination of legal entities, organizations and institutions providing material, technical, financial, organizational and methodological, informational, consulting and other services for the innovative activity of entities and supporting their innovative activity.

The analysis of this population was carried out on the basis of several approaches:

– a system-functional approach to identify the quality, properties, consequences of its systemic actions aimed at creating opportunities for technological breakthrough;
– a reproductive one to identify the logic of economic processes that ensure the continuity of technological changes in the reproduction system based on new discoveries and inventions;
– a formation approach to analyze the main technological changes when changing stages of the economic formation, identifying their causes and effects.

The study was carried out on the basis of the analysis and comparison of theoretical principles of the "digitalization" origin , the formation of infrastructure, including the identification of the digital infrastructure features, its role in economic and innovative development, comparison and evaluation of statistical information on the dissemination of ICT at the national and international levels, international rankings (competitiveness, innovative development, quality of infrastructure), materials of the Federal State Statistics Service (Rosstat), its bulletins on the science of information-oriented society compiled in collaboration with the NRU HSE.

Paper Results

A technological breakthrough is a fundamental, accelerated pace of restructuring the technological base of the existing economy based on the use of innovations, technical achievements, professional competencies of entities and institutions. Such logic (Fig. 1) indicates the need for a close relationship between the processes of economic system development and its infrastructure, which will ensure the transition to a new technological structure. Examples of network company priorities say that a new type of infrastructure is emerging today, which are designed to solve a number of problems and challenges facing different countries, regions, cities and by an individual (Schedrovitsky P., (2013)).

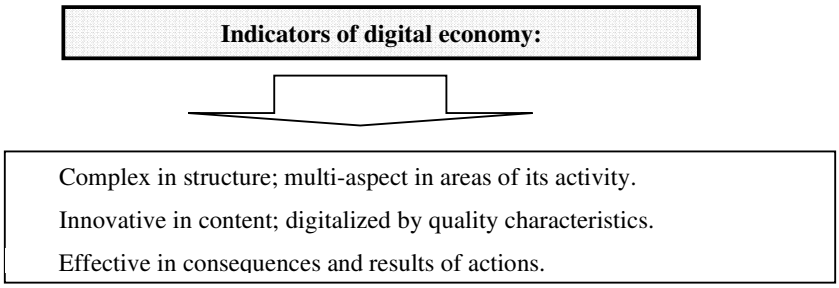

Fig. 2. Digital Infrastructure Characteristics

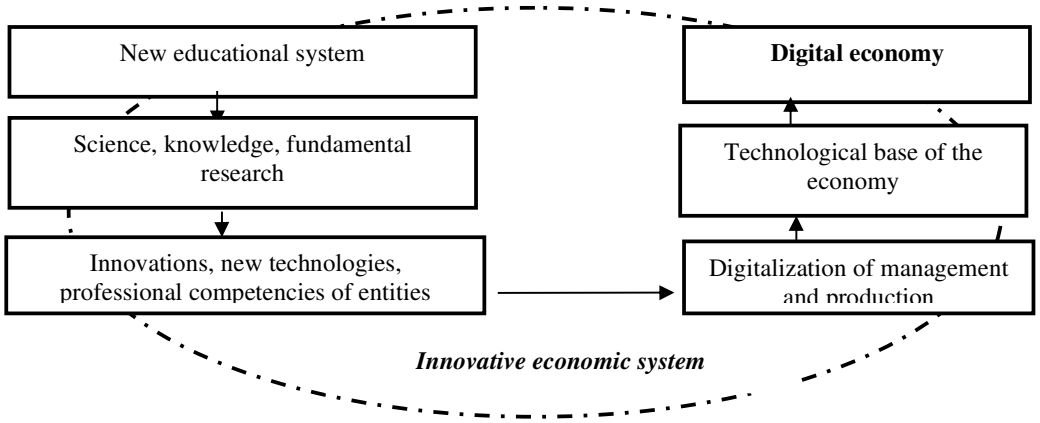

Fig. 1: Logic of technological breakthrough

At the same time, to successfully bring about the technological breakthrough, it is necessary to have, within the framework of the general economic system, an innovation-oriented, digital in essence infrastructure, having a powerful development potential, clearly organized and adequately oriented, purposeful, i.e. adequate persistent digital economy (Fig. 2). In continuing the development of the theme identified in an earlier publication (Vavilina, A.V, Kalashnikov, I. B., Yakubova, T..N. (2018)), we affirm that in a certain sense, the digital infrastructure in the economic system performs a number of important functions (Fig. 3).

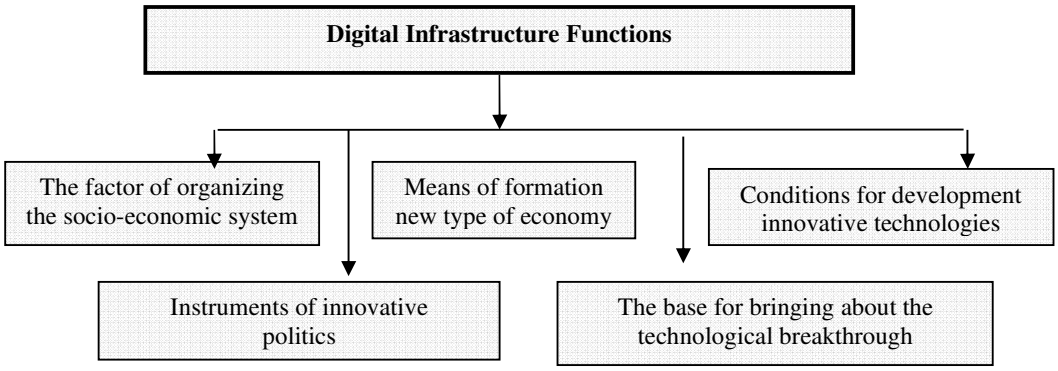

Fig. 3: Digital Infrastructure Functions

Digital infrastructure includes all the informational, organizational, marketing, educational, network and other institutions that help the new innovative idea to get implemented and find its consumer. The infrastructure is very large in size. It comprises a part (probably the biggest one) of the country's economic system. Therefore, the digitalization of infrastructure is the digitalization of the economy as a whole. Digital infrastructure includes enterprises and organizations that have become digital, producing innovative benefits, working in the manufacturing, trade, communications, transport, management, planning, and optimization of economic processes. Global experience in the article of Mohamad A.S. (2016) indicates that the more substantial the infrastructure, the more successfully it develops, the higher the degree of influence of the data used in doing business, the higher the level of coherence and conformity of the economy system and its infrastructure (Table 2).

Table 2: Global country ranking by quality of infrastructure

Country	Infrastructure quality (position on ranking list)	Specific GDP (current USD prices)	Competitiveness factors, %		
			basic	effectiveness	innovations
Switzerland	1	81332	20	50	30
Hong Kong	2	37777	20	50	30
UAE	3	43876	21.2	50	28.8
Finland	4	47129	20	50	30
Singapore	5	54776	20	50	30
Netherlands	6	47634	20	50	30
Austria	7	64863	20	50	30
Iceland	8	45536	20	50	30
Japan	9	38491	20	50	30
France	10	43000	20	50	30

If we look into the quality of Russia's infrastructure with a analogous indicator in countries that have a similar level of welfare (Poland, Hungary, Greece, Kazakhstan), we can see that the level of infrastructure quality is comparable. In general, international assessments of the quality of key Russian infrastructure indicate that it is currently not adequate to the tasks of modernizing the economy, let alone its transition to an innovative development path. In the world ranking, according to the World Economic Forum (WEF), Russia was ranked 35th in 2017 and 43rd in 2019. The assessment of Russia's infrastructure is higher than in African and Latin American countries, but significantly inferior to European countries and North America. One of the key elements of digital infrastructure is digital information resources and systems containing information on the results of innovative activities, products, services, technologies, scientific and innovative organizations, intellectual property, and technology transfer processes. The effectiveness of the information component of digital infrastructure is manifested in the multiplication of scientific and technical results and an integrated approach to the use of investments and innovations in the scientific and industrial sphere (Biktimirov M. R., Syuntyurenko O. V. (2017), Andrushchak G.V., Artemov S.V., Vakhstein V.S., (2017)), which affects the level of competitiveness of the country (table 2). For the period 2015–2019 Russia has managed to significantly develop its innovative potential against a global background, having improved its position in the GII from 62nd (2013), 48 (2015) to 46th place. At the same time, in recent years there has been a trend towards a slowdown in the growth rate of innovation indicators (table 3). The weaknesses of innovation in Russia include: the loan portfolio of microfinance institutions (73rd position) and transactions using venture capital (77) - indicators of innovation resources, as well as a group of indicators of innovation results - ICT and the creation of business models (91), development print and other media (78), compliance of quality management systems with ISO 9001 (111). If we look at the institutional readiness of Russia for innovative and

technological transformations, then according to the annual World Bank study The Global Competitiveness Report-2019, the conclusions for Russia are not yet encouraging in all respects. Indeed, compared with 2018, Russia improved its innovation potential by 2.2 points (32nd place) due to the improvement of the quality of its research institutes (9th place) and constant R&D expenses (1.1% of GDP, 34th a place). Innovation is also supported by the growth in the introduction of information and computer technologies (+4.9 points, 22nd place) due to the especially rapid spread of the Internet, reaching 81% of the population (39th place). At the same time, Russia was in the lower half of the ratings by the level of development of such an indicator as "Public Institutions": Russia ranks 74th. According to the criterion of "technology management", how quickly the country's legal framework adapts, in particular digital business models? - Russia has 51st place (3.9 points out of 7 possible) (WEF, 2019). A comparative analysis based on data from such sources as "Global Innovation Index – 2019" and "Innovative regions ranking Version 2017. Association of innovative regions in Russia, 2018" demonstrates that Russia lags behind developed and many rapidly developing countries in respect of almost all metrics that characterize the efficiency of resource utilization and the degree of impact of the results of scientific, technical and innovative activities on the economy and society. It should be noted that in contrast to digital technologies themselves, which are distributed mainly evenly, the benefits from their use - "digital dividends", are mainly received by developed countries - technology developers, which leads to deepening global inequality, increasing unemployment in developing countries (Digital dividends, 2016).

Table 3: Dynamics of Russian Federation positions in GII: 2015-2019

Year	GII (position)	Ranking for individual items	
		Innovation resources	Innovation results
2019	46	41	59
2018	46	43	56
2017	45	43	51
2016	43	44	47
2015	48	52	49

Information technology systems and related services are key elements of digital infrastructure in Russia and other countries. This list of elements includes information on innovative products, services, technologies, scientific and innovative organizations, intellectual property, etc. Such systems include the following: CORDIS (since 1990) - a database system in which information on research activities in the EU countries is accumulated; ARIST - scientific and technological information service, which is an information tool for obtaining data about existing markets for innovative technologies, which is used to provide a number of information services, to establish contacts between innovative organizations and potential customers; EPIDOS - European Patent Information and Documentation System, Japanese PATOLIS Database - Japanese Patent Data Source. Among the Russian organizations developing information technology systems in order to provide information on innovative technologies, the All-Russian Institute of Scientific and Technical Information (VINITI), the All-Russian Scientific and Technical Information Center (VNTIC), etc. stand out.

Experts from different countries associate the successful development of digital infrastructure with integration processes that under the new conditions allows achieving a synergistic effect by combining and coordinating the actions of various infrastructure elements. An example of such integration was the creation of the European network of innovation and business centers - EBN. This network was created in 1984. According to experts, including Kazakova M.V., Pospelova E.A., (2017) and analysts of the Eurasian Economic Commission currently, the European network includes 160 innovation and business centers from 21 countries and 70 associate members that share the goal of promoting and developing small and medium enterprises.

Digital infrastructure is as a kind of systemic basis for building the entire socio-economic life of society (Tab. 4).

Table 4: Structural Elements of Digital Infrastructure

Infrastructure Subsystems	Elements of individual infrastructure subsystems
material (production and technology)	industrial clusters, investment and technology centers, business incubators, transfer centers, technology, etc.
financial	different types of financial foundation and financial institutions
social	institutions, organizations, centers of culture, leisure, health, education, communications, transport, etc.
informational	proper databases, knowledge and access centers, as well as analytical; statistical, information centers
personnel	educational institutions for training and retraining personnel in the field of scientific and innovative management, technological audit, marketing, etc.
expert and consulting	organizations engaged in the provision of services in the fields of intellectual property, standardization and certification; centers, both general ones and those that specialize in certain areas (finance, investment, marketing, management, etc.), consulting. Their activity in processing and utilization data results in the emergence of qualitatively new socio-economic relations
organizational and methodological	data based on digital technologies, marketing, statistical research, practice of building business models, scientific and social networks, cooperation ties

All of these subsystems are designed to deal with specific tasks and have their specific effects. Such tasks include: information support of ongoing economic processes and current changes; ensuring the growth of economic value in the field of data transmission, processing and storage; manufacturing, technological and financial support for innovation; certification and standardization of innovative products; assistance in promoting effective development and implementing innovative projects; arranging exhibitions of innovative projects and products; providing practical and consulting assistance in training, retraining, and professional development of personnel for innovative activities. The successful harmonizing effect of infrastructure is achieved through the formation of the digital economy in the form of an integral, systemically functioning, and effective whole (Table 5).

Table 5: Characteristics of digital infrastructure as a factor of the digital economy development

Elements	The content and effects of the constituent elements action
Digital technologies and digitalization	contribute to the formation of fundamental grounds of a new-type society, digital models of technological and economic processes,
Data its reliability	create conditions for planning and forecasting economic processes at all levels of management, for a reliable assessment of the performance of entities and institutions, optimizing the utilization of all types of resources
Data communication network	provides a link between various sectors of the economy, affects the formation of a new economic content
Electronics industry	manufactures microchips, computers telecommunication and electronic devices
Digital sector companies	become the growth points in the digital economy, provide services in the field of digital technologies, use digital means of production, storage, and

	data management
Digital capacity of a company	provides the profitability of the digital resources, the necessary level of transaction costs, organizational efficiency, market opportunities

Reports "Summary statistics on geographic information system for technology clusters. RF Ministry of Industry and Trade 10.07.2018" show and experts of Association of innovative regions in Russia confirm the current state of Russian infrastructure is characterized by a number of problems that impede the progress in digital technologies and the digitalization of economic procedures: small and medium-sized innovative companies are not sufficiently integrated into innovative networks; cooperative ties, which are to ensure the formation of innovative chains «science and education - innovative small and medium business - large business» are insufficient. According to Rosstat, the number of organizations implementing technological innovations is declining both in Russia as a whole and in individual regions (Fig. 4). In Russia, there is a significant differentiation of the digital maturity of the regions. The main indicator determining the possibility of developing "smart manufacturing" in the region is the development of information and communication technologies (ICT). Based on a study of the possibilities of developing smart industries in the regions of Russia (Tkachenko I.N., Ramenskaya L.A., 2019), very contradictory trends are noted. Thus, an analysis of the change in the number of organizations that used personal computers for the period from 2007 to 2017 allows us to see a paradoxical picture. Despite the increase in the functionality of ICT, the conversion of a number of business processes to digital format, a decrease in the use of ICT occurred in half of the federal districts and in more than half of the constituent entities of the Russian Federation (50 out of 85), which can certainly be considered a negative trend. The leader in the use of ICT is Moscow, in which this indicator has remained equal to 100% since 2005. Among the federal districts, the Siberian region has the highest value, the use of ICT for which has grown most dynamically. The negative trend was most pronounced in the Ural Federal District, in which all subjects showed a decrease, the worst values in the northern regions - the Khanty-Mansiysk Autonomous Okrug - Ugra and the Yamalo-Nenets Autonomous Okrug, as well as in the Kurgan Region. Among the analyzed districts, an increase in the indicator technological innovation was observed only in the Central Federal District. This prevents the dissemination and capitalization of knowledge in the Russian economy.

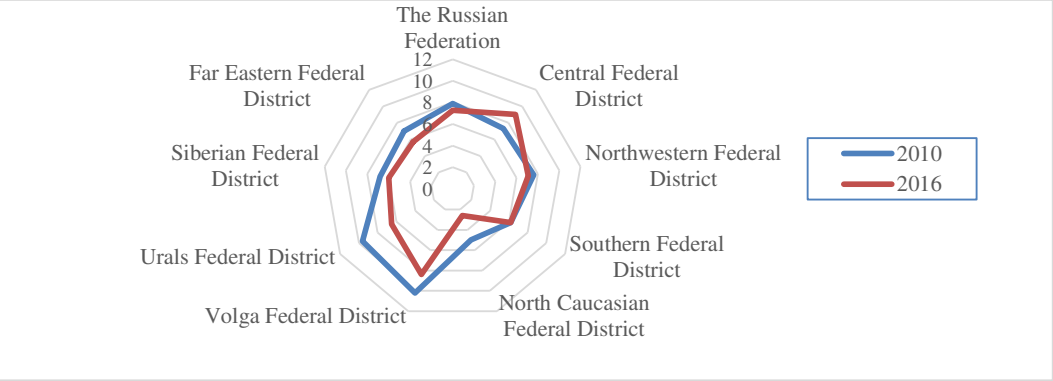

Figure 4: The share of institutions that carried out technological innovation in the total number of institutions surveyed by constituent entities of the Russian Federation, % (Source: Federal State Statistics Service)

Without resolving these and other problems it is impossible: to ensure the transfer of the of the research and development results to the economy; development of entrepreneurship in the innovation field; performing technological update of fixed assets. Achieving specific results through intensifying the improvement of infrastructure effectiveness requires some measures, including: the formation of a

unified digital environment through adequate services - identification and authentication of interacting entities, protection against unauthorized access and modification of documents; activation of the latent potential in economic activity; reformation of the legal regulation in information risk management processes and provision of cybersecurity; actualization of innovation activities of infrastructure institutions.

Discussion

In 2019, Dell Technologies, in collaboration with Intel and Vanson Bourne, compiled a digital transformation index. Based on a survey of 4,600 business executives from more than forty countries, they analyzed the initiatives of digital transformation companies. The analysis showed that most companies in the world do not keep pace with the trends of digital transformation. However, Russia follows the global trends in digital transformation: in Russia, 7% of companies can be attributed to leading companies, 19% of companies are digital innovators, and only 1% of companies (compared with 9% of companies in the world) are companies that lag behind digital transformation. The dynamically developing situation in the formation of the digital economy demonstrates the scale and complexity of the new infrastructure functioning. Overcoming them involves: a) increasing the throughput of communication channels; b) expanding access to mobile Internet; c) enhancing the work of data centers; d) increasing investment resources for the implementation of projects and further maintenance of the operability of IT systems; d) the removal of the problem of staffing for the "digital revolution"; f) stimulating demand from suppliers and consumers for advanced technologies; g) the implementation of broad government support for digital technologies implementation.

Acknowledgments

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Implementation of Lean Production Tools to Increase Labor Productivity of Modern Companies on The Example of Small and Medium Enterprises of The Russian Federation

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Abstract

The article analyses the historical aspects of the development of lean production, briefly describes modern concepts for improving production efficiency, and identifies the main tools and methods used in lean production and the application possibility in micro, small and medium enterprises in the Russian Federation. The article shows the possible advantages of introducing tools and methods in microenterprises. Also this article presents the barriers of the lean project implementation from the owners' side and the employees. Authors of the article offer a cycle for the implementation of a complex of projects at the enterprise.

Keywords: lean production, lean manufacturing, small enterprises, micro enterprises, project implementation, barriers, staff resistance

Introduction

One of the key tools to solve the problem of increasing the efficiency is lean production. Lean production includes principles, norms, rules, methods, tools for developing lean organization management. All of the above allows owners to use all the capabilities of the enterprise on the basis of reducing wastes. Many companies, implementing elements of lean manufacturing, are able to improve the quality of products and services. At present, there is a lot of research on this topic in relation to large and medium-sized enterprises, while the analysis of the effectiveness of the lean approach in small enterprises is extremely scarce. At the same time, many regional development programs proclaim the growth of the importance of small business. Therefore, this article takes the first step in analysing the applicability of modern methods and principles of organizing production for small businesses (both in terms of individual implementation of tools and principles, and the main types of wastes).

To solve the problems, such scientific research methods as the comparative method of analysis, questioning, generalization, abstracting, statistical method, and the method of expert evaluations were used.

Literature Review

The idea of lean production gained fame in the late 1980s after the research of the 19th century global automotive industries was made. That research revealed that Japanese automobile factories had higher performance and quality than their western competitors. Researchers gave the name of the Japanese manufacturing model to lean manufacturing or lean production.

The first prerequisite was in 1850 when Eli Whitney introduced the term "mass production". Henry Ford talked about strategy in 1900, while Frederick Taylor and Frank Gilbert dealt with rationalization and standardization of processes (Table 1). In the mid-1950s Tahiti Ono introduced the Kanban control system created at the Toyota factory, which eliminates the main types of wastes *(Ono, n.d.)*. The illustrated glossary on lean manufacturing gives the following definition of the Toyota production system: "The production system developed by Toyota and aimed at ensuring maximum quality, minimizing costs and lead time by eliminating wastes" *(Assemblymag.com, 2020)*. The goal of the Toyota Production System is to provide products at world class quality levels to meet the expectations of customers, and to be a model of corporate responsibility within industry and the surrounding community [Toyota Production system handbook] *(Ono, n.d.)*.

Table 1 presents the results of the main literature sources concerning different stages of lean instruments' development.

Table 1: development of the Lean production concept

Period	Author	Main milestones in developing of lean production
1920	Kaom Ishikava	Graphic method for the analysis of causal relationships "Fishbone Diagram" *(Osipov, 2018)*
1924	Walter Andrew Shewhart	Shewhart control charts
1950-1970	Taiichi Ohno	Toyota production system; Kanban system; Seven wastes in production; SMED – Single minute exchange of die
1950-s	Shigeo Shingo	Developed a quick changeover method; Source inspection; Poka-Yoke; Production visual management
1950	William Deming	14 Deming's point
1950	Armand Vallin Feigenbaum	Quality Control system *(Lapidus, 2008)*
1950-1980	William Deming	Development of quality control management
1951	Joseph M. Juran	Spiral of quality

1950-1960	Joseph M. Juran	Total quality management *(Lapidus, 2008)*
1960	Eliyahu Moshe Goldratt	Theory of Constraints
1962	Kaom Ishikava	Quality circles
1964	Joseph M. Juran	AQI (Annual Quality Improvement)
1982	William Deming	"Deming Wheel" – PDCA (Plan – do – check – act)
1986	Masaaki Imai	Kaizen
2003	James P. Womack, Daniel Johnson	Make lean production known worldwide 5 principles of lean production
	Meier David, Jeffrey Liker	Allocation of the eighth type of wastes: non-utilized talent *(Liker, 2013)*

(Source: compiled by the authors)

Lean production is an approach to management (principles, norms, methods, rules, standards) that focuses on cutting out wastes, whilst ensuring quality and continuous improvement. Owners of the enterprises, managers and CEOs can fully apply this approach to all aspects of business, starting from design, through production process, to distribution and customer service. The lean philosophy allows using capabilities of the enterprise to improvements and reducing waste losses.

Lean manufacturing allows you to achieve a competitive advantage by increasing productivity, improving the quality of products or services, reducing costs and the production cycle time. Lean manufacturing is a management philosophy based on the principle of doing more with less investment: fewer human resources, reducing time and space, reducing the use of equipment *(Assemblymag.com, 2020)*.

This concept is a system of solutions that should be applied at a time in order to focus not on individual aspects of the processes, but on the process as a whole: improving the production process in order to reduce costs (SMED, just-in-time, Kanban, SOP, TPM, 5S, VSM); continuous improvement of quality (Kaizen, Jidoka); staff training and motivation (Kaizen, 5S); creation of a "pulling system" from the final consumer of the product (Just-in-Time, Kanban, VSM). As part of the implementation of lean manufacturing, the use of additional tools, borrowed from other spheres, is possible *(Assemblymag.com, 2020)*.

Methodology: Functional fields of the enterprise and the use of various tools and principles of lean production

Nowadays, there is a trend in recent years the number of large enterprises has been decreasing in the territory of the Russian Federation. Moreover, a classification of enterprises today has an additional category such as micro enterprises along with small and medium-sized enterprises.

The criteria for referring to a particular type of enterprise are 3 groups: legal criteria, criteria for number of staff and criteria for income. Legal criteria are mostly cut-off or personal in nature (for example, enterprises with a share of foreign capital of more than 49% will not fall into small and medium-sized enterprises).

As for the criteria for the number and income, according to them there are:

- microenterprises - an enterprise with a marginal value of income for the year -120 million rubles for all types of activities and the average number of employees up to 15 people,
- small enterprises - an enterprise with a marginal value of income for the year - 800 million. for all types of activities and the average number of employees from 16 to 100 people
- medium-sized enterprises - an enterprise with a marginal income for the year of -2 billion for all types of activities and the average number of employees from 101 to 250 (and from 251 to 1000 if they are included in the list of light industry enterprises approved by the Ministry of Industry and Trade in the manner prescribed by the Government Decree dated November 22, 2017 No. 1412).

The final category of the enterprise is determined in accordance with the largest condition. If, for example, in terms of number, an LLC that meets the legal criterion can be considered a microenterprise, but its revenue over the past year is in the range of over 800 million rubles to 2 billion rubles inclusive, such an LLC will be considered a medium-sized enterprise.

According to statistics presented by the Federal State Statistics Service, the following conclusion was made (see Fig. 1): the share of micro-enterprises is stable and has a tendency to increase, in addition, micro-enterprises account for more than 95% of the total number of registered enterprises in the Russian Federation, while the share of small and medium-sized enterprises declining slightly.

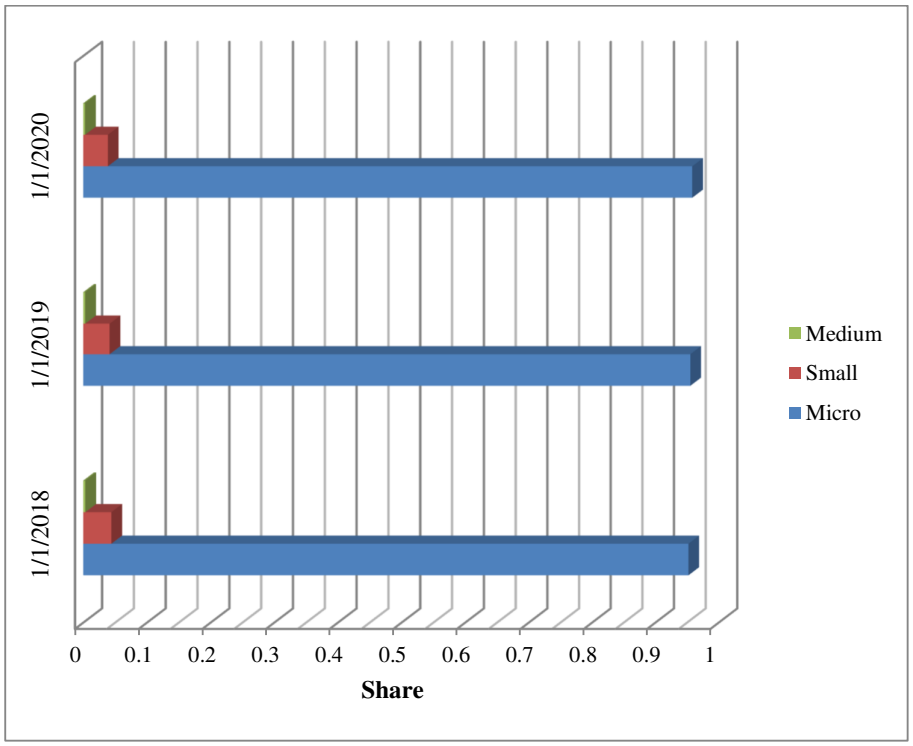

Fig. 1: Share of the enterprises of different sizes

(Source: compiled by the authors on the basis of stats (Rmsp.nalog.ru, 2020)

The number of small and medium enterprises during 2018-2020 in the Russian Federation (Table 3*) (Rmsp.nalog.ru, 2020).*

Table 2: number of enterprises in the Russian Federation (excluding large enterprises)

Date of formation of the statistical base	Registered enterprises			
	Total number	Micro	Small	Medium
10.01.2018	6 039 216	5 751 885	267 033	20 298
10.01.2019	6 041 195	5 771 626	250 758	18 811
10.01.2020	5 836 910	5 594 309	225 910	16 691

(Compiled by the authors based on stats (Rmsp.nalog.ru, 2020)

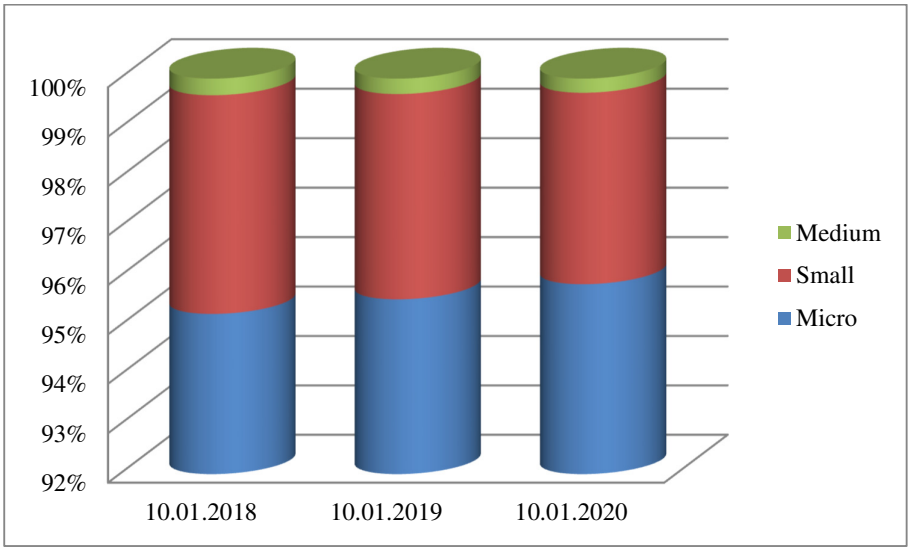

Fig. 2: The ratio of the number of different forms of enterprise
(Compiled by the authors based on Rmsp.nalog.ru, 2020)

In August 2016 the number of registered micro, small and medium-sized enterprises was 5 523 765. This number increased to 5 542 782 enterprises in August 2017. While by August 2018 there was a significant increase, which amounted to 6.8% compared to August 2017. Table 3 shows the share of small and medium-sized businesses in the Russian economy.

Table 3: share of the contribution of small and medium-sized businesses to the Russian economy

Year	Share in Russian economy, %
2014	19
2015	19.9
2016	21.6
2017	22

(Source: compiled by the authors according to RBC, 2018)

By order of the President of the Russian Federation in 2018, a strategic goal was set - to achieve a 40% contribution of small and medium-sized businesses in the economy of the Russian Federation. Today the reference point is 2024 (the year of the end of the national project "Small and medium-sized enterprises and the support of individual entrepreneurial employment"), when the contribution rate should be 32.5%.

Today, there is a tendency to increase the number of enterprises, but still the question remains of increasing the contribution of these enterprises to the country's economy. The development potential of the sector of small and medium enterprises can be increased by applying the principles and tools of lean manufacturing. To do this, in the framework of this study, the tools of lean production were analysed and the functional fields of the enterprise were identified.

Functional fields are areas of activity in which departments and units of an organization are functioning to gain the interests of the organization as a whole. Although functional fields have certain boundaries, they are cross-functional in nature.

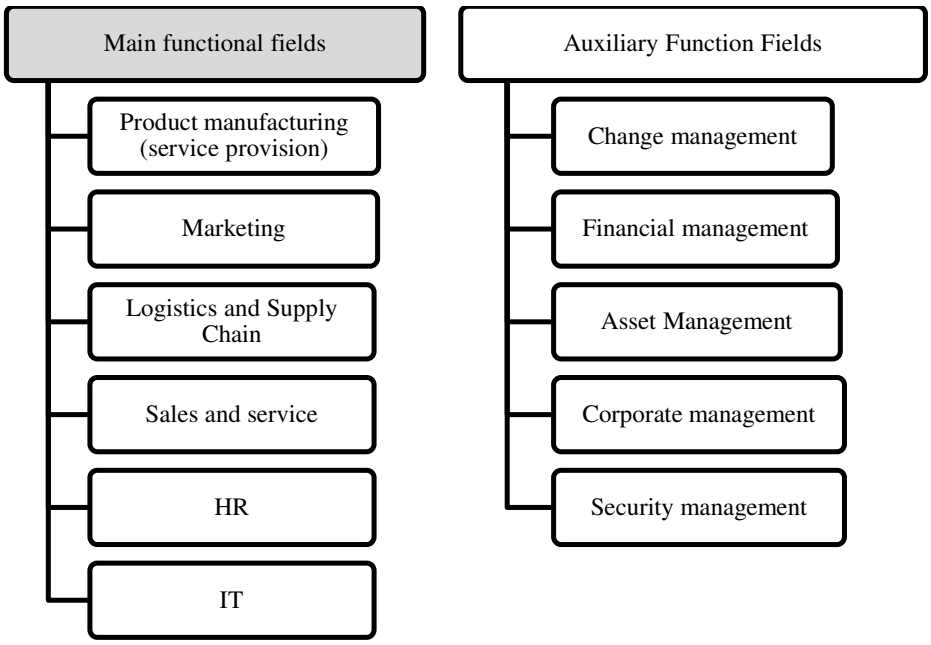

Fig. 3: Functional fields of the enterprise

(Compiled by the authors)

Certain functional fields may sometimes not present within some enterprises, especially if this does not apply to large enterprises. In this regard, authors select the fields, after group into 3 blocks according to the frequency of finding in micro, small and medium enterprises: personnel, mechanisms and equipment, production planning, analysis and control.

Table 4 shows lean production methods and tools which were considered in the context of the following functional fields and their applicability.

Table 4: lean production tools and techniques depending on functional application

Functional fields	Lean production tools and methods
Personnel	Kaizen
	Qualification Matrix
	Methods for calculating staff rotation
	Lean-leadership
	Motivating pay system
	TWI – Training Within Industry
	SFM – Shop floor management
	OPL – One Point Lesson
Mechanisms and equipment	TPM – Total Productive Maintenance
	SMED – Single-Minute Exchange of Dies
	Poka-Yoke
	MES – Manufacturing Execution System
	Rational loading / arrangement of equipment
Production planning, analysis and control	Standartization
	5 why?
	VSM – Value stream map
	A3 Value stream mapping
	MCT – manufacturing critical path time
	Desciption of business process BPMN, Swim-line
	Spaghetti diagram
	Line balancing. The Jamazumi chart
	One-piece flow
	Pull system
	Principle of “3 do not”: Do not take junk! -Do not make junk! -Do not pass on junk!
	Heijunka (Product levelling)

	Jidoka
	A3 problem solving
	PFMEA - Failure Mode and Effects Analysis
	TRIZ - theory of the resolution of invention-related tasks
	7 new instrument in quality management

(Compiled by the authors)

Practice shows that lean manufacturing methods and tools may not be equally applicable to large and small organizations. If the successful experience of implementing lean production at a large enterprise can still be adapted to the medium, then it is completely unsuitable for small and micro enterprises.

This article investigates existing lean manufacturing methods for further use in micro, small and medium enterprises. The results of the preliminary study should demonstrate the existing hidden potential in small enterprises and the possibility of choosing suitable methods for them. Because of their flexibility and innovative capabilities, small and medium-sized enterprises are more suitable for introducing innovative tools in contrast to large and multinational enterprises.

In the literature you can find many examples of the implementation of lean production in large and medium enterprises, however, there is no information on the implementation of tools in small and micro enterprises. According to the authors of the article, the introduction of individual tools and lean manufacturing methods for enterprises with fewer than 100 people can improve the company's productivity and competitiveness in the market.

Lean thinking inherent in lean production ceases to work at the stage of work with suppliers. Small business owners are not confident in their business partners and are not ready to transfer their planned needs. Although in many cases, close cooperation with suppliers and customers can reduce the amount of waste for processing, reduce the amount of waste in the supplied components, reduce the time for delivery and processing of the application *(Liker, 2013)*.

One of the main goals of this study is to present a list of suitable or recommended methods and tools for increasing productivity in small enterprises (Table 5).

Table 5: list of suitable methods and tools for different types of enterprises

	Lean production tools and methods	**Micro**	**Small**	**Medium**	**Large***
Personnel	Kaizen	◑	●	●	●
	Qualification Matrix	◔	◑	●	●
	Methods for calculating staff rotation	◔	◕	●	●
	Lean-leadership	◔	◑	●	●
	Motivating pay system	●	●	●	●
	TWI – Training Within Industry	◔	◔	◕	●

	OPL – One Point Lesson	○	◔	◕	●
Mechanisms and equipment	TPM – Total Productive Maintenance	○	◔	●	●
	SMED – Single-Minute Exchange of Dies	◔	◕	●	●
	Poka-Yoke	◔	◕	●	●
	MES – Manufacturing Execution System	○	◔	●	●
	Rational loading / arrangement of equipment	○	◕	●	●
Production planning, analysis and control	Standartization	◑	◕	●	●
	5 why?	○	◔	●	●
	VSM – Value stream map	○	◕	●	●
	A3 Value stream mapping	○	◔	●	●
	MCT – manufacturing critical path time	○	◔	●	●
	Desciption of business process BPMN, Swim-line	○	◔	●	●
	Spaghetti diagram	○	◔	●	●
	Line balancing. The Jamazumi chart	○	◔	●	●
	A3 problem solving	○	◔	●	●
	PFMEA - Failure Mode and Effects Analysis	○	◕	●	●
	TRIZ - theory of the resolution of invention-related tasks	◑	◕	●	●
	7 new instrument in quality management	○	◔	●	●

(compiled by the authors)

* Large enterprises can be adopted as an ideal example, since all tools and methods can be applied at large enterprises, and almost all tools can be sold to varying degrees in medium-sized enterprises. This is due to several points: the availability of sufficient funding, the existence of a separate department engaged in lean production and the development of lean projects.

This study is based on the findings of foreign authors presented in scientific papers, as well as practical results obtained when working with enterprises of the Chelyabinsk region.

According to the study, it was concluded that for micro-enterprises it is possible to effectively use a limited number of tools and methods: kaizen, qualification matrix, methods for calculating staff

rotation, Leadership, motivating pay system, production briefing, SMED, Poka-Yoke, standardization and TRIZ.

Results and Discussion

A study of the literature on lean manufacturing shows that various authors are of the opinion that one of the reasons for abandoning lean manufacturing is the costly and time-consuming implementation, in addition, often small business owners are not convinced of the tangible results and benefits that they can achieve. Compared to larger enterprises, small businesses have fewer resources and less available capital *(Jørgensen, Boer and Gertsen, 2004)*. At the same time, it can be concluded that small enterprises that have introduced that lean manufacturing can benefit from increased competitiveness through faster implementation of innovations and production, while increasing flexibility and reducing costs.

As part of this study, a survey was conducted of the owners of the enterprise and the managerial staff of the enterprises in order to identify the main barriers and constraints in the implementation of lean production and connected projects (Fig. 4).

In this questionnaire, questions were grouped into the following categories:

- description of the company (revenue ranges, field of activity, number of employees, share of standardized goods / services)
- Lean manufacturing (whether fully implemented in the enterprise, whether individual tools have been implemented, degree of implementation, who initiated the implementation process)
- problems with the implementation of lean manufacturing (problems of implementation by management, staff resistance, barriers)
- success of implementation (stage at the moment: projects have been successfully implemented and further development has been suspended, continuous improvement continues)

More than 115 representatives of companies were interviewed, of which a sample of 57 representatives of micro, small and medium-sized enterprises was made to analyze problems.

Fig. 4: The main difficulties that suspend work on lean manufacturing projects
(Compiled by the authors based on the survey)

Based on the results of the responses to the questionnaire, possible barriers were grouped in the following areas: staff knowledge and skills, management, finances, resources and conflicts (Fig. 5).

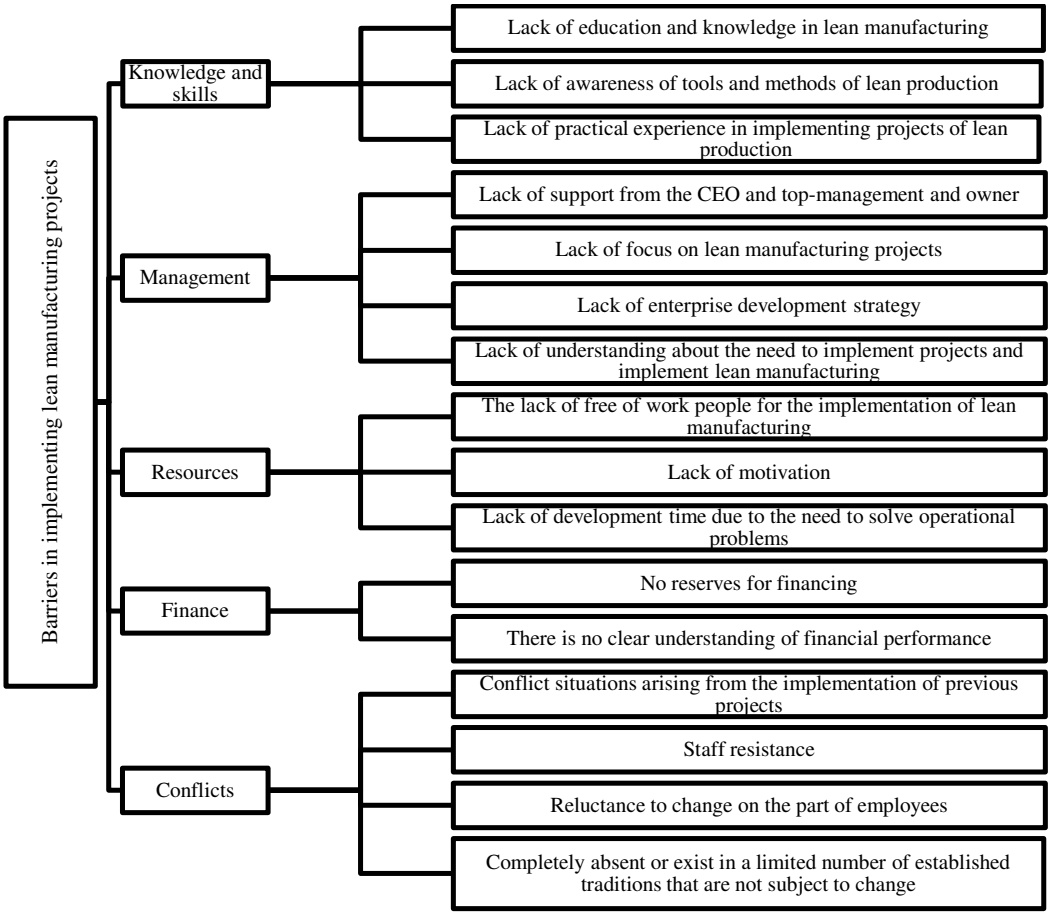

Fig. 5: Barriers arising from the implementation of lean manufacturing projects
(Compiled by the authors based on the survey)

Events that allow you to work with objections from employees when implementing the principles and tools of lean production

According to the results of the survey, it was revealed that one of the most frequently indicated reasons for refusing to introduce lean production (or the risk associated with implementation) is the resistance of the enterprise personnel. The reasons for these resistances can be of a different nature, but for the most part they come down to fear of job loss, as the growth of labor productivity is often perceived by employees as a prospective decrease in the number of employees. Moreover, the notes on the part of the owners indicated that the concept of lean production does not give direct answers and recommendations on working with such objections. Therefore, it was decided to find out how top management generally works with the objections of its employees. When conducting open interviews, many of the respondents found it difficult to formulate answers (what methods of persuasion they use), therefore, typical forms of overcoming resistance were proposed for assessment:

-logical form (action through logic, arguments are suggested, the interlocutor is given time to think, while it is desirable to have a structured list of arguments),

-emotional form (impact through emotions, mood, in this case, emphasis is placed on feelings, surprises, doubts, confidence, laughter, for example, “without you we can’t cope, and you can do it easily”),
-shift to the past (using the past experience of a person illustrating the effectiveness of such changes),
-shift to the future (the idea is to form an attractive vision of the future),
-link to authorities (using the principle of social evidence when we push others to follow, for example, those who have already done this),
-link to the standards (we refer to some patterns, trends, relevant situations, for example, the introduction of lean production in most companies led to such and such results),
- sayings and sayings (using sayings it is necessary to explain and decipher them, for example, the saying "Who gets up early, God gives it to him" can be provided with explanations about the possible primacy of both the company and the specialist among similar ones on the market),
metaphors and allegories (metaphorical influence sometimes has a stronger effect than direct evidence),
-boomerang (using the energy of resistance for their own purposes, giving the statement the opposite direction),
-concentration on the positive (when the focus of attention is shifted from difficulties to positive results, it can also fix "small victories" and other tricks),
- substitution of resistance (for any doubt there is some reason, for example, past experience, lack of training, etc., that is, more constructive reasons need to be found and discussed),
-game provocation (for example, you can offer to change responsibilities, but you need to do this without aggression in a game manner),
-change of role (the point is. To put a person in another role - yours, customer, supplier, etc.)
Work on the implementation of projects related to improvements and the implementation of individual tools can be presented in cycles. The authors proposed a cycle that consists of 4 main phases:

• search for weaknesses in the implementation of lean manufacturing projects;
• selection of areas and facilities for the implementation of improvement projects;
• the expected effect of the implemented improvements;
• identification of strengths and positive results that should be recorded as a standard and basis for starting a new cycle of improvements.

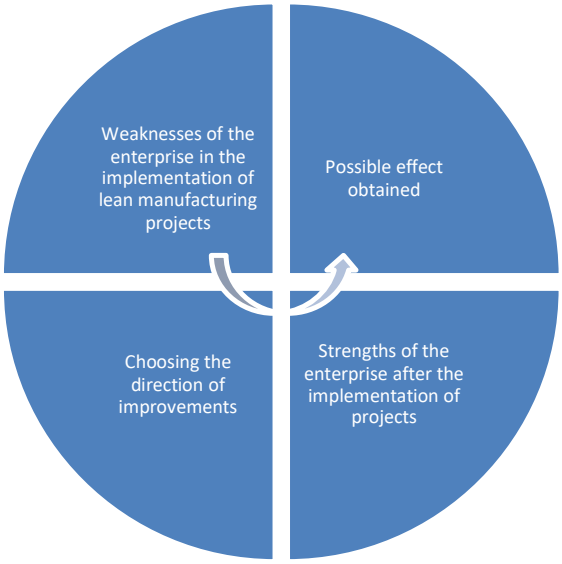

Fig. 5: Identification of the elements of the cycle of implementation of projects for the implementation of a set of improvements

(Compiled by the authors)

In large enterprises, a separate office or unit (department) is usually formed to work with improvements, which is directly involved in project activities, improvements and development. As an example, in this study, we will consider the cycle of work with staff resistance during the implementation of the lean manufacturing project, and also predict the possible effect of the implemented measures.

- Weaknesses of the enterprise in the implementation of lean manufacturing projects
- Possible effect obtained
- Strengths of the enterprise after the implementation of projects
- Choosing the direction of improvements

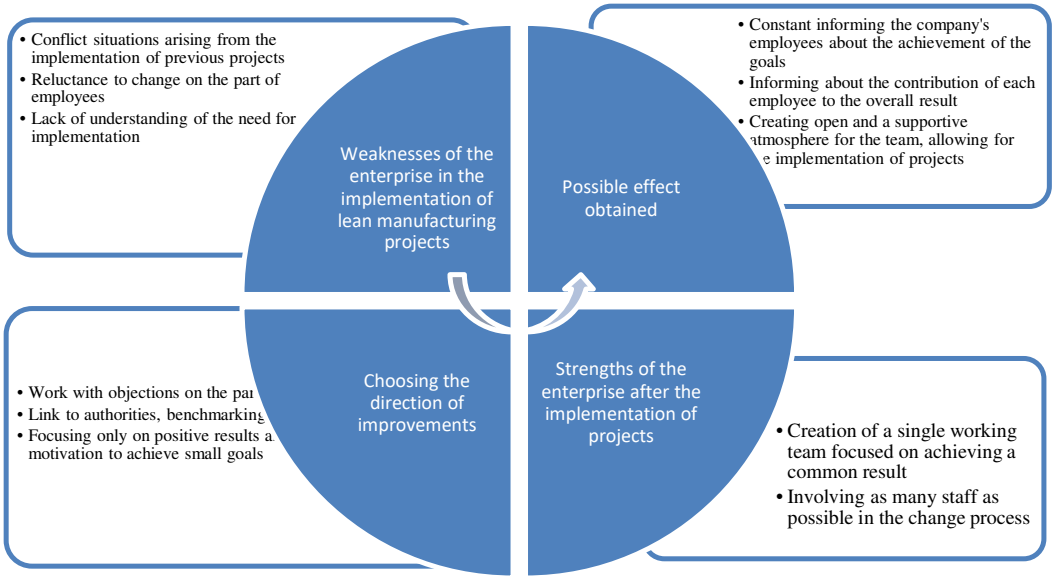

Fig. 6: Identification of elements within the implementation cycle of a complex of projects on work with personnel resistance

(Compiled by the authors)

Conclusion

The scientific literature on lean manufacturing has revealed that most of the companies that have introduced lean manufacturing are large and medium-sized enterprises. The current economic conditions in Russia require that micro and small enterprises actively engage in the implementation of tools and principles of lean manufacturing at their sites. However, the study showed that in existing realities the owners of micro and small enterprises refuse this in connection with various problems: distrust of outside experts, lack of qualified personnel, lack of free financial resources or time for implementation measures.

One of the main tasks posed before the study was to identify tools and methods depending on their functional application. This was done by the example of the following areas: personnel, mechanisms and equipment, planning, analysis and control, which allowed us to identify the most appropriate methods that can be implemented in micro and small enterprises.

Acknowledgement

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From Business Process to Cloud Application

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Abstract

Business Process (BP) development can be defined as the process of constructing a workflow application by composing a set of services performing BP's activities. In this respect, Cloud Services (CSs) are being increasingly used in BP development to ensure a high level of performance with a low operating cost. Although large companies may benefit from CSs' advantages, Small and Medium-sized Enterprises (SMEs) and startups are falling behind in cloud usage due to missing Information Technology competence, (IT-competence). The crucial challenge facing SMEs and startups in cloud-based BP development is to effectively address the so-called business and IT alignment issue. It presents the alignment between two different domains; one that entails technical cloud resources requirements and another comprising business-level. Formerly, we present this issue as a discovery challenge of suitable CSs performing abstract BP's activities. To address this challenge, firstly, we introduce the concept of cloud-aware BP by proposing a Domain-Specific Language (DSL) named "BP4Cloud" to enrich BP modeling and cover both business and technical requirements. Secondly, we propose an Activity-Services Matching algorithm that automates the discovery of CSs performing BP's activities. As a part of the evaluation, we set up by clarifying the specification of BP4Cloud elements through a proof of concept implementation applied on a real BP. Then, we proceed by evaluating the precision and recall of our Activity-Service Matching algorithm.

Keywords: Cloud services discovery, Business process development, Activity-Services Matching.

Introduction

A business process is the combination of a set of activities which are performed in coordination within an organizational and technical environment. These activities jointly realize a business goal [Carrillo and Sobrevilla, 2017]. The BP development leads to define a workflow application which consists of coordinated executions of multiple activities that require access to high performance IT services [Carrillo and Sobrevilla, 2017]. For this reason, companies are interested in cloud computing environments which provide on-demand high performance IT services based on a pay-as-you-go model, allowing them to reduce the management costs, improve their productivity and decrease the time to market.

Despite these advantages, SMEs and startups are falling behind in cloud usage due to missing IT competences. In fact, BP designers and technical developers usually have to cope with alignment challenges between business aspects and CSs needed for BP development. This challenge is, practically, conducted, in our work, through two perspectives, on the one side, we introduce the concept

of cloud-aware BP which presents an enrichment of BP by supporting cloud requirements modeling. On the other side, we handle the mapping of BP's activities to concrete CSs required to perform the BP. Despite the existence of two widely adopted standards for process models and execution like Business Process Model and Notation "BPMN" [Geigera et al., 2018] and Web Services Business Process Execution Language "WS-BPEL" [Sun et al., 2019], there is no general agreement on the mapping and alignment between the business modeling side and the performing of abstract business's activities side. Several efforts have investigated the business and IT alignment challenge in cloud environments such as[Nacer et al., 2019], [Martino et al., 2018] and [Nagarajan et al., 2018]. However, fundamental issues remain for further investigations, mainly, a discovery process ensuring an automatic mapping from business activities to CSs.

The contributions of this paper can be summarized as follows:

- Introducing the concept of cloud-aware BP by proposing a DSL named "BP4Cloud", an extension realized in full compliance with BPMN meta-model in order to cover both business and technical requirements and pave the way to the CSs discovery step.
- Proposing an Activity-Services Matching algorithm to automate the mapping between business activities and CSs.
- Demonstrating the effectiveness of the proposed algorithm through experimental evaluation.

The remainder of this paper is organized as follows: Section 2 presents a motivating scenario. Section 3 details BP4Cloud language. Section 4 presents the Activity-Services Matching algorithm. Section 5 illustrates the evaluation of our contributions. In Section 6, we discuss the related work. Section 7 provides concluding remarks and outlines our ongoing works.

Motivating Example

Our main focus in this paper is to assist the modeling and discovery of cloud resources required for BPs development. To effectively achieve our purpose, we need to outline a substantial interaction between business designers and technical developers during the resources modeling and resources discovery.

The resources modeling presents the specification of abstract entities that carry out the work related to activities which are in our context CSs [Carrillo and Sobrevilla, 2017].

The resources discovery presents the identification of concrete CSs needed for (i) the deployment and (ii) the performing of abstract BP's activities. The deployment of the BP requires to identify suitable infrastructure and platform services. These services provide virtualized resources and software tools needed for application development. The performing of BP activities requires a mapping between abstract business activities and concrete software services.

To illustrate, let us suppose the following scenario presented in Figure 1. This scenario describes a simple BPMN process for online bank accounts opening which initiates with an application request sent from a customer. The first activity consists on checking the customer summary, if a similar request is already in process, his/ her request will be rejected. Otherwise, the process evaluates the customer application, if the application is approved, a provisional account Id is generated and sent. In order to develop the bank account opening process using CS, two major steps should be conducted:

First, we need to define technical cloud resources, essentially, IaaS and PaaS requirements. For instance, the evaluation application activity requires a compute resource to evaluate the customer's application. The check customer summary activity requires a database server to verify if the customer has already an account Id. The whole process may require a load balancer to distribute the application traffic across the allocated compute resources. However, BPMN, which is the most used standard for the high-level description of BPs, supports neither the modeling of the required cloud resources nor their configuration features. This fact presents an important challenge for business designers.

The second step consists of the discovery of software services performing abstract activities. For instance, the sending account Id activity can be performed by a service which sends notifications or emails. Our main purpose is to assist business designers in the aforementioned steps.

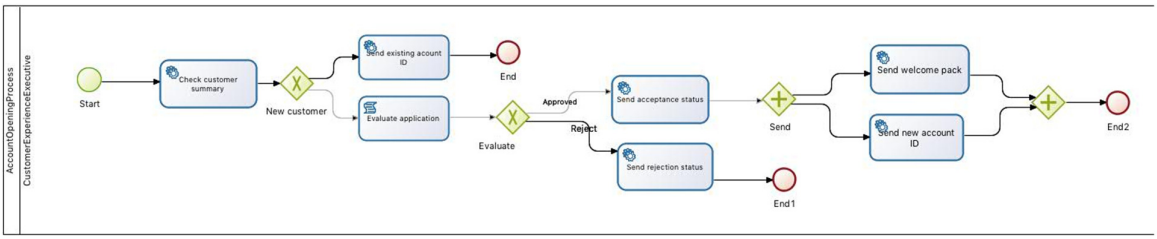

Fig. 1: BPMN Process Example

BP4Cloud Language

BP4Cloud consists of a set of extension elements that allow the attachment of cloud resource perspectives to the BPMN standard. By enriching BPMN with CSs covering both business and technical requirements, we define a cloud-aware BP. BP4Cloud considers two aspects:

- First, technical resource requirements which are IaaS and PaaS services allowing to define the run-time environment.
- Second, business specifications which assist SaaS services discovery to perform abstract business activities.

Concretely, we specified these proposed extension definitions in an xsd document derived from the BP4Cloud meta-model. By importing our xsd extension in the BPMN document, we extend the BPMN document by putting into the core of its tag the corresponding extension elements.

Technical Cloud Resources Requirements

The first aspect considered by BP4Cloud is the modeling of IaaS and PaaS requirements. IaaS requirements cover three types of resources which are: computing, storage, and network resources.

- The computing aspect provides resources able to deploy and run service activities or execute script activities (e.g. virtual machines) [Nacer et al., 2019].
- The storage meta-class presents the requirement of information recording resources in data storage devices. There are different ways to use the storage resource depending on activities requirements. Namely, the online storage state manages the shared data. The backup state manages private data.
- The network meta-class presents network resources providing mechanisms that are used for communication [Nacer et al., 2019]. The network type denotes an interconnection resource (e.g. a virtual switch).

The PaaS requirements cover the virtual appliances' requirements that present the middleware components needed for the execution of activities such as; web server, application server, etc. Figure 2 illustrates the meta-model presenting the infrastructure requirements.

It is worth pointing that our presumption consists on assisting non-cloud experts in identifying their technical requirements. Thus, we specified the main cloud technical requirements which can be exhaustively extended.

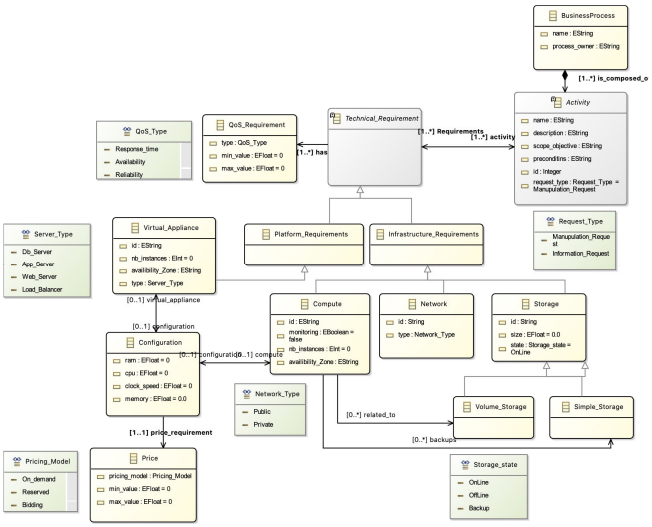

Fig. 2: BP4Cloud Meta-Mode

Software Cloud Resources Requirements

The second aspect considered by BP4Cloud is the required software/application services. In practice, these services are identified using our proposed Activity-Services Matching algorithm. In order to upgrade the performance and the results of the algorithm, we need accurate specifications related to the business logic of BP's activities. For these reasons, we introduce the Business Logic meta-class which classifies activities according to their business logic. This classification is, basically, inspired by Workflow Pattern Activity (WPA) [Workflow Resource Patterns, 2018]. WAP describes a business function frequently found in BPs [Martino et al., 2017]. In fact, BP can be seen as several connected process fragments each one presents a particular business function. Thom et al. [Lucineia et al., 2009] performed a manual analysis to identify relevant WAPs as well as their cooccurrences within a collection of 214 real wold BPs. Based on the frequency of appearance and potential reuse of a business function in the analyzed models, the authors define seven WPAs which are; which are Approval, Question-answer, Uni/Bi-directional Performative, Information Request, Notification, and Decision Making.

In our proposal, a CS classification is conducted based on WPAs in order to identify candidate services for a particular business logic. This fact can upgrade the precision of the algorithm by identifying service classes that share the same business logic as the activity. To do so, we propose a modified K-means algorithm based on CS descriptions. In order to have meaningful classification adapted to our context, first, we left frequent and rare words extracted from services description unclassified in order to avoid overfitting.

Second, we enhance the cohesion and correlation conditions defined in the standard K-means algorithm by quantifying the cohesion and correlation of classes based on a semantic functional similarity (which is presented in the next section) instead of Euclidean distances used in the standard K-means algorithm.
Third, to ensure that we obtain classes with high cohesion, we only add an item (in our case a service) to a class if it satisfies a stricter condition, called cohesion condition. Given a class C, an item 'i' is called a kernel item if it is closely similar to at least half of the remaining items in C. Our cohesion condition requires that all the items in the class be kernel items. Formally;

$$i \in C \implies (\forall j \in C, i \neq j), Sim(i,j) \geq \frac{||C|| - 1}{2}$$

We illustrate the major steps of the modified K-means algorithm as follows:

Modified K-means Algorithm:
Input: classes scopes set (S = s1, s2, ..., sn) k the number of classes
Output: k classes
Let sim be the similarity function
C = {c1, c2,... , ck } (set of classes centroids)
L = {L(si)|i = 1, 2, ..., n}(set of classes labels)
for all ci in C do
ci <-- sj {Initialize Centroid (ci) }
end for
for all si in S do
l(si) <-- index_max_Sim(si,cj)
end for
Centroid_Change <--False, cohesion_condition() <--True
srepeat
for all ci in C do UpdateCentroid(ci)
end for
for all si in S do
M <-- index_max_Sim(si,cj)
if M /= l(si) then
l(si) <-- M
Centroid_Change <-- True
end if
Verify(cohesion_condition(si, sl))
l in (1, 2, ..., n) l /= i
end for
until (Centroid_Change == False and Verify(cohesion_condition()))

Figure 3 illustrates activities' business logics.

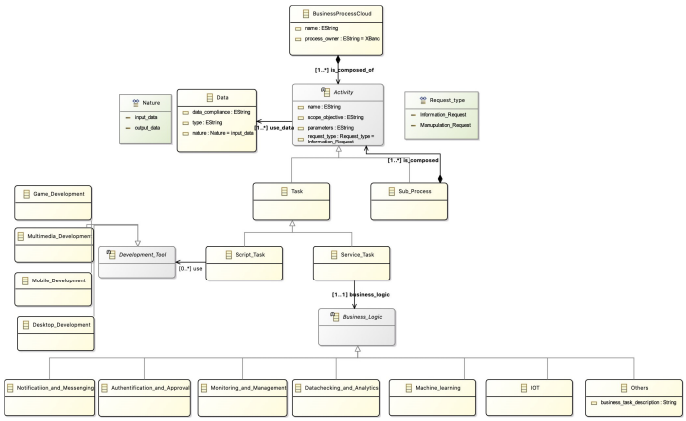

Fig. 3: BP4Cloud Meta-Model

Activity-Services Matching Algorithm

After modeling the required cloud resources, we need to particularly discover concrete services that will be invoked to perform BP's activities. To do so, we propose the Activity-Services Matching algorithm which is accomplished through two main steps: the technical matching and the business matching. Figure 4 illustrates an overview of the matching algorithm steps.

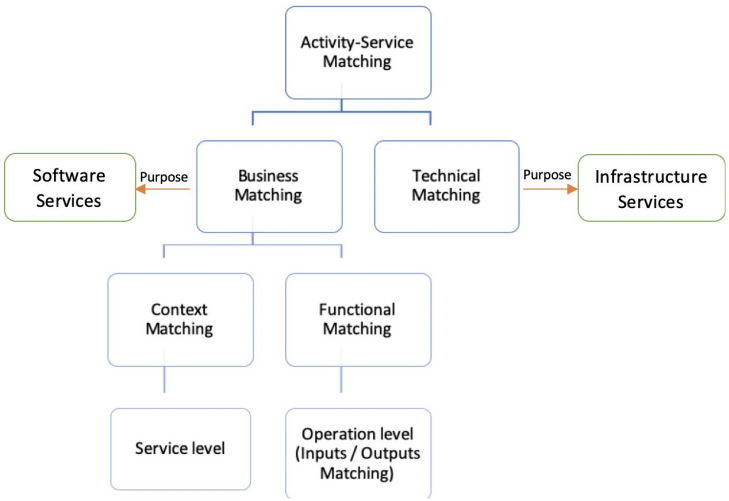

Fig. 4: Activity-Services Matching steps

Our algorithm uses real services referenced in a cloud registry. We propose a consistent registry, named ULIT (Unified cLoud servIces regisTry), where services offered by different cloud providers, such as Amazon, IBM, and Google, are collected, unified and classified based on their functional features. ULIT was reviewed and accepted by Elsevier Mendeley Data [Elsevier Mendeley Data , 2019]. It is publicly available on [ULIT , 2019].

Technical Matching

The main purpose of the technical matching is discovering the infrastructure environment based on technical requirements specified by BP4Cloud. To do so, we establish, first, a mapping relationship between "agnostic cloud resources" specified in BP4Cloud and "concrete cloud resources" referenced in ULIT. Figure 5 illustrates this mapping.

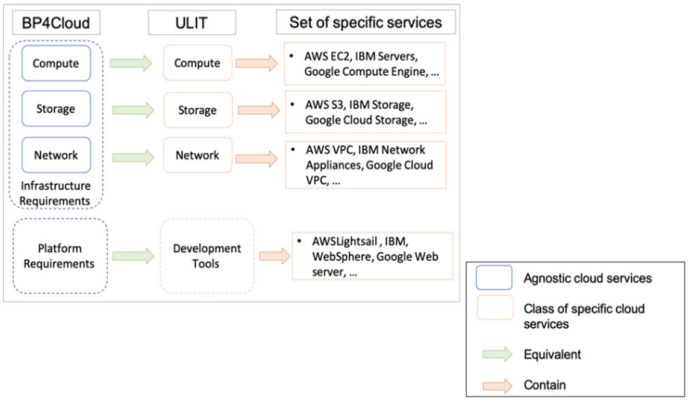

Fig. 5: Technical Matching

However, this is not enough to precisely define the infrastructure environment. Indeed, IaaS services need to be correctly configured. Several and conflicting criteria have to be considered such as; VCPU, RAM, etc. No single service exceeds all other services isn all criteria but each service may be better in terms of some of the criteria. Therefore, we consider IaaS services discovery and configuration as a MultiCriteria Decision Making (MCDM) problem. In our previous works [Gabsi et al., 2018] and [Gabsi et al., 2019], we have clearly addressed the technical matching.

Business Matching

The business matching is conducted through two steps. The context matching and the functional matching. Figure 6 illustrates the business matching steps.

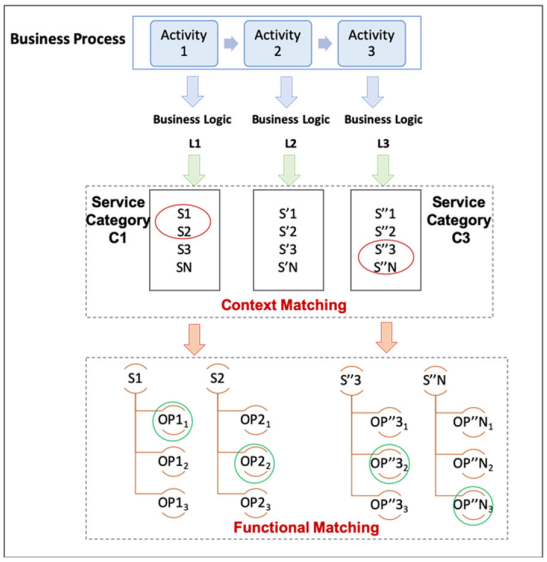

Fig. 6: Business Matching

Context Matching

The context matching discovers CSs sharing the same business context as BP's activity. To identify the business context of BP's activities, we annotate each activity by scope & objective that clearly define the business context such as Send Notification, Database Access. The scope & objective are defined by the business designer.

Defining the business context of a CS is more challenging due to its heterogeneous description and the abundant use of adjectives for commercial purposes. To deal with this challenge, we extract relevant keywords presenting the functional features of CSs from its provided descriptions in supplier's web portals. We use a natural language processing tool named Stanford Parser [Marneffe and Manning, 2015]. The Stanford Parser can identify the grammatical structure of each sentence of service descriptions by creating grammatical relations or type dependencies among elements in the sentence. These dependencies are called Stanford Dependencies SDs [Marneffe and Manning, 2015]. In our work, we model keywords as a set of binary relations < action, object >, where the action is a keyword presenting a verb, which denotes the functional feature of the service. The object is a keyword presenting a noun, which denotes the entities affected by the action. Then, we use the SD sets to properly identify the grammatical relations between < action, object >. In fact, each SD is a binary relation between a governor (also known as a regent or a head) and a dependent [Marneffe and Manning, 2015].

After defining services functional features, the context matching is based on the semantic similarity between service's keywords and activity's scope & objective. The semantic similarity $SIM(S_1, A_1)$ is inspired by [Lin, 1998a]. Indeed, the authors prove the relevance of the proposed similarity formula in the context of words pairs similarity. The main asset of this work is defining similarity in information theoretic terms which ensure the universality of the similarity measure.

We denote $S_1 = \{S_{1,1}, S_{1,2}, S_{1,3}, \dots, S_{1,N}\}$ *a* service business features, where $s_{1,i}$ is the pair < action, object > and $|S_1|$ the cardinality of S_1, (the number of pairs $s_{1,i}$). We denote $A_1 = \{a_{1,1}, a_{1,2}, a_{1,3}, \dots, a_{1,N}\}$ *the* activity's scope & objective. The similarity $SIM(S_1, A_1)$is the sum of the similarities between each pair s_{1i} of S_1, and the pairs $\{a_{1,1}, a_{1,2}, a_{1,3}, \dots, a_{1,N}\}$ of A_1, normalized by the cardinality of S_1. Formally, we obtain;

$$SIM(S_1, A_1) = \frac{\sum_{i=1}^{|S_1|}\left(\frac{\sum_{j=1}^{|A_1|} SIM\ (s_{1i}, a_{1J})}{|A_1|}\right)}{|S_1|}$$

where $S(s_{1i}, a_{1j})$ is the pairs similarity. We define the pairs similarity as follows:

- Let A_{s1} and A_{c1} respectively denote the actions in the pair s_1 and a_1;
- OS_{i1} and OA_{i1} respectively denote objects in the pair s_1 and a_1;
- ω_1, ω_2 denote the weight of the action part and the object part. We suppose that some predefined action has a higher weight such as; offer, provide, deliver, etc.;
- *m* is the minimum number of objects of the pair s_1 and a_1 (min number objects(s_1 ,a_1)) whereas n is the maximum number of objects of the pair a_1 and s_1 (max number objects(a_1 ,s_1)).

The pair similarity is calculated as :

$$SIM(a_1, s_1) = \omega_1 SIM(A_{S1}, A_{c1}) + \omega_2 \frac{\sum_{i=1}^{m} SIM(OS_{i1}, OA_{i1})}{n}$$

where $SIM(OS_{i1}, OA_{i1})$ is words similarity. We use Jacard Similarity Coefficient [Niwattanakul et al., 2013] to calculate the word similarity. In fact, the Jaccard coefficient measures similarity between finite sample sets, and is defined as the size of the union divided by the size of the intersection of the sample sets.

$$J(E,F) = \frac{E \cup F}{E \cap F}$$

where E and F are two given sets of words. We create a feature set F(w) for each word 'w' (i.e for each object which is presented by a word in our context) containing the synonym set, generic word and interpretation of the word w. F(w) is created using BabelNet. Based on [Lin, 1998b], we define the similarity between the two words as follows:

$$SIM(\omega_1, \omega_2) = \frac{2 \times I(F(\omega_1) \cap F(W_2))}{I(F(\omega_1) + F(W_2))}$$

where I(S) represents the amount of information contained in a set of features S. I(S) is calculated as:

$$I(S) = -\sum_{f \in S} logP(f)$$

The probability $P(f)$ can be estimated by the percentage of words that have the feature f among the set of words that have the same part of speech in the entire BabelNet library database. If the semantic similarity $SIM(S_1, A_1)$ is greater than a specific threshold (experimentally fixed in our work as 0.5), S_i is considered as candidate for the functional matching.

Functional Matching

The output of the context matching is a set of candidate CSs that share the same business context as the activity. The functional matching aims to identify the CS's operations that can perform the BP's activity. Inspired by [TRAN et al., 2009], we perform the functional matching by evaluating how a service operation fulfills an activity requirement. This is performed by answering two symmetric questions: (1) how the activity can fulfill required inputs for the service operation; and (2) how the service operation can fulfill expected outputs of the activity. To do so, first, we classify CSs operations and business activities into two categories: information request (IR) and manipulation request (MR). Information requests (IR) aim to retrieve diverse information regarding a particular request such as get attributes(), list methods() etc. Manipulation requests (MR) present several modification functions such as: create(), recommend(), etc. Based on this classification, we identify candidate operations according to the activity request type. We define a matched operation if two main elements are verified: a matched context and matched inputs/outputs.

A matched context is defined through two steps. First, we take advantage of the structure of CSs operations' naming, which is typically action object, to calculate the semantic similarity between the operation action and the activity action. If this similarity is greater than a fixed threshold, the second step consists on verifying if the operation object is a generic word of the activity object, that means the activity object satisfies the relationship *"is a"* an operation object. We consider an operation is a candidate for the inputs/outputs matching if it satisfies the two abovementioned conditions.

The input/output matching consists of a matching level and matching degree. The matching degree consists of four elements: SIF: service operation input fulfillment, AIR: activity input redundancy, AOF: activity output fulfillment, and SOR: service operation output redundancy. SIF and AOF are, respectively, the ratio of the fulfillment of the service operation inputs and activity outputs by the activity inputs and service operation outputs. AIR and SOR are, respectively, the ratio of redundancy (unused) of the activity inputs and service operation outputs in fulfilling the service operation inputs and activity outputs. SIF, AIR, AOF, and SOR have values in [0.1]. Formally;

$$SIF = \frac{Matched_Input_Count}{Operation_Input_Size}$$

$$SOR = \frac{Unused_Operation_Otput}{Operation_Otput_Size}$$

$$AIR = \frac{Unused_Activity_Input}{Activity_Input_Size}$$

$$AOF = \frac{Matched_Output_Count}{Activity_Output_Size}$$

A matching level can be precise, over, partial, or mismatch and it is specified based on SIF, AIR, AOF, and SOR in the following rules:

- Precise: if (SIF = 1 ∧ AOF = 1) ∧ (AIR = 0 ∧ SOR=0)
- Over if (SIF=1 ∧ AOF=1) ∧ (AIR>0 ∨ SOR> 0)
- Partial if (SIF >= iMT ∧ SIF < 1) ∧ (AOF >= oMT ∧ AOF < 1)
- Mismatch if SIF < iMT ∨ AOF < oMT

iMT and oMT are customized matching thresholds. Depending on a particular business context, we can set suitable values for iMT and oMT to get more or less partial matched services, e.g. they can be set to 0.5. If there are more than one service operations which are matched with the activity then the list of matched service operations is sorted according to the following rules:

- Precise>Over>Partial>Mismatch
- If two operations are both over match then
    - The smaller the value SOR is the better the matched operation is.
    - If they have the same value SOR then the smaller the value AIR is the better the matched operation is.
- If two operations are both partial match then
    - The larger the value AOF is the better the matched operation is.
    - If they have the same value AOF then the larger the value SIF is the better the matched operation is.
    - If they have the same values AOF and SIF then we apply the rules of the values SOR and AIR as in case of over match above.
- If two operations are both mismatch then they are considered the same.

The following algorithm illustrates the Activity- Services Matching process.

```
Activity-Services Matching Algorithm
Let S be a Cloud Service.
Resources.
{Context Matching}
Select S where S.Class == A.BusinessLogic
If (Sim (A.Scope_Objective, S.Keywords_Set)>=0.5) then Add(Candidate_Services,S)
{Functional Matching}
For each S in Candidate_Services do
Select S.Operations_Set where A.Request_Type == S.Operation_Category
If Sim(A. Verb, S.Operation_Verb) >= 0.7 then
If (A.Object is_a (S.Operation_Object) Add(Candidate_Operaton , S.Operation)
Endif
Endif
Endfor
matchCount=0
unusedCount = 0
For each op in Candidate_Opererations do
```

```
For each inp in op.Input_set do
m = match (inp, A.input) (the match function checks the compatibility between
data types.)
if m != "mismatch" then
matchCount ++
Endif
Endfor
Endfor
For each a_input in A.input do
If a_input.used == "false" then
unusedCount ++
Endif
Endfor
(Service Input Fulfillment)
Sif = matchCount /S.Input.size();
(Activity Input Redundance)
Air = unusedCount /A.Input.size(); IfSif==1andAir==0 then matchingInput.Level =
"precise"; elseifSif==1andAir>0then matchingInput.Level = "over";
elseif Sif < 1 and Sif >= iMT(0,5) then matchingInput.Level = "partial";
elseif Sif < iMT(0,5) then
matchingInput.Level = "mismatch";
Endif
(We apply the same algorithm for matching
the outputs as matching the inputs.)
If (matchingInput.Level == "precise" and matchingOuput.Level == "precise") then
matchingOperation.Level == "precise";
elseif (matchingInput.Level == "precise" and matchingOutput.Level == "over") or
(matchingInput.Level == "over" and matchingOutput.Level == "precise") or
(matchingInput.Level == "over" and matchingOutput.Level == "over") then
matchingOperation.Level = "over";
elseif (matchingInput.Level == "partial" and matchingOutput.Level != "mismatch") or
(matchingInput.Level != "mismatch" and matchingOutput.Level == "partial") then
matchingOperation.Level = "partial";
elseif (matchingInput.Level == "mismatch" or matchingOutput.Level == "mismatch") then
matchingOperation.Level = "mismatch";
Endif
```

Application and Performance Analysis

In order to illustrate our approach, we set up, firstly, by clarifying the specification of BP4Cloud elements applied on the use case, ”Online Bank Accounts Opening”. Then, we proceed evaluating the overall performance of our Activity-Service Matching Algorithm.

BP4Cloud Evaluation

We present an extract of BP4Cloud file specifying the activity ”Check customer summary” requirements. The activity requires a compute server, as IaaS requirement, and a database server as PaaS requirements. Its business logic is ”Datachecking and Analytics.

```
1 <is_composed_of
2        xsi:type="CloudBusinessProcess: Service_Task"
3        name="Check customer summary"
4        description="Verify if a customer has already made an application earlier"
```

```
    key_words="Check summary" , "Verify application", "Validate
        Summary"
    preconditins=""
    effects=""
    id="1">
<use_data
    href="Data.xmi#/" input_data_type="
        String" output_data_type="Boolean "/>
<requirements
    xsi:type="CloudBusinessProcess: Data_Base_Server"
    href="Data_Base_Server.xmi#/">
<requirements
    xsi:type="CloudBusinessProcess:Compute"
    href="Compute.xmi#/" id="1" vmsize="
        Meduim">
<business_logic
    href="Datachecking_and_Analytics.xmi #/"/>
```

To practically evaluate our specification, we measure the complexity of two process models, one using the standard BPMN and the other using BPMN extended by BP4Cloud. The complexity of a process model can be defined as the degree to which a BP is difficult to analyze and understand. [Huber et al., 2018]. Huber et al. [Huber et al., 2018], propose to categorize BP complexity metrics. We consider the following metrics:

- The number of activities and control flow elements in a process metric (NOAC). It counts the activities and control flow elements of a process, which are the gateways in BPMN.
- McCabe's Cyclomatic Complexity metric (MCC) measures the number of control paths through the process. MCC is defined to be $e - n + 2$, where e is the number of edges and n is the number of nodes in the control flow graph.
- Control flow Complexity metric (CFC) is defined as the number of mental states that have to be considered when a designer develops a process. It is calculated as $C_{XOR} + C_{OR} + C_{AND}$, where C_{XOR} is complexity of XOR-split (equals to number of branches that can be taken), C_{OR}complexity of OR-split (equals to number of states that may arise from the execution of the split), and C_{AND} complexity of AND-split (always equals 1). The higher the value of C_{XOR}, C_{OR}, and C_{AND}, the more complex is the process design.

The online bank accounts opening process designed using BP4Cloud has the same control flow elements (NOAC), activities elements (NOA, control paths (MCC) (in our use case e=15 and n=15) and the control-flows (CFC). Using the presented metrics, we can clearly demonstrate that using BP4Cloud is not in any view more complex. In fact, BP4Cloud does neither modify the control-flow elements of the BP nor its activities.

Activity-Service Matching Algorithm Evaluation

In order to evaluate the effectiveness of our algorithm, experiments were conducted to evaluate its precision and recall on the BP presented in the motivating scenario section. The precision evaluates the capability of the algorithm to retrieve top-ranked services that are most relevant to the activity. The recall evaluates the capability of the algorithm to get all the relevant CSs [Davis and Goadrich, 2006]. Formally;

$$P = \frac{|S_{Rel}|}{|S_{Ret}|}, \qquad R = \frac{|S_{Rel}|}{|Rel|}$$

$$P_k = \frac{S_{Rel,k}}{k}, \qquad P_r = \frac{S_{Rel,|Rel|}}{|Rel|}$$

where Rel denotes the set of relevant service, S_{Ret} is the set of retuned services, S_{Rel} is the set of returned relevant services and $S_{Rel,k}$ is the set of relevant services in the top k returned services. Among the above metrics, P_r is considered to most precisely capture the precision and ranking quality of the algorithm. We also plotted the recall/precision curve (R-P curve). In an R-P curve figure, the X-axis represents recall, and the Y-axis represents precision. An ideal discovery result presents a horizontal curve with a high precision value. The R-P curve is considered by the IR community as the most informative graph showing the effectiveness of the discovery algorithm [Davis and Goadrich, 2006].

In order to evaluate our proposed algorithm, we asked several BP designers and technical developers who are familiar with CSs uses to identify the relevant services meeting the business activities. Table 1 illustrates the online bank account process results. For reason of space restraint, we display some relevant services related to the activities ”check customer summary” and ” send account id”.

TABLE I: Activity-Services matching algorithm evaluation

Activity	Business Logic	Scope / Objective	Relevant Services	Relevant Operation	Context Matching			Business Matching	
					Returned Services	Extracted keywords	SIM (S.KW, A.Scope/Objective)	Returned Operation	Matching Level
Check summary ,	Data checking & Analytics	Database Access / Availability Check	Amazon SimpleDB Amazon DynamoDB Amazon RDS Amazon Aurora Amazon Neptune Amazon Redshift Oracle Database	elect() Query() Describe events() Select () Select () Describe events() Query()	Amazon SimpleDB	(’query’, ’data items’) (’storing’, ’data items’) (’serving’, ’requests’)	0.796	Query()	Over
					Amazon RDS	(’query’, ’data items’) (’replicate’, ’databases’) (’scale’, ’database setup’)	0.796	-	Over
					Amazon DynamoDB	(’handle’, ’requests’) (’Create’, ’table’) (’handle’, ’data’)	0.642	Query()	Over
					Amazon Neptune	(’build’, ’queries’) (’querying’, ’database’)	0.597	Select ()	Over
					Oracle Database	(’retrieve’, ’information’)	0.503	Query()	Over
Send account ID	Notification	Send/Receive Message	Amazon SQS Amazon SNS Amazon SimpleMail Amazon WorkMail IBM	Send Message () Publish() Send Email() Send Message ()	Amazon SQS	(’send’, ’messages’) (’receive’, ’messages’) (’losing’, ’messages’)	1	Send Message()	Over

We evaluated the precision of the proposed services and report the average top-2, top-5, and top-10 precision. To ensure the top-10 precision is meaningful, we selected activities for which we can identify more than 15 relevant services over different providers. Figure 7 illustrates the results. The top- 2, top-5, and top-10 precisions related to the context matching of our algorithm are, respectively, 91%, 87%, 74%. The precision related to the functional matching can be 1 or 0. Finding the suitable operation

performing the activity is considered as 1 in terms of precision value, else the precision is estimated to 0.

The evaluation demonstrates that taking into account the context of both the business process and activity using their business features during the context matching can effectively provide acceptable precision values (91%, 87%), which means, we can identify suitable candidate services. The discovery of suitable service operation can more challenging since the functional matching involves different matching level. The inputs/outputs matching is considered as the main important step to validate if a candidate operation can perform the activity.

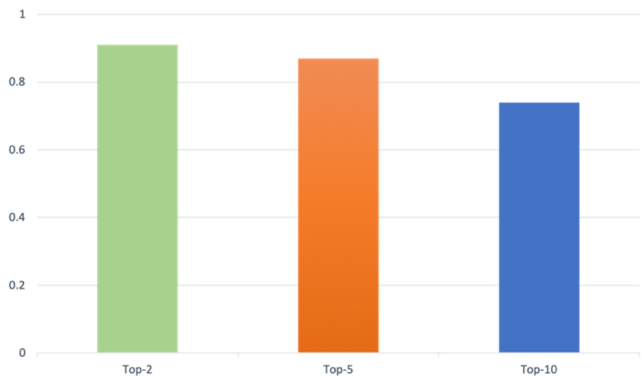

Fig. 7: Top-k precision for retrieved services

We plot the average R-P curves to illustrate the overall performance of the matching algorithm. As mentioned previously, an appropriate discovery result has a horizontal curve with a high precision value. Typically, precision and recall are inversely related, ie. as precision increases, recall falls and vice-versa. A balance between these two needs to be achieved. As illustrated by Figure 8, for a recall average equals to 0,63 we have 0,85 as precision value. As an example, for the service activity " Check customer summary ", we have 20 services considered as relevant in ULIT i.e $|Rel| = 20$, the matching algorithm returns a total of 16 services i.e $|S_{Ret}| = 16$, among them 13 services are considered relevant i.e $|S_{Rel}| = 12$. We obtain a precision value $P = 13/16 = 0,81$ and a recall value $R = 13/20 = 0,65$.

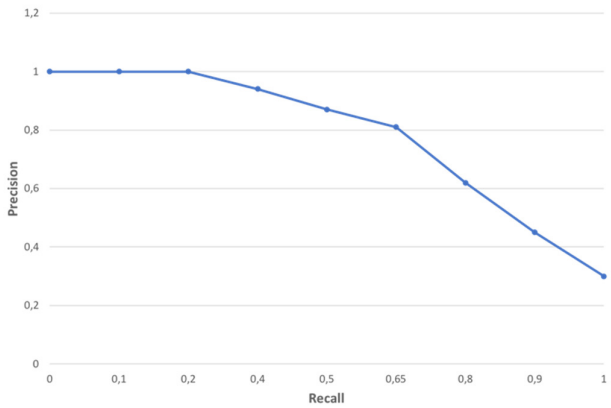

Fig. 8: R-P Curves

It is worth pointing out that in some cases, depending on particular context, high precision at the cost of a recall or high recall with lower precision can be chosen. Thus, evaluating a matching algorithm for services discovery must be related to the purpose of the discovery. In our case a compromise between the recall and the precision values is necessary. Therefore, we can announce the proposed algorithm provides accurate results for CSs discovery.

Related Work

Despite various efforts for cloud resource integration in BPs modeling, it remained poorly described and operated [Nacer et al., 2019]. In [RamosMerino et al., 2019], the authors proposed extensions to support new features such as the possibility to describe the workflow behavior, the activities performed and the context of the application in a machine understandable way. Even though, this works can simplify the BPs modeling, it did not take into consideration several resources required for the development and execution of the BP, particularly, cloud resources perspective. In [Heidari et al., 2013], the authors proposed the use of BPSim, which is a standard that provides a framework for structural and capacity analysis of BP models specified by the use of BPMN or XPDL (XML Process Definition Language). However, it is limited to introduce BPMN extensions to enhance its expressive capabilities without considering the runtime environment. In fact, the resource perspective may change depending on the runtime environment, notably, cloud environments require specific resources that are different from other runtime environments.

Other approaches investigated the discovery of concrete CSs performing BP's activities. In that respect, several semantic approaches are scientifically interesting such as [Martino et al., 2018], [Nagarajan et al., 2018]. However, most of these works are depending on the preexistence of providers' specific ontologies (OWL-S services description) that require mapping techniques to coordinate the difference between agnostic (abstract) and vendor dependent concepts to support interoperability. Moreover, from the business designer perspective, it requires to have intimate knowledge of semantic services and related description and implementation. The business designers may not be aware of all the knowledge that constitutes the domain ontology. As a result of which many relevant services may not be considered in the service discovery process. Therefore, proposing an atomic mapping from business activity to CSs based on available services description that does not make any assumptions about the description standard languages of CSs, presents valuable insights to improve BP development.

Conclusion

This paper aims to provide efficient support to discover cloud services required for business process development. To achieve our aim, we define a cloud-aware BP by proposing BP4Cloud which is a BPMN extension that supports the design of cloud resource perspective requirements. BP4Cloud offers a solution for coordinating cloud resources between business designers and technical developers. Following the modeling of the required cloud resource, we propose an Activity-Services Matching algorithm to assist technical developers in discovering the required cloud services. Our proposed algorithm is conducted through two steps; the context matching which aims to discover services that share the same business context as the business activity and the business matching which aims to identify the suitable operation performing the activity. Our experimental evaluation has demonstrated that the Activity-Services Matching algorithm can potentially assist technical developers owing to its precision. Although we believe that our algorithm leaves scope for a range of enhancements, yet it provides suitable results. As ongoing work, we intend to conduct the composition of the discovered cloud resources in order to develop the cloud workflow application.

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Conceptual Foundations for Constructing A Sociocultural Matrix of An Ecological-Tourist Landscape

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Abstract

This article attempts to construct a sociocultural matrix of an ecological-tourist landscape in order to promote the image of the territory. It is shown that the social construction of the ecological-tourist landscape is based on the ideas of the correlation of the environment, image, action and narrative. Today, the landscape fits into our identity, relationships and life scenario and suggests an active position in the sequence of life events. To a certain extent, the design of ecological-tourist landscapes is designed to overcome the growing emancipation of man from the place, to restore the coherence and meaningfulness of the spatial organization of life that we lose in separation, lack of commitment and unlimited freedom. At the same time, representing a positive, "elevated" from an axiological point of view and at the same time very varied image, the constructed ecological-tourist matrix of the region is an important element of strategic planning of the image of the territory.

Keywords: Sociocultural Matrix, Tourism, Ecological Tourism, Landscape, Image Of The Region.

Introduction

The field of ecological tourism, in comparison with other areas of world tourism and industry, is currently characterized by the most powerful and rapid development. One of the main reasons for this phenomenon of our time is that environmental problems have now become global. The increased interest in the field of ecotourism in the world and in the Russian Federation indicates that this phenomenon has a significant impact on the political, economic, social and spiritual spheres of society. The experience of regions where ecotourism is thriving can lead to positive socio-cultural and economic trends.

The development of eco-tourism is currently creating favorable conditions for the formation of a new, modern tourism culture. Its highest priority is environmental protection, preservation of the natural ecosystem, the formation of environmental awareness and environmentally conscious behavior for each participant in ecological tourism activities. Moreover, such a culture is a reliable foundation for the development of not only ecological tourism, but also the tourism industry as a whole.

Research Methods

The theoretical and methodological foundations of the study are based on the subject field of tourism sociology, whose main interests are concentrated in the intersection of the concepts of consumption, identity and tourist experience. In accordance with the formulation of research tasks, the work uses elements of the theory of social mobility J. Urry, as well as his ideas regarding the practice of managing tourist attention. The activity-structural approach predetermined the research orientation on the use of the case study strategy of a particular place / places, which allows us to identify the logic of the relationship between local practices of constructing the sociocultural matrix of the ecological-tourist landscape and the processes of their capitalization developing on this soil with a wider social context, reflecting the formation of the territorial structure society.

The research methodology is based on the use of general scientific methods of a systematic approach, typological techniques, social construction, a method for assessing the reliability of qualitative and quantitative statistical indicators.

Results and Discussion

Currently, there is a rapid increase in the number of people for whom daily trips, travels and relocation are becoming the norm. As A. Toffler rightly remarks, today we are “witnesses to the historical process of destroying the significance of a place in human life” (Toffler, 1997, p. 57). This circumstance determines the turn of research interest in the problems of mobility in the sociocultural environment. More and more often, scientists are wondering how and why tourism has turned from an elite type of vacation for a very small group of people into a symbol of mass consumption and has become one of the trendsetters for standardized pleasures. In turn, modern tourist practices actualize the problem of the production of new tourist places and attractions, images and brands. Tourism and travel create their own system of significations, creating ways of constructing themselves and others.
Recent studies have revealed a wide range of problems related to the tourist image of individual territories (Kryukova, Pechorina, 2014; Cherifi, 2014; Lai K., Li Y, 2012, Chen Lei, 2019).

It should be noted that the development of tourism in the regions has some growth restrictions that depend mainly not so much on the availability of developed tourism infrastructure, but on the degree of generation and accumulation of tourist narratives in the region. Thanks to these narratives, places of interest are perceived by visitors and the local population as objects of tourist interest (Leukhin, 2018, p. 41)

In the context of the indicated problems, the vector of “tourist reflection”, which, according to J. Urry, “makes it possible to identify a specific place in geographical, historical and cultural coordinates, and to determine its existing and potential material and semiotic resources” is of particular importance (Urry, 2005) The surge of "tourist reflection" has led to the emergence of various technologies, procedures, and evaluation criteria for any point on the planet from the standpoint of global tourism standards. Now any city, locality - by and large, any place - can be studied and modified in the context of a rapidly changing world order. Such procedures, according to J. Urry, were the basis for the invention, production, sale and distribution (by telecommunications) of new or newly “packaged”, different from each other or occupying a separate niche places and their visual representations, offering models of global spatial arrangement (Urry, 2005).

First of all, we are talking about the actualization of the processes of constructing the sociocultural matrix of a particular place or object endowed with meanings, associations and memories. As a result, we have the opportunity to create (form) a holistic tourist landscape, which is not only a natural form created and changed by man, but also a kind of cultural product with many layers of meanings that require thoughtful “reading” and comprehension.

The modern development of ecological tourism, the tourism industry and activities is indisputable evidence and confirmation of the thesis of modern scientists on the need for official recognition of global (transnational) citizenship. Going beyond the usual borders of the national state, such

citizenship objectifies the need to take into account the rights and obligations of a citizen of the global community, which, in our opinion, should be considered any ecotourist as a traveling person.

Scientists identify a number of duties of a citizen of such a global community (Kimelev, 2001, p. 131-152):

- ✓ to be aware of the state of the planet using not only national but also international sources of information;
- ✓ demonstrate the installation of cosmopolitanism in relation to other cultures, environments, people;
- ✓ comply with behaviors that are consistent with the standards of stability and sustainability;
- ✓ respond to information, images, etc. as a citizen of the planet, and not as a citizen of a certain country or as a member of a certain ethnic group, class, etc.;
- ✓ strive to convince others to act in the name of the planet as an integrated and unified system;
- ✓ act in terms of global public interest, and not in terms of local or national interests.

In our opinion, the following rights are rightly recognized as the rights of a citizen of a reputed global community:

- ✓ to migrate from one society to another and stay there for a while, having received rights comparable to those of indigenous people, to return home without losing citizenship and other rights;
- ✓ bring your own culture with you, as well as meet in a new place with a "hybrid culture" that also contains elements of tourist culture;
- ✓ culturally participate in all social groups in world society (ownership of information, knowledge, communication, representation);
- ✓ buy services and goods produced in other cultures and use them within their own culture;
- ✓ form social movements with citizens of other countries to counter any state or group of states, as well as corporations;
- ✓ migrate around the planet for leisure and consumption of various places;
- ✓ live in an environment relatively free of risks and threats to health and safety.

It is in the context of the presence of the above duties and rights that it is necessary to talk about a sociological interpretation of the place, which now seems to be a social construction. Due to the emergence of new technologies, modern socio-economic processes, the network of high-speed travels, there has been a significant increase in regional and global ties. The consequence of these processes is a noticeable increase in attention to a place that has ceased to be a simple locus. Sociocultural transformations in modern societies with obligatory dislocations, movements that significantly compress the time frame of social actions carried out in various places, which inevitably cause a feeling of soil loss, contribute to such attention. All this has a significant impact on a person's perception of a place, since it acts as a recognizable and changing reality (Culture, Power, Place, 1999, p. 12).

In addition, the concept of a place focuses on relations in the format of "a person traveling - the natural environment", and not just refers to geographical localization. This is because the world embodies something that is experienced and acquires significance as a human construct, because people live in the world, creating, using and transforming the image of the world. A place does not exist as a simple given, since it is subjectively perceived and experienced differently depending on the perspective of observation, the strength of emotional experiences, and the readiness to perceive it.

In this connection, an interesting theory is M. Aude, in which he proposed his original concept of non-place (Aude, 1997, p. 51-52). The scientist clearly distinguishes between a place filled with historical sights and the work of social life, and a non-place where no form of organic social life is possible.

By non-place, this scientist understands "interesting places that are everywhere and nowhere," that is, contexts in which people spend a significant part of their time (supermarkets, airports, hotels, roads, watching television, sitting at a computer, etc.), where the consciousness is fragmented and leads to the loss of the unity of the world. In his opinion, the existence of non-place allows you to clearly define a place as both a concrete and symbolic construction of space, which serves as a reference point. The place is endowed with a basic meaning for its inhabitants and has three mandatory properties: correlation with identity, relationships, history (Aude, 1997, p. 77).

The significance of the place is also explained by the fact that it is symbolically embedded and reproduced in a unique tourist landscape, which focuses on the practice of tourism consumption and virtual design, ensuring its originality.

As the analysis shows, the landscape is understood in the social sciences as a social construct, as something that is experienced and endowed with meanings, associations, and memories.

In the context of ecological tourism activities, it is advisable to define the sociocultural landscape as the multiplicity of relative places that embody (directly and indirectly) the emotions, memories, associations received in individual and group experience in a general historical and cultural context. Moreover, the sociocultural landscape is embodied not only in natural forms created by man or changed by him, but also in the meanings embodied in them (Pokrovsky, 2008, p. 172).

Interesting, in this context, is the opinion of K. Girtz that between "what our body says and what we need to know in order to function, there is a vacuum that we ourselves must fill, and we fill it with information (not misinformation) provided by our culture. The border between what is controlled by innate mechanisms in human behavior and what is controlled by cultural mechanisms is an undefined and unstable border" (Girtz, 2004, p. 62).

It is important to emphasize that in this sense, the concept of a sociocultural landscape clearly indicates that the geographical characteristics of a place are not determining components of its existence. That is why scientists identify three main approaches based on various cultural practices of landscape use (Kagansky, 2001, p. 3-18):

1. Aesthetic. It involves the perception, description, emotional assessment of the surrounding beauty, harmony, aesthetic characteristics.
2. Naturalistic. It is based on the understanding of the eternity of nature and its supremacy over human activity, which, being a derivative, builds ecological relations with the landscape.
3. Escapism. With this approach, the landscape acts as a special environment for the activities of socially marginalized groups that unfold a peculiar theatrical action that contrasts or even conflicts with the life of the main part of society.

Obviously, it is advisable to agree with scientists who are convinced that the methods for distinguishing the landscape directly depend on the sphere of activity of people who differently inhabit it and represent culturally and socially significant experience (Kagansky, pp. 3-18).

It is in this sense and context that it is advisable, in our opinion, to talk about the official recognition of another approach to the use of the landscape through the prism of ecological tourism activities.

We believe that this fourth approach should be called "educational and enlightening", since its essence is to obtain new additional knowledge about the environment and, accordingly, the landscape and the place. It is important to emphasize that obtaining additional knowledge cannot be an end in itself, since it is necessary, firstly, to expand existing practices of relationships and interaction in the format "environment-sociocultural landscape, tourist-sociocultural practice-behavior".

Secondly, the acquired knowledge must necessarily be disseminated in order to create a kind of "knowledge bank" about existing sociocultural landscapes and the accumulation of their so-called "institutional memory", common to all tourists as representatives of the global community.

This is especially important because the perception of the environment is determined by the semantic connections that a person puts, including the perceptual image, into the structure of his life experience. This process is accompanied by various emotional experiences, correlating individual concepts with existing cultural themes. That is why culture as a system of established well-known signs becomes both power and a context within which various social events, institutions or processes, people's behavior can be described and understood (Pokrovsky, 2008, p. 173).

People create, use, and transform landscapes using sign systems with which they identify themselves and understand the world around them.

Landscape as a cultural product becomes a text with many layers of meanings, which requires thoughtful reading (Brueggemann, 1997, p. 5). We share the opinion of scientists that the landscape is a complex grid - a network of relationships, connections and sequences, “physical, social and cultural conditions that describe my actions, my reactions, understanding, and this gives the form and content of life itself, which I am "(Brueggemann, 1997, p. 5).

In this regard, we believe that the use of technologies for the social construction of ecological and tourist landscapes will contribute to improving the management of the development of the field of ecological tourism in Russia.

By creating an ecological-tourist landscape, we understand the process of constructing a sociocultural matrix of a certain unknown place or object with the mandatory use of a number of successive phases, namely (Pokrovsky, 2008, p. 174):

1. Identification of the place. The purpose of passing this phase is to choose a place as an object of construction and determine its main characteristics.
2. The formation of sociocultural connotations. This phase provides for the confirmation of the historical, sociocultural, ecological value of the chosen place by using various means for this.
3. Visualization and virtualization. The purpose of this phase is to create an attractive positive image of the chosen place or object using various modern technical means (photos, videos, media), and create legends and myths about it.
4. Distribution of the image and distribution of the created texts using the media, advertising companies, tourists.
5. Development of the tourist infrastructure of the place. The emphasis is on creating conditions for excursions, recreation and other types of tourist activity, possible in these conditions.

We believe that taking these phases into account is an essential element in the landscape design process that is carried out to manage the tourist presentation and aimed at creating a message that needs to be perceived, understood, learned in a certain way to trigger further feedback and actions that form the basis of the visual organization of the space being transformed in his image.

According to J. Urry, such an organization defines the physical (movement), psychological (interest, attention, surprise), social (communication, perception of social information, interaction) components of action (Urry, 1995, p. 78-79).

In this context, the concept of indexing representations of C. Roger deserves attention. In his opinion, the structure of tourist perception is a combination of visual, textual and symbolic representations placed and presented in various guides, film, television, video shows, stories of tourists, etc. That is why, according to this scientist, each person has a socially constructed range of ideas composed of various elements. Since sights, like tourist places, do not have any of their own or initial values, it is necessary to create their frames, be sure to index the elements of culture, using various means of visualizing their image, namely: cinema, video, television, media, etc. (Rojek, 1997, p. 70-71).

In this context, it is necessary to take into account the fact that the ecotourist perceives a certain version of reality that has developed on the basis of images created by modern technology, powerful for shaping the perception of a place.

However, these images may not coincide with their own images, feelings, assessment of the place. In this case, the feelings and expectations of ecotourists from the place visited by him personally are not justified, and the place or attraction creates an anti-experience.

In our opinion, this fact should be especially taken into account in the process of preparing and distributing printed advertising materials about ecotourism places and sights. It is important at the same time not to impose on a potential tourist an opinion about a place or attraction, but to create opportunities and prerequisites for him to become interested in a place or attraction and a desire to see it with his own eyes. In this context, ecological tourism acquires the importance of spatial self-realization, self-identification and self-actualization of the personality of a tourist.

We believe that in the process of social construction of tourist landscapes, increased attention requires the process of focusing attention. According to J. Urry, a tourist's view always includes relationships between bodies that are in motion. Bodies present themselves in the space of sensations of others and in diverse sensual landscapes. The bodies pave the way between the direct perception of the outside world, in which they either physically move or lie motionless on the beach waiting for a bronze tan, and discursively, mediated by sensual landscapes in which their social tastes and differences, ideology and significance are articulated. That is why an important task for landscape design is the establishment of links between discourse and the body, providing a fixation of the tourist point of view [Sokolova, 2006].

Scientists rightly, in our opinion, identify a number of ways that contribute to the social construction of the tourist landscape, namely (Pokrovsky, 2008, p. 175-178):

1. Novelty and surprise. Z. Bauman explains this state of things by the fact that the purpose of the tourist's movement is a new experience, since the tourist consciously and systematically searches for adventures, new, not like the old ones, experiences (Bauman, 1995, p. 146).
2. Archetypal symbolism and disconnection of everyday life. Scientists have proven that the perception of “magical lands” like Disneyland is based on a standard set of social frames, organizes the view of tourists thanks to essential, archetypal symbols that excite, initiate a sense of mysterious, sacred, sacred, magical (Urry, 1995, p. 86-87). The organization of magical spaces gives rise to specific bodily experiences that switch the tourist's attention from ordinary to magical, wonderful. In addition, K. Rogek is convinced that the pleasure and excitement that tourists experience during travel is directly related to their temporary disconnection from the daily routine. Magic places, activating mental symbols, introduce elements of the essential and significant into the chaos of everyday life, thereby increasing the value of the experience gained (Rojek, 1997).
3. Image attack. This path is gaining importance now, since information technologies and Internet communications are beginning to play an increasingly important role in shaping the visual and emotional perception of the landscape. The appearance of different versions of the same landscape is considered as a strategy for the victory of the tourist services producer over the consumer. Victory begins already with a forced visual selection of an object (place, attraction, transport) and / or determining a route and ends with a triumph - possession of a set of visual confirmations (Pokrovsky, 2008, p. 177).
4. Entertainment and interaction of feelings. It has been proven that acoustic and visual (spectacular) effects have an extraordinary effect on travelers. At the same time, the culture of the event turns into a culture of participation, which is impossible without the acoustic and optical component of the “sound light” type. For example, in Rome tourists visiting the Coliseum is accompanied by sound effects: you can hear the emperors' speeches, the noise of the fire of the Nero era (Papiryan, 2000, p. 27), although history is often written in many places, and not just in a single city, like a way of creating a tourist-city (Urry, 2002, p. 86-87).
5. Programming narratives. Scientists rightly note that the meaning of a place is impossible without a word, a story, because “words are complex systems of metaphors and symbols that translate experience into our pronunciations or feelings that come out. This is the technology

> of explicitness. By translating direct sensory experience into voice characters, you can awaken and reproduce from memory at any time" (McLuhan, 2003, p. 74).

In this context, particular attention should be paid to narratives associated with any landscape that bears a name or title. The name itself gives it a unique meaning, and it is not chosen spontaneously. Of course, each toponym is a code of something once understandable that opens up a whole world of associations and stories, because "all human experience is a story with which we figuratively reconstruct it, and every encounter with the sacred is rooted in a place, in a socio spatial context, rich in myths and symbols "(Lane, 1994, p. 19).

Conclusion

The social construction of the ecological-tourist landscape is based on the ideas of correlation of the environment, image, action and narrative. Today, the landscape fits into our identity, relationships and life scenario and suggests an active position in the sequence of life events. To a certain extent, the design of ecological-tourist landscapes is designed to overcome the growing emancipation of man from the place, to restore the coherence and meaningfulness of the spatial organization of life that we lose in separation, lack of commitment and unlimited freedom. At the same time, representing a positive, "elevated" from an axiological point of view and at the same time very varied image, the constructed ecological-tourist matrix of a certain place / places is an important element of strategic planning of the image of the territory.

The analysis shows that the creation of an ecological-tourist landscape should now be the process of constructing a sociocultural matrix of a particular place / places. This process must necessarily occur due to consecutive phases, and the previous task is a prerequisite for the next phase.

Their primary task should be to conduct a SWOT analysis (analysis of strengths, weaknesses, opportunities and threats) and determine the regional specifics of the development of the tourism industry and related industries. This is followed by the development of a geo-information system (catalog of natural and cultural attractions). It is about organizing the list of tourist sites and making it convenient for use. The next step in this direction is the creation of a comprehensive strategy for the promotion of tourist services in the region, which involves the identification of target audiences, basic communication channels with them, the frequency and intensity of the relevant information impact. Thus, following a similar algorithm for increasing the tourist attractiveness of the region will contribute to bringing the region's ecological tourism industry to a new level.

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Financial Support for Small and Medium-Sized Industrial Enterprises in the Conditions of Technological Transformation

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Abstract

The technological transformation of the economic system contributes to the improvement of existing industries and the development of new ones. The main factor in the growth of the number of small and medium-sized industrial enterprises in developing countries is active state support, the formation of an effective infrastructure and the reduction of administrative barriers that impede the development of enterprises. Therefore, the formation of promising tools to support small and medium-sized industrial enterprises in the Russian Federation is a priority, both for state and private investors. The aim of the study is to analyze existing support tools for small and medium-sized industrial enterprises in terms of improving the economic situation in the Russian Federation and to increase their effectiveness. In the process of researching tools to support small and medium-sized industrial enterprises in the Russian Federation, methods of logical and statistical analysis were used, as well as a method of comparative and correlation analysis of indicators which characterize funding and development of small and medium-sized enterprises in the Russian Federation. The study has identified factors affecting the growth in the number of small and medium-sized industrial enterprises in developing countries. At the present time, state regulation of small and medium-sized industrial enterprises and support for entrepreneurial activity are not carried out at the necessary financial and systematic levels in the Russian Federation. To create rapid growth rate and sustainable development, small and medium-sized industrial enterprises should be regulated by the reasonable and rational impact of the state, and it should also contribute to the creation of favorable conditions for the development and maintenance of enterprises

Keywords: Small and Medium-Sized Industrial Enterprises, Financial Support, Efficiency.

Introduction

At the present time in the Russian Federation, less attention is paid to the study of the development of small and medium-sized industrial enterprises than in countries that are successful in this regard. For instance, American economists consider business to be an activity of creating and implementing bold, sometimes dangerous and difficult projects. Business is an activity voluntarily carried out by citizens

or their associations, which includes taking high-risk decisions on their own responsibility. In the modern world, business is closely connected with the willingness to do something new in society, to invent something or to improve an existing one. Entrepreneurship is the tool that helps to release the potential of citizens in terms of developing the society, improving the quality of life, increasing the number of innovations.

The interest of world scientists in researches on the development of small and medium-sized industrial enterprises is logical and explicable. Small and medium-sized businesses are the foundation for the development of the entire economic system; the stability of the economy, as well as the formation of favorable conditions for the society depends on the level and effectiveness of their activity (Vetakova et al., 2016).

The degree of knowledge of the problem of financial support for industrial enterprises is reflected in studies of the features of regulation of a market economy by the state. These issues were considered by a number of leading economists from EU, for example, J. Sachs, who studied the features of economic development taking into account the living standards of the population. In this work, he raises the topic of state support for business, including various kinds of grants. There are many studies of this problem in the EU countries, especially in countries with relatively low economic development such as Romania (Beldiman et al, 2016), Slovakia (Majdúchová et al., 2015), Hungary (Csata Andrea, 2018), Croatia (Kotarski, 2016).

Currently, state support for small and medium-sized industrial enterprises in the area of organizing project competitions and grants is mainly carried out at the federal level and to a much smaller extent at the regional and municipal levels. Thus, the involvement of representatives of regional and municipal authorities is one of the priority tasks in the formation of targeted support tools for small businesses. This is problematic for the economic development of our state. It is necessary to correct the present situation by involving municipal authorities in improving and developing the business.

Materials and Methods

The method of statistical analysis, namely the use of formulas and the calculation of the Pearson correlation coefficient has been originally used in this article. The Pearson correlation analysis index allows the authors to identify the strength of the correlation between the two indicators that were measured in a quantitative scale. It shows the strength of the existing relationship between the two indicators, whereupon it is possible to draw a logical conclusion concerning cause-and-effect relationships in the research field. According to statistical data, a quantitative analysis of information on small and medium-sized businesses has been carried out, indicators over the past few years has been compared, which gives a general understanding of the current situation; and on the basis of it, conclusions about the effectiveness of small and medium-sized industrial enterprises in the country have been drawn.

Results and Discussions

At the beginning of the study of promising tools to support small and medium-sized industrial enterprises in the Russian Federation, the authors have generated the hypothesis: the number of small and medium-sized enterprises is directly dependent on the amount of grant financing.

During the first stage of the study, the authors have conducted a comprehensive analysis of the volumes of grants allocated to support small and medium-sized industrial enterprises and analyzed the interdependence of this indicator and the number of small businesses. The comparison of data on financial support for small businesses according to the Central Bank of the Russian Federation and Rosstat is presented in Table 1.

Table 1: Data on the volume of grants and loans provided to small and medium-sized industrial enterprises

Year	the volume of grants provided to small and medium-sized industrial enterprises by the state, thousand of rubles	the volume of provided loans, mln rubles
2014	20 800 000	6 023 812
2015	19 815 042	6 933 243
2016	19 374 822	6 568 483
2017	18 528 287	4 540 710
2018	11 124 625	4 560 099
Growth rate, %	53.5	75.7

Source: Overview of the financial affordability in the Russian Federation [Electronic resource] -Access mode.— URL: https://cbr.ru/statistics/?PrtId=pdko

According to table 1, it is possible to talk about a significant reduction in funding, in particular, the volume of grants to support small and medium-sized industrial enterprises has decreased by 46.5% (the growth rate is 53.5%), the volume of loans has decreased by 24.3% (the growth rate is 75.7%). Negative factors also include the level of the interest rate for lending to small businesses; in the Russian Federation, it is 11%, while in many foreign countries the interest rate is 5%. At the same time there is a decline of 25% in lending.

At the next stage of the study, there has been made a comparison of the volume of grants issued and the number of small and medium-sized enterprises in the Russian Federation from 2014 to 2018 (Table 2). The growth rate for this indicator is 73.1%, which demonstrates an insufficient level of stimulation of the development of small and medium-sized industrial enterprises and the advisability of managing this process.

Table 2: Data on the volume of allocated grants and the number of enterprises in the Russian Federation

Year	The amount of grants for state support to small and medium-sized industrial enterprises, - X	The number of small and medium-sized industrial enterprises – Y
2014	20 800 000	258 895
2015	19 815 042	249 909
2016	19 374 822	250 905
2017	18 528 287	257 941
2018	11 124 625	189 224
Growth rate, %	53.5	73.1

Source: Federal State Statistics Service of the Russian Federation. - grant volume, number of enterprises - [Electronic resource] -Access mode. — URL: http://www.gks.ru.

To analyze the relationship between the amount of grant financing and the number of small and medium-sized industrial enterprises, the Pearson correlation coefficient has been calculated: X- The amount of grants for state support of small and medium-sized industrial enterprises, thousand rubles; Y - "the number of small and medium-sized enterprises."

As a result of calculations by formula 1, the value of the Pearson coefficient is 0.97, which indicates a strong relationship between the two indicators and their direct relationship. Thus, financing of small and medium-sized industrial enterprises and grant support directly affects the development of small businesses, i.e. first hypothesis is confirmed.

The authors address the second hypothesis: the indicator "ease of doing business" is a stimulant for a group of indicators: "global competitiveness" and "level of innovative development". In order to study this thesis, the authors have similarly defined the relationship between these indicators.

To confirm or refute the second hypothesis, the authors have analyzed the popular international ratings: 1. The Doing Business report, 2. The Global competitiveness rating, rating of countries of the world by the innovation index.

The Doing Business report, which is annually compiled by the World Bank and the International Finance Corporation, characterizes the level of creation of favorable conditions for doing business in different countries; in other words, it is the ease of doing business index. The rating covers 189 countries and consists of 10 indicators, the less, the better the conditions for doing business.

In 2018, New Zealand occupies the first place, Singapore- the second place, Denmark- the third place, Russia takes only the 35th place, but one can note positive trends. Compared to 2012, the situation has improved by 88 positions.

Table 3: Statistical data of Russia on ratings

Year	The Doing Business report- X	The Global competitiveness rating- Y1	Rating of countries of the world by the innovation index - Y2
2012	123	66	56
2013	120	67	51
2014	112	64	62
2015	92	53	49
2016	62	45	48
2017	51	43	43
2018	35	38	45
Change, %	81.6	42.5	19.7

Source: Doing Business - a global study and the accompanying rating of countries around the world in terms of their creation of favorable business conditions - [Electronic resource] -Access mode. - URL: http://russian.doingbusiness.org/en/rankings. The Global Competitiveness Report - Global Competitiveness Rating - [Electronic resource] -Access mode. - URL: https: //web.archive.org/web/20141210040419/http: //www.weforum.org/issues/global-competitiveness. Global innovation Index - Rating of the countries of the world by the innovation index - [Electronic resource] -Access mode. - URL: https://www.wipo.int/publications/ru/details.jsp?id=4330.

The next indicator under study, the Global Competitiveness Rating, compiled by the World Economic Forum, measures the level of citizens' well-being. According to 2018 data, Switzerland occupies the first place, Singapore -the second place, Finland - the third place; Russia occupies the 38th place, while its rate has improved by 28 positions.

According to the international statistics, a study has been conducted on the competitiveness of small and medium-sized industrial enterprises in ten countries. Competitiveness indicators included such elements as: price, quality or innovation (table 4).

Table 4: Small and Medium-sized Enterprise Competitiveness Indicators in Ten Industrialized and Developing Countries

Indicator	Great Britain	Brazil	The USA	Germany	France	Russia	Spain	China	Italy	Japan
Price	3.3	3.53	3.24	2.85	3.15	3.27	3.16	3.40	3.09	2.97
Quality	3.67	3.5	3.60	3.89	3.44	3.45	3.38	3.16	3.40	3.28
Degree of innovation	3.49	3.43	3.47	3.42	3.22	3.12	3.23	3.11	3.22	3.00
Recognition	3.48	3.50	3.28	3.17	3.40	3.22	3.20	3.07	3.22	2.79
Delivery time	3.43	3.51	3.19	3.75	3.24	3.30	3.30	3.31	3.25	3.31
Level of service	3.58	3.36	3.53	3.85	3.34	3.30	3.27	3.09	3.11	2.87
Personnel	3.32	3.22	3.14	2.55	3.00	3.01	3.07	3.44	2.92	2.77
General level	3.47	3.44	3.35	3.35	3.26	3.24	3.23	3.23	3.17	3.00

The global innovation index based on the methodology of the INSEAD International School (France) is calculated on the basis of two groups of indicators: available (existing) resources and conditions for innovations; practical results of innovations.

The leaders in this indicator are: Switzerland, Sweden, the Netherlands, the USA and Great Britain. Russia takes 45th place (the position has been improved by 11 places over the study period).

To analyze the second hypothesis, according to which the indicator “ease of doing business” is a stimulant for a group of indicators: “global competitiveness” and “level of innovative development”, the authors have defined the relationship between these ratings in a similar way by the Pearson coefficient. The following results are obtained: the correlation coefficient between the rating of “ease of doing business” and the rating of global competitiveness is 0.9907, the correlation between the rating of “ease of doing business” and the rating for innovation index is 0.7943.

However, in general, according to the results of the study, it can be concluded that the reduction in the number of small and medium-sized industrial enterprises in the country is directly related to the financial support tools, and the development of small business in turn affects the socio-economic development of the country as a whole.

At the present time, existing programs to support small and medium-sized businesses are poorly developed both at the state and regional levels. This is mainly due to the lack of dissemination of information on forms of state support; thus the result of surveys of representatives of small and medium-sized businesses, shows that 79% of respondents heard about forms of state support, but only 7% of respondents (mainly from the agricultural industry) used these forms. This proves the necessity of a general popularization of various forms of state support for small and medium-sized enterprises. It is necessary to expand the sources of informing entrepreneurs about existing support programs and the areas within which they can be implemented. It is also worth not only making such information more accessible, but also giving a kind of “advertising” to foundations and companies that are ready to provide entrepreneurs with financial support for a promising project. At the moment, such advertising is not given everywhere and for everyone. A vivid example is the “You are an Entrepreneur” program, which covers mainly educational institutions through a course of lectures from entrepreneurs. However, billboards with business lecturers now can be noticed on the streets of cities during the program.

The analysis of the number of registered representatives of small and medium-sized businesses (table 5) shows a positive trend in all categories. Nevertheless, one can notice the Central Federal District takes the first positions in all quantitative indicators, but at the same time, the farther the region moves away from the central part of the Russian Federation, the smaller the number of registered representatives of small and medium-sized businesses is. This situation is quite logical, since the Central Federal District possesses more resources and opportunities for creating a small business. However, state programs to support small and medium-sized enterprises are currently aimed at creating favorable conditions for development, regardless of the region; one can take part in them in absentia.

Table 5 : the Dynamics of Registered Small and Medium Enterprises in 2018 in the Russian Federation

Territorial units	Total	Legal Entities				Individual Entrepreneurs			
		Total	Micro-enterprises	Small enterprises	Medium enterprises	Total	Micro-enterprises	Small enterprises	Medium enterprises
The Russian Federation	6170963	2917371	2661202	236495	19674	3253592	3225786	27 460	346
The Central Federal District	1928175	1053243	958 864	86 411	7 968	874 932	868 626	6 219	87
The Northwest Federal District	716 973	398 966	365 728	30 925	2 313	318 007	315 571	2 406	30
The Southern Federal District	717 402	217 921	198 485	17 930	1 506	499 481	495 962	3 487	32
The North-Caucasian Federal District	203 163	50 614	45 743	4 439	432	152 549	151 724	815	10
The Volga Federal District	1099717	49 7647	450 917	43 314	3 416	602 070	595 639	6 349	82
The Ural Federal District	52 791	250 843	230 103	19 228	1 512	277 948	275 199	2 715	34
The Siberian Federal District	711 469	333 478	306 297	25 277	1 904	377 991	374 153	3 787	51
The Far Eastern Federal District	265 273	114 659	105 065	8 971	623	150 614	148 912	1 682	20

Source: Federal Tax Service, Unified Register of Small and Medium Enterprises - [Electronic resource] -Access mode. — URL: https://ofd.nalog.ru/statistics.html

The authors suggest considering the rating of the effectiveness of state grant support by federal districts (table 6). This will give a broader picture of the effectiveness of state support for small and medium-sized enterprises in the federal districts of the Russian Federation.

Table 6: the total rating of the effectiveness of state support of small enterprises in the Federal districts of the Russian Federation

№	Indicator	The rating of Federal Districts							
		1	2	3	4	5	6	7	8
1	**Federal Districts**	**The Siberian Federal District**	**The Northwest Federal District**	**The Central Federal District**	**The Southern Federal District**	**The Volga Federal District**	**The Ural Federal District**	**The Far Eastern Federal District**	**The North-Caucasian Federal District**
2	The percentage of small businesses in the total set of entrepreneurial business structures.%	56.6	54.31	30.21	52.07	48.14	50.88	48.82	39.08
3	The percentage of employees in small enterprises.%	15.9	19.4	17.7	13.9	16.8	15.7	15.7	8.1
4	Percentage of ongoing small enterprises support programs.%	6.08	5.82	5.72	5.5	5.43	11.5	4.56	5.14
5	The degree of effectiveness of small enterprises	Effective	Effective	Effective	Effective	Effective	Medium effectiveness	Medium effectiveness	Ineffective

Source: MCC. Microfinance Fund NSO [Electronic resource] - Access mode. — URL: https://www.microfund.ru/

According to table 6, it is clearly seen that the activities of small and medium-sized industrial enterprises are directly dependent on the level of state support. It can be concluded that in most regions, and especially in the North-Caucasian Federal District, it is necessary to strengthen measures and apply effective instruments of state support.

The analysis of the largest grantors in the Russian Federation for the period 2016-2018 (table 7) has shown that the largest amount of money was operated by such grantors as the “League of the Health of the Nation”, the “National Charitable Foundation”, and the “Zhnanie” Russian Association.

Table 7: The largest grantors of the Russian Federation

Firms	2016		2017		2018	Total, mln rubles
	The first competition (№115-po 2016) mln rubles	The second competition (№348-po 2016) mln rubles	The first and the second competitions (№11-po 2017) mln rubles	The third competition (№243-po 2017) mln rubles	The three competitions (№79-po 2018) mln rubles	
League of the Health of the Nation	570	-	474	350	519	1 913
National Charitable Foundation	500	25	474	200	585	1 784
the "Zhnanie" Russian Association.	320	25	400	250	695	1 690
Russian Youth Union	320	-	340	200	695	1 555
Civil dignity	-	200	500	-	528	1 228
ISEPR Fund	110	-	275	-	422	807
Institute of Civil Society Problems	500	-	235	-	-	735
Union of Pensioners of Russia	-	-	-	-	415	415
Union of Women of Russia	-	-	-	-	365	365
General Fund of the Competition	2 320	250	2 698	1000	4 228	10 496

Source: Bulletin of NKOs - information resource center of NKOs - reports - [Electronic resource] -Access mode. - URL — URL: https://vestnik-nko.ru/press-tsentr/biblioteka-nko/biblioteka-12/
Thus, in connection with a sharp increase in the volume and dynamics of the grants distribution, one could expect a significant increase in interest in obtaining state support for organizations close to the authorities, NPOs.

Therefore, beginning and experienced entrepreneurs can conclude that at the moment both the state and private investors are ready to sponsor promising business ideas. This is shown by the amounts of money allocated for grant support. However, it can be noticed that many amounts of subsidies and grants do not change for several years and remain fixed, which does not have a very positive effect on the development of small and medium enterprises. Prices are growing every year; that is why it will be possible to implement less and less points of a business plan for the allocated grant every year.

Conclusions

After the calculations and analysis, it was revealed that the number of small and medium-sized enterprises is growing depending on the increase in the amount of grants allocated for their support; as well as an improvement in the ease of doing business index leads to improved global competitiveness and economic development in terms of innovation. For a stable increase in the effectiveness of state support, it is necessary to improve the municipal component of this system. Support programs at this level are currently unstable and do not bring the desired results.

Assessing the quality of the provided state support for the development of small and medium enterprises in Russia, the main attention should be paid to the information coverage of all participants of the business environment. Currently, weak indicators include 1) the amount of costs to overcome administrative barriers; 2) distribution and availability of credit resources. This was clarified by statistical indicators of the number of small and medium-sized industrial enterprises and the amount of taxes received by the state budget for 2016-2018. From the point of view of the country's economic development, grant support was most successful in 2017, when there was the largest

amount of financing for three years and the largest amount of taxes paid; 3) the number of inspections by the regulatory authorities.

The creation and maintenance of small and medium enterprises leads to an improvement in the economic situation in the country, since such enterprises perform significant macroeconomic tasks, among which the most relevant are: treatment of social issues; increase in the revenue component of budgets through taxes at the municipal level; increase of the flexibility of the state economy and reduce of the reaction rate to market fluctuations; increase in the share of participation of small and medium-sized companies in the structure of the domestic market of goods and services; increase in the level of employment of the population and the standard of living in general.

According to the rating of directions in business development, the three leaders have been defined: 1) social entrepreneurship; 2) scientific, technical, innovative entrepreneurship; 3) entrepreneurship in the sphere of agriculture.

Based on the foregoing, it can be concluded that the effective regulation and promotion of the development of small and medium-sized businesses is one of the key priorities of the state at this stage of economic development.

Acknowledgement

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The Influence of Digital Economy Transformation on Organization Project Management

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Abstract

The article is devoted to research of influence of digital transformation of economy on project management of the organization. The basic purpose - revealing of specificity and principles of project management of the organization in the context of digital transformation of economy. Achievement of the set purpose has predetermined the decision of following problems: to prove high penetration of digital technologies in all areas of society life; to analyze State support measures of digital economy development of leading countries; to investigate level of digital economy development of countries on the basis of the rating approach, and introduction and use of information and communication technologies in activity of the organizations. In the article were used general scientific methods of comparative analysis, methods of rating estimation. As a result of research, the authors identified basic principles of project management of the organization in the context of digitalization of economy.

Keywords: Digitalization, Digital Transformation, Project Management.

Introduction

In today's world, the digital transformation of socio-economic and production processes is actively carried out in the conditions of transition to a new technological mode. At present, there are six levels of development of productive forces, i.e. the technological stage, reflecting a set of related productions with the same technical level and synchronous development. At the same time, transition from one mode to another is closely linked to scientific and technological progress and transformation of social thinking based on accelerated emergence of new technologies. The modern world is characterized by the transition to the fifth technological mode, the specifics of which is the active introduction in all spheres of life of information and communication technologies, nano- and biotechnology, genetic engineering, new types of energy and materials, high humanities technologies. For the Russian Federation, the transition to this mode is based on the development of priority areas of science and technology. Transition to the fifth order implies individualization of production and consumption in the conditions of globalization, rapid growth of communication speed and movement. At the same time, qualitative transformations of the above-mentioned technologies and human capital are prerequisites for the formation of the sixth technological mode. Its essence can be broadly described through intensive development of individualization of production and consumption, creation of materials and organisms with predetermined properties, sharp reduction of energy and material intensity of production to improve the quality of life. At the same time, the formation and development of technological patterns is carried out on the basis of digitalization of all socio-economic processes, in the conditions of digital economy development.

Scientific works of such scientists as A.V. Babkin (Babkin A. & et al, 2019), S.D. Bodrunov (Bodrunov S. & et al, 2019), Y.V. Vertakova (Vertakova Y. & et al, 2020; 2019), A.E. Karlik (Karlik A. & et al, 2019), V.A. Plotnikov (Plotnikov V. & et al, 2019), A.V. Polyanin (Polyanin A. & et al, 2019) and others are devoted to research of digital economy problems. The term "digital economy" can be presented as an important component of economic relations, which uses the global Internet network, cellular communications and other information and communication technologies (ICT) for its implementation. Digital economy focuses on the development of an economy based on new methods of generating, processing, storing, transferring data, as well as digital computer technologies - digital economy. Examples and analysis of successful digital transformations are presented in published works on the digitalization of the economy of such scientists as Matt C., Hess T., Benlian A. (Matt C. & et al, 2015), Wiesbock F. (Wiesbock F. & et al, 2016), Karapetyants I., Kostuhin Y., Tolstykh T., Shkarupeta E., Krasnikova A. (Karapetyants I. & et al, 2017). This accumulated research experience shows that it is from the transformations or transformations of specific areas and businesses in the country that the GDP of the digital economy grows and develops, digital leaders grow.

Results and Discussion

Cloud and other digital technologies that store and analyze continuous data flow are already changing the nature of many industries. The active development of the Internet, its further penetration into all areas of society should be taken into account at the state level to justify the strategic direction of the economy, which, in particular, is defined in the China Development Strategy "Made In China 2025" (MIC 2025), which aims to make China a world leader in production. At the same time, the first of the ten priority directions of China's economic development, indicated by the State Council, is information technology of the next generation (Fig. 1).

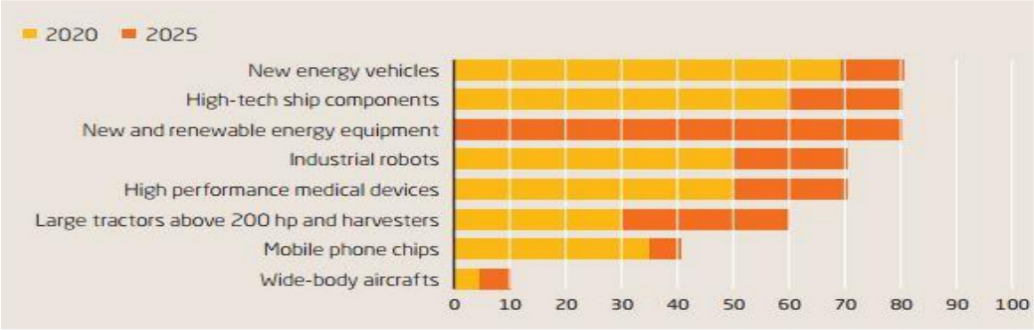

Fig. 1: Made in China 2025 aims at substitution. Semi-official targets for the domestic market share of Chinese products (in per cent)

Source: Just Wubbeke, Mirjam, Meissner, Max J. Zenglein, Jaquline Ives, and Bjöm Conrad, (2017)"Made in China 2025: The making of a hight-tech superpower and consequences for industrial companies" URL // https://www.uschamber.com/sites/default/files/final_made_in_china_2025_report_full.pdf

In particular, MIC 2025 notes that "active use of the Internet contributes to the digital development of the Chinese economy and society. "The development of information technology, including cloud computing, large volumes of data, e-commerce and Internet of Things (IoT)," which will play an important role in the future development of MIC 2025 industry. Information and communication technologies (ICTs) form the basis on which all future innovative solutions will be built. Embedded systems and global networks are the two main drivers of technological progress in ICT. Embedded systems are already playing a central, though invisible, role in our lives.

In the "smart, networked world", due to the Internet of things and services, the fourth industrial revolution will be felt in all key areas. This transformation is leading to the emergence of smart grids in energy supply, sustainable mobility of strategies (smart mobility, smart logistics) and the development of smart health care. In a production environment, a vertical working network, continuous design and horizontal integration across a network of increasingly intelligent products and systems have been established to move to the fourth industrialization level - "Industry 4.0".

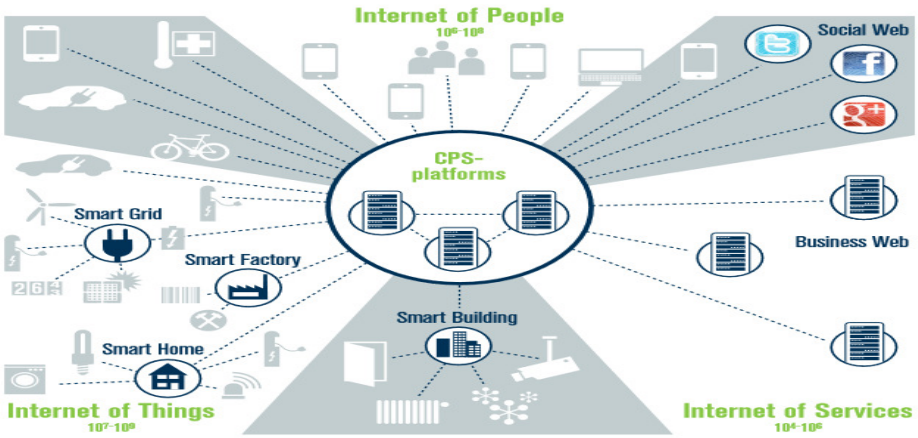

Fig. 2: The Internet of Things and Services – Networking people, objects and systems

Source: Recommendations for implementing the strategic initiative Industrie 4.0 (2013) Securing the future of German manufacturing industry Final report of the Industrie 4.0 Working Group. URL // https://www.din.de/blob/76902/e8cac883f42bf28536e7e8165993f1fd/recommendations-for-implementing-industry-4-0-data.pdf

Professor Henning Kagermann, President of Acatech's National Academy of Science and Manufacturing, spokesman for the Communication Promoters Group of the Industrial-Scientific Research Alliance and co-chairman of the Industries 4.0 Working Group, says, "The Internet of Things is paving its way into production. The Machine-to-Machine communication model is transforming factories into decentralized management. The embedded software directs the flexible production flow of the smart enterprise, allowing complex products of small volumes to be produced in the most cost-effective way. The new generation of auxiliary industrial systems with the help of augmented reality and multimodal interaction will help factory workers to work in conditions of complex cyberphysical production and activate new forms of cooperation of digital social media.

Industrial Internet of Things (IIoT) refers to the expansion and use of the Internet of Things (IoT) in industrial sectors and applications. Focusing on communication between machines (M2M), BIG data and machine learning, IIoT enables enterprises and businesses to increase the efficiency and reliability of their operations. IIoT covers industrial applications including robotics, medical devices and software-defined manufacturing processes. IIoT goes beyond conventional consumer devices and the interconnection of physical devices typically associated with IoT. What makes it great is the intersection of information technology (IT) and operating technology (OT). OT refers to the networking of operational processes and Industrial Control Systems (ICS), including Human Machine Interfaces (HMI), Supervisory Control and Data Acquisition Systems (SCADA), Distributed Control Systems (DCS) and Programmable Logic Controllers (PLC). IT and OT convergence provides the industry with greater system integration in terms of automation and optimization as well as better visibility of the supply chain and logistics. Monitoring and management of physical infrastructure in industrial operations such as agriculture, healthcare, manufacturing, transportation, and utilities is simplified by the use of intelligent sensors and actuators, as well as remote access and management.

In the context of the fourth industrial revolution, called Industry 4.0, IIoT is an integral part of the transformation of cyberphysical systems and production processes using large data and analytics.

As part of the implementation of Presidential Decree No. 204 dated May 7, 2018 "On National Goals and Strategic Development Tasks of the Russian Federation for the Period until 2024", including the task to ensure accelerated introduction of digital technologies in the economy and social sphere, the Government of the Russian Federation formed a national programme "Digital Economy of the Russian Federation" on the basis of the programme "Digital Economy of the Russian Federation". Within the framework of the Federal project "Digital Technologies" it is envisaged to support Russian high-tech companies - leaders developing products and platform solutions for digital transformation of priority sectors of the economy and social sphere.

Further to the implementation of planned measures of state support for the digital economy development of the leading countries, a study of the development level of the digital economy of countries based on the rating approach was conducted.

IMD World Digital Competitiveness Ranking is made in three directions: "Knowledge" (quality of education and science), "Technology" (regulatory environment, financial capital in the IT industry, the state of Internet and communication technologies) and "Future readiness" (level of readiness to use digital transformation). The 2019 IMD World Digital Top 10 countries are shown in Figure 3.

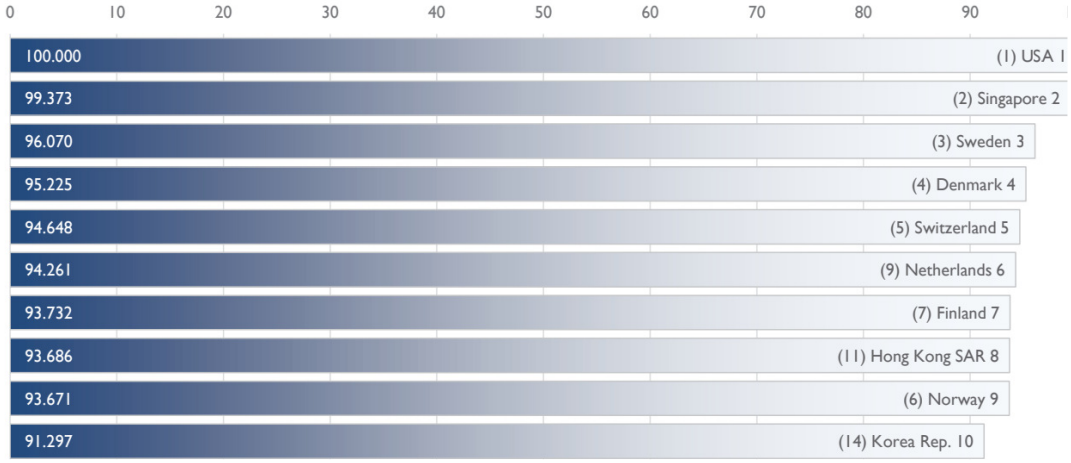

Fig. 3: Top-10 in the 2019 IMD World Digital

Source: The 2019 IMD World Digital URL // https://www.imd.org/wcc/world-competitiveness-center-rankings/world-digital-competitiveness-rankings-2019/

The first place in the overall standings went to the USA, the former leader of the ranking Singapore moved down to the second position. Then come Sweden, Denmark, Switzerland and Norway. Compared to the previous version of the list, Russia moved up two lines and took the 40th position out of 63. Russia's weak points, according to the authors of the rating, are in the legislation on research and protection of intellectual property rights, in the level of financing of the IT industry (including venture capital) and high investment risks, as well as in "attitudes to globalization" and the ability of businesses to adapt to changes.

Global Competitiveness Report 2019 noted that governments must better anticipate the unintended consequences of technological integration and implement additional social policies that support the population during the fourth industrial revolution. The report shows that some countries with strong innovation potential, such as South Korea, Japan and France, or with growing opportunities, such as China, India and Brazil, need to improve their skills base and the functioning of their labour markets (Figure 4).

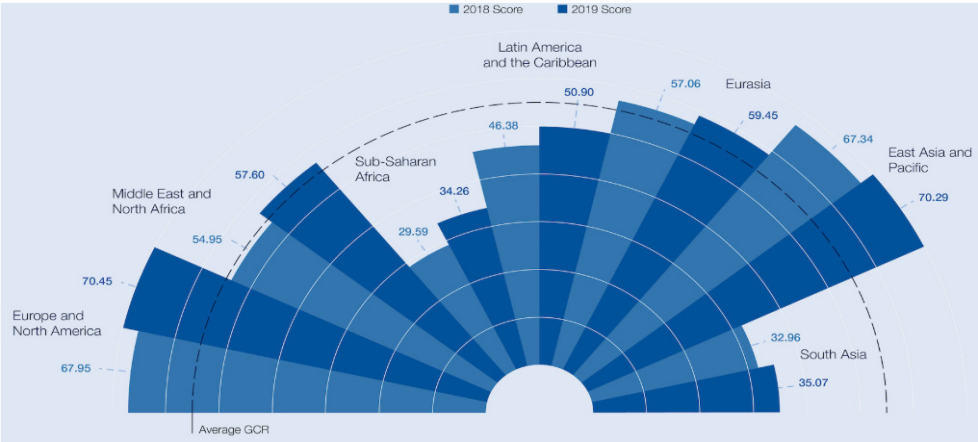

Fig. 4 : Speed of technological adaptation of legal framework of states to digital business models, 2019.

Source: Global Competitiveness Report 2019 URL // https://www.weforum.org/reports/how-to-end-a-decade-of-lost-productivity-growth

Based on how the legal framework in their countries adapts to digital business models, only four G20 countries are in the top 20: USA (1st place), Germany (9th place), Saudi Arabia (11th place) and Great Britain (15th place), China ranks 24th in this category.

According to the results of Bloomberg Innovation Index 2020, the first place in the ranking in 2020 was taken by Germany, which surpassed South Korea due to the decline in productivity in the Asian country (in this category it fell from 18th to 29th line). Germany took the lead in value-added production, high technology and patent activity. Russia moved up one place in the ranking of the world's most innovative economies and was ranked 26th, ahead of Malaysia. The data was released in January 2020. ING analyst Carsten Brzeski says that the lack of innovation in higher education leads to "growing concern," especially as the world economy is increasingly shifting towards services and production.

The top 10 countries of the Bloomberg Innovation Index 2020 ranking are shown in Figure 5.

2020 Rank	2019 Rank	YoY Change	Economy	Total Score	R&D Intensity	Manufacturing Value-added	Productivity	High-tech Density	Tertiary Efficiency	Researcher Concentration	Patent Activity
1	2	+1	Germany	88.21	8	4	18	3	26	11	3
2	1	-1	S. Korea	88.16	2	3	29	4	16	5	11
3	6	+3	Singapore	87.01	12	2	4	17	1	13	5
4	4	0	Switzerland	85.67	3	6	14	10	17	3	19
5	7	+2	Sweden	85.50	4	16	19	7	13	7	18
6	5	-1	Israel	85.03	1	31	15	5	32	2	7
7	3	-4	Finland	84.00	10	15	9	14	24	9	10
8	11	+3	Denmark	83.22	7	24	6	8	31	1	24
9	8	-1	U.S.	83.17	9	27	12	1	47	29	1
10	10	0	France	82.75	13	39	16	2	20	17	8

Fig. 5: Top 10 countries in Bloomberg Innovation Index, 2020

Source: Bloomberg Innovation Index 2020 URL // https://www.bloomberg.com/graphics/2015-innovative-countries/

The Institute of Statistical Research and Knowledge Economy (ISRKE) of the National Research University Higher School of Economics has developed the Business Digitalization Index (hereinafter - the Index) to provide an integral assessment of the level of digitalization of the business sector. It characterizes the speed of adaptation to digital transformation, the level of use of broadband Internet, cloud services, RFID-technologies, ERP-systems, inclusion in electronic commerce of business sector organizations. The Index is calculated for Russia and European countries, the Republic of Korea, Turkey and Japan. The leading position among these countries is occupied by Finland with the Index value of 50 points (Fig. 6). Next come Belgium (47), Denmark (46), Republic of Korea (45). Russia (28 points) is on a par with such Central and Eastern European countries as Bulgaria, Hungary, Poland and Romania.

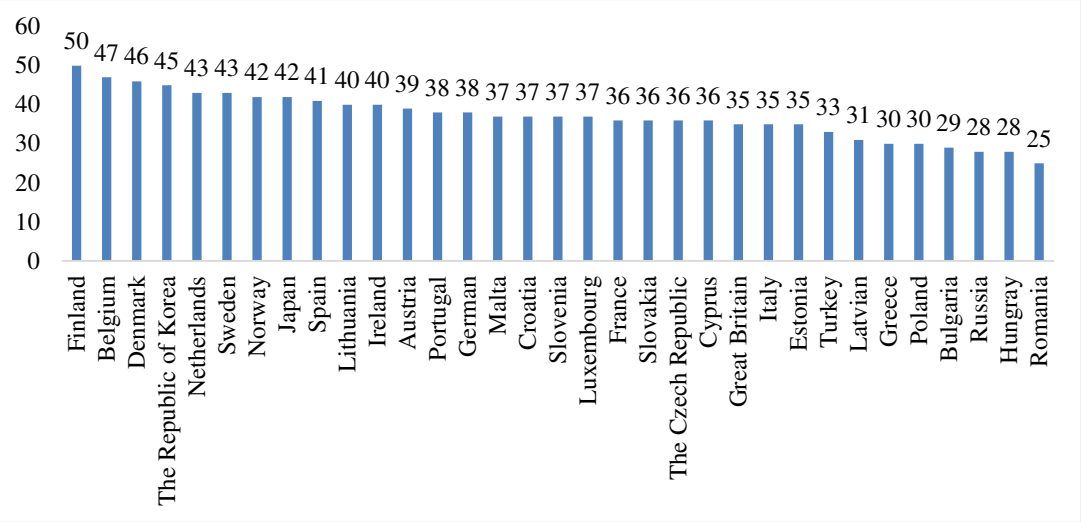

Fig. 6: Index of business digitalization, 2019

Source: Business Digitalization Index 2019. Institute for Statistical Research and Knowledge Economy (ISRKE) NRU HSE URL //https://issek.hse.ru/data/2019/02/27/1193920132/NTI_N_121_27022019.pdf

The analysis of intensity of using separate technologies in our country, taken into account at calculation of the Index, shows, that broadband access to the Internet is used by 82% of organizations, cloud services - 23%, ERP-systems - 19%, electronic sales - 12%, RFID-technologies - 6% (Table 1). The gap between Russian indicators and similar data for Finland, which has the highest Index value, ranges from 9 to 43 percentage points. The lowest gap is recorded for e-sales (9 percentage points) and RFID (17) and the highest for cloud services (43).

The Digital Economy and Society Index (DESI) is a composite index that summarizes relevant indicators on the performance of digital technologies in Europe and tracks the evolution of EU member states in the area of digital competitiveness. Ireland has the highest score on the Digital Integration Index, followed by the Netherlands, Belgium and Denmark. Bulgaria, Romania, Poland and Hungary have the lowest score (Figure 7).

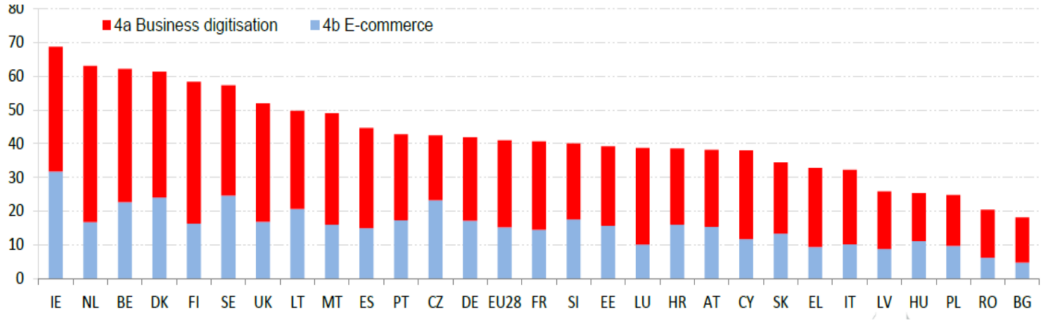

Fig. 7 : Digital Economy and Society Index (DESI) 2019, Integration of Technology

Source: Digital Economy and Society Index (DESI) 2019 URL // https://ec.europa.eu/digital-single-market/en/news/digital-economy-and-society-index-desi-2019

The EU members most actively using e-commerce opportunities are Ireland, Sweden and Denmark, while the Netherlands and Finland are leaders in adapting and implementing e-business technologies.

The different segments of the ICT sector (from telecoms to the manufacture of computers) tend to be the most digitised sectors of the economy. However, other sectors such as travel agencies and the media sectors are also highly digitised. Some sectors are still impervious to digital changes: for example, in the construction sector only 6.5 % of the enterprises have a high or very high DII, while for transport and storage almost 10 % of enterprises have high or very high DII. The distribution of the DII by economic activity is similar across EU countries. Denmark, Finland and Sweden are over performing in many of the sectors. Some positive exceptions of higher digitisation exist in the following sectors: "travel agency; tour operator reservation service and related activities" (Slovenia, Lithuania, Romania, Hungary, Estonia, the Netherlands and Czechia), "professional scientific and technical activities" (Finland, Slovenia and Lithuania), "real estate activities" (Finland, the Netherlands and Ireland) and "transport and storage" (Malta).

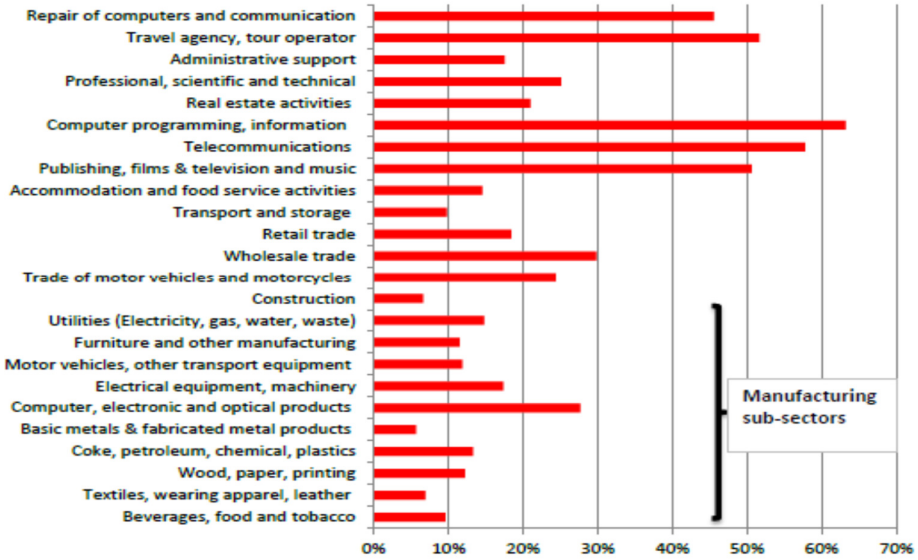

Fig. 8: Enterprises with high or very high digital intensity by economic activity, EU, 2018 (% of enterprises)

Source: Digital Economy and Society Index (DESI) 2019 URL // https://ec.europa.eu/digital-single-market/en/news/digital-economy-and-society-index-desi-2019

The adoption of digital technologies varies strongly according to company size. There are still many areas for SMEs, where opportunities for digitization can be exploited.

Large enterprises have a scale advantage, thus 75 % of them employ internal ICT specialists. The share of SMEs employing ICT specialists decreased slightly (1.6 percentage points) during the last six years, however the share of SMEs where ICT tasks were carried out by external personnel increased since 2015 (1.7 percentage points) Electronic information sharing through Enterprise Resource Planning (ERP) software is much more common in large companies. SMEs are active on social media (47 % use any type of social media, 2017) and, to a limited extent, they try to exploit e-commerce opportunities by selling through online marketplaces (6.5 % of SMEs versus 8.3 % of large enterprises). Nevertheless, there are many technological opportunities yet to be exploited by SMEs such as cross-border ecommerce, cloud services and customer relationship management.

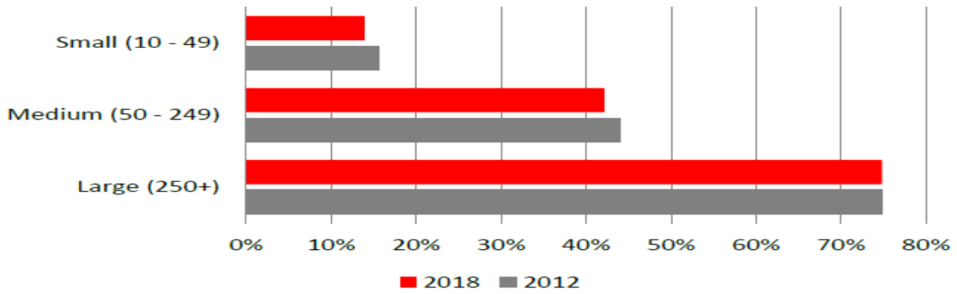

Fig. 9: Enterprises employing ICT specialist, EU, 2012-2018, (% of enterprises)

Source: Digital Economy and Society Index (DESI) 2019 URL // https://ec.europa.eu/digital-single-market/en/news/digital-economy-and-society-index-desi-2019

Orientation on innovations assumes not only creation of products demanded by the market, possessing new qualitative differences, or introduction of process allowing appreciably more effectively to reach necessary results. This is also the very ability to change, and to do it quickly in the conditions of digitalization of the economy. In this regard, the study of the specifics of project management in the era of digital economy is relevant. In opinion of the director of business applications department of the integration decisions center of company RedSys A. Semin from the point of view of design management projects of digitization and digital transformation differ nothing essential from each other. In his opinion, digitalization is the automation of individual business processes, and digital transformation is a set of digitalization projects that translate key business processes of the customer into a digital format.

Conclusions

Unlike digitalization projects, digital transformation is not a single act, but a continuous process that changes the way we do business to one extent or another. As a result of digital transformation, the dependence of business on uninterrupted operation of IT systems is increasing many times, and this requires rethinking approaches to building the entire software and hardware stack and the underlying IT infrastructure. Also it is necessary to mean that after end of the similar project of ways of returning to old business processes can't be or its cost can appear unacceptable.

The basic principles of project management remain basic also in the conditions of digital transformation as they prescribe and fix the need in the project office for constant monitoring, adjustment and adaptation of plans and tasks taking into account the specification of the original goals in an unstable environment. The basic principles are becoming more flexible, knowledge and competencies are essential to the success of the project, but they will not be enough. Project management must be refined in efficiency and ergonomics to the level of the tasks to which it applies. Basic principles such as planning, monitoring, teamwork remain. In a digital transformation

project it makes sense to pay special attention to risk management, including technological risks, taking into account a significant innovation component. For effective work with uncertainty and minimization of negative risks it is required to organize project management correctly. Change management as one of principles of classical design management, and following it will help to solve problems in the conditions of global updating of requirements and the purposes of projects in the conditions of digital transformation.

The so-called hybrid approach becomes relevant when it is recommended to bet on the symbiosis of the management model of the Stage-Gate Process type in the organization of project phases, which are logically combined works in the course of which some final result is achieved, and practices of the Scrum type, which allow to organize the effective work of a group of heterogeneous specialists within a short period of time. Thus, in the course of the project the advantages of different management models are used and "an important task is the seamless integration of these approaches within a single project", - believes Ilya Vinokurov (Svarni, P., 2019)

Project management becomes very flexible. At initial introduction it is necessary to adhere to the traditional approach which sets rigid frameworks on time of introduction and functional filling of system.

The study is allowed:

- a reasonable degree of penetration of digital technologies in all spheres of society;

- analyze measures of state support for the development of the digital economy;

- to study the level of development of the digital economy of states on the basis of the rating approach, as well as the activity of using and using information and communication technologies in the activities of organizations.

Thus, the main goal of the research that was achieved was achieved.

Acknowledgments

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Problems and Prospects for the Development of Digital Public Administration

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Abstract

The vast majority of government agencies and organizations actively implement and use information technology in their practice. It should be noted that the level of innovation diffusion in the public sector is still lower than in commercial business structures. This is due, first of all, to a certain inertia inherent in the traditional system of state and municipal government, especially at the initial stages of reform, the desire to maintain the stability of the existing structure, as well as considering innovations as a destabilizing factor. At the same time, it is important to fully understand the fact that the process of creating an electronic state should not act as an end in itself, since the priority goal in this process is to improve the quality of services provided, as well as the benefits derived by citizens, the public, representatives of the business community, and organizations in process of interaction with authorities. The transfer of managerial functions to the information environment as a result of the implementation of the E-Government concept will allow authorities to actively interact with other departments and solve not only current operational tasks much faster and more efficiently, but also to implement long-term programs and projects in various sectors of the economy and social sphere, making maximum use of the whole range of opportunities that will become available as a result of informatization of state and municipal government. The purpose of this article is to consider the problems and prospects for the development of digital public administration.

Keywords: Digitalization, Public Administration, E-Government, Information, Telecommunication Technologies.

Introduction

In our dynamic age, innovations in the provision of electronic state and municipal services are very relevant, which are now very popular and allow making the interaction between government structures, citizens and organizations more high-quality and comfortable.

The transfer of managerial functions to the information environment will allow the authorities to actively interact with other departments and to solve not only current operational tasks much faster and more efficiently, but also to implement long-term programs and projects, making maximum use of the whole range of opportunities that will become available as a result of state informatization and municipal government. The obvious advantage of converting public services to electronic form is the reduction of administrative barriers between the executive bodies and local governments that provide services, on the one hand, and citizens and organizations that need them, on the other hand.

Until recently, issues related to the provision of state and municipal services in electronic form were not adequately reflected in scientific research. This was primarily due to the insufficient level of development in our country of information and telecommunication technologies necessary to create information services that could provide high quality and convenience for users in the interaction of citizens with authorities. Nowadays, modern information technologies have become an integral part of the life of each of us, and with their widespread distribution, including in the field of management, the topic of converting state and municipal services into electronic form has become one of the most discussed.

The purpose of this article is to consider the problems and prospects for the development of digital public administration.

The theoretical foundation for comprehending the digital age, as well as the waves of digitalization of state administration, are considered in the works of Dunleavy & Hood (1994), Dunleavy & Margetts (2015), Helen Margetts & Dunleavy (2013), issues of digital government, its open architecture are devoted to the works of Fishenden and Thompson (2013). The study of open data and big data in the development of the digital era of the public administration is devoted to the research of Card (2015), Aggarwal (2016), while Höchtl, Parycek and Schöllhammer (2016) emphasize the increasingly important role of big data in the process of making government decisions. The problem of digital government also is one of the current problems in the Russian literature. The theoretical interpretation of the administrative paradigm of the state and the bureaucracy transformation that contributes to the crisis state of the modern state administration is devoted works of Barabashev (2016); open data as a new instrument of interaction between the state and society, tasks and prospects for the implementation of open data in Russia are considered in works of Babkin (2018), Dmitrieva (2014), Plotnikov (2018), Polyanin (2017), Vertakova (2019), Vidyasova (2014), and etc.

Problem Statement

Today, the Russian Federation is going through a “transitional” period from e-government, where in assessing the effectiveness of public administration, special attention was paid to adapting public services to the needs of individual citizens (their groups), to the stage of formation of a digital government, in which special attention is paid to issues of openness, transparency, and quality of governance and interaction, trust issues to authorities.

However, it is worth noting that the leaders in building e-government (Great Britain, Australia, South Korea and Singapore) have not been able to achieve full-scale digitalization today and switch to the digital government by default, which implies a digital interaction format and the maximum avoidance of paper circulation.

Today, the main requirement in building a digital government is to study the possibilities of moving from paper documents to records in authoritative databases. In this regard, the problem of data confidentiality and the accuracy of the processed information is becoming particularly relevant. In its solution, it can be very useful to use the technology of distributed data storage - the blockchain, the introduction of which will allow solving two key problems: preserving the history of changes and guaranteeing the authenticity of the entered data, as well as the identity of the data for all participants of the decentralized platform.

The creation of a national blockchain system will create a full-fledged platform for digital government, consisting of trusted basic information resources, personal identifiers of citizens and government bodies. The basis of this initiative can be successfully proven existing basic components of e-government infrastructure, such as a unified portal of public services and municipal services, a federal registry of public services, a unified system of identification and authentication, a system of interagency electronic interaction, a unified system of regulatory and reference information and state information system on state and municipal payments.

The main goal of implementing projects on digitalization of public administration is the rationalization and integration of work and production processes, the effective management of data and information, improving the efficiency of the provision of public services online, as well as expanding communication channels to involve and empower people (UN, 2014). However, a unified

understanding of the criteria and parameters of digitalization has not yet been developed either in the Russian Federation or internationally.

Results and Discussion

The research analyzed key trends in the development of digital government and examined global trends in the provision of electronic services based on the E-Government Development Index (EGDI).

One of the key indicators of the development of the information society in the countries of the world is the rating of the UN e-government. Since the UN's first attempt to mark the state of e-government in 2001, it has developed rapidly. Studies from year to year emphasize a constant positive global trend towards an increase in the level of development of e-government. 40 countries received a rating of "very high", with EGDI from 0.75 to 1. For comparison: in 2003 there were only 10 such countries, and in 2016 only 29. Since 2014, all 193 member states provide an online presence in one form or another.

The percentages of groups of countries with different EGDI levels for 2016 and 2018 are shown in Figure 1.

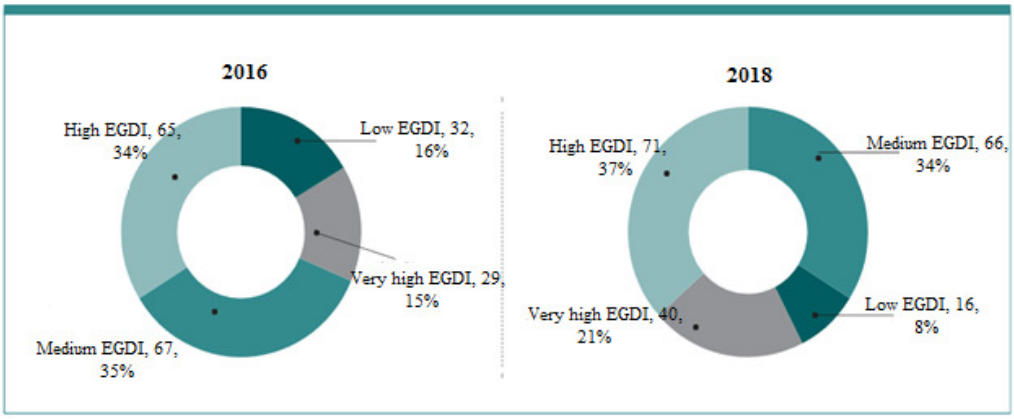

Fig. 1: Grouping of the analyzed countries by the e-government development index for 2016 and 2018

In 2018, there is an increase in the number of countries with high and very high EGDI or values from 0.50 to 1.00. As a result, the percentage of countries with high and very high levels of e-government development cumulatively reached 58% or almost 2/3 of the total number of UN member states.

The list of countries with the highest ratings in the field of e-government development according to the results of the Study for 2018 is presented in Table 1 together with the corresponding values of EGDI and its three components - OSI, TII and HCI. All 29 leading countries with very high EGDI ratings in 2016 remained in the same group in 2018.

Table 1: Leading countries in e-government development, 2018

Position	Position change 2018/2016	The country	Level of evolution	(EGDI)	Online services	ICT infrastructure	Human capital
1	+8	Denmark	Very high	0,915	1	0,7978	0,9472
2	-	Australia	Very high	0,9053	0,9722	0,7436	1
3	-	The Republic of Korea	Very high	0,901	0,9792	0,8496	0,8743
4	-3	Great Britain	Very high	0,8999	0,9792	0,8004	0,92
5	+1	Sweden	Very high	0,8882	0,9444	0,7835	0,9366

6	-1	Finland	Very high	0,8815	0,9653	0,7284	0,9509
7	-3	Singapore	Very high	0,8812	0,9861	0,8019	0,8557
8	-	New Zealand	Very high	0,8806	0,9514	0,7455	0,945
9	+1	France	Very high	0,879	0,9792	0,7979	0,8598
10	+1	Japan	Very high	0,8783	0,9514	0,8406	0,8428
11	+1	USA	Very high	0,8769	0,9861	0,7564	0,8883
12	+3	Germany	Very high	0,8765	0,9306	0,7952	0,9036
…	…	…	…	…	…	…	…
32	**+3**	**Russia**	**Very high**	**0,7969**	**0,9167**	**0,6219**	**0,8522**

The positions of the Russian Federation in the ranking of countries with the highest level of development of e-government were considered. A UN study is conducted every two years. Over this period, Russia has risen in this list in three places - from the 35th in 2016 to the 32nd in 2018. Our country also rose from 34th to 23rd place in the group with the highest level of citizen involvement by the criterion of electronic participation of citizens in the management and adoption of government decisions using ICT. In addition, Russia strengthened its position in the ranking of telecommunications infrastructure, gaining 0.6219 points in 2018 against 0.6091 two years earlier. The dynamics of the place in the overall ranking is determined by the dynamics of the relative position of the country in these three groups of indicators. An analysis of this dynamics shows that the main contribution to increasing Russia's place in 2018 was made by a significant increase in the Online Services Index (from 0.7319 in 2016 to almost the maximum value of 0.9167 in 2018), according to which Russia entered the group of 25 countries leaders (in 2016, it closed together with Brazil a group of 38 leading countries), while the index itself in Russia is now in 11th place (in a number of countries the values of this index are the same), rising from 22nd place in 2016. The online services index is calculated on the basis of a survey of official government portals and websites, which is carried out during the preparation of the next rating.

After reviewing the global development trends of e-government and the positions of the Russian Federation in the global ratings of countries, we analyzed the main indicators characterizing the efficiency of the process of converting state and municipal services into electronic form within the country. The results of regular monitoring of the quality of the provision of electronic services by the constituent entities of the Russian Federation were summed up on May 28, 2019 at a meeting of the Government Commission on Digital Development. Monitoring was carried out by the RANEPA IT Research and Expertise Center at the request of the Ministry of Economic Development of Russia in August-November 2018. In the course of the study, experts analyzed 1,143 priority services provided by executive authorities of the constituent entities of the Russian Federation and local governments on the Unified portal gosuslugi.ru and regional portals of state and municipal services. Services were examined for compliance with the provisions of the current legislation establishing requirements for the provision of state and municipal services in electronic form, in particular, Decree of the Government of the Russian Federation No. 236 "On requirements for the provision of electronic state and municipal services" of March 26, 2016.

Based on the monitoring results, we can conclude not only about the increase in the number of electronic services provided in the regions compared to the previous year (1100 and 1143 services, respectively), but also about improving the quality of their provision (Fig. 2). Successfully generate and send a statement to the department was possible in 89% of cases (1021 services). However, it was revealed that in almost half of the cases (49% or 556 services), the application was not properly reviewed by the department, and the user did not receive any feedback. Therefore, departments should pay particular attention to ensuring that applicants are correctly and timely informed, reflecting the actual progress of service provision.

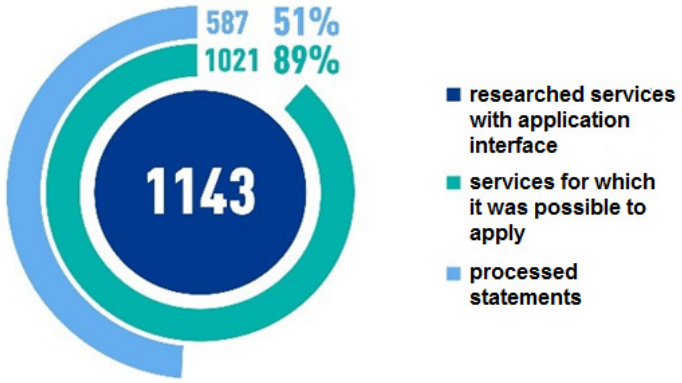

Fig. 2: Results of monitoring public services

Regarding information on the procedure for providing services hosted on portals, it was revealed that often the user was not provided with full information (Fig. 3). The completeness of information on all regional and municipal services averaged 87%. That is, only 600 investigated regional and municipal services provided comprehensive information.

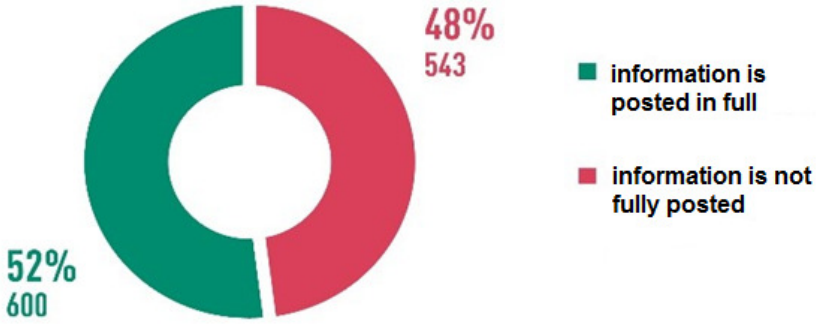

Fig. 3: Providing information on the procedure for obtaining regional and municipal services

It should be noted that users are not always provided with the opportunity to complete all the necessary procedures in electronic form. In particular, users do not always have the opportunity to make an appointment with the department, pay a fee, etc. Thus, the departments responsible for the provision of services do not fully comply with the applicable regulatory requirements.

Based on the analysis, it can be concluded that citizens use official websites of authorities mainly in order to receive information when they need to contact the appropriate state authority. This is a positive trend, since it is precisely this function that can be called one of the main ones for information portals of government bodies. The results of a survey of residents of the Kursk region regarding the level of reliability and usefulness of official websites of authorities allow us to draw certain conclusions. Firstly, the degree of attendance of the sites under investigation remains low, which is undoubtedly a negative trend. Secondly, the level of trust in information published on official websites should be brought to an extremely high level. Thirdly, it is necessary to take into account the opinion of users about the shortcomings of such sites and eliminate them in a timely manner. And, finally, to develop and improve the structure and interface of official sites, introduce innovative forms of communication between the population and government, as well as raise the rating for the use of electronic services.

Thus, having examined the main indicators characterizing the development of the system of providing public services in electronic form, at the global and Russian levels, you can get a holistic view of the state of e-government and make appropriate recommendations on the development of a comprehensive strategy to improve the quality and accessibility of electronic public services.

We should not lose sight of the fact that in the process of introducing modern information technologies into the sphere of state and municipal government, the bodies carrying out reforms in this direction, one way or another, encounter a number of difficulties at different stages of this complex process. These problems are the result of the inevitable opposition of the external and internal environment to the active introduction of innovations in the traditionally established system of government. All existing problems in this area for a more orderly and systematic consideration and their subsequent solution can be classified by source. According to this criterion, the following problems are identified that arise in the process of introducing new technologies, including in the process of converting public services into electronic form: managerial, technological, organizational and social. Consider each of these types in more detail.

1. To the managerial barrier, first of all, there are significant differences between the authorities of various sectors and levels of management in terms of the quantity and quality of information technologies used in everyday activities, the implementation results of which are only departmental in nature. Another manifestation of this problem is the lack of a single body responsible for the transition to e-government. This problem made itself felt in the early stages of a systematic transition to the provision of public services in electronic form. The powers in this area are distributed between the Ministry of Communications and Mass Media and the Ministry of Economic Development, the competence of which includes certain issues directly related to the informatization of public administration. Within the framework of the Government Commission on the use of information technology to improve the quality of life and the conditions for doing business, federal and regional authorities are coordinated, as well as specific actions of individual ministries and departments. This situation led to an interdepartmental struggle for control over budget funds allocated for the implementation of the transition to the electronic state, and inefficient work in this direction due to duplication of functions. Another factor that significantly impedes the process of improving the provision of public services in electronic form, especially at the initial stages of reform, is the inertia of the traditionally established administration system, as well as the unwillingness of some corrupt officials to lose the possibility of generating income by illegal means.

2. Technological barriers are manifested in the fact that the infrastructure of open access to the official websites of authorities and other means of information and reference support and services for citizens and organizations are currently underdeveloped for a complete transition to the provision of electronic services. Obtaining public services in most cases requires a personal appeal of the applicants to the appropriate authorities, which leads to large time and financial costs and creates significant inconvenience. In addition, all the necessary infrastructure has not been prepared that can ensure the information security of electronic forms of interaction between authorities, among themselves, with citizens and organizations, which also does not contribute to the transition to an electronic state.

3. Organizational problems, in turn, are due to the lack of a single regulatory and scientific and methodological base that regulates in detail the process of providing state and municipal services in electronic form using modern information and telecommunication technologies. Currently, normative legal acts adopted in the Russian Federation regarding the transition to e-government are advisory in nature, rather than strictly regulating the activities on the widespread introduction of information technologies in state and municipal government processes. In laws, it is necessary to clearly define resources, implementation mechanisms and responsibility for the implementation of the concept. Until this is fully reflected in normative acts, there will be constant contradictions regarding the interpretation of official documents, which, in turn, significantly reduces their practical significance.

A separate consideration deserves the question of the development of relevant administrative regulations. The process of automation of public administration involves the restructuring of the organizational structure of government bodies of various levels of government that has developed over the years. That is why the review of existing and the development of new regulations acts as a paramount operational task in the conditions of informatization of public administration.

4. In this area there are social problems that impede the process of informatization of management. First of all, they include the low level of computer literacy of a significant part of the population, the lack of access points to the Internet, as well as the stereotypes prevailing in society. One of the main inhibiting factors hindering the comfortable use of modern information technologies in everyday life is the insufficient level of informatization of society. First of all, this refers to populated areas far from large cities, where in fact there are not only terminals, but also access to the Internet, which is especially necessary here, since it is not always convenient to travel several kilometers to the right authority to receive a public service. In addition, the majority of Russian society, like the authorities, are often too slow to accept any innovations, especially when it comes to information and telecommunication technologies. Therefore, even now, in the age of Internet technologies, a significant proportion of the population is not completely ready for fully electronic interaction with power structures, even in those areas where all the necessary conditions have already been created for this. We should not lose sight of the fact that over decades of interaction with various government agencies, certain stereotypes have emerged in society regarding the bureaucratic system, of which paperwork was an integral part.

In modern Russia, the vast majority of government agencies and organizations actively implement and use information technology in their practice. It should be noted that the level of innovation diffusion in the public sector is still lower than in commercial business structures. This is due, first of all, to a certain inertia inherent in the traditional system of state and municipal government, especially at the initial stages of reform, the desire to maintain the stability of the existing structure, as well as considering innovations as a destabilizing factor. At the same time, it is important to fully understand the fact that the process of creating an electronic state should not act as an end in itself, since the priority goal in this process is to improve the quality of services provided, as well as the benefits derived by citizens, the public, representatives of the business community, and organizations in process of interaction with authorities.

Conclusion

As can be seen from the above, the problems that impede the efficiency of the use of information and telecommunication technologies in the activities of government bodies are complex and cannot be solved at the level of individual government bodies. Therefore, to solve the complex of identified problems, it is necessary to implement a program-targeted approach to ensure the compatibility of state information systems, develop standards and technologies for their interaction.

The transfer of managerial functions to the information environment as a result of the implementation of the E-Government concept will allow authorities to actively interact with other departments and solve not only current operational tasks much faster and more efficiently, but also to implement long-term programs and projects in various sectors of the economy and social sphere, making maximum use of the whole range of opportunities that will become available as a result of informatization of state and municipal government. After all, all these processes and current trends in the field of computer technology are designed to make people's lives and activities more comfortable. That is why one should not stop there, do not stand still, but continuously move forward, develop in this direction and make every effort to further improve information technologies in the provision of state and municipal services and management in general for the benefit of our state and society. Putting this concept into practice and putting it into practice by the country's population will bring the system of providing state and municipal services to a new level, and it will force employees of state institutions to provide these services efficiently and on time.

Acknowledgment

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Statistical Modelling of Innovative Development of The European Union Countries and Russia

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Abstract

Crisis phenomena, complex external and internal economic conditions highlight the innovative component of the state economic entities modernization. One of the most important requirements of modern economic development is the need for innovation and the ability to innovate. This work is devoted to the innovative activity analysis of the European Union countries and Russia and their rating based on the integral innovative development index. The basis of the study was statistics for 2018, which allowed us to identify 16 indicators characterizing the level of states innovative development. These indicators are grouped into three blocks: “Socio-economic conditions of innovative activity”, “Scientific and technical potential” and “Innovative activity of organizations”. The obtained values of the integral index made it possible to divide the countries into 5 homogeneous groups, in each of which the strengths and weaknesses of innovative development were identified. The analysis of innovation indicators in the EU and Russia allowed us to formulate the main conclusions that reflect the innovation development level, as well as the specifics of main innovation types processes in the context.

Keywords: Statistics, Innovation, Integral Index, Rating, Clustering, FCM Clustering.

JEL Classification: C43; O30; O52

Introduction

In the conditions of international competition from not only economically developed countries, but also developing countries, increasing the innovative activity of enterprises and organizations is a necessary condition for further dynamic economic growth. There are various methods for evaluating innovative

development, which include various indicators that characterize the level of their innovative development. The methodology developed in the European Union for assessing the innovative development level includes 27 different indicators (EIS 2019). Data for 18 of the 27 indicators applied in the EIS 2019 are used to assess the innovative development of EU countries by region. In Russia, in order to assess the level of the subjects innovative development, a proprietary methodology has been developed based on a system of 29 indicators (AIRR, 2017), which is regularly updated. The methodology for assessing the level of innovative development of Russian regions, proposed by Bakhtin et al. (2017) contains 37 indicators, among which there are indicators that are not presented by official statistics. Due to historical, geographical, economic and cultural features, the European Union countries and Russia have differences in the innovative processes development. Therefore, for a comprehensive analysis of the main indicators structure characterizing the innovative potential of the state, it is necessary to divide countries into homogeneous groups. This allows you to strengths and weaknesses identify, determine the further development direction and improvement of the state innovative activities. The need for a differentiated approach to the regional development strategies development is reflected in research study by Gusev et al (2018), Khalimova (2016).

When conducting economic transformations, it is necessary to take into account the region existing specialization. The need to orient the region towards the use of local production is highlighted in studies Valentey et al. (2019), et al. Kolmykova (2017). Moreover, without the new production technologies at enterprises and organizations active introduction of and increasing their innovative activity, successful economic growth and the industrial production modernization are impossible.

Materials and Methods

The methodology for evaluating EU countries and Russian by the innovative development level is based on the Federal state statistics service of the Russian Federation (2019) official statistics published. The calculation of the proposed innovation index is based on 16 indicators system, which are grouped into three blocks that allow calculations of the corresponding sub-indices: "Socio-economic conditions of innovation activity", "Scientific and technical potential" and "Innovative activity of organizations". The choice of indicators is based on the availability of official statistics for all countries under consideration. Ranking is carried out for each of these indicators. The total integral innovation index is the average of the normalized all included in the rating indicators. The indicators system for the the final integrated innovation index formation of the EU and Russia is presented in table 1.

Table 1: Indicators System of the integrated innovation index

	Indicator Name	Measure Unit
1. Socio-economic conditions of innovation activity		
1.1	GDP per employed in the economy person	US dollar
1.2	Students quantity per 1000 population	human
1.3	Proportion of households with Internet access in the total households quantity	%
1.4	The proportion of organizations that used the Internet, in the total number of the business sector organizations	%
1.5	Percentage of organizations using broadband Internet access, in the total business sector organizations quantity	%
1.6	Percentage of organizations using cloud services in the total business sector organizations quantity	%
1.7	ICT Development Index	
2. Scientific and technical potential		
2.1	Domestic research and development costs as GDP percentage	%
2.2	The research and development staff quantity per 1000 the economy person	human

2.3	The publications in scientific journals indexed quantity in Web of Science, in 2014-2018	units
2.4	The citations in scientific journals quantity indexed in Web of Science, in 2014-2018	units
2.5	The patent applications for inventions filed in the country by national and foreign applicants quantity in 2017, per 1000 in the economy person	units
3. Innovative activity of organizations		
3.1	The proportion of organizations implementing technological innovations in the total organizations quantity	%
3.2	The proportion of organizations engaged in marketing innovation in the total organizations quantity	%
3.3	The proportion of organizations implementing organizational innovation in the total organizations quantity	%
3.4	The proportion of industrial production organizations engaged in technological innovation in the total organizations quantity	%

To the indicators used achieve comparability, the transition from absolute values to their normalized values by the formula was previously carried out:

$$\tilde{x}_i^k = \frac{x_i^k - x_i^{\min}}{x_i^{\max} - x_i^{\min}}, \quad (1)$$

$\tilde{x}_i^k$ – normalized value of the *i*-th indicator in the *k*-th country;

x_i^k – initial value of the *i*-th indicator in the *k*-th country;

$x_i^{\min}$ – minimum of the *i*-th indicator;

$x_i^{\max}$ – maximum of the *i*-th indicator.

Before performing normalization, a procedure was carried out to assess the asymmetry of each rating indicator relative to its average value. To smooth out the influence of extreme values on the final result with an asymmetric distribution, the value of each rating indicator was transformed according to the following rule:

$$\tilde{x}_i^k = \sqrt[r]{x_i^k}, \quad (2)$$

$\tilde{x}_i^k$ – the adjusted of the *i*-th indicator in the *k*-th country;

x_i^k – initial value of the *i*-th indicator in the *k*-th country;

r – the degree of adjustment (takes from 2 to 4, is selected so that the distribution asymmetry coefficient of the indicator is less than 0.5). For a symmetric distribution, the adjustment of the corresponding rating indicator is not carried out.

We give a sequence of stages in the formation of the final integral innovation index.

Stage 1. Formation of indicators of the innovation index system of the EU and Russia, the collection of statistical data.

Stage 2. Rationing of indicators according to formulas (1), (2).

Stage 3. The total integrated innovation index calculation as the average of the normalized all included in the rating indicators.

Stage 4. Ranking of the EU and Russia by the calculated total integral innovation index calculation.

Stage 5. Isolation of 5 groups of countries according to the innovative development level. The division of Russian regions by the level of innovative development into similar groups is proposed in the AIRR methodology (2017).To classify the EU and Russia participating countries, we define 5 groups according to the level of innovative development according to the following rule:

Group 1 – strong innovators. The innovation development index exceeds 140% of the average.
Group 2 – medium-strong innovators. The innovation development index is from 110% to 140% of the average, inclusive.
Group 3 – medium innovators. The innovation development index is from 90% to 110% of the average, inclusive.
Group 4 – medium-weak innovators. The innovation development index is from 60% to 90% of the average, inclusive.
Group 5 – weak innovators. The innovation development index is below 60% of the average.

Stage 6. The use of the fuzzy clustering algorithm for the automatic classification of the EU and Russia according to the innovative development level and comparison with the obtained at stage 5 results. The FCM (Fuzzy Classifier Means, Fuzzy C-Means) clustering algorithm assumes that all objects belong to all clusters with a specific membership function. Moreover, the clusters are represented by fuzzy sets and the boundaries between these clusters are also fuzzy sets. The degree of membership is determined by the distance from the object to the corresponding cluster centers. The FCM algorithm calculates cluster centers and new ownership of objects degrees. Fuzzy clustering is carried out according to three subindexes that define the set of input vectors x_1 = {Socio-economic conditions of innovation activity}, x_2 = {Scientific and technical potential}, x_3 = {Innovative activity of Organizations} and 5 allocated clusters v_j, $j = 1, \ldots, 5$. In this case, we assume that any vector x_i, $i = 1, \ldots, 3$ belongs to any cluster v_j with membership u_{ji}, moreover $0 \le u_{ji} \le 1$. For the membership function, the following normalization conditions are true:

$$\sum_{j=1}^{5} u_{ji} = 1, \forall\, i = 1, 2, 3,$$

$$0 < \sum_{i=1}^{3} u_{ji} \le 3, \forall\, j = 1, \ldots, 5.$$

The algorithm purpose is to minimize the sum of all distances weighted $\|x_i - v_j\|$:

$$\sum_{j=1}^{5} \sum_{i=1}^{3} u_{ji}^{q} \|x_i - v_j\| \to min, \tag{3}$$

q – fixed parameter before iterations.

Results

The final innovation development rating is the ranking result the EU and Russia in descending order. The ranking leaders are Finland, Germany and Denmark. The group of “strong innovators” also included the Netherlands and Sweden. The medium-strong innovators group includes seven EU: Belgium, Austria, France, Great Britain, Luxembourg, Ireland and Italy. The average innovators group is represented by five states: Portugal, Spain, Slovenia, Czech Republic and Estonia. The medium-weak innovators include eight EU: Lithuania, Greece, Croatia, Cyprus, Latvia, Malta and Poland. The weak innovators group according to the rating results are Slovakia, Hungary, Russia, Bulgaria and Romania. The distribution of countries according to the innovative development level is presented in Figure 1.

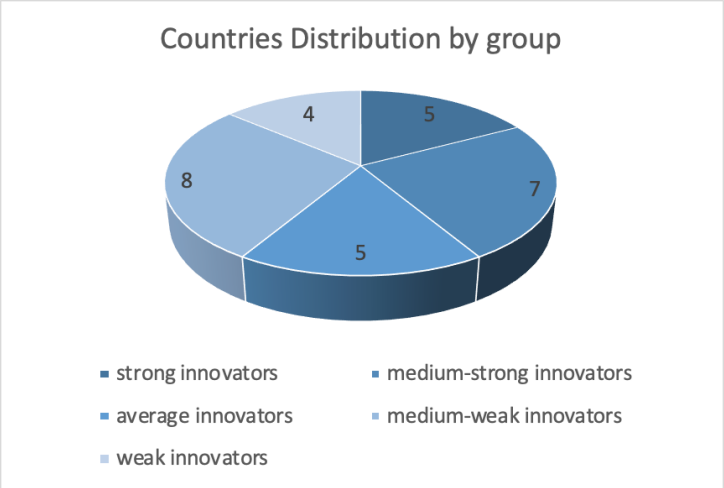

Fig 1. Countries Distribution by group

The final innovation development rating results are presented in Figure 2.

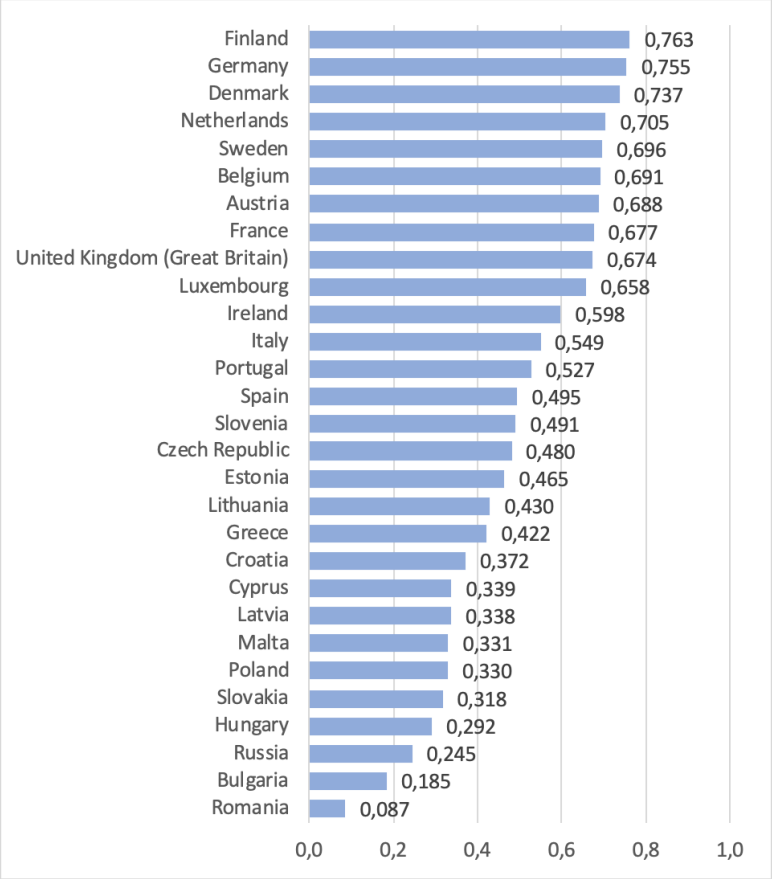

Fig 2. The Rating Results

The leaders in terms of the negative impact degree on the final position in the ranking are the indicators blocks "Socio-economic conditions of innovation activity" and "Scientific and technical potential". According to these indicators blocks, 15 states from the EU and Russia participating countries have sub-indices below their average values.

The average values comparison of all 16 indicators for the selected innovative development groups shows the development heterogeneity of the EU countries and Russia (Figure 3). As can be seen from Figure 3, a strong innovators countries group surpasses the rest of the countries in all indicators, with the exception of 1.1. "GDP per employed in the economy person" and 3.3 "The proportion of organizations implementing organizational innovation in the total organizations quantity".

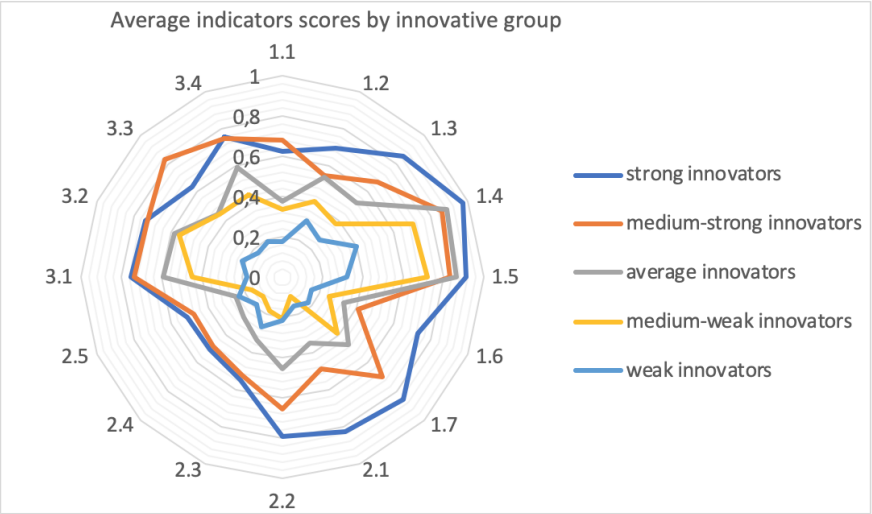

Fig 3. Average indicators scores by innovative group

Consider the strengths and weaknesses of the leading countries in the innovative development final rating. A comparison of the normalized indicators values that form the final integrated assessment is used in Figure 4.

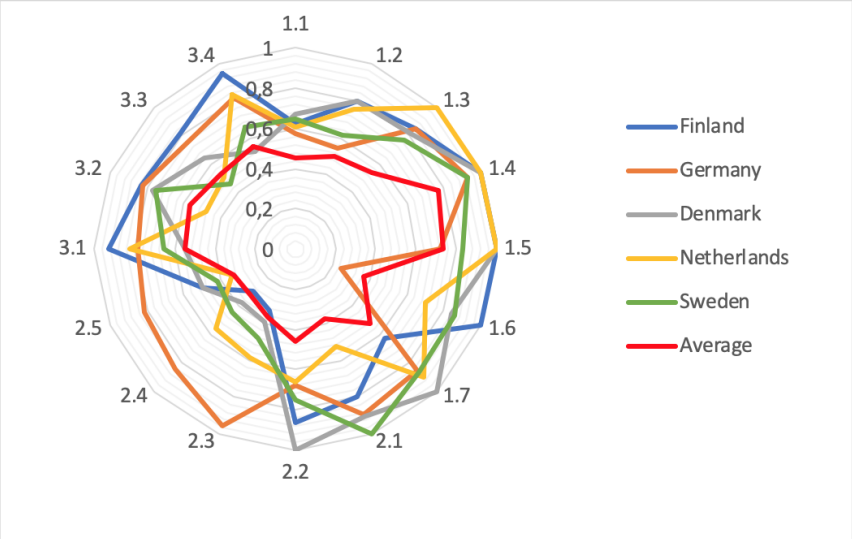

Fig 4. Comparison of relative values indicators of the rating leading countries

As can be seen from Fig. 4, for all countries strong innovators, with the exception of Germany, the weak side of innovative development are indicators such as 2.3 "The publications in scientific journals indexed quantity in Web of Science, in 2014-2018", 2.4 "The citations in scientific journals quantity indexed in Web of Science, in 2014-2018" and 2.5 "The patent applications for inventions filed in the country by national and foreign applicants quantity in 2017, per 1000 in the economy person". The

most strong side of the innovative development the leading countries is the indicators that form the block "Socio-economic conditions of innovation".

For all countries included in the group of strong innovators, all three main groups of indicators are uniformly developed, while for Germany, the indicator 1.6 "Percentage of organizations using cloud services in the total business sector organizations quantity" showed a value below its average. For Sweden, all rating indicators turned out to be higher than their average values, with the exception of the indicator 3.3 "The proportion of organizations implementing organizational innovation in the total organizations quantity". It should be noted that in the group of strong innovators among the 16 indicators presented, only 5 indicators show negative deviations from the average. So, according to indicators 2.3 "The publications in scientific journals indexed quantity in Web of Science, in 2014-2018" and 2.4 "The citations in scientific journals quantity indexed in Web of Science, in 2014-2018", the values of innovative Finland's development shows values below average. In terms of indicator 3.3 "The proportion of organizations implementing organizational innovation in the total organizations quantity", the values of innovation development sub-indices in the Netherlands and Sweden could not exceed their average value. According to indicator 3.4 "The proportion of industrial production organizations engaged in technological innovation in the total organizations quantity" did not allow to exceed the average value of this sub-index.

Consider the strengths and weaknesses of the final ranking of innovative development countries, which were in the groups of medium-weak and weak innovators. A comparison of the normalized indicators values that form the final integrated assessment is presented in Figure 5. As can be seen from Figure 5, for countries of weak innovators, except Russia, not one of the indicators exceeds its average value. In countries with medium-weak innovators, most indicators of all three blocks take values below their average.

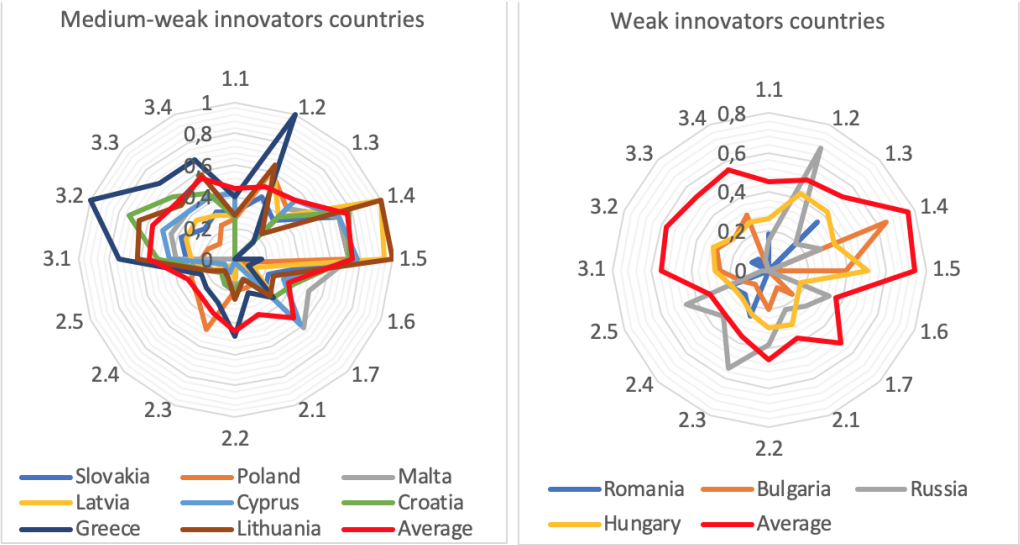

Fig 5. Comparison of relative values of the indicators medium-weak innovators countries and weak innovators countries

One of the key indicators characterizing the conditions for the innovation development is the cost of research and development. In the EU and Russia, there is a high variation in indicator 2.1. "Domestic research and development costs as GDP percentage". Figure 6 shows the distribution of internal research and development costs.

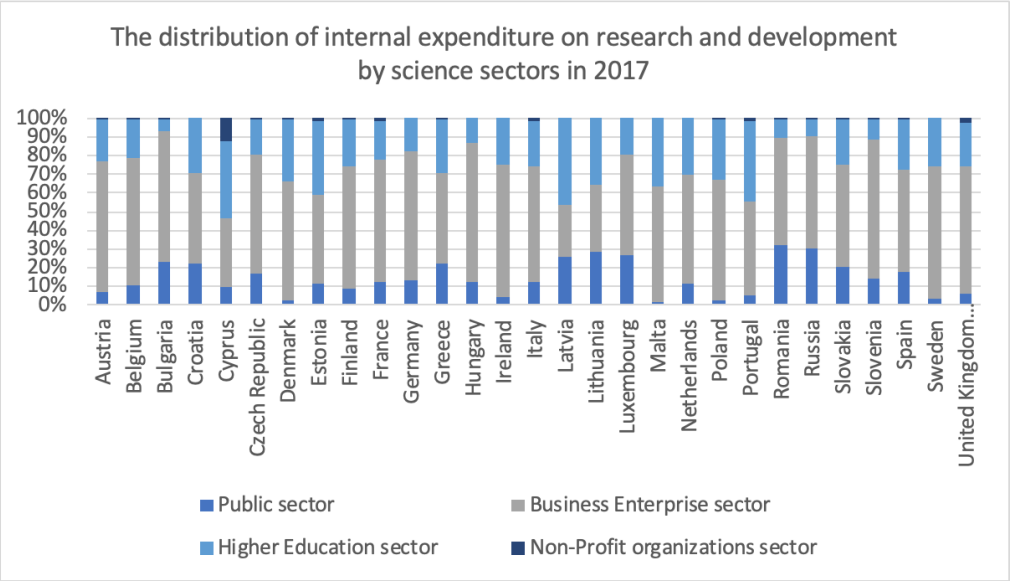

Fig 6. The distribution of internal expenditure on research and development by science sectors in 2017

Let us consider in more detail the positions of the EU and Russia in certain groups of indicators that form the system of indicators for the final integrated innovation index of the EU and Russia.

According to the indicator "Socio-economic conditions of innovation", the leaders group are Denmark, Netherlands, Finland and Sweden. The weak innovators group includes Greece, Russia, Bulgaria and Romania. According to the indicator "Scientific and technical potential" 10 EU countries were included in the group of strong innovators, the leaders among which are Germany, Great Britain and France. The weak innovators group are made up of 9 countries, including Estonia, Croatia and Lithuania. In the EU and Russia, there is a high scatter in the level of scientific and technological potential that characterizes the initial stage of the innovation life cycle. However, even with a developed infrastructure of innovation, a key problem for some states remains the technology transfer low efficiency. According to the indicator "Innovative activity of organizations" the following states are leaders in the level of innovative activity development: Finland, Belgium and Portugal. The leaders group strong innovators also included Austria, Luxembourg, Germany, Ireland and Greece. The country's rating is completed by weak innovators. This group includes 7 countries including Slovakia, Latvia, Hungary, Bulgaria, Poland, Romania and Russia. The distribution of EU and Russian countries by sub-ratings is presented in table 2.

Table 2: Distribution of EU countries and Russian countries by sub-ratings

Group	Countries Distribution by sub-rating "Socio-economic conditions of innovation activity"		Countries Distribution by sub-rating "Scientific and technical potential"		Countries Distribution by sub-rating "Innovative activity of Organizations"	
	Number of Countries	Countries	Number of Countries	Countries	Number of Countries	Countries
Group 1. Strong innovators	4	Sweden, Finland, Netherlands, Denmark	10	Italy, Belgium, Netherlands, Finland,	8	Greece, Ireland, Germany, Luxembourg,

				Austria, Sweden, Denmark, France, United Kingdom (Great Britain), Germany		Austria,, Portugal, Belgium, Finland
Group 2. Medium-strong innovators	8	Estonia, France, Germany, Austria, United Kingdom (Great Britain), Belgium, Luxembourg, Ireland	2	Spain, Luxembourg	6	Denmark, United Kingdom (Great Britain), Sweden, Netherlands, Italy, France
Group 3. Average innovators	6	Italy, Latvia, Czech Republic, Lithuania, Slovenia, Spain, Estonia	3	Czech Republic, Slovenia, Russia	4	Estonia, Czech Republic, Croatia, Lithuania
Group 4. Medium-weak innovators	7	Hungary, Croatia, Poland, Slovakia, Cyprus, Malta, Portugal	5	Hungary, Ireland, Greece, Poland, Portugal	4	Spain, Malta, Cyprus, Slovenia
Group 5. Weak innovators	4	Romania, Bulgaria, Russia, Greece	9	Malta, Cyprus, Latvia, Romania, Bulgaria, Slovakia, Lithuania, Croatia, Estonia	7	Russia, Romania, Poland, Bulgaria, Hungary, Latvia, Slovakia

The final ranking results of the EU and Russia by the level of innovative development and sub-ratings for the three selected indicators blocks are presented in Table 3.

Table 3: The Rating Results

Country	Integral Index of Innovation	% from the average	Group by Integral Index of Innovation	Rating by Integral Index of Innovation	Rating by Indicator 1	Rating by Indicator 2	Rating by Indicator 3
Finland	0,763	154,25%	1	1	3	7	1
Germany	0,755	152,71%	1	2	10	1	6
Denmark	0,737	149,04%	1	3	1	4	14
Netherlands	0,705	142,56%	1	4	2	8	11
Sweden	0,696	140,88%	1	5	4	5	12
Belgium	0,691	139,71%	2	6	7	9	2
Austria	0,688	139,19%	2	7	9	6	4
France	0,677	136,85%	2	8	11	3	9
United Kingdom (Great Britain)	0,674	136,24%	2	9	8	2	13
Luxembourg	0,658	133,03%	2	10	6	11	5
Ireland	0,598	121,03%	2	11	5	19	7
Italy	0,549	111,11%	2	12	18	10	10
Portugal	0,527	106,66%	3	13	19	16	3
Spain	0,495	100,08%	3	14	13	12	22
Slovenia	0,491	99,28%	3	15	14	14	19
Czech Republic	0,480	97,16%	3	16	16	15	17
Estonia	0,465	94,01%	3	17	12	21	18
Lithuania	0,430	86,99%	4	18	15	23	15
Greece	0,422	85,39%	4	19	26	18	8
Croatia	0,372	75,17%	4	20	24	22	16
Cyprus	0,339	68,56%	4	21	21	28	20
Latvia	0,338	68,39%	4	22	17	27	24
Malta	0,331	67,02%	4	23	20	29	21
Poland	0,330	66,78%	4	24	23	17	27
Slovakia	0,318	64,23%	4	25	22	24	23
Hungary	0,292	59,07%	5	26	25	20	25
Russia	0,245	49,60%	5	27	27	13	29
Bulgaria	0,185	37,44%	5	28	28	25	26
Romania	0,087	17,57%	5	29	29	26	28

We apply the fuzzy clustering algorithm of the EU and Russia. The input parameters are the number of allocated clusters v_j, j = 1, …, 5 and the sub-index vectors x_1 = {Socio-economic conditions of innovation activity}, x_2 = {Scientific and technical potential}, x_3 = {Innovative activity of Organizations}. The FCM algorithm results implementation are presented in Figure 7. The selected clusters and their centers are marked in different colors.

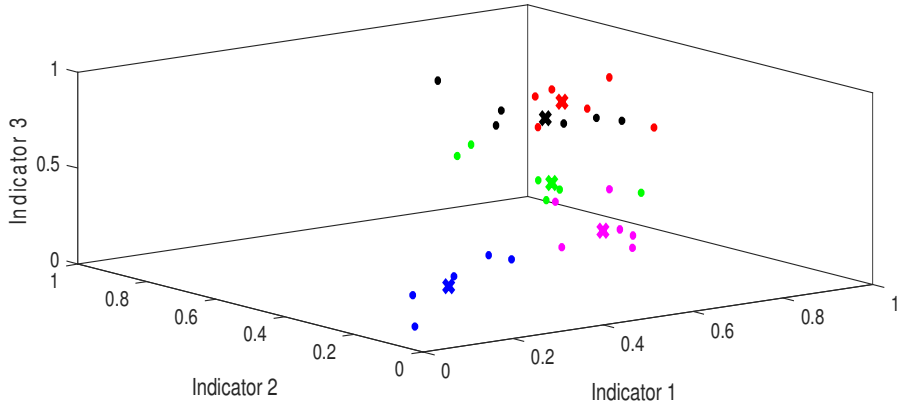

Fig. 7: Clustering result of EU countries and Russia by FCM method

Based on the fuzzy clustering results, we obtained cluster centers, a fuzzy membership matrix of vectors x_i, i = 1, …, 3 to each of the clusters v_j, j = 1, …, 5 and the objective function value, the minimum value of which was obtained at 31 iterations and is 0.4340. Table 4 shows the distribution of EU and Russian member states by cluster as a result of applying the FCM clustering algorithm.

Table 4: Distribution of EU countries and Russian by cluster as result of the FCM clustering algorithm

Group	Cluster center	Number of Countries	Countries
Group 1. Strong innovators	(0.7004; 0.5100; 0.8250)	6	Germany, Denmark, Netherlands, United Kingdom (Great Britain), France, Sweden
Group 2. Medium-strong innovators	(0.7574; 0.6331; 0.6622)	6	Austria, Belgium, Ireland, Luxembourg, Portugal, Finland
Group 3. Average innovators	(0.5465; 0.3392; 0.5331)	6	Greece, Spain, Italy, Slovenia, Czech Republic, Estonia
Group 4. Medium-weak innovators	(0.4805; 0.1049; 0.4149)	6	Cyprus, Latvia, Lithuania, Malta, Slovakia, Croatia
Group 5. Weak innovators	(0.2319; 0.2276; 0.1567)	5	Russia, Bulgaria, Hungary, Poland, Romania

As can be seen from table 4, the fuzzy clustering results differ from the rating results. Note that the rating leader – Finland – according to the FCM clustering results belongs to the second group - medium-strong innovators. This is easily explained by the fact that a positive influence on the final position in the ranking of countries on the development of innovative activity was exerted by the fact that for some indicators of the "Socio-economic conditions of innovation activity" group their absolute maximums were obtained. Finland showed maximum values for all indicators of the "Innovative activity of organizations". Among the strong innovators were Great Britain and France, which, according to the rating results, were in group 2 – medium-strong innovators. Austria, Belgium, Ireland and Luxembourg retained their positions, while Portugal improved its position and moved from the average innovators

group to medium-strong innovators. Greece and Slovakia also improved their overall ranking position and moved from group 4 to group 3 and from group 5 to group 4. Spain, Italy, Slovenia, Czech Republic and Estonia maintained their positions in the average innovators group, and Cyprus, Latvia, Lithuania, Malta and Croatia in the medium-weak innovators group. Among the weak innovators were Russia, Bulgaria, Hungary and Romania, while Poland lowered its final position and moved from group 4 to group 5.

Conclusion

Innovative development states problems may be associated with insufficient socio-economic conditions for innovation, among which are low investment attractiveness, lack of human and financial resources. Efforts to create innovative infrastructure coordination and improving the interaction of the state with educational and research centers, innovation financing infrastructure and innovative companies becomes a key task in implementing the innovation strategy. For this it is necessary: stimulating demand for innovative activity in the economy and the effectiveness of scientific research, creating the prerequisites and conditions for the formation of sustainable scientific and production cooperation links, innovation clusters and networks; creating favorable conditions for technological modernization of economic sectors based on advanced technologies and integration with world-wide complexes of technological innovations in order to create an innovation market for the research and development sector; the formation and implementation on the basis of public-private priority areas partnership for the development of science, engineering and technology, within which the competitiveness of individual economy sectors can be achieved mainly through national technological developments.

The analysis of indicators of innovation in the EU and Russia allowed us to formulate the main conclusions that reflect the level of innovation development, as well as the specifics of processes in the context of the main types of innovation. Based on the findings, it is possible to develop management recommendations that must be considered when stimulating innovation.

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Government Bonds and Their Role in Polish Economy

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Abstract

Government securities such as government bonds are considered as safe assets. The safe assets term is understood as securities that give a reliable, stable profit and, above all, which are guaranteed by the state. State securities give the government "fuel" to act (e.g. by stabilizing the state's liquidity). However, their supply is not dependent on demand, as is with the case of private securities, but on the financial needs of the state. In addition, the interest rate on state securities does not necessarily meet market expectations for safety assets. The purpose of this article is to present the issue of Polish treasury bonds (10 years government bonds) and their role in the economy. The author of the article will attempt to identify the determinants affecting profitability on Polish treasury bonds and relation between their profitability and public finance balance.

Keywords: Financial Security, Financial Stability, Government Bonds, Budget Deficit

Introduction

Treasury securities are a cumulative category of securities that is created by various types of financial instruments. From the point of view of this article, the most appropriate criterion for the division of state securities will be the criterion of their redemption. In the above context, it is worth to point out that treasury securities are divided into two groups. The legislator referring to the classical for financial science division of financial instruments into financial instruments specific to the money market (with maturity up to one year - up to 364 days inclusive) and to financial instruments characteristic of the capital market (with a maturity of at least year - at least 365 days).

The first category, known as short-term treasury securities, includes, in particular, securities such as treasury bills, while the second category consists of securities such as government bonds.

The purpose of this article is to present the issues of government bonds with their role they play in the Polish economy and the relationship between their profitability and the (Polish) public finance balance.

Tax competition in EU Member States - analysis of CIT tax rates

Focusing further considerations on government bonds, it is worth to start with a few introductory remarks. The legal act defining government bonds is the Public Finance Act. According to art. 92 paragraph 1 of the Public Finance Act. a government bond is a security offered for sale in the country or abroad, bearing interest in the form of a discount or interest rate. The above legal definition of a government bond indicates its most important features, which in practice individualize government bonds within the category of treasury securities. It should be noted, that government bonds are complex category, which includes various specific categories of securities. A common element for them is that they are issued by the State Treasury, they are based on monetary claims, they are issued for a period of not less than one year (at least 365 days) and are offered for sale in the country or abroad . Treasury bonds are type of debt securities in which the seller (State Treasury) borrows a given sum of money from the buyer of the bond and undertakes to return it within a predetermined time period. However, individual types of treasury bonds are distinguished by such elements as:

• the group of entities to which the bond purchase offer on the primary market is addressed;

• the method of their distribution on the primary market;
• the form of the cash benefit associated with the bond.

Government bonds are included in the collective category of treasury securities, and as a consequence they are characterized by the above-mentioned features that all treasury securities have. When personalizing treasury bonds as part of treasury securities, it should first of all be pointed out, that the treasury bonds is a security that has a monetary claim. Thus, the only entity that has the right to issue government bonds is the Minister of Finance. The cash benefit incorporated in the content of government bonds may take the form of a discount or interest rate. Government bonds may be offered for sale at home or abroad and may be issued as securities with an original maturity of not less than a year.

The mentioned above elements describing government bonds in the category of treasury securities indicate at the same time the possibility of flexible use of government bonds in the process of raising capital by the Minister of Finance to finance the medium and long-term needs of the Treasury. On the other hand, it should be emphasized once again that, in accordance with the regulations contained in the Public Finance Act, treasury bonds may be issued only within the limits specified in the content of the Budget Act. The combination of the above elements makes government bonds flexible from the point of view of the Minister of Finance and a safe way of raising foreign capital by the State Treasury from the investor's point of view.

In the above context, it is worth to emphasize that the considerations contained in the content of this publication will be devoted only to 10-year government bonds offered on the financial market.

Determinants of Government Bonds Yield

The purpose of making investments by business entities is to achieve specific material benefits in the future, related to the allocation of capital to another entity in temporary management. The measure of the effectiveness of implemented investments is the rate of return, informing about the proportion of capital allocated to the investment that will be returned to the investor in the form of profit. There are many ways to allocate financial resources to investments in the financial market. It should be noted, that the choice between alternative methods of allocating cash results are the sovereign decisions of investors. This chapter presents a set of factors affecting the profitability of 10-year government bonds. The presented scientific material is the result of author's own scientific research enriched by the synthesis of the results of scientific research raising the discussed issues by other scientists. It should be noted, that the factors listed below deter-mining the yield on government bonds can be also used to assess the profitability of other securities.

Government debt to GDP. In the opinion of many experts and investors, this feature is one of the key factors for government bonds yield. The deterioration of the financial situation of the state is associated with an increased demand for capital, which increases the interest rate on treasury bonds. In addition, an increase in debt leads to a worsening of the country's risk assessment. With higher risk, investors expect higher rates of return. Scientific research has confirmed this phenomenon (L. Oliveira, J.D. Curto, J.P. Nunes, 2012 and P. De Grauwe, Y. Ji, 2014). In addition, the high Treasury demand for capital, associated with an increase in interest rates on government bonds (or simply state securities), may cause the phenomenon of investment capital being pushed out of the private market to the state. Such a phenomenon will have an impact on the economic slowdown (J. Siwińska-Gorzelak, 2015).

Tax revenues in relation to GDP. This is another factor affecting government bond profitability, related to the ratio of public debt to GDP. Effective fiscal policy of the state - perceived as the ability to collect tax liabilities is important for assessing the country's ability to pay its debts, and thus affects the profitability of treasury bonds. Even a country with a low debt-to-GDP ratio may have problems with its debt servicing if its ability to collect tax liabilities is limited (J. Aizenman, M. Hutchison, Y. Jinjarak, 2013).

GDP dynamics. Lowering the GDP growth rate will result in an increase in government bond yields. The economic crisis will create uncertainty about the profits in the private investment market and lead

investors to allocate capital to government securities that are considered safer. In addition, as the economic downturn, the country may have problems with collecting taxes, and thus with debt service. **Inflation**. An economy with high inflation is becoming uncompetitive. High inflation is associated with high volatility of relative prices, which weakens the information base of financial institutions on which investors base their decisions. In addition, high inflation may cause a deficit, which is the reason for the increase in public debt (P. De Grauwe, Y. Ji, 2013). High inflation is accompanied by an increase in government bonds yield. It should be noted, that this trend is not clear. In the conditions of high economic growth, an increased level of inflation may not lead to an increase in government bond yields (P. Gajewski, 2014).

VIX index. The volatility index measures market expectations for S & P500 index volatility over the next 30 days. The high value of the VIX index is associated with the high volatility of the S & P500 index - both increase and decrease in the index, which may affect the yield on government bonds (Y. Duran, 2018). The VIX index is commonly called the fear index because it expresses investors' expectations of future returns based on their own (more or less accurate) premises. The increase in the value of the VIX index (implied volatility for the S & P500 index) indicates intensification of tensions in global financial markets.

CDS indicator[1]. Credit Default Swap is a derivative instrument functioning on credit markets. The purpose of CDS is to transfer the risk of insolvency of the debtor - the issuer of the underlying instrument. The underlying instrument may be, for example, government bonds. CDS is collateral in which the issuer (investment bank) can sell to the holder of the underlying instrument (e.g. government bonds) a "collateral" in the event of the debtor's insolvency. In this way, the bank accepts the risk of insolvency of the issuer of the underlying security, while the bond holder accepts some type of "insurance". At the same time, however, investors must pay an annual rate for such collateral - a percentage of the value of the hedged instruments. The price of CDS depends mainly on the perception by large players from the financial market of the risk that the issuer of the underlying instrument (e.g. Poland with its bonds) will not be able to pay interest on time (e.g. 10 years) and on the maturity does not repay the capital due. CDS may affect bond yields - as an indicator of the expected financial position of the underlying issuer. If big players put an increased risk of repayment of the country's debt, then the CDS contract rates will increase. The consequence of such a situation or accompanying phenomenon may be an increase in the demand of the capital hedge issuer, which may ultimately lead to an increase in government bond yields. This also applies to securities issued by companies, because the poor fiscal situation of the country increases the risk of unforeseen government actions in the field of taxation or freedom of economic activity. As a rule, the local currency is also weakening, which is a consequence of the increase in investment risk in a given country and the outflow of some portfolio investments.

Exchange rate. The exchange rate affects the rate of return on investment when the financial instrument in which the investor invests his financial resources (e.g. treasury bonds) is denominated in a currency other than the currency of the investor's country. Therefore, exchange rate changes mean that rates of return expressed in two different currencies are not the same. Exchange rate fluctuations can have positive or negative investment effects. If there is a depreciation of the exchange rate in which the collateral is expressed, the return on investment after conversion to another currency will be lower. In the event of appreciation of the currency in which the value of the financial instrument is expressed (treasury bonds), the potential profit of the investor will be greater. The exchange rate reflects the stability and strength of the economy (D. Maltritz, 2012).

Summing up the considerations on the factors determining the profitability of government bonds, it should be noted that the attractiveness of investing in government bonds depends on the overall economic situation and economic policy of the country. This applies in particular to the central bank's policy in the area of interest rates, exchange rates, tax and budget policy of the government, the expected money supply on the market, shaping individual balance of payments items as well as

[1] The Credit Default Swap is the research subject of article's author. The results of the research will be published in the near future.

inflation and growth of the economy. Political aspects are also important. Sometimes this field is the dominant factor in assessing the profitability of not only government bonds, but also other securities.

Budget Deficit and Government Bonds Yield

Government bonds are popular and effective financial instrument used by the Treasury to manage public debt and budget deficits. In this part of the article author decided to present the results of his own scientific research and prove the existence of a relationship between the level of budget deficit in Poland and the profitability of 10-year Polish government bonds. As mentioned earlier in the paper, interest on treasury bonds is a premium on investment risk undertaken by the investor. The profitability of government bonds, which are securities, also has an impact on the cost of servicing public debt (public debt) and the overall cost of capital in the economy.

The time range used in the survey is 2008-2018. The adoption of such a time period was dictated by the occurrence of the Global Financial Crisis in 2008, which was considered the appropriate benchmark for beginning proces of improving economic situation in the country and in the world. The characteristics of the budget balance for Poland and the profitability of 10-year government bonds are presented in the table below.

Table 1: The balance of the Polish budget in 2008-2018 and the profitability of Polish 10-year treasury bonds

Year	Balance	*R**	Year	Balance	*R**
2008	- 3.6%	6,07 %	2014	- 3,6 %	3,52 %
2009	- 7,3 %	6,12 %	2015	- 2,6 %	2,70 %
2010	- 7,4 %	5,78 %	2016	- 2,4 %	3,04 %
2011	- 4,9 %	5,96 %	2017	- 1,5 %	3,42 %
2012	- 3,7 %	5,00 %	2018	- 0,2 %	3,20 %
2013	- 4,2 %	4, 03 %			

** Yield on 10-year government bonds*

A preliminary analysis of the information contained in the table shows that in all years in the period under consideration the Polish economy generated a budget deficit. The highest deficit fell during the global economic crisis, which confirms that this situation has also affected the Polish economy. The slow exit from the economic crisis also illustrates the size of the budget deficit. The highest general government deficit falls in 2008 and 2009 - the summit years of the global economic crisis. Over time, the deficit falls. According to Eurostat, the general government deficit in Poland in 2018 was 0.2%. This is one of the lowest deficit results in the country's economic history (after 1989).

The table clearly shows that the highest interest rate on government bonds also falls during the global economic crisis. The growing demand for capital from the state coincides with the investors' expectation of higher rates of return on government bonds. As a result, the highest government bonds profitability was gained in 2009. The figure below graphically presents the considered issues.

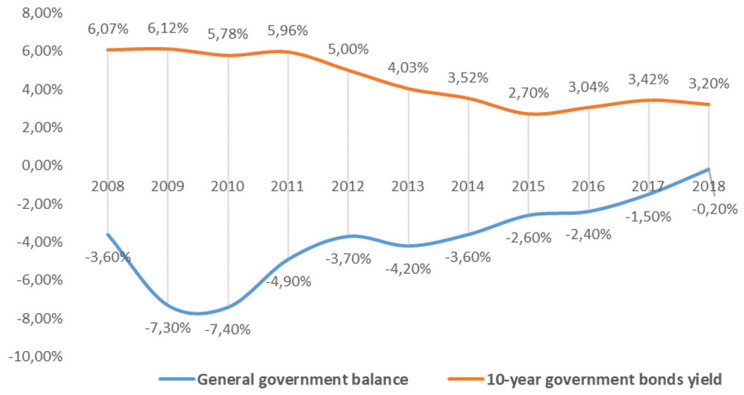

Fig. 1: Chart for data from Table 1

Graphical presentation of the data from Table 1 shows that at a first sight it can be stated that along with the decrease in the budget deficit in Poland in the years 2008-2018 the profitability of 10-year treasury bonds also decreased.

The figure below presents the distribution of data on the general government balance and government bonds yield over the considered period.

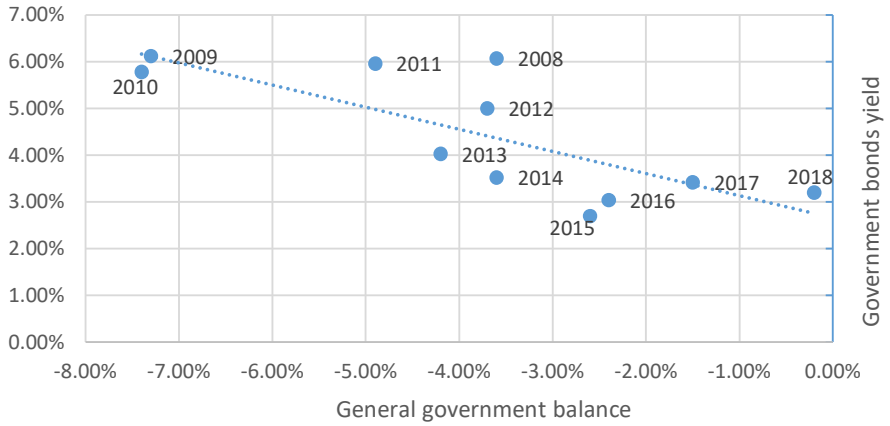

Fig. 2: Data dispersion of general government balance in relation to government bonds yield for Poland in 2008-2018.

The above chart presents the dispersion of data from the discussed issues. The values that deviate most from the trend line fall in 2008 and 2015. The R2 determination coefficient is 0.59, which can be considered a satisfactory result, but with a high risk of incorrect forecasting. It can be assumed that about 60% of the variability of government bonds yield is explained by the general government balance.

The table below presents the results of the Pearson and Spearman correlation tests for the discussed issues.

Table 2: Pearson and Spearman correlation coefficient for the convergence between general government balance and government bonds yield for Poland in 2008-2018.

Poland	Pearson's correlation coefficient	Spearman's correlation coefficient	Critical t value α=0,05, n-2
Saldo general government/ government bonds yield	-0,77	-0,76	2,262
t statistic	-3,57	-3,47	

Pearson's correlation coefficient between the general government balance and the yield on 10-year government bonds in 2008-2018 was -0.77. Such result means a strong relationship between the state budget balance and the yield on 10-year treasury bonds in Poland. It confirms the accepted assumption that the financial situation of the state affects the profitability of treasury securities. However, this relationship is negative over the period under review, which means that the increase in the budget deficit is accompanied by increase in the yield on treasury securities (10-year government bonds) and vice versa. Importantly, for the adopted significance level $\alpha = 0.05$, the result is statistically significant. This relationship was also confirmed in the Speraman's correlation study. The correlation coefficient was -0.76. As in the case of Perason's correlation, this value indicates the existence of a strong relationship between government bonds yield and general government balance. A negative coefficient result indicates the opposite relationship of these two variables. The result is also statistically significant.

Budget Deficit and Government Bonds Yield

The presented results of the research on the relationship between the Polish budget balance and the yield on 10-year treasury bonds in 2008-2018 confirm the general assumptions about the functioning of treasury securities. According to these general assumptions, during the financial crisis and increased demand for capital (also higher costs of servicing public debt) by the state, the yield on government bonds should increase. Another factor impacting the increase in the profitability of these securities during the financial crisis is investors. They are able to accept higher risk in change of higher rates of return. In discussed period for Polish economy, the assumptions of existing relation between general government balance and general government bonds yield is true. Pearson and Spearman correlation coefficients are negative and show strong relation between these factors.

Table 3: The balance of the Polish budget in 2008-2018 and the profitability of Polish 10-year treasury bonds

	General government balance	Deficit dynamic t+1 - t	Deficit economically	Mathematically	Government bonds yield	Bonds dynamic t+1-t	Yield increase /decrease	Pearson's/ Spearman's realtion
2008	-3,60%	-	-	-	6,07%	-	-	-
2009	-7,30%	-3,70%	increase	decrease	6,12%	0,05%	increase	negative
2010	-7,40%	-0,10%	increase	decrease	5,78%	-0,34%	decrease	positive
			decrease					

2011	-4,90%	2,50%	increase	5,96%	0,18%	increase	positive
2012	-3,70%	1,20%	decrease increase	5,00%	-0,96%	decrease	negative
2013	-4,20%	-0,50%	increase decrease	4,03%	-0,97%	decrease	positive
2014	-3,60%	0,60%	decrease increase	3,52%	-0,51%	decrease	negative
2015	-2,60%	1,00%	decrease increase	2,70%	-0,82%	decrease	negative
2016	-2,40%	0,20%	decrease increase	3,04%	0,34%	increase	positive
2017	-1,50%	0,90%	decrease increase	3,42%	0,38%	increase	positive
2018	-0,20%	1,30%	decrease increase	3,20%	-0,22%	decrease	negative

In the period under review, the highest dynamics in the increase in the budget deficit were recorded in 2009. The general government balance was -7.3% and was as much as 3.7% higher than in the previous year. At the same time, in 2009, the dynamics of change in government bonds yield was the lowest in the entire period - it increased only by 0.05%. In 2010, the general government balance increased by 0.1% to -7.4%, while the yield on 10-year government bonds fell by -0.34%, which is evidence of the economy's behavior different from generally accepted canons. The year 2011 is also characterized by a positive relation: general government balance to government bonds yield. However, during this year, the decline in the budget deficit was accompanied by an increase in government bonds yield. In subsequent years from the audited period, the relationship between general government balance and government bonds yield was 5 times positive (opposite to results of the evaluation) and 5 times negative, as shown in Table 3.

The considerations presented in this article concern an important area for the economy. The article characterizes the determinants of government bonds profitability and proves the existence of a relationship between general government balance and government bonds yield for Poland. The scope of research was limited in time to 2008-2018 and concerned only the Polish economy. For more reliable results and conclusions, however, longer time series and a wider spatial approach are needed. In the next few or more years it will be possible to verify the hypotheses presented today. The existence of dependencies between these variables would seem obvious. Also, the mechanism of the functioning of this relationship seems to be clear. The presented research confirms that the shape of the whole is determined by the details.

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The Approaches to Managing of Industrial Enterprises on The Ecosystems and Digitalization Principles

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Abstract

Digital technologies now provide opportunities for inclusive and sustainable economic growth, in all sectors of the economy. The digital transformation is helping companies discover and monetize new business models. That might mean delivering new value added services for the fleet of products forming installed base. Or it might mean creating entirely new revenue streams for a company. The article highlights how to obtain the benefits of digital economy in order to realize greater job creation, increase country competitiveness, and allow for diversification and innovations in service delivery to improve the lives of people. The development of industrial ecosystems is one of the methods for economic growth. The authors propose to evaluate the effectiveness of industrial ecosystems using KPI methods based on corresponding of industrial ecosystems aims from the standpoint of global benchmarking. The authors concluded that in modern economic conditions it is necessary to consider new approach - digital innovation ecosystem, which has a number of important advantages.

Keywords: Digital Ecosystem, Innovation System, Economic and Social Benefits, Accelerating Global Development, Metallurgical Industry.

Introduction

The statistics of recent decades have shown that the dynamic and structural characteristics of the Russian economy development are quite different from those in most developed and largest developing economies. Over the last decade (2009-2019), the Russian economy has grown by 5%,

while the growth of the world economy during this period was 25%, and, for example, China's GDP more than doubled. Among the twenty largest economies of the world and the Eurasian Economic Union (EEU) countries in 2017, Russia ranked 17th in terms of GDP growth. Slower growth rates than in Russia in 2017 were observed only in 3 leading EU countries (Great Britain, France, Italy), Japan, Brazil, Belarus and Saudi Arabia. The lag in growth rates from the average world level leads to a consistent decline in Russia's share in the global economy. According to the Russian Academy of Sciences, Russia's share in world GDP is expected to decline to 2.8% in 2022. The development of industrial ecosystems is one of the methods for economic growth. The industrial ecosystems contribute to extension of infrastructure, increasing employment in the manufacturing industry and the share of industrial production in GDP, use of environmentally technologies, enhancing scientific research and raising the technological potential of industrial sectors.

The concept of digital economy is evolving all the time because of its multifaceted and dynamic nature and due to the transformational power of digital technologies. For instance, the Australian government defines a digital economy as "the global network of economic and social activities that are enabled by platforms such as the Internet, mobile and sensor networks"1. Digital economy is defined by Oxford Dictionary as "an economy which functions primarily by means of digital technology, especially electronic transactions made using the internet" [1] .The digital economy is sometimes called the Internet Economy, the New Economy, or Web Economy It is often perceived as conducting business through markets based on the internet and the World Wide Web. According to OECD, the digital economy enables the trade of goods and services through e-commerce on the internet [2]. European Union considers digital economy as the most important driver of innovation, competitiveness and growth in the world. The Economist Intelligence Unit and IBM joint study defines digital economy as one that "can provide a high quality of ICT infrastructure and harness the power of ICTs to benefit consumers, businesses and governments" [3].

According to the UK Government, digital economy includes the manufacture of digital equipment, publishing, media production and computer programming [4]. The recent studies highlight diffusion of the digital economy within the whole economy and claim that "it can no longer be described as a separate part, or subset, of the mainstream economy" [5]. It goes beyond e-commerce and e-business and includes doing business, conducting communications and providing services across all sectors including transport, financial services, manufacturing, education, healthcare, agriculture, retail, media, entertainment and business using digital technologies (fig. 1). Digital economy has an important role in accelerating global economic development, enhancing productivity of existing industries, cultivating new markets and industries, and achieving inclusive, sustainable growth.

At the same time, the digital economy is becoming a powerful catalyst and a driver of inclusiveness, by linking communities to each other in a sort of "global village" [6], sharing information, ideas and products, and allowing countries to rise up the value chain.

Economic and Social Benefits of Digital Economy Development

Today, people around the world rely on mobile communication, internet access and social media for interactions with each other, sharing information and obtaining new knowledge and services, while governments and businesses increasingly prefer the internet for disseminating information, delivering services, communications, marketing and doing business in general. According to the World Development Report 2016: Digital Dividends recently released by the World Bank, digital technologies have boosted growth, expanded opportunities, and improved service delivery. Digital technologies can transform the economy as a whole and across different sectors. As shown by the successful practices, the more efficient use of digital technologies is a key driver for a more competitive economy, growth and jobs.

Sector	Assets			Usage				Labor		
	Overall digitization	Digital spending	Digital asset stock	Transactions	Interactions	Business processes	Market making	Digital spending on workers	Digital capital deepening	Digitization of work
ICT										
Media		1								
Professional services										
Finance and insurance										
Wholesale trade										
Advanced manufacturing					4					
Oil and gas										
Utilities										
Chemicals and pharmaceuticals										
Basic goods manufacturing									5	
Mining										
Real estate	•									
Transportation and warehousing	•			3						
Education	•									
Retail trade	•									
Entertainment and recreation										
Personal and local services										
Government	•									
Health care										
Hospitality	•	6								
Construction										
Agriculture and hunting										

Fig.1 : Extent of Digitization varies by sector

1- Knowledge intensive sectors, highly digitized; 2 – Capital intensive, potential to further digitized their assets; 3- service sectors ; 4 - B2B sectors; 5 - Labor intensive sectors; 6 –Large, localized, low productivity.

Relatively low digitization *Relatively high digitization*

Source: McKinsey Global Institute analysis

The global digital economy is experiencing high growth, rapid innovation, and broad application to other economic sectors. An Accenture study estimates that digital transformation of the top ten economies of the world is a $ 1.36 trillion. According to BSG, it will reach $4.2 trillion in the G-20 economies by 2016 and contributes up to 8 % of GDP [4, 9]. It is estimated, that the digital economy accounts for about 6 percent of GDP in OECD countries and in Sweden it reached to almost 8 percent of GDP due to significant competitive advantage in digital services and platforms the digital

economy growth. The UK's digital economy has the largest proportion of GDP among G-20 countries (close to 10 percent of GDP) [4, 5]. It led by a strong e-commerce sector and includes online retailing, sales of Internet-related devices, IT and telecommunications investments, and internet-related government spending. The economic contribution of the digital economy in terms of Gross Value Added was £118 billion, 7% of the UK total in 2014 [6].

According to BCG in Russia, the share of the digital economy in GDP is 2.8%, or 75 billion US dollars. Most - 63 billion US dollars - accounted for the sphere of consumption (e-commerce, services, and online search and offline purchases). The share of online commerce in all sales was 1.7% (12 billion US dollars) in 2010, and then in 2017 it rose to 3.9% (48 billion US dollars). IT technology exports amounted to 8.4 billion US dollars.

Digital innovation drives the development of the digital economy and society, enables applications in many areas, and leads to transformations. Digital technologies can affect businesses' dynamism, which supports the emergence and growth of firms. The Internet lowers barriers to entrepreneurship and makes it easier to start, grow and manage a business. It also supports "lean start-ups" that leverage the Internet to lower fixed costs and outsource many aspects of the business to stay agile and responsive to the market. The Internet further affects the broader business environment by lowering transaction costs, increasing price transparency and improving competition. It is now easier for businesses to communicate with suppliers, customers and employees using Internet-based tools. Improved communication is also leading to the emergence of new and transformed business models.

Digital innovation and applications transform not only products, business models and markets, but also jobs and trade. In some sectors ICT investment has led to job losses while in others it has led to job creation.

Creating new jobs. The digital economy in UK employed 1.3 million people in 2014, 5% of all employees. There were 204,000 digital economy businesses, 9% of the UK total in 2015. Over the last five years, the development of mobile applications alone has created nearly 500 000 new jobs in the US, implying strong employment growth prospects [5,7]. It is estimated that 1.5 million additional jobs could be created in the EU digital economy if it mirrors the performance of the US or Sweden. According to a BCG study, European countries that are leaders in digitalization, such as Denmark, Sweden, Finland etc., between 2015 and 2020 the number of new jobs will exceed the number of those phased out by 1.6–2.3 million [12].

Improving Public Services. As highlighted by Mckinsy, "innovative governments are making it easier for citizens to access public services" and shifting from simply administering services to regularly engaging and empowering citizens to participate in the design and the delivery of these services. This helps not only increasing choice and wellbeing but also boosting government productivity and efficiency of public administration. For instance, the UK government's 2012 Digital Efficiency Report suggested that transactions by government channels are 20 times cheaper than by phone, 30 times cheaper than by post and as much as 50 times cheaper than by face-to-face contacts. Shifting 30% of government service delivery "front office" contacts and transactions to digital channels would deliver gross annual savings of more than £1.3 billion a year, rising to £2.2 billion a year if 50% of contacts and transactions shifted to digital channels [7, 13, 14].

The methodology for assessing industrial ecosystems KPI

The authors propose to evaluate the effectiveness of industrial ecosystems using KPI methods based on corresponding of industrial ecosystems aims from the standpoint of global benchmarking. The methodology for assessing KPI of industrial ecosystems in the digital economy differs in the structural composition of KPIs used for analytical purposes. KPI (indicators, ratios) allows evaluating progress in industrial ecosystems, to identify and justify the prospects of this process due to comparison estimated KPIs with similar ones in developing and new industrial countries.

In order to implement global benchmarking, the KPI assessment methodology should be consistent with the goals and indicators adopted in 2015 by the UN General Assembly [16] :

№ 8 "Promoting sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all";
№ 9 "Creating resilient infrastructure, promoting inclusive and sustainable industrialization and innovation";
№ 10 "Reducing Inequality within and between Countries";
№12 "Ensuring the transition to rational consumption and production patterns".

In existing methodologies, the achievement of sustainable development goals is proposed to measure.

Goal № 8 "decent work and economic growth" - through seventeen indicators, of which Rosstat does not develop five, one indicator is in the process of development, eleven indicators are developed;
Goal № 9 “industrialization, innovations and infrastructure” - through twelve indicators, of which three are not developed by Rosstat, nine are being developed;
Goal № 10 “reducing inequality” - through eleven indicators, of which eight are not developed by Rosstat, one is under development, two are being developed;
Goal № 12 “responsible consumption and production” - through thirteen indicators, of which Rosstat does not develop any.

The problem of indicators lack developed by Rosstat can be solved by using the database of the UN Department of Economics and Social Threats.

The authors correlated the presented indicators with the goals of the industrial ecosystem (IE) development in the digital economy and identify key KPIs (Table 1). The KPI assessment methodology includes the following steps for evaluating all 15 indicators.

Table 1: The key KPI for IE

The purpose of the IE management	UN Indicators	Measurements	Inclusion in KPI
Maximizing the level of global leadership (competitiveness) in high-tech markets	"Research and development expenses as a percentage of GDP" (9.5.1 SDG)	%	KPI-1
	"The share of value added products of medium-tech and high-tech industries in the total volume of value added" (9.b.1 SDG)"	%	KPI-2
	"Total official international support (official development assistance and other official funding flows) allocated to infrastructure" (9.a.1 SDG)	$ mil., 2016 prices	KPI-3
	"Number of researchers (in full-time equivalent) per million inhabitants" (9.5.2 SDG)	number of people	KPI-4
Labor productivity growth	"Annual growth rate of real GDP per employed person" (8.2.1 SDG)	%	KPI-5
	"The share of the industry value added " “Manufacturing” in GDP for the year preceding the previous one" (9.2.1 SDG)	%	KPI-6
	"Internal material consumption of raw materials per unit of GDP" (8.4.2 or 12.2.2 SDG)	kg / $, 2016 prices	KPI-7
The growth of the	"Annual growth rate of real GDP per capita"	%	KPI-8

The purpose of the IE management	UN Indicators	Measurements	Inclusion in KPI
level and quality of life of the population	(8.1.1 SDG)		
	"CO2 emissions per unit of added value" (9.4.1 SDG)	kg CO2 eq. / $	KPI-9
	"Proportion of population covered by 4G mobile networks" (9.c.1 SDG)	%	KPI-10
	"Value Added Industry Manufacturing Per Capita" (9.2.1 SDG)	$	KPI-11
	"The growth rate of per capita income among the least affluent 40% of the population" (10.1.1 SDG)	%	KPI-12
	"Internal material consumption per capita" (8.4.2 or 12.2.2 SDG)	tones	KPI-13
Employment growth in non-primary industries	"The share of young people (aged 15-24) who do not study, do not work, and do not acquire professional skills" (8.6.1 SDG)	%	KPI-14
	“Employment in the manufacturing industry as a percentage of total employment" (9.2.2 SDG)	%	KPI-15

Source: developed by the authors using materials [1]

By 2017, the RF IE reached the world level in KPI-4 (number of researchers), KPI-14 (employment among young people) and KPI-15 (employment in the manufacturing industry), despite the presence of downward trends in these indicators, due to including, patterns of change in industry. According to KPI-1, KPI-2, KPI-5, KPI-6, KPI-7, KPI-8, KPI-9, KPI-10, KPI-11, Russian IE didn’t reach the world level.

We offer to use the rating of V.L. Quinta [17], when conducting a global benchmarking of countries in terms of IE development, as well as the term “emerging market country”, which means “society moving from dictatorship to a market-oriented economy, with a growing level of economic freedom, consistent integration into the world market space, a stronger middle class, improved living standards, social stability and tolerance, as well as increased cooperation with international institutions "[18].

V.L. Quint algorithm classification of countries based on the Benett algorithm and integrated indicators (the industry modern index, knowledge economy index, industry index, economic freedom index and per capita GDP) and offers a systematic rating of countries technological development.

Let's analyze a number of significant KPIs in more detail.

KPI-1 "Research and development costs,% of GDP."

R & D expenditure as a percentage of GDP in Russia declined from 2010 to 2018. (as of 2018, the figure was 1.1%). The European Union (EU), for example, has set a goal to invest 3% of GDP in scientific research, while the EU is investing 1.97% of GDP (in 2017) [19].

International statistics show that in the past twenty years, there has been an outpacing growth in spending on research and development relative to the growth of global GDP. So, according to the UN [18], for the period 2013-2018 global spending on research and development grew by 30.5%, and the global economy - by 20%. The main share in the expenditures is occupied by countries and regions with high per capita incomes - primarily the United States (25.5%) and Western Europe. However, this share is decreasing due to a significant increase in research and development costs in the

countries of the Asia-Pacific region, primarily in China. If in 2007, the share of China in world expenditures on research and development was 10.2%, in 2018 it was twice - 20.8% [16].

It is expected to maintain sustainable values of global economic growth, an increase in the number of countries in which science support is among the main priorities of long-term development. This creates favorable conditions for the growth of global spending on science, which will be observed in the future. According to the Russian Academy of Sciences, in the period up to 2035, the total amount of scientific expenditures in the world will increase from 1.7 trillion dollars in 2016 to 3.3 trillion dollars in 2035, that is, almost doubled, and knowledge intensity of world GDP will grow from 2.2% in 2016 to 2.3% in 2035.

KPI-1 below the world level, below the level of developed countries.

Target KPI-1 in 2030: 10% of GDP.

KPI-2 "The share of high-tech and knowledge-intensive industries in GDP for the year preceding the previous one,%." In 2016, Russia had the 51st place in the world in the share of high-tech and medium-tech industries in manufacturing.

KPI-2 is above world level, but below the level of developed countries.

Target KPI-2 by 2030: 50%.

KPI-3 "Total official international support (official development assistance and other official financing flows) allocated to infrastructure, million US dollars". *Data for the calculation of KPI-3 in Russia are not available.*

The target value of KPI-3 by 2030: achievement of world indicators.

KPI-4 "Number of researchers (in the equivalent of full employment) per million people (person, value of the indicator per year)". The number of researchers in the Russian Federation has decreased since the 2000s. In European countries, on the contrary, there is a significant increase in the number of researchers per million people. Russian indicators are above world level.

Target *KPI-4: 4500 people* by the year 2030.

KPI-6 "The share of the value added of the industry "Manufacturing production" in GDP for the year preceding the previous one (percentage, value of the indicator for the year)". There is a global tendency to reduce this indicator. However, it should be noted that the share of manufacturing in global GDP in dollars with constant purchasing parity (in US dollars), calculated using different sectoral conversion factors, has not changed significantly [25].

KPI-6 below the world level, below the level of developed countries.

Target KPI-6: 26.51% by 203

KPI-9 "Volume of greenhouse gas emissions (tons of CO2-eq.) per unit of gross domestic product ". Russia's KPI-9 indicators significantly exceed world values, which is a negative factor.
Target KPI-9: Achieving the world level by 2030.

KPI-10 "Share of population covered by 2G mobile networks, %". Russia's KPI-10 figures are below world level. It is necessary to note the breakthrough world dynamics to the growth of this indicator. Mobile networks and LTE technologies are an example of disruptive innovations and technologies that have taken over the world in the last ten years.

The target value of KPI-10 by 2030: 100%.

KPI-15 "Employment in the manufacturing industry as a percentage of the total number of employees, %". As a rule, in high-income countries, the share of manufacturing in total employment, as well as the number of people employed in manufacturing in absolute terms, is reduced. The decline in employment in the manufacturing industry is due to structural changes occurring in it. Thus, the Russian indicator (14.35% in 2016) corresponds to the global trend of reduction, but is at a level higher than the global one.

Target KPI-15: 28.2% by 2030

The choice of the RF IE development target level should determine the country's ability to take a leading position in the global industry [20-24]. A summary table of KPI goals for the development of IE in a digital economy is presented in table 2.

Table 2: The summary table of KPI goals

KPI	RF/The world	2015	2016	2017	by 2030 г.
KPI-1	RF	1,10	1,04	1,05	**10**
KPI-1	World	1,70	1,70	1,72	
KPI-2	RF	25,60	22,46	22,15	**50**
KPI-2	World	23,94	24,35	24,47	
KPI-3	RF	n.d.	n.d.	111,12	**-**
KPI-3	World	57 321,14	55 520,00	55 990,40	
KPI-4	RF	3 121,73	2 991,40	2 964,01	**4 500**
KPI-4	World	1 150,76	998,19	1 020,47	
KPI-5	RF	-2,20	0,00	1,70	**-**
KPI-5	World	1,50	1,30	2,10	
KPI-6	RF	13,42	13,30	13,25	**26,51**
KPI-6	World	16,13	16,18	16,27	
KPI-7	RF	1,39	1,42	1,22	**1,12**
KPI-7	World	1,12	1,12	1,16	
KPI-8	RF	-2,91	-0,28	-1,58	**4,46**
KPI-8	World	1,60	1,30	1,19	
KPI-9	RF	0,77	0,66	0,64	**0,48**
KPI-9	World	0,48	0,52	0,53	
KPI-10	RF	50,00	59,00	62,00	**100**
KPI-10	World	61,83	68,29	74,75	
KPI-11	RF	1 507,01	1 489,90	1 510,95	**3021,89**
KPI-11	World	1 642,80	1 667,74	1 707,77	
KPI-12	RF	1,68	n.d.	n.d.	**4,46**
KPI-12	World	2,45	3,98	2,43	
KPI-13	RF	185 801 811	187 468 661	189 135 511	**-**
KPI-13	World	11,37	11,53	11,68	
KPI-14	RF	12,00	11,03	10,61	**5**
KPI-14	World	16,70	15,76	15,76	
KPI-15	RF	14,30	14,35	14,10	**28,20**
KPI-15	World	13,43	13,21	13,11	

Source: developed by the authors according to the UN Statistics Department and Rosstat

Digital Transformation in the Steel Industry as an integrator of industrial ecosystem

The global steel industry is the critical backbone of the industrialized value chain. An essential base material for significant sectors, such as automotive and aerospace, steel is a centerpiece of innovation and economic growth. The steel industry is facing significant challenges due to cost, regulatory, product and service requirements (fig. 2)

Figure 2: Metals business challenges

Source: PwC's Digital Services

Steel producers face continuing challenges to improve EBITDAs which is only possible by pushing the productivity, flexibility and innovation envelope continuously. One such opportunity to transform operations and alter the cost structure is by creating the digital workshop serves as a working and communication platform for multidisciplinary collaboration when tackling tasks that involve various disciplines. By making use of the native data and data exchange formats (IGES, JT, WRL) available in the 3D CAD systems used in the engineering departments, it links simulation data with actuations of plant components and movements of products.

Today, virtual technologies are used as a tool to back planning and designing. Proven fields of application are, for example, interactive product presentations used in sales departments, integration tests as part of the project implementation process or virtual technologies used by service departments for training purposes. Making the customer part of a virtual, multi-discipline working environment shared by several users facilitates effective coordination and agreement processes that will minimize corrections at a later stage, saving project time and costs.

The basic instrument of Supply Chain Management, for example, is the consistent mapping of the production and material flows and the complete order handling process, including the customer order, the manufacturing order and the suppliers. The employees rely on digital simulation and optimization tools operating in real time to be able to plan production more effectively and at shorter notice and predict production processes or energy consumption more reliably. They expect flexible, cooperative logistics solutions implemented together with their raw material, consumables and spare parts

suppliers. Here, cost reduction potential is tapped from economies of scale resulting from the combination of several spare part portfolios.

Sales departments request digital tools that facilitate pricing and provide for transparency in delivery date setting as well as solutions enabling "digital shadowing" of products and processes, serving as documentation for the customer. Providers of IT and automation solutions as well as the IT departments of the manufacturing companies are presented with the challenge of having to capture all data and information arising from the production activities (plants, processes, products) in a consistent form, at all process stages. At the same time, the correct information has to be processed in a way suitable for all involved (humans and machines), while being accessible at any place and time and guaranteeing a maximum of data security.

Today there is a large choice of innovative technologies that not only save time and resources, but also ensure employee safety. This allows metallurgical enterprises translate into digital format the most important functions (fig. 3).

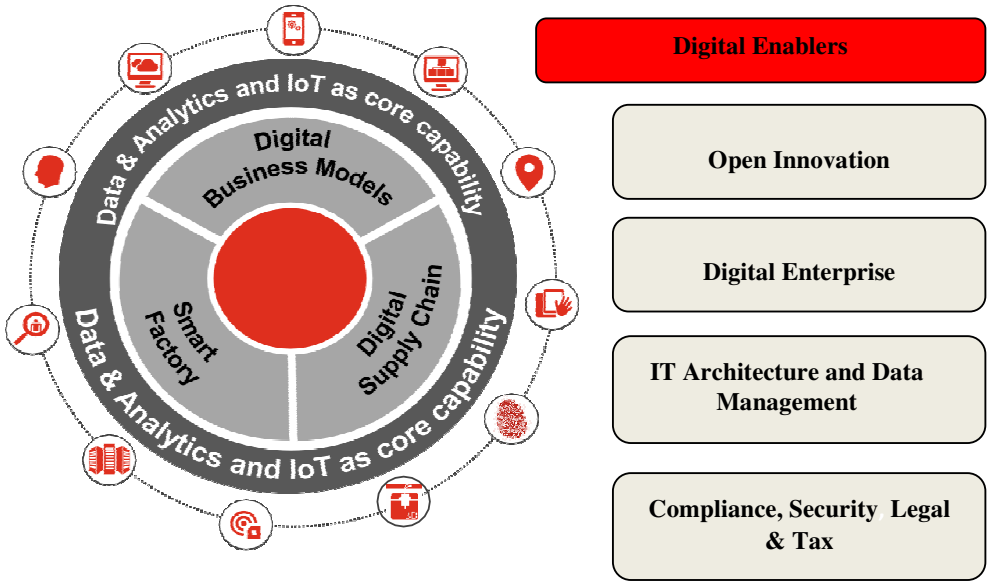

Figure 3: The digital enterprise combines vertical and horizontal integration with customer access & business models

Source: PwC's Digital Services

Our approach to the digitization of the metallurgical plants:

1. Comprehensive expert research, including analysis of business problems, business processes, IT infrastructure and assessment of the current level of automation and compliance of existing equipment with the requirements of Industry 4.0.
2. Formation of the customer's digital business model based on the target parameters of the enterprise's efficiency, compliance with the criteria of Industry 4.0, as well as industry and business characteristics of the business.
3. Formation of a strategy for the implementation of a digital enterprise model, which takes into account the economic feasibility of the entire digitalization process and each of its stages, in priority.

4. Clear implementation of the approved strategy, based on the principles of openness and interactive feedback mode.
5. Assessment of the actual performance of the digital enterprise model in the context of each project or complex of projects.

Conclusion

1. Data-driven innovation, new business models, and digital applications are changing the workings of science, governments and industry. Policies to support digital innovation tend to focus on innovation networks, access to finance, and data use, but pay less attention to investment in ICTs, knowledge-based capital and data analytics.
2. Digitalization is the new competitive instrument. It is the key differentiator in manufacturing today.
3. Companies should also take advantage of established innovation networks around universities and R&D centers that give the steel industry an opportunity to develop new technologies and products. Besides, industry requires employees with the advanced skills and technical know-how to master complex equipment and take products beyond the concept stage.
4. Trust underpins most digital relationships and transactions and depends on the management of risk. A few are listed here.

– Risks associated with the speed of labor market changes and the destruction of traditional jobs;
– Risks associated with changing nature of work and the quality of internet enabled jobs, such as micro work or jobs in the on-demand economy;
– The risks associated with widening income inequality.

5. The authors tested the methodology for KPI assessment of IE development goals in a digital economy based on the Sustainable Development Resolution adopted by the UN General Assembly in 2015. It was proposed to use fifteen KPIs, for each KPI a calculation method was developed in accordance with the Rosstat methods. All KPIs are estimated in dynamics since 2000 and correlated with international and global values. Target KPI values by 2030 have been developed.

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The Influence of the Main Characteristics of the Procurement Procedures on the Savings Achieved in the Purchase of Motor Vehicles in Romania

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Abstract

The article examines the influence of the main characteristics of the open procurement procedures for the supply of motor vehicles from Romania on the savings achieved. In this regard, from the Romanian Public Procurement System was extracted a sample of 165 lots of vehicles that were awarded in 126 procurement procedures carried out in 2019 (open tenders and simplified procedures). The research verifies for the analyzed sample if there is an inverse proportional relationship between the number of offers received and the savings achieved. Also, the research tries to determine the point from which the offered price no longer decreases and the efficiency of the use of budgetary funds becomes maximum. By carrying out 8 unifactorial and multifactorial linear regressions, the research verifies whether the number of offers received depends on the type of procurement procedure and which of the following characteristics of the procedures most influence the achieved savings: the type of procurement procedure, the number of offers received and the estimated value of the procedure.

Keywords: Public Procurement Procedure, Savings, Type Of Procedure, Number Of Offers, Estimated Value.

Introduction

The biggest challenge in the field of public procurement is the efficient use of public funds, with the level of competition being one of the factors affecting the efficiency of the spending funds (Hanak and Muchova, 2015).

In a procurement procedure, the criteria for the qualification and selection of offerors must be established in such a way as to fulfill two objectives: firstly, to allow the qualification of economic operators which may carry out the procurement contract (similar experience, facilities, qualified personnel etc) and secondly, to facilitate sufficient competition in the procedure leading to the greatest possible efficiency in the use of public funds.

Papers such as “Surgical team and surgical communication” (Dutu, C., Luchian, A., Starcu, E., Savulescu, F., 2015), “Internal Medicine Papers” (Popescu, A. L., Costache, R.S., Savulescu, F.,

Jinga, M., Ionita-Radu, F., 2019), "Patient-centered innovative monitoring system and smart personalized health care services using ICT" (Ianculescu, M., Alexandru, A., Radulescu, C/Z., 2018), "A Pilot Study on Management Systems Implemented within Romanian Organizations" (Popa, I., Stefan, S.C., Popescu, D.I., 2015) and "A Parametric Approach for Filling the Gap between Raw Data and Knowledge Based Engineering in the Aerospace Industry" (Alexandru, T.-G., Pupaza, C., 2018) reveal two areas in which public procurement is large and in which the efficiency of the use of public fumds is essential, respectively medicine, and aerospace industry.

The most important way to increase the savings achieved and implicitly the efficiency of procurement procedures is to increase competition.

Research by Thai et al. (2009) concluded that in order to achieve significant savings in a procurement procedure at least four economic operators must participate. According to the authors, the situation becomes unfavorable to the contracting authority to three offers or less, and when only one offer is received, the situation is catastrophic (Thai et al., 2009).

An explanation of this conclusion is that when there are multiple bidders, it is very difficult to reach any non-competitive agreements between them. Also, the potential profit that can be obtained by a bidder decreases greatly when the competition is high, the lower gain not justifying taking the risk that the non-competitive agreement poses. The reduced profit may even be a reason for economic operators not to participate in the procedure.

The amounts that are allocated annually in Romania for public procurement represent about 7% of GDP. Thus, in 2018 were completed procurement procedures with a total value of 42,484,208 thousand lei, VAT excluded, meaning 50,556,207 thousand lei, VAT included, respectively 10.5 billion euros, VAT included (ANAP - Romanian National Agency for Public Procurement, 2019).

Table 1 presents the final values of completed procurement procedures and the number of procurement contracts concluded in Romania in 2018 for each type of procurement procedure.

Table 1: The awarded values of completed procurement procedures and the number of contracts concluded in Romania in 2018

Type of procedure	Awarded value (thousands of lei, without VAT)	The weight from the total awarded value	Number of contracts
Open tender	16,809,037.12	39.56%	8,480
Simplified procedure	24,567,230.52	57.83%	20,478
Accelerated open tender	30,040.57	0.07%	71
Restricted tender	102,796.39	0.24%	13
Competitive dialogue	393.97	0%	1
Competitive negotiation	974,709.93	0.01%	26
Total	**42,484,208.49**	**100%**	**29,069**

Source: (ANAP, 2019)

As can be seen, most contracts with the highest total value have been concluded following the application of simplified procedures followed by open tenders. In view of this situation, research will continue to analyze only these two types of procurement procedures.

Simplified procedures differ from the open tenders by the fact that the estimated value of the products / services to be procured is lower, the documents that are requested from offerors are less and with shorter deadlines (for submission of tenders, submission of appeals, etc).

As a result, the duration of open tenders is higher than the duration of simplified procedures.

For example, in 2018 in Romania, the average duration of the 3,626 open tenders was 118 days and the average duration of the 14,874 simplified procedures was 90 days. If the open tenders were ex-ante controlled by ANAP, the average duration of the open tenders was 143 days, meaning a very long period of about 4 and a half months (ANAP, 2019).

Literature Review

Gupta (2002) analyzed the competition in a sample of US works auctions (investments) from 1981 to 1986 and found that after receiving 6 to 8 offers, the price no longer decreases and the maximum spending efficiency is achieved (Figure 1).

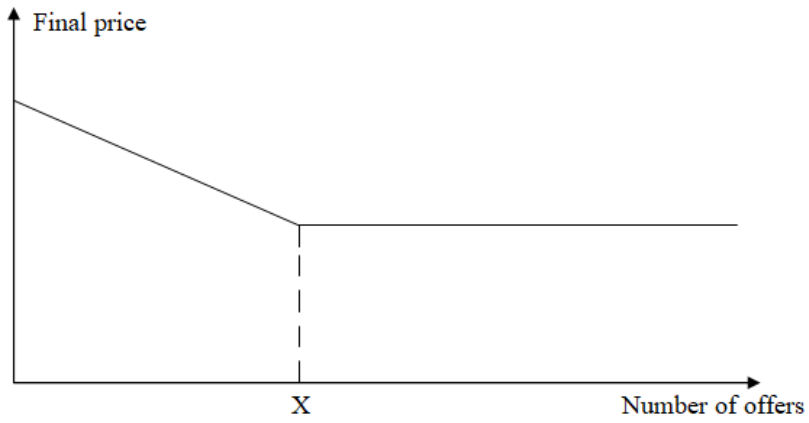

Figure 1: The level of maximum competition (X)
Source: Gupta (2002)

Brannman et al. (1987) confirmed the results of Gupta (2002) and found that the maximum level of competition is reached when 5 to 8 bids are received.

Gineitiene and Serpytis (2011) concluded that in some procurement procedures where 2 tenders were received instead of 1, savings were achieved between 10% and 20%.

Pavel (2010) concluded that in the case of procurement procedures for the construction of Czech railways and motorways from 2004 to 2009, each additional offer received led to an average reduction in the final price achieved by 3.2%.

Ilke, Rasim and Bedri (2012) found that each additional offer led to a 3.9% reduction in the final price and that the number of offers received depends on the estimated value of the procurement procedure.

However, Rose-Ackerman (1999) concluded that there are a number of procedures in which only 3 offers were received and where savings were obtained in the same size as 6 offers.

In times of economic crisis, the trade mark-ups of the offerors were smaller due to the increase of the competition because of the reduction of demand (Gugler, Weichselbaumer and Zulehner, 2014).

Most research in this area has concluded that if competition increases, then the final price decreases, and if 5 to 8 offers are received, then the price will no longer decrease and the efficiency of the use of budget funds becomes maximum.

Research Methodology/Working Hypotheses

The study objectively analyzes the specialized literature on the field of competition and the factors that influence the savings achieved.

A representative sample of lots awarded in motor vehicle procurement procedures will be drawn from the Romanian Electronic Public Procurement System (SEAP). The data extracted from this system presents the advantages of being accurate, relevant data and covers the whole territory of Romania.

Using unifactorial and multifactorial linear regressions, the possible correlations between the main characteristics of the procurement procedures will be determined.

As the number of offers received may depend on certain characteristics of the procurement procedure, the following working hypotheses have been defined:

H1: The number of offers received depends on the type of procurement procedure;
H2: The number of offers received and the estimated value of the procedure influence the size of the savings achieved.

Analysis of the influence of procurement procedures characteristics on savings achieved on the purchase of motor vehicles

In Annex 1 are presented the main characteristics of the motor vehicles procurement procedures carried out and completed in Romania in 2019. The sample of data was extracted from SEAP and contains the data of 165 lots of motor vehicles that were awarded in 126 procurement procedures (open tenders and simplified procedures). Out of the 165 motor vehicles lots, 95 lots were awarded by open tender and 70 lots were awarded by simplified procedures.

The main characteristics that were extracted for each lot were: the number and date of the award notice, the object of the procurement, the type of procurement procedure, the number of offers received, the estimated value of the procedure, the final value of the procedure, the savings achieved and the weight of the savings achieved from the estimated value.

Products and services subject to procurement procedures are classified according to a Common Procurement Vocabulary (CPV) code. Motor vehicles are in CPV class No 34 - Transport equipment and auxiliary transport products.

In 2018, in this CPV class, 1,210 supply contracts were awarded in Romania and the average number of offers received in each procedure was 2 (ANAP, 2019).

For the sample analyzed of 165 lots, the average number of offers received was 1.72, which is very close to that recorded at national level. For the selected sample, the average number of offers received at the 95 open tenders was 1.92 and the average number of offers received at the 70 simplified procedures was 1.42.

Figure 2 shows the average number of offers received by type of contract in 2018 in Romania.

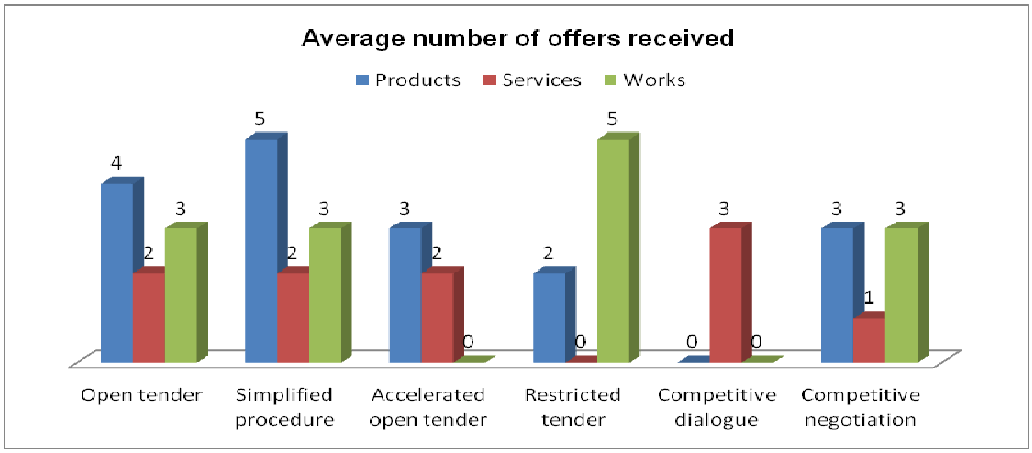

Figure 2: The average number of offers received within the procurement procedures carried out in Romania in 2018

Source: (ANAP, 2019)

As far as can be seen, the average number of offers registered at national level in product procedures (for all product types) was 4 in open tenders, respectively 5 in simplified procedures. By comparison, for the sample analyzed of 165 lots of motor vehicles, the average number of offers received was much lower (1.92 in open tenders and 1.42 in simplified procedures). It is interesting that **the trend of economic operators to submit more offers in simplified procedures is not confirmed** for the sample under consideration.

In 2018, in Romania, at CPV class no. 34 were concluded 735 contracts based on a single offer received (out of the total of 1,210 contracts awarded), representing a weight of 60.74% of the total (ANAP, 2019). In the sample analyzed, 103 lots were awarded on the basis of a single offer received, which represents 62.42%. It is observed that for the sample under consideration, the weight of contracts concluded on the basis of a single offer (62.42%) is very close to the weight registered at national level for the entire CPV class (60.74%).

A plausible explanation for the reduced competition is that in Romania many national motor vehicle manufacturers' representatives participate in the procurement procedures but do not allow smaller dealers of the same manufacturer to participate in the procedures. These are in reality "anti-competitive agreements" that reduces competition and increases the inefficiency of spending public funds.

The weight of savings achieved (column 10 of Annex 1) by the number of offers received (column 6 of Annex 1) for the sample analyzed is presented in Figure 3.

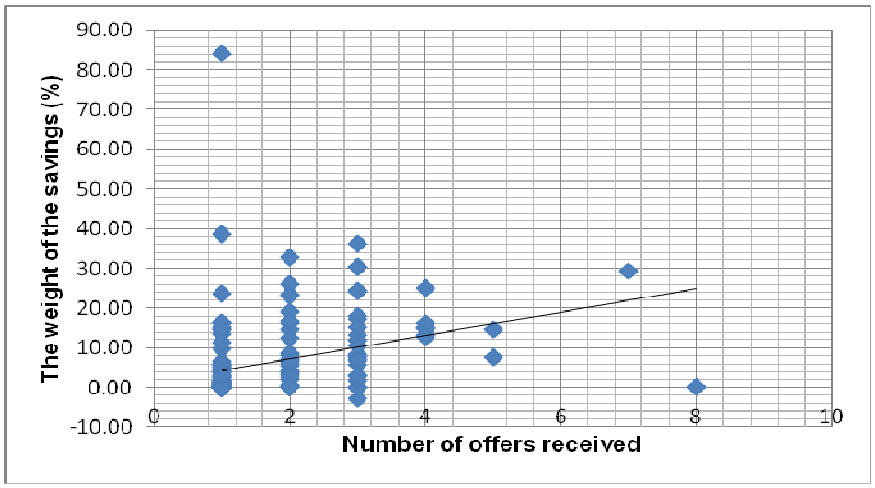

Figure 3: The weight of savings obtained according to the number of offers received
Source: Based on the data in Annex 1

As can be seen, there is an inversely proportional relationship between the savings and the number of offers, but it is not possible to establish the point from which the price no longer decreases and the efficiency of the procedure becomes maximum due to the small number of offers received.

In order to verify hypothesis H1 for the sample analyzed by 165 lots, that is, if the number of offers received depends on the type of procurement procedure, we will use a linear unifactorial regression model of the form:

$$y = a + bx \quad (1)$$

where:

y – number of offers submitted (column 6 of Annex 1);
x – type of procurement procedure (column 5 of Annex 1);
a – residual variable;
b – factor of independent variable x.

In Table 2 are presented the results of the linear unifactorial regression model.

Table 2: The results of the linear unifactorial regression model (y – number of offers submitted, x – type of procurement procedure)

Regression Statistics						
Multiple R	0.21226503					
R Square	0.04505644					
Adjusted R Square	0.03919789					
Standard Error	1.1394409					
Observations	165					
ANOVA						
	df	*SS*	*MS*	*F*	*Significance F*	
Regression	1	9.9850535	9.985054	7.690716	0.0061978	
Residual	163	211.62707	1.298326			

Total	164	221.61212				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	2.42406015	0.2705806	8.958737	7.24E-16	1.8897651	2.958355
X Variable 1	-0.4977444	0.1794828	-2.77321	0.006198	-0.8521556	-0.143333

Source: author's calculations

As can be observed, the correlation ratio (R) is 0.2122 and it shows that between the number of offers received and the type of procurement procedure exists a weak link.

The coefficient of determination (R^2) is 0.0450 and it shows that only 4.5% of the variation in the number of offers received (y) is explained by the type of procurement procedure.

Thus, according to the results of the regression model for the sample analyzed, **it is not possible to establish a significant, strong link between the number of offers received and the type of procurement procedure**.

Hanak and Muchova (2015) analyzed a sample of procurement procedures which resulted in 256 public works contracts and found a moderate positive correlation between the number of offers received and the relative reduction of prices offered.

The same conclusion was reached by Man, Matejkova, Jurcik and Heidu (2014), who analyzed 197 procurement procedures. The authors found that there was an inversely proportional relationship between the number of offers and the price offered. Furthermore, the authors also analyzed the influence on the final price of two more independent variables, namely the type of procedure (open or restricted) and the estimated value of the procedure. Following the successive application of several linear multifactorial regressions, the authors found that the savings of the procurement procedure depends on the type of procedure and its estimated value.

It is easy to see that more offers will be received in open procedures and thus the final price obtained will be lower than in restricted procedures. More difficult to see is how the number of offers will vary if both types of procedures analyzed are open, namely open tenders and simplified procedures.

For the verification of the H2 hypothesis for the sample analyzed, meaning to verify if the savings obtained depend on the type of procedure (open tender or simplified procedure), the number of offers and the estimated value of the procurement procedure, we will use a multifactorial linear regression of the form:

$$y = a + bx_1 + cx_2 + dx_3 \quad (2)$$

where:

y – savings achieved (column 9 of Annex 1);
x_1 – type of procurement procedure (column 5 of Annex 1);
x_2 – number of offers submitted (column 6 of Annex 1);
x_3 – estimated value, in lei, without VAT (column 7 of Annex 1);
a – residual variable;
b, c, d – factors of independent variables x_1, x_2 and x_3.

In Table 3 are presented the results of the linear multifactorial regression model.

Table 3: The results of the linear multifactorial regression model (y – savings achieved, x_1 – type of procedure, x_2 – number of offers submitted, x_3 - estimated value)

Regression Statistics						
Multiple R	0.5897372					
R Square	0.3477899					
Adjusted R Square	0.335637					
Standard Error	4916418.4					
Observations	165					
ANOVA						
	df	*SS*	*MS*	*F*	*Significance F*	
Regression	3	2.08E+15	6.92E+14	28.6177	6.936E-15	
Residual	161	3.89E+15	2.42E+13			
Total	164	5.97E+15				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	1236280.9	1427495	0.866049	0.38775	-1582748	4055310
X Variable 1	-552467.05	797973.6	-0.692337	0.48972	-2128312	1023378
X Variable 2	-92830.381	380383.3	-0.244044	0.80751	-844014.3	658353.6
X Variable 3	0.0675004	0.008406	8.030108	1.9E-13	0.0509003	0.0841

Source: author's calculations

The correlation ratio (R) is 0.5897 and it indicates that there is a medium-intensity link between the obtained savings and the three independent variables.

The coefficient of determination (R^2) has the value 0.3477 and it shows that 34.77% of the variation of the obtained savings (y) is explained by the three independent variables.

In order to determine which of the independent variables most influence the achieved savings (y), we will try to improve the regression model, by excluding one or two of the independent variables used.

Therefore, 6 multifactorial and unifactorial linear regressions have been performed and their results are presented in Table 4.

Table 4: Extract from the results of the 6 multifactorial and unifactorial linear regressions performed

Independent variable (x)	**The correlation ratio (R)**	**The coefficient of determination (R^2)**	**The mean square error deviation**
Multifactorial linear regression $y = a + bx_1 + cx_2$, where y = the savings achieved (in lei, without VAT) (column 9 of Annex 1)			
x_1 = type of procurement procedure (column 5 of Annex 1) **x_2 = number of offers (column 6 of Annex 1)**	0.294229	0.086571	5,800,265.50
x_1 = type of procurement procedure (column 5 of	0.589532	0.347548	4,902,127.25

Annex 1) x_2 = estimated value (in lei, without VAT) (column 7 of Annex 1)			
x_1 = number of offers (column 6 of Annex 1) x_2 = estimated value (in lei, without VAT) (column 7 of Annex 1)	0.588088	0.345848	4,908,511.36
Unifactorial linear regression y = a + bx, where y = the savings achieved (in lei, without VAT) (column 9 of Annex 1)			
x = type of procurement procedure (column 5 of Annex 1)	0.160614	0.025797	5,971,712.96
x = number of offers (column 6 of Annex 1)	0.274999	0.075624	5,816,991.63
x = estimated value (in lei, without VAT) (column 7 of Annex 1)	0.588008	0.345753	4,893,785.84

Source: author's calculations

From the comparative analysis of the results of these regressions, respectively of the correlation ratios - R and of the coefficients of determination - R^2, it can be found that they have higher values when the independent variable is the estimated value of the procedure (cells highlighted with yellow color in Table 4).

These results show that in the case of the analyzed sample, **the savings achieved are most influenced by the estimated value of the procurement procedure**, the other two independent variables, respectively the number of offers received and the type of procedure (open tender or simplified procedure) having an insignificant influence.

Conclusions

The article analyzes the influence of the main characteristics of the procurement procedures on the savings achieved for a sample of 165 lots awarded in 126 procurement procedures for motor vehicles carried out in Romania in 2019.

The study found that in the case of the sample under consideration, competition in motor vehicle procedures is lower compared to competition in procedures for other product types. The research also concluded that in the procedures with lower estimated values (simplified procedures) do not significantly submit more offers. A explanation may be the existence of anti-competitive agreements between the national representatives and the dealers of car manufacturers.

The research found that there is an inverse proportional relationship between the size of the savings and the number of offers, but it is not possible to establish the point from which the price no longer decreases and the efficiency of the procedure becomes maximum due to the small number of offers received.

According to the results of linear regressions performed in the case of the analyzed sample, no significant connection could be established between the number of offers received and the type of the procurement procedure (open tender or simplified procedure) and it has been demonstrated that the savings achieved are influenced most by the estimated value of the procurement procedure, the other two independent variables, respectively the number of offers received and the type of procedure having an insignificant influence.

Future research should examine other types of products in a similar way. The comparative analysis of the obtained results should emphasise a number of characteristics of the observed differences that can be exploited by identifying and implementing measures to improve the procurement procedures and

to increase the savings achieved (simplifying the minimum requirements of qualification / selection for offerors, increasing competition, changing value thresholds, etc).

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Annex 1: Situation of the main characteristics of the motor vehicle procurement procedures completed in 2019 in Romania

No.	Award notice number	Award notice date	Object of procurement	Type of procurement procedure	Number of offers	Estimated value (lei, without VAT)	Final value (lei, without VAT)	The savings achieved (lei, without VAT)	The weight of the savings in the estimated value (%)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9) = (7) - (8)	(10) = (9) / (7)
1	SCNA1030473	31/12/2019	dump trucks	simplified procedure	3	210,000.00	204,000.00	6,000.00	2.86
2	SCNA1030298	24/12/2019	school bus	simplified procedure	1	188,000.00	186,000.00	2,000.00	1.06
3	CAN1018856	24/12/2019	vans	open tender	8	477,929,628.78	477,167,761.00	761,867.78	0.16
4	CAN1018856	24/12/2019	vans	open tender	3	44,483,172.27	43,102,545.72	1,380,626.55	3.10
5	CAN1018856	24/12/2019	vans	open tender	3	137,547,064.10	127,989,225.00	9,557,839.10	6.95
6	CAN1018856	24/12/2019	vans	open tender	4	257,512,606.22	219,257,820.00	38,254,786.22	14.86
7	CAN1018856	24/12/2019	vans	open tender	3	128,193,277.00	89,123,100.00	39,070,177.00	30.48
8	CAN1016940	24/12/2019	motor vehicles	open tender	1	1,682,657.18	1,682,727.91	-70.73	0.00
9	CAN1016940	24/12/2019	motor vehicles	open tender	1	3,898,922.40	3,883,350.77	15,571.63	0.40
10	CAN1016940	24/12/2019	motor vehicles	open tender	1	3,935,160.80	627,177.23	3,307,983.57	84.06
11	CAN1026744	24/12/2019	passenger cars	open tender	2	381,748.80	326,513.82	55,234.98	14.47
12	CAN1026744	24/12/2019	passenger cars	open tender	2	132,480.00	121,772.00	10,708.00	8.08

13	SCNA1030241	23/12/2019	motor vehicles	simplified procedure	1	145,210.00	144,187.32	1,022.68	0.70
14	SCNA1030241	23/12/2019	motor vehicles	simplified procedure	1	225,000.00	224,895.83	104.17	0.05
15	CAN1026735	21/12/2019	motor vehicles	open tender	3	9,538,500.00	9,819,000.00	-280,500.00	-2.94
16	SCNA1030140	20/12/2019	motor vehicles	simplified procedure	1	181,512.62	152,100.00	29,412.62	16.20
17	CAN1026471	19/12/2019	dump trucks	open tender	3	1,200,000.00	1,099,000.00	101,000.00	8.42
18	SCNA1029632	17/12/2019	vans	simplified procedure	1	49,930.10	49,895.83	34.27	0.07
19	SCNA1029632	17/12/2019	vans	simplified procedure	1	71,192.20	70,216.90	975.30	1.37
20	CAN1026235	13/12/2019	ambulances	open tender	1	653,400.85	614,571.91	38,828.94	5.94
21	CAN1026217	13/12/2019	dump trucks	open tender	1	1,000,000.00	854,000.00	146,000.00	14.60
22	CAN1026191	13/12/2019	passenger cars	open tender	1	417,153.36	416,442.00	711.36	0.17
23	SCNA1030167	12/12/2019	passenger cars	simplified procedure	1	140,588.00	140,526.44	61.56	0.04
24	SCNA1029269	11/12/2019	buses	simplified procedure	1	645,378.15	645,360.00	18.15	0.00
25	SCNA1029256	11/12/2019	buses	simplified procedure	1	1,740,000.00	1,329,796.00	410,204.00	23.57
26	CAN1026143	10/12/2019	passenger cars	open tender	1	90,000.00	89,036.56	963.44	1.07
27	CAN1026017	10/12/2019	motor vehicles	open tender	1	640,000.00	638,400.00	1,600.00	0.25
28	SCNA1028918	06/12/2019	vans	simplified procedure	1	141,000.00	140,999.00	1.00	0.00
29	CAN1025891	06/12/2019	motor vehicles	open tender	1	638,481.13	638,000.00	481.13	0.08

30	CAN1025891	06/12/2019	motor vehicles	open tender	1	69,374.82	69,000.00	374.82	0.54
31	CAN1025829	05/12/2019	motor vehicles	open tender	1	166,309.50	161,900.00	4,409.50	2.65
32	CAN1025829	05/12/2019	motor vehicles	open tender	2	230,237.60	220,714.00	9,523.60	4.14
33	CAN1025829	05/12/2019	motor vehicles	open tender	2	305,582.03	285,000.00	20,582.03	6.74
34	SCNA1028796	04/12/2019	motor vehicles	simplified procedure	1	574,876.00	574,876.00	0.00	0.00
35	CAN1025595	02/12/2019	passenger cars	open tender	1	71,848.74	71,123.83	724.91	1.01
36	CAN1025962	29/11/2019	minibuses	open tender	3	605,042.01	558,000.00	47,042.01	7.77
37	SCNA1028289	28/11/2019	motor vehicles	simplified procedure	1	280,800.00	279,403.35	1,396.65	0.50
38	CAN1025348	28/11/2019	passenger cars	open tender	1	362,370.00	358,995.00	3,375.00	0.93
39	CAN1025348	28/11/2019	vans	open tender	3	290,475.00	251,900.00	38,575.00	13.28
40	CAN1025289	27/11/2019	motor vehicles	open tender	1	9,907,334.40	9,857,930.41	49,403.99	0.50
41	CAN1025133	26/11/2019	buses	open tender	1	1,764,705.00	1,759,945.60	4,759.40	0.27
42	CAN1025131	26/11/2019	motor vehicles	open tender	1	2,786,160.00	2,776,800.00	9,360.00	0.34
43	SCNA1020241	23/11/2019	motor vehicles	simplified procedure	1	145,210.00	144,187.32	1,022.68	0.70
44	SCNA1020241	23/11/2019	motor vehicles	simplified procedure	1	225,000.00	224,931.85	68.15	0.03
45	CAN1025055	23/11/2019	motor vehicles	open tender	3	1,121,050.00	1,120,680.00	370.00	0.03
46	CAN1024977	22/11/2019	motor vehicles	open tender	1	330,000.00	330,000.00	0.00	0.00

47	CAN1024978	21/11/2019	motor vehicles	open tender	2	176,000.00	168,990.00	7,010.00	3.98
48	CAN1024981	21/11/2019	motor vehicles	open tender	3	409,500.00	409,380.00	120.00	0.03
49	CAN1024833	20/11/2019	motor vehicles	open tender	1	282,887.00	279,280.36	3,606.64	1.27
50	CAN1024833	20/11/2019	vans	open tender	1	990,105.00	958,660.43	31,444.57	3.18
51	CAN1024901	20/11/2019	passenger cars	open tender	1	71,690.00	71,567.37	122.63	0.17
52	SCNA1027555	19/11/2019	motor vehicles	simplified procedure	1	84,034.00	82,562.07	1,471.93	1.75
53	CAN1024790	19/11/2019	motor vehicles	open tender	2	944,640.00	763,800.97	180,839.03	19.14
54	SCNA1027523	18/11/2019	dump trucks	simplified procedure	1	817,000.00	817,000.00	0.00	0.00
55	CAN1024691	15/11/2019	passenger cars	open tender	1	1,136,974.79	1,077,750.00	59,224.79	5.21
56	CAN1024498	11/11/2019	passenger cars	open tender	1	380,478.00	380,000.00	478.00	0.13
57	SCNA1027003	11/11/2019	vans	simplified procedure	1	180,000.00	180,000.00	0.00	0.00
58	SCNA1026543	04/11/2019	vans	simplified procedure	1	168,067.23	167,595.00	472.23	0.28
59	CAN1023857	29/10/2019	motor vehicles	open tender	1	856,800.00	844,440.00	12,360.00	1.44
60	CAN1023851	29/10/2019	passenger cars	open tender	2	638,655.46	471,946.20	166,709.26	26.10
61	SCNA1026076	28/10/2019	vans	simplified procedure	1	542,500.00	540,639.72	1,860.28	0.34
62	SCNA1026024	28/10/2019	passenger cars	simplified procedure	1	125,000.00	76,671.84	48,328.16	38.66
63	SCNA1026024	28/10/2019	passenger	simplified	1	100,840.33	100,790.01	50.32	0.05

			cars	procedure					
64	SCNA1026024	28/10/2019	passenger cars	simplified procedure	1	96,218.00	86,800.16	9,417.84	9.79
65	SCNA1025934	25/10/2019	dump trucks	simplified procedure	2	517,000.00	499,700.00	17,300.00	3.35
66	SCNA1025847	24/10/2019	vans	simplified procedure	1	126,050.42	126,000.00	50.42	0.04
67	SCNA1025796	23/10/2019	ambulances	simplified procedure	1	380,000.00	380,000.00	0.00	0.00
68	CAN1023550	22/10/2019	passenger cars	open tender	1	395,000.00	389,467.68	5,532.32	1.40
69	SCNA1025583	21/10/2019	dump trucks	simplified procedure	1	412,994.66	412,950.00	44.66	0.01
70	CAN1023236	17/10/2019	vans	open tender	1	840,336.00	820,000.00	20,336.00	2.42
71	CAN1023236	17/10/2019	vans	open tender	1	252,101.00	252,000.00	101.00	0.04
72	CAN1023236	17/10/2019	quad bikes	open tender	2	47,059.00	39,400.00	7,659.00	16.28
73	CAN1023100	16/10/2019	passenger cars	open tender	1	3,577,840.34	3,572,500.00	5,340.34	0.15
74	SCNA1025265	15/10/2019	passenger cars	simplified procedure	1	310,000.00	310,000.00	0.00	0.00
75	CAN1023052	15/10/2019	motor vehicles	open tender	1	1,027,200.00	1,027,000.00	200.00	0.02
76	SCNA1025031	11/10/2019	vans	simplified procedure	1	530,993.62	524,200.00	6,793.62	1.28
77	CAN1022854	10/10/2019	passenger cars	open tender	1	2,758,991.76	2,710,440.00	48,551.76	1.76
78	CAN1022854	10/10/2019	passenger cars	open tender	1	302,521.00	302,400.00	121.00	0.04
79	SCNA1024760	08/10/2019	motor vehicles	simplified procedure	1	353,357.00	329,900.00	23,457.00	6.64
80	SCNA1024205	01/10/2019	passenger	simplified	1	140,336.00	140,306.07	29.93	0.02

			cars	procedure					
81	CAN1022316	29/09/2019	passenger cars	open tender	1	274,776.00	263,800.00	10,976.00	3.99
82	CAN1022316	29/09/2019	passenger cars	open tender	1	85,142.00	84,156.00	986.00	1.16
83	CAN1022274	27/09/2019	passenger cars	open tender	1	344,980.00	330,000.00	14,980.00	4.34
84	SCNA1024051	26/09/2019	dump trucks	simplified procedure	2	416,935.73	409,000.00	7,935.73	1.90
85	SCNA1023917	25/09/2019	vans	simplified procedure	1	201,681.00	168,880.00	32,801.00	16.26
86	CAN1021884	22/09/2019	dump trucks	open tender	3	1,092,000.00	903,000.00	189,000.00	17.31
87	CAN1021884	22/09/2019	dump trucks	open tender	3	825,000.00	622,511.50	202,488.50	24.54
88	CAN1021884	22/09/2019	dump trucks	open tender	3	290,000.00	237,600.00	52,400.00	18.07
89	CAN1021585	18/09/2019	motor vehicles	open tender	2	23,575,846.33	23,574,204.51	1,641.82	0.01
90	CAN1021585	18/09/2019	motor vehicles	open tender	1	37,724,452.42	37,721,675.29	2,777.13	0.01
91	CAN1021585	18/09/2019	motor vehicles	open tender	1	11,462,012.55	11,460,949.01	1,063.54	0.01
92	CAN1021585	18/09/2019	motor vehicles	open tender	1	38,249,328.85	38,247,246.01	2,082.84	0.01
93	CAN1021585	18/09/2019	motor vehicles	open tender	2	15,012,479.30	14,973,406.00	39,073.30	0.26
94	SCNA1023367	17/09/2019	trucks	simplified procedure	1	501,408.33	499,000.00	2,408.33	0.48
95	CAN1021471	14/09/2019	motor vehicles	open tender	1	830,499.75	829,200.00	1,299.75	0.16
96	CAN1021471	14/09/2019	motor vehicles	open tender	2	9,071,211.13	8,577,880.00	493,331.13	5.44
97	CAN1021493	14/09/2019	motor	open tender	1	1,262,184.87	1,188,979.91	73,204.96	5.80

			vehicles						
98	CAN1021386	14/09/2019	passenger cars	open tender	2	2,095,798.20	2,095,498.20	300.00	0.01
99	CAN1021303	11/09/2019	buses	open tender	1	2,394,957.98	2,381,400.00	13,557.98	0.57
100	CAN1021260	10/09/2019	dump trucks	open tender	1	189,815.50	181,174.60	8,640.90	4.55
101	SCNA1022912	09/09/2019	passenger cars	simplified procedure	2	529,411.76	513,973.14	15,438.62	2.92
102	SCNA1022912	09/09/2019	passenger cars	simplified procedure	1	58,823.52	58,800.00	23.52	0.04
103	SCNA1008561	09/09/2019	motor vehicles	simplified procedure	4	646,800.00	561,692.00	85,108.00	13.16
104	SCNA1008561	09/09/2019	motor vehicles	simplified procedure	3	171,292.00	171,292.00	0.00	0.00
105	SCNA1008561	09/09/2019	motor vehicles	simplified procedure	3	302,400.00	256,938.00	45,462.00	15.03
106	CAN1021065	04/09/2019	motor vehicles	open tender	2	294,117.64	257,700.00	36,417.64	12.38
107	CAN1021065	04/09/2019	motor vehicles	open tender	2	294,117.64	273,120.00	20,997.64	7.14
108	SCNA1022616	04/09/2019	motor vehicles	simplified procedure	1	168,067.00	167,000.00	1,067.00	0.63
109	CAN1021029	03/09/2019	buses	open tender	4	1,200,000.00	1,018,284.26	181,715.74	15.14
110	CAN1020880	30/08/2019	vans	open tender	1	3,180,000.00	3,018,000.00	162,000.00	5.09
111	CAN1020865	30/08/2019	buses	open tender	3	720,000.00	678,000.00	42,000.00	5.83
112	SCNA1022377	29/08/2019	buses	simplified procedure	1	714,285.72	714,000.00	285.72	0.04
113	SCNA1022290	28/08/2019	vans	simplified procedure	1	111,835.39	109,900.00	1,935.39	1.73
114	CAN1020762	27/08/2019	quad bikes	open tender	2	168,500.00	140,400.00	28,100.00	16.68
115	CAN1020714	27/08/2019	buses	open tender	1	195,487,890.00	195,268,331.70	219,558.30	0.11

116	CAN1020538	23/08/2019	buses	open tender	3	2,255,748.00	2,085,408.00	170,340.00	7.55
117	SCNA1015039	21/08/2019	motor vehicles	simplified procedure	1	626,218.47	624,600.00	1,618.47	0.26
118	SCNA1015039	21/08/2019	motor vehicles	simplified procedure	1	138,800.00	138,800.00	0.00	0.00
119	CAN1020348	20/08/2019	passenger cars	open tender	1	1,397,640.00	1,397,600.00	40.00	0.00
120	CAN1020225	15/08/2019	passenger cars	open tender	1	1,609,035.00	1,598,861.00	10,174.00	0.63
121	CAN1020157	14/08/2019	passenger cars	open tender	5	4,148,356.66	3,543,840.00	604,516.66	14.57
122	SCNA1021353	09/08/2019	motor vehicles	simplified procedure	3	504,201.68	495,425.99	8,775.69	1.74
123	SCNA1020898	02/08/2019	buses	simplified procedure	1	462,184.70	459,530.00	2,654.70	0.57
124	CAN1018856	22/07/2019	motor vehicles	open tender	3	44,483,172.27	43,102,545.72	1,380,626.55	3.10
125	CAN1018856	22/07/2019	motor vehicles	open tender	3	137,647,064.10	127,989,225.00	9,657,839.10	7.02
126	CAN1018856	22/07/2019	motor vehicles	open tender	4	257,512,606.22	219,257,820.00	38,254,786.22	14.86
127	CAN1018856	22/07/2019	motor vehicles	open tender	3	128,193,277.14	89,123,100.00	39,070,177.14	30.48
128	CAN1019116	20/07/2019	motor vehicles	open tender	4	5,001,680.67	3,753,782.40	1,247,898.27	24.95
129	CAN1012338	20/07/2019	motor vehicles	open tender	1	9,340,762.90	9,298,904.00	41,858.90	0.45
130	CAN1012338	20/07/2019	motor vehicles	open tender	1	7,834,033.65	7,747,500.00	86,533.65	1.10
131	SCNA1020010	19/07/2019	motor vehicles	simplified procedure	4	523,361.00	438,624.00	84,737.00	16.19
132	SCNA1006152	02/07/2019	motor	simplified	3	648,000.00	491,460.24	156,539.76	24.16

			vehicles	procedure					
133	SCNA1018900	01/07/2019	ambulances	simplified procedure	1	154,000.00	154,000.00	0.00	0.00
134	SCNA1006835	01/07/2019	motor vehicles	simplified procedure	3	291,000.00	256,154.76	34,845.24	11.97
135	SCNA1018764	28/06/2019	vans	simplified procedure	2	159,663.86	122,356.80	37,307.06	23.37
136	CAN1017817	26/06/2019	motor vehicles	open tender	1	2,521,008.40	2,142,857.00	378,151.40	15.00
137	CAN1017621	21/06/2019	motor vehicles	open tender	3	624,454.99	398,629.41	225,825.58	36.16
138	SCNA1006751	19/06/2019	motor vehicles	simplified procedure	4	289,915.95	252,762.12	37,153.83	12.82
139	SCNA1006751	19/06/2019	motor vehicles	simplified procedure	1	347,899.15	333,655.00	14,244.15	4.09
140	SCNA1018211	19/06/2019	ambulances	simplified procedure	1	645,360.00	539,798.00	105,562.00	16.36
141	SCNA1018115	18/06/2019	minibuses	simplified procedure	2	507,600.00	507,500.00	100.00	0.02
142	SCNA1018107	18/06/2019	motor vehicles	simplified procedure	2	280,000.00	215,500.00	64,500.00	23.04
143	SCNA1019632	12/06/2019	passenger cars	simplified procedure	3	599,158.00	536,187.19	62,970.81	10.51
144	CAN1016846	07/06/2019	vans	open tender	7	1,270,000.00	896,803.00	373,197.00	29.39
145	SCNA1017407	04/06/2019	passenger cars	simplified procedure	1	503,300.00	503,300.00	0.00	0.00
146	SCNA1017092	29/05/2019	passenger cars	simplified procedure	1	360,000.00	360,000.00	0.00	0.00
147	SCNA1016996	28/05/2019	motor vehicles	simplified procedure	1	227,791.00	197,182.16	30,608.84	13.44
148	SCNA1006946	27/05/2019	motor vehicles	simplified procedure	1	315,000.00	269,390.85	45,609.15	14.48

149	CAN1014385	18/05/2019	vans	open tender	2	816,000.00	809,500.00	6,500.00	0.80
150	SCNA1016516	17/05/2019	motor vehicles	simplified procedure	1	138,655.46	137,955.00	700.46	0.51
151	CAN1015688	15/05/2019	motor vehicles	open tender	1	1,545,920.17	1,457,571.27	88,348.90	5.71
152	SCNA1016152	13/05/2019	ambulances	simplified procedure	1	191,818.39	184,499.00	7,319.39	3.82
153	SCNA1015604	02/05/2019	passenger cars	simplified procedure	1	397,250.00	396,466.46	783.54	0.20
154	CAN1014614	22/04/2019	motor vehicles	open tender	1	256,000.00	255,767.23	232.77	0.09
155	CAN1014444	19/04/2019	passenger cars	open tender	2	648,907.50	648,555.00	352.50	0.05
156	CAN1013264	26/03/2019	passenger cars	open tender	1	691,176.36	673,700.00	17,476.36	2.53
157	SCNA1012843	25/02/2019	vans	simplified procedure	1	148,276.38	148,226.38	50.00	0.03
158	SCNA1012671	19/02/2019	motor vehicles	simplified procedure	1	340,736.67	340,270.00	466.67	0.14
159	CAN1011466	12/02/2019	buses	open tender	2	2,521,008.40	2,302,560.00	218,448.40	8.67
160	CAN1011082	31/01/2019	sewage truck	open tender	2	368,000.00	247,800.00	120,200.00	32.66
161	SCNA1011628	22/01/2019	motor vehicles	simplified procedure	1	221,837.77	221,540.00	297.77	0.13
162	SCNA1031110	16/01/2019	dump trucks	simplified procedure	2	319,327.73	299,000.00	20,327.73	6.37
163	SCNA1011194	10/01/2019	motor vehicles	simplified procedure	1	284,369.00	275,629.40	8,739.60	3.07
164	SCNA1011194	10/01/2019	motor vehicles	simplified procedure	1	80,000.00	70,799.53	9,200.47	11.50
165	CAN1009917	10/01/2019	passenger cars	open tender	5	9,870,000.00	9,107,302.80	762,697.20	7.73

TOTAL	**open tender - 95 simplified procedure – 70**	**283**	**2,093,031,237.92**	**1,903,865,183.32**	**189,166,054.60**	**1,063.57**
MEDIUM VALUE	**-**	**1.72**	**12,685,037.81**	**11,538,576.87**	**1,146,460.94**	**6.45**

Source: Romanian Electronic Public Procurement System (SEAP)

Structural Analysis of Agglomerations as the Ontological Basis of Territorial Planning (Case Study of Kharkiv Region, Ukraine)

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Abstract

Spatial arrangement of human activity by territorial planning is a highly relevant problem for many countries throughout the world. A problem of an optimal population settlement distribution network is always drastically crucial for Ukraine due to a number of reasons, some of which have been taken into account upon the administrative and territorial reform provided. The determination of structural and dynamic characteristics of the population settlement network gets more and more topicality in the mentioned aspect. Our paper focuses on methodical and procedural issues of the agglomeration spatial structure regional research by the modeling of Integral Function of Impact (IFI). This approach is grounded on the concept of some "area of impact" for any socio-economic geographic feature. Modelling builds the series of IFI-surfaces with spatial distribution of population settlement by the IFI-function itself, by the population settlement potential, and by the averagely weighted with the IFI population settlement potential. These surfaces represent various sides of interactions according to a parameter selected. The IFI-surfaces built are a user-friendly tool for the definition of initial agglomerations and promising region growing points, which stimulated development would contribute to an optimal usage of a territorial potential, while increasing economic, human, and investment potential too. The paper demonstrates the results of the IFI-approach application within a case study of Kharkiv region (Ukraine). The outlined approach of the agglomeration spatial structure regional research can be in demand for evidence-based territorial planning and managing, for effective policy of regional development, etc.

Keywords: regional development, population settlement, agglomeration, territorial planning, IFI-modeling, Ukraine.

Research Problem Introduction

The population settlement system is a conservative constituent of the mankind due to its historical development. It not only represents all singularities of former socioeconomic formations, but also the population settlement system permanently stays in contradiction with those newly entities of social production, which have been generated recently. The increased pace and rapid development of the urbanization process during the industrial age was caused by the growth of manufactures in cities and by the following necessity of their labor potential increasing. As the result, the urban population concentration reached acritical level in the biggest megalopolises all over the world in the twentieth century. This circumstance caused much higher specifications to the urban infrastructure functioning, citizen life support systems, social security, etc. However, the beginning of postindustrial development of human civilization initiated the definite decentralization of the productive industry with relocation of productive units from urban territories to suburbs and even to rural areas. Hence, the countryside obtained the higher development priority in comparison with a traditional urban area, what was reasoned by the rural labor market promptly developed due to agriculture demand, and this trend was followed by corresponding spreading of various services for rural residents. All mentioned above drastically altered existing requirements with respect to a population settlement system and to the medium of communication. As a result, the territorial planning of agglomerations obtained the highest priority.

All processes and phenomena described above are relevant to Ukraine. The existing structure of the population settlement distribution were implemented upon Soviet times. This out-of-dated structure is unable to provide the flexibility of the spatial organization of the society upon contemporary transition to the free market economics. Because of this the regions pertained to the monocentric class of the population settlement began losing their labor force. Distal parts of regions began to expose a significant decay, while the countryside fell in the drastic decay. The disbalance between the regional center and almost all distal part of a region grew more and more, and that continually distorts the spatial organization of regions and makes all components of regional development be more complicated. Thus, there is an evident necessity for new approaches to territorial planning as to a tool, which can provide an optimal balance between a region center and its periphery (distal parts).

A category of "urban agglomeration" was officially used in the research domain of population settlement since some time. This category possesses quite a few definitions for the time being. The most frequently it means a big city (as an agglomeration center) with its suburbs and with all nearest townships. All these settlements are, as a rule, associated among them by various relations and interconnections, which all together finally produce a new entity of common functioning for this big city and small towns and villages around. Such territorial compact entity of settlements can be considered as a spatial systemic formation with all relevant properties of the social geographic system – socio-geosystem [10, 11]. As they were investigated, it appeared, that agglomerations as spatial structures of various hierarchical level are a widespread mode of the territorial arrangement. Taking this into account, it is possible to suggest the following hierarchy of these agglomerations for the administrative and territorial division of Ukraine (Table 1).

Table 1: The agglomeration hierarchy of the population settlement in Ukraine

(implemented by the authors)

#	*Agglomeration hierarchical level*	*Agglomeration center*	*Topical sociogeosystem*
1	Mega-level	A large city (almost or over 1 million of residents)	Interregional, regional
2	Macrolevel	A city as a center of an oblast – a larger administrative unit	Regional
3	Meso-level	A town as a center of a rajon – a smaller	Under-regional

		administrative unit	
4		A town, a township (a center of UTC)	United territorial community
5	Microlevel	A township, a large village	Local

Thus, a regional population settlement system is a mosaic of all five agglomeration levels, which either partially, or completely overlap each other in the spatial extent. That is, the local agglomerations are the elementary ones, while various hierarchical levels of the population settlement spatial structure can be distinguished – from microlevel to mega-level. If summarized, this structure of the population settlement network can be represented at any place of a populated territory by the vector, which components are a cluster of agglomerations of different levels. Therefore, the delineation of agglomerations with further research is a topical issue of the population settlement system optimization (territorial management and planning), this stipulates the importance and necessity of its structural-systemic analysis.

Key singularities of the contemporary structure of the population settlement network have been defined by the long history of its formation. A settlement agglomeration initiation is a complicated process of numerous stages, and which is caused by many factors. This process should be considered as the consequent implementation of the development and the self-organization functions of the geographical space. The latter is the origin domain of the future key environmental factor and an initiator of future civilizations – a biological species *Homo Sapiens.* The allocation function was the initial function of the geographical space. Implementation of this function led to creation of distinguished single settlements, which made an initial framework for further population settlement distribution. Afterwards several other functions of the geographical space were consequently implemented (*distance function, gradient function, transference function, interaction function)* [9]. It is necessary to emphasize, that quite a few preventing factors, both natural (mountains, impassible marshes and forests, big lakes and rivers), and artificial (e.g., state boundaries) ones impeded implementations of these functions. The biggest and most rapidly developed settlements gradually became accepted leaders and the agglomeration centers upon the interconnections with respect to the development of industrial and business specialization, trade growth, and cultural advancement. Agglomerations were initiated as soon as newly originated settlements attempted to enter into already existing spatial infrastructure of a number of settlements in a given area. Further alterations of initial agglomerations were determined by demographic processes of "population-depopulation" (increasing / decreasing number of residents), as well as by a migration process upon the procedure of the continual territorial self-organization.

The optimal usage of the integrated territorial potential is one of the key tasks in the regional development management for the time being. This task requires the composite research on the agglomeration spatial structure as well as on their evolutionary potential for indication of possible development distortions and for optimization of the regional production spatial structure. The delineation of the mentioned spatial structure and consequent estimation of agglomeration interactions – from local level to mega-level – is the first step of the mentioned key task solution.

This paper deals with the methodological substantiation of the regional research of the agglomerations spatial structure using the method of integral influence function modeling (IIF modeling), the presentation of the results of the grounded methodology application on the materials of Kharkiv region (Ukraine), which may be useful for the determination of scientifically-based planning measures and managing the territories of other countries and regions.

Literature Review

Many various topics in the domain of territorial planning have been examined in publications issued for years by both scientists, and managers. Agglomeration issues were considered by many well-known researchers. In particular, J. Coppolani once suggested to consider an urban agglomeration as a system of towns and villages interconnected by functional relationships, which exposes a definite

trend of unification into one common urban territory [2]. According to P. McCann, the existence, allocation, and repartition of the labor force is the determinant of the agglomeration development [7]. B.H. Baltagi B.H. proposes to accept purely economic criteria of research on the development of agglomerations (general level of a national economy, rate of salaries and wages, productive specialization, existing transportation infrastructure) [1]. According to A. Pujiati with coauthors the questioning survey with further analysis of its results can be highly effective method in agglomeration research if the following criteria are taken into account: characteristics of city management, urban housing development, urbanization level and a population number, housing supply ratios, possible environmental hazard, if there is an embankment in an area, local economy with its informal sector, urban green space and volume, if there are sources of renewable energy, the possibility of environmental harmful contamination [14].

Some issues of the regional development spatial models have been presented by the authors and discussed on the former IBIMA conferences [12, 13]. The authors have explored the agglomerations of Kharkiv region for quite a long time by applying the structural systemic approach and some other methods of the information theory and the systemic analysis [5, 6, 9]. This text has summarized the regional research of the agglomeration spatial structure methodological issues and represents key results of the relevant analysis of Kharkiv region.

Research Approach

The IFI-modeling method is quite applicable for pursuing the outlined research goal. This method is based on the series of publications made by L. Niemets and K. Niemets, which introduced the concept of "the Impact Zone" of a human geographic feature [10, 11]. An interaction between two settlements is possible according the mentioned concept, if impact zones of these settlements obviously overlap, thus they share a common part of the geographical space. If a distance between them is a historically given constant, their interaction force is determined by the radius R of impact zones. The latter in its turn depends on the potential of an analyzed entity (a number of residents), which is a settlement. Changing R sequentially on the systemic basics (for all analyzed entities simultaneously), it is possible to explore various according to the rate of summarization "profiles" of the interaction field for two settlements. These profiles can be accepted as the views of some historical stages of the agglomeration development. Finally, the series of IFI-surfaces of interaction fields is computed. These surfaces represent the distance function and the interaction function of the geographic space bounded to different historical benchmarks [10].

Presentation of research results

The alteration of the social relation in Ukraine, transition of our country to the postindustrial society, structural improvements in regional developments, all these factors cause the current changes in the territorial organization of the society. The geographic space polarization, spreading of deprived areas, low competitiveness of some regions and the absence of the effective regional policy, all this is intrinsic for the majority of regions. The population settlements as a mode of the society territorial organization cause singularities of the population social activity. The administrative territorial reform has been provided in Ukraine since 2015. Its essence lies in a delegation of more power credentials to the local self-governments and self-authorities. The changes in administrative territorial divisions took place too. This reform has to become a crucial tool of optimal changes in the spatial organization of the society, a factor of the regional development acceleration, and a condition of upgrade for the population settlement and the economy [3]. Generation of united territorial communities in Ukraine in 2015-2019 demonstrated two opposite trends. The first trend: rural territorial communities in distal areas were united around county ("rajons" – in Ukrainian) centers – small townships and villages [4]. The second one: rural communities around big cities of regional scale attempted to organize UTCs without this city involvement. The placement of UTCs throughout Ukraine is quite uneven. UTCs in some regions such as Khmel'nyts'ka Oblast', Zhytomyrs'ka Oblast', Ternopil's'ka Oblast', Dnepropetrovs'ka Oblast' already possess the bigger parts of the corresponding areas. At that very time, Zakarpats'ka Oblast' and Kyyivs'ka Oblast' present a quite slow process of

UTCs generation. Kharkiv region - Kharkivs'ka Oblast' can be described by the regional center exaggerated development and by the conservation of the center-peripheral models of development. There are only 23 UTCs in the region [4], that only emphasizes both timeliness, and necessity for our research to be done.

Computing of IFI-surfaces has been provided in our research with *R*-parameter sequential increasing from 2 till 30 km with a step of 1 km. In this way, a cluster of IFI-surfaces models consequently the relationship origination among settlements with increasing interaction forces. In some way this describes the dynamics of a process of agglomeration generation, changes of agglomeration size and configuration, spatial interrelationships, overlapping, etc.

The series of IFI-surfaces have been modeled for 993 settlements within the boundaries of Kharkiv region. These surfaces display spatial distribution of population settlement by the IFI-function itself, by the population settlement potential (*P*), and by the averagely weighted with the IFI population settlement potential (P_w), These surfaces represent various sides of settlement interactions according to a parameter selected. The most pictorial surfaces are introduced on Fig. 1.

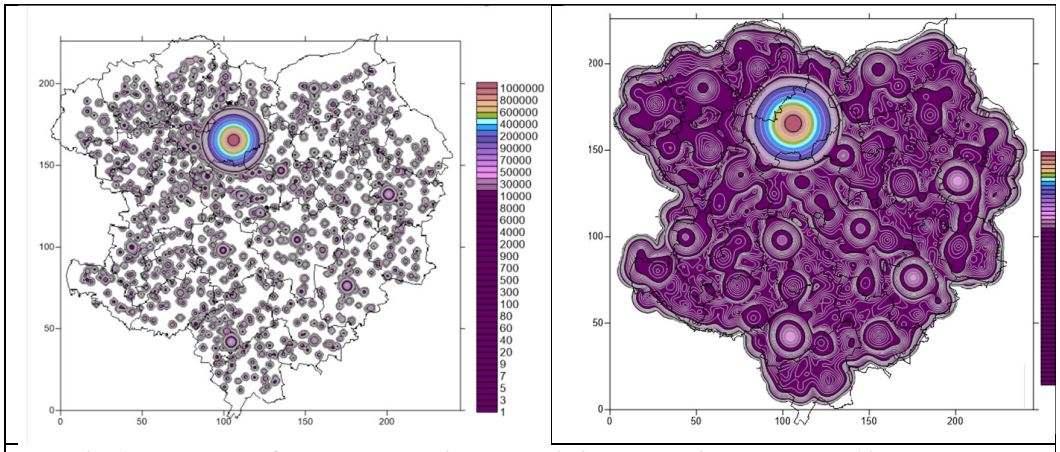

Fig. 1: The IFI-surfaces modeled with the basic impact radius $R_0 = 2$ and 10 km by the averagely weighted with the IFI population settlement potential (P_w), (made by the authors according to modeled results)

It is necessary to emphasize, that IFI-surfaces for $R_0 = 2 - 4$ km display clearly the origination of the initial local agglomerations with the centers of large villages. We can easily trace the microlevel / meso-level agglomeration origination upon $R_0 = 10 - 12$ km, while the macrolevel agglomeration origination - upon $R_0 = 19 - 22$ km. The IFI-surfaces relevant to the initial stages of the mega-level agglomeration origination are distinctive for rather big R_0 values.

The built IFI-surface can be accepted as the efficient tool for the definition of initial agglomerations and promising region growing points (the areas expected for the socio-economic growth), which stimulated development would contribute to an optimal usage of a territorial potential, while increasing economic, human, and investment potential too. The delineation of region growing points contributes to the regional development acceleration, in general, and can speed up the peasant farming, in particular. These processes can be supported by both the central, and regional authorities, since there is a sustainable perspective of the regional manufacturing industry and various services further developing. In its turn, the development of promising region growing points as the areas expected for the socio-economic growth contributes to decreasing external migration as well as to enhancing investment attractiveness of the region. Also, it can be taken for granted, that gradual development of promising areas within the region strongly contribute to the territorial distortion diminishing with respect to the regional socio-economic growth.

Conclusions

A problem of an optimal population settlement distribution network is always drastically crucial for Ukraine due to a number of reasons, some of which have been taken into account upon the administrative and territorial reform provided in our country recently. Thus, the accomplishment of the regional population settlement research can be considered as an extremely topical issue. The outlined approach can be demanded for evidence-based territorial planning and managing, for effective policy of regional development, etc. Our paper focuses on the results of the IFI-approach application within a case study of Kharkiv region. The following conclusions can be made: 1) the polarizing impact can be traced within the region, which is related to not only Kharkiv-city, but also to such cities as Lozova, Izym, and Kup"yans'k; 2) the model of basic radius of 20 km displays an origination of some elongate impact zone of organizational cores of population settlement distribution and significant distortion in the relevant regional development; 3) the population concentration phenomenon can be traced at the locations, which can be considered as the "region growing points" mentioned above; 4) the rural areas with the lowest averagely weighted potential of population settlement can be accepted as the most promising ones for the priority development. The authors' research will be continued in this thematic domain.

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Food Security Problems in Ukraine

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Abstract

The country's food security is an important indicator of socio-economic development, a component of social and physical health of the population. Ukraine having got high quality black soil is a potential contender for growing ecologically clean food. Land market can start working in the country in the near future, which potential business is interested in. Food security is an integral part of many economic and political transformations in Ukraine. This issue requires comprehensive research, including scientists. The paper analyzes the current state of food security in Ukraine, indicators of physical and economic availability of food by main foodstuffs have been calculated. It was found that the highest level of food security by the indicator of physical accessibility is characterised for certain products, in particular, it is oil, potatoes and sugar, and by the indicator of economic accessibility - for potatoes and bread products. Volumes of food production by domestic producers fully meet the solvent demand of the population, however, due to the low incomes of the majority of Ukrainian citizens, the consumption of practically all foodstuffs (except potatoes and bread products) is lower than rational norms. In order to solve the problems of food security of Ukraine, it is necessary first of all to raise the level of population's income, which will stimulate increase in consumption of foodstuffs and rise the capacity of the internal food market.

Keywords: Food Security, Indicator Of Food Physical Availability, Indicator Of Food Economic Accessibility, Rational Rates Of Consumption, Agri-Food Complex Of Ukraine.

Statement of the Problem

Food security is one of the indicators of the socio-economic development of the country. It characterizes the level of satisfaction of one of the basic human needs - the need for food. Achieving

a sufficient level of food security is a major factor in social stability and a guarantee of social peace in society.

Since 2014, the crisis processes in the Ukrainian economy have led to a sharp deterioration in the standard and quality of population's life, which has been reflected primarily in meeting the basic needs of the vast majority of people. In this view, the study of Ukraine's food security problems is extremely relevant and important in today's context.

The purpose of this study is to identify Ukraine's food security problems and determine ways to address them.

Review and analysis of previous research materials

According to the Methodological Guidelines for the Calculation of the Economic Security Level of Ukraine (2013), food security is "… a status of foodstuffs production in a country able to fully meet the needs of every member of the society for good quality food, provided that it is balanced and accessible to every member of society».

According to Kwasha S.M. (2000), three essential aspects of the concept of food policy are identified: political, economic and social.

According to Shchekovich O.S. (2009), food security necessarily includes not only the consumer aspect (taking into account physiological norms), but also production (due to the development of own production, and only then - the necessary imports of agricultural products and food).

Golikova K.P. (2012) proposed a food security structure consisting of resources coming from the environment.

Problems of population provision with agricultural products (mainly crop production) at the regional level are considered by Dobrovolskaya N.V. and Kostrykov S.V. (2016).

In the study of regional competitiveness the issues of agricultural development are considered by Niemets L.M. and Sehida K.Yu. (2017), in particular, its innovation and investment potential is determined as a factor of the food security formation.

Ungureanu, G., Leonte, E., Chiran, A., Costuleanu, L. C., Ignat, G., Donosă, D., Boghita, E., Petrea, E. (2019) showed understanding of the concept of food security and nutrition in the XX and XXI centuries.

There are different methods of assessing food security. The Global Food Security Index (GFSI) considers such key factors related to such indicators as the economic and physical availability of food (sufficiency diet, infrastructure development level, GDP, level farmer financing, etc.), as well as their safety and quality (dietary norms; presence of micronutrients in food) (Global Food Security Index).

The Food and Agriculture Organization of the United Nations uses 30 indicators to monitor food security, which are formed into four groups: availability, access, stability, use of food (FAO's web site).

According to the methodology of the Cabinet of Ministers of Ukraine and the Ministry of Economic Development and Trade of Ukraine, food security is considered as one of the indicators of economic security. The status of food security is characterized by an integral index consisting of 9 weighted average subindices.

Banach O.I. (2017) describes the features of food security and its problems at the individual, national and global levels.

Fachrudinawati F. and Handayani D. (2019) investigate gender-based food security in Indonesia's households.

Some issues of population trading service of regions of Ukraine as a component of food security and features of food security as components of regional development were discussed by us at previous IBIMA conferences and some papers (Kobylin, P.O. (2015), Kobylin, P.O. (2016), Kobylin, P.O. (2017), Niemets, L.M. et al. (2018), Niemets, L.M. et al. (2019).

Research Methodology

Determining the food security of Ukraine, the authors propose to consider it in terms of the physical and economic availability of food.

The indicator of food physical availability (I_{pa}) proposed by the authors can be represented as a ratio of food production and consumption:

$$I_{pa} = \frac{\text{Volumes of production}}{\text{Volumes of consumption}} \quad (1)$$

This indicator reflects the development level of the food complex of a country or region, its ability to meet the population's needs in food in general. In fact, this is an indicator of *food availability* produced by domestic producers.

The indicator of food economic availability (I_{ea}) proposed by the authors is defined as the ratio of food consumption and its rational norms:

$$I_{ea} = \frac{Volumes\ of\ consumption}{Rational\ norms\ of\ consumption} \quad (2)$$

In fact, it is an indicator of *food consumption sufficiency*, which depends on the level of purchasing power of the population.

Statement of The Study Materials

The calculated indicators of the food physical and economic availability in Ukraine are shown in Table 1.

Table 1: Ukraine's Food Security Indicators, 2017
(Source: based on data from "Agriculture of Ukraine: Statistical Yearbook", 2017)

The main food stuffs	Consumption per 1 person per year, kg	Rational norms of consumption, kg	Indicator of the food economic availability, I_{ea}.	Production per 1 person, kg	Indicator of the food phisical availability, I_{pa}
Meat and meat products, including offal and raw fat	51,7	80	0,65	54,6	1,06
Milk and dairy products	200	380	0,53	242	1,21
Eggs, pcs.	273	290	0,94	365	1,34
Bread products (bread and pasta in terms of flour; cereals, flour, legumes)	100,8	101	1,00	No information available	-
Potatoes	143,4	124	1,16	523	3,65
Vegetables and melon food crops	159,7	161	0,99	219	1,37
Fruits, berries and grapes (without wine processing)	52,8	90	0,59	48	0,91
Fish and fish products	10,8	20	0,54	No information available	-
Sugar	30,4	38	0,80	46,9	1,54
Oil	11,7	13	0,90	123,5	10,56

The calculations of the indicator of food physical availability show that the level of of agricultural production development and food industry in Ukraine provides a sufficient level of food security for most food products, especially oils (I_{pa} = 10,56), potatoes (I_{pa} = 3,65), sugar (I_{pa} = 1.54). Volumes of domestic production of vegetables and melons, eggs, milk and dairy products, meat and meat products also exceed their consumption (I_{pa} exceeds 1). Only production of fruits, berries and grapes provides about 90% of the population consumption (Fig. 1).

The indicator of food economic availability in Ukraine has greater variability of values than the indicator of food physical accessibility (Fig. 2).

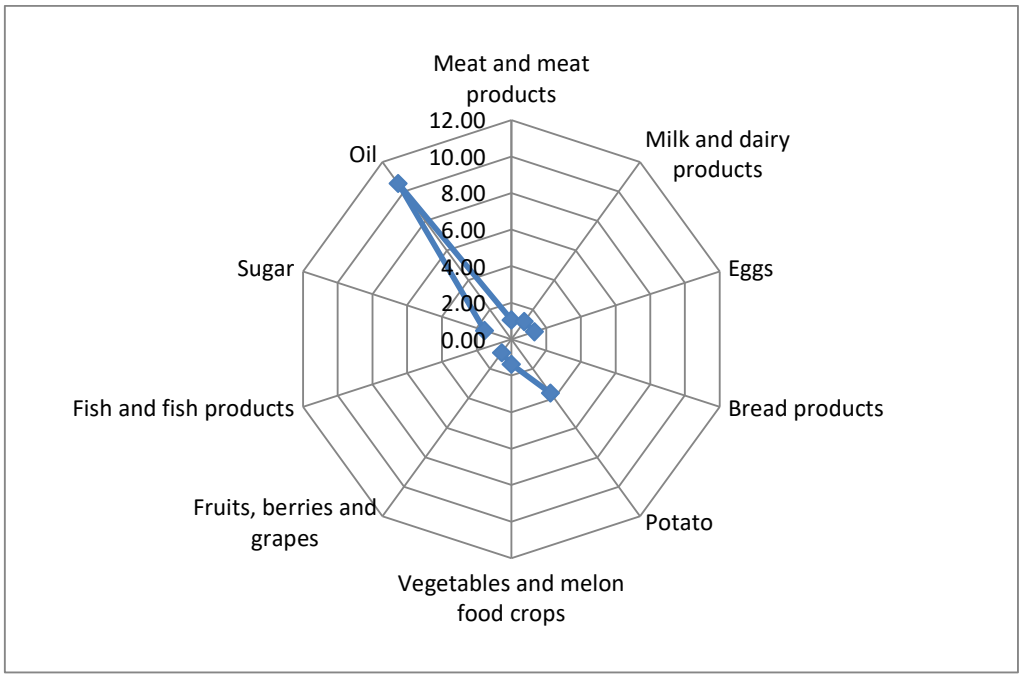

Fig. 1: Indicator of the food phisical availability,
(Source: based on data from "Agriculture of Ukraine: Statistical Yearbook", 2017)

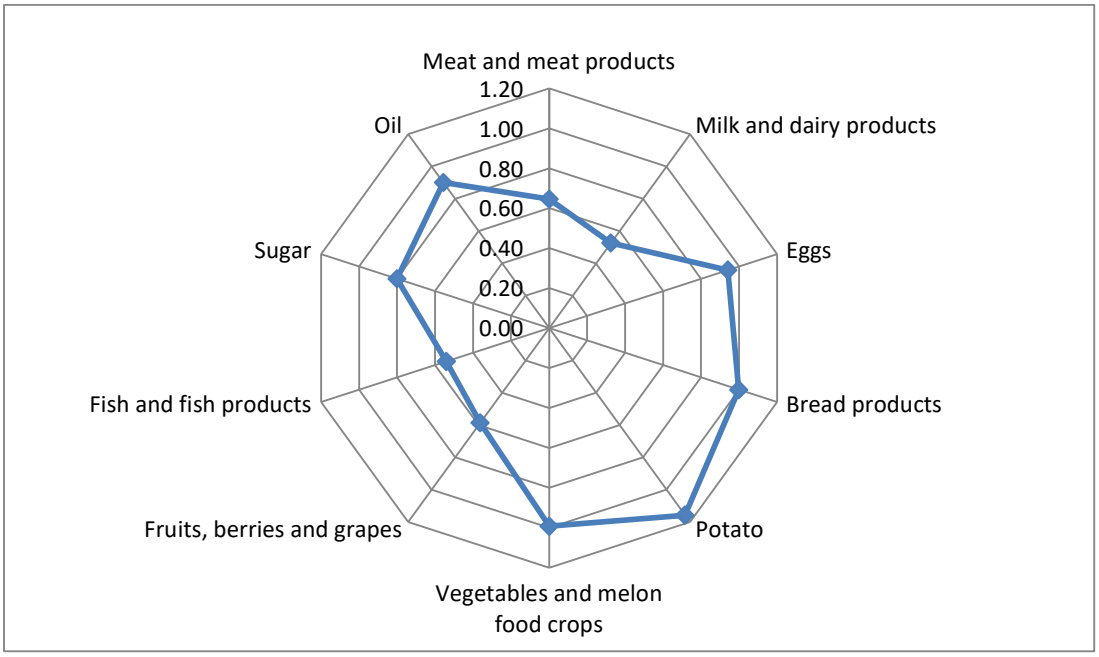

Fig. 2: Indicator of the food economic availability in Ukraine,
(Source: based on data from "Agriculture of Ukraine: Statistical Yearbook", 2017)

According to this indicator, the highest and sufficient economic availability is characterized for such foodstuffs as potatoes (I_{ea} = 1.16) and bread products (I_{ea} = 1). For other basic foodstuffs, the indicator of food economic availability is less than 1, indicating a lack of consumption of certain foodstuffs in accordance with rational standards. The lowest indicators of economic availability are characterised for milk and dairy products (I_{ea} = 0.53), fish and fishery products (I_{ea} = 0.54), fruits, berries and grapes (I_{ea} = 0.59), meat and meat products (I_{ea} = 0.65).

The greatest imbalance in terms of physical and economic accessibility is characterized for oil, sugar, milk and dairy products, meat and meat products, eggs. The indicator of physical accessibility shows that these products are produced excessively in Ukraine, but their consumption levels are less than normal. This indicates that population due to low incomes cannot generate sufficient solvent demand for basic foodstuffs.

The authors analyze the level of food security of Ukraine for each of the basic food products. During 2015 – 2017, the volume of meat production per person remained virtually unchanged and exceeded 54 kg, its consumption slightly increased from 50.9 kg to 51.7 kg *("Agriculture of Ukraine: Statistical Yearbook", 2017).* That is, domestic production actually provides consumer demand for meat and meat products, but their consumption is only 65% of the rational consumption rate which is 80 kg. This situation is explained, on the one hand, by the low purchasing power of the population and, on the other, by the constant rise in prices for livestock products. The number of cattle stock in Ukraine decreased from 9.4 million heads to 3.5 million heads, and the number of pigs - from 7.7 million heads to 6.1 million during 2000-2017. *("Agriculture of Ukraine: Statistical Yearbook", 2017)*. Therefore, it is extremely problematic to achieve a sufficient level of food security using a domestic livestock resource base.

The volume of milk production decreased from 248 kg to 242 kg per person, as well as its consumption - from 210 kg to 200 kg during this period. Although the population of Ukraine is provided with surplus dairy products, their consumption is almost twice less than the normal rate (380 kg). This is due to the same reasons as in the meat situation.

The situation is the same with fish and fishery products, whose consumption is twice less than rational rate, although during 2015 - 2017 their consumption increased from 8.6 kg to 10.8 kg per person.

Egg production for the period from 2015 to 2017 decreased from 392 pcs. up to 365 pcs per one person, and their consumption - from 280 pcs. up to 273 pcs., which provides almost adequate food security for this foodstuff with a rational consumption rate of 290 pcs. Poultry breeding in Ukraine is better compared to other livestock industries due to its higher profitability, faster payback on production costs.

The highest level of food security among vegetable products of plant origin, according to the indicator of food physical availability, has oil, whose production is in 10 times higher than the volume of consumption and they are constantly growing. Ukraine ranks first in the world on the production of sunflower oil. However, consumption of vegetable oil below rational norms was approximately 10% and in 2015-2017 decreased from 12.3 kg to 11.7 kg per person *("Agriculture of Ukraine: Statistical Yearbook", 2017)*.

The similar situation with the sugar supply: its consumption has decreased from 35.7 kg to 30.4 kg and it is 80% of rational rates, but its production is in 1.5 times higher than the consumption (Agriculture of Ukraine, 2017).

The highest level of food security for both indicators of (physical and economic) accessibility is characterized for potatoes, its production exceeds the consumption in 3.6 times, and the consumption increased from 2015 to 2017 from 137 kg to 143 kg and on 16% higher than rational rates (*"Agriculture of Ukraine: Statistical Yearbook", 2017*). Potatoes for Ukrainians have traditionally been one of the key foodstuffs called "second bread".

The same situation is with bread and bread products, their consumption generally meets or exceeds rational rates, and the baking industry fully provides the population with this "strategic" food product based on a powerful flour-milling industry. The developed olericulture in Ukraine creates a sufficient products supply which covers 137% of domestic consumption of vegetables, which is almost in accordance with rational rates of nutrition.

The lowest level of food security among crop products is characterized for fruits, berries and grapes, their production provides consumption for about 90%, and the level of consumption of these products is only about 60% of rational rates.

Conclusions

Summarizing the conducted research, it should be noted that in general, the agro-food complex of Ukraine has a sufficient level of production of food products to ensure population consumption, except fruits, berries and grapes, and partly - meat and meat products. However, the level of population consumption of the majority of basic foodstuffs is lower than the rational norms and at the same time decreases over time, which indicates deterioration of the population's living standard. In turn, the decline in solvent demand for foodstuffs is a deterrent to the development of certain branches of the agro-food complex of Ukraine. A way out of this situation for food producers may be increase of their exports, which will stimulate the development of the agricultural sector of the economy and related branches of the food industry, promote economic growth and raise of population's social standards, in particular it is regarded to the balance of foodstuffs consumption.

The analysis in this study is based on the real status of economic development of Ukraine. Complex institutional and economic processes are held, which raises many important issues, including Ukraine's food security. The authors continue to investigate this problem, including in particular the improvement of research methodology, statistical data collection, etc.

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Peripheral-Central Migration as A Component of The Post-Industrial Development of The City (Case Study of The City of Kharkiv, Ukraine)

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Abstract

The article describes the relationship between the central and peripheral regions of the Kharkiv region, which are manifested, as a rule, in the form of labor and educational migration. On the basis of the "growth poles theory", it has been proved that cities become a place of concentration of economic, social, financial, intellectual, labor resources. Such "growth points" provide wide opportunities for the population to receive higher incomes and, therefore, attract migrants from peripheral areas. The purpose of this article is to analyze the current migration situation in the Kharkiv region in order to identify factors, directions and characteristics of migration. Based on the migration trends identified by the authors in the Kharkiv region, it can be noted that urbanization processes are intensifying in the region due to the influx of rural residents, but settlement within the city occurs in semi-peripheral areas, thereby creating a suburbanization process. An increase in the urban population, its employment in the tertiary sector and high-tech sectors of the economy, a high proportion of youth and students speaks of its post-industrial development.

Keywords: Labor Migration, Educational Migration, Post-Industrial Development; Center-Periphery, Growth Pole, Kharkiv.

Relevance of the Research

Differentiation of the socio-economic development of the region often leads to the concentration of a number of resources: production, human, financial, transport and communications, infrastructure, innovation, investment, etc. in some territories, mainly large cities, and the lack of these resources in other territories. Large-scale urbanization processes have long led to rural depression, and the migration of people from villages to cities causes decline and even the elimination of many villages throughout Ukraine. Only those rural settlements, which are located in close proximity to large cities, and also have good transport access to them, benefit. There are close ties between such settlements and a large city, which are supported by peripheral-center population migrations. The relevance of this topic is that the city of Kharkov, which is the center of the Kharkiv agglomeration with a post-industrial city, daily, receives tens of thousands of migrants from peripheral areas who are mainly employed in the tertiary sector of the economy, while this process is typical of most post-industrial cities of Eastern Europe.

The ***purpose*** of the study is to analyze the current migration situation in the Kharkiv region in order to identify factors, directions and characteristics of migration. The main ***research questions*** are: How have the main directions of migration in the Kharkiv region changed? Why is the city of Kharkiv a center of attraction for migrants? Do migration processes affect the post-industrial development of the city?

Methods

This article is based on a set of philosophical, general scientific and concrete scientific research methods. The main methods: analytical, synthesis, inductive-deductive, problem-searching (identifying the impact of population migration on the post-industrial development of the city), retrospective (analysis of the main periods of the city's development, changing its functions and factors of migratory attractiveness) statistical (operating with statistical data), graphic (when visualizing the results of the study in the form of graphs, charts, cartographic diagrams).

The research database consists of data from the State Statistics Service of Ukraine, the Main Department of Statistics in the Kharkiv Region, materials from the Kharkiv Regional State Administration and the Kharkiv City Council. Analytical reviews and reports, scientific articles and publications of foreign and Ukrainian authors were studied.

Analysis of Previous Studies

At the beginning of the XX century, many scientists, in particular economists, sociologists, philosophers and futurists in their studies talked about the upcoming transformations of society and its individual components. The founders of this concept were A.J. Penty (Penty, 1922) and D. Bell (Bell, 1967), who, as the main agent of these changes, considered the level of technological development of society, in particular, the method of production. E. Toffler called such transformations “technical revolutions” and in the book “The Third Wave” (Toffler, 1980) described in detail the current and future technical, economic and social transformations, calling the new period of development of society – post-industrial, and the previous ones: industrial and agrarian (pre-industrial). The industrial revolution was followed by scientific and technological, which entailed a complex of changes in society. If in industrial society the main driving force was labor productivity, now human capital has come to the fore. For most post-industrial or those that are in the process of transformation to post-industrial cities of the world, the predominant mechanism for replenishing the quantity and quality of human capital is migration in all its manifestations. Perhaps the most important and visual form of migration during the post-industrial transformations of the city is migration from the periphery to the center, if we consider the city as part of an agglomeration, and from the center to the periphery, if we talk specifically about the city itself.

Demographic transformations have formed a territorial unevenness in the settlement of Ukraine, since the density of urban and rural populations varies significantly against the background of the

concentration of significant economic and labor resources in cities and territories adjacent to them with high economic activity. The processes of polarization of socio-economic development of settlements in the center-periphery direction on the background of depressiveness of rural areas and small towns due to a significant outflow of youth.

In the middle of the twentieth century among economists, the "growth poles theory", was emerging. Jacques Boudeville (Boudeville, 1966), continuing the idea of François Perroux (Perroux, 1970), in his studies, in addition to focusing on the particular concentration of enterprises in certain industries, an important role is given to the territory in which this concentration occurs, calling large industrial cities the main "growth poles" of the territory. For the first time, based on the "growth poles theory" urbanization processes are analyzed by H.R. Lasuean (Lasuean, 1969). In his opinion, the regional node of enterprises associated with the export of the region may be the "growth pole"; "growth poles" grow due to impulses generated by nationwide demand, these impulses are transmitted to peripheral secondary industries through market saints and connections between enterprises, taking into account the factors of their location. In addition to this, P. Pottier (Pottier, 1963) noted that territories located between "growth poles" and providing transport links receive additional development impulses due to the growth of cargo flows, the spread of innovations, and the development of infrastructure, thereby turning into development axes (corridors). Such territories are suburban areas of cities and settlements that are part of the agglomeration.

A critic of the "growth poles theory" was J. Friedmann, who associated the concept of a "growth center" directly with geographical space, and his concept of "center-periphery" suggested that the uneven economic growth of the regional system and the process of spatial polarization create imbalances between the center and the periphery (Friedmann, 1979). In the process of relations between the center and the periphery, the center constantly dominates due to the emergence of innovations and the constant use of resources from the periphery, including human resources, increasingly generating migration from the periphery.

Center-peripheral and peripheral-center migration of the population is a subject study of socio-economic geography, economics, sociology and political science, since they affect various components within the socio-territorial system, therefore, they need an integrated approach to their study. Within the framework of human geography, this approach is widely used in the works of W. Crystaller (Crystaller, 1966) and C. Friedmann (Friedmann, 1966), and in the center-peripheral concept of A. Frank, the center is seen as a concentration of economic political, military power that exploits the peripheral regions.

Presenting Main Material

Suburban zones have long been formed around large cities, the relationship of which with a large city is greatly enhanced. This connection is manifested mainly due to the migration of the population, since large cities are a system of concentration of production, investment, intellectual, educational and other resources, which allows the population to get better job opportunities, increase their own incomes and receive quality social services. One of the striking examples of the city-growth pole, which is at the stage of transition to post-industrial development in Ukraine, is the city of Kharkiv, in the past a powerful industrial city.

According to the legislation of Ukraine, the main criterion for the status of a city is a population of at least 10 thousand inhabitants, and 2/3 of the population is employed outside agriculture. In this regard, in the Kharkiv region there are 17 cities, 7 of which are cities of regional subordination (Cities and areas…). The increasing role of cities is evidenced by the fact that the urban population over the past 30 years has increased from 78.6% to 81.0% (Fig. 1) (Cities and areas…).

Kharkiv agglomeration is the second largest agglomeration of Ukraine, located in the Kharkiv region, formed around the city of Kharkiv. According to the "Demographia World Urban Areas", in 2019 Kharkiv agglomeration takes 340th place in the world with a population of 1,585 million people and a population density of 4,000 people/km² (Ukrainian society: the migration dimension). 54.04% of

the total population of the region lives in Kharkov, no more than 5% in other cities of the region, this indicates the monocentric city of the Kharkiv region. The centers of spatial distribution of the population of the Kharkiv region depend on the number of people in the city of Kharkiv (Fig. 2). This is especially true of the arithmetic center and the center of gravity of the population. The calculations presented on the map of Figure 2 indicate that the regional center – the city of Kharkiv – Is the center of gravity of the population of the region, and the maximum concentration of the population is in the neighboring administrative regions of the region. Thus, around Kharkiv – the "center", a "semi-peripheral region" was formed – the Kharkiv, Chuhuiv and Zmiiv districts, and the rest of the region is the "periphery".

In contradistinction to the cities and districts of the Kharkiv region, which lose their population every year, the population of the city of Kharkiv due to the influence of migration processes decreases slightly, since the city is a center of regional attraction for potential migrants from smaller cities and villages of the region and other regions of the country. The relatively high migration attractiveness of Kharkiv as a regional center is naturally caused by a high level of socio-economic potential, a better situation on the labor market, a large concentration of training and research centers, industrial enterprises and service organizations, which, in turn, causes the formation of new labor flows and educational migration to the city (Ukrainian society: the migration dimension). These two types of migration (labor and educational) can be called one of the most important signs of the transition to the post-industrial development of the city (Suptelo, 2019). Moreover, the scale of migration flows could be of different levels, both international or interregional, and local, within the city itself.

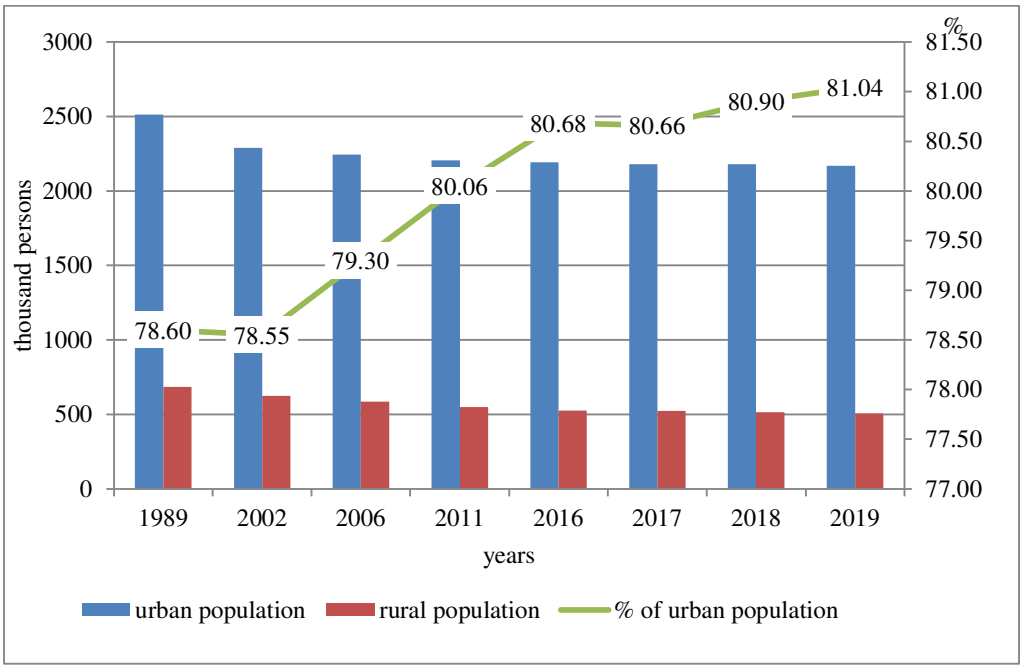

Figure 1: The dynamics of the urban and rural population of the Kharkiv region for the period from 1989 to 2019 (built by authors according to the (Cities and areas of the Kharkiv region in 2018)

In 2018, the migration balance of the population in Kharkiv was positive in the amount of 5755 persons. Emigration from the city amounted to 22,736 people, immigration – 28,491 people. Mostly among immigrants, a population of 18 to 50 years old, that is, an active working population predominates (Kharkiv region in 2018. Statistical Yearbook). Thus, the migratory replenishment of the young population to some extent compensates for the depopulation losses and the scarcity of regional labor markets, which creates favorable conditions for the socio-economic recovery of the city.

One of the positive effects of migration processes in cities is the centralization of human resources, which is manifested in the territorial concentration of labor and intellectual resources. The greatest potential for the development of human capital, in our opinion, is concentrated in such a group as applicants and students, since it is they who are promising qualified personnel, therefore the effectiveness of the socio-economic system depends on the quality and quantity of this group in the region. The reason for the migration of young people from the regions and the reason not to return is the location in the city of 52 higher education institutions (Fig. 3).

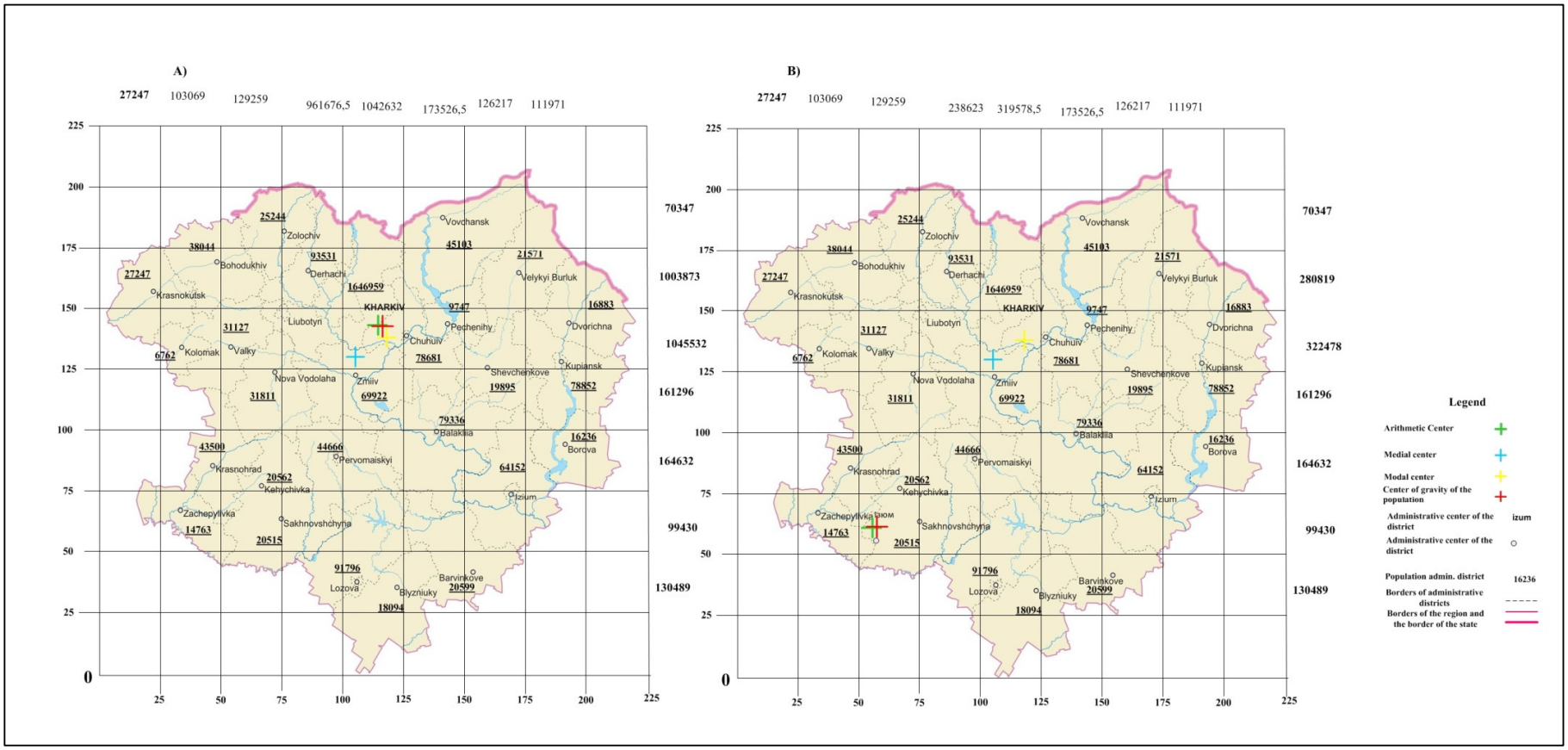

Figure 2. The spatial distribution of the population of the Kharkiv region as of January 1, 2019
a) taking into account the city of Kharkiv, b) excluding the city of Kharkiv)

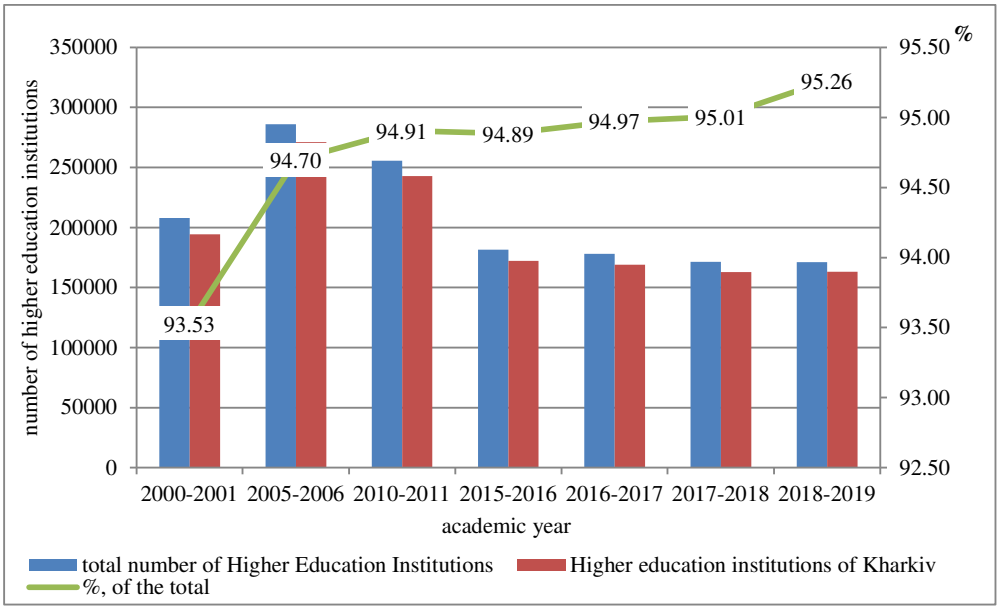

Figure 3: The dynamics of the number of students in the Kharkiv region and in Kharkiv

In Ukraine, there is no comprehensive data on internal educational migration, although a certain part of the information is collected at the national level. So, in the Unified Electronic Database on Education of the Ministry of Education and Science of Ukraine, admission commissions of higher educational institutions enter data on enrollment in the first year of full-time education for residents of the region where the educational institution is located, as well as residents of other regions. However, in the Register of subjects of educational activities, these data are not freely available (in particular, separately for higher educational institutions and regions), which complicates detailed monitoring of youth migration flows.

Since there are no statistics on the volume of educational migrations between and within regions, it is reasonable to use the indicator of the number of visiting full-time students who need to be accommodated in a hostel, which can be used for approximate volumes of migration in the region. Of the total number of enrollees in Ukraine who needed a settlement, 15% were settled in hostels in Kharkiv and the region. 49.5% of all city enrollees are directly from Kharkiv, 50.5% are residents of the Kharkiv region, other regions and foreign students (Official website State Statistics Service of Ukraine).

According to the data on educational migration, in 2018, 90% of all school graduates began to study in their region, 10% chose another region for higher education, mainly Kiev, Dnipro, Lviv, Odessa, and some of the graduates wished to receive education abroad. Of the 32871 enrollees who entered higher educational institutions of the Kharkiv region in 2018, 5941 were residents of other regions of Ukraine, which makes up 18% of all enrollees. The increase in applicants in the Kharkiv region occurred mainly due to migration from the Luhansk and Donetsk regions, which in 2018, 45% and 35%, respectively, which were selected by higher educational institutions of the Kharkiv region (Official website Kharkiv Regional State Administration).

In order to identify the positive impact of population migration on the development of the city, we created a periodization of migration processes in the city of Kharkiv, depending on the functions that the city performed at different periods of the development of society (table 1). It should be noted that throughout the entire period of the city's development, labor migrations predominated, only during the period of pre-industrial and industrial development of the city were these mainly migrations from the central regions of Ukraine and the peripheral regions of the Russian Empire, and post-industrial -

peripheral migrations from the districts of the region, having the form pendulum migrations. With the opening of Kharkiv University in 1805, the city became the center of educational migration. These two types of migration (labor and educational) prevail in the city to this day, replenishing the city with highly qualified labor resources. Since 2014, the population of the city is replenished by internally displaced persons from the Donetsk and Luhansk regions, which are also potential resources for the socio-economic development of the city, having a certain financial, economic and intellectual potential (Niemets, Husieva and etc., 2018).

Table 1: Periodization of migration processes in Kharkiv (compiled by the authors (Bahalei, Myller, 1905; Mazurova, Virchenko, 2014; Niemets, Husieva and etc., 2020))

Period	City functions	Types of migration and composition of migrants	Migration attractiveness factors
Pre-industrial (agricultural)	Defense	Forced migrations due to war and peace – the heirs of the Cossacks and the military of the Moscow state	On the ruins of the Wild Field appears Kharkiv Fortress – the defense center of the Moscow state; the beginning of the construction of roads that connected Kharkiv with Poltava, Sumy, Moscow
Industrial	Administrative, industrial, transport	Voluntary labor migrations, forced labor migrations, both permanent and episodic, educational migrations.	Transformation of Kharkiv into a large provincial city; opening of Kharkiv University; development of trade fair and crafts; the beginning of the development of the financial, commercial, cultural and educational spheres of the city; expansion of urban development; open rail links; the emergence of the first educational institutions and the development of theater, cinema, art. Kharkiv – the largest transport center with a high level of economic development, attracts workers to industrial enterprises and service industries; wide connections with the Donetsk-Kryvyi Rih region; the availability of jobs; Kharkiv is the first capital. During the Second World War, the city suffered tremendous damage, many enterprises were irrevocably evacuated or destroyed, so in the post-war period a large number of both the local population and migrants were sent to restore the city.
Post-industrial	Multifunctional center	Educational, labor, both permanent and pendulum, forced migration of immigrants from Donetsk and Luhansk regions	Departure of industry to the 2nd plan, priority development of the services sector: financial sector, trade; the development of high-tech industries; IT industry, a high level of development of science, education (Kharkiv is the student capital of Ukraine), positioning the city as a Smart city; wide transport links both within the city and with the periphery attracts a completely different qualitative composition to the city. This is mainly a young population with a high level of education.

Conclusions

Of course, the level of development of the territory affects the qualitative and quantitative composition of the population, which changes under the influence of both natural and mechanical movement of the population For countries and territories that have moved to a post-industrial level of development, a feature of population reproduction processes is a reduction in natural growth and an increase in migration flows. The main reason for the reduction in the rate of natural growth is the ability of the population to comprehensive development and self-realization. At the same time, this is the main factor in the migratory attractiveness of the territory. The transformational processes of the territory in the economy and technical features of production are primarily displayed on its population, at the same time. The population itself is the agent of these transformations.

For Ukraine, the Kharkiv region and the city of Kharkiv, in particular because of events in the east of the country, are strategically important for the development of the country's economy. As a powerful industrial city in the past, Kharkiv is now at the stage of an active transition to post-industrial development. At the same time, not only the features of the economic life of the city are changing, but also the composition of its population. As for most other post-industrial cities, in Kharkiv, migration flows change the composition and quantity of the population more intensively than the processes of natural population growth.

Compared with other cities in the eastern region of Ukraine, Kharkiv is a rather young city that developed intensively and changed its functions (Table 1), while the composition of the city population changed. A retrospective analysis suggests that it was migration processes that had the greatest impact on the population of the city. The relationship between the level of development of the city, its functions, features of migration and its direction is also traced. In the Kharkiv region, Kharkiv has always been a “pole of attraction”, both economically and demographically. In the first two periods: pre-industrial and industrial, as for most cities in eastern Ukraine, the prevalence of labor migrations, both forced and voluntary, as well as migrations due to war and peace, was characteristic. The duration and extent of such migration flows were mostly constant. In the modern post-industrial period, the causes of migration in the Kharkiv region have not changed, their nature has changed. Labor migrations have become predominantly pendulum. Educational migrations were added, which in most cases from a temporary phenomenon develop into a permanent one, students do not return, but remain in the city for permanent residence.

Given the fact that more than 50% of the region’s population lives in Kharkiv, one cannot ignore its impact on both economic and migration processes. Supporting the main theses of the concepts of “cent-periphery” and “growth poles”, it can be argued that for the Kharkiv region and Eastern Ukraine the city of Kharkiv is a “center” and a “growth pole” in which the maximum number of population and production, which is migratory, is concentrated attractive and attracts all kinds of innovations in production, economics, science and education.

At the same time, a number of unresolved issues remain in need of further research. First of all, these are the problems of methodological support of migration studies at the local and regional territorial levels, associated with the lack of most of the necessary statistics on the number, quality of migrants and the direction of migration. Available statistics do not provide a complete picture of the impact of migrants on the development of individual sectors of the city’s economy. To obtain such information, most likely, it is necessary to apply sociological research methods.

Linking migration with the transition of the main city of the region to the post-industrial stage of development, it is necessary to study these processes on a city-wide scale. The results of such studies, on the one hand, will confirm or refute the theory of its post-industrial transition, and on the other hand, they will give an idea of the pattern of population distribution. Until the post-industrial transition is completed, the city is under threat in optimal development: from full-fledged industrial development to the complete decline of the city. In their further research, the authors intend to

reasonably consider the indicated options based on an interdisciplinary approach, drawing up conceptual models of possible development directions

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Modern Migration Processes in the European Union: Trends, Factors and Consequences

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Abstract

Migration of the population is becoming increasingly important, their directions are diversified. There is an increase in the volume and impact of migration on the population, economy, culture, and politics of almost all countries of the world in the 21st century. The migration crisis has become a major challenge for the European Union and has disturbed its integrity, because every state has interests that do not always coincide with the needs and interests of the EU as a coherent integration union. Migration challenges of the 21st century regard many European countries, affect their stability, determine the relevance and timeliness of migration studies, taking into account the geopolitical, demographic, sociocultural and economic capabilities of countries. They require studies of the causes, volumes and consequences of migration processes, as well as their impact on security and social transformations, which can be useful to increase the effectiveness of migration policy both within one state and at the interregional and global levels. This publication analyzes the positive and negative socio-economic effects of migration processes for both recipient countries and EU donor countries. The spatio-temporal features of migration processes in the EU countries are determined, push-and-pull factors, migration movements are determined based on the analysis of official data and analytical reports. The main migration trends are investigated, the socio-economic consequences for the countries of departure and acceptance of migrants are determined, measures to resolve the migration crisis in the EU are identified. The experience that will be gained depending on the success of these issues in the European Union will be of great value for the further development of the world society, the world economy, the movement of labor and the international division of labor.

Keywords: Migrants, Migration, Migration Crisis, Positive and Negative Migration Effects, Migration Policy, European Union.

Relevance of the research topic

Intensification of migration processes is observed in the world, which has led to significant social changes and shocks in the last ten years, especially in the most developed and developed countries of the European Union. The relevance of this study determines the powerful economic, social and political effect of migration processes in the countries of the European Union. Of great interest are interregional and interstate migrations in modern scientific research, the result of which can be significant economic consequences not only for countries in which there is significant emigration of the population, but also for those states in which there is immigration of the population from other countries. Changes in the structure of the population, social characteristics and the relationship between the strata of the population emerging as a result of migration open up new opportunities for states that accept migrants to solve existing problems, and at the same time create a whole series of new social problems and conflicts. The emerging issue of changing migration policy has become a very serious challenge for each state of the world's largest integration association. The experience that will be gained depending on the success in resolving these issues by the European Union will be of great value for the further development of world society, the world economy, the movement of labor resources and the international division of labor.

Analysis of previous studies

Studies of individual aspects of migration processes in the European Union and its individual countries are sufficiently covered in the scientific literature. The issues of migration processes in the EU are presented in the works of B. Dmitruk [2], H. Lutsyshyn [11], O. Malynovska [12], M. Martsinyk [1], R. King, E. Zontini [17]. This topic was also discussed at previous IBIMA international conferences. In particular, the determinants of migration flows from the «new» member states of the European Union to the «old» member countries of the European Union, which have accompanied the process of enlargement of the European Union since 2004, followed by the liberalization of migration by removing restrictions on labor markets at different time periods in different member countries represented in the work of S. Franca, A. CehCasni, A. Barisic [5]. Demographic effects of labor migration in European countries presented in the work of researchers A. Cristea, D. Cristea, A. Bobocand, E. Samoila [1]. Features of the impact of the refugee crisis on EU economic diplomacy are analyzed in the work of A. Ilieand, D. Dumitriu [7]. An analysis of the dynamics of labor force and population employment in the European space, as well as the implications for the Romanian labor market was discussed in a scientific study of M. Stefan, M. Oancea, A. Diaconu, O. Buzoianuand, M. Mitrita [20]. Some issues of migration processes in the world and in Ukraine in particular were discussed by us at previous IBIMA conferences [15, 16, 18].

The purpose and objectives of the study

This publication identifies the positive and negative socio-economic consequences of migration processes for both recipient countries from the EU and donor countries. To carry out the study, the tasks were set to establish the spatiotemporal differences of migration processes in the EU countries, determine pushandpull factors of migration movements, consider the main trends, determine the socio-economic consequences for countries of departure and acceptance of migrants, determine measures to resolve the migration crisis in the EU based on analysis of official data and analytical reports.

Information base and research methods.

The information base for the analysis of migration processes in the EU countries is official data of European Union [3], United Nations (UN) [21], United Nations High Commissioner for Refugees (UNHCR) [23], United Nations Fund For Population Activities (UNFPA) [22], International Organization for Migration (IOM) [9], International Labour Organization (ILO) [8], open data of Eurostat [4] and Migration Database [10], analytical reviews, reports, scientific articles, data from

sociological studies, materials from the specialized and socio-political press, and the results of our own research by the authors. In the research process, analysis and synthesis methods were used (to identify the structural features of migration processes), systematization (to group the positive and negative effects of migration), a comparative historical method (to identify the dynamic features of migration processes in the EU countries), a comparative geographical method (to identify regional differences in migration processes and EU countries), generalization method and others.

Main Exposition

There are several directions of migration in the European Union now. In general, only a small fraction of Europeans migrate to North America, and all other migrant flows are directed to the EU.

The main directions of migration flows in the European Union, which can be represented as follows [19]:

- from the Middle East through the Mediterranean to Greece, Italy, Spain, and then to Hungary, Germany, France, Great Britain, Sweden;
- from Eastern Europe to Central Europe;
- from Central Europe to Western and Northern Europe;
- from Western Europe to Canada and the USA;
- from the countries of the Balkan Peninsula to Central and Western Europe;
- from the countries of the Baltic region to Western Europe.

It should be noted that the magnitude of migration from Eastern, Central and Southeastern Europe to Western Europe was very large in 2000-2010, after which there was a decrease in their intensity. This is confirmed by data on changes in the working-age population of individual states as a result of emigration. There was a recession of more than 3 % in Lithuania, in Latvia – by 2 %, in Poland - almost 4 %. The global economic crisis slowed down the pace of mechanical movement in Europe itself, but it had almost no effect on migration from North Africa and the Middle East [9, 13]. In general, migrations from the countries of the Middle East have received the greatest intensity in recent years [14]. In addition, the intensification of forced migrations over the past ten years is typical. Note that the most attractive regions for immigrants, including refugees, are among the countries of Europe and the Middle East: Western and Northern Europe, including Germany, France, Austria, Denmark, Sweden. The transit states include Spain, Italy, Portugal, Malta, Greece, Bulgaria, other Balkan states and Hungary. Bulgaria, Romania, Slovakia, Croatia, Hungary, Czech Republic, Poland, Lithuania, Latvia, Estonia are considered to be the countries where emigrants predominate. These states are the least attractive for migrants and pursue such an economic and social policy that gravitates toward the countries of Western Europe, one of the world development centers [19].

The positive investigation of migration processes for the economy can be evidenced by information from countries that have become new members of the European Union after 2000: unemployment rates have declined there since 2007. But in this case the main factor is the migration of citizens from these states to the more developed states of Western Europe. The decrease in the number of unemployed is due, first of all, not to changes in the domestic economic policy of these states, but to the departure of people to work in Germany, France, Great Britain, Spain, Portugal, Italy, Sweden. The positive role of economic transformation through membership in the European Union should not be reduced, because the sharp economic growth in the new EU member states has led to the phenomenon of reverse migration.

The report of the Special Rapporteur on the human rights of migrants of the UN General Assembly highlights the results of recent studies by scientists at Oxford University, which found that an increase in the share of migrants in the low-skilled labor segment by 10 % reduces wages in these professions by only 2 %. It is also noted that such a decrease in salaries can have a positive effect: University of California researchers studied the labor activity of refugees who arrived in Denmark from 1991 to 2008, and found that migrants really drove the poorly educated indigenous population

out of the low-paid professions. But instead of staying on unemployment benefits, most of the citizens who were laid off found places with higher wages [21].

A new migration problem can be attributed to the refusal of new migrants from the Middle East to return to their homeland if a stable peaceful political and economic situation is established in the states from which they came. The experience of previous migrants will not be very useful in assessing the impact of the current wave of refugees on the European economy. Migrants in Germany have become an additional burden on the budget in past years, because among them there were many pensioners. The current migrants from North Africa and South-West Asia are mainly young people, which means they will work for a long time throughout their lives. It is these immigrants who require a special political and economic approach to satisfy both their needs and the needs of the indigenous inhabitants of the European space [9, 14].

Both positive and negative effects of migration processes from the positions of the European Parliament, EU leaders and leaders of the governments of the participating countries are highlighted. Among the positive results (fig. 1) are the solution to the demographic problems of depopulation, the solution to the problems of the lack of cheap labor resources (following the concept of a new demographic transition), the solution of economic problems and overcoming crisis phenomena in the economy (in particular, the prevention of economic stagnation).

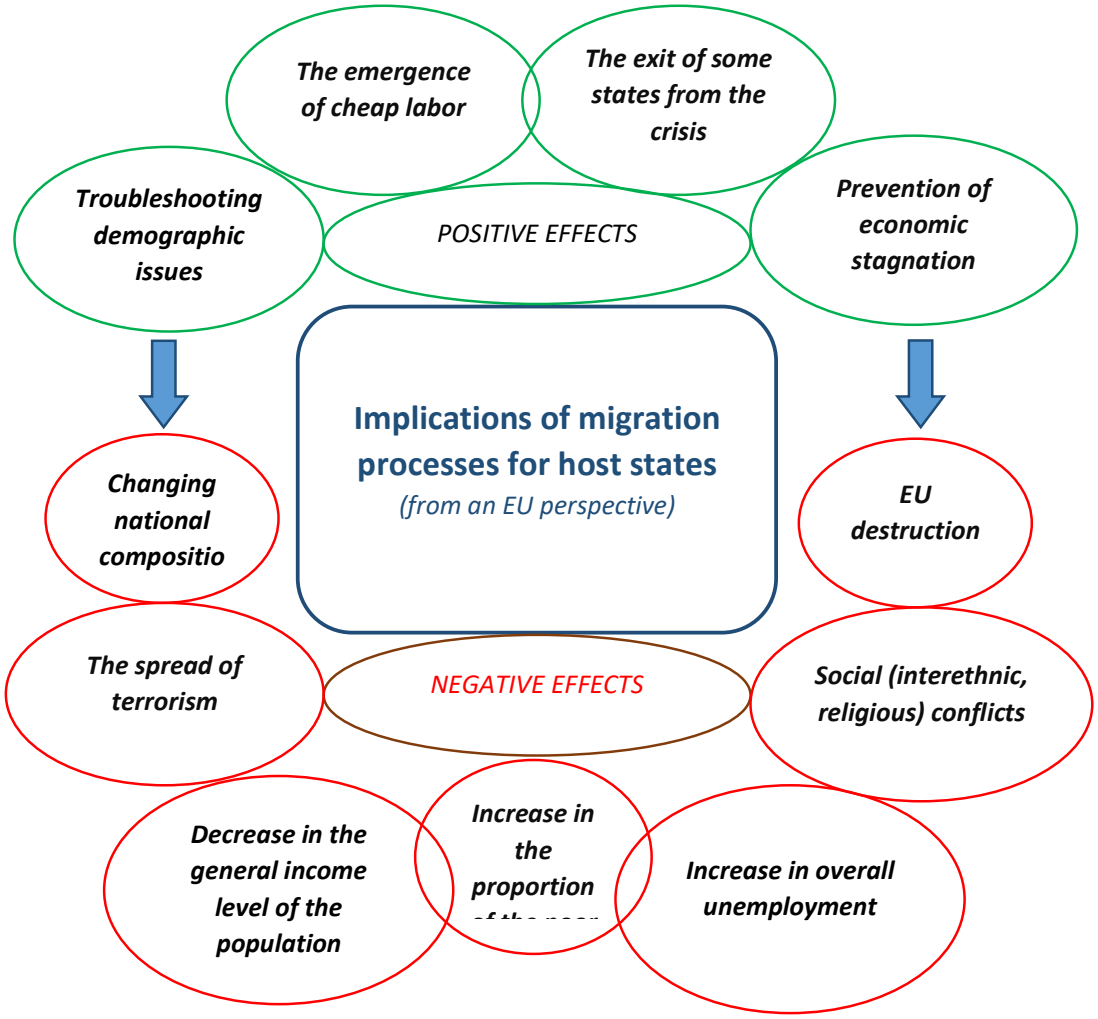

Fig. 1: Effects of migration processes for recipient countries (summarized according to [2, 3, 11, 12, 14, 17, 21])

At the same time, experts identify a significantly larger number of negative effects of the influx of refugees: despite the solution of some demographic problems, others may appear, the basis of which is a significant change in the national composition of member states with a decrease in the influence of state-forming nations. The spread of terrorism, interethnic and religious conflicts, a decrease in the general income level of the population (disproportionate increase in income and population growth rate (including – children and older people)), as a result, the public reaction to such a change will be impoverishment of the population, increase in unemployment. The cumulative negative impact will result in a violation of the integrity of the European Union. Most of the projected consequences have been fully or partially confirmed, and some influential states intend to exit the European Union (Great Britain).

The effects of migration on the countries of destination can be considered. The positive effects include a decrease in social tension, because there is a decrease in the pressure of excess labor. As a result of this, the solvency is partially increased, but the most important factor in this case is the

receipt of funds that citizens earn abroad. If a migrant returns, he is an important skilled worker. Negative consequences have an impact: the loss of most of the qualified resources (young people usually do not plan to return), the decrease in investment due to the loss of investor confidence in the reliability of their investments. The loss of part of the national income occurs because migrants produce goods and services for other states, which also increases the competitiveness of other states, especially if the migrant is highly skilled worker.

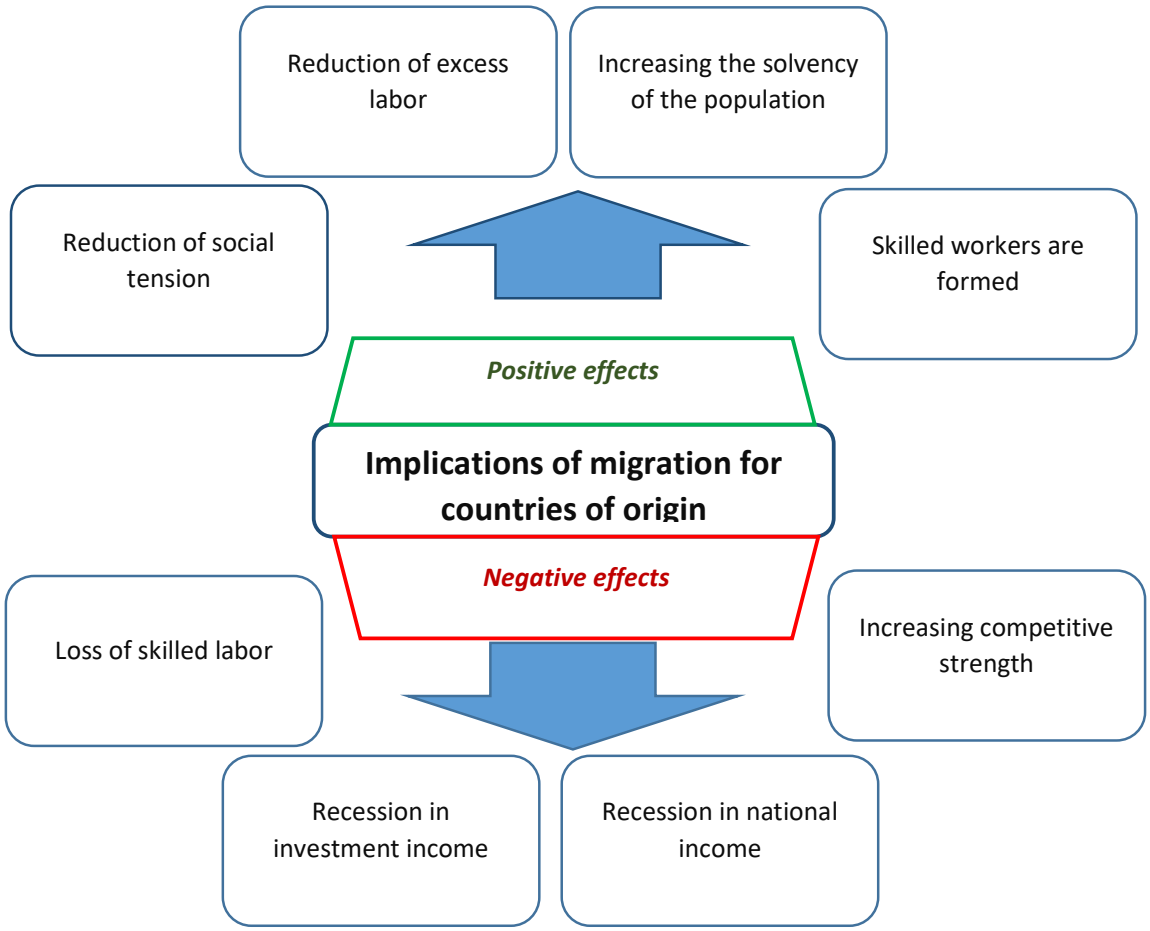

Fig. 2: Consequences of migration processes for donor countries (summarized according to [2, 3, 11, 12, 14, 17, 21])

Migration problems in developed countries were exacerbated at the end of the twentieth century, but current migrants have completely different qualities than those that prevailed until 2010 [3, 10]. It was believed that globalization should solve this problem, because the disappearance of borders should not cause intolerance in a tolerant society. But in reality globalization exacerbates existing interethnic, national, and religious conflicts. The modern migration wave is a direct consequence of globalization and one of the types of reactions of other civilizations to the spread of economic, political, cultural influence of the European Union and the USA. An example of the transition of regional problems to the global scale are migrants, who migrated to them in connection with military operations and economic problems and generate crisis situations in their territories.

The main problems associated with migration processes include cultural inequality, the problem of integrating migrants into the European community, and lack of consensus on the issue. It is the fundamentally different positions between the states that are the reason for such a long search for a solution to the migration crisis. Some states are in favor of introducing a hard migration policy with

full control over irregular migration processes and emphasizing the unification of the procedure for returning irregular migrants to the donor country [11, 21].

The emphasis is that the cultural and social integration of migrants always has two sides: it depends not only on the desire or unwillingness of the newcomer to integrate into society, but also on the attitude of society itself towards it. Recently, the attitude of society towards migrants of a new wave has intensified, which is one of the decisive indicators of the possibility of further acceptance of illegal migrants and their legalization as refugees. The difference between EU residents and refugees is too big at the civilizational level. This led to the consideration of several ways of integrating migrants into the European community, which present opposing views on the migration problem:

- isolating migrants through the creation of closed ethnic and religious communities;
- assimilation, which goes through complete voluntary identification with European culture (speech, mentality, religion).
- multicultural approach: immigrants receive the same rights and privileges as a citizen of any state within the EU.

The first approach is a partial restriction of the rights of migrants, therefore, it cannot be used to conduct migration policy at the regional level. The EU is trying to maintain a multicultural approach, which is the best option for refugees, but there is increasing support for ultra-right, nationalist movements in society. These include organizations such as «SYRIZA», which is significantly represented in the Greek Parliament, the National Front (represented in France and the European Parliament). Radical-nationalist parties in the elections to the European Parliament received more than 14 %, which was an important indicator and a signal to search for new approaches that would satisfy everyone [3].

The priority is to strengthen the protection of the external borders of the EU among further actions aimed at solving the migration crisis. This task was determined by the European Council. The result of this decision was to check the activities of the Rapid Response Teams regarding the violation of the external borders. With the help of such a decision, it is planned to overcome illegal migration and remind everyone, who plans to immigrate to any country of the European Union, about the opportunities provided to legal migrants. The result of the migration crisis is an increased focus on border protection, which indicates the beginning of the dominance of more radical positions that have been lobbied by states such as Hungary, Slovakia and the Czech Republic [3, 11, 19]. Migration problems and methods for solving them will become those indicators with the help of which tests of willingness to yield to interests will continue to be tested in order to find a compromise and make informed decisions.

The results of the study

Migration processes intensified in the late 1990s, but by 2010 they had a regional aspect: most of the migrants were from Europe. Immigrants from the Middle East began to prevail among the immigrants only after 2010. After the influx of migrants from South-West Asia and North Africa, including refugees and illegal migrants, into the European Union in 2015, the economic and domestic political situation intensified. It was called the «migration crisis». Some states have come out of the demographic crisis, but new problems have arisen: the unstable economic and labor market conditions, the rise of terrorism, cultural, ethnic and religious conflicts against the background of the general consolidation of migrants on religious and ethnic grounds. The increase in radical nationalist and separatist movements was a reaction to multicultural politics. The continued existence of all countries in harmony and unity was threatened [9]. Several mechanisms were proposed to stabilize the migration crisis, none of which found full support in society, since most of the representatives of indigenous nations believe that this violates their rights, national and cultural identity. An important and promising is the study of the impact of refugees on the national composition of the population, changes in the role of the state-forming nation in world globalization processes and social resistance to such changes. Ideas for integrating migrants from Syria, Iraq, Libya, Algeria, Afghanistan, Iran,

Morocco into the European space so far remain only ideas, therefore, conflicts in society will arise with periods of powerful exacerbations [3]. The experience of the European Union as a leading integration entity will become an example for all other countries of the world and regional organizations, including Ukraine, which is part of Europe and announced its intention to become a member of the EU in the future.

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Mobile Robot Driving System Applied to an Auto Platform

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Abstract

One of the most important aspects in the evolution of the human being is the use of tools that simplify his physical work. The man imagined intelligent mechanized devices that would take over a significant part of the physical effort. Thus, he built automatic toys and intelligent mechanisms or imagined robots in "SF" drawings, books, movies. In general, robots are a class of technical systems that mimic or substitute human motor or intellectual functions. This is achieved by combining different types of handling systems or locomotives, determining the anthropomorphic character of the robot, with different types of computing or logical equipment, which determines its intellectual functions. Robots operate in a specific environment, whose characteristics may remain constant or variable over time. The proposed application is a variant of experimental study with signal acquisition for a uniform rectilinear motion where the LabView package and a DAQ U 6008 data acquisition board were used as a programming medium, with particular emphasis on the movement and speed control.

Keywords: Driving System, Mobile Robot, Microcontroller, Programming Controller, Sensor System.

Introduction

An advanced industrialized society requires a flexible automation of the production processes. Given that industrial robots are flexible and versatile, providing freedom of movement similar to those of the upper limb (human-arm), their use ensures a number of economic and social benefits. These include: increasing productivity, humanizing labor activity in heavy sectors of production, preventing accidents at work, increasing product quality and speeding up investment.

A study by the British Robotics Association (BRA) shows that Japan ranks first among the industrialized countries in the production and use of robots in industry, a situation confirmed by the American Institute of Robotics (RIA), which states that even excluding robots with manipulation simple, the base of robots used in the Japanese industry remains three and a half times greater than the American one. Only the production of industrial robots of the company " MOTOMAN ", in 1991 was 500 robots / week, the installed capacity of the company being 1.000 robots / week.

After RIA and BRA one can observe, nowadays, a strong upward trend, especially in USA, Japan, but also in Europe. In this sense, the problem of developing methodologies for testing robots as well as of a device for determining their performances was posed, especially since, at the time, this problematic issue was under study at the world level, with only a few norms, specific to some countries, with project character.

The robot is an automatic manipulation mechanism, serviced in position, reprogrammable, versatile and capable of positioning and orientating specialized materials, tools or devices, during variable and programmed movements, destined to perform various tasks.

The German standard DIN 2801 defines: "Industrial robots are mobile automatic with universal applications, with multiple axes, whose movements are freely programmed on the trajectories or angles with certain sequence of movements and in certain cases, controlled by sensors. They are

equipped with pre-tensioning devices, tools or other means of manufacture and can carry out handling and manufacturing activities. The industrial robot can be fixed, in one place or it can be moved to an assembly".

Japanese standards state: "The robot is a mechanical system, equipped with flexible motor functions analogous to those of living organisms or their imitations, with intelligent functions, systems that act according to human will."

The Robotics Institute of America (RIA) states that: "The robot is a reprogrammable, multifunctional manipulator, designed to move materials, parts, tools or devices through variable programmed movements, in order to perform different tasks. The robot is an advanced component of automation, which combines computer-type electronics with advanced mechanical actuation systems, to achieve highly flexible independent equipment. The robot is an equipment with automatic functioning, adaptable to the conditions of a complex environment - in which it evolves - by reprogramming being able to prolong, amplify and replace one or more of the human functions in its actions on the environment".

According to the definition of the British Robot Association (BRA), the robot is a reprogrammable device, made for manipulating parts, tools and other means of production, through variable, programmed movements, to perform specific manufacturing tasks.

Company A.S.E.A. from Sweden, in 1971, he produces the industrial robot with electric drive IRB6 for arc welding operations. In 1975, the Cincinnati Milacron (US) machine tool company built a family of industrial robots powered by T3 (The Tomorrow's Tool), now widely used.

In Romania, beginning with 1980 the first RIP63 robot was manufactured at Automatica Bucureşti after the A.S.E.A. model and the first industrial application with this robot was welding an electric arc of a component of the bus chassis and was made in 1982 at the Bucharest Bus. Another indigenous robot is REMT-1 used in a flexible manufacturing cell at the Timisoara Electromotor for cutting through the shaft of electric motors.

Statistics on robot types suggest significant increases in the number of robots responding to non-industrial applications. If during the year 2000 the number of units installed was 112.500, at the end of 2004 it was estimated that their number was almost 825.000. In these years one can said that the number of robots in the world has reached 2.000.000 units. This development, even spectacular, in the direction of non-industrial applications justifies the review in the following of the main sub-domains in which non-manufacturing robots or service robots can find their applicability.

These areas are: construction, rehabilitation of the sick, trade, transport and movement of goods, local administration, environmental protection and agriculture; surveillance, inspection, radiation protection and disaster intervention; hotels and restaurants; in medicine, household, hobby and leisure.

Rădoi, C. (1997) said that the robot is currently the point of intersection of the top results in a number of fields: mechanical, automatic, computers and drive systems. This congruence of so many different scientific and technological branches is explained by the special complexity of the robot, both in terms of mechanical architecture and in terms of the driving system.

Of course, the robot is the natural result of the evolution from the automated machine tools, the machines with program control, the automatic lines of manufacture etc. when their rigidity and inflexibility no longer corresponded to the current requirements of productivity and quality, and the man tried to execute direct, direct actions on the processes taking on a supervisory and control role. Therefore, the robot, as a result of these technical - scientific developments, can be defined as a technological system capable of replacing or assisting the human being in performing various actions on the machines or production lines. In this context, the complexity of the problems regarding both

the construction and the operation of the robots, and in particular their management, is evident, as Armas I. (2011) said.

The original contributions in this paper are making a Robot Driving System trying to implement to an Auto Platform, building a car concept able to officially compete in a Formula 1 race, for example.

Presentation of the Mobile Robots

The robot, the basic component of this system, consists of two parts: the information processing unit and the operational unit. The information processing unit is a compliant hardware-software that receives data on the instructions defining the executed operations, measurements on the status of the operational unit, observations on the operating space of the robot, data based on which it determines according to the established management algorithms, decisions on how to operate the operational unit. The basic function of the robot is represented by its movement in space, so the static and dynamic regimes of the mechanical structure will represent the starting point in defining the robot as a driving object, as Borangiu T. and Ionescu F. (2002).

Mobile robots represent, the most spectacular and representative category of mechatronic systems, especially because of the attempt to copy and approach the models of the living world. A mobile robot has a complex mechanical structure, drive motors that ensure movement in the environment, sensors that allow it to orient, identify and avoid obstacles and a "brain", consisting of one or more numerical processors, which provides control of the entire system.

Intelligent systems and control

An exact definition of intelligent control is still a problem today. In May 1993, the IEEE Control Systems Society's Technical Committee for Intelligent Control formed a working group to determine what attributes can be encompassed in the area of intelligent control, what features and what role intelligent control systems play, how to recognize them. systems and how they differ from conventional control systems and at the same time to identify those problems for solving which only intelligent control techniques give results. It was estimated at that time that a single definition would not be possible, given the multiple facets of intelligent control, so several points of view expressed by specialists were analyzed and debated in order to extract the essential features.

The notion of "intelligent control" cannot be debated outside that of "intelligent system", which in fact means a nuance of the term "intelligent" used in the two terms. In fact, this term is found in the specialized literature and in relation to "artificial intelligence". It is obvious that intelligent controllers are also designed to emulate faculties of mental behavior such as adapting and training (learning), planning in inaccurate conditions (uncertainty), associating various information. Perhaps an alternative definition to that of "intelligent control" could be that of "autonomous control", to underline the degree of autonomy that an intelligent control system must provide, as Berian S. and Maties V. (2011) uses in their research.

An intelligent system has the ability to act appropriately in incomplete defined environments, by appropriate action understanding an action that maximizes the probability of success, the success being the achievement of one of the partial objectives whose overall objective is the end.

An intelligent system can be characterized by a series of attributes, or dimensions. These are degrees or levels of intelligence. A minimum level would be that of the capacity for environmental recognition, decision making and action to execute them. A higher level of intelligence may involve the recognition of events or objects, their representation in a model (for example a knowledge base), and a long-term plan. The highest levels involve the ability to perceive and understand, to choose wisely and to act appropriately in all circumstances, including under hostile environmental conditions.
An intelligent control system must be designed in such a way that it autonomously achieves high-level objectives, even if the system or process-driven model and even the structure and objectives of

the system are not completely defined, either due to partial knowledge or unanticipated changes, as Dutta A. (2015) said.

According Margineanu I. (2005), a system is considered autonomous when it has the ability to act correctly in incomplete defined environments without external intervention over a long period of time. There are several degrees of autonomy, which could be associated with the control functions included in the intelligent control: a control system with fixed parameters has the minimum degree of autonomy; adaptive control systems have a higher degree of autonomy.

To the extent that a system has a higher degree of autonomy, it is accepted that it also has a higher level of intelligence. In order to differentiate the degrees of intelligence, other criteria can be adopted such as: the computing power of the system; the degree of complexity of the algorithms used for the acquisition, processing and evaluation of the data obtained from the surrounding medium; data storage capacity in memory. In most artificial systems, increasing the level of intelligence reflected by computing power and storage capacity is done by increasing the complexity of the hardware structures and thus can become an obstacle in the application either by too high a cost or by the impossibility of real-time processing of the stored information.

The Hardware Configuration

To realize these application one choose some hardware parts, which authors want to explain below.

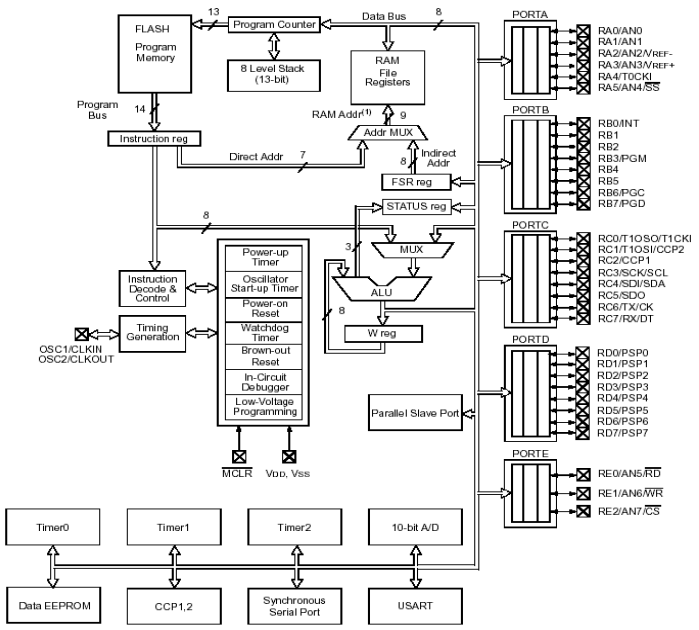

Fig. 1: Internal block diagram of the PIC16F877 microcontroller

PIC16F877 microcontroller

The manufacturer best placed on the PIC microcontroller market is Microchip. Another major manufacturer of PIC microcontrollers is Motorola. There are several families of PIC microcontrollers: PIC12, PIC16, PIC17, PIC18. The microcontroller used in this application is PIC16F877, like one presented in figure 1, from above, like Patic P. C. and Zemouri R. (2018) said.

Proximity sensor SHARP GP2Y0A21YK

GP2Y0A21YK, used in this application, is an analog proximity infrared sensor. It can be used to detect obstacles. This sensor has an LED that emits infrared waves. The infrared wave has an interesting property to reflect on the surface of objects. In front of the sensor, near the infrared emitter, is a photodiode sensitive to infrared waves.

This will have a variation of the output voltage depending on the infrared train it will receive. Thus, the more it receives pulses, the closer the object is to the sensor and the output voltage generated by the photodiode is higher, like Munteanu O. (2003) said.

Configuration: High immunity to ambient light and color of objects; Does not require control of the external circuit; The sensor includes mounting bracket; Compatible with ATMEL and Microchip microcontrollers; Digital output; The duration of the LED pulse cycle is: 32 ms; Range of action: from 10 to 80 cm; Response time: 39 ms; Delay on start: 44 ms; Power consumption: 30 mA; The diameter of the detection area at 80 cm: 12 cm.

Applicability: Robotics, Television, Personal computers, Cars, Copiers.

Calibration: Because the output of the GP2Y0A21YK sensor is not linear, one must determine in a way which distances correspond to certain voltages. A variant of sensor calibration is to measure the output voltage of GP2Y0A21YK at fixed distances, in centimeters. Once the authors get this information one will know what the voltage is given by the sensor in relation to the distance it is to an object.

Interconnection of the GP2Y0A21YK sensor with the PIC16F877 microcontroller

If the output voltage is connected to a microcontroller with the possibility of converting from analog to digital, such as PIC16F877, it is possible to transpose this voltage into numerical values. Figure 2 shows that these values can be used to determine whether or not there are obstacles near the sensor and how far they are from the sensor.

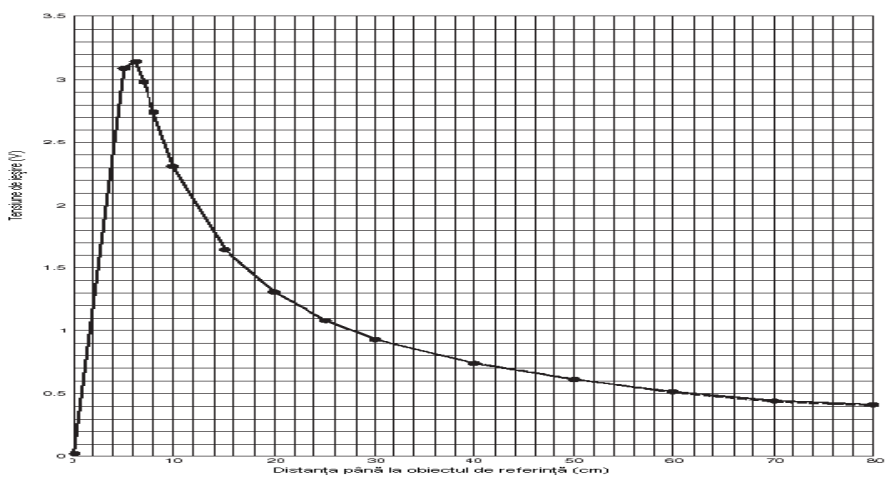

Fig. 2: The GP2Y0A21YK sensor. The characteristic of the distance to the output

A brief overview of the Lab View programming environment

LabVIEW is a programming environment used especially for measuring and monitoring automated processes. For writing programs in LabVIEW, the graphical language G, 5th generation programming language is used, the LabVIEW environment containing several predefined function libraries for data acquisition, processing, display and transmission.

According with Borangiu T. and Dumitrache A. (2010), the programs created in the LabVIEW environment are called, as I mentioned above, virtual tools (IV). An IV has three component parts:

- Front panel, as one shown in figure 3, the left one;
- Block diagram, as one shown in figure 3, the right one;
- Icon and connector, like one presented in figure 4, as example.

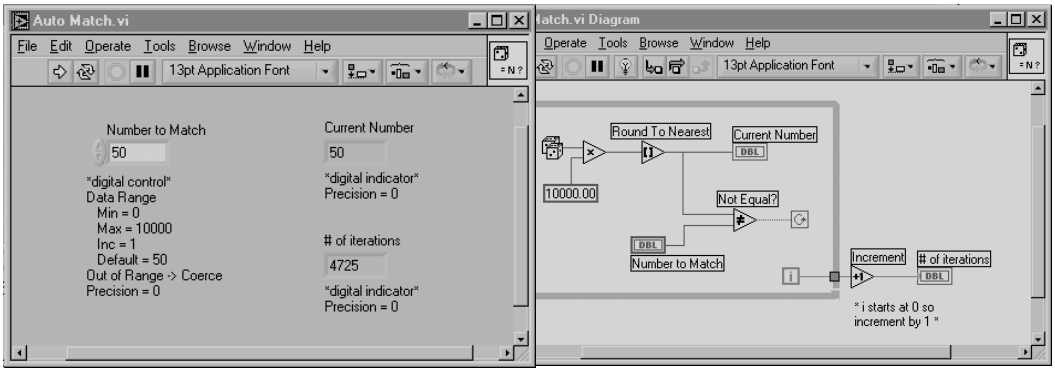

Fig. 3: Block Diagram in Labview

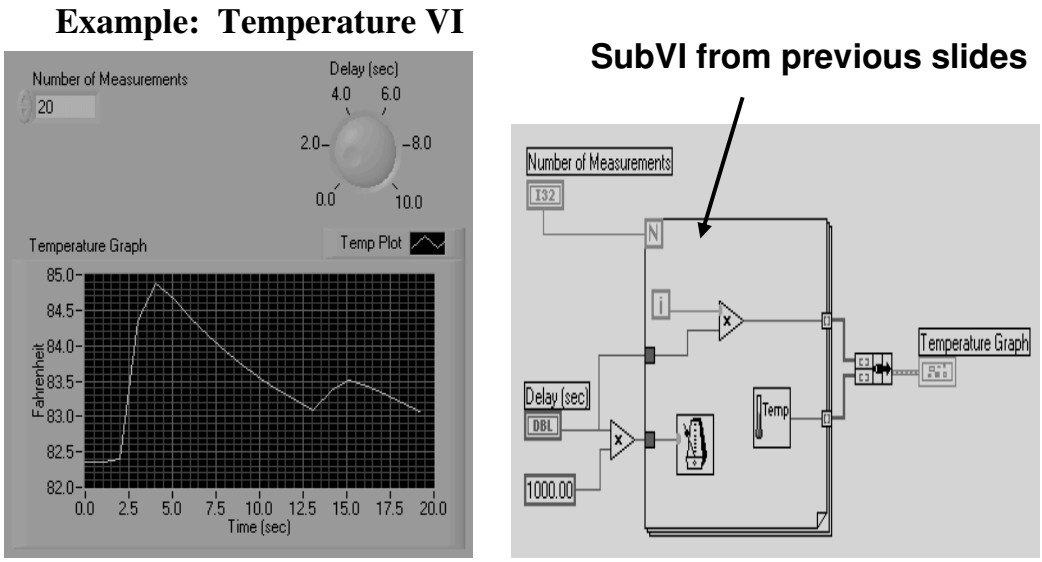

Fig. 4: Example to measure temperature, using Labview Interface

In figure 3 and figure 4, from above one tried to represent software interfaces used to develop presented application.

Robot Driving System Applied to an Auto Platform - General presentation

In a research study by Cojocaru M. G. (2010) the movement control, of the application is made according with next figure, presented below, in figure 5.

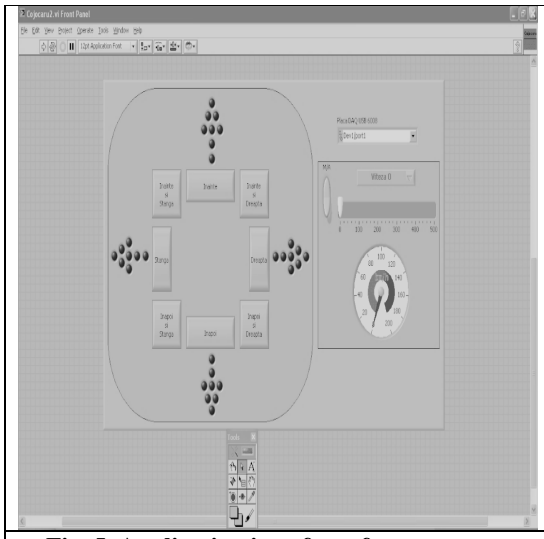

Fig. 5. Application interfaces for movement control

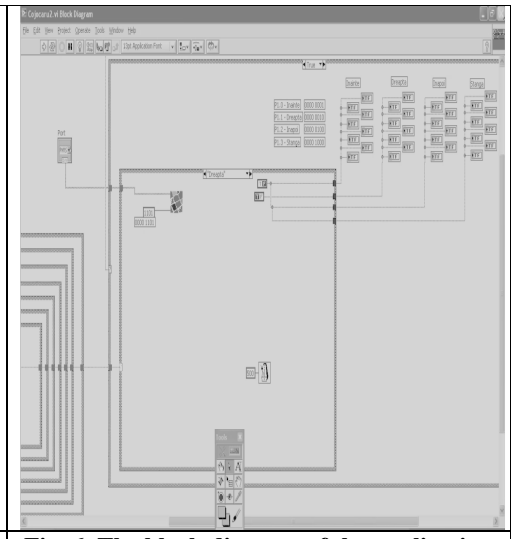

Fig. 6. The block diagram of the application

The Block diagram of application was shown in figure 6.

The proposed application is a variant of experimental study with acquisition of signals for a uniform rectilinear motion. In the real system, the mobile is a car that moves in a circuit of Formula 1, for example figure 7.

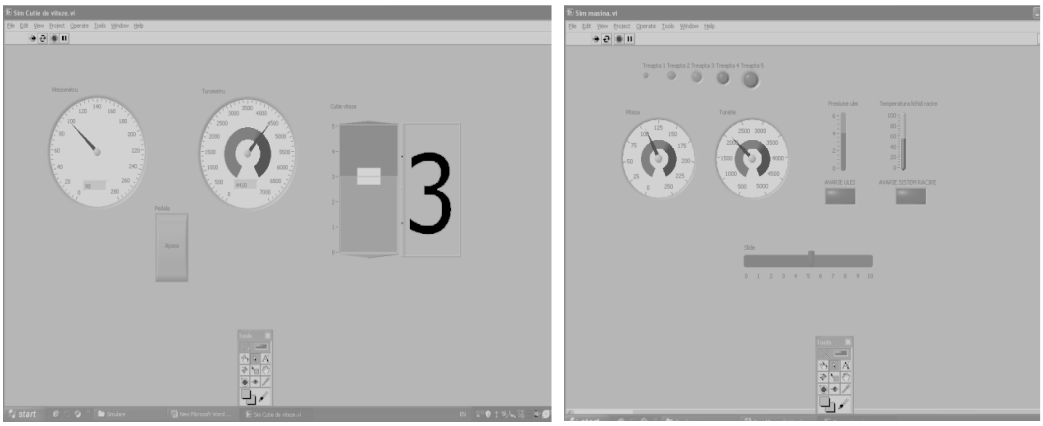

Fig. 7. Application Interface for speed control

The sensors used to monitor the movement of the car on the rectilinear portion of the route are coils in which a voltage pulse appears during the passage of the mobile equipped with a strong magnet, underneath them. The DAQ acquisition board and Lab View programming environment were used to study the movement, as Patic P. C. and Zemouri R. (2019) said.

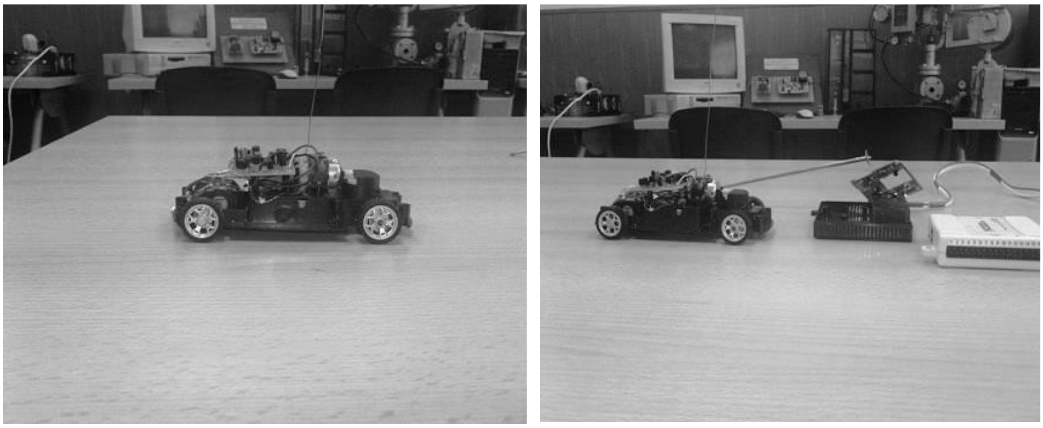

Fig. 8. Final application assembly

The final assembly of our application was shown in figure 8 and 9, where one discover the link between the mobile robot (the car) and the LabVIEW acquisition board.

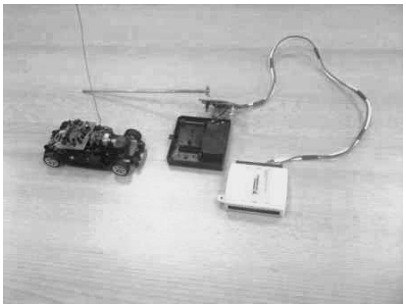

Fig. 9: Final application assembly, top panoramic view

Conclusions

Most industrial robots and manipulators operate in practice under conditions known in advance, operating cyclically in accordance with the technological requirements imposed. As a result, it is possible to synthesize a nominal management, a programmed control, which implements the desired movement for a particular initial state considering that no disturbance affects the movement. Such control can be synthesized using the centralized (global) model of the robot. Since these models are, in general, quite accurate, it is expected that the trajectory achieved by the robot by exercising this control will be quite correctly executed. One consider that present practical realization can be used on auto platform for racing circuits and can provide an alternative to a multitude of these application, maybe more of them expensive, complex etc.

The synthesis of this control is usually performed offline by first defining the motion trajectory in accordance with the technological requirements of the robot's operation and then calculating the control quantities necessary for its operation.

This solution is generally unanimously accepted in the industrial applications of robots and manipulators, the off-line control calculation being carried out in a sufficiently powerful computer,

covering a large number of management systems, while the effective control of robots at the executive level it falls to the task of local machines, microprocessors or specialized microcomputers.
A special problem, in the synthesis of tactical control, arises due to the redundancy of the mechanical structure. This problem can be eliminated by introducing additional criteria that penalize and restrict the movement possibilities of the robot. In this way, optimal or suboptimal management meets on the one hand certain performance criteria and removes, on the other hand, the redundant management aspects. Obviously, such an approach requires an approach at higher hierarchical levels, the respective algorithms requiring substantial hardware and software support.

Driving robots by measuring moment-forces is also required in assembly operations when the robot comes in direct contact with certain objects. In this case, driving by force control allows a better adaptation to the fluctuations of the operating space parameters while also achieving satisfactory dynamic performances.

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Government Engagement in Adressing The Potential of People Trade in Indonesia

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Abstract

Potential trafficking in Indonesia from the beginning until now unresolved problems. However, this happens because of a lack of attention and involvement of the government in anticipation of potential trafficking growing transaction mode via offline and online. This study aims to determine the form of anticipation and government involvement in suppressing the emergence potential trafficking of children and women to prevent the early occurrence of trafficking. Such engagement is defined in terms of regulation on the policies made by the government. The method used in this research is a descriptive qualitative approach by taking a sample in one of the provinces in Indonesia. Data were collected through observation, interviews, and documentation. The results show that in the context of regulation, government involvement is still very minimal. It is evident there is no single mechanism of rules that can be directed to anticipate the potential trafficking in Indonesia. As a recommendation the need for regulation and the action more real and touching at the root of the problems that exist in the entertainment industry.

Keywords: Potential Trafficking, Government Involvement.

Introduction

Indication of the phenomenon of trafficking, in the Kalimantan region refers to the results of previous research, it turns out the mapping of potential trafficking in South Kalimantan indications are quite clear, especially when seen from South Kalimantan region in the form of areas of the coal industry, the number of facilities that provide services hotel Cheap, karaoke parlors and entertainment venues, as well as being the region route providing dimly lit stalls or even prostitution. Of these factors are most susceptible to potential trafficking is an area of the coal industry which in the region is also facilitated by means of cheap hotels, entertainment venues and saloons, and also there is the area of prostitution, as well as dimly lit stalls (Mansur, H., 2019).

The setting of the problem of trafficking contained in the formulation of article 297 of the Penal Code which this chapter is the only chapter that regulates the trafficking of women and boys. While setting the law No. 23 of 2002 on the protection of children such as Article 68 paragraph (2); article 78; Article 83; Article 84; Article 85; and Article 88. In terms of protecting victims of crime, there are no rules on the granting of compensation to victims and witness protection in the criminal code. While the law No.

23 of 2002 on the protection of children also has drawbacks, among others: the type of sanctions / criminal, old criminal, and criminal threats formulation system. (Ambarsari, RR, Andiyansyah, FA, & Soewandy, AA, 2016).

If this understanding is used as a reference to assess whether there is trafficking in the region such as South Kalimantan, the opportunity and the indication in that direction have been there. This is supported by the results of the mapping is done in the field shows that in the area of the sample is no indication that there has been syndicated trafficking in the region. An indication of the results of the mapping of trafficking is seen from 1) places that are prone to trafficking, such as: hotels, karaoke-karaoke, salons and practice legal CSW (commercial sex workers), 2) the area crossing (transit), 3) The region's coal industry (Mansur, H., 2019).

As data on potential trafficking on previous studies have shown that in the region of the sample has a considerable potential for the emergence of trafficking. This has been indicated by some sectors that support the emergence of such cases. The purpose of this study is:

a. To determine the shape of local government involvement in anticipation of potential trafficking
b. To determine the activities that have been carried out by local governments on sectors vulnerable to potential trafficking.
c. To find out the attitude of local authorities to act to anticipate trafficking in Indonesia.

Referring to the above research objectives, the benefits to be gained from the study are as information for the public on what has been done by the local government in anticipation of potential trafficking, so that there are preventive measures that are preventive of society. Then the emergence of a permanent regulation of the local government, so that potential trafficking does not develop in Indonesia.

Literature Review

Foucault, Michel (1985) suggests that the potential for human trafficking, especially of children and women occur due to personal motivation and comfort just to be able to meet the demands of their daily needs. The renewal of social democracy should be followed up by local governments in efforts to improve the motivation and purpose in life is wrong to hold moral counseling (Giddens, 1999). Perspectives of people who sell themselves for the sake of momentary comfort and gain a bit of self-interest will be transferred to another person if it is not followed up by the local government in a planned and gradual (Haralambos, 1980). Perspectives of people who are happy to sell himself for a moment convenience and gain a bit of self-interest is referred to as an outbreak of social pathology (Kartini, 2001). Economic factors and poverty as a cause of trafficking practices located in the border area between Indonesia and Malaysia (Niko, 2016). Implementation of the model of social services tackle the problem of trafficking need to be developed by the local government (Dianayati, 2018). International cooperation in combating social service model and Illicit Arms Trafficking in Southeast Asia should be the reference implementation of design models preventing potential trafficking (Parici, AA, AK, S., & Idris, A., 2016). Model trafficking in Indonesia coping strategies have been implemented gradually in every province and district (Minin, 2011). The result is the handling of trafficking in East Nusa Tenggara run up through preventive measures by way endorse the rules or regulations of local governments related to the handling of potential trafficking. (Daniel, ESR, Mulyana, N., & Wibhawa, B., 2017). Efforts to tackle trafficking in the United States is something that is risky and requires the involvement of all elements of society and stakeholders (Fedina, L., Williamson, C., & Perdue, T., 2019). The black-market trafficking is a potential trigger perpetuating trafficking and alien smuggling (Hughes, DM, 2019). Unnecessary debates occur between elements of society who always blame the victims of trafficking, should be more focused on preventive measures through moral education (Kelly, L., 2019). Anti-trafficking organization in the Netherlands, revealed that there has been a new person trading model in the form of evasion of immigrants become slaves (Bruinsma, GJ, & Meershoek, G., 2019). The United States government crackdown on the fence / brokers cases of trafficking in persons (Soderlund, G. (2019). Victims of trafficking need to be further identified in the system of support which they can obtain physical and psychological treatment that is

needed (Sanchez, R., & Stark, SW, 2014). the development model of handling of potential trafficking need to be implemented in the regulation / International regulations that bind all citizens of the world, because of the potential trafficking occurred in almost all countries (Laczko, F., & Gramegna, MA, 2019).

Methodology

The research method is descriptive qualitative that emphasizes the recording element. Emphasizes qualitative descriptive methods to researchers to be able to describe on data and facts and be able to build the full involvement of the researcher (Muhadjir, 2002). Description The location was done by taking samples in the region of South Kalimantan in places such as nightclubs, hotels, and the area provides many crossing the dimly lit stalls. Data collected through library research, field research, interviews, and photo documentation. Data analysis technique is done by using interactive model approach developed by Miles and Huberman, with three procedures, namely data reduction, data presentation, and conclusion and verification.

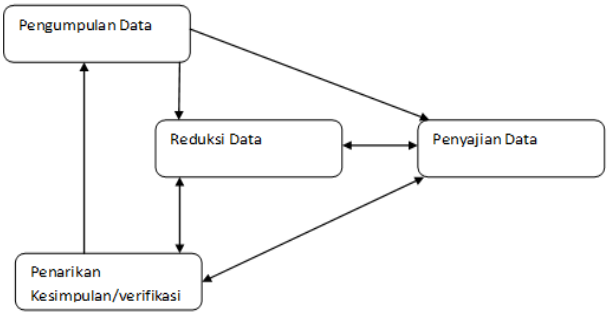

Fig. 1: Model Interactive Data Analysis Techniques Miles and Huberman

Results and Discussion

One of the problems lately often discourse by many is associated with problems of children and women trafficking (trafficking) either mode both online and offline transactions. This is a pretty basic humanitarian issue. Preventive measures must be carried out with the involvement of local authorities, considering the development and deployment of this trafficking problems spread so fast. Trafficking in human beings have relevance to the issue of development where development gaps, cultural influences and exposure to globalization increases the vulnerability of people to trafficking in more developed regions. Since trafficking involving international criminal,

Human trafficking is happening in Indonesia due to many factors, among others: the conditions of the community that is not fully conscious, caring and knowledgeable enough about human trafficking, corruption that has access to the institution of legal government, and the low effort of legal instruments to combat human trafficking was own (Daniah, R., & Apriani, F., 2018). This is in line with efforts to protect victims of crime, there are no rules on the granting of compensation, and also for the protection of witnesses in the Criminal Code. While Law No. 23 of 2002 on the protection of children also has drawbacks, among others: the type of sanctions / criminal, old criminal, and criminal threats formulation system. One of the causes contributing factor is the lack of coordination and cooperation among members of the task force,

As revealed in the plan of action mandated by the national action plan for the elimination of trafficking in persons that tackling trafficking in addition to do with the integrated approach, should also be carried

out with a bottom-up approach that is considered as an approach to accommodating the aspirations from below by actually building the pillars of openness, transparency, open access to information, and develop a civil society based management in the handling of human trafficking. Based on previous research, that the South Kalimantan, there is the potential occurrence of trafficking who are at places such as karaoke, beauty salons, hotels, dimly lit stalls, and places of prostitution. Entertainment venues and the hotel is very prone to trafficking. Survey of the three places of entertainment (karaoke) like Grand Discotheque, HBI and Barito. The Ladies who work in three places of entertainment in Singapore are mostly from outside the region, such as Surabaya, Bandung, Jakarta and Manado (Mansur, 2010: 61).

As mandated by the Law of the Republic of Indonesia Number 21 Year 2007 concerning the Eradication of Trafficking as set out in Chapter VII, Article 29 Paragraph (1) states for the effective implementation of the prevention and eradication of trafficking in persons, the Government of the Republic of Indonesia is obliged to carry out international cooperation , whether they are bilateral, regional and multilateral. In the aforementioned article shall include the words mean this is a requirement by the government. The government is meant to be understood that not only the central government but also for the purpose of government is a government that Provincial, District and City. What was expressed by Head of Tourism, Culture, Youth and Sports of the the measures undertaken by the respective local governments. These measures, if linked to the Regional Regulation No. 20 Year 2008 on the Amendment of Regional Regulation About Licenses Public Recreation and entertainment, then it cannot be found in the rules on prohibitions or restrictions that can be categorized as a precaution against trafficking.

Governments in preventive medicine or anticipation should always refer to the clear legal umbrella. So that in every action there is an element of the amplifier. This is as expressed by the Head of Social Services Tanah Bumbu, that: "For places where prostitution like in Batu Ampar Batu Ampar I and II We always provide coaching and social counseling. One of our real effort is to provide health services to sex workers to always check their health to the officer. Besides coaching we are doing is in the form of mental guidance to bring the preachers. From the results of the coaching there are some who are aware and change their work ". Referring to the explanation, preventive measures to prevent trafficking, especially for places where prostitution has been no action is emphatic. The activities undertaken by the Government are the actions it has taken, but to anticipate in order to prevent (preventive) before referring to that direction.

Table 1: Result and Discussion

Factors	Description	Implementation
Regulation	There are no regulatory mechanisms preventive	The government will soon issue regulations / rules related to the prevention of potential trafficking by listening to the aspirations of the people and involve the relevant stakeholders
Government Involvement	Only limited guidance and counseling activities which are not effective	The government immediately organized the training for the prevention of potential trafficking by listening to the aspirations of the people and involve the relevant stakeholders

Conclusion

Referring to the findings and discussion we can conclude the government's involvement in the potential of trafficking in Indonesia are: In the context of regulatory involvement, government involvement is still very minimal. It proved none of the regulatory mechanisms that can be directed to anticipate the potential occurrence of trafficking. Regulation is in the form of rules in the form of Local Government Regulations or legislation but do not yet have the power to anticipate the potential trafficking, this is because the contents of the rule does not lead to preventive measures or anticipation of potential trafficking. Actions taken by the government against vulnerable sectors of potential trafficking, such as places where prostitution is still within the range of guidance and counseling to the perpetrators of prostitution, while for the indication has not been touched, or in other words the counseling that has been done is not right on target. In the broader sector, such as hotels and places of entertainment performed by the government is still within the limits of surveillance, but the sector is even smaller in scale that is dimly lit stalls absolutely nothing for any actions taken by the local government.

Acknowledgment

As an input that can be advised of the results of this research is the need for clear regulations, especially from the government in terms of the adjustment to the entertainment industries continue to employ women. The need for action more real and touching at the root of the problems that exist in the entertainment industry.

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Sustainable Development of Forests in Romania

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Abstract

The main purpose of the present paper is to identify new solutions for prevention and, at the same time, to stop certain actions whereby man leaves his mark on the natural space. Nowadays, the economic power has become greater than the ecological one, so that the man no longer appreciates the natural space and prefers to think about the benefits that he adopts for a short period of time, neglecting important aspects that in the long term produce certain disasters. natural. We have tried to highlight the most important issues that arise when man does not respect nature, but also its effects. We also analyzed the figures that appear in the statistical yearbook to see their evolution.

In the last part of the paper are highlighted the solutions that should be imposed to save the nature and improve the condition of the forests. Also topics from this paper such as the structure of the forestry fund, the distribution of forests on relief forms and climatic floors, but also on the functional groups will be reproduced and exemplified in the following.

Keywords: population, globalization, resources, biodiversity, earth, development.

Introduction

There is an increasing tendency in recent years, once the concept of sustainable development and management of forests in Romania has been introduced, namely that of regulating the forestry field in the defense of forest functions and on the national or state forest fund (Bran et al., 2019). It is a fact that we enjoy and choose these steps. However, there are situations when implementing the proposed measures, especially those with a financial character in the state budget (Jianu et al., 2019).

For example, ensuring from the state budget the amounts for forest management for owners with areas less than 100 hectares is new, as well as the fact that for owners of forests over 100 hectares, the necessary funds for forest management are insured. by them, if the management of the total national forestry fund, regardless of the model of ownership, is ensured by targeted and authorized forestry structures (Burlacu et al., 2018). This measure is not really implemented, it has been created a regulatory framework for implementation, but it depends a lot on the budget allocation (Dima et al., 2020). According to the analyzes that have been done on the cutting of trees in the last years, they have revealed that the owners with private properties did not provide an adequate protection from the sludge of funds, and out of about 500,000 hectares, 400,000 were already destroyed, according to certain reports of the Court of Accounts. This reflects a clearer regulation on the obligations of forestry operators made to reduce the effect of illegal logging. (Cogălniceanu, 2007).

The new forest code enforces the obligation to set up a conservation fund of its own regardless of who is the owner, which until now applies only to the administrator of the state steps, and thus obligatory is allocated funds for different things that are meant to ensure a regeneration. quality of the forest, as well as the afforestation and care of the trees that constitute it (Negescu Oancea, et al., 2019). Also, the introduction of the wood mass limitation, related to the annual possibility, represents an additional value compared to the regulations that were before and established this volume by which the government decided (Burlacu et al., 2019). All these regulations, which are considered welcome, concern only the surface on which the racial cuts are applied, which has decreased from 5 hectares to 3 hectares at the present time. Moreover, in natural and national parks, racial cuts are strictly forbidden, except in certain cases where natural regeneration can only be done through such cuts (Callicott, 1985). There are also some regulations that may be risky in our opinion and which endanger the integrity of the forestry fund, as for example: the permanent removal of some territories from the private forestry fund for the arrangement of housing or rental villas, detailed and unsatisfactory provision that can thus, it allows a massive fragmentation of the forests near the villages, or the law according to which the owners who have forest areas less than 10 hectares are no longer obliged to make forestry arrangements helps the small forest owners to use a quantity of wood up to at 3 cubic meters per year per hectare, but having a forest management contract concluded with a certain forest bypass, but here there is a quite high risk of abuses or violations in this context, this provision being discriminatory at a at a certain time and to a certain extent (Bran et al., 2018).

Perhaps a more efficient solution, which would ensure a complete control and record over the small properties, would have been for their owners to conclude a forestry arrangement at the level of the entire administrative territory of the belonging communes, which would constrain them as well. to hold everyone accountable and to be carried out by the mayors, from the budgets that are representative of this norm. (Moga & Rădulescu, 2005)

It should be noted that there is now a bureaucracy that is sharpened and quite stubborn in the process of approving and approving forest management, without the existing endorsement stages having decisive beneficial effects for the conservation and sustainable use of forests (Bodislav et al., 2019). The checks are based only on the written analysis of the documentation submitted by the companies specialized in forest management and most of the time the necessary checks are not performed (Alpopi et al., 2018).

Methodology Used

The methodology used in the work below is based on the study of the behaviors of forests in Romania and was taken for the analysis of the period 2017-2018 regarding the division by groups and species, but also by the phytoclimatic floors. The forests under evaluation will be constituted and delimited according to the norms in force regarding the establishment of indicators and criteria. In general, the plot boundaries should not necessarily overlap with the natural boundaries, and here we have bridges, valleys and secondary peaks or artificial boundaries such as railways, permanent roads. It also aims to identify by certain specific methods the surfaces that are anthropically affected and that meet the criteria of naturalness. At the same time, an evaluation of the indicators is done through a photo documentation, and depending on the case, certain biodiversity elements can be identified. By the presence of certain rare or exemplary species of forests with exceptional dimensions.

Elements of characterization of forests in Romania

The national forest fund of Romania is made up of all the forests, of the lands destined for afforestation, of those that represent aid to the needs of culture, production or forestry administration, of ponds, of streams, or of other lands with forest destination, even if they are not productive, included. in forestry arrangements as of January 1, 1990, including surface changes, according to certain operations performed in accordance with the law, regardless of the form of ownership. The national forest fund represents, as the case may be, a public or private space and is of good interest at national level (Rădulescu et al., 2018).

The total area of the national forest fund of Romania is about 6,564 thousand hectares and represents 27.5% of the country's surface. The European average at the moment is about 32%.

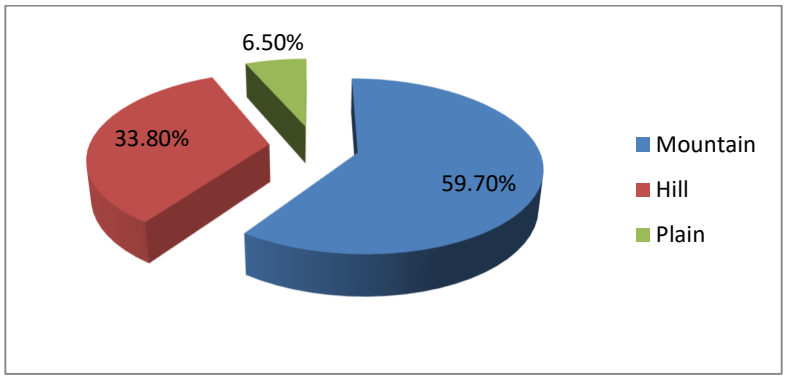

Source: IFN

Figure 1: Distribution of forests by relief

As can be seen in the graph above most of the forest cover is represented by the mountain area, 59.7%, followed by the hill area, in our case we talk about Subcarpathian where the proportion is 33.8%, and the smallest part as it is normal to happen is the plain area where we have a 6.5% forested percentage.

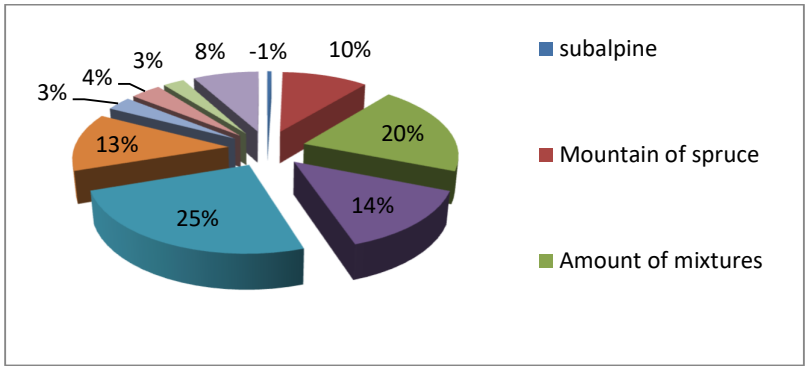

Source: IFN

Figure 2: Distribution of forests on phytoclimatic floors

According to the graph above, it is observed that predominant in our country are mixtures of beech and gorse with a percentage of 24.9% followed immediately by the mix of spruce with a percentage of 20%. the highest percentages, as we can see, are in the mountain area, it is a favorable area for the development of these species, but neither the hilly or the sub-Carpathian area can be neglected, because 12.8% is a considerable percentage, even if in many zoos in Romania, deforestation is becoming more and more present.

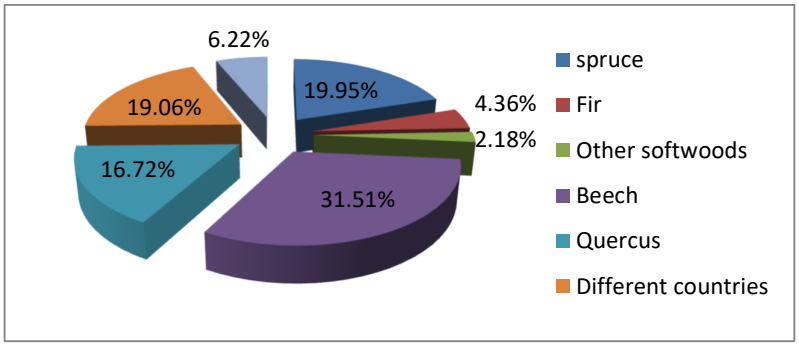

Source: IFN

Figure 3: Distribution of forests by species and species groups

The beech forest is distributed on the largest surface in Romania, with a percentage of 31.51%, followed by the spruce forest with 19.95%, which shows us that these two essences are specific to the continental temperate zone, especially in the mountain area from the submontana.

Depending on how a forest is managed, forest resources may be either depleted or inexhaustible. If the exploitation of the forest resources is done in an unsustainable (unsustainable) manner, then the regeneration capacity of the forest is affected and can even be canceled, these resources having a (depletable) character. The application of a sustainable management ensures the continuous regeneration of the resources, these having an inexhaustible (infinite) character.

Managing forests in a sustainable way requires an assessment of the impact of the works applied in the medium term but also in the long term, in which it is imperative to anticipate the effects of any intervention not only for a certain period of time, but for the entire production cycle. existing. This is why, when intervening in the forest, a high degree of forest awareness is needed, but also a special training on this branch, because the effects of negligent action persist for long periods of time, are major, extend over the long term and resemblances are very difficult to remedy. (Bran et al., 2011).

There was no possibility yet that in a single generation of foresters we would drive an orchard from the phase where it was at the beginning, that is, from seedlings to exploitation, which is why the forest is a good that we take over and it is necessary to offer it more. away to future generations. In order to sustainably manage the forest, certain principles must be taken into account or should be the basis of any forest management action, and they are:

- The primordiality of the ecological objectives of the forestry;
- Ascension of the role of forestry in rural and regional development;
- Promoting the fundamental natural type of forest and
- ensuring an ecological diversity of the natural cdr;
- Correlation of relations between forestry and other fields
- of activity that underlies them;
- Promoting practices that ensure management
- sustainability of forests;
- Ensuring the integrity of the forestry fund and the forest;
- Increasing the area of land occupied by
- continuous forests;
- Stable medium- and long-term forest policies;
- Ensuring an adequate level of legal continuity,
- Institutional and operational in the management of forestry and certain compensations.

It is known that worldwide, the Earth has a limited capacity to meet the increasing demand for natural resources from the socio-economic system and to absorb the destructive effects of their use. Climate change, erosion and desertification, soil, water and air pollution, reduction of the surface of forest systems and wetlands, disappearance or destruction of an increasing number of species of aquatic animals and plants or on land, The continuous depletion of non-renewable natural resources has begun to have negative, quantified effects, especially on the socio-economic development and quality of life of people in wider areas of the planet. For the moment at the declarative level, the principles of sustainable management have been adopted by all the states that want to apply an advanced forestry based on technology. This is precisely why there are various methods based on the sustainable management of the forest. At national level, it is important to promote certain actions that respond to the national strategy for sustainable development. (Jacobs, 2012).

Another common situation, very visible, in fact, taking into account the species composition of the forest fund in Romania, is the high percentage of trees regenerated vegetatively from shoots or cuttings that rises to about 56.7%, ultimately leading to a reduction in quality and the annual growth of wood from these forests. Thus, the average annual growth is 3.3 m3 / year / hectare, resulting in a possibility of harvest in a year of approximately 577.5 thousand m3. Under the current conditions, the legally harvested wood according to the calculated possibility cannot have the capacity to completely cover even the fuel needs for the whole humanity, this fact causing an exponential increase of the anthropic pressure on the forest. The possibility of harvesting determines the volume of wood mass to be harvested from a forest, based on the forest bypass, to reach a normal capacity. The volume of wood harvested annually means the possibility of annual harvesting, and the one to be harvested over a period of time - the possibility of periodic harvesting. (Lane, 2010)

For these situations to have a solution is very it is important to establish and respect a forest strategy that contains:

- Promoting a seed regeneration of species of the fundamental natural type of forest;
- The increase of the areas covered with forest by works of afforestation and ecological reconstruction at certain periods of time;
- Use of acacia crops in separate areas (but not in the natural forest), so as to eliminate the risk of acacia spreading in the natural forests,
- The more detailed use of wood by developing small industries by craftsmen showing the capacity that was created of added value for this resource.

To what extent is climate change a major threat to our forests?

For a country like Romania with a high agricultural potential, the role of the forest is also a paramount one. Although it started, the forests were the first meadow for the growth of agricultural areas, while it was found that they play a special role in the development of the agricultural sector. Also, the forest often has the capacity to change agricultural production in a positive way, by maintaining and developing networks of forest curtains that would greatly contribute to the development efforts of urban areas. Forest camps are stretches of forest vegetation, located at a certain distance from each other, to protect against the effects of harmful factors or for the climatic, economic and sanitary improvement of arable land. (Satbyul et al., 2014).

From the climate point of view, these networks that are formed improve the cultivation conditions of the agricultural plants during the dry periods during the summer by:

Lowering the air temperature is especially beneficial in high summer summers when the sun's radiation is low in the leaf layer of the trees and uses the radiation energy to create the transpiration process. Increased humidity due to the evaporation capacity of the leaf mass of the trees. Through this process, in the dry periods, the water from the precipitations dropped in excess during the periods with large amounts of water, the decrease of the direct and the refracted solar radiation due to the crowns of the trees shading the agricultural areas in the immediate areas. The decrease of the intensity of the winds that during the dry periods intensifies the process of aridization of the plants.

During the winter season, the forest curtains help protect the snow from blurring and implicitly eliminate it from the agricultural fields, ensuring a water supply to the melting of the snow for agricultural crops and protecting the localities from the snow phenomena. Strong winds also support soil particles that can cause damage to crop plants. Also, since the protective curtains are most often assembled in areas where forests are not found, they also contribute to their specific functions such as: providing wood for burning, carbon storage, shelter for agricultural workers. . The appreciation that the existence of the networks of the forest protection curtains of the field does not emphasize the degree of development of the agriculture for a certain country must be brought into the spot. (Cândea și Bran, 2001). Many of us know that forests will be affected, but we do not know exactly how and to what extent. Climate change can have both positive and negative effects. As the climate becomes warmer and the global warming is increasing, it is expected that the growth rate of the trees will be lower, generating a negative impact on the wood production. Climate change can also have an effect on the geographical spread of forests, advancing to higher altitudes and to more northern latitudes as it began to happen. At the same time, however, forests may face a greater number of threats from pathogens, newly emerging diseases, pests and harmful species.

For example, as a result of the hotter and drier summer and spring periods, the species native to Europe from the large bark of the spruce bark reaches maturity in a much shorter time and can be reproduced several times during the same season. , which leads to the growth of the population of this pest, in the medium and long term certainly affecting this species. Changing weather conditions can add to the change of forests against the background of the proliferation of weather phenomena of the type. Changing the annual and quarterly precipitation regime could lead to the replacement of some current tree species with other species more apt for survival and development in the new climatic conditions. Even though most forest fires in Europe are created by humans, extreme drought and dry weather can increase their risk of production, especially in southern Europe, and can be devastating for forest ecosystems, trapping by themselves and what is happening in Romania. (Păun, 2012).

Measures proposed

According to those identified in this article for better protection of forests it is necessary that:

- a whole range of means of protection should be focused on the sphere of economic interests;
- placing natural warnings to visually remember the destruction of the planet - global warming;
- Annual replanting of young;
- Fragmentation of certain areas where clearing is allowed.

Conclusions

Protected areas are essential in the conservation of natural and cultural capital as well as in the sustainable development of forests, as they include the most representative and significant methods in terms of biodiversity, natural values and associated crops. Management measures in these areas are developed and implemented in such a way as to maintain or even restore, where necessary, natural ecosystems and populations of wild species, while maintaining at the same time or seeking solutions for the sustainable use of natural resources. The establishment of sustainable development and their efficient management are a necessity in our day because, they are the most effective way of conservation, as they are often designated on relatively large areas, they can include representative natural and semi-natural ecosystems that allow their conservation and monitoring. Also represented are areas followed, where the efficient actions of conservation of natural and semi-natural ecosystems, including through sustainable use, can demonstrate that, maintaining in a proper state of the components of the natural capital allows to ensure all services and resources that underpin the social development. sustainable economies and represent true "entities", in which the actions of protection or active management for the purpose of biodiversity conservation allow the accumulation of valuable knowledge either on the natural processes or on finding efficient parameters to ensure the transition from a concentrated economic development. on profit to a new model of sustainable development.

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The Trade Battle Between the European Union and The Russian Federation

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Abstract

This paper tries to analyse the relation between the Russian Federation and the European Union to foresee who is better positioned in the trade battle with its nearby commercial partners and how they would develop towards the 2030, where also both of them should meet the criterias for sustainability.

Keywords: Trade, Emerging Economy, Development

Introduction - The relation between the European Union and Russia

The European Union represents an economic union for 28 Member States. The EU covers an area of 4,475,757 km2 and a population of approximately 513 million inhabitants. The process of forming a European Union began to flourish after 1945, with the US model, in order to reduce the involvement of European states in a new world conflict. When the French Minister, Robert Schuman, in French, Robert Schuman, proposed that France, Germany and other European countries combine coal and steel production at the behest of a supranational authority, 5 years after the end of World War II. avoids a new war between France and Germany.

Russia is the largest country in the world, it has an area of 17.125.200 km2 - representing an optimum of the inhabited surface of the Earth. In terms of population, it ranks 9th in the world, with over 144 million inhabitants in December 2017 (excluding Crimea). The capital of Russia is Moscow, one of the largest cities in the world.

In 2017, Russia's economy recovered from the recession and turbulence of 2014-2016 in the banking sector, benefiting from increased revenues from oil and raw material exports. The economic system is concentrated in only a few sectors, investments with transformative effects are lacking, and large companies close to the state dominate the market (Ioniță, F. et al., 2009). Despite sanctioning policies, the EU remains Russia's first trading partner, and Russia is the fourth for the EU. However, trade and economic relations are disrupted by many factors, such as Russia's embargo on EU agricultural

products, WTO disputes and serious constraints on EU companies to participate in public tenders in Russia.

Since March 2014, the EU has gradually imposed restrictive measures against Russia, in response to the illegal annexation of Crimea and destabilizing Ukraine. EU sanctions widened substantially following the collapse of the MH17 passenger plane on June 17, 2015, over territory controlled by Russian-backed rebels in eastern Ukraine. The sanctions are periodically updated and extended.

EU vs. Russia Living Standards

In the graph below we analyzed GDP per capita in Russia and compared with the EU 28 average. This indicator helps us analyze the living standards in the EU and Russia. For both economies, GDP per capita grew slightly in 2018 compared to 2017. Numerically Russia has a GDP per capita below the EU average28, but we must mention that they are EU member countries. which have a GDP per capita lower than that of Russia, for example: Bulgaria and Romania (Romania recorded in 2018 a GDP per capita approximately equal to that of Russia, $ 11,433, compared to 2010 prices).

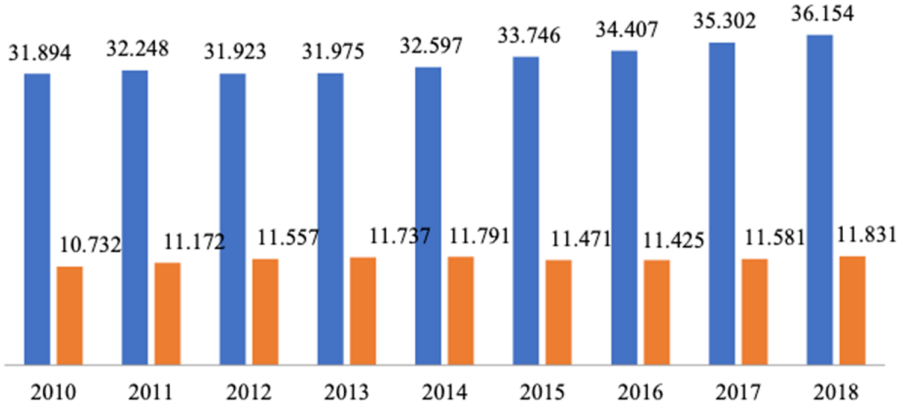

Chart 1: Comparative analysis of GDP per capita - Russia vs EU

Source: Own data processing: United Nations Conference on Trade and Development

Renewable Resources

There is no doubt that renewable energy sources will play a strategic role in fueling the global economy of the future. For the moment, oil is still the undisputed champion of the energy world. In 2018 we consumed more oil than any other year in history - about 99.3 million barrels per day, globally. It is estimated that this number will increase again in 2019, reaching up to 100.8 million barrels per day.
In the chart below we have illustrated the top 15 countries that have the largest oil reserves. As we can see, Venezuela is in first place with 300.9 billion barrels in reserve. Russia ranks 8th, with 80 billion barrels in reserve. Russia is one of the main producers of oil and natural gas and is also a leading exporter of metals such as steel and primary aluminum.

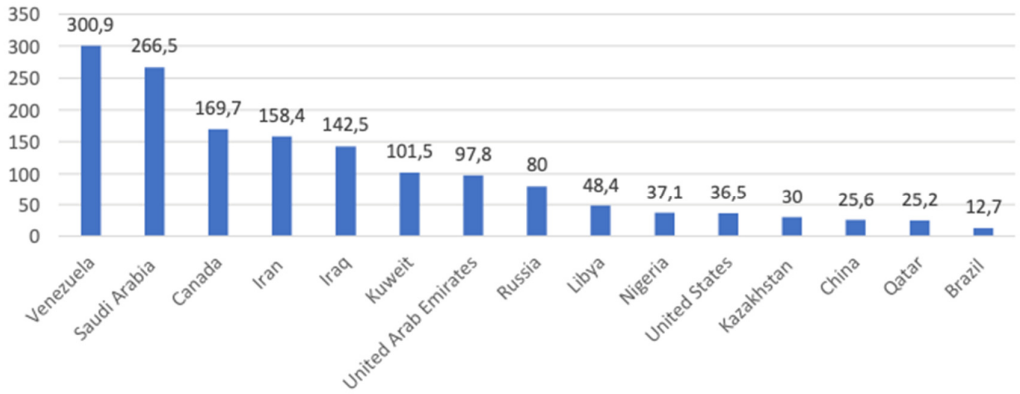

Chart 2: Oil reserves (billion barrels)

Source: Own data processing: United Nations Conference on Trade and Development

It is important to note that although supplying billions of barrels of oil can be a natural mother's advantage, they are only a factor in assessing the potential value of this crucial resource. Russia is among the countries with the lowest cost of oil production, ranking 4th, with a total cost of $ 19.21 per barrel, and the 1st place is Saudi Arabia, which produces a total cost of about $ 9 a barrel.

Greenhouse Gas Emissions

One of the goals of the European Union is to reduce carbon dioxide emissions to combat climate change. Since 1965 it is estimated that over 1.35 million metric tons of greenhouse gases have been released into the atmosphere, and over a third can be caused by 20 companies. Both the European Union and Russia are bad at this indicator, being in the top 4 countries with the highest carbon dioxide emissions - the European Union has annual CO2 emissions of 3,115,125 thousand tonnes (meaning 11.4%), and Russia 1,524,993 thousand tonnes. (meaning 5.6%).

Below we have added a graph that highlights the companies that have been responsible for the most carbon emissions for the last half century. We note that in the list of the 20 companies that produce the highest amount of CO2 emissions, we find both companies in Russia and companies in the European Union (France, UK, Netherlands).

Table 1: Biggest oil companies in the world and their emissions (2019)

Company	Country	Ownership	All Emissions, $MtCO_2e$
Saudi Aramco	Saudi Arabia	State-owned	59,262
Chevron	U.S.	Investor-owned	43,345
Gazprom	Russia	State-owned	43,230
Exxon Mobil	U.S.	Investor-owned	41,904
National Iranian Oil Co.	Iran	State-owned	35,658
BP	UK	Investor-owned	34,015
Royal Dutch Shell	Netherlands	Investor-owned	31,948
Coal India	India	State-owned	23,124
Pemex	Mexico	State-owned	22,645
Petroleus de Venezuela	Venezuela	State-owned	15,745
PetroChina	China	State-owned	15,632
Peabody Energy	U.S.	Investor-owned	15,385
ConocoPhillips	U.S.	Investor-owned	15,229
Abu Dhabi National Oil Co.	UAE	State-owned	13,840
Kuwait Petroleum Corp.	Kuwait	State-owned	13,479
Iraq National Oil Co.	Iraq	State-owned	12,596
Total SA	France	Investor-owned	12,352
Sonatrach	Algeria	State-owned	12,302
BHP Billiton	Australia	Investor-owned	9,802
Petrobras	Brazil	State-owned	8,676
Total Emissions			**480,169 $MtCO_2e$**

Source: https://www.visualcapitalist.com/companies-carbon-emissions/

Foreign Direct Investment

The value of foreign direct investment (FDI) stocks has increased considerably over the entire period analyzed, from 1995 to 2018. As can be seen in the graph above, the value of internal FDI stocks is significantly higher than that of stocks. external to FDI, in 2018 reaching even double value. This fact can be explained by increasing the equity of foreign investors and the loans granted to entities in the Russian economy. The highest values of FDI stocks, both internal and external, are recorded in 2017, approximately $ 441k million, respectively $ 380k million.

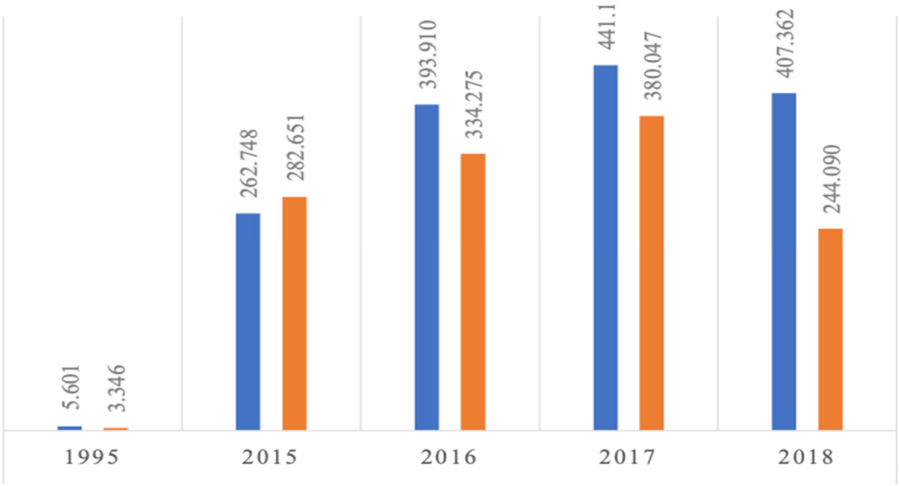

Chart 3: Evolution of Foreign Direct Investment in Russia

Source: Own data processing: United Nations Conference on Trade and Development

The evolution of FDI as a percentage of GDP is a surprising evolution, recording high values, on average over 20% in the last 3 years analyzed. Compared to 1995, 2018 is surprising, the value of the external FDI stocks increased by 20 percentage points, and the value of the internal FDI stocks increased by approximately 23 percentage points.

Export and Import of Russia. Worldwide structure

In 2012 Russia became a member of the World Trade Organization (WTO) - an organization that works to reduce and abolish international trade barriers. Also, the Russian Federation is the leading member of the Commonwealth of Independent States (CIS) and one of the five members of the Eurasian Economic Union, along with Armenia, Belarus, Kazakhstan and Kyrgyzstan.

The figure below shows the evolution of imports and exports from Russia in the period 2013-2018. Between 2013 and 2016, including, there is a downward trend in international trade, against the backdrop of political and economic imbalances - inflation, modest GDP growth, reduction of foreign capital flows. Starting with 2017, exports from the Russian Federation have an upward trajectory, towards the end of 2018 increasing by 60% compared to 2016 and by 14% compared to 2017. The level of imports fluctuates around 200 billion euros in 2015-2018, being lower export level over the whole period analyzed.

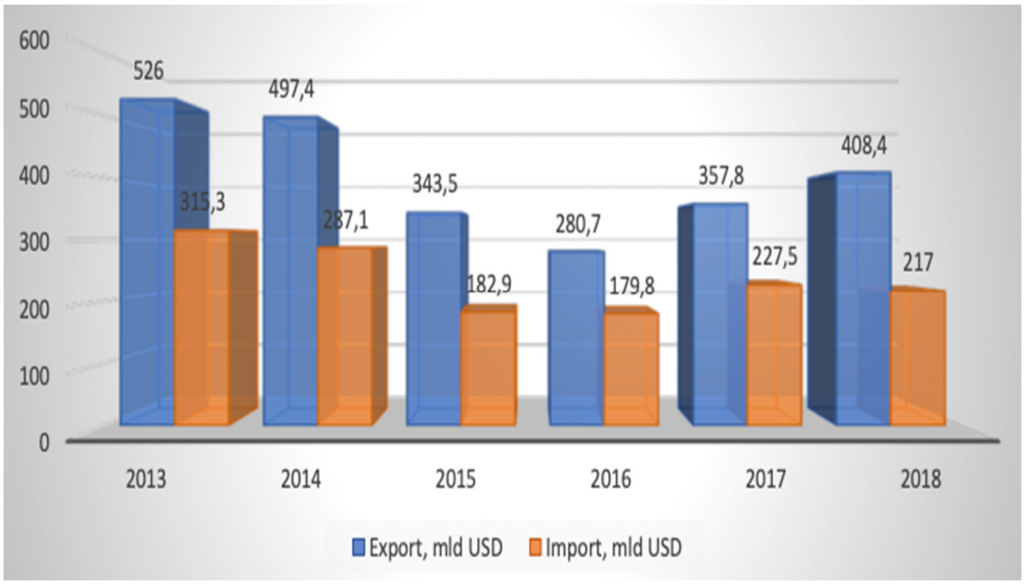

Chart 4: Evolution of Export and Import in Russia, 2013-2018
Source: Own data processing: United Nations Conference on Trade and Development

Economic Freedom Index

We live in the most prosperous period in human history (Angheluta, S. P. et al., 2019). Poverty, disease and ignorance is diminishing throughout the world, due in large part to the advancement of economic freedom (Bran, F. et al., 2018). Economic freedom is the fundamental right of every man to control his work and his property. In an economically free society, individuals can work, produce, consume and invest in whatever way they want (Burlacu, S. et al., 2018). The Economic Freedom Index (ILE) 2 is an annual guide published by the Washington Heritage Foundation, which measures the principles of global economic freedom. The index covers 12 freedoms - from property rights to financial freedom - in 186 countries. Depending on the index level, the states are classified into 4 types: (0-50 points) - repressed, (50-60 points) - mainly free, (60-70 points) - moderately free, (70-100) - predominantly free. By 2030, the complexity of the global economy may look very different from today's. According to recent projections by Standard Chartered, a multinational bank based in London, in the next decade, emerging markets such as India and Turkey will climb the global economic scale to become tomorrow's power.

Below we can see the projected change for the biggest economies from 2018 to 2030:

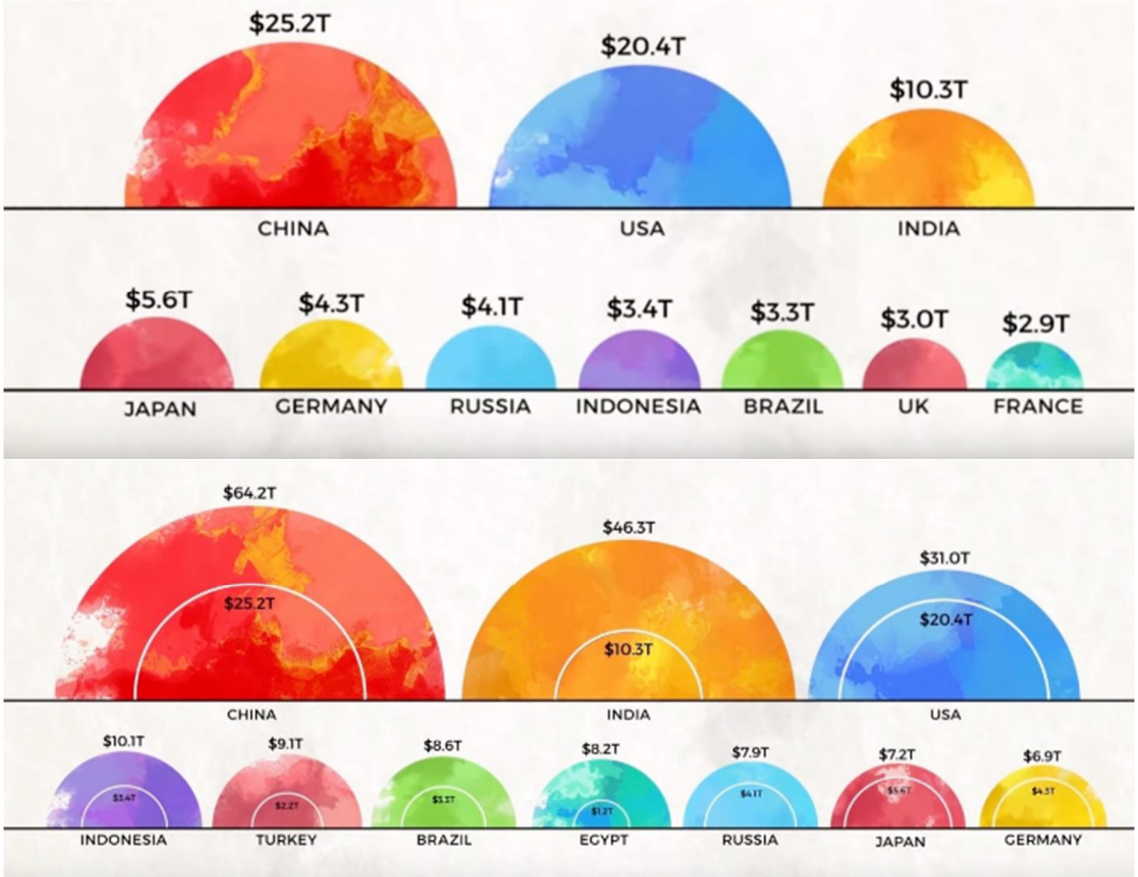

Chart 5: Top 10 states by GDP (PPP) in 2018 vs. 2030

Source: https://www.visualcapitalist.com/animation-the-biggest-economies-in-2030/

Conclusion

EU restrictive measures have different forms. Diplomatic measures consisted in excluding Russia from the G8, suspending Russia's accession to the OECD and the International Energy Agency, and disrupting regular EU-Russia bilateral summits.

Economic sanctions target trade with Russia in certain economic sectors. They limit the access of certain Russian banks and companies to primary and secondary capital markets in the EU and impose prohibitions on the export and import of weapons and the export of dual-use goods for military or military end-users in Russia. The sanctions also restrict Russia's access to certain sensitive technologies and services, which can be used for oil production and exploration. Specific restrictions on economic relations with Crimea and Sevastopol apply, including a ban on the importation of goods from the peninsula, a ban on the export of certain goods and technologies, restrictions on investments and a ban on providing tourism services. The measures on economic cooperation suspend the new financing operations in Russia of the European Investment Bank (EIB) and of the European Bank for Reconstruction and Development (EBRD).

Individual restrictive measures are applied against 150 persons and 40 entities, whose assets have been frozen and have been imposed travel bans, because their actions have undermined the territorial integrity, sovereignty and independence of Ukraine. Their list includes the presidents of the two chambers of the Russian Federal Assembly (State Duma and the Federation Council), as well as the acting president of the Russian Delegation to the EU-Russia Parliamentary Cooperation Commission.

Since August 2014, Russia has responded to EU and Western countries' sanctions (including the US, Canada and Australia) by imposing counter-sanctions on agricultural products, raw materials and food, under the pretext of violating food security rules. This has strengthened Russia's policy of substituting imports into the agricultural sector. Also, Russia applies a "stop-list" (travel bans) to EU and US nationals who criticized their actions, denying them the right to enter the territory of Russia (on this list there are 18 MEPs). There is no legal remedy if a person is included in the list, as opposed to the travel ban imposed by the EU.

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Waste Management in North-Maramures Area

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Abstract

Solid waste management is a major problem today. Defective waste collection and transportation as well as the low amount of their recycling and reuse has resulted in an increasing amount of waste being deposited, sometimes at will and most of the times under adverse conditions that may affect the health of the population and can lead to the destruction of habitats and ecosystems. In order to prevent and control the flow of waste, several management systems have been implemented, as well as modern waste recovery systems that allow the reuse of a large amount of waste and less and less storage.

Keywords: Management, Waste, Transport, Recycling

Introduction

Waste management includes the activities of collection, transport, treatment, recycling and storage of waste and aims to reduce their effect on human health, the environment or the appearance of a habitat, as well as saving some natural resources by reusing the recoverable parts (Oros V., 2002) (Bran, F. et al., 2019).

To come to the aid of the local authorities, national waste management plans were first developed, from which they subsequently derived county and local waste management plans (Rădulescu, C.V. et al., 2018). Waste management plans play a key role in the development of sustainable waste management (Negescu Oancea, M.D. et al., 2019). Their main purpose is to present the waste streams and their management options (Ackerman F., 2000). In more detail, the waste management plans present the planning framework for the following aspects:

- Compliance with the waste policy and reaching the proposed targets: waste management plans are important tools that contribute to the implementation of policies and to the goals set in the field of waste management (Bodislav, A. . et al, 2019).
- Establishing sufficient and characteristic capacities for waste management: Waste management plans outline the flows and quantities of waste that must be collected, recycled, treated and / or disposed of (Alpopi, C. et al, 2018).
- Control of technological measures: the presentation of waste flows ensures the identification of the areas where technological measures are needed to eliminate or minimize certain types of waste

- Presentation of economic and investment requirements: waste management plans are a starting point for establishing the financial requirements for operating waste collection, recycling, treatment and disposal schemes.

On this basis, the needs for investments in waste recycling, treatment and disposal facilities can be determined (Dima, C. et al, 2020). The PJGD is requested by the European Union as a planning tool on the basis of which financial assistance and support from the EU can be obtained (Burlacu, S., Alpopi, C., Mitrită, M., & Popescu, M. L., 2019). It is necessary to ensure that EU and national targets will be achieved and sustainable solutions tailored to specific regional conditions will be identified (Circular Economy Strategy, 2016).

Based on the County Waste Management Plan, Maramureş County must develop a waste management system valid and functional for the entire county. Due to the orographic barrier that divides the county into two parts, the waste management will be differentiated on the two parts of the county, respectively in the part of the municipality of Baia Mare and in the part of the city of Sighetul Marmatiei.

The proposed project wants the theoretical implementation of an ideal waste management system in the northern part of Maramures County. This ideal system is composed of all the stages included in the management of waste and focuses on the most efficient variants, but at the same time plausible collection, transport, sorting, recycling and storage of waste being to some extent a fully implementable system (Paunescu I., 2002).

The present paper proposes a description of the current situation of waste management followed by the proposal of a new management base with construction details and specialized site on the North Maramures region. We should mention that this management system includes only the solid municipal waste collected through the waste collection network in the cities, communes and villages of the northern part of Maramures County.

The Existing Situation in The Study Area

Calculation of the served population

Table 1: Served population

City / Town	Population	Households
Bârsana	4870	1700
Bistra	4160	
Bocicoi	4620	1321
Bogdan Vodă	3620	
Borşa	26984	
Botiza	3016	958
Budeşti	3300	
Călineşti	3660	
Deseşti	2664	
Dragomireşti	3132	
Giuleşti	3400	
Ieud	4240	
Leordina	3000	1050
Moisei	9275	
Ocna Şugatag	4500	
Oncești	1500	
Petrova	2870	
Poienile de sub munte	10287	

Poienile Izei		1100	400
Remeţi		3045	1050
Repedea		4856	
Rona de Jos		2250	
Rona de Sus		4987	
Rozavlea		4280	1263
Ruscova		4864	
Săcel		3800	
Săliştea de Sus		5320	
Săpânţa		3300	
Şieu		2680	1035
Sighetu Marmaţiei		41219	
Vadu Izei		2880	
Vişeu de Sus		16930	
Total inhabitants served	**Rural**	**107024**	
	Urban	**93585**	
Total		**200609**	

Source: INS

In order to estimate the future quantities of waste and their composition, the provisions of the Regional Waste Management Plan were considered:

- Evolution of the population until 2042.
- Specific factors for the generation of waste and an annual increase of 0.8%. According to the data provided by the National Institute of Statistics ("Population forecast in the areas of origin 2004 - 2005") and contained in the Regional Waste Management Plan for the period 2003 - 2013 the following trends have been identified
- Urban area: negative values -0.6154% per year
- Rural area: positive values of + 0.2981% per year

Average composition of waste

Regarding the composition of the collected municipal waste, it differs in the urban environment from the rural one, and the amount of waste eliminated per capita differs from the urban to the rural one. The graph below shows the average compositions of waste collected in urban and rural areas (Burcea S., 2009).

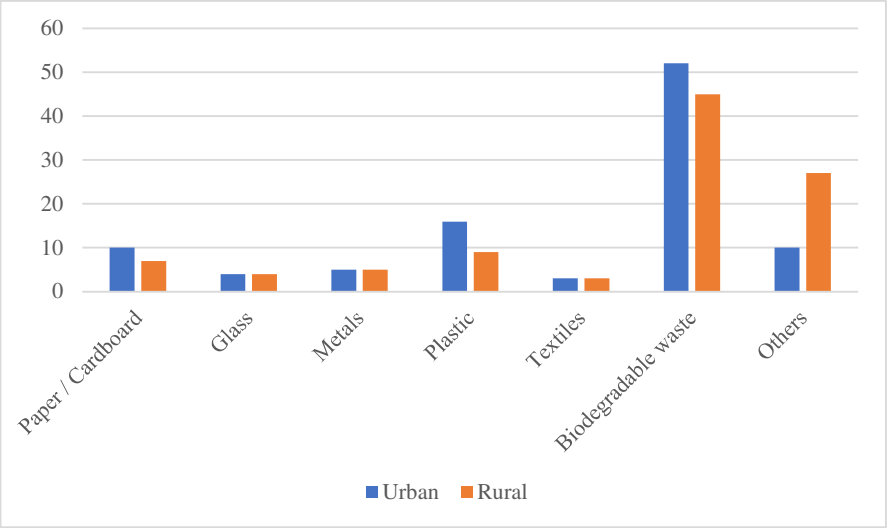

Figure 1: Average composition of waste

Source: INS

The most important amount of waste collected from the population, whether from urban or rural areas, is biodegradable organic matter.

In the conditions of the existing situation, in Romania it is recommended to introduce separate collection of biodegradable matter in the less dense urban environment, in the green areas of the big cities and in some rural areas, which represent 25- 35% of the population.

According to the report of the European Environment Agency "Management of municipal biodegradable waste", in the urban area the share is 69% and in the rural 60%. Currently, there is no separate collection in the county of Maramureş, at the source of the fraction of biodegradable waste from household waste.

The following assumptions reflecting the general trend of developing the economy and changing consumer habits (Bahor B., 2009) were taken into account for estimating the quantities of waste generated:

- decrease of the amount of organic waste by 1% per year;
- an increase in the amount of paper and cardboard waste by 3% per year;
- an increase in the amount of plastic waste by 2% per year;
- a decrease in the amount of waste from glass by 1% per year
- a constant tendency of the quantity of ferrous materials;
- an increase in the amount of textile waste by 1% per year.

Proposed Management Strategy

The proposed methodology envisages the creation of a unique center for collection, processing, recovery and storage of waste from the North Maramures region. Taking into account the directions of the European Union, of which Romania is a part, regarding waste management, it imposes a complex waste management based on reuse, recycling and avoiding waste production (Campeanu V., 2007). In the waste regime proposed by the EU, a regional centralization of the activities related to waste is also required, which means the elimination, namely the closure of all existing waste storage centers and the creation of a county-level center for waste collection and processing, creating locally - waste transfer stations for temporary storage until the time of accumulation of sufficient quantities to be transported to the county center.

Due to the orographic barrier raised by the Igniş - Gutâi Mountains, the county of Maramureş is the only one in the country where the construction of two county waste collection centers is necessary, the project proposing the construction variant for the center that will cover the North Maramureş region serving the communes and cities presented in the table. the next subchapter.

The design of such a center raises a complex problem that must be analyzed from all points of view, choosing the most optimal and favorable solution (Mertins L., 1999). Regarding the location, as it appears from the previous chapter, the location near the commune Ocna Şugatag was decided, this being contested by the inhabitants, but given the new jobs created as well as the subsequent economic development of the area this will be avoided. especially due to the fact that the center will be located at a legal distance from housing and will not have a negative effect on the population.

The center will consist of the following units:

- Unit for the temporary reception and storage of waste
- Primary waste sorting unit
- Waste treatment units
- Waste landfill
- Unit infrastructure

All units will be described in detail in the following chapters, with details of location, surface, construction, etc. Regarding the changes at the level of localities, they will be noticeable by the way the waste is collected.

Figure 2 : Waste flow diagram
Source: after Davidson, G., 2011, *Waste Management Practices: Literature Review*

Waste Collection

Waste collection is one of the most important factors in the entire waste management technology flow. This element is mainly felt by the population served because they are in direct contact. A correct and rational collection of waste leads to a normal and fluent technological flow without difficulties and without major problems as well as to direct benefits at the level of the local communities reflected through clean public spaces and avoiding uncontrolled storage (Hoornweg D., 2012).

A rational waste collection also facilitates the subsequent technological flow by reducing the amount of mixed waste by differentiated collection (Themelis N., 2003). The design of the waste collection system is thus an element of major importance and for its efficient implementation, several elements such as:

- Type of container
- The volume of the container
- Combination of containers
- Frequency of waste collection

The proposed waste collection system involves the acquisition and placement in the region of several types of containers and the bins described below.

Effective waste management starts from the phase of waste collection and extends throughout the technological flow through which waste passes. In the waste collection phase, differentiated collection

helps a lot and favors the following processes. Thus, the waste management system proposes a selective collection at the source of the waste.

The differentially collected waste will be as follows:

- Glass
- Paper
- Metals
- Lightweight PET packaging

For each type of waste collected differentiated will be placed in each commune and in each city, at acceptable distances specialized containers each having its own emptying regime and its own constructive characteristics.

Collection Systems

In practice, several methods of waste collection are applied and known, each of them having their advantages and disadvantages. Effective waste management involves several methods, or generically called collection schemes, generally depending on the type of waste collected or the amount of waste collected (Consonni S., 2005).

The collection in collection points is a more passive method from the point of view of the sanitation agents because in this case the citizens have to make their own contribution to the collection of waste by transporting personal waste to the collection points (McDougall F., 2001). The location of collection points is very important because too much distance between them will mainly lead to passivity from the user's point of view. However, this method has the disadvantage in the case of differentiated waste collection because it remains up to the user whether or not to sort their waste.

For certain types of waste, the door-to-door collection system can also be applied. This method is a more practical one for the users, but it is disadvantageous for the sanitation agent because it will make more effort and will consume more resources for collecting waste from each user. For this reason, this method will only apply in the case of waste collection of used electronic equipment in the case of the proposed management (Wilson D.C., 2006).

In this case, the sanitation agent will set a day when a collection machine will go from gate to gate and pick up the waste of used electrical and electronic equipment.

The main element in the collection stage is the users' awareness, because an effective selective collection starts from the source, and in this case each user has the responsibility to sort their waste.

In order to maintain a superior quality of the environment and to avoid some negative impacts, we suggest that the following be included in the monitoring of the future landfill:

- Monitoring the quality of the environment;
- Technology monitoring;
- Monitoring after closing the site.
  The system for monitoring the warehouse after closing consists of:
- Groundwater monitoring: tracking wells located one upstream and two downstream of the landfill; the chemical and biological parameters will be monitorized, the analysis will be carried out in the accredited laboratory according to the legal norms.
- Monitoring of the coating system: visual inspections of the warehouse in order to prevent and correct the landslides, clearing the final layer, uncontrolled growth of vegetation.
- Monitoring of gas emissions. Monitoring tasks regarding closed landfills are not included in future services, as it is the responsibility of the operator (in this case, the municipalities that hold the respective landfills) (Davidson G., 2011).

The necessary measures to prevent, reduce and eliminate the negative impact have been identified for each major environmental problem. The positive impact of each proposed activity was also underlined. The evaluation of the potential impact is based on the proposed conditions and the general characteristics of this development project. The impact on the environment is quantified as Zero, Not Significant, Moderate and Significant.

Conclusion

Waste management remains unknown in the decision-making landscape of communities. Problems get complicated quickly over time, and delays in their integrated resolution make things even more complicated. The organization of waste management is well developed as documentation but in the field the situation is aggravating. There are components that have not been taken into account and they are even more confusing elements. Integrated management solutions have a much broader scope and need to be considered in order to make a correct and realistic assessment of costs.

Waste recycling is a challenge for everyone. It is necessary for the local authorities to ensure, in stages, the separate collection of waste, having organized a sanitation service at the level of each locality. Separate collection must increase, and the transport of waste from the territory of the localities should be done on time, strictly applying the legislation regarding environmental protection. It is necessary to emphasize the awareness and education of the population, economic agents and local public authorities regarding the impact of waste on the environment.

In order to evaluate the situation in the field of chemical administration, highlighting the problems regarding their management it is necessary to develop an integrated monitoring program of the chemical substances in the environmental components.

In order to stop the processes unfavorable to nature, to exclude or minimize the effects of the influence of anthropic activities on the environment and population health, applying the "polluter pays" principle, as well as perfecting the normative acts regarding the increase of the efficiency of the ecological control in the field of environmental protection, stimulation and application in country of non-polluting technologies it is necessary to elaborate some norms, which would allow the prevention of pollution and make more efficient the compensation of the damage caused to the environment.

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European Forest Areas Management

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Abstract

Future generations will be able to meet their life and living needs by applying proper forest management. Decreasing the vegetation period is an effect of global warming. Tree health is also affected by the increasing acid rainfall. Deforestation leads to the decrease of the areas occupied by forests. For this reason, the article presents an analysis of the area of forested land for the European Union. Protecting forests can lead to improved human health. The importance offered by this function is also highlighted by the evolution of the forest surfaces, as well as of other forested lands, which fulfill the protective function. Also, cutting down forests is an additional pressure that leads to global warming. Thus, the article presents a situation of industrial roundwood removals as well as roundwood production.

Keywords: European Union, Environment, Forest Areas, Forest Protection

Introduction

The conservation of biodiversity also contributes to the application of sustainable management measures of forest areas. Following the research, it was found that there is the possibility of anticipating both precipitation and temperature (Voicu and Rădulescu, 2018). These measurements can be the basis of sustainable forest management.

Human health, but also the environment, is affected by pollution (Dima, C. et al, 2020). The balance of ecological systems can be maintained and restored by measures to combat pollution. The pollution manifested in the forest areas is a process that influences the capacity of the trees of regeneration and, in general, their state of health (Negescu Oancea, M.D. et al., 2019). The drying of trees before reaching maturity is determined by climate change (Bran, F. et al., 2018, 2019). Certain economic activities adversely affect the forests, through the emanated powders, but also through the appearance of acid rain.

The rational and prudent use of natural resources allows the application of measures related to environmental protection (Burlacu, S.; Alpopi , C.; Popescu, M. L. 2018). These measures lead to the improvement and conservation of the quality of the environment. Through them, the objective of protecting the health of the population is also achieved (EU, 2020). The landslides and soil erosion can be reduced by afforestation measures. Forests contribute to the absorption of carbon dioxide, but also to the production of oxygen needed for life (EP, 2013).

It has been found that afforestation can be applied on degraded land. Thus, afforestation programs contribute to the extension of forest areas. Forests can act as protection and absorption screens for different harmful gases . At the same time, the existence of the forest fund allows for additional protection of both soil, water and climate. Also, forests represent a favorable environment for the development of some plants, which allow the use of both fruits and flowers or leaves Burlacu, S. et al., 2018). Biodiversity and wildlife are preserved through forests. At the same time, in addition to these, forests also fulfill the recreational function (Lindahl et al., 2017).

Literature Review

To apply a good management of ecosystem services, it is necessary to know the complex socio-ecological systems. Forest areas provide renewable raw materials, clean air and rich biodiversity (Pynnönen et al., 2019).

The existence of the bidirectional flow of materials between the environment and the economy is offered by the economic activities. One result of this flow of materials is the production of goods, and another represents waste. Thus, we can divide the economic activities according to the degree of use of material resources, including those coming from the forestry field (Victor, 2018).

Even if clearing actions occur, over time, forests regenerate. This capacity should continue to be maintained. Another way to increase the areas covered by forests is by reusing those lands that can no longer be used in agriculture. Their afforestation increases the importance of those areas.

The types of trees that are today part of the forests, but also their distribution, can change over time due to climate change. More and more cases of desertification are emerging. At the same time, global warming can lead to the spread of forest areas to higher altitudes (EEA, 2017).

It must be kept in mind that the loss of ecological value and the decrease of ecosystem capacity can occur if there is a greater emphasis on water resources at the expense of species biodiversity (Weber, 2014).

Ecosystem services make the connection between human well-being and the natural environment a dynamic one. This category also includes forest areas (Ward et al., 2018). The production of oxygen, but also the absorption of carbon dioxide, represent functions of forests, which contribute to reducing environmental pollution.

Applying environmental legislation can lead to the protection of forests and the improvement of natural capital (EU, 2019).

The importance of forests is also given by their role with regard to the health of the environment. They also have an economic advantage for communities. Climate change also causes certain pressures on forest areas. Whether they are willing or not, deforestation actions lead to the reduction of areas covered with forests (WB, 2020).

The application of some legislative measures can lead to the reduction of the pressure exerted on the biodiversity and the ecosystems. Improving forest resilience can be achieved by applying effective management measures (EP, 2013). Also, timber production should also consider the application of biodiversity conservation measures (Ezquerro et al., 2019).

Another aspect that influences the way forest management is given is urbanization. The application of conservation policies for land use can be reflected in the wildlife and forest areas (Balukas et al., 2019).

Methodology of Research

It is necessary to have a balance between the cuts made in the forest areas and the quantity of wood that remains after these cuts (EEA, 2018). Illegal cuts, as well as other types of deforestation, can be controlled through local communities. Certain legislative measures can support them.

The article presents an investigation of the situation in the forest areas for the member countries of the European Union by analyzing the surface of the forest land. A comparative analysis of the data regarding the protective function of the forest surfaces, as well as of other forested lands is performed. Due to the economic activities carried out in the forest areas, the evolution of roundwood production is studied. The evolution used in forestry and logging for 2012-2016 was also analyzed.

Considering the importance of the cuts made in forests, the comparative situation of industrial roundwood removals is presented, for the period 2008-2017.

Results and Discussions

Forest ecosystems are a suitable environment for different species of plants and animals. In addition to the wood material provided, forests allow climate control and protection against natural disasters (EP, 2013). It becomes important to analyze the forest surfaces. Thus, the comparative situation of forest areas, as well as of other forested land, for the period 2000-2015 (thousand hectares) is presented in Table 1.

Table 1: Comparative situation of forest areas, as well as other forested lands, 2000-2015 (thousand hectares)

Countries	2000	2005	2010	2015
European Union	177,834	179,133	180,311	181,918.00
Austria	3,955.00	3,978.00	4,000.00	4,022.00
Belgium	694.40	704.20	714.00	719.10
Bulgaria	3,480.00	3,677.00	3,761.00	3,845.00
Croatia	2,300.00	2,387.00	2,474.00	2,491.00
Cyprus	385.47	386.72	386.13	386.19
Czechia	2,637.29	2,647.42	2,657.38	2,667.41
Denmark	721.45	599.30	634.08	657.69
Estonia	2,450.31	2,465.04	2,452.96	2,455.51
Finland	23,282.51	23,300.00	23,019.00	23,019.00
France	17,093.00	16,748.00	17,163.00	17,579.00
Germany	11,354.00	11,384.00	11,409.00	11,419.00
Greece	6,525	6,532	6,539.00	6,539.00
Hungary	1,907.00	1,983.00	2,046.39	2,190.43
Ireland	684.44	744.46	772.86	801.24
Italy	10,019.00	10,467.00	10,789.00	11,110.00
Latvia	3,364.00	3,415.00	3,467.00	3,468.00
Lithuania	2,103.00	2,194.00	2,254.00	2,284.00
Luxembourg	88.15	88.15	88.20	88.20
Malta	0.00	0.00	0.35	0.35
Netherlands	360.00	365.00	373.48	376.00
Poland	9,059.00	9,200.00	9,329.00	9,435.00
Portugal	4,560.61	4,577.18	4,742.20	4,907.21
Romania	6,600.00	6,743.00	6,919.00	6,951.00
Slovakia	1,921.40	1,931.60	1,938.90	1,940.00
Slovenia	1,271.00	1,272.00	1,272.00	1,271.00
Spain	27,336.96	27,540.76	27,525.38	27,626.65
Sweden	30,707.00	30,762.00	30,505.00	30,505.00
United Kingdom	2,974.00	3,041.00	3,079.00	3,164.00

It is noted that in 2015, the area of forests and other forested land was the highest in: Sweden (30,505 thousand hectares), Spain (27,626.65 thousand hectares), Finland (23,019 thousand hectares), France (17,579 thousand hectares), Germany (11,419 thousand hectares), Italy (11,110 thousand hectares). Compared to 2000, in 2015, it increased significantly in: Ireland (+17.07%), Hungary (+14.86%), Italy (+10.89%), Bulgaria (+10.49%). At the same time, compared to 2000, in 2015, the area of forests and other forested land decreased in: Denmark (-8.84%), Finland (-1.13%), Sweden (-0.66%).

In recent years, the protective function of forests is a predominant feature of forests. The table 2 presents the comparative situation of the forest areas, as well as of other forested lands, that fulfill the protective function, for the period 2000-2015 (thousand hectares). The table does not present the data for the countries where the forests do not have a protection feature, respectively the countries for which there was no data available on the Eurostat website.

At European level, the data extracted from the Eurostat website shows the growth of forest areas, respectively of other wooded lands, from 27,606.7 thousand hectares (in 2000) to 38,075.1 thousand hectares (in 2015). The countries where the largest areas for the protective function were allocated in 2015 were: Italy (9,349.31 thousand hectares), Spain (6,628.92 thousand hectares), Germany (5,500 thousand hectares), Sweden (5,328 thousand hectares), Poland (3,152.4 thousand hectares), Romania (3,087 thousand hectares).

Table 2: Comparative situation of forest areas, as well as other forested lands, which fulfill the protective function, 2000-2015 (thousand hectares*)*

Countries	2000	2005	2010	2015
European Union	27,606.7	34,117.5	36,180	38,075.1
Austria	773	801	833	833
Belgium	179.1	175	170.9	167.6
Bulgaria	665	597	583	569
Croatia	96	116	135	126
Czechia	179.97	251.56	281.25	312.27
Estonia	275.72	231.64	157.88	157.38
Finland	727	583	326	326
France	:	:	906.39	906.39
Germany	2,981	3,737	4,616	5,500
Hungary	218.24	181.46	197.82	200.65
Italy	8,547.45	8,811.87	9,080.91	9,349.31
Latvia	71	122	131	141
Lithuania	230	258	246	251
Netherlands	:	:	4.5	4.5
Poland	2,753	2,907	2,887.4	3,152.4
Portugal	:	:	:	380.09
Romania	3,009	3,013	3,087	3,087
Slovakia	316.9	344.4	357.8	354.7
Slovenia	74.14	94.84	249.4	299.9
Spain	6,510.21	6,566.68	6,600.71	6,628.92
Sweden	:	5,326	5,328	5,328

Above the European average growth is: Slovenia (from 74.14 to 299.9 thousand hectares), Latvia (from 71 to 141 thousand hectares), Germany (from 2,981 to 5,500 thousand hectares), Czechia (from 179.97 to 312.27 thousand hectares), Croatia (from 96 to 126 thousand hectares).

As Slovenia has the highest growth, the figure 1 shows the evolution of the forest area, respectively of other forested lands, between 2000-2015.

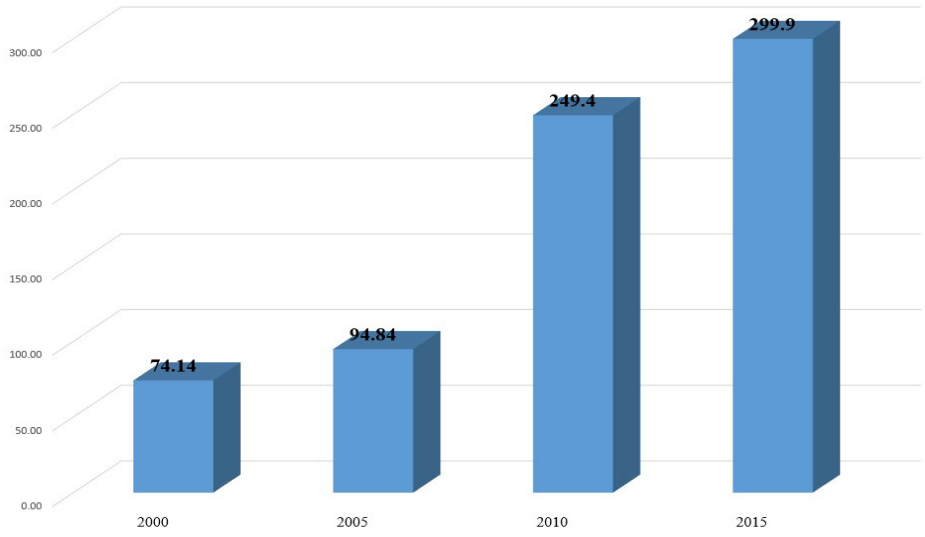

Fig. 1: Evolution of forest areas, respectively of other forested lands, between 2000-2015, fulfilling the protection function, for Slovenia (thousand hectares)

The increase from 74.14 thousand hectares (2000) to 299.9 thousand hectares (2015) is observed. Another important aspect regarding the management of the forest areas is given by the quantity of cut wood. The following figure shows the evolution of industrial roundwood removals for non-coniferous and coniferous, for the period 2008-2017 (million cubic meters).

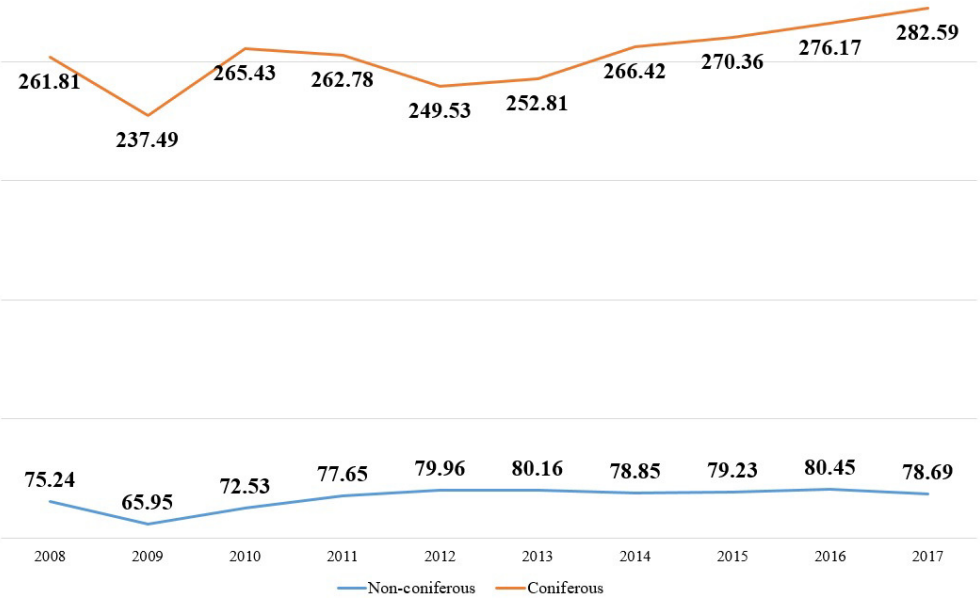

Fig. 2: Industrial evolution of roundwood removals for non-coniferous and coniferous, 2008-2017 (million cubic meters).

The evolution of industrial roundwood removals for the two categories shows a different trend. Thus, for Non-coniferous, in the period 2011-2017, the tendency is to maintain constant values. The growth registered in 2017, compared to 2008, is 4.59%. On the other hand, for the coniferous, in the period

2012-2017, there is an increasing trend of values. Also, in 2017, compared to 2008, there is an increase of 7.94%.

The table 3 presents the comparative situation of industrial roundwood removals for the member countries of the European Union, between 2008-2017 (million cubic meters).

It is noted that, at European level, compared to 2008, in 2017, industrial roundwood removals increased by approximately 7.19%, from 261.81 million cubic meters to 361.28 million cubic meters. From the data presented, for all tree species, in 2017, compared to 2008, the highest increases were recorded in: Estonia (+84.52%), Slovenia (+68.30%), Ireland (+37.89%).

The situation is similar for the two species analyzed (coniferous and non-coniferous). However, in 2017, industrial roundwood removals had high values in: Sweden (65.38 million cubic meters), Finland (55.33 million cubic meters), Germany (43.56 million cubic meters), Poland (40.10 million cubic meters), France (25.36 million cubic meters), Czechia (17.01 million cubic meters), Spain (14.64 million cubic meters), Austria (12.74 million cubic meters). It should be noted that the volume of industrial roundwood removals registered in 2017 for the eight countries represents 75% of the volume given by all the countries of the European Union.

Each socio-economic system, whether it is regional or local, has a certain approach when it comes to the management of forest areas. Thus, adaptation and impact to adaptation measures may be different, even if the ecological forest areas are similar (Andersson and Keskitalo, 2018).

Table 3: Comparative situation of industrial roundwood removals for the member countries of the European Union, 2008-2017 (million cubic meters)

Countries	2008			2011			2017		
	Conifer-ous	Non-conifer-ous	Total	Conifer-ous	Non-conifer-ous	Total	Conifer-ous	Non-conifer-ous	Total
European Union	261.81	75.24	337.05	262.78	77.65	340.43	282.59	78.69	361.28
Belgium	3.06	0.94	4.00	3.23	1.00	4.24	3.14	0.98	:
Bulgaria	1.98	1.40	3.38	2.01	1.36	3.36	2.12	1.09	3.21
Czechia	13.49	0.82	14.31	12.29	1.18	13.47	16.09	0.92	17.01
Denmark	1.30	0.38	1.68	1.12	0.35	1.47	1.25	0.22	1.47
Germany	38.28	8.53	46.81	36.44	8.91	45.36	35.70	7.86	43.56
Estonia	2.50	1.21	3.71	3.58	1.65	5.23	4.70	2.14	6.84
Ireland	2.18	0.00	2.18	2.44	0.00	2.44	2.99	0.02	3.01
Greece	0.36	0.15	0.51	0.24	0.10	0.34	:	:	:
Spain	7.27	7.16	14.43	4.62	6.90	11.53	7.79	6.85	14.64
France	18.05	9.67	27.72	19.59	8.80	28.39	16.72	8.64	25.36
Croatia	0.64	3.06	3.71	0.68	3.16	3.84	0.81	2.64	3.45
Italy	1.37	1.62	2.99	1.41	0.94	2.36	1.32	0.89	2.21
Cyprus	0.01	0.00	0.01	0.00	0.00	:	0.00	0.00	0.00
Latvia	5.83	2.38	8.21	8.45	3.20	11.65	7.55	3.15	10.70
Lithuania	2.27	1.94	4.21	3.33	2.01	5.35	2.99	1.67	4.66
Luxembourg	0.10	0.24	0.33	0.11	0.14	0.24	0.21	0.14	0.35
Hungary	0.51	2.21	2.72	0.68	2.34	3.02	0.84	2.02	2.86
Malta	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Netherlands	0.57	0.26	0.83	0.49	0.20	0.69	0.54	0.28	0.82
Austria	15.72	1.05	16.77	12.78	0.85	13.63	11.72	1.02	12.74
Poland	23.57	6.90	30.47	24.97	7.23	32.20	32.34	7.76	40.10

Countries	2008			2011			2017		
	Conife-rous	Non-conife-rous	Total	Conife-rous	Non-conife-rous	Total	Conife-rous	Non-conife-rous	Total
Portugal	3.12	6.45	9.57	3.52	6.85	10.36	3.81	8.68	12.49
Romania	4.69	4.82	9.52	5.11	5.24	10.34	4.42	5.16	9.58
Slovenia	1.62	0.45	2.06	1.58	0.47	2.05	2.75	0.72	3.47
Slovakia	5.90	2.81	8.71	5.12	3.45	8.57	5.20	3.57	8.77
Finland	38.13	7.33	45.46	38.35	7.17	45.53	46.53	8.80	55.33
Sweden	61.55	3.35	64.90	61.98	4.03	66.00	62.13	3.25	65.38
United Kingdom	7.74	0.11	7.86	8.66	0.12	8.79	8.72	0.12	8.84

Thus, one of the economic activities that use the resources offered by the forest areas is given by the exploitation of the wood. Many of the ecosystem products and services required by the population are provided by forests. These include wood production (Lešo et al., 2019). The table 4 presents the comparative situation of roundwood production for the member countries of the European Union, between 2007-2017 (million cubic meters).

From the previous table, it is noted that, compared to 2007, in 2017, roundwood production increased significantly in: The Netherlands (+208.3%), Estonia (+121.07%), Italy (+60.64%), Slovenia (56.47%). Also, the values fell in: Germany (-30.28%), Cyprus (-18.66%), Austria (-17.22%), Sweden (-6.8%), France (-6.2%) %), Romania (-5.53%).

However, in 2017, the largest roundwood production was registered in: Sweden (72.88 million cubic metres), Finland (63.28 million cubic metres), Germany (53.49 million cubic metres), France (51.2 million cubic metres), Poland (45, 35 million cubic metres), Czechia (19.39 million cubic metres), Austria (17.65 million cubic metres), Spain (17.57 million cubic metres). Thus, in 2017, roundwood production for these eight countries represented about 72.5% of the roundwood production corresponding to the European Union.

Table 4: The comparative situation of roundwood production for the member countries of the European Union, 2007-2017 (million cubic metres)

Countries	2007	2009	2011	2013	2015	2017
European Uniontries	462,51	388,82	435,67	432,89	450,57	470,30
Belgium	5,02	4,40	5,13	:	:	:
Bulgaria	5,70	4,60	6,21	6,15	6,37	6,20
Czechia	18,51	15,50	15,38	15,33	16,16	19,39
Denmark	2,57	2,81	:	3,18	3,48	3,48
Germany	76,73	48,07	56,14	53,21	55,61	53,49
Estonia	4,50	5,40	7,11	7,65	9,52	9,95
Ireland	2,71	2,43	2,64	2,76	2,91	3,22
Greece	1,74	1,03	1,20	1,09	:	:
Spain	14,53	13,98	15,43	15,56	17,43	17,57
France	54,58	54,45	55,04	51,30	51,01	51,20
Croatia	4,21	4,24	5,26	5,44	5,18	5,31
Italy	8,12	8,08	7,74	:	5,05	13,05
Cyprus	0,02	0,01	0,01	0,01	0,01	0,02
Latvia	12,17	10,44	12,83	:	12,29	12,90
Lithuania	6,20	5,46	7,00	7,05	6,41	6,75
Luxembourg	0,29	0,27	:	:	:	0,43

Countries	2007	2009	2011	2013	2015	2017
Hungary	5,64	5,24	6,23	6,03	5,74	5,69
Malta	0,00	0,00	0,00	0,00	0,00	0,00
Netherlands	1,02	1,02	0,98	1,02	2,25	3,15
Austria	21,32	16,73	18,70	17,39	17,55	17,65
Poland	35,93	34,63	37,18	38,94	41,37	45,35
Portugal	10,82	9,56	10,96	10,61	11,65	13,53
Romania	15,34	12,56	14,36	15,19	15,31	14,49
Slovenia	2,88	2,93	3,39	3,42	5,05	4,51
Slovakia	8,13	9,09	9,21	8,06	8,99	9,36
Finland	56,61	42,16	52,78	56,99	59,41	63,28
Sweden	78,20	65,10	71,90	69,60	74,30	72,88
United Kingdom	9,02	8,62	10,02	10,82	10,57	10,93

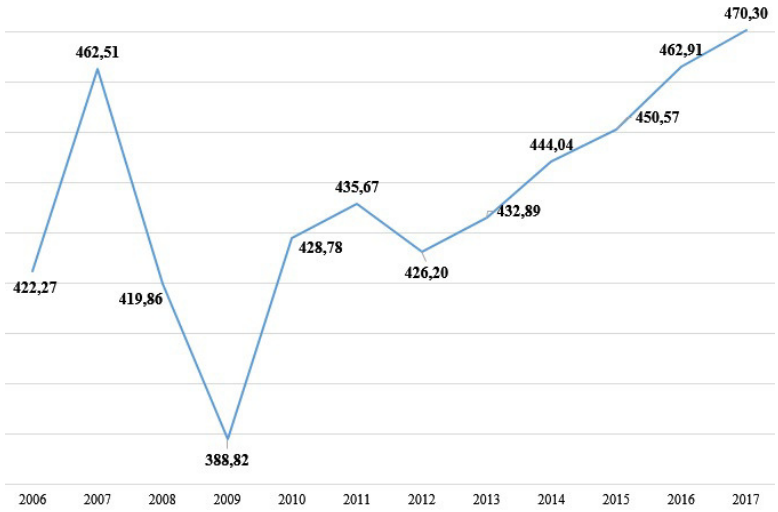

Fig. 3: The evolution of roundwood production for the European Union (million cubic meters)

The evolution of roundwood production for the European Union is shown in the figure 3 (million cubic meters). For the period 2007-2009, a decrease in values is observed. We also find that the trend of recent years is increasing. Between 2012 and 2017, roundwood production in the European Union increased from 426.2 million cubic meters (2012) to 470.3 million cubic meters (2017). However, we must bear in mind that the decline of forest areas leads to additional anthropic pressures. Conservation of biodiversity is one of the advantages that forests offer.

The importance given to the forestry field is also given by the number of employees in this field. Thus, at European level, for the period 2012-2016, the evolution of employed persons in forestry and logging is presented in table 5 (thousand annual working units).

Table 5: Employee evolution, 2012-2016 (thousand annual working units)

Countries	2012	2013	2014	2015	2016
European Union	493.11	491.92	512.92	514.71	503.26
Austria	20.33	20.27	21.40	20.69	18.84
Belgium	2.40	2.40	2.40	2.40	2.40
Bulgaria	14.45	15.67	15.11	13.99	12.31
Croatia	14.93	13.57	13.31	13.12	13.89

Countries	2012	2013	2014	2015	2016
Cyprus	0.13	0.12	0.10	0.11	0.11
Czechia	22.90	22.10	22.20	21.60	21.50
Denmark	6.00	6.00	6.00	6.00	6.00
Estonia	6.02	6.41	6.61	6.54	6.05
Finland	25.00	24.00	23.70	22.50	21.70
France	29.30	29.50	28.40	28.59	28.48
Germany	38.76	39.82	47.24	50.21	48.89
Greece	10.73	12.00	12.86	13.21	10.05
Hungary	17.50	18.25	19.73	19.66	20.32
Ireland	3.27	3.40	2.91	1.94	2.78
Italy	39.90	39.79	39.29	40.00	40.60
Latvia	16.60	16.87	17.55	18.80	17.85
Lithuania	12.63	12.17	13.73	13.75	12.69
Luxembourg	0.53	0.51	0.56	0.56	0.56
Malta	0.00	0.00	0.00	0.00	0.00
Netherlands	2.00	2.00	2.00	2.00	2.00
Poland	47.70	48.20	48.50	48.70	51.60
Portugal	10.82	11.13	12.02	12.86	13.46
Romania	60.30	57.90	47.03	46.69	44.78
Slovakia	8.86	8.11	22.79	21.43	19.98
Slovenia	5.34	5.81	7.44	7.50	7.49
Spain	19.00	19.00	20.60	21.90	21.20
Sweden	42.70	42.90	43.40	42.90	40.70
United Kingdom	15.00	14.00	16.00	17.00	17.00

The data presented show an increase at European level. In 2016, the highest values were registered in: Poland (51.60 thousand annual working units), Germany (48.89 thousand annual working units), Romania (44.78 thousand annual working units), Sweden (40.70 thousand annual working units), Italy (40.60 thousand annual working units). Also, compared to 2012, in 2016, significant increases were observed in: Slovakia (+125.51%), Slovenia (+40.26%), Germany (+26.14%), Portugal (+24.40%). Significant decreases were recorded in: Romania (-25.74%), Cyprus (-15.38%), Ireland (-14.98%), Bulgaria (-14.81%).

Since, in the period 2012-2016, the number of employees has decreased significantly in Romania, the following figure shows the evolution of the number of employees for this period.

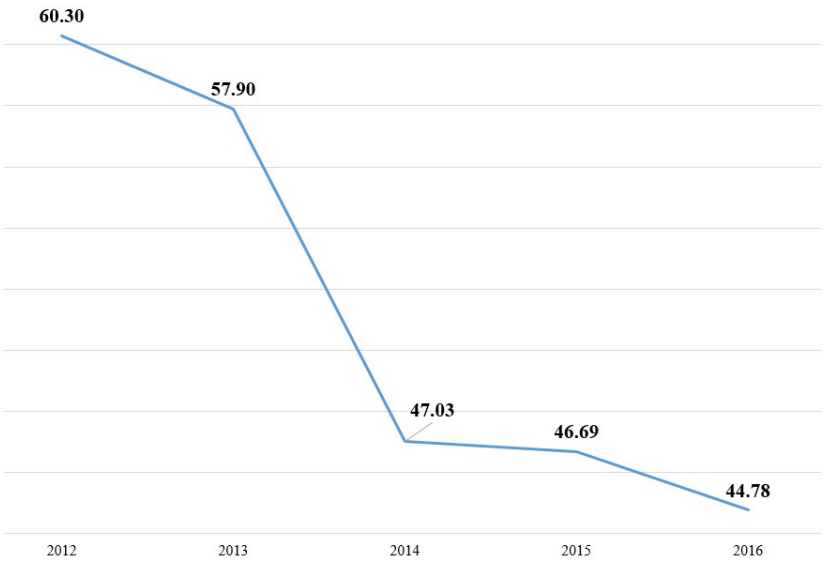

Fig. 4: The evolution employed, between 2012-2016, for Romania (thousand annual working units)

The decrease from 60.30 thousand annual working units (2012) to 44.78 thousand annual working units (2016) is observed.

Conclusions

Sustainable management of forest areas can lead to the needs of future generations. Decreasing the vegetation period is an effect of global warming. Tree health is also affected by the increasing acid rainfall.

For local communities, sustainable forest management allows both the quality of the environment and the creation of new jobs (Buzoianu et al., 2018).

Between 2000-2015, the area of forests and other forested land increased. This increase was observed both at European level and in most of the member countries of the European Union. Also, it has been observed the increase of the forest surfaces, respectively of other forested lands, that fulfill the protective function. Regarding the evolution of industrial roundwood removals, at European level, there is a tendency of increasing values for coniferous. At the same time, the volume of industrial roundwood removals registered in 2017 for the eight countries represents 75% of the volume given by all the countries of the European Union. Growth trends were also observed for roundwood production. Regarding the evolution of employed persons, it can be said that the situation is different in the member countries. If in most of the values have increased, there are countries where the evolution has had decreasing trends.

In order for future generations to live in a healthy living environment, the way resources are used today needs to change. Natural capital is a wealth that must be preserved and passed on to future generations (EU, 2020).

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Business Models for Start-Ups in The Globalized Economy

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Abstract

The basic idea that starts from this concept is the following: essential for business success, in a constantly changing world, is, first of all, an optimal organization of the activity, given to external priorities and rigor and not the availability of resources (financial). , materials, human, information, etc.). Business Process Reengineering (BPR) has become one of the most commonly used terms by management specialists and managers who want to increase the efficiency and effectiveness of their businesses. Officially launched in the 1990s (M. Hammer, J. Champy, 1993), the reengineering revolutionized the managerial theory and practice at the company level, with the emphasis placed on the fundamental, spectacular, profound and radical redesign of work processes and, in especially those of value added generators. The key notion around which this unique mode of change gravitates is the "process", which, we must admit, the Romanian management made little reference to until the emergence and promotion of quality management systems.

Keywords: Reengineering, Business, Start-Up, Organization

Introduction

Reeingineering is an increasingly common term, but not always better understood. It is a concept originating in America from the last recession, then spreading rapidly throughout the world (Dubois H, 2002).

The basic idea that starts from this concept is the following: essential for success in business, in a constantly changing world, is, first of all, an optimal organization of the activity, given to external priorities and rigor and not the availability of resources (financial, materials, human, information, etc.) (Jianu, I. et al., 2019).

The concept of reengineering finds its roots in management theories developed in the early 19th century in the USA (Ioniţă, F. et al., 2009a,b). The purpose of reengineering is to: "Make all your processes the best in the classroom," suggested Fredrick Taylor since the 1860s. Taylor revolutionized the workplace with his ideas on how to organize work. He believed that the same principles that brought success to solving technical problems could also be used to structure the jobs performed by individuals (Davenport T, 1993).

Taylor suggested that managers could discover the best way to perform the process and implement reengineering to the extent that it reflects the classic belief that there is a "best way" to perform tasks. The principles Taylor has developed have become known as scientific management. Scientific management has had a long-term effect on the organizational structures of workers 'work, the terms of content of the workers' workplace, their models of interaction with technology, as well as on the roles and relationships between workers and management.

Business process reengineering involves radical redesign of core processes to achieve dramatic improvements in productivity, cycles and quality. In the process of reengineering business processes, companies start with a blank sheet of paper and rethink existing processes to provide more value to customers (Bălan C., 2006).

The Reengineering Process

A business process in the above concept can be defined as a collection of activities that take one or more types of inputs and create something at the output, something that has value for the customer (Hammer M., 2006).

Three types of reengineering enterprises have been identified (Ionita, F., & Burlacu, S., 2009):

• The first type is represented by those companies that face great difficulties, which have no other solution. If, in an enterprise, the costs are of an order of magnitude greater than the competition or that would allow the model of production process in which they fall, if the service activity offered is so defective that the customers protest, if the failure rate of the products is twice, three or five times higher than the products of the competition, if, in other words, the company needs improvements in the scale of an order of magnitude, then that company needs reengineering;
• The second type is the one of companies that have no problems at the moment but whose management anticipates the emergence of these major difficulties. This leadership prefers to approach this solution before reaching the crisis situation.
• The third approach to the reengineering concept is even the companies on the wave, which have a very good position but which have an ambitious and aggressive management.
Adam Smith's theory, according to which industrial activity can be broken down into simple, fundamental operations, was the one that stood for two centuries at the basis of business organization and the concept of reengineering comes with the reunification of operations around business processes (Burlacu, S., 2010) (Costache, G., et al., 2015).

The division of labor is no longer the reality of our day, it simply does not work anymore. Clients, competition, change are the driving forces behind another approach (Al-Mashari M., 2001).
Business reengineering means starting from the beginning, from the ground up, to let go of much of the wisdom gathered during two hundred years of industrial management, to look at how to work in the mass production era and to decide how best to currently operated (Bran, F. et al., 2018).

The need for reengineering

In 1990, Michael Hammer, a former computer science professor at the Massachusetts Institute of Technology (MIT), published in the Harvard Business Review the article "Reengineering Work: Don't Automate, Obliterate," stating that "the biggest challenge for managers is eliminating forms of work that add no value, rather than using technology to automate it" (Hammer M., 2006).

Hammer's proposal was very simple: most of the work done by companies does not add any value to customers, and this activity should be eliminated, not accelerated by automation. His proposal was to companies: they should reconsider their inability to meet the needs of their clients and to redo their processes. Hammer said that BPR (business process reengineering) will bring more value to customers; will accelerate their processes; the focus will only be on what matters BPR basically aims to maintain

long-term profitability and strengthen competition in line with transforming the market reality (Hammer M., 2006).

BPR can represent an effective management approach, adopting a wide range of use and can have very successful results, if it is put in the right conditions. Before proper and careful implementation, consideration can be given to the factor care and can be significantly included in the BPR project (Ozcelik Y., 2010). Their commitment and support are the main success factors in the re-engineering project. Peak administration cannot provide strong and consistent support in terms of capital, resources, or life-long leadership, this is very important for BPR design.

At the same time, the top management should ensure constant control over the design of the BPR for a monitoring of the modality in the effective care works and for taking measures before a problem for any problem (Dubois H., 2002).

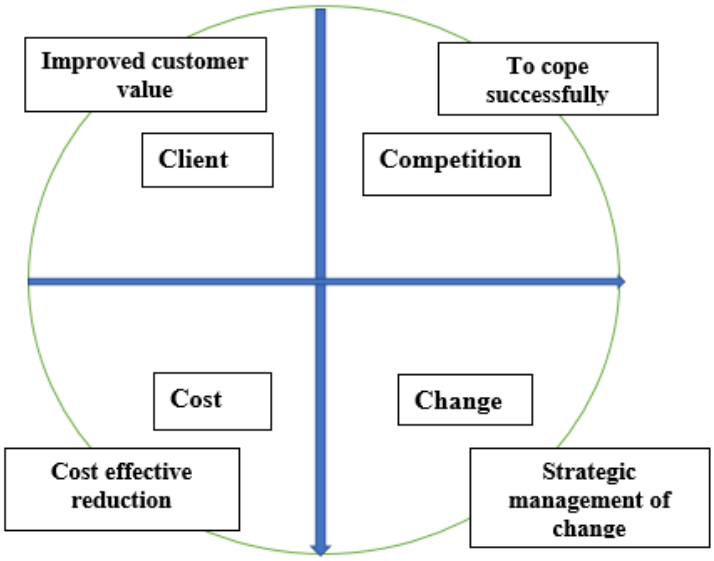

Figure 1: The objectivs of BPR

Define Start-Up

A startup is a type of temporary organization, which aims to look for a repeatable and scalable business model, in response to an existing unresolved problem, and which constitutes the transition from a simple idea to a business (Lewis L.V., 1983). Although there are many definitions for the concept of start-up, some very technical, some less specialized, there is still no unanimously accepted explanation (Zeleny M., 2005).

In the case of Romania, the following approach is identified with an optimal application:

- a startup is a company that has less than 10 employees and activates for a maximum of 5 years (from other sources, maximum 2 years) only that this variant takes more of technical aspects instead of taking into account the part of innovation, novelty and so on. completion also appears;

- a startup is a company that has noticed an existing problem and has designed a creative solution that has not been encountered until then, in response to that problem. More efficient solutions can be framed here, for problems already "solved" by other methods.

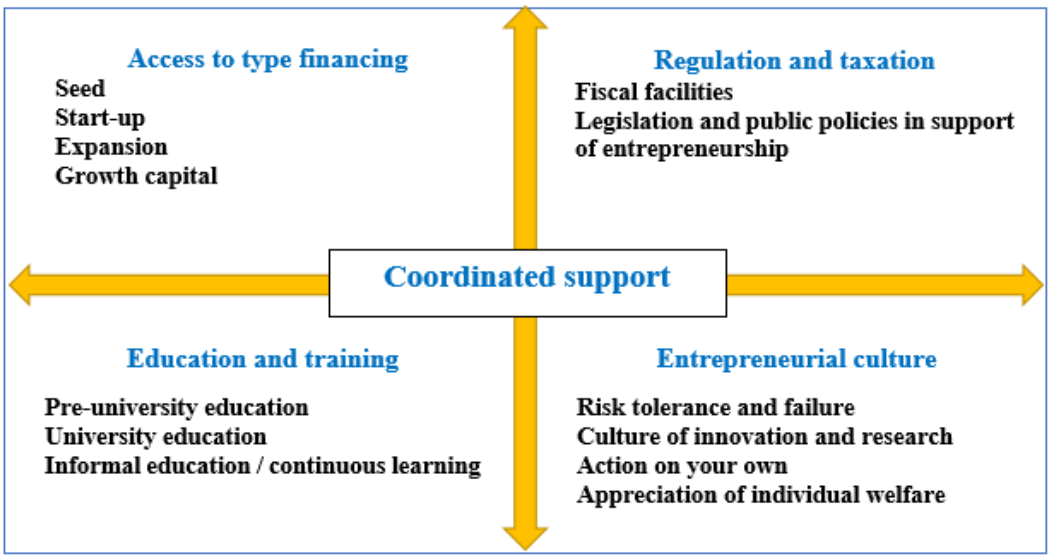

Figure 2: A framework for increasing entrepreneurship

Startup financing programs

At present, there are several programs for financing, supporting and accelerating start-ups. These programs are supported by the Government of Romania, by certain investment funds (eg: GapMinder, recently launched venture capital fund in Romania), by certain banks (eg Romanian Commercial Bank, Banca Transilvania).

In order to be able to access these funds, each person must take certain information, development and training courses to help them develop and sustain the business (internships in companies with the same field of activity as the one of the company they wish to access. o set up, personalized mentoring and mentoring sessions, "business school" type events, support for setting up the business and monitoring the implementation of the business plan and the expenditure of the financial aid received) (Rădulescu, C.V. et al., 2018a,b). The conditions and requirements differ from one funding program to another. Structural Consulting Group has started projects on the financing line Romania Start Up Plus, through which new businesses are financed.

Their involvement is made in four geographical areas as follows:

- Start-up @ CENTER - project addressed to the Centru region (Alba, Braşov, Covasna, Harghita, Mureş and Sibiu counties), more specifically for people with a residence or residence in this region and who wish to set up a business in this region;
- Entrepreneurs' Workshop - project addressed to the West region (Timis, Arad, Caras-Serverin and Hunedoara counties);
- Start UP Smart 2.0 - project for the South-East region (Galaţi, Brăila, Constanţa, Tulcea, Vrancea and Buzău counties);
- Plus for the start-ups of the North-West region - project addressed to the North-West region (Cluj, Bistriţa-Năsăud, Maramureş, Satu Mare, Bihor and Salaj counties);

The conditions regarding the business provided under this program are the following:

- To be new businesses (companies will be set up after the selection of business plans by the selected contractors);
- To be business in non-agricultural fields and to be set up in the urban environment, in one of the counties of the region to which the project is addressed;
- To create at least 2 jobs (per business);
- The entrepreneurs selected to receive the financial support for setting up and developing the businesses will no longer have the status of majority partners in other businesses;
- Financing can be obtained for the proposed businesses in most areas of activity.

The Start-up Nation program is a program to encourage and stimulate the establishment and development of small and medium-sized enterprises, implemented by the Ministry for the Environment of Business, Trade and Entrepreneurship "through the Territorial Offices for Small and Medium Enterprises and Cooperation, according to with the provisions of Emergency Ordinance No. 10/2017 for stimulating the establishment of new small and medium-sized enterprises approved by the provisions of Law No. 346/2004 on stimulating the establishment and development of small and medium-sized enterprises, with subsequent amendments and completions, as well as Government Decision no. 23 / 2017- regarding the establishment, organization and functioning for the Business, Trade and Entrepreneurship Environment.

Start-Up Nation is a program through which the Romanian state commits to offer up to 200,000 lei to those who want to start an SME. The 200,000 RON (the maximum amount that can be accessed by one person through this program) are non-refundable and represent 100% of the value of the eligible expenses.

In short, unlike other financing programs, the state no longer requires the entrepreneur to pay part of the expenses that arise with the opening of a new company. The state wants this program to be successful because this funding program could lead to the establishment of 10,000 SMEs and the creation of new jobs: every person who starts a business as a result of this program will have to hire at least a man and hold the post (not the employee, the employee can be changed) for a period of at least two years after the end of the implementation period.

Conclusion

The concept of reengineering involves recasting and redesigning the activity of a company to achieve significant and lasting improvements in terms of costs, revenues, quality. The purpose of reengineering is to optimize the development of all the processes involved in the activity of the company, maximizing the results with an optimal consumption of resources.

In this context, my work on the topic "Reengineering in business models for start-ups" is part of the modern management approaches regarding new businesses and how they can be successful in the Romanian economic market.

I can say that the Romanian entrepreneurship has a favorable evolution and is very receptive to the opportunities existing in the economic environment. Entrepreneurs share a common set of features that help them start their own business and increase their chances of success with start-up programs.

In conclusion, I can say that the private environment can make a significant contribution to the development of entrepreneurship by implementing quality programs: training sessions, events and competitions for entrepreneurs at the beginning of the road, mentoring programs and support for start-ups or information sessions about existing financing opportunities.

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Romania's Population and The Pressure of Old Age – Reforming the Pension System

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Abstract

This paper tries to underline the evolution of the three pillars of the Romanian pension system and the support developed by the European Commission and midrange entities that are designed to grow the real convergence between EU Member States and reduced development delays between the East and the West.

Keywords: Pension System, European Union, Development, Sustainability

Introduction

The aging of the population is a major problem found in the pension systems of all the countries of the European Union. By 2050, the life expectancy at birth for men is expected to increase by 7.4 years, and for women by 6.1 years, compared to 2010. Due to the increase of the retirement age of the baby-boom generation the active age of Europe will it begins to decline, thus leading to annual growth of approximately 2 million elderly people over 60 years of age. Also, the active persons between the ages of 20 and 59 will decrease each year during the following decades.

Increasing longevity and phasing out the baby-boom generation will have significant economic and budgetary repercussions in the EU, limiting the potential for economic growth and putting pressure on public finances.

The pension policy is established and implemented by the European Union countries at national level (Profiroiu, A. et al., 2019). The EU supports national efforts to ensure a high level of social protection, pension allocation and exchange of best practices.

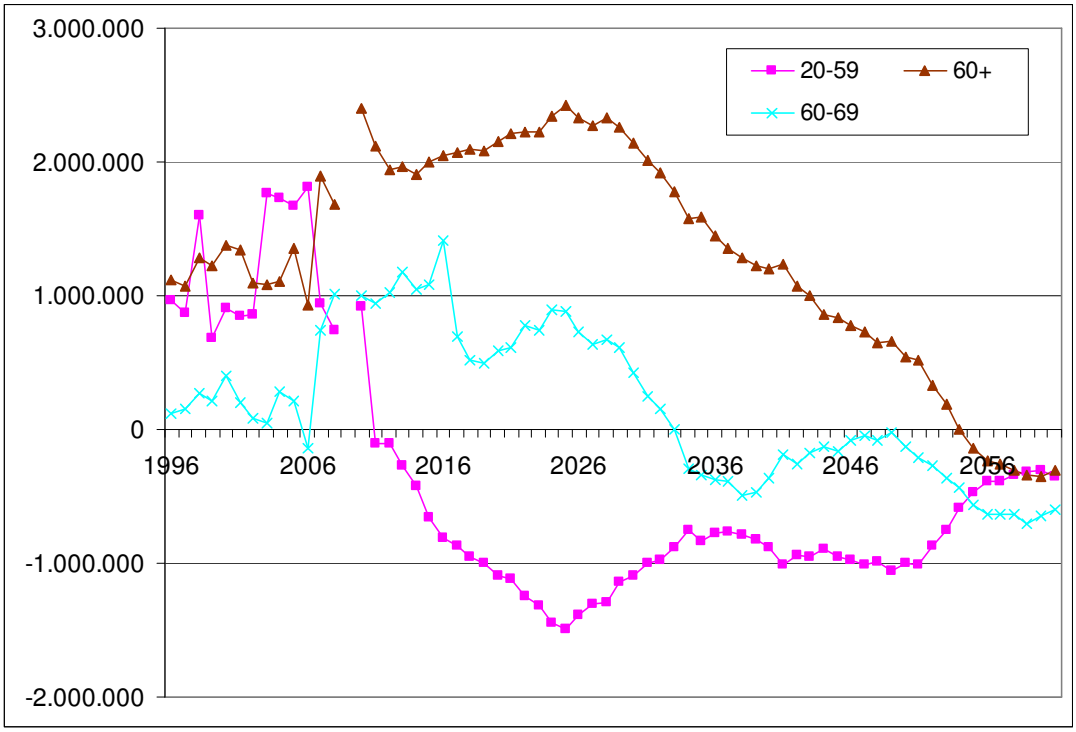

Fig. 1: Demographic changes from the previous year, EU-27, 1996-2060
Source: Eurostat, 2019

The Pension System in Romania

The World Bank supports and promotes the reform of the pension systems in the EU countries. The system promoted by the World Bank, implemented by Romania, is based on three pillars:

1. Pillar I - It is the pension offered by the public system and is represented by the state pension
2. Pillar II - It represents the privately administered pensions - the obligatory private pensions
3. Pillar III - Represents optional private pensions, consisting of additional contributions of employees and employers

Pillar II and III assume the private administration of the pension money.

The role of the Member States and the EU in the field of pensions

For the sustainable functioning and efficiency of the pension system it must be supported by the people with a job through taxes, contributions and savings (Bran, F. et al, 2018). The way of financing the pension fund must be supported in a fair way by the conditions on the labor market in order to have a balance between the active taxpayers and the beneficiaries, ie the retired persons (Bodislav, A. et al, 2019).

Each Member State has the power to develop its own pension system according to their context. According to the Treaty on the Functioning of the EU, it provides for the support and completion of the activities of the Member States in the implementation of policies and social protection (Burlacu, S., Alpopi, C., Mitrită, M., & Popescu, M. L., 2019).

The European Union has a plethora of political instruments to support Member States in ensuring and maintaining adequate sustainable pensions (Burlacu, S. et al., 2019). However, it is recognized that

pensions play a vital role in supporting EU citizens, but the largest public expenditures are allocated for pension funding (Jianu, I. et al., 2019).

In order to postpone retirement, some Member States resort to different factors such as increasing the number of years required for the contribution to obtain a full pension; adapting the retirement ages in direct relation to the increase in life expectancy (Ioniţă, F. et al., 2009).

Increasing the retirement age as well as phasing out the early retirement system requires measures to allow workers to continue their work over an extended period, health-related measures, employment and the work environment (Rădulescu, C.V. et al., 2018).

The value of pensions in relation to the GDP of the European average is increasing, contributing to the increase of public spending, currently being at 10% of GDP, and by 2050 it will reach 12.5%.

During the last decade the pension system has undergone various structural reforms. Most EU countries have adapted the pension system to cope with any demographic changes. A series of changes to the pension system reforms include the inclusion of mandatory financial support pillars and the transition from predefined benefits systems to predefined contributions systems.

Average life expectancies at EU level

According to Eurostat in Europe average life expectancy is constantly increasing for all states. Life expectancy for men grows exponentially from decade to decade so that by 2050 the country with the highest life expectancy is Switzerland with 85.3 years, and at the opposite end is Latvia with an average life of 78.4 years.

Table 1: Average life expectancy for men

TIME / GEO	2018	2020	2030	2040	2050
Belgium	79.3	79.6	81.1	82.5	83.8
Bulgaria	71.6	72.1	74.6	77.0	79.2
Czechia	76.1	76.6	78.5	80.2	81.9
Denmark	78.9	79.6	81.1	82.5	83.8
Germany (until 1990 former	78.8	79.1	80.7	82.1	83.5
Estonia	74.0	74.5	76.7	78.8	80.7
Ireland	80.3	80.8	82.1	83.4	84.5
Greece	79.0	79.3	80.9	82.4	83.8
Spain	80.4	81.0	82.3	83.6	84.8
France	79.4	80.1	81.6	83.0	84.3
Croatia	75.1	75.5	77.5	79.3	81.1
Italy	81.0	81.2	82.4	83.6	84.7
Latvia	69.7	70.6	73.4	76.0	78.4
Lithuania	70.8	71.5	74.1	76.6	78.9
Luxembourg	79.2	80.3	81.8	83.2	84.4
Hungary	72.7	73.2	75.6	77.8	79.9
Malta	80.3	80.6	82.1	83.4	84.6
Netherlands	80.1	80.6	81.9	83.2	84.3
Austria	79.4	79.8	81.3	82.6	83.9
Poland	73.6	74.6	76.8	78.9	80.9
Portugal	78.1	78.9	80.4	81.9	83.3
Romania	71.6	72.5	75.0	77.4	79.7
Slovenia	78.1	78.6	80.2	81.7	83.1
Slovakia	73.9	74.5	76.7	78.7	80.7
Finland	78.7	79.3	80.9	82.3	83.6
Sweden	80.8	81.1	82.4	83.6	84.7
United Kingdom	79.4	79.9	81.4	82.8	84.0
Norway	81.1	81.3	82.6	83.7	84.8
Switzerland	81.6	81.9	83.1	84.3	85.3

Source: Eurostat, 2019

According to Eurostat in Europe average life expectancy is constantly increasing for all states. Life expectancy for women grows exponentially from decade to decade so that by 2050 the country with the highest life expectancy is Spain with 89.4 years, and at the opposite end is Bulgaria with an average life of 84.6 years. Compared to the life expectancy of men, that of women is exponentially higher due to the different factors and working environments in which the two sexes activate.

Table 2: Average life expectancy in women

TIME / GEO	2018	2020	2030	2040	2050
Belgium	84.0	84.3	85.7	86.9	88.1
Bulgaria	78.5	79.0	81.0	82.8	84.6
Czechia	82.0	82.4	83.9	85.4	86.7
Denmark	82.9	83.5	85.0	86.3	87.6
Germany (until 1990 former	83.5	83.8	85.2	86.5	87.7
Estonia	82.7	83.1	84.6	86.0	87.3
Ireland	83.9	84.5	85.8	87.0	88.2
Greece	84.1	84.3	85.6	86.9	88.0
Spain	86.0	86.5	87.5	88.5	89.4
France	85.4	86.0	87.2	88.2	89.2
Croatia	81.1	81.5	83.1	84.6	86.0
Italy	85.4	85.6	86.7	87.8	88.8
Latvia	79.6	80.3	82.2	83.9	85.6
Lithuania	80.6	81.0	82.8	84.4	85.9
Luxembourg	83.9	84.9	86.3	87.5	88.6
Hungary	79.5	79.9	81.8	83.7	85.4
Malta	84.8	85.1	86.4	87.7	88.8
Netherlands	83.3	83.8	85.2	86.5	87.7
Austria	84.0	84.4	85.7	86.9	88.0
Poland	81.6	82.3	84.0	85.5	86.9
Portugal	84.3	85.0	86.2	87.3	88.4
Romania	79.1	79.7	81.7	83.6	85.4
Slovenia	84.0	84.4	85.7	86.9	88.1
Slovakia	80.8	81.2	83.0	84.6	86.1
Finland	84.3	84.9	86.1	87.3	88.4
Sweden	84.2	84.5	85.8	87.0	88.1
United Kingdom	83.0	83.5	85.0	86.3	87.6
Norway	84.4	84.7	86.0	87.2	88.3
Switzerland	85.6	86.0	87.1	88.1	89.1

Source: Eurostat, 2019

Conclusion

At the level of the European Union, the aging of the population is an important factor, more precisely a negative element due to the decrease of the number of active persons and the increase of the number of old people, having effects on the economic evolution, limiting its potential.

At the level of Romania, the pension system promoted and implemented is based on 3 pillars, being supported both from the public space and from the private space, through various taxes, contributions and savings, forming a balance between active taxpayers and pensioners.

Regarding the role of each state, they have the duty to create their own pension system, according to the needs of each one. The European Union offers support to the Member States in support of these pensions, being shown that the largest public expenditures are made to finance these pensions. Having the opportunity to make their own pension system, some states postpone retirement by calling on various forms of age extension as well as ending the early retirement phenomenon.
Looking at the demographic estimates on the increase of the number of pensions and the decrease of the young generation due to the decrease of the birth, a future problem of the states is evaluated, the

coverage of these pensions. Specialists support the move to private pensions to avoid problems in the public environment.

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Achieving the Goals Proposed in The European Union for The Sustainable Development Goal - Quality Education

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Abstract

Technological progress, automation, digitization, lead to changes in the demands of the labor market. Vocational education and training systems are forced to keep up with these changes. The acquisition by young people and adults of skills that are as relevant to the labour market as to provide them with increased employment opportunities is the basis of investments in education. Objective 4 of sustainable development pursues these aspects. The article analyzes the progress made in reaching the targets proposed by the Member States of the European Union. Depending on the degree to which young people acquire new knowledge, skills and competences, their capacity to integrate them into the labour market increases. Subsequent integration into the labour market of young people may be affected by the early departure of vocational education and training systems. Throughout life, adult education measures may be hindered by their refusal to participate in vocational training programs. Comparative analyzes regarding both basic education and tertiary education are presented, as well as comparative analyzes regarding adult education.

Keywords: European Union, Education, Training, Employment

Introduction

The United Nations agenda for sustainable development for 2030 aims at both poverty reduction and combating climate change and addressing inequalities. To meet these issues, 17 sustainable development goals were set, for which 169 targets were associated (EC, 2020). The Treaty on European Union stipulates that the European Union assumes the principles of the Charter of the United Nations (EC, 2012).

At EU level, through the reflection paper „Towards a sustainable Europe by 2030", the European Union recognizes that for its political agenda it is necessary to prioritize the 2030 Agenda for sustainable development, as well as the 17 goals of sustainable development (EC, 2019) . It is also proposed that the overall objective in the next strategic plan of the European Union for the period 2019-2024 and subsequently be represented by the implementation of the 2030 Agenda for sustainable development (ECR, 2019).

Achieving a sustainable future for the Member States of the European Union is closely linked to achieving these goals. One of the goals of sustainable development concerns the quality of education. The Member States of the European Union, with the intention of providing new opportunities for young people, given the special importance of improving the quality of education and vocational training (EC, 2016).

All the Member States of the European Union aim at increasing the quality of their own education and training systems. The exchange of experience in the steps to achieve this objective constitutes advantages in preparing young people and their transition to the labour market (CEDEFOP, 2018).
Changing the qualification needs leads to the need to update the skills. Loss of contact with the labour market diminishes the chances of getting a job (CEDEFOP, 2018b). Workplace practice becomes a necessity in the youth's quest to acquire new knowledge, skills and competences (OECD, 2017). In this context, dual education has the advantage of partnerships between companies and the education system. In the labour market, persons trained in the dual system benefit from high mobility (Koudahl, 2010).

Investments in education allow the overcoming of the mismatches between the competences required in the labour market and the competences with which the young graduates are presented for employment (EC, 2018a).

The implementation of digitization has made the mobility of the population increase. Both professional insertion and social inclusion are influenced by the existence of reading, math and science skills (EC, 2017b).

Reducing social inequities can be achieved through adequate education. In this way, changes can occur both at the level of individuals and communities they belong to (OECD, 2019).

Modern technologies have also emerged as a consequence of investments in innovation and research. Economic growth, based on productivity growth, is influenced by employment rates. The structure of the labour markets changes according to the level of education of the recent graduates. Thus, new jobs appear based on new skills (EC, 2019).

It cannot be said that the protection of young people against social exclusion or poverty can be based only on employment. The low levels of pay or the long periods affected by unemployment lead to the need to complete the competences by acquiring higher level qualifications (Maguire, 2015).

Companies are becoming more and more mobile and digital. This is why it is necessary to identify new ways of education and vocational training, through which those skills required by the labour market can be acquired (EC, 2017).

The changes manifested on the labour market, due to the financial crisis, influence the structure of the economy. Thus, a motivating salary can make graduates choose a job in public administration to the detriment of small or medium-sized companies, with unattractive salaries. Also, the segmentation of the labour market, as well as the regional differences, make the graduates to occupy jobs in certain occupations, respectively in less developed regions (Xiaohao and Changjun, 2013).

Literature Review

In recent years, there is an increase in population in urban areas to the detriment of population in rural areas. These changes influence the way in which the planning of educational systems should be carried out (UNESCO, 2016).

The objectives of the early childhood education programs should include aspects related to the development of children in general, namely self-care skills, as well as issues related to their preparation for a higher level of education (Ahi and Kildan, 2013).

In many countries of the European Union the education and training systems have also changed as a result of European law (Dias, 2014).

In view of demographic, social and economic changes, most EU Member States promote quality in adult education (Pozdnyakova and Pozdnyakov, 2017).

Many young people are tempted to put a job first, to the detriment of acquiring skills. It is often proven that such an approach in life can be harmful (Burlacu and Jiroveanu, 2009). Under the current changes in the labour market, the acquisition of a qualification, as well as the updating of competences, allow to eliminate the risk of social exclusion and represent advantages in the steps of employment (Maguire, 2015).

Increasing the ability to take a job can be achieved through education (Costache et al., 2015). The information is becoming more and more diverse and diverse. Therefore, lifelong learning has an important role to play (Burlacu, 2011). Economic growth can occur through the application of investment measures in education and training (Jianu et al., 2019). In this way, the number of low-skilled people can be reduced and the number of people with the required qualifications in the labour market can be increased (Burlacu et al., 2019).

For regions facing low-skilled workers, regional economic development can be achieved either by increasing the employment rate of these workers or by using high-tech sectors. In this case, increasing productivity can be achieved by improving workers' skills (Lee and Clarke, 2019).

By ensuring quality in education, knowledge is promoted, but opportunities are created to promote creativity (Burlacu et al., 2019b). In this way, literacy and numeracy skills are of particular importance. Poor results in basic reading, math and science skills can lead to situations of social exclusion (Rădulescu et al., 2018b). Also, the professional insertion is done with weight. One measure by which these limitations can be eliminated is digitization (EC, 2017).

Due to the evolution of the labour market, the connection between education and training, on the one hand, and employment, on the other, will be based on the interconnection of some activities (Dubois and Rousset, 2017).

Vocational education and training systems may undergo changes due to economic trends. In this way, the need for new education and vocational training programs emerges, at the end of which the graduates acquire the skills required by the labour market (Sava and Bădulescu, 2016).

The chosen field of study influences the further professional development (Burlacu and Jiroveanu, 2012). Also, a better transition of graduates also depends on the degree to which they identify and occupy suitable jobs (Stojanová and Blašková, 2014). The educational trajectory of the students is influenced by the employability of the parents. Thus, parental unemployment has negative consequences on family life and implicitly on children (Lindemann and Gangl, 2019).

Lifelong education and training should encompass both the context of formal education as well as the context of non-formal and informal education (Aleandri and Refrigeri, 2013).

It is considered that the young people who fall into the category of neither in employment nor in education and training (NEET) do not have a portfolio of vocational training adapted to the new needs of the labour market. Belonging to this state influences both professional and personal life (Bodislav et al., 2019). Also, their possibility of participating in vocational training programs is affected (Angheluta et al., 2019). These people are often marginalized and have a high risk of social and economic exclusion. For this reason, measures are needed to support this category of people (RCT, 2017).

Methodology of Research

Although for many companies it is easier to acquire ready-made specialists than to invest in vocational training, however, the areas that offer more jobs also allow for easier skills building (Rădulescu et al., 2018).

The article presents research on achieving the targets proposed by the Member States of the European Union for the Sustainable Development Goal 4 - Quality Education. A comparative analysis is performed for each indicator of this sustainable development objective. Thus, the research was conducted for: early leavers from education and training, tertiary educational attainment, participation in early childhood education, underachievement in reading, maths or science, employment rates of recent graduates, adult participation in learning, young people not in employment nor in education and training. Indicator developments are also presented for some Member States which have had results in reaching the targets. The analyzes are based on the data existing on the EUROSTAT website.

Results and Discussions

One of the indicators is Early leavers from education and training. It takes into account the share of the population between the ages of 18 and 24, who has at most lower secondary education (level 0-2 ISCED). In addition, the comparative situation of Participation in early childhood education is presented in Table 1. The indicator shows the share of children between the ages of four and the age required for compulsory primary education. Table 1 presents the comparative situation of the indicator Young people neither in employment nor in education and training. This indicator refers to personnel between the ages of 15 and 29 who are not employed and are not included in vocational education and training programs.

Table 1: Comparative situation for Early leavers from education and training, Participation in early childhood education, Young people neither in employment nor in education and training, 2002-2018 (%)

Countries	Early leavers from education and training (%)				Participation in early childhood education (%)				Young people neither in employment nor in education and training (%)			
	2002	2007	2012	2018	2002	2007	2012	2017	2002	2007	2012	2018
European Union	17	14,9	12,7	10,6	86,6	90,7	94	95,4	15,6	13,2	15,9	12,9
Austria	9,5	10,8	7,8	7,3	86,9	88,8	93,8	95,6	8	9,4	8,2	8,4
Belgium	14,1	12,1	12	8,6	100	99,7	98,1	98,7	16,4	13	14,4	12
Bulgaria	20,7	14,9	12,5	12,7	81,1	83,9	87,1	83,9	31	20,3	24,7	18,1
Croatia	8	4,5	5,1	3,3	:	66,5	71,7	82,8	21,7	14,5	19,7	15,6
Cyprus	15,9	12,5	11,4	7,8	68,3	82,7	83,8	92	9,5	10,3	17,3	14,9
Czechia	5,7	5,2	5,5	6,2	93,7	93,3	86,1	92	16,5	11,6	12,9	9,5
Denmark	9	12,9	9,1	10,2	93,5	92,7	98	98	6,6	5,3	8,2	8,5
Estonia	13,6	14,4	10,3	11,3	85,1	93,8	90	92,9	15	11,6	15,1	11,7
Finland	9,7	9,1	8,9	8,3	65	69,8	75,1	87,8	10,2	8,4	10,4	10,1
France	13,4	12,8	11,8	8,9	100	100	100	100	13,2	12,8	15,1	13,6
Germany	12,5	12,5	10,5	10,3	88,4	94,5	96,5	96,4	10,9	11,6	9,3	7,9
Greece	16,2	14,3	11,3	4,7	68,3	66,1	75,2	81,5	19,1	15,2	26,8	19,5
Hungary	12,2	11,4	11,8	12,5	93,3	95,1	94,5	95,6	18,3	15,7	18,7	12,9
Ireland	14,6	12	9,9	5	72,6	71,6	99,1	100	14,4	11,1	21,6	11,6
Italy	24,2	19,5	17,3	14,5	100	100	99,2	95,1	19,8	18,8	23,8	23,4
Latvia	16,5	15,6	10,6	8,3	70,5	89,4	93,4	96,3	17,6	13,9	17,2	11,6
Lithuania	13,4	7,8	6,5	4,6	64,3	79,7	84,8	91,9	15,2	10,1	13,9	9,3
Luxembourg	17	12,5	8,1	6,3	97,7	93,9	97,9	96,6	7,5	7,3	7,6	7,5

Countries	Early leavers from education and training (%)				Participation in early childhood education (%)				Young people neither in employment nor in education and training (%)			
	2002	2007	2012	2018	2002	2007	2012	2017	2002	2007	2012	2018
Malta	53,2	30,2	21,7	17,4	92,6	99,2	100	96,5	18,5	13,7	12	7,3
Netherlands	15,3	11,9	8,9	7,3	99,1	98,9	99,6	97,6	6,1	5,4	6,5	5,7
Poland	7,2	5	5,7	4,8	58,4	66,8	84,3	91,9	21,7	14,4	15,7	12,1
Portugal	45	36,5	20,5	11,8	80,3	87,9	95	94,2	11,5	12,7	15,6	9,6
Romania	23	17,3	17,8	16,4	72,3	85	85,5	89,6	23,5	14,8	19,3	17
Slovakia	6,7	6,5	5,3	8,6	75,4	78,8	77,1	78,2	27,2	16,9	18,8	14,6
Slovenia	5,1	4,1	4,4	4,2	86,8	84,1	90,9	92,1	10,1	8,2	11,8	8,8
Spain	30,9	30,8	24,7	17,9	100	97,9	97,4	97,4	15,2	12,8	22,2	15,3
Sweden	10	8	7,5	7,5	86,6	94	95,9	96,3	7,6	7,9	8,4	6,9
United Kingdom	17,6	16,6	13,4	10,7	100	90,2	97,3	100	12,6	12,9	15,3	11,7

The target for 2020 for early leavers from education and training is 10% maximum. For early leavers from education and training, from table 1 it is observed that, in 2018, the share of population aged 18 to 24 was over 10% in 11 countries. The highest values were observed in: Malta (17,4%), Spain (17,9%), Romania (16,4%), Italy (14,5%), Bulgaria (12,7%), Hungary (12,5%). However, compared to 2002, in 2018, in Malta, the values decreased by 35,8%.

Being the biggest difference registered, in figure 1 is presented the evolution of this indicator for Malta, for the period 2002-2018 (%).From the presented figure it is observed that for the period 2002-2018, the share of population aged 18 to 24, for the indicator early leavers from education and training in Malta, had a decreasing tendency, from 53,2% (in 2002) to 17, 4% (in 2018).

The target of 2020 for participation in early childhood education is over 95%. From table 1, it is observed that, in 2017, almost half of the countries of the European Union did not reach this percentage. The countries with the lowest weights are: Slovakia (78,2%), Greece (81,5%), Croatia (82,8%), Bulgaria (83,9%), Finland (87,8%), Romania (89,6%).

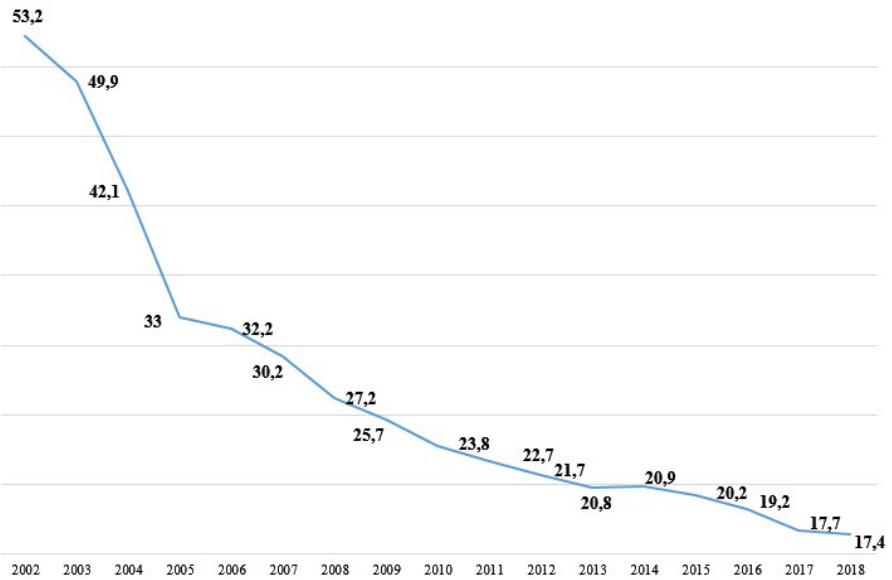

Fig. 1: Early leavers evolution from education and training, for Malta (%)

However, in Poland, in 2017, there was the highest increase compared to the values of 2002. Figure 2 shows the evolution of the age group between 4-years-old and the starting age of compulsory education, for the period 2002- 2017, for Poland (%).

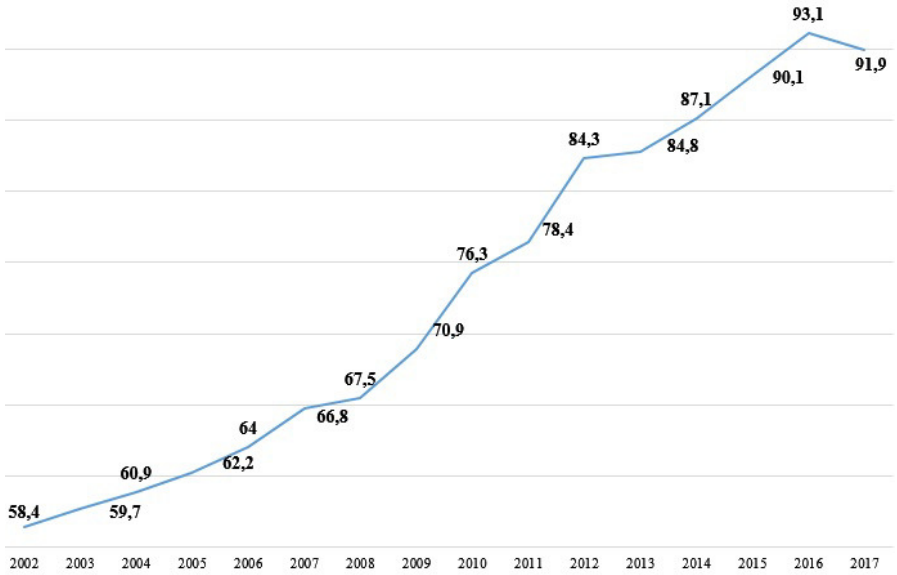

Fig. 2: Evolution of participation in early childhood education, for Poland (%)

For the period 2002-2016, figure 2 shows an increasing trend. Also, in 2017 the values decreased slightly from 93,1% (in 2016) to 91,9% (in 2017).

In 2018, the indicator of young people neither in employment nor in education and training had high values in: Italy (23,4%), Greece (19,5%), Bulgaria (18,1%), Romania (17%), Croatia (15,6%), Spain (15,3%).

Although Bulgaria had high values in 2018, however, compared to 2002, it registered the most significant decrease among the countries of the European Union. The evolution of the indicator is shown in figure 3.

Thus, in the period 2008-2013, there is an increase in the values of this indicator. For the period 2002-2008, respectively 2013-2018, the share of population aged 15 to 29 from Bulgaria, which falls in the category young people neither in employment nor in education and training, decreased by 12,9%.

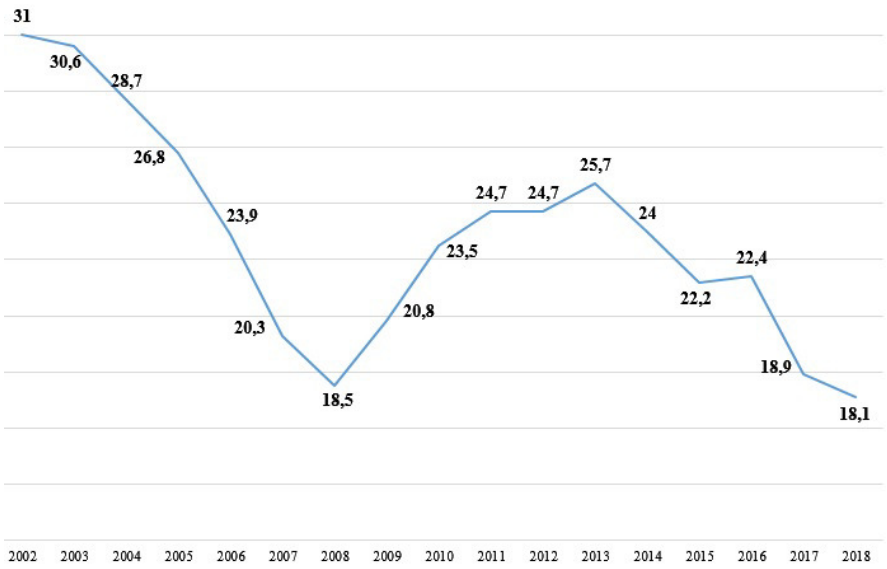

Fig. 3: Evolution of young people neither in employment nor in education and training, for Bulgaria (%)

Table 2 presents the comparative situation for a set of three indicators: tertiary educational attainment, adult participation in learning and employment rates of recent graduates.

Table 2: Comparative situation for Tertiary educational attainment, Adult participation in learning, Employment rates of recent graduates (%)

Countries	Tertiary educational attainment (%)				Adult participation in learning (%)				Employment rates of recent graduates (%)			
	2002	2007	2012	2018	2002	2007	2012	2018	2006	2010	2014	2018
European Union	23,6	30	36	40,7	7,1	9,4	9,2	11,1	78,9	77,4	76	81,7
Austria	:	20,9	26,1	40,7	7,5	12,9	14,2	15,1	89,5	88	87,2	88,6
Belgium	35,2	41,5	43,9	47,6	6	7,4	6,9	8,5	81,1	81,3	79	83,4
Bulgaria	23,2	26	26,9	33,7	1,2	1,6	1,7	2,5	69,6	69,7	65,4	78,6
Croatia	16,2	16,8	23,1	34,1	1,9	2,9	3,3	2,9	71,2	71,6	62	71,2
Cyprus	36	46,2	49,9	57,1	3,7	8,7	7,7	6,7	80,5	78,4	68,7	78,9
Czechia	12,6	13,3	25,6	33,7	5,6	6	11,1	8,5	82,8	81,3	81,3	89,6
Denmark	34,2	38,1	43	49,1	18	29,1	31,6	23,5	89	83,5	83,7	85,9
Estonia	27,7	33,5	39,5	47,2	5,3	7	12,8	19,7	84,6	64,5	80,9	81,7
Finland	41,2	47,3	45,8	44,2	17,3	23,4	24,5	28,5	79,7	79,7	77	81,7
France	31,5	41,4	43,3	46,2	2,7	6,1	5,7	18,6	78,4	77,6	75,5	78
Germany	24,2	26,5	31,8	34,9	5,8	7,8	7,9	8,2	82,1	86	90	92,1
Greece	23,5	26,3	31,2	44,3	1,1	2,4	3,3	4,5	66,8	58,6	44,3	55,3
Hungary	14,4	20,6	29,8	33,7	2,9	3,9	2,9	6	79,7	73,8	78,5	87,5
Ireland	32	45,2	52,2	56,3	5,5	7,8	7,5	12,5	88,5	72,7	76	84,3
Italy	13,1	18,6	21,9	27,8	4,4	6,2	6,6	8,1	66,1	57,8	45	56,5
Latvia	17,3	25,7	37,2	42,7	7,3	7,2	7,2	6,7	77,6	63,4	77	84,1
Lithuania	23,4	36,4	48,6	57,6	3	5,5	5,4	6,6	83,1	73,7	80,7	84,7
Luxembourg	23,6	35,3	49,6	56,2	7,7	7,2	14,2	18	91,1	89,5	83,8	87,9
Malta	9,3	20,8	26,3	34,7	4,4	5,9	7,2	10,9	91,1	92,9	93,6	94,8
Netherlands	28,6	34,9	42,2	49,4	15,8	16,8	16,9	19,1	92	91,7	86,2	92

Countries	Tertiary educational attainment (%)				Adult participation in learning (%)				Employment rates of recent graduates (%)			
	2002	2007	2012	2018	2002	2007	2012	2018	2006	2010	2014	2018
Poland	14,4	27	39,1	45,7	4,2	5,1	4,5	5,7	71,3	76,3	75,6	83,1
Portugal	12,9	19,5	27,8	33,5	2,8	4,4	10,5	10,3	83,1	80,6	69,4	80,6
Romania	9,1	13,9	21,7	24,6	1	1,5	1,4	0,9	74,7	71,2	66,2	77,4
Slovakia	10,5	14,8	23,7	37,7	8,5	4,1	3,2	4	77,5	69,4	72,7	83,4
Slovenia	20,7	31	39,2	42,7	8,4	15,1	13,8	11,4	80,8	80,7	70,1	84,2
Spain	34,4	40,9	41,5	42,4	4,5	10,8	11,2	10,5	82,9	70,6	65,1	75,4
Sweden	28,3	41	47,9	51,8	18,4	19	27	31,4	83,3	83	85	88,1
United Kingdom	31,5	38,3	46,9	48,8	21,3	20,5	16,3	14,6	86,3	81,3	83,2	86,7

The tertiary educational attainment indicator refers to the share of the population between the ages of 30 and 34, who graduated from tertiary studies (level 5-8 ISCED). For this indicator, the target of 2020 is that at least 40% of population aged 30 to 34 be a graduate of tertiary educational attainment. From the data presented in table 2, it turns out that, in 2018, only 10 countries did not reach the proposed target: Romania (24,6%), Italy (27,8%), Bulgaria (33,7%), Croatia (34,1%), Portugal (33,5%), Czechia (33,7%), Hungary (33,7%), Malta (34,7%), Germany (34,9%), Slovakia (37,7%).

Compared to 2002, in 2018, the largest increases were recorded in Lithuania (+34,2%). Figure 4 shows the evolution of tertiary educational attainment, for Lithuania, for the period 2002-2018 (%).

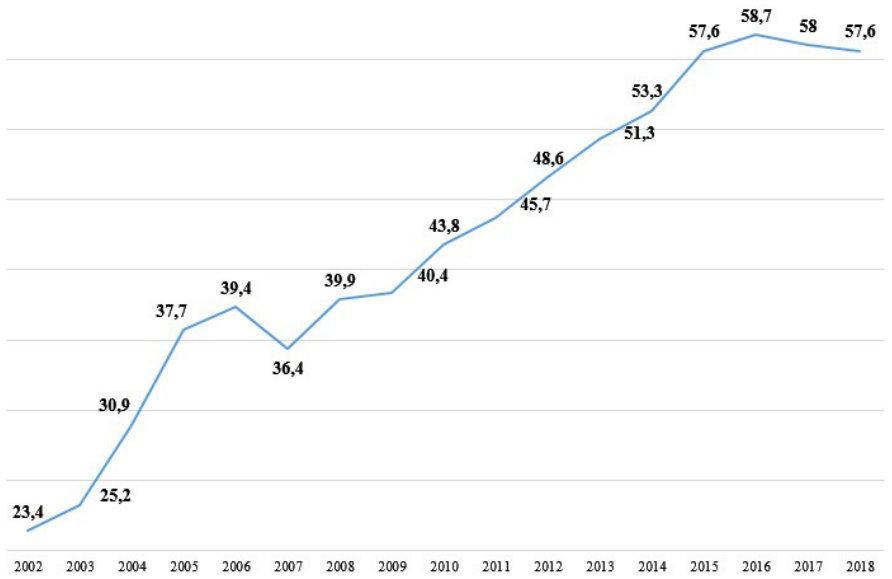

Fig. 4: Evolution of tertiary educational attainment, for Lithuania (%)

Between 2002 and 2016, there is a relative increase from 23,4% (in 2002) to 58,7% (in 2016). Between 2016 and 2018, this indicator shows a slight decreasing trend.

The adult participation in learning indicator aims at 2020: at least 15% and refers to the share of people between the ages of 25 and 64 who have participated in vocational education and training programs. In 2018, this value was reached in: Sweden (31,4%), Finland (28,5%), Denmark (23,5%), Estonia (19,7%), Netherlands (19,1%), France (18,6%), Luxembourg (18%), Austria (15,1%). The lowest values were recorded in: Romania (0,9%), Bulgaria (2,5%), Croatia (2,9%), Slovakia (4%), Greece (4,5%).

The importance given to this type of education, through the reforms implemented in 2013 in France, has led to the increase of the share of population aged 25 to 64 who participated in learning in 2018 compared to 2002. The evolution of this indicator is shown in figure 5.

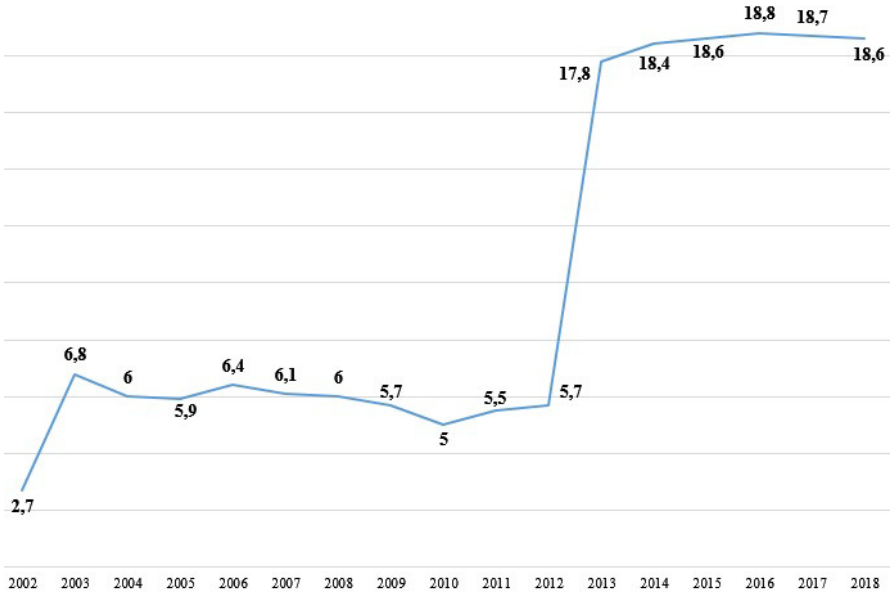

Fig. 5: The evolution of adult participation in learning, for France (%)

We observe the results of the reforms introduced in the education system in France, in 2013. Thus, adult participation in learning increased from 2,7% (in 2002) to 18,6% (in 2018).

For employment rates of recent graduates, the proposed target is that over 82% of population aged 20 to 34 with at least upper secondary education, after graduation, take a job. Table 2 data shows for 2018 percentages below 82% in 11 countries: Greece (55,3), Italy (56,5), Croatia (71,2), Spain (75,4), Romania (77,4), France (78), Bulgaria (78,6), Cyprus (78,9), Portugal (80,6), Estonia (81,7), Finland (81,7).

With a percentage in 2018 of 83,1%, Poland is the country with the highest difference between the values of 2006 and those of 2018. The evolution of the share of population aged 20 to 34 with at least upper secondary education in Poland, for the period 2006-2018 is shown in Figure 6.

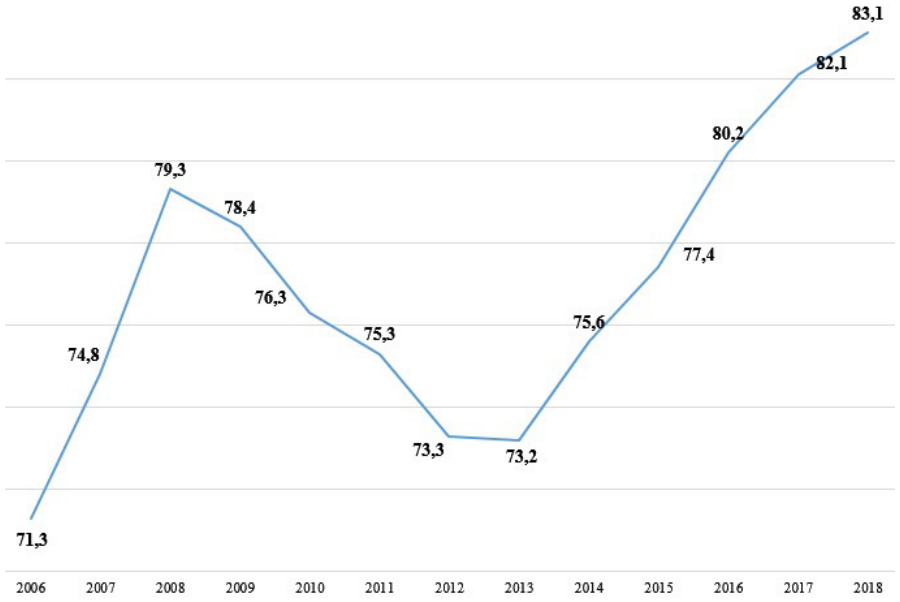

Fig. 6: Evolution of employment rates of recent graduates, for Poland (%)

From the presented data it is observed that, between 2008 and 2013, employment rates of recent graduates had a decreasing trend. Also, between 2006-2008 and 2013-2018, respectively, the values of this indicator increased.

For the underachievement indicator in reading, maths or science, the targets for 2020 are given by obtaining a percentage of less than 15% of 15-year-old students. Table 3 shows in alphabetical order, for 2015, the countries for which the percentages are below 15% or close. This indicator is updated every 3 years. The results for 2018 will be published this year.

Table 3: The situation of underachievement in reading, maths or science, weights below 15%, 2015 (%)

Countries	Reading	Mathematics	Science
Denmark	15	13,6	15,9
Estonia	10,6	11,2	8,8
Finland	11,1	13,6	11,5
Ireland	10,2	15	15,3
Poland	14,4	17,2	16,3
Slovenia	15,1	16,1	15

It is noted that for reading the lowest values have: Ireland (10,2%), Estonia (10,6), Finland (11,1). For mathematics: Estonia (11,2%), Denmark (13,6%), Finland (13,6%). The lowest values of 15-year-old students with underachievement in science are in: Estonia (8,8%) and Finland (11,5%).

Also, Table 4 presents the countries in which the share of 15-year-old students with underachievement in reading, maths or science, corresponding to 2015, was very high.

Table 4: The situation of underachievement in reading, maths or science, high weights, 2015 (%)

Countries	Reading	Mathematics	Science
Bulgaria	41,5	42,1	37,9
Cyprus	35,6	42,6	42,1
Greece	27,3	35,8	32,7
Malta	35,6	29,1	32,5
Romania	38,7	39,9	38,5
Slovakia	32,1	27,7	30,7

Thus, the worst results for reading were recorded in: Bulgaria (41,5%), Romania (38,7%), Cyprus (35,6%), Malta (35,6%), Slovakia (32,1%). For the mathematics the worst results were recorded in: Cyprus (42,6%), Bulgaria (42,1%), Romania (39,9%), Greece (35,8%). Countries where the share of 15-year-old students with the highest underachievement in science were: Cyprus (42,1%), Romania (38,5%), Bulgaria (37,9%), Greece (32,7 %), Malta (32,5%), Slovakia (30,7%).

Conclusions

A correlation of the demands of the labour market with the educational offer should also be achieved in higher education. This can be achieved by participating in partnerships of all providers of education and training.

From the analysis, it is observed that the Member States of the European Union are making progress towards achieving the proposed targets regarding the Sustainable Development Goal 4 - Quality Education. Thus, in 2018, for early leavers from education and training, the target was reached in 11 countries, and for tertiary educational attainment, only 10 countries did not reach the proposed target. For participation in early childhood education, in 2017, almost half of the European Union countries did not reach this proposed target. In 2018, the target for the adult participation in learning indicator was reached in 8 countries. Also, for employment rates of recent graduates, the target was not reached in 11 countries.

Even though secondary education is the basis of education systems, it is becoming increasingly clear that lifelong learning becomes very important (Dias, 2014).

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Products and Services Market in The Globalized Economic Space

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Abstract

Globalization is a complex system or phenomenon that can be analyzed differently. Although it has both negative and positive opinions, it is extremely difficult to decide which of the two inclines more balance. According to the information analyzed, the number of optimists on the problem of globalization has increased compared to that of the pessimists. A good example given by optimists is that of increasing life expectancy from 46 years to 66 years in the last 50 years.
Another optimistic example is the fact that due to globalization, namely the progress in health, at the end of the 21st century we will be able to live 200 years according to scientists. But pessimists sound an alarm because many countries, areas, territories and peoples of the Earth will not have any of these discoveries of science. Due to the fact that the progress of globalization is taking place at the planet level, the areas left behind are enhanced by their deposits, raw material resources, energy and human resources. Beyond these, globalization is a living, real fact that we must face regardless of our will. Through this article we disseminate the results of our documentary research by highlighting the main trends and opinions expressed today.

Keywords: Globalization, Poverty, Market Space

Introduction

Human need to exchange goods generated a new activity "trade", which comes from the Latin word "commutatieo mercium" meaning exchange of goods. The notion of trade has an extremely complex content that involves the exchange of goods, currencies and services, determining an economic function that consists in the purchase of goods, currencies or services and to sell them and make a profit convenient to the seller (Bodislav, A. . et al, 2019).

The history of trade is a very old one, its presence has been necessary since the time people started communicating with each other. In the beginning, the first form of trade was the "dumb" in the form in which the exchanges of goods took place (Ioniță, F. et al., 2009). The exchanges of goods that were made at the beginning were those produced against the product and thus replaced the so-called barter (Ioniță, F. et al., 2009). Thus, in order to obtain what they needed, the man gave in his things to those who gave in exchange what they had as surplus (Bran, F. et al., 2018). The exchange became easier when it went from barter to the use of intermediate goods called currency. The barter split in two into selling and buying, truly marking the beginning of true trading (Bran, F. et al, 2012). If at first people were satisfied with a few things and endeavored to produce all that was needed, over time, as the

civilization developed, needs increased and could no longer be met. Which led to the continuous development of trade.

The specialists in the commercial theory have analyzed the evolution in time of the exchange and have noticed a true commercial civilization whose beginnings have to be looked for in a past of more than four thousand years (Ionita, F., & Burlacu, S., 2009). Thus China, Mesopotamia, Northern Europe have been trading internationally ever since. Several Mediterranean peoples were also more navigators and traders. Later the Greeks and then the Romans built empires genuine commercial advantage of improving land and sea transport and the development of trade and economy.

After the Second World War in the second half of the twentieth century, world trade was marked by a series of events such as:

- the collapse of the colonial system
- the appearance of over 150 national states
- US propulsion as leader of the Western world
- the emergence of transatlantic trade
- the appearance of NAFTA (North America) and EU (Europe) alliances

Global trade comprises two distinct entities, namely transnational corporations and regulatory institutions (Jianu, I. et al., 2019). World trade, the most widespread international economic form represented by transactions with goods and services that take place between residents of different countries (Alpopi, C. et al, 2018).

World trade is a human activity that concerns us all and involves us every day. It has effects on citizens in at least two ways, namely:

- first of all the international trade diversifies the offer of available goods and services and leads to the decrease of the price of the products due to the increase of the competition
- secondly, access to raw materials, cheaper materials, more efficient technology and a broader market leading to the growth of local companies, economic growth, creation of new jobs and increased investment rate.

A series of events and changes marked the evolution of international-global trade, namely:

- increasing the share of developed countries in world trade (reaching 70%)
- cross-sectoral exchanges have led to an independence between nations
- parallel existence of financial flows (which determine the interest rate, exchange rates) that stimulate world trade
- changing the structure of world trade
- the growth of international trade

The global market represents the assembly of international flows of products, services, capital, goods and labor (Costache, G., et al., 2015). This is the starting point in the protection of goods and services designed to meet the needs, representing the relationships established on the basis of the demand and the supply of goods, goods and services from different countries that resulted in international economic transactions. In global markets countries meet from different levels of development or different product structure (Rădulescu, C.V. et al., 2018).

Research Aim / Question

Regulations and Deregulations in World Trade

Over time, in the evolution of world trade, the following manifestations of protectionist type and global trade order are highlighted. Protectionism appeared at the end of the seventeenth century - with the objectives of maximizing the export and minimizing the import, objectives that were achieved through the development of the national industry, limiting the import through various instruments (taxes,

restrictions). This is a customs policy of a state that aims to protect the national economy against foreign competition.

The global trading order represents a fixed system of exchange rates and marks the beginning of the global trading order. And it represents the follow-up to the 1944 Bretton Woods Agreement, concluded after World War II. After that, the General Agreement on Tariffs and Trade (GATT), designed to negotiate tariffs, appears. In 1995 it is replaced by the World Trade Organization (WTO), adapted to the reality of today's world. As a result of the adoption of these treaties, the tariff barriers were lowered but the non-tariff ones appeared.

The World Trade Organization is a first instrument in the process of globalization, especially in the liberalization of markets. This is considered to be guilty of failure to implement the anti-dumping order.

Findings

Market Liberalization

Price liberalization is influenced by a number of positive and negative effects, namely:

Positive effects:
- consumers benefit from new, more efficient services
- consumers benefit from lower prices
- consumers are free to choose what they want
- The European economy is becoming more and more competitive
- liberalization of the international movement of goods and services
- disappearance of commercial borders
- disappearance of customs duties
- expansion of markets
- creation of new interdependent markets

Negative effects:
- reducing the number of jobs in developing countries
- stagnation of raw material prices
- outsourcing of some economic activities
- the liberalized black market operates in parallel with the illegal market with great effects on the state budget

The effects of the process of globalization differ depending on the degree of development of the respective country and the typology also:

- the appearance of the e-tarifari barriers
- multiplication of non-tariff barriers
- company policies focus on products that offer price advantages on the world market
- the inter niche trade remains unaffected by the globalization and liberalization of the markets. This reduces the pressure of the impact on the budgets of the small urban and rural communities.

The effects of globalization led to the modification of the physical structure of export and import after 1989. Absolutely all the products had decreases in the volume of production which led to a decrease in the volume of export. To highlight these decreases we will analyze several product groups in turn.

The first group of products and certain machines, machines and means of transport, production was at the level of the 1950s-1960s. The group of chemicals, fertilizers and pesticides are not very much found in the export offer nor in the domestic market. Regarding the wood, its exploitation is done by grinding, and its processing has yielded the place of export of raw wood.

The food group registered in Romania a food export of about 2.35 billion euros in 2010 and an import of 3.34 billion euros, a rather large gap. Romania thus becoming a net importer of food.

The group of services has developed their commercial activities, financial services, real estate and insurance. Reducing those for health, education and military. In the case of utility services, namely energy, natural gas, water, telephony, and heating, they have experienced a continuous increase..[1]

Debates: Externalities of The Globalization Process

Poverty

Poverty is a state of permanent lack of the necessary resources to ensure a way of life considered acceptable at the level of a given community (Dima, C. et al, 2020). The World Bank calculates the poverty line after the consumption of calories, as being "the average level of the income at which the consumption expenses allow to satisfy the nutritional requirements and to ensure a consumption of calories accepted according to FAO recommendations.

We have absolute poverty when the total earnings are insufficient to meet the minimum needs to maintain the physical performance of a person. That person is exposed to various risks and humiliations that go beyond the imagination of the privileged world, representing his threshold of survival. Poverty is the product of the power structure existing in society and the way in which certain social processes create poverty.

Poverty can never be eliminated from society even if there was enough wealth for everyone because other reasons are responsible for this process and not the lack of needs.

Poverty legitimizes the existing structure because the poor are responsible for their situation, they have "a perspective of sustainable poverty". That is why they will always be the most prone to the disasters of life than the rich. The continued lack and shortcomings make them more unreliable, isolated, vulnerable, powerless associated with the idea that they can do nothing to improve their situation.

Poverty makes them forget fundamental things like:

- discipline
- order
- politeness

Interpreting in his own life style.

Poverty is present in all countries and its causes are numerous:

- individual crisis: the psychology of poverty according to which the poor are guilty of poverty
- political explanation: the cause of poverty results in the institutional dysfunctions of the society
- economic and social explanation: according to which the poor are the victims of society and not the culprits
- cultural explanation: we say that it creates its own culture, an own world from which they do not want to escape

[1] Florina Bran, Gheorghe Manea, Ildiko Ioan, Carmen Valentina Radulescu, Globalizarea Manifestari si reactii, Editura Economica, Bucuresti, 2012, pp. 173.
George Postelnicu, Catalin Postelnicu, Globalizarea Economiei, Editura Economica, Bucuresti, pp. 321.

- the theory of social labeling: Today they are labeled as lazy, immoral, incompetent, in which they will never be able to overcome their condition.

The most important barrier to overcoming poverty is motivation and hope, the lack of which diminishes the chances of escaping poverty. Poverty is present in all countries of the world. More than 50% of the population in sub-Saharan Africa and Latin America lives on less than $ 1 a day, 9% in Denmark, 12% Slovenia, 20% Italy and 17% of the EU population. But the proportions of poverty in the world are much higher than trying to express official statistics.

Beyond the official statistics, the economic reality whose accents are extremely painful must be highlighted. Thus, according to UNDP data, about 3 billion people live on only $ 2 a day, of which 1, 3 billion with 1 dollar a day, and about 70% of them are women.

In Sweden 70 phones per 100 inhabitants return, in Kenya only 0.8 phones return, and in Hungary only 0.1. According to statistical data, only 0.1 of the sub-Saharan African population uses the Internet. Because of this percentage, sub-Saharan Africa's doctors do not have access to all the data needed to fight certain diseases. It is noted that the library of the University of Medicine of Nairobi, an institution of higher education in East Africa has only subscriptions for 20 specialized magazines. In contrast, a US medical school has approximately 5,000 specialist journals. Considering that the population of the Earth is growing, with about 80 million a year, in the next 30 years we will have 5 billion people living with only $ 2 per day. Due to the fact that I live for only $ 2 a day or even less, the population of Earth suffers from anemia. According to the United Nations Development Program, only 4% of the income of the rich (ie 225 rich people) would be sufficient to meet the essential needs (regarding food, water, health and education) of poor countries.

The geography of poor countries means not only Africa but also Asia. According to some analysts, about 70% of the world's poor live in Asia. Such results were much worse 30 years ago, when more than half of the territory of Asia was covered by a glossy poverty, where life expectancy did not exceed 48 years, where only 40% of Asia's adult population was schooled.

Today, the proportion of the poor population has dropped by one third, and life expectancy has increased from 45 years to 65 years, and the adult school population has reached 70%.

One of the reports presented by Mark Malloch Brown, administrator of the United Nations Development Program, presented some rather large economic differences that described today and show that:

- the first three richest people in the world have assets that, in terms of value, exceed the gross domestic product of 43 developing countries
- the number of computers connected to the internet was 36 million in 1998, while ten years ago it was only 100,000
- 97% of the computers connected to the internet were in the highly industrialized states
- an employee in Bangladesh must save his entire salary for 8 years in order to buy a computer
- more than 80 countries today have a lower per capita income than ten years ago
- In Cambodia a phone returns to 100 inhabitants, while in Monaco 99 phones return to 1000 inhabitants
- 74% of the total world telephone lines are owned by 1/5 of the population
- Tanzania spends nine times more to pay its foreign debt service than it spends for health and four times more than it spends for education.

With such data, particularly suggestive for the creation of an economic picture of the contemporary world. According to these predictions, in 2017 about 70 million children worldwide will remain completely out of school. As of now, at least 45 million children in Africa have never seen the inside of a school. Another 5 million children die daily due to malnutrition or other diseases.

A scary statistic that should make us think and shame us. For example, in the UK a person is expected to live an average of 77 years, while in Sierra Leone in West Africa he is expected to die at the age of 37. Another problem that should concern us in these underdeveloped countries is the HIV virus, which has a high percentage. In Africa, the percentage reaches even 30% of people infected with HIV. Worldwide, according to statistical data, about 40 million people are infected with this virus, at a rate of 16,000 per day. Besides avest virus there are other diseases such as tuberculosis which mainly affects poor countries because there is no access to treatments and information to prevent, fight against these diseases. If these diseases do not have access to the necessary ones, the ones mentioned above will expand rapidly and will result in the loss of an impressive number of the population.

Another major problem of poor countries is the high degree of indebtedness, in relation to their level of economic development. Thus, after long discussions, the need for an external aid of the comet and the investments in solving these problems and canceling the debts has been realized,

An example is the one from 1965, when the aid granted to the poor states amounted to 0.48% of the gross domestic product of the developed countries. But in 1998 it decreased, reaching only 0.23% of the gross domestic product of the developed countries. The Group of Seven or G7 recently decided to cancel the $ 100 billion total from the poorest countries.

In terms of world trade, it has declined considerably in recent decades in the case of developing countries, with poor countries being the most affected. While developing countries have opened markets for the goods of rich countries, the latter have introduced many restrictions. One thing is very clear and that developing countries could have gained more if they could access the markets of the world's poorest countries (Postelnicu, G.& Postelnicu, C., 2000).

Globalization and Poverty

Poverty - this dramatic concept of history has been perceived over time. Globalization has not always had the same impact on it (Burlacu, S. et al., 2018). In the nineteenth century, the economic progress generated by globalization resulted in visible things, which meant more steel and more electricity.

In the 21st century, the general progress of globalization is materialized in less visible things, such as technological information focused on education and people's motivation (Burlacu, S., Alpopi, C., Mitrită, M., & Popescu, M. L., 2019. Globalization is not the cause of poverty in the world, but it has a major contribution to this process for about two billion people.

There are also favorable effects of globalization, increasing the standard of living of the population (Bodislav, A. . et al, 2019). That is why the liberalized capital market allows developing countries access to direct investments, which has led to the following positive effects such as:

- creation of new jobs
- Increase of population incomes
- high level of qualification
- infrastructure improvement
- access to management knowledge

The liberalization of the labor market is easily transformed into the safety valve for the working population in the poor countries of the world, who cannot find a job in their country. Thus, those who leave their native country return to send money to the family's country. Or they remain permanently in the host country as citizens, but they bring a loss for the sacred country from which they come. This process favors increasing the productivity of economic activities in all fields and accumulating professional knowledge.

Another point of view within the globalization-poverty relationship is that poverty is an effect of the globalization process. An example is that according to which an employer of a company that finds a

better place of operation and positioning with respect to the resources and the market will move its activity, thus reducing the number of employees.

Another very common example is the large number of supermarkets, growing hypermarkets, which does nothing but eliminate jobs because it covers small farms, medium-sized, small firms and local and traditional producers.

Thus, all these are gradually but surely leading to a poverty of our traditional products and the importation of the necessary products to the population.

Conclusions

It is noted that, the biggest problem of globalization remains the dehumanization of some of those whom this wave simply swallows, conquered by the market, television and the Internet, they live against a general crisis of the meanings of life. The globalized or globalized man, centered only economically risks becoming the atomized man, living only for production and consumption, lacking: culture, policy, religion, consciousness, meaning. Despite all the effects of globalization and warnings, none of us can avoid or eliminate the process of globalization.

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Globalization of the Economy: Causes, Risks, Effects

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Abstract

Globalization has begun to take shape once the history of mankind, namely since the population migration to a better life. This is a result of the development of technologies, services and trade, the population wanting to discover more and more places. History globalization intensifies along with the industrialization process, outlining the emergence of large migration flows, new continents, territories and empires.In terms of economic and financial globalization is defined as strengthening and broadening relationship between national economies in the global market of goods, services and capital. In other words, the phenomenon represents the international integration of both the goods, services and capital markets. This article presents the results of research documentation on globalization trends with a focus on the causes, risks and effects of economic globalization.

Keywords: economic and financial globalization, internetional integration, poverty

Introduction

The term globalization appears in the late 1960s under the auspices of Canadian specialist Marshall McLuhan, a professor at the University of Toronto, and Zbigniew Brzezinski of Columbia University, a specialist in communism issues, one of the founders of the Trilateral Commission (1973), who defines himself. as "a group of private citizens" made up of over two hundred personalities from North America, Europe and Japan, aiming to reflect on the crisis of "accidental democracy governance". Brzezinski saw the unfolding of the technotronic revolution, the fruit of technological convergence, the consecration of the American superpower as "the first global society in history" (Bran, 2012).

Literature Review

Globalization is a complex process of multidimensional and correlative ordering of the world, whereby people accept what they look like. This process is based on the liberalization of access to efficiency and modernity, on free information, permissive finances and modern technology, the free access to honest accumulation of wealth (Alpopi, C. et al, 2018). Globalization is the process of ensuring the functioning of the global economy within a global society, capable of creating a global decision structure, capable of solving global problems (Dima, C. et al, 2020). Even if the term of globalization belongs to the "economic lexicon", essentially manifesting the phenomenon at the level of the global space, from the temporal perspective it has led to the creation of new advanced concepts such as:

- globalism;
- globality;
- it was knowledge;
- the information society;

- the era of wealth.

In short, globalization is described as giving up territorial boundaries, namely:

- unlimited growth of technology;
- unbalanced circulation of information;
- free movement of capital;
- free movement of the platform;
- uniformization of the economy.

The Canadian A. Ayoud uses instead of the term globalization, the notion of globalization and states that “globalization is far from being a novelty or an unusual phenomenon. In terms of concepts, globalization is, in essence, just a name of an old concept that simply is the leader of exchange. ”In conclusion A. Ayoud considers that globalization represents the leader of exchange extended on the planetary scale, ie the extension of the free movement of of goods and services, capital, people and ideas between all countries.

The French economist J. Percebois uses the whole phenomenon of globalization instead of the one of globalization, considering that globalization, as a process leads to the setting up of transnational decision networks in the motor fields of growth such as:

- information;
- research - development;
- finances.
- cutting-edge technologies.

In the specialized literature, there are three major approaches to this process:

- a phenomenon reached, analysts manifesting over-optimism about the possibilities and potential of the new process;
- that all important process, we can distinguish and contrary current, that of pessimists, who is minimized, if not deny the advantages of globalization, or insist on its negative consequences, particularly social;
- a moderate line, characterized by promoting a balanced approach in which to regain and novelties brought by globalization but expensive precesele you enter.

British professor P. Worsley says that "to date, there has been no human society", meaning that only today can we talk about forms of association that are spread all over the world, in the sense that until now, they have never been on the stage all the possible actors of globalization. The actors of globalization are the following: the state, a political entity consisting of a territory delimited by borders, from police and from an institutional power; international organizations; global organizations (United Nations: International Monetary Fund, World Bank, International Transparency, Medecins sans Frontieres, Greenpreace); macroregions (NAFTA, ASEAN, CSI, MERCOSUR, APEC, African Union, other organizations); International Monetary Fund; transnational corporations ; USA; Russia ; China.

Today's globalization is in full swing, transformed from process into phenomenon, served by four support pivots:

- capital market;
- market for information and knowledge;
- free movement of human resources;
- liberalization of product and service markets.

Its vectors are the transactional corporations and the capital banks that power the globalized system, giving it viability.

Globalization is a reality of the contemporary world, a component of human, economic history, which puts its mark on the present and future of the Earth (Negescu Oancea, M.D. et al., 2019). It operates in the economy and produces economic, financial, social, informational changes of human components and models of production and consumption (Burlacu, S., Alpopi, C., Mitrită, M., & Popescu, M. L.,

2019). The driving forces driving globalization are inspired by the concepts of the market economy in general, the liberalization of capital and the labor market (Jianu, I. et al., 2019).

Concerns regarding the analysis of the globalization phenomenon highlighted the following definitions:

- globalization can be conceived as a process or assembly of processes that include the transformation into a spatial organization of social relations and transactions, expressed through transcontinental or inter-regional flows and networks of activities, interactions and power (David Held, Anthony Mr Grew);
- globalization meant for the very rich many opportunities to make money and this much faster. These people have used the latest technology to transport money anywhere in the world, in just a few seconds, to be able to speculate more efficiently (John Kavanagh);
- process with multiple transplanetary connections between people (J. A. Scholte);
- globalization is the global integration of financial markets, nation states and technologies within a free market capitalized, on a scale unknown until now (J. A. Scholte);
- globalization refers to all the processes by which the peoples of the world are incorporated into a single world society - the global society (Martin Albrow).

Methodology

Since the 1960s, the term globalization began to be used more and more often, which required that the debate on this topic be "structured along the following points of discussion, as:

- how to conceptualize the reality called term;
- adequate tools and methods for measuring the phenomenon;
- its temporal classification;
- its normative evaluation;
- its impact on states.

The consecration of the notion of globalization will take place in the 80s under the auspices of geoeconomics and not under those of geopolitics, under the rule of market pragmatism (Bran, F. et al., 2018). Opportunity given to the transformation in international management of corporations as well as the globalization of the financial sphere (Ioniţă, F. et al., 2009). A sector of the international economy that has achieved the interconnection of its activities and its information and communication networks (Androniceanu, A. et al, 2017). From the documentary research, it seems that the term globalization was used for the first time by Theodorow Levitt in the work "Globalization and Marketing" since 1980. An answer to the question "What is globalization? "Is given by Friedman, a supporter of globalization, who says that" globalization is not a mere tendency or a fantasy but rather, an international system. " He also argues that globalization has its own laws, its own logic that can influence politics, the environment, geopolitics and the economy of every country on the globe.

FINDINGS

Positive definitions of globalization:

Globalization is defined according to the World Bank as the freedom and ability of individuals and companies to initiate voluntary economic transactions with residents of other countries.

Negative definitions of globalization:

One of the pessimistic definitions of globalization is that: The planet is cut off today by a huge dividing line, on one side there are young societies that multiply rapidly, without resources, underdeveloped and under-educated and on the other side are rich populations, but old people with technological inventiveness but demographically dying.

UNDP defines globalization as one of the most discussed phenomena in the world, manifesting its effects on the simple population. It is a powerful force that enhances the world welfare of humanity. Solving these negative effects of globalization is represented by finding a balance between negative and positive effects.

Another definition proposed by Henry Kendill states that "if we do not stabilize the population through justice, humanity and mercy, then nature will do it for you."

The process of globalization depends on economic and cultural independence and less on economic and cultural domination, diversification rather than unification and integration (Costache, G., et al., 2015). Today, in the age of globalization, we face a harsh reality, namely an unfair international order that should be eliminated (Burlacu, S., 2011); at is why third world countries (Africa, Asia) do not have the opportunity to compete with those who own the monopoly on the most advanced technologies and unlimited resources. They already own the majority of the markets compared to the countries in the world of linden which represents the weakest market (Profiroiu, A. et al., 2019). Gradually these markets will be reduced to only some areas and not markets for the production of raw materials (Rădulescu, C.V. et al., 2018).

The second problem in the age of globalization is that of demographic and technological development (Burlacu, S. et al., 2018).. The historian Paul Kennedy states that our planet would be cut by a dividing line, on one side are the fast-growing, lacking resources and underdeveloped, underdeveloped young societies, and on the other side are the rich, elderly population with technological inventiveness. .

Globalization should be the relationship that would complete, standardize the two separated worlds (Bodislav, A. . et al, 2019). So it is obvious the gap between developed countries, protagonists of globalization and developing countries, victims of the effects of globalization (Rădulescu, C.V. et al., 2018). If developed countries will become richer as a result of globalization, developing countries will become increasingly poor and indebted (Bran, F. et al., 2018).

Globalization Objectives

To highlight the importance of the two terms, namely objectives - globalization, scientists and international specialized institutions have defined the following:

The Club of Rome: interdependence between countries on a global scale, without national borders.

UN (UNDP, 1999): Globalization with the human face, a concept that also involves the concepts of sustainable development, sustainable human development, balanced development and sustainable development of the environment. From all this, it is proposed to establish a set of principles that give consistency to the concept of globalization with the human face.

The objectives of the globalization process - selection are the following:

- formation of the global state, creation of the global civilization;

- modern colonialism;
- trade liberalization and promotion of free trade;
- solving the major problems of today's world;
- formation of a global supermarket;
- global institutional order, world governance;
- the spread of capitalism in the developed countries to the developing ones.

Principles of globalization

- the principle of market and commodity liberalization;
- the flow of people, the global labor market, migration having as its final objective the emergence of a homo globalism;
- liberalization of capital flows with the 3 components: credit flows, investments (direct and shares) and currency.

The tools of globalization that ensure its dynamics, direction and evolution are numerous, the most important being:

- labor force migration "brain theft";
- consolidation, improvement of education;

- protectionism: taxes, subsidies, quotas, norms, quality, impact on the environment;
- international credit institutions (BM *, IMF *);
- transnational corporations.

The effects, risks, causes and consequences of globalization (Pisleag, G.A .; Pisleag, T. & Postolache, M. n.a., pp. 30-34)

Positive effects:

- offers space for new systems of world governance;
- reduces production costs due to economies of scale;
- it emphasizes the transactions, the exchanges that are realized almost in real time due to the globalized communications systems;
- development of international trade;
- increases the speed of running commercial, financial and technological operations;
- expanding markets and creating new markets independent of certain resources or traditional areas;
- international aid offered in various forms to poor countries;
- reduction of production costs due to economies of scale;
- movement of capital;
- foreign direct investments;
- reducing the feeling of isolation of poor countries;
- freedom of travel;
- expansion of the information society and ease of access to information;
- technology development;
- development of communications.

Negative effects:

- demographic deficit (the national intellectual potential is restricted and the export of human resources increases);
- the loss of the individuality of a people;
- loss of social control;
- security deficit (poverty, personal insecurity, migration is transferred in threats to the national and global social horizon);
- ecological deficit (the natural environment of the world deteriorates rapidly depending on the national and global economic growth);
- social deficit;
- reducing the number of jobs;
- strengthening the commercial networks for drugs, weapons, people and money laundering;
- international terrorist networks;
- paralyzing national strategies for radical reforms;
- the traditional culture of societies disappears;
- deepening economic barriers;
- the danger of setting up branches;
- destabilizing the economic life.

The Causes of Globalization

Complex phenomena can only be explained if we consider several causes. This is the only point where everyone agrees on globalization. Depending on what acceptance of globalization is taken as a starting point, other causes and motive forces appear in the foreground. In the chart below are the most frequently mentioned causes. Without a doubt, technical innovations, especially those in the field of computer and communications, have played and still play a central role. The Internet is, in many ways, the emblem of globalization. A very important role, especially at the level of consciousness, has been played by global problems. Proof of this is not only "One World" type stores in industrialized and ultra-developed states. Global problems, however, also require internationalization of politics, stimulating the development of a global consciousness. Organizations such as GreenPeace or Amnesty

International, which are dedicated to global issues such as the environment or human rights, are "Global Players". Critics of the phenomenon of globalization such as the ATTAC network are increasingly drawing attention to the fact that globalization is not an inevitable process, but rather a consequence of the US de-regulation policy begun at the end of World War II. Without the liberalization of world trade within the GATT and the WTO, this development could not have really been possible.

DEBATE: Globalization of the Economy

Globalization broadly covers thre areas of the respective social life: economic, politics and cultural. This domain of globalization is also the most important, representing the backbone of globalization on the basis of which it develops 2 domains, political and cultural. In order to highlight the history of the evolution of the globalization of the economy, we must take into account that the components of globalization originate from the earliest forms of marketing, selling products, but this becomes evident only in the mid-1980s.

By economic globalization is meant an expansion of the markets of goods and services, of the volume of products but with lower consumption of natural resources. Thus, the globalization of the economy, essentially implies the globalization of the process of creating the gross domestic production of the states of the world. The globalization of the economy also implies a reduction or renunciation of the customs policy, the restrictions of circulation of the customs duties, restrictions of circulation of the services, of the technological information and of the capital.

Economic globalization implies the globalization of the process of creating the gross domestic production of the states of the world and of orienting the restoration of the free market production with a unique competition. From an economic and financial point of view, globalization is defined as the strengthening and widening of the links between national economies on the global market of goods, services and capital. In other words, the phenomenon represents the international integration of both the goods, services and capital markets.

The determining factors of the globalization of the world economy:

Determinants of globalization of the world economy led to deepening of economic globalization and includes:

- liberalization of trade in services;
- liberalization of capital markets;
- liberalization of foreign investments.

The liberalization of the trade in services in the field of telecommunications, banking insurance took place in the 1980s, then in the European Union and then in Japan, including the countries of Central and Northern Europe. The liberalization of capital markets as a result of obstacles to the movement of capital represents an important step towards forming global financial markets. The liberalization of foreign investments is another factor that has favored globalization. The '70s led to the emergence of concepts with global vocations, as:

- the common goods of humanity;
- sustainable development;
- ecological security.

Conclusions

We can say that globalization directly affects all of us, therefore, it is necessary to analyze the opportunities and risks that it implies. From my point of view, globalization is not responsible for all the problems that the population is facing today. It is true that this has had both positive effects, forced the countries to improve their efficiency, as well as negative ones, namely that the internal problems of certain countries or areas have increased. The opening of international trade has led to an increase or improvement of many countries, such as East Asia, through exports but it has also led to the reduction of markets in developing or underdeveloped countries due to the increase of interdependencies. In the case of multinational companies, the globalization from a positive point of

view has led to their growth and development, and in a negative sense it has acted by reducing or eliminating the domestic companies. Globalization should be seen as a process that helps open markets, create activities and new technologies. Developing countries are forced to accept globalization if they want to develop and combat poverty, although in most cases it has not brought any promised benefits. The impact of globalization on developing countries can be a positive one, through the effects of removing barriers, integrating national economies, with the role of improving the situation of the population economy.

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Features of Electronic Public Services: Principles, Beneficiaries / Participants, Classifications

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Abstract

The concept of Electronic Public Service includes two attributes: public and electronic. Starting from the understanding of the two attributes, we will continue to try to investigate what electronic public services are. The use of the term "e-Services" is found in various fields, but its predominant application is observed in the case of electronic commerce (e-Services provided in the private sector of companies and NGOs) and in the case of e-Government (e-Services provided). by citizens and businesses). In this paper by this term we will refer to the second situation. The public administration unit as a provider has the task of popularizing the e-Services offered, and the technical equipment, and the necessary training for the use of the technical means, could be returned to the government through programs to favor their acquisition by the population and small companies. The objective of the present paper is to present some essential characteristics of electronic public services as documented in the specialized literature.

Keywords: Electronic Services, Principles, Classifications, Public Services

Introduction

In the absence of a definition of the public service in the legislation, the working definition will be adopted according to which "the public service represents the activity organized or, as the case may be, authorized by a public authority of the central or local public administration, in order to satisfy a public interest or needs. social, having as characteristics continuity, equality and adaptability"[1]. We find in the specialized literature characteristics specific to public services: Public utility services must meet certain essential requirements: universality; continuity from the qualitative and quantitative point of view, under contractual conditions; adaptability to user requirements and long-term management; equal and non-discriminatory accessibility to the public service, under contractual conditions; transparency and user protection (Burlacu, S., 2009, 2010, 2011).

The State of Knowledge

The term e-Service (the prefix "e" means "electronic", as is the case with other uses), although difficult to classify, refers to electronic services in general. In the doctrine various definitions meet, but all agree on the role of technology in facilitating the provision of services, which makes them to be categorized as electronic (Ionita, F., & Burlacu, S., 2009).

Therefore e-Services include e-commerce, but may also include non-commercial (online) services that are usually provided by the government. Rowley J. (2006) defines electronic services as: "facts, efforts, or performances whose dissemination is mediated by information technology."

This definition reflects three main components - the service provider, the service receiver, and the service delivery channels (ie It is deduced that an example of e-Services is electronic public services. In these cases the public agencies are the service providers, the citizens as well as the companies are the recipients of the services, and the delivery channel is mainly the Internet, while other classical

[1] For a more elaborate explanation of the concept see Analysis of the legislative and institutional framework for the provision of public services at the level of public administration, SNSPA POCA Project

channels. (for example, telephone, call center, public kiosk, mobile phone, television) are also taken into account (Ioniţă, F. et al., 2009((Burlacu, S., Alpopi, C., Mitrită, M., & Popescu, M. L., 2019).

These electronic public services, e-Services, are added to the traditional ones provided by a traditional computerized public administration unit (PAU) and turn it into an electronic public administration unit (eUAP). The idea of electronification refers both to the provision of e-Services through electronic access channels (mainly the Internet) and to a reorganization of traditional UAPs, meant to adapt them to the new access channels and to bring in general, greater efficiency in operation. We agree that not all traditional public services can be fully electronic - so some services will be electronically only partially, while others will not. The computerization of a UAP (electronification, or automation) forms the technological basis, which, extended and adapted, allows the implementation of electronic public services". Vasilache states that "an eUAP is, in most situations, a 'UAP plus the Internet' if we consider the beneficiaries of public services, that is, citizens viewed as consumers (demand-side), and from the point of view of government (supply side). , an eUAP is a 're-organized and re-organized UAP', more efficient (lower costs, better services), and with more qualified staff. "And in this definition the three main elements (provider, receiver, channel) appear, in addition it is specified that electronic public services are added to traditional UAP services and run in parallel with them, although they can be accessed through various electronic channels (internet, telephony, interactive digital television, etc.). In fact, at present, most of the public services of the PAU are provided in the traditional form, with the beneficiaries coming to the counter and exchanging paper documents. An eUAP will therefore provide in parallel both traditional services and the same services (or part of them, or new ones) provided in electronic form.

For the "electronic" attribute of electronic public services some authors uses the term "electronified" to better distinguish them from traditional computerized public services, which involve the limited use of computer equipment (computer, printer, scanner, fax, etc.) in the back office work of to an office within a PAU in order to make this work more efficient (Vasilache, D, 2008). The limitation is given by the lack of interconnection between the various computer devices. Therefore electronic public services are not only computerized public services, computerization is the basis of them, but they are computerized and connected public services, using the Internet generating an exchange of information or data in a shorter time and obviously with lower costs, a reorganization. of the processes, but it also requires new skills from the officials. It is obvious how the concept of electronic public services meets the requirements of the "3E" (economy, efficiency and efficiency).

Returning to the architectural structure of an electronic public service, we have detailed some of their main features. The architectural structure includes, but is not limited to: provider (eUAP, government), gateway (site or portal), interaction and presentation (internet connection, access channels, interface or device owned by the client through which the web pages are connected and services), data (information), processing systems (data management and storage, etc.), exchange (applications for service integration), and receiver (beneficiaries: citizens, companies, eUAP other than the one who is the provider).

The beneficiary who accesses e-Services through the Internet uses an electronic access gate in the form of an electronic counter, eGhişeu (virtual counter). It appears in the form of a website created by the service provider, a site from which it can obtain information or through which it can interact bidirectionally (receiving and entering data) to perform more complex services.

An eUAP provider of e-Services can have a single site, which represents a single access point (one-stop shop, a store where they are all located), making it easier for the beneficiaries to search for the services they need, or for a single portal (the only central government site that can send all existing, central and local e-Services). All sites of the same type (eg town halls) can have a similar structure by applying standards.

In order to use the administrative e-office the beneficiaries must have the means of access to the Internet (a device used as an interface such as the computer and Internet connection) and have the

necessary knowledge - first to find out about the existence of e-Services, and then to know how to use your computer to use e-Services.

The public administration unit as a provider has the task of popularizing the e-Services offered, and the technical equipment, and the necessary training for the use of the technical means, could be returned to the government through programs to favor their acquisition by the population and small companies. Access channels to electronic services are electronic channels that eliminate the need to present the beneficiary in person at the counter, or reduce the number of such visits. These include: the Internet (the main electronic access channel to e-Services through a computer, laptop or tablet equipped with a modem or adapter, specific to the connection mode - dial-up telephone line, DSL, ISDN, cable, fiber optic or radio and browser), voice channels (landline, call centers / Call Centers), mobile phones (increasingly used for Internet access), small laptops equipped with a mobile phone modem (palmtop, handheld, PDA , smart watch), and interactive digital television (iDTV, Interactive Digital TV). They are considered as access channels and the so-called PIAP (Public Internet Access Point) equipped with one or more personal computers connected to the Internet, through which the beneficiaries who do not have a device connected to the Internet can have free access to e-Services at UAP locations , and those who do not have the necessary knowledge to use the computer and e-Services can be assisted by a guidance staff. When PIAP presents the public with a series of useful information about the services (not just electronic) of the administration unit they are in, it is called Information kiosk (Kiosk).

Findings

The information that flows between the beneficiary and the e-Services is in this case in electronic documents in various formats, such as .html, .XML, .doc, .pdf, SMS, or e-mail, which sometimes meet the requirements of security and confidentiality, can be accessed using a digital signature or a card equipped with a chip.

It is obvious that this structure of electronic public services describes their functioning, operating mode that responds to principles underlying the electronic governance itself. The following lines will outline some of these principles that we considered to be more representative:

1. User focused: means that a government builds its services based on understanding the needs of the users, around the needs of its citizens, and not vice versa.
2. Accessibility and ease of use: it means the ease with which citizens can make use of the possibility of electronic consultation of government information: finding, digesting and using it. Accessibility criteria: easy access, friendly, permanent, transparent, responsible, for information and participation, the ability to respond to special needs.
3.Standardization: by using compatible data formats, by using the same terminology, information exchanged between agencies can be understood by all applications in their information systems, including old ones that were not created for this purpose.
4. Automation: the provision of electronic public services is not done manually, but in an automated way which limits the possibility of human error.
5. Transparency and traceability: in the digital environment, everyone is equal, there is no personal favor because a computer cannot be bribed, transparency is real and all actions are traceable, regardless of whether they are related to accessing or modifying certain sets. data, etc.
6. Confidentiality, trust, security: the authenticity of the entities participating in e-Services, the integrity and authenticity of the data, the confidentiality, the prevention of fraud is essential.
6. Permanent re-design / reorganization: all services and their related processes are permanently re-analyzed and re-designed, old systems deleted and rebuilt, in order to streamline and streamline, to minimize the effort from the beneficiaries.
7. Interoperability, correlation between systems, integration: the data are provided by the beneficiary only once to a certain supplier and this is sufficient, they are not double collected if they are already available in the system (s); the principle of "one time data" applies, there is no additional burden on the shoulders of citizens to ensure that all authorities have new data available.
8. Multi-channel (multi-channel) provisioning: services are offered through various supply channels, providing online is just one of many other options.

9. Continuity, collaboration between front-office and back-office: seamless services, that is to say in one piece, uninterrupted, are more efficient than providing many separate services to the same user group.

The variety of electronic public services seems endless, with a wide range of them being offered in public administration, both locally and nationally (Rădulescu, C.V. et al., 2018). The following will be presented some of their possible classifications that reflect the above-mentioned principles. One of the criteria for classifying electronic public services that can be used is taking into account their beneficiaries. This criterion was also adopted by the European Union by defining it the List with the 20 public services considered basic. Thus, there is a set of 20 services monitored at European level (12 for citizens and 8 for economic operators)[2].

Public services for citizens

1. Services for collecting the income tax of citizens;
2. Looking for a job;
3. Service for tracking social assistance benefits (3 out of 4)
- Unemployment benefits
- Children's allowances
- Medical costs (reimbursement or direct settlement)
-Students for students
4. Issue of personal documents (passport and driving license);
5. Vehicle registration service (new, used or imported);
6. Issuance of building permits;
7. Service for monitoring police statements (eg in case of theft);
8. Service for public libraries (availability of catalogs, search tools);
9. Application and issuing of personal certificates (birth, marriage);
10. Enrollment in universities;
11. Home Change Announcement Service;
12. Health services for citizens (interactive consultancy regarding the availability of services in different hospitals; appointments for consultations);

Services for companies:

13. Payment and monitoring of social contributions;
14. Service for the payment of the tax on the profit;
15. VAT payment service;
16. Registration of new economic operators and modification of data of existing economic operators;
17. Statistical data of economic operators;
18. Service for customs declarations management;
19. Issuance of environmental permits;
20. Public Procurement Service.

Discussions

Another possible criterion for the classification of e-Services is deduced from this classification, namely according to their importance e-Services are distinguished: basic or fundamental and others.

As you can see, these services are essential in public administration, being used by almost all citizens and all companies. These were also the reasons why they were included by the European Commission in the list of fundamental services for the governance process, being monitored to offer these services online, within the e-Government programs.

[2] European Interoperability Framework for Pan-European eGovernment Services, EIF, v1.0, 2004, http://ec.europa.eu/idabc/servlets/Doc4ee4.pdf?id=18060, p.13

From the point of view of evaluating the online presence of these public services, the European Commission has established to use a model of the maturity of the service divided into five stages, also called sophistication stages, which are presented in Table 1. Within this model, which shows the increasing extent in which the service is offered in electronic form, from very little to fully electronic, it is essential to reach at least level 3, which is a standard in most European countries at the moment. . Stage 5 is most desirable, but not always possible.

Table 1: Sophistication stages used to measure the maturity of online public services

Stage	Stage description
0	No counter on the Internet or with a site containing only general information
1	Online information materials about the public service
2	Interaction with the unidirectional citizen (download forms that are completed and sent in paper format by post or fax)
3	Interaction with the two-way citizen (download, fill and send the form in electronic form, electronic processing of forms, authentication)
4	Included are methods of decision, notification, delivery and payment of online services (transactions, complete processing, payment)
5	Fully automated, personalized service (this is targeting or personalization)

Source: *Adaptation after European Commission*

Another classification related to the complexity of electronic public services is divided into: information services (unidirectional) and actual services (two-way), which carry out more complicated operations, such as paying taxes or registering new companies. Thus, the services in stage 1 and 2 of sophistication where the service provider offers information to the beneficiary, the flow of information flowing only from the supplier to the beneficiary are unidirectional, while the services that have reached the 3rd, 4th and 5th levels of sophistication are bidirectional (or interactive, or transactional), during their execution, the information flowing between the supplier and the beneficiary in both directions.
The four models of (re) organization of offices, described by Jeremy Millard (2004), which take into account the number of services (one, or more) and the number of stages (stages) can be used to describe the complexity of the way services are performed.) necessary in their realization, that is, by the number of offices (one, or more) in which the procedures finalizing the service are carried out, differentiated according to their degree of digitization

Table 2: Office organization models for the provision of online public services

Font-office / Back-office	One service	More services
One office	**Model A**	**Model B**
More office	**Model C**	**Model D**

Source: Adaptation after Millard[3] (2004).

Model A - one service and one office (the beneficiary sees a single service, and interacts with a single office, which performs that service),
Model B - more services and one office (beneficiaries see more services, but interact with a single office which makes them all),
Model C - one service and several offices (the service is performed by at least two offices, so the beneficiary interacts with one office 1, and offices 1,2,3 interact with each other), and
Model D - more services and more offices (more services are integrated with automatic re-entry data and more offices cooperate to a lesser or greater extent, including ancillary services).

[3] Millard J.*Reorganization of government back-offices for better electronic public services – European good practices (back-office reorganization), Final report to the European Commission, January 2004, vol 1, p.16-17,URL: https://www.ifib.de/publikationsdateien/Back_Office_Reorganisation_Volume1_Main_Report.pdf*

Conclusion

If we take the example of the European Union, e-Administration services can be offered by one state and the other Member States. This is ensured by the government's strategy for each state to implement its own e-Government, a strategy that must also take into account a cross-border dimension, this dimension being already formalized in a normative document called the European Interoperability Framework (EIF). . In this context we can talk about e-Services: cross-border, national, central and local.

Furthermore, starting from the interoperability and interconnection feature of e-Services, it can be stated that, although in each country it is different, the transition of the services in electronic form leads to a certain degree of uniformity by sharing the successful experience from one country to another. countries, especially within the European Union. Thus another classification follows: international electronic services, pan-European and national.

The following principles, of a general nature, should be considered for any of the eGovernment services to be established at pan-European level: accessibility, multilingualism, security, privacy, subsidiarity, use of open standards, evaluation of the benefits provided by open source software, the use of multilateral solutions.[4]

Depending on how they serve a need of the beneficiary, the distinction is made between: direct services (they directly serve a need, but they may call during their implementation a series of auxiliary services), auxiliary (auxiliary services such as: the management service of electronic identity, eID, through which a declaration of the identity of the beneficiary is made followed by its authentication, and the electronic payment service, ePayment or ePayment, through which various payments required within a direct service can be made electronically).

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[4]*European Interoperability Framework* disponibil online la adresa: http://ec.europa.eu/idabc/servlets/Doc4ee4.pdf?id=18060

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Assessment of Heritage in The Basis of Theory Value-Entropy

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Abstract

Following synthesis of theory evaluation studies were identified several issues criticized by academics and practitioners. Most problems occurred due to lack of appropriate theoretical fundamentals. Currently, evaluation theory is defined based on neoclassical economic theory, based on the concept of value-utility theory underwent considerable changes in recent decades. Theory evaluation, however, failed to comply with the changes, which created problems in practice.
The methodology of the combination (reconciliation) can be found in the specialized literature in three approaches - by cost, by income and by comparison. These approaches are focused on neoclassical economic theory, which could be derived from the idea of long-term market value matching with costs. Modern economic theory accepts that costs and market value over a long horizon may have a tendency to approach, but at the same time, he mentions that in reality there is no internal reason for ensuring this approach or long-term equivalence. The present article presents the results of our research regarding the analysis of valuation theory from the perspective of modern economic theory. A first conclusion was that the significance of the methodology of reconciliation of values could diminish and the theory of valuation could use probabilistic notions because the heritage markets are uncertain.

Introduction

One of the tendencies of theory evaluation assessment work is split into two areas: financial evaluation - investment (EFI) and professional estimation value (EPV) (Bran, P., 2009). In the EPV see two paths of development: assessing the likely selling price and second - limited boundaries of public and state interests - assessing the estimated value (fair value) (Costache, G., et al., 2015). The modern school of professional evaluation, in its turn, has been divided into two directions: technical-mechanical (measurement, examination, market reflection) and behavioral (modeling / simulation of active price formation processes).

Analyzing the logical chain of creation, estimation, management of value, we came to the need to explain the way of dimensioning the value, resulting from the way it appears (Burlacu, S. & Jiroveanu, D., 2011). The most explicit theory from this point of view, which explains the essence of the value and the mechanism of its creation, is, in our opinion, the value theory based on low entropy (Bran, F. et al., 2018). In the following, we will try to explain the evaluation method based on the value-entropy theory, as evidenced by the documentary analysis.

Problems Researched

The assessments should be used when receiving concrete decisions and be specially adapted to solve the problems specified by the beneficiary. These problems may require, and may not imply a market value (Bran, P., 2003).. The most acceptable way to forecast likely sales prices is by comparison approach. The modern statistical techniques (from the market position) and the techniques of market simulation (from the position of the transaction, of human behavior) must be applied. The use of the cost of reconstruction in the cost approach is focused on theoretic theoretical ideas. Adding the value of the land with the value of the improvements does not form the most likely selling price. Moreover, the division of the impairment into physical, functional and economic components is incorrect and misleading (Bran, P., 1992).

Findings

A Marshal's ideas became a landmark for the emergence and development of the entropic value theory, elaborated by Paul Bran (1941-2006). From this perspective, value-entropy theory generalizes existing directions defining value and indicates that the value is the result of changes taking place in economic processes (at least) the human activity is involved. These processes may include production, distribution, exchange and consumption. In these conditions, the value is the result of complex processes of transformations, conservation and transfers brought together in the dynamic states of production, consumption, liquidation (Ioniţă, F. et al., 2009. The physical support of value is the degree of organization of the elements of matter: substance, energy and information or, in other words, low entropy (Bran, P., 2003).. For the sake of clarity, we will mention the basic definitions of TVE:
Entropy is the measure of the degree of organization / disorganization of a system. The lower the entropy (low, negative), the higher the degree of organization, cumulating with the living systems (Bodislav, A. . et al, 2019). The potential represents the degree of organization (low entropy) held by a simple or complex system, the level of organization that makes it attractive to be consumed by a living system. In other words, that potential represents the ability of a system to provide organization (Dima, C. et al, 2020).. In the TVE model, the potential category is a basic category, used to generalize the ability to provide the organization of several types of systems: natural, biological, social, economic (Burlacu, S.; Alpopi , C.; Popescu, M. L. 2018).

The natural potential (Pn) is represented by the degree of organization existing in all systems in nature: systems at equilibrium, systems near equilibrium, systems far from equilibrium. Pn encompasses the entire low entropy existing in our reference system and conserved in the elementary forms of matter: substance (s), free energy (s), information (s)

The social potential (Ps) is the result of the transformation of natural potential attracted (Pna), biologically attracted (Pba) and economically attracted (Pea) in the complex system of the society. This degree of organization is included in the structure of the society system, but also in the products and services provided by this system through social activities, other than the economic one (administration, education, culture, defense, health, scientific research, etc.).

The biological potential (Pb) comprises the degree of organization existing in the living systems, being the result of the transformation - the conservation of natural potential attracted by the respective systems.

The economic potential (Pe) shows the degree of organization included in the economic systems and in the products and services provided by these systems and is the result of the economic type attraction of natural potential (Pna), biological potential (Pba), social potential (Psa), economic potential from other systems or from own results (Pea).

Taking into account that considered above relationship and definitions, will formulate the definition of value according to TVE. Value system (the property) is all attracted potential in this system.

Paradigms and Debates

The basic paradigms of economic theory have remained so far at the level of the two axioms: Value = Work and Value = Utility The path to a new paradigm was started by the late Professor Paul Bran even before 1989, when he was concerned about the measurement or financial distribution of value, by which he observed numerous clumsiness of economic theory. Explaining the economic reality from that period, as well as the major dysfunctions (unemployment, pollution, economic and social imbalances) that developed in society, both in us (where we used Labor-based Theory of Value) and in the countries that used the theory based on utility (marginal value) (Jianu, I. et al., 2019).

The foundations of the value-entropic theory (TVE).

In order to bring into economic theory concepts, assumptions, laws, definitions, etc., it is necessary to use a rich arsenal of tools, methods and processes in the economic field or borrowed from other fields of science. In order not to remain isolated between the narrow borders of the economic field, the working area of one's own science must be surpassed, thus widening the horizon (Negescu Oancea, M.D. et al., 2019). On the other hand, it must penetrate into the depths of the systems that contribute to the realization of the phenomenon of value (economic, society and natural environment) (Rădulescu, C.V. et al., 2018).

Thus, we reach the basic objective, which is:

• Finding and substantiating symbolic generalizations in the form of basic paradigms of value theory;
• Synthesis of partial models and the general model of the mechanism for obtaining and managing value;
• Use of paradigms and the general model of obtaining and managing value to explain and solve the complex problems of the economic activity.
In the action of defining the value, it is likely that solving the problem of physical support would be necessary (Profiroiu, A. et al., 2019). The scientific theory in the economic field has gone from the support called work, in the form of socially necessary work time, to utility or satisfaction (Androniceanu, A. et al, 2017). In entropic value theory (TVE), we choose another type of physical support, much more general, low entropy support or degree of organization existing in simple systems or complex systems.

Secondly, it was necessary to establish a defining relation that does not conflict with the requirements of the general laws of nature (the law of transformation and conservation of matter and the law of entropy). Using the classical notations for the inputs and outputs of the economic processes, the corrections were completed that supplemented the inputs with the potential attracted free from society and the environment, and the outputs with the useless results in the form of high entropy wastes.

The object of study of the value paradigm to understand the value theory based on low entropy is the need to know the mechanism of life, this myth of systems far from equilibrium (Bran, 2013). Living organisms maintain their life, only if, from the environment, they attract and transform low entropy from the primary elements of matter: substance, free energy, information (Burlacu, S., 2010,2011). Integrated into the natural circuit of matter, the living system of man is the beneficiary of an enormous low entropy potential, manufactured by the living and the nevi systems of nature. This potential allows it to exist, even if the processes it triggers in society and in the economy are very wasteful. In order to understand the mechanism of value, economic science must master the discoveries of the other sciences. It can no longer be sister to mechanics, but will have to be related to nonlinear thermodynamics, biology, cybernetics, etc.

The general model of entropic value theory (TVE) Having a new opening, economic science must build a complex model for the mechanism of obtaining value, a model that includes many cash. The construction of a model presupposes the existence of a well-structured project, in which the primary processes of transformation, conservation and transfer are present, all of which contribute to transforming the potential initially attracted into the real value recognized by TVE.

The TVE model does not exclude the final event from the life of a system, the moment of liquidation. The correlation of the TVE model with the models of the other theories of value emphasizes the differences, but also the fact that the model of the value based on entropy includes the other models, taking the knowledge further, to the real level of the potential conserved as value of the obtained product. Although, in TVE, the production process is only a process of transformation-preservation-transfer, and not of creating an additional value inputs, it is a decisive component of the TVE model. Therefore, understanding the model of the production process is essential for the knowledge and assimilation of the general model of obtaining and managing value.

The decoding of the primary processes of transfer-entry, transformation, conservation, transfer-exit brings additional elements of knowledge in economic theory and practice. Inbound transfer, as well as outbound transfer, occurs naturally through repartition or exchange(Burlacu, S. et al., 2018). The sources from which the transfer is made are of the most diverse, highlighting the possibility of restoring in the economic circuit the potential of waste. In turn, the primary processes of transformation and preservation contribute to the resetting of low entropy from inputs in accordance with the company profile and with the consumer's demands.

The transformed potential is conserved in the quantitative, qualitative and reliability dimensions of the product, at an always subunit efficiency. The Entropic Value Theory Model (TVE) The Entropic Value Theory model implies the recognition of service potential, taken out of the product by accepting this potential in a future production process. Only the level at which this potential is recognized becomes, according to TVE, the value of the product obtained in the production process. The model of the Entropic Value Theory TVE includes all the systems possible to train in obtaining and managing the value, as well as the channels of the transition of the natural, social and economic potential towards the real level of the value. In these passages, forces are manifested that bring the market value to dimensions that differ from the real value level.

Resolving the price deviations from the entropic value is another novelty for the economic theory, these solutions explaining the phenomena of inflation, of the environment and of entering the economic systems in the complex process of liquidation (Burlacu, S. et al., 2019). The construction of the general model of the Entropic Value Theory imposed a disciplinary matrix with many novelty elements or with totally different interpretations compared to the current content of some economic categories. The transition from the entropic support for the value category has brought, in the foreground, new symbolic generalizations, models, common examples (paradigms). The entropic value theory brings severe restrictions on the development of economic processes in the form of the entropic value law action. This law requires that economic processes, but also some processes in society and of environmental protection and restoration, be conducted within the limits of the economic potential preserved during the economic processes. If there is no sense of value in these systems, then the system in question enters into a state of fluctuation and goes to a fork, where the problem of disappearance or survival is posed by restructuring the system in the sense of obtaining and managing the value in other conditions, more effective. and more efficient.

The TVE model and the action of the Law of Entropic Value are verified in the system of human society in the four major stages: antiquity, middle age, industrial, post-industrial. Each stage went through periods of flowering, maturation and decline, largely determined by the way in which the mechanism of obtaining and managing the value worked. The level of the economic potential attracted and processed depended on the ways of attracting (work, science and technology, geographic discoveries, war, etc.), on the way of organizing and equipping the economic processes (property force, technical endowment, management), as well as on how useful results, products and services were distributed and used. The changes that have taken place in society and economy have made the mechanism of obtaining value, fertilizing a period of time, enter into difficulty, attracting the whole society in this situation. The productivity of this mechanism was reflected in the way of building the tools, in the evolution of the society, in the diversification of the economic and social activities, in the environmental impact, in the social and political events of the world. Through these effects on such a complex system, as the society, the TVE model verifies itself, its main paradigms succeeding, largely, the society's walk on

the arrow of time. This model allows us to foreshadow the economic aspects of the future human society, the postindustrial or information society.

Current economic theories are not built on the principle of increasing entropy. According to these theories, the value and the wealth depend on the work and the means of the economic activity, so, by developing them, the road to welfare is open! This model has proven to be inappropriate and even dangerous in the area of secondary activities, as a transformative activity of potential removed from the environment and society from primary activities. Through these reconsiderations, we will be able to adapt the system of economic activity to the countless restrictions that are in front of the bifurcation point, where the human society is now.

After verifying the TVE model based on the complex system of the company, it is necessary to see if this model explains the changes in the environment and the structure of the economic activity system. Given the fact that the most important partner of man in the economic and social activity, the natural environment, has been permanently neglected in the distribution of results and disadvantaged by eliminating the waste of the economy and society. As Professor Paul Bran states, "Nature had to die a little in order for 20th-century scientists to warn humanity that we are near the limits of economic growth. For these reasons, the construction of the economic activity system (either enterprise or other micro-, macro-, world- level) in the future society must comply with the restrictions required by environmental protection and the law of entropic value. Science has made available to the people the procedures, methods, instruments suitable for observing the mentioned restrictions; therefore, miniaturization, computer science, education, creativity".

Conclusions

The entropic value model requires documentation as to how this consumer, who has become a producer, will be able to use the services removed from the product they are about to sell. Only by discovering the source of the enormous potential brought by information in the economy, we will recognize that the whole natural environment is the number one partner in our economic activity and we will have to reward it with an increasing share of the economic results to which it contributes directly and through of the other elements of the structure of the company, including through information. The TVE model for changing managerial behavior.

The adoption of economic decisions greatly increases the responsibility and the risks that a manager assumes. A first change in the manager's behavior refers to the reconsideration of the processes involved in the mechanism of obtaining value. He must accept that, in addition to the economic processes such as production and consumption, he participates with decisive role also the processes in the natural environment and the processes in society. On the basis of this reconsideration, the manager will have to grant equal rights to all the mentioned processes, both in the mechanism of obtaining the value and in the division of value between the participants in the respective mechanism.

Therefore, the manager must be aware that the value is obtained through the obligatory contribution of both economic processes, the production and the consumption processes. A second change concerns the redesign of the entire decision-making process. Economic communication through money The economic language mediated by money is part of a broad process of communication in economy and society. At each stage, there is a risk of miscommunication and communication errors. Thus, four main moments are observed: knowledge of the phenomenon of obtaining value; coding the meaning and inscribing it in the content of a sign; decoding the sign by the recipient of the message; confirmation of the agreement to the sender of the message.

The first moment corresponds, in the process of money communication, to the knowledge of value through measurement. Second, the one by which the meaning obtained, the price, is discharged in money signs through the banking system and which presents risks. Third, it is about decoding the money signs. The value message brought by money does not specify the goods in which the value is to be placed, which the economy will put at the disposal of the holder of money signs. The decoder will identify the value based on its model, both in terms of the size of the standard and in terms of the goods

in which it thinks the value is. The fourth step is only achieved if the money holder uses them to buy the goods on the market. The money signs reach the bank, being able to reenter a communication circuit. If the money is kept for future payments, they will no longer have the same meaning, because both the value and the standard change daily. Born in the intimacy of processes and complexes, in systems such as environment, society and economy, the value is revealed, on the market, in the form of price. The information is mediated by the monetary standard, a standard undergoing profound changes, as well as the value and the sign-form of the currency.

Therefore, the price will reflect the conflict of interests of the participants in the mechanism of obtaining and managing the value, from the producer to the consumer, from the company to the natural environment! The use of money in the process of communication in the economy brings elements of ordering, but also of disorder, when the decoding models of the standards for measuring the value are not correct or permanently updated. Inflation fraud is an old tool of social management, at the same time, it is also the cause of social discontent and riots, inflation drastically reducing the amount of real value that reaches the systems in the state of consumption. In conclusion, the mechanism of obtaining value, through its complexity, deserves attention from all, whether they work in the economic, technical, cultural, political, or social field, "THE ENGINE OF THE SOCIETY" needing the input of each participant in the social life. The gain of value in the struggle with the laws of nature and of the economy proves to be the result of both the worker and the engineer, economist, teacher, sociologist or painter, etc.

Perhaps only by associating with the mechanism of obtaining value the processes from the natural environment and from society, we can give "value" to all processes and we can respect the activity of all the specialists and participants in the respective processes. Or maybe just in this systemic form, the value model recognizes us all, from humans to the natural environment, from plants and animals to tools, from physical work to scientific and educational activity, the contribution to obtaining value and the right to receive a parts, from the economic results.

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Economic-Financial Decision and Resource Management in The Context of The Law of Value

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Abstract

The decision represents a dynamic, rational process, in which a line of action is chosen, from a number of alternatives, in order to influence the activity of the performers and to obtain a certain result. The management and conduct of the financial activity in the economic unit is achieved through decisions with a financial content. The decision involves the transition "from power to act under conditions of efficiency", consciously, based on a scientific, psychological and purpose rationale and motivation. Adopting the strategic economic decision involves choosing an optimal solution from the set of possible solutions. In choosing this solution, the decision maker has at its disposal the consequences of a technical, economic, financial, social nature, present in the core of each solution that participates in the stage of choosing and adopting the economic decision. The objective of the present article is to highlight these elements in the specialized literature and, through an adequate documentary analysis, to make available to the specialists viable perspectives in order to make practical decisions.

Keywords: Economic Analysis, Resource Management, Economic-Financial Decision, Value Law,

Introduction

The decision represents a dynamic, rational process, in which a line of action is chosen, from a number of alternatives, in order to influence the activity of the performers and to obtain a certain result (Ioniţă, F. et al., 2009).

The following elements can be kept from the definition of the decision:

- it is regarded as a process of rational choice;
- represents the final act in establishing the direction of action of achieving an objective;
- the action bears the name of decision only insofar as it corresponds to a situation of choice;
- it directs the activity of the subordinates under the conditions in which the action of a leader is imposed by events without having the possibility to choose another alternative, it is not a decision.

Depending on the time horizon referred to, the financial decision may be (Ion-Trifoi, G. & Dinte, C. n.a.):

- *Strategic decision*, targeting a distant time horizon that foreshadows the framework of the company's activity.
- *Tactical decision*, which aims to adjust the conjunctural influences that can remove the company from the adopted strategy.

Financial Decision Making - Decision Making Process

The management and conduct of the financial activity in the economic unit is achieved through decisions with a financial content (Jianu, I. et al., 2019). The decision involves the transition "from power to act under conditions of efficiency", consciously, based on a scientific, psychological and purpose rationale and motivation (Costache, G., et al., 2015).

The financial decision is the result of a complex decision-making process comprising the steps of knowledge of financial reality and stages of acquiring the optimal solution (Burlacu, S. et al., 2019). The main steps to be taken in order to play the content of the financial decision are: establishing the financial objectives included in the line of development of the company, financial information analysis, adopting the financial decision, executing the financial decision (Profiroiu, A. et al., 2019).

The development line includes the most general and important objectives of the management of the economic activity (Burlacu, S. & Jiroveanu, D., 2011). These objectives include a synthesis of the main types of activities that take place in the respective unit: economic, technical, technological, organizational, financial, etc.

Research Methodologies

Information analysis is an action to know the economic reality with the help of methods and tools for collecting, processing and interpreting information. Starting from the information obtained, based on this analysis, the possible solutions for achieving the objectives of the development line are synthesized. Adopting the financial decision involves choosing the optimal solution from the set of possible solutions. The execution of the financial decision seeks the complete and operational satisfaction with financial funds of all economic and social activities in the economic unit, as well as the supply of the centralized financial funds from the national economy (Bran, P., 1980). In order to carry out our research, we used the documentary analysis that allowed us to highlight those particularities that present to the specialists in the field viable perspectives in order to make practical decisions.

Finding

Adopting the Strategic Financial Decision

The strategic financial decision involves a complex action to finance the economic, technical, social activities, required by the production process and the development of the elements of the economic structure of production (Litra, M., & Burlacu, S., 2014). The preparation of the financial allocation solutions that participate in the establishment of the strategic financial decision is carried out with the help of financial actions. These actions have the mission to establish the financial information around which the possible solutions are formed in the form of the variants of income and expenditure budget of the economic unit (Pricop, C., et al., 2016).

The synthesis and adoption of the optimum solution are achieved through the financial activity, of two categories of attributions: the knowledge of the reality of the economic unit and its environment and the intervention in the environments of defining the financial phenomenon represented by the production and consumption processes (Burlacu, S. & Stoica, A., 2012). The intervention of the financial activity in the economic activities depends on the qualitative side and is achieved through the connections of the reverse connection type: financial action - production process and financial action - consumption process (Alpopi, C. et al, 2018).
The choice and establishment of the optimal solution for the content of the strategic financial decision take into account the nomological motivation (based on the scientific knowledge of the reality), the psychological motivation (it concerns the interests of those who will make the financial decision), the axiological motivation (it takes into account the value judgments made in relation to the activities

required by the financial decision), and the teleological motivation of the decision's purpose (Rădulescu, C.V. et al., 2018).

a. Strategic financial decisions for economic activities regarding fixed assets. The financial action will adopt the optimum financial allocation solution for the strategic financial decision regarding the investment activity (replacement, training or development of fixed assets). The optimal solution is determined by the correlation between the need for funds and the financial sources.
b. Financial decisions strategic economic activities on public assets. Financial activity will adopt strategic financial decisions for financing economic activities of training and development inventory working capital and insurance of goods by insurance institutions. Financial decision will be adopted based on a correlation between the volume of necessary funds and financial funds to be mobilized from internal or external sources.
c. Strategic financial decisions for economic and social activities regarding the workforce element of the economic unit. The financial decision is made on the basis of the correlation of the company's own financial resources and of bank loans on the one hand with the need for financial funds for the investment expenses and for the repayment of the previously used credits, plus the related interests, on the other.
d. Strategic financial decisions for the information element activities. The strategic financial decision considers the need for funds arising from the quotations for the research-assimilation works, as well as the need for funds for the payment of financial obligations. On the other hand, the level of the internal sources, the allocations outside the unit and the credit for the technical assimilation plan are considered.
e. The strategic financial decision to pay the financial obligations to the state budget and to the finances of the economic center. This decision will include all the financial relations of the company with the respective financial links.

Results

Strategic Financial Decision Making

Making strategic financial decision is made by the execution of tactical financial decisions, through which the financial allocation envisaged by the strategic decision (Bodislav, A. . et al, 2019). These decisions are part of operational decisions taken in the financial service of the economic unit. These decisions are mobilizing funds from outside the enterprise or production results and then share to finance the establishment and payment obligations to the national economy Angheluta, S. P. et al, 2019).
The argumentation and the realization of the tactical financial decisions have implications both on the economic activities and on the strategic financial decision (Bran, F. et al., 2018). These decisions depend on the general competences of the economic unit within the self-management of workers through the economic-financial mechanism of the national economy, and specifically, what competences in the field of taking self-financing decisions from their own results (Bran, F. et al., 2018). Financial activity is an important factor in driving economic activities organized economic unit, methods, tools and high informational value of its information (Burlacu, S., Alpopi, C., Mitrită, M., & Popescu, M. L., 2019). Economic undertaking any decision should be based on fund financial information on funding needs, available resources, future financial results, financial indicators of economic efficiency (Bran, F. et al., 2019).

The Stages of Foundation of The Strategic Economic Decision

The first step is information. This involves investigating the sources of information in the areas that will influence or will be affected by the adoption of the strategic economic decision (Negescu Oancea, M.D. et al., 2019). To achieve this stage, the financial activity must contribute with the financial information fund regarding the internal situation of the company and the external environment requirements of the economic unit.

The second stage is information analysis. This ensures the obtaining of information regarding the adoption and the realization of the object in question of the development line, an objective that generates the strategic economic decision that must be based and adopted in the economic unit.

The purpose of the financial activity at this stage is that, through the financial information analysis, it will contribute to the financing sources, to the total financial and economic results obtained from the activities that accompany the adoption and the realization of the economic decision, to the financial obligations, and to the financial indicators of economic efficiency.

Conclusions

Adopting the strategic economic decision involves choosing an optimal solution from the set of possible solutions. In choosing this solution, the decision maker has at its disposal the consequences of a technical, economic, financial, social nature, present in the core of each solution that participates in the stage of choosing and adopting the economic decision.

To be comparable, the consequences of the multitude of possible solutions must be expressed by the same unit of measure. By the method of calculating the utility, it is used as a unit of common utility measure.

This method gives the value of 1 the utility of the most favorable consequence and the value 0 of the most unfavorable consequence for the decision maker. The choice of the optimal solution will be made taking into account the sum of the utilities on each solution, and the solution with the highest sum of the utilities will be chosen.

If several solutions have the same amount, the second method of calculation is used. The utilities granted previously, are multiplied by the coefficients of importance that have values between 0 and 1. The new amounts of utilities on each solution will allow to differentiate the solutions and adopt the optimal solution for the decision maker.

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Risk of Deforestation in Romania – The Effects of Mass Deforestation

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Abstract

Global warming is undoubtedly a fairly debated environmental issue, but the biggest environmental situation detected is the disappearance of forests, which is also a consequence of global warming, because the forest has the capacity to absorb tons of carbon dioxide at the moment. respectively. in which massive deforestation is made, the amount of greenhouse gases increases. In this paper we will be able to observe the economic-ecological dysfunctions, generated when the forest is destroyed, we will also perform a quantitative, but also qualitative analysis of the forest area, how a forest can be managed in based on SWOT analysis, as well as creating certain strategies for combating and reducing deforestation, also, the identification of new ideas in preventing and stopping certain actions by which man leaves his mark on the natural space. Nowadays, the economic power has become greater than the ecological one, so that man no longer appreciates the natural space and prefers to think about the benefits that he can have for a short period of time, neglecting important aspects that in the long run will it produces certain natural disasters for its descendants.

Keywords: Forest, Risks, Resources, Biodiversity, Earth, Development.

Introduction

If we look at the general level of our country, Romania has a forest fund of about 6.3 million hectares, which represents 26.6% of the country's surface compared to Europe, where the average is 32%, we do not have this percentage an encouraging one. , but we can't even say it's dramatic. When we talk about the role of the forest in the economy, we refer to the main factor of ecological stability according to the legal regulations, because it is in direct relation with the territorial administrative units. (Antonescu, P., 1992). Forests have always had and will have a significant economic role in economic and social development, producing revenues from the exploitation of wood products and forestry. Even though

we do not currently have an impressive volume of forests, they fulfill many functions of a social and ecological nature. For our country, the economic function of the forest is of particular importance, as it is an indispensable resource for sustainable development.

Through its diversity, the forest is united in a huge reservoir of genetic information. Its value cannot be calculated or estimated, because not all species that are housed in virgin areas are known. Many of these species and varieties of plants contain certain principles that help treat incurable diseases. (Alexandru, B. & Alexandru, R. 2001).

Regardless of the area we are talking about, the importance of the forest ecosystem that maintains an ecological balance is very well understood or outlined. As mentioned above, the role of the forest has often been ignored with or without good science, receiving economic interests. The direct or indirect consequences in relation to local conditions are major.

Economic and ecological malfunctions generated by the destruction of forest

If we look at the situation of deforestation in a superficial way and what are the immediate benefits, in the short term we can highlight a valuable result regarding the capacity of the wood and the free land. It is also mentioned that a very high profit can be obtained in a very short period of time and at low costs, and here we refer in particular to certain deforestations that are not legal and contribute to the growth of the underground economy. , most of the time, it has poorly trained staff, sometimes even unskilled and that is rewarded for the value of the work done and there are no costs related to replanting the areas that have been eliminated. Viewed as a whole, but at the same time, careful, the deforestation situation is very worrying for the world economy and this is what researchers from all over the world say. In this case, the destruction of forests, but also other situations related to the deterioration of the environment and especially of the forest area, can halve the standard of living for many poor countries in the world and has the capacity to reduce global GDP by about 6, 8 % by 2050. (Antonie., J.)

All forest products have played throughout life on Earth and continue to play a particularly important role in the development of today's society compared to the role played by arable land or water. Currently, developing or developed countries continue to use timber for the construction of certain terraces or homes or even for the manufacture of paper. In developing countries, over 3 billion people rely on this wood raw material for cooking and heating, this industry being a very important part of the economy in most countries. Short-term economic gains that turn forest-occupied land into land used for agriculture or sometimes through over-exploitation of timber products often lead to loss of medium- and long-term incomes due to decreased biological productivity. Therefore, many areas whose development has focused in the past on the use of wood, presently face a major decline due to the substantial decrease of the incomes obtained from the smaller timber harvests. Analyzing the low areas of Romania, but also some warm areas from the planetary level, the drought, contributes to the degradation of the tree vegetation. Often, instead of the forest we find savanna or steppe vegetation, and the protective effect on the soil is quite low. Modifying the floristic structure by afforesting with species that develop very quickly and, at the same time, that help to obtain exploitable plantations in half time produces dysfunctions by modifying the biocenetic structure, and for example we can think of replacing the beech in the spruce floor. or pine whose root system is shallow, will clearly have negative chain effects. (Stoiculescu, C.D ., 1999).

Analyzing the low areas of Romania, but also some warm areas from the planetary level, the drought, contributes to the degradation of the tree vegetation. Often, instead of the forest we find savanna or steppe vegetation, and the protective effect on the soil is quite low. Modifying the floristic structure by afforesting with species that develop very quickly and, at the same time, that help to obtain exploitable plantations in half time produces dysfunctions by modifying the biocenetic structure, and for example we can think of replacing the beech in the spruce floor. or pine whose root system is shallow, will clearly have negative chain effects.
Another main role of forests that disappears through the phenomenon of clearing, which also has immediate effects, is the retention of dust in the air. It has been shown that one hectare of forest filters an average of 19-20 million cubic meters of air over a year, retains about 80 tons of dust and produces

up to 3500 tons of oxygen in a year. If we mention between the medium and long term effects, we can specify that the forests create a soil rich in humus, which means that a land that is graded after it has been reforested, but also after a long period of time, becomes again fertile. Desertification occurs when the amount of precipitation decreases considerably, sometimes reaching the limit. If the massive deforestation will continue repeatedly, these will be a disastrous situation, and in time, causing damage where there are accumulation lakes or even dams destroyed, followed by flooding downstream areas. (Vlad, I., Chiriţă, C., Doniţă, N., Petrescu, L.,1997).

Quantitative and qualitative analysis of forests in Romania

Quantitative and qualitative analysis consists of gathering, organizing and analyzing data, which are fundamental to all studies that use statistical data as a research methodology. Quantitative analysis is based on quantitative or numerical data and is very useful in interpretation because it offers quantifiable results that are easy to understand. Below we have taken into consideration a database from 1990 to 2017 to observe what are the changes made at the level of Romania regarding the state of the forests and what were the trends in these segments. The data are retrieved and analyzed from the website of the National Institute of Statistics.

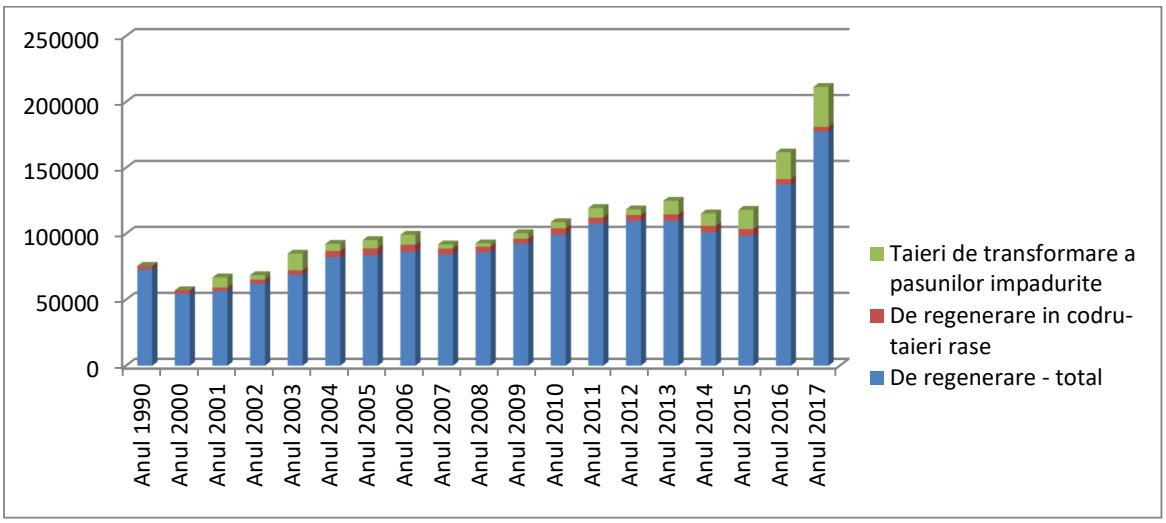

Source: National Institute of Statistics

Figure 1: The surface of the land from the forest fund is crossed by cutting by categories of cuts

Analyzing the graph above, it can be observed that the three categories analyzed throughout the period have the same trends. If at the beginning of the segment, the felled forests totaled about 72,915 hectares, the trend is increasing, but after the period of 2015, things became 177,296, approximately 3 times higher. From an increasingly complex desire for the recovery of wood, the grinding is an increasingly accentuated one for the purpose of industrializing and processing the wood in order to obtain cellulose, paper and furniture. Despite the clearing actions, the priority objective is the protection of forests and calls for an increasing number of forests and forest forests for their protection.

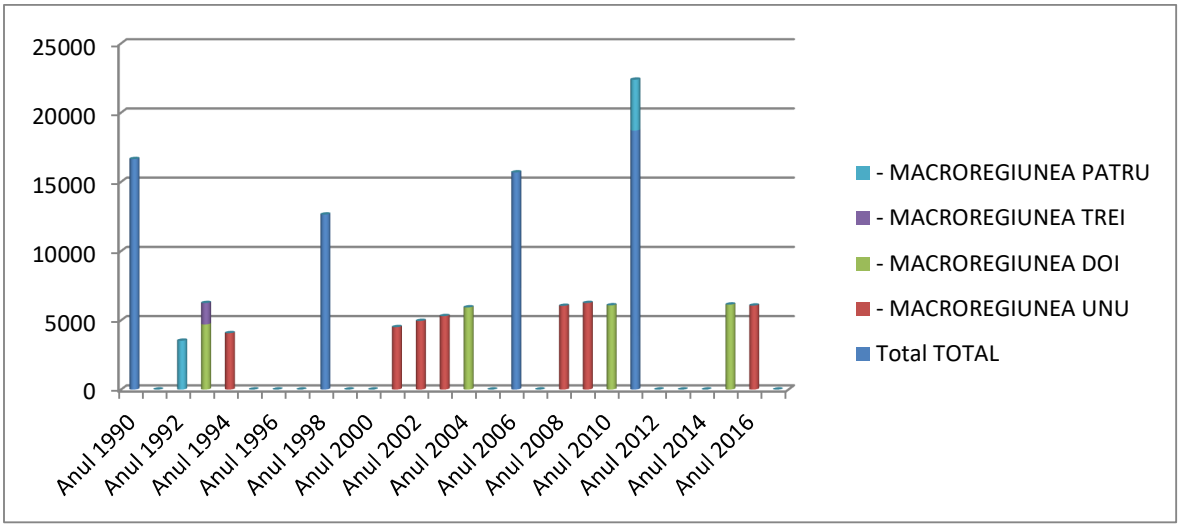

Source: National Institute of Statistics

Figure 2: The volume of wood harvested by species, macroregions, development regions and counties.

According to the graph above, we analyzed the evolution of the volume of wood that was harvested by species categories in the four regions of our country. Macroregion one is the most present on the graph, because here we refer to the North and West part of the country where the forest areas are still extended and here we find an important source of harvest. At the opposite pole is classified the region of the South West, because here the largest area of land is composed of plains and has not exceeded 4000 m3 harvested, only after 2004.

Analysis of the forest management practiced at national level

The promotion and recognition of certain complex values of the forest have become and continue to be a necessity especially after the way the technology evolved and the development of the transport infrastructure has allowed unlimited access to the forest resources. Over time, people from local communities have focused their attention on the resources acquired through forest ecosystems with a minor influence on the level of ecological balance. The local communities have used these resources that I mentioned earlier, for a good reason. The existence of resources such as construction, heating and food for food were the main reasons. Therefore, a shift has been made from the exploitation of forest resources that aim to meet subsistence needs, to commercial exploitation. Following this change, certain management principles were developed in the context of maintaining the forest environment as a provider of environmentally friendly products and services, not only as a raw material, as a wood source. Nowadays, wood represents the raw material that has been emphasized to a significant extent, the exploitation of wood being considered a controversial topic, discussed in depth among certain groups of people. (Oarcea, Z., 2016)

The economic development on a global level, especially in the last period, was done by ignoring certain effects it has on the environment (air, water, forest) and produces major changes in their entire structure. Human action that has been uncontrolled over nature, especially in recent decades due to the development of the industry, has sounded an alarm signal about the danger the environment is in and has tried to raise awareness of the global population to focus your efforts on maintaining a natural balance where the forest is the main instrument of the forest fund and plays a very important role. Also in the present situation have contributed the economic policies, which have been carried out in the last decades in this field and whose purpose was to reduce it by an abundant felling of forests that was

double-acted due to the fact that no measures were taken to reforest those areas, but also the existence of a legal framework for regulating specific modalities and actions carried out in this segment.

The efficiency of certain activities cannot be dissociated from a prior knowledge model of forestry situations. Wood contributes to the needs of the present population and future generations, influencing the life of the human being. All forest resources, regardless of the country of which they are a part, of their development stage or size, remain in the medium and long term, being vital from many points of view: ecological, social, economic, and in some situations, the survival of the community depends on they. In order for these assessments to be maintained for the generations to come, we need serious commitments from all those involved in forest management and its resources, but also to maintain a sustainable development concept. All the specialized studies that have been carried out internationally show that there is a close and dynamic link between economic development and forestry. The wood that is exploited and transported from the forest is marked and inventoried according to the forest rules in force and is attested by legal documents provided by government decisions. (Merce, O., 2016). In the specialized legislation, the forest regime is defined as a unitary type system with norms that have an economic, technical, forestry nature, protection against pests and regeneration of forests for a secure and sustainable management of forest ecosystems.

SWOT Analysis of Forest Management in Romania

STRONG POINTS	**WEAKNESSES**
• The value of natural capital that brings an added value in the quality of biodiversity; • We have very important sources of income due to the exploitation of forests ersity; • According to environmental factors, the existence of certain forest areas in our country is highly valued; • Arrangement of parks and natural reserves, while preserving the natural state of the forest bottom; • A network of forest roads that helps local communities; • • A very good property of the lands that are in the forest area.	• Treatment and establishment of inadequate policies to support environmental factors. • A rather low degree of environmental information management. • The landslides and soil erosion. • A very low price of the technical and economic indicators that contribute to the introduction in mountain areas and certain tourist destinations. • A very low irrigation concept, in this way, the water quality being compromised quite a lot. • Loss of productivity due to unfertile soils
OPPORTUNITIES	**THREATS**
• Adaptation of fiscal formalities for economic agents; • Creation of investments in environmental areas in ecological risk process; • Introduction and regulation of the environmental fund in Romania. • Continuous improvement of the quality of life; • Intensification of forested land to help protect and succeed with aid that reduces soil erosion processes.	• Impact and deterioration of the patrimony, if the existing regulations are not respected; • The increase of average temperatures in our country every year; • High costs to support environmental protection will affect the market economy; • Climate change and its impact on the green space that has been analyzed through several climate models globally. • After 2035, in the hill and low areas that are afforested at the present moor, there will be a significant decrease.

Regarding the above analysis, we can identify some major issues that we have to improve in the immediate period, if we want to save as much of Romania's forest territory as possible. Even if the statistics are worrying, every gesture we try to protect nature keeps us from disaster. Deforestation in the last period is very large and in areas of increasing extent, tens of thousands of hectares have been deforested, but even worse is the fact that the afforestation came with a delay of several years, and in some areas it is completely lacking.

Strategies to Combat Massive Deforestation

Romania is in the top of the European countries when the forested area is discussed, all of which take place under the eyes of the authorities. Our country has illegally cleared over 3,500,000 hectares of forest. All statistics show us the gloomy truth as we rank in the last place when the forested surface is brought into question. If we take the time back, at the beginning of the ninth century, Romania had a share of approximately 80% forest cover, and currently the area covered if it reaches 26%. With these conditions at hand, no one should be surprised by the fact that the weather names are from one extreme to another, floods and landslides more and more often, where many people have died. It is hardly possible to blame any particular person, but those who are in parliament even have a much greater power than any person who decides to act in this direction in a positive sense. At the moment there is no inventory to be carried out to keep the deforestation under control or a large national plan to combat this phenomenon. No one has any interest at this time for this data to be known by everyone, but the effects of deforestation can no longer be neglected. Due to the lack of a National Agency, illegal logging is encouraged. In the reserves of Romania natural resources are exploited, constructions are made, mass tourism, and the newest phenomenon is hunting. (Jalubă, Iuliana, 2013).

Pollution and deforestation are the main environmental situations that are felt by Romanians according to several studies. An objective that must come into view of Romania is to conserve the remaining or virgin areas regarding the implementation and promotion of sustainable management, in order to bring benefits in the medium and long term both to the environment and to the people. Many counties in the North and North West of the country have been cleared thousands of hectares, but no one received a certain punishment or if he received, it was not a very serious one. Wherever you try to explore the codri of Romania, it is close to impossible not to find without too much effort thieves who are in action. The authorities at the local level do not have the possibility to completely stop the clearing of illegal forests, because often, they are out of the situation or they are overlooked, which I think has determined to reach such statistics. Most of the times the commercial operators are protected by the court or personal property, where no one can access anyone, as long as there is no mandate issued by the specialized police bodies. For the poor areas, this phenomenon of clearing is the main source of economic growth. (Giurgiu, V., 1999).

Combating strategies for deforestation in Romania and a first solution that will have an effect is to stop the damage. World trade in mass volumes reached about $ 5 billion, and if anyone were to try to stop the flow, they would face many hostilities. It does not mean that a complete cut of the forest is necessary. All the schemes that are organized have a plan in place that helps keep them. Another very important step in stopping deforestation is informing and educating those people who directly or indirectly influence the fate of forests and subsequently of humanity. (Dinu, L., 2012).

Conclusions

The main causes that led to deforestation are a real ecological disaster that was produced by illegal logging of private forests, but also unprotected ones. Further measures must be considered to further prevent the destruction of what is left in the virgin or preserved areas of the environment, in particular forest areas. Looking back, the last 20 years do not have very good statistics, and the main reason from my point of view is the economic power that was much higher and viewed in the short term, without analyzing the consequences in the medium term, but more long-term choice. The dysfunctions related to the judicial system by analyzing the delay in resolving the cases and punishing criminal offenders

who commit certain crimes. From a managerial point of view it is necessary to create a new system of coordination and organization in the forest field by separating the activities.

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Corporate Cash Holding Determinants of Manufacturing Firms in Indonesia Stock Exchange

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Abstract

Cash holding is the most common form to reflect firm's liquidity. Most Indonesian firms' manager agreed that corporate hold an optimal amount of cash which maximizes shareholders' wealth and operational performance. According to the Powell (2018), most Indonesian's managers believe that there is relationship between growth opportunity, leverage, cash flow volatility, capital expenditure, and cash holding. Hence, werecognize to implement cash holding, required variables which has been examined by Powell (2018). Then this study is aimed to examine corporate cash holding determinants of manufacturing firms in IDX for period 2015-2017. The samples used are 81 manufacturing companies (243 firm-year observations) was selected using the purposive sampling technique. Our study find that leverage and capital expenditure have negative and significant impact toward corporate cash holding. While growth opportunity, cash flow volatility, and corporate governance with board independence as its proxy is found to have positive and significant impact to the corporate cash holding.

Keywords: Cash holding, CFO, Growth Opportunity, Cash Flow Volatility

Introduction

One of the most important financial management is to hold or use cash. As we have known, cash is the most liquid asset. And therefore, the amount of cash must be determined optimally. Financial management literature state if cash was excessive determined then firms has to bear the opportunity cost. Thus, with that amount of cash, firms will miss the opportunity to buy securities. On the other hand, if a firm deficit in cash then the firm fail to fulfill short term obligations. Therefore, optimal cash management is needed. To determine the optimum cash can be explained by three theories. First, the trade off model, the optimum amount of cash is when the marginal costs and marginal benefits of holding cash are the same or identical. Second, the pecking order theory, optimum cash determination is used to meet the availability of corporate funding sources. Third, free cash flow theory, the optimum determination of cash depends on the flexibility of the manager in allocating cash for projects that are considered still profitable.

As in other countries, it turns out that cash management contributes up to 75% of financial management functions. By the financial management functions, it includes investment management, which management uses cash to buy short-term securities, inventories, and recognizes the existence of accounts receivable. Investment management also means to meet capital budgeting needs or buy equipment and facilities that are long-term in nature. While to meet the cash needs, the company must be able to determine short term and long-term financing. In principle, financial management teaches in order to fulfill short-term investments, such as buying securities or cash equivalents, buying inventory and recognizing the existence of accounts receivable, it should be fulfilled with short-term obligations including trade debt and short-term bank loan. Meanwhile, to fulfill long-term investment needs, ideally it is fulfilled with long-term obligations, specifically the issuance of bonds

and fundraising from several creditors, both banks and non-banks for the long-term financing. Thus, the financial management principle adopted in cash management is to fulfilling short-term investment needs with short-term liabilities and in the same time, fulfilling long-term investment needs or capital budgeting using long-term obligations. This principle is often referred to as the principle of hedging, which means preventing the occurrence of congestion in investment financing both short and long term because the company could be wrong in using its types of obligations. The principle of hedging was also relevant to the precautionary motive of cash holding that had been known before.

In practice, Indonesian companies have made mistakes in cash management, that is during the 1997-1998 monetary crisis. Many CFOs from large companies tended to use short-term obligations to finance long-term investments. The severe condition is when short term liability used by those companies was denominated in foreign currencies. On the other hand, the types of long-term investments targeted were various projects that have a very high level of risk. The error in cash management mentioned above is also contributing to the bankruptcy of many companies listed on the Indonesian Stock Exchange in the era of the monetary crisis. Also, the bankruptcy of the company causing many banks and other financial institutions to collapse. Furthermore, after a period of economic recovery, many Indonesian companies began to reorganize their cash management policies by paying attention to the principles of true cash management. In practice, many companies have been asked to pay attention to the issue of current ratio when applying for loans to banks or when the company wants to issue debt or bond securities. The crucial point is, if the company wants to get credit, the position of the cash balance must be safe. Similarly, when you want to issue bonds, the company's liquidity position must also be safe. With the increasing number of companies that have managed to get loans from both local and foreign creditors along with the increasing number of companies that have successfully become bond issuers, it arises beliefs that some companies have successfully implemented ideal cash management.

Because of the progress in cash management that has been successfully carried out by Indonesian companies, it then encourages academics to do further studies. One of cash management progress is that many companies have succeeded in becoming debtors from several large foreign companies and also become bond issuers in IDX. One interesting study was conducted by Powell (2018) who did a survey of 250 companies in Indonesia to find out the determinants of cash management. This survey is very interesting because it was carried out towards the CFOs of the companies listed in IDX and found various determinants factors of cash management decisions. Based on the survey from Powell (2018), some important dimensions are found, companies tend to hold a lot of cash to avoid the risk of financial distress and bankruptcy. Also, companies with high future cash flow volatility tend to hold cash in excessive amounts to prevent underinvestment in profitable projects in the future. The most critical factor in cash management is balancing conditions where cash is not in the excessive or shortage level, which in practice the magnitude of its value cannot be observed directly. The amount of this value will depend on the company's unique characteristics, namely growth rates, debt position, volatility of cash flows, investment levels, and corporate governance issues. Thus, this research intends to prove the results of a study from Powell (2018) on the relationship between various unique characteristics of the company and cash management policies using empirical research designs. This should be done to reinforce the results of studies from Opler et al. (1999), Arfan et al. (2017), and Harford et al. (2008) in other countries that have succeeded in finding determinants of cash management, especially leverage and cash flow volatility. While in the case of Indonesia, based on the Powell (2018) survey, there were indications that capital expenditure and growth opportunities should be considered as determining factors for cash holding. Further, according to our opinion, it should also consider the issue of corporate governance as a determining factor because CFOs are in the ranks of decision making which have the power and authority to use or hold cash as the most liquid assets. Finally, as a differentiator with other studies we will pay more on manufacturing companies as the majority part of IDX to obtain a comprehensive picture of the profile and determinants of cash management policies. In general, this study will be divided into several parts, which the first sections are preliminary which have been discussed before, continue with an overview of the theories and relationships between variables, research methods, results and discussion, and last but not least the conclusions and implications of this study.

Literature Review

In this section, we provide the main theories of cash holdings. Then we highlight findings of Powell (2018) survey. Lastly, we develop alternative hypothesis to test empirically whether independent variables have impact towards cash holding.

Cash Holding Theory

a) Trade Off Theory

The trade off theory states that the company's cash level is optimal by balancing the marginal costs and marginal benefits of holding cash (Ferreira & Vilela, 2004). Dittmar, Mahrt-Smith, and Servaes (2003) explain two costs of holding cash, (1) if managers maximize shareholder wealth, the costs that arise are the low rate of return on other investments at the same level of risk, this kind of cost namely the cost of carry; (2) if the assumption of maximizing shareholder wealth is ruled out, then the cost of holding cash increases because managers have the opportunity to spend capital expenditure and acquisition spend or even in some countries corrupt. The benefits of holding cash according to Dittmar et al. (2003) arise from two motives. First, according to the motive of the transaction, the company holds a lot of cash when the cost and opportunity costs of cash shortages are higher. Second, the precautionary motive cash is based on the impact of asymmetric information about the ability to obtain funds.

b) Pecking OrderTheory

Companies will first fund investments with retained earnings, then with debt, finally with equity. The purpose of this funding sequence is to minimize the cost of asymmetric information and other funding costs. This theory suggests that companies do not have a specific cash level target, but cash is used as a support for retained earnings and investment needs. When operating cash flows are currently sufficient to fund new investments, companies will pay off debts and collect cash. Furthermore, if the retained earnings are not enough to fund the current investment, the company will use the cash that has been collected and if necessary, issue debt to fund the investment (Ferreira and Vilela, 2004).

c) Free Cash Flow Theory

Free cash flow predict that agents or managements will rather increase investment than returning cash to shareholders. Managers prefer cash because it can reduce risk and increase the authority of managers in making decisions. Companies that are more concerned with managerial authority tend to hold more liquid assets than are needed to maximize shareholder wealth (Opler et al., 1999). This kind of managerial authority can trigger agency costs. Agency costs are defined as costs arising from conflicts of interest between shareholders, bondholders, and managers that include incentive costs for managers to maximize shareholder wealth and monitoring costs for shareholders to observe whether managers work according to shareholders' desire (Jerzemowska, 2006).

Hypothesis Development

Based on the research that has been done before, it can be specified the variables that contribute to the determination of the corporate cash holdings as follows: growth opportunities, firm's size, cash flow volatility, leverage, capital expenditure, research and development expenditure, net working capital, profitability, dividend payment, and corporate governance. However, this study refers to the survey conducted by Powell (2018). The survey results found that around 70% of managers agreed to a positive relationship between growth opportunities and cash holding. Firms with abundant growth opportunity tend to hold higher level of cash to segregate capital expenditures from the volatility of future internal cash flow. Another finding is that firms with higher growth opportunity hold higher level of cash because these firms want to maintain their competitive position and in accordance to

free cash flow theory, when a firm has greater investment opportunities, managers prefer to hoard large cash balances to provide discretion in their firm's spending and capital expenditure decision.

Further, survey results indicate that 57% of managers agreed on a positive relationship between leverage and cash holding. This positive finding supports the view of trade off theory, which states leverage increase the possibility of financial distress or bankruptcy (Ozkan & Ozkan, 2004). Hence, firm with high level of leverage should hold high level of cash to reduce the default risk. The survey also found that 80% of managers agreed that cash flow volatility and cash holding had a positive relationship. The higher the variability of cash flow, the higher level of cash will be hold by a firm. The purpose of holding such high level of cash is to prevent the possibility of cash shortages in the future when profitable project is available. Managers want to reduce the underinvestment problem where as in the condition they have to give up on profitable project because there has no enough internal funds.Another important finding that underlying the selection of this research variable is that 12% agreed managers increase cash holdings to increase the freedom of expenditure and capital expenditure decisions.

This finding concludes that the higher the company's cash level, the higher the capital expenditure. It can happen because the cash is used to finance capital expenditure. Furthermore, if cash is used to finance capital expenditure then firms will be likely to have fewer resources to collect cash. Bates et al.(2009) asserts if capital expenditure creates assets that can be used as collateral, then capital expenditure can increase debt capacity and reduce demand for cash. According to Harford et al.(2008), cash allocation policy related to managers and shareholders. It is important to examine whether this cash will be distributed to the shareholders, spent by the company, for external procurement or held as a firms' safety margin. Because of these considerations, it is interesting to study how corporate governance can influence the company's cash management policies. Lastly, to sum up, we then focus to test whether growth opportunity, leverage, cash flow volatility, capital expenditure, and corporate governance are the determinants of corporate cash holding.

a) Growth Opportunity and Corporate Cash Holding

Trade off theory postulates and predict a positive relationship between growth opportunity and cash holding (Ozkan & Ozkan, 2004). Firms with high level of growth opportunities tend to have higher bankruptcy cost. Hence, these firms will hold more cash to reduce the possibility of cash shortages and prevent uncertainty of internally generated cash flow. Growth opportunity is measured by by dividing (book value of total assets - book value of equity) plus the market value of equity and book value of total assets, where the market value of equity (MVE) is calculated by multiplying the closing stock price with the number of shares outstanding (Frank & Goyal, 2004). Then we can formulate the alternative hypothesis as follow:

H1: Growth opportunity is positively related to corporate cash holding.

b) Leverage and Corporate Cash Holding

Firms with higher level of leverage will face higher cost in liquid assets investment. This context explains if leverage is used up to increase cash balances. Thus, to reduce the cost, firms has to lower the cash balances. Therefore, by following the pecking order theory we assume that there is a negative relation between leverage and cash holding. Leverage is measured by total liabilities of total assets. Then we can formulate the alternative hypothesis as follow:

H2:Leverage is negatively related to corporate cash holding.

c) Volatility and Corporate Cash Holding

Volatility of cash flow implies that there is possibility to have cash shortages in the future. Trade off theory postulates there is positive relationship between cash flow volatility and corporate cash holding. Higher cash flow volatility of a firm will hold higher cash to reduce the possibility of cash shortages in the future. This positive result was found in Guizani (2017) research. Cash flow

volatility is measured by dividing standard deviation of 5 years operating cash flow and average total assets. Then the alternative hypothesis could be formulated as follow:

H3: Cash flow volatility is positively related to corporate cash holding.

d) Capital Expenditure and Corporate Cash Holding

Generally, one of the cash allocations is capital expenditure. In accordance with pecking order theory, firms with high level of capital expenditure will be financed by cash. As explained before, if capital expenditure creates assets that can be used as collateral, then capital expenditure can increase debt capacity and decrease demand for cash (Bates et al., 2009). And hence, the higher the capital expenditure the lower the cash holding. Capital expenditure is measured by the ratio of net fixed assets to total assets. Then the alternative hypothesis could be formulated as follow:

H4: Capital expenditure is negatively related to corporate cash holding.

e) Corporate Governance and Corporate Cash Holding

The weaker the corporate governance, the lower the cash will be held, and vice versa, the stronger the corporate governance, the higher the cash holding (Harford et al. 2008). Strength or weakness of corporate governance can be determined by board independence (ratio of total independent directors and total directors) and board size (ratio of total directors and logarithm of total assets). If a firm owned at least 1/3 of independent directors and on average 9 directors overall then the firm has strong corporate governance (Osei, 2014). Then we can formulate again the alternative hypothesis for two proxies of corporate governance respectively as follow

H5a: Corporate governance by board independence is positively related to corporate cash holding.
H5b: Corporate governance by board size is positively related to corporate cash holding.

Methodolgy and Data

a) Data

This study employed manufacturing firms listed on Indonesia Stock Exchange as data with period spanning from 2015 to 2017. The purposive random sampling method was adopted in this study. Samples used in this study has to fulfilled few criterias as follows (1) listed in IDX; (2) listed at least since 2011 till 2017; (3) listed have audited financial statements since 2011 till 2017; (4) financial statements denominated in Rupiah currency. Though the period of study is starting from 2015 but 2011 data are needed due to measure the cash flow volatility variable. Thus, based on the above criteria, 81 manufacturing firms chosen as sample out of 163 listed manufacturing firms. This study used the panel data as it combines time series of data for the 2015-2017 and cross section data of 81 companies. Since the study investigates 81 companies for three-year study period, the total number of observations of the study was 243 years observations.

b) Variable Measurements

This study conducted five main independent variables (growth opportunity, leverage, cash flow volatility, capital expenditure, and corporate governance) and one dependent variable (corporate cash holding). The measurement of each variable is presented in Table 1.

Table 1: Variable Measurements

Variables	Measurements	References
Cash Holding	$\frac{Total\ CE}{(TA - Total\ CE)}$	Guizani (2017)
Growth Opportunity	$\frac{BV\ of\ TA - BV\ of\ Equity + MVE}{BV\ of\ TA}$	Wasiuzzaman (2014); Frank & Goyal (2004)
Leverage	$\frac{Total\ Liabilities}{Total\ Assets}$	Wang& Chang (2014)
Cash Flow Volatility	$\frac{Std\ of\ Annual\ OCF\ (5\ years)}{Average\ TA\ (5\ years)}$	Wasiuzzaman (2014); Ozkan & Ozkan (2004)
Capital Expenditure	$\frac{NFA}{TA}$	Arfan *et al.* (2017)
Corporate Governance	$BS = \frac{Total\ Directors}{Log\ TA}$	Harford, Mansi, & Maxwell (2008)
	$BI = \frac{Independent\ Directors}{Total\ Directors}$	

Note: Where CE is Cash and Equivalents; TA is Total Assets; BV is Book Value; MVE is Market Value of Equity; Std is Standard Deviation; NFA is Net Fixed Assets; BS is Board Size; and BI is Board Independence. All the measurements used in this study was adapted from few references as written in Table 1.

c) Analysis Method

This study adopted the Generalized Least Square (GLS) panel regression analysis based on fixed effect model estimation. Since this study using panel data which combines time series and cross section, so the regression equation was structured as follow:

$$CH_{it} = \beta_{11}D_{1i} + \beta_{12}D_{2i} + \cdots + \beta_{1,81}D_{81i} + \beta_2 GO_{2it} + \beta_3 LEV_{3it} + \beta_4 CFV_{4it} + \beta_5 CAPEX_{5it} + \beta_6 CG(BI)_{6it} + \beta_7 CG(BS)_{7it} + e_{it}$$

Where CH represents corporate cash holding, β_1 is the constant of the equation, GO represents growth opportunity, LEV is the leverage, CFV is the cash flow volatility, CAPEX is the capital expenditure, CG(BI) is the corporate governance measured by board independence, and CG(BS) is the corporate governance measured by board size.

In addition, this study will provide descriptive statistics of each variables, hypothesis testing, and multicollinearity and autocorrelation diagnostic. And also, to control the autocorrelation and heteroscedasticity problem, we conducted cross section weight and heteroscedasticity-consistent standard error in the regression analysis by using Eviews 3 and 9 version.

To test the hypothesis, p-value will be shown, and if the p-value is lower than the significance level, the formulated alternative hypothesis is accepted. In contrast, if the p-value is higher than significance level, alternative hypothesis is rejected. In order to diagnose multicollinearity, this study using correlation coefficient between each independent variable, if the correlation coefficient below 0.8 then we assume regression is free from multicollinearity (Gujarati & Porter, 2010). Finally, to

check the autocorrelation problem, we use Durbin Watson statistics, if the result around two, then it is free from the autocorrelation problem.

Empirical Results and Discussion

a) Descriptive Statistics

In this section will be presented the results of descriptive statistic tests of all variables both dependent and independent. Descriptive statistical measurements include mean and standard deviation as shown in Table 2**.** In the following table, the average value of cash holdings from 81 companies is 0.149187 with a minimum value of 0.000416 and a maximum value of 1.721276. Variation of mean value might be influenced by the different cash management policies of each company. Some companies may hold too little cash, but other may hold too much cash. Judging from these varied values, it also increasingly convinced us that it was necessary to conduct research on corporate cash holding. Next will be discussed the descriptive statistics of other independent variables expected to having an influence on the corporate cash holdings.

As shown below, differences in mean and standard deviation of each variables are not significant, unless the growth opportunity (GO). The large standard deviation in this independent variable compared to other variables is caused by fluctuations in closing stock prices and including stock splits (splitting the number of shares into more with lower nominal prices) by several companies. For example, the highest growth opportunity value (60.66348) owned by MYOR company in 2015, then it dropped to 3.36138 in 2016. This drastic decline was due to the year of 2016, MYOR company did stock split. Standard deviation of the growth opportunity variable is much larger because there are fluctuations in the closing price in some companies and some of them did stock split during the period in this study. The growth opportunity which then calculates the market value of equity is certainly influenced by those two incidents.

Descriptive statistical values that must be considered are corporate governance variables measured by board independence. Board independence in this study is measured by dividing the total independent directors by the total directors in a company. So that the minimum value of this variable which shows the number 0.000000 also means that some certain companies in the study period spanning from 2015 to 2017 reported no single independent director in their audited financial statements.

In addition, when collecting data to test H5b, the number of directors from 81 companies during three study periods was an average of five directors. Based on the explanation in the hypothesis development section, that the range of total directors for a company to be said having strong corporate governance should have an average number of directors of nine people. Hence, it is concluded that the majority of manufacturing companies in Indonesia still in a weak corporate governance system.

Table 2: Descriptive Statistic

Variables	Mean	Std. Dev.	Min.	Max.
Cash Holding (CH)	0.149187	0.259722	0.000416	1.721276
Growth Opportunity (GO)	2.115853	4.782888	0.304145	60.66348
Leverage (LEV)	0.447742	0.198206	0.091390	0.917341
Cash Flow Volatility (CFV)	0.062915	0.053227	0.000237	0.443634
Capital Expenditure (CAPEX)	0.385734	0.196335	0.035695	0.907350
Board Independence (BI)	0.124596	0.132790	0.000000	0.666667
Board Size (BS)	0.423451	0.196222	0.163892	1.296652

Note: Std. Dev. namely standard deviation of the data collected; Min. is the minimum level from all data collected; while Max. is the maximum level from all data collected.

Multicollinearity is a phenomenon of perfect correlation between one independent variable and another independent variable. The criteria used in this test, if the correlation value between independent variables has been tested < 0.8, this study is free from the problem of multicollinearity. Shown in Table 3 that the correlation value between independent variables is less than 0.8 so it is concluded that the sample of this study is free from multicollinearity problems. In addition, in Table 4 this regression model produces a DW value of 2.191951, the DW stat is around two, so it is free from the problem of autocorrelation.

Table 3: Multicollinearity

Variables	GO	LEV	CFV	CAPEX	BI	BS
GO	1.000000	0.012226	0.127362	-0.053242	-0.135987	0.114998
LEV	0.012226	1.000000	0.175918	0.192262	0.028946	-0.132280
CFV	0.127362	0.175918	1.000000	-0.095452	-0.054979	-0.101320
CAPEX	-0.053242	0.192262	-0.095452	1.000000	0.179557	0.023673
BI	-0.135987	0.028946	-0.054979	0.179557	1.000000	-0.113618
BS	0.114998	-0.132280	-0.101320	0.023673	-0.113618	1.000000

Note: GO is the Growth Opportunity; LEV is the Leverage; CFV is the Cash Flow Volatility; CAPEX is the Capital Expenditure; BI is the Board Independence; and BS is the Board Size. With 5% significance level, all variable independents show no multicollinearity problem.

b) Panel Regression Model Results

As explained before, to test the developed hypothesis in this study, we conducted few estimation models including common effect, fixed effect, and random effect. Each of the estimation model was then tested with no weight and cross-section weight method namely Generalized Least Square (GLS), except for the random effect estimation, because the estimation itself is a GLS model. By going through five model testing (two common effect model, two fixed effect model, one random effect model) as seen in Table 4, we then sum up fixed effect model with GLS method is the best fit to test all formulated hypothesis. Lastly, we apply White Heteroscedasticity-Consistent Standard Errors and Covariances to the regression analysis which according to Hayes and Cai (2007) the Heteroscedasticity-Consistent Standard Errors can be used to minimize the autocorrelation and heteroscedasticity effect of regression analysis.

Table 4: Different Panel Regression Model

Variables	(1)	(2)	(3)	(4)	(5)
GO	0.0004 (0.8879)	0.0010 (0.0003)	0.0005 (0.6883)	0.0010 (0.0193)	0.0005 (0.7076)
LEV	-0.4951 (0.0000)	-0.3820 (0.0000)	-0.1293 (0.1061)	-0.0928 (0.0000)	-0.2364 (0.0006)
CFV	-0.0755 (0.7864)	-0.0213 (0.6697)	-0.0225 (0.9541)	0.1144 (0.3488)	-0.1337 (0.6581)
CAPEX	-0.4051 (0.0000)	-0.3136 (0.0000)	-0.8977 (0.0000)	-0.8318 (0.0000)	-0.6830 (0.0000)

BI	-0.0760 (0.4938)	-0.0554 (0.0230)	0.4063 (0.0003)	0.3108 (0.0000)	0.2686 (0.0052)
BS	-0.0432 (0.5644)	0.0518 (0.0063)	0.0082 (0.9508)	0.0019 (0.9481)	-0.0033 (0.9714)
DW Stat	0.186397	0.177350	2.221518	2.191951	0.131291
	Significant at 5%			No autocorrelation	

Note: (1) common effect-no weight; (2) common effect-cross section weight; (3) fixed effect-no weight; (4) fixed effect-cross section weight; (5) random-effect. If only assess significant influence, then model (2) is the best suit, but we also consider the problem of classical assumptions, namely autocorrelation, so that model (4) is the most suitable model to be applied among other models. Then to test the hypothesis empirically, model (4) was developed again by applying the White Heteroscedity-Consistent Standard Errors to minimize the impact of heteroscedasticity problems in the regression model.

In Table 5 we present the coefficient and p-value to shows the effect of each independent variable on the corporate cash holding variable. The positive and negative effects of each variable are seen from the sign of the coefficient value, if the value of the coefficient is positive then the change in the independent variable will increase the dependent variable, and if the coefficient value is negative then the change in the independent variable will decrease the dependent variable. Where as to see whether the influence is significant or not can be seen from p-value, if the p-value is less than the level of significance (Sig. Level), the alternative hypothesis is not rejected, but if the p-value is more than the level of significance, the alternative hypothesis is rejected. In the following paragraphs, discussion of hypothesis testing results will be presented.

Table 5: Results of Hypothesis Testing

Variables	Coefficients	P-value	Diagnostic Test
GO	0.001005	0.0000	F-test = 0.0000 Adj. R^2 = 0.929586 DW = 2.191951 Sig. Level = 0.05
LEV	-0.092839	0.0000	
CFV	0.114427	0.0042	
CAPEX	-0.831820	0.0000	
BI	0.310810	0.0000	
BS	0.001914	0.8240	

Note: GO is the Growth Opportunity; LEV is the Leverage; CFV is the Cash Flow Volatility; CAPEX is the Capital Expenditure; BI is the Board Independence; and BS is the Board Size. The coefficient explains the sign of the influences of each independent variable toward corporate cash holding. P-value is the probability value which determined whether each independent variable has significant impact toward corporate cash holding. F stat is the probability value of Anova test. Adj. R^2 is the value of Adjusted R Square which determine proportion of corporate cash holding explained by all independent variables. DW is the Durbin Watson Stat to detect autocorrelation problem. Sig. Level is the level of significance applied in this study.

c) Each Alternative Hypothesis Testing Result

c.1) Growth Opportunity and Corporate Cash Holding

From the results of data processing, we can not reject the alternative hypothesis that growth opportunity is positively related to corporate cash holding so that H1 is supported . Growth opportunity as measured by market-to-book ratio, shows a company investment opportunity in projects that have a positive NPV. The positive relationwas found because companies with high growth opportunity are expected to have high bankruptcy costs and hence tend to hold more cash.

Companies that have many investment opportunities will also have a high risk so that the possibility of financial difficulties is also high. Therefore, companies will hold large amounts of cash to avoid the possibility of the crisis. Next reason for the firms with high growth opportunity will hold more cash is to avoid future cash shortages when the cash planned to be spent. This too support to the precautionary motive of holding cash, which states the company holds cash to avoid future cash shortages. If the company lacks cash which is so called source of internal funds, the company must look for external funding sources that are expensive. Therefore, companies with high growth opportunity will hold more cash in order to reduce the risk of cash flow shortages and reduce the cost of acquiring expensive external funding sources.

c.2) Leverage and Corporate Cash Holding

Leverage as a reflection of a company that relies on debt as one of the funding sources measured by total liabilities divided by total assets, is found negatively related to corporate cash holding as supported H2. This negative relationship shows that leverage is seen as a substitute for holding cash because leverage is considered as a measure of a company's ability to issue debt. Firms that are too focused on using debt as their main funding source, tend to hold less cash. In line with the pecking order theory that companies with high leverage will pay more expensive fees when the debt is used to invest in liquid assets and therefore must reduce cash holdings. Companies with high leverage will hold less cash because the purpose of obtaining the debt is not to be invested in cash but to increase their own capital needed to increase the company's sales. To strengthen the results of hypothesis testing, researchers added data on manufacturing companies from sub-sectors of consumer goods. Data added in the form of growth values from accounts payable and sales. Researchers want to prove that the increase in account payable (debt) aims to increase the company's sales.

As shown in Table 6**,** it can be seen that increases and decreases in account payable can increase and decrease company sales as well. For example, the CEKA company, from 2015 to 2016 there was an increase in payable accounts from minus 15.12% to 25.39%, sales of the company also increased in the same period from minus 5.84% to 18.07%. This proves that companies increase debt to increase sales not only to increase cash. So that the results of the study concluded that the increase in leverage reduces the ownership of cash because the debt aims to increase sales.

Table 6: Additional Data for testing Relationship Between Leverage and Corporate Cash Holding

	Account Payable (Growth)			*Sales (Growth)*		
KODE	**2015**	**2016**	**2017**	**2015**	**2016**	**2017**
APLI	-50.61%	171.22%	69.16%	-11.36%	33.20%	10.09%
CEKA	-15.12%	25.39%	20.60%	-5.84%	18.07%	3.46%
FASW	-54.83%	48.30%	39.34%	-9.11%	18.44%	24.89%
IMAS	-8.17%	-36.78%	92.43%	-6.98%	-16.85%	2.06%
INCI	70.04%	92.32%	42.38%	24.22%	28.83%	53.18%
MYOR	24.31%	30.02%	29.15%	4.58%	23.83%	12.35%
RICY	-10.20%	51.90%	185.38%	-6.28%	9.94%	31.02%
ROTI	27.12%	8.01%	-12.98%	15.65%	15.98%	-1.22%
VOKS	-19.95%	23.58%	39.17%	-20.25%	26.58%	11.67%

c.3) Cash Flow Volatility and Corporate Cash Holding

Cash flow volatility, which is defined as the level of uncertainty in the cash inflows and outflows of the company, is predicted to have a significant effect with a corporate cash holding at a 5% significance level and is positively related to corporate cash holding. So we can support H3. Volatile cash flows reflect financial uncertainty in the future, firms with high volatility in cash flows will hold more cash to anticipate future financial shortages. Cash flow volatility can also mean that a company

cannot allocate cash usage appropriately, especially for company operating activities because the variable cash flow volatility is calculated by the standard deviation of cash flows generated from the company's operations. Companies with high volatility in cash flow will hold more cash to avoid a cash shortage that can be used to finance the company's operations. If a company fails to generate cash that can finance operational activities, then the company is at risk of failing to achieve business continuity goals.

c.4) Capital Expenditure and Corporate Cash Holding

Capital expenditure is used to invest in certain fixed assets that can generate profits for the company. With a 5% significance level, we do not reject the fourth hypothesis that the capital expenditure variable was found to have a negative and significant effect on the company's cash holding. Thus H4 is supported. This negative influence is in line with the predictions of the pecking order theory, which states that companies will use the cash they have to finance capital expenditures. Companies with high levels of capital expenditure tend to be financed with cash, and therefore the company's ability to collect cash is also reduced. Additionaly, capital expenditures are often used to produce assets that can be used as collateral, so a high level of capital expenditure consumes more cash. The illustration reflects the negative influence of capital expenditure variables on corporate cash holdings.

c.5) Corporate Governance and Corporate Cash Holding

The results of the study indicate that the hypothesis of the effect from corporate governance as measured by board independence, H5a is not rejected at the 5% significance level. Corporate governance variables with board independence measurement have a positive effect on cash holding. Our findings support the view that stronger corporate governance tended to hold more cash. Companies with more independent directors will hold more cash. The tendency to hold more cash is due to the company's operational activities. Board independence provides better shareholder protection, thereby reducing agency costs from holding cash. So that companies with more independent directors will hold more cash and therefore have a positive effect on cash holdings. But the contradictory results were found by Wasiuzzaman (2014) who stated that there was a negative influence, arguing that the more independent directors on the board, the managers were subjected to further checks and could not accumulate cash for personal gain. This result shows the effectiveness of independent directors in controlling the level of cash held by the firm.

While corporate governance variables measured by board size, the results of the study indicate that the hypothesis, H5b was rejected at the 5% significance level. The reason for rejecting the hypothesis is because the probability value shows a non-significant effect but produces the same direction as the hypothesis formulated in the previous section. In the context of Indonesia's manufacturing firm which shows to have weaker corporate governance system, with a positive influence on corporate cash holding, we support our hypothesis that weaker governance tended to hold less cash. This is due to the way how a company would allocate its cash. The more boards of directors of a company reflects the more agents a company has. Agents will prefer to hold lots of cash in order to increase the freedom making cash allocation decision. Thus, this positive effect is explained that companies with large board size (the number of directors) are increasing their cash holding because it can increase agents' discretionary power for the investing decision making that benefit themselves but disserve the shareholders.

d) Discussion of Hypothesis Testing Result

In this section we will discuss the comparison between current research with previous research by three researchers, namely: 1) Ozkan and Ozkan (2004) conducted a study of the determinants of cash holding in companies in the UK using the Generalized Method of Moment (GMM) regression; 2) Arfan et al. (2017) conducted a research on the determinant factors of cash holding in manufacturing companies in IDX using the GLS model; 3) Harford et al. (2008) which examined the effect of corporate governance on corporate cash holding on US companies.

Table 7: Comparison of Recent and Previous Studies

Each Variables of Hypothesis Testing	Our Study (2020)	Ozkan & Ozkan (2004)	Arfan et al. (2017)	Harford et al. (2008)
GO → CH	0.001005 *0.0000	0.027 *0.010	0.546 **	
LEV → CH	-0.092839 *0.0000	-0.324 **0.042	-0.197 **	
CFV → CH	0.114427 *0.0042	0.084 *0.125		
CAPEX → CH	-0.831820 *0.0000		-0.198 **	
BI → CH	0.310810 *0.0000	-0.037 *0.033		-0.021 0.33
BS → CH	0.001914 *0.8240			-0.035 0.99

*Note: Recent study is comparing to Ozkan & Ozkan (2004); Arfan et al. (2017); Harford et al. (2008) by the coefficient value and p-value in different significance level which * shows 5% level and ** shows 10% level.*

The growth opportunity variable as shown in Table 7 which provide a comparison of the results between current research findings and previous researchs turned out to have the same effect on the corporate cash holding which is positive. So that the change in one growth opportunity unit will increase cash holding by the coefficient value presented according to each study. The results of this study are similar to the results found by Ozkan and Ozkan (2004) and Arfan et al. (2017). The leverage variable also shows the same negative effect on the corporate cash holding either recent study or previous study conducted by Ozkan and Ozkan (2004) and Arfan et al. (2017). However, both previous studies were significant at 10% level. The higher the significance level it means the less percentage that the hypothesis is true. So, comparing to both previous studies, we are sure that our findings are more accurate. Looking down to the cash flow volatility variable, which comparing to Ozkan and Ozkan (2004), it shows the same direction from the coefficient value and significant at 5% level. Cash flow volatility proved to have positive effect on corporate cash holding.

Next up, the capital expenditure variable shows the negative influence towards corporate cash holding both recent study and Arfan et al. (2017) study. Yet both study's result conducted in two different significant level which recent study using 5% level and Arfan et al. (2017) used 10% level. On the contrary, corporate governance which measured by board independence, compare to Harford et al. (2008) shows the different sign on coefficient value. Harford et al. (2008) found that the more independent directors in a firm the less level of the cash holding. Lastly, corporate governance which measured by board size, compare to Harford et al. (2008) also show the different effect on corporate cash holding. We find positive effect however Harford et al. (2008) found negative effect. To sum up, the influence of corporate governance on corporate cash holding still can not be precisely predicted.

Conclusion and Suggestion

Conclusion

This study was conducted to determine the factors that determine the level of cash holding manufacturing companies listed on the Indonesia Stock Exchange in the period 2015-2017. Through sample selection techniques, purposive sampling, with the criteria needed by researchers in completing this paper, produces 81 manufacturing companies with various sub-sectors. The total observations found in this study were 243 observations with 81 companies in three years.

The determinants of corporate cash holding examined in this study consisted of growth opportunity, leverage, cash flow volatility, capital expenditure, and corporate governance. The measurement of corporate governance variables used in this study to explain the effect of corporate governance on

corporate cash holding is board independence and board size. Thus, it has been proven the hypothesis that the growth opportunities variable has a positive influence on corporate cash holding, leverage has a negative influence on corporate cash holding, cash flow volatility has a positive influence on corporate cash holding, capital expenditure has a negative influence on corporate cash holding, and corporate governance with board independence proxy has a positive effect on corporate cash holding.

a) Suggestion

Regarding the results of this study, the researcher will provide some suggestions that could be useful for other researchers, namely as follows:

1) For other researchers, it is recommended that the selection of research subjects not only be limited to one company sector, so as to strengthen and complement previous research.
2) For other researchers, it is suggested that examining the independent variables other than those that have been proven to have a significant effect in this study.
3) For other researchers, if you want to examine the effect of the leverage variable on a corporate cash holding can show data that increased leverage is used to increase sales and not to collect cash.
4) For other researchers, it is suggested that separate corporate governance variables and other independent variables in determining the level of the company's cash holding. Related to the context of corporate governance variables themselves are very broad and very many measurements.
5) For companies, it is recommended that they be able to work with other academics in providing a real picture of what determinants have an important role in the policy of determining a company's optimal cash level.

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The Special Section "Pricing And Price Policy of The Companies' Price Structure and Features of Legal Regulation of Setting The Amount of Tax Payments, Allowances and Discounts in The Price of Goods

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Annotation

The essence of the price is expressed in its functions; one of the most important of them is the distribution. With pricing established national income is distributed between the market actors. This distribution is multiplicative. Fiscal multipliers show the impact of discretionary changes to core budget indicators and allow you to form sound economic policy. The purpose of the study to determine the optimal allocation mechanism established the national product among the market agents based on price ad valorem, specific and complex taxes. Authors in the study used a VAR model to calculate the magnitude of the fiscal multiplier generated by the value added tax (VAT) and excise duty (A).
Existing pricing models no longer cope with the emerging challenges of efficient distribution and modalities for the accounting of internal and external factors. Therefore, when creating a pricing policy increasingly turn to the tax agreements, providing for a deviation from the tax pricing.

Keywords: Fiscal Multiplier, Pricing, Budget Rule Pricing Models, Taxes, National Product.

Introduction

Price is the monetary expression of costs and benets plus social, political, and other effects, as wrote A. Marshall. The essence of the price is expressed in its functions; one of the most important of them is the distribution. With pricing established, the national revenue is divided by market actors. This distribution is multiplicative. Fiscal multipliers show the impact of discretionary changes in the main fiscal indicators. Knowledge of fiscal multipliers allows generating an optimal economic policy, since for the last decade, there has been a weakening of the budgetary policy in many countries. Fiscal multipliers show the direct impact of fiscal policy on the change (growth) of GDP.

Over the last decade in the world, there are many methods of calculation of fiscal multipliers. However, so far not identified the benchmark. Gimpelson V. and others, (2015) believe that the research results largely depend on the used class of models for the estimation of fiscal multipliers. Among empirical methods of evaluation, there are two basic vector autoregression (VAR), the model that was used by the authors, and dynamic stochastic General equilibrium model (DSGE). In one of the most famous works of J. E. Arias, Rubio-Ramírez J. F., D. F. Waggoner (2014) uses the theoretical concepts of the authors to construct the structural shocks and the determination of their impact on GDP growth. Favero, Giavazzi (2012), Baum A., Poplawski-Ribeiro M., Weber A. (2012), summarized the researched features of various countries, and identified non-linear behaviour of fiscal multipliers in different phases of the business cycle is Auerbach, Gorodnichenko (2012). Anderson D., B. Hunt, M. Kortelainen, M. Kumhof, Laxton D., Muir D., Mursula S., S. Snudden (2013) investigated the VAR model and the "average" response of GDP to shocks of fiscal policy and the multipliers obtained through them, they are usually used when the economy is close to "normal". When the state of the economy is significantly different from "normal", the more effective can be the estimates obtained using DSGE models.

Methods of Research

An overview of DSGE models is presented in Gechert S., Will H. (2012). The presence of a significant number of countries that do not have a sufficient number of observations for qualitative analysis prompted the IMF to create a simplified method of calculation of the total fiscal multiplier based on the evaluation of a set of determinants that determine its value.

Authors in the study used a VAR model to calculate the magnitude of the fiscal multiplier generated by the value added tax (VAT) and excise duty (ED):

$$Y_t = \mu_t + nB(F_i) * Y_{t-1} + \mu_{t-1} \quad (1),$$

Where, Yt - GNP;
n - Fiscal multiplier calculated according to the methodology of the Ministry of Finance;
F_iendogenous and exogenous variables: state of the business cycle; development of financial markets; reaction to monetary policy shocks; exchange rate regime; amount of debt; the effectiveness of tax administration, etc. .;
μi is a constant at each time lag.

As noted above, one of the price distribution functions. In the price model, there are taxes that cause the strongest animated effect; this is the value added tax (VAT) and excise tax (A). Price models cover all areas of activity. Let us dwell on the most common. The Tax Code, Figure 1, determines the first two models and their elements

C	P	Pcp	ED	VAT	CCH	TN
Price for calculating the commodity products of the organization (enterprise)						
Amount for excise duty (A)						
Wholesale price of the organization (WP)						
Intermediary price (IP)						
Retail price (RP)						

Fig . 1: Tax pricing model or price model for industrial товаров economic goods.

Designations in the figure[1]:

C - Costs or cost;
Pcp- Price for calculating the commodity products of the organization (enterprise)
P - profit;
ED - excise tax;
VAT - value added tax;
CCH - premium intermediary;
TN - retail chain premium.

An entrepreneur (seller) can set any price level, but cannot change model elements. The taxes laid down in the model form the tax multiplier. Consider the process of pricing according to the system shown in Figure 1. The calculation is summarized in table 1.

[1] Tax code of the Russian Federation (part two) " from 05.08.2000 N 117-FZ (as amended from 29.12.2019)

Table 1 – Price calculation for goods of various categories

Name of goods	**C**	**P**	**P %**	Pcp	ED **%**	ED **rub.**	**A**	VAT**, %**	**WP**	**CCH**	IP	TN	**RP**
Conditional product	100	10	10	110	23		135,3	10	148,83	25	186,0375	5	195,3394
Cahors wine, 750 ml capacity.	236,76	71,03	30	307,79		18 rub\ for 1 l	321,29	20	379,12	35	511,8	10	563
Millet grits	38,62	9,27	24	47,89	0	0	47,89	10	52,68	16	61,11	8	66
the drug Quprenil	13819,62	3316,71	24	17136,33	0	0	17136,33	0	17136,33	1	17307,69	4	18000

This model, used for the domestic market, allows you to solve marketing and fiscal problems related to the distribution of profits between the participants of the transaction and taxes for the budget. Considered example[2].

PC "Tire" sells waste rubber crumb to the small business enterprise "Technologist". The cost of crumbs - 50 rubles \ kg. LLC "Technologist" makes rubber hoses from rubber crumbs and sells them at the price of 154 rubles\kg. VAT = 18%. There is no excise tax.

Let's determine at what price PC "Tire" sells the crumb, if the organizations agreed to divide the profit and loss in equal proportions.

Table 2:Source data

C (PC)	**P** (PC)	Pcp	**VAT**	**WP**	**C** (LLC)	**P**(LLC)	Pcp	**VAT**	**WP**
50	32.8					32.8			154

To solve it, you must use a system of equations:

$$\begin{cases} (50+P)*1.2=СМП \\ (СМП+P)*1.2=154 \\ 59+1.2P=СМП \end{cases} \qquad (2)$$

59+1.18P+P= 130.5

2.2П=71.5

П=32.8

Table 3: Results of calculations

C (PC)	**P** (PC)	Pcp	**VAT**	**WP**	**C** (LLC)	**P**(LLC)	Pcp	**VAT**	**WP**	**taxes**
50	32,82	82,8	14,904	97,704	97,704	32,8	130,504	23,49072	153,99472	38,39
50	5	55	9,9	64,9	64,9	65,600001	130,5	23,49	153,99	33,39
50	60	110	19,8	129,8	129,8	0,6999992	130,5	23,49	153,99	43,29

[2] Gryzunova N. V., Lukashevich A. B. Workshop on the discipline "taxes and taxation". Taxes in trade. Moscow.: PRUE im. G. V. Plekhanova, 2016.

Based on a simple example can be seen that the largest fiscal effect will be of the maximum profit in the initial stage of distribution.

The third type of models are implemented in the case of actions of international relations, prices, the pledged taxes and risks are subject to Incoterms[3]. Depending on the price of the group's transport costs are divided between seller and buyer. According to Incoterms 2020, a group of E- "self" - transport costs and risks are on the buyer. Price group F, the word "free." This pricing structure assumes that the seller transfers under certain conditions. Their products to the international carrier. After this fact–the «transfer of goods" the seller is not under any obligation. The third group-C. This design of prices implies that the seller not only signed a contract with the international carrier. However, the risks paid. Group D - "delivery" - all costs borne by the seller.

The fourth group of the classification prices - the selling prices are contractual, exchange, prices, fairs and auctions. The fifth group, the stages of the sales forms of bid, proposal and implementation. The sixth group of models determines the price according to the degree of regulation. Respectively are rigidly fixed, adjustable and free. The seventh level of classification characterizes the stability of prices in time by determining the moving and sliding prices with subsequent fixation[4].

The eighth model group rates –tariff. The rate is the price rate at which the settlements, for example, the electrical and thermal energy, including related services. A major role in the determination of tariffs plays a form of the financial statements: "statement of cash flows". The time interval of validity of the established rate, usually equal to one year. The current system of tariffs for thermal and electric energy includes:

• limit and (or) maximum levels of tariffs for thermal energy (capacity 25 MW or more) supply of thermal energy to the end user;
• Tariffs for the consumed heat energy generated by the organizations who supply to the wholesale market.
In determining the forecasted levels of values, costs and tariffs, which implements the unit of production (works or services) use the information contained in the official sources of information, namely:
• depending on the consumer group set tariffs, subject to state regulation;
• The price formed as a result of the auction (tenders);
• The forecasts reflected in the program socially economic development of the Russian Federation for the next financial period in the base scenario, which reflects:
• The predictive value of CPI (consumer price index);
• Level of natural gas prices;
• limit growth of tariffs.
Creation and calculation of the tariff level for electric energy involves the implementation of the following algorithm of actions[5]:
• Determination of the expected (required) of gross revenue:
GS = (CCapex – Vcapex/2) / (1- T) x ROIC + VCapex + capex x (30 + 1 – 2 x n) /30 x Tp + Cexp x12 (3)

Where, gross sale (GS) - the amount of gross revenue required breaking even;

-Cost of capital expenditure (Ccapex) - costs for the reimbursement of capital costs at the beginning of the reporting period;

-volume of capital expenditure (Vcapex) - the amount of capital costs recoverable in the reporting period, in value terms;

-tax of profit (T) - the amount of tax on profit in value terms payable to the federal budget and the budget of the subject of the Russian Federation;

[3] International rules for the interpretation of trade terms " incoterms-2020

[4] Kiseleva I. A., gryzunova N. V., Bui N. A., Simonovich N. E. Analysis of pricing factors for the cost of tourist services \\ Izvestiya Kabardino-Balkarian state agrarian University. V. M. Kokova. 2016. No. 1 (11).

[5] The RF Government decree of 29.12.2011 No. 1178 (ed. by 19.10.2018), "On pricing in sphere of controlled prices (tariffs) in electric power industry " (together with "Bases of pricing in sphere of controlled prices (tariffs) in electric power industry", "Rules of state regulation (revision, application) of prices (tariffs) in electric power industry")

-return on invested capital (ROIC) - the rate of return on invested capital, set at 14% per annum;
-capex - the value of specific capital costs for MW of installed capacity of the generated facility;
-number (n) - serial number of the period starting from the year in which the supply of electric energy and power of the generating facility began;
-Tax of property (Tp) - amount of tax on the property of the company, valid in the period n;
cost of exploitation (Cexp) - the volume of operating costs in the year n.

Pricing in the housing sector is a set of principles and methods of forming and establishing the price range for the following activities:

• The contents of the housing;
• Housing repairs
• hiring of premises
• Utilities (rates).

Within the aforementioned pricing policy in the housing are formed rules for the regulation of prices, develop methodological recommendations by definition of the structure of prices and tariffs, the basis for revising the recommended level of prices and tariffs, the establishment of the period of regulation.

Costs in housing and utilities include the following elements: the cost of using cold water, hot water, electric energy, thermal energy, gas (including the supply of gas in cylinders), solid fuel, and the discharge of wastewaters, municipal solid waste management. The change in the value of these articles in the dynamics is regulated using marginal indexes.

Depending on the tariff structure and allocation base costs are:

• straight-line rate, assuming the costs for the consumption of cold water, Sewerage and wastewater treatment of the calculation for 1 cubic meter of cold water, 1 cubic meter of wastewater disposed 1 cubic meter of treated wastewater, respectively;

• two part tariff involving cost recovery organizations and utilities on the two bases of allocation, namely: rates of payment for consumption of cold water, Sewerage and wastewater treatment (a natural measure of the act of 1 cubic meter of hot water, 1 cubic meter of cold water, 1 cubic meter of wastewater disposed 1 cubic meter of treated wastewater), and the rate of payment for the content of all allocated water systems.

Single-rate tariffs in the sphere of cold water supply is defined as the quotient of the magnitude of the financial requirements for the relevant type of goods on the estimated volume of goods[6]:

$$T_{cw} = (C_1 + C_2 + C_3 + C_4 + C_5 + C_6) / V_{cw} \quad (4)$$

Where, Tcw - tariff for a product (service), rubles / cub. m.;
C1 - the cost of raising water in part;
C2 - the cost of water purification in part;
C3 - the cost of transporting water;
C4 - non-operating expenses;
C5 - expenses from profit in part;
C6 - adjustment of the value of financial needs for this type of product;
Vcw is the estimated sales volume of this type of product.

In the particular case when the company is involved only in the provision of services and the performance of work in only one category, it is allowed to set a tariff according to a simplified scheme:

[6] Resolution of the Government of the Russian Federation No. 1075 of October 22, 2012 " Fundamentals of pricing in the field of heat supply" as amended on 08.02.2018.

Single-rate tariff calculated according to a simplified scheme[7]:

$T_{cw} = (c_1 + c_2 + c_3 + C_5 + C_6) / V_{cw}$ (5)

Where Tcw - the rate at which the product (service), RUB./sq. m.;
C1 — costs associated with the production and sale of goods (services);
C2 - non-operating expenses;
C3 — the cost of profits;
C5 - reinvestment of profits;
S6 - adjustments for financial needs;
Vcw - the estimated volume of sales of this type of product.

At regulation of tariffs in sphere of housing and communal services (HCS) using the following methods of calculation and determination of the rate used in organizations, utilities:

- Method of establishing fixed tariffs;
- The method of setting maximum tariffs;
- The method of indexation of the established tariffs.

Discussions

However, whichever method of calculation was not chosen, the result should remain the same. Since the level of tariff for different consumer groups is fixed, so far the chosen method only allows redistributing income via institutional market participants.

Existing pricing models no longer cope with the emerging tasks and modalities for the accounting of internal and external factors. Therefore, when creating a pricing policy increasingly turn to the tax agreements on the procedure for determining prices and applying pricing methods for transactions subject to price control. These aspects of price policy arise only from the largest taxpayers, which (for the Russian Federation) have defined limits[8]:

- The total amount of accruals of Federal taxes — 300 million rubles;
- Total volume of revenue (income) exceeds 20 billion rubles.
- The total assets exceed 20 billion rubles.

A statement on the agreement can address organization — the largest taxpayers subject to tax administration of tax service. The level of control can be, at both the Federal and regional levels. The opportunity to apply to FTS of Russia with the statement for the conclusion of an agreement on prices is only for residents, foreign organizations can use this tool. Methodological basis of the agreement on price is the theoretical development of the organization for economic cooperation and development (OECD). The process of agreement involves conducting tax due diligence and tax risks for the FTS, as well as the appearance of additional responsibilities for the taxpayer:

1. Analysis and identification of controlled transactions;
2. Preparation and submission of transfer pricing documentation;
3. Canceling 20% of the allowable deviation from market prices;
4. introduction of penalties in the amount of 40% of the unpaid amount of tax payable, but not less than 30,000 rubles.

The first two groups of pricing models are designed so that the final sale price is practically independent of the chosen pricing strategy. So often, use methods:

- Least Cost Method
- Target pricing method
- Method of accounting for return on investment

[7] in the same place

[8] The order FNS of Russia from 16.05.2007 № MM-3-06/308@ "ON amendments to Order of Ministry of Russia from 16.04.2004 № SAE-3-30/290@".

- Price markup method
- Cost plus method
- Method for determining selling prices in determining the minimum margin of profit and loss
- Regression analysis method

The first four price groups depend on the type and type of taxes laid down in them: taxes are ad valorem (ad valorem means "noble", constant interest), specific (in the money rate) and complex (both interest and money are applied).

The price of goods, work, and services is formed through the interaction of supply and demand. Taxes are always a supply factor, except for taxes on personal income. Consider the effect of tax changes on the price level. Figure 2.34 shows the law of supply and demand in canonical form and the shift of the supply curve under the influence of ad valorem or specific taxes.

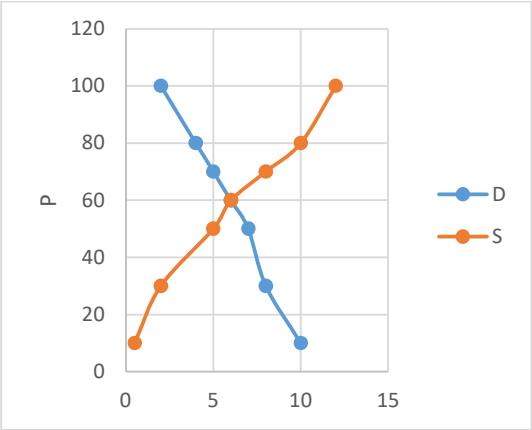

Fig. 2: Law of supply and demand. P — price; D-demand; S-supply

A formalized record of supply and demand curves can be presented in the following form:

$$\begin{cases} y = a \mp bx; \\ P = a + bQ \text{ — supply curve; (6)} \\ P = a - bQ \text{ — demand curve.} \end{cases}$$

The first equation is the equation of the line. To simplify, we will present the supply and demand curves in the form of a straight line. In equation (6), (a) is the point where the line intersects the [OX] axis, and (b) is the angle of the curve. If a specific tax is entered, then a parallel transfer is performed from the supply curve, as shown in figure 2.

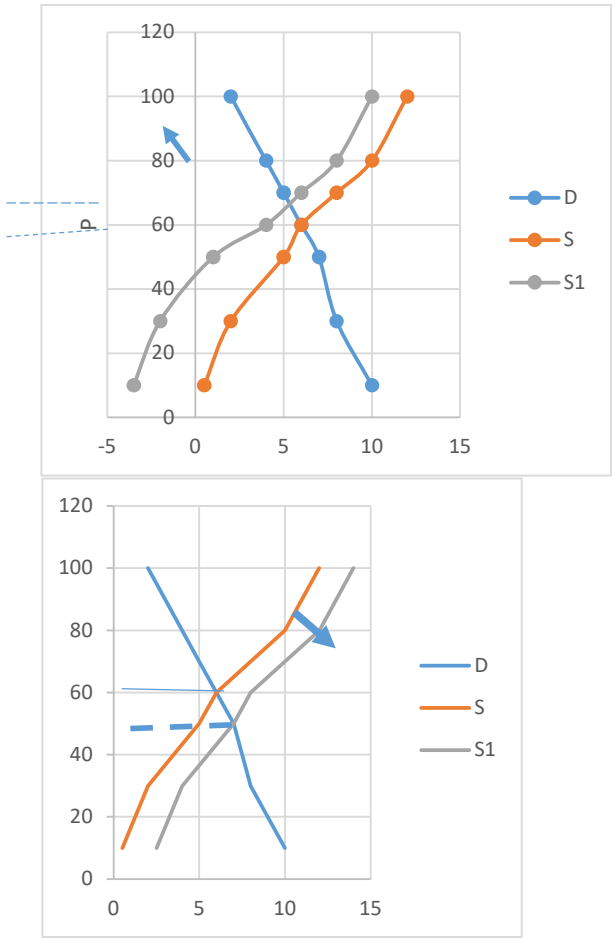

Figure 3: Introduction of a specific tax

After the introduction of the tax t, the equations of the system (7) will take the form:

$$\begin{cases} P = (a \mp t) + bQ; (7) \\ P = a - bQ. \end{cases}$$

When an ad valorem tax is introduced, the supply curve will change its slope, as shown in figure 4.

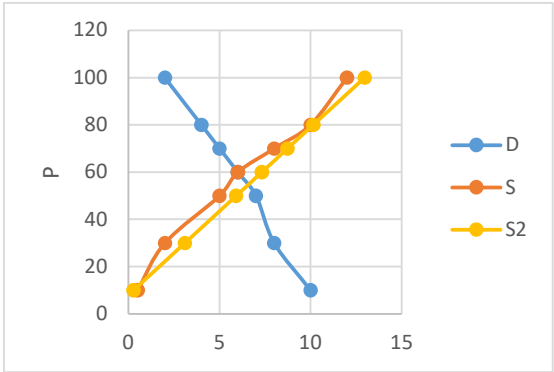

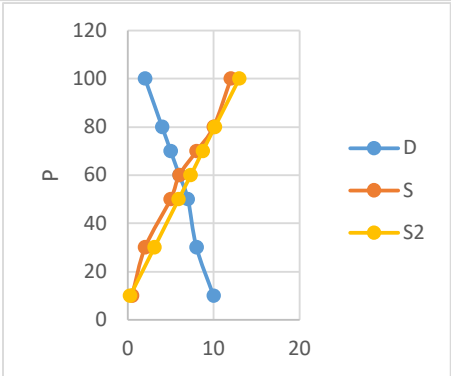

Figure 4: Introduction of ad valorem tax

After the introduction of the tax t, the equations of the system (8) will take the form:

$$P = \begin{cases} a + (b \pm * t) * Q; \\ P = a - (b)Q. \end{cases} \quad (8)$$

Instead, we introduce the notion of the interval of market prices (profitability interval), within which should be the price of the controlled transaction in order to admit the market. When applying for an agreement, a state fee (in Russia it is the size of 1,5 million rubles.). Issues of tax control over pricing in most cases affect the foreign trade transaction. The pricing agreement may be concluded by one or more transactions (group of homogeneous transactions), with the same subject matter of the transaction, for a period not exceeding three years. The effect of pricing agreements can be extended for a period ending on the first day of the calendar year in which the taxpayer appealed to the FTS on the day of its entry into force. It should be noted that the taxpayer in compliance with all conditions of an advance pricing agreement might apply to the tax authority, authorised on control and supervision in the field taxes and fees, a statement on the extension of the term of the agreement on pricing. The renewal term of the agreement can be no more than two years. The main advantages of the agreement for the taxpayer are as follows:

• if the taxpayer complied with the terms of the agreement, the tax authorities are not entitled to take decision on additional taxes, fines and penalties with respect to those controlled transactions, prices which were defined in the agreement;

• subject to the provisions of the agreement the taxpayer can with a higher degree of confidence to estimate the size of future tax liabilities related to controlled transactions;

• in the case of an agreement on pricing, the taxpayer is exempt from the obligation to prepare transfer pricing documentation for purposes of establishing the conformity of the applied prices market level in relation to those controlled transactions that are covered by the agreement.

Results

There are two types of agreements — unilateral and bilateral. The first is used for any agreements that are concluded without the participation of the competent Executive authorities of a foreign state, with the participation of the relevant authorities of a foreign state.

During the preliminary discussion, the taxpayer may be in the form of presentations or in any other convenient form allow:

1) The circumstances warranting the conclusion of the controlled transaction;
2) Description of the business activities of the parties to the controlled transaction tax residents;
3) The intended methodology for determining prices for tax purposes, information sources and other information that taxpayer considers necessary to specify.

It should be noted that a preliminary discussion of the award process and the rationale for key provisions of the agreement between the taxpayer and the tax authorities is widely used in international practice and is included in the list of recommendations contained in the OECD guidelines. The results of the preliminary discussion of the FTS of Russia may notify the taxpayer of its position regarding the appropriateness of application of the agreement, as well as on their assessment of the time expenditure necessary for the conclusion of a specific agreement. Consideration of the draft agreement after its official submission to the tax bodies should be completed in a period not exceeding six months from the date of receipt of documents FTS. This period may be extended to nine months.

Financial and economic activity of each subject of tax legal relations can be diverse. Estimates show that the multipliers of the costs are much lower multiples of income. On financial and economic activity of each entity can be influenced by various conditions: seasonality, location, international politics, etc. a Significant part of these terms is considered the subject of legal relations at the stage of tax planning at formation of accounting policy and tax accounting system.

Conclusion

We define the value of fiscal multipliers as the maximum size of the response of GDP to fiscal shock of the price variable. Values are statistically significant. Analysis of the determinants of fiscal multipliers showed a relatively low degree of influence of the main indicators of public finances on GDP growth in Russia. The increase in government spending by 1 percent of GDP causes GDP growth in the next after shock quarter of 0.28%. Raising taxes on 1% of GDP leads to a gradual decrease of GDP and reaches a peak of 0.75% after eight quarters after the shock. With 2017 and the need to reduce the budget deficit has a negative direct effect on GDP growth. The planned reduction of expenditures relative to GDP as the main measure of fiscal consolidation is consistent with the results of the evaluation of fiscal multipliers, allowing you to expect a relatively small negative impact on GDP growth slowing (for 2018-2020 cumulative of about 0.3 p. p.), and in addition may allow to increase the efficiency of budget expenditures. In addition, the negative direct effect on GDP could be more than offset by a substantial positive indirect effect of increasing the confidence of economic agents in the long-term stability of the budget.

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Chinese initiative One Belt, One Road – the Implications for the European Economy

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Abstract

Initiative of the Chinese government, *One Belt One Road*, focused on the expansion of the network infrastructure linking China, the countries of Central Asia, the Middle East, Africa and Europe is meant to expand the cooperation of these countries in the implementation of infrastructure and finance related projects. Therefore the initiative will be of crucial importance to the development of the Chinese economy, its partner countries and regions in the world. The aim of the article is to present the essence, significance and the expected impact of this strategic economic project, both on the European market and the world market. The basis of conducted analyzes are mainly experts' opinions obtained from the press and Internet portals, consulting agencies and so-called *think tanks,* specializing in economics and international economic relations, such as: European Council on Foreign Relations, Bruegel and McKinsey's Podcasts. Preliminary statistical data on the implementation process of the *One Belt, One Road* project has also been included. Analyses have been conducted in two key areas: regarding trade between China and other countries, and in the field of the investment activity in the countries covered by the initiative.

Keywords: One Belt One Road, China, European economy;

Introduction

Over the past four decades, the People's Republic of China has undergone impressive transformation from a poor farming country to a global economic power. "Opening of China to the world" started by, the leader of China at that time, Deng Xiaoping in 1978, allowed for recovery of the country from the economic collapse it had been left in by the Chairman Mao TseTung. This was due to the socio-economic reform program initiated by Xiaoping, that started the development of Chinese economy and affected a gradual change in both the economic and social image of the country. Thereby People's Republic of China could rebuild its economic and political relations with many countries while developing the basis for economic growth at the same time (Guthrie, 2012).

Implementation of the *Go Global* strategy resulted in a huge progress reported by Chinese economy. Currently, Chinese investors are active in more than 132 countries and regions all over the world. It results from reports of the United Nations, that the value of Chinese foreign investment grew from USD 2.7 billion in 2002 to USD 84.2 billion in 2012. This allowed China to advance from the sixth position in 2011 to the third position among the most active countries in terms of conducting foreign direct investment in 2012 (Pinkerton, 2014).

Increase in investment activity of China in the international arena has been especially observed since the global financial crisis of 2007/2008. This resulted from the fact that, even though the overall value of foreign direct investments in the world declined during this period, the level of investments of Chinese enterprises showed a significant increase. Their value of USD 55.9 billion in 2008 doubled in comparison with USD 26.5 billion obtained in 2007, and then it reached the value of USD 68.8 billion in 2010. This gave China the fifth position in terms of the scale of direct investments conducted all over the world, and allowed for overtaking Japan and Great Britain in this respect.

Currently in the face of the economic slowdown, China is constantly seeking new incentives that might stimulate the pace of its growth and development.

Analysing the projected development prospects of Chinese market, the importance of one of China's main initiatives, *One Belt, One Road*, aiming at reactivation of the Silk Road and providing a better transport and trade links within China, as well as between China and the countries of Europe, Asia and Africa should be emphasised**.**

Within the framework determined by the *Belt and Road*, Chinese investors, will have a better chance to conduct business activities and build relationships with foreign partners.

According to experts, success of the project is of fundamental importance, as in the case of many areas, also including the western part of China, it will not only contribute to easing regulations concerning capital flows between states and internationalization of Chinese yuan, but above all to significant civilizational progress (The State Council The People's Republic of China, 2015).

One Belt One Road - main assumptions of the project and its significance

The purpose of the paper is to present the essence, importance and predicted impact of the strategic economic project, that is *One Belt One Road*, both on the European market and on the global market. The first part of the article is devoted to the presentation of the essence of the project and the premises that prompted the Chinese government to undertake this initiative. Further in the article the general objectives of the *One Belt, One Road* project and its anticipated implications, for the European economy in particular, have been presented. The conditions, that are necessary to meet for the successful implementation of the project‘s objectives have been addressed. Lastly potential threats and challenges that may arise from the inevitable growth of Chinese influence and domination on the international arena in connection with the implementation of the objectives of the project have been presented.

The project of *One Belt One Road* initiative was presented for the first time by China’s President Xi Jinping in September 2013 during his visit to Kazakhstan. In his speech at Nazarbayev University, Jinping officially presented the idea of creating a land-based trade and transport route linking China and Europe within the so-called *Silk Road Economic Belt*. On the other hand, in the same year, in October, during a visit to Indonesia, the President presented the vision of creation of *Maritime Silk Road*, within which establishment of connections between Asia, Europe and Africa is planned. Both routes are to be developed simultaneously within *One Belt One Road* initiative and represent construction of new, or redevelopment of already existing transport and rail infrastructure networks (European Parliament Think Tank, 2016).

Analysing the routes of both the Land and the Sea Routs, they can be seen as a coherent system of communication covering the whole of Asia. This is the main assumption of *Belt and Road* initiative. For the homogenous network created in this way will not only facilitate trade with existing foreign partners, but also create new opportunities for making investments in areas previously poorly penetrated or not penetrated, while enabling investors to transport goods safely.

Furthermore, it is predicted that implementation of *Belt and Road* initiative will contribute not only to modernization of tracks for high-speed rails, land and sea ports and airports, but also to considerable progress in the development of transmission infrastructure, including gas pipelines, oil pipelines and telecommunication infrastructure. Developed facilities will further allow for the creation of various, not mutually exclusive, but complementary options of routes, connecting China with European countries, and facilitating the establishment of a dialogue between the Middle Kingdom and foreign partners (TłustyKot, 2016).

It should be emphasized that *Belt and Road* initiative is aimed not only at the creation of transport and trade links of a physical nature, but also, and even above all, at the creation and development of relations between the participants in the analysed project. This is because it will allow for economic,

political and socio-cultural cooperation between China and the countries included in New Silk Route, while contributing to creation of the world's largest international cooperation platform (Jinchen, 2016).

Thus, it results from the analyses that the main assumptions of *One Belt One Road* initiative are focused on:

- increasing investment activity of China and the countries involved in the project, as well as trade between these countries,
- stimulating undertaken investments in infrastructure,
- achieving higher effectiveness of land transport, i.e. higher quality transport at lower cost and simultaneous reduction of time.

A special USD 40 billion fund was established in 2014 for implementation of the Silk Road assumptions and initiatives, and moreover USD 10 billion was allocated to the BRICKS New Development Bank.

In 2016, the government of China declared development of activity of the Asian Infrastructure Investment Bank (AIIB), which will be responsible for implementation of *Belt and Road* initiative. The capital of the bank amounts for USD 100 billion, and China is its main shareholder (30%). Declarations of support for the initiatives of the Bank have been made with various shares by almost all the world's richest countries, except for the United States and Japan (finanse.wp.pl, 2015; Aiib.org, 2020).

The major task of the bank is to provide support for the poorer Asian countries neighbouring with China, such as Vietnam, Cambodia, Bangladesh, Birma and Laos, for development of industrial infrastructure in these countries. For construction of new factories and production halls will create opportunities for foreign investors (especially from China and Europe) to transfer their production there. Increase in foreign investments in these countries will create new employment opportunities, which, in turn, will have a positive impact on reducing the level of unemployment, and will strengthen their competitiveness.

Furthermore, the AIIB's task is to develop infrastructure facilitating trade and transport of goods within the New Silk Road. Russia, Mongolia, Kazakhstan, but also Middle East and Balkan countries, i.e. the countries of strategic position for China and of poorly developed car and railway infrastructure are among the major beneficiaries of these investments (Chiny Powołują Do Życia AIIB, 2015).

Implementation of the project was preceded by a thorough analysis of the relations between the countries included in the New Silk Route and China. These relationships were assessed in terms of economic, political and historical contexts. For the government of China plans to establish strategic free trade agreements with each of these countries. So far, agreements have been signed with Hong Kong, Singapore, Taiwan, Pakistan, Switzerland, Iceland, Peru, Chile and Costa Rica, among others. Agreements with such countries as Japan, South Korea, Australia, Sri Lanka, Norway, the countries associated within Regional Comprehensive Economic Partnership (RCEP), Association of Southeast Asian Nations (ASEAN) and Gulf Cooperation Council have still been under negotiations.

As of 2017 it is estimated that *Belt and Road* initiative reached 4.9 billion people from over 68 countries, which represents 40% of the total world economy, and over half of the world's population. It is predicted that implementation of this strategic initiative will allow for generation of 55% of global GNP and 75% of energy resources reserves. *One Belt One Road* is therefore perceived as the project of greatest importance with a long-term development potential, and its implementation will have an impact both on domestic and foreign policy of China, and on its economy and international relations (SCMP, 2015, European Council on Foreign Relations, 2015; Godement and Kratz, 2015)
The success of New Silk Road initiative is in the interest of the countries located along the designated routes, whereas the regions of Europe, especially of Central and Eastern Europe are of the key

importance for the development of *Belt and Road* initiative. For the implementation of this project will contribute to the substantial development of their infrastructure, and thus their economic growth. The government of China declared its willingness to respond to the needs of the countries of Central and Eastern Europe by proposing cooperation within the *16+1* agreement in 2012. This was one of the stimuli that led to the development of direct links between China and Europe.

In 2013, the first direct railway link between China and Poland was established. This had impact on a significant increase in trade between these countries, as transportation time was shortened from 40 days needed before for sea transport, to only two weeks by rail. Therefore, the possibility of rail transportation contributed to increase in efficiency while reducing the costs in comparison with air transport.

Furthermore, in 2015, a direct air link was created between Prague and Beijing. It contributed to enhancement of cooperation both in trade and investments, as well as tourism and health protection, and it strengthened ties between the two countries (Jakóbowski, 2015).

It is predicted that especially the development of railway links will allow for a significant increase in the speed of flow of goods and money between the countries of *Belt and Road* initiative, which will affect industry growth, activation of trade, as well as urban development and population growth. According to reports from the Ministry of Commerce, trade between China and the countries of *One Belt One Road* initiative reached USD 995 billion in 2015, which represented about a quarter of the national trade turnover. However, not only opportunities but also threats to Belt and Road project ought to be indicated.

This is because on one hand, the concept of the New Silk Road is perceived as another step in China's political and economic evolution, but on the other hand, the difficulties that investors face, and the risks that this initiative can bring may not be neglected. Successful implementation of the project will therefore require considering its broad range of impact and the level of complexity of the initiative (Godement and Kratz, 2015).

Additionally, the size and scope of the projected investments in infrastructure allow for assuming that the Asian Infrastructure Investment Bank will start cooperation with other international development banks in the world.

Determinants of One Belt One Road project implementation

Implementation of the objectives and assumptions of the project needs taking a series of determinants into consideration. They include political, economic, logistic, as well as social and cultural determinants.

One Belt One Road initiative is primarily perceived as an opportunity to obtain economic support from China, and for the participating countries it means entering new economic paths. Estimates developed by Asian Development Bank show that until 2030 the region needs to be supplied by investments worth an estimated USD 26 trillion. Within *Belt and Road* initiative, the Export-Import Bank of China announced financing of one thousand projects in 49 countries, whereas the Chinese Development Bank informed about implementation of over 900 investments in 60 countries in 2015. (Tomański, 2017) Therefore, it can be concluded that on one hand the economic determinants of the implementation of the *Belt and Road* perform the key role in stimulating the development of the economies of the countries involved. However, looking from the perspective of political determinants, many countries are concerned about growing expansion and power of the Middle Kingdom influence, as well as the rise of China‘s power brought by the New Silk Road project.
Attention should also be paid to dangers associated with intensification of problems related to serious territorial claims of the People’s Republic of China concerning the area of South China Sea. This is because currently, there has been a dispute between China and the states of ASEAN community about the archipelagos located in the area. Beijing explains its expansion with the intention of ensuring safety to sea transport within the Sea Silk Road.

Countries such as Indonesia are afraid of hegemony of China in the region (Tjhin cited Tomański, 2017). On the other hand, Russia is anxious that involving post-Soviet states by China in cooperation within *Belt and Road* is an expression of Beijing's aspiration to reduce the influence of Moscow in the area of Central Asia (Kaczmarski & Rodkiewicz cited in Tomański, 2017). India also expressed its critical view on the issue of Chinese investments in Kashmir, while explaining its objections with security reasons (Tomański, 2017).

Concerns are also raised by the announcement related to financing investments within *Belt and Road* in the form of loans to partner countries, which will result both in the increase in economic dependence of their governments of Chinese and the political burden on the partner countries.

In view of the observers, China is obviously trying to change the political structure of functioning of the region and reduce American influence in the world. *Belt and Road* initiative will help to achieve these goals (Callahan cited in (Tomański, 2017). Furthermore, withdrawal of the United States from the Trans-Pacific Partnership Agreement (TPP) is a significant opportunity for China to fill the gap created by the United States and to increase its influence in South East Asia region.

Despite the concern of many states about growing global dominance of China, the country assures that the goal of the policy pursued by the government is not to gain control over the states, but to develop cooperation that will bring mutual, both financial and strategic benefits over the long term (Xiaoli cited in Tomański, 2017). The initiative is focused on making China "a power of a new type", that is, neither striving for confrontation, nor having hegemonic aspirations. (Bondaz cited in Godement and Kratz, 2015)

During the May 2017 summit on *Belt and Road* that has been held in Beijing, the President of China, Xi Jinping, declared that within the next three years China will provide food and crisis support to countries in need and already in 2018 it has become an important donor in these areas to developing countries. China's readiness to help developing countries as well as to expand and improve its aid programmes have been supported by the Development Cooperation Agency that China has established earlier in 2018 (Neuweg, 2018).

However, successful implementation of *Belt and Road* initiative, demands from all its participants development of strategies of effective solutions, both in the sphere of transport and logistics as well as transfer of knowledge and products between China and the countries of Asia, Europe and Africa.

It ought to be stated that making investments in foreign markets also often brings complex results of social nature that may arise at all stages of conclusion of agreements, especially between companies coming from different countries and diverse backgrounds. Therefore, performance of a thorough analysis of the market environment before starting a business activity on a particular market is a fundamental element for the success of *Belt and Road* initiative. This analysis requires a multidimensional approach, while considering the situational context of the transaction, its premises, its objectives, the scope of its cooperation and its nature, as well as the benefits to all parties involved (Hajduk, 2016).

Apart from economic, political and social determinants, it is also necessary to take into consideration cultural determinants that affect attitudes, mentality and the way in which the new phenomena and processes are perceived, and thereby have impact on organizational culture of enterprises. Despite special, comprehensive trainings in the area of international management that emphasise extreme importance of corporate culture, the managers still have the habit of neglecting this factor in favour of hard factors. However, cultural mismatch is a strong determinant for the success of many investments and with as broad range of impact in terms of territory as *Belt and Road* initiative, it is particularly important to apply an appropriate model of intercultural management, based on intercultural cooperation and focused on the use of valuable resources of cultural diversity to achieve synergy effect, improve the level of efficiency and develop both sides to the agreement. (Kostera, 2005; Adler, 1980; Koźmiński, 1999; Zając, 2006; Szczepankowski, 2000)

The importance of logistics in coordinating international flows should also be emphasised. It is an important instrument in coordinating actions by companies from countries that make a decision to be actively involved in the development of *Belt and Road* initiative. (Szymczak, 2004) This finds reflection in plans of China's government related to creation of modern logistic centres alongside the Belt and Road routes. One of such centres is going to be established on the Polish-Belarusian border in Małaszewicze town (Money.pl, 2015).

That is why it is important to ensure that agreements within One *Belt One Road* project are appropriately prepared in terms of content, and consider political, economic, logistical, social as well as cultural determinants.

Challenges resulting from Chinese expansion on the European market

The inflow of Chinese capital into markets all over the world, also including the European market, plays a vital role in the process of stimulating economies of the countries most affected by the financial crisis of 2007-2009. For the increased activity of Chinese companies also in Europe contributed not only to lowering the costs of infrastructural ventures and creation of new workplaces, but also provided local companies with opportunities of greater and easier access to Chinese market. It also increased profitability of conducted research and development activity resulting from significant interest of Chinese companies in European technology (Millner, 2012). This gives hope that intensification of foreign expansion of China and the involvement of Chinese investors on international arena within *Belt and Road* initiative will contribute to favourable changes in the sphere of regulations that facilitate making investment by foreign enterprises in Chinese market.

However, it must be remembered that increased investment activity of Chinese companies in the markets of countries covered by *Belt and Road* project implies numerous problems and challenges for the countries receiving the incoming capital.

According to experts, the concerns of European countries are mainly related to a different attitude of Chinese companies to the allocation of resources and the investment risk management. For in China, they are dependent on the applied model of state capitalism, and not on the principles of the market mechanism. This, in turn, results in violating the principles of free-market competition operating in Europe. Decisions of Chinese investors are therefore less predictable and raise concerns about their impact on the process of implemented investments (Owen, 2012).

Several negative effects brought by activities of Chinese companies on the markets of countries included in the *Belt and Road* also need to be indicated. They are expressed by social reluctance of these countries, additionally strengthened by the application of the so-called dumping, i.e. selling Chinese goods on foreign markets at prices lower than the prices at which those goods are sold on domestic market, or at prices lower than their manufacturing costs. In this way, Chinese companies contribute to the rise of unfair competition on foreign markets, and thus weaken the position of companies offering the same goods in these markets.

Another factor disturbing competition in the future is related to the presence of Chinese state-owned conglomerates in Europe that because of their dominance may bring the threat of oligopolisation of the European market. Therefore, all Chinese state-owned companies, i.e. those under the control of the State-owned Assets Supervision and Administration Commission (SASAC), are perceived by authorities of the European Union as a single economic entity, and in the assessment of its operation, its overall market share is taken into account (European Commission, 2011).

Furthermore despite the high openness of European countries to the inflow of foreign investment within *Belt and Road* initiative, they try to approach the actions of Chinese companies with caution, especially when they involve the key sectors of the domestic economy of the host country. For there is a risk that while implementing the adopted model of China's economy development, the investors will liquidate European companies that have been taken over, and transfer assets of strategic importance from Europe to China. However, analysing the existing agreements established by

Chinese companies not only on the European market, but also all over the world, it is clear that investors are more inclined to expand the size of production and increase employment in acquired companies while trying to benefit from their experience, technology and prestige, rather than concentrate on the liquidation of acquired companies. For in this way, Chinese companies can achieve a synergy effect from development of cooperation with European partners within the New Silk Road. In fact, the European market creates conditions for them to develop those areas of conducted business activity in which explicit deficiencies are observed, i.e. first of all in the sphere of new technologies and acquisition of highly qualified staff. Nevertheless, in order to avoid the danger related to facilities of strategic importance, European countries are starting to apply the policy of economic protectionism (Hanemann, 2012). It is obvious that the threat to European partners will increase together with levelling the largest weaknesses in Chinese business activity. However, before this happens, investing in the development of companies overtaken on the European market is in the best interest of China.

While analysing the intensified investment expansion of Chinese companies in the countries involved in the Silk Road, cultural differences seem to be a serious challenge, for Chinese managers often lack the relevant experience and preparation to conclude business agreements with partners from other cultural circles (Gao, 2012). Whereas the lack of such preparation, starting from a good command of English, through lack of sufficient knowledge about local determinants of business activity in a particular country, low flexibility, difficulty in adopting to international standards and finishing with thorough preparation on the details of the very transaction, makes it impossible to build long-term relationships and to develop investment activities of companies (Tung and Luo, 2007).

The practical application of the regulations concerning intellectual value, environment protection or labour rights, applicable in the European Union states and in other regions involved in *Belt and Road* initiative, also seem to be a big challenge. (Shambaugh, 2012).

Assessing the economic consequences and motivations of *Belt and Road* initiative, experts indicate the concerns of Chinese scientists, analysts and other representatives of the intellectual elite regarding unreasonable allocation of limited resources of China, when its economy is slowing down. Therefore, successful implementation of *Belt and Road* initiative is perceived as an opportunity to strengthen the weakening power of Chinese export (Kratz, cited in Godement and Kratz, 2015).

It should be emphasized here that, despite the economic slowdown, China has not remained passive in the situation, but on the contrary, the Middle Kingdom has been working on the integration of sixteen Asian economies within the framework of proposed RCEP. This agreement would include ten most dynamically developing countries of ASEAN and five countries with which ASEAN countries have free trade agreements, i.e. China, Japan, South Korea, New Zealand and Australia. Because of the large share of these countries in world trade, this partnership, that is to be sign in 2020, would have a very positive impact on foreign trade, while enabling China to establish its own sphere of influence, both in the area of economy and in politics (Zadrożna et al., 2016; Lee, 2019).

To assess the development prospects for the expansion of China, it is necessary to indicate the impact of global economic downturn on weakening of domestic demand in countries that are the major business partners of China. This is reflected in the weakening of exports (by 1,3% in 2019), which before has played a key role in driving the growth of the Chinese economy (Tomański, 2019). Therefore, expectations related to strengthening of the declining power of Chinese export are so strong. This can be achieved through successful implementation of *Belt and Road* initiative because China is currently focused on searching for new stimuli for growth, and on reforming the national economy towards (Mercator Institute for China Studies and Rhodium Group, 2016):

- ⇒ more modernized and environmentally friendly industry,
- ⇒ modernization of the existing production base (departure from the image of the manufacturer of cheap goods of low quality),
- ⇒ increase in expenditures on research and development,
- ⇒ implementation of new technologies,
- ⇒ making investments in design,

⇒ increased consumption, both domestic and worldwide.

According to experts, increased openness of both the Chinese market to foreign investors, as well as of Chinese enterprises to start business activity with foreign partners within implementation *of Belt and Road* concept, as a part of *Go Global* policy of the government, are conducive to the process of transformation of the country and creation of a new economic reality of China (The State Council The People's Republic of China, 2015; García-Herrero and Xu, 2016).

Conclusions

Intensified activity of Chinese companies in the markets of European countries and globally within implementation of *One Belt One Road* initiative will contribute to growth of the scale of foreign direct investments conducted in these markets and related inflow of new capital. While establishing links with global value chains and export markets, it is anticipated that *Belt and Road* will contribute to increased expenditures on research and development, formation of development clusters and improvement of workers' qualifications. Furthermore, the scale and pace of growth, and the complementary nature of Chinese economy offer unique opportunities for development of the economies involved in the New Silk Road. However, it must be remembered, that the nature of economic and political system of China can raise some concerns, and constitute challenges for markets of partner countries, including the European market. As an emerging market in which financial system is not fully stable yet, China may put the countries where they invest in danger of capital flow variability and instability. Although Chinese entrepreneurs appreciate the freedom offered by the European Union countries, they retain many formal restrictions concerning foreign investments, and European companies are still discriminated in Chinese market. It should also be remembered that Chinese companies, particularly the state-owned enterprises, are still largely supported financially by the government, which provides them with a significant advantage over other companies operating in the market. This forms a threat to development of competition. Additionally, there is a risk of diffusion of bad practices into the countries of *Belt and Road* initiative in which Chinese investments are located.

However, despite apparent challenges that *Belt and Road* initiative can bring, it is generally perceived by the countries involved as an opportunity to create new platforms of cooperation. They include new technologies, scientific exchange, support for young researchers, the creation of a "big data" exchange platform and implementation of solutions aiming at protection of the climate and improvement in ecological solutions in economy among others (Tomański, 2017a).

At the May 2017 Summit on *Belt and Road*, that has been held in Beijing, Xi Jinping emphasised the importance of development of cooperation between the states within *Belt and Road* initiative in the face of rising global challenges that individual countries may not be able to deal with independently. It is crucial to coordinate the strategies applied by countries, and at the same time to search for development prospects at a global level. This is the main objective of the Chinese initiative *One Belt One Road* (Kaczmarski, 2016; Polska-azja.pl, 2020).

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Mediation as A Tool for Resolving Corporate Conflicts in Russia

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Abstract

The scientific community, rating agencies and news media pay close attention to the issue of corporate conflicts, which affect company's operations, business reputation and capitalization. The research conducted by the authors of this article is devoted to the search for answers to questions about corporate conflict resolution tools. In our research mediation is regarded as an instrument for resolving corporate conflicts in Russia. The article presents the content of the mediation process and emphasizes the importance of this method in resolving persisting corporate conflicts that are witnessed in current Russian practice. The authors analyze the characteristics of corporate conflicts and highlight the fundamentals of mediation in resolving them in Russia. The article concludes that the institution of mediation in Russia does not match the essence of mediation as an extra-judicial form of conflict resolution.

Keywords: Corporate Governance, Corporate Values, Corporate Interests, Corporate Conflicts, Forms and Types of Corporate Conflicts, Mediation, Intercession, Conflict Resolution.

Introduction

The corporate history of Russia substantially is a history of conflicts between business structures. The conflict map detects the formation of the largest groups, their management styles, the amount of administrative resources and their position in the hierarchy. Corporate conflicts lead to an increase in corporate disputes number. In Russia, in 2018, the amount of corporate claims increased 3 times compared to 2017 and 9 times compared to 2016. No other type of entrepreneurial dispute is growing at that rate. And this is a new steady trend: companionship, joint business on the basis of conceptual agreements, investments in start-ups, refusal to disclose sales contracts for expensive fixed assets by creating joint legal entities, the desire to hide interdependence in a group of companies are potentially dangerous, prolonged and latent conflicts that the business has not yet learned to prevent or solve without complete elimination of the joint business. Statistics of the Judicial Department of the Supreme Court of the Russian Federation confirms the above (Fig. 1.)

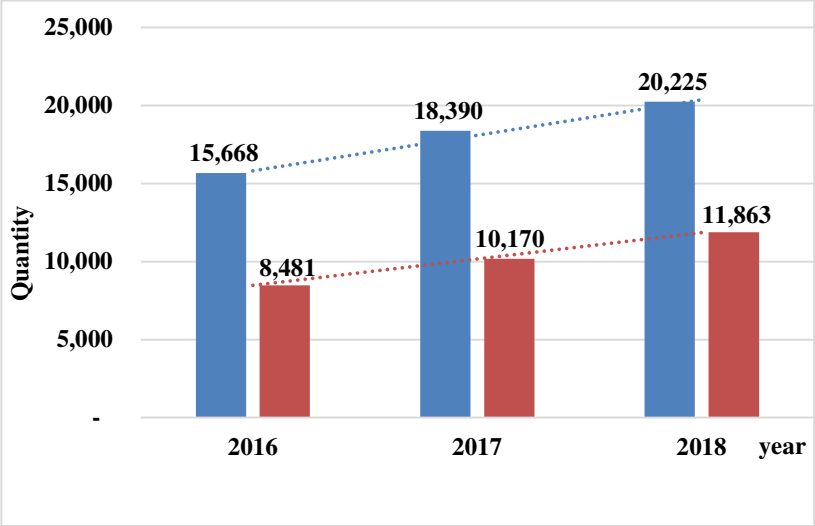

Fig. 1. Corporate disputes (ratio of tried and upheld claims[1]

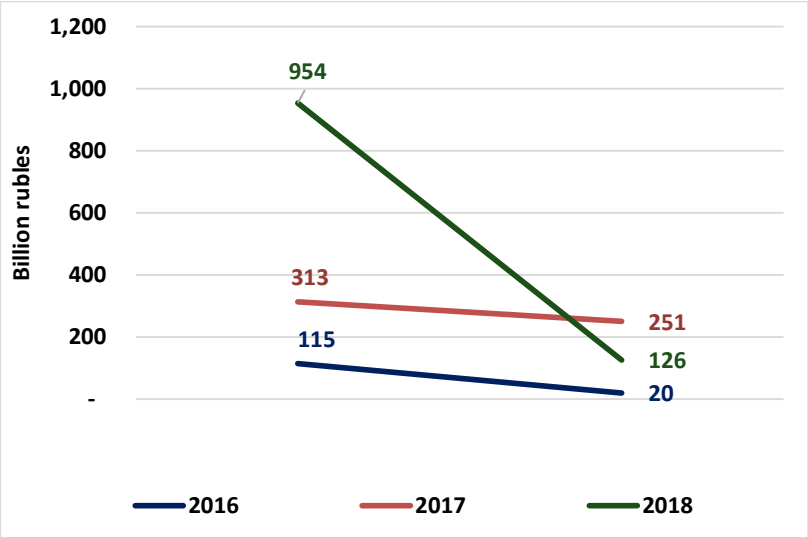

Fig. 2. The ratio of the claimed and collected money according to legal actions[2]

Of course, everything is comparative, and 504 555 disputes related to non-performance or improper performance of obligations under sales contracts were heard in arbitrations in 2018, while the amount of money involved exceeded 1.2 trillion rubles. In such a context, though corporate disputes seem rare, but very costly, and the results of such disputes are often fatal for business.

Interestingly, corporate disputes overshadow tax disputes, as the amount of their claims is "only" 19 billion rubles.

At the same time, let us draw attention to the fact that in 2018 the share of collected funds for corporate disputes turned out to be 9 times less than the amount of claims. That is, many corporate

[1] www.cdep.ru
[2] ibidem

disputes simply do not end up in court, because business owners do not see this as a solution to the conflict eventually brought before a court are resolved 9 times less efficiently, as plaintiffs suggest. The most significant and high-profile corporate conflicts in Russia in 2019 are presented in Table 1.

Table 1: The most significant and high-profile corporate conflicts in Russia in 2019

Parties to a conflict	Content and status of conflict
Rosaviatsia against the developer GC "Filatov Lug"	The conflict between the Federal Air Transport Agency and the developers of the residential complex Filatov Lug (GC Ingrad) was the most unexpected. In 2017, the federal agency issued a permit to the developers to construct a complex near the Vnukovo airport. However, in 2019, when the construction was well in the way and deals were being concluded, the government department reconsidered and canceled the previously granted permission, believing that the RC still interferes with the airport operations. Developers had to right wrongs in court. The court of the first instance came down in favor on the side of the developers, canceling the rescinding of the permit issued by the Federal Air Transport Agency. The federal agency tried to appeal the judgment, but the appeal only reinforced it. But the government department does not intend to give up so easily: in 2020, the cassational instance will pursue the case. **Status of conflict:** The Federal Air Transport Agency is trying to challenge the judgment of the Moscow Region Arbitration Court appealing to a court of cassation. . The hearing of the complaint of the federal agency is scheduled for February 6, 2020.
Investigative Committee against the founder of Rolf automotive dealer	The past year turned out to be not very successful for the Rolf car dealership network: in June, security forces rushed into the company with searches. The reason for the operational events was the allegedly illegal activity of the founder of the network - Sergey Petrov and a number of top managers. The Investigative Committee suggests that Mr. Petrov and his colleagues withdrew about 4 billion rubles abroad. The purchase of shares of the Cypriot Panabel Limited by the Rolf structure was considered illegal. Under the guise of a sales contract, Sergey Petrov and his colleagues allegedly withdrew abroad the funds earned by car dealerships. Sergei Petrov strongly denies the accusations against him. To turn aside the blow from the company, he hastily left the board of directors of the company. Whether this will help Rolf to get out of the delicate situation we will find out in 2020. Conflict status: according to the latest data, Sergey Petrov was put on the international wanted list, he was charged in absentia under part 3 art. 193.1 of the Criminal Code of the Russian Federation ("Conducting currency transactions to transfer funds to accounts of non-residents of the Russian Federation using forged documents") The Rolf car dealership network continues to operate as usual.
The public against Rostec waste incineration plants	The problem of waste disposal for the Moscow region is one of the most acute. Last year, the public "fought" with the authorities over a landfill site in Volokolamsk, because of which schoolchildren were poisoned; this year a protest was launched against Rostec incineration plants, planned to be constructed in the Moscow region.

	In July 2019, Kommersant, citing a study by the NRU HSE, published data on the inefficiency of enterprises under construction. Allegedly, they pollute the air with waste combustion products, and the ash that remains after processing will be at least 70% of the waste. Later on this information was called unreliable, and Deputy Chairman of the Moscow Region Government Evgeny Khromushin spoke up for the Rostec plants. He emphasized that the garbage recycling plants being built in the region will have the most modern equipment, the quality of which is monitored by the Japanese Hitachi Zosen Inova, a world authority in the field of garbage processing. As for ash, it, as the deputy chairman noted, is primarily formed from the burning of plastic and glass, which will not be delivered to plants - these materials are planned to be sorted and sent for recycling. Conflict status: despite the absence of active "centers of resistance", the public continues to be wary of the idea of Rostec. Fuel is added to the fire by Incinerator No. 4 (operated by Charter LLC,owned by the son of the Prosecutor General of the Russian Federation), which doesn't bring out the best. Residents of the region rightly fear that Rostec enterprises will also poison them with fetid smoke.
Rospotrebnadzor versus AnderSon cafe network	In 2019, the Russian consumer protection agency (Rospotrebnadzor) attacked the AnderSon network of cafes with numerous inspections, during which in several Moscow cafes they found "systemic violations of sanitary and epidemiological requirements" and Bacillus thuringiensis. All this resulted in 10 lawsuits against Anderson, which the cafe network is now trying to challenge. AnderSon's owner Anastasia Tatulova believes that the attack of the government department against her business is connected with her participation in the election campaign in the Moscow City Duma. In addition, sources close to Mrs. Tatulova believe that the owner of the network could provoke the anger of Rospotrebnadzor by criticizing the department. Conflict status: the first instance and the appeal recognized the right of Rospotrebnadzor in all claims against AnderSon and ordered the network to pay fines for violations revealed during the inspection. The defendant does not agree with this situation and will appeal the decision in cassation: AnderSon's complaints will be considered in 2020.
Leonid Reiman, Ex-Minister of Communications of the Russian Federation, against the Angstrem-T plant	The bankrupt Angstrem-T plant near Moscow gives no peace to Leonid Reiman, ex-Minister of Communications of the Russian Federation, who at various times was the stockholder of this enterprise. The former official is trying to recover a considerable sum of money from the plant and its affiliates - both on his own behalf and through one of the companies affiliated with him. Mr. Reiman has already managed to "shove" 423 million rubles of debt into the register of creditors of Angstrem-T with the help of the appeal. The court will consider another 2-billion-ruble claim of his Alternative Capital LLC to Angstrem JSC in 2020. Conflict status: in October 2019, Angstrem-T JSC was declared bankrupt and entered into bankruptcy proceedings, the financial claims of Leonid Reiman were included into the statement of creditors' claims: there is nothing he can do but wait for payments. The consideration of the financial dispute between

	Alternative Capital and Angstrom will take place in January next year. A third party to the case was the Federal Financial Monitoring Service.

No conflict can last forever. What tool can be used for effective and rapid resolution of the conflict? Four out of five top managers prefer to agree under a pre-trial process, therefore such a tool as mediation can successfully cope with the task.

Mediation as a type of brokerage in the resolution of disputes has existed for as long as conflicts, therefore, now this process is well-established, has its own requirements and principles of conduct, as well as specific features in various countries. A mediator only directs the negotiations, his/her interest is to resolve the conflict, he/she has no personal or business relations with either side, he/she should not have a material interest in the conflict. The decision to terminate the dispute under certain conditions is always made by the parties themselves. In addition, the mediator does not have advisory functions (does not have expertise in the field that is the subject of conflict), but creates only conditions for dialogue, with a view to further cooperation.

In Russia, it has become possible to use mediation procedures in resolving the conflict since 2011 with the adoption of Federal Law No. 193 “On an Alternative Dispute Resolution Procedure with the Participation of a Mediator (Mediation Procedure)”.

In Russia mediation is an novelty, but abroad mediation is popular and successful among many companies and citizens. So, the first countries that legislated the mediation procedure were the USA, Canada, a little later the countries in Europe and Latin America. The effectiveness of mediation can be witnessed in the United States, which is the founder of this method. Nowaday in the United States up to 80% of conflicts are resolved using the procedures of out-of-court settlement of disputes, and of all such settlement 30% are provided by arbitration (arbitral tribunal in Russia), and 70% - mediated (Parinsky A.I. ,2010) Since 2004 the European Code of Mediators has been applied, which defines the basic principles of mediators’ activity.

The main condition for using mediation is the intention of the parties to agree to a compromise and constructively solve the problem. According to T.V. Letuta, for the successful implementation of mediation in Russian corporate relations, it is necessary to address the problem for mediator services payment in local acts of corporations, where the principle of forming a guaranteed fund should be laid down, the funds of which should cover legal and other costs of out-of-court dispute resolution (Letuta T. V. 2009). The main disadvantage of the mediation procedure is the impossibility of enforcing the mediation agreement, the execution of which is based on the good will of the parties. Therefore, it may be advisable in developing this institution to give mediation agreements the force of an executive document. We should agree with the opinion of C.A. Shamlikashvili, that “the specificity and at the same time the advantages of mediation are such properties as its informal, confidential nature: as it is a process, in which the parties participate on an equal footing, while retaining full control both over the decision-making process and its content”(Shamlikashvili C.,2010).

For example, in the United States, approximately 800 companies, including Time Warner, UPS, General Electric, the Prudential, and Coca-Cola, try to resolve a dispute using alternative dispute resolution methods before suing (Runesson E. M. and Guy M. L. Mediating Corporate Governance Conflicts and Disputes, Focus 4). Thus, in order the mediation to become an element of the corporate governance of a company, it is necessary to:

1) adopt a policy providing for the assessment of each dispute regarding its mediaability; require managers to make maximum efforts to resolve disputes through negotiations or mediation, without continuing with a lawsuit; 2) include a clause on mediation in all contracts, namely, providing that before going to court, the parties to the dispute should try to resolve the conflict through mediation; 3) regularly train employees in mediation or negotiation skills based on interests rather than positions; 4) establish that all disputes between parties should be resolved without judicial

procedures. It is possible to regulate the mediation procedure within a large company with the help of internal documents, rules, regulations, and instructions developed by specialists.

At the same time, the effectiveness of this institution is confirmed by international practice. Thus, the United Nations Commission on International Trade Law adopted a model law on international commercial conciliation, in Canada the procedure for conciliation in resolving labor disputes is established as mandatory (Alexander N.M.,2006). Mediation is used in countries of continental Europe, in Canada, Australia, Great Britain and other states. Since 1947, a special federal body has been operating in the USA - the US Federal Mediation Conciliation Service (FMCS) (Ralko V.V., 2009). In Germany, the Federal Union for Mediation in Economics and Labor (Bundesverband Mediation in Wirtschaft und Arbeitswelt) actively operate and develop (Abolonin V. , 2010); and in the UK there is the advisory service for arbitration and conciliation (Asac Codes of Practice), the main function of which is to promote the development of industrial relations and offer, at the request of the conflicting parties, of assistance in resolving the dispute (Voronkova E. R. ,2007).

The effectiveness of the mediation process lies in the fact that it assumes the existence of future relationships between the conflicting parties, and confidentiality. Mediation is applied in cases where the dispute raises issues that are sensitive to the business or the parties, for whatever reason, do not want their dispute to be considered by the court. In addition, the mediation process lasts less than a month, when in the arbitration court the proceedings will take from one to three months, and in arbitration from nine to ten.

Research Methodology

The theoretical and methodological basis of the study is a systematic and structural-functional approach to the analysis of corporate conflict, a sociological and conflictological view of it as a holistic, dynamic, differentiated system of social actions, relationships and processes. The resolution of corporate conflicts is considered in close connection with the specific role of this process in the system of well-established corporate relations.

The principle of unity of the objective and subjective is realized in the study. The objective need for resolving corporate conflicts is defined as a process determined by the real external environment and existing corporate relations, which are influenced by subjective assessments, opinions and ideas of people.

Results

The current development of corporations in Russia is accompanied by an endless series of corporate conflicts, some of which are given in Table 2

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Table 2: The practice of using mediators in resolving corporate conflicts in Russia

Parties to a conflict	*The subject and cause of conflict*	*Intermediary (Mediator)*	*Mediator's interest*
JSC MMC "Norilsk Nickel" Majority shareholders of Interros V. Potanin and OJSC Rusal owned by O. Deripaska	• Criticism of the Norilsk Nickel strategy, dividend policy and operational management of the company; • CEO personality and the board of directors • different management styles of major shareholders.	Roman Abramovich - the guarantor of compliance with all conditions of the agreement between the shareholders of Norilsk Nickel	In 2012, MillhouseCapital bought from Interros and Rusal a 5.87% stake in Norilsk Nickel Rusal sold 3 million 873 thousand 537 shares of Norilsk Nickel (or 2.03% of the total number) to MillhouseCapital, another 5 million 420

			thousand 464 shares were sold to Interram owned by Potanin. MillhouseCapital manages approximately 20% of the company's stake, having the opportunity to act as an arbitrator to resolve conflicts between Norilsk Nickel shareholders
CJSC "Oil Company" Nobel Oil ", LLC" Kolvaneft ", CJSC" NeftUs "and OJSC" Lukoil "	OJSC Lukoil prevented the direct activities of CJSC NK Nobel Oil , LLC Kolvaneft, CJSC NeftUs by stopping the transportation of oil through the Kharyaga-Usa pipeline. During the conflict, the defendant used an illegal form of struggle that is contrary to corporate ethics.	Panel of Arbitrators of the Joint Commission on Corporate Ethics under the RUIE, composed of the chairman of the panel of arbitrators E. Somers, Arbitrators of the Commission - S.V. Generalova and S.A. Abramova, with the participation of the Executive Secretary of the Commission N.A. Ostarkova.	
IJSC Ingosstrakh Majority shareholders O. Deripaska (controlling more than 60% of the stake - 10% personally and about 50%) and A. Mamut (controlling 38.5% of the stake)	Different views on the strategy: A. Mamut wanted to turn the company into a transnational corporation, for which he proposed to attract as a partner the Czech businessman P. Kellner O. Deripaska rejected the proposals make by A. Mamut, since he believed that Russia and the CIS countries should become the main markets for Ingossrakh.	OJSC VTB proposals in 2001	A stake in a joint insurance company.
CJSC Tsvetmetservice and OJSC NK Yukos	CJSC and NK were shareholders of CJSC Rosskat. Yukos owned a controlling interest in it, and Tsvetmetservice - 25% of the shares. The company was suspended from participation in the management of Rosskat. In this regard, it demanded that Yukos either buy out its stocks or, conversely,	Commission on Corporate Ethics under the RUIE. Mediator - Chairman of the Commission, Mr. B.Yu. Titov. His decision did not help Petersburg metalworkers to feel like co-owners of Rosskat. He	

	sell part of its own at an affordable price.	decided that Yukos should simply redeem a blocking stake from Tsvetmetservice.	
In September 2004, Prosperity Capital Management and the Association for the Protection of Investor Rights filed a claim against CJSC Severstal-Group, OJSC Severstal-Resource, and personally, Mr. A.A. Mordashov.	As a result of the additional issue of shares, the package of minority shareholders was diluted, after which the assets of the company were transferred to a third party, which was under the control of the same main shareholder, CJSC Severstal-group. The claimant considered such actions a violation of corporate ethics. The claimants were minority shareholders of OJSC Severstal-Resource.	Joint Commission on Corporate Ethics under the RUIE, Mediator - Mr. E.L. Yuriev.	
Buryat Airlines and Aerofuels refueling company	Buryat Airlines decided to purchase kerosene from another supplier at better prices. The company requested a fuel storage contract with Aerofuels, but the contract was rejected.	Specialists of Federal Anti-Monopoly Service of the Russian Federation	
The majority shareholders of Lenta VTB and TPG on the one hand and August Meyer's Svoboda Corporation	Each co-owner proposed their own representative as the head of the company. Various assessments of the activities of the general director of the Lenta retail network, Jana Dunning; Disagreements of A. Meyer with the composition of the board of directors. Disagreement over development strategies.	"Mediator" - , member of the board and co-owner of «Ilim Pulp and Paper Group» Boris Zingarevich	Option to purchase 3.375 million common equity of Lenta at $ 25.086 per share. The peacekeeper's package amounted to about 3.2%. The peacekeeping mission is thus estimated at 2.6 billion rubles.

Analyzing the first and second columns of the table, we can conclude that disputes mainly occur between majority shareholders regarding inconsistencies in corporate development strategies, the composition of the board of directors and company boards. These conflicts are the result of a concentrated ownership structure and the merging of ownership and management, formed over the past twenty-five years in the Russian economy. In addition to conflicts between majority shareholders, there are also conflicts between majority and minority shareholders, and they are associated with the abuse of control of the majority and violation of the minority shareholders' rights as a result.

But these conflicts have common features: they all arise under the strong influence of personal relationships and emotions. And in some cases, the parties to the conflict even show aggressiveness towards their opponents, which tensions the situation and is not productive for resolving the contradictions between corporate entities. In such circumstances, the actual method of resolving corporate conflicts is the use of mediation, which in countries with a developed corporate governance

system has been practiced for over fifty years, is popular and effective. So, based on international statistics, 25–50% of all disputes go through mediation, and in 80% of cases the mediator resolves the dispute successfully.

Let us note that many businessmen believe that in Russian context mediation will not work - the aggressiveness and distrust of the parties are usually too great, although in our opinion, these are precisely the cases where mediation should help because of its advantages over other forms of resolving corporate conflicts. Despite the skepticism that prevails in business community about the use of the mediator institution in resolving corporate conflicts, mediators have been involved in Russian practice for a long time. Another thing is that these mediators far from meeting the professional requirements of the mediator, although they play a positive role in resolving corporate conflicts. Thus, a number of features of the Russian practice of mediation in resolving corporate conflicts can be highlighted.

Analyzing the second and third columns of the table, we can conclude that the mediators in resolving corporate conflicts are often oligarchs, who are respected in the business community and have a personal material interest in the subject of the conflict. Consequently, the invited intermediaries lack special professional knowledge, not to mention the professional qualities of a psychologist.

A number of authors propose to invite as a mediator - a member of collegiate bodies of corporate governance, for example, a member of the board of directors. But this can be argued, because corporate actions arise in Russian companies as a result of certain actions of the board of directors, although the steps of the board of directors should be aimed at minimizing them.

The requirement to assign personal responsibility to the mediator is also doubtful, when it is supposed that the mediators is accountable to the parties for the harm caused as a result of mediation, in the amount of full reimbursement. The question arises, how a mediator can describe the possible risks and negative consequences, as a result of which the party incurred losses, if his/her task is only to direct the dispute process and create conditions for resolving the dispute? After all, the mediators are not a consultant and they should not have professional knowledge in the field of conflict. The talent of a mediator possessing psychology expertise is crucial for the success of the mediation procedure, and legal knowledge can impede the progress of negotiations.

Conclusions

The costs associated with poor governance and corporate conflicts are too high. And when regulating corporate conflicts, attention should be paid to their emotional side. The advantage of mediation in resolving corporate conflicts is confidentiality, and therefore parties to disputes can “save face”. Mediation is designed to maintain relations between conflicting parties, which is undoubtedly important for corporate relations. But Russian business is characterized by atavisms of a planned economy, namely, CEO’s rude statements, incompetent task setting, lack of skills for developing feedback and constructive criticism, and a low culture of meeting. The use of mediation in such an atmosphere is limited and requires a special approach.

The first step for introducing a mediation approach into the real life of Russian organizations is the ability to communicate with the most short-sighted leaders, who still consider the method of the carrot and stick the only means of managing people. The second step is the need for the parties to explain to the mediator all the features of the corporate culture and company management. As a result, some disputes within the organization can be resolved by internal employees who are not involved in the conflict, but who know the specifics and culture of the organization. As a result, it is crucial today to build a whole system of mediation within the company, designed to help resolve internal conflicts.

To determine to which mediators, internal or external, it is necessary to turn in a specific situation, it is necessary: to distinguish between situations that can be resolved by internal experts or internal employees in the role of mediators; formulate mediation competencies and select the employees who

are most relevant to them; conduct training of internal mediators. The main thing is that the organization's employees are aware of the possibility of resolving conflicts through a similar procedure, and the highest corporate governance bodies have contributed to the maximum use of the internal mediation in the company.

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Expectations of Generation Z from Perspective of Employers: The Delphi Method

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Abstract

This paper aims to identify the factors and areas that Generation Z expects from its employers. However, these expectations are not identified by the representatives of the Z generation themselves, but by the employers themselves represented by HR specialists from Czech companies. For the research was theoretically defined and practical used three-round questioning in the form of Delphi method. The results indicate that employers are able to identify areas that are crucial for Generation Z. However, this identification is not entirely accurate and there are areas such as the need for your own workspace, the importance of the corporate social responsibility concept (CSR), the emphasis on diversity or the business mindset that are important to the Z generation, but employers themselves have not identified them as important. On the contrary, there was a consensus between the expectations of both sides in the areas of learning & development, rewarding or attractive corporate culture. The need for a gradual shift of concentration from Milenialls towards the Gen Z is thus a necessary activity that will give businesses the needed advantage in labor markets.

Keywords: Generation Z; Expectations; Motivation; Delphi Method, Employer

Introduction

In recent years, the media, as well as companies and their human resources (HR) departments, have focused on the Millenials (the generation Y) that entered the labor market. Now is the time when representatives of the next generation, the generation Z (the Gen Z), are entering the labor market. The youngest economically active generation Z consists of individuals born between 1995-2010 and are currently (2019/2020) aged 24 years or less (Henley, 2019; Francis & Hoefel, 2018; Fratričová & Kirchmayer, 2018a, b; Monych 2017; Patel 2017). It means that attention is slowly but surely shifting from the mentioned Millenials towards the Gen Z, specifically to its characteristics. They consist of opinions, views, values, qualities, ideals and, last but not least, the expectations of the representatives of this generation. The necessity of a Gen Z‘s orientation is aslo based on an estimate of the global population according to which the Gen Z is the largest generation on the planet with population of 2.5 billion, the Millenials is about 1.7 billion (13%) (Kleinschmit, 2019; Deloitte, 2018).

Characteristics of Generation Z

The Gen Z growing up at the turn of the millennium is influenced, as it is based on the definition, by various cultural-historical, economic and social factors of the time. Specifically, it can be mentioned the 2008 World Economic Recession or the deteriorating security in the world, for example as a result of the terrorist attacks of September 11, 2001, which according to many sources have influenced mainly the Z generation in the Western Hemisphere (Deloitte, 2018; Merriman, 2018; EY, 2015). The fact that individuals grew up in families that may have been struggling with job loss or living standards in times of economic decline means that individuals are *realistic, pragmatic, self-sufficient and independent* (Deloitte, 2018; Monych, 2017; Patel, 2017; EY 2016; EY 2015

Another undisputed factor that influenced the formation of the Gen Z is *technology* and *digital world*. For this reason, the Gen Z is also called iGen, Gen Tech, Digital Natives or Net Gen (Baldonado, 2018). Since birth, this generation has been surrounded by mobile phones, unrestricted Internet access and social networks (Fratričová, & Kirchmayer, 2018b; Merriman, 2018). This context has the effect that the Gen Z considers its own the validation and retrieval of information anytime, anywhere and can be described as strongly cognitive. The Gen Z uses his smartphone an average of 15.4 hours per week, that supports the positive relationship of the Gen Z to technology (Kleinschmit, 2019). They also expect

the use of technology in their professional lives, for example in the area of learning & development (L&D) - in training, retraining or redeploy of employees (KPMG, 2018).

Other traits of the Gen Z include *self-reliance* and *independence* (Patel, 2017). Unlike the Millenials, which are characterized by shared work environment, collaboration and teamwork, the Gen Z is characterized by independent work (Half, 2015). They want to work on their projects, the results of which are of course fully responsible. This goes hand in hand with the fact that the Gen Z favors its own workspaces at the expense of the currently widely used open spaces (Miller, 2018; Puiu, 2017). This does not mean that the Gen Z is not in personal contact. Quite the contrary, according to Half (2015), three quarters of respondents prefer personal communication. Kutlák (2019) and Bejtkovsky (2016) confirm a similar tendency in their research.

Frequently mentioned characteristic of the Gen Z is a positive attitude towards *entrepreneurship* (Kleinschmit, 2019; EY, 2016). According to Patel (2017), the relationship to starting their own business is 55% higher than for the Millenials and even 72% of college students would like to start their own business. In addition, 61% of college students and more than 40% of high school students would become an entrepreneur rather than to be employed (KPMG, 2018). In general, entrepreneurship and innovation are among the main skills of this generation. At the same time, the Gen Z is aware, even on the basis of its pragmatic approach, that business brings possible failure. Less than three quarters of the Gen Z are aware, according to EY (2016), that their business may end in failure. But at the same time they want to learn from that mistakes. Entrepreneurship is also supported by the fact that almost 90% of the Gen Z wants to spend part of their free time productively and creatively (EY, 2016).

It is precisely *financial security* that is mentioned as the most frequent inspiration and motivation for the Gen Z and their professional life (Deloitte, 2018, Hppy, 2018; Half, 2015). Among the three most importnat work motivation factors is mentioned by Schwabel (2014) (2nd position); Half (2015) (2nd position); Deloitte (2018) (1st position) or Kubátová (2016) (1st position). According to a survey by Kirchmayer and Fratričová (2018b), one third of respondents (3rd position overall) evaluate the financial reward as an main motivation factor. However, great interest in financial security also brings issues in the form of overstated expectations of salary levels or growth. According to the PayScale (2019), the average expected wage is higher than the median of the actual wage in 10 out of the 12 sectors surveyed (with the exception of computer science and nursing). This is also confirmed by the fact that college students actually receive 23% lower wages than they initially expected (Henley, 2019).

For the representatives of the Gen Z is very important *meaningful work*, which can be expressed, for example, in feeling of satisfaction from the work done, but also in the *impact of the company* on the outside world. The activities of the company in which the Gen Z wants to work must be in accordance with the individual's beliefs. This belief is presented, for example, by the impact on the social and environmental environment and on the ethical nature of the company, which according to Deloitte (2018) is important for 77% ot the Gen Z. Moreover, activities in these areas must be real and should be developed through the entire stakeholder system (Francis & Hoefel, 2018). According to Kleinschmit (2019) 60%, and according to EY (2016) 38% of the Gen Z wants to act by changing the world for the better and the profession could be one of the tools.

Regarding *career opportunities* and *career development*, unlike their predecessors, the Gen Z does not place much emphasis on job titles and does not recognize the traditional career ladder system (Baldonado, 2018; Monych, 2017). According to Kubátová (2016), Kirchmayer and Fratričová (2018b) and Baldonado (2018), expectations of career growth and opportunities are among the main motivators. However, career opportunities are not only related to advancements, but also to alternative career changes, such as rotating at different positions, participating in multiple projects (their own), performing multiple roles or diverse workloads regardless of individual specialization (Deloitte, 2018). KPMG, 2018). It is estimated that the youngest generation should also become the most educated generation (Adecco, 2019; Deloitte, 2015). Long-term education also has an impact on the need for further education in the workplace.

As mentioned above, the *work environment/culture* and *flexibility* are other factors of motivation. As both the Millennials and the Gen Z are looking for a job that provides them the possibility of flexible schedule, more and more organizations will be offering workplace flexibility to attract and retain these

talents in the long term (ManpowerGroup, 2018). According to KPMG (2018), 47% of the Gen Z consider the entertainment environment to be important and 44% wanted flexibility in their work schedule. However, can be found the studies in which flexibility and work-life-balance factors do not feature prominently (eg Meret et. Al., 2018; Kirchmayer and Fratričová, 2018b). Because of their positive relationship to technology, they are willing (if the nature of work permits) to work anytime and anywhere (Henley, 2019). It follows that the Gen Z is more focused on completing tasks than on the time spent at work.

Finally, it is necessary to mention the *diversity* in the workplace, which is a matter of course for the Gen Z rather than a factor influencing them in the choice of their employer (Deloitte, 2018; Hppy, 2018). Companies with high homogeneity (age, race, gender, etc.) may thus be unattractive for Gen Z representatives (Deloitte, 2018; Monych, 2017).

Research Methodology

The research was carried out using the Delphi method, which is characterized as a qualitative method with the form of controlled group communication, the aim of which is to converge to the same opinion or view of the examined issue. The communication process is represented by several-round questioning of respondents with controlled feedback. The use of this method in research is recommended for areas that do not work with historical data and therefore is a very little explored area (Wright & Grime, 2016; Ferreira et al., 2015; Habibi et al., 2014). Experts are guaranteed anonymity and are not under pressure from their surroundings, social norms or working position when expressing their opinions, views and feelings. (Ferreira et al., 2015). Thanks to individual answers, the respondent cannot succumb to the majority influence or interests of a strong personality. Strengths of this method are low cost, no time limitation and no need for collective meetings (Habibi et al., 2014).

The group of respondents, called as experts, consists of competent experts who have sufficient knowledge and experience with the subject matter. It is possible to define a group of experts using conditions that all or part of the experts must match. According to Wright & Grime, (2016) the optimal number of heterogeneous group is between 5-20 experts. Laurie & Mortimer (2019) report a number of 10-15 experts. It is also necessary to think about the return rate of questionnaires, which ranges between 40-77% (Egerová & Mužík, 2010).

The reason for terminating the questioning is stated to reach a consensus among the interviewees, but Green (2014) states that the reason may also be the fact that the data show a big mismatch and no consensus among the interviewees can be expected. However, it is stated that two rounds are considered to be the absolute minimum and three rounds of questioning are considered sufficient (Wright & Grime, 2016; Green, 2014).

Delphi Survey

The Delphi research is focused on the expectations of the Generation Z from the perspective of employers. However, as can be seen in the theoretical framework of the article, expectations are often obtained only from Gen Z views, but the perspective from employers and the subsequent comparison are equally important.On this basis, the following research question has been evaluated:

The research question*: Which factors and areas, according to employers, will be expected from the Gen Z in relation to their employer?*

It is the view of the employers themselves that, on the basis of comparison with data from the representatives of the Gen Z, tells about the readiness of companies. It is also possible to identify possible areas where there is no consensus between the two parties of the psychological contract. Ruchika & Prasad (2019) define the Anticipatory Psychological Contract (APC) as a term that indicates a set of mutual expectations and responsibilities between employees of an organization and an organization. This, of course, undermines the performance of the organization.

The research itself took place between November 2019 and January 2020. Before the research, the questionnaire was piloted on a smaller group of experts. The panel of experts selected for this research is composed solely of persons with sufficient knowledge of the issue of the Gen Z expectations. This assumption was fulfilled as a result of setting out the following criteria for the selection of panelists.

- The research participant (expert) is a person who represents an organization that employs or will employ a representative of Generation Z in the near future.
- The research participant (expert) is a person who has at least 3 years of practical experience in the field of human resources.

Based on the above criteria, 29 persons satisfying the given conditions (both together) were approached. Out of the addressed respondents, a total of 24 experts representing national and multinational companies operating in the Czech Republic promised to participate in the interview.

Procedure and evaluation of first round of Delphi method

The first round of research was carried out between November and December 2019. The addressed experts were asked for opinions or views on the issue of working expectations of the Z generation representatives from their future employers. The form of the answer was open to ensure the widest range of different opinions and views on the issue. In total, 21 experts took part in the first round with a response rate of around 88%. The form of distribution of questionnaires was using Google forms.

During the evaluation of the first round, individual answers were processed. Synthesis was used to unify the opinions and views of individual experts. Based on the answers, a total of 29 unique factors were obtained, which occurred several times in the expert's answers. These factors were further divided into 4 areas. The theory of the anticipatory psychological contract was based on the creation of areas. This theory according to Lub et. al (2016) mentions five dimensions of the APC fulfilment, which have been adjusted to the following 4 areas due to the opinions and views of the researched issue and because of the saturation of individual areas: *Benefits and Rewards; Content of Work; Social and Corporate Atmosphere; Learning and Career Development*. Experts are more focused on narrower issues in their rating and the factors are more easily compared to each other - especially in the third round of the Delphi method. All areas and their factors are shown in Tab. 1-4, which are part of the evaluation of the second round.

Procedure and evaluation of second round of Delphi method

The second round was carried out immediately after the evaluation of the results of the first round and took place from 10 to 24 December 2019. The aim of the second round was to evaluate the factors that were the output of the first round of the Delphi method. The experts were asked to evaluate the individual factors, which were divided into the mentioned areas. Likert's 5-grade rating scale was used for the assessment, where the lowest grade 1 presents a low-impact opinion (the factor will not be crucial for the expectations of individuals of the Z generation from future employers). On the other hand, the highest level 5 means the fundamental influence of the factor and thus the fact that individuals will expect this factor from their employers. A total of 20 questionnaires were completed in the second round, indicating a high rate of participation / return.

For the evaluation of the second round were used descriptive statistical methods – *the mean, median and the sample standard deviation*, which is the characteristic variability of a statistical sample (Laurie & Mortimer, 2019). Using the values of the mean, the importance of the individual factors and thus their order for the third round of the Delphi method is determined. At the same time, given the 5-degree scale, it can be argued that the factor becomes important at an mean value of 3 and above. Mean values that are equal to or greater than 4 can be considered very important. Factors with a value less than 3 can be described as unimportant and these factors were eliminated for the third round.

In the first area, the highest rated factors were „Flexible hours“ and „Regular growth of salary“ with an average value higher than 4. This value was also approached by the Generous salary factor. On the contrary, the factor "Financial contribution for non-work benefits according to the individual's interests (books, cinemas, etc.)" reached a below average rating of 2.75 and is not taken into account for the third round of the questioning. At the same time, when compared to other areas, the sample standard deviation values are higher for most factors, indicating greater variability in individual responses.

Tab. 1: Importance of factors - Area of Benefits and Rewards

Benefits and Rewards	Mean	Median	Std. dev
Flexible hours	**4.25**	4.5	0.91
Regular growth of salary	**4.15**	4	0.88
Generous salary	3.95	4	0.94
Home-office	3.9	4	0.97
Sick days	3.65	4	0.81
Individualization of benefits according to individual needs	3.2	3	1.01
Shortening of working time	3.05	3	0.89
Financial contribution for non-work benefits according to the individual's interests (books, cinemas, etc.)	*2.75*	3	1.07
Total Mean	**3.61**		

The second area is "Content of Work", where three factors have a value greater than 4 and can be considered as important. Conversely factor "Shorter work Concentration (No need to work continuously and focused)" reached average value lower than 3, and for the third round was eliminated. The sample standard also indicates greater variability of the research sample. Moreover, the overall average for this area is the lowest ever, specifically 3.59. If, however, the overall average were calculated only from factors that are also used for the third round, then its value would be higher - 3.74.

Tab. 2: Importance of factors - Area of Content of Work

Content of Work	Mean	Median	Std. dev
Meaningful work	**4.15**	4	0.88
Work-life-balance	**4.1**	4	0.85
Focus on tasks than on time at work	**4**	4	0.73
Diverse and creative work	3.7	4	0.92
Use of flexible types of working time (part-time etc.)	3.3	3	0.86
Slow work pace	3	3	1.12
Shorter work concentration (no need to work continuously and focused)	*2.85*	3	1.04
Total Mean	**3.59**		

The "Social and Corporate Atmosphere" area contains two factors with a value greater than 4. Even the "Attractive workplace culture and friendly atmosphere" factor is the best rated factor across all areas and is the only one reaching a median of 5. No factor has an average value of less than 3, which is also the cause of a higher overall average of 3.68.

Tab. 3: Importance of factors - Area of Social and Corporate Atmosphere

Social and Corporate Atmosphere	Mean	Median	Std. dev
Attractive workplace culture and friendly atmosphere	**4.45**	5	0.76
Open communication	**4.2**	4	0.77
Workplace trust	3.75	4	0.72

Modern elements of relaxation and fun at workplace	3.55	4	0.76
Emphasis on environmental and social responsibility of the company	3.45	4	1
More frequent teambuilding events	3.4	3	0.75
Less bureaucracy and administration	3.35	3.5	1.18
More personal space (against open workplaces)	3.25	4	1.12
Total Mean	**3.68**		

In the fourth area of study "Learning and Career Development", there was only one factor rating of 4. However, the first five factors, as can be seen in Tab. 4 below, reached a very above-average value of 3.9. This implies that an overall average of 3.88 makes this area the highest rated and therefore most important. The sample standard deviation reachs lower values for most factors, indicating low variability in the examined values.

Tab. 4: Importance of factors - Area of Learning and Career Development

Learning and Career Development	Mean	Median	Std. dev
Skill/capability development and learning needs	**4**	4	0.79
Fast career advancement	3.95	4	0.76
Traveling is part of job (eg internships abroad)	3.95	4	0.76
Using and improvement in foreign languages	3.95	4	0.83
Engaging digitization in work and development	3.9	4	0.97
Development outside scope of job position	3.5	3.5	0.69
Total Mean	**3.88**		

It is clear from the results of the second round that "Learning and Career Development" is the area that the Gen Z will place the greatest emphasis in its expectations. The second area according to the overall average is the "Social and Corporate Atmosphere". A total of 7 factors with an average values of more than 4 have been identified across all areas (bold highlighted), making them very crucial already after the second round. In other words, employers identify them as important and expected from the Gen Z.

Procedure and evaluation of third round of Delphi method

The third round of Delphi research was carried out immediately after the evaluation of the results of the second round from December 2019 to January 2020. The aim of the third round was to evaluate the factors in the selected areas. In the questionnaire, factors were presented in order from most important to least important, based on the results from the previous round. However, unlike the second round, the evaluation of experts consisted of considering the order (importance) of the factors within each of the 4 areas. All three rounds of the Delphi method were actively attended by 18 experts, which means a return of 75% (according to Egerová & Mužík (2010) it is the upper limit of the expected return).

Similar to the second round, statistical methods were used to evaluate the third round, namely *the non-parametric Kendall's coefficient of concordance (Kendall's W)* (Habibi et al., 2014). Using this coefficient it is possible to determine the tightness (compliance) of evaluation of individual experts. The calculation is performed using the following formula:

$$W = \frac{\Sigma X^2 - \frac{(\Sigma X)^2}{n}}{\frac{1}{12}k^2.(n^3 - n)} \quad (1)$$

where:

W… value of Kendall's coefficient of concordance;
X… total ranks of factor;
n… number of ranked factors;

k… number of judges (Chráska, 2016).

The coefficient can be a value of 0 - +1, while a value of +1 indicates a complete match of the order of factors between the experts. According to Habibi et al. (2014) there is strong agreement for W values> 0.7; slight agreement for W≈0.5 and poor agreement for W <0.3. In the Tab. 5-8 below, the factors, that were identified as key areas in the second round, are indicated in bold.

In the "Benefits and Rewards" area, there were only two shifts in the third round, between 2nd and 3rd and between 5th and 6th. As in the second round, the experts rated the factor "Flexbile hours" as the most important. On the contrary, the „Shortest of working time“ was again chosen by experts as the least important. The coefficient of agreement is 0.53, which indicates a slight agreement among the experts.

Tab. 5: Factors ranking - Area of Benefits and Rewards

Benefits and Rewards	Primary rank	Sum of ranks	Final rank
Flexible hours	1.	40	**1.**
Regular growth of salary	2.	49	**3.**
Generous salary	3.	46	**2.**
Home-office	4.	68	**4.**
Sick days	5.	104	**6.**
Individualization of benefits according to individual needs	6.	92	**5.**
Shortening of working time	7.	105	**7.**
Kendall's *W* = 0,53			

In the "Content of Work" area, only the "Diverse and creative work" factor was shifted to the 3rd place (at the expense of "Focus on tasks rather than time at work" factor). As the least important factors for the Gen Z, HR experts expect the factors "Use of flexible types of working time (part-time etc.)" and "Slow work pace". The Kendall's *W* value is 0.46, which is less than in the "Benefits and Rewards" area, but the data still shows a weak concordance in the experts' answers.

Tab. 6: Factors ranking - Area of Content of Work

Content of Work	Primary rank	Sum of ranks	Final rank
Meaningful work	1.	35	**1.**
Work-life-balance	2.	46	**2.**
Focus on tasks than on time at work	3.	69	**4.**
Diverse and creative work	4.	52	**3.**
Use of flexible types of working time (part-time etc.)	5.	80	**5.**
Slow work pace	6.	96	**6.**
Kendall's *W* = 0,46			

In the third area of study "Social and Corporate Atmosphere", where most factors occurred (8), the ranking changed only to the 2nd and 3rd position and to the 6th and 7th position. However, it should be noted that the 2nd and 3rd place factors have very similar value to the sum of ranks. The total Kendall's W for this area is the same as the previous area, 0.46 (weak concordance).

Tab. 7: Factors ranking - Area of Social and Corporate Atmosphere

Social and Corporate Atmosphere	Primary rank	Sum of ranks	Final rank
Attractive workplace culture and friendly atmosphere	1.	25	**1.**
Open communication	2.	62	**3.**
Workplace trust	3.	58	**2.**
Modern elements of relaxation and fun at workplace	4.	92	**4.**
Emphasis on environmental and social responsibility of the company	5.	95	**5.**
More frequent teambuilding events	6.	107	**7.**
Less bureaucracy and administration	7.	96	**6.**
More personal space (against open workplaces)	8.	113	**8.**
Kendall's *W* = 0,46			

The fourth area focused on "Learning and Career Development" shows the lowest concordance (*W* = 0.4), even though the area contains only six factors. The change occurred in the first position (Fast career advancement). As can be seen in Tab. 8 below, based on the results of the second round, where the first five factors oscillated around a value of 3.95 (+ -0.05), it was possible to expect different shifts in order due to the significant importance of all factors.

Tab. 8: Factors ranking - Area of Learning and Career Development

Learning and Career Development	Primary rank	Sum of ranks	Final rank
Skill/capability development and learning needs	1.	44	**2.**
Fast career advancement	2.-4.	35	**1.**
Traveling is part of job (eg internships abroad)	2.-4.	64	**4.**
Using and improvement in foreign languages	2.-4.	62	**3.**
Engaging digitization in work and development	5.	83	**5.**
Development outside scope of job position	6.	90	**6.**
Kendall's *W* = 0,40			

Discussion and Conclussion

The aim of the research was to identify factors that will be important for the youngest economically active generation, ie for the Gen Z, based on the opinions and views of the HR experts. The research was conducted by using the three-round Delphi method, which resulted in the following findings. The experts identified a total of 29 factors that have been divided into 4 areas (see tables above). These factors were evaluated by experts using the 5-degree Likert scale in the second round of the Delphi questioning. According to the results, the most important factors for experts are (these factors have rating of 4 and above):

- Flexible hours;
- Regular growth of salary;
- Meaningful work;
- Work-life-balance;
- Focus on tasks than on time at work;
- Attractive workplace culture and friendly atmosphere;
- Open communication;

- Skill/capability development and learning needs.

Conversely, on the basis of below-average evaluation, the following factors were considered by experts as an unimportant (values below 3):

- Financial contribution for non-work benefits according to the individual's interests (books, cinemas, etc.)
- Shorter work concentration (no need to work continuously and focused)

When comparing the different areas, experts rated the Gen Z as the "Learning and Career Development" area (total mean 3.88), followed by the "Social and Corporate Atmosphere" area (total mean 3.68). The other two areas reached the same rating of the total mean of approx. 3.6. According to the outputs from the last round, the preferences of the factors within individual areas were adjusted by changing the order. According to Kendall's W values, there is only a slight consensus among the participating experts across areas of research.

The following conclusions can be drawn when comparing the research results with the theoretical framework of the paper. L&D (Learining and Development) is a highly valued area for both the Gen Z and experts. In addition, Gen Z representatives also report the involvement of digitization in this field. In the "Social and Corporate Atmosphere", businesses have identified attractive corporate culture and open communication as important factors, which does not contradict the views of the Gen Z. On the contrary, they identified as unimportant the factor „More personal space (against open workplaces)", which, however, is gaining importance in the youngest the Gen Z (unlike the Millennials). Estimates of businesses may be distorted by the previous generation of the Millenials, for which an open workplace was in high demand. Also the factor concerning "Emphasis on environmental and social responsibility of the company" was not identified by experts as very important, but representatives of the Gen Z place great emphasis on this issue. The agreement of experts with the Gen Z can be found in the area of the „Work content", where both sides identify „Meaningful work" and „Work-life-balance" as very important factors. A similar consensus can also be observed in the area of the „Rewards and Benefits", where high pay and flexibility in the choice of working time are important for both the Gen Z and HR experts.

Among the areas that are important for the Gen Z, but experts have not been mentioned in the Delphi survey, are the focus on diversity and entrepreneurial spirit of this generation. The application of these areas, together with the other factors mentioned above, may lead to greater business readiness, which may ultimately result in easier recruitment or retention of Gen Z workers.

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Trademarks in Company Resources at The Background of Their Valuation

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Abstract

The paper addresses the issue of the place of trademarks in the company's resources and the use of such resources in business activity. The concepts of trademark and brand were distinguished, specifying their definitions. The considerations were also focused on the concept of their legal protection. The objectives of trademark valuation were described, and income methods were indicated as being among those that best estimate their value, based on generating future economic benefits. Particular emphasis was focused on the definition of discounting itself and the discount rate as the cost of the company capital.

Keywords: Trademark, Trademark Valuation, Discounting, Discount Rate.

Introduction

In the times of market economy, competition between different entities makes each of them strive to be recognisable among customers. Such recognisability is very often achieved through the identification of the seller with certain positive (or negative) characteristics of the products or services sold. It can be achieved by marking one offer with a specific trademark, which is to be associated with the brand and its quality. A trademark that is known on the market and well associated is part of the company's assets, the value of which is often difficult to estimate.

The issue of trademarks and their valuation is also particularly important when an entrepreneur wishes to use another's trademark against payment, or to let his own trademark be used by another entity.

The purpose of this paper is to present the methods of financial mathematics used in trademark valuation, and more specifically the process of discounting future benefits generated by the valuated trademark. The paper also points out the most common practical objectives of the valuation of such intangible assets.

Objectives of trademark valuation

A very important part of the company's activity is its development, ensured, among other things, by its internal resources. Subject literature usually distinguishes three types of company resources: material, human and intangible. This paper focuses on intangible resources, which include: know-how, technology, patents, licenses and the brand, as well as the trademark characterised below.

According to the definition of a trademark provided in the Industrial Property Law Act [The Act 2000] “a trademark is any sign that can be used to discern the goods of one entrepreneur from those of another and can be presented in the trademark register in a manner that allows for the identification of the unequivocal and accurate subject matter of the protection granted. A trademark may be, in particular, a word, a drawing, an ornament, a colour composition, a spatial form, including the form of the goods

or their packagng, as well as a melody or another sound signal. Commonly, trademarks are referred to as: trade name, company marking, company name or logo."

In turn, European Union regulations [Council Regulation 2009] indicate that EU trade mark may consist of any signs (words, including names) or drawings, letters, numbers, colors, the shape of goods or their packaging or sounds, provided that that such signs enable the goods or services of one company to be distinguished from the goods or services of other company, and that they can be presented in the register in a way that makes it possible to establish the unambiguous object of protection.

In view of the high competitiveness of companies operating on the market, it is essential to distinguish their products or services from others, of the same kind but offered by other entities. They allow to distinguish between products of the same type offered by different entrepreneurs, thus constituting the basis for building the image and reputation of the brand [Zieliński, Kubacki 2014]. An important aspect of the use of a given trademark is to provide it with legal protection by registering it with the relevant office. The duration of a trademark's protection right is 10 years from the date of its registration with the Patent Office. It is possible, however, to renew it for further ten-year periods upon the fulfilment of certain conditions.

It indicates that a trademark may be granted a protection right which, according to the balance sheet law, may constitute an intangible asset upon the fulfilment of certain conditions.

Providing trademarks with adequate legal protection not only prevents infringement by other companies but can also contribute to the material benefits arising from their use. The trademark's protection right brings its owner various benefits, including the fact that the right to the trademark may be traded, i.e. it may be transferable and inherited. The establishment of a trade mark licence agreement is also permissible [Furman 2015]. Such a case constitutes an example of a situation where a need arises for the valuation of a trademark, allowing the entrepreneur to grant other entrepreneurs the right to use its trademark in exchange for payment, based on a license or a franchise. Another motive for trademark valuation can be e.g. its sale or a contribution-in-kind to the company, which will increase the value of the entire company. The trademark therefore increases the company's market value and reputation. It makes a given brand not only popular but also credible. The registration of a trademark allows to build bonds with customers and leads to the association of the products of a given company (entrepreneur) with a certain standard and quality, while the customers know that this is where they can find them [Falkowski and Słupicka 2019].

A trademark may have legal protection throughout the country or may be protected throughout the European Union. In the second case, the trademark is registered in the European Union Intellectual Property Office (EUIPO) based in Alicante, Spain. EUIPO is the European Union Intellectual Property Office responsible for managing the EU trade mark and the registered Community design. We also work with the IP offices of the EU Member States and international partners to offer a similar registration experience for trademarks and designs across Europe and the world.

Trademark valuation is associated with yet another objective. Unfortunately, the legislation does not allow companies to register the trademarks they have developed. In order for a trademark to become an intangible asset entered into the company's accounting ledgers, certain conditions must be met under both balance sheet and tax law. The conditions that must be met by the entity in this respect are set out in the Accounting Act. The trademark must be acquired by the entity, it must be suitable for economic use, and its expected period of economic utility must be longer than one year; moreover, it must be intended for the needs of a given entity [The Act 1994]. This implies that only trademarks that have been purchased can become part of intangible and legal assets included in the balance sheet. In such a case, it is necessary to estimate the value of the purchased trademark, which includes its purchase price (excluding VAT and excise duties) increased by the costs directly related to the purchase. The initial value calculated in such a way is subject to depreciation or amortisation write-offs in accordance with the general principles set out in the Accounting Act [Pach 2019]. Tax depreciation consists in spreading over time the costs associated with the introduction of certain assets into the company, in this case

those of a trademark. It affects the amount of the company's income, which constitutes the basis for income tax. The subject of depreciation, however, is not the trademark itself, but rather the right of protection assigned to it, which means that only a trademark for which a protection right has already been granted within the meaning of the Act on Industrial Property Rights may be subject to tax depreciation. Depreciation of an unregistered trademark is possible, however, in such cases the trademark is regarded as a work subject to copyright law and may be subject to depreciation on the basis [Falkowski and Słupicka 2019].

There is one more need for trademark valuation, pointed out by G. Urbanek, namely the need to estimate the value of collateral in order to raise external capital and for the purposes of legal disputes concerning the infringement of intellectual property rights [Urbanek 2011].

The problem of trademark valuation

Intellectual property (IP) and intangible asset (IA) issues abound throughout the business world, touching nearly all aspects of a company, from product development to human capital, and staff functions such as legal, accounting, finance to line operations such as R&D, marketing and general management [Flignor, Orozco 2006]

The valuation of a company's intangible assets may be related to their overall value or the value of individual factors, which include trademarks. In the valuation of trademarks, the same approaches are used as in the valuation of tangible assets or entire companies, namely the cost, market and income approach. This three generally accepted valuation approaches are employed by valuation analysts to estimate the value intangible property, including trademarks [Marcinkowska 2011; Smith,, Richey 2013].

The cost approach assumes that the value of a trademark is the result of the updated value of outlays that would have to be incurred to reproduce a given mark [Czerwiński, Wiszowata 2013]. These may be, e.g. costs related to the creation of the image of the mark or the costs of its registration at the Patent Office. [Thoma, 2017] This method leads to the lowest value of the mark being valued. The problem with this method is the estimation of costs for trademarks that have been on the market for a long time due to the frequent lack of data for calculations. [Niklewicz-Pijaczyńska 2017]

The advantage of the cost method is the ability to simplifying the estimation of the value of the trademark. On the other hand, the disadvantage of this method is the fact that the estimated value of the trademark does not take into account its market nature or ability to generate profits, which the company can generate due to the given trademark. It only indicates the expenditure that has been incurred in connection with the creation of the trademark, its registration or marketing activities. The valuation of a trademark using the cost method is also associated with the risk of making an quite significant error resulting from underestimation of the value of trademark. A trademark can be created at a low cost, while its recognition can be very high and can generate considerable revenues.

The second approach to trademark valuation is the market approach. The point is to compare transaction prices for analogous trademarks [Damodaran 2009]. In this method, the value of a trademark is determined on the basis of the market value of the sale transactions of similar trademarks. However, this method is difficult to apply because there is no market for this type of transaction. In addition, transactions are mostly confidential, which means that external entities are not able to obtain accurate information on the terms of the transaction and the price set by the parties in the agreement [Stronka, Kołata 2018].

The next approach mentioned to trademark valuation is the income approach. In this approach, the value of the trademark is in line with the current value of the expected economic benefits arising from its ownership. This method takes into account projected future revenues and costs associated with the trademark and can be used to a much broader extent than the two approaches described earlier. This

method is consistent with the Discounted Cash Flow (DCF) [Götze, Northcott, Schuster 2015] used in determining the value of an enterprise as a whole [Flisiuk, Gołąbek 2017].Summing up the characteristics of valuation methods used for trademarks, I conclude that they are identical to the methods used to value companies. In addition, the income method has an advantage over the others.

Nevertheless, the valuation of the company's intangible assets, which include trademarks, constitutes a more difficult task for an analyst in comparison with the valuation of tangible assets or entire companies [Urbanek 2011]. This is related to certain limitations, such as the unique character of the trademark, but also its absence of the market on which the sale of trademarks would take place. Another obstacle pointed out by G. Urbanek is the problem with estimating the economic benefits brought by the trademark. [Urbanek 2008].

As indicated by P. Szczepankowski, the trademark's value depends on how it affects the company's financial results, including the value of sales revenues, the value of net profit or that of the cash flows. In view of the above, he argues that the best method for estimating a trademark's value would be the income or market (comparative) method, and not the property method which presumes that the trademark's value is its expressed replacement or reproduction cost [Szczepankowski 2007, Borkowski 2009].

The income methods of trademark valuation are based on predictions of the future in terms of revenues generated by the owned trademarks. According to the income approach, the value of the intangible asset that is a trademark is as high as the current value of the expected future economic benefits generated by the trademark [Borkowski 2009, Urbanek 2001, Polański 2006]. The income approach indicates the key factors that need to be estimated while taking this path of trademark valuation. Such factors include [Urbanek 2011] the volume of expected future economic benefits that will be generated in subsequent periods by the trademark, time of their generation and the risk associated with obtaining them.

The general model of trademark valuation based on the income approach may be shown mathematically by means of the following formula [Michna 2003]:

$$\text{BRV} = \frac{p_1}{(1+k)^1} + \frac{p_2}{(1+k)^2} + \cdots + \frac{p_n}{(1+k)^n} + RV \times \frac{1}{(1+k)^n},$$

where: BRV – value of the trademark subject to valuation, p – future net cash flows generated by branded products, RV – residual value, K – rate of return required for the trademark (discount rate, cost of capital), n – income generation period.

When pointing out the problems that may be encountered by the analyst during trademark valuation, the estimation of the economic benefits generated by the trademark was indicated, as such benefits should be separated from the overall benefits generated by the company's business activity. One of the methods of estimating a trademark's benefits is to calculate them using hypothetical licence fees that would arise in the case of using someone else's trademark and bearing the resulting lease (license) fees. The amount of the license fee is typically based on market fees charged for similar factors, whereas license rates are most commonly set as a percentage of sales revenues [Urbanek 2011].

The second problem encountered in trademark valuation is the determination of the time of future income generation by the trademark. It could be assumed that the lifespan of a trademark is the duration of legal protection that is granted for a period of ten years by both the Patent Office and the European Union Intellectual Property Office. However, upon expiry of this period, it is possible to renew the protection for further periods of ten years. It would therefore be unjust to limit the time taken into account during trademark valuation to only ten economically beneficial years. It is therefore reasonable to set the financial projection period for an infinite number of years, which is reflected in the residual value (RV).

Another parameter used in income methods is the discount rate recognised as the cost of capital and the discount factor. These issues will be discussed in the following section of the paper.

Discount rate in trade mark valuation as an element of financial mathematics

When using the income approach in trademark valuation, it is necessary to forecast the future economic benefits that will be generated by the valued trademark. Given that they are distant in time, their value must be converted into their present value, i.e. their value as of the date of trademark value estimation. For this purpose, the accounts require the use and application of the change in the value of money over time [Mączyńska 2005].

The determination of the discount rate is of great importance for trademark valuation valuation [Krüger, Landier, Thesmar 2015], as with the same level of economic benefits generated by the trademark being valued over the following years, but with different discount rate levels, the value of the trademark will also differ. The discount rate allows for the estimation of future income as of today and thus allows for the estimation of the value of the trademark [Gollier, Hammitt 2014].. Its assumption is the changing value of money over time. The value of the amount that we may receive in a year or two is, from our perspective, fundamentally different from the same amount received today, as we may invest the present amount in a different manner, thus obtaining greater (or lesser) amounts in a period of one or two years. To calculate the value of money over time, the compound interest account is used, along with its inverse, discounting [Węgrzyn 2018].

According to M. Podgórska and J. Klimkowska, discounting consists in calculating the value of the initial capital PV on the basis of the known value of the final capital FV for a fixed time n [Podgórska, Klimkowska 2005]. Discounting consists in determining the present value of future cash flows generated by the trademark. It answers the question what the present value of the future benefits is, thus allowing for their comparison with the present benefits [Marcinek 2002].

The following formula is used to calculate the future value of capital FV [Bojańczyk 2011; Davidson, Song, Tippett 2015]:

$FVn = PV \times (1+r)^n$,

where: FV – future value of capital; PV – present value; n – number of years; r – interest rate per annum.

The above indicator allows for the calculation of the future value of a given amount of money invested today. However, from the point of view of income-based methods of trademark valuation, the amount required is not the future value of the trademark, but its present value. It is therefore necessary to transform this formula in order to calculate the present value PV [Sobczyk 2011].

$$PV = \frac{FV_n}{(1+k)^n},$$

where: k – discount rate (cost of capital).

The discount rate r and the so-called discount factor dn are used in economic calculation. The discount factor is distinguished from the percentage rate [Towarnicka 2004]. If the cost of capital is determined, then the discount factor dn is calculated using the formula [Walica 1999; Rogowski 2004]:

$$d_n = \frac{1}{(1+k)^n},$$

where: n – period of generation of economic benefits by the trademark.

When shown this way, the discount factor is the inverse of the percentage rate, whereas the main element of the discount factor is the discount rate that expresses the change in the value of money over a given period (usually per year).

The value of a trademark depends not only on the value of future economic benefits, but also on the time they can be made available to the company, as over time their present value decreases, despite setting the same discount rate for each year. Current, present value PV of individual future economic benefits is lower than their future value FV [Mączyńska 2005].

The application of the discount rate in trademark valuation has for its purpose not only to provide comparability of individual economic benefits obtained at different moments in the future, but also to express the limit rate of return on capital employed expected by the investors [Rogowski 2004]. The reason for this is that the capital invested by the investor in a given trademark or company could be used in other ways, possibly generating higher benefits. This alternative use of capital is expressed precisely by the discount rate. The existing discount rate estimation methods typically use two factors that influence its level, namely the cost of capital and the risk premium [Bojańczyk 2011]. Typically, in the case of trademark valuation, it is assumed that the cost of capital and the risk of obtaining benefits in the future are equivalent to the cost of capital and the operational risk of the entire company. The cost of capital is related to financing the company and investing the capital in this particular company, which means that its estimation will depend on whether the company is financed solely with own capital, or with foreign capital as well. Subject literature places particular emphasis on hybrid, or mixed, financing. In this case, a weighted average cost of capital is calculated, which is the cost of engaging all forms of capital in the company's operations. And it is precisely the weighted average cost of capital (WACC) that constitutes the discount rate used in income-based trademark valuation, converting future economic benefits to their current value as at the time of trademark valuation. [Zarzecki 2016].

In order to calculate the WACC [Magni 2015],, it is necessary to determine the share of individual capital involved in financing the company operations and, separately, determine the cost for own capital and foreign capital. These issues, however, will be subject to theoretical and empirical research in a separate study.

Conclusion

Intangible resources, including trademarks, represent a significant proportion of the company's total value and are therefore increasingly subject to corporate finance studies. Their role in a competitive environment is continuously expanding. More and more often, the trademark is perceived separately from the concept of the brand, which is only a marketing concept. This entails the need for trademark valuation. According to the literature of the subject, the best methods of trademark valuation are income-based methods that use financial mathematics processes, namely discounting, that is bringing future economic benefits generated by trademarks to the valuation date. A key element of this process is the estimation of the discount rate that will correspond to the financing structure and, at the same time, reflect the cost of capital involved in the company's operations.

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The Aspect of Fair Value in the Valuation of the Enterprise

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Abstract

The purpose of this article is to present fair value and its impact on the valuation of the enterprise from the appraiser's/analyst's perspective. Asset-based and income-based methods in a theoretical aspect have been presented as well as a case study of the valuation of the enterprise with these methods with the use of the fair value. Adjusted values of the assets on the basis of the balance sheet of the analyzed entity have been defined and correlated with their fair value.

Keywords: Fair Value, Book Value, Asset-Based Valuation, Income-Based Valuation, Valuation Of The Enterprise

Introduction

The valuation of the enterprise comprises many activities carried out in accordance with the rules of science and evaluation, the aim of which is to define its value as at a given moment of business operation [Maćkowiak 2009, p. 149]. The valuation of business or its assets is necessary for various reasons [Matschke, et al., 2010]. Most often they include situations connected with the change of the owner, e.g. as a result of a purchase-sale, or lease transactions, merger or division of companies. Other reasons include situations connected with compensation, transfer of ownership of a leased object to users, balance sheet revaluation of assets and liabilities of the enterprise, assessment of creditworthiness, or property or financial restructuring of the enterprise [Mączyńska 2005, p. 11; Zadora 2010, p. 89-91; Tabara 2010, p. 96-104;].

The literature presents various ways of comprehending the value of the enterprise, which is caused by the fact that depending on the adopted valuation method the same business entity may have a different value [Zarzecki 1999, p. 21-38; Sulik-Górecka et al. 2017, p. 356-364].

The purpose of this article is to present valuation methods of the enterprise, appraised for the purpose of sale taking into account the fair value.

The concept of fair value

The value is a basic economic category; however, it has no concrete definition. Following the market definition, the value of an enterprise is a price that the market is ready to pay for the enterprise at a given moment. A classic definition says that the value of the enterprise is a sum of values of tangible and intangible assets [Siempińska, Leśniewski 2009, p. 13;]. In economics money being a measure of the value determines a few concepts of the value. It is a real, market, investment, fundamental, fair value [Barlev, Haddad 2003, pp. 383-415].

In accountancy the concept of value is defined otherwise, used within the meaning of being precious and expressed by a measurement formula relevant for the object. Most often it consists in giving the price or cost with reference to which a given object is presented in the accounting books of the entity. The source literature provides a few types of value used in the accountancy [Zadora 2010, p. 19-22]. It is the so-called good will, residual value and fair value [Fargher, Zhang 2014, pp. 184-199].

The problem of valuation of fixed assets exists in every enterprise, and one of the possible methods of estimation is valuation at fair value. Estimated values are disclosed in the financial statements. Fair value is a type of value used in accounting. In Poland, according to the Accounting Act, it is "the amount for which a given asset could be exchanged and the liability settled on the terms of a market transaction between interested and well-informed, unrelated parties" [Accounting Act].

Different definition is given in the International Financial Reporting Standards No. 13 - Fair value measurement. According to the IFRS cited, "this is the price that one would receive for the sale of an asset or would be paid to transfer the liability in a transaction carried out on normal terms between market participants at the measurement date" [IFRS 13 Commission Regulation (EU) 2018/1595 of 23 October 2018 amending Regulation (EC) No 1126/2008 adopting certain international accounting standards in accordance with Regulation (EC) No 1606/2002 of the European Parliament and of the Council with regard to Interpretation 23 of the International Financial Reporting Interpretations Committee]. IFRS 13 is used in many parts of the world, including the European Union, Hong Kong, Australia, Malaysia, Pakistan, the Gulf Cooperation Council countries, Russia, South Africa, Singapore and Turkey. All listed companies of the European Union have been obliged to use IFRS since 2005. According to IFRS and other national legislations, fair value is the result of a measurement based on market data. According to the standard, the determination of fair value consists in estimating the price of a given asset in a transaction carried out on ordinary terms. Depending on the type of asset, access to market information may be limited, which can significantly impede valuation [Walkiewicz, 2018]. As indicated by A. Mazur - fair value is a reflection of the likely price to be obtained on the market for an identical component to the one being measured [Mazur, 2011, p. 59; Gierusz 2017, pp. 207–219]. It should be noted that both of the above definitions relate fair value to the current market value of individual components of the balance sheet. The form of the verbs 'received by' and 'paid by' indicates that no real transaction is required to make a valuation. Such events do not occur, and the object being valued does not change ownership. It is still owned by an economic entity [Gierusz, Stepnowska 2018, pp. 143-163].

Fair value refers to the value used in accountancy which, according to the Accountancy Act and International Financial Reporting Standards, serves to evaluate, among other things, elements of assets. It is a reflection of the amount at which a given asset could be exchanged and the obligation settled in a market transaction, between interested and well informed, unrelated parties [Szczepankowski 2007, pp. 43-44]. The fair value constitutes:

- in case of financial instruments traded in an active market – the market price reduced by the costs connected with the transaction, if their amount was significant;

- the market price of financial assets held by the entity and financial obligations to be incurred by the entity – the current bid price in the market;

- the market price of financial assets to be purchased by the entity and financial liabilities incurred – the current selling price in the market [Szczepankowski 2007, p. 40].

In the Accountancy Act the historical cost principle is provided for the majority of the assets. The historical cost consists in the purchase price or the cost of manufacture, in compliance with the prudence principle. The reduced use value of the assets is taken into account, including also in form of depreciation and amortization write-offs [Mączyńska 2005, p. 40].

The cost of manufacture of a product includes costs directly related to a given product and a justified part of the costs indirectly connected with manufacture of such product. Direct costs include the value of direct materials used, the costs of acquiring and processing directly connected with manufacture and other costs incurred as a result of bringing the product to the form and place it can be found on the valuation date. The net selling price (value) of an asset shall be the potential selling price of such asset to be obtained as on the balance sheet day, less value added tax and excise duty, reduced by discounts, rebates and other similar reductions and costs connected with adjusting the

asset to sale and effecting such sale, and increased by a specific subsidy due [Ustawa o rachunkowości, 2019].

Apart from the historical cost, i.e. the purchase price or the cost of manufacture, the fair value of the assets listed below can also be used in their evaluation:

- real property and intangible assets,
- shares in other entities,
- shares in subsidiaries,
- short-term investments,
- liabilities.

In the Accountancy Act there is a concept of both market value and fair value. The market value is the possible price to be obtained in the active market, which means that the market value of a given asset can be determined if such asset is traded in the active market [Molenda 2008, p. 16-17]. Fair value is a wider concept than the market value, as it is determined by the market price formed in the active market, on which an authoritative evaluation of goods takes place, and in a hypothetical market when there is no active market for a given asset, i.e. in fact such market does not exist. The fair value is then a hypothetical value of the asset that would be obtained in the effective market provided that such market existed [Hasik 2007, p. 48-51]. The fair value is a value that would be obtained by a given enterprise in the conditions of market-based evaluation [Duliniec 2007, p. 72], and more generally, it is a value determined during casual negotiations between the parties to the transaction holding a full range of information.

According to A. Bieda, [Bieda 2009, p. 71] the fair value does not have to be comparable to the market value. As far as the majority of measures used in production is concerned, they even cannot be said to be equal since specialist devices are not the object of a purchase-sale transaction in a free market [Ronen 2008, pp. 181-208; Barth, Landsman 2018, pp. 49-58].

The challenge of fair value is the lack of an exact algorithm for its determination by the Accounting Act. However, the methods of its determination, possible valuation techniques and methods for determining its levels are presented in the International Financial Reporting Standards No. 13 - fair value measurement [International Accounting Standards IAS No. 13; Ball 2006, pp. 5-27; Iatridis 2010, pp. 193-204; Schneider et al. 2017, pp. 378-403].

The value of the enterprise versus asset-based valuation

As far as the enterprise is concerned, its multi-aspect value can be quoted, of diversified nature, depending on the way it is perceived. At the same time, it results from the fact that the process of valuation of the enterprise is presented as set of calculations, based on an individual nature of the assets of a given enterprise and on its financial results [Jaki 2000, p. 53; Sayed 2015, pp. 832-844].

As far as valuation methods of the enterprise are concerned, asset-based methods prevail. They help both in the valuation of individual assets and in the assessment of the value of the enterprise being a sum of their values. Asset-based methods need to be used as it is necessary to assess the value of individual assets or its organized part at purchase, sale, rental or lease transactions. Therefore, it is justified for the asset-based valuation method to be the first stage in the valuation of the value of the enterprise. Their essence consists in the assumption that the value of the enterprise equals the sum of

the values of tangible assets, i.e. the difference between the value of foreign assets and liabilities of the enterprise [Borowiecki 1997, p. 55; Farooq, Thyagarajan 2014, pp. 7-14].

Valuation of the assets in the enterprise

Valuation of the enterprise may comprise different scopes and areas. They are connected with different elements making up the value of the enterprise but also with corresponding determinants of such value. Additionally, factor that have a material impact on the scope and course of the valuation include its purpose, likewise its functions which are directly related to the nature of the parties making the valuation and the circumstances of such valuation [Jaki 2008, p. 40]. These elements enable to differentiate two attitudes to the assets and to the value of the enterprise [Borowiecki 1997, p. 25; Jaki 2000, p. 41]:

- as a material substance of the enterprise, i.e. elements reflected in the assets of the enterprise;
- as non-material elements, resulting from the level of organization of production measures and inputs in the enterprise which enable to use them, deciding thereby on the ability of the entity to multiply the capital invested.

In case of such apprehension of the assets of the enterprise the valuation may refer to its material elements, i.e. most often fixed assets or the enterprise as a whole, which comprises tangible and intangible assets. It seems that the assets of the enterprise can be evaluated independently, since it can be the object of a barter transactions in the market. On the other hand, in case of the other meaning the assets cannot be evaluated independently as it only exists in combination with tangible assets of the enterprise. Determining the value of a business is critical to many important managerial decisions. Because the future of any enterprise is uncertain, business valuations are rarely identical across analysts [Schill 2017].

The easiest valuation method of the enterprise is to use the information included in the balance sheet. The result of such valuation consists in the asset value of the enterprise which defines the current value of the capital to be spent in order to restore the assets of the enterprise indispensable in further operation [Biela 2000, p. 16; Khurana, Kim 2003, p. 19-42; Jenkins 2006, pp. 48-50]. Such attitude to the valuation is called the asset-based attitude. It is the oldest historical attitude, which not long ago was used in Poland as the only attitude. It combines the value of the enterprise only with its material substance.

The advantage of the asset-based valuation consists in relative simplicity, easy interpretation and comparison of the results of the valuation. It also includes disadvantages, among which failure to take into account development opportunities of the enterprise shall be the basic disadvantage [Zarzecki 1999, p. 54; Laughton et al. 2008, pp. 46-65]. The attitude does not distinguish good profitable enterprises and failing and loss-making enterprises. The results of the asset-based valuation do not depend on the surroundings of the enterprise, which has a significant impact on economic results. Asset-based methods consist in the valuation of fixed and current assets of the enterprise, irrespective of the level and effectiveness of use of such assets. The valuation is based on the reporting data concerning the assets of the enterprise and its sources i.e. the balance sheet. It is, among other things, the structure of assets and liabilities that decides on the value of the enterprise [Zadora 2010, p. 70; Pomykalski, Pomykalska 2007, pp. 283-284].

Income-based methods of valuation of the enterprise

Income-based methods of valuation of the enterprise are built on a theoretical background of efficiency calculus of the investment. The enterprise is the object of investments in accordance with the efficiency calculus despite should provide the investor with specific income in the future which

are defined as profits, dividends or cash flows [Mączyńska 2005, p. 93; Barth et al. 2014, pp. 297-327].

Income-based methods are based on the ability of the enterprise to create future income irrespective of the assets. The enterprise is worth as much income as it is able to generate in the future, no as much as it results from the said assets. The company can dispose of small property but many elements not presented in the financial statements may cause that the ability to generate income would be very significant [Panfil, Szablewski 2006, p. 40]. The most important financial measure used in the valuation of the enterprise with income-based methods consists in specification of free cash flows (FCF) [Gołębiowski Szczepankowski 2007, p. 133]. Cash flows consist in juxtaposition of receipts and expenditures of the enterprise connected with its operation within successive years of the settlement period and determination on their basis of a financial surplus that will be the basis of the valuation [Jaki 2008, p. 93-94; d'Amato 2015, pp. 207-219].

The literature distinguishes two fundamental types of cash flows [Gołębiowski, Szczepankowski 2007, p. 134; Szablewski, Tuzimek 2007, p. 149; Panfil 2009, p. 18; Piekkola 2016, pp. 28-51]. The first one is marked as ECF and consists in income generated by the company and coming from the operating activities, being the ownership of the company's owners, discounted by the cost of equity. The other type marked as FCF consist in income generated by the company and coming from the operating activities, being the ownership of both the company' owners, and lenders. They are discounted by weighted average cost of capital (WACC) [Szablewski, Tuzimek 2007, p. 149; Frank, Shen 2016, pp. 300-315; Ortiz-Molina, Phillips 2014, pp. 1-32].

Case study

The valuation of the enterprise started with the appraisal, which involve reporting data concerning property of the enterprise and its sources, i.e. the structure of assets and liabilities. The first valuation method applied referred to the net book value method which serves as a basis for the valuation using other asset-based methods. The net book value refers to the value of equity, in other words, it is a difference between the sum of assets and current and long-term liabilities [Maćkowiak 2009, p. 155]. The results of valuation using this method are presented in Table 1.

Table 1: Book value of the enterprise in years 2014-2018 [thousands PLN]

Specification	**Years**				
Years	**2014**	**2015**	**2016**	**2017**	**2018**
Fixed assets	12 937	12 740	17 321	60 611	199 506
Current assets	20 457	33 348	39 407	56 826	17 942
Fixed assets available for sale	-	-	-	-	19 040
Total assets	33 394	46 088	56 728	117 437	236 488
Equity	16 790	19 261	26 957	54 618	154 600
Foreign capital	16 604	26 827	29 771	62 819	81 888
Total liabilities	33 394	46 088	56 728	117 437	236 488
Book value	**16 790**	**19 261**	**26 957**	**54 618**	**154 600**

Source: own survey on the basis of data of enterprise X

Book value of enterprise X in years 2014-2018 was dynamically growing. In 2015 it increased by 15% in comparison to 2014, in 2016 by 25% in comparison to the previous years, in 2017 by 63% with reference to 2016, and in 2018 by 80%. Increase in the book value was caused by the increase in the book value of assets and significantly lower dynamics of increase in foreign capitals.

In the analyzed years, the sum of total assets increased, resulting from growth of fixed assets, while the value of current assets was growing until 2017, and then dropped. Decrease in 2018 was caused

by decrease in inventory, receivable and cash and separation of assets held for sale. The amount of equity was growing as well as the amount of foreign capital, however, not as dynamically as the amount of equity.

Net book value indicated the value of the enterprise specified on the basis of data included in the balance sheet, presented in the purchase price or cost of manufacture, taking into account depreciation in case of fixed assets. However, depreciation is not a market deduction which means that balance sheet values are not market values. In all valuations of the enterprises using asset-based method, always value corrected by market value of main assets and liabilities is taken into account.

In case of the enterprise being analysed, the value of corrected assets in the amount of 224,000 zloty was obtained after applying comparative attitude for the elements of fixed assets. The paper contains no calculations concerning market values as it is too extensive concept to be analyzed herein. For the purposes of this article, only fixed assets were corrected, current assets and liabilities were not corrected which results from a very good financial situation of the analyzed entity.

Following the definition, specific corrected values of the assets are correlated with their fair value. International Accounting Standards (IFRS 13) indicate three commonly used methods of measuring fair value. These are market, cost and income methods. To determine fair value, an entity uses measurement techniques that are consistent with one or more of these approaches.

Cost methods reflect the amount for which a given asset could be reproduced (often referred to as the current cost of replacement). This is the price that takes into account the cost incurred to acquire or construct a replacement asset with similar utility. In addition, this amount is corrected for loss of usefulness, physical consumption. [Bareja, Giedroyć 2016, pp. 9-18]. Very often the cost method is used to determine the fair value of tangible assets that are used in conjunction with other assets or liabilities.

It should be underlined that fair values obtained may have different impact on the recommended final value of the enterprise, depending on its financial situation. The obtained fair values may affect the recommended final value of the enterprise in various ways depending on its financial situation. Due to the fact that the net book value method, as well as other cost asset methods, value the company's fixed and current assets without directly taking into account the degree and effectiveness of using the assets, it is necessary to value income methods that take into account the effectiveness of the use of the assets.

As IFRS 13 indicates, the income approach is based on converting future amounts (e.g. cash flows or income and expenses) into one current (i.e. discounted) amount. When an income approach is used, the fair value measurement reflects current market expectations for these future amounts.

As the method of net book value of the assets as well as the other asset-based methods evaluate fixed and current assets of the enterprise without taking into account the level and efficiency of use of these assets, income-based method of valuation is required which take into account effective use of the assets. To this effect, free net cash flow method is used most in case of the enterprise.

Free cash flows refer to cash flow coming from the operating activity, adjusted by income tax paid (operating profit subject to income tax), increased by depreciation and increased or decreased by growth or decline in working capital and expenditures on new fixed capital. The advantage of such estimated cash flows is that they can be used freely by the owners of the enterprise to finance growth or (i) to reduce debt of the company, pay dividend or purchase own shares for redemption.

Cash flows for the analyzed enterprise have been calculated in table 2, using the following assumptions to the valuation using discounted cash flows method (FCF):

- tax rate shall be 19%,
- FCF shall be discounted by weighted average cost of capital,
- Fixed growth rate of 1% has been adopted.

FCF method is connected with financing of operating activities of the enterprise, its development and growth of value through equity and foreign capital. Specific group of entities, likewise the owners, is interested in forming the value of the enterprise X. Evaluating this value, free cash flow account was taken into consideration for all parties financing the activity of the enterprise, i.e. owners and creditors.

Table 2: Free cash flows FCF in 2018 [thousands PLN]

Year	**2018**
EBIT (Operating profit)	74 910
Depreciation and amortisation	296
EBITDA (Operating profit incl. depreciation and amortisation)	75 206
EBITDAAT (Taxed operating profit incl. depreciation and amortisation)	60 917
NOPAT (Taxed operating profit)	60 677
Current assets	17 942
Current liabilities	12 710
Change in net working capital	5 232
FCF (Free cash flows for the enterprise)	55 685

Source: own survey on the basis of data of enterprise

Free cash flows FCF in 2018 amounted to 55 685 thousand PLN. Using the value of free cash flows for the analyzed enterprise, in table 3 the valuation of enterprise X using discounted cash flow method.

Table 3: Valuation using FCF method [thousands PLN]

Years	**2019**	**2020**	**2021**	**2022**	**2023**	**>2023**
FCF	50 066	69 091	87 746	11 1 4378	141 526	
Fixed growth rate						1%
Cost of debt	5,8%	5,8%	5,8%	5,9%	6,0%	6,1%
Cost of capital	11,0%	11,1 %	11,1%	11,2%	11,3%	11,4%
WACC	9,9%	10%	9,9%	9,9%	10%	10%
Discounted FCF (PV)	45 556	57 100	66 105	76 391	87 876	
Residual value						1 415 255
Discounted residual value						341 275
Value of the enterprise	674 304					

Source: own survey on the basis of data of enterprise

According to the valuation using discounted cash flows method (FCF), the value of the enterprise X has been estimated at the level of 674,304 thousand zloty, provided that the existing development strategy shall be continued.

As a result of the valuation of the enterprise X with the use of various methods, different value of the enterprise has been obtained. The results obtained have been presented in table 4.

Table 4: Statement of the results of valuation of the enterprise X

Valuation method	Value of the enterprise [thousand PLN]
Net book value	154 600
Adjusted book value (fair value)	224 000
Discounted cash flows FCF	674 304

Source: own survey

The results in the evaluation using different methods included in table 4 present a very significant difference in the value of the very enterprise. The evaluated object X holds a very low property value (154,600 thousand zloty), a little bit higher value adjusted by fair values (224,000 thousand zloty), while a very high-income value (674,304 thousand zloty).

On the basis of practical calculation of the value of enterprises, in the event that the property value and income-based value significantly differ, most often the arithmetic average of those two values is calculated (mixed German method) or the average value of the property value and two income-based values (Swiss method). Table 5 presents calculations of the analyzed enterprise in German method.

Table 5: Final recommended value of the enterprise X [thousand PLN]

Valuation method	Value of the enterprise
German method	414 452
German method taking into account fair value	449 152

Source: own survey

If the asset-based valuation method used assets in the fair value, then, as far as the analysed enterprise is concerned, it would have a slight impact on recommended value for sale.

The purpose of calculation was to provide valuation of the enterprise X in case of negotiations in purchase-sale transactions. On the basis of the results obtained, it may be concluded that the limit price to be accepted by the buyer could be the value of the enterprise specified in a mixed attitude using German method.

Summary

Using the aforementioned valuation methods, the current value of the enterprise was calculated for the purpose of sale. The goal was achieved and precise results of valuation of the entity for sale were obtained, taking into account its asset value, which is much lower than the income-based value calculated on the basis of free cash flows.

However, consideration should be given how assets and liabilities calculated at the fair value, adopted for the purpose of valuation of the enterprise X, change the entire result of the valuation. The use of assets and liabilities at the fair value in the valuation may cause significant changes in the value presented in the financial statement on account of its variability. Followers of those using the

fair value state that such variability of valuation is the advantage since changes in the fair value reflect changes in prices and risk connected with a given asset, which could mean that they are better in presenting the real image of this entity [Molenda, 2008, p. 17].

Presentation of assets at the fair value provides the information on how much the entity would earn if it sold its net assets, although it still uses it in the operation activity. According to T. Gabrusewicz [Gabrusewicz 2009, p. 29], investors hoping to earn profits from dividends can ignore valuation at the fair value, presuming that the amount of dividend in a longer perspective would anyway depend on the final result upon sale of assets and settlement of liabilities. The result on sale of assets shall be finally dependant on its selling price compared to the price of purchase, i.e. the historical cost.

The aforementioned research shows that the fair value in the valuation of the enterprise has no significant role if the entity is in a good financial condition and obtains high income on sale and high profits. Then income-based value decides on its final value. However, it is not the case when the enterprise has no profits and its income-based value is negative or equal to zero. Then it is reasonably to estimate the property value with the use of the fair value in order to obtain the most probable value of such entity that is held for sale. Likewise, when the adjusted value of assets at fair values is significantly higher than income-based value. In such case the adjusted value of assets has a great impact on the final recommended value of the enterprise.

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Safety Management in Quality Management Approach - The Context of Safe Working Conditions in Micro-, Small and Medium-Sized and Large Enterprises

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Abstract

The purpose of this paper is to compare the assessment of occupational health and safety (OHS) management effectiveness in various size enterprises (micro, small and medium-sized, large enterprises). In the paper the results of research conducted among employees of enterprises from the manufacturing sector have been presented. The survey form were developed based on the interpretation of the safety management principles in analogy to the principles of quality management. It has been stated that the safety management in large enterprises usually work properly. Whereas in micro, small and medium-sized enterprises the safety management are completely unapplied and occupational safety issues (regulation, principles e.t.c.) are not treated properly. In micro-enterprises is often lack of health and safety policies, and employee knowledge in this area are negligible.

Keywords: Safety Management, Quality Approach, Quality Principles, OHS

Introduction

According to world statistics, the manufacturing sector is still the sector where accidents at work occur most frequently. Regardless of the industry of the enterprise, the risk of hazardous events occurring in manufacturing enterprises is the highest. The results of the number of accidents (also with fatal outcomes) are shocking (Chi et al., 2005; Yang and Jeong, 2019; Huizinga et al., 2019). However, these data result from the fact that in the production sector there is a continuous interaction between human and technical resources, processes are implemented by people using machines and devices of varying degrees of complexity (Hwang and Yoon, 2020; Kolbachev and Salnikova, 2018). Despite the applicable laws regarding the development of technical and commissioning documentation for all devices placed on the market, it is still assumed that the most common cause of accidents is improper (or inattentive) use of machinery by employees (Furci and Sunindijo, 2020; Cowing et al., 2004; Sanni-Anibire et al., 2020). One of the concepts of eliminating (or reducing the occurrence) of accidents is full automation and monitoring of processes, which is in line with the main assumptions of the Industry 4.0 revolution (Taylor et al., 2020; Hirsch-Kreinsen, 2016; Kagermann, 2015; Nelles et al, 2016; Haque and Oino, 2019; Ingaldi and Ulewicz, 2020). Interestingly, accidents at work occur for both more manual and automated processes. National and even international strategy for managing employee safety is to indicate the so-called 'national priorities', the observance of which is aimed at achieving short-term and long-term improvements in the field of safety management. The priorities are to (Burt, 2015): provide safe working conditions, effectively manage work safety, reduce high incidence and high severity risks, improve the capacity of business operators and workers to manage OHS effectively, prevent occupational disease more effectively, eliminate hazards at the design stage, strengthen the capacity of government to influence OHS (occupational health and safety) outcomes (Oswald et al., 2020; Lee et al., 2020; Hale, 2003; Burt, 2015; Lobanova and Tulenkov, 2019). Many production companies, despite a very strong emphasis on safety issues, still prefer the economic effect, effectiveness, efficiency and quality over the safe and hygienic working conditions of their employees. What's more, entrepreneurs, who know the main assumptions of multilevel enterprise management, put a lot of emphasis on ensuring quality as the

primary advantage - turning a blind eye to the safety issues of their employees. Occupational safety is as important as professionalism, resource availability, quality, costs and work organization (Hale et al., 1997; Aburumman et al., 2019). And since entrepreneurs are familiar with the principles of quality management, their can be tempted to interpret safety management in the context of the basic principles of quality management.

Methodology

This paper attempts to identify the level of safety management in various size companies. The level of safety management has been determined based on the opinions of employees of enterprises from the manufacturing sector. As research tool an anonymous survey (filled in electronically) has been used. Employees from enterprises in the manufacturing industry were invited to the study. Based on the completed metric, the employees have been divided into three groups, to unify the number of groups for analysis, 100 questionnaires from each group have been randomly selected:

Group 1 – 100 employees of large enterprises from the production sector,

Group 2 – 100 employees of small and medium-sized enterprises (SMEs) from the production sector (enterprises employing employees),

Group 3 – 100 employees/owners of micro enterprises from the production sector (enterprises employing only employees with family relationships).

All employees answered a series of questions. The questions contained in the form were developed based on the interpretation of the safety management principles in analogy to the principles of quality management (Table 1). Respondents were asked a number of questions (40 questions) about safe working conditions maintanance and safety management in the enterprise, but for the purposes of that study only 7 statements have been considered – statement that that best correlate with safety management in the quality management approach. The respondents rated the situation in their company by assessing factors on a scale of 0 to 5, where 0 meant: I totally disagree (this is not true), and 5 meant: I completely agree (it is true).

The general assumptions of quality management in an enterprise are based on eight principles. Table 1 presents the basic principles of quality management and their interpretation from the safety management point of view. As it can be seen, the interpretation of quality management principles in the context of safety management is relatively easy, because all areas of management are based on the same doctrines (Aziz et al., 2019; Ulewicz and Nový, 2019) . Therefore, the focus on employee safety in the context of the achievements of management sciences is to manage and supervise the organization in relation to employee safety, which is the most important element in the enterprise. Due to this approach, the principles that relate to the identification of employee requirements in the context of occupational safety should be constantly verified in terms of their compliance (Mullen et al., 2017).

The employees, absolutely, are the most important element of every enterprise, and their sense of safety as well as the awareness of safe and hygienic working conditions should be constantly strengthened (Mullen et al., 2017). Considering the aspect of occupational health and safety when planning resources means that infrastructure, environment, employees, information and other resources must be checked for their ability to meet OHS requirements – principle 1.

Regarding the best leaders - people do not notice their presence. Good leaders are respected and praised. Leadership is the ability to influence people by unleashing their strength and potential to enable them to strive for increased safety – principle 2. Furthermore, leadership is the art of motivating employees to achieve amazing goals. A good leader is a co-creator of vision and mission, but in their actions they do not avoid transferring responsibility and giving voice to employees. The main responsibilities of the leader are: creating a mission and vision, setting goals, planning resources, assigning responsibility,

controlling activities in goals achivement (Costa-Font and Ljunge, 2018). Leadership, therefore, is a process of planning, organizing, leading and controlling the activities of members of an organization and the use of all its other resources to achieve the objectives of OHS management. The leader ensures good relations and strengthens employee relations with the organization. They give them a sense of participation in something important and good. The leader allows employees to see in the organization something more than just a workplace, builds trust between the supervisor and the employee. Provides employees with safety and support in crisis situations (Cooper and Phillips, 2004; Guldenmund, 2000).

Employee involvement is based and is identified by: motivation, communication, organizational culture and teamwork (Cooper, 2000; Guldenmund, 2000). In the aspect of safety, it is nothing but respect for the rules in force in the company, cooperation and mutual care for health and safety at work and in the whole enterprise – principle 3. An employee is the most important value of any organization. And every employee should take part in creating safe working conditions. Involvement and commitment are the basic conditions for achieving a high level of safety in an enterprise.

The process approach focuses on the company presentation by a set of interrelated processes - the dependences of processes are determined by the need to achieve the organization goals. With regard to safety, it is primarily a model of information flow and the ability to apply safety procedures and instructions (Aziz et al., 2019). Documentation of the processes interdependencies should be based on: the impact of the process on the safety level, the reluctance of employees adaptation to the principles and culture of safety, general safety regulations, economic risk, and above all, the effectiveness and efficiency of operations – principle 4.

The system approach to OHS management consists in understanding and managing interrelated processes as a whole system - i.e. combining all activities into one working system – principle 5. This helps to increase the efficiency and effectiveness of the organization in achieving their goals. The system approach in safety management is particularly important in relation to physical and intangible flows. In this aspect, it is advisable to constantly monitor variables that have an impact on employee safety. And taking care of an appropriate level of communication between departments - in particular in the field of occurring dangerous and conducive events. To safety management in a system approach, one must: create a clear process structure, understand correlations between processes, integrate processes, eliminate organizational constraints, constantly improve the system by regularly measuring, monitoring and auditing (Li et al., 2020; Duijm, 2009).

Table 1: The basic principles of quality management and their interpretation from the safety management point of view

	Principles of quality management	**Principles in the context of occupational health and safety management**
PRINCIPLE 1		
	Customer orientation	Focus on employee safety - putting employee needs above economic, efficiency and productivity conditions
PRINCIPLE 2		
	Leadership	Leadership - being a role model in the aspect of care for work safety
PRINCIPLE 3		
	Employee involvement	Employee involvement in the implementation of the mission, vision and goals of safe working conditions
PRINCIPLE 4		
	Process approach	Process approach - documenting the interrelationships of processes aimed at

		maintaining safety
PRINCIPLE 5		
	System approach to quality management	System approach to safety management
PRINCIPLE 6		
	Continuous improvement	Continuous improvement - introducing additional safety systems, conducting regular trainings etc.
PRINCIPLE 7		
	Making decisions based on facts	Making decisions based on facts - legal documents, statistics and results of monitoring security parameters
PRINCIPLE 8		
	Mutual beneficial relationships with suppliers	*Not applicable*

Source: Own study

Continuous improvement in the field of health and safety provides not only efficient operation, but also the ability to cope with crisis situations (Bhuiyan and Baghel, 2005). Continuous improvement is based on the Deming cycle (PDCA) and consists in constantly raising the level of safety, often before the actual need arises – principle 6 (Jagusiak-Kocik, 2017). The elements on which the continuous improvement process is based are, first and foremost: safety policy, general and specific objectives of enterprises in the field of safety, corrective and preventive actions in the field of occupational health and safety management in the enterprise.

Decisions making based on facts requires constant monitoring of safety parameters, systematic collection of information, analysis of obtained data by use of reliable methods and forwarding the results to the right addressees, responsibility transfer to a person with an appropriate level of safety competence – principle 7. The process of data collection should extend to the both internal and external information. Internal information primarily are: the results of the processes and products safety measurement, effectiveness indicators, results of employee evaluation e.t.c. As external information, helpful can be: national and global statistical data, research results on the expectations of safety levels e.t.c.. An organization that wants to implement the philosophy of effective OHS management must remember about the proper way of collecting data and presenting safety data. Despite the fact that many management specialists are skeptical about the necessity of conducting measurements, considering them to be time-consuming and bureaucratic, they mainly give the opportunity to check goals with achieved results, constituting a challenge and motivation to improve.

The principles of health and safety management are based primarily on legal regulations, but it should be remembered that the specificity of company management directly determines the safety of the employee. Therefore, it is very difficult to generalize the way of management in enterprises, e.g. in the manufacturing or service sector. It is also very difficult to generalize the management assessment method in enterprises of various size with different levels of process automatization. The purpose of this paper is to compare the assessment of OHS management methods by employees of various size manufacturing enterprises (micro, small and medium-sized, large enterprises).

Results and Discussion

Tables 2-4 present the structure of rates awarded by employees of micro, small and medium-sized enterprises (SMEs) and large enterprises. Based on experience and opinions, employees assessed the statements that best correlate with safety management in a quality management approach:

1. My safety (as an employee) is the most important thing at work.

2. My supervisor is a role model in respect of compliance with the OHS principles.
3. Together with other employees, we care about ourselves and others' safety.
4. I pay special attention to the relationship between safety and efficiency of work.
5. All OHS recommendations at positions are documented and easy to interpret.
6. The company is constantly introducing new safeguards to guarantee safe working conditions.
7. Changes in OHS management are made on the basis of data and statistics.

Table 2: Assessment structure for OHS management principles - according to employees of micro enterprises

Question	Rate						
	0	**1**	**2**	**3**	**4**	**5**	**Average**
My safety (as an employee) is the most important thing at work.	14	16	31	21	11	7	2.20
My supervisor is a role model in respect of compliance with the OHS principles.	18	13	15	21	15	18	2.56
Together with other employees, we care about ourselves and others' safety.	16	19	29	21	8	7	2.07
I pay special attention to the relationship between safety and efficiency of work.	42	24	12	8	6	8	1.36
All OHS recommendations at positions are documented and easy to interpret.	63	21	8	5	1	2	0.66
The company is constantly introducing new safeguards to guarantee safe working conditions.	64	9	8	7	5	7	1.01
Changes in OHS management are made on the basis of data and statistics.	71	9	4	7	6	3	0.77

Source: Own study

Table 3: Assessment structure for OHS management principles - according to employees of small and medium enterprises

Question	Rate						
	0	**1**	**2**	**3**	**4**	**5**	**Average**
My safety (as an employee) is the most important thing at work.	9	11	16	27	29	8	2.80
My supervisor is a role model in respect of compliance with the OHS principles.	36	26	13	12	10	3	1.43
Together with other employees, we care about ourselves and others' safety.	17	11	12	17	21	22	2.80
I pay special attention to the relationship between safety and efficiency of work.	12	42	13	14	12	7	1.93
All OHS recommendations at positions are documented and easy to interpret.	9	17	18	28	21	7	2.56
The company is constantly introducing new safeguards to guarantee safe working conditions.	8	5	6	8	32	41	3.74
Changes in OHS management are made on the basis of data and statistics.	21	12	18	31	12	6	2.19

Source: Own study

Table 4: Assessment structure for OHS management principles - according to employees of large enterprises

Question	Rate						
	0	1	2	3	4	5	Average
My safety (as an employee) is the most important thing at work.	7	5	19	24	33	12	3.07
My supervisor is a role model in respect of compliance with the OHS principles.	8	9	18	21	21	23	3.07
Together with other employees, we care about ourselves and others' safety.	0	3	8	11	21	57	4.21
I pay special attention to the relationship between safety and efficiency of work.	1	6	8	14	28	43	3.91
All OHS recommendations at positions are documented and easy to interpret.	6	4	2	3	13	72	4.29
The company is constantly introducing new safeguards to guarantee safe working conditions.	5	7	12	11	38	27	3.51
Changes in OHS management are made on the basis of data and statistics.	5	11	13	22	31	18	3.17

Source: Own study

For comparison the employees of micro, small and medium-sized enterprises and large enterprises ratings and perceptions, based on the results presented in Tables 2-4, the charts have been constructed (Fig. 1-7). Regarding the principle 1 (Focus on employee safety), regardless of the size of the enterprise, employees have doubts about the priority of their safety. At the same time, employees of large enterprises gave the highest scores at level 4. Employees of micro enterprises gave the most answers 2, this is due to the fact that very often the employee is the owner and manager of the company (Fig. 1).

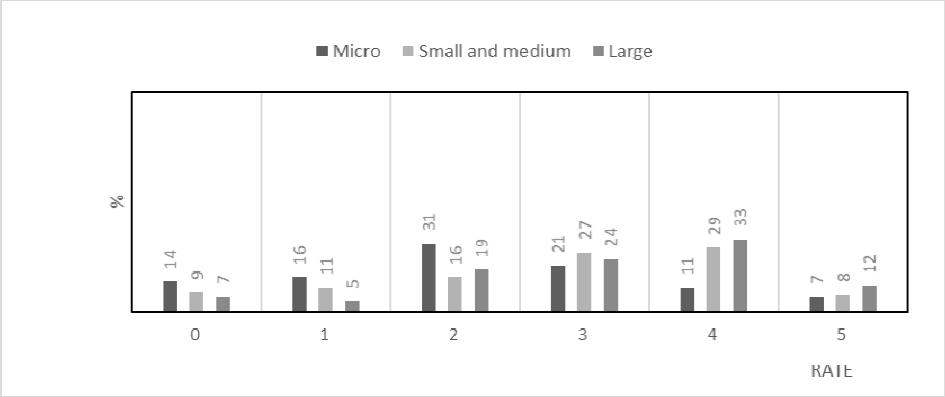

Source: Own study

Fig. 1: Comparison of the assessment structure for the principles of health and safety management - according to employees, micro, small and medium-sized enterprises and large enterprises. Statement 1 (regarding principle 1): My safety (as an employee) is the most important thing at work

A similar uncertainty and lack of unanimity is observed in the case of principle 2 (Leadership). Employees, regardless of the type of enterprise, are not convinced that their supervisor is an example to follow in terms of compliance with health and safety rules. The worst were assessed supervisors by employees of small and medium-sized enterprises, as many as 36 votes at level 0. In the case of large enterprises, the votes are evenly distributed between rates 3, 4 and 5 - so it can be said that supervisors make every effort (although not always effectively) to be a role model for their subordinates (Fig.2).

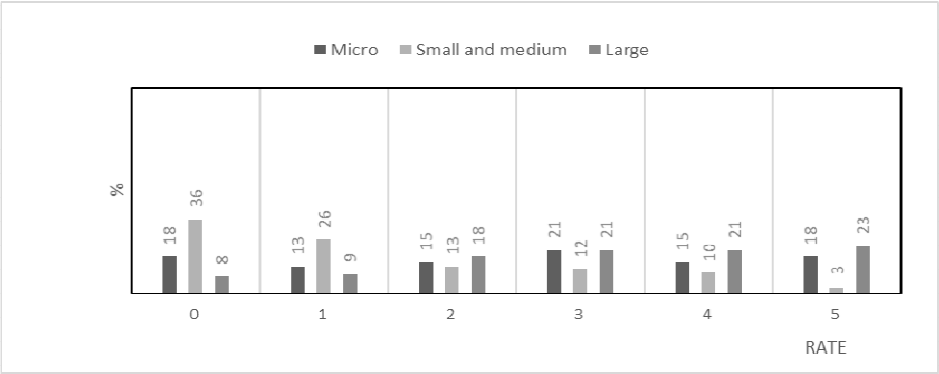

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Fig. 2: Comparison of the assessment structure for the principles of health and safety management - according to employees, micro, small and medium-sized enterprises and large enterprises. Statement 2 (regarding principle 2): My supervisor is a role model in respect of compliance with the OHS principles

With regard to principle 3, it can be seen that employees of large enterprises are most aware of the safety behavior, care of themselves and other colleagues safety. In this case, the highest 5 rate has been given by as many as 57 employees, while the lowest has not been awarded at all. An interesting tendency is observed for the next principles (Figs. 4 - 7) of those related to system and process safety management (the domain of well-organized enterprises). It is observed that the responses of employees from large enterprises tend to take on higher values, while in micro enterprises, principles 4, 5, 6 and 7 have been rated low. This demonstrates the extensive safety management system in large enterprises. Whereas low ratings from employees of micro, small and medium enterprises show that the OHS management system is not working properly. Critically low grades awarded by employees of micro-enterprises are proof that occupational safety issues are not treated properly in these enterprises. In micro-enterprises is often lack of health and safety policies, and employee knowledge in this area are negligible.

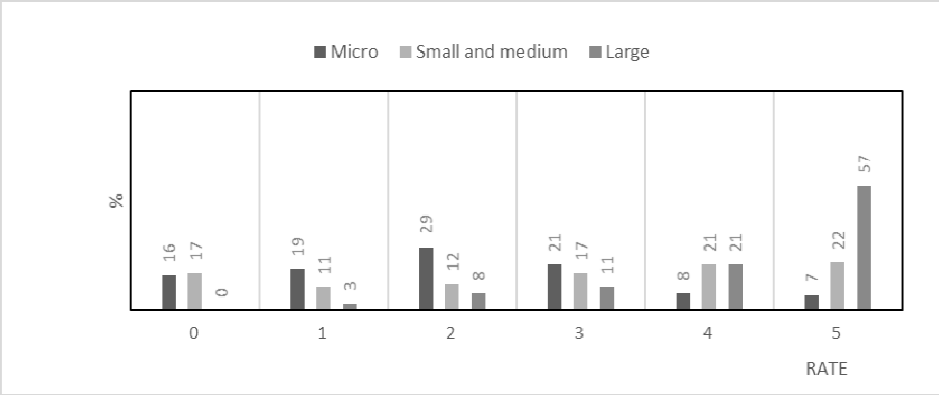

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Fig. 3: Comparison of the assessment structure for the principles of health and safety management - according to employees, micro, small and medium-sized enterprises and large enterprises. Statement 3 (regarding principle 3): Together with other employees, we care about ourselves and others' safety

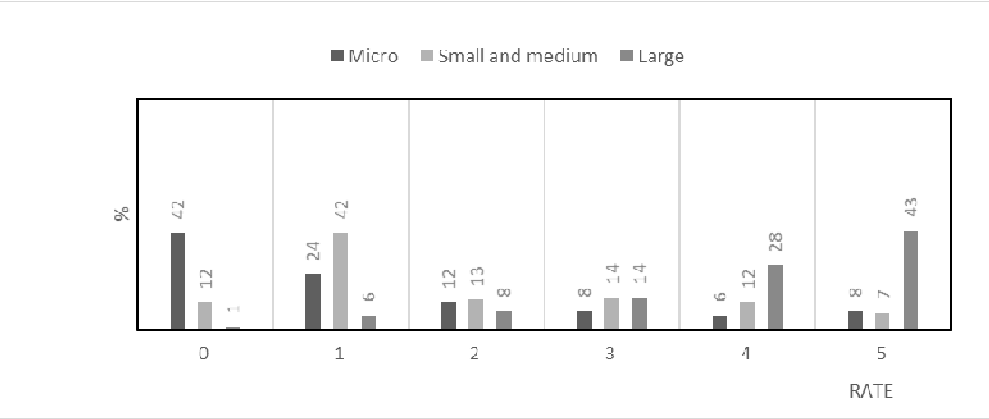

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Fig. 4: Comparison of the assessment structure for the principles of health and safety management - according to employees, micro, small and medium-sized enterprises and large enterprises. Statement 4 (regarding principle 4): I pay special attention to the relationship between safety and efficiency of work

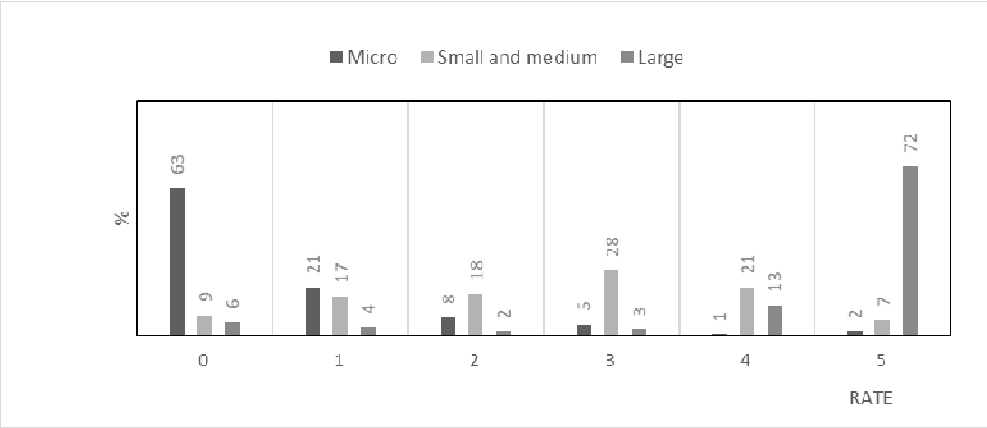

Source: Own study

Fig. 5: Comparison of the assessment structure for the principles of health and safety management - according to employees, micro, small and medium-sized enterprises and large enterprises. Statement 5 (regarding principle 5): All OHS recommendations at positions are documented and easy to interpret

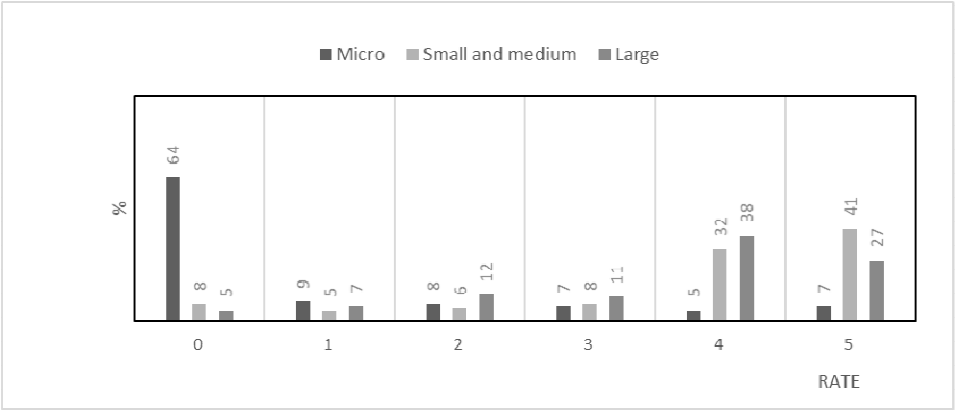

Source: Own study

Fig. 6: Comparison of the assessment structure for the principles of health and safety management - according to employees, micro, small and medium-sized enterprises and large enterprises. Statement 6 (regarding principle 6): Changes in OHS management are made on the basis of data and statistics

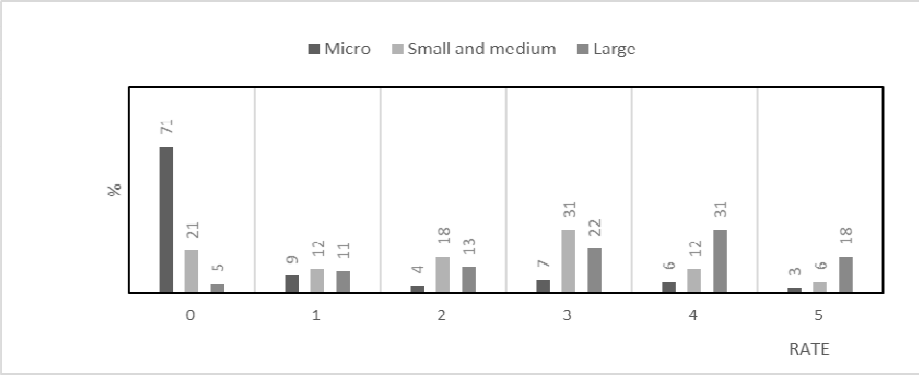

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Fig. 7: Comparison of the assessment structure for the principles of health and safety management - according to employees, micro, small and medium-sized enterprises and large enterprises. Statement 7 (regarding principle 7): Changes in OHS management are made on the basis of data and statistics

The summary of the results presented in the tables and figures is a radar chart for average ratings of all discussed principles, for three sizes of manufacturing enterprises (Fig. 8). In general, it can be seen that the approach to health and safety management looks the worst in the case of micro enterprises - average ratings range from 0.7 to 2.6, none of the averages exceeded 3, which could indicate compliance with the minimum health and safety requirements. On the other hand, employees of large enterprises received significantly higher grades and average values for individual principles range from about 3 to over 4 - which indicates the fulfillment of OHS requirements. For SMEs, the average grades are strongly differentiated, to clearly state whether these enterprises meet the requirements of OHS, it is necessary to conduct in-depth research, which are carried out by other authors (Niciejewska and Klimecka-Tatar, 2018).

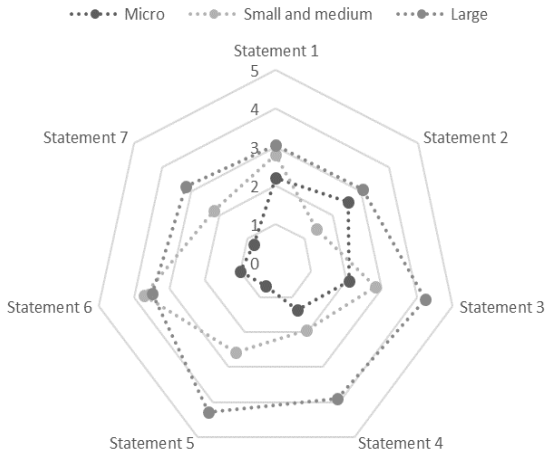

Source: Own study

Fig. 8: Comparison of average ratings for the principles of health and safety management - according to employees, micro, small and medium-sized enterprises and large enterprises

The limitation in this study was, that despite the fact, the respondents are employees of enterprises from the production sector, the survey did not examine the degree of automation of production processes and the strength of the impact of human labor on the production process. The further development of research work, research can be expanded to include a technological factor, i.e. determination of the technological level based on known management tools in relation to the literature (Ingaldi and Zhuravskaya, 2018).

Conclusions

Based on the analysis, it can be clearly stated that it is possible (and relatively simple) to interpret OHS management principles in relation to the principles of quality management, however, this requires a horizontal transfer of customer needs to the employee's needs. On the other hand, on the basis of presented results, the employees' perception of OHS management in enterprises from the manufacturing sector has been assessed - the perception of micro, small and medium-sized enterprises and large enterprises employees'. It has been noted that with respect to the general principles of safety, all employees, regardless of the size of enterprise, have mixed feelings about the importance of their safety, and supervisors are not always a role model in safety issue. Immediate differences have been noticed in relation to the principles of safety management, which are mainly based on management in process and system approach. In this case, high rates awarded by employees of large enterprises clearly indicate, that in large enterprises the occupational health and safety management system works best. In large enterprises processes are properly planned and documented, and all safety parameters are constantly monitored and form the basis for changes implementation. While, the low rates awarded by employees of micro enterprises indicate that this is far from the minimum fulfillment of the requirements in the scope of proper OHS management.

Based on the presented results, it is generally recommended to: increase knowledge on occupational safety at all levels, introduce of trainings enabling hatching leaders in the field of health and safety, build pleasant trust between employees and inform about mutual responsibility for safety. Whereas, in particular form micro and small and medium-sized enterprises are recommended to: build a culture of safety based on legal regulations and plan processes in relation to the principles of systemic management in the field of occupational health and safety.

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How to Study Complex Social Phenomena in The Organization?

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Abstract

In this article, the way of conducting research on complex social phenomena in an organization is shown. The basic assumption in the proposed concept is that the organization is a social system, and consequently a complex adaptive system (CAS). In such systems, understanding the local dynamics of the system is important because it allows insight into the behavior of the entire system and identifies key reasons for changes. The whole concept is based on inductive reasoning ("bottom up" approach). As a research method, simulations using agent-based model (ABM), were proposed, because firstly ABMs show a lot of similarities to the social systems, secondly they allow to study systems dynamics based on local interactions of their elementary units (individual agents or networks of agents)

Keywords: Organization, Social System, Agent-Based Model, Complex Adaptive System, Simulation

Introduction

Complexity concerns both physical, biological and social systems. Each of these fields of study develops tools for studying complexity, and many of these tools can be universally applicable. An example is the recently intensively developed econophysics, where for the needs of economics the latest concepts and methods of physics are used, such as: critical phenomena, scaling, fractals, multifractals, deterministic chaos (chaos theory), turbulence theory, complex networks, agent models. It is also quite popular to transfer to the field of social and economic research models from synthetic biology, which aims to design and create artificial biological systems modeled on natural ones. As a result, we are witnessing the integration of knowledge from many disciplines: physical sciences, social sciences and humanities.

Studies of complex systems at the border of various fields can be summarized in the following main areas:

1) **complex adaptive systems** studied at the Santa Fe Institute (SFI) in the USA mainly by Kauffman (1993, 1995, 2000), Holland (1995, 1998), Langton (Waldrop 1992), Gell-Mann (1994), and in Europe by Goodwin (1995); Axelrod (1990, 1997; Axelrod & Cohen 2000); Bonabeau et al (1999), Axtel and Epstein & (1996);
2) **far-from-equilibrium** and **dissipative structures** developed by Prigogine and Stengers (1984), Prigogine (1990, 1997), Maturana and Varela (1992) and Luhmann (1990);
3) **autopoiesis theory** studied by Maturana in biology and transferred to social systems by Luhmann (1995);
4) **systems theory, cybernetics, social network theory** and other work in social systems and management (Maguire and McKelvey, 1999a, 1999b; Parker & Stacey (1994) and Stacey (1995, 1996, 2000, 2001).

All these areas relate to the complex systems attributes, but present different approaches to defining them. This article uses theories of complex adaptive systems (CAS) because this approach is consistent with the proposed way to study social phenomena in an organization based on computer modeling. The basis for researching organizations in the context of CAS is the perception of

organizations as a complex social system. Numerous studies in the field of social sciences indicate that individuals are embedded in the networks of social relations and interactions (Borgatti, et al., 2009). Such a situation also occurs in organizations perceived as social systems. The organization as a social system is a group of people who cooperate on the one hand in an orderly and coordinated (institutional) way to achieve a certain set of goals but on the other hand participate in informal mutual interactions resulting from individual characteristics and rules of behavior. Such social systems also show features of complex adaptive systems (CAS).

According to Plsek and Greenhalgh (2001), CAS is a collection of individual agents with freedom of action, which is not always entirely predictable. In addition, agents are so connected to each other that the behavior of one agent changes the context for other agents. As emphasized by Mille and Page (2007) in CAS there are therefore units at the micro level that, through mutual interactions, form global system properties, which then, by feedback, affect the interaction at the micro level. In addition, CAS through interaction with the environment modifies its behavior, adapting to changes in the environment (Rammela et al., 2007; Rotmans and Loorbach, 2009). This behavior of the system is a manifestation of its adaptability. Complex adaptive systems are also characterized by co-evolution, self-organization and emergence (Mitleton-Kelly, 2003). Kauffman (1995) defines co-evolution as a process of coupled, deforming landscapes, where the adaptive movements of each individual change the landscapes of the neighbors. These landscapes are states of factors determining the behavior of individuals at the micro level. Adaptive movements of individuals, on the other hand, are the effects of agents' interaction (e.g. changes in attitudes, views, etc.) referred to as co-evolution. The effect of these changes at the level of the entire adaptive system is co-evolution with its environment, i.e. responding to changing external requirements. The characteristic feature of CAS is also self-organization, a phenomenon in which elements of the complex system undergo spontaneous order. This arrangement is the result of independent interactions between individual agents within the system and iterations of agents with the environment (Mainzer, 1994). It is a process in which the internal organization of a complex system increases complexity without being managed by an external source (Rotmans and Loorbach, 2009). The phenomenon characterizing the CAS is also emergence. The system has emergent properties if its presence is new at the evolutionary level or at the physical level of the complexity of the system in which it occurs (Newman, 1996). It is the emergence of new and consistent structures, patterns and properties in the processes of self-organization occurring in complex systems (Goldstein, 1999).

Bearing in mind the above features of CAS, it can be concluded that most organizations are characterized by a set of attributes and special behaviors typical for such systems. First of all, the organization is a relatively large group of related elements (agents) that enter into various interactions with each other. They are rather intense and non-linear (with multiple feedbacks), which means that each organization member affects many others and vice versa. Furthermore, the influence of even one person or small group can cause significant changes in the entire spheres of the organization's activity. In addition to basic interactions (mainly with members of the same substantive teams, informal groups) members of the organization also react to information flowing directly or indirectly from the environment. The organization is therefore an open system. Organization members are autonomous units that can themselves initiate activities without external management and control. Between these units, there is interaction through various forms of communication. They also have the ability to learn, through which they are able to adapt by modifying their individual capabilities and changing their operating principles to improve their performance. These characteristics and behaviors of agents (organizational members) affect adaptability, self-organization and co-evolution of the social system that is the organization. Because it is difficult to predict the effects of interaction at the micro level for the organization as a whole, even if the behavior patterns of individual organization members are known, then the behavior of the organization as a whole is emergent.

It should also be noted that in such systems rules at the local level, i.e. at the level of individual units or networks of units, as well as the way they interact, are often more important than global directives. In addition, as Sanders and McCabe (2003) show, understanding of the local dynamics of the system can allow insight into the behavior of the entire system and help identify key reasons for changes and transformations.

The purpose of this article is to build tutorial: how to study complex social phenomena in an organization?. The following paragraphs of this article therefore show:

- adequate reasoning in the case of CAS study
- computer modeling (agent-based modeling) as a CAS research tool
- the way to build, verify and validate the agent model
- steps of agent-based model creating
- example of the use of the proposed approach

Type of reasoning used to study complex social system

The basis of the CAS analysis and the study of social processes occurring in complex systems is an attempt to explain the behavior of the entire system (at the 'macro' level) based on the recognition of the rules of behavior of its constituent elements (the 'micro' level). Therefore, it is necessary to think about an appropriate way of inference that realizes such a research perspective. The most popular types of inference used in social sciences, and in particular in management sciences is deduction and induction. Both these types of reasoning, as shown in the work of Trochim (2010), have their terms used informally. Deductive reasoning is sometimes called “top-down” approach, and it works from the more general to the more specific. Inductive reasoning moves from specific observations to broader generalizations and theories and informally is called "bottom up" approach. The ideas of both types of inference in this sense are shown in Figure 1and 2.

In the study of the organization in the context of CAS, the 'induction' perspective is particularly interesting (Fig. 2), because on the basis of knowledge about system elements on the micro level it allows to explain the behavior of the entire system on a macro level, as opposed to the deductive reasoning where, on the basis of knowledge about the system (and its operation) at the macro level, conclusions are drawn about relations and factors explaining behavior, usually without referring too deeply to its basic elements (Fig. 1).

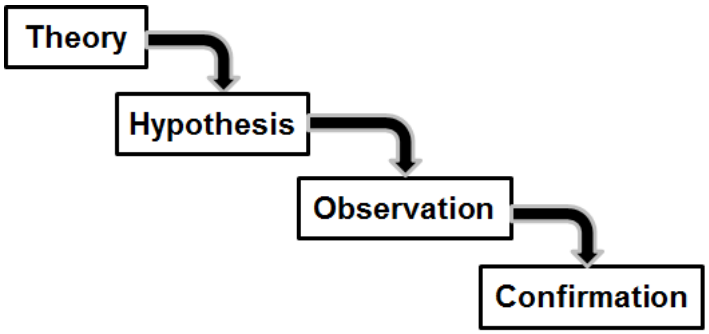

Fig. 1: The idea of deductive reasoning (Trochim, 2010)

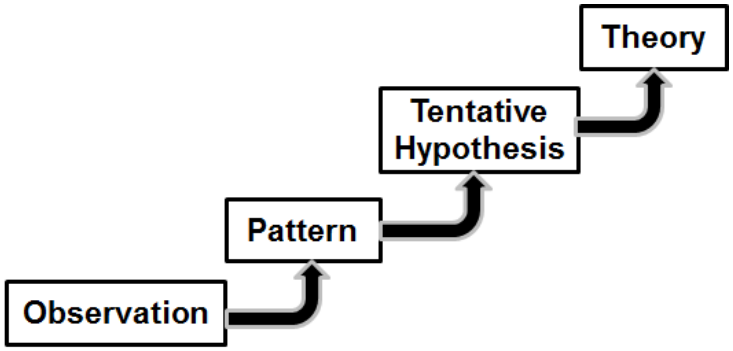

Fig. 2: The idea of inductive reasoning (Trochim, 2010)

Computer modeling as a tool for studying a complex social system

Choosing the right way to research and analyze complex social systems, attention should be paid to limitations that the nature of such systems causes. These limitations are as follows:

- a large number of basic elements of such systems (agents), hence also a large number of interactions
- the high complexity of real organizations/institutions (study too many aspects at the same time is actually not possible)
- the need to take into account changes in time, limits the ability to analyze the dynamics of real-world behavior in the long-term
- in real conditions, it is not possible to carry out factor experiments (properly designed) that allow to check the hypothesis of the investigator or search for causal relationships that combine behavior at the micro level with the behavior of the organization as a whole.

The answer to these restrictions can be computer modeling which is a practical implementation of the computational paradigm (Hoekstra et al. 2010). The appearance of this concept is associated with the development of IT technologies and concepts after the Second World War. The origins of the computational paradigm date back to the analysis of Alan Turing (1950) and concern artificial intelligence. Turing's research leads to the assumption that artificial cognitive systems with discontinuous states have cognitive abilities qualitatively identical to those of natural entities.

The computational paradigm plays a fundamental role in situations when precise, analytical descriptions of the observed phenomenon are unavailable or are beyond the scope of direct experimentation. Such a situation refers complex systems - especially social ones. For example, many real characteristics of relationships between people (agents) can be identified, but it is practically impossible to conduct a factor experiment that examines the course of the effects of such relationships in real time in real communities.

Computer modeling mentioned earlier is also called computer simulation, which is understood as the process of building a model of a specific, real object (system) and conducting experiments based on this model (Anderson, 1999). It is an abstract model implemented into a computer program.

The importance of the simulation approach in the organization's research was emphasized by Burton (2003), who describes it as a computational laboratory. In his opinion, it is a way by which it is possible to:

- asking questions about the behavior of individual agents or teams, including for information processing and communication in the organization, the results of various organizational processes, the influence of the organizational context and environment

- building a computational model that relates to the question
- design and conduct an experiments, the results of which can be used to solve the problem (answers to the questions asked)
- answer the questions asked, or at least refer to them

As it was emphasized earlier, the social system is described by individuals who react to each other and the environment (agents act according to established rules, cooperate with each other and learn). The answer to such a system can be a computational laboratory based on agent-based modeling (ABM). Agents (actors) in such models (as in real social systems) interact and influence each other, learn from their experiences and adapt their behavior to the environment (Macal and North, 2010). They can represent people, but also companies, organizations or states. In addition, what is important, ABM is a simulation, which involves the study of system dynamics based on local interactions of their elementary components (Gotts et al., 2003). It is assumed that the behavior of the system can be explained bottom-up, through a dynamic analysis of local behaviors, i.e. the interaction between elementary components of the system (Miller and Page, 2007). These are therefore analyzes based on an inductive (bottom-up) way of reasoning.

The method of building an agent model to study social system

A typical agent-based model consists of three elements (Macal and North, 2010):

1) a set of agents, their attributes and behaviors;
2) a set of relationships and methods of interaction of agents (i.e. how and with whom agents interact);
3) spatial environment of agents (agents interact with their environment in combination with other agents).

In ABM, agents have states that varies over time. An agent's behaviors are conditioned on its state. The richer the set of an agent's possible states, the richer the set of behaviors that an agent can have. Agents have rules for interaction with other agents. These rules apply to communication, movement, the capability to respond to the environment, and others. Agents are autonomous because there is no central behavior control, and agents can act independently in their environment and interact with other agents. Depending on the context of the research, they may be homogeneous, that is, they react according to the same behavioral patterns or heterogeneous, i.e. they can be distinguished from other agents and they are also recognizable by other agents. Agents interact in a certain social environment consisting of a network of interactions with other agents on which they influence and are at the same time under their influence (cooperate and compete with each other). Information exchange between agents can be direct or indirect. Although the agent-based models do not have a central authority that sends information to individual units, this does not exclude the possibility of receiving information from a management authority and responding to it. Agents obtain mainly information from their neighbors, whose set may change, e.g. as a result of spatial movement of agents. It is a neighborhood in a physical, geographical or defined by the social network of the agent. These features of the ABM indicate similarity with the social system. They can be summarized in the following way in Table 1.

Table 1: Similarities between agent-based model (ABM) and social system

	ABM	Social system
Basic units	Agents/cells	Individuals/ people
Environment	Spatial environment of agents, most often a two-dimensional network/lattice	Groups of people, families, teams, workers' groups, etc.
Possible states	The agents are in states taken from a certain set of possible states	People make certain choices, take certain attitudes and emotional states

Interdependence	Agents affect other agents and are at the same time influenced by them	Individuals affect each other mutually
Level of impact	The level of impact is determined by the rules of interaction. Agents interact mainly with their neighbors, but they can also receive information from the system or some central authority	People interact and influence each other directly locally in a certain environment, but they also undergo external influences, authorities
Applications/Possibilities/Tasks	Agents adaptation. Patterns, structures, and behaviors emerge that were not explicitly programmed into the models, but arise through the agent interactions. The emergence of self-organization, macro effects explained by rules at the micro level	To understand the phenomena occurring in social systems, it is important to: understand emergences, adaptations, understand micro and macro-trends, understand social dynamics

As shown in Table 1, ABM show many similarities to social systems, which is why social phenomena can be modeled in an artificial agent environment, which is also underlined by Macal and North (2010), Fioretti (2012), Smaldinoa et al. (2012), Sajjada et al. (2016), Li and Xiao (2017). The importance of agent-based model is growing due to the dynamic development of computational techniques. However, despite the growing availability of software, the agent-based models in organizational and management sciences are rarely used. Therefore, to facilitate the use of agent-based model (ABM), the exact steps of model creating are proposed in Table 2. The table, in addition to the steps of agent's model creating , contains questions that should be asked in each phase of the model construction. The proposed classification uses the Macal and North (2010) and Johnston et al. (2012) approach, but also simulation research Kowalska-Styczeń et al. (2018a), Kowalska-Styczeń et al. (2018b), Kowalska-Styczeń, A. Owczarek, T. (2017), Paradowski et al.(2018).

Table 2: Steps of agent-based model (ABM) creating

Steps **The following elements must be defined:**	**Questions to ask when ABM is formulating**
Goal	What is the research problem (research hypothesis)? Why was this type of modeling chosen? What specific questions should the model answer to? What will we consider a satisfactory end result?
Agents	How will the agents be represented on the network? What types of agents will be used in the model (one type or several types)? Who or what will be represented by individual agents?
Properties, attributes for agents	What states will the agents be assigned in the next steps of simulation? With which agents (cells), individual agents will interact? Is agents movement on the network possible? What will the agent's environment be defined?
Rules for agents	What will be the possible actions of each agent? What or who will influence agents' decision making? What sources of information will be used by agents

	in the decision-making process? How do the agents interact with each other? How do the agents interact with the environment?
Simulation steps and duration of the simulation	What will the time interval of each next step of the simulation be? What will the duration of the simulation be? Will the results be averaged after a certain number of simulations?
Model verification and validation	How will it be possible to check the correctness of the model, especially the behavior of agents and mechanisms of interaction between them? Will empirical data or knowledge about the modeled phenomenon be used for verification and validation?

As you can see in table 2, the construction of the ABM requires a thorough understanding of the modeled phenomenon and consists of many stages. However, such a thorough analysis of the examined problem allows to create a theoretical model, which is then implemented as a computer program. The results obtained during simulation using a computer program must be verified and validated. Verification is checking the adequacy between conceptual models and a computer model, while validation is ensuring that both conceptual and computer models are an appropriate representation of the theory or phenomenon being studied (David, 2009). In the case of social simulation, the verification methods include (David, 2013):

- **dynamic methods** that rely on checking the computer program through various ranges of input parameters (obtained in this way results allow to determine whether the model is appropriately programmed)
- **static methods** that focus on the analysis of the static representation of system elements (mainly on the detection of program code errors) and are aimed at showing that the computer model adequately performs its tasks without software flaws.

In the case of validation, it is important whether the goal of the model is prediction or explanation. In the context of social simulations, prediction is quite a difficult task, because social systems are characterized by complexity, non-linearity and high sensitivity to initial conditions. Therefore, the purpose of social simulations is mainly to explain modeled phenomena. In this case, the validation consists in showing that the mechanisms created in the model by simulation are able to reproduce real-like behaviors. The aim of validation is first of all to assess whether the structure of mechanisms at the micro level allows the creation of macro-level effects consistent with known theories or qualitatively and quantitatively convergent with real data (David, 2013).

The proposed simulation approach was used in the works Kowalska-Styczeń et al. (2018a), Kowalska-Styczeń et al. (2018b), Kowalska-Styczeń, A. Owczarek, T. (2017), Paradowski et al.(2018).

Below, in table 3, an exemplary ABM describing the transfer of knowledge was shown in the form of the proposed in table 3 approach. Details of the simulations carried out using this model can be found in the works: Kowalska-Styczeń et al. (2018a), Kowalska-Styczeń et al. (2018b), Paradowski et al.(2018). These articles use the special case of ABM - cellular automata. The concept of a cellular automaton was introduced in the 1940s by John von Neumann, while the practical application of AK is associated with the development of computers in the 1980s and with the popularization of this tool by Wolfram (2002).

Table 3: Steps of knowledge transfer model creating

Steps The following elements must be defined:	Answers for the created ABM model
Goal	What factors influence the efficiency and effectiveness of knowledge transfer in the organization?
Agents	Members of the organization (employees) who are represented by cells of the square lattice of cellular automaton. Each agent can be a leader of knowledge or a follower. In a single interaction, an agent who has more knowledge (more chunks) is the leader of knowledge. Each agent has the ability to have each K portion of knowledge with the probability q
Properties, attributes for agents	Each agent can be a leader of knowledge or a follower. The transferred knowledge is divided into a number of knowledge chunks. In a single interaction, an agent who has more knowledge (more chunks) is the leader of knowledge. Each agent has the ability to have each K chunks of knowledge with the probability q.
Rules for agents	Each agent in each step of the simulation t can receive one chunk of knowledge from one of his neighbors. Transfer in time t is possible, if in time t - 1 neighbor of the selected agent has exactly one chunk of knowledge more than himself. Initially, the missing chunk of knowledge is drawn randomly, and then a neighbor with a knowledge distance equaling one is sought. If such an agent exists in the neighborhood, then knowledge transfer takes place.
Simulation steps and duration of the simulation	A single simulation is carried out until the stable state of the system is obtained (i.e. the state in which agents do not change anything in the system). The results were averaged usually after 100 such simulations
Model verification and validation	Model verification consisted in checking various ranges of input parameters and observing the behavior of the system. The validation of the model consisted in assessing its compatibility with knowledge in the field of psychology, management and research on knowledge transfer. Simulation results were also compared with the results of empirical studies by Fleming et al. (2007) and Coleman (1988).

Summary and conclusions

An organization is a multidimensional, multi-faceted and complex system, especially an organization considered in the context of the social system.

Undoubtedly, this state of affairs is the impulse to look for specific tools that allow analyzing and describing processes taking place in organization. A new direction is attempts to combine the presented perspectives of analysis within the complex systems theory. The theory of complex systems, developed initially in the spheres of physical and biological sciences, in its essence is aimed at modeling and explaining the behavior of systems of interrelated objects based on the knowledge of

the rules of individual elements (on the local level) and structures (networks) of their connections. Understanding the behavior of a complex system therefore requires understanding not only the behavior of its part, but also understanding how they work together and how they create the behavior of the whole. Therefore, it seems interesting to use computer tools developed on the basis of complexity theory, especially agent-based models.

The importance of simulation, and in particular agent models is growing due to the dynamic development of computational techniques. However, despite the increasing availability of software, attempts to use agent models in organizational and management sciences are scarce. In order to fill this gap and identify new possibilities of analyzing social phenomena in the organization, in this article the methodology of conducting simulation studies of complex social processes was developed.

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Approaches for The Russian Competitiveness Improvement in The World Through Sustainable Development of Human Capital

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Abstract

The aim of this research paper is the identification of human capital role in the sustainable economic development of any country in the changing world. This paper includes the overview of general current trends in the world, influencing on further development of countries and its competitiveness level to each other. Based on the literature review the role of human capital has been outlined and its involvement in different rankings has been studied. The target of this paper is the understanding of development track for the Russian economy through reforms in human capital area with attraction of investments, efficient cooperation with trade partners and sustainable policy of a government. As a result, several rankings have been analyzed and required proposals for the Russian economy have been revealed.

Keywords: Higher Education, Social and Economic Indicators, Competitiveness, Digitalization, Innovativeness, Economic Growth, Human Capital Development.

Introduction

Recently the world has changed dramatically influenced by global financial crisis initiated in USA and covered almost all countries around the world through international trade and international division of labor. The world society meets the issue of further capital accumulation or sustainable economic development of any country with scarcity of resources and markets in the world scale (Akhmadeev et al, 2019).

Such problem has its influence on the trade interaction among countries through sanction policy, trading wars by whole regions as USA and China, USA and EU, USA and Russia, etc. The allocation process of numerous financial flows among strategic companies in key world economies with a target to develop and launch new technologies and cover more markets is a consequence of aggressive policy by leading countries. As a result, government debts to the annual GDP indicator of many countries have grown exponentially. For example, Japanese debt to GDP is 238%, Italian – 134%, American – 106%, French – 98%, etc. (Table 1).

At the same time, this is important to analyze the debt of these countries to the whole world debt both in percent and in absolute numbers. Thus, the first ten countries are USA (31% of the whole world debt), Japan (17%), China (9, 8%), Italy (4%), France (3,9%), UK (3,5%), Germany (3,5%), India (2,7%), Brazil (2,4%), Canada (2.2%).

Table 1: World debt by countries, %

Place in the ranking	Country	Government debt to GDP of a country, %	Government debt in absolute numbers, US dollars	% of the world debt
1	USA	104,3%	21,465	31%
2	Japan	237,1%	11,788	17%
3	China	50,6%	6,764	9,8%
4	Italy	132,2%	2,744	4%
5	France	98,4%	2,736	3,9%
6	UK	86,8%	2,455	3,5%
7	Germany	61,7%	2,438	3,5%
8	India	68,1%	1,851	2,7%
9	Brazil	87,9%	1,642	2,4%
10	Canada	89,9%	1,540	2,2%
11	Spain	97,1%	1,386	2,0%
12	Mexico	53,6%	655	0,9%
13	South Korea	37,9%	652	0,9%
14	Australia	41,4%	588	0,8%
15	Belgium	102%	543	0,8%

Source: https://www.visualcapitalist.com/69-trillion-of-world-debt-in-one-infographic/

At the same time, China is increasing its influence in the world GDP based on purchasing power parity: the share of Chinese economy was 25,4 trillion US dollars or 18,6% and American economy – 20,5 trillion US dollars or 15% accordingly (Table 2).

Table 2: Position of a country in the ranking by GDP based on PPP, trillion US dollars

Place in the ranking	Country	GDP based on PPP, trillion US dollars	Share in the world GDP, %
1	China	25,4	18,6
2	USA	20,5	15,0
3	India	10,5	7,7
4	Japan	5,5	4,0
5	Germany	4,5	3,3
6	Russia	4,0	2,9
7	Indonesia	3,5	2,6
8	Brazil	3,4	2,5
9	US	3,1	2,3
10	France	3,1	2,3

In conjunction with the growing debt of leading economies, fundamental changes in the structure of global value chains have occurred. There was a shift in the export of goods and services from industry to services. During last 10 years the share of services has increased in 0,4% in the whole world volume of export, then the share of industrial goods has decreased in 1,2% and natural resources – in 0,6% accordingly (Lehoux et al, 2019). At the same time, the sector of services includes IT and telecommunication (7,8% of world GDP), business services (5,3%), patenting (5,2%), financial and insurance services (3,2%), and transport (1,7%) (Morozova et al, 2019).

Due to some changes in the structure of world economy based on GDP and trade turnover between countries, and additionally global trends in the field of digitalization and automation in majority of production processes in goods and services, there is an issue on competitiveness level of key world economies based on the development of human capital (Dorofeev et al, 2018). In accordance with last

data of Word bank the structure of common wealth in Russia in 2017 includes the human capital (46%), production capital (33%), natural resources (20%) and net foreign assets (1%). The share of human capital in average in OECD countries is 70%, and this indicator is higher in 24% than in the Russian economy. Such difference in the development of human capital is the main indicator in further analysis of competitiveness level of Russian in comparison with leading world economies (Yukhimov et al, 2002).

Thus, the target of this research paper is to reveal weak points in further development of human capital development for competitiveness level improvement of Russia within the world economy.

Literature Review

Research papers on the development of human capital and its influence on the economic growth of a country have been appeared several decades ago, but only today, the role of a human being has been raised due to digitalization and automation trends. Researchers have revealed main 5 stages of economic development and human capital: pre-industrial, mass education, late industrial, first and second post-industrial stages (Anikin, 2017).

The pre-industrial stage (up to the end of 18th century) can be described by the development of agricultural sector without additional investments in the educational process of a society. During the second stage or mass education of population (first decade of 20th century), there is a new concept formation of a human capital by creation of qualified human resources. And during post-industrial stage (end of 20th century) intangible assets have a crucial role in the economic development of a country. This is a reason why skills and abilities of human beings are the factor of competitiveness for some countries in comparison with others (Becker et al, 1962). The special attention pays to the professional education for adults, but the main investor in the human capital level growth is the government (Schults, 1961).

Within development of first and second post-industrial stages from the end of 20th century to date there was seen the importance of development and influence of additional factors besides educational level on a person progress, including a family quality, preschool education, communication, etc. (Heckman et al, 2010). Moreover, some researchers are considered such resources as social capital (Augusto et al, 2014), cultural capital (Bourdieu, 1986), and internal qualities of people and their preferences to the special line of work, which can be described as a talent for a person. Consequently, researchers take into account rankings of satisfaction for human beings by their job and rankings of happiness at the level of countries, etc. (Deaton et al, 2013).

Methodology

Further comparative analysis assumes the implementation of different indicators describing the attraction of human resources with the highest economic value (the labor efficiency) within leading world economies. Such indicators include labor efficiency, innovativeness of economies, complexity of economies, ease of doing business ranking, etc. The list of countries is defined in accordance with the following principles:

- The biggest economies in accordance with GDP volume per PPP: China, USA, India, Japan, Germany, Russia, Italy, Brazil, UK, France
- Economies with the highest growth in the field of trade turnover with Russia after year 2014: Finland, Austria, the Netherlands, Saudi Arabia, South Korea

Findings

First, there is a need to pay attention on innovativeness index of different economies worldwide. This ranking includes leading position of South Korea, Germany, Finland, Switzerland, Israel, Singapore, Sweden, USA, Japan and France. Russia has 27th place before Brazil, India and Saudi Arabia but behind China (Table 3).

Table 3: Innovativeness index of different economies, 2019

Position in the ranking	Country	Position in the ranking	Country
1	South Korea	16	China
2	Germany	18	UK
3	Finland	21	Italy
8	USA	27	Russia
9	Japan	45	Brazil
10	France	54	India
12	Austria	56	Saudi Arabia
15	The Netherlands		

Source: Bloomberg Innovation Index, 2019

This index includes key points, which define the level of innovativeness for any country: (1) R&D investments by country, (2) number of patents per person, (3) number of graduates in universities, (4) export volume, (5) labor efficiency, (6) share of human capital in key fields, (7) number of researchers.

As a next step, consider positions of Russia in indicators mentioned above, which have its impact on the qualitative level of human activity in the economy of a country nowadays.

Taking into account government investments in R&D of a country, Russia has invested 40330 mln US dollars for year 2018. At the same time China and USA have invested approximately 370605 and 476452 mln US dollars accordingly or ten times more than in Russia. Additionally, India and Brazil have more investments annually in comparison with Russia based on Figure 1.

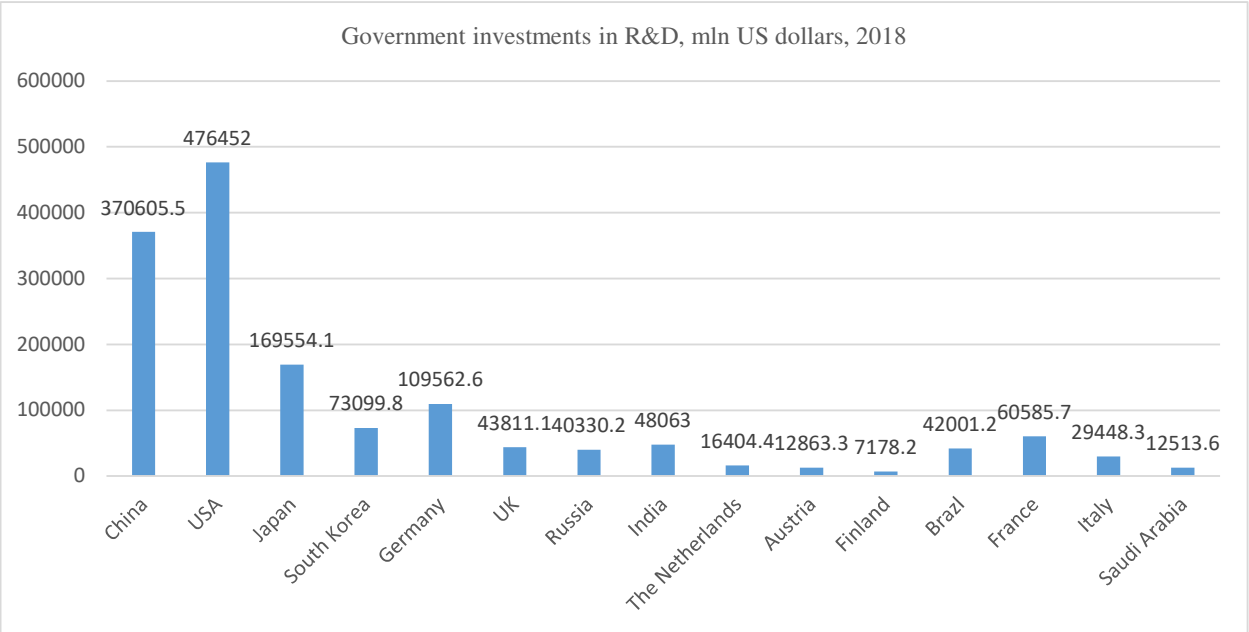

Source: http://uis.unesco.org/apps/visualisations/research-and-development-spending/

Figure 1: Government investments in R&D, mln US dollars, 2018

Russia is on the last positions in accordance with investments in R&D to GDP of a country in percent or 1,1% in comparison with indicators of South Korea (4,3%), Japan (3,4%), Finland (3,2%). Only India is located behind Russia with 0,8% of investments (Figure 2).

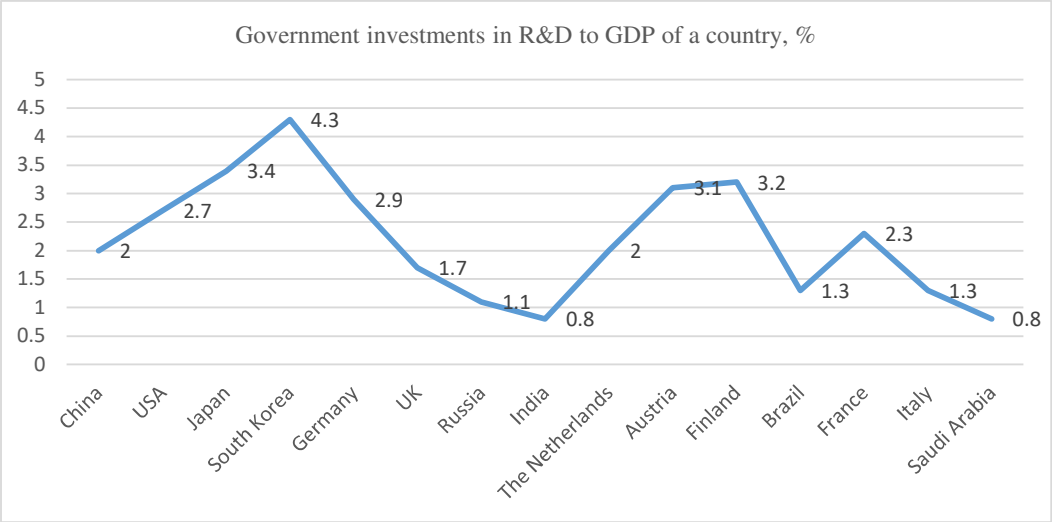

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Figure 2: Government investments in R&D to GDP of a country, %

The number of patents worldwide has achieved 3,3 mln issues for the year 2018, and China has 46,4% of all patents. Russia has the 7th position with 37957 patents after China, USA, Japan, South Korea, Germany and India (Figure 3). Such result is the consequence of insufficient investments in R&D during a long period.

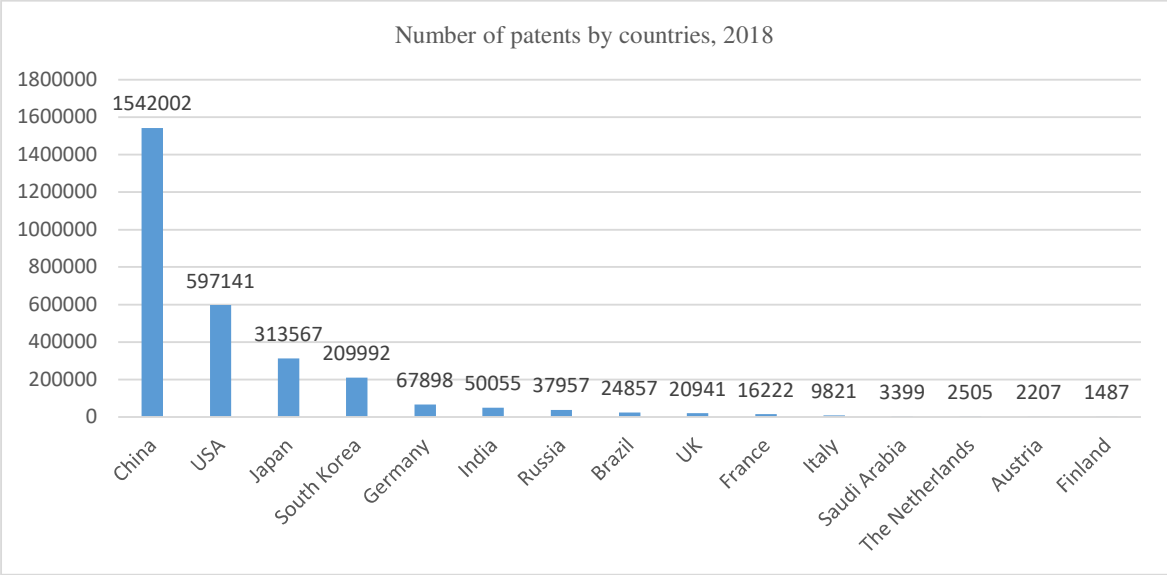

Figure 3: Number of patents by countries, 2018

Source: OECD report on Education, 2019

Nowadays, Russia has one of a leading position in graduates by universities in comparison with other countries (Figure 4) but these results do not take into account the qualitative valuation by the level of human capital by countries in different fields (Table 4). Additionally, Russia has around 3094 researchers by one mln of population, and it proves the average research potential of a country worldwide (Figure 5).

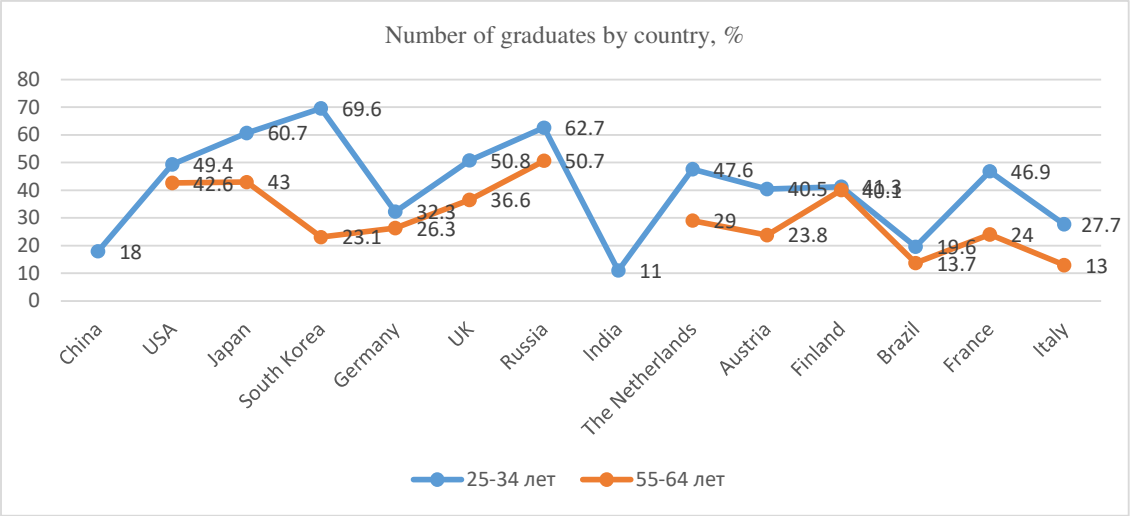

Figure 4: Number of graduates by countries, %

Source: OECD report on Education, 2019

Table 4: Level of human capital in key fields by country, 2018

Country	Business	Technologies	Data Science
China	36	41	39
USA	18	23	16
Japan	35	38	49
South Korea	55	51	50
Germany	7	7	7
UK	14	20	9
Russia	28	18	25
India	50	44	51
The Netherlands	4	11	12
Austria	3	3	4
Finland	1	10	11
Brazil	34	30	34
France	17	16	8
Italy	23	21	23
Saudi Arabia	58	50	58

Source: Coursera, Global skills index, 2019

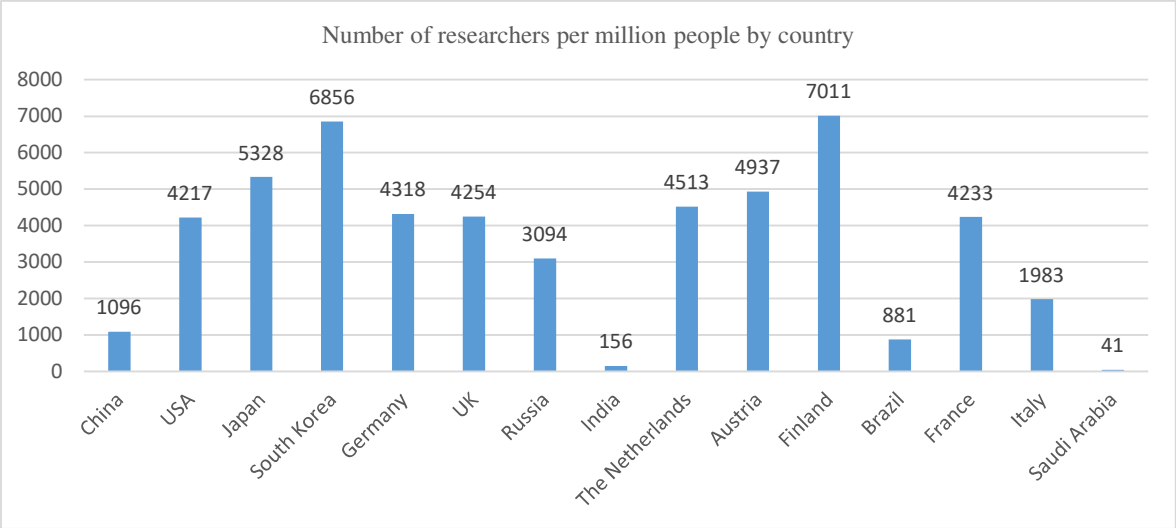

Figure 5: Number of researchers per million people by country

Source: http://uis.unesco.org/apps/visualisations/research-and-development-spending/

As a consequence of a lack both in the qualification of workers and the technological modernization of enterprises, there is a low level of labor efficiency in the Russian economy, which is revealed in low volumes of production in goods and services in comparison with other countries, and accordingly, the decrease of economic potential of a country (Figure 6).

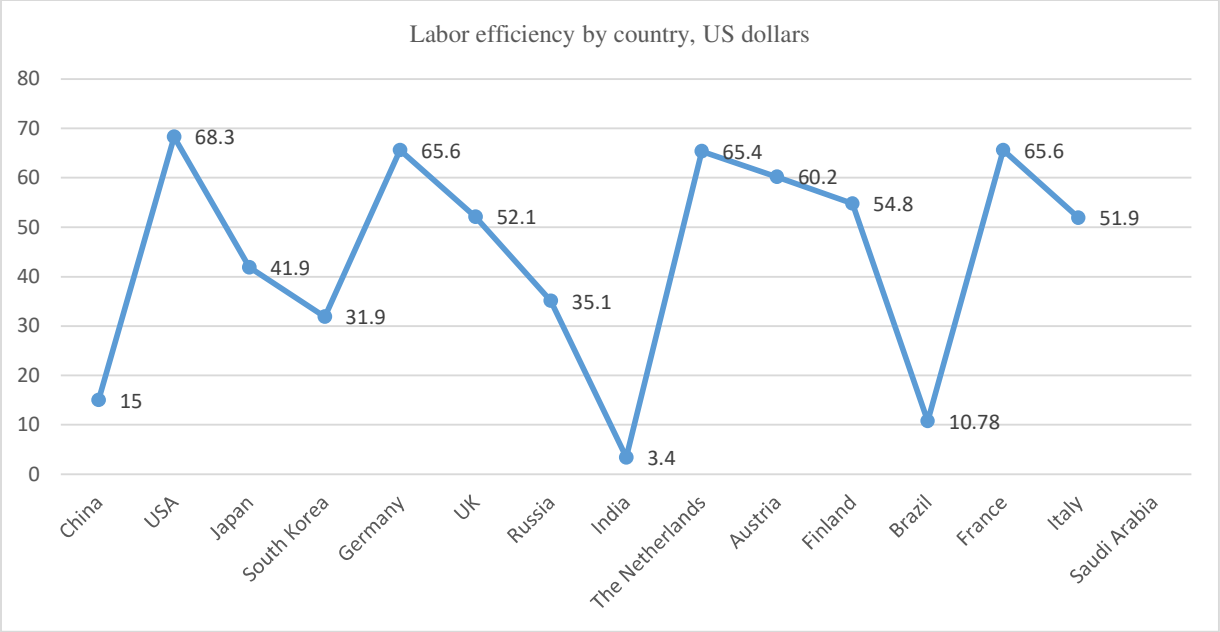

Figure 6: Labor efficiency by country, 2018

Source: OECD report on Labor efficiency

The role of a country at the international cooperation is supported nowadays by its place in the international division of labor and trade relationships with main partners. Any country can get additional profit and increase its economic growth in comparison with other countries through export

of goods and services. Thus, leading positions of China, USA, and Germany by its export volume are obvious taking into account key positions in global value chains (Table 5). Russia has 14th position in this ranking before India, Saudi Arabia, Brazil, Austria and Finland.

Table 5: Export volume by country, 2019

Position in the ranking	Country	Export volume, US dollars
1	China	2, 494, 230, 195,000
2	USA	1,665,992,032,000
3	Germany	1,557,176,334,000
4	Japan	738,188,768,000
5	South Korea	605,169,190,000
6	The Netherlands	585,622,815,000
8	France	568,448,540,000
9	Italy	543,466,795,000
10	UK	487,069,299,000
14	Russia	449,347,157,000
18	India	323,056,409,000
21	Saudi Arabia	294,535,553,000
27	Brazil	239,889,210,000
29	Austria	184,726,848,000
44	Finland	75,258,290,000

Source: http://www.worldstopexports.com/worlds-top-export-countries/

Conclusion

Thus, nowadays the Russian sustainable economic development depends not only on the technological progress in companies but also on the influence of a government on the human capital development within a country. The following list of issues could be considered for this reason taking into account indicators mentioned above:

- the direct investment in R&D of a country based on advantages of every region. Partly this initiative can be launched though financing of national projects;

- the close cooperation with the main trade partners in the field of investments with mutual development of R&D;

- the improvement of legal regulations in the country for business transparency and attraction of SMEs in regional technoparks and its interaction with large companies;

- the development of all educational stages taking into account latest trends worldwide taking into account best practices of other countries (Finland, Japan, etc.) but with historical and cultural aspects of home country;

- the analysis and increase of labor efficiency level in the national economy through the professional education enlargement among the whole population;

- the development and improvement of regional infrastructure in the country taking into account the latest trends;

All listed above measures are essential for the Russian economy for its further development and position in the world. Nowadays this is important to understand that the level of human capital in a country is the key point in the interaction with each other.

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Presumerism – Trend, Fashion or New Face of Emotional Marketing?

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Abstract

The paper presents the concept of a presumer and the factors which determine this particular type of consumer activity on contemporary markets in the context of the development of emotional marketing. The first part of the paper presents significant changes in the contemporary form of company-consumer communication, which are based on the use of new forms of customer involvement. Traditional methods of communication between an organisation and its market environment evolve towards individual experiences. This is inevitable due to both the new communication possibilities (technological aspect) and the evolving needs of target groups (emotional aspect). The following part of the study outlines the concept of a prosumer and a presumer and attempts to provide a synthesis of the factors that determine the emergence of new consumer attitudes.

Keywords: Presumerism, Marketing, Consumer.

Introduction

Contemporary changes in the social environment impose a change in the approach towards a company's operating philosophy and focusing the attention of those in charge on changing the profile of the contemporary consumer. In business markets, collaborating with customers and users has become increasingly important to get knowledge about consumer needs and to develop new products [Laage-Hellman, et. al. 2014, pp. 257-276]. The contemporary consumer has become more demanding and active, he expects specific solutions and offers "tailored" to his sublime expectations [Dusi, 2018, pp. 663-681]. From a hitherto passive recipient, he has transformed into a prosumer - a consumer who is both conscious and involved. For this reason, special attention is to be paid to three facets of a marketing strategy: product differentiation, competitor orientation and brand profiling emphasis. [Kaulio 1998, pp. 141-149; Svendsen, et. al., 2011, pp. 513-530]. The customer has a broad understanding of products and services available on the market, makes conscious purchasing decisions and willingly shares his knowledge with others, primarily via the Internet (Trentmann, 2009, p. 107; Miles 2017, pp. 16-19). The next stage in the development of the concept of an involved customer is the presumer, or a prosumer who engages in active interaction with companies before the products or services enter the market and thus participates in the concept phase [Alderete 2017, pp. 1-12; Pauwels 2015, pp. 66-84; This raises the question of whether contemporary consumers do indeed feel the need to establish such relationships, or whether presumerism (preceded by prosumerism) is a fashion created by companies that use the potential of emotional marketing. The author's intention is that the findings of the literature review conducted for the purposes of this study contribute to the attempt at finding the answer to this question.

A new understanding of contemporary times

Companies base their operations on rational and effective activities. Similar trends are observed in the contemporary society, where “a shift has been made from seeking the truth to seeking effectiveness and efficiency. The boundaries between ideology and science, opinion and knowledge are being blurred. Knowledge is the sum of commercialised information operating in the pragmatics of the free market. Commercialisation promotes a constant change in fashion, a search for novelty, the rejection of permanent values and norms, the denial of authorities, in reality promoting consumerism,

individualism, commercialism, extreme liberalism, hedonism [Hoffmann, et al, 2018, pp. 167-178.]. The commercialisation of social structures is the source of the spread and deepening of the consumption lifestyle [Drożdż, 2012, p. 18]."

The observation of current global trends in subject literature indicates that research directions tend to be related to strategies of the period of transition and crisis, the development of the resource theory and building strategies supporting key business processes. They concern mainly the proper implementation of marketing policy, "in particular the creation of a brand and engaging the customer in manufacturing and customisation processes, networking and supply chains, logistic strategies and new manufacturing methods, information strategies [...], they enable better adjustment of forecasts and the related methodologies to the requirements of modern business, based to an increasing extent on information and knowledge [Gospodarek, 2012, p. 24]."

The awareness of company managers is on the increase in terms of the role of innovation in the management process (and thus in the development of the company). Management is becoming "innovation-sensitive" [D'Olivio et. al., 2018, pp. 392-406]. Demand-based approach to innovations presumes that they are not only formed within the organisation, but primarily acquired from the environment [Crespi 2008, pp. 655-672; Fabrizio 2012, pp. 42-64; Edler 2016, pp. 414-426]. The source of knowledge and innovative solutions are no longer just employees, but mainly entities operating in its environment (the so-called external stakeholders) – trade partners, customers, end users. The managers acknowledge the possibility of involving the customers in the process of creating new, innovative products. From final recipients, customers are turning into active co-participants involved in the innovation process by searching for new product concepts, testing prototypes, adapting products to individual consumer needs [Żelichowska and Furman, 2013; Koren et. al., 2013, pp. 719-729]. What is significant in this context is the emotions – the emotional model assumes that "it is the emotions associated with the product that are the basis for shaping customer satisfaction. The factor mediating the development of satisfaction is the analysis of the results of product use in terms of success or failure. A purchaser experiencing satisfaction manifests it, whereas dissatisfaction is expressed more discreetly [Desmet 2002, pp. 60-68; Desmet 2008, pp. 379-397; Czerw, 2008, p. 22;]."

Table 1: Values and features of post-modern consumption culture

No.	Values	Culture Features
1	Pluralism	Negation of universal ideology or norms, scepticism, disappointment, plurality of beliefs
2	Diversity	Searching for individual identity, lifestyle diversity, growing diversification of demand
3	Globalisation	Consumers' drive for a modern, more attractive lifestyle in which global products play a major role
4	Tribal community	Growing importance of social bonds – searching for goods and services that facilitate social interaction
5	Symbolism	Creation of a hyper reality and virtual reality
6	Fragmentation	Fragmentation of experiences, detaching them from the context
7	Lack of hierarchy	Disorderly sequences of consumption stimuli
8	Multiculturalism	Drawing upon the heritage of different cultures
9	Popularisation	Omnipresent influence of the mass media

Source: Mazurek-Łopacińska [2011, p. 47]

Along with the development of the concept of marketing and the emergence of relationship marketing, the approach towards the customer has changed. The communication addressed to the consumer ceases to be collective and anonymous. A new era of individual communication begins, primarily due to the customer's individualised approach to the purchase of products, the context of individual taste and specific preferences [Quinton, 2013, pp. 912-932; Chrąchol, 2013, p. 149; Cao et. al., 2016, pp. 1303-1321; Habicht 2017, pp. 114-131]. Emotional marketing [Consoli 2010, pp. 52-59; Deshwal 2015, pp. 254-265], in turn, is based on the understanding that the advertising and promotional tools used should have a strong, emotional impact on the consumers. When faced with huge information (media) noise, it is indeed difficult to communicate with the potential consumer. It is also unlikely that he will receive the message, understand it and, on top of that, will act upon it when making individual purchasing decisions. Consequently, marketing activities in context should appeal to the emotional realm so that the message can reach its target audience and prove successful. In view of these considerations, however, a certain doubt arises which was aptly defined by K. Wójcik in the form of a question about the ethical context of marketing activities (in this case public relations) [Wójcik, 2014, p. 25]: "Is there a chance […] not to manipulate the marketing audience in the era of searching for ever new sources of influence on consumers, such as marketing of emotions and feelings, guerrilla, olfactory, whisper or value marketing, and more recently neuromarketing, […] when all rules of rhetorical expression are used with full awareness, also those that lead to the manipulation of the advertising audience?"

The prosumer and the prosumer on the contemporary market

The role and importance of the consumer is not limited solely to a passive acceptance of the company's market offer. Consumers are becoming active market participants, providers of specific services and co-creators of the offer – the prosumers. The consumer, hitherto passive, submissive towards product and service offers of companies, has transformed into an active consumer – the prosumer [Planells 2017, pp. 620-638]. Targeting strategies should distinguish carefully between truly innovative consumers and other early adopters. The costs of identifying them in a particular market need to be weighed against the potential benefits. [McDonald 2007, pp. 421-435; Fursov et. al. 2017, pp. 153-160]. A cognitively interesting definition has been proposed by A. Niezgoda. She defines the presumer as a "consumer whose activity exceeds the average, who is aware of his personal needs, who has knowledge about products and passes it on to other consumers, takes part in designing (creating) the product, is involved in the process of developing and selling the product by passing information to other consumers. Thus, he can also be considered as an opinion leader, as he often anticipates the consumer's general behaviour [Niezgoda, 2013, p. 205]." This thesis is confirmed by I. Zdonek who also defines a prosumer as a local public opinion leader. According to the author quoted above, one of the characteristics of the prosumer is his active involvement in publishing information about his product experiences in electronic media (on the Internet), as such information has a great influence on other consumers' purchasing decisions [Zdonek, 2010, pp. 399-406].

In conclusion, a prosumer is more than a consumer [Ritzer, 2019, pp. 75-95]. He is defined by his extensive knowledge of products and services related to given brands and is eager to share this knowledge with others. We can therefore describe prosumers as active consumers who are more than just passive recipients of marketing messages and media content. Such people often become good ambassadors for a given brand or product. However, should they lose confidence in the brand, they are quick to become their ardent adversaries [Bobola, 2013, p. 58]. In turn, when trying to identify the characteristics of a presumer, one could be tempted to say that it is a prosumer who wants to take part in active creation of products and services (and even brands) before they enter the market. In this context, some interesting research results have been presented by W. Wolny, who states that "active participation in designing an individualised service can be considered to be the highest form of the prosumer phenomenon." According to research, however, such participation in the development of e-services still has little popularity, but continues to develop, particularly in the area of the Internet [Wolny, 2013, p. 161; Roberts 2019, p. 213-230;].

Determinants of Presumer Attitudes

Is it possible to determine, in the context of the development of society, such phenomena which favour consumer attitudes?

Mass individualisation of the offer, which according to the managers influences customer loyalty, will probably have a significant impact in this case. The objective of mass individualisation is to adapt the offer in such a way that each (individual) consumer may find precisely what he wants in the value communicated by a given company. What is important in this case is the pre-defined (and not random) potential for individualisation.

An interesting division of the bonds enabling individualisation has been presented by P. Stach [Stach 2009, p. 46-55] The conducted literature review allowed the Author to draw a number of interesting conclusions on the quality and durability of the relationship between the organisation and the customer. He concludes that the factor responsible for the durability and quality of the relationship are the bonds. The first level encompasses financial bonds. These are relatively easy to establish; however, they do not last and can be easily copied by competitors. The second level is social bonds that are responsible for the durability of the relationship. They are based on the personalisation of the relationship between organisation and the customer. Another level is the relationship based on the individualisation of the offer and adapting it to the specific (concrete) needs of the consumer, as well as shaping proximity in the relationship between the buyer and the supplier. In the case of consumption services, the service provider's partnership approach to the customer is a process consisting in building and strengthening the bonds with selected customers at the aforementioned levels, particularly the third one. Based on the Author's observations, a presumer approach emerges in such cases, consisting in engaging the customer in the process of perfecting the service offer (e.g. surveys of needs and satisfaction, consultations during design of new products) or treating the customer as a partner or friend, which makes him feel unique in comparison with other consumers [Stach, 2009, pp. 47-48]. In conclusion, economic development, increased consumption and prosperity are the factors that contribute to a decrease of interest in the standard offer (even in the case of mass consumption) [Van Tonder 2016, pp. 289-302; Sureshchandar et. al, 2002, pp. 363-379; Aburoub et al, 2011, pp. 107-118; Taylor 1994, pp. 163-178].

As confirmed by other research, if a specific product is available to an increasingly wider group of customers, its attractiveness decreases. Consumers expect products that are tailored to their individual needs and available at attractive prices comparable to those of standard products. Managers strive to adapt to these requirements while maintaining relatively low costs of such adaptation. The measures aimed at meeting these challenges are referred to as mass customisation. Thanks to the mass customisation strategy, it is possible to gain a competitive advantage by offering the customer something more than a standard product by offering additional attributes related to that product [Tiihonen 2017, pp. 1-7; Bednarz, 2010, p. 102]. “The strategy of mass customisation seeks to achieve something that has so far only been achieved in certain types of production: the customisation of products to the individual requirements of a specific customer, typical of traditional artisanal production and its modern form, known as engineering to order, with low prices and short delivery cycles typical of mass production. It allows to simultaneously meet both of these opposing requirements. [Deradjat 2017, pp. 95-121; Bednarz, 2010, p. 105; Noguchi et al, 2016, pp. 95-119; Cannas et al, 2018, pp. 495-517].”

Contemporary economic and social changes result in multidirectional transformations of many areas of life and of the social structure, as well as changes in customs and mentality, in value systems, lifestyles and consumer behaviour. Consumption has become a driving force behind the behaviour of Polish consumers as well, determining the shape of their life aspirations, dreams and desires. In the capitalist world, consumption has become one of the basic values, especially in the context of the previous consumption asceticism, regarded as a relic from the previous era. The accumulation of goods became, and in some periods of actual regulation of consumption, the possession and accumulation of goods ceased to be a shameful relic of small bourgeois attitudes. Being in possession of attractive goods became a symbol of social status and an indicator of personal success. The spread of materialistic systems of values and consumption attitudes is favoured by the accelerating processes of globalisation

and integration, which enable the free flow of civilisation patterns, lifestyles and consumption. Highly developed consumerism is a certain *signum temporis* of contemporary societies in economically developed countries [Bylok 2017, pp. 61-74; Drapińska 2017, pp. 103-110; Delieva 2019, pp. 59-67 Mróz 2015, pp. 25-36].

In the decision-making process concerning his consumption needs, the consumer follows his own needs and their hierarchy which depends on the values he confesses. A consumption need is a tendency to use or own a given product. A desire is a need that has not been satisfied, while a requirement is a request or demand for a good or service. Every consumer has his own hierarchy of consumption needs and, on that basis, he makes choices based on specific needs which, if not satisfied, result in a feeling of dissatisfaction. Making the final purchasing decision is the process of identifying the market, obtaining useful information and planning the purchase. The described actions have for their purpose the elimination of the undesirable state of dissatisfaction. [Włodarczyk-Śpiewak 2011, pp. 64-65; Antioco 2018, pp. 301-310; Poushneh 2017, pp. 97-118].

With respect to the psychological dimension of the consequences of consumption, a distinction can be made between the micro-social context (related to the consumer's role, his interactions and interpersonal relations in a broader aspect) and the macro-social context (related to structural changes that the society is undergoing). In turn, the main functions of consumption in the context of these considerations include primarily: ensuring the individual's expected quality of life (health and wellbeing), enabling the identification of individual identity and belonging to a particular social group, achieving and maintaining a social status and a place in the structure of society, assigning a symbolic meaning to the purchased goods and services and acting as a means of expression and communication with other consumers and social groups [Bylok, 2006, p. 212; Shen et al. 2016, pp. 2265-2270; Duffett 2017, pp. 19-39; Black 2017, pp. 416-429].

Consumption redefines the sense of belonging; according to a concept by M. Maffesoli [Maffesoli 2016, pp. 739-747] individualisation does no longer constitute a guiding principle for individuals. Rather, it constitutes an volutionary step towards new forms of community. In the Author's opinion, the individual needs to be re-embedded and to share a certain territory with others. The phenomenon of disembedding (*disembeddment*) is accompanied by the phenomenon of re-embedding (*re-embeddment*), i.e. the process of deindividualization – the transition from individualism to new forms of socialisation and social bonds [Skorodumova 2019, pp. 947-953; Nemesh 2017, pp. 151-159]. Identity is not constituted individually, but rather through participation in certain different emotional communities, defined as tribes. These are new forms of community which the consumer joins of his own free will, through an individual decision. Such communities provide the individual with a sense of belonging, a meaning, they offer an attractive lifestyle and facilitate identification with other consumers. This allows for the creation of an identity as if “from scratch”. Thus, individualism gives way to a redefined sense of community, defined by consumption [Olcoń-Kubicka, 2006, p. 147].

Certain companies make excellent use of this phenomenon by provoking their customers to behave in a way that has more to do with religion than with consumption. In a way, the consumers become "faithful followers" of their brands. This kind of "cult", however, has no rational justification; it is the companies that create a quasi-religious bond with their consumers. They often achieve this effect using the principles of sensual *branding*, offering their consumers a unique sense of belonging that stimulates and strengthens the bonds between the participants, a clear vision associated with a sense of purpose, authenticity, consistency, perfection, influence on the senses, established rituals, symbols and a sense of mystery. The brand's role is that of creating a social bond that connects individuals, creates a platform for understanding and action and gives a strong sense of belonging [Lindström 2009, p. 218-220; Koch 2019, pp. 1-25; Humayun 2017, p. 677; Mathras et al. 2016, pp. 298-311]. What helps in the creation of the said platform is the Internet. In the communities of fans, for example, it plays a significant role. Without virtual fan communities operating in the Internet, people with similar interests would not have the opportunity to interact at all. Such communities can be considered as legitimate human communities. “The full-fledgedness that encourages participation and various activities results from the fact that these communities become a source of social life, support, information, sense of belonging and social identity [Orgad 2018, pp. 251-260; Siuda 2008, p. 248].”

Conclusion

Upon analysis of the determinants of both the prosumer and presumer attitudes, the question posed in the introduction to this paper cannot be answered unambiguously. Consumer attitudes are indeed evolving towards an increased activity, treating presumerism as a form of individual self-fulfilment. On the other hand, however, marketing is undergoing a change of the existing paradigms, there is a growing need to integrate communication, marketing is defined by a strong influence on emotions. Market goals are achieved through the perception of the brand, its association with strong and positive features by means of comprehensive and multi-level strategies, using unconventional promotion methods [Datko, 2012, p. 13-14]. As a result, consumers feel the need to interact more closely with the brands operating on the market, while on the other hand, companies position their brands (and make available the potential for interaction) in a way that ideally allows for the creation of closer bonds.

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Investments in The Market of Commercial Properties Case Study of The Collateral of a Credit Facility

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Abstract

The article presents a common method of external financing of assets in the real property market, i.e. a mortgage secured bank credit facility. The purpose of the study was to assess the mortgage value of a commercial property. An attempt was made to assess the value of the commercial property for the purpose of securing repayment of the bank credit facility. Commercial property referred to in the article being subject to external financing is a hypothetical shopping centre in the area of a housing estate. The investor has no sufficient funds and decided to finance the construction of the aforementioned property with the use of a bank credit, secured by mortgage. One of the existing real estate valuation methods - the income method - was used to calculate the value of the analysed property. In this method, the value of the property depends on the income it generates in the future.

Keywords: Bank Credit Facility, Mortgage, Income-Based Approach, The Value Of The Commercial Property, Valuation Of The Real Property.

Introduction

In the article, the income of the owner from the analysed property is in the form of rent obtained from renting the property. The value of the property is the basis in the investment loan process, so assessing this value is crucial (Baum 2008). The commercial real estate appraisal presented in the article is an important aspect in the process of crediting the purchase of real estate. The estimated value affects the amount of credit granted depending on the adopted LTV ratio by the bank (Lin 2014; Ambrose 1993).

The authors used the case study methodology – as case study is expected to capture the complexity of a single case, and the methodology which enables this has developed within the social sciences. Such methodology is applied not only in the social sciences, such as psychology, sociology, anthropology, and economics, but also in practice-oriented fields such as environmental studies, social work, education, and business studies (Johansson 2007).

When buying the real property which will or should bring profits in the future, investors make decisions what kind of (whose) capital to choose to finance the purchase. Most often investment outlays are so high that the investor's own funds are insufficient. Therefore, the bank credit facility helps in many cases, most often repaid for a period of several dozen years (Kucharska-Stasiak 2011). One of the most important elements analysed by the financing bank consists in the collateral of repayment of credit. The subject of the loan is commercial real estate. In this case, the bank may protect itself against the owner defaulting on the loan by establishing a mortgage. The purpose of the

article is to describe the most common source of external financing in the real property market, i.e., bank credit and attempted estimation of the value of a commercial property for the purpose of the bank credit when the property is encumbered with a limited property right constituting collateral of the debt.

In the survey, income-based approach and investment method were applied as one of possible methods to be selected in order to establish the value of the commercial property. This is the most commonly used method for real estate that can generate income.

Bank credit in financing of the commercial property

An investor financing the undertaking connected with the purchase of commercial property takes into account different sources of financing, classified by corporate finance literature as own and external sources. In the event of an individual investor, own capital comes most often from personal savings. In case of enterprises, own financing of investments in commercial properties most often comes from the part of profit allocated for development. Usually own share in financing of an investment in the market of commercial properties is minor (Hellwig 2001; Jonak 2015a; Clementi 2006). The financial market offers many different instruments of financing investments, however, the most popular include bank credit offered by commercial banks. In case of financing investments in the market of commercial properties, bank credit secured by mortgage is the most popular source of financing (Calem 2004; Wielgórka 2009; Boleat, 2012). Mortgage established on the real property is one of many ways of securing repayment of credit. Mortgage is considered the most effective form of collateral. Such credit shall be granted provided that the borrower is creditworthy, i.e. that they are able to repay the credit granted including interest on the agreed dates. The assessment of creditworthiness concerns not only current but also future financial situation of the borrower (Bednarz, Gostomski 2008). Moreover, credits for financing of commercial properties are most often long-term credits, therefore, stable security is required, i.e. the value of a real property. The collateral enables the bank to get its funds back, including interest and commissions if the client defaults on credit under the terms of the credit agreement (Kucharska-Stasiak 2006; Jonak 2015b). Thanks to financing from external sources, the investor can undertake investments without engaging its own capital. However, financing with the bank credit is subject to certain risk since future income from the property can be insufficient to repay credit instalments or even interest (Jonak 2015a; Ranyard 2012).

LTV (Loan-to-Value) ratio applied by banks plays a significant role in case of such type of credits; it combines the amount of credit with the value of collateral, i.e. with the market value of the real property. The majority of banks adopts LTV ratio at the level of 60-80%, and on account of safety of the bank the level of LTV shall not exceed 100%. The ratio is used to establish the amount of interest rate, and more precisely, the bank's margin. The lower LTV ratio, the lower interest rate can be proposed by the bank (Epley 1996, pp. 71-86; Marcinek 2009, p. 76-77; Lin 2014; Ranisavljević 2016). Banks establish their own maximum level of LTV ratio they are able to accept. The higher value of the ratio, the greater risk for the bank. It used to happen in the previous years that LTV ratio could be at the level of 100%, which meant that one could take credit without own contribution. Some banks even offered credits for 110-120% of the value of the real property. On the basis of an analysis concerning offers of commercial banks it was noticed that the higher LTV ratio was usually accompanied by additional security of own contribution – usually when it exceeded 80%. Due to the economic crisis (2007) banks became more careful in granting credits and moreover, the Polish Financial Supervision Authority (KNF) which monitors the situation in the banking market on a regular basis issued recommendations concerning, among other things, recommended level of LTV ratio. The maximum LTV ration in 2014 was 95% according to the recommendations provided by KNF and it is reduced every year. Starting in the 1st January 2017, banks have to apply LTV ratio at the level of 80% or 90%. In the other case it is necessary to apply insurance or additional collateral of credit (Bester 1987; Wójcik-Mazur; Bilan 2019).

Commercial property as Collateral of a Bank Credit

The source literature divides real properties into land, buildings and premises (Źróbek, Bełej 2000). However, on account of the fact that the real property may generate income for the owner, commercial properties have been separated, i.e. properties purchased for the investment purposes, bringing periodical income on account of rent, when rented for use to third parties (Nalepka 2006; Breuer 2019; Roberts 2007). They are non-residential properties but purchase or built for the purpose of obtaining profit.

Commercial properties include, for instance, office buildings, shopping malls, hotels, sport centres, tourist centres etc. Owners of such properties can obtain financial benefits in many ways. They may include revenues resulting from rental or shares in the user's (tenant's) profits –or capital benefits resulting from the increase in the value of a given property in time (Kietliński and Woźniak 2009; Clapp 1992; Geltner 1995). J. Lipiński defines commercial property as a real property generating systematic revenues resulting from its use or ownership (Lipiński 2000). M. Prystupa points out that the basic source of income from real property comes from rent generated by rent or lease, and additional source may include income from rental of parking space, from advertisements situated on the property, as well as different types of slot-machines (Prystupa 2016, p. 89-90), e.g. with drinks, sweets, coffee, or ATM machines. Investors in the commercial property market are often interested in shopping centres. The source of income for the investor are rents paid by tenants of commercial space for the rented space. Additionally, tenants participate in financing of costs of maintenance of common areas, e.g. parking space, elevators, promenades (Marcinek 2009).

Therefore, the value of real property depends on whether it is rented or leased in a given period. There is a relation between income generated by the property and its market value, thanks to which such property can be evaluated for the purpose of securing credit with the use of an income-based method (Dydenko 2015).

If the investment of purchase/building a shopping centre (commercial property) is financed with funds coming from the bank credit, the bank shall establish mortgage on the property credited. „Mortgage consist in a limited tangible right that can be established on the property or on selected rights such as perpetual usufruct, ownership right to premises, debt secured by mortgage, wholly or partly (fraction), constituting share of a co-owner. Mortgage constitute security of the debt, pursuant to which creditors can claim compensation against real property, with a priority before personal creditors of the owner of the real property (Feldman 2004; Lendo-Siwicka 2016; Wang 2006; Holland 2000; Lieser 2014).

Case Study

Commercial property referred to in the article being subject to external financing is a hypothetical shopping centre in the area of a housing estate. The investor has no sufficient funds and decided to finance the construction of the aforementioned property with the use of a bank credit, secured by mortgage. One of key documents based on which such credit is granted is the opinion concerning the value of pledged property. A hypothetical value of LTV ratio adopted for the purposes of this article amount to 85%, which means that 85% of the value of real property can be financed by credit and the remaining 15% by the investor's funds. In table 1 the area of the shopping centre and the rate of rent have been presented, since the basic element of income related to the said commercial property consists in rent paid by tenants for the use of individual commercial premises.

Table 1: Data of real property

Specification	Area m2	Rent for m2
Usable service area	745	35.00

Source: own survey

The total usable service area amounts to 745m2. A monthly net rent resulting from rental agreements amounts to 26 075 zloty, i.e. annually almost 312 900 zloty.

The object of the valuation concern real property and the source of value consists in business activity connected with rental of the said property, while the carrier of the value used in the valuation shall be rent from the analysed property (Konowalczuk 2009).

For the purpose of evaluation of a hypothetical value of commercial property being the object of the analysis in this article, an income-based approach was used as well as the investment method and a technique of discounting future income (Trojanek 2012; Gollier 2010). In the aforementioned approach, the value of real property is defined assuming that the selling price will depend on the expected potential future income from the real property, possible to be obtained by a potential buyer. This approach is used in relations to real properties which bring or may bring income (the Act dated 21 August 1997). Other definition points out that „…the income-based approach is used in case of establishing the value of real properties generating income or offering an opportunity of obtaining income, assuming that income is the basic factor having impact on the value of such properties" (Zabielski 2011; Adebimpe 2018).

In the process of estimating the hypothetical value of commercial property, the investment method was used (Mączyńska 2005; Gane 1995; Lefley 1996) due to the fact that income obtained from such property is defined in the rates of rent. In this technique the value of real property was estimated as a sum of discounted streams of variable income to be obtained in the future. The value was increased by a discounted residual value of the commercial property (Cymerman, Hopfer 2009):

$$DCF = CF1 / (1+r) + CF2 / (1+r)2 + CFn / (1+r)n + RV / (1+r)n \quad (1)$$

where:

CF – cash flows in subsequent years of forecast
r – discount rate
n – the last year of forecast
RV – residual value

According to J. Dydenko, most often the residual value of real property is established assuming fixed income after the period of forecast that is adopted as the amount of income from the last year of forecast (Dydenko 2015):

$$RV = CFn / r \quad (2)$$

The number of years of forecast depends on the expected period for which income from the evaluated property will be generated. As far as the said property is concerned, a 10-year period of forecast has been adopted. The source of income from the analysed property shall be rent generated for the owner by real property (Prystupa 2016). Calculation of income generated by the real property has been organised and three stages of estimation have been distinguished (Dydenko 2015; Edelstain 2006; D'Amato 2015).

The first stage consists in calculation of potential gross income (PGI) which includes all possible income from real property, established with the assumption that all the areas are rented and all rents are collected. On the basis of data included in table 1 the potential gross income (table 2) has been calculated, i.e. possible income to be obtained annually with reference to the real property under analysis.

Table 2: Potential gross income PGI

Specification	Area m2	Rent for m2 PLN/m2	Net rent PLN/m-c	Potential gross income PLN/ year
Usable service area	**745**	**35**	**26 075**	**312 900**

Source: own survey

In the process of valuation of the market value of real property, even if the property is rented in 100%, certain reserve is taken into account for vacant areas. In the second stage of estimation of income generated by the analysed property, the potential gross income specified above has been verified taking into account vacant areas. These are losses in income connected with periods during the year when not all areas are rented or losses are caused by arrears in payment of rent. The average vacant areas in the market of similar properties amount approx. to 10% and such value was adopted herein. The potential gross income verified by loss in income enables to determine the effective gross income (EGI) which is the value actually obtained by the investor. Therefore, the effective gross income for the analysed property has been calculated in table 3.

Table 3: Effective gross income EGI

Income and its elements	[PLN]
Potential gross income	312 900
Effective gross income	281 610

Source: own survey

The third stage consist in calculation of net operating income NOI, being a difference between the effective gross income and operating expenses incurred continuously on account of current use of the real property. Operating income for the hypothetical property includes property tax, insurance, costs of keeping books as well as repairs and regular maintenance. Amortisation, depreciation and the cost of credit have no impact on the difference between the effective gross income and the net operating income in the process of valuation (Dydenko 2015). Operating costs of the analysed property have been adopted at the level of 50 699 zloty per year.

After estimation of the potential and effective income generated by the real property and after estimation of the running costs of the said property, the expected income to be obtained by the investor has been established. It is a value which determines potential of the real property to obtain the net income by the investor. Net operating income calculated for the analysed commercial property has been presented in table 4.

Table 4: Net Operating Income

Specification	Value [PLN/year]
Effective gross income	281 610
Operating expenses	50 699
Net operating income	230 911

Source: own survey

Another stage of valuation consists in the estimation of a discount rate, used subsequently to calculate the value of the real property (Dydenko 2015, p. 498-500). The discount rate of 6% was adopted on the basis of research and analyses of the real property market for 2018 conducted by CUSHMAN&WAKEFIELD. (Cushman and Wakefield 2016). Another step in the valuation of the commercial property in asset-based approach consist in the definition of future income from the analysed real property within next 10 years of the period of forecast, and then discounting. Growth of

income was adopted at the level of the average inflation rate of 1.5%. Table 5 contains calculation of the value of land developed by a commercial building.

Table 5: Calculation of the value of real property

Specification	1	2	3	4	5	6	7	8	9	10
Expected income [PLN]	234 375	237 890	241 459	245 080	248 757	252 488	256 275	260 119	264 021	267 982
Discount rate	0.050									
Discount coefficient	0.952 4	0.907 0	0.863 8	0.822 7	0.783 5	0.746 2	0.710 7	0.676 8	0.644 6	0.613 9
Residual value [PLN]	5 359 631									
Discounted expected income [PLN]	223 214	215 773	208 581	201 628	194 907	188 410	182 130	176 059	170 190	164 517
Discounted residual value [PLN]	3 290 349									
Market value [PLN]	5 215 760									

Source: own survey

Research methodology used, enabled to estimate the hypothetical market value of the commercial property in the amount of 5 215 760 zloty, which can be the basis for security of debt. Financing of this investment with the use of external capital coming from the bank credit could be realised in the amount calculated according to LTV ratio used by commercial banks. As mentioned before, its value in the amount of 85% means that the investor could apply for financing of the investment in the analysed commercial property with the use of external capital in the amount of 4 433 396 zloty. The investor should provide own funds in the amount of 786 364 zloty.

Summary

The purchase of the commercial property involves considerable financial outlays. Most often investors use external sources of financing, especially bank credits. The value of a given property serves as a basis in the process of crediting investment, therefore its valuation is essential. The attempt to evaluate the commercial property presented herein shows that the bank credit can be used in the amount of 4 433 million zloty depending on the value of LTV ratio, to finance the investment, which will generate income in the future coming from rental.

The income-based approach is not the only way to “reach” the value of the commercial property. There is also a cost-based and a comparative approach, however, income-based approach used herein is deemed to be the most appropriate in case of commercial properties since their value depends on income generated by a given property. It means that the higher forecasted income, the higher the value of the estimated real property.

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Evaluation of Pension Assets and Economic Growth in Nigeria (2007 – 2017)

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Abstract

This study examined the impact of pension assets on economic growth in Nigeria from 2007 to 2017. The study adopted secondary data which were sourced from the annual reports of Pension fund administrators (PFA) and Central Bank of Nigeria (CBN) Statistical Bulletin. Thirteen investment outlets were extracted but made use of seven of them because they were commonly employed throughout the 11-year period (2007 – 2017). Descriptive statistics, test of stationarity using Augmented Dickey-Fuller (ADF), Co-integration test using Engle-granger and Ordinary least square (OLS) were employed to ascertain the impact of pension assets investment on economic growth in Nigeria. The results revealed that there is positive and significant relationship between investment of pension fund and economic growth in Nigeria. The study recommended that more pension assets should be made available by the pension operators as financial capital to industries for development and improve Gross domestic product (GDP) in Nigeria. It also recommended that there should be efficient control of the funds by pension fund managers and the returns from the investments giving to pension contributors, into their Retirement savings accounts for enhanced funding at retirement.

Keywords: Pension assets, Gross Domestic Product, Pension investment, Retirement saving accounts.

Introduction

The development of any economy is premised on the gross domestic products generated by the residents of that country at a given period of time. Every industry within the economy requires huge capital outlay and funding to remain in business and pension fund is a major source needed to propel the economy. One of the reasons for investing pension fund in pension assets is to keep the fund active till when the contributors will be retiring. The main thrust of Pension Reform Act 2004 include making sure that their employees receive their retirement benefits as and when due; assist low income earners save so as to handle their livelihood at old age; and to provide a uniform set of guidelines and standards that will ensure prompt payment of retirement benefits to workers (Akpan and Ukpong, 2014).

The funded nature of the contributory pension scheme in operation in Nigeria make for provision of source of finance for both capital and money markets. This is the reason why pension assets are invested in portfolios stipulated in the investment guidelines issued by the National Pension Commission

(PenCom). However, as plausible as the provisions and implementation of the Pension Reform Acts 2014 (as amended) are, operation of the funded pension scheme in Nigeria might have been made difficult by weak institutions, corruption, social injustice and insecurity and leading to lot of challenges which threatens its objectives. It is therefore important to consider operation of pension assets as source of funding has contributed to the growth and development of the Nigerian economy; and whether its continuity has prospects, (Farayibi, 2017).

Section 86 of Pension Reform Act (PRA) (2014) provides various portfolios where pension assets should be invested. The investment instruments were graded as contained in PenCom's Investment Guidelines which guide pension fund investments (Sule and Ikechukwu, 2009). Pension assets can be traded in bonds, bills and other securities issued and guaranteed by the Federal Government of Nigeria (FGN); in equity stocks of public limited companies, money market securities among other stipulated windows.

Despite the provisions of the Act mentioned above, studies have not been updated to look at how investment of pension fund has impacted the growth or decline in the Nigerian economy. Pension Fund Administrators (PFAs) have as major challenge, dearth of investment outlets where pension funds could be invested, coupled with the directives in the PenCom guidelines which streamlined the quantity of Pension assets that should be invested in a given instrument (Akowe, Ocheni and Daniel, 2015). Akpan and Ukpong, (2014) in their study on Challenges of pension administration and capital formation in Nigeria concluded that efficient pension administration and capital formation is a solution to industrializing the Nigerian economy. Akowe, *et.al* (2015) in their study, while evaluating the contribution portfolios of new Contributory Pension Scheme on Nigerian economy have concluded that investing in domestic equity shares, FGN securities and Real Estate Properties have positive contributions to Nigerian GDP and investing pension funds in Domestic Money market securities have negative contributions to the GDP. Other studies have looked at effect of new pension scheme on Nigerian retirees (Anazodo, *et al*, 2014); comparison of pension investment analysis using a variance-comparison tests of non-contributory and contributory schemes in Nigeria (Okoro and Okoye, (2017).

Literature Review

Empirical Framework

Nwawolo and Nwogwugwu (2019), looked at pension contributors' involvement in decision making on pension fund investment and their living standards using University of Lagos, Nigeria as case study. The study made use of a sample size of 100 respondents from population of 5,098 non-academic staff through Taro Yamane (1967) formula. Data were analysed using descriptive and inferential statistics (linear regression). The research employed convergent parallel research design and revealed that contributors' decision making on pension fund investment resulted in positive significant effects on retirees' living standard. However, Andonov and Rauh (2018) while looking at the expected expectations of institutional investors revealed that the investors depend on past performance in setting future return expectations. The study used statistical testing on real return versus expected return on pension investments to analyse its data. The study found that asset class around 22% weight of variation in portfolio expected returns, leaving a large role for difference in beliefs concerning returns in the different asset classes. The study also discovered that unfunded liabilities are positively correlated to the portfolio expected returns. This is in line with the hypothesis that 'fiscally entangled' government face pressure in maintaining higher expected rates of return (Andonov, Bauer and Cremers (2017); Novy-Marx and Rauh (2011); Brown and Wilcox (2009). The study also found that the expected returns in risky asset classes (public equity, real assets, private equity and hedge funds) are significantly and positively correlated to the past return. Osondo (2016) appraised the adoption of the pension reform act 2004 to explore the possibility of the scheme influencing the payment of pension to retired employees.

Uzoh and Anekwe (2018) examined contributory pension scheme vis-a-vis fate of retired and retiring Nigerian workers used conceptual and observations in the pension industry in Nigeria. They found that administration of pension funds in Nigeria was fraught with lots of challenges since the advent of

pension payments to pensioners. The study asserted that the provisions of amended Pension Reform Acts (2014) made good the challenge embedded in the old pension scheme especially as it affects regular payment of pension benefits to pensioners. It also believed that the new contributory pension scheme is a source of new hope to retired Nigerian workers. The study did not highlight how this hope can be brightened by investing the pension fund during periods before retirement. Ishola, Sanusi and Abayomi (2016) looked at the effects of contributory pension scheme (CPS) on productivity of employees in Lagos state civil service. The study revealed that significant relationship exists between employees' productivity and retirement package resulting in positive effect on organisation's efficiency. The study advised organisations to key in to the new CPS as a means to reduce overall cost and wasteful expenditure.

Zubair (2016) examined how pension funds investment has impacted capital market performance in Nigeria. The study concluded that there is a significant positive relationship between pension fund investments and capital market performance in Nigeria after 2004 major industrial reform. In specific term, the study revealed that total pension investments in Nigeria enhances the performance of the Nigerian capital market significantly. It further concluded that the interaction of macroeconomic indicators vis-a-vis pension investments affect the market performance significantly. Eke and Onafalujo (2015), in their own work examined capital market, interest rate and pension management in Nigeria between 1981 and 2013. The study made use of ordinary least square to test elasticity of impact of Treasury bill, stock market index, with GDP as control variable on growth of pension assets. The study saw pension assets to be directly related to stock market index but inversely related to short term interest regime leading to impairment of 'wholesome' presence of pension assets in the capital market.

Njeru, Njeru and Kasomi (2015) evaluated financial performance in relation to portfolio investments by pension funds in Kenya. A survey of 1,262 pension funds as population was carried out of which 35 of them were sampled. Data relating to pension fund portfolio, the price schedules, the investment reports and audited accounts of sampled pension funds were used. The study employed inferential statistics to ascertain the difference in asset classes. Comparisons were made between compositions of the various portfolios, the weighting of the asset classes and the returns from on each portfolio. The study concluded that performance of the pension fund was influenced by both discretionary and non-discretionary mandates entrusted to pension managers. Nwanne (2015) investigated the impact contributory pension scheme has on Nigeria's economic growth between 2004 and 2012. The study made use of two parameters which include pension funds traded in specified investment outlets and pension savings contributed by both private and public sectors in Nigeria vis-a-vis economic growth variables. The study found out that pension funds have significantly influenced economic growth in Nigeria.

Ezugwu and Itodo (2014) analysed the portfolio where pension funds managers invested pension funds in Nigeria using secondary data obtained from PenCom during 2007 – 2012. Using ordinary least square (OLS) estimation techniques, the study found out that ordinary shares recorded the highest percentage in portfolio of pension fund management. Essien and Akuma (2014) descriptively made comparison between the present contributory pension scheme and the old defined benefit plan based on core values. The study revealed that the old pension scheme was fraught with overwhelming financial misappropriations and embezzlement. Edame and Okoro (2013) using neoclassical growth model examined the impact of capital market on the economic growth of Nigeria. Ordinary least square (OLS) technique was employed to analyse the data collected from Central Bank of Nigeria (CBN) annual reports and statistical bulletin using time series covering 1970 -2010. The study revealed that capital market has a significant and positive effect on the economic growth in Nigeria. Odo, Igbeka and Ani (2011) ascertained the root causes that made pension reform inevitable. Their study evaluated the strengths, weaknesses and measures that will correct the weaknesses in the pension reform in Nigeria. In their theoretical analysis, they observed that employers and employees were forced by law to provide fund anticipated to pay pension claims at retirement compared with the old order when no financial provisions were made.

Bikker, Broeders and Dreu (2010) examined 'Stock market performance and pension fund investment policy: Rebalancing, free float, or market timing?' The study made use of a detailed set of data containing quarterly information on entire Dutch pension funds for 1999: Q1 to 2006:Q4 derived from De Nederlandsche Bank. The researchers employed self-reported returns and MSCI World total return index dominated in Euro in assessing the effect of equity returns on actual and fundamental equity allocation. The sample used was unbalanced panel because some of the pension funds did not provide data for the whole period as a result of mergers, terminations and failures in reporting and new entrants. The study revealed that stock market operation has influence pension assets allocation in the short run, and the out-performance of equities over bonds and other investment categories and this resulted automatically in higher equity allocation (and vice versa). This is because pension funds do not continuously rebalance their asset allocation. In the medium term, out-performance of equities motivates pension funds to maximise their strategic allocation (and vice versa). Conclusively, the estimates showed that the investment policy of pension funds is slightly driven by cyclical performance of the stock market.

However, as plausible the earlier studies were, none of the studies have taken holistic view on the contribution of Contributory pension fund to the capital development of the Nigerian economy by looking at the contribution of the pension assets to the gross domestic products in recent time. Few studies have been carried out on pension fund and capital development and on capital formation in Nigeria especially, capturing the most recent happenings in the use of pension funds for capital development. Earlier study by Eke and Onafalujo (2015) made use of ordinary least square (OLS) alone to analyse data. This has been proven not to be reliable enough to address the consequences of auto-correlation which this study addressed by using ADF unit-root test to address such short-coming.

This study improved on the existing works on the use of pension funds to provide capital in Nigeria. Reliable data were gathered from PenCom annual reports for eleven-year period (2007 – 2017) and also from the reliable Central Bank of Nigeria Statistical Bulletin (2017). Seven portfolios from those specified in the Pension Reform Act (2014) were used against gross domestic product (GDP) to arrive at robust results. In order to obtain the results, descriptive statistics, unit root test, co-integration test, ordinary least square (OLS), Engle-granger test and parsimonious ECM tests were carried out to surpass the results in previous studies. It was found out from the earlier studies above that capital development through pension funds were not examined up to date thereby distorting the actual contribution the funds has made to capital development in Nigeria. Akpan and Ukpong (2014) only examined capital formation through pension fund in Nigeria up to 2013. Zubair (2016) looked at just few macroeconomic variables (interest rate, inflation and GNP per capita) The gap discovered from literatures included increasing the size of the macroeconomic variables and expanding the years of consideration of the effects of the variables on the pension fund investments and Nigeria's economic growth from 2007 to 2017. This study delved into how contributory pension scheme has provided reliable funding to financial and money markets with a view to examine how such funds availability have created an impact in the Nigeria Gross domestic products (GDP). As at the time of writing this paper, no study has been carried out to look at the contributory effect of employing pension assets to provide capital and impact on the GDP up to 2017.

Theoretical Framework

The theory of pooling as discussed in the work of Matheson, Jorge, Ramana and Anna, (2004), the theory of intermediation applied by Allen and Santomero, (1998), and the theory of life cycle used in Bailliu and Reisen, (1997) are relevant to this study. These theories follow Tijani (2002) because most of the studies conducted were on developed economies. It is therefore believed that using the theories on the study of Nigeria is quite relevant. Adoption of the theories help the study to determine how the investment management processes of the magnitude volume of pension fund contribution and the indivisibility assets such as property which are not within the reach of small investors contribute to capital development in Nigeria. Adoption of pooling theory is to confirm whether or not pension funds could compensate for the rising risk by pooling at a minimal cost across assets whose income are imperfectly correlated.

Intermediation theory was adopted to help the study establish whether the operation of pension funds is to be seen as agents of economic development and growth by rekindling the functions of financial systems more efficiently than banks and individual investors. Pension fund managers are considered growth oriented when they are able to cover all their costs of operation from the revenue generated for themselves, which they derive from pension contributions. Life cycle theory was adopted to discover the development of pension fund as coming from three stages consisting of start-up and growth and maturity stages. This theory explains the three stages of development of pension fund managers and their financing needs. Life-cycle theory also proposes that the sources of pension fund manager‘s funding has linkage with their stages of development and economic development and growth (Lapenu and Zeller, 2001 and Farington and Abrahams, 2002)

Materials and Methods

The methodology adopted for the study involved the use of time series data obtained from PenCom Annual Reports, annual reports of Pension fund administrators (PFA) operating in Nigeria (2007-2017) and Central Bank of Nigeria (CBN) Statistical Bulletin (2017). Data on Gross domestic product (GDP) were sourced from Central Bank of Nigeria (CBN) Statistical Bulletin (2017), and data on Cash and other assets (COA), Corporate debt instruments (CDI), Federal Government of Nigeria securities (FGNS), Domestic ordinary shares (DOS), Local money market instruments (LMMI), Mutual funds (MUF) and Real Estate properties (REP) sourced from Annual reports of PenCom and Pension Fund Administrators for the years under study. Data were analysed using descriptive statistics, test of stationarity using Augmented Dickey-Fuller (ADF), unit root test, co-integration test, ordinary least square (OLS), Engle-Granger Test for co-integration and parsimonious ECM. Stationarity test was adopted on a priori that most times series data have unit root. However, to study the long run relationship of micro economic variables to economic growth, the series must be tested for unit root where if found that such exists, we apply integration approach to stationarity for such model to be efficient. Engle granger cointegration approach was adopted due to the smaller number of observations used for the analysis. This was because adoption of the Pension scheme started in year 2007.

Model Specification

The model specification for the study is as given is as given below:

$$GDP = f(COA+DOS+LMMI+MUF+REP+FGNS+CDI) \quad (1)$$

$$GDP_t=\beta o+\beta_1 COA_t +\beta_2 DOS_t+\beta_3 LMMI_t+\beta_4 MUF_t+\beta_5 REP_t+\beta_6 FGNS_t+ \beta_7 CDIt+\mu_t \quad (2)$$

Where,

GDP = an indicator representing Gross Domestic Product (Dependent variable);

βo = a constant;

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5. \beta_6,$ and β_7 = Coefficients of the Independent variables

COA_t = a predicator representing independent variable (Cash and Other Assets of Pension Administrators);

DOS_t = a predicator representing independent variable (Domestic Ordinary Shares);

$LMMI_t$ = a predicator representing independent variable (Local Money Market Instruments);

MUF_t = a predicator representing independent variable (Mutual Funds);

REP_t = a predicator representing independent variable (Real Estate Properties);

$FGNS_t$ = a predicator representing independent variable (Federal Government of Nigeria securities);

CDIt = a predicator representing independent variable (Corporate debt instruments);

and

μ = Stochastic error term.

Results and Discussion

Descriptive Statistics

Table 1 contains summary statistics for the variables drawn for this study. The results revealed that the average for GDP was 75681.59t with a maximum of 113711.6t and minimum of 32995.38t, CDI has an average of 118.4070 with maximum of 285.82 and minimum of 0.24, COA over the period was about 26.5585b, with a maximum of 38.22b and minimum 14.19b respectively. The average DOS over the period was about 447.1740b, with a maximum of 672b and minimum 220.71b respectively. The FGNS has an average of 2322.798b with maximum and minimum of 5292b and 279.69 respectively. The LMMS averaged 478.6095b over the study period with a maximum of 681.35b and minimum of 186.01b. The MUF was at the average of 14.077b and it fluctuated between the upper limit of 24.99 and the lower limit of 4.46b. Also, the average REP during the period stood at 188.5510b, with a maximum of 233.89b and minimum of 79.08b.

Table 1: Descriptive Statistics

	GDP	CDI	COA	DOS	FGNS	LMMS	MUF	REP
Mean	75681.59	118.4070	26.55850	447.1740	2322.798	478.6095	14.07700	188.5510
Median	80092.56	80.94000	25.39000	500.4300	1755.655	489.2500	12.80500	198.8250
Maximum	113711.6	285.8200	38.22000	672.0000	5292.000	681.3500	24.99000	233.8900
Minimum	32995.38	0.240000	14.19000	220.7100	279.6900	186.0100	4.460000	79.08000
Std. Dev.	24957.58	93.00242	7.530114	155.7126	1661.007	122.2003	6.597520	40.08078
Skewness	-0.163127	0.759190	-0.007238	-0.181831	0.445081	-0.511641	0.238246	-1.185072
Kurtosis	1.840456	2.276525	2.013052	1.610488	1.935809	3.122876	1.727618	3.920063
Sum	1513632.	2368.140	531.1700	8943.480	46455.95	9572.190	281.5400	3771.020
Sum Sq. Dev.	1.18E+10	164339.6	1077.350	460681.8	52419940	283725.5	827.0180	30522.91

Source: *Authors' Computation, 2019*

Unit Root Test Results

Before the estimation of the empirical models, the unique characteristics of the data were examined. Testing the stationarity of economic time series is vital since stationarity in time series data is assumed in standard econometric methodologies. In actual sense, there might be violation of the assumption of stationarity. This may render statistical tests inappropriate and the inferences drawn may result in misleading conclusions. The study employed augmented Dickey-Fuller (ADF). The unit root tests results for stationarity for the ADF of the variables is as presented below. The ADF results in Tables 2 shows that all the variables are non-stationary at their levels.

Table 2: Unit Root Tests Results for Stationarity of the original data

Variable	Augmented Dickey Fuller Test (ADF)					
	Level	Critical value at level	First Differencing	Critical value at First Differencing	Second Differencing	Critical value at Second Differencing
COA	-2.006637	0.2796	-3.028536	0.0615	-3.298547	0.0215*
DOS	-0.633083	0.8203	-4.1372608	0.5443	-4.179698	0.0041*
GDP	0.985921	0.9916	-3.197897	0.0752	-3.397297	0.0193*
LMMS	-2.908967	0.0787	-3.114373	0.1096	-3.444363	0.0108*
MUF	-1.384397	0.5463	-4.336687	0.2036	-4.475997	0.0208*
REP	-2.875221	0.0861	-5.678336	0.2082	-6.678446	0.0010*
FGNS	2.250499	0.9993	-2.291552	0.0654	-3.123342	0.0072*
CDI	0.227563	0.9587	-2.614221	0.1248	-3.467156	0.0413*

Source: Authors' Computation, 2019

The unit root test in Table 1 shows that COA, DOS, GDP, LMMS, MUF, REP, FGNS and CDI are not stationary at levels and I(1). However, they are all stationary at second difference I(2), since the p-values of each of the variables at second difference are less than 5% significance level. Hence, the variables are stationary at second differencing. As a result of the stationarity of the series at I(2), we go ahead to test the variables for cointegration using Engle granger approach as evidenced from table 3.

Co-integration Test Results

Table 3: Engle-Granger Test for co-integration

Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
GDP	-7.214869	0.0200	-28.32143	0.0064
CDI	-5.500782	0.1718	-73.70584	0.0000
COA	-4.600604	0.4069	-45.30706	0.0000
DOS	-4.990113	0.2878	-54.13693	0.0000
FGNS	-6.585175	0.0447	-26.65745	0.0288
LMMI	-5.785776	0.1334	84.19101	1.0000
MUF	-5.167406	0.2342	-23.49360	0.1580
REP	-6.946105	0.0282	-27.65509	0.0124

Source: *Authors' Computation, 2019*

From table 3, it can be evidenced that virtually all the variables have long run relationship with economic growth (p-value <5% level of significance) except LMMI and MUF since there associated p-values were relatively higher than 5% level of significance.

Parsimonious ECM Results

Table 4: Summary of Parsimonious ECM

Variable	Coint. Eq	Standard Error	t-Statistic	p-value
ECT_{t-2}	0.227394	1.028522	0.221088	0.8295
D(CDI)	167.0588	145.1526	1.150918	0.2765
D(COA)	418.3159	33.00462	12.67447	0.0000*
D(DOS)	66.55813	9.563181	6.959832	0.0010*
D(FGNS)	66.27734	16.77638	3.950634	0.0000*
D(MUF)	949.9702	191.2802	4.966380	0.0000*
D(REP)	119.3713	19.12682	6.241042	0.6984
C	71989.22	6898.328	10.43575	0.0009

Source: Author's computation

The long run coefficients form which allows for the determination of the short run adjustment process towards the long run equilibrium state in the system known as error correction modelling as written in equation 3. The result of the error correction term in table 4 suggests that the previous year's deviation from long run equilibrium is corrected at a speed of 22.7%. This indicates that economic growth as a measure of capital development and pension assets has inertia of adjusting back to a state when acted upon by external forces.

It can also be evidenced from the table that after adjusting for long run equilibrium, coefficients of the predictor variables were statistically significant as it explains the behaviour of economic growth in Nigeria particularly during the period under consideration. This is an indication that the economic growth in Nigeria was influenced by the current state of Cash and other assets (COA), Domestic ordinary shares (DOS), Real estate property (REP) for the year under study.

Table 5: OLS Regression Result

Variable	Coefficient	Standard Error	t-Statistic	p-value
COA	105.6209	43.63133	2.420759	0.0297*
DOS	48.75018	4.057147	12.01588	0.0000*
LMMS	5.63E-04	0.000360	0.308664	0.9229
MUF	-0.006312	0.006856	-0.747427	0.6469
REP	134.7533	10.31946	13.05818	0.0000*
FGNS	8.322283	0.957222	8.694206	0.0000*
CDI	-5.522705	13.96173	-0.395560	0.6984
C	6991.714	1666.645	4.195083	0.0009

R =0.9992; R-square=0.99843;Adj. R-square=0.99787;
F-stat = 1780.637 (P-value 0.000); DW = 2.1265
Source: Authors' Computation, 2019

Table 5 shows that the overall significance of the OLS regression results for the model implies that it was statistically significant at 5 percent level, indicating that the model was sufficient and adequate in relating the dependent and the independent variables together. In addition, about 99.8% of the total variation in gross domestic product (GDP) is explained by the joint effect of COA, DOS, LMMS, MUF, REP, FGNS and CDI. The model result tells us that GDP has a positive and significant relationship with COA, DOS, REP and FGNS as indicated in table 4. Thus a unit increase in COA results in 105.6 unit increase in GDP (provided other independent variables were held constant); a unit increase in DOS will cause 48.75 unit increase in GDP (provided other independent variables are held constant). Also, a unit increase in REP results in 134.75 unit increase in GDP. Lastly, every unit increase in FGNS results in 8.322 unit increase in GDP. This implies that for the years under consideration, increase in Cash and other assets (COA), Domestic ordinary shares (DOS), Real estate property (REP) and Federal Government of Nigeria securities (FGNS) lead to increase in Gross domestic product (GDP). However, out of these variables, Real estate property (REP) contributes more to GDP followed by Cash and other assets (COA). The least contributing variable is Federal Government of Nigeria securities (FGNS).

Conclusion and Recommendations

This study has provided evidence on the effect of the pension scheme on economic growth of Nigeria using error correction mechanism (ECM) and Ordinary Least Square (OLS) methodology. It was observed from the analysis that increase in pension fund has positive effect on the economic growth. The cash and other assets, domestic ordinary shares, real estate property and federal government of Nigeria securities have positive and significant effects on GDP. However, the original data for the variables under consideration were not stationary at their levels. Hence, they were made stationary at second order differencing, which leads to their integration at order two for long run effect to be measured. The co-integration test was conducted using Engle-granger produced and developed by Robert Engle in 1987. It was established that co-integration exists among Cash and Other Assets (COA), Domestic ordinary shares (DOS), real Estate Property (REP), Federal Government of Nigeria Securities (FGNS) and Gross Domestic product (GDP).

The ordinary least square (OLS) result shows that increase in cash and other assets (COA), domestic ordinary shares (DOS), Real Estate Property (REP), Federal Government of Nigeria Securities (FGNS) lead to increase in GDP, meaning that increase in these variables will cause increase in the amount of pension assets invested, hence an increase in GDP. Result of parsimonious error correction model (ECM) reveals that these variables are significant at their levels and past level of federal government of Nigeria securities. However, while cash and other assets, domestic ordinary shares and real estate property have effect at their present levels, the federal government of Nigeria securities have significant effect at past level. This indicates that the past value of Federal Government of Nigeria securities is having effect on GDP of Nigeria. The results have correlation with the study carried out by Zubair (2016) but for the fact that the study made use of fewer macroeconomic variables.

From the foregoing, it was found out that investment of pension funds improves the size of financial and capital employed in business positively. This will also bring a positive influence on the Nigeria gross domestic product (GDP). Further use of pension assets as source of capital for industries is highly recommended so as to aid the supply of needed capital in the industries. It is, however, recommended that there should be adequate monitoring and control of the movement of the pension assets to the users of the funds by the regulators of pension funds in Nigeria, in this case, the National Pension Commission (PenCom). The commission should carry out its oversight functions over Pension Fund Administrators (PFAs) and Pension Fund Custodians (PFCs) with utmost efficiency. There is the need to expand the investment windows of pension funds to give room for optimum investments in order to further boost the GDP.

Finally, since the investment of pension funds in capital and money markets is meant to generate returns on investment (ROI), it is expected that such returns should translate to further income to the pension fund contributors and pensioners, which means increase in the amount credited to their Retirement savings account and as a soft-pad for eroded value of money due to inflation. The study had beamed a searchlight on investment of pension fund and the outcome of such investments in different portfolios. There will also be caution to pension managers to invest the funds in better income-yielding portfolios with minimal risks. The result of this is better living standard for potential retirees and existing retired persons in Nigeria.

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The Development Level of The Digital Sector of The Russian Economy

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Abstract

The article discusses the information and communication sector of the Russian economy. His condition is assessed by various indicators reflecting his role in the country's economy. Since the digital Russian sector is still quite young and not all the institutions that regulate and promote its development are fully operational, it has not high indicators compared to the leading countries of the industry. This conclusion is confirmed by the data on the digital competitiveness rating of the countries of the world where Russia occupies only 40th place out of 63. The article identifies the reasons for the low development of the ICT sector and suggests measures to improve its situation.

Keywords: Digital Technologies, Russian Federation, IKT Sector, Digital Competition.

Introduction

Digital technologies play a key role in improving the competitiveness of the economy and in stimulating the economic growth of many countries. The use of digital technologies launches the modernization of traditional sectors of the economy and creates new industries, which becomes the basis for economic growth. The introduction of new digital technologies increases labor productivity, reduces business costs, increases the availability of information and reduces barriers to entry into new markets, which has a multiplier effect on the development of the economy.

Recognizing the importance of digital technology, many countries are taking steps to accelerate digital development. According to OECD data, 32 of the 36 member countries of the organization, as well as 6 partner countries, have national digital strategies (OECD, 2017). Large-scale programs for the development of the digital economy operate in the USA, China and the countries of the European Union, and exists in Russia.

The high penetration of digital technologies in economic activity allows us to use these competitive advantages to strengthen our position in the world. Countries that fail to fully realize the digital transformation and realize their potential risk falling behind more successful partners and fail to provide the population with a high standard of living, guarantee their economic sovereignty. All this confirms the relevance of this work (Plotnikov, V., Kuznetsova, V., 2018).

The purpose of the work is to assess the level of development of the digital sector of the Russian economy based on several indicators characterizing the degree of development of the industry and propose measures conducive to its development.

The objectives of the study are:

- Consider the main features of the IT sector of the Russian economy;
- Determine the place of the ICT sector in the country's economy based on indicators;
- Analyze Russia's place in the global ranking of digital competitiveness;
- Identify the obstacles to the development of the digital sector of the Russian economy;
- Propose measures conducive to its development.

To achieve the stated goal, theoretical methods and a systematic approach are used, allowing to consider the ICT sector as a system. The method of comparative analysis of statistical data comparing individual economic phenomena in order to identify their similarities and differences made it possible to identify the characteristic features and problems of the Russian information and communication technology sector. The method of formal logic allowed us to consider the processes taking place in the digital sector of the Russian economy.

Results and its Discussion

The information and communication technology sector (ICT sector) are a collection of organizations engaged in economic activities that are related to the production, distribution and application of information and communication technologies.

The structure of the Russian ICT sector includes the following sectors:

• Telecommunications;
• IT and other information services;
• Production of ICT equipment;
• Wholesale trade in ICT goods;
• Publishing activities;
• Activities in the field of production, rental and screening of films, broadcasting and television.

The largest share in the overall structure of the ICT sector belongs to telecommunications, their share in 2010 was 50%, and in 2017 already 38%. The second place is taken by IT and other information services, their share in 2010 was 16%, and in 2017 increased to 33% due to the growth of data processing services. In connection with the development of projects in the field of state information systems, a high share has grown in the production of equipment (16%). The share of other elements of the sector has not changed dramatically and amounts to an average of 5-7%.

The contribution of the digital sector to the Russian economy is relatively small in comparison with the economies of developed countries. So, in 2018, its share in the economy amounted to 3% of GDP. At that time, in most developed countries, the size of the digital sector averaged 6-7% of GDP. In France - 5.7%, in Germany - 6.3%, in the UK - 7.1%, in the USA - 7.4%, Sweden - 8.6% (Fig. 1).

In absolute terms, Russia's digital sector is also relatively small - in 2018, its size amounted to 2.5 trillion. rub. (PPP 103 billion US dollars). At the same time, in Japan, with a comparable population, the digital sector is almost 3.5 times larger (355 billion US dollars in PPP), and in the United States with a twice as large population - 13 times (1348 billion US dollars) (Abdrakhmanova G. et. al. 2018).

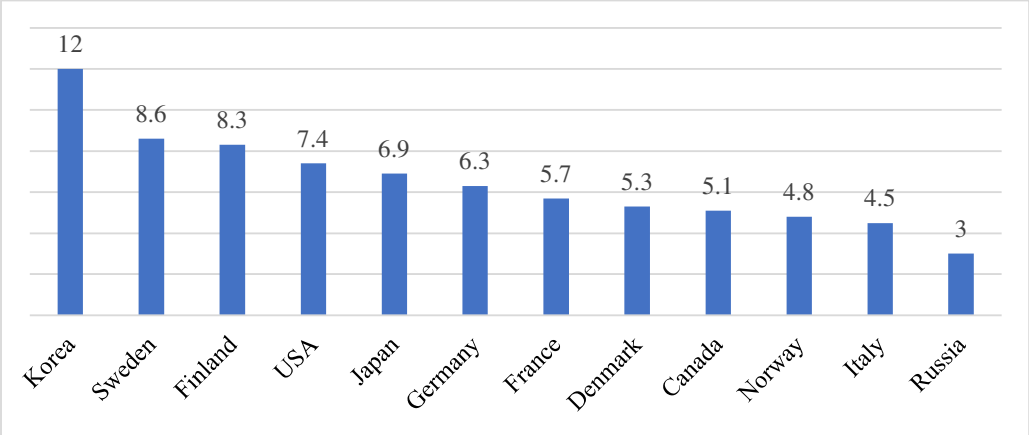

Fig. 1: Share of the digital sector in GDP by country, %.

Compiled by authors from the Digital Economy Indicators in the Russian Federation: 2018.

The Russian IT sector is characterized by a small number of companies working in it. As of 2018, only 0.8 enterprises of the IT sector accounted for 1 thousand people. In developed countries, the number of enterprises per 1,000 people averages 2.7 (Fig. 2). For example, Germany, which has 1.3 enterprises per thousand people, is making serious efforts to rectify the situation: in recent years the number of enterprises has decreased by more than 40%.

Since technological and innovative enterprises are the driver of the development of the digital economy, their small number in Russia poses serious risks for the digital development of the country.

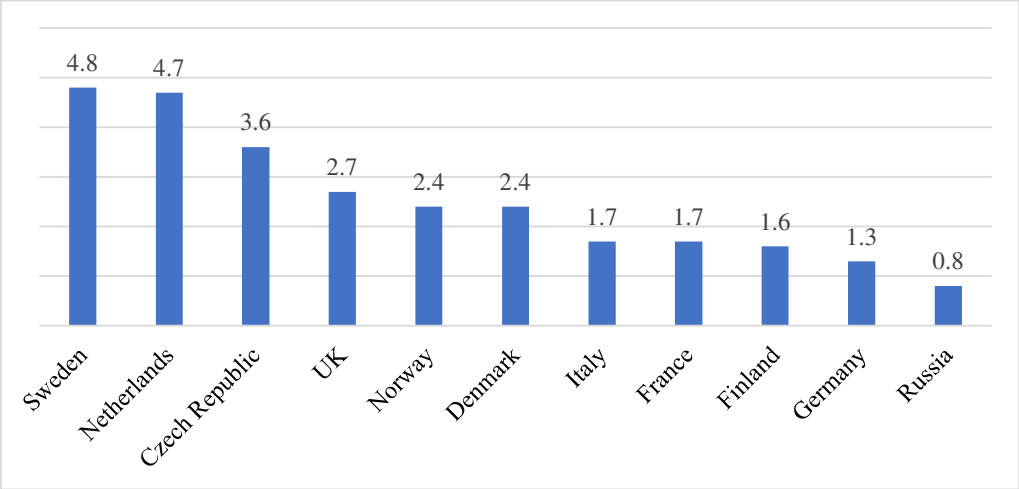

Fig. 2: Number of enterprises in the IT sector and per 1 thousand people, units.

Compiled by authors from the Digital Economy Indicators in the Russian Federation: 2018.

In 2018, the number of people employed in the ICT sector in Russia amounted to 1.7% of the total number of people employed in the economy (1.2 million people). This value is significantly lower than in most developed countries, where it averages about 3%. For comparison, 2.7% of people employed in France in the IT sector, 2.9% in Germany, 3.1% in the USA, and 3.5% in the UK (Fig. 3). The low share of employees in this sector only confirms that the digital sector in Russia is relatively small.

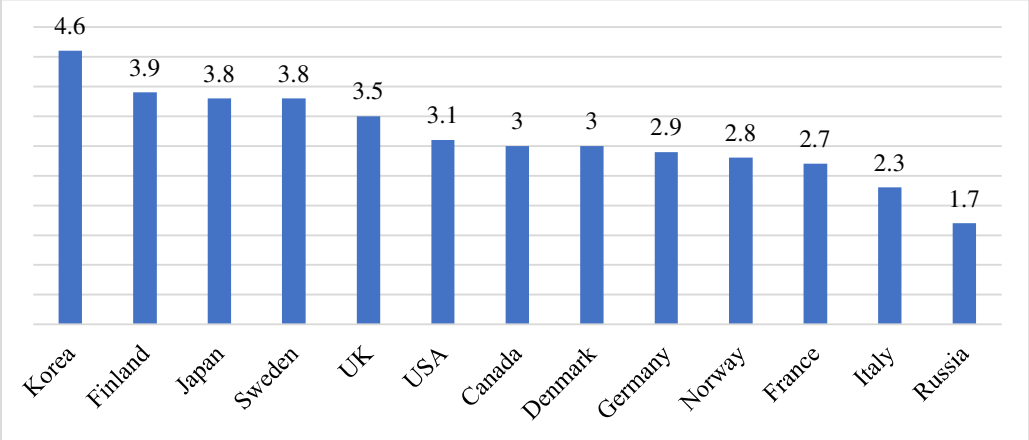

Compiled by authors from the Digital Economy Indicators in the Russian Federation: 2018.

Fig. 3: Percentage of employees in the ICT sector of the total number of employees, %.

In 2018, the value added per 1 employee in the ICT sector in Russia amounted to 1.8 million rubles, or 75 thousand dollars. USA (PPP). Which is significantly lower than in European countries such as

Finland, France, Germany, Sweden, Great Britain and Norway (Fig. 4). In these countries, there is a closer relationship between digital technologies and applied software products - primarily in the field of finance, new equipment is being developed, and modern technologies are being introduced. Leading countries are Norway, the UK and Belgium.

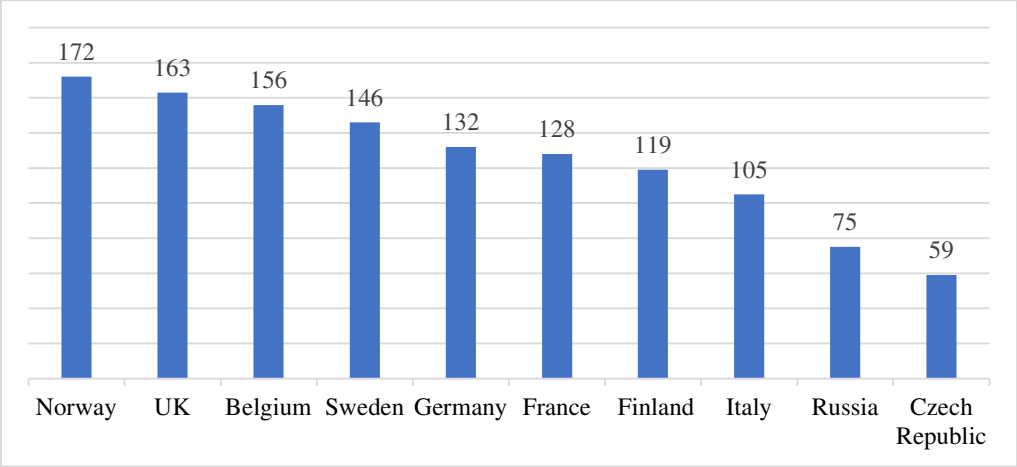

Compiled by authors from the Digital Economy Indicators in the Russian Federation: 2018.

Fig. 4: Value added per 1 employee in the ICT sector, thousand dollars. US (PPP).

Over the past 8 years, the growth dynamics of the digital sector of the Russian economy has changed significantly (Fig. 5). It can be noted that on average from 2010 to 2013 the growth was 4.8%. Since 2014, there has been a decrease in the growth of the ICT sector, and in 2016 it showed a negative value. In subsequent years, there was an increase, which in 2018 amounted to 5%.

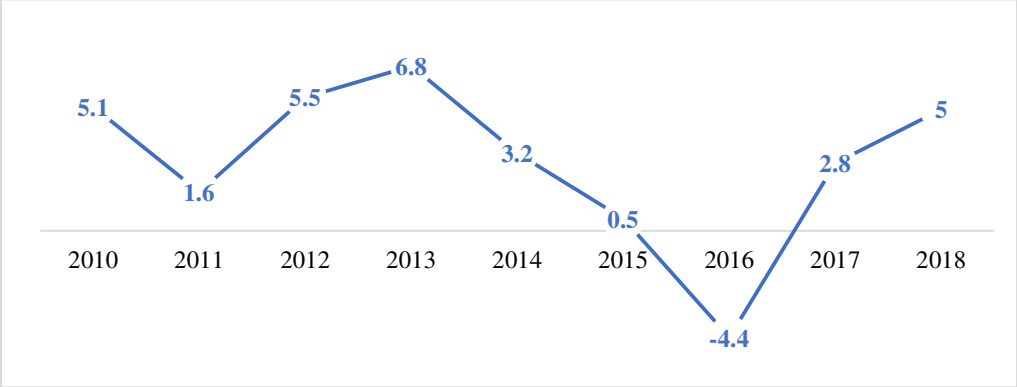

Compiled by authors from the Digital Economy Indicators in the Russian Federation: 2018.

Fig. 5: Growth rates of the digital sector in Russia, %.

The peculiarity of the digital sector in Russia is that it has a high state share. The share of state ownership in the authorized capital of companies in the IT sector was 35.2% in 2018. The campaigns that occupy a large share in the digital sector are the state corporation Rostec and the company Rostelecom. At the same time, the share of small and medium-sized businesses in the communications sector was only 13.1%, while the share of Rostelecom accounted for 16.4% (Selishcheva T.A. et al. 2018).

In this case, the state is one of the main participants in the ICT sector and one of the main consumers of information products and services. The growth of the digital sector of the Russian economy is largely due to the expansion of the public sector, which is reflected in the creation of new public accounting systems in the fiscal sphere and the creation of new state and municipal systems (e-government,

digitalization of transportation). Examples of government investments in the development of the country's digital sector can be seen in table 1.

Table 1: State investments in the digitalization of the Russian economy

	Project	Number of devices	Investment
1	Online ticket offices	2 million	30 billion rubles
2	System PLATON	1 million	6.8 billion rubles
3	Tachographs	1 million	30 billion rubles
4	EGAIS ALCOHOL	69 000 companies	284 million rubles

Compiled by N. Sopina

From the foregoing, it can be concluded that the digital sector of the Russian economy is still underdeveloped and requires significant investment not only from the state, but also from private business. Let us consider what factors influence the competitiveness of Russia in the field of digital technologies in the world based on the rating of the World Competitiveness Center.

Digital competitiveness shows the degree to which a country implements and explores digital technologies that contribute to the transformation of the state, business and society itself.

The main countries ranking first in the global digital competitiveness ranking are presented in table 2.

Table 2: The leading countries in the global ranking of the digital competitiveness in 2017-2018.

2017			2018		
Number in the rating	**%**	**Country**	**Number in the rating**	**%**	**Country**
1	100	Singapore	1	100	USA
2	95,938	Sweden	2	99,422	Singapore
3	95,410	USA	3	97,453	Sweden
4	95,026	Finland	4	96,764	Denmark
5	94,524	Denmark	5	95,851	Switzerland
6	93,225	Netherlands	6	95,724	Norway
7	92,135	Hong Kong	7	95,248	Finland
8	91,998	Switzerland	8	95,201	Canada
9	91,671	Canada	9	93,886	Netherlands
10	90,790	Norway	10	93,239	United Kingdom
42	62,854	Russian Federation	40	65,207	Russian Federation

Compiled by authors from the World digital competitiveness ranking 2018.

According to the rating, in 2018, most of the countries that participated in the study increased their digital competitiveness, while about 40% of countries showed a decrease in level and only eight countries continued to remain at the same level. It should be noted that the change in the level of digital competitiveness is not directly related to the geographical position of the country but is directly determined by the conditions that allow improving the level of digitalization of the state (Tab. 1).

As for Russia, in 2018 the country improved its position in the ranking and moved from 42 to 40 places, which is determined by an increase in the level of factors such as technology (from 44 positions to 43) and readiness for the future (from 52 positions to 51) (Borkova E., Kochkin T et al.).

The “knowledge” factor did not change its values in 2018, as in 2017 it is equal to 24 points. At the same time, the situation on sub-factors was as follows: “talent” decreased from 35 to 40 positions, it should be noted that Russia’s weakness is the low involvement of international experience (59 points), “training”, on the contrary, the indicator improved its position from 14 to 12 , this is due to the fact that Russia has high indicators in such areas as the level of higher education (8), the ratio of students and teachers (12), the number of graduate students (13), and the number of women with an academic degree

(3). sub-factor "development of scientific potential" moved from 25th to 23rd place, , which is related to such indicators as an increase in the efficiency of R&D (6), but the weaknesses were a small number of patents (35) and low R&D expenses (OECD, 2017).

The “technology” factor in 2018 increased its value from 44 to 43 points. Let us consider in detail what change in subfactors led to this. The sub-factor “regulatory framework” here should state a deterioration, as the indicator has shifted from 36th to 38th place. This can be explained by the low level of protection of intellectual rights (52), the legislation on scientific research (50) and technology development (51) is not well developed, however, a positive trend in the implementation of contracts should be noted (17). The technological base sub-factor weakened its position by 1 point, falling to 38. Here, the weakness should be noted: insufficient number of Internet users (45), wireless broadband (44), Russia's dependence on high-tech exports and low Internet speed (36), but as a plus, many mobile users can be called (28). The sub-factor “capital”, it also decreased, moved to 58 position, adding 1 point.

Here, the minuses for attracting capital to the development of technologies in the ranking are indicated first of all - these are high investment risks (57), low attraction of venture capital (55), insufficient level of banking and financial services (53), the highest indicator is investment in telecommunications sector (37).

The factor of “readiness for the future” in 2018 rose to 51 lines, which is associated with a positive trend in some sub-factors. So, the sub-factor “adaptive attitudes” increased its value by 5 points. This positive direction is associated with participation in the development of digital technologies (28), the level of smartphone ownership (31), the weakness of the rating highlights the attitude towards globalization (61). The “business flexibility” sub-factor, on the contrary, worsened its importance and increased from 59 to 62 places. Here, weaknesses of companies about digitalization (61), insufficient use of big data (58) and knowledge transfer (54) are indicated as weaknesses, but the increase in the number of innovative companies (46) can be called a plus. The sub-factor "IT integration" takes 38th place, worsening it by one position. According to the rating, Russia has low security against computer piracy (54), insufficiently well-developed public-private partnerships in the field of digital technology development (50), insufficient cyber security (37), but a high rate of electronic government development (30).

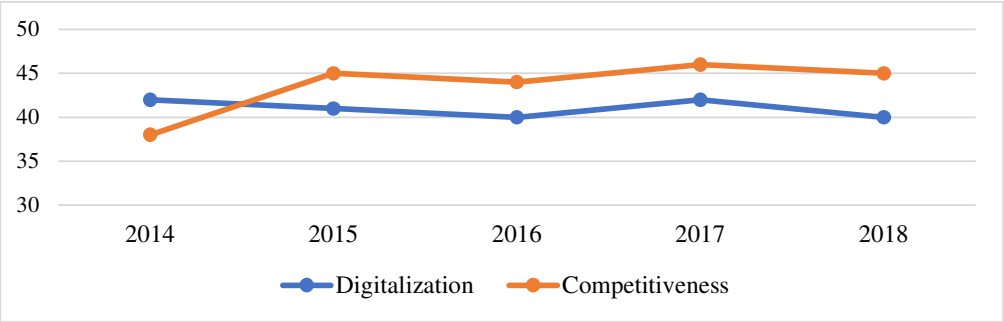

Compiled by authors from the World digital competitiveness ranking 2018.

Fig. 6: Comparison of the level of competitiveness and the level of digital competitiveness of Russia.

If we compare the level of world competitiveness of Russia and the level of its digital competitiveness, we see that in the second rating Russia occupies better positions than in general world competitiveness (Fig.6). This can be explained by the fact that the overall global competitiveness rating considers not only the level of development of (digital) technologies, but also other areas of the country's economy.

Conclusion

The sector of information and communication technologies in Russia began to emerge quite recently, therefore, in terms of its indicators, it lags the digital sector of foreign countries. This is evidenced by the low level of digital competitiveness of the country. The main reasons are:

Poorly developed legislation for the protection of intellectual property rights;

• The development of the Internet network is insufficient due to the large territory of the state;
• Underdevelopment of a venture capital institution;
• High investment risks;
• Cybersecurity issues.

To solve these problems, a comprehensive interaction of business and the state is necessary. The state should pay attention to the following issues, the solution of which can contribute to the development of the ICT sector:

• Attraction of investments;
• Creation of conditions for the development of small and medium-sized businesses in the IT sphere;
• Training of qualified personnel;
• Creation and development of new technologies considering world experience;
• Development of the institution of public-private partnerships in the field of digitalization;
• Improving legislation.

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Evolution of Wheat and Maize Productions In Romania between 2007-2018

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Abstract

The integration of Romania into the European Union has led to the development of the vegetable agricultural sector by increasing the agricultural surfaces destined for cereal cultivation. Using new technologies, financial programs to support farmers and quick access to the international market, Romania ranks among the top producers and exporters of cereals in the European Union. The study compares the evolution of wheat and maize productions during 2007-2018 and the trade in the same period.

Keywords: Wheat, Corn, Export, Import

Introduction

Grain cultivation is a long and important tradition in Romania. The production of wheat and maize has grown significantly in recent years due to the measures taken by the government to support farmers both in setting up crops, stimulating the use of high-performance technologies, storing them and marketing them.

Wheat (Triticum aestivum L.) is one of the most important crops, providing over 20% of the calories consumed by the world population. Global wheat production in 2017/18 was 757.92 million tons, increasing with 5.92 million tons compared to the previous year (STATISTA, 2019). In the year 2050, the world population is estimated to be 9 billion, while the demand for wheat is estimated to reach more than 900 million t (Dixon et al., 2009). In many countries, wheat (Triticum aestivum L.) is a widely grown and major field crop, and as such it is of great economic importance. (Har-Gil et al., 2011).

The European Union reported that its wheat production in the year 2017/18 raised at 151.58 million tons, being the main wheat producer and exporter, alongside China, India and Russia. Egypt, Indonesia and Brazil being the largest importers (Statista, 2019). Within these trade exchanges, special attention is paid to the quality of wheat that plays an important role in price justification.

The European Union (EU) harvested 129.0 million tonnes of common wheat and spelt in 2018, representing 43.7 % of all cereal grains harvested. This was 13.6 million tonnes less than in 2017, a decline of -9.5 %. The main reason for this decline was the drought in central and northern Europe, although the cultivated area of common wheat and spelt was also slightly lower (-1.6 %) than in 2017. In contrast, the harvested production of grain maize and corn-cob-mix (CCM) in the EU was

4.4 million tonnes higher in 2018 at 69.1 million tonnes, with much of that increase coming from much higher production levels in Romania (+30.3 %) and Hungary (+18.4 %). (Eurostat, 2020).
The harvested production of cereals (including rice) in the EU was 295.1 million tonnes in 2018, about 11.3 % of global production. This was 14.9 million tonnes less than in 2017, representing a sharp fall of -4.8 %. This decline reflects the drought conditions that prevailed in many areas of central and northern Europe, the cultivated areas of cereals being broadly unchanged (-0.3 %). To put this in some further context, the EU's harvested production of cereals in 2018 was 37.5 million tonnes lower than the record harvest of 332.6 million tonnes in 2014.

France harvested 62.6 million tonnes of cereals in 2018, a little more than one fifth (21.2 %) of the EU's total production. Germany harvested 38.0 million tonnes (12.9 % of the EU total), Romania a further 31.5 million tonnes of cereals (10.7 % of the EU total) and Poland harvested 26.8 million tonnes (9.1 % of the EU total). (https://ec.europa.eu/eurostat, 2020).

According to the data published by STATISTA, the wheat production estimated at EU level in 2020 will be approx. 136.7 million tonnes, with an annual increase of approximately 1.2-1,3 million tonnes per year, following that in 2028 the estimated production will reach 144.2 million tonnes, being still below the production obtained in 2015, respectively 144, 4 thousand tons.

Materials And Methods

The article follows the evolution of wheat and maize productions in Romania between 2007-2018, as well as the evolution of imports and exports during this period. The data come from the reports of the Ministry of Agriculture and Rural Development, the National Institute of Statistics and the European Commission. The analyzed period represents the first 11 years since Romania's integration into the EU and the effect of investments in agriculture.

Results and Discussions

Romania has the 6th largest agricultural area used between EU countries and is among the top 10 exporters of wheat and maize. According to the data published by National Institute of Statistics of Romania (INS), the wheat production in Romania in 2018 was 10.14 million tonnes compared to 2007, when the production was 3.04 million tonnes. The growth of 330% in 2018 compared to 2007 was influenced during the period analyzed by the economic measures to stimulate the agriculture, the support programs for farmers, the development of irrigation networks, access to European funds. Table 1 shows the wheat production from 2007-2018, noting that 2018 was the year with the highest production.

Table 1: Evolution of wheat productions in Romania between 2007-2018

Year	Surface (thousands of hectares)	Average production Kg/ha	Total production mii to
2007	1.975,0	1.541	3.044,5
2008	2.110,3	3.403	7.181,0
2009	2.148,8	2.421	5.202,5
2010	2.162,4	2.688	5.811,8
2011	1.947,0	3.663	7.131,6
2012	1.997,6	2.652	5.297,7
2013	2.104,0	3.468	7.296,4
2014	2.112,9	3.59	7.584,8
2015	2.106,6	3.78	7.962.4
2016	2.137,7	3.944	8.431,0
2017	2.052,9	4.888	10.035,0
2018	2.109,0	4.803	10.130,0

Source: Ministry of Agriculture and Rural Development

The use of new technologies and varieties and hybrids adapted to the pedoclimatic and drought-resistant conditions, diseases and pests have led to an increase in average yields per hectare. The arable agricultural areas used in the cultivation of wheat did not suffer any diminution or significant increases, the differences coming mainly from crop rotation. Of the agricultural area used in Romania, respectively 14.6 million hectares, the arable area represents 64%, respectively 9.4 million hectares. For wheat cultivation, a percentage of 20-22% of the total arable land is constantly used, and the share of arable land intended for corn cultivation is on average between 26-28% of the total agricultural area of the country.

Wheat production in the EU at 2019 level stood at 135.324 million tonnes, compared to 124,892 million tonnes in 2018 and 137,707 million tonnes in 2017. Based on the centralized data in Table 1, we can see the weighted growth of Romanian wheat production in production at EU level, reaching in 2018 at 8.1%.

From the comparative analysis presented in the Table 2, it results that the corn production per hectare has increased significantly, and at the national level the corn production reached 18,353 million tonnes reported in 2018, compared to 3,853 million tonnes in 2007.

From the two tables there is a record increase of wheat and maize production in 2011 and a decrease in 2012, these fluctuations of production are motivated by the environmental factors of the respective agricultural year.
Another factor that has influenced the yields per hectare is the association in producer groups and the purchase or lease of land by natural persons by farmers, thus obtaining large and compact areas.

Table 2: Evolution of maize productions in Romania between 2007-2018

Year	Surface (thousands of hectares)	Average production	Total production
		Kg/ha	mii to
2007	2524,7	1526	3853,9
2008	2441,5	3215	7849,1
2009	2338,8	3409	7973,3
2010	2098,4	4309	9042,0
2011	2589,7	4525	11717,6
2012	2730,2	2180	5953,4
2013	2518,3	4488	11305,1
2014	2512,8	4770	11988,6
2015	2605,2	3462	9021,4
2016	2581,0	4159	10746,4
2017	2402,1	5959	14326,1
2018	2371,0	7740	18.353,0

Source: Ministry of Agriculture and Rural Development

The ability of a country to face challenges in the international market depends upon the export competitiveness of the country. (Kedar et al., 2003)

At EU level, Romania is one of the top wheat exporters in Europe, and since 2008 the quantity of wheat exported has been constantly higher compared to the imported quantity. In 2016, the largest quantity of wheat exported and the largest quantity of important wheat, as shown in Table 3.

Table 3: Evolution of imports and exports of wheat in the period 2007-2018

Year	Imported quantity (tons)	Imported value (thousands of euros)	Exported quantity (tons)	Exported value (thousands of euros)
2007	587.525,7	108.968,9	206.633,7	45.936,9
2008	441.636,9	93.295,2	1.988.757,9	381.635,1
2009	628.843,0	77.874,2	2.340.673,1	302.947,4
2010	719.954,0	112.444,4	2.480.143,0	379.446,1
2011	559.138,5	124.235,5	1.568.734,0	309.768,9
2012	531.827,0	118.663,4	2.314.888,2	544.095,9
2013	679.827,7	122.897,1	4.773.293,8	977.679,5
2014	670.919,4	116.079,9	4.965.442,7	959.356,8
2015	652.266,9	115.459,3	3.555.280,7	692.534,9
2016	2.155.962,6	330.860,5	6.993.999,2	1.141.908,4
2017	1.249.972,1	203.869,0	5.837.479,8	1.003.815,9
2018	695.173,2	115.544,7	5.886.755,9	1.037.727,8

Source: Ministry of Agriculture and Rural Development

Analyzing the wheat production from 2011 and 2012 and the quantity exported in the respective years, we also observe an increase of the price per ton in 2012 by the ratio between the value and the quantity exported.

The export of maize during the period analyzed as shown in Table 4, registered a constant growth from 2008 to 2015, year that is evidenced as having a record production. The imported quantity of maize was greater than the quantity exported only in 2007. As in the case of wheat, there is an increase in the price of maize when purchased on the domestic market in 2011 and 2012.

Table 4: Evolution of imports and exports of maize in the period 2007-2018

Year	Imported quantity (tons)	Imported value (thousands of euros)	Exported quantity (tons)	Exported value (thousands of euros)
2007	667.005,7	126.369,6	312.288,5	74.693,7
2008	521.411,9	127.179,7	695.100,7	134.275,4
2009	813.356,1	130.754,1	1.698.139,9	252.018,1
2010	430.548,7	89.426,9	2.054.488,2	388.317,9
2011	373.881,2	113.221,6	2.310.665,1	578.710,3
2012	698.581,3	191.133,1	2.272.649,4	596.517,6
2013	284.155,7	121.343,3	3.233.350,7	730.995,2
2014	471.204,1	123.510,5	3.708.953,0	755.147,2
2015	1.621.458,1	293.968,4	5.125.274,3	959.907,5
2016	583.451,4	141.228,0	3.439.250,7	702.405,89
2017	463.117,3	130.107,18	3.773.159,53	729.885,51
2018	416.964,6	120.903,5	4.680.005,9	869.347,3

Source: Ministry of Agriculture and Rural Development

At EU level, in 2019, 75.8% of all wheat production was obtained due to the high yields of seven Member States, respectively: France, Germany, United Kingdom, Romania, Poland, Spain, and last

but not least, Italy . Romania, ranked fourth in wheat production, held 7.3% of total wheat production.

In terms of maize production, Romania ranked first at European level, becoming the largest corn grower in the EU. This was followed in the ranking by France, Hungary, Italy, Poland, Spain and Bulgaria.

In the external trade balance of cereals and "cereal preparations" the value of exports was over € 2.17 billion in 2018, and imports amounted to over € 905 million.

In 2017, EU-28 harvested production of cereals was 310.6 million tonnes. The highest levels of production, at least 3.5 million tonnes, were principally located in:

- nine French regions, mainly in the west and the north, including the French region of Centre — Val de Loire which harvested more cereals (8.9 million tonnes) in 2017 than any other region in the EU, producing mainly common wheat and spelt;
- nine German;
- three Romanian regions and two Polish regions. (Agriculture statistics, Eurostat 2020)

Conclusions

The quantitative variations are due to the lack of climate sensitivity or the lack of precipitation in the critical moments of development or harvest.

By implementing a set of measures, Romania could increase its total cereal production and implicitly the quantity of cereals it can export.

Among the necessary measures would be to reduce tax evasion, increase the degree of capitalization of agricultural holdings, the adoption of new technologies, the digitization and use of robots in agriculture.

Considering the vast agricultural area and the reasonable utilization rate in Romania, it is clear that the yield of production is the main limiting factor of the agricultural sector

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Management of Cadres' Potential of Trade Enterprises: The Essence and Methods of Evaluating the Efficiency of Its Use

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Abstract

The article explores the scientific and theoretical provisions on managing the cadres' potential of trade enterprises: the nature and methods of evaluating the efficiency of its use. The cadres' potential of trade enterprises is an aggregate of qualified full-time employees whose professional training and work experience enable them to perform the functions and their competences assigned to them within the framework of the trade enterprise's activities. The components of cadres' potential, of which professional and physiological qualities are obligatory, are considered. As a result of the researches the existing methods of the analysis of the level of cadres' potential with improvement of costly, profitable, comparative approaches and personnel audit have been improved. An algorithm is proposed and an assessment of the constituent groups of competencies of cadres' potential of trade enterprises (personal, professional, instrumental, interpersonal and systemic) is made. The indicators of cadres' potential diagnostics are analyzed, as well as a number of reasons that hinder the qualitative organization and carrying out of the cadres' potential diagnostics according to the results of the conducted survey. The conclusions were drawn on the basis of which the outstanding problems in the personnel policy related to: the transformation processes of economic formation and adaptation to the European standards in the personnel sphere were established at the enterprises of Ukraine; preparation of personnel for the needs of the enterprise, type of economic activity, society; mismatch of the system of training and advanced training to the needs of the market; imperfection of the personnel selection system, etc.

Keywords: Cadres, Personnel, Cadres' Potential, Competencies, Diagnostics, Trade Enterprises.

Introduction

Whatever technical capabilities, organizational and managerial advantages are not opened before the enterprise, it will not start to work effectively without the appropriate cadres' potential. The quality of cadres' potential directly affects the competitiveness of the enterprise and is one of the most important conditions for maintaining competitive advantage. Ensuring the efficient use and maintenance of an adequate level of cadres' potential in the enterprise management system is one of the promising ways to minimize the impact of the crisis on the activity of trade enterprises and their competitiveness.

Formation of cadres' potential is a priority of each enterprise. The main task of cadres' potential management is to identify and make the most effective use of the abilities of each employee in accordance with the goals of the company, as well as to establish good relationships between members of the workforce. Today, there is a need to improve the cadres' potential management system of the enterprise, whose main functions will be to perform diagnostics of cadres' potential, and will allow to identify and evaluate the problems of personnel management and plan the directions of its development in the future. Modern Ukrainian enterprises, for the most part, have problems in the area of personnel management, namely: lack of innovative orientation of personnel policy and use of good experience of foreign enterprises; non-accounting by departments of personal characteristics of each individual employee; lack of a clear system of development of cadres' potential of employees, etc. The result of such personnel policy is a high turnover of personnel at enterprises and a low level of interest in achieving organizational goals.

Great contribution to the study of theories of social development and personnel management, including formation of basic principles of modern personnel policy of enterprises, made by both foreign and domestic scientists: M. Amstrong, S. Bandura, D. Bogin, V. Gurne, V. Kibanova, A. Kolot, E. Libanova, M. Magura, J. Roberts, G. Shchekin and others. Scientific views on the criteria and methods of personnel assessment, methodical approaches to the personnel diagnostics at the trade company outlined in the works of T. Bazarov, V. Vasilchenko, A. Grinenko, A. Grishnova, G. Dessler, G. Zavinovskaya, E. Vilka, L. Kerb, A. Krushelnitskaya, V. Moskalenko, A. Oleksiuk, A. Fedonina, A. Shakhno, etc. Various aspects related to the personnel potential of trade enterprises and its evaluation were investigated in the works of V. Apopy, S. Bai, L. Garmider, V. Zhukovskaya, Y. Karpenko, V. Kravchuk, M. Menshikov, G. Pisarevskaya, I. Savchenko, P. Smirnova, A.Hodakevych and others. However, an analysis of scientific publications and practical experience shows that today there is practically no scientifically-based holistic system of staffing for the activities of enterprises that meets the requirements that are changing dynamically. A particularly current problem is the creation of a scientifically based system for an integrated assessment of the cadres' potential of a trade enterprise, which determines the relevance of the topic of the article.

The Main Part

In the modern economic literature, the concept of "cadres' potential" is viewed differently. For example: as a set of qualitative and quantitative characteristics of the personnel of the enterprise, including the number, composition and structure, physical and psychological abilities of employees, their intellectual and creative abilities, professional knowledge and qualification skills, communication skills and ability to cooperate, attitude to work and other qualitative characteristics [Belorus, 2007, p.8]. In a narrower sense, cadres' potential can be considered as temporary vacancies or reserve jobs that can be occupied by professionals as a result of their development and training. According to the results of the analysis of publications in which scientists offered their vision of the essence of the concept of "cadres' potential", it was concluded that there were disagreements in its interpretation. Therefore, in order to clarify and clearly define what it is expedient to understand by the cadres' potential of the enterprise, a systematization of the currently available theoretical approaches to the interpretation of the concept of "cadres' potential" was carried out (Table 1).

Table 1: systematization of definitions of the concept of "cadres' potential" in publications of domestic and foreign scientists

Author (s) / Source	Cadres' potential is:
Resource approach	
G. Boldyreva, F. Mosin [2011]	general (quantitative and qualitative) characteristics of personnel as one of the types of resources, related to the performance of the functions assigned to it and the achievement of the goals of future development of the enterprise;
N. Geber [2013, p.104]	one of the important resource elements of the enterprise potential, the effective formation and use of which allows to achieve the main strategic goals;
Systems approach	
L. Garmider [2011, p.96]	1) a socio-economic phenomenon that reflects the totality of relations (economic, social, organizational, personal, etc.) associated with the enterprise and obtaining the desired result, as well as dependent on the conditions of the production process, distribution, exchange and consumption of labor; 2) what makes the human factor a driving force, that is, its internal basis, a latent opportunity with dynamism;
V. Moskalenko [2010]	a generalized characteristic of the system of formation, distribution and use of personnel, which includes both those employed in social production and the unemployed, but able to work depending on their capabilities;
Continuation of the table 1	
Factor approach	
I. Tsvetkova, A. Sivolap [2007]	skills of employees of the enterprise, which can be used to increase its effectiveness in various fields of production, with the aim of generating income (profit) or achieving a social effect;
T. Bilorus [2007]	the capabilities of workers, the quality of their vocational training, labor, personality, psychological and physiological qualities, as well as the most important creative abilities;
Attributive-synthesizing or integration approach	
N. Kasyanova [2013]	a set of staff abilities and capabilities to ensure the achievement of the goals of long-term (perspective) development of the enterprise;
I. Pletnikova [2007, p.78]	the set of abilities of the production personnel of the enterprise to ensure the production of consumer values that meet the needs of the market in specific economic, scientific and technical conditions of production;
Indicative Resulting Approach	
V. Grineva, G. Pisarevska [2012]	the magnitude of the possible participation of highly skilled workers in production, their ability to innovate, their educational, qualification level, psychophysiological characteristics that can be used to achieve the strategic goals of the enterprise and ensure competitiveness in the market;
V. Dovbenko, V. Melnik [2010]	temporary free or reserve workplaces that may be occupied by specialists as a result of their development and training.

Along with this, on the basis of the analysis of the above definitions, it was concluded that some of them are controversial in their semantic content. For example, the position of V. Grineva, G. Pisarevska [2012] , which associates the cadres' potential only with the possible participation of employees in the enterprise's activity, ignores their existing participation, during which the cadres' potential also manifests itself, is ambiguous. In our opinion, the binding of I. Pletnikova [2007, p.78] on cadres' potential to the capabilities of only production personnel is also incorrect. The cadres' potential of I. Tsvetkova and A. Sivolap [2007] is very narrowly defined, which reduces it to the abilities and skills of workers, neglecting their physical and psychological qualities, professional knowledge and abilities.We cannot agree with the interpretation of N. Kasyanova [2013] and other scientists who associate cadres' potential with those abilities and capabilities of

personnel that ensure the achievement of the goals of only the long-term development of the enterprise. We believe that the cadres' potential at enterprises is used both to achieve long-term and medium- and short-term goals. A fuzzy and one that can come to the definition of other types of activities of the enterprise is the definition proposed by N. Geber [2013, p.104]. We do not support the position of L. Garmider [2011, p.96], where she considers cadres' potential as a socio-economic phenomenon, since the essence always manifests itself in specific objects or actions (in our case, one way or another connected with cadres' potential), and the phenomenon expresses only some side of the essence. Too primitive and one-sided is the proposal of V. Dovbenko and V. Melnik [2010] to determine the cadres' potential of the enterprise through free and reserve jobs and the like. Due to the presence of disagreements in the interpretations of the essence of cadres' potential, there is no single scientific opinion on the definition of its components. It has been established that the vast majority of scientists (90.9% of the sample studied) are of the opinion that professional and physiological qualities are mandatory components of cadres' potential. 81.8% still add psychological qualities to these two components, 72.7% - qualification, 63.6% - social, 54.5% - educational, 45.5% - intellectual, 27.3% - cultural, moral and organizational, 18.2% - humanistic, motivational, communicative, personal, structural and creative, 9.1% - adaptive, innovative, creative, leadership, technical and technological, labor qualities and characteristics, as well as a component of development potential. Based on all of the above, as well as using a competency-based approach, we offer the cadres' potential of an enterprise to understand the totality of personnel and their competencies that determine the personnel capabilities of the enterprise. Thus, by the cadres' potential of a trade enterprise, we consider it appropriate to understand the totality of qualified full-time employees whose professional training and work experience allow them to fulfill the functions and their competencies assigned to them within the framework of the activities of a trade enterprise [Peniuk, 2015, p.243].

As a result of the analysis, a number of methods and approaches for diagnostics of cadres' potential were identified, and a number of their advantages and disadvantages were also highlighted (Table 2).

Table 2: advantages and disadvantages of methods and approaches to the diagnostics of cadres' potential of trade enterprises

Name of method / approach	Advantage (s)	Disadvantage (s)
Methods		
Expert methods	- savings when attracting experts from their own staff; - speed of obtaining results; - objectivity of the assessment of external experts; - adaptation to the values of reference indicators; - coverage of a large volume of qualitative values;	- the need to form an independent / disinterested group of experts; - lack of independent / «fresh» vision; - the cost of attracting external experts; - the risk of obtaining an incorrect assessment by an incompetent expert; - high level of subjectivism;
Pointed methods	- ease of use; - convenience and speed of interpretation of results;	- lack of a unified methodological base; - considerable level of subjectivism;
Methods of economic-mathematical modeling	- possibility of repeated (periodic) calculations of values; - full evaluation / diagnostics; - convenience and speed of interpretation of results;	- the need for special equipment and specialists; - the cost of buying software, updating or modifying it; - moral aging;

Benchmarking method	- systematic eradication of differences from the best representatives of this class; - borrowing the best methods; - achievement of a leading position in competition; - recognition of technological «breakthroughs»;	- a small number of specialists with sufficient experience to implement benchmarking; - restriction in access to information;
Rating methods	- ease of use; - convenience and speed of interpretation of results;	- lack of a unified methodological base; - high dependence on benchmarks; - ack of consideration of the specifics of an enterprise;
Approaches		
Comparative	- reliable factual information improves the accuracy of calculations and reflects the specifics of the object of assessment, taking into account the actual results achieved;	- ignoring the prospects of enterprise development in the future; - the complexity of collecting a large array of information; - the need for complex adjustments; - inability to evaluate unique or specific objects for lack of analogs for comparison;
Profitable	- the image of real benefit; - permission to evaluate the future profitability of cadres' potential; - accounting for economic use;	- complexity of calculations; - subjective risk assessment; - the difficulty or inability to determine the contribution of an individual employee;
Costly	- the ability to accurately estimate the cost of creating the object; - the possibility of elemental assessment of the components of	- limited use of market information in valuation; - difficulties in selecting the most informative quantitative characteristics of the potential;

Ending of the table 2

	cadres' potential; - presence of clearly formalized dependencies between the value of the cadres' potential and the values of the input parameters; - slow adaptation of cumulative costs to changes in their cost over time.	- lack of a single information base of incoming information; - fragmentation of methods of calculation of the same parameters by the methods of different scientists and practitioners; - the difficulty or inability to determine the contribution of an individual employee.

With a large number of diagnostic methods, mainly related to the nature of the functions performed by employees, most of them are based on indicators and standards. Such diversity of methods leads to the idea that the methodology of cadres' potential diagnostics should be based on a system of indicators that would reflect the full utilization of the potential of each of the components of the cadres' potential of the enterprise. As the competitive advantages of the enterprises in the market depend on the level of qualification, professionalism and other qualitative characteristics of the personnel, it is also worth paying attention to studying the methods of assessing the competitiveness of the cadres' potential of the enterprises. Modern economic literature identifies expert, matrix, graphic, mathematical, criterion methods and other methods. For example, indicator methods provide for the comparison of personnel evaluated with personnel from only one competing enterprise, as

well as the determination of the quantitative gap in the values achieved. Matrix methods are to determine the quantitative value of an integral rating indicator of the competitiveness of an individual frame or to graphically determine its competitive position in the competitive matrix by certain parameters.

Since the realization of an enterprise's ability to use or create conditions for the development of cadres' potential is directly related to the personnel policy, which it implements, it is necessary to determine the indicators of its evaluation. Any personnel policy is formed with the purpose of effective use of personnel resources, timely provision of the company's divisions by qualified employees, creation of conditions for effective use and development of the potential of the company's personnel, satisfaction of socio-economic hopes and interests of employees and the like. Under the most favorable working conditions, the staff will be able to provide the highest possible results of the enterprise. Therefore, in our opinion, the evaluation of the effectiveness of the personnel policy will depend, first of all, on the overall results of the enterprise. The process of diagnostics of cadres' potential should be carried out in stages, which simplifies its carrying out. The data of the conducted researches and the analysis of the methodological base for carrying out diagnostics of the cadres' potential of the enterprise indicated their versatility. It is determined that diagnostics can be performed both on its own and by involving external participants, using mathematical calculations or solutions of working situations.

It is established that diagnostics of cadres' potential, when using one or another method, can be accompanied by imperfection in calculations, problems in obtaining information base or attraction of funds, subjectivism or gravity in obtaining quick results, etc. As the results of diagnostics of cadres' potential can allow to form priority areas for investing in human capital, assessing the effectiveness of personnel policy and / or giving impetus to its reconfiguration, and under such conditions such results you can be false, it is worth refining the methodology of cadres' potential diagnostics and adapting it for trade enterprises. Thus, an important component of the development of cadres' potential is its monitoring with the help of specific indicators and analysis of the efficiency of the personnel of the enterprise. Carrying out an assessment of the level of cadres' potential will allow to realize one of the main functions of management - control, and will also provide information on perspective ways of building up. In this context, there is a need to develop approaches to the formation of a system of performance indicators of cadres' potential development that would meet the expectations of stakeholders, allowed to evaluate and analyze the cadres' potential.

Taking into account previous studies [Peniuk, 2016, p.200] let us try to assess the state of development of the cadres' potential of five trade enterprises. We will evaluate the cadres' potential according to their competences, which are its components. Among them: personal (provide the employee with such qualities as responsibility, ability and willingness to self-development, etc.); professional (determined by the ability to act successfully on the basis of practical work experience, skills and knowledge when solving professional tasks) instrumental (include cognitive ability, linguistic and technological skills and abilities); interpersonal (assuming that the employee has such traits as the ability to express feelings, the ability to self-criticize, as well as social skills related to the processes of social interaction and cooperation) systemic (combining understanding, knowledge and abilities that allow to perceive the relationship between parts of the whole and evaluate the location of each component). Within the framework of interpersonal competences, intercultural ones, which are connected with the ability of employees of the enterprise to successfully communicate with representatives of other cultures in the process of fulfilling their duties, can also be distinguished. Let's diagnose the cadres' potential of the enterprise on the example of some trade enterprises. The estimation of the components of cadres' potential of trade enterprises is given in Table 3.

Table 3: constituents of cadres' potential of trade enterprises

Components of cadres' potential	Calculation algorithm	*Optimal value*	Eurobud LLC	Universam LLC	Maxam PE	Zdoroviy son LLC	Val-Yan LLC
Personal							
Responsibility (R)	$R = \frac{N_{ct}}{N_{st}}$, N_{ct} - the number of completed tasks of the employee; N_{st} - number of scheduled tasks of the employee.	1	1,00	0,95	1,05	0,97	1,15
Stability (S)	$S = \frac{N_{ee}}{\overline{E}}$, N_{ee} - number of employees with experience in the organization for more than one year ; $\overline{E}$ – average number of employees of a certain period.	1	0,83	0,88	0,75	0,29	0,45
Determination (D_t)	$D_t = \frac{N_{qe} - N_{ilo}}{\overline{E}}$, N_{qe} - number of employees quitting during the period; N_{ilo} - number of inevitably laid-off workers of a certain period; $\overline{E}$ – average number of employees of a certain period.	1	0,01	0,04	0,13	0,20	0,01
Discipline (D_s)	$D_s = \frac{N_{ae}}{N_{tot}}$, N_{ae}- number of absenteeism of employees during a certain period; N_{tot} - total number of man-hours worked for a certain period.	1	0,02	0,07	0,05	0,13	0,05

Continuation of the table 3

Professional							
Education (E_d)	$E_d = \frac{N_{eh}}{N_{ev} + N_{ebs} + N_{ewe} + N_{we}}$, N_{eh} - number of employees with higher education; N_{ebs} - number of employees with vocational education; N_{ewe} - number of workers with basic secondary education; N_{we}- number of employees without education.	1	0,83	0,82	1	0,61	0,81
Experience (E_x)	$E_x = \frac{N_{ech}}{\overline{E}}$, N_{ech} - the number of employees who have changed jobs within the organization during a certain period; $\overline{E}$ – average number of employees of a certain period.	1	0,01	0,03	0,01	0,05	0,06
Competence (C_p)	$C_p = \frac{In}{\overline{E}}$, In - income from the activities of the unit; $\overline{E}$ – average number of employees of a certain period in unit	Increase	2146	1028	265	545	491
Qualification (Q)	$Q = \frac{N_{hq}}{N_{hq} + N_q + N_{fq} + N_{nq}}$, N_{hq} - number of highly skilled workers ; N_q - number of skilled workers; N_{fq} - number of few-skilled workers ; N_{nq}- number of unskilled workers.	1	0,16	0,75	0,5	0,27	0,30
Instrumental							
Entrepreneurial abilities (A_e)	$A_e = N_{re}$, N_{re} - the number of risky cases performed by the employee during a certain period.	Increase	15	17	14	18	12
The ability to organize activities (A_{oa})	$A_{oa} = \frac{N_{ot}}{N_{pt}}$, N_{ot} - number of organized tasks of the employee; N_{pt} - number of planned employee organized tasks.	1	1	1	1	1	1
Ability to generate ideas (A_{gi})	$A_{gi} = N_{gi}$, N_{gi} - the number of ideas generated by the employee during a certain period.	Increase	9	8	18	16	13

Ending of the table 3

Decision making ability(A_{md})	$A_{md} = N_{md}$, N_{md} - the number of decisions made by the employee during a certain period.	Increase	13	8	18	16	10
Interpersonal (including intercultural)							
Ability to work in a group (A_{gw})	$A_{gw} = N_{zgw}$, N_{zgw} - the number of realized group work involving an employee during a certain period.	Increase	9	11	15	17	9
Conflict (C_f)	$C_f = N_{cf}$, N_{cf} - the number of conflicts involving the employee during a certain period.	Increase	12	9	1	7	11
Mood for interaction (Int)	$Int = N_{cd}$, N_{cd} - the number of collective decisions, actions or issues involving the employee during a certain period .	Increase	15	10	9	12	9
Communication predisposition (CP)	$CP = N_{cc}$, N_{cc} - the number of colleagues, comrades, partners of the employee during a certain period.	Increase	3	5	4	7	5
Kindness (K)	$K = N_{iw}$, N_{iw} - the number of cases done, identified wishes, tips by the employee during a certain period in relation to the colleagues of the enterprise.	Increase	9	6	16	12	14
Systemic							
Ability to innovate (A_{inn})	$A_{inn} = N_{pi}$, N_{pi} - the number of proposed, implemented, forecasted innovations by an employee during a certain period.	Increase	5	5	11	12	9
Research skills (A_{rs})	$A_{rs} = N_{sc}$, N_{sc} - the number of studies carried out by the employee during a certain period.	Increase	3	4	9	2	4
The ability to put theoretical knowledge into practice (A_{tp})	$A_{tp} = N_{cpt}$, N_{cpt} - the total number of completed (completed) practical tasks by the employee during a certain period.	Increase	21	16	30	21	16

The data of the table 3 indicate the following the components of personal competencies at these enterprises do not correspond to their optimal value, excluding competencies «purposefulness» at Universam LLC. Among the professional components, the significant difference between the actual and the optimal values are the values of competence «experience», which indicates that the employees have insufficient level of experience in three enterprises, possibly due to their young age or unwillingness to improve. An exception is the level of

education at the enterprise of Eurobud LLC. In terms of instrumental, interpersonal (including intercultural) and system competencies, all their values at these enterprises are positive. The positive would be an increase in their values, except for the «conflict» component, the optimal value of which should decrease or equal to 0. The dynamics of these indicators indicate the need for stable work on the diagnostics of the level of cadres' potential in three enterprises. Priority directions of work at the studied trade enterprises are: reduction of staff turnover; increasing the level of employee experience; reducing conflict; increase in teamwork, communication development and the like.

At the studied enterprises only some indicators (staffing) is the indicator whose value corresponds to the optimal value at the studied enterprises. The values of such indicators as labor productivity, the coefficient of constancy of the staff, the coefficient of staff turnover and the level of conformity of education of the position occupied are only approximate to their optimal values. The exception is Eurobud LLC, where the turnover rate and the level of conformity of the education of the position still correspond to their optimal value.

Diagnostics of cadres' potential of a single personnel unit in the process of the enterprise (including the trade enterprise) is a measurement of the individual contribution of each employee to the overall result of the whole enterprise. In other words, such diagnostics make it possible to determine the value of an employee for an enterprise. If we consider personnel management activities as a set of specific functions, then as a result of diagnostics of cadres' potential, we can achieve a better result in the implementation of all these functions. For example, the executives and managers of trading companies who were interviewed in the course of our research noted the following:

- diagnostics of cadres' potential is necessary in the process of selection of personnel, as it allows to fill the enterprise with the necessary amount of qualified personnel, to select the best applicant for a vacant position and to minimize the costs of selection;
- diagnostics of cadres' potential of the existing employees allows to determine the needs of the enterprise in their development, rotation, replacement; provides the most effective decision making related to the personnel (change of motivation, increase / decrease in the career ladder, etc.), optimizes the budget for personnel development and allows to determine the expected profit from investments in the staff (due to projected production, labor productivity);
- diagnostics of cadres' potential helps to more carefully and reasonably approach the selection / adjustment of personnel policy, including: in terms of solving the problem of staff turnover, identifying and analyzing the positive and negative sides of a set of specialists from the outside and in the process of promoting or moving their employees within the enterprise.

According to the heads of trade enterprises, the following were highlighted among the main reasons that hinder the qualitative organization and diagnostics of cadres' potential at enterprises today:

- at the enterprises there was no need to form an HR department (for personnel);
- the number of employees does not allow to form the responsible person / department for diagnostics;
- diagnostics of cadres' potential is carried out only in the course of promotion of the employee on the career ladder or in the process of problems with the personnel;
- assessment of cadres' potential is mainly carried out at the stage of selection of employees, according to the established scheme of the producer of products (brands of a specific department);
- ignorance of management about features of work;
- measures for the employment of workers are carried out by reducing non-productive costs, reducing the amount of time lost, primary vocational training, training and the like.

For example, at Val-Yan LLC trade company, there is a clear procedure for evaluating the promotion on the «career ladder» of supervisors / heads of trade departments of different brands. This procedure is carried out periodically (once every 3 months) solely for the purpose of checking the relevance of knowledge about the specifics of brands of goods. Workers of sales departments of different brands - sales representatives, according to a similar scheme, take a daily assessment at the same enterprise, taking into account the peculiarities of their functional responsibilities (work in the fields, daily communications, work with «problem clients» / clients-debtors).

Conclusion

So, it is worth noting that not all trade enterprises pay attention to the assessment of cadres' and diagnostics of cadres' potential. It is established that in large and medium-sized enterprises of trade, as a rule, personnel are evaluated at the selection stage (i.e, to make a hiring decision) and periodically in the work process (for example, to make a decision on career growth, preparation of the reserve, identification reasons for unsatisfactory results, etc.). However, at large networked trade enterprises (especially when it comes to enterprises that have «foreign roots»), the assessment is carried out according to certain criteria, at certain times by clearly written procedures with a clear definition of possible variants of the end result of diagnostics and consequences, which this result stipulates.

At the enterprises of Ukraine there are unresolved problematic issues in personnel policy related to: transformation processes of economic formation and adaptation to European standards in the sphere of personnel; preparation of personnel for the needs of the enterprise, type of economic activity, society; mismatch of the system of training and advanced training to the needs of the market; imperfection of the personnel selection system and the like. The main thing in an enterprise (in an organization, company, firm) is not the potential of individual workers, but their only cadres' potential, as in the system the main interaction between the elements that form it. Cadres' potential characterizes the level of employees' capabilities and their ability to interact with employees and interact with other components of the enterprise's potential. The higher the cadres' potential of the enterprise, the higher the potential of the employed workforce, the more complex problems can be solved by the team (regarding the production, its quality, the rate of development of its new types, the efficiency of production and economic activity, etc.).

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Psychological Features of Perception of Supervisor by The Subordinates

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Abstract

The study of interpersonal relations in the supervisor-subordinate system is one of the most important areas in the modern social psychology of organizations. Consideration of this issue is essential in solving such applied problems as improving the adaptability, motivation, trustworthiness, and loyalty of employees, effective leadership, developing an organizational culture and introducing innovations. Almost no problem of organizational psychology can be solved without an analysis of the interaction of the supervisor and subordinates. A special issue of organizational psychology of interpersonal relations is the subordinate's perception of the personality and actions of the supervisor. In the process of implementation, the manifestation of leadership is recognized and interpreted by employees in one way or another, and the results of this social perception make a significant contribution (positive or negative) to the functioning and development of the organization. The perception of the personality of the supervisor is the most important factor in the formation of professional self-awareness and professional identity. As a result of perception, the characteristics of the perceived object are usually structured, and the object of perception belongs to a certain category by the subject of perception. Thus, the main issue in the scientific analysis of the perceptual process is the definition and study of the determinants of structured perception. The article discusses the specifics of the psychology of relations in the context of "supervisor-subordinate." In the course of a multi-stage socio-psychological study conducted in mixed teams of manufacturing enterprises, the structure of the manager's image was revealed, including two parts: the core and the peripheral part. In the male and female parts of the respondents of mixed groups, the perception of the core of the perceptive image of the supervisor was identical, while differences were revealed in the structure of the elements of the peripheral part of the image of the supervisor. The peripheral part of the manager's image has a variable dynamic structure that is sensitive to external changes (transformation of the socio-economic situation, change of ownership of a manufacturing enterprise, etc.). The data obtained are of interest for further study of the socio-perceptual process in management and can be used as part of a course to increase the psychological competence of managers of mixed production teams.

Keywords: Socio-perceptual process in management, image structure, supervisor, subordinate.

Introduction

In order to successfully and long-term maintain their advantages, companies are constantly forced to adapt to the changing market realities and look for innovative approaches to solving their problems (Brimhall 2019). In these conditions, managers need to increase their competence in the field of psychology of personnel management. The success of interaction in the social-production team is achieved through the joint efforts of all its members. Accordingly, the importance of scientific data on the individual personality characteristics of each employee is growing.

One of the socio-psychological reasons for the decline in labor productivity is a psychological distortion or loss of objectivity of the information of the team members about each other in the process of communication. This is especially pronounced in the interaction of "supervisor-subordinate." The increase in the share of mixed teams in various industries has had a significant impact on the psychology of interpersonal relationships between employees. At the same time, the psychological characteristics of the interpersonal relationships of employees in the labor process are not well understood (Suazo, Turnley and Mai-Dalton 2008).

The work of domestic and foreign authors is devoted to the study of the specific psychophysical qualities of employees of mixed teams (Obozov 2001; Hewlett, Sherbin, Dieudonne, Fargnoli and Fredman 2014; Stoet and Geary 2018). Scientists have identified the peculiarities of psychophysical qualities in women employees of teams (fine motor skills, sound, and verbal memory, the speed of perception of digital information, speech communication skills, etc.), allowing them to perform certain labor operations more successfully than men, as well as be more successful in some areas of business (Markova 2003). If we talk about digital competencies, which are currently becoming particularly relevant due to changes in all production and management processes in all areas of activity (Masyuk and Pankova 2019, then the leader must make every effort to master them, thereby demonstrating compliance with the requirements of the time and gaining additional authority among subordinates.

Method and Methodology

The development of methodological foundations of socio-psychological practices for constructing new harmonious types of relationships in groups is impossible without taking into account both priority values, attitudes, norms, role-based behavior of employees, and psychological characteristics of interpersonal relationships. In the course of the study, a set of methods was used: questionnaires (the “Business Portrait” methodology), testing, sociometry, observation, standardized interviews, as well as economic and statistical methods.

For three decades, Ivanovo State University (Russia) conducted research on socio-perceptual processes in management on the basis of collectives of enterprises of various forms of ownership. At the first stage (1988–2010), the ways of increasing labor efficiency in mixed groups were studied, the psychological resources of managerial interaction were analyzed (Gitelmacher 1992; Ptitsyna and Nikiforova 2001; Nazarov 2006; Nazarov and Nikiforova 2006: Nikiforova 2008). At the second stage (2011–2018), the specifics of the psychology of relations between employees of mixed teams were revealed. During this period, there was an increase in the interest of the organizers of production activities in studying the characteristics of interpersonal relations and leadership (Pantyushina, Nazarov 2016).

It was found that recently, the formation of a team aimed at the effective implementation of production tasks has become increasingly important for managers. The social life of any individual begins with its formation as part of a collective subject, while remaining an individual carrier of the relations of this subject. If a person, for various reasons, is opposed to his social environment, then he remains alone. A similar conditioning of psychological processes is also characteristic of production teams (Sushkov 2008; Ulich 2001; Mattan, Kubota and Cloutier 2017). When studying the structure

of leadership images, we proceeded from the metacognitive orientation of the perception process (Jussim 2014; Bach and Schenke 2017; Nazarov et ol 2019; Karpov 2018).

Results

The socially perceptual process in management is a multifactorial, hierarchically organized process, determined by objective and subjective determinants. An important parameter is the attitude to the immediate supervisor, which is formed as a result of the influence of various information flows on the perception of a subordinate. In the course of the study, a number of the most significant qualities of managers for respondents were identified (Table 1).

Table 1: Significant personality traits of supervisors in subordinate's assessments (generalized indicators, samples of the 80s, 90s, 2000s)

Parameter (max=10 points) M±m по годам	80s N_1=323	90s N_2=372	2014-2016s N_3=212
P n_1	6,8±0,40	7,6±0,34	8,8±0,07
M n_2	6,7±0,30	6,4±0,32	6,71±0,13
B n_3	5,1±0,12	5,6±0,23	7,9±0,06
Significance of Differences p≤0,05	P_{1-3}<0,019 P_{2-3}<0,06	P_{1-3}<0,013 P_{2-3}<0,04	P_{1-3}<0,08 P_{2-3}<0,018

where - N is the number of respondents in the sample;

- p - significance of differences;
- 80s , 90s; 2014-2016 - observation time intervals;
- P - an integral indicator of the performance of the supervisor in the interests of the organization;
- M - an integral indicator of the performance of the supervisor in the direction of supporting the interests of employees;

B - other characteristics of the personality of the supervisor.

A study of the structure of perceptual images of the supervisors of product segments and the recreation of the image of supervisors among respondents (both men and women) revealed two functional parts: the core of the image (stable) and the peripheral (variable part). According to the data obtained, the identity of perception in the male and female parts of the core sample of the perceptual image of the leader is established. At the same time, discrepancies in the structure of the elements of the peripheral part of the image of the leader were revealed. The peripheral part of the manager's image has a variable dynamic structure that is sensitive to external changes (transformation of the socio-economic situation, change of ownership of a manufacturing enterprise, etc.). The ambiguous interpretation of the problems of gender socialization is the subject of discussion by researchers of the socio-perceptual process in management (Pantyushina 2016; Ptitsina, Nikiforova 2001).

Discussion

Most researchers come to the conclusion that the image of a leader is constructed by employees on the basis of his perception as a representative of a certain social group, and the psychological characteristics of the leader's personality are less important. Nevertheless, for many employees, an important quality of a leader is the ability to make informed management decisions and resolve conflict situations. In the case when an optimal solution does not exist or cannot be accepted for one reason or another, we propose the use of a conflict-compromise methodology described in detail in a number of works (Macyuk 2016, 2018), the main element of which is a local compromise that allows

us to accept a quasi-optimal solution and reduce the tension of the situation. This methodology works especially well in resolving financial conflicts (Bushueva, Korovin and Masyuk 2013).

Conclusion

Social perception as a process has a dynamic nature of development, the variability of the structure of the main result (employee's attitude to the leader). A study of the social practice of the functioning of production teams indicates the presence of identity perception of the core of the image of the leader of both male employees and female employees. Differences are revealed in the perception of the peripheral part of the image of the leader. To a greater extent, these features were manifested in the changing forms of ownership of enterprises (for example, state to private). The dynamics of socio-economic transformations have a significant impact on the psychology of interpersonal relationships of participants in production activities. According to the data obtained, one of the conditions for increasing the effectiveness of the leader is to take into account information about the psychological characteristics of the relationship of the subordinate to the leader. Long-term observations show that during the formation of an effective team in the management process, more attention should be paid to studying the characteristics of the perception of functional-business and individual-personality characteristics of both the manager and employees. The discrepancies in the structure of the elements of the peripheral part of the manager's image in men and women made it possible to assume that the individual-personal picture of the subordinate's perception of the leader's image requires further in-depth analysis. In this regard, the attention of researchers should be focused on the further study of the characteristics of the psychological response of employees of mixed teams to changes in industrial relations.

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Temptation Goods Consumption: Is There Moral Hazard in the Provision of Household Microcredit in Indonesia?

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Abstract

Microcredit has become a significant element in development strategies (Islam 2015), but microcredit has not always had a positive impact on the welfare of the borrowers. In many cases the recipients do not use the loans in accordance with the designation. One example of inappropriate use of microcredit loans is in the form of consumption of temptation goods. Using data from Indonesia Family Live Surveys 5 (IFLS 5) in 2014, this study aims to analyze the impact of microcredit loans on households' temptation goods expenditure. Using linear regressions and propensity score matching (PSM), our empirical results show that there were differences in expenditure on temptation goods between recipients and non-recipients of microcredit. Microcredit recipients' weekly real expenditure on temptation goods is around 39,000 rupiahs (3 US dollar) higher compared to non-recipients, or equivalent to around 2 million rupiahs (146 US dollar) a year. Despite the impact on real expenditure, we found no evidence that microcredit affects the proportion of expenditure on temptation goods with respect to total household expenditure. In addition, the proportion of expenditure on temptation goods is decreasing with a higher degree of risk aversion.

Keywords*:* Microcredit, Temptation Goods, Risk Preference

JEL classification: G21, O12, D01

Introduction

Microfinance has become a significant element of development strategies in various developing countries (Islam 2015). The assumption used is very simple, providing the community with access to credit will increase their income, open an entrepreneurial spirit, strengthen development through business improvement and ultimately reduce poverty (Ledgerwood and White 2006). However, several studies show that microcredit has not always had a positive impact on the welfare of the borrowers (Bylander 2015; Jahiruddin et al. 2011; Wickramasinghe and Fernando 2017; Zeballos, Cassar and Wydick 2014). One of the causes is due to the occurrence of what is called *moral hazard*, a situation in which the microcredit obtained is not used in accordance with its designation (Presbitero and Rabellotti 2014).

People often think of microcredit as an instant income and use it as a tool for consumption smoothing instead of using them for productive activities that can generate income (Bylander 2015; Zeller 1999). Karlan and Zinman (2008) found that 50% of borrowers lied about their credit usage activities. Microcredit customers do report their business investment activities, but they do not report the use of credit loans (Karlan and Zinman 2011).

In addition to basic needs, households also spend a lot of their money on temptation goods. The term temptation goods refer to goods that only provide satisfaction when consumed but make the consumer regret purchasing them in the future (Banerjee and Mullainathan 2010). Items included in the category of temptation goods include alcohol, cigarettes, betel, candies, chocolate, soft drinks, processed food both consumed inside and outside the house, sweepstakes, entertainment, and festival (Banerjee et al. 2015; Banerjee and Duflo 2007; Dasso and Fernandez 2013).

Banerjee and Mullainathan (2010) stated that consumption of temptation goods could cause poverty trap. In microcredit borrowing households, consuming temptation goods can cause a debt trap. Increased expenditure on temptation goods means sacrificing the expenditure allocations for more productive goods, or durable goods, which will have an impact on businesses owned by the households (Banerjee et al. 2015). In addition, overborrowing and overconsuming behaviour can also cause borrowers to experience a debt trap (Nakajima 2012).

Several studies have been conducted previously to investigate the impact of microcredit or cash transfers on the consumption of temptation goods. Banerjee et al (2015) found that when household received microcredit loans, they would divert temptation goods expenditure to durable goods. This means that consumption of temptation goods will decrease as the size of credit increases. Meanwhile, Dasso and Fernandez (2013) found that households receiving cash transfers increase their food consumption by 10% to 20%. The increase is driven by the consumption of candy, chocolate, soft drinks, and going to meals at restaurants.

Other factors that may influence credit usage and consumption behaviour are time and risk preferences (Ferecatu and Önçüler, 2016; Start, 2013). (Stiglitz and Weiss 1981) implies that risky borrowers invest more on risky investment which reduces consumptions. Also, many people are impatient in spending the money, so they ignore their long-term consumption plans. As a result, they are tempted to spend money on goods that satisfy them now but not in the future (Laibson 2011; O'Donoghue and Rabin 1999), or what are referred to as temptation goods.

This study was conducted to analyze the effect of microcredit on household temptation goods expenditure. In addition to the previous studies, we also explored whether the effect was influenced by risk and time preferences of the head of the households. Using survey data from Indonesia, we found that households who received loans spent round 39,000 rupiahs higher in real temptation goods expenditure compared to non-recipients, indicating *moral hazard* problem in the provision of microcredit. However, there is no statistically significant differences in the proportion of household expenditures on temptation goods between microcredit recipients and non-recipients. It implies that while receiving loans leads to higher household expenditures in temptation goods; the change is not more than proportional to the change in total household expenditures. We also found that the proportion of temptation goods expenditures is 2.3% lower for households with more risk-averse household head.

Our paper proceeds as follows. Section 2 contains a literature review. Section 3 describes our data and model and discusses the expected effects of microcredit on temptation goods expenditure. Section 4 presents the estimation results. The final section provides a conclusion.

Literature Review

Microcredit and Consumption of Temptation Goods

Zeller (1999) explains that the presence of microfinance institutions influences household consumption through two components. The first component is income that is expected to be obtained by the households using human, physical and social capital (ex-ante or permanent income). Access to financial institutions can be used to increase the capital owned by the households, which in fact can increase the value of household income. The second component is income that is generated from ex-post income by households, namely the existing income after the results of agricultural and non-agricultural businesses and from labour costs, are realized. If the ex-ante income turns out to be lower

than the minimum level of disposable income needed to meet food and other basic needs, then the household will conduct ex-post activities to generate additional income.

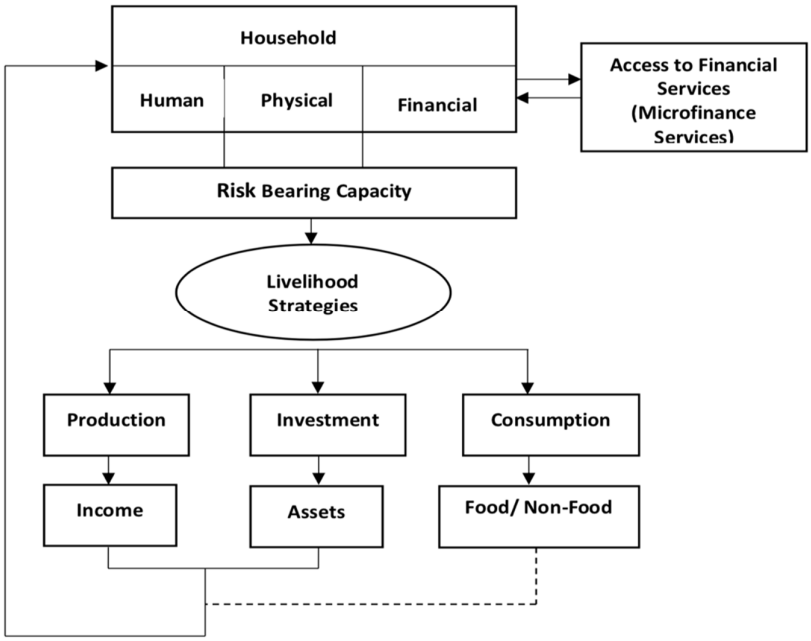

Figure 1: Microcredit and Consumption Smoothing

Source: (Zeller 1999) and (AIMS 2001)

Figure 1 shows alternative strategies that can be done by households when getting microcredit loans. With the available resources (human capital, physical capital and financial capital) and the ability to overcome risks, households can use credit loans for production, investment, and consumption activities. Production is income-generating activities, such as buying business raw materials and paying employee salaries. Investment activities are activities carried out to increase household resources and assets. This includes buying production machinery, investing in shares and buying properties such as land and buildings.

Unlike the two previous activities, consumption is an activity that does not directly generate income. Consumption matters include food, entertainment, clothing, health expenses and education. If the household spends microcredit loans for consumption activities, the household has committed moral hazard, where the credit loans they receive is not used according to its purpose. However, if households use it for education and health type of consumption, in the long run this will support their productive activities, especially in increasing productivity in human capital.

This study referred to the model developed by Banerjee et al. (2015) which assumed that the borrower's household consumption consists of temptation goods (c_t) and durable goods (c_d). Borrowers decide how much households will consume each of the goods in the current period and in the future period. Their model shows that when a household borrower is patient enough, then it is assumed that the household places fewer utilities in the t period than in the t + 1 period. In this case, households tend to delay consumption of temptation goods and invest in durable goods.

In other case, households might sacrifice their consumption of temptation goods and engage in investment activity. Thus, the increase in the welfare of households that get microcredit loans comes

from the utility of increasing durable goods as the return of the investment; in the long run, this increase can be seen from the rapid investment in household businesses so that business profits increase which lead to an increase in overall consumption.

One of the main results of this model is that households with access to microcredit may sacrifice short or even medium-term consumption to get durable goods or to invest in businesses. The available investment opportunities through loans require them to reduce their consumption of temptation goods. Various empirical studies with various methods have been conducted to analyze the impact of microcredit on household consumption. One of them is Karlan et al. (2016) which tested the consumption and investment response to liquidity shock that occurs in households. The results show three findings: first, respondents reported that they used very little of the bank loans for non-business, but they reported higher amounts when asked directly by an independent surveyor. However, when given a list of questions by independent surveyors without having to disclose what they are doing with a bank loan directly, the results will be more significant. Second, even when borrowers tend to report what they think is truth, their answers were counterfactuals, as there is additional expenditure spent. Third, they estimated that the full business credit loan is allocated to business investment, specifically inventory.

Risk Preference, Time Preference, and Consumption of Temptation Goods

The expected impact of risk preference on consumption in general and consumption of temptation goods in particular is not clear. Neave (1971) proposed that risk preference does not affect how much and individual consumes or invests, the investment (and consumption) decisions is only affected by the person's preference over current and future consumption. Meanwhile, Stiglitz and Weiss (1981) theorized that an increase in interest rate encouraged risky borrowers to invest too much on risky business that leads to default and credit rationing. Zeballos et al. (2014) conducted an experimental test of a concept introduced by Stiglitz and Weiss (1981) regarding borrowers' behaviour. The results they found was surprising. They found that defaulted borrowers are more risk-averse than non-defaulted ones. They invest too little and spent the loans on for non-risky expenditures, including consumption of temptation goods.

Contrary to Zeballos et al. (2014), Ferecatu and Önçüler (2016) studied the relationship between risk preference and time preference. They found that risk-averse individuals tend to be more patient and more willing to defer consumption for other purposes, such as investment. Conversely, risk-seeking individuals are less patient and less willing to defer consumption. In addition, risk aversion is also negatively associated with cigarette smoking, heavy drinking, and the probability of being obese (Anderson and Mellor 2008).

Microcredit Provision in Indonesia

In 2013, the Government of Indonesia launched a financial institution whose mission was to empower micro-businesses in Indonesia. The institution provided microcredits and funding for small businesses as well as consultation. Since then, the government and banking sectors have provided a massive number of microcredits for micro and small business development. In June 2019, the amount of credit provided for micro and small businesses reached over 1,000 trillion rupiahs. The amount of fund provided by microcredit is around 50 million rupiahs per applicant.

Methodology

The empirical study in this research used data from Indonesia Family Live Surveys 5 (IFLS 5/Sakerti) for the 2014 period. IFLS is a longitudinal survey in the socio-economic and health sectors. The survey was conducted on a sample representing 83 percent of Indonesia's population in 13 provinces. The survey was conducted by collecting data on individuals, including families, households, the smallest communities where they live and the health and education facilities they use. We limit our study to households who own non-farm businesses.

This study used one data period and aims to capture the short-term effect of microcredit on households' expenditure on temptation goods. The model used in this study refers to the research conducted by Banerjee et al. (2015):

$$\mathrm{TG_{ij}} = \beta_0 + \beta_1 \mathrm{Credit_{ij}} + \beta_2 \mathrm{Risk_{ij}} + \beta_3 \mathrm{Time_{ij}} + \beta_4 \mathrm{Kredit_{ij}} * \mathrm{Risk_{ij}} + \beta_5 \mathrm{Kredit_{ij}} * \mathrm{Time_{ij}} + \delta \mathrm{X_{ij}} + \gamma Z_j + \varepsilon_{ij}$$

where:

$\mathrm{TG_{ij}}$	: household weekly real temptation goods expenditures; the proportion of temptation goods expenditure to total household expenditures
$\mathrm{Credit_{ij}}$	: dummy microcredit (households that have non-farm businesses and get credit loans from formal financial institutions = 1)
$\mathrm{Risk_{ij}}$	: dummy risk preference (more risk averse=1)
$\mathrm{Time_{ij}}$	: dummy time preference (more impatient=1)
$\mathrm{X_{ij}}$	: vector of household-specific controls
Z_j	: vector of regional controls
ε_{ij}	: error term

We use two measures of temptation goods consumption. The first one is the household's weekly real expenditure on temptation goods. We divided nominal expenditures on temptation goods with regional (provincial level) CPI because the price level in the regional level varies, and this might affect the money households spent on temptation goods. The second measurement is the proportion of temptation goods expenditure to total expenditure. If the proportion of expenditure on temptation goods increases, it means the proportion of expenditure on other goods such as durable decreases, which will then affect the sustainability of household businesses.

We define temptation goods consumption as consumption of alcohol, cigarette, betel, chocolate, soft drinks, prepared foods consumed outside or inside the house, lottery, and entertainment. The data is collected at the household level.

Microcredit variable is a dummy which is equal to 1 if the household had a non-farming business and got a micro-credit facility from the formal sector and 0 otherwise. We controlled for total yearly wages received by all household members, micro-profit earned by the household from their business activity, age of the household head, education of the household head, number of household members (household size), the gender of the household head, the residence area of the household, and the value of total assets owned by the household. We also include provincial-level minimum wage and island dummy to control for regional heterogeneity.

In addition, this study also included time preference and risk preference variables which may affect how microcredit affects temptation goods expenditure. Risk preference was measured using the approach used by Ng (2012). In the survey conducted by IFLS, respondents were given lotteries using five questions. In each question, the respondent was presented with two financial choices, a certain proceed and another alternative based on probability. Based on their answers, respondents were grouped into four levels of risk preference. Respondents who did not like risks most (most risk-averse) would be in the terminal box in the lower-left corner of Figure 3, which was in category 4. Conversely, the respondents who liked risk most (least risk-averse) would come out in the lower right terminal box, which was category 1. After obtaining four risk aversion respondent categories, we formed a dummy variable following Zeballos et al. (2014). Respondents who scored 4 is categorized as more risk-averse while the rests are categorized as less risk-averse.

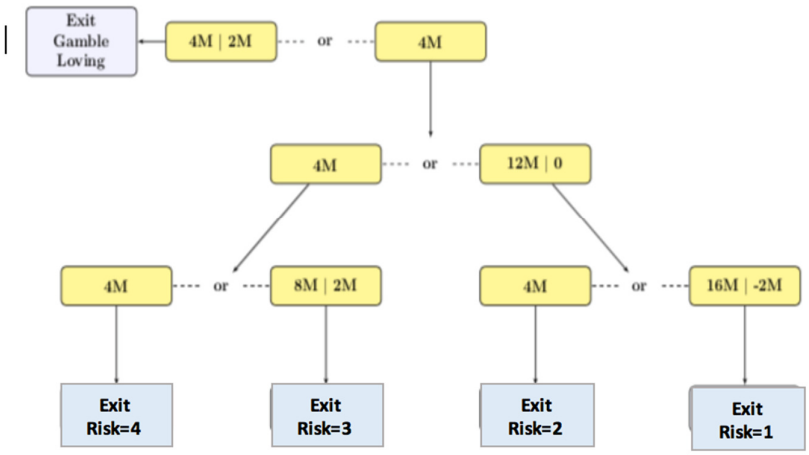

Figure 2: IFLS 5 Risk Preference Measurement Flow Chart

Source: (Ng 2012)

The time preference measurement techniques were the same as those used in risk preference measurement where after four preference categories were obtained, a dummy was then formed from that category. The time preference variable would be equal to 1 for category 4 (the more impatient) and 0 for the rest.

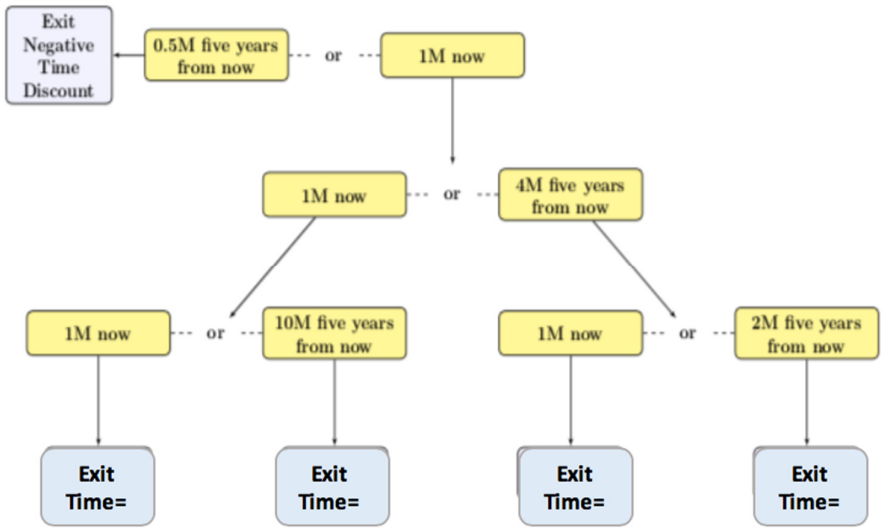

Figure 3: IFLS 5 Time Preference Measurement Flow Chart

Source: (Ng 2012)

Econometrics Issue

The model is estimated using linear regression (OLS). However, OLS estimates might be biased since we are not able to ensure the causal effect of microcredit due to selection bias. Households who received credits might fundamentally different from the ones who did not. As a consequence, the difference in consumption of temptation goods cannot be attributed solely to receiving microcredit (Caliendo and Kopeinig 2008).

To overcome this problem, we also employ propensity score matching (PSM) technique. PSM allows us to construct an artificial control group by matching each treated household with non-treated counterparts which share similar observable pre-treatment characteristics. Taking into accounts of those characteristics, then it is assumed that the difference in outcome between the treatment group and control group is due to treatment or intervention (Gertler et al. 2010). We use nearest neighbour matching with caliper to match the observations. We chose this type of matching because we have a large number of non-treated units in the study.

Results and Analysis

By using wave 5 of the Indonesia Family Life Survey (IFLS), which was conducted in 2014, this study aims to capture the short-term effect of microcredit on household temptation goods expenditure. We limit the sample to households who own non-farm business. Table 1 contains a statistical summary of the variables used in this study.

Table 1: Summary of Household Statistics

Variable	Statistics				
	Obs.	**Mean**	**Std. Dev**	**Min**	**Max**
Dependent Variables					
weekly real temptation goods expenditure (in rupiah)	2468	148,392	197,182.1	0	2,304,415
the proportion of temptation goods expenditure (%)	2468	15.665	12.295	0	75.218
Explanatory Variables					
microcredit (1= recipients)	2468	.136	.343	0	1
risk preference (1= more risk-averse)	2468	.046	.210	0	1
time preference (1= more impatient)	2468	.697	.460	0	1
yearly business profit (in ten million rupiahs)	2468	1.717	2.324	0	30
yearly household wage income (in ten million rupiahs)	2468	5.322	8.276	0	211.04
household head age	2468	43.722	12.162	17	101
household head gender (1=female)	2468	.139	.346	0	1
university (1=university education or higher)	2468	.208	.406	0	1
urban (1=urban area)	2468	.660	.474	0	1
household size	2468	5.446	2.621	1	18
total asset (in ten million rupiahs)	2468	20.620	31.261	.014	295.05

The number of samples included in the study was 2,468 households. On average, households spent 148,392 rupiahs (10.8 US dollar) per week for temptation goods. This amounted to 15.67% of the total household expenditure. There is a considerable variation in the expenditure of the temptation goods. Around 14% of the sample received microcredit. Only around 5% of them are most risk-averse, the rests are less risk-averse. Meanwhile, 70% of them are more impatient.

Table 2 presents the estimation results of the effect of microcredit on temptation goods spending. The first two columns use weekly real temptation goods expenditure as dependent variable, whereas the last two columns use the proportion of temptation goods as the dependent variable. The OLS results are shown on the first and the thir column whereas the regression after applying PSM are shown on the second and the fourth column. The results show consistent results in terms of sign and statistical significance between OLS and PSM results.

Table 2:Estimation Results of the Effects Microcredit on Temptation Goods Spending

	Dependent variable: Weekly Real Temptation Goods Expenditure (in rupiah)		**Dependent variable: Proportion of *Temptation Goods* Expenditure to Total Expenditure (%)**	
	[1] OLS	**[2] PSM**	**[3] OLS**	**[4] PSM**
microcredit (1= recipients)	38356.9**	39069.2*	1.839	2.166
	(19121.5)	(20248.9)	(1.258)	(1.345)
risk preference (1= more risk-averse)	-29578.0	-29238.6	-2.305*	-2.294*
	(19608.3)	(19320.7)	(1.290)	(1.283)
microcredit*risk preference	58988.9	83421.9	8.721***	3.788
	(43264.6)	(76547.5)	(2.846)	(5.083)
time preference (1= more impatient)	-7701.7	-7983.2	-0.157	-0.207
	(8658.0)	(8532.8)	(0.569)	(0.567)
microcredit*time preference	-10743.7	-13383.9	-0.0772	-0.297
	(22954.1)	(24379.2)	(1.510)	(1.619)
profit	13429.7***	15326.4***	0.0116	0.0960
	(1703.4)	(1846.2)	(0.112)	(0.123)
wage income	2911.0***	2808.4***	0.0571*	0.0611*
	(483.9)	(480.8)	(0.0318)	(0.0319)
household head age	-1075.0***	-1122.6***	-0.0475**	-0.0443**
	(329.0)	(326.0)	(0.0216)	(0.0217)
household head gender (1=female)	-30545.1***	-29050.0***	-2.720***	-2.600***
	(10865.7)	(10749.5)	(0.715)	(0.714)
university (1= university or higher)	28391.4***	27134.9***	-0.322	-0.331
	(9404.1)	(9429.8)	(0.619)	(0.626)
urban (urban=1)	7709.04.00	6772.00.00	-0.315	-0.279
	(8028.7)	(7984.9)	(0.528)	(0.530)
household size	-2318.3	-2250.6	-0.431***	-0.426***
	(1520.1)	(1509.9)	(0.1000)	(0.100)
total asset	1088.0***	1112.1***	-0.0229***	-0.0274***
	(129.5)	(130.1)	(0.00852)	(0.00864)
constant	7603.07.00	54770.9*	9.318***	11.57***
	(30317.4)	(28232.5)	(1.994)	(1.875)
N	2468	2417	2468	2417
Adjusted R-squared	0.153	0.152	0.058	0.054
F statistics	25.77	25.15.00	9.381	8.652

Standard errors are in parentheses. We include controls for regional minimum wage and island dummy to take into account regional heterogeneity in all specifications, * p<0.10, ** p<0.05, *** p<0.010

The results show that microcredit recipients' weekly real expenditure on temptation goods is around 39,000 rupiahs (3 US dollar) higher compared to non-recipients, or equivalent to around 2 million rupiahs (146 US dollar) a year. The results are contradictory to the research by Banerjee et al. (2015) who found that temptation goods expenditure in households receiving credit loans would decrease in line with the increase in durable goods expenditure. However, it is in line with the results of Dasso and Fernandez (2013) study which found that when having cash, households tended to consume temptation goods such as chocolate, soft drinks and food purchased at restaurants. If this happens, then there is a *moral hazard*, a situation where the household does not use microcredit they got for business purposes but for household consumption activities, or in this case temptation goods.

One possible explanation which drives the difference in our results might be because the findings of Banerjee et al. (2015) were obtained from household respondents who borrowed a large size of loans for a relatively long period of time, while the results of this study were obtained from data with shorter time periods. The results of this study indicate that in the short-term households are suspected of using microcredit loans as consumption smoothing, especially consumption on temptation goods.

Another possible explanation, the goods included as temptation goods are different in a number of studies, which might drive different results. Evans and Popova (2014) investigated the effect of cash transfer on alcohol and cigarette consumption, type of consumption goods that not only our future self has no care for but also detrimental and might lower utility in the future. They found a negative association in most cases and no association in other cases of cash transfer and expenditures on alcohol and cigarette. Banerjee et al. (2015) directly asked respondents of the type of goods they considered as temptation goods pre-treatment, whereas we used secondary survey data and had no information on the goods respondents consider as temptation goods. Consequently, some goods we use for construction might derive positive utility to respondents' future self and are not considered inferior after they receive credit.

However, when we instead used the proportion of temptation goods expenditure to total expenditure as the dependent variable, we found no significant impact of microcredit on the proportion of temptation goods expenditure to total expenditure irrespective of econometrics method being used. Thus, although microcredit encourages loan recipients to spend more on temptation goods, the increase in spending is still lower than the increase in total expenditure.

Based on the results time preference has no impact on temptation goods expenditures. Nevertheless, households with more risk-averse head tend to have a lower proportion of expenditures in temptation goods. The proportion of temptation goods expenditure is around 2.3% smaller for risk-averse households. OLS estimates on column three suggest that risk aversion affects how microcredit is impacting proportion of expenditures in temptation goods, however the effect is not significant once we use PSM to overcome selection bias. This is in line with research by Anderson and Mellor (2008) and Ferecatu and Öençüler (2016) which found that risk-averse borrowers tend to defer consumption and are negatively associated with cigarette smoking and alcohol drinking which are some examples of temptation goods.

In addition, we found that profit, wage income, university education and total asset are positively associated with household real temptation goods expenditure. However, the household's business profit does not affect the proportion of temptation goods expenditure. Total asset is negatively associated with the proportion of temptation goods expenditure.

Female and older household heads spent less on temptation goods, not only that, but they also tend to have a smaller proportion of expenditure dedicated to temptation goods. Households that have more household members also tend to have lower proportion of temptation goods expenditure.

Conclusions

Giving microcredit has become a major element of development strategies in various developing countries (Islam 2015). However, there is evidence that microcredit obtained is not always used in

accordance with its designation (Presbitero and Rabellotti 2014), creating a *moral hazard* in microcredit provision. One of those unintended use of microcredit is for temptation goods consumption, goods that only provide satisfaction when consumed but make the consumer regret purchasing them in the future such as alcohol, cigarettes, betel, candies, chocolate, soft drinks, processed food both consumed inside and outside the house, sweepstakes, entertainment, and festival (Banerjee and Mullainathan 2010).

Previous theoretical and empirical studies suggest that microcredit provision will decrease consumption of temptation goods since the goods become inferior and households shifted their consumption to durable goods (Banerjee et al. 2015; Evans and Popova 2014). However, Dasso and Fernandez (2013) found that chocolate, soft drinks and food purchased at restaurants increase with cash transfer.

Using data from Indonesia, we found that microcredit recipients' weekly real expenditure on temptation goods is around 39,000 rupiahs (3 US dollar) higher compared to non-recipients, or equivalent to around 2 million rupiahs (146 US dollar) a year. However, when we instead used the proportion of temptation goods expenditure to total expenditure as the dependent variable, we found no significant impact of microcredit on the proportion of temptation goods expenditure to total expenditure irrespective of econometrics method being used. Thus, although microcredit encourages loan recipients to spend more on temptation goods, the increase in spending is still lower than the increase in total expenditure. Also, households with more risk-averse head tend to have a lower proportion of expenditures in temptation goods.

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The Impact of Innovative Companies Finance on The Innovative Development of The Regions

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Abstract

Today the most important part of the nations' strategy for innovative development is the elaboration of financing mechanisms for innovative activities. The research tests the hypothesis on the impact of financial performance of innovative companies and the spatial distribution of innovation capital across Russian regions on the effective innovative activity development and presents some elements of the authors' methodology for assessing the amount of innovation capital invested by innovative companies as well as the rate of regions' spatial development. The financial indicators influencing the income of Russian innovative companies are studied based on their financial status analysis; the determinants conditioning the growth of innovative activity within the framework of regional innovation systems, the identification of barriers to innovative capital spillover and the measures for overcoming them in order to develop innovative activities are analyzed. Using the methods of correlation-regression, comparative and graphical analysis, it is analyzed to what extent the individual financial indicators of financing innovative companies influence the final results of the innovative companies' activities. The study reveals a high degree of differentiation in the financial indicators of regional innovative companies and the uneven distribution of innovation capital across the regions of Russia, which inhibits the effective spillover of innovation capital, transfer, diffusion and implementation of innovations. In conclusion, the potential regional centers for innovation capital concentration and areas of developing sources of innovative activity financing are identified.

Keywords: financing of innovative activity, structure of sources of financing, innovative enterprises, regional economy, spillover of innovation capital.

Introduction

At the current stage of the advanced economies development, innovations are the most important factor in maintaining the competitive advantages of companies and countries; which is why in public policy of all countries of the world the attention is focused on the development of sources of innovative activities financing (OECD, 2000). The success of innovation, as one of the main requirements for the growth of economic efficiency, is largely determined by the forms of its organization, by the ways of financial support (Davidson, Mariev & Pushkarev, 2018).

International studies demonstrate that the contribution of innovation to GDP growth can reach 50-75% (Rodríguez-Pose, Crescenzi, 2008; García-Manjón, Romero-Merino, 2012). Today the most important part of the nations' strategy of innovative development is the elaboration of financing

mechanisms for innovative activities (Coad, Rao, 2008), (Broekel, Brenner, 2011). In economically developed countries, the public share in these expenditures is on average 25-35% (Firsova, Novoselova & Vavilina, 2018). The remaining funds are provided by the private sector.

In Russia, the opposite trend in the structure of innovation financing sources is observed; the share of budgetary funds continues to increase from 60% in 1995 to 67% in 2017, demonstrating a structural imbalance between innovation financing sources, a high share of the public sector, insufficient development of the venture capital market, and angel and private investments, lack of owner's equity of enterprises to be invested in innovation, poor development of long-term investment instruments in the stock market as a source of financing innovative projects, and most importantly, the lack of incentives to invest private capital in innovation due to high internal innovation risks and the presence of other areas for more favorable capital allocation (Firsova, 2017).

Quantitative indicators of innovation financing reflect the level of country's economic development. One of the relevant research in this area is the problem of finding the determinants of innovative and economic growth, analyzing the structure of innovations financing in the Russian regions, the search for a correlation between the amount of funds and the effectiveness of the innovative development in the region.

The study tested the hypothesis about the impact of financial performance of innovative companies and the spatial distribution of innovation capital across Russian regions on the effective innovative development.

The research objective is to examine financial indicators influencing the income of Russian innovative companies based on their financial status analysis, to analyze the determinants conditioning the growth of innovative activity within the framework of regional innovation systems, to identify the barriers to innovative capital spillover and to find method of overcoming them.
The article also presents elements of the author's methodology for assessing the amount of innovation capital invested by innovative companies as well as the rate of spatial development of regions.

To solve these problems, the following research steps were taken:

- defining the research object, which is innovative companies and organizations, determining indicators of financing sources for innovative companies, aggregating their financial statements by regions, and analyzing the development indicators of innovative companies by region;
- cleaning the set of regions from abnormal entities, grouping by key indicators and clustering entities for research into the groups of regions;
- analyzing a set of financial indicators-factors that affect the results of the studied companies determination, correlation coefficients within the groups and assessing the parameters of intra-group regressions;
- modeling and forecasting analysis results for maximum and minimum values of indicators;
- identifying Russian regions with a high potential for concentration of capital and innovations financing in terms of innovation capital amount based on a center-peripheral approach;
- making conclusions on the development trends of innovation financing processes and developing recommendations for overcoming capital spillover restrictions and for the development of innovative activity financing factors in the regional context based on the analysis.

Methods and data

Every country has its own macroeconomic statistical indicators for assessing the effectiveness of the innovation system resources. However, at the micro level, assessing the status and structure of innovative companies financing is difficult due to the lack of primary data in the statistics registers. The awareness of this problem leads us to the idea to analyze the information on the financial and economic activities of innovative enterprises, which are in the accounting statements.

Of all the actors in the national and regional innovation systems, of the many independent entities of the innovation process that implement their individual stages we selected for analysis the most basic level, where the success in innovation process depends on its activity and which reacts most flexibly to changes in the market environment - to innovative companies.

The research object is the financial indicators of the capital structure for innovative companies that carry out research and development, which include innovatively active enterprises engaged in the development and implementation of new products, technological processes or other types of innovative activities. To assess the current state of innovation financing and analyze the sources and structure of financing innovative enterprises by Russian regions, we used a database in which we collected official financial statements of 4,032 innovative organizations and enterprises for 2016 (the latest available data at the time of the study) in 85 regions of Russia (Firsova, 2019), (Federal Taxation Service, 2019).

We analyzed accounting financial statements (balance sheet and statement of financial performance) of each individual enterprise, then they were aggregated by region, calculated; then we evaluated the main financial indicators of innovative companies — the structure of assets and liabilities as sources of companies financing. Based on this data, we carried out a comparative analysis of the financing sources structure of innovative enterprises in the Russian regions.

To develop a statistical model for analyzing the outcomes of innovation at the regional level, the following base of indicators was formed. The indicator of gross proceeds from the goods sale of innovative companies was chosen as the dependent variable: the key indicator of the volume and scale of the company's activity and the result of its innovative activity, by analogy with the region's gross regional product or the country's GDP. The main indicators of composition and structure of assets and liabilities, without taking into account the interdependence of indicators, were chosen as the independent variables (Table 1).

Table 1: Indicators of innovative companies financing

Variable	Indicators, mln rubles
Y	Sales proceeds (goods, operations, services)
X1	Non-current assets
X2	Fixed assets
X3	Current assets
X4	Equity
X5	Long-term liabilities
X6	Short-term liabilities

The dynamics of the number of innovative companies over 22 years is presented in fig. 1-2. The rate of innovative development in the Russian Federation varies across regions depending on the level of productive forces development, natural and geographical conditions, historical and socio-economic development and territorial distribution of industries and science; therefore, there is a high differentiation and polarization in their number across Russian regions, which is reflected in the regional specifics of innovative enterprises financing (Rosstat, 2019; Ministry of Education and Science, 2019). These factors inhibit the spillover of innovation capital and innovative evolution.

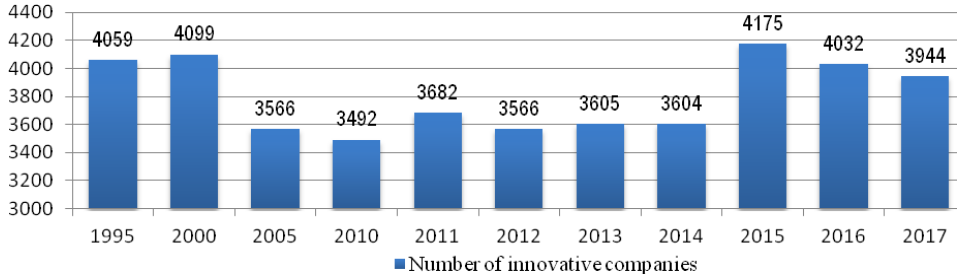

Fig. 1: Dynamics of the number of innovative companies, 2005-2017

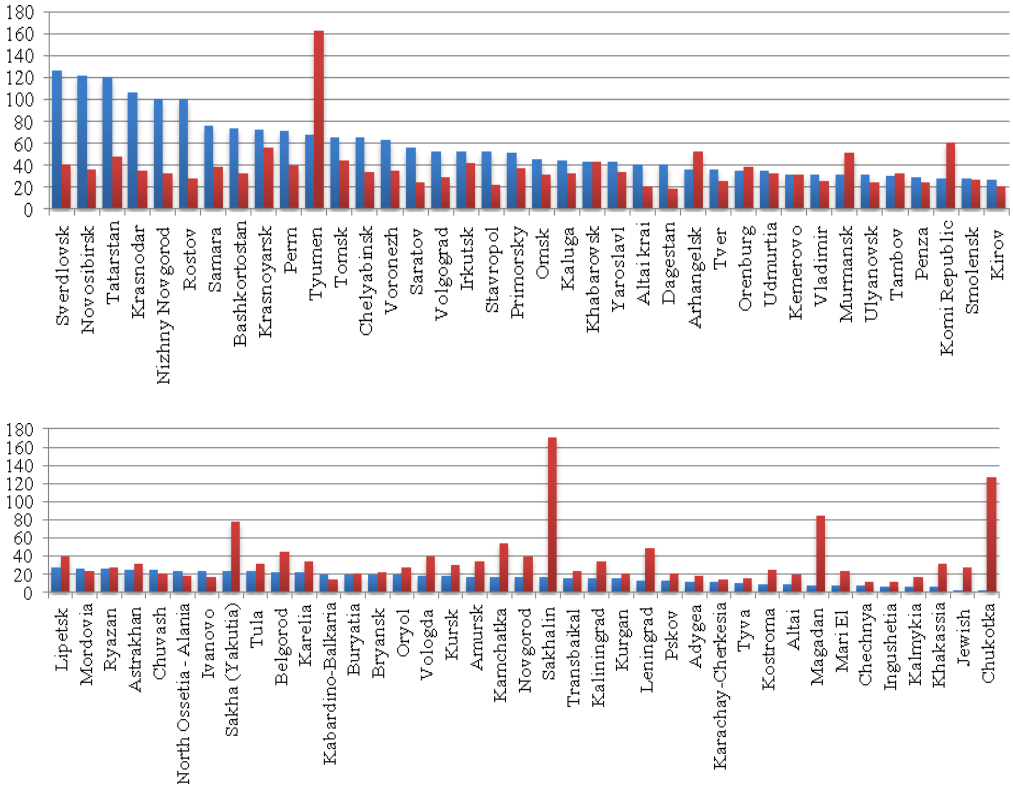

Fig. 2: The number of innovative companies in Russia in comparison with GRP per 10,000 people by Russian regions, 2017

In the set of regions under examination there are some companies that are obviously in better conditions, which means that they receive a larger (relative to other regions) number of innovative products. Such entities are considered “abnormal outliers”; they were excluded from the analyzed sample.

Bringing the original set to a homogeneous form is a separate statistical task. As part of the study, the entities with the largest and smallest values were “cut off”; for this, the lower and upper percentiles were calculated using the effective variable. Thus, the lower 5% percentile equals 13,521 million rubles, and the upper 95% percentile - 49,588,241 million rubles.

Out of 85 regions, 72 regions were selected for further analysis; indicators of innovative companies in Moscow, St. Petersburg, the Moscow regions, Samara regions, and small-sized regions such as

Mari El, Khakassia and others were excluded from the analysis due to incomparably polarized indicators of these regions or lack of statistical data.

Then, to highlight the most homogeneous groups, a cluster analysis was carried out using the Ward's method, the result of which is a structural diagram - a dendrogram shown in fig. 3.

The grouping of regions of the Russian Federation by indicators of the innovative companies' financial status allowed us to distinguish two groups of regions - underdeveloped and leading regions:

- the regions included in the first group have lower values of financing indicators of innovative companies (54 regions): Altai, Amur, Arkhangelsk, Astrakhan, Adygea, Altai Republic, Belgorod, Bryansk, Buryatia, Volgograd, Vologda, Dagestan, Zabaykalsky, Ivanovo, Irkutsk, Kabardino-Balkaria, Kaliningrad, Karachay-Cherkessia, Kemerovo, Kirov, Kostroma, Kurgan, Kursk, Lipetsk, Magadan, Mari El, Murmansk, Novgorod, Omsk, Orenburg, Oryol, Primorsky Krai, Pskov, Kalmyk, Karelia, Komi, Crimea, Mordovia, Sakha (Yakutia), North Ossetia-Alania, Ryazan, Saratov, Sakhalin, Sevastopol, Smolensk, Stavropol, Tambov, Tver, Tyumen, Udmurtia, Khabarovsk, Chechnya, Chuvash, Yaroslavl regions.

- regions leading in innovative development, which are included in the second group, have the maximum values of the indicators (18 regions): Vladimir, Voronezh, Kaluga, Krasnodar, Krasnoyarsk, Leningrad, Nizhny Novgorod, Novosibirsk, Penza, Perm, Bashkortostan, Tatarstan, Rostov, Sverdlovsk, Tomsk, Tula, Ulyanovsk, Chelyabinsk regions.

Fig. 4 presents a map of regions demonstrating the spatial distribution of two groups of regions according to the level of financing progress of innovative companies.

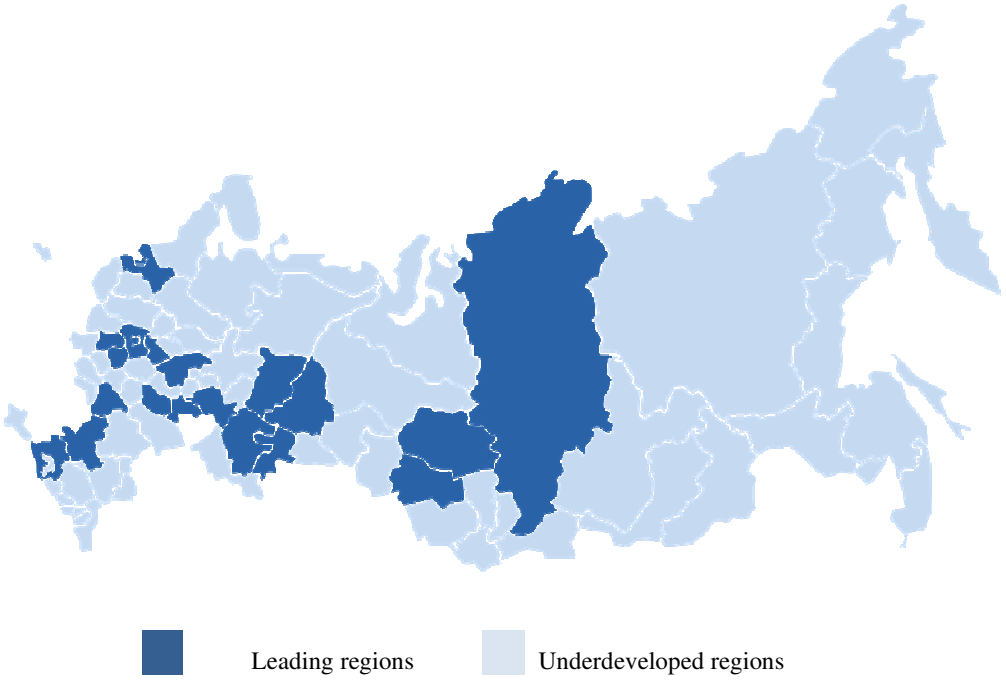

Fig.3: Diagrammatic map: two types of regions

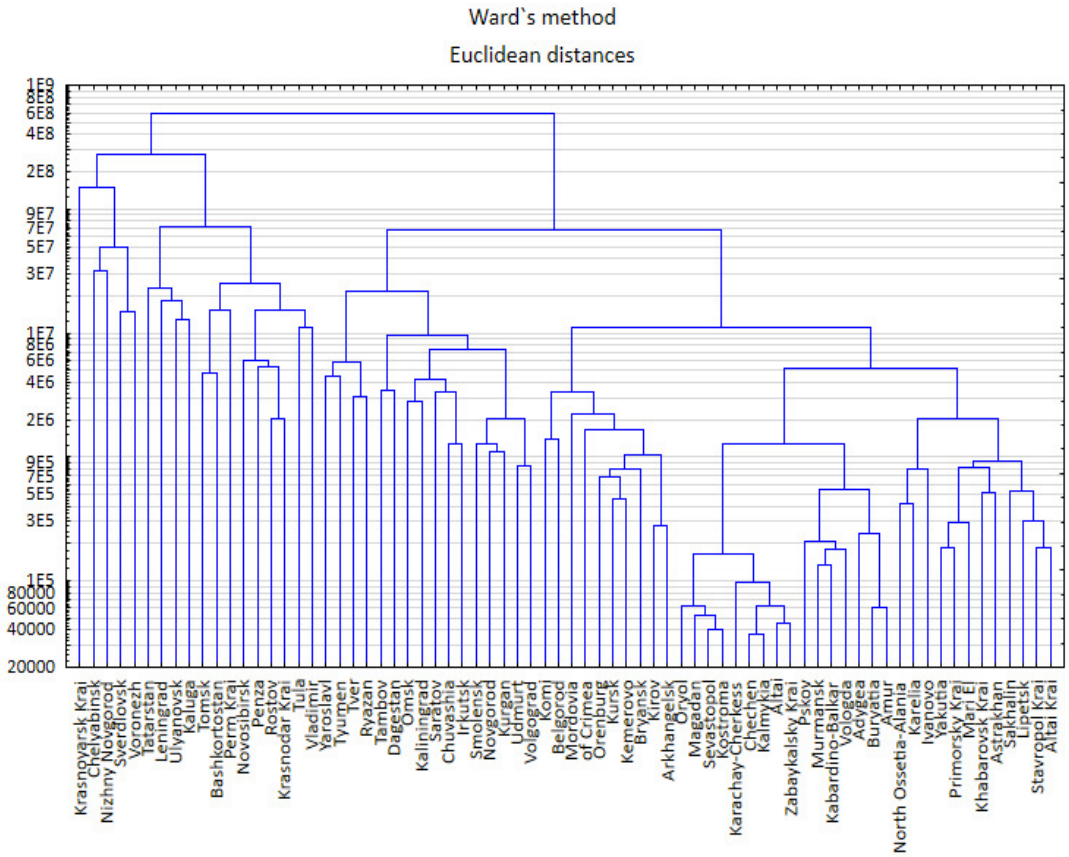

Fig. 4: Dendrogram is a tree-like hierarchical clustering of Russian regions by indicators characterizing the financial status of regional innovative companies

To assess the quality of regions grouping and the differentiation in intra-group mean values, the Student t-test was analyzed (Table 2).

Table 2: The actual values of t-student's test

Indicators	Mean values		Student's t-statistics	Significance level of p-values
	Underdeveloped regions	Leading regions		
Y	1468715	16858627	-12.15	0.00
X1	579122	12786212	-9.73	0.00
X2	394058	8012852	-8.43	0.00
X3	1222327	26271354	-6.94	0.00
X4	858221	14923235	-11.25	0.00
X5	119384	2788114	-7.51	0.00
X6	824215	21337383	-5.81	0.00

The criterion values presented in Table 2 indicate that the whole complex of indicators differ (the p-value exceeds 0.05) therefore, the division of the original set regions into two groups can be considered acceptable.

Results

Further on, during testing the impact of various factors - indicators of innovative companies financing using the methods of correlation and regression analysis, we analyzed the influence of individual financial indicators on the final performance of the innovative companies. The values of the correlation coefficients obtained in the course of the modeling for each group are presented in Table 3.

Table 3: The results of the correlation coefficients assessment for two groups of regions

Groups of regions	Indicators	Y	X1	X2	X3	X4	X5	X6
Underdeveloped regions	Y	1.00						
	X1	0.64	1.00					
	X2	0.58	0.92	1.00				
	X3	0.92	0.64	0.58	1.00			
	X4	0.77	0.86	0.77	0.81	1.00		
	X5	0.38	0.37	0.34	0.54	0.48	1.00	
	X6	0.84	0.60	0.56	0.87	0.57	0.30	1.00
Leading regions	Y	1.00						
	X1	0.53	1.00					
	X2	0.44	0.77	1.00				
	X3	0.46	0.70	0.20	1.00			
	X4	0.61	0.93	0.73	0.73	1.00		
	X5	0.44	0.47	0.25	0.23	0.32	1.00	
	X6	0.40	0.70	0.20	0.99	0.69	0.19	1.00

In each of the two groups of regions, there are a different set of factors-determinants that affect the sale proceeds generated by innovative products:

- in the first group of underdeveloped regions, the determining factors are X1 (non-current assets), X3 (current assets), X4 (equity), X6 (short-term liabilities);
- in the second group of leading regions, the decisive factors are X1 (non-current assets), X4 (equity).

But the joint application of the selected factors in the models is excluded due to the presence of multicollenarity, therefore, two pairs of linear models were compiled, while the variable having the highest effect on the resulting revenues was included in the regression equation (table 4).

Table 4: The results of the assessing regression equations for two groups of regions of Russia

Group	Model	Fisher's F-statistics	R^2
Underdeveloped regions	Y' = 171147.78 + 1.06X3	274.64	0.84
Leading regions	Y' = 7894228.43 + 0.06X4	9.69	0.38
Note: calculated by the authors in the STATISTICA package; model parameters are statistically significant at 5% level			

The results were interpreted and transferred into percentage using the following formula:

$$\theta_j = a_j \frac{\bar{x}_j}{\bar{y}} \quad (1)$$

a_j – parameters (coefficients) of the regression equation.

$\bar{x}_j$ average value of the j-factor (independent variable).

$\bar{y}$ –average value of the j-factor (dependent variable).

The coefficients in the first model of underdeveloped regions allow us to conclude (1), that with an increase in current assets (X3) by 1 million rubles sale proceeds from innovative enterprises increase by 1.06 million rubles:

θ_1 – 1.06*(1222327/1468715) = 0.88

Thus, an increase in X3 (current assets) by 1% in the first model leads to an increase in product sales by 0.88%.
According to the second model, in the leading regions, the increase in X4 equity by 1 million rubles leads to an increase in product sale proceeds by 0.6 million rubles (1):

θ_2 = 0.60*(14923235/16858627) = 0.53

Thus, with an increase by 1% in the variable X4 (equity) in the second group of leading regions, it will lead to an increase in the dependent variable by 0.53%.
Since the obtained models are statistically significant, situational modeling was carried out on their basis.
As the expected values of factor variables we use the actual values for the city of Moscow, where the highest values were registered, and the Republic of Tuva with the smallest value of the variable X3 (current assets) = 8 million rubles, and the Republic of Ingushetia with the minimum value of the variable X4 (equity) = -1082 million rubles.
Thus, the capabilities of the Russian regions of each selected groups were modeled and evaluated, provided that the values of the dominant factors were brought to extreme values (table 5).

Table 5: The results of situational modeling based on regression equations for two groups of the Russian territorial entity

Indicators	Underdeveloped regions		Leading regions	
	maximum	minimum	maximum	minimum
Factor score	1 089 270 621	8	592 675 387	-1 082
Point prediction of variable Y	1 156 491 906	171 156	363 914 771	7 893 578
Lower confidence bound	1 016 637 099	-90 580	127 572 663	813 551
Upper confidence bound	1 296 346 713	432 892	600 256 879	14 973 606
Note: calculated by the authors in the STATISTICA package				

According to the modeling results shown in Table 5, the greatest success in innovative development could be achieved in the first group of regions, bringing current assets to the level of the flagship Moscow region. In general, the growth of current assets in underdeveloped regions can be achieved by using and expanding lending tools and increasing innovative companies financing. The growth of equity in the leading regions can be increased through direct and indirect support for innovation.

Discussion

The results can be interpreted in two aspects. Firstly, one of the most important outcomes of our research should be emphasized: the structure of the liabilities of innovative companies has insufficient long-term sources of financing for innovative enterprises while in some regions they do not have them at all. Long-term loans are one of the sources of long-term investment projects; their absence implies the lack of investment for innovative projects, the damping of innovative activity and a decrease in all indicators of innovative development.

The problems of underfunding are also exacerbated by the spatial uneven distribution of innovation capital in the regions of the country.

The effectiveness of national innovation systems in any country is evaluated from the position of its ability to form and maintain the favorable environment for innovation for the full application of all available resources, create innovations and diffuse them on a large scale, providing a new quality of the country's economic growth (Firsova, Makarova, 2017; Pittaway, Robertson, Munir, Denyer & Neely, 2003).

For Russia, as well as for many large countries, the problem of analyzing the uneven distribution of resources and the quality of innovative growth in the effectiveness of innovation in the regions and developing a policy for its development is of great urgency.

The spatial features of Russia explained by its vast territories and existing distribution of industries and science, accordingly, innovation generation centers, determine the specifics of the innovations diffusion processes and innovative spillover effects.

The uneven spatial distribution of fixed assets, production resources, and human capital leads to spatial heterogeneity of regional development negatively affecting innovation processes (Krugman, 1991; Spielkamp, Vopel, 1998; Audretsch, 1998).
The financial resources of innovative companies (along with the resources of other scientific and academic organizations) are the predominantly important (i.e. the largest) part of the country's innovative capital, which significantly affects the intensity of innovative processes in the regions. The uneven distribution and the efficiency of spillover between regional innovation systems are an important determinant of effective innovation processes and significantly affect the transfer, diffusion and implementation of innovations.

The spatial remoteness of the leading regions and the “disconnection” of the channels for innovations and capital spillover hinder the innovations diffusion and the progress of the innovation spillover across the regions of Russia.

The capital is concentrated in a small number of leading regions of economic and innovative development, and the distances between existing centers of capital concentration are so great that innovation diffusion and spillover effects are disrupted.

Sources of financing and development of new innovative projects - long-term liabilities of innovative companies - are extremely “disconnected” and differentiated by region (Fig. 5).

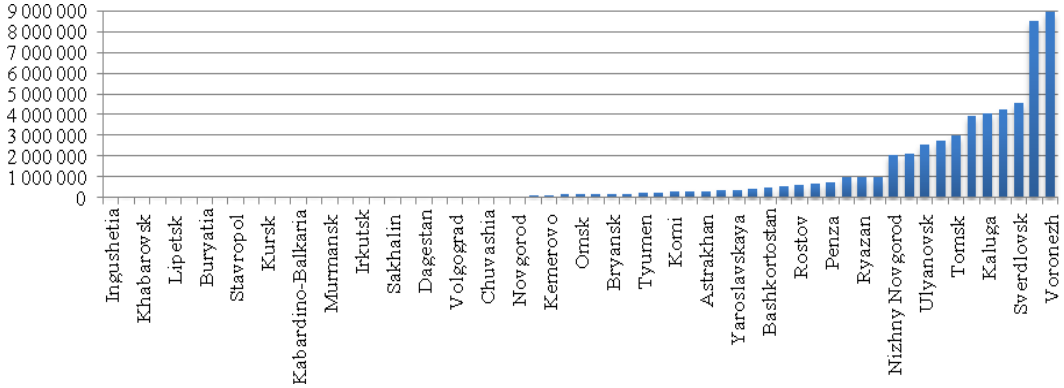

Fig. 5: Differentiation of inequality of innovative capital by regions in Russia, 2016, the average value is 0,93 million rubles (Rosstat, 2019)

The differentiation of the Russian regions selected for analysis based on indicators of innovative enterprises is presented in Figs. 6 and 7. The regions are ranked in descending order of considered indicators values. In line with the identified determinants during the analysis, the leading regions are ranked by the share of their own funds in the liabilities of innovative companies. Underdeveloped regions are ranked by the share of current assets in the assets of innovative companies.

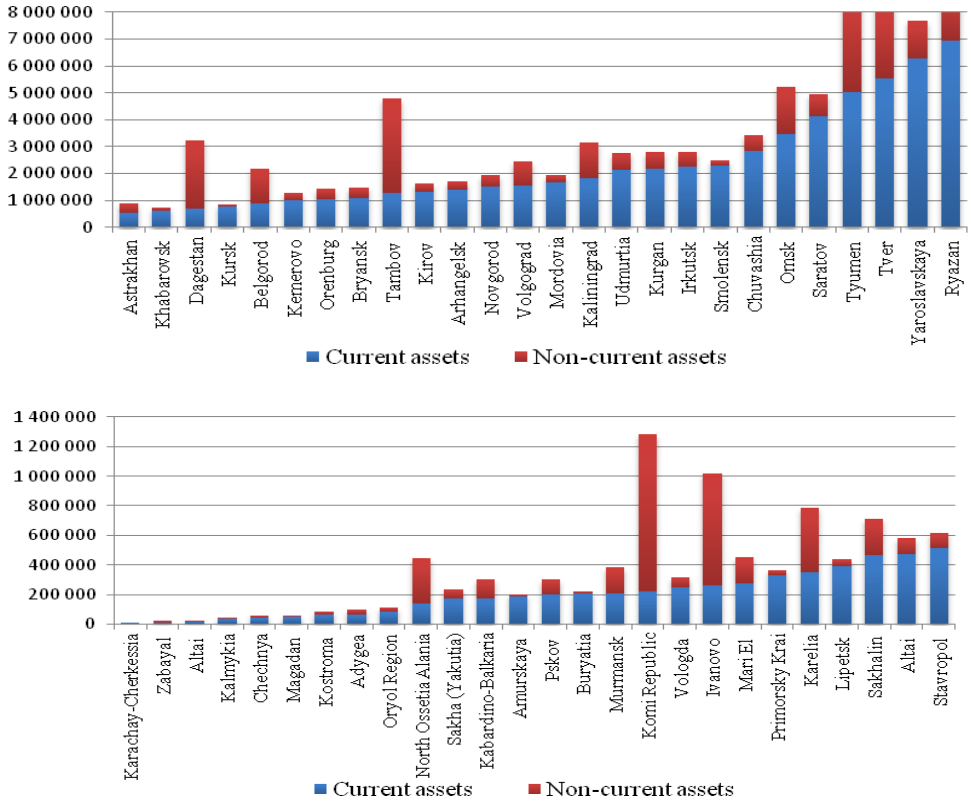

Fig. 6: Asset structure of innovative enterprises in underdeveloped regions of Russia, 2016 (Rosstat, 2019)

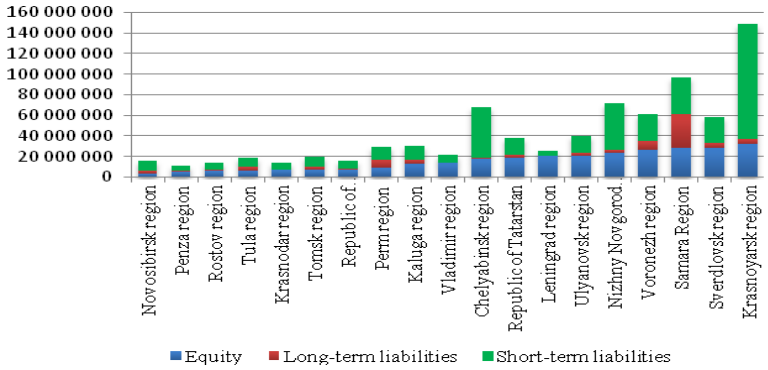

Fig. 7: The structure of earnings and liabilities of innovative enterprises in leading regions of Russia, 2016 (Firsova, 2019)

The rate of concentration and unevenness of the Russian regions in terms of equity and current assets of innovative companies is presented in Figs. 8 and 9.

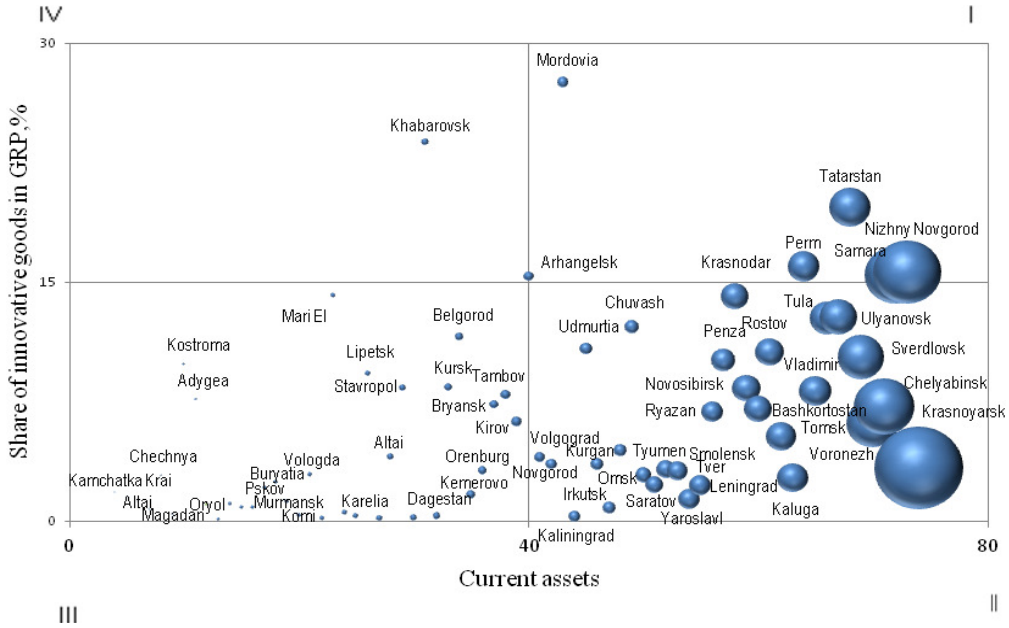

Fig. 8: The concentration of current assets in underdeveloped regions, the share of current assets in GRP, the size of the balls - the volume of current assets

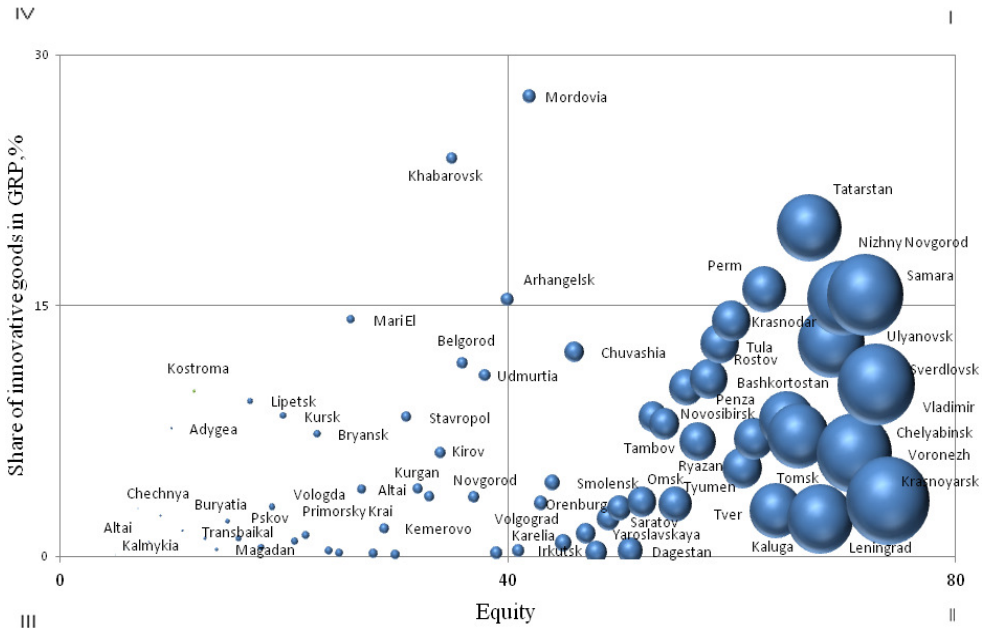

Fig. 9: Concentration of earning and liabilities of innovative capital in leading regions, share of equity in GRP, size of balls - the amount of equity of innovative companies

Such a spatial uneven structure of financing sources cannot provide macro-assumptions for financing the change of technological structures that require a significant structural upgrade of the fixed assets and equipment. However, it is possible to single out a number of regions, in which indicators of financing innovative companies point to potential development capacities for innovative activities with an increase in the volume of funding sources.

Based on the results of a graphical analysis using the "center – periphery" model, it is possible to distinguish the following centers – the cores of financing innovation in the territorial structure of Russian regions, semi-periphery and periphery zones.

The regions of quadrant I are potential centers for the development of innovative activity due to the availability of investment opportunities for investing innovation capital, while the remaining regions belong to the semi-periphery (quadrant II) and periphery (quadrants III and IV). The most innovative and effective regions in terms of their own funds capacity to finance innovation are Tatarstan, Nizhny Novgorod, Samara, Perm, Tomsk regions, etc. (as well as Moscow, St. Petersburg); these regions claim to be centers of innovative development. Similarly, in quadrant II, we can identify regions with a high opportunity and potential to become centers, provided that funds are invested and sources of financing are developed at the public and private levels.

Conclusion

Thus, the results of the study demonstrate a very high level of differentiation in indicators of financing innovation in Russian regions. The existing capital structure of innovative companies complicates innovation and inhibits the effective sustainable development of innovative enterprises as well as impedes the effective flow of innovation capital.

The problem of insufficient financing of innovative activity is one of the most serious constraining forces in the development of the innovation system in Russia. It is the insufficiency of region's own financial resources and the inaccessibility of external sources of financing that in most cases explain the low level of innovative activity of economic entities.

It is necessary to reduce the polarization and transform semi-peripheral regions into sources and "points" of innovative growth, as well as to develop sources of financing in peripheral regions.
The measures necessary for the effective development of innovative companies and the diversification of their financing sources are:

- to form a national balanced financing system for fundamental and applied research and development, direct support for financing those areas that are not in demand for financing by private investors and the creation of attractive indirect steps to support the "capital building-up strategy" for private investors in R&D;
- to develop innovative infrastructure, taking into account the territorial specifics and regional differentiation of Russian regions, the features and competitive advantages of the regions, promote fundamental science, and the corresponding education system;
- to establish the regulatory framework and practice of applying new forms of financing innovation in the context of new information technologies and fintech;
- to form sectoral, intersectoral and regional innovation clusters, combining scientific, educational institutions, production and markets that attract syndicated forms of financial resources;
- to stimulate demand for innovations by the government (for example, removing administrative barriers, public contracts and procurement, indirect measures and targeted support of strategic directions of R&D development);
- to provide point targeted funding for the creation of innovative products that can be commercialized, and not the creation of ideas that cannot be realized in the future;
- to ensure the interaction of public and private capital in order to develop science, engineering and technology;
- to develop indicators, procedures and mechanisms for the functioning of the national innovation financing system, monitor and adjust the system according to the current state of public policy measures in the field of R&D;
- to work out regional strategies of economic development, aimed at creating so-called "growth points" by improving the investment climate and infrastructure in the regions.

The role of the government in this process should consist in the effective use of the financial capacities and public instruments to support the financing of innovative activities, in measures of indirect stimulation and attraction of private resources in the field of innovation and the creation of a common stable institutional environment that ensures effective regulation of the relationships of all participants of the innovation process.

Administration and coordination of financing sources for innovative activities by the state as a regulator of financial and innovation processes should provide the participants of the investment resources market with an effective legislative framework, mechanisms and tools for accumulating "long" investments, guarantees of investments, improving the institutional environment, developing innovative financial infrastructure to increase accessibility of private sources and stimulation of private investors and commercial banks to finance innovative activity. The implementation of these measures will contribute to the development of innovation and the creation of an effective innovative economy in Russia.

Acknowledgment

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Work Values and Turnover Intention in Chinese New Generation Employees Based on Multiple Intermediaries

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Abstract

In this study the aim was to ascertain the effects of work values on job satisfaction, organizational commitment, and turnover intention in a Chinese context. Job satisfaction and work values were employed as determinants of organizational commitment and turnover intention. The mediating effect of job satisfaction andorganization commitment on work values and turnover intention was also examined，using EQS 6.3 computer program.Atotal of 463 questionnaires were distributed to employees of different corporations in China. The results indicated that job satisfaction led to greater organizational commitment and lower turnover intention. Participants also indicated that their work values significantly affect normative commitment and turnover intention through job satisfaction.

Keywords: Work Values;Job Satisfaction;Organizational Commitment;Turnover Intention.

Introduction

At present, the situation at home and abroad has undergone numerous changes. The trade war between China and the United States has been on the verge of explosion and China is facing a critical period of economic transformation and upgrading. New technologies, new formats, and new models such as "Internet Plus," shared economy, and supply-side reforms have had an impact on the old labor relations management model. Faced with the gradual disappearance of the "demographic dividend" and the urgent need for economic restructuring, the conflict between labor and capital has intensified. In the past, extensive labor relations management methods have been unable to meet the requirements of the times. By establishing a good atmosphere of labor relations, the management of labor relations has been standardized. It has become the focus of current management work to improve employees' job satisfaction and promote their better initiative and enthusiasm in a good atmosphere.

In China, new generation employees are who were born after 1st January 1980, including the post-80s, the post-85s, and the post-90s. Nowadays, new generation employees have been the major driving force in companies. From managers' point of view, they are unstable, having independence of thought, poor self-discipline, and blind confidence. High turnover rate and blurred value orientation of new generation employees are the biggest blocks of companies' strategic development, which brings huge challenge to managers. Therefore, this research focused on the explicit and implicit work value, their

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difference, and the relationship between work value, job satisfaction, organizational commitment, and turnover intention.

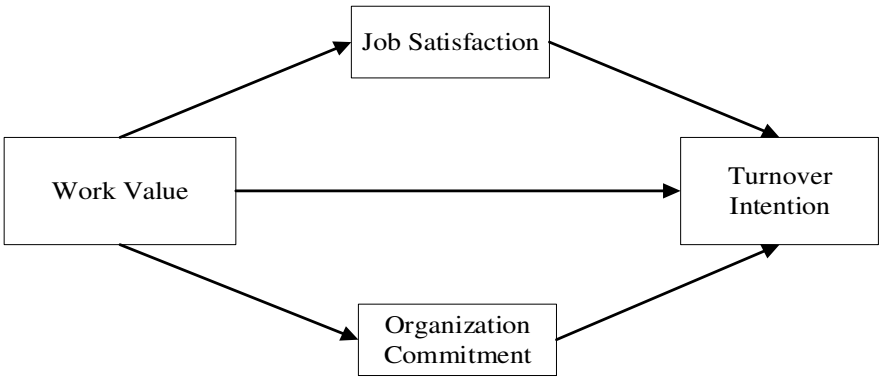

Fig. 1: Proposed model for work value and turnover intention

Literature Review and Hypothesis

The New Generation of Employees

The new generation of employees in this study pointed out that employees born after January 1, 1980 were subdivided into post-80s, post-85s, and post-90s. At present, although more and more scholars are beginning to pay attention to the turnover intention of specific types of employees .Today, many view job choice and turnover intent as distinct aspects of work and are aware that these are directly related o their job. However, since this was not always the case this new attitude of workers has created problems in the current labor market in China. Younger generations of Chinese workers have become individualistic and materialistic and also tend to seek more challenges and changes, thus causing them to pursue better employment opportunities and seek higher wages (Ralston, Egri, Stewart, Terpstra, & Kaicheng, 1999).

Work Values

Values are regarded as the essential concepts that are possessed by individuals and a society.The operational definition of work values is defined as the value judgment of the work itself, work and environment, and work and self-relationship formed by employees in their careers. It belongs to the individual's internal and stable personality tendency or personality dynamic system, which affects the employees' external Work behavior and performance. Studying the structure of work values helps us better understand work values.

Turnover Intention

The time always comes when an individual considers the possibility of terminating his or her employment with an organization (Mobley, 1982). Turnover intention has been defined as a conscious psychological willingness to leave an organization (Tett & Meyer, 1993).

Job Satisfaction

Job satisfaction, usually refers to a person's work in the organization, the work itself and related aspects (including work environment, work status, work style, work pressure, challenge, interpersonal relationships at work, etc.) Mental state with benign feelings. An individual's emotional response, emotional experience, and attitude to their work. It is an important employee attitude variable derived from the evaluation of their work or work experience. Studies have shown that job satisfaction includes satisfaction in five areas: job itself, compensation, promotion opportunities, supervisors and colleagues. Based on whether work can help to achieve individual values, and whether it can meet individual needs and interests, it is reflected in different levels of high and low. High levels of job satisfaction occur when work matches personal needs, interests, and working conditions and interpersonal cooperation are satisfactory.

Organization Commitment

There are a number of definitions of organizational commitment.Organizational commitment has been described as an antecedent of turnover intention(Poznanski & Bline, 1997). Other researchers have demonstrated the importance of organizational commitment in explaining turnover intention (Bluedorn, 1982).OReilly and Chatman combined empirical research to point out that the support path presented by individuals in enterprises and organizations includes three parts: obedience, belonging and consistency(O'Reilly Iii & Chatman, 1986). Obedience reflects the purposeful measures of individual enterprises to obtain rewards; belonging is due to the goals and attitudes of the organization. Allen and Meyer based on the results of empirical research, sorted out, analyzed, and defined the content of three factors, improved the content of organizational commitment, and has become a widely accepted concept of organizational commitment by researchers.Organizational commitment has also been recognized as having a significantly negative association with turnover intention(Allen & Meyer, 1996).

Influence of the work value on the turnover intention

Values can steadily influence a person's behavior and way of doing things. Because of this stable influence, the research on values has become a research hotspot in recent years. During the work, employees will show their likes or dislikes about their work, and they will also show their love or dissatisfaction with the organization. The stable development of such emotions is the work values and the embodiment of values in people's work.

There are many factors affect the turnover intention. Amongst these factors, the function of work values to the turnover intention can't be ignored. Schwartz suggested that the pursuit of intrinsic work values (e.g., personal growth or opportunities for creativity) was likely to be seen as desirable and justified when the value of autonomy is emphasized(Schwartz, 1999). Hofstede suggested that in patriarchal societies motivation may be based more on the acquisition of money and possessions than on quality of life because money is associated with security and stability. Jaw and colleagues believed that, in this respect, Western culture has had an effect on Chinese Confucian dynamism(Jaw, Ling, Wang, & Chang, 2007). Apossible explanation for this is that people in management positions in Chinese industries/businesses who have been exposed to Western cultures are thought to work more diligently so they can obtain more rewards that are related to performance, and this is a major feature of management practices in the Western work environment . We therefore form the following hypothesis on the impact of work value on turnover intention:

H1: Work value is negatively related to turnover intention.

The mediating effect of the job satisfaction and organization commitment on the relationship between work values and turnover intention

In previous studies, it has been found that the relationship between job satisfaction and organizational commitment is variable and at times results are contradictory. Bateman and Strasser determined that organizational commitment was the initial affective factor and was an antecedent to job satisfaction(Bateman & Strasser, 1984). Porter et al. (1974) held the opposite view, arguing that satisfaction represents one specific component of organizational commitment. Williams and Hazer were of the view that satisfaction does causally affect organizational commitment(Williams & Hazer, 1986), while Steers found that as an employee's needs are satisfied by the organization, they develop more commitment to the organization. Chen and Francesco adopted the view that job satisfaction has a causal influence on organizational commitment(Chen & Francesco, 2000).

The expression of work attitude is job satisfaction. Stable values can guide a person's behavior. In work, it is shown that work values affect employees' work attitude, that is, they will affect job satisfaction. This has been confirmed in previous studies.Organizational commitment is the emotional dependence of employees on the existing organization, loyalty to the organization and strong emotional dependence on the organization, and the ability to dedicate themselves to the emotional development of the organization.

Most scholars' research on organizational commitment and job satisfaction is a combination, because the two are interconnected and very similar in some aspects, except that emotional commitment is a more stable job satisfaction. Attitude performance. The simple point is that job satisfaction is temporary, and it is a current emotion. Organizational commitment is something deep in the heart. It is an identification with the organization. If a person does not agree with his organization in attitude, then the performance The job satisfaction that comes out will definitely have a certain impact, which in turn will affect the emotions of the organization.

Based on the above analyzation, we can form the following hypothesis on the function of job satisfaction and organization commitment on the relationship between work value and turnover intention.

H2a: The job satisfaction plays the mediating effect on the relationship between work values and turnover intention

H2b: The commitment plays the mediating effect on the relationship between work values and turnover intention

Research Methodology

With the objective to contrast the research hypotheses presented, market research was carried out by combining the qualitative and quantitative methodologies that are detailed hereafter.

Context of the research

During the last decade, China has been trying to stimulate economic growth through implementation of innovation. The Chinese government and relevant organizations have issued a number of policies to promote business development by focusing on work value and turnover culture in Chinese universities. China's increasing focus on work value provides a favourable environment for human resource management research, which can measure the new initiatives' effect on employee turnover intention.

Setting and participants

In order to empirically contrast the proposed research hypotheses, a quantitative investigation was carried out using surveys of the new generation of employees. To ensure the variability and representativeness of respondents, we selected employees from different cities. we conducted a questionnaire survey on them, covering basic information, work values, job satisfaction, organization commitment turnover intention.

Of the 463 questionnaires distributed, 405 were were determined to be valid, of which 58 were subsequently discarded because of incomplete information. The 463 fully completed questionnaires (response rate of 87.5%) were from 196 males (48.4%) and 206 females (51.6%).

Design and Measure

The questionnaire was developed and pretested on a small sample of students for validation purposes. The study's constructs were work values, job satisfaction, organization commitment, and turnover intention. The information that was collected was brought together using a questionnaire in which the variable in the theoretical model was measured with a multi-item scale. This makes it possible to

obtain evaluations of psychological variables that cannot be quantified directly(Churchill, 1995). The evaluations were found using the Likert scale of five positions (1 = strongly disagree with the affirmation made and 5 = strongly agree).

Work values

Refer to the measurement scale of the The 21 items that were used for measurement of work values were taken from the Work Values Scale (Meyer & Alien, 1991).Three dimensions of work values were defined in this study: Suitability,stability,career development and employee status. People-related factors included relationships with colleagues and supervisors, personal growth, recognition, the use of expertise, knowledge, and competence. Job outcome represented the desire for respect, economic rewards, secure and stable lifestyle, benefits, prestige, and social status. Finally, the job itself focused on working conditions, hours worked, degree of autonomy, ideal pursuance, and meaningfulness of job content. All statements were measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

The job satisfaction

Following Hochwarter、kacmar、Perrewe(2003), the job satisfaction was measured through four statements on a five-point Likert scale ranging, which assessed the degree of attraction of starting a new job for participants.

The commitment

Meyer andAllen developed a 3-component conceptualization that we adapted to measure organizational commitment in this study(Meyer & Alien, 1991). The questionnaire contained 3 items classified as affective commitment , continuance commitment , and normative commitment . Participants rated their responses using a 5-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree.

Turnover Intention

In order to investigate how often respondents seriously considered quitting their job, whether or not they wanted to quit, and/or were actually planning to quit, six items were extracted from a scale developed by Konovsky and Cropanzano (Konovsky & Cropanzano, 1991). Responses followed a 5-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree.

Result

Descriptive Analysis

Table 1 shows the demographic distribution of the participants.

Table 1: Socio-demographic profile of the nascent entrepreneurs sample

			n	%
Gender	1	Male	196	48.4
	2	Female	209	51.6
Age	1	36-40	23	5.7
	2	31-35	60	14.8
	3	26-30	159	39.3
	4	20-25	163	40.2
Education	1	Senior school	3	0.8
	2	Senior high school	52	12.8
	3	College	296	73.1
	4	Master degree	54	13.3
Position	1	Non management	255	45.4
	3	Management	150	29.9
Martial Status	1	Single	169	41.7
	2	Married	236	58.3

Note：N=405

Assessment of measures and common method bias

In order to test the research model, a Structural Equations Model (SEM) approach is used. This statistical method allows the estimation of causal interrelations between

latent factors measured with multi-item scales. Therefore, it is especially appropriate to study psychological variables that are not directly observable, as is the case in this research. In particular, SEM approach requires the development of two levels of analysis: first, Confirmatory Factor Analysis (CFA) is carried out to confirm the psychometric properties (reliability, convergent validity and discriminant validity) of the measurement scales (measurement model), and then, structural model is estimated to test the causal interrelations established in the theoretical model. In this research, the measurement model and the structural model are estimated through the Maximum Likelihood Robust method, using EQS 6.3 computer program.The results of the CFA summarized in Table 2 confirm the convergent validity of all the measurement scales.

Table 2: CFA for model variables

latent variable	measured variable	Stand.Lambda	R^2	CR	AVE	Goodness of fit
work value	VAL1	0.83	0.69	0.86	0.56	BBNNFI=.916 RMSEA=.059 IFI=.972 CFI= .972
	VAL2	0.77	0.59			
	VAL3	0.74	0.54			
	VAL4	0.63	0.40			
	VAL5	0.76	0.53			
Job satisfaction	SAT1	0.92	0.92	0.94	0.77	
	SAT2	0.89	0.89			
	SAT3	0.88	0.88			
	SAT4	0.93	0.93			
Commitment	COM1	0.92	0.85	0.73	0.48	
	COM2	0.86	0.74			
	COM3	0.89	0.80			
Turnover intention	INT1	0.92	0.68	0.88	0.66	
	INT2	0.89	0.76			
	INT3	0.88	0.60			
	INT4	0.93	0.67			

Test the convergence and discriminant validity according to the procedures proposed by Steenkamp and Trijp (1991) and Anderson and Gerbing (1988). The method proposed by Murtagh and Heck is used to test the validity of aggregation, that is, the degree of correlation between tools used to measure potential factors(Anderson & Gerbing, 1988). According to the annotations proposed by Steenkamp and Trijp , if the reliability of all items reaches a significance level of 95% and the standardized lambda coefficient is higher than 0.5, the convergence validity of the metric can be confirmed. The CFA results summarized in Table 3 confirm the consistent validity of all measurement scales(Steenkamp & van Trijp, 1991).

In addition, the calculation results of the goodness-of-fit index indicate the correctness of the model. We use the statistical data given by EQS6.3. According to the parameter indicators proposed in the

literature widely used in SEM(Byrne, 1994), Table 3 confirms that the BBNNFI, IFI, and CFI statistics exceed the recommended minimum of 0.9, while RMSEA It is below the maximum limit of 0.08, so the model has a good fit.

Discriminant validity refers to the degree to which there is a correlation but a difference between two potential factors. Anderson and Gerbing (1988) argued that if the confidence interval of the correlation between potential factors does not include 1 (the maximum correlation), then the discriminant validity can be determined. The results summarized in Table 4 confirm the discriminant validity of all measurement scales.

In addition, the reliability of the scale was evaluated by calculating the combined effect of Cronbach`s a, Composite reliability and AVE(Bagozzi & Yi, 1988). The values of these statistics (summarised in Table 3) are in each case above the required minimum values of 0.7 and 0.5. Therefore, the internal reliability of the assumed structure is supported.

Table 3: Confidence intervals for the correlations between pairs of latent variables

Latent variable	work value	Job satisfaction	Commitment	Turnover intention
work value	1.000			
Job satisfaction	.705**	1.000		
	(.633;.781)			
Commitment	.658**	.695**	1.000	
	(.578;.732)	(.620;.755)		
Turnover intention	-.581**	-.692**	-.585**	1.000
	(-.679;-.484)	(-.758;-.614)	(-.676;-.479)	

It can be seen from Table 3 that work values significantly affect turnover intentions, and work values are negatively correlated with turnover intentions, hypothesis H1 is supported.

Mediation Analysis

Work values are negatively related to turnover intentions. In order to test the proposed mediation effect, we use the two predictors of job turnover and organization commitment as the predictors for regression analysis. Next, we conducted a regression analysis on the main effect and the mediation effect of turnover intentions, and found that for each model, work values significantly predicted job satisfaction and organization commitment, providing support for further mediation tests on each model. Subsequently, we loaded two variables, job satisfaction and organization commitment, and

verified them according to the mediation effect test model shown in Figure 2 and Figure 3.

Fig. 2: Test diagram of the mediating effect of Job satisfaction between Work value and Turnover Intention

Table 4: Fitting index of the job satisfaction mediation model

□²	df	□²/df	RMSEA	CFI	NNFI	GFI	IFI
175.885	62	2.837	0.067	0.969	0.957	0.940	0.969

The validation parameters in Table 4 indicate that the model has a good fit, so the model studied is acceptable. Figure 2 shows that the mediating effect of job satisfaction between work value and turnover intention is significant.H2a mediation effect hypothesis holds that the job satisfaction plays the mediating effect on the relationship between work values and turnover intention.

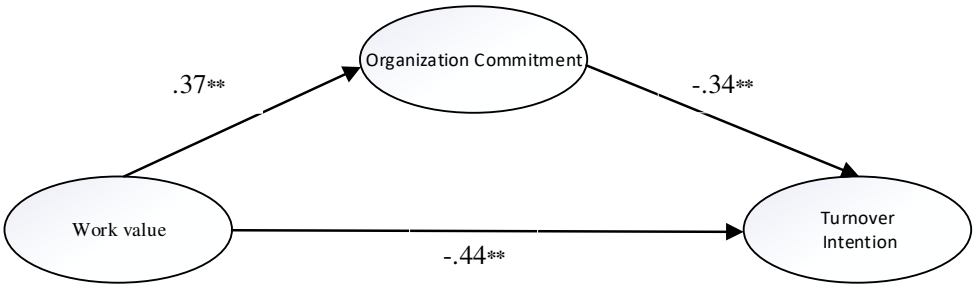

Fig 3: Organization Commitment test chart of the mediating effect between work values and turnover intention

Table 5: Fitting index of the organization commitment mediation model

□²	df	□²/df	RMSEA	CFI	NNFI	GFI	IFI
156.252	51	3.064	0.071	0.965	0.89	0.942	0.965

The validation parameters in Table 5 indicate that the model has a good fit, so the model studied is acceptable. Figure 3 shows that the mediating effect of organization commitment between work value and turnover intention is significant.H2b mediation effect hypothesis holds that the organization commitment plays the mediating effect on the relationship between work values and turnover intention.

Discussion and implications

Conclusions and Discussion

In this study, work values, job satisfaction, and organizational commitment were found jointly and individually to have a significant influence on turnover intention.We found that when a company's management supports its employees' value systems, the employees tended to have a higher commitment to the organization.Based on the analysis of the mediation effect, this paper explores the impact mechanism of the new generation of employees' work values on turnover intentions, constructs an optimized multiple intermediary model(Mitchell, 1999), and discusses the impact mechanism of the work values of the new generation of employees on turnover intentions. The study lays the foundation.

Based on the perspective of multiple intermediary roles, this article studies the turnover intention from a new perspective through argumentation, design, induction of job satisfaction, and organizational commitment, and looks at the problem of turnover intention in the perspective of intergenerational differences, deepening the discussion of the new generation of employees. Of the various variables. Combined with the literature, Western scholars' research on the work values of employees in organizations has a deep characteristic that reflects the western cultural background. In the Chinese context, its applicability and the degree of differences are explored and compared(Mobley, Horner, & Hollingsworth, 1978).

The results of this study may provide some guidelines for managers in understanding the work vales of the younger generation of Chinese employees, and this could lead to implementation of more effective policies for improving employee retention. Some companies in China have not tried to find ways to reduce turnover because the labor supply has been plentiful. This situation has changed and it has become increasingly difficult for Chinese firms to recruit new employees. Our results confirming that job satisfaction and organizational commitment were strong predictors of turnover intention, indicate that companies should conduct periodic surveys of employees on their job satisfaction and organizational commitment. This could lead to a better understanding of employee reactions and feelings about, and opinions of, the company's current operations or policies; it could also help management to take precautions against unexpected developments.

Limitations and Future Studies

There are some potential limitations in the present study that inform possibilities for future research. Attempts to explain an increase or decrease in the level of organizational commitment and turnover intention can involve many factors. Work values and job satisfaction are just two factors that were

used in this study; however, there are many other factors that could be considered or examined. This study might also have been limited by the quantification methods that were used. Future researchers could include qualitative measures for obtaining additional information from the participants. Generalizing the opinion of individuals could provide a more complete picture of the relationships between organizational commitment and turnover intention. Additionally, the questionnaires were distributed in the Chengdu area; hence, their representation might not be generalizable to other areas in China(Mitchell, 1999; Palich & Ray Bagby, 1995).

First, the target of the investigation was a single industry. The respondents possessed a high level of education and other specializations, so they are not necessarily representative of the general workforce in China (e.g., people working in the service and manufacturing industries might possess different work values relating to organizational commitment and turnover intention). Future researchers should test the reliability of the findings with other sectors of business and industry, as well as taking demographics into account as control variables in the analysis. Additionally, there is a possibility that the structure of this research might have been too simplistic, and the survey may also suffer from common method variance. Consequently, our findings may not be generalisable to developed economies in individualistic cultures like those of the USA or Europe(Hofstede, 1993). It is possibilie to replicate this theoretical model in other countries with different economic, cultural and legal characteristics, which could affect the effects of the risk dimensions associated with work value, as a future line of research. Finally, longitudinal studies for turnover intention are required. Future studies should also include other related variables, such as the personal characteristic variables and situational variables to clarify how turnover intention will be transmitted over a longtime.

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Principles of Sustainability and Sustainability Development

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Abstract

The aim of the paper is to identify the principles (dimensions, areas) of sustainability development. The paper is based on information gathered through extensive literature review (research publications, research studies, documents about the principles of sustainability) using internet and research databases. It should be emphasized that the principles of sustainability are interrelated, interacting with each other and all areas need to be addressed, and it is not enough to choose just one area that will be given increased attention and neglect the other.

Keywords: Sustainability, Sustainable Development, Principles of Sustainability.

Introduction

The present time places particular emphasis on sustainability. This is also confirmed by the 2030 Agenda for Sustainable Development (United Nations, 2015). The increasing pressure to achieve and maintain competitiveness on the domestic and international market in recent years signed by the sharp increase in the need to implement the concept of sustainability into business strategy.

The concepts of *sustainability* and *sustainable development* began to be used in the early seventies, mainly in the context of the knowledge that any uncontrolled growth, whether population, production, consumption or pollution, etc. is unsustainable in an environment of limited resources. (National Sustainable Development Strategy, 2001)

The term *sustainability* covers environmental issues, wider corporate social responsibility (CSR), the long-term continuity, and economic survival of business (Scottish Enterprise, 2011). According to R. B. Pojasek (2012), sustainability is only one of several terms now being used to denote the same concept; other terms include corporate social responsibility (CSR), social responsibility (which drops the "corporate" modifier in an attempt to make the term more universal), corporate citizenship, corporate responsibility, environmental sustainability, sustainable development, and each of these terms in turn can be defined in scores of different ways.

One of the best known and used definition of sustainable development was first introduced in 1987 in the Report of the World Commission on Environment and Development: Our Common Future (World Commission on Environment and Development, 1987): *Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs*.

It contains within it two key concepts (World Commission on Environment and Development, 1987):

- the concept of “needs”, in particular the essential needs of the world's poor, to which overriding priority should be given,

- the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.

Sustainability and sustainable development comes in many different shapes and sizes which is demonstrated by many authors (Blašková et al., 2019; Soviar et al., 2019; Jankalová & Jankal, 2018; Varmus et al., 2018; Jankalová, 2016; Figurska, 2014; Craddock, 2013; Cerin & Dobers, 2008; Kotler & Lee, 2005; Elkington, 1994)

Sustainable development in the Slovak Republic is defined in § 6 of Act No. 17/1992 Coll. on the environment (Law on the environment, 2007): *Sustainable development of society is a development that preserves the ability of current and future generations to satisfy their basic living needs, while not reducing the diversity of nature and preserving the natural functions of ecosystems*.

The aim of the paper is to identify the principles (dimensions, areas) of sustainability development. The paper is based on information gathered through extensive literature review (research publications, research studies, documents about the principles of sustainability) using internet and research databases (Scopus, WoS, Google Scholar).

Main findings - Principles (dimensions, areas) of Sustainability and Sustainability Development

The principles of sustainability are the foundations of what this concept represents. The most widespread view is that sustainability is made up of three pillars: *economic, social and environment*. These principles are also informally used as *profit, people and planet*. John Elkington, from a sustainability consultancy firm, was one of the first people to integrate these 3 principles. He argued companies needed to start considering this triple bottom line so that they could the world thrive in the long run. (Elkington, 1994; Jankalová & Jankal, 2017; Youmatter, 2019)

Archie B. Caroll (1979) stated four areas – the economic, legal, ethical and discretionary. The economic component represents the fundamental social responsibility of business. The legal component recognizes the obligation of the enterprise to obey laws. The ethical responsibilities have been considerably more difficult to define and interpret. Referred to as the "grey area", this component "involves behaviors and activities that are not embodied in law but still entail performance expected of business by society´s members". The fourth area of responsibilities is called discretionary or voluntary. This category is totally dictated by the "discretion" of the organization as there are no laws or codified expectations guiding the corporations’ activities. Later Carroll (1991) defined this component as philanthropic because this term provides a more specific description of how this component is typically implemented in organizational practice.

Alexander Dahlsrud (2008) specified five primary areas, namely: environmental, social, economic, stakeholder and voluntariness (Table 1). The reason for this choice is also the fact that companies are forced to engage all key partners (*stakeholder*), including item of providing quality products and services, transparent company management (*economic*), care of employees (*social*), environmental protection (*environmental*) and cooperation with the local community (*voluntariness*). (Jankal & Jankalová, 2016) In the table 2 are another views on areas of sustainability.

Table 1: The five dimensions, how the coding scheme was applied and example phrases

Areas of sustainability	The definition is coded to the item if it refers to	Example phrases
Environmental	the natural environment	"a cleaner environment" "environmental stewardship" "environmental concerns in business operations"
Social	the relationship between business and society	"contribute to a better society" "integrate social concerns in their business operations" "consider the full scope of their impact on communities"
Economic	socio-economic or financial aspects, including describing CSR in terms of a business operation	"contribute to economic development" "preserving the profitability" "business operations"
Stakeholder	stakeholders or stakeholder groups	"interaction with their stakeholders" "how organizations interact with their employees, suppliers, customers and communities" "treating the stakeholders of the firm"
Voluntariness	actions not prescribed by law	"based on ethical values" "beyond legal obligations" "voluntary"

Source: Dahlsrud, 2008.

Table 2: Areas of sustainability in the literature

Approach	Areas of sustainability
Committee for Economic Development (1971)	inner circle, intermediate circle, outer circle
Carroll (1979)	economic, legal, ethical, discretionary
Carroll (1991)	economic, legal, ethical, philanthropic
Elkington (1994) Trnková (2005) Prskavcová et al. (2008) Mutz (2008) Lakin & Scheubel (2010) Kuldová (2010)	economic, social, environmental
Researchers from the Ashridge Business School in Danish Commerce and Companies Agency (2005)	leadership, vision and values; marketplace activities; workforce activities; supply chain activities; stakeholder engagement; community activities; environmental activities
Búciová (2008) Remišová (2011)	economic, ethical, legal
Dahlsrud (2008)	economic, social, environmental, stakeholder, voluntariness
Scerri & James, (2010)	economic, ecological, political, cultural
Bervar & Bertoncelj (2016)	economy (material well-being through

	sustainable growth), equity (social well-being though social cohesion), ecology (environmental well-being through natural harmonization), culture (cultural well-being through intercultural dialogue) and security (peace and sustainable stability)

Source: prepared by paper authors, based on Committee for Economic Development, 1971; Carroll, 1979; Carroll, 1991; Elkington, 1994; Danish Commerce and Companies Agency, 2005; Trnková, 2005; Búciová, 2008; Dahlsrud, 2008; Mutz, 2008; Prskavcová et al., 2008; Kuldová, 2010; Lakin & Scheubel, 2010; Remišová, 2011; Scerri & James, 2010; Bervar & Bertoncelj, 2016

*Marc J. Epstein and Marie-Joseé Roy (2003) in their paper "*Improving Sustainability Performance: Specifying, Implementing and Measuring Key Principles*" in order to identify the key principles of sustainability, reviewed corporate standards and a wide variety of governmental and NGO guidelines. The guidelines were rigorously analyzed, synthesized and organized into nine principles of sustainability (Epstein & Roy, 2003):*

- *Principle 1 - Ethics* - The company establishes, promotes, monitors, and maintains ethical standards and practices in dealings with all of the company stakeholders.

- *Principle 2 - Governance* - The company manages all of its resources conscientiously and effectively, recognizing the fiduciary duty of corporate boards and managers to focus on the interests of all company stakeholders.

- *Principle 3 - Transparency* - The company provides timely disclosure of information about its products, services, and activities, thus permitting stakeholders to make informed decisions.

- *Principle 4 - Business relationships* - The company engages in fair-trading practices with suppliers, distributors, and partners.

- *Principle 5 - Financial return* - The company compensates providers of capital with a competitive return on investment and the protection of company assets.

- *Principle 6 - Community involvement/economic development* - The company fosters a mutually beneficial relationship between the corporation and community in which it is sensitive to the culture, context, and needs of the community.

- *Principle 7 - Value of products and services* - The company respects the needs, desires, and rights of its customers and strives to provide the highest levels of product and service values.

- *Principle 8 - Employment practices* - The company engages in human-resource management practices that promote personal and professional employee development, diversity, and empowerment.

- *Principle 9 - Protection of the environment* - The company strives to protect and restore the environment and promote sustainable development with products, processes, services, and other activities.

The International Sustainability Council developed, from a culmination of discussions and thought processes by the ISC Council, 7 principles of sustainability. These principles are further divided in 75 subprinciples (ISC, 2009):

- *Principle 1 - Interdependence, participation, providing information, and improving science* - We all need to recognize our economic, ecological and social interdependence on a global scale and understand and respect differing economic and social views, values, traditions and aspirations. We are all caretakers of the economy, the environment, and social well-being for the benefit of present and future generations. Today's decisions must be balanced with tomorrow's effects. A participatory process on all scales of decision making is vital to community sustainability. Such a process engages all the people who have a stake in the outcome of the decision being contemplated. It encourages the identification of concerns and issues, promotes the wide generation of ideas for dealing with those concerns, and helps those involved find a way to reach agreement about solutions.

- *Principle 2 - Provide intergenerational equity and durability* - The economy, environment, and social well-being should be managed for the equal benefit of present and future generations. A sustainable community does not deplete its resources, destroy natural systems, or pass along unnecessary hazards to future generations. We should incorporate disaster resilience and mitigation into our decisions and actions. A community is resilient in the face of inevitable natural disasters like tornadoes, hurricanes, earthquakes, floods, and drought if it takes steps to ensure that such events cause as little damage as possible, that productivity is only minimally interrupted, and that quality of life remains at (or quickly returns to) high levels. A disaster-resilient community further takes responsibility for the risks it faces and, to the extent possible, is self-reliant. That is, it does not anticipate that outside entities (such as federal or state government) can or will mitigate its hazards or pay for its disasters.

- *Principle 3 - Support and improve the rules of governance* - Growth management planning, community design, green building practices and environmental mitigation all play a role in maintaining the quality of life while accommodating growth through sustainable development strategies. It is imperative that our societies develop an informed democracy. The practice of publishing reports on the state of the environment, and of indicators of environment and social quality, used effectively by the proponents of sustainability should allow citizens to view the risks and threats to their lifestyle and to demand political honesty and accountability. Good decision making by government is imperative on all four scales: global, national, regional, and local.

- *Principle 4 - Maintain and, if possible, enhance the quality of society through community building* - A sustainable society is one that persists and thrives. It provides a high quality of life for all of its inhabitants without harming the integrity and productivity of the natural systems and resources upon which all life depends. Humans' needs and desires are met within the limits of what nature can provide. Choices on design, particularly at medium and high density, greatly affect energy use and natural materials consumption. Public transport and road investment, and decisions that affect an individual's car ownership choices are important when talking about improving the quality of society through community building.

- *Principle 5 - Maintain and, if possible, enhance the quality of human life* - Quality of life - or "livability" - differs from community to community. It has many components: income, education, health care, housing, employment, legal rights on the one hand; exposure to crime, pollution, disease, disaster, and other risks on the other. One town may be proud of its safe streets, high quality schools, and rural atmosphere, while another thinks that job opportunities and its historical heritage is what makes it an attractive place to live. Each locality must define and plan for the quality of life it wants and believes it can achieve, for now and for future generations. A sustainable community's resources and opportunities are available to everyone, regardless of ethnicity, age, gender, cultural background, religion, or other characteristics.

- *Principle 6 - Maintain and, if possible, enhance economic vitality* - A viable local economy is essential to sustainability. This includes job opportunities, sufficient tax base and revenue

to support government and the provision of infrastructure and services, and a suitable business climate. A sustainable economy is also diversified, so that it is not easily disrupted by internal or external events or disasters, and such an economy does not simply shift the costs of maintaining its good health onto other regions or onto the oceans or atmosphere. Nor is a sustainable local economy reliant on unlimited population growth, high consumption, or non-renewable resources.

- *Principle 7 - Maintain and, if possible, enhance the quality of the environment* - A sustainable community sees itself as existing within a physical environment and natural ecosystem and tries to find ways to co-exist with that environment. It does its part by avoiding unnecessary degradation of the air, oceans, fresh water, and other natural systems. It tries to replace detrimental practices with those that allow ecosystems to continuously renew themselves. In some cases, this means simply protecting what is already there by finding ways to redirect human activities and development into less sensitive areas. But a community may need to take action to reclaim, restore, or rehabilitate an already-damaged ecosystem such as a nearby wetland.

Michael Ben-Eli (2015) in his publication "*Sustainability: Definition and Five Core Principles. A New Framework*", inspired (in particular) by the work of R. Buckminster Fuller, describe five sustainability principles. These principles are expressed in relation to five fundamental domains (Ben-Eli, 2015):

- *The Material Domain* - Constitutes the basis for regulating the flow of materials and energy that underlie existence. *The First Principle* - Contain entropy and ensure that the flow of resources, through and within the economy, is as nearly non-declining as is permitted by physical laws.

- *The Economic Domain* - Provides a guiding framework for defining, creating and managing wealth. *The Second Principle* - Adopt an appropriate accounting system to guide the economy, fully aligned with the planet's ecological processes and reflecting true, comprehensive biospheric pricing.

- *The Domain of Life* - Provides the basis for appropriate behavior in the biosphere with respect to other forms of life. *The Third Principle* - Ensure that the essential diversity of all forms of life in the biosphere is maintained.

- *The Social Domain* - Provides the basis for social interactions. *The Fourth Principle* - Maximize degrees of freedom and potential self-realization of all humans without any individual or group adversely affecting others.

- *The Spiritual Domain* - Identifies the necessary attitudinal orientation and provides the basis for a universal code of ethics. *The Fifth Principle* - Recognize the seamless, dynamic continuum of mystery wisdom, love, energy and matter that links the outer reaches of the cosmos with our solar system, our planet and its biosphere including all humans, with our internal metabolic systems and their externalized extensions — Embody this recognition in a universal ethics for guiding human actions.

The set of five domains and five primary principles is fundamentally systemic in nature, meaning that each domain affects all the others and is affected by each in return. By anchoring the essence of human motivation and intention, the spiritual principle acts as the causal root, which sets the tone for the whole. It drives the integration of the other four principles, those related to the material, economic, life, and social domains. If integrated in a balanced way, it can infuse a common purpose, provide a common foundation, and stimulate common resolve. Lacking the ethical commitment implied by the spiritual principle, considerations of questions related to the four other domains, no matter how elaborately expressed, are reduced to mere technicalities. When the principles are thus

integrated and seamlessly inform choices and actions, a state of sustainability, which otherwise appears as a difficult, distant goal, can be realized spontaneously and completely. (Ben-Eli, 2015)

One of the standards directed at helping businesses and organizations contribute to sustainable development is ISO 26000, Guidance on social responsibility. This International Standard describes seven principles for social responsibility, which every organization should respect and apply (ISO, 2017):

- *Accountability* - an organization should be accountable for its impacts on society, the economy and the environment.
- *Transparency* - an organization should be transparent in its decisions and activities that impact on society and the environment.
- *Ethical behavior* - an organization should behave ethically.
- *Respect for stakeholder interests* - an organization should respect, consider and respond to the interests of its stakeholders.
- *Respect for the rule of law* - an organization should accept that respect for the rule of law is mandatory.
- *Respect for international norms of behavior* - an organization should respect international norms of behavior, while adhering to the principle of respect for the rule of law.
- *Respect for human right* - an organization should respect human rights and recognize both their importance and their universality.

As Kozlovska et al. stated (2014), in Slovakia, the first set of sustainable development indicators was approved by the Government Resolution in 1997 and the National Strategy for Sustainable Development of the Slovak Republic was adopted in 2001. The assessment of sustainability is based on the following fundamental principles (National Strategy for Sustainable Development, 2001; Kozlovska et al., 2014):

- *the principle of supporting the human resource development,*
- *the ecological principle,*
- *the principle of efficiency,*
- *the principle of self – regulation and self-supporting development,*
- *the principle of reasonable sufficiency,*
- *the principle of preventive care and predictability,*
- *the principle of respecting the needs and rights of future generations,*
- *the principle of intra-generational, inter-generational and global equality of Earth inhabitants' rights,*
- *the principle of cultural and social integrity,*
- *the principle of non-violence,*

- *the principle of emancipation and participation,*
- *the principle of solidarity,*
- *the principle of subsidiarity,*
- *the principle of acceptable errors,*
- *the principle of optimization,*
- *the principle of socially, ethically and environmentally friendly economy, decision making, management and behavior.*

Conclusion

Organizations on the road to sustainability can benefit from the help of different organizations and can also benefit from the recommendations of authors dealing with sustainability. Authors look at the principles of sustainability differently and their number varies from 3 to 16. Regardless of the approach taken by organizations, it should be emphasized that the principles of sustainability are interrelated, interacting with each other and all areas need to be addressed, and it is not enough to choose just one area that will be given increased attention and neglect the other. The same opinion is also expressed by Ben-Eli, who claims (Ben-Eli, 2015): *It implies that in seeking a transition to sustainability as the organizing principle in a new world order, a piecemeal approach—emphasizing some aspects, while neglecting others—is unlikely to yield effective, lasting results*.

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Utilization of Internet-Based Live Video Streaming as An Alternative Media for Campus Television

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Abstract

Advances in communication technology that is so dynamic in the all-digital era now also penetrated the television media. Many platforms use the internet to reach a wider audience. No exception on-campus community television such as Suska TV using the Youtube account "Suska TV Official" took part in providing information to the campus community. The purpose of this study was to determine the extent of internet-based live streaming video into alternative communication media at Suska TV. The research method uses an interpretive paradigm with a case study approach. Data collection techniques using observation, in-depth interviews, and online search. The results found 3 factors utilizing live streaming video using virtual mixer technology and internet networks in Suska TV. First, it can generate live shows anywhere. Production of news broadcasts, campus programs, and events does not have to be done in Suska TV studios. Second, Following communication technology trends. Through a YouTube account, it gives freedom for the campus community to choose to watch the programs they want from their respective gadgets. Third, this alternative communication media makes it easy for Suska TV as a community television to continue to be productive through broadcast digitalization.

Keywords: Live Streaming Video, Television, Alternative Media Communication

Introduction

In the digital era nowadays, communication technology advances are increasingly massive. Broadcasting activities through various media platforms have become commonplace. This was triggered by the spread of media digitalization. The users' behavior changes overtime, frequently we meet individuals who get to the Internet without knowing the time limit. This activity is carried out wherever and whenever. Furthermore, there are many platforms with various options and interesting features available so that they reach a wider audience.

Television is one example of technological development and has a great influence on people's lives. The industry has experienced technological and structural changes in the past decade. [1] Advances in communication technology that is so dynamic in the all-digital era now also penetrated the television media. Many television stations in Indonesia are also utilizing digital services and are starting to abandon conventional broadcasting methods. To reach a wider audience, it's undoubtedly television shows are now also reaching content that can be accessed through internet-based live streaming broadcasts.

As far as television innovation, there is a term called Smart TV or Hybrid TV that is connected to the Internet or convergence technology that connects computers, television sets and set-top boxes, for

[1] ("Y.Shim and D.H. Shin, "Analyzing the Development of 4th Generation Mobile Network in China : Actor Network Theory Perspektive, " Info Vol. 17. No. 1, pp 22-38, Jan. 2015," n.d.)

example, Google TV and Apple TV. [2] At present, many television shows are competing to use various platforms to stay alive. The high mobility of everyday audiences requires television shows to be enjoyed not only in the home but also anywhere. One of them, many television programs that broadcast shows via new media. Call it through streaming websites or with a touch of other new media or more familiar with the term social media, like Youtube, Instagram TV and so forth.

Internet-based television shows that utilizing the social media have recently begun to increase their audience. This has certainly become a special interest especially for information providers and business operators. Internet-based shows on social media are considered effective for promoting the products and services offered. Moreover, if the target audience is young people like Gen Y (Millennial) and Gen Z.

Referring to some recent communications research, young generation, for example Gen Z, tends to prefer watching television through social media platforms compared to conventional television at home. There are some interesting motives for them to always use social media, first, as a place of self-existence, second to follow the style in relationships and third, namely to want to earn income from social media. [3]

The high use of the Internet in Indonesia is progressively gigantic from year to year. The survey results from the Polling Indonesia in collaboration with the Association of Indonesian Internet Service Providers (APJII), the number of Internet users in Indonesia grew by 10.12 percent. This field data was taken during the period from March to 14 April 2019. According to the Secretary General of APJII, Henri Kasyfi, from a total population of 264 million people in Indonesia, there were 171.17 million people or around 64.8 percent who have been connected to the Internet. [4]

As shown by the phenomenon as above, it isn't astounding that numerous TV media in Indonesia are contending to communicate their shows through media convergence on the web. The community television is no exemption. Community television is a media established by a particular group in a region with the aim of being a forum for information for that group.

Up to this point, the quantity of community TV in Indonesia can be said to have not grown too fundamentally. This happens in light of the fact that there are genuinely severe limitations and rules given by the Ministry of Communication and Information Technology (Kemkominfo) for authorization to air the community TV. In addition to the establishment permit, the broadcast radius is just restricted to 2.5 kilometers with a maximum transmit power of 50 watts. Likewise, the TV channel must utilize recurrence stations dependent on specialized investigations that do not interfere with local or national private TV. Concerning the authorizing procedure, it isn't entirely different from how the private area presents a grant through the Local Indonesian Broadcasting Commission (KPID). To date, there have been 13 network TV channels that have acquired authority-broadcasting licenses in Indonesia. [5] One of the community television stations within the Sultan Syarif Kasim State Islamic University (UIN Suska) Riau is SUSKA TV.

This campus television has obtained an establishment permit since November 10, 2017. Since its establishment, SUSKA TV has had several programs and collaborations with various parties, which are certainly very helpful to the campus academic community to get information. However, to date, SUSKA TV does not have a broadcast license in analogue because of a moratorium from the Minister of Communication and Information.

The Minister of Communication and Information of the Republic of Indonesia issues Circular Letter Number 1 of 2017 concerning the Moratorium on New Applications for Analogous Television

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[2] ("A. Boztas, A.R. J. Riethoven, and M. Roeloff, "Smart TV Forensics ; Digital Traces on Television, " Digit. Investig., Vol. 12, pp. S72-S80, Mar. 2015," n.d.)
[3] (Anwar, 2019)
[4] (Media, n.d.)
[5] (KOMINFO, n.d.)

Broadcasting Services Licenses through Terrestrial since February 6, 2017 until an undetermined deadline. However, this moratorium does not apply to applications for new licenses and expansion of broadcast coverage in the Disadvantaged, Frontier and Outermost (3T) areas as long as the service area is still available by following the radio frequency master plan for analog TV broadcasting purposes. [6]

With the existence of this Ministry of Communication and Information moratorium, SUSKA TV could not broadcast analog shows from the beginning. However, SUSKA TV tries to take advantage of the opportunity of digitization by showing internet-based production through the YouTube channel "SUSKA TV Official" and the SUSKA TV Instagram Account. This step is considered as an alternative solution so that SUSKA TV information shows can continue to be enjoyed by the campus academic community. Currently, there are 5 SUSKA TV programs that can be watched, including, Suska News, Cahaya Hati, *Young Inspiration*, *Let's Find Out* and *Top List*. The program was welcomed by the academics on campus and off campus. This is evident from the number of active followers on SUSKA TV's Instagram account, which has reached 6112 followers. In addition, the number of subscribers on the YouTube channel "SUSKA TV Official" has exceeded 1034 subscribers.

Some Suska TV programs are broadcast live streaming through the Youtube channel. Usually live streaming is done at official events such as the Flag Ceremony in commemoration of state holidays, graduation processions, seminars, and other official events. Live streaming broadcasts utilize virtual mixer (VMix) Pro 17 so that the audience of Suska TV viewers can enjoy multi-camera shows like watching television on a television screen. The purpose of this study was to determine the extent of Internet network-based live streaming video by utilizing virtual mixer technology to become an alternative communication media in Suska TV. This live streaming video based on Internet network is a form of application of new media theory.

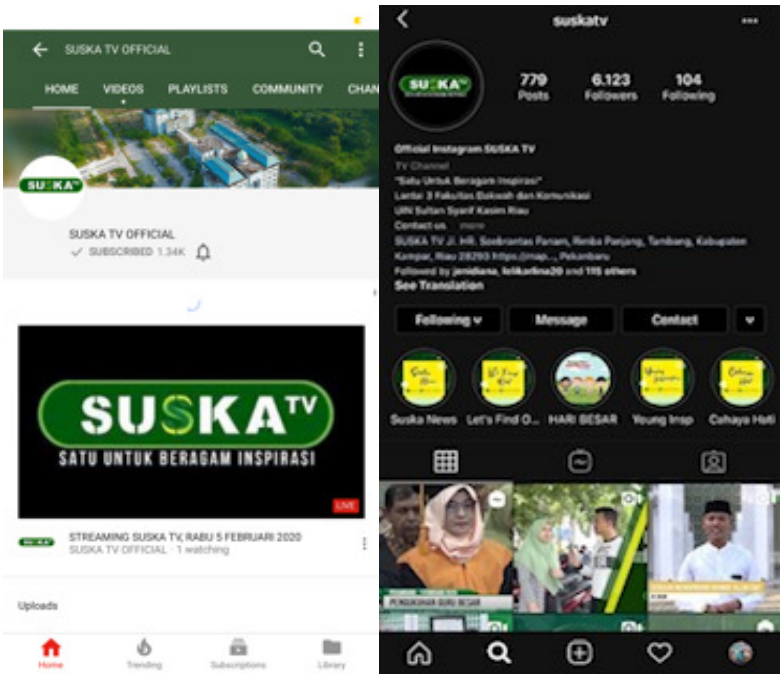

Picture 1: (Right) Suska TV' Instagram Account and

(Left) Suska TV Official' Youtube Channel

[6] (KOMINFO, n.d.)

As quoted by Mark Poster in Littlejohn, new media theory is about a new period in which interactive technology and network communication, especially cyberspace, will affect society. In this article we will explain how to use new media in the development of campus community television broadcasts. [7]

The utilization of new media and old mainstream media has become a kind of media convergence. This is happening more and more around us. Many televisions incorporate new and old media in the production process, as well as in terms of promotion. New media is a variety of communication technology devices that share the same characteristics, which apart from being new, is possible with its wide digitalization and availability for personal use as a communication tool. [8]

Lia Kurniawati from Kridatama Polytechnic conducted previous studies according to the theme of this study in March 2019. Lia raised the title on Utilization of Video Streaming Technology at LPP TVRI West Java. This research focuses on the integration of information technology, information technology and mass communication where it is related to all the activities of processing, manipulating, managing, transferring information between media. The results of Lia's research, namely video streaming technology that is utilized in LPP TVRI West Java, greatly affects both TV stations and the public. With LPP TVRI West Java can compete with regional and national TV stations in the use of video streaming technology, especially LPP TVRI is the first TV station to utilize video streaming technology and LPP TVRI West Java is in it, whereas for video streaming technology community is very helpful in the needs the public will be information and entertainment, the public can easily and practically watch TVRI West Java LPP programs through gadgets wherever and whenever. [9]

Advantages of video streaming technology that is utilized in LPP TVRI West Java is that the network chooses separately, especially in video streaming so that there are no network constraints, missed programs can be watched again by selecting TV catchup contained in the live streaming TVRI application. The drawbacks of LPP TVRI West Java's live streaming: LPP TVRI West Java's live streaming programs can be watched starting at 15.00 on the Kalawarta program until 21.00 on the music program. For YouTube when selecting LPP TVRI West Java programs that appear is the National TVRI live program, because LPP TVRI West Java's live streaming starts at 3:00 PM LPRI TVRI West Java program titles available on youtube when selected are still empty, so users must type the program desirable in the search engine. The obstacle faced by LPP TVRI West Java in video streaming is the Internet network used by users. [10]

Furthermore, Irfan has carried out the other research in 2017, with the headline "Analysis of the Application of Internet Television as a Digital Information Dissemination Media for Regional Development (Case Study of the Communication, Information, Archive and Regional Code of Kotabaru District)". This study discusses the readiness of the application of Internet television to optimize the dissemination of regional development information. In terms of the Regional Government especially those, which have a fairly large area and consist of islands, the existence of Internet television provides an opportunity to be able to disseminate information on regional development effectively and efficiently. This is related to the increasingly widespread use of gadgets that can access the Internet quickly, in addition to the support of the BTS (Base Transceiver Station) infrastructure that has entered into remote villages. Therefore in this study, it will be seen the readiness of the Regional Government (Kotabaru Regency) in implementing internet television technology using a quantitative approach through the distribution of questionnaires to Employees of the Kotabaru district's communications, information, archives, and regional code. In this study, an index of readiness for the communication, information, archives and Kotabaru regency was produced in terms of readiness to apply Internet television technology to optimize the dissemination of regional

[7] (*Littlejohn, S. W. (2009). Teori komunikasi, theories of human communication, edisi 9. Terjemahan Mohammad Yusuf Hamdan. Jakarta: Salemba Humanika*, n.d.)
[8] (*McQuail, D. (2011). Teori komunikasi massa, Edisi 6. Terjemahan Putri Iva Izzati. Jakarta: Salemba Humanika*, n.d.)
[9] (Kurniawati, 2019)
[10] (Kurniawati, 2019)

development information. [11]

In other references, as stated by Elhussein (2016), Tagging systems design is often neglected despite the fact that most system designers agree on the importance of tagging. They are viewed as part of a larger system which receives most of the attention. There is no agreed method when it comes to either analyzing existing tagging systems or designing new ones. There is a need to establish a well-structured design process that can be followed to create tagging systems with a purpose. This chapter uses practical inquiry methodology to generate a general framework that can be applied to analyze tagging systems and proceeds to suggest a design process that can be followed to create new tagging systems. Existing user behavior while tagging is the main guide for the methodology. User-centric approach in information system tries to discover how users' behavior is affected by the design of the system. With users in mind, user-centric design tailors how the information system is constructed according to the user group that is expected to interact with the system. This chapter introduces the concept with social tagging by following a methodology that is focused on providing solutions to specific problems. After a solution is found, the methodology suggest ways to expand it to similar problems within the domain. The conclusion of this research is Better understanding of the effect tagging components have over tagging behavior was achieved through FATS. Although this is useful, it is sometimes hard to explain tagging behavior coming from multiple tagging interface e.g Flickr taggers provide tags from the web-based system and/or the mobile based system. [12]

Research and Metodology

The research method in this article uses an interpretive paradigm with a case study approach. Data collection techniques using observation, in-depth interviews, and online search. Sources of data in this study are from various sides. Among them are the Chairperson of Suska TV Crew, Suska TV Master Control Room (MCR) Coordinator, Suska TV Users / viewers, and Community Television Observers. In selecting this informant the researcher used a purposive technique in which the researcher chose people who were considered to know clearly the problem under study. Sources of data in this study are from various sides. Among them are the Chairperson of Suska TV Crew, Suska TV Master Control Room (MCR) Coordinator, Suska TV Users / viewers, and Community Television Observers. In this study, researchers also used the method of triangulation with data sources.

Case study research is generally a study that has been produced from many sources. This research uses data collection techniques such as in-depth interviews, observation and document study. Stake in Creswell states that case studies are research that will explain an inquiry strategy where researchers explore in depth a program, event, activity, process or one or more individuals. [13] Creswell suggests several characteristics of a case study, namely: (1) identifying the "case" for a study; (2) The case is a "system bound" by time and place; (3) Case studies use various sources of information in gathering data to provide a detailed and in-depth description of the response of an event and (4) Using a case study approach, researchers will "spend time" in describing the context or setting for a case. [14]

Meanwhile, according to Patton in Pawito see that the case study is an attempt to collect and then organize and analyze data about certain cases regarding issues of concern to researchers and then the data is compared or linked with one another while still holding on to holistic and contextual

[11] (Irfan, 2017)

[12] (Saeed, S., Bamarouf, Y.A. and Ramayah, T. eds., 2017. Design solutions for user-centric information systems. Hershey: IGI Global., n.d.)

[13] (*Julianna Davidson, "John W. Creswell Research Design Qualitative, Quantitative, and Mixed Methods Approaches SAGE Publications, Inc (2009),"* n.d.)

[14] (*John W.Creswell, Qualitative Inquiry and Research Design: Choosing Among Five Tradition. (London: SAGE Publications, 1998),hlm.61-62*, n.d.)

principles. [15]

Asmussen and Creswell displays data collection through a matrix of information resources for the for its reader. This matrix contains four types data; interviews, observations, document and audio-visual material for the column and specific form of information such as students, administration for classifields. submission of data through this matrix is intended to see the depth and many forms of data collection, so it shows complexity form the case. The use of a matrix will be usefull if ap[lied in an information rich case study. Cresswell further revealed that interviews and observation are data collections tools which is widely used by various studies. This shows that both tools are central to all the traditions of qualitative research so requires additional attention from researchers. [16]

Results and Discussion

In the case study perspective approach, the use of internet-based live streaming video as an alternative communication medium of Suska TV is often referred to as having many integrated factors. There are factors that can be supporting and there are factors that might hamper production. Suska TV programs that are broadcast to community viewers, especially the UIN Suska Riau academic community at the same time as the original event, through internet-based Virtual mixer (Vmix) media make communication data connected.

The digitalization opportunity utilized by Suska TV is broadcasting its shows through the "Suska TV Official" Youtube account has been carried out for more than a year. From an online search and researcher interview with the chairman of the Suska TV crew for the 2017-2018 period, Ibnu said that SUSKA TV conducted the first live streaming broadcast on January 10, 2019, at the Judicial event organized by the Da'wah and Communication Faculty of UIN Suska Riau at the Premiere Hotel in Pekanbaru. Since then, almost every time there is a big event held on campus, for example, flag ceremonies, seminars, commemorative holidays, etc., SUSKA TV broadcasts live streaming on Suska TV Official's Youtube account and also through the Instagram platform.

> "Suska TV has a virtual video mixer around the end of 2018 if I'm not mistaken. We order through the custom procurement team from Solo and fix the first live streaming broadcast on the official Suska TV on January 10, 2019 to coincide with the Faculty Judicial event at the Premiere hotel. "(Interview on 29 Jan 2020)

Picture 2: Virtual Mixer Pro 17 Suska TV

[15] (Vebrynda et al., 2017)

[16] (*John W.Creswell, Qualitative Inquiry and Research Design: Choosing Among Five Tradition. (London: SAGE Publications, 1998),hlm.61-62*, n.d.)

In the production process of SUSKA TV's live streaming broadcast via YouTube channel, it is not much different from the satellite system on analog TV, both go through the process of selecting images that will air on the control room or better known as the Master Control Room (MCR). SUSKA TV also has a crew (MCR) working in the broadcast control room. SUSKA TV's MCR Coordinator will be responsible for controlling all live streaming programs. SUSKA TV's MCR coordinator, Fikrul Irsyad, said that the virtual mixer used was indeed intended for live streaming anywhere. It doesn't have to be in SUSKA TV's studio, because the shape is portable so it's practically taken anywhere to help the production process.

> "So indeed, since Suska TV, which is a campus TV, has a virtual mixer, our production process has been greatly helped, especially if we are having an important event outside of campus. So, this Vmix is portable so you can carry it anywhere. Practical. "(Interview on 4 Feb 2020)

Picture 3: The crew personnel while using The Virtual Mixer Outside The Studio

Meanwhile, how to work a virtual mixer (Vmix) can be said to be simple. Fikrul said that the principle works through the transfer of images directly from the camera to Vmix using certain software. Fikrul Irsyad, MCR Coordinator Suska TV said;

> "The way Vmix works is quite simple. The captured image is transferred via SDI cable to Vmix. Then, Vmix software will display a real-time Multicam of what is captured by the camera, there are several views in the Vmix software, including, 1 preview view, 1 program view or image which is on air, and some camera angle display all connected to Vmix and audio which enter Vmix through the audio port. "(Interview on 4 Feb 2020).

Meanwhile, from the viewer / user / users of Suska TV, one of the student informants, Aisyah expressed her appreciation to the research team. He said that since Suska TV has live streaming technology, many campus academicians have benefited greatly. For instance, during the graduation occasion on grounds. Suska TV broadcasts helped her family to watch the procession when Ayesha joined the graduation ceremony.

> "So yeah, this is another trend everywhere, live streaming broadcasts, moreover I'm proud that my campus can also participate in live streaming of graduation processions, so it benefits large families of students who are going to graduation because, no need to bother coming to the PKM building, it's full and crowded. You can just watch Suska TV on the graduation program. "(Interview on 5 Feb 2020)

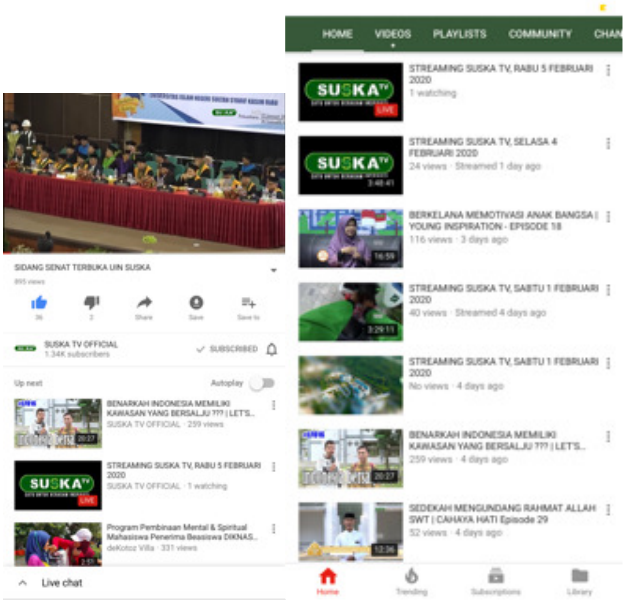

Picture 4: Live Streaming Scenes on The Graduation Event

On the other hand, Hisam Setiawan, deputy chairman of the Riau Regional Indonesian Broadcasting Commission (KPID) as a community television observer stated that until the beginning of 2020 there was still a moratorium on Broadcasting Operations Licenses by the Ministry of Communication and Information Technology (Kominfo). Hisam said that at this time in Pekanbaru, in particular, there was not a single community TV that could broadcast analogs via terrestrial.

> "Since its establishment, SUSKA TV should have been running a broadcast trial for 1 (one) year, and after that, it would obtain permanent permission for analog broadcasts. However, due to constraints on the moratorium from the Minister of Communication and Information of the Republic of Indonesia which issued Circular Letter Number 1 of 2017 concerning the Moratorium on New Applications for Analogous Television Broadcasting Services for Terrestrial Broadcasting Services since February 6, 2017. This is valid for an undetermined deadline. However, this does not apply to applications for new licenses and expansion of broadcast coverage in Disadvantaged, Frontier and Outermost (3T) areas. Well, for borders, you can, but, for TV campus communities like SUSKA TV, you have to be patient. "(Interview on 3 Feb 2020).

However, the enactment of the community TV broadcasting moratorium until now has not broken SUSKA TV's enthusiasm as a campus TV to continue producing through digitizing broadcasting. This is in line with what was written by Putri Adenia, regarding "Campus Television: Enlighteners Without Regulation". Campus media, including campus television, are identified as part of community media with limited reach. But the development of technology and the world of the Internet, it is appropriate that the understanding and regulation of community media be reviewed. Because of the Internet platform, making the campus media reach broad and has the same opportunities as the mainstream mass media. Even campus television has the opportunity to become an alternative TV for the community when the condition of the mainstream-broadcasting world is currently controlled by a handful of people. Seeing this opportunity, AJI Indonesia supported the implementation of TELEVISIONAIR organized by UMN TV, television campus of the Multimedia Nusantara University. [17]

[17] ("Televisi Kampus," n.d.)

According to Euis, Technician of Suka TV at UIN Sunan Kalijaga, they have been using live streaming technology using an analog system since 2015, and then in 2019 began using Internet-based Black Magic technology. According to him the use of internet-based live streaming technology has advantages and disadvantages.

"The advantages related to an unlimited target audience, internet-based live streaming systems could also be recorded and watched multiple times after live broadcasting. But, the drawback is that the network must be stable, then for off-campus production, we must always refill Internet data packages. "(Interview on 5 Feb 2020)

Besides, concerning the use of Youtube and Instagram platforms in broadcasting Suska TV, this has its advantages. In the article it is mentioned that the use of various platforms to support broadcast programs is very useful, in addition to free, good management will make the target to be achieved will be easier. From various media platforms used, such as conventional television, TV streaming, netcj.co.id website, Net CJ applications, Twitter, Facebook, Path, Instagram, Google Hangout and YouTube have different functions. The merging of various media platforms is known as convergence. [18]

Conclusion

It can be concluded based on observations and in-depth interviews, then found 2 factors supporting and inhibiting the use of live streaming video using the internet network at Suska TV. Supporting factors include, first, can produce live shows anywhere. Production of news broadcasts, campus programs, and events does not have to be done in Suska TV studios. Second, Following communication technology trends. Through a Youtube account, it gives freedom for the campus community to choose to watch the shows they want from their respective gadgets and then freely watch Suska TV shows again. While the inhibiting factors include, Bandwidth in the campus of UIN Suska Riau, which still needs to be increased. This is needed so that the quality of the broadcast is maintained and is not constrained by delay. Second, the qualification of live streaming technology that is used must always follow existing developments. This requires a lot of costs and Human Resources (HR) so that Suska TV can still be active in producing through digitizing broadcasting. This research is expected to be one of the references in the next research regarding the same theme of broadcasting digitalization, new internet-based media, campus community television, and so on.

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[18] (Vebrynda et al., 2017)

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Leadership Models in Construction Company: The Consistent Pursuit of Circular Economy Maturity

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Abstract

The building sector is featured by significant influence on the environment. Both buildings and non-building structures require natural resources to be constructed and maintained. There are many unsolved problems in the construction industry. One of the most important is the extensive usage of resources for construction projects. In the absence of proper education, even the most excellent ideas may be insufficient in eliminating emissions and other negative externalities. Due to the complexity of the organizations, both in a project and in corporations, that is among individual stakeholders, it is worth indicating leaders of change. In the article, based on the literature review, it was pointed out that knowledge management in a construction company should primarily be based on the corporate culture that shows a preference for the idea of Circular Economy. The path to CE maturity has been shown as a continual pursuit. The consistency enables for effective promotion of the concept of CE in the construction company. The research allowed to draw three explicit phases: disharmony, euphoria, harmony in becoming CE-matured by the enterprise.

Keywords: leadership, construction company, Circular Economy, organizational behaviour.

Introduction

Waste collected during construction and demolition phases is a priority for many policies at a local, regional and global level (López Ruiz, Roca Ramón and Gassó Domingo, 2020) at the moment. Whereas in the building sector many issues connected with energy efficiency are being widely studied, the ways to get rid of the pollution problem is still in its embryonic stage (Leising, Quist and Bocken, 2018). The concept that is gaining increasing recognition, especially among legislative decision-makers in the European Union, is Circular Economy (CE). Its applicability in different sectors is an evident advantage. In the construction industry, its implementation consists mainly of new design philosophy where different disciplines are integrated in advance to check their applicability and constructability.

The organization is the basic assumption on which the methodology of a system theory of organization is based. In a system approach, instead of dealing with individual segments of the organization separately, it is treated as a whole and a purposeful system, composed of interrelated parts. Similarly, in the case of construction companies which, apart from the main processes, there have also several side processes (managerial or supporting). A model of the construction company system is presented in Figure 1.

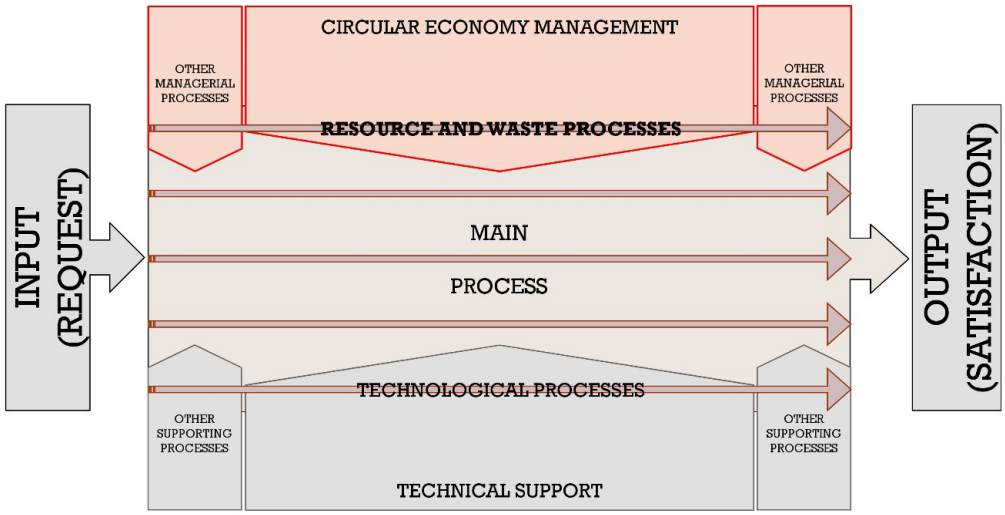

Fig. 1: Business process map in construction companies – specification of managerial processes including CE management

One of the key challenges of the construction industry is the transition from an extensive development model based on the concept of linear production, which treats the used product at the end of its life as waste (Bassi and Dias, 2019), to a sustainable development model involving production in a closed circulation of resources. Various issues threaten the sustainability and many of them are coming from human behaviour (Abusafieh and Razem, 2017). Due to a limited number of studies which take into consideration the human behaviour, the organizational behaviour, or the leadership models and their influences on the sustainable built environment (Soares *et al.*, 2017; Wang, Pan and Luo, 2019), this article addresses the issue of leadership as a prerequisite for the diffusion of knowledge about Circular Economy in construction companies. The roles of individual stakeholders in construction projects in shaping corporate culture based on CE principles are detailed in the manuscript. Showing a changeable leadership ecosystem based on an evolutionary approach, and situational leadership theory developed by Hersey and Blanchard, was the main concern of the research. All considerations were based on the desk research method.

Circular Economy in the building sector

Circular Economy usually means the philosophy of breaking with the current thinking about products based on a linear model and promoting a new production system created on the basis of a perpetual circulation of resources. Due to the multitude of manufacturing processes within construction projects, there are many types of waste that are generated in large quantities. When considering supply chain models in the construction industry, it should be borne in mind that they reflect the mutual relationship between stakeholders in construction projects in the field of material flow. When it comes to adding value to customers, one can consider a model that shapes the form of a closed-loop (Figure 2).

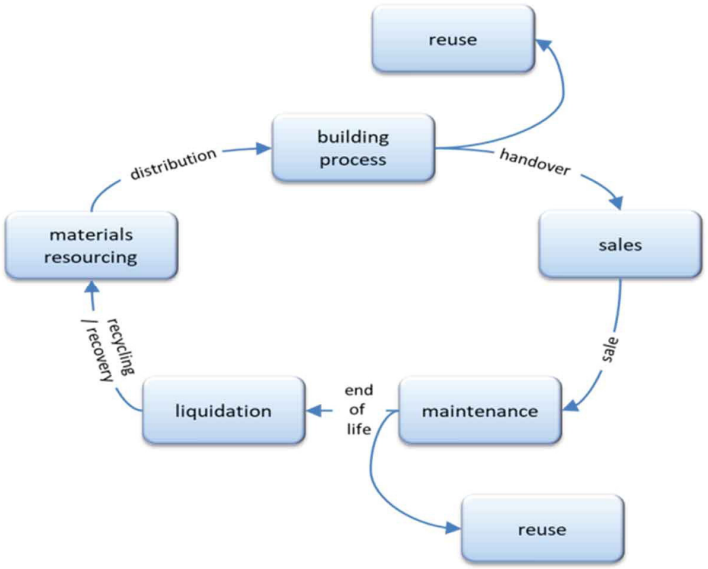

Fig. 2: Closed-loop project value chain for value management of construction projects (Górecki *et al.*, 2019)

Each working package related to the implementation of a new production effect is characterized by the standard material usage. It determines their quantity necessary to perform a unit of process or an element of the structure, in accordance with all applicable technical and rational, i.e. economical, material management standards. The standard of material usage includes not only the amount of material built into the building/non-building structure (basic consumption) but also the amount of waste and losses. Even the most restrictive set of procedures will not limit the amount of waste and losses to an absolute minimum. In addition, demolition processes provide waste, which is treated as worthless matter.

Circular Economy, as an idea on the one hand, and as a real action on the other, supports the construction industry by reducing its negative impact on the environment. The degree of involvement of main stakeholders of the construction projects in Circular Economy was shown in Table 1, depending on the project's phase. At the same time, the risks that should be considered at each stage were shown.

Table 1: Possibilities of using CE by various stakeholders of construction projects, based on (Bennett, 2003; Nuñez-Cacho *et al.*, 2018; Górecki *et al.*, 2019; Górecki, 2020a)

Stakeholder's name	First phase of the involvement	Last phase of the involvement	Potential activities	Dominant risks
Investor	Pre-project phase – initiation	Closure – end of project closeout and termination phase	- setting CE requirements for an architect, - setting CE-related requirements for a contractor, - selection of investment location enabling materials recovery,	- the unprofitability of investments in CE (financial risk), - extension of construction time (schedule risk), - lack of suitable architects, contractors and managers,

Stakeholder's name	First phase of the involvement	Last phase of the involvement	Potential activities	Dominant risks
Contractor	Execution – the start of contractor mobilisation phase	Handover – end of contractor mobilisation phase	- selecting ambassadors of Circular Economy (ACE), - setting ACE in the organizational structure of the enterprise, - establishment of the CE training program, - promoting CE as a part of corporate culture, - carrying out the reorganization/reengineering processes, - search for new technologies for the recovery of building materials,	- resistance to changes among employees, - incorrect and inefficient training, - wrong organizational changes, - lack of appropriate technologies at the time of operation
Architect	Start of planning and design phase	Execution – end of architectural supervision	- proposing CE-friendly design solutions, - design in accordance with CE, - analysing the possibilities of reusing materials after their end-of-life,	- lack of appropriate competences, - lack of appropriate tools for analysis,
Project manager	Pre-project phase – definition of project	Closure – fulfilment of project goals	- selecting Circular Economy managers (CEM), - setting CEM in the organizational structure of the project, - using measures of the degree of involvement to the idea of CE, - preparing response plans for CE-related risks, - selecting project partners according to their levels of CE maturity	- inappropriate project assumptions, - bad diagnosis of project status, - inefficient planning and risk management, - lack of knowledge about all project activities

The table above shows that CE can be considered on many levels, including both a construction company and a project. It has been noted that there is a number of risks that give rise to uncertainty about future CE-related states.

Finally, it can be seen that a lack of knowledge and tools hampers Circular Economy in the building sector, which in turn is treated as a macro-level transformation to a sustainable economy (Anastasiades *et al.*, 2020; Foster, 2020). Therefore, in order to promote closing loops of supply chains in construction projects, it seems inevitable to put stress on a controlled leadership. The specificity of the building sector implies a need for considering the attributes of business activity in the whole life-cycle perspective.

Building CE-based corporate culture

General Background

Environmental issues have recently become the focus of considerations on the modern paradigm of management of construction companies (Górecki and Bizon-Górecka, 2019). Noticing the significant impact of these organizations, participating in various construction projects, on the natural environment has become the beginning of changes in thinking about their resources. It has become necessary to review the needs of enterprises, reduce the degree of consumption, as well as to develop new technologies or methods of process management in accordance with the principles of sustainable development (Górecki, Swoiński and Bizon-Górecka, 2018).

A large number of investments around the world, as well as the multitude of construction project stakeholders, who are mainly construction companies responsible for erecting building or constructing infrastructure, having various impacts on the course of these processes (Bizon-Górecka and Górecki, 2017), raises concerns about the effectiveness of measures to reduce the negative externalities of this business activity.

The risk of construction projects is of great importance, which determines the concern of enterprises for effective methods of planning their activities. This term is generally understood as the likelihood of diverging between plans and reality (Górecki and Bizon-Górecka, 2017). It may relate to various aspects, but particularly concerns issues of cost, time, scope and quality.

Basic Attributes of Models

The risk manager, responsible for preparing response strategies (including planning and decision making process) for possible deviations of the actual course of the project from the initial plans, may become a creator of the project maturity in a construction company (Górecki and Bizon-Górecka, 2018). This concept understood as the pursuit of a high level of perfection in mastering the management of the basic attributes of construction projects becomes rudiments of the new leadership model. To ensure appropriate dissemination of knowledge about Circular Economy, it is necessary to create a specific ecosystem based on the CE maturity (Górecki, 2018), achieved through the appropriate strategy and corporate culture.

Figure 3 shows a situation where there is a lack of harmony in the values represented by the employees of a given enterprise. A change leader is emerging - the so-called leader of the Circular Economy in a construction company, also known as Circular Economy manager (CEM) (Górecki, 2020b). His/her competences are indisputable, he/she can be a graduate of post-graduate studies in the field of Circular Economy in construction or a participant of training/workshops on such topics. At this time, only he/she and the top management (because they hired him) are aware of the advantages of managing construction projects under CE requirements. The beliefs and values of the leader are usually divergent with the beliefs and values of other employees. The CEM's effort should be directed towards sharing these qualities with others and educating them. This stage is characterized by the evolution of CE maturity, and when it comes to the period it can be called adolescence of Circular Economy culture in a company. The success of this phase depends on the level of commitment of the leader, the belief in the correctness of matters, as well as the consistent pursuit of change.

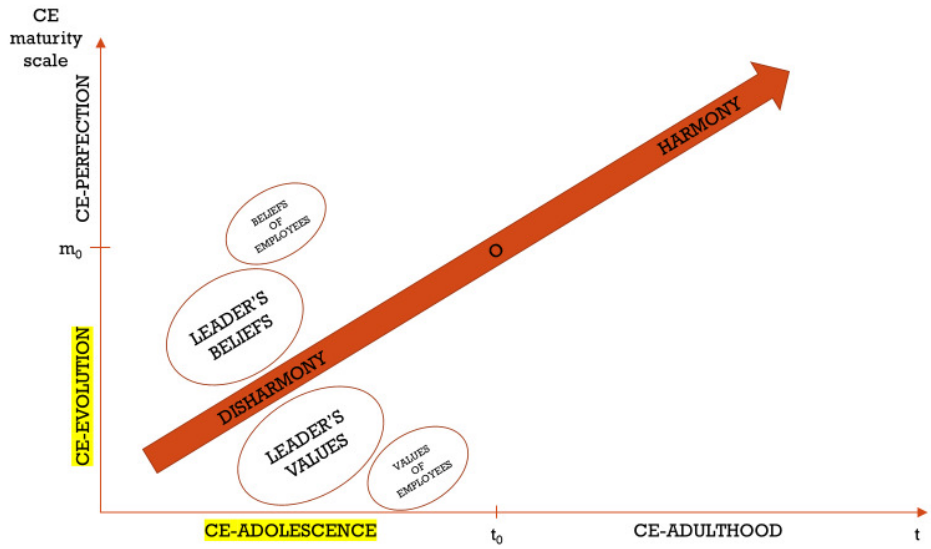

Fig. 3: The pursuit of high perfection in meeting CE requirements in construction companies - stage one: disharmony

The next stage is the euphoria (Figure 4). After a monotonous period of internal organizational changes, employee training, discussions, consultations, reorganization, and sometimes reengineering in a construction company, the phase is reached where all beliefs and values of the leader and other employees become shared. This is not a state given once and for all; turnovers, periodic failures, as well as the routine can lead to these qualities being diverged again. The CEM's effort should be directed towards maintaining a state of euphoria. This moment $M(t_0)$ can be called CE-maturity-equilibrium. Further actions must lead to the perfection of actions and, associated with it, the harmony.

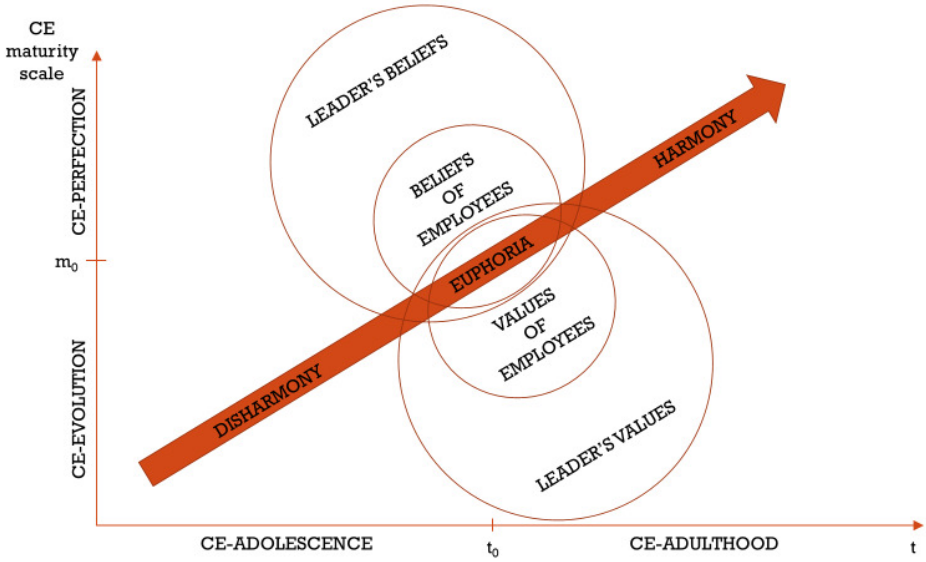

Fig. 4: The pursuit of high perfection in meeting CE requirements in construction companies - stage two: euphoria

The harmony (Figure 5) that can be observed in construction companies, related to achieving perfection in mastering procedures in accordance with CE principles by all employees, is the final

stage of the pursuit. It crowns the efforts of CEM, as well as all employees who have gained the conviction that their beliefs and values are common to all. The newly created corporate culture can be a condition for the success of a construction company that uses the advantages of the CE approach.

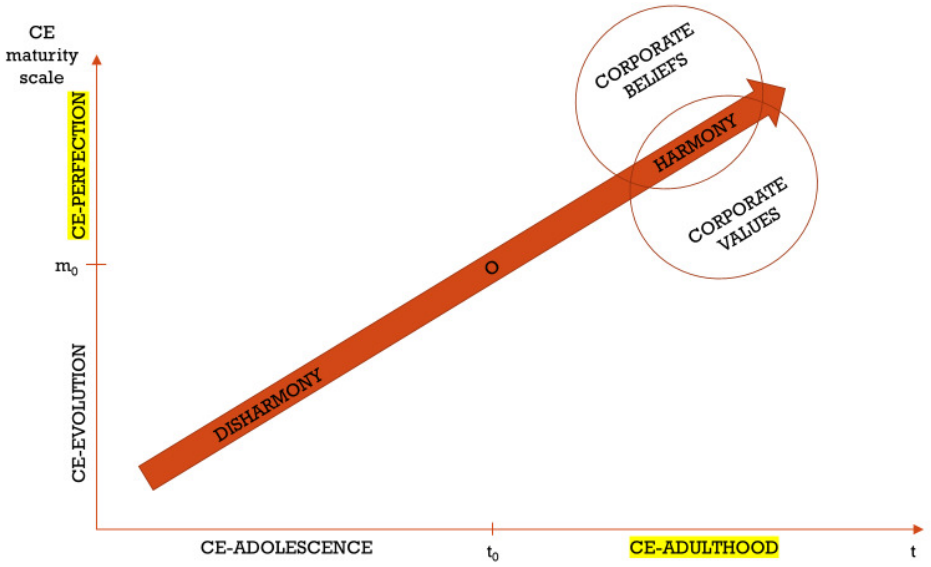

Fig. 5: The pursuit of high perfection in meeting CE requirements in construction companies - stage three: harmony

However, for the transformation described above to be realistic, it must be conditioned by appropriate leadership models.

Modelling leadership

Effective business activities depend on the quality of individual employee behaviour (Gilstrap and Hart, 2020). To effectively implement construction tasks, it is necessary to use appropriate tools to use power and influence the subordinates in a clever way. Acting as a leader, who should be equipped with the sensitivity and diagnostic ability, is not easy (House, 1997). There are many leadership theories also covering various leadership styles (autocratic, democratic, laissez-faire). When choosing the right strategy, one can be guided by the achievements of modern science, including situational leadership theory (Hersey and Blanchard, 1988). The style, developed by Paul Hersey and Ken Blanchard, is based on the following assumption: a good superior should provide his subordinates with what they need to effectively carry out the tasks set. The leadership is conditioned by the fact the boss should base his/her influence on subordinates not only on the professional hierarchy but also on the authority he/she builds around him/her (Al-Najjar, 2001).

Therefore, at the beginning of activities aimed at transforming a construction company into an organization based on procedures in accordance with CE principles, some resistance from employees should be expected. A situational leadership model in a construction company is shown in Figure 6. It can be noted that an appropriate approach at the beginning is to use high discipline (manager - drill sergeant). One should gradually strengthen the instructions and transform the approach (manager - athletic coach).

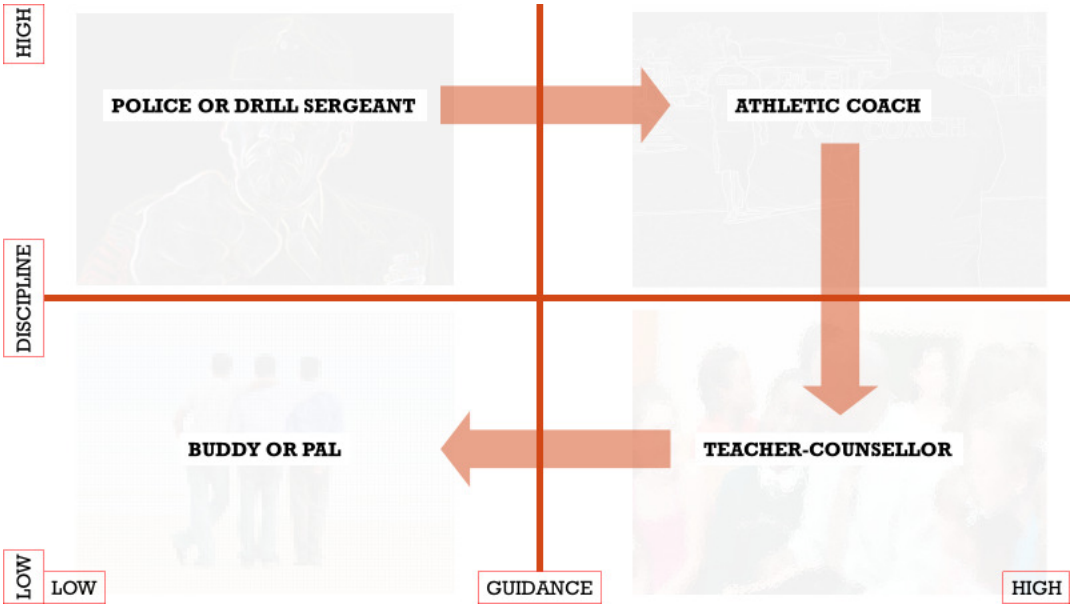

Fig. 6: Situational leadership model for effective knowledge diffusion about Circular Economy in a construction company

Once all the rules are understood by most employees, one can begin to limit the discipline by replacing it with greater concern for the wellbeing of subordinates (manager - teacher-counsellor). As work is not a military training ground, it is necessary to balance management styles with the effects observed. When everybody starts to understand what CE is about, what the rules are and why it is beneficial to keep it, the guidance can be limited and a relaxed attitude towards employees begins (manager - buddy).

This model emerged on the basis of parent-child relationships described in the literature (Eloff and Ebersöhn, 2004).

Summary

Transforming a construction company into an organization that cares about ecology, sustainable development and promotes behaviours based on Circular Economy principles is not easy. It requires time, experience and persistence in pursuing the goal. It is not only about conducting a series of training sessions with certificates. It is not just about drawing up and enforcing new procedures. This transformation is a constant pursuit of harmony in which the beliefs and values of the corporation are the same as what the employee feels. Of the many leadership models, the situational one presented in this article seems to be the most rational.

It is obvious that the leadership may be a subject of criticism. Leaders may commit some mistakes too. They can resign from the values they praised before. People are just people but in the end, one should trust them to achieve some goals.

The basic concept of situational leadership including four original steps: delegating, participating, selling and telling was adapted to new circumstances of effective knowledge diffusion of Circular Economy in a construction company.

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Leadership Models in Construction Company: Facing New Technological Challenges

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Abstract

Construction is a sector of the economy being under a significant influence of developing technology. Buildings and non-building structures shape the environment and "consume" natural resources throughout their life cycle. They "live" many years what makes that management of a construction project (taking into account the entire life cycle) is the goal of many generations of supporting technologies. The technologies may be used in the phase of design, construction, maintenance and demolition of buildings and non-building structures. They refer to manufacturing processes, construction production or management. They include the use of computers, automated tools and machines or other intelligent devices. Therefore, contractors of construction projects have to be sensitive to these issues. In the article, based on literature studies, it was revealed that knowledge management in a construction company should primarily be based on the corporate culture that shows a preference for computer-aided methods. The path to technological maturity of the construction company has been shown as a continual process. The consistency enables for effective promotion of innovative technologies in the construction company. The research allowed to draw three explicit phases: lack of experience, euphoria, experience in becoming technologically-matured by the enterprise.

Keywords: knowledge, technology, skills, construction company, IT.

Introduction

Construction as a significant sector of the economy has been a subject of the continuous impact of the technology. After the Second World War, development of the technology was concentrated on the methods of constructing prefabricated buildings and non-building structures. A straight advantage of the approach was a rapid construction process which resulted in a quick supply of the ecosystem needed by and convenient for societies in many European countries after years of destructive military activities. After some decades, technology development was focused on other issues, e.g. manufacturability (Fastenau, 1984), energy savings (Opitz *et al.*, 1997), quality (Neelamkavil, 2009), cost and time efficiency (Blake, 1990; Salam and Jose, 1995), diversification of solutions etc. – it means a further improvement of the construction methods. Nowadays, development in this area is still observed (e.g. graphic or transparent concrete (Goss, 2016), new and improved precast accessories, including seismic-resistant joinery techniques (Kurama *et al.*, 2018) etc.), but the effects are no longer as spectacular. On the other hand, brand new materials are expected to replace the currently used, and not always environmentally friendly material technologies.

A final phase of the 20th century was connected with other technological revolution – implementation of IT to construction projects. It was noticed that methods of construction were developed sufficiently but there were still other undiscovered challenges connected with an efficient way of raising buildings and creating infrastructure. Digitalization of the construction sector is not a rapid process.

Unlike in other sectors of the economy (manufacturing or services), market players of the construction are still quite sceptical about the innovations of the IT origin. Many construction companies are featured by comparably low level of use of computer-aided methods. Due to this fact, there is still a small percentage of enterprises using Building Information Modelling (BIM) (EUBIM Taskgroup, 2017) or accompanying technologies Virtual Reality (VR) (Kim *et al.*, 2013), Augmented Reality (AR) (Shanbari, Blinn and Issa, 2016) or Mixed Reality (MR).

Lately, it has been discussed that sustainable ways of conducting construction processes are inevitable. Therefore, more and more theoreticians and professionals concentrate on new concepts like environment-focused certifications of buildings including the Building Research Establishment Environmental Assessment Method (BREEAM) (Cheng, Behzadsodagar and Feifeisun, 2017) or the Leadership in Energy and Environmental Design (LEED) (Azhar *et al.*, 2011), the ISO 14000 and its relevance to the construction industry, the Life Cycle Assessment (LCA) (Bribián, Capilla and Usón, 2011; Wang, Zhang and Wang, 2018), Life Cycle Costing Analysis (LCCA) (Cabeza *et al.*, 2014), cradle-to-cradle (C2C) approach (Silvestre, De Brito and Pinheiro, 2014; Van Dijk, Tenpierik and Van Den Dobbelsteen, 2014), design for deconstruction (DfD) (Cai and Waldmann, 2019; Basta, Serror and Marzouk, 2020), green labels (Chegut, Eichholtz and Kok, 2019) or Circular Economy (CE) (Nuñez-Cacho *et al.*, 2018; Górecki *et al.*, 2019; Górecki, 2020). All these ideas seem quite complicated, but they all have something in common - are connected with mechanisms that are favourable, not harmful to the environment, and related to construction projects. Despite the apparent environmental connotation, these activities are possible mainly due to the use of product or process innovations - whether in the field of heating, ventilation, and air conditioning (HVAC) technologies, whether in the field of new recovery, reuse and recycling technologies, or finally due to the use of new, yet even uncovered or untested building materials.

The development of construction-related technology has not been limited by the aforementioned actions. The Industry 4.0 (or its related term of Construction 4.0) (Hossain and Nadeem, 2019; Spisakova and Kozlovska, 2020) concept brings even more challenges. It requires changes on many levels: technological, organizational or mental both in construction companies and construction projects. It seems that despite the unimaginable development of the entire construction ecosystem including all elements of business activity in construction, upcoming years may be a moment of a critical juncture in which it will be possible to combine seemingly disjoint and incoherent elements into one idea sustainable and circular construction. Remodelling the entire traditional construction process into a chain of interrelated activities carried out by automated production systems (like 3D printing (Khorramshahi and Mokhtari, 2017)) based on Big Data (Batty, 2016; Górecki, 2018; Burak Gunay, Shen and Newsham, 2019), processed in data mining supervised by artificial intelligence (AI) (Cheng, Chang and Korir, 2019; Xu, Chong and Liao, 2019), in accordance with the spirit of sustainable development, with a closed-loop of resources conditioned by product and process innovations is becoming the industry's most important challenge in 21st century.

All in all, the subject of trends in the construction sector should be broadly perceived. This article focuses on the issue of technological conditions for the development of construction companies. It has been assumed that the technological process is one of many processes present in the company's production system (Figure 1).

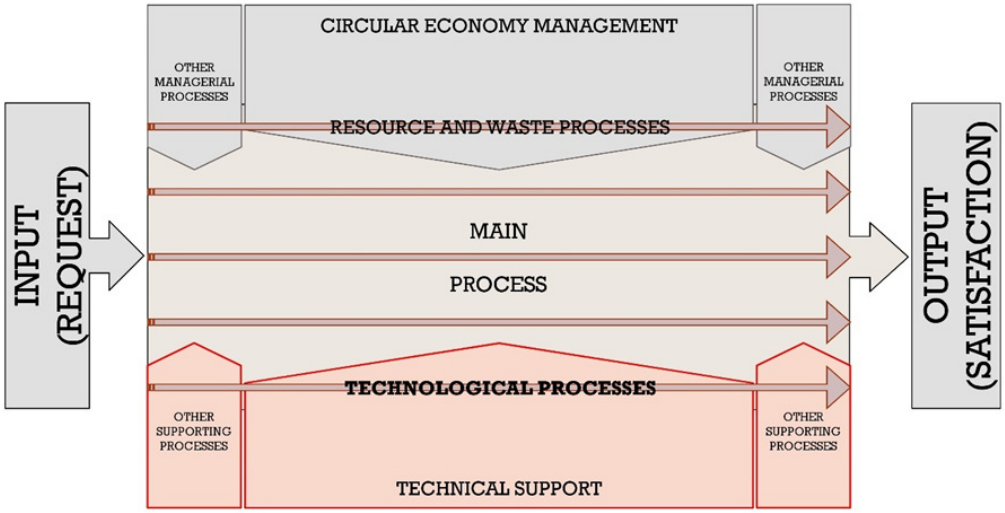

Fig. 1: Business process map in construction companies – specification of supporting processes including technical support

However, it requires constant technical support. Preferring a development model based on technology treated seriously as an advantage and an implementation of innovative technologies as an opportunity both for companies and projects has become the starting point of the study.

Technological challenges in the construction sector

Building means erecting buildings and other constructions, infrastructure etc. From the executive point of view, the erection process can be categorized according to where most construction production takes place. Therefore, it is possible to erect the building and non-building structures from delivered building materials directly on the construction site (e.g. monolithic construction). Another option is prefabrication (pre-construction) of elements that, after being transported to the construction site, are built into the place, i.e. jointed using various joinery techniques. The further division consists in taking into account the dominant material used to manufacture a given building element (concrete - precast, reinforced concrete, ceramic, wooden, metal structures - although the latter are only prefabricated). Today, it is believed that it is easier to implement innovations with regard to the quality criterion in a prefabrication mode.

Mechanization of the production of building materials is a part of the economy that drives the development of technology basically around the construction sector, but which has a significant impact on this sector. It turns out that innovations derived from manufacturing materials create pressure to seek new solutions at the stage of construction works. Prefabrication factories are a place of robotization of production processes. To meet expectations of the customers and not to squander a high quality obtained at an earlier stage, contractors are somewhat forced to demonstrate continuous improvement of processes at the further step – on a construction site. What's more, innovations from the design stage also reinforce the need for implementing innovations on the construction site. The best example of this is the use of BIM. Software, based on such attitude, is a great tool for simulating the best solutions and creating the so-called Digital Twin (Kaewunruen and Xu, 2018; Lu *et al.*, 2020) of a future facility. However, the potential of BIM is unused as long as technologies based on this idea are not used in subsequent life cycle stages of a building or a non-building structure, i.e. at the stage of construction, maintenance or end-of-life. All in all, the conceptual package related to the development of technologies used in construction is very capacious and contains a lot of concepts. A set of these ideas are presented in the form of a word cloud in Figure 2.

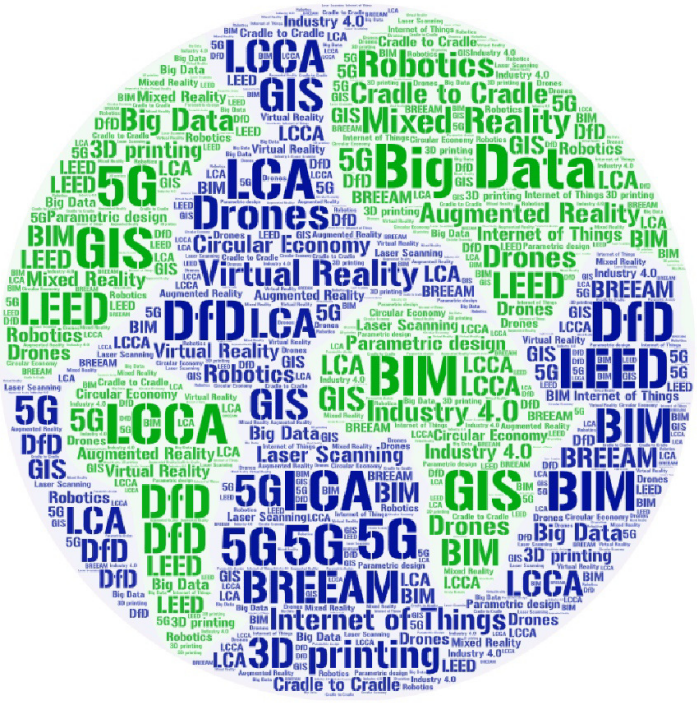

Fig. 2: Word cloud based on concepts connected with new technologies connected with the construction sector

Historically, technology has always been the driving force of the industry. Today, thanks to the universal availability of technology, as well as remodelling business concepts of various industries, it is a competitive advantage mainly in the sphere of services. The development of innovations, not only in the construction industry, is based on three pillars: technology, law and administration and social acceptance. Today, this first foundation is easily solvable thanks to advanced computational techniques or modern production systems that are able to provide a product whose specification is unimaginably complicated. And we can do it. The law is a little harder to manage. Legal regulations take place at various levels and in various forms. However, the most difficult is to convince users and system participants to accept, adopt and use innovations. People and their perception are becoming the industry's most difficult challenge.

Construction works the same way. Perhaps the conditions in which construction projects are carried out remain unchanged. Still, the building must ultimately be erected (whether built or assembled) in the target area, in certain variable soil and water conditions, with the participation of many entities, not always agreeing with each other, etc. But the methods and means of achieving the same goal as before have been and are being improved. To sum up, technological innovations in construction are present in various areas, from the production of building materials, design processes, through logistics processes, methods of erecting construction objects, including technologies of construction works - junctures and constructing, techniques of project management (in costing, scheduling, quality control, inspections or project settlement), up to the stage of managing the existing building or non-building structure, and finally the moment of its demolition.

Technology-oriented leadership models

General Background

It has to be noted that, on the one hand, technology is an opportunity that leads to increasing the efficiency of processes. On the other hand, however, it is a threat, it will be a surveillance tool or a

technique used for unfair competition, etc. Therefore, how to deal with this dilemma? First of all, one should focus on education as a dimension of implementing strategies to deal with the threats arising from the development of technology. This article is devoted to searching for a way to shape the technological maturity of a construction company expressed by the harmonized state of competence of all employees in the field of technology used in the enterprise.

Basic Attributes of Models

Figure 3 presents a case where there is a lack of harmony in the values represented by the employees of a given enterprise. A change leader is emerging - the so-called leader of the technology development in a construction company, who can be called construction technology manager (CTM). His/her competences are indisputable, he/she can be a graduate of post-graduate studies in the field of IT for construction, construction technology or a participant of training/workshops on such topics. At this time, only he/she and the top management (because they hired him) are aware of the advantages of managing computer-aided construction projects. The skills and knowledge of the leader are usually divergent with the skills and knowledge of other employees. The construction technology manager's effort should be directed towards sharing these qualities with others and educating them. This stage is characterized by the evolution of technological maturity, and when it comes to the period it can be called technological adolescence of a company. The success of this phase depends on the level of commitment of the leader, the belief in the correctness of matters, as well as the consistent pursuit of change.

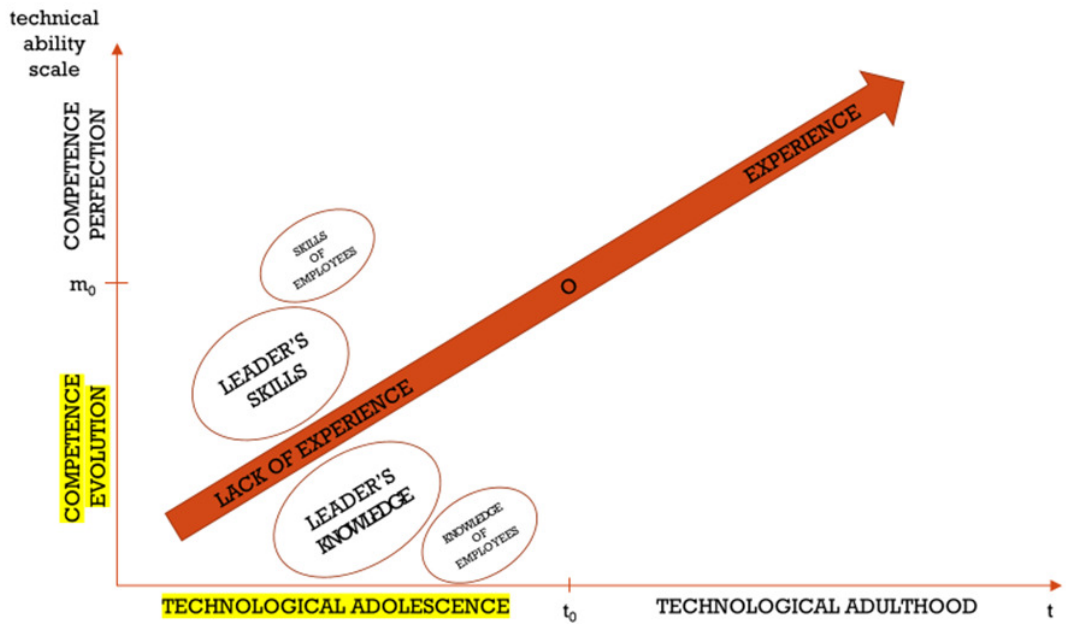

Fig. 3: The pursuit of high perfection in meeting technological requirements in construction companies - stage one: lack of experience

The next stage is the euphoria (Figure 4). After a monotonous period of internal organizational changes, employee training, discussions, consultations, reorganization, and sometimes reengineering in a construction company, the phase is reached where all skills and knowledge of the leader and other employees become shared. The construction technology manager's effort should be directed towards maintaining a state of euphoria. This moment $M(t_0)$ can be called technological-maturity-equilibrium. Further actions must lead to the perfection of actions and, associated with it, the full experience level.

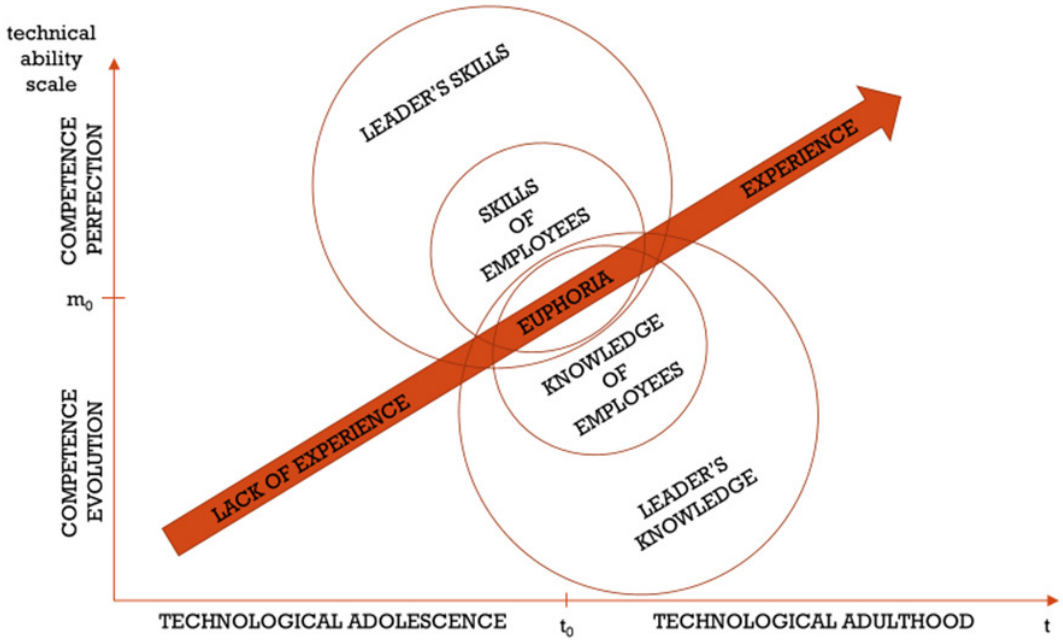

Fig. 4: The pursuit of high perfection in meeting technological requirements in construction companies - stage two: euphoria

The full experience level (Figure 5) that can be observed in construction companies, related to achieving perfection in mastering competence in terms of technology by all employees, is the final stage of the process. It crowns the efforts of CTM, as well as all employees who have gained the conviction that their skills and knowledge are common to all. The newly created corporate culture can be a condition for the success of a construction company that uses the advantages of competence perfection in technology connected with construction.

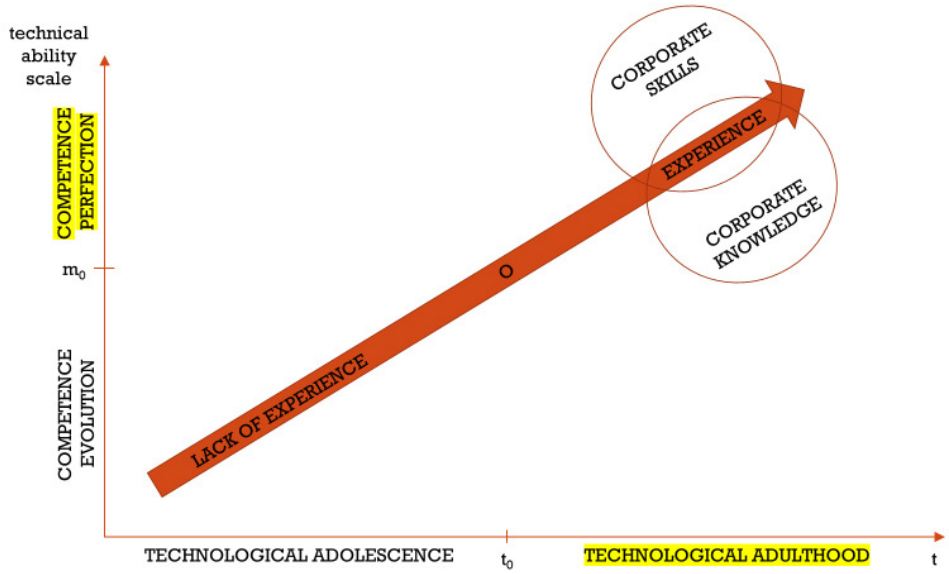

Fig. 5: The pursuit of high perfection in meeting technological requirements in construction companies - stage three: full experience

However, for the progress described above to be realistic, it must be conditioned by appropriate leadership models.

Modelling Leadership

Effective business activities depend on the quality of individual employee behaviour (Gilstrap and Hart, 2020). To effectively manage construction processes, it is necessary to apply appropriate means to use power and impact the subordinates in an efficient way. Being a leader is not an easy task (House, 1997). There are many leadership theories with various leadership styles (autocratic, democratic, laissez-faire).

A choice of the right strategy should be guided by the achievements of modern science, including evolutionary leadership theory (van Vugt and Ahuja, 2010). The attitude, developed by Van Vugt & Ahuja, is based on the following assumption: both leadership and followership are important for the reproductive success of ancestors. However, modern organizational structures of companies of all industries are sometimes inconsistent with innate psychological mechanisms of two processes: leading and following. This explains some problems in the relationship between managers and subordinates. The leadership is conditioned by the fact that turning subordinates (employees) into followers of the leader is a key success factor for organizations.

An evolutionary leadership model, configured for technology knowledge management in a construction company, is shown in Figure 6. It can be noted that an appropriate approach at the beginning is to use open communication model for superior-subordinate. Then a feedback quality increases and the behaviour of the employee switches into a distant observer.

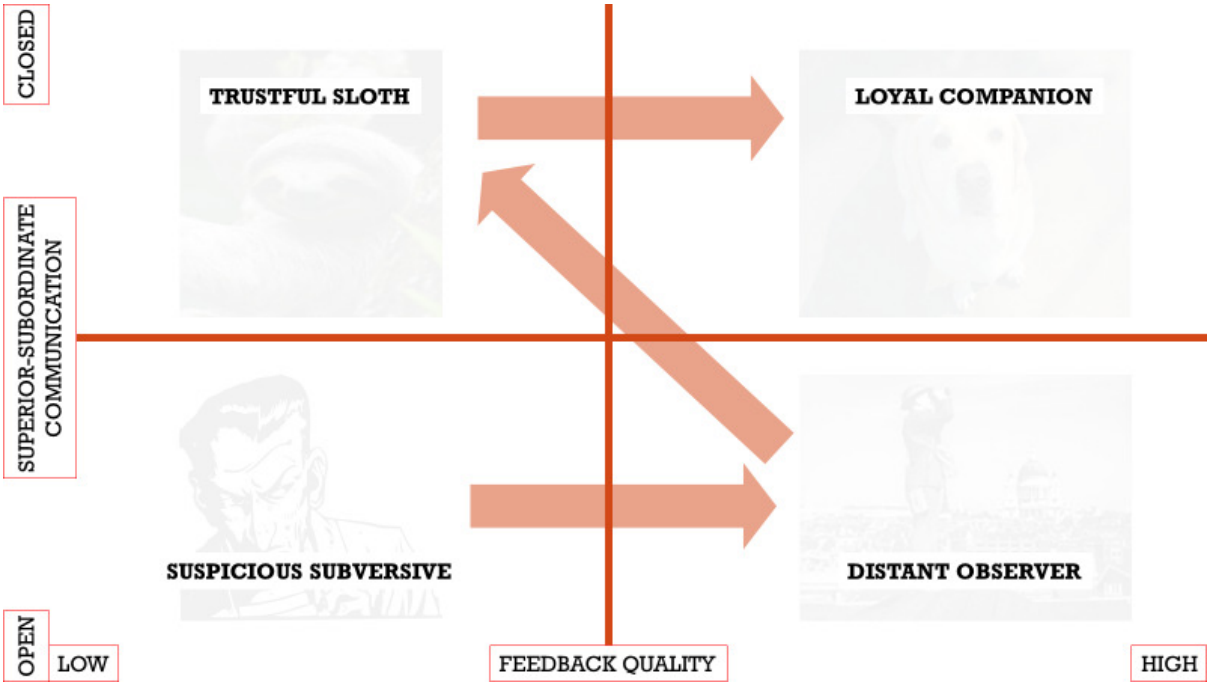

Fig. 6: Evolutionary leadership model for effective knowledge diffusion about technology in a construction company

Once all the communication model converts into a closer one, once again a feedback quality decreases as the subordinates become more suspicious again. When everybody in the organization starts to understand how to use all advantages of the technology in a construction company, the feedback quality can increase one more time and an employee becomes a loyal companion as he/she trusts in the leader and his/her position.

This model emerged on the basis of student-master relationships described in the literature**.**

Summary

Transforming a construction company into an organization that cares about technology development and diffusion of the related competences is not easy. It requires time, experience and persistence in reaching established targets. Going towards technological adulthood is not only about conducting a series of training sessions about BIM, Big Data, drones etc. with certificates. It is not just about creating new procedures. This transformation is a process of getting experience in which the skills and knowledge of the whole corporation are the same as what the employee can and knows. The evolutionary leadership model seems to be the most rational of all. It is obvious that the leadership may be a subject of criticism. Leaders may be the wrong example. They can trick and lie. But in the end, one should trust them to achieve some measurable benefits. The basic concept of evolutionary leadership including four original states: suspicious subversive, distant observer, trustful sloth and loyal companion was adapted to new circumstances of effective knowledge diffusion of technology development in a construction company.

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Negoitation in Modernity : The BAZNAS (National Zakat Collection Agency) and the Philosophy of Zakat (Alms) Socialization in Indonesia

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Abstract

To pay Zakat (alms) is an obligation for a Muslim. However, this religious obligation cannot encourage Muslims in Indonesia to pay Zakat. In fact, in several cities, some Zakat organizations are established to collect the zakat. Some of them is the BAZNAS which is spread in most cities in Indonesia. In fact, this organization is a semi-government because there are some collaborations between the BAZNAS and local government in most regions. This collaboration indicates also that it tries to get benefit from the modern and established government structure. This article aims to know the BAZNAS negoitation with modernity, specifically it wants to deal with the BAZNAS zakat socialization. Using a case study, this article finds that the zakat organization like the BAZNAS Kepulauan Meranti Indonesia deals with a complicated negoitation with modernity through its zakat socialization. In fact, there is a religious understanding among Muslims there that to pay zakat is an obligation but it cannot deal with their religious awareness to pay zakat. This article identifies that disseminating the zakat payment obligation is a never ending project. The BAZNAS improves Muslim understanding about Zakat through socialization. Some socialization activities done are using modern instruments but some are not.

Keywords : Zakat, BAZNAS (National Zakat Collection Agency), Socialization.

Introduction

Zakat, undeniable, is a major issue in Islam. A number of studies discuss the urgency of zakat in seizing the potential of economic resources left behind in Muslim societies, for example Farida (2016: 1-76), Marpuah (2016: 313-412) and Ismail (2016: 629-680). The issue of zakat and the problem of underdevelopment of Muslim communities in economic aspects is a logical impact of the development of globalization and modernization which often places Muslim communities in marginal positions (Hadiz, 2018). The marginalization of Muslim communities from national economic competition becomes a force on the one hand in 'sharia mobilization', one of which is through the issue of zakat and the potential economic strength of the ummah and political mobilization on the other. This is shown by one interesting research conducted by Salim (2015). Through zakat regulation issued by the local government, he explained how zakat is used as an economic and political mobilization tool in West Sumatra.

Nevertheless, the aspect of zakat and economic empowerment remains a favorite in research related to zakat. The focus of related research that has not been touched is the efforts made by zakat institutions that flourished in the post-New Order era to encourage preaching for alms in the Muslim community. These institutions continue to try to encourage awareness of the zakat Muslim

community, because paying zakat is a major symbol of piety in Muslim societies (Hassan, 2006: 59-60). The symbol of piety that will be shown in this article is a discourse that continues to be contested in Muslim societies in the context of paying zakat. Then, the research related to zakat needs to focus on the efforts of zakat institutions to understand the complex and complicated negotiations they undertake regarding religious awareness and modern instruments. These institutions as in other regions in Indonesia often face technological stuttering and modern management amid a strong spirit of religiosity .

This article would like to explain the ways taken by the Meranti Islands National Zakat Agency in spreading the obligation of paying alms among communities in the Meranti Islands. The findings of this article are useful to see how to spread the understanding of the obligation of zakat as an unfinished project because the values of religiosity often require modern instruments. The empty space needed by these religious institutions is, instead of increasing their established religious understanding, strengthening the basis of understanding and implementation of instruments of modernity such as management and use of modern media .

The method used in this article is a case study since this article focuses on one institution. This article is based on a sociological approach that negates doctrinal-based research models. Thus the descriptive qualitative method is a method that is considered appropriate to explain the facts 'as is' in the process of preaching the obligation of tithe carried out by the Meranti Islands BAZNAS. Data collected through observation, interviews, and documentation. Because it is based sociological approach, the findings produced do not promise to be directly proportional to religious texts that are considered authoritative in Muslim societies.

The informants in this article are 8 people selected based on *purposive sampling techniques.* Mechanical *purposive sampling* is sampling or informants based on certain considerations. Consideration is meant for example the person who is considered most knowledgeable about what we expect or maybe he as a ruler so that it will be easier for researchers to find the facts expected (Sugiyono: 2015). Five informants were selected from the management of the Meranti Islands National Amil Zakat Board (BAZNAS), namely the Chairman of the Meranti Islands BAZNAS, the Deputy Chair I of the Collection and Development Division of the Meranti Islands BAZNAS, the Chair of the Meranti Islands Collection and Development Division in the Meranti Islands, the UPZ (Zakat Collection Unit) of West Rangsang District, The Secretary of UPZ, West Rangsang District and 3 informants were taken from the Rice Plant Farmers in the West Rangsang District of Meranti Islands.

This article argues that zakat is both a religious and secular phenomenon. It is considered a religious phenomenon because a number of doctrines in Islam mention the obligation to pay alms. The Qur'an at least mentions 82 times which is often associated with the obligation to pray (Ali, 1988: 9 & Salim, 2015: 79). It is considered a secular phenomenon because in order to succeed these obligations require modern instruments that are worldly in nature. Thus the discussion of this article will look at the process of negotiation of these two phenomena in the local context in the Meranti Islands.

The BAZNAS in Muslim Communities in the Meranti Islands

Most Muslim communities in the Meranti Islands, as in other regions in Indonesia, work as traditional farmers. The basis of community income is natural resources. No wonder Indonesia is known as an agricultural country. This country has great potential from the agricultural sector. Supported by climate, soil fertility, forests, and water sources, the majority of Indonesia's population is dependent on its main profession as a farmer. In terms of revenue sources, the Meranti Islands have diverse natural resource potentials in the oil and gas and non-oil and gas sectors. The oil and gas sector comes from petroleum and natural gas, while the income from the non-oil sector comes from sago, rice, coffee, rubber, areca, and others. One of the districts in Meranti Island that has an abundant source of rice income is the West Rangsang District. Not surprisingly, the government of the Meranti Islands Regency set West Rangsang District as a rice granary

area. Statistical data shows that the area of rice plants in the West Rangsang District is 1872 hectares and produces 3.7 tons of dry grain per hectare.

BAZNAS of the Meranti Islands focuses the propagation of rice zakat in the West Rangsang District as the main program. West Rangsang Subdistrict is one of the sub-districts in the Meranti Islands Regency, consisting of 12 villages namely, Segomeng Village, Bantar Village, Anak Setatah Village, Lemang Village, Bokor Village, Sungai China Village, Melai Village, Telaga Baru Village, Bina Village, Sialang Pasung Village, Permai Village, and Mekar Baru Village. However, there are only six villages that have paddy fields, namely, Mekar Baru Village, Bina Maju Village, Segomeng Village, Melai Village, Anak Setatah Village, and Sungai Cina Village.

Because the large income of Meranti Island communities is from the paddy farming sector, BAZNAS Kepulauan Meranti then arranged a program related to efforts to spread understanding about the importance of paying rice zakat for Muslims. The efforts made by BAZNAS cannot be separated from the early history of the establishment of the Meranti Islands BAZNAS through the Decree of the Meranti Islands Regent No. 76 A in 2011 aimed at raising zakat funds for the economic development of the people.

The formal goal of the Meranti Islands Regency's BAZNAS is to achieve efficiency, effectiveness and accountability in the management of Zakat, Infaq and Alms (ZIS) funds. This is certainly related to efforts to increase the participation of Muslims in the Meranti Islands district in the context of full human development through ZIS fund management.

Before the Meranti Islands BAZNAS was established, the collection and management of Zakat funds was managed by the Amil Zakat Agency (BAZ) of Tebing Tinggi District, which at that time was led by HA Karim, Z, SH. Tebing Tinggi District BAZ is a unit of Bengkalis Regency BAZ which was formed before the division of the Meranti Islands Regency.

Juridically, the establishment of the National Amil Zakat Board in the Meranti Islands Regency refers to the Law of the Government of the Republic of Indonesia, namely; Law Number 38 of 1999 concerning Management of Zakat (State Gazette of the Republic of Indonesia of 1999 Number 164, Supplement to the State Gazette of the Republic of Indonesia Number 3885), Decree of the Minister of Religion of the Republic of Indonesia Number 373 of 2003 concerning Implementation of Law Number 38 of 1999 dated 18 July 2003, Decree of the Director General of Islamic Community Guidance and Hajj Affairs Number D / 291 of 2000 concerning Technical Guidelines for Management of Zakat, Regional Regulation of Riau Province Number 2 of 2009 Regarding Management of Zakat, Law Number 23 of 2011 concerning Management of Zakat, which was passed by the DPR RI on October 27, 2011 which was the result of an amendment to substitute Law Number 38 of 1999 because it was not in accordance with developments and legal needs in the community, the Decree of the Meranti Islands Regent Number: 76 of 2011 dated March 21, 2011 concerning the Establishment of the National Amil Zakat Board Management (BAZNAS) Kepulauan Meranti Regency, Decree of the Regent of the Meranti Islands District anti Number: 299 Year 2015 June 23, 2015 concerning the Appointment of the Implementation of the Management Task of the National Amil Zakat Board (BAZNAS) of the Kepulauan Meranti Regency, the Regional Regulation of the Kepulauan Meranti District No 05 of 2015 concerning zakat.

The various regulations related to zakat above indicate the management of zakat in Indonesia, especially in the Meranti Islands, which is not cohesive and solid. The various regulations also show the dimension of the attraction of permits that allows every social actor in related aspects to make a profit, and zakat is essentially not free from that aspect.

Socialization of Rice Alms

In modern terms, the socialization of rice zakat means efforts to spread or socialize the urgency of paying zakat from rice income for Muslim farmers. In an effort to maximize the collection of zakat, based on the Amil Zakat Agency Regulation No. 2 of 2016 concerning the Formation and Work

Procedures of Zakat Collecting Units, Zakat Collecting Unit was formed or abbreviated as UPZ in each district in the Meranti Islands Regency, including in the West Rangsang District.

The potential of rice zakat in the West Rangsang Subdistrict of the Meranti Islands is large enough to encourage the Meranti Islands BAZNAS to try to spread the understanding of rice farmers to pay zakat. The method adopted by BAZNAS, first, is to form an extension organization from BAZNAS in the form of UPZ at the District level in the Kepulauan Meranti Regency.

The distribution of authority through the formation of the UPZ is possible to facilitate the implementation and management of zakat as a manifestation of the modern management system. The manifestation of modern management is in line with that delivered by Sodikin UPZ Rangsang Barat's Secretary that "We (UPZ Rangsang Barat Management) always coordinate with the management of BAZNAS in the Meranti Islands Regency in carrying out the socialization of zakat, both the socialization of zakat in general and the socialization of rice zakat in particular" .

The religious approach model is also carried out by BAZNAS of the Meranti Islands Regency in socializing or preaching paddy alms. The lecture, for example, was carried out by BAZNAS to encourage the understanding of the Muslim community about zakat on the one hand while distributing BAZNAS institutional authority to preachers.

Based on interviews with Abdul Rauf, Chairman of UPZ Rangsang Barat, said :

> "The lecture method is one of the methods we use in this rice zakat socialization. Its nature is like a recitation or majelis taklim, the lecturer is myself and does not rule out the possibility of also lecturer from outside, like from the management of BAZNAS Kepulauan Meranti Regency. "

Sodikin, Secretary of UPZ Rangsang Barat said :

> "UPZ Rangsang Barat currently has indeed carried out the socialization of rice zakat through the lecture method, the lecturer himself is the chairperson of UPZ Barat Rangsang sub-district namely Ustaz Rauf, but it can also be lecturers from outside according to the UPZ management agreement, the important thing is that the lecturers understand this rice zakat material." .

Sunarto, Chair of BAZNAS of Meranti Islands Regency, said that: "UPZ Rangsang Barat in the implementation of rice zakat socialization has implemented this lecture method, the lecturer was directly delivered by Ustadz Rauf who is also the Chairperson of UPZ Rangsang Barat, he is very understanding about this rice zakat material ".

Using a religious approach model such as lecture is considered effective if it combines modern instruments and management. This is done for example through planning the timing of the implementation, where the socialization is and how the process in the lecture method is carried out. This is done in the hope that the objectives of the da'wah or socialization of zakat will run well. This was stated by Abdul Rauf, Chairperson of UPZ Rangsang Barat that: "This lecture method was effectively carried out in the fasting month during the Ramadan Safari activity, so we visited the mosques of every village that had paddy fields."

In addition to the momentum of the month of Ramadan, lectures are also held during the commemoration of Islamic religious holidays.

The model of utilizing certain religious activities is an implementation of modern management aimed at effectiveness and efficiency. This is because an approach like this does not require energy to gather people in one place. Furthermore, Abdul Rauf, Chairman of UPZ Rangsang Barat explained that:

> "We conducted this lecture method like majelis taklim or recitation in general, lecturers have about 30-40 minutes to deliver material during the month of Ramadan, the duration of time is not very long, because we also consider the condition of the community when the fasting month, of course already tired, during the day fast, and at night certainly need adequate rest. But if the socialization is during the celebration of the Islamic holidays only about 20 minutes, because it is only a distraction in the event ".

The term 'distraction' in the above statement is assumed to be like 'advertising'. It adopts ' *marketing* ' in modern management. The *marketing* product offered is the socialization of rice zakat which is packaged in such a way. The contents of preaching or outreach is also adjusted to the needs of rice farmers. Therefore, as stated by Abdul Rauf, Chairman of UPZ Rangsang Barat, "The material that we convey is in accordance with the needs of rice farmers, such as explaining the mandatory size of rice zakat, then when rice zakat is issued, how much rice zakat must be issued, as well as threats for people who do not want to pay zakat, the importance of zakat through UPZ and so on. ".

In terms of intensity, the lecture method like this is often done by UPZ Rangsang Barat in socializing this rice zakat, as stated by Sodikin, the secretary of UPZ Rangsang Barat that "The method that we always carry out in the socialization of rice zakat is the lecture method because this method is very easy to implement ".

Abdul Aziz Wahab (2012: 88) says that the lecture method is an easy method to do, in the sense that it does not require complicated preparation. Besides being uncomplicated, this method can be done in a short time with a large audience (Maryatin, 2014). Nevertheless, this method still has shortcomings as revealed by Wahab (2012) and Fathurrahman & Sutikno (2017).

In addition to lectures, BAZNAS of Meranti Islands through UPZ Rangsang Barat also uses the method or method of discussion in giving alms. The discussion method is done in the socialization of rice zakat, because this method supports rice farmers to understand about the implementation of this rice zakat. The use of this discussion method is related to the flexibility of this method in responding to things that may not be known by participants. In its implementation, Sodikin Secretary of UPZ Rangsang Barat explained that: "The discussion method is carried out based on mutual agreement between UPZ officials and rice farmers, usually carried out after the Asar Prayer at the nearest mosque, but also this discussion method is carried out when women are married every week, if in Segomeng Village, wirid Yasin ibuk-ibuk were held on Friday at 14.00. "

This method seems to be a modernization of the lecture method that has flaws. Sunarto Chair of BAZNAS Kepulauan Meranti Regency explained that:

> "This method is led by presenters who have extensive knowledge about rice zakat, because the discussion method requires presenters to be able to answer all questions from rice farmers. In this case, the method of discussion was led by Ustadz Rauf who is also the Chairperson of UPZ Rangsang Barat and did not rule out other religious teachers who have extensive knowledge about the implementation of rice zakat ".

However, the hybridity of the method is also possible according to the circumstances and conditions that allow the method needed. Abdul Rauf Chairperson of UPZ Rangsang Barat added:

> "Before this discussion method was held, we first gave a few lectures related to the material delivered in about 10 minutes, then continued with questions and answers, whereas if it was carried out when Yasin Ibn Ibuk-ibuk, the discussion method was carried out after reading Yasin together and the lecture submission by the cleric then continued the question and answer session ".

In addition to the lecture and discussion method, the *door to door* method is also used to increase the understanding of Muslim communities in paying rice zakat. Based on an interview with Abdul

Rauf, Chairperson of UPZ Rangsang Barat said, " We also carry out this *door- to-door* method in the socialization of rice zakat, if it is termed like picking up the ball, where we visit rice farmers who have paddy fields".

UPZ Rangsang Barat conducted this *door-to-door* method by visiting local community leaders. This method is deemed effective for some BAZNAS administrators because traditionally this approach model increases relations and social engagement of both parties. Face to face communication such as *door to door* above is used in order to get the effect of *behavior change* from the communicant. This is possible because in this communication model direct feedback will occur (Wardani : 2018). According to him, as quoted by Dedy Mulyana, by interacting and meeting face to face, the communicator can find out the response and response of the communicant to the message conveyed. Furthermore, by meeting in person, a communicator can build emotional connections with the communicant. This is useful to invite the sympathy and desire of the communicant to give alms (Effendy: 2017).

Integration of Modern Instruments

In this section, we will explain how the da'wah project never separates from the elements of modernity. Responding to the guidance of modernity, the socialization or propaganda of alms is carried out using modern media. Sunarto, Head of BAZNAS, Kepulauan Meranti Regency said,

> "In addition to conducting traditional socialization methods such as lectures and the like, BAZNAS Kepulauan Meranti Regency also utilizes electronic media such as radio. The radio that we are cooperating with in the socialization of zakat is the 88.4 FM Selat Panjang Vocational School radio ”

This is also in line with what was conveyed by Mustafa Deputy Chairman I of the Collection and Development of BAZNAS Kepulauan Meranti Regency, "BAZNAS Kepulauan Meranti Regency has long used the radio as a media for socializing zakat, which is in collaboration with 88.4 FM Selat Panjang Vocational School Radio".

The main reason for the use of radio as a means or medium for propagation of zakat as said by Muslims, Chairman of the Collection and Development Staff of BAZNAS, "The use of radio as a socialization of zakat in BAZNAS Kepulauan Meranti Regency in collaboration with 88.4 FM Selat Panjang Vocational School Radio, we select this radio because it has a very broad reach, up to 6 villages that have paddy fields ".

Zakat promotion through radio is considered to have advantages in aspects of the system, procedures, facilities, and procedures. It is not surprising if the Meranti Islands BAZNAS then collaborates with related radios. Sunarto, Chair of BAZNAS, Kepulauan Meranti Regency said, "The collaboration system conducted by BAZNAS Kepulauan Meranti District with 88.4 FM Selat Panjang Vocational School is in the form of lectures and questions and answers and the screening of public service announcements about zakat socialization ".

Muslim, Chair of the Collection and Development Division of BAZNAS, Kepulauan Meranti Regency explained that:

> "This lecture and question and answer session is held once a month, usually the first week of Thursday or on another day, according to the agreement with the speaker. The time for implementation is at 16.30-17.30 WIB. The 15 minutes are for lectures and the remaining 45 minutes are questions and answers with listeners via telephone, the theme of lectures changes each month, while for questions and answers may come out of a specified theme, while the public service advertisement contains an explanation of the BAZNAS program, types types of zakat, procedures for tithe and appeals to tithe to BAZNAS, Kepulauan Meranti Regency, this ad is about 1 minute in duration, and is rotated every day ".

The implementation of zakat socialization on this radio was also justified by one of the rice farmers in Anak Setatah Village, Abdul Hamid, who said, "We found out about the rice zakat ratio from advertisements on the Selat Panjang Vocational School radio, which explains that our rice income reaches 55 The TEAM is obliged to pay alms ".

For more details, the following is a table of rice zakat implementation through an interactive dialogue on the 88.4 FM Selat Panjang radio SMKArt:

Table 1: Socialization of Rice Zakat through SMKArt Radio

No	Date and time	Hour	The place	Theory	Presenters
1	Thursday / March 8, 2018	4:30	SMKArt radio studio	Implementation of rice zakat	Khozin, MA (Secretary of BAZNAS Meranti)
2	Friday / April 6, 2018	4:30	SMKArt radio studio	Pay zakat to BAZNAS	Sunarto, S.Ag (Chair of BAZNAS Meranti)
3	Wednesday / May 2, 2018	4:30	SMKArt radio studio	Alms for Prosperity of the People	Mustafa, S.Ag, MM (Deputy chairman of BAZNAS I Meranti)

The use of radio media in the propagation of rice alms enables the effectiveness of these activities. Some dakwah organizations, like IKMI (Indonesian Mosque Association) also uses radio as a medium to gain its objectives (Rosidi and Yusuf, 2018). This is because of this modern media, according to Samsul Munir Amin (2009: 270-271) as a communication medium, it has direct power, has a penetrating power, and has appeal. In addition, radio can provide information refreshment and public entertainment. This media is also easily accessible to the wider community because the price is relatively cheap and the easy way to use it (Ma'arif, 2010: 163).

Besides radio, BAZNAS Kepulauan Meranti also uses other modern media such as print media. Muslim, Chair of the Division of Collection and Development of BAZNAS, Kepulauan Meranti Regency explained,

> "We carry out the socialization of zakat through banners by installing banners in strategic places, such as at crossroads, mosques, and on paddy fields. This banner contains an explanation of Nisab, haul, and the level of rice alms and an appeal for alms to the BAZNAS of the Meranti Islands Regency. "

Banners and brochures are used as a medium for propagation of rice alms which allows each farmer to easily find information about rice alms. One of the rice farmers in Segomeng Village, Farida, said that: "Banners containing procedures for implementing rice zakat are installed in our village, usually at the crossroads and also in our paddy fields ." Brochures are distributed to farmers to read and understand. Sodikin, Secretary of UPZ Rangsang Barat added, "We increase the brochure and distribute it to rice farmers and place it in strategic places such as mosques, daily shops and rice mills."

Conclusion

After the New Order, zakat institutions flourished as a result of the widespread awareness of Muslim communities in the context of marginalization of the people in the arena or competition for economic resources. During this time, as stated by Hadiz (2018), the issue of marginalization of the ummah is so strong so that strengthening Islamic symbols in the public sphere (read: Islamic populism). However, the facts as found in this article, the issue of backwardness of the ummah is still not perfect in strengthening the awareness of Muslim communities in paying paddy zakat. This can be seen from how BAZNAS efforts to integrate management and modern instruments in socializing rice zakat in the Muslim community. Constrained by the lack of modern management, BAZNAS as a charity institution continues to strengthen and encourage the awareness of the zakat Muslim community as a symbol of piety. This article also shows that semi-modern zakat institutions, such as the Meranti Islands BAZNAS carry out complex and complicated negotiations related to religious awareness and the problem of modernity. These institutions as in other regions in Indonesia often face technological stuttering and modern management amid a strong spirit of religiosity.

The findings of this article show how to spread the understanding of the obligation of zakat as a never-ending project because the values of religiosity often require modern instruments. The empty space needed by these religious institutions is to strengthen modern instruments and the implementation of modern management in these institutions. The problem is thus not to increase their established religious understanding through religious lectures or other religious activities.

In this article it was found that BAZNAS of the Meranti Islands integrated modern methods in the propagation of rice alms activities. This can be seen from the methods they use through discussion methods, the use of radio media, as well as the use of print media such as brochures and banners. The success of this method depends on the extent of their success in using modern management and instruments in the future, not their success in raising awareness of their religiosity.

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Modern Tendencies in Changing the Sectoral Structure of Cross-Border Territories of The Russian Federation

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Abstract

The urgency of the research stems from studying the processes taking place in cross-border regions of the Russian Federation and ever-increasing impact of their neighbourhood with near and far abroad countries. Studies in the field of structural changes in economic sectors of Russian cross-border territories are assuming particular importance due to increasing geopolitical influence and economic cooperation. Thus, the paper considers the peculiarities of structural changes taking place in sectoral structure of cross-border territories economy during 10 years. The purpose of the study is the assessment of tendencies connected with changing the sectoral production structure of border territories of the Russian Federation from 2006 to 2016. The study was based on the following methodology: 1) defining the production specialization of 50 cross-border subjects of the Russian Federation by means of calculating the coefficient of production specialization and the criteria of mono-specialization and poly-specialization of these regions; 2) analysing the changes in the sectoral production structure of cross-border regions with the help of the system for indicators of sectoral and cross-sectoral shifts; 3) defining the tendencies of changing sectoral production structure in cross-border territories of the Russian Federation. The study revealed the following results: a) the structure of cross-border regions according to their specialization (mono-specialization, poly-specialization); b) sectors of production specialization which are in the focus of mono-specialized regions' production (agriculture, hunting and forestry as well as mining operations); c) more dynamic sectoral structure of mono-specialized regions targeted at mining operations; d) more intensive period of structural changes in relation to mono-specialized regions (2006–2011); e) a complex of structural policy measures should be aimed at the diversification of sectoral structure of border regions.

Keywords: Cross-Border Regions, Sectoral Production Structure, Structural Shifts.

Introduction

In current circumstances cross-border regions of the Russian Federation have a particularly important role in providing sustainable social and economic growth and national security of the country. It can be demonstrated by the fact that according to the end of 2016 border regions occupied 86.0% of the total territory of the Russian Federation, with 52.1% of the country's population and more than 51.3% of the total gross domestic product of the Russian Federation (Source: Calculated by the authors on the basis of official data of the FSSS *(Gks.ru, 2018)*.

Obviously, the past 25 years have seen significant changes in the sectoral production structure of Russian border territories with the collapse of the USSR, the building of a market economy as well as due to the changes in the new geopolitical and economic interaction.

Thus, the purpose of the study is to assess the tendencies of changing sectoral production structure of the RF cross-border territories during 2006–2016. To this end, the following objectives have to be carried out:

- to study the theoretical grounds for sectoral production structure in cross-border regions;
- to propose the methodology of sectoral production structure analysis;
- to assess modern tendencies of changing sectoral structure of mono-specialized cross-border territories of the Russian Federation.

Theoretical grounds for studying the sectoral structure of Russian cross-border territories

The peculiarities of developing structural changes in economics were first studied by J. B. Clark (1891), who proposed a theory of structural changes in his research on economic dynamics. Later, the basics of structural changes were analysed by V. V. Leontief in 1941 (Leontief, V., 1941, 1953) by means of applying an input-output model. The dynamics of structural shifts in economics was also studied by J. M. Esteban-Marquillas (1972), P. Krugman (1991), V. J. Matlaba, M. Holmes, P. McCann, J. Poot (2014) and others.

The peculiarities of structural changes in regional development were analysed by C. Clark (1940), B. Hansen (2001), Sh. Fan, X. Zhang, Sh. Robinson (2003), A. Urraca-Ruiz, N. E. Laguna-Molina (2016), O.P. Ivanova (2018), E. Cutrini (2019) and others.

The structural changes theory was also proposed by Soviet scholars L. V. Kantorovich (1960) and V. S. Nemchinov (1960) who used quantitative analysis methods while solving planned economy issues in order to better use the resources in the national economy with simultaneous complication of internal economic links in the Russian Federation.

Russian economists of the Soviet period made a special contribution to the development of the theory of cross-sectoral structural shifts. Among them we should mention O. Yu. Krasilnikov (2017) who revealed the theoretical grounds of interconnection and development of structural shifts in the economy of modern Russia. V. Danilov-Danilian (2015) assessed the effect of macro-economic tendencies on structural shifts in Russian economy. Transformational structural changes in Russian industrial production were studied by V. A. Bessonov (2000), O. V. Daneev (2004), V. S. Antonyuk, E. R. Vansovich (2012), A. N. Lyakin (2013), O. S. Sukharev (2014), V. S. Bilchak (2014), V.A. Kolosov, A.P. Klemeshev, M.V. Zotova, A.B. Sebentsov (2015), L.A. Strizhkova, G.O. Kuranov, G.YU. Kuznetsova, A.A. Blokhin (2019), O. A. Romanova, A. O. Ponomareva (2019), S. Yu. Glaziev (2019) and others.

The problems of assessing cross-border specialization of cross-regional interactions of border territories were the subject of studies performed by N. M. Mezhevich, N. P. Zhuk (2013).

According to the Federal Law "On the basics of cross-border cooperation" dated July, 26, 2017, No 179-FZ *(On the basics of cross-border cooperation, 2017)*, Russian cross-border territories are defined as "the subjects of the Russian Federation whose territories are adjacent to the State border of the Russian Federation".

Production specialization of a cross-border territory is understood as orientation of its production site towards the creation of certain products which meets the needs of the region as well as other subjects of the country and foreign partners and has a considerable share in the output of this territory. As this definition illustrates, the orientation towards the production of a product exported in foreign countries is a peculiarity of production specialization of a cross-border region. Production specialization of a region is defined on the basis of analysing its sectoral structure of production (GRP) which presents a set of proportions between different types of economic activities using various indicators.

We should also mention a system of factors defining the sectoral structure of the region's production: its geographical position, natural and climatic conditions, resource endowment, the level of development and access to technologies, economic and social factors. The channels which have a strong impact on the sectoral structure of a region's production also include the following: a banking system, law and regulation system as well as an international system. International cooperation of these territories with other countries, export-import operations are of particular relevance to cross-border regions.

In the course of time the factors determining the sectoral structure of a region can be transformed which can lead to shifts in the role of certain sectors or types of economic activities, that is to sectoral structural changes and later, it can lead to the changes in a production specialization of this territory. These changes are called sectoral structural shifts.

Methodology of sectoral structure analysis of production in cross-border territories

The sectoral structure analysis of production in territories adjacent to the border is carried out according to the following algorithm.

At the first stage we identify the production specialization of cross-border regions of the Russian Federation. After calculating the coefficient of production specialization and criteria of regional mono-specialization and poly-specialization *(Antonyuk and Vansovich, 2013)* cross-border territories of Russia will be divided into mono-specialized and poly-specialized ones.

$$K_l = \frac{O_p / P_p \times 100}{O_c / P_c \times 100}, \quad (1)$$

where Op is the output of the given sector in the region in terms of gross amounts;
Oc is the output of the same sector in the country on the whole in terms of gross amounts;
Pp – the whole output in the given region in terms of gross amounts;
Pc – the whole output in the country in terms of gross amounts.

At the second stage we analyse the changes in sectoral structure of production in cross-border regions of the Russian Federation using the system of indicators of sectoral proper and cross-sectoral shifts (Fig. 1). The sectoral structural shifts proper are presented by the following indicators: "absolute increase", growth rate and progression rates of the sector. The cross-sectoral structural shifts are presented by linear and quadratic coefficients of "absolute" structural shifts, linear and quadratic coefficients of relative structural shifts.

Indicators of sectoral structural shifts

Sectoral proper	Cross-sectoral	
1. "Absolute" increase in the sector's share 2. Growth rate of the sector's share 3. Rate of increase in the sector's share	1. Linear coefficient of "absolute" structural shifts	$\delta_{F_2-F_1} = \frac{\sum_{i=1}^{n}\lvert F_{i2} - F_{i1}\rvert}{n}$
	2. Quadratic coefficient of "absolute" structural shifts	$\sigma_{F_2-F_1} = \sqrt{\frac{\sum_{i=1}^{n}(F_{i2} - F_{i1})^2}{n}}$
	3. Linear coefficient of relative structural shifts	$\bar{\delta}_{\frac{F_2}{F_1}} = \sum_{i=1}^{n}\left\lvert\frac{F_{i2}}{F_{i1}} - 1\right\rvert F_{i1}$
	4. Quadratic coefficient of relative structural shifts	$\sigma_{\frac{F_2}{F_1}} = \sqrt{\sum_{i=1}^{n}\frac{(F_{i2} - F_{i1})^2}{F_{i1}} \cdot 100}$

Fig 1: Indicators of sectoral structural shifts
(Source: Kazinets, 1981)

where F_{i1} and F_{i2} are specific values of Sector i in the first and second period of time.

At the third stage it is appropriate to present the tendencies of changes in the sectoral production structure in cross-border territories of the Russian Federation.

Results of the study

Among 48 cross-border regions we identified mono-specialized (16) and poly-specialized (23) regions (2016) based on the calculation of localization coefficient and application of mono- and poly-specialization criteria (Fig 2). The rest 9 regions are those subjects of the Russian Federation which are not characterized by production specialization.

The majority of mono-specialized regions are oriented at agriculture, hunting, forestry and mining industry. Over half of the poly-specialized regions are oriented at agriculture, hunting, forestry as well as transportation and communication (14 regions amount to 61% of all the regions); nearly half of the regions – at processing and manufacturing, wholesale and retail trade (11 regions – 49%); less than half of the regions (9 regions – 39%) – at building and construction; and nearly a quarter of the regions (5 regions – 22%) – at mining industry.

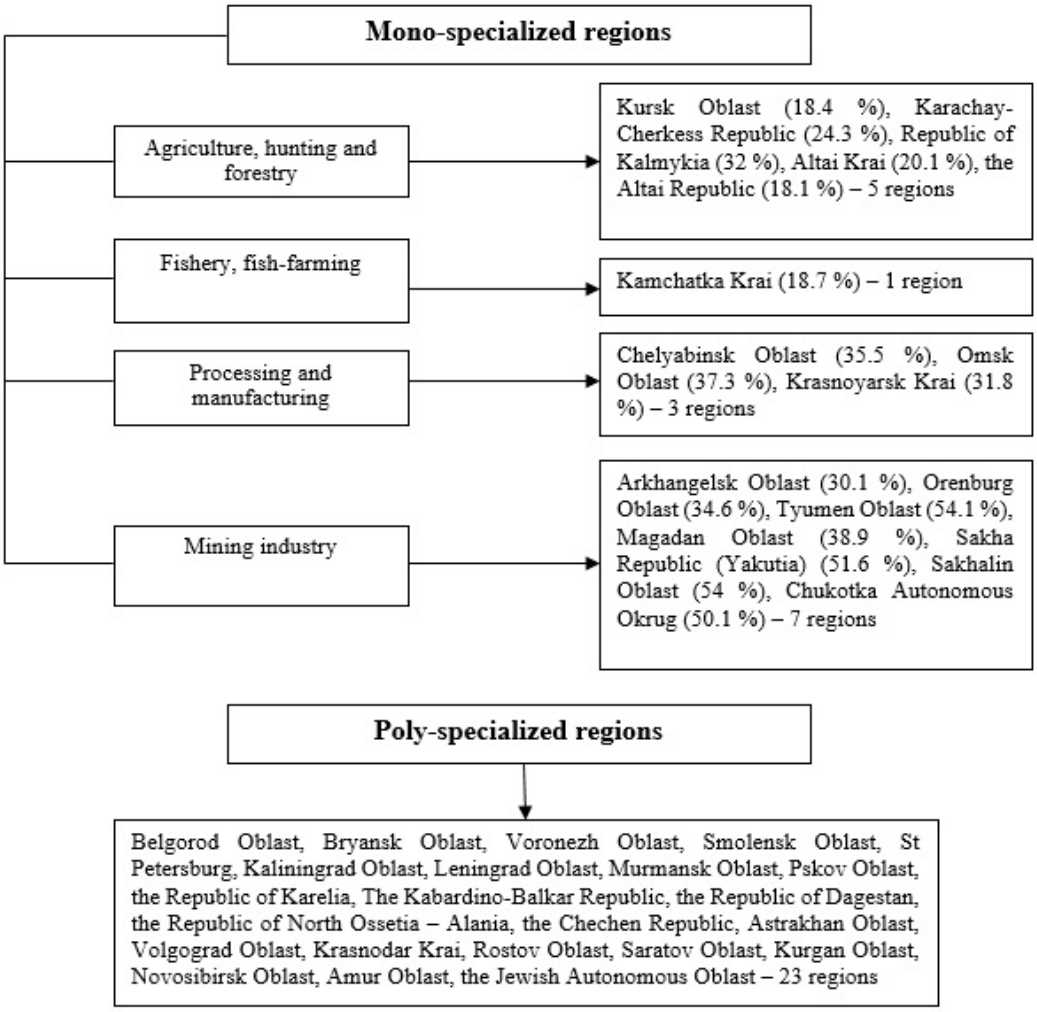

Fig. 2: Distribution of regions according to their production specialization
(Source: compiled by the authors)

In all the cross-border regions the most important, in our opinion, is the analysis of changes in the sectoral production structure concerning border territories of a mono-specialized type, since they are more at risk due to their narrow specialization in case of global market shocks. For that reason Table 1 presents the indicators of sectoral proper and cross-sectoral structural shifts in mono-specialized regions in the short-term (2006–2011, 2011–2016) and long-term periods (2006–2016).

Table 1: indicators of sectoral proper and cross-sectoral structural shifts in mono-specialized regions

No	Regions	"Absolute" increase			Rate of increase, %		
		2011/ 2006	2016/ 2011	2016/ 2006	2011/2006	2016/2011	2016/2006
		Agriculture, hunting and forestry					
1	Kursk Oblast	-0.30	5.00	4.70	-2.19	37.31	34.31
2	Karachay-Cherkess Republic	-1.00	2.00	1.00	-4.29	8.97	4.29
3	Republic of Kalmykia	8.40	-4.40	4.00	30.00	**-12.09**	14.29

4	Altai Krai	-0.30	4.00	3.70	-1.83	24.84	22.56
5	the Altai Republic	-0.30	-2.40	-2.70	-1.44	-11.71	-12.98
		Fishery, fish-farming					
6	Kamchatka Krai	-3.40	3.30	-0.10	-18.09	21.43	-0.53
		Processing and manufacturing					
7	Chelyabinsk Oblast	-2.80	-0.70	-3.50	-7.18	-1.93	-8.97
8	Krasnoyarsk Krai	**-18.10**	-2.50	**-20.60**	**-34.54**	-7.29	**-39.31**
9	Omsk Oblast	-3.20	-0.10	-3.30	-7.88	-0.27	-8.13
		Mining industry					
10	Arkhangelsk Oblast	7.70	1.70	9.40	37.20	5.99	45.41
11	Orenburg Oblast	-7.30	-0.80	-8.10	-17.10	-2.26	-18.97
12	Tyumen Oblast	-6.00	2.20	-3.80	-10.36	4.24	-6.56
13	Sakha Republic (Yakutia)	4.40	8.20	12.60	11.28	18.89	32.31
14	Magadan Oblast	4.90	**13.80**	18.70	24.26	**54.98**	92.57
15	Sakhalin Oblast	**35.20**	**-6.60**	28.60	138.58	-10.89	112.60
16	Chukotka Autonomous Okrug	34.10	8.50	**42.60**	**454.67**	20.43	**568.00**

(Source: Calculated by the authors on the basis of official data of the FSSS (Gks.ru, 2018)

According to Table 1, the dynamics of structural changes in sectors of production specialization is sufficiently high which is characteristic for the regions specializing in mining. The top regions according to the positive indicators of both "absolute" increase and rate of increase are Sakhalin Oblast, Chukotka Autonomous Okrug (2006–2011) and Magadan Oblast (2011–2016). On the other hand, Krasnoyarsk Krai during 2006–2016 shows a downward trend.

The most illustrative among all indicators of cross-sectoral structural shifts, in our opinion, is a linear coefficient of "absolute" structural shifts which characterizes the mean value of the variation of sectors' weight as well as a quadratic coefficient of relative structural shifts characterizing the intensity of changes in the sectoral structure of the region on the whole.

Table 2 and Figure 3 present some analysis of indicators of cross-sectoral structural shifts in mono-specialized regions.

Table 2: indicators of cross-sectoral structural shifts in mono-specialized regions

Number of region	Linear coefficient of "absolute" structural shifts			Quadratic coefficient of relative structural shifts		
	2011/2006	2016/2011	2016/2006	2011/2006	2016/2011	2016/2006
	Agriculture, hunting and forestry					
1	1.08	1.76	2.53	22.66	29.99	42.36
2	1.05	0.99	1.35	21.61	19.10	27.64
3	1.60	**2.47**	2.40	30.43	**91.56**	54.99
4	0.71	1.04	1.43	20.38	19.41	30.49
5	1.41	1.76	1.69	35.09	41.86	32.21
	Fishery and fish-farming					
6	1.17	1.15	1.25	23.91	26.46	32.52
	Processing and manufacturing					
7	0.75	0.47	1.07	13.73	12.67	22.63
8	2.53	0.75	3.00	73.22	12.90	86.09
9	0.72	0.65	0.89	17.50	14.85	20.14

	Mining industry					
10	1.45	0.69	1.81	27.10	13.61	32.81
11	1.15	0.72	1.43	19.15	14.71	29.09
12	1.61	0.72	1.56	47.45	16.15	35.30
13	1.44	1.21	2.07	27.07	19.88	35.13
14	1.36	2.11	3.20	28.96	36.21	55.30
15	**4.71**	1.37	4.48	83.33	33.86	75.95
16	4.61	1.33	**5.69**	**130.66**	24.79	**162.40**

(Source: Calculated by the authors on the basis of official data of the FSSS (Gks.ru, 2018)

According to Table 2 the greatest changes in the sectoral structure are observed in two regions – Chukotka Autonomous Okrug and Sakhalin Oblast, whose specialization is directed at mining industry. Besides, the most significant changes characterize both the sector of production specialization and the time period 2006–2011. During the period under review (2006–2016) the proportion of mining operations in Chukotka Autonomous Okrug increased almost 7 times (from 7.5% in 2006 to 50.1% in 2016). Moreover, there have been significant changes in other sectors – production and distribution of gas, electric energy and water, building and construction, transport and communication, real estate operations, renting and provision of services, public administration – since their shares decreased approximately two times.

The share of mining industry in Sakhalin Oblast increased more than two times during 2006–2016 (from 25.4% in 2006 to 60.6% in 2011 and 54% in 2016). Significant changes have also taken place in building and construction (31.5% in 2006, 6.3% in 2016).

The share of the main sector of production specialization in the sectoral structure of Krasnoyarsk Krai – processing and manufacturing – have dropped since the "absolute" rate of increase was (– 20.6%) (52.4% in 2006, 31.8% in 2016), but at the same time the share of mining industry increased 5 times (from 3.7 % in 2006 to 19% in 2016). Thus, we can observe here a tendency towards the change of the region's production specialization.

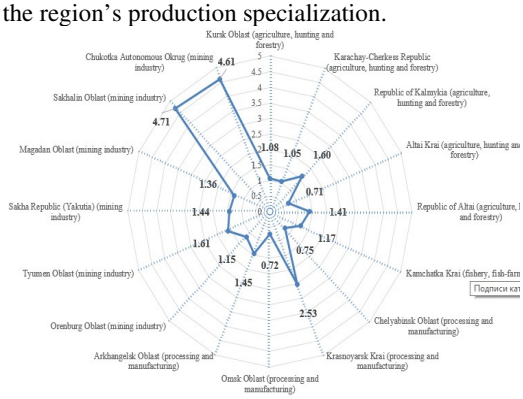

a) Linear coefficient of "absolute" structural shifts 2011/2006

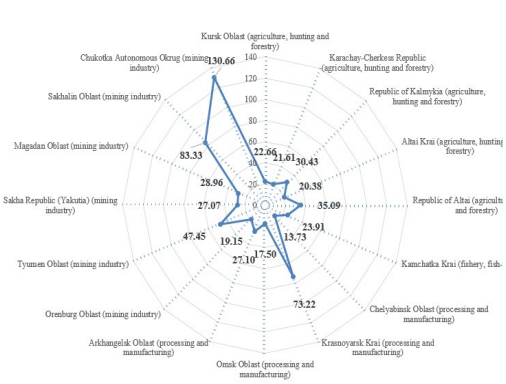

d) Quadratic coefficient of relative structural shifts 2011/2006

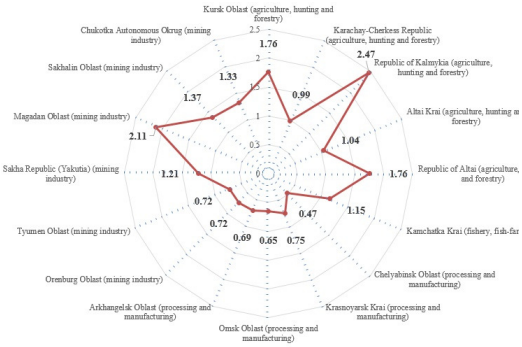

b) Linear coefficient of "absolute" structural shifts 2016/2011

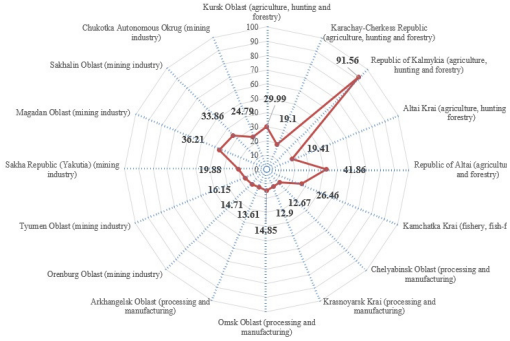

e) Quadratic coefficient of relative structural shifts 2016/2011

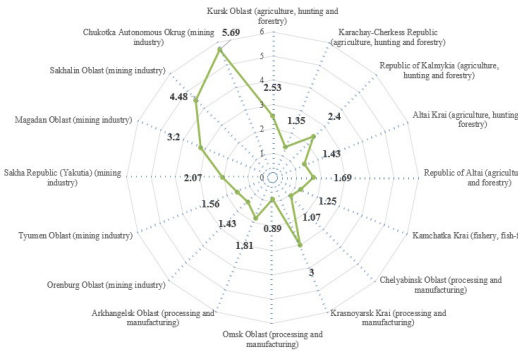

c) Linear coefficient of "absolute" structural shifts 2016/2006

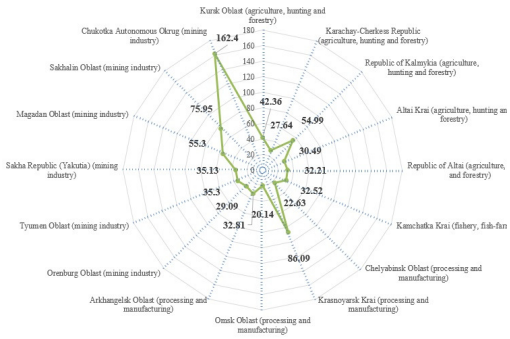

f) Quadratic coefficient of relative structural shifts 2016/2006

Fig. 3: Indicators of cross-sectoral structural shifts in mono-specialized regions
(Source: compiled by the authors)

The mean values of the quadratic coefficient of relative structural shifts were 38.89% and 26.75% during 2006–2011 and 2011-2016 respectively. Meanwhile, the most significant value of the quadratic coefficient of relative structural shifts during 2011–2016 characterizes the Republic of Kalmykia which specializes in agriculture, hunting and forestry.

The mean values of the linear coefficient of "absolute" structural shifts among all the mono-specialized regions were 1.71% and 1.20% during 2006–2011 and 2011–2016 respectively.

Thus, the most intensive changes of the sectoral structure in mono-specialized regions were observed during 2006–2011, which can be connected with significant changes in the sectoral production structure due to the world financial crisis in 2008 and adaptation of regional economies to the new conditions.

In the long-term period (2006–2016) the mean values of the linear coefficient of the "absolute" structural shifts and the quadratic coefficient of relative structural shifts were 2.24% and 48.44% respectively.

Conclusion

The analysis leads to the following conclusions.

1. The absolute majority of all cross-border regions of the Russian Federation (80%) have a distinct specialization: they are either mono-specialized or poly-specialized. Mono-specialized regions are

more at risk since their functioning and development is limited by one sector of specialization which results, in its turn, in their strong dependence from external and internal markets.

2. Most mono-specialized regions are oriented at such types of economic activities as agriculture, hunting and forestry as well as mining industry.

3. The most intensive dynamics of structural changes in mono-specialized regions is observed in the sectors of production specialization especially in those oriented at mining operations.

4. The most intensive period of structural changes in mono-specialized regions was during 2006–2011, which can be proved by quadratic coefficients of relative structural shifts.

Thus, during 10-year period taken for our analysis the sectoral structure of cross-border regions suffered significant changes, especially in mono-specialized regions. The main tendencies here included an increase in the share of mining operations and a decrease in the share of processing and manufacturing in the sectoral structure of the gross regional product, which means an increase in commodity-based economy of cross-border subjects of the Russian Federation. All this indicates that there is a strong need to develop a complex of structural policy measures directed at the diversification of the sectoral structure in cross-border regions, which would provide economy's movement from a mono-specialized to a poly-specialized type.

Acknowledgement

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Possibility to Apply Selected Decision-Making Models in Designing and Implementing Cost Strategy in an Insurance Company

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Abstract

The purpose of this paper is to analyse the possibility of applying selected decision-making models in the design and implementation of a cost strategy in an insurance company undertaking subject to the achievement of financial management objectives. In the area related to decision analysis two groups of decision-making models have developed. These are the groups that include prescriptive (normative) models, and descriptive models. The presented models are analysed in the context of the possibility of their application by insurance companies when implementing the cost strategy. This analysis is carried out using the deduction method. As a result, seven areas were identified which are related to factors determining the selection and design of cost strategy in an insurance company. In addition, the paper is supplemented by the presentation and description of the organizational and behavioural aspect of the implementation of a cost strategy in an insurance company.

Keywords: Insurance Company, Cost Strategy, Financial Management, Decision-Making Models

Introduction

Insurance companies belong to this group of financial institutions which offer their clients financial products. These institutions operate on a robustly developing market. Accordingly, all the operations regarding their management require constant modifications and adjustment to the current market needs. One such activity is designing a cost strategy. Designing a cost strategy as an element of financial management in an insurance company includes planning activities related to the implementation of the strategy, the implementation of which is to guarantee the achievement of the set objectives.

The purpose of this paper is to analyse the possibility of applying selected decision-making models in the design and implementation of a cost strategy in an insurance company undertaking subject to the achievement of financial management objectives [more: Chmielowiec-Lewczuk, 2019]. In addition, the paper is supplemented by the presentation and description of the organizational and behavioural aspect of the implementation of a cost strategy in an insurance company. These aspects are extremely important in practice.

Literature Review

The design of a cost strategy is a decision-making-based activity, therefore the assumptions of the decision-making analysis should be taken into account. In the book by Goodwin and Wright (2016, p. 19), primary objective of the decision-making analysis is to spread the decision-making problem into a set of smaller problems. As a result of the development of decision-making theory there has been a change in the perception of the role of decision analysis.

Currently, it is believed that decision analysis is not a method of obtaining optimal solutions to decision-making problems, but that its aim is to gain knowledge and stimulate the creativity of managers. Such a view is represented by, among others, R.L. Keeney and L.D. Phillips in the book by Goodwin, Wright (2016, p. 21-23). In the contemporary application of decision analysis, attention is drawn to the fact that the decision making of a manager is conditioned by two factors. These are: a rational factor related to the fact that the decision maker takes into account the results obtained through

the analysis, and an intuitive factor related to his feelings - the decisions are influenced by behavioural aspects.

The issues related to modelling cost strategy in an insurance company are little known and rare in the world literature. On the other hand, one can find publications presenting issues related to the development of strategies in insurance companies, or topics related to cost management problems.

In 2005 an article was published in which the effects of work on the project of the team consisting of twelve people led by R. Massey were presented. The subject of this project was to develop the application of theoretical strategy models for non-life insurance companies. Seven strategy models were used for this purpose, such as: competitive advantage, Porter's five strengths, value chain, PESTL, SWOT, product life cycle and the Blue Ocean theory and innovation value. The application of these strategy models was analysed in two hypothetical insurance companies (one of medium size, which operates only in the UK, and the other, larger, which has international coverage).

An interesting publication on this issue has also appeared in 2014. Its author, S. McGregor, presented the process of implementation of modification of the existing cost accounting system used by the life insurance company AXE in the United States. It describes the analysis of problems connected with costs, managers' opinions, actuaries' expectations and organizational solutions, as well as presents the whole process of changes in the scope of cost management.

There is one more article among the publications related to the subject matter discussed. It was published in 2010 and its authors are P. Francis and S. Butler. They focus in their study on the reduction of costs related to compensation and benefits of insurance companies. They point to a very important role of this cost item, which in their opinion is crucial in the management of costs of an insurance company. The authors propose the use of one of the four models of claims and benefits management as a solution giving the possibility to control activities in this area and the use of a matrix based on the segmentation of claims and benefits, which allows for the reduction of costs in an insurance company.

Methodology

In the area related to decision analysis two groups of decision-making models have developed. These are the groups that include:

- prescriptive (normative) models,
- descriptive models.

The first group is represented by models which are applicable to structured decision-making problems and which primarily use analytical methods using mathematical methods, from the area of operational research. This group includes such models as: Altman, Valenzi and Hodgetts' monocriteria model, Robbins and Coulter's multi-criteria model, Sutherland's model, Holt's model, praxeological model, operational research model, cybernetic model and fuzzy decision-making rules model. These models are based on the assumption that following the adopted algorithm gives the possibility to obtain an unambiguous solution to the decision problem, and they also assume the possibility of fully quantifying all decision options.

The second group consists of descriptive models, which are descriptive in nature. They are based on the fact that in the practice of business entities, decisions are not only made as a result of rational analysis but are also shaped by human behaviour. Therefore, Teale et al (2003, p. 17) mentioned that during solving decision-making problems, psychological and sociological factors should be additionally taken into account. In the book by Holska (2016, p. 240) is written that descriptive models are of different nature, some of them are similar to normative models, and some propose a completely different approach, completely different from prescriptive models.

Descriptive models include Simon's suboptimization model, in which he proposes to assume that decision making is shaped by limited rationality (managers have limited knowledge, want to achieve

different goals, often at the same time or are satisfied with the first good solution). This model does not, admittedly, assume fully irrational human behaviour when making decisions, but it does change the view on the possibility of applying normative models in practice.

Among the descriptive models, there are also those that propose a complete abandonment of rational analysis of decision-making problems, e.g. the "trashcan" model or Brunsson's irrational model. These models aim at directing the decision-making process towards generating creativity among managers and assume that human behavioural factors such as lack of motivation, doubt or unwillingness to engage should be taken into account in the process.

The presented models will be further analysed in the context of the possibility of their application by insurance companies when implementing the cost strategy. This analysis will be carried out using the deduction method.

Cost Strategies Possible to Implement in Insurance Company

If an insurance company makes a decision to implement a cost management strategy, it should work it out on the basis of one of the adopted cost strategies. The choice of a strategy enables a precise definition what is objective achievement index of cost management whether a defined cost level, profitability or some other parameter whose achievement should guarantee achievement of the aims set by the insurer.

Table 1 presents the objectives of financial management in the insurance company, the cost strategies assigned to them which may support the achievement of those objectives, as well as the most important areas which are related to them. These areas determine the limits of the analysis to assess the current conditions and capabilities of insurance companies.

Table 1: Financial management objectives, cost strategies to support their implementation and the most important areas subject to analysis of current conditions and possibilities in an insurance company

No.	Financial management objective	Cost strategy	Areas to analysis
1	Profit maximization, Realization of a definite profit level	Strategy subordinated to cost reduction	Financial condition Human Resources Organisation
2	Sales maximization, Market share increase	Strategy subordinated to profitability Strategy subordinated to price policy	Insurance risk portfolio Financial condition Human Resources Organisation
3	Financial Stabilization	Strategy subordinated to price policy Strategy subordinated to financial liquidity	Insurance risk portfolio Human Resources Relationships with others
4	Efficiency of action	Strategy subordinated to cost reduction Strategy subordinated to profitability Strategy subordinated to capital cost minimization Strategy subordinated to value creation of the insurance company	Insurance risk portfolio Financial condition Reinsurance
5	Financial liquidity maintenance	Strategy subordinated to financial liquidity Strategy subordinated to insurance risk	Investments Insurance risk portfolio

6	Solvency maintenance	Strategy subordinated to insurance risk Strategy subordinated to cost reduction Strategy subordinated to price policy Strategy subordinated to financial liquidity	Insurance risk portfolio Financial condition Reinsurance Investments Human Resources Organisation
7	Value maximization	Strategy subordinated value creation of the insurance company Strategy subordinated to capital cost minimization	Financial condition Relationships with others

source: own study

Cost management process in the insurance company can be designed in various ways in accordance with the chief objective the process is to serve. Here are three most common situations:

1. cost management is subordinated to finance management,
2. cost management is correlated with implementation of kaizen (continuous improvement process) based on activity management,
3. cost management is part of value-based management process.

This paper is based on the first concept when cost management is subordinated to financial management in an insurance company. In cost management concept based on finance management indicated areas refer to typical notions, which are important for the financial economy of the insurer.

Results

The problem of designing a cost strategy in an insurance company as well as its implementation is complex. It is influenced by various factors. Therefore, let us consider whether prescriptive or descriptive models should be used when making decisions concerning the design and implementation of a cost strategy that is to support the financial management of an insurance company. To this purpose we will analyse the areas that are related to the factors presented in Table 2 that influence the cost decisions of an insurance company.

Table 2: Factors influencing cost decisions of an insurance company, cost strategies in which they are most important, and determinants of the modern insurance market related to these factors

Group of factors	Factors	Cost strategy	Determinants of the modern insurance market
Financial factors	Financial result (profit/loss) and profitability	Strategy subordinated to cost reduction Strategy subordinated to profitability	Independent factor
	Revenue	Strategy subordinated to profitability Strategy subordinated to price policy	New insurance risks
	Costs	Strategy subordinated to cost reduction Strategy subordinated to profitability	All determinants
	Capitals	Strategy subordinated to capital cost minimization	New systems of insurance supervision, financial groups

	Investments	Strategy subordinated to financial liquidity	Financial markets and financial instruments
	Reinsurance	Strategy subordinated to profitability	Independent factor
Non-financial factors	Market position	Strategy subordinated to cost reduction Strategy subordinated to price policy	Financial groups
	Sales policy	Strategy subordinated to price policy	New insurance risks
	Distribution policy	Strategy subordinated to cost reduction,	New distribution channels
	Insurance portfolio policy	Strategy subordinated to insurance risk	New insurance risks
	Loss adjustment policy	Strategy subordinated to cost reduction	Services of indemnity chancellery
	Territorial network	Strategy subordinated to cost reduction	Independent factor
	Relationships in the financial group	Strategy subordinated to value creation of the insurance company Strategy subordinated to capital cost minimization Strategy subordinated to insurance risk	Financial groups
	Human resources	All strategies	Independent factor

source: own study

On the basis of the factors presented in Table 2, seven areas can be identified for which we will consider the application of individual decision-making models.

The first area concerns the objectives to be pursued by the application of the cost strategy in the insurance company. These are objectives that are quantified. They relate to financial figures and are fully measurable. Their achievement is assessed by clearly verifying whether a given financial volume has been achieved or not (level of costs, profitability, level of income, insurance risk, insurance price, etc.). The financial nature of the objectives related to the cost strategy, especially when it is subordinate to financial management, indicates that normative models seem to be the best solution when making decisions.

The second area relating to the factors that shape an insurance company's cost decisions is that of the actions and activities that need to be carried out in order to achieve the intended strategy objectives. These activities and actions in practice mean changes in the reorganisation or reduction of human resources. Therefore, in order to achieve financial, clearly measurable objectives, it is necessary to plan and implement activities that are related to people. This means that in practice this can prove difficult and requires taking into account human behaviour (their reaction to change, acceptance, commitment, etc.), which affects both managers and employees of different departments. The impact of the human factor on the achievement of objectives related to the implementation of the cost strategy indicates the validity of using descriptive models in the insurance company.

Another of the analysed areas is insurance risk, and in particular its impact on costs. The amount of insurance risk is measurable, but not fully. First of all, it is not always possible to clearly determine the probability of loss occurrence (e.g. in relation to new risks). Secondly, the probability of occurrence of a given loss is also influenced by human behaviour (of the insured, current and potential customers). Therefore, the assumptions made about the planned costs of compensation and benefits may turn out

to be partly wrong. The level of the insured risk determines most of the financial objectives and conditions to be met by the insurance company, and therefore this level is very important in the implementation of the cost strategy. The nature of the area related to insurance risk indicates the use of both prescriptive and descriptive methods in the analysis of insurance company costs.

Another area is related to the product, which is insurance. Insurance risk is also important in its construction. However, this product, its sale (form, amount of premium) or acquisition costs are also influenced by the human factor, resulting from the expectations of customers of the insurance company and their inclination to purchase insurance. The specificity of the product, which is insurance, makes the application of solutions tested in other entities conducting e.g. production activity impossible. This is indicated by H.C. Kunreuther, M.V., Paulty, S. McMorrow [2013, p. 146], who believe that normative models do not work in an insurance company due to the nature of the product. Therefore, the area of the insurance product indicates the use of descriptive models in an insurance company.

The next area discussed is that of differences relating to the legal form of an insurance company and the sector in which it operates. While insurance companies operating in the form of joint stock companies can be treated as entities whose general objective is to achieve good financial results, this is not the case for mutual companies. As these entities operate on different principles, the choice and development of a cost strategy for them must be subject to different, modified objectives. Mutual companies operate on the basis of self-insurance. For this reason, social aspects, which are not always fully measurable and not always capable of improving financial results, are more important for them. Therefore, in those entities, descriptive models are more applicable than in insurance companies operating as joint stock companies.

Differences also apply to the insurance sector offered by the insurance company. The sellers of life insurance are more dependent on human factors and their claims valuation is more ambiguous and subjective than that of non-life insurance. Therefore, the descriptive models are more applicable to life insurance sector than to non-life insurance sector, where the use of prescriptive models is more justified.

Another area determining the possibility of using decision making models is the area related to investors. Behaviour, reactions and decisions of investors influence the results of investment activity and the cost of capital of an insurance company. Behavioural finances, whose problems include the issue of investment decisions in financial markets, highlight the role of the human factor and the influence of human behaviour on the economic situation in financial markets. As the relationship of an insurance company with financial markets is very close and its performance depends in part on the situation in financial markets, it is justified to take into account the impact of the human factor on the achievement of the objectives set for the cost strategy. However, an approach based on the rationalisation of investment decisions cannot be completely disregarded, and therefore this area indicates the use of both prescriptive and descriptive models.

The last area that is relevant for the choice of models to be used in an insurance company's cost decision-making is the relationship within the financial group. The problem of these relations is very important for designing cost strategy in an insurance company. The links between the different entities that are relevant for cost decision-making also determine the nature of the models that can be used in an insurance company. Relationships in a financial group affect the setting of objectives, in particular strategic objectives, and may also give rise to disparities between objectives in different entities. Therefore, the existence of financial groups should be regarded as a factor which makes it difficult to apply prescriptive models in an insurance company. It therefore seems more appropriate to use descriptive models in this case.

Table 3 summarises the possibility of using cost decision-making models in insurance companies in relation to the areas that relate to them.

Table 3: Application of models of decision making according to the area that shapes decisions on insurance company costs

No.	Area	Models
1	Defining and achievement of objectives of the cost strategy	Prescriptive model
2	Operations and activities related to implementation of the cost strategy	Descriptive model
3	Insurance risk	Prescriptive model Descriptive model
4	Insurance products	Descriptive model
5	Legal form of the insurance company and insurance sector in which it operates	Prescriptive model – insurance company in the form of a joint-stock company, nonlife insurance sector Descriptive model – mutual insurance company, life insurance sector
6	Investors	Prescriptive model Descriptive model
7	Relationships in the financial group	Prescriptive model Descriptive model

source: own study.

Having analysed the impact of factors in the various areas that are related to an insurance company's cost decisions, it can be concluded that there is no clear solution as to the type of model that should be used in the design and implementation of a cost strategy under the financial management of the insurance company. In that situation, a normative-descriptive model or a descriptive model that assumes a partial rationality of the decision-makers' behaviour should be used.

The organisational aspect of implementing cost strategies in an insurance company

After selecting the cost strategy in the insurance company and designing it according to the adopted decision-making model, it is necessary to proceed to its implementation. The performance of this activity should be analysed taking into account two aspects: organizational and behavioural.

The organizational aspect of cost strategy implementation, which is an element supporting financial management in an insurance company, is connected with the following problems:

- appointment of a person or persons responsible for the cost strategy,
- to define the responsibilities of these persons,
- the qualifications and desired characteristics that these persons should possess,
- indicating the area covered by the implementation of the cost strategy,
- identification of persons involved in activities related to the implementation of the cost strategy.

In designating the person or persons to be responsible for the cost strategy, attention should be paid to the distinction between activities related to the selection and design and implementation of the cost strategy, as well as to the nature of the cost strategy, which, as part of financial management, requires that close cooperation between the persons responsible for it and the persons who take decisions in the area of the financial management of the insurance company be included.

Deciding on the choice of the cost strategy to be subordinate to the achievement of the financial management objectives is an activity which should involve both the decision-makers of the financial management of the insurance company (primarily the CFO) and the person who is directly responsible for the cost strategy. The decision to choose a cost strategy, which would be taken without cooperation

between those persons, may result in a lack of coordination between the objectives of the cost strategy and the financial management.

On the other hand, when designing and implementing a cost strategy, the scope of cooperation between these persons is smaller. At this stage, the task of the person responsible for the cost strategy will be to plan activities resulting from the adopted assumptions in the strategy, as well as to monitor and supervise their implementation. While designing and implementing the cost strategy, the cooperation of the person responsible for it with other managers should also be taken into account (depending on the type of strategy that has been chosen, these may be persons making decisions in the area of sales, investment activity, reinsurance, etc.).

The responsibilities and tasks of the person who has been appointed to carry out the activities related to the cost strategy should include:

- cooperation with the CFO in selecting the cost strategy,
- planning activities related to the implementation of the cost strategy using the selected decision-making model,
- to define the scope of these actions and the areas in which the strategy will be implemented,
- monitoring progress in the implementation of the strategy and supervising the effects of its implementation (drawing up reports and statements showing the degree of achievement of the financial objectives set).

The person who is responsible for the cost strategy in the insurance company should have certain qualifications and characteristics which will allow him/her to carry out the activities assigned to him/her efficiently and properly. Such a person should in particular:

- be familiar with the financial reporting rules of insurance companies,
- have knowledge of financial management,
- know the specificity of activities of insurance companies and financial institutions,
- have the ability to think analytically and make decisions.

The range of activities carried out by the person responsible for cost strategy in an insurance company includes activities of a different nature, and that person should therefore have interdisciplinary skills and be able to solve problems in terms of both calculation and compilation of financial data and human relations (e.g. including the need to explain the justification for cost reductions). However, the person responsible for cost strategy should primarily be the 'link' between financial reporting and accounting and financial management.

Behavioural aspect of implementing cost strategies in an insurance company

The second aspect to be considered when discussing these issues is the behavioural aspect of implementing a cost strategy in an insurance company. Its inclusion is dictated by the fact that the presented topic concerns the area of decision making, which is directly related to human behaviour.

Behavioural finance, which includes, among others, research on the influence of human behaviour on the decisions made in the area of finance of companies or institutions, has become very popular for several years, which has contributed to the development of this area of science. One of the most important representatives of behavioural finance is D. Kahneman and A. Tversky, who created the so-called theory of perspective. Currently, as a result of very dynamic development, behavioural finance is represented by many scientists, and the issues covered by them concern a very wide range of problems from the borderline of economics and psychology. Behavioural finances can be divided into two streams of research that concern [Czerwonka 2016, p. 15]:

- analysis of individual behaviour (perspective theory, predisposition effect, heuristics),
- market behaviour analysis (seasonal anomalies, fundamental anomalies, market over reactivity anomalies).

In the case of modelling cost strategy for the purpose of supporting financial management in an insurance company, the first trend that concerns the behaviour of individuals, i.e. individual people, deserves attention. When implementing a cost strategy in an insurance company, problems related to human behaviour in two groups of people should be considered. These groups include:

- managers (making decisions),
- employees (carrying out activities) of the insurance company.

Influence of managers' behaviours on the decisions that are made in relation to the activities aimed at implementing the cost strategy manifests itself in their subjective approach to solving problems. In order to understand the complexity of this issue, it is possible to consider the possibility of applying in an insurance company one of the methods of the theory of individual differences psychology. It is the Big Five personality traits (also known as the five-factor model), developed by P.T. Costa and R.R. McCrae (1980), which assumes that decisions made by people are shaped by five features of his personality, such as:

- neuroticism (tendency to experience negative emotions and susceptibility to psychological stress),
- extraversion (determining the quality and quantity of social interactions and the tendency to experience positive emotions),
- amicability (attitude towards other people),
- conscientiousness (degree of organisation, perseverance and motivation in pursuing a goal),
- openness to experience (degree of tolerance to novelty, cognitive curiosity).

The five-factor model provides an opportunity to observe how managers' decisions can vary depending on their individual characteristics. It is worth noting that research has shown that there is geographical variation in personality traits, which is reflected in the fact that managers in different countries may behave differently (more: Rentfrow P.J., Jokela M, 2016).

The application of this model does not relate directly to cost decisions in the insurance company, but to the decision making of managers in general. Therefore, there is no need to indicate to what extent individual personality traits shape decisions on how to implement a cost strategy in an insurance company, but it should be noted and taken into account in the application of the model in practice that differences in those traits influence decisions, including on the costs of the insurance company.

The second group of people whose behaviour is important for the implementation of the cost strategy are employees of the insurance company who are not decision-makers but perform activities that shape costs. Taking into account the employees' behaviour is a very important element of the implementation of the cost strategy, which to a large extent determines the success and achievement of objectives. The analysis of such employees' behaviours deserves special attention:

- reaction to changes,
- willingness and ability to cooperate,
- the degree of motivation,
- commitment.

The implementation of a cost strategy very often requires changes that relate to the scope of activities allocated to individual employees, reorganization of their work and reduction of their activities. That is why the willingness of employees to accept and accept changes is so important.

The same applies to the willingness and ability of employees to cooperate, as this is also a key factor in implementing the cost strategy. On the other hand, the degree of employees' motivation and involvement in activities related to the implementation of the cost strategy are the features which, although they also determine the effectiveness of the cost decisions taken, the behaviour of employees shaped by them is a result of the generally conducted personnel policy in the insurance company.

Discussions and Conclusions

The aim of the article was to analyse the possibility of applying selected models of decision making while designing and implementing cost strategy in an insurance company subordinated to the realization of financial management objectives. This goal has been achieved and the results of the analysis are presented in Table 3. As can be seen from these results it is not possible to determine one decision making model which would be applicable in the insurance company. A normative-descriptive model or such a descriptive model should be used, which assumes partial rationality of decision-makers' behaviour. That model is also closely related to the areas that shape the cost decisions of insurance companies.

It is also possible to adjust the decision-making model to the conditions of designing and implementing the strategy and to the type of strategy that has been chosen. If an insurance company adopts a cost strategy with a range of activities that focus on activities that are closely related to the finances of the insurance company (e.g. a strategy that is subordinated to financial liquidity, profitability), then a prescriptive model should be chosen. If, on the other hand, the chosen strategy includes activities whose effects are determined by people's behaviour (e.g. a strategy that is subordinated to insurance risk), a descriptive model is better. However, it is not so explicit, and one cost strategy cannot be assigned to one decision making model, as there are such strategies as e.g. a strategy subordinated to cost reduction, which may involve the implementation of actions of very different nature. Therefore, those considerations should only guide those responsible for designing and implementing a cost strategy, as the final decision on this issue depends on the individual circumstances of the insurance company.

Further research in this field should focus on trying to propose a decision-making model designed for insurance companies. That model should take into account the specificities of the activities of those financial institutions as well as changing market conditions. An important factor which should be taken into account in this proposal is the behavioural factor.

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Financial Efficiency of Kazakhstan's Energy Efficiency Projects

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Abstract

At the present stage, a significant pool of financial instruments can stimulate the growth of energy efficiency indicators by industry. In the process of the research, solutions and measures of optimal conditions that can contribute to improving the energy efficiency of buildings were studied. A residential building located in Almaty for research was chosen, for which the costs of energy efficiency projects were calculated. Based on the modeling of the measures, we can conclude that the proposed system can objectively evaluate not only the available data for specific objects, but also offer specific recommendations for improving the energy efficiency class of buildings according modern standards. For economic and financial evaluation of energy efficiency projects in buildings, several methods and indicators were used: simple payback period; net present value and internal rate of return, cost of energy savings. Key elements of the methodology are: selection of a reference building; determination of measures to ensure target levels of energy efficiency and thermal protection parameters and assessment of cost; conducting financial and economic analysis of projects. An important conclusion on the use of financial instruments is that government bodies need to rethink the concept of energy efficiency, that must are used as independent energy source, the value of which is equal to the cost of energy resources saved.

Keywords: Energy Efficiency, Rating, Energy Savings, Environmental Management.

Introduction

In conditions of fierce competition in the world market, any country aimed at economic growth and development should take thoughtful and consistent steps to create optimal conditions for the development of the industrial sector. As the experience of developed countries shows, for the harmonious development of industry it is necessary to take into account energy efficiency indicators. Today, the energy intensity of industry in Kazakhstan is 4-5 times higher than in European countries. The energy intensity index of Kazakhstan's GDP in the world ranking is 1.9, while the indicator of Japan, for example, is 0.1, and that of Germany is 0.16.

The average data on heat consumption in the residential sector in Central Asia countries (230-270 kW * h / m2) exceed this indicator in Europe (100-120 kW * h / m2) and are comparable with Russia (210 kW * h / m2). Per square meter in Kazakhstan, an average of 13.8 kg OE (162 kWh per m2), while in Germany and France 3.24-3.76 for apartments (38-43.7 kWh) and 7.2-8.2 for individual houses (83.7-95 kWh).

It is worth noting that the level of requirements for thermal resistance of structures in Kazakhstan is significantly lower than the requirements imposed in EU countries with similar climatic conditions. In general, the level of our lag in the degree of thermal protection of newly constructed buildings is 15-20 years.

The European Union is a leader in environmental standards applicable in Kazakhstan. In the practice of technical regulation of energy efficiency in the EU, two main methods are used - labeling energy efficiency and establishing requirements for eco-design of products (environmentally-friendly design).

At the moment, in the field of energy saving and energy efficiency in buildings, the republican building standards "Energy Consumption and Thermal Protection of Civil Buildings" are in force SN RK 2.04-21-2004, SN RK 2.04-04-2011 "Thermal Protection of Buildings".

The classification and standard values of the specific characteristics of the consumption of thermal energy for heating for residential and public buildings, the form of the energy passport of the building in SN RK 2.04-04-2011 are identical to Russian standards.

The role of standards is undeniable in the transition to more sustainable, but at the same time economically viable energy solutions that can develop a green economy. Most technologies, including renewable energy, must be cost-effective and cost-effective due to the large volumes of implementation and the gradual increase in productivity as knowledge of them increases. They also require the implementation and standardization of relevant technical specifications in order to expedite their widespread use. It is also important to clearly understand the relationship between various energy efficiency standards in the development of a green economy, which can be represented as follows (Figure 1)

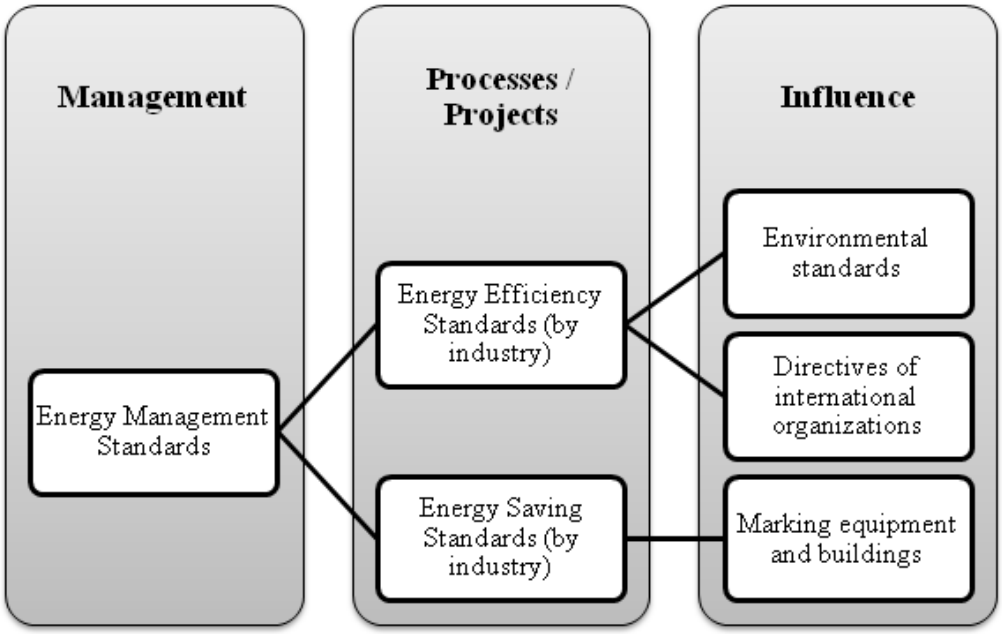

Fig. 1: The relationship of standards in the development of the green economy

It is necessary to study the reasons that impede the implementation of standards, as well as to work on the coordination of existing and newly implemented. Harmonization of energy efficiency standards helps:

- minimize the cost of testing and verification of energy efficiency of products;

- make it possible to compare energy efficiency on a common basis;

- simplify the introduction of more efficient production;

- Accelerate the translation of best practices into policy measures.

On the basis of financial, technical, environmental and social indicators, methodologies for environmental assessment of building construction have been developed in various countries, of which the following are best known: LEED - a guide to energy and environmental design (USA); BREEAM - environmental impact assessment method (United Kingdom); DGNB - certificate of sustainable construction (Germany), Standard STO NOSTROY 2.35.4-2011 - Residential and public buildings. Rating system for assessing the sustainability of the environment (Russia) and others. The financial indicators for assessing the construction of a building are described in the cost-optimal methodology concept, which became widely used after the adoption of Directive 2010/31 / EC on the energy performance of buildings. This methodology is discussed in various studies: Araujo et al. (2016), Ascione et al. (2016), Atanasiu et al. (2013), Ballarini et al. (2017), Bashmakov et al. (2015), Becchio et al. (2015), Hamdy et al. (2017), Hamilton B. A (2010), Enseling and Loga (2013), Gurgun A.P. and Arditi D. (2018), Leutgöb and Rammerstorfer (2013), Miller (2014), Ortiz et al. (2016), Pikas et al. (2015), Tadeu et al. (2016), Tabunshchikov et al.(2013), Tleppayev (2019). Based on previous standards and studies, a rating metodology for Kazakhstan's practice was developed to assess the attractiveness of energy efficiency projects.

Results

As a study of the best practices in the field of improving energy efficiency shows, the investment attractiveness of energy efficiency projects depends on the use of various assessment tools that contribute to the formation of objective and relevant forecasts for investors. The current practice of development of the economy of Kazakhstan indicates the need to develop this issue and apply project evaluation methods that take into account the particular development.

The life cycle cost of a building is the total discounted cost of owning, operating, repairing and disposing of a building or complex of buildings over a period of time. The concept of life cycle costs has been known for a long time. However, in relation to buildings, it has become actively used relatively recently - after the adoption of the EU Directive 2010/31 / EC on the energy performance of buildings, which requires EU members to set energy efficiency requirements not lower than economically optimal levels. To determine such levels, states are obliged to use a framework methodology that is fully based on the concept of the costs of the building's life cycle [6]. In addition to assessing the initial costs of building the building, all future costs associated with its operation, repair and subsequent demolition are taken into account. The sum of all costs associated with the construction and operation of buildings is "the cost of the building's life cycle". Optimization is carried out according to the criterion of minimizing the total life cycle costs of the building for the builder, owner and society, including the requirements to reduce environmental damage and reduce greenhouse gas emissions. Analysis of the life cycle cost of a building can be carried out for buildings of any type - existing and new, residential and public, individual and multi-unit.

The discount factor significantly affects the indicators of economic efficiency of projects. Its high value leads to a rapid depreciation of future income and underestimates the positive cash flow, and hence the economic effect of the project. A package of measures is cost effective if the net present value of the revenue stream calculated with a given discount factor is greater than zero, or the discounted income is greater than the discounted cost. In substantiating investment projects, two approaches are used: calculating cash flow at current prices and at comparable prices. In the first case, the refinancing rate is often used as a discount coefficient in economic analysis, and in the financial analysis, the market interest rate on long-term loans. In comparable prices - the interest rate taking into account the level of inflation.

For comparison and obtaining comparative data for analysis, the proposed and modified approach with a reduction in indicators was applied to the building, which is located in Almaty. For the building selected for examination in the project, it is known that it was built in the 70s. The readings

of the heat meter installed in the heat point of the building were analyzed for the period from February 1, 2016 to April 15, 2019.

In 2016/17, the actual heat consumption for the heating season amounted to Qот = 364.69 Gcal, i.e. exceeding 68.09 Gcal or 29%, while the actual specific heat consumption of the building, taking into account the energy efficiency class, q_s =204,3kWh/м^2. In 2017/18г Qот =332,0 Gcal, i.e. excess 35,4Gcal or 12, the actual specific heat consumption of the building, taking into account the energy efficiency class, q_s =186,0kWh/м^2. In 2018/19г Qот =330,0 Gcal, i.e. excess 33,4 Gcal or 11, the actual specific heat consumption of the building, taking into account the energy efficiency class, q_s =184,0kWh/м^2.

The cost of heat consumption by a building can be reduced only through the introduction of an automated heat point and measures for thermal modernization of the building.

Electricity costs for lighting the common areas of use of the building were also calculated. In a year they amounted to 3710 kWh or 1.79 kWh/m2. Lighting costs can be reduced to 700-800 kWh or 0.34-0.4 kWh/m2 through the introduction of energy-saving LED lamps.

Average data on heat consumption in the residential sector in Kazakhstan q_s =270 kW * h / m2. In the EU, a building with low heat consumption for heating is considered at qs from 50 to 80 kWh / m2.

For the considered residential building, the total score was 37 points, which corresponds to class E. This rating corresponds to the class of construction and operation of the building 40 years ago.

The heat consumption rate for such a building according to the standards of the Republic of Kazakhstan is about 222 Gcal. To ensure efficient heat supply to the building, a system of automatic recording of the outdoor temperature during the heating period and regulation of the regulation of the supply of thermal energy for heating are required. According to calculations, the heat consumption will be 204 Gcal against the standard in 222 or actual in 330 Gcal.

A business plan for the energy efficiency of the building was calculated with various options to calculate the economic efficiency of the proposed measures, such as installing an automated heat point, building insulation to reduce energy consumption to class B.

According to calculations, the simple payback period of an automated heating substation, together with installation without borrowing due to energy saving measures, is 4 years, building insulation - 13 years. Calculations were also made taking into account borrowing for the purchase of an automated heat substation for 10 years and heat modernization for a period of 20 years at an interest rate of 4.5% (state program rate) and 15% in commercial bank. According to calculations, the installation of district heating substation pays off at any interest rate, since energy savings cover all interest payments with debt repayment. Insulation of the building without and with substations is paid back only at a rate of 4.5% for the next year after closing the loan (21 years) and for 31 years, respectively. Calculations show that lengthening the terms of borrowing makes it possible to cover annual payments of the main debt and interest due to savings in energy consumption, while increasing the interest rate lengthens the payback periods of the proposed major energy efficiency measures. Thus, measures to stimulate energy efficiency in buildings are impossible without government support for subsidizing interest rates and lengthening the term of borrowed funds.

Among the recommendations for upgrading the building class in Almaty, the following measures should be proposed:

- automation of heat energy consumption by apartment buildings (automation of heating units, facade control): the installation of an automated heat station will reduce specific energy consumption in the winter from 180 kWh / m2 to 115, which will correspond to class C;

- thermal insulation of pipelines and increase of energy efficiency of the equipment of heat points, distributing pipelines of heating and hot water supply;

- restoration / implementation of circulating hot water supply systems, hydraulic adjustment, automatic / manual balancing of distribution heating systems and risers;

- installation of frequency regulation of pump drives in hot water supply systems;

- insulation of the building, basement and attic with overhaul of the roofing and replacement of the outer windows of public spaces, which will reduce energy consumption by another 20-25% to class B;

- installation of automated lighting control;

- Relocation of electric networks to reduce losses of electric energy;

- Development, together with municipal authorities, of separate waste collection tools.

It should be noted that if the automatic control of the heating temperature is limited by the central heating system (central heating unit), the system corresponds to an ineffective class D, since the heat carrier of the same temperature is supplied to different rooms of the building with different heating needs. In order to comply with at least the standard class C, it is necessary to provide room temperature control with at least one of the following methods: radiator valves, thermostats, room controllers, etc. For class B, it is necessary to organize room temperature control with communication between the controllers and the central station. Feedback communication allows you to extract additional savings potential in the heating system. And finally, in order to comply with class A, it is necessary to provide room temperature control with communication between the controllers and the central station, plus control of the presence of a person in the room. Thus, the higher the level of automation, the more opportunities there are to extract the potential for savings in engineering systems.

Conclusions

The above examples indicate the need to use an integrated approach in determining the sustainability parameters of buildings with the allocation of energy efficiency and energy saving indicators.

An integrated approach allows you to:

1) Include in the assessment the maximum number of indicators that relate to the energy efficiency of the building;

2) Allow, based on the data obtained, to plan measures to eliminate the most inefficient indicators;

3) Allows you to comparatively evaluate indicators for various objects;

4) With a lack of data allows you to vary the data for evaluation;

5) Reflects the multidimensionality of the measurement of the project energy efficiency indicator

Also, the use of an integrated approach is based on the following provisions:

- At the present stage, there is a large list of energy efficiency indicators for buildings, which includes 5 main groups, within which indicators are distributed into subgroups.

- Using an integrated approach to assessing energy efficiency allows you to get significant returns in accordance with a variety of parameters and criteria. What is especially important in conditions when obtaining some data may be difficult or distorted as a result of various phenomena and circumstances.

- Based on international and Russian experience, a building in Kazakhstan was evaluated, on the basis of which the main obstacles were identified.

- Based on the data obtained, it can be concluded that the proposed approach allows us to understand how different standards and approaches can be harmonized to obtain generally accepted and comparable data.

- In Kazakhstan, the relevance of the proposed approach is especially felt when working with residential facilities. This is due to the fact that usually such buildings have a large number of owners, and decisions are taken for a sufficiently long period.

- objective factors affecting obstacles to reducing incentives in energy efficiency projects are high bank interest rates, rising costs of materials and equipment. Calculations for European countries show that energy efficiency packages are applicable if one or more of the following conditions is met: a lower discount rate (i.e., from 3% to 1%), an increase in energy prices (i.e., from 2.8% up to 4%), reducing investment costs between options.

- the economic return on projects in existing and new buildings, in our opinion, depends on the creation of energy efficiency programs for overhaul and subsidies from the budget for the overhaul of energy-efficient projects; creation of revolving funds for energy conservation and business development of energy service companies; developing standardized banking products to finance energy efficiency programs.

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Identification of Model Risk of Selected Systemic Risk Measures for The Polish Banking Industry

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Abstract

There are many approaches to measure systemic risk (Hansen 2013), but the main distinction entails financial soundness indicators and advanced systemic risk models. The advanced models are based on the statistical multivariate distributions or on the stochastic processes. In the paper the Conditional Value-at-Risk (CoVaR) proposed by Adrian and Brunnermeier (2011, 2016) will be used to assess systemic risk. Two methods, i.e. the conditional (DCC-GARCH) and unconditional (quantile regression) will be applied for these estimations. As a proxy of a financial system a construction of an index, free from disadvantages as opposed to the stock market index, will be proposed by the author. The empirical analysis for the Polish financial system will contain: a model risk analysis, comparison of results for selected measure of systemic risk and estimation methods, an evaluation of results (back testing and a financial condition assessment of financial institutions). In the study existence of the strong and positive relationship between results of the delta CoVaR gained while applying the DCC-GARCH and quantile regression confirmed complementarity of both approaches. The relationship between the systemic risk measure for an individual bank and measure of its financial condition was confirmed, but the results were not consistent. The *delta CoVaR* was more influenced by the size of a bank rather than its financial condition. This study indicated that the *delta CoVaR* and a composite indicator contained different sets of information.

Keywords: Systemic risk, banking industry, CoVaR, model risk

Introduction

In this paper systemic risk will be meant in a very narrow sense as a risk of breakdown or major dysfunction in a banking system. The term is used by some researchers to include the potential insolvency of a major player or a component of the financial system. The development of these models is observed after the financial crisis of 2007-2008 and significantly after 2010. There is a large group of systemic risk measures in the literature e.g. Acharya et al (2010); Hansen (2013); Benoit et al (2013). The main representation of different approaches in systemic risk measurement includes the following measures:

- ***CoVaR*** (the Conditional-VaR) - Adrian and Brunnermeier (2011, 2016),
- ***MCoVaR*** (the Multi-Conditional-VaR) - Cao (2012),
- ***MES*** - Acharya et al. (2010); Brownlees, Engle (2012),
- ***SV*** (the Shapley value) approach - Tarashev et al. (2010),
- ***CES*** (the Component Expected Shortfall) – Banulescu, Dumitrescu (2012),

- ***SRISK*** (the Systemic RISK) measure - Acharya et al. (2012) and Brownlees and Engle (2012),
- ***DIP*** (Distress Insurance Premium) – Huang, Zhou, Zhu (2009, 2010, 2011),
- ***JPoD*** (Joint Probability of Distress) – Segoviano, Googhart (2009).

Risk models play a fundamental role in the regulatory process and are directly embedded within the Basel Committee regulations. Therefore, the risk models are used to determine bank capital. While their use for macroprudential purposes is not clear, there are a number of proposals from the academic and public sectors to apply these models setting bank capital and surcharges to meet systemic risk. Thus the output of these models has a real economic impact (Danielsson et al. 2011).

The goal of this paper is to identify model risk and its sources for a selected systemic risk measure, namely delta CoVaR. The following research hypotheses were formulated by the authors of this paper:

Hypothesis 1. The main source of the model risk of delta CoVaR is an estimation procedure.

Hypothesis 2. There is a relationship between the systemic risk measure for an individual bank and measure of its financial condition.

In the empirical study delta CoVaR (measured with the DCC and the quantile regression approach) will be selected to measure the systemic risk and the composite indicator – a classical measure of development proposed by Hellwig will be the measure of bank's financial performance.

Such an empirical study concerns the Polish banking system and covers the lack of studies with the aim to investigate a relationship between the systemic risk and a financial condition of a bank. This study enhances the literature by verifying results in a less developed market.

The structure of the paper contained literature review, research methodology, empirical results, conclusions and finally references.

Literature Review

Model risk is the risk of economic or reputation loss due to errors in data, errors in the development, implementation or use of models. The use of models invariably poses model risk which may potentially account for adverse consequences while reaching decisions based on outputs and reports derived from an incorrect or an inappropriately employed model (McCarthy, Ananthapadmanaban, Warner, Cryezu, 2017). A model consists of three main components:

- an information input component which delivers assumptions and data to the model;
- a processing component which transforms inputs into estimates; and
- a reporting component which translates the estimates into useful business information.

All these components are exposed to model risk. Model risk occurs primarily for two reasons:

- The model may have fundamental errors and may produce inaccurate outputs when viewed against the design objective and intended business uses.
- The model may be used incorrectly or inappropriately. Even a fundamentally sound model which provides accurate outputs and is consistent with the design objective of the model may exhibit high model risk if misapplied or misused.

Therefore, model risk is a regular risk and must be managed accordingly by applying a process of risk identification and an analysis followed by an assessment, monitoring and mitigation. In the empirical study the first step in risk management process – namely, risk identification was analyzed by the authors.

In practice, the existence of the model risk is often ignored. Only in the banking sector, because there are recommendations of Basel Committee and regulators about the model risk steering, cannot be

underestimated. Therefore banks have procedure to manage model risk. In case of the systemic risk there is to our best knowledge a few papers focused on the model risk. But there is a large literature on model risk in related areas. Colletaz et al (2013) present a method, called the Risk Map, for validating risk models. This method jointly accounts for the number and the magnitude of extreme losses and graphically summarizes all information about the performance of a risk model. Authors indicate that the Risk Map can be used to validate market, credit, operational, or systemic risk estimates (VaR, stressed VaR, expected shortfall, and CoVaR) or to assess the performance of the margin system of a clearing house. Danielsson et. al (2011) evaluate the model risk of models used for forecasting systemic and market risk. Model risk, is shown to be increasing with market uncertainty.

There are several contributions which analyze CoVaR and other systemic risk measures from the model risk point of view (e.g. Boucher et al. 2013, Danielsson et al. 2011 and Löffler, Raupach 2011). Boucher et al. (2013) conclude that riskiness of systemic risk measures is crucial for the sake of the fairness and the global system stability.

Research Methodology

CoVaR is a systemic risk measure proposed by Brunnermeier and Adrian (2011, 2016). *CoVaR* represents conditional Value at Risk, i.e. it indicates the *VaR* for a financial institution conditional on a certain scenario in a particular bank or a set of banks (a system). *CoVaR* measures the contribution of a given financial institution to the systemic risk and other financial institutions. Some institutions can have a low *VaR* but a high *CoVaR*. Therefore, the simple *VaR* is not a sufficient measure to evaluate the systemic riskiness of financial institutions. It should be taken into consideration by a policy maker while forming policy regarding risk of an institution. *CoVa*R has a complement in another risk measure i.e. Marginal Expected Shortfall. *CoVar* is defined as follows (Brunnermeier, Adrian 20011, 2016):

$$P\left(X^{j} \leq CoVaR_{q}^{j|i} \middle| X^{i} = VaR_{q}^{i}\right) = q$$

In this paper the *CoVaR* measure was not directly applied by the authors. However, a related measure such as the delta *CoVaR* was employed. The delta *CoVaR* of institution *i* is defined as a difference between the *VaR* of the system conditional on this particular institution being in financial distress and the *VaR* of the system conditional on institution *i* being in its median state ($q = 0.5$):

$$\Delta CoVaR_{q}^{j|i} = CoVaR_{q}^{j\left|X^{i}=VaR_{q}^{i}\right.} - CoVaR_{q}^{j\left|X^{i}=VaR_{0.5}^{i}\right.}$$

CoVaR provides an answer for the question: what is the *VaR* of the financial system if a particular institution is under financial stress? While the delta CoVaR responds to the following issue, namely – what is the *VaR* of the system change like when a particular institution becomes financially stressed?

CoVaR estimation methods include: the Quantile regression approach, the Multivariate GARCH approach, the Copula Function approach, the Extreme Value Theory approach and, finally, the Bootstrap approach. In this paper the focus is directed towards the quantile regression (Koenker, Basset 1978, Koenker 2005) and the DCC GARCH procedure. In both methods the delta CoVaR can be defined in a similar way i.e. it takes into account a multiplier and a difference between VaR calculated for different *q*:

$$\Delta CoVaR_{q,t}^{j|i} = \hat{\beta}_{q}^{j|i}\left(VaR_{q,t}^{i} - VaR_{0.5,t}^{i}\right)$$

where beta is a parameter estimated by the quantile regression, and

$$\Delta CoVaR_{q,t}^{j|i} = \hat{\gamma}_{ji,t}\left(VaR_{q,t}^{i} - VaR_{0.5,t}^{i}\right)$$

where gamma is a parameter estimated by the DCC GARCH approach (Engle, 2002).

The concept of the **pattern of development** and the **measure of development (composite indicator)**in English was presented in English by Professor Zdzisław Hellwig at the UNESCO conference in Warsaw in 1967 (eg. Hellwig 1968, Walesiak 2016). The following terms were introduced in this study:

• stimulants and destimulants,

• pattern of development,

• measure of development (distance from the pattern of development).

There is a taxonomy of the pattern objects: a pattern object (an upper pattern object, an ideal object, an upper pole) and an anti-pattern object (a lower pattern object, an anti-ideal object, a lower pole). The coordinates of a pattern object cover the most desired values of preference variables (stimulants, destimulants, and nominates). The coordinates of an anti-pattern object comprise the least preferred preference variable values. The pattern of development is defined as follows:

$$m_i = 1 - \frac{d_{i0}}{d_0},$$

where: m_i – measure of development for i-th bank, d_{i0} – distance between a pattern of development and i-th bank, d_0 – distance between a pattern object and an anti-pattern object.

The measure of development is constructed so that it fulfills the following properties:

1. the higher the level of the complex phenomenon, the higher the value of the development;

2. values of the measure of development are included in the range [0,1], while the measure of development calculated for the pattern of development equals one, whereas the value for the anti-pattern comes to- zero.

Research on financial performance indicators was conducted mainly by the International Monetary Fund (IMF). The IMF uses the term Financial Soundness Indicators (FSI) as referring to statistical measures used for monitoring the condition and financial soundness of the financial sector as well as enterprises and households (IMF 2006, 2009, 2013). In this paper financial ratios which cover different areas to evaluate a bank's activity, e.g. risk, quality of debt were selected by the authors. Presented in Table no. 1 ratios are the compromise between availability of data and diversity within groups of ratios used in empirical study.

Additionally, the classical Euclidean distance was utilized as the distance measure:

$$d_{i0} = \left(\sum_{j=1}^{m} w_j \left(z_{ij} - z_{0j}^{+} \right)^2 \right)^{\frac{1}{2}},$$

$$d_0 = \left(\sum_{j=1}^{m} w_j \left(z_{0j}^{+} - z_{0j}^{-} \right)^2 \right)^{\frac{1}{2}},$$

where: z_{ij} – value of the j-th transformed into stimulant and normalized ratio X_{ij} (idicator) for i-th object (bank), z_{0j}^{+}, z_{0j}^{-} - pattern and anti-pattern co-ordinates, w_j – weight of the j-th variable, m – number of variables.

The system of 10 variables and equal weights has been used.

Table 1: Variables to describe a bank's financial condition

	Ratio	Variable	Type
X_1	return on assets	stimulant	profitability
X_2	return on equity	stimulant	profitability
X_3	net interest margin	stimulant	Risk
X_4	TIER 1	stimulant	Risk
X_5	cost to income ratio	destimulant	efficiency
X_6	noninterest expenses/total income (noninterest +interest)	destimulant	efiiciency
X_7	loans to deposit ratio	destimulant	liquidity
X_8	liquid assets to deposit ratio	destimulant	liquidity
X_9	impaired loans to gross loans	destimulant	quality of debt
X_{10}	reserves for impaired loans/impaired loans	stimulant	quality of debt

Source: own elaboration

Empirical Results

Sample periods range from 5 Jan 2015 to 28 Dec 2015, from 4 Jan 2016 to 27 Dec 2016 and from 5 Jan 2017 to 28 Dec 2017. A sample of weekly rates of return for the 9 largest banks in Poland, i.e. a banking index (WIGBanks) and a WIG index (WIG index comprises all companies listed at WSE) were employed by the authors for delta CoVaR. For the above mentioned 9 banks ten financial ratios were calculated (for each bank separately) in the years 2015-2017 and total assets values in PLN were collected. The assumptions concerning the delta CoVaR estimation are as follows:

1) Due to prudential reasons 1% of tolerance level for VaR and delta CoVaR was assumed.
2) Two estimation methods of delta CoVaR: the Quantile regression approach and the Multivariate GARCH approach were applied, for the VaR estimation a method of filtered GARCH historical simulation was utilized by the authors.

By definition, while employing delta CoVaR, the results of the systemic risk contribution measurement for a bank are related to the size of a given bank. Therefore, the pure results of the delta CoVaR as well as the results additionally weighted by asset values were scrutinized by the authors.

Such a construction of the *delta CoVaR* implemented by the authors allows it to use market prices instead of the net asset value. However, a problematic issue appears while defining a system. Instead of taking into consideration solely 100% of banking index, the financial system was extended by the authors. While measuring the *delta CoVaR,* the system with the banking index and banking index plus stock index were approximated by the authors. Such an approximation was performed in order to search for a more convenient solution rather than applying accounting data. Finally, the financial system is composed of a banking index and a banking index plus WIG index (three different weights of WIG – namely, 0.1, 0.2 and 0.3 were considered):

- 0.9 of banking index + 0.1 of stock index;
- 0.8 of banking index + 0.2 of stock index;
- 0.7 of banking index + 0.3 of stock index.

The influence of this solution is illustrated in Figure 1 which presents results of the *delta CoVaR* for a selected bank (for illustrative purposes only one bank was randomly selected, namely mBank) and different weights of stock index WIG (0.1, 0.2, 0.3 and 0). Such a comparison of results indicates that the following phenomena were included. Firstly, the higher weight of stock index, secondly, the higher

value of the *delta CoVaR* calculated by using both approaches, and finally, considerably higher difference in results obtained by both approaches were detected.

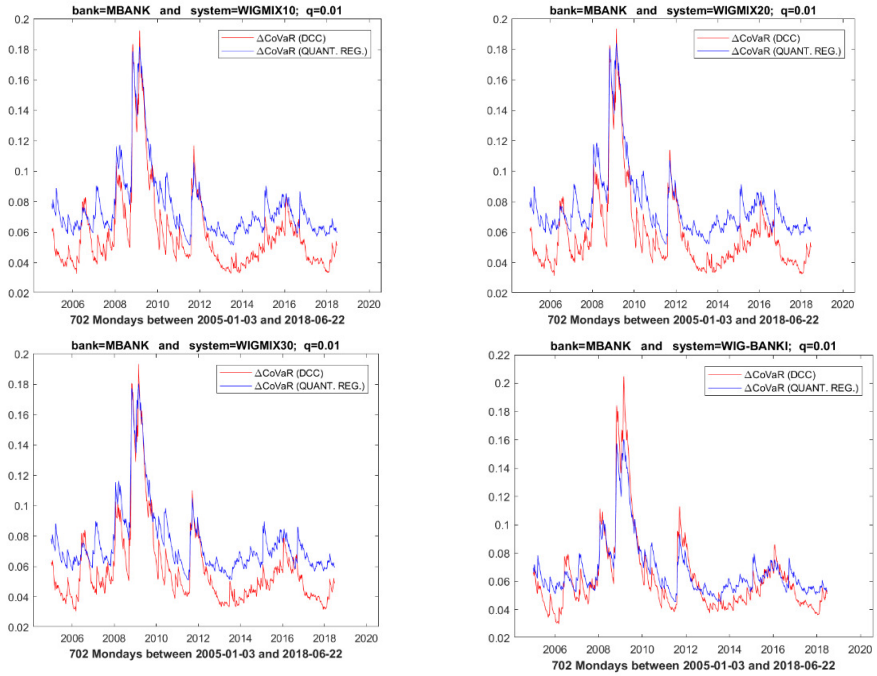

Figure 1: Results of the delta CoVaR for a selected bank with different weight of stock market index (WIG index)

Source: Own calculation.

To verify both research hypotheses, relationships between the results of *delta CoVaR* (calculated by two methods) and a composite indicator, together with relationships between the results of the *delta CoVaR* weighted and not weighted by size of a bank were investigated in this paper by the authors. Therefore, Spearmen's rank correlation coefficients were calculated. The results of Spearman's rank correlation coefficients between the *delta CoVaR* and a composite indicator are collected in Table no. 2, whereas Table no. 3 provides the results from an analysis of the *delta CoVaR* weighted and unweighted by the size of a bank.

Table 2: Spearman's rank correlation coefficients between the delta CoVaR and a composite indicator

2015	**DCC1/ QR1**	**DCC1/ M**	**QR1/ M**	**DCC2/Q R2**	**DCC2/ M**	**QR2/ M**	**DCC3/Q R3**	**DCC3/ M**	**QR3/ M**	**DCC4/Q R4**	**DCC4 /M**	**QR4/ M**
cor	0.8833*	0.2667	0.400	0.9667*	0.3000	0.400	0.9667*	0.3333	0.333	0.5167	0.1500	0.600
p-val	0.0016	0.4879	0.286	0.0000	0.4328	0.286	0.0000	0.3807	0.381	0.1544	0.7001	0.088
2016	**DCC1/ QR1**	**DCC1/ M**	**QR1/ M**	**DCC2/Q R2**	**DCC2/ M**	**QR2/ M**	**DCC3/Q R3**	**DCC3/ M**	**QR3/ M**	**DCC4/Q R4**	**DCC4 /M**	**QR4/ M**
cor	0.9167*	0.3500	0.517	0.9333*	0.2333	0.467	0.9833*	0.3833	0.467	0.6333	0.4333	0.733*

p-val	0.0005	0.3558	0.154	0.0002	0.5457	0.205	0.0000	0.3085	0.205	0.0671	0.2440	0.025
2017	**DCC1/ QR1**	**DCC1/ M**	**QR1/ M**	**DCC2/Q R2**	**DCC2/ M**	**QR2/ M**	**DCC3/Q R3**	**DCC3/ M**	**QR3/ M**	**DCC4/Q R4**	**DCC4 /M**	**QR4/ M**
cor	0.9667*	0.2167	0.300	0.9667*	0.1833	0.400	0.9333*	0.1833	0.383	0.8000*	0.4000	0.683*
p-val	0.0000	0.5755	0.433	0.0000	0.6368	0.286	0.0002	0.6368	0.309	0.0096	0.2861	0.042

*where: DCC – DCC-GARCH estimation method, QR – quantile regression method, 1,2,3,4 – weight of WIG index 0.1, 0.2, 0.3, 0 respectively, M – composite indicator, cor – coefficient of correlation, p-val – p value, * – statistically significant results at 5% level.*

Source: own elaboration.

The analysis of results proved that the correlation coefficients between results of delta CoVaR obtained in both methods were positive, high and statistically significant. The results based on the unconditional (quantile regression) and conditional (DCC) approach consistently indicated changes in the systemic risk level of the banking system. However, the correlation coefficients between results of delta CoVaR and a composite indicator were positive, low and statistically insignificant. It did not confirm the relationship between measures of systemic risk based on market information (market prices/returns) and a measure of a financial condition based on published financial information (available in financial reports).

Table 3: Sperman's rank correlation coefficients between the delta CoVaR weighted and unweighted by the size of a bank

2015	**DCC1**	**QR1**	**DCC2**	**QR2**	**DCC3**	**QR3**	**DCC4**	**QR4**
Corr	-0.7000*	0.3167	-0.5667	-0.4000	-0.6667*	-0.4500	-0.8500*	0.0000
P-value	0.0358	0.4064	0.1116	0.2861	0.0499	0.2242	0.0037	1.0000
2016	**DCC1**	**QR1**	**DCC2**	**QR2**	**DCC3**	**QR3**	**DCC4**	**QR4**
Corr	-0.7833*	-0.1333	-0.8167*	-0.4167	-0.6833*	-0.4667	-0.6333	-0.0500
P-value	0.0125	0.7324	0.0072	0.2646	0.0424	0.2054	0.0671	0.8984
2017	**DCC1**	**QR1**	**DCC2**	**QR2**	**DCC3**	**QR3**	**DCC4**	**QR4**
Corr	-0.7667*	0.1500	-0.7667*	-0.1333	-0.7667*	-0.2833	-0.5167	0.0667
P-value	0.0159	0.7001	0.0159	0.7324	0.0159	0.4600	0.1544	0.8647

*where: DCC – DCC-GARCH estimation method, QR – quantile regression method, 1,2,3,4 – weight of WIG index 0.1, 0.2, 0.3, 0 respectively, corr – coefficient of correlation, * – statistically significant results at 5% level.*
Source: own elaboration.

The correlation coefficients were partially statistically significant. The significantly negative and strong relationship existed between results of delta CoVaR weighted and unweighted by the size of a bank which were estimated with the DCC GARCH approach, while the system comprised banking index plus WIG index. For the delta CoVaR estimated by the quantile regression, the relationship was statistically insignificant.

Conclusions

CoVaR and *ΔCoVaR* extend the *VaR* framework to measure the systemic risk rather than the individual institution risk. *ΔCoVaR* is higher for the quantile regression in comparison with the DCC approach. The results bear resemblance to the ones obtained by Girardi, Ergün (2013), Benoit et al. (2013).

Without the size adjustment (a restricted sample) it was observed that ranking banks in accordance with their size was consistent for the DCC approach in 2016, only on the condition that the share of banking index in the 'system' was higher. With the size adjustment (a restricted sample) rankings gathered by using both methods were similar and stable in time (correlation coefficients were positive, high and statistically significant).

Existence of the strong and positive relationship between results of the *delta CoVaR* gained while applying both methods confirmed complementarity of the approaches. The first hypothesis was verified negatively.

The results of the delta CoVaR and a composite indicator were not consistent (correlation coefficients were positive, low and statistically insignificant). The *delta CoVaR* was more influenced by the size of a bank rather than its financial condition. Lower values of financial condition measure (a composite indicator) were not reflected in higher values of the *delta CoVaR*. This study indicated that the *delta CoVaR* and a composite indicator contained different sets of information. It did not allow for the second hypothesis to be verified positively.

According to the literature and the previous studies conducted by authors, the proper systemic risk measure, *delta CoVaR* was chosen. Therefore, the model appropriateness was not considered as a source of model risk in this case. The following should be considered as sources of model risk:

1) Data structure: stock rates of return or net asset value;
2) Frequency of data: weekly, monthly or daily data;
3) Definition of the system: banking index or other stock market index;
4) Estimation method: the Quantile regression approach or the Multivariate GARCH approach;
5) Measure a bank size: total assets or market capitalization value;
6) Results: pure result of the *delta CoVaR* or adjustment with size of a bank.

On the basis of the results elaborated by the authors it is highly recommended to identify and use corrections while applying various methods to assess the systematic risk so that it does not depend on a size of a bank.

Analysis of sources of model risk is very important element in the model risk management process because model risk cannot be removed, only mitigated through such critical analysis. Danielson stated the broader context of this issue: "Policymakers should be wary of relying solely on models. Formal model-risk analysis should be a part of the regulatory design process." (https://voxeu.org/article/model-risk-risk-measures-when-models-may-be-wrong).

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Measurement of Expenditure Efficiency of Polish Cities with County Rights in The Context of Quality of Life

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Abstract

The article is devoted to the measurement of efficiency of overall expenditures. The purpose of the study is to evaluate the efficiency of use of budget resources by local government units in the context of fostering quality of life. The subject of the study is 65 Polish cities with county rights (county status). Calculations were carried out using Data Envelopment Analysis (DEA). The results of analysis confirm the two research hypotheses: the efficiency of budget expenditures is higher in larger cities with county rights (status), and the efficiency of budget expenditures is higher in cities with county rights (status) with lower overall per capita expenditures.

Keywords: Efficiency, Budget Expenditures, Data Envelopment Analysis, DEA, Cities With County Rights, Cities With County Status.

Introduction

The subject of local government finances encompasses issues related to the rationality of public fund management that include processes of collection and expenditure of these funds by local government bodies. An expenditure policy should be governed by the criteria of rationality and efficiency of public and social task performance. One of these criteria – efficiency – is examined in this article.

Cities with County Rights (status) in the Structure of Polish Local Government

Polish local government has been functioning on three levels since 1999: commune (gmina), county (powiat) and region (voivodeship). A commune is the fundamental local government unit, while a county has the status of a local unit performing tasks that exceed the competences of communes. With respect to the nature of the localities that make up a commune, they are divided into three types: urban, rural and urban-rural. Some urban communes, i.e. of the first type, have a specific status: one administrative centre performs both commune and county tasks. Formally, they are referred to as cities with county rights. Their overall revenue consists of revenues derived from performing both commune tasks and county tasks. Cities with county rights do not form a separate level of local government or a fourth type of commune. However, because of their distinctive functional, demographic, urban, administrative and economic features, they are often considered a separate category in statistics. Cities with county rights are also known as county-free cities (Kuhlmann 2010). They exist in a number of European countries, such as France, Norway, Spain and Hungary (Pickvance 2002). Examples of cities with county rights include Dresden, Schwerin and Munich in Germany (*kreisfreie Städte*), Innsbruck and Graz in Austria (*Statutarstädte*), Oslo in Norway, and Paris in France (Sekuła 2015).

The concept of efficiency and Urban Quality of Life

The concept of efficiency can be differently defined. For the purpose of further considerations, Farrell's concept of technical efficiency is adopted as a measure describing the ratio of the output produced from the input to the maximum output possible to achieve in the specific circumstances and using a particular technology (Farrell 1957). On this basis, we can say that technical inefficiency describes a situation where more input is used than necessary to achieve a particular output level or the output produced is below the output capabilities for a particular input level.

With respect to economic and research practice, the concept of efficiency is treated strictly quantitatively. However, in view of the emphasis placed on the rationalisation of public spending, it is reasonable to give particular attention to the qualitative aspects of actions undertaken using public funds. This aspect directly relates to the concept of quality of urban life as strictly connected with the perception and subjective experiences of people.

Quality of urban life is defined as the relationship between the perceptions and feelings of residents and their own experiences relating to the space they inhabit (Senlier et al. 2008). A comprehensive explanation of this term is connected with such concepts as "satisfaction", "personal growth" and "well-being". Because it often refers to a specific place, in the case of cities it is referred to as the urban quality of life (Marans 2015). The quality of life in a particular area can be analysed in the context of its two main dimensions – objective and subjective. Studies focusing on the objective dimension are chiefly based on socio-economic indicators that can be used to present the achievements and shortcomings in certain component areas of quality of life (Liao 2009).

There are many publications devoted to the problem of selection of areas for analysis to evaluate quality of life. In the most general sense, it is thought that quality of life is affected by cultural, social, economic, environmental and even personal factors. The choice of factors taken into account depends on the type of quality of life to be measured (urban, rural, general) and the relevant geographical area. There are sets of factors relating to urban life in general, i.e. without geographical constraints (Marans 2015), considering the specific character of European cities (Senlier et al. 2008) or European functional regions (Cheshire and Magrini 2006) or US metropolitan areas (Shapiro 2006). The areas selected for this study are the seven areas proposed by P. Liao (2009).

The determination of the areas for analysis is as important as the selection of appropriate methods of efficiency evaluation. The literature devoted to this subject identifies the following methods, as required: classical, parametric and non-parametric. Non-parametric methods use mathematical programming, and, unlike the previous category, they do not make it necessary to consider the effect of random factors or measurement errors or to make assumptions as to the functional relationship between inputs and outputs. The original non-parametric method of efficiency evaluation is DEA.

Data Envelopment Analysis

Data Envelopment Analysis (DEA) is a non-parametric method for evaluating relative efficiency, based on linear programming and referring to the construction of production function as empirical data envelopment (Charnes et al. 1978), drawing on Farrell's concept (Farell 1957).

The determination of efficiency involves solving a mathematical decision-making problem. It consists of identifying reference observations among the set of objects analysed and comparing the other objects to them. Thus, DEA is said to evaluate the relative efficiency of decision-making units (DMUs). The units are "decision-making" because they have an impact on the level of resources incurred (inputs) and results obtained (outputs). The efficiency of DMUs that, from the point of view of the production process, are best at transforming inputs into outputs and therefore are situated at the best practice frontier, is given the value 1, whereas the efficiency of other, less efficient units is less than one.

DEA makes it possible to find the causes of inefficiency and determine the directions of input or output changes enabling inefficient units to achieve maximum efficiency. The distinguishing feature of DEA is the capability of examining objects that transform multiple inputs into multiple outputs. The application of DEA does not require attaching weights to the individual inputs and outputs as measures of significance or making assumptions as to the functional relationship between the variables (Cooper et al. 2007). Unfortunately, DEA is highly sensitive to outliers (atypical data) describing efficient units, which may lower the efficiency results for the remaining objects. When using the most basic DEA models, redundancy of efficient objects may sometimes be observed. To ensure reliability of analyses conducted using DEA, it is necessary to adhere to specific assumptions and limitations, which will be described in the methodological section.

Application of DEA in Evaluation of The Efficiency of Local Government Expenditures – a Literature Review of The Results of Previous Research

There are many studies examining local government expenditures all over the world. Analyses conducted by Kalb et al. are regarded as being among the first studies devoted to the efficiency of German local government units. The study covered more than 1000 municipalities of the German state of Baden-Württemberg. The data for 2004 were used, and the inputs were the total current expenditures, net, i.e. excluding the capital expenditures. The study employed four areas: the social, educational, recreational and infrastructural spheres (Kalb et al. 2012).

Geys and Moesen measured the efficiency of local government units using the non-parametric methods DEA and FDH (Free Disposal Hull), as well as econometric techniques (stochastic approach). The study was carried out based on data for 2000 collected from 304 Flemish municipalities and was intended to compare different measurement methods. The authors pointed out that many analyses concerning the efficiency of local governments focus on a single area, and therefore cannot be used as a basis for comprehensive evaluation. Total current expenditures were selected as the input variable. The outputs were measures in five areas, i.e. the social, educational, recreational, infrastructural and environmental spheres (Geys and Moesen 2009).

Another study assessed the efficiency of local government units in Brazil. The analysis used data for 2001 obtained from nearly 4,800 Brazilian municipalities. Calculations were made using the FDH approach and different variants of DEA. The study employed 4 inputs representing 3 categories: total costs, personnel and public services, and 11 outputs from the communal service areas relating to administration, education and health and housing conditions. The results obtained indicated a link between the municipality size and its efficiency rating. The analyses suggest that smaller municipalities are less efficient than larger ones. There could be different reasons why the efficiency increases with municipality size. The authors point out that the economies of scale could explain this effect in large units (Sousa and Stošić 2005).

The efficiency of the municipal sector was also investigated in Spanish region Murcia. Data for 2000–2002 were collected from 31 units. The following spheres were analysed: green spaces, water supply, waste collection, police, culture and sport. The results revealed a positive correlation between efficiency and the following determinants: economic level, size of the municipality, decentralisation, political sign and financial situation (Benito et al. 2010).

Study conducted in Finland, focused on the cost efficiency of basic service provision by municipalities. The data were collected from 353 Finnish municipalities and covered the period 1994–2002. A two-stage approach was employed in the study. The first stage involved calculation of efficiency, and in the second stage regression models were applied to explain the obtained efficiency scores. While only a single input was used throughout the study – aggregate net cost of provision – the outputs included between 6 and 10 constituent basic municipal services. The cost efficiency median was 87.2%, with a minimum value of 62% (Loikkanen and Susiluoto 2005).

A combination of the DEA method and parametric analysis was also used in the evaluation of efficiency of Portugal municipalities. The study included estimation and analysis of expenditure efficiency for 278 clustered continental municipalities. The study was based on data for 2001. The input was per capita expenditure, whereas the output was a composite indicator referred to as the Local Government Output Indicator (LGOI). It consisted of sub-indicators referring to municipal service provision in the following areas: social services, education, cultural services, sanitary services, territory organisation and road infrastructure. The results obtained led to the conclusion that most municipalities can improve their efficiency without increasing budget expenditures. The second stage of the research was intended to explain the distribution of efficiency results. The following factors contributing to efficiency improvement were identified: education, municipal per capita purchasing power and the distance from the district capital (Afonso and Fernandes 2008).

Analyses carried out for Turkish municipalities employed a combination of DEA and Grey Relation Analysis (GRA). The analysis covered 14 metropolitan municipalities. The data collected applied to the year 2011. In the first stage carried out using the DEA model, a set of 3 inputs (current expenditures, investment expenditures and transfer expenditures) and 3 outputs (tax revenues, non-tax revenues and the revenues obtained from aid and funds) was used. Then the municipalities identified as efficient were sequenced by the GRA method (Kaygisiz Ertuğ and Girginer 2015).

An article concerned with the efficiency of Italian local government presents the results of research evaluating the expenditure efficiency of the 103 largest Italian cities on the basis of data for 2011. The inputs consisted of annual expenditures in 9 areas, including municipal waste management, public transport or cleaning services. The outputs covered 5 areas: urban infrastructure development, urban ecosystem quality, kindergartens, municipality area extension, and the number of residents. The results obtained indicate a probable impact of economies of scale on efficiency. It was additionally noted that uncontrollable environmental variables, the decision-making process complexity and managerial skills may have a stronger effect on the efficiency of large cities than their size alone (lo Storto 2013).

Efficiency of local government expenditures was also investigated in a group of 37 large cities (with a population exceeding 100,000) in Poland. The time frame of analysis was the period between 2009 and 2013. The input consisted of total expenditures per resident, whereas the outputs included values representing the areas of health care, household finances, labour market, education, leisure and recreation, public safety and environmental protection. The analysis proved that an increase in efficiency is promoted by the proximity of other units which offer cooperation possibilities, but also exert competitive pressure. It was demonstrated that budget expenditure efficiency in the large city category is greater in cities that have smaller populations and lower per capita expenditures (Sekuła and Julkowski 2015).

In Poland, the research was carried out on the subject of the efficiency of local governments' expenditures on public and merit goods at the communes' level. The analysis using DEA and Tobit regression covered the years 2002-2006 and three fields: education, environmental protection and public administration. The results prove that communes with higher population and revenues tend to be more efficient, whereas small rural ones are generally less efficient (Karbownik and Kula 2009).

Other research on the area of Poland evaluated the efficiency of investment activity in the communes in Poland on rural areas. The inputs and the effects of investment activity of rural and urban-rural communes in the years 2007-2013 were compared. The studies showed that the amount of expenditure incurred on the studied spheres of investment activity does not translate into their efficiency. This was connected with the possibility of obtaining additional funds from EU, which were not included in the study (Kobiałka and Kubik 2017).

In other studies devoted to efficiency of capital expenditures of Polish municipalities in the Westpomeranian Region it was shown a link between the size and specificity of the entity, and the level of efficiency of its spending for investment. The lowest level of efficiency ratio carried small territorial units - rural profile generally. The article evaluated the efficiency between 2004–2009 using the DEA method (Zioło 2012).

Research Methodology

Selection of units (sample)

This study examines 65 cities with county rights, which constitute the DMUs. This category includes all province capitals as well as cities that have a relatively large impact on the surrounding area. Hence, they are often referred to as "local capitals" even if they are not administrative capitals of regions. From the statistical viewpoint they are classified at both NUTS-5 and NUTS-4 levels. When investigating the expenditure efficiency of such units, it is therefore possible to take into account both commune and county tasks.

One of the fundamental assumptions of DEA is that the set of units to be analysed should be a homogeneous group (Domagała 2007), to avoid comparing inherently different objects. Therefore, Warsaw was excluded from the study, since it performs the tasks of the state capital in addition to commune and county responsibilities. Taking into account the basic homogeneity criteria concerning the similar nature of activities and tasks performed, equal access to resources and functioning in comparable environments (Dyson 2001), the cities with county rights included in the study are a homogeneous group.

Selection of variables

Keeping in mind the purpose of this study the total expenditures [PLN] per resident were selected as the input (I). To identify the measures enabling evaluation of the efficiency of public funds spending by local government units, quality of life indicators can be employed and these were used to determine the results. For this purpose, indicators (Tab. 1) were selected within the areas suggested by P. Liao (2009) to reflect the characteristics of these areas.

The figures used in the study were sourced from the Local Data Bank. Mean values for the 2010–2014 period were applied to ensure an objective character of the measures used. Two exceptions are the O5 and O6 indicators, available at NUTS-4 level only for the 2012–2014 period.

Table 1: Output indicators representing quality of life areas

Symbol	Area	Indicator
O1	Medical services	Number of beds in general hospitals [per 10,000 residents]
O2	Domestic finances	Mean gross monthly salary [per resident]
O3	Work	Proportion of employed people in the working age population [%]
O4	Education	Number of students awarded the secondary school leaving certificate out of the total number of exam takers [%]
O5	Leisure	The area of sport and leisure areas out of the total survey area [%]
O6	Public safety	Crimes confirmed in completed pre-trial criminal proceedings [%]
O7	Environmental quality	Purified sewage [dam^3/100 km^2]

Source: Own calculations

The set of variables selected meets the uniform preference trend condition, i.e. an increase of output will be considered favourable, whereas an increase of input with constant output will be regarded as undesirable. The results of the analysis indicating a low correlation between the variables confirm the possibility of using the selected indicator set in further investigations.

Model Selection

There are numerous DEA models available, meeting different analysis needs (see Cook and Seiford 2009). The most common, basic models include CCR (short for the names Charnes, Cooper and Rhodes), assuming constant returns to scale (Charnes et al. 1978), and BCC (short for the names Banker, Charnes and Cooper) with variable returns to scale (Banker et al. 1984). When these models are used, the maximum efficiency (equal to 1) is usually achieved by more than one DMU, which limits the possibility of comparing efficient units. To remedy this shortcoming, P. Andersen and N. Petersen developed the super-efficiency model, where a ranking of efficient DMUs can be created by assigning to them efficiency scores greater than 1 (Andersen and Petersen 1993). The aforementioned models are of the radial type, assuming a proportional change of inputs and outputs. Because of this, they do not take into account deficiencies in the form of slacks, while allowing zero weights (measures of significance) within inputs and outputs, which in turn may lead to a situation where some variables are not included in the determination of the efficiency score of a particular DMU.

For the purpose of this study, to enable full comparison, including between efficient DMUs, while taking into account the significance of all inputs and outputs, the authors decided to use the Super Slacks Based Measure (Super SBM) proposed by K. Tone (2002), which, assuming constant returns to scale and an input-oriented approach, is expressed as follows:

$$\min \delta = \frac{1}{\frac{1}{s}\sum_{r=1}^{s} \bar{y}_r / y_{r0}}$$

subject to:

$$\bar{x} \geq \sum_{j=1,\neq 0}^{n} \lambda_j x_j$$

$$\bar{y} \leq \sum_{j=1,\neq 0}^{n} \lambda_j y_j$$

$$\bar{x} = x_0, \qquad \bar{y} \leq y_0, \qquad y_0 \geq 0, \qquad \lambda \geq 0$$

The model orientation is an important feature relating to inputs and outputs. An input-oriented model aims to minimise the inputs incurred while assuming constant outputs, whereas an output-oriented model maximises the outputs given a constant level of inputs (Cooper et al. 2007). In view of the fact that local government units, by appropriate adjustment of their policies, have a greater potential to maximise the results of their activities than to directly influence the resources they have at their disposal, an output-oriented model was adopted. Therefore, further considerations are based on the assumption of constant budget expenditures per resident and the objective of maximising performance results that enhance the living conditions and quality of life.

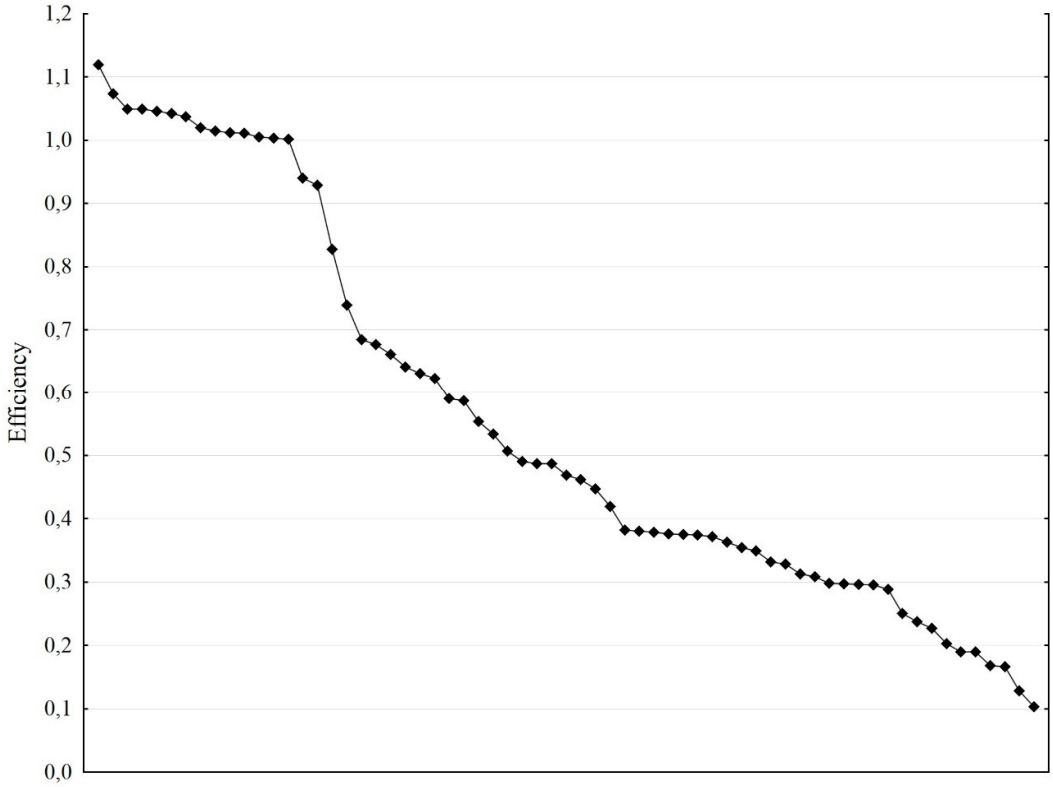

Fig. 1: Distribution of efficiency scores

Source: Own calculations

Calculation and Results

Calculations were made using MaxDEA Ultra 6.11 software. Calculation results suggest that the efficiency scores of the units investigated range between 0.103 and 1.119, and the mean score is 0.557. Fourteen cities out of 65 DMUs were rated as efficient. As regards the remaining (inefficient) ones, a remarkable fact is that only 4 cities achieved a score between 0.7 and 1, as shown in Fig. 1. Thus, there is a clear division between the efficient and inefficient units. Most of the inefficient units attained a score between 0.289 and 0.685.

All the 14 efficient cities with county rights and the same number of least efficient units with their efficiency scores are presented in Tab. 2. Eight out of the 14 efficient units, i.e. more than half, are situated in the Upper Silesian metropolitan area. One of them is Katowice – the capital of the Silesian Province, where the aforementioned metropolitan area is located and winner of a national quality of life ranking created by the Polish edition of Newsweek magazine. It could be proposed that the proximity of urban centres that cooperate and compete with each other contributes to the higher efficiency. This concept, known as the cluster theory, is widely known and well-grounded in theory and practice, although mainly with respect to businesses (e.g. Engel 2015).

Table 2: Efficiency scores of the budget expenditures of Polish cities with county rights – the most and least efficient units

Rank	DMU	City	Efficiency	Rank	DMU	City	Efficiency
1	DMU17	Chorzów	1.119	52	DMU3	Skierniewice	0.298
2	DMU3	Kraków	1.074	53	DMU5	Radom	0.296
3	DMU13	Piekary Śląskie	1.049	54	DMU48	Koszalin	0.296
4	DMU23	Jastrzębie-Zdrój	1.049	55	DMU4	Ostrołęka	0.289
5	DMU18	Katowice	1.046	56	DMU53	Wałbrzych	0.250
6	DMU22	Świętochłowice	1.043	57	DMU39	Łomża	0.237
7	DMU56	Bydgoszcz	1.037	58	DMU63	Sopot	0.227
8	DMU28	Sosnowiec	1.020	59	DMU2	Piotrków Trybunalski	0.203
9	DMU11	Bielsko-Biała	1.014	60	DMU26	Dąbrowa Górnicza	0.190
10	DMU34	Krosno	1.012	61	DMU25	Żory	0.190
11	DMU47	Poznań	1.011	62	DMU40	Suwałki	0.168
12	DMU30	Biała Podlaska	1.005	63	DMU62	Gdynia	0.166
13	DMU54	Wrocław	1.004	64	DMU50	Świnoujście	0.128
14	DMU21	Siemianowice Śląskie	1.002	65	DMU37	Tarnobrzeg	0.103

Source: Own calculations

The capitals of provinces in the south and west of Poland are also efficient units. This suggests a potential link between the unit's location in the European area and its efficiency level, which was also noted in the Finnish study (Moisio and Uusitalo 2013). Meanwhile, inefficient units are characterised by relatively small populations, as presented in Fig. 2. It could be concluded from the graph that efficiency increases with increasing population, which confirms hypothesis 1. High efficiency is a feature of the largest Polish cities, such as Cracow, Wrocław, Poznań or Katowice, as mentioned above. B□□d o□ □□mpl□ of 65 ob□rv□tio□, □po□itiv□, mod□r□t□ li□□r r□l□tio□hip w□□obt□i□□d; th□ correlation coefficient of 0.3820 proved to be of high statistical significance (p<0.01). The studies quoted earlier also pointed to a similar relationship, which confirms the existence of economies of scale (lo□torto 2013; □ou□□□d □tošić 2005).

The second hypothesis is verified by demonstrating a relationship between efficiency and public expenditures per resident. It is of significance because the model analysed used total expenditure per resident as the input and assumed it to be constant while aiming to maximise the outputs, being the effects of activities resulting from local governments' expenditure policies, which was the basis for efficiency measurement. Based on the sample of 65 observations, a negative, moderate linear r□l□tio□hip w□□obt□i□□d; th□ □orr□l□tio□ □o□ffi□i□□t of -0.3525 proved to be of high statistical significance (p<0.01). These results are consistent with the findings of earlier studies examining a sample of large Polish cities (Sekuła and Julkowski 2015) and confirm hypothesis 2. This situation can be explained by more rational spending of resources where they are in shorter supply.

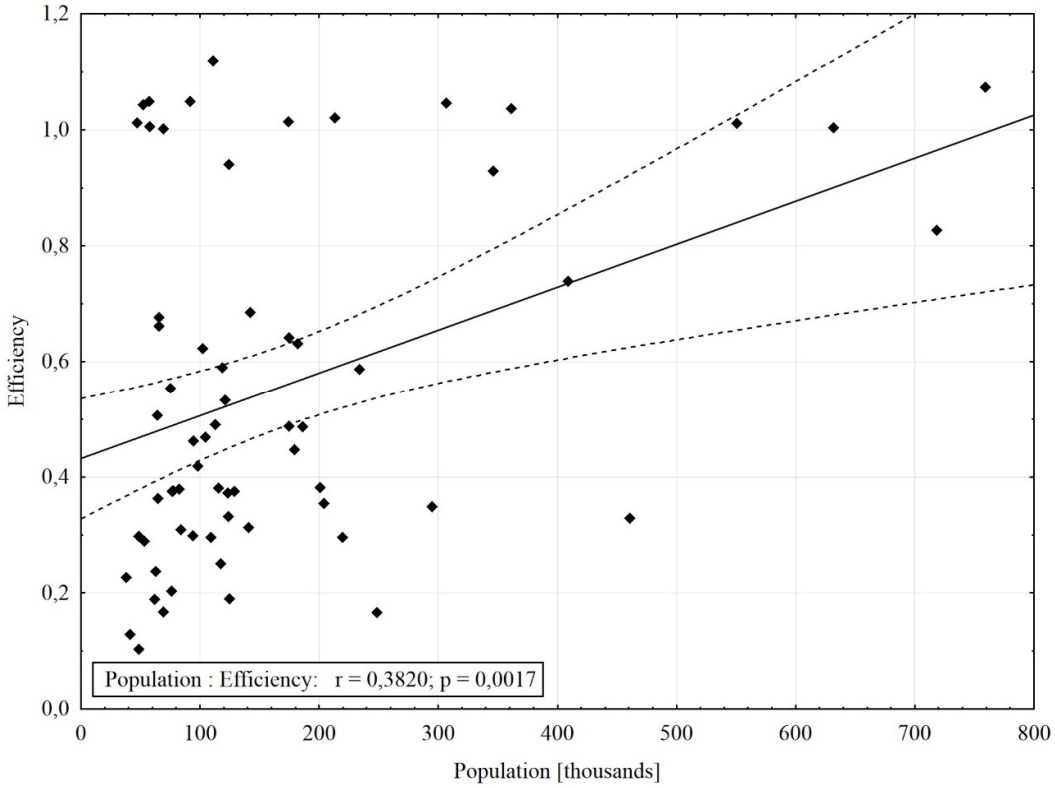

Fig. 1: Scatter plot – Population (in thousands) : Efficiency

Source: Own calculations

Conclusions

An efficiency ranking of cities does not answer the question how inefficient cities could improve their situation. For management purposes, the position relative to other cities is of less importance, but it is useful to know in which areas and to what degree efforts should be concentrated to improve efficiency and manage the city's policy with a view to improving the quality of life. This information is provided by variable projection, which is obtained by solving the DEA model. The first obvious conclusion is that there is considerable diversity in the mean values of the desired magnitude of changes as well as in the maximum values in the individual areas. This indicates that the recommended magnitude of changes aimed at improving efficiency and the significance of the individual factors/areas show large differences.

The greatest mean deviation between the initial and projected values (magnitude of change), equal to 931%, was observed with respect to variable O5: *The area of sport and leisure areas out of the total survey area*. According to the DEA model calculations, the share of recreational areas relative to the total survey area for inefficient cities should range between 3.1% and 27.1% (given the present actual share in the range 0.49–8.58%). A far smaller mean magnitude of change (229%) was observed with respect to variable O6. *Crimes confirmed in completed pre-trial criminal proceedings*. The greatest projected percentage increase applies to the city of Sopot, struggling with the problem of multitudes of tourists in the holiday season. An average magnitude of change exceeding 100% (equal to 136%) is also observed in the case of variable O7: *Purified sewage*. It applies to the natural environment area, which plays a major role in the improvement of the quality of life. Improvement of sewage treatment plant capacity is the responsibility of the commune authorities. In the remaining cases (O1, O2, O3,

O4) the projected changes do not exceed 50% on average, and the values of standard deviations are not so significant

Summary, Limitations and Further Research

The most important conclusions drawn from the research are as follows:

- an increase in efficiency is promoted by the vicinity of other units which offer cooperation possibilities, but also exert competitive pressure;
- the majority of the efficient cities with county rights are situated in the south-western part of Poland;
- the efficiency of budget expenditures is higher in larger cities with county rights (confirming the first hypothesis);
- the efficiency of budget expenditures is higher in cities with county rights where per capita expenditures are lower (confirming the second hypothesis);
- three out of seven result indicators (outputs) characterising the individual aspects of the quality of life – leisure, public safety and environmental quality – show a far higher mean magnitude of change, i.e. difference between the initial and projected values, than the remaining four indicators.

The conclusions drawn from the study focused on the investigation of the population of cities with county rights, and as such they are certainly of significance for the characterisation of such units as a group. Analysis focused on individual cities was not the purpose of this article.

It is necessary to bear in mind the relative character of DEA results, which entirely depend on the selected set of objects to be analysed and the defined set of variables. In this study, inefficiencies due to measurement errors, the presence of outliers, and other statistical discrepancies were not taken into account.

Further research into the area under discussion here should focus on the evaluation of changes in efficiency over time and identifying the factors determining such changes. Additionally, to enhance the objective character of the data representing the quality of life areas used as outputs, it is possible to use composite indicators, enabling a larger number of variables to be included in the analysis.

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Development of Framework for Safety Culture Improvement by An ISM Approach – Pilot Survey

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Abstract

The main objectives of this paper are: to identify factors influencing safety culture and to discover and analyse the interaction among these factors using ISM. This research utilizes interpretive structural modelling as the methodology and framework to develop the relationships between the selected safety culture factors in two large companies operating in Poland. The proposed model provides a useful tool for enterprises to focus on those determinants of decision-making process that are most important for effective safety culture improvement. The authors used MICMAC analysis to classified variables involved in the study into five clusters: input variables, intermediate variables, resultant variables, excluded variables and clustered variables. This study highlights the benefits of an interpretive approach where interrelationships between safety culture factors can be modelled to demonstrate potential influence on other connected factors thereby, increasing the chances of safety improvements success.

Keywords: Safety Culture Management, Interpretive Structural Modelling (ISM), MICMAC

Introduction

Safety is one aspect among others that needs to be managed by organizations. Study on safety culture requires multidimensional approach and safety culture issues may vary based on country, geographic location within the country and organizational culture of the company. Lot of research has been carried out in the field of safety culture modelling. Some researchers did empirical studies and presented conceptual or theoretical models (Cooper et al., 2019; Waszkowski, 2019; Rubin et al., 2020).

In the literature, researchers indicate many techniques to use for modelling and multi criteria decision-making. Main of them, which allow for taking into consideration multiple decision criteria simultaneously, are Interpretive Structural Modelling (ISM), Analytic Network Process (ANP) and Analytic Hierarchy Process (AHP). ISM is a methodology for identifying and summarizing the

relationships among specific elements, which define a problem or an issue (Warfield, 1973). To the best of authors 'knowledge, this is the first study to examine the interrelationships between safety culture factors utilizing the ISM methodology.

The main objectives of this paper are: (1) to identify the key interrelationships between safety cultural factors based on empirical data via expert participant opinion; (2) to develop a model of the causal links between safety cultural factors to identify interdependencies in the context of driving and dependent factors; (3) to present a relationship driven architecture that can clearly identify how certain individual factors can affect and be affected by other factors in the model.

The rest of the paper is organized as follows. The next two sections deal with literature review for identifying the safety culture factors and ISM methodology. Section "Methodology" deals with the research methodology used to analyse the factors. MICMAC analysis of developed ISM model is carried out in this section. Finally, last section includes general conclusions with research findings, limitations and suggestions for future research.

Literature Review

Safety culture is just one of many within an overall organizational culture. Therefore, before continuing with review of a safety culture literature, it is necessary to understand what organizational culture is. Organizational culture comes from the external environment and the integration of an internal framework (Schein, 1990). According to Hopkins (2018) culture is a characteristic of a group, not an individual, and talk of culture must always specify the relevant group.

There are varying definitions of organizational culture (Sun, 2008). Frazier et al (2013) according to Kotter and Haskett (1992) indicate that stronger cultures that involve employees can affect the organization in three ways. "When goals of management and employees are united, each understands the necessity of their work to the organization. Thus, strong communication between management and employees is vital. Secondly, the motivation and "engagement" of employees can favourably affect business outcomes. Lastly, strong cultures enhance performance by supplying structure and control without the need of an overbearing establishment of rules and other formalities. All of these components can contribute to a positive safety culture as well".

Safety culture, like organizational culture, does not have a universal definition. Table 1 shows examples of safety culture definitions based on literature analysis.

Table 1: Safety culture definition

Author/s	Definition
International Atomic Energy Agency (1991)	"assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, [nuclear power] safety issues receive attention warranted by their significance"
Pidgeon (1991)	"set of roles, norms, technical, social, attitudes, and belief practices intended to minimize the exposure of the public, managers, employees, and customers to injurious or dangerous conditions"
NSAG (1996)	"an organizational atmosphere where safety and health is understood to be, and is accepted as, the number one priority"
Clarke (1999)	"values and beliefs of an organization that is specific to health and safety".
Cooper (2000)	"shared organizational beliefs, attitudes, values, and norms including attitudes associated with the proper conduct, danger, and risk of hazardous operations"
Guldenmund (2010)	an aspect that influences behaviour and attitudes related to decreasing or increasing risk
Antonsen (2017)	The safety culture term is a construct used to explain how internal organizational social environments directly influence organizational risk practices that could lead to personal injuries or catastrophic process safety disasters
Cooper (2018)	"social construct used by industry and academe to describe the way that safety is being managed in organizations to avoid catastrophes and personal injuries"

The above definition implies that safety culture is not a standalone concept and it is the reflection of shared values, beliefs, attitudes, and perceptions manifested in the employee perception of environmental safety and organizational characteristics that influence safety behaviours.

According to Cooper et al., (2019) the purpose of the safety culture construct is to reduce organizational and occupational accidents. Rubin et al., (2020) suggests that safety culture and climate variables operate as important predictors of risk-taking. According to Boughaba et al., (2014) the manager's commitment, the employees' involvement, and the safety management system are the key indicators of the safety culture concept. Cooper (2018) suggest that top management can positively influence an organizations safety culture by paying attention to the effectiveness of the development, execution, and performance of the safety management system, routine meetings with employees, and visiting various business units to discuss safety issues. An overview of the factors influencing safety culture by different authors is presented in Table 2.

Table 2: The factors influencing safety culture

Author/s	Factors
Flin et al., (2000)	management/supervisors, safety systems, procedures and rules, risk, work pressure, and competence
Studenski (2000)	attitude towards health and safety regulations and trust in their preventive role; superiors attitude towards subordinates taking risks; the attitude of employees towards risk-taking colleagues; attitude of superiors to employees who require meeting safety standards; attitude towards OHS training; prestige of services and rank of the OHS position; employers' involvement in the organization of safe working conditions
Mielczarek (2002)	management commitment; open and honest communication; employees participation; OHS education; accident analysis; motivating and strengthening of safe behaviour; cooperation between employees
Ejdys (2010)	an appropriate employee training system shaping their awareness; compliance with health and safety regulations by both employers and employees; visible signage system - communication routes, emergency exits, danger zones, rooms; safe working conditions; general order in the enterprise; OHS procedures and instructions valid in the company; personal protective equipment used by employees; preventive measures taken (medical examinations); ensuring technical safety of machines and devices; liability of the employer and employees for health and safety matters; low accident rate; control system existent in the organization
Frazier et al., (2013)	supervisor concern, senior management concern, work pressure, supervisor/management blame, risky behaviour, incident reporting, caution others, respectful feedback, communication, training, discipline, rewards and recognition
Boughaba et al., (2014)	safety communication; safety incentives; safety manager's attitude; safety manager's behaviour; safety compliance; safety policy; safety participation; safety rules and procedures; safety training; safety worker's involvement
Cooper (2018)	management/supervision; safety systems; risk; work pressure; competence; procedures and rules

A good/poor safety culture affects all managerial aspects of Occupational Safety and Health. It has been stated elsewhere in the literature that organizations with good safety culture have lower accident rates than those with weak safety culture (Stemn et al., 2019).

Interpretive Structural Modelling (ISM)

The concept of Interpretive Structural Modelling (ISM) was primary introduced by J. Warfield in 1973. According to Malone (1975) ISM "is used to refer to the systematic application of some elementary notions of graph theory in such a way that theoretical, conceptual, and computational leverage is exploited to efficiently construct a directed graph, or network representation, of the complex pattern of a contextual relationship among a set of elements". ISM process transforms unclear, poorly

articulated mental models of systems into visible, well-defined models useful for many purposes (e.g. Vinodh et al. (2016; Attri et al., (2017); Li et al., 2019).

To get the model, there are several steps in adopting the ISM technique (Kannan et al. 2009):

Step 1: Variables affecting the system under consideration are listed.
Step 2: From the variables identified in step 1, a contextual relationship is established among variables with respect to which pairs of variables would be examined.
Step 3: *3*Astructural self-interaction matrix (SSIM) is developed for factors, which indicates pair-wise relationships among factors of the system under consideration.
Step 4: A reachability matrix is developed from the SSIM and the matrix is checked for transitivity. The transitivity of the contextual relation is a basic assumption made in ISM.
Step 5: The reachability matrix obtained in Step 4 is partitioned into different levels.
Step 6: Based on the relationships given above in the reachability matrix, a directed graph is drawn and the transitive links are removed.
Step 7: The resultant digraph is converted into an ISM, by replacing variable nodes with statements.
Step 8: The ISM model developed in Step 7 is reviewed to check for conceptual inconsistency and necessary modifications are made.

Although not a formal element in the ISM process, many studies develop an additional step to derive the Matrics d'Impacts Croises-Multiplication Applique a Classment (MICMAC) analysis after the canonical form step. The MICMAC step is included in this study.

Methodology

Introduction of the Object of the Research

The current study tackles an assessment of relationship among selected factors of safety culture by applying an Interpretive Structural Modelling (ISM). The research was conducted in two large companies (Company A and Company B) operating in Poland. Company A belongs to the automotive industry. Its customers are world leaders in the automotive industry such as Volvo, Ford and Mercedes. The company works on the basis of lean manufacturing principles, uses such improvement tools as e.g. 5S, SMED. Improvement activities (Kaizen events) concern all areas of the company's operation, including the area of occupational health and safety. In 2016, the company received the Best Global Performance Award. The second company (Company B) products furniture. For more than 10 years, the company has been implementing the IWAY Standard, concerning minimum requirements for working conditions, social conditions and environmental protection. IWAY Standard is based on eight main conventions defined in the Basic Principles of Labor Law, the ILO Declaration of June 1998 and the Ten Principles of the UN Global Compact of 2000. In addition, the company has introduced ISO 9001 and ISO 14001.

Selection of Factors

The authors of the paper and eight industry professionals of SHE department were consulted to confirm the factors influenced on safety culture. Based on the analysis of the literature (section "Literature review" and taking into consideration the opinions of experts, 10 factors were selected (Table 3).

Table 3: The list of important factors identified by experts and influencing safety culture

No.	Factor	Description
F1.	Management commitment	The management is personally involved in employee safety issues, shows interest in the state of OSH in the company. Defines and allocates financial resources as required. Investing in security measures ensuring, among others, employee comfort.
F2.	Employee engagement	Employees provide information on existing threats and cooperate with management, suggest improvement actions and actively participate in their implementation.
F3.	Trust between managers and employees	Managers treat employees with respect, keep their promises and encourage mutual trust and support. Employees respect the orders of their superiors and follow their recommendations.
F4.	Attitudes towards OHS regulations	A sense of personal responsibility for the safety of each employee, attitude to health and safety regulations and compliance with them.
F5.	Communication	Free and open communication in the enterprise. Informing clearly about safety aspects such as occurring threats, occupational risk, and safety prevention. Using various forms of communication, e.g. information meetings, materials in the form of brochures, posters and instructions.
F6.	Education on OHS	Health and safety training, which are adapted to the specifics of the work (on-the-job training) and hazards occurring at the workplace. In addition, promoting safe behaviour through educational campaigns, posters and practical exercises
F7.	Rewards and Recognition	Encouraging employees to perform work safely, by rewarding (approving, praising) correct behaviour.
F8.	Analysis of accidents	Reporting accidents and near misses and their analysis, taking into account the causes and effects of accidents, initiating corrective and preventive actions.
F9.	Monitoring employees behaviour	Monitoring the state of safety and supervision over the way work is performed (e.g. the use of protection measures and detection of potential problems).
F10.	Employees' competences	Assigning tasks to employees with appropriate knowledge, skills and education. Training in given positions must be carried out by persons who have properly documented competences.

Development of structural self-interaction matrix (SSIM)

The next step is to analyse the interrelationship between these factors using ISM. ISM methodology suggests the use of the expert opinions. The expert participants from company A and company B were tasked with identifying all pairwise relationships between the factors.

''Leads to'' or ''influences'' type of contextual relationship was chosen for analysing factors of safety culture. Considering this as a basis, the contextual relationship amongst factors is developed. Four symbols were used to denote direction of relationship between the factors (i and j): V: factor i influences factor j; A: factor i is influenced by factor j; X: factor i and j influence each other; O: factor i and j do not influence each other, since they are unrelated. Using experts' expertise, in each of two enterprises the SSIM was developed (Table 4).

Table 4: Structured Self Interaction Matrix (SSIM) – Company A and Company B

Company A

Factors Fi →	Factors Fj→									
		2	3	4	5	6	7	8	9	10
1	X	X	A	X	A	A	X	A	A	
2		X	V	X	V	V	X	V	X	
3			X	X	O	O	X	A	V	

Company B

Factors Fi →	Factors Fj→									
		2	3	4	5	6	7	8	9	10
1	X	X	A	X	A	A	O	A	A	
2		X	A	X	V	X	X	O	X	
3			A	X	O	V	X	A	V	

4				A	X	X	A	A	O		**4**				V	A	V	O	V	A
5					X	V	X	O	V		**5**					X	X	X	X	X
6						X	A	O	A		**6**						X	X	O	X
7							A	V	O		**7**							A	X	O
8								X	O		**8**								X	O
9									V		**9**									V

The initial reachability matrix is obtained from SSIM by transforming information of each cell of SSIM into binary digits (i.e., 1 or 0). The substitution of 1s and 0s are as per the following rules: (1) If the (i, j) entry in the SSIM is V, the (i, j) entry in the reachability matrix becomes 1 and the (j, i) entry becomes 0; (2) If the (i, j) entry in the SSIM is A, the (i, j) entry in the reachability matrix becomes 0 and the (j, i) entry becomes 1; (3) If the (i, j) entry in the SSIM is X, the (i, j) entry in the reachability matrix becomes 1 and the (j, i) entry also becomes 1; (4) If the (i, j) entry in the SSIM is O, the (i, j) entry in the reachability matrix becomes 0 and the (j, i) entry also becomes 0. Following the above rules, the initial reachability matrix was prepared (Table 5).

Table 5: Initial Reachability Matrix (IRM)

Company A

Factors Fi →	Factors Fj→ 1	2	3	4	5	6	7	8	9	10
1	1	1	1	0	1	0	0	1	0	0
2	1	1	1	1	1	1	1	1	1	1
3	1	1	1	1	1	0	0	1	0	1
4	1	0	1	1	0	1	1	0	0	0
5	1	1	1	1	1	1	1	1	0	1
6	1	0	0	1	1	1	1	0	0	0
7	1	0	0	1	0	1	1	0	1	0
8	1	1	1	1	1	1	1	1	1	0
9	1	0	1	1	0	0	0	1	1	1
10	1	1	0	0	0	1	0	0	0	1

Company B

Factors Fi →	Factors Fj→ 1	2	3	4	5	6	7	8	9	10
1	1	1	1	0	1	0	0	0	0	0
2	1	1	1	0	1	1	1	1	0	1
3	1	1	1	0	1	0	1	1	0	1
4	1	1	1	1	1	0	1	0	1	0
5	1	1	1	0	1	1	1	1	1	1
6	1	0	0	1	1	1	1	1	0	1
7	1	1	0	0	1	1	1	0	1	0
8	0	1	1	0	1	1	1	1	1	0
9	1	0	1	0	1	0	1	1	1	1
10	1	1	0	1	1	1	0	0	0	1

To get final reachability matrix (FRM), the concept of transitivity was introduced, and some of the cells of initial reachability matrix were filled by inference. If a factor 'i' is related to 'j' and 'j' is related to 'k', then transitivity implies that factor 'i' is necessarily related to 'k'. The final reachability matrix is developed after incorporating transitivity concept (Table 6). The completed FRM was assessed based on the reachability and antecedent sets for each of the variables in the matrix (Warfield, 1974). The reachability set R(Pi) consists of the element itself together with other elements which it may help to achieve. The antecedent set A(Pi) consists of the element itself and other elements which may help in achieving it. Table 7 shows the canonical form of the FRM matrix.

Table 6: Final Reachability Matrix (FRM)

Factory A

Factors 'i' ↓ / Factors 'j'→	1	2	3	4	5	6	7	8	9	10
1	1	1	1	0	1	0	0	1	0	0
2	1	1	1	1	1	1	1	1	1	1
3	1	1	1	1	1	0	0	1	0	1
4	1	**1***	1	1	0	1	1	0	0	0
5	1	1	1	1	1	1	1	1	0	1
6	1	**1***	0	1	1	1	1	0	0	0
7	1	**1***	0	1	0	1	1	0	1	0
8	1	1	1	1	1	1	1	1	1	0
9	1	**1***	1	1	0	0	0	1	1	1
10	1	1	0	0	0	1	0	0	0	1

Factory B

Factors 'i' ↓ / Factors 'j'→	1	2	3	4	5	6	7	8	9	10
1	1	1	1	0	1	0	0	0	0	0
2	1	1	1	0	1	1	1	1	0	1
3	1	1	1	0	1	0	1	1	0	1
4	1	1	1	1	1	0	1	0	1	0
5	1	1	1	0	1	1	1	1	1	1
6	1	**1***	0	1	1	1	1	1	0	1
7	1	1	0	0	1	1	1	0	1	0
8	**1***	1	1	0	1	1	1	1	1	0
9	1	**1***	1	0	1	0	1	1	1	1
10	1	1	0	1	1	1	0	0	0	1

Table 7: Canonical form of FRM for Company A and Company B

	Factors	Reachability set R(Pi)	Antecedent set A(Pi)	Intersection set	Level
Company A	**F1**	1,2,3,5,8	1,2,3,4,5,6,7,8,9,10	1,2,3,5,8	I
	F2	1,2,3,4,5,6,7,8,9,10	1,2,3,4,5,6,7,8,9,10	1,2,3,4,5,6,7,8,9,10	I
	F3	1,2,3,4,5,8,10	1,2,3,4,5,8,9	1,2,3,4,5,8	IV
	F4	1,2,3,4,6,7	2,3,4,5,6,7,8,9	2,3,4,6,7	II
	F5	1,2,3,4,5,6,7,8,10	1,2,3,5,6,8	1,2,3,5,6,8	VII
	F6	1,2,4,5,6,7	2,4,5,6,7,8,10	2,4,5,6,7	II
	F7	1,2,4,6,7,9	2,4,5,6,7,8	2,4,6,7	VI
	F8	1,2,3,4,5,6,7,8,9	1,2,3,5,8,9	1,2,3,5,8,9	VII
	F9	1,2,3,4,8,9,10	2,7,8,9	2,8,9	V
	F10	1,2,6,10	2,3,5,9,10	2,10	III
Company B	**Factors**	**Reachability set R(Pi)**	**Antecedent set A(Pi)**	**Intersection set**	**Level**
	F1	1,2,3,5	1,2,3,4,5,6,7,8,9,10	1,2,3,5	I
	F2	1,2,3,5,6,7,8,10	1,2,3,4,5,6,7,8,9,10	1,2,3,5,6,7,8,10	I
	F3	1,2,3,4,7,8,10	1,2,3,4,5,8,9	1,2,3,4,8	IV
	F4	1,2,3,4,5,7,9	4,6,10	4	VI
	F5	1,2,3,5,6,7,8,9,10	1,2,3,4,5,6,7,8,9,10	1,2,3,5,6,7,8,9,10	II
	F6	1,2,4,5,6,7,8,10	2,5,6,7,8,10	2,5,6,7,8,10	IV
	F7	1,2,5,6,7,9	2,3,4,5,6,7,8,9	2,5,6,7,9	II
	F8	2,3,5,6,7,8,9	2,3,5,6,8,9,	2,3,5,6,8,9	III
	F9	1,2,3,5,7,8,9,10	4,5,7,8,9	5,7,8,9	V
	F10	1,2,4,5,6,10	2,3,5,6,9,10	2,5,6,10	IV

The canonical form is a restructured version of the FRM where the factors are grouped to align with the level partition stage. The *Level* column in the table highlights the implicit ordering that will be represented in the final ISM diagram denoting the dependent and driving attributes of each of the factors.

MICMAC Analysis

The MICMAC system is a specialized computer program developed by M. Godet (2011), serving as a tool for structural analysis. The use of the MICMAC program allows the analysis of complex systems with many driving forces, enabling the transition from a comprehensive mapping of the system to its simplified form. The major highlight of the ISM–MICMAC approach is that, it helps to analyse the problem situation through graphical representation and structured model (Singh 2015). In MICMAC analysis, variables involved in the study are classified usually into four clusters: (1) autonomous factors; (2) dependent factors; (3) linkage factors and (4) independent factors. However, in this study, the authors used five clusters according to Godet and Durance (2011): (1) input variables; (2) intermediate variables; (3) resultant variables; (4) excluded variables and (5) clustered variables.

The MICMAC program determines the strength of direct and indirect interactions between factors based on a previously defined matrix of direct influences. The direct influence matrix is transformed into a graph whose vertices correspond to individual factors. The direct influence / dependence map and direct influence graph for Company A and Company B is drawn as shown in Fig. 1. This figures was prepared with MICMAC software (http://en.laprospective.fr).

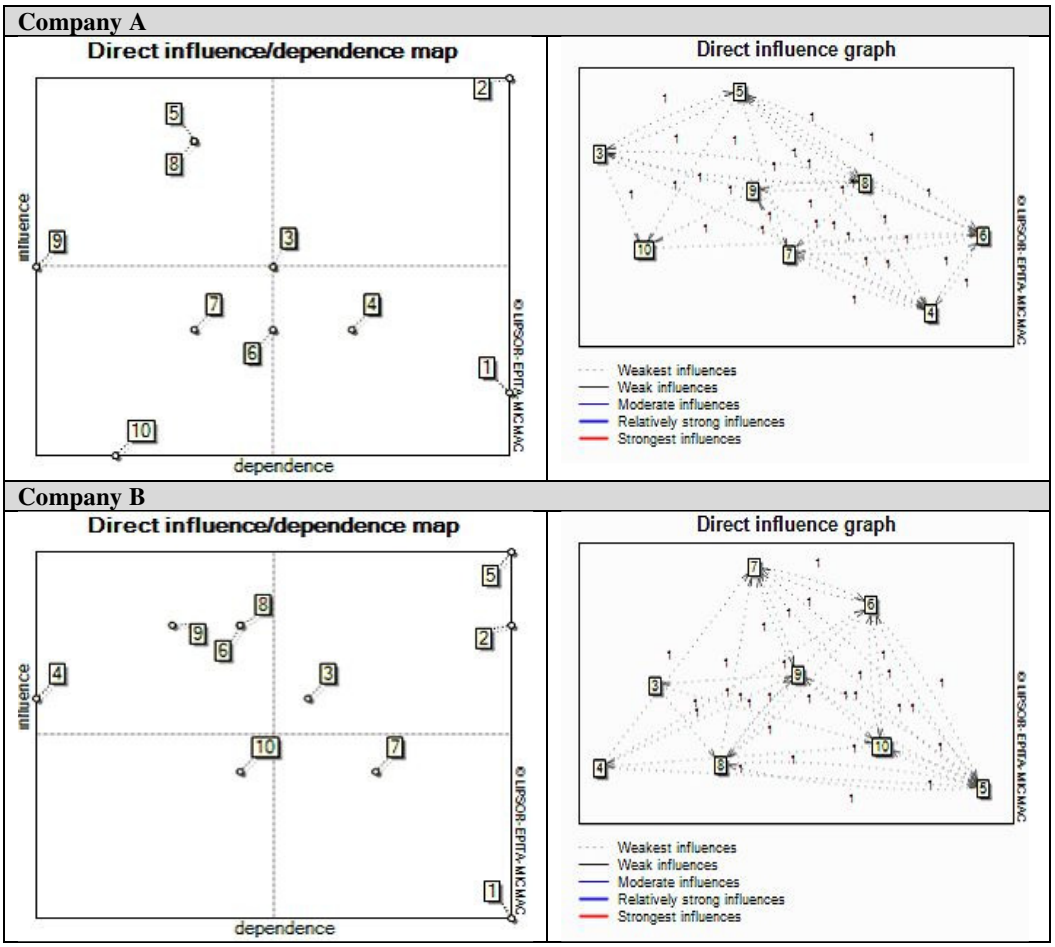

Fig. 1: MICMAC graph for Company A and Company B

The MICMAC diagram presented in Fig.2 highlights the driving and dependence attributes of the safety culture factors respectively for Company A and Company B.

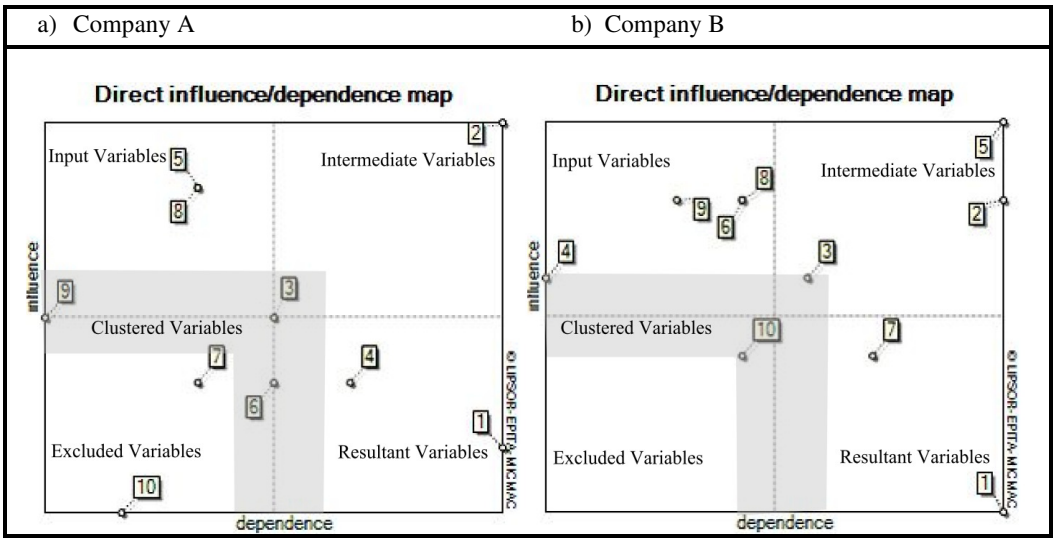

Fig. 2: MICMAC diagram

More details about clusters and its characteristics for both companies are provided in Table 8.

Table 8: Clusters and its characteristics

No	Clusters	Characteristics (Godet and Durance, 2011)	Safety culture factors
1	Input variables	These variables are highly influential and also independent. They tend to describe the system under study and condition the system's dynamics. When at all possible, these variables should be a priority when considering strategic plans of action	**Company A** F5 Communication F8 Analysis of accidents
			Company B F6 Education on OHS F8 Analysis of accidents F9 Monitoring employees behaviour
2	Intermediate variables	These variables are both highly influential and highly dependent. Thus, they are, by their nature, unstable. Any action taken on these variables will cascade throughout the rest of the system, profoundly affecting the system's dynamic.	**Company A** F2 Employee engagement
			Company B F2 Employee engagement F5 Communication
3	Resultant variables	These variables are not influential but very dependent. Their behaviour explains the impacts coming from other variables, principally input and intermediate variables.	**Company A** F1 Management commitment F4 Attitudes towards OHS regulations
			Company B F1 Management commitment F7 Reward and recognition
4	Excluded variables	These variables are neither influential nor dependent. They have little impact on the system under study. Often these variables simply describe inertial or prevailing trends, which change little over time. Sometimes, these variables are simply autonomous, and therefore have little impact on the system.	**Company A** F7Reward and recognition F10 Employees' competences
			Company B **------**

		Excluding these variables will therefore have few consequences for analysis.	
5	Clustered variables	These variables tend to congregate together. They are not sufficiently influential or dependent to be included among the previous classifications. We cannot draw any definitive conclusions about these variables and their impact on the system	**Company A** F3 Trust between managers and employees F6 Education on OHS F9 Monitoring employees behaviour
			Company B F3 Trust between managers and employees F4 Attitudes towards OHS regulations F10 Employees' competences

The presented studies were treated as preliminary, and their result was to determine further directions of analyses. The conclusions drawn should be treated with some caution. Nevertheless, some regularities are worth noting.

In both companies, the factor F10 "*Employees' competences*" is underestimated as development indicators. In Company A, this factor is clearly classified as "Excluded", in Company B it is part of the "Clustered" set. This may mean that competences are treated as so-called "Must have", which is something that must be met for legal reasons, but their usefulness or potential for the development of a culture of security in the enterprise is not further considered. In both companies in the "Resultant variables" cluster, F1 "Management Commitment" found the result variables as an indicator of the OHS policy measure. Nevertheless, depending on the company, the second indicator of measure was factor F4 "*Attitudes towards OHS regulations*" (Company A) or factor F7 "*Reward and recognition*" (Company B). This may indicate two trends in treating health and safety matters: as a "punishment or reward" - that is, forcing certain actions by rewarding employees (Company B) or shaping employee awareness and engaging them in actions based on understanding the needs and acceptance of a given policy (Company A). The set of influence variables in both companies includes factor F8 "*Analysis of accidents*". This seems a natural situation - both companies are production companies and despite the fact that they operate in different industries and different conditions, this indicator is associated with the technical conditions and causes of accidents. Next, there is the difference in the "Input variables" cluster: factor F5 "*Communication*" (Company A) and factor F6 "*Education on OHS*" and F9 "*Monitoring employees behaviour*" (Company B). These sets of tools shaping health and safety policy in these companies harmonize with the measures of the result, reinforcing the thesis about the strategy adopted in the companies. In this case, it is natural to place in both companies the F2 variable "*Employee engagement*" in the group of "Intermediate" variables, i.e. those that are a policy implementation tool - they are influenced by input variables and shape other groups of variables. The "location" of factor F5 is also right: in Company A, factor F5 "*Communication*" is an input tool for policy implementation, in Company B an indirect tool - through the motivation system, employees are encouraged to communicate, hoping that this will shape the culture of security.

Conclusions

Research Findings and Implications

This study indicates that adopting an ISM-based approach can help in deeper understanding of the correlations between the factors of security culture in an enterprise, and thus support managers in the decision-making process and the implementation of the basic goal of reducing organizational and occupational accidents.

The construction of a positive safety culture is not easy, and it is not universal. Something that works well in one organization may not work in another. Adjustments will need to be made depending on the resources available and the goals of the different organizations.

Limitation and Suggestions for Future Research

First, study on safety culture is a multidimensional concept. The safety culture issues may vary based on country, geographic location within the country and organizational culture of the company. In addition, as the research focuses on two large companies operated in Poland, the findings are not universally applicable across different sectors or in different countries. In this study are investigated only selected factors of safety culture in enterprises experts' opinion. There are many other areas of challenges in this area and future research should investigate the relationships between other dimensions of this concept. Second, the ISM model was developed using the experience and judgements of the expert team, which represents an element of bias. Finally, the model has not been statistically validated.

Nevertheless, the findings suggest that the safety culture survey is an interesting theme for future research. A number of research propositions may be proposed that would be appropriate for further study and research concerning the modelling the safety culture factors using various modelling techniques like AHP, ANP, etc.. Research work in this area may act as a roadmap for safety culture improvement in enterprises.

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Genesis of The Social Responsibility Concept

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Abstract

The article provides an overview of key national model of socially responsible behaviour of businesses, defined the role of government and the degree of regulation of corporate social responsibility in different countries. The features of the formation of the Russian model of corporate social responsibility. The different types of models that combine national models of countries and their comparative analysis on the following criteria: the main factor in the development of social responsibility of business entities, the basic stakeholders, financial reporting, cooperation with non-profit organizations, the legal framework of corporate social responsibility.

Keywords: socially responsible behaviour of businesses; the model of socially responsible business conduct.

Introduction

Current changes in Russia are tending to strengthen a social orientation of the market economy. The government priority programmes and the strengthening of social partnership gaining resonance among the public bear witness to the mainstreaming of the problem concerning the development of civil society and socially responsible corporate behaviour in the first place. Meanwhile, one of the primary factors determining the prospects of the Russian society and nationhood is the culture of the relationships between the state, business and society, rather than politics or even economy *(Yakimets, 2005)*.

In many countries across the world, these relationships represent a powerful tool for developing economic systems and solving social problems. A lengthy and continuous capitalist development process in the Western countries created a sophisticated and well-balanced regulation system for the relationships of private business, government agencies and society in the area of socio-economic development of the countries and individual territories *(Yakimets, 2005)*.

Corporate Social Responsibility: The Background

The problem of social responsibility as it concerns different agents has been addressed by a variety of academic disciplines: philosophy, sociology, management, law and economics. Said disciplines provide a multifaceted and ambivalent interpretation of the "social responsibility" concept as a derivative of the "responsibility" concept.

Social philosophy normally approaches social responsibility from the perspective of "social justice", "social inequality", "freedom", "power" or "social power", "tolerance", "violence", "harmony", "justice and equality". According to the approach practised in philosophy, the concept of "social responsibility" is treated as the flip side of "freedom" and is subordinated to such categories as freedom and necessity whose status is more generic. According to philosophers, the more freedom a person enjoys, the greater the responsibility vested therein. Social responsibility is a necessary condition for social and personal freedom. The agents of responsibility may be the society as whole or specific social institutions including teams, families, groups and individuals constituting the elementary units of responsibility *(Ladykina, 2015)*.

From the standpoint of sociological analysis, the concept of "corporate social responsibility" is a sub-type of "social responsibility" defined by the peculiarities of the social responsibility agent, i.e. business, and its proactive and transformative role in the society. Social responsibility arises as an indispensable condition for interaction between individuals or groups and the other social groups. For instance, the sociological dictionary *(Kravchenko, 2004)* defines social responsibility in a broader sense, specifically as 'certain expectations of the immediate social environment from the individuals and public organisations on the one hand, and their awareness of their obligations to the society, team and individuals on the other' (p. 268). Therefore, sociologists deem social responsibility to be defined by internal awareness and internal motivation manifested through assumption of certain ethical obligations. Furthermore, as contrasted with the other types of responsibility, social responsibility is not necessarily characterised by a vertical hierarchy associated with performance of certain obligations. It also includes horizontal ties integrating the components of public life with closer and more informal links. As noted in the Russian Sociological Encyclopaedia *(Osipov, 1998)*, social responsibility arises from social norms and fulfils itself both through the forms of social control (public opinion, charter, law), and through social agents' awareness of their social role. Social responsibility in the narrow sense refers to the realm of social welfare, the immediate living environment of the people and satisfaction of their diverse social needs *(Osipov, 1998)*.

Economists appropriated "social responsibility" as a research subject much later and normally addressed it at the intersection of ethics, morality and economics. It is believed that the traditions of social responsibility originate from England and date back to the 17th-19th centuries depicted as a period of cardinal changes in the economic paradigm. The idea of socially responsible corporate behaviour was shaped by A. Smith and his followers. As he analysed ethical standards, A. Smith largely framed the future study of the problem. According to A. Smith (1993), the society functions in accordance with certain unobserved but natural process binding private and public interests together. It is notable that the nature of the factors underlying this process was not been clearly identified.

D. Ricardo's (1955) approach to the issue of whether the business or the public interests should be prioritised was free of the mysticism so typical of A. Smith's approach. D. Ricardo declared his ethical position when he came up with a criterion for distributing profits. In D. Ricardo's view (Ricardo, 1955), this criterion is social justice: "... Independently of the consideration of the discovery and use of machinery, ... the labouring class have no small interest in the manner in which the net income of the country is expended, although it should, in all cases, be expended for the gratification and enjoyments of those who are fairly entitled to it" (p.186). This quote illustrates D. Ricardo's idea according to which an equitable distribution of profits does not go well with the utilitarian principles of classical political economy and is just indirect evidence confirming the relevance of the ethical factor for the economy. During D. Ricardo's times, the methods of implementing social justice in practice did not go beyond speculation.

Contemporary researchers note that despite the incorporation of the ethical factor in A. Smith's and D. Ricardo's works, it is hard to identify any evidence of a detailed and well-balanced analysis. Meanwhile, we should highlight that even the fathers of the bourgeois political economy incorporate the prerequisites for the development of the socially responsible corporate behaviour concept in their works.

Throughout the entire 19th and in the early 20th century, the problem of balance between the interests of the society as a whole and of its specific members – social groups and individuals – was the prime focus of such prominent thinkers as R. Owen, A. Carnegie, H. de Saint-Simon, A. Comte, M. Weber, W. Sombart, T. Veblen, V. Pareto, J. Galbraith, H. Gantt, O. Tead, etc.

Many researchers name A. Carnegie's *The Gospel of Wealth* published in 1889 as the landmark work spearheading a serious debate about the phenomenon of socially responsible corporate behaviour. A. Carnegie *(Carnegia, 1995)* views a properly shaped philanthropic policy intended to make up for the true unfairness of wealth distribution in the society and ease the tensions between the rich and the poor as a real alternative to revolutionary programmes. The business community did not give a particularly warm welcome to A. Carnegie's ideas. Nonetheless, a combination of public pressure, resounding exposures of fraud and instances of tax evasion forced the business elite to reconsider their approach to social responsibility in the future.

In the first third of the 20th century, a number of works were published in the United States that created the foundations for the concept of socially responsible corporate behaviour. Publication of these works was due to the aggravation of antagonisms between various social groups in the form of protests, strikes, racial and student unrest during this period, in a word – growing instability, which raised the problem of respect for the public interest once more. Thus, in the 1930s, *The Modern Corporation and Private Property* by economists A. Berle and G. Means *(Berle and Means, 1991)* generated widespread interest and played an important part in the development of the present-day concept of socially responsible corporate behaviour. This study defines the key idea concerning the prerequisites for the survival of a business corporation.

A. Berle and G. Means' ideas were developed further by German researcher A. Müller-Armack *(Kozlowski, 1999).* He insisted on a compromise between the requirements of private ownership, competition and free pricing on the one hand and social justice on the other to be secured through government and public regulation. The political will to accept the concept of socially responsible corporate behaviour was expressed by the prominent German post-war reformer L. Erhard stated: "I am addressing the major responsible businesses controlling the production tools and national wealth distribution machinery and I am raising the strongest possible demand to take the highest toll and to be most conscious of their responsibility" *(Erhard, 1991, p.131).*

One of the first fundamental works on corporate social responsibility (hereinafter referred to as CSR) was H. Bowen's *Social Responsibilities of the Businessman* published in 1953. According to H. Bowen *(Bowen, 1953)* often referred to as the father of this concept, the social responsibility of the businessman is to implement such a policy, make such decisions or to follow such a course that would be desirable from the standpoint of social values and public objectives. H. Bowen's works largely determined the ensuing debate on CSR, but they lacked the arguments to defend the concept of socially responsible corporate behaviour.

M. Friedman and T. Levitt are most often mentioned as the main opponents of this concept in the literature. Specifically, in *The Dangers of Social Responsibility* (*Levitt, 1958*), T. Levitt treats the increasing focus of business on local community development as a "new orthodoxy", "new feudalism" and even "fascism" that will inevitably lead to the death of capitalism. In his study *Capitalism and Freedom*, M. Friedman (1962) claims that "a few trends could so thoroughly undermine the very foundations of our free society as the acceptance by corporate officials of a social responsibility other than to make as much money for their stockholders as possible" (p.133). In a later study *The Social Responsibility of Business is to Increase its Profits,* M. Friedman came up with

more sophisticated arguments (*Friedman, 2007*). Specifically, he referred to the managers advocating and applying the concept of social responsibility as to "thieves of their owners' money".

Corporate Social Responsibility: Basic Theories

As for the concept of corporate social responsibility, the toolkit of present-day economics includes multiple theoretical concepts reflecting various aspects of the problem under consideration. A major contribution to the analysis and systematisation of knowledge on the genesis of the concept of socially responsible corporate behaviour in the Russian academic literature has been made by Yu.E. Blagov *(Blagov, 2014)*. The basic theories are depicted in Table 1.

Table 1: basic theories of socially responsible corporate behaviour

Basic theories of socially responsible corporate behaviour	Key ideologues	Definition of socially responsible corporate behaviour under a given theory	Essence of the approach
Corporate social responsibility concept	H. Bowen (1953) K. Davis (1960) J. McGuire (1963) S. Sethi (1975) A. Caroll (1979)	H. Bowen is the author of the definition most typical of this concept - The social responsibility of the businessman is "to implement such a policy, make such decisions or to follow such a course that would be desirable from the standpoint of social values and public objectives.	The normative and declarative nature of the approach provided an excessively wide interpretation of CSR definition. Further development of the concept in A. Caroll's pyramids made it possible to systematise the normative approach by identifying economic, legal, ethical and discretionary responsibility (Fig. 1)
Corporate social sensitivity concept	R. Ackerman (1976) W. Frederick (1978) J. Pos (1978)	Social responsibility is treated as the first stage in the development of the social sensitivity concept that "describes a corporation's capacity to be sensitive to the public influence" (Frederick, p.6)	Logical development of the social responsibility concept addressing the use of CSR at the level of a single firm. Positive approach
Stakeholder theory, stakeholder concept	E. Freeman (2004) T. Donaldson D. Preston (1995) M. Clarkson (1995)	Socially responsible behaviour is treated as a leverage to influence the stakeholders.	This theory envisages certain cooperation with all the stakeholders. Companies' objectives should recognise the diverse interests of various parties that will represent a certain type of an informal coalition
Corporate social activity concept	E. Epstein (1987) W. Frederick S. Sethi (1975) S. Wartick& F. Cochran (1985) W. Wood	Social responsibility is defined as "related primarily to such outcomes of organisational decisions that under certain normative standards produce more of a	According to S. Sethi (1975), the essence of "corporate social activity" is corporate behaviour segregated into performance of "social obligations" assumed as a response to the action of "market forces and legal restrictions", fulfilment of "social

	(1991)	positive rather than negative effect on the stakeholders"	responsibility" in excess of stringent economic and legal obligations, as well as "social sensitivity" construed as the corporation's capacity to adapt its behaviour to public needs" (p.62).
Sustainable development concept	M. Van Marrwijk (2003) R. Steurer (2005)	Socially responsible corporate behaviour is construed as behaviour recognising the environmental, economic, social and moral aspects of business	The concept of sustainable development is based on the understanding of the main task of development as "meeting the needs of the current generation without compromising the prospects of the future generations" (Steurer et al, 2005, p.263)
Corporate citizenship concept	D. Logsdon& D. Wood (2002)	Under the model of corporate citizenship, socially responsible areas of activities are treated as resources for improving economic efficiency and competitiveness	In order to implement the corporate citizenship model, a corporation will develop and implement socially responsible initiatives intended for specific parties involved. This kind of activities are defined as corporate social responsibility Corporate citizenship models prioritise the value orientation in the motivation of a company as a morally responsible community, a vehicle of a certain value system

(Source: compiled by the authors)

After systematising the basic concepts of socially responsible business, we were able to identify a number of scholars (including H. Bowen, C. Davis, P. French, R. Blomstrom, J. McGuire, S. Sethi) whose works would consistently add something new to the concept of corporate social responsibility. Without downplaying the importance of their works, a majority of contemporary researchers give most attention to A. Caroll's works. It was A. Caroll's approach that generated widespread interest due to the fact that it gives certain shape and coherence to the concepts of the authors mentioned above. Caroll's famous pyramid reflects the poly-agency of the interpretation applied to the corporate social responsibility of the business community. Interestingly, as A. Caroll *(Carroll, 1979)* consistently defined the levels of corporate social responsibility, he named discretionary responsibility quite relevant construing it as complementary will of the business manifested in the performance of social obligations beyond the legal requirements concurrently with the obligations prescribed by law (Fig 1).

Fig. 1: Multi-level responsibility
(Source: compiled on the basis Carroll, 1979)

Consequently, A. Caroll's and M. Schwartz offered a modified pyramid. In essence, we are talking about the inclusion of philanthropic responsibility in the categories of ethical and/or economic responsibility. According to A. Caroll's and M. Schwartz *(Schwartz& Carroll, 2003)*, such reclassification is due to the fact that first, philanthropic responsibility and ethical responsibility are oftentimes hardly discernible both in theory and in practice and second, philanthropy oftentimes relies on business interest directly. In other words, as they engage in "strategic philanthropy", businesses are often motivated by economic reasons based on their economic responsibility.

The above definitions of corporate social responsibility, even though they reflect the overall development logic of the corporate social responsibility concept, do not obviously cover the entire range of diverse approaches to the interpretation of corporate social responsibility. We believe that by comparing these different conceptual perspectives, it can be concluded that all of them are legitimate and reflect different aspects of the complex interconnections between the society, the state, politics and business.

The concept of socially responsible business and all subsequent modifications thereof as they currently exist were imported to Russia from Western economies in the late 1990s. But it would be a misstatement to say that they were borrowed completely. At the time, Russia has already accumulated its own experience in the area of interaction between business and society. This experience can definitely include traditional charity and patronage so common in Tsarist Russia and the social function of the core enterprises that is a true "relic of the Soviet era". It should also be noted that Russia, as opposed to the Western countries where all initiative in the area of socially responsible behaviour was virtually fully concentrated in the hands of the society, was characterised by state initiative.

Essence of Social Responsibility: The Russian Interpretation

Over the past 15 years, corporate social responsibility has been studied and analysed by such Russian scholars as Liborakina et al (2003), Turkin (2003), Kostin (2004), Yakimets (2005), Katyrin (2004) etc.

According to many researchers, the lack of a uniform terminology is among the most pressing problems in the field of corporate social responsibility. In a situation when there is no clear understanding of CSR, companies interpret both the components of corporate social responsibility and the phenomenon of sustainable corporate development differently. The other members of the society also diverge in their understanding of the terminology, as evidenced by the surveys of the population, managers and state figures conducted by the Russian Managers Association *(Litovchenko&Korsakova, 2003)*.

The peculiarity of CSR interpretation in Russia in the present-day context is that the definition of socially responsible business goes as far as to include the companies' capacity to pay salary to their employees and taxes in a timely manner. According to certain experts *(Litovchenko&Korsakova, 2003)*, this approach is typical for "the young, developing, emerging (about 10 years old) markets".

However, it should be noted that a growing number of companies treat social responsibility as ability and willingness of the business to address the issues directly associated both with the production and sale of goods and services and with the welfare of the country where the company operates.

According to S.A. Strizhov *(Strizhov, 2005)*, "the difference in the understanding of corporate social responsibility between the Russian and Western business communities is that in Russia, businesses normally make one-time projects (as a reputation management tool) the cornerstone of social responsibility and social accountability, while in the West, companies view social responsibility and accountability as a long-lasting continuing process of productive, mutually beneficial and sustainable interaction between the employer and all stakeholders: employees, customers, public organisations and regional government authorities" (p. 117).

According to The Concept of the Social State of the Russian Federation (2003), corporate social responsibility is defined as business' proactive involvement in the funding of social welfare in addition to the social welfare spending by the government. In our view, this definition reflects just one aspect of socially responsible corporate behaviour.

We fully agree with the opinion expressed in The Concept of the Social State of the Russian Federation according to which corporate social responsibility is manifested in the following areas:

- the market – fair pricing, high quality of goods and services, consumer safety and fair competition;
- the employee and the workplace – decent remuneration, occupational safety and health, equal employment opportunities, professional and career development, involvement in the company's operations;
- the environment – green production, lean consumption of natural resources and waste management;
- partnership with the society, state and territories;
- human rights understood as employee and citizen rights.

Meanwhile, it is hard to identify the specific objects of socially responsible corporate behaviour within this approach. There are other approaches to the definition of social responsibility. Thus, for instance, according to S.V. Bratyushchenko *(Bratyushchenko, 2005)*, social responsibility includes the following types:

1. Legal responsibility. This approach assumes that any steps that are legally legitimate can be considered socially responsible: "there is no place for ethics in business".
2. Professional responsibility. This approach is dictated by the rules of engagement between a professional and an employer: "the only responsibility of business is to make maximum profit".
3. Economic responsibility. This approach recognises corporate social responsibility only if there is a specific benefit or utility for business.
4. Moral and ethical responsibility. This approach assumes that corporate responsibility is governed by moral and ethical standards and prioritises the problem of securing and reconciling the interests of all parties involved in the "life" of a company.

The existing diversity of CSR definitions is largely reflected in the approaches referred to above. In the Russian context, the most typical interpretation of CSR is the one under the theory of altruistic corporate social responsibility.
In our view, it is through the lens of this theory that CSR is understood by the Russian Managers Association as a voluntary contribution of business to social development in the social, economic and environmental realms directly related to the core business of the company and going beyond a certain minimum required by law.

By contrast with responsibility under law (labour law, taxes, etc.), CSR implies a free choice, goodwill, a sui generis social contract between the state, population and business.
Interestingly, this definition does not address such components of CSR as responsibility for the quality of goods and services, environmental protection, bona fide conscientious partnership, job creation and welfare of the employees.

Yet another definition of corporate social responsibility suggested by N.A. Krichevsky and S.F. Goncharov *(Krichevsky & Goncharov, 2007)* treats corporate social responsibility as a system of voluntary relations between the employee, the employer and the society aimed at improving social and labour relations, maintenance of social stability within the work team and the community, development of environmental activities at the national and international levels. However, this definition lacks such basic criteria of corporate social responsibility as compliance with the standards codified by law, i.e. formal obligations.

Thus, the overview of conceptual approaches and interpretations of corporate social responsibility provided by the authors demonstrates that there is no generally accepted definition of corporate social responsibility and corporate social responsibility management to date. Meanwhile, all approaches have a common feature: corporate social responsibility is treated as responsibility of a company with respect to all the people and organisations that it comes across while conducting its operations and with respect to the society at large. This broadest interpretation considers socially responsible corporate behaviour through the lens of roles and responsibility areas.

Identification of the responsibility area makes it possible to set the benchmarks and attributes of a socially responsible company that essentially constitute its obligations. Meanwhile, these obligations can conventionally be divided into formal (must) and informal obligations (does not have to, but does) on their face.

The limits of formal obligations of socially responsible business are determined by law, regulations and other regulatory instruments. The authors concur with the view expressed by Russian and foreign scholars claiming that socially responsible behaviour should be based on the principles of totally voluntary assumption and performance of social obligations that go beyond the minimum prescribed by law. This explains why informal obligations lack a framework codified by law.

Models of Social Responsibility

Most researchers worldwide identify two models of social responsibility or socially responsible behaviour in business: the open and the closed models. According to V.S. Poluhina (2011), "the models of corporate social responsibility are primarily examined through the lens of a dilemma: whether it is the business that determines the extent of its contribution to social development at its own discretion or these are formal and informal institutions that reconcile the public interests ultimately transformed into mandatory requirements to business" (p.12). Most often, scholars explain such differences by the socio-historical and socio-economic contexts in the country in which the relations between public institutions were developed where the main role belongs to state regulation. The open model provides for the minimum possible government interference with CSR development policy typical for the American model. By contrast, the closed model provides for the predominance of the state in promoting corporate social responsibility (Fig 2).

The report on social investments in Russia reads, "Due to the nature of business in the U.S. that is based on the maximum freedom of its agents, many social realms still remain self-regulating up to the present day... minimum interference with the private sector is typical for the United States. And yet, the U.S. is famous for its traditions of business' and/or its representatives' systematic involvement in the funding of a wide variety of goodwill projects" *(Litovchenko, (Ed.), 2004, p.18)*. Therefore, when we mention the open model of socially responsible corporate behaviour, we primarily refer to the American model as the social policy implemented by corporations is initiated by the businesses themselves rather than by the government. State regulation is indirect and catalytic in nature such as rewarding socially responsible companies with tax benefits. Yet another distinct feature of the American model is the social image of a company and its reputation that are largely dependent on social policy activities. They are implemented through the funding of social programmes tailored to the interests of internal stakeholders (creating jobs, ensuring safe working conditions, vocational training, etc.), as well as of external stakeholders (sponsoring cultural and sports activities, engaging in charity work through corporate funds).

The main difference between the European model and the American model is state influence and regulation of companies' activities manifested through development of relevant rules, standards and laws with a focus on the social labour realm. According to V. Ivanova (2009), "The main effort within the realm of corporate social responsibility is aimed at combating unemployment by reducing staff turnover, creating jobs and implementing regional social business projects" (p. 47). For instance, minimum wage, 35-hour working week or regulation of overtime work, etc. Furthermore, there are multiple documents that regulate the business' external social policy. These include the European

social policy directive The Green Book. If we take a look at the European system of corporate social responsibility, etc., we can argue that on the one hand, all the areas of responsibility in the European model are very articulate and well-elaborated, but on the other, despite the state's dominant positions in the promotion of CSR, the authors note a shift towards indirect regulation measures that are increasingly replacing direct regulation in recent years.

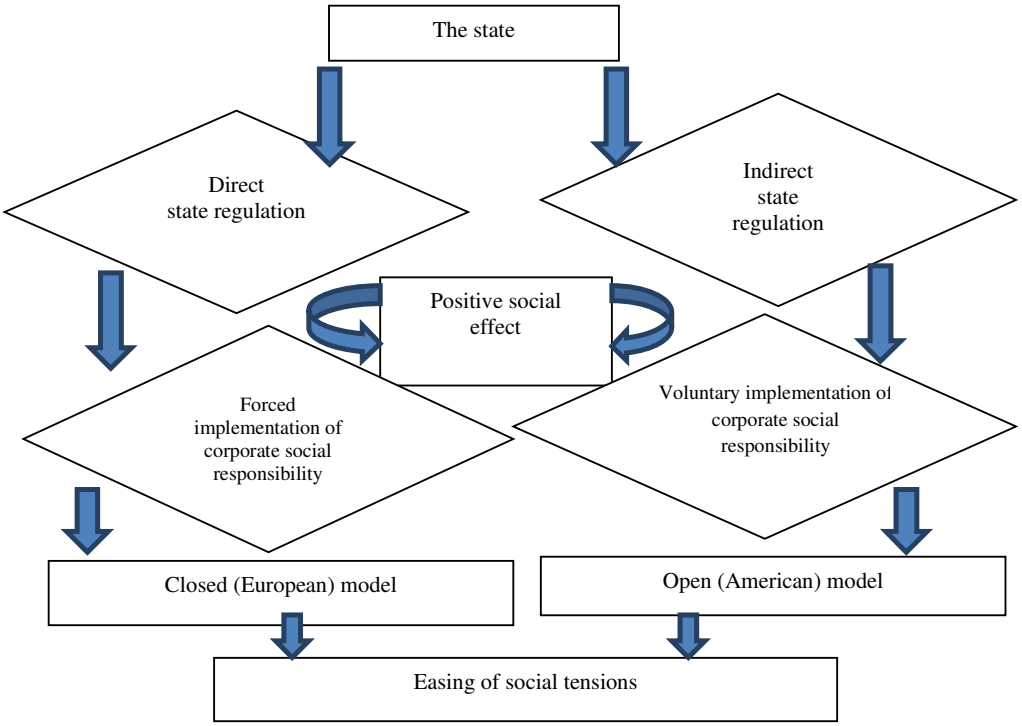

Fig. 2: Basic models of corporate social responsibility
(Source: Poluhina, 2011)

Even inside the European Union, there are distinct models of corporate social responsibility that can be identified and examined separately. Many scholars *(Mantaev et al.,2012; Ostroukhova, 2009)* name the British model as a distinct model. The British model combines the essential features of both the American and European models and is characterised by a greater involvement of the government and civil institutions in the consideration and reconciliation of social interests. Collaboration between the government and business entities in the British model finds expression in public-private partnership involving co-funding of educational, social and cultural projects, etc. Indirect state regulation is manifested in the form of tax benefits and support of initiatives aimed at bringing national CSR standards in conformity with international standards. Nowadays, the British model of corporate social responsibility tends to shift towards a more open model to a certain extent, which brings it closer to the American model *(Perekrestovet al., 2011)*.

A comparative analysis of the European and American models by A. Crane and D. Matten *(Crane & Matten, 2004)* is based on A. Carroll and M. Schwartz's *(Schwartz & Carroll, 2003)* approach who were the first to construe CSR as public expectations in four different realms: economic, legal, ethical and philanthropic (traditional charity). Economic responsibility in the European model includes employees and the local community, while the American model is limited to responsibility to owners and shareholders. The American model does not include any legal rules of CSR regulation as inadmissible, while the British model abounds in such legal rules. Philanthropic responsibility in the American model is very widespread, which represents a major difference from the European model. This is largely due to a significant social load of European companies that can be considered compulsory.

In addition to the American, European and British models, researchers name the Canadian, Japanese and Chinese models that have a number of peculiar features.

The Canadian model stands out for the corporate social responsibility standard developed by the National Quality Institute of Canada that regulates labour activities using the so-called "quality and healthy workplace excellence model" and Canada's national excellence award. In order to secure the award, a company must demonstrate improvements in the basic criteria of quality and healthy workplace excellence developed by Canadian specialists over the course of 3-5 years.

The Japanese model is quite young. The first corporate social reports in Japan did not appear until the early 2000s as a mandatory condition for entering international markets and bringing the documentation in conformity with the requirements set out in the international standards including social responsibility standards. Nonetheless, this does not mean that CSR principles did not priory exist in Japan's business practices. Thus, according to Bobrova *(Bobrova, 2013)*, the genesis of the Japanese CSR model was influenced by the Japanese economic system in general and major business associations in particular (such as Keidanren and Doyukai). The Japanese CSR model is based on the national cultural traditions envisaging solidarity at the company level and business solidarity at the industrial group level. The Japanese model is characterised by a proactive role of the government in corporate strategic planning. Business people focus on profit generation and responsibility for the company's successful development to the society.

Thus, after analysing a relatively broad range of international CSR models, the authors have reached the conclusion that the main issue or dilemma is whether it is the business that determines the extent of its contribution to social development at its own discretion or these are formal and informal institutions that reconcile the public interests ultimately transformed into mandatory requirements to business.

Due to historical, social, economic and political peculiarities, the Russian model of corporate social responsibility has major differences from its Western peers in terms of forms, drivers and roles of the business itself, the state, civil society and non-profit organisations. Russian scholars and business practitioners have diverging opinions regarding the existence of a distinct "Russian model" characterised by a number of specific features that make it different from the other models. Such opinions may be classified in three groups. According to the first, corporate social responsibility in Russia is a "hybrid" of the British and European CSR models. As the proceedings of an international conference on corporate social responsibility state, the Russian version of social responsibility is a blend of the British model (voluntary initiation by business) and the continental (European) model (companies' interest in obtaining a clear legislative framework for social responsibility from the state) *(Poluhina, 2011)*.

In general, this view reiterates the reasoning of those researchers who advocate the "convergence" theory of governance models that has gained popularity in the West over recent years. According to this theory, current development trends (globalisation of commodity and financial markets, improvements in telecommunications) will inevitably make national governance models converge *(Chirikovaet al., 2005)*. According to the second group, Russia has currently chosen the British model of social responsibility that prioritises social investments in local communities and "human capital" *(Ivchenkoet al.,2003)*. Specifically, this opinion is advocated by S. Peregudov *(Peregudov, 2005)*. According to the third group, the Russian model of social responsibility does exist and stands out for combining new social practices with Soviet and even pre-revolutionary traditions.

Conclusion

This study has examined the genesis of social responsibility as it is presented in the works of the economists, identified the basic theories of corporate social responsibility that currently exist alongside with their followers and ideologues. A review of the models presented in Chapter 4 of this paper suggests that the Russian model of socially responsible corporate behaviour is currently at its initial development stage, as due to historical reasons and peculiarities associated with the

development of the market economy in the country, there are certain factors that constrain the development of corporate social responsibility in Russia. Despite the fundamental similarities of the Russian and European models, where the state is the primary initiator of socially responsible corporate behaviour, there are significant differences, including absence of stimulation for CSR initiatives by the government, weakness of formal institutions, corruption, etc. We will just note that the interest of the state in the implementation of socially responsible practices in the form of relevant measures intended to support and encourage such practices both reduces the political risks and eases social tensions on the one hand, and creates the prerequisites for a strong performance of business and ultimately improves the Russian companies' investment potential ratings on the other.

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Causal Dependencies between the WIG and Other Stock Market Indices

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Abstract

The purpose of the paper is to investigate the linkages between the Warsaw Stock Exchange Index (WIG) and selected stock indices, such as BUX, DAX, FTSE100, S&P500, HIS and NIKKEI in the period 2009–2016. There are many studies examining different aspects of the interdependencies between the WIG and selected indices but usually they use only two out of four following methods: causality in mean, causality in volatility, nonlinear relationships, tail dependencies. In this study, we apply all four methods to detect these linkages taking into account many aspects of potential interdependencies. We show that causal relationships between stock markets observed in earlier studies have incompletely be confirmed and have not been stable in all cases.

Keywords: Granger Causality, Diks-Panchenko test, crisis, copula, tail dependence, stock index.

Introduction

Contemporarily the interdependence between financial markets and stock markets is being more and more strong observed. Movements in stock market in a given country are linked not only to the internal factors reflecting financial, economic and political state, but also to the events on other foreign financial markets. Especially, the impact of subprime crisis on the relationship of returns of financial instruments is considered (Misiuk and Zajkowska 2010; Righi and Ceretta 2012; Buszkowska and Płuciennik 2013; Doman and Doman 2013; Buszkowska 2014; Syczewska 2014; Jiang *et al.* 2017). However, these relationships before and after the onset of subprime crisis are expected to differ (Syczewska 2014). There are many different economic and political events that occurred in the last decade which potentially might have influenced the interdependencies of financial and stock markets (Righi and Ceretta 2012; Su 2013).

Causal linkages among stock markets have important implications for security pricing, hedging and trading strategies, and financial market regulations. Also, the presence of linear and nonlinear relationships may be used to achieve financial gains from international portfolio diversification and to reduce systematic local risks. Consequently, there exists a large body of literature on examining the presence of causal linkages between markets, especially developed (less risky) markets. There existing various estimation techniques and testing methodologies are applied to investigate the interdependencies of stock markets. The VAR model and impulse response functions (IRF) are often used (Geweke *et al.* 1983; Lütkepohl 1991; Hiemstra and Jones 1994; Fiszeder 2001, 2009; Osińska 2004; Égert and Kocenda 2006; Misiuk and Zajkowska 2010; Madrak-Grochowska and Żurek 2011; Su 2013; Syczewska 2014). Many authors use the family of GARCH models, specifically bivariate GARCH (Ghysels and Jasiak 1998; Chuang *et al.* 2012), generalized VAR-GARCH (Kim *et al.* 2005; De Gooijer and Sivarajasingham 2008; Su 2013) and multivariate GARCH-BEKK or DCC-GARCH model (Cheung and Ng 1996; Kim *et al.* 2005; Hafner and Herwartz 2006; De Gooijer and Sivarajasingham 2008; Fiszeder 2009; Madrak-Grochowska and Żurek 2011; Balcerzak *et al.* 2016) or copula-based multivariate GARCH models (Righi and Ceretta 2012; Doman and Doman 2013; Su 2013).

This study relates to the studies considering the changes in interdependencies of index returns in the presence of crisis events, i.e. in the period from 2009 to 2016 when the Greek debt crisis (2010) and the Fukushima disaster (March 2011) occurred. The purpose of the paper is to investigate the linkages between the Warsaw Stock Exchange Index (WIG – Poland) and selected stock indices, such as BUX (Hungary), DAX (Germany), FTSE100 (UK), S&P500 (U.S.), HSI (China), NIKKEI (Japan). The causal relationships between stock indices were found in earlier mentioned studies; i) in mean for the WIG and BUX, DAX, FTSE100, S&P500, ii) in variance the WIG, BUX, FTSE100, S&P500. Besides, Doman, Doman (2013) showed that dynamics of the WIG20 is strongly linked to the dynamics of the BUX. Due to the growing trade links between Poland and China and the disaster in Fukushima (Japan), the HSI and NIKKEI indices were also taken into account.

There is the vast literature on examining different aspects of the interdependencies between the WIG and selected indices: causality in mean (Fiszeder 2001, 2008, 2009; Osińska 2004; Égert and Kocenda 2006; Misiuk and Zajkowska 2010; Madrak-Grochowska and Żurek 2011; Syczewska 2014); causality in volatility (Fiszeder 2001, 2008, 2009; Osińska 2004; Égert and Kocenda 2006; Madrak-Grochowska and Żurek 2011; Buszkowska 2014; Balcerzak *et al.* 2016), nonlinear relationships (Orzeszko and Osińska 2007; Syczewska 2014; Orzeszko 2016; Burzała 2017) or tail dependencies (Doman and Doman 2011, 2013; Trzpiot and Majewska 2014).

The current study, in contrast to others, focuses simultaneously on examining causality in mean and variance, tail dependencies and nonlinear relationships. To detect potential nonlinear relationships the Diks-Panchenko test will be applied. The existence of causality in mean will be verified by the means of the Granger test based on the VAR model. Also, the impulse response functions will be applied. In order to examine the causality in variance the DCC-GARCH model and Hafner and Haerwart test will be used. To investigate changes in dynamics of interdependencies the dynamic correlation will be applied. Moreover, the copula-based GARCH model will be used to study the relationships in variance and tail dependencies.

The contribution of this paper lies in applying different approaches to detect causality between the WIG and selected stock indices taking into account many aspects of potential interdependencies. The previous studies are usually limited only to two different approaches (ie. causality in mean or causality in volatility or nonlinear relationships or tail dependencies). In addition, it was examined whether previously observed dependencies occurred in 2009–2016.

The structure of the paper is as follows. Section 2 describes the methodology and data. The empirical results are discussed in Section 3. Summary of results and general conclusions are stated in the last section.

Methodology and Data

This section presents a brief description of the methodologies and data used in this study.

A Linear Granger Causality

Let us consider two time series, X_t and Y_t. The Granger causality holds if (X_t) helps predict (Y_t) at some stage in the future what can be written as follows (Granger 1969), if

$$\sigma^2(Y_t|\Omega_t') < \sigma^2(Y_t|\,\Omega_t'\backslash X_t'), \tag{1}$$

then X_t Granger-cause Y_t,

where:

σ^2 – prediction error variance,

Ω_t' – a set of all information from the past available in time t,

$\Omega_t'\backslash X_t'$ – a set of all information from the past available in time t except information from the past about X_t.

Bi-directional causality exists if Granger causality runs in both directions.

In practice, the Granger causality is modelled via vector autoregression (VAR) models:

$$\mathbf{r}_t = \boldsymbol{\phi}_0 + \boldsymbol{\phi}_1 \mathbf{r}_{t-1} + \cdots + \boldsymbol{\phi}_p \mathbf{r}_{t-p} + \boldsymbol{\varepsilon}_t, \tag{2}$$

where:

$\mathbf{r}_t$ – a k-dimensional vector of the returns at period t,
$\boldsymbol{\phi}_0$ – a k-dimensional vector of constants,
$\boldsymbol{\phi}_i, i = 1, \dots, p - k \times k$ matrixes of parameters,
$\{\boldsymbol{\varepsilon}_t\}$ – a sequence of serially uncorrelated random vectors with mean zero and covariance matrix $\boldsymbol{\Sigma}$.

The VAR models are estimated by the Maximum Likelihood (ML) method, the optimal lag lengths are determined using the Bayesian information criterion (BIC), and the Wald variant of the Granger causality test is used.

Granger Causality in Volatility – Bi-variate-GARCH

Hiemstra and Jones (1994), among others, provide evidence that the nonlinear structure characterizing univariate daily stock return series is related to ARCH errors.

To test nonlinear Granger causality in variance we use the Hafner and Herwart test (HH; 2006) based on the dynamic conditional correlation model (DCC-GARCH; Engle 2002) in which the null hypothesis of non-causality in conditional variance is tested. DCC-GARCH model is defined by the following equations:

$$\begin{aligned} \mathbf{r}_t &= \boldsymbol{\mu}_\mathbf{t} + \boldsymbol{\varepsilon}_t, \qquad \boldsymbol{\mu}_\mathbf{t} = E(\mathbf{r}_t | \Omega_{t-1}), \qquad \boldsymbol{\varepsilon}_t = \sqrt{\mathbf{H}_t}\mathbf{z}_t, \\ \mathbf{H}_t &= \mathbf{D}_t \mathbf{R}_t \mathbf{D}_t \\ \mathbf{R}_t &= (\mathbf{Q}_t^*)^{-1/2} \mathbf{Q}_t (\mathbf{Q}_t^*)^{-1/2} \\ \mathbf{Q}_t &= \left(1 - \textstyle\sum_{i=1}^q \alpha_i - \sum_{j=1}^p \beta_j\right)\mathbf{S} + \sum_{i=1}^q \alpha_i (\boldsymbol{\varepsilon}_{t-i} \boldsymbol{\varepsilon}'_{t-i}) + \sum_{j=1}^p \beta_j \mathbf{Q}_{t-j}, \end{aligned} \tag{3}$$

where:

$\mathbf{D}_t$ – a diagonal matrix of time varying standard deviations from univariate GARCH models,
$\mathbf{z}_t$ – a vector of the standardized residuals ε_{it},
$\mathbf{R}_t$ – a time varying conditional correlation matrix of the $\mathbf{z}_t$,
$\mathbf{S}$ – an unconditional correlation matrix of the $\mathbf{z}_t$,
$\mathbf{Q}_t^*$ – a diagonal matrix composed of the square roots of the diagonal elements of $\mathbf{Q}_t$.

The model is estimated using the Quasi Maximum Likelihood (QML) in two stages. In the first stage univariate GARCH models are estimated for each asset series. In the second stage, residuals, transformed by their standard deviation estimated during the first stage, are used to estimate the parameters of the dynamic correlation.

Nonlinear Granger causality – A Nonparametric Test

In this paper, the nonlinear Granger test proposed by Diks and Panchenko (2006) was used. This test draws on the following causality definition: the series X_t is said to Granger cause Y_t if the past and the present of X_t have additional power in forecasting Y_t after controlling for the past of Y_t (Diks and Panchenko 2006), i.e. X_t Granger-causes Y_t, if

$$Y_{t+1} | (\Omega_{X,t}, \Omega_{Y,t}) \nsim Y_{t+1} | \Omega_{Y,t}, \tag{4}$$

where:

$\Omega_{Y,t} = \left\{Y_{t-l_y+1}, \dots, Y_t\right\}$ – a set of all information of Y_t,

$\Omega_{X,t} = \{X_{t-l_x+1}, \dots, X_t\}$ – a set of all information of X_t,
$l_y, l_x \geq 1$ – time lags.

The Diks-Parchenko test focuses on examining the impact of X_t on Y_{t+1}.The null hypothesis implies that X_t is not a cause of Y_t.

Tail Dependence – Copulas

Empirical studies have pointed out that stock returns display also an asymmetric dependence in bearish and bullish markets, i.e. this dependence may be stronger in bearish markets than in bullish markets and tends to increase in the periods of violent fluctuations of prices (Longin and Solnik 2001; Ang and Bekaert 2002; Jondeau 2014). Because, the asymptotic dependence of random variables in tails is a property dependent only on the copula (Patton 2006), we apply the copula-based model (Definitions, examples and properties of copulas can be found amongst others: Doman (2011), Joe (1997)). This approach allows investigating the dependence in variance and in tails which provides absolute control of the marginal latent trait distributions and accommodates several dependence structures what is not possible using standard dependence measures.

In this paper, we used functions from VineCopula library in R (Stoeber *et al.* 2018). First, for each pair, the Kendall's τ is estimated and the p-values of the independence test based on the Kendall's τ were determined. Second, from the catalogue of pair-copula family are fitted copulas using maximum likelihood estimation.

To measure the discrepancy between a hypothesized model and the empirical model we use the Goodness-of-Fit (GoF) statistics based on the Kendall's process as proposed by Wang and Wells (2000). For computation of p-values, the parametric bootstrap described by Genest et al. (2006) is used.

Data

The data used in this study cover the period from January 7th, 2009 to September 30th, 2016. They consist of daily closing values of indices (WIG, S&P500, BUX, DAX, FTSE100, HSI, NIKKEI). We analyse logarithmic returns (we assume further in the paper that 'returns' stand for 'logarithmic returns'), i.e.

$$r_t = 100(lnP_t - lnP_{t-1}),$$

where P_t is a stock index closing quote.
Stock indices and returns are displayed in Figure 1 and 2. It can be easily found that increases and decreases of stock indices (Fig. 1) occur in similar time periods, but their returns (Fig. 2) display diversified volatility at the same time periods. This can indicate a potential relation between markets.

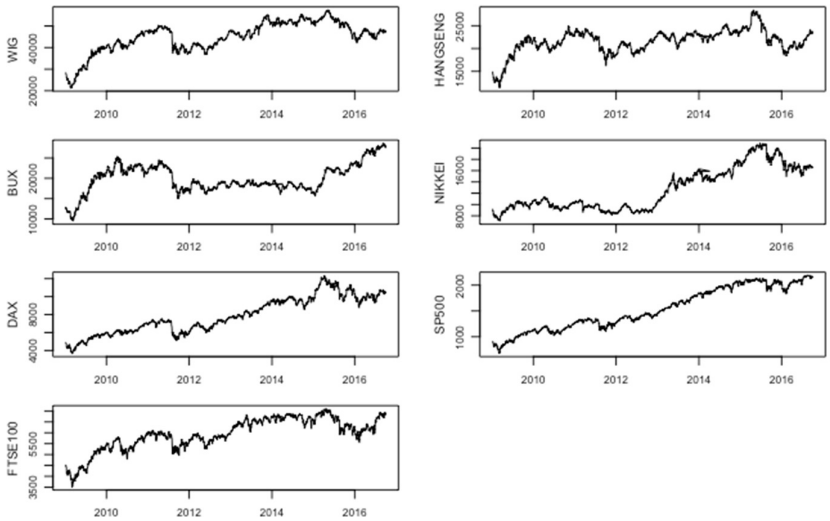

Fig. 1: Time plots of stock indices

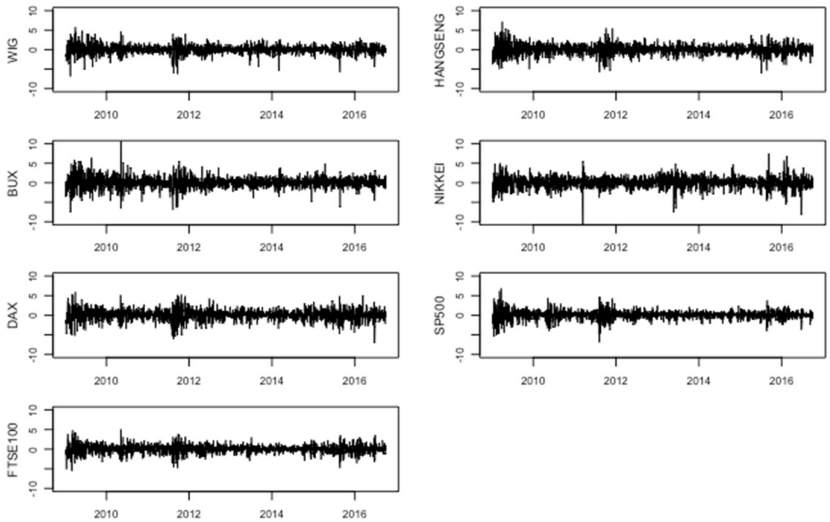

Fig. 2: Time plots of stock indices returns

Empirical Analysis

Results of the Diks-Panchenko Test

To conduct tests for nonlinear causality among stock indices, we use the nonlinear Granger causality test of Diks and Panchenko (2006). We perform the test for different embedding dimension (d =2 and 3) in order to be robust against the lag order used in the test. Results are presented in Table 1.

Table 1: Results of the Diks-Panchenko test for the pairs of returns

X↛Y	d=2		d=3	
	Test statistic	p-value	Test statistic	p-value
BUX↛WIG	1.393	0.0819	0.818	0.2067
WIG↛BUX	5.159	0.0000	3.521	0.0002
DAX↛WIG	5.327	0.0000	3.345	0.0004
WIG↛DAX	1.133	0.1286	0.063	0.4750
FTSE100↛>WIG	2.417	0.0078	1.783	0.0373
WIG↛FTSE100	2.368	0.0089	0.75	0.2267
HSI↛WIG	2.74	0.0031	1.814	0.0348
WIG↛HSI	2.748	0.0030	1.785	0.0371
NIKKEI↛WIG	0.904	0.1829	1.150	0.1250
WIG↛NIKKEI	3.456	0.0003	1.282	0.0999
S&P500↛WIG	3.033	0.0012	2.556	0.0053
WIG↛S&P500	1.685	0.0460	1.491	0.068

Note: X↛Y means that X is not a cause of Y; Calculations were done with the use of program available at the website of V. Panchenko: http://research.economics.unsw.edu.au/vpanchenko.

The results of the test are depending on the number of lags (d). For d=2 the null hypothesis of non-causality is rejected for almost all pairs of returns, i.e. returns of selected indices and the WIG returns are interrelated (except NIKKEI and BUX). Moreover, there is bidirectional causality between the WIG returns and returns of selected indices (except DAX). For d=3, there is a unidirectional causality running from returns of DAX, FTSE100, HSI, S&P500 to returns of WIG, and returns of WIG cause only returns of BUX and HSI. There is no causality for the pair (WIG, NIKKEI) when d=3. Because the test results are depending on the number of lags, the decision about causality between returns of selected indices, in the analyzed period, cannot be unambiguous. Additionally, the influence of small Polish market on the economy of the US, China or Japan seems to be unlikely. This is the reason why other methods of causal analysis are needed.

Testing Causality in Mean

To examine causality in mean the bivariate VAR models are applied for the pairs of returns of stock indices. The following models: VAR(2) for pairs: (WIG, DAX) and (WIG, S&P500), and for the rest of pairs – VAR(1), are fitted. Then, we carry out the Granger causality test (see – Table 2) and compute impulse response functions (Table 3) which measure the response of one return of rate to unit shock of another return of rate.

Table 2: Results of Granger causality test

Null hypothesis	F-Wald Statistic	p-value
S&P500↛WIG	33.7513	<0.01
WIG↛S&P500	1.6078	0.1544
DAX↛WIG	279.1007	<0.01
WIG↛DAX	1.1885	0.3048
FTSE100↛WIG	4.0674	0.0437
WIG↛FTSE100	0.2485	0.6182
BUX↛WIG	0.0000	0.997
WIG↛BUX	410.5159	<0.01
HSI↛WIG	2.0443	0.1529
WIG↛HSI	129.5722	<0.01
NIKKEI↛WIG	0.3073	0.5794
WIG↛NIKKEI	196.9251	<0.01

Results displayed in Table 4 indicate the causal relationship running from returns of major world economy (S&P500) and the most influential European markets (DAX, FTSE100) to returns of WIG. In each case the response of WIG returns is immediate and persists several periods, and then starts dying (see Table 3). The returns of WIG do cause the returns of BUX, HSI and NIKKEI, but there is no reverse causality. While the impact of the WIG returns on the BUX returns is reliable, the unidirectional influence of returns of WIG on returns of NIKKEI and HSI is a surprising result. This is rather an indirect impact carried through other returns which influence the WIG returns and is an effect of local time zone differences. This is in line with the results obtained by Madrak-Grochowska and Żurek (2011) who studied causal relationship between WIG20 and NIKKEI returns.

Table 3: Characteristics of the response of returns to unit shock

Shocks→Responses	Period of strongest response	Dying periond
S&P500→WIG	1	5
DAX→WIG	2	6
FTSE100→WIG	1	4
WIG→BUX	1	2
WIG→NIKKEI	Indirect impact due to time zone difference	
WIG→HSI	Indirect impact due to time zone difference	

Causality in Variance

The distributions of all returns turn out to be leptokurtic and fat-tailed hence the GARCH models for each return innovations are estimated. We consider different specifications of GARCH(p,q) model, i.e. q=1,2 and p=1, 2, with Gaussian, Student t and skewed t distributions. As a result, the GARCH(1,1) is chosen for each returns, in most cases with t-Student distribution, except the WIG, DAX and FTSE100 returns for which skewed t-Student is taken.

Then, for given pairs of return innovations: (WIG, BUX), (WIG, DAX), (WIG, FTSE100), (WIG, HSI), (WIG, NIKKE) and (WIG, S&P500) the DCC-GARCH(1,1) are estimated. The multivariate t-Student distribution is applied as the null hypothesis of multivariate normal distribution (using Shapiro-Wilk test) is rejected.

The estimated DCC-GARCH models satisfy the restrictions imposed on conditional variance and conditional correlation in the case of the pairs of returns: (WIG, S&P500), (WIG, DAX), (WIG, FTSE100) and (WIG, BUX). For pairs of returns (WIG, HSI) and (WIG, NIKKEI) conditional correlation parameters are insignificant at the 5% significance level, hence the models for these pairs are excluded from further considerations.

Using innovations from the models with significant conditional correlation, we apply the Hafner-Herwartz (HH) test. The test results indicate the causal relationship in variance for pairs of return innovations (Table 4). However, it should be remembered that it is not possible to determine the direction of causality using this test.

Table 4: The HH test results for the pairs of (WIG, …)

HH test	BUX	DAX	FTSE100	S&P500
Statistic	370.488	14.934	30.960	55.710
p-value	0.000	0.005	0.000	0.000

The conditional correlation analysis for the pairs of stock indices returns unable to determine the power and direction of indices retruns' interdependencies. The strongest relationships are seen between the WIG returns and FTSE100 returns (see Fig. 3), however, we can observe a highly volatile time path of conditional correlation, meaning the co-movement (correlation) between Polish and British stock markets returns is time-varying. The co-movements between Polish and US stock markets returns are less volatile and more stable (conditional correlation in the studied period ranges from 0.35 to 0.6) indicating the constant influence of S&P500 returns on WIG returns.

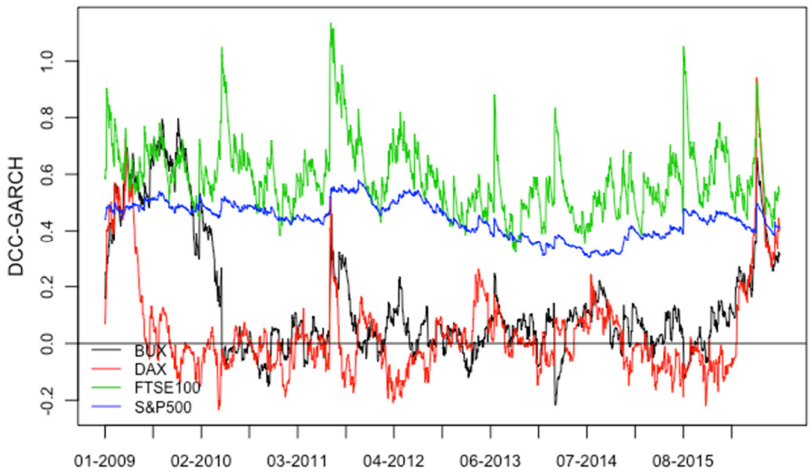

Fig. 3: Conditional correlation for pairs (WIG, …) – DCC-GARCH model

Interdependencies between Polish and German (DAX) stock markets are not stable during the observed period what is manifested by both negative and positive conditional correlations. It is possible that this relationship is affected by the subprime crisis and later the Greek debt crisis. The Greek debt crisis "broke out" at the beginning of 2010, and with 7th May, 2010 Angela Merker presented the plan of bail-out package demanding new austerity and major reforms and informed the Germany's participation in this package will be EUR 22,4 mld (Koszel 2015).

Changes in the conditional correlation between Polish and Hungarian stock markets with regard to volatility are similar to that between Polish (WIG) and British (FTSE100) stock markets till the beginning of 2010. Since then the trend of conditional correlation between Polish and Hungarian stock markets is falling, indicating that these stock markets have become less interdependent, and the time path of this correlation is approaching that for correlation between returns of WIG and DAX. Changes of this interdependence coincide with taking power in 2010 by Orban who introduced the bank tax and nationalized the pension system.

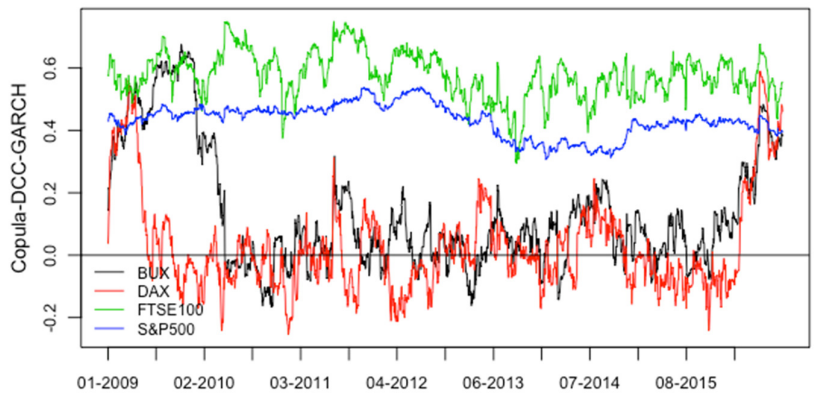

Fig. 4: Conditional correlation for pairs (WIG, …) – Copula-DCC-GARCH model

To eliminate the potential influence of returns volatility on the conditional correlation between these returns we applied Copula-DCC-GARCH models with t-Student distribution. It is seen in Fig. 4 that conditional correlations based on Copula DCC-GARCH model are less volatile than those received on the basis of DCC-GARCH model (Fig. 3). However, general conclusions concerning the interdependencies between pairs of returns remained the same (including the HH test).

Tail Dependence

To quantify the degree of tail dependence in each pair the Kendall's τ is estimated and the p-values of the independence test based on the Kendall's τ are determined (see Table 5). The results indicate the existence of positive dependence for 5 pairs at the 5% significance level. Only for the pair (WIG, DAX) we cannot reject null hypothesis what is rather surprising result whereas in previous studies this (tail) dependence was revealed (Doman and Doman (2013) found that since 2007 the tail dependence between WIG20 returns and DAX returns was not observed. However, they applied different models than in current paper). The strongest dependencies have the pair (WIG, FTSE100) what can be explained by the strong connection of the Polish and British economy. Then, for the pairs of returns revealing the significant tail dependence, the appropriate Copulas are fitted. The chosen copulas parameters are presented in Table 5.

Table 5: Tail Dependence for pairs (WIG, …)

Index	Copula	$\hat{\tau}$	Indep. (p-value)	GoF test (p-value)	λ_L	λ_U
BUX	t	0.101	0.000	0.830	0.013	0.013
DAX	–	0.030	0.293	–	–	–
FTSE100	t	0.396	0.000	0.550	0.148	0.148
HSI	BB1	0.239	0.000	0.320	0.090	0.191
NIKKEI	BB1	0.140	0.000	0.540	0.042	0.069
S&P500	BB1	0.272	0.000	0.220	0.117	0.228

Note: $\hat{\tau}$ – empirical Kendall's τ; Indep. – testing for independence for pairs of variables (H_0: $\tau = 0$); λ_L – coefficient of lower tail dependence; coefficient of λ_U – upper tail dependence

The results indicate that for chosen copulas we cannot reject null hypothesis, i.e. our copulas are the true copulas. For pairs (WIG, BUX) and (WIG, FTSE100) the symmetric copula is selected, and for the rest of pairs of returns – asymmetric copula allowing to depict the lower- and upper-tail dependencies. The obtained results indicate that the tail dependence between WIG and BUX returns is very weak

and symmetric, while between WIG and FTSE100 returns – slightly stronger. For the rest pairs of returns the upper-tail dependence is stronger than lower-tail one, but still rather weak. The occurrence of simultaneous extreme events (increases) is most likely for the Polish (WIG) and US (SP500) stock markets.

Conclusions

The aim of this study was to examine causal relationships between WIG returns and selected indices returns in the period 2009–2016, but in contrast to previous studies, we focused simultaneously on different aspects of these interdependencies. The summary of the results is tabulated in Table 6.

In most cases, the results of Diks-Panchenko test correspond to those obtained from the Granger-causality test, except the pairs (WIG, HSI) and (WIG, NIKEI). It is found that the S&P500, FTSE100 and DAX returns cause in mean WIG returns what is in line with findings revealed before the sub-prime crisis (see Fiszeder, 2008; study period: 3.10.1994–3101.2008). However, there is one exception in comparison to study by Fiszeder (2008), i.e. BUX returns do not cause in mean WIG returns any longer. On the other hand, WIG returns turn out to cause in mean BUX, NIKKEI and HSI returns, but no reverse causality is observed. While the impact of WIG returns on BUX returns might have been expected, the lack of its feedback is rather surprising.

Causality in volatility is found between WIG returns and BUX, DAX, S&P500 and FTSE100 returns. Additionally, the time paths of conditional correlations indicate that interdependencies between (WIG, S&P500) and (WIG, FTSE100) returns are constant and stable, whereby interdependencies between (WIG, S&P500) returns are more stable and weaker, and between (WIG, FTSE100) returns – less stable and stronger. However, the correlation between Polish (WIG) and German (DAX) stock markets, and Polish (WIG) and Hungarian (BUX) stock markets are time-varying since the beginning of 2009 and 2010 respectively. Applying Copula-DCC-GARCH models with t-Student distribution to obtain the conditional correlation between indices returns did not change the general conclusions.

Table 6: Causality between WIG returns and selected stock indices returns – summary of results

WIG and …	Methods for testing causality				
	Diks-Panchenko test (d=3)	VAR model	DCC-GARCH model	Tail dependence	
				λ_L	λ_U
BUX	WIG→BUX	WIG→BUX	yes	0.013	0.013
DAX	DAX→WIG	DAX→WIG	yes	–	–
FTSE100	FTSE100→WIG	FTSE100→WIG	yes	0.148	0.148
HSI	HSI↔WIG	WIG→HSI	–	0.090	0.191
NIKKEI	–	WIG→NIKKEI	–	0.042	0.069
S&P500	S&P500→WIG	S&P500→WIG	yes	0.117	0.228

Interdependence between pairs (WIG, FTSE10) and (WIG, S&P500) identified in earlier methods are also observed in the tails distributions. The strongest symmetric dependence has the pair (WIG, FTSE100) whiles for the pair (WIG, FTSE100) weaker and asymmetric dependence (stronger in the upper tail) is found.

Summing up, the situation on world stock markets does influence the WIG returns in the observed period, 2009–2016, however not all earlier observed interdependencies are validated. It is likely that the change of interdependence pattern results from different country-specific events like changes in fiscal policy in Hungary, Greek debt crisis and German bailout). Changes in interdependence between WIG and FTSE10 returns are rather not affected by the Greek debt crisis because it refers mainly to countries in the Euro zone (and both Poland and the UK do not belong to it and were not involved into preparing the bailout package for Greece), but it might have been expected that the Fukushima catastrophe did influence co-movements (conditional correlation) between WIG returns and others selected stock indices returns.

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Modern Business Crowd Financing

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Abstract

There are modern sources, business financing instruments and investment projects galore. Not only direct investment attraction through a share or debt issue, collective financing (mutual funds, etc), project financing via an SPV, banking investment crediting and other classic forms are popular now. The methods, which were unknown in Russia until recently are gaining popularity -- crowdfunding, crowdinvesting, digital currency issues (ICO), etc. The article will consider one of these modern financing and business project instruments, which is especially important for startups, -- crowdfunding, in detail. Crowdfunding in Russia is a relatively new type of business financing, while abroad it has been popular for more than 15 years. However, growing popularity of this type of financing triggers growth of related problems. That is why the research underlines the importance of crowdfunding in financing of startups, offers the key directors of its improvement to minimize risks and losses of potential investors.

Keywords: Crowdfunding, Financing, A Crowdfunding Platform, A Startup, A Project, Investment, Crowdinvesting

Introduction

More and more companies with new startups appear each year in Russia and in the world causing financing problems as investors often avoid projects with the high risk inherent to many startups. Crowdfunding, or collective financing of charity or business projects, has been gaining popularity in the last few years (Andre, K. 2010). The method unites many groups of people, including businessmen, investors, inventors, small business owners, people involved in charity (Petrov, A. 2019). Crowdfunding helps them attract the capital needed to start a business, creation and sales of goods and services, in project financing (Attanasio, O. 2003). The key goal of crowdfunding is financing, while different business projects are aimed at satisfying demands of a person or a group of people. Consequently, according to Akhmadeev (2018), Bade (2020) success of crowdfunding depends on effectiveness of marketing. Interest to alternative financing ways of company operations is in the

development of modern payment technologies, which facilitate payments significantly and help its users make use of the money almost immediately.

Theoretical Background

There are many definitions of crowdfunding. According to Petrov and Kosolapova (2019), crowdfunding is accumulation of money from a lot of people (thus, the word 'crowd' – a crowd as a collection of individuals and 'funding' as financing) done for the promotion of goods or services, organization of different events. The very notion of crowdfunding appeared in 2006 thanks to Jeff Howe. The textbooks or the Internet define crowdfunding as follows – cooperation of people, who give away their money or other resources voluntarily to support efforts of other people or commercial enterprises. At that, a project can be both charitable and socially important, which, as a rule, is not meant to bring profit. In fact, crowdfunding can be considered an example of Internet effectiveness as a functional floor, which bring people together (Kosov, 2018). There are three types of crowdfunding:

1. Reward crowdfunding – most popular among investors, which receive different bonuses and gifts, for example, an invention, which they financed (Sotnikova, 2019).

2. Equity crowdfunding – when the initiator of fund raising offers a stake in the project to the investor. Equity crowdfunding is popular with small and medium-sized business, when significant financial resources are needed for intensive development (Calic, 2016), but their attraction is very difficult because of various reasons: low business transparency in Russia, high interest rates (Korableva, 2019). Crowdfunding helps solve the problem, attract sufficient investment in the shortest time possible and at a low cost (Zimakova, 2016).

3. Debt crowdfunding includes debt repayment, a share in the future project or repayment of some investment from profits. Here the debt nonrepayment risk can be very high, if the project fails, but if it is successful, the return on such investment can be very high (Colombo, 2015).

There are also three key crowdfunding models:

1. Without reward, gifts. As a rule, this model is used in social business projects, political, ecological, medical projects (for instance, fund raising to pay for medical treatment, for charity organizations). This model led crowdfunding seven years ago (Ustyuzhanina, 2017).

2. The Kickstarter Model (nonfinancial reward). This crowdfunding system is at the moment the most popular by the number of internet platforms. An example of nonfinancial reward can be a mention in the captions, etc. The Kickstarter floor collected U.S. $4,666,193,837 and had 173,509 successful projects in 2019.

3. Crowdinvesting (financial reward). The key features of crowdinvesting is in the financial reward received by the sponsor in exchange for his support.

Another form of crowdfinancing is crowdlending -- P2P, P2B and B2B collective crediting (Turishcheva, 2019). This form of financing is not very popular in Russia now. The advantage of crowdlending is a higher margin of the investor compared with banking rates, while for the borrower, on the contrary, the cost of credit is lower. However, the non-return risk is also very high here because of the absence of any collateral. This kind of financing can be very promising, if the non-return problem is solved by new laws. Another type of collective financing is crowdsale, whose key goal is to pool money or other resources to develop an idea, a project. Its key different from crowdfunding, when the investor gets different kinds of rewards for his investment, is his getting tokens (the crypto currencies) in exchange for investment. Russia now has many different crowdplatforms (Boomstarter, Planeta, Kroogi, etc.).

These projects copy the western floors, like Kickstarter and Indiegogo. The Russian crowdfunding history started in 2010 from platform Smipon.ru, where the public was attracted to fund raising to build a monument to Apple's founder Steve Jobs. The largest Russian crowdfunding floors, Planeta.ru and Boomstarter, started operations only in 2012. Planeta.ru has so far raised 1.5 bln rbl for over 5,000 projects. In 2016, the platform launched the country's first offline course The Crowdfunding School. The following sections topped the floor by popularity – public projects, music, cinema, video and animation. The key difference of the first local crowdfunding platforms was in the mechanism of operations – the funds raised through Boomstarter can be used only on condition of raising the whole sum, "all or nothing." A change in people's mentality that crowdfunding is not charity but chance is the goal of the floor. Now Boomstarter is Europe's top crowdfunding platform by the number of active users, which has collected over 380 mln rbl. The projects implemented by Boomstarter vary, the same is the case with the floor described above (Fassin, 2017). These include the Young Moscow project implemented together with the Moscow city's culture department, which raised about 15 mln rbl. This is a good illustration of local crowdfunding – state involvement in the projects (Morozova, 2019). There should be several prerequisites to launch crowdfunding – you should choose a floor depending on the project and resident status, etc; check the project for compliance with the rules of the platform; register on the website, register the project in the chosen category and mention the sum to be raised; choose the type of the award for sponsorship; pass moderation and launch the campaign. You should also not forget to assess the risk of underfinancing, termination of the platform's operations and consider additional costs for the use of crowdfunding platforms (the fees for the placement, different fees of the platform and the payment system, taxes.) Together with the promotion costs and bonuses in the form of souvenirs, etc., total costs usually amount to 30–40% of the raised amount. One should also keep in mind that the Platform is only needed to raise money, while promotion, advertising of his idea is to be done by the businessman in any way he deems reasonable. He will not succeed in fund raising on the Platform without promotion.

Results

The key advantages of crowdfunding are minimization of intermediary services, accountability of the funds' recipients, transparency of fundraising, identical, voluntary and understandable rules of operations. However, crowdfunding also has its downsides:

1) intended swindling or failure to fulfill their obligations by the borrowers. Although the crowd platform moderators check the crowd projects, this is no guarantee of their reliability. For instance, according to Satis Group, about 80% of ICO is scam. Willful misrepresentation, false information about the projects and their results are also frequent. Con work is often performed on the project, different reports are provided to the investors, while the money is spent on personal needs of the unscrupulous borrowers;
2) poor business plans (although some platforms allow borrowers to change the end sum as the plan is fulfilled);
3) the risk of plagiarism in case of full disclosure of technical and financial information about the project;
4) insufficient financing (there is no guarantee that the necessary sum will be raised, while the fees for registration on the platform are obligatory).

According to the central bank of the Russian Federation, the crowdfunding market slumped by 42 % to 5.2 bln rbl in the first nine months of 2019 compared to 8.9 bln rbl in the same year-ago period and to 7.7 bln rbl in 2017 (fig. 1).

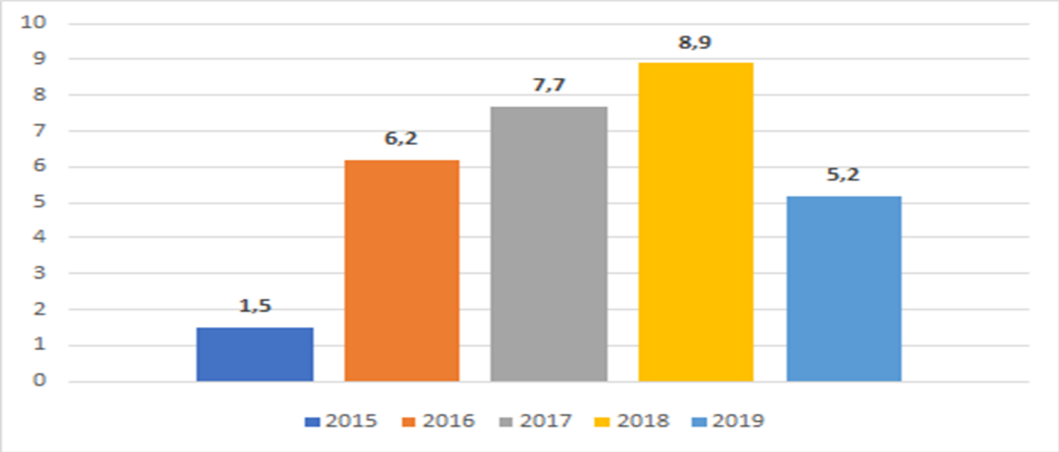

Fig. 1: Russian crowdfunding in the last 5 years, bln rbl

Compiled by the author with the use of research http://icopartners.com/2019/01/games-and-crowdfunding-in-2018.

The central bank says a large unscrupulous player leaving the market is behind the slump. At the same time, crowdfunding market players say that the reason is affordable credits – allegedly getting money from a bank is now easier than convincing many small investors. However, the negative trends are not seen in the charitable unrewarded crowdfunding, when people donate money in exchange for a non-financial reward. The international crowdfunding market exceeded $10 bln in 2018 with the two thirds of the money collected in China and the USA (Mollick, 2018). Experts say the figure may triple in the next five years. Of course, the character and development rates of the international and local crowdfunding markets are different. First, this is because of the users' mistrust to the modern technologies of the world wide web. Second, insufficient knowledge about crowdfunding and its risks prevent the volumes of the Russian platforms from becoming comparable with their foreign peers. However, popularity of crowdfunding has been growing steadily in our country in the last few years, the number of participants increased. In 2018, the Association of Investment Platforms' Operators was founded primarily with the aim of establishing dialogue between the authorities and market participants. The association also aims at spreading and development of crowdfunding in Russia. At the moment its key goal is formation of initiatives to support stable market development and advertising new digital services and financial products.

Hypothesis

The aforementioned risks of crowdfunding, its market's rapid growth as well as the increasing number of funders disappointed by their investment predetermined the problem of legal regulation of this activity in Russia and introduction of strict legal measures for unscrupulous recipients to ensure due protection of investors (donors). This is why the State Duma passed a bill on crowdfunding regulation № 259-FZ "On Investment Attraction with the Use of Investment Platforms and Adjustments to Some Legal Acts of the Russian Federation." The document outlines the rules of fundraising by companies or individual entrepreneurs via investment platforms as well as the legal basis of such platforms' operations (Bykanova, 2018). Now only the companies from a special central bank register can raise money to develop their projects. This bill should aid the development of crowdfunding in Russia. However, the document has lots of loopholes and problems. The bill does not provide for investment in the form of a cryptocurrency or the use of utilitarian digital rights outside the Russian digital venues.

The bill lacks the notion of a cryptocurrency, but allows an ICO (attraction of investment via an issue of tokens on a block chain). This makes stipulations of a law on ICO and tokens pointless. You can only invest Russian rubles under the new type of ICO. The tokens you receive in exchange can only circulate on the Russian Federation's local market, which undermines their liquidity and consequently, investor interest. Investment for individuals is limited by 600,000 rbl within one year – very low, if we consider the possibility of investment return (Thaler, 2018). There are gaps in regulation of platform operations. For instance, according to the new bill, a platform operator can only be a company from the central bank's register of investment platforms operators. However, there is no order of keeping this register. Besides, some obligations of the operators are formal. For example, the bill orders the operators to establish the people with whom they sign deals, but there are no criteria of such establishment.

A formal approach to investor protection. For example, the operator must check the volume of individuals' investment on other platforms basing on the statements of the individual, which is impossible. If the statement is false, the losses are born by the investor (Ekimova, 2016; Prodanova, 2018). The absence of investor funds' blocking. Unjustified restrictions on the persons able to raise funds to only Russian companies and individual entrepreneurs, although individuals are the key participants of crowdfunding projects. This creates problems during fundraising for non-commercial projects in social and other good causes (Zhang, 2001). Prohibition on advertising of utilitarian digital rights, which may hurt marketing campaigns to attract attention, including for socially important projects.

Conclusion

Although crowdfinancing and crowdfunding is perceived very skeptically in Russia, we can say that this type of financing is developing quite rapidly and counts about 20 platforms for this type of activity. Businessmen have been waiting for long for legal regulation of this sphere, that is why adoption of the new law should influence further development of crowdfunding, which is yet to happen. The document has numerous arguable points, which can make the investment platforms unsuitable for work, because, for instance, they cannot be advertised, while ordinary users will have no access to it. Unfortunately, the bulk of the documents, which regulate crowdfunding are still under government consideration. The consideration and approval should be spurred up. Besides, further improvement of the crowdfunding bill is necessary – adding the possibility to convert investment into stakes, investment freeze, a cryptocurrency notion, regulation of relations between the funders and the crowdfunding venue. It was the cryptocurrencies, which allowed the investment floors to carry out international projects, cut transaction costs and time of implementation. The bill deprives crowdfunding of its potential without regulation of cryptocurrencies.

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The Wasta – Is it an Ethical Problem for Muslim Auditors and Accountants?

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Abstract

Progressive globalization means that business entities conduct business in various parts of the world and in different cultural circles, often using the local services. A knowledge of certain cultural differences and the resulting phenomena that create mechanisms and style of doing business becomes indispensable today. The article aims to present a phenomenon of the wasta, relatively little known in other cultures but widespread in Muslim society. This paper shows what a wasta is from a sociological point of view and investigates some consequences of it (political and economic), but mostly tries (by analyzing principles of Islamic ethics – qualitative research) to answer the question whether the wasta can pose an ethical challenge for Muslim accountants and auditors, whose threats their clients should be aware of.

Keywords: Wasta, Islam, Ethics, Accountants, Auditors

Introduction

The earliest research of wasta's phenomenon was conducted by Cunnigham and Sarayrah (1993), who identified two types of it: intermediary and intercessory. Intermediary wasta is used to facilitate the resolution of inter-group or interpersonal conflicts. In this system, wasta improves interpersonal relationships and strengthens social norms. On the other hand, intercessory wasta includes those who intervene on behalf of the client to gain benefits (obtain an advantage) or overcome an obstacle on the part of the authority. It is this type of wasta that affects i.e. employment decisions.

Although the use of wasta is firmly rooted in the Arab culture, it is inconsistent with Muslim teachings regarding e.g. hiring practices. Islam is stressing the importance of hiring based on qualification and merit in several places (Abbas 2005). There is a phrase in the Quran: "the best that you can hire employee is one who is competent and trustworthy" (Holy Quran, 2011, 28:26). Quoting Prophet Mohamed: "He who is in a leadership position and appoints knowingly a person who is not qualified to manage, than he violates the command of God and His messenger" and "when a person assumes an authority over people and promotes one of them because of personal preferences, God will curse him forever" (Mohamed and Handy 2008).

In spite of its violation of Islamic teachings, using wasta is quite rampant in the Islamic world. A number of factors may have led to the spread of wasta. First, to maintain their grip on authority, Arab political regimes tend often to place close confidants in key positions even if they are not the most qualified (top governmental positions are reserved for members of the ruling families or members of their supporting tribes). Being connected to the right people becomes critical when seeking a position. The fear of being disadvantaged by the lack of a proper connection motivates people to seek and use wasta (Mohamed and Handy 2008). Also, many Muslim economies suffer from very high levels of unemployment, so job, especially "good one", is scarce, what motivates applicants to use every possible way to improve their chances of being hired. The wasta works, because human resource departments in the Muslim world depend heavily on subjective assessment tools (unstructured interviews). There is a question, if informal relationships like wasta can affect some way behaviors of professionals, like accountants and auditors, and harm the public confidence that society places usually in these professions. It is also very important question from point of view their clients, especially foreign ones.

The wasta as the social relationship

The wasta means "intercession" or "mediation". This concept covers a wide range of social activities and it is quite difficult to translate into Western conceptual categories. Górak-Sosnowska (2010) rightly points out that the wasta in its concept resembles clientelism, because it assumes the existence of an informal relationship between the patron and the client and concerns the economic or political sphere. Clientelism, however, corresponds only to one type of wasta – intercessory. The wasta is a broader concept than nepotism. It applies usually to one's own group - tribe, clan, family, ethnical or religious group. However, this relationship may also apply to people who are not relatives – f.e. the politician and potential voter (offering vote in exchange for benefits). It indicates the corruptogenic nature of wasta, however, it is also not synonymous with corruption (Górak-Sosnowska 2010). If the relationship is not maintained "today", at the expense of a third party (state, nation, other person), there is not "corruption space". For this reason a distinction is made between "good" and "bad" wasta (Loewe et al, 2007) - therefore a wasta may be seen as relation which brings benefits, and does not affect the social system (benefiting the individual). In "good" meaning, intercessory wasta can be f.e. a particular commitment of the employee to the company and the superior - because of their kinship; in "bad" meaning - if it is a state-owned company, and someone's admission to work was determined by family ties, not professional qualifications. A good intermediary wasta's example can be mediation in a dispute between two people to resolve it in a mutually beneficial and just way; but if the dispute involves personal connections and the mediator only forces a favorable solution on one side, it is an example of wrong wasta's use. It shows the different contexts of wasta functioning. The wasta in terms of conciliation may alleviate or resolve an inter-conflicts, so maintain positive relationships between groups or individuals. The wasta as an intercessory - if its purpose is intervention of the patron/agent on third party customer benefit, may be about avoiding negative sanctions or to gain benefits (Mohamed and Handy 2008).

Initially, the wasta was primarily of an amicable nature and was associated with the management of the Muslim community. It was therefore positively connotated and testified to the fact that the leader the community is able to effectively and responsibly care for (Hooker 2009). It creates a social capital (Putnam 2000), because a social bond between the members of the community (belonging to various social categories) is established. This traditional wasta still exists in local communities and helps to regulate social relations. However, in parallel with the processes of modernization and urbanization, wasta has evolved in intercessory one. It is based on similar norms and values and is grounded in informal networks, however, it assumes actions whose purpose is to obtain benefits only through one of the parties. The external environment is also different; this is not local authority, but a state institution or corporation. It aims to maintain order in one's own group, but to obtain benefits for a member of their own group at the expense of others (Mohamed and Handy 2008)

The relationship within wasta is between two or three parties (Loewe 2006):

• a person (the client) trying to get the benefit,

• an agent/patron who can provide him with this benefit,

• a mediator helping the client contact the agent (unless they know each other directly).

The wasta is a social relationship, because it fulfills all its features (Sztompka 2002). It assumes the existence of a multitude of interactions that are multi-thematic. They can be specialized (e.g. obtaining a driving license by a customer) or relate to various spheres of life (e.g. activities aimed at raising the standard of the client's life - from facilitating access to basic goods or services after providing work) (Górak-Sosnowska 2010). The wasta is a permanent relationship, which results in its character and client and agent expectations of each other. Its feature is also a normative on adjustment; it is regulated by certain patterns. They are not formalized, but create a framework for mutual expectations and powers. The client has the right to beckoning from his patron to find him employment (a good job, well-paid, etc.) In turn, the patron (or agent) has the right to client's loyalty. The relationships arising from the wasta are imposed on the partners of the relationship because of their social positions. As a social relationship, wasta is unbalanced - the client usually has more responsibilities than the agent, and the benefits under the patron-customer relationship are unevenly distributed. The patron

accumulates benefits from many customers, so the sum of the benefits he receives is greater than what he redistributes to his clients (Amundsen and Ezbidi 2002). Still, the wasta cannot be seen as a claim or exploitation, because both parties enter it for instrumental reasons, focused on obtaining specific benefits. As about creating a social capital, it is positive for those remaining in the discussed relationship, but for people excluded or losing it on its existence – negative (Górak-Sosnowska 2010).

It's important to notice, that the wasta practices, sometimes referred to as a feature of Muslim culture, exist around the world in various forms and intensities. Susceptible to clientelism are especially countries undergoing systemic transformation, because of changes in the functioning of the economy that cause, among others, unemployment and the deterioration of the material situation of society. Radical changes force the search for adaptation strategies; one of them is the development of informal networks and so-called the gray area. Also in undemocratic countries, the patron-client relationship is new foundation of social order in which a particular segment of society (ethnic group, family, tribe) has a privileged position (Güneş-Ayata 1994). But there is also a culture as a factor creating informal bonds, like guanxi in China. The wasta is sometimes compared to the Chinese concept of guanxi. Both use social networks to influence the distribution of advantages and resources. However, while guanxi is based on Confucian ethics which focus on strengthening collective ties (Hutchings and Weir 2006a; Hutchings and Weir 2006b) and therefore widely accepted in a society, as may benefit organizational competitiveness and performance, the wasta violates generally Muslim ethics.

The wasta's role in economy and politics

The wasta's role in the economy is not clear and mainly concerns the labor market. If a patron employs a client in its own enterprise, becomes directly interested in his work as his employee. It creates a loyalty relationship and builds social capital; if the client has been recommended by a mediator, it is in the client's interest to perform as well as possible. Otherwise he will "lose face"; more, his mediator can lose face as well. In the public sector, however, giving the client employment the patron is less interested in his efficiency and effectiveness as an employee. Working in the public sector means to obtain benefits like a fixed salary and/or social prestige. Having a wasta is an important factor in increasing probability of getting a job in the public sector or promotion (Tlaiss and Kauser 2010). The mediator is obliged to find employment for the client (often many clients) because of social expectations. His high position is seen as a sufficient condition to find a job for clients. There is no excuse (reluctance to find employment, lack of appropriate opportunities, lack of positions in the public sector, insufficient client's qualifications). These expectations are maintained by the nature of Middle Eastern societies in which the individual is seen as part of the group and committed to loyalty to it. A mediator is therefore under pressure, which he transfers to the patron - asking him for employment. The mediator may be in independent wasta relationship with the patron (the mediator is the patron here, and the patron is the client), which causes an additional pressure on the patron (Górak-Sosnowska 2010). Such contact with the patron (or indirectly - with the mediator) is not only for the benefit of individual, but as well for collective benefits, like the implementation of infrastructure projects can be an advantage - construction or renovation of school, roads, sewage system etc. Their implementation requires significant financial outlays that are obtained from ministries or non-governmental organizations. The patron mediates in acquiring these funds (Makhoul and Harrison 2002) and in such terms his role is perceived rather as something positive. It must be taken into consideration that economic reforms, in particular liberalization and privatization, have hit primarily in the lowest segments of the social structure, which caused a return to proven mechanisms such as clientelism (King 2003). The restructuring of the labor market may cause in some circumstances perception of wasta as the only effective method to find a job (Al-Ali 2008). The wasta's role is then complementary to institutional solutions, if state system is proved to be inefficient - not able to meet the needs specific social groups. For this reason, groups at risk of marginalization seek support in informal networks. Still, the wasta as a concept is rather publicly condemned, blamed for Arab world's poor economic performance and brain drain (Cunnigham and Sarayrah 1994). Kilani and Sakijha (2002) stress that wasta is becoming a burden on its seeker, its granter and the government, while Makhoul and Harrison (2004) warns that it may lead to economic decline, and practicing the wasta may feed feelings of injustice and frustration among those who are qualified for the job but do not have proper connections.

As about politics, the power is without doubt one of the most important socially valued goods. In countries with a high level of hierarchy, having power can guarantee access to other desirable goods, like material resources or prestige. An authority guarantees access to resources, and exercising it enables their redistribution. This gives rise to the creation and strengthening the patron-client network, and thus to maintain influence through ruling (Górak-Sosnowska 2010). At the state level, this illustrates the degree of state intervention in the economy. Guaranteeing access of specific social categories to socially valued goods for many years constituted the basis for state power and social order (Bowker 2010). For this reason, state authorities are often not interested in taking action aimed at eliminating or limiting the wasta - it would harm the whole power system (Loewe et al. 2007).

At the local community level, political influence of wasta is still grounded in networks of informal relationships. It is a dynamic system in which positions are negotiated and agreed on an ongoing basis. Due to the collectivist nature of Muslim society, more often it is based on whole families or communities than individuals. Contact with the patron is an important symbol of status, which gives credibility. The inflows of individual parties are dynamic and they often clash. If a given patron does not meet the expectations of the local population, citizens may begin to support another (Makhoul and Harrison 2004). In a way, therefore, wasta enables marginalized individuals and groups to articulate their needs and interests in public space. The patron-client relationship works also during the elections. In exchange for a small fee clients may offer a politician their votes. The transaction, however, is one-off and the amount of payment depends on external factors - distribution of votes in constituency. A participation in the election is for them only the source of income; the political orientation of the candidate is unimportant (Blaydes and El Tarouty 2009).

Due to its informal nature and wide scope, it is difficult to define measurable significance of wasta in economy and politics. An indirect measure can be international rankings on corruption. Positions of Arab countries in the corruption rankings point to the varying effectiveness of measures taken against and at the same time indicate their level of governance. However, international corruption indicators do not reflect specifics of wasta well, because they often focus on financial advantages/benefits (e.g. bribes). For this reason, the position in the corruption rankings does not seem to be correlated with the prevalence of wasta, one can therefore suppose that an effective state management system does not exclude the existence of informal networks within wasta (Górak-Sosnowska 2010).

Muslim accountants and auditors: between Islamic ethics and the wasta

The Islam provides guidance for Muslims in every situation (Al-Ghazali 2001). Islamic ethics covers all aspects of life, physically, morally, spiritually, intellectually, emotionally, individually, and collectively (Al-Qaradawi 1996; Yaken 2006). Islam represents moral values derived from transcendental source - a fundamental concept is based on the Quran (Amin et al. 2013). Islamic ethical system is based generally on equal, justified, benevolent, and accountable principles. Islamic ethical behaviors have much more spiritual dimension, what is understandable, considering that a background is here a religion. More emphasis is placed on individual's conscience and observance of religious teaching, while the pressure is much stronger than in case of other religions, because breaking the rules excludes individual from the circle of believers and thus from the whole community (umma). Because a whole social and economic life in Muslim countries is based on umma, this threat is particularly onerous. There is also an element of fear of punishment in not only mortal life, but also in the afterlife. The wasta seems to be then hard to reconcile with Muslim ethics, but otherwise some features of this ethics (rooting from collectiveness of these societies) cause that the attitude towards wasta is ambivalent. As a phenomenon, it seems to be contrary to the Muslim model of social justice, and therefore not fitting in Muslim society. Still many Muslims admit that the wasta is an effective facilitator of daily life.

Considering a specific position of professionals like accountants and auditors, their independence, honesty and accountability are the key virtues, necessary to practice. Auditors and accountants by definition should be objective in their work and free from conflicts of interest in discharging their professional responsibilities. The study of Muslim ethical principles can help to find an answer, if the wasta can negatively affect their professional behaviors (like to succumb to patron's pressure for employment, desired opinion etc.).

The concept of Amaanah (trust) in Islam is the fundamental ethical principle greatly emphasized in Quran. Muslims must be truthful in their dealings in all aspects of activities (Ahmad et al. 2019). Honoring the public trust means that individuals should accept the obligation to serve the public interest and demonstrate commitment to professionalism (Al-Aidaros et al. 2011). Muslims consider the principle of public interest as more important than an individual interest (Al-Qaradawi 1994). According to this concept, auditors and accountants are trustee of the company resources and they should keep high degree of honesty and respect of information confidentiality. Amaanah comes with the concept of stewardship and responsibility. Auditors and accountants' duty is to be trustworthy in their practices. A responsibility towards God and the umma demands on them to refrain from engaging in activities that may jeopardise their integrity, objectivity and independence (Abdul Rahman, 2003). This principle goes against the assumptions of an intercessory wasta.

The principle of integrity (and righteousness) encompasses a moral integrity based on religiosity and supreme accountability to Allah and requires Muslims to be competent in their professional work (Naqvi 2003), so for Muslim auditors and accountants it will mean to work diligently and provide professional duty with the best service they could. Acting with integrity is to maintain and broaden public confidence, by holding Iman (faith), as the key that protects and increases personal integrity (Al-Qaradawi 1994). Again, this rule contradicts with the wasta and should restrain from practices of hiring incompetent ones.

Khalifah principle implies that the interactions and relationships of human being are based on justice, accountability and trust (Parvez 2000). So accountants and auditors – like other Muslims – following this rule should be honest and truthful in their practice, performing their professional duties by following Allah commandments and avoiding prohibitions (and the wasta is clearly banned in Quran, like it has been mentioned above). With this principle comes along A'del, meaning to treat everyone equally regardless of race, religion, wealth and occupation (Al-Gazali 2001), so from A'del comes at least partially obligation to maintain objectivity and independence, without any bias (Al-Aidaros et al. 2011). Justice is the shortest way to achieve Iman. An order to behave fairly with every Muslim or non-Muslim is connected with acting just, so also acting faithfully.

The same way, an accountability and piety principles encompass Muslim professionals a priority of accountability to Allah over accountability to others (like clients), as well as accountability to society over client's wishes and expectations. In literature of subject it is clearly stated: an auditor (accountant) is accountable to Allah first and foremost, then the umma, then profession and client (Ahmad et al. 2019).

Clear ethical guidelines concerning the day-to-day activities and their transparency come from the sincerity principle, which requires auditors and accountants to perform duties sincerely for Allah and without subject to external influences such as to gain certain rewards or pressures due to their obedience to God. The sincerity in performing duties can benefit the profession by contributing to high productivity and efficiency in professional work, and discourages manipulations as well as enhances cooperation and trust (Ahmad et al. 2019). There is no room for the wasta practices, at least these negative intercessory bonds.

Finally Sabr, which means endurance or more accurately perseverance and persistence, is one of the parts of Muslim faith. The Sabr teaches to remain spiritually steadfast and to keep doing good actions in the personal and collective domain, specifically when facing opposition or encountering problems, setbacks, or unexpected and unwanted results. It is then a patience in face of all unexpected and unwanted outcomes. With respect to the Sabr, there is expected f.e. that professional auditor (accountant) will perform even when has not yet received the fees for previous work done; but more important is, that professionals according to Sabr should not care of possible, unwanted consequences, like client's displeasure and loss (Al-Aidaros et al. 2011).

According to Islam then, auditors and accountants must have professional competency and sufficient knowledge related to financial transactions. Both must be sincere in performing their duties be able to make right decision in seeking Allah's satisfaction (Abdul Rahman 2003). They refrain from agreeing to perform professional duties if they have no sufficient knowledge or competency to perform. Moreover, professional competences in Islam are especially important due to desire to gain Allah's

satisfaction. It is actually very strong motivation to exercise sensitive professional and moral judgments in all their activities (Al-Aidaros et al. 2011). They should observe the profession's technical and ethical principles, develop competence and the quality of services, and discharge professional responsibility to the best. More, they should perform their duty beyond the expectation of clients, because their life should be as perfect as possible (Al-Qaradawi 1994). Also, the reward in the next life is much more important than the reward in this life (such as fees or salary), thus professional auditors and accountants are expected to carry out their work as best as possible in this society, not for the sake of money (Al-Aidaros et al. 2011).

The possible source of wasta's acceptance are then perhaps some specific principles like e.g. Ihsan, representing values that Islam stresses to be incorporated in the daily Muslim life. With respect to Ihsan (kindness), auditor (or accountant) is encouraged to provide perfect services beyond the expectations of the clients (Al-Qaradawi 1994). But kindness in some circumstances means also to be helpful (e.g. to relatives) and lenient (forgiving about their deficiencies), so it may be a background of wasta as well.

Conclusions

Despite the professional ethical codes, we can still witness some unwelcomed practices in business, considering also professional behaviors. The informal, but non-illegal relationship of wasta may be one of them. It is difficult to assess the wasta, though, because – like Chinese guanxi with which it is sometimes compared - it has some advantages and disadvantages. The wasta, deeply rooted in Islamic culture, has become a keyword explaining the failures of economic and political reforms in Muslim countries. However, it should be remembered that the concept of wasta definitely goes beyond the negative practices that are associated with it – like nepotism, mobbing and corruption. It can also mean mediation, lobbying and social solidarity (and here it stays in line with Islamic ethics, emphasizing the solidarity). The wasta in the whole range and variety exists also in other cultures and its universal character allows Muslims to excuse its existence. If it goes beyond the Islamic world and exists actually everywhere, but under different names and in other forms, therefore it may be seen as an immanent element of social order. Another explanation is practical in nature and associated with extensive bureaucracy (Górak-Sosnowska 2010), while the wasta can significantly reduce the time needed to settle matters. It is also really difficult to assess to what extent wasta actually limits the possibility of employment of competent and highly qualified persons; this practice seems to concern primarily the public sector.

This article attempted to find the answer to the question whether representatives of financial services, professionals such as accountant or auditor, may be under the negative influence of the wasta. The paper focused on Islamic religious ethics as a source of moral values, because the religion is considered to be a very strong factor shaping law, manner of conducting business and social bonds in Muslim countries. However, it is some limitation of this paper, which does not analyze f.e. the recommendations of the formal ethical code developed by The Accounting and Auditing Organization for Islamic Financial Institutions and their impact of the subject of matter and does not contain quantitative research. This is a possible field for complementary studies, as well as surveys of Muslim accountants and auditors in order to check their moral judgment regarding wasta and its possible impact on their professional situation, frequency of the phenomenon, etc. Further studies may also be heading towards a deeper comparison of wasta with guanxi, in terms of moral assessment and the risks these phenomena may pose in the environment of financial professionals.

In this paper, an analysis of ethical principles of Islam shows clearly that most of them exclude the wasta as admissible way to professional conduct. Only value of solidarity and principle of Ihsan may be some background to justify its existence. Considering that unethical behavior in Muslim countries carries risk not only bearing legal consequences, but a threat of exclusion from the umma and condemnation in Allah's eyes, beyond the temporal after-effects, it seems that one can venture to say that accountants and auditors' independence, qualifications and objectiveness are not more threatened in Islamic countries than anywhere else, or maybe even less. The existing of the wasta doesn't make their virtues more questionable, as well as it does not seem like these professions may be particularly susceptible to its negative impact.

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Analysis Factors Affecting The Profits of Cooperative Business in Indonesia

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Abstract

This study aims to determine the effect of the number of members, business volume, capital and assets on cooperative business profits in Indonesia Indonesia. The data used are secondary data taken by the Central Java Cooperative and UMKM Office, the data were analyzed by multiple linear regression. The results showed that partially the number of members did not affect business profits, business volume affected business profits, capital did not affect business profits and assets affected business profits.

Keywords*:* business profits, number of members, business volume, capital, assets, cooperatives

Introduction

Economic development is a very important sector and is one of the focus of the government in making various policies to achieve prosperity. So important is this economic sector that in every policy making must consider all aspects that may affect both positive and negative.

The Indonesian Nation has three economic power sectors that carry out various business activities in the economic order of life, the three sectors are the State-Owned Enterprises (BUMN), private and cooperative sectors. To achieve a strong economic position and achieve a just and prosperous society, the three sectors of economic power must be interconnected and collaborate well. Of the three economic sectors, cooperatives are considered the most suitable to be developed in Indonesia because of their family-friendly nature in the interests of members in particular and society in general. Cooperatives are formed by members and the results are used for the welfare of members.

One indicator of the success of cooperatives can be seen from the size of the business profits that are cooperative income obtained during the fiscal year after deducting depreciation costs and other obligations including taxes in the fiscal year concerned. The greater the business profits obtained by a cooperative, the more it shows progress from year to year.

In the managerial efficiency theory of profit, it is stated that a company can achieve above-normal profit if it succeeds in managing efficiency in various fields and can meet the desires of its consumers. Under the concept of cooperatives, cooperatives will benefit from the results of managerial efficiency, because the business orientation is more emphasis on business services that can provide benefits and

joint decisions of its members. In a cooperative the benefits of the business carried out are called business profits (SHU). So it can be said that to get maximum business profit (SHU), cooperatives must certainly maximize or streamline all components both financial and non-financial. The financial component of cooperatives can be seen from the capital and the volume of business carried out, while for non-finance can be seen from the number of cooperative members (Wiyono, 2016: 612).

Related to this problem, several studies have been conducted, including; Dewik, et al. (2016), who state that the number of members, the number of deposits, the number of loans and working capital has a significant effect on business profits. But partially, the number of deposits has a negative and significant effect on business profits. Cahyani's research (2015) states that there is a direct influence between the number of members on the acquisition of business profits, and there is an indirect effect between the number of members on the acquisition of business profits through member participation. Research Rianto, et al. (2012) concluded that; Capital, Number of Members, and Business Volume together have a significant effect on business profits. But the variable Number of Members harms business profits. In research Lilis (2011) states that the number of members and the number of deposits does not affect the acquisition of business profits, the variable that has a dominant effect on business profits is the variable amount of loans. In Ghazali Syamni's (2016) research on Determinant Cooperatives of Business Profit in Indonesia: A Partial Least Square Approach states that business profits are influenced by employees and business profits are not influenced by members, managers, internal capital, external capital, and business volume. research Carlo Russo et al's (2001)on Effects of Managers 'Power on Capital Structure: A Study of Italian Agricultural Cooperatives states that business profits are influenced by managers' power and capital structure.

The renewal of this study compared to previous research is on the independent variables, the independent variables studied include: number of members, business volume, capital, and assets. As for previous studies, no one has examined the four variables together. Also, the researchers looked at how the overall condition of cooperatives in Central Java. That way we can see the condition of cooperatives in Central Java as a whole.

Literature Review

Business Advantages

Business profits represent the difference between cooperative income in one year after deducting costs and taxes incurred by the cooperative. (Susanti, 2013: 9). Based on Law No. 25 of 1992 business profit (SHU) is the income of cooperatives obtained in one financial year reduced by costs, depreciation, and other obligations including taxes in the fiscal year concerned (Kuznetsov & Kuznetsova, 2008). Wigati and Cornelio (2003) state that business profits are cooperative income obtained from activities or businesses during one accounting period after deducting costs (Putu Trisna Ganitri, 2014: 3).

In general, cooperative business profits are divided as follows: (1) cooperative reserves are part of the allowance for business profits that are not shared and can be used to accumulate their capital and to foster their capital and to cover cooperative losses if needed, (2) member services within the cooperative has a dual function, namely as the owner (owner) and at the same time as a customer (customer), (3) management funds are SHU that is set aside for management or service fees in managing organizations and cooperative businesses, (4) employee funds are allowance for business profits used to pay salaries for employees who work in cooperatives, (5) education funds are allowance for business profits used to finance the education of management, managers, and cooperative employees as an effort to improve the ability and expertise of human resources in managing cooperatives, (6) Social funds are allowance business profits that are used to help ang members of the community and surrounding communities affected by the disaster, (7) the funds for the development of the working area are the allowance for business profits that are used to develop the working area (Tamba, 2001: 78).

The Number of Cooperative Members

The number of cooperative members according to Karta Saputra is the number of cooperative persons or legal entities that have the same interests, namely as the owner and at the same time the cooperative service users themselves (Saputra, 1991: 25). Based on the opinion above, it can be explained that the number of members is a group of cooperative persons or legal entities that have the same interests in carrying out their duties as owners and users of the cooperative's services, so members are required to be active in every cooperative business activity.

The number of members according to Tiktik Sartika Partomo is the owner and at the same time a cooperative service user. (Partomo, 2009: 56). whereas according to Hendar, members are the owners of the cooperative so they will participate in making important decisions for the progress of the cooperative. Members who do not have the ability and willingness to take part in important decisions in their implementation will have an unfavorable impact on the development of cooperatives. Also, Hendar reiterated that members are the main investors who expect benefits for their membership as well as the main customers of cooperative companies. (Hendar, 2010: 148). Members as the main customers are also under Ropke's opinion that the number of cooperative members is the final consumer and entrepreneurs who use the cooperative in its socio-economic activities. (Ropke 2003: 83). Based on this theory, it can be explained that members are investors and cooperative owners who participate in decision-making and as well as the main customers who take advantage of cooperatives in their socio-economic activities.

Cooperative members according to Baswir are individuals who are part of the cooperative following specified requirements (Baswir 2012: 67). It can be explained that the members of the cooperative are a group of individuals who have fulfilled the requirements specified by the cooperative, the same thing was also stated by Wibowo, according to Wibowo cooperative members are people who have been able to take legal actions and meet the requirements set by the cooperative concerned and function as the owner and user of savings and loan services by the cooperative (Wibowo 2017: 13). It can be explained that besides fulfilling the requirements set by the cooperative, cooperative members are also people who have been able to take legal action because there are several rights and obligations of cooperative members that must be obeyed.

Based on the theories above, it can be synthesized that the number of members is a group of individuals who have the same interests and have fulfilled the specified requirements. Besides, members are owners and users of cooperative services, so members are required to be active in every cooperative business activity.

Indicators of members, if we see from the above definitions, are members joining certain requirements determined by cooperatives, members provide benefits as the main customers of cooperatives and members are cooperative investors

Business Volume

The economic activities of cooperatives can be seen from the large volume of cooperative businesses. Activities towards the volume of business carried out by cooperatives can provide maximum benefits, especially for cooperative members and cooperative benefits in general. Business volume is the total value of sales or receipts of goods and services in a given period or financial year. Thus the volume of cooperative businesses is the accumulation of the value of goods and services receipts from the beginning of the fiscal year (January) to the end of the financial year (Hendar, 2010: 159). Based on the above definition, it can be explained that from the total sales of goods or services income will be obtained, so that the business can be seen from the large volume of business so that later it will have an impact on the income received by cooperatives.

The volume of business according to Tamba is the amount of gross circulation of the business or also referred to as operating income (Tamba, 2001: 141), thus the business volume is income from the cooperative business unit. A similar opinion was stated by Siegel that, sales (business volume) are the overall turnover of goods and services sales which are the main operations of all cooperative business units (Siegel, 1999: 123). It can be explained that the volume of business is the sale of goods and services from cooperative business units. Some of the above understanding can be concluded that the volume of business is the amount of gross circulation or can be called operating income for the overall turnover of sales of goods and services which is the main operation of all cooperative business units in a year.

According to Alamiyah and Padji in Fridayana, the volume of business is successfully achieved or wants to be achieved by a company in a certain period (Fridayana 2016: 4). Meanwhile, according to John Down and Jordan Elliot Goodman, translated by Susanto Budidharmo in Astari, business volume is the total sales obtained from commodities traded in a certain period (Astari 2016: 3). So it can be explained that the volume of business is the total sales that a company wants to achieve.

Chaniago in Agustin, business volume is the overall amount of income derived from the sale of goods or services within a certain period (Agustin 2014: 3). It can be explained that the volume of business is the overall results obtained from the sale of goods and services in a certain period. Assegaf Abdullah in Beni Susanti's business volume is the number of units sold from the production unit of a transfer from the producer to the consumer and remains in a certain period. (Susanti 2014: 5). Based on this theory, it can be explained that the total volume of total income from consumer sales in a given period.

The volume of cooperative businesses can consist of various types of businesses depending on the type of cooperative. In a multi-business cooperative, its business activities are not only in the savings and loan business but also in the trade or service business managed by the cooperative. The volume of business or income from a cooperative consists of several characteristics as follows: 1). Revenues arising from product sales transactions or delivery of services to members and non-members, 2). Revenue of certain income is still dependent on the terms/conditions applied. According to PSAK No. 27 concerning Cooperative Accounting, it is stated that income derived from product sales transactions or service delivery to members is reported separately in the calculation of the results of operations as sales to members or income from members. (IAI, 2009: 12) can be interpreted that the business volume is obtained from product sales transactions and service delivery, which in reporting is separated between member transactions and non-member transactions.

Indicators of the volume of business according to Kotler in Sudaryono include:

a. Price. Price is an exchange rate that can be equated with money or other goods for the benefits derived from an item or service for a person or group at a certain time and place. Price interacts with all elements and all elements of.
b. Product Quality Product. quality is the ability of products to carry out tasks that include durability, reliability, progress, strength, ease of packaging and product repairs.
c. Distribution Channels. Products that have been made need to be distributed to reach the hands of consumers, either through distribution channels, intermediaries or sent directly to users of
d. Product. Products are anything that can be offered into the market to reach consumers, up through distribution channels, intermediaries or sent directly to the user
e. Promotional Costs Promotional. costs are the activities of a company that are designed to provide information to persuade other parties about the company concerned and the goods and services offered.

The above theories can be explained that the volume of business is the result of sales of goods and services that are influenced by several indicators of price, product quality, distribution channels, products and production costs. These indicators will affect business units in cooperatives so that cooperatives need to pay attention in determining the price of products and services, determine the distribution channel distribution and create product innovations, and regulate promotional costs so that

they are not too excessive but can attract the market, the way above is done so that business income or business volume is increasing.

Based on the study of the experts above, it can be concluded that the volume of business is the total operating income from the sale of goods or services in a certain period which is recorded separately between member transactions and non-member transactions. The indicators that influence business profits are price, product quality, distribution channels, product and promotion costs.

Capital

Adam Smith in a book entitled "The Wealth of Nations" defines capital as part of the value of wealth that can bring income (Firdaus and Susanto, 2004). the cooperative capital consists of own capital and external capital. As Lukman noted, Mmdal cooperatives comprise and are fostered from the principal, mandatory and voluntary savings of their members (which in this case are also voluntary deposits from non-members), loans and allowances for business results and other sources (Article 32 (1), (2), and (3) Law No. 12 of 1967). Therefore, in a cooperative capital consists or constitutes internal capital and external capital which are equally potential to finance businesses that are specialized as reserves, while external capital comes from loans and deposits (deposits) from outside membership whose amount will depend on the trust that can be fostered by the cooperative itself (Lukman, 2010: 4).

Own capital is capital that comes from the founding funds or members of cooperatives that were first deposited, in the technical language of a company organization commonly referred to as the basic capital for establishing cooperatives (Pachta 2005: 8) based on the above understanding it can be explained that own capital funds from cooperative members who must be deposited at the beginning when joining a cooperative. Meanwhile, according to Hadhikusuma his capital in cooperatives comes from several deposits as follows (1) Principal Deposits (2) Mandatory Deposits, (3) Reserve Funds (4) Grants (Rahardja, 2000: 17). It can be explained that own capital is the accumulation of principal savings, mandatory savings, reserve funds, and grants.

Own capital is capital that comes from several sources, namely the founding funds or cooperative members in the form of principal savings, mandatory deposits that are first deposited, reserve funds, as well as non-binding external funds in the form of grant funds. According to Agustin Lusiana Dewi, loan capital or outside capital is capital that comes from outside as a loan. Loans can be obtained from various parties, including private entities, individuals or government loans and so forth. (Susanti, 2013: 3) can be explained that external capital is capital obtained from loans from individuals or entities.

Arifin Sitio and Halomon Tamba stated that cooperative loan capital can be sourced from the following, (1) Members, (2) Other cooperatives and / or members, (3) Banks and other institutions, (4) Issuance of bonds and other debt securities, (5)) Other legal sources (Tamba, 2001: 67). It can be explained that external capital is loan funds obtained from members, other cooperatives or their members, banks and other institutions as well as from the issuance of bonds and other debt securities and other legal sources.

Both opinions above can be concluded that external capital is capital sourced from outside, namely members, other cooperatives and or their members, banks and other institutions, issuance of bonds and other debt securities, other sources that are legitimate and considered as loans, and based on debt service between the cooperative and the parties concerned..

Aset

Munawir (2007: 30) states that assets are facilities or resources that have economic value that can support a company in its acquisition price or fair value must be measured objectively. Meanwhile, according to Hidayat (2011: 4) that the definition of an asset is the goods in a legal sense is referred to as an object, which consists of movable and also immovable, both tangible (tangible or intangible (intangible). The entirety of this includes assets or assets or assets of an agency, organization, business

and individual or individual

An asset is an object, consisting of movable and immovable objects, both tangible and intangible and the means or resources having an economic value that can support the company in its cost or fair value should be measured objectively. Siregar (2004: 178) states that the assets, in general, is a good (thing) or for something (anything) that has a use-value or economic (economic value), commercial value (commercial value) or exchange value (exchange value) owned by a bad business, agency or individual. So it can be explained that assets are goods that have a use or economic value, commercial value, or exchange value owned by individuals or entities.

Financial Accounting Standard 16 of the 2011 Revision which states that the definition of assets is all assets owned by individuals or groups that are tangible or intangible, which has benefits for each person or company.Based on the understanding it can be concluded that the assets are all assets owned by the business entity or individual who has a use-value or economic (economic value), its commercial value (commercial value) or exchange (exchange value) which is owned by a business entity, institution or individual.

Under ETAP Financial Accounting Standards (2009) Assets are resources that are controlled by an entity as a result of past events and from which future economic benefits are expected to be obtained by the entity. The future economic benefits that are manifested in assets are the potential of these assets to contribute, directly or indirectly, to cash flows and cash equivalents to the entity. Some assets, for example, fixed assets have a physical form. However, the physical form is not essential to determine the existence of assets. Definition of assets according to International Financial Reporting Standards (2008) that the definition of an asset is defined: "an asset is a resource controlled by the enterprise as a result of past events and from the which future economic benefits are expected of flow to the enterprise"

From notions in It can be concluded that the assets are all assets owned by the business entity or individual who has a use-value or economic (economic value), its commercial value (commercial value) or exchange (exchange value) which is owned by a business entity, institution or individual form an object, consisting of movable and immovable objects, both tangible and intangible as well as facilities or resources that have economic value that can support the company in its acquisition price or fair value must be measured objectively.

Method

This study is a causal study to analyze the relationship between one variable and another. This research will discuss the number of members, business volume, capital and assets that can affect business profits. Data obtained through data collection in the field which is done by using the documentation method, through the collection of reports records and financial reports relating to the cooperative situation. This method is used to collect data on the number of members, business volume, capital assets and business profits from 2008 to 2017. The

subjects in this study are Central Java which has a full report during the observation year, while the object of this report is the number of members, business volume, capital and assets, and business profits in Central Java for the period 2008-2017. This type of research data using quantitative data used is cooperative performance data in Central Java in 2008-2017. The data source used in this study is secondary data. Secondary data is data obtained from a second source or secondary source of the required data. Data processed with program e-views 8. In more detail, the formulation model is explained in Figure 1.

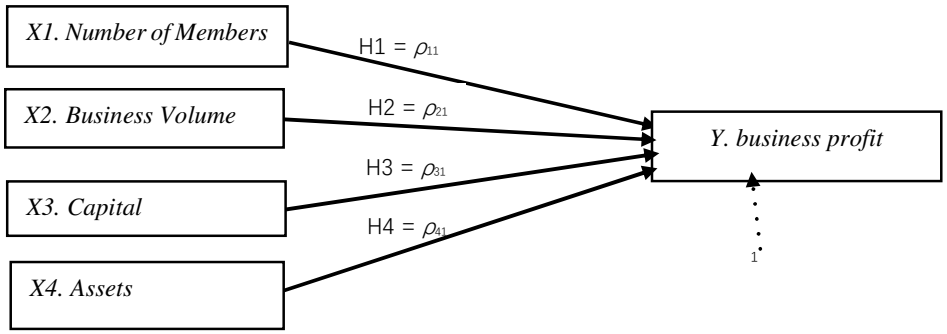

Figure 1: The Proposed Model

$\acute{Y} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$ .....(1)

Description:

$\acute{Y}$ = business profit
α = constants
β = regression coefficient
X_1 = Number of Members
X_2 = Business Volume
X_3 = Capital
X_4 = Assets

Results and Discussions

Based on the results of the descriptive statistical analysis test, the following distribution of variable data in this study were obtained with the help of Eviews 8.

Table 1: Values of Each Variable Data Statistics

	Business Profit	Number of Members	Business Volume	Capital	Assets
Mean	447636.8	6046888.	27474303	29203463	10250512
Median	393581.5	5995164.	27898937	26546360	6915742.
Maximum	1460177.	8221627.	61879534	65664695	26249000
Minimum	93717.00	4408888.	10878303	6256055.	3260187.
Std. Dev.	279251.4	1422470.	14538727	19324763	7343403.

Source: Researcher Processed Data

Detection of symptoms of classic assumptions is done to find out whether the model used meets the criteria BLUE (Best Linear Unmark Estimator). If the estimation model used has met these criteria, then this model is feasible to be used as a estimation model of the remaining operating results variable. Detection of symptoms of the classic assumptions made in this study include normality, heteroscedasticity, multicollinearity, and autocorrelation. The following are the results of detecting symptoms of these assumptions: At this stage the data under study must pass through hetrokedastisitas, multicollinearity and normality tests. Data can be said to be good if it passes the normality test.

Table 2: Detection Result of Kasik Assumption

Detection Result of Kasik Assumption	Result				
	Nilai Jarque-Bera			P-value	
Normality (Jarque-Bera Test)	4.89			0.08	
	Chi Sqaure-Table			Significant	
	9.49			0.050	
	IndependenVariable			P-value (t-stats)	
Heterokedasticity (White-Test)	Number of Members			1.2792	
	Business Volume			0.2424	
	Capital			0.3975	
	Asets			0.6757	
	Dependen Variable			Significant	
	Residual Absolut			0.05	
Multikolinearity		Number of Members	Business Volume	Capital	
	Number of Members	1	0,783397	0.7892999	0.73318
Correlation	Business	0,783397	1	0.792137	0.74943

Detection Result of Kasik Assumption	**Result**				
	Volume				
		0.789299	0.792137	1	0.77963
	Capital	9			
	Asets	0.733183	0.749431	0.779635	
	Significant				
Autocorrelation		0,05		0,54	
	Dl	Du		Durbin Watson	
	1.284	1.7209		1.7859	

Source: Data Processed Researcher with Eviews8Source: Data Processed Researchers with Eviews8

Detected normality results shown in table 4.4, it can be seen that the value of Jarqueresults of detection of normality shown by table 4.4, it can be seen that the value of Jarque Wath -Bera is 4.89, while the Chi-Square table is 9.49, with a significance level of 0.05 d an degree of freedom (4-1). With so H0 accepted for Jarque-Bera value smaller than the Chi-quare tabel. In addition, the probability value of the Jarque-Bera is at 0:08 slightly larger than the significance level (0.05), so that H0 is received. Then it can be concluded that the residual value of the estimation model used is normally distributed. Heteroscedasticity detection results shown by table 4.4, which is done using white, the t-statistic probability value of all X variables is greater than the significance level of 0.05. So that H0 is received, which means thatstructure of the variance-covariancethe residuals are homoskedastik. Coefficient value of the correlation between the independent variables shown in table 4.4 on thevalue centered VIF below 10 means that there is no multicollinearity. Thetest Durbin-Watson will produce a Durbin-Watson (DW) value and from the Durbin-Watson value it can be determine the decision whether there is autocorrelation or not. In table 4.4 it is known that if the probability value is greater than the significant level, it can be concluded that this study did not occur autokoleration. If seen from the DW value, then du ≤ DW ≤ 4-du and the meaning of the study there is no autokoleration.

Table 3: Test Results Hypothesis and the coefficient of determination (R^2)

Dependen Variable (Y)	Independen Variable (X)	t-test (partial)				F-test (simultan)			R^2	Adjusted R^2
		t-statistik	Coefficient	std. error	P-Value	F-statistik	P-Value	std. error		
Business Profit	Number of Members	0.005148	0.001029	0.199797	0.9959	18.60369	0.000000	735806.2	0.680119	0.643562
	Business Volume	3.971789	0.012693	0.003196	0.0003					
	Capital	-0.745713	-0.014029	0.018813	0.4608					
	Asets	2.650036	0.043099	0.016264	0.0120					
	t-tabel (0.05, (40-4-1))		Sig			F - Tabel	Sig			
	1.690		0.05			2.63	0.050			

Source: Researchers Processed Data with Eviews8

The results of this study aim to determine the effect of each independent variable on the dependent variable and to determine influence simultaneously that is together whether the independent variable has a significant effect or not on business profits at a significant level of 0.05

Table 4. Sample: 2008Q1 2017Q4

Included observations: 40

HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	94633.55	735806.2	0.128612	0.8984
X1	0.001029	0.199797	0.005148	0.9959
X2	0.012693	0.003196	3.971789	0.0003
X3	-0.014029	0.018813	-0.745713	0.4608
X4	0.043099	0.016264	2.650036	0.0120

R-squared	0.680119	Mean dependent var	484136.8
Adjusted R-squared	0.643562	S.D. dependent var	277972.4
S.E. of regression	165956.4	Akaike info criterion	26.99331
Sum squared resid	9.64E+11	Schwarz criterion	27.20442
Log likelihood	-534.8661	Hannan-Quinn criter.	27.06964
F-statistic	18.60396	Durbin-Watson stat	0.954168
Prob(F-statistic)	0.000000	Wald F-statistic	24.07195
Prob(Wald F-statistic)	0.000000		

Discussion and Conclusion

Effect of the Total Number of Members on Business profits

The maximum value on the variable number of members is 8221627.which is the total number of Central Java cooperative members in 2017 fourth quarter. While the minimum value of the variable data on the number of members is 4408888.which is the total number of Central Java cooperative members in the first quarter of 2008. To see the dynamics of the variable data movement of the number of Central Java cooperative members during 2008-2017 can be seen through Figure below

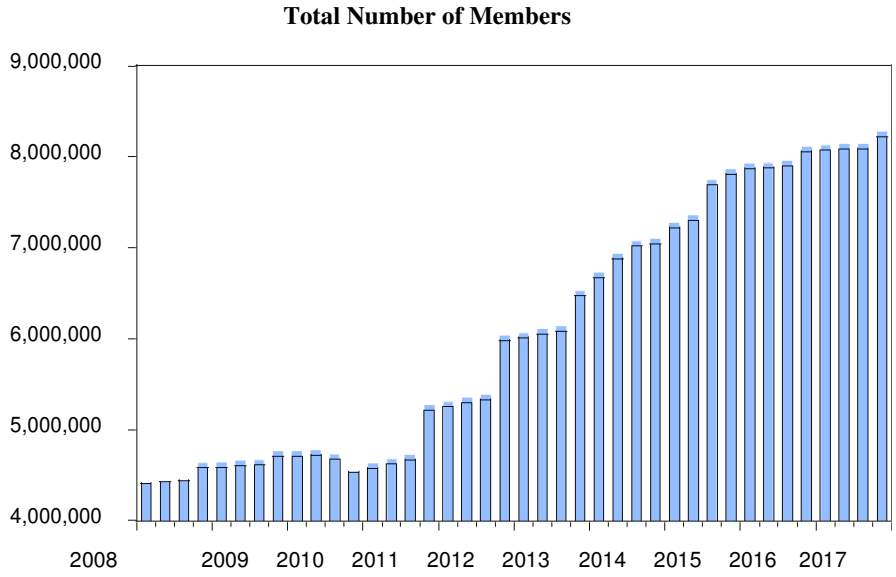

Graph. 1: Data Movement Dynamics Number of Members in Central Java in 2008-2017

Based on partial testing (t-test) intended to find out if there is any effect of the number of members on business profits with a significant level of 0.05. From these tests the value of $_{arithmetic}$ = 0.005148 <t_{table} = 0.05 means that the number of members does not affect business profits.

The first hypothesis does not support the hypothesis that is formulated, as well as following the theory, where the number of members always influences the profitability of the business. From the research results obtained probability values indicate that this variable does not significantly influence business profits, with a probability value of 0.9959 thus it can be said that the number of members does not significantly influence business profits. this is following a similar study studied by Sudaryanti, et al (2017) finding the same results that partially the number of members has no significant effect on the effect of the number of members. In addition to Sudaryanti, Ghazali Syamni in his research entitled *Determining Cooperative Business Profit in Indonesia* stated that business profits are not influenced by cooperative members.

This is consistent with the opinion expressed by Hendar that members of the cooperative are the owners

of cooperatives so that they will participate in making important decisions in their implementation, and will have an unfavorable impact on the development of cooperatives. (Hendar, 2010). The number of cooperative members does not have a significant effect on business profits because of the possibility of members who are members of cooperatives less actively participating in businesses conducted by cooperatives. Many members who are members of a cooperative do not influence business profits if the members do not participate in cooperative business activities.

Effect of Business Volume on Business Profits

The average value of the business volume variable is 27474303. the standard deviation of the business volume variable is 14538727, this shows that the sample value is far below the average value. The maximum value of the business volume variable is 61879534, which is the total business volume of Central Java cooperatives in 2017 fourth quarter. While the minimum value of the variable business volume is 10878303, which is the total assets of Central Java cooperatives in the first quarter of 2008. To see the dynamics of the variable volume of cooperative business data movement in Central Java in 2008-2017, can be seen through the picture below.

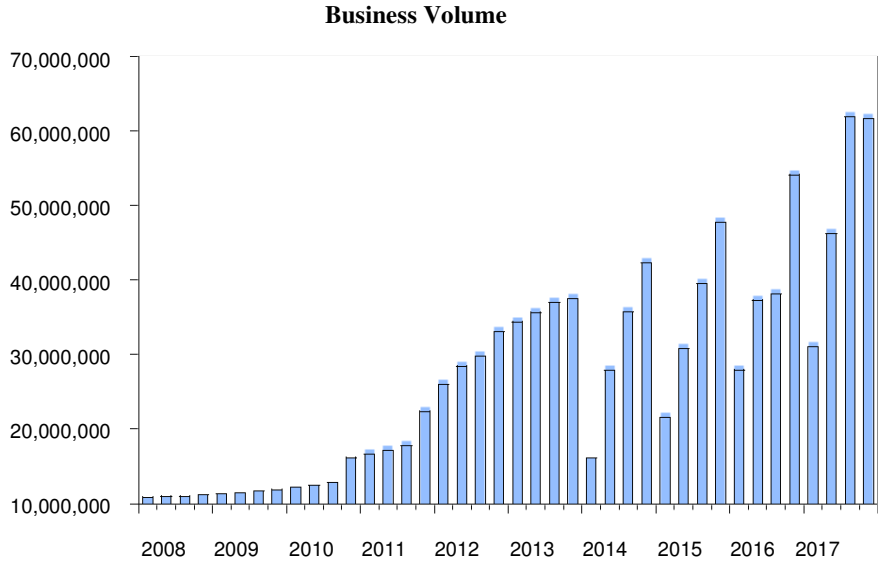

Graph. 2: Dynamics of Business Volume Data Movement in Central Java in 2008-2017

Based on partial testing (t-test) intended to find out whether there is an influence of business volume on business profits with a significant level of 0.05. From this test, the value of $_{arithmetic}$ = 3.971789> t_{able} = 0.05 means that the volume of business affects business profits.

The second hypothesis supports the hypothesis that was formulated, as well as following the theory. Where the number of members always influences the business profits. From the research results obtained, the probability value indicates that this variable has a significant effect on business profits, with a probability value of 0.0003. under previous research studied by Putu Indira Widiartin, I Wayan Suwendra, Fridayana Yudiatmaja who examined the effect of the loan capital and business volume on business profits, where one result was that business volume affected business profits. The results of this study prove that the opinion expressed by Sitio and Tamba (2011) which states that the volume of business will affect the acquisition of business profits.

Effect of capital on business profits

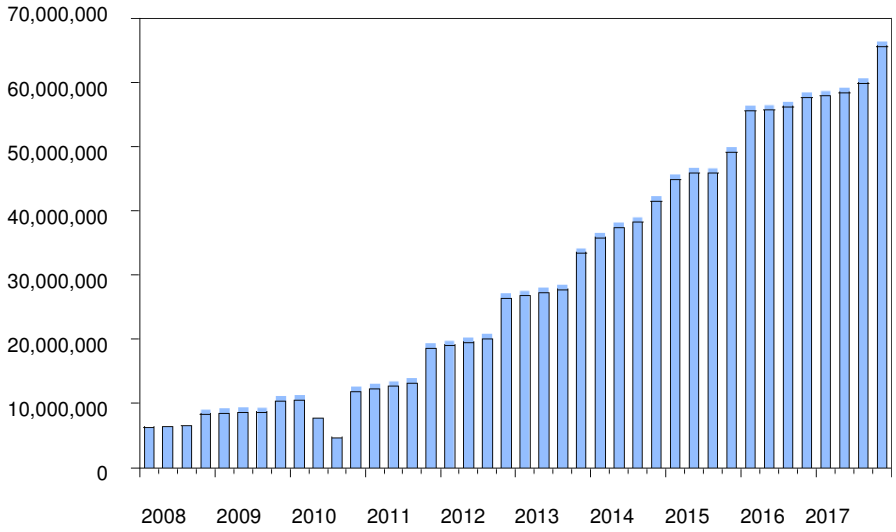

The capital variable data movement in Central Java in 2008-2017, can be seen through the figure below:

Capital

Based on partial testing (t-test) intended to find out whether there is an influence of capital on business profits with a significant level of 0.05. From the test, the value of $_{arithmetic}$ = -0.745713 <t_{table} = 0.05 means that capital does not affect business profits.

The third hypothesis does not support the hypothesis that was formulated and is not under the theory. Where capital always influences business profitability. From the research results obtained, the probability value indicates that this variable has no significant effect on business profits, with a probability value of 0.4608. this is under a similar study studied by Sudaryanti, et al (2017) finding the same results that partially capital does not have a significant effect on the effect of the number of members. Besides Sudaryanti, Ghazali Syamni in his research entitled *Determining Cooperative Business Profit in Indonesia* stated that business profits are not influenced by capital.

This is consistent with what was stated by Andjar Pachta W, et al (2005), the factors that influence business profits consist of two factors, namely internal and external factors. The internal factors consist of the participation of members, the amount of their capital, the management's performance, the number of business units owned, the manager's performance and the employee's performance. External factors consist of loan capital from outside, the behavior of outside consumers in addition to members and the government. So much or less capital does not affect business profits because the development of capital must also be followed by the performance of employees in managing the business unit.

Effect of Assets on Business Profits

The average value of asset variable data is 10250512. The standard deviation of the variableis baget7343403. This shows that the data shows that the sample values gathered or clustered around the average value of the calculation. The maximum value of variable asset data is 26249000 which is the total assets of Central Java cooperatives in 2017 fourth quarter. While the minimum value of variable

data assets is 3260187.which is the total assets of Central Java cooperatives in the first quarter of 2010. Asset movement can be seen in the dynamic movement of data variable assets for the period 2008-2017 in each uarter, can be seen through the picture below.

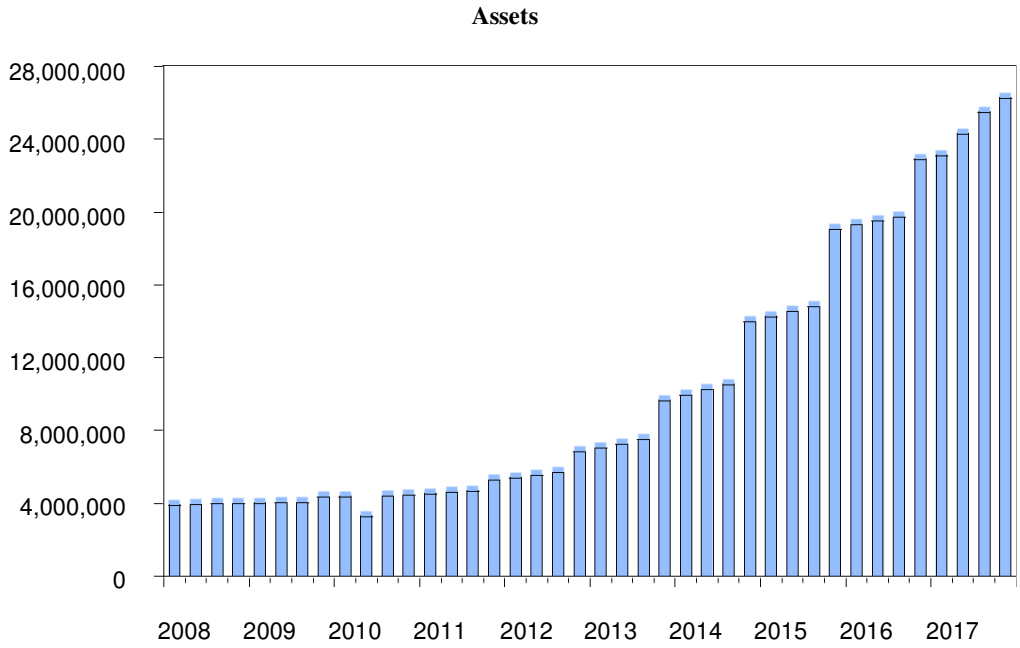

Graph. 4: Asset Variable Data Movement in Central Java in 2008-2017

Based on the picture above, it can be seen that assets tend to experience a steady increase from 2008 to 2017 the decline occurred in 2010 the second quarter, but another increase in the next quarter. Based on partial testing (t-test) intended to find out whether there is an effect of assets on business profits with a significant level of 0.05. From this test, the value of $_{arithmetic}$ = 2.650036 <t_{table} = 0.05 means that the assets affect business profits.

The fourth hypothesis supports the hypothesis that was formulated, as well as under the theory. Where capital always influences business profitability. this is under previous studies examined by Dedeh Sri Sudaryanti, Nana Sahroni, who examined the effect of the number of members, external capital and total assets on business profits, where one result is the total effect on business profits.

Simultaneously the independent variable (number of members, business volume, capital, and assets) has a significant effect on the dependent variable (business profit). *under the(managerial efficiency theory of profit*), it is stated that a company can achieve above normal profit if it succeeds in managing efficiency in various fields and can meet the desires of its consumers. Under the concept of cooperatives, cooperatives will benefit from the results of managerial efficiency, because the business orientation is more emphasis on business services that can provide benefits and joint decisions of its members. In a cooperative the benefits of the business carried out are called business profits (SHU). So it can be said that to get maximum business profit (SHU), cooperatives must certainly maximize or streamline all components both financial and non-financial. The financial component of cooperatives can be seen from the capital and the volume of business carried out, while for non-finance can be seen from the number of cooperative members (Wiyono, 2016: 612). The results of output *e-views 8* after the significance test are seen that $F_{arithmetic} > F_{table}$ or 18.60369> 2.63 which means that there is a joint influence between the number of members, business volume, capital and assets on business profits.

Conclusions and Suggestions

Based on the results of research and discussion can be concluded as follows. (1) The number of members does not affect business profits, (2) business volume influences business profits, (3) capital does not affect business profits (4) assets affect business profits (5) number of members, business volume, capital, and assets jointly affect business profits.

In subsequent studies, it is recommended that researchers use more diverse cooperatives with more variables so that the research to be carried out can be more optimal and comprehensive. with diverse cooperatives, it is hoped that further research can be used for all types of cooperatives not just one type of cooperative.

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The Effect of Renewable and Nuclear Energy on CO2 Emissions and Economic Growth in Selected EU Countries

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Abstract

In the paper we examine how renewable and nuclear energy consumption impact the economic growth and CO2 emissions using a four variables Vector Autoregression methodology (VAR) together with causality analysis, forecast error variance decomposition and impulse response function. We use a sample of three countries (France, Spain and Sweden) with different level of economic development and social structure but with a high level of nuclear or/and renewable energy consumption over the period 1970-2018). Our main finding is that renewable and nuclear energy decouples the economic growth from carbon emissions in France and Sweden (in contrast to Spain) what may suggest the policy aimed at reducing carbon emissions is effective, and that introduction of green energy sources contributes to it considerably. Additionally, we have found that renewables in Spain have the negative impact on nuclear energy consumption suggesting that renewable energy tends to squeeze out nuclear energy instead of fossil energy source. Hence, to mitigate climate changes in Spain, the RES support needs to be more markedly completed with changes to political-economic structures that effect fossil fuel use.

Keywords: Renewable and Nuclear Energy, CO2 Emissions, Economic Growth, Decoupling, VAR Model.

Introduction

Global climate change is most of all driven by anthropogenic greenhouse gas emissions, especially CO2 coming mainly from the combustion of fossil fuels. Since the Paris Agreement has been entered into force in 2016, many countries have quantified their contributions more formally known as nationally determined contributions (NDCs) to the United Nations Framework Convention on Climate Change (UNFCCC), in terms of greenhouse gas (GHG) emission reductions. For example, the European Union pledged to reduce GHG emissions by at least 40% below 1990 levels by 2030. Many researchers and policymakers tend to agree that to curtail the effects of climate change, nations must substantially reduce the use of fossil fuels and replace them with "green" technology. Hence, dealing with global warming and emission reductions it is crucial to find sources of energy alternatives to fossil fuels. Many believe that both renewable (hydro, wind, solar, biomass and geothermal) and nuclear energy sources as virtually carbon free energy sources can provide some solutions to the problems of energy security and climate change (Elliott 2007; Ferguson 2007; Adamantiades and Kessides 2009). However, a debate still persists whether the development of renewable and nuclear energy can allow to effectively address environmental problems without harming the economic growth (Apergis *et al.* 2010; Menyah and Wolde-Rufael 2010; Jorgenson and Clark 2012; York 2012; York and McGee 2017).

It is assumed in environmental science and policy analyses that the development of green energy sources, especially the renewable energy, could take the place of fossil fuels and thereby allow for a reduction in carbon emissions and be the contributor to the decoupling of economic growth from CO2 emissions where economies grow but emissions do not (OECD 2011; Weizsäcker *et al.* 2014). However, some empirical analyses have shown that the development of "green" technologies often does not lead to the expected environmental benefits due to complex interactions in political and

economic systems (York 2012; McGee 2015; York and McGee 2017). For example, the common assumption that renewables primarily compete with fossil fuels is not necessarily valid as in affluent nations with high levels of renewables, fossil fuels and renewables may tend to squeeze out nuclear power (York and McGee 2017). Then, high levels of renewables make the economic growth dependent on fossil fuels in place of nuclear power, and conversely, in affluent nations with high levels of nuclear power, growth in renewables tends to substitute more for nuclear power than for fossil fuels (York and McGee 2017).

While there have been numerous studies examining the causal relationship between pollutant emissions, energy consumption and economic growth (e.g. Chontanawat et al. 2008; Dinda 2004; McGee 2015; Ozturk 2010; Payne 2009; Tiba and Omri 2017; Waheed et al. 2019), there is much less empirical research that has attempted to test the causal relationship between emissions, nuclear energy consumption, renewable energy and economic growth (e.g. Apergis et al. 2010; Menyah and Wolde-Rufael 2010). The most important distinction between these studies is the approach they use with regard to multiply- or single country analysis and hence the use of pane data or time series techniques. The majority of these works performed the analysis in a panel data framework. Although, there have been some criticisms of panel data techniques pointing that the main assumption behind pooling the data of different countries in one panel is not satisfied, i.e. the assumption that economic development trajectory is the same for all countries in a panel (Dinda 2004). Moreover, even the countries in seemingly a homogenous group like developed countries differ in the level of economic growth and social structures what seems to speak rather in favour of focussing on individual country analysis in a time series framework. Therefore, we follow the time series approach.

The purpose of this study is to investigate the causal link between nuclear and renewable energy consumption, CO2 emissions and economic growth and the effects of these two energy sources (as potential sources of mitigating greenhouse gases emission) both on emissions and economic growth with the use of modern advances in time series econometrics of integration and causality. This study contributes in the literature by three ways. First, it tests the effects of renewable energy and nuclear energy on CO2 emissions and economic growth using time series approach (VAR model incorporating causality analysis as well impulse response function and forecast error variance decomposition) for three countries (France, Spain, Sweden) with different level of economic development and social structure but with a high level of nuclear or/and renewable energy consumption, while most of the studies focus on group of countries using cross-national time-series (panel model) assuming homogeneity of all countries with regard to the same trajectory of economic development (Fosten *et al.* 2012). Second, we examine whether renewable and nuclear energy development decouples economic growth from carbon emissions based on a relatively longer period of time (annual data from 1970 to 2018) when the renewable energy consumption has already reached a level allowing it to significantly contribute to emissions reduction unlike in previous studies (e.g. Menyah and Wolde-Rufael 2010); then it is more likely to reflect general tendencies than in the shorter period of time. Third, we inspect to what extent the development of renewables may affect the use of nuclear power, which may in turn influence dependence on fossil fuels, and thereby CO2 emissions (York and McGee 2017).

Methodology and Data

To investigate the effect of renewable energy consumption on carbon emissions and economic growth we use the VAR(p) methodology (Juselius 2006):

$$X_t = c + \pi_1 X_{t-1} + \pi_2 X_{t-2} + \ldots + \pi_p X_{t-p} + \varepsilon_t$$

where X_t is (n x 1) vector of endogenous variables, c is constant, π_i – (n x n) coefficient matrices; i=1, 2,…,p, where p is the autoregression order of VAR model and ε_t is an (n x 1) vector of error terms with zero mean and the variance-covariance matrix Ω. This VAR model is estimated to evaluate the impacts of renewable energy (RES) on economic growth and carbon emissions in four countries (France, Spain, Sweden) with different level of economic development and social structures but with a high level of renewable energy consumption (wind, solar, hydro, geothermal or wave power, biofuels). Except renewable energy, we include also the nuclear energy consumption to check the hypothesis that high

levels of renewables tend to squeeze out the nuclear power. Therefore the vector of endogenous variables includes: X_t'=[ΔCO_2, ΔGDP, ΔNUC, ΔRES]), where CO_2 – CO_2 emissions in metric tons per capita), GDP – real gross domestic product in constant 2015 US dollars per capita and NUC – nuclear energy consumption in kg of oil equivalent per capita, RES – renewable energy consumption in kg of oil equivalent per capita. The data with regard to emissions, nuclear and renewable power is taken from the BP databank (www.bp.com) and GDP from OECD database (www.oecd.org). Our sample covers the period from 1970 to 2018 (annual data).

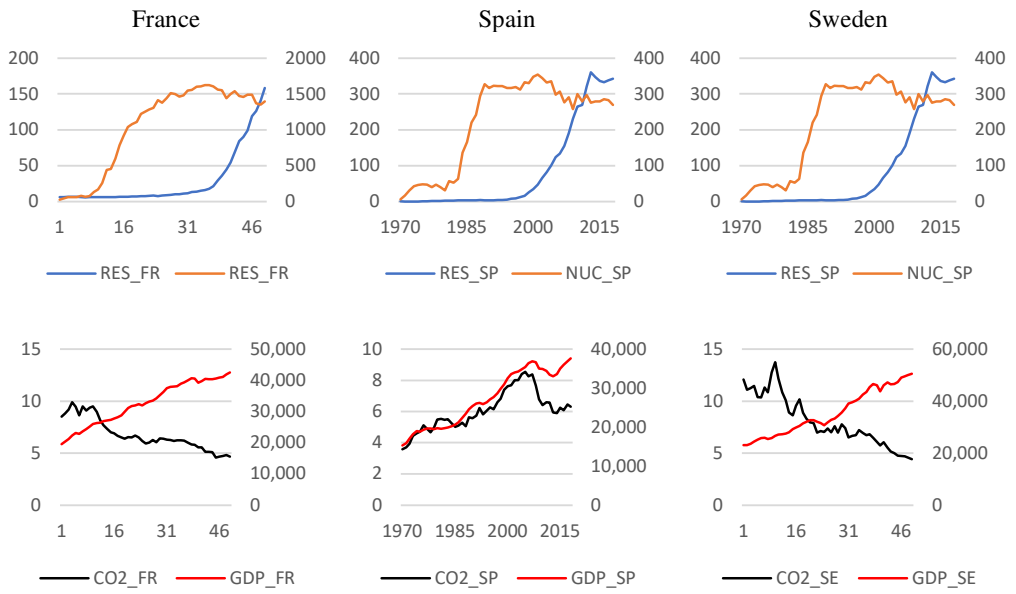

Fig. 1: Renewable and nuclear energy consumption, CO2 emissions and GDP per capita in the selected countries

Fig. 1 shows that since the end of seventies the considerable increase in nuclear energy consumption and since 2000 – in renewable energy consumption has occurred in all countries which is also illustrated by very high rates of growth (Fig. 2). At the same time, it is seen that the GDP has been growing but carbon emissions have been decreasing (Fig. 1). This is an evidence that more energy-efficient technologies and energy policy aimed to reduce carbon emissions have been started to be implemented. However, still the changes in emissions are in general procyclical, i.e. they increase during expansions and decrease during recessions.

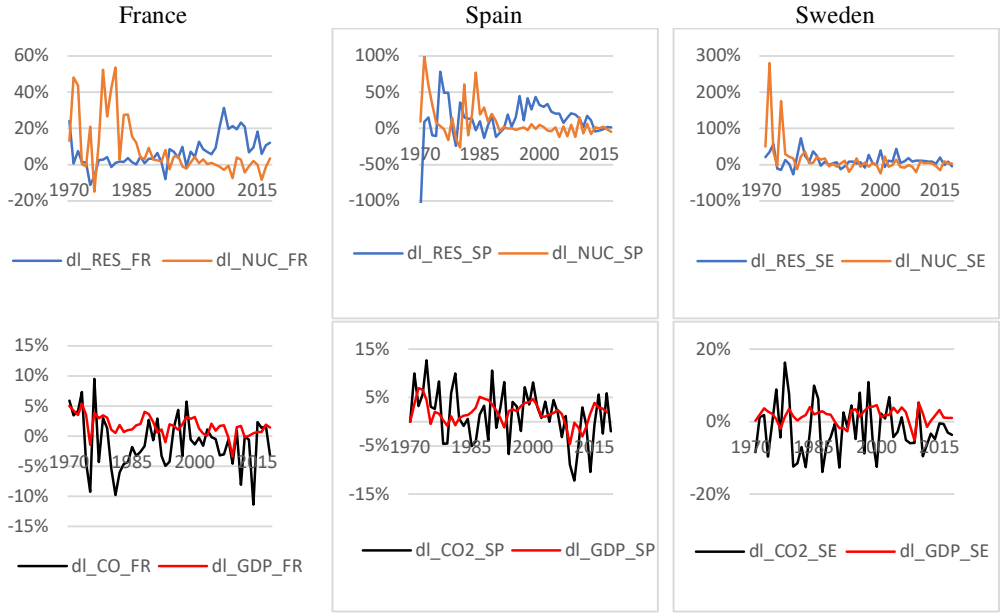

Fig. 2: Growth rates of nuclear and renewable energy consumption, carbon emissions and GDP in the selected countries

Note: the prefix 'dl' stands for differences of the natural log of a given variable.

Fig. 1-2 are also the reflection of different economic development trajectories and more importantly – different energy policy in the countries under review. Let us outline some of these differences.

France has a low-carbon electricity mis due to its large nuclear fleet, yet many reactors are reaching the end of their lifetime (IEA.org). Since 2019 the country has started an ambitious energy transition under the Energy and Climate Change Law by designing a national low-carbon strategy, carbon budgets, a carbon price trajectory and a planning framework for energy investment. France plans to reduce the share of nuclear from current 75% to 50% in the electricity mix by 2035 (IEA) as the support for nuclear technology is fading, both politically and socially (due to the cost of post-Fukushima security improvements, delays and over costs in the construction of the new Flamanville 3 reactor in Normandy, in addition to the high cost of replacing plants that will soon reach their useful life). However, reducing nuclear energy will require investments in renewable energy (e.g. planned growth of the share of electric vehicles and variable renewable electricity will demand enhanced power system operation and flexibility, including demand-side response, smart grids and metering and more interconnections.

Spain is a world leader in integration and renewable energy and has built a robust electricity system with high shares of wind and solar PV. In 2016, Spain generated a significant amount of power from renewable sources, with 39% of gross electricity generation (18% of Spain's gross electricity generation came from wind energy, 14% from hydropower, 5% from solar, and 2% from other renewable sources in 2016). The quick growth of renewable generation was possible due to government subsides. However, the government reformed its renewable energy subsidy program in 2014 to cap renewable energy producers' rate of return due to the rising costs of the subsidies. As a result, a drop in renewable generation occurred in 2015, most likely because of these reforms and the low-price environment of coal and natural gas. As a consequence, non-renewable sources (including fossil fuels, 40% and nuclear energy, 22% of country's electricity generation in 2016 respectively) still held the largest share of generation at 62% (IEA, Red Eléctrica de España).

Spain's Kyoto target (GHG emissions increase below 15%) was not reached as emissions were 24% above their 1990 level in 2012. After a 25% fall due to the economic downturn between 2007 and 2016, GHG emissions rose by 4.4% in 2017, as coal-fired power generation had to offset lower hydro resources (due to Europe's massive heat wave in the summer of 2017) and as road transport emissions continued to rise. Therefore, Spain needs to implement clear long-term energy and climate policies to encourage the transition to a low-carbon energy system, and also develop an energy strategy that integrates security of supply, sustainability and internal market dimensions (IEA).

Sweden is a global leader in building a low-carbon economy, with the lowest share of fossil fuels in its primary energy supply among all IEA member countries. Swedish success in its energy transformation has been achieved through market-based policies that focus on energy efficiency and renewable energy, notably CO_2 taxation which helped drive decarbonisation across several sectors (IEA News, 2019). The reason why Sweden has a low emission rate is that about 80% of electricity production comes from nuclear and hydroelectric power; about 11% of the electricity comes from wind power; the share of renewable energy used in Sweden already in 2012 reached the government's 2020 target of 50% (Swedish Energy Agency). Sweden is a good example that ambitious energy transition policies which are well integrated with climate objectives can be accompanied by strong economic growth.

Empirical Results

All variables expressed in natural logarithms are tested for the unit roots using the ADF-GLS (Elliott *et al.* 1996) and KPSS (Kwiatkowski *et al.* 1992) tests. The results tabulated in Table A1 on zenodo.org indicate that all variables are integrated of first order. Therefore, we use the logarithmical differences; this guarantees that all variables are stationary. Then, the order of the VAR model is chosen basing on the lag length test. The detail estimation results are available on request; in this paper we display only the residual diagnostics of VAR models (Table A2 on zenodo.org). The VAR models satisfy the stability condition (no root lies outside the unit circle) and pass all of the multivariate diagnostic tests, including the Breusch-Godfrey LM test for serial correlation, the White test for heteroscedasticity, the Jarque-Bera normality test (reported in Table A2).

Results of Granger Causality Tests

It is seen in Table 1 that in the short run, there is unidirectional Granger causality running from renewable consumption to carbon emissions in the case of France and Spain, while in Sweden the renewables have a neutral effect on CO2 emissions; although, the results for the renewables equation suggest that CO2 emissions Granger-cause the renewable energy consumption. The results in carbon emissions equation show that the nuclear energy consumption significantly affects the emissions in the case of France and Sweden which have a high share of nuclear power in the electricity mix. The findings for Spain and Sweden indicate that the renewable energy consumption has an effect on nuclear energy consumption. It can be seen from the economic growth equation that in the case of France only the renewable energy consumption influences the economic growth. For the other two countries none of the variables have a significant impact on economic growth, implying that the neutrality between renewables and nuclear energy consumption, carbon emissions and economic growth is observed in the short run. However, the economic growth significantly affects carbon emissions and nuclear energy consumption in Spain. In turn, carbon emissions Granger-cause the nuclear energy consumption in Spain and renewable energy consumption in Sweden.

Table 1: Granger causality results of the Wald test for France, Spain and Sweden

Country dependent variable	Causes (short-run effects)			
	ΔCO2	ΔGDP	ΔNUC	ΔRES
France				
ΔCO2	–	7.37	**24.17*****	**15,37*****
ΔGDP	2.91	–	1.7	**18,01*****
ΔNUC	3.99	2.49	–	3,93
ΔRES	0.42	1.65	2.18	–
Spain				
ΔCO2	–	**11.7****	6.55	**12,99****
ΔGDP	1.92	–	3.21	1,94
ΔNUC	**12.95****	**10.19***	–	**17,11*****
ΔRES	2.61	2.08	3.78	–
Sweden				
ΔCO2	–	0.854	**8.71***	6,99
ΔGDP	4.52	–	5.19	5,46
ΔNUC	4.0	2.11	–	**21,21*****
ΔRES	**15.3*****	5.6	4.96	–

Note: ***, **, * stand for the significance at the 1%, 5% and 10% level respectively.

Forecast Error Variance Decomposition

In this study we focus on the forecast error variance of changes in CO2 and GDP (Table 2). Spain has the largest share of CO2 variation explained by changes in GDP, reaching about 38% after the 6th period. The other countries show lower values, ranging from 27% in France and 11% in Sweden after the 6th period (in line with Granger causality results indicating insignificant impact of GDP on CO2). The contribution of changes in nuclear and renewable (RES) energy consumption to the variation of CO2 is relatively small all countries except France where it reaches about 16% (nuclear) and 24% (RES) after the 6th period. Variations in GDP are explained the most by RES (33%) in France, while in other countries the contribution of RES and NUCLEAR to the explanation of GDP variations is rather small, i.e. 9% and 2% in Spain and 6% and 7% in Sweden respectively. The same occurs to the contribution of CO2 to variations in GDP.

Table 2: Forecast error variance decomposition results

Period	Variance decomposition of ΔCO2 (in %)				Variance decomposition of ΔGDP (in %)			
	France							
	ΔCO2	ΔGDP	**ΔNuclear**	**ΔRES**	ΔCO2	ΔGDP	ΔNuclear	**ΔRES**
1	66.2	22.6	2.2	9.0	0.0	100,0	0.0	0.0
2	58.0	27.0	7.0	8.1	4.9	88,8	0.6	5.7
3	49.9	36.6	6.0	7.5	4.0	69,4	0.6	26.0
4	35.4	26.7	12.9	25.0	3.5	61,1	1.9	33.5
5	33.4	27.0	15.7	23.9	3.5	60,9	2.3	33.2
6	33.1	27.1	15.6	24.1	3.9	60,9	2.3	32.9
7	32.6	26.4	16.1	24.9	4.3	60,5	2.4	32.8
8	32.5	26.1	16.3	25.1	4.5	59,7	3.3	32.4
9	32.4	26.0	16.4	25.2	4.5	59,4	3.9	32.2
10	32.4	26.0	16.4	25.2	4.5	59,1	4.2	32.2
Period	**Spain**							
	ΔCO2	**ΔGDP**	ΔNuclear	**ΔRES**	ΔCO2	ΔGDP	ΔNuclear	ΔRES
1	59.8	36.6	1.4	2.1	0.0	100.0	0.0	0.0
2	36.7	40.6	7.3	15.5	0.0	99.0	0.0	0.9
3	36.7	40.4	7.5	15.4	0.4	98.4	0.2	1.0
4	38.5	37.8	8.8	14.9	4.5	91.6	1.8	2.1
5	37.5	40.1	8.2	14.2	6.4	85.2	6.5	1.9
6	36.5	38.8	8.3	16.4	7.3	82.0	8.8	2.0
7	36.3	38.9	8.2	16.6	7.8	80.1	10.2	2.0
8	36.3	38.8	8.2	16.7	8.2	79.3	10.4	2.1
9	35.6	37.9	10.2	16.3	9.2	78.4	10.3	2.1
10	35.3	37.6	10.6	16.5	9.6	77.7	10.1	2.6
Period	**Sweden**							
	ΔCO2	ΔGDP	**ΔNuclear**	ΔRES	ΔCO2	ΔGDP	ΔNuclear	ΔRES
1	71.8	14.5	0.0	13.7	0.0	100,0	0.0	0.0
2	64.2	12.9	10.1	12.8	3.1	93.0	2.5	1.4
3	63.1	12.4	12.4	12.1	7.9	84.0	5.6	2.5
4	63.7	11.8	12.6	11.8	7.8	81.4	5.4	5.4
5	61.6	11.2	13.5	13.7	9.0	79.1	5.3	6.6
6	61.4	11.4	13.3	14.0	9.0	78.8	5.5	6.7
7	60.8	11.3	13.3	14.5	9.1	78.7	5.5	6.7
8	60.7	11.3	13.4	14.5	9.1	78.0	5.5	7.4
9	60.9	11.3	13.3	14.5	9.2	77.8	5.5	7.5
10	60.8	11.3	13.5	14.5	9.2	77.7	5.5	7.6

Impulse Response Functions

Figures 3-6 show the results of generalised impulse response functions of each variable to shocks in all variables in the system. We employ the generalized impulse response which is not sensitive to the ordering of variables in the VAR system (unlike the standard approach). Impulse responses show how a given variable responds to a shock in the other variable initially and whether the effect of the shock persists or dies quickly. We combine the interpretation of impulse responses with the results of Granger causality indicating the significant relationship between given variables.

It is clear from an examination of Fig. 3 that carbon emissions respond to changes in GDP only in case of Spain, i.e. shocks in GDP have positive and significant (Table about causality) initial impact on CO2 emissions which appears to die since the 3rd year after the shock. This increase of emissions due to growing economic growth indicates that the decoupling of economic growth from emissions is not observed in Spain so far. Whereas, results for Sweden and France show that carbon emissions respond also positively but insignificantly to one standard deviation innovation in GDP changes (see Table 1), and reversely, the effect of shocks in CO2 emissions on GDP shocks is also positive but again insignificant (Fig. 4, Table 1). This performance of impulse responses together with causality pattern may mean the lower sensitivity of carbon emissions to variations in GDP due to widespread use of low-carbon technologies (Lanne and Liski 2004). Then, these findings provide some evidence for decoupling of economic growth from carbon emissions in the case of Sweden and France. This also means that the conservation policy aimed at the reduction of carbon emissions will not hinder the economic growth in these countries.

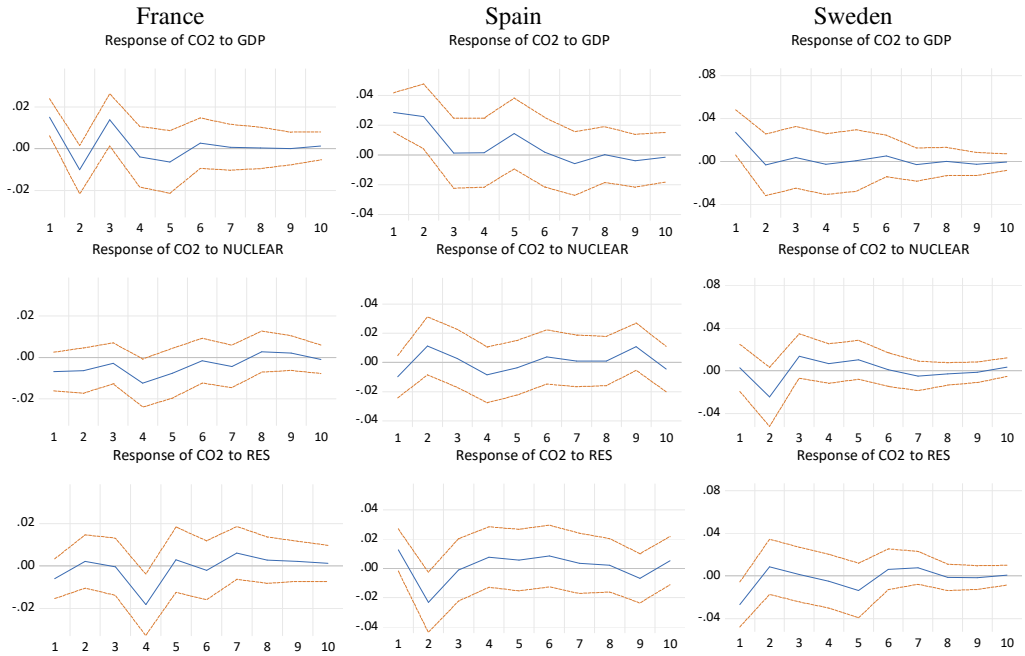

Fig. 3: Responses of carbon emissions to shocks in all variable in the system

Carbon emission responses to nuclear shocks in the case of France and Sweden (Fig. 5) are significantly negative and this initial impact of nuclear power shocks on emissions reduction lasts longer in the case of France than Sweden. This indicates that nuclear energy contributes significantly to the abatement of emissions and improvement of environmental quality in both countries. Our result that nuclear energy plays an important role in reducing CO2 emissions is similar to previous research by Iwata et al. 2010 for France and Menyah and Wolde-Rufael 2010 for the US.

Due to the shocks in RES the response of CO2 emissions in France is initially negative reaching its minimum in the 2nd year and then it is persisting several years before dying. While in the case of Spain the initial positive response of emissions to shocks in RES is observed, and then there is a dip in the second year dying quickly in the consecutive years. This means that renewable energy consumption does contribute to reduction of carbon emissions in all countries under study. Our result is in contrast to that obtained by Menyah and Wolde-Rufael (2010) and Apergis et al. (2010) who have not found a significant impact of renewable energy on CO2 emissions. However, it is possible that France and Spain have already reached the threshold pint where renewable energy starts to mitigate CO2 emissions.

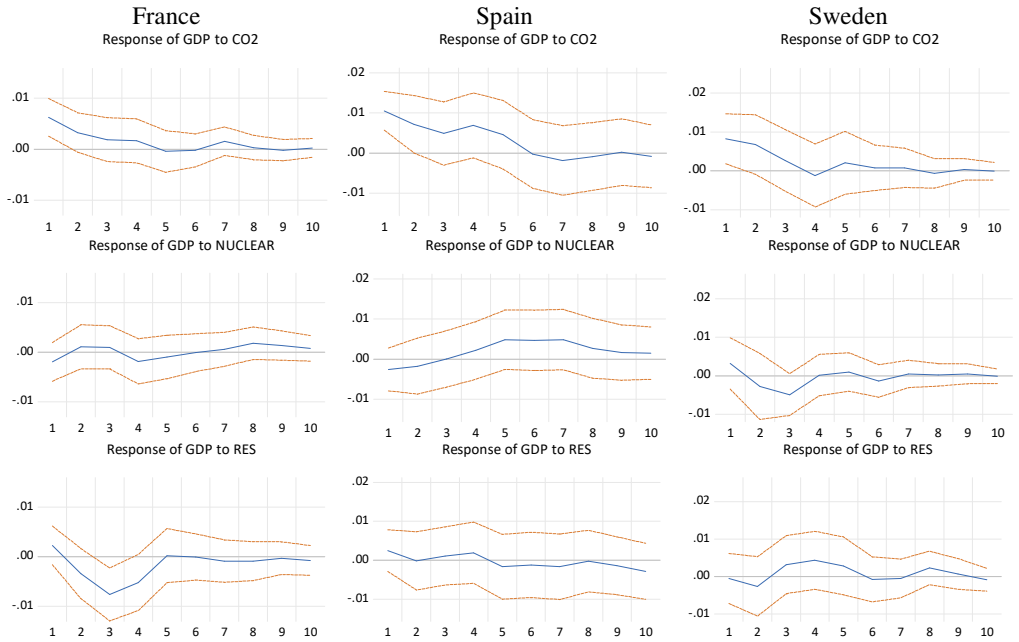

Fig. 4: Responses of GDP to shocks in carbon emissions, nuclear and renewable energy consumption

From an examination of Fig. 4 it is seen that GDP does not respond at all to changes in CO2 emissions, nuclear and renewable energy, except the case of France where shocks to RES have initially tiny positive and significant impact on changes in GDP, which switches to negative one since the second year and after reaching its minimum at the third year dies out slowly. This surprising decrease in GDP may be explained by additional generation costs imposed by RES. Another possible explanation is the vulnerability of renewable energy to positive oil prices shocks as renewable energy is considered as a substitute for oil; and it is believed that increased oil price will reduce economic growth (Sadorsky 2009; Lahiani *et al.* 2018).

To examine the possibility that renewable energy may squeeze out nuclear energy we consider the responses of nuclear energy consumption to shocks in RES (Fig. 5). These responses are significant in case of Spain and Sweden, however there are differences in their pattern. Namely, the shock in RES in Spain has an immediate negative impact on nuclear energy consumption which is persisting during several years after shock. This result may suggest that high level of renewables tends to squeeze out nuclear energy rather than fossil fuels (York and McGee 2017). This seems to occur in case of Spain where the rise in fossil fuel consumption has been observed, i.e. coal consumption recorded its highest surge at 28.5% in 2017, boosting CO2 emission by 6.9% (BP 2018). This is surprising that there are barely any improvements in the energy mix over the last 20 years (coal consumption which accounted for 38% in 2017 is the same as in 1998) despite long-lasting political efforts to promote the replacement of coal with cleaner fuels and lower CO2 emissions.

While the shock in RES in Sweden has a positive effect on nuclear energy which is slowly decreasing in consecutive years but still remains positive, unlike the case of Spain. This result is a confirmation of coherent energy policies focused on energy efficiency and 'green' energy sources which in turn helped drive decarbonisation.

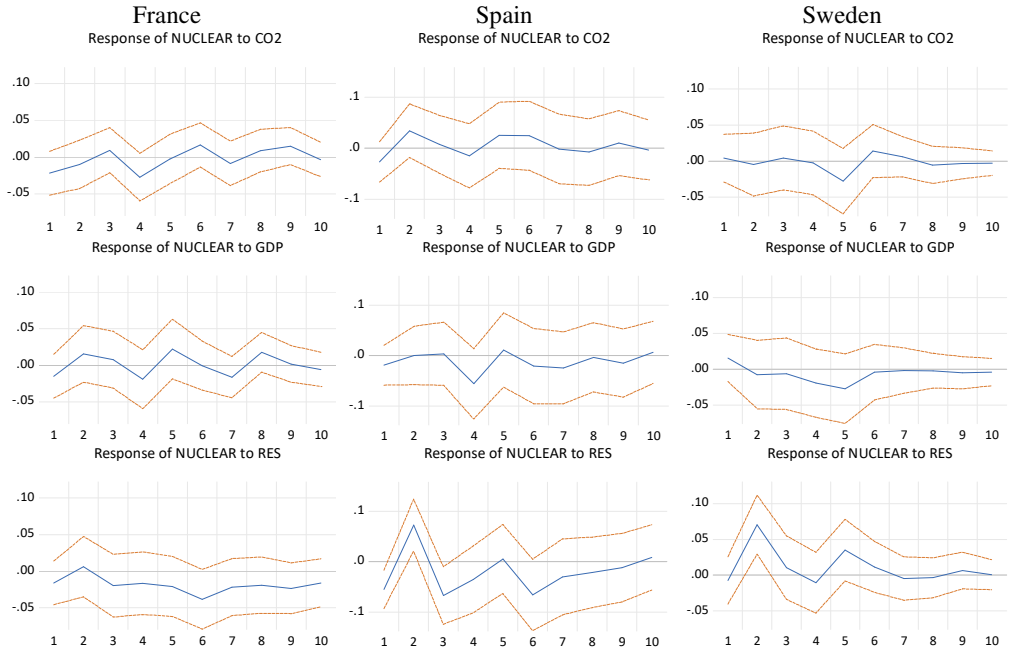

Fig. 5: Responses of NUCLEAR to shocks in carbon emissions, GDP and renewable energy consumption

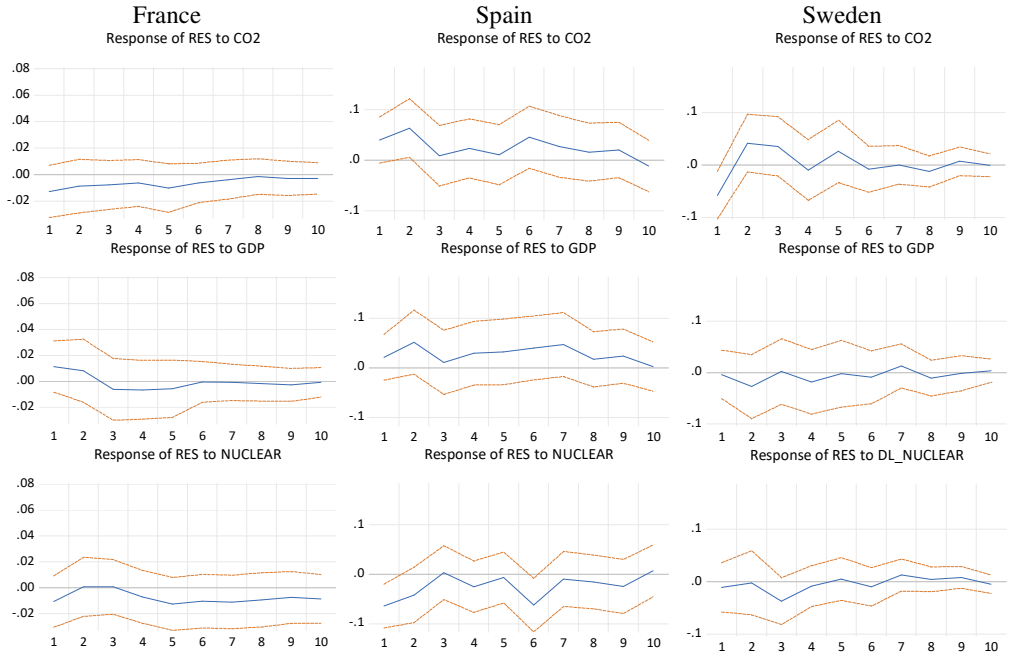

Fig. 6: Responses of RES to shocks in carbon emissions, GDP and NUCLEAR energy consumption

Conclusions

The growing concerns about climate change, reduction of emissions and energy security have brought the importance of both nuclear and renewable energy to the forefront of the energy usage debate. This paper explores the causal link between renewable and nuclear energy consumption, CO2 emissions and economic growth for three countries (France, Spain, Sweden) over the period 1970-2018 using the VAR approach.

The empirical evidence indicates that nuclear energy consumption (France, Sweden) and renewable energy consumption (France and Spain) significantly reduce CO2 emissions. The forecast error variance decomposition also shows the pronounced contribution of nuclear and renewable energy consumption in explaining variations in carbon emissions (it ranges from 8% to 16% for nuclear energy, and from 14% to 24% for renewable energy after the 6th period). These findings indicate that both nuclear and renewable energy plays an important role in reducing carbon emissions.

The finding of no causality between carbon emissions and GDP for France and Sweden suggests both that emissions are less sensitive to variations in GDP and conservation policy aimed at reducing emissions does not hinder economic growth. This can be interpreted as an evidence of decoupling economic growth from carbon emissions mainly due to widespread use of low-carbon technologies combined with effective energy transition policy which is well integrated with climate objectives. Therefore, France and Sweden can be thought to be on leading-edge trend because of their small CO2 emissions despite their relatively high economic growth. The results for Spain, in contrast to those for France and Sweden, do not provide evidence for decoupling of economic growth and CO2 emissions as the variations in GDP significantly contribute to the increase in emissions. Despite the significant impact of renewables on emission reduction, growing economic growth in Spain seems to offset the reduction in emissions due to the expansion of renewables. It also means that the potential reduction of carbon emissions will be at the cost of economic growth. Moreover, the negative impact of renewables on nuclear energy consumption suggests that the production of electricity from renewable sources is prone to suppress the production of nuclear power instead of fossil fuel use. This is surprising that despite long-lasting political efforts to promote green energy sources and lower carbon emissions, there are barely improvements in Spanish energy mix with regard to coal consumption (in 2017 it accounts for 38% as in 1998). Hence, to mitigate climate changes and reduce carbon emissions in Spain, the development of non-fossil energy sources should be more markedly completed with parallel changes to political-economic structures that affect fossil fuel use.

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Patenting Activities in The Context of Innovative Capacities of Public and Private Sectors in Poland

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Abstract

The paper analyses the origins of innovative capacities in various industries in Poland. The analyzed data covered years of 2006-2015, decomposed into patent applications filed by public and private sectors, as well as high and low technology industries. More patenting activities were registered in low technology industries, which also tend to be dominated by private sector applicants, while majority of high technology patents were granted to public sector organizations. Public sector applicants have higher patent success rates, while more applications originating in private sector tend to be rejected by patent examiners, and many patents granted to public sector owners expire because universities and research institutes refrain from paying the maintenance fees. This comparative analysis reveals diversified approaches to patenting and their respective effectiveness. It also supports the quest for relevant innovation indicators, highlighting the limitations of aggregate measures of patenting, commonly used to characterize innovation systems.

Keywords: Patents, High Technology, Innovation Indicators, Public Sector, Industry

Introduction

The paper investigates the origins of innovative capacities spread across various industries in Poland. For each industry, patenting activities were analyzed for years of 2006-2015. Counts of patent applications and granted patents were decomposed into subsets representing individual industries, as well as divided into patent documents filed by public and private entities. This enabled cross-sectoral comparisons, revealing diversified approaches to generating inventions, protecting them and collaborating in R&D in specific industries, public and private organizations.

Analyses of patents can offer interesting insights into practices of public and private sectors across multiple industries. The paper looks at this important dimension of sectoral innovation systems, contrasting the performance of industries in Poland, 2006-2015. Decomposition of patent applications and granted patents helps analyze the activities of public and private sectors, revealing their differentiated effectiveness and collaboration patterns. Patent analysis offers only limited insights into innovation systems, owing to its focus on inventive results that could be protected by patents, and disregarding diffusion of innovations or creative processes that are not patentable. Nevertheless, the study offers a systematic comparison of important aspects of the innovation system and management practices.

Literature Review

Knowledge gaps exist in relation to the differences in patenting of public and private sectors, and there is a notable lack of relevant studies for Poland. Acs et al. (2002) discussed the merits of using patent data as proxies for innovations, offering an overview of literature and a comparison between patent statistics and other indicators such as R&D expenditures and literature-based innovation measures (bibliometric indicators referring to scientific or technological publications).

The US universities became sources of commercialized inventions through regulations that facilitated the protection and transfer of academic inventions (Mowery et al., 2001; Grimaldi et al., 2011). Czarnicki et al. (2016) analyzed the role of scientific inventors commercializing academic patents through the establishment of spin-offs or start-ups. Geuna and Nesta (2006) analyzed university patenting in Western Europe, with mostly reputational uses of patents by universities. Scientific inventions at European universities are rarely licensed and when they are, licenses tend to generate revenues not covering the costs of their development and protection. In the past, many European universities refrained from patenting and allowed scientists to individually pursue protection (Lissoni, 2013: 380). The European public science displays heterogeneity of approaches to patent protection (Czarnitzki et al., 2009: 28). These challenges have not played a significant role in Poland, as even prior to the change of economic system of the 1990s, universities and research institutes retained the ownership of inventions and were actively patenting, albeit usually with limited commercial interests, using the patents as indicators of research excellence. Inventions generated by Polish scientists are owned by the employing scientific institution, which differs from some countries (Geuna, Rossi, 2011: 1069).

Patents are used either to protect inventions, or for other, "strategic" uses. Goktepe-Hulten and Mahagaonkar (2010: 401) indicated that scientists tend to patent for reasons other than financial benefits, focusing on reputational gains. Many patents in public sector serve as quality signals, building up the recognition and academic reputation of scientists (Goktepe-Hulten, Mahagaonkar, 2010: 407). For academic entrepreneurs, founders of start-ups or spin-offs, patenting remains relevant and instrumental for their success, and the filing of a patent application increases their willingness to initiate entrepreneurial activities (Goel, Goktepe-Hulten, 2013: 472). Patents signal the competence and managerial sophistication of start-ups (Lai, 2017: 826), so reputation is prioritized over commercial gains. Similarly, in a survey of patent holders at the European Patent Office, individuals (including founders of small companies) were found to use the signaling function of patents rather than expecting their inventions to be monetized (Veer, Jell, 2012: 514).

Patents have different uses depending on industry. Cohen et. al (2002) surveyed R&D managers to analyze R&D performance of companies in the US and Japan. Their results reveal differing propensity to patent, including cross-sectoral diversity in the uses of patents, which might either be transformed into marketable products, or maintained for strategic reasons, e.g. to block competitors from entering into a specific field, demonstrate technological strengths, support negotiations or prevent infringement suits (Cohen et al., 2002: 1358).

For private sector, including individual inventors and newly established companies, patenting costs can become prohibitive (Goel, Goktepe-Hulten, 2013: 474), resulting in decisions to cease patent protection. Inventions protected by individuals tend to be less valuable than outcomes of corporate R&D (Laplume et al., 2015: 40). Individual patent owners play important roles in Poland, in a manner different from many other countries. For example, majority of South-Korean patents are held by organizations, while in Taiwan, far bigger share of patents were filed by individuals (Wang, Tsai, 2010: 1413), and in the US, individual applicants retain visible roles (Agiakloglou et al., 2016: 147).

Cross-sectoral cooperation in patenting, involving joint patent applications filed by representatives of public and private sectors, is still relatively rare. The suggestion to look into linkages between public and private R&D was formulated by Narin et al. (1997). Joint patenting, licensing or transfer of patented inventions remain only some of possible collaborative mechanisms, and not the most widely used ones (Perkmann, Walsh, 2007: 262-263). Interactions between scientists and companies take multiple forms, with many approaches not formally registered or not relying on transfer of patents (Boardman, Ponomariov, 2009: 142). Comparable results are also provided by the analysis of US industrial patents held by multiple co-owners (Mahnken, Moehrle, 2018).

Following the literature review, the following research gaps were identified, and will be filled in by the present study:

- differences between patenting of public and private sectors, depending on the specific industry and high or low technology,
- cooperation patterns that result in joint patenting, including multiple co-owners of an application, and cross-sectoral applications filed together by public and private sectors,
- differences in the rates of success (patent grant), failure (rejection of patent application) and discarding the already awarded patents (no payment of maintenance fees), which indicate differing approaches to patenting, varying degrees of professionalism and commitments to pursue patented results as commercially relevant.

These research gaps lead to the formulation of the research theme, which consists in the analysis of the origins of innovative capacities in sectoral innovation systems in Poland, decomposed into activities of applicants representing public and private sectors, and patent applications belonging to various specific industries/fields of technology.

Research Methods

The research presents quantitative analysis of patent applications, using bibliometric techniques (Porter and Cunningham, 2005). The dataset was downloaded in 2018 from the database of the Polish Patent Office. The queries identified all priority applications matching the selected patent sub-classes filed between 2006 and 2015. The document subset consisted both of applications with granted patents, as well as applications that have received negative decisions or were still awaiting a grant. Based on the adopted methodology and selected data sources, the research maps technological activities from a period of tremendous changes in Poland's innovation system due to the increased availability of public funding for R&D, and accompanied by proportional increases in the levels of private R&D expenditures.

Patent applications were identified from the International Patent Classification (IPC), corresponding to the specific types of technologies or industrial activities from NACE classification of industries and services, as proposed by van Looy et al. (2014) (Table 1).

Table 1: The concordance table between NACE and IPC classes used to match specific industries to subsets of patent documents. Source: van Looy et al. (2014)

NACE class	Industry	IPC classes
10	Manufacture of food products	A01H, A01J, A21D , A23B, A23C, A23D, A23F, A23G, A23J, A23K, A23L 1/*, A23L 3/*, A23P, C12J, C13B, C13F, C13J, C13K
11	Manufacture of beverages	A23L 2/*, C12C, C12F, C12G, C12H
12	Manufacture of tobacco products	A24B, A24D, A24F
13	Manufacture of textiles	D04D, D04G, D04H, D06C, D06J, D06M, D06P, D06Q, D06N
14	Manufacture of wearing apparel	A41B, A41C, A41D, A41F
15	Manufacture of leather and related products	A43B, A43C, B68B, B68C
16	Manufacture of wood and of products of wood and cork, except furniture; Manufacture of articles of straw and plaiting materials	B27D, B27H, B27M, B27N
17	Manufacture of paper and paper products	B42F, D21C, D21H, D21J
18	Printing and reproduction of recorded media	B41M, B42D, B44F

NACE class	Industry	IPC classes
19	Manufacture of coke and refined petroleum products	C10G, C10L
20.2	Manufacture of pesticides and other agrochemical products	A01N, A01P
20.3	Manufacture of paints, varnishes and similar coatings, printing ink and mastics	B27K, C09D
20.4	Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	A61K 8/*, A61Q, C09F, C11D, D06L
21	Manufacture of basic pharmaceuticals products and pharmaceutical preparations	A61K (except A61K 8/*), A61P, C07D, C07H, C07J, C07K, C12N, C12P, C12Q
22	Manufacture of rubber and plastic products	B29B, B29C, B29D, B60C, B67D, C08C
23.3	Manufacture of clay building materials	B28B, B28C
23.4	Manufacture of other porcelain and ceramic products	E03D
23.5	Manufacture of cement, lime and plaster	C04B
25.7	Manufacture of cutlery, tools and general hardware	E05B, E05D, E05F, E06B
27.1	Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus	H02B, H02J, H02K, H02N, H02P
27.2	Manufacture of batteries and accumulators	H01M
27.3	Manufacture of wiring and wiring devices	H01B, H01H, H01R, H02G
27.5	Manufacture of domestic appliances	A21B, A45D, A47G, A47J, A47L, B01B, D06F, E06C, F24B, F24C, F24D, F25C, F25D, H05B
28.3	Manufacture of agricultural and forestry machinery	A01B, A01C, A01D, A01F, A01G, A01K, A01M, B27L
29	Manufacture of motor vehicles, trailers and semi-trailers	B60B, B60D, B60G, B60H, B60J, B60K, B60L, B60N, B60P, B60Q, B60R, B60T, B60W, B62D, F01L, F02B, F02D, F02F, F02M, F02N, F02P, F16J, G01P
30.1	Building of ships and boats	B63
30.2	Manufacture of railway locomotives and rolling stock	B61
30.3	Manufacture of air and spacecraft and related machinery class	B54
31	Manufacture of furniture	A47B, A47C, A47D, A47F
32.4	Manufacture of games and toys	A63
32.5	Manufacture of medical and dental instruments and supplies	A61B, A61C, A61D, A61F, A61G, A61H, A61J, A61L, A61M, A62B, B01L, B04B,

NACE class	Industry	IPC classes
		C12M (not A61K except A61K 8/*), G01T, G21G
42	Civil engineering	E02B, E03B, E03C
43	Specialised construction activities	E03F, E04B, E04C, E04D, E04F, E04G, E04H

The data were divided into submitted by public sector entities (public universities and research institutes, public hospitals and governmental agencies) and private sector applicants (companies and individuals). Applications submitted by two or more applicants, representing both sectors, were assigned to two sector at the same time (shares of applications filed by public and private entities may add up to more than 100%).

The delineation of documents was based on applications not granted patents, owing to limited certainty of receiving the patent rights, time lags between submission and award, and limited opportunities to track actual R&D merely on the basis of granted patents. The results may thus include applications that were negatively evaluated by patent examiners, and were not innovative, lacked inventive steps, referred to known or prematurely disclosed solutions, or described ideas that could not be subject to patent protection.

Research Hypotheses

The study will verify 8 research hypotheses, related to the origins of innovative capacities revealed by patent applications filed by representatives of public and private sectors in Poland.

H1. More patent applications are filed in high technology or medium-high technology sectors than low or medium-low technology sectors of the Polish economy.

Various industries differ in their patenting propensities. Proportionally more patent applications can be expected in high technology or medium-high technology sectors than in more traditional, low technology or medium-low technology industries, which had limited experiences in using the intellectual property protection. The distinction between levels of technology is possible thanks to a standardized classification. Eurostat (2016) divided industries into:

- high and medium-high technology: NACE 20, 21, 26, 27, 28, 29 and 30
- low and medium-low technology: NACE 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24, 25, 31, 32 and 33

For the present study, 14 sub-groups of patents were considered to represent high technology or medium-high technology (including also NACE 32.5, medical technologies), while the remaining patents were considered to be low technology or low-medium technology.

H2. High and medium-high technology patent applications in Poland are dominated by public sector organizations, while low and medium-low technology patents are primarily filed by private sector applicants.

The scale of patenting activities of public and private organizations might be notably different depending on the type of technologies or NACE classes. Public sector entities are hypothesized to excel in patenting of inventions in the fields that are scientifically advanced and linked to the high-technology. Private sector organizations and individual inventors-owners might be more active in low-tech NACE classes, which in turn do not correspond to research interests of scientists working for universities or public research institutes.

H3. High and medium-high technology patents in Poland are granted primarily by public sector organizations, while low and medium-low technology patents are granted mostly to private sector applicants.

In a manner similar to the analysis of patent applications, counts of granted patents can be divided into grants awarded to public and private sector representatives. Shares of granted patents awarded to public and private entities reveal the differing activities of actors in each sectoral innovation system, with some NACE classes dominated by either public or private actors. Similarly to patent applications, it could be hypothesized that public sector tends to concentrate its patenting activities in high-technology NACE classes, while private sector leads the patent grants in other types of technologies.

H4. High and medium-high technology sectors in Poland are characterized by higher propensity to interorganizational cooperation that results in joint patenting when compared with low and medium-low technology sectors.

Innovation processes are increasingly collective, involving multiple collaborations in accordance with the open innovation model. Polish organizations have been catching up with the trends, but many R&D and innovation still remain restricted to inhouse activities. This can be measured by shares of patent applications submitted by more than one applicant. High and medium-high technology industries are expected to be more active in inter-organizational collaboration.

H5. High and medium-high technology sectors in Poland are characterized by higher propensity to science-industry cooperation that results in patenting applications submitted jointly by representatives of public and private sectors when compared with low and medium-low technology sectors.

Cross-sectoral ownership of patent applications between public and private sector corresponds to results of science-industry R&D projects, carried out as partnerships of equals rather than contract R&D. Occurrence of such joint patenting might be limited, because transfer of intellectual property to the commissioning party is more popular for science-industry cooperation.

H6. Success rates of patent applications filed by public sector organizations are higher than for applications submitted by private sector applicants.

Success rates can be interpreted as shares of applications that lead to a grant. Comparison of success rates reveals cross-sectoral differences related to abilities to screen for viable inventions, prepare patent applications and deal with patenting procedures. Some public sector applicants might not have sufficient experience in patenting, and file imperfect applications. Even within the same university, applications from one field might have rates significantly lower than other fields due to diversified skills of attorneys and research teams.

In private sector, individual inventors often draft applications by themselves, disregarding procedural requirements or not following the common standards. Less experienced companies might also make mistakes that restrict patenting probability (e.g. premature invention disclosure).

H7. Failure rates of patent applications filed by public sector organizations are lower than for applications submitted by private sector applicants.

Failure rates indicate shares of applications with negative decisions. Patenting failures may result from characteristics of technologies (e.g. lack of novelty; solutions not protected in the Polish system such as software). Other reasons relate to procedural mistakes (e.g. premature disclosure; inadequate contents; failure to respond to patent examiners requests). Failure rates are expected to reveal diversity among NACE classes and between the public and private sector. Public organizations are hypothesized

to be more professional in patenting, when compared with private entities that also include individual inventors.

H8. Shares of patents that are no longer maintained by their owners and loose exclusive protection due to unpaid patent maintenance fees are higher for patents owned by public sector organizations than by private sector applicants.

Counts of applications or grants illustrate the scale of R&D activities in industrial sectors, but might not be viable indicators of commercial outputs. Some NACE classes appear dominated by patenting of public sector, with limited interests of private applicants. This leads to misleading conclusions about their innovativeness. Applications filed by scientific institutions might be indicators of excellence of research, but not necessarily filed to introduce new products, or to transfer the technologies to companies that would commercialize them.

This could be analyzed by patterns of patent maintenance. After a patent is awarded, its owner is obliged to pay maintenance fees in order to retain exclusive rights to the invention. Some owners stop paying the maintenance fees and their invention loses the patent protection.

This might be linked to multiple scenarios:

- use of patents as signals of research quality not commercial instruments,
- patent is no longer commercially attractive (failed attempts to transfer the technology),
- lack of funding to pay maintenance fees,
- mistakes of patent owners.

Patent application fees are low in Poland, amounting to ~120€ for short applications, but the costs of maintenance fees need to be paid. "No maintenance rates" were calculated by comparing counts of granted patents discarded by owners with the counts of granted patents. They did not include applications still under examination. Public organizations are hypothesized to discard more patents than private owners, who tend to apply for protection of inventions considered commercially important.

Research Results

The analysis of patent data enabled stepwise verification of the eight research hypotheses, which are discussed in this section of the paper.

High and medium-high technology industries yielded more applications (10,538) than low and medium-low technology industries (7,051), thus confirming **H1**, see: Table 2.

Table 2: Patent applications submitted by applicants representing public and private sector in Poland. Source: own elaboration, based on data from the database of the Polish Patent Office.

NACE class	Applications (all)	Applications (public)	Applications (private)
Low and medium-low technology			
10	894	395	531
11	169	66	106
12	139	4	135
13	220	104	130
14	137	40	101
15	33	6	27
16	112	17	99

NACE class	Applications (all)	Applications (public)	Applications (private)
17	84	24	65
18	110	4	106
19	476	167	340
22	733	246	492
23.3	134	21	114
23.4	40	2	38
23.5	530	272	285
25.7	689	16	674
31	418	28	393
32.4	329	64	266
42	253	81	179
43	1,551	196	1,369
Total	**7,051**	**1,753**	**5,450**
High and medium-high technology			
20.02	385	123	271
20.03	208	99	119
20.04	330	156	176
21	2,747	2,146	675
27.1	666	332	343
27.2	162	122	48
27.3	467	160	316
27.5	916	123	801
28.3	700	252	458
29	1,473	543	947
30.1	233	57	178
30.2	289	111	188
30.3	166	68	103
32.5	1,796	860	1,000
Total	**10,538**	**5,152**	**5,623**

H2 was not supported by empirical data (Table 2). For high and medium-high technology, 53.4% of applications were filed by private applicants, and 48.9% by public sector. The only distinctive differences concern NACE classes: 21 (pharmaceuticals), with 78.1% applications filed by public sector, and 27.2 (batteries and accumulators; 75.3% from public sector).

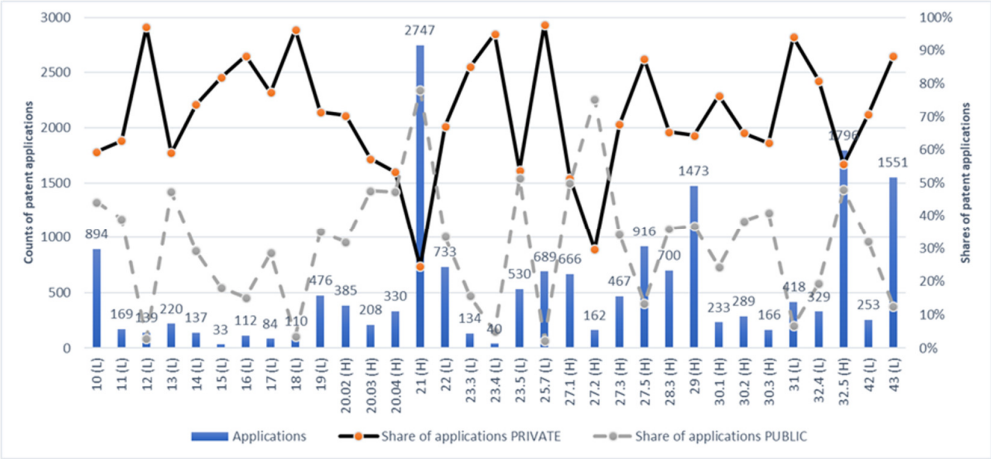

Fig. 1: Shares of patent applications filed by representatives of public and private sectors in specific industries. (L) indicates low and medium-low technology sectors, (H): high and medium-high technology sectors. Source: own elaboration, based on data from the database of the Polish Patent Office.

In low and medium-low technology industries, private sector dominated (77.3% of applications) over the public sector (24.9%). In some of the NACE classes, public entities were hardly active (12, 18, 23.4, 25.7, 31), see: Figure 1. Private sector accounts for majority of patenting in low and medium-low technology, while in high and medium-high technology, the situation is more diversified, with some fields dominated by public entities while others displaying also strong activities of private sector.

Results of analyses confirm **H3**, as illustrated by Figure 2. For high and medium-high technology, 63.4% of granted patents are owned by public sector, while only 38.9% by private sector; for low and medium-low technology, the distribution of granted patents is reversed, as 68.8% of patents belong to private owners and 34.1% to public entities.

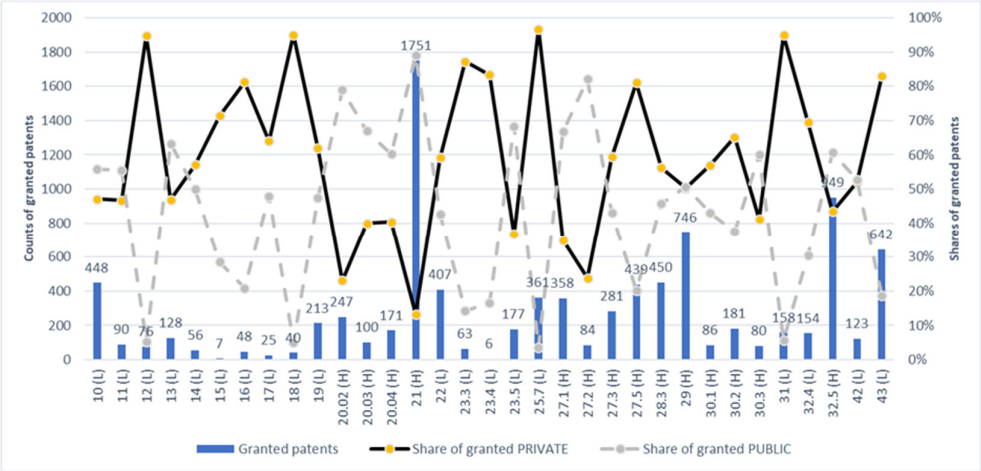

Fig. 2: Shares of granted patent owned by representatives of public and private sectors in specific industries. (L) indicates low and medium-low technology sectors, (H): high and medium-high technology sectors. Source: own elaboration, based on data from the database of the Polish Patent Office.

Shares of patent applications filed jointly by two or more applicants were not distinctively different for high/medium-high technology (11.5%) and low/medium-low technology (12.1%), so **H4** was not confirmed (see: Table 3).

Table 3: Shares of patent applications filed by more than 1 owner and filed jointly by representatives of public and private sectors. Source: own elaboration, based on data from the database of the Polish Patent Office.

NACE class	Shares of applications with more than 1 owner	Shares of applications jointly filed by public and private applicants
Low and medium-low technology		
10	15.0%	3.8%
11	8.3%	1.8%
12	0.0%	0.0%
13	22.3%	6.4%
14	19.7%	2.9%
15	18.2%	0.0%
16	9.8%	3.6%
17	16.7%	6.0%
18	5.5%	0.0%
19	22.3%	6.5%
22	10.2%	1.9%
23.3	11.2%	0.7%
23.4	5.0%	0.0%
23.5	12.5%	5.1%
25.7	9.0%	0.1%
31	8.9%	1.0%
32.4	9.4%	0.3%
42	12.6%	2.8%
43	10.6%	0.9%
Total (high and medium-high technology)	**12.1%**	**2.3%**
High and medium-high technology		
20.02	11.9%	2.3%
20.03	15.9%	4.8%
20.04	10.9%	0.6%
21	14.1%	2.8%
27.1	8.9%	1.4%
27.2	11.7%	4.9%
27.3	8.6%	1.9%
27.5	12.1%	0.9%
28.3	9.0%	1.4%
29	6.2%	1.2%
30.1	11.6%	0.9%
30.2	9.0%	3.5%
30.3	9.0%	3.0%
32.5	14.2%	3.6%
Total (high and medium-high technology)	**11.5%**	**2.3%**

H5 was not supported, as illustrated by Table 3. Both for high/medium-high technology and low/medium-low technology, shares of applications filed jointly by science and industry (public-private co-ownership) were approximately equal, amounting to 2.3% of all applications, so no distinctive difference was observed.

H6 was supported for most of the analyzed industries (see: Figure 3). Private sector outperformed public sector only in NACE sub-classes 20.02, 23.3 and 31. This means that public sector organizations are more likely to submit patent applications that would lead to successful grant.

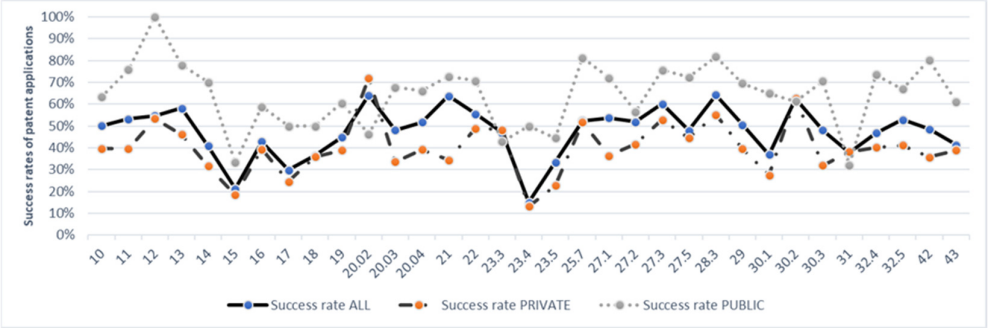

Fig. 3: Success rates of patent applications filed by representatives of public and private sectors in specific industries. Source: own elaboration, based on data from the database of the Polish Patent Office.

H7 was supported for the majority of industries, as illustrated by Figure 4. Private sector applicants have lower failure rates than public sector only in three NACE classes (15, 18 and 30.2). For other industries, private applicants perform worse than public organizations and have more applications rejected.

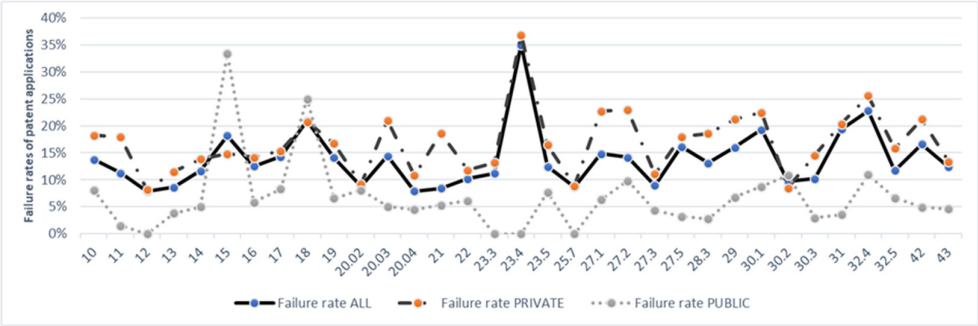

Fig. 4: Failure rates of patent applications filed by representatives of public and private sectors in specific industries. Source: own elaboration, based on data from the database of the Polish Patent Office.

H8 was confirmed for majority of the industries, albeit the tendency is not uniform across all fields (Figure 5). Private owners are less willing to pay maintenance fees in classes: 12, 15, 16, 17, 23.3, 23.4, 25.7 and 30.2. Public organizations cease the maintenance more often in classes: 10, 11, 13, 19, 20.2, 20.3, 20.4, 21, 22, 23.5, 27.1, 27.2, 27.3, 27.5, 28.3, 29, 30.1, 30.3, 31, 32.4, 42 and 43, i.e. majority of the industries. NACE classes where public owners frequently discontinue financing of patents include high and medium-high technology industries.

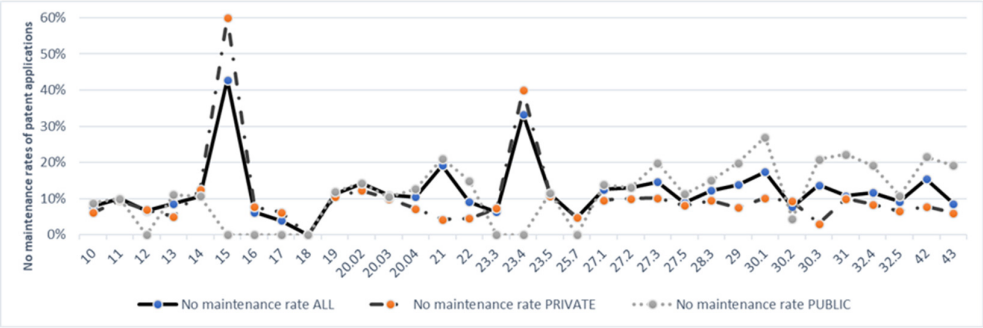

Fig. 5: No maintenance rates of patent applications filed by representatives of public and private sectors in specific industries. Source: own elaboration, based on data from the database of the Polish Patent Office.

Conclusions

The paper presented results of a patent analysis in Poland, looking into applications filed by public and private sectors, from various industrial sectors.

More patent applications were filed in high/medium-high technologies than in low/medium-low technologies (H1). Low technology industries were dominated by applicants from private sector, while the situation in high technology industries was more nuanced, with dominance of public sector only in pharmaceuticals and batteries & accumulators (H2). The analysis of granted patents revealed a dichotomy between low technology dominated by the private sector and high technology, where the majority of patents was granted to public sector (H3). No distinctive differences were identified in joint patent applications when comparing public and private sector or various industries (H4, H5). Outcomes of patenting were different depending on the sector of applicants: the public sector was characterized by higher success rates (H6), and the private sector has more applications rejected by examiners (H7). Shares of patents that are not maintained by their owners were higher in the public sector than among private owners (H8).

The analysis offers interesting insights for management science. It reveals the institutional diversity of organizations pursuing R&D activities, with heterogeneous approaches and differing outcomes. Aggregate measures of patenting, used to compare innovation systems, might be misleading as they include patent applications filed both by public and private sectors, and only some of them are subsequently commercialized. Researchers might benefit from more granular indicators, as demonstrated by the present paper. For management practitioners, the research can also offer useful information about tendencies in various sectors and industries, facilitating search for potential collaboration partners, and providing inputs into the valuation of intellectual property in technology transfer transactions. Future research directions include further decomposition of the dataset of Polish patent applications, analyzing individual sectors, technologies and regional applicants. Comparable research approach could also be adopted for patent data from other countries, with a view to analyze activities of private and public sector organizations.

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«The Pearl of Siberia» - Lake Baikal: Environmental Problems and The System for Solving Them

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Abstract

This paper presents the main characteristics of Lake Baikal, which is a UNESCO World Heritage Site. Various environmental problems that harm the lake are considered. Forest cover problems due to "black loggers" and fires caused by natural or human causes. Problems with the fauna of the lake due to poachers hunting mainly for omul and grayling. Pollution problems due to the improper cleaning system of nearby enterprises, the lack of special boxes accepting garbage from other vessels, as well as the activity of tourists near the lake. The discussion includes measures taken by the state to protect the lake and the surrounding territories, as well as social actions related to protection. Further, a system for the protection and restoration of Lake Baikal with specific steps and a sequence of problem solving was developed and presented.

Keywords: Lake Baikal, protection, loess massifs, the fauna, pollution, world heritage.

Introduction

Currently, Lake Baikal is a UNESCO World Heritage Site, and in Russia it is the only geographical object that has protection in the form of the federal law. The UNESCO World Heritage Committee on December 7, 1996 at the XII session in Merido (Mexico) included Lake Baikal on UNESCO's World Heritage List under No. 754 for all four criteria of the UNESCO Convention on the Protection of the world Cultural and Natural Heritage (1972). Lake Baikal is unique. It is the deepest lake in the world. The bottom of Lake Baikal is 1167 meters below the level of the World Ocean, and the mirror of its waters is 453 meters higher. The lake stretched from northeast to southwest for 620 km. The width of Lake Baikal ranges from 24 to 79 km. Among the largest lakes in the world, Baikal takes the sixth place in terms of the area of the water mirror (31,722 km2 excluding islands). The coastline is 2100 km long. Baikal has the largest fresh water supply - 23,615.39 km3 (about 19% of the world's reserves of lake fresh water), it has more water than all five Great Lakes of North America taken together (https://spravochnick.ru/geografiya/geografiya_baykala/, Geography of Baikal).

1. In its turn, there is The Federal Law "On the Protection of Lake Baikal", which was accepted special for protection this «pearl of Siberia». Moreover, not just the lake Baikal, but the territory around too. So, turning to the law: «Baikal Natural Territory - a territory that includes Lake Baikal, a water protection zone adjacent to Lake Baikal, its catchment area within the territory of the Russian

Federation, specially protected natural territories adjacent to Lake Baikal, as well as an area up to 200 wide adjacent to Lake Baikal kilometers west and northwest of it.» (http://base.garant.ru/2157025/, Federal Law of May 1, 1999).

Also the Federal Law identifies three ecological zones - the central, buffer and atmospheric zones. As a result of special work, their borders are defined, justified and proposed for approval by entities operating in these territories. (Figure 1)

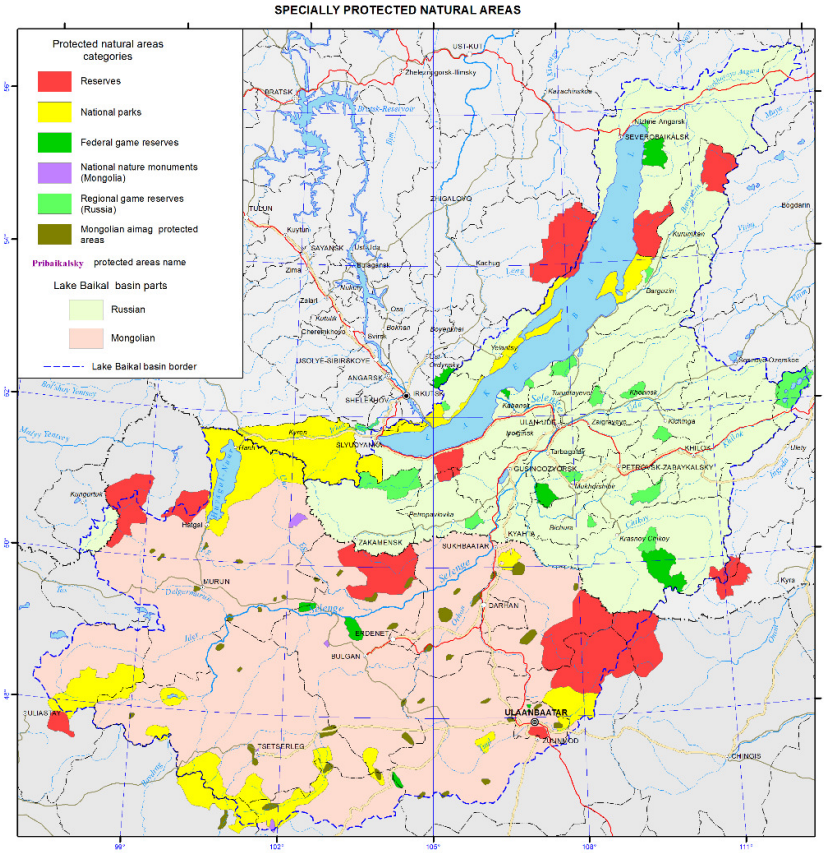

Fig. 1 : Specially protected natural areas around Lake Baikal in Russia and Mongolia, (http://bic.iwlearn.org/en/atlas/atlas/124-specially-protected-natural-areas-map/specially-protected-natural-areas-map, Specially Protected Natural Areas Map).

The preservation of such a unique object of world significance and the largest fresh water resource for present and future generations is an important task of the Russian Federation and the whole World.

The Forests

1. One of the threats to the safety of Lake Baikal is a reduction of loess massifs. The primary reason is the deforestation, as well as the destruction and damage of forests. Deforestation occurs in the Irkutsk region and the Republic of Buryatia, including in the catchment area of the lake. Most actively this occurs north of the Selenga River. Even though all types of deforestation, except for sanitary felling, are prohibited in the catchment area, satellite imagery and the testimonies of local people show that there are still protected forest areas that were cut down. “Black lumberjacks,” as they are commonly called, most often sell mined wood abroad, thereby enriching themselves and contributing to the destruction of the ecosystem of the sacred lake, (https://novayagazeta.ru/articles/2018/02/18/75550-topor-lesnoy-voyny, Forest War Ax).

Another problem is forest fires most often occur due to human faults. This may be due to careless handling of fire, non-compliance with the standards of forestry organizations working in the forest, or intentional burning of forests. The latter is most often resorted to by the already mentioned "black lumberjacks" in order to hide traces of their activities.

The Fauna

What is a lake without its inhabitants? The fauna is an integral part of the Baikal ecosystem, and the reduction in the number of one species affects the populations of other species and the environment.

An example is the extermination of the great cormorant in Soviet Union. It was believed that the cormorant eats a significant number of commercial fish - omul. However, after the cormorant practically disappeared, the omul population began to decline even faster. This is because cormorant excrement that has fallen into the water becomes food for epishura (Baikal plankton), which is also food for omul. Thus, the disappearance of one of the links in this chain resulted in a serious decrease in the abundance of two other species.

1. Currently, all three species are out of danger. However, poaching leads to serious fluctuations in the numbers of many animal species, primarily commercial fish. The scale of illegal catch is such that every year the number of detained violators is within ten thousand people! According to experts, the catch on the quota and outside it can be comparable in volume, (https://1baikal.ru/ekologiya/ekologicheskie-problemyi-bajkala-ne-spirogiroj-edinoj, Environmental problems of Baikal: not a spirigual one)

The main goals of poachers are Baikal omul and grayling. One can only guess about the real reserves of the latter in the lake, about how much of it is caught. However, the fact is that in almost any coastal settlement they are engaged in its fishing very intensively. In 2005, alarming information came from the Baikal Reserve. His workers said that the entire coast near the village of Tankhoi was laden with nets and grayling had practically disappeared.

Pollution

The main sources of pollution of the lake basin are industrial and household waste from such large settlements as Irkutsk, Ulan-Ude, Severobaykalsk, Baikalsk, Slyudyanka, where the treatment facilities are either outdated and cannot cope with the increased load or are absent. The Irkutsk region and Buryatia, especially their centers Irkutsk and Ulan-Ude, are one of the most environmentally hazardous territories in Russia. In the environmental rating for the summer of 2019, in which the indicators of the state of air, water, discharges, emissions, as well as the responsibility of the authorities, the activity of public environmental organizations and others were analyzed in 85 regions, the Republic of Buryatia took the 75th and the Irkutsk region – the last (Trifonov, I et al. 2019), (https://tass.ru/obschestvo/6962500, Ecological rating of subjects of the Russian Federation). Industrial and household waste, petroleum products, phosphates, pesticides and other substances enter the lake mainly through its largest tributary, the river Selenga.

2. Another problem causing pollution is shipping on the lake. Now there is only one ecological vessel operating on lake Baikal, on which the owners of other vessels can take waste. It is non-self-propelled and is far removed from the northern regions of the lake. During navigation, about 700-800 tons of oily waste and wastewater are delivered to it, and a significant part of the existing fleet on Lake Baikal dumps them into the lake. According to experts, annually from 160 to 400 tons of oil products and wastewater gets into Baikal (https://irkobl.ru/sites/tour/law/%D0%9E%D1%82%D1%87%D0%B5%D1%82%20%D0%BD%D0%B0%20%D1%81%D0%B0%D0%B9%D1%82%20%D0%B7%D0%B0%202018%20%D0%B8%D1%81%D0%BF%D1%80%2004.03.2019.pdf, Report tourism agencies of the Irkutsk region about

the work done in 2018).

1. In recent years, the anthropogenic load on the lake coast has increased significantly due to the active development of tourism. Baikal is a popular destination among tourists visiting the Irkutsk region, 90% of them go to the lake. In 2018, the region was visited by almost 1.7 million guests. According to the regional agency for tourism, annually the tourist flow increases by 3-4% (http://pravo.gov.ru/proxy/ips/?docbody=&nd=102158919, Protection of Lake Baikal and socio-economic development of Baikal natural territory for 2012-2020). Winter holidays on Baikal are becoming popular, people from all over the world go to see the transparent ice of the lake, known as the deepest on the planet and as the cleanest in Russia. However, the cleanliness of Lake Baikal and its shores has recently raised more doubts, especially due to the large amount of garbage. From the mass tourist pilgrimage and especially from the "wild" tourism, the environment is polluted.

Having examined Table 1, one can note the steady growth of tourists visiting the Irkutsk region. Moreover, the share of foreign citizens visiting this region is increasing, which should be noted. In contrast to the increase in the percentage of visitors, the increase in foreign citizens shows excellent results.

Table 1: Analysis of the volume of tourist flow in Irkutsk region

Name of indicator	**2016**	**Dynamics 2016/2015 (+/-),%**	**2017**	**Dynamics 2017/2016 (+/-),%**	**2018**	**Dynamics 2018/2017 (+/-),%**
The volume of tourist flow in Irkutsk region (thousand people), including:	1525,8	+8,1	1597,8	+4,7	1655,8	+3,6
The number of foreign tourists	156,8	+21,7	211,0	+34,6	295,3	+40,0

It is necessary to say separately for 2019: According to estimated data for 9 months of 2019, the total number of tourist arrivals increased by 5.2% compared to the same period last year and amounted to 1278.0 thousand people (http://pravo.gov.ru/proxy/ips/?docbody=&nd=102158919, Protection of Lake Baikal and socio-economic development of Baikal natural territory for 2012-2020).

It is just some of the main problems, connected with ecological situation on Lake Baikal. The unique nature of Lake Baikal is not sufficiently studied to responsibly declare what exactly can cause it the greatest damage. But there are basic, accurately established sources of such problems.

Results and Discussion

Earlier, there were already described the main ecological problems in this paper. But what did the society and government do to safe Lake Baikal? At the government level, the basic achievements, on our opinion, in the field of protection Lake Baikal are:

- adoption of the Law “On Lake Baikal” in 1999;
- suspension of the operation of the Baikal Pulp and Paper Mill;
- reduction in the number of toxic substances discharged into the Selenga River;
- tracking and full support of the activity of parks and reserves located on the territory of the lake.

Lake Baikal is the only natural object, that has a federal law on its protection in the Russian Federation: No. 94-ФЗ On the Protection of Lake Baikal (http://base.garant.ru/2157025/, Federal Law of May 1, 1999). In addition, the law establishes the zoning of the Baikal natural territory, the borders of the

Baikal natural territory, the basic principles of protecting Lake Baikal, and special modes of life in the zone of the Baikal natural territory, the order and forms of state regulation in the field of protection of Lake Baikal. In particular, the elements of state regulation of protection of Lake Baikal in accordance with the law provide for the existence of a specially authorized body for the protection of Lake Baikal, the implementation of state environmental control and monitoring in the field of protection of Lake Baikal. The law is special, and, in this regard, it occupies a special place in the hierarchy of other federal laws regulating relations in the field of nature conservation and the management of natural resources, in addition, it provides for the adoption of several documents for its implementation. By-laws and regulations have been adopted and are in force (Koryakov, A.G. & Zhemerikin, O.I., 2019).

Also, we need to mention Federal Target Program «Protection of Lake Baikal and socio-economic development of Baikal natural territory for 2012-2020», which is on the way to finish now.

The total funding for the Program for 2012 - 2020 at prices of the corresponding years is 32765 million rubles, including:

- at the expense of the federal budget - 26946.7 million rubles (82.2 percent),
- at the expense of the consolidated budgets of the constituent entities of the Russian Federation - 3875.8 million rubles (11.8 percent);
- at the expense of extrabudgetary sources - 1,942.5 million rubles (5.9 percent) (Tumin, V.M. & Koryakov, A.G., 2013).

1. It should also be noted the attitude of society towards the protection and conservation of Lake Baikal. For the first time, Greenpeace activists spoke of the magnitude of the problem. In 2001 and 2002, the organization held international events on Lake Baikal. The last visit of this organization took place in the summer of 2019 (https://esquire.ru/articles/117412-eks-zhemchuzhina-rossii-kak-ozero-baykal-zadyhaetsya-ot-plastika-reportazh/#part0, Ex-pearl of Russia: how Lake Baikal suffocates from plastic). The Zero Waste project team spent a week on Lake Baikal to find out how much the lake suffers from plastic. “In seven days, we found 3813 garbage fragments on small sections of the Baikal coast, most of them are plastic” (https://1baikal.ru/ekologiya/kto-spasaet-bajkal-ot-musora, Who saves Baikal from garbage).

Another famous project: “360 minutes” is the largest all-Russian eco-marathon, which is implemented on the initiative and support of Oleg Deripaska and the Volnoe Delo Foundation. Every year, the volunteers of the action spend six hours cleaning garbage and landscaping protected areas to preserve picturesque natural places. For five years, eco-marathon volunteers have collected more than 3 thousand tons of garbage (https://regnum.ru/news/society/2662754.html, The study found out the causes of pollution of Lake Baikal). After the action, it is recycled and partially recycled. Since 2016 the number of types of work that volunteers did was increased. For example, near the visit center of the Baikal Reserve, activists removed heavy metal and concrete structures using a tractor and a truck with a crane.

Considering all the above, we have developed a system for solving environmental problems in the territory of Lake Baikal. (Figure 2)

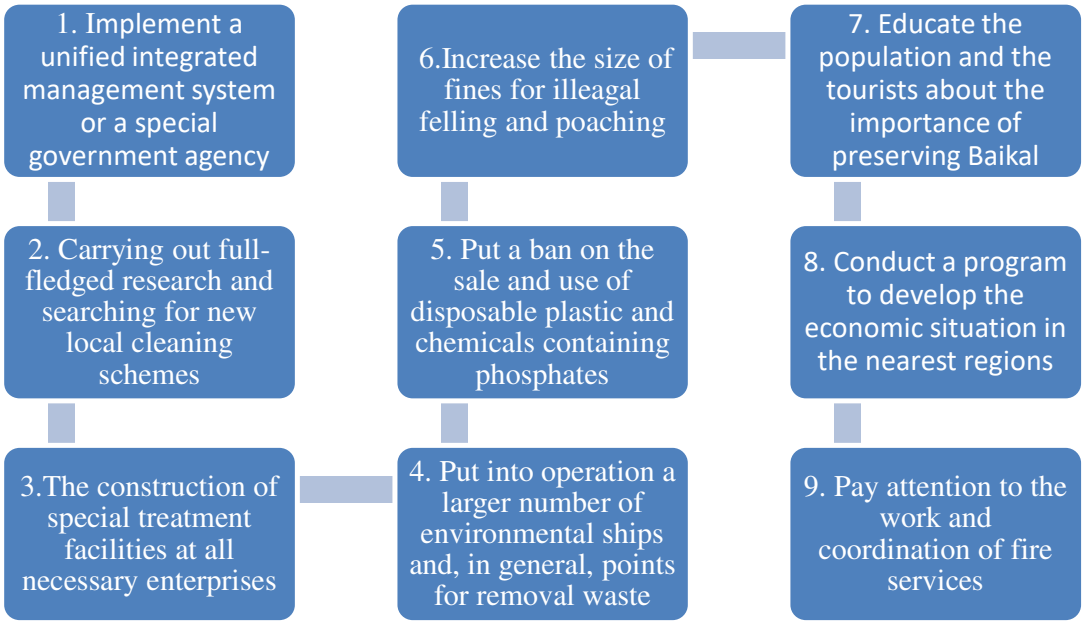

Fig. 2: Scheme of the author's system for solving the environmental problems of Lake Baikal and adjacent territories

First, since there is a lack of proper control and a peculiar unsystematic nature in solving the problem. To monitor all activities to preserve the "pearl of Siberia", implement a unified integrated management system for Lake Baikal and the Baikal Natural Territory or a special government agency responsible for this area. This system or body will be engaged in state and public supervision, monitoring, as well as combine the accumulated research base of the institutions involved in monitoring Lake Baikal and adjacent territories and support their interaction.

According to the latest data from the press conference "Protection of Baikal: Environmental Threats and Solutions", July 9, 2019, only 18 out of 100 settlements located in the immediate vicinity of Lake Baikal have sewage treatment plants. According to Vladimir Burmatov, Chairman of the State Duma Committee on Ecology and Environmental Protection, these structures either do not function or do not fulfill the norm of permissible impacts on the ecosystem (Koryakov, A.G., Zhemerikin, O.I. & Kulikov, M.V., 2019).

Thus, the next item in our system for solving the problems of Lake Baikal is the construction of special treatment facilities at all necessary enterprises. As well as carrying out full-fledged research and searching for new local cleaning schemes focused on Baikal. Due to the remoteness of some settlements from large cities, to improve the access of the hotel sector and villages to the best technologies for wastewater treatment. It is also necessary to implement the proposal to increase the size of economic sanctions and fines in case of violation of the rules for the discharge of waste into Lake Baikal.

To solve the problem of shipping, it is necessary to put into operation a larger number of environmental ships and, in general, points for the reception, removal and processing of ballast water and household waste from ships. Introduce fines for the discharge of oil products and pollution of Baikal water by ships.

The rules for organizing tourism adopted at the end of September in the Irkutsk region will help to reduce the negative impact on the Baikal ecosystem. "11 recreational areas were identified where it was recommended to organize tourism. Each of them had its own rate calculated (the number of tourists the territory can accept), and the types of tourism that were possible in each zone were also spelled out.

How can you regulate the flow of tourists? By the number of accommodation facilities. Accordingly, parking lots with a certain number of tent places should be allocated for those who love shawls, "the head of the Irkutsk Tourism Agency, Ekaterina Slivina, told reporters earlier (https://rg.ru/2019/08/13/reg-sibfo/pochemu-gorit-tajga-i-kak-vazhen-les-dlia-bajkala.html, Without a forest there will be no Baikal). In addition to this decision, which will be introduced, we would like to add a ban on the sale and use of disposable plastic and household chemicals containing phosphates in the lake and Baikal natural territories. Thus, the introduction of tourism with a maximum environmental focus. And, the organization of proper work with the tourist flow, the importance of preserving the nature of Lake Baikal through special events (https://rg.ru/2019/08/13/reg-sibfo/pochemu-gorit-tajga-i-kak-vazhen-les-dlia-bajkala.html, Without a forest there will be no Baikal).

The Baikal ecosystem is suffering from a disturbance in the flora surrounding the lake; it is necessary to strengthen control over felling in the catchment area of the lake. It is necessary to increase the size of fines and introduce an independent service to monitor this problem. The same method of economic impact through fines should also be introduced for poaching, another major problem that destroys the fauna of Lake Baikal.

We propose to indirectly influence the two previous problems through the development of measures in the nearest cities from the lake to educate the population about the importance of preserving Lake Baikal. Also, it will be important to conduct a program to develop the economic situation in these regions.

In the summer of 2019, the news of a forest fire in Siberia caused a massive resonance. The situation has reached other states, the world community and stars. At the beginning of August 2019, over 2 million hectares of taiga were exposed to fires in the Irkutsk Region and the Krasnoyarsk Territory (Trifonov, I., Sankov, P., Dikariev, K. & Kapshuk, O., 2019). It is necessary to pay attention to the work and coordination of fire services, to identify the potential for improving work efficiency for a better fight against forest fires.

Conclusion

Lake Baikal and the surrounding areas are world heritage. Containing 19% of the world's drinking water and being the deepest lake in the world. The beauty and grandeur of the lake every year attracts huge flows of tourists who want to look at the clear waters of Lake Baikal. Scientists from all over the world consider this lake to be unique and with trepidation relate to the importance of preserving the natural heritage.

The problem of pollution of Lake Baikal, which is known around the world, is becoming increasingly acute. Now the “pearl of Siberia" is experiencing many problems: it is littered shores due to the increase in tourists, and deforestation with poaching, and emissions, and fires. Even though some scientists claim that the rumors about the pollution of Lake Baikal are clearly exaggerated, we believe that the alarming statements of other scientists about the disaster are fully justified. Pollutants negatively affect the ecosystem of the lake and reduce the quality of water in Lake Baikal.

The government and public organizations are making efforts to save the rare lake. Only Baikal has a separate federal law on protection in addition to countless legal documents.

It is possible to save the “Pearl of Siberia” only by solving problems systematically and comprehensively, thereby we have developed a system of measures to neutralize the most acute problems of Lake Baikal. Among them: a ban on the sale of plastic products, the introduction of fines, economic development programs for neighboring regions and much more.

Baikal is an invaluable gift of nature, which must be wisely used and protected with all we might.

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The Role of Trade Union in the System of Higher Education in Latvia: The Analysis of the Demonstration Organisation Survey

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Abstract

In the last decade, trade unions have become an important social partner in the European Union countries, including Latvia, where, within the National Tripartite Cooperation Council, they ensure influence on taking important decisions. Surveys on working conditions in Latvia show that working conditions in companies with a trade union are significantly better than in those without a trade union. A survey of members of the Latvian Trade Union of Education and Science Employees (LIZDA) was conducted in one institution, namely a University (Demonstration Organization), to find out the trade union members' views on the role and activities of the trade union, as well as their needs for improving working conditions. To find out the opinion of the trade union members about the role and activities of the trade union, as well as the needs of the trade union members to improve their working conditions, a survey of members of the Latvian Trade Union of Education and Science Employees (LIZDA) was organized in one institution, namely, a university. The results of this survey are used both theoretically to identify employees' perceptions of the importance of trade unions in creating a comfortable working environment, and in practice – to coordinate the work of the union within the given university. In general, the results of the survey can be used to determine the strategic direction of the union's work as well as to improve its prestige. The sociological data were obtained by using two approaches – quantitative and qualitative. The quantitative survey was conducted between 10 February 2019 and 10 April 2019 at one of the universities in Latvia.The organized study has allowed for the identification of areas of trade union's work that need further consideration. (1) The trade union should more actively disseminate news about its activities in the media, including e-environment, informing about the pedagogues' situation, popularizing what has been done and linking it with the performance of the organization. (2) The circulation of information on the trade union activities should be significantly wider and more diverse. Special attention should be paid to informing and educating young teachers, including work with students (Student Council). (3) Cooperation with the social partners of the organization should be intensified, thus encouraging members and potential members for wider and more active participation, as well as strengthening the influence of

the trade union at local, regional and national levels. (4) It is important to develop the exchange of experience with interregional institutions by more actively integrating the good practices and experience of other trade unions, thus making the trade union of the organization more up-to-date and attractive to new potential members.

Keywords: Trade Union, Higher Education, Working Environment, Employees, Social Partners

Introduction

Today, globalization processes have a significant impact not only on national economies and policies, as well as on international cooperation, but also on individual citizens, changing their identity and worldview, and influencing behavioral practices and work habits (Romanovska, 2019). As a result of globalization, significant changes affect both objective working conditions and people's subjective feelings related to the working environment – competition is increasing, ways of working are changing, companies are undergoing restructuring, staffing policies are being revised and more and more people's duties are performed by mechanisms. All of these contribute to the increase in unemployment or the fact that part of the employees of enterprises are employed only part time (Baglioni, 2006; Rigby et al., 2006, 135). Such threats become an incentive for strengthening the role of trade unions in the global and national context. In the last decade, trade unions have become an important social partner in the European Union countries, including Latvia, where they ensure influence on important decision-making within the National Tripartite Cooperation Council. Several studies focused on working conditions in Latvia testify to the fact that working conditions in enterprises with trade unions are significantly better than in those where there is no trade union.

In recent years, trade unions in Latvia have significantly developed their potential, by developing not only in public sectors, such as education or medicine, but also in the private sector. Because enterprises in the private sector are the ones that make the biggest tax contributions to the state budget. Collective agreement and the presence of a trade union in an enterprise are one of the indicators that the employer is out of the shadow economy. Therefore, the strengthening of trade union positions can also be seen as a national interest.

The development of trade unions in Latvia is determined by the conditions of their existence in the past. Namely, Latvia belongs to the Eastern countries of the European Union, where the trade unions have undergone a paradigm shift. From mandatory memberships, they have become voluntary employee associations. Therefore, they face a new problem, which is the motivation of employees to join or continue to be a member of a trade union.

To find out the opinion of the trade union members about the role and activities of the trade union, as well as the needs of the trade union members to improve their working conditions, a survey of members of the Latvian Trade Union of Education and Science Employees (LIZDA) was organized in one institution, namely, a university. The results of this survey are used both theoretically to identify employees' perceptions of the importance of trade unions in creating a comfortable working environment, and in practice – to coordinate the work of the union within the given university. In general, the results of the survey can be used to determine the strategic direction of the union's work as well as to improve its prestige.

Trade unions in Latvia: the history and the present

To date, there has been relatively little research on the functioning and importance of trade unions in Latvia; significant researches have been done by R. Karnīte, I. Kalniņa, Ch. Woolfson, M. Hazans; T.

Paas and R. Eamet, as well as S. Stacenko, who focused on the involvement of trade unions in public administration decision-making and research on issues of social partnership. (Līne, 2016)

From the economic point of view, trade unions' activities and their work in general are often seen as additional costs and obstacles historically associated with the restrictions in working time, minimum wages, etc. But nowadays, trade unions have a much broader range of issues. Successful social dialogue at the micro-level of the organization, including trade union's influence on the cohesion of team of the organization, the development of corporate social responsibility and business ethics, the improvement and more active implementation of team building and decision making, problem solving, as well as more effective use of soft skills such as trust, influence and conflict treatment in managing the organizationa. (Pender, Elgoibar, Munduate; Prins, Stuer, Gielens; Eurofound). With the growing importance of diversity and partnership, the significance of trade unions to the economy also increases. Employee retention in the workplace is also becoming increasingly important, thus reinforcing the importance of social dialogue within organizations. (Casey, Gold). Therefore, the impact of trade unions is also significant at the macro level: engaging in sector challenges and unemployment insurance, researching, gathering, and identifying directions for satisfaction of other needs of employees. Thus, trade unions are institutional systems that ensure a balance between social and economic development. It often happens that, the economic conditions improving, less attention is paid to social conditions and the balance is lost. Trade union activities, on the other hand, focus on the elements of social well-being in organizations and workplaces, thus rebalancing and strengthening social support systems. (Grimshaw, Koukiadaki, Tavora) In addition, trade unions as members of the Tripartite Cooperation Council represent Latvia's interests in the EU (Tripartite Social Summit, and other institutions), and the influence of such institutions in solving various issues is increasing. More favourable interpersonal relations influence social and economic policies, promoting the development of business culture and employment, as well as creating favourable social conditions.

Historical evidence suggests that the first unions in Latvia were established in the early 20th century, during the post-revolutionary period. As a result of the occupation of Latvia, within a few months of 1940 those organizations were reorganized and became part of the USSR trade unions. Shortly after the restoration of Latvia's independence, in May 1990, Latvian trade unions decided to leave the USSR trade union institutions and formed an independent trade union association – the Free Trade Union Confederation of Latvia (Kluinis, Pētersons, 2006). Thus, the development of the Free Trade Union Confederation of Latvia went hand in hand with the development of Latvia as an independent state during the period of economic restructuring. Trade unions were given the right to negotiate the issues of wages, employment, working conditions and economic restructuring (Rajevska, 2005, 88). The restoration of Latvia's national independence posed new challenges for trade union leaders – the need to acquire new knowledge and forms of activity, such as wages, the development of the spirit of collectivism, solving social dialogue, going into labour safety and labour law issues.

Latvia as an independent state has existed for little longer than twenty years and this period has not been sufficient to establish lasting traditions of effective social dialogue. Moreover, the status of trade unions in Latvia compared to the "old" EU Member States is not yet established and, despite the relatively extensive trade union rights, they are not always considered as a serious social partner. Currently, there are trade unions of various branches operating successfully in Latvia, for example, Latvian Trade Union of Health and Social Care Workers, Latvian Industrial Sectors Trade Union, Latvian Forest Sector Trade Union, etc. 20 trade unions have united in the Free Trade Union Confederation of Latvia, which is the largest trade union federation in Latvia. The largest sector trade union is the Latvian Trade Union of Education and Science Employees.

There is a legal framework for the functioning of the trade union in Latvia. The Trade Union Law states that "a trade union is a voluntary association formed to represent and defend the labour, economic, social and professional rights and interests of employees" (Arodbiedrību likums, 2014). Trade unions are

therefore considered to be non-governmental organizations. Non-governmental organizations can be identified as a separate type of organizations; they are also called "third sector" organizations because they operate in parallel with the public and the private sectors. (Daftt, 2012)

Different legislation specialists and researchers offer different definitions of trade unions, emphasizing a particular function of this organization. One of the most accurate definitions of trade unions is given by T. Hannigan, who states that trade unions have nine basic functions: social dialogue, organization, legal protection of members, administration, management, political activities, implementation of public activities, improvement of trade union activities, and international cooperation (Hannigan, 1998, 7). According to Hannigan, the successful fulfilment of key functions directs the trade union toward its goals. The specific difference between trade unions and other types of organization is determined by the importance of members in the trade unions – their power and influence on management. The nature of trade unions presupposes a high level of participation of its members in the life of the trade union, including its management.

Methodology

The aim of the study was to find out the opinion of the trade union members on the functioning of the demonstration organization and the role of the trade union in the sector of education in Latvia in general, focusing on the wishes and needs of the trade union members. The sociological data were obtained by using two approaches – quantitative and qualitative. The quantitative survey was conducted between 10 February 2019 and 10 April 2019 at one of the universities in Latvia. The previously approbated questionnaire contained a number of questions to allow for a comparative analysis with the results of the previous survey "The needs of educators to ensure employment stability and decent working conditions in collective agreements", but it also takes into account the specifics of these different actors. The study target audience is the university employees.

The questionnaire was designed to clarify the respondents' views on the importance of the trade union and the specifics of their work, as well as to outline future perspectives. The survey was carried out in the e-environment by using the form *google.docs*. The survey included 16 questions. The survey instrument – a questionnaire – is structured in three sections: 1) general information on the respondents' demographic data 2) opinions and attitudes concerning LIZDA work, directions of activity, availability of information; 3) evaluation of the work of the University LIZDA Professional Committee and suggestions for achieving the goals.

The survey contains both closed and open questions that are aimed at obtaining the evaluation of LIZDA performance on a Likert scale of 1 to 5, where 1 – very poor, 2 – poor, 3 – satisfactory, 4 –good, 5 - excellent. It took about 10 minutes to complete the questionnaire and the participation in the survey was voluntary.

Research results

Of the total number of the respondents, 76% are female and 24% male; 62% of them are general and 38% – academic personnel. The respondents represent all age groups, but most of the respondents – 60% – represent the age group 41-60. This also is the basic age of the university staff. The survey mainly involved long-serving university employees: 44% of the respondents have 11-20 years of work experience, but 38% – over 21 years. More than 90% of the respondents are LIZDA members, 70% of them have been the union members for more than 11 years.

Attitude to LIZDA work

Attitude is important in any area of human activity. Attitude is a complex, multidimensional concept that includes different contexts: employee attitude towards work, employer attitude towards employee as the most important resource in the labour market, the state's attitude towards the citizen. Attitude is an ability of the consciousness to evaluate the processes, with which a person comes in contact, changes in consciousness, or human behaviour. Attitudes can be defined as an integrated attribute of the individual that is formed in the unity of life experience, knowledge acquisition, experience and effort of will and is expressed in values, goals, ideals, and norms. Attitude is one of the components of characterizing the human being. (Špona, 2004). Attitude is expressed not only in human actions and values, but also in political decisions. In the context of this study, the attitude of higher education institution employees' towards LIZDA is analysed.

The respondents' responses indicate that the university employees generally have a positive attitude towards the work of LIZDA, as the trade union acts as a bridge representing the interests of employees and ensures social dialogue with education policy makers. About half of the respondents (47%) have a clear understanding of the union members' rights and obligations; they believe that "union is power". About 15% are ready to join the trade union work or working group and volunteer for fulfilling various duties – thus the respondents indicate in the survey, but only a few individuals show initiative. (see Fig.1)

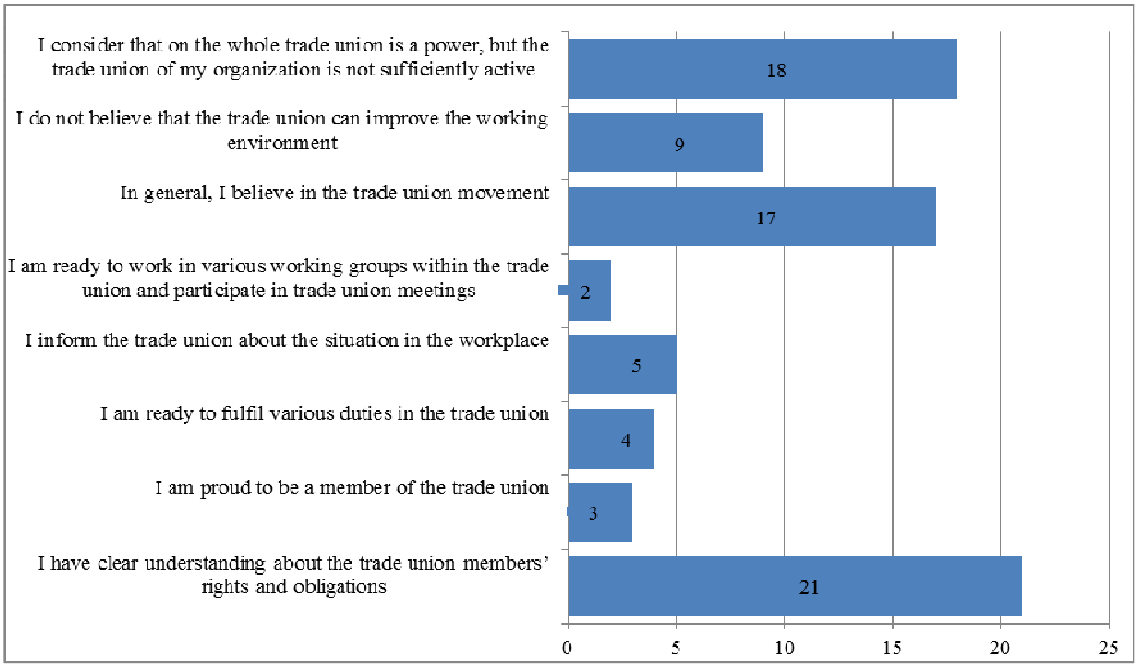

Source: demonstration organization's survey

Fig. 1: Respondents' attitudes to the trade union's work at the organization (number of people)

At the level of Latvia, the respondents have provided the evaluation of the activities of the trade union of Latvia's education employees as a social dialogue partner. Half of the respondents admit that LIZDA is actively involved in the social dialogue. The views of the educators surveyed concerning the process and groups of social dialogue as well as the institutions participating in it are rather different. From the pedagogues' point of view, those are the administrations of educational establishments that have the

highest level of involvement, since in 80% of cases they always or almost always are social dialogue partners. The respondents' opinions about the role of local governments, trade union leaders of educational establishments, LIZDA and MES (Ministry of Education and Science) in the development of the sphere of education are rather diffused and contradictory. (Izglītības darbinieku vajadzības…, 2013) Some respondents express support and gratitude to the LIZDA management and regional representatives. (see Fig. 2)

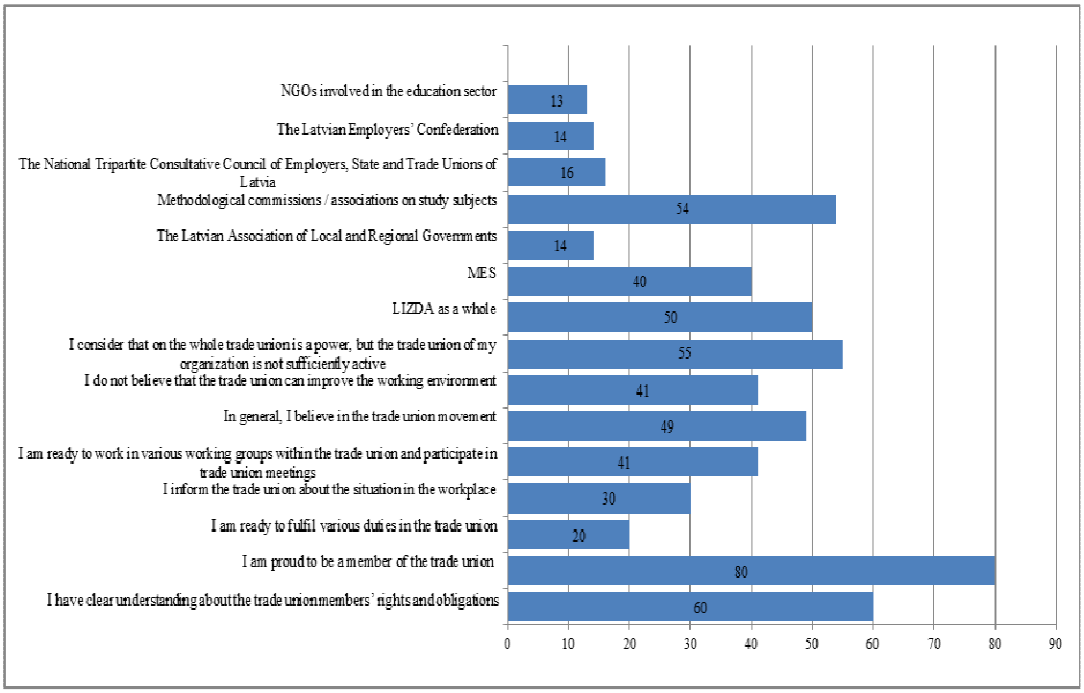

Source: Izglītības darbinieku vajadzības nodarbinātības stabilitātes un cienīga darba apstākļu nodrošināšanai un šo jautājumu aktualizēšanai kolektīvajos līgumos (The Needs of Educators to Ensure Employment Stability and Decent Working Conditions in Collective Agreements), 2013

Fig. 2: Respondents' opinions on the involvement of social dialogue partners in solving development issues in the sphere of education (%, only responses "always" and "almost always")

About 7% of the survey respondents admit that they have no interest in trade union activities and their attitude is indifferent, possibly because they have not directly experienced LIZDA activities or support. In turn, about one fifth (20%) of the respondents are concerned about the trade union's ability to improve working conditions. The small number of respondents in general also implies the need to improve the organization's culture and awareness that its main driving force is the employees. The culture of an organization is directly related to its effectiveness – the stronger the culture of the organization, the more effective the organization is (Psihosociālā darba vide, 2010).

Awareness and Information Acquisition

Effective access to up-to-date information is the key to purposeful activity. According to the survey data, about half of the respondents obtain information about LIZDA activities electronically, mainly from the university website. Other sources are used too – the LIZDA website, conversations with colleagues, attending joint events. The survey data testify that, in general, the availability of information is ensured, but the interest of respondents varies.

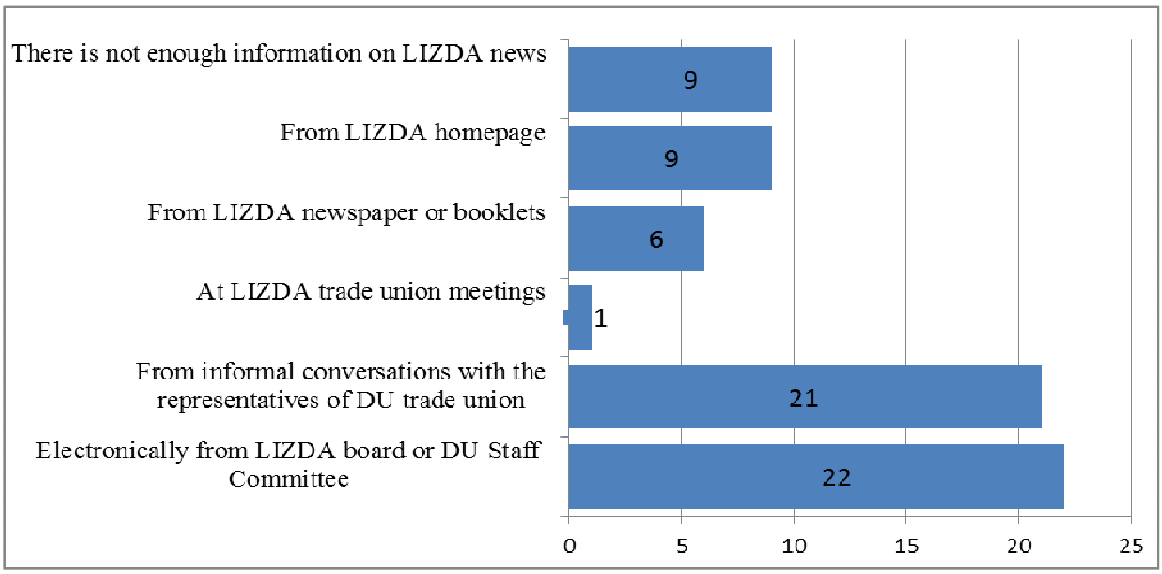

Source: demonstration organization's survey

Fig. 3 : Respondents' evaluation of the circulation of information in the trade union (number of people)

About 8% of the survey respondents regularly inquire and obtain information about LIZDA news from the University website, 47% sometimes show interest, and about the same number of the respondents does not show any interest in LIZDA activities. (see Fig. 3)

LIZDA Activities at the Demonstration Organisation

The responses concerning the work of the University Trade Union show a diversity of views. There are positive evaluations, critical remarks, and indications of the lack of information for one to be able to evaluate. As the most important activities are mentioned those which directly concern the employee: accident insurance, provision of material assistance, organization of leisure activities. However, it has to be noted that a significant number of the respondents – 49% – emphasize the insufficiency of information to be able to evaluate the work of the trade union. This means that existing members, not to mention the potential ones, do not get enough information about the union's activities. (see Fig. 4)

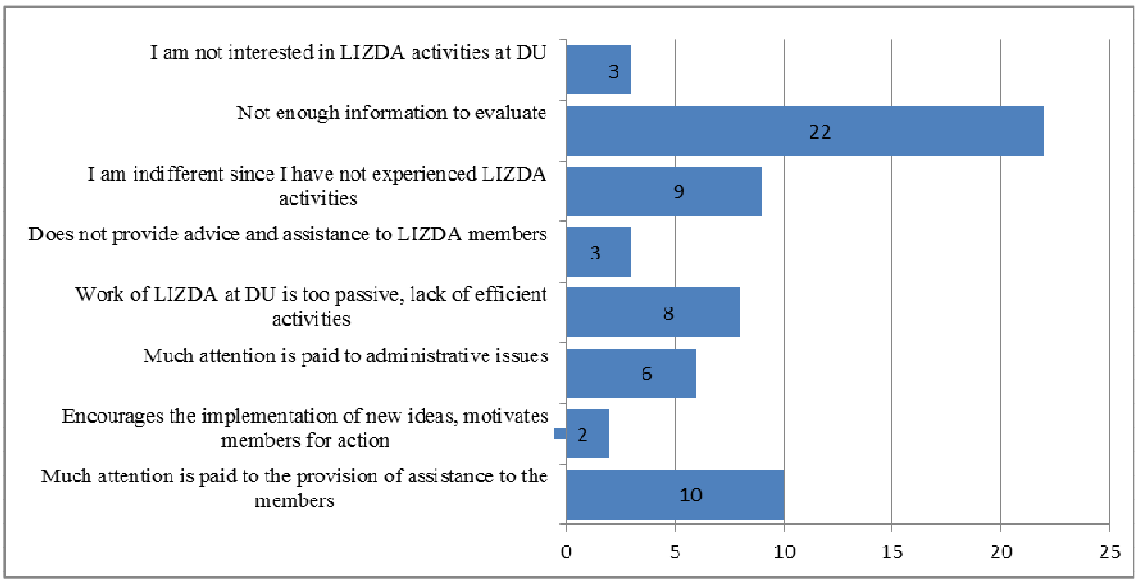

Source: demonstration organization's survey

Fig. 4: Respondents' evaluation of the trade union's activities (number of people)

Employees are largely satisfied with the work of the trade union in addressing problems related to improving the working environment and working conditions, but unsatisfactory is the evaluation of work aimed at influencing the state's and partially also the university management's policies towards reducing the employees' workloads and the amount of work.

For the employees it is unacceptable that the university lecturers are not paid for the methodological work, control of students' independent work and consultations. The academic workload of lecturers, senior lecturers, professors is disproportionately high, and employees expect more serious involvement of the trade union employees in solving the issues of workload reduction and salary increase. It has to be admitted that the employees' requirements are fully in line with the requirements of LIZDA, which prioritizes the achievement of stable financing of higher education and science, including the financial reference amount for science in accordance with the Law on Higher Education Institutions and the Law on Scientific Activity.

There are also a lot of critical statements about the trade union's work in Latvia in general. An overwhelming majority of the respondents urge the trade union to become more active, assertive and unyielding in trying to find other forms of communication with the ministry. It is emphasized and recommended to more actively share the information on their activities in the media, to inform about the situation of educators, to raise their prestige in the society by popularizing their work. Special attention should be paid to informing young pedagogues about the union's activities and their involvement in the union. (Izglītības darbinieku vajadzības..., 2013)

Overall, the work of the professional committee is assessed as satisfactory: 60% of the respondents evaluate the work of the professional committee as satisfactory and 16% – as good. What is evaluated particularly positively is the dissemination of up-to-date information. The respondents appreciate the LIZDA employee survey, suggesting that surveys of similar content should be carried out more frequently in order to plan work more effectively, solve problems and improve the organizational culture. The most important recommendations of the survey respondents for the improvement of the work of the professional committee are the following: 1) to organize thematic discussions in departments / working collectives more frequently; 2) to maintain social dialogue with the university management in order to

solve current problems; 3) to disseminate current information, inform employees about the activities implemented and the results achieved, and popularize the role of trade unions.

Conclusion

The influence of trade union manifests itself in corporate decision-making, organization of work in enterprises, organization of training, responsible ethical management, and respect for human rights. Corporate social responsibility is also linked to the development and implementation of trade union strategies (Preuss, et al., 2006, 258). Corporate responsibility ensures better economic growth in the long term if, in addition to economic aspects, the social and environmental aspects of all interested parties' well-being are equally taken into account (Büchner, 2012, 50). Latvia, as a state that has restored its independence relatively recently, has certain problems with activating trade union organizations' work and building employee loyalty to trade unions. By using a variety of motivational mechanisms, promoting the active social positioning of union members and creating feedback, it is possible to achieve the best results. The research results testify to the fact that the respondents expect that the trade union will be able to solve various problems existing in the particular university and the country in general in the field of higher education, such as salary increase, reduction of workload, increase of financial reference amount for science. The majority of education employees believe that social dialogue is a very necessary and recognizable way of addressing both specific issues of daily work and broader questions of the sphere of education, but some respondents consider the existing social dialogue organized by the trade union to be ineffective and formal. However, the trade union members often lack the awareness that significant changes can only be achieved through joint and active participation in decision-making and trade union membership. It is therefore the responsibility of the trade union leader to explain the benefits of corporate responsibility, thus developing active social position in the trade union members.

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The Role of Knowledge and Training in The Transition to a Digital Economy in The System of Educational Services

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Abstract

Modern conditions of socio-economic development are a prerequisite for the transition to a new technological structure. According to Russian and foreign experts, it will be based on a new - information, knowledge - model of the economy. This places high demands on the systems of the formation, replication and dissemination of knowledge, i.e. to the education system. Therefore, in the transition to a digital economy, priority is not given to solving technical issues, but to problems associated with the formation of a training system, the transfer of knowledge, its accumulation and productive use.

Keywords: Educational Technologies, Knowledge Model, Digital Technologies, The Provision Of Educational Services, Training Programs.

Introduction

The proliferation of digital technologies over a long period of time determines the path of development of the economy and society and has already led to dramatic changes in people's lives more than once. The development of the digital economy is one of the priority areas for most developed countries; it also dictates trends in education. Now the most valuable thing is the ability to constantly develop skills. Accelerating the pace of technological change creates new challenges in all sectors, including education. Companies are waiting for new, and sometimes completely different competencies from their employees, the educational process has long gone beyond schools, universities and other educational institutions.

By 2025, Russia will need at least 5.8 million highly qualified personnel for the digital revolution and the transition to a knowledge economy, 62% of employers are confident that in the next couple of years they will have to retrain almost 35% of their employees, about half of the companies in our country now More than half of its employees need retraining.

Employment agencies and business representatives complain that training programs do not meet the new realities and market requirements. In a world where the economy is constantly changing, we need specialists who can quickly learn new business practices and skills. “A feature of the current era of digital transformations at tremendous speeds is the obsolescence of technical solutions and business models in the horizon of only a few years, new technological needs are constantly being created, which, in turn, need to instantly build up competencies. Thus, the most important factor now is the growth rate of new educational opportunities” (Daria Nosova - Head of Fintech O2 Consulting).

The unconditional trend in education today is its flexibility, which in practice means constant monitoring of requests for new examinations and the immediate adjustment of educational programs and teaching courses. Education is sometimes perceived as the sphere most resilient to changes, while it is most susceptible to crisis and loss of effectiveness in responding to new trends of the time. Education innovations can help improve its quality, as well as provide more stability during “budgetary pressures” and growing demand. The elasticity of the education system is the key to successful digital transformation, as can be seen in many countries, where such an approach is strategically provided at the level of national and private programs.

According to many experts, the most valuable skill is the ability to acquire new skills, the understanding that you will have to change your occupation many times. “The need to have fundamental knowledge will recede into the background - all knowledge is now immediately available, but the ability to analyze, systematize and visualize complex processes and related professions will most likely be relevant for a long time” (General Director of Oblakoteka Maxim Zakharenko).

A few years ago, at the Davos Economic Forum, we compiled a list of key skills necessary for successful work in 2020, including critical thinking, the ability to solve problems comprehensively, creativity and communication. All these skills belong to communicative (soft skills), and in this segment there is now a gap in the ocean of educational projects and programs.

Leading Russian universities announced dozens of programs in various specialties that are connected with the digital economy, but it is still difficult to draw any conclusions about their effectiveness. Not all universities today meet the new challenges and requirements of the time. Although, in our opinion, medium-sized universities are likely to be able to adapt to rapidly changing requirements. “Their information systems are less loaded than large universities, and the modernization process does not take so much time, effort or money. In the next few years, they can make a significant transformation and become fully competitive in the digital economy.” (The head of the group for work with academic organizations of the Softline group of companies in the Northwestern Federal District Alexei Shcherbakov). At the same time, departments specializing in Big Data, blockchain or cybersecurity already exist in the technical departments of most major universities, but the real need for a large number of such specialists will appear on the market in the next three to seven years, but many universities need to make changes in the training of professional frames now. In addition, the digital economy is not just the future, but also the present, and therefore the training of such specialists should be widespread.

If we talk about completely new professions and types of activities, it must be said that universities will never be ready for them immediately, because the training programs for the profession arise too quickly, and the training process is long and requires at least three to four years. And this will not be a ready-made specialist, but only a graduate. At the same time, Russian universities, as it seems to us, respond to a market demand for versatile skills, that is, dynamics of thinking, variability of activity, constant ability to self-education. Of course, educational institutions will have to make several changes to their work, and this primarily concerns the transition to the most practice-oriented model of training (project activity). Now it is being declared, but poorly implemented. Soon, it is necessary to move away from the obsolete model of "one educational diploma for life." This is no longer working.

Lifelong learning should become a standard for a modern person, that is, constant updating of their knowledge, free reorientation to new specialties, and regular development of competencies. One of the trends in education is the emergence of many distance learning programs and online courses. And if in the case of full-time forms, Russian universities practically do not compete with Western ones because

of the relatively high cost of living in Europe and the USA, then in the case of distance learning programs, the situation is completely different.

For example, the cost of an annual distance education undergraduate program at Open University in the UK is about € 2,500 per year, that is, 90 thousand rubles per semester, which is comparable to Russian prices. “At the same time, many Russian universities regard distance learning programs as something secondary and practically do not develop these areas, and therefore more and more Russian students receive distance education in Western universities. In addition, the advantage of Western institutes is that their diplomas, unlike domestic ones, are recognized in Europe and the graduate does not have to further confirm their qualifications” (Crimson Education CEO Jamie Beaton).

Online courses hosted on numerous MOOC (Massive Open Online Courses) platforms are also very popular today. the demand for the MOOC platform motivates many universities to revise curricula and create mixed programs, including both traditional lectures and seminars, as well as online programs, the demand for which is constantly growing. Of course, the process is complicated by the need to coordinate new training plans with the requirements of federal standards, since the transfer of interaction of the main participants of the educational process to the online mode requires educational institutions to modify the IT landscape as well as major internal transformations.

The need for changes in the education process is dictated by new trends in the organization of business, and, accordingly, the labor market. Requirements for specialists are changing, as the boundaries between the “white” and “blue collars” are blurred. In the structure of the modern labor market, a slice of mass digital professions is being highlighted - mid-level specialists who produce products "in digital" using various automation solutions.

Already today, a large segment of professions related to online markets can be considered massive: call center operators, copywriters, database operators. According to some estimates, by 2025 the number of representatives of mass online and offline professions in the country can reach 9.2 million people. Today, around the world there is a shortage of specialists in the labor market who can create and implement complex IT projects using artificial intelligence, virtual reality or big data in their work. And those who know how to do this are under the scrutiny of "bounty hunters."

Several trends stand out in the transformation of the labor market - new mandatory points. This knowledge and application of modern digital products and solutions. In addition to basic professional competencies, you can now find a whole block of requirements in the field of digital technology. Professionals with the skills to implement modern digital solutions are the most competitive.

Another trend is the acceleration of processes in the organization and increasing transparency and business efficiency. This means moving away from a clear focus on basic business knowledge and common functions. Digital companies need to be universal (generalist). Previously, employees engaged in production, such as petrochemicals, were tasked with effectively managing only this process. Today they are required to dive into procurement, sales, and even customer service. This happens because digitalization allows you to track all processes from beginning to end in their relationship. I must say that in industries where the digital transformation is most visible, the labor market is transforming now. So, such professions as an operator in a bank or an insurance agent “die out”. But the digital transformation, especially in Russia, is far from comprehensive, and the sales consultant is still the most sought-after profession.

As for the most relevant professions in the wake of digitalization, these are all kinds of IT specialties: developer, project manager, data analyst and others. But “pure” IT is not enough for life, therefore, “subjects” who know and actively use IT will be even more in demand. For example, an architect of virtual worlds, a genetic analyst, a house builder using 3D printing technology. For example, many of them are updated and more narrowly focused “versions” of obsolete professions. All this allows developers to create all kinds of services and programs, analysts, testers. They all grew out of programmers in the sense that was relevant in the 2000s.

It is also necessary to speak not about professions, which are a rather narrow positioning, but about roles in the digital economy. Depending on the size of the organization, one person can combine several roles or devote himself entirely to one role. From this position can be called completely differently

(Head of the analytical department of the personnel company Manpower Group Russia & CIS Mikhail Tuzov). There is another side of the influence of digital technologies on education - the use of new technical developments directly in the learning process. As a rule, technological implementations in education today do not require any additional skills and abilities from the teaching staff, management or schoolchildren themselves.

In most cases, a short introductory briefing on the rules for handling equipment for teachers will be enough. Universities and most teachers today are friendly towards technological solutions and understand that progress should cover all spheres of life, including education. Moreover, learning with the help of interactive panels, virtual and augmented reality can be made many times more effective and interesting.

In Russia, qualified and well-trained teachers are annually graduated from universities who are aware of the important role of technological solutions in modern education, but there are also skeptics who believe that, for example, VR-technologies can negatively affect the health of students.

Nevertheless, virtual reality technologies have a place to be, for example, to reduce the gap between theoretical education and practical skills. Most experts confirm that graduates, as a rule, are perfectly "knowledgeable" theoretically, but rarely can perform even simple actions in the framework of specialized education in practice. This seriously affects both the graduates themselves in finding a job and business. Companies must spend huge amounts of time and money on training interns or even training them from scratch. If VR technology takes root in universities, then in many ways this problem will be solved. It is important not only to introduce new technologies into the work of secondary and higher educational institutions, but also to carry out continuing education of teachers, as well as involve them in innovative projects implemented based on educational institutions.

The average age of teachers is still from 40 years old, in universities it is even higher. As a result, the level of digital literacy and IT culture of the most experienced teachers often leaves much to be desired. Knowledge management is based on the idea that the most valuable resource in an organization is its skilled workers. Consequently, the success of a company will depend on how effectively its employees can create new knowledge, share it and use it effectively.

If you start to consider any organization anywhere in the world, it is indisputable that in the course of their work, employees communicate and exchange information with each other. But if the desire for communication is inherently human, then the desire to share your knowledge and share it needs to be instilled. If we turn to the modern theory of management, knowledge is one of the key sources of creating and maintaining long-term competitive advantages of the organization in the market. Therefore, today, for many companies, the tasks of managing various processes at different levels, especially in high-tech organizations that are somehow related to knowledge, come to the fore.

Knowledge becomes an economic object, and the exchange of knowledge - a type of economic activity that affects the attitude of the subject to other economic objects. On the one hand, knowledge is exchanged between individuals and organizations (for example, in partnerships). They can be bought, saved, transferred, invested, accumulated and, accordingly, can be depersonalized.

On the other hand, knowledge differs from information in that it includes a personality component - an estimated attitude to information, its subjective significance for an individual or organization.

As well as the relation to any other economic objects - property, wealth, money, etc. the attitude to knowledge gives them many meanings, (see the works of Russian psychologists O.S. Deineka, A.L. Zhuravlev, A.B. Kupreichenko, A.D. V.A. Khashchenko and others) and can be considered as an opportunity to communicate, a means of ensuring personal security, etc.

Various forms of intellectual capital such as, for example, copyrights, technologies and trademarks can be transferred in the literal sense of the word and be impersonal, but this attitude to knowledge is not applicable, since they are, firstly, the result of learning, that is, they are formed and represent a process; secondly, they include those psychological relationships that arose during their creation, acquisition and assimilation.

Many large multinational companies operating in areas such as information technology (IBM, Hewlett-Packard, Microsoft, Oracle), consulting services (PricewaterhouseCoopers, Bain), oil and gas production and refining (BP, Shell, LUKoil), manufacturing (General Motors, Ford, Boeing), have implemented and continue to develop their own knowledge management system.

Increasing their capitalization and improving the financial results of their activities prove the important role of knowledge in the functioning of a business, which is a confirmation of the need to identify modern areas and forms of knowledge sharing (A. Urintsov, 2014). Usually in practice, the knowledge carrier does not seek to share them with other employees, as he considers the possession of knowledge as some competitive advantage over others that he may lose in the process of transfer or exchange. The task of the leadership of any organization is to convince employees of the need for the exchange of experience and knowledge, that is, to create a supportive atmosphere in the team.

Let us now analyze the characteristics of an employee who is positively inclined towards the exchange of knowledge and can successfully participate in it. There are, for example, personal qualities that can stand in the way and impede the transfer and exchange of knowledge, such as a tendency to advance and develop only one's own ideas, the pursuit of individual achievements and orientation to one's own interests, respect for hierarchy and formal authority (Husted, K., Michailova, S. 2002.).

It can also lead to the opposite quality of others, such as orientation to the interests of groups and group recognition, a tendency to cooperate, relationships to a group, emotional stability, extraversion, the ability to participate in the exchange of knowledge. Thus, it is possible to group some of the characteristics listed by us (Table 1):

Table 1: Characteristics of the individual

Parameter	Prone to the creation of new knowledge, focused on innovation	Knowledge prone
Thinking	Original / Custom	Stereotyped / Standardized
Group behavior	Independent behavior, non-conformism	Involvement, conformism
Authority	Self-orientation	Orientation to external authoritative guide
Motivation	Self-realization, recognition	Security, involvement
System of values	value of achievements	relationship value
Attitude towards goals	hard to reach goals as a motivator	hard to reach goals as a demotivator

Compiled by E.Borkova

According to these characteristics, given in the table, it is not difficult to notice that the simultaneous combination of these opposite qualities within the framework of one person is difficult, and they counterbalance each other, which may not contribute to the creation of new knowledge and facilitate the exchange of information. All these nuances must be known and considered in the selection of personnel and the search for new employees, since an individual cannot simultaneously be focused on innovation and replication.

Knowledge includes not only information and personality characteristics of an individual, but also elements of group consciousness, which can be formed in a joint activity and include the cognitive and emotional components of a group attitude to reality. This means that understanding the factors and mechanisms of knowledge exchange requires systematic theoretical models of those processes that were previously studied independently in the psychology of interpersonal relations and communication, social cognition, small groups, intergroup relations, etc.

Today, it is recognized that competitive advantages are on the side of those companies that are able to quickly learn and share knowledge, not only within their structure, but also outside it, this is one of the

reasons for revising a number of traditional ideas about the factors of teamwork. For example, on the one hand, it is obvious that cohesion in a small team can increase the level of mutual assistance and coordination of actions, but on the other, it can lower the level of motivation of group members to build external relations - with other teams and stakeholders in the organization.

Thus, the baggage of knowledge of team members does not become so important as “knowing who knows” - the “transactional memory” of a unit, department, group and the greatest contribution to its development are made by the joint training of members of this team, in which they have the opportunity to form for themselves an idea of the knowledge, skills and abilities of each other. The formation of adequate representations of the enterprise employees about each other's expert resources step by step becomes a special managerial task.

To solve such problems in organizations through the introduction of information technology, the so-called "knowledge cards" of employees are collected, and the exchange of information between them about the knowledge, experience and skill of each other is increasing. Company management can organize conferences, special thematic forums so that employees have the opportunity to voice their ideas on key organizational, innovative and scientific issues, conduct so-called “knowledge fairs” and “knowledge lunches”.

In turn, the existence of cognitive limitations in the transfer of knowledge from an expert to a beginner was discovered. With the growth of skills and experience, knowledge becomes more abstract and it is more difficult for an expert to transfer them effectively. Experts tend to algorithmize and simplify understanding of the problem. Most often, in practice, they are not able to restore complex relationships, individual nuances and a way to solve the problem so that it becomes accessible to beginners.

To overcome this barrier, enterprises should apply special techniques for transferring experience: keeping a diary for a novice to observe more experienced colleagues, receiving structured feedback from them based on the results of their work, performing tasks together, etc.

Organization of the exchange of experience is carried out using:

- ***Trainings.*** During the training, where private questions are asked, it allows for a short time to a large number of young specialists to get acquainted with effective ways to solve certain problems that are currently relevant for those who have received theoretical knowledge, but do not have practical skills.

- ***Individual workshops.*** Master classes help to master the skills of working with certain programs. For example, if a more experienced specialist is fluent in Excel, and a young specialist is poorly versed in opportunities, just a few lessons are enough. Then check the results. As a rule, without additional training, such lessons are learned as quickly as possible.

- ***Mentoring.*** For an inexperienced employee, a mentor is attached for a long time. The task of mentors can be facilitated by developing sets of regulations, instructions and memos, as well as tables in which reference data are presented in the organization.

- ***Brainstorming.*** An operational method for solving the problem based on stimulating creative activity, in which the participants in the discussion are invited to express as many solutions as possible, including the most fantastic ones.

- ***Introduction of a database of useful sources.*** With the help of the database, any employee will be able to take advantage of useful articles, books, informational reference material, and with the help of useful information complete the task. Employees need to be encouraged so that they can replenish this database with useful information. For example, if a specialist attended a thematic conference, you should take care of creating a thematic report, which can be put in the database of useful sources.

- ***Collaborative training in webinars.*** Reception of transfer and exchange of experience is not expensive. The webinar mainly runs on Skype. Participants ask the facilitator a series of questions to which they receive answers. In addition, participants communicate with each other, discussing specific problems, receive recommendations and ready-made solutions.

Internal marketing is the conduct of regular surveys regarding the company's development opportunities. It is rational to be interested in what problems exist in a company where weak links are identified. In the future, such work will help organize training for inexperienced specialists or develop training programs that will eliminate all weak links in the organization.

There is also such a tool as an exchange of experience, which is considered as a key one in the framework of the knowledge management initiative. If we consider the simplest option, then these are the lists of general rules of action that are familiar to us, such as, for example, operating instructions or instructions “how to do”. The next step is to identify and share best practices and is the most effective way to achieve a specific goal.

Exchange of experience between organizations - this can be an exchange between specialists working in the same industry, carried out with the introduction of new technologies, programs where there will be a real opportunity to get acquainted with innovations in the field of technological and information technologies, at special events, forums and seminars. You can also send your employee to exchange experience with another company for borrowing, for example, a new technique in the production process.

Training is conducted by mentors or specialists who have mastered the relevant skills and technological processes, can teach beginners. However, when concluding an agreement, it is necessary to consider that in the process of interaction between organizations that are partners, it is important to ensure mutually beneficial cooperation. If the company has installed new equipment, but none of the working specialists knows how to manage it, partners who have been working on such equipment for some time can help.

The essence of secondment is that in practice, employees acquiring the necessary skills and knowledge in another company returning “home” to train other specialists. Internal secondment is the same process, but within the framework of one organization.

Thus, knowledge management is a new vector in the management activities of organizations aimed at the accumulation and effective use of intellectual capital. It should become one of the main tools to increase the competitiveness of organizations. The main obstacles to the implementation of knowledge management will most often be the low culture of Russian organizations and the insufficiently high level of use of information technology.

The fact that a huge, if not to say that a large part of the cost of many goods is created not so much at the stage of material production as at the stage of research, development and technological work, testifies to the increasing influence of knowledge on the formation of competitive advantages of companies.

Studies show that value added created with the help of intellectual capital exceeds that created with the help of tangible assets, equipment. The classic of IR theory, T. Stuart, back in 1997, said that “benefits became a product of knowledge, and in turn, knowledge became a very important production factor” (Steenkamp N., Kashyap V., 2010). Productivity and competitiveness of material production in the modern economy depend mainly on the ability to generate added value, process, accumulate and efficiently use information based on knowledge (Murtazin A.S., 2011).

Thus, it is fair to say that the types of activities related to the generation, transformation and use of knowledge i.e. the presence of a knowledge component in each product and service. As an example, “the cost of production of a car consists of only 30% of the cost of a Mercedes car, and the rest is compensation for the cost of developing a car, that is, costs to support the activities of engineers and managers ... ”(Pakhchanyap A., 2002).

The economic parameters of companies that have high intellectual capital and actively use it, significantly differ from the parameters of companies focused on the traditional principles of the industrial economy (Table 2). The main difference is manifested in the volume of investment in research and development (R&D), in knowledge.

Table 2 : Comparison of some companies focused on the industrial economy and the knowledge economy

Companies	Physical assets, billion dollars	Number of employed, thousand people.	R&D costs for the number of employees, thousand dollars	R&D costs to sales, %
Companies focused on the industrial economy				
Chrysler Group LLC	372	441	14	2,9
General Motors	315	594	13,5	4,9
Ford	284	345	17,4	4,1
Nippon Steel	34	26,3	11,9	4
Knowledge Oriented Companies				
Microsoft	59,3	50,6	86,6	16,9
Intel	44,4	80	36,8	9,4
IBM	88,3	319	16	5,5
CISCO	35,2	35	63,4	10,8

One way or another, knowledge is turning the economic picture of the world. Here are some examples. Everyone knows the electronic game Tetris. It was invented by the programmer of the Computing Center of the Academy of Sciences Pazhitnov, and she personally brought him $ 15,000. The computing center sold the rights to distribute the game to Nintendo. received $ 4 million, while the company received more than $ 1 billion. Another example is the famous Microsoft company. Its market value is estimated at 350-400 billion dollars, profit value is 50-70 billion, and the book value is only 510 billion. Russia is just entering this area, but we also have examples of high-tech business, in which knowledge prevails. The market value of the Russian company Paragraph International is $ 40 million with a book value of $ 1 million.

Conclusion

All this suggests that today, when society is developing rapidly, one should not underestimate the role of human knowledge and their contribution to the development of both individual companies and the national and world economy. Knowledge is becoming the engine for the development of mankind in various fields and with limited resources, such as financial, material and others, intellectual capital can become the key to success for many enterprises, organizations and entire industries.

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Comparative Characteristic of Conditions and Results of SME Operations in the Russian and European Economies

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Abstract

This article discusses practical aspects of SME's operations in the Russian Federation and the E.C. It researches the relationship and difference of recognition criteria as well as results of SME's activities, their contribution to the economies of the European states and Russia. A lot of attention is paid to the most important positions of SME's support. The article reveals SME's contribution to the economies of the countries under consideration as well as creation of new jobs, support of social stability. The work focuses on the problems in SME's development, such as budget financing, organizational and administrative barriers, accounting systems, the tax burden. The research will be useful not only for the existing entrepreneurs, but also to the top management of banks and governments, who are able to promote the development not only of a handful of companies but the economy as a whole.

Keywords: Small and Medium Entities, Entrepreneur, The Value Added, The Number of Employees, Support, Tax Burden, Innovations.

Introduction

Small businesses represent a significant part of the global economy, and can be one of the strongest factors in economic development and employment when given the right support, access to financial services and a favourable regulatory environment. The Understanding of SMEs by the leaders from around the world will help practitioners build successful small business operations. Small and medium entities do not require heavy investment and guarantee high velocity of resources (Adham, 2019). They react rapidly to market changes rendering the economy the necessary flexibility. These businesses are able of solving economic restructuring problems, forming and saturating the consumer goods market fast and cheap in a modern economy amid restricted financial sources. Besides, SMEs help solve the unemployment problem, help the appearance of the middle class and the class of medium-sized owners, who are interested in a stable economy of any state. Their taxes, being a leveraging instrument for the economy, are the backbone of budget revenue. This is why incentives for the development of entrepreneurship is an important government instrument.

Literature Review

The first scientific definition of the word entrepreneur appeared in the works of English economist of the end of the XVIIth - the start of the XVIII century R. Cantillon (1755), an entrepreneur was someone who operated in a risky environment, because merchants, farmers, craftsmen and other small owners buy things at one price and sell at another. In return, A. Smith (1776) believed that a businessman is an owner of capital, who takes risks to implement his commercial idea and get a profit. At the same time, J. Baudot (1797) defined an entrepreneur as someone responsible for the business he undertakes. This is a man who plans, controls, organizes and owns a company. Jean-Baptiste Say (1803) not only developed the three production factors theory (land, labour, capital), which are the sources of the society's riches, but viewed a businessman from the risk-oriented point of view, as they invested their own money. Schumpeter J. in 1934 underlined the primary role of entrepreneurship in creation of an

innovative economy (Say, 1803).) Filion L. (1997) was one of the first to consider businessmen's features from the point of view of different sciences.

The Russian Civil Code says that entrepreneurial activity is independent operations done at businessman's own risk aimed at a stable profit from the use of property, the sale of goods, work or services by the persons registered as such in accordance with the procedure established by law.

Theoretical Background

To start our research, let's turn to the 'company' category. The Russian Federation defines the 'company' term in the Civil Code, article 132. It says that a company is a combination of property, supposed to be used for entrepreneurial activities. This view means that a company comprises all property purchased for its activities, including land, buildings, constructions, equipment, implements, raw materials, products, claims, debts, as well as the right for the designations that individualize the company, its products, works and services and other exclusive rights. In European Union the economic essence of enterprise is determinated by Commission Recommendation 2003/361/EC of 6 May 2003.According to it, «an enterprise» is any entity engaged in an economic activity, irrespective of its legal form. Self-employed persons and family businesses engaged in craft or other activities, and partnerships or asso- citations regularly engaged in an economic activity are included in this definition.

In mind the provisions of article 3 of Federal Law 209 defines Russian SME as the subjects (companies and individual entrepreneurs), which satisfy the legal requirements and are entered in the Unified Register of Small and Medium Business Subjects. Under Federal Law 209-FZ, the SME criteria includes such "numeric" parameters as the number of employees and annual turnover (Table 1).

Table 1: definition of SMEs in Russia

Indicators	Enterprise Category		
	Micro SME	Small SME	Medium-sized SME
1	2	3	4
Employees	<= 15	100 to<250	<=250
Turnover	<=120 million rub.	<=800 million rub.	<=2000 million rub.

Source: compiled by the author

In the European Union, the number of employees and the turnover or total balance are also key indicators for classifying entities as SMEs. (Table 2).

Table 2: definition of SMEs in EU

Indicators	Enterprise Category		
	Micro SME	Small SME	Medium-sized SME
1	2	3	4
Employees	0 to < 10	10 to< 50	50 to <250
Balance sheet total	< €2 million	< €10 million	< €43 million
Turnover	< €2 million	< €10 million	< €50 million

In the E.C., the key factor of classifying as a SME is the number of employees. The employees are the people who worked full-time for a whole year as well as the company owners, the partners with managerial duties, who participate in company operations. The financial criteria is secondary in classifying a company as SME. For example, the turnover of a non-retail company is much lower than that of a retail firm. In such cases the overall balance is used apart from the net turnover.

An important difference of classification as SME in the E.C. is meeting at least one financial criteria. For example, if the total balance of a company exceeds a 45 mln euro limit, while the net turnover is below the acceptable level of 40 mln euros, the company will not lose the SME status. In Russia, this company will not be classified as SME, because it has to meet all the criteria for this. This study of the criteria shows that the Russian procedure of acknowledgement as SME is more difficult, because the criteria is higher, for example, the employee count is two times as high. This means that the number of potentially new SMEs in Russia will be smaller, other things being equal.

According to a Unified Register of SME Subjects, there were 6 mln SMEs in the Russian Federation, including 2.7 mln companies and 3.3 individual entrepreneurs as of the end of 2018. According to the Tax Service, the number of SMEs increased until August in 2018. Since August 10, 2018 the number has been falling. Analysts explain the slump by an annual deletion of non-operating SMEs from the database. This means that we cannot talk about the growing numbers of SMEs in Russia. However, 64% of the SMEs, which functioned in January 2016, are still working. Russia registers 56,000 new SMEs a month, while 28,000 stop their operations.

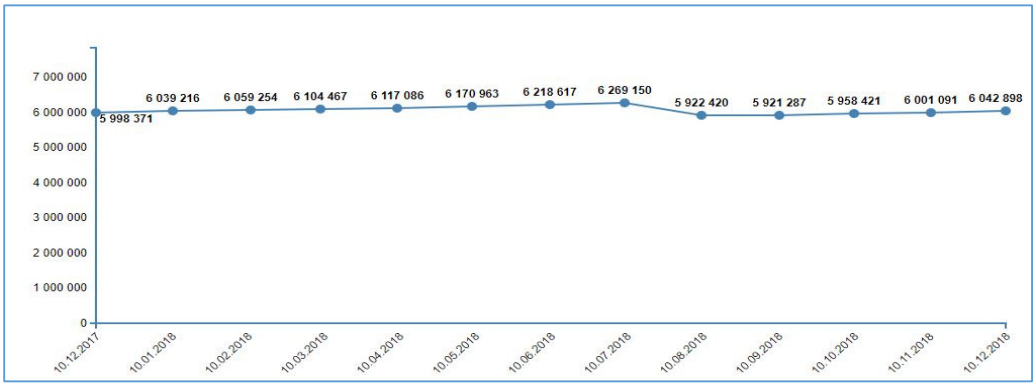

Figure 1: The number of SMEs for the period from 12/10/2017 to 12/10/2018
Source: compiled by the author https://ec.europa.eu/growth/smes/

In 2018, there were slightly more than 25 million SMEs in the EU, of which 93% were micro-SMEs. SMEs accounted for 99.8% of all enterprises in the EU-28 non-financial business sector (NFBS). They generated 56 .4 % of value added and 66.6% of employment in the NFBS. The number of enterprises in EU in 2018 is shown on Figure 2.

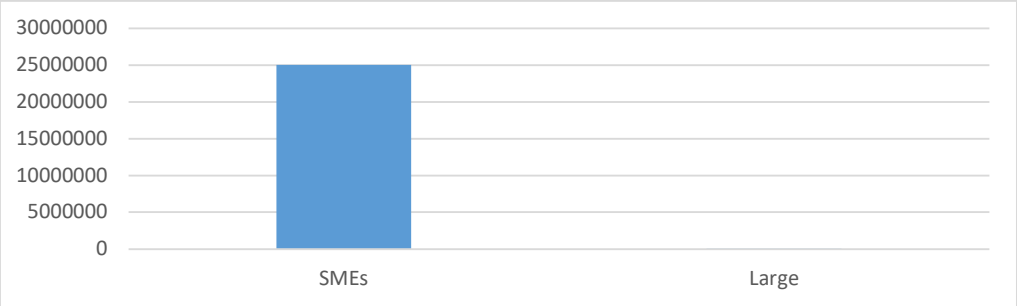

Figure 2: Number of enterprises in EU in 2018
Source: compiled by the author https://ec.europa.eu/growth/smes/

There are 27.6 enterprises registered per thousand Russians compared with 57 in the E.C. and the international level of 32.2 (Figure 3). This indicator fluctuates strongly in Europe – from 29 in Romania

and 115 in the Czech Republic. These figures demonstrate significant involvement of Europeans in entrepreneurship.

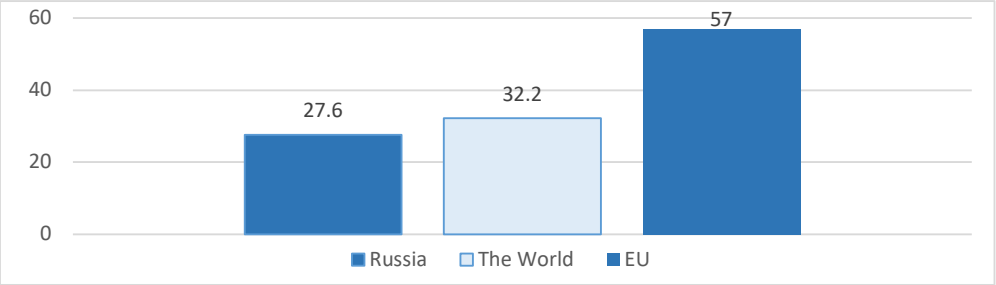

Figure 3: Data of SME's number of per 1000 people

Source: compiled by the author https://ec.europa.eu/growth/smes/

Figure 3 shows that the number of SMEs in Russia per 100 people are two times lower than in Europe and below the international indicator. However, according to the Russian Tax Service, 15.9 mln people were employed in small business as of the end of 2018. Consequently, SMEs account for about 25% of Russian employment compared to 61% in France, 62.9% in Germany and 65.6% in the Netherlands. Labour productivity has grown in EU SMEs, first of all due to the growth in the value added. Overall, in 2018, EUSME value added grew by 4.1% and EU SME employment by 1.8%. Micro SMEs have driven this recovery - they recorded by far the strongest value added and employment growth of all SME size classes.

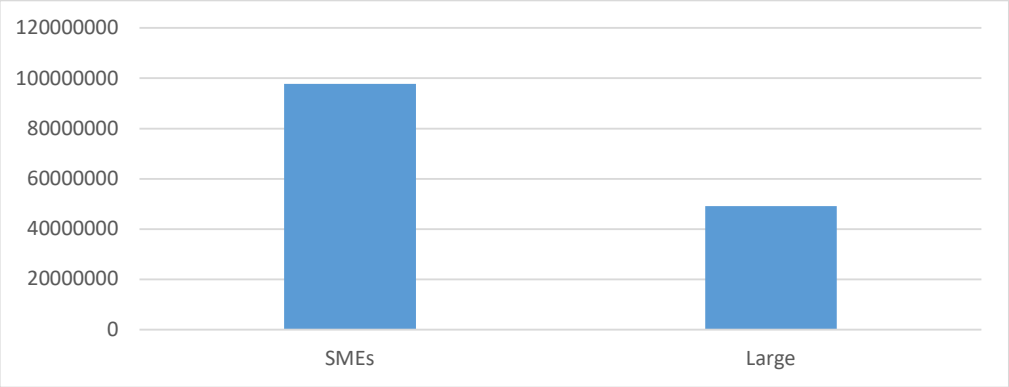

Figure 4: Number of persons employed in EU in 2018

Source: compiled by the author https://www.moodys.com/research/

We should agree with Commissioner for the protection of entrepreneurs ' rights under the President of the Russian Federation Boris Titov, who said that "only a higher turnover of small and medium enterprises, hi-tech facilities in industry and agriculture, innovative companies will ensure a wider taxation base, creation of new highly paid jobs, solution of social problems." Almost 50% of EU SMEs undertook some innovation activity over the last years. The participation of SMEs in innovation activities varies greatly across the EU, with the share of innovating SMEs in the total SME population ranging from 10% in Romania to 66% in Portugal. As an undoubtedly positive factor for the appearance of new SMEs, we see development of competition and entrepreneurship, which leads to a wider spread of innovations, and a higher efficiency of economy on the whole. Schumpeter, J.A. told, that those people who have implemented successful innovations can be found in the capitalist class. From this point of view, entrepreneurial activity can provide an excellent mechanism for social mobility, that is, achieving a higher social status for a person and his family (Croitoru A., 2012).

According to research the Stolypin Growth Economy Institute, total contribution of small business to the Russian economy amounts to a meagre 22%, as cited by the RBC news agency. Europe's average indicator amounts to 50-60% -- in Germany, the share of small and medium-sized business in GDP amounts to 53%, in Switzerland to 60%, and in the Netherlands to 63%.

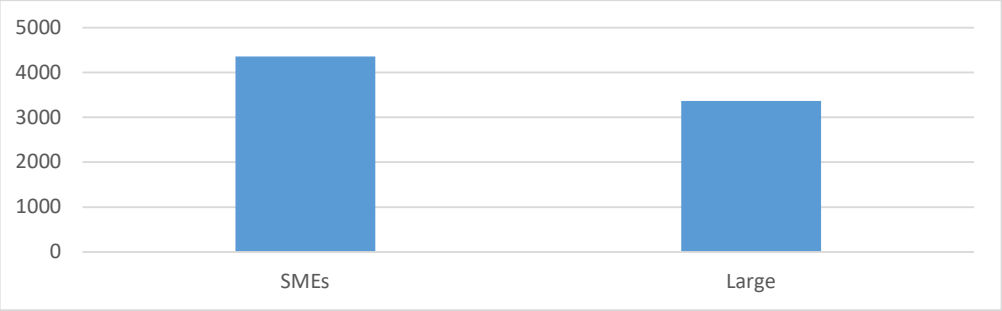

Figure 5: Value added in EU in 2018

Source: compiled by the author https://www.moodys.com/research/

On average, in the EU, SMEs have generated ca. 60 % of the increase in value added. Micro SMEs generated 28.5% of this increase, while small SMEs accounted for 16.9% and medium-sized - 14.1%. This increase in value added in EU was generated, mostly in less knowledge-intensive industries. There are more than 3⁄4 SMEs concentrated in only three areas: trade, construction and manufacturing, - 10.6% in Russia. Of course, state support of SME will stimulate economic growth and development of the country and increase social advantages of higher competition. This is why the SME development problem is solved through creation of a competitive business environment (Ayyagari, 2007)

Results and Discussion

The role of the government and its support in the development and duration of active SME functioning cannot be underestimated. CEER (2016) confirmed that the companies, which receive state support, have a higher chance to improve their financial indicators and survive fierce competition. In 2014-2020 €57 billion or ca. 20% of funding from the European Regional Development Fund (ERDF) were dedicated explicitly to SMEs support in European Union. The Russian government does not provide such huge support for SMEs. One of the most systemic and most efficient SME supporting programmes of the Economic Development Ministry is shrinking constantly – in 2015, total support of 85 Russian regions amounted to 16.9 bln rbls, while in 2018 it amounted to 5.02 bln rbl. (Kharakoz, 2018). At that, this programme finances the most important projects in most regions – creation of the innovative infrastructure. The government has the primary role in support of the innovative activities of SMEs. Many social achievements of the country are based on significant success of its small companies, such as SMEs (Cirera, 2017; Golubtsova, 2019.). The need for this type of support is explained by the existence of a closed circuit. The innovations developed by the SMEs, will, in their turn, have a positive impact on the growth of the size and number of SMEs, and, consequently, on the national economy growth (Petrov 2019; Tulio, 2019).

In particular, improvements in the overall innovation environment would have positive effects and stimulate innovation by SMEs especially in those Member States which rank less highly in the EU Innovation Scoreboard. Such policies would need to be complemented by policies directly targeting innovating SMEs and those that currently do not plan innovation activities (Bykanova, 2017; Kuznetsov, 2017). The main instruments of such policies may be: providing funding (grants, vouchers, tax credits), helping SMEs access the skills required for their innovation activities, and providing mentoring, advice and networking opportunities. Public funding of some of the SME's innovation activities would be especially valuable in those Member States as well as in Russia where such funding has declined in recent year (Kosolapova, 2019).

One of the most important factors of operation and especially establishment of a private business is undoubtedly the possibility to attract additional financial resources. That is why an affordable credit is an indispensable leverage on SME's activities. On the one hand, banks are not eager to cooperate with SMEs, on the other hand, they realize SME's hidden potential. The Moody's posits that in considering lending, the size of the company has a significant impact. Thus, higher default rates should be expected for smaller companies than for larger ones.

However, total outstanding amount of SME loans in EU decreased from a maximum of ca. EUR 85 billion in 2013- Q3 down to less than EUR 60 billion in 2018-Q4, that is ca. 30 %. According to the Expert Ra agency, the share of overdue credits among Russian SMEs amounted to 12.4% at the end of 2019 compared to 14.9% at the start of 2018. The total volume of overdue credits shrank by 16.2% to 521.8 bln rbl in 2018. The positive dynamics of SMEs' credit portfolio is confirmed by the data from 41 leading Russian banks. Despite a rise of credits issued to SMEs in 2018 (to 6.8 trln rbl, a record volume since 2015 and a 11% rise on 2017 levels), the crediting problem is seen as one of the most pressing and requires a solution from the very high levels of management. Many authors note that simplifying the registration procedure and reducing the tax burden are indirect measures to support the development of SMEs. The cross-country analyse of the burden of tax accounting and documentation processes in EU results in Figure 6.

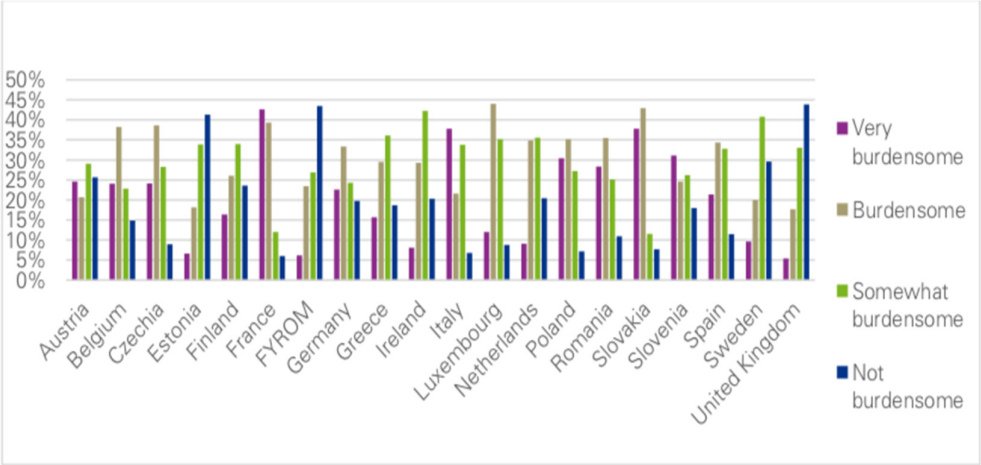

Figure 6: The burden of tax accounting and documentation processes in EU
(Source: KPMG 2018)

The most complicated system of tax accounting and documentation processes (fig. 6) exists in France, and the most simple - in United Kingdom. Empirical evidence shows that there is a robust, negative relationship between the complication of registration process, the amount of tax burden and the quantity of active SMEs in Russian Federation due to the very intricacy tax system (Ivanova, 2018; Akhmadeev, 2019). Case studies show that tax burden on business is still enormous in Russia. The current tax policies do not favour business development; they limit themselves to their fiscal function. Russia's payroll burden is 130% higher than the world's average (Turishcheva, 2019, Korableva, 2019). The situation with the administrative burden on SMEs in Russia is similar - 52% of businessmen had from 1 to 6 checks, including 5.6% who had more than 6 checks.

Conclusion

When comparing development of small and medium-sized businesses one should keep in mind the differences in defining SME subjects in different countries. The obvious solution to increase the number of Russian SMEs is a change of their criteria. According to the researches, Europeans'

involvement in entrepreneurship is on average two times higher than in Russia. At the same time the criteria for attribution to SMEs by workforce numbers in Russia is also almost two times higher.

Despite active development of small and medium-sized businesses in Russia, the indicators, which characterize their operations are much lower than those in Europe. The necessary and important step here can be a revision of economic policy, its targeting affordable loans, a more loyal tax burden, reduction of administrative barriers, higher professionalism of businessmen. The state SME support measures as the strongest lever should primarily include state preferences and guarantees offered in the form of credit guarantees, subsidies, training of entrepreneurs, access to the state order. Russia's tax burden does not comply with its labour productivity, which is much lower than in the developed states. The burden on the small and medium-sized businesses is higher than the burden on large business. This curbs SME's development, does not stimulate their growth, but encourage their splitting and going into shadows. The states with a higher GDP per capita ensure more loyal credit conditions and, consequently, a greater probability of successful functioning of SMEs. Finally, SMEs remain an underutilized resource of the Russian economy, and in European Union are the most effective and powerful tool in the development of an innovative economy as well as all over the world.

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Assessing the Level of Digitalization of Countries and Regions: Methodological Approaches

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Abstract

The potential for digitalization in countries continues to face a number of challenges that hinder both the sustainability of digitalization initiatives and the expected benefits. Taking a critical approach to a realistic perspective, this article examines the main cause-and-effect factors and indices that characterize the digitalization of the economy of a country or business entity. .New digital technologies are rapidly penetrating the economy of various countries and regions, having a significant impact on the development of its infrastructure and economic efficiency. The effectiveness of the latest digital technologies is becoming a key element of international economic competition. The increasing use of modern information and communication technologies is becoming a prerequisite for the emergence and development of new effective management technologies, business practices and successful business operations. Therefore, most countries and regions stimulate these processes at the state and regional levels. To ensure the systematic implementation and development of digital technologies, it is important to develop methodological approaches to assessing the level of digitalization of countries and regions.

Keywords: Digitalization, Digital Transformation, Digital Economy, Big Data, Artificial Intelligence.

Introduction

There are several approaches to defining digitalization in the literature. According to Reddy and Reinartz (2012), digitalization has two definitions and one of them is the use of the Internet and the computer to create effective economic value relative to the traditional sense.

The other definition fully asserts the new technology's changes in operation, interaction, configuration, and wealth creation in relation to the broader meaning. Schallmo et al (2017) investigate the definition of digitalization and the proposed definition of digital transformation for business model research. According to Schallmo et al. (2017) digitalization involves networking business, customers, segments and requires data analysis to achieve the information used to evaluate the options that performance in order to increase value.

Berman (2012) proposed the value of digitalization based on consumer value and transformational operations based on digital technology to achieve customer collaboration and interaction for successful digital transformation. The digitalization of countries can be measured with six key attributes: ubiquity, accessibility, reliability, speed, convenience and skills.

Westerman et al. conducted an Executive study on digitalization in terms of three aspects: buyers, business models, and operational process.

In the literature, Schwarzmuller investigated how digital transformation affects organizations. Majchrzak et al (2016) conducted a study on the implementation of digitalization. Balyer and Oz (2018) investigated the impact of digitalization on education according to the point of view of academics. Bouwman investigated the effects of digitalization on small and medium-sized businesses.

Motta also investigated the impact of digitalization on socio-economic development. Lee investigated the ability of small and medium-sized businesses to digitally transform.

Loonam investigated some case studies on digital transformation. Digitalization affects the world economy, contributes to the emergence of such concepts as the digital economy (UNCTAD, 2017).

Russia, like other countries that have a significant impact on the global and political arena, has entered the digital technology race. This is also facilitated by the fact that, according to most indicators characterizing socio-economic development, Russia is among the countries that are world leaders.

So according to the CIA Fact book 2018 Russia:

by occupied area - takes first place in the world;

by population - ranks ninth in the world;

in terms of GDP (purchasing power parity) the sixth place in the world, after Germany and Japan;

in terms of exports of products in 15th place in the world Singapore, Mexico and Canada;

by the number of Internet users in 6th place in the world after Japan and Brazil;

by the ratio of the number of Internet users to the total population in twenty-eighth place in the world, ahead of the United States and lagging behind countries such as Israel and Spain.

Despite the leading places in the world in the level and dynamics of indicators, Russia lags behind most countries in the dynamics of socio-economic development.

For example, in terms of happiness, Russia is in 68th place in the world after countries such as Peru, Portugal and Pakistan. Also, the residents of Russia have a rather low level of GDP per capita in terms of which, amounting to $ 27,900, Russia ranks 74th in the world.

This necessitates the speedy development of digital technologies in Russia, as their speedy implementation will significantly increase the efficiency of economic processes. The result of increased efficiency will be an increase in the level of happiness and income of the population.

Formulation of the problem

New digital technologies are dynamically penetrating the economies of various countries and regions, having a significant impact on the development of its infrastructure and economic efficiency. The effectiveness of the latest digital technologies is becoming a key element in international economic competition. The expanding use of modern information and communication technologies is becoming a prerequisite for the emergence and development of new effective management technologies, entrepreneurial practices, and successful businesses. Therefore, most countries and regions stimulate these processes at the state and regional levels.

The effective development of digital technologies and the planning of their development cannot be carried out without constant monitoring of the digitalization level of Russian society, both as a whole and by regions. Therefore, the development and improvement of methodological approaches to the evaluation of digitalization processes is relevant.

Results

Currently, there are many ratings and indices that characterize the digitalization of the economy of a country or business entity. Among these studies, the following research and development should be highlighted.

a. Digital Evolution Index rating developed by MasterCard and the School of Law and Diplomacy named after Fletcher at Tufts University.

The results of the study show the competitiveness and development potential of the digital economy in 60 countries. The Digital Evolution Index 2017 rating evaluates each state according to 170 unique parameters.

They describe 4 main factors that determine the pace of digitalization:

- level of supply (availability of Internet access and degree of development

infrastructure);

- consumer demand for digital technology;

- environment (state policy, legislation, resources);

- An innovative climate (investments in R&D and in digital startups).

The MasterCard study proposed a way to study and measure the level of “digital trust”, as well as assess the state and speed of digital development.

In addition, the Digital Evolution Index considers various examples of the introduction of digital services around the world, which allows each state to study the practices of other countries.

The disadvantage of this rating is that this rating reflects the progress in the development of the digital economy throughout the country, in terms of integrating the global network into people's lives.

b. ICT Development Index, an IDI that is measured annually by the International Telecommunication Union, a specialized UN entity.

The index consists of 11 statistical indicators reflecting the availability and use of ICT, as well as practical skills in the use of ICT by the population of 190 countries

The IDI is comprehensive and is based on the following three basic factors (sub-indexes).

The basic factor (sub-index) “Access” (Access): the number of subscribers of fixed telephone lines per 100 inhabitants, people .; the number of mobile phone owners per 100 inhabitants, people; width of the cross-border channel in terms of one Internet user, Bit / s; share of households with a computer,%; share of households with Internet access,%.

The basic factor (sub-index) “Use”: the percentage of Internet use,%; fixed wired access per 100 inhabitants, people; the number of active subscribers to mobile broadband access per 100 inhabitants, people

Basic factor (sub-index) “Skills”: average number of years of study, year; primary education enrollment rate,%; indicators of secondary and higher education coverage,%.

The main drawback of this rating is that it provides the basic parameters for the development of ICT in the country (regions), but does not answer many questions related to the introduction of new technologies, such as cloud computing, the Internet of things, big data, which significantly determine the degree advancement of the country (regions) on the path to building a digital economy.

c. PwC's The Future is Coming Rating

The study provides a rating of large cities in terms of their readiness to introduce new digital technologies, as well as their current capabilities, readiness and elaboration of the implementation of technological solutions and products in various social spheres: health, education, security, tourism and culture, transport, economy , Housing and communal services, urban planning, interaction with citizens.

The readiness of the city was assessed by a number of parameters: infrastructural readiness (availability of basic infrastructure), regulatory and technological readiness (availability of strategies, regulations and examples of innovative solutions), as well as the social readiness of citizens to use future technologies.

Index “Virtual services”: “E-democracy and budgeting with the support of citizens' initiatives”, “City as a service”.

Digital Economy Index: A Shared Economy (a shared economy means the physical or virtual association of people to use resources and skills effectively, the sharing of cars (Carsharing) or group trips (Ridesharing) are typical examples of a shared economy); “Innovative financial technologies” (as examples of innovative financial technologies, the authors call decision-making technologies based on big data analysis in the financial industry, as well as block chain-based decisions); “Industry 4.0” (production based on robotics and process automation, including innovations such as the use of industrial IoT and 3D printing).

Infrastructure Readiness Index (readiness to implement 5G technology that provides data transmission with high bandwidth and minimal latency (including to support unmanned vehicles), and IoT networks with low power consumption and a large number of connected devices (including for personalized medicine), the development of data analysis centers using intelligent analytics and artificial intelligence, as well as providing online information about the city and its development based on data (received from city services, residents and companies): “Data Infrastructure”; "Data usage"; "Data analysis".

The Smart Home and Utilities Index (smart lighting systems, smart electricity networks, the use of sensors in housing infrastructure and utilities to monitor and optimize resource consumption): Smart buildings and systems for efficient use of resources; “Intelligent Electric Networks”.

“Unmanned transport” index (the index determines the willingness to switch to unmanned electric vehicles, which will optimize travel time, reduce the number of traffic jams and incidents, improve the environmental situation in the city, as well as readiness for aerial drones, which will take on many functions of transport and monitoring services): “Unmanned ground transportation”; “Unmanned aerial vehicles”.

Index “Digitalization of Culture and Tourism”

Smart Health Index

Open Adaptive Education Index

Proactive Security Index

Index "Virtual city".

One of the drawbacks of PwC's The Future is Coming rating is that the PwC rating assesses a greater degree of readiness to introduce technologies than the effect of their introduction; The rating is aimed at researching megacities.

d. Global Connectivity Index (GCI), Huawei

When calculating this index, the country's status in the field of digital economy development is determined, which is determined by investments, implementation, experience and potential in building the appropriate ICT infrastructure.

The GCI index takes into account the degree of development of such technologies in the country as big data, cloud technologies, data centers, the Internet of things and broadband data transfer. The degree of implementation and commercialization of these technologies is evaluated in various categories, including supply, demand, quality and potential.

The main drawback of the GCI index is the lack of official statistics for most countries and the world and their subjects. The development of the entire spectrum of digital technologies is not disclosed.

e. The Digital Russia Index, which allows one to evaluate each subject of the Russian Federation by a wide number of criteria using weighting factors, including based on:

assessing the level of public coverage in open sources of development in the constituent entity of the Russian Federation of normative regulation and administrative indicators of digitalization, ensuring the digitalization of the economy at a particular point in time;

assessment of the level of public coverage in open sources of development in the subject of the Russian Federation, specialized personnel and training programs that ensure the processes of digitalization of the economy at a particular time;

assessment of the level of public coverage in open sources of development in the constituent entity of the Russian Federation of the availability and formation of research competencies and technological groundwork, ensuring the processes of digitalization of the economy at a particular point in time;

assessment of the level of public coverage in open sources of development in the constituent entity of the Russian Federation, the direction of the information infrastructure that ensures the processes of digitalization of the economy at a particular point in time;

assessment of the level of public coverage in open sources of development in the subject of the Russian Federation, the direction of information security, ensuring the processes of digitalization of the economy at a particular point in time;

assessment of the level of public coverage in open sources of financial and economic efficiency of the development of digitalization in the subject of the Russian Federation at a particular point in time;

assessment of the level of public coverage in open sources of the social effectiveness of the development of digitalization in the subject of the Russian Federation at a particular point in time.

As conceived by the creators, the Digital Russia Index allows you to get an expert assessment of this parameter in the context of each subject of the Russian Federation, the accuracy and reliability of which corresponds to the accuracy and reliability of information obtained from open sources.

In our opinion, this approach to the level of digitalization has its drawbacks, as it is associated with the level of public coverage of one or another aspect of digitalization in the region of the Russian Federation. Also, this rating can be used to a limited extent to assess countries and regions of the world as a whole.

Conclusions

The study showed that at the present time the introduction of the latest digital technologies can improve the efficiency of the economic activity of the country in its regions and the world economy as a whole. Digital technologies, including indirectly affect the overall level of socio-economic development of the country, which makes them a relevant tool for the development of modern society.

Formation of plans for the development of digital technologies and their development is impossible without an objective assessment of the current state in a particular country and its regions, as well as in the world as a whole. Therefore, most of the participants in digitalization form their methodological approaches to assessing the level of digitalization.

The analysis above showed that each of the assessment methods has its own characteristics and disadvantages.

In our opinion, the main drawback of existing methods is the lack of assessment of the negative impact of digitalization on society. The most striking examples of the negative impact of digitalization include the emergence and explosive increase in the number of cybercrimes, cases of dependence on the Internet and computer games in children and adults.

Therefore, in our opinion, the complex of assessing the digitalization level of socio-economic objects (the subject of a particular country, country, region of the world and the world as a whole) should consist of several main blocks:

a. Assessment of the technological level of digitalization in a particular region.

b. Digitalization assessment in relation to socio-economic processes.

c. Assessing the negative impact of the digitalization process on society.

The following indicators can be used as indicators for assessing the negative impact: the number of cyber-attacks (theft of cash from credit and debit cards, suicide using social networks, theft of vehicles and real estate using electronic means of registration, theft of personal data), cases of dependence from the Internet and games, including mental illness, the average time spent by children and adults in social networks and games, in comparison with the standard, I provide general normal physical and mental condition of a person, without consequences for health and psyche.

The calculation of such an indicator will allow us to identify not only the overall development of digital technologies in a particular region or country, but also to assess the negative consequences of their implementation.

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Integration and Safety of Immigrant Students: Implications for Migration Governance

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Abstract

Immigration-driven population growth has a considerable impact on schools. The aim of this paper is to investigate factors associated with successful integration of immigrant students: student safety and integration policies. More specifically, the study focuses on the following research questions: (1) To what extent does safety in the classroom affect successful integration of immigrant students? (2) What are the educational solutions adopted by schools in the countries that are the most successful at educating foreign students? (3) Do safety in the classroom and integration policies affect educational attainment of immigrant students? The study shows that creating safe space in the classroom empowers learners and facilitates their development. It is a space that enables learners to take risk and tackle challenging issues. Furthermore, immigration policies foster the integration of migrants and help them achieve academic success. In fact, strict immigration policy and effective integration policies are the key indicators of high academic performance of immigrant children. In increasingly diverse schools, policy interventions should aim at providing language, social and emotional support. The analysis also provides implications for migration governance.

Keywords: Immigration, Safety, Immigrant Integration, Intercultural Education

Introduction

Increased migration flows lead to rapidly changing demographics and social structure, especially in urban areas. Immigration-driven population growth has a considerable impact on schools that should provide learning, social and emotional support to empower disadvantaged students and facilitate immigrant integration. However, immigrant students face a variety of challenges that become an obstacle to successful social integration. Challenges, such as low income, informational gaps as well as language and cultural barriers, affect their social and cognitive development, academic performance (Gonzalez, 2003; Lacoe, 2016), restrain their educational and occupational choices, and prevent social inclusion (Gitlin *et al.*, 2003; Plenty and Jonsson, 2017). Educational institutions need to buffer the negative effects experienced by foreign students during their acculturation process.

Safety of immigrant children is another important issue that needs to be considered. Research shows that immigrant minors' safety may be at risk, e.g. circa 10% of migrants in the farm work force in the US are unaccompanied minors (McLaurin and Liebman, 2012). Furthermore, foreign students struggle with learning, well-being (Oliveira, 2017) and mental health issues (Fawzi, Betancourt and Marcelin, 2009). They also tend to attend disadvantaged, violent, and disorderly schools (Peguero and Bondy, 2017). Finally, they struggle to assimilate into the local community as the local population is preoccupied with migration affecting local labor markets, causing potential violence and lowering levels of academic performance at schools (Gitlin *et al.*, 2003).

Successful integration of foreign students at school is a complex process. The aim of this paper is to investigate factors associated with successful integration of immigrant students. The study seeks to address two of the most significant factors related to immigration: student safety and integration policies. More specifically, the study focuses on the following research questions: (1) To what extent does safety in the classroom affect successful integration of immigrant students? (2) What are the

educational solutions adopted by schools in the countries that are the most successful at educating foreign students? (3) Do safety in the classroom and integration policies affect educational attainment of immigrant students? The study is based on a thorough literature review and the analysis of the results of the Programme for International Student Assessment (PISA) and immigration policies adopted by the countries where immigrant students scored highest in the PISA assessment. The study contributes to a comprehensive understanding of effective integration of immigrant children in schools.

Safe space at schools

Safety in the classroom is a prerequisite for academic performance (Piaget, 1936; Maslow, 1970). Students who do not feel safe in the classroom underperform on standardized rates, are more frequently absent from school (Lacoe, 2016), do not activate higher level thinking (Maslow, 1970). Creating safe space in education is also essential to empower learners, to let their ideas grow and creativity develop. It is a space that enables learners to take risk and be involved in challenging issues such as diversity, multiculturalism and injustice (Holley and Steiner, 2005, p. 49) that immigrant students face on a regular basis. In order to deal with difficulty, students also need to put themselves at risk and dare to be vulnerable. Therefore, not only a safe space but a 'brave space' needs to be created where diversity and injustice immigrant students face will be challenged (Arao and Clemens, 2013) and where constructive feedback will be offered. As Kislyakov et al (2014) argue, "[s]ocially safe and functioning education environment defines the success of formedness of students' professional competencies that relate to the life in multi-cultural society, harmonization of inter-ethnic and cultural relationships, prevention of xenophobia, strengthening of tolerance in education environment."

The feeling of safety, just as perceptions of disciplinary fairness, racial tension and disorder, differ among students of various ethnic and racial backgrounds. For instance, Black and Hispanic students tend to report feeling unsafe more frequently than their Caucasian or Asian classmates who attend the same classroom (Lacoe, 2015). Minority students are frequently targeted by bullying (Hjern *et al.*, 2013), have low peer status and are marginalized (Plenty and Jonsson, 2017). Discipline and disorder affect more deeply the safety of minority students than their non-minority classmates. Therefore, creating safety in the classroom should be educators' major objective.

School plays a very important role in the integration and upward mobility of disadvantaged groups as its positive structural and relational features can help address the barriers disadvantaged students face (Hao and Pong, 2008). Structural aspects include curriculum, specific programs, enrollment size, demographics and other attributes whereas relational features refer to collective responsibility for student learning, academic standards, and student-teacher relations. Research shows that low-income and minority students succeed in schools with narrow curriculum and strong academic focus (Lee and Smith, 1993; Lucas and Berends, 2002), controlled variations in demographic composition (Griffith, 2010), and small enrollment (Lee and Smith 1996). As for relational attributes, disadvantaged students benefit from teachers' high expectations, emotional student-teacher relationship (Crosnoe, Kirkpatrick Johnson and Elder, 2004), and increased collective responsibility for students' development and academic achievement (Hao and Pong, 2008).

Educational attainment of immigrant students

Educational attainment refers to "the quality and quantity of knowledge, skills and positive attitudes, behavior and philosophy that students acquire" (Tamanja, 2016, p. 110). First, it needs to be emphasized that students across culturally contrasting groups adopt similar approaches and strategies that help them achieve academic success (Entwistle, Tait and McCune, 2000; Domalewska, 2017). However, a large body of research points at barriers that impede immigrant students' academic success (Gonzalez, 2003; Lacoe, 2016). First, academic success is associated with factors such as socio-economic status, parents' education level, parental involvement over child academic achievement, learner attitudes to learning, and school environment factors. Therefore, immigrant

families face the same challenges as their similarly disadvantaged native counterparts, namely economic and sociodemographic factors as well as bureaucratic complexity or distrust of government programs (Karoly and Gonzalez, 2011). However, immigrant students face additional challenges, such as informational gaps, language and cultural barriers, well-being (Oliveira, 2017), and mental health issues (Fawzi, Betancourt and Marcelin, 2009).

On the other hand, a large body of research proves that some countries are effective in educating foreign students. OECD (2015) present the results of the Programme for International Student Assessment (PISA) and compare the scholastic performance of first- and second-generation immigrants with comprehensive immigration policies adopted by the country. The findings prove that the academic success of foreign students depends mainly on the immigration policy rather than systemic solutions adopted by schools. Foreign students achieve academic results similar to native pupils in Singapore, the Chinese region of Macao, Hong Kong, Canada, and Japan, whereas the greatest difference in school performance between foreign and native students was observed in Slovenia, Sweden, Denmark, Finland and France. Table 1. presents the results of several indexes related to migration of the countries that scored highest in the PISA assessment. The indexes include overall migrant integration policy index, education, permanent residence, anti-discrimination, immigration policy, and PISA score.

Table 1: Determinants of academic achievement of immigrant children

	Singapore	**Canada**	**Japan**	**Hong Kong**
Overall migrant integration policy index (MIPEX 2015)	N/A	68 (6th in the ranking)	44 (27th in the ranking)	N/A
Education (MIPEX 2015 score)	N/A	65 (4th in the ranking)	21 (29th in the ranking)	N/A
Permanent residence (MIPEX 2015 score)	N/A	62 (16th in the ranking)	59 (20th in the ranking)	N/A
Anti-discrimination (MIPEX 2015 score)	N/A	92 (1st in the ranking)	22 (37th in the ranking)	N/A
Immigration policy	skill-based, supply-driven system	skill-based, supply-driven system based on points	skill-based, supply-driven system based on points	skill-based, supply-driven system based on points
PISA score (OECD 2015)	564 in Math (1st in the ranking) 535 in Reading (1st in the ranking) 556 in Science (1st in the ranking)	516 in Math (10th in the ranking) 527 in Reading (3rd in the ranking) 528 in Science (7th in the ranking)	532 in Math (5th in the ranking) 516 in Reading (8th in the ranking) 538 in Science (2nd in the ranking)	548 in Math (2nd in the ranking) 527 in Reading (2nd in the ranking) 523 in Science (9th in the ranking)

As presented in Table 1., the academic success of immigrant students correlates with restrictive immigration policies, but rather not with indexes measuring integration of immigrants. Immigrant policies in most top-ranked countries in the OECD report have adopted restrictive immigration policies that encourage top professionals to settle down permanently in order to ensure work efficiency and economic stability (Singapore is the only country that favors short-term migration to fill labor gaps). Immigrant integration policies do not correlate with foreign students' academic achievement. Japan's integration policies are under-developed. Foreigners, for example, live in separated residential areas. The country also lacks coordinated policies to support newcomers. Hong-Kong fails to promote civic and social integration of immigrants. What is more, state policies lead to

discrimination against migrants (e.g. unfavorable welfare policies and territorial segregation of newcomers in the poorest districts) (Law and Lee, 2006). Both in Japan and Hong-Kong strict immigration policies contribute to the stigmatization of foreigners and social exclusion.

Singapore and Canada, on the other hand, are rigorous in accepting immigrants but at the same time value integration of newcomers. Singapore is a unique country as its population is mostly composed of immigrants. The country's economic development is closely related to the country's policy to attract foreign manpower to overcome the shortage of local human resources[i]. However, the country has been curbing immigration since a high level of migration resulted in social problems. At present Singapore's immigration policy is highly selective based on labor demand in the market favoring temporary immigrants as a temporary response to labor shortages without granting them residence, family reunion right or welfare entitlement (Lian, 2016). Singapore's education is based on multiculturalism since early childhood when children internalize knowledge, attitudes and skills necessary to participate successfully in a pluralistic society. Educational policy both promotes diversity through preservation of the cultural identity of the ethnic groups and maintains social cohesion among different groups (Berthelsen, Karuppiah, 2011). Foreign students' needs are effectively catered for as they can enroll in supplemental English language courses, orientation and induction programs whose goal is to facilitate adjustment to life in Singapore. Additionally, special programs enable integration of foreign students, such as life-skills workshops, teacher mentors, local buddy schemes (buddies introduce newcomers to Singaporean school system and lifestyle easing their transition to a new culture) (Ministry of Education in Singapore, 2010).

Canada has long been an immigrant receiving country; therefore, the country has developed effective integration policies. Canada was ranked first out of 38 countries for its anti-discrimination policies and has reached the top five in terms of family reunification, education and labor market mobility (MIPEX 2015) (see Table 1.). The country has implemented a 'human capital' immigration model based on a point system. However, recently Canadian immigration policy has been undergoing restrictions with longer wait for permanent residency and more complex naturalization process.

In Canadian schools 22,7% of 15-year-old students are 1st and 2nd generation pupils (MIPEX 2015). High academic achievement of immigrant students is mainly attributed to generous funding on education, teacher support (e.g. training), and school programs to further foreign students' academic pursuits (e.g. language courses, mentoring programs, tutoring, and afterschool clubs). Social support is also offered for students and their families when immigrants may receive guidance from counselors, social workers and psychologists to assist in their effective social, economic and cultural integration (Cardoza, 2018). Finally, Canada promotes the recognition, retention and fostering of cultural and ethnic identities to facilitate integration (Griffith, 2017), as it encourages "the feeling of differentiation from others, the recognition of one's own difference, the sense of belonging, and consequent mechanisms of inclusion and exclusion, which are in turn created, maintained, and reinforced through public policies and the law" (La Barbera, 2015, p. 9).

To sum up, the educational solutions adopted by schools in the countries that are the most successful at educating foreign students, share one underlying principle: restrictive immigration policies. A large body of research (Levels, Dronkers and Kraaykamp, 2008; Hartwich, 2011) proves that strict immigration policy is the key indicator of high academic performance of immigrant children. High educational and occupational status of foreign students' parents as well as ambitious family background ensures that immigrant students enjoy familial support and are eager to succeed, which is the best predictor of academic success.

Parental socio-economic status is a significant variable that determines the academic performance of immigrant students. However, familial socialization may buffer the negative effects of low socio-economic status. As Yamamoto, Liu and Liu (2016) show, low-income parents hold stronger beliefs about parental responsibility for education whereas middle-class parents offer more reading engagement and enrichment activities, which boosts students' educational attainment. Other factors that influence high academic outcomes include maternal education, maternal supportiveness, and

literacy stimulation (Mistry *et al.*, 2008). Therefore, socialization processes in the family influence academic disparities of foreign students.

Yamamoto, Liu and Liu (2016) also prove that low-income parents offer less stressful environment, which is a factor that correlates with academic success. Increased parenting stress negatively influences child development through early exposure to parental maladaptive behaviors (Ritchie *et al.*, 2009; Zajicek-Farber, Mayer and Daughtery, 2012) and through being brought up in a stressful environment (Kendler and Prescott, 2006; Timko, Cronkite and Moos, 2010). In fact, stress is a factor that exerts negative impact on mental health and well-being. Immigrants face numerous stressors upon arrival to the target country, including discrimination (Żakowska and Domalewska, 2019), language barrier, loss of social support, isolation, and culture shock.

Conclusions, Research Recommendations and Practical Implications

The study aimed to contribute towards the understanding of successful integration of immigrant students at schools, which can be observed when students feel empowered to develop socially, emotionally and cognitively. Therefore, academic excellence is one of the factors that indicate successful integration. Two dependent variables were analyzed to explain immigrant integration at schools: safety in the classroom and integration policies. The results of the study indicate that the migratory background does not determine the academic success of students as in many countries (such as Singapore, Canada, Japan, and Hong Kong) foreign students attain educational success at a level comparable to non-immigrants. Immigrant families face economic and sociodemographic challenges similar to other disadvantaged groups. Additional obstacles that impede integration include informational gaps, language and cultural barriers. These barriers should be addressed to implement policy options in order to help migrants overcome them. Therefore, policy interventions should aim at providing language, social and emotional support.

Safety in the classroom facilitates students' social, emotional and cognitive development. When students study in a safe environment, they can tackle challenging issues, discuss conflicting ideas and deal with tension and difficulties they experience on everyday basis. As minority students are frequently targeted by bullying, have low peer status and are marginalized, creating safe spaces offers a buffer zone that is necessary to help students deal with negativity. Another factor that correlates with the educational attainment of immigrant students is strict immigration policies because they foster the integration of migrants. Restrictive immigration policies favor immigrant families with high educational and occupational status as well as ambitious family background, which ensures that immigrant students enjoy familial support and are eager to succeed academically. However, immigration policies should be accompanied by effective social, economic and cultural integration.

In increasingly diverse schools, education should be based on multiculturalism because students need to internalize knowledge, attitudes and skills necessary to participate successfully in a pluralistic society. Culturally responsive curriculum should be promoted. Teachers need to adapt classroom practice to the changing needs of students. Furthermore, teacher education programmes need to effectively prepare preservice teachers to handle increasingly diverse schools. Teachers need to acquire different strategies to empower disadvantaged and immigrant students and help them feel safe in the classroom. Effective strategies include culturally responsive teaching, establishing a bond with students, and creating caring and safe communities. New technologies offer a variety of didactic tools that can be easily implemented in the classroom to provide a safe learning environment for students (Gawlik-Kobylińska and Maciejewski, 2019).

Finally, given shifting immigration trends and demographics, coordinated integration policies that support newly-arrived immigrants need to be implemented. School helps to overcome the obstacles immigrant students face; therefore, it facilitates immigrant integration. However, further research is needed to point at the correlation between integration policy and specific educational outcomes across countries.

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[i] International migrant stock rose from 18,1% in 2000 to 30% in 2016 (Yang, Yang , Zhan, 2017). Most migrants come from Malaysia, China, Hong Kong, Macau and South Asian countries. In 2010 immigrants constituted 34,7% of Singapore's labor force. They either get high-paying jobs in e.g. high-tech industries or fill low-skilled ends of the labor spectrum doing jobs that Singaporeans are reluctant to take up such as in the construction, manufacturing, domestic labor, or marine industries. The latter group of migrants remain a transient workforce managed through strict policies of the work-permit system, the dependency ceiling regulating the number of migrant employees in the company and the foreign-worker levy. When the foreign-born worker's employment relationship terminates, the work permit expires and the migrant has to leave Singapore within 7 days (Yeoh and Lin, 2012).

Multivariate Analysis and Modeling of Sources and Financing Structure of Innovative Enterprises in The Russian Regions

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Abstract

The identification of the innovative growth determinants, as factors affecting the innovative activities performance at the regional, level and the assessment of the impact of the structure and sources of funding on the effectiveness of innovative development in the region are one of the relevant research areas in the context of the countries' strategy of innovative development. The article presents the tools, models and findings of multivariate analysis and modeling of the influence of sources and structure of financing of innovations on manufacturing innovative goods in 80 Russian regions. Based on the various mathematical models of regression analysis - the least-squares, least modules and minimax criteria - the structural changes in the sources of funding innovative enterprises were assessed in two groups of Russian regions - in leading regions and in regions with an average share of innovative goods in GRP for the period 2011-2017. It was inferred about the stronger effect of the equity of innovative enterprises on the volume of innovative goods related to the spatial specificity of regional capital markets and the lack of an effective mechanism for capital spillover on them, insufficiently effective financial mechanisms and high risks of innovation investment. Strong regions conduct innovative activities based on their own investment resources. Regions with a mean level of innovation development increase the ratio of funds raised from the business sector, but this is not enough to become a leader. There are identified the directions for the development of instruments and mechanisms of innovation financing.

Keywords: Innovation Financing Sources, Region, Economic Modeling, Minimax.

Introduction

At the current stage of development, public policy, regions and enterprises in all advanced countries of the world focus on fostering innovations. One of the most important components of the innovation development strategy is to increase innovative activity and expand the range and forms of sources of innovative activity financing.

The problem of identifying the determinants for innovative growth, analyzing innovations financing sources and assessing the impact of their structure on the effectiveness of innovative development in the region is one of the relevant areas of research in this field.

The aim of the study is to analyze the current state and dynamics of innovations financing sources in Russian regions from 2011 to 2017, as well as to design mathematical tools for assessing "noisy" data on financing innovative enterprises and innovative development of the regions.

The object of the study is the assessment of structural changes in the sources of financing of innovative enterprises in the Russian regions from 2011 to 2017 in order to determine the dominant sources and the direction of their development.

To solve the set problems the study went through the following stages:

- assessment of the dynamic series of socio-economic indicators in the regions to characterize the structure and dynamics of innovative regions financing in the Russian Federation and the grouping of Russian regions into three homogeneous groups in decreasing order of innovative goods in GRP;
- selection of research tools, the testing of relevant use of various mathematical models of regression analysis - least squares, least modules and minimax criteria - for the development of mathematical tools for assessing the dynamic series of socio-economic indicators;
- determination of the presence and nature of the influence of innovative activities financing the structure and volumes on the dynamics of the innovative products production in regional economies, modeling of the correlation among indicators and the assessment of influence of financing sources on the results of innovative activities using methods of economic and mathematical tools in each group of regions;
- identification of directions of the financing sources for innovation development, elaboration of measures to improve the efficiency of the enterprises' innovative capital structure in the context of regional economies.

The study applies a minimax approach based on a problem generalization by P. Chebyshev, which is improved for its application to two-factor dependencies. Computational experiments were performed to evaluate the economic and statistical dependencies in the innovation sphere, and regression parameters were evaluated in the "production and innovation function" model within two groups of regions. Elements of the novelty and scientific significance of the study consist in the elaboration of approaches to assessing the effectiveness of regional innovative development using the minimax criterion and in posing the problem of studying the interconnections of the financial structure of innovative capital, economic growth and determining the degree of influence of financing sources on it.

Theoretical Framework

Problem of innovation financing

The problems of developing sources of financing innovation are relevant and characteristic of all countries. The success of innovations as one of the main conditions for economic growth is largely determined by their financial support and investments (Davidson, Mariev & Pushkarev, 2018). In advanced countries, the bulk of R&D funds come from the private business sector and industrial companies (Firsova, Novoselova & Vavilina, 2018). The experience of advanced economies indicates that the leaders in R&D are those countries where the demand for innovation from the private sector of the economy is high, and this is the driver of an innovative economy (fig. 1).

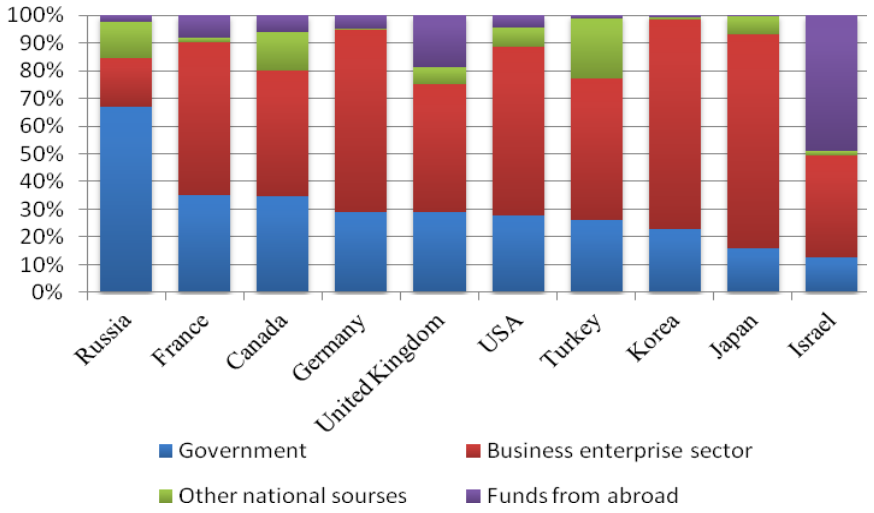

Fig. 2: R&D cost structure by source of funding by country
Compiled by the authors based on data from Rosstat (Rosstat, 2019)

The most significant part of the private sector is in R&D financing in countries that hold leading positions in international competitiveness ratings: USA, Sweden, Finland, Japan (66 - 75%), EU, Belgium, Germany, France (55 - 60%). The share of public funds in domestic spending on R&D in the EU countries is 33%, the United States - 28%, China - 25% (Kang, Baek & Lee, 2017).

In Russia, public funds are the main source of innovation financing. The figures presented in fig. 2 differ from most developed economies (fig. 2),

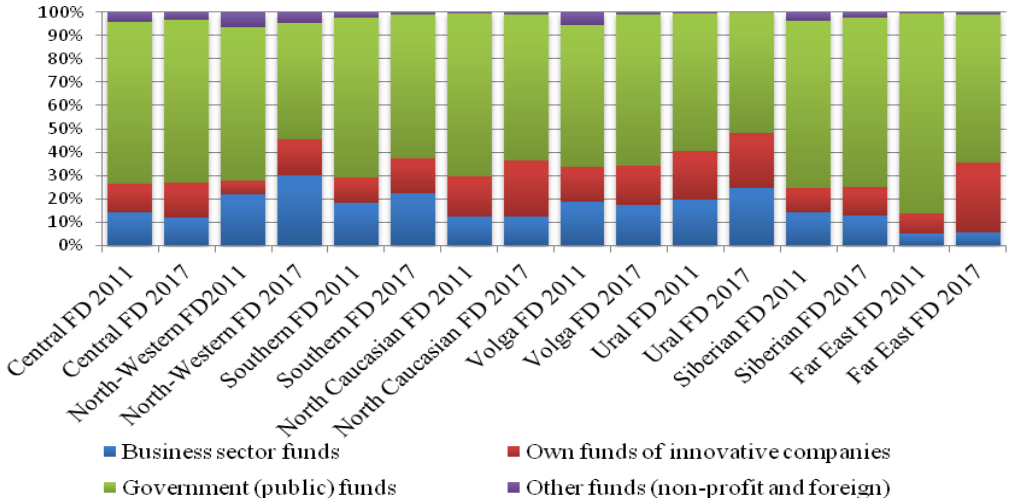

Fig. 2: Structure of domestic R&D costs by sources of financing according to Federal Districts of Russian Federation, 2011- 2017
Compiled by the authors based on data from Rosstat (Rosstat, 2019)

Despite a twofold increase in the funds invested into innovation by the state over the past 20 years with respect to GDP, the imbalance between public and private resources in financing innovation remains an urgent problem. In 2018, government sources investments into R&D accounted for 67% of total gross domestic spending on innovation, essentially replacing the funds of private and corporate investors in innovation processes (Firsova, 2017). The lack of own financial resources

aimed at innovation and the inaccessibility of external sources for innovative companies, in most cases, leads to a low rate of innovative activity and low efficiency of economic entities. Such a structure of innovation financing sources cannot provide opportunities for structural shifts in the economy and modification in the technological structure in Russia. Regional disparity strengthens the processes of concentration of innovative financial resources in the leading regions, pushing them from economically weak regions of the periphery.

Obviously, to increase the R&D financing level, it is needed a detailed analysis of the sources composition and innovation financing structure in dynamics in terms of assessing the effectiveness of their financing mechanisms. This explains the significance of the sources analysis in the structure of R&D financing and investment processes in order to determine the directions for the development of public incentive policies

Since public funds are the dominant source of financing innovation in Russia, in this study we determine the significance and rate of the influence of two other components of innovation financing sources: own funds of innovative enterprises and funds of the enterprise sector on the key indicator of the innovative development in the region - the volume of innovative products.

While examining dynamic processes in the economy, a cause-and-effect analysis of events applying mathematical methods of economic and statistical modeling is relevant to study the properties of the objects in question, to quantify the time series indicators (Korolev, 2011; Podinovski, Potapov, 2013; Akopov, Beklrayan, 2004).

Literature Review

Time series in economics and finance are analyzed is the works by G.E.P. Box, Taleb, A. Gorshenin, R. Nizhegorodtcev and other researchers who today widely use economic-mathematical and statistical methods (ARIMA, ARMA, GARCH, spectral analysis, neural networks, wavelet analysis) to solve these problems (Box, Jenkins, 1970; Taleb, 2007; Gorshenin, 2017; Nizhegorodtsev et al. 2017). The development of the apparatus for assessing statistical dependencies in the economy is studied in the different works (Granger, 1980; Seo, 2000; Demyanov, Malozemov, 1972; Sidorov, Faizliev, Balash & Korobov, 2016). Classical approaches to evaluating innovative regional growth on the basis of a regression approach were developed by Z. Griliches, F. Jaffe et al. (Griliches, 1979; Jaffe, 1989).

For the econometric measurement of the influence of factors on the outcome of innovation, the relationship between regional factors and regional innovation development is studied empirically. Based on the works by M. Feldman and R. Florida, they are described by a logarithmic linear dependence using a neoclassical production function of the Cobb-Douglas type, which is transformed into a modern production-innovation function, which consists in the fact that a regional innovative "output" is created from a number of factors which multiplicatively join (Feldman, Florida, 1994; Cobb, Douglas, 1928).

1. Existing methods of analysis usually require a sufficiently large sample of source data, which is not always available, especially when the modeled indicator depends on several variables (Shapchits, 2012). They underestimate the possibility of key events occurring, smooth out extremely rare events that create high heterogeneity in the initial time series, and pass noise data that misrepresent the distribution pattern of the indicator in question. The consideration of several factors and the "noisiness" of the initial data led to the choice of models and a multivariate approach to the analysis of the structure of innovation financing. The traditional apparatus, based on minimizing the sum of the squared approximation errors, in many cases makes it possible to obtain a qualitative model, but with significant differentiation, minimax methods have proved to be effective, the idea of using which to estimate the parameters of regression dependencies belongs to Petr Chebyshev. The use of minimax methods in an innovative economy is underdeveloped, that is why the research in this direction is topical. t is advisable to supplement the analysis with the minimax criterion (Vygodchikova, 2015; Vygodchikova, 2017), which was used in this study to increase the reliability

of the modeling results.

Research Methodology

Variables Description

To analyze the sources of innovative activities financing at the regional level, an analysis of the financing structure for 2011-2017 was implemented; and the following indicators were analyzed:
Y (IPV) - Innovation Product Volume;
X1 (IE) - Own Funds of Innovative Enterprise;
X2 (BS) -Business Enterprise Sector.
As the assessment of the correlation matrix according to regional statistics for the period under examination showed, these indicators most significantly affect the volume of innovative goods in the regions.

Data and Methods

To construct models, qualitative models of the production and innovation function were built in two groups of active in innovation and middle groups of Russian regions.

The authors proceeded from the assumption that if the models constructed by various methods are close in coefficients, this confirms that the sample turned out to be homogeneous enough to reliably predict the behavior of the output parameter (Y) depending on the input (X1, X2), and it can be used in the analysis and modeling. In this study of the funding sources structure, we use a multivariate analysis: firstly, it was necessary to take into account correlations in the sample of indicators, which allowed us to obtain a meaningful model and a reliable forecast, and secondly, to confirm or refute the result by a separate analysis and minimax criterion.

To analyze the sources of financing structure for innovative activities at the regional level, an analysis of data on financing domestic expenditures for research and development in 80 regions of the Russian Federation for 2011-2017 was conducted (CSRS, 2016). The data are not available in official statistics and were collected in a special way according to the annual reports of the statistical research institute “CSRS” in the context of regions for 2011-2017.

The Russian regions were grouped into three homogeneous groups in decreasing order of innovative goods in GRP (see Table 1) and then the analysis was carried out separately for two groups (Rosstat, 2019):

Table 1: Grouping of regions by the share of innovative goods in GRP, %

1 group: leading regions	Share in GRP, %	2 group: regions with an average share of innovative goods in GRP	Share in GRP, %	3 group: regions with a small share of innovative goods in GRP	Share in GRP, %
Republic of Mordovia	27,5	Kostroma Region	9,9	Jewish Region	2,0
Khabarovsk Region	23,8	Lipetsk Region	9,3	Kamchatka Region	1,8
Republic of Tatarstan	19,6	St. Petersburg	9,1	Kemerovo Region	1,7
Perm Region	16,0	Kursk Region	8,4	Transbaikal Region	1,5
Samara Region	15,6	Stavropol Region	8,3	Chukotka Region	1,4
Nizhny Novgorod Region	15,4	Novosibirsk Region	8,3	Murmansk Region	1,3
Arhangelsk Region	15,3	Vladimir Region	8,1	Altai Republic	1,2
Moscow Region	14,7	Tambov Region	7,9	Oryol Region	1,1
Mari El Republic	14,2	Republic of Adygea	7,6	Republic of Sakha Yakutia	1,1

Krasnodar Region	14,1	Bryansk Region	7,3	Kabardino-Balkaria	0,9
Ulyanovsk Region	12,8	Chelyabinsk Region	7,2	Amursk Region	0,9
Tula Region	12,7	Republic Bashkortostan	7,0	Irkutsk Region	0,8
Chuvash Republic	12,2	Ryazan Region	6,8	Republic of Kalmykia	0,7
Yaroslavl Republic	12,2	Kirov Region	6,2	Republic of Ingushetia	0,5
Belgorod Region	11,6	Voronezh Region	6,1	Primorsky Region	0,5
Udmurt Republic	10,8	Tomsk Region	5,3	Republic of Khakassia	0,5
Rostov Region	10,6	Smolensk Region	4,4	Magadan Region	0,4
Sverdlovsk Region	10,3	Novgorod Region	4,0	Komi Republic	0,4
Penza Region	10,1	Altai Region	4,0	Republic of Karelia	0,3
		Kurgan Region	3,6	Republic of Dagestan	0,3
		Volgograd Region	3,6	Kaliningrad Region	0,3
		Moscow city	3,3	Astrakhan Region	0,2
		Krasnoyarsk Region	3,3	Ivanovo Region	0,2
		Tyumen Region	3,2	Sakhalin Region	0,2
		Orenburg Region	3,2	Tyva Republic	0,1
		Tver Region	3,1	North Ossetia-Alania	0,1
		Vologda Region	2,9	Karachay-Cherkessia	0,1
		Omsk Region	2,9		
		Chechen Republic	2,8		
		Kaluga Region	2,7		
		Republic of Buryatia	2,4		
		Saratov Region	2,3		
		Leningrad Region	2,2		
		Pskov Region	2,1		

Production-Innovation Function Model

Let $\{X_1^0 < \ldots < X_1^N\}$ – be the volumes of own funds of innovative enterprises, $\{X_2^0 < \ldots < X_2^N\}$ – the volumes of funds from the enterprise sector (mainly sources of money borrowed), and Y the volume of innovative goods in the region.

Dependence in the form of a model of the "production and innovation function" (PIF), that is, the dependence of the volume of innovative goods produced on own and borrowed financing can be represented as:

$$Y = AX_1^{a_1} X_2^{a_2}, \quad (1)$$

The coefficients of the model serve as parameters of elasticity Y by X and show approximately how many percent the indicator Y changes with one percent change in the indicator X1 (X2). Therefore, when constructing a model, it is necessary to focus on the analysis of the quality of the obtained dependencies; the center here is the adequacy of the constructed model to the described object.

Since the scale and units of measurement of different indicators for regions are different, the linear scaling method for each regional indicator is used and its normalized analogue is recalculated (Awrejcewicz et al., 2015).

$$\hat{X} = \frac{X - X_{\min}}{X_{\max} - X_{\min}} + 1,$$

where X is the actual value of the indicator for this group of regions, the minimum and maximum are taken for the same indicator among all regions of this group. Thus, the minimum value of this

indicator is one, the maximum is two (for finding a logarithm, a scale from one to two is more relevant than from 0 to 1).

To obtain the model parameters, the logarithm of initial data is taken; an estimated model is obtained (2).

$$\ln Y = a_0 + a_1 \ln X_1 + a_2 \ln X_2 , \quad (2)$$

Estimates of the model coefficients (2) are based on the criterion of the least squares method (5). However, if there is a clear dependence between the factors, which are various sources of financing, the application of the method of the least squares criterion can lead to a distortion of the model coefficients. Therefore, it is necessary to apply more stable criteria to the initial data perturbation. This will confirm the stability of the model coefficients when changing the approximation method, and justify the quality of the conclusions obtained as a result of modeling.

The article also applies the minimax criterion (6) and the criterion of the least modules method (7) for an alternative assessment of the influence of the factors on the effective indicator. The model quality is tested through standard methods of regression analysis, as well as using new estimates obtained from achieved additional approximation criteria (maximum approximation error, the sum of the absolute approximation errors).

Estimates of the model coefficients (2) are based on the criterion of the least squares method (3), the criterion of the least modulus method (4) or the minimax criterion (5); and then the multiplicative dependence (1) is constructed.

$$\sum_{k=0}^{N} \left(Y_k - a_0 - a_1 X_1{}^k - a_2 X_2{}^k \right)^2 \longrightarrow \min_{A=(a_0,a_1,a_2)\in R^3} , \quad (3)$$

$$\sum_{k=0}^{N} \left| Y_k - a_0 - a_1 X_1{}^k - a_2 X_2{}^k \right| \longrightarrow \min_{A=(a_0,a_1,a_2)\in R^3} , \quad (4)$$

$$\max_{k\in \overline{0,N}} \left| Y_k - a_0 - a_1 X_1{}^k - a_2 X_2{}^k \right| \longrightarrow \min_{A=(a_0,a_1,a_2)\in R^3} . \quad (5)$$

With a strong correlation dependence between the explicative variables in the model (multicollinearity of input variables), it is advisable to conduct a separate analysis for each variable. For example, for the first variable X1, the method is as follows. The model is analyzed:

$$Y = A X_1{}^{a_1} , \quad (6)$$

To obtain the model parameters, the logarithm of initial data is taken:

$$\ln Y = a_0 + a_1 \ln X_1 . \quad (7)$$

The following models are considered: least squares (8), least modules (9) and minimax (10).

$$\sum_{k=0}^{N} \left(Y_k - a_0 - a_1 X_1{}^k \right)^2 \longrightarrow \min_{A=(a_0,a_1)\in R^2} , \quad (8)$$

$$\sum_{k=0}^{N} \left| Y_k - a_0 - a_1 X_1{}^k \right| \longrightarrow \min_{A=(a_0,a_1)\in R^2} , \quad (9)$$

$$\max_{k\in \overline{0,N}} \left| Y_k - a_0 - a_1 X_1{}^k \right| \longrightarrow \min_{A=(a_0,a_1)\in R^2} . \quad (10)$$

All procedures are repeated for the second variable X2.

Modeling Quality Indicators

When analyzing noisy data, the use of standard quality criteria, such as the sum of the squared approximation errors, the standard deviation of the indicator from the average, the coefficient of variation, does not always lead to reliable estimates of the constructed model adequacy. For example, in a two-variable model obtained on the basis of the least squares method, a significant model (regression equation) can be obtained, but the coefficients of individual variables may turn out to be low-significant. Therefore, conclusions about the influence of variables (model factors) on the final indicator (volume of innovative products) may not be reliable; the coefficient may turn out to be negative. However, it is obvious that an increase in resources cannot lead to a decrease in output. Hypersaturation with innovative capital, in principle, is not possible, therefore, only the presence of multicollinearity (strong dependence) between the factors of the model, which is not always possible to diagnose in a small sample, can interfere. Therefore, alternative methods need to be applied: robust estimates, separate analysis, the criterion of the minimum maximum approximation error, combining robust noise immunity and approximative model quality.

Therefore, along with the traditional indicator (the sum of the squared approximation errors, the sum of the error modules), the following two indicators are used in this study: the maximum approximation error and the sum of the absolute approximation errors for model (1) (the errors are analyzed for the output function obtained by exposing the model (2)) (Awrejcewicz et al., 2015). The last indicator shows the high quality of the minimax model when working with heterogeneous and very noisy data on the structure of innovations in the second group of regions.

To assess the quality of the models, standard statistical indicators are used (the significance of the regression equation according to the Fisher criterion, the significance of the regression coefficients according to the Student criterion), as well as the average and maximum approximation errors according to the obtained multiplicative dependences (Seo, 2000).

In the course of the study, for a comparative analysis of the structural differences in the sources of financing innovation in dynamics, we sequentially evaluated the coefficients for the three developed models (3), (4) and (5) based on the data on the structure of financing sources separately in two groups of Russian regions - in the regions- leaders and in regions with an average share of innovative goods in GRP for the two periods of 2011 and 2017. The third group of regions with a low share of innovative goods was not studied.

To justify the adequacy and feasibility of including variables in the model, normalization of primary quantitative data was carried out and a correlation analysis was performed in the Gretl.

Results

The following modeling results were obtained.

Analysis of the impact of funding sources in the first group of leading regions with a high share of innovative products in GRP

In 2011, own funds are of fundamental and important importance, despite their low amount, it is they that lead to a significant increase in the volume of innovative goods. A model based on the least squares (LSM) criteria (3) and least modules (4) with two variables is not highly significant (Table 1):

Table 1: Model 1- LSM, observations 1-19, dependent variable Y (IPV)

	Coefficient	*Std. error*	*t- statistics*	*P- value*	
const	0,110365	0,0527681	2,0915	0,05279	*
X1 (IE)	1,15477	0,56004	2,0619	0,05584	*
X2 (BS)	-0,306315	0,525166	-0,5833	0,56784	

Mean depended var	0,206359		S.D. depended var	0,229148
Sum squared resid	0,543817		S.E. of regression	0,184360
R- square	0,424628		Adjusted R- square	0,352707
F(2, 16)	5,904058		P- value (F)	0,012011
Log-likelihood	6,799197		Akaike criterion	-7,598393
Schwartz Criterion	-4,765076		Hannan–Quinn	-7,118883

When using the model with two variables, the coefficient at X2 turns out to be negative, which may be due to multicollinearity between X1 and X2.

Table 2: Model 2- Method of least modules, observations 1-19, dependent variable Y (IPV)

	Coefficient	*Std. error*	*t- statistics*	*P- value*	
const	0,0370375	0,0382719	0,9677	0,34757	
X1 (IE)	0,86874	1,33655	0,6500	0,52492	
X2 (BS)	0,130292	1,0393	0,1254	0,90180	

Median dependent var	0,116577		S.D. depended var	0,229148
Sum of error modules	1,995670		Sum squared resid	0,623684
Log-likelihood	10,64593		Akaike criterion	-15,29185
Schwartz Criterion	-12,45853		Hannan–Quinn	-14,81234

It should be noted that the method of least modules showed the less importance of the model and coefficients; however, the influence of companies' own funds on the volume of innovative goods is obvious and undeniable; the coefficient of 0.87 in the first variable is close to one, as in the previous model (LSM, model 1).

Therefore, an additional instrumental base was applied to obtain results, namely: a separate analysis for each variable and a minimax criterion for approximating the model parameters (minimum maximum approximation error). When applying separate analysis, the best result, in terms of regression statistics, was obtained according for model (8) (model 3, presented below).

Table 3: Model 3- LSM, observations 1-19, dependent variable Y (IPV)

	Coefficient	***Std. error***	***t- statistics***	***P- value***	
const	0,104698	0,0508495	2,0590	0,05516	*
X1 (IE)	0,863982	0,250131	3,4541	0,00303	***

Mean depended var	0,206359		S.D. depended var	0,229148
Sum squared resid	0,555380		S.E. of regression	0,180747
R- square	0,412394		Adjusted R- square	0,377829

F(1, 17)	11,93097		P- value (F)	0,003031
Log-likelihood	6,599317		Akaike criterion	-9,198633
Schwartz Criterion	-7,309755		Hannan–Quinn	-8,878960

Since exp (0.1047)≈1.11, we get the model:

$$Y = 1.11 X_1^{0.86}.$$

The model is significant and relevant in terms of regression statistics. Interpretation of the model with regard to the elasticity indicator: with a 1% increase in the equity of enterprises, ITI increases by about 0.86%.

A model based on the minimax criterion (5) (the minimax criterion allows one to get rid of multicollinearity without separate analysis); the parameters are calculated by the method from [22], and has the form:

$$Y = 1.33 X_1^{0.52} X_2^{0.08}.$$

The model is quite reliable, as evidenced by low approximation errors, that are lower than when using separate analysis by least squares analysis.

With a 1% increase in the enterprises' own funds, volume of innovative goods increases by about 0.52%. With a 1% increase in the enterprises' own funds, volume of innovative goods increases by about 0.08%.

The resulting models show a high impact of own funds on the production of innovative goods in the group of leading regions, which is under examination.

The results of errors calculation show that, each of the criteria is "in the zone of influence" of reliability, errors by minimax are much lower than by the least squares criterion (Fig. 4).

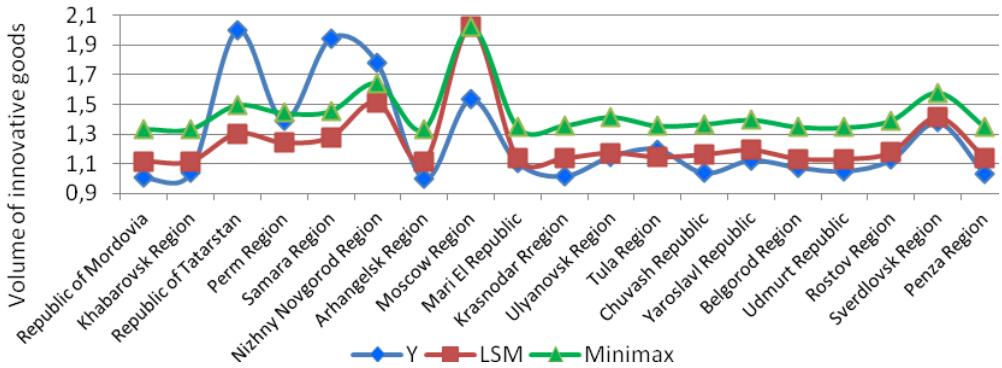

Fig. 4: Group of Leading Regions, 2011

In 2017, own funds have an even more important influence on the volume of innovative goods, namely they lead to a significant increase in the volume of innovative goods.

Performing an analysis similar to the above one for 2011, we obtain high quality one-factor model (8), as evidenced by regression statistics (model 4).

Table 4: Model 4- LSM, observations 1-19, dependent variable Y (IPV)

	Coefficient	*Std. error*	*t- statistics*	*P- value*	
const	0,110612	0,0440536	2,5108	0,02244	**
X1 (IE)	0,85106	0,205178	4,1479	0,00067	***

Mean depended var	0,228257		S.D. depended var	0,202549
Sum squared resid	0,367021		S.E. of regression	0,146934
R- square	0,502999		Adjusted R- square	0,473764
F(1, 17)	17,20518		P- value (F)	0,000673
Log-likelihood	10,53452		Akaike criterion	-17,06904
Schwartz Criterion	-15,18016		Hannan–Quinn	-16,74937

Since exp (0.11) ≈1.12, we obtain a model based on the least squares criterion:

$$Y = 1.12 X_1^{0.85},$$

With a 1% increase in the enterprises' own funds, volume of innovative goods increases by about 0.85%.

Model based on minimax criteria:

$$Y = 1.2 X_1^{0.96} X_2^{0.06}.$$

With a 1% increase in the enterprises' own funds, volume of innovative goods increases by about 0.96%. With a 1% increase in the enterprise sector funds, volume of innovative goods increases by about 0.06%.

Both models demonstrate a high impact of equity on the output of innovative products, the estimation of approximation errors shows the absence of sharp contradictions and the high quality of each of the obtained models (Fig. 5).

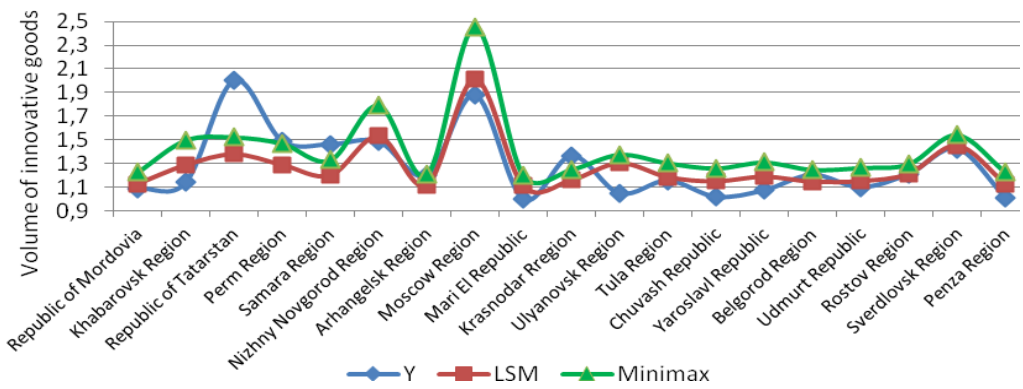

Fig. 5: Group of Leading Regions, 2017

Thus, in group 1 of the leading regions of innovation development, own funds steadily and stably affected the growth in the volume of innovative goods, both in 2011 and in 2017, funds of the business sector have a lesser effect on the indicator under study. The criteria of minimax and least squares allow obtaining high-quality models, the criterion of least modules has high errors and its use is not advisable. Therefore, we further use the least squares method and the minimax method.

Analysis of the impact of funding sources in the second group of leading regions with an average share of innovative products in GRP

In 2011, a high-quality solution for all coefficients (according to regression statistics) is provided by a model based on the least squares criterion:

$$Y = X_1^{0.7} X_2^{0.3}.$$

With a 1% increase in the enterprises' own funds, volume of innovative goods increases by about 0.7%. With a 1% increase in the enterprise sector funds, volume of innovative goods increases by about 0.3%.

A good justification of the above conclusion is the obtained regression statistics (coefficients are significant, the model is relevant) (model 5).

Table 5: Model 5- LSM, observations 1-34, dependent variable Y (IPV)

	Coefficient	*Std. error*	*t- statistics*	*P- value*	
const	0,0545878	0,012386	4,4072	0,00012	***
X1 (IE)	0,688815	0,129998	5,2986	<0,00001	***
X2 (BS)	0,29943	0,174426	1,7167	0,09602	*

Mean depended var	0,108586		S.D. depended var	0,156202
Sum squared resid	0,140472		S.E. of regression	0,067315
R- square	0,825538		Adjusted R- square	0,814283
F(2, 31)	73,34464		P- value (F)	1,76e-12
Log-likelihood	45,07095		Akaike criterion	-84,14191
Schwartz Criterion	-79,56282		Hannan–Quinn	-82,58031

For 2011, a model based on the minimax criteria has the form:

$$Y = X_1^{0.37} X_2^{0.25}.$$

With a 1% increase in the enterprises' own funds, volume of innovative goods increases by about 0.37%. With a 1% increase in the enterprise sector funds, volume of innovative goods increases by about 0.25%. The influence of both factors is quite strong, own funds affect greater.
For 2017, a model based on the minimax criterion is more reliable, due to a significant reduction in approximation errors (Fig. 6):

$$Y = 1.19 X_1^{0.8} X_2^{0.07}.$$

With a 1% increase in the enterprises' own funds, volume of innovative goods increases by about 0.8%. With a 1% increase in the enterprise sector funds, volume of innovative goods increases by about 0.07%.
The LSM-based model for 2017 has the following form (the significance of the coefficient at X1 (own funds ratio) is too low to provide a high-quality model), approximation errors are quite large:

$$Y = 1.19 X_1^{0.3} X_2^{0.6}.$$

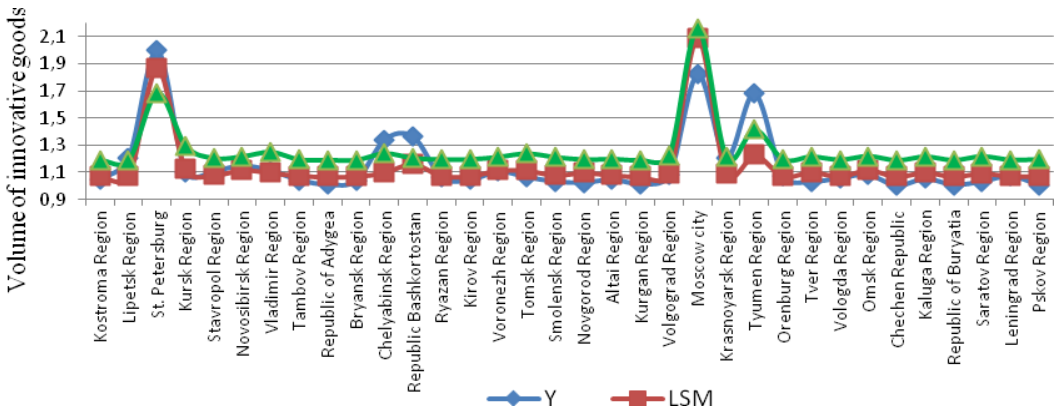

Fig. 6: Group of regions with an average level of innovation share in GRP, 2017

In the second group of regions, own funds and funds of the enterprise sector have a significant impact on the volume of innovative goods, while the influence on own funds have a stronger effect.

The influence of the criteria of mathematical models of the criteria of least squares, least modules and minimax on the results of the analysis of the influence of financing sources on the production of innovative goods, operations and services of innovative enterprises is presented in Table 6.

Table 6: Results - the influence of the criteria of mathematical models on the results of analysis

Methods	The influence of innovation financing sources on the volume of innovative goods Y (IPV):	Period	Coefficient value
Regions with a high level of innovation share in GRP			
LSM	X1 (own funds of innovative enterprises)	2011	0.86*
		2017	0.85*
Minimax	X1 (own funds of innovative enterprises)	2011	0.52
		2017	0.96*
	X2 (business enterprise sector funds)	2011	0.08*
		2017	0.06
Regions with an average level of innovation share in GRP			
LSM	X1 (own funds of innovative enterprises)	2011	0.70
		2017	0.30
	X2 (business enterprise sector funds)	2011	0.30
		2017	0.60
Minimax	X1 (own funds of innovative enterprises)	2011	0.37
		2017	0.80*
	X2 (business enterprise sector funds)	2011	0.25
		2017	0.07

Conclusion

The article presents a set of tools for multivariate analysis and modeling of sources and structure of financing innovative activities in the regions of Russia. There were built models of the funding sources influence on the production of innovative goods, operations and services of innovative enterprises in two groups in 80 Russian regions. Based on the application of various mathematical models of regression analysis: least squares, least modules and minimax criteria, an assessment was made of structural changes in the sources of innovative enterprises financing in Russian regions for the period 2011-2017.

In the field of developing mathematical methods, it should be noted that the estimation of approximation errors shows the absence of sharp contradictions and the high quality of every obtained model. As for choosing a modeling method, the criteria of minimax and least squares allow obtaining high-quality models, the criterion of least modules has high errors and its use is not advisable. Model evaluation results show that, of all the models under consideration, the more relevant one was obtained using the minimax criterion.

In terms of economic results, the obtained models show a significant impact of own funds on the volume of innovative products in the leading regions with a high level of innovation share in GRP. From 2011 to 2017, the influence of own sources on the volume of innovative products increased significantly and amounted to 0.96%, with a 1% growth in own funds in the structure of internal costs for research and development. The impact of business enterprise sector funds has changed slightly and remains very low. This conclusion allowed us to draw a model on the basis of the minimax criterion.

In the second group of regions with an average share of innovations in GRP from 2011 to 2017, the influence of own sources on the volume of innovative goods also increased and amounted to 0.8% with a 1% growth in own funds in the structure of R&D expenditures. The impact of business enterprise sector funds in financing innovations is weaker due to their low share in the total volume of funding sources decreased during the study period in the first group of regions from 0.08 to 0.06%, and in the second group of regions decreased from 0.25 to 0.07 % with 1% net growth in borrowed funds in the structure of R&D expenditures.

According to the criterion of the least squares method, during the analyzed period, the influence of business enterprise sector funds on the volume of innovative goods increased, which is a positive trend in the context of the need to attract long-term credit resources to invest in innovation. To confirm the conclusion about a higher effect of own funds on the volume of innovative products, the minimax criterion was used as an alternative criterion; it still confirms the high influence of own funds.

Thus, computational experiments showed a noticeable increase in the influence of own funds of innovative enterprises in both groups of regions. In the group of regions with an average share of the of innovative goods volume, the obtained models show a significant impact of companies' own funds, and a moderate increase in the impact of funds from the business sector (where significant resources are represented by credit resources of banks and similar financial institutions) on the volume of innovative goods. At the same time, their own funds still exert a stronger influence on the volume of innovative goods. We attribute this result to the specifics of regional capital markets and the lack of an effective mechanism for capital spillover, insufficiently effective mechanisms and high risks of investing innovations. Thus, strong regions conduct innovative activities based on their own investment resources. Regions with a mean innovation development in 2011-2017 increased the ratio of funds raised from the business sector, but this is not enough to become a leader.

These results provide further insight into the mechanisms for financing innovation in the Russian regions, the specific features of the innovative capital formation and the factors affecting the results of innovation at the regional level and contribute to the deepening of knowledge system on the structure and processes of financing innovation and regional development.

The main recommendation based on this analysis is to increase the financing of enterprises in the second group of regions. Therefore, it is important today to create mechanisms for investing in innovative activities that can overcome the asymmetry of innovative investment processes. We need new tools in the financial market that can eliminate risks and attract "long-term money" in the field of innovation.

It is extremely important at present to elaborate tools and mechanisms for financing innovation with private funds and promote innovation environment by expanding the interaction of private capital and

public sector, and it is also important to develop public policies based on data from an analysis of the Russian regional specifics aimed at supporting innovation.

Based on the analysis, it is possible to recommend directions for the development of sources of innovation financing in the Russian regions: development of reliable long-term investment instruments of the stock market as a source of financing for innovative projects; development of small innovative enterprises, venture capital and business angels, finances and private investment; creating incentives for investing private capital in innovation.

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Digital Innovation: Impact on Company Performance

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Abstract

Digital innovations affect company performance and results by changing business models, expanding markets, and attracting new customers. At the same time, an active role is played by the impact on the modernization of production processes at all stages of the product life cycle and the emergence of new business lines. Companies are concerned about the need to improve their competitiveness and strengthen their positions in the market based on innovation and the introduction of digital production. At the same time, internal effects are associated with improving various aspects of the company's life and its economic performance. External effects affect customer relationships, competitiveness, and the company's position in the market. Of particular interest for this purpose are sustainability studies, which provide a viable research model for evaluating and confirming the potential impact of digitalization elements on economic, environmental, and social sustainability. Thus, digitalization of processes in the enterprise can be considered as a kind of green IT-focused on digital transformation and sustainable business models.

Keywords: Digital innovation, sustainable, economic indicators, digital transformation, economic performance, costs.

Introduction

Digitalization causes a shift in the production paradigm and affects the activities of companies from different aspects. In the digitalization trend, innovative systems and management face new challenges. Digitalization refers to the use of digital technologies to change the business model and provide new opportunities for generating revenue and creating value. Digitization is the process of moving from an analog form to a digital form. Digitalization processes accelerate the need for innovation and accelerate the process of innovation implementation.

Worldwide, large companies embrace digital transformation through digital innovation. Digital innovation, that is, new combinations of digital and physical components for the production of new products (Yoo, Y., Boland, R. J. Jr., Lyytinen, K., & Majchrzak, A. (2012)), allow companies to strengthen their competitive advantages by differentiating from competitors. The introduction of digital manufacturing technologies involves the introduction of digital technologies in order to create value and improve the efficiency of the organization. Thus, the study of the impact of digital innovation on the economic performance of companies will be relevant.

Digital transformation leads to transformation of production, as well as a positive impact on the reputation of the company (Anderson, C. (2014)).

Organizations use digital technologies for establishing new products and services, to implement new business processes, or to operate new business models (Legner, C., Eymann, T., et al. (2017)).

Digital innovation can act as the core and represent the central element of digital transformation, and is a domain where the use of digital technology is manifested in organizations. In addition, we know that the implementation and implementation of digital innovation will not happen automatically, but requires a thoughtful approach that allows them to translate digital technology into digital innovation (Kohli, R., & Melville, N. P. (2018)).

According to a number of authors, effective adoption of digital innovations can have three advantages: obtaining new customers and experience; modernization of operations; and the emergence of new business lines (Fitzgerald, Kruschwitz, Bonnet, & Welch).

Through automation, the companies with the most success in implementing digital technologies in customer service and operations according to Fitzgerald are distinguished by improved customer service.

On the consumer side, digital innovation has revolutionized the way consumers seek information, buy, consume, and share their experiences about goods and services. From a corporate perspective, digital innovation opens up new opportunities «to reach, inform, engage, sell, learn, and provide services to customers» (Lamberton, C., & Stephen, A. T. (2016)).

Digital innovation is changing business models in the industry (Zott, C., & Amit, R. (2017)), leading to lower costs, cost of production and expansion of markets. Contactless payments, for example, have revolutionized banking. In addition, thanks to digital innovations, a huge amount of customer data is collected.

Since the adoption of digital innovation is associated with a high level of uncertainty for potential customers, it is especially important to understand how consumers may not accept digital innovation. Kuester, S., Konya-Baumbach, E., & Schuhmacher, M. C. suggest that digital innovation should primarily signal reliability and usability.

Nambisan, S., Lyytinen, K., Majchrzak, A., & Song, M. indicate that digital innovation refers to the use of digital technology in the process of innovation in production. Many innovations are based on digital technologies that enhance the human ability to acquire, produce, distribute and consume information at an unprecedented level and value (Teece, D. J. (2018)). In addition, value creation for companies is increasingly carried out through the production of digital information. This is due to digital production (Schallmo, D., Williams, C. A., & Boardman, L. (2017)). Schultz, D. E., & Peltier, J. argues that for most companies, the challenge is not to develop and launch digital innovations, but to make them more attractive and useful to consumers. We understand that this can be achieved by finding new markets and reducing costs.

Formulation of the problem

The aim to introduce digital innovation in enterprises is to increase economic efficiency of enterprises and product quality, reduction of terms of creation and the start of production, optimizing the use of available resources of enterprises, the mobilization of the reserves of production capacity, competitiveness of products on world markets, formation of the modern business model of the enterprise.

Organizations must innovate to succeed over time. A rapidly growing part of innovation comes directly from the latest digitalization tools. Many resources and much attention are focused on further developing methods, processes, tools, etc. around digitization.

Results

The introduction of certain digital innovations can have a different impact on the performance of the enterprise. Table 1 shows the impact of digital innovations on the economic, and social indicators of the enterprise in the framework of assessing the sustainable development of the enterprise.

Table 1: Impact of digital innovation on enterprise performance

Digital innovation	Influence on economic indicators of the enterprise	Influence on environmental indicators of the enterprise	Influence on social indicators of the enterprise
Additive technologies	Improving the design and use of materials The quality of the products Risk minimization Reduce development and prototyping time Reduction of production costs (labor costs, operating time of technological equipment, electricity, materials) Reducing the cost of the product by reducing the costs of the company	Reducing the amount of water used from all water sources Reducing the volume of contaminated wastewater discharge to surface water bodies	Increase employee satisfaction with the work performed Creating jobs for people with disabilities in organizations Improving compliance with safety requirements
Rapid prototyping	Quality control Reduce product development and testing time Reducing the cost of goods	Reduction of mass emissions of pollutants into the air from stationary sources Reducing the amount of water used from all water sources Reducing the volume of contaminated wastewater discharge to surface water bodies	Increase employee satisfaction with the work performed Increase in employee training costs
Cloudy computing	Optimizing the use of computing resources Access to the skills and abilities of professionals Increase productivity, reduce costs for deployment and maintenance of it infrastructure Reduction of capital costs The decrease in expenses for purchase of software	Reducing greenhouse gas emissions Optimization of expenses for the protection of the environment	Improve customer experience Improving compliance with safety requirements Accelerate the introduction and deployment of applications
Big data	Operational monitoring of all systems and processes Analysis of unstructured data sets Expansion of markets Reduction of costs for repair and maintenance of facilities Improving the quality of processed data for decision making The reduction of production costs	Reduction of consumption of fuel and energy resources Optimization of expenses for the protection of the environment Reduction of mass emissions of pollutants into the air from stationary sources	The basis for the development of the Internet of things

Digital innovation	Influence on economic indicators of the enterprise	Influence on environmental indicators of the enterprise	Influence on social indicators of the enterprise
	The increase in profits due to emerging opportunities		
Internet of things	Automation of tracking and forecasting of complex systems and objects Full implementation of object and process control automation Increased productivity Cost optimization and reduction of maintenance and repair costs Savings of the wage Fund	Reducing the amount of water used from all water sources	Attracting new qualified employees Increase in employee training costs
Digital double	Application of new production technologies Reduce development and prototyping time Reducing the cost of designing, testing and upgrading of products Reduction and elimination of losses from marriage Reducing the cost of finished products	Reducing the amount of water used from all water sources Reducing the volume of contaminated wastewater discharge to surface water bodies	Reduce design and prototyping errors Increase in employee training costs

Conclusions

Internal effects are associated with the improvement of various aspects of the life of the company and its economic performance.

These include the following effects:

1. Reduction of internal costs.

2. Increased productivity.

3. Acceleration of business processes (production, sales, service, development, etc.).

4. Increase efficiency in decision-making.

5. Improve the manageability of the company.

6. Improving awareness about the operation of equipment, transport, products.

7. Increase employee satisfaction with the work performed.

8. Attracting new qualified employees.

External effects include those related to customer relationships, competitiveness, market position:

1. Increase in sales.

2. The growing number of customers.

3. Increasing customer satisfaction

4. Improve customer awareness of the company's products/ services.

5. Better understanding of customer needs.

6. The emergence of fundamentally new products and services.

7. Reducing the backlog of competitors.

Thus, the introduction of digital innovations allows you to develop much faster, cheaper and with a much smaller number of employees, significantly reduces the risks of increasing time and reduces development costs, allows to significantly reduce the amount of field testing, finally allows to dynamically and efficiently manage changes of target characteristics and to consider new constraints that arise during design, production or operation. Thus, digitalization of processes in the enterprise will have a significant potential impact on indicators of economic, environmental and social sustainability.

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Chat-bots in Marketing: Review of Russian and International Companies Activities

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Abstract

The article discusses the use of chat-bots as the elements of artificial intelligence in companies' marketing activities, as their further development may become the basis for the implementation of the concept of relationship marketing in the digital economy. Opportunities and advantages of chat-bots in marketing are presented; examples of successful application of this marketing tool in the practice of Russian and international companies of various industries are investigated. The work pays attention to the main tendencies for solving marketing problems using chat-bots, it also identifies tools for introducing chat bots-into the marketing activities of the company. The analysis showed that using of a chat-bot results in a new level of partnership in interaction between the brand and the target client.

Keywords: Marketing, Artificial Intelligence, Chat-Bot, Marketing Communications, Target Audience.

Introduction

Artificial Intelligence (AI) technologies are actively developing and are widely used in companies' business practice. Chat-bots, Big Data, targeted and contextual advertising are the elements of Artificial Intelligence that have found certain application in modern marketing (Ivanchenko, 2019). The purpose of using AI is to combine customer data from different sources and then to use them for marketing campaigns, that is:

- to make marketing communications with customers automated;
- to make marketing more individual for each client in each channel at any given time;
- to improve the customer experience on the site and in mobile applications;
- to understand which marketing channels of communication with a client work better and why.

AI technologies have attracted widespread attention from both businesses and academic community (Faggella, (2019), Thiraviyam, (2018), IAB-Europe Artificial-Intelligence-Report (2018), 9 Applications Of Artificial Intelligence In Digital Marketing (2019). Marketers tend to use artificial intelligence to analyze huge amounts of data from various points of interaction with a client and form marketing solutions with the aim of:

- Building trust through personalized customer interactions.
- Increasing loyalty and maintaining interest in a product, brand, company.
- Applying creative approaches throughout the entire cycle of interaction with the client.

In the conditions of further development of the information and communication space, the competitive advantages can be ensured by improving the quality of personal relationships between the company and the target consumer (Evdokimov N.,2017). In this regard, the study of AI usage experience in companies' activity seems to be quite relevant.

Short Literature Review

"A bot is a program that interacts with a user's application through an API (application programming interface), receives data and requests from it, and converts them into useful information" (Rodionov, 2017). This program is controlled by specified algorithms or artificial intelligence, while the user interacts with this program using a dialog box.

Consumers are gradually changing informational noisy social networks for more personalized communication channels - messengers. In addition, consumers spend more and more time in mobile phones (Bondarenko, 2018). Today, messaging apps have over 5 billion active users monthly, and at the moment it is the first time when people use them more often than social networks. (Why Chatbots Are the Future of Marketing, 2019). Therefore, companies are transforming marketing channels in order to increase the effectiveness of interaction with the target audience. In this regard, chat-bots are turning into a really powerful marketing tool.

Big business, banks and state corporations have already adopted this new tool. For example, in banks modern chat-bots not only relieve the pressure on call centers and technical support, but also perform more serious functions. Without leaving the chat-bot, you can pay a loan, utility bills, transfer money, etc. According to statistics, instant messengers are very popular now, and even social networks no longer enjoy such attention (Bazhenov, 2019).

Chat-bots help companies to solve marketing problems. They are used to create an additional marketing channel for communication with the target audience, promoting products and attracting leads. Another aim is to automate communication, thereby increasing the customer service quality level as most of the routine operations and typical issues can be solved by the bot 24/7, and managers deal with atypical, difficult situations. Using chat-bots improves customer experience, increase engagement and audience loyalty " (Evdokimov, 2017).

Brands create this virtual assistant with a chat-bot builder, and connect it with messaging apps like Facebook Messenger, WhatsApp, Snapchat, etc., or add to their website. According to Sendpulse (What is Chatbot Marketing? 2019), Chatbot Marketing provides the following benefits to companies:

- It saves time and money.
- Helps to segment traffic.
- Provides a quick response.
- Speeds up the payment process.
- Fits any business.
- Boosts engagement.
- Gives data for analysis.
- Helps in lead nurturing.

The appearance and development of chat-bots helps to improve customer service and it reduces costs. Artificial intelligence advises online stores customers. The development and machine learning of chat-bots helps to reduce call center costs as well as site's technical support costs. Now, round-the-clock support for online stores and services has become possible thanks to programmed and self-learning bots that can answer frequently asked questions. Artificial intelligence collects data about the client: behavior on the site, his preferences, etc. In the future, AI uses this information to communicate with the client (Dmitrieva, 2018).

There are two types of bots (Zhestkov, 2017):

1. Limited. Those that respond to the minimum number of phrases and only in case the request matches exactly;
2. Self-developing. That is, an "artificial neural network", which, when talking with a client, self-learns and can capture the context of the conversation.

According to experts (Protsenko, 2018), chat-bots in the marketing activities of companies can:
• cheapen the lead with the help of a sales funnel;
• do any mailing to subscribers with openness up to 90%;
• conduct surveys, game quizzes and segment users in regard to their answers;
• help to purchase and pay in online stores;
• book any services: from a hotel and a doctor to a test drive of a car;
• integrate with site analytics and CRM systems;
• implement up- and cross-sales depending on behavior, interests and preferences of the user;
• provide support to users, saving budgets for call centers.

Thus, chat-bots answer users' popular questions, select the right product according to the parameters, help with online payments or notify the user about the status of the order. However, sometimes bots with more unusual functionality are used in marketing.

Research Hypothesis

Under the influence of Internet technologies and social media, consumers are currently becoming more demanding and less loyal to brands. In this regard, the primary goal of relationship marketing in the digital economy is to improve customer experience. The use of Artificial Intelligence helps marketers to solve the problem of ensuring the maximum possible personification of marketing solutions for the target consumer.

Key Research Findings

Practical examples of Russian and international companies

«VkusVill» chain of stores has developed a bot in Telegram to reduce the technical support load. VkusVill bot helps to search for nearby stores, see the remnants of the desired product in a particular store, find out about discounts and promotions, purchase without presenting a bonus card, check information about each product's features, see electronic bills, information about manufacturers, change "Favorite product" (daily personal subscription with a discount on one of any goods). Developing a bot in Telegram is cheaper and faster than developing a mobile application. All the process from the idea to the launching the campaign cost $ 4,600. With the help of the bot buyers can contact VkusVill employees. The company receives about four thousand calls per month. This feedback collection channel is the second place in popularity and first in quality and usefulness of feedback. VkusVill taught the bot minimal responses to customer messages, and then every week it receives a report on unrecognized messages and teaches the bot to recognize more complex messages. Automation of routine processes allows VkusVill to grow without increasing the number of office employees, which affects the effectiveness of the company (Kretsu, 2017).

One of the brightest examples of chat-bot marketing is that of Volvo Cars Amberg, a German car dealership. More and more potential car buyers visit dealership websites these days to research the prices, so the company introduced a chat-bot with an integrated Typeform survey into their marketing site that provides an instant, totally customized price quote based on visitors' input. The Volvo dealership's chatbot provides instant price quotes to website visitors.

Here's the impact the chatbot had on the dealership's bottom line, according to their marketing manager Tobias Wamser:"We were able to increase lead generation on our website by about 300%. We are also able to prioritize high-quality leads and offer them an even more personalized experience". Not only that, but leads coming through the Volvo dealership's chatbot are 200% more

likely to purchase a vehicle than those acquired via their contact form, since they're able to get immediate answers to their questions or book a test drive online (Weaver, 2019).

As a part of the advertising campaign of the Green Jam festival in 2016, the beverage producer Tuborg Russia launched the VOTVOSDAT bot in Telegram. The bot was promoted on the official pages of the festival on social networks (Nozhkina, 2019) (Fig. 1).

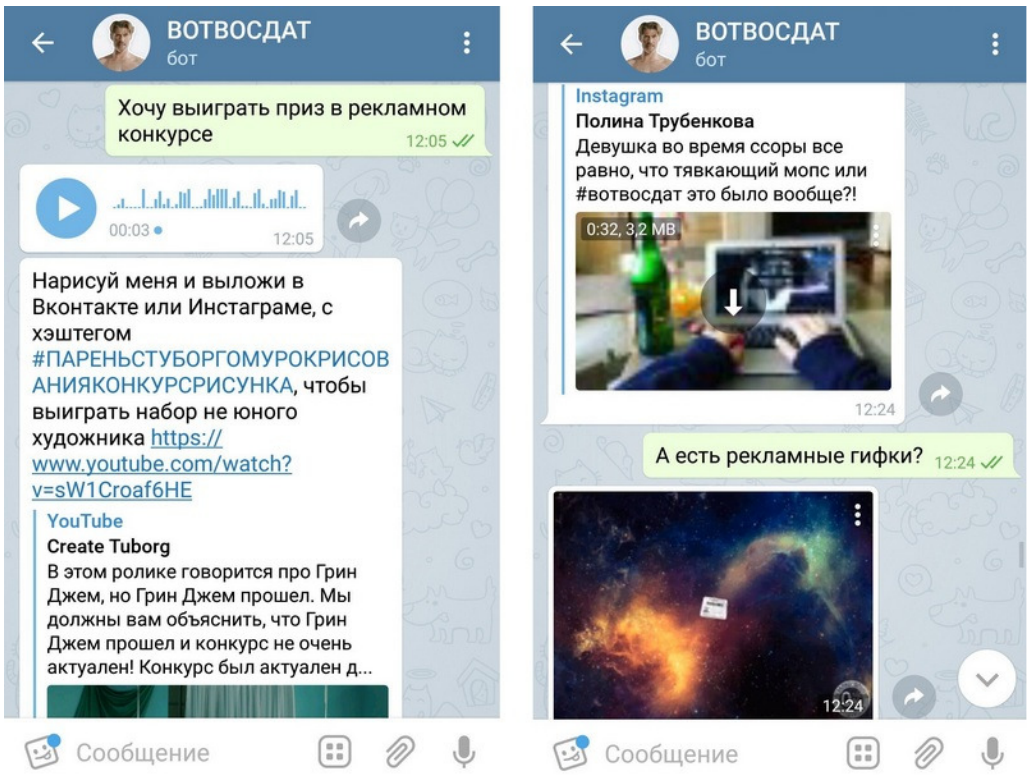

Note: "I want to win a prize in an advertising contest. Draw me and post me on Vkontakte or Instagram with a hashtag…".

Fig. 1: Tuborg Russia and the chat-bot "VOTVOSDAT"

The bot communicated with users, invited them to participate in various brand contests and activities, sent funny gifs and videos, informed the participants about the festival program. At the same time, it gathered a loyal audience around the Tuborg brand and attracted attention to the festival even among those who could not get to the event.

The Khrusteam cracker brand launched a detective bot in Viber in 2017 as a part of the "Guess the Secret Taste" campaign. Users had to guess the taste of the company's new product, and one of those who guessed could win £ 20,000. The bot explained the conditions of the contest, offered riddles, gave hints and promotional codes for receiving consolation prizes, and it also subscribed participants to the official Khrusteam group in the messenger (Nozhkina, 2019) (Fig. 2). Users got a post-call banner in a promotional chat. According to Khrusteam, as a result of the campaign, 92% of the brand's subscribers managed to communicate with the bot, each sending 4 messages in average.

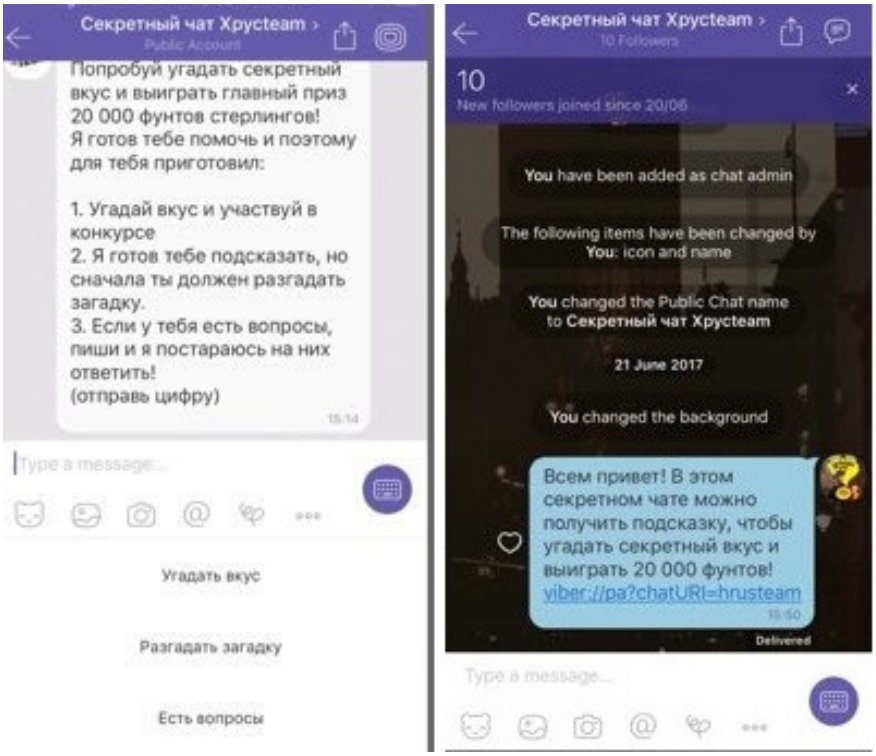

Note: "Try to guess the secret taste and win the main prize of 20 thousand pounds"

Fig. 2: A detective bot by Khrusteam

The Matryosha bot was created specifically for the BalticWeekend 2016 forum. The bot in Telegram talked about speakers, the forum program, sent jokes and stickers, and gave useful advice to the participants of the event. Using the bot, you could tell visitors about the forum news online. The user could control the bot on his own, choosing in the convenient button menu what he wants to know. Using the chat bot, visitors could communicate with each other or with the organizers (Fig. 3).

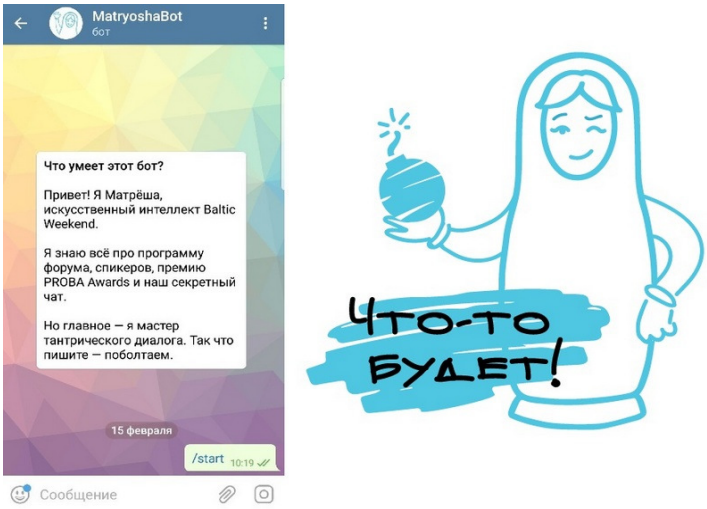

Note: "Hi. I am Matryosha artificial intelligence BalticWeekend. I know all about the Forum program, speakers,

and our secret chat"

Fig. 3: The Matryosha Bot at the BalticWeekend PR Forum

The bot still exists, it was actively used at Baltic Weekend-2019 as well. A new approach to creating this bot was to create a communication channel by combining the bot (which replaces the paper program), the channel (which transmits information in one direction) and the chat (involving people in the community).

At the end of 2016 the cosmetics company Sephora introduced a Facebook Messenger bot, which helps customers to choose lipsticks from its own brand line. The user only needs to upload a photo, and the SephoraVirtualArtist bot will find the perfect shade of a lipstick, based on the color of the face and eyes analysis. And then it will inform the customer about the price of the lipstick and the nearest store it can be bought today (Fig. 4).

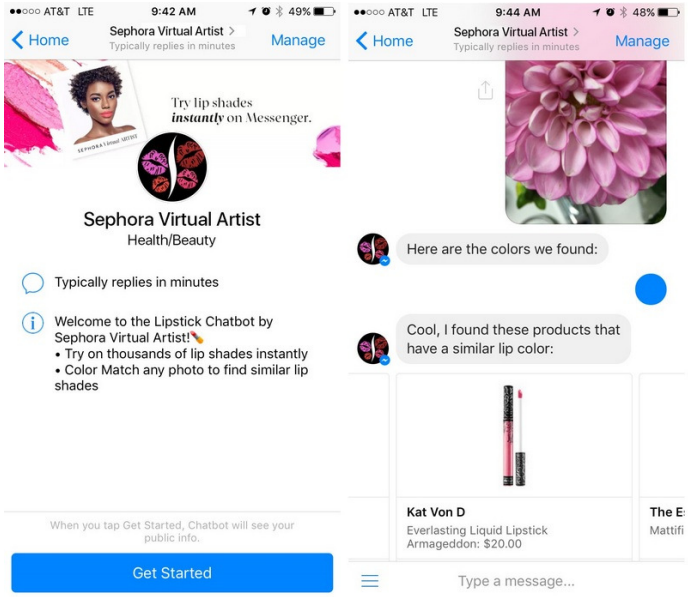

Fig. 4: Sephora and a product selection chat- bot

You could switch to the bot from the Sephora group on Facebook. In addition, a banner hung on the store's website urging visitors to try a stylist bot.

The Unilever brand launched a Facebook bot in October 2016 as a part of the Little Brush, Big Brush campaign, which told children tales about how important it is to brush their teeth. In total, the bot knew 21 stories (in the mini-cartoon format) – the idea was that parents and children would learn something new about the lives of the heroes every day for 3 weeks. After all, it is believed that just 21 days are necessary for any habit to be developed. The "Little Brush, Big Brush" campaign was widely advertised on TV, Internet and social networks of the brand.

And at the end of 2018, Unilever launched another chat-bot - this time in Viber, to advertise Forest Balm mouthwash. The chat-bot had an image of a funny raccoon named Gelik and reminded people to rinse their teeth, and with the help of FaceRecognition facial recognition technology, the bot tracked the moment when the consumer used the rinse aid. Then points were given to the user, and according to the results of the contest, the participant with the most points could win an iPhone. If after rinsing a person showed a barcode from a packaging of "Forest Balsam" to the camera, the awarded points were multiplied. The competition and the bot itself were advertised by popular Instagram bloggers. According to the bot development agency, as a result of the campaign, 10,620 people added the bot to their messenger. Of these, 62% performed the intended target effect - they rinsed their teeth.

The GoProGuruchatbot on Facebook Messenger, which appeared in 2018, answers users' questions, provides recommendations for extreme travelers and helps to choose a good camera from the brand line. Its feature is the response format that is the bot attaches a beautiful GIF or an impressive video made using with the GoPro camera to each of its recommendations. That is, the bot not only gives the user advice on which camera to buy, but also immediately attests the reason why GoPro should be chosen (Fig. 5).

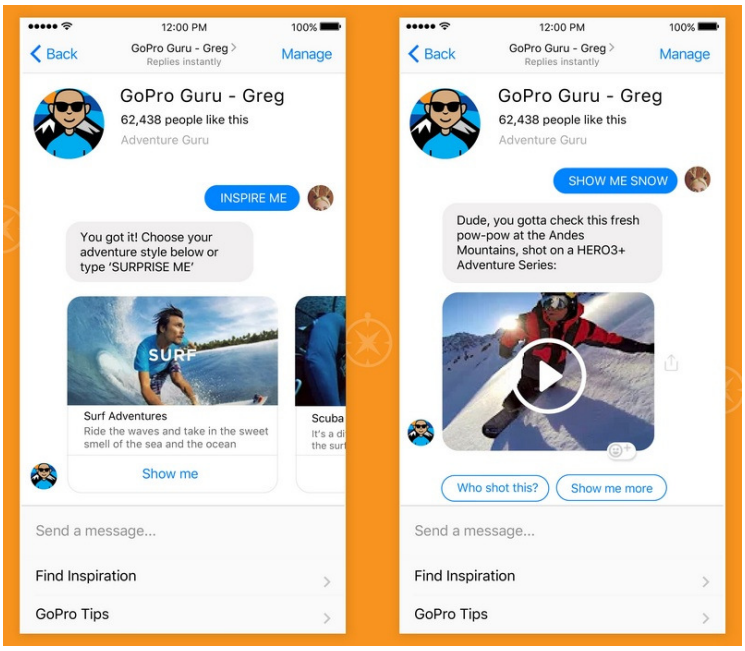

Fig. 5: GoProGuru chat-bot

Comunica, a Russian integrated communications agency, has developed a bot assistant not for its own marketing purposes, but as a tool that it sells to its customers. In 2017, the agency introduced the DigitalPressOffice chat bot for PR professionals. The bot works on Facebook or Telegram. It can help the company's press service gather journalists for the event: it will send them information about the event, speakers, timing. The bot will register those who wish to the event and send a list of all accredited journalists to the press service. It will also answer questions about when and how to get photos from the past event, provide detailed information about the speakers, and send a post release. This bot is not publicly available. The agency sells and sets up a chat-bot for each company individually.

Results and Discussion

The usage of chat-bots has grown exponentially and doesn't seem to slow down any time soon (Himanshu, 2019). Facebook has recently released a host of data proving the value of bots for business:

- 2 billion messages are sent among people and businesses monthly
- 56% of people would rather message than call customer service
-53% of people are more likely to shop with businesses they can message (The Complete Guide to Chatbots for Marketing, 2019).

The active practice of wide using chat-bots is due to the fact that bots can optimize personnel activity, in addition, the process of bots development is fast and cheap.

Chat-bots are used for various business processes: sales (auto-funnels); loyalty management (bonuses and promotional codes distribution); booking and reservation (tickets, services); feedback collection (interactive questionnaires); customer support.
From the point of view of customers, the company's chat-bot is a consultant which can answer various questions and find a solution to the problem. From a business point of view, chat-bot is a complete marketing tool leading a client through a sales funnel.

And for marketers, communicating with consumers via messenger app is a smart way to make sure messaging has been seen. Users are 80% more likely to open communication from brands if it comes via messenger. According to Gartner, by 2020, customers may manage up to 85% of their interactions with a company without ever even speaking to a human. A well planned chat-bot can serve as an engagement driver, lead generator, and can even help with market research. Treating chatbots as marketing tools, rather than virtual help desks, means better insights into customer behaviors, preferences, and pain points. This, in turn, drives better engagement and could even lead to higher sales (Alford, 2019).

Stages of implementing chat-bots in marketing activities:

1. Purpose definition. Depending on the purpose, different bot functionality is needed, and, therefore, the chat-bot will perform differently.
2. Site selection. Today such kind of chat can be introduced to almost all popular social networks and applications: for Vkontakte, for Facebook, Telegram, Viber, WhatsApp. But a chat-bot can be applied to a site as well by being simply pasted onto the page, in the form of a regular feedback window.
3. Choosing a service that allows you to configure all the necessary actions through its interface.
4. Setup and launch. The functionality of services is constantly being improved and allows creating more effective solutions.

Currently, there is a large number of special chat-bot constructor programs. For example, Manybot.io.is a Telegram chat-bot creating constructor. Robochat.io is a platform which helps to create a chat-bot for VKontakte communities. BotVK is a bot constructor for VKontakte with wide functionality. Manychat.com is a Facebook bot messenger constructor. Botmother.com creates a cross-platform chat-bot that will work in several instant messengers and networks: Telegram, FacebookMessenger, Viber, VKontakte and Odnoklassniki.

Chatbots are already widely used in various fields and industries, however, the next stage is call centers with artificial intelligence. Now many IT companies are working actively in this direction - voice assistants "Alice" from "Yandex", OK Google, SiriApple, CortanaMicrosoft and others is a bright proof of their activity. They analyze the user's speech and can give correct answers to simple questions. NeurointellectiPavlov, created by the laboratory of neural systems and deep training at MIPT, is able to understand people's speech and give adequate answers. This project is partially financed by Sberbank, which plans in the future to use iPavlov to communicate with customers. Google introduced the GoogleDuplex service, which can speak in a human voice and call and make an appointment at the hairdresser instead of the user himself, while his speech will be very natura. (Dmitrieva, 2018).

Conclusion

Summarizing the above, we indicate that empathy is the most important aspect when communicating with a client. Possessing this quality, chat-bots could understand the context of messages and customers intonations. The potential for the development of AI chat-bot is great, and it is really able to serve customers of different levels. It can be used in different business aspects. In general, AI technologies in marketing have enormous opportunities that significantly expand the channels of interaction with the target audience.

In the era of the information society the task of marketing is the use of new technologies and tools to improve consumer experience throughout the cycle of interaction with the client, which take into account his individual needs. Marketers need to form such relationships with customers that will persist even in the changing demands of evolving markets. This makes it possible to ensure the competitive development of the company.

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External and Internal Gamification in the Marketing Practice of Companies Using Digital Communication Channels

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Abstract

The article is devoted to the use of gamification in the activities of a company in order to develop marketing relations when working with clients and employees. While the digital economy is being developed, a significant part of marketing activity is transferred to the virtual space, as well as the use of social media for communication becomes more important. The involvement of the population in digital communication channels and the use of game content forces companies to turn to gamification to build confident relationships with both consumers and staff. The article discusses cases illustrating companies' use of internal and external gamification. The authors suggest that the use of this marketing tool will improve the overall performance of business.

Keywords: Relationship Marketing, Gamification, Digital Communication Channels, Internal Gamification, External Gamification, Company Cases.

Introduction

The information and communication infrastructure of relationship marketing is a part of the global socio-technological model of the information society, the development of which led to the virtualization of business and social relations. The information boom in the online and offline environment has predetermined the need for the development of communication technologies in various industries and spheres (Bezpalova, 2019). In modern business relationship marketing is aimed at managing relationships and communications between a company, personnel and consumers using digital channels. The development of the information and communication infrastructure of relationship marketing helps to improve the quality of individual interactions between a company, internal and external consumers, making them more trusting and open (Ivanchenko, 2017).

Gamification as a part of the modern digital environment is currently widely used in marketing activities of companies. Gamification involves applying computer games specific approaches to non-gaming areas in order to control the motivation and behavior of groups of people.

External gamification involves interacting with existing customers and attracting new ones, which in this case is a way to increase customer engagement and loyalty. The use of internal gamification is based on the approaches used in games development and aims at increasing the productivity of staff within the organization (Gamification in Business, 2016). Thus, game elements in marketing activity are used both within the company (for motivation and personnel management) and outside it (to attract consumers and increase loyalty).

Analysis of external and internal gamification as a new communication marketing practice is relevant, as it allows the complex mechanisms of forming long-term partnerships with customers and company personnel to be examined. The widespread development of computer games and consumer interest in them also stimulate attention to business gamification (Zickermann, 2014).

In general, it should be noted that gamification is not related to virtual games. But it is characterized by practical use of the games entertainment elements, the so-called game mechanics or game techniques. “Game mechanics are the rules of the game and its elements (points, badges, levels, ratings, awards / prizes), game dynamics are scenarios of user participation in the game” (Introduction to Gamification, 2013).

In the modern literature, there are six main game approaches that are aimed at increasing engagement (Table 1). Ether one or several approaches can be use in relation to any of two interested parties: employees or customers.

Table 1: types of game approaches aimed at increasing engagement

Types of game approaches	Description
Big challenge	Competitions in which participants receive a prize for victory
Quick response system	Scoring is in real time
Modeled discovery	Using of new models or ideas, as well as options for the development of something
Status marathon	Designed for a long time, such systems use various rewards for moving up the status ladder
Commercial / Negotiation	Such systems most often rely on a real or imagined global economy, including securities markets and auctions
Expressive	They are aimed at allowing the user to express himself, to show his personality

Source: Zickermann G., 2014

In marketing activities, gamification can be used to create different patterns of behavior. It is important to understand that gamification is not only holding contests in which one can get a prize for achievements, it is an approach that helps to motivate consumers and employees, as well as stimulate creative thinking and introduce innovations.

Key Research Findings

Examples of Internal Gamification in Staff Marketing

Staff marketing plays an active role in improving business performance (Bondarenko, 2017). “In the context of labor relations internal gamification implies influencing the labor behavior of employees by involving them in the game: using corporate software (application or social network), employees of a certain company are offered to perform various tasks or complete online quests related to the company directly, to training or the work process, all the interaction between employees is necessarily based on competition. In Russia, “Tele2”, “MTS”, “Odnoklassniki”, “Baby.ru”, the state corporation “Rosatom”, “M. Video”, “T-Systems CIS Russia”, "Orient Express" bank and many others use gamification in varying degrees” (Tsyplakova, 2016).

Here we consider the case of the Internet Marketing Agency, which is one of the largest agencies in Eastern Europe, where an internal gamification system has been implemented for two years.

The company developed indicators, upon reaching which employees receive virtual awards - badges that are displayed in the profile of each employee in the company's ERP system. For example, such indicators were “Maximum number of projects” or “Increase in turnover per month”. The agency’s gamification system is the aggregation of all points for all badges for all employees. “The rating is updated quarterly, so every three months employees have a new motivation to compete with each other. In this system, badges are given solely for actions that benefit the company” (Real Experience in Implementing a Gamification System, 2014).

The results of this gamification system functioning are:

- the system signals the effectiveness and activity of employees;
- it gives the staff additional motivation to take the company-benefit actions;
- increases corporate spirit and volatility in the company's activity;
- adds an entertainment element to the work.

According to the agency’s top management, “badges can very rarely act as the only motivation in the work of the staff, but at the same time they are a pleasant and well-deserved reward for employees of the agency” (Real Experience in Implementing a Gamification System, 2014).

The next case of internal gamification is a training project of a large company manufacturing baby food. The key task of the training project of the company - the baby food manufacturer was the development of loyalty to the products and brands of this company with its own staff and resellers (sales consultants).

The training project was developed in the form of a distance online learning. To engage and motivate students, all training modules included:
• motivational blocks and involving materials;
• interactive components for both developing knowledge and engaging students;
• visual representation of theoretical material with vivid illustrations;
• full or partial gamification of the module or the entire course.

Gamification of training courses in this case was used to make learning more effective during the training. The integration of online learning with game elements in the manufacturer’s marketing communications process resulted in several times increase of the number of courses taken by the target audience, which led in its turn to an increase in the level of company's products sales.

Examples of external gamification in the companies’ marketing activities

In the marketing practices of companies, gamification is usually a part of social media marketing and is carried out on various social networking platforms.

Old Spice company developed an online comic book style game “Choose Your Own Adventure” on Instagram. One of the posts on the brand’s official page contained marks that led to fake pages with the continuation of the game. The result is a large branched comic book filled with retro jokes, monsters and robots (Fig. 1).

Fig. 1: Instagram game by "Old Spice"

The story begins with a description under the photo: “So, you find yourself in a dark cave, on the side you see a faint light, and next to it is a bottle with Old Spice shower gel. What will you choose? ” When you click on the screen, two labels appear, one of which leads to the next level, and the second, unfortunately, turns out to be one of the possible endings to the script. However, there is a way out of any deadlock to the previous “location”.

The Old Spice game was a kind of parody of traditional computer quests. Users open the first photo, and then choose their further actions from the proposed options. At the same time, the end of the game contained an Old Spice advertisement.

The mechanics of modern Instagram quests are very similar to a computer game. Making a decision, the player interacts with the program by clicking the appropriate buttons or selecting certain dialogue branches. By opening this or that link, the user interacts with the plot, making a certain game action. This mechanic is suitable for various marketing purposes, including creating interactive online storefronts.

The next case is a joint competition from MVideo and the MoreMall multi-brand shopping center in Sochi. A contest was held on the social network Vkontakte platform, and a real prize was offered - a Jawbone UP3 Red fitness tracker and a modern Presigio tablet (see Fig. 2).

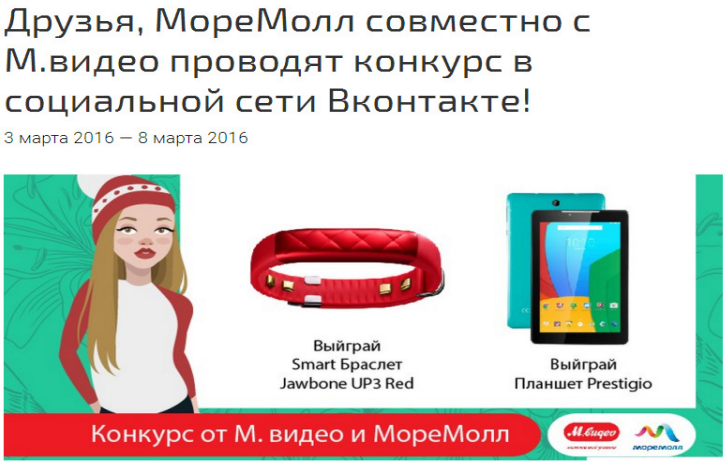

Note: «Friends, MoreMall together with M.Video holds a competition in the social network Vkontakte. Win a Fitness tracker Jawbone UP3Red. Win a Tablet Prestigio»

Fig. 2: Competition Information

Every day, the company published tasks on the social network Vkontakte (see Fig.3).

Fig. 3: Tasks of the competition from MVideo and the MoreMall

At the end of the competition, prizes were awarded to the subscriber who answered most of the tasks of the competition not only correctly, but also quickly.

As a result of the action, data on the involvement of the Shopping Center subscribers in the VKontakte social network before, during the competition and after it was analyzed (Table 2).

Table 2: The dynamics of the involvement of the Vkontakte social network subscribers

Indicators	Before the competition (07.02-19.02)	During the competition (20.02-08.03)	After the competition (09.03-21.03)
Number of likes	183	1983	1084
Number of reposts	83	407	157
Number of comments	53	727	81
Audience outreach	120 069	261 024	144 545

Source: MoreMall, Sochi

As a result of this competition with gamification elements, the audience coverage indicators were exceeded by more than 2 times, the number of comments increased by 14 times. The number of reposts increased 5 times, the number of likes increased 11 times.

The following case shows the game mechanics working in the banking sector. Tinkoff Bank together with the MasterCard payment system launched the quest for its customers - for 35 days participants got the tasks passing which they performed various online and offline operations. The more difficult the task, the greater the reward the client received. The prize fund of the stock was 1 million rubles. Initially, the company promised the winner one million rubles, but due to the large number of people who successfully completed all the quests, it divided the amount between them - each of the 444 winners received 2,252 rubles and 12 thousand miles with the opportunity to spend them on tickets of any airlines (Examples of Gamification, 2017).

The objectives of the Tinkoff Bank quest were:

• To increase the activity of using co-branded cards: ALL Airlines, OneTwoTrip and eBay;
• To attract new customers, to increase the number of cards issued;
• To increase interest in the Bank's loyalty programs and show that it is simple and profitable to use them.

The results of the "Tinkoff Bank" quest:

1. More than 15,000 participants.
2. The number of transactions on co-branded cards increased by 20%, among participants by almost 40%.
3. More than a thousand clients' publications in different social networks.
4. The number of cards issued has increased.
5. A large number of purchases were made from Bank partners (Tinkoff Quest, 2015).

The action was so successful that it was repeated in next year. This time the quest lasted only one day. 813 people reached the final. The main prize was shared among the five fastest players. The record of passing tasks - 56 minutes.

"Tinkoff Quest -2016" was much more dynamic, since all the tasks had to be completed in one day. The tasks themselves also changed - before completing the task had to be solved. Another change was that in 2016 the bank linked the quest with the city locations of Moscow.
According to the bank, the main prize of the "Tinkoff Quest - 2016" was about 1 million rubles. It was shared among the first 5 winners. Participants who took places from 6 to 10 received an iPad from "Svyaznoy" company. The remaining winners received 5,000, 2,000 or 1,000 bonus points on Tinkoff Bank cards, depending on the results of the quest (Tinkoff Quest, 2016).

The analysis of the Tinkoff Bank quest shows that gamification can be effectively used to solve marketing problems. It is used not only to attract the attention of consumers, but also to increase income.

Conclusion

In the era of digital marketing the success of a company depends on its opportunity and ability to use the Internet to promote the product and increase the competitiveness of the company. Using the techniques of external gamification in business can give the following advantages:

• being ahead of competitors who are accustomed to acting using outdated sales techniques;
• strengthening the brand with an innovative approach;
• increasing the level of trust in the company and the product, it is gamification that is aimed at entertaining and increasing subscribers;
• attracting new users thanks to the recommendations of those who have already participated in the developed game mechanics;
• a large stream of new leads from social networks, as the results of game mechanics are published or participants are invited to share it with friends;
• an active dialogue with the target audience gives feedback, as well as positive comments;
• savings on advertising, since gamification works like an advertisement;
• increasing the level of products sales at all stages of the game and a measurable result from investments.

The use of internal gamification as a new management practice gives management modern ways to manage employees and increase productivity, by electronic monitoring of employee activities and increasing employee engagement.

Games and quests differ from the traditional marketing tools as they more actively attract the attention of the media, which means they create news occasions. The game allows you to enhance the emotional experiences of the client and increase his involvement in the company.

To make users interested in playing, the following conditions must be observed:

1. The game must have specific goals and rules.
2. The actions that are required in the game should be affordable for any users.
3. Feedback on the actions of the client or employee is required.
4. It is necessary to exclude factors that may interfere with the game.

Thus, effective gamification involves the preliminary development and testing of the game, taking into account the business goals of the company, the needs and capabilities of the game participants, as well as the ability to manage the motivation and behavior of employees and customers. The use of game technologies in the company's activities accelerates customer feedback, and also allows companies to develop individual interactions with internal and external consumers based on the information and communication infrastructure of partnership marketing.

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Improving Educational Management in Russia Based on Information and Communication Technologies

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Abstract

The article discusses the issues of improving educational management based on the use of information and communication technologies to create services that allow managing processes in the University. The relevance of the article is determined by the fact that research in the field of education management in Russia is mainly devoted to the study of its theoretical aspects. At the same time, some studies cover issues related to the process of Informatization of education in the field of building an information system of an educational organization. Transformations taking place in Russia, lead to changes in education, placing the graduates of higher educational institutions in new requirements for the quality of education, and the universities requirements new priority goals and objectives of the development of modern education. This issue is particularly acute in connection with the transition to a new stage of the Russian information economy – digital.

The purpose of the article is to identify specific processes in an educational organization, use the tools of the quality management system to develop documented procedures for their management and use them to create electronic services for improving educational management at the University in the information and educational environment of the organization.

Keywords: Educational Management, Informatization Of Education, Quality Management System, Process Approach, Management Services.

Introduction

The main tasks of educational management are to ensure the quality of educational services that meet educational standards and the needs of the main subjects of education, as well as to constantly monitor the effectiveness of educational activities, to coordinate the work of all departments and subjects of education.

One of the main aspects of education management, as a type of activity, is the educational aspect: the management of the educational process, during which the coordination of scientific, material and human resources necessary for the effective achievement of educational goals is achieved.

At the same time, we will consider the strategic aspect of educational management in the context of implementing the concept of managing an educational organization based on human resources as the basis of an organization that focuses on consumer needs, allowing for flexible regulation and timely changes that are adequate to the impact of the external environment, to ensure competitive advantages in the educational market.

The process approach in the management system of enterprises and organizations began to be applied in Russia from 2005-2010, and abroad even earlier. When building the enterprise information model, a process model of the enterprise was developed using business processes. Enterprise reengineering

involves the adoption of process thinking and the use of advanced information technologies in combination with an attempt to implement organizational changes (Ruzakova, 2010). Theoretical research and practice in the field of the process approach determine the relevance of this article in the application of this approach in educational institutions in Russia.

The purpose of this study is to concretize some processes of an educational organization, develop documented procedures for their management and, on their basis, create electronic services, the use of which is aimed at improving the educational management of a university in the information and educational environment of an organization based on its information system.

The management of an educational organization based on an information system is a key mechanism that will create advantages in a competitive environment. In this regard, the main activities in the process of education informatization are the creation of a reliable and effective infrastructure that provides unified ways to access corporate data, improves the manageability of the entire complex of information resources and is in line with the strategic goals of the educational organization (Mironova, 2017).

As a tool for developing documented procedures for managing specific processes at a university, the process approach of a quality management system (or TQM) was used (Mironova, 2019).

Issues of educational management are quite widespread in the research of Russian scientists (Asaul, 2007, Zernov, 2008, Ponomarev, 2007). These studies are mainly devoted to studying the problems of education as one of the leading branches of the Russian national economy. They consider the theoretical aspects of education management (system, strategy, personnel, methods, efficiency). In addition, the scientific basis of the development of marketing of an educational institution (research of the education market, marketing environment and communications, consumer behavior, marketing management) is considered. At the same time, a number of works are devoted to the development and functioning of the information system of an educational organization (Kryukov, 2007, Oleynikov, 2005, Mironova, 2020). There are practically no publications related to educational management based on the TQM process approach in the context of the functioning of the University's information system.

However, according to State standard ISO 9001-2015 “Quality Management Systems”, the fundamental principle and main component of the quality management of the educational process in a university based on the TQM is the process approach, the implementation of which involves:

-a meaningful description of the process of developing information and methodological support, with by which the desired result is achieved;
- identification of the relationship of this process with organizational and managerial processes taking place in the departments of the university;
- establishment of responsibility, authority of internal and external consumers and other interested parties involved in this process
- account the results of this process for managing it.

At the same time, the analysis showed that within the framework of the TQM existing in universities, the requirements of this State standard are not fully implemented, and the main work on quality management (Soloviev, 2003, Mironova, 2019) is focused only on:

-maintaining technological documentation presented on the websites of universities;
-regulation, mainly, the content of educational programs;
-fixing provisions on structural units and provisions on the exercise of various functions by them;
-presentation of quality plans and programs, internal audit plans, work plans.

The analysis of scientific publications on the issues of educational management made it possible to state that in the conditions of informatization of education, the goal of educational management of an organization is to ensure the quality of educational activity by rational organization of processes

(pedagogical, educational- methodological, organizational-managerial, science-research, educational) based on electronic services included in the information and educational environment of the organization, when used effectively and human resources and the development of its technical and technological base.

At the same time, we will understand the information and educational environment as a set of purposefully created conditions for the interaction of all categories of users responsible for the development and use of information and methodological support for the educational process based on the university's information system (Mironova, 2017).

The structure of the article includes an introduction, which defines the purpose of the study and clarifies the tools for its implementation, as well as the result of the analysis of scientific research, which showed that the management of the quality of education in modern universities is limited to recording on the websites of universities technological documentation regarding the content of educational programs and provisions on structural units University and their functions, as well as quality plans and plans for its checks. In terms of informatization of domestic education, this is clearly not enough.

Methodology for using TQM- Tools for Developing Management Services

In connection with the above, we will consider the management of some processes occurring in the University, using the tools of the TQM system. In scientific publications on quality management of education, it is noted that the basis of it should be the modeling of educational activities, while it is noted that the quality management system of the University is one of the tools to improve the efficiency of the educational process.

However, the analysis of research in the field of quality management system of universities showed that within the existing universities across the country all the work TQM quality management is to maintain, above all, technological documentation provided on the websites of the universities and regulating the content of educational programs, the provisions on structural subdivisions and the provisions of the implementation of the various functions, as well as plans and quality program plans of internal audits, work plans, etc.

The fundamental principle of quality management of education is a process approach that allows us to consider educational activities as a whole, consisting of a set of the following processes: educational and methodological, organizational and managerial, research, and educational.

Implementing the process approach involves performing the following actions:

- determining the process by which the desired result is achieved;
- definition and measurement of inputs and outputs of the process;
- identification of the relationship between the process and the functional divisions of the University;
- establishing responsibility, authority, and accounting for managing the process;
- identification of internal and external consumers and other stakeholders in the process (Vasilieva, 2008, Ruzakova, 2018, Mironova, 2017).

In the context of the study, the selected method seems to be universal, because almost any organizational process in a university can be represented as a sequence of deterministic steps, each of which has input and output information.

As an example, consider from the point of view of process approach of TQM of the University is the development of documented procedures to control the creation of electronic educational resources (EER), run by the Department of the University. The figure shows a diagram for managing the process of its development.

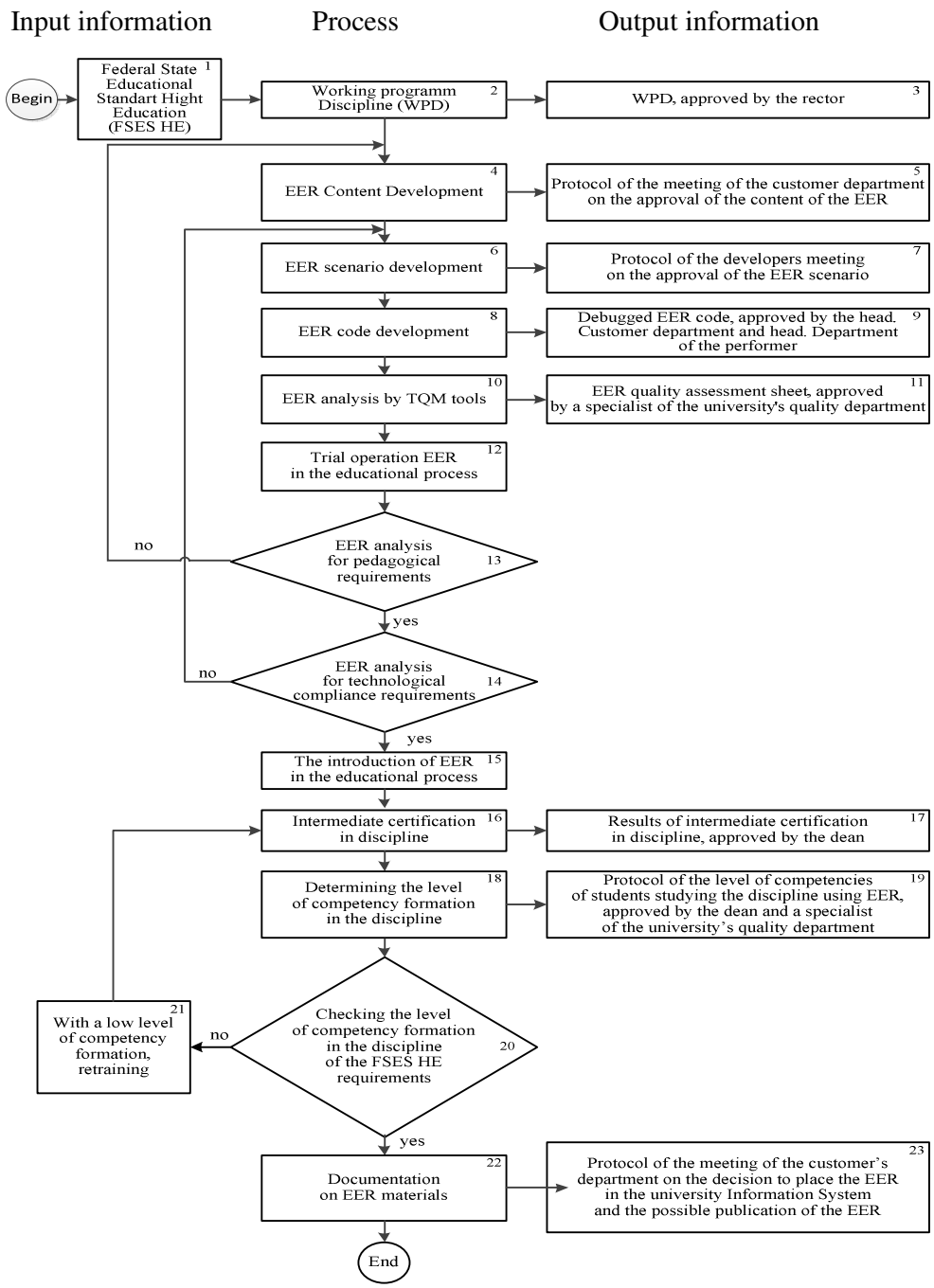

Figure-Managing the process of developing an electronic educational resource (EER) as a documented TQM procedure

Main blocks of the EER development process: 2, 4, 6, 8, 10, 12, 13, 14, 15, 16, 18, 20, 21, 22. Their contents and those responsible for their implementation are shown in table 1. The input information for the process of developing an EER for a specific discipline is the Federal state educational standard of

higher education (FSES HE) of Russia and the working program of the discipline for which the EER will be developed.

Table 1 : The main blocks of the development process electronic educational resource (EER)

Process Block number	Process Block Content	Responsible executor
2	Working programm Disciplines (WPD)	Leading subject teacher from the department of the customer
4	EER Content Development	Leading subject teacher, methodologist from the customer's department
6	EER scenario development	Leading subject teacher, methodologist from the customer department, teacher from the department of performer
8	EER code development	EER code developers, teacher from the department of performer
10	EER analysis by TQM tools	Specialist of the University Quality Department, Leading subject teacher
12	Trial operation EER in the educational process	Leading teacher from the customer department
13	EER analysis for pedagogical requirements	Leading teacher and methodologist of the customer department
14	EER analysis for technological compliance requirements	Leading teachers of the department of the customer and the department of performer, methodologist of the department of the customer
15	The introduction of EER in the educational process	Leading teacher of the customer department
16	Intermediate certification in discipline	Leading teacher of the customer department, employee of the dean's office
18	Determining the level of competency formation in the discipline	Leading teacher of the customer department, specialist of the university quality department
20	Analysis of the level of competency formation in the discipline	Leading teacher of the customer department, specialist of the university quality department
21	With a low level of competency formation, retraining	Leading teacher customer departments
22	Documentation on EER materials	Leading teacher customer departments, head customer department

The output blocks of the development process of the electronic educational resource (3, 5, 7, 9, 11, 17, 19, 23) of the discipline are presented in table 2.

Table 2 : The Content of the output blocks of the development process electronic educational resource of discipline

Output block number	Output Block Content
3	Work program of the discipline for which the EER is developed, approved by the rector
5	Protocol of the meeting of the customer department on the approval of the content of the EER
7	Protocol of the developers meeting on the approval of the EER scenario
9	Debugged EER code, approved by the head. customer department and head. department of the performer
11	EER quality assessment sheet, approved by a specialist of the university's quality department
17	Results of intermediate certification in discipline, approved by the dean
19	Protocol of the level of competencies of students studying the discipline using EER, approved by the dean and a specialist of the university's quality department
23	Protocol of the meeting of the customer's department on the decision to place the EER in the university Information System and the possible publication of the EER.

The result of the process approach is a documented procedure, TQM-regulated institution, which defines the input and output parameters of the process, identified all its relations, established responsible at each stage of the process, identified internal and external customers of the process.

In this article, the process of developing an EER based on the TQM process approach is considered as an example. Similarly documented procedures have been developed to manage the following processes at the University:

- in the learning process - managing the development of educational and methodical complex of discipline, managing quality control of teaching materials;
- in organizational and management – management of monitoring the satisfaction of participants in the educational process;
- in the research process-managing the process of forming students ' competencies in research activities;
- in the educational process-managing the process of forming a student's portfolio as the initial conditions for the graduate's career growth in the profession and healthy lifestyle skills.

The algorithm proposed in the article was used to develop the above-mentioned documented procedures. The developed documented procedures served as the basis for the development of the corresponding services, the functions of which are presented in table 3.

Table 3: A list of services functions that ensure the improvement of educational management at a University

Process	Process Objective	Service Function
Educational-methodical	Provision of the educational process with electronic educational and methodical complexes (EEMC), the formation of students design knowledge, skills and experience;	Management of the development electronic educational resources (EER), management of the process development EEMC, control of EEMC quality

Table 3 continue

Process	Process Objective	Service Function
Scientific research	The formation of knowledge, skills and experience in research activities	Management of the students scientific process activity, service ASSPRSR (Automated System for Statistical Processing of Results Scientific Research)
Educational	The development of the personality of students, the formation of a system of beliefs, moral standards, general cultural and business qualities	Management of the process of formation of the student's electronic portfolio, the formation of healthy lifestyle skills, the service ELECTRONIC PORTFOLIO
Organizational management	Improving the quality of student training	Management of monitoring the satisfaction of participants in the educational process (System Electronic Monitoring of Quality Educational Process service (SEMQEP))

Conclusion

Within the framework of the study, based on the TQM process approach, documented procedures were developed for managing certain processes aimed at improving educational management in the information and educational environment, on the basis of which services were developed that provide:

- in the educational and methodological process - management of the electronic educational resource development process, managing the process of developing electronic educational materials and monitoring their quality;

- in the organizational and management process-management of monitoring the satisfaction of participants in the educational process;
- in the research process-managing the process of forming competencies in the research work of students;
- in the educational process-management of the process of forming a student's portfolio as the initial conditions for the graduate's career growth in the profession and the formation of healthy lifestyle skills.

In the introduction of the article, the purpose of the research is formulated, which consists in specifying some processes of the University, developing documented procedures for their management based on the process approach of the quality management system and on their basis creating management electronic services. As a result of the analysis of scientific publications, it is shown that the process approach of TQM as a tool for managing the quality of education in modern universities in the conditions of Informatization of education is not fully used. The second part is devoted to a description of the methodology of the research, based on the process approach of quality management system for

example, the development of documented procedures to control the creation of electronic educational resources.

Further development of the research results involves the development of documented quality management system procedures for other processes at the University in order to intensify the process of Informatization of education in Russia and create effective and reliable educational infrastructures that allow implementing the strategic goals of educational management based on information systems of universities.

The academic consequences of funding are determined by the fact that the developed methodological and technological solutions aimed at improving educational management have a significant positive impact on the management of the educational process, including conducting training sessions; monitoring students knowledge; providing means of delivering educational materials from teacher to student.

The managerial consequences of financing consist in solving methodological problems of improving educational management in the context of Informatization of education in Russia using the process approach of the quality management system, aimed at developing the theory and practice of the evolution of society (industrial and information) and the development of a new stage of the information economy – digital.

At the same time, the results of the research can be used in the activities of educational organizations (universities, colleges and other educational institution) that have implemented information systems and plan to develop the information and educational environment of their organization in order to improve the manageability of the entire complex of information resources.

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Currency Exchange and Compensation Transactions on A Non-Currency Basis

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Abstract

Non-Currency transactions and counter trade form an important aspect of international trade in today's globalized economy. This type of transactions may be both for goods and services. This is an important form of trade from the point of view of developing nations. There can be several forms and variants of non-currency trade and each country follows whichever suits its current economic and social structure. This method of non-currency trade is especially helpful for middle- and low-income countries which lack sufficient fund of hard cash reserves. In politically and economically unstable countries, this form of trade can also help ensure protection from currency exchange rate fluctuations. It also helps avoid inflation since the trade is carried out in goods without the involvement of hard cash. As the world is becoming more prone to financial turmoil, many less developed and developing countries are resorting to such kind of transactions to avoid financial risks. In this paper, the analysis will be made of the three such forms of exchange in a detailed manner namely Barter deals, Buyback (Compensation) and Direct Compensation (Counter Purchase). Each variant will be studied as per their further classifications, advantages and disadvantages. The study would focus on the mechanism of such transactions, the salient features of such methods of exchange and the need for such a system in today's world.

Keywords: Barter, Compensation, Counter Purchase, Direct Compensation, Buyback.

Introduction

This mode of trade exchanges usually involves developing nations and is a means to reduce imbalances in trade between them and other advanced countries. Such mechanisms are used when there is a shortage of foreign exchange in a country or when there are foreign exchange controls

which restrict the availability of foreign currency in a country *(Robert, 2018)*. In simple terms, this mechanism helps countries to export their products across national borders to foreign countries or companies even when they are unable to pay using hard currency.

Literature Review

When writing this work scientific and educational literature, articles were used. The main sources, revealing the theoretical foundations of the compensation transactions mechanism, were works of Eric Martinez, Ian Jones W, Tim G. Richardson.

As per the United States Department of Commerce, 1978 "A Seller provides a buyer with deliverables and contractually agrees to purchase goods from the buyer equal to an agreed percentage of the original sales contract value". This is one of the first definitions of counter trade. According to Hennart, 1989, counter trade is a set of agreements in which the seller is involved in several compensatory activities to settle the sale. Some studies say that counter trade reduces risks associated with the purchase of high-end technological goods. Authors *(Hennart, 1989; Hennart, Anderson, 1993; Lecraw, 1989; Mirus, Yeung, 1986; Marin, Schnitzer, 1995)* support this claim. According to Lecraw, 1989 and Fletcher, 1996, the long term and close relationships between companies and foreign suppliers can benefit for both the stakeholders involved resulting in technological, managerial and commercial growth. Counter trade may help to train local labour and task force *(Forker, 1997)*. Hennart, 1990; Caves and Marin, 1992; Hennart and Anderson, 1993 suggests that counter trade usually establishes in places where market transactions are not well established or are in the developing phase. Studies on Williamson's transaction cost theory (1975) *(Hennart, 1989; Hennart, Anderson, 1993)* show that counter trade is an alternative to FDIs. Some studies underline the rapid growth that counter trade agreements have had over the years *(Erridge, Zhabykenov, 1998; US Department of Commerce, 2007)* both in the relations between Western countries and emerging economies and in the relations between developed economies.

Methodology

There are mainly three kinds of non-cash trade transactions commonly used around the world namely barter system, compensation agreement and counter purchase. Each of these three methods has been dealt with, individually. First attention has been made on the very concept of counter trade, its meaning and advantages of using such a system. The barter system has been studied on the basis of its main idea and definition, classification, advantages and disadvantages. For compensation Agreement also the first approach has been the main idea and the types of transactions involved. Then some of the ways to avoid penalties have been discussed in case there is a violation of the promise of payment. The similar approach has been used for buyback compensation and study has been made related to the main idea, advantages and disadvantages and some salient features.

Reasons for engaging in counter trade

Some of the main reasons for engaging in counter trade include:

1) If the trade deals are of very high value (over $1 million) or deals with a certain category of industry, then this mechanism supports that kind of transaction *(Barternews.com, 2019)*. For E.g. in South Korea, as per government regulations, telecommunication procurement above $1 million as to be carried out using counter trade.

2) As counter trade bypasses the use of hard currency and only deals with goods, so the risk of currency fluctuations can also be mitigated to a considerable extent *(Counter trade, 2020)*. This is a good method to hedge against inflation as well.

3) Counter trade is an effective way to recognize profits. The government of many countries restricts the flow of currency out of the nations. In such situations, counter trade acts as a useful tool to get back profits in the form of goods and products *(Martinez, 2019)*.

4) Many developing countries do not have access to ample credit facilities or funding to facilitate international trade. In such cases, counter trade helps.

5) Counter trade also helps countries enter new geographies for international trade.
6) It provides an opportunity for sellers to differentiate their products from their competitors.
7) It helps counter bad debt situations as the payment can be done through goods or products.
8) It helps developing countries retain their markets from competitors.

Phases of Countertrade

- Negotiation of Parties

The first and most difficult phase is the negotiation phase. Generally private companies have an advantage over state-controlled ones but this should not be taken as a rule and the strength and position of the parties are strictly determined by the economic condition of the company and the country. Although the concept of economic public order tends to be of a national scope, some principles should be accepted in international trade by the States involved. These principles should be taken into account by a mediator, a trouble-shooter and an arbitrator, so there is no chance the arbitral award is not accepted in another country.

- Initial documentation phases

Lots of documents, letters, etc. are exchanged among the parties which take considerable amount of time. The term "letter of intent" is used by parties in international trade with many meanings which adds a certain difficulty to the evaluation of the commitments undertaken by means of the document. These letters can be used to confirm the seriousness with which negotiations are approached, as a framework agreement that allows reaching partial agreements or as contracts.

- Execution Phase

It is difficult to draw concrete borders between the different phases. The exact start of execution is not well defined. The parties begin operations even before settling of the contract law. The transaction is not the actual phase either as deadlines can be extended usually by the parties involved. Modifications in the contract law involve mediation, conciliation and negotiation between parties, which are addition to the more traditional ways of arbitration and judicial means. These modifications are carried out by companies and governments situated in different parts of the world with totally different economic, legal, political and cultural backgrounds.

Table 1: Advantages and disadvantages of the countertrade

Advantages	Disadvantages
1) Allows entry into new and difficult markets	1) No personal use of goods offered by customers
2) Overcomes currency controls and exchange problems	2) Negotiations are time consuming and complex
3) Increases sales volume	3) Uncertainty
4) Overcomes credit difficulties	4) Increase costs
5) Allows full use of capacity	5) Difficult to resell goods by offsets
6) Allows disposal of declining products	6) Brokerage costs
7) Provides sources of attractive inputs	7) Getting businesses in which firm may have no knowledge

(Source: compiled by the authors)

GATT/WTO and Countertrade

- GATT had originally accepted countertrade agreements given certain restrictions such as use of countertrade measures on discriminatory grounds and in response to government policies.
- Article 1 of the GATT Agreement says that all GATT member countries should be treated equally without any discrimination. It does not mention anything about imposing restriction on countertrade. However, there can be no preferential treatments to selected countries.
- Trying to impose countertrade requirements in order to protect domestic industries however goes against Paragraph 1 of Article II *(McVey, 1981)*.

Types of Counter trade

1) Barter System

It is a system of trading where no money is involved. It is a very old technique and dates back to the age when money was not invented. Today it exists in a new form and using the latest technology like the internet. The value of a commodity can be negotiated for another and this process usually involves online auctions and swap markets. It can be of the following types

- Direct trade. This is a case of a simple transaction where one party gives item "X" in return of item "Y".
- Partial trade. Here one-party barters away products for partial trade + cash. It helps trade away the margin and pays for the "hard cash". By this method, one can get business without having to pay cash or green dollar bills.
- Associated Trade. Here a third party exists which brings together various businesses. A particular trader may sell some product to a person but might not necessarily exchange the latter's product for his own. He may choose to purchase some other product or service
- Conjoined Trade. In this method, a person may mix products and services to trade for other products and services.
- Investment Trade. In this method, investments of services are made but the payoff is not immediate. Instead one has to wait for years and build relationships which will pay off in years to come.

A barter contact consists of Parties, recitals, acknowledgement of obligation of first party to provide and accept goods, acknowledgement of obligation of second party to provide and accept goods, first-party goods, second party goods, bank guarantees providing for full payment in the event of the non-performance of one party, guarantee of quality, quality control, right to inspect, right to neutral surveyor, determination and settlement of claims and penalties.

Table 2: Advantages and disadvantages of the barter system

Barter system	
Advantages	Disadvantages
1) The system helps gain access to new markets, customers and thereby leading to increased sales (Mint.com, 2019). 2) It helps increase cash flow by allowing saving cash for the business. Saving cash is a kind of cash flow. 3) It helps increase profit by allowing purchasing goods and services on barter at a discount which is equal to gross profit margin less the barter fees incurred *(Notjustanentrepreneur, 2015).* 4) Flexibility. Even heterogeneous or unrelated things can be realized.	1) Each party should possess the goods or service which the other party needs and is willing to trade for. Availability of mutually desired goods is a pre-requisite. This is a remote possibility and does not always coincide. 2) There is no common unit to measure the value of goods being traded. Hence the values are arbitrarily fixed by the parties based on their individual needs of the products. Professor Culbertson had put forward a formula to measure the number of exchange rates which is n(n-1)/2. For e.g., if there are 100 types of goods involved in barter trade, then the number of exchange rates would be 100(100-1)/2 which is equal to 4950. This creates a problem in the calculation of final accounts because it is not possible to include a huge list of products in the balance sheet or Profit and Loss Account Statement *(Meghana, 2019).* 3) Certain goods cannot be divided such as in the case of trade between animals such as horse and sheep. One party may desire 5 horses but the other party may be willing to only part with 4. And since the goods here are animals and they are indivisible, the transaction may fail to happen. 4) Since there is no fixed measure of value, it is also very difficult to store value for the future. Perishable items such as rice, grains etc. are very difficult to store and depreciation happens very

	fast and is not predictable. 5) Deferred payments are also not possible due to problems in storage and quality of the goods to be exchanged at a later date. As we have seen perishable goods decrease in quality drastically so there might be disagreements over the type of goods to be used for exchange at a future date. 6) There is also a lack of specialization. With no experience of trading with a particular type of goods and also with the absence of proper monitory framework and transactions, this system of barter fails in a proper market economy.

(Source: compiled by the authors)

2) Direct Compensation (Counter Purchase)

This is an agreement where the exporter agrees to buy a number of goods in return from the country to which it is exporting. The counter purchase is made of goods of equivalent value. A unique feature of this arrangement is that the exporter entering into purchase agreement has to have an agreement with a trading firm to market the goods they purchase *(Globalnegotiator.com)*. Most of the time the exporters do not use these goods themselves but however, there can be some buy-back conditions where they agree to purchase some raw materials to use them in their production process.

This agreement can help a firm to enter a new market and get a competitive advantage over others. Counter Purchase agreement can be of different types such as:

- Swap. Here, products are traded to different locations to save transportation costs. Most common commodities for such agreement include sugar, chemicals and oil *(Citeman.com, 2019)*. For e.g. in 1978, a swap agreement was signed for USSR oil bound for Cuba and Mexican oil bound for Europe and Asia. USSR transferred oil to Europe and Mexico supplied oil to Cuba. By this way, both countries saved considerable cost on transportation.
- Clearing. This is a bilateral agreement between two countries where one country agrees to purchase a specific amount of another country's products over a certain period of time. The type of currency to be used such as USD or French Franc is also mutually agreed upon by both the countries. This arrangement helps in maintaining better trade balances and is popular in many developing countries and new growth markets.
- Switch. This kind of agreement helps a country when its flow of international currency is weak and irregular. The country which initiates the agreement transfers its imbalances to another country or third party.

It is an agreement where the two parties agree to buy and sell from each other but under two different sales contracts. The mediation of a trading firm is required between the two parties entering into a counter purchase agreement. It is a type of counter trade where countries having a shortage of hard foreign currencies can trade by exchanging goods and services.

A typical case of Counter Purchase Agreements:

In order to sell $250 million worth of Apache helicopters to UAE, Us company McDonnell Douglas agreed to help them fight the whitefly, which is a menace to crops. McDonnell Douglas helped install an insect trap in Abu Dhabi (capital of UAE) to counter whitefly. In return, UAE accepted to buy Apache helicopters from them.

Risks in counter purchase trade can be avoided by hiring a sales assistant or local assistant who has experience in that country. Risks can also be avoided by hiring reliable third parties who will take the product from the exporter in advance and at fixed prices after the conclusion of the counter purchase contract. Third parties will also mitigate the risks of resale of the products. Finally, by legally fulfilling obligation by "bona fide" offers which transfer the risk on the exporting country or the country that has the obligation to sell products for counter trade.

Counter purchase agreements include penalties and demands guarantees of performance. In certain cases, the penalty is to be paid and still, obligations are to be fulfilled. In case of a penalty, the target should be to reduce the penalty as much as possible and a provision that allows the return of the penalty when the obligation is finally fulfilled. Some of the ways to reduce penalties include offering a simple corporate guarantee which can be accepted by the contracting party only when it has a corporate patent. Risks can also be avoided by offering a Performance bond which is actually an insurance contract. All stakeholders such as subcontractors, construction workers and suppliers are fully paid after the project is completed. If the contractor fails to perform, then the guarantor will pay the full amount *(Gordon, 2019)*. Also, by using a bank guarantee. It is similar to Letter of Credit (L/C) but in this case, the bank is not liable to pay if the presence of some legal argument. It works better than L/C. Finally, the last option is an L/C which is expensive and the bank is obligated to pay out under the given terms even if the dispute is legitimate except in case of obvious fraud. Counter Purchase contract consists of Protocol, Primary Sales Agreement and Secondary Sales Agreement.

3) Buyback (Compensation)

It is a form of trade where the exporter of heavy machinery and technology agrees to "buy back" or purchase a percentage of its output once the machinery is deployed for production in the importing country. One major advantage of this type of agreement is that it helps in the transfer of technology and production processes from developed to developing countries *(Globalnegotiator.com)*. It helps in establishing production facilities in such countries. The agreement also has longer-term than other forms of trade and thus helps build long-lasting and sustainable economic relations between countries. The importer pays for the goods in currency and also receives currency for sale of finished goods to the exporter. The payment can be in another form where the importer ships the manufactured goods to the exporter as royalty payment in place of cash. However, this variant is a kind of barter deal which is difficult to regulate.

Compensation agreements have two separate contracts. However, the exporter would aim at keeping them linked so that they import final goods produced from technology and machinery provided only by them and not from some foreign unknown entity. A compensation contract consists of Protocol, Primary Sales Agreement and Secondary Sales Agreement

Response of the business community to countertrade

Companies in low income and third world countries try their best to negotiate with the countertrade terms and change the rules and norms to their favour. Companies try to restrict the products which they agree to purchase to those which they can use in domestic market. They attempt to purchase products which it can use in its manufacturing process, such as raw materials or component parts, or occasionally, office equipment or goods suitable for distribution to its employees. As a generally less desirable alternative, the company will look to take back goods in anticipation of resale on the international market *(Palich, Ireland and Bagby, n.d.)*. This resale is generally accomplished through either the utilization of an in-house trading arm or the transfer of the countertrade obligation to an outside trading house. As a result of the increased frequency of the imposition of counter purchase requirements and the use of in-house trading subsidiaries, the in-house trading company is becoming an increasingly significant component in the overall corporate structure.

Future of Countertrade (A new model)

Small entrepreneurial firms can take advantage of the benefits that countertrade provides due to their dynamic and flexible structure. Countertrade has some unique demands which established giant companies may not be able to suit in. They might not deviate from established norms and regulations. Small firms producing unique products or offering special services but having low reserves of cash can take advantage of this position *(Vogel, 2000)*. Also entrepreneurial firms can demand premium prices for such countertrade contracts which other established companies may not agree with. In this way countertrade can check the supply while keeping the demand constant. This will increase the cost of products which they can use to their advantage to earn revenue and profits.

Results

We can find from the study that every form of trade is unique with their problems and benefits. Barter is a very old concept but even today it plays an important role in a modified manner. Today, it is not only restricted to goods but has been extended to services as well. Barter helps a country to exchange only in goods or services. So, it has the possibility to exchange the goods it has in excess for the goods that are deficit. Counter purchase enables a country to purchase from the same country to which it sells based on a single contract. This not only helps both the countries to meet their needs but also helps establish long term relationship between nations. Buyback option is a good way to utilize individual resources in a positive manner. Suppose country A has abundant raw materials but lacks the technical expertise to manufacture products using the available raw materials. It might export those raw materials to country B which has the technological expertise to manufacture finished goods from those raw materials. After manufacturing, country A again purchases the final products from country B. This helps generate employment in country B and solves the problem of scarcity of finished products in country A.

Discussion

By the above study, we can see that these mechanisms of trade without using hard cash holds advantages for several middles- and low-income economies, in today's globalized world no country can survive in isolation and trade and business forms an integral part of the income of any country. In such a condition, it becomes very difficult for a country to trade which has a deficit of hard cash. It may have several negative impacts on the local economy including inflation. However, such problems can be reduced if non-currency exchange trading systems are practised. Barter can be used for both goods and services as a country can sell either goods that it has in excess or may even sell some expertise or core competency in any particular sector in return for some other good or service that it lacks. A country which has a deficit of hard cash can first export some product to earn cash in return and later purchase products from the same country as part of the same agreement. It also helps the easy exchange of labour and resources across countries and helps hedge risks of the cash crunch.

Conclusion

Counter trade and agreements form an important aspect of today's economy. It helps companies to maintain existing markets and also expand to foreign countries. It increases sales and mitigates liquidity problems *(McVey, 1981)*. It cleans up bad debt situations, released locked capital and helps to maintain long term relationship with customers. It also helps gain contracts for future and finds low-cost sources for purchase. Some countries are in weak economic condition and cannot pay by hard cash and for them; counter trade provides a very efficient alternative *(Tim and Richardson, 2014)*. The political scenario in many countries and protectionist policies also makes them involve in counter trade with developed nations. It allows hedging against risks of inflation as trading in only don't in goods or services without the use of hard currencies. With the advent of new technologies, expansion of world trade and global business, this method of trade will gain more popularity and grow in future.

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Methodological Approaches to System Analysis of Socio-Economic Systems

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Abstract

Problem of complex objects management has become an important factor for the economic development of a country. A special role is devoted to acquisition of system thinking. Despite the vast scientific literature on system analysis, it is currently loosely connected totality set of technics and methods of informal and formal nature. Thus, what is called system analysis, presents not enough integrated corpus of methods, technics and tools for system activity. Nowadays, it is common knowledge, that the most urgent task of system research is the problem of an appropriate toolkit creation. This article deals with the problem of social-economic system comprehensive assessment. According to authors, it is possible to be solved on the basis of systematic approach under which condition description of this or that economic object is implemented not with individual indicators, but integrated set. Research purpose is to justify mythological approaches to system analysis on different socio-economic systems study using analysis of its ubiquitously internal structure and resources potential (space, time and energy). Presented algorithm of a consistent pattern intelligent search allows solving many system analysis problematic issues. These include: identification of system structure, removal of non-structural elements, establishment of analysed object basis indicators, emphasizing and description of subsystems and echelons of economic systems, models creation for final indicators, role of structure evaluation and determination in object organization.

A positive aspect of the proposed method is its versatility. This approach use allows identifying not only gaps in socio-economic systems and managing resource flows to achieve its best objective and effective use, but also to reveal mechanisms of socio-economic systems organization determining management ability.

Keywords: Socio-Economic Systems, System Analysis, Elements, Structure, Subsystems, Model and Ideal Model.

Introduction

The ideas of system city under various names, such as system synthesis, system ideology, system analysis become the leading scientific paradigm of the XX century. A whole "system movement" including different directions has appeared: general systems theory, system approach, system-

structural analysis, philosophical concept of the system of the world and knowledge *(Alekseeva and Vetrenko, 2020)*.

This process is caused by the fact, that in the middle of the XX century, scientists start talking about the need to change the scientific paradigm, as they realize that the old models no longer correspond to reality, they do not work, do not allow them to correctly assess present, predict and plan the future.
It is also can be applied to economic theory, which is based on a number of paradigms that are still often in opposition to one another. Economy based on plans ensures production and distribution processes. Classical political economy, which asserts market relations, describes exchange processes well. Government interventions in economy are justified with Keynesian theory. Economic liberalization is embodied in monetarism. Social research direction of social production is reflected in Marxism and institutionalism. Besides, there are a number of combined theories that are formed on the basis of mentioned above paradigms combination. At the same time, relevant description of real economic systems is not always possible within the frames of existing theories *(Papkov and Kulikov, 2019)*.

Crisis of economic theory manifests in the fact that it is unable to foresee and also to explain the causes of many economic transformations of recent decades, including economic crises. Implemented empirical studies are fragmented and do not lead to the discovery of fundamental laws or consistent patterns of ubiquitously nature, that could serve as a basis for theoretical constructions. In addition, a number of laws that has been empirically proven for decades are later refuted *(Volkova and Denisov, 2019)*.

In view of the foregoing, current problem of the development of modern economic theory is the choice or creation of a paradigm that could describe the main processes of economic development with a high degree of reliability and validity, anticipate and explain the causes of changes, and determine the mechanisms of their course.

Research purpose is to justify mythological approaches to system analysis on different socio-economic systems study using analysis of its ubiquitously internal structure and resources potential (space, time and energy).

Literature Review

System paradigm in economics represented the economy as a set of interacting, transforming and evolving systems acts, on the one hand, as an alternative to neoclassical paradigm with its economy division into macro- and microeconomics, and, on the other hand, as a concept, which integrates neoclassical, institutional and evolutionary approaches *(Edmondson, Kern and Rogge, 2019)*.

The goals of the vast majority of economic systems in market conditions are price maximization and profit. Elements of economic systems are structural divisions of an object and its management body, centres for processing material flows, sources, receivers, and information processing centres and etc. The more detailed system elements and their relationships are described, the more precisely system structure is determined and, consequently, its entropy (uncertainty) decreases.

There are different approaches to the study of socio-economic systems.

Hierarchical approach. This approach is based on an indication of a significant feature of a large system, namely the presence of a hierarchical structure of relationships between the general criterion for the entire system as a whole and private local criteria formed for individual subsystems of different levels of the hierarchy *(Alekseeva and Vetrenko, 2020)*.

The higher the level of the hierarchy, the less its elements have the properties of subjectivity and there are fewer degrees of freedom. All these limits the ability to extrapolate methods and models developed for analysing individual levels of the economy to other levels of its hierarchy.

Leading approach in the study of systems, including socio-economic approach, is the approach of structures assessment. Focus shift to the structural side of development is impossible without a holistic system perception of objects and a synthetic method of studying them as systems based on the "whole to part" principle implementation. Hence, the system approach and system analysis become the main tools of research in the economy *(Papkov and Kulikov, 2019)*.

The institutional approach is not supposed to divide structures considering significance level, studying both macroeconomic and microeconomic structures. It offers a special analysis apparatus based on methods of accounting and measuring transaction costs that determine organizations effectiveness and decision-making in management *(Alekseeva and Vetrenko, 2020)*.

An institutional subject is a carrier (information carrier) of certain specific rules and regulations as a result of individuals' coordination cooperation within the frames of this institution, which imposes economic restrictions on interacting parties' behaviour. At the same time, the institutional form, in which activity of subjects is, implemented for scientific and technical research and development, commercialization means "enterprise institute" *(Volkova and Denisov, 2019)*.

Evolutionary approach. This approach in economic science is not formed long ago. Since about the 1980s, it gains independent significance in scientific research works and has its development in the theory of systems along with models of system dynamics development.

Evolutionary approach develops four types of system models of different complexity levels: selection models, game models that take into account the effect of learning, and models of the "neural network" type allowing creating models of structural dynamics that are used in problem solving of economy restructure management *(Mahmoudi, Emrouznejad, Shetab-Boushehri and Hejazi, 2020)*.

Thus, the evolutionary methodology allows us to present system as non-equilibrium and identify the features of changes in its structure.

Cybernetic approach. The essence of the cybernetic approach is that in any system under consideration, which experiences a change in structure, there is a feedback mechanism that determines the dynamics of its characteristics *(Krajčo, Habánik and Grenčíková, 2019)*.

Synergetic approach. This approach considers behaviour of unstable nonlinear systems and conditions and assumes dynamic equations development of economic systems and the extension (revision) of the Samuelson correspondence principle, which describes stable systems. In terms of synergetic, there is a concept of multiple equilibrium, instability and structural instability/stability of the system. The transition from one condition to another is considered as a bifurcation that is a sudden and unpredictable violation of the continuity of development. According to the synergistic approach, all properties of the system are important, including its minor parameters and minor deviations. Thus, W.-B. Zhang, referring to the synergetic analysis, that stability is no longer assumed in science a priori, and minor parameter shifts can lead to structural changes in dynamic systems" *(Durmanov et al., 2019)*.

Synergetic approach is substantially related to the cybernetic approach and involves the implementation of several relevant features, namely the Law of Requisite Variety of Ashby, heterogeneity of systems and etc. Both approaches enhance ability of complex social systems effective management.

Structuralist approach. This approach is based on structural analysis methodology. It is based on the historical and descriptive method and includes sociological analysis of interaction of modern economy various subjects *(Roetzel, 2018)*.

Neoclassical approach. Models developed by neoclassical schools offer an explanation of management system economic development through descriptions of changes in its micro-level conditions. This approach is based on the Arrow-Debreu model, Samuelson correspondence

principle, the idea of economic efficiency according to M. Allais, the Solow model, the Lucas model, P. Romer and etc. The crown of the evolutionary method of analysing structural changes is the so-called innovation and technology school.

Innovative and technological approach. Success of innovations (their potential viability) is determined by properties of the objects on which they are reproduced. The organizational structure and management system of the economy substantially determine their effectiveness. Serious intersectoral analysis methodology generalizations are made by V. Leontiev's colleagues and students. Modern researches in the framework of the input–output model deals with the problems of combining consumption characteristics of different demographic groups *(Prestes Joly, Teixeira, Patrício and Sangiorgi, 2019)*.

Despite the vast scientific literature on system analysis, a number of issues remain insufficiently studied due to its complexity, connection with hierarchy and the variety of structural and functional relationships among elements. Sources of their probabilistic properties are not only an extremely large number of relationships between numerous parameters and difficulty of quantifying some of them, but also significance of external influences that change object condition forming and supporting the system of production and financial indicators. At the same time, the object itself must be considered as a higher-level system *(Koval, Nabareseh and Chromjaková, 2019)*.

Thus, data accumulated to nowadays show different approaches to analyse functioning of socio-economic systems, which is explained with complex relationships of their constituent elements due to their openness. These relationships are expressed in changing influence of environmental factors over time and space, arrival and removal of different quality resources, system components synergistic relationships, and complexity and diversity of the systems themselves. We conclude that their effective analysis is possible only in case of applying a systematic approach. Distinctive features of this approach are use of mathematical tools, logic tools, cybernetics and synergetic in comparison with the existing ones.

Methods

The study involves economic, statistical and economic and mathematical methods.

Results

Traditionally, conditions and causes of changes in the economic system are evaluated through production and financial indicators, although they are formed under the influence of many factors. That is, in-chain "factors – the economic system – production and financial indicators" the role of the enterprise, as a rule, not considered, which is caused, on the one hand, with description complexity and, on another hand, with approach absence for such a representation of an object *(Jin, 2019)*.

The efficiency of production process is the most important economic category that largely determines its existence in modern market conditions.

Practice has shown that the most attractive ones are general assessments of production efficiency based on the principles of a systematic approach. In this case, any economic object that combines a set of interacting material and financial characteristics is considered as a large system that maximizes its properties through mathematical models.

When combining elements within a system, qualitatively new properties and effects appear that are absent at the individual elements level – system properties, emergence effect, synergism and etc. They reflect generality and difference, stability and variability, repeatability and uniqueness of properties, connections and relationships of system elements, that is, they reveal their probabilistic and statistical nature.

An important aspect in understanding the properties of an element is its formation from the indicators of the object, which is possible, in our opinion, if the following conditions are met:

1) in the analysed matrix, there is a sufficiently large number of ≥ 3 x 5 features, that can create a common space, where indicators resourcefully interact with each other and create conditions for the structure organization;
2) each element is endowed with a higher-level system, in this case with an object, with special properties of communication with others that determine its resource capabilities;
3) elements interaction in the subsystem between subsystems and echelons of the pyramid are realized by moving resources determined with informational, energetically and material flows;
4) movement of resources is explained by the mandatory presence of resource-deficient (system-forming) and resource-owning (system-destroying) elements among all elements, which is determined with the higher-level system;
5) resource-deficient elements contain active contacts on their surface, while resource-owning ones contain passive contacts, through which resource flows are perceived and given away;
6) to solve the most important problems of the higher-level system, its elements are organized into subsystems;
7) inclusion of elements in subsystems is implemented considering the principle of minimal competition for resources between them, as well as the mandatory presence of one system-forming and two or more system-destroying elements;
8) if these circumstances are met, a structure is formed, a space filled with elements and exchanged resources, whose task is to solve the problems of the object (enterprise) most effectively based on environmental circumstances;
9) object indicators do not have all listed characteristics, they only have the opportunity to become an element if the above mentioned circumstances are met, transferring their potential energy to kinetic energy as a result.

Implementation of these circumstances leads to the creation of idealized elements that are organized with help of the higher-level system into an idealized hierarchical system.

Idealized element is an abstract element that lacks any physical properties, other than the ability to implement relationships with other similar idealized elements. Thus, the idealized element is completely determined by the nature and direction of its connections *(Volkova and Denisov, 2019)*.
Set of idealized elements united with the necessary connections forms system idealized model, which, obviously, can be conveniently and visually represented as a graph or a corresponding adjacency matrix.

This formalization of the system structure makes its presentation clear to the researcher and significantly simplifies its analysis. However, it should be taken into account that any element of the system can be considered as a system consisting of a number of other elements.

Thus, the idealized system of an object has, as a rule, a hierarchical structure, where elements are combined into subsystems located in echelons of hierarchical order.

System analysis usually begins with model building of investigated system. First and foremost, you must define the structure of the system.

Among many definitions of structure in the philosophical and methodological literature, the most adequate should be recognized as the formulation proposed by V. F. Sergeant describing structure as ".... a set of elementary objects and such material interactions between them, thanks to which this set forms a single material object with its qualitative and spatial-temporal certainty" *(Volkova and Denisov, 2019)*. Characteristically, this definition has not only morphological, but organizational meaning, because the structure is treated as a set of concepts: element, element connection, spatial structure and temporal organization of interaction.

Proposed approach includes the following steps:

1) evaluation of actual features of the system:
1a) checking for structure;
1b) rationing of all features to one parameter;
1c) removing outside structural elements;
2) analysis of the organizing structures of the system:
2 a) establishing for each feature its potential (resource capabilities) considering correlation sum for each feature;
3) assessment of the overall characteristics of the system:
3 a) determining location of the feature depending on the potential, identification of the stability index;
4) subsystems selection based on the principle of minimum filling of elements;
5) determining the load of elements in the subsystem;
6) building the actual and best model for the final element of the subsystem;
The main tool for these steps performing is the statistical software packages (for example, Statistica). Thus, for example, structure detection is performed using the main component method. When solving issue on the number of allocated structures (elements), two most important aspects are noted:
- system allocation can be talked, if there are at least three or more elements;
- increasing elements number leads to the complexity of the subsequent analysis.
In this regard, we propose to consider any system as a three-structure formation.

It should be noted; that analysis characteristic includes a large number of features usually heterogeneous by nature. In this regard, at the first stage of research, the problem usually arises of bringing all analysed features to a single base, which is a comparable form. Such problems are solved with data rationing. Least dependent indicators of a particular sample are used. In addition, rationing to bring the analysed features to a comparable form increases the data structure due to the fact that they become partially common to the entire structure.

Regression quality level depends on the degree of reliability of the source data and the size of the sample. Increasing the number of observations is one of the prerequisites for building adequate statistical models. Growth of the initial indicators "generates" the problem of multicollinearity, one of the indicators of its presence is the excess of the paired correlation coefficient of 0.8.

To eliminate it, we propose the following approach: sequential removal of object features using the method of clipping (iterations) considering the number of reliable correlations of the feature, which goes beyond $X+1\sigma$. For greater confidence in the absence and maximum removal of the influence of multicollinearity, it is necessary to remove all reliable pair correlations.

Practice has shown that with the help of the described method, non-structural elements of the system are removed, creating more expressed boundaries, reducing the degree of uncertainty of the structure, and improving the overall condition of the analysed system.

One of the most important regularities is that the system gives a higher level to all elements of system-forming (resource-deficient) or system-destroying (resource-surplus) features without exception. Hence, the selection of subsystems is carried out using factor analysis based on the principle of minimum filling, when they necessarily contain the maximum degree of system – forming (negative correlations) and the minimum-system-destroying (positive correlations) elements.

As long as, system-forming elements usually have a large weight (their number in the system is less), the organization of the subsystem follows the next principle: one system-forming element is supplemented with two or more destructive elements.

The number of organized subsystems is determined, on the one hand, with the potential of the system, and, on the other hand, with the level of adaptation of the system to the environment. As a rule, this is usually implemented as a larger number of organized subsystems.

From the remaining indicators, subsystems of the second and next orders are formed in the same way until the elements of this level (echelon) of the object's economic system are completely exhausted.

Determining the loading of elements in subsystems is based on correlation analysis based on the sum of the module of paired correlations in the matrix of their interaction.

The element with the minimum sum of the number modulus is an activating start: it changing causes the subsystem to start.

The element with the maximum amount is the result of the subsystem activity.

The resource bond in the subsystem between revitalization element and the final element is performed with an intermediate element whose number is determined randomly from the environment.

The next step is to build a model for the final element of the subsystem. For this purpose, multiple regression analysis is performed and a standard (actual) and best model is built based on its results.

Herewith the final element is always dependent variable, and the activation element and intermediate elements of the subsystem are independent features.

After elements are exhausted, they begin to form a higher-level (echelon) based on the "black box" effect, when the activation elements and the result of the activity of the lower subsystems rise structurally higher, and a new echelon is organized. In this case, the same steps are performed as in the first echelon, namely: identification of system-forming (resource-deficient) and system-destroying (resource-owning) elements; isolation of financial indicators from the economic system of subsystems; determination of the order of elements in the subsystem; construction of models of subsystems functioning.

After that, the next echelon will be organized from the activation elements and the result of the subsystems activity. This procedure is repeated until only one subsystem is structurally established or the structure for the remaining elements disappears.

Between echelon subsystems and the entire system echelons quite complex synergetic relationships are established and each subsequent subsystem obeys the previous one. The first subsystem launch is carried out by the higher echelon causes the next subsystem to automatically activation. Launch of control subsystem is started with environmental factors. Interaction between echelons is carried out on the principle of feedback.

Subsystems organization in the newly formed echelon is based on the same here-above principles. Operations are repeated until the presence of the control subsystem structurally established.

Conclusion

The presented approaches to the system analysis of socio-economic systems are, in contrast to the previously considered ones, one of the specific tools for implementing the system analysis of non-natural objects. A positive aspect of the proposed method is its versatility. This approach use allows identifying not only gaps in socio-economic systems and managing resource flows to achieve its best objective and effective use, but also to reveal mechanisms of socio-economic systems organization determining management ability.

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Supreme Audit Institutions and Importance of Their Trustworthiness

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Abstract

There is a lot of scientific research on the concept of trust and the impact trust has on business operations. Public decision-makers also try to avoid situations that negatively affect the level of trust in public organizations and may reduce the competitiveness of domestic economies. Although Supreme Audit Institutions (SAIs) through their activities support competitiveness in the business sector reducing the risk of opportunistic behaviours, their role in maintaining or enhancing public trust in SAIs is virtually an unexplored area. This preliminary study addresses this research gap. The objective of this research was to identify and describe specific activities that SAIs can take to mitigate the risk of loss of public trust in its operations without negatively affecting the benefits these organizations provide to society. This study was based on a literature review, an analysis of audit reports prepared by SAIs from Poland, USA, United Kingdom, Germany, Austria, Czech Republic, and an analysis of audit laws, regulations and standards. In addition, the study was based on information obtained from interviews carried out with SAI's representatives from Poland, the USA, Germany, and Austria. The results show that when SAIs take steps to mitigate the risk of losing trust they may create an epistemic injustice in the public audit process and they may limit their usefulness to their customers. The audit mechanisms that may enhance trust in audit institutions have been identified. The presented results may be useful for managers, practitioners and policy makers from different organizations in various ways.

Keywords: Performance Audit, Supreme Audit Institution, Trust, Epistemic Injustice.

JEL Classification: M 4

Introduction

While issues related to the strategies business institutions employ to enhance trust have been addressed by many researchers and business practitioners, the approaches employed by SAIs to strengthen trust in their organizations and the consequences of such approaches have not been the subject of much research. There is a need for such research because the audits and evaluations performed by SAIs provide critical information and recommendations to parliaments, governments, and other public and private customers.

SAIs' evaluations of public policy and the laws affecting public and private sectors have direct impacts on the private sector and the functioning of the whole innovation ecosystem and competitiveness. Therefore, the reliability of the SAIs' work is crucial to the proper functioning of the State, which is aptly highlight by the International Organization of Supreme Audit Institutions (INTOSAI), one of the biggest worldwide organizations that cooperate with the United Nations.
Although some of the research has been conducted on the nature and types of auditing activities performed by SAIs (Mosher, 1979; Pollitt et al., 1999; González-Díaz & Fernández, 2008; González-Díaz et al., 2012; Blume & Voigt, 2011; Bringselius, 2014; Dobrowolski, 2017; Dobrowolski &

Szejner, 2019; Cordery & Hay, 2019) there is a research gap regarding the actions that are or could be taken by SAIs to mitigate the risk of losing public trust in their activities and limit SAIs role in enhancing competitiveness in public and private sectors. The aim of this original research was to identify and describe specific activities that SAIs can take to mitigate the risk of loss of public trust in its operations without negatively affecting the benefits these organizations provide to society. The term "supreme audit offices" is understand in the following manner. There are nonpartisan public organizations, which are independent in relation to auditees, including the governments and subordinate only to parliaments. Basically, the do not belong to judiciary, although in some countries (e.g., Portugal, Greece) they are part of judiciary.

Theoretical Background

Trust has been defined, among other things, as an element of social capital (Tansley & Newell, 2007; Chen & Wang, 2008; Choudhury, 2008); an organizational resource, as pointed out by Tzafrir (2005) or Fang & Chiu (2010); the foundation of social interactions in organizations (Berg et al.,1995; Weber et al., 2004); the willingness to accept the behaviour of others (Schoorman et al., 2007); and the willingness of entrepreneurs to invest and trade (Aykens, 2005; Natalier & Willis, 2008; Styles et al., 2008; Dobrowolski & Szejner, 2019). Trust plays special role in the financial sector. Without trust, this sector could not exist (Cox, 2007; Ennew & Harjit, 2007; Devlin et al., 2015). Therefore, trust is a unique capital that always affects the cost of economic or public activity.

Social capital belongs to the most important values that constitute society's cohesion and proper functioning at the level of the state, organization or family is beyond doubt not possible without it. For organizations with large social capital, it is typically much easier to achieve outcomes beneficial for organization and its stakeholders, allowing to obtain prosperity and recovering entrepreneurship, leading eventually to competitive advantage for the organization (Burt, 2000; Marjański, Sułkowski, Marjańska-Potakowska & Staniszewska, 2019). Social capital should be a tie bonding together the society, businesses, and families, filling in the social gap between people and its sources should be rooted in the links and networks founded on principles of firm cooperation. Like in the case of other kinds of capital, social capital aims to facilitate the development and performance of the organization mainly by improving the relations between its members (Lin, 2017).

Over the past thirty years, social capital has grown to become one of the most influential ideas to explain social behavior at different levels (Lin, 2017). The concept of social capital is describe in many ways, and its relations with trust as well as human, cultural and relationship capital, which have the closest connection with social capital definitions, are multi-dimensional. Compared to related concepts, social capital with over 2,33 million references is closest to human capital (2,180,000), while cultural capital has 630,000 references and relationship capital – 7.750 (Scholar Google, 20.11.2019). There are also scholars whose position is that the concept of social capital is outdated. If we take a quick look at the classical definitions of social capital, we will surely see how diverse it is. Coleman (1988: 98) defined social capital in functional terms as "a variety of entities with two elements in common: they all consist of some aspect of social structure, and they facilitate certain actions of actors." For Bourdieu (1983) social capital is "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition". Putnam (2000: 19) sees it as "connections' among individuals and social networks and the norms of reciprocity and trustworthiness that arise from them", while Fukuyama defines it generally understood rules than enable people to cooperate. In this work, definitions dominating in the literature viewing social capital as social trust, connections, and social networks that facilitate cooperation and reciprocity will be used (Sułkowski, 2017).

State institutions that influence the cooperation of market participants by passing laws and regulations have a significant impact on creating and maintaining trust. While State policies can foster trust, the actions of the representatives of public organizations in implementing the polices can also erode trust. This statement leads to the generalization that SAI's role is to prevent the erosion of public trust.

Just as there is a dependency between business and trust, there is also a dependency between auditing and trust. Lack of trust in public organizations can contribute to the necessity of their frequent auditing. If audits are perceived as a tool to be used in the continuous improvement of organizations' outcomes, they may strengthen the audited entities, and enhance public trust. An audit can enable an auditee to correct errors and/or irregularities and it should be considered to be a regular process that enables organizations (that create a particular system) become predictable in pursuing desired goals. The loss of control over audit processes leads, among others, to formalism and destroys trust (Bradach & Eccles, 1989; Das & Teng, 1998; Caldwell & Karii, 2005). Audits may erode trust (Castelfranchi & Falcone, 2000).

If there is a correlation between trust and audit one may generalize, that the audit is more effective when is conducted in a trust-based environment. Taking into account that auditing can enhance trust in auditee' operations (Das & Teng, 1998; Caldwell & Karii, 2005; Skinner & Spira, 2003) it is clear that auditing organizations and auditing systems need to include mechanisms designed to mitigate the risk of the erosion or loss of public trust. However, such mechanisms should not reduce the effectiveness of the audit.

If opportunistic behaviors increase the cost of audit activity and may lead to the wrong decision (Williamson, 2000), the auditing instruments implemented by audit organizations, such as SAIs, should be designed to reduce incentives for opportunistic behaviors in auditees through enhancing integrity, reliability, and accountability. They should also reduce opportunistic behavior among their auditors. However, implemented mechanisms cannot reduce the appropriateness of public decisions through the reduction of available data when making a decision due to avoidance of the risk of losing trust. Otherwise, the regularity of decisions is always limited due to the inability to make use of all available data when making decisions.

In contemporary western and developed countries, the role of the SAI is critical because SAIs are important pillars of parliamentary democracy that assist legislatures in the exercise of their rights concerning actions carried out by executive branches. Although governments have a major responsibility for creating an environment that does not favor or enable the occurrence of irregularities, SAIs have a key role to play as an advocate of good governance. The important role SAIs plays in promoting good governance typically results from their special position in relation to the government. SAIs usually are subordinate only to their Parliaments, and their audits are independent of their executives and judiciary branches. Having broad audit rights, SAIs typically evaluate the functioning of all government operations and the execution of public funds. From such a broad perspective they can provide guidance on how to strengthen public institutions (INTOSAI, GUID 5270; INTOSAI, GUID 5260; Dobrowolski, 2017).

The nature and scope of the SAIs' important role in the public and private sectors can be demonstrated by an examination of the functions they perform. One can distinguish the following SAI functions: control, informative, regulatory, advisory, and preventive, investigative, educational, and political. How the SAI carries out its audit derives from laws and regulations. Audit effects depend not only on the SAI's efforts but also on inter-organizational collaboration. All SAIs' efforts are intended to establish the facts based on audit evidence, determine the cause and effects of irregularities or best practices, and make proposals (recommendations) to eliminate irregularities in and or improve auditees' activities. By providing decision-makers and the general public with fair and objective results of the audits, SAIs affect the activities of institutions using public funds by promoting an attitude of respect for the law, integrity, transparency and accountability. The results of SAIs' financial audits help to reassure policymakers that they have reliable data about the financial status of public sector entities. The SAIs' conduct analyses to determine whether auditees apply the best accounting practices. This means that SAIs do not only monitor compliance with accounting rules but also propose approaches to improve accounting systems (Dobrowolski, 2017; European Court of Auditors, 2019).

The Welfare concept that is well known in developed countries has been associated with significant increases in public expenditures. This affects the scope and manner of state audits. While the reliability of financial data is still a crucial element of the state audit, it is no longer sufficient. Currently, there is a

need to examine and evaluate the effectiveness of the executive power resulted from the need to maintain an "in check" of government spending. Such audits are defined as performance audits, or value for money audits and were introduced in most European democracies after World War II. In some new member states of the European Union, this was at the end of the 20th century after the reintroduction of a free market economy and democratic order in those countries. Among the reasons in favor of carrying out this kind of audit is accountability. Decision-makers are responsible for the efficient management of public organizations that includes legal and reliable spending of public funds and efficient, cost-effective implementation of tasks. The results of the performance audits give citizens an insight into the course and results of actions taken by state institutions or bodies financed from the State (public sector). The need to study the efficiency of public organizations results from the nature of governance. Representatives of the authorities try to meet the expectations of its citizens and gain their trust and thus obtain the chance of re-election. Therefore, they demand, on behalf of the citizens, efficient realization of public tasks (Dobrowolski, 2017).

The objectives of the performance audit vary in different countries. They may be defined in the SAIs' basic legislation or be a matter for internal decisions within the SAI. In general, most SAIs set to achieve one or more of the following objectives: 1) to provide the legislature or discharge authority with independent assurance as to the economic, efficient and/or effective implementation of policy; 2) to provide the legislature or discharge authority with independent assurance as to the reliability of indicators of or statements about performance that are published by the audited entity; 3) to identify areas where performance is poor and thus to help the audited entity, or government more generally, to improve their economy, efficiency and/or effectiveness; 4) to identify examples of "best practice" and draw these to the attention of government and/or audited entities (Contact Committee of Presidents of the SAIs of the European Union, 1998).

The audit objectives described above leads to a generalization about the SAI role. SAI audits play an important role in the information network. During SAI audits public organizations and the public may participate in by providing comments suggesting proposed solutions to problems identified. Although these suggested solutions may have been identified by the government directly, the gathering of such information in the audit work of the SAI (independent of the executive branch, which has no supervisory powers in relation to public organizations) helps in an impartial informing of decision-makers about the problems faced by the public administration. Using this process and enabling public consumers' inputs, SAIs promote the democratization of the public sector. Results of audits carried out by SAIs gives citizens an insight into the course and results of actions taken by organizations financed by the State, and the statements of the persons responsible for the execution of specific tasks. The aim of SAIs is to ensure the accountability of those who are responsible for resource management in the public sector. SAI analyses provide information on the extent to which public administrators' activities are based on the generally applicable legal standards. This helps to guarantee citizens that officials will be predictable, and on the other hand ensure citizens' equality before the law and impartiality of public officials in decision making. SAIs examine whether the activities of public organizations are reliable, but also whether better results may be delivered. Through their informative function SAIs also realize other functions, including civic and general education (Dobrowolski, 2017).

SAI plays an important role in maintaining the innovation ecosystem, which is defined as the network of interconnecting and interacting organizations. An innovation ecosystem models the economic dynamics of the complex relationships that are formed between entities whose functional goal is to enable innovation. In this context, parts of such ecosystem include the material resources and the human capital (Jackson, 2011; Dobrowolski & Szejner, 2019). The functioning of innovation ecosystem requires compliance culture, where preventive measures against opportunistic behaviors of different individuals are taken in place. This compliance culture should be maintained by SAI, which evaluates the conditions of ecosystem functioning (Dobrowolski & Szejner, 2019).

SAIs through their activities support competitiveness in the business sector reducing the risk of opportunistic behaviors. For example, SAIs identify constraints that reduce competitiveness of entrepreneurs and countries, in particular, SAIs assess the effect the deficit has on the country' competitive position in the world, focusing on the issues and challenges the deficit poses for the future

regarding education, health care, banking and capital markets, the environment, and transportation infrastructure. They analyze how do public organizations assess their progress in the ongoing improvement of public tasks, which helps implement the learning culture necessary to build intangible assets and using them create tangible outcomes. SAIs present audit findings in written reports addressed to the legislature. The right of the public disclosure of audit results is limited by the protection of the interests of the state and the auditee. Audit reports are typically available to the public unless they contain classified information. (GAO/RCED-92-16, 1991; GAO-18-656, 2018; Najwyższa Izba Kontroli, 2017; GAO, 1990; GAO, T-IMTEC-90-12, 1990).

Research Objective, Methodology, and Data

The theoretical reasoning and empirical evidence presented above suggests the following research question. Can efforts taken by SAIs to reduce the risk of losing trust in their activities negatively affect the benefits SAIs provide to society?

The following methods and techniques used to identify and describe the specific activities that SAIs can take to mitigate the loss of public trust:

- A comprehensive literature review.
- An analysis of audit reports prepared by SAIs from Poland, USA, United Kingdom, Germany, Austria, Czech Republic (listed in references), and an analysis of audit laws, regulations, and INTOSAI standards (listed in references).
- Informal interviews carried out with SAI's representatives from Poland, the USA, Germany, and Austria. These interviews were conducted with SAI officials in person (all – 6 officials who participated in meetings of INTOSAI Working Group Fighting Against Corruption and Money Laundering in 2008-2016. These officials were asked to provide information regarding which SAI's activities they perceived, as attempts to mitigate the risk of losing trust in their SAI.

The selection of the SAIs included in this study was based on the following criterion - the SAI's legal authority and capacity to conduct financial and performance audits. All selected SAIs report to legislative authority and they are independent on the executive branch of the State. The research methodology, presented above, was carried out is in line with the requirements of the triangulation of data collection and research methods used in management science.

Results and Discussion

Approaches that build trust in the supreme audit office

What follows is a presentation of results of the analysis of four major approaches that SAIs utilize to maintain trust in their organizations and an assessment of the effect of each approach.

SAI position in the macrostructure of the State

Trust can be considered as a key factor in the relations between the provider of goods or services and the client. The following values influence customer trust: 1) satisfaction with the services or products provided; 2) sense of justice and security (Pizzutti & Basso, 2012; Roman, 2003); 3) Customer loyalty, which can be explained to a substantial degree by customer satisfaction (Ball et al., 2004; Eisingerich & Bell, 2008).

These generalizations are also true in the case of SAIs' relationship with their clients. According to INTOSAI standards, SAIs have to continuously strive to increase their credibility. This enables them to fulfil their functions and ensure their potential value to citizens. SAIs only deserve trust if they are objectively judged as being credible, competent and independent. To make this possible, they need to be

model institutions, being an example for others in the public sector and the auditing profession to follow. (INTOSAI, ISSAI 12).

Although SAIs cannot be independent because they are typically subordinate to their Legislative Branches, they normally have functional and organizational independence required to accomplish their tasks (INTOSAI, ISSAI 1). This requirement established in official INTOSAI standards can help reduce the risk of losing public trust due to improper relations of SAIs with auditees. According to INTOSAI standard - ISSAI 1, Supreme Audit Institutions shall be provided with the financial means to enable them to accomplish their tasks. Supreme Audit Institutions shall be entitled to use the funds allotted to them under a separate budget heading as they see fit (INTOSAI, ISSAI 1). Review of SAI laws from analysed countries (Poland, USA, United Kingdom, Germany, Austria, Czech Republic) confirms, that these SAIs have financial independence from the executive branch. Of course, it would be naive to think that SAIs are financially independent of those ruling the State. The political parties that form governments have the majority in parliaments or are in coalitions ultimately decide about SAI budgets . An important characteristic of SAIs is that they are financially independent of auditees. This helps to ensure the basic requirement of audit objectivity. This requirement was pointed out by all interviewed SAI auditors as crucial for maintaining SAI impartiality.

The nature and type of work SAIs undertake

In general, SAIs do not carry out ex-ante audits. This approach makes it much easier to manage the risk of losing public trust. It is much easier to assess the process and its effects as part of the ex-post-audit. It is obvious that based on the auditee experience, having an overview of all the conditions accompanying the performance of public tasks, one can formulate assessments, comments, and recommendations from the long term "sage's perspective". Analysis of SAI reports (listed in references of this article) showed that the assessment of effectiveness, legality, reliability, and saving of auditees prevails in audit reports. Interviewed auditors confirmed that there is much easier to evaluate the activities of auditees that lead to savings than the efficiency of auditees. Their answers are convergent with research, where one pointed out the fact, SAIs avoid the assessment of efficiency of auditee's economical activities (Pollitt et al., 1999). Meantime, such an assessment is necessary for a comprehensive assessment of public activity.

It is clear that there is some ineffectiveness of SAIs in the fight against corruption or money laundering. This is pointed out in the results of a study published by Transparency International of the Basel Institute of Governance. The level of corruption or the threat of money laundering are significant in the countries analysed in this research study (Transparency International, 2019; Basel Institute of Governance, 2018). These two public diseases have disastrous effects on the economy and society. (Rose-Ackerman & Palifka, 2016; Chayes, 2016; Fisman & Golden, 2017; Dobrowolski, 2017).

There is a research problem related to the functioning of SAIs identified during this research work. There is a lack of scientific research on how SAIs select areas or organizations to be audited. For example, data is unavailable on how much of their work is directed by Parliament? Meantime, these questions are crucial from the point of SAIs benefits for societies. A good mix of parliamentary requests with SAI's own audit initiatives may increase the SAI usefulness for society in a short time. Audit recommendations, resulting from audits carried out from SAI initiatives, provided to auditees may help resolve some management and particular society problems. But this does not necessarily mean that such audits (initiated by SAIs, and not by parliaments) are crucial from the interest of whole country and society, specially from the long-period perspective. Interviewed auditors confirmed that their SAIs undertake audits that are based on SAI initiatives as well as parliamentary requests.

Undertaking self-initiative audits can be a way to build SAI image as society useful organization, and the same time, the way to avoid the risk of losing SAI reputation caused by examining the issues that SAI auditors do not have sufficient knowledge and skills. However, in order to increase the utility of SAI for parliament, the number of audits ordered by the parliament might be increased as a proportion of the total number of audits carried out by SAI.

Using arguments formulated by Fricker (2007) one can state that prejudice of auditors wrongly deflates judgement of the credibility of auditees. Such unduly deflated credibility of auditees may be not only an epistemic dysfunction but it may also be an ethical dysfunction. For example, if an auditee is wrongly assessed by the auditor with a lack of credibility. Such a situation can be understood as an epistemic injustice in public audit. To prevent this, a number of approaches have been introduced in the SAI. First, is the requirement that an auditor must be excluded from the audit when there is a conflict of interest. Secondly, the principle of many eyes is implemented. For example, draft audit reports are reviewed by several senior auditors. Thirdly, the audit process provides for the auditee's submission comments on audit findings including its methods, assessments, conclusions and recommendations. These approaches should reduce the risk of loss of public trust arising from epistemic injustice.

According to the INTOSAI standards "auditors should actively manage audit risk, which is the risk of obtaining incorrect or incomplete conclusions, providing unbalanced information or failing to add value for users. Many topics in performance auditing are complex and politically sensitive" (INTOSAI, ISSAI 300). The analysis of this statement leads to a generalization that INTOSAI representing SAIs may recommend that risky topics be avoided. Interviewed auditors confirmed that their SAIs do not audit politically sensitive issues such as assessment of advisability of actions undertaken by local government decision makers. However, such avoidance of risky topics may also limit the role of SAIs as the public auditor. Also, avoidance by auditors of some topics leads to unequal treatment of auditees by auditors. Taking into accounts this fact one can generalize that the solutions adopted by the SAI to limit the risk of loss of public trust in SAI through limitation audit scope may catalyse epistemic injustice in the public audit process.

There is also another problem that should be discussed in future research. Do SAI audits identify areas of good performance? Review of SAI audit reports (listed in the bibliography of this article) did not confirm that SAIs always focus their activity on identification of areas of auditee good performance. Also interviewed auditors could not confirm that their SAIs always identify examples of auditee good performance. Taking into accounts this fact, one of one's concerns may be that SAI audits mainly tend to focus on weaknesses and do not inform the public of positive aspects of government operations. Such a focus on negative aspects of realized government tasks could contribute to erosion to public trust in governments.

SAIs use various audit methods and techniques to reduce the risk of incorrect findings, conclusions, and recommendations

Today's SAIs are unable to review and evaluate all expenditures, due to the size of the public sector. This creates a problem with the credibility of certifying the correctness of keeping books and preparing financial statements. There are therefore solutions mitigating the SAI's risk of issuing an incorrect opinion about the financial statements or more broadly about audit findings, conclusions, and/or special considerations for recommendations. First, SAI uses the well know concept of materiality and audit risk (INTOSAI, ISSAI 1003). The application of the audit risk, materiality, and audit sampling approaches help to reduce or manage the risk of reaching an inappropriate audit conclusion and helps to mitigate the risk of losing audit trust (which one may define as the willingness of stakeholders to use the results of SAI audits when making decisions). However, it cannot be ruled out that even after employing the proper sampling techniques, the auditor can incorrectly assess the audited evidence. Based on interviews with SAI representatives, it was established that one approach to limiting such risk is the introduction of a requirement to place randomly drawn audit evidence in audit working files. The Polish SAI also requires auditors to digitize audit evidence.

Based on interviews with SAI representatives, it was established that typically it was the practice followed by SAI auditors was to make notes from the review of documents - "auditor's notes". Such a practice of allowing auditors to make auditor's notes from the document review may be considered as the weakness of the audit procedure. There is a risk that the information contained in such auditors' notes is unreliable. It was also established that audit methods enable auditors to treat the interviews with representatives of auditees as a valid source of information. Such an audit approach related to information provided by auditees can be considered as a manifestation of confidence in auditees.

However, relying only on interviews with individuals from auditees instead of analyzing documentary evidence also generates the risk of incorrect audit findings and evaluations. This may undermine trust in SAIs.

To minimize the risk of an incorrect assessment of the activities SAIs typically reach agreement on draft reports that outline the audit findings and conclusions with auditees. Agreeing on the draft documents should be considered not only as a way to reduce the risk of wrong auditor's assessment but also as a tool of reduce the risk of weak implementation by auditees SAI recommendations. In such situations, SAI may ask about the implementation of recommendations despite the absence of the legal authority to oblige auditee to implement recommendations. Through making available to the public "agreed with auditees" audit findings, opinions, comments, recommendations, SAI may require the implementation of recommendations, arguing that audit reports have not been questioned (INTOSAI ISSAI 1003). In the well-known concept - change management, trust plays an important role in communication and allows decision-makers to carry out any change more effectively (Neves & Caetano, 2006; Lee & Teo, 2005). The process of agreeing to SAI's audit reports with auditees can be considered as the tool of increasing trust in change management.

The SAI's inability to assess the advisability of actions undertaken by auditees, as well as, the replacement of ex ante audit by the ex-post audit favors limiting the risk of loss of public trust. Another SAI approach that limits the risk of losing trust is the optional nature of SAI audit recommendations. Audited entities are not required to carry out SAI audit recommendations. SAIs' recommendations typically only point to the possibility of improving audited activities; with the final choice of solutions improving the operations of the audited entity belongs to its management (INTOSAI, ISSAI 300). If relevant and allowed by the SAI's mandate, auditors should seek to provide constructive recommendations. However, they should be phrased in such a way that they should not encroach on the management's responsibilities. In other words, while auditors can make recommendations, they need to take care that they do not assume the responsibilities of the responsible parties (INTOSAI, ISSAI 300). The optionality of audit recommendations is therefore, a tool that limits the risk of losing trust in SAIs. However, the optional nature of SAI recommendations can limit the overall effectiveness of SAI's activities. Because of the optional nature of recommendations, auditees may adopt an approach of avoiding proposed changes by claiming that steps to realize SAI audit recommendations are in progress.

SAIs treat their audit reports as products, which should be properly advertised and promoted to enhance public trust.

Information is a product of SAI, like in the case of mass media. The adoption of this statement as obvious allows one to determine the dimensions of trust and use of research results regarding trust in the media. There are the following dimensions of trust: credibility (Audi, 2008; Ganesan & Hess, 1997), competence, predictability, relevance, and brevity (Audi, 2008). All those dimensions are taken into accounts in SAIs and their audit reports (National Audit Office, 2006; U.S. GAO, 2019; Rechnugshof Österreich, 2018; Czech Republic Supreme Audit Office & Bundesrechnungshof, 2019; Najwyższa Izba Kontroli, 2019).
Analysed audit reports have a specific structure. Typically the initial section of an audit report presents the principal audit findings, recommendations or special considerations for recommendations. Detailed information is presented in other parts of the audit reports. The audit reports are concise, precise and written in an un-bias manner. SAIs use a standardized physical makeup for their products to help make them recognizable as SAI products (National Audit Office, 2006; U.S. GAO, 2019; Rechnugshof Österreich, 2018; Czech Republic Supreme Audit Office & Bundesrechnungshof, 2019; Najwyższa Izba Kontroli, 2019).

In all studied SAIs press releases are prepared that focus on the most important findings and conclusions of audits. Interviewed auditors confirmed that SAI employees responsible for media policy have the task of determining when to provide the media with information about the results of the audit. Of course, the audit reports are delivered first to the statutory organs such as parliamentary committees, and appropriate members of the government. The moment of making the information available for other

stakeholders is important. Information about the results of the audit should not be secondary or tertiary information of the day. Appropriate SAI internal entity has primary responsibility for ensuring the media receive accurate and timely information about SAI activities. Information about audit results is presented in such a manner that they have to focus the attention of decision-makers and the public on SAI activity. Interviews with SAI representatives and the author's observation show there is the requirement that audit information should consolidate the positive image of the SAI and enhance public trust in SAI. The generalization about the promotion of SAI audit reports (SAI advertisement) is justified.

Conclusions

This research study found that: 1) Audit trust can be defined as the willingness of stakeholders to use the results of SAI audits when making decisions; 2) SAIs use different activities for limiting the risk of losing public trust in SAIs. One of them is the process of reviewing SAI's audit reports with auditees. This process, however, needs special security tools to prevent auditor's opportunism; 3) Epistemic injustice in public audit can be understood as a situation whereby the auditee who receives a prejudicially deflated degree of credibility from an auditor is wrongly assessed; 4) The exclusion of certain areas of public activity from the SAI audit due to the avoidance of risky topics and protection against weakening trust in SAI is a manifestation of epistemic injustice; 5) To prevent opportunistic behavior among SAI auditors and do not reduce SAI usefulness for society SAIs should convince themselves that lack of mistakes in their audit activities should not be perceived as the indicator of professionalism but also it may be indicator of improper SAI activity. SAIs have the right to make mistakes and correct them; 6) In order to counteract the negative consequences of SAI artificially increasing its audit's utility for parliament and society, parliamentary verification of SAI audit initiatives is necessary. Audits undertaken on the own initiative of SAI and not commissioned by parliament should be the subject of a periodic evaluation carried out by the special parliamentary commission to establish the necessity of such audits for the country and society and their benefits. Such review, however, should not limit the SAI audit's independence stated in INTOSAI standards.

The research assumption was also to identify research problems that need to be solved during future scientific research. This goal has been achieved. The following research questions were identified during this research: 1) To what extent SAIs focus in their audits mainly on weaknesses in government activities? 2) Do they realize how such activity (described in question 1) influence on public trust in the State?; 3) How does such SAI activity erode the public trust in the State? 4) How does SAI select areas or organization to be audited if audits are undertaken from SAI own initiative? How much of SAI audit work is commissioned by Parliament? To what extent audits undertaken by SAI on its own initiative covered key problems of the functioning of the state and its institutions?

The generalizations formulated in this article are not an attempt to create a new paradigm but indicate the direction in which further research into public auditing and its impact on public trust should be pursued.
One can formulate the following perspective of the competitive role of supreme audit institutions in building trustworthiness for customers. SAI should constantly develop the informative function of state audit knowing that strengthening this function provides ongoing accountability within the government and the SAI, and will create a preventive environment that does not favour organizational pathologies in the State. The informative function of the state audit should be realized by presenting complete and accurate audit findings, conclusions and recommendation in audit reports. SAI should precisely explain and public present audit methodology used during the audits, especially audit sampling. SAI should consider the public access to digitalized audit working papers, where audit evidence is gathered which are the base for audit reports. This will strengthen SAIs' trustworthiness for their customers.

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Limitations of the Work

There are not limitations of the work

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The Impact of New Technologies on Labor Productivity and Wages in Kazakhstan

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Abstract

Wages and labor productivity are important indicators of the standard of living and economic development of the country. Based on data on the manufacturing industry and the economy of Kazakhstan, the article analyzes the dynamics of labor productivity and average wages under the influence of the introduction of new technologies. The results show that there is a gap in labor productivity and wages depending on the degree of diffusion of new technologies in various sectors of the economy. Analysis of statistical data on wages and other indicators was carried out for the period 2010—2018. A relatively stable level of wage inequality was discovered, which was largely due to the influence of new technologies.

Keywords: Product and Process Innovation, New Technologies, Wage, Labor Productivity, Kazakhstan

Introduction

In developed countries, there is a process of structural transformation of the economy under the influence, first of all, of the introduction of the latest technologies. Technological innovation has been identified as a key driver of long-term macroeconomic growth (P. Romer, 1986). Kazakhstan has focused on the transfer and development of new technologies and achieving sustainable economic growth based on them (Nazarbayev N. (2017). But its practical implementation has revealed a number of complex problems. New technologies are created mainly in leading developed countries of the West. Transfer and development of new technologies, the subsequent creation of local technologies based on them turned out to be a long process. Until now, the innovative component of the Kazakhstani economy remains insignificant. According to the WEF Global Competitiveness Report 2019, Kazakhstan ranked 95th in the “Innovation capability” indicator (The Global Competitiveness Report, 2019).

Researchers typically classify innovation as process innovation and product innovation. Enterprises are introducing technological innovations to save costs, product innovations - to expand demand. A large amount of research is devoted to the above considerations, a small number of studies examine the impact of process innovations on wages and labor productivity.

In this regard, the study of the impact of technological innovation on labor productivity and wages in Kazakhstani practice is of particular interest. In our study, we used empirical data on the effect of technological innovation on the wages and labor productivity at the level of the economy as a whole

and of an individual industry for a comparative analysis. Studying the relationship between the variables in question makes it possible to identify many different factors that impede the development of an innovative economy in Kazakhstan.

Methodology and Analysis

It is well known, that in recent years in the developed countries of the world there has been a high rate of introduction of the latest technologies. In the extensive literature on this topic, the main attention is focused on employment and unemployment, the creation and destruction of jobs. And the important issues of the impact of new technologies on wages and labor productivity are not sufficiently explored. The work of a number of researchers, including D. Acemoglu, and D. Autor (2011), G. Cortes, N. Jaimovich and H. Siu (2017), G. Lordan and D. Neumark (2018), OECD (2017), B. Dachs (2017),: Ya. Kuzminov, L. Ovcharova, L. Jacobson (2015) and others. New technologies mean new more productive jobs, that require high professional skills and knowledge from workers. It can be said that in the final analysis, economic growth depends to a decisive degree on the number of created new jobs. The use of new technologies is associated with an increase in labor productivity and with a higher level of wages. New technologies affect labor remuneration in the industries where they are applied: professional diversification in the labor market is deepening, new activities are emerging, etc. It is also important to emphasize one feature of the Kazakhstan model of the labor market. It consists in the fact that the adaptation of the labor market to changes in the economic situation occurs mainly due to changes in wages, and not due to changes in employment. But high employment and low unemployment is achieved due to low labor productivity and low wages, insufficient investment in new technologies.

We are investigating the question of whether technological innovations play a significant role in increasing labor productivity and wages in Kazakhstan. Does our assumption that the difference in productivity and wages in sectors of the economy is generated by the different scales of the funds they spend on the development and development of new technologies is confirmed. For analysis, we used statistics from 2010-2018, which cover the manufacturing industry and the economy as a whole (Statistics Committee of the Republic of Kazakhstan). Labor productivity we measured the ratio of production to the number of employees.

We limited ourselves to comparing the paths of changes in the average nominal wage in the economy of Kazakhstan and in the most innovative industry - manufacturing. Figure 1 shows that 71.32% of the total cost of innovation in the economy is in manufacturing.

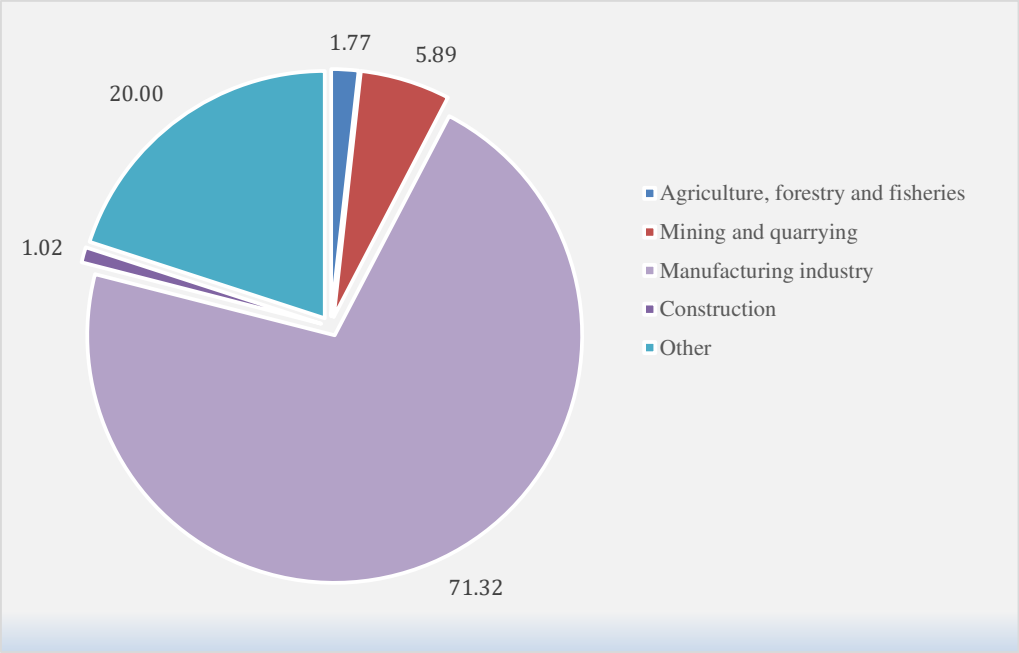

Figure 1: The share of costs for product and process innovations by type of economic activity, % (2018)

(Created by authors based on data of Committee on Statistics of the Ministry of National Economy of Kazakhstan Republic)

Figure 2 presents data characterizing the following data in dynamics: the sum of the costs of technological innovation in the economy and manufacturing industry in absolute figures (billion tenge) and, accordingly, their ratio as a percentage of GDP and the volume of manufacturing industry output. As we see, over the period under review, the average annual value of the growth of costs for technological innovations in the manufacturing industry exceeded 4.5 times that of the economy as a whole. Nationwide, manufacturing is the most active innovation industry.

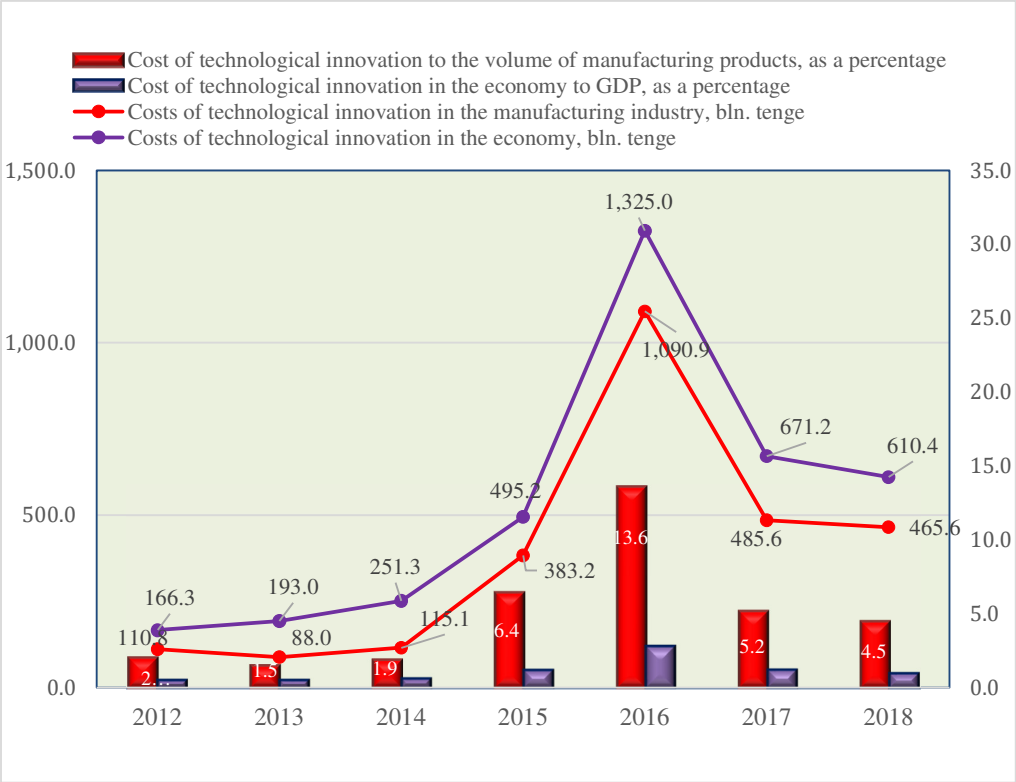

Figure 2: The costs of technological innovation in the economy and manufacturing of Kazakhstan

(Created by authors based on data of Committee on Statistics of the Ministry of National Economy of Kazakhstan Republic)

We examined the issue of the impact of new technology on wages in comparison with the dynamics of its productivity. Figure 3 presents a comparison of the dynamics of labor productivity and wages in the economy and manufacturing in 2010–2018. Over this period, labor productivity in the economy grew by about 1.29 times, in manufacturing - by 1.22 times. The average wage increased 2.10 and 2.36 times, respectively. A phenomenon paradoxical for a market economy is observed: firstly, in both cases, the growth rate of wages is much faster than the growth rate of labor productivity; secondly, in the manufacturing industry, the rate of labor productivity is lower than in the economy, but wages in it are growing faster. That is, the growth rate of wages in the economy lags behind the growth rate of wages of workers in an active innovation industry.

As can be seen in Figure 3, the trend of the long-term relationship between these indicators is almost unchanged. The reasons for this situation can be briefly summarized as follows:

- the increase in labor costs caused by the excess of the growth rate of wages over the growth rate of labor productivity is offset by a more significant increase in prices for manufactured products (see table 1). If the average annual price increase for industrial products of manufacturers in the European Union amounted to 1.2%, in Germany - 1.1%, then in Kazakhstan - 8.2%;
- in developed countries, wage growth is in a more stringent relationship with the growth of labor productivity. In turn, an increase in labor productivity in these countries is achieved on the basis of V and VI technological structures. In Kazakhstan, medium and low technological patterns prevail Dnishhev, F., F. Alzhanova (2014);

- the inertia of the behavior of the subjects of the labor market that has developed under the conditions of the previous labor legislation and the policy of the authorities that prevent dismissals;
- the low level of the competitive environment does not contribute to increasing the interest of the private sector in introducing new technologies, etc.

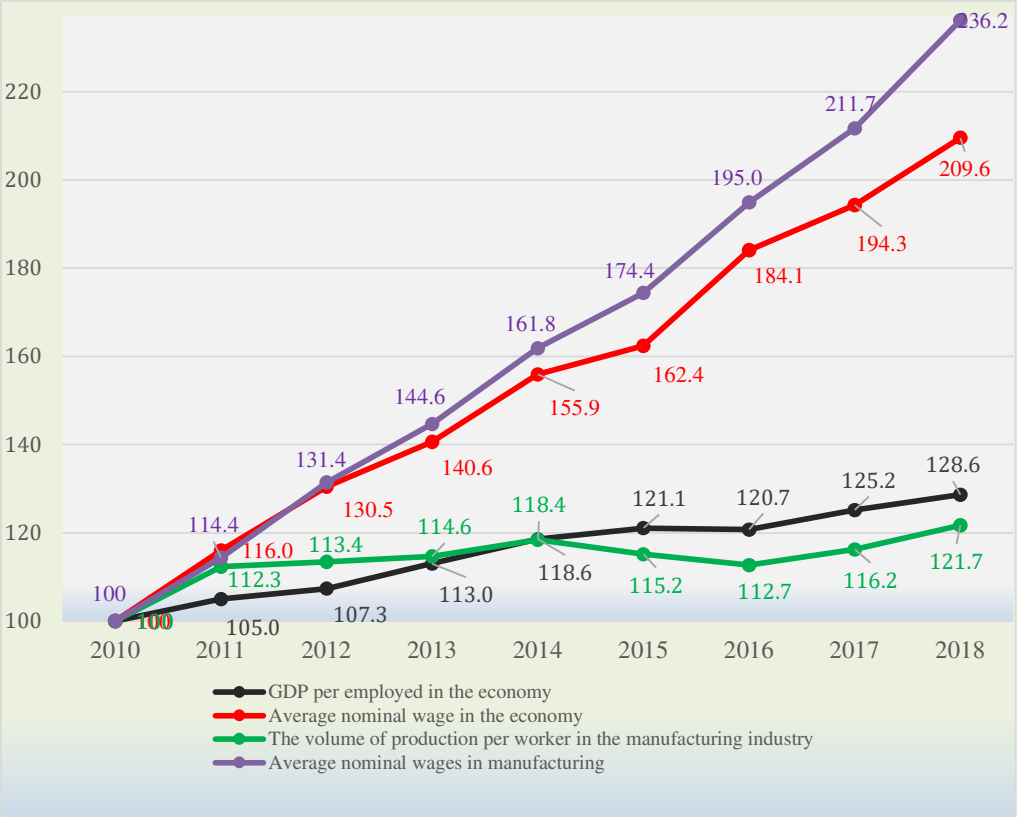

Figure 3: Dynamics of wages and productivity (2010 = 100%) (Created by authors based on data of Committee on Statistics of the Ministry of National Economy of Kazakhstan Republic)

Table 1: Annual increase in industrial producer prices, % (Created by authors based on data OECD and of Committee on Statistics of the Ministry of National Economy of Kazakhstan Republic)

	Annual increase in industrial producer prices, %								
	2010	2011	2012	2013	2014	2015	2016	2017	2018
European Union (28 countries)	3	4,7	2,3	0	-1,4	-1,6	-0,9	2,9	2,2
Germany	2,6	3,5	1,5	-0,2	-0,2	0	-0,7	1,9	1,5
Kazakhstan	12,9	20,3	2,1	-0,5	-1,6	-4,8	15,5	17,6	12,4

Results

The results of this study as a whole confirms the thesis that wage growth in the innovation industry is ahead of wage growth in the economy as a whole. The impact of new technology on this growth through increased labor productivity was negligible. One of the main reasons is the lack of interest of private sector enterprises in the implementation of the latest technologies in the current conditions.

.Summary

There is a non-linear relationship between technological innovation, wages and labor productivity, which depends on the level of implementation costs and the degree of novelty of most technologies. The Kazakhstan example also shows the need to normalize the relationship between the growth rate of labor productivity and wages. This will allow enterprises to pay more attention to accelerated technological modernization of their production. As a result, one can count on sustainable economic growth.

Acknowledgment

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Human Capital as The Basis for The Formation and Development of Post-Industrial Society

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Annotation

The relevance of the research topic is due to the fact that human capital acts today as the basis for the formation and development of post-industrial society. It is this fact that has led to an increase in the interest of theorists and practitioners to study the processes of formation of human capital, its place and role in social-economic development. Physical force was the leading factor of production in pre-industrial society, machinery in industrial society, and human capital in post – industrial society.
The purpose of the study is to assess the impact that the quantity and quality of human capital have on the volume of national wealth and the level of socio-economic development of society. The paper analyzes the following on the global economy scale: the sectoral structure of employment, which acts as one of the criteria for the formation of a post-industrial society, the structure of national wealth and the state of human capital. The article presents the assessment of these indicators in the Russian economy. Underestimating the consequences of losses and a decline in the quality of human capital can permanently consolidate Russia's economic and social lag on the world stage. Today, Russia's priority task is to ensure the quality of human capital and achieve high rates of economic growth on this basis.

Keywords: Human Capital, Post-Industrial Society, National Wealth, Human Development Index, Economic Growth.

Relevance and problem statement

The formation of the post-industrial system has led to an increase in the interest of theorists and practitioners to study the processes of formation and development of human capital. Post-industrialization meant a transition from material factors of production to spiritual and intellectual ones. Physical force was the leading factor of production in pre-industrial society, machinery in industrial society, and human capital in post – industrial society. Today, human capital is the basis for the formation and development of a post-industrial society.

Labor, as a factor of production, was the most accessible resource at all stages of human society development. Therefore, we can only talk about modifications of its content in the evolution process of technological methods of production. At each subsequent stage of socio-economic development, human labor becomes more and more intellectual, successively passing through manual and mechanized stages. In post-industrial society, the largest social group is employees with higher education. The role of the labor activity motive passes from material incentives to the possibility of creative self-realization. In a post-industrial society, the labor force received the qualities of capital-human capital.

The degree of the problem development

The development of human society is viewed through the upward growth of its complexity as a social-economic system. The historical classification of the stages for society development, in addition to the modern system, should include systems of the past and the future. In the theory of post-industrial society, pre-industrial, industrial and post-industrial systems are distinguished. D. Bell is considered the founder of the post industrialism theory (Bell, 1974). In modern Russian science, the leading expert on the concept of post-industrial society is V. Inozemtsev (Inozemtsev, 2000).

Pre-industrial society	**Industrial society**	**Post-industrial society**
Leading sector of economy		
Agriculture, mining industry	Manufacturing industry	Service sector
Type of technology		
Labour-intensive	Capital-intensive	Science-intensive
Limiting factor		
Land	Capital	Information
Type of consumption		
Products satisfying the primary needs	Durable goods	Leisure services and products
Content of labour		
Physical manual	Mechanized physical	Intellectual
Labour motivation		
Traditions and non-economic coercion	Financial incentive	Creativity
Education level		
Transfer of experience within the family	Secondary general	High
Dominant social group		
Farmers	Workers	Employees

Figure 1: Main features of pre-industrial, industrial and post-industrial society

The preindustrial society was a mining society. The leading sector of the economy in this era was agricultural production, and the limiting factor was land. The industrial society had a manufacturing character. This period is characterized by the dominance of industrial production over agricultural production. Capital has become the main productive resource. A post-industrial society can be considered as a processing society, since data processing, understood as the exchange of information and knowledge, takes place through information and communication technologies. The leading industry of post-industrial society is the service sector, and the leading resource is information. The process of historical development of economic systems is shown in figure 1. In developed countries, the formation of post-industrial society began in the last third of the XXth century. It is expected to reach its peak in the United States by 2020, in Japan and Western Europe by 2030-2040, and in Russia and other CIS countries by 2050.

According to some scientists, the sectoral structure of employment can be considered as a criterion for the society to transit from the industrial to the post-industrial stage of development. Each new stage of social development was accompanied by the transformation of employment in three sectors

of the economy – agriculture, manufacturing and services. A common pattern observed in the global economy is the loss of a leading role for rural households in the economy, first in favor of industrial production, and then in the service sector. These structural transformations, acting as a necessary stage of the country's economic development, are called industrialization and post-industrialization. In the era of industrialization, the share of people employed in agriculture decreased from 70-80% to 10-15%, which increased the share of people employed in industry and other non-agricultural sectors. One sign of post-industrial development is the high employment level in the service sector, it is more than 50%.

The idea of human capital has long roots in the history of economic thought. The first attempts to formulate it can be found in the works of W. Petty, A. Smith, A. Marshall, K. Marx, and J. S. Mill and other major scientists. However, as an independent section of economic analysis, the theory of human capital took its shape only at the turn of the 50-60s in the twentieth century. The merit of its nomination belongs to T. Schultz (Schultz, 1963), and the basic theoretical model was developed in the works of G. Becker (Becker, 1964).

Today, economic science has not developed a single interpretation of both the category of human capital and its types. However, most scientists identify such important components as the capital of education, the capital of health and the capital of culture, which include a number of their constituent elements. All these forms of capital can be converted to income in one way or another.

Research Result

As mentioned above, the high level of employment in the service sector is one of the signs of post-industrialization. Table 1 shows the sectoral structure of employment in some countries in 2008 and 2018. The formation of a post-industrial society is accompanied by a high proportion of the population employed in the service sector. For example, in the Netherlands, the share of people employed in the service sector was 78.9% in 2008, and 83.5% in 2018; in Mexico, 60.8% and 61.1%, respectively.

In Russia, 62.8% of the workforce was employed in the service sector in 2008, and 67.4% in 2018. A comparative analysis of the sectoral employment structure of the Western European and Russian economies allows us to conclude that our country is close to the average European indicators in terms of employment in the service sector. The structure of employment in the Russian economy roughly corresponds to Western European States and is ahead of Eastern European ones.

Table 1 : Sectoral structure of employment in the economies of OECD and some other countries in 2008 and 2018, % (ALFS Summary tables, 2019)

Country	Employment in agriculture, %		Employment in manifacturing, %		Employment in Service sector, %	
	2008	2018	2008	2018	2008	2018
Australia	3.2	2.6	22.4	20.4	74.4	77
Austria	5.2	3.5	26.3	25.6	68.5	70.9
Belgium	1.6	0.9	24.6	21.2	73.8	77.9
Estonia	3.9	3.3	35.6	29.8	60.5	66.9
Finland	4.5	3.7	25	22.3	70.5	74
Germany	1.8	1.2	29.3	27.3	68.9	71.5
Japan	4.2	3.4	27.9	24.8	67.9	71.8
Mexico	13.7	12.8	25.5	26.1	60.8	61.1
Netherlands	2.9	1.9	18.2	14.6	78.9	83.5

Country	Employment in agriculture, %		Employment in manufacturing, %		Employment in Service sector, %	
	2008	2018	2008	2018	2008	2018
Brazil	19.9	9.2	21.7	20.1	58.5	70.7
Russia	8.5	5.8	28.7	26.8	62.8	67.4

The distribution of the employed population aged 15-72 by type of economic activity according to Rosstat data is shown in figure 2. As follows from its data, 6.7% of the employed population of Russia was involved in agriculture in 2015-2016, its share decreased to 5.8% only in 2017. The share of those employed in industrial production is stable (19.7-19.8%) during the analyzed period. In 2017, there was a trend of growth in the share of people employed in trade, hotel and restaurant business from 18.2% in 2015-2016 to 18.5% in 2017.

As mentioned above, human capital at the present stage of social and economic development has become the main source of national wealth. In the next report, the Changing Wealth of Nations 2018, the organization's experts note that «Another finding is that estimates of human capital wealth are highly correlated with GDP per capita. The orders of magnitude are different, with human capital wealth per capita typically 7-10 times larger than GDP per capita. However, as expected, the two measures remain highly correlated» (The Changing Wealth of Nations 2018, 2019).

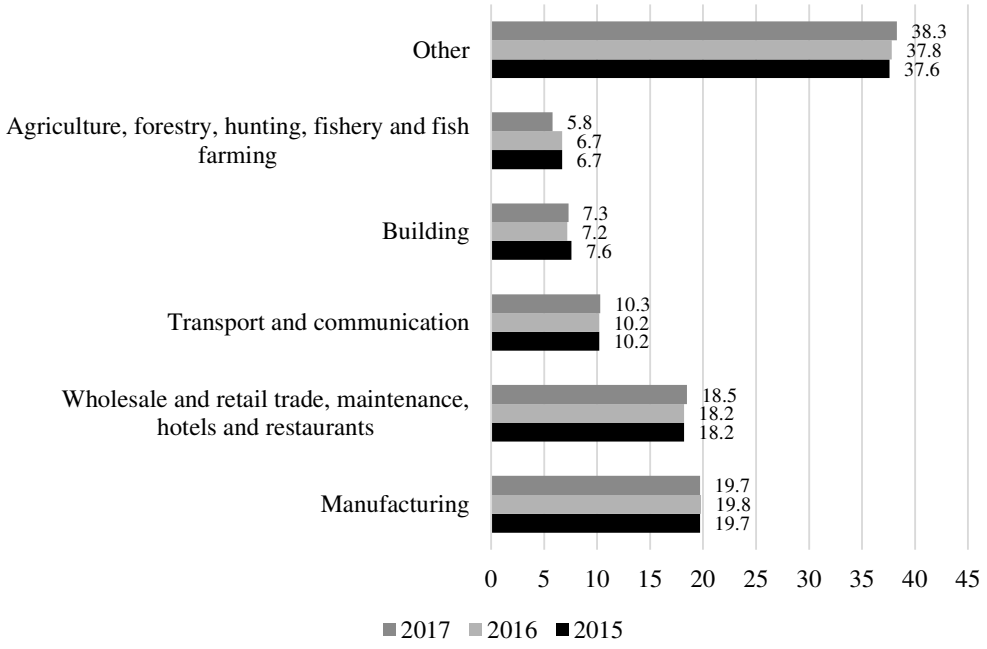

Figure 2: Distribution of the employed population at the age of 15-72 by the type of economic activity in 2015-2017, % (Labor market, employment and wages, 2018)

According to the World Bank's methodology, national wealth consists of produced capital (factories, roads, etc.), natural capital (forests, water, etc.), human capital (knowledge, skills, etc.), and net foreign assets. As for 2014 data, the total national wealth of all countries in the world was $ 1143249 billion, per capita – $ 168580 billion, and the total cost of human capital in the same year was $ 73.1679 billion. Figure 3 shows the structure of the national wealth for countries with different levels of wealth in 2014. In all countries, human capital, measured as a person's projected lifetime earnings, is the most important component of well-being. In low-income countries, the share of human capital

in the national wealth structure was only 41%, while in high-income countries that are members of the OECD, its share was 70%. It should be noted that natural capital per capita in low-income countries was $ 6,421, and human was $ 5,564. In 2014 in high-income OECD countries, the amount of natural capital per capita in the same year was $ 19,525, and the human was $ 498,399.

As for 2014, the total wealth of Russia was $ 188,715 per capita (U.S. dollars per capital), produced capital was $ 48,807 (25.9%), natural capital was $ 46921 (24.9%), human capital was $ 90,812. (48.1%). To compare, in 2014 Brazil also had a large amount of national wealth per capita - $ 1,88883, including produced capital - $ 32,067, natural capital $ 36,978, human capital $123,696. In China, the total wealth per capita in 2014 was $ 108,172, including produced capital – $ 28,566, natural capital - $ 15,133, human capital - $ 63,369. In Russia, the value of human capital per capita is comparable to such countries as Colombia ($87,674) and Croatia ($90,549). The Russian Federation is significantly inferior to Luxembourg in terms of human capital per capita ($881,629).), Iceland ($733,612), Canada ($730,832), Australia ($585,737), Denmark ($538,947), Ireland ($ 473,656), Germany ($ 467.668), Finland ($460,082), Austria ($421,846), Belgium ($404,997).

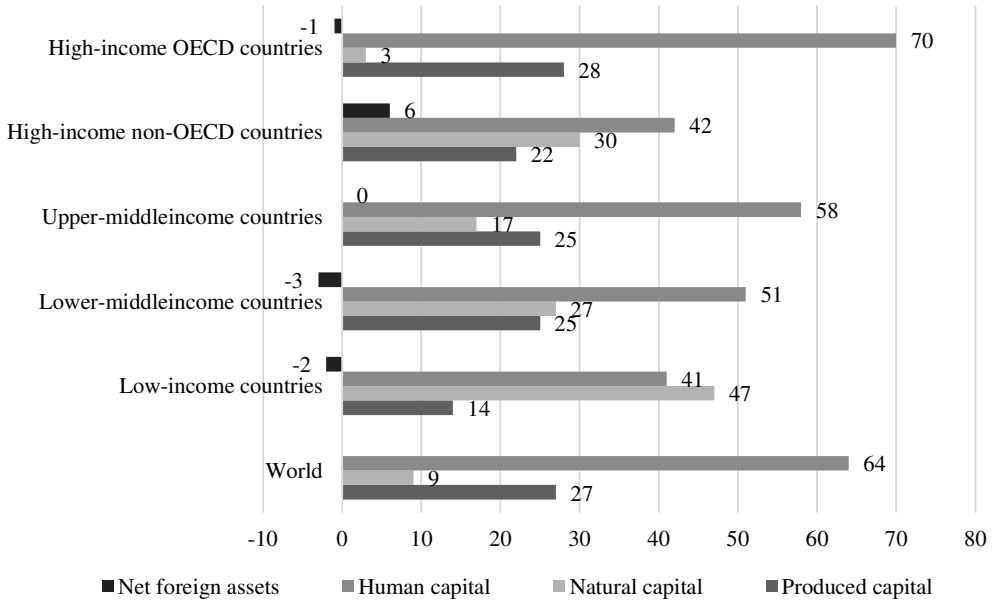

Figure 3: Structure of national wealth of countries with different Levels of wealth in 2014, %

(The Changing Wealth of Nations 2018, 2019)

The countries listed above, according to the world Bank's methodology in the Gross National Income per capita 2019 ranking, are classified as a group of countries with a high level of per capita income (from $12,616 and above). The Russian Federation, which had a gross per capita income of $ 10,230 in 2018, was classified by experts as a group of countries with average per capita income (from $1,036 to $12,615) (Rating of countries and territories by gross national income per capita in 2018, 2019). The positions of some countries in the world in this rating are shown in table 2.

Table 2 : GNI per capita 2018 (constant 2010 US$) in different countries (GNI per capita 2018, 2019)

Ranking	Economy	Income ($)	Ranking	Economy	Income ($)
1	Liechtenstein	116.430	72	Turkey	10.380
2	Bermuda	106.140	73	Russia	10.230
3	Switzerland	83.580	74	Grenada	9.780
4	Norway	80.790	80	Bulgaria	8.860
5	Isle Of Man	80.340	90	Gabon	6.800
6	Macau	78.320	100	Bosnia and Herzegovina	5.690
7	Luxembourg	69.420	110	Albania	4.860
8	Iceland	67.950	120	Georgia	4.130
9	USA	62.850	130	Mongolia	3.580
10	Qatar	61.190	140	Egypt	2.800
20	Germany	47.180	150	Uzbekistan	2.020
30	Italy	33.540	160	Pakistan	1.580
40	Bahrain	21.890	170	Mauritania	1.190
50	Lithuania	17.350	180	Rwanda	780
60	Hungary	14.590	190	Sierra leone	500
70	Nauru	11.240	198	Burundi	280

According to Rosstat's guidelines, the national wealth "represents the total value of all economic assets (non-financial and financial) in market prices that are owned by residents of a given country at a given date, minus their financial obligations to both residents and non-residents" (Russia in numbers 2018, 2019). A significant disadvantage of the methodology is that non-financial non-produced values are not taken into account at all when assessing national wealth. Meanwhile, experts at Financial and accounting consultants believe that this group is potentially the most significant part of the national wealth (How much Russia costs: 10 years later, 2014). Among the reasons why a significant part of Russian assets is not taken into account in practice when assessing the value of national wealth is still the secrecy of relevant information (The law of the Russian Federation "About government secret", 2018). Thus, a significant part of the Russian national wealth falls out of the field of assessment and does not allow us to judge the size of human capital in its composition. The balance of assets and liabilities reflecting the statistics of the Russian national wealth is presented in table 3.

Table 3: Assets and liabilities balance 2011-2016. (Russia in numbers. 2018, 2019)

	2011	2012	2013	2014	2015	2016
Assets	447.255	518.381	585.883	691.133	787.077	817.360
Non-financial assets	224.091	256.262	275.962	302.799	340.334	361.430
Financial assets	223.164	262.119	309.921	388.334	446.743	455.931
Liabilities	218.353	257.796	305.610	370.888	422.421	442.459
National wealth	228.902	260.585	280.273	320.245	364.656	374.901

As mentioned above, human capital acts today as the main production factor and it is a strategic resource for social and economic development. The human development index (HDI) developed by UNDP specialists is used for its evaluation and for international comparisons.

In 2019, UNDP submitted a progress report on the development of human potential, Human Development Report 2019. The study covered 189 States. The group with a very high level of HDI consists of 62 countries, with a high level of 54 countries, with an average level of 37 countries, and with a low level of 36 countries. As shown in figure 4, Norway, Switzerland, Ireland, Germany, and Hong Kong topped the 2018 ranking, while Niger, the Central African Republic, Chad, South Sudan, and

Burundi have the lowest HDI scores. Russia gained the 49th place in the ranking, ahead of Bulgaria and Montenegro, but could not surpass Oman and Argentina. The world HDI rating of Russia is declining mainly due to the value of life expectancy. The gap between our country and the leader of the rating by this indicator was 12.3 years.

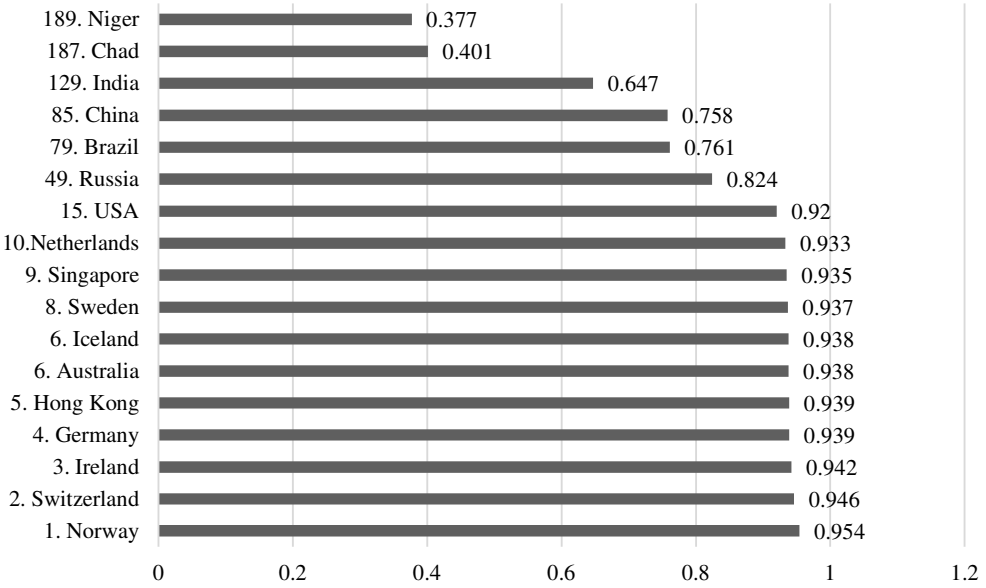

Figure 4 – The human development index of some countries in 2018
(Human Development Report 2019, 2020)

Conclusions and suggestions

The processes taking place in the world economy indicate that at the beginning of the 21st century, human capital became the main productive resource. Only thanks to the leading role of human capital, a number of countries (Japan, Taiwan, Hong Kong, South Korea, etc.) were able to achieve a high level of social-economic development. At the same time, there are no examples of long-term economic development based on the use of natural capital in the world economy today. In this regard, the quality and quantity of human capital should be considered as the main factor in the social-economic development of countries.

In Russia, the attitude to a person has always been quite indifferent. This indifference came, obviously, from the fact that the country has enough population and workers. Today, the situation with human capital has changed radically. The reduction in the population and the lack of human resources is becoming almost the main constraint on social-economic transformations. Our country has passed the stage of economic recovery based on the use of previously created production facilities and previously trained labor force. An underestimation in the consequences of losses and a decline in the quality of human capital can permanently consolidate Russia's economic and social lag on the world stage.

Ensuring the economic growth and well-being of the people is the main goal of a civilized state. Today, the first task for Russia is to ensure the quality of human capital and achieve high rates of economic growth on this basis. This process is connected with constant and significant investments of the country in the social sphere. Investing in human capital leads to higher labor productivity and, consequently, production efficiency.

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Efficiency of The Higher Education System, Scientific and Pedagogical Workers: Russia In Comparison with Global Trends

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Abstract

The urgency of the research is based on the fact that in the modern world the education system is the foundation of the emerging post-industrial society and any changes in it have a significant impact on all socio-economic processes. In this respect, determination of the national educational system's effectiveness as a whole and the higher education system in particular is of high importance. The professional level and scientific and pedagogical workers' labor efficiency directly determine the quality of the educational services provided by the university as well as efficiency level of an educational organization. Therefore, it seems no less urgent to research the main directions to increase the efficiency of employees' labor activity among educational organizations in frames of the higher education system.
The purpose of the study is to evaluate the higher education system as well as scientific and pedagogical workers' effectiveness in different countries of the world, including Russia. The given work considers the ratings' results concerning the strength of the higher education system, the rating of the national higher education systems' effectiveness, the rating of universities, the rating of scientific and pedagogical staff's publication activity. The presented work gives an assessment to the position of Russia in these ratings.

Key words: Higher Education, Scientific and Pedagogical Staff, The Higher Education System's Effectiveness, Labor Efficiency, Educational Expenditures.

Relevance and Problem Statement

Postindustrial society formation means moving from tangible production factors on to the spiritual and intellectual ones. Today, the world economy is seeing a high degree of dependence on the human capital development level. In a post-industrial economic system, one of the criteria for economic success is the quality characteristics of the human capital, the possibility of its accumulation, multiplying (provided further efficient use), i.e. developing those areas of economic life that predetermine the development of man himself (Rudakova, O.V. and Samorodova, E.M., 2007). In about every country human capital measured as projected lifetime earnings of a person is the most important component of welfare. In the countries with a low per capita income the human capital share in national wealth was only 41%, whereas in high-income countries, which are members of the OECD, its proportion was equal to 70%

(The Changing Wealth of Nations 2018, 2018).

Education capital is an important component of human capital. Education is a purposeful process of education and training, corresponding to the interests of the person, society and the state, accompanied by a statement of achievement of the educational levels established by the state (Prokopyeva, A.V., Rybakov, L.N. and Pchelkina, V.V., 2012). Currently, the educational level of the population is one of the global competition elements, which is due to the increasing impact of education on the successful development of states and their advance in global labor markets and new technologies (Zelenina, T.Yu., 2014). Education today is seen as national capacity and capital and, as a condition for the competitiveness of the State and society. In today's world, the educational system is undoubtedly the basis of the emerging knowledge society and any changes in it have a significant impact on all the social and economic processes. In this regard, the national educational system effectiveness determination is of particular importance. The professional level and efficiency of the academic staff work directly determine the quality of educational services provided by the academic institution and the level of the educational organization effectiveness. Therefore, it is no less urgent to study the main directions of improving the efficiency of the higher education system academic staff work.

The level to which the problem is developed

The theoretical basis of the research is the works by the founders of control theory, efficiency theory, and the theory of human capital. The modern society stays in the process of accelerated transformation followed by increase in the role of mental labor in the society, which determines the particular importance and urgency of its comprehensive study. The above-mentioned problems were researched in the works of such scientists as Aron R., Becker G., Bell D., Gelbraith J.K., Drucker P., Clark K., Naysbit J., Toffler O., Furastier J., Schulz T ., Danilin G., Krasilshchikov V., Lvov D., Nizhegorodtsev R., Tolokina E., Antipina O., Inozemtsev V.I. etc. The problems of efficiency and labor productivity were studied in the works of many foreign and national scientists, such as Drucker P., Clark JB, Marx K., Marshall A., Samuelson P., Sink D., Smith A., Taylor F., Emerson G., Abalkin L., Anchishkin A., Kapelyushnikov R., Lvov D., Odegov Yu., Strumilin S., Sukharev O. The studies of labor productivity's possibilities were reflected in the works of Taylor F.U., Gilbreth F., Fayol A., Urvik L., Muni D., Reilly A., Arjiris K., Herzberg F., Likert R., MacGregor D. Management problems of labor productivity were researched in numerous works of Russian scientists, such as Abalkin LI, Gavrilov RB, Ivanchenko A.A., Ignatovskii P.I., Kapustin E.I., Karpukhin D.N., Kostin L.A., Morozova E.V., Odegov Yu.A., Strumilin S.G., Frenkel A.A., Cherkovets V.N. Recent studies presented in the works of Adamchuk V.V., Andreev B.F., Genkin B.M., Germanova O.E., Kuchina E.V., Morozova E.V., Petrov A.Yu., Semenov A.N. and etc. are urgent as well.

The educational arrangement of higher education, like any other organization, needs the effective implementation of managerial functions. However, nowadays higher education institutions are poorly studied both from the standpoint of theoretical and practical management. There are no unified scientifically substantiated and approved standards and methods of higher institutions' management. In Russia, a scientific and practical direction, so called 'university management is under the current formation. Foreign theories and practices of university management, in our opinion, are not always applicable due to the difference in the condition's educational organizations' existence. To our mind, university management should combine both characteristics: general of economic processes' management in any organization and unique to educational institutions of higher education.

The Results of The Study

The expenditures on education are a fairly large budget item in most countries and they are considered one of the key indicators of socio-economic development, as they reflect the level of attention paid to the education of citizens by the state and the society. The level of national education spending is a relative indicator, expressed as a percentage of gross domestic product. The indicator is calculated for the calendar year as the total amount of public and private expenditures on education, including state budgets of all levels, as well as private funds, external borrowing, donations and grants from international institutions and non-governmental organizations.

However, it should be noted that this indicator does not take into account the income equality to education for various social groups within a particular state, it gives no idea either of the ratio of public and private spending on education or the spending structure.

The top 10 countries that are leaders in the level of education spending are shown in Figure 1. The ranking leader, according to the World Bank, in 2016 was Grenada, where the share of education spending in the country's GDP was 10.24%. It should be noted that a relatively large number of developing economies have demonstrated a high level of public expenditure on education, primarily due to mass illiteracy elimination programs funded by international institutions and charitable organizations. In developed economies, the level of spending on education is 5-8% in the GDP of these countries. Among the developed countries, the leader is Norway, where the share of spending on education is 7.98%. According to the data of 2016, education spending in Russia was 3.74% of GDP. It should be noted that in 2014, 4.0% of GDP was allocated to support the education sector. According to the level of spending on education, Russia was outpaced by Uzbekistan (6.87%), Moldova (6.66%), Uruguay (4.76%), Georgia (3.78%).

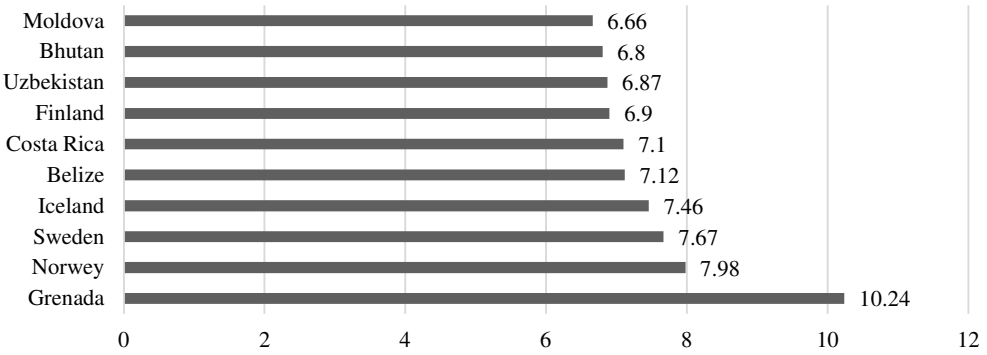

Figure 1: Top 10 countries in terms of education spending in 2016, % of GDP (Government expenditure on education, total (% of GDP), 2017)

According to the Higher School of Economics data, in Russia government spending on education at current prices grew steadily from 2006 to 2014 (Fig. 2a). The same dynamics was demonstrated by their value in constant prices (fig. 2b). Between 2014 and 2016, it was reduced in current prices as well, but little growth in constant prices could be recorded.

Higher professional education acts as a system-forming element of the national economy, because it forms personnel potential for all sectors of the economy. Since 1970, the higher educational programs' coverage of the world population has increased more than 6 times, and the growth of the gross world product in this period has been only 2 times higher. In 2007, the OECD published a new methodology for a comprehensive assessment of the higher education impact on socio-economic development of regions (Higher Education and Regions. Globally Competitive, Locally Engaged, 2007). At the beginning of the XXI century, higher education programs became the main segment of the international educational services market.

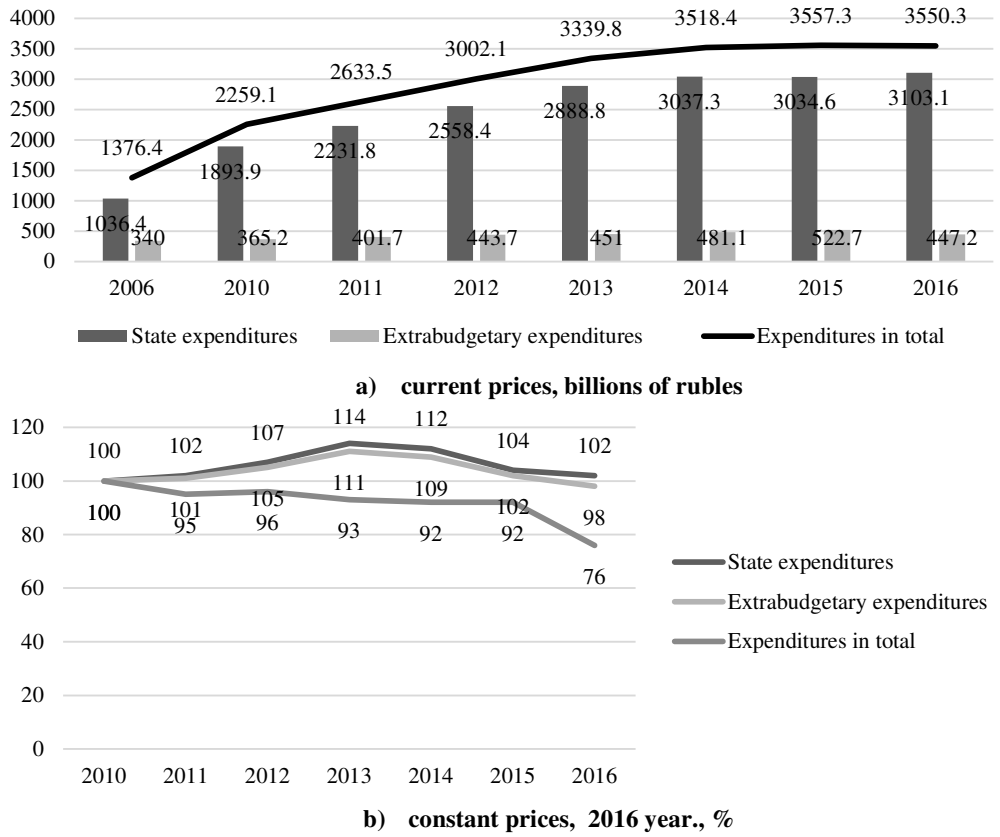

Figure 2: Expenditures on education in the Russian Federation in 2006-2016 years (Bondarenko, N.V., Gohberg, L.M. and Kovaleva, N.V., 2018)

Today, there are several methods which allow to carry out a comprehensive assessment of the national system of higher education through the compilation of world ratings. In our opinion, among the instruments aimed at fixing the integrated position of the development of national higher education systems, one can single out the Higher Education System Strength Rankings, compiled by QS and the rating of the effectiveness of national higher education systems (Ranking of National Higher Education Systems) represented by Universitas 21.

The leading countries of the Rating of the higher education system's strength in 2016 are presented in Figure 3. As one can see from the data in the Figure and the Appendix, the United States became the leader in the 2016 rating, having received 100 points for all rating indicators. Great Britain took the 2nd place in the Rating of the higher education system's strength, receiving 98.5 points. At the same time, the best scored and high-ranked was the country's leading university (99.8 points), the worst rating was scored for the accessibility of world-class higher education (96.7 points). Germany, having received 94.0 points, ranked the third in the QS Higher Education System Strength Rankings. The country's higher education system has achieved the best results in terms of accessibility (97.9 points), and the worst in terms of the economic context (91.9 points). Pakistan has ranked the last, the 50th, the best result is obtained by the country in terms of economic impact (31.3 points), and the worst by accessibility (0 points).

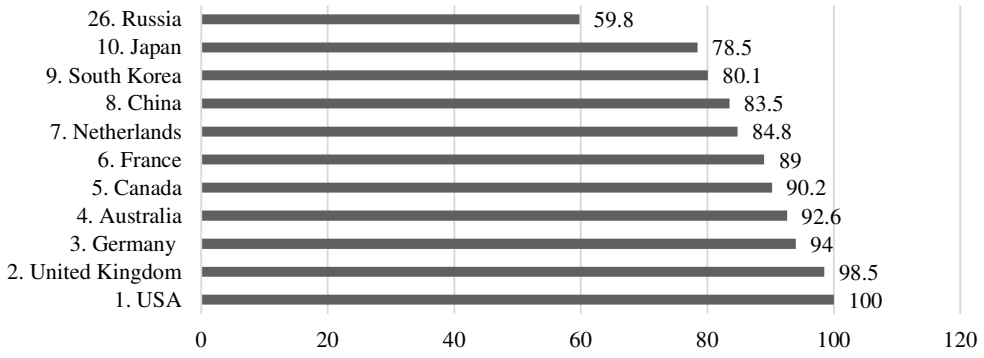

Figure 3 : Top 10 leading countries in 2016
(Higher Education System Strength Rankings 2016, 2017)

The Ranking of National Higher Education Systems is a research project implemented by the international network of universities Universitas 21 (U21), being devoted to the higher education achievements assessment all over the world. The top 10 countries-leaders of the higher education efficiency rating of national systems in 2017 are shown in Figure 4. According to the data presented, the leader in this rating is also the USA. It should be noted that the North American system of higher education, which has been formed in the USA and Canada, is today an indisputable leader among the world educational systems. The five leaders also included Switzerland, Great Britain, Denmark and Sweden. The European system of higher education has long academic traditions in such countries as Great Britain, France, Germany and Italy. Indonesia has ranked the last, the 50th.

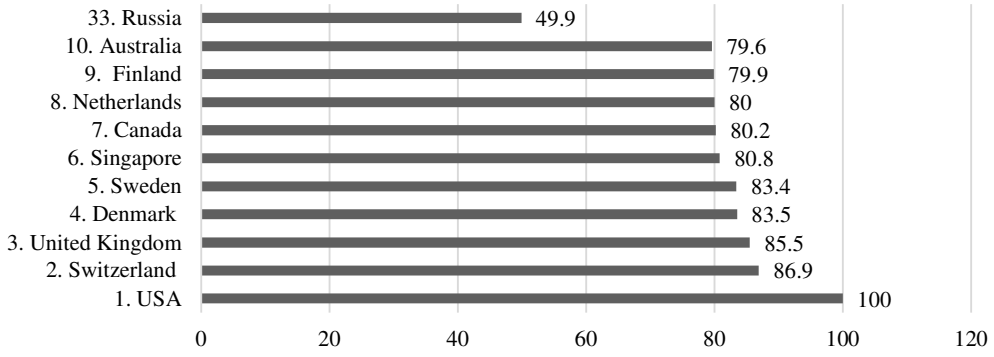

Figure 4: Top 10 countries-leaders of the higher education efficiency rating of national systems in 2017
(Ranking of National Higher Education Systems 2017, 2018)

The BRIC countries are presented in the ranking of the effectiveness of national higher education systems. In the ranking of 2017, China takes the 30th place, Brazil has the 42d place, India is located at the 49th place. One should note that in the ranking of 2014, China was at the 35th place, Brazil took the 38th place, India was located at the 50th place (Ranking of National Higher Education Systems 2014, 2015). Our country is located at the 33rd place in the ranking of U21 Ranking of National Higher Education Systems 2017, skipping ahead Taiwan (the 21st place), Malaysia (the 25th place), China (the 30th place). It should be noted that in the 2014 ranking Russia was the 35th (Ranking of National Higher Education Systems 2014, 2015).

In the modern society, universities act out as the main providers of knowledge; they possess the leading positions in sphere of providing a high-quality theoretical information base. Nowadays, universities are increasingly being seen as drivers of regional development. The number of universities in the world is

growing not only because of the developed countries, but also due to developing ones. At present, world university rankings act as indicators of the higher education system's efficiency in the country. Universities' world rankings, in difference from the performance ratings of national higher education systems, measure not the entire higher education system of a particular country, but only the indicators of its higher education institutions.

There are about a dozen of global university rankings. Nowadays, QS World University Ranking acts out as one of the most significant university ratings. In the ranking of 2017, there were 935 universities of the planet already which took part. Four of the first five places in the QS World University Ranking 2017 belong to the United States, and another one belongs to the United Kingdom. The USA is represented in the ranking by universities such as the Massachusetts Institute of Technology (1st place), Stanford University (2nd place), Harvard University (3rd place), and the California Institute of Technology (5th place). British Cambridge University is one of the five leading universities worldwide (World University Ranking 2017, 2018).

QS World University Ranking included 22 Russian universities in 2017. It should be noted that the leading university of the country, Moscow State University named after M.V. Lomonosov ranked only the 108th according to the rating. The general assessment of the university, according to the experts, is only 62.1 points; academic reputation being 77.1 points, reputation among employers being 69.3 points, the ratio of teachers and students being 99.7 points, the share of foreign students being 51.9 points. Indicators such as the citation index and the foreign teachers ratio were not even evaluated by international experts.

In 2017, the rating agency RAEX (Expert RA) made the sixth annual rating of Russian universities. The rating of RAEX universities (Expert RA) is an integral university graduates' training quality assessment, determined by quantitative parameters of educational and research activities of universities and qualitative characteristics reflecting the opinion of key reference groups: employers, academic and scientific circles representatives, as well as students and university graduates (Methodological approaches to ranking Russian universities, 2020). The top-10 rating of the RAEX for 2017 is presented in Table 1.

Table 1: Top-10 of "The best 100 of Russian higher institutions" Rating of 2017 according to RAEX (100 best universities in Russia. 2017, 2017)

Place, 2017 year	Place, 2016 year	Name	Rating functionality	Conditions for obtaining quality education, rank	The level of employers' demand for graduates, rank	Research activity level, rank
1	1	Moscow State University after M.V.Lomonosov	4.729	1	2	1
2	2	Moscow Institute of Physics and Technology (State University), MIPT	4.603	3	5	3
3	3	National Research Nuclear University (MERhE)	4.424	7	4	2
4	5	St.Petersburg State University	4.244	4	12	5
5	7	Moscow State Institute of International Relations, MFA of the Russian Federation	4.223	2	7	34
6	6	National Research University "Higher School of Economics"	4.216	5	6	15
7	4	Bauman Moscow State	4.136	10	1	11

		Technical University				
8	8	National Research Tomsk Polytechnic University	4.100	6	15	7
9	9	Novosibirsk National Research State University	3.957	8	16	6
10	11	Peter the Great St.Petersburg State University	3.890	12	13	8

The leaders in the rating of 2017 were the universities, which ranked the first last year (Moscow State University named after M.V. Lomonosov, MIPT and National Research Nuclear University MEPhI. The above-mentioned universities are among the best universities in Russia in terms of conditions for obtaining qualitative education and the demand for graduates by employers. Moscow State University, MIPT and MEPhI demonstrate the highest level of research activity among all Russian universities for the second year in a row. In the team of leaders in 2017, in comparison with 2016, there were significant changes: MGIMO advanced from the 7th place (in 2016) to the 5th place (in 2017); MSTU named after Bauman worsened its position, ranking the 7th place in 2017 compared to the 4th in 2016.

At the current stage of development, the effectiveness of the organization's activities is determined by the efficiency of its staff. In other words, the personal effectiveness of each employee is seen as the basis for achieving the organization's strategic and tactical goals. The effectiveness of the activities of both a separate educational organization of higher education and the entire system of higher education depends on the main academic staff of universities, since it is the academic staff which is the main generator of scientific ideas and knowledge, the evaluation of which is carried out by external parties concerned.

In the international practice it has become widespread to use the publication activity indicators of scientists and educational organizations to assess the effectiveness of their work, assess the effectiveness of the organization itself and even the state of science in some countries. The idea of the country's place in the scientific world is judged upon by the total number of its scientists' publications in databases, indexed by international scientific publications. Figure 5 shows the top 10 countries which are the leaders in the rating of publication activity in 2017. The United States took the first place in the number of documents presented in the Scopus database in 2017 (683,590 documents). China ranked second in the 2017 ranking (534,879 documents). Russia took the12th place (89,492 documents), it was 7.6 times behind the United States and 6.0 times behind China.

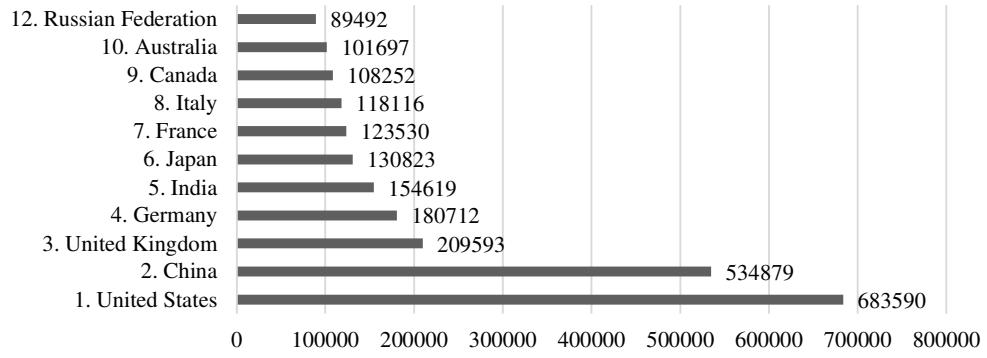

Figure 5 : Top 10 leading countries in publication activity rating 2017 (based on the number of documents contained in the Scopus database) (Publication Activity Rating (by number of publications) in the world in 2017)

Scopus data analysis makes it possible to determine that from 2003 to 2010, Russia's position in the world scientific market had a tendency to deteriorate, so in 2011 our country ranked 11th in the publication activity of SJR in terms of the number of documents placed in the database, then in 2010 –

the 16th. Since 2011, the improvement has become obvious: in 2017, our country returned to the 12th place in the rating (Fig. 6).

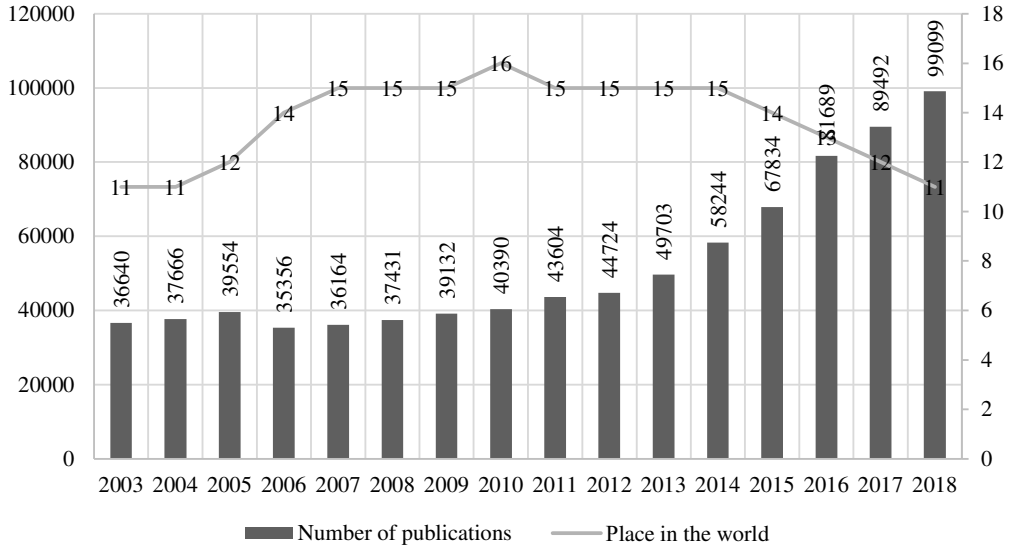

Figure 5: Russia publication activity rating according to the number of documents contained in the Scopus database, in 2003-2017, according to the SJR version

(Publication Activity Rating (by number of publications) in the world in 2017)

It should be noted that the number of scientific publications indexed by international databases is considered by the Russian authorities as an important indicator of the national science development. According to the passport of the national project "Science" by 2024, Russia is to enter the top five countries in terms of priority areas for science for the country (National Project Science, 2020). From the point of view of the science-based indicators, this should lead to a double increase in the number of publications of national scientists.

Conclusions and offers

The given data indicate that the key policy for Russia in order to improve results among the world competitiveness of the higher education system is its integration into the global educational space, accompanied by an increase in its functioning effectiveness.

The professional level and labor efficiency of higher education's employees directly determine the quality of educational services provided by the university. In this respect, it seems urgent to develop directions to increase employees' labor efficiency concerning Russian higher education system's organizations.

The system of labor efficiency management is based on three following aspects: the development of criteria for personnel labor efficiency; monitoring of their implementation; employees' motivation. It lets classify personnel basing on its efficiency, which makes it possible to reward efficient employees, stimulate ineffective employees or optimize personnel, considering inefficiency. Management of scientific and pedagogical workers' effectiveness is carried out by the managing subsystem, which is a university's administration. The managed subsystem is represented by scientific and pedagogical workers of the higher educational organization. Management information represents by itself a collection of information about the processes which take place both in the organization itself and beyond it.

The management of scientific and pedagogical workers' effectiveness starts with collection, accumulation and processing of information which comes both from the external environment of a higher educational institution (the state, employers, applicants / students), and from its internal environment (the university itself). Requirements and the amount of funding that enter the institution of higher education on the part of the state, employers, applicants / students serve as the basis for the system's formation concerning the educational organization's performance indicators. Based on this system of indicators, there is created a system of indicators concerning the activity of scientific and pedagogical workers. This system is supplemented by the indicators reflecting the requirements for implementing the university's development strategy. It should be noted that the implementation of performance indicators by academic staff of the university has a decisive influence on the performance indicators of the university as a whole. Planned labor efficiency indicators of one employee are established on the basis of a system of performance indicators among scientific and pedagogical workers. Some indicators are obligatory and are paid from the wage fund, while other indicators are advisory and are paid from the stimulating part of the wage fund. At the same time, default of the obligatory indicators deprives a scientific and pedagogical worker of the right to receive incentive payments for the recommended indicators.

It is necessary to form an end-to-end system of performance indicators, the values of which are set at the federal level and are subject to execution at the level of scientific and pedagogical workers. The formulation of state priorities and the setting of target indicators that determine the effectiveness of the national education system take place at the federal level. They are supplemented with their own part of the established system of indicators at the level of constituent entities of the Russian Federation, municipalities and higher educational institutions. The signing up of an effective contract with a scientific and pedagogical worker containing indicators of the effectiveness of the latter is the ultimate level of the considered system. Due to this system, it is precisely the scientific and pedagogical workers who will definitely ensure the direct achievement of the necessary targets.

The process of reforming the higher education system in Russia should help to increase its effectiveness. It is expected that a reduction in the number of universities will increase competition between applicants, which will lead to an increase in the overall level of education in the entire country. It is also assumed that a reduction in the number of students will result in a reduction in the number of educators and that will increase competition between them. The consequence of these processes will be an increase in the quality of teaching in the country. The closure of inefficient universities, according to the reformers, on the one hand, should reduce a financial burden on the country's budget (higher education in Russia is mainly budgetary), and on the other hand, it will help to direct the released funds to the development of effective educational organizations.

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The Role of Non-Financial Sector Deposits in The Activity of Commercial Banks on The Example of The Polish Banking Sector

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Abstract

The aim of the publication is to specify the characteristics of bank deposits obtained from the non-financial sector, indicating their role in commercial banks' functioning and presenting the most important aspect of the bank's financial economy, that is, funding its activity. The discussion is based on the analysis of quantitative data concerning the activity of the banking sector in Poland in the scope of funding sources. The data covered by the object of the research has been obtained from financial reports of Narodowy Bank Polski (the National Bank of Poland) and the Polish Bank Association. The obtained research results underline the significance of bank deposits not only from the point of view of a commercial bank, but also the whole banking sector.

Keywords: Bank Deposit, Non-Financial Sector Deposit, Bank's Capital, Financial Economy, Bank's Funding Sources

Introduction

The activity of banks as participants in the financial system has a specific character. It primarily results from the economic and social meaning of the bank's activity. Furthermore, the role of banks in the economy is also related to their function of a public trust institution.

The activity of banks, similarly as the activity of any economic entity, depends on the held capitals. With regard to the need to ensure proper amount thereof, banks are obliged to conduct financial economy aimed at providing coverage for costs incurred during activity with the amount of generated revenues.

The fundamental task of commercial banks is to obtain funds and transform them into investment. Funds collected by banks come from various sources and constitute grounds for functioning thereof. The activity of commercial banks is primarily funded with foreign capital. The key role in their structure is played by deposits. In fact, accepting deposits constitutes the basic area of each banking activity.

Literature Review

Banks are a special type of enterprises, the activity of which consists in collecting funds from people in a form of deposits and sharing them in a form of loans (*Rose & Hudgins, 2012; Apostolik, el. al., 2009).* In principle, proper functioning thereof depends on the level of held capitals. In the case of banks, however, their balance structure is significant, that is, the relation between foreign and own funding sources, which is different from other enterprises. In general, the division of the capital is the same – equity and foreign capital, however, in the case of the equity capital, banks are obliged to fulfil certain capital requirements. As a matter of fact, in compliance with the binding prudential standards, in order to ensure economic security, the banks are obliged to have own funds adjusted to the size of conducted activity. Whereas, foreign capital constituting the prevailing part of the bank's equity and liabilities, cannot be treated as a typical external source of funding its activity – as in the case of enterprises *(Nyoka, 2019; Iwanicz-Drozdowska, et al., 2017; Matten Ch., 2000).*

In order to implement the adopted policy, banks, as other enterprises, act while using various funding sources. Some tasks are funded with equity and others can be performed with the use of foreign capitals, especially in the situation of having insufficient own resources. Therefore, the selection of funding sources constitutes an important decision-making area in the bank's functioning. Nevertheless, the characteristics of banks' activity causes the decisions, to be taken by the banks in this area, to play an extremely important role. (Kolari & Gup, 2005). Therefore, from the point of view of proper functioning of a bank, an important role is played by its financial economy, which consists in proper management of held resources so that they generate expected profits *(Trinugroho, et.al., 2016; Podstawka, 2010).*

Among activity funding sources available to banks, an especially important role is played by deposits. The share of other sources in increasing the bank's resources is much smaller and usually does not exceed a few or several percent of its liabilities. The essence of bank deposits consists in executing the customer's instruction as ordered, at their responsibility and risk and with resources held by the customer. The bank does not take any substantive decision and is restricted solely to the control of correctness and legality of received instructions *(Apostolik, el.al., 2009, Matthews & Thompson, 2008; Matten Ch, 2000, Safiat, et.al., 2019).*

Deposits are included in the bank's balance sheet as liabilities to customers (predominantly from financial and non-financial sectors). They constitute a basic form of foreign capital of any bank. Accepting cash from people, business entities and other institutions is commonly defined as bank deposits. These funds are kept on various bank accounts, which decides on classifying them to more specifically defined sources of funding bank's activity *(*Melnychuk*, et.al., 2018; Świderska, et.al., 2016).*

In the subject literature, bank deposits are often the object of research of many various authors in different countries. It primarily results from the fact that the level of thus obtained funds determines the possibilities of funding banks. Therefore, deposit operations constitute a key element in managing bank's finances. Thus, in order to obtain as many customers as possible, banks compete among themselves in the scope of presented deposit offers. Therefore, they differentiate deposit products not only due to terms or interest rates, but also encourage customers with additional, related services. One of the factors with a significant impact on the level of bank deposits is also, as underlined by many authors, the deposit guarantee scheme. *S. Lobozynska* believes that proper bank deposit guarantee scheme has a significant impact on the customer's trust in bank services. The purposefulness of the existence of deposit guarantee schemes, social premises for developing them and consequences thereof are discussed in a similar manner by, among others, *Bergbrant, et. al.* Whereas, *Cooper and Kempf* underline their role in limiting in the loss of depositors' confidence regarding the banking sector in times of disturbances and crisis, and they indicate that the rules of deposit guarantee schemes become a significant element reinforcing relations between depositors and banks. On the other hand, *Demirgüç-Kunt, Kane and Laeven* write about the reasons for establishing deposit guarantee schemes and indicate that the development level of the banking system and legal-regulatory environment in a given country also have a significant impact on the establishment thereof. Additionally, *Huizinga and Nicodème* believe that the existence of an effective deposit guarantee scheme can be treated as an additional advantage of a given banking system.

Methodology

The article has been drawn up on the grounds of the analysis of quantitative data obtained from financial reports of Narodowy Bank Polski (NBP) (the National Bank of Poland) and the Polish Bank Association (ZBP). This data was used to diagnose the characteristics of funding the activity of the commercial banks' sector in Poland. The object of the analysis predominantly covers non-financial sector deposits. Simultaneously, the research period presented in the analytical part of the article covers the years between 2014 and 2018. The year 2019 has not been included in the research due to the lack of comparable data from this period. Taking into consideration five consecutive years in the analysis allowed in-depth comparison thereof as well as indicating the trend of changes in analysed values in time.

The research conducted herein has been carried out with the use of simple statistical methods the main aim of which was to analyse the structure and dynamics of studied quantitative data in the scope of funding the activity of commercial banks. The use of the dynamics of the studied phenomenon allowed determination of changes in its level i.e. an increase or a decrease in distinguished time units, as well as determination of the rate of the changes in question.

Results

The data included in table no. 1 implies that in the analysed period of time the structure of funding commercial banks was stable. The main role was played therein by foreign capitals, that is, liabilities. Deposits of the non-financial sector had a prevailing share among them.

Table1 : The level of funding sources of commercial banks in Poland in the years 2014-2018 (billion zloty)

Funding sources	years				
	2014	**2015**	**2016**	**2017**	**2018**
Central Bank	0.12	0.01	0.01	0.01	5.85
Financial sector	258.5	258.9	250.2	230.5	227.9
Non-financial sector	849.3	933.4	1,021.1	1,062.5	1,151.2
General government sector	60.6	48.4	63.5	69.0	83.4
Debt instrument	54.5	57.6	67.2	85.3	87.8
REPO transaction	26.6	19.4	11.9	12.6	18.3
Derivatives	40.5	32.7	25.1	17.2	16.7
Other liabilities	73.1	69.3	83.6	95.8	91.5
Total liabilities	**1,363.22**	**1,419.71**	**1,522.61**	**1,572.91**	**1,682.65**
Equity capital	**166.0**	**175.2**	**183.4**	**203.9**	**204.5**
Total equity and liabilities	**1,529.22**	**1,594.91**	**1,706.01**	**1,776.81**	**1,887.15**

Source: Own study "Development of the Financial System in Poland" NBP reports for the years 2014-2018.

Liabilities of the commercial banks sector in 2014 amounted to PLN 1,363.22 billion, which constituted 89% of the balance sheet total. Their value in the consecutive years was growing and at the end of the analysed period, i.e. in the year 2018, the level of liabilities amounted to PLN 1,682.65 billion, that is, by PLN 319.43 billion more than at the beginning of the research. Thus, the share of liabilities in the balance sheet total oscillated around 90%. On the other hand, the analysis of own funds of commercial banks implies that their capital equipment in the analysed period of time was also gradually increasing. It predominantly resulted from the accumulation of retained profits from previous periods, as well as (although, to a significantly smaller extent) issuance of shares and subordinated debt. The biggest increase in own funds was noted in 2017, as they grew by PLN 20.5 billion (in 2015 the nominal increase amounted to PLN 9.2 billion and in 2016 – PLN 8.2 billion, whereas, in 2018 to only PLN 0.6 billion). Apart from the accumulation of retained profits from the previous year, increasing the share capital Tier I by PLN 13.3 billion and capital Tier II by PLN 2.7 billion also contributed to the increase in the value of own funds in 2017. Whereas, the low increase in these funds in 2018, in comparison to previous years, resulted from the structural changes that occurred at the end of that year and losses suffered by some banks. In comparison with foreign capitals, the value of own funding sources of commercial banks was small, approx. 10%. Nevertheless, such a relation of equity capital to foreign capital is completely correct. It results from the characteristics of the activity of banks that base their operations predominantly on foreign capital. The manner in which commercial banks' capitals were developing has been presented in diagram no. 1.

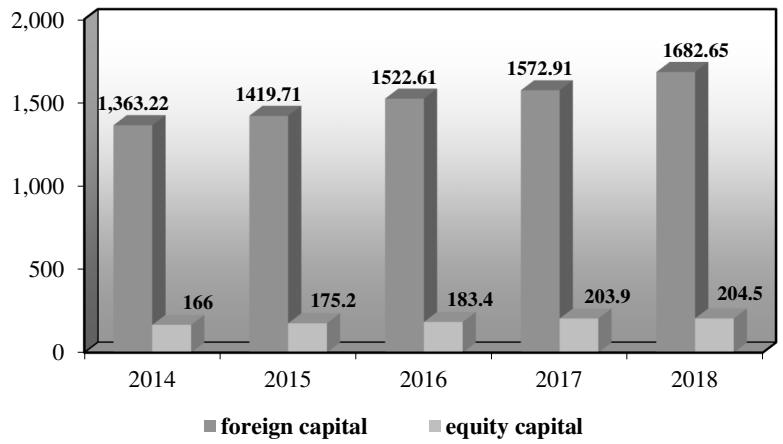

Fig. 1 : Value of capitals of the commercial banks sector in the years 2014-18 (billion zloty)
Source: Own study: "Development of the Financial System in Poland" NBP reports for the years 2014-2018.

The rate of changes (year/year) in the values of commercial banks' capitals noted in the period of analysed years has been presented in diagram no. 2.

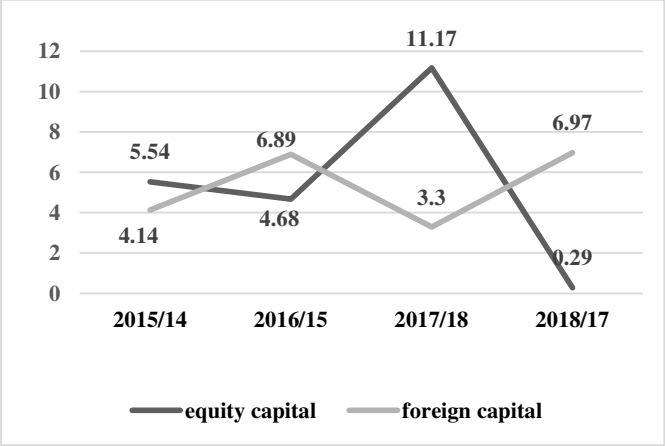

Fig. 2: The rate of changes in banking sector's capitals in the years 2014-18 (%)
Source: Own study: "Development of the Financial System in Poland" NBP reports for the years 2014-2018.

As has already been mentioned, a dominant role among foreign funding sources of the activity of commercial banks' sector is played by non-financial sector's deposits. Those are deposits of households that include: private persons, individual entrepreneurs and farmers, as well as enterprises. Over the years 2014-2018 their value was gradually growing. The nominal increase in non-financial sector deficits in 2015 amounted to PLN 84.1 billion, which was an amount slightly higher than the one generated in 2014 (PLN 78.6 billion) and significantly higher than the one generated in 2013 (PLN 51.3 billion). The noted increase in non-financial sector deposits resulted from the even rate of increase in funds on accounts of households and business entities. In the consecutive years of the analysis, the non-financial sector deposits were also gradually growing. At the end of 2018 they reached over 61% of the value of all equity and liabilities (table no. 2) and amounted to over one billion zloty – PLN 1,151.2 billion. Thus, the nominal increase in non-financial sector deposits in 2018 amounted to PLN 88.2 billion and was decidedly higher than in 2017, when it amounted to PLN 42.3 billion and was the lowest for several years. For comparison purposes, it is worth mentioning that the result form the year 2018 was comparable to the results from previous years: in 2016 the increase nominally amounted to

PLN 89.2 billion, in 2015 – PLN 84.1 billion and in 2014 – PLN 78.6 billion. The increase in the value of non-financial sector deposits was caused by a better situation of households and relatively good financial results of many enterprises.

At the same time, the share of the second most important funding source of commercial banks – funds obtained from financial sector entities – was decreasing (table no. 2). In consequence, as of 2014 financial sector deposits decreased by PLN 30.6 billion. Thus, their share in the funding structure of the commercial banks sector decreased from 16.8% in the year 2014 to 12.1% in the year 2018. Whereas, the share of other equity and liabilities items in the balance sheet total was relatively stable.

Table 2: Funding structure of commercial banks in Poland in the years 2014-2018 (%)

Funding structure of the banking activity - share in the balance sheet total	**years**				
	2014	**2015**	**2016**	**2017**	**2018**
Central Bank	0.01	0.01	0.00	0.00	0.31
Financial sector	16.80	16.60	14.70	13.00	12.10
Non-financial sector	**54.0**	**56.0**	**59.8**	**59.8**	**61.0**
General government sector	5.80	4.30	3.70	3.90	4.40
Debt instrument	3.50	3.60	3.90	4.80	4.70
REPO transaction	1.70	1.60	0.70	0.70	1.00
Derivatives	2.50	2.40	1.50	1.00	0.90
Other liabilities	4.80	4.70	4.90	5.40	4.80
Total liabilities	**89.10**	**89.30**	**89.20**	**88.60**	**89.20**
Equity capital	**10.90**	**10.70**	**10.80**	**11.40**	**10.80**
Total equity and liabilities	**100%**	**100%**	**100%**	**100%**	**100%**

Source: Own study: "Development of the Financial System in Poland" NBP reports for the years 2014-2018.

Due to the fact that non-financial sector deposits constituted, in compliance with the binding model of Polish banking, a dominant position in equity and liabilities of commercial banks, they have been covered with more in-depth analysis.

The increase in the non-financial sector deposits, observed in the research period, was predominantly the increase in both, household and enterprises deposits. As results from the data included in table no. 3, a dominant role in the structure of non-financial sector deposits was played by funds obtained from households. Their value was growing year by year and from the amount of PLN 606.3 billion in 2014, the amount of PLN 838.8 billion was obtained in 2018, which constituted a nominal increase by PLN 232.4 billion (i.e. by 38.3%). It should be underlined that the increase in non-financial deposits in 2018 (as in the previous years) occurred in the conditions of low interest rates and outflow of some bank deposits to other forms of allocating free funds. Simultaneously, it was influenced by the decidedly better financial situation of households, which, due to the improvement of the situation in the labour market and transfer of funds, among others, from the 500+ programme, allocated their financial surpluses to banks. Furthermore, the relatively good financial results of many enterprises associated with the limited scale of decisions on initiating investment projects caused an increase in the value of deposits. Therefore, the share of household deposits in equity and liabilities of commercial banks oscillated around 40%. In comparison, deposits of enterprises constituted approx. 15% and other – only 1%.

Table 3: Non-financial sector deposits (level, structure and dynamics) in the years 2014-18

Non-financial sector deposits - on an entity basis	years				
	2014	**2015**	**2016**	**2017**	**2018**
	value in billion zloty				
business entities (enterprises)	229.4	253.3	274.9	284.9	293.6
households	606.4	665.7	730.8	761.3	838.8
other	18.3	19.7	22.4	24.1	26.2
	% of the balance sheet total				
business entities (enterprises)	15	15.8	16.1	16	15.5
households	39.6	41.6	42.7	42.7	44.2
other	1.2	1.2	1.3	1.4	1.4
	rate of changes (%)				
	2014/13	**2015/14**	**2016/15**	**2017/16**	**2018/17**
business entities (enterprises)	9.4	10.4	8.5	3.6	3.0
households	10.6	9.8	9.7	4.2	10.2
other	4.6	7.9	7.6	7.7	8.9

Source: Own study: "Reports on the economic situation of banks" ZBP for the years 2014-2018.

The study on non-financial deposits showed that the dynamics of enterprises' deposits in 2015 was slightly higher than the dynamics of liabilities from households, whereas, in the previous year the banking sector experienced a reverse phenomenon. A slower increase in household deposits can be related to some customers taking a decision on other manner of allocating at least some of their financial resources. Whereas, in the years 2016-18 a situation could have been observed. The dynamics of household deposits was slightly lower than the dynamics of liabilities from households. A faster increase in the household deposits could have been associated with the aforementioned conditions, i.e. improvement of the situation in the labour market or their financial situation due to transfers of funds from the 500+ programme. This increase contributed to the stability of funding the activity of the commercial banks sector.

Additionally, the analysis covered non-financial sector deposits as divided into deposits of households and deposits of business entities by term and currency, as presented in table no. 4.

Table 4: Nominal dynamics of household deposits and business entities' deposits by term and currency in the years 2014-18 (%)

	years				
	2014	**2015**	**2016**	**2017**	**2018**
household deposits					
by term					
overnight	108.6	113.7	117.9	112.8	115.5
term	111.3	105.9	100.7	93.3	101.7
by currency					
zloty	111.0	109.0	109.2	101.9	110.2
currency	107.0	117.5	115.6	120.0	110.3
business entities' deposits					
by term					

overnight	110.4	117.5	116.3	113.6	106.8
term	107.3	101.6	96.1	91.6	99.2
by currency					
zloty	111.1	108.3	104.7	98.8	106.7
currency	100.3	123.0	128.3	124.3	90.5

Source: Own study: "Reports on the economic situation of banks" ZBP for the years 2014-2018.

In 2014 overnight household deposits increased by 8.6%, whereas, term deposits increased in the same time by 11.3%. Changes in the term structure of household deposits most probably resulted from better economic situation of the country in the last year. In the next year covered by the analysis, the term structure of household deposits changed. In 2015 it was heading in the direction opposite to the one observed in the previous year, that is, overnight deposits were growing much faster than term deposits. Overnight household deposits increased by 13.7%, whereas, term deposits increased in the same time by 5.9%.

Changes in the term structure of household deposits observed in the years 2016-18 were heading in the similar direction as in 2015 – overnight deposits were growing much faster than term deposits.
For comparison:

-in 2016 overnight household deposits increased by 17.9%, whereas, term deposits increased in the same time by 0.7%;
- in 2017 overnight household deposits increased by 12.8%, whereas, term deposits decreased in the same time by 6.7%;
- in 2018 overnight household deposits increased by 15.5%, whereas, term deposits increased in the same time by 1.7%.
This phenomenon seems to be natural due to functioning in the conditions of low interest rates.

While analysing the term structure of household deposits, it can be noticed that a characteristic feature of this segment of customers constituted a stronger growth of amounts of overnight deposits and slower rate of increasing term deposits in the whole period covered by the analysis. For comparison:

- in 2014 the growth rate of overnight deposits amounted to 10.4, whereas, the value growth of term deposits of enterprises amounted to 7.3%;
- in 2015 the growth rate of overnight deposits amounted to 17.5%, whereas, the value growth rate of term deposits of enterprises amounted to only 1.6%;
- in 2016 the growth rate of overnight deposits amounted to 16.3%, whereas, the term deposits of enterprises decreased in this year by 3.9%;
- in 2017 the growth rate of overnight deposits amounted to 13.6%, whereas, the term deposits of enterprises decreased in this year by 8.4%;
- in 2018 the growth rate of overnight deposits amounted to only 6.8%, whereas, the term deposits of enterprises decreased by only 0.8%.

The analysis of the data included in table no. 4 implies that in the currency structure of household deposits, in 2014, a faster growth in the significance of zloty deposits as compared to currency deposits (contrary to the previous year) was observed. Zloty deposits from households increased in 2014 by 11.1% and at the end of the year generated the value of PLN 533.6 billion. In the case of currency deposits, the value growth in this category of deposits amounted to 7%. It may be the effect of smaller transfers of funds from abroad to households, as well as it may result from the lack of profits from exchange differences. The opposite situation took place in the consecutive year, when faster growth in significance of currency deposits as compared to zloty deposits was noted. Zloty deposits from households increased in 2015 by 9% and at the end of the year generated the value of PLN 603.6 billion. In the case of currency deposits, the value growth in this category of deposits amounted to as many as 17.5%. Determinants of those changes could include: the increase in the transfer of funds from abroad to households and, which seems to be the most important, the change in the exchange rate regarding several most important currencies in the world. In the consecutive two years of the analysis, i.e. 2016-

17, faster growth in the meaning of currency deposits as compared to zloty deposits was observed. Respectively:
- in 2016 zloty deposits from households increased by 9.2% and at the end of the year generated the value of PLN 659.1 billion. In the case of currency deposits, the value growth in this category of deposits amounted to as many as 15.6%.
- in 2017 zloty deposits from households increased by 2.8% and at the end of the year generated the value of PLN 677.4 billion. In the case of currency deposits, the value growth in this category of deposits amounted to as many as 17.1%.

Changes that could have been observed in these years predominantly resulted from transfers of funds from abroad to households; partially they could have resulted from exchange differences and partially - from decisions of deponents. Whereas, the interest rate of deposits was of small importance, where the difference in the level of the said interest rate in comparison with zloty and currency deposits was further decreasing.

In the last year of the analysis zloty deposits from households increased at almost the same rate (10.2%) as currency deposits of those customers (10.3%). At the end of the year, zloty deposits reached the value of PLN 746.3 billion. Whereas, the growth rate of zloty deposits was clearly higher than the result from the previous year and in the case of currency deposits – lower than a year before.

In 2014, similarly as the year before, the banking sector noted a stronger growth of zloty deposits from enterprises (by 11.1%) than currency deposits (by 0.3%). The situation changed in 2015, which marked a return to the situation observed in the years 2011–2012, that is, to higher dynamics of currency deposits from enterprises than zloty deposits. Dynamics of currency deposits was high and amounted to as many as 23% per year, whereas, zloty deposits noted an increase by 8.3%. In the year 2016 a situation observed in 2015 was repeated, that is, a significantly higher dynamics of currency deposits (28.3%) of enterprises than zloty deposits (4.7%). Dynamics of these deposits was record-high in the recent years, even if the impact of fluctuations in foreign currency exchange rate as compared with zloty is taken into consideration. Also in the year 2017 the dynamics of currency deposits was again very high and amounted to as many as 24.3% per year. In comparison, zloty deposits noted a small drop by 1.2%. A high growth rate of currency deposits in the years 2015-17 was especially noticeable in the period of strong growth of the Polish export in the recent years, including also the increase of its significance for financial results of Polish enterprises. The year 2018 marked a reversal of the situation observed in the years 2015–2017, that is, divergence from the higher dynamics of currency deposits of enterprises than zloty deposits. In this year the dynamics of currency deposits was very low, as there was a decrease in the amount thereof by 9.5% per year. In the same period of time the value of zloty deposits increased by 6.7% per year.

Conclusions

While assessing the situation of the banking sector, it may be stated that in compliance with the binding banking model in Poland, commercial banks conduct their activity mainly on the basis of foreign capital. The conducted research indicated that non-financial sector deposits are, from the point of view of their proper functioning, a very important component of their liabilities. Additionally, the said research underlined the significance of household deposits in the funding structure of Polish commercial banks. Predominantly due to the fact that they constitute approx. 40% of the balance sheet total and each increase in the value thereof has a positive impact on the manner of maintaining financial stability of commercial banks. Therefore, contemporary commercial banks undertake a series of measures both, in the scope of soliciting new customers and maintaining the existing ones. It is undoubtedly a difficult task owing to the fact of functioning in the conditions of continuous competition, growing globalisation, as well as the increase in the significance of new technologies.

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Continuous Improvement Model Based on Lean Tools to Reduce Cost Overruns in Power Transformer Assembly Projects

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Abstract

Electrical installation construction projects are among the most specialized within the electrical sector, with a very high degree of difficulty compared to other construction projects. Total costs of elements to be installed for such a project can reach US$ 7,000,000.00. Therefore, delays in this type of project result in high cost overruns. Accordingly, the present work proposes an improvement model that integrates the Plan-Do-Study-Act (PDSA) methodology, Takt Time Planning (TTP), and Failure Modes and Effects Analysis (FMEA) tools to improve efficiency in the design and planning of electrical assembly projects.

Keywords: Plan-Do-Check-Act, Plan-Do-Study-Act, cost overruns, Takt Time Planning.

Introduction

At present, companies responsible for assembling electrical substation equipment are subject to customer requirements, including the performance of quality services that ensure adequate future operational results. Therefore, the tools and capability to manage projects in the most efficient way are essential for fulfilling and participating in the power generation, distribution, and transmission projects of large companies.

However, despite their specialization in assembling devices for the electricity sector, these companies face high cost overruns in their projects, mainly due to delays. The causes determined for this problem are bad programming, misestimation of budget, inappropriate timeframing, and the failure to identify risks based on key project planning and design processes.

Given the problem as described, this paper proposes an improvement model that integrates the Plan-Do-Study-Act (PDSA) methodology with Takt Time Planning (TTP) and Failure Modes and Effects Analysis (FMEA) tools to improve efficiency in the design and planning of projects to reduce cost overruns in their execution.

State of the art

Various methodologies or tools are currently used for project planning. Among these is the Project Management Body of Knowledge (PMBOK) guide, which proposes best practices for project management. However, the degree of uncertainty is admittedly high in the execution of these best practices. Therefore, Biotto (2017) and Cristóbal (2016) state that the PMBOK project execution guide in the Project Management Institute (PMI) approach is not very useful for the management of construction projects because of the high degree of uncertainty it creates. These researchers thus defend the implementation of Lean Construction (LC) tools as a better way to manage such projects.

Indeed, some propose that LC be made a part of the PMI approach to create a model possessing the best aspects of both methodologies.

Delay and Cost Overrun Factors

Because of the complexity, large scale, long duration, high investment, and site conditions, various researchers agree that projects are exposed to greater risks than traditional project construction. Andrić (2019) and Lozano (2018) suggest this greater risk as the reason that such projects are likely to incur cost overruns. In other studies, researchers highlight the time overrun on various projects. These studies indicate that less than 30% of such projects are completed on time, although the average time excess is less than 30% (Assaf (2006), Akogbe (2013), Chan (2002)).

Among construction projects, electrical installations require a spectrum of essential and specialized work services (Yik, 2008). Failure to complete an electrical installation on time causes delays in the configuration of site provisions. For this reason, many contractors fight for better planning to improve time management (Chiu, 2017).

According to various studies, the most frequently reported causes of cost overruns are underperforming contractors, an environment of uncertainty, recurring financial issues, general price escalation, high capital cost, delays in the supply of equipment, poor administration, poor work supervision, poorly prepared subcontractors, schedule delays, inadequate planning of activities and schedules, lack of experience, inadequate modifications of times and costs, changes in designs, risks and uncertainties, inadequate evaluation of the duration or time of the project, complexity of the work, and subcontractor non-compliance. As mentioned, these authors agree on the planning factors and the inadequate evaluation of risks and costs (Lozano, 2018; Chiu, 2017; Narayanan, 2019).

Takt Time Planning (TTP)

The Last Planner system has exhibited greater reliability in planning and creating an environment for continuous improvement. Frandson (2013), Dlouhy (2018) and Binninger (2017) reported that the use of Takt Time Planning (TTP) is more efficient with a control system such as the Last Planner. Equally importantly, Binninger (2018) documented more than 80 construction projects of various sizes for which the TTP tool was used successfully. One of these was a medium-sized pilot project in southern Germany, characterized by a non-repetitive workflow. This project achieved a substantial (70%) reduction in time vs. the initial estimate.

The main benefits of TTP are variability reduction, project duration reduction, and project cost minimization (Yassine, 2014). Similarly, they reported the importance of working together to achieve the takt goals of eliminating downtime, avoiding interruptions, and saving resources, all of which ultimately result in enhanced productivity.

Failure Mode Analysis and Effects

Barbosa (2018) reported a successful application of Failure Modes and Effects Analysis (FMEA) in 10% reduction of complaints regarding the design of a product. To analyze non-conformity in product quality, they integrated Lean tools such as six sigma, quality function deployment (QFD), and FMEA in analyzing various stages of production and logistics. Similarly, Izaguirre (2017) reported the application of FMEA integrated with 8D, providing a manufacturing company with a total cost savings of 40% with respect to the initial estimate. This application also improved the percentage of satisfied customers by improving the design of the production process. Izaguirre (2017) and Rojas (2019) also agreed that FMEA can be effectively combined with other tools; that is, it presents flexibility for adapting or linking up with other methods according to project requirements.

Plan-Do-Study-Act

The Plan-Do-Study-Act (PDSA) continuous improvement cycle is considered to be the descendant of the Plan-Do-Check-Act (PDCA) cycle developed by Deming in 1950 and modified in 1993 (Moen, 2009). Chakraborty (2016) reported the importance of the application of the PDSA cycle methodology in medium-sized companies, for which these authors indicate that it must be applied on a smaller scale at first, that is, to some specific process of the company. This advice is aimed at minimizing interruptions in the area of interest and is bound to achieve greater success in its implementation.

Similarly, Arnao (2006) reported the implementation of continuous improvement in which different tools are integrated with the PDSA cycle, such as the Pareto chart, 5S methodology, cause–effect analysis, and QDF. This research obtained an average productivity increase of 34% for the relevant products.

Contribution

The model proposed herein seeks to apply Lean tools, namely TTP and FMEA, through the PDSA methodology. In this way, the companies that use these tools can reduce their cost overruns by avoiding delays and obtaining satisfactory performance in their projects and processes.

Based on Section II, a comparative matrix was developed that presents the different attributes of selected tools. Insights from this matrix facilitate the development of the model proposed below.
The attributes of the model according to tool type are as follows:

- A1: orientation to continuous improvement,
- A2: analysis of customer-oriented methods,
- A3: productivity increase,
- A4: reduction of operating costs,
- A5: process knowledge and reliability and
- A6: capacity for integration with other tools.

Table 1: Matrix of attributes and tools

Tools /Attributes	A1	A2	A4	A5	A6	A7
TTP		x	x	x	x	x
FMEA	x			x	x	x
PDSA	x		x		x	x
PROPOSAL	x	x	x	x	x	x

Model Design

Figure 1 illustrates the proposed model, which is guided by the PDSA methodology or modified Deming cycle. This guidance allows proper implementation of the model. Although this technique is used here for drastic or radical continuous improvements, it can also be adapted to smaller improvements than those of other methodologies.

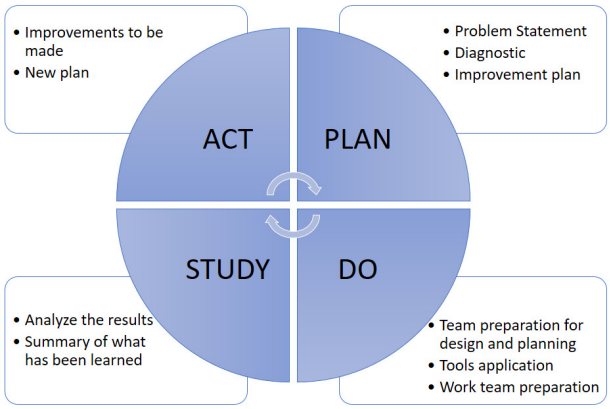

Fig. 1: Improvement model to reduce cost overruns in assembly projects

The model starts with Plan (Planar), in which the diagnosis is made, the objectives are defined, and the improvement plan is proposed. In Do (Do), the proposed plan is carried out by applying the tools. In Study, the results are analyzed. Finally, Act adjusts if necessary what has been done in Do, and returns to the Plan to continue improving or to forge a new plan.

Main Components of the Model

Takt Time Planning: TTP is a planning tool that aims to design the development system of a process or workflow that maintains its operations at a balanced work pace matching the customer's demands. For the proposed model, the TTP tool allows resources and time to be distributed equitably, providing a better work sequence to be accomplished on a shorter time scale.

Failure Mode Analysis and Effects: The FMEA methodology is a technique that serves as an alternative to risk management. FMEA allows risk assessment to be centered on the analysis of identification, evaluation, and prevention of possible failures. FMEA helps reduce the risks associated with the development of the project. The implementation of this technique provides greater detail regarding the service to be improved while reducing the percentage of costs subject to project risks.

5W-H Matrix: The 5W-H matrix is a method that inquires (who, what, where, when, why, and how) about a process or problem. For the proposed model, this technique organizes those responsible for each activity of the implementation. In this way, the dates, managers, methods, and places of elaboration are established.

Checklist: The checklist is a list of predefined tasks or, interchangeably, steps to follow. For the proposed model, a checklist of the client's requirements must be prepared. In this way, the checklist verifies that the plan complies with the request.

Matrix of critical processes: This matrix allows the selection of those critical processes that require greater control or review. This matrix was applied to the proposed model in the plan phase, since the matrix helped in determining processes that caused the problem(s) and then analyzing the root causes.

Implementation Guide

Figure 2 illustrates a step-by-step guide to the phases of the proposed model as observed through a scheme. This scheme is divided into phases: Plan, Do, Study, and Act.

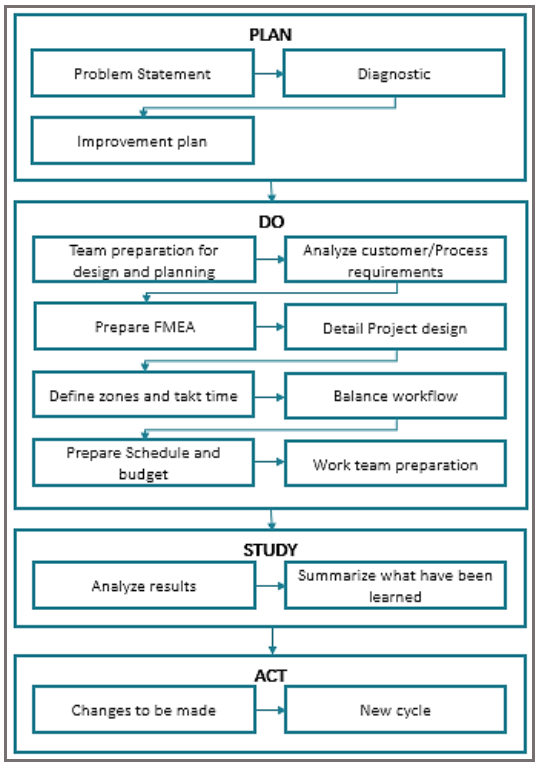

Fig. 2: Proposed Model Implementation Guide

Validation

Case study

The improvement proposal presented was implemented in a microenterprise dedicated mainly to offering maintenance and assembly services for power transformers in the electricity sector in Peru, with a trajectory of more than 25 years. The company has been presenting large cost overruns in its projects due to the poor project planning and design processes.

Indicators for the case study: Table 2 presents the indicators designed for the case study. The main indicator is the cost overrun percentage, as it represents the problem to be solved. Three indicators measure the reduction of the impact generated by the problem. Established indicators served as a basis for analysis of the company's current situation regarding power transformer assembly projects. This analysis determined that the average project cost overrun is 31%. Nearly half (14%) of this average overrun is costs for penalties; approximately one quarter (8%) is costs for unplanned days; and another quarter (9%) is due to unidentified or controlled risks.

Table 2: Definition of indicators for the case study

Indicator	Formula	Purpose	Interpretation		
			Acceptable	Significant	Unacceptable
Percentage of cost overruns	$\frac{(Real\ Cost - Estimated\ Cost)}{Estimated\ Cost} \times 100$	Measure project cost overruns in percentage	Less than 15%	Between 15% and 45%	More than 45%
Decrease in cost due to penalties	$\frac{Total\ Penalties}{Cost\ overruns} \times 100$	Measure the costs for penalties in percentage	Less than 5%	Between 5% and 20%	More than 20%

Cost reduction for unplanned days	$\frac{Cost\ of\ unplanned\ days}{Cost\ overruns} \times 100$	Measure costs for unplanned days in percentage	Less than 5%	Between 5% and 20%	More than 20%
Cost reduction due to unidentified risks	$\frac{Cost\ of\ unidentified\ risks}{Cost\ Overruns} \times 100$	Measure risk costs as a percentage	Less than 5%	Between 5% and 20%	More than 20%

Model Implementation

PLAN:

- Step 1 – Problem Statement: The problem determined is the cost overrun on power transformer assembly projects. Likewise, the results (Fig. 3) obtained from the matrix of critical processes indicate that the main processes causing the problem are the design and project planning processes.

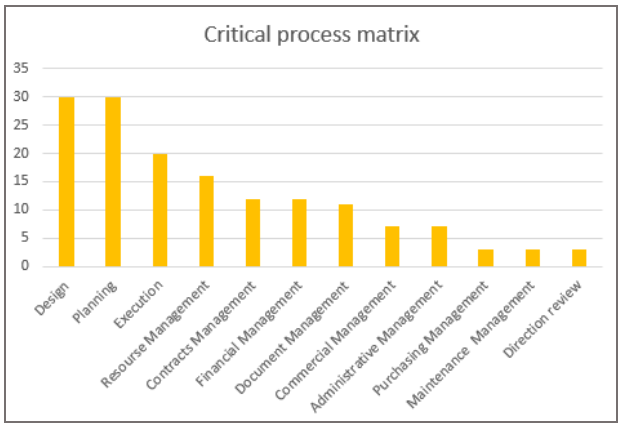

Fig. 3: Critical process matrix of the case study

- Step 2 – Diagnosis of the case study: From the TTP tool, the takt zones were determined: The current design proposes an execution of a 50 V transformer assembly project in a period of 17 days.
- Step 3 – Improvement plan: Once the diagnosis was made, a plan was prepared, indicating how, who, when, where, why, and what through the 5W-H matrix. This plan indicated a duration of 30 days to make the improvement plan and eight operators in total to participate in the improvement plan.

DO:

- Step 4 – Preparation of a planning and design team, The team from the corresponding areas and those involved together on this project must be trained and informed about the proposal to be implemented, so that it can be successfully carried out.
- Step 5 – Analyze customer / process requirements, A checklist was prepared to summarize the fundamental points from which to develop the project and by which to inform the team's approach.
    - Requested duration: 17 days
    - Place: ES Piura WEST
    - Customer: -
    - Start date: 4/11/2019

  Restrictions: The security engineer will not carry out any operational activity other than supervision.
- Step 6 – Prepare FMEA: An FMEA analysis was performed that identified more than 60 failure modes in total. On average, three failure modes were possible for each activity. More emphasis was given to those tasks related to activities that had the highest Risk Priority Number (RPN). Corrective actions to be included in the design were established.

- Step 7 – Detailed project design: According to the results obtained from the diagnosis in the Plan stage and the FMEA results, corrective actions are taken in the design to reduce risks. In addition, details of each procedure regarding the relevant functions and resources are elaborated.
- Step 8 – Define zones and takt time: The client's requirements in the present case included an approximate duration of 10 days, whereas our estimated time was 17 days.

$$Takt\ time: \frac{17\ days}{10\ days} = 1.7 \quad (1)$$

The above formula yields a result of 1.7. This means that the delimited areas have an average duration of 1.7 to be completed in the time requested by the client.

- Step 9 – Balance workflow: When the zones are balanced, the distribution of work is more orderly and equitable. This process has allowed the work plan schedule to change from 17 to 11 days.
- Step 10 – Prepare schedule and budget: According to the results in terms of time, the project schedule is prepared. This has been done in a Microsoft Excel format that allows the projection and control of implementation results. Thanks to the detail of the project design and the analyses performed, a much more realistic work budget was elaborated.
- Step 11 – Work team preparation: Training is carried out with the planning team, as well as those hired for the execution of the work, so that they know the new work plan to be carried out.

Study

- Step 12 – Analyze results: For this step, the execution of the planned project has ended. An analysis of the results obtained is then carried out.
  Results of applying TTP: Regarding the work plan and defined takt time, the work was distributed in a more equitable and collaborative manner.
  Figs. 4 and 5 indicate that, according to the characteristics of the task, more operators available for a given activity have been added, allowing the project to complete on a timeframe closer to that requested by the client.

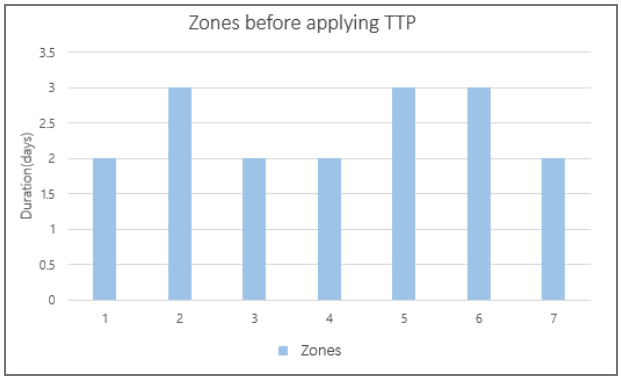

Fig. 4: Activities balance before TTP

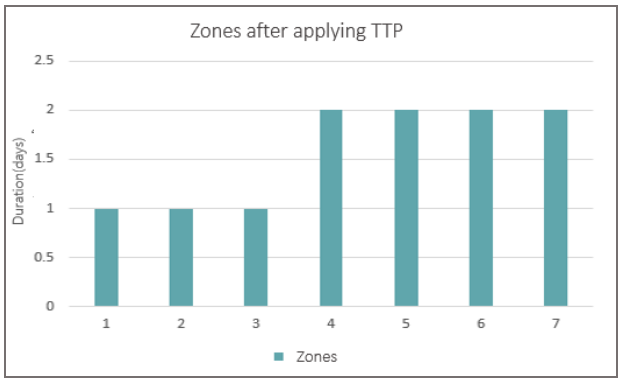

Fig 5. Activities balance after TTP

Results of applying FMEA: Implementation of the recommended actions in the FMEA caused a significant decrease in the RPN of the prioritized activities in most cases (Fig. 6).

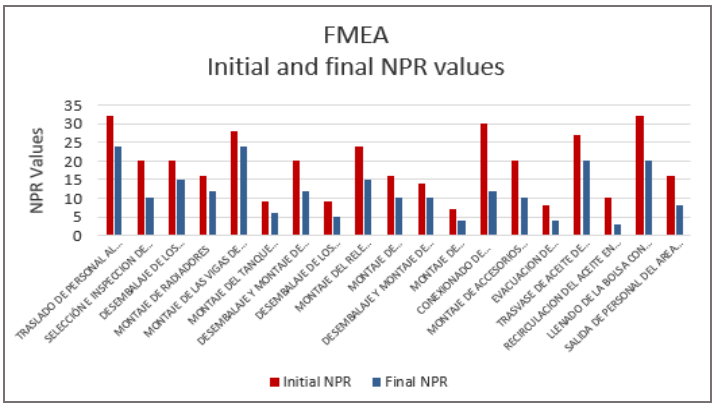

Fig 6. Initial and final RPN of the project

Results for indicators designed for the case study: Table 3 indicates that the total cost overrun per project was reduced from 31% to 11%, including cost reductions for penalties and for unplanned days. However, the costs associated with unidentified risks remained unchanged.

Table 3: Results of indicators designed for the project

Indicator	Value without improvement	Projected value with improvement	Resulting value with improvement
Percentage of cost overruns	31%	10%	11%
Decrease in cost due to penalties	14%	0%	0%
Cost reduction for unplanned days	8%	5%	2%
Cost reduction due to unidentified risks	9%	5%	9%

ACT

- Step 13 – Summarize what has been learned: The results obtained demonstrate that an even more thorough risk analysis should be carried out, since costs associated with unidentified

risks dominate the improved cost overruns. However, it is noteworthy that the penalties category, which previously dominated overall cost overruns, was fully zeroed out thanks to the implementation of the takt time planning tool. Also, according to the observations of the operators, teamwork was one of the fundamental means by which assigned tasks were fulfilled, leading to the completion of project execution in the determined time.

- Step 14 – Changes to be made: According to the results, it will be necessary to carry out a risk analysis of the project with the observations given by the operators and to evaluate the recommended actions.
- Step 15 – New cycle: According to its characteristics, the proposed model can be implemented in the other services of the company, including other projects of smaller scale. This companywide implementation would serve to optimize all the processes of the company in the long term.

Conclusions

The FMEA tool is a tool that easily adapts to other tools; that is, it can be included in different work methodologies. For its part, the PDSA tool has been found to be widely adaptable to any sector or organization that is required.

The results of the present analysis demonstrate that, based on the design, it is ideal to add more control tools that allow both planning and project execution to be integrated. The same can be said for tools that allow a deeper analysis of the topics to be investigated or improved.

The implemented design allowed the company to reduce its cost overruns in transformer assembly projects and thus obtain greater utility per project. However, a more thorough risk analysis and more effective action plans remain pending.

Finally, it can be concluded that the proposed model managed to reduce the time and cost overruns in the case study project. This success will allow it to be applied in the company's other services and is likely to increase sales while improving the company's image. It is recommended that every project have a manager in charge of management control, as it is important to follow up and guide when deviations occur.

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Improvement Proposal to Increase an Electric Conductor Company's Profitability Through the Implementation of 5S and TPM

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Abstract

Previous studies revealed that semiautomated electrical cable manufacturing companies in Peru have high production costs due to high levels of machine breakdowns, high mean time to repair, and poor/inadequate training provided to a plant's staff. Hence, this paper addresses the abovementioned issues through a management model based on lean manufacturing techniques and total productive maintenance philosophy by measuring their impact on a pilot project.

Keywords: Lean Manufacturing, TPM, Losses, Metalworking.

Introduction

In Peru, the metalworking industry plays a vital role due to its contribution and dependence on the mining sector, production of the auto parts, wood products for export, food and fishing sectors for direct human consumption, energy and construction sectors; in addition, a variation in any of these sectors directly impacts the metalworking industry.

In the manufacturing sector, the metalworking companies dedicated to the production of electrical conductors are highly dependent on the mining sector with respect to copper production; owing to the high costs related to variations in production, the problems related to the manufacturing sector aggravates with production losses, high reprocessing levels, and late order delivery.

To solve these problems, we combined the value stream mapping (VSM), 5S, and total productive maintenance (TPM) methodologies because these methodologies have been implemented in various industries for eliminating all types of production system waste.

As difficulties faced in eliminating all types of production system waste are the major problems in today's highly competitive business environment, companies are concerned about improving the quality of their products and services to achieve sustainable growth and advancing their position and reputation in the market. This paper thereby proposes an implementation model that integrates 5S, TPM, VSM, and the overall equipment effectiveness (OEE) indicators.

We validated the proposal by addressing the problems of Celsa, a metalworking company, dedicated toward manufacturing and marketing of electrical conductors for the construction, mining, telecommunications, and manufacturing sectors.

State of the art

Krajewski (2013) argues that lean manufacturing eliminates waste and delays in every process conducted by a company, thereby maximizing the added value of its products. Similarly, Bhamu (2014) states that lean manufacturing is mainly dedicated to transforming a company to be highly competitive and responsive to customer demand by waste elimination.

Lean manufacturing offers various tools and techniques, such as VSM, 5S methodology, and TPM, to increase a company's profitability.

Al-Ashraf (2012) reports that VSM is a main tool that is employed to identify improvement opportunities. Yu (2009) describes a comparative matrix used to choose lean techniques and presents VSM implementation research conducted in different manufacturing industries.

Moreover, several problems have been addressed by different studies that have designed various proposals as solutions. According to Randhawa (2017), Chapman (2005), and Randhawa (2018), the 5S method is used to improve the organization's workplace and reduce waste, costs, and time spent in production; 5S initiatives allow employees to organize and manage their workspace, time, and capital investment to reduce the rejection rate in production.

Management commitment or support, full employee involvement, education, motivation toward continuous improvement, and training play a significant role in the successful implementation of 5S in any organization; this tool consists of five fundamental elements that act as the basis of a good production system. 5S focuses on maintaining workplace organization, maintaining cleanliness, standardizing techniques and regulations, and facilitating discipline in the workplace to sustainably improve organizational productivity, efficiency, cost optimization, and waste reduction Osada (1989).

Studies conducted by Bhamu (2014), Hooi (2017), and Bataineh (2019) have reported problems such as breakdowns and high mean time to repair, which need to be resolved to meet the TPM implementation's success factors focused on top management leadership, maintenance practices, and TPM implementation initiatives.

Input

Our proposal combined three tools, namely, 5S, TPM, and VSM, to integrate and resolve the main problems related to an organization's low profitability.

We made a comparative analysis of tool dimensions and achieved the following eight dimensions.

Table 1: Comparative Matrix Proposal vs. Dimension

Problems	**D1**	**D2**	**D3**	**D4**	**D5**	**D6**	**D7**	**D8**
5s	X	X	X	X	X			
TPM			X			X	X	
VSM								X
Proposed Model	X	X	X	X	X	X	X	X

The proposed model was the sum of VSM, 5S, and TPM tools. The five S' in 5S were sort, set in order, shine, standardize, and sustain; furthermore, the factors of TPM methodology included equipment effectiveness and autonomous maintenance. Finally, in the comparative matrix, the VSM indicator was production control.

Randhawa (2017) describes the 5S method employed as a quality improvement tool in Wellex Corporation (USA). After two years of the 5S implementation, the corporation's productivity improved by 26%, reaching a turnover of USD 23 million. In another company (C&K Systems), the 5S was used to improve the product quality and work environment's quality and increase the percentage of trained employees.

Lai Wan Hooi argues that although traditional maintenance initiatives significantly affect factory performance, they do not affect top management and maintenance practices; furthermore, the author states that TPM implementation initiatives will gradually enable commitment, proper planning, appropriate execution, and continuous improvement Chang (2014).

A study conducted in a manufacturing plant revealed that the maintenance department spent 67.6% of its time on corrective maintenance repair, 24.3% on preventive maintenance, and 8.1% on other activities. In addition, the surveys conducted showcased that 70.5% of the workers were aware of the TPM concepts; 14.7% of the workers believed that TPM would help improve the current maintenance system; and 14.7% of the workers were unsure Mwanza (2015).

The proposed model consists of three tools addressing the issue of low profitability in a power cable manufacturing company.

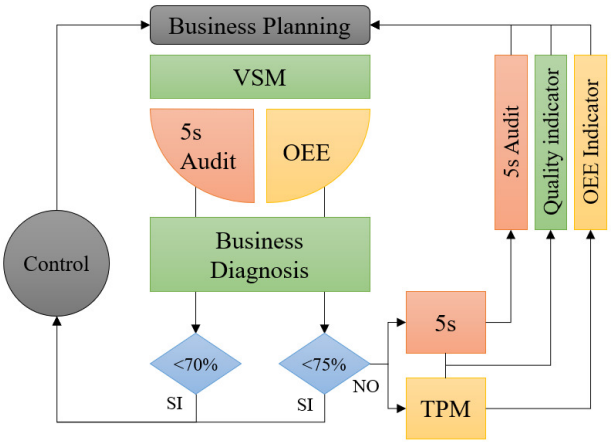

Fig. 1: Integrated 5S and TPM Model

Figure 1 shows the proposal used to solve the identified problem, which is formulated on the basis of an input and output model, i.e., the company's system receives input elements that result into generating a transformation through processes and achieving the expected results.

On the basis of business planning, we implemented the VSM tool to understand the process, identify the waste, and non-value-added activities. Later, we performed the 5S audit, and in parallel, we used the OEE indicator to measure the equipment effectiveness. After the business diagnosis, we aimed at achieving a 5S audit higher than 70 points and an OEE indicator of 75%. Control and supervision would only be performed when the abovementioned goals have been achieved; otherwise, the implementation of the two proposed methodologies (5S and TPM) must be continued. Moreover, both the tools provide indicators to measure the implementation effectiveness of the proposed model.

Implementation Phases

The model will be implemented in two phases.

Phase 1: Business analysis and diagnosis: Consists of collecting all the information from the organization's production area under study and understanding and obtaining the current state of the area to be treated.

- **Define the implementation scope and goals**, and seek top management commitment.
- **Model policy** specifies that the whole organization must be committed to and motivated with the changes to be implemented.
- **Task assignment** includes assigning responsible people in the pilot area who will be in charge of assessing and enforcing the new implementation.
- **5S audit** is a documented process used to assess the current state of the company's compliance with the existing standards.
- **OEE indicator** is used to measure the equipment effectiveness.

Phase 2: Methodology implementation: On the basis of the literature review on 5S and TPM, we designed a proposal that combined both the tools comprising 2 phases and 11 activities.

1. Staff training plans were developed for providing training in terms of basic concepts and according to the employees' requirements related to their daily work, and then, surveys were conducted with each employee.
2. A blackboard was used to seek the employees' attention for attending the training sessions.
3. Responsible people were assigned to each area, and they classified the instruments or tools in their work area.
4. Staff training plans were developed with respect to basic knowledge related to implementation, such as an induction on TPM and 5S, basic mechanics, and machine cleaning.
5. Training was conducted according to the needs of each employee's work area.
6. After the workplace organization, easily accessible storage places were defined and prepared to store the process tools and/or materials; it was recommended to work on this activity together with other areas.
7. The tools and/or materials were classified into three groups, namely, necessary items, occasionally used items, and unnecessary items.
8. In the workplace organization, necessary items were identified from unnecessary items by using visual elements such as "red card." In this way, an employee would identify the unnecessary items and take corrective measures.
9. Storage places were defined and prepared where process tools and/or materials were to be located. In this way, unnecessary activities would be avoided, and employee efforts would be minimized.
10. The visible tools and places were identified and labeled to achieve a better visual control.
11. A thorough cleaning was performed at least twice a year, which was called "The Great Cleaning Day," because a thorough cleaning of machines, work tools, offices, and other areas of the company was vital.
12. A cleaning kit was placed in each area with the necessary tools for proper cleaning management.
13. Machines were divided into three sections, and a person was assigned for each part; this person was in charge of keeping the space clean during each shift.
14. A cleanliness and order inspection was conducted on a monthly basis. The area that would score the best would be given incentives. In this way, we promoted employee motivation for task completion.
15. We proposed a continuous evaluation of the first steps, which would involve a supervisor and a scoring system to acknowledge and reward the best area.
16. A meeting was held every week with the people responsible for the assigned tasks to inform about the achievements and improvements required for attaining the goals.
17. Two panels were setup. Panel 1, i.e., the 5s panel, reported about the implementation progress and team members, showcased pictures of the conditions before and after the implementation of the model, and displayed winners of the monthly inspection. Panel 2, i.e., TPM panel, recorded the employees' observations about the equipment and displayed a TPM progress chart.
18. Finally, the implementation must be controlled and supervised.

The abovementioned steps were executed on the basis of the models described below.

The first model identified for proposal comparison was based on preventive maintenance that aimed at guaranteeing the production plant equipment availability and operational reliability in an efficient and safe manner to meet the company's quality policy; this model integrated the TPM and 5S methodologies. From this proposal, we used the fundamental concepts of maintenance types and then selected the model based on preventive maintenance.

The second model was a proposal solution for an integrated production and maintenance system to reduce the company's costs. It consists of a training plan for the production area employees, alongside material requirements plan (MRP). We first used the TPM to develop an autonomous and planned maintenance and later used the VSM lean manufacturing technique and the 5S'. Owing to the fact that we used this model to prepare and develop the training plan in the production area, we did not use the MRP because the selected combined methodologies adequately resolved the existing issues.

The model implementation phase began with the VSM development to identify waste, time loss, etc. Then, in parallel, we diagnosed the equipment effectiveness and performed the 5S audit. The OEE indicator was intended to increase equipment effectiveness by 100%, and the goal of the 5S audit was to achieve more than 71 points. If the results were not positive, the implementation of the proposed model was commenced, alongside implementing the 5S and the TPM. In addition, the employees should be periodically trained and given incentives to keep them engaged and motivated, respectively, to continue with the implementation because they are the stakeholders who are mainly involved.

Following steps were taken for the implementation of the model.

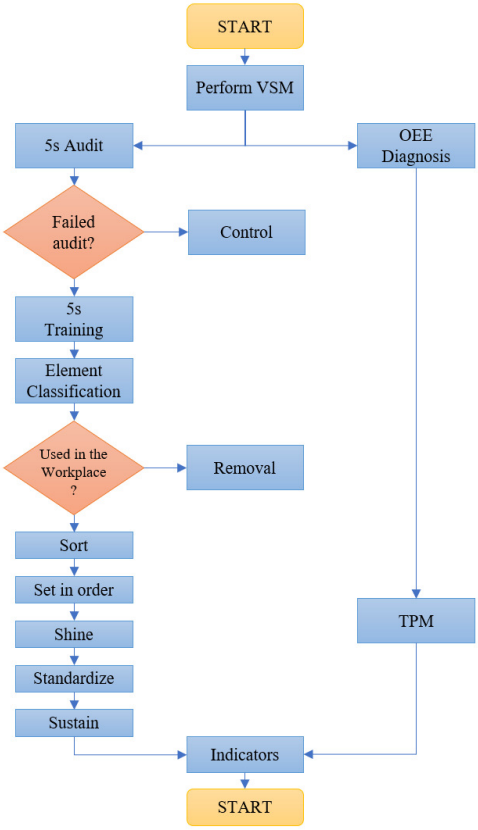

Fig. 2: Proposed Model's Flowchart

Interpretation Phases

Interpretation of Phase 1 indicators: The survey measured the percentage of employee satisfaction, an indicator used to assess the employees' degree of conformity toward their working environment and conditions. Further, the results were directly proportional to the company's good practices, work quality, and productivity and profitability indicators.

Data collection was another indicator used to identify the company's problems. In this case, we identified the percentage of waste, reprocessing, and delayed delivery and problems related to employees and machines that prevent the company's growth in the manufacturing area.

The job description manual was a work tool that contained the rules and tasks that each employee followed and performed, respectively, as a part of their daily activities.

Step-by-step guide for Phase 1 indicators:

- We collected data to identify the root causes of the company's low profitability.
- Responsibilities were assigned to each employee so that they feel committed toward the new implementation.
- The OEE indicator was measured to determine the equipment effectiveness.

Interpretation of Phase 2 indicators: Gross profit margin was a profitability indicator that relates gross profit to the company's total sales.

The OEE indicator provided insights into the losses incurred during the manufacturing process; it consisted of the availability, rate of return, and quality rate multiplication.

The quality indicator measured the level of compliance with the manufacturing process specifications.

Step-by-step guide for Phase 2 indicators:

- We measured profitability so that it can be assessed after the model's implementation to further make a comparison.
- A quality indicator was used to determine the rejection rates, the percentage of production losses, and delayed delivery.

Validation

We implemented the production area model proposed to improve organizational profitability in a manufacturing company dedicated to manufacturing of power cables. Further, we analyzed the tools proposed for each phase.

Phase 1. We analyzed the company's production processes to find out how and where they were performed. We also found unused equipment and dirty and messy work areas. Furthermore, we performed the 5S audit and achieved a score of 63 points. In addition, we assessed the equipment effectiveness and achieved 70%.

Phase 2. We selected the pilot area, i.e., extrusion process area, which was the most affected by the existing problems. Employee training on basic concepts and awareness about the benefits of the proposed model implementation were commenced. After each training session, we conducted a survey to measure the performance and understanding of each employee. To disseminate information and motivate the employees to attend the training sessions, a blackboard was made available for everyone to read and be enthusiastic about the topics covered in these sessions. A space marked by a red tape was provided in the extrusion process area so that the employees could separate the necessary from the unnecessary tools; further, red cards were used to classify the tools, and two

panels were established to encourage the employees. The 5S panel detailed about the team structure and recorded the progress with respect to the implementation process on a monthly basis, while the TPM panel was used by the employees to write comments on equipment sounds or any observation regarding the equipment.

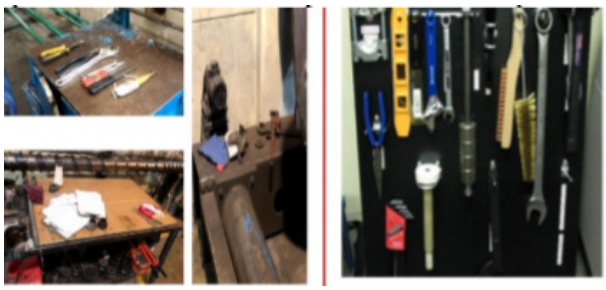

Fig. 3: Comparison of the Extrusion Work Area Orde

Fig. 4: Comparison of Equipment Maintenance

Phase 1 indicators were reanalyzed to measure the implementation progress. We achieved 80% of the OEE indicator and an increase of 29 points in the 5S audit, thereby providing all the employees with an excellent and more comfortable working environment.

The implemented model was effective in addressing the root causes of “low profitability,” reaching an improvement of USD 151,999, i.e., a 72% improvement in the Celsa’s profitability.

Conclusions

The pilot plan test conducted in the extrusion work area reveals improvements in waste reduction, reprocessing, and late order delivery. Therefore, we conducted the implementation simulation in the entire company and achieved 72% of improvement, saving USD 152K for the company and providing reliable solutions for the existing problems. Moreover, the 5S and TPM methodologies played a crucial role in addressing these issues. The implementation shows that these two methodologies can work together to upgrade the staff and improve and organize the workplace.

Acknowledgments

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Motion Capture Systems as A Tool for Inclusive Design Strategies at Work with People with Disabilities

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Abstract

The aim of the paper is to present main findings of the research project "People with disabilities as actors in motion capture sessions" held in 2015 and sponsored by Polish Ministry of Science and Innovative Economy European Union Programme. Project is a part of "University of Young Inventors" programme and supports close collaboration between universities and high schools. We were working with a team of 8 young researchers from The 3rd High School in Wroclaw. The aim of the project was to show strengths and limitations of collaboration with disabled people as actors in motion capture shots. We are working with young people visually impaired, in a wheelchairs and with the deaf ones and this way are able to examine their sometimes very unique movements and behaviors mapped into virtual creatures and personas. Motion capture system is used in this project as a tool to bring out potentials of disabled people that abled ones don't have. In the same time mocap is also a technology that brings new findings regarding inclusive design.

Keywords: Motion Capture, Disabilities Studies, Inclusive Design, 3d Animation.

Introduction

The contemporary video game developers and CGI/animation studios typically seek new, more profound fictional patterns on the one hand, and on the other they aim at creating a film and game environment even more perfect in terms of credibility of the world presented. Thus the purpose of this research was to discuss to what degree these tendencies can be developed with the participation of people with disabilities and motion capture technology, which is frequently used in games and animations. At present, these systems have numerous technological versions, which are employed in various ways. Nonetheless, the animation and game design industries seem to benefit the most from it and they are exactly the target of the following study.

The research project "People with disabilities as actors in motion capture sessions" has been held in 2015 and sponsored by Polish Ministry of Science and Higher Education as well as Innovative Economy European Union Programme. Project was a part of University of Young Inventors" programme and supports close collaboration between universities and high schools. We were working with a team of 8 young researchers from The 3rd High School in Wroclaw. The aim of the project was to show strengths and limitations of collaboration with disabled people as actors in motion capture shots. We were working with young people visually impaired, in a wheelchair and with the deaf ones and this way are able to examine their sometimes very unique movements and behaviors mapped into virtual creatures and personas.

The main purpose of this research was to elaborate on the strategies for working with people with disabilities and showing a grand potential of this type of co-operation when developing computer games and animations. We have made a point of a thorough investigation and formulating conclusions, which would allow representatives of game design and animation industries to prepare and organize sessions which people with disabilities could participate in, bearing in mind technological, acting and communication conditioning. In the research, the method of open and controlled participant observation, was employed, connected with the analysis of video materials recorded during sessions. The project can be described in terms of scientific and practical assumptions of occupational therapy as subjects were directly and indirectly involved in the process of developing animations. Motion capture system serves in the project as a tool to bring out potentials of disabled people that abled ones don't have. In the same time mocap is also a technology that brings new findings regarding inclusive design.

We began with an attempt to develop the idea of inclusive design. The central conviction here is the necessity to design products and services addressed to a wide range of users, including those from typically marginalized groups, e.g. people with disabilities and the elderly . While inclusive design mostly focuses on an end user (Persson et al. 2015), we aim at including a marginalized group in the course of designing a product, even if this product is not targeted at this group (e.g. working with the blind to develop computer games and animations, even though they themselves cannot benefit from them).

The hypothesis which we would like to suggest here could be verbalized in the following way: people with disabilities fail to participate in commercial motion capture sessions, which impoverishes characters' motions present in games and animations. This means that people with special needs suffer from design exclusion not only as end-users of various technologies but also as producers of a media content.

Simultaneously, we wanted to address the following research questions:

1. Which unique motor capabilities are typical of people with disabilities?
2. What limitations appear during motion capture sessions involving people with disabilities?
3. How to organize sessions involving people with disabilities?
4. What challenges for animators appear in the course of processing materials from mocap sessions involving people with disabilities?

Literature Review

During literature study period of the project it has been found out that research on motion capture systems can be divided into several main areas: biomechanics and movement tracking, application of motion capture systems in medicine, rehabilitation and support for people with disabilities, mocap and sport , mocap in games and animations, mocap in speech, face, and hands examination, artistic projects and performative arts measurements , motion capture systems in recording animals movement. The study proved the broader lack of studies devoted to analysis of acting techniques and positioning motion capture as a tool for therapy.

Biomechanics and Movement Tracking

A lot of current research concentrates on teaching motion capture system how to be sensitive to the specificity of human body movement or one's particular organs, such as knees (Worsley et al.

2010), feet (Shultz et al. 2010), elbow (Zhang et al. 2011) or jaw (Pinheiro et al. 2010). Researchers also work on technologies which would make the most exact measurements or would have the greatest advantages in tracking the specificity of body positions, hence the interest in markerless systems or Kinect (Corazza, Andriacchi 2009, Schmitz et. al 2014, Bonnechere et al. 2014). This research is then applied in more specific areas, for instance medicine, post-traumatic rehabilitation, or supporting people with disabilities and sport.

Application of Motion Capture Systems in Medicine

Motion capture tracks the trajectory of movement of each part of the human body in a three-dimensional space, permits a detailed investigation and precise computing with little error. It is highly significant whenever this kind of system is to serve as a basis for developing new solutions for medicine. Collected data is then used for creating simulations of human movement and predicting it for clinical uses (Xiang et al. 2012). Motion capture systems provide opportunities for the development of diagnostic medicine through comparing an average movement of healthy, able-bodied people with patients suffering from various disorders of joints or muscles (Otake et al. 2005, Klotz et al. 2013). Computational collecting of characteristic parameters and differences of movement trajectories from program data and graphs (Halit, Capin 2011) or more directly from the observation of three-dimensional recordings give a precise picture of faulty functioning of the musculoskeletal system and let discover any underlying causes (Vignais, Marin 2014).

Rehabilitation and Support for People with Disabilities

The analysis of movement by means of a motion capture system provides us with a wide spectrum of biological knowledge about human body and the musculoskeletal system in humans. Movement tracking is essential for learning and detecting numerous diseases and medical conditions, it contributed to many innovations in medicine, discovering cheaper and more effective solutions in treatment and diagnosis. Since it provides valuable data, mocap finds its use also in rehabilitation. Restoring people to physical fitness after serious injuries (Engsberg et al. 2013) or helping them overcome some inborn defects or palsy can become more effective and take much less time. Motion capture helps investigate such issues as correct functioning of upper and lower limb joints, potential threats which can accompany fixing a prosthesis or the impact of rehabilitation on improving physical fitness (Yurtman 2013). It monitors the temporomandibular joint and muscles taking part in chewing, provides new information about brain centres, monitors the behaviours of human body during physical activity, e.g. horse riding (Garner, Rigby 2015) or cycling (Lai et al 2013).

Mocap and sport

Since motion capture systems can capture even the slightest movement, they are widely used in many disciplines of sport where impeccable technique and a precise trajectory of movement are crucial: racket sports – tennis, badmington (Fuji et al. 2011, Kwan et al. 2010), soccer (Shan et al. 2012), tai-chi (Chao et al. 2004), cycling (Shan 2008).

Mocap in Games and Animations

A lot of research related to the use of motion capture systems in film and game animation is devoted to solving particular problems and responding to challenges which appear on different stages of creating an animation. Interactive generation of falling motions for virtual character with realistic responses to unexpected push, hit or collision is a popular issue in many games or film

animations. Tang et al. (2006) prove that the desired effects can be achieved by means of a method based on simulated trajectory prediction and biomechanics inspired adjustment. Smooth, cyclic human motion is the point of interest of other scholars. One of the methods of modelling uses functional analysis (Ormoneit et al. 2006). In yet another project (Urtasun 2004), the authors focus on representing motions as linear sums of principal components, which has become a frequently used animation technique in video game development.

Mocap – speech, face, and hands (in the context of non-verbal communications)

The nature of our project where on the one hand we use performance capture techniques and on the other we focus our attention on working with deaf people made us differentiate between various sample groups related to animating speech and nonverbal gestures, as well as face and hand animation. Registering motion does not pose a problem for motion capture systems at present. Their result, though, is not always convincing. There is a considerable difference between a mere change of the position of a particular extremity or trunk and designating a means of communication by body language. The orally and aurally challenged, for whom facial expression and gesticulation are crucial for effective communication, are well-aware of that. Non-verbal communication is a key factor to express oneself and act properly in interpersonal relations. Its analysis has contributed significantly to the understanding of human communication. It is not surprising then that scientists are continuously developing methods of effective measurement and analysis of such behaviours. So far non-verbal messages have been observed and coded by means of evaluative schemes. This approach is plagued, though, with a number of nuisances, as a result of which scientists launched automatic measurement with motion capture devices. Poppe et al. (2014) offered a shared methodology of conducting such research, which facilitates effective comparison of non-verbal behaviours both in the whole body and selected extremities. Interesting research has also been conducted on improving facial expressions of models used in motion capture systems. One important study is the work by Deng and Neumann (2008), who examined four facial expressions: neutral, happy, angry and sad. They claim that their system effectively adopts a 3D model to recite in one of these emotional states. Chin et al. (2013) approach this issue from a different perspective. They abandon the attempt to render realistic emotional states. They venture the opinion that the audience prefers exaggerated facial expressions when watching a film or playing a computer game. They offer a system which exaggerates character's facial expression automatically. A separate group of scientific works related to registering and animation of hand motion and facial expressions are sign language studies. In the United States, Motion Capture Corpus of American Sign Language has been collected for quite some time (Lu, Huenerfauth 2012). A similar project called Sign3d, whose purpose is to register FSL - French Sign Language, is developed at Gallaudet University in the USA (Lefebvre-Albaret et al. 2013).

Artistic Projects and Performative Arts Measurements

Recording performative arts is an area which has been developing for quite some time. At the turn of the 20th and 21st century, a number of artistic and educational sessions with a French mime Marcel Marceau were recorded in the Advanced Computing Center for the Arts and Design (ACCAD) at Ohio State University in the USA. In the same research centre, American choreographer Bebe Miller, who was the man in charge, put to life another artistic project with the use of mocap. Meanwhile, at the University of California in Irvine at the Department of Dance, artistic dancer and researcher Lisa Naugle carried out her first artistic projects (e.g. AVA in 2002). With the passing of time, more and more artistic projects used mocap, often engaging artists as well as researchers. One such project which is titled "Collapse (suddenly falling down)" received the Izadora Duncand Award for visual arts in 2009 (Neff et al. 2010). A similar interdisciplinary

team was created in England in 2009 by the representatives of a few research centres. Recent findings embraces new methods of capturing and analyzing dance movements: Volkova et al. 2014, Deng et al. 2011, Oshita et al. 2013.

Motion Capture Systems and Animals

Motion capture systems serve to detect not only movement of the human body. They can also be used in veterinary or other applications related to animals. One example might be dogs therapy and rehabilitation (Foss et al. 2013). Animals whose movement have been studied through mocap sessions also include: rats (Johnson et al. 2012), horses (Skrba et al. 2009), and even spiders, ants (Gibson et al. 2007), fish or octopuses (MacIver and Nelson 2000).

Methods

The research method is a combination of several tools. Within the scope of the sessions we applied the experimental method. Before the start of respective sessions, we adopted a particular typology of motions which we intended to observe. Also, we collected comments from our participants with disabilities and we were the witnesses of their motor actions in preparatory sessions and during two sessions of theatrical workshops. The typology of motions and observational data collected during initial meetings gave us the incentive to compose frame scenarios with respective groups of subjects. The outcome of our sessions are experimental animations, which should be regarded as more as specimens since aesthetic effects were not our major purpose. Instead, we aimed at stressing the specificity of motion among people with disabilities. The animations show the potential of working with such people during mocap session and the uniqueness of their motor actions.

Second part of our research focused on the analysis of the sessions. By that we meant to reach conclusions which could be useful for further work with people with disabilities as mocap session actors. In our research, we employed the method of participant observation connected with the analysis of video materials recorded during sessions. Direct analysis of sessions and video materials was conducted with the use of observation worksheets composed specifically for this study. Since the suggestions and solutions included in this report are addressed mainly to representatives of animation and game design industry, who are directly involved in conducting such sessions (directing, system support, production support) and to people responsible for postproduction (editing the material from sessions, rigging a character and animation), we divided the analysis into several important levels such as:

1. The course of the session.
2. Comments on disability (crucial issues related to disability, body limitations and ways of dealing with difficulties, unique skills).
3. Technical comments related to conducting the sessions.
4. Comments on developing good communication with people with disabilities.

Research Group

At the turn of January and February, 6 people with disabilities were invited to participate in the project. In the course of sessions, one person quit the project due to the lack of time and was replaced with another one. The final shape of the group was influenced by several factors. The first one was the readiness for cooperation – not all participants had enough time to take part in the project. The choice of participants was also determined by an attempt to diversify kinds of

disability, which was supposed to add to the richness of unique motions we meant to investigate. Bearing in mind the shape of our research group – consisting of senior high school students – we intended to select young people, which would ease communication. As a result, most of the subjects were people at least in senior high school (4 people), and the team was completed with one junior high school student and one forty year-old person.

Fig. 1: People with disabilities who took part in our experiments together with the members of the research group.

The research group consisted of: 2 people using wheelchairs, 2 people with hearing impairment and 2 blind people.

Marcin M. – was a junior high school student suffering from muscle weakness involving lower extremities. His body type is stocky. The specificity of his disability forces him to use a passive wheelchair in a public space, while at home he moves on his knees. He is interested in computer games.

Paweł – was a forty year-old journalism graduate. He is tall. As a result of spine injury at a high level, he suffers from quadriplegia, upper body weakness including partial palm weakness, and he has to use an active wheelchair.

Łukasz – was this year's graduate of the massage educational centre. He suffers from an inborn and complete vision loss. He is an athletic body type and his hobby is bodybuilding.

Krystian – was a first grade senior high school student. He also suffers from complete vision loss. He is fairly slim and actively practises goalball and showdown.

Ola – was a second grade senior high school student. She has a partial hearing impairment corrected with a hearing aid, which makes it possible for her to communicate with other people smoothly. Ola's disability is not really a nuisance in her everyday life but she knows a variety of sign language called "signed Polish".

Marcin – was a student at a vocational education centre. He has an advanced hearing impairment and on a regular basis he communicates with sign language and lip reading. He is of slight build and he is interested in new technologies.

Pic. 2: One of the participants Marcin M. assuming the starting position (T-pose), example of a passive wheelchair.

Project Schedule

The selected group of examined people with disabilities participated in a test session and two theatre workshops in March and April, 2015. In May and June 2015, we held three day-long mocap sessions with three two-person teams divided with respect to the same kind of disability (for organizational reasons). In July and August, first animations were created. We also conducted an analysis of video materials shot during sessions.

Typology of Motions

During the conceptual stage of preparatory phase of the project, we developed a typology of motions which were substantial from the point of view of the project and which we intended to examine. The typology reflects potential benefits of motions generated by people with disabilities in animation projects.

1. Basic motions:

In this category, one can find typical body motions which are used in animations and computer games. Taking into account the underrepresentation of people with disabilities in films and computer games, we found it crucial to register sequences which could be directly used by animators. Effectively, part of basic motions discussed here are fragments of motions which mostly appear in games such as walking, running, turning around, aiming at an opponent, etc. In this category, we place the following motions: walking, running, squatting, walking on tiptoes, sitting down, bending over, stopping in front of an obstacle (abyss, wall), reloading guns, inactivity, turning around, etc.

2. Motions unique to disability:

We assumed that a considerable benefit of working with people with disabilities can be derived from using motions which can hardly be performed by professional actors. We mean here such kinds of motor activity, which are determined by a particular disability. In this category, we place the following motions and activities: overcoming an obstacle on a wheelchair, an exchange in sign language, everyday activities of blind people (e.g. pouring liquids or eating) and people with arm weakness (signing documents, eating, turning pages in a book or a newspaper).

3. Professional motions:

Apart from motions unique to disabilities, we distinguish a category of motions regarded as professional since we believe that people with disabilities take up various activities where they reach higher levels of proficiency than able-bodied people. What is meant here are some unique sports disciplines, e.g. goalball or showdown.

4. Comparative motions:

The reason why we regard this group as separate is that people with disabilities participating in game and animation projects will perform certain motions more credibly than an able-bodied actor. For that reason, it is an interesting experiment to capture the same motions of an able-bodied person and, then, by a person with disabilities in order to observe differences between these two modes of acting. In this category, we place the following motions: sitting on a chair at the desk done by the sighted and by the blind, using a wheelchair by an able-bodied and disabled person, using a mobile phone by an able-bodied person and a person with hand weakness.

5. Simulations:

In this category, we place acting tasks related to mutual mimicking motions of able-bodied people and people with disabilities. We meant to investigate limitations of moving and doing everyday tasks on both sides. Motions of non-humanoid characters: during our experiment, we paid special attention to a great potential motions of people with disabilities seem to have in animating non-humanoid characters. Our assumption was that having a body working according to different mechanics, which can act other motions and emotions, is here a competence. In this category, we investigate motions of the following creatures: quadrupeds, robots, birds, dinosaurs, creatures of unspecified shape with a different number of extremities or without extremities.

6. Improvisations:

This category features motions which were new for the participants, e.g. a space for the blind with specially arranged obstacles, which they had to find and get used to. Short role play scenarios: here, one can find short role play scenarios acted in various configurations: an able-bodied person and a person with disabilities, two people with disabilities, etc. We were eager to construct acting tasks which would reveal acting potential related to disability.

Results

Very rich data which was collected during sessions became the basis for developing eight sample animations.

Animation one

First animation features specialized movements performed by Krystian who is blind. Goalball players have to hear a passing ball. The animation shows trained offence and defence goalball movements, which are hardly repeatable for an unprofessional actor.

Animation two

Second animation is also based on Krystian's movements related to goalball. We observed that the way he catches the ball reminds of an animal attacking its victim. We used the mocap material to render a model of an attacking spider.

Animation three

The animation features Łukasz, who is also a blind person, acting as master Yoda from "Star Wars". This material proves that not only people fully capable of controlling their body can be employed for such roles. During the workshop and sessions, Łukasz did not feel too confident in acting tasks, which let him act credibly the movement of characters also having problems with moving.

Animation four

This animation was prepared on the basis of sessions involving Marcin, who suffers from paraplegia. As it has already been mentioned, since he normally moves on his knees, he was a perfect match for the role of a knight appearing in the computer game "Castle Crushers". A disabled actor is a much better candidate for this role than an able-bodied person when his movement is coordinated with a character without a knee joint.

Animation five

The animation is based on the material obtained during sessions involving Marcin who moves on a wheelchair or on his knees. In several Hollywood films, producers decided to employ motion capture systems to produce scenes involving characters requiring prostheses elongating limbs (e.g. "Rise of the Planet of the Apes", "Real Steal" or "King Kong"). In the animation of a dragon, we used primitive prostheses elongating Marcin's hands. In this material, we can observe poor mobility of dragon's rear limbs and actor's disability added to the impression that it is wounded.

Animation six

A sequence featuring Marcin and an able-bodied member of research group, Oliwier was used in this session. What was the most important in the fight scene was coordinating the shape of Marcin, who was kneeling, with the model of a character with only one lower extremity – a tentacle. It is clearly visible here that, animating the character with his movements, Marcin behaves in a natural way and fights without any effort.

Animation seven

This animation was rendered on the basis of a mocap session involving Paweł, who uses a wheelchair. The film is the example of integration activity ensuing from great opportunities provided by a mocap system. One interesting Hollywood strategy is a digital integration of bodies of two actors. It was employed in films, such as "The Curious Case of Benjamin Button" and "Capitan America". Paweł took part in a gripping take where an actor with disabilities was supposed to act as the upper part of the body of tyrannosaurus, while an able-bodied actor was supposed to act as the lower limbs. His minor hand weakness (matching the nature tyrannosaurus's movement) made the whole part look really natural, even though it was performed by two people simultaneously.

Animation eight

The animation was developed on the basis of the material involving Marcin and Ola. The actors performed short utterances revealing a great potential of mocap technology in animating characters using sign language.

Discussion

As it has been stated in the hypothesis and in the subsequent detailed questions, attention needs to be paid to a great movement potential of people with disabilities in motion capture sessions, even though it is not directly related to their acting skills. The uniqueness which is manifested by people with disabilities in this respect results from their perceptual and motor limitations, which they try to compensate naturally and neutralize creatively.

Movement skills of people with disabilities proved difficult to be recreated by able-bodied actors, which was discovered mainly during comparative sessions when subjects performed the same movements (e.g. clumsiness of able-bodied people using a wheelchair or difficulties with imitating blind people). The sessions proved then that the credibility of disabled characters, which can appear in games and animations, acted by able-bodied actors, is debatable. The subjects also demonstrated non-standard strategies of using everyday objects and dealing with daily activities. This knowledge can broaden the movement repertoire which can potentially occur in games and animations in a considerable way and also enrich the storyline of a game.

People with disabilities also prove to be "motor" specialists in narrow areas, such as dedicated sports disciplines, as well as in acting non-humanoid characters. In the latter case, dynamic properties of the body seem to be less important than passive motor skills of their body originating in their limitations. Motor barriers, as well as inhibitions against performing some acting tasks, may prove not to be a downside. They become a competence which helps to construct a kind of "body credibility". A limited plasticity of Łukasz's body boosted the credibility of the character he performed, namely elderly Yoda.

It is also worth to mention that one of the greatest virtues of working with people with disabilities was the exploration of their individual potential originating in the specificity of their disability but also unique strategies of dealing with it. Marcin M. has one such property, that is unusual dexterity of movement on his knees crucial in rendering some of the scenes. Another participant, Paweł, who suffers from quadriplegia, invented extraordinary strategies of using gloves and mouth in order to improve the grip or dealing with some basic activities.

As for organisational aspects of sessions involving people with disabilities, a few recommendations and suggestions need to be considered, which are related to communication, technical aspects or acting tasks.

During the sessions, people with disabilities as actors will demand more attention paid both to the preparation of sessions and additional support during production stages. For instance, wheelchair users can experience problems with dressing in a costume. A wheelchair will also require fixing markers correctly. People with disabilities may also need help with leading them to the toilet or eating. Our experimental sessions lasted 6 hours. None of the examined groups showed any symptoms of fatigue.

An important aspect to consider when organizing sessions for people with disabilities is hiring a professional who will look after them. In the case of sessions with blind people, a professional audio descriptor should become part of a team so that he or she can describe everything that is happening during a session. In the case of sessions with deaf people, a sign language interpreter can facilitate contact with a recorded deaf person. During the sessions it is recommended to employ people with total hearing loss, because it gives an opportunity to record very natural ways of using sign language and very clear facial expressions and gesticulation.

It should be also taken into account that the sessions may vary in length. It takes relatively more time to work with blind people because of the need to verbalize instructions more vividly, direct "work with the body" of an actor and a greater number of necessary attempts. In our project it was possible to register significantly less materials than in other groups.

As for communication with people with disabilities, one needs to consider both the type of disability and individual characteristics. One aspect of the project we found crucial was to verbalize the instructions clearly, which required a different approach each time. In the case of blind people, it turned out necessary to touch their body since verbal messages could prove insufficient and, as a result, the proxemics of sessions varied significantly from other sessions.

These aspects overlap with individual conditioning – Paweł, who suffers from quadriplegia, asked us to stand in front of him when speaking as he was not able to turn around. People who were the subjects of the project also differed significantly in their attitude to sessions. There were observed extrovert people, who were willing to cooperate and, above all, developed the specifics of their disability. On the other hand, there were some introvert people, who would be less willing to open themselves to instructions and cooperation. Even in the latter case, however, there was a lot of potential, which we tried to exploit to develop credible animations.

As far as technical aspects of sessions are concerned, using a wheelchair proved problematic for people with hearing impairment. Some types of wheelchairs have a number of chrome elements which may interrupt the work of markers capturing movement. In sessions involving deaf people, as long as it is possible, motion capture systems should be equipped with individual cameras registering actors' faces (e.g. Vicon CARA). These systems guarantee better synchronization of capturing sing language and facial expressions. All sessions involving people with disabilities

should be recorded with additional cameras, which will facilitate the developing of animation in the postproduction stage.

In postproduction stages and when rendering the final animation, one needs to take into account the fact that the software supporting motion capture and its digital editing is not fit for purpose in the case of working with people with disabilities. In this case, one may use the category of software exclusion or software apartheid. Programs such as Autodesk Motion Builder are more appropriate for constructing the skeletons of able-bodied characters. That is why, certain limitations of people with disabilities should be considered when writing software and algorithms should make it possible to adjust automatically their silhouettes to skeletons of constructed characters (either humanoid or non-humanoid). During the stage of developing animations, people with disabilities should be invited as consultants, which seems indispensable when animated characters are to use sign language. Skills and knowledge of a hearing animator may prove insufficient to build a correct sequence of movements of a character which uses sign language.

Fig. 3: Example of software exclusion – Paweł, a disabled participant of the project, is not capable of performing the initial position well enough (so called T-pose).

Conclusions

The project proved that working with people with various degrees of disability opens the way to new opportunities. They appear in the context of realistic performance of different movement features and motor limitations, which can be directly applied to the realistic movement of characters or indirectly to the sequences of non-humanoid characters' movement and characters with different skeleton structure. Working with people with disabilities let us investigate many interesting strategies of dealing with some activities in early stages of recording motion capture

material, which can inspire the development of storylines in computer games and animations. People with disabilities, as we tried to show it in the report, very often play an additional role in storyline and their silhouettes are not developed in any interesting way. We hope that our project discovered a large potential of people with disabilities, who can be perfect matches for the roles of protagonists in games and animations. Even though this potential has already been exploited in films, computer games and animated movies have a lot to make up for in this respect. We would also like to emphasize a new approach to the idea of inclusive design, that is employing people with disabilities to design during the development stage, even if a product is not addressed to this group directly. In this way, integration thinking about design takes on a new dimension disregarding the idea of being different and creating a product "adjusted" to the needs of people with some limitations. Here, our starting point is a competence. Effectively, the category of disability loses its significance.

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The Impact of Consumer Engagement with Social Media and Social Media Advertising on Advertising Evaluation and Purchase Intention

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Abstract

This study aims to analyse the effect of consumer engagement with Instagram and Instagram Ads on the evaluation of advertisements and purchase intention. This study refers to the experience engagement framework that analyse engagement with experience dimensions to analyse consumer engagement with social media and social media advertising. All 407 respondents who are active Instagram users were participated on this quantitative study. The data is then processed and analysed using Structural Equation Model. The results show that engagement with social media (Instagram) positively influence the social media advertising engagement and further influence advertising evaluation. However, no direct effect found from social media engagement toward advertising evaluation. This study also shows that advertising evaluation positively influence purchase intention.
Providing an empirical analysis about the influence that engagement with Instagram and Instagram Ads have to advertising evaluation, this study resulted in several contributions such as, provides discussion related to the evaluation of several advertising to purchase intentions on products that promoted through social media advertising. This study also gives insights to marketers on how to develop consumer engagement by the experience users had from advertisement on social media.

Keywords: Social Media Engagement, Social Media Advertising, Advertising Evaluation, Purchase Intention

Introduction

The use of social media has been increasing in the last few decades. There is a nine percent annual growth in active user of social media worldwide (Wearesocial, 2019). The three social media with the most active users are Facebook, Youtube, and Instagram. This phenomenon occurs almost all over the world with no exception in Indonesia, it is estimated that in 2019 there will be 20 percent active social media users reaching 150 million users in Indonesia (Wearesocial, 2019). The report from Instagram also shows that Indonesia is the 4th country with the largest Instagram users (Instagram, 2019). The growing number of active social media user has triggered marketers to integrate their marketing activities on social media, especially advertising. It also supported by advertising features launched by the social media.

The number of advertisers on Instagram has increased in line with the increasing number of active users. So it is necessary to analyze the effectiveness of Instagram ads seen from how the ads are evaluated and purchase intention on the goods advertised on Instagram. A study in US analysed the impact of media engagement on perceived value and acceptance of advertising within MSN (Mobile Social Networks). The study confirms that there is positive influence of media engagement on advertising effectiveness in the context of mobile social media (Wu L. , 2016). In this study engagement was chosen as an important factor in the context of social media so that this study was

conducted with the aim to determine the impact of engagement on Instagram and Instagram ads on how Instagram ads are evaluated and the purchase intentions of the product that advertised on it.

The increasing use of social media platform as a medium for advertising still has limited empirical studies. The limited studies that have been conducted to analyse effectiveness of advertisements on social media usually examine the engagement based on the number of likes, comments, and shares (Voorveld, Noort, Muntinga, & Bronner, 2018). This study postulates that there are other approach that can be analysed beside those quantitative metrics, such as the experiences received by the public when using social media and the experience felt when viewing social media ads. Those experiences became part of the engagement variable that examined. In the context of Instagram, there is also currently limited academic research that studies the effectiveness of Instagram Ads addressing the increasing trend of using the Instagram Ads by the marketers. With the increasing use and unique characteristics, the effectiveness of advertising in Instagram is worthwhile to be examined.

Some studies tend to focus on the aspects of advertising content and the products offered by the advertisement (Ashley, Christy, & Tuten, 2015). However, previous research (Voorveld, Noort, Muntinga, & Bronner, 2018) thought that there are other aspects rather than content, the effectiveness of advertising is also determine by context of the media used (platform). Previous studies have shown the effect of engagement on media in advertising evaluations, especially on traditional media. So it is worthwhile to analyse if similar relationships could also happen in the context of social media. Other study found that there is a relationship between social media engagement and social media advertising engagement (Voorveld, Noort, Muntinga, & Bronner, 2018). We also found the research that refer to the Ducoffe web advertising model (1995), analysed how advertising can influence the purchase intention (Martins J. , Costa, Oliveira, Gonçalves, & Branco, 2019).

Theoretical Review

Engagement

There are quantitative metric and qualitative approaches regarding to engagement with many distinctive definition exist (Hollebeek, 2011). This study refer to the understanding which states that engagement is a multilevel and multidimensional concept that arises from thoughts and feelings about one or more experiences involved in achieving personal goals (Calder, Mathew S, & Mathouse, 2016). The central of this view conclude that engagement is manifested in various experiences. Although this is an emergent view in the literature, it has been analysed by multiple studies. For example, it was demonstrated that engagement with TV programs is predictive of evaluations of embedded advertising (Calder, Mathew S, & Mathouse, 2016) and also been previously reviewed in a study that analyse the role of social media platform regarding to social media engagement and social media advertising engagement (Voorveld, Noort, Muntinga, & Bronner, 2018).

Social Media and Social Media Advertising Engagement

Engagement with social media and advertising on social media are the result of how media and advertising are experienced. Referring to Calder, Isaac, and Malthouse (2016), who argue that engagement is a context specific concept (varies between contexts). This context is defined as the advertising environment where this ad is placed which in this case is the social media (Voorveld, Noort, Muntinga, & Bronner, 2018). To strengthen this approach, this study chose one of the social media with the most active users in the hope of more reviewing the intensity of engagement with a large scope of active users.

Experiences in relation to engagement are defined as intuitive experiences or emotional perceptions that people experience when using certain media. This experience can be multidimensional, therefore in this study there are several dimensions of experience that are analysed in building the engagement. Refer to that approach, we define social media engagement as special experiences that people experience during the use of social media. In line with how social media engagement is defined,

social media advertising engagement is defined as intuitive experiences or emotional perceptions that people experience when faced with advertising on the social media platform. Media engagement can be seen as an important context characteristic that drives a response to an advertisement (Calder, Malthouse, & Schaedel, 2009). Therefore, the engagement with media could drive how people engage with the advertising embedded in particular media platform.

H1: Social media engagement has an influence on social media advertising engagement.

Advertising Evaluation

Social media platforms can be seen as a context for advertising where it provides an advertising environment. The study of media context provides strong evidence for the idea that the same source conveys the same message to the same audience on separate occasions producing different effects depending on the context in which the message appears and can be seen as essential context characteristics that encourage responses to an advertisement (Norris & Colman, 1992; Calder, Malthouse, & Schaedel, 2009). Advertising evaluation is interpreted as a subjective evaluation perceived by consumers of social media advertisements that respondents meet when accessing a particular social media. This indicator of measuring advertising evaluation variables is taken from previous research (Hilde A. M. Voorveld, Muntinga, & Bronner, 2018; Martins J. , Costa, Oliveira, Gonçalves, & Branco, 2019).

From previous study, it was found that the more engaged someone engaged in television programs, magazines, or online newspapers, the better the evaluation of the advertisements available in the media (Calder, Mathew S, & Mathouse, 2016). The same thing is also obtained when social media is used as a medium for advertising (Voorveld, Noort, Muntinga, & Bronner, 2018), where Instagram is included. With the relationship between social media engagement with social media advertising engagement and social media engagement relationships, a study examines the possibility that social media engagement can also influence the evaluation of advertisements on that social media. The study also concluded that the more people engaged with an advertisement, the more positive they evaluated it (Voorveld, Noort, Muntinga, & Bronner, 2018).

H2: Social media engagement has an influence on advertising evaluations.
H3: Social media advertising engagement has an influence on advertising evaluation.

Purchase Intention

Purchase intention shows the possibility that consumers will plan or want to buy certain products or services in the future (Wu, 2016). Previous research has shown that increased purchase intentions reflect increased buying opportunities. If consumers have positive purchase intentions, and also with positive brand engagement will promote a purchase (Martins, Costa, Oliveira, Gonçalves, & Branco, 2019). One of the goals of making an advertisement is to increase people's desire to buy the advertised products. Previous study has found that advertisement value had a significant impact to purchase intention of the promoted product (Martins J. , Costa, Oliveira, Gonçalves, & Branco, 2019).

H4: Advertising evaluation has an influence on purchase intention.

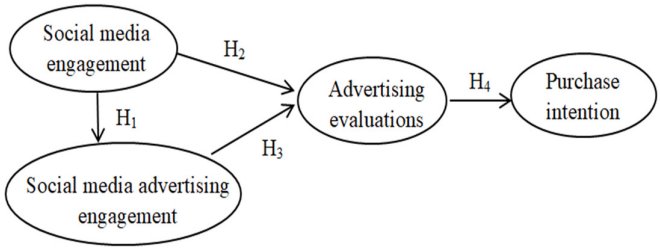

Fig 1. Conceptual Model

Method

Design and Procedure

In this study we chose to focus on Instagram. The reason for the selection is because Instagram included in the three social media that have the most active users besides Facebook and Youtube both in the Worldwide and in Indonesia, and among the three social media, Instagram has advertising features that are designed and positioned as in their main content. Instagram with the Instagram Ads feature is also able to make users take real action by clicking on the link listed in the description of the ad to the site of each product that can give users the opportunity to immediately buy the product.

Data collection in this study uses a single source approach. At the beginning, respondents were asked whether the respondent is an Instagram active user (proven by Instagram account ownership and accesses it at least once a week) and whether they have seen an ad from the Instagram Ads feature. Then they were asked about the experience of accessing Instagram and their experience when they came across Instagram Ads. Respondents were then asked to give their opinions on statements regarding evaluations of the advertisements (Instagram Ads) in general and their intentions in the products advertised in the Instagram Ads feature.

The collected data then processed using SPSS version 25.0 and Amos ver. 24 for Structural Equation Modelling (SEM) analysis techniques. Before the data is ready for testing, pre-test is conducted to test the validity and reliability of the questionnaire used.

Participant and Data Collection

Data are obtained from filling out the questionnaire distributed among Indonesia resident using an online questionnaire. To be able to become a respondent, a person must meet the requirements that are checked with the screening questions and 407 respondents are participated in this study. The number of respondents is considered sufficient because according to Hair, Black, & Barry J. Babin (2010), the minimum sample calculation is the number of indicators multiplied by five. This study has 74 indicators so that the minimum number of samples needed is 370 respondents. The respondent profile can be seen on Table 1.

Tab. 1: Respondent Profile (N = 407)

Indicator	Item	N	%	Indicator	Item	N	%
Gender	Male	127	31.2	Instagram Usage Frequency	1 – 7x/week	98	24.1
	Female	280	68.8		8 – 14x/ week	101	24.8
					>14x/ week	208	51.1
Age	<19	26	6.4	Instagram usage duration	<15 minutes	131	32.2
	19 – 24	173	42.5		15 – 30 minutes	177	12.5
	25 – 30	195	47.9		30 – 60 minutes	48	43.5
	31 – 37	10	2.5		>60 minutes	51	11.8
	>37	3	0.7				
Education	Junior high	4	1	Instagram Ads Type	Story Ads	200	49.1
	Highschool	83	20.4		Feed Ads (Image/Video)	140	34.4
	D3	12	2.9				
	S1	278	68.3		Carousel Ads	67	16.5
	S2	26	6.4				
	Profession	4	1				
Residence	Jakarta	112	27.5	Type of product that advertised in Instagram Ads	Automotive	2	0.5
	Banten	34	8.3		E-commerce	17	4.2
	West Java	121	29.7		Education	6	1.5
	Central Java	32	7.8		Electronic/Gadget	42	10.3
	East Java	9	2		Entertainment	2	0.5
	DIY	68	16.7		Fashion	183	45.0
	Others	31	7.6		Food & Beverage	34	8.4
Job	Student	168	41.3		Furniture	6	1.5
	Civil Servant	19	4.7		Hobby	10	2.5
	Private employees	135	33.1		Jewelry	2	0.5
	BUMN/BUMD employees	8	1.9		Property	7	1.7
					Skincare/Makeup	21	5.2
	Entrepreneur	39	9.5		Travel/Transportation	35	8.6
	Unemployed	14	3.4		Others	40	9.8
	Others	24	6.1				

Measurements

Referring to previous research on social media engagement and social media advertising engagement (Voorveld, Noort, Muntinga, & Bronner, 2018), social media engagement uses 10 experience dimensions consisting of entertainment, negative emotion, pastime, stimulation, identification, practical use, social interaction, innovation/trendsetter, topicality, and empowerment. which then formed 36 indicators with a 7-point scale. Social media advertising engagement is analyzed using an approach similar to social media engagement, the experience dimension that is still relevant to use. It uses 8 dimensions consisting of entertainment, negative emotion, pastime, stimulation, identification, practical use, social interaction, and topicality which then formed 26 indicators with a 7-point scale.

Advertising evaluation is measured using a combination of indicators from 2 previous studies (Voorveld H. A., Noort, Muntinga, & Bronner, 2018; Martins J. , Costa, Oliveira, Gonçalves, & Branco, 2019) consist of 5 indicators with a 7-point scale. As for the purchase intention variable is measured using 5 indicators with a 7-point scale (Alalwan, 2018; Martins J. , Costa, Oliveira, Gonçalves, & Branco, 2019).

Table 2: Measurement Instrument

Contructs	Dimensions	Measurement Items	References
Social Media Engagement & Social Media Advertising Engagement	*Entertainment*	*Gave me enjoyment; made me cheerful; gave me pleasant feeling; made me happy*	(Voorveld, Noort, Muntinga, & Bronner, 2018)
	Negative emotion	*Annoying; irritating; disturbed me; difficult to understand*	
	Pastime	*Suitable for free time; accessed when have free time; accessed when there is no busyness*	
	Stimulation	*Interesting;* made me enthusiastic; *unique; offered something new*	
	Identification	*Recognized myself in it; empathized with it; made sure I could vent my opinion*	
	Practical Use	*Gave useful idea; gave useful advice; motivated me to find more information; gave me opportunities to contact with new things*	
	Social interaction	Enabled me to share something with others; gave me the possibility to know how it is with others*; made sure I am in contact with others; gave subject of conversation; enabled me to gain knowledge of the opinions of others*	
	Innovation	Made people pay more attention; made sure I was ahead of others; made sure that others like me	
	Topicality	*Made sure I was quickly informed; made sure I was up to date; gave me useful information*	
	Empowerment	Made sure I could help others; provided freedom of interaction; made me feel that I had influence on others;	
Advertising Evaluation		I like Instagram Ads; feel satisfied with Instagram Ads; feel that Instagram Ads is important; provided relevant information about product; feel the number of Instagram Ads is too many.	(Martins, Costa, Oliveira, Gonçalves, & Branco, 2019); (Voorveld, Noort, Muntinga, & Bronner, 2018)
Purchase Intention		Intent to buy products advertised on Instagram Ads; Will try to buy products advertised on Instagram Ads; Will try to buy products advertised on Instagram Ads; It is possible to buy products advertised on Instagram Ads in the future; Feeling purchasing products advertised on Instagram Ads is worthwhile.	(Alalwan, 2018); (Martins, Costa, Oliveira, Gonçalves, & Branco, 2019)

Note. Italics = also measured for social media advertising engagement.

Results

This study used structured equation modeling (SEM). First, in order to analyze the indicator validity, the loadings should be higher than 0.50 (Hair, Hult, Ringle, & Sarstedt, 2014). There are 2 indicators that have loadings < 0.50 each come from negative emotion dimension both social media and sosical media advertising. Secondly, the reliability of the measurement items seen from the value of construct reliability (CR) and variance extracted (VE). The construct is said to have good reliability if it has a construct reliability value (CR) ≥ 0.70 and a variance extracted value (VE) ≥ 0.50. All items has CR ≥ 0.70 and VE ≥ 0.50. For the structural model, first we analyze the model fitness. The fit indices (GFI = 0,83, AGFI = 0,80, RMSEA = 0,51, CFI = 0,89, NFI = 0,82, and CMIN/DF = 2,06) of the structural model were found to be within their suggested values, that are marginal fit to good fit.

As for the main research hypotheses, except for H2 (Social media engagement to advertising evaluation) (C.R = -1,249, P-value = 0,212), the rest of the research hypotheses were supported as presented in Table 3. In detail, social media engagement was found to have significant impact to social media advertising engagement (C.R = 8,545, P-value < 0,001), social media advertising engagement was found to have significant impact to advertising evaluation (C.R = 4,641, P-value < 0,001), and advertising evaluation also found to have significant impact to purchase intention (C.R = 4,614, P-value < 0,001).

Table 3: Hypotheses Results

Hypotheses		T Value (CR)	Estimates	Remarks
H1	Social media engagement has an influence on social media advertising engagement	8.545	0.447	Hypothesis supported
H2	Social media engagement has an influence on advertising evaluations	-1.249	-0.041	Hypothesis not supported
H3	Social media advertising engagement has an influence on advertising evaluation	4.641	0.924	Hypothesis supported
H4	Advertising evaluation has an influence on purchase intention	4.614	0.790	Hypothesis supported

Discussion

The results of this study are in line with previous studies analyzing the context of media experience on advertising effectiveness. The study had results that indicate that engagement with TV programs, magazines, and websites can have an effect on how an advertisement in the media is evaluated (Malthouse, Bobby J., & Tamhane, 2007). Another study also found that there was a significant relationship between social media engagement and social media advertising engagement in the context of Instagram (Voorveld H. A., Noort, Muntinga, & Bronner, 2018).

The results of this study indicate that the strongest dimensions in social media engagement variables are the empowerment (SLF: 0.972) and stimulation dimension (SLF: 0.941), as can be seen on Table 4. The empowerment dimension shows that in using Instagram, respondents feel they have an influence on other people, as well as having freedom to interact. As for the stimulation dimension, respondents feel that Instagram is interesting, unique, and provides something new. In social media advertising engagement variables, the strongest dimension is stimulation (SLF: 0.951) followed by the practical use dimension (SLF: 0.931). The stimulation dimension indicates that respondents feel Instagram Ads are unique, interesting, and offer new things. While the practical use dimension shows

that respondents feel Instagram Ads provide useful ideas and suggestions, provide opportunities to connect with new things, and motivate to find more information about the advertised product.

Table 4: Loading Factors of Dimensions

Dimensions of SocMed Engagement	Loading Factor	Dimensions of SocMed Advertising Engagement	Loading Factor
Entertainment	0.769	Entertainment	0.768
Negative Emotion	0.258	Negative Emotion	0.392
Pastime	0.511	Pastime	0.667
Stimulation	0.941	Stimulation	0.951
Identification	0.772	Identification	0.709
Practical use	0.872	Practical use	0.930
Social interaction	0.863	Social interaction	0.860
Topicality	0.858	Topicality	0.910
Innovation	0.670		
Empowerment	0.972		

Social media engagement has no significant effect on advertising evaluation. From the definition of social media engagemetn can be seen that this type of engagement has nothing to do with advertising so it is very possible that there is no direct relationship between the two variables. The results of this study are also in line with the results of previous that postulate investigating the direct relationship between social media engagement and advertising evaluation of the ads contained is not the right thing, because there may be variables that encourage an effect (Voorveld H. A., Noort, Muntinga, & Bronner, 2018). The variable that proposed to be analyzed to explain the relationship between those two variables is social media advertising engagement where is proven to have an influence on advertising evaluation. In line with this study, The results of previous study conclude that the more someone is engaged with an ad, the more positive that person evaluates the ad (Voorveld H. A., Noort, Muntinga, & Bronner, 2018). This results prove that social media advertising engagement is the variable that is needed to analyzed the effectiveness of advertising in social media.

Advertising evaluation has an influence on purchase intention. In line with previous studies, the research successfully proved that consumers' purchase intention is influenced by how customers evaluate smartphone advertising (Martins J. , Costa, Oliveira, Goncalves, & Branco, 2019). Other research that analyzes the effect of advertising features on social media on purchase intention also concludes that customers who find social media advertising useful and profitable, will tend to be willing to buy products advertised on social media advertising features (Alalwan, 2018).

The results of the study which states that social media engagement has an influence on social media advertising engagement can be the basis for marketers or advertisers to be able to carefully choose social media. Furthermore, social media advertising engagement has a significant effect on advertising evaluation. This result also can becomes the basis for advertisers to be more focused in building consumer engagement on advertised advertisements so that evaluations of these advertisements are better. Another contribution of this study is that it provides specific implications based on the dimensions of engagement that can be improved to create better engagement for both Instagram and Instagram Ads.

This study shows that there are some points that can be analysed for future research. Future studies can consider the duration and frequency of Instagram usage and analyze whether there are different effects on engagement on Instagram Ads and Instagram Ads. In the context of Instagram ads, future research can also consider the type of Instagram Ads as a moderating variable that might play a role in the influence of Instagram engagement and Instagram ads engagement. In addition, the type of product advertised can also be analyzed whether this can affect engagement on Instagram Ads.

Conclusion

The results show that social media engagement has an influence on social media advertising engagement, social media engagement is not proven to have a significant effect on advertising evaluation, social media advertising engagement has an influence on advertising evaluation, and advertising evaluation has an influence on purchases intention. From the results of this study it was found that from the ten dimensions analyzed to measure social media engagement in the Instagram context, it appears that the three dimensions that have the strongest relationship are the dimensions of empowerment, stimulation, and practical use. Meanwhile, from the eight dimensions analyzed in measuring social media advertising engagement on Instagram Ads, it appears that the three dimensions with the strongest relationship are the dimensions of stimulation, practical use, and topicality

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Analysis of Markets and Development Trends of Green Energy Efficiency Technologies in The Context of Sustainable Development

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Abstract

Today there are powerful incentives for the development of green technologies in the field of energy efficiency, in particular in the field of expanding the use of renewable energy sources and reducing specific fuel consumption. According to many experts, in the foreseeable future, green technology is the largest area of technological innovation. The analysis based on a comprehensive economic and statistical analysis of volumes, structure and directions, an analysis of markets and current trends in the development of green energy efficiency technologies in the context of sustainable development in various countries is carried by authors. The stimulation of green technology markets and the expansion of their implementation are of primary importance for sustainable development, which means that this area requires a comprehensive review to identify developmental features and the risks associated with it. From the perspective of sustainable development, it is worth noting that the development of "green" energy efficiency technologies will have an effect not only on the economic, environmental and technological side of the process, but will also make its own social changes.

Keywords: "Green" Energy Efficiency Technologies, Innovative Technologies, Renewable Energy Market.

Introduction

The development of the world community in the 21st century is accompanied by a number of challenges arising from natural and socio-economic reasons. The global problems of mankind, combined with the growing needs of society, have posed the modern generation the need to reorient existing economic practices. The key vector of development in this situation was the concept of a “green economy”, which is designed to change the trends and become the main vector on the path to sustainable development. At the same time, the main feature of the “green” economy is a radical increase in energy efficiency, the obligatory nature of energy conservation and the development of a “low-carbon” economy, which makes up the development priorities of the leading world powers (Matraeva etc. 2017).

So, in the last decade, a course has been taken towards sustainable "green" growth, which implies stimulating economic growth and development while ensuring the preservation of natural assets and the uninterrupted provision of the required resources and ecosystem services. (HSE portal).

The green growth strategy is one of the proposed recommendations (here you can also cite the 2016 OECD Plan of Action for Sustainable Development Goals) and indicators (such as, for example, “green” accounts of the World Bank and others) developed by international and intergovernmental organizations for governments of different countries to solve the key task for today - the implementation of the Sustainable Development Goals (SDGs), adopted in the UN Agenda for Sustainable Development until 2030, and the implementation of the principles expressed in them, its management and at the national level (UNEP, 2011).

The transition to the rails of sustainable development and green "growth" is possible due to the implementation of the "green" economy concept. In the modern sense, according to official UN documents, a “green” economy is understood as “an economy that enhances people's well-being and ensures social justice, while significantly reducing environmental risks and its impoverishment” (OECD, 2017). Thus, from the point of view of OECD experts, for further socio-economic development and progress, ensuring not only the well-being of the current generation, but also the possibility of sustainable growth in the future, it is necessary to reduce dependence on natural resources as sources of growth (Klochkov, 2013).

In this regard, the key direction of “green” growth is the conservation and rational use of natural resources, in particular, the implementation of the concepts of energy conservation and energy substitution in the energy field in order to structurally change the existing order of energy consumption and environmental attitudes.

Methodology

The study used the following general scientific methods: a content analysis method aimed at analyzing the semantic content of text arrays in the subject of the study, as well as inductive and deductive analysis, graphic analysis tools that allowed to combine individual conclusions on this issue and formulate the author's vision of the problem. Principles of an integrated approach were also utilized. The research was supported by information taken from the official statistical and analytical materials of the United Nations Environment Program, as well as by scientific publications in periodicals and on official websites.

The General State of The Renewable Energy Market

Despite the simultaneous development of primary energy resources having a high energy content - coal, oil, gas, uranium - the increased needs of society and economies were not satisfied, which was reflected in the energy crisis of the 1970s. The 21st century has preserved the trends that have taken shape in the 20th century: energy consumption continues to increase even taking into account periodically occurring economic crises leading to short-term reductions in energy consumption; the world community continues to be dependent on oil and other fossil fuels (Matraeva etc. 2019).

According to the report of the International Renewable Energy Agency (IRENA), by the end of 2018, the global renewable energy capacity amounted to 2351 GW, which amounted to about a third of the total world energy capacity (Renewable capacity highlights, 2019). In 2018, half of all installed capacity generated by renewable energy sources fell on the hydropower sector, which amounted to 1,172 GW. The capacity of wind and solar energy amounted to 564 GW and 486 GW, respectively. Other RES accounted for the remaining 6% of the total global renewable energy capacity, of which 115 GW was bioenergy, 13 GW - geothermal energy and 500 MW - ocean energy (Fig. 1). The largest players in renewable energy markets continue to be the United States and China, which occupy first positions in such major areas of renewable energy as hydro, solar and wind energy. It is interesting to note the centers of development of ocean technologies - Korea, France, Great Britain. RES has gained much development in small EU countries, for example, in Denmark.

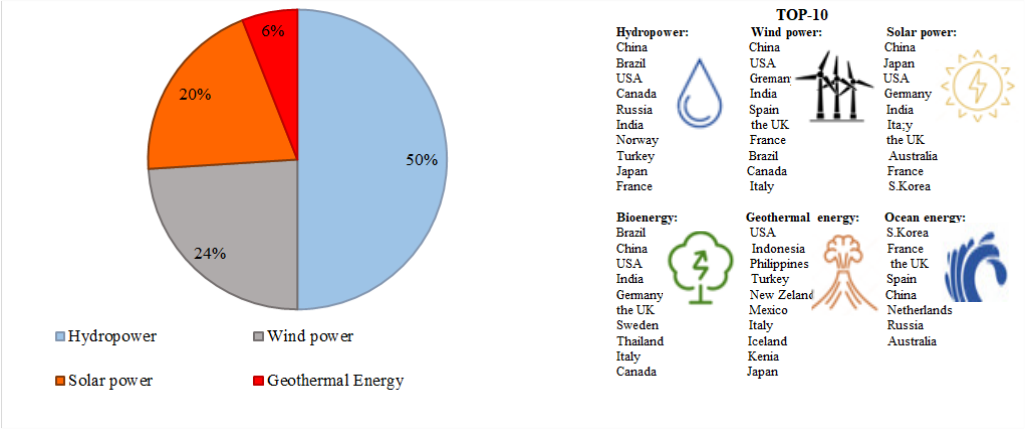

Fig.1: Distribution of world renewable energy capacity by energy sources,%, 2018

Source: composed by authors based on (IRENA, 2019 and database of IRENA)

In a regional context, the largest share of renewable energy capacities is currently concentrated in Asia (43.47%) with its undisputed leader - China. The next place is Europe, most of which is located in countries such as Germany, Great Britain, Italy. North America closes the top three (15.58%) (IRENA, 2019). In 2018, the world renewable energy continued the ten-year trend of capacity growth, the growth of which at the end of the year amounted to 7.9% (+171 GW) compared to 2017 (Fig. 2). At the same time, 84% of this increase (144 GW) was provided by the commissioning of new capacities in the fields of solar and wind energy, which indicates the continued rapid spread and commercialization of these energy generation technologies. The total increase in solar energy capacities in 2018 amounted to 95 GW (or + 24%), wind energy - 49 GW (+ 10%). The contribution of hydropower to the total increase in RES capacity was slightly more modest - only 12%, which amounts to 21 GW (+ 2% to the level of hydropower capacities in 2017). The introduced bioenergy capacities accounted for only 3% of the total value of the renewable energy growth, however, this sector increased about 5% (5 GW) from the level of own capacities in 2017. The growth of geothermal energy amounted to a little more than 500 MW, and the development of the "oceanic" technology sector led to a capacity increase of 2 MW.

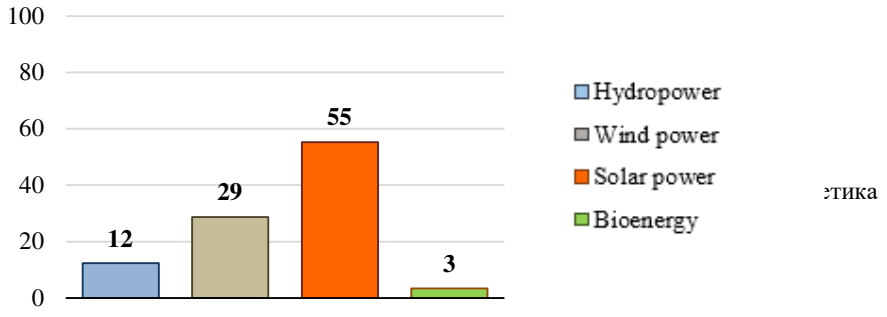

Fig.2 : Contribution to the total increase in RES of selected sectors in 2018

Source: composed by authors based on (IRENA, 2019)

The generating capacities growth dynamics of renewable and non-renewable energy sources (fossil fuels and nuclear energy) deserve special attention, noting the rapid increase in renewable energy capacities - from 20 GW in 2001 to more than 160 GW annually from 2016, which amounted to about 63% of the total volume of commissioned generating capacities (IRENA, 2019).

In turn, energy generation from non-renewable sources, on the contrary, does not have such a clear tendency to increase or decrease the commissioning of new generating capacities - on average, the increase was about 115 GW per year. However, it is worth emphasizing that in Europe, North America and Oceania, non-renewable generating capacity has decreased by 85 GW since 2010, while in Asia and the Midwest an increase of 725 GW and 100 GW has occurred over the same period, respectively. Consequently, these two regions have become the main driving forces for increasing generating capacities from non-renewable energy sources (Renewable capacity highlights, 2019).

Thus, despite the fact that the last decade has been characterized by a transition to a qualitatively new energy generation based on increasing renewable energy capacities, transition to a low-carbon economy and energy efficiency requires not only the spread of "green" technologies, but also a reduction in the generation of energy from fossil species fuel.

Market Analysis of Renewable Technology

The renewable energy technology market in 2018 can be described as stable. The main progress of renewable energy in 2018 was concentrated in the energy sector, which is due to increased competitiveness of renewable energy compared with traditional energy generation. Thus, the electricity generated by wind and solar photovoltaic (PV) power plants in many places has become more economical than the energy received from power plants operating on fossil fuels (REN21, 2019). For example, in the US, the use of wind and solar energy is now cheaper than the operation of coal-fired power plants in most of the country (IEA: renewable energy growth is slowing, 2019).

In addition, it has become more economical to build new wind and solar photovoltaic power plants than to continue to operate existing fossil fuel power plants. For example, Enel Generación Chile, a subsidiary of the Italian Enel in Chile, won a tender in November 2018 for the construction of a complex of RES-based power plants, although the projects involved in the generation of energy at thermal power plants. The commissioned wind, solar and geothermal stations will sell electricity at a price of $ 32.5 per 1 MW / h, which is lower than the price of electricity generated by gas and coal-based power plants (Renewable energy beat fossil fuels, 2018).

Thus, the record low tenders held in many countries of the world, especially for solar photovoltaic and wind energy, as well as the rapid development of technologies in this field, made a significant contribution to the development of renewable energy generation.

By the end of 2018, renewable energy provided, according to experts, more than 26% of global electricity production. For several years, renewable energy has been recognized worldwide as the main source of electricity production (REN21, 2019). At the level of individual countries, the production of electricity from renewable energy is even more important. The leader in this case is Denmark, 69% of the electricity for which is generated from renewable sources. Among the larger economies of the EU, we can distinguish Germany and the United Kingdom, whose share of renewable energy in the energy sector is 32% (BP, 2019). At the same time, the reliability of the energy systems of Denmark and Germany, integrated among themselves, is considered one of the highest in the world (Deloitte, 2018). Among other countries in which renewable energy accounts for more than 20% of energy generated, they include: Spain, Italy, Portugal, Finland, Ireland and New Zealand (BP, 2019).

A much smaller increase in renewable energy is observed in heating and cooling systems, as well as in transport, progress in which is still constrained by the lack of stable political support from the state and the slow development of technologies, such as advanced biofuels. In 2016, modern renewable energy sources provided about 10% of the global demand for heating and cooling, but their growth in the sector remains insignificant (less than 5%) (REN21, 2019). Despite the fact that heating and cooling systems account for about half of the total final energy demand, this area is characterized by insufficient attention to the development of renewable energy in this sector by states: in 2018, only 47 countries had targets in the field of organization of cooling systems and heating from renewable sources, while the number of countries with regulatory policies in this sector fell from 21 to 20.

Meanwhile, the integration of renewable energy technologies in the residential sector and industrial This is necessary both to reduce the demand for heat and increase energy efficiency, and to expand the use of modern renewable energy sources in general and achieve the goals of decarbonization of economies.

The share of renewable energy sources in the transport sector increased slightly compared to the previous year and reached 3.3%, 3% of which are represented by liquid biofuels. Between 2013 and 2017, the use of biofuels in the transport sector (mainly ethanol and biodiesel) increased by about 18%. This sector is becoming increasingly open to electrification, which suggests new perspectives and opportunities for further integration of renewable energy sources. Despite the increase in ethanol and biodiesel production in 2018, the growth in the use of biofuels for transport is still constrained by policy uncertainties and slow progress in the development of renewable fuels, for example, for markets such as aviation.

In the fuel context, as of 2017, renewable energy provided about 18.1% of total final energy consumption. Of these, modern renewable sources accounted for 10.6% of final consumption, while, according to estimates, demand for them increased by 4.4% compared to 2016. The remaining share of final energy consumption from renewable sources came from the traditional use of biomass (mainly in developing countries for heating and cooking). Most of the energy consumption from modern renewable energy sources was in the field of heat energy (about 4.2% of final consumption), followed by hydropower (3.6%) and other renewable energy sources, including wind energy and solar photovoltaic installations (about 2 %), as well as biofuel (1%).

Renewable Energy Investment Analysis

Global investments in renewable energy in 2018 amounted to $ 288.9 billion (or $ 304.9 billion, including large hydropower plants with a capacity of more than 50 MW) - 11% less than in the previous year, which was primarily due to a significant reduction investments in China (in 2018, investments in renewable energy in China amounted to $ 91.2 billion, and in 2017 they amounted to $ 145.9 billion). However, for the fifth year in a row, global investment in renewable energy sources has exceeded the mark of 230 billion US dollars.

Since 2015, developing countries and countries with economies in transition have been leaders in terms of investments in renewable energy sources; in 2018, their share was 53%. Of course, the main driver of growth in this group is still China, which accounted for 32% of the total investment. For the seventh consecutive year, China has occupied the largest share in the volume of global investment flows in the renewable energy sector, despite a significant drop in the indicator in 2018 (by 37%, the lowest since 2014). A key factor in this decline was the change in the state's tariff policy, which halved investments in solar energy (to $ 40.2 billion, compared with $ 89 billion in 2017). Investments in wind energy in China decreased over the same period, decreased by 6% to $ 50.1 billion. Nevertheless, it is China that is the most dynamic market for renewable energy investments. The next major investor is Europe (21% in 2018), the United States (17%) and Asia and Oceania (excluding China and India; 15%).

However, it is worth noting that over the past two years, investment activity in the group of countries with developing and transitional economies increased by a record 6%, due to the expansion of investment activities in the field of solar and wind energy in most countries of Asia, Eastern Europe, the Middle East and Africa. So in Vietnam in 2018, the volume of investments in renewable energy sources reached $ 4.1 billion, which is 7 times more than in 2017 - for the first time the country has shown itself to be a multi-billion dollar market of solar PV cells. And in the Middle East and Africa, the largest prospective region of solar and wind energy with such large markets as Egypt, Kenya, Morocco and South Africa, investments grew by 57% to a record $ 15.4 billion.

Renewable energy markets of developing countries and countries with economies in transition are not only the most promising and have the greatest potential for the development of renewable energy, but

they also serve as “incubators of innovations” in this area (Deloitte, 2018). For example, the tendency to hold auctions for the sale of renewable energy supplies is formed primarily by emerging markets, which leads to cheaper prices for renewable energy throughout the world. In addition, one can observe the process of “reverse innovation” (the flow of innovation from developing countries to developed countries) when products developed and intended for use by developing countries are used in developed countries, mainly in the field of solar and wind energy. For example, this is how microenergy networks, used for electrification of territories not served by traditional energy grids, have found application in developed countries, and have become used in remote mines. However, of course, international corporations creating an international technology transfer play a decisive role in this process.

The key areas of renewable energy investment are still solar energy technologies. Nevertheless, the total volume of investments in this sector decreased by 22% compared to the level of 2017, which, however, is associated primarily with the reduction in the cost of solar energy generation technologies and, consequently, a decrease in specific capital costs for it, as well as significant changes in China's photovoltaic market. An increase in investments in photovoltaic installations could be noted on the Spanish market, which was facilitated by the equalization of electricity prices through competitive energy auctions and the implementation of corporate agreements for the purchase of electricity, which could reduce the price of introducing renewable energy without subsidies; and, as mentioned above, investment growth was observed in the markets of Africa and the Middle East.

Wind energy is in second place in terms of investments, which in 2018 increased the volume of investments by 2%, which amounted to a record 134.1 billion US dollars. This was mainly due to the financing of large wind energy projects in China, the USA, South Africa, India and Sweden, as well as a number of offshore projects in Europe. Among the largest are onshore wind projects in the Scandinavian countries - Sweden and Norway, due to agreements on the purchase of electricity (SES), as well as offshore projects in the waters of Belgium, Denmark, the Netherlands and the United Kingdom. In general, investments in offshore wind energy grew by 2% per year, to $ 109.8 billion (a record high), while investments in offshore wind energy grew by 7%, to $ 24.6 billion (the second largest indicator).

Together, wind and solar energy attracted 94% of the total investment in renewable energy in 2018. In other areas of renewable energy, one can note the financing of several large projects in the field of biomass in Japan, as well as the conclusion of agreements on financing large enterprises for the conversion of waste into energy in Serbia, the United Arab Emirates and the United Kingdom. One can also note an increase in investment in ocean energy (+ 12%, which left $ 203 million). However, these technologies continue to face financial difficulties, so the prospects for political support for their development in key markets such as France and the UK are not clear.

It should be noted that the experts of REN21, an international non-profit organization based on the United Nations Environment Program (UNEP), emphasize that the observed net increase in renewable energy capacities, combined with a decrease in the absolute level of investment in renewable energy technologies, is a result of a fall in system costs and the development of more attractive renewable energy financing models, which means “a larger number of capacities can be installed for less money” (REN21, 2019).

Particularly rapid development is observed for battery-powered energy storage systems, although pumped storage systems still dominate. According to experts, battery storage is a key technology in the global transition to a sustainable energy system. Such technology can be used not only at large power plants, but also as “energy reservoirs” in electric vehicles, and will allow modernization of mini-grids, which will support individual energy production using installations on roofs of houses.

The wider adoption and commercialization of new battery storage technologies has led to rapid cost reductions, especially for lithium-ion batteries, as well as high-temperature sodium-sulfur (“NAS”) and so-called “flow” batteries. For example, in Germany, spending on lithium-ion batteries for small

households has fallen by more than 60% since the end of 2014. According to the IRENA forecast, by 2030, the total cost of installing electricity storage systems can fall by 50-60% (even more for rechargeable batteries) due to the optimization of production capacities, modernization and reduction of materials used, in turn, improving the technical characteristics of the equipment will reduce the cost of the equipment provided services (IRENA, 2017).

The competitiveness of dispersed power generators, for example, solar installations on roofs of houses, so far is determined not by price advantage, but by the ability to provide hard-to-reach areas with electricity. At the same time, a price advantage can be achieved when individual energy generation is cheaper than invoiced by energy companies. This situation is already typical for some regions of the USA, as well as several regions of Australia and Germany, where photovoltaic panels installed on the roofs of households are becoming more widespread (Deloitte, 2018).

Conclusion

Thus, the need to not only rapidly increase the use of “green” technologies, but also to abandon the most “polluting” traditional methods of energy generation, i.e. comprehensive decarbonization of the energy sector is required. And for this, it is necessary to increase political support for the sphere of "green" technologies, expand the use of both financial and market incentive tools (corporate procurement agreements, etc.), and incentive measures on the part of governments (tax loans, subsidies), as well as the establishment of more ambitious goals for landscaping economies.

From the perspective of sustainable development, it is worth noting that the development of "green" energy efficiency technologies will have an effect not only on the economic, environmental and technological side of the process, but will also make its own social changes.

According to the forecast of experts of the International Labor Organization, by 2030, thanks to environmentally sound policies of states to deploy green technologies, 24 million jobs can be created, 6 million of which compensate for the loss of various sectors of the economy due to the reorientation of economic practice. In particular, in the energy sector, namely in the field of oil refining and distillation, job cuts are projected for 1 million people. Nevertheless, the development of new technological solutions will allow to collectively receive an increase in labor market offers by 18 million jobs (TASS, 2018).

Summing up the analysis, we can say that the development of "green" energy efficiency technologies is one of the fastest growing trends in the modern world. The need and extreme importance of their dissemination and improvement is emphasized at the international level, and the growth of investment activity and the rapid development of renewable energy markets indicate their technological and economic attractiveness. In addition, the Sustainable Development Goals and the adopted course on sustainable green growth impose additional obligations on “green” technologies, in particular renewable energy, to reduce CO2 emissions and improve the quality of life of the population: from increasing the availability of electricity and reducing its cost to creating new jobs. Therefore, the stimulation of green technology markets and the expansion of their implementation are of primary importance for sustainable development, which means that this area requires a comprehensive review to identify developmental features and the risks associated with it.

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National Model of Technical Regulation and Standardization: Analysis of International Experience Formation and Development

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Abstract

The article is devoted to the study of the experience of building national systems of technical regulation and standardization operating in different countries of the world. An analysis of systems in more than 30 countries of the world revealed two basic development models, the features of their modifications and formulated recommendations for the Russian system. The first model is characterized by an essential component of state regulation, and the second type by the independence of the institution of the system from direct subordination to state authorities. The tendency of convergence of models and the potential for the formation of an adjacent variant of the organization of processes are also identified.

Keywords: Technical Regulation, Standardization, Energy, National Models, Harmonization.

Introduction

In modern conditions of state energy policy development, it is necessary to take into account existing trends and international experience in the formation of a national system of technical regulation and standardization.

Technical regulation refers to the non-tariff form of regulation and consists in the establishment, application and implementation of technical standards characterizing the material nature of the object and the assessment of these standards. The theoretical basis of regulation is the creation of a two-level system for establishing requirements for products, processes, works and services aimed at creating favorable conditions for business development and at the same time protecting the interests of purchasers. The first level of requirements is related to the fact that it involves the creation of conditions under which the state must ensure the safety of products for life, the health of citizens, the safety of their property and environmental protection. The second level of the system is associated with providing entrepreneurs with a certain degree of freedom in establishing requirements for the quality of regulatory objects.

Technical regulation also becomes an integral part of antitrust policy, as it creates equal conditions for market entities through obligations to maintain standardized quality indicators for products, processes, works and services. This circumstance reduces the influence of unfair competition and creates conditions that exclude the possibility for market leading companies to dictate their technical standards to the detriment of other participants in the relationship.

Information provided through technical regulation tools: technical regulations, standards, certificates, rules, etc. provides citizens and interested business entities with information about the quality of products and services. This implements the economic function of the state to create conditions for citizens to obtain reliable information that does not mislead them.

The implementation of the functions of technical regulation is associated with the use of administrative and economic methods of influencing market entities, therefore, two main approaches to the study of this tool are distinguished.

According to the first approach, technical regulation by some authors as Baldwin, Cave (1999), Morgan, Yeung (2007) and Ogus (2004) is considered as a legislative, executive and controlling mechanism used by authorized state structures, public organizations in relation to market entities in order to establish, apply, execute and assess the compliance of mandatory and voluntary requirements for products, processes, works and services and other objects ensuring the safety of life and health of citizens, environmental protection, property safety, as well as the development of fair competition.

The second approach is technical regulation, as a managed system that can be represented as infrastructure elements. Many researchers of the institutional foundations of technical regulation such as Kay, Vickers (1990), Zvorykina, Platonova (2011) Zvorykina (2005), analyze the elements of technical regulation and come to the conclusion that the following can be considered its main elements: regulation; standardization at the national level and organization level; declaration of conformity; compulsory certification; accreditation; authorization; state control (supervision); voluntary certification; tests; registration, etc.

A comprehensive approach to the task of achieving orderliness in this area, providing for the possibility of harmonizing systems at the regional and international levels, as well as improving the national one, is possible only when conducting research on the experience of building national systems of technical regulation and standardization operating in different countries of the world.

Methodology

The analytical coverage in the implementation of research tasks regarding the development of national systems of technical regulation and standardization includes more than 30 countries. The selection criteria for these countries were:

- the role of the fuel and energy complex as a backbone (one of the key) complex of the country's economy;
- the presence of bilateral (multilateral) foreign trade relations in the Russian Federation in the field of fuel and energy complex;
- participation in integration associations and international organizations, of which the Russian Federation is a member country.

The approach to the description and classification of national models of technical regulation should be defined as structural-functional, that is, the model is based on the system of management of technical regulation in the country and the distribution of functions for individual state and public institutions. Therefore, it is proposed to understand the model of technical regulation as a set of institutions responsible for the development of requirements for technical regulations and national standards, as well as procedures for assessing compliance with these requirements stated in works of Kucherov (2016) and Shulginov (2014). By establishing the rules and the procedure for applying regulatory elements in their interconnections, an appropriate model of technical regulation and standardization is being formed.

National Experience

Brazil Experience

Brazilian experience demonstrates the fragmentation of technical regulation and standardization functionality among several independent organizations – fig 1.

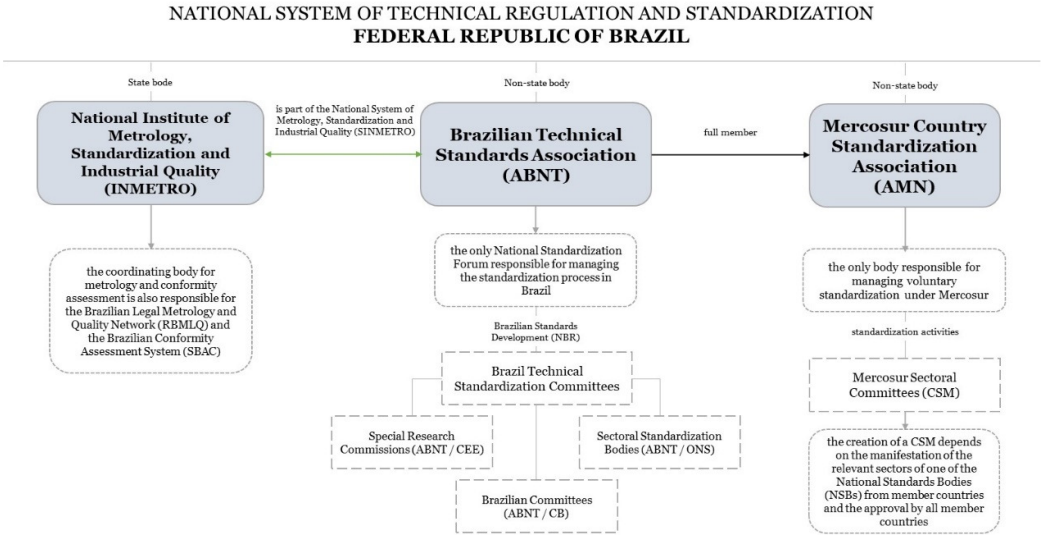

Fig. 1: Brazilian National System of Technical Regulation and Standardization

The legal status of the regulator is specific to Brazil's national governance model: a strong public sector determines the state status of the regulator. At the same time, the differentiation of powers among several management institutions depends on many criteria: the country's participation in regional integration associations, the size of the country, the volume of foreign trade, the maturity (level of development) of the system of technical regulation and standardization, the country's participation in the international division of labor, the structure of the national economy and etc.

Norway Experience

The Norwegian experience indicates the existence in the world experience of the possibility of the distribution of powers by industry (sectoral) grounds (fig 2). The specification of powers on a sectoral (sectoral) basis involves the separation of a number of sectors of the national economy into a separate category and the formation of a special regulatory center that takes into account the characteristics of this sector of the economy, for example, a number of European countries highlight the field of electrical engineering and / or communications, fixing technical regulation and standardization issues separate structures.

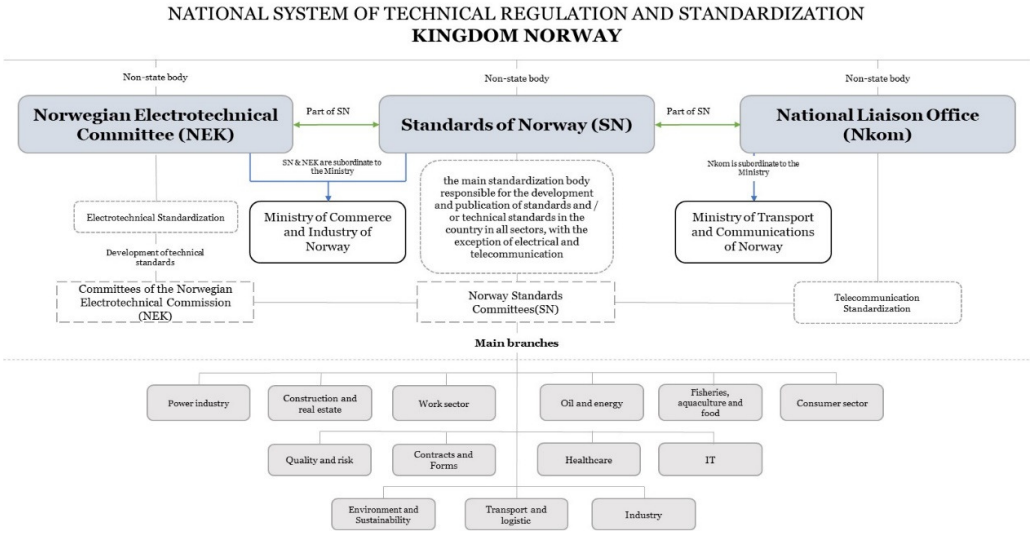

Fig. 2: Norway National System of Technical Regulation and Standardization

Paraguay Experience

The experience of Paraguay is an illustration of the distribution of powers of government by functional attribute (fig 3). The functional distribution is based on a clear delineation of powers and areas of responsibility, based on the tasks assigned to the relevant structures. For example, in Paraguay, organizations that carry out product certification, research activities, supervisory functions, and so on can be distinguished as separate entities of the system.

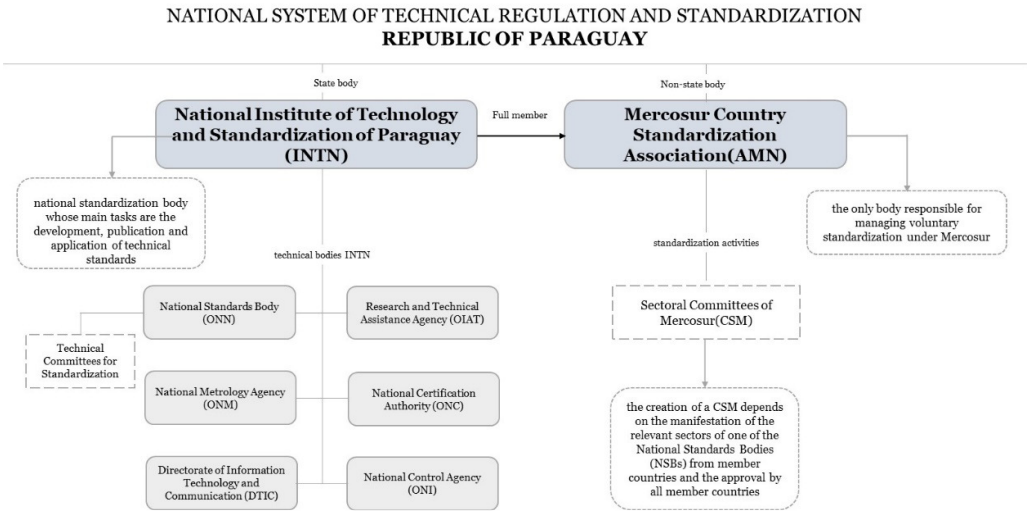

Fig. 3: Paraguay National System of Technical Regulation and Standardization

Germany Experience

The German experience is interesting in that the regulator is the non-governmental organization - Deutsches Institut fuer Normung (DIN), which coordinates the entire standardization process at the national level, and is also responsible for organizing Germany's participation in European and

international work standards - fig 4. DIN He is also responsible for overall project management, ensuring uniformity and consistency in the collection of German standards.

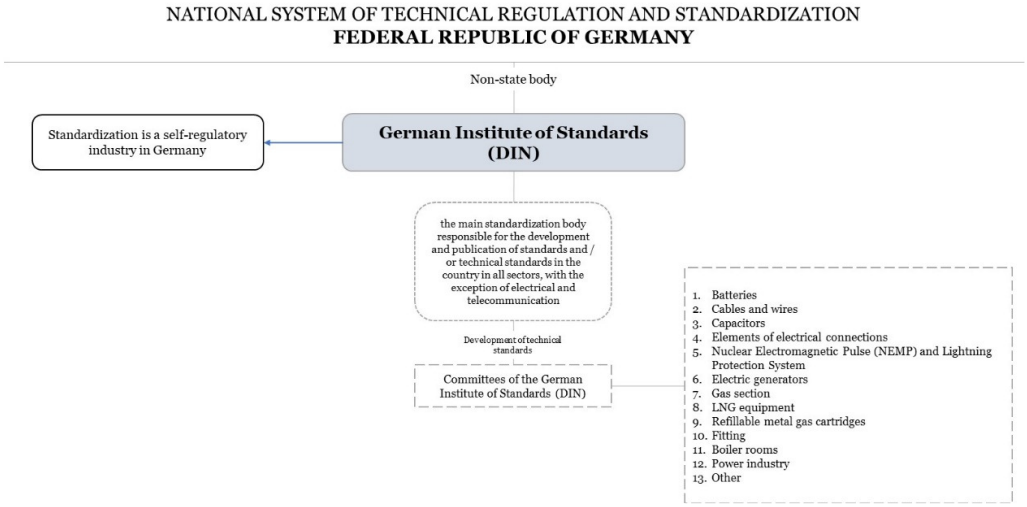

Fig. 4: German National System of Technical Regulation and Standardization

DIN standards are developed in 73 committees, most of which are combined into several National Technical Committees (TCs). Any organization can place an order to develop a standard. In the process of working on the new standard, both the manufacturing and consumer sectors, trade organizations, scientific institutions, government bodies, as well as regulatory institutions are involved. All these structures send their experts to numerous DIN technical committees, which in turn form more than 70 regulatory committees, divided by industry. DIN employees coordinate the development process and carry out project management.

Results

The obtained information base made it possible to conduct a comparative analysis of national models of technical regulation and standardization of the studied countries - Tabl. 1.

Table 1: Results of a comparative analysis of national models of technical regulation and standardization

Benchmarking Criteria	National Models of Technical Regulation and Standardization			
	Brazil	Paraguay	Norway	Germany
The presence of a public authority endowed with a regulatory function in the studied area		+		
The presence of non-governmental organizations with regulatory influence in the system	+		+	+
Compliance of national standards with international standards			+	+
The presence of a developed system of technical committees *	+	+	+	+
Availability of a voluntary standardization system	+	+		+

* Technical Committee - an organizational unit consisting of representatives of business, government and the scientific community responsible for the development of standards.

Source: compiled by the author.

As a result of the study, two basic models were identified.

The model of the first type is one of the most widespread in the organization of the system of technical regulation, has no regional specifics, does not depend on the state structure and the dominant type of management. Historically, it was the first one, the issues of technical regulation were the prerogative of the state, and the outline of the organizational and legal framework was developed "from above". The model was not static, it developed, relations between the subjects of technical regulation were complicated, but the fact that the responsible subject of the national system of technical regulation was directly subordinate to a certain ministry or other state institution, most often the executive branch, remained unchanged (Fig. 5).

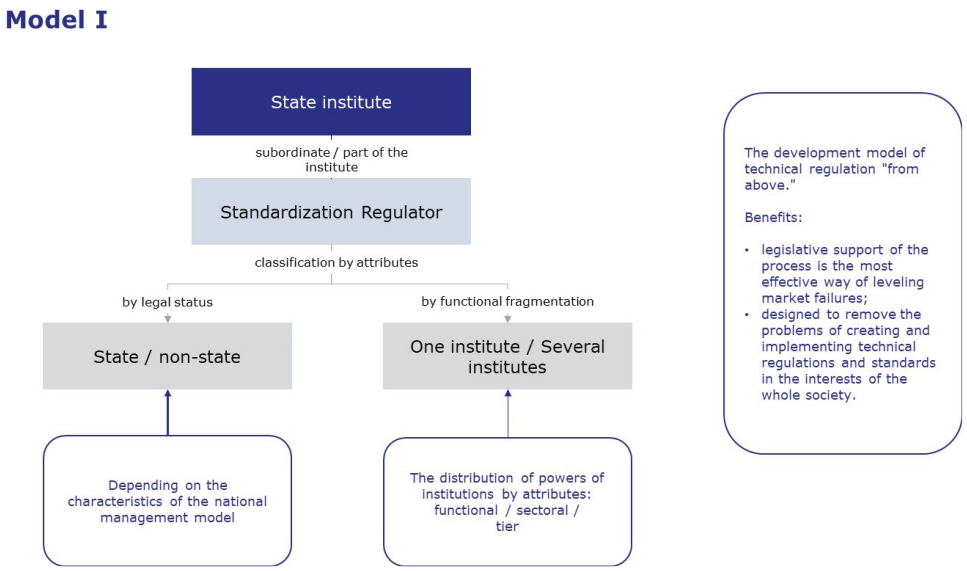

Fig.5: Model of the technical regulation system of the first type

Source: composed by authors

Having a defined circle of competencies and functionality, over time, such organizations ceased to be structural units of the ministries themselves (departments), separated into an independent institute of a system of technical regulation.

This model is still relevant, and in many national economies the system of technical regulation and standardization has exactly the same organizational and functional structure. The main argumentation of the advantages of this model comes from the point of view that technical regulation is a reaction to the classic market failures associated with information asymmetry and the presence of external effects, while the standards and technical regulations themselves have some characteristics of a "public product". Therefore, legislative support of this process is an effective way to mitigate market failures, and the formation of a request solely from the business environment cannot provide all the advantages of their application. Firstly, because the one who creates the standards controls the market, and, therefore, acquires the tool for forming industry barriers that impede the development of competition. Secondly, a number of companies are inclined to evade national standardization, encouraging the development of their own corporate technical conditions, in particular, in order to reduce the existing competitive field. Rational state policy is designed to remove the problems of creating and implementing technical regulations and standards, and in the interests of the whole society. This is ensured by the direct subordination of the regulator to the state executive authority.

Modifications of this type of model are possible by the legal status of the main governing body (state or non-state) and by whether the functionality is fragmented among several independent

organizations, for example, in Brazil, Argentina, Finland, or is absolutized in one institution, for example, in Denmark, Kazakhstan, New Zealand.

And if giving the right status is determined by the characteristics of the national management model, and often, the presence of a traditionally strong public sector leads to giving the state status to the regulator, then the separation of powers among several management institutions depends on a number of reasons and occurs on the basis of various criteria.

Powers can be distributed between institutions on a functional, sectoral or tier basis. The functional distribution is based on a clear delineation of powers and areas of responsibility, based on the tasks assigned to the relevant structures. For example, organizations that carry out product certification, research and development, supervisory functions, and so on can be distinguished into individual subjects of an organization. An example is the national system of the Republic of Paraguay.

The specification of powers on a sectoral (sectoral) basis involves the separation of a number of sectors of the national economy into a separate category and the formation of a special regulatory center that takes into account the characteristics of this sector of the economy, for example, a number of European countries distinguish the field of electrical engineering and / or communications, fixing technical regulation and standardization issues for separate structures.

The formation of collegial management on a level basis depends on how actively the country takes part in regional integration associations and whether special work is required to develop, improve and / or harmonize the system of national technical regulation with regional or international systems. For example, in Argentina, at the national level, IRAM (Instituto Argentino de Normalizacion) is an organization that performs the task of standardization in all areas of activity. At the transnational level: AMN (Asociación MERCOSUR de Normalización) is the only body responsible for managing voluntary standardization within the framework of MERCOSUR.

The second type of model is less common, but it was he who became the target model in the context of the New Global Approach. The main difference is the independence of the institute of a system of technical regulation from direct subordination to executive authorities (Fig. 6). In extreme cases (Germany), it is an absolutely self-regulating system.

The model was formed in those countries where the position of large and medium-sized businesses was initially strong, which, in order to streamline the movement of goods and services, as well as to determine the “rules of the game” in industry markets, created professional associations, communities and industrial chambers, in which a variety of initiatives lobbying for the interests of the business environment, including the creation of technical regulations, professional standards, and a voluntary certification system.

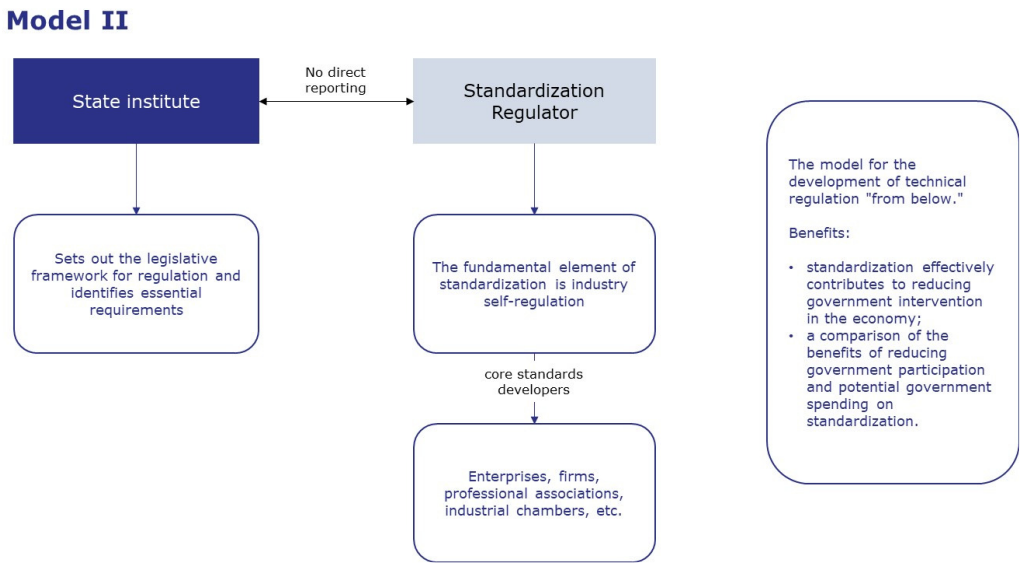

Fig.6: Model of the technical regulation system of the second type
Source: composed by authors

Thus, the system of technical regulation and standardization grew "from below" and initially provided that the request for the formation of technical standards should come from enterprises and firms, and this is the responsibility of industry, as is the case, for example, in the USA. Associations and standardization experts have taken joint efforts to convince policy makers to adopt the principle of reference to standards in the development of draft legislative acts and to achieve high appreciation of the productivity and usefulness of such an approach for the state.

As the model developed, one principle remained unshakable - the vital importance of self-regulation of industry as a fundamental element for any kind of standardization. For this, various technologies were actively used, demonstrating the advantages of reducing state participation compared with the approach according to which all requirements should be included in technical legislation. This implies a comparison of the benefits of reducing government participation and potential government spending on standardization.

On the basis of progressive legislation, a clear line has been drawn between areas where regulatory measures are needed and those areas where standardization can be effective (the state sets forth the legislative framework in the field of regulation and determines the essential requirements). In the political context, the inclusion of the results of the work of standardization bodies in technical legislation makes the work of lawmakers easier, and thus standardization effectively contributes to reducing the amount of government intervention in the economy. Directives in most cases formulate their specifications on an international basis in order to minimize restrictions on products, technologies and services both domestically and in international markets.

The relationship between the national technical regulatory authority and the government is regulated by a special document, for example, in the UK - this is a Memorandum of Understanding between the Government of the United Kingdom and the British Standards Institution (BSI), in which the parties declare the identity of positions on a number of issues in this area.

The transfer of standardization issues into private hands does not mean, however, the removal of state bodies from participation in the development of standards. For example, the number of representatives of state inspection bodies in the technical committees of the Council on the International (Construction) Code (USA) is at least 30% of the number of committee members. Government officials participate in the process of discussing and approving private sector standards

on a common basis and do not differ in status from other voting members of the development organization.

Despite all the initial differences in national models, their rapprochement is currently being observed; the general development vector is aimed specifically at implementing the principles of the New Approach. Foreign experience confirms that at a certain level of economic development, the state is not able to provide regulation ("keep track") at the same time of all processes occurring in science, technology and non-strategic sectors of the economy, see work of Matraeva etc. (2019). Moreover, at higher levels of economic development, when the size of the gross national product reaches several trillion dollars, the involvement of the state in standardization processes at the level of developing specific standards becomes economically inexpedient.

If, under the conditions of the formation of the system of national regulation, the model of the second type initially provided for the strong influence of the business community, self-regulatory organizations of manufacturers and public organizations in this field, then in those countries where historically the initiative to form the conditions of technical regulation belonged to the executive branch or specially allocated structures (model of the first type), the need to involve business and production efforts, and Reforms are being promoted that contribute, if not to a change in the management system of technical regulation, then at least to the formation of alternative sources of requests and initiatives.

Reforms in the model of the second type can go in several directions, the main of which are as follows:

1. Deregulation, i.e. reduction of state intervention in the system of technical regulation and standardization. In the future, deregulation should lead to the fact that only legislative, control and oversight functions remain with state bodies. Moreover, it envisages the implementation of the principle of the inadmissibility of duplication of functions in regulatory bodies and, in turn, administrative barriers and corruption.
2. Formation of a broad institutional system that replaces the functionality of state structures (technical and professional communities, industry associations, independent expertise, public councils under the regulator and industry departments, arbitration organizations, bodies for accreditation of subjects and certification of products, consortia created by large corporations implementing development of standards in new, dynamically developing industries and so on), with the provision of wide public discussion adopted technical standards.

The presence of a comprehensive system of institutions that act as a “counterweight” to the current state regulator allows decisions to be made as balanced and verified as possible, taking into account the interests of the majority, since each participant in these relationships not only balances, but also limits other participants.

Conclusion

Thus, an analysis of the experience in building national systems in the field of technical regulation and standardization of different countries of the world revealed two basic models of the formation and functioning of technical regulation and standardization systems. At the same time, the analysis also shows that the two models are moving closer together in the course of their development, and it is potentially possible to establish an adjacent variant of the organization of processes that combines the strengths of both basic models. This trend and the features of constructing basic models were taken into account in the analysis of the national model of technical regulation and standardization in the Russian Federation, as well as in the formation of the organizational and functional diagram of the organization of processes within the framework of a single industry system of technical regulation and standardization in the fuel and energy complex, including the need for separation of the regulatory, coordinating and executive functions in the specified area.

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World Experience of Formation and Development of Microfinance Institutions to Stimulate Small Business

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Abstract

The authors analyzed the experience of developing microfinance organizations in order to support small businesses based on cases from the USA, France, Mexico, Japan and other countries. As a result, the main criteria for their differences are identified: mission, tools for supporting small businesses and the level of digital development. The authors propose, in the light of modern trends in the development of microfinance organizations, to identify 4 basic models for the development of microfinance organizations. A description and comparison of these models is provided. The conclusion proves the feasibility of using microfinance institutions as socially significant organizations focused on supporting priority groups of small and medium-sized enterprises, requiring special attention of the state and society, contributing to the growth of self-employment of the population, improving the quality of human capital and reducing social tension in society.

Keywords: Microfinance Organizations, Microcredit, Small and Medium Business.

Introduction

Micro-enterprises in some countries play an important role in ensuring employment, with a large role in countries in countries with high unemployment and persistent imbalances in the labor market by Matraeva etc. (2018). In Spain, Portugal and Italy, employment in microenterprises makes up more than 40% of the total employment of the country's population, and in Greece - almost 60%, however, only 12% of the total number of microenterprises were able to use bank loans as additional sources of financing in work of Kraemer-Eis etc. (2017). From this point of view, microfinance can be a tool that can be adapted to support the needs of small businesses, including those from disadvantaged segments of the labor market specified by Utkin (2018).

The microfinance field does not have strictly defined boundaries, a clear organizational structure, unified methods and rules for conducting operations. A variety of microfinance organizations (hereinafter referred to as MFIs) act as lenders and financial service providers, differing from each other in goals, forms of organization, clientele, the range of services provided, funding methods and other parameters by Kaurova etc. (2019).

The activities of microfinance institutions show successful growth around the world, as evidenced by the figures of the annual analytical report “Microfinance Barometer 2019”. In 2018, 139.9 million borrowers used the services of microfinance organizations, compared with 98 million in 2009. At the

same time, the initial mission of microfinance institutions, which was to open access to financial resources for low-income individuals to organize small businesses, is still relevant. this is evidenced by proportions that have remained unchanged over the past ten years, despite an increase in the number of borrowers: 80% of women and 65% of rural residents in Microfinance Barometer (2019).

Since the efforts of Professor M. Yunus to develop and promote the ideas of microfinance have gained international recognition, microfinance institutions have begun to spread throughout the world, including those countries where the level of social well-being and disposable income is significantly different from the home country stated by Khandker (2005). However, the problem of supporting small businesses in more developed countries remains relevant, and microfinance institutions successfully fill a niche where traditional methods of stimulating SMEs have shown low efficiency.

Each country, adopting the experience of introducing microfinance institutions, has formed unique national models, within which a whole range of specific microfinance practices has arisen. However, all MFI countries tried to solve similar socio-economic problems: reduce unemployment, increase the availability of financial services for the population, increase economic activity and well-being of the population, and form a focus on long-term sustainable development.

Over 20 years of spreading in international practice, MFIs are interesting in that they have developed new management and technological solutions that overcome various barriers that impede access to traditional sources of funds for individuals to organize small businesses. Therefore, the main objective of the study was to analyze the best international practices of the formation of an MFI system, with the aim of identifying conceptual models, the introduction of elements of which will contribute to increasing the efficiency of the functioning of the national microfinance system.

Methodology

The selection of countries to analyze the best international practices of the MFI system to support small businesses was built on the following methodological principles:

- the principle of completeness of coverage on a regional basis, i.e. a requirement was laid for the analysis of international practices in various regions of the world.
- the principle of compliance with the goals laid down, in the formation of an MFI system with the basic requirements of a developing small business sector;
- the principle of taking into account the unity of the substantive and procedural aspects of the development of the microfinance sector and small business;
- the principle of structural integrity of the functioning of the microfinance sector in the country and the stimulation of the development of small business at different levels, which involves mutual proportionality, complementarity and harmony.

Based on these principles, the following selection criteria for countries follow:

- the criterion for a holistic reflection of the main components of the financial system: building experience, development prospects, multilateral development objectives in conjunction with small business.
- the criterion of the high importance of the MFI system for supporting the development of small business and self-employed, i.e. the selection of countries in which the most universal, necessary elements of the microfinance system can be identified to stimulate small business.
- the criterion of compliance of the financial system of the country for the possibility of “importing” the positive experience of building and regulating the system of MFIs.
- the criterion of conformity of time, the experience of countries where the MFI system is relevant, tested and has shown stability over a certain period of time is studied.

Thus, the indicated principles and criteria are of a specified nature, and their application should satisfy both the development conditions and the current trends in the microfinance system, and the targets for the functioning of small business.

For the initial selection of countries, the specialized program for solving infometric research problems in the field of scientometry and bibliometry CiteSpace was used, which supports the structural and temporal analysis of various networks arising from scientific publications and has a set of functions that facilitate understanding and facilitate the interpretation of these models.

As part of the task of selecting countries, a statistical-bibliometric analysis of a given scientific direction was carried out. As the initial array, we used data obtained from the Web of Science database at the request of microfinancing for the last 16 years.

The frequency of scientific articles on this topic suggests that countries in which publication activity is high use this tool extensively in practice, discuss the testing of new tools and mechanisms for providing microloans to small businesses, and, therefore, can become the base units in the formation of a sample of countries whose experience it is advisable to take as a basis the study of national models of MFIs.

Results

Statistical-bibliometric analysis made it possible to single out a group of countries that formed the basis for further research of national MFIs (Fig. 1)

If we analyze the global publication flow presented by WOS by country, then the leaders in this direction were scientists from the USA, Great Britain, Bangladesh, India, Australia. These countries met all the basic principles of selection and entered the sample. A further selection of countries was formed by experts from the list presented, while maintaining relevance to the objectives of the study, which provides an applied analysis of empirical information on the microfinance sphere. Such a methodological approach is justified in the formation of the sample, which reduces the likelihood of distorting the idea of the internal structure and essential features of the microfinance sphere.

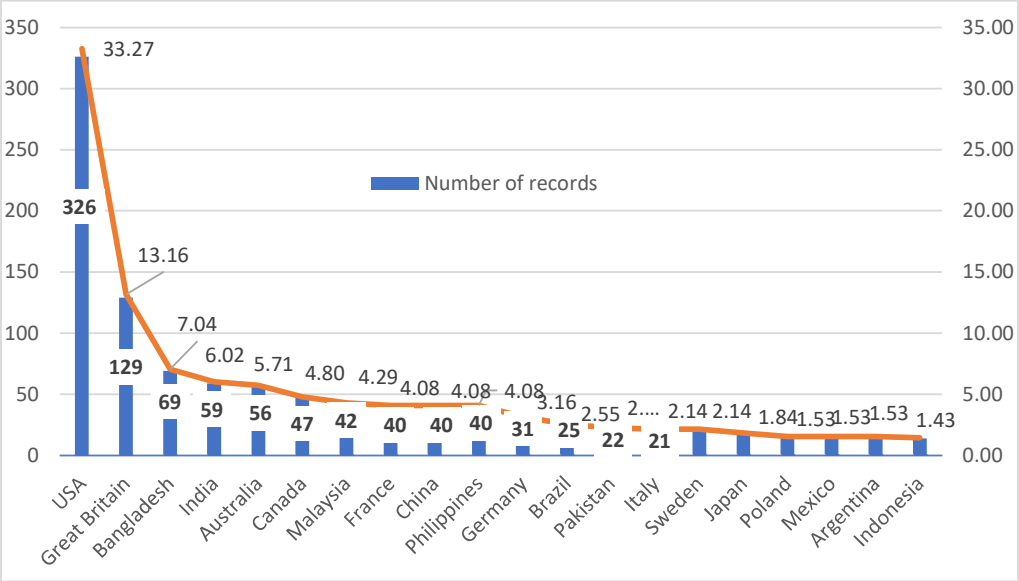

Fig.1: Microfinance Frequency of Publication by WOS Categories.
Source: composed by authors

An analysis of the existing systems of microfinance institutions in different countries included in the presented sample allowed us to identify 4 modern microfinance models that differ primarily in mission, tools for supporting small businesses and the level of digital development.

The Basic Model

The basic model is characterized by the presence of the social orientation of microfinance institutions and a high level of state requirements for the creation and construction of their activities. The refusal of banks, as traditional financial institutions, to provide loans to low-income citizens for small businesses, initially led to the introduction of state credit support programs in these countries, which also did not give the expected results: loans often fell to those who did not need them, were not used to organize small businesses and did not return after the deadline. The loan scheme implemented by microfinance institutions helped to avoid banking restrictions and public sector errors.

The basic model for the functioning of microfinance institutions is built on the basis of the Grameen Bank model proposed by M. Yunus, which has become the benchmark for the development of microfinance institutions in underdeveloped countries. Elements such as: group responsibility; dynamic lending regime; frequent loan repayments; lack of requirements for securing a loan or non-traditional forms of collateral; small loan amounts - have become classic attributes of financial activities of MFIs by Amin (1994) and Amin (2001).

The basic model is most widely used in countries with a low per capita income, the predominance of agricultural production. The formation and implementation of this model can be recognized by the average loan amount of less than $ 100 provided in the country.

The principle of operation of microfinance institutions in this system is based on the availability of a reliable creditor, capable of providing financial support, taking into account the financial exclusion of borrowers and the inability of the latter to use banking services.

However, according to the totality of conditions and signs of implementing the basic model of organization and promotion of microfinance institutions, it can be stated that for the realities of many countries, including the Russian Federation, it is not suitable for several reasons:

1. Starting positions and priority tasks

The fundamental factor determining the growth vector of the microfinance sector is the mission of microfinance institutions, the tasks that they should contribute to. For many countries, they are formulated in such a way that does not correspond to the basic model.

2. Legal

In the conditions of the national system of economic and social relations, it is impossible to use credit schemes embedded in the basic model, for example, a mechanism of shared responsibility, which is not applicable in the absence of a close commonality of production and moral family ties.

3. Socio-economic

The level of socio-economic development of countries initially forms a different solvent demand for financing, in terms of qualitative and quantitative indicators, approaching more advanced models of functioning of microfinance institutions.

Banking Model

In some countries, microfinance institutions, initially formed on the principles of the basic model, have outgrown the inherent functionality over time. The essence of the banking model is that microfinance organizations are increasingly acquiring the features of specialized banks as financial institutions. Expanding their functionality (issuing loans, depository functions, issuing bonds, etc.), MFIs began to gradually transform into an element of the banking system, subjecting not only to the regulatory impact very similar to banking, but also to the functional content. Such a movement towards rapprochement of the two sectors up to the formation of a two-tier banking system, taking into account the creation of the institution of “local banks” (banks with a limited license), is observed in Bolivia, Mexico and other countries in works of Mosley (2001) and Griffin (2015).

Bolivia is a country with a relatively mature microfinance market, with a high concentration of specialized banks and other non-bank deposit organizations in the microfinance sector. For example,

Banco Solidario (BS) arose in the mid-80s. as a non-governmental organization (PRODEM), which provides small business loans. By the beginning of the 90s. the fund had more than 17 thousand customers, and the total amount of loans issued amounted to $ 4 million. In 1992, PRODEM was transformed into the commercial bank Banco Solidario. By 2007, the bank had a network of 48 branches in 7 cities of the country, the number of its customers increased to 110 thousand people, and loans - up to 172 million US dollars. BS used elements of the basic model in its work: a group contract for 3 to 4 people, "dynamic stimulation" with a gradual increase in the loan amount with a good credit history. But at the same time, BS from the very beginning set a course for serving more affluent customers and achieving high profitability.

In 1990, Compartamos was established in Mexico as a non-governmental organization that provides loans based on a group contract to finance revenue-generating activities. In 2002, Compartamos entered into a strategic alliance with Accion International, and in 2006 became a commercial bank. It is one of the first microfinance institutions in the world to list bonds on the stock exchange. This allowed the bank to reduce the cost of funding, improve financial performance and expand the range of services. Currently, the bank has 630 thousand customers, the loan portfolio is 285 million US dollars stated by Klyukin (2016).

In Indonesia, while maintaining and complying with the general principles and regulations of banking legislation, incentive mechanisms are used to facilitate the expansion of retail banking services to lower-level microfinance markets.

The emerging microfinance policy in India is decisively changing the status of microfinance institutions, turning them into specialized banks. Microfinance activities are constantly supported by core banking activities as part of an accelerated financial integration program. RBI has used banking licensing and regulatory mechanisms to encourage large microfinance players to become full-blown banks. In 2014, it granted a universal banking license to one of the largest MFI-NBFIs, Bandhan Financial Services, and a small financial bank (SFB) license to eight others in 2015.

In 2010, a tendency towards convergence with the banking model has been outlined in Germany, since banks that currently lend for short periods both to the population and entrepreneurs who need funds to develop a business play an active role in issuing microloans. Banks lend money quite willingly, which is understandable: the return of microloans is guaranteed by the state, which manages a special microcredit fund. The main clients of such programs are small businessmen, owners of small family-owned companies, and the procedure for providing microloans, for example, at Berlin Investitionsbank and other similar banks, is simpler and more profitable than receiving similar amounts from purely commercial banks.

The merger of microfinance institutions with the banking sector is objective in nature, since the instruments of microfinance organizations are similar to banking financial instruments provided to similar groups of business entities as microfinance organizations. Similar intersection in other models can be called the microfinance identity problem. In the banking model, the separation of the two lending sectors and determining their place in the credit system is gradually leveled, the banking sector increasingly includes microfinance tools in its functionality, thereby further blurring the differences that consist only in the way these services are provided and their consumers. A bank may have microfinance goals, for example, supporting segments of the population with socio-economic problems.

However, there are a number of arguments that cast doubt on the feasibility of switching microfinance institutions to the banking model. The fusion of the banking sector with microfinance organizations will inevitably lead to an increase in risky assets in the structure of the portfolio of banks. And as the financial crisis of 2007-2008 showed, an overuse of risky loans with a simultaneous investment burden in the stock markets can lead to a "domino effect" that will affect the entire financial market.

Marketplace Model

To increase the reliability of microfinance institutions, it is not necessary to follow the path of merging them with the banking sector. Today, in a number of countries where government participation is high in organizing the functioning of MFIs, microfinancing based on digital platforms is transforming into a financial ecosystem that provides for the implementation of a marketplace model, where on the one hand there is a global monitoring system (most often on a state platform), on the other - An affiliate network is being created to expand client opportunities. The model involves the breeding of the banking and microfinance sectors, with further systematization of disparate financial organizations into a single window system.

The marketplace model is a holistic approach to organizing the functioning of microfinance institutions, based on specialized management of the microfinance industry with a quick time response. If we talk about the advantages of this model, the implementation of the system provides continuous monitoring of the functioning of MFIs, while significantly reducing the time to identify possible problems. The model allows you to quickly bring together all the analytical information collected from various departments into one, and metric thresholds are built on the basis of the collected data, critical points are determined and, acting according to a given scenario, it is easy to determine the needs of the MFI system, diagnose business processes and prioritize actions. Also, based on these data, it is possible to proactively solve problems and predict possible development scenarios.

Financial ecosystems have spread in countries with a large number of disparate territories, as well as countries with significant participation of budget financing in this area. As an example of the implementation of the model, we can cite the Philippines, where in just 5 years, from scratch, with the virtual absence of a banking system, through the development of Internet banking institutions, a model has been formed and is currently operating stably, according to which any farmer, for example, in a rural area , using the Internet, it can easily get a small loan and solve other problems that it faces through standardized channels and the MFI model.

The Polish microfinance market is considered one of the most developed not only in Europe but also in the world. Poland is the flagship of digital change, gradually transforming into a model of marketplaces and according to the Raiffeisen group in its review of fintech ecosystems in the region of Central and Eastern Europe, Poland is one of the three leaders in the transition to a model of marketplaces.

The transition to the financial ecosystem also involves a number of problems, the main of which are the level of customer readiness, technological challenges and the adequacy of ecosystem partners.

The level of willingness of clients in different regions to interact with the financial ecosystem is considered the main barrier to unlocking the model's potential. This indicator is highest in the Asia-Pacific region, where 80% of consumers are willing to work with the ecosystem stated in Regulatory Framework in Bolivia.

Another barrier is technological challenges. The creation of such ecosystems became possible only under the condition of the proper level of development of IT systems that allow you to collect and process a huge amount of user data both online and offline, build effective communications through any available channels and provide many services remotely.

The third problem is called the availability of adequate ecosystem partners. When launching the model, one should focus on partners performing the task of bringing new offers to the largest number of potential customers with the subsequent provision of services at the declared level. Microfinance institutions do not just sell their product separately, but are embedded in a certain chain of relationships of other economic counterparties (supplier - buyer).

Segment Model

In a number of countries, a sufficiently powerful banking sector is initially present, but it does not try to absorb microfinance institutions and does not try to form a single platform based on the principles of complementarity. On the contrary, they are intentionally divorced both in terms of functionality and by sector. The banking sector serves the traditional client segment that meets the scoring and risk management requirements of commercial banks, MFIs take on a higher risk segment, but also with higher social responsibility: depressed regions, startups, migrants, etc., while their activities it is a channel of strong support from the government. Therefore, in developed countries, a model began to take shape where there is close interaction between government bodies and intermediary organizations (microfinance institutions), while government bodies focus not so much on legislative support and regulation of the microfinance market, but on the development of standards and criteria to evaluate the activities of financial institutions, state-run; the procedure for providing state subsidies and targeted loans; development of legislative requirements governing the procedure for the provision of inexpensive and sought-after financial services. For example, the proportion of the population in the United States that is not covered by traditional banking services is only 5-6%, while about 400 MFIs operate in the United States. In the United States, microfinance is based on the interaction of government bodies (Small Business Administration, SBA) and microfinance institutions as intermediary organizations. Microloans should be targeted: for working capital, for the purchase of office equipment and equipment (loan capital cannot be spent on the acquisition of real estate and advance payments on it). Moreover, each loan is accompanied by a technical assistance grant, and the conditions for obtaining a loan may vary depending on: the size of the loan, interest rates (depending on the intermediary), the planned use of capital, the requirements of the intermediary, and the needs of the borrower by Shreiner (2003).

In addition to the AMB, other government organizations are widely involved in subsidized special-purpose loan programs, including: the Federal House for Mortgage Lending (Freddie Mac), the Federal National Mortgage Association (Fannie Mae), the Small Business Development Agency, and the Social Development Financial Institute, which invests in social development organizations serving depressed communities by Glasova (2016).

France, where microfinancing since 2005, has become one of the priorities of the national government, is a segmented model among the highly developed post-industrial countries of Western Europe. Within the framework of the specially created program, serious financial support is provided for the independent entrepreneurial activity of the population, and the creation of a new business is considered as one of the effective ways of transforming hired workers into a self-employed population, which, in turn, leads to a decrease in unemployment in the country. Microfinance programs in France are implemented by the Unity Social Fund, which provides loan guarantees for unemployed people who want to build their own business, and also gives social microloans ranging from 500 to 2,000 euros to low-income people in work of Balkenhol (2013).

In France, the mission of microfinance institutions is to integrate low-income people. MFIs in France provide microloans for projects related to increasing population mobility - their education, training, as well as improving employment and developing their own business.

In Japan, the activities of MFIs are based on the particularities of the country's labor market, where about 70% of the able-bodied population is employed in the field of small business (individual and family enterprises predominate by ownership). The segment model in Japan operates on the basis of state and private specialized organizations that clearly distribute the functionality among themselves: the Japanese State Corporation (financing of small business through preferential long-term loans to increase the fixed and working capital of enterprises operating in industries that are identified by the government as priority), Folk Financing Corporation (long-term microloans without property support), State Insurance Corporation of loans and small business financing (guarantees repayment of loans) as stated in works of Armendariz (2007), and Suzuki etc. (2011).

Conclusion

1. Thus, each country, when developing a national model and policy in the field of microcredit, uses a "multi-level" approach, which consists in creating a conceptual framework for the system of microcredit regulation as a separate area of activity. That is, specific types of financial institutions, legislative or regulatory “windows” are determined, which differ in:

- permitted activities (mainly, placement of deposits compared to the provision of loans);
- legal status (commercial versus non-commercial);
- approach to regulation and supervision (full prudential regulation or only licensing compared to the lack of regulation).

2. The highlighted models of the MFI system are correlated with the banking sector. The criterion for distinguishing became the place and role of microfinance organizations relative to banking institutions. The basic model assumes the lack of a full-fledged financial sector, either due to territorial features or due to solvent demand for traditional banking services. Therefore, microfinance organizations are in this model an alternative to banks, especially in the formation stage of the latter.

3. The banking model involves the gradual merging of banks and MFIs. The functionality of microfinance organizations is gradually being included in the tasks of specialized banks, which will replace MFIs in supporting small businesses and self-employed.

4. The marketplace model accompanies the digitalization of economies and becomes one of the most promising for countries whose development strategy is aimed at reducing transaction costs through the creation of digital aggregators for various financial market players whose services are complementary, while maintaining each individuality.

5. The segment model is designed to implement an MFI positioning policy that complements the banking system in the provision of financial services. Microfinance institutions contribute to the growth of self-employment of the population and the quality of human capital and reduce social tension in society, acting in a niche that, for various reasons, is not interesting to the banking sector.

6. Moreover, all models contribute to accelerate economic growth and improve the quality of the social sphere. The main factors determining the position of microfinance institutions are:
- willingness to cooperate with small business mainly at the initial stage of its development;
- the ability to determine a package of services, which includes not only financing, but also advice in the field of financial and managerial accounting;
- understanding of the regional and industry specifics of small business and the development of an adequate risk assessment system;
- availability of sufficiently trained personnel to service and attract customers;
- a significant impact on the development of microfinance infrastructure for small business government support programs in the field of microcredit.

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Standard Operating Procedures for Vocational Training in Rehabilitation Centres: What Have We Missed?

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Abstract

Private companies in Indonesia must employ People with Disabilities (PwD) at the rate of at least 1%. The National Vocational Rehabilitation Center (NVRC) or is an institution offering services for PwD to help them gain employment at formal institutions. At NVRC, PwD acquire skills that are useful in the workplace setting through education and training offered by experts, including social workers and instructors. In addition to job skills, many PwD require psychological support to cope with their workplace settings. The process by which NVRC delivers these services is fundamental because the competence of PwD in the workplace is strongly dependent on the quality of their education or training they receive. This study used a qualitative approach to examine the process. Our data was collected through in-depth interviews with 16 informants as well as group discussions and observation. This study noted various problems, especially regarding the practice of student recruitment and assessment for vocational training. Our findings indicate that standard operating procedures (SOPs) have been established at NVRC. Due to the lack of funds, however, the actual recruitment and assessment processes at NVRC are not in keeping with the SOPs. Another problem preventing the full implementation of the SOPs is that the local institutions referring PwD from other regions do not have an adequate selection process that can match the type of skills training to be undertaken at NVRC.

Keywords: Persons with Disabilities, Instructor, Standard Operational Procedure, Social Worker, Vocational Institution

Introduction

Every individual, including those with disabilities, has the same right to a decent life and should therefore have equivalent opportunities. Real life, however, is not always in line with these expectations. The difficulties experienced by persons with disabilities (PwD) include limited employment opportunity, which is related in part to society's failure to fulfil the rights of PwD and to the lack of support from related parties. One attempt to correct this situation in Indonesia is the regulation on workers with disabilities, wherein the national government has mandated that both government and private institutions should employ PwD.

This government regulation states that central government-, regional government-, state- and regionally owned enterprises are required to employ PwD at the rate of at least 2% of all employees, while private companies must employ PwD at the rate of at least 1%. In spite of this regulation, not all PwD are employed in government or private institutions or run their own businesses. According to the Ministry of Social Affairs' Data and Information Center (Pusdatin), PwD who do not work may be prevented from working by:

1. Insufficient education and training.
2. Lack of need for unskilled workers.
3. Small number of employees at enterprises subject to the regulation.
4. Concern about accidents and insurance costs.
5. Lack of awareness among employers of the needs and abilities of PwD.

6. Inadequate personal or technical assistance.

As many scholars have mentioned (Oud, 2018; Villanueva-Flores, Valle-Cabrera, & Bornay-Barrachina, 2014); Hassi, Foutouh, & Ramid, 2015); and Milner, Taouk, Disney, Aitken, Rachele, & Kavanagh, 2018), PwD face several challenges in the work setting. Business organisations and other sectors must make changes that will allow them to accept disabled workers more easily; PwD must also have the best possible education and training to gain employment and succeed in the workplace. Therefore, education for PwD is a crucial matter. As Žganec, Laklija, & Milić Babić (2012) have argued, education is the highest priority for uplifting PwD through the social welfare system.

The government and private sector certainly expect that individuals with disabilities whom they employ should have proper qualifications with regard to the level of education, work experience, abilities and skills and high motivation. To maximise these characteristics in PwD, the Indonesian Ministry of Social Affairs has established NVRC as a social rehabilitation service institution serving PwD. In collaboration with Japan International Cooperation Agency (JICA), NVRC focuses on providing vocational training and mental development to ensure readiness to work at companies and other places.

NVRC aims to develop and improve vocational rehabilitation systems in Indonesia so that PwD will have the skills and expertise they need for employment. The primary task of NVRC is to develop human resources, especially workers with disabilities, so that they will be able to compete to obtain decent work. NVRC equips individuals with physical disabilities with the knowledge, attitudes and work skills they will need to flourish in the world of work.

To improve the quality and employment rates of graduates from NVRC, social workers are needed to prepare PwD to function socially. Social workers aim to improve the performance of social institutions and services so that they effectively empower vulnerable groups and promote social and economic prosperity (Zastrow, 2004). Given the broad scope of the role of aid providers in service organisations, however, it may be more suitable to call them Welfare Workers or Community Workers rather than social workers, as they no longer come exclusively from a social work background.

In addition to Welfare Workers or Community Workers, NVRC also needs instructors (Johnson & Geal, 2009). Instructors are individuals with advanced abilities related to a skill or profession who intend to transfer these abilities to others. Instructors generally have high intelligence related to their specific fields, and they must not only understand the material but also be able help other people understand it so that the learners can apply their new knowledge to achieve their goals. Instructors at NVRC play a role in delivering skills training.

The skills taught at NVRC include sewing, computer skills, graphic design, electronics, metal work and automotive work. In addition to skills training, students also prepare to live in the community and to apply the results of their training in the world of work. Thus NVRC works to improve social welfare through training and social rehabilitation. Training is intended to provide students with work skills according to their individual talents and abilities, while social rehabilitation is designed to restore and develop the willingness and ability of students to successfully perform the functions of community life.

The tasks and functions of social workers and instructors are clearly defined. Social workers are involved in almost all the stages of the work that NVRC does, from assessment to termination. The activities undertaken by social workers are geared primarily towards preparing students to receive their skills training successfully and providing insight and mental guidance related to how to work at a company or another place. Instructors, meanwhile, are more involved in activities related to the instructor's competence, namely, skills training.

The institution has established standard operating procedures (SOPs) for student recruitment activities and for assessment to determine the type of training that will be offered to each student. Based on our preliminary information, however, these two stages of the training process do not comply with the SOPs in practice. The SOPs were established to ensure that the service activities carried out by NVRC meet the needs of the centre’s clients and will be useful for the PwD whom the centre serves.

Accordingly, we set out to clarify the extent to which SOPs are implemented at NVRC, especially the SOPs on recruitment and determination of skills training fields. Both stages are critical elements of the NVRC programme because they affect whether PwD who are NVRC graduates can be absorbed by the job market. As an educational institution, it is important for NVRC to prioritise the quality of the services it provides.

Research Method

The purpose of this study is to assess the SOPs implemented in the social rehabilitation services and vocational training programmes at NVRC and whether these further the goals of NVRC. The particular SOPs that we reviewed are related to the recruitment and assessment stages. This study used a qualitative approach and descriptive research. The data were collected in the field through in-depth interviews (Sugiyono, 2007), group discussions and field observations, as well as documentation studies.

The study location was the Bogor Cibinong Bina Daksa Vocational Rehabilitation Center (NVRC). This location was chosen because it is a training place for PwD that exists to help PwD become qualified workers who can be employed in the job market. Yet NVRC is different from other rehabilitation institutions in that it offers advanced skills training services. The knowledge received by students corresponds to the skills needed by the labour market. Because of its continuous enrolment practice, students at NVRC must go through an initial selection process consisting of the stages of recruitment and assessment.

To identify informants, the researchers used a purposive sampling technique. This technique allows researchers to identify informants who meet specific criteria. Our criteria for informants were developed based on a framework of thought that supports the achievement of research objectives. Each informant was chosen based on specific considerations and not convenience, based on an understanding of the material in this study. The criteria for informants that have been set out in this study are as follows:

Table 1: Informant Criteria

Informant	Criteria	Total
Social Worker	a. Social Worker has worked at the Cibinong NVRC for at least five years. b. Informant is a social worker who has a social work education background. c. Informant has participated in General Skills Training. d. Informant has participated in the Rehabilitation Aid Skills Training activity. e. Informant has participated in Vocational Rehabilitation activities.	Based on the established criteria, this study interviewed six social workers.
Instructor	a. Instructor has worked at the Cibinong NVRC for a minimum of 5 years. b. Informant has participated in General Skills Training activities. c. Informant has participated in the Rehabilitation Aid Skills Training activity. d. Informant has participated in Vocational Training activities. e. Informant is registered with the Ministry of Social Affairs ASN.	Based on the established criteria, this study interviewed two instructors.

Student	a. At least one student is selected from each of the skills training areas in NVRC. b. Informant is currently enrolled in a programme at the Cibinong NVRC and has been there for at least three months. c. Informant is from outside the Bogor/Jakarta area.	Based on the established criteria, this study interviewed six students.
Institution leadership:	Structural officials are essential informants because they are the ones who determine the policy. They also have a significant influence on the overall organisational system of the NVRC, including how social workers and instructors carry out activities according to the demands of their respective professions. Structural officials are also expected to carry out evaluations of the implementation of policies at the Cibinong NVRC.	Based on the established criteria, this study interviewed two people. They were as follows: a. One Cibinong NVRC Chief b. One Vocational Training Section Head.

The data analysis in this research consisted of several stages. After the data were collected, data from the interviews and field observations were sorted into several themes in keeping with the research objectives. The themes of the research results were thus confirmed and one theme was chosen as the main focus. We also examined the problems that arose with regard to each theme.

To increase data credibility and validity, the authors used triangulation techniques and also confirmed some information with other informants to ensure the quality of the data.

Results

As previous studies have noted, there are many obstacles to maintaining diversity management in a work setting. One solution to this is to make education for PwD ongoing and long-term (Žganec, Laklija, & Milić Babić, 2012). Workplaces also have to provide some education and training for their disabled employees, so that PwD in the workplace are not prevented from adapting to the workplace dynamic (Rashid, Thompson-Hodgetts, & Nicholas, 2018; Soldan, & Nankervis, 2014). In the social welfare system, realising ideal methods of inclusion is not an easy matter. Kemény, Kondor, & Tausz (2014) have observed that:

> '… although all the professional preconditions have been given to implement the right to rehabilitation since 2002, and on the surface the government supports the implementation of the Supported Employment and Back to Work occupational rehabilitation programmes based on American and British schemes, the lack of unambiguous political commitment hinders improvements in the field. Although up-to-date knowledge and more than ten years' experience on the procedures of complex rehabilitation is available in Hungary, this know-how is not adopted by the state-run services of rehabilitation.'

The situation is the same in Indonesia, where welfare services for PwD through Vocational Training are designed so that, ideally, disabled workers will be accepted in the job market. These SOPs have to be followed, but there are obstacles to developing the skills of disabled people that affect the process from the beginning, i.e. the recruitment and assessment phases. So that the social services from NVRC could reach its goals as social rehabilitation center. Suharto (2004) said social rehabilitation is a comprehensive and integrated social services, in order to help PwDs to do their social functions. Socia workers become crucial profession. Ministry of Social Affairs (about social welfare) based on the law

of Republic of Indonesia Number of 2009, Number 4 of of 1997 disabled people (about People with disability), and Number 8 of 2016 about People With Disabilities said that social rehabititation is a process of recreating and developing to enable a person to do his/her social function in society normally. Kirst-Ashman (2010) mentioned roles of social workers, they are: counsellor, educator, broker, case manager, mobilizer, mediator, and advocate.

Recruitment Process

As a government institution, NVRC directs its efforts towards service and social rehabilitation, especially the process of functionalisation and development to enable PwD to be able to carry out their social functions reasonably in mainstream life. One of its programmes is institution-based social rehabilitation and vocational training with social workers and instructors as the driving force. Social workers and instructors work with PwD to carry out the process established by the Ministry of Social Affairs regarding the standardisation of social rehabilitation services that should be adopted by every social institution.

Based on data from field findings, in the implementation of SOPs at NVRC, social workers were involved in several stages of activities, including recruitment and assessment activities, vocational training activities and resocialisation activities.

Recruitment and assessment in general at NVRC is related to the delivery of information on the service programmes offered by NVRC to city and provincial social services institutions, as well as to the selection of prospective students for the Technical Service Unit or *Unit Pelayanan Teknis* (UPT) in Bahasa. The findings in the field stated that the distributed information about the service programme activities offered by NVRC was obtained by prospective students from several sources, namely from the city and provincial social services institutions serving prospective students and from NVRC alumni.

NVRC has established criteria that must be met by prospective students; these are shown in Table 2 below:

Table 2: Requirements for Prospective Students

NO	Dissemination about NVRC		
1	Requirements for Prospective Students	General requirements	• Age 18 to 35 • Marital status = not married
		Special requirements	• Minimum education level • Basic skills (certificates)

This field data was collected by the authors from leaflets and booklets published by NVRC. One of the requirements for prospective students who want to receive training at NVRC is that they master certain basic skills as evidenced by a certificate, as explained by the following quote:

> ‘Yes, so [all students] must have basic skills from the UPT [in Bahasa] or Technical Service Unit) from specialised training institutions; only then will they be selected to enter here. Here they are trained to have skills so that they can later be placed in the work setting, industry, companies that do have standards. They are (from) almost all over Indonesia, as [NVRC is] part of the national referral system; basically those who get in here no longer need to get basic vocational [training], we just help them get advance skill level that matches the standard… for nine months.’ (AMA, March 2018, Management)

As this quote explains, to enter NVRC, students are required to have basic skills from training institutions prior to selection. This was confirmed by other informants:

> ‘Here, the requirement is having a basic skill. For instance, sewing skills, so that they must be able to do basic sewing.’ (IWG, March 2018, Social Workers)

Before being able to receive services at NVRC, prospective students are selected while they are at basic skills training institutions. This is also supported by the following quote:

> 'We chose the UPT [in Bahasa] or Technical Service Unit, ministry of Social Affairs before he graduated from there; we looked first, we selected him, we interviewed him, we assessed him, we were motivated… if you want to be here… and want to continue to get advanced skills, [it requires] coordination with parents [and] coordinating with social services as recommended. But what we need to look at is the ability in the institution… we see their ability first.' (M, March 2018, Social Workers).

Our field data explains the general recruitment stages that should be carried out by NVRC. Yet our data also mention things that are contrary to the SOPs, namely, the incompatibility of prospective student requirements. This can be explained based on the following interview excerpts:

> 'It can be seen from the students that maybe they don't have basic abilities, so they have difficulty following the subject in class … for example, in electronics or automotive class that requires skill at mathematics, yeah, you know that our children are from all over Indonesia and from that point … on the level of education… maybe lack of knowledge, on average … they have difficulties, … because finding PwD who have high marks at school is difficult, [even in] a large region.' (PA, March 2018, Management)

PA states that students who do not have basic skills will have difficulty with the training at NVRC. This is due to the difficulty of finding qualified students among PwD. Informants such as the social worker quoted below also mentioned matters related to students' basic skills:

> 'Those children … are primarily those who do not have basic [skills], even though the requirements [state that they] must (have basic skills), but the fact is there are still many, in fact many (who have no skill base).' (S, March 2018, Social Workers)

Our findings show that there are still obstacles to the recruitment process. These constraints include, among others, the process of socialisation and non-compliance with the requirements of prospective students. This can be explained based on the following interview excerpts:

> 'For the recruitment itself, we look for our children in the area, and there is a process of socialisation [that] is tasked to capture prospective PM.' (PA, March 2018, structural official)

As our PA informants explained, socialisation activities are carried out throughout the various regions as part of the recruitment process of prospective NVRC students. One PA informant, however, also mentioned the obstacles affecting the socialisation process, as explained in the following quote: 'Because of budget constraints [we] cannot reach all provinces.' (PA, March 2018, structural official)

This PA informant explained that, because of the limited budget available to NVRC, not all regions could be reached through socialisation and recruitment activities. This relates to prospective students who would be sent to NVRC by their own regional (city/provincial) social service organisation, as also explained in the following quote:

> 'The social services here have to guess, is this possible with the criteria? … can this student pass NVRC? … that's because there is no socialisation … we don't understand what kind of student is accepted at NVRC, as only [students from] a few regions were selected.' (S, March 2018, social workers)

Informant S mentioned that the regional office sent prospective students without knowing the criteria required by NVRC; according to S, this was due to lack of socialisation. Informant S also mentioned that prospective students could select only a few skill areas to work on. This claim is also supported by the following quote: 'If I don't have a filter from the social service, the assessment doesn't exist.' (IF, March 2018, student)

IF informants explained the lack of filtering conducted by the social services organisations in their area. This claim supports the previous statement that not all regions can carry out socialisation and selection.

Based on our field findings, the reason for this is the limited budget available to NVRC for socialisation activities.

Assessment Phase

The assessment stage at NVRC is carried out to determine the types of skills that are in keeping with the interests and talents of prospective students with disabilities and their degree of accountability. In general, the assessments carried out by NVRC are divided into two phases, namely, skills assessment and physical assessment. As one informant explained:

> 'This assessment looks at the abilities, talents and interests, [including] physical abilities, [to determine] whether he or she (a student sent by the disability facilitator) is suitable or not.' (AMA, March 2018, structural official)

This confirms that the assessment is carried out to determine the students' abilities, talents, interests and physical skills. That explanation is also supported by the following quote:

> 'We read the biodata [of the students] that will enter here, for example [whether their disabilities arose] from congenital disabilities or accidents, [and whether to date] he has studied in school and what skills he learned before.' (EN, March 2018, social workers)

Informant EN explained that, from the biodata submitted to NVRC, the staff can see what skills have already been learned by each prospective student. Regarding physical assessments of prospective NVRC students, Informant EN reports that 'later the assessment team will explain the child's physical potential, health and so on.' (EN, March 2018, social worker)

The activities carried out by NVRC related to the assessment stage can be classified into two types, namely, the choices made by prospective students based on their interest in a particular skill field and the adjustment of the availability of facilities and infrastructure at NVRC. This is explained in the following quote:

> 'This is where you (students) learn what you want first; the first one is the primary choice, and the second is the second choice (skill choice). If [a student] fulfils the requirements of the primary alternative, he is in. But if he does not, you can't help looking at the second option.' (S, March 2018, social worker)

Informant S explained that students who are unable to complete or not suitable for the training they are most interested in can move to their second-choice skill because each student is asked to name their top two choices in the assessment. This is supported by the following quote:

> 'During the evaluation, we (students) were told to choose two, and there was a primary choice [and] a backup option. Because maybe… the disability itself [plays a role], so perhaps there are friends who want to go to automotive, for example, but [due to] the condition of their own body, it is not possible.' (IF, March 2018, student)

As explained earlier, assessment activities are carried out to determine the ability of students so that they can be placed in appropriate skills training. One of the factors that influences this placement is the availability of facilities and infrastructure owned by NVRC, as explained in the following quote:

> 'Yes. There is indeed a quota; there are restrictions. For example, computer [classes have] a maximum of 20 because [more] computer seats are not available.' (S, March 2018, social worker)

Informant S explained that every training area has a capacity limit; this is related to the facilities and equipment owned by NVRC.

Our findings showed that there were obstacles affecting the assessment process. One of these constraints is that the choice of skill field is not based solely on the abilities of students; rather, it can be influenced by internal factors such as limited facilities and infrastructure, as well as on external

factors such as the determination of skills not following the interests of students who register. This is confirmed by the following interview excerpts:

> 'There was an assessment tool: [skills to be learned were chosen] not only according to desire or student requests, but also according to tested ability. There have been children who were interested in design, but did not have ten fingers to type on a computer so [their goals were] adjusted.' M, March 2018, social worker)

Informant M mentioned that, in determining placement in a training field, the assessment is carried out using specific tools and methods so that it is not only based on the wishes of the prospective students themselves. However, a different explanation was given by a student informant:

> 'Our placement is determined by [multiple factors], for example, when I joined the training in Banten, I joined cell phone service programme, [but] when I joined here, I joined metalworking because of my wishes.' (A, March 2018, student)

The results of our interviews reveal that the choice of skills training that each student follows is not based solely on the results of the assessment but is also based on the students' interests or willingness.

Discussion

Butcher (2004) has explained that, in organisational management, several elements are needed to ensure that the services provided by HSO play the most significant role possible. The primary components in service organisations are corporate culture, SOPs, management roles and organisational systems. As a whole, each aspect is interdependent rather than separate from one another. The implementation of SOPs is also closely related to cultural elements, management roles and organisational systems. As the system model, the sub-systems in the organisation interact with one another. Concerning NVRC, any problems related to the implementation of recruitment and assessment will ultimately affect various other things within the organisational system. These problems can be seen in coordination and control efforts, efforts to manage the quality of NVRC students (student acceptance in the world of work) and NVRC efforts to improve the quality of the organisation and of the staff, who often experience workload beyond their competence.

Coordination efforts can be carried out between NVRC and the provincial/district/city social services organisations in terms of recruiting students, yet students from the PwD population must be selected according to the provisions and needs of NVRC. Coordination efforts can also be made with other parties who conduct skills training, especially necessary skills, such as vocational training centres, both public and private. Monitoring activities for recruiting prospective students also play an essential role in recruiting students from qualified PwD circles, starting by providing transparent and sustainable information about the requirements. Furthermore, to produce trained workers who are also PwD, standards regarding the acceptance of prospective students at NVRC must be implemented fully and with integrity; this can be done by controlling and verifying the recommended prospective students from the provincial/district/city social service organisation or training centre.

Considering that the skills training provided at NVRC is at an advanced level, if students who get the skills training follow the requirements and conditions of their accessibility, it will undoubtedly affect the quality of services provided. This will affect the success of NVRC graduates at companies and in the world of work. The distribution of NVRC graduates in the work setting should be based on the skills that have been obtained through training at NVRC. Thus the aim of NVRC to produce qualified and professional workers who are also PwD will be achieved.

To achieve this, NVRC must improve the quality of its organisation by adjusting the rules and policies that are deemed necessary to achieve the organisation's goals. If a regulation or procedure is deemed appropriate, then its proper implementation must be prioritised, and each stage of the process must be properly supervised to ensure that this is the case, from the perspective of the implementation of the

process stages and from that of organisational quality. Of course, this must be supported by the staff associated with the programme.

The staff at NVRC plays an important role in the implementation of the programmes at NVRC. It is natural that NVRC will continue to make efforts to improve the quality of its staff, including social workers, instructors and other workers who carry out the activities and programmes. A prior inventory of needs would be useful to direct NVRC's efforts to improve the quality of its services, by revealing, for example, whether it is necessary to increase the number of workers in a particular field, or simply to increase the level of expertise or skills of the existing workforce. This will ensure that the expected performance of the organisation can run effectively and efficiently so as to produce optimal results.

Conclusion

The recipients of the service programme at NVRC are given skills training in accordance with their various needs and levels of disability. With this skills training, it is expected that the PwD who graduate from NVRC will become more independent, especially in terms of obtaining employment. The benefits of the training are also expected to be felt by their families and even by the surrounding community.

To achieve these objectives NVRC has divided the duties and functions of each profession or its workforce and has arranged every activity in accordance with the SOPs. In reality, however, not all of the SOPs that have been established can always be applied. One example is the requirement that prospective students who are accepted at NVRC must have followed and passed basic level training as evidenced by a certificate. Our field observations have revealed that the social workers and recruitment teams do not always consider these requirements before beginning the recruitment process.

Considering that NVRC is a training centre for PwD that aims to train and guide these individuals by giving them certain skills that will enable them to work in a company or another workplace, prospective students who are to join the skills training programme at NVRC are required to have basic skills obtained through basic training at training facilities or centres, both public and private. After they have these basic skills, they can continue applying the skills they have acquired towards higher skill training at NVRC.

Given the present situation, the researchers suggest the following:

1. Suggestions for Institutions:
    a) NVRC should cooperate with training institutions throughout Indonesia, including institutions run by government ministries, the private sector and skills training institutions (BLK) for the purpose of socialisation and recruitment of prospective students at NVRC. This will ensure that students are accepted only according to NVRC's stated requirements for basic skills that must be possessed by prospective students.
    b) The recruitment and assessment processes should be carried out in accordance with the existing requirements. Each prospective student should have complete and accurate documentation on file, and good communication with the candidate's area of origin is necessary so that all incoming students meet institutional requirements and are in a position to benefit from enrolment.
    c) NVRC should develop quality assurance, infrastructure, technology and supporting training in accordance with the needs of the institution.
    d) NVRC should establish communications with provincial/city/district social service organisations as a means of disseminating information about NVRC. This can be done without NVRC staff visiting each location directly if NVRC staff makes appropriate use of media.
2. Advice on Labour/Teaching
    a) NVRC should increase the number of workers/teaching staff according to the needs of the institution, so that the service activities carried out are provided by people who are truly competent in their fields.

b) Social workers should approach and communicate more effectively with relevant parties at the assessment stage, so that all students who qualify will meet the requirements, in terms of both general requirements and requirements regarding mastery of basic skills. Social workers should also develop methods of fostering a sense of independence and self-confidence among students so that they are better prepared to enter the world of work.

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The Employee's Performance at Faith-Based Organisations: Why Commitment, Motivation and Discipline Matters?

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Abstract

This paper examines the relationship between employee performance and the traits of the commitment of workers in faith-based organisations (FBOs). This study used the quantitative method at the national level in two FBOs in Indonesia, and it confirmed the existence of the investigated association. Although the performance of the majority of the respondents in both organisations showed moderate performers, this paper showed that the commitment of workers in FBO is a tremendous potential factor. The respondents indicated their strong commitment to do their tasks, especially the obligation to serve the community at any time and outside their working hours. The readiness to serve the beneficiaries become the potential factors in FBO whether it belonged to the government or the private sector because the supporting system and culture at FBO that support affective dan normative commitment of the workers. These findings are helpful to our understanding of administrative policies implementation in a human service organisation. The practice in a human service organisation, especially FBO, have to make the existence of employees as individuals and as an integral part of the social environment within an organisation.

Keywords: Affective Commitment, Normative Commitment, Faith-Based Organisation, Social Environment

Introduction

Non-government organisations, both faith-based and non-faith-based, are essential contributors to the improving the quality of life in the social service structure in Indonesia (Canda and Furman, 2010; Machdum, Daryanti, Imelda, and Adi, 2015). The existence of faith-based organisations (FBOs) is notable for providing assistance and developing businesses that promote social welfare. The characteristics that distinguish FBO from other organisations include shared values and beliefs that underpin services provided to the community.

In Indonesia, FBOs influence the welfare of the people. One of FBOs is the organisation that manages almsgiving from 88.2% of the country's 240 million people in Indonesia (Khoiron, 2015). The benefit of national *zakat* reached Rp 286 trillion in 2015 (Puskabaznas, 2016). Indonesian people put a lot of effort to manage those tremendous potentials. As an organisation devoted to the service of humanity, an FBO must demonstrate professionalism in executing its duties. Machdum, Daryanti, Imelda, and Adi (2015) state that FBOs evince efforts to professional work as the emergence of *zakat* management institutions that have grown from foundations into companies.

In Indonesia, *zakat* is explicitly managed by *zakat* management organisations (OPZs), which comprise the National Amil Zakat Agency (BAZNAS) and the Amil Zakat Institution (LAZ). BAZNAS is a government organisation formed to administer zakat nationally. On the other hand, LAZ is an institution that aims to collect and to manage *zakat* funds. Whether it is under the auspices

of the government or non-government organisation, OPZ is very important to the social welfare system because of certain unique features that do not exist in non-sectarian social service organisations. Graddy and Ye (in Machdum, 2013) explain that one of the distinctive attributes of FBOs is the elevated level of commitment exhibited by their members to achieve the organisation's vision and mission.

This paper examines the relationship between employee performance and the traits of the commitment of workers at two FBOs in Indonesia: X and Y. Wahyuny (2016) has demonstrated that the two organisations evince very high-efficiency levels. However, our study showed that the performance of the majority of the respondents in both organisations showed moderate performers. We argue that commitment is not enough for formal organisations. Some other factors contribute to the performance of workers: motivation and discipline. Previous studies examined commitment, motivation, and discipline in profit organisation (Chung-Kim 2017; Erasmus and John 2016; Osella and Widger, 2018; Pandya, 2016; Abu-raiya 2015; Aziz and Shofiawati, 2014). Whereas human service organisation is a vital element in a society in delivering welfare services for the existence of "human" as crucial raw material the input, process, and output of an organisation (Hasenfeld, 1983). This paper uncovers what we can learn about workers' performance in FBO and its correlation with commitment, motivation and discipline. We found that commitment is the strong correlation between commitment and performance, especially the commitment to serve the community at any time and outside their working hours. The readiness to serve the beneficiaries become the potential factors in FBO whether it belonged to the government or the private sector because the supporting system and culture at FBO that support affective dan normative commitment of the workers. Motivation and discipline had a weak correlation with performance. However, FBO must pay attention to those factors so that the workers become an integral part of the Human Service Organisation (HSO).

Methods

The present study uses the quantitative approach, and the examination scrutinises the relationship between independent and dependent variables. The type and nature of the study mandated descriptive research. Neuman (2013) explains that descriptive analysis uses survey data collection techniques, in which a researcher defines a research subject in detail, describes the study accurately and elucidates the research results. Descriptive research aims to provide a more comprehensive image of a phenomenon and purposes to explain the mechanism of the investigative process. The independent variables selected for the present study were commitment, motivation, and discipline. Meanwhile, employee performance was the dependent variable. The purpose of this study is to find if there is a correlation between performance and commitment; there is no correlation between performance and motivation; there is no correlation between performance and discipline.

Sample

This research was conducted at OPZ X and OPZ from September 2017 to April 2018. The population for this study comprised all non-managerial OPZ X and OPZ Y employees who had worked at the organisations for at least one year before the survey. The non-managerial staff consisted of employees and the support personnel of the organisations. Based on the criteria of the respondents, the population for the study were about 65 people at OPZ X and 47 people at OPZ Y. The study utilised the total sampling technique that surveyed the full population.

Data Collection Procedure

Data collection technique through the questionnaires administered to the population of respondents. The research questionnaire consists of closed questions. In filling out the survey, respondents were only required to select answers following their opinions and attitudes (Bryman, 2012). A validity test and a reliability analysis were first conducted to assess the research instrument. Validity refers to the degree of accuracy of the measurement instrument for research. According to Bryman (2012),

validity denotes whether the indicators designed to quantify the research concepts can be measured. Also, Bryman (2012) states that reliability alludes to consistency in the size of a concept. The measure of reliability requires three main factors to be possessed: stability, reliability, and consistency. An instrument is said to be good if the test results obtain a minimum measure of 0.70 (Neuman, 2013). The present investigation expected to receive a reliability value above 0.70 alpha.

Data Analysis

Before analysing, it was processed using MS Excel and the Statistical Programme for Social Science Windows version 23. The data analysis encompassed three stages for the present study. First, we assessed the frequency distribution that described the characteristics of the respondents and obtained the profile of respondents consisting of age, gender, education level and years of service. Second, a descriptive analysis was conducted for each variable to define and ascertain the indicators for each variable. Third, we examined a bivariate comprising cross-table and correlation assessments between the independent variables and the dependent variable.

Reliability and Validity

First, we conducted validity and reliability testing on data obtained from the results of the pretest questionnaire. We distributed the pretest questionnaire to prospective respondents. The alpha conbrach reliability test results about OPZ X were 0.768. The OPZ Y alpha conbrach reliability test results were 0.852. The alpha coefficients obtained for this study (0.768 and 0.852) demonstrated the acceptability of the research instrument because the measures were more than 0.70 (Neuman, 2013). The research instruments were thus declared reliable.

Results and Discussion

The results of the analysis of performance proved that the majority of the respondents were moderate performers. The results described above evidenced moderate performance outcomes by employees at both study sites. However, as FBOs, both X and Y displayed similarities in the aspect of commitment. Thus, even though the two organisations evince differences in nuances because of discrete funding sources, FBOs both recorded the highest scores on the item "ready to serve the community at any time and outside their working hours". The high scores of commitment correlate with the characteristics of FBOs. Graddy and Ye (in Machdum, 2013) mentioned that one of the distinctive attributes of FBOs is the elevated level of commitment exhibited by their members to achieve the organisation's vision and mission. However, our study showed that both organizations had a moderate performance. As a professional organisation, FBOs can not only rely on commitment as single factors. Organisations need to support the workers so that they can achieve FBOs' goals.

Previous studies have examined aspects of commitment, motivation, discipline These and the correlation with the organisation's culture and leadership style. However, the majority of such research is still related to the management of a general organisation. Study in human service organisation still emphasises motivation, values, discipline, and the correlation with the performance of volunteers. Whereas, the workers at Human Service Organisation are not only volunteers (Chung-Kim 2017; Erasmus and John 2016; Osella and Widger, 2018; Pandya 2016; Abu-raiya 2015; Aziz and Shofiawati, 2014).

Fahrudin and Adi, Yusuf and Husmiati, Witono and Toton, and Mudzakir (2016) professional workers, including social workers, played essential roles in FBOs. They do professionals works that maintain some field to use zakat funding properly. The professionals' help that become part of social services in FBOs is social rehabilitation, empowerment, protection, and insurance. Even Hall and Midgley (2012, p. 227) described *zakat* as one of the essential subjects in the development of new human service programs. As a potential organisation in the welfare system, development of professional work at FBO became a crucial matter.

Strong Commitment: Why Faith Matters?

About comparability, or the attitude of evaluating coworkers, 74.5% of OPZ Y employees evidenced a moderate mindset, 4.3% were low in their approach, and 21.3% were highly positive in their relative outlook. The analysis of the questionnaire items also evidenced the existence of a high level of indirect competition in the organisation. Some employees considered their coworkers to be their competitors, but others thought of coworkers as work partners. The comparatives and competencies at OPZ Y evidence the desire for employees to advance over each other in their careers and job designations.

The results of the analysis revealed that 93.8% of OPZ X employees are entirely committed to the organisation. The commitment variable consisted of three indicators in the present study: normative commitment, affective commitment, and continuance commitment. We also assessed descriptive percentages for each indicator. 1.5% of OPZ X employees demonstrated a low commitment for the scrutiny of commitment indicators and 4.6% exhibited high commitment.

A similar analysis with the same parameters as described above for the OPZ X employees, the population of the OPZ Y were non-managerial workers and support staff. At OPZ Y, 78.7% (37 respondents) of employees were wholly committed to the organisation, and 21.3% (10 respondents) revealed high commitment (Graphic 1).

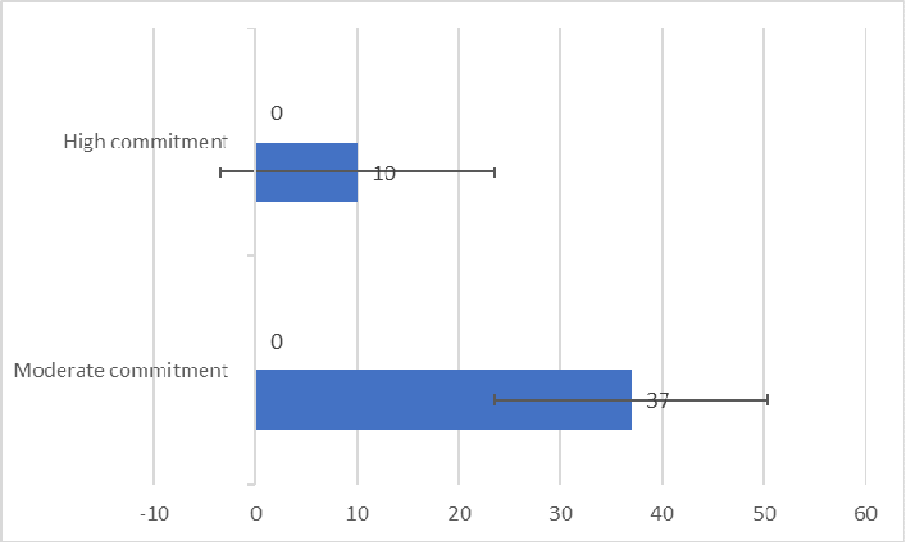

Graphics 1: Commitment Variable Description at OPZ Y

The analysis of commitment indicators also indicated this evaluation. The percentage of descriptive normative commitment evidenced that 66% of OPZ Y employees showed low commitment awareness and 34% displayed high commitment awareness. From the questionnaire items about normative commitment, the highest score was at the question "ready to serve the community at any time and outside their working hours ". The percentage of affective commitment proved that 70.2% of OPZ Y employees presented intermediate levels of commitment attachments, and 29.2% revealed high commitment commitments. The indicator of affective commitment proved that employees felt that they belonged to their organisation and that they had begun to feel an emotional attachment to their employer. The continuance commitment indicator showed that 83% of employees were moderately committed to the organisation, and 17% of OPZ Y employees exhibited a high commitment to the organisation. OPZ Y employees displayed moderate to high levels of loyalty to the organisation and thus found it difficult to leave their organisation (Graphic 2).

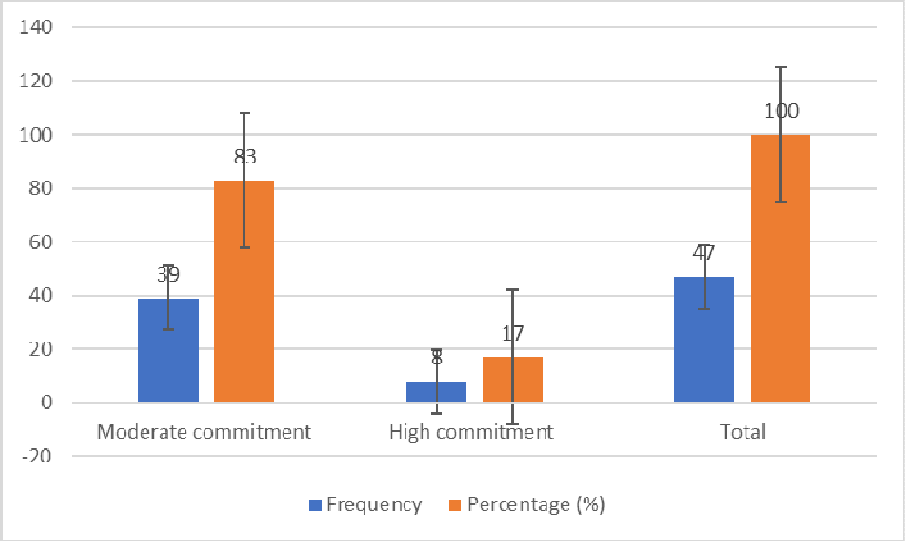

Graphics 2: ***Continuance Commitment Indicator Description at OPZ Y***

The high scores of both organisations in commitment variables are similar to Graddy and Ye's arguments about a characteristic of FBOs (in Machdum, 2013). The elements of faith and religion exert significant influence on the development of social welfare efforts to provide social services within a community. Adi (2013) asserts that religion is one of the drivers of performance in carrying out such community activities. In other words, the intrinsic motivation of an FBO can encourage the performance of its employees. Canda and Furman (2010) and Machdum (2013) also mentioned that the spiritual aspect of the social intervention in soybeans is significant because this religious feature accords individuals of more considerable influence in the control of human behaviour. For those reasons, FBOs have become a potential organisation in the welfare system. The workers automatically get the affective and normative commitment to work at FBO, whether it belonged to the government or the private sector.

Affective Commitment: working "from the heart."

The employees of both FBOs were also able to display optimal work quality and could be held responsible for the work they were asked to accomplish. Besides, employees were able to achieve the quantity of work and to evidence it by the number of tasks or volume of work performed per day or week. The employees of both organisations completed their assignments immediately and without delay.

Affective commitment pertains to the bond that involves the emotional feelings of employees towards their organisation. Employees with affective commitment feel a sense of belonging in the organisation and begin to forge an emotional attachment to their work environment. 80% of OPZ X employees who registered an intermediate level of commitment attachment reported the highest percentage of affective commitment, 6.2% were computed to show low commitment attachment, and 13.8% displayed high commitment attachment.

Machdum, Daryani, Imeda, and Adi (2015) also argued that FBOs evince efforts to professional work as the emergence of *zakat* management institutions that have grown from foundations into companies. Even FBOs become a proprietary organisation, spiritual aspect as a basic foundation in FBOs still existed. Similar to OPZ X and Y. Individually, the workers at OPZ X and Y had mental basic to work and use "the heart" in delivering social services for the needy people.

Moral obligation to serve the beneficiaries

Normative commitment is an awareness that work is part of personal responsibility. The highest percentage of normative commitment was shown by 98.5% (65 respondents) of OPZ X employees who demonstrated a moderate level of commitment awareness and only 1.5% (1 respondent) of the employees were found to exhibit a low commitment awareness towards the organisation and its work. From the questionnaire items regarding normative commitment, the highest score was at the question of "ready to serve the community at any time and outside their working hours" (Graphic 3).

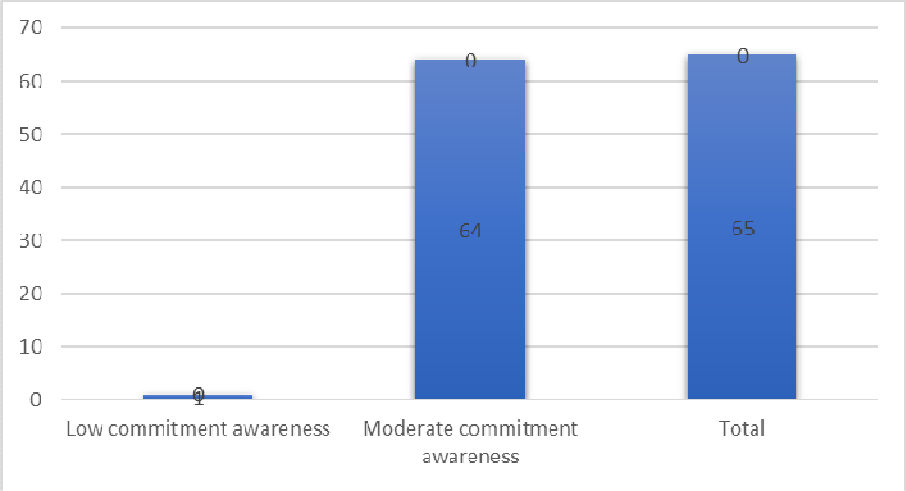

Graphic 3: Normative Commitment Indicator Description at OPZ X

The readiness of the worker to help others any time and outside their working hours became the uniqueness of FBO. This is potential for developing administration in a human service organisation (HSO). Moreover, HSO is not similar to the other types of general organisation. HSO use different theory, technique and principle for managing their unique raw material: the human being. Moreover, Pujileksono, Abdurrahman, Yuliani, and Wuryanti (2018, p. 127) argued that the domain of human service organisation management, especially in Indonesia, is still limited. In contrast, the human service organisation is a vital element in a society in delivering welfare services. As mentioned previously, the context of “human” is crucial raw material the input, process, and output of an organisation (Hasenfeld, 1983).

Independent workers as of an individual: why motivation and discipline also matter?

Not similar to affective and moral commitment, continuance commitment at both organisation showed a different result. Normative continuity relates to the awareness that the organisation is an aspect of one’s life. 90.8% of OPZ X employees who recorded a moderate commitment awareness showed the highest percentage on normative continuance, 1.5% showed low commitment awareness, and 7.7% displayed high commitment awareness. OPZ X employees were already aware of the importance of the organisation and felt as if they belonged to the organisation. OPZ X employees also found it is hard to quit the organisation because of their moderate to high levels of loyalty to their employer (Table 1).

Table 1: Continuance Commitment Indicator Description at OPZ X

Continuance Commitment			
		Frequency	Percentage (%)
Valid	Low commitment awareness	1	1.5
	Moderate commitment awareness	59	90.8
	High commitment awareness	5	7.7
	Total	65	100.0

The organisational structure and environment and to varied aspects of the psychology of employees who form a significant part of an FBO (Hasenfeld, 1983; Jones and May, 1995; Skidmore, 1995). Thus other factors besides commitment must also be evaluated. Commitment is not always the primary fuel encouraging employees towards high performance, and other aspects require attention. Motivation is one such factor. According to Wibowo (2007), commitment occurs on its own in employees who are already highly motivated as workers become aware of the importance of their optimal performance for the progress of the organisation.

Motivation is the most crucial element in social services (Skidmore, 1995, p.194) Concerning social work administration; moreover, available resources are more critical directly for the service delivery process of FBOs.

Bauer and Erdogan (2012) define motivation as the desire of a person to achieve specific goals or levels of performance in an organisation. Motivation directs the expenditure of best efforts by employees and aligns the conduct of members to the organisational goals.

Many organisational features can motivate employees to execute their work optimally, and one of them is existence. The results of the present investigation in both organisations reveal that employees can obtain conducive employee relationships because the indicators of work behaviour and attitudes show that most employees have reasonably polite work behaviour. Primarily, the employees of both organisations consider their coworkers to be partners rather than competitors and rarely enter into conflict with colleagues. This work climate was an effort in developing social work administration within the scope of the organisation. In promoting social work administration, social workers must understand that an FBO is different from other enterprises as it is fundamentally a human service organisation.

In contrast to organisations in general, the raw material of an FBO is the human element (Hasenfeld, 1983, p. 4). The individual needs of employees in FBOs are indeed a primary concern in the development of social work administration (Jones and May, 1995, p. 20-21). Thus, whatever the form of the organisation, if it is related to social services, social workers must attend to human factors within the organisation (Skidmore, 1995).

The role of superiors is also critical because they are evidenced to consider the advice of employees and to accept the aspirational needs of their workers. Besides, employees have begun to get direction from the organisational leadership concerning their work. Leadership skills in developing social work administration are related to more than aspects such as persistence, time management, compromise,

and creativity. In FBOs, the quality of leadership also requires soft skills. Thus, employees must be made to feel that they have the freedom to express themselves within the framework of the vision and mission of the organisation (Skidmore, 1995, p. 154-156).

The findings evidence the implementation of the basic principles of social work administration (Skidmore, 1995, p. 26-28) in both FBOs. The intended values of democratic involvement in the formulation of agency policies and procedures and observed open communication.

Other aspects related to motivation require attention in both organisations. Respondents at both sites stated that their remunerations were not commensurate with their workloads. Thus, improvements in the aspects of discipline in both FBOs could be from salaries paid. Choirudin (2015) asserts that the level of discipline is a factor that influences employee performance. Discipline is essential to the shaping of employees who are orderly and who obey organisational rules. Besides, the discipline also promotes corporate harmony and can help to leverage the effectiveness of the organisation in the future.

The present investigation demonstrated that 90.8% of the respondents who were OPZ X employees showed moderate motivation characteristics, 1.5% registered low motivation, and 7.7% were found to be highly motivated. The analysis of motivation indicators also clarified these results. In this study, the commitment variable comprised the three indicators of existence, relatedness, and growth. Presence denotes the meeting of the physiological and safety needs of employees. The highest percentage on the existence indicator evidenced that the organisations have fulfilled 92.3% of the physiological needs and security needs of OPZ X employees. The fulfilment of physiological needs and security needs are from collateral funds such as loans, pensions, work accident reserves and death resources available from organisations. However, the OPZ X employees stated that the salaries they received did not match their workloads.

Relatedness indicates the fulfilment of social and interpersonal needs. To determine the magnitude of the relatedness indicators, knowing the extent of the satisfaction of a person's social needs is essential. The highest percentage of relatedness indicators demonstrated that organisation sufficiently fulfilled 72.3% of the social needs of the OPZ X employees. The social needs that received the highest score also indicated that a strong sense of brotherhood (*ukhuwah*). The organisation already established fellowship among employees.

Growth symbolises the fulfilment of self-actualisation needs at work. At the highest count, the growth indicator proved that 80% of the self-actualisation needs of OPZ X employees were appropriately satisfied. Employees felt that they were able to initiate new ideas at work, and they accomplished assignments without delay.

In this study, the discipline variable consisted of four indicators: discipline quality, the quantity of discipline, compensation, and conservation. The results of the analysis divulged that 87.7% of the OPZ X respondents were quite disciplined, 1.5 were undisciplined, and 10.8% were very disciplined. The study of disciplinary indicators elucidated through this outcome.

The quality of discipline is related to the compliance of employees with organisational orders. The highest percentage on the discipline quality indicator evidenced that 78.5% of OPZ X employees were entirely compliant with organisational regulations. Employees were punctual and registered their presence. However, employees rarely attended the morning prayer activities held by the organisation. The two locations inhabited by OPZ X attributed to the absence of employees during prayers: the employees who worked at areas that were not at the places where the implementation of morning prayer activities tended not to be present because of the distance between the offices.
The volume of output and contribution measures the quantity of discipline. The amount of discipline is satisfied when employees can contribute to the organisation through acts such as offering opinions at organisational meetings. Besides, the measure also encompasses the leadership's consideration of suggestions received from employees. The highest percentage on this discipline quantity indicator

revealed sufficiency of the quantity of discipline at 83.1%. Discipline was low for 1.5%, and 15.4% showed high levels of discipline quantity.

Compensation denotes suggestions, directions and improvement exchanged between the leadership and members of the organisation. The highest percentage on the compensation indicator shows that 93.8% of OPZ X employees displayed moderate compensation and 6.2% showed high compensation, in the sense that employees had begun to get directions from the leadership of the organisation regarding their work. Conservation refers to respect for the rules and regulations of the organisation. The highest percentage of conservation indicators showed that 53.8% of OPZ X employees were entirely compliant, and 46.2% of the employees were not compliant with organisational regulations. Employees showed respect for the organisation. They sought permission from the leadership before late arrival. However, OPZ employees were not found to be compliant with regulations as sick employees rarely tendered illness certificates from doctors.

In this study, the performance variable consisted of four indicators: work quality, the quantity of work, attribution and competence and comparability. The investigation disclosed that 93.8% of the OPZ X respondents presented moderate performance characteristics, and 6.2% were high performing. The analysis of performance indicators also highlighted this assessment.

From the quality and quantity of work, we calculated the work results. Based on the work quality questionnaire items, employees were able to display optimal work quality. Employees were also found to be responsible for their work. The work quality indicator showed that 92.3% of OPZ X employees delivered moderate work results, and 7.7% were high performing. From the work quantity questionnaire item, employees were able to display work quantity based on the number or volume of work per day or per week. The employees had sufficient quality and quantity.

Work behaviour consisted of two indicators: conduct while executing work and attitudes towards coworkers. The work behaviour indicator evidenced that 89.2% of OPZ X employees showed reasonably polite work behaviour and 10.8% of OPZ X employees were very courteous at work. The questionnaire items regarding attitudes towards coworkers proved that employees were willing to help their coworkers with work-related problems. The attribution and competency indicator revealed that 81.5% of OPZ X employee respondents owned the characteristics of attribution and competency and 18.5% presented with high attribution and competency characteristics. Attribution and competence involve knowledge and planning. In the sub-indicator of knowledge, employees master general knowledge (theory) that supports the implementation of their work.

About the planning and presentation sub-indicator, an employee was expected to devise a plan to accomplish all tasks and to create a presentation target. On the indicator of comparative attitude, 96.9% of employees were adjudged to have a moderate mindset, 1.5% were evaluated low, and 1.5% were assessed as high in their relative percentage of approach. The conclusion is the employees valued their coworkers to be partners rather than competitors in terms of their work. The research also found that employees rarely entered into conflict situations with their coworkers.

Table 2: Attitude Toward The Colleagues at OPZ X

Comparative			
		Frequency	Percentage (%)
Valid	Low Comparative	1	1.5
	Moderate Comparative	63	96.9
	High Comparative	1	1.5
	Total	65	100.0

The results also divulged that 85.11% of the OPZ Y respondents presented the characteristics of moderate motivation, 2.1% showed low motivation and 12.8% were highly motivated. The analysis of motivation indicators also verified this outcome. Existence indicators proved organisation fulfilled 70.2% of the physiological and security needs of OPZ Y employees. Nonetheless, as with the OPZ X, OPZ Y employees also stated that their salaries were not commensurate with their workloads. The relatedness indicator shows that the organisation gave satisfaction to 72.3% of the social needs of OPZ Y employees adequately and also fulfilled 27.7% of their social needs. As with their OPZ X counterparts, the highest social need scores also proved the existence of a strong brotherhood (*ukhuwah*) among employees. The growth indicator evidenced that organisation adequately fulfilled 87.3% of the self-actualisation needs of OPZ Y employees.

The investigation further disclosed that 87.2% of OPZ Y's respondents are quite disciplined, and 12.8% are very disciplined. The analysis of disciplinary indicators also corroborated this result. The disciplinary quality indicator displayed that 70.2% of OPZ Y's employees were entirely compliant with organisational regulations. Employees came to work on time and registered their presence. Employees also attended the morning prayer activities held regularly by their organisation. The discipline quantity indicator showed sufficiency at 78.7%. The quantity of discipline was found to be low, with 4.3% of the respondents, and 17% revealed an elevated amount of discipline.

The compensation indicator exhibited moderate results for 87.2% of OPZ Y employees and high outcomes for 12.8% of the respondents. Meanwhile, conservation indicators proved that 66% of OPZ Y employees were entirely compliant with organisational regulations, and 34% were compliant. Employees showed respect for the organisation and asked for permission from the leadership for delays in attendance. When sick, employees were required to provide a certificate from a doctor.

Conclusion

There is a correlation between employee performance and the traits of the commitment of workers at two FBOs in Indonesia: X and Y. However, our study showed that the performance of the majority of the respondents in both organisations showed average scores. Based on the findings, we claim that commitment is not enough for formal organisations. Motivation and discipline contributed to the performance of the workers, whether it belonged to the government or the private sector. Emotional and psychological aspect for workers as an individual is a crucial matter for the existence of “human” as essential raw material, the input, process, and output of an organisation. To get professional performance, FBOs need to build supporting system and culture. Organisations system must appreciate the existence of factors that influence employee performance in addition to commitment, motivation, and discipline. Other attributes that can affect employee performance include job satisfaction, leadership styles, organisational culture, and corporate environment. In the future, the employees' performance will continue to improve through organisations attending to these factors.

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Tax Rate and Income Shifting Behavior of Top Bracket Taxpayers: Evidence from Indonesia

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Abstract

This study estimates the effect of dividends tax rate reduction on income shifting behavior of top-bracket taxpayers in Indonesia by natural experiment. Income shifting behavior is measured by the Directorate General of Tax (DGT) data in the period of tax rate reduction (2008-2012). Descriptive statistics and dynamic panel data analysis show that the decrease of dividend tax rate causes income shifting to dividend income on top bracket personal taxpayers. Based on descriptive analysis, income shifting behavior occurs in quartile one and quartile four of the top bracket individual taxpayers with an average income of IDR 390 and IDR 10 billion in 2008.

Keywords: Tax rate, income shifting, tax on dividend

Introduction

In 2008, the Indonesian Personal Income Tax (PIT) rate was changed by law number 36/2008 that amended law Number 7 of 1983. This law that took effect on January 1st, 2009, changed the tax treatment for dividends. As a result, individuals that receive dividend income pay lower income tax after the enactment of the law. This dividend tax cut aimed to increase investment by lowering the cost of capital. Based on Kartikasari (2013), simplification and dividend tax cuts in 2009 have a positive impact on individual shareholdings. Single tariffs on dividends also increase competitiveness in tax competition (Pirttila & Selin, 2011).

Although simplification and dividend tax cuts have a positive effect, they also create incentives for tax avoidance through income shifting. Income shifting is the process of income transfer between periods, type of income, and tax bracket to reduce total tax payment (Pirtilla & Selin, 2011). Income shifting is a form of legal tax avoidance and does not have a direct impact on the actual income earned. Income shifting has some negative impacts on the welfare of society. Income shifting increases the tax system's cost efficiency due to the transition from the non-dividend income tax base to the dividend tax base. Income shifting also reduces the progressiveness of tax rates, thus increasing the wealth gap (Pirtilla & Selin, 2011). Income shifting between tax bases also lowers tax revenues as well as distorts aggregate statistics (Slemrod & Gordon, 2000; Slemrod J., 1995).

Based on empirical research, income shifting occurs mostly among self-employed and high-income individuals. Ramonov (2006) suggests that income shifting between private and corporate tax bases has occurred in Israel. Gordon and Slemrod (2000) and Devereux et al. (2014) obtained similar results in the US and UK, while Pirtilla and Sellin (2011) showed an increase in the share of capital income among business owners after-tax rate reduction. Although income shifting is legal and financially rewarding, some eligible individuals still do not do it. Empirical research indicates a difference in individual response to changes in tax policy. For example, some eligible individuals do not take welfare

benefits (Chetty et al., 2013). Based on Chetty et al. (2013), people do not realize capital gains at the most optimal time. Stephens and Ward-Batts (2004) show that there are eligible individuals who do not reallocate asset ownership for tax savings. There are several explanations for various responses to income shifting opportunities. Based on Further et al. (2016), the complexity of the confusing tax system has led to an unintentional response. Meanwhile, Chetty et al. (2011) indicate that response occurs if the tariff changes are significant enough.

The Indonesian Tax Reform in 2008 led to a difference in tax rates between non-dividend income and dividends, especially in high-income groups. The marginal tax rate on the non-dividend income of top bracket personal taxpayers is three times the marginal tax rate on dividends. Theoretically, the high rate difference encourages profit shifting from non-final income to dividends. Nevertheless, there is no empirical research that proves income shifting behavior as a result of the Indonesian tax rate reform in 2008.

This study investigates the existence of income shifting on the top bracket individual taxpayers because of the difference in tax rates between dividends and other income. This research is the first research on income shifting behavior that uses micro tax data in Indonesia. Previous research has mostly been carried out in European and American countries, which have different taxation systems. According to Saez, Slemrod, & Giertz (2012), system taxes and responses to changes in tax rates are closely related.

Literature Review

New Tax Responsiveness Literature

Economists, at first, analyzed the impact of tax rate changes on labor supply reflected by hours worked. However, empirical research indicates that taxes have a minimal and even negative effect on working hours except for married women (Pencavel, 1986; Heckman, 1993). This result is contrary to the hypothesis that taxes decrease the job's incentives. In 1995, Feldstein measured responses to changes in tax rates by using taxable income. The Feldstein (1995) study became the beginning of The New Tax Responsiveness (NTR) literature.

Feldstein (1995) used panel data to analyze the response of tax rate changes in 1986 in the United States. The results showed an enormous Elasticity of Taxable Income, ranging from 1-3. The study conducted after Feldstein (1995) tried to improve the estimation method by paying more attention to the instruments of the net-of-tax rate as well as the non-tax factors affecting the income distribution. With these modifications, the results showed a much lower elasticity estimate than Feldstein's elasticity (1995). Based on some empirical studies, ETI ranges from 0 to 0.6. Based on Gruber and Saez (2002), the magnitude of ETI is 0.18 for the middle-income group and 0.57 for the high-income group. Further research was conducted to assess the reliability and consistency of ETIs with various tariff policies and net-of-tax rate instruments.

Using Swedish data, Blomquist and Selin (2010) estimated the size of the ETI in the range of 0.2 in males and 1 in females. Also, there is a positive elasticity for wage rate as well as significant income effects. Kleven and Schultz (2014) use panel data on some tax rate changes in Denmark. The result indicates that the ETI is 0.3. Chetty (2011) conducted the same research in Denmark and produced a very small ETI. Aarbu and Thorseen's (2001) studies in Norway show an insignificant ETI. According to Poterba (2007), the tax rate affects the taxable income of individual taxpayers through two channels. First, changes in tax rates affect the behavior of individuals in generating revenue or also called the labor supply effect (Doerrenberg & Duncan, 2014). For example, an increase in tax rate leads to a reduction in working hours. Thus, the increase in tax rates will lower taxable income.

The second channel is the behavior in reporting taxes. If there is an increase in tax rates, there will be a tendency to lower the reported earnings. For example, an increase in payroll tax rates causes employees to choose income benefits, such as health insurance, rather than cash compensation. This behavior lowers taxable income and consequently increases other compensation. Another example is the behavior of time-shifting income recognition through deferred income, thus decreasing the current

reported income. Although taxpayers have deferred income in the future, current revenue will not reflect that information.

Tax reporting behavior consists of avoidance and evasion (Slemrod & Yitzhaki, 1996). Tax reporting behavior is classified as tax avoidance if done legally and vice versa. High-income responses to changes in tax rates are higher than in other income groups (Feldstein, 1995). This difference is because wealthy individuals have greater control over income and deductions (Poterba, 2007). The high-income response to tax rate changes comes from three channels: labor supply, tax avoidance, and compensation bargaining (Piketty, Saez, & Stantcheva, 2014).

An increase in tax revenues due to tax rate cuts in high-income individuals, initially, are considered to be labor supply responses (Feldstein, 1995; Lindsay, 1987). Through the labor supply channel, tax rate cuts will stimulate the economic activities of the affluent group. Financial incentives will increase the intensity of work, entrepreneurship, and investment while increasing taxable income and tax revenue. However, Slemrod (1995) showed that response from the high-income group is dominated by tax avoidance behavior, including income shifting between tax bases and periods.

Responses from the high earning group to changes in tax rates can come from the compensation bargaining channel (Piketty, Saez, & Stantcheva, 2014). There is a correlation between tax rates and high-income behavior in demanding compensation. If the marginal tax rate is high enough, then the utility of earning high income among the rich will decline. Thus the demand for high payment will also decrease and vice versa. Through these three channels, theoretically, a decrease in the marginal tax rate will lead to an increase in the taxable income of the rich.

Income Shifting

Stiglitz (1985) classify the income tax avoidance in 3 (three) basic principles: suspension of tax payments in the lower tax rate period, transfer of tax burdens to tax agents at lower rates; as well as income reclassification to get lower tax rates. Tax avoidance occurs because of differences in tax rates across periods, individuals, and income classifications. Tax avoidance is often a combination of these three principles.

Income shifting is the most relevant form of tax avoidance for business owners and high-income groups (Slemrod & Gillitzer, Tax Systems, 2014). Income shifting is also suspected to be the primary cause of the high elasticity of taxable income among the top income (Gordon & Slemrod, 2000). The difference in tax rates between cash wages and other types of income drives high-income earners to choose non-cash fees, while workers outside the high-income group do not have that option. If the tax consideration is excluded, the cash wage income is more profitable, and the lower-income group is in the corner solution. Thus low- income group behavior is less responsive to changes in tax rates. Conversely, the high-income group would be susceptible to the tax rate of income classification (Gordon & Slemrod, 2000).

The distinction between real responses and income-shifting is crucial because it affects the accuracy of policy recommendations (Slemrod J. 1995, Piketty, Saez, & Stantcheva, 2014). The existence of income-shifting between earning bases can lead to inaccurate deadweight loss calculation since the decrease in taxable income due to income-shifting is not entirely a deadweight loss if the income transferred will also be taxed (Saez E., 2004). Thus, the deadweight loss due to income-shifting is smaller than the real response (Chetty R., 2009). If the income-shifting response is not separated from the actual response, then the optimal tax rate determination is less accurate, as well as the strategy in increasing the income tax. Information on the magnitude of income shifting responses is the key answer to the debate over effective tax revenue policies, closing income-shifting gaps, or tax rate cuts.

Three conditions must be met before a person decides to make income shifting, i.e., incentives, access, and awareness (Alstadsaeter & Jacob, 2017). A person does tax avoidance if the expected benefit exceeds the cost incurred for tax avoidance. Benefits derived from tax avoidance include the expected disposable income increase due to a reduction in tax payments. Meanwhile, the cost of tax avoidance

includes monetary expenditure such as the cost of the consultant and non-monetary expenses such as tax morale (Andreoni, Erard, & Feinstein, 1998; Fortin, Lacroix, & Villeal, 2007). In contrast to tax evasion, tax avoidance is influenced by tax rates since there is no punishment for "unsuccessful avoidance."

Another thing required by individuals who want to do tax avoidance is access to perform such activities. For example, someone must be an entrepreneur to practice tax avoidance (Pirtilla & Selin, 2011; Kleven, Knudsen, Kreiner, & Saez, 2011) or have stock options (Goolsbee A., 2000). The opportunity to do tax avoidance is reserved. For example, to make income shifting from labor income into capital income, a person must have the ability to get paid salary in the form of capital income or to negotiate so.

In addition to incentives and access to tax avoidance, another requirement that must be met is the awareness of the tax rules. The tax-consciousness level is influenced by information about the tax system and the ability of taxpayers to process information (Chetty, Looney, & Kroft, 2009). Consequently, the taxpayer may not be aware of any incentives to undertake a strategy to minimize taxes.

Dual Income Taxation

Dual Income Taxation is a tax scheme that divides revenue into income from assets and labor income and classifies it as a different tax base. Dual income Taxation based on various economic activities (business, self-employment, employment, land rent) is separated into capital income and labor income. Capital income includes dividends, interest income, rent, and capital gains from real capital and property. Employment income consists of wages and salaries, benefits in kind, pension payments, and social security transfers. The capital income is subject to a flat tax, whereas labor income is subject to progressive tax rates.

Taxes on capital earnings made under the flat withholding tax mechanism at low rates will significantly reduce tax compliance and collection costs. The flat capital tax also reduces the difference in tax rate between domestic tax and source tax in foreign countries, thus preventing the occurrence of capital flight.

Research on dual-income taxation reform in the Nordic countries shows incentives for small business owners to convert labor income into capital income (Sorensen, 1998; Lindhe, Sodersten, & Oberg, 2004). Fjaerli and Lund (2001) research indicate that taxpayer's decision to choose income in the form of salary or dividend in the double taxation system in Norway is determined by tax and non-tax factor, such as access to social benefits.

Methodology

Model

To measure the income shifting response, we assume that there are two personal income tax bases, namely, non-dividend z_{ND} and dividend z_D. So, the total taxable income (z_Y) can be formulated as $z_Y = z_{ND} + z_D$. The non-dividend tax rate is τ_{ND}, whereas the dividend tax rate is τ_D. Assume $\tau_{ND} > \tau_D$, and both are exogenous variables.

The income owner is assumed to have the opportunity to make income-shifting but not changing the amount of taxable income. If the size of income transferred from non-dividend to dividend is α, the budget constraint can be formulated as follows:

$$c = (1 - \tau_{ND})(1 - \alpha)z_Y + (1 - \tau_D)\alpha z_Y + R \quad (1)$$

In equation (1), $(1-\alpha)z_Y = z_{ND}$ is taxable income on non-dividend, $\alpha z_Y = z_D$ is taxable income on dividends. The utility function of the income owner is formulated as follows:

$$\mu_i(c, z_Y, \alpha) = c - \theta(z_Y) - \phi_i(\alpha) \quad (2)$$

In equation (2), $\theta(z_Y)$ is the cost incurred to obtain income while $\phi_i(\alpha)$ is the cost incurred to move income from salary to dividend. Following the model used by Piketty et al. (2014), to simplify the model, it is assumed that both cost functions are separate convex functions. The first-order condition to maximize utility is as follows:

$$(1-\tau_{ND})(1-\alpha) + (1-\tau_D)\alpha = \phi_i'(\alpha) \quad (3)$$

$$(\tau_{ND} - \tau_D)z_Y = \phi_i'(\alpha) \quad (4)$$

Based on equation (3), if the amount of income-shifting α is fixed, then total taxable income is the increasing function of the net tax rate. According to equation (4), if the total taxable income z_Y is fixed, then income-shifting is an increasing function of the difference in the tax rate $(\tau_{ND} - \tau_D)$. Based on theory and previous empirical research, the hypothesis proposed in this study is that the magnitude difference of net of the marginal tax rate of dividend income and non-dividend income will have a negative impact on non-dividend income.

The data is collected from the Individual Tax Return of top-bracket taxpayers from 2007 to 2012. Based on tax regulation in 2007, the top bracket taxpayer is an individual taxpayer who reported income exceeds 200 million rupiahs per year. The data covers all critical information needed in this research, such as taxable income and composition and taxpayers' demographic data including age, assets, debt, residence, job classification, and the number of dependents. With this information, the author can calculate the amount of marginal tax rate and the average tax rate.

Empirical Specification

The empirical method in this study is based on Saez, Slemrod, and Giertz (2012) and Harju and Matikka's (2016) models. The empirical model used is as follows:

$$\log y_{ti} = \alpha_0 + \alpha_1 \log(\mathrm{NMTR_D} - \mathrm{NMTR}) + \alpha_2 \log \mathrm{NMTR_{ti}} + \alpha_3 \log y_{t-1i} + \alpha_4 \mathrm{mariage} + \alpha_5 \mathrm{joint} + \alpha_6 \mathrm{kids} + \alpha_7 \mathrm{age} + \alpha_8 \mathrm{age2} + \alpha_9 \log \mathrm{net\ asset}_{t-1i} + \alpha_{10} \log non - \mathrm{dividend}_{t-1i} + \Delta\varepsilon_{ti}.$$

Where:

y_{ti}	= non-dividends income
$\mathrm{NMTR_{ti}}$	= net marginal tax rate of y_{ti}
$\mathrm{NMTR} - \mathrm{NMTR_D}$	= net marginal tax rate of y_{ti} minus net marginal tax rate dividend \ income
marriage	= dummy marital status (0 = unmarried; 1 = married)
joint	= dummy spouse status (0 = partner not working; 1 = working partner)
kids	= total dependent in tax return
age	= age of
age2	= age square
$\log \mathrm{net\ asset}_{t-1i}$	= natural logarithmic of the net asset in year $t-1$
$\log non - \mathrm{dividend}_{t-1i}$	= natural logarithmic of non-dividend income in the previous year
dummy quartile	= quartile groups of non-final income

The estimation method used is the system and difference generalized method of moments (GMM) estimators developed by Holtz-Eakin et al. (1988), Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998). This method is used for several reasons, including:

- Non-final taxable income is a dependent variable that is affected by the same variable in the past.
- There are arbitrarily distributed fixed individual effects, so the size of the dependent variable changes more quickly in specific individuals than in the other individuals
- Some regressors are endogenous
- A small number of years within a period

Results and Analysis

Descriptive Analysis

Average gross income or total dividend and non-dividend income in 2007-2012 had positive growth except in 2010. The average growth rate of gross income was 26%, with the highest growth being 72% in 2009. The amount of gross income growth comes from dividend growth of 66% and non-dividend growth of 11%. The highest growth of dividends and non-dividends was 214% and 26%, which occurred in 2009.

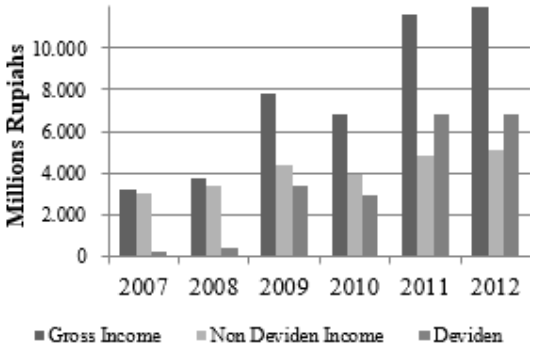

Figure 1: Average Income

In 2009 there was also a growing number of taxpayers who had dividend income. In 2008 the number of taxpayers who had dividend income amounted to 140 taxpayers. In 2009, the number of taxpayers who had dividend income rose to 287 taxpayers. The proportion of the number of taxpayers who have dividend income from each quartile can be seen in Chart 2. In 2011 there was a change in the Information System of the Directorate General of Taxation, which caused fewer data available than other years. The decline and simplification of the dividend tax rate led to an increase in the number of taxpayers in 2009.

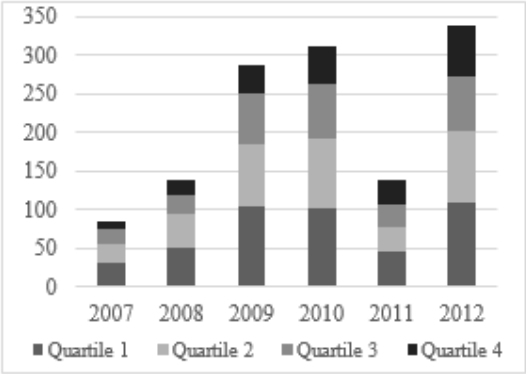

Figure 2: Number of Taxpayers who had Dividend Income

The growth of the non-dividend income of taxpayers who had dividends in the quartile one and four is more significant than the growth of the non-dividend income of taxpayers who did not have a dividend. In contrast, in quartile 2 (two) and 3 (three), the growth of the non-dividend income of taxpayers who had dividends was smaller. These different behaviors ware indicative of income shifting.

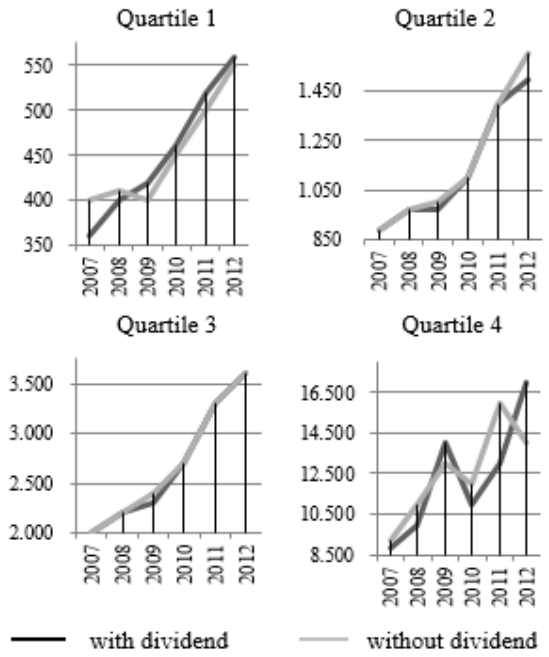

Figure 3: Average Non-Dividend Income (IDR in millions)

The taxpayer in quartile 1 (one) had an average non-dividend income of 360,000,000 rupiahs up to 400,000,000 rupiahs. This group had an incentive to keep a non-dividend income below 500,000,000 rupiahs to get a lower tax rate. While the taxpayer in quartile 4 (four) had the highest average non-dividend income, thus the incentive to make income shifting is also the greatest.

Estimation Result

Indication of income shifting in this research is measured by the relationship between the net marginal tax rate (NMTR) and non-dividend income reported by personal taxpayers. Net of the marginal tax rate is one minus the marginal tax rate. Identification of income shifting behavior using taxable income proxies and NMTR is in accordance with previous empirical studies (Harju & Matikka, 2016).

The result of model estimation using panel data in 2007-2012 is presented in Table 2. The estimation used the generalized method of moments (GMM) estimators developed by Holtz-Eakin et al. (1988), Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998). The estimation method is designed for situations with small T, large N, as happened to be in this research.

Table 1: Estimation Result

	Model (1)	Model (2)	Model (3)
Lagged Log non-dividend income	0.973***	0.918***	0.755***
	(0.000)	(0.000)	(0.000)
NMTR Dividend - NMTR	-0.659*	-0.765*	-0.245
	(0.093)	(0.086)	(0.595)
NMTR	1.120	2.086	0.894
	(0.294)	(0.178)	(0.597)
Log Dividend		0.019	0.005
		(0.377)	(0.803)
Dummy Quartile			
Quartile 2 (two)		-0.046	-0.020
		(0.828)	(0.924)
Quartile 3 (three)		0.257	0.390*
		(0.259)	(0.056)
Quartile 4 (four)		0.237	0.606*
		(0.383)	(0.097)
Age			0.1***
			(0.007)
Age2			-0.0***
			(0.003)
Log Net Asset			0.1
			(0.199)
Joint Income			0.1
			(0.390)
Kids			-0.0
			(0.461)
Marriage			-0.1
			(0.420)
Observations	672	558	537
Arrellano Bond test	0.992	0.995	0.738
Sargan test	0.135	0.083	0.079
Hansen test	0.531	0.799	0.751

Based on the estimation results shown in Table 2, the difference between NMTR Dividend and NMTR non-final income negatively affects the non-final income. This result is consistent with previous empirical results (Harju & Matikka, 2016). A more significant dividend rate decrease causes NMTR from dividend income to be higher than NMTR non-final income. As a result, taxpayers prefer income

in the form of dividends, and there is an indication of income shifting from non-final income to dividend income.

Conclusions

This research investigates the indication of income shifting due to the tax rate difference between dividend and non-final income. Indication of income shifting is measured through the non-tax final income reported on an annual notification letter to the Directorate General of Taxes. The results of estimation and descriptive analysis indicate that the change of dividend income tax rate from progressive tariff to single tariff tends to cause income shifting behavior on top bracket personal taxpayers. Based on descriptive analysis, there is an income-shifting indication in groups with an income close to 500 million rupiahs and the highest income group.

The results of this study have implications for strategic public policy formulation. The difference in tax rates between dividends and other taxable income causes income shifting. This behavior can increase tax cost efficiency as well as decrease the progression of tax rates that may increase the income gap. Therefore, simplification and a decrease in dividend rate must be followed by other rules that minimize income shifting opportunity, especially for top bracket personal taxpayers.

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Instruments of Financial Support for Exports

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Abstract

External trade and foreign economic activity are essential in ensuring national economic development. As a rule, the export-import operations have a strong effect on the country's economic indicators (especially, the GDP). Export operations are one of the key factors that ensure the growth and sustainable development of the national economy. In terms of sanctions and trends of decrease in the world economy caused by various factors, it is crucially important to analyze Russian export structure and export policy, and to draw out the most important instruments of financial support for exports.

Keywords: Export, Economic Growth, Development of Foreign Trade, Financial Insurance

Introduction

The main systemic factors that constrain the development of exports are the high risk of financial losses of exporters in foreign economic activity, unfavorable conditions for crediting of export operations, and insufficient competitiveness of individual goods and services. Thus, the participation of in the global exchange of goods and services is ensured by a stable position on world markets.

However, the multipolarity and heterogeneity of the world economy of the twenty-first century determine the need to find new directions for the development of foreign trade. In these circumstances, increasing of the national exports (especially the export of high-tech production), can become an important element of the country's structural adjustment and technological modernization.

Main Body

To build an innovative economy, it is necessary to further support and develop the innovative industry, diversify the economy to solve structural problems, ensure economic security and achieve strategic development goals (Ustyuzhanina, E.V., Komarova, I.P., Novikova, E.S., Sigarev, A.V., 2018). The development of foreign trade operations also contributes to the sustainable development of the economy, with exports being singled out among factors that directly affect economic growth.

A promising direction for the leading countries could be exporting to the South-East Asia, the Middle East, South Africa and North Africa, and Latin America regions (Petrov A.M., Kosolapova M.V., Yshanov I.G., Muravitskaya N.K., Nurmuhamedova N., 2019). As it seems, the most perspective goods for export will be:

- universal, power and electrical equipment;
- ready-made food;

- plastics;
- textile materials and products;
- pharmaceutical products;
- clothes;
- chemicals and materials, ready-made chemical products;
- hardwares;
- industrial products;
- electronics and home appliances;
- grain and milling products;
- telecommunication equipment;
- ferrous and non-ferrous metals;
- special industry equipment.

Despite the negative consequences of the economic crisis of 2014-2016, introduction of the import substitution and the overall decline in production, construction and industry, there is still a stable demand for metals and metal products due to active participation in investment and infrastructure international projects (Golubtsova, E.V., Zvereva, A.O., 2019). However, the policy of import substitution stimulated "simple" industries and has hit high-tech. The diversification of the economy can be achieved by removal of the trade barriers. The point of international trade is that, by purchasing imported goods at a lower price (even taking into account shipping costs), one can focus resources on areas having a competitive advantage. Modern trade theory emphasizes that trade liberalization helps identify the sectors and firms that are most effective for the country, reduces production costs and increases the competitiveness of the economy. In this regard it is necessary to make a comparative analysis of the Russian and American export structures.

The contribution of top exporters in Russia and the United States to manufacturing exports is very similar, so it is interesting to draw attention to the differences. Thus, in the United States, large exporters (those that supply five or more goods to five or more countries) make up to 11% of the total number of exporters and account for 92% of manufacturing exports. In Russia, such exporters make up to 6% of the total and provide only 53% of the manufacturing exports. Small exporters ("one product to one country") in Russia provide 4% of exports, and in the United States only 0.2% of exports, accounting for about 40% of exporting firms in both countries.

This gives reason to believe that in Russia there are not enough large non-resource exporters with a diversified goods structure of the export portfolio, while the existing ones are not large enough. This means that measures to support and develop exports should be focused primarily on large exporters.

Agricultural products, grains, and milling products have significant export potential to African countries due to increasing food demand, ongoing political instability, and growth of population. The increase in exports is also facilitated by the tariff policy implemented in the import of food from the abovementioned countries, despite the measures of state support for the agricultural sector.

The potential for increasing exports of chemicals and materials is provided by the growth of demand in the petrochemical and pharmaceutical industries of the economies of South-East Asia, the Middle East, South Africa and North Africa, and Latin America, due to projected GDP growth. The increased demand for imports of chemicals and materials from foreign enterprises is based on the implementation of state programs to expand and modernize the construction and petrochemical

sectors. A positive factor for increasing exports is the absence of customs barriers and low import duties.

Russian exports of pharmaceutical products can be increased due to insufficient provision of medicines and medical care to the growing population of developing countries, as evidenced by the absence of import duties on pharmaceutical products and the small number of national manufacturers of medicines.

Construction of solar power plants and power lines, supply of solar panels seem to be a promising opportunity. Africa and Latin America constantly face a shortage of electricity, the share of electrification of these regions remains low. The problem can be solved through the construction of power plants and renewable energy sources. Absence of import duties on light-emitting diodes and solar panels, as well as the absence of equipment manufacturers for the construction and operation of renewable power plants, can have a positive impact on the Russian exports (Lehoux, L., Duck, H., Akhmadeev, R., Morozova, T., Bykanova, O., 2019).

The measures of state export support allow domestic producers to be more confident in the international market, to receive additional benefits by entering into contracts with foreign partners, which ultimately has a positive effect on the economic development, and contributes to the growth of the welfare of the Russian citizens. The main directions of stimulating Russian producers to export products and services include:

- preferential loans;
- preferential terms of investment, credit obligations and export factoring;
- state guarantees;
- simplification of customs clearance procedures;
- attractive conditions for products to enter the world market;
- elimination of administrative barriers;
- information support and consultations of specialists in foreign economic activity.

The combination of financial and non-financial measures to stimulate Russian exports increases the competitiveness of domestic products and increases the potential of the main sectors of the national economy (Sotnikova L.V., Polenova S.N., Mislavskaya N.A., Petrov A.M., Basova M.M., 2019).

From the perspective of the classical economic theories, the export promotion strategy at the country level is based on the principle of comparative advantage: when a country specializes in a specific product that it can produce on a competitive basis. Empirical studies show that the most effective export incentives are export credits, tax refund schemes, grants and bonuses from export support funds, duty-free import of semi-finished products for production and raw materials, as well as exemption from value added tax, foreign exchange deductions, exemption from corporate income tax, and other forms of subsidies (Akhmadeev, R., Morozova, T., Voronkova, O., Sitnov. A., 2019).

Thus, in order to maintain competitiveness on world markets and increase export potential, Russia needs to develop instruments, typical for world practice:

- instruments for financing the foreign economic activities: pre-export financing, issuing guarantees, direct lending to a foreign buyer;
- implementation of international projects and tenders;
- insurance;
- expert advice on taxation, law, customs administration, logistics, and currency control.

The analysis of the mechanism for export development support shows that to the present day, Russia has developed the following financial directions:

1. Partial compensation of national producers' expenses for transportation and delivery of agricultural and food products to customers via export routes. To manage the costs of manufacturers, special attention should be paid to the organization of accounting;

2. Wide-format consulting on legal regulation of foreign economic activity and taxation of exporters;

3. Practical assistance in preparing documentation, as well as research and analytical reviews of the current market for export sectors, segmental analysis of potential for national producers (Korableva, O. N., Kalimullina, O. V., Mityakova, V. N., 2018);

4. State guarantees in the form of written financial obligations issued by the Government or the Ministry of Finance to a national exporter or credit institution (both national and foreign) on full or partial responsibility for the performance of obligations under trade contracts;

5. Preferential terms of lending to foreign buyers in foreign trade contracts with national producers. This supposes providing the exporter with a loan or credit line and insurance to finance the purchase of national products by foreign buyers;

6. Insurance of export credits and investment operations, the most common insurance products currently include:

- credit insurance (to protect national or foreign bank from the risk of loan default), while coverage extends on the loan to the foreign borrower to perform its obligations under the export contract signed with a Russian exporter;

- supplier credit insurance (to protect national exporters and their financing banks from the risk of non-payment by a foreign buyer for individual deliveries basing on deferred payment);

- comprehensive insurance of export credits for exporters and banks that finance them against the risk of non-payment by a foreign buyer;

- insurance of a confirmed letter of credit used by foreign banks that have secured and confirmed a letter of credit for payment of an export product of a national manufacturer, against the risk of non-receipt of compensation.

- insurance of guarantees of those national exporters who provided the guarantee against the risk of its execution for reasons not related to the violation of obligations on the part of the exporter.

7. Financial incentives for a number of export-oriented industries at all stages of the export cycle, including:

- financing expenses of the national supplier under the export contract;

- financing current expenses for export deliveries;

- financing the exporter's commercial credit;

- financing a trade turnover with a foreign buyer for the period of waiting for revenue receipt under export contracts;

- direct credit to a foreign buyer if the terms of loan provision are less attractive in the country of its residence;

- financing through a confirmed letter of credit;

The abovementioned financial products are provided by specialized national banks with the state participation, established to support the national export development. In practice, the basic line of bank guarantee products is represented by the following:

- a tender guarantee that provides support to national exporters in terms of financial support for their participation in competitive procedures and auctions organized by foreign buyers for the conclusion of foreign trade contracts (Workman, D., 2019);

- guarantee of advance payment refund as a measure of financial security of competitive advantages of national exporters in terms of the possibility of providing foreign buyers with bank guarantees of advance payment refund. This direction assumes an obligation of the guarantor to pay the guarantee amount to the beneficiary, which the foreign buyer previously paid to the exporter acting as the principal, in the form of an advance payment, if the principal does not fulfill its obligations to return part or all of the advance payment amount in cases stipulated by the terms of the foreign trade contract;

- guarantee of proper fulfillment of obligations under the export contract when implementing the competitive advantages of the national exporting company (bank guarantees of proper fulfillment by the exporter (principal) of its obligations under contracts concluded with foreign buyers and customers) (Cuervo-Cazurra, A., Inkpen, A., Musacchio, A., Ramaswamy, K. 2014);

- a payment guarantee that provides financial security for the national exporter payment obligations as a principal to a foreign counterparty – beneficiary under a contract for the supply of goods, works, or services.

The study allows us to conclude that the combination of state measures of financial support for national exporters allows us to expand foreign markets and ensure sustainable development of the world economy.

All the instruments described are deemed as key in the context of international and regional economic integration. These instruments and methods of state support should be used in combination together with the strategic planning of exporting operations.

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The Role of Information in The Process of Unemployment Reduction

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Abstract

The unemployed can often view available employment information negatively when viewing job offers and many hope for a change in this area. These kinds of opinions were revealed in a survey accepted as the basis of formula that was prepared and is presented in this paper. The formula utilises algorithms and element connection models and aims to connect three main determinants regarding the development of the information society which have a fundamental effect on the labour market: information features, informational process phases and IT professions. This paper aims to assess the role of information in struggles in finding work faced by the unemployed. In order to complete the assessment, the author used a custom-made method to analyse the relationship between certain IT professions, which lead to the achievement of successive information process phases and a final conclusion to this process, i.e. acquiring information regarding the required features and focussing specifically on the IT professional labour market, as well as work opportunities in this area, in the reality of the information society. This was seen as a priority to depict the relationship between information as a driving force of information society development and unemployment.

Keywords: Labour Market, Unemployment, IT Professions, Information Society.

JEL Classification: E24, J64, J24

Introduction

When listening to comments made by long-term job seekers it is impossible to remain indifferent to the issue of unemployment. Many authors (Eichhorst, Marx, Wehner, 2017; Deelen, de Graaf-Zijl, van den Berge, 2018; Connolly, Sheehan, 2018; Axelrad, Malul, Luski, 2018) have debated whether this problem can disappear or is set to increase ever greater in the future, especially within the information society, so desired by some, and perceived as a key to welfare (Steger, 2015; Stern (Eds.), 2002; Targowsky, 2004; Blaha, 2012). When considering scenarios relating to the development of societies, unemployment is usually predicted as high in almost every one. Therefore, it should be a priority to minimize this issue at the initial stage in the creation of the information society. When analysing literature concerning this problem (Lim, Lee, 2019; Naisbitt, 1998; Masuda, 1980), it was noted that the relationship between information (as a driving force in the development of the information society) and unemployment is not captured. This problem requires an urgent solution and could be an excellent opportunity to improve the difficult situation of a great number of unemployed individuals. This situation occurs because within the information society, the greatest dynamics of growth are characterized though informational resources and determine the level and dynamics of any social potential. Work aimed at solving this problem is regarded as necessary because it is based on a difficult situation in which hundreds of thousands of people find themselves. An individual from this group might begin by looking for employment information about jobs, and the first issue that should be considered is the precision of the information and its quality. Appropriate information, i.e. that will meet the unemployed person's expectations is the first link of its so-called duality. However, the second link in the chain involves regarding information as an element of a causative factor in the development of workplaces.

One of many hypotheses determining transition to the information society is, as emphasized by many authors (van der Lippe, Treas, Norbutas, 2018; Biewen, Fitzenberger, de Lazzer, 2018; Passaretta, Wolbers, 2019), increasing the supply of individuals in professions connected with computer science and providing traditional professions holding qualifications that are related to informational technologies.

The dichotomy of information (about and on the labour market) has resulted in the need to investigate the form of information around labour and act in a form that can lead to its improvement. However, the counterpart of the discussion allows labour market research with regards to traditional and new IT professions and the analysis of perspectives in this area. The return of information onto "the common way" from a dualistic perspective is fulfilled in this paper through a so-called information dichotomy formula. This formula, using algorithms and element connection models connects three main determinants in the development of an information society: information features, informational process phases and IT professions.

This assessment of information from different perspectives can be the basis of a method of interpreting its dual nature, considering the role of an unemployment reduction process. The first is "labour information", which includes mainly vacancy offers, the second is "information forming workplaces", through the use of information and telecommunication technologies.

From the perspective of an unemployed individual, it is essential to discover what the desirable features of "labour information" might be and the course of informational processes which create it. Describing information feature relationships with informational processes can answer the question of which processes are "responsible" for the lack of desirable information features, and consequently to attempt to improve them.

Summing up, this paper aims to assess the role of information in the fight to reduce unemployment. In order to complete the assessment the author utilised her own method to analyse the relationship between specific IT professions, the fulfilment of successive information process phases and the result of this process, i.e. information having desirable features and leading to specifically focusing on pinpointing the IT profession labour market, as well as perspectives in this area, in the reality of the information society.

The accepted priority is to depict the relationship between information as a driving force of the development of an information society, as well as unemployment.

The dysfunctional character of information on the labour market

Through the process of rectifying incorrect information in the labour market, it seems useful to focus on the "informational condition" of information sources relating to the labour market. These can be press advertisements, online proposals, and offers available in agencies to monitor job opportunities. Even after a perfunctory glance at various advertisements, which include job offers, can give the impression that there is an abundance of vacancies in different professions. They are often pages and pages of announcements or ads in larger or smaller formats, as well as announcements purchased by employers in daily or specialist publications. Unfortunately, it seems common that many vacancies are out-of-date or some only placed in official outlets, which are in fact already reserved for friends or relatives.

These kinds of opinions were frequently expressed unofficially and "between the lines" by potential employers, and on being told that the job "has already been taken", unemployed individuals gradually lost their trust in these sources of information. Survey conversations with individuals seeking employment clearly confirmed these facts. The unemployed often repeated opinions that information on job offers were incomplete, too short or too general, or in some cases displayed false information.

Rising unemployment results in many individuals being more active on the Internet when looking for work (Kureková, Beblavý, Thum-Thysen, 2015; Chowdhury, Mukherjee, 2016). While at the same

time, companies and employment agencies fall back on the medium to facilitate the process of recruitment. Over the past number of years several hundred online services have sprung up there which either supplement the activity of the existing employment agencies, or are companies that offer their employment services solely online. In connection with the process of creating of the information society it is predicted that this trend will remain.

Representatives of e-employment agencies have seen a distinct growth of popularity of their sites in the past few years. There has also been a considerable growth of sites that collect the professional data of those seeking work. This has had a twofold influence on unemployment agency websites, on the one hand, there is an increase in the number of individuals registering on their databases, on the other, this has led to a decrease in the number of job offers advertised by employers on those websites. There is also the same trend as in online personal consultancy companies or newspaper advertisements, i.e. there are fewer vacancies and employers, while at the same time a reduction in personnel budgets, often preferring to not employ staff through employment agencies.

Offers made available to unemployed individuals by various agencies monitoring job opportunities should be prepared professionally. One of their tasks is to expand the "outflow" of the unemployed to employment by effectively associating them with vacancies and collecting information about the labour market more efficiently.

This practically involves sifting through job offers and training for employment agency customers, creating databases on employers, planned redundancies, vacancies that are offered and requirements regarding worker qualifications.

Individuals looking for work were asked to comment on whether they were satisfied with the form and content of the information in job vacancies on offer, but most of the individuals questioned mentioned numerous shortcomings in this area. The most frequent complaints were those concerning insufficient, incomplete or even out-of-date information and over-advertised vacancies.

The report of frequent dissatisfaction made by unemployed individuals on the quality of available information of vacancies should be sufficient reason to take action improving information in job offers in the labour market. In the light of the above considerations, it seemed proper to set out 48 information features and carry out research among individuals seeking jobs. This diagnostic survey took the form of a direct inquiry and it consisted of two questions for respondents on whether given features appeared in information about job offers, which they analysed and then to state which features should be in every job offer. The survey was carried out on a test sample of 1500 people, who were randomly selected from a group declaring themselves as unemployed. They group was made up of representatives of several European countries. Itemized information features and answers provided by unemployed individuals to the second question translated into determination of weights of those features by experts when applying the formula presented in the fourth part of the paper.

Information as a job creator

The aforementioned rule of the duality of information in the case of unemployment show a second, apart from informing, role. To clarify, it can be stated that information, especially through informational and telecommunication technologies, can be a causative factor of jobs, as well as an informational and telecommunication economy is regarded as a key impulse of social development.

The foundation for the running of the information society is the provision of an activity that is connected to the production and distribution of information with economic activity indicators that can draw measurable profits.

Separating the so-called informational sector and placing it next to agriculture, industry and services have been proposed by many information society researchers. However, there is no agreement as to what belongs in the informational sector and what functions should be outside it. It must be reiterated

here that differences in the approaches of F. Machlup and M.U. Porat to an informational economy (Crawford, 1984; Porat, 1997) are clearly observable.

While Machlup tried to clearly separate parts that deal with the "production" of information and information services from the national economy, Porat aimed at defining the degree to which informational activities are widespread in each production branch. However, E. Eliasson et al indicate that the both approaches lack the criterion of a function fulfilled by information (Eliasson et al, 1991). In compliance with those authors' idea, the information sector identified according to Machlup's criteria is only a small and inessential part of an information economy. Moreover, information and information services do not form a compact sector, but they are dispersed in various economy branches where they support and often dominate production cycles (Dziuba, 1998).

New phenomena and economic forms appear in economies where information plays a leading role, with good examples being the electronic economy or virtual enterprises. These novel approaches are accompanied by a change in location, roles and manners of human functioning (also as an employee) in the economy and society (Garnham, 2000; Martin, Halls, 2009).

The essence of the formula of reciprocity of information features, professions and informational process phases

It has been observed that the dysfunctional nature of labour information has created a powerful challenge for the information society, involving improvement of information condition. On the one hand, to list many of the features of the information that would be desirable for unemployed individuals related to the jobs they want, and on the other examples of unsatisfactory information in this area which does not fulfil their expectations in many cases, it is proper to wonder what the relationship of determined phases in informational processes are, which product is actually information with determined "result" features. This will allow us to respond to the question of what phases of an informational process producing a given item of information demand special observation and, in the event of this information item having unsatisfactory features, offering the chance of immediate intervention into the fulfilment of this process. Obviously, on the other hand, knowing which information features are desirable in a given situation, emphasis can be put on the proper course of particular determined phases of the aforementioned information process. It will also be possible to define which informational process phases are, in a sense, "responsible" for possessing or not possessing desirable information features.

Bearing in mind the goal to reduce unemployment, it might be useful to try and find a connection between the specified phases of informational processes, as well as professions or jobs connected with them, especially in the area of IT professions.

Since the informational process can be, so to speak, an "employer", it can be determined on this basis which phases of informational processes are fulfilled by which IT professions, and consequently, maintaining certain professions are dependent on the necessity to fulfil those informational process phases.

Continuing the discussion regarding the problems of the desirable features of information, it seems advisable to note their relationship with IT professions, because work carried out by individuals employed in computer science positions and fulfilling certain informational process phases is directly related to the shape of the product in this process, i.e. information.

The aforementioned problems are illustrated by figure 1.

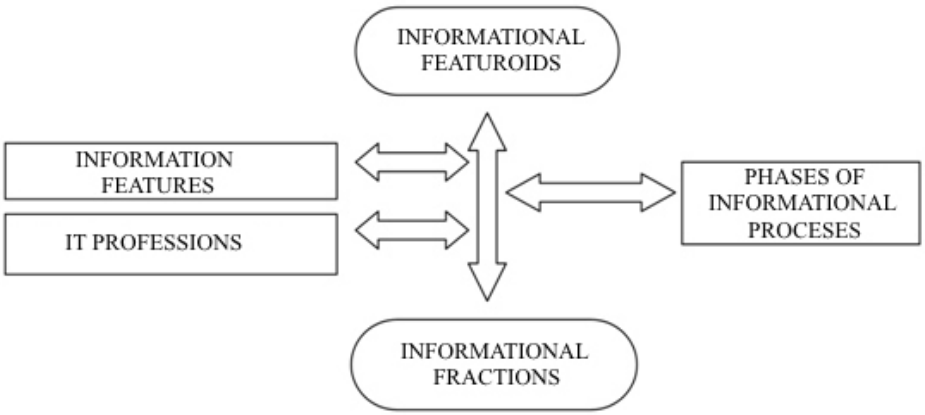

Fig. 1: The complex depiction of the formula

Source: The author's study

In order to create a complex depiction of the three problems illustrated above, the following connection can be made: information features – informational process phases – IT professions. It can be achieved with the support of so-called element classification (connection) models (Dattola, 1969; Avison, Fitzgerald, 2003).

It is widely accepted that usually the basis of connecting is a so-called "residual", i.e. a measure of the proximity (resemblance) of elements (Gitman, Levine, 1970; Salton, 1974; Pawlak, 1981; Nowak, 1990; Ho, Hull, Srihari, 1994). The analysis of connecting methods leads to the conclusion that the connection method from a two-aspectual automatic designer approach will be the closest to the assumptions accepted in this paper. The designer's representation creates the possibility of connecting elements with the omission of limitations resulting from the actual state of any examined system. A dual-aspect approach allows us to consider two fundamental criteria for element connection, i.e. proximity and significance (of weights).

The starting point in the described study was to establish a list of 48 information features and their weights, specifying the required degree of occurrence of a given feature. A method of connecting similar elements based on the Gitman-Levine algorithm was used. Techniques for building a similarity matrix of the examined elements (e.g. information features, IT professions) were used.

The findings and discussion - application aspects of the information dichotomy formula

The practical assessment of the presented information dichotomy formula was effected on selected model data. Symbol X indicates the occurrence of a group of information features generated in a specific phase of the informational process (see Table 1) and a group of professions responsible for carrying out these processes (see Table 2). The location of symbol X in the tables was determined on the basis of diagnostic tests, i.e. interviews with employees in specific IT professions. The first elements subjected to the process of connecting information features, similarly consider the phases of the informational process that create it. Carrying out a connection formula resulted in the following findings (Table 1).

Table 1: A list of featuroids and phases of the informational process

Number and name of the phase of the informational process / Featuroid	1 Generating information	2 Gathering information	3 Information storage	4 Transferring information	5 Information processing	6 Making information available	7 Information interpretation	8 Information use
SC_1	x				x		x	
SC_2	x	x		x			x	
SC_3	x	x			x			
SC_4	x	x				x		x
SC_5		x		x	x	x		x
SC_6			x	x		x		
SC_7	x						x	x
SC_8							x	x
SC_9			x		x			
SC_{10}	x	x	x	x	x	x	x	x

Source: the author's study

Featuroids, from SC_1 to SC_{10}, include the following groups of information features:
SC_1 – Accuracy, Purposefulness;
SC_2 – Explicitness, Precision;
SC_3 – Completeness, Aggregation;
SC_4 – Value, Accurateness;
SC_5 – Speed, Effectiveness, Age;
SC_6 – Cheapness, Activity;
SC_7 – Adequacy, Preciousness, Fullness, Decision-making ability, Quantity, Priority, Prospectiveness;
SC_8 – Usefulness, Reasonableness;
SC_9 – Safety, Productivity;
SC_{10} – Being up-to-date, Flexibility, Honesty, Availability, Communicability, Responsibility, Comparability, Work consumption, Truthfulness, Assimilativeness, Reliability, Time flexibility, Ease of utilization, Stability, Confidentiality, Faithfulness, Redundance, Efficiency, Retrospectivity, Profitability, Conformity, Volume, Integrality, Special requirements.

Later, according to the same formula, IT professions were subjected to the connection process, comparable with regards to the phases of the informational process performed by those professions.

After carrying out a connection formula resulted in the following findings (Table 2).

Table 2: The list of fractions and phases of the informational process

Number and name of a phase of the informational process / Fraction	1 Generating information	2 Gathering information	3 Information storage	4 Transferring information	5 Information processing	6 Making information available	7 Information interpretation	8 Information use
SF_1	x		x	x	x	x	x	x
SF_2		x		x	x	x	x	x
SF_3		x	x	x	x	x	x	
SF_4	x	x			x			
SF_5					x			
SF_6				x	x			
SF_7	x		x		x			
SF_8	x	x	x		x			
SF_9					x	x		
SF_{10}		x	x		x			
SF_{11}	x	x	x	x	x	x	x	x

Source: the author's study

The fractions (SF) include the following groups of professions:
SF_1 – IT Systems Manager, Chief IT Specialist, Implementation Consultant, Project Manager, Exploitation Manager;
SF_2 – Auditor, IT Consultant;
SF_3 – IT Systems Designer and IT Uses Specialist;
SF_4 – IT Systems Analyst, IT Tool Programmer, Graphics and Animation Designer;
SF_5 – IT Systems Engineer, IT Technician, Computer Installation Technician, IT Systems Operator, IT Systems Maintenance Technician and IT Infrastructure Operation Worker;
SF_6 – IT Network Engineer, IT Systems Safety Inspector and IT Network Administrator;
SF_7 – Application Programmer and Multimedia Application Programmer;
SF_8 – Databases Programmer and Web Designer;
SF_9 – IT Communications Systems Programmer and IT Communication Specialist;
SF_{10} – SAP Software Specialist, Multimedia Applications Designer, Screen Designer and IT Systems Administrator;

SF_{11} – IT Department Manager, IT Unit Manager, IT Systems Analyst, Database Analyst, Dataflow Specialist, Implementation Specialist, IT Service Specialist, Multimedia Project Manager, Database Administrator, Application Idea Creator, Information Broker, IT Services Agent, IT Products and Services Sales Worker.

Connecting separated fractions and featuroids was used during another execution of the formula and concluded with the following results (Table 3).

Table 3: The category list: professions and information features

Category	Profession	Feature
$SZ_1=SF_1 + \{SC_1, SC_7, SC_9, SC_{10}\}$	IT Systems Manager, Chief IT Specialist, Implementation Consultant, Project Manager, Exploitation Manager	Accuracy, Purposefulness, Adequacy, Preciousness, Fullness, Decision-making ability, Quantity, Priority, Prospectivity, Safety, Productivity, Being up-to-date, Flexibility, Honesty, Availability, Communicability, Responsibility, Comparability, Work consumption, Truthfulness, Assimilativeness, Reliability, Time flexibility, Ease of utilization, Stability, Confidentiality, Faithfulness, Redundance, Efficiency, Retrospectivity, Profitability, Conformity, Volume, Integrality, Special requirements
$SZ_2= SF_2+\{ SC_{10}\}$	IT Auditor, IT Consultant	Being up-to-date, Flexibility, Honesty, Availability, Communicability, Responsibility, Comparability, Work consumption, Truthfulness, Assimilativeness, Reliability, Time flexibility, Ease of utilization, Stability, Confidentiality, Faithfulness, Redundance, Efficiency, Retrospectivity, Profitability, Conformity, Volume, Integrality, Special requirements
$SZ_3= SF_3 + \{SC_{10}\}$	IT Systems Analyst, IT Application Specialist	Being up-to-date, Flexibility, Honesty, Availability, Communicability, Responsibility, Comparability, Work consumption, Truthfulness, Assimilativeness, Reliability, Time flexibility, Ease of utilization, Stability, Confidentiality, Faithfulness, Redundance, Efficiency, Retrospectivity, Profitability, Conformity, Volume, Integrality, Special requirements
$SZ_4= SF_4 + \{SC_3, SC_{10}\}$	IT Systems Analyst, IT Tool Programmer, Graphics and Animation Creator	Completeness, Aggregation, Being up-to-date, Flexibility, Honesty, Availability, Communicability, Responsibility, Comparability, Work consumption, Truthfulness, Assimilativeness, Reliability, Time flexibility, Ease of utilization, Stability, Confidentiality, Faithfulness, Redundance, Efficiency, Retrospectivity, Profitability, Conformity, Volume, Integrality, Special requirements
$SZ_5= SF_5 + \{SC_1, SC_3, SC_5, SC_9, SC_{10}\}$	IT Systems Engineer, IT Technician, Computer Installation Technician, IT Systems Operator, IT Systems Maintenance Technician, IT Infrastructure Operation Worker	Exactitude, Purposefulness, Completeness, Aggregation, Speed, Efficiency, Age, Safety, Efficiency, Being up-to-date, Flexibility, Honesty, Availability, Communicability, Responsibility, Comparability, Work consumption, Truthfulness, Assimilativeness, Reliability, Time flexibility, Ease of utilization, Stability, Confidentiality, Faithfulness, Redundance, Efficiency, Retrospectivity, Profitability, Conformity, Volume, Integrality, Special requirements
$SZ_6= SF_6 + \{SC_5,$	IT Network Engineer,	Speed, Efficiency, Age, Being up-to-date,

SC_{10}}	IT Systems Safety Inspector, IT Network Administrator	Flexibility, Honesty, Availability, Communicability, Responsibility, Comparability, Work consumption, Truthfulness, Assimilativeness, Reliability, Time flexibility, Ease of utilization, Stability, Confidentiality, Faithfulness, Redundance, Efficiency, Retrospectivity, Profitability, Conformity, Volume, Integrality, Special requirements
SZ_7= SF_7 + {SC_{10}}	Application Programmer, Multimedia Application Programmer	Being up-to-date, Flexibility, Honesty, Availability, Communicability, Responsibility, Comparability, Work consumption, Truthfulness, Assimilativeness, Reliability, Time flexibility, Ease of utilization, Stability, Confidentiality, Faithfulness, Redundance, Efficiency, Retrospectivity, Profitability, Conformity, Volume, Integrality, Special requirements
SZ_8= SF_8 + {SC_{10}}	Databases Programmer, Web Designer	Being up-to-date, Flexibility, Honesty, Availability, Communicability, Responsibility, Comparability, Work consumption, Truthfulness, Assimilativeness, Reliability, Time flexibility, Ease of utilization, Stability, Confidentiality, Faithfulness, Redundance, Efficiency, Retrospectivity, Profitability, Conformity, Volume, Integrality, Special requirements
SZ_9= SF_9 + {SC_5, SC_{10}}	IT Systems Programmer, IT Communication Specialist	Speed, Efficiency, Age, Being up-to-date, Flexibility, Honesty, Availability, Communicability, Responsibility, Comparability, Work consumption, Truthfulness, Assimilativeness, Reliability, Time flexibility, Ease of utilization, Stability, Confidentiality, Faithfulness, Redundance, Efficiency, Retrospectivity, Profitability, Conformity, Volume, Integrality, Special requirements
SZ_{10}= SF_{10} + {SC_{10}}	SAP Software Specialist, Multimedia Applications Designer, Screen Designer, IT Systems Administrator	Being up-to-date, Flexibility, Honesty, Availability, Communicability, Responsibility, Comparability, Work consumption, Truthfulness, Assimilativeness, Reliability, Time flexibility, Ease of utilization, Stability, Confidentiality, Faithfulness, Redundance, Efficiency, Retrospectivity, Profitability, Conformity, Volume, Integrality, Special requirements
SZ_{11}= SF_{11} + {SC_{10}}	IT Department Manager, IT Unit Manager, IT Systems Analyst, Database Analyst, Dataflow Specialist, Implenetation Specialist, Maintenance Specialist, Multimedia Project Manager, Database Administrator,	Being up-to-date, Flexibility, Honesty, Availability, Communicability, Responsibility, Comparability, Work consumption, Truthfulness, Assimilativeness, Reliability, Time flexibility, Ease of utilization, Stability, Confidentiality, Faithfulness, Redundance, Efficiency, Retrospectivity, Profitability, Conformity, Volume, Integrality, Special requirements

	Application Idea Creator, Information Broker, IT Service Agent, IT Products and Services Sales Worker	

SZ – categories – professions, having an influence on information features
SC – featuroids including groups of information features
SF – fractions including groups of professions

Source: the author's study

Conclusions

The research presented in this paper focused on assessing the role of information in the struggle with unemployment. The author identified the relationship between certain IT professions, fulfilling successive phases of informational processes and the product of this process, i.e. information related to gaining the most desirable features. As a result of the research, through the use of the author's classification method (the formula of reciprocity of information features, professions and informational process phases), initially, it was ascertained that each of the fractions had been connected to certain featuroids. Consequently, it can be accepted that a group of IT professions, classified in fractions, have a direct relationship with creating certain forms of information features, while performing successive informational process phases.

Secondly, an exact analysis of the scope of responsibilities of individuals employed in certain IT professions can provide the basis of a correction of those ranges, especially from the perspective of the quality of work, as well as an enhanced inspection of work effects, taking into account particular information features.

Thirdly, some information features are dependent on doing one's job properly by groups in certain positions. However, such “collective responsibility” should not diminish the efforts of individuals “producing” the information given.

Next, the content of tables with findings can be changed to a different arrangement of priorities of desirable information features (i.e. their different weights) or with another accepted profession hierarchy. This can occur during informational preference investigations, which are unlike the groups of individuals presented.

Finally, unemployed individuals approached the problem of labour information often in a very emotional manner, which is of no surprise. This was expressed in assigning many features of information of both very high and high priorities, which led to the following category arrangements: a great number of professions were connected with a large number of information features. Unemployed individuals attach huge importance to accurate information about jobs. In answer to the user expectations of this information a list of potential categories in which an individual performing a certain profession (in this case computer science) can find guidelines regarding what information features they have to pay particular attention to during the fulfilment of these informational process phases.

Improving condition of information, including especially information for the unemployed, and particularly depicting the relationship between information and unemployment, can be regarded as one of the most essential imperatives in the development of the information society.

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Modern Methods of Teaching Accounting and Financial Literacy in The Context of The Transformation of Educational Technologies

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Abstract

Information and educational technologies are currently a necessary for transforming society into a digital format. The increasing complexity of financial and accounting products and the need for responsible decisions focused on the use of special methods of preparing students based on e-learning, blended learning, as well as designing models of responsible financial behavior. This is connected with the fact that in short-term perspective young people will become a key segment in a new financial infrastructure. The article is devoted to the analysis of the modern trends in teaching methods of such directions as accounting and financial literacy. According to the authors' opinion, the study of particularly these directions allows students to form the first experience of rational behavior competences, conscious decision-making in finance management, as well as to undergo the effective socialization in the modern society.

Keywords: Accounting, Financial Literacy, E-Learning, Blended Learning, Financial Behavior.

Introduction

Nowadays, the issues of the financial development and accounting education became relevant due to the features of the modern financial life, increase of the financial products and services amount including the products based on digital technologies. Consumers of accounting and financial services must take more and more independent financial decisions, realizing the responsibility for the consequences and risks. Generalization of the existing pedagogical experience makes it possible to highlight the interactive way of learning as the most effective tool of accounting and financial literacy education. It is based on the interaction of all participants of the educational process, for example, in modeling life situations, organizing discussions and joint problem-solving. The interactive form of classes on the basics of accounting and financial literacy fully contributes to a more complete formation of the necessary competencies for students in the field of accounting and financial literacy.

E-learning was implemented in the classes covering the fundamentals of accounting taught at the Wrocław University of Economics to the first-year students of Finance and Accounting at the Faculty of Economic Sciences. The objective was to support classes in their traditional forms (lectures and classes). Students were obliged to enrol on the course, but they were free to decide about making use of it during the semester. The obtained effects were analysed on the basis of surveys and the observation of students' behaviour on the e-learning platform.

The reorganisation of classes and empirical research were preceded by the analysis of the literature on the implementation of e-learning in the teaching of accounting at the higher education level.

Thus, during the research at Kazan Federal University (Economic Faculty), in order to determine the level of financial literacy, a sociological survey was conducted among 50 students aged from 18 to 25 years old.

Methods

Deduction and reasoning by analogy, based on the analysis of literature and the analysis of own research (surveys and observations). The authors conducted a sociological survey among students, the results of which showed the main problems and tasks that need to be addressed in the methods of teaching accounting and financial literacy to modern students. As a result of the conducted research the correspondence between the assumptions adopted for designing complementary teaching and the expectations of the present generation of students could be verified.

Results

The process of teaching accounting is organised in the way which can be described as controlled discovering. An expert in accounting first becomes familiar with simple elements, which are then synthesised. However, at the higher levels of education the contents and terms become more complex and they are accompanied by multivariate solutions and controversial issues. Thus, the role of a guide (teacher, coach), who controls these discoveries, is growing.

The hermetic professional language of accounting and unknown terms (as well as the incorrect use of some accounting terms in the colloquial language) cause that students have difficulties with absorbing the material.

The development of technology and its increasing accessibility as well as the availability of various tools such as, for example, educational platforms, have caused that for many years already higher education institutions have been taking actions enabling them to support traditional teaching methods (lectures, tutorials, laboratories) with blended learning or to replace them completely with e-learning or remote teaching.

In the 90s, in the studies on educating in the field of accounting, researchers expressed considerable interest in the theory of learning through experience (ELT/LSI). These studies concentrated on comparing practitioners' preferences regarding styles of learning, taking account of their changes at different career stages and changes in the requirements imposed by the profession on its experts. In view of the generation changes taking place in the schools of higher education and changes on the labour market, it is necessary to continue research regarding this theory.

The literature review focused mainly on the studies related to the utilisation of e-learning in the teaching of accounting.

The present model of learning based on competencies requires modern tools enabling students not only to absorb the contents in a passive way, but also to acquire skills in an active manner.

The researchers point out that one of the major problems in education is to improve the learning process (Lopez et al., 2015). The conducted research shows that the introduction of e-learning to the teaching of accounting improves the learning efficiency of students with poor results (Concannon et al., 2005), (Lopez et al., 2015).

The team analysing the factors affecting the behaviour of students discovered that the level of acceptance for this way of learning was significantly affected by a hedonistic attitude and, therefore, that the pursuit of pleasure was a motivating factor in using e-learning in the learning of accounting (Kelana et al., 2017).

In the opinion of the research team the availability of blended learning in the teaching of accounting to large groups of first-year students improved both the learning efficiency and the integration of foreign students, owing to the possibility of cooperating on the Internet platform (Schaffhauser-Linzatti et al., 2008). Interesting results were also obtained by the team analysing the learning efficiency of students preparing together for certification in accounting. A blog was used as an educational platform. Students were divided into two groups, out of which one could use the blog for cooperation and for the other it was only a place for teaching, but the progress made by this group was controlled based on their learning outcomes. When the course was finished, it was discovered that in the group which was not controlled but whose members were cooperating the efficiency was higher (Liao et al., 2012).

In Poland, the experience of implementing e-learning in the teaching of accounting was analysed, among others, by P. Zieniuk (Management accounting), K. M. Klimczak (Financial accounting) and J. Krasodomska (International accounting and Bank accounting). In each case a change in the organisation of classes, which consisted in implementing e-learning, was positively received by students (Zieniuk, 2011), (Klimczak, 2008), (Krasodomska, 2012). This common opinion is contradicted only by the research conducted in the years 2012-2013, which showed, on the basis of the assessment of teaching aids used during the financial accounting classes, that students prefer to gain the knowledge from the literature on the subject and not from e-learning (Hinke, Svoboda, 2014).

The research on the use of the broadly understood e-learning in the teaching of accounting analyses also the possibilities of employing different tools. Positive results were obtained, The effects related to the use of e-books and e-television in the e-learning of accounting were also positively evaluated (Azaltun, 2009). The online platform, operating as an educational platform and as a place for looking for a job, was also considered to be useful. The use of various tools entails the issue of humanisation of e-learning. The usefulness of various tools and teaching methods in the e-learning of accounting was investigated also by Polish researchers in cooperation with their Bulgarian colleagues. The study included students and academic staff and employers in Poland and Bulgaria, because of the possibility of using e-learning in the training of employees (Jaworska-Białek et al, 2013)

In the opinion of the team investigating the influence of e-learning on the globalisation of education in the area of accounting, it can be used for the commonly accepted education of accountants at the international level, separating it from the education based on the national regulations (Ionescu et al., 2009).

Unfortunately, the research on the possibility of using e-learning in the teaching of accounting shows also that e-learning applications are still rarely implemented. Among the reasons for this situation the researchers have listed the incorrect selection of applications as such or their contents. Other obstacles include costs, poor or insufficient infrastructure or the lack of access to it or the lack of human resources (Kashora et al., 2016), or insufficient technical support, which makes it difficult to use the dedicated equipment (Wong et al., 2017).

Summarising, e-learning contributes to the improvement in the efficiency of learning, but the key to success includes cooperation and willingness to share knowledge, which are characteristic of the current generation of students, and not control. The research on students' attitude to e-learning and blended learning shows that this way of organising work stimulates their positive emotions and meets their expectation related to the flexibility of learning and freedom in managing their time.

Memory and learning are affected by both rational premises and emotions, which are inseparably connected with each other (Kolb, 2013, as cited in LeDoux J., 1997, Zull J., 2002, Damasio A., 1994). According to Kolb, feelings and emotions have priority when it comes to the determination of whether or not to learn and what to learn, and negative emotions (fear, anxiety) hinder learning, while the presence of positive feelings (attraction, interest) is indispensable, because learning something which is not interesting is very difficult (Kolb, 2013). The pursuit of pleasure is one of the features of

Generation Z, and, therefore, people with such disposition have a positive attitude to the use of e-learning in the learning of accounting.

The creation of a modern space for learning accounting may also contribute to solving the problem of students' passivity, as many of them, based on their prior educational experience, are passive recipients of what they learn. Enabling students to take control and responsibility for learning may significantly strengthen their ability to learn on the basis of experience (Kolb, 2013).

Such approach meets the expectations of the generation connected with the non-linear learning method and independent learning and ensures the flexibility of learning (working) hours. It also necessitates becoming involved in the process of acquiring knowledge and skills.Today's student will soon become (or has already become, while still studying) an employee, and also employers are interested in solutions that transfer the educational process, in part or in whole, outside the classroom. The time of being a student is appropriate to master how to learn making use of e-learning.

Accounting is receptive to e-learning. According to the research, blended learning as well as e-learning or remote teaching work well for the teaching of accounting. However, the higher the level of education in accounting, the more important the role of contact with the lecturer becomes, because of the multivariate nature of solutions (cf. Kasperowicz, 2011). It seems that this problem can be solved to a large extent, for example, by transferring theory to e-learning, and, consequently, gaining additional time for discussion during the traditional classes. It should be emphasised that young people also have to develop social competencies and acquire face-to-face communication and cooperation skills. The respondents were also asked to assess whether they needed e-learning and whether the materials used by them on the platform helped them in learning (Fig. 1).

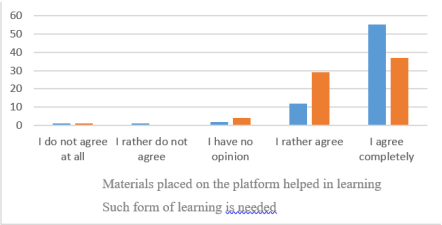

Fig. 1: Is e-learning needed? Did the materials provided on the platform help in learning?

The usefulness of respective elements of the course is confirmed by the number of students' visits. Tests and tasks with feedback (making it possible to check if the solution is correct) as well as solved examples regarding the more difficult parts of the material were used most often. The students also willingly viewed the glossary, but in this group nobody made use of the possibility of editing its entries.

The latest news forum, which by nature is a place for discussion, was used only one-sidedly: the lecturer placed the information there and the students read this information. Instead of continuing, in case of questions, a given thread, which would be visible also to other students, the students wrote emails with questions. Perhaps the reason for this is the lack of anonymity of the forum users and, thence, they were afraid to 'post' a question. The author's impression is that the forum did not fulfil expectations – students were eager to ask questions, but in an oral form during the classes.

Enabling the students to undertake some tests unlimited number of times demonstrated that many of them made use of this possibility and the system showed the progress made by them in subsequent attempts.

In the next question the students were asked to assess, using a scale from 1 to 5 (5 – being the highest score), the usefulness of the provided materials.

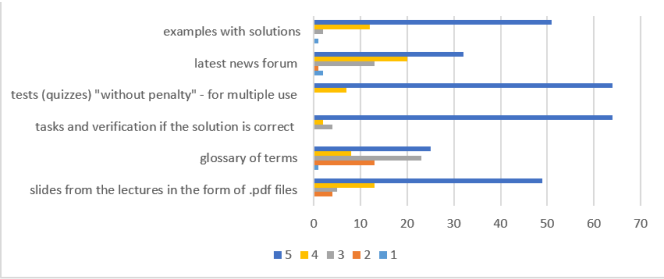

Fig. 2: Assessment of the resources made available in e-learning

The survey included one open question, giving the students the opportunity to comment freely on their expectations (what they would like to receive in the new version of the course). The students could also write what they did not like. The replies concerning expectations were, after having been coded, presented in Figure 3.

Figure 3: Word cloud – expectations

The word cloud shows that the students taking part in the course would like to have more tasks and tests to solve on their own (with the possibility of verifying their answer) and examples. They would also welcome films to be used for learning, in particular the short ones, presenting the content provided in a traditional way during the lectures.

Critical comments concerned, among others, the visual qualities of the platform as such and difficulties in using the course.

In the questionnaires the respondents made comments on their difficulties in using the course, but, at the same time, during the time of students' activity the system had only 91 records showing all participants' activity in the tab entitled "How to use the course?".

Complementary classes improved the efficiency. From the group covered by the study and allowed to take the exam at its first date all full-time students passed and only four part-time students failed their exam. A year ago, for a similar number of students, ten full-time students and seventeen part-time students, from the group allowed to take the exam at its first date, did not pass it.

The exam was held in the computer laboratory, making use of exam sets placed on the platform. Students had an equal amount of time (from the moment of logging in into the exam set, each student had the same amount of time), the commotion related to handing out and collecting paper sets was eliminated. The time for providing feedback to the students was reduced to a minimum. Everybody could see the grade and the number of received points and could analyse the made mistakes immediately after closing the exam page.

Even after passing their exams students were returning to the course for as long as it was available to them. It may demonstrate that the students were successfully motivated to take an active part in the process of teaching and learning.

Thus, no obligation to use e-learning, fully unconstrained access, asynchronous character of the course and no control over the progress made in e-learning were successful. These assumptions made it possible to adapt to the needs of the studying generation.

Sociological surveys, conducted by different organizations, fix sufficiently low level of financial literacy of the population in general. According to the results of the field research conducted by the Higher School of Economics in monitoring financial behavior and trust of the population to the financial institutions, 46% of the citizens admit their financial illiteracy. Among the other problems, the transformation of the regulatory framework of the financial markets can be highlighted, for example, continuous pension reformations, innovations in the deposit insurance system etc.

A number of risks connected with the low level of financial literacy of students influences the financial sector and the development of the economy, namely these risks are connected with the certain typical behavior of citizens, especially students in the financial market, first regarding lending and savings.

Therefore, high level of financial literacy of students must consider at least:

- high level of deposits in banks;
- low level of debt load (the ratio of the average credit payment to his monthly average income;
- low share of the delayed payments.

The research on the level of financial literacy of students are based on the questionnaires of experts and students. Practice shows that that the necessary data taken by this method can be used as indicators while assessing the financial literacy of students. During the study, we interviewed 50 people aged 18 to 25 years to determine the level of financial literacy.

Among the respondents, 92% are students, and 8% are people who combine work with studying. Around 34% of all respondents the level of month income per person is from 240 to 480 dollars. More than 20% falls on the group of respondents whose monthly income per 1 person in the family ranged from 80 to 160 dollars and higher. Slightly more than 14% falls on the category of respondents with income from 480 to 790 dollars for each family member.

To the question: “Do you keep records of your expenses?” 50% of respondents said that sometimes they keep records of their expenses. 35% of respondents answered positively, and 12% replied that they did not keep records of their expenses. During the survey, it was determined that more than half of the respondents do not borrow money at all, and the rest borrow funds for running expenses from relatives, friends and acquaintances (Figure 4).

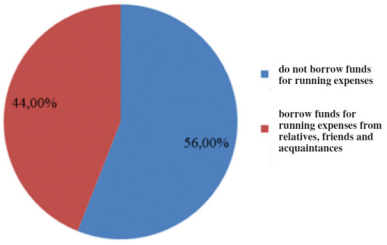

Figure 4: Distribution of respondents' answers: Where do you most often borrow money for current needs?

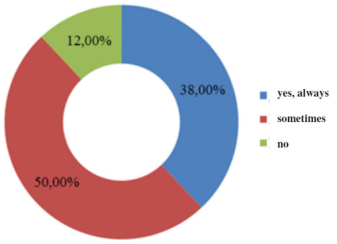

Figure 5: Distribution of respondents' answers to the question: Do you keep a record of your expenses?

When asked if you have enough financial knowledge in everyday life, the answers of the respondents are distributed as follows (Fig.6).

According to the figure, 48% of the total number of respondents said that they lack knowledge on financial issues. Approximately 26% were unable to answer this question. 24% of respondents believe that they do not have enough knowledge on financial issues in their daily lives.

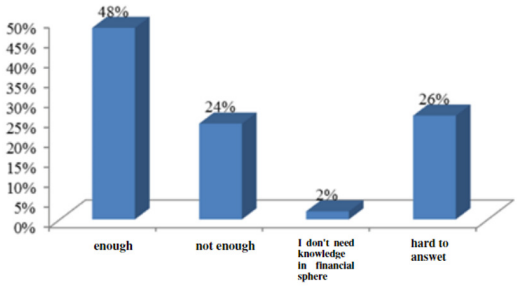

Figure 6: Distribution of respondents' answers: Do you have enough financial knowledge in everyday life?

To the question "How do you feel about introducing classes in financial literacy?" 72% of respondents answered positively, 14% negatively. The remaining respondents were not able to answer this question unambiguously. (Fig.7).

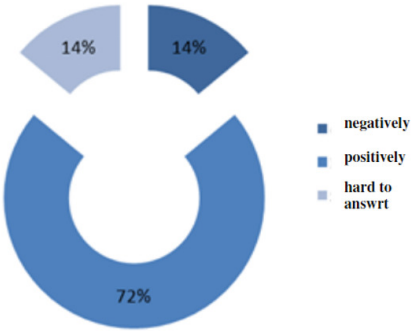

Figure 7: Distribution of respondents' answers to the question: How do you feel about introducing a subject of financial literacy?

In addition to the above issues, respondents were asked to undergo testing on a number of issues to determine the level of financial literacy. It was proposed to answer 8 questions on financial literacy. Table 1 shows the test results for each issue.

Table 1: Test results of respondents to determine the level of financial literacy

Questions	Percentage of respondents who answered the question correctly	Percentage of respondents who answered the question incorrectly
Choose which types of compulsory insurance are prescribed by law when obtaining a loan	44%	56%
What methods of securing an obligation can be provided for by a loan agreement?	68%	32%
Can a credit institution unilaterally change the interest rate on a loan agreement?	56%	44%
What services under a loan agreement the consumer cannot refuse to pay?	80%	20%
Is the bank entitled to charge an additional fee for depositing cash through the bank's cash desk for a loan payment?	38%	62%
At what point of time is the payment schedule provided to the borrower?	48%	52%
In what cases is a consumer entitled to repay a loan ahead of schedule?	66%	34%
What is the maximum amount of compensation for a deposit established by law?	38%	62%

We have conducted a sociological survey for 50 people aged from 18 to 25. According to the received data none of the respondents answered all the questions correctly. The largest number of incorrect answers were received on the following questions: «Is the bank entitled to charge an additional fee for depositing cash through the bank's cash desk for loan payment?» and «What is the maximum amount of compensation for a deposit established by law?». These questions were incorrectly answered by 62% of respondents. 56% of the total number of respondents incorrectly answered the question about the types of compulsory insurance prescribed by law when obtaining a loan.

In general, it should be noted that increasing the level of financial literacy remains important not only for people of retirement age (as evidenced by various sociological surveys of working and non-working pensioners), but also for young people - students. In other words, this issue is relevant for categories of people of different ages.

It can also be noted that the population survey should be considered not only as a research method, but also as a tool of influencing the object of study. The person who answers all the questions from the questionnaire already has a different level of financial literacy.

In general, the studies and analysis of expert opinions indicate that the following aspects are inherent to the consumer of financial services:

- certain financial behavior settings that are associated with assigning responsibility for personal financial decisions and financial risks on the government (paternalism);
- passive attitude to control over personal finances.

These are caused by the following problems:

a) the first group of problems is related to the fragmented nature of teaching the basics of financial literacy in educational institutions, the lack of accessible educational programs and educational materials for students, as well as the lack of qualified teachers of the basics of financial literacy;

b) the second group of the problems is related to:

   1) low awareness of the protection of consumer rights of students,

   2) the imperfection of legislative and regulatory support, the absence of a mechanism of interaction between the state and society, which provides the increased financial literacy of the population of students and the development of their financial education,

   3) an insufficient level of resources, including financial, human resources, information technology, provision of the necessary programs and activities,

   4) the absence of a mechanism of interaction between the state and society that ensures the increase of financial literacy of students and the development of their financial education.

The economic development of a country largely depends on the general level of financial literacy of the country's population. The low level of financial literacy leads to negative consequences for consumers of financial services, the government, the private sector and society as a whole.

Conclusions

The professional future will comprise improving competencies, gaining knowledge and acquiring new skills on a continuous basis. In the work environment the active participation in the process of learning will gain in importance. The implementation of modern forms, such as e-learning and blended learning, especially at the lower levels of education in accounting, makes it possible to use the personality traits of this generation and provides a response to its needs. Entrusting students with control over education in e-learning (in the complementary system) supports the process of developing the skill of independent learning of accounting, without the risk of losing control by the lecturer, as tests and exams are carried out in accordance with the rules set out in the study regulations.

The first version of e-learning is just the beginning of our work on it. Owing to the cooperation with students it will be possible to eliminate from the course its “early age diseases” and to enrich it with additional materials and activities. The development of this course may lead to its transformation into a course completely based on e-learning. It should also be highlighted that meeting the young generation halfway, by making e-learning available, may not lead to the abandonment of developing their social competencies and face-to-face communication and cooperation skills.

It is very important to share experience of implementing specific, more or less advanced solutions in the e-learning of accounting. Thus, the relevant good practice can be disseminated.

In the short term, young people will become a key segment of the financial structure. The received experience and the formed competencies of financially rational behavior will allow the younger generation to make conscious decisions, responsibly manage personal finances and analyze the possible consequences that will help to improve the person's financial well-being. These are important factors for person's successful socialization in society. The circumstances mentioned above allow us to conclude that it is necessary to use the capabilities of the education system as one of the elements of state policy to influence the financial behavior of students.

Information technology in education is currently a necessary condition for the transition of society to a digital format. Digital technologies play a significant role in expanding access to financial services and improving the welfare of the population. At the same time, the complication of financial products, the transition to remote formats, the emergence of new providers, as well as unfair practices in the sale of financial products increase the risks for consumers, first of all for socially vulnerable groups, including students. In such conditions, financial education and the availability of adequate mechanisms to protect the rights of consumers of financial services are becoming increasingly important.

Successful integration of financial literacy in the education system also depends on:

- the programs that harmoniously fit the necessary financial knowledge into training programs with connection to real life and age-related interests (problems) of students;
- teaching staff for the formation of necessary knowledge among students, which involves the organization of a reliable and effective system of assistance in training;
- stimulating mechanisms for both students and teachers.

New educational products are the following:

- creation of information and educational resources (websites, portals, computer games, print media, etc.);
- cognitive educational events, various business games and quests (debates, competitions, excursions and other events). Particularly effective are case studies such as the ABC of Financial Literacy and the Financial Literacy Championship.

New training technologies include online courses, e-learning, interactive, communication technologies, etc.

A generalization of the existing pedagogical experience makes it possible to highlight the interactive way of learning as the most effective tool of financial literacy education. It is based on the interaction of all participants of the educational process, for example, in modeling life situations, organizing discussions and joint problem-solving. The interactive form of conducting classes on the basics of financial literacy fully contributes to a more complete formation of the necessary competencies for students in the field of financial literacy.

In conclusion, we would like to note that interactive methods and technologies for teaching the fundamentals of financial literacy for youth are finding more and more practical application, since they have advantages over traditional forms of education (memorization is not supposed, the focus is not on theory, but on a specific life situation, conditions are created for inclusion of all students in active work and for working in small groups, based on the construction and design of various models

of financially competent behavior). Such technologies provide a direct link between acquired knowledge and their practical application, which has a positive effect on young people and forms their responsibility for financial decisions.

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The Change of Security-Related Conditions in Developed Societies as A Result of The Exponential Development of Cognitive Science

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Abstract

A philosophical movement that advocates for, among others, "exporting" best human qualities to machinery has been increasingly popular in the modern world. It is described by the term transhumanism (abbreviated as: H+), coined by one of its most important precursors - Max More. An intensive debate is currently on-going both on the undoubted chance for the rapid development of humanity as well as the threats associated with the transition of this movement from the conceptual to the practical implementation phase. Cognitive science has a special place in H+ philosophy, besides neurotechnology, biotechnology or other sciences combating the limitations of a human body. It is an interdisciplinary science that studies cognitive systems, with particular emphasis on the human mind and artificial systems, i.e. computers that would ultimately reveal higher intelligence than the one encountered in humans. Simultaneously, a growing number of business entities expose themselves to a stream of economic transformations, which consist in favouring a "knowledge-based economy". They are in the process of a gradual transition from a material-consuming economy to the economy dominated by modern technology and access to knowledge. This impels us to try to be open-minded towards challenges and threats associated with such processes, in the context of international security. Theoretical research methods were widely applied in the research process, i.e. bibliographic query, critical analysis of the subject literature, selection and serious assessment of source materials. Owing to the analysis and synthesis, gradual abstraction, comparison and generalization, the inference phase has begun. The possibility of contact with high-class specialists, scientists from the Military University of Technology, involved in the development of new technologies, allowed for interviews and confrontation of theory and practice.

Keywords: Transhumanism, Cognitive Science, Changes In The Labour Market, Technological Threats

Introduction

The modern times, brimming with innovations, new opportunities and threats, are more and more strongly vocalizing the philosophical movement, characterized, among others, by its pursuit of a new reality, which replaces the natural environment with an artificial system. To a large extent it involves "exporting" the best human qualities to machines. The movement is described as transhumanism (abbreviated as: H+), a term coined by one of its most important precursors - Max More. According to the English philosopher and futurist "*transhumanism is a class of philosophies that seek to guide us towards a posthuman condition. Transhumanism shares many elements of humanism, including a respect for reason and science, a commitment to progress, and a valuing of human (or transhuman) existence in this life rather than in some supernatural "afterlife". Transhumanism differs from humanism in recognizing and anticipating the radical alterations in the nature and possibilities of our lives resulting from various sciences and technologies such as neuroscience and neuropharmacology, life extension, nanotechnology, artificial ultraintelligence, and space habitation, combined with a rational philosophy and value system*" (More M., 1990). This quote best recaps the gist of the phenomenon.

The main representatives of this philosophy (Natasha Vita-More, Anders Sandberg and Nick Bostrom) assume that man is not the last link in the development of humanity and civilization, but only a transitional stage. The development of technology, science and robotics strives for the human

body to go to a higher level of readiness, significantly and even completely exceeding the natural capacity of a human being.

The modern world does not leave any room for natural processes, feelings, ethical values and moral norms; their place is being taken by lies and violence at an alarming rate, and Social Darwinism seems to be a growing global "religion" leading to a very difficult social structure. Civilization starts to be governed by intelligent energy networks, the Internet of Things, robotics and artificial intelligence, geoengineering and technotronics. These changes are closely related to GRIN technology (i.e. genetics, robotics, computer science and nanotechnology), which forms the axis of basic tools ensuring the development of humanity, while maintaining its fundamental impact on the direction of societal changes. Transhumanists suppose that the final stage of transhumanist evolution of humanity will be a "posthuman" with supernatural power and superintelligence.

An intensive debate is currently on-going on the undoubted chances for the rapid development of humanity (Czajkowska A., 2018) as well as the threats associated with the transition of this movement from the conceptual to the practical implementation phase [Bostrom N.N. 2003]. Cognitive science has a special place in H+ philosophy, besides neurotechnology, biotechnology or other sciences combating the limitations of a human body [Miller G. A. 2003]. It is an interdisciplinary science that studies cognitive systems, with particular emphasis on the human mind and artificial systems, i.e. computers that would ultimately reveal higher intelligence than the one encountered in humans. Certain elements and concepts of this science have already been implemented by organizations most open to innovative solutions.

Changes in The Labour Market

The results of "Global Human Capital Trends 2019" research conducted by Deloitte company on approximately 10,000 leaders of Human Resources and Information Technology as well as management board members in 119 countries show that we are in the initial phase of diametrical, in particular employee-related changes, that will need to be addressed by entrepreneurs around the world. Despite the widespread digital transformation, 84% of respondents say they will have to change their approach to employee experience to increase the employees' productivity, because a driver for innovation is and will be the human potential, yet supported by artificial intelligence, cognitive technology, automation and robotics. It is assumed, that machines will take over repetitive activities, people's activities will lose their routine character, and men will work hand-in-hand with robots (Ezequiel A. Di Paolo, 2003).

This issue is naturally related to what every person is currently thinking about, namely their sense of existence as an employee in the context of the forthcoming changes in the labour market. We are inevitably headed towards key problems arising from the conflict between the development of technology and the disappearing labour market.

The report prepared by the Millennium Project expert group Work / Technology 2050: Scenarios and Actions, which focuses on social and governmental responses to problems associated with work and technology development, shows that global society is exempt from criticism in its movement towards a labour market conflict involving a natural employee and a technologically improved robot, whose development cannot be fully anticipated.

Due to too strong of a focus on political conflicts, no attention was paid to how quickly artificial intelligence, robotics, 3D / 4D printing or bioengineering contribute to the today's business being out-dated. In addition, a gap in income and economic growth is widening despite there being no increase in employment, while an average number of people working in services and products have dropped significantly.

Currently, among the global workforce of over 7 billion citizens, only about 2 billion are employed by others or self-employed. The new technologies introduced in recent decades have not created more jobs than they ousted. As a result, today two-thirds of the world's workforce is in the grey economy

or unemployed, and the economy and financial systems cannot support aging societies and mass youth unemployment. This exacerbates social conflicts, cyber-crime, terrorism and organized crime. McKinsey Global Institute experts forecast that the highly economically developed countries, e.g., Germany or the United States, will be most affected by these changes, and the most seriously aggrieved persons will be machine operators, food sector employees, mortgage brokers, accountants and administrative employees. Occupations that are based on the need to maintain interpersonal contacts, complex tasks of perception and manipulation, or tasks of creative intelligence will be less susceptible to automation.

Knowledge-Based Economy

Global corporations, i.e. Google or Facebook made sure the Internet can be accessed even from the poorest parts of the world. As a result, many remote villages in poor countries gained access to virtual space, which, in addition to such significant benefits as tele-education, tele-work, tele-medicine or tele-commerce, gave people the ability to be much more destructive while their privacy has become a complete illusion.

Representatives of management sciences perceive modern transformations differently and carry on a very intense discussion about the memory of an organization (Walsh J.P.and Ungson G. R., 2006) and the ways in which it can be managed. This type of memory can be treated as an exported, shared, and in an organization-specific way, organized memory and patterns of its employees. It often constitutes a key element of resources of those companies, which base their activities on the intellectual capital of employees. Interestingly, such entities fit perfectly into the trend of economic change, currently supported by the European Union. The trend promotes a "knowledge-based economy", or "a gradual shift from a material- consuming economy based on economies of scale to the economy based on knowledge and modern technologies."

Hence, only those with intellectual potential and the latest knowledge in the field of science and technology have a chance to develop countries. Therefore, the competitiveness of the "new economy" lies in the advantage based on knowledge and innovation being a function of at least three variables: people's creativity, demand for innovation and the appropriate pro-innovative climate of the state (Almeida H. and Sequeira B., 2019).

Widely available 24-hour virtual reality and engaging social media just like ("cyber heroin") have lulled people into a false sense of security in the context of new revolutionary movements. Social divisions have arisen and continue to arise between honest taxpayers and the unemployed. New social divisions between technologically advanced citizens and "natural people" are becoming apparent. The evolution of technology is so extensive that no matter how good the initial intentions of the inventors of new technologies were, immoral personalities turn them against the good majority.

It may therefore turn out in the future that "human intelligence, the driving force of which is creativity and the ability to describe the surroundings in a logical way, has led to a stage that can be a dead end of evolution - with all the accompanying consequences" (Pasieka T., 2018).

Technological Threats

The efficiency and pace of information flow in the 21st century is gradually increasing, gaining in dynamics. It mostly results from a snowball increase of technologies and changes in general global trends. The development of the idea aims to ensure that in the manufacturing process every item of daily use is equipped with appropriate micro-chips having the functionality of, among others, a wireless network adapter connecting to the Internet. Such connections communicate with other "machines" independently and as needed (*machine-to-machine* – M2M). The concept is called the Internet of Things (Miller M., 2016). Artificial Intelligence - AI, to put it simply, consists in expanding the current capabilities of electronic devices and device-controlling software with certain cognitive functions, which humans associate (or have associated) only with the human mind, such as learning. Contemporary types of self-learning AI are based, among others, on the analysis and

synthesis of natural languages (e.g. speech synthesizers and translators, with some of the functions that are currently being refined such as the so-called virtual assistants); logical reasoning (inference based on knowledge and reasoning algorithms, and by the same token the processing of information from the database); neural networks and broadly understood machine learning involving independent decision making based on a knowledge base and algorithms.

Another element affecting the dynamics and scope of impact of the discussed threats in the context of national and international security is the progress in miniaturization and automation, with the flagship example being MEMS technology (*Micro-electromechanical Systems*), which consists in the integration of mechanics, sensors, actuators and electronics in a single sub-millimetre system. MEMS elements are sometimes surprisingly small. Probably the most common example of the application of this technology are components of modern "smartphones", such as acceleration sensors, elements of movable optics, microswitches or other additions. It is estimated that the turnover for the whole MEMS-related industry increases annually by 14%, which is comparable to the pace of development of the artificial intelligence market.

Conclusion

The rapid development of technology already affects many aspects of the security of citizens and entire countries, ranging from miniaturization and Internet infrastructure to the most advanced methods of data processing. They are gradually dominating an increasing share of the global goods and services market, giving countries that have decided to take part in this race a chance to raise their position in the global economic system.

The examples of threats related to new technologies may be multiplied here: from economic aspects and block chain technology, being the foundation for the existence of cryptocurrencies that could potentially destabilize the current financial system, to a technology bordering on biochemistry and research on ways of inducing genetic mutations of plants, animals and even people. The above examples do not exhaust to a smallest extent an enormous range of various threats associated with the development of science and technology for both the individual and entire societies. One could, however, be tempted to make a certain generalization referring to the 4th industrial revolution - almost every field of science (social sciences and humanities as well) has been equipped with powerful tools in the form of supercomputers, the Internet, Big Data and other elements that require more and more computational power. They allow to precisely design modern materials at the molecular level, forecast weather on a global scale, or even predict the effects of conflicts, including the detonation of nuclear bombs. Therefore, two things seem to be the most important elements in this race. The first one involves control over the full supply chain of modern technologies, from research and concept to production. Whereas the second key element is setting standards in the software layer, which allows constant access to the analysis of behaviours of network users, their preferences, mood modifications, etc. and, based on this data, development of further, increasingly better generations of algorithms. Nowadays, the coupling between modern technologies, software and specialized human resources is a kind of recipe for successive movement up the ranks of the most developed countries in the world. The national security of each country is increasingly dependent on the technological potential, which means that the development possibilities of this potential determine the position of the country and its real defence capabilities against the challenges of the future.

Thus, using a futuristic analogy, it can be assumed that not only humans, but also technology will have a potential to generate technology. Falling behind this global race of progress may ultimately be detrimental not only to the standard of living of a given society but also to its security.

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Decomposition of GDP Growth Rate in Poland Over the Years 2010-2019. Exposition of The Problem

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Abstract

Public authorities [central and local] implement a specific fiscal and monetary policy of the state, they have to have a particular information base. Public authorities make short-term, medium-term and long-term decisions. The information base for taking decisions by the public authorities is provided by:

- natural measures
- statistical measures proposed by science
- monetary measures

Considering the need of making decisions in the global economy, statistical offices in the world agreed that the Gross Domestic Product (GDP) will be such a measure. GDP is used by governments, politicians, international organizations such as OECD, the World Bank, the International Monetary Fund, financial markets, UN agencies. In practice, we use GDP per capita and GDP real growth rate. Therefore, it is important to know factors affecting the GDP growth rate. It may be done through decomposition of a GDP growth rate which involves a final breakdown of the GDP into a domestic and foreign demand. This paper will evaluate the impact of components of a domestics and foreign demand for Poland over the years 2010-2019 in the quarterly view (39 observations – each observation comprises 6 variables, 234 variables in total).

Key words: GDP, Private Consumption, Public Consumption, Investment, Stock, Net Exports, GDP Growth Rate.

Introduction

According to the System of National Accounts (SNA) and the European National Accounts (ENA) GDP may be calculated and analysed from the two points of view:

a) on one hand GDP measures the output being the sum of value added manufactured by all business entities (enterprises, financial institutions and insurance, governmental institutions and local governments, households and non-commercial institutions) operating in the entire country increased by indirect taxes imposed on products and decreased by subsidies granted to products.

b) on the other hand, GDP also shows a final division of the output into various types of demand meaning its final consumption. The final division of GDP of an enterprise is presented as follows:

$$\mathbf{PKB \equiv C + G + I + \Delta R + (E\text{-}M)}$$

where:

C – private consumption
G – public consumption
I – investment (gross expenditure on fixed assets)

ΔR – a change in inventory; inventory is understood as a difference between the production and the sales
E – exports
M – as imports
(E-M) – exports net
entities may be used to satisfy domestic demand comprising:

- private consumption
- public consumption
- investment
- changes to the inventory
  and foreign demand including net exports.

In the book by Noga, finally, the use of GDP meaning the final division of goods and services into categories of the final demand (domestic and foreign) is referred to in economy as decomposition of GDP [2018].

Decomposition of Real GDP Growth Rate in Poland Over the Years 2010-2019 From the Quarterly Perspective.

Table 1 presents decomposition of GDP growth rate for 2010-2019 (39 quarterly observations). The entire period witnessed the GDP growth rate ranging 0,0% ÷5,5%.

The range (from minimum to maximum) of particular components of GDP decomposition was as follows:

- Private consumption 0,0% ÷ 2,9%
- Public consumption – 1,1% ÷ 1,9%
- Investment – 1,6% ÷ 2,8%
- Changes to inventory -1,9% ÷ 2,6%
- Net exports – 2,1% ÷ 2,8%

The division of components into domestic and foreign demand shows the following ranges:
domestic demand -1,9% ÷ 2,9%
foreign demand -2,1% ÷ 2,8%

The first analyses of the GDP growth rate in Poland over the recent 10 years show that the GDP growth rate is equally affected by domestic as well as foreign demand as their ranges of impact almost align. The mode for particular factors of decompositions amounts as follows:

- Private consumption 2,6%
- Public consumption 0,8%
- Investment 1,5%
- Changes to inventory 0,1%
- Net exports 1,0%

Whereas the median (the central value of the set) for these factors of decomposition is as follows:

- Private consumption 2,1%
- Public consumption 0,6%

Table 1: Decomposition of real GDP growth rate of Poland over the years 2010-2019 broken down in quarters in %

	I 2010	II 2010	III 2010	IV 2010	I 2011	II 2011	III 2011	IV 2011	I 2012	II 2012	III 2012	IV 2012	I 2013	II 2013	III 2013	IV 2013	I 2014	II 2014	III 2014	IV 2014	I 2015	II 2015	III 2015	IV 2015	I 2016	II 2016	III 2016	IV 2016	I 2017	II 2017	III 2017	IV 2017	I 2018	II 2018	III 2018	IV 2018	I 2019	II 2019	III 2019
Private consumption	1,3	1,8	1,7	1,7	2,4	2,2	2,0	1,3	1,4	0,5	0,1	-	0,1	-0,4	0,5	0,3	1,7	1,8	1,2	1,3	2,2	2,0	2,0	1,6	2,0	1,9	2,3	2,1	2,6	2,7	2,7	2,5	2,9	2,8	2,6	2,1	2,5	2,6	2,2
Public consumption	-0,2	0,5	1,5	0,7	0,3	-0,2	-1,1	-0,3	-0,3	-0,2	0,2	-0,1	0,2	0,3	0,6	0,5	-0,6	0,9	1,1	1,3	0,2	-	-	1,3	0,7	0,7	0,8	0,5	0,3	0,4	0,5	0,8	0,8	0,8	0,9	0,9	1,1	0,6	0,8
Gross expenditure on fixed assets [investments]	-1,4	0,1	-	0,7	0,7	1,4	2,0	2,8	0,9	-	-0,6	-1,1	-0,3	-0,6	-0,1	0,1	1,5	1,6	1,8	2,6	1,5	1,1	0,9	1,2	-0,3	-0,9	-1,4	-1,6	0,2	0,3	0,7	1,5	1,1	1,0	1,9	2,0	1,6	1,5	0,1
Inventory growth	2,2	2,2	1,3	2,6	1,0	1,5	1,1	0,2	0,3	-1,0	-1,1	-0,3	-1,9	-1,6	-1,3	0,5	0,8	1,0	1,4	-0,8	-1,0	-0,1	0,1	0,1	1,3	0,4	1,1	1,4	0,7	1,8	0,3	0,5	1,5	0,1	0,4	-0,3	-1,1	-0,1	0,0
Net exports	0,2	-1,0	-0,5	-0,9	0,5	-0,1	1,0	1,3	1,0	3,0	2,3	1,6	1,9	2,8	2,1	1,2	-0,3	-2,0	-2,1	-1,1	1,0	0,4	0,7	0,4	-0,7	1,0	-0,3	0,3	0,9	-0,9	1,3	-0,2	-1,0	0,6	-0,6	0,3	0,7	0,0	0,8
GDP dynamics	2,1	3,6	4,0	4,8	4,9	4,8	5,0	5,3	3,3	2,3	0,9	0,1	-	0,5	1,8	2,6	3,1	3,3	3,4	3,3	3,9	3,4	3,7	4,6	3,0	3,1	2,5	2,7	4,8	4,3	5,5	5,1	5,2	5,3	5,2	4,9	4,7	4,5	3,9

Source: Own work on based NBP Report on Inflation, November 2019, nbp.pl [access29.01.2020]

- Investment 1,1%
- Changes to inventory 0,5%
- Net exports 0,9%

I have also calculated an arithmetic mean of all decomposition factors and I have received the following results:

- Private consumption 1,72%
- Private consumption 0,69%
- Investment 0.67%
- Changes to inventory 0,39%
- Net exports 0,44%

Conclusions

A. In the entire surveyed period consumption was the main source of economic growth in Poland. According to my research, this consumption was mainly private. Out of 38 observations in 22 quarters the impact of private consumptions on the GDP growth rate was higher than the average 1.72%.

B. Undoubtedly, the second source of the GDP growth rate is generated by investments as reflected by the modal value, the median, the impact on the GDP growth rate (2.8%). My research has shown that. The following facts should be emphasised:

Firstly, in decomposition of GDP growth rate the investment factor refers only to expenditure on gross fixed assets. The analysis does not consider portfolio investments (in financial products and intangible assets)

Therefore, from the macroeconomic point of view, we divide investment into:

- public welfare investment
- non-profit investment

The classification is according to sectors. However, in research by Noga , the macroeconomic classification of investments in terms of tangible investments is as follows: a:

- fixed assets of enterprises
- housing
- inventory [2018]

Secondly, in macroeconomics there was a dispute between classical economics and Keynesian economics. Classical economists claim that before you can invest you must save first. Whereas Keynesian economists claim that investments "generate" savings. However, the theory and practice have revealed mistakes in reasoning of Keynesian supporters. They did not take into account that making investment through a bank loan is nothing else than using savings deposited in the bank by other entities. Thus a conclusions may be drawn that first we have to save than we can invest.

Thirdly, the above deliberations lead to the conclusion that in the relation between savings and investments there is a feedback. On one hand, investments result from transformation of consumption demand into investment demand. The research study by N. Nehrebecka and A. Białek-Jaworska has revealed that investment in fixed assets depend first of all on the cash flow from corporate operational activities and a smaller dependence of starting investment on conditions in the lending market. On the other hand, the investment will increase consumption demand, private and public consumption in the future [2016].

Fourthly, the level of investments in a country depends on the so called investment climate which is determined by:

1. macroeconomic factors including:
   a) a fiscal policy of the state,
   b) a monetary policy of the state,
   c) a state of economic cycle (expansion phase vs recession phase),
   d) a growth in sales revenues,
   e) expectations of households and enterprises,
   f) changes to the law;
2. microeconomic factors related to the financial standing of an enterprise (cash flow, finance standing);
3. structural factors related first of all to the ownerships structure of an enterprise and the type of an enterprise (a stock company, a partnership, a limited liability company etc.).

C. According the research carried out, the third place among the sources of growth is taken by net exports denoting a positive indictor which involves exports greater than imports. It entails Poland's aspirations to a greater share in the world foreign trade.
D. Public consumption is on the fourth place as regards sources of GDP growth in Poland with greater aspirations for a higher position.
E. Changes to inventory are residual factor and from the point of view of general balance it would be favorable for this indicator to range near 0.,0%.

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A Graph-based Model for Big Data Warehouses Governance

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Abstract

Data governance emerges as an increased challenge in the context of Big Data, as it increases the heterogeneity and variety of data sources. Data governance covers a few subareas, namely Metadata Management and Data Quality, which can also be extended to the Data Profiling concept. These areas offer a set of processes to support and manage the complexity in the integration of different data sources. It is not only about increased data volume, but also about the increased number of business processes within an organization, requiring additional knowledge about this data. The objective of this work is to propose a graph-based model for the cataloging and governance of a Big Data Warehouse, in order to make its content available and show, among others, how it is evolving over time. The proposed model also allows the tagging and lineage of the data sources and the storage of the collected metadata in a graph database.

Keywords

Big Data Warehousing Governance, Graph Data Model, Big Data Management, Metadata Management.

Introduction

The high availability of data sources motivated by the increasing use of smartphones, tablets, social networks and IoT devices, providing huge amounts of data, produced at different velocities, having high degrees of heterogeneity, leads to new research challenges Cassavia et al. (2014). Big Data brings a new era in the usage and exploration of data, where characteristics like high volume, variety and velocity do not allow data processing or analysis by traditional tools. For integrating data from several data sources and supporting decision-making environments, Big Data Warehouses (BDWs) can be seen as flexible, scalable and high-performance repositories Costa and Santos (2018).

The governance of BDWs is a challenge that emerges associated with the context of Big Data, due to the

complexity of governing massive volumes of data, coming from distinct sources, with different purposes, different target audiences and, consequently, different constraints Hashem et al. (2015). Thus, without adequate tools, managing a heterogeneous environment and defining access policies for all scenarios can become almost impossible Costa and Santos (2017). Moreover, due to the data heterogeneity, the ability to automatically generate metadata about the data will be essential Katal et al. (2013); Labrinidis et al. (2012).

When the number of business processes in a BDW increases, data volume also increases, and the complexity of managing this repository can become complex and only possible with adequate tools. It is necessary to know which tables and attributes were stored, when they were created and which business processes they support, as well as the several updates they had (when and how many rows were included).

This work enhances Big Data Warehousing by proposing a graph-based data cataloging system for the tagging and lineage of data sources and for the storage of the relevant metadata in a graph database. In addition to gathering the basic characteristics of data, the proposed system records information about access policies, profiling, similarity, key performance indicators and business processes. This graph-based data model supports the governance of the data model of a BDW and its evolution over time.

This paper is structured as follows. Section 2 presents the related work. Section 3 describes the proposed graph-based model and Section 4 presents its instantiation and validation. Section 5 concludes with highlights of the presented and future work.

Related Work

Data Governance

Based on the principles identified by Costa and Santos (2017), the Big Data Governance challenge arises as a key issue for managing data. Data Governance describes how organizations manage all the data that pass by their business processes and implies a structure of responsibility, which it encourages the behavior in the evaluation, creation, storage, use, cataloging and deletion of data Smallwood (2014); Soares (2013).

In Khatri and Brown (2010) work, a Data Governance strategy is presented to guide the organizational decision-making processes, structured as five interrelated domains: (1) the data principles, that is, which policies, standards and guidelines are appropriate, so that organizations recognize the data meaning; (2) the data quality, as organizations must establish standards to ensure that data is up-to-date, complete and reliable; (3) the metadata, which provides a mechanism for a concise and consistent description of the data representation, helping to interpret its meaning; (4) the data access, where organizations should define data access policies, establishing rules for accessing the data and by whom, in order to manage the compliance with the data policies; and, (5) the data life cycle, as organizations must understand and document how data comes from, or progresses, throughout their business processes.

Considering the Data Management Body of Knowledge (DAMA-DMBOK) DAMA (2014), Data Quality is directly related to Data Profiling and consists of defining, monitoring and maintaining the integrity of the data, defining metrics, regulations or standards for obtaining knowledge about the data (metadata) Dai et al. (2016); Juddoo (2015). Data Profiling, aims to systematically detect errors, inconsistencies, redundancies and incomplete data Dai et al. (2016); Rodrigues (2017). Also, it is associated with a set of activities and processes to identify the metadata of a data set. There are metadata that are simple to obtain and can be called simple statistics, as for example the number of nulls, distinct values, data type or the most frequent patterns of a certain column. However, there are other metadata that are more complex to obtain, because they imply the correlation between several columns Abedjan et al. (2015).

Tagging and Lineage

Considering that in the area of data governance, works about tagging and lineage of a BDW are inexistent, to the best of our knowledge, it is necessary to research and analyze these concepts in a more traditional context, like Data Warehouses or Data Lakes, to later extend them to their role in a BDW context.

Some of the repositories that usually support Big Data contexts are known as Data Lakes (DL), which store data in its original format, or as BDWs, which store data in its structured format Terrizzano et al. (2015). To support data scientists in data analysis tasks, there should be control over the data, in order to describe and perceive its content, using metadata. Consequently, the metadata play an important role in understanding the data sets and how they related with each other, e.g. duplicate attributes, joinable attributes or outliers Alserafi et al. (2016); Morton et al. (2014).

To deal with this challenge, the work presented in Alserafi et al. (2016) proposes a process for cataloging the data schema of a DL, as well as proposes the systematic extraction, management and exploitation of metadata about the content of the data sets and their relation by means of schema matching. The work integrates automatic techniques to support the discovery of the DL content, with a formalized Metadata Management Walker and Alrehamy (2015).

Several research works explore the extraction of the schema and metadata content, providing an overview of techniques, algorithms and approaches for schema matching and finding patterns in the data content Murthy et al. (2012); Touma et al. (2015). The ontologies alignment and the schema matching techniques, which are based on finding similarities between data schemas and data instances, can also be used to integrate data sets Bernstein et al. (2011).

Graph-Based Model For Big Data Warehouses Cataloging And Governance

This section proposes a graph-based model for BDWs cataloging and governance based in the BDW model proposed in Costa (2019).

The graph-based model proposed in this work is implemented in the Atlas tool, as it is an open-source project and highly customizable. The base model of Atlas is here extended to answer the following requirements:

(1) How entities (tables and columns, among other entities/nodes) are classified in order to organize them in a hierarchical way, allowing to relate similar meanings (e.g. Customer, can be divided in the requirements Customer, the payer, or who get the goods)?
(2) What words/terms that are used in the organization and how the entities are associated with them (e.g. OEM (Original Equipment Manufacturer))?
(3) What actions can be performed on an entity?
(4) How does the data flow in the BDW?
(5) Based on the BDW model, what is the type of each table and attribute?
(6) How was the data evaluated in terms of its quality?
(7) How different tables can be integrated considering different similarity measures?
(8) Which permissions are defined on users and data?
(9) Which business processes are included in the BDW and what data each one uses?
(10) What are the organization's performance indicators and what data is used to compute them?

The various data sources and technologies that are used in this work to feed the BDW governance model and implement the graph-based governance system are summarized in Fig 1. The graph-based system includes Atlas as one of its core components, importing with a REST API all its metadata. Hive and HDFS are storage systems used in the implementation of a BDW, also they are used to feed the metadata to Atlas. A profiling tool Magalhães (2019), allows the monitoring of the data quality, computing data quality statistics and similarity measures. Ranger is the technology used to collect data policies and permissions

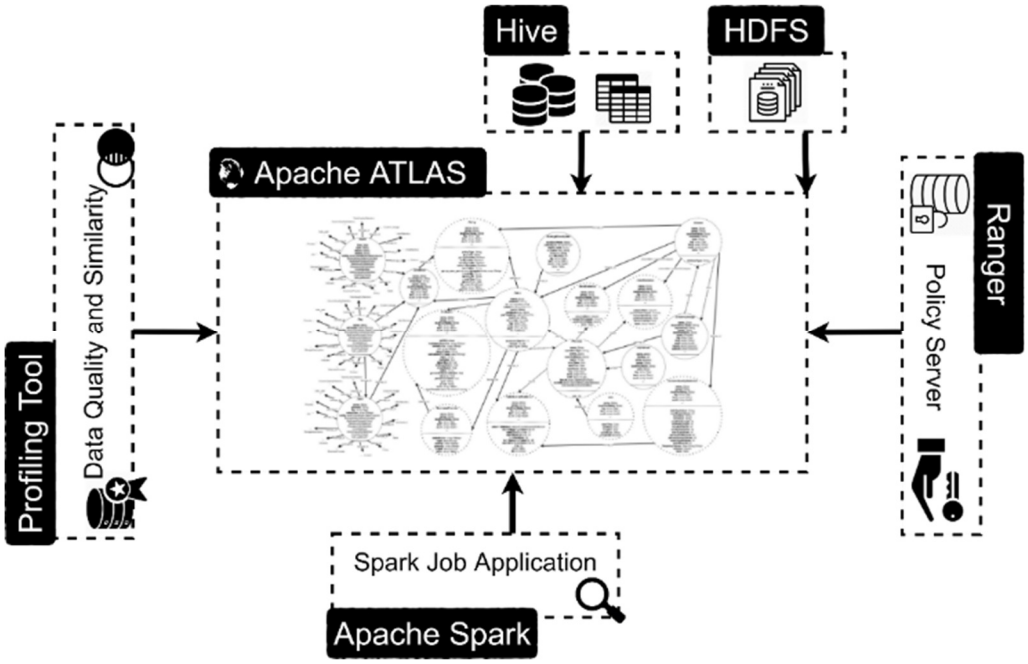

Fig 1. Data source and technologies for the Big Data Warehouse Governance.

information. Spark interacts with the profiling tool, collecting the relevant metrics and feeding the supporting graph-based model Magalhães (2019).

In this paper, and due to the complexity of the whole graph, only the most relevant nodes and attributes are presented in detail. The overall graph-based model is available at Costa (2019). Fig 2 and Fig 3 gives an overview of the BDW graph model, pointing its nodes and the relationships existing between them. The model includes nodes already available in Atlas, some of which extended with new attributes, while other nodes are here proposed to fulfill the defined requirements. In Atlas, whenever a classification/tag or term are created, it is possible to associate them with any node of the graph.

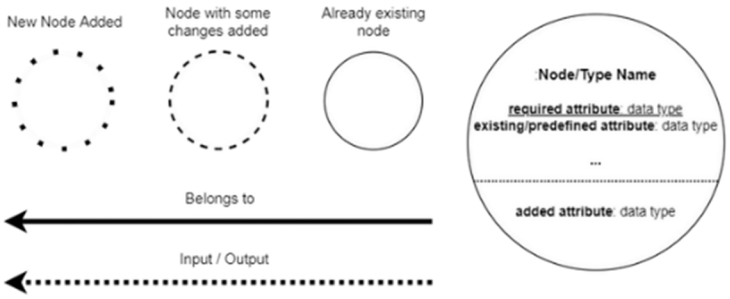

Fig 2. Legend of the graph model

Each ***Tag*** type node corresponds to a classification that aims to organize information, within a hierarchy, allowing to relate similar meanings and identifies the data itself, for example, may refer to data quality (eg. tag: DATA_QUALITY); this node answers requirement (1). The ***Term*** node is a glossary term associated to the business rules/terms; this node supports requirement (2). The ***Audit*** node represents each action performed on entities and shows, for example, the details of their creation ("Entity Created") or change ("Entity Updated"), information already stored in Atlas; this node supports requirement (3).

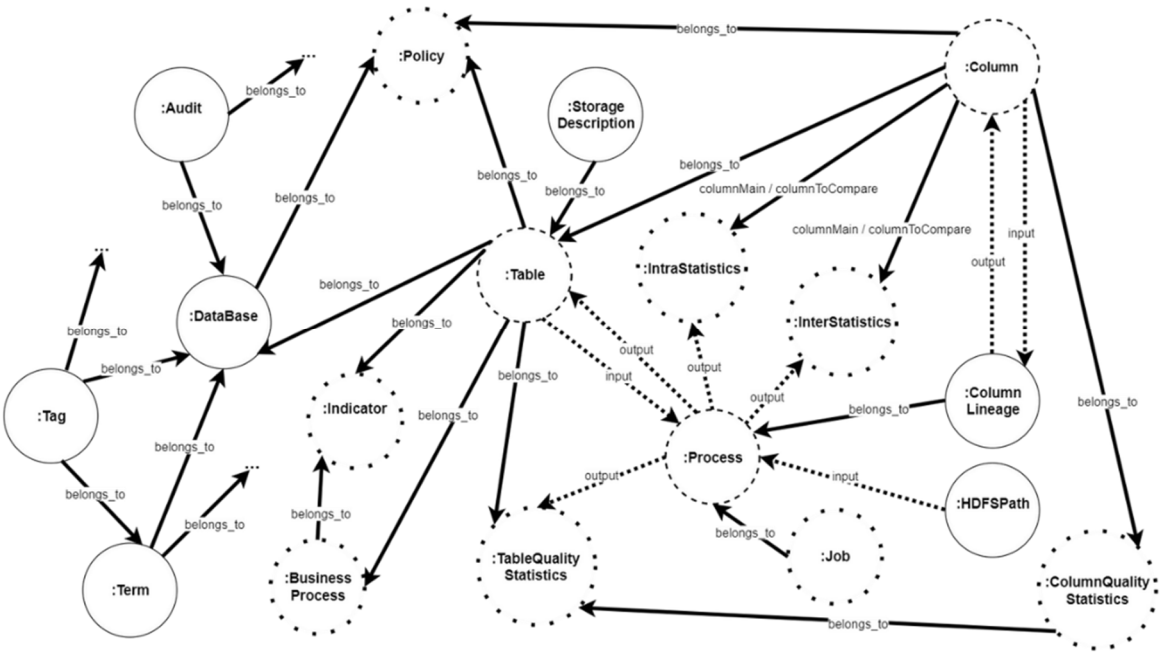

Fig 3. Big Data Warehouse Catalog Metadata Model

The ***DataBase*** node contains databases' metadata, in this work metadata about BDWs. Each database has associated a set of tables, so the ***Table*** node describes the characteristics of each one. Besides the Atlas metadata, this work adds the following attributes Inuwa and N. D. Oye (2015); Santos and Costa (2019); Santos and Costa (2016):

- *accessesCounter*: counts the number of table updates;
- *scores*: corresponds to the average user score of the table (on a scale of 0 to 5 points);
- objectType: A table can correspond to: (1) Analytical Object; (2) Complementary Analytical Object; (3) Materialized Analytical Object; (4) Date and Time Object; (5) Spatial Object.

The ***StorageDescription*** node represents the attribute *sd* in the tables and describes the storage of *Managed Tables*, namely providing information about their location (*path*) in the repository (*file system*).

Each of the tables contains a set of associated columns. The columns can be described through the metadata definition present in the ***Column*** node. In addition to the metadata extracted from the Atlas, another one is added Kimball and Ross (2013); Santos and Costa (2019):

- *attributeType*: Can be "Descriptive", "Factual", "Predictive" or "Identifier".

The lineage of each column is traced by the attributes of node *ColumnLineage* of type *hive_column_lineage*, for example, when a certain table is created by a certain process, the lineage of the

columns that indicates the columns of the inputs and the columns of the outputs and is associated to this process. Consequently, the data flow can be analyzed from these nodes (requirement (4)).

In addition, the new metadata added to the *Table* and *Column* nodes make it possible to know the tables and columns that the organization/business has, in order to understand how to use/apply the data, according to requirement (5).

The ***Job*** node arises to see what a job of a process (type *ProfilerProcesses*) performs and what its state is. Each job is identified by its "id" that corresponds to its name. These metadata were obtained from the Spark Job application:

- *startTime*: Job creation date;
- *endTime*: End date of job creation;
- *duration*: Duration of the job in milliseconds;
- *sparkUser*: Spark user;
- *completed*: Matches the job state; if it fails, it indicates "false"; if it was successful, it returns "true".

The ***Process*** node is created to describe a process that happened. The *ProfilerProcesses* process type is created, the input that receives is a table and the output is the table statistics (*TableQualityStatistics*). This profiling component was elaborated in collaboration with another work called *Smart Crawler for Big Data Integration,* as this generates the data profiling process in Spark, using the metadata defined here.

When the process of type *ProfilerProcesses* is triggered, it originates the type *TableQualityStatistics* and, therefore, the type *ColumnQualityStatistics*. Thus, the ***TableQualityStatistics*** node includes the metadata obtained from Atlas and describes the general quality characteristics of a certain table Abedjan et al. (2015):

- *columnStatistics*: Column statistics to which the table is associated;
- *numcategoricalColumns*: Number of columns of nominal type;
- *numDateColumns*: Number of columns of date type;
- *umObservations*: Number of rows in the table;
- *numVariables*: Number of columns in the table;
- *numNumericalColumns*: Number of columns of the numeric type;
- *numOtherTypesColumns*: Number of columns of another data type;
- *size*: Table size in megabytes.

Still following the characteristics related to data quality is defined ***ColumnQualityStatistics*** node that describes the general quality characteristics of a certain column Abedjan et al. (2015):

- *dataTypeCol*: Data type associated with the column;
- *numEmptyValues*: Number of empty values;
- *maxValue*: Maximum column value;
- *minValue*: Minimum column value;
- *maxFieldLength*: Maximum number of characters;
- *minFieldLength*: Minimum number of characters;
- *numNullValues*: Number of null values;
- *numFalseValues*: If the data type is Boolean, it returns the number of false values;
- *numTrueValues*: If the data type is Boolean, it returns the number of true values;
- *percentFillRecords*: Percentage of filled values;

- *percentUniqueValues*: Percentage of unique values;
- *numUniqueValues*: Number of unique values;
- *numRecords*: Number of rows;
- *frequencyValues*: Frequency of certain column values.

There are metadata classified as simple statistics, for example, the number of nulls, distinct values, the data type data or the most frequent patterns. Thus, when a profiling process is triggered, it origins the *TableQualityStatistics* and *ColumnQualityStatistics* nodes that are developed to evaluate data quality (requirement (6)).
To save measures about the joinability between columns of different tables, the ***InterStatistics*** node is created, which gathers two similarity metrics. The metadata associated with this node, essentially allows to understand the percentage of common values between the attributes of the two data sets, this is, between columns of different tables Abedjan et al. (2015); Maccioni and Torlone (2018):

- *columnMain*: Column to be compared;
- *columnToCompare*: Second column to be compared;
- *headerSimilarity*: Calculates similarity using similarity metrics to compare column headers;
- *contentSimilarity*: Calculates similarity using similarity metrics to compare column content;
- *thresholdFilter*: Value that is defined as the limit on which the similarity of headers is filtered.

On the other hand, as a way of analyzing the relationship (correlation) between the column values of the same table, the ***IntraStatistics*** node is created. The metadata associated with this node allows to perceive the percentage of common values between columns Abedjan et al. (2015); Maccioni and Torlone (2018):

- *columnMain*: Column to be compared;
- *columnToCompare*: Second column to be compared;
- *correlationValue*: Columns correlation.

However, there are metadata that are more complex because they imply the correlation and association between columns. Thus, the *IntraStatistics* and *InterStatistics* nodes that identify dependencies and similarities between columns (requirement (7)) are outlined.

According to the needs in a policy (permission) creation, and based on the Apache Ranger tool, the ***Policy*** node is created in association with a certain database, and/ or tables and/ or columns and with a succession of metadata:

- *policyType*: Type of policy, for example, "Access";
- *policyID*: Policy identifier;
- *policeEnabled*: If the policy is active it returns "true" and "false," otherwise, in the latter case, the policy is disabled;
- *dbExcludes*: If the databases are included it returns "false" and "true", otherwise, in the latter case, the databases of the policy are being excluded;
- *tableExcludes*: If the tables are included it returns "false" and "true", otherwise in the latter case, the tables of the policy are being excluded;
- *columnExcludes*: If the columns are included it returns "false" and "true", otherwise, in the latter case, the columns of the policy are being excluded;
- *description*: More detailed description about policy;
- *group_user_permisson_delegateAdmin*: It gathers the user group(s), the user(s) to whom permission is given, as well as the permissions defined.

Thus, the *Policy* node responds to requirement (8), since it contains the characteristics that allow to investigate the permissions and accesses provided to databases, tables and columns, and also, which users or groups have articulated these privileges.

Business process includes a set of activities that produce a service or a specific product to certain stakeholders, a node called ***BusinessProcess*** is added in the model. This node is constituted of metadata that describe the business process in general Dijkman et al. (2008):

- *stakeholder*: Is the entity that is engaged with a business process;
- *input*: Inputs associated with the process, basically relate to what motivates and feeds the execution and existence of the process;
- *activity*: An activity can be a task or a subprocess. A task is a detailed activity and represents the work to be executed. A subprocess is a composite activity and is defined as a flow of activities;
- *gateway*: There are parallel gateways (AND-split) to create simultaneous flows (sequence), parallel-join gateways (AND-join) to synchronize simultaneous flows, among others;
- *output*: The outputs correspond to what the process originates in the end.

The ***BusinessProcess*** is related to requirement (9), describing the organization's business processes, and how they are associated with the BDW.

In reply to requirement (10) and based on the work of Imhoff (2019), the ***Indicator*** node is used to classify the Key Performance Indicator (KPI) according to its importance to the business and the process in question. This node allows the representation of the performance of an organization during a specific time window. Based on Imhoff (2019); Chan and Chan (2004); Kerzner (2017); Turner (2009), it is identified and defined a set of metadata associated with Indicators:

- *isKPI*: If the Indicator is identified as a KPI (isKPI: true, otherwise, isKPI: false);
- *businessObjective*: The business objective corresponds to the long-term goal;
- *stakeholder*: Is the entity that is engaged with a business process Indicator;
- *csf*: The Critical Success Factors (CSF) are determined by several factors, ranging from the market in which the company is inserted, to what differentiates it;
- *targetFrame*: Temporary window associated with Indicator. For example, "Annual", "Semi-annual", "Monthly", among others;
- *calculationFormula*: Method for the Indicator calculation;
- *trend*: Measures performance over a period;
- *realValue*: The value in that particular period;
- *upperBound*: Maximum limit;
- *averageBound*: Average limit;
- *lowerBound*: Minimum limit;
- *status*: Performance against the target;
- *percentToleranceBound*: a given percentage of tolerance;
- *variance*: Difference between the actual (*real*) value and the objective (*upperBound*) value;
- *percentVariance*: The percentage of variance;
- *type*: Two types of Indicators are distinguished: (1) Absolutes: Individual number, sum, difference and average; (2) Relatives: Quotas, reference numbers and index numbers;

- *group*: Indicators can be divided into two groups: (1) Objective: Time, cost and amount; (2) Subjective: Quality, functionality and satisfaction.

Demonstration Case

Graph Instantiation for TPC-DS

The demonstration case uses the TPC Benchmark DS (TPC-DS) Nambiar and Poess (2006), transforming the original data model into a BDW model, and implementing that model in order to later use it to feed the graph for governance and cataloging.

The implementation of the BDW model help this demonstration case in feeding, with the TPC-DS data, the nodes of the proposed graph. Due to the complexity of the graph, only a subset of the nodes is shown. The bottom of each node contains the metadata that is added, while the upper part includes the metadata acquired from the Atlas tool and, from that set, the mandatory attributes, which are underlined.

The *ProfilerProcesses*, *Policy*, *TableQualityStatistics*, *ColumnQualityStatistics* and *Job* types are shown in fig 4.

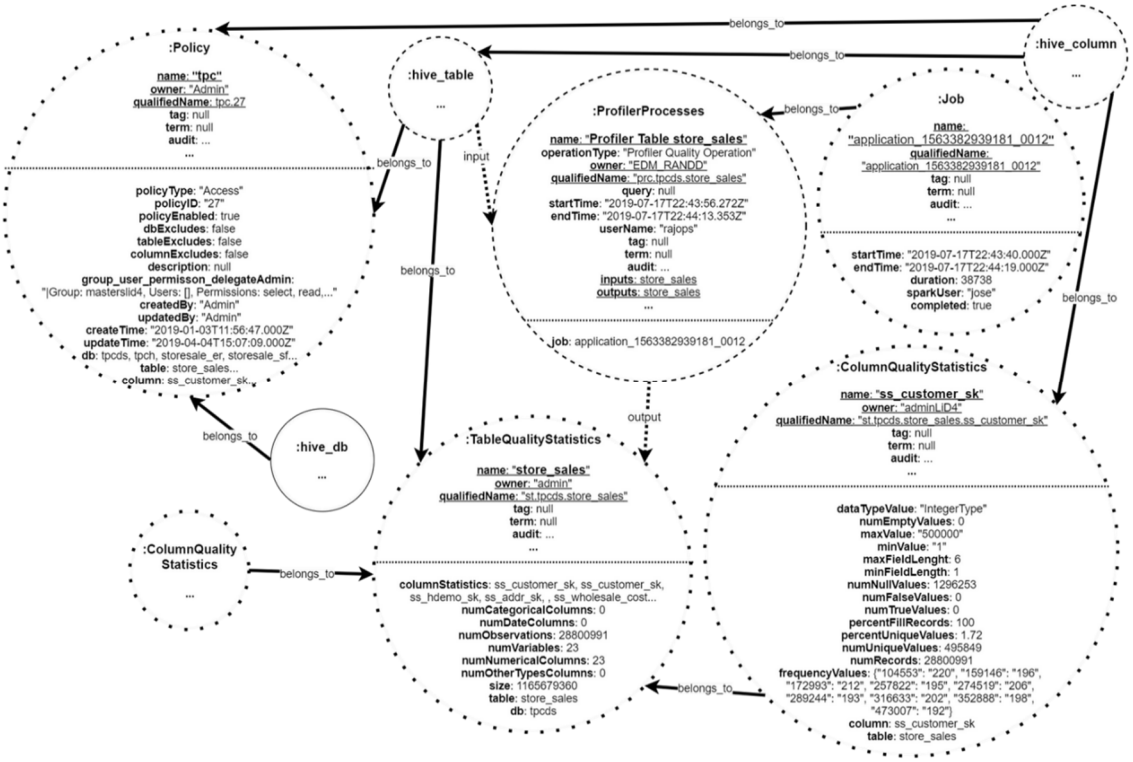

Fig 4. Instantiation of *ProfilerProcesses*, *Job*, *TableQualityStatistics*, *ColumnQualityStatistics* and *Policy* types.

The node of type *ProfilerProcesses*, originates the nodes of types *TableQualityStatistics* and *ColumnQualityStatistics*. Therefore, *ProfilerProcesses* is generated from a data profiling process executed in Spark, so the node is named “Profiler Table store_sales” and translates an operation of type "Profiler Quality Operation" that has as input the table “store_sales” and output the quality statistics of this table,

also called “store_sales”. This process has associated the *Job* called “*application_1563382939181_0012”*, whose status is "complete" (*completed: true*) and its duration is "37589" milliseconds. These quality statistics gather a set of metadata that describes characteristics of the table, such as the total number of columns in that table *(numVariables: 23*) and how many of them are numeric (*numNumericalColumns: 23*). It should be noted that when generating the quality statistics of a table, the quality statistics of each one of its columns is generated together, so the *TableQualityStatistics* node also gathers the names of the various statistics of the associated columns (*columnStatistics*). Through these statistics, it is possible to verify that the column “ss_customer_sk” is of the integer type (*dataTypeValue*), and it does not have empty values (*numEmptyValues*), although it presents "1296253" null values (*numNullValues*). Frequencies of values (*frequencyValues*), among other metadata, are still available.

The Policy node in the figure characterizes the policy named *tpc*, whose creator and modifier is the “Admin”, is of the “Access” type, its identifier is "27" and is active/enabled *(PolicyNameEnabled: true*). The policy is associated with several data sets, including the “tpcds”, “tpch”, “storesale_er”, “storesale_sf” databases, the “store_sales”, “customer” tables and the “ss_customer_sk”, “ss_wholesale_cost” columns, between all other tables and columns of each of the databases. In a policy, there can be multiple permissions, and a group or multiple groups of users can be associated to that policy. Also, permissions can be granted to a user or to a specific set of users. After selecting the user and the permissions, it is possible to indicate if the permission is associated with the administrator role (*delegateAdmin*). After this, all mentioned metadata are exposed in one of the attributes of the node, the *group_user_permisson_delegateAdmin*.

To improve the visualization of the proposed graph-based model, full images can be accessed in the folder named “Graph_Demonstration_Scenarios” at Costa (2019).

Graph Implementation for TPC-DS

For implementing the above metadata in Atlas, it is necessary to develop a JSON file to create or edit each node type through an Atlas REST API. In the folder named “Atlas Type Structure” at Costa (2019), the JSON files used to edit and create some of the node types are available. The several types are added/edited

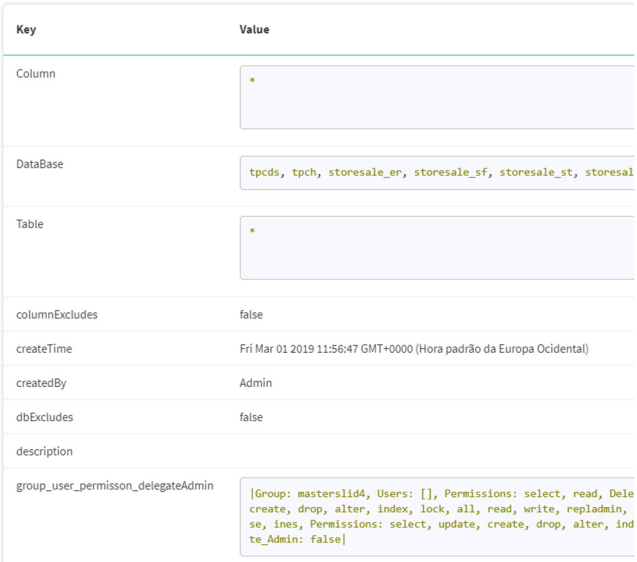

Key	Value
Column	*
DataBase	tpcds, tpch, storesale_er, storesale_sf, storesale_st, storesal
Table	*
columnExcludes	false
createTime	Fri Mar 01 2019 11:56:47 GMT+0000 (Hora padrão da Europa Ocidental)
createdBy	Admin
dbExcludes	false
description	
group_user_permisson_delegateAdmin	|Group: masterslid4, Users: [], Permissions: select, read, Dele create, drop, alter, index, lock, all, read, write, repladmin, se, ines, Permissions: select, update, create, drop, alter, ind te_Admin: false|

Fig 5. *Policy* "tpc" in Atlas

(POST/PUT) by Atlas REST API. The *TableStatistics*, *ColumnStatistics*, *IntraStatistics* and *InterStatistics* types are filled by running a data profiling process on Spark. The policy information is transcribed from Ranger to the *Policy* type created in Atlas from the REST API that allows you to parse and retrieve metadata from the returning XML. *Job* attributes are filled by invoking the REST API of the Spark Job application. At this time, part of metadata is already being fulfilled in an automated way. Other metadata like *hive_table*, *hive_column*, *Indicator*, and *BusinessProcess* types are manually filed by the user in the Atlas interface, with the exception of the *hive_table*, where the accessCounter attribute is only filled and modified when the table with the quality statistics is triggered or updated.

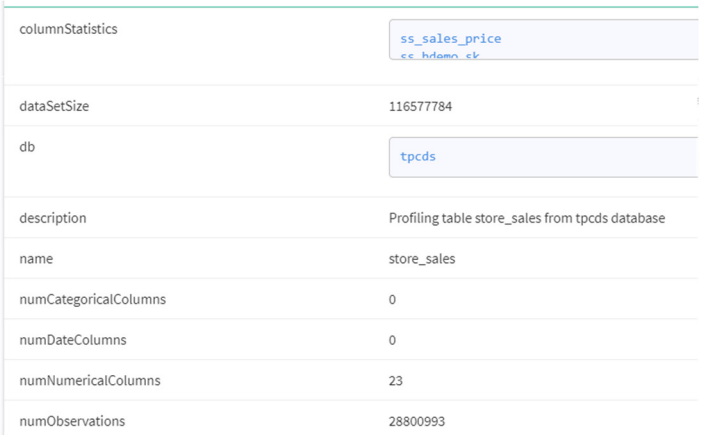

Fig 6. Quality Statistics of the "store sales" table in Atlas.

The fig 5 shows a part of the implementation in Atlas of the “tpc” policy whose metadata comes from Ranger. In fig 6 a part of the quality statistics of the *store_sales* table is displayed in Atlas, with the metadata already filled out.

Conclusions

This paper presented a cataloging and data governance system that is based on a graph model, aiming the support of governance tasks in a BDW, in order to better deal with the growing data and business processes of an organization. In this way, the tagging and lineage components were defined, and how they should be represented and stored in a graph database. As the main goal is essentially to collect and assemble the metadata catalog of the BDW, it does not make sense to develop a new tool or API, since Atlas already exists and can be extended for this task (as foreseen in this paper). Atlas incorporates a REST API where users can read, edit and create new data types, and allowing the automatic tagging and lineage of a database, considering information derived from numerous sources, such as Hive.

The graph-based model for the BDW stores its metadata. Its components, such as tagging, have several uses according to the business process or with security and privacy. In the lineage component, it is verified how the content of the BDW is evolving over time. Although the importance of the proposed graph, in the future, Atlas must be extended in order to allow the automatic collection of some relevant metadata, so far manually introduced in the system. With the necessary improvements, it is expected that, in the future, Atlas will be more automatically feed and interactive, allowing, for example, the representation of graphs for data quality statistics.

In conclusion, it can be affirmed that this work makes an important contribution to the Data Governance area, a current research topic, with almost no contributions in Big Data Warehousing. Thus, the result of this work provides a set of components that can be used and applied to various business contexts.

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Knowledge Transfer in Enterprise Intellectual Capital Management

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Abstract

Dynamism and multidimensionality of knowledge as an enterprise strategic resource is associated with its transformations both between individuals and groups of an enterprise and its environment. These transformations relate to the conversion of knowledge, i.e. the process of multidirectional exchange, which involves tacit/hidden and explicit/available knowledge as well as overall organizational transfer of knowledge. The above mentioned transformations and their effectiveness condition transformation of knowledge resources into intellectual capital, whose management is based on identification, measurement, use and development. The problem of conversion and knowledge transfer combines the issues of knowledge management (KM) and intellectual capital management (ICM). Therefore, it can be assumed that *the streams of transformations within the framework of knowledge-based intellectual capital combine the dimensions of intellectual capital and their management with particular elements of knowledge management. The purpose of the epistemological article* is to present the problem of knowledge transfer in enterprise intellectual capital management. The study consists of considerations on: integration of intellectual capital management and knowledge management, transformations and transfer of knowledge and their relationships with intellectual capital; as well as presentation of a knowledge transfer grid in enterprise intellectual capital management. The argument is summarized in a list of management dilemmas regarding knowledge transfer in an enterprise.

Keywords: Knowledge, Intellectual Capital, Knowledge Transfer, Knowledge Transfer Grid, Knowledge Management, Intellectual Capital Management.

Introduction

Knowledge as a multidimensional, dynamic and strategic resource of an enterprise has the ability to create new intangible assets that become intellectual capital. Dynamism, inexhaustibility, simultaneity and non-linearity of knowledge is associated with its transformations both between individuals, groups, organizations and beyond. These transformations relate to knowledge conversion, i.e. the process of multidirectional exchange, which involves tacit/hidden and explicit/available knowledge as well as overall organizational transfer of knowledge. The above mentioned transformations and their effectiveness condition transformation of knowledge resources into intellectual capital, whose management is based on identification, measurement, use and development. The problem of conversion and knowledge transfer combines the issues of knowledge management (KM) and intellectual capital management (ICM), which constitute a mosaic of managing intangible resources of an enterprise.

Intellectual capital is also subject to transfer processes both within an enterprise and between it and the environment. The mere fact that an enterprise has intellectual capital (human and structural) is not sufficient to increase the efficiency of its functioning. It must be transferred externally through structural - external - relational capital, meaning continuous exchange of added value between an enterprise and its environment participants, as well as internally increasing the value of intellectual potential. In this context, intellectual capital can be treated as a category that somehow constitutes the intelligence of an enterprise, which should be supported by the process of organization learning, combining its individual dimensions, but also facilitating the above-mentioned transfer.

Models of intellectual capital management (including measurement) functioning in theory and used in practice do not propose clear ways of transforming intellectual capital, focusing more on developing

new standards and tools for registering all possible intangible assets items than on capturing subtle relationships between them (cf. Khavand Kar, Khavandkar and Mottaghi 2013; Loyarte, Garcia-Olaizola, Marcos et al. 2018), hence there is a need to search for such solutions.

The purpose of the epistemological article is to present the problem of knowledge transfer in enterprise intellectual capital management. The study consists of considerations on: integration of intellectual capital management and knowledge management, transformations and transfer of knowledge and their relationships with intellectual capital; as well as presentation of a knowledge transfer grid in enterprise intellectual capital management. The argument is summarized in a list of management dilemmas regarding knowledge transfer in an enterprise.

The considerations are accompanied by *the assumption that the streams of transformations within the framework of knowledge-based intellectual capital combine the dimensions of intellectual capital and their management with particular elements of knowledge management.*

Intellectual capital management and knowledge management - characteristics and areas of concept integration

Defining the notion of knowledge is a serious epistemological and methodological problem. It is a broad, ambiguous and multi-faceted concept, and its definitions can be grouped into those that in the traditional sense define it as a result of the accumulation of experience and learning process, as well as the ones that emphasise the importance of knowledge as an intangible resource of an enterprise. In the context of a modern enterprise functioning, knowledge becomes a strategic resource, the basis for achieving competitive advantage, but also the basis for generating new - occurring in various forms - intangible resources. Knowledge can take many forms. One can speak of tacit, hidden, silent, secret, inaccessible, informal knowledge, but also its contrast, i.e. explicit, available, formal knowledge. Knowledge can also be individual, group, organizational, inter-organizational. There are many proposals for managing this resource (cf. Davenport and Prusak 1998; Bukowitz and Williams 2000; Probst, Raub and Romhardt 2002; Nonaka and Takeuchi 2000).

Generally, the set of activities that constitute the knowledge management process relates to the process (according to T.H. Davenport and L. Prusak)[1]:

- knowledge creation (e.g. by acquiring/purchasing/borrowing knowledge - purchasing databases, computer programs, recruiting highly qualified employees; through knowledge creation centres - innovations, patents, licenses, creating own centres, research and development departments, knowledge universities; by combining: joint work, teamwork, managing organizational behaviour, creating task groups, clash of views, conflict management; through adaptation - creating adaptive abilities, responding to changes in the environment, environment monitoring, cooperation with stakeholders; through networking - formal and informal networking, building an experience exchange community, learning processes, etc.);
- codification (e.g. by gathering knowledge, giving organizational knowledge an appropriate form, facilitating access to it by people who need it most; by identifying knowledge in its various forms, assessing knowledge from the point of view of its usefulness and coding capabilities, identifying the codification and distribution medium of knowledge etc.);
- knowledge transfer (e.g. through training, conferences, seminars, practical workshops, spontaneous, informal meetings, individual teaching, coaching, mentoring, group work systems; through document circulation systems, knowledge bases, expert systems, etc.).

Intellectual capital is based on knowledge, while knowledge-related processes facilitate creation of intellectual values. Intellectual capital consists of components of different levels of aggregation, most often one can talk about human[2] and structural[3] capital: internal and external-relational. [4] Intellectual capital is a combination of intangible assets, their ordering and conscious dimension. It does not match the traditional accounting model that tries to value activities such as employees' competences or customer loyalty, which may not affect enterprise's profits for many years. This type of capital is less

likely to appreciate short-term benefits that have less impact on an enterprise's position in the future. Intellectual capital bridges the gap between market perception and accounting reality, i.e. between market and accounting value, and includes all the immeasurable elements that create the difference between the total value of an enterprise and its financial value (the difference between the total value and traditional, material capital including financial).

Proper management of intellectual capital provides an enterprise with the basis for obtaining competitive advantage. The intellectual capital management process can be more or less formalized. Formalized ways of knowingly disposing of the intellectual potential of an enterprise are presented in the form of models and "try" to name and organize "scattered" and hidden elements of intellectual competence. The most important management models (including measurement) include: Konrad Report, Intangible Asset Monitor, Balanced Scorecard, Skandia Navigator, Value Platform, Danish intellectual capital measurement project (Danish Guideline), Value chain card, Tobin Index, Economic Value Added and human resource accounting methods, etc. The models are multi-faceted and diverse attempts to present a simplified reality. They affect many areas of an enterprise's operations, focusing on the opportunity to create benefits on the foundation of unique intellectual values. However, quite a lot of achievements in the area of the model creation gives a possibility of a wider choice to enterprises diversified in terms of size, object of activity, type of environment, industry features, etc[5].
Based on an in-depth analysis of the assumptions, spectrum of tools, indicators, solutions, etc. of available models, intellectual capital management can be unified by proposing the process that includes: *identification of elements of intellectual capital, their measurement as well as their use and development.* The above elements form a kind of intellectual capital management triad (cf. Sokołowska 2005, p. 18).

Intentional impact on intangible assets in the form of knowledge and intellectual capital results in the concepts of management: knowledge management and intellectual capital management. Both concepts coexist with each other, and considering the essence of intellectual capital management, it is impossible not to notice the issues of knowledge management and vice versa.

Similarities can be found, among others, in the following aspects:

- *adaptive* – the concepts can be a response to the turbulence of the environment and constitute a comprehensive attempt of an enterprise to adapt;
- *competitive* - their effective use creates opportunities for achieving competitive advantage;
- *structural and organizational* - their implementation requires favourable organizational conditions: an organizational structure shape, a specific organizational culture, acceptance by managers and employees, existence of communication, IT and technological possibilities and means; both concepts support creation of modern forms of organizations: learning, intelligent, virtual, etc., as well as R&D departments and positions for knowledge and intellectual capital management;
- *personal* - coordination of processes by people with appropriate competences and understanding the importance of these issues: knowledge employees/practitioners, i.e. knowledge operators, knowledge specialists, knowledge engineers, project managers, knowledge management managers, intellectual capital management managers;
- *tool/instrumental* - they have common tools, techniques, media, activities, e.g. Internet, Intranet, e-mail, groupware, innovative activities, etc.

Differences, however, can be observed in the following dimensions:

- *systemic* – in an intangible resource management system intellectual capital management can be strategic, superior while knowledge management can be tactical and operational, subordinate. Although in a situation of different optics, the configuration of both concepts may assume their integration at the strategic level (intellectual capital strategies as well as knowledge personalization and codification strategies);
- *dynamic* - intellectual capital is treated as a more static category than knowledge; it is the result of dynamic knowledge-related processes;
- *objective* - intellectual capital management seeks to develop new standards and tools for registering all possible items of intangible assets, while knowledge management aims to

develop methods that allow an efficient course of the processes of creation, acquisition, gathering, sharing and use of knowledge;

- *measuring* - components of intellectual capital in the form of human and structural capital can be measured using a set of quantitative and qualitative indicators, and elements of both explicit and tacit knowledge are more difficult to describe and measure.

The characteristic features of the concepts in the above aspects indicate existence of many common points, but also divergences. Both concepts complement and penetrate each other. They can create a system that covers the entire enterprise. The individual elements of the concepts can be considered both in the *human* (individual, group), *organizational* (structural internal) and *inter-organizational* (structural external - relational) dimensions. The processes make a network of cyclical, conscious actions directed at individual components (in the case of ICM - human and structural capital, in the case of KM - tacit, explicit, formal, informal, individual, group knowledge). The instrumentation in the form of models proposing a set of methods and tools has been developed for the needs of effective intellectual capital management and knowledge management. It seems that ICM dominates in this respect (especially in the scope of measurement models). Concepts creating a coherent system, can either be considered at the level of equivalent management concepts, or on the basis of subsidiarity and superiority. Then one of them is leading and the other supporting. Generally, the complementarity of concepts assumes their integration. The intellectual capital management process may be more or less formalized.

As part of the intangible assets functioning in an enterprise, including knowledge, components of intellectual capital are *identified*. Knowledge, both individual and group, is a very important element of *human capital*. Employees' knowledge can be contained in their heads, coded in a set of their formal and informal skills, ways of action, but also in an employee's ability to learn (his absorptive mind, imagination, analytical and creative thinking ability). Group knowledge is also important, as it is stimulated by the synergy effect and it is determined by the proper selection of group members and management of their behaviour (coherence, dynamism, roles, tasks, creation phases and crises of a group and team, leadership). Whereas, s*tructural capital* is disclosed and codified organizational knowledge. It is a product of directed actions of people (organizational structure shape, developed organizational culture and strategy, management methods, communication and IT systems, innovation, etc.) and consists of the effects of intellectual activities. It has an internal dimension, creating an internal structure, i.e. how an enterprise operates, but also an external one that is related to intangible market assets (commercial brand, contracts and contracts, marketing strategies, etc.) based on relations with external entities (customers, suppliers, local community, etc.), also in the aspect of creating and transferring knowledge.

The next stage of the process is the *measurement* of individual components. Intellectual capital management models propose a set of indicators that facilitate quantitative and qualitative measurement of intangible assets, among them are knowledge resources that are also subject to estimation.

The last element of the process is *the use and development* of intellectual capital with the supporting role of management methods, manners and techniques that facilitate creation of the value of human and structural capital. At this stage, the integration of both concepts is most visible, as knowledge management is becoming the leading concept supporting effective management of intellectual capital, consisting of creation, accumulation and use of knowledge (use of knowledge management strategies and methods is also important). Integrated intellectual capital management and knowledge management assumes a combination of the components of both concepts, indicating a close relationship between creating the value of an organization based on intangible assets. The assumption that an enterprise is able to create its value based on the intellectual capital at its disposal is becoming dominant only when all its components will coexist, cooperating harmoniously, also in connection with the knowledge management process, leading to transparent flows between individual components. The degree of this cooperation ensures effectiveness of integrated management implementation, and value is created not only directly from the operation of individual components of knowledge and intellectual capital, but from the entire system of interactions between these elements. Cooperation should be expansive, dynamic, continuous and holistic.

Transformations of knowledge and their relationship with intellectual capital

The basic problem in effective management of intellectual capital and knowledge are multidirectional exchanges within various types of knowledge, called knowledge conversion. The main roles in this process are played by *tacit and explicit knowledge*.

Tacit/hidden knowledge is of a process-dynamic character, but it is also primary and personal. It is invisible, difficult to express, articulate, present, identify, and is not subject to traditional codification. It is usually used intuitively, involuntarily, subconsciously. In principle, it is impossible to copy fully and follow. It is based on accumulated experience, daily activities, practical skills, intuition and individual level of intelligence. It usually occurs in two forms: non-codified skills and abilities as well as beliefs, views, thoughts, insights, patterns of reasoning and behaviour and thought models. It should be spread and obtained by accompanying the master, observing and codifying his judgements that value phenomena and problems, ways of formulating thoughts, views, approaches to problem solving, behaviours, choice of words, used associations, references to analogies, metaphors, models. Transferring tacit knowledge requires the use of various means of communication, primarily conducive to informal, spontaneous and personal contacts.

Explicit/available knowledge is of a static-receptive character, it is secondary and impersonal, visible and easy to identify, express, articulate, formalize and present, it is subject to codification. It is created by understanding tacit knowledge and giving it functional features, ensuring its universal use by various users in different problem contexts at different times. It is based on developed and widely accepted rules, principles, algorithms, processes and procedures. It is used consciously, deliberately, taking into account premises, effects and limitations. Explicit knowledge occurs in the form of organizational documents (e.g. organizational regulations, position descriptions), programs, reports, codes of conduct, instructions. It is spread and obtained by others mainly through access to relevant documents saved in paper or electronic form. The transfer of explicit knowledge is primarily ensured by available information technology.

Nonaka and H. Takeuchi distinguish four ways to convert knowledge (Nonaka and Takeuchi 2000, pp. 85-98):

- from tacit/hidden knowledge to tacit/hidden knowledge (socialization);
- from tacit/hidden knowledge to explicit/available knowledge (externalization);
- from explicit/available knowledge to explicit/available knowledge (combination);
- from explicit/available knowledge to tacit/hidden knowledge (internalization).

Socialization is a process of sharing experience, and thus creating tacit knowledge such as mental models and skills. An individual can acquire tacit knowledge directly from others, without using language, through observation or imitation. Experience, emotions and the context of specific meanings that help to adapt one's own thoughts and cognitive codes to other people's thinking are crucial in acquiring tacit knowledge. In *intellectual capital management*, it is important to anticipate (at identification, use and development stages) that among current and acquired human resources there are individuals with specific mental characteristics and skills. Socialization takes place both in direct contact on the employee-manager line and in conscious creation of specific thought patterns embedded in organisation cultural values in teamwork and in written but also invisible principles of its operation (structural capital). It is important here to respect cognitive codes of members of an organization, as well as their formation for needs of synchronization, to get out from employees reserves of their knowledge, transferable into specific solutions and activities.

Externalization is a process of expressing tacit knowledge with the help of available concepts. It is a complex process of creating knowledge in which tacit knowledge is made available through metaphors, analogies, concepts, models. Externalization is usually initiated through dialogue or collective thinking in the process of developing ideas (combining deduction and induction). When *managing intellectual capital*, it is important to implement such methods and tools as: competence management, coaching,

mentoring, but also to provide training in which model, image and abstract forms of presenting concepts are used.

Combination is a process of organizing and incorporating a concept into a specific knowledge system. It includes combining various components of explicit knowledge. Individuals share knowledge through conversations, documents, meetings and IT networks. Processing of explicit knowledge through selection, unification and categorization of information can lead to the emergence of new knowledge. It is important to encourage employees to share their insights, thoughts, suggestions and raise objections (*human capital*) by creating appropriate organizational conditions (*structural capital*).

Kombinacja to proces porządkowania i włączania koncepcji w określony system wiedzy. Obejmuje on łączenie różnych składników wiedzy dostępnej. Jednostki dzielą się wiedzą za pośrednictwem rozmów, dokumentów, spotkań, sieci informatycznych. Przetwarzanie wiedzy dostępnej w drodze selekcjonowania, ujednolicania i kategoryzowania informacji może prowadzić do powstania nowej wiedzy. Ważne jest mobilizowanie pracowników do dzielenia się swoimi spostrzeżeniami, myślami, propozycjami, zgłaszania zastrzeżeń *(kapitał ludzki)* poprzez tworzenie odpowiednich warunków organizacyjnych *(kapitał strukturalny)*.

Internalization is a process of incorporating explicit knowledge into tacit knowledge. It is closely related to learning by doing. When experience, due to socialization, externalization and combination, penetrates the ground of individual tacit knowledge, in the form of shared mental models or skills – it becomes a useful resource. Conversion of explicit knowledge into tacit is supported by verbalization, record in documents, as well as verbally transmitted stories. Documentation helps people to internalize what they have experienced, thus enriching their tacit knowledge, and also facilitates the transfer of explicit knowledge to other people, helping them indirectly experience the experience of others. However, for creation of organizational knowledge to be effective, tacit individual knowledge must be socialized by other team members, which begins another spiral of knowledge creation (cf. Nonaka and Takeuchi 2000, pp. 86-93). Internalization is the foundation of an organizational knowledge creation loop. It can be a virtually never ending process which, after proper design (making employees aware and creating an environment for directing employees' intellectual products - *human capital embedded in structural capital*) is self-propelling when habits of creating, codifying and transferring knowledge are developed.

Creating organizational knowledge is a constant and dynamic interaction between tacit and explicit knowledge. This interaction is shaped by transfers between different conversion methods. These, in turn, are activated by several forces. Conversion through socialization begins with building a field/ground of interaction that facilitates dissemination of experiences and mental models of organization members. Externalization is initiated by meaningful dialogue or collective reflection, where the use of an appropriate metaphor or analogy helps team members to articulate knowledge that would be difficult to convey without it. Combination is created by combining new and already existing knowledge and is expressed in a new product, service or management system. Finally, learning by doing triggers internalization.

Knowledge Transfer Grid in Enterprise Intellectual Capital Management

A knowledge transfer process combines transmission, i.e. presentation and sending of knowledge and its absorption, i.e. acceptance. Transmission involves acquisition of knowledge from a database or other element of a knowledge management system and sending/transfer or presentation of knowledge to a potential recipient. Then there must happen absorption or acceptance of knowledge and its assimilation for later use. If knowledge is not decoded and accepted by a recipient, despite the fact that transmission has taken place, one can not recognize it as a transfer. To transfer knowledge, it is necessary for both processes to occur (Morawski 2006, p. 166)). Knowledge can be transferred in a variety of ways, and it is not difficult to transfer explicit, decoded and formalized knowledge, but, on the contrary, tacit, encoded and informal knowledge.

An enterprise in which intellectual capital is managed uses its intellectual assets in the form of character traits, abilities, skills, cognitive code sets, experience, rational verification of reality, intuition of its employees, noticing variety of their intellectual profiles and diversity of their needs. Bearing in mind their well-being, a managers bring out the best from them in order to use these values for measurable effects in an enterprise's operation and, consequently, its growth and development. In an enterprise that treats individuals as a dynamic whole, opportunities to share knowledge thanks to teamwork, shared training, close contacts, and informal meetings are provided, while at the same time striving for comprehensiveness and flexibility of an individual in performing tasks. Solutions that provide every human resource with access and a possibility of using mechanisms that enable him/her to achieve his/her full potential taking part in enterprise's operations, as well as help in activating hidden resources and focusing on strengthening their value, creating structural conditions and applying properly selected actions, methods and techniques are invaluable in this aspect.

Knowledge transfer can occur in various forms and depends on the type of knowledge, but also on organizational, management and social conditions. Integration of intellectual capital management and knowledge management results in an impact of knowledge transfer directions on the realization of an intellectual capital management process.

Identification of relationship areas between components of intellectual capital can be carried out by exploring *the knowledge transfer grid* (cf. Sbeiby 2001, pp.348-353), in which the following configurations matter:

- *knowledge transfer between employees*, i.e. the relationship between *human capital - human capital*, both in the configuration of *individual human capital - group human capital* and *human group capital - individual human capital*. The important question here is: *how can transfer of competences and knowledge among employees, management staff (at different levels and among them), and between management staff (at different levels and among them) and employees take place*?

- it is facilitated by building an efficient communication and IT network, but also, above all, building trust in an organization, encouraging teamwork and facilitating it, creativity and creative solutions, interdisciplinarity of employees, position rotation, adaptation programs, communication training.

- *Transfer of employees' knowledge and individual competences from them to the internal structure*, in the configuration: *human capital - internal structural capital*. The important question is: *how can one stimulate intellectual activities of employees and managers towards creating the internal structure?*

-enabling conversion of individual competences into management patterns and tools by creating strong organizational values (organizational culture) and strategic solutions, as well as using favourable management methods (e.g. human resource management, including competence management, talent management, coaching, mentoring, but also innovation management, including social innovation). It is also creation of best practices, databases and procedures whose principles of operation and use can be easier and more efficiently spread among employees.

- *Transfer of employees' knowledge from them to the external structure,* in the configuration: *human capital - external-relational structural capital.* The important question is: *how can employees create relationships with an enterprise environment participants, enriching competence of customers, suppliers, etc.?*

- it is facilitated by methods helping employees to provide information on products, organization of trainings, courses, seminars on products, ensuring customer education in this area, reducing bureaucracy and information bottlenecks, but also creating positive relationships with other stakeholders from an enterprise's environment by identifying their goals, expectations, scope of power. It also means formulating and applying effective marketing strategies.

- *Transfer of knowledge from the internal structure to employees and their individual competences,* in the configuration: *internal structural capital - human capital.* The important question is: *how to*

increase intellectual potential of employees through the use of organizational systems, methods and tools?

- here one must focus on improving interpersonal relationships, the flow of knowledge and information, but also on computer links, process learning, improving system interfaces, simulations and interactive tools. Competences that are in the system must be available to others so that they can increase their ability to act.

- *Knowledge transfer in the internal structure,* in the configuration: *internal structural capital - internal structural capital.* The basic question is*: how to effectively integrate processes, products, management concepts, organizational tools?*

- it is facilitated by integration of management concepts, an organizational structure adequate to the type and direction of activity (process-ability, short paths of information flow), a consistently implemented and used strategic program with strong values, creating awareness among employees of coherence, community and importance of information flow, building integrated IT systems, database availability, reconstruction of functional office systems, especially those related to customer service, etc.

- *Transfer of knowledge from the internal to external structure,* in the configuration: *internal structural capital – external structural capital - relational.* The basic question is: *how do organizational processes, systems, etc. improve relations with key stakeholders?*

- this type of transfer is favoured by well-organized customer service processes (customer databases, after-sales service, loyalty programs, etc.), cooperation with suppliers (long-term cooperation programs), marketing activities, identification of stakeholder expectations and application of social responsibility programs targeted at specific individuals and groups directly and indirectly interested in the activities of an enterprise.

- *Transfer of knowledge from the external structure to employees,* in the configuration *external structural capital - relational - human capital.* An important question: *how do stakeholders enrich knowledge and competence of employees?*

- firstly, it should be assumed here that stakeholders provide not only material values to an enterprise, mainly in the form of money, but also intangible assets. Employees can get ideas, new experience, opinions about a product, sometimes suggestions for its improvement, new technological knowledge from them. It is mainly facilitated by creating and maintaining good personal relationships between an organization employees and the environment participant. It is about creating procedures that regulate acquisition of knowledge from the environment (for example, entering the role of a client, pilot projects, engaging clients in the client development process, understanding the language of clients, etc.). Quite often, however, such procedures regulating acquisition of knowledge from the environment are dispersed, immeasurable and have a slight impact on the strategy formulation process.

- *Knowledge transfer from the external to internal structure,* in the configuration *structured capital - relational external - internal structural capital.* That is why the important question is: *how can knowledge and competences of key environment participants be used to improve the internal intellectual architecture - processes, systems, products?*

- it can be done by means of obtaining information from market participants as feedback on the quality of products offered by an enterprise, e.g. opinion polls, customer satisfaction surveys, telephone switchboards registering and interpreting customer complaints, cooperation with other enterprises / organizations to generate new ideas, joint research and development projects etc.

- *Knowledge transfer in the external structure,* in the configuration *external structural - relational - external relational structural capital.* Therefore, the key question is*: how to ensure transfer of knowledge between enterprise's stakeholders?*

- communication between stakeholders can have a great impact on the success of an organization, which should support growth of competences, e.g. clients, suppliers, and affect transfer of competences between stakeholders that contribute to the value of external-relational capital. It is important in this case to focus on partnership, cooperation, alliances, improving the image, brand and quality of products, conducting courses and seminars on products and technologies, organizing meetings to which loyal, regular, "old" clients, suppliers and others contractors are invited (but also those who are new, undecided and even dissatisfied with products offered by an organization), providing seminars promoting an enterprise's offer among local community, support programs for local community, programs for retired, former employees, etc.

Conclusion

Prioritizing intangible assets in enterprise management obviously does not exclude or limit existence and use of tangible assets. But it encourages competent combining and balancing both to create unique competences. And the key competence of an enterprise in the area of this "balancing" of resources and "emphasising" the intangible dimension can be effective management of intellectual capital and knowledge, integrated into the intangible asset management system of an enterprise. Knowledge-based intellectual capital is a multi-dimensional and dynamic category, hence it is subject to transfer processes both within an enterprise and between it and the environment. As it is a category that somehow constitutes enterprise's intelligence, it should be supported by the process of organization learning, combining its individual dimensions, but also facilitating transfer of knowledge.

In conclusion, it should be stated that managers have to solve the following dilemmas (cf. Perechuda 2005 pp. 62-64; 87-89; 93;102-103):

- *Creating tacit knowledge.* Tacit knowledge continually created at all levels of enterprise management is most often created unconsciously, which means that a significant part of it is incompatible with the bundle of enterprise's goals. However, its creation is a positive phenomenon, because it expands employees' individual awareness and collective awareness. The basic criterion for success is to create opportunities for employees to create their own tacit knowledge, as well as to create mechanisms to verify usefulness of knowledge and outflow of worn out internal knowledge.
- *Intuitiveness of tacit knowledge* is available through the use of intuitive cognitive techniques, it requires seemingly static cognitive self-reflection. Tacit knowledge in an enterprise is created from within, and its effectiveness is based on its internal circulation, its external transfer is irrelevant, and sometimes it can be dangerous. Explicit knowledge obtained through rational methods can, deceptively, have little practical value or it can require internationalization that is "subjective digestion" (being the reason of, among others, ineffectiveness of many modern management concepts and methods imposed on employees by top management and consulting companies).
- *Filtering knowledge through organizational structures.* Tacit knowledge generated by employees must be diffused within an enterprise in all directions. Knowledge must be created and consumed in real time. The most useful are process structures, flattened, matrix, network, virtual and fractal. However, these are highly fuzzy structures that give a lot of freedom to the members of an organization, and therefore require them to be more knowledge workers than simple executives of managerial orders.
- *Lifting mental blockades, changing organizational culture and strengthening strategic direction.* The basic determinant of implementation and realization of the intellectual capital and knowledge management concepts is a change in an organizational culture, which is associated with an extremely difficult and evolutionary change in employees' mentality from passive to practical and creative. A strategic direction is necessary to adopt strong organizational values and ways to achieve competitive advantage through implementation and realization of personalization and codification strategies. The most valuable knowledge is developed inside an enterprise, which gives an opportunity to give up imitation and emulation strategies and increases possibilities of control over the near and distant environment segments. In this type of enterprises, so-called "information filters" are created, which select inflows and outflows of managerial, economic, social, political, technical and technological knowledge, etc. Maps of strong-signal signals (strategic, significant) and low-signal signals (irrelevant, so-called "information garbage") are also created, enabling efficient selection of knowledge.
- *Indivisibility of knowledge and a need to share it.* An immanent feature of knowledge is its indivisibility; it is of a holistic character, which means that it is homogeneous. In addition, it is created for here and now and is non-transferable, and usually information about knowledge and its creation is transferred. But on the other hand, the "illusionary" optics of knowledge assumes its inexhaustibility and simultaneity. A type of knowledge and a wider situational context of knowledge management are relevant in resolving this dilemma.

The problems identified above are correlated with both the intellectual capital dimensions in the form of human and structural capital, and the management triad, i.e. identification, measurement, use and development. One of the most important effects of multidimensional transformations should be a change of employees and management staff's behaviour, whose natural consequence will be changes within an enterprise (organizational, social, etc.) that can lead to the transfer of a traditional organization into a learning organization and further into an intelligent organization managed with full awareness of intangible asset importance. Success in the process of transforming knowledge and intellectual capital, the quality and dynamics of its course will depend on a number of internal and external factors of a social, organizational and systemic character, etc. Identification of these factors will also certainly facilitate a reliable assessment of the process. The review character and limited scope of the study did not exhaust the described issues. There is a need to indicate its methodological, empirical and application aspects, i.e. research assumptions and results of empirical research together with a list of recommendations for managers in various types and groups of organizations.

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[1] Other suggestions for components of the knowledge management process include, among others: knowledge localization, acquisition, development, sharing and spreading, use, preservation (according to G. Probst, S. Raub, K. Romhardt); acquiring knowledge from the environment, using knowledge in an organization, estimating knowledge assets in an organization, maintaining and developing knowledge assets, selling knowledge in the form of new products, technology services (according to W.R. Bukowitz, R.L.Williams), organization learning, knowledge production, knowledge distribution (according to M. Sarvay), acquiring knowledge, sorting and classifying knowledge, filtering, gathering, synthesis and organization of knowledge, storage, distribution (according to Ernst & Young), identification of knowledge sources, creation, formalization, sharing and spreading, use, application of knowledge, learning (according to KPMG), knowledge acquisition, knowledge localization, knowledge creation, use of knowledge, retention (according to B. Buckman) (see, among others: Davenport and Prusak 1998; Bukowitz and Williams 2000; Probst, Raub and Romhardt 2002; Grudzewski and Hejduk, 2004; Sokołowska 2005 a, pp. 166-167).

[2] Human capital is knowledge, experience, presence and possibilities of human activity in an organization. It is also a combination of traits brought by an employee (intelligence, commitment, energy, positive attitude to life, reliability, honesty, credibility), an employee's ability to learn (absorbency of the mind, imagination, ability to think analytically, creativity), employee motivation to share knowledge, ability to work in a team, pursuit of goals. Capital is the property of employees, it cannot be appropriated, it can only be subject to "lease" (Sokołowska 2005, p. 17).

[3] Structural internal capital is technologies, methods and processes that enable an enterprise to function. Examples include organizational culture, company history, management concepts and methods, organizational structure, trade secrets, patents, licenses, design rights, copyrights, trademarks and service marks, innovation, and the ability to organization learning. External-relational structural capital is e.g. commercial brands, clients and their loyalty, relationships with clients and other stakeholders, contracts and agreements, marketing strategies, including product quality shaping, pricing strategies, distribution channels, promotion measures that are used, enterprise reputation and image (Sokołowska 2005, p. 18).

[4] Other divisions are: intellectual capital assigned to an individual (individual capital), intellectual capital assigned to an organization (structural capital) (according to Konrad Group in Konrad Report), internal structure, external structure, individual competences (according to Sveiby in Intangible Assets Monitor), customers, enterprise's internal structure, processes: learning and innovation, finance (according to Kaplan and Norton in Balanced Scorecard), human capital, structural capital (according to Edvinsson in Scandia value scheme, the foundation for Navigator), human capital, client capital (relational), organizational capital (structural) (authors: Petrash, Edvinsson, Onge, Armstrong, Bukowitz, Williams in the Value Platform), competences, mutual relations (according to Haanes, Lowendahl in the classification of intangible assets), market assets, human factor assets, infrastructure assets, market value (according to Brooking in identifying components of human capital), human capital, structural capital, customer related capital (according to Stewart in identifying components of intellectual capital), social capital, human capital, organizational capital (according to Bratnicki and Strużyna in the company value tree)), human capital ("thinking assets"), structural capital ("non-thinking assets") (according to Ross in measurements of the intellectual value of an enterprise), human capital, intellectual assets, intellectual property (author: Sullivan, in elements of intellectual capital (cf. . Edvinsson and Malone 2001; Bratnicki and Strużyna 2001; Ross and Ross 1997; Stewart 1997; Brooking 1996; Kaplan and Norton 2001).

[5] And so, for example: Konrad Report is an uncomplicated model with transparent rules, which was the starting point for creating the new ones; good at the beginning of the "struggle" with measuring immeasurable; its special features are: a clear strengthening of the intellectual capital position assigned to an individual and relatively small instrumentation for creating human and structural capital. On the other hand, Intangible Assets Monitor clearly touches on accounting issues, most of the proposed indicators match the reality and extensive structures of large

enterprises, the division of the indicators into: growth and renewal, efficiency and stability allows to capture development trends and the intellectual layer condition of an enterprise's activity, but some of the proposed indicators are unintelligible. Balanced Scorecard are a model with an interesting proposal of qualitative indicators, emphasizing the area of clients, the internal structure as well as the process of learning and innovation as a place for seeking competitive advantage; the model concept is directly related to an enterprise's strategy and its development vision, and the implementation procedure is adapted to construction and functioning of large enterprises, etc.

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Rapprochement De L'image Complexe Et De L'image Induite : Le Cas D'une Ville Touristique Libanaise

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Résumé

La présente recherche étudie l'image d'une destination touristique libanaise, la ville de Tyr. Afin de comparer les différences existantes entre l'image complexe par les visiteurs de la destination et l'image voulue par la municipalité de la ville, deux études complémentaires ont été effectuées. Les résultats obtenus ont montré l'existence d'une divergence significative entre des composantes essentielles de l'image perçue et celles de l'image désirée de la ville, et par le fait même la nécessité d'un apport d'améliorations au niveau opérationnel et commercial pour garantir une satisfaction des touristes et susciter l'intérêt des touristes potentiels pour cette ville.

Mots-clés : Image Induite, Image complexe, Destination touristique, Tyr-Liban.

Introduction

Le marketing touristique intéresse la plupart des villes du monde et en constitue, pour plusieurs d'entre elles, la base de leurs rentrées touristiques (Frochot et Legohérel 2017). Dans un contexte de compétition touristique mondiale, certaines destinations touristiques tentent de s'imposer en développant des stratégies d'attraction. Se distinguer en créant une image forte, devient aujourd'hui pour toute destination, un objectif capital (Bédard 2011). Cette image requiert une stratégie cohérente et de mise en valeur de la ville et ce n'est pas exagéré de dire que pour exister, une destination touristique doit être présente sur la carte mondiale des pratiques touristiques (Piriou 2011). Au XXIème siècle, « vendre une image » aux touristes ne suffit pas. Il faut que cette image soit « partagée » ; plus précisément, l'image « désirée » par les décideurs doit aussi être l'image « vécue » par les touristes (Barthès 2005). À ce sujet, Piriou (2011) affirme qu'une destination touristique ne peut être considérée comme « excellente » que si elle est co-construite par les deux parties. Ainsi, l'image d'une ville est la combinaison de deux images, celle de l'image voulue et celle de l'image perçue. Ces deux images doivent se compléter et doivent donner une même vision de la ville en question (Chon 1991).

La ville de Tyr

Au Liban, la ville de Tyr tente, par le biais des efforts déployés par la mairie, de devenir une destination touristique prisée aux yeux des visiteurs. Connue pour son riche patrimoine, elle cherche à se différencier en créant une forte notoriété. En dépit de ces efforts, l'activité touristique de la ville est en régression. Cette ville n'arrive pas à exploiter convenablement ses sites archéologiques impressionnants, ce qui affecte ses autorités ainsi que tous les acteurs du tourisme qui y sont impliqués et à tous les niveaux.

Dans ce contexte concurrentiel, notre problématique porte sur le fait que l'activité touristique de la ville balnéaire de Tyr n'est pas à la hauteur de son patrimoine exceptionnel et ne fait que régresser. La mairie de la ville est satisfaite du travail entrepris et considère que cette régression est principalement due à la conjoncture du pays, indépendamment de la perception de la ville par les touristes qui l'ont visitée. En se basant sur la perception de la destination de Tyr du point de vue des membres principaux de sa municipalité ainsi que du point de vue des touristes qui ont l'ont visitée, notre objectif est de déceler et d'analyser les différences existantes entre l'image perçue et l'image voulue de la ville. De surcroît, nous visons d'une part à comprendre la situation et à savoir quelles sont les activités que la municipalité implante pour attirer et séduire de plus en plus de touristes et d'autre part comment les touristes locaux et étrangers perçoivent cette destination en termes d'image et de notoriété. Afin de répondre à notre objectif de recherche, nous avons procédé en trois étapes. La première partie présente le cadre théorique de la recherche. La seconde partie détaille la méthodologie de recherche. La troisième partie s'appuie sur les résultats de notre cadre d'analyse ainsi que leur discussion.

Cadre Théorique : Image D'une Destination Touristique

En nous basant sur les travaux antérieurs, nous allons dans une première étape définir et analyser l'image d'une destination touristique puis, dans une seconde étape identifier ses différentes composantes.

Définition de l'image d'une destination touristique

L'association d'une image positive et distincte à une destination touristique est un phénomène qui permet à la ville d'occuper un positionnement important dans l'esprit du voyageur. Ceci pousse les destinations à adopter des stratégies communicationnelles dans le but de la création, la valorisation et la promotion d'une image forte et satisfaisante (Leisen 2001).

De nos jours, les villes sont contraintes d'adopter des stratégies de marketing touristique afin de mettre en avant leurs atouts touristiques (Baloglu et Magaloglu 2001). La concurrence entre les territoires expose les villes aux mêmes défis qu'une entreprise ; elles possèdent une image, un nom, un positionnement qu'elles doivent développer afin de mettre en valeur leurs différences. C'est pourquoi il est important d'analyser le processus de formation de l'image d'une destination touristique, ses composantes et ses déterminants (Jenkins 1999).

Il n'existe pas de consensus sur une définition précise de l'image d'une destination touristique. Selon Crompton (1979, p.20) elle représente «*l'ensemble de croyances, d'idées et d'impressions qu'une personne a sur une destination ou la somme agrégée de croyances, d'idées, d'impressions et d'attentes qu'un touriste a à propos d'une destination touristique*». De même, les travaux de Tapachai et Waryszak (2000, p.39) la définissent comme «*les perceptions ou les impressions sur une destination détenues par les touristes sur la base des bénéfices attendus ou des valeurs de consommation*». Finalement, Kim et Richardson (2003, p.218) la représentent comme «*la totalité des impressions, des croyances, des idées, des attentes et des sentiments accumulées au fil du temps sur une destination*».

Nous remarquons à travers cet amalgame de définitions que plusieurs termes comme «impressions», «perceptions», «idées», «conceptions», «sentiments», «attentes» et «croyances» se répètent quand il s'agit de définir l'image d'une destination touristique, ce qui confirme son caractère subjectif,

multidimensionnel et complexe (Bigne et al 2001). L'image d'une destination joue un rôle primordial dans le choix de la destination puis qu'elle constitue un facteur décisif pour le visiteur, affecte sa prise de décision ainsi que ses choix futurs (Baloglu et McCleary 1999 ; Chon, 1990). Ce choix étant lié à la capacité du lieu à véhiculer une image positive capable de susciter l'intérêt du touriste. L'image va de même guider le comportement touristique du visiteur, Hunt (1975), influencer le processus de sélection de la destination ainsi que ses intentions comportementales (Qu et al 2011 ; Wang et Hsu 2010). La stratégie marketing touristique mise en place par la destination doit être placée au centre des stratégies de la destination en question. La formation de l'image résulte de plusieurs facteurs interagissant ensemble, comme des facteurs physiques, historiques et culturels (Kotler et al 2017).

Par ailleurs, l'image d'une destination touristique est aussi influencée par les distances culturelles que partagent certains territoires et qui affectent les préférences et les comportements des touristes (Crotts, 2004). De surcroît, cette image qui selon Richardson et Crompton (1988) change en fonction de la nationalité et des origines du touriste, est formée grâce à la combinaison des caractéristiques physiques ou fonctionnelles de la destination en question (Crompton 1979). Cela nous mène à dire que plusieurs motivations interviennent de manière consciente ou inconsciente, directe ou indirecte, lors de la formation de l'image d'une destination touristique (Moutinho 1987 ; Baloglu, 1997 ; Gartner 1993). L'image d'une destination touristique n'est alors que l'ensemble des perceptions des attributs individuels de la destination et l'impression globale qu'elle reflète Echtner et Ritchie (1991).

Les composantes de l'image d'une destination touristique

Gunn (1988) affirme que l'image d'une destination touristique évolue en fonction des étapes du processus d'achat et qu'elle est capable de créer une confusion chez le touriste potentiel et rendre son choix difficile. Il distingue entre trois différentes composantes de l'image qui sont l'image organique, l'image induite et l'image complexe. L'image organique provient de l'exposition du voyageur à des informations non touristiques. C'est l'image formée dans l'esprit du visiteur, avant d'avoir effectué le déplacement. Il s'agit d'une image souvent incomplète qui peut être influencée par l'image du pays et qui est parfois difficile à modifier par les acteurs touristiques. L'image induite est diffusée par la communication des acteurs touristiques. Elle a pour objectif de «vendre la destination» mais aussi d'agir sur l'image organique formée initialement et la changer pour inciter le touriste à voyager. La médiatisation de la destination lui apporte donc une multitude d'images encourageant le déplacement du touriste à travers de nombreuses informations qui l'aideront à se projeter dans le lieu choisi (Violier 2007). L'image complexe est formée suite au voyage du visiteur ; elle joue un rôle dans l'appréciation de la destination ainsi que dans son évaluation et est capable de modifier les images organique et induite. C'est à partir de son séjour que le touriste pourra développer une image positive ou négative du lieu visité (Frochot et Legohérel 2017). C'est pourquoi, il existe une grande différence entre l'image formée avant et après la visite de la destination qui s'explique par le manque de connaissances et d'informations de la part du voyageur.

L'image complexe qui reflète la véritable image d'une destination touristique est selon Chon (1991, p.72) «*plus diversifiée, plus différenciée et plus réaliste que les précédentes car seul le séjour permet de l'évaluer*». Elle provient de l'expérience personnelle du touriste lui laissant la possibilité d'évaluer correctement la destination en question (Marchat et Camelis 2017). Cette image représente la réalité de la destination touristique et joue un rôle primordial dans les intentions de recommandation et de revisite qui, selon Qu et al (2011) sont à l'origine de la fidélité du visiteur (Lee 2003). Pour saisir les comportements des touristes Prayag et Ryan (2012) parlent de «*l'intention de revisiter la destination*», de «*l'intention de la recommander à d'autres*» ou encore du «*bouche à oreille*» qui, s'il est intentionnel, représente un indicateur pertinent de fidélité (Chen et Phou 2013). Certains auteurs comme George et George (2004) ; Veasna et Huang (2013) ont affirmé que l'image est capable de provoquer des « émotions fortes » qui renforcent l'attachement et la fidélité du voyageur. Ces « sentiments forts » développés par les visiteurs, représentent une véritable source de liens émotionnels (Yuksel et al 2010). À la fin de cette revue il serait prudent d'explorer, à travers les lunettes du touriste, l'image globale d'une destination, cette image qui qui a un caractère multidimensionnel et subjectif est, selon Stylidis et al (2017) la base du succès d'une destination quelconque dans l'attraction des touristes.

Cadre méthodologique : Cas de la ville de Tyr

La ville de Tyr

Appelée « Reine des Mers », la ville de Tyr jouit d'un patrimoine historique et culturel très riche. La ville possède un potentiel touristique remarquable que les membres de la municipalité essayent d'exploiter et de développer à travers la diversification des activités touristiques présentes dans la ville. Cette revue de littérature nous conduit à formuler notre question principale à laquelle cette recherche vise de répondre :

Compte tenu du potentiel touristique remarquable de la ville de Tyr, quels sont les éléments d'attractivité touristiques que les décideurs doivent renforcer afin que Tyr occupe la place d'une destination compétitive et dont l'image complexe reflète le positionnement aspiré par la municipalité ?

Méthodologie

Nous avons privilégié dans cette recherche la triangulation qui consiste à associer systématiquement dans la même étude des méthodes qualitatives avec des méthodes quantitatives (Caillaud et Flick, 2016). Ceci permet de recueillir des informations et des données provenant de différentes sources en faisant usage à plus d'un outil afin de les confronter pour pouvoir dégager les informations capables de nous donner une réponse à notre questionnement de recherche. Comme il existe différents modèles de recherche s'appuyant sur les méthodes mixtes (Tashakkori et Teddlie 2010 ; Creswell 2009), nous avons adopté un modèle qui s'appuie sur le principe de complémentarité. Ainsi deux études une qualitative et une quantitative, ont été effectuées pour saisir et analyser la perception des touristes visitant la ville de Tyr et de ce fait répondre à la problématique de la recherche.

L'étude Qualitative

Il s'agit d'une étude exploratoire qui a été réalisée par le biais de trois entretiens semi-directifs qui s'appuient sur un guide d'entretien dont la revue de littérature a facilité son élaboration. Ces entretiens ont été menés auprès du directeur adjoint de la municipalité de Tyr (D.ad), du responsable du tourisme au sein de la municipalité (R.t) ainsi que du directeur des sites archéologiques de Tyr et du Liban Sud (D.sa). L'objectif était de saisir l'image de la cité telle que désirée par la municipalité et d'en tirer les informations concernant les divers attraits touristiques de la ville. Le traitement des données recueillies a été effectué par le biais de l'analyse de contenu (Bardin 2013). Les entretiens ont été enregistrés suite à l'accord des personnes interviewées. Chaque entretien était mené en face à face et a duré entre 60 et 90 minutes. Après une lecture attentive de tous les propos recueillis, une analyse thématique a été effectuée pour ressortir des «unités de sens - éléments clefs» dont l'occurrence est significative. Les éléments clés principaux ont été regroupés en variables afin de formuler les hypothèses à tester et à développer le questionnaire ayant servi à recueillir les données de l'étude quantitative.

L'étude Quantitative

L'étude quantitative menée sur un échantillon de 118 individus durant la période s'étendant entre le 15 avril 2019 et le 10 juin 2019, a constitué la seconde partie de cette recherche. L'analyse statistique descriptive élaborée a permis de présenter les caractéristiques socio-démographiques et les motivations des personnes appartenant à l'échantillon puis à travers une analyse statistique inférentielle à tester les hypothèses déduites de la seconde partie d'un questionnaire auquel les touristes visitant la ville de Tyr ont pu répondre durant leur séjour. Ce questionnaire a constitué l'outil qui a permis de déceler l'image complexe de la cité par les touristes. Il a été élaboré suite aux résultats obtenus par différents entretiens réalisés au préalable.

Le questionnaire comprenant 18 questions a été développé en français et en anglais en trois sections. La première section comporte des questions qui concernent le séjour et les motivations du visiteur. La seconde partie comprend 18 affirmations pour l'évaluation des opinions des touristes vis-à-vis des

composantes de l'image perçue de la ville de Tyr. Ces items sont incorporés à une échelle de Likert comprenant 5 options de réponses (allant de 1 «Tout à fait d'accord» jusqu'à 5 «Pas du tout d'accord») pour lesquelles le répondant exprime son degré d'accord ou de désaccord. La troisième partie comprend des questions d'identification qui concernent le touriste.

Pré-test du questionnaire

Avant d'administrer le questionnaire à notre échantillon, nous avons effectué un pré-test sur onze individus. L'objectif était d'augmenter la validité des données de l'enquête en réduisant les erreurs de mesure, et de ce fait augmenter la validité des conclusions dérivées (Snijkers 2002, p.224).

En focalisant sur la façon dont les gens répondaient à nos questions et les interprétaient, ce pré-test nous a fourni les preuves les plus directes de la validité des données du questionnaire pour la plupart des items. Notre procédure était basée sur l'approche rétrospective de l'interview cognitive où nous avions posé des questions verbales à tous les participants après avoir rempli le questionnaire.

Administration du questionnaire

Le questionnaire a été administré en face à face aux touristes et visiteurs dans les hôtels de Tyr où ils résidaient (25 répondants) ainsi que dans les sites touristiques et archéologiques qu'ils fréquentaient (40 répondants). Le même questionnaire, créé sur *Google Forms* a été administré en ligne aux visiteurs qui ont exprimé leur désir de répondre ultérieurement (53 répondants). Il n'y a pas eu de cas de refus et tous questionnaires ont été remplis complètement.

Ces deux études complémentaires avaient pour objectif de confronter l'image perçue de Tyr par les touristes avec l'image désirée par les membres de la municipalité et les responsables des sites touristiques de la ville. Cette démarche nous a non seulement permis de faire cette confrontation, mais également de formuler des recommandations utiles sur le positionnement de la ville.

Choix des échantillons

Le choix des participants de l'étude qualitative a été fait par choix raisonné, c'est-à-dire non aléatoire. Il a été réalisé sur la base d'une caractéristique particulière (Fortin et al 2005) qui est essentiellement leur compétence et expérience dans le domaine du tourisme à Tyr. C'est en fonction de la richesse et de la pertinence de l'information que les informateurs-clés dans cet échantillon ont été sélectionnées. Cependant, le nombre de ces participants n'a pas été décidé à l'avance puisque la représentativité statistique n'en était pas essentielle. La taille de l'échantillon (trois personnes interviewées) a été déterminée en fonction de la saturation (Bertaux 1981 ; Savoie-Zajc 1997) obtenue par les données recueillies qui n'apportaient plus de nouvelles informations au bout du troisième entretien.

L'échantillon de l'étude quantitative a été choisi aléatoirement et sur la base de la définition donnée par l'Organisation mondiale du tourisme (OMT) sur le tourisme comme étant les activités de loisir, d'affaires ou autres et qui sont «*déployées par les personnes au cours de leurs voyages et de leurs séjours dans les lieux situés en dehors de leur environnement habituel pour une période consécutive lqui ne dépasse pas une année*» (Lozato-Giotart et al 2014, p.6). Nous avons donc choisi les répondants au hasard. Il s'agissait des voyageurs « visitant » rencontrés à Tyr définis par les mêmes auteurs comme étant l'ensemble des voyageurs ou touristes dont la visite n'entraîne pas une nuit passée, ceux qui passent 3 nuits consécutives et ceux dont le déplacement entraîne au moins quatre nuits consécutives hors du domicile habituel (Lozato-Giotart et al 2014, p.7). Ils incluaient des étrangers et des libanais vivant au Liban ou résidant à l'extérieur du pays mais venant en visite à Tyr.

Plusieurs auteurs s'accordent que des variables ordinales avec cinq catégories ou plus du type Likert, peuvent souvent être considérées comme continues et utilisées sur cette base sans que ceci puisse nuire à l'analyse dans laquelle on prévoit les utiliser (Norman 2010 ; Sullivan et Artino 2013 ; Chimi et Russel 2009). Pour les données continues, Bartlett et al (2001) ont déterminé la taille minimale de

l'échantillon comme étant 119 pour une population ≥ 10 000 et pour un niveau α = 0,05. Le choix de notre échantillon composé de 118 individus correspond donc à cette catégorisation.

La présentation des résultats de l'étude qualitative

Les informations collectées grâce aux entretiens réalisés ont permis de mettre en lumière l'image de la ville telle que projetée par la municipalité. Elles ont de même permis d'identifier les éléments sur lequel repose le potentiel touristique de la ville. Elles ont été regroupées par thèmes et analysées à l'aide d'une grille d'analyse. Les trois personnes interrogées ont mis l'accent sur plusieurs éléments clés constituant le tourisme à Tyr. Ces éléments regroupés par thèmes et illustrés par des verbatim tirés des propos des interviewés sont récapitulés dans le tableau 1.

Le D.ad et le R.t se sont mis d'accord pour affirmer que la ville de Tyr a été placée au premier rang au niveau touristique pour l'an 2018 et qu'elle fait partie de l'une des plus belles villes touristiques du Liban grâce à sa plage, ses quartiers anciens, ses souks et son port traditionnel. Ils ont également précisé que malgré sa petite surface, la ville de Tyr renferme une diversité d'activités touristiques culturelles et balnéaires. De son côté, le D.st nous a expliqué que la particularité des sites archéologiques de Tyr réside dans le nombre et la diversité des civilisations qui l'ont traversé, dans leur emplacement et leur dimension mais aussi dans leur conservation car il s'agit de ruines qui datent de plus que mille ans. Tous les interviewés s'accordent à dire que les mesures proposées par la municipalité pour la mise en valeur et la protection du patrimoine de la ville sont suffisantes mais ils attribuent la faiblesse de la fréquentation touristique de la ville au contexte de crise économique et financière qui prédomine dans le pays.

Tableau 1 : Les thèmes abordés illustrés d'un extrait de *verbatim* et complétés par les éléments clefs ressortis.

Thèmes	Verbatim	Les éléments clés ressortis
Patrimoine historique	*«Patrimoine historique très riche inscrit à l'UNESCO.»* *«C'est le principal atout touristique de la ville de Tyr.»* *«Tyr, l'image importante dans l'histoire, à travers plusieurs civilisations et époques archéologiques.»*	Sites archéologiques inscrits à liste du patrimoine mondial de l'UNESCO.
Diversification du tourisme à Tyr	*«Le tourisme à Tyr est très diversifié et repose surtout sur les activités balnéaires et culturelles, ainsi que plusieurs évènements et festivals.»* *«Présence de quartiers et souk à caractères traditionnels, mais aussi la page et le port.»*	Tourisme très diversifié. Plusieurs activités touristiques, culturelles et artistiques.
Diversité culturelle	*«Diversité culturelle et religieuse à Tyr, vie communautaire multiculturelle, paix civile, liberté d'expression et politique de fraternité.»*	Une diversité culturelle et religieuse.
Festival de Tyr	*«Evènements diverses très important pour le tourisme, comme le festival de Tyr.»*	Evènement annuel traditionnel très attendu.
Vie nocturne	*«La vie nocturne à Tyr est très animée, les restaurants restent ouverts jusqu'à 2 h durant l'été et les kiosques ne ferment jamais.»*	Très belle ambiance, vie nocturne très animée.
Quartiers anciens	*«Tyr est connue pour ses anciens quartiers comme «Hara», son vieux «Souk» et son ancien port «Sidonien», qui conservent leurs caractères anciens.»*	Souk et Port à caractère traditionnel.
Plage de Tyr	*«La plage représente l'atout principal de la ville de Tyr.»* *«C'est l'une des meilleures et des plus propres plages du Liban.»* *«Emplacement des sites archéologiques face à la plage.»*	Tourisme balnéaire dynamique et plage très propre.
Hôtels de Tyr	*«Hôtels de Tyr offrent un service satisfaisant et sont contrôlés régulièrement.»* *«12 Hôtels très variés, motel, guest house... et l'architecture varie aussi.»*	Variété d'hôtels et motels avec un service satisfaisant.
Restaurants de Tyr	*«Contrôle quotidien et régulier de la qualité au niveau culinaire.»* *«90 Restaurants très contrôlés au niveau de la qualité de la nourriture et de hygiène.»*	Contrôle culinaire régulier. Une alimentation bonne et saine.
Propreté de la ville	*«Contrôle du nettoyage de la ville pour s'assurer du niveau de propreté de la ville.»*	Nettoyage régulier et quotidien des rues.
Sécurité à Tyr **Parking**	*«Tyr est une ville très sécurisée ce qui est agréable pour ses visiteurs.»* *«Sécurité et sûreté importantes pour préserver l'ordre de la ville.»* *«Manque de parking car Tyr est une ville limitée géographiquement.»*	Ville sécurisée par la présence de police. Un manque d'espace pour les parkings.
Circulation	*«Circulation compliquée et beaucoup d'embouteillages.»*	Sérieux problèmes d'embouteillages.
Population locale	*«Population locale très hospitalière et conviviale avec des habitants très accueillants, des interactions et des échanges faciles avec les gens.»*	Habitants accueillants et hospitaliers.
Piétons	*«Présence de trottoirs partout à Tyr.»* *«Corniche rendant agréable les promenades dans la ville.»*	Ville accueillante pour les piétons, présence de trottoirs et corniche.
Prix	*«Prix convenables à toutes les classes économiques et sociales.»* *«Entrées aux sites fixées par le ministère de la culture.»*	Prix convenables à toutes les classes économiques et sociales.

Ces descriptions et affirmations recueillies ont permis d'illustrer l'image touristique désirée de la ville par la municipalité. Elles ont été d'une importance fondamentale pour le déroulement de cette recherche. Leur interprétation a permis de reconstruire l'image induite de Tyr par la municipalité, de révéler son identité touristique et de mettre la lumière sur ses multiples facettes du tourisme.

Variables dégagées et hypothèses formulées

À la suite des éléments clés recueillis par l'étude qualitative, les variables suivantes ont été dégagées : Patrimoine historique, tourisme diversifié, diversité culturelle, festival de Tyr, vie nocturne, quartiers anciens, plage, services des hôtels, propreté de la ville, sécurité, parking, circulation, population locale, sites touristiques, cuisine, accueil, vivacité et prix.

Les hypothèses formulées en fonction de ces variables sont :

H1 Le patrimoine historique de Tyr constitue une composante de l'image perçue positive de la ville

H2 Les sites touristiques de Tyr constituent une composante de l'image perçue positive de la ville

H3 La diversification du tourisme à Tyr constitue une composante de l'image perçue positive de la ville

H4 La diversité culturelle à Tyr constitue une composante de l'image perçue positive de la ville

H5 Le festival de Tyr constitue une composante de l'image perçue positive de la ville

H6 La vie nocturne à Tyr constitue une composante de l'image perçue positive de la ville

H7 Le caractère ancien et traditionnel des quartiers de Tyr constitue une composante de l'image perçue positive de la ville

H8 La plage de Tyr constitue une composante de l'image perçue positive de la ville

H9 La propreté de la ville de Tyr constitue une composante de l'image perçue positive de la ville

H10 Les services offerts dans les hôtels à Tyr constituent une composante de l'image perçue positive de la ville

H11 La cuisine locale saine constitue une composante de l'image perçue positive de la ville

H12 Les parkings à Tyr constitue une composante de l'image perçue négative de la ville

H13 Le caractère accueillant et convivial de la population locale de Tyr constitue une composante de l'image perçue positive de la ville

H14 La vivacité de Tyr constitue une composante de l'image perçue positive de la ville

H15 La circulation à Tyr constitue une composante de l'image perçue négative de la ville

H16 L'accueil à Tyr constitue une composante de l'image perçue positive de la ville

H17 La sécurité à Tyr constitue une composante de l'image perçue positive de la ville

H18 Les prix à Tyr constituent une composante de l'image perçue positive de la ville

Analyse et interprétation des résultats de l'étude quantitative

La base de données obtenue a été traitée sur SPSS et le logiciel tableur Excel. Dans une première phase, des analyses statistiques descriptives portant sur l'aspect socio-démographique ainsi que sur les motivations de l'échantillon des touristes et des visiteurs de Tyr ont été effectuées. Dans une deuxième phase les hypothèses monovariées construites ont été testées grâce à une analyse statistique inférentielle.

Analyse descriptive des données socio-démographiques

Les données obtenues de l'enquête ont été traitées sur le logiciels SPSS et le logiciel tableur Excel. Les résultats statistiques descriptifs révèlent que 70% des répondants ont un âge compris entre 18 et 34 ans et que 95% de ces touristes « visitant » ont un niveau d'études universitaires et sont presque également répartis entre femmes (53%) et hommes (47%). 53% des répondants sont des libanais résidant dans leur pays natal et 70% sont célibataires. Quant au revenu mensuel des touristes, plus de 50% d'eux ont un salaire mensuel qui ne dépasse pas 1500 dollars américains tandis que celui de 18% seulement dépasse les 3000 dollars américains.

Analyse descriptive des motivations des touristes

33% des touristes ont visité la ville une seule fois et 55.% deux fois. Presque 60% des répondants sont restés une seule journée et 84% ont été motivés de la visiter en raison de ses attraits naturels, touristiques et culturels. Parmi les visiteurs 65% ont connu la ville grâce au bouche à oreille tandis que 18% l'ont connu à travers des brochures et 16% à travers internet et les réseaux sociaux. 42% sont venus en famille et 43% en compagnie d'amis.

Ces résultats nous permettent de déduire que le profil général du touriste visitant Tyr est celui d'un homme ou d'une femme indépendant(e) et éduqué(e) appartenant à une génération jeune et qui cherche à découvrir, apprendre et jouir des attractions touristiques à Tyr. Ce touriste « visitant » est du type excursionniste et est fortement motivé par les attraits naturels, culturels et touristiques et de la ville. Il est généralement accompagné soit des membres de la famille soit d'amis. Il a connu Tyr surtout grâce au bouche à oreille mais très peu par le biais d'une documentation écrite ou en ligne ou à travers les réseaux sociaux.

Tests d'hypothèses

18 hypothèses déduites des variables précédemment dégagées ont été testées. L'objectif de ces tests était de déterminer si les variables étudiées forment des composantes de l'image perçue par les touristes et de confronter par la suite les résultats de cette analyse avec l'image désirée par la municipalité de Tyr afin d'en tirer les conclusions. Ces hypothèses monovariées n'ont pas été testées à travers des associations mais à travers des comparaisons entre les réponses des deux groupes de touristes et de voyageurs «visitant » qui ont constitué l'échantillon composé des 118 individus.

L'approche suivie est celle qui a été préconisée par Gosavi (2015). Nous avons utilisé la distribution binomiale pour développer un test de signification statistique. Nous avons en premier lieu inversé la valeur de réponse pour chacun des éléments puis combiné les cinq catégories de réponse en trois (accord, désaccord, neutre) selon deux groupes de répondants $L1$ et $L2$ avec le groupe des répondants «neutres» alternant dans l'analyse statistique avec l'un et l'autre de ces deux groupes. Les proportions de répondants dans chaque groupe ont été calculées afin de tester les hypothèses $H_0 : p_1 \leq p_2$ et $H_1 : p_1 > p_2$ au taux d'erreur $\alpha = 0{,}05$ sur la base du chevauchement ou du non-chevauchement des valeurs délimitant les intervalles de confiance pour les proportions des groupes étudiés de l'échantillon p_i.

Les résultats obtenus seront acceptés car la taille de l'échantillon est > 100 (Gosavi 2015). Sur la base du chevauchement des valeurs des limites minimales et maximales des intervalles de confiance, ces résultats ont permis de rejeter H_0 pour les hypothèses H_2, H_3, H_4, H_5, H_6, H_7, H_8, H_{11}, H_{12}, H_{13}, H_{15}, H_{16},

H_{17}, H_{18} et de ne pas rejeter H_0 pour les hypothèses H_1 (dans la seconde étape de l'analyse) et H_{10} (dans la troisième étape de l'analyse).

Pour les hypothèses H_9 et H_{14}, l'analyse statistique effectuée dans la première étape n'a pas permis de tirer une conclusion définitive quant à savoir si l'hypothèse nulle est vraie ou fausse.

Analyse et discussion des résultats

La confrontation des résultats de l'analyse quantitative avec ceux de l'étude qualitative a permis de souligner les points de différences et de similitudes entre les affirmations faites par la municipalité et les avis des touristes concernant l'activité touristique de la ville. Elle montre que l'image désirée par la municipalité concorde dans la majorité de ses aspects avec l'image perçue par les visiteurs excepté deux aspects qui ne sont pas concordants et qui démontrent une divergence entre l'image désirée et l'image perçue.

Pour les touristes, Tyr est une ville perçue comme ayant un aspect traditionnel à travers ses anciens quartiers, une plage remarquable et des sites impressionnants avec des festivals considérés comme des évènements importants, et dans laquelle le tourisme est diversifié et la vie nocturne est agréable. Tyr est également perçue comme une ville à pluralité culturelle, sécurisée et accueillante avec une population conviviale ayant une cuisine locale saine et où la vie n'est pas chère. Cependant, le patrimoine historique de la ville n'est pas perçu comme étant très riche et les services des hôtels comme satisfaisants. Par ailleurs, les problèmes des parkings et de la circulation sont perçus comme importants.

Selon la littérature existante le produit touristique est défini comme tout bien tangible ou service qui peut être acquis durant un voyage pour satisfaire un besoin ou un désir (Kotler *et al.,* 2017), l'attraction touristique comme un produit associé à un acte de promotion et un touriste (Leiper, 1990) tandis que l'attrait est définie comme toute ressource naturelle et culturelle présente dans une région et qui pourrait contribuer au produit touristique (De Grandpré 2007), et ce indépendamment de la présence des touristes (Laplante 1983).

Le tableau 4 regroupe les différentes composantes de l'image perçue en 3 groupes principaux les attractions touristiques, les produits touristiques et l'attrait. Les deux composantes de l'image perçue qui sont surlignés en rouge à savoir le patrimoine historique en tant que ressource naturelle qui appartient au groupe de l'attrait, ainsi que les services hôteliers en tant que bien tangible appartenant au groupe des produits touristiques, sont les éléments vis-à-vis desquels les touristes et les décideurs se sont désaccordés.

Tableau 2 : Regroupement des composantes de l'image perçue en groupes

Composantes de l'image perçue	Groupes
Sites touristiques	**Attraction touristique**
Festival de Tyr	
Patrimoine historique	**Attrait**
Diversité culturelle	
Vie nocturne	
Quartiers traditionnels	
Plage	
Propreté	
Accueil	
Sécurité	
Cuisine	
Parkings	
Circulation	
Tourisme	**Produit touristique**
Hôtels	
Prix	

L'image de Tyr comme cité touristique doit être améliorée. Comme la base du tourisme dans cette ville est le service dans ses divers aspects, celui-ci doit être matérialisé pour qu'il apporte une valeur ajoutée à son image globale. Les attractions touristiques sont perçues comme satisfaisantes, cependant la municipalité de Tyr doit, en tirant des conclusions des résultats de cette étude, apporter des modifications en termes de service et de marketing afin d'affermir l'attrait de la ville et la valeur de ses produits touristiques. La création de parkings publics et l'organisation de la circulation par la police municipale et la mise en place d'une signalisation adéquate dans les rues est importante pour faciliter le séjour des visiteurs et touristes. L'installation de panneaux explicatifs ainsi que l'accessibilité des brochures et autres informations touristiques au sein et en dehors des sites restent d'une grande nécessité car ceci permettra une meilleure visibilité des attractions et produits touristiques. La performance des services au sein des hôtels existants en fonction des aspirations de la clientèle réelle et potentielle, ou même la création de nouveaux hôtels, doit constituer une priorité. De surcroît, le patrimoine historique de Tyr n'est pas mis en valeur, la communication doit donc porter sur cet aspect à travers une forte médiatisation tant au niveau local qu'international.

Nous déduisons des résultats obtenus de l'enquête que de nombreux touristes n'ont pas eu la possibilité de visiter toute la ville et d'explorer son patrimoine historique ou même de connaitre ses hôtels et leur service car un grand nombre d'entre eux étaient des visiteurs excursionnistes qui sont venus pour passer la journée et n'ont pas pu fréquenter tous les lieux de la ville ; ce qui les a empêchés de les noter correctement.

Finalement et sur le plan théorique, ce travail confirme l'existence de plusieurs images d'une destination touristique (image induite et complexe) qui diffèrent l'une de l'autre et souligne l'importance de l'image complexe pour une destination. Cette dernière qui est formée suite au séjour du touriste, joue un rôle primordial dans le degré de satisfaction ou d'insatisfaction du visiteur tel que signalé par Oliver (1997), dans l'intention de recommandation et de revisite déjà évoquée par Bigné (2001) et aussi dans l'intention de fidélité du touriste au lieu (Lee 2003).

Le but principal de cette recherche était de déceler et d'analyser les différences existantes entre l'image perçue et l'image voulue et de mettre en lumière les éléments d'attractivité touristiques de la ville afin d'éclairer les membres de la municipalité de la cité sur la réalité du tourisme dans la ville. Il est donc essentiel d'informer les décideurs touristiques des divergences ressorties afin de les inciter à améliorer et renforcer la situation touristique de la ville, et d'unifier très rapidement son image. Il s'est avéré nécessaire et urgent, dans un milieu fortement concurrentiel, de faire un repositionnement clair et durable de cette destination afin de garantir une image unique qui produirait une satisfaction chez les touristes tant potentiels qu'actuels.

Conclusion

L'image d'une destination touristique est le thème central de cette recherche qui a étudié la possibilité de divergence entre l'image induite et l'image complexe d'une destination touristique. Elle a de plus mis en relief, l'importance de l'image perçue et son influence sur l'activité touristique d'une ville.

Tyr est une ville phénicienne libanaise qui renferme un potentiel touristique remarquable et qui peine à occuper la place touristique qu'elle mérite. Grâce à cette recherche, les perceptions des décideurs et des touristes visitant la ville ont été saisies et analysées afin de déterminer d'éventuelles recommandations.

Le patrimoine historique fait une partie des éléments qui influencent la perception envers une destination touristique. La perception par les touristes du patrimoine de Tyr -un attrait primordial de la ville- n'est pas telle que voulue par la municipalité. Il serait donc pertinent que l'industrie touristique prenne en considération cette ressource culturelle et élabore des actions durables pour sa préservation.

Les opinions des touristes visitant une destination touristique représentent une source de progression primordiale pour la ville en question. Sur la base de ces idées, il est essentiel pour toute destination de développer une image forte et un positionnement solide et clairement lisible opérationnalisé par un ensemble d'éléments de communication et de commercialisation capables de répondre aux attentes des touristes afin d'assurer un niveau de satisfaction capable de les faire retourner de nouveau à cette cité.

Notre étude montre la nécessité pour une destination touristique, d'adapter l'image induite à l'image complexe. En effet, si l'effet multidimensionnel de l'image est difficile à gérer, des enquêtes permanentes et sur une grande échelle sur les aspirations et les besoins des visiteurs d'une ville spécifique, menées par les décideurs municipaux, peuvent être utiles. De plus, une étroite collaboration entre les décideurs municipaux, les fournisseurs de service et les résidents d'une destination touristique est recommandée ce qui des approches participatives en gestion. Ces approches facilitent la valorisation des ressources locales et garantissent des améliorations accommodées à leur contexte de mise en œuvre. Une idée forte de ces approches consiste à mettre les valeurs et les préférences des acteurs au centre de l'action publique parce que le «*mélange des valeurs des experts et de celles de la société devraient être plus réalistes que les valeurs de la société auscultées de façon normative par les experts*» (Wagle 2000).

Dans la lignée de cette étude, plusieurs perspectives de recherches ultérieures seront envisageables. Qu'en est-il de de la divergence entre l'image induite et l'image perçue par les touristes locaux et celle perçue par les touristes étrangers ? Pour conclure, il pourrait de même être utile de réfléchir à des mesures et des démarches à mettre en œuvre et qui permettent de corriger les perceptions erronées de l'image d'une destination touristique.

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Genesis of The System of State Communications of Authorities in Ukraine

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Abstract

The issue of the establishment in Ukraine of a system of public communications of the authorities with representatives of civil society was researched. The legislative and organizational principles of information and communication activity of the authorities of Ukraine in the conditions of transformational changes are considered retrospectively. It was revealed that in Ukraine the institutionalization of the system of state communications of the authorities was evolved. It was established that in the conditions of modernization of public administration, which processes are rapidly spreading in Ukraine today, there is an increasing necessity to establish effective public communications of the authorities with civil society actors on the basis of modern information technologies. A number of problems are identified in the field of public communications, which hinder Ukraine's further progress on its democratic development.

Keywords: communication, state communication, communicative interaction of the authorities with the public, public relations.

Introduction

One of the prerequisites for sustainable democratic development of society is the informational openness of the authorities and the transparency of their activities. The government's adherence to these modern principles of democratic governance is the key to guaranteeing effective policies, facilitating civil control, and strengthening people's credibility. Achieving this goal is closely linked to the desire and ability of the authorities to carry out clear procedures to inform citizens of their activities and to use mechanisms to involve them in forming public policy and assessing the quality of its implementation. In current conditions of the rapid development of the information society, the active expansion of social networks, the formation of many forms of self-organization of the population, such as public movements, unions, associations and alliances, it is of great importance to create an effective system of interaction between the state power and society. Ukrainian scientist L. Chupryna (2015) believes that the ability of the authorities to maintain such interaction is becoming one of the important indicators of public administration.

In countries with a democratic vector of development, the necessity for communication is enshrined in law by the obligation of the authorities to inform the population of their activities, and the population has the right to express public opinion. The implementation of the legally established principles of communication requires the authorities to establish a communication process, its main purpose is to establish close interaction with civil society actors and to maintain a constant dialogue with them. This ensures the authorities with the opportunity to understand the changing needs of society, to respond to them adequately and in a timely manner, to involve the population in the joint development and adoption of the necessary management decisions. How has the system of communicative interaction between the authorities and society formed in Ukraine? What were the tasks of the Ukrainian authorities for the establishment of such a system? Have the authorities'

approaches to the organization of public communication evolved in the course of the transformational changes that took place in Ukraine over the last 30 years? This research is dedicated to finding answers to these questions.

The main purpose of this study is to retrospectively analyze the processes of formation and development of the system of state communications between the government and the public after Ukraine's independence. Achieving this purpose foresees the following tasks:

(a) exploring the modern views of scientists concerning communication, determining the essence of state communication;

(b) an analysis of the legal foundations of the establishment in Ukraine of a system of communication of state authorities with civil society actors;

(c) to understand the importance of communication between the authorities and the civil society in the context of the modernization of public administration;

(d) substantiation of the feasibility of introducing in activity of system of state communications modern information technologies and communication interaction tools.

Literature Review

The origins of the definition of the essence of communication were M. Weber, G. Godet, G. Lasswell, P. Lazarsfeld, M. McLuhan. The theory of communication was elaborated by representatives of the communicative philosophy Y. Habermas, K. Jaspers, A. Toffler, philosophers futurists D. Bell, J. Gelbraith, J. Gerbner, N. Luman, T. Parsons and others. The communicative interaction of state authorities with society was explored by S. Black, D. Dorothy, F. Jeffkins, P. Jackson, D. Grunig, S. Katlip, R. Harlow and many other foreign scientists. In the works of Ukrainian scientists, various aspects of state communications were covered by V. Bebik, V. Korolko, V. Kobzanenko, S. Kvit, G. Pocheptsov, V. Rizun, O. Kholod. The interaction of the authorities with the civil society in Ukraine was researched by V. Bakumenko, N. Dragomiretska, A. Kolodiy, O. Kruti, O. Litvinenko, N. Nizhnik, V. Rebkalo, Y. Surmin, V. Tertichka and many other scientists.

Research Findings

Most scholars consider communication as a multidimensional social phenomenon. From the standpoint of a systematic approach, they consider communication to be the basis of functional management interaction. In the theory of social organization, scholars view communication as an important determinant of managerial behavior in social institutions and organizations. The marketing approach in communication research reveals the dependence of the development of administrative and political organizations on the external and internal conditions of communication interaction. According to the concept of change management, which is especially relevant for the business sector, a continuous improvement of communication strategies is a prerequisite for improving management and maintaining competitiveness. The concept of cognitive management implies the modernization of the administrative foundations of administration through structural restructuring, innovation, creation of an innovative model of social and communicative interaction of a qualitatively new level.

The results of the research of the role of communication in public administration testified that the level of public trust in state institutions depends on their consistent, systematic, objective, high-quality, open and transparent information and communication activities. For the authorities, an important condition for establishing effective communication with the structures of society is the continuous implementation of state communications.

From the standpoint of the theory of public administration, state communication is a stable social interaction of the participants of the management system, which is a complex of communicative exchange of messages, information, knowledge necessary for the decision of management tasks, achievement of goals, realization of strategies. According to the process approach, state communication is the process of information exchange carried out by state authorities and local self-government bodies with various institutions of society (subjects of communication). The actors in

this process are state institutions, business structures, public institutions (parties, movements, unions, etc.).

According to the method of communication interaction, there are two types of state communications: propaganda and marketing. The propaganda type of state communication involves rigid information control of the authorities by the consciousness of the people, which often turns this process into a manipulation of consciousness. History testifies that different states of the world, if they are interested in propaganda or even war, often use manipulative techniques such as misinformation (fakes), “white noise” technology (glut of information), spin-doctoring (change of meaningful accents of information) and other techniques for influencing human consciousness. Marketing type of communication interaction is formed on the basis of the laws of supply and demand for information services. Peculiarities of marketing communications include the use of indirect, weak (or soft) communicative influence rather than direct propaganda.

In the process of state communication, the bodies of executive power are the transmitter of information, and at the local level, if it concerns the information of local importance - the bodies of local self-government, at the same time its recipients in the first and second case are citizens. State authorities, bodies of local self-government are interested in assimilating the communication of the information transmitted by the participants, but they cannot fully rely on its correct understanding, because there is a risk of divergent attitude towards the information message. This risk can be mitigated if the appropriate conditions for communicative interaction are created that maximize the interests of all participants in the communication.

Public relations are a tool to facilitate the harmonization and convergence of interests of communicating entities. Most researchers share the view that public relations (PR) is usually aimed at building understanding and agreement between people, social groups, classes, nations, states through purposeful public opinion formation and management.

Revealing the essence of communication, Ukrainian researcher L. Borysenko (2008) refers to the definition of American scientists D. Forrestol and R. Dilenschneider, who defined communication as "the use of information to influence on public opinion". In this case, influence on public opinion is understood as bringing to the consciousness of people information that is true. Revealing the essence of PR as one of the tools of communication, the scientist V. Komarovsky (2001) gives the definition of the American researcher R. Harlow, who claimed: "Public relations is one of the functions of governance that facilitates the establishment and maintenance of communication, mutual understanding and the establishment of cooperation between the organization and the public. It involves addressing a variety of issues: ensuring guidance to public opinion information and assisting in the development of appropriate measures; ensuring their activities in the public interest; keeping managers ready for different changes by anticipating trends in a timely manner; use of research and open communication as the main means of activity”.

Researching the multidimensional nature of public relations, Ukrainian scientist S. Pushnyak (2015) defined RR as “a constant communicative psychological direct and feedback contact of governing bodies of any system with the public with a view for creation, forming and functioning of a positive management image that influences the emergence of a favorable environment for interaction of both parties”.

The purpose of public relations for state authorities and local self-government bodies is to establish bilateral communication in order to identify common interests and to achieve mutual understanding between citizens and authorities based on knowledge and full awareness. The tasks of the PR structures created in the authorities include the reproduction of the internal and external socio-political and psychological environment, favorable for the successful work of the body, ensuring the desired behavior of the public towards it. According to Ukrainian researcher D. Tereshchenko (2009) the authorities are interested in gaining public support and reducing resistance to their actions. State authorities also require public relations to create an image of effective and competent leadership that can solve problematic issues without undermining the legitimate rights of citizens to access timely information.

In Ukraine, the establishment of the public relations Institute dates back to the 1990s. Awareness of the necessity of introducing PR into the activities of the authorities became a reaction to the social changes that were taking place in Ukraine towards the formation of economic and political institutions of democracy. The real process of creation of the basic principles of PR activity began from the moment of organization in 1992 in the structure of the Presidential Administration of Ukraine of the press service of the Head of State. In the same year, the Law of Ukraine "On Information" was adopted (1992), which was the beginning of the creation of a national legal framework concerning information and communication activities of the authorities. This Law first defined the right of public entities to information, which was guaranteed by the creation in the state bodies of special information services or systems that would ensure access to information in the prescribed manner. In addition to determining the right of citizens to receive information from state authorities, Article 5 of the Law foresaw its openness, accessibility, freedom of exchange, objectivity, reliability, completeness and accuracy, as well as the lawfulness of receiving, using, disseminating and storing information. The special importance of the information in the relations of the authorities with the citizens was enshrined in other articles of the same Law. Thus, Article 10 guaranteed the establishment of a mechanism for the exercise of the right to information and established liability for breaches of the law on information; Article 21 identified the main sources of information concerning the activities of state authorities, and Article 28 established a regime for access to information.

The adoption of the Law of Ukraine "On Print Media (Press) in Ukraine" (1992) had great importance for public relations, which established the right of citizens to receive publicly disseminated information from the authorities and their officials.

Another Law “On the Procedure forReporting the Activity of State Bodies and Local Self-Government Bodies in Ukraine by the Mass Media” (1997) established the procedure for accreditation of journalists and media technicians at state bodies and local self-government bodies by registering them on the basis of official submission of applications. In turn, the authorities were obliged to inform the accredited journalists in advance of important activities, plans and assistance in organizing their activities.

In Ukraine the regulation of relations between citizens and authorities is enshrined in the Constitution (1996). Thus, Article 40 of the Constitution reads as follows: “Everyone has the right to send individual or collective written appeals or to personally address the state authorities, local self-government bodies and officials and civil servants of such bodies, who are obliged to consider the petitions and give a reasoned answer within the time limit established by law.

The practical implementation of this constitutional right is carried out within the framework of the Law “On Citizens' Appeals”, which was adopted in October 1996 (Verkhovna Rada of Ukraine). In 2015 this Law was amended according to it, state authorities are obliged to respond to e-appeals and e-petitions. The same year, the President of Ukraine issued Decree No. 523/2015, which approved the Procedure for Consideration of an Electronic Petition.

The Law of Ukraine "On Access to Public Information" (2011) became enough democratic according to European norms, which established the right to free access to information from state authorities and local self-government bodies, affirmed the necessity for governmental institutions to communicate with civil society actors in the public sphere.

It is worth noting that the characteristic feature of all the above mentioned laws was their orientation to exert unilateral information influence on citizens. The adopted Law “On the Basic Principles for the Development of the Information Society in Ukraine for 2007-2015” (2007) laid another, broader approach to the information sphere. In particular, the task of establishing an information society in Ukraine was identified. The provisions of the Law foresaw the reorientation of public administration to a more modern form of public development management - a system of public administration, which envisaged a transition from a model of unilateral informing of citizens of the actions of the authorities to a bilateral model of communication with feedback by the type of “citizen-public body-citizen”. The Decree of the President of Ukraine “On Promoting Civil Society Development in

Ukraine" of February 28, 2016 No. 68/2016" and "On Approving the Strategy for the Development of the Information Space of Ukraine for the Period until 2020" substantially supplemented the legal framework for public communication of the authorities.

The modernization of public administration, which began in Ukraine in the first decade of the new millennium, necessitated the introduction of new components of public communication, including:

(a) planning and conducting public consultations;
(b) informing of the activity and clarification of the goals and content of public policy in the respective sphere of public administration to society and individual segments (groups) of the population;
(c) ensuring the activities of advisory and consultative bodies;
(d) promoting the development of civil society;
(e) facilitating public examination of the activities of executive bodies and public anti-corruption expertise of draft legal acts (Ivano-Frankivsk Center for Science, Innovation and Informatization (2012).

In terms of the direct implementation of practical tasks of public communication, it should be carried out by specially created units within the structure of the authorities, which may be called differently: information ensuring department, press center, press service, public relations center (department) for public relations, department (division) for public communication etc. The diversity of the names of communication units is explained by the lack of a regulatory act that requires the unification of their names. The main function of these structures is to establish effective public relations, and the main task is to develop a positive image of the authorities and their officials, to increase the level of public confidence to the state authorities.

In Ukraine PR subdivisions use the following organizational forms of work to disseminate information concerning the activities of the authorities in the society:

(a) issue and distribution of newsletters, press releases, reviews, photos, videos, information collections, express information;
(b) holding press conferences, briefings, political dialogues, television debates, roundtables, press clubs, organizing interviews with government leadership and officials;
(c) preparation and conducting of television and radio programs;
(d) provision of publications (speeches) in the media by the heads or other officials of the authorities;
(e) creation of archives of information concerning the activity of the authority;
(f) making web pages on the Internet concerning the authority and its activities.

The recognition by the Ukrainian authorities of the importance of the use of PR-technologies in public administration makes it possible to identify public relations with the management of public interest, during it, on the one hand, public interests are transformed into a supportive expectation of a management initiative and, on the other, a management initiative is brought into compliance with expectations of the public.

The characteristic feature of recent years in the field of public communications became the introduction in Ukraine into activities of state authorities of modern information and communication technologies. On this basis, innovative social forms of communication between the government and the society were created, among them "E-Government", social media, "Civil Initiative" web portal, "Public television", online conferences with the President and the Head of Government, members of the government, heads of bodies of local self-government etc.

The introduction of the latest information and communication technologies gives the possibility to carry out information providing of process of adoption of organizational-administrative decisions in bodies of public power with participation of citizens and their institutes. Possibilities for that are growing first of all through widening of audience of Internet-users. Today many Ukrainian state actors became active users of social network in the Internet. According to National center of e-governance among them who is represented personally by the page in social networks for close

cooperation with population, NGOs and media there are 50 representations of state authorities (National eGovernment Center). The activities of the authorities in the social networks opens additional ways for the construction of effective communicative spaces between society and the authorities,. This, in particular, the establishment of communities where state bodies contact with citizens, creating blogs, where state services are presented and discussed, involvement of society to the work concerning improvement of the legislation – access on-line of citizens to information of state sector, laws in force and draft laws, direct accountability of officials to citizens, immediate discussion and solution in online environments of problems which arise in the country and regions.

Improvement of public communication of governmental structures, achievement of openness and transparency of their activity was facilitated by creation of the Unified web portal of executive authorities in Ukraine. The portal is a central part of the electronic information system "Electronic Government", which integrates websites, other electronic information systems of all executive bodies. Studying the experience of other countries convinced the national authorities that computer technologies of "E-government" significantly facilitate the interaction of executive authorities and their structural units, reduce the unproductive work, increase the effectiveness of adopted state-management decisions, which projects are placed on the web site for public discussion. Scientists, entrepreneurs, experts, ordinary citizens have the opportunity to submit to the authorities their suggestions and original ideas for solving important economic and social problems.

The official publication on the web-site of the Cabinet of Ministers of materials of meetings of governmental committees, agendas and all adopted resolutions and orders of the Government became a new aspect in the development of public communication of the Government of Ukraine with the public. The new tools of public communication of the authorities with members of the public, which are widely used by the authorities, include the social networks Facebook, Twitter, Youtube, Telegram, WhatsApp etc. A new form of public communication, which has already earned the sympathy of Ukrainian citizens, is a short video which are shot by specialists of the Press Center of the Presidential Office of Ukraine, in them the Head of State V. Zelensky voices his position for solving the most pressing issues that are of most concern to society.

Discution Issues

The study of the history of the formation of relations between the government and the civil society gives grounds to state that a system of public communications has been created in Ukraine. However, we believe that the following issues need further discussion. The power mainly performs the obligation to inform the public of its activities through the system of public relations, which became a mandatory element of the government structure at all levels of governance. At the same time, despite the positive developments, a number of problems in the field of public communications remain unresolved. Public information management needs improvement; there are problems with the promotion of state policy. Timely explanations of changes in government, sometimes fundamental, in government policy, actions by the Government and Parliament became not sustainable character, often blurred, spontaneous, unclear to the public and often unpredictable. This is to a certain extent explained by the lack of standards of communication activity, the presence of mistakes and gaps in the state information policy.

Conclusions

In Ukraine the process of institutionalization of the system of communicative relations between the authorities and society continues, the institutionalization became stable and continues to deepen, and the development of the system is evolutionary.

State communications as a system of public interaction between state authorities, mass media and the public are recognized in Ukraine as a prerequisite for democratic development, the emergence of civil society, the provision of conditions for widespread public participation in the formulation and implementation of public policy, and the strengthening of public confidence in the public.

With the development of the information society, the attitude of the authorities to the importance of communication changed. Recognizing that old methods of communication with society no longer work for effective communication policy, now the task of state and local authorities in the field of public communications recognizes the necessity to introduce new methods, instruments and tools. In order to optimize their activities in the context of ensuring a transparent and open dialogue with the public, representatives of the authorities began to actively use social networks.

In the system of information law of Ukraine, which regulates public relations in the field of information and communication technologies, new legal institutions are being formed: electronic government, electronic administrative and technical regulations, remote provision of public services, etc. Today, these institutes are actively developing.

At the present stage of the development of Ukrainian society with its characteristic transformation processes in different spheres of public life, the communicative interaction of the authorities and society should foresee permanent, honest, open, equal, clear public and other civil society format in a fully public dialogue in the format subject-subject horizontal relations, which is an absolute guarantee of the democratic development of the state.

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The Role of Design Thinking in Creating Innovation in Business: A Literature Review

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Abstract

The dynamic development of the world economy and the increase in competition affect enterprises that are taking actions aimed at increasing the attractiveness of their business processes as well as products and services. The use of innovative techniques and tools focused on the problems and needs of users became an important element. In recent years, Design Thinking is one of the methods that have gained the attention of practitioners and theoreticians dealing with the problems of innovation. The aim of this paper is to present the concept of Design Thinking as a tool used in the process of creating innovation in business activities. An attempt was also made to show the most important differences between Design Thinking and the traditional approach typical for business. The research was conducted on the basis of the literature in the field of innovation and Design Thinking, as well as using data analysis from reports and consulting studies from Poland and foreign countries. The paper also uses examples of the practical use of the Design Thinking method. It has been found that Design Thinking is important in terms of introducing innovative activities in enterprises. The use of this method leads to the production of new or improved products, technological processes or organizational systems. There are many advantages of this method. The most important are, above all, an unconventional approach to solving the problem and an empathic understanding of the user perspective of the proposed idea.

Keywords: Design Thinking, Innovation, Business, Decision Making

Introduction

Driven by new technologies and globalization, new trends in the business environment affect enterprises in offering new solutions to meet the current or emerging needs of individuals, business and the public sector. Frequently observed factors affecting the current business environment are the ever shorter product life cycle, resource scarcity and growing competition. As a result, there is a conflict between the business tools, methods used in recent decades and the existing or evolving business environment. This situation often causes chaos in the minds of business directors about how to maintain their business in ever-changing circumstances. There is a growing need to look for new business thinking opportunities by using new tools and methods to create value for customers. It results from the need to maintain competitiveness and profitable business results in the long term (Volkova and Jakobsone, 2016).

Nowadays, the key to business competitive advantage is to introduce innovation. It is becoming more and more common to use a creative approach throughout the decision-making process, including usage of the Design Thinking method in business (Ben Mahmoud-Jouini et al., 2019). Design Thinking is important when developing products and services (Bianchi et al., 2018), as well as gaining importance in the entire corporate structure. By combining a creativity-based approach with business decision-making, the company's value is increased both internally and externally (Brooke, 2010). The functioning of enterprises, in the environment of growing competition, requires taking actions to increase the attractiveness of the goods offered. It is therefore necessary to search for tools and techniques to meet the growing demands of customers (Curedale, 2013).

The aim of this paper is to present the concept of Design Thinking as a tool used in the process of creating innovation in business activities. An attempt was also made to show the most important differences between Design Thinking and the traditional approach typical for business.

Methodology

The research was conducted on the basis of the literature in the field of innovation and Design Thinking, as well as using data analysis from reports and consulting studies from Poland and foreign countries. The paper also uses examples of the practical use of the Design Thinking method. It was assumed that the combination of this type of data will allow obtaining satisfactory results from the point of view of formulated research aims.

Literature Research

Literature sources point to the huge role of innovation in all spheres of life, ranging from new solutions for economic or social life, to new mental and cultural currents (Edwards-Schachter, 2018; Chen et al. 2018; Chen, Yin and Me, 2018; Lundvall, 2016). Despite the extensive literature that is available, it is very difficult to give a complex definition of this term and clearly describe its character. Innovation is a multidimensional concept encompassing different meanings and definitions from the perspective of different disciplines (Edwards-Schachter, 2018). The concept of innovation has evolved over the years. In the initial sense, the term was understood as something new in relation to existing solutions, currently, innovations are increasingly associated with refinement or improvement. Currently, one of the most recognized definitions is contained in the Oslo manual. This definition indicates that „innovation is a new or improved product or process (or a combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)" (OECD/Eurostat, 2018). Innovation (understood as a process and outcome) are considered one of the main factors contributing to continuous business success. It was the subject of many research studies in which special attention is increasingly paid to the relationship between design, innovation and business results (Hernándeza et al., 2018).

Much attention in the literature has been devoted to innovation processes. One of the latest concepts is the User-Driven Innovation process (UDI) (Tacer et al., 2018). The UDI concept, which began to evolve since 2005, is based on the belief that consumers (users) are increasingly influencing the available commercial offer. They actually take part in the process of creating the products and services they buy. Therefore, UDI can be defined as a process that is based on user knowledge to develop new products, services and concepts. Thanks to this, the obtained solutions are based on a real understanding of users needs and systematically involve users in the enterprise development process (Szymańska, 2017). Figure 1 presents a proposal for a UDI concept.

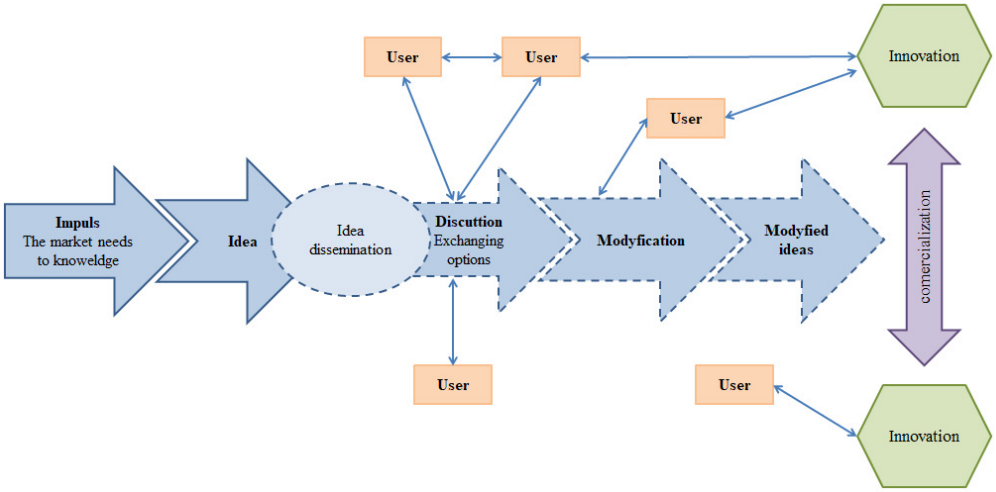

Figure 1: User-Driven Innovation process

Source: Own study based on Szymańska, 2017

The implementation of the process as an innovative strategy also requires the company to take the following steps: recognizing the needs and expectations of customers, creating new ideas and designing solutions, analyzing technological potential and production capabilities, identifying the capacity of the market, attaching new solutions to business activities, and then introducing the solution for the market (Rosted, 2005). In this connection, Design Thinking deserves special attention, which is an example of a method of solving problems in a way that takes into account creative processes focused on the receiver of the proposed solutions (Ingle, 2013; Micheli et al., 2019).

Design Thinking is one of the innovation tools that respond to the challenges of the present day related to changing economic, political and social conditions. This concept can be defined as an action that requires complex commitment, focused on finding optimal solutions and answers to the needs of people and the environment in which they live. According to the definition adopted by the International Council of Societies of Industrial Design, design is the main factor in the innovative process of humanizing technology as well as cultural and economic exchange. According to the assumptions of the European Commission, by 2020 design should be a fully recognizable element of innovation policy in Europe, both at the Community, national or regional level. Design is a comprehensive process that includes both the way of thinking and the end result, which can be a business model, object, product or service (PARP, 2020).

According to literature sources Design Thinking is defined as a research approach to the analyzed problems, containing creative thought processes (Rudkin Ingle, 2015). This concept is applicable not only to products but also in the service and process offer. It is primarily a systematic way of searching for a solution, from defining the problem, implementation, to prototyping and in-depth evaluation of the results obtained (Plattner, 2010). According to Lockwood (2010), this term is an innovative process that puts people and their needs at the center of attention. Design thinking can be used to create new products and services, but also to solve business problems and challenges. Brown (2009) defines this as a messy creation process by people who were not considered to be associated with design in any way. In this process, it is important to focus on human needs and use a diverse set of design tools (Bianchi et al., 2018).

Design Thinking is based on the assumption that this method can be helpful in solving problems and challenges that go beyond the traditional and common approach. Another characteristic feature of the described method is that the considered tasks should be implemented in multidisciplinary teams. Design groups should include people from the production, research and development, marketing and

sales departments, as well as designers. The mentioned procedure causes a diversity of competences among team members, thanks to which it is possible to stimulate creativity and develop unconventional solutions (Chasanidou et al., 2014). One of the most important components of this method from a business perspective is the team's deep understanding of the target users needs (Liedtka and Ogilvie, 2011; Baker and Moukhliss, 2020) through a specific learning process (Holzle and Rhinow, 2019). As part of an innovative solution to the problem, Design Thinking is based on detailed research related to the product or service development process (Curedale, 2013). The Design Thinking process is considered to be a system of overlapping three perspectives: available technology, business and client (Figure 2).

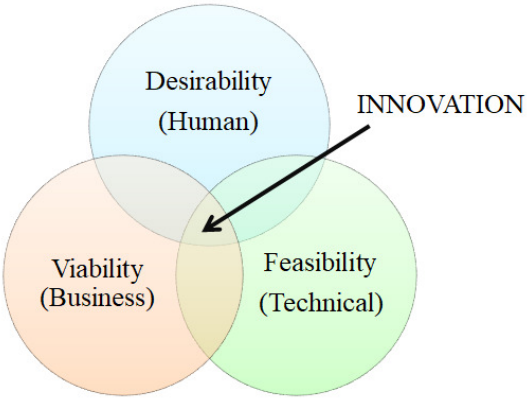

Figure 2: Design Thinking innovation as overlapping area
Source: Own study based on Chasanidou et al., 2014

The first issue concerns the technical aspects of the implemented solution. In this step the answers to the following questions are important: does your technology allow you to implement the solution? Can implementation take place at a sufficiently fast pace? Is the solution easy to maintain? The second perspective refers to the business requirements related to the specific solution. This stage concerns the analysis of the current market situation, as well as forecasts regarding profitability and return on investment. The third perspective draws attention to placing the real needs of users at the center of operations. Understanding the beliefs and leading motivations of clients allow creating a useful and innovative solution. Innovation increases when all three perspectives are taken into account (Chasanidou et al., 2014; Pavie and Carth, 2015).

The literature on the subject does not provide a clear classification of the stages that make up the process of implementing the Design Thinking method. Some authors have three basic stages: searching for needs including defining the problem through observation, generating ideas and prototyping (building models that facilitate the development and selection of concepts) (Seidel and Fixson, 2013). Most papers distinguish five design thinking components including empathize, define, ideate, prototype and test (Steinke et al., 2017) (Figure 3).

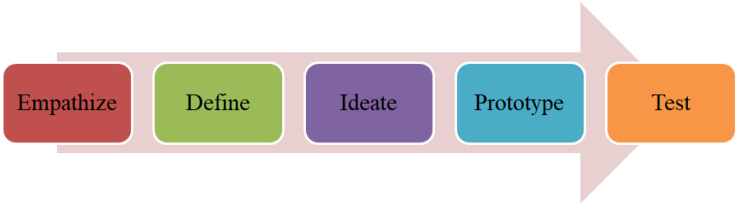

Figure 3: Design Thinking concept
Source: Own study based on Steinke et al., 2017

The first stage includes a set of actions to determine the requirements for the new concept and to orientate on user expectations. Empathy is an attempt to understand the thinking of the potential user of the proposed solution. Innovation often begins with an inspirational and non-obvious discovery

that deals with understanding intuitive motivations that affect human behavior and choices. Research phases based on qualitative, usually ethnographic or anthropological methods are of fundamental importance here. The customer often unknowingly makes certain product-related choices, which is why these studies allow discovering new life contexts or unmet needs (Lockwood, 2009). It is worth noting that it is not recommended to carry out these studies among focus groups or in laboratory conditions, because people in these situations tend to avoid authentic comments (Curedale, 2013). The next challenge is to define the problem. Design Thinking allows to discover the leading aspects of current situation and draw conclusions from the information that was collected during interviews and observations of users. All of that combined can form a solid basis for identifying correct problem. Proper definition of the problem makes it much easier to determine the right direction of the solutions sought. An important assumption of this stage is to look at the issue from a broader perspective, which is not limited by the standard thought framework and habits of team members (Steinke et al., 2017). The next step in Design Thinking is the ideate phase. The basic tool here is brainstorming, i.e. a group process in which techniques that promote the search for new solutions are used. It should be noted that brainstorming is not an end in itself, but only a starting point for determining the next course of action (Ingle, 2013). The next stage is prototyping, in which innovative ideas are transformed into a preliminary model, enabling the assessment of a given approach, as well as the potential for further changes. Prototyping is the physical transfer of ideas and concepts into a form that allows them to be visually presented and to collect opinions on the solution. It grants you an ability to explore ideas developed by preparing tangible models. The building and continuous improvement of prototypes reduces the risk of failure for the final product (Geissdoerfer et al., 2016). Testing is a way to get feedback from prototypes and ideas created in the previous phase. Testing allows you to repeat the empathy process of how users experience the prototype and compare opinions with their initial notes. Thanks to feedback from the testing phase, prototypes can be improved, which in the end will indicate whether the defined problems are properly solved (Steinke et al., 2017).

Empirical Researches

Modern business is focused on efficiency and constant change. A change understood as a mutable market environment (new technologies, competitors' activities), but also a change as continuous improvement of services, processes or products. Descriptive research on the practical use of the Design Thinking method by enterprises is contained in a report prepared by the Hasso-Planter Institute at the University of Potsdam in cooperation with Stanford University. In the study, respondents had the option of multiple-choice answers. Enterprises of various sizes and from various industries participated in the study. The results of the study showed that the size of the enterprise or industry is not the factors that determine the use of Design Thinking by organizations. Most of the surveyed enterprises use the analyzed method in the Research and Development (60,1%) and Marketing (40,9%) departments, while the smallest percentage of use was recorded in Finance & Accounting (5,3%). In the surveyed enterprises, Design Thinking is used to solve various types of problems. Among respondents, 69% say that innovative processes in their organization are more effective thanks to the Design Thinking (Figure 4). Despite the undoubted advantages of the method, respondents also pointed to its barriers and limitations, as well as to the problems associated with measuring its results (Schmiedgen et al., 2015).

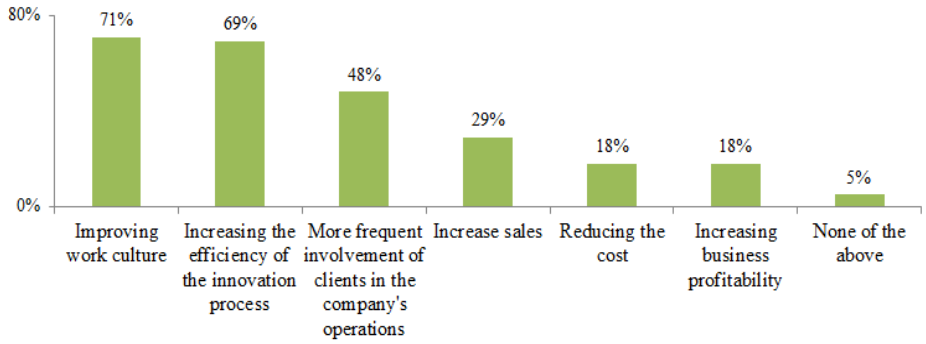

Figure 4: Impact of Design Thinking for organization

Source: Own study based on Schmiedgen et al., 2015

Another example is a study that attempts to clarify the relationship between Design Thinking and innovation as well as business results. The survey was conducted among 525 companies listed on the Thai stock exchange. The obtained results showed that there is a strong, positive correlation between the Design Thinking method and innovations, as well as between innovation and the company's results. There was no correlation between Design Thinking and the results of enterprises. The results of the study show that this relationship is indirect due to the generation of non-obvious ideas that are transformed into innovation and then into the profit of the organization (Wattansupachoke, 2012).

The Design Thinking method significantly influenced the creation, development and conquering of the market by products and services of many enterprises, including Airbnb, Amazon, Apple, Coca-Cola, Conversem FedEx, General Electric, IBM, Simens, SAP, Toyota, Uber (Chybowski and Idziaszczyk, 2015; Vetterli et al., 2016; Sutton and Hoyt, 2016). Table 1 presents selected examples using the presented method among recipients of the private sector and administration units from Poland and the world.

Table 1: Selected applications of the Design Thinking method

Orderer	Contractor	The result of using Design Thinking
Apple	IDEO	Development of the computer mouse project for Macintosh Lisa.
Fabbrica d'Armi Pietro Beretta	Design Factory, Aalto University	Improving safety during hunting.
Boeing	IDEO	Marking the occupation of toilets on planes. Development of aircraft window lighting.
Łomża Brewery	Touch Ideas, Poland	Visual identity of the Łomża Unpasteurised beer, base with shelves for beer display, the first fridge pack cardboard on the Polish market.
North Face	IDEO	Extending the product recipient area to the Chinese market.
LEGO	Cloud Design, Poland	Developed packaging LEGO (SCA Challange final in Brussels).
Shimano	IDEO	Development of a simple walking bike design for adults.

Source: Own study based on Chybowski and Idziaszczyk, 2015

Design Thinking has also found its practical application at IKEA. The company commissioned to study social, technological and demographic connections that will affect the future appearance of the kitchen and what functions they will perform in 2025. IKEA commissioned IDEO to design and build the developed solution. The designed kitchen was tested during EXPO in Milan by a large number of visitors. Another example of the use of Design Thinking by IDEO was the development of a solution for Bayer. Bayer Diabetes Care, a division of Bayer Healthcare, is a global leader and innovator in

health self-control solutions. The solutions introduced by Bayer include, among others, a blood glucose meter or test strips. The result of cooperation with IDEO was the launch of Bayer CONTOUR USB, which monitors blood glucose levels. In addition, healthcare professionals gain immediate access to patient blood sugar data and impacts efficiency and speed of optimization of diabetes management (Ideo, 2020). An additional example where Design Thinking was used is the Millennium Bank. This method has been used, among others, for analog solutions, such as the employee-customer conversation model in the facility. Thanks to the Design Thinking method, Bank Millennium has developed a model in which communication with the client takes place according to a certain scenario. This scheme causes the client to become a very active party in the process. Thanks to the designed tools, each conversation can be different, and at the same time, they ensure that during it all necessary elements will appear, which the bank employee must inform the customer about (Millennium Bank, 2019).

Discussion and Summary

Literature sources demonstrate varied definitions of Design Thinking. It is worth noting that all these definitions of Design Thinking contain the following main elements: goal setting (the goal is to develop a new solution to the problem being analyzed), orientation (user orientation), process (structured structure) and participants (interdisciplinary teams) (Schallmo et al., 2018). Design Thinking based on the problems and needs of users differs from the commonly accepted approach to process improvement. For example, this method is most useful in the early stages of innovation creation when problems are not specifically defined. This creates opportunities for its multi-dimensional solution. In turn, standard process improvement finds its application in less complex situations (Roberts et al. 2016).

Due to the continuous development of the concept of innovation as well as models of innovative processes, there is a need to search for new methods affecting the creation and implementation of innovation in business. In recent decades, processes leading to the growing interdependence and integration of countries, societies, economies and cultures that have led to the gradual similarity of products and services on the world market can be observed. In addition, customer requirements and expectations for the offered solutions have grown. Therefore, companies are forced to carefully analyse their clients requirements. Design Thinking is one of the methods that support the creative and innovative process of creating or improving the products and services offered.

Design Thinking plays an increasingly important role in designing innovative services and products. This method is a way of introducing a series of actions in enterprises, which in turn lead to the production of new or improved products, technological processes or organizational systems. The concept based on Design Thinking creates a chance to solve an unusual problem or improve an existing solution, which in the long run gives business a chance to achieve competitive advantage on the market. Other authors also received similar observations (Micheli et al., 2019; Pap et al., 2019, Pamfilie and Croitoru, 2018).

The analysis of the practical application of Design Thinking confirms that many modern product and service solutions have been developed or improved thanks to the presented method. The undoubted advantage of this method is the empathic understanding of the user's point of view. In addition, Design Thinking allows you to quickly define potential failure. It also focuses on action and not on theorizing. In turn, this method is based on the cooperation of people from many disciplines, environments, and industries, which entails the exchange of experience among the members of the project team.

A review of literature sources as well as data analysis from reports and consulting studies indicates the importance of the design thinking method for the practice of enterprises in the field of creating and implementing innovations. Due to the wide scope of this problem, the work carried out should be extended to other aspects of business operations that may be affected by Design Thinking.

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Banking Competition and MSME Lending in Indonesia Using Provinces Data

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Abstract

The purpose of this paper is to explore the effects of banking competition on the lending behaviour of commercial banks specifically towards Micro, Small, and Medium Enterprises (MSME) in Indonesia as a developing country. This paper uses provinces data to produce a more robust result due to MSME in Indonesia spread over 34 provinces throughout the vast archipelago. The authors measure competition within the banking sector using concentration ratio and Hirschman Herfindahl Index (HHI) based on data of all commercial banks in Indonesia every six months over the period between 2013 to 2018, then examine the effects of banking competition on credit supply and interest rate for MSME by applying panel regression model. Overall, the findings reveal opposite effects on credit supplies for MSME when banking competition is measured using concentration ratio compared to HHI. Further, it was found that banking competition is not associated with interest rate charged to MSME in Indonesia. Results in this paper raises concern on using structural approaches of market concentration to measure banking competition conditions in examining bank-firm relationships. There are other approaches to measuring bank competition such as the non-structural approaches, the H-statistic approach, and the conduct parameter approach that could be added for future research.

Keywords: Banking Competition, MSME Lending, Concentration Ratio, Herfindahl Hirschman Index.

Introduction

In 2017, the Indonesian Ministry of Cooperatives and MSME reported that the number of MSME dominated the market by having a share nearly 99,9% or around 63 million business units in Indonesia. The large number of MSME contributes to achievement of more than half of GDP and almost whole of the national workforce. Therefore, MSME holds the main role for national economic development in Indonesia. Policies regarding to fund MSME were made to establish and ensure opportunities, support, and development of MSME business activites. Accordingly, in 2012 and 2015, the central bank of Indonesia which is Bank Indonesia established regulations for banks to achieve the minimum ratio of lending to MSME compared to total loans at 20% by 2018. However, Bank Indonesia (2018) reported that until 2018 only 25,8% of MSME population that received credit loans from banks. This low amount of bank lending is out of the ordinary for small firms with limited financing options compared to large firms. In several studies such as Carbo-Valverde et al. (2009), Saeed & Sameer (2015), and Mercieca et al. (2009), mention in their studies that small firms, SME in specific rely more on bank financing.

Reflect on MSME in Indonesia spread over 34 provinces throughout the vast archipelago, in general the decision-making process for MSME lending are carried out by each bank's branch offices. Each provinces has varied total of banks which create different market structure. In a research study by Claessens & Laeven (2004), industrial structure of banks in Indonesia is classified as monopolistic competition. Cetorelli (1997) mentioned that this is considered to have a positive impact on developing

countries, including Indonesia, whilst Beck et al. (2004) observed the negative impact of monopoly competition especially for MSME. Therefore, this paper tries to inform how banking competition effects MSME lending using provinces data.

There are numerous studies focus on the impact of banking competition towards access to financing and lending rate such as Beck et al. (2003), Berger et al. (2004), Carbo-Valverde et al. (2009), Cetorelli & Gambera (2001), Cetorelli & Strahan (2006), Claessens & Laeven (2005), Guzman (2000), Mercieca et al (2009), Petersen and Rajan (1995), and Saeed & Sameer (2015). Some studies find that concentrated market leads to financial constraints dan high loan rates for firms, yet other studies believe competitive condition cause credit loan is more accessible and lower pricing.

In measuring competition, we use the measurement of concentration, which there are previous empirical studies that use the structure-conduct-performance (SCP) hypothesis using Concentration Ratio (CR_k) as used by Abadi (2016), Ahamed (2012), and Berger et al. (2004) and HHI used by Agostino & Trivieri (2010), Ahamed (2012), Hannan & Berger (1991), and Petersen and Rajan (1995). In addition, CR_k and HHI measurement tools have been used to ensure the implementation of antitrust law in banking by various regulators.

The remainder of the paper is organized as follows, literature review, empirical approach and data, results, and conclusion in the end.

Literature Review

In literature studies, there are two opposing views related to banking competition, market power theory and information-based theory. The market power theory argues that higher concentration hence banking competition decreases, will lead to higher lending rate and financing constraint. According to the study by Berger et al. (2004) that included developing nations database, suggests low levels of competition due to regulatory restriction for participation limits contribute to less competitive interest rates and difficult access to credit facilities. Furthermore, studies by Guzman (2000) and Cetorelli & Gambera (2001) mentioned that monopolistic bank structure causes higher credit rationing compared to competitive banking and charging higher rates on loans. Cetorelli & Gambera (2001) has the same outcome, but with In US banking markets, Cetorelli & Strahan (2006) find that new entrants encounter difficult access for bank financing in a concentrated banking market than in a competitive market. Claessens & Laeven (2005) find evidence that competition able to reduce the financing constraint and lower the financial costs, therefore it provides opportunities for dependent firms seek external financing and leads them to grow faster. In broader view, the level of competition is important as an aspect of financial sector development and economic growth. Relating to SME financing manner, Mercieca et al. (2009) find that lending relationships between banks and MSME increases with more competition and decreases with more concentration. In a research study by Beck et al. (2003), the effect of market power theory is stronger towards small and medium firms than large firms.

On the contrary to market power theory, information-based theory argues that market power enables banks have lending relationship with debtor, hence more credit availability and lower price of credit. Petersen and Rajan (1995) argue through a framework that shows within a concentrated market, lower financing constraint especially for young firms than older firms. Higher concentration enable banks to obtain information about their debtor thereof better in mitigating asymmetric information and decrease constraints in accessing external financing. Another study by Abadi et al. (2016), lend support to information-based theory in emerging countries where the impact of high level of concentration in banking market help higher firm leverage. In addition, banking industry with a low level of competition or a high level of concentration, has rigidity in the change or understanding of interest rates, especially for MSME. Rigidity was found to be more an adjustment for a decrease in lending rates than an increase in lending rates, as studied by Hannan & Berger (1991).

Further studies concentrate the analysis of bank competition to SME such as Carbo-Valverde et al. (2009) and Saeed & Sameer (2015). A study by Carbo-Valverde et al. (2009) using Spanish SMEs data shows that concentrated market increases firm financing constraints, which is bank-dependent SMEs.

Saeed & Sameer (2015) analysis based on the Pakistani banking sector, find that SME as opaque firms confront financing constraint more in competitive market than in concentrated market.

It was found that banks in Indonesia had a category of industrial structure classified as monopolistic competition (Claessens & Laeven, 2004b). This is considered to have a positive impact on developing countries, including Indonesia (Cetorelli, 1997). However, it can also have a negative impact, which is to give rise to developing country finances, especially for MSME (Beck, Demirgüç-kunt, & Maksimovic, 2004).

Empirical Approach and Data

The present research is based on processing of bank financial data extracted from Regular Bank Reports (LBBU) and also using data from Central Bureau of Statistics and Bank Indonesia. This study includes all bank-level data over the period between 2013 to 2018, since the category of MSME credit was regulated in 2012. Despite there are 34 provinces in Indonesia, one of the provinces which is East Kalimantan still merge with North Kalimantan in bank reporting. The data is a combination of time series data and cross section data that is suitable for use in research with one or more variables over several time periods. Therefore, this study uses 2 (two) independent variables and 6 (six) control variables with every 6 months of observation for 6 years.

For bank market concentration measures, we adopt two methods, concentration ratio and HHI. We assess both measures on province level as independent variables. Following, the control variables consists of the aspect of provinces and macro variables which are Regional GDP (RGDP), population, Non Performing Loan Ratio for MSME outstanding credits (NPL), total credits (TOTAL_CREDIT), Bank Indonesia rate (BI_RATE), and inflation .

Taking the literature review into consideration, we decided to set the following hypotheses:

H1: There is effect of banking competition towards credit supply for MSME in Indonesia.
H2: There is effect of banking competition towards interest rate for MSME in Indonesia.
Overall, the following results of descriptive statistical processing:

Tab. 1: Descriptive Statistic (Years 2013-2018)

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	N
MSME_CREDIT	2.45E+13	1.08E+13	1.52E+14	1.45E+12	3.31E+13	396
MSME_INTEREST	0.178638	0.174588	0.262545	0.154116	0.027061	396
CR4	0.606042	0.582532	0.867231	0.358004	0.122356	396
HHI	1321.145	1100.325	2606.507	528.6372	579.3092	396
RGDP	2.82E+14	1.19E+14	1.74E+15	1.82E+13	3.90E+14	396
POPULATION	7.78E+09	4.06E+09	4.87E+10	8.28E+08	1.08E+10	396
NPL	0.026476	0.024849	0.075422	0.005507	0.010264	396
TOTAL_CREDIT	1.23E+14	4.07E+13	1.72E+15	4.77E+12	2.49E+14	396
BI_RATE	0.062708	0.0625	0.0775	0.0425	0.012325	396
INFLATION	0.050542	0.0399	0.0838	0.0302	0.020416	396

Source: Processed data from Eviews 9.0

Results

Tab. 2: Regression Results: Determinants of Credit Distribution for MSME in Indonesia over years 2013-2018 with CR_4

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CR4	0.158568	0.127307	1.245557	0.2137
LOGRGDP	0.558904	0.105747	5.285288	0.0000
LOGPOPULATION	0.240876	0.129145	1.865161	0.0630
NPL	1.180860	0.488688	2.416386	0.0162
LOGTOTAL_CREDIT	0.516438	0.046853	11.02261	0.0000
BI_RATE	-0.102465	0.411966	-0.248723	0.8037
INFLATION	-0.272293	0.284078	-0.958517	0.3385
C	-9.750641	3.208561	-3.038945	0.0025

Source: Processed data from Eviews 9.0

Tab. 3: Regression Results: Determinants of Credit Distribution for MSME in Indonesia over years 2013-2018 with HHI

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HHI	0.000117	2.96E-05	3.966560	0.0001
LOGRGDP	0.453981	0.106830	4.249545	0.0000
LOGPOPULATION	0.266099	0.126835	2.097988	0.0366
NPL	1.338681	0.480629	2.785270	0.0056
LOGTOTAL_CREDIT	0.566744	0.047827	11.84996	0.0000
BI_RATE	-0.037518	0.402900	-0.093120	0.9259
INFLATION	-0.234764	0.278327	-0.843484	0.3995
C	-8.548200	3.154268	-2.710042	0.0071

Source: Processed data from Eviews 9.0

The independent variables CR_4 and HHI as proxies of banking competition in each Indonesian province, have different p values or significance levels. CR_4 has a p value above the critical limit of 0.05 which is worth 0.21 so it receives H0, while HHI has a p value below the critical limit so it accepts H1. Thus, HHI has a positive effect on the total distribution of MSME loans. The difference in results for the two concentration measurement approaches can be due to HHI reflecting the entire distribution of market share compared to CR_4 which is a composition of four banks in the market.

Furthermore, for other independent variables as control variables for the characteristics of provinces in Indonesia, the Regional GDP, population, total credit, and NPL have a positive influence on MSME credit distribution. For the independent variable as a characteristic of Indonesia's macro conditions, the BI rate and the inflation rate do not have a significant effect on total lending. This can be seen both in the regression model with CR_4 and the regression model with HHI, both of these variables have p values above the critical limit.

Taking the result of regression model approach with HHI measurement tool that has a positive effect on the level of MSME credit distribution shows support for the results of empirical studies which state that a high level of concentration or a low level of competition can reduce financial constraints for MSMEs thereby increasing the level of lending to MSME (Abadi et al., 2016; Petersen & Rajan, 1995). Overall, the results of Tab. 2 and Tab. 3 in which CR_4 and HHI as concentration indicators showing different results in which one is significant to effect the amount of MSME lending while the other is not. This result lend support to the research by Carbo-Valverde et al. (2009) that raise doubt concentration indicators as measures for competition banking market. Additionally, this result implisitly supporting the literature study by Claessens & Laeven (2004) which states that the level of competition is not determined only by the level of concentration but by the number of foreigners allowed to enter or restrictions on entry or exit that do not strictly determine competition effective.

Tab. 4: Regression Results: Determinants of Interest Rate for MSME in Indonesia over years 2013-2018 with CR_4

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CR4	0.005330	0.015927	0.334648	0.7381
LOGRGDP	-0.004557	0.004759	-0.957716	0.3388
LOGPOPULATION	0.001221	0.003072	0.397330	0.6913
NPL	0.193555	0.145959	1.326096	0.1856
LOGTOTAL_CREDIT	0.003594	0.004401	0.816654	0.4146
BI_RATE	-0.920130	0.145460	-6.325640	0.0000
INFLATION	0.402768	0.090509	4.450040	0.0000
C	0.215696	0.058611	3.680156	0.0003

Source: Processed data from Eviews 9.0

Tab. 5: Regression Results: Determinants of Interest Rate for MSME in Indonesia over years 2013-2018 with HHI

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HHI	1.09E-07	3.53E-06	0.030796	0.9754
LOGRGDP	-0.004409	0.004746	-0.928917	0.3535
LOGPOPULATION	0.001391	0.003075	0.452370	0.6513
NPL	0.195400	0.145952	1.338794	0.1814
LOGTOTAL_CREDIT	0.003012	0.004233	0.711536	0.4772
BI_RATE	-0.923568	0.145348	-6.354186	0.0000
INFLATION	0.398394	0.089974	4.427872	0.0000
C	0.228900	0.059888	3.822127	0.0002

Source: Processed data from Eviews 9.0

Independent variables as characteristics of banking competition in each province and characteristics of provinces in Indonesia, namely CR_4, HHI, population, total credit, NPL, and Regional GDP have p values above the critical limit so that these variables do not affect the MSME interest rate.

In contrast to the independent variables as characteristics of Indonesia's macro conditions namely the BI rate and the inflation rate have an influence on the MSME interest rates. This can be seen in both the CR_4 regression model and the HHI regression model, both variables have a p value below the critical limit. These results support the study of literature by Hannan & Berger (1991) which states that there is rigidity in lending rates in markets that have high levels of concentration.

Conclusion

In this paper, we investigate the effect of banking competition on MSME loan availability and loan rate. The majority market of Indonesia is dominated by MSME which is spread over 34 provinces. This condition provides a unique setting for investigating this issue using provinces data. In particular, we find different results between 2 (two) concentration measurement approaches where CR_4 shows that the level of banking competition does not have an influence on the distribution of MSME credit in each Indonesian province, making it possible that there are other measures other than concentration to assess the level of banking competition. On the other hand, through HHI measures that is more closely reflect the distribution of the market share of all banks, it is found that the level of competition affects the distribution of MSME loans. Nonetheless, neither measures of market power affect loan rate for MSME.

Thus, we argue that our results lend support to market structure hypothesis and bring intention to concentration indicators as banking competition proxy. Therefore, other approaches to measuring bank competition such as the non-structural approaches, the H-statistic approach, and the conduct parameter approach could be added for future research.

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Russian Youth in the Labor Market: Problems and Trends

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Abstract

Youth labor market is an integral institution of a market economy. Its effective functioning contributes to the progressive development of the Russian economy as a whole, ensuring the financial stability of the country, and improving the living standards. The modern youth labor market in Russia as part of the world's labor market is characterized by a widening gap between the labor claims of the young people and the opportunities to satisfy them. The article raises issues of the dual position of youth in the labor market. Since young people most often do not have practical work experience (or it is not sufficient), their high salary requirements make it difficult to find a suitable job. The lack of appropriate work experience often becomes an obstacle when filling vacancies, as the heads of enterprises and organizations prefer to hire specialists with sufficient work experience. Incomplete use of the labor potential of the youth is a negative phenomenon, since the process of renewing the workforce and the rotation of personnel are slowing down (especially in those areas in which work for young people is not attractive). A waste of their labor potential nowadays is a loss of the quality of the workforce in the near future. In addition, the article considers the supply factors in the youth labor market, draws conclusions regarding the parameters of the population, demographic burden, and economic activity.

Keywords: The Youth, Youth Labor Market, Labor Supply, Labor Demand, Youth Employment.

Introduction

Youth is an important part of the country's human capital and determines the potential supply labor. From an economic point of view the youth is the most promising segment in terms of the labor supply in the labor market, and the productivity of the national economy depends on the level of its qualifications.

In the 21st century, a shortage of competent specialists, rather than the availability of capital, will be a constraint on innovation, competitiveness, and sustainable growth.

The study of the youth labor market is important in the context of socio-economic processes, since they are the basis of the economy and become an indicator of ongoing changes. Given the accelerating development of technology, the Fourth Industrial Revolution will pay particular attention to the ability of workers to constantly adapt and learn new skills and approaches in a variety of contexts. This will provoke a decrease in employment in segments of the labor market that demand low-skilled jobs, which will lead to increased competition for jobs and an increase in the burden on highly skilled labor. According to the Boston Consulting Group research "Russia 2025: From Personnel to Talent", the

rapid development of technology helps to ensure that the knowledge of older generations is less than ever in human history relevant to new generations.

With the growth of knowledge-intensive processes in the production and in the service sector, the requirements for professional skills and knowledge in each profession increase. As a result, the content of labor and the requirements for the level of professional knowledge are transformed, entailing an acceleration of the actual and moral depreciation and obsolescence of professional knowledge.

The solution of large-scale tasks of digitalization of society implies a more efficient use of the labor and intellectual potential of youth, which is the main source of updating labor resources, the bearer and "generator" of innovative ideas and professional knowledge.

Information on the youth labor market is very important for identifying youth employment problems at the national and local levels for the formation of policies and programs aimed at solving these problems.

Besides, a youth employment crisis is brewing in the world. Both developing and developed countries have to look for ways to solve the difficult task of creating decent and permanent jobs for a large group of young people who annually join the labor market. Increased attention to the problems of the youth labor market is given in international development programs (World youth employment trends, 2016; p. 3).

The labor market is the most striking reflection of the duality of the economic characteristics of the youth. A young man enters the labor market in his youth (on average, at age 20) and remains there until old age (Rudenko, E.O., & Krasova, E.V., 2015). Therefore, all the processes taking place in this market accompany a person and directly affect his life characteristics. On the one hand, the younger generation is able to overcome the existing ideological and psychological stereotypes associated with labor activity, create new value-oriented systems. From a demographic and economic perspective, the youth is seen as the foundation for the reproduction of society's labor resources (Rudenko, E.O., & Krasova, E.V., 2015; p. 8-9). Young people have all the objective prerequisites for this: the creative nature of thinking, high socio-economic mobility, professional motivation (career, financial independence, etc.), capacity for work, psychological flexibility, the desire to continue professional training, the desire to practically implement a system of new knowledge and values, openness to the perception of new arrays of knowledge, work methods, etc.

On the other hand, in the tough market conditions the youth is the most vulnerable social group. Young people are less economically independent and consolidated, do not have significant professional experience, the required skills and competencies, are strongly influenced by market forces, without having the experience and the ability to adequately respond to incoming challenges from the market, customers and employers.

The particular importance of this problem is given by the dynamism and inconsistency of socio-economic processes in modern Russian society. The situation in the Russian youth labor market in recent years is quite tense. An increase in the registered and hidden unemployment rate among young people and an increase in its duration lead to toughening the conditions for young people to enter the labor market, while the possibilities of young people are already limited due to their lower competitiveness compared to other categories of the population.

The youth labor market is a segment of the labor market where persons aged 15-29 are the subjects that form the labor supply. A feature of this labor market is the relatively low competitiveness of young workers due to the high costs of their adaptation and the risks for the employer when hiring. The specifics of the functioning of the youth labor market is in social, demographic, economic, political, cultural and other differences among youth groups (adolescents under 18 years old, youth 18-24 years old, young people 25-29 years old) (Kot, V.V., & Kuz'mina, A.G., 2016).

The youth is a social group that is just starting the process of secondary socialization, and therefore its position in society can be described as unstable, changing. The study of the social well-being of young people seems very significant, because people's life strategies (educational, family, professional, etc.) are formed during this period. Research interest is caused by youth perception of their position in the modern Russian labor market and assessment of professional development opportunities (Gorshkov, M.K., 2018; p. 46).
The problems of employment, including youth, have always been given great attention by scientists and specialists both in Russia country and abroad.

Features of youth as a socio-economic category are reflected in the works of Bel'tyukova, O.N., & Khoroshilova, E.N. (2016), Konstantinovskii, D.L., Voznesenskaya, E.D., & Cherednichenko, G.A. (2014), Gorshkov, M.K. (2007, 2014, 2017, 2018), Zagrebin, V.V. (2014), Tikhonova, N.E. (2005), Jeffs, T., & Smith, M.K. (1999).

The problems of youth employment, trends in the development and regulation of the labor market and youth employment are reflected in the works of Vishnevskaya, N.G. (2013, 2014), Lotareva, K.M. (2015), Ratslaf, A.A., & Sedova, A.V. (2014), Roshchin, S.Yu., & Slesareva, A.A. (2012), Ratslaf, A.A., & Sedova, A.V. (2014), Cherednichenko, G.A. (2015), Barham, C. (2009), Rivera-Aguilera, G. (2018).

The problems of the youth labor market and employment policy, the “school-to-work” transition are also considered by such researchers as Dolgova, A.V., & Zhukova, I.R. (2013), Klemeshov, A.M. (2005), Kolosovskii, V.V. (2004), Nikulin, A.G. (2014), Caliendo, M., & Schmidl, R. (2016), O'Reilly, J. (2015), Shi, L.P. (2018), Zuccotti, C.V., & O'Reilly, J. (2019).

The purpose of this study is to analyze the factors of supply in the youth labor market of Russia and to indicate the dual position of youth in the labor market.

Research Methodology

The research methodology includes theoretical analysis of literature, statistical analysis, comparison, calculation of indicators and coefficients. In solving a number of problems, methods of general scientific research, logical and functional analysis were used. The results are summarized using tabular and graphical methods.

Theoretical Ground for The Research

The theoretical basis of the paper is the conceptual conclusions presented in the scientific works of Russian and international scientists on the economics and sociology of labor, various practical aspects of the functioning of the labor market, and the characteristics of the youth segment of the labor market.

Supply Factors in The Youth Labor Market: Population, Demographic Burden, Economic Activity

The parameters of labor supply depend on two main circumstances: the population in the main demographic groups and the involvement of these groups in employment (employment levels). Neither the first nor the second are constant quantities (Russian labor market: trends, institutions, structural changes, 2017).

Due to an aging population, the distribution of employed by age will shift. If in 2015 the modal age group was 26-30 years, with each five-year period there will be a shift in the modal value of approximately 5 years. As a result, by 2030 the largest group will be the age of 41–45 years, and the number of employees under the age of 40 will significantly decrease (Russian labor market: trends, institutions, structural changes, 2017; p. 42).

Fig. 1 (Age pyramids construction, 2019) shows the age pyramid for Russia (for 2018). As we can see, the proportion of young people aged 15-29 is 16.8% of the population (including both men and women), which is below the global average (23.7%) (see Fig. 2) (Age pyramids construction, 2019). The majority of the population is a group aged 25-39. Moreover, according to the forecast (see Fig. 3) (Age pyramids construction, 2019), by 2036 the main part of the Russian population will be the age group of 40-54 years (the shift of the average age to increase), but at the same time the proportion of young people of 15-29 years old will increase to 19.5%.

The age pyramid of Russia in 2018 shows that there has been a slight increase in the number of young people aged 25-34 years, which is associated with a higher birth rate in previous decades with its subsequent sharp drop (this shows the narrow base of the age pyramid under a rapidly expanding area with a jump in population of the youth).

However, the general trend is that since 2004 the total population of 14–30 years has been sharply reduced and this process will be long-time (Gorshkov, M.K., & Sheregi, F.E., 2010). The reduction in the number of Russian youth is not an autonomous process, but a direct consequence of the depopulation of the Russian Federation as a whole (Tikhonova, N.E., 2005; p. 318-361).

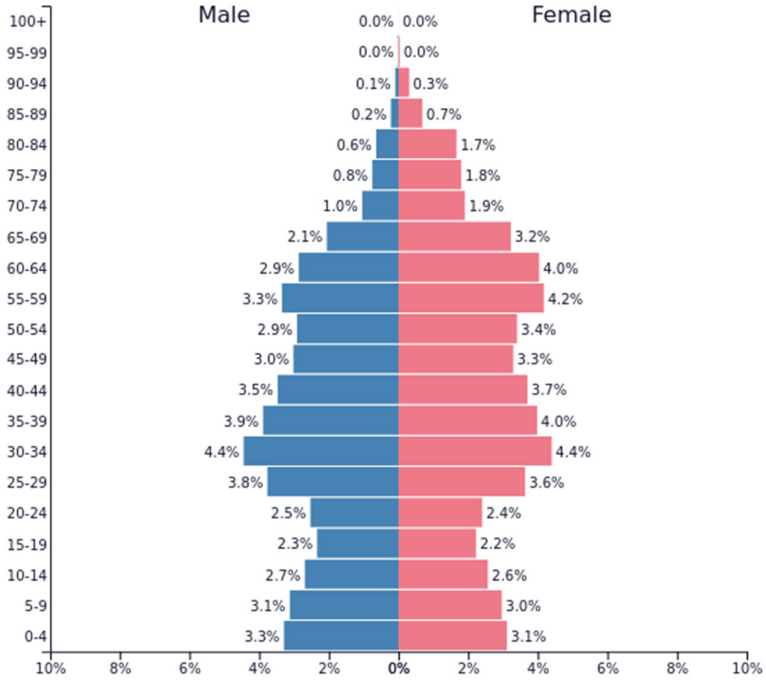

Fig. 1: Age pyramid (Russian Federation, 2018)

Fig. 2: Age pyramid (countries of the world, 2018)

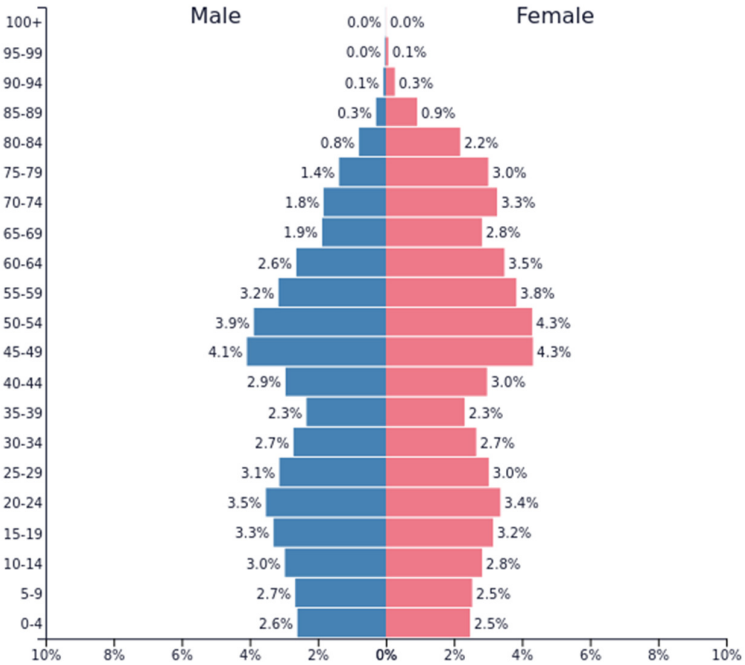

Fig. 3: Age pyramid (Russian Federation, forecast, 2036)

When considering population data, it is also necessary to analyze the age dependency ratio. Data for Russia (for 2014-2018) are presented in Table 1.

Table 1: Age dependency ratio in Russian Federation, % (2014-2018)

	2014 г.	2015 г.	2016 г.	2017 г.	2018 г.
Per working population (15-64 years old)					
Total	42	43	45	46	47
Children (0-14 years old)	23	24	25	25	26
Older people (over 65 years)	19	19	20	21	22
Per young people (15-29 years old)					
Total	143	154	164	176	187
Children (0-14 years old)	79	85	91	97	102
Older people (over 65 years)	64	69	74	79	85

As can be seen from the Table 1, the proportion of children still exceeds the proportion of elderly people, but the demographic dividend will soon come to an end. This can lead to the fact that the population will continue to age and will not be replaced (which means an increase in the burden on the working-age population, including young people, to ensure a system for paying old-age pensions).

In addition, there is a tendency of faster growth of the age dependency ratio by the elderly. Therefore, in this study, we made an attempt to predict the demographic burden on youth by the older population. Based on the data of the Federal State Statistics Service on the population in the selected age groups (from 15 to 29 years old and older than 65 years), as well as the demographic forecast until 2036 (Official website of the Federal State Statistics Service, 2020), a graph is constructed (see Fig. 4). To prepare the forecast values, data were used on the population by one-year ages (for the period until 2036), grouped by the selected ages.

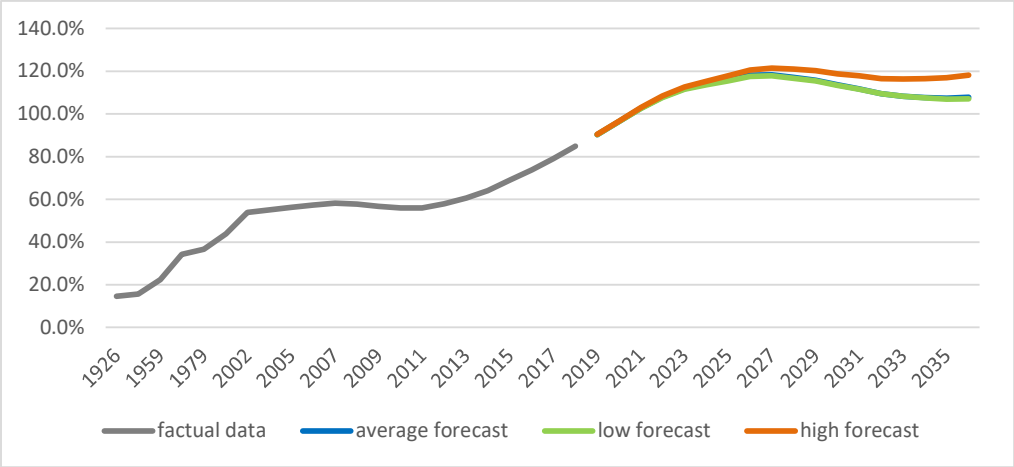

Fig. 4: The demographic burden on youth from people over the age of 65 (according to factual data until 2018, and also including a forecast until 2036)

Fig. 4 shows the increase in the demographic burden on Russian youth from 1926 to 2018. Further are the values for high, average, and low forecast. As we can see, all three variants suggest a further increase in the demographic burden on young people with a peak in 2025-2027. Next a small recession is forecasted (an average and low forecast) or a recession ending with a new growth stage (high forecast). However, for any of the variant the demographic burden on youth by the end of the forecast period is significantly higher than the current values of 2018 (by 23.1%, 22.1%, 33.3% respectively for the low, high and average forecast variants).

Table 2 shows the number of potential labor force in Russia (among the youth). Potential labor force is unemployed people who express interest in getting a job, but the current conditions limit their active job search or their willingness to start working.

Over 5 years (from 2013 to 2017), there has been a decrease in potential labor force for all age categories of youth (both among men and women). The greatest decrease occurred in the age group of 20-24 years (-35.7% over the past 5 years). However, among men, the potential labor force in the age group of 25-29 years was most reduced.

Table 2: The number of potential labor force, thousand people

	2013	2014	2015	2016	2017	% of change (2017 to 2013)
total						
15-19 years old	126	114	111	99	98	-22,2
20-24 years old	193	157	156	139	124	-35,7
25-29 years old	136	124	119	108	89	-34,6
men						
15-19 years old	66	66	58	56	54	-18,2
20-24 years old	90	77	74	69	62	-31,1
25-29 years old	59	53	49	47	33	-44,1
women						
15-19 years old	59	48	53	43	44	-25,4
20-24 years old	104	79	82	70	62	-40,4
25-29 years old	78	72	70	61	56	-28,2

The main indicator when considering labor force is the level of youth economic activity, which is defined as the ratio of the economically active population (employed + unemployed) to the working-age population.

The level of economic activity of Russian youth aged 15-29 is shown in Fig. 5.

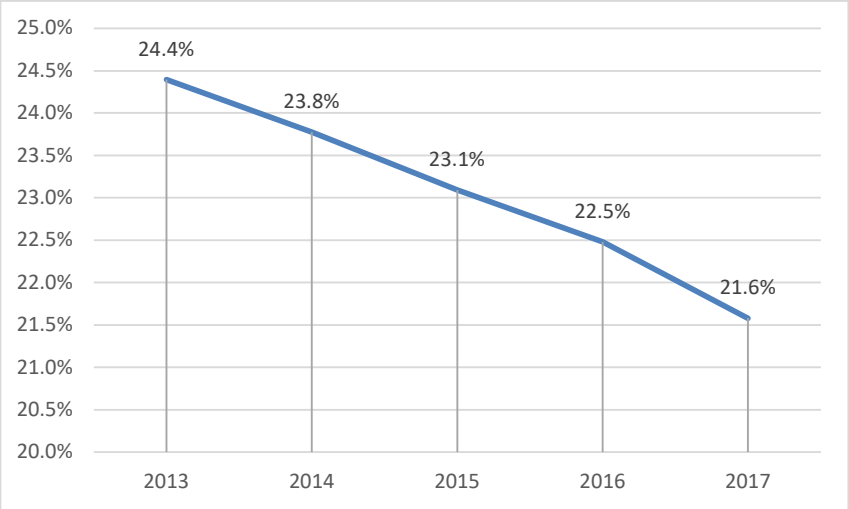

Fig. 5: The level of economic activity of young people aged 15-29 years, %

In recent years, the level of economic activity of young people, especially the younger and middle ages, has declined significantly. It can be noted that over 5 years (from 2013 to 2017), there has been a decrease in the economic activity of Russian youth by 2.8%. During this period the working-age population grew and economically active young population decreased. This can be attributed to the fact that young people are not forced to stop studying and go to the labor market, but to a greater extent began to devote themselves to study (Russia and China: 21st Century Youth, 2014; p. 296).

The Dual Position of Youth in The Labor Market

According to studies, it can be noted that young people in the modern labor market are in a dual position. On the one hand, some authors note that young people have a number of qualities that can contribute to their successful competition in the labor market (see Table 3).

Table 3: The youth strengths

Authors	Highlighted Qualities
Bel'tyukova, O.N., & Khoroshilova, E.N. (2016)	High mobility, working efficiency, easy learning.
Gornov, V.A. (2017)	Perspective, mobility, energy and openness to everything new.
Gritsunova, S.V. & Chepiga, K.A. (2016)	Ambition, creativity, intelligence, stress resistance and the desire to develop independently.
Il'inykh, S.A., & Kameshkova, V.G. (2018)	High social and labor mobility. Readiness for innovations, constant change of labor functions, active life position.
Kolesnik, E.A. (2015)	Young people have great ability to work and create in all spheres of society. Young people also have a great social and professional perspective, because only they are able to master new knowledge, professions and specialties faster than other social groups.
Kot, V.V., & Kuz'mina, A.G. (2016); Osipova, L.B., Kolesnik, E.A., & Goreva, O.M. (2018)	The creative nature of thinking, socio-economic mobility, professional motivation, working efficiency, psychological flexibility, the desire to continue vocational training.
Rudenko, E.O., & Krasova, E.V. (2015)	The desire to practically implement the system of new knowledge and values, openness to the perception of new arrays of knowledge, methods of work.

Savchenko, V.V., & Popova, M.V. (2012)	High mobility, flexibility, ability to adapt quickly, energy. A high degree of socialization, knowledge in the field of modern law, economics, social life. A high degree of learning, willingness to master new knowledge, the absence of strict stereotypes in professional activities.

Source: compiled by the author

On the other hand, many researchers note that young people in the labor market also face many problems that significantly complicate employment and have a negative impact on the position of this age category (see Table 4).

Table 4: Problems of youth in the labor market

Authors	Identified Problems
Bel'tyukova, O.N., & Khoroshilova, E.N. (2016)	Labor instability, unemployment, low wages and competitiveness, lack of experience and labor skills.
Vishnevskaya, N.G. (2013, 2014)	Structural imbalances in supply and demand. Inconsistency of the structure of demand and the structure of professional training of youth. Substantial regional differentiation. Overstated requirements of graduates themselves to their future place of work due to ignorance of the labor market conditions. Reluctance of many employers to take workers without work experience and high qualifications.
Gornov, V.A. (2017)	Lack of life experience, lack of work experience. Lack of knowledge and skills necessary to enter the post-industrial social order. Unwillingness to take full responsibility for their own actions.
Il'inykh, S.A., & Kameshkova, V.G. (2018)	Minimum work experience (as a result - low professional status).
Kozyreva, P.M., & Smirnov, S.A. (2017)	Lack of demanded professional knowledge, work experience. The imbalance between the demand for skilled labor and the specialties that young people receive in higher and secondary specialized educational institutions.
Kolesnik, E.A. (2015); Osipova, L.B., Kolesnik, E.A., & Goreva, O.M. (2018)	The intensification of the contradictions between the demand for labor of youth and its supply, the deformation of the regional and sectoral structure of employment, the complication of the process of attracting young people to the sphere of productive labor activity, as well as the imperfection of the mechanism of its state regulation.
Lyubenkova, E.P., Gorbatovskaya, N.N., & Tkachenko, A.V. (2013)	Lack of required work experience by employers, difficulty in obtaining this experience; the problem of imbalance of supply and demand in the labor market; the problem of lack of jobs in a particular specialty.
Petrov, P.V. (2017)	The widening gap between the labor claims of the young and the possibilities of satisfying them. Lack of practical experience. High wage requirements. Lack of relevant experience.
Pitukhina, M.A. (2017)	Lack of expectations from upcoming professional activities. Lack of clear knowledge and understanding of the basic mechanisms, patterns of the labor market. Lack of understanding of the requirements of employers for labor results. Lack of clear ideas about corporate culture, about the ability to work in a team. The increased ambitions of the vast majority of young people.
Solomatina, A.S., & Khalyukina, E.V. (2017)	Lack of necessary qualifications, lack of work experience, differences in the expectations of young specialists and employers regarding wages and available vacancies. Inconsistency of

	specialties in universities and the demands of the modern labor market; the contradiction of personal and social priorities, the lack of a regulatory framework for socio-economic support for graduates.
Sychevskaya, L.A. (2011)	Legal insecurity of young people. A lack of motivation to work, restrictions on territorial mobility.
Titova, M.N., Efimova, N.V., & Klimova, N.S. (2017)	Inadequate assessment of their professional potential, search for a high income and at the same time an increase in the number of "working poor" among young people. In addition to low wages, young people often work in the informal sector, part-time, or in temporary jobs. Lack of skills needed for available jobs. Lack of experience from the perspective of the employer. Lack of jobs suitable for entry-level skills. Mobility and increased readiness for migration.
Khishaueva, Zh.T., Kupavtsov, A.N. (2012)	Instability of supply and demand. Low competitiveness compared to other age groups. The pole nature of competition, due to the presence of primary and secondary workers. The difficult situation with female employment.

Source: compiled by the author

The Russian labor market shows an imbalance between supply and demand. The number of students and graduates of higher educational institutions has significantly increased over the past 10 years, but the state is faced with the problems of creating high-tech jobs. Specialists in technical profiles and skilled workers are in demand, while in the labor market there is a glut of lawyers and economists. In fact, universities are guided by the demand for specialties among applicants, and not by the needs of employers, and this is the result of educational reform, when a university is forced to survive through paid services, thereby sometimes creating the so-called "pseudo-education". The gap between the spheres of education and the labor market will soon increase, and young people will be forced to cope independently with difficulties in the way of employment, as well as in the process of work. Observing difficulties in the labor market, young people try to adapt, gaining the first experience of employment while still studying, thereby smoothing the transition between study and work. However, in recent years entry into the labor market has been increasingly delayed, and youth remains economically inactive. At the same time, one part of the youth continues to receive education, accumulating diplomas and certificates, while the other does not study and does not work. Thus, modern youth despite their adaptive properties remains a vulnerable group in the labor market (Youth employment in the motivational and structural dimension, 2017; p. 76).

Conclusion

The situation with youth employment is characterized as very controversial. On the one hand, there are differences in the wages depending on the type of employing organization (high salaries in the private sector of the economy and foreign companies) and industry (high-paying and low-paying industries). At the same time, employment in the "advanced" segments of the economy requires the applicant to possess communication skills and competencies along with professional education. On the other hand, there is a strong dependence on social origin and family resources, which does not allow us to consider education as a channel of mobility in Russian society. This leads to the degradation of the values of professionalism, doubts and anxiety for the future, skepticism about building a professional career.

Available data indicate several negative trends in the youth labor market in Russia, including a general decrease in the number of potential labor force among young people, and a drop in the economic activity of young people. Remains the trend of increasing the demographic and social burden on young people (especially from older people).

Thus, the position of young people in the market is dualistic. On the one hand, young people, due to their age characteristics, are more active and mobile, more susceptible to innovation and modernization

processes than the older generation, and therefore more competitive. On the other hand, this category is vulnerable due to the lack of sufficient professional experience and an unformed labor motivation system. It is not entirely legitimate to consider youth as the most vulnerable category of the population in the labor market. Adaptation mechanisms allow young people to adapt to the rapidly changing requirements of the modern economy much faster than the older generation. But young people, especially at the initial stage of their careers, need qualified help and support.

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Regression Procedures and Best Practice in Real Estate Valuation

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Abstract

An important problem for the mortgage is real estate valuation. A comparative approach to property valuation is the main method of property valuation because its principles are based on market behavior. It requires identification of the impact of various property features on transaction prices. Modelling of that influence is based on principles which are historically conditioned and which frequently do not take into account the contemporary data analysis research methods. Transaction prices datasets generated by broadly understood real estate market are characterized by heterogeneous dispersion and a tendency for local coincidence. This structure induces application of statistical methods based on recreating dependencies in the price set rather than assuming a parametric model ad hoc. In this work we present an assessment of the application of methods based on regression analysis as an example of a parametric method. We indicate advantages and imperfections of using these methods. Specificity of market information is presented which constitutes the basis for property valuation. We propose a canon of best practices for individual valuation and show the advantage of following the principles of best practice over the procedures followed in automatic solutions. Finally, we highlight the principle of primacy of experience and professionalism over technical solutions.

Keywords: Real Estate, Regression Analysis, Comparative Approach, Best Practice, AVM

Introduction

Property valuation is an important element of the real estate market. It usually accompanies decision making associated with investments, loans, mortgages, expropriation, planning and many more. In the global market era it is crucial that the process of property valuation, as well as the estimated value of the property be interpreted in the same way by all participants in the market. However, real estate is a type of goods characterized by high heterogeneity. There are no two identical properties, and even if they can be considered to be very similar, they are unlikely to be the subject of a transaction in the same moment. Therefore their transaction price is a product of a different time and social-economic situation. Real estate has both objective features (use, geographic location, area, floor, year of construction, number of rooms, etc.), and subjective ones (quality of the surroundings, standard, etc.), which are assessed in different ways by the buyers and sellers depending on their needs: financial standing, family situation, age, aesthetic needs, etc. Moreover, property buyers and sellers make many cognitive errors in the process of negotiating the conditions of sale, which result from their knowledge, personality traits and other factors accompanying the transaction (Majewska, 2014).

This characteristic of the real estate market requires the valuer responsible for valuation to analyse varied data and draw objective conclusions, based on limited and imperfect market data. The

transaction price specified in the notarial act is a concrete number. However, the property which is the object of the transaction has many defining characteristics which influence the investment decision of the transaction parties in different ways. International Valuation Standards define price as the amount that is expected, offered or payed for a given asset. However, they also take into consideration different preferences of transaction parties resulting from their different motivations, budgets or particular requirements of a given buyer or seller, which may result in an agreed transaction price that is different from the value attached to the given asset by other potential buyers or seller (Blackledge, 2017).

Data and Regression Methods

The object of our analysis is property valuation. We do not specify what property is analysed, but we assume that it is unambiguously stated and we have complete knowledge about it as far as its history, as well as its present state and its future are concerned. For a given property a valuation analysis is to be produced. Property valuation involves defining the nominal value of a property. Property value is the amount equal to a property's transaction price in the real estate market. At the preliminary stage the value of a property can be any amount and it is possible to model it using a theoretical mathematical object which we define as a random variable.

Therefore when we use the term 'property value' we refer to an element of a theoretical model that is a random variable. The assumption that the property value estimated by the valuer is treated as a random variable is crucial for the whole property valuation process and constitutes the foundation of the reasoning which lies at the core of property valuation. This is a standard approach in applied sciences. This approach is substantially different from the population approach, in which the result of observation is a value produced as an observation of one of the analysed objects in a group of objects called population. Population comprises property valuers and at best one can speak of randomness in choosing the person responsible for valuation, but the result of the valuation is deterministic. In statistics, these approaches are differentiated with the former referred to as descriptive statistics and the latter, based on modelling random variable distributions, as mathematical statistics.

In property valuation usually we do not have a satisfactory dataset which can be treated as a population. Therefore a normal and effective solution is an approach based on treating property value as a random variable characterized by a certain distribution. What interests us in the results of a valuation are the characteristics of that distribution. These may include the expected value (E(X)), median, quartiles, and variability scatter spread. One can proceed in the direction of parametrization procedures and attempt an estimation of the parameters of the distribution. Also allowed are methods based on non-parametric procedures or Monte Carlo simulations, but all these procedures are used based on the assumption of a model of randomness of property value (Kathmann, 1993 and Ahn at al, 2012). This preliminary stage of modelling of the property valuation process has usually met with a consensus of researchers and is not considered controversial. Modelling of property value by means of random variable implies treating transaction prices of other comparable properties as realization of random variables as well. This is a natural approach adopted today and in the past (Isakson, 1998 and Narula at al, 2012).

Differences of opinion between researchers emerge when further postulates are adopted. If the value of the property undergoing valuation is a random variable characterized by a distribution with a density f, then it is not necessarily the case that the values of other properties, taken into consideration in the estimation of the density of parameters, also have a distribution f. Usually researchers adopt this assumption, modifying the distribution parameters accordingly if needed. The approach adopted by the researchers is dictated by tradition and potential problems, solving of which goes far beyond the standard statistical methods. It is worth considering that in a traditional statistics course taught at virtually all higher education institutions around the world it is assumed that the distributions of the values of accompanying properties are identical (as far as parameters are concerned) as those of the analysed property, and what is more, the values of accompanying properties as random variables are independent. Such an assumption allows to carry out a series of statistical processes using simple random sampling. It is almost never the case that in this kind of

analysis an attempt is made to examine if the independence condition is met, which obviously does not occur, and that has far-reaching consequences distorting the model. For example, if the technical condition of a building is bad, then the prices of all the apartments in the said building drop simultaneously, and not independently from each other. If the independence postulate was to be given up, the kind of dependency would have to be determined and formally specified. In the present state of theoretical knowledge it is usually impossible to elaborate technical procedures which would allow for effective calculations in such cases. Certain procedures combining objects into groups and treating constituent results as independent results are permissible, but these are methods in which we attempt to adjust reality to fit the model, and not the other way round, which is the goal of modelling. Few researchers working on this problem notice such subtleties as independence, and attempts to get even marginally closer to modelling this problem are unheard of. Usually we assume without any scruples that property values have the same distribution as the property under valuation (as far as parameters are concerned). There is a lot of room for misunderstandings here as well. The often used attribution of the random variable to the normal distribution entails identifying certain characteristics of reality with characteristics occurring as properties of normal distribution. These properties are usually expressed in a highly complicated way and it is difficult to interpret them directly (Kagan at al, 1972). Generally, it can be said that Gaussian randomness is characterized by an enormous sum of minute influences with different directions and a self-similarity structure (stable distribution). This characteristic is completely alien to property value. It is characterized by some scattering around the mean, but the main empirical differences lie in the quality structure, and not associating randomness with self-similarity (fractality). The average researcher is not able to identify the characteristics of the random structure of the property, which would be reflected in a mathematical model such as normal distribution. Therefore assuming a Gaussian distribution is a serious misuse.

Let us consider a simplified example that will help demonstrate certain aspects of the regression approach. The object of the analysis is a dataset comprising transaction data from notarial acts of sale of residential property (apartment) situated in Żabianka district in Gdansk including 549 pieces of data. In Poland, valuers are statutorily guaranteed access to notarial acts of sale, stored, among others, in the poviat authority. In our dataset, the transaction parties were independent individuals. The properties in question had the same location in the city, in a district situated in the central area of Tricity, characterized by homogenous 1970s multi-family development. The transactions were completed between 2004-2016. It is important to note that these are all the transactions involving the same kind of property completed in the said area in that period of time. The market did not generate more comparative transaction data. Differences between properties resulted from their location in four-storey buildings without an elevator or ten-storey with an elevator; their surface area and their location on a given floor. Moreover, properties differed with regard to an unspecified characteristic of quality of standard and quality of the surroundings. For the purposes of this work, let us assume that the task of a valuer is to perform valuation of a residential property (apartment) located in the same neighbourhood, whose characteristics are specified and its current value is to be estimated.

In our model, let W_i where i =1,…,549 be the values of properties considered in the example (random variables). Empirical values (w_i, p_i) constitute empirical observations of values of comparable properties and values of their surface areas described in the example. Let us assume that the model of dependency of property value from its surface area is defined by the regression equation $W=\beta_0 +\beta_1 P+\varepsilon$, where β_0 i β_1 are the parameters of linear regression, P is the surface area (and is not a random variable), and ε is the error. Random variable ε has a normal distribution with the expected value of 0 and unknown variance σ^2. Using comparative data the model is defined by the equation $W_i= \beta_0 +\beta_1 P_i+\varepsilon_i$, i = 1,…,549, where the sequence of random variables ε_i, constitutes a sequence of independent random variables with the same normal distribution with an expected value = 0 and variance σ^2. Of course, these assumptions imply that property values are independent and have a normal distribution with the same variance and expected value constituting a linear function of surface area. By means of maximum likelihood estimation (MLE) we find the estimators of parameters β_0 i β_1, with β_0 = 5927.9 and β_1=-10.5 . It is worth noting that according to the adopted model an increase in surface area by 1 sqm implies a decrease in unit price by approx. 10 PLN. Of course, the model is far from being adequate, however, based on the data at hand we can incorporate into the model the information about the floor number, as intuitively it seems that it should have an important influence

on the value of the property in question. Having taken into account the information regarding the floor on which the comparative properties are located, a model emerges with 15 one-dimensional regression equations. Thus, the model becomes more complex, the estimators of parameters are less precise, and we will obtain results with a low diagnostic value that leave room for many different interpretations. For example, the transaction value of an apartment with the surface area of 53 sqm calculated using the model will be equal to:

Table 1: Slope coefficients and prices of 53 sqm apartments by regression model

Floor	0	1	2	3	4	5	6	7	8	9	10
β_0	-19.7	18	-14.7	-33.8	-11.4	-25.2	-16.4	-13.6	-32.7	-24.4	-28.7
Price [PLN/sqm]	5831	4715	6313	6958	5945	6576	6401	6017	7074	6484	6761

Source: Own study.

Looking at the results presented in Table 1 we can see that, when we increase the surface area by 1 sqm, the price of an apartment can increase or decrease from -33.8 PLN (4th floor) to 18 PLN (1st floor) and there is no regularity. It should not be expected that the results concerning the price of an apartment with a surface area of 53 sqm will be correlated in a sensible way with the floor on which it is located. The reason for that lies in an inadequate model and too rigorous assumptions. Two characteristics, surface area and floor number, are not enough to make estimates about property value even with a good model at hand. Dependencies shown in Figure 1 reveal the different dependencies of price from surface area on different floors.

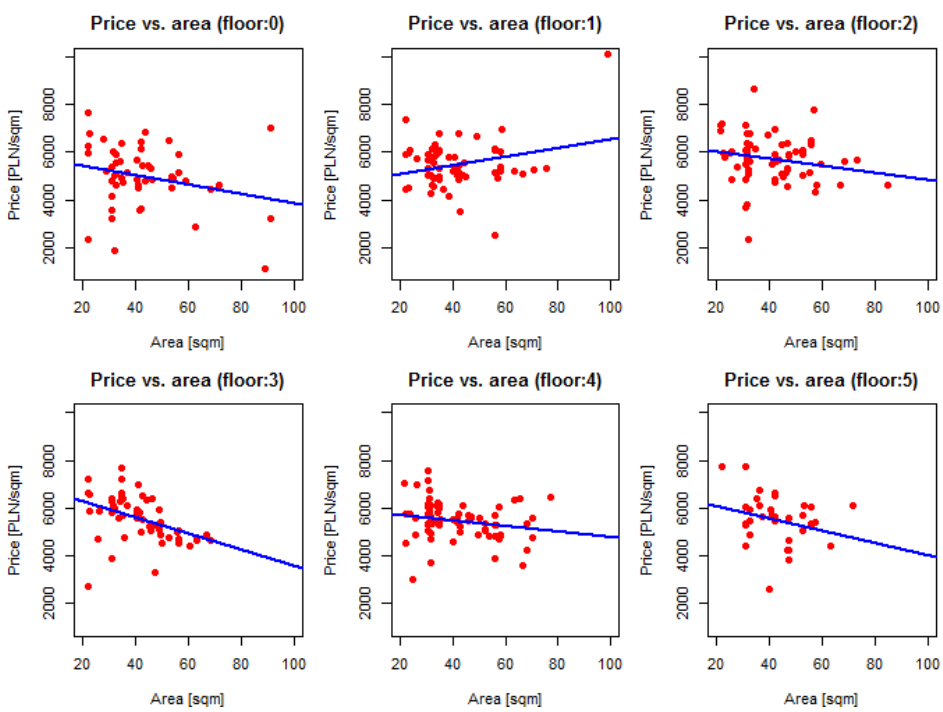

Fig. 1: Regression of price vs. surface area for floors 0 to 5th

Source: Own study

The 'floor' property is found in our data and we could extend the model to take into account this dependency. However, there is a range of other properties which diversify the price of the property in a similarly dramatic way as the 'floor' property. We do not know the extent of influence these

characteristics have and we do not know their values for the comparative properties. If we make an attempt to enrich the model with additional dependencies, eventually the model will be good enough, but it may turn out that it will be very complex, comprising many different equations. If we proceed towards increasing the number of features, we reach the point that researchers have reached in economics, where models including up to tens of thousands of equations were created. These did not produce satisfactory results and a new direction, that of analyses of stochastic equations, was adopted instead, nevertheless a group of advocates of putting together linear equations is still visible amongst researchers. If the set of comparative properties analysed is homogenous (so that they have identical distributions), transaction prices are characterized by independence and additionally, a series of congruities are observed, then the model will usually be adequate and uncontroversial. There are valuers who attempt to use regression models in valuation, however, in practice the valuation is not based on a regression model, but the regression model is meant to justify the valuer's professional intuitions.

When modelling a phenomenon using regression it is important to note one other crucial aspect of the model. In standard cases we endeavor to obtain estimators of the parameters of the value prediction model, we test the coefficients, and in the case of multidimensional regression we try to identify the significant variables of the model (submodel selection). The next stage, referred to as model diagnostics, plays an important part as well. In 1973 Francis Anscombe published an example of regression which went down in history under the name of Anscombe's quartet (Anscombe, 1973). It includes four linear regression graphs for data characterised by different structures but identical parameters.

The means, x and y values, their variances, correlation coefficient and, of course, regression graphs are almost identical for each dataset. This example shows the importance of regression model diagnostics. Stopping the analysis of regression at the calculation of coefficients can lead to serious errors and the next stage, which allows to assess if the regression model is adequate, needs to be carried out. Further details regarding this issue can be found in many traditional monographies, but it is advisable to refer to publications which require using computer programs (e.g. Biecek, 2013).

Regression as a modeling method is a basic data visualization method and should always be used as an element of data visualization in the context of a linear model, particularly when we have access to a big set of comparative data. Another aspect to be considered is the aim of the analyses. If the analyses are aimed at specifying the relationships in the context of a big homogenous dataset (for instance, in order to specify the principles of valuation for the purposes of cadastral tax), then elaborating and confirming one's intuition based on regression is by all means recommendable. However, using regression in individual appraisals is not appropriate. Methods relying on exploratory data analysis (EDA), although they do not provide a definitive answer to the valuation problem, are considerably more useful. EDA consists in discovering relationships existing in an empirical dataset without referring to the parametric form of those relationships. Normally the relationships discovered between variables are not represented in the form of a function, but rather expressed descriptively. For example, we will say that properties in a given location have quite a homogenous value (it can be assumed to be constant), and in another location the value of comparative properties is split up into several levels dependent on subgroups conditioned by additional characteristics. The answer is therefore descriptive and not functional, such as that obtained in the classic approach. Examples using these methods are described in Krzykowski and Majewska (2011).

To summarise, it should be emphasized that EDA methods provide extensive analytical material that can be used to obtain structural knowledge concerning comparative properties, as well as empirical material that can be used to determine the value of the property being analysed. Carrying out these analyses, we acquire knowledge about a given situation that perhaps is different from the one we set out to obtain at the start, but is the kind of knowledge concerning the structure of comparative properties that allows for further detailed stages of property appraisal.

Comparative Approach to Valuation

The property appraisal methods and approaches used in Poland are defined in the current regulations. The comparative approach is used to define the market value understood as „the estimated amount for which an asset or liability should exchange on the valuation date between a willing buyer and a willing seller in an arm's length transaction, after proper marketing and where the parties had each acted knowledgeably, prudently and without compulsion", in keeping with the definition as stated in Blackledge (2017). The comparative approach is one of the methods of estimating the market value of property and it based on the prices obtained for similar properties in the market. This requires the valuer to gather transaction data where the object of a transaction is a property similar to the property undergoing valuation. Next, the prices of these properties should be corrected for characteristics which distinguish them from the property in question and if it is necesarry the changes of price level in time should be taken into account as well. The crux and procedura of the comparative approach is defined in International Valuation Standards (2017) and also described in relevant literature (Millington, 2000 and Blackledge, 2017).

As mentioned earlier, property appraisal involves searching for the price for which a transaction of sale of a property with certain characteristics would take place in a given market between well-informed transaction parties that act rationally. This search is carried out based on transaction data from notarial acts of property sale contracts, which in Poland are made available to property valuers. The thus collected transaction data contain information about the parties and the object of the transaction, the transaction price and date, the kind of transaction parties (e.g. property developer, individual), and the basic characteristics of the property:
-property type (undeveloped, separate premises, built-up land)
-address, or record number in case of a plot of land
-surface area in case of plots and apartments, whereas in the case of buildings that are part of built-up properties no detailed information regarding their surface area is available

Further information regarding the property, such as its purpose in the spatial layout plan, utilities provision, or technical condition are rarely stated, and only if such is the desire of the transaction parties. The information is clearly limited, and it does not contain many important pieces of data concerning the property taken into account by buyers and sellers during the transaction negotiations. The information regarding such characteristics of the property as: quality of the neighbourhood, technical condition of buildings, standard of the apartment, shape of the plot and lay of the land in case of land property, are missing. Some of these characteristics can be identified using the resources available, such as underground infrastructure maps, spatial planning maps, or by viewing the property. However, it is not possible to determine the technical condition and standard of interior finishing works. Nonetheless, by gathering additional information and relying on expert knowledge and understanding of the real estate market in the area of their professional activity, valuers are able to identify these characteristics as well.

Best Practice

When estimating the property value, understood as a market value, a property valuer seeks to answer the following question: at what price would a potential rational buyer or seller who is well-informed with regard to the real estate market, buy or sell a given property in a given moment. We can say that the valuer looks for the transaction price that would be agreed upon as a result of negotiations between the buyer and seller. A professional valuer usually follows the procedure presented below.

4.1. Identification of the object of appraisal

The object of appraisal is a market object (Kucharska-Stasiak, 2016). First, the valuer identifies the property type, which is legally and physically defined. This means that the valuer defines the rights with respect to a given property which undergoes valuation, as well as its physical characteristics, which are important for its value in a given real estate market. In the example discussed above, the

object of appraisal is ownership of the property (apartment) (art.2.2. of the Act on Ownership of Premises 2015).

Next we define physical characteristics which influence the property value, which are unambiguously interpreted, i.e. identically by all participants of the real estate market:

1) location, which is the most important physical characteristic of a property. It is an invariant characteristic that is constant in time and space. It is understood as the property's location in a given urban or rural area, within which there is a specified economic and social situation that has an important influence on the local real estate market and that determines supply and demand in this market. Moreover, a given location determines the availability of various services and its accessibility conditioned by the infrastructure and public transport available.
2) size, which determines the potential use of the property and the size of the capital associated with its price or value in a given market. At this stage of the analysis size can be defined by the number of bedrooms.

   In the case of apartments it is also possible to unambiguously define other characteristics such as:

3) location on a given floor
4) type of the building where the apartment is located

Characteristics which are not unambiguously interpreted are:

1) quality of immediate surroundings, which includes aesthetic aspects and whether the surroundings may cause disturbance
2) technical condition and standard of finishing works. This is a characteristic which can be improved upon as a result of repair works in the apartment or building, however, these entail further expenses which the buyer will have to incur in the future and which s/he will take into consideration during transaction price negotiations, but it is difficult to define what standard s/he would find satisfactory.

It is possible to consider a more extensive range of characteristics, but such an approach is not always justified, and often it does not improve the accuracy of appraisal.

Selection of comparative transactions and their analysis

Following the identification of the object of appraisal and carrying out of the analysis of the real estate market, the valuer uses their expertise and experience to define the segment of the real estate market where the potential buyers look for properties of a given kind or potential sellers try to sell properties of a given type. It should be noted that within the real estate market we can consider many segments of the market, which result both from the characteristics of the properties of a certain kind, and from their value understood as the capital which potential buyers are willing to invest in a given market. A valuer usually focuses on a concrete segment of the market, where s/he looks for a representative dataset of comparative properties, i.e. properties which have the same characteristics as the property undergoing valuation, identified beforehand.

If the object of appraisal is a residential property of a given size situated in a given location in a multi-family building erected using given technology, then we look for transactions concerning properties that are located as close as possible to the property under valuation, sharing the same characteristics, which took place at a point in time as close as possible to the moment in which the appraisal is being carried out. In other words, we look for a dataset comprising elements (properties) with the following identical characteristics, which were the object of transactions in a given period of time, when no significant price level changes took place in the real estate market:

1) type – separate premises (apartment)
2) use – residential
3) location – Żabianka district

4) size – from 1 to 4 bedrooms
5) building age and technology – buildings erected between 1970-1980, precast building technology

The thus created dataset with comparative transactions is the object of further detailed analyses. It comprises elements which still differ significantly from one another. This dataset will allow to examine tendencies in a given market and the price structure, using statistical methods which discover dependencies within the selected comparative properties.

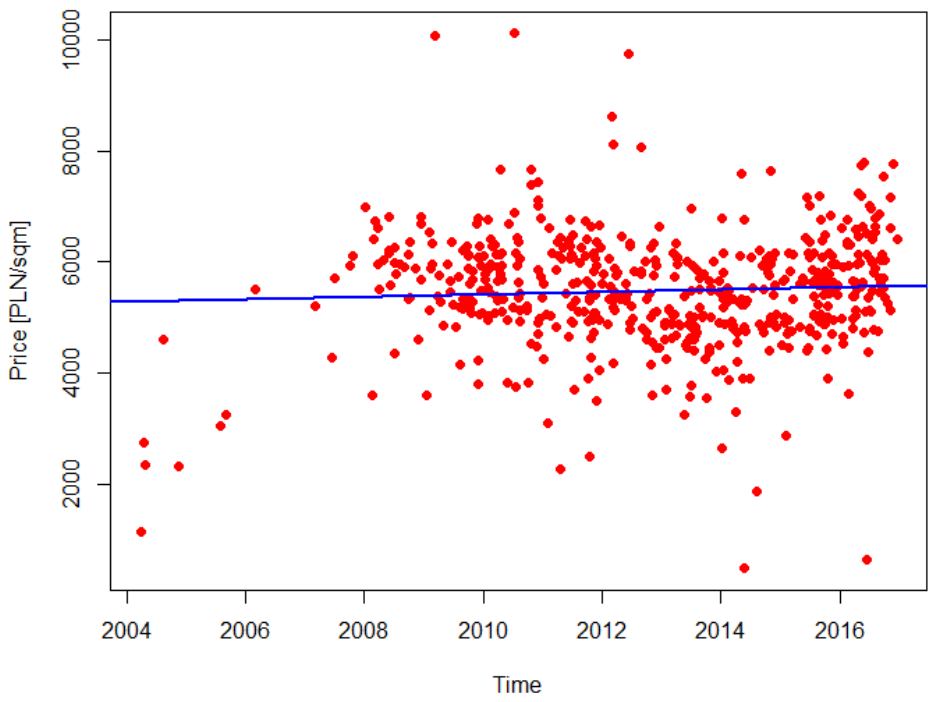

Fig. 3: **Linear regression of price vs. time**

Source: Own study.

First of all, we examine the change of price levels in time. In the example analysed, these changes are shown in Figure 3. The above graph shows a big spread of prices, and the linear regression of this dependency is expressed by the equation: Y = 0.0389 x +3836.8. A series of diagnostic parameters show that regression is not an adequate model and does not describe the relationship of price changes and time, therefore the above equation will not allow us to update the transaction prices with respect to the date of appraisal, even if the result would fall within the expectations of those monitoring the market. Such reasoning would, however, have a low statistical value. The valuer's expertise allows them to assume that in shorter periods of time prices in the real estate market remain stable. The real estate market is characterized by big inertia, therefore in a short amount of time one can ignore the change of prices in time. Exploratory data mining methods are helpful here, allowing to determine the ranges of time when there is price stability (Krzykowski and Majewska, 2011). Hence, property valuation should be carried out based on a dataset comprising transactions which took place not long before the date of the valuation itself. The big spread of prices indicates that there are additional determinants which influence buyers' decisions. The advocates of linear regression models will assume that transaction prices and the identified characteristics of the property are in a linear relationship. The multidimensional regression model, which in this approach would be expected to describe this relationship has several defects (Wyman et al, 2013), including:

-the assumption that potentially all characteristics of the property which influence the transaction prices have been defined
-the assumption that characteristics are independent
-the assumption that relationships and phenomena which occurred in the past will repeat in the future
-the „ceteris paribus" assumption, i.e. that all variables which are not analysed, in this case the characteristics of the property, are stable
-the assumption that relationships obtained based on the global dataset are applicable to the small subset of transactions constituting the direct basis for the valuation (Samuelson at al, 2012)

By adapting different regression models, using trial and error, as well as discarding some transaction data or modifying the characteristics analysed, some valuers obtain a model which will yield a pre-determined result. Such approach does not have high quality and, what is important, can be seen as a manipulation.

A professional valuer will carry out a different logical analysis based on the assumption that, given that the object of the appraisal is a property with certain definable characteristics, one needs to check what prices are reached in a given market by properties with the same characteristics as the property in question.

Let us assume that we are looking for the value of a residential property of a given size, e.g. 3 bedrooms, and located in a given housing estate. In our example, this allowed us to obtain a dataset with three comparative data pieces with the same location and size, located in buildings of the same type.

Table 2: Selected comparative transactions

Transaction Date	Street	Area [sqm]	Price [PLN/sqm]	Floor
2016-11-08	Rybacka	53	5133,08	4
2016-04-21	Szyprów	53	6463,88	0
2016-05-06	Szyprów	53	5969,58	4

Source: Own study.

The three selected properties underwent verification with regard to conformity with the complete market information collected beforehand by the valuer. Selecting a small group of properties for direct valuation requires extensive experience and familiarity with the market. This expertise is mainly obtained by means of one's own professional practice and exchange of experience through workshops and training sessions.

Estimating the value of the property

A valuer estimates the value of the property based on a meticulously selected small group of comparative properties which have been deemed to be the most similar to the property undergoing valuation. First, the valuer views the property during a site visit (which is not possible in the case of 549 transactions) and defines characteristics, which s/he did not take into consideration beforehand, i.e. quality of the surroundings, technical condition of the buildings, and, if possible, standard of the apartment. It should be noted that regression models used in property appraisal do not identify such a wide range of property characteristics. It should be further emphasized that in the case of a big number of data used in regression this is practically impossible and almost always economically unjustified. Estimating the value of the property analysed based on a small group of selected transaction data consists in comparing each of the selected comparative properties with the property undergoing valuation. We specify the differences and estimate their influence on the differences between the transaction prices of the particular comparative properties. Next, we correct the prices with respect to the property undergoing valuation. This procedure is to a large extent based on the valuer's experience and assumptions made by her/him based on their professional expertise and intuition.

It is worth noting that this procedure allows to estimate the value of a property not only in mature markets, rich in transaction data, but also in undeveloped markets, where transaction data are scarce. When the research material is limited, automatic statistical methods are useless, while a competent professional can effectively estimate the value of the property in question.

Conclusions

The presentation of methods used in property appraisal in the comparative approach presented in this work allows to draw the following conclusions:

1) The real estate market does not generate data with a homogenous random distribution that could constitute a statistically understood population. Properties differ as far as qualitative characteristics are concerned, which are assessed differently and ambiguously by the participants in the market.

2) Using rigorous parametric models (e.g. regression models) allows to observe tendencies in the market and describe the structure of property transaction prices, however, reasoning based on automatic modelling without sufficient market information can lead to erroneous conclusions.

3) Regression methods do not reflect the behaviour of the participants in the market, therefore using them for individual appraisal is inherently erroneous. This aspect of the problem is also considered in the International Valuation Standards, which recommend using methods which are employed in a given market

4) According to the authors' opinion, the specificity of the real estate market does not hold promise for effective use of machine learning methods based on neural networks for individual appraisal. The real estate market does not generate research material extensive enough for a successful learning process.

5) The presented analysis shows that the currently widely discussed Automated Valuation Models (AVMs) based on statistical models can only be useful in large-scale valuation, e.g. for the purposes of cadastral tax.

6) In the case of individual appraisals in the comparative approach the best practices followed by professional valuers most adequately reflect the behaviour of the participants in the market, at the same time allowing for successful valuation even with limited market information.

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Regional Aspects of Development of Competitive Environment[1]

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Abstract

Description of a main objective of research. In recent years, Russia has encountered a crisis. This resulted in the low economic growth and low investment activity. In such conditions, regional authorities (including the authorities of Tambov region), face the challenge of stimulating business and developing a competitive environment. All this determines the relevance of this study. *Short description of methodology.* The study was based on official Rosstat and Tambovstat statistics and the annual social and economic research "The competitive environment in the markets for goods and services in Tambov region: current conditions and prospects for development" (in 2015-2019), commissioned by Tambov Region Administration. The authors of the study analyzed the specific features of regional entrepreneurship and assessed the competitive environment and business conditions. *Compilation of the most important research results and their significance.* The study shows that the general economic situation and the crisis processes have an impact on the business community of Tambov region, and cause changes in the competitive environment. As a result, entrepreneurs confirm that they face an increased competition, and outline the problems and basic conditions for the competitive environment. The article shows that, to a large extent, the development of the competitive environment in Tambov region is restrained by systemic and general economic processes the regional authorities can hardly influence. At the same time, due to the specifics of the regional economy, a growing crisis will have a dramatic impact on the business community of Tambov region and its competitive environment.

Keywords: Competition, Competitive Environment, Level of Competition, Economic Growth.

Introduction

Recent years have become rather problematic for the Russian economy due to a noticeable economic crisis [1]. In general, this situation can be characterized as stagnation, which is even more critical at the regional level. Thus, the volume index (GDP and GRP of Tambov region) at constant prices shows that the situation in Tambov region is more challenging than in Russia as a whole (Table 1).

Table 1: volume Index (GDP and GRP of Tambov Region) at constant prices [2, 3]

Index	2012	2013	2014	2015	2016	2017	2018
Volume Index at Constant Prices (Russia)	103,7	101,8	100,7	98,0	100,3	101,8	102,5
Volume index at constant prices (Tambov Region)	108,9	109,2	105,7	103,9	95,1	101,1	no data

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Moreover, the indices of the second level make the situation even clearer. For example, the analysis of investment activity demonstrates the impact of the crisis [4]. So, the dynamics of investment in fixed assets shows the following (Table. 2).

Table 2: the dynamics of fixed capital investments in the Russian Federation and Tambov region at constant prices [5]

Index	2012	2013	2014	2015	2016	2017	2018
Growth rate of fixed investment at constant prices (Russia)	**106,8**	**100,8**	**98,5**	**89,9**	**99,8**	**104,8**	**104,3**
Growth rate of fixed investment at constant prices (Tambov region)	116,7	113,6	108,0	96,1	84,0	102,7	79,2

Ultimately, this affects, not only the economy of certain regions, but it also has an impact on the regional budget balance. This problem is quite critical, since in 2018 12 regions did not receive budgetary subsidies (Tatarstan, Leningrad region, Moscow region, Samara region, Sakhalin region, Sverdlovsk region, Tyumen region, Nenets Autonomous District, Khanty-Mansiysk autonomous district, Yamalo-Nenets Autonomous District, Moscow and St. Petersburg) [4.6].

The rest districts are subsidized to some extent. However, the level of subsidization is different. Thus, the amount of the federal subsidy offered to Kaluga region was 0.27 billion rubles, while Tambov region received 9.11 billion rubles, and the Republic of Dagestan - 59.07 billion rubles. [6].

In such a situation, the quality of regional policy should be increased since it is crucial to stimulate and support the regional economies. It is vital to develop a competitive environment in the markets for goods and services of the regions of the Russian Federation [7]. Nowadays, the government does its best to contribute to the development of competition and to provide equal conditions for commodity producers, trading enterprises and consumers in all markets for goods and services, which determines the relevance of this study.

In this regard, the main goal of the study was to analyze the competitive environment in Tambov region and the corresponding problems. Thus, in future it may help to promote the effective policy aimed at improving the regional business climate.

Methods

The study was based on the logical and dialectical methods, as well as the methods of analysis and synthesis. In addition to general scientific methods, specific methods were widely applied in the research work.

In this article the authors referred to the sociological studies of entrepreneurs and the population of Tambov region devoted to the development of a competitive environment. The results of these studies were published in the Analytical Reports “The competitive environment in the markets for goods and services of Tambov Region: current conditions and prospects for development” (2016-2020) [8-12]. In the course of these sociological studies (in 2015-2019), entrepreneurs and the population of Tambov region were surveyed. An electronic questionnaire was used as a monitoring tool, and it was put on the official website of Tambov Region Administration.

In the course of the research the authors used the statistical methods, sampling methods, a method of grouping, a trend analysis and a structural analysis.

Apart from that, the authors analyzed the data related to the period of 2015-2019. On the one hand, there were certain objective restrictions on the availability of public data, and on the other hand, it is quite normal to analyze a five-year period to identify the specific trends. In some cases, the authors analyzed a three-year period as they faced some problems when carrying out a comparative assessment.

Results

Regional entrepreneurship. The regional portrait of the entrepreneur of 2015-2019 has changed dramatically. There are significant changes in the level of education of entrepreneurs (Table 3).

Table 3: the level of education of Tambov entrepreneurs [8-12]

Response options	Percentage, %				
	2019	2018	2017	2016	2015
1. Incomplete secondary education (post-primary school, vocational school, etc.)	1	1	1	1	5
2. Secondary education (secondary school, vocational school)	3	4	5	4	9,4
3. Special secondary education (technical school, medical school, pedagogical school, musical college, etc.)	19	28	32	24	36,1
4. Post-secondary education (2 years at the university)	3	2	3	4	3,4
5. Higher education	73	65	58	65	46,1
6. Academic degree	1	0	1	2	0
Total	**100**	**100**	**100**	**100**	**100**

According to the industry analysis, there are significant changes in entrepreneurship of Tambov region (Table 4).

Table 4: the sector profiles of the enterprises of Tambov region [9-12]

The sector profile	The number of respondents. %			
	2018	2017	2016	2015
1. Agriculture	22,7	19,4	17,6	15,7
2. Forestry	2,4	1,4	2,6	0,7
3. Mining	0,3	0,3	0,5	0
4. Manufacturing	0,8	1,1	1,4	0
5. Food industry	2,8	1,8	1,6	2,2
6. Construction	2,2	3,3	3,7	3,4
7. Wholesale and retail trade	20,8	16,7	16,2	58,9
8. Vehicle maintenance	2,7	2	2,1	2,6
9. Hotels, restaurants (catering)	3,2	1,7	2	0
10. Transport	5	3,1	3,1	1,9
11. Support services for entrepreneurs, consulting, advertising, PR	0,8	0,6	0,6	0,4
12. Communications, telecommunications, information technology	0,6	0,4	0,7	0
13. Finance, credit, insurance	1,3	1,1	2	0,4
14. Energy	0,2	0,6	0,2	0
15. Culture and leisure	3	4,1	4,9	0
16. Real estate operations, rent and service provision	0,3	0,9	2	0,4
17. Education and science	9,3	12,1	19,3	0
18. Healthcare	9	10,5	8	0
19. Provision of social services	3,5	2,2	3,5	0
20. Communal service	0,9	1,5	1,6	0
21. Mass Media	0,3	0,4	0,4	0

22. Domestic services	5,2	3,4	3	11,2
23. Other	22,7	11,4	3	2,2
Total	**100**	**100**	**100**	**100**

Assessment of the competitive environment. According to the analytical reports "The competitive environment in the markets for goods and services of Tambov region: current conditions and prospects for development" (2016-2020), there are significant changes in the competitive environment of Tambov region (Tables 5-6). The results of assessment of competitive environment are presented in Table 5.

Table 5: assessment of competitive environment [8, 9]

Response options	Competitors, %					
	In the city / area			In the region		
	2019 г.	2018 г.	2017 г.	2019 г.	2018 г.	2017 г.
1. No	47,6	47,7	53,2	30	28,8	40,5
2. Yes, there are some	44	46,5	40,1	64,3	67,7	55,4
3. Yes, there is one	8,4	5,9	6,7	5,7	3,5	4,1
Total	**100**	**100**	**100**	**100**	**100**	**100**

The authors also analyzed the problems associated with the increase in competition.

Table 6: problems associated with the increase in competition [8.9]

Response options	Percentage, %		
	2019 г.	2018 г.	2017 г.
1. Import competition	19,2	16,6	15
2. Unfair price competition (dumping, etc.)	20,4	20,1	17,4
3. Unfair quality competition	21	22,4	22,3
4. Unfair advertising	10,4	10,7	14,7
5. Administrative barriers restricting competition	4,2	4,8	4,9
6. Government support for individual entrepreneurs	4	4,2	5,2
7. Association of business entities to increase market share and gain competitive advantages	4,2	3,6	3,4
8. No problem in this area	29,9	35,7	26,2

It should be noted that in 2019, the analytical report included the entrepreneurs' assessment of the measures aimed at the development of competition (Table 7).

Table 7: measures aimed at the development of competition (entrepreneurs' estimates, 2019) [8]

Measures for the development of competition	Share, %
Price control	40,1
Product Quality Assurance	32,6
Job creation	18,0
Creating conditions for more companies selling goods or services	17,6
Preventing companies from dictating their own terms in the market	17,3
Ensuring fair competition	16,7
Creating a system of informing the public about the services offered by various companies, consumer protection and the state of competition	12,7
Support for start-ups	12,3
Legal protection of entrepreneurs	8,8

Measures for the development of competition	Share, %
Attracting investors	7,2
Support for new directions in the economic development of the city and area	5,8
Monitoring the performance of natural monopolies, such as water supply, electricity and heat supply, railway and air transport	4,2
Providing everyone with business opportunities	3,2
Transparent procedures in municipal tendering and procurement	2,5
Reduction in the number of municipal enterprises providing services to the population due to the emergence of new commercial enterprises	1,6
Registration of citizens' complaints related to the problems of competition development	1,4

Business conditions. We should also analyze the way the business conditions in Tambov region were estimated. Thus, Tambov entrepreneurs outlined the following business factors (2017-2019) (Tables 8-10).

Table 8: business conditions (estimates of 2019) [8]

Response options	Very bad	Bad	Satisfactory	Good	Very good	No answer
1. The availability of information on the state of the markets for goods and services of the city / area	0,9	3,0	31,5	31,5	5,6	27,5
2. The goods and services are in demand and are bought by the customers	1,8	6,2	37,3	24,5	2,8	27,5
3. Relationship with other competing firms	1,1	3,5	33,3	28,9	3,3	29,9
4. An opportunity to receive a loan	2,1	3,9	26,2	31,7	6,3	29,8
5. Permission to start a business	1,2	2,3	27,5	34,2	4,4	30,5
6. An opportunity to rent premises	1,6	3,2	26,6	34,3	4,0	30,3
7. Interaction between business and authorities	1,2	3,9	23,2	34,3	7,4	29,9
8. A number of requirements and for tax accounts	2,8	4,9	31,0	27,5	3,5	30,3
9. Availability of state and municipal services	0,7	2,3	23,6	36,1	8,5	28,9
10. An opportunity to participate in tenders and competitions organized by local authorities	1,8	4,2	21,1	34,0	7,4	31,5
11. Lower barriers to business	1,4	4,0	26,8	28,2	6,3	33,3
12. No nepotism and clannishness in the bodies regulating the development of competition in the city / area	2,3	4,0	24,1	25,5	5,6	38,4

Table 9: business conditions (estimates of 2018) [9]

Answer options	Very bad	Bad	Satisfactory	Good	Very good	No answer
1. The availability of information on the state of the markets for goods and services of the city / area	1,7	5,3	39,8	38,1	8,1	7,0
2. The goods and services are in demand and are bought by the customers	3,0	8,6	44,5	30,6	7,0	6,2

3. Relationship with other competing firms	1,2	2,6	42,7	37,3	6,3	9,8
4. An opportunity to receive a loan	2,5	3,9	29,8	42,0	13,0	8,9
5. Permission to start a business	1,1	3,7	27,8	44,7	11,6	11,1
6. An opportunity to rent premises	1,1	3,9	30,4	43,9	9,3	11,4
7. Interaction between business and authorities	1,6	4,3	24,6	46,5	12,3	10,7
8. A number of requirements and for tax accounts	2,8	8,5	35,4	36,5	6,4	10,4
9. Availability of state and municipal services	0,5	4,1	25,4	50,0	12,1	8,0
10. An opportunity to participate in tenders and competitions organized by local authorities	1,4	4,1	25,9	40,2	10,7	17,7
11. Lower barriers to business	2,3	3,6	27,3	42,6	7,5	16,8
12. No nepotism and clannishness in the bodies regulating the development of competition in the city /area	2,8	3,5	25,9	33,7	8,0	26,1

Table 10: Business conditions (estimates of 2017) [10]

Answer options	Very bad	Bad	Satisfactory	Good	Very good	No answer
1. The availability of information on the state of the markets for goods and services of the city / district	4,2	5,8	35,1	33,4	7,9	13,7
2. The goods and services are in demand and are bought by the customers	3,9	8,1	39,0	29,7	5,7	13,6
3. Relationship with other competing firms	2,2	5,3	38,5	33,1	4,4	16,5
4. An opportunity to receive a loan	2,8	5,4	32,5	38,1	7,8	13,5
5. Permission to start a business	2,5	4,6	32,2	36,9	7,8	16,0
6. An opportunity to rent premises	2,2	4,5	33,4	37,5	8,0	14,4
7. Interaction between business and authorities	2,3	4,3	31,7	36,7	9,0	16,0
8. A number of requirements and for tax accounts	3,5	6,6	34,9	33,2	5,3	16,5
9. Availability of state and municipal services	2,3	3,5	29,4	41,2	11,2	12,3
10. An opportunity to participate in tenders and competitions organized by local authorities	2,8	5,5	29,4	36,1	9,8	16,5
11. Lower barriers to business	2,8	5,6	31,6	32,8	7,2	20,0
12. No nepotism and clannishness in the bodies regulating the development of competition in the city / area	5,0	6,7	29,6	24,2	6,9	27,6

Finally, entrepreneurs claim that the most significant factors that hinder business development and competition are (Table 11):

Table 11: hindering factors in business development (estimates of 2019) [8]

Problem	Rating,% of respondents
Lack of funds	53,2
Lack of qualified personnel	36,4
Outdated equipment	24,1
Competitor pressure	10,7

Low labor productivity	7,9
Administrative barriers	7,6
Conflicts between employees and management	2,5

Unfortunately, there are estimates received only in 2019, which makes it impossible to thoroughly analyze the changes and problems associated with business development in Tambov region.

Discussions

Regional entrepreneurship. The level of education has changed most significantly (Table 3). There are a lot of entrepreneurs who have a degree and few businessmen who have only a GCSE. There are two reasons for that. Firstly, entrepreneurs tend to get a higher education. Secondly, there are more graduates who get involved in the economic life. It should be noted that at the end of the 1990s and in the early 2000s, it became clear that it was not enough for entrepreneurs to have only a GCSE to be successful in business.

According to the industry analysis, there are noticeable changes in the regional economy (Table 4). On the one hand, there was a decrease in commerce, and on the other hand, there was a dramatic increase in such sectors as agriculture, education and science. In all other sectors, the situation is quite stable. As for the negative sides, there are not enough capital-intensive industries (such as construction, mining, manufacturing and power engineering) and high-tech industries (communications, telecommunications, and information technology). It is due to the lack of large-scale production facilities in Tambov Region; in addition, there are no breakthrough projects to boost the regional economy.

All this means that in case of aggravation of crisis in Russia or all over the world, Tambov region will encounter great difficulties, since this region, in fact, does not have its own drivers of the economic growth.

On the whole, this section of economy has a significant impact on the level of competition in the region and the development of the competitive environment.

Assessment of the competitive environment. According to the entrepreneurs' estimates, the level of competition has noticeably increased over the past three years (Table 5). Moreover, when entrepreneurs assess the situation in the region, it makes us see the whole picture.

It implies that the Russian economy is in crisis (as well as Tambov regional economy). Thus, there is no increase in the income of entrepreneurs, which leads to enhancing competition. However, due to the fact that the market is stagnant, this kind of competition cannot be considered as an absolutely positive aspect.

It should be noted that the assessment of problems associated with an increase in the intensity of competition has undergone considerable changes (Table 6).

According to the estimates, the competitive environment is significantly affected by the import competition and unfair competition. In general, the role of competition between domestic and foreign companies has increased. The most competitive companies are Chinese, Turkish, German, Israeli, Polish, Korean and Belarusian.

It should also be noted that administrative barriers and insufficient government support for entrepreneurship hardly influence the competitive environment. Thus, the development of the competitive environment mainly depends on the economic factors.

The entrepreneurs' estimates of the measures aimed at the development of the competition (Table 7) made the researchers carry out a further analysis. Thus, the most effective measures to increase the competition in Tambov regional market are the following:

– price control;

– product quality assurance.

These factors are mentioned most frequently (72.7%) [8]. Apart from that, the businessmen mention such measures as:

– creating conditions for more companies selling goods or services;

– preventing companies from dictating their own terms in the market;

– ensuring fair competition;

– creating a system of informing the public about the services offered by various companies, consumer protection and the state of competition;

– offering support for start-ups.

It should be noted that the government is responsible for implementing the first two measures; however, balanced federal and regional economic policies are required.

Business conditions. The business conditions presented in Tables 8-10 are considered to be the most significant.

The following approach was used to interpret the results. If the cell value was about 70% or more, the answer option was associated with an important business condition (green cells). If the cell value was 50-70%, the answer option was associated with a condition having a moderate impact on business (yellow cells). If the cell value was 30-50%, the answer option was associated with a condition having a weak impact on business (grey cells). If the cell value was 30% or less, the answer option was associated with an insignificant business condition (the cells in the table are not highlighted). In most cases the matrix allows to unambiguously interpret the results.

Thus, all the conditions except the last two (lower barriers to business; no nepotism and clannishness in the bodies regulating the development of competition in the city / area) are believed to have either a significant or moderate impact on business. As for the last two conditions, they are not considered as the important ones since they have a weak impact on business.

There was a fairly even split between the respondents identifying the most significant business conditions, so the results reflect only an average opinion. It should also be noted that there were quite a lot of respondents who found it difficult to answer the questions. However, in general the situation related to business conditions is stable.

According to the logic of the study, the next step was to assess the competitive offers for business representatives from the standpoint of the development of competition between key suppliers. Thus, 7.7% of entrepreneurs normally work with a single supplier, 25% deal with 2-3 key suppliers, and 67.3% cooperate with four or more suppliers. In other words, most companies prefer working with different suppliers [8].

As for the level of competition between suppliers, only 1.6% of respondents consider it not to be high enough [8]. The vast majority of entrepreneurs are satisfied with the competition between suppliers.

Finally, it is crucial to analyze the way the entrepreneurs assess the problems related to business in Tambov.

In general, the identified problems are systemic in nature. Thus, more than half of entrepreneurs “complain” about the lack of financial resources. Unfortunately, it is practically impossible to solve this problem at the regional level, since the region is subsidized. The problem itself is largely associated with the ongoing monetary policy, which determines the level of interest rates and the availability of credit [13].

The second important problem is associated with the lack of qualified personnel. It is also a systemic problem, since it depends both on the demographic situation and on the education system in the country and the region. However, we should make a reservation: Tambov region borders on rather large and economically more developed regions (Saratov region, Voronezh region, Lipetsk region) and it is not far from Moscow megalopolis. In such a situation, for quite objective reasons, there is an outflow of qualified professional personnel.

The third important problem is associated with obsolete equipment. The technological systems are quite complicated. On the one hand, modernization of technologies requires financial resources. On the other hand, there is a shortage of equipment and technology produced in Russia.

However, according to entrepreneurs' estimates, the problem associated with "administrative barriers" is insignificant. They are much more concerned about the lack of financial resources, qualified personnel and equipment.

Thanks to the low level of administrative barriers, entrepreneurs have an opportunity to start up their own business in Tambov region. Over 50% of respondents do not think that there are any administrative obstacles. Only 15.5% of respondents find it hard to start up their own business. Thus, the authors of the article concluded that modern problems associated with business development and competitive environment are systemic in nature and cannot be solved by means of tactical methods. In general, one of such methods is associated with regional economic policy which is unable to influence monetary policy, education, demography, and investments. In this regard, it is obvious that the regional authorities can hardly contribute to the development of the competitive environment.

Conflict of Interests

The authors argue that the data presented in the article do not contain a conflict of interest.

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This research was based on sociological studies published in the Analytical Reports "The competitive environment in the markets for goods and services of Tambov Region: current conditions and prospects for development" (2016-2020), as well as on official Rosstat and Tambovstat statistics. In addition, the authors referred to the results of their previous research works.

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Building A Risk-Oriented Management System in A Regional Bank

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Abstract

The article observes the basic theoretical background of forming the "banking risk-processing" concept. Authors give its definition and identify the key areas of the banking risk-processing practical application to the regional banking system. It is settled the correlation between the risk- processing and the strategic development policy of the credit organization in the face of uncertainty. In order to activate and improve the effectiveness, the risk-management algorithm is proposed. It finds out the coherent plan of measures and actions to optimize the reserve accumulation process. The plan is designed based on "from AS IS to TO BE» model as part of the implementation of the banking risk-processing in regional bank.

Keywords: Risk-Processing; Development Strategy; Uncertainty; Bank; Risk-Management; Risk Model/

Introduction

Nowadays many financial transactions are carried out in conditions of uncertainty. This causes the need to monitor unsafe events and manage the consequences of possible threats, which is based on risk-processing. The effective functioning of any financial and credit organization, including banks, depends on the quality and efficiency of information systems, technological models applied to identifying risks.

Typically, the understanding the necessity of risk processing associated with other elements range of business activity, appears only in the implementation of major general banking projects requiring comprehensive analysis of both environmental factors and internal environment. Often goal-settings of resembling projects are aimed at the diversification of services provided, or increasing internal transparency, degree of manageability and controllability of financial organization at its different levels. In this case, the risk management is not separate from the key source of the suppositional improvements and it is involved as an essential direction and strategic development policy element of the bank, the design of which includes, on the one hand, the characteristics of the organization itself, and on the other, - regional or more global progress trends.

The relevance of the study concerning various aspects of risk-processing is proved by the escalating scientific and practical interest in this area. This is reflected in the diverse publications of domestic and foreign authors. So, S.Avdoshin and E.Pesotskaya explore the problems of applying different information technologies in the banking risk management [1]. G.Avagyan and M.Saitova analyse the characteristics of regional banking cluster [2]. E.Altuhova, V.Zotov, M.Markov develop a methodical approach to risk management in the regional commercial bank [3]. S.Vayn investigates trends and resource to optimize a modern bank [4]. V.Shumilova, A.Karataev offer information model assessment

of banking risks in different industries [5]. Among foreign scientists it is worth mentioning such authors as: J. Bessis with a study of risk management in the banking sphere [6], O. Kosta, J. Hahn and S. Levi who analyse emerging markets including the financial banking sector [7], A. Meyer, J. Armstrong and M.Zelmer who overviewed the risk management tools in Canadian banks [8].

Despite widespread scientific debate on risk management in various financial institutions, it remains poorly studied the innovative direction such as banking risk processing in the regional banking system and its correlation with strategic planning at the meso- and micro- levels. So, this direction states the research keynote within the paper submitted.

Materials and Methods (Model)

The stated purpose required to solve specific problems:

– to formulate the definition of the "banking risk-processing" concept basing on identifying the theoretical and practical prerequisites for its emergence and penetration into the practice of organizations' economic activity;

– to identify the interrelation of the banking risk-processing and Bank Strategic Policy;

– to develop an algorithm and a consistent plan of measures and actions to optimize the process of reserve accumulation based on the implementing banking risk-processing into the organization's activities in order to activate and improve the effectiveness of risk management and the bank strategic policy.

The methodology for achieving the goal, solving problems and obtaining results is based on applying system analysis approaches and using the model "from AS IS to TO BE".

Results and Discussion

To investigate the specifics of the banking risk-processing in the regional banking sector application we should start with analysing the theoretical and practical background of this innovative phenomenon and term. Such examination will give the possibility to determine the terms and terminology used, which in future will enable us to select and introduce the tools and models that are adequate to our tasks.

A. Backgrounds to define the term "banking risk-processing"

Risk management is one of the key areas of management in the banking field. The main task of risk management is to provide relevant formalized information on the expecting occurrence and the consequences of risk events, to identify and select ways and means to overcome threats, to control reactions and to detect external and internal feedback. As it is known, the process of identifying hazards is also actualized by the fact that the CBR (the Bank of Russia) withdraws licenses from banks with unsatisfactory financial condition that conduct equivocal, opaque and unbalanced operations. That is, such banks include those whose activities demonstrate a variety of unmanageable or poorly managed risks, namely: liquidity and low solvency risk, legal, reputation, operational and others. At the same time, as it can be seen from the data in Table 1, banks in different Federal Districts are exposed to varying degrees of risks, which leads to a reduction in their number in the regions. The most efficient risks overcomers are the credit and financial organizations of the South and North-West, where licenses have been withdrawn in less than 12% in three years. In the 2012-2015 period, the North Caucasus Federal District demonstrated the most complicated conditions when 53.6% of banks have lost their licenses [1].

Table 1: functioning credit organizations for the federal districts of russia (2015-2019) [a]

Federal District (FD)	01.01.15	01.01.16	01.01.17	01.01.18	01.07.19
Total RF	**978**	**956**	**923**	**834**	**797**
Central FD	572	564	547	504	**479**
Including Moscow	**502**	**494**	**489**	**450**	**423**
North-Western FD	69	70	70	64	61

Southern FD	45	46	46	43	43
North-Caucasus FD	56	50	43	28	26
Volga FD	111	106	102	92	91
Ural FD	45	44	42	35	32
Siberian FD	54	53	51	44	41
Far Eastern FD	26	23	22	22	21
Crimean FD	—	—	—	2	3
Regional Banks	**476**	**462**	**434**	**384**	**374**

[a.] *Compiled by the authors basing on [1] and data http://www.cbr.ru*

The choice of risk response tools depends on the risk type: functional (internal), external and financial. According to this typology, banking risks can be classified by subspecies [9].

1. Interest rate risk is associated with losses in the value of interest-bearing portfolio when interest rates change.

2. Credit risk arises from the failure to meet loan commitments and the unsustainable provisioning process.

3. Liquidity risk appears when there is insufficient funds to repay the bank's obligations.

4. Price risk is associated with losses due to changes in quotations for portfolio instruments.

5. Currency risk may cause losses due to fluctuations in the exchange rate during sales transactions.

6. Market risk is based on opportunistic changes in financial markets.

7. Investment risk is related to the activity of the bank's capital investments.

The variety and complexity of banking risks involves the working out a wide range of tools for their identification, definition, detailing, optimizing quickness and methods of feedback. Thereafter there is a need to introduce an appropriate business process to create and form easily applicable universal methods for identifying threats and overcoming their consequences. Such a process we will call "banking risk-processing". We note that multipurpose banking risk-processing is comprehensively ensured and depends directly on the means and methods of its digitization, namely: the software and automation tools used, algorithms and forms to communicate and disseminate information both inside and outside the bank.

B. Risk-processing and bank strategic policy correlation

Forming an effective strategic policy for regional bank under uncertainty is based on the analysing and processing risks and possible threats. Based on the "Risk Management Policy of the Bank of Russia" (dated March 23, 2016) [9], we should note that the risk management is aimed at setting up the formation and implementation of measures that contribute to the more efficient organization functions under uncertainty. At the same time, the financial losses reduction may not be prior, taking into account the social significance and wide range of the bank's activities. In the case of regional banks, the financial loss risk is at the heart of strategic planning, and it is advisable to analyse possible threats and dangers using banking risk-processing based on key risk management principles:

– *responsibility and authority* implies compliance with the obligations to implement risk-processing according the competence of corresponding employees;

– *the priority of the functioning objectives and the mission* distributes the benefits between the goal and the means to achieve it, i.e. to prevent possible financial losses should not prevail over the measures resolve tasks within the mission;

– *improving activities implies* a prolonged functional efficiency increase in the organization with the introducing innovative business processes, including the risk management optimization;

– *integration into business processes* is aimed at introducing risk-processing into various types of bank economic activities in order to reduce the impact of internal and external threats;

– *awareness* means conducting a preliminary identification and analytical assessment of the possible risks associated with the implementation of planned projects and passing the research results to the staff;

– *materiality and expediency*, as a principle, are realized by deciding on the necessity and mobility of a feedback to potential threats identified in banking risk-processing, taking into account the possible costs and benefits of the implementation of response measures to hazards identified;

– *prevention, identification and conflict management of internal and external interests* implies avoiding collision of different levels interests while implementing the banking risk processing;

– *the principle to provide "three lines of protection"* developed and applied directly by the Bank of Russia [10, p.6] presupposes three-level risk-processing: at the level of risk owners; in the context of divisions that fulfil methodological, controlling and monitoring functions during risk processing; at the participants performing an independent evaluation of the risk-processing system;

– basing on the possible complete information, *a transparent uncertainty demonstration* allows to assess objectively the risk degree, taking into account the likely limitations associated with the use of the analytical data obtained in a particular situation;

– *continuity* implies permanent risk-processing with the subsequent communicating the information about possible threats to the corresponding staff;

– *training and motivation* are widely used to encourage employees to risk-processing, which enables to enhance the strategic planning efficiency and the activities of the bank as a whole.

This brief overview of the risk-processing principles clearly demonstrates its close correlation with the bank strategic planning, from which the formation and improvement of relevant policies originates. However, we note that implementing every principle is aimed at increasing the efficiency of the regional bank as a whole. Though only an integrated approach is to be applied, since the principles are written down for certain business processes and types of interests: financial-economic, client, market, employees and staff motivation and stimulation; informational and methodological. It worth integrating these directions into the banking risk-process. It will ensure its positive impact on the design and implementation of the bank strategic policy, as far as it will help to actualize and compare the danger of threats, the probable losses resulting from them and the use of feedback tools to prevent them and possible benefits from implementing the appropriate measures.

C. Working out an algorithm and a consistent plan of measures and actions to optimize the reserve accumulation process basing on the model "from AS IS to TO BE»

To implement successful strategic development, the banks should introduce banking risk-processing, which may prove to be quite profitable, as it will help to level the causes and consequences of unaccounted risks.

1. High price and extremely negative consequences of errors. The risk-processing flaws are very dangerous for any bank or credit organization, as its results can be not only a significant financial loss, but, in the most negative scenario - bankruptcy.

2. High dependence on core competent employees that are high qualified in risk-processing. Each of them has a range of unique skills and abilities gained from invaluable experience in the sphere of their competencies. The firing or withdrawing such an employee entails a significant efficiency decreasing of risk management and increasing costs to restore the knowledge base lost. Therefore, there is a need to digitalize the banking risk-processing.

Thus, to introduce banking risk-processing is objectively proved. The most adaptive model is "from AS IS to TO BE". The algorithm to introduce the risk-processing into bank management is shown in Fig. 1.

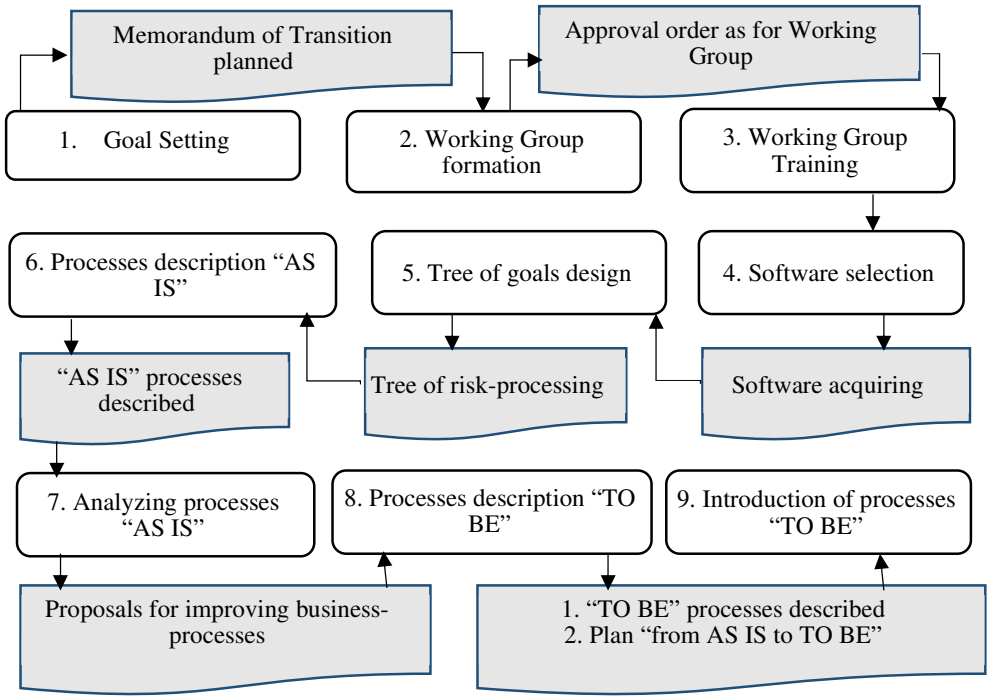

Fig. 1: Banking risk-processing algorithm based on the model "from AS IS to TO BE"

Analysing the algorithm and scheme of the ASIS process makes it possible to identify two possible areas of optimization. The first of these is due to the multiple process inputs. Each of the bank unit involved (credit department, loans subdivision, middle-office, etc.) sends an e-mail to the employee participating in the implementation of a risk processing specific stage, supervising a certain client. At the same time, if there is no employee in the workplace for a good reason (sick, vacation or business trip), one’s mail remains unsorted for a long time. Simultaneously, there is a high risk of delaying the messages and information monitoring or the loss probability when sending materials to the wrong address.

Such a way to provide materials will allow them to be automatically processed and accurately sent to the employee responsible for this stage of risk-processing or supervising this client. This will utterly speed up the workflow and it will streamline the load distribution among the risk department staff, without notifying all the units involved. Those customers, for whom the corresponding employee was not selected by mistake in the subject line of the letter, would be manually processed.

The second potentially problematic area is the process exit. In the ASIS process, a professional judgments or opinions on the client arise from the papers signed and sent to the back-office. Usually in large credit organizations, the back office is centralized and geographically distant from departments

and employees carrying out the risk-processing. It stipulates the necessary to scan the relevant conclusions and documents and send them electronically.

As a result, the risk of inferior processing the documents, and even its loss, that will lead to incorrect reflection of reserves on balance sheet accounts and sanctions introduced to the financial organization by the Central Bank of the Russian Federation.

To optimize this part of the process, it is recommended to computerize the summing up conclusions and professional judgments, by providing the existing banking information system with the preliminary input of the classification parameters to encounter borrowers and clients. This will make possible to eliminate unnecessary operations in the workflow and it will significantly reduce the risk of inaccuracies. At the same time, the following action plan can be formed to implement the transition to the TOBE process (Table II).

Nevertheless, this project can take up to several years from a credit institution or a bank. Bank24.ru has recently spent 9 months for a coherent organizational and technical work, including core processes identification and its description. However, according to the representatives of the bank's management, it took much longer to change the employee's mentality including those of strategic positions, and after three years the process was not finalized.

Table 2: sequence plan of activities and operations to optimize the stocking up the reserve[a]

N	Activity	Deadline	Executor
1. Optimizing the input to the process (based on "AS IS")			
1.1	Creating a single e-mail box for the risk department	1-5 working days	IT department
1.2	Summing up and forwarding to the IT department the client list with instructions of employees who supervise them	1-5 working days	Risk department
1.3	Forming the instruction on the standard format applying to the transferring materials	5-10 working days	Risk department
1.4	Testing the information system and software for automatic distribution and sending the materials	15 working days	IT department
1.5	Distribution (intra-bank and client) of notifications on the transfer to a new format of the materials sent	1-5 working days	Risk department
2. Optimization of the output from the process (the "TO BE" plan implementation)			
2.1	Development of a technical task for the digitization of the processing expert opinions on the risks identification	up to 2 months	Risk department
2.2	Confirmation and final testing of the bank's software and information support for risk identification, taking into account the developed terms	up to and a half months	IT department
2.3	Training the risk department personnel to work with new software	up to and a half months	Risk department, IT department
2.4	Training the back-office personnel to work with new software	up to and a half months	Back-office, IT department
2.5	The transaction order issue for a new format of risk processing	1-5 working days	Risk department

[a.] *Compiled by the authors*

It seems that the integrated employment of the developed recommendations and proposals will facilitate the banking risk processing implementation and raise the efficiency of the regional bank strategic planning as a whole.

Conclusion

Based on the results of this study, the following conclusions can be summarized.

1. A definition of banking risk-processing is given, under which it is proposed to understand a permanent and prolonged business process to create and form easily applicable common methods for identifying threats and its consequences overcoming.

2. A close correlation between banking risk-processing and forming the regional bank strategic policy has been identified. It is proved that the introduction of risk processing will help to actualize and comprehend the degree of threats, the possible losses caused by them and by the implementing feedback tools to prevent them and potential benefits in case of executing the appropriate measures.

3. The developed algorithm and a consistent plan of measures and actions to optimize the reserve accumulation process based on the model "from AS IS to TO BE" allows to actually assess the existing threats and to find effective means to react.

We emphasize that the practical employing banking risk-processing by the regional banks will significantly increase the efficiency of the strategic planning and operational results of the credit institution as a whole by reducing the costs of identifying threats and choosing the appropriate means to react. This will ultimately have a beneficial effect on the competitiveness of both individual banks and on the sustainability of the regional banking system.

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The Ussue of Assesting The Development Leve of The Regional Financial Security

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Abstract

The issue of financial security for Russia and for any other countries becomes one of the key in the context of economic globalization and formalization and also the existing restrictions in the movement of international financial flows. The existing problems of differentiation of regions, a serious imbalance in resource availability and sustainable development of territories were the one of the key problem of regional financial security and challenges facing the country. The relevance of the article is due to the fact that in Russian conditions the problem of ensuring financial security on the macro-and meso-level becomes systemic and chronic, covers strategies, political mechanisms, regions, economic entities, Finance, resources, etc. The article describes the theoretical and methodological issues of financial security of the region, analyzes the positions of various scientists on the issues under consideration, and formulates a methodological approach to assessment and management, justifies the need to modify approaches to assessing the financial security of the region.

Introduction

In the context of the impact of sanctions and the economic crisis, the most important task of the state became to ensure its economic security and financial in particular. The finance is the driver of any economic system. But their main drawback is the limited nature in solving a large number of equal strategic objectives of sustainable development. It is necessary to create a new powerful financial block of national security given the unstable nature of political and economic relations between Russia, the United States and the European Union. At the same time, public administration of financial security should not only be a "response to Western sanctions", but should be formed an effective mechanism of public financial management within the framework of national economic policy. This determines the relevance of the chosen research direction of financial security as the basis of national economic security.

The financial security of the state is undoubtedly linked to the sustainable economic development of all regions. Each region must adapt to new conditions and the unstable economic situation, the impact of crisis processes and to determine the vector of its development. Therefore, talking about regional financial security, it is necessary to point about the stable functioning of all elements of the territorial financial system, as well as to take into account the differentiation in the development of the regions of Russia, the unevenness of all types of resource availability and multidirectional threats to the territorial economy development.

The problem of financial security is now being discussed by regional scientists is particularly acute, but despite the large number of publications, there is no single approach to the interpretation of the essence, methodology of assessment and tools for providing both macro and meso-level. And it should also be noted that today, there is no legally fixed unified system of indicators for assessing financial security both at the Federal and at the regional level.

At the federal level, financial security is traditionally defined as the most important element of the state's economic security (V. Burtsev) [1]. At the same time, E. Rohatenyuk notes that financial security, unlike national (the protection of priority national interests) or economic (the protecting economic interests), determines the adequacy of financial resources to ensure the "normal" functioning and development of the economy in conditions of uncertainty and increased instability of the external environment. S. Klimchuk [5] draws the attention to the fact that "the goal of national financial security is the solving the problem of stable, sustainable, dynamic behavior of the economic system, which in turn will avoid imbalances in the development and functioning of the economy, taking into account the limit of available financial resources.

It should be noted that the considering this definition at the regional level, researchers are even more divided about its content. A critical analysis of the Russian scientists positions in the interpretation of the term "regional financial security" let us to reveal several basic approaches in determining its content.

Thus O. Zhalsapova, A. Korableva [4] consider the regional financial security in statics (at a certain point in time) and believe that this is substance of the economy which provides stability and sustainability of the regional economic development in the conditions of limited resources (economic, labor, social, organizational, etc.), the required standard of living, full employment etc., which compensate for the negative impact on the regional economy of the external environment. A similar approach is followed by Yu. Vorobyov, D. Poritsky [2], who consider that the financial security of the territory is a set of conditions to ensure the stability and the regional development. In contrast to them, Sh. Magomedov, L. Ivanitskaya, M. Karataev, M. Chistyakov [2,3,7] believe that the national financial security takes place if the region is able to resist destabilizing factors and improve the quality of life of the population, ensuring sustainable economic growth in the long term and saving all types of resources. P. Danilov, A. Nazarov, E. Mitrofanov [6] claim that in case of achievement of the regional financial security has an opportunity to improve the social and economic indicators that allow, in turn, to resist threats, etc. Also the regional financial security can be interpreted from organizational or administrative positions. In particular E. Kormilkin, O. Causewa, O. Fedonin [3] suggest the complex of measures which aimed at the sustainable development and the protection from internal and external stimuli.

The study of approaches and interpretations to the content of the definition "the regional financial security" allows us to formulate its content as a resource base of the regional economy, which provides stable and dynamic development of territory through the effective use of its own capacity, the neutralization of external and internal threats, as well as an integration into a global economic space.

The key objectives of regional financial security are twofold: on the one hand, ensuring sustainable economic regional growth while reducing the level of differentiation (strategic level of regional management); on the other hand as part of the national security of the Russian Federation is aimed at achieving its main priorities in the field of national defense, a quality and a standard of living, a development of science, education and health, solving environmental problems and environmental management.

Materials and Methods (Model)

The methodology of the regional financial security assessing is one of the most important tools to substantiate the directions and rates of socio-economic development of the region, as it is based on forecasting methods, identifying the correlation between the evaluation indicators, modeling of individual areas of regional development. From the point of view of the content, it allows to determine both the position of the regional economy, its potential and real financial resource availability, stability and the degree of dependence on the impact of threats and the effectiveness of

the regional authorities activities. It focuses on the refinement of the methodology for the regional financial security assessing, based on economic and mathematical methods of integrated assessment.

An integral indicator was developed to assess the level of the regional financial security. The method of its calculation is based on determining the level of impact of positive and negative factors on the resulting indicator – the regional gross product. There were 56 estimated indicators in the calculation, reflecting 5 types of regional financial security: budget, investment, banking, foreign economic, financial market. As a result, after normalization of the incoming indicators, the integral indicator was calculated based on the calculation of the average value of the assessing parameters. Calculations (on the example of the regions of the North Caucasus and Southern Federal districts) distinguish regions in which the value of the integral index tends to 1, have a higher level of financial security, and the regions with the value of the indicator close to zero – full dependence and the instability of the economy. Using of cluster analysis tools allow to distribute regions according to the level of financial security (FSA) into 4 groups: with a high level of security $0.7 \leq FSA \leq 1.0$; with an average level at $0.5 \leq FSA \leq 0.7$; with a low level $0.3 \leq FSA \leq 0.5$; with a critical level (fully dependent regions) $FSA \leq 0.3$.

Results and Discussion

The financial security of any state is determined, first of all, by its financial independence, which cannot be achieved in a simple declarative manner. It can be obtained only by a set of targeted actions to create conditions for the inflow of financial resources that ensure economic growth and a long-term supply of financial strength. At the same time, external financial sources are important, first of all, international financial organizations, transnational corporations, private foreign investments, etc. In many ways, national financial security is determined by the specifics and nature of the financial policy pursued, both within the state and beyond. And also, of course, the political situation in the country (its stability and sustainability), the organization of normal financial flows between countries, regions, industries, the expectations of the population and their well-being, the degree of development and riskiness of financial markets and the instruments used on them, etc.

Therefore, in the financial security system, it is advisable to distinguish such elements as budget, investment, monetary, stock, and foreign economic. The financial security of households can also be considered.

The specifics of any system is formed by a set of mandatory principles, the observance of which determines the effectiveness of its existence. The system of national financial security is no exception and its capabilities depend on the principles of its construction, the consistency of the elements, and the tools used.

In our opinion, the system of principles of financial security should include the following:

– legality, i.e. the activities of all economic entities should be carried out in accordance with legal standards, within their competence, and not contribute to the emergence of threats to the loss of financial independence;

– priority tasks to ensure financial security over the adoption of any managerial decisions in the socio-economic sphere;

– validity – all components of the system should be based on a clear theoretical and methodological basis);

– manageability – each element, in spite of its independence, must correspond to a certain hierarchy level, which in its entirety solves the tasks of ensuring financial security, the fulfillment of which is subject to unconditional and continuous control;

– punishability, i.e. any intentional violations leading to the threat of safe and sustainable development do not go unpunished;

– the presence of an effective and efficient law enforcement apparatus for resolving legal disputes and conflicts in the field of financial security;

– complexity and indivisibility, since no element of financial security can be compensated by another;

– balance, i.e. maintaining a balance of financial interests at the macro and micro levels;

– the mutual responsibility of all subjects of financial security at all its levels;

– closed, provides closed and limited distribution of information, taking into account the requirements of state secrets in the field of financial security;

– continuity and consistency – the formation of the system is carried out sequentially taking into account the priority of tasks, as well as existing potential and real threats;

– dynamism, i.e. take into account the constant changes in qualitative and quantitative characteristics, especially integration processes and globalization;

– alternatives in making managerial decisions aimed at achieving the desired result indicator.

The regional financial security includes the following structural elements:

1) Budget financial security. It reflects the position of the regional economy in which the region has enough of own financial resource for covering of the necessary expenses (balance of income and expenses) and ensure the socio-economic development of the territory through the effective using of financial capacity. Also budget security includes debt security which manifested in the stability of the financial system and a protect from the threats of external and internal debt, including the cost of maintenance and efficiency of using. Thus budget security characterizes the stability of the regional financial system to the impact of various financial risks, the necessary level of solvency and enough credits rating of the regional economy.

2) Investment financial security characterizes the state of the regional economy, ensuring the attraction, effective distribution and redistribution of domestic and foreign investment resources, resistance to "panic attacks" of investors, the impact of investment risks and an attractive investment climate.

3) Security of the credit and financial sector characterases the state of the regional credit system, ensuring the stability of the banking and non-banking financial institutions, the availability of credit resources for all participants, sufficient liquidity for the regional economic growth, increasing real incomes, resistance to the impact of real and potential threats.

4) Foreign economic security reflects the state of the regional economy which provides a balance in export-import operations, resistance to exposure of external risks and global "financial infections».

5) Security of the stock market characterases the optimal amount of the regional financial market capitalization (in terms of structure and level of liquidity), providing a stable financial condition of all participants and the protection from excessive volatility and “inflating stock bubbles”.

The analysis of approaches to the assessment of regional financial security presented in the researches of scientists (Sh. Magomedov, L. Ivanitskaya, M. Karataev, M. Chistyakova, I. Dolzhikova, T. Feofilova, T. Lomachenko, etc.) allowed us to form the author's system of indicators that assess comprehensively the regional financial security [4,5,7].

System of indicators for assessing regional financial security

1. Indicators of fiscal security

1.1 Revenue budget to GRP, %;

1.2 Ratio of income and expenditure of the regional budget, % (total coverage ratio);

1.3 Per capita Income to the subsistence minimum, %;

1.4 Ratio of uniformity of budgetary funds expenditure during the year;

1.5 Coverage Ratio of regional budget deficit;

1.6 Share of programme expenditures in total budget expenditures, %;

1.7 Ratio of autonomy (concentration of own funds) budget;

1.8 Ratio of the tax regional budget independence;

1.9 Share of non-tax revenues in total budget revenues, %;

1.10 Ratio of solvency of the regional budget (absolute liquidity);

1.11 Ratio of financial dependence of local budgets;

1.12 Ratio generating own revenue by region;

1.13 Ratio of tax revenues to total tax payments;

1.14 Ratio of the controllability of the budget;

1.15 Level of accounts payable of the regional budget;

1.16 Ratio of the reginal tax payments to the Federal budget to the amount of got federal transfers to the regional consolidated budget;

1.17 Level of budget risk of the territory.

2. Indicators of investment security

2.1 Index of industrial production;

2.2 Index of agricultural production;

2.3 Dimension of products produced by small enterprises to GRP, %;

2.4 Ratio of accounts payable of 2.Indicators of investment security

2.1 Index of industrial production;

2.2 the Index of agricultural production;

2.3 the Volume of products produced by small enterprises to GRP, %;

2.4 Ratio of accounts payable of enterprises to GRP, %;

2.5 Ratio of net income of enterprises to GRP;

2.6 Consumer price Index;

2.7 Ratio of economic efficiency of regional investments;

2.8 Ratio of the regional investment activity;

2.9 Investment in fixed capital per capita;

2.10 Investments in fixed assets to the value of fixed assets, %;

2.11 Dimension of investment in fixed assets to GRP, %;

2.12 Level of fixed assets depreciation, %;

2.13 Level of the regional inversion risk.

3. The security of the financial sector

3.1 Number of credit institutions in the region, units;

3.2 Ratio of funds raised by banks to GRP, %;

3.3 Ratio of invested assets to GRP, %;

3.4 Ratio of the funds attracted, %;

3.5 Level of credit risk, %;

3.6 Share of regional banks in the total number of credit institutions in the region, %;

3.7 Level of savings quota, %;

3.8 Ratio of loan debt to the economic sector to GRP, %;

3.9 Number of microfinance institutions in the region, units.

4. Indicators of foreign economic security

4.1 Growth Rate of foreign trade turnover, %;

4.2 Dimension of foreign trade turnover per capita, RUB/ person;

4.3 Share of exports per capita, RUB / person;

4.4 Share of imports per capita, RUB / person;

4.5 Ratio of the volume of regional foreign trade turnover to GRP, %;

4.6 Share of import to GDP (import quota, %);

4.7 Share of export to GDP (export quota, %);

4.9 Foreign Trade quota (%);

4.10 Share of FEC exports in total exports %);

4.11 Share of machinery exports in total exports, %;

4.12 Coverage Ratio of imports by exports;

4.13 Trade deficit to GRP, %;

4.14 International Competitiveness Index.

5. The safety performance of the stock market

5.1 Number of issuers of the region in the rating of the largest companies in Russia in terms of sales and market capitalization;

5.2 Level of capitalization of the regional stock market;

5.3 Ratio of efficiency of the regional stock market integration into the national market;

5.4 Ratio of efficiency of institutional investors ' investments;

5.5 Dimension of resources attracted to the GRP on the regional stock market.

The integral indicator reflecting the level of the financial security is calculated as the geometric mean of the 5 represented structural elements. At the same time within each group after the normalization of indicators, the group indicator is determined by a simple summation of the incoming normalized indicators.

This research allowed us to conclude from 30 to 80 % the level of the regional financial security is determined by the indicators of budgetary and investment stability, that tell about their decisive influence on the regional financial security and sustainable development of territory.

Conclusion

Thus, it is necessary to implement the following measures for determination the level of the regional financial security, its position on a country-wide scale, identification strengths and weaknesses in the stability of the territorial financial system and ensuring the capacity of the regional socio-economic development and improvement the level of competitiveness and "controllability" of regional processes:

1. To approve the methodology and to fix the list of indicators determining the level of financial security of the region. Assessment of financial security is advisable to use in the development of programs and strategies of socio-economic development of regions as an analytical block.

2. Regular monitoring of socio-economic development using the proposed indicator of the level of regional financial security allows to timely identify "failures" and "UPS" in the structure of resource availability of the territory and possible structural changes. The applied indicators of regional

financial security assessment can be modified and improved taking into account the specifics of the development of a particular region.

3. It is necessary to modify the system of assessing the effectiveness of public authorities, taking into account the identified aspects of regional financial security, and the effectiveness of their activities in solving the problems of territorial imbalances, the proportionality between the structural elements and further overcoming this imbalance.

The presented results are ambiguous, as it is necessary to continue an in-depth research of the relationship of the structural elements of the regional financial security by subjects, terms, level of imbalance, etc. However, submitted qualitative assessments allow to define the objectivity of the links and to identify the most significant features. In this case the presented approach determines the need for an integrated access to identifying the depend structure of the GRP on the regional financial system parameters in order to identify its impact to the regional financial security and national security in general.

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Sustainable Quality Culture in Higher Education Institutions in Poland

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Abstract

Both in practice and in the literature on the subject, significant trends can be observed in the change of widely understood management in the higher education sector. New trends are caused, among others, by economic, social or political changes. Currently, the higher education sector in Poland is a perfect example of that. New legal regulations impose a bigger responsibility on universities for their actions. The aim of the article is to indicate examples showing the process of creating a diversified types quality cultures at Polish universities. The methodology of research is qualitative whereas the research method is based on a case study comparative analysis of the data gained from interviews, observations and documentation. The sample is non-random and heterogenic to find examples showing the process of creating a diverse quality culture at universities in Poland. There are cases of quality culture of universities. The contribution of the article to the issue of sustainable higher education is the characteristics of the three fields of sustainable university culture development. There is a clear differentiation between public and non-public universities which introduce sustainable quality culture to their own academic culture, shaped over the years. Universities strive to create a sustainable quality culture which is possible to achieve by building it over a long period of time, taking into account quality assurance processes, academic ethos and mutual trust of stakeholders engaged in the process.

Keywords: quality culture, sustainability, sustainable quality culture, higher education sector, higher education in Poland, sustainability in education

Introduction

Both in practice and in the literature on the subject, some trends can be observed when it comes to the change of widely understood management in the higher education sector. New trends are dictated by economic, social or political changes. At present, the Polish higher education sector is a perfect example of that. The authorities superintendent over universities have introduced regulations entitled "Act 2.0", which has resulted in a number of changes in higher education. To a large extent, the new regulations have led to a transformation in the academic order. In Poland, one can observe massification of higher education, increased competition or partial commercialization of the sector. New legal regulations impose even greater responsibility on universities to take action. Universities ought to act in a transparent manner. This policy is consistent with global trends, assuming the autonomy of universities in the ways of managing their assets and in creating study programmes in which universities are required to take responsibility for the quality of the provided services (Costes et al. 2010). In the Polish system of higher education, mechanisms aimed at controlling the quality of education have been strengthened through the evaluation of educational programmes, research on the scientific development of scientific and teaching staff, evaluation of conducted classes or examination of the fate of graduates.

An important point of the changes in the Polish higher education system is the promotion of the idea of education quality assessment by external institutions among universities. In this way, Polish higher education institutions (HEIs) have a chance to create curricula consistent with international trends and based on common criteria. According to Normand, international institutions, assessing the quality of education at universities, are increasingly becoming regulators. At the same time, they create a coherent quality assessment for all universities, thus ensuring their transparency (Normand 2016). The literature on the subject devotes significant attention to the issues of methodology of university quality assessment (Banta, Palomba 2015; Harvey, Newton 2007; Martensson, Roxa, Olsson 2011) which largely depends on the region in which a given university is assessed. On the other hand, a certain universality of educational quality assessment programmes is emphasized, which makes it possible to evaluate universities according to transparent rules and criteria (Smidt 2015; EUA 2005; Yu, Mai, Tsai, Dai 2018).

Along with the growing awareness of quality assessment at universities, the number of internal units at universities, whose aim is to control and ensure proper quality of education, has also increased. These units are, in a way, a binder connecting universities with external accreditation bodies. There has been a change in the course of academic culture at universities towards internal control (Kottmann et al. 2016). Such a situation has also been observed over the last decade in Polish HEIs. In the literature on the subject there are many views on internal quality control at universities (Craft 2018; Seyfried, Ansmann 2018; Costes et al. 2010; Geven, Maricut 2015; Sułkowski, Seliga, Woźniak 2016a; Sułkowski, Seliga, Woźniak 2016b; Sułkowski, Seliga, Woźniak 2017). A common feature of all contemporary views on the issue of internal quality control in HEIs should be its specific responsibility towards the HEI stakeholders and the society itself in international and not only local terms. Such an approach is supported by the fact that universities participating in the processes of international evaluation of education become the guarantor of the quality of their diplomas which can be used all over the world. It is also important to adjust internal units and procedures of quality control at universities to international standards and requirements (Vlăsceanu, Grünberg, Pârlea 2007).

Research Aim and Questions

The issue of sustainable quality culture in the Polish higher education system is very little explored. In the Polish literature on the subject, there are no previous studies discussing and describing the issues of sustainable quality culture in the Polish higher education system. Therefore, the purpose of this study is primarily an attempt to identify and describe the activities undertaken in the Polish higher education system regarding a sustainable quality culture.

The study has been guided by the following research questions:

1. To what extent do Polish universities implement the concepts of sustainable quality culture?
   In order to obtain the answer to this question, we analyzed the internal documentation of Polish universities (strategies, administrative documentation, websites).
2. How do Polish universities implement the concepts of sustainable quality culture?

The aim of the study is to analyze sustainable quality culture at Polish universities.

Materials and Methods

The methodology of research is qualitative. The unstructured nature of the problem needs a deeper analysis, possibly with qualitative methodology. The method of the research is qualitative case study comparative analysis based on data from: interviews, observations and documentation analysis.

The comparative analysis of case studies method was used in the research process. The study was based on a targeted, heterogeneous sample of 3 case studies of Polish universities. Three Polish universities, operating in different regions of the country with different university traditions, were selected for the study. The course of the study included a number of techniques from the analysis of

internal university documentation, websites, free interviews with university employees (2 interviews at each university) as well as participant and non-participant observation. The research in the form of an interview was divided into two categories: the first - individualizing the problem of sustainable quality culture in the Polish higher education system and the second - identifying good practices in the implementation of sustainable quality culture in the Polish higher education system. The findings of this study have been critically assessed.

Sustainable Culture

The notions of "sustainability" and "sustainable development" are increasingly emerging in the science and practice of management in contemporary society, starting with business, through international development and ending up with education and politics (Huge, Waas 2013; Waas et al. 2011). Both terms are complex in nature, but "sustainable development" can be characterized as a response to the awareness of dynamic economic growth and industrialization which contribute to the degradation of the environment and, consequently, to the dramatic consequences of ecological and social changes. The literature on the subject shows a great diversity regarding the conceptualization and implementation of sustainable development in various academic disciplines (Nielsen et al.; Rametsteiner et al. 2011; Brehmer, Podoynitsyna, Langerak 2018; Geissdoerfer, Vladimirova, Evans 2018).

The first attempt to define the role of education in contributing to a more sustainable society at the global level was made in the Stockholm Declaration of 1972. In 1990, the first declaration (the Talloires Declaration) was created on the role of higher education in response to the ever-growing global environmental problems. Since then, work on sustainable development in HEIs has continued, both as a mission of universities in shaping society and as a response to the growing importance of sustainable development (Hoover, Harder 2014; Lozano et al. 2013; Wals 2014).

E. Hoover and M. Harder believe that the role of universities in shaping future members of society and potential leaders is significant. HEIs carry out these tasks by introducing innovations, conducting scientific research and shaping knowledge that contributes to the perception of a world where there can be no lack of sustainable development. It should be stated that not only activities undertaken by universities are crucial, but also the way they are conducted is important (Moore 2005; Harvey, Stensaker 2008). Changes in the educational quality processes, decision-making and organizational structure are possible to be carried out only when accompanied by a simultaneous creation of a sustainable quality culture. This is a huge challenge for the higher education sector on a global scale, requiring overcoming internal resistance on the part of academic teachers, legal and organizational barriers, as well as the interests of numerous stakeholders who often have diversified views on the possibility of making changes in the traditional academic order shaped over the years.

A quality culture can be defined in different ways. There is no single definition that clearly characterizes it. J.A. Woods defines a quality culture by combining it with a systemic approach, characterizing six fundamental values that constitute a pro-effective quality culture: 1) focus on processes, 2) learning is crucial, 3) all stakeholders work together towards the same goal, 4) there is open access to all information regarding intra-organizational processes, 5) there is open and transparent communication, 6) there are partner relationships within the organizational structure. Some definitions refer to quality management, while others define it in relation to the activity. In this approach, a quality culture of HEIs is a derivative of academic culture. Over twenty years of experience in managing institutions of the higher education sector in Poland prove that the implementation of a formalized education quality control system does not directly affect the provision of high-quality education. Therefore, the key issue seems to be the engagement of stakeholders in the process of improving quality culture in the higher education sector. Through the increasing participation of internal and external stakeholders its development is very important and brings results. Therefore, the quality culture in HEIs can be a kind of synthesis of academic culture and business methods of quality management (Sułkowski, Seliga, Wozniak 2017).

According to the definition of the European University Association, a quality culture is an organizational culture whose main objective is to continuously improve quality. It distinguishes two essential elements of quality culture: the first one has a structural and managerial nature, related to the quality improvement process whereas the second one concerns cultural and psychological aspects referring to common expectations, beliefs and values in the area of quality improvement. HEIs should manage in such a way that both of these elements support the others in synergy, thus contributing to the systematic development of the higher education sector (Bendermacher et al. 2017). The concepts of quality management and quality assurance had emerged earlier than the concept of quality culture. The latter responds to the emerging concerns of the academic community who are skeptical about the introduction of changes to the existing procedures and tools typical for quality management which do not necessarily have a positive impact on the management process of HEIs (Dzimińska, Fijalkowska, Sulkowski 2018).

HEIs should strive to create a sustainable quality culture that is achievable through a long-term development that takes into account quality assurance processes, academic ethos and mutual trust of all stakeholders engaged in this process. A sustainable quality culture can be achieved through regular evaluation and control, while balancing excessive bureaucracy. One of the barriers may be fixed financial expenditure and investment in human resources, which constitutes significant costs for universities. On the other hand, the benefits of this should be treated as a long-term investment resulting in increasing a competitive position in relation to other universities and ensuring a high quality of educational offer. The key mechanisms considered to be strategic in the context of creating a quality culture include widespread knowledge sharing, promotion of processes that foster ownership distribution and sharing. Additionally, it is necessary to involve all employees of the university, reduce barriers of change and introduce appropriate supporting mechanisms – all these elements together should contribute to the development of a quality culture of higher education (Dzimińska, Fijalkowska, Sulkowski 2018; (Harvey, Stensaker 2008).

The literature review shows that the features indicating a university with integrated sustainable development include, among others (Tilbury et al. 2005; Pinto 2017; Ferrer-Balas et al. 2008; Nidumolu, Prahalad, Rangaswami, 2009; Schaltegger, Freund, Hansen 2012):

1. integrating the concept of sustainable development into teaching and research.
2. promotional actions regarding the concept of sustainable development.
3. leadership and vision, with an emphasis on sustainable development.
4. engagement in social activities that contribute to environmental sustainability.

Universities have a high environmental impact through energy consumption and waste generation. An increasing number of universities are joining the group that has improved environmental management through their activities. Unfortunately, a full integration of sustainable development into the creation of a quality culture is progressing much slower than the “greening” of campuses along with the emergence of a “third wave of sustainability” in the learning-focused higher education sector (Wals, Blewitt, 2010).The number of universities reporting on sustainability as well as the level of sustainability reports is still far less advanced than that of corporations (Lozano, 2011; Lozano, Lozano, Mulder, Huisingh, Waas, 2013).

Case studies - three types of sustainable quality culture in the Polish higher education system

Type 1. Educational

Implementing sustainable development policy in their missions, Polish universities base themselves on social responsibility for the quality of education of future work force. Universities try to meet the expectations of stakeholders and meet the needs of business practice by adapting education programs to the needs of the labor market, taking into account environmental needs.

University of Warsaw (UW)

The university was founded in 1816 under the name of the Royal University of Warsaw. This is the largest, best and one of the oldest universities in Poland. Currently, 42,500 students are studying at the University of Warsaw. The University of Warsaw is a member of the 4EU + alliance, since 2016, the University of Warsaw has the right to use the "HR Excellence in Research" distinction, took 3rd place in Southern and Eastern Europe and 96th in the world in the ranking of rising science stars Nature Index 2016 Rising Stars.

The University of Warsaw implements the concept of sustainable development in educational programs. The University authorities have recognized the necessity of cooperation of various science disciplines for environmental protection. Therefore, the University of Warsaw established the University Center for Research on the Environment and Sustainable Development, whose mission is to provide access to knowledge about the natural environment and its role and importance for human functioning, allowing to understand the mechanisms of emerging consumer, economic and production pressure on the environment and to provide skills in solving related problems (http://test.msos.uw.edu.pl/pl/msos/jakosc-ksztalenia-2/misja-i-strategia, accessed on 5.12.2019). This center has become a place where projects combining such fields of knowledge as chemistry, physics, biology, geology and geography as well as law, philosophy, sociology, history and economics were implemented. As part of the center's activities, lectures on ecological education and support for this type of teaching are conducted in schools and regional education centers. Educational programs are organized in cooperation with significant international institutions, including the London Environment Center, European Commission for Environmental Education IUCN or Baltic University. The University Center for Research on the Environment and Sustainable Development has participated, among others in the organization of the Polish-Danish and Danish-Polish School of Environmental Protection. These activities enabled Polish and Danish students to learn about basic ecological problems in both countries.

Inter-Faculty Studies in Environmental Protection (MSOŚ) were also created at the University of Warsaw. In 2018, the University Center for Environmental Research and Sustainable Development (UCBS) and the Interfaculty Studies in Environmental Protection (MSOŚ) merged. In this way, an inter-faculty organizational unit was created: University Center for Environmental Research and Sustainable Development. It took over all tasks and rights of existing MSOŚ and UCBS sections.

The University Center for Research on the Environment and Sustainable Development (UCBS) operates at the University of Warsaw as an organizational unit with faculty rights. This unit has been operating in the structures of the University since 1989. The establishment of the center was determined by the conviction of the University of Warsaw scientific staff that environmental science is not only related to purely natural issues, but also to economic, social, legal and ethical ones. Currently, the Center for Research on the Environment and Sustainable Development brings together nine faculties: Biology, Chemistry, Geology, Geography and Regional Studies, Physics, Economic Sciences, Law and Administration, Biology, Management. As part of UCBS there are also studies in the fields of: Inter-Faculty Studies in Environmental Protection (MSOŚ), undergraduate and graduate level and Sustainable Development, in English, graduate level. In addition to educational activities, UCBS employees are also involved in scientific research and dissemination. The University Center for Research on the Environment and Sustainable Development (UCBS) implements graduate studies in the field of geoinformation in modeling and management under the Erasmus Mundus program. In addition to the University of Warsaw, four European universities cooperate as part of these studies: University of Southampton, University of Twente, Lund University and University of Iceland.

The University of Warsaw also developed the Social Responsibility Strategy, which by its assumptions is part of a cycle of changes consistent with the direction of sustainable quality culture. From 2019, the University of Warsaw has been operating the "University of Warsaw for Climate" Team, whose task is to:

- conduct and coordinate activities, including educational and practical activities, dedicated to counteracting the climate-ecological crisis and related issues related to the social responsibility of the University of Warsaw in the face of these crises;
- diagnose the needs and develop good practices related to reducing the negative impact of UW on the natural environment;
- cooperate with the scientific community, the academic community, non-governmental organizations, business and government representatives to exchange experiences, promote activities and develop joint solutions for environmental protection;
- prepare positions and recommendations for organizational units of the University of Warsaw.

Type 2. Pro-ecological orientation

Polish universities are increasingly taking part in environmental programs. Sustainable culture of the university is based primarily on the rational use of current resources, which is in accordance with respect for the natural environment. It should be noted that Polish universities are currently undergoing a phase of modernizing their campuses. These modernizations are carried out in compliance with pro-ecological principles. Old devices are replaced with new, more efficient and economical ones. The buildings of Polish universities are being modernized by replacing heat installations with ecological ones.

University of Economics in Katowice

An example of pro-ecological activities at a Polish university is the University of Economics in Katowice (https://www.ue.katowice.pl/projekty/uniademicet-spolyszne-odpowiedzialny/ekologia.html, accessed on 5.12.2019). The University of Economics in Katowice is one of the oldest universities in southern Poland, it was established in December 1936. The university provides education for nearly 10,000 students in the field of social and economic sciences. It possesses the HR Excellence in Research logo. The University of Economics in Katowice has international accreditations: AACSB, CEEMAN IQA, ACCA, CFA, CIMA, EPAS.

In the opinion of the University authorities, the functioning of the University should be based on the rational use of resources while respecting the natural environment. Taking care of ecology, the University of Economics in Katowice changes its campuses in such a way that they are as efficient as possible and that they do not harm the natural environment. Heat pumps were used at the University, thanks to which the university uses its own temperature to heat the tap water and the building. In addition, solar systems are installed, which are mainly used to heat utility water, and rainwater stored in special tanks recovered from roof and terrace drains is used in sanitary facilities and is used for watering greenery. There are also parking lots for bicycles at the university. Recently, four pro-ecological programs have been implemented at the University of Economics in Katowice: the UniEKO project, joining the "Adopt a bench" action (*Przygarnij ławkę*), participation in WWF's "Earth Hour".

The UniEKO project consisted in creating and marking a path of Polish trees, fulfilling didactic and ecological functions. This initiative was addressed not only to students of the University of Economics in Katowice but also to the inhabitants of Katowice. The aim of the project was to increase knowledge about native coniferous species and the symbol of Polish deciduous trees - pedunculate oak. The path consists of five species of Polish coniferous trees and one species of deciduous tree. The Faculties of the University took patronage over individual conifers. morphology. The University of Economics in Katowice also joined the "Przygarnij ławkę" (Adopt a bench) project organized by Park Śląski. Thanks to the University's support, the Rosarium bench located in the Park has been restored. As a result, the bench gained its former splendor without the need to replace it with a new one - which is especially important for reasons of rational resource management - the eternal problem of economics. On the bench there is also a slogan promoting a balanced lifestyle: "To be productive, you need to be rested" in two language versions: Polish and English. The University of Economics in Katowice is also a participant in the global action "Earth Hour" organized by WWF. The initiative is not so much about saving energy as demonstrating concern for the environment. Its

participants around the world turn off the light for an hour, thereby expressing support for the idea. In addition to the above-mentioned pro-ecological actions, the University of Economics in Katowice conducts full segregation of municipal waste in accordance with the guidelines of the Common Waste Sorting System (WSSO) and participates in the "Collect batteries - dispose of selectively" program. Caring for the environment, the University also uses reproduced inks and cartridges.

Type 3. Sustainable quality culture in the university's strategy

The concept of sustainable quality culture has not been clearly identified in the strategies of Polish universities. As can be seen from the analysis of documents containing the strategies of Polish universities, it can be observed that sustainable quality culture manifests itself in the form of activities in the field of sustainable development of universities.

University of Economics in Wrocław

The Higher School of Commerce in Wrocław was the precursor of the University of Economics. The university was founded in 1947. In 1974, it was transformed into the Oskar Lange University of Economics. However, in 2008 the name of the university changed to Wrocław University of Economics. Taking into account the future of its graduates, the University of Economics in Wrocław attaches great importance to the quality of study programs offered. The University has the following accreditations and domestic and foreign certificates: IQA, IEP, ACCA, EPAS, CIMA, AMBA, EMOS.

In its strategic activities the University of Economics in Wroclaw includes activities for sustainable development in a sense of social and ethical responsibility open to environmental issues. In the strategy adopted by the University of Economics in Wrocław there is a provision about: "Compliance with high ethical standards and good educational practices based on universal values and principles of education for sustainable development" (http://www.ue.wroc.pl/uczelnia/4931/strategia_rozwound_uniademicetu_ekonomowego_we_wroclawiu .html, accessed on 5.12.2019). Issues of social responsibility were also found in the vision of development of the Wrocław University of Economics. The vision of EU development in Wrocław was structured as follows: "The Wrocław University of Economics will be a modern educational and research, opinion forming and consulting unit, permanently embedded in regional, national and international space, undertaking actions for sustainable development in a sense of social and ethical responsibility, friendly to employees, students and graduates, and open to all their surroundings (http://www.ue.wroc.pl/uczelnia/5582/misja_i_wizja_uniademictu_ekonomicznych_we_wroclawiu.html, accessed on 5.12.2019). The strategic goal chosen by the University for pro-ecological activities is implemented by the Rector's Commission for Social Responsibility established within the structure of the university. The goal of the Commission is to develop a social responsibility strategy of the Wrocław University of Economics in cooperation with all university stakeholders, conduct surveys, organize meetings with business representatives, non-governmental organizations, local authorities, prepare the Code of Ethics, introduce the Diversity Charter (http: //www.ue. wroc.pl/uczelnia/17059/co_robimy.html, accessed on 5.12.2019). In 2018, the university signed an agreement with the Climate Reality Project leader regarding the transition to renewable energy on campus by 2030.

According to interviews with university executives, all managers see the need and the need for their university to implement environmental activities. As indicated by the respondents, these activities have several benefits. On the one hand, the university cares for the environment, on the other hand, such activities allow it to reduce operating costs. Some of the respondents also indicate that the university can obtain image benefit through this type of activities, which may contribute to the increase of interest in its education offer by future students.

Table 1: Comparative analysis of case studies of sustainability in 3 Polish HEI's

	Case 1 UW	Case 2 UE in Katowice	Case 3 UE in Wrocław
Main understanding of sustainability	Integrated, as processes, values and strategic objectives	Mainly pro-ecological orientation of university	Part of the strategy of HEI, more declared than implemented
Main stakeholders and their awareness	Managing staff, academic and teaching staff. High awareness of the stakeholders.	Managing staff, academic and teaching staff, local community. Very high awareness of the stakeholders.	Managing staff, academic and teaching staff. Medium awareness of the stakeholders.
Communication of sustainability	Through internal documents and resolutions.	Through internal documents and resolutions. Marketing tools are used in communication.	Through internal documents and resolutions.
Range of sustainability idea	Diversified depending on the Faculty. General principles prevailing throughout the university.	General principles prevailing throughout the university. Diverse coverage, special emphasis put on the implementation of projects.	Medium coverage. General principles prevailing throughout the university.
Limitations of sustainability idea	Financial barriers, change of organizational culture in University units.	Financial barriers, change of organizational culture in University units.	Financial barriers, change of organizational culture in University units.
Sustainability in mission, strategy and strategic management	A significant concept in development strategy.	Included in the development strategy.	A significant concept in development strategy.
Sustainability in education	High level of concept implementation in course curricula.	Medium level of concept implementation in course curricula.	Medium level of concept implementation in course curricula.
Pro-ecological orientation of HEI	High level of ecological orientation.	High level of ecological orientation.	Moderate level of ecological orientation.
Sustainability in organizational structures	Occurs as a separate organizational unit of the University.	Absent in the organizational structure.	Occurs as Rector's Commission on Social Responsibility.
Sustainability as part of organizational culture and identity	Key concept in the organizational culture and identity of the university.	Medium rooting in the organizational culture and identity of the university.	Medium rooting in the organizational culture and identity of the university.
Sustainability as part of quality culture of HEI	Highly rooted in quality culture.	Present in the quality culture.	Present in the quality culture.

Source: authors' own

Conclusions

The Polish higher education sector faces a period of transition dictated by numerous changes in the higher education law. One can see a trend showing changes in the area of university management. This is fostered by the concept of new public management, indicating management techniques and tools to direct people managing organizations towards professionalization. The literature on the

subject highlights that the analysis of changes taking place in the area of university management can be subject to the sociological and cultural analysis (Lounsbary 2007). The changes taking place in the management of universities manifest themselves in the areas of universities' administrative structures, legal regulations, missions and strategies and values, when looking at them through the change of the "university ethos" prism. It should be noted that these changes deeply interfere with the current view on the university management and its autonomy. Universities strive to create a sustainable quality culture that is achievable by building a long-term quality culture, taking into account the quality assurance processes, academic ethos and mutual trust of all stakeholders involved in this process. Obvious barriers involve constant financial expenditure and investment in human resources, which constitutes significant costs for universities. However, the resulting benefits should be seen as a long-term investment. The literature review shows an integrated sustainable university is characterized by the following features: integration of the concept of sustainable development into teaching and research, promotion of the concept of sustainable development, strategies with an emphasis on sustainable development and involvement in social activities that contribute to achieving environmental sustainability. Research shows that universities have a high environmental impact through energy consumption and waste generation. At the same time, an increasing number of universities are joining the group that improves environmental management through their activities. Unfortunately, a full integration of sustainable development into the creation of a quality culture is progressing much slower than reducing the negative impact of universities on the environment. The number of universities reporting on sustainability is still far less advanced than that of corporations. The key issue, however, is that the universities strive to achieve a sustainable quality culture by taking actions at different levels.

Formulating answers to research questions, it can be stated that in the studied universities the concept of sustainable quality culture is implemented in a diverse way. The University of Warsaw has the largest scale of implementation, it consists of a number of integrated activities ranging from formal procedures to pro-ecological and educational activities. At the other two universities, it has a much more limited range. The analysis shows that sustainable quality culture is understood and implemented in different ways depending on the type of university and how managers interpret the concept of sustainable university.

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Digital Transformation of Tourism Economy

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Abstract

The fourth industrial revolution fundamentally changes all spheres of economic activity, including tourism. The aim of the study was to study the key factors affecting the modification of economic activity in tourism. A statistical analysis of data on Internet access has shown that there are favorable conditions for the development of online services and the digitalization of tourism activities. The analysis of digital technologies used in tourism is carried out, their influence on the development of the tourism industry in the context of global digitalization is shown. It has been established that new digital platforms provide care from intermediaries and minimize indirect costs in tourism. The features of consumer preferences of travelers in terms of information support of tourism activities are revealed, the most popular mobile applications in tourism are considered.

Keywords: Tourism, Digital Technology, Digitalization, Tourism Economy.

Introduction

The main directions of tourism development have always been associated with technological innovation. So in the 60s of the last century, the emergence of global reservation systems fundamentally changed the entire technological process in the tourism industry, led to a significant reduction in operating costs, and increased the speed and quality of service delivery. Currently, one of the key factors in the transformation of the tourism economy is global digitalization, which was generated by the fourth industrial revolution. Along with the banking sector, the tourism industry was one of the first to apply digital technology.

Within the digital economy, the interaction of producers and consumers of tourism services is undergoing significant changes. On the one hand, information has been and remains an important factor in the interaction of all the resources that are used to form a tour product, and on the other hand, it is an important independent resource that affects the preferences of tourists and consumers of this product. Therefore, the study of the main areas of application of digital technologies in tourism, their impact on the economy of tourism systems seems to be a very relevant area of research. In the conditions of the modern digital economy, when the technologicalization of public life takes place, which entails the formation of new principles and methods for managing the tourism sector, it certainly requires an awareness of the role of digital tourism.

Methods and Materials

During the study, systematic, monographic, and statistical analysis methods were used. Based on them, the main possibilities of applying the latest digital technologies in tourism and their impact on the modification of the tourism economy were analyzed.

A study of tourism digitalization is contained in the articles of Javornik (2016), Xiang & Fesenmaier (2017), Dredge et al. (2018), Khatri (2019), Nguyen et al. (2019), Pesonen & Neidhardt (2019).

Digitalization affects the entire value chain in tourism, improves business processes and dramatically changes the economic relationships of all participants in the tourism market.

One of the factors contributing to the implementation of digitalization in the tourism sector is the availability of the Internet and the ability of the population to work in the Internet environment.

According to the International Telecommunication Union (ITU), at the end of 2019, 4.1 billion people used the Internet, i.e. 53.6% of the world's population (Fig. 1).

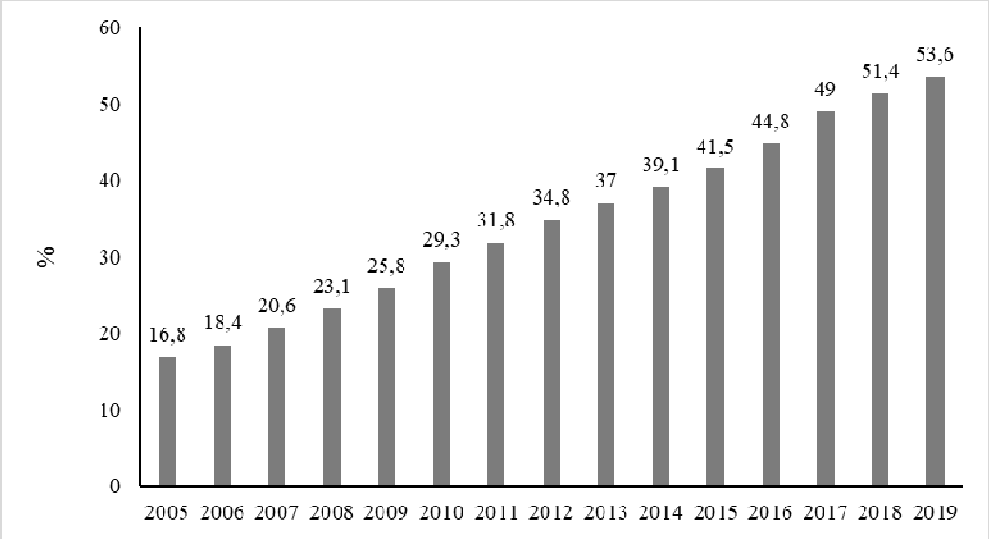

Built by the authors according to ITU https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx

Fig. 1: The number of individual Internet users in the world (in% of the world population)

Since 2005, the number of Internet users in the world has grown from 16.8% to 53.6% of the total world population, i.e. more than 3 times. For half the world's population, the Internet has become every day and affordable tools. However, the uneven access to the Internet in different regions of the world should be noted.

Figure 2 shows a regional breakdown of the percentage of households with Internet access.

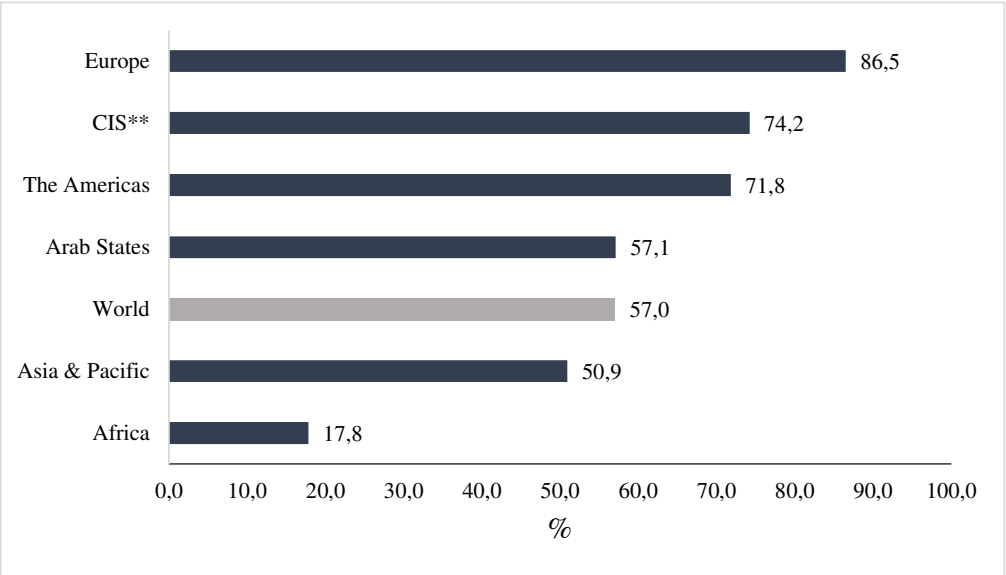

Built by the authors according to ITU http://www.itu.int/ict/statistics

Fig. 2: Percentage of households with Internet access by region

As follows from the graph, the maximum number of households with Internet access is recorded in Europe 86.5%, which is significantly higher than in the world as a whole (57%). The minimum level of household Internet access in Africa (17.8%).

In Russia, in 2018, 76.6% of households had Internet access, which is higher than the global average and slightly lower than European indicators.

The latest digital technologies that act as the basis for the digitalization of tourism activities include:

- Big data technologies (Big Data), blockchain,
- artificial Intelligence,
- Internet of Things (Internet of Things - IoT and IIoT - Industrial Internet of Things),
- mobile devices and more.

Results and Discussion

The fourth industrial revolution, which characterizes the modern stage of the development of society, is connected, first of all, with the digitalization of activity in all its fields. In terms of volume, scale and complexity, it has no analogues in all previous stages of the development of human society. The technologies that have appeared in recent years are based on completely new principles of digitalization, which are based on the use of artificial intelligence, robotics, working with big data, blockchain, the Internet of things, etc. The fastest digital technologies penetrate the banking sector, the tourism and hospitality industry. Regardless of the travel company's profile, competition is shifting to digital technology.

In tourism, dramatic changes are taking place in all business processes. The digital economy is creating fundamentally new business conditions. Its key difference is that information becomes the most important and significant resource on the basis of which new knowledge is generated.

The development of the digital economy is also addressed in the Russian tourism market, in particular, in the "Strategy for the Development of Tourism in the Russian Federation for the Period

until 2035", developed in 2019, focuses on the development of digital tourism services and digital platforms.

The digital economy is based on the digitalization of all business processes occurring at all levels and links in economic systems, with particular emphasis on the information component, which provides real-time access to information on the activities of economic systems in an integrated global network. The digital economy is creating new requirements for the information and communication environment, information systems, services, business processes. The creation of a single information space in the tourism sector should be carried out to obtain high-quality, timely and reliable information, which should be formed taking into account the needs of citizens and society. Much attention is paid to the formation of a single information space in tourism, and they have been discussed for a long time, and quite a lot has been done in this direction by the tourism authorities and the tourism community.

The tourism sector is largely consistent with the introduction of digital technology, since many business processes have already been restructured in accordance with the new paradigm of digital economy development. This is especially true for tour formation and booking systems, e-commerce technology, the use of mobile technologies, etc. This will allow in the digital economy to create new forms of tourism industry enterprises, spatially distributed network companies based on digital economy technologies.

The digitalization of business processes in tourism is especially important in terms of the formation of digital competitiveness, which is determined by the level and effectiveness of the introduction of digital technologies Morozov & Morozova (2016). The main component in the creation of tourism products is information support, which must be provided to the tourist. The result of tourist activity is again the information and impressions that the tourist receives in the process of his trip. It is not for nothing that the term "economy of impressions" is now widely used. Thus, tourism activities are associated with the process of obtaining tourist new knowledge and impressions about tourist destinations, which corresponds to an understanding of the digitalization of information.

The paradigm of the digital tourism economy is based on the collection, transmission, processing of large amounts of information, on the basis of which new knowledge is formed. In this regard, the requirements for the personnel infrastructure of the tourism business in the field of digital competencies will change. The need for a high level of staff qualification to work in the digital economy is confirmed by the following data Morozov & Morozova (2019). In Russia, the sector of information and communication technologies 74% of staff have higher education. This allows us to conclude that in the conditions of the digital tourism economy, requirements to the level of digital competencies of personnel will sharply increase.

Due to the fact that the digital economy is based on the ideology of processing large amounts of information, the digital competencies of personnel, security, reliability, and the long-term storage of large amounts of information will become especially important. High technological effectiveness of all processes of the digital tourism economy will entail the need for continuous staff development, in connection with which the so-called lifelong learning will be in demand.

In addition to the digital revolution, tourism has been greatly influenced by generational change. Now there is a formation of a new type of digital tourists who place high demands on the quality of digital services both during the preparation for the trip and during the trip itself. The main consumers of tourism services are people of generation Y (millennials) and generation Z, for whom modern digital communications are an integral attribute of everyday life. Already, 50% of requests use mobile search. The tourism needs of the new generation are changing. Tour operators must personalize their product for the client. The time from the search to the purchase of a tourist product should be minimized.

New trajectories of tourism development are closely interconnected and affect the organizational and production business processes in tourism.

Digitalization in the field of tourism leads to the formation of new economic relations between participants in the tourism market. For example, the WindingTree project, based on a blockchain platform, offers a simplified process for the interaction of economic actors in the tourism market. It excludes intermediaries from the process, thereby reducing the commission to additional intermediaries and costs. This digital platform is already in use at Lufthansa. Similar blockchain tools are used at Dubai Airport (UAE), in the transport system of Japan and South Korea, etc.

We highlight the key factors affecting the economy of the tourism industry:

- digitalization of the main business processes in tourism,
- generational change and the formation of a new type of digital tourists,
- the formation of economies of a new type of Sharing Economy, an economy of impressions,
- new technologies for the interaction of all participants in the tourism market, which provide care from intermediaries and minimize indirect costs,
- the possibility of remote access to services (online travel agencies),
- personalization of services for tourists.

An example of Sharing Economy, which dramatically changes the economic relationship between suppliers and consumers of tourism services, is the Airbnb booking system. The articles Aznar et al. (2017), Blal et al. (2018) examined the impact of Airbnb on tourism and hotel business.

In order to ensure the personalization of tourist services, it is necessary to collect and process huge amounts of information. For these purposes, Big Data technology is used. It allows you to carry out analytical studies and get complete information about tourists and their needs. Given the capabilities of artificial intelligence, you can predict and model the needs of tourists. A Booking.com study found that one-third of the world's travel audience is interested in helping artificial intelligence travel planning.

In 2018, a decentralized blockchain platform for data exchange in the TravelChain tourism industry was launched. This is an ecosystem for the tourism market, which allows you to collect customer information and use it to provide personalized offers, while users receive a reward for providing data and viewing address messages. Artificial intelligence technologies involved in processing data about tourists will allow predicting the desires and preferences of tourists, which will create tourism products that best meet the desires and needs of certain user groups and individual travelers.

The capabilities of blockchain technology with its distributed data processing system can serve as the basis for the implementation of models for the dynamic formation of tourism products and pricing, within which, according to the customer’s request, various combinations of a tourist product can be compiled in real time.

Currently, the level of monopoly in the tourism industry is quite high. The largest global reservation systems Amadeus, Saber and Travelport occupy 99% of the total market share of air transportation. For several decades, Priceline Group has received an annual 40% increase in EBITA. Blockchain projects in tourism will ensure decentralization and disintegration of the hotel reservation process with payment in the domestic cryptocurrency. The widespread adoption of blockchain technology in the tourism industry will reduce the level of monopoly in tourism.

Augmented reality technologies are used as an innovative tool in organizing and conducting tours.

Mobile devices have become an integral attribute of tourists who want to receive travel information at any time. Already, existing mobile applications can provide booking services, provide background information, thereby increasing the competitiveness of tourist destinations.The article Morozov & Morozova (2015) analyzes mobile applications used in tourism.

A study of the use of mobile applications in Russia showed that 74.7% of users use applications on vacation and while traveling, 19.3% prefer to relax even from their mobile devices. More often, women (56.4%) use applications on vacation than men (43.6%). The most active age group of users of vacation applications is people aged 25 to 35 years, their share was 32.6%. The share of pensioners was only 2.1%. The most popular are cartographic mobile applications - 59.5%. Table 1 presents mobile apps for travelers.

Table 1: Mobile applications for tourism

Group	Name of mobile application
Cartographic Services	City Guide, Redigo, MapsWithMe, Lonely Planet, Spotted by Locals, 2GIS, Around Me, MapMyRide, Waze, Pin Drop, City Guides от National Geographic, OsmAmd, ForeverMap, Pocket Earth, Galileo Offline Maps
Geoinformation Services	Google maps, City Maps 2Go, YandexMaps, NearestWiki
Guides and audio guides	TourCaster, World Explorer, Localscope, TopTripTip
Help directories with reviews and tips	TripAdvisor, Ask a Nomad - Travel Guide, Tagwhat
Booking tickets	Aviasales, Anywayanyday, Skyscanner, Kayak, Momondo, Eviterra, Flight Status, BiletyPlus, Seatguru, GateGuru, Lounge Buddy, Skyscanner–All Flights!, Smartive Travel, Corner
Hotel Reservation	Booking.com, Ostrovok.ru, Expedia, Hotel Tonight, Hotels.com, Airbnb, Roomorama, Nightswapping, Agoda, Hotellook, Hotel Tonight, Couchsurfing
Booking train tickets	Railtime Mobile
Car and taxi rental	SixT, Uber
Reference information on catering	LocalEats for iPad, Zoon, Buuuk, Foodspotting
Weather reference	GisMeteo, Swackett
Translation software	Google Translate, Word Lens, Руссо туристо, Word Lens, Lingvo
Instant messengers	WhatsApp, Viber, Couchsurfing, Skype, Postale
Travel organizers	TripIt, Tripomatic, CheapTrip, Gogobot, TouristEye, Worldmate, Flight Radar, World Airport Board, Airport (All), Flight Tracker,
Additional services	Wikitude, Roamer, Metro24, Foursquare, SmileDrive, App in the Air, mTrip Travel Guides, Triposo, Free Wi-Fi Map, Free Wi-Fi Finder

In order to increase the competitiveness of tourism enterprises and the convenience of customers, it is advisable to create your own mobile applications. In the application, it is advisable to provide for various methods of payment and prepayment of a tourist product. It is much more convenient for tourists to make payments through the mobile application. In a mobile application, it is advisable to provide search filters by cost, duration and directions, to make it possible to compare two tours. The mobile application must interact with the CRM system. It is advisable to introduce an intelligent chatbot into a mobile application that will help you choose a tour and place an application.

Conclusion

Information has become an important resource shaping consumer preferences and determining the attractiveness of both the tourist product itself and the tourist destinations that offer them. Information support of tourism acts as the most important factor in its development, which is of particular importance in recent years in the context of the development and establishment of the digital economy. Information support of the tourism business is a combination of an information

database on tourism activities and specialized information technologies designed for its processing, which ensure the effective functioning of the tourism system.

Digitalization of business processes in tourism directly depends on the availability of professional digital competencies of employees of a tourism enterprise. Currently, in all areas of economic activity there is an increased need for personnel professionally owning digital competencies. The digital economy is based on the digitalization and integration of all business processes taking place in economic systems at all levels, with particular emphasis on the information component that provides access to real-time information on the activities of economic systems in an integrated global network. In the digital economy, new requirements are being formed for the information and communication environment, information systems, services, business processes. The formation of a single information space in the tourism sector is carried out taking into account the needs of citizens and society in obtaining high-quality and reliable information. In tourism, issues of forming a single information space have been discussed for a long time, and tourism authorities have done quite a lot in this direction. The tourism sector is fully focused on the active introduction of digital technologies, many business processes have already been restructured in accordance with the new paradigm of digital economy development, including tour booking systems, e-commerce technologies, the use of mobile technologies, etc.

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Methods for Designing Spatial Development of Tourist Territories

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Abstract

The article considers the most important problem of tourism development related to the formation of tourist territories (destinations). In conditions of high competition in the tourism market, the spatial development of tourist destinations is becoming the main competitive advantage. It is proposed to use the method of cartographic taxonomy as a spatial planning method. This approach provides tools for modeling tourist clusters and destinations. Cluster binding to the territory is carried out using cartographic taxon. Each taxon is characterized by a number of parameters that make it possible to present information on tourist clusters and destinations in a formalized form. Such an idea makes it possible to plan the spatial development of the tourist area based on its model. The structure of the balance model of tourism activities is proposed, taking into account the distribution of tourist flows between tourism enterprises in the territory of the destination.

Keywords: Tourist Cluster, Tourist Destination, Spatial Development, Tourist Territory, Modeling Of Tourist Destination, Cartographic Taxon

Introduction

One of the important problems of tourism development in many countries is its competent territorial planning. The formation of the spatial development of tourist areas refers to the tasks of the state level. The key areas of development of Russian tourism in the coming years are defined in the document "Strategy for the Development of Tourism in the Russian Federation for the period until 2035". In this strategy, special attention is paid to strategic development, in particular, the spatial development of tourist areas. In this regard, the study of scientific approaches to territorial planning for the development of tourist territories is very relevant.

Methods and Materials

The theoretical and methodological basis of the article is the work of domestic and foreign scientists on spatial planning, the formation of tourist destinations and clusters, the application of the methodology of intersectoral balance for tourism.

During the study, grouping methods, comparisons, logical and economic analysis techniques, generalization and synthesis, modeling were used.

Research in tourism planning is contained in (Gunn, 2002), (Veal, 2002), (Hall, 2008), (Aminu et al., 2013) and others

Results and Discussion

Spatial development of tourism is the basis for the formation of high-quality tourist offer and sustainable tourism development. In this regard, it is necessary to consider the basic concepts associated with the territorial organization of tourism.

In the framework of solving the problems of territorial planning of economic systems, the cluster approach proposed by M. Porter at the end of the 20th century is widely known. The traditional concept of a cluster is as follows. The cluster is considered as a territory on which geographically concentrated groups of interconnected enterprises engaged in joint activities are concentrated. This joint activity can be connected by a single technological process, the creation of a certain type of product.

This approach is legitimate and is used when considering issues of territorial planning in tourism. With the spatial organization of the tourist system, it is also advisable to form tourist clusters and destinations. The initial principle of their creation is associated with those tourism resources that this territory possesses. Proper spatial organization of the tourist territory will ensure the most efficient use of tourist resources and improve the quality of tourist services.

From the point of view of the spatial organization of tourism, the concept of tourist destination should be defined, since in the scientific literature there is an ambiguous interpretation of this term.

Tourism destinations should be considered both from the point of view of the territorial approach and taking into account the needs of customers (Morozov & Morozova, 2016). In the first case, a tourist destination can be defined as a certain territory with specific tourist resources. In the second case, the key characteristic of the destination is its tourist attraction, which determines the motive of travel. The main factor generating tourist flows to the destination is its attractiveness. It is attractiveness that acts as the main motive and reason for tourists traveling to this destination. The authors propose the following definition of tourist destination.

Tourist destination is a certain territory that has tourist attractiveness for travelers and satisfies the following conditions:

- the presence of a key tourist resource, event, etc., which forms the main attraction for a tourist and the motivation for his trip,
- the presence of the necessary tourist infrastructure, including information, and a specific set of services that meets the needs and expectations of tourists.

Tourist destination can be represented as a combination of smaller structural units called clusters. Clusters provide the satisfaction of the tourist needs of a particular segment of travelers. In other words, a destination can have several tourist attractions, and only one tourist attraction is concentrated in a cluster. For example, the destination of Sochi has several tourist attractions: sea climate, summer resort, skiing, etc. At the same time, the clusters included in it are divided by type of attractiveness, for example, marine and ski clusters.

When forming a territorial tourist system, it is necessary to ensure its high-quality information support, which should contain a comprehensive description of the destination. It is necessary to describe the infrastructural support of the destination, provide comprehensive information about the tourist resources and attractions of each cluster, and describe the tourist attractiveness. Thus, the constituent elements of the destination will be clusters. They have a tourist attractiveness and are designed to satisfy the tourist demand of a certain segment of travelers (Morozov & Morozova, 2017).

To model tourist clusters and destinations, it is proposed to use the method of cartographic taxonomy, which is as follows. The geographical territory of the destination is divided into separate squares, the so-called cartographic taxa. Usually the size of a taxon is 1x1 km. Each taxon corresponds to its coordinates. The size of the taxon can be scaled depending on the accuracy of binding the

characteristics of the cluster to the terrain. Thus, the cluster consists of several taxa, and the destination includes a number of clusters. The cluster is formed by cartographic taxa that correspond to given conditions depending on the tourist needs of a particular segment of tourists.

Thus, the method of cartographic taxonomy allows a systematic and structured representation of the spatial information model of tourist destinations through a combination of clusters and cartographic taxa.

Consider the use of cartographic taxonomy in modeling the tourist destination of Krasnaya Polyana. The method of cartographic taxonomy allows us to represent the destination of Krasnaya Polyana as a collection of interconnected taxa (Figure 1).

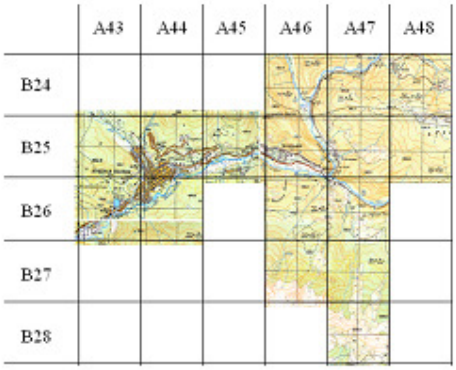

Figure 1: Representation of the territory of Krasnaya Polyana using taxon

Each taxon has a set of parameters, including the characteristics of infrastructure, tourist resources, attractions, etc. The entire information base for taxon descriptions is structured, so it is easy to search for it according to the specified criteria and make selections using various filters. For example, you can select cartographic taxa on the basis of their belonging to the ski infrastructure. In Krasnaya Polyana, the ski infrastructure is represented by the Alpika-Service, Gazprom, and Gornaya Karusel ski lifts. Each of them is located in a specific geographical area and is tied to the corresponding cartographic taxon. In particular, ski lifts belong to the following cartographic units (taxa):

- “Alpika-Service” - for taxa A47B26, A47B27, A47B28,
- Gazprom (Laura) includes taxa A47B24, A48B24, A47B25, A48V25,
- “Mountain Carousel” refers to taxa A45B25, A46B25, A46B26, A46B27.

Figure 2 shows the binding of the Alpika-Service ski lift to the corresponding taxa.

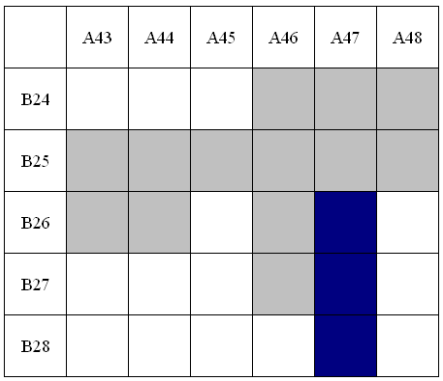

Figure 2: Taxa modeling the Alpika-Service ski lift

Thus, each territorial unit (taxon) is described by a number of parameters, together they form an information database on the infrastructure of tourist clusters and destinations, available tourist resources, etc. Based on this information base, you can make various samples, create models of clusters and destinations depending on from various parameters, maintain up-to-date information on the destination. A formalized representation of the tourist destination will allow a complete understanding of its condition, may be the basis for the formation of spatial development plans for the territory, which is the basis for the effective management of tourist systems.

When designing the spatial development of the territory, it is necessary to take into account the degree of balance of tourist flows and tourist infrastructure. On the one hand, the production capacity of tourism infrastructure should be calculated taking into account forecasted tourist flows. On the other hand, it is necessary to form tourist flows in order not to exceed the capacity of tourist infrastructure. The quality of tourist services and the degree of satisfaction of tourists largely depend on the ratio of tourist flows and tourist infrastructure. It is also necessary to take into account the staffing of the destination (Morozov & Morozova, 2019). The phenomenon of a competitive tourism system is most fully manifested when combining individual tourism services into a single tourism product. Only in this case, the tourism industry begins to work as a holistic system. However, a prerequisite for the effectiveness of the tourism system is the degree of balance of tourist flows and its infrastructure.

One of the urgent tasks of the territorial organization of tourist activity is to ensure the balance of tourist flows and tourist infrastructure. The solution to this problem is possible through the application of a balance approach The territorial organization of tourism activities largely depends on the availability of appropriate infrastructure and its capacity. If the infrastructure capabilities of the territory significantly exceed the tourist flows received by the destination in terms of volume (capacity), there is a need for additional efforts to attract tourists. At the same time, part of the tourist infrastructure is not loaded, and tourism industry enterprises will receive less profit, i.e. will have lost profits. We can say that in the described situation the organization of tourist activities is ineffective.

With excessively large tourist flows, a full load of infrastructure facilities is observed, but at the same time, the quality of tourist services provided may decrease, which may provoke an increase in tourist dissatisfaction and subsequently lead to a decrease in tourist flow.

In the 20s of the last century, V. Leontiev developed the Input-Output Model. It is designed to assess the balance of economic systems at various levels. This model provides an analysis of intersectoral relationships at the national or regional level. The Input-Output Model allows you to calculate and evaluate the most important economic proportions in order to ensure the balance of individual sectors of the economy.

The principle of the balance approach is advisable to use when designing the spatial development of tourist areas. The relationship between supply and demand, the balance of tourism infrastructure and tourist flows can be modeled using the input-output model. This approach allows you to simulate the relationship of the tourism system with all productive sectors of the economy, as well as evaluate indirect and induced effects.

The application of the balance approach at the level of tourist destinations and clusters will allow us to correctly assess the capacity of the infrastructure and justify the spatial development of the tourist territory.

Table 1 presents the structure of the statistical balance of tourist destinations. It shows the distribution of tourist destinations flows between individual tourism industry enterprises.

Table 1: Layout of the statistical balance of tourist destinations

Total number of services		**Tourists with accommodation**	**Tourists without accommodation**	**Transit tourists**	**Local population**	**TOTAL**
Accommodation facilities (number of places)	Max = total number of tourists	H1		H2	H3	H1+…+Hn
Total:		H1/Max		H2/Max	H3/Max	(H1+…+Hn)/ Max
Catering (quantity)	Max = total number of seats	R1	R2	R3	R4	R1+…+Rn
Total:		R1/Max	R2/Max	R3/Max	R4/Max	(R1+…+Rn)/ Max
Museums (quantity)	Max = Capacity, people	M1	M2	M3	M4	M4+…+Mn
Total:		M1/Max	M2/Max	M3/Max	M4/Max	(M4+…+Mn)/Max
Transport services (quantity)	Max = Capacity, people	T1	T2	T3	T4	T1+…+Tn
Total:		T1/Max	T2/Max	T3/Max	T4/Max	(T1+…+Tn)/ Max
Other services (quantity)	Max people	S1	S2	S3	S4	S1+…+Sn
Total:		S1/Max	S2/Max	S3/Max	S4/Max	(S1+…+Sn)/ Max

According to the table, one can judge the demand for tourist services from different groups of tourist flow, as well as assess the conformity of the tourist infrastructure of destination to its tourist flow.

Conclusion

Thus, when developing projects for the development of tourist territories, it is advisable to use a modeling methodology based on the cartographic taxonomy method. It allows you to present in a formalized form all the information about tourist destinations and their tourist clusters.

The design of the spatial development of tourist areas must be carried out taking into account the principle of balanced tourist flows and tourist infrastructure. Only in this case, the tourist destination system will function efficiently, ensuring a rational loading of tourist infrastructure and an appropriate quality of tourist services. The proposed structure of the balance sheet model for assessing the conformity of tourist infrastructure and tourist flows can serve as the basis for developing managerial decisions in case of non-compliance.

The "Strategy for the Development of Tourism in the Russian Federation for the period until 2035" indicates the need to develop master plans for the development of tourist areas. They should reflect

the points of attraction (tourist attraction), the localization of collective accommodation facilities, the zone of objects of auxiliary and transport infrastructure, ensuring the development of the tourist territory and other zones. The systematic approach proposed in the article is the methodological basis for the development of master plans for territories.

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Statistical Analysis of Unauthorized Money Transfers Using Payment Cards in Russia

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Abstract

The purpose of the study is to analyze the trends in the unauthorized transactions number and volume for the funds transfer by individuals through payment cards. In the process of research, the methodology of econometric modeling was used. Econometric analysis of quarterly values unauthorized transactions number and volume for the funds transfer by individuals through payment cards during 2014-2018 allowed to trends identify. The volumes of unauthorized transactions trends in the commitment place context are separately identified: trade organizations, ATMs and CNP transactions, and also the trends types. The volumes of unauthorized transactions trends in the commitment place context are separately identified: trade organizations, ATMs and CNP transactions, and also the trends types. The analysis showed that stable pattern indicators are still being formed. Therefore, the creation and implementation of an effective strategy for the development of the banking sector, in the modern conditions, together with the traditional introduction of new, innovative approaches to risk assessment and management in its specific sphere of activity.

Keywords: the digitalization of the economy, cyber security, the risk, unauthorized operations, payment cards, express loan, the trend equation, the econometric model.

JEL Classification: C53; C15

Introduction

One of the key issues of the Information Society Development Strategy in the Russian Federation for 2017–2030 (Presidential Decree, 2017) is the formation of a national digital economy. The corresponding Program for the period 2017–2024 (Order of the Government of Russia, 2017) with an annual estimated budget of 100 billion rubles was adopted. The country's economy's transition to the digital development trajectory implies "support for the development of both existing conditions for the emergence of breakthrough and promising cross-cutting digital platforms and technologies, and the creation of conditions for the emergence of new platforms and technologies" (Order of the Government of Russia, 2017). The banking sector is one of the most important structures of a market economy, which in the context of its digitalization requires a new principle of transition from an operational response to risk management, prevention and prevention of new negative factors, risks and threats. One of the conditions for the successful implementation of this principle is the development of the skills of the digital economy, the digital education and R&D system, investment in digital infrastructure and cybersecurity (Report on the Russian economy, 2017).

The formation and implementation of an effective development strategy for the banking sector in modern conditions requires the introduction of international standards for risk assessment and management (COSO, 2017). Each country has risk management systems that take into account the

peculiarities of organizational factors for introducing risk management in small and medium enterprises. One such study at the interstate level was conducted by Henschel and Durst (2016). adjusted for the Russian market, as well as the creation and implementation of new science-based models and methods in its specific field of activity. Features of the Russian risk management system are reflected in the works of Barilenko (2016), Ankina (2017), Lanskov and Zenkovich (2017). The choice of the mathematical apparatus for modeling decision-making processes is largely determined by the degree of uncertainty of environmental factors with the strong dependence of Russian economy indicators on them.

Materials and Methods

The complexity and inconsistency of domestic and global socio-economic processes lead to the expansion of the risk zone. The evolution of banks in the emerging digital economy involves the introduction of new organizational forms. This also induces the emergence of new banking risks. Classic banking is undergoing change. Cash gives way to non-cash payments. At the same time, in terms of volume, such operations occupy 68% of the market. In general, in the first half of 2019, individuals used their cards 19.2 billion times for a total of more than 40 trillion rubles. This is primarily due to the growth of online commerce. In 2018, the turnover of online trading in Russia amounted to 1.5 trillion. rubles. Figure 1 shows the dynamics of the use of payment cards in Russia and abroad.

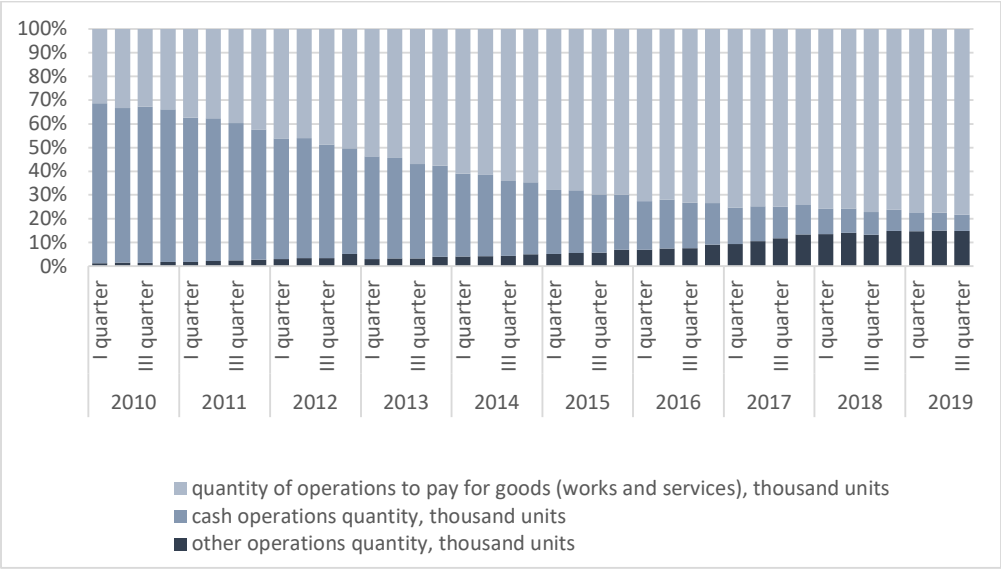

Fig. 1: Operations using payment cards committed in Russia and abroad

The most popular payment methods through the Robokassa platform in 2018 were bank cards, electronic money, Qiwi-wallets, mobile payments of all major operators, Internet banking, payments through Euroset and Svyaznoy salons. The distribution of payment methods for online purchases in the total volume of non-cash transactions is presented in Figure 2.

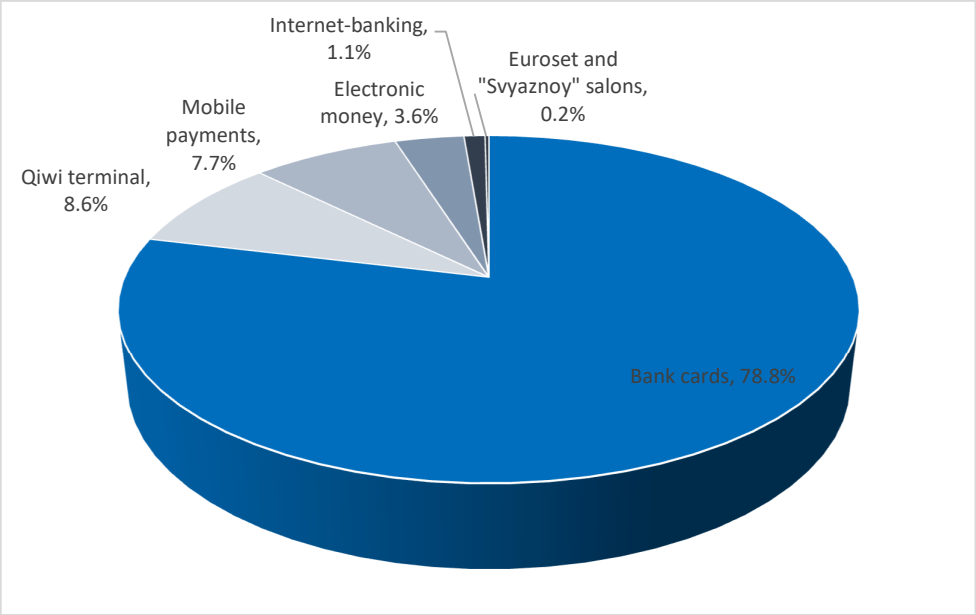

Fig. 2: The most popular payment methods

Bank cards are the leader in terms of cashless payments, which can easily be explained by their wide distribution. According to the statistics of the Bank of Russia, more than 90% of transactions on cards of Russian citizens in the first half of 2019 were made by non-cash transactions: payment for goods and services, as well as transfers from card to card / bank account / deposit. The level of provision of the population with payment infrastructure is growing every year, and as of July 1, 2019, for 1 million inhabitants, there were 21 thousand devices for receiving payment cards. The dynamics of the number and volume of transactions using payment cards in the Russian Federation is presented in Figure 3.

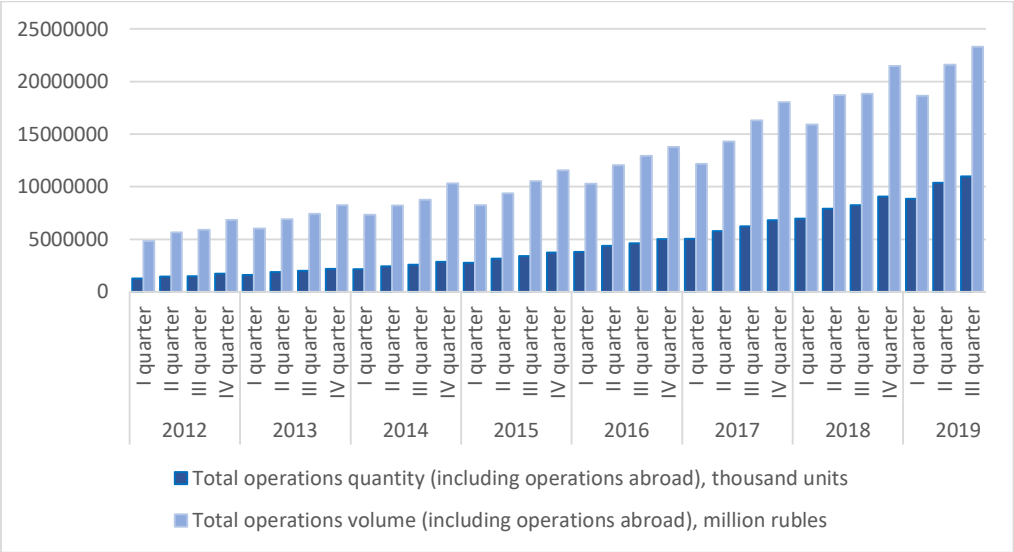

Fig. 3: Dynamics of transactions number and volume using payment cards in the Russian Federation

The risk of unauthorized transfers of funds by individuals using payment cards is increasing. The complexity of assessing such a risk is due to the blurring of the boundary of the operational risk category, to which it can be attributed in accordance with the agreement of the Basel Committee on Banking Supervision. In order to develop scientifically based recommendations on ways, means and methods to increase the effectiveness and efficiency of risk assessment and risk management processes, internal control and cybersecurity in the field of banking operations, it is first necessary to analyze information on the number and volumes of unauthorized money transfer operations. We take the indicators of bank reporting as a basis for this analysis.

Results

At the first stage of work, we studied the dynamics of the number and volume of unauthorized operations conducted in Russia and abroad using payment cards. The report presents quarterly data sets for the period 2014 - 2018.

In 2014, the total amount of unauthorized transactions committed using payment cards amounted to 1,581.4 million rubles (Review of unauthorized transfers of funds, 2016). In 2015, this indicator reached a value of 1,147 million rubles, which is 72.53% of its previous value. In 2016, the indicated volumes amounted to 1075.4 million rubles; in comparison with 2014, this is 68%, and compared to the previous year - 93.76%. In 2017, the emerging downward trend continued: in comparison with 2014, the volume of unauthorized transactions committed using payment cards amounted to 60.79%, and compared to the previous year - 89.39%. According to (Review of unauthorized transfers of funds, 2017), the volume of unauthorized operations using payment cards in 2017 amounted to 961.3 million rubles. The volume of all unauthorized operations committed using payment cards issued in the Russian Federation in 2018 amounted to 1384.7 million rubles, which is 44% more than the same indicator in 2017 (961.3 million rubles). The number of such operations for the reporting period in 2018 amounted to 416,933 units, which is 31.4% more than the same indicator for 2017 (317,178) (Review of unauthorized transfers of funds, 2018). The dynamics of quarterly data on the number and volumes of unauthorized payment cards operations conducted on the territory of Russia is presented in Figure 4.

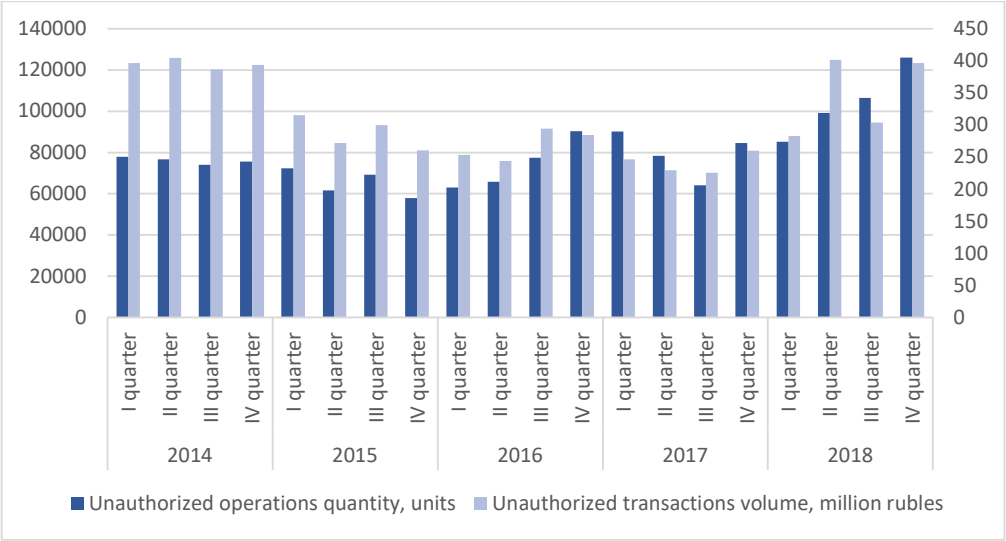

Fig. 4: Unauthorized transactions number and volume using payment cards

Figures 3 and 4 show that the number of unauthorized transfers of funds by individuals is increasing against the background of an increase in the number of transactions using payment cards. An analysis was also made of the quarterly values of the volume of unauthorized transactions committed using payment cards. Its graphical interpretation is shown in Figure 5. From Figure 5 it can be seen that in

some periods the volume of unauthorized operations tends to decrease. However, in 2018, the data showed an increase in the number and volume of thefts in 2018.

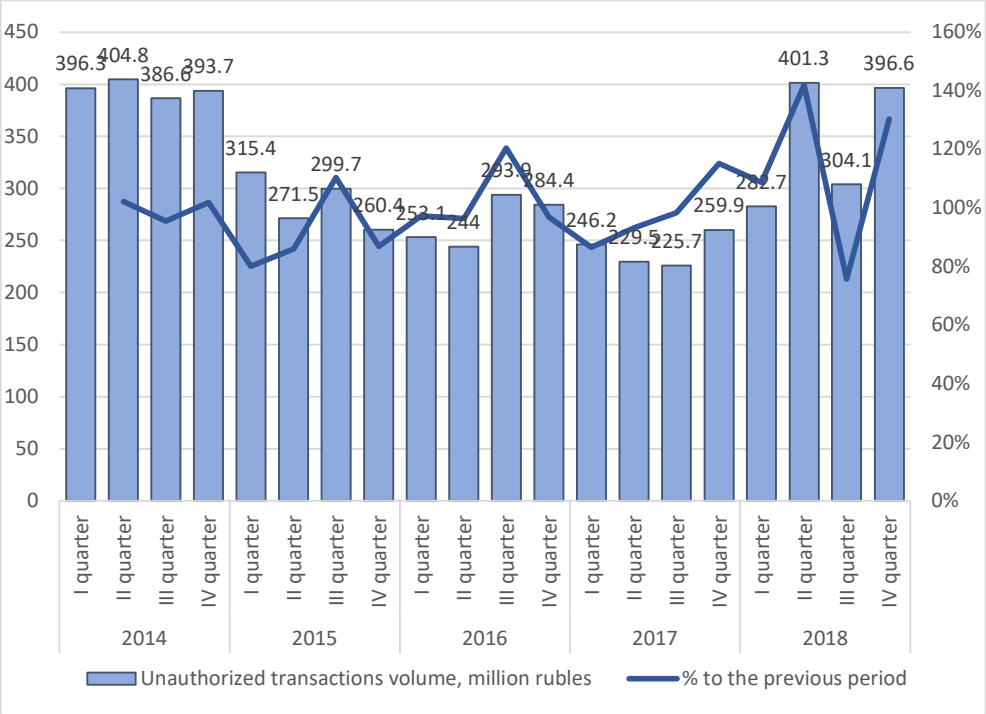

Fig. 5: Unauthorized transactions volume, million rubles

According to the indicators of bank reporting, in the period 2014 - 2015 there is a slight decrease in the number of unauthorized operations. However, from the fourth quarter of 2015 to the fourth quarter of 2016, the number of these operations from 57,929 increases to 90,277 units per quarter. The first three quarters of 2017 are characterized by a decrease in the indicator to 64089 units per quarter, but in the IV quarter there is a sharp increase in the number of unauthorized transactions using payment cards to 84,559 units, which reaches the third highest value for the entire period under review. At the same time, the average amount of one unauthorized operation in 2016 amounted to 3.62 thousand rubles. The average amount of one unauthorized operation in 2018 increased by 9.6% and amounted to 3.32 thousand rubles against 3.03 thousand rubles in 2017. This increase is due not only to an increase in the number and volume of unauthorized transactions in the reporting period, but also to an increase in the number of detections of these operations in the total number of transactions completed.

It should be noted that the share of the volume of unauthorized transactions in the total volume of transactions performed using payment cards in 2018 amounted to 0.0018% compared to 0.0016% in 2017 (Fig. 6). In general, for this indicator we can observe a steady downward trend. The calculation of the coefficients of the trend equation allowed us to obtain a nonlinear equation $y_t = (4.9\ln(t) - 1.1)10^{-5}$, which shows that in 2019 we should expect a decrease in the share of the volume of unauthorized operations to 0.0013%.

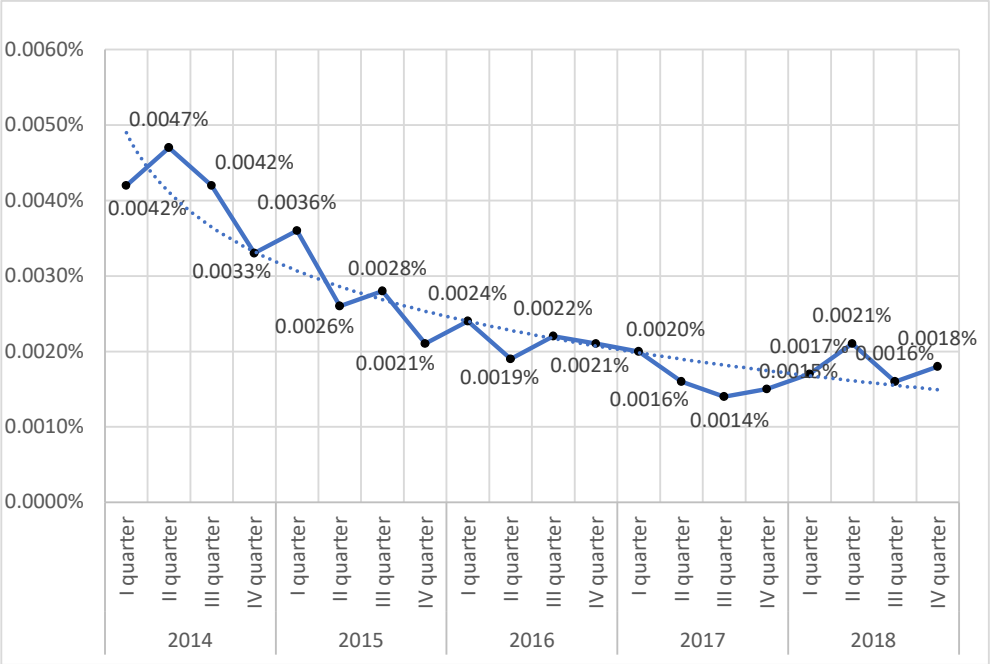

Fig. 6: Share of unauthorized operations in the total transactions volume committed using payment cards, %

To estimate and obtain a forecast for 2019 of the number and volume of unauthorized transactions using payment cards conducted on the territory of Russia and outside it, we construct the trend equations. The results of the regression analysis are presented in table 1.

Table 1: Regression analysis results of the unauthorized transactions number and volume using payment cards

Indicator	Trend	Forecast values	
		I quarter 2019	II quarter 2019
Unauthorized transactions number using payment cards, units	$y_t = 41937 + 3107.7t$	107115	351,03
Unauthorized transactions volume using payment cards, million rubles	$y_t = 138.09 + 10.14t$	110218	361,17

The linear trend does not adequately describe the current dynamics in the number and volume of unauthorized transactions using payment cards conducted in Russia. For processes with a changing trend, the best forecast result is provided by adaptive models, which include, for example, the Brown model (1956), the Holt model (1957), etc. The forecasting trend approach involves extrapolating the aligned values of the dynamic time series of the predicted indicator, i.e. transferring past trends of the predicted indicator to its future development. The reliability of forecasts in this case depends on the stability of the trend of demand changes, which may be violated in the conditions of crisis development of the economy.

One of the simplest adaptive methods for short-term forecasting of irreversible processes is Brown's exponential smoothing method, the idea of which is to determine the next predicted value through the previous predicted value, adjusted by the deviation of the actual value from the predicted (Brown, 1956). The Holt-Winters model (Winters, 1960) is a modification of the Holt method (Holt,1957) and is used to predict time series in the structure of which there is an established trend and seasonality. This

model is three-parameter and takes into account the smoothed exponential series, trend and season and consists of a system of recurrence equations:

$$\begin{cases} L_t = \alpha \frac{y_t}{S_{t-s}} + (1-\alpha)(L_{t-1} - T_{t-1}), \\ T_t = \beta(L_t - L_{t-1}) + (1-\beta)T_{t-1}, \\ S_t = \gamma \frac{y_t}{L_t} + (1-\gamma)S_{t-s}, \end{cases} \quad (1)$$

where $\alpha \in [0;1]$, $\beta \in [0;1]$, $\gamma \in [0;1]$ – smoothing constants;

L_t, L_{t-1} – the smoothed values for the current and previous periods, respectively;
T_t, T_{t-1} – trend value for the current and previous periods, respectively;
S_t, S_{t-1} - seasonality for the current period and for the same period in the previous season, respectively.

For the first period, the exponentially smoothed series is equal to the first value of the series: $L_1 = y_1$. Seasonality in the first and second period is 1: $S_{t-s} = 1$. The trend value for the first period is 0: $T_1 = 0$. Then the forecast for p periods is

$$\hat{y}_{t+p} = (L_t + pT_t)S_{t-s+p} \ , \quad (2)$$

where S_{t-s+p} – the value of the seasonal component for the same period in the last season.

To build a forecast of the number dynamics of unauthorized operations using payment cards for the first half of 2019, as the initial value we choose the data on the number of unauthorized operations in the first quarter of 2017, for which we assume p = 1. We choose the smoothing constants $\alpha \in [0;1]$, $\beta \in [0;1]$, $\gamma \in [0;1]$ to minimize the average relative forecast error. For the initial data of the levels of the considered time series, we obtain α = 0.835, β = 0.635, γ = 0.5. The approximation error of the Holt-Winters model is $\overline{O} = \frac{1}{n}\sum \frac{|y_t - \widehat{y_t}|}{y_t} = 0.046$, which indicates the high quality of the forecast. Based on the simulation results, we obtained the following values of the number of unauthorized transactions using payment cards for the first half of 2019: in the first quarter – 123289 units, in the second quarter – 124707 units.

To build a forecast of the volume dynamics of unauthorized operations using payment cards for the first half of 2019, we choose the data on the number of unauthorized operations in the first quarter of 2017 for which we set $p = 1$. For the initial data of the levels of the considered time series, we obtain α = 0.835, β = 0.835, γ = 1. The approximation error of the Holt-Winters model is $\overline{O} = \frac{1}{n}\sum \frac{|y_t - \widehat{y_t}|}{y_t} = 0.068$, which indicates the high quality of the forecast. The result of modeling (1) and building a forecast (2) is as follows: in the first quarter of 2019, the volume of unauthorized transactions using payment cards is forecasted at 429.89 million rubles, in the second quarter – 470.09 million rubles.

The next stage of work explores the dynamics of unauthorized payment cards operations in the context of the execution place. These places are differentiated by the following groups: trade organizations, ATMs and CNP transactions (transactions performed via the Internet and mobile devices, including Internet banking). A histogram of the volumes of these operations is shown in Figure 8. In the total volume and number of unauthorized operations, the main share is made up of CNP transactions: in 2018, their share in the total volume of operations was 81.4%, which is 5.8 percentage points more than in 2017 (75.6%).

The dynamics of unauthorized operations for each group are investigated using trend highlighting. The trend hypothesis was confirmed in each group. To check the quality of the obtained nonlinear trend models, the tightness of the relationship through the correlation index was evaluated for each of them: $\rho_{ty} = \sqrt{1 - \frac{\sum_{i=1}^{n}(y_i - \widehat{y_{ti}})^2}{\sum_{i=1}^{n}(y_i - \bar{y})^2}}$ and average approximation error: $\bar{A} = \frac{1}{n}\sum_{i=1}^{n} \frac{|y_i - \widehat{y_{ti}}|}{y_i} \cdot 100\%$,

where y_i – actual row level value,
$\widehat{y_{ti}}$ – theoretical (calculated) value of the level of the series,
$\bar{y}$ – average of the actual levels of the series,
n – amount of elements.

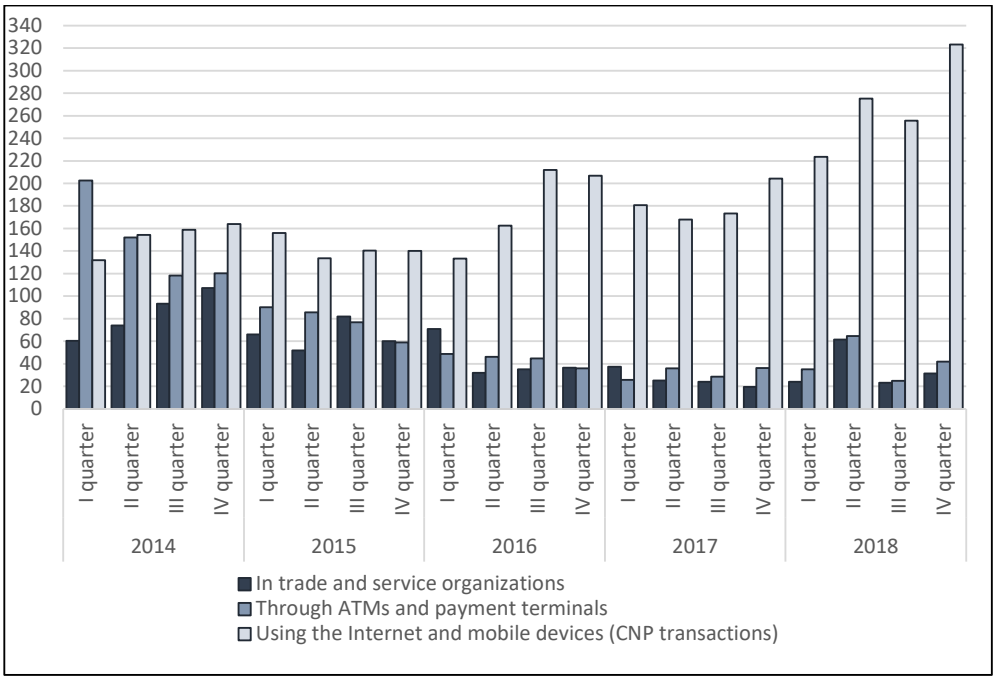

Fig. 8: Unauthorized transactions dynamics using payment cards in the context of their terms and conditions (million rubles)

Between the 1st quarter of 2014 and the 3rd quarter of 2015, the volumes of unauthorized transactions carried out through ATMs and payment terminals are rapidly decreasing. Then, relative stability is observed, but the decline does not stop. This behavior is characteristic of both hyperbolic and logarithmic types of trend. Therefore, the standard procedure for clarifying the type of trend was carried out. Based on the results of a regression analysis for the volumes of unauthorized operations carried out through ATMs and payment terminals, the equation is obtained $y_t = 186{,}86 - 55{,}82\ln(t)$.

For volumes of unauthorized operations using payment cards committed in trade and service organizations, the linear trend equation is: $y_t = 85{,}19 - 3{,}27t$.

For the volume of transactions made through the Internet and mobile devices, the equation of the exponential trend was obtained $y_t = 123{,}13\exp(0{,}0356t)$.

It should be noted that, in contrast to the volumes of unauthorized transactions committed in trade organizations and through ATMs, the volumes of unauthorized CNP transactions tend to increase.
A feature of the consideration of the territorial distribution of unauthorized operations is their concentration on the territory of the Central Federal District. This is explained by the fact that the majority of credit organizations serving individuals are located in the Central Federal District (Table 2, Fig. 9).

Table 2: Unauthorized operations number and volume by Federal districts

Federal districts and Federal significance cities	Number of unauthorized operations, units			Unauthorized transactions volume, thousand rubles		
	2016	2017	2018	2016	2017	2018
Moscow	65 403	85 819	138 422	277 642,90	325 539,50	522 507,32
Central FD	27 224	28 572	18 858	78 924,70	56 388,81	55 717,65
Volga FD	20 496	18 810	19 952	54 131,10	40 016,48	52 008,49
Siberian FD	15 911	12 915	13 103	39 335,90	23 525,70	27 984,69
Southern FD	10 619	8 459	10 689	30 002,20	17 594,90	26 560,88
Urals FD	9 895	9 357	9 374	28 036,70	19 920,15	27 126,41
North-Western FD	9 756	10 348	9 183	27 090,20	19 724,56	17 219,57
Eastern FD	7 177	5 801	5 038	23 812,40	14 587,96	24 748,08
Saint Petersburg	6 410	5 464	6 705	27 628,80	19 471,93	61 429,02
North Caucasus FD	3 797	2 208	1 808	11 945,60	3 953,19	5 059,70

The leaders in the number and volume of unauthorized operations are Moscow and the Moscow region. In terms of the volume of unauthorized transactions using payment cards, 64% of the corresponding indicators in 2018 accounted for Moscow.

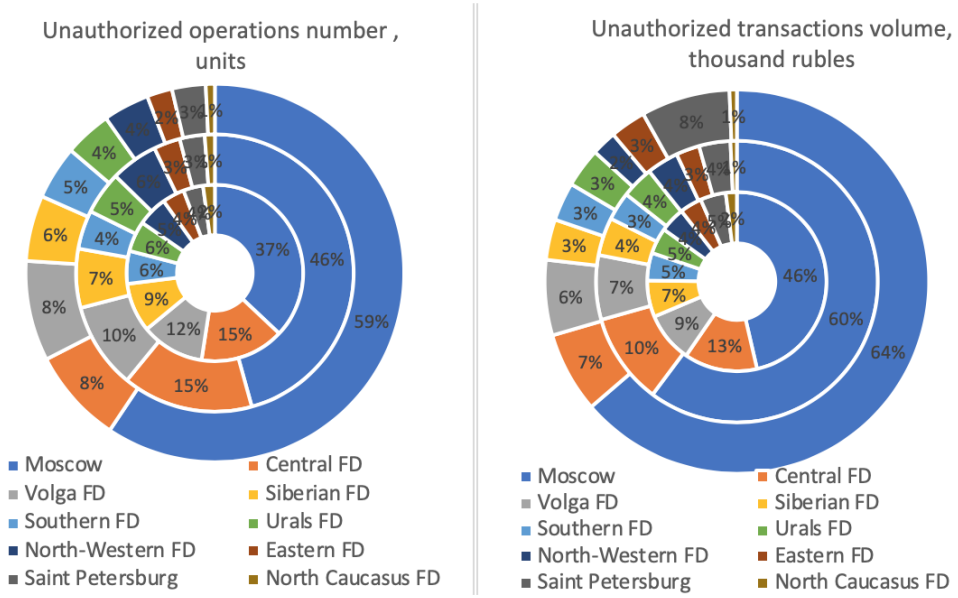

Fig. 9: Unauthorized operations number and volume by Federal districts

Unauthorized transactions committed outside the Russian Federation account for 44% of the number and 40.7% of the volume of all unauthorized transactions committed in 2018. In 2017, these indicators were 40 and 44%, respectively. In this regard, it is possible to predict the continuation of a trend in which the share of the volume and number of unauthorized operations committed in the Russian Federation in the total volume and number of all unauthorized operations is more than 50%.

Conclusion

Summarizing the results of the study, we can draw the following conclusions. A non-linear downward trend in the volume of unauthorized transactions committed using payment cards has been identified. Separately identified trends in the volume of unauthorized operations in the context of the place of their execution: trade organization, ATMs and CNP transactions. For volumes of unauthorized transactions committed through ATMs and payment terminals, a logarithmic trend is obtained. For volumes of unauthorized operations using payment cards committed in trade and service organizations, a linear trend model with a downward trend was obtained. For the volumes of transactions performed via the Internet and mobile communication devices, an equation of the exponential trend with an upward trend is obtained.

The analysis showed that for certain indicators it is difficult to obtain forecast values, since in the context of large-scale digitalization of the economy and the rapid development of information and financial technologies, stable patterns are still being formed. The results can be used by money transfer operators, as well as payment infrastructure service providers, to plan activities for risk management, internal control and information protection. Cybersecurity technologies should be prioritized.

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The "Knowledge Triangle" Is A Modern Concept for Managing the Development of Education, Science and Innovation

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Abstract

The purpose of the research is to consider the modern concept of the "Knowledge Triangle" as a universal approach to higher education for the development of innovative economies of states.
The theoretical and methodological base of the research is constituted by the fundamental principles of economic theory and practice, general scientific and special methods of knowing economic reality. The main methods that were used: structural-logical; comparative, the method of detailing and synthesis. The concept of the "Knowledge Triangle" is becoming a more popular method for regulating innovation and developing state innovation policy. The article provides a conceptual analysis of various definitions of the concept and its relationships with other structures, in particular with national innovation systems. The basic elements of the concept and the possibilities of its application in the development of innovative policy of state innovation policy the state are considered. Attention is focused on a systematic approach to regulating the processes of creating scientific knowledge and innovation. The participants in the "Knowledge Triangle" are described, which include higher educational institutions, authorities and private companies. Their tasks in the development of state innovation activity are determined. It is concluded that universities perform numerous functions; therefore their functions are usually determined by the national context. The quality of educational, scientific and innovative activities of universities varies from country to country and depends on historical factors, public policy and institutional structures.

Keywords: higher education, university, science, innovation.

Introduction

The concept of the "Knowledge Triangle" formalizes the links between the traditional "basic" functions of universities – teaching, research and social activities. Under this model, universities, implementing educational programs and scientific projects, generate scientific knowledge, and multi-faceted interaction with the general public helps to create new products, processes and services.

Higher education and research systems in the public sector of developed countries are in the process of transformation. Long-term political reforms of higher education led to duplication of measures of educational, scientific and innovative policies, and sometimes to contradictions between them.

The feedback between education and the innovation sector remains poorly understood. Scientific knowledge sharing is limited to promoting individual innovations for educational purposes.

The concept of the "Knowledge Triangle" implies not only the strengthening of the educational, scientific and innovative components, but also the strengthening of the relationships between them. The concept can become an attractive basis for a policy whose task is to link the creation of scientific knowledge with innovative activity.

The theoretical basis of the "Knowledge Triangle"

The "Knowledge Triangle" is formed from the three functions of universities in educational, scientific and innovative activities. The quality, intensity and significance of each of the three activities are very different in the production of new scientific knowledge by country and region.

M. Unger and W. Polt (2017) discuss the functioning of the "Knowledge Triangle", analyse the roles of its participants, their motivation to participate in this system and possible problems. An analysis of the cases revealed that in order to implement institutional transformations in universities and other organizations, certain incentive methods are required. These include federal or regional strategies with a targeted budget, competitive programs, special measures for the distribution of state grants, etc.

The various aspects of the "Knowledge Triangle" in OECD states can be found in the studies of M. Cervantes, which address issues related to improving the effectiveness of higher education and the growth of its socio-economic significance as the main element of the innovation system. The author's work of M. Cervantes (2017) reveals the content of the model, analyzes its promotion strategies, issues of evaluating the effectiveness of educational institutions, possible contradictions in relations with other subjects of scientific knowledge production. It is concluded that there is no universal model of universities and the "Knowledge Triangle". The reason for this is the peculiarities of educational systems in different countries.

M. Raunio, N. Nordling, M. Kautonen and P. Rasanen (2018) suggest using a platform approach in which users create new value for each other, generating a network effect and a combination of digital solutions and physical innovation support centres. The authors consider this model as a source of answers to modern challenges in the development of the "Knowledge Triangle" strategies and regional development based on scientific knowledge.

The theoretical and methodological base of the research is constituted by the fundamental principles of economic theory and practice, general scientific and special methods of knowing economic reality. The main methods that were used: structural-logical (when constructing the logic and structure of the work); comparative (when considering the various participants of the "Knowledge Triangle", concepts and models of innovative development and their analysis), the method of detailing and synthesis (to study the sources of financing science and innovation).

The purpose of the research is to consider the modern concept of the "Knowledge Triangle" as a universal approach to higher education for the development of innovative economies of states. To achieve the purpose of the research, the following tasks were set: to consider the prerequisites for the emergence of this concept; analyse the definition of the "Knowledge Triangle"; to identify the basic elements of the concept and the possibility of its application in the development of innovative policy of the state; to characterize the participants of the concept and determine their tasks in the development of innovative activity of the state; point out the special role of universities in shaping the contribution of education to science and the creation of innovations.

The "Knowledge Triangle" is a concept that involves an integrated approach to politics in the field of science, education and innovation with an emphasis on the role of universities as a subject of the production of scientific knowledge. The concept intersects with other models that focus on individual participants in the innovation system, namely the "third mission", the "entrepreneurial university" and the "triple helix", whose brief characteristics are reflected in fig. 1.

Having common properties, these concepts, however, have some differences. The "Knowledge Triangle" model focuses on activities in the educational, scientific and innovative fields, while the "triple helix" considers participants in the national innovation system. The concept is a functional model that characterizes two-way communication channels between the mentioned areas of activity.

The novelty of this concept lies in the focus on the role of education in the development of science and innovation. Thus, the “Knowledge Triangle” can be defined as a combination of participants in three areas (education, science, innovation), which expands the possibilities for joint activities (Fig. 2).

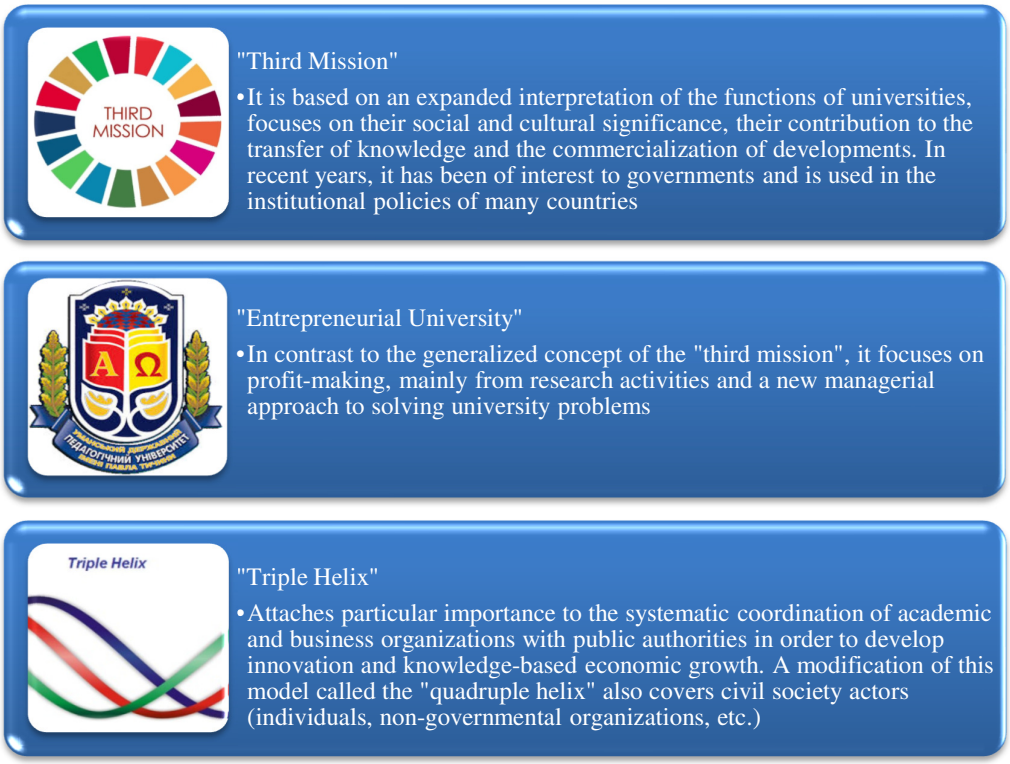

Fig. 1: Conceptual models of innovation system management
Source: (OECD, 2015), (Ranga and Etzkowitz, 2013), (Unger and Polt, 2017)

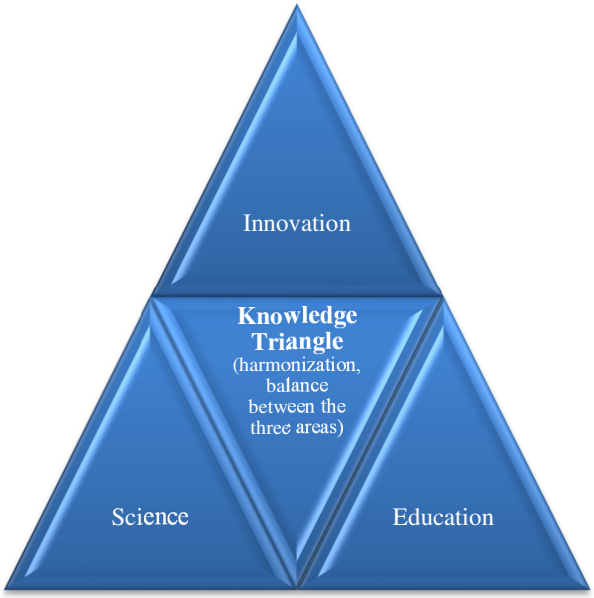

Fig. 2: The "Knowledge Triangle" of science, education and innovation
Source: (Unger and Polt, 2017)

This model, which belongs to the category of "systemic innovative concepts," should not be considered as a full-fledged substitute for any of the other schemes described earlier. Some of them are already used in institutional practice, becoming part of the strategies of scientific, technological and innovation policies in a number of states.

Let us turn to a detailed examination of the activities of participants involved in the "Knowledge Triangle", problems for politics in the formation of relationships between all its components, political approaches that favour or hinder the functioning of this system. This concept can be used as a political tool, socio-economic model or strategy for the development of academic institutions.

Higher Educational Institutions

Universities as the foundation of the "Knowledge Triangle" make the main contribution to the filling of all its components. Different types of institutions do not play the same role in different countries. Diversity is found even among institutions of the same category. We mention only some key aspects: topics of scientific and educational activities, resource base, organizational structure, internal management mechanisms and relations with other stakeholders. Depending on the degree of diversification of universities, increasing the effectiveness of their participation is ensured by flexible adjustment of political measures. Based on the policy of autonomy and increasing the responsibility of universities, many states are deliberately working to strengthen their image as socially significant institutions involved in the transfer of scientific knowledge.

Universities transfer and commercialize scientific knowledge using a variety of channels. Traditional core scientific knowledge channels include (Vonortas, 2017):

- Publication of articles, monographs, proceedings of conferences, reports;
- Communication in the framework of professional conferences, informal ties, working contacts;
- Research or consulting services for companies provided by universities and state scientific organizations;

- Hiring employees in the company and student internships, the institutional basis for which can be ensured by organizing an internship, joint scientific management of graduate students;
- Development of standards defining terminology, measurement and testing procedures, interfaces;
- The founding of companies by students and recent graduates with experience in scientific research (recently this channel has received increased attention).

Less traditional ways of disseminating scientific knowledge aimed at their commercialization include (channels of the second category):

- Collaborative research, research projects carried out and sometimes funded by universities and companies on a joint basis;
- Scientific and technological partnerships, such as the creation of formal alliances with a different number of participants, for example, research corporations; conclusion of long-term research agreements;
- Contract research conducted by order of companies to solve specific problems;
- Patenting and licensing are the main functions of technology transfer centres. They do not cause much interest among universities and companies, but enjoy the great attention of state bodies.

The transfer of scientific knowledge from universities and state scientific organizations has always been carried out. It is bidirectional and through the exchange of research results and business information provides mutually beneficial cooperation. Traditional methods of transferring scientific knowledge are still relevant.

The concepts of “entrepreneurial” and “civic” universities are based on an expanded understanding of the role of universities. Nevertheless, there are contradictions between these models, since the orientation toward entrepreneurship, modernization, and the pragmatic distribution of assets from the point of view of a commercial result may not correspond to public goals, which often seem unrealizable in the short term. However, with an innovative and flexible approach, the university is able to combine “entrepreneurial” and “socially-oriented” models, gaining additional benefits through the use of creative resources to develop new solutions.

As the main participants in the “Knowledge Triangle”, universities play an important role in its formation. Their positioning in this system is determined by managerial models and financing mechanisms. The activities of universities not only contribute to strengthening the position of the region in global competition for attracting companies, but also largely determine its social, demographic and cultural appearance. The attractiveness of the region for young educated people has a positive effect on the development of its infrastructure, including schools, kindergartens, and cultural events. In addition, universities stimulate economic growth in the regions.

Public Research Institutes

The global competition for scientific leadership and the continued disregard for basic research by the business have contributed to the fact that public research institutes have become hubs of research and development (R&D). They occupy an important place in the innovative systems of countries performing unique research for the commercial sector. They carry out research in specific areas or implement strategic projects. They operate in the field between state universities and business, carry out specialized applied research, and open up career opportunities for researchers from specific areas, sometimes going beyond the university environment and not always oriented to the market.

Private Companies

Business as a subject of the “Knowledge Triangle” is guided by other interests than state institutions and developers of innovation policy. Entering into partnership with state organizations, private companies proceed from commercial rather than public or political considerations. This interaction is carried out through different channels. Particular importance is attached to the mobility of specialists with varying degrees of training, which form the basis of the innovative potential of companies, as well as research conducted by state universities or research institutes that can be converted into

innovations (Jaffe, 1986; Karlsson and Andersson, 2005). The contribution of companies to the development of education and R&D depends on the method and degree of intensity of interaction with the public sector of science and universities.

State Authorities

State innovation policy has become networked and decentralized. Politicians consider universities as suppliers of competent specialists, subjects of national and regional innovation systems. Effective communication of scientific, educational and innovative activities is a key prerequisite for responding to social challenges. State stimulation of innovations in the "Knowledge Triangle" takes various forms: tax lending to companies, conclusion of contracts with universities for the implementation of targeted R&D, the organization of postgraduate programs and student internships, the promotion of university advisory services, often financed regional authorities. Being very heterogeneous, the functions of government and administrative structures do not lend themselves to a uniform classification.

The concept of "smart specialization" is related to the coordination of the regional participants. It serves as a key paradigm for the formation of subsystems combining various components of the "triangle" in order to achieve sustainable regional development based on scientific knowledge and innovations. (European Commission, 2012; OECD, 2014a,b). In many countries, regional or other administrative units (cities, municipalities) to one degree or another participate in the formation of scientific, technological and innovative policies. Mechanisms for coordinating scientific, technological and innovation policies vary depending on the constitutional status of regions in a given country.

University management models and their financing schemes vary depending on the distribution of power between the central and regional levels.

The "Knowledge Triangle" takes on various configurations depending on the composition of participants and the areas of responsibility of the authorities. Within its framework, state structures (ministries, regional and local administrations) perform the following main functions (Mazzucato, 2013):

- determine the legal and regulatory framework for scientific, educational and innovative activities in the public sector by delegating responsibilities to relevant bodies, as well as developing norms, standards and regulations for business;
- institutes of higher education, public and private sector R&D and innovative activity are provided with resources through financing, as well as indirect incentives (provision of tax benefits, etc.);
- support innovations by generating demand for them (innovation-oriented public procurement system);
- manage the needs for highly qualified personnel and the results of scientific and innovative activities;
- establish thematic or technological priorities that serve as a long-term guideline for the distribution of financing, planning the activities of the public and private sectors.

In an attempt to coordinate activities, public authorities face many challenges. Engaging universities in the region is not an easy task for politicians. Problems arise due to differences in their teaching and educational missions. In turn, management systems and financial obligations in relation to universities, innovation policy or regional development depend on the distribution of powers between the central and regional levels.

Such a complex set of factors can lead to contradictions in the application of stimulating mechanisms. Consequently, the ability of regional structures and mechanisms for planning and implementing innovative policies to ensure the integrity of the "Knowledge Triangle" varies.

Conclusions

Thus, the "Knowledge Triangle" is not the ultimate concept, but rather a guideline that stimulates productive interaction between the educational, scientific and business sectors. Political measures based on such an approach are designed to expand the academic culture of universities, encouraging them to focus not only on scientific excellence and teaching, but also on the development of innovation and the solution of socio-economic problems. The concept was formulated to address a number of tasks: stimulate innovation; strengthening the flow of private investment in R&D; overcoming difficulties in connection with the commercialization of R&D results.

The innovative activity of business is increasingly dependent on the scientific base of universities. The latter are also the main employers for researchers in countries and serve the interests of local and national economies.

In addition, they produce public goods – from the flow of scientific knowledge, the training of qualified specialists to the scientific support of decision-making processes, and products for private consumption, including business consulting services, patented inventions, and contract research.

At the same time, in the context of decentralized financing of higher education in many countries and competition for supporting scientific projects, universities are under tremendous pressure from the state and other stakeholders. In order to meet modern requirements and satisfy the request for inclusiveness and accessibility of higher education, they need reforms.

Enhancing the social and economic importance of universities is a key task of national policy, the solution of which requires new approaches. In this regard, the relevant departments of OECD countries have high hopes for the concept of the "Knowledge Triangle", which offers tools to strengthen the links between the educational, scientific and innovative functions of universities.

Meanwhile, universities as participants are very diverse, have different missions and structure for innovation, determined by country specifics. Their various types are capable of contributing to the development of innovations, carrying out educational, scientific and other activities and collaborating with other entities.

Effective tools to support the transfer of scientific knowledge are innovative strategies adapted at the local level. The traditional concept of scientific knowledge production as a linear and sequential process is being replaced by a systematic approach to scientific, educational and innovative policies.

The logic of the concept focuses on the links between educational, scientific and innovative activities. In accordance with it, any policy measure that focuses on any of these areas automatically affects the rest. The concept includes only those measures, criteria and tools that integrate all three of its components. The "Knowledge Triangle" encompasses different levels of politics, from municipal to international. Its strategic interpretation depends on the orientation of the national or regional innovation system and approaches to the management of science, technology and innovation in a particular country.

Thus, the "Knowledge Triangle" provides support for political decision-making, showing that investments in one of its components produce positive effects not only for the other components, but also for the external context, including the modernization of the labour market, stimulating structural changes in the economy, and improving the quality of life. Therefore, it should not be perceived as a theoretical concept, but as a practical platform.

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Asian Monetary Fund - Genesis and Challenges

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Abstract

The main objective of this paper is to characterise the Asian Monetary Fund (AMF) project as a manifestation of financial regionalism and to discuss its genesis, attributes, and challenges. The project of the Asian Monetary Fund was submitted by the Ministry of Finance of Japan in 1997; however, it has not been implemented to date. Association of Southeast Asian Nations (ASEAN) Plus Three (APT) states, led by China, Japan, and the Republic of Korea, chose the path of gradualism, establishing a regional architecture of financial cooperation on the base of the network of the swap agreements (Chiang Mai Initiative – CMI), which have since been replaced by multilateral contracts (Chiang Mai Initiative Multilateralisation - CMIM), mechanisms of policy dialogue, and macroeconomic surveillance. The authors conclude that the progress of institutionalisation under the crises episodes of 1997-98 and 2007-09 increased the probability of AMF establishment, but this is on the condition that several criteria are met, such as de-linking CMIM and the International Monetary Fund (IMF), increasing CMIM funds, enhancing the effectiveness of APT Macroeconomic Research Office (AMRO) activities, ensuring complementarity between CMIM/AMRO (AMF) and the IMF's actions to create synergy effects, expanding CMIM membership. The following research methods were used: statistical and descriptive analysis and comparative and critical studies.

Keywords: Asian Monetary Fund, financial regionalism, Chiang Mai Initiative

Introduction

The Asian Monetary Fund (AMF) project has been the subject of academic and political discussions since 1995, when the possibility of creating the Asian equivalent of the Bank for International Settlements (BIS) was considered. However, the circumstances of the Asian financial crisis of 1997-98 prompted Japan to submit a project for a new regional financial institution at the international forum. The aversion of the United States and China to the concept of an institution dominated by Japanese influences led to a premature failure of the proposal but inspired the search for a formula for financial cooperation inside the region affected by the consequences of financial turbulence from the late 1990s. The Chiang Mai Initiative (CMI) and the Economic Review and Policy Dialogue (ERPD) gave rise to closer coordination of the financial policy of the Association of Southeast Asian Nations (ASEAN) Plus Three (APT) countries at the dawn of the new century, and then the global financial crisis of 2007-09 inspired the decision to replace the CMI with a single facility, Chiang Mai Initiative Multilateralisation (CMIM), as well as the establishment of a new macroeconomic surveillance mechanism, the APT Macroeconomic Research Office (AMRO). The creation of a new regional financial institution has once again become highly likely, although a number of conditions still need to be met.

The main objective of this paper is to characterise the project of the Asian Monetary Fund as a manifestation of financial regionalism and to discuss its genesis, attributes, and challenges. The structure of the paper is as follows: a review of the literature on the AMF project and the theoretical

frameworks of financial regionalism is followed by a discussion of the characteristics of the AMF project as a framework of financial regionalism, which is followed by an overview of the major challenges facing the AMF project and, finally, the authors' conclusions. The following research methods were used: statistical and descriptive analysis and comparative and critical studies.

Literature Review

AMF Project

The AMF project has attracted the attention of many scholars over the years. Narine (2003) generated insights into the implications of the Asian financial crisis of 1997-98 for regional financial architecture, highlighting the need for the establishment of an effective system of protection against global volatilities. Lee (2006) adopted an identity approach to explain the reasoning behind the exclusion of the United States from Japan's AMF project. Grimes (2011) analysed regional liquidity arrangements established in East Asia through the prism of experiences of the global financial crisis. Kim and Yong Yang (2011) conducted research on regional financial and monetary cooperation in Asia, paying special attention to challenges resulting from the global financial crisis and global imbalances for the newly established CMIM and other financial initiatives, such as the Asian Bond Market Initiative (ABMI), the Asian Bond Fund (ABF), and regional surveillance mechanisms. Menon and Hill (2014) studied the evolution of financial safety nets in Asia, recognising the potential of CMIM as a prospective complement to the International Monetary Fund (IMF) on the condition that the total size of the facility or the de-linked IMF portion of funds and the scope of membership are increased. Kawai (2015) summarised the progress of regional financial initiatives, that is, CMIM, the ERPD, and the AMRO, pointing at key prerequisites that need to be met for AMF establishment. Bobowski (2018) contrasted the AMF project with the already established Asian Development Bank (ADB) and Asian Infrastructure Investment Bank (AIIB) through the prism of the role of Japan in the financial regionalism of East Asia in the 21st century. Hyun and Paradise (2019) conducted a comparative analysis of European and Asian financial arrangements over the years and their impacts on the financial stability of both regions.

Financial Regionalism

Although there is no single, coherent definition of financial regionalism, one can distinguish its two basic forms: a meeting or a forum for financial and (macro) economic issues and a regional financial agreement (Hamanaka 2010, 78-79). The financial forum is often a place for discussion of economic and financial issues among representatives of regional financial bodies. Regular contact and mutual understanding are conducive to closer regional financial cooperation. Meetings on economic supervision are of particular importance, usually involving the exchange of economic and financial data and continuous monitoring of the economic situation in partner countries using the mutual pressure mechanism. The second form of financial regionalism is a regional financial agreement, that is, a regional development bank or regional monetary fund, quite often involving three or more countries of the region. The signatory countries accumulate common financial resources, which they then borrow or withdraw when necessary. The region may also be covered by a network of bilateral repurchase arrangements (repos) or swap arrangements, which may be multilateralised over time; however, this does not fall under the logic of regionalism. For the purpose of securing repayment, financial arrangements are usually accompanied by an economic surveillance mechanism to monitor the stability of member states' economies or the feasibility of projects. Depending on the specificity of the regional financial agreement, the leading country used to bear specific costs in the form of contributions to the institution.

Asian Monetary Fund as a manifestation of financial regionalism

The Asian Monetary Fund project was officially announced in August 1997 by the then Deputy Minister of Finance of Japan, Eisuke Sakakibara, after nearly two years of discussions inspired by Fraser's concept regarding the Asian version of the BIS. The outline of the new regional financial institution was developed by a working team established at the Institute of Monetary Affairs,

operating under the auspices of the Ministry of Finance of Japan (Bobowski 2018, 292). The AMF project was presented during the anti-crisis meeting in Tokyo on 11 August 1997, on the occasion of arrangements for a rescue package for Thailand worth USD 1.72 billion, involving, in addition to Japan, Australia, and Brunei Darussalam, China together with Hong Kong, Indonesia, Malaysia, the Republic of Korea, Singapore, and three international organisations, that is, the ADB, the International Monetary Fund, and the World Bank (WB). The favourable circumstances of solidarity in the countries of the region during the Asian financial crisis of 1997-98 prompted the Japanese delegation to submit the AMF project at that time. The newly established institution was expected to involve Japan, Australia, Brunei Darussalam, the Philippines, Hong Kong, Indonesia, Malaysia, the Republic of Korea, Singapore, and Thailand and operate with initial capital at USD 100 billion, with Japan's contribution of USD 50 billion (Wang 2000, 207; Calder 2008, 27). The subject of the discussion at that time did not become the so-called institutional link with the IMF, which only increased the resistance of U.S. diplomacy to Japan's project.

As early as September 1997, Sakakibara initiated formal consultations with partners from Australia, China, Hong Kong, Indonesia, Malaysia, the Republic of Korea, and Singapore, gaining the official support of the 10 ASEAN member states and the Republic of Korea. Australia and Hong Kong presented a neutral position, while the U.S. Department of State and Department of the Treasury as well as high representatives of the IMF opposed the project. China was unwilling to form a new regional financial institution dominated by Japanese influences (Pempel 2012, 262).

The sources of the failure of the AMF project in 1997 can be seen not only in the attempt to exclude the United States from the new financial institution and the silent opposition of China but also in the scepticism of the Bank of Japan (BoJ), which opted for a low-profile regional institution with the option of gradual development of its structures and agenda. The AMF project can also be considered as a challenge to the concept of Asian regionalism of that time, coming down to elimination of U.S. influences in the newly established regional institutions. The result of the AMF fiasco was the New Miyazawa Initiative, which offered financial assistance to the countries of the region from a USD 30 billion fund (Grimes 2004, 193; Kawai 2006, 32). On the basis of this initiative, during the Meeting of Finance Ministers of APT in May 2000, a regional network of swap arrangements was established (CMI). By April 2009, 16 bilateral swap arrangements had been concluded, totalling USD 90 billion (Table 1).

Table 1: Bilateral swap arrangements under the Chiang Mai Initiative, April 2009 (USD billion)

From \ to	China	Japan	Republic of Korea	Indonesia	Malaysia	Philippines	Singapore	Thailand	Total
China	-	3.0[a]	4.0[a]	4.0	1.5	2.0[a]	-	2.0	16.5
Japan	3.0[a]	-	13.0[b]	12.0	1.0[c]	6.0	3.0	6.0	44.0
Republic of Korea	4.0[a]	8.0[b]	-	2.0	1.5	2.0	-	1.0	18.5
Indonesia	-	-	2.0	-	-	-	-	-	2.0
Malaysia	-	-	1.5	-	-	-	-	-	1.5
Philippines	-	0.5	2.0	-	-	-	-	-	2.5
Singapore	-	1.0	-	-	-	-	-	-	1.0
Thailand	-	3.0	1.0	-	-	-	-	-	4.0
Total	7.0	15.5	23.5	18.0	4.0	10.0	3.0	9.0	90.0[d]

[a] Arrangements were concluded in local currencies; amounts are given in USD equivalent.
[b] Bilateral swap arrangements (BSAs) between Japan and the Republic of Korea included both USD swaps (USD 10 billion from Japan to the Republic of Korea and USD 5 billion from the Republic of Korea to Japan) and swaps in local currencies (USD 3 billion equivalent from Japan to the Republic of Korea and from the Republic of Korea to Japan). In December 2008, swaps in local currencies were increased from USD 3 to USD 20 billion equivalent; this limit was maintained until the end of 2009.
[c] An additional commitment of USD 2.5 billion was made on 18 August 1999 as part of the New Miyazawa Initiative.
[d] The table does not include the ASEAN Swap Arrangements (ASAs), which amounted to USD 2 billion at the time. The ASAs were formed in 1977 among the five founding members of ASEAN; under the CMI, they were extended to all member countries. In November 2000, the value of the ASAs was increased to USD 1 billion. A decision to double the limit was made in May 2005.
Source: MoF (2016).

The favourable stance of the U.S. Department of Treasury and representatives of the IMF regarding the new liquidity support instrument was because the use of bilateral swap arrangements was accompanied by the requirement to resort to IMF programmes when applying for support exceeding 10% of the bilateral swap arrangement (BSA) limit granted. The official premise for establishing the so-called IMF link was the need to eliminate the moral hazard, associated with excessive risk, to which countries offering loans to each other, secured at the same time due to belonging to other loan institutions, would be exposed.

In parallel with the CMI, in May 2000, a new mechanism was created to promote macroeconomic and financial stability in the region, the Economic Review and Policy Dialogue, which became an integral component of the CMI five years later. The ERPD was to be a forum for the exchange of information, political discussions, and supervision to counteract future financial crises in the region. The problem was the absence of representatives of central banking and the absence of a competent secretariat that could supervise the mechanisms for monitoring the economic and financial situation of the countries in the region. The inclusion of the ERPD in the CMI was to favour the control of borrowers in the context of their economic and financial condition, political adjustments, and emerging risks during the liquidity support period. Thanks to the existence of such a structured network of financial cooperation between the countries of the region and information transmission channels and data exchange to monitor and predict market phenomena that may threaten the financial stability of East Asia, among other factors, Japan became aware of Indonesia's difficult situation in April 2009 and decided to double the financial assistance to USD 12 billion.

During the 11th Meeting of the Ministers of Finance of APT in May 2008, they agreed to multilateralise the Chiang Mai Initiative to form CMIM, which formally replaced the CMI in March 2010. At that time, the ERPD became an integral component of CMIM. In February 2009, a decision was taken to increase the size of the CMIM fund from the existing USD 80 billion to USD 120 billion to stabilise regional financial markets and restore confidence in the market. Importantly, Japan and China made an equal contribution of USD 38.4 billion, which translated into equal shares in the CMIM fund of 32%, and the Republic of Korea contributed half of this amount, which translated into the participation of the 'Plus Three' countries at the level of 80%. Meanwhile, the 10 ASEAN countries participated at the level of 20% (Bobowski 2015, 193). Hong Kong participated in the Chinese contribution, obtaining a separate multiplier and the pool of votes resulting from the contribution, although the basic votes, equal to the pool allocated to Japan and the Republic of Korea, were converted in full to mainland China.

After the changes that took effect on 17 July 2014, the CMIM fund was doubled to USD 240 billion (Table 2), and the share of the so-called IMF link was reduced to the level of 70%, which meant an increase of the limit for use by CMIM signatory countries to 30%, without the need to refer to the credit conditions of the abovementioned institution, with the prospect of a further increase to 40% in 2014 (which, however, ultimately never materialised). The CMIM fund doubled while maintaining the proportions from before 17 July 2014. In other words, the contribution of the 'Plus Three' countries

remained at 80%, while that of the 10 ASEAN countries remained at 20%, although the total distribution of votes was slightly different: the 'Plus Three' countries' share of votes declined to 71.59%, and the 10 ASEAN countries' share of votes increased to 28.41%. The maturity of the swap covered by the IMF link was extended from 90 days to a year; this also extended the so-called upholding period from two to three years, with a limit of two renewals. The maturity of the swap not covered by the IMF link was extended from 90 days to six months, and the maintenance period increased from one to two years, with a limit of three renewals (this is the so-called CMIM Stability Facility - CMIM-SF).

Table 2: Chiang Mai Initiative Multilateralisation, as per the changes enacted on 17 July 2014

	Financial contribution USD billion (%)	Lending multiplier	Maximum swap amount (USD billion)	Voting power (USD billion, %)		
				Basic votes	Votes resulting from the contribution	Total voting power, USD billion (%)
Plus Three	192.00 (80.00)	-	117.30	9.60	192.00	201.60 (71.59)
China	68.40 (28.50)	0.5	34.20	3.20	68.40	71.60 (25.43)
Hong Kong	8.40 (3.50)	2.5	6.30	0.00	8.40	8.40 (2.98)
Japan	76.80 (32.00)	0.5	38.40	3.20	76.80	80.00 (28.41)
Republic of Korea	38.40 (16.00)	1	38.40	3.20	38.40	41.60 (14.77)
ASEAN	48.00 (20.00)	-	126.20	32.0	48.00	80.00 (28.41)
Brunei Darussalam	0.06 (0.025)	5	0.30	3.20	0.06	3.26 (1.158)
Indonesia	9.104 (3.793)	2.5	22.76	3.20	9.104	12.304 (4.369)
Cambodia	0.24 (0.100)	5	1.20	3.20	0.24	3.44 (1.222)
Lao People's Democratic Republic	0.06 (0.025)	5	0.30	3.20	0.06	3.26 (1.158)
Malaysia	9.104 (3.793)	2.5	22.76	3.20	9.104	12.304 (4.369)
Myanmar	0.12 (0.050)	5	0.60	3.20	0.12	3.32 (1.179)
Philippines	9.104 (3.793)	2.5	22.76	3.20	9.104	12.304 (4.369)
Singapore	9.104 (3.793)	2.5	22.76	3.20	9.104	12.304 (4.369)
Thailand	9.104 (3.793)	2.5	22.76	3.20	9.104	12.304 (4.369)
Vietnam	2.00 (0.833)	5	10.00	3.20	2.00	5.20 (1.847)
APT	240.00 (100.00)	-	243.50	41.60	240.00	281.60 (100.00)

Source: AMRO (2016b).

As part of CMIM, the CMI Precautionary Line (CMIM-PL) was also launched to provide support in the face of a crisis threat, not as a consequence. In this case, the maturity was one year for the limit

covered by the IMF link and six months for the remaining amount, with a maximum duration of up to two years. The eligibility criteria for obtaining preventive assistance covered five areas: external position and market access, fiscal policy, monetary policy, condition of the financial sector and supervision, and data adequacy. A country belonging to CMIM cannot simultaneously use the swap amount under CMIM-SF and CMIM-PL.

The CMIM-PL mechanism was introduced due to the ineffective preventive impact of the previous CMI format, a clear example of which was the mini crisis of Korean won at the end of 2008. At that time, the authorities of the Republic of Korea decided not to use the CMI network to obtain liquidity support, directing the application directly to the U.S. Federal Reserve Bank. There were at least three reasons for this. First, CMI swap arrangements were available in a crisis, not as a preventive measure. Second, due to exceeding the swap amount by 20%, the Republic of Korea would be forced to use IMF programmes, whose legitimacy since the Asian financial crisis of 1997-98 remains weak. Third, the use of bilateral swap arrangements with the Bank of Japan or the People's Bank of China would mean obtaining support at a far-reaching level of USD 3 billion and USD 4 billion, respectively, in local currency, which in the context of the lack of full convertibility of RMB to USD created additional complications.

The usefulness of CMIM-PL in the context of crisis prevention will be verified in the future, but it is undoubtedly a significant step forward in the development of regional financial cooperation. Since May 2012, representatives of the APT countries have been working on the so-called ERPD matrix, consisting of economic and financial indicators of all signatory countries. The matrix's task is to improve the qualification of signatory states for preventive support. Work continues to increase the usability of the matrix.

In May 2011, the AMRO was created in Singapore, which aimed to ‘monitor and analyse the economies of the region for early detection of threats, rapid implementation of countermeasures, and effective decision making at the CMIM level’ (Oba 2014, 65).

In April 2016, representatives of the governments of the APT countries and Hong Kong signed the Agreement Establishing ASEAN Plus Three Macroeconomic Research Office, that is, the AMRO Agreement, which transformed the existing corporation into an international organisation with full legal personality and legal capacity to implement its basic functions. The AMRO was equipped with statutory bodies, that is, the Executive Committee, composed of representatives of the ministries of finance and central banking of each of the signatory countries (with the exception of Hong Kong, which had one seat on the Committee), the director, the Advisory Panel, and staff.

The independence of the AMRO is still problematic, if only due to the link with the activities of the Executive Level Decision-Making Body (ELDMB) created by representatives of the ministries of finance and central banking of the signatory countries of CMIM, which in fact perform supervisory functions in relation to the AMRO. In other words, the AMRO's activities are controlled by the East Asian governments; thus, like CMIM, it will evolve under the influences of the intra-regional play of stakeholder states. Importantly, according to art. 13 of the AMRO Agreement, the organisation is fully financially dependent on the contributions of the members, and it cannot borrow money without the consent of the Executive Committee. In principle, the operating costs of the AMRO are borne by the government of Singapore; however, expenditures are to be the subject of regular settlements among the other signatories (AMRO 2016a). There is uncertainty regarding whether the final shape of CMIM will prefer the interests of the lenders (China, Japan, Republic of Korea) or the borrowers (ASEAN), but there is no doubt that, in the absence of a threat of dictate from either party, the proposed system guarantees relative pluralism and balance. China along with Hong Kong, Japan, and ASEAN have the same pool of votes, 28.41%, while the Republic of Korea has a smaller share, 14.77%. With the rule of a two-thirds majority, this allows each party to cast a casting vote (Pitakdumrongkit 2015). No single APT country has the ability to block joint decisions on its own; however, there is a concern regarding the ability to conciliate and cooperate in accordance with such rules in the future.

Challenges facing the Asian Monetary Fund project

The creation of the Asian Monetary Fund may be of critical importance, due to the wide spectrum of both external risks, that is, normalisation of monetary policy in the United States and deepening of the crisis in the Eurozone or outbreak of geopolitical conflict (e.g. United States versus China) and internal risks, that is, an increase in the public and private indebtedness of the region's countries, macroeconomic policy errors, the sensitivity of regional financial markets, and insufficient policy coordination of the region's countries in areas such as crisis management, economic supervision, and political dialogue.

In this context, the challenge for the APT countries is to maximise the effectiveness of regional macroeconomic supervision under the AMRO for the gradual reduction and, thus, the elimination of the IMF link so that the countries of the region can benefit from regional financial support mechanisms in both crisis and pre-crisis situations, without reference to IMF programmes. In the context of the AMRO, obtaining the status of an international organisation with legal personality and full legal capacity is undoubtedly an important step on the way to developing credit conditions independent of the IMF programmes and monitoring the economic and financial condition of the applicant countries and those already benefiting from CMIM support (in the case of activation of the stability fund).

In the context of the above, the following actions seem to be necessary (Kawai 2015, 27):

- gradual elimination of the IMF link;
- clarifying the conditions and procedures for activating CMIM-SF and CMIM-PL, in particular to avoid IMF programmes in the circumstances of local crises of small scale;
- guaranteeing the AMRO's independence for improving the quality of the regional economic supervision mechanism under the ERPD, the efficient launch of interventions under CMIM, and the formulation of adequate credit conditions independent of the IMF;
- further increasing CMIM funds and/or lending multipliers and then the financial liquidity available to signatory countries, except for Japan and China;
- supplementing CMIM with bilateral swap arrangements with countries from and outside the region, significantly increasing the available liquidity resources;
- improving the quality of economic surveillance by transitioning from the information exchange phase towards the application of mutual pressure and due diligence;
- physical contribution to CMIM in the form of capital or amounts from official foreign reserves of the countries of the region;
- CMIM extension to other ASEAN Plus Six countries, that is, Australia, India, and New Zealand.

Meeting the above conditions could pave the way for the creation of an Asian Monetary Fund equipped with the necessary financial resources, competence, organisational resources, and political mandate. The role of secretariat could be played by the AMRO. Being independent of the IMF does not mean, however, that cooperation and coordination between the AMRO/CMIM and the IMF is not necessary. Given the still limited experience and resources at the disposal of Asian financial cooperation structures and the need to coordinate activities in circumstances of a greater scale of turbulence in the financial markets of the region, it is necessary to ensure mutual complementarity and synergy of the IMF and the AMRO/CMIM (AMF) activities (Kawai 2015, 27-28). The Asian region must develop its own model of crisis management coordination.

Conclusions

Financial cooperation in the Asian region has contributed to strengthening mutual relations and increasing mutual interdependence. Therefore, there is a need to optimise the institutional architecture of the region in such critical areas as coordination of financial policy, macroeconomic supervision, and crisis management. The AMF project seemed to be a natural consequence of the difficulties experienced as a result of the crisis of the late 1990s and the growing role of the dynamically developing region in the global economy and internal integration. Japan's hegemonic ambitions were confronted with the influences of the United States, China, and the IMF in the region,

therefore taking the path of gradualism and starting with a low-profile institution turned out to be the only available option.

The AMF project can be supported by, among other factors, the co-leadership of China and Japan within CMIM (Haggard 2011, 17), providing the Republic of Korea with a proportionally larger number of votes than results from its share in the region's economy, granting the AMRO the status of an international organisation after five years, consistent efforts to increase CMIM funds, and a reduction of the link to IMF programmes.

Challenges for the future undoubtedly remain: eliminating the IMF link while ensuring consistent cooperation with this organisation, adjusting the size of the liquidity support funds available under CMIM to the needs of the borrowers, ensuring real independence and professionalism of the macroeconomic surveillance mechanism under the auspices of the AMRO, and, finally, expanding the group of members. There is no doubt that the impact of the U.S. administration on the possible success of the AMF project remains far more limited under the current circumstances than it was in the situation 20 years ago.

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Conditions for Development of The United States from 1990 To 2016

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Abstract

The United States of America is one of the most competitive economies in the world. The country's competitive advantage is due to its specificity. Therefore, the main goal of this article is to identify the main competitive advantages of the modern U.S. economy. An analysis was conducted of the period from 1990 to 2016. This article presents the main macroeconomic indicators, including gross domestic product (GDP) growth rate, GDP per capita, consumption rate, and trade exchange. Next, the authors analysed the innovation and human capital indicators for the U.S. economy. In addition, this article presents a brief overview and evaluation of government activities. The analysis allows for identifying the strengths and weaknesses of the U.S. economy. The authors used data from World Bank, Organisation for Economic Co-operation and Development (OECD), and Global Competitiveness Index (GCI) databases.

Keywords: Competitiveness, Innovation, Human Capital, Government, U.S. Economy.

Introduction

The countries that are at the top of the competitiveness rankings differ significantly. The competitive advantage of a given country results from its characteristics. The macroeconomic indicators achieved by the country are immensely relevant in determining the country's competitiveness. Contemporary growth theories also indicate the importance of human capital and innovation as factors of economic growth. The efficiency of the functioning of the economy is significantly influenced by the institution of the state and the government's policy. A holistic analysis of the aspects shaping modern market economy systems can help to identify factors of their competitiveness. In addition, this article analyses the development conditions for the global leader, the United States, from 1990 to 2016.

The free market economy of the United States is an example of the Anglo-Saxon economic system. It is one of the largest and the most competitive in the world. Because of its history, the United States is a country that is significantly diverse in terms of culture, ethnicity, religion, and morals. The United States occupies a leading position in the global economy. It is a member of many international organisations, such as the North American Free Trade Agreement (NAFTA), the United Nations (UN), the World Trade Organisation (WTO), the Organisation for Economic Co-operation and Development (OECD), the International Monetary Fund (IMF), the Group of Eight (G8), and the Group of Twenty (G20).

The Economic Situation

The United States generates over 35% of the gross domestic product (GDP) of all the OECD countries. The economic growth rate in the United States until 2000 was higher than the OECD average. The United States has suffered from the effects of the crises of 2000 and 2008, when the GDP growth rate significantly dropped (Dobrzanski, 2009). In 2009, GDP fell by almost 4%. However, since 2010, the economy has rebounded, and the growth rate reached a value close to 1.5% in 2016.

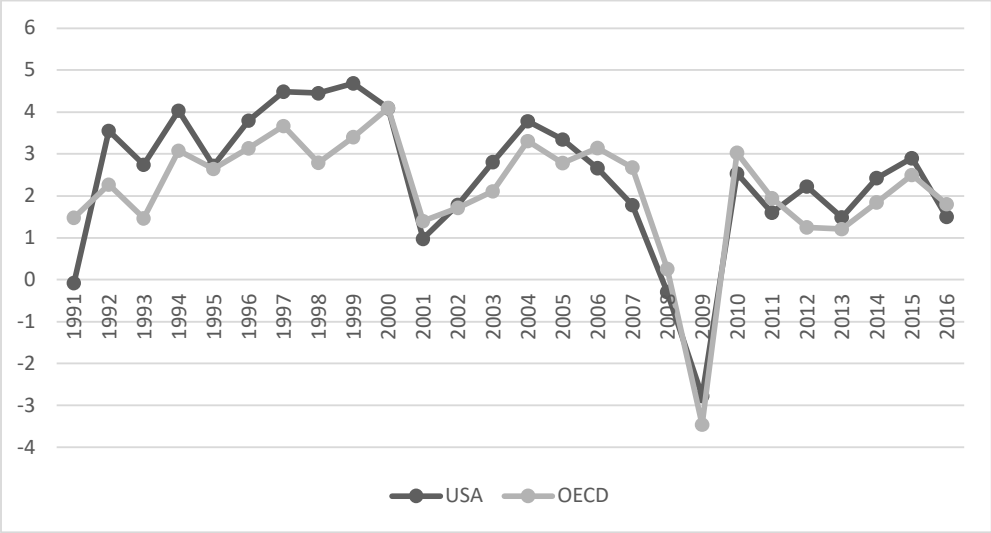

Fig. 1 : GDP growth in the United States and OECD countries from 1990 to 2016
Source: Authors' own study based on the OECD database

Moreover, the United States is a leader in terms of GDP per capita, and this indicator is improving year by year. In 2016, the average resident generated almost 58,000 USD, exceeding the average value for the OECD countries by over 15,000 USD. The service sector generates 77% of the United States' GDP; meanwhile, the industry sector generates 22%, and agriculture generates just over 1%.

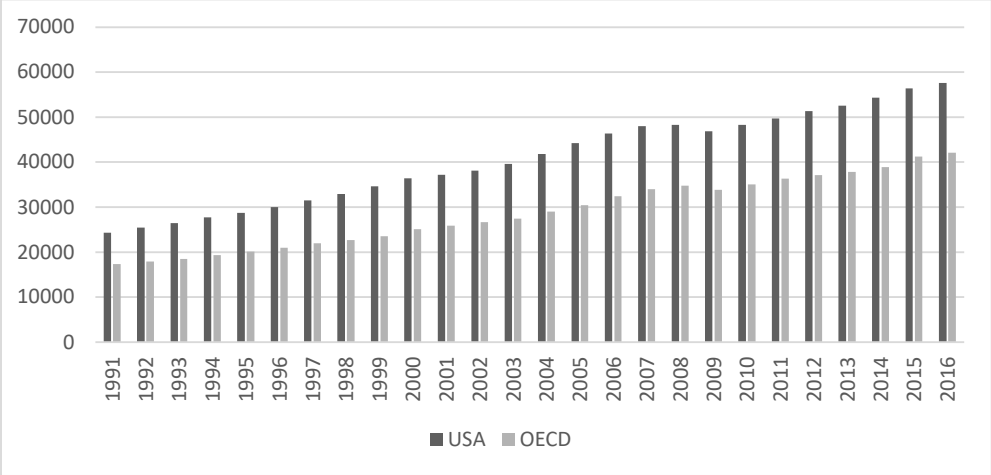

Fig. 2: GDP per capita in the United States and OECD countries from 1990 to 2016
Source: Authors' own study based on the OECD database

The consumption rate in the United States is relatively high. In the second half of the 1990s, it amounted to 4 to 5% per annum; it then remained at around 2 to 3% until the crisis in 2008. However, in subsequent years, it returned to a high level exceeding 3%. In the case of OECD countries, the trend is similar, although the growth rate is lower. Individual consumption accounts for 70% of economic activities in the United States. Therefore, the increase in consumer spending is a positive stimulus for the U.S. economy. It also ought to be noted that the United States, as a global giant, helps to develop the economies of other countries. A decline in consumption in this country exerts a negative impact on global economies, which export a large proportion of their goods to the United States.

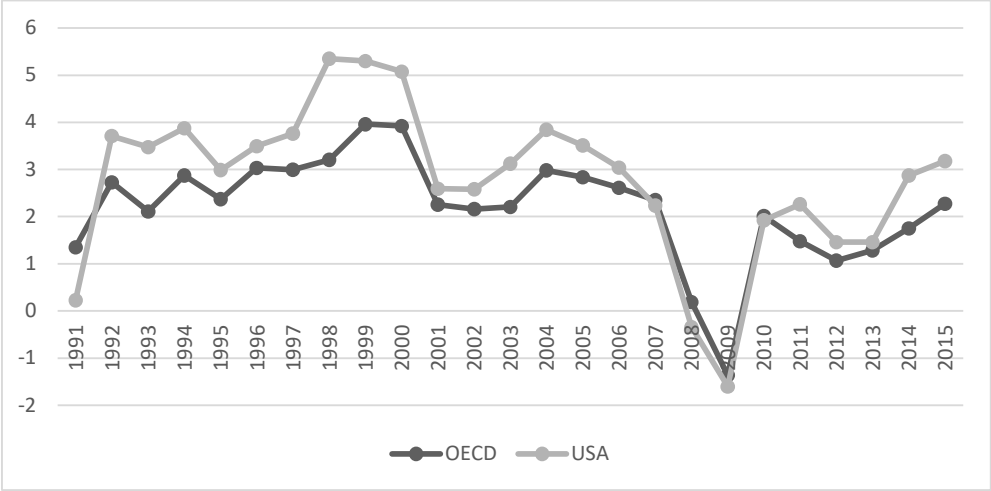

Fig. 3: Private consumption growth in the United States and OECD countries from 1991 to 2015

Source: Authors' own study based on the World Bank database

The United States is a country that plays a key role in international trade. Due to the size of its internal market, U.S. imports far exceed exports. Both imports and exports are characterised by a positive trend and in the period from 1991 to 2015 increased more than threefold, from 414 billion USD to 1,455 billion USD.

The United States is the largest importer in the world. Imported goods are mainly passenger cars, ships, computers and electronic devices, mineral resources, fuel, sugar, fruits, tea, coffee, clothes, shoes, and wood. In terms of export value, the United States ranks third in the world. Exports mainly consist of machinery and equipment, computers, airplanes, cars, weapons, plastics, drugs, grains, and tobacco.

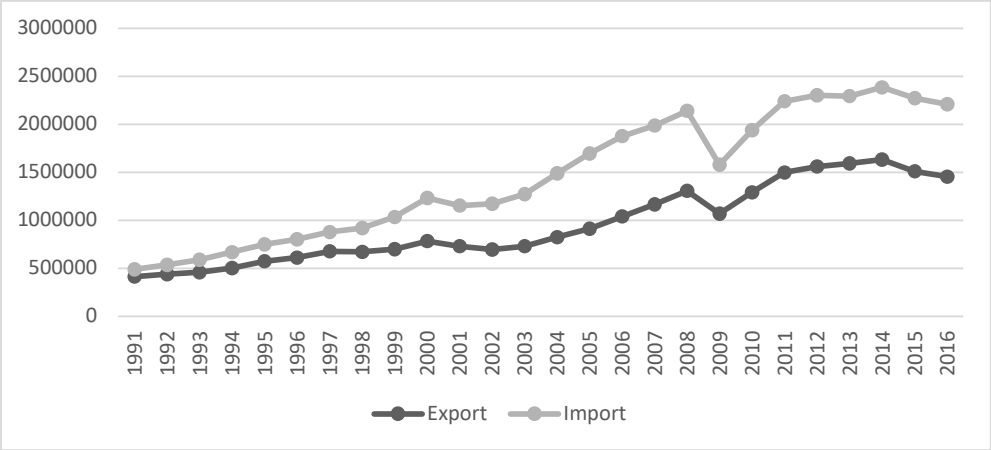

Fig. 4: Goods exports and imports in the United States from 1991 to 2016
Source: Authors' own study based on the World Bank database

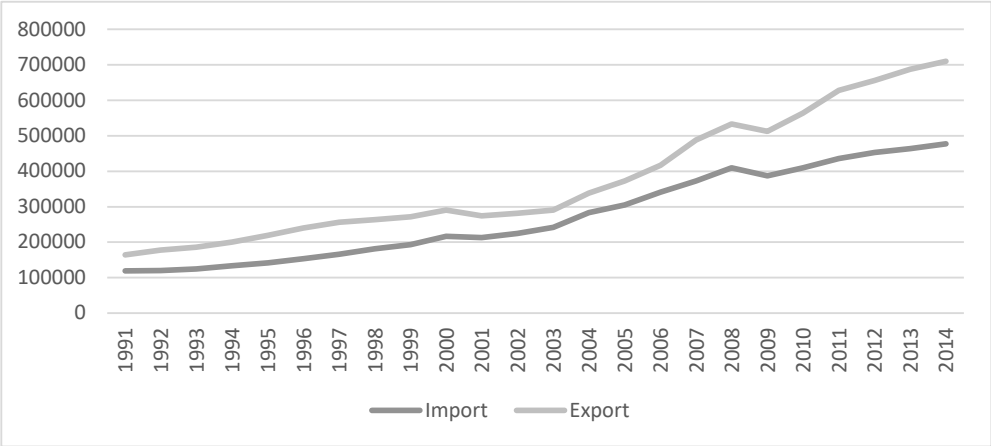

Fig. 5 : Services exports and imports in the United States from 1991 to 2014
Source: Authors' own study based on the OECD database

Due to the high value of its imports, the United States has a negative current account balance. This value has been falling since 2009, and it reached -2.25% of GDP in 2014.

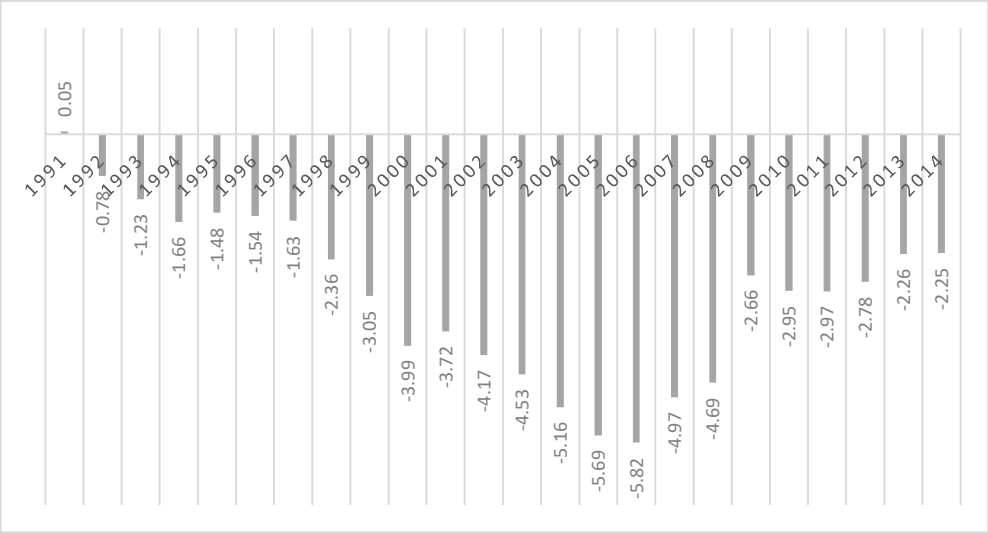

Fig. 6: Current account balance in the United States from 1991 to 2014
Source: Authors' own study based on the OECD database

The United States has a high share of trade in goods from the information and communication technology (ICT) sector. In the years between 2000 and 2015, however, this ratio dropped from 17% to 14% for imports and from 20% to 9.5% for exports.

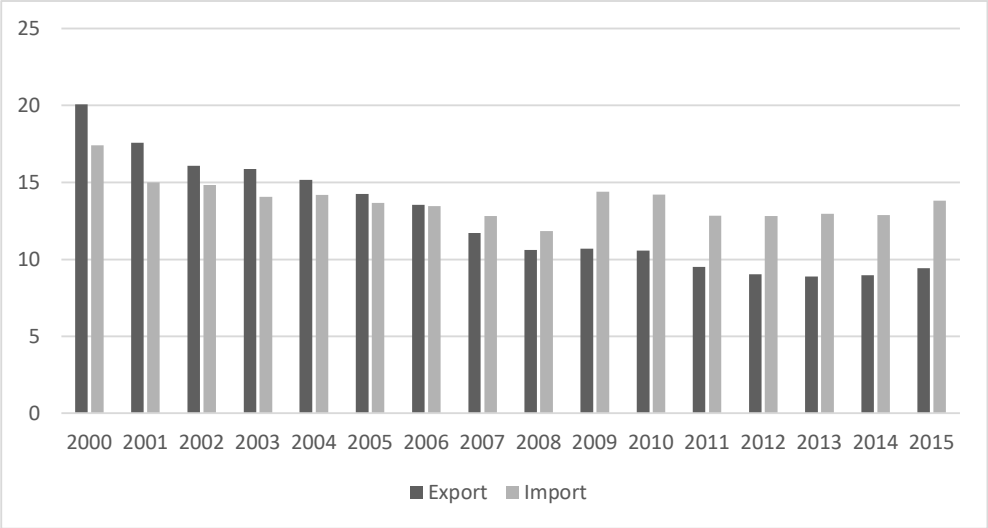

Fig. 7: ICT exports and imports in the United States (% world imports/exports) from 2000 to 2015
Source: Authors' own study based on the World Bank database

There was a decline in the proportion of high-tech goods in U.S. exports. In 2000, exports of these goods accounted for 34% of U.S. exports. However, they accounted for only 20% in 2016.

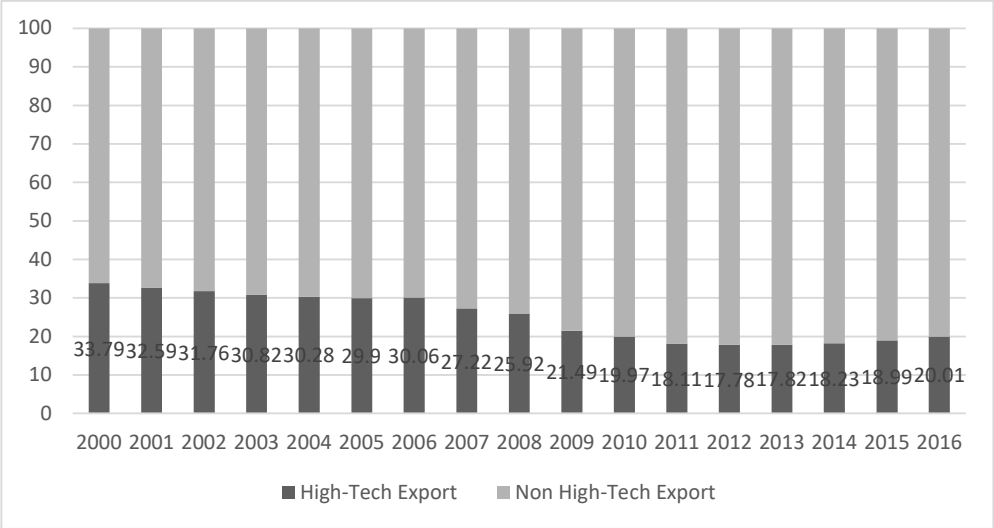

Fig. 8: The proportion of high-tech goods in the United States' exports from 2000 to 2015
Source: Authors' own study based on the World Bank database

The level of Innovation in the Economy

In the years between 2012 and 2017, the United States of America was rated as one of the most competitive economies in the world, according to the Global Innovation Index. In 2016, it maintained third position. The United States was very highly rated in the category of indicators of increasing effectiveness, such as higher education, training, goods market efficiency, technological preparation, and market size; this is confirmed by its subindex B rating (first place among 138 researched countries).

Table 1: United States in the rankings of the Global Innovation Index 2016-2017

Global Competitiveness Index	2017-2016	
United States	Place out of 138	Score (1-7)
Global Competitiveness Index	3	5.7
Subindex A: Basic requirements	27	5.4
First pillar: Institutions	27	5
Second pillar: Infrastructure	11	5.9
Third pillar: Macroeconomic environment	17	4.6
Fourth pillar: Health and primary education	39	6.2
Subindex B: Efficiency enhancers	1	5.8
Fifth pillar: Higher education and training	8	5.9
Sixth pillar: Goods market efficiency	14	5.2
Seventh pillar: Labour market efficiency	4	5.5
Eighth pillar: Financial market development	3	5.6
Ninth pillar: Technological readiness	14	6
Tenth pillar: Market size	2	6.9
Subindex C: Innovation and sophistication factors	2	5.6

Eleventh pillar: Business sophistication	4	5.6
Twelfth pillar: Innovation	4	5.6

Source: Authors' own study based on the Global Innovation Index 2016/17

Table 2: United States in the rankings of the Global Innovation Index 2016-2017

United States	2016-2015	2015-2014	2014-2013	2013-2012
Rank	3/140	3/144	5/148	7/144

Source: Authors' own study based on the Global Innovation Index 2016/17

In 2016, the United States was the best-rated economy in the "Innovation Ecosystem" category. This was due to high grades that the United States received for the state of cluster development, university co-operation with the private sector in research and development (R&D) activities, and the broadly understood "culture of innovation". In addition, the United States has high-quality R&D facilities, easy access to training and research and investment financing, and intensive local competition. The percentage of the United States' workforce employed in the research sector is very high, and in this respect the United States ranks second in the world. The United States was granted the highest position of all countries for financing R&D investments.

In 2015, the total expenditure on R&D in the United States equalled 2.8% of GDP. Like in all developed economies, a significant proportion of R&D expenditure in the United States comes from the private sector.

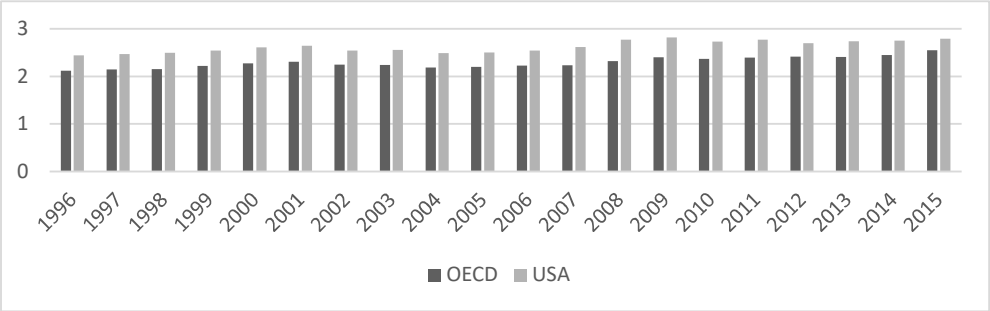

Fig. 9: R&D expenditure in the United States from 1996 to 2015

Source: Authors' own study based on the World Bank database

Another indicator showing the level of technological development and the innovativeness of the U.S. economy is the number of patents, trademarks, and industrial designs. In this respect, the United States is a world leader, filing over 500,000 patents every year. It is worth noting that most of the patents are filed in the rapidly developing computer (11.50%) and medical (8.21%) industries. The United States is also a world leader in terms of the number of trademarks and industrial designs.

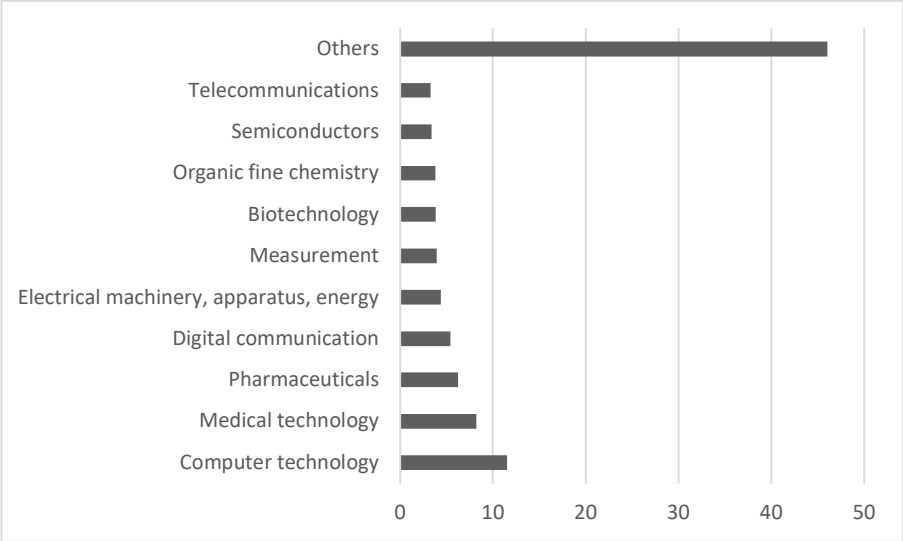

Fig. 10: Patent applications by top fields of technology in the United States from 2002 to 2016
Source: Authors' own study based on the World Intellectual Property Organisation (WIPO) database

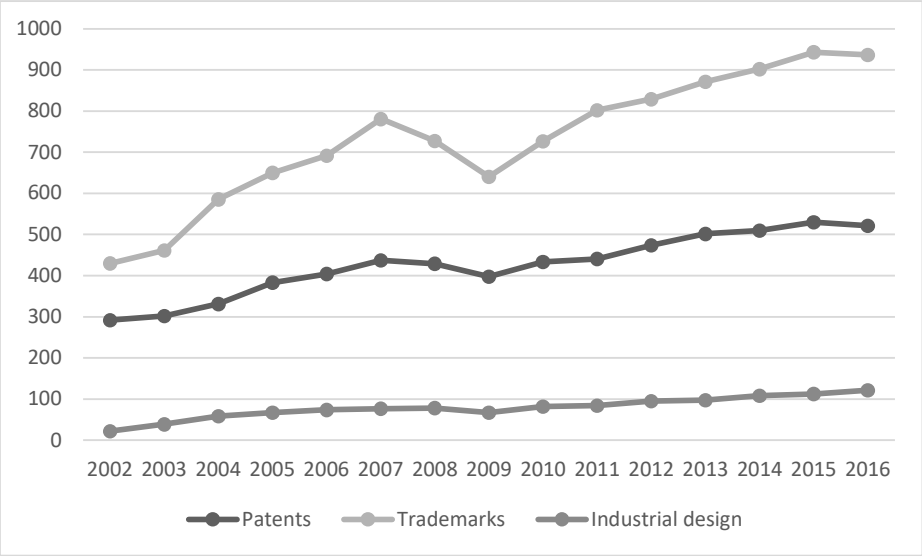

Fig. 11: The number of U.S. patents, trademarks, and industrial designs at WIPO from 2002 to 2016
Source: Authors' own study based on the WIPO database

Human Resources and Human Capital

The United States is populated by over 318 million inhabitants; there has been an increase of over 36 million since 2000. According to OECD forecasts, this number is expected to increase significantly and reach 439 million by 2050. U.S. society is relatively young. In 2014, as much as 66% of the population fell within the working age. The United States has a high fertility rate, which means that, unlike in other developed economies, the share of the population falling within the pre-working age is higher than the share falling within the post-working age.

Table 3: Basic demographics – United States

	Population (million)	Population growth rate (%)	Working age population (%)	Fertility rate	Population under 15 years of age (%)	Population over 65 (%)
2000	282,16	1.12	66.21	2.06	21.36	12.43
2001	284,97	0.99	66.4	2.03	21.21	12.38
2002	287,63	0.93	66.59	2.01	21.06	12.35
2003	290,11	0.86	66.74	2.04	20.9	12.36
2004	292,81	0.93	66.92	2.05	20.71	12.36
2005	295,52	0.93	67.12	2.05	20.48	12.4
2006	298,38	0.97	67.26	2.1	20.28	12.46
2007	301,23	0.96	67.3	2.12	20.14	12.56
2008	304,09	0.95	67.22	2.08	20.03	12.75
2009	306,77	0.88	67.17	2	19.91	12.92
2010	309,33	0.83	67.13	1.93	19.79	13.09
2011	311,72	0.77	67.10	1.90	19.63	13.27
2012	314,11	0.77	66.80	1.90	19.46	13.74
2013	316,49	0.76	66.56	1.90	19.31	14.13
2014	318,86	0.75	66.35	1.90	19.15	14.50
2020	341,39	0.95	63.99	,,	19.96	16.05
2050	439,01	0.79	60.58	,,	19.25	20.17

Source: Authors' own study based on the OECD database

The phenomenon of increasing labour resources in the United States is caused by a relatively large influx of labour resources from abroad. There is a large proportion of immigrants in the total population, and this indicator is characterised by an increasing trend in the United States. In 2013, people who were born abroad constituted over 13% of the population. This value would probably be higher if the visa procedure were not so restrictive. Moreover, it is relevant that the foreign nationals who are emigrating to the United States are mainly well-educated people who fall within the working age and are proficient in foreign languages (OECD Factbook, 2013).

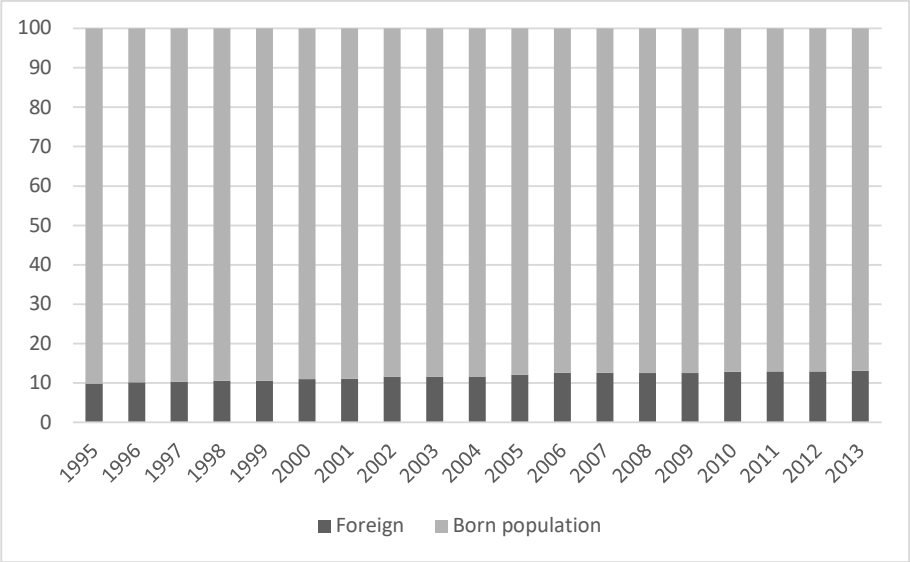

Fig. 12: Foreign and born population in the United States from 1995 to 2013
Source: Authors' own study based on the OECD database

In the first years of the 21st century, the United States boasted a very low unemployment rate of 4 to 6%, which is significantly lower than the OECD average. A collapse of the labour market, however, occurred in connection with the 2008 crisis, and the unemployment rate rose to 9.63% in 2010. In subsequent years, the labour market situation in the United States improved continually. It is worth noting that the unemployment rate was significantly lower than the average for OECD countries, amounted to only 6.17%, in 2014.

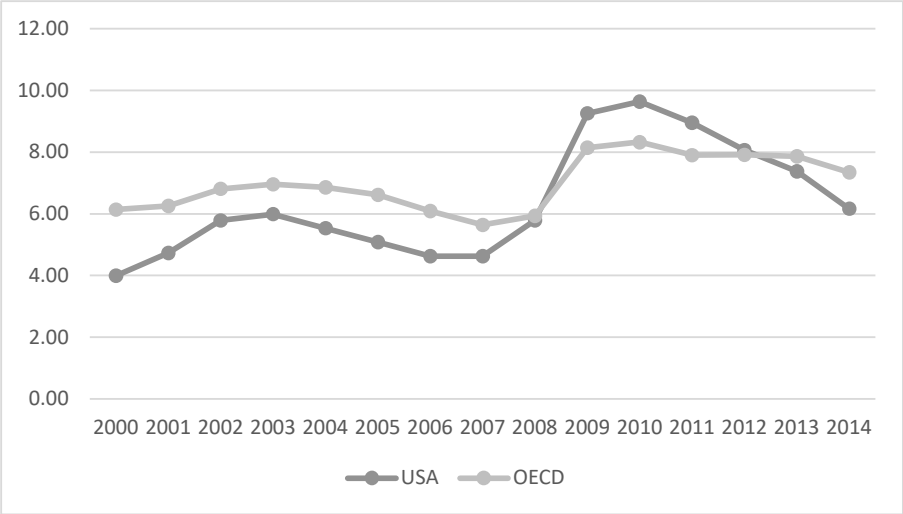

Fig. 13: Unemployment rate in the United States from 2000 to 2014
Source: Authors' own study based on the OECD database

The creation of national income is determined not only by the number of employees but also by the average working time. The graph below indicates that the average working time in the U.S. economy dropped from 1,844 to 1,789 hours in the period from 2000 to 2014. Despite the decline, it remains above the OECD average.

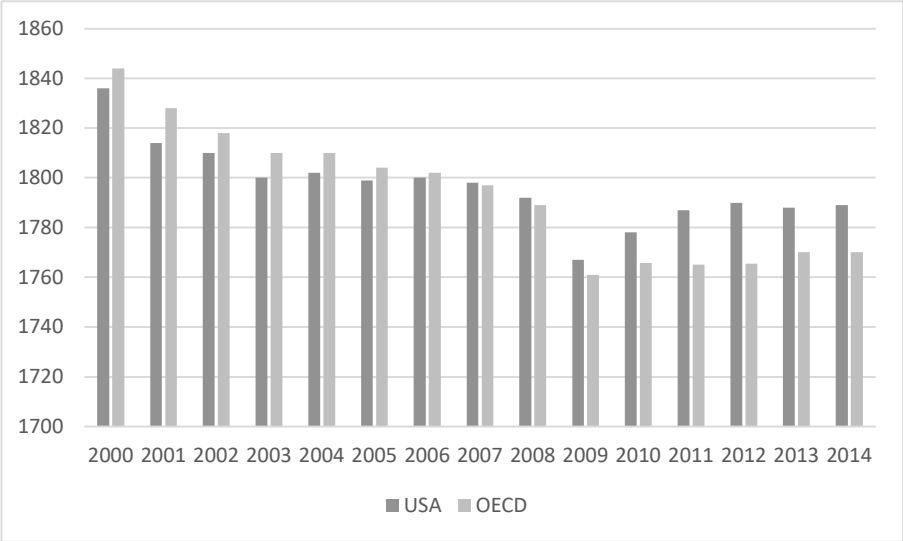

Fig. 14: Average annual hours actually worked per worker in the United States from 2000 to 2014

Source: Authors' own study based on the OECD database

Furthermore, the United States is characterised by very high work efficiency. Despite the crisis in 2008-2009, a positive annual GDP growth per employee could be observed (in most of the OECD countries, this indicator was negative during the same period). In 2016, in the United States, a working hour increased GDP by 61.9 USD; this is 22.5 USD more than the OECD average. The highest value of GDP per employee in the OECD countries was in the United States, and it equalled 121,000 USD in 2016. In this respect, the United States overtook countries such as Luxembourg and Norway. However, it ought to be remembered that this advantage is mainly caused by the greater number of working hours in the U.S. economy.

Table 4: Labour productivity in the USA from 2000 to 2016

	GDP per employee in USD	Annual GDP growth per employee (%)	GDP per hour worked in USD
2000	73 898	2.1	40.8
2001	76 294	3.2	42.6
2002	79 085	3.7	44.5
2003	82 170	3.9	46.8
2004	86 706	5.5	49.3
2005	90 941	4.9	51.9
2006	94 465	3.9	53.9

2007	97 627	3.3	55.9
2008	99 690	2.1	57.4
2009	101 410	1.7	59.5
2010	105 841	4.4	61.9
2011	109 141	3.1	63.3
2012	111 608	2.3	64.7
2013	114 181	2.3	65.8
2014	117 347	2.8	67.4
2015	120 005	2.3	68.6
2016	121 264	1.0	69.6

Source: Authors' own study based on the OECD database

The structure of education in the United States is demonstrated by its high-skilled workforce. In comparison with the OECD average, the United States has a very high proportion of people with higher education. In 2009, it was over 48%, 5% more than in the OECD countries. It is worth noting that the higher education in the United States is not financed by the government as much as in European countries. In addition, the proportion of the population with only primary education is very low, and it amounted to only 9% in 2016.

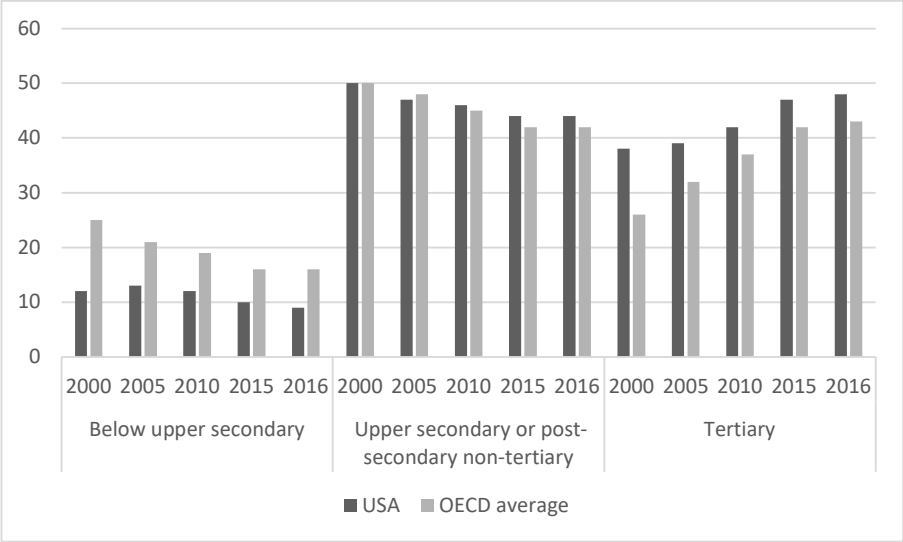

Fig. 15: Trends in educational attainment of 25- to 34-year-olds in the United States in (2000, 2005, 2010, 2015, and 2016)

Source: Authors' own study based on the OECD database

The Role of The State and Direction of Economic Policy

The constitution from 1789 forms the basis of the U.S. socioeconomic system. In the case of the United States, institutional factors are perceived as a source of economic success. The principles of the inalienability of the right to freedom, private property, enrichment, and relatively unfettered economic activity are enshrined in constitutional and legal provisions that constitute the essence of U.S. solutions. Constitutional provisions and the nature of law still perfectly match modern, open realities and an increasingly global economy (Posner, 1987).

Amongst the highly developed countries, the American economy is the closest to the model of the capitalist system. However, it also represents modified capitalism, in which there is a significant role played by the state. After World War II, there was a continued growth in the size and role of the state in the U.S. economy, mainly at the federal level. Government growth was uninterrupted until the late 1970s, when the growing threat of inflation led to a reduction in spending and deregulation (Lipford & Slice, 2007).The government's activity in the U.S. economy includes public finances and, related to them, fiscal policy, monetary policy, and supervision of economic activities. At the same time, there is little government involvement in direct economic activities, and its direct control of prices and wages is also very limited (Kozłowski, 2004).

Public finance is the most visible manifestation of state activities in the United States. It is a tool that helps to realise the redistributive role of the government (it allows for correcting the distribution of income rendered by the market) and enables the creation of public goods (Neil, 2000). In 2002, public expenditure accounted for nearly 30% of the United States' GDP. In terms of federal expenditure, which amounts to nearly two-thirds of total public expenditure, the costliest item is social security: It consumes more than one-fifth of the budget and, together with medical insurance for pensioners (Medicare), more than one-third of the budget. National defence comes second (17%), and the third category (15%) is occupied by the cumulative category "income protection", which includes pensions of federal employees, disability assistance not covered by pension insurance, unemployment benefits, and housing and food assistance (CIA World Factbook, 2017).

Tax burdens situate the U.S. economy in 27th place out of 30 amongst OECD countries. There is a characteristic trend based on shifting the tax burden from big business and the richest groups of people to the average and poorer Americans. In 1950, two-thirds of federal budget revenues were derived from corporate income taxes. In 2002, corporate income taxes constituted only 17% of federal budget revenues. In the United States, the corporate income tax (CIT) is relatively high, at 35%. Among OECD countries, this is the second highest rate, after Japan (Piketty & Saez, 2007).

The main goal of monetary policy is to ensure an adequate level of activity and stability in the economy. Monetary policy is implemented by the Federal Reserve System, which is the U.S. central bank. The regulation of economic activities by the state aims at creating conditions in the economy as close as possible to the theoretical market model. The implementation of the state's functions involves the need to hire employees in various state institutions and agencies. This is the reason why the state is present in the U.S. labour market (Timberlake, 1993).

The state is also the largest U.S. employer, directly hiring approximately 16% of all employees in the civil sector; there are now more Americans employed by the government than by the entire manufacturing sector in the United States. Furthermore, the government contributes indirectly to the creation of millions of jobs. Military bases, armament factories, and large state universities stimulate economic development in the local areas. The working conditions in many fields are regulated by the public sector as well. The state's participation in production activities is low and amounts to 1.5% of the national product; however, it is possible to find public enterprises at all levels of the U.S. administration. State-owned enterprises occur mainly in the agricultural sector and public utilities (Moore, 1993).

In 2008, the subprime mortgage crisis shook the foundations of the global financial system. The first reason for the crisis was the activity of investment banks, which conducted high-risk operations in conjunction with deposit and credit banking. The second factor was speculation on financial markets, which initially concerned high-tech companies. After the collapse of the financial markets, the situation repeated itself in the real estate market. In the era of globalisation, this event exerted an impact on other countries. As a result of events in the United States, the world was plunged into the greatest financial crisis since the Great Depression; this exerted a very strong negative impact on the entire global economy. The outbreak of the global financial crisis and the strength of its spread to subsequent segments of the financial market and the real economy necessitated launching multi-billion-dollar government bailouts (Dobrzanski, 2017).

In 2014, the United States occupied 12th place in the Heritage Foundation Index of Economic Freedom rankings. In comparison with the previous year, its rating dropped marginally, mainly due to an increase in government spending, which currently amounts to slightly over 40% of GDP; meanwhile, public debt is approaching 100% of GDP. According to this measure, freedom on the labour market, freedom of business activities, freedom of trade, and the level of property rights are best evaluated.

Conclusion

The competitive advantage of a given country results from its characteristics with respect to its history, geopolitical and economic situation, state policy, and available resources. The countries that are at the top of the rankings of competitiveness differ significantly. This article examines the development conditions of a country that is a leader in many international rankings and statistics. It represents the market economy system, with a strong emphasis on economic freedom and competition. The structure of the U.S. economy can be classified as post-industrial, with a large share of its GDP generated by the service sector. This economy allocates significant resources to research and development, of which a substantial amount comes from the private sector.

Demographic predictions for the United States are favourable. According to OECD forecasts, by 2050, the population is expected to be over 40% higher than it was in 2010. Moreover, the United States has a high proportion of its population falling within the pre-working age rather than the post-working age. The reason behind the increasing labour resources in the United States is the relatively large inflow of labour from abroad. This phenomenon might support the further strengthening of the U.S. position in the future, while other economies will have to face demographic problems.

Finally, the indicators presented in this article confirm that the United States is a highly innovative economy. The high level of innovation is due to the strong co-operation of universities with the private sector and high-quality research and development facilities. The United States is also a world leader in patent applications. As the world's largest importer, the United States stimulates the economies of other countries. The average working time in the United States is high in comparison with the average working time in other researched countries; together with high labour productivity, this enables the United States to achieve its high GDP. The main manifestations of state activities in the United States are in fiscal and monetary policy and regulation and control of economic activities. In turn, the direct economic activities of the state are marginal.

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Industry 4.0: A Case Study of Industrial Company Transformation into Smart Factory with An Accent on Internal Logistics and Production

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Abstract

The first part of the paper contains the description of Industry 4.0 concept. The different views on this concept and main principles are mentioned. One of these principles is named Smart Factory. The Smart Factory concept is briefly described afterwards. The second part of the paper contains the main chapter – case study, there is described the transformation of a real industrial company into smart factory concept. The case study firstly concentrates on the current state analyses. Then Smart Factory transformation with specified technology is described. Based on the Smart Factory transformation, the realization of this solution is determined, including the implementation of elements and principles of Industry 4.0. Case study results and future plans are summarized in conclusion. Transforming into a Smart Factory and implementing Industry 4.0 technology is an extensive and long-term process. The primary purpose of the paper is to determine potential issues and obstacles faced by manufacturers during their transformation into Smart Factory.

Keywords: Industry 4.0, Smart Factory, Internal Logistics, Production, Manipulation

Introduction

The essence of Industry 4.0 is digitization, the expansion of the high-speed Internet, the development of smart technologies, communication and many other topics. Businesses that want to remain competitive and market-driven must take the first steps towards digitization today. Digitization promises lower costs, higher production quality, flexibility and efficiency. Investing in digitization is essential for the growth of all industrial companies, regardless of their size or industry. Industry and the economy are undergoing significant changes caused by the introduction of information technology, cyber-physical artificial intelligence systems into production, services and all sectors of the economy. The impact of these changes is so fundamental that they are referred to as the 4th Industrial Revolution.

The main concentration of the paper is on Industry 4.0 part named Smart Factory. The Smart Factory concept is shown in the presented case study.

Definition and main principles of the Industry 4.0 concept

According to online source Národní iniciativa Průmysl 4.0 (2015), the Industry 4.0 concept is a whole new philosophy of societal change that spans a wide range of industries, from industry to technical standardization, security, education, legal framework, science and research, to the labour market or social system. The phenomenon of today is the interconnection of the Internet of Things, Services and People, and the immense amount of data generated by it, whether machine-machine, human-machine or human-human. Basl (2017) mentions in his publication that the advent of new

technologies is changing entire value chains, creating opportunities for new business models, as well as pressure on the flexibility of modern industrial production or increased demands on cybersecurity and interdisciplinarity of access.

The comprehensive definition and description include a by Kagermann, Wahlster and Helbig (2013). Briefly, the first three industrial revolutions arose as a result of mechanization, the use of electricity and the use of computer technology. The introduction of the Internet of Things and Services into the production environment is now the fourth industrial revolution.

For example, Hofmann and Rüsch (2017), in their publication, identify four critical components of the Industry 4.0 concept, based on the revision of academic and business (industrial) publications using different publication databases to ensure objectivity. These are the key components: Cyber-Physical System, Internet of Things - IoT, Internet of Services - IoS, Smart Factory.

Other authors Rüßmann et al. (2015) mention the 9 main pillars that Industry 4.0 integrates. Many of the nine technological attributes that underlie Industry 4.0 are already being used in manufacturing. However, with the concept transforming production, insulated and optimized cells combine as a fully integrated, automated and optimized production flow, leading to greater efficiency and a change in traditional manufacturing relationships between suppliers, manufacturers and customers - as well as between humans and machine. According to Poor, Basl (2018), the main 9 pillars are autonomous robots, simulation, horizontal and vertical system integration, industrial Internet of Things, cybersecurity, cloud storage, additive manufacturing, augmented reality, big data and analysis.

Other main features of the Industry 4.0 concept are defined by Deloitte (2015). The following main characteristics of the sector show the massive capacity of industry and traditional production for change based on these assumptions:

- Vertical interconnection of intelligent manufacturing systems
- Horizontal integration through a new generation of global value chain networks
- Through-engineering throughout the value chain
- Acceleration using exponential technologies

In their publication, Weyer, Schmitt, Ohmer and Gorecky (2015) mention three main central aspects of the Industry 4.0 concept, which can be further specified using three paradigms: Smart Product, Smart Machine, Augmented Operator.

The primary characteristics of smart factories conforming to the Industry 4.0 concept can be summarized as follows, expanded from online source Národní iniciativa Průmysl 4.0 (2015) and publication by Mařík (2016):

- manufacturing processes are optimized throughout the value chain thanks to vertically and horizontally integrated IT systems,
- fully automated and interconnected production lines replace isolated production units,
- physical prototypes are replaced by virtual designs of products, means of production and production processes, and their commissioning takes place within one integrated process involving both the manufacturer and his supplier,
- flexible production processes allow efficient production of small batches tailored to individual customer requirements,

- Broum and Simon (2019) mention that interoperable robots, production equipment and products make to some extent autonomous real-time decisions, thereby increasing the flexibility and efficiency of the production process,
- the production equipment optimizes itself and configures itself according to the parameters of the processed product,
- automated logistics facilities using autonomous trucks and robots automatically adapt to production needs. The logistics background concerns more cooperative entities that are not located in a single location, and therefore the logistics chain also concerns the coordination of transport links between production entities. The same applies to coordinate the distribution process of the product itself.

Characteristics of Smart Factory

The concept of Industry 4.0 and its ideal implementation creates a so-called Smart Factory, also called Intelligent Factory, which is accessed by different authors in different forms. The technological attributes of Industry 4.0 are incorporated into this whole Smart Factory. The main views are shown in this section of the article, including an example.

There are several definitions of the meaning of "smart factory". For example, Yoon, Shin and Suh (2012) describe an intelligent factory as an innovative factory that combines ubiquitous computing as a tool to solve problems with existing components.

At Smart Factory, the products find their way independently of production processes and are easily identifiable and localized at any time, with the idea of cost-effective but highly flexible and individualized series production, as defined by Rüßmann et al. (2015).

Another definition is provided by Radziwon, Bilberg, Bogers and Madsen (2014), a smart factory is a manufacturing solution that provides flexible and adaptive manufacturing processes that solve the problems of a plant with dynamic and rapidly changing boundary conditions around the world with increasing complexity. This unique solution could, on the one hand, be associated with automation, understood as a combination of software, hardware or mechanics, which should lead to optimization of production, reducing unnecessary work and wasting resources. In a research study by Broum and Kleinová (2018), reducing waste then leads to cost reductions in the major and minor functions of the product.

Zuehlke (2010) describes the SmartFactoryKL Technology Initiative. SmartFactoryKL is an excellent concept that represents a registered non-profit association made up of SmartFactoryKL and its research, industrial and political partners. Research company SmartFactoryKL (2019) focuses on research into innovative technologies and solutions to realize the production vision of the Industry 4.0 concept. They have their hybrid production experimental equipment and can present, for example, the Plug'n'Produce modular production line, various production line modules, virtual reality training, augmented reality manual workstation, etc.

According to Valvodová (2018), another place we can talk about as Smart Factory is the EWA plant. It is a factory hall of Siemens Elektronikwerk Amberg (EWA). Machines and computers serve two-thirds of activities throughout the chain, with the rest of the work done by people. EWA is a prime example of the implementation of the Siemens Digital Enterprise (Siemens Digital Enterprise), a production environment that could become standard within a few years.

Smart Factory Components

The authors of the paper have designed the essential components listed in this chapter, and the technological aspects of Industry 4.0 can be implemented on these core components. The diagram in Figure 1 identified Smart Factory components.

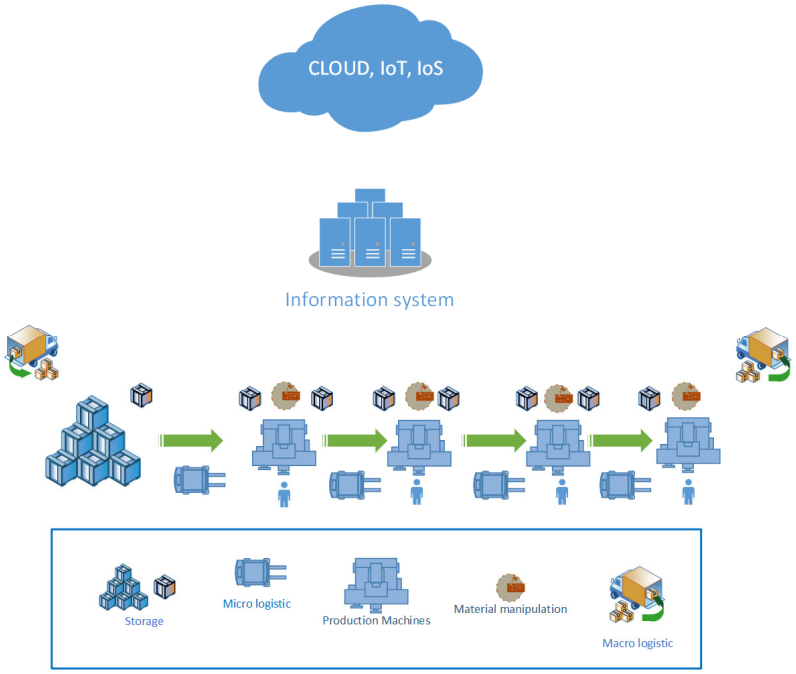

Fig. 1: Smart Factory components

Of course, all components are:

- Cloud storage
- Internet of Things and Services (or Industrial Internet)

Its own information system covers each smart factory. System requirements will be increased because, in addition to the usual services (e.g. ERP), they must also include communication between components inside and outside the production system. On the physical layer of the factory, there are the following key components:

- Storage system
- Internal logistics (Micro logistics)
- Production machine and equipment
- Material handling equipment
- External logistics
- As well as employees or operators

In terms of internal logistics, we can also encounter terms such as intralogistics, micro-logistics, these are different expressions, but the meaning remains the same. The term internal logistics is used in this paper. Internal logistics deals with the material flow in companies and the accompanying information flow. These include activities such as storage, handling, supply, packaging, etc. External logistics extends beyond the scope of the enterprise between individual entities (Supply Chain Management).

Case study

In this case study, we try to put principles, available or developed technology into a real factory. The aim is to create SmartFactory concept with replacing technologies and processes of the current state. In the end, there should be a list of challenges or solutions.

Current state

In the current state, the first station is entry warehouse where is a big stock of all parts needed for production. Three vertical warehouses systems are next station (this system is called Kardex). In Kardex 1 a 2, there are small KLT boxes with small and lightweight parts like plastic or rubber seals or circles for assembling. In Kardex 3, there are different types of aluminium parts for the next processing.

The primary participant in the process is a supplier employee. This supplier has its defined routes within the factory hall. He visually checks mid-stocks in each assembly line and picks up an empty container. Then he returns with empty bins to the specific Kardexes and enters requirement for material needed. The Kardex then search material for him and pick it up. The supplier then takes full KLTs from Kardex and removes Kanban card from this bin. Then he gives this Kanban card to the warehouse worker, who records the decrease of the material and sends it to the entry warehouse. Next, the supplier refills line requirements and again looks for empty bins and the whole process is repeated.

Product Manufacturing

Company products are pipes of different shapes for the automotive industry. Currently, they have several assembly lines for individual customers. Each customer has several types of products with different manufacturing processes.

Fig. 2: Example of product

Currently, each customer has an assembly line. For assembling, there is need for shaped pipes and small parts (seals, rings). The main processes are bending and soldering. Some types of products also require some CNC manufacturing like drilling or special cutting. When these parts are ready, they are moved straight to the assembly line or back into the warehouse where they wait for use.

Assembling operations are mainly montage of seals and rings onto pipes and then covering it with rubber wrap. Assembly is done by workers at assembly workstations (FIG) After successful assembly, and there is control workstation. Some customers (Audi) requires to have their control station implemented in the system. The current state layout with material flows is also available.

Smart Factory Transformation

a) Order receive

In SmartFactory transformation, the first step is receiving of the order. For example, Customer 1 requires 500 pieces of products 1A ad 700 pieces of product 1B. The manufacturing system sends a

requirement to the last station in the process (packaging). This requirement is sent back to all previous stations and into production line itself.

b) Manufacturing line and modules

The production line should be chosen based on an occupation of other lines or the type of production it's already doing. The operator of the line should also see process request (line station, tablet or PC). Then he can send accept a command to the system and chosen line.

The line consists of modular parts. Each module presents one technology in the process. So there is need for CNC module, bending module, soldering module and possibly assembly module and control module. Currently, there is only one known assembly line. [18] This line consists of operations for creating business cards. Product and operations are straightforward, so there is a long way until specific modules will be involved in this case. For the modules to be practical, they should be able to operate several parts at once. Especially for bending, where is a requirement for a high amount of the same product. The inspiration was a publication by Slama et al. (2015).

c) RFID, parts

Publications by Hameed, Durr and Rothermel (2011) and Govindasamy and Thambidurai (2013) mention that, the parts must be identified during the whole process. Industry 4.0 counts with RFID technology. RFID tags are mostly planted right into the product in current experiments. [19] [20] So there is no need to remove RFID tags at the end of the process. However, this had been involved for just a few prototypes and for our product (pipes) there is a problem with placing and implementation of RFID tags into the product itself. With product identification, machines can do defined operations on them, so there is no need for re-programming machines each series of products. Machines also have a memory, so once specific manufacturing is programmed and recorded with its identification, machines can change to this manufacturing based on the RFID signal they get from the product.

d) Material request, delivery and storage

Depended on the order, the production line can request specific modules for the process. The Plug n Produce assembly line can be easily and fast reconfigured. Also, the production line must send requirement for material – primary pipe material and other assembly parts. The entry warehouse receives a requirement and finds the required materials. Then the manufacturing system will plan material delivery. Small boxes with lightweight parts can be delivered with the use of drones right into the assembly station. More substantial pipe parts must be delivered into carousel type of mid-storage. This storage should supply a whole manufacturing line. The material could be picked by a robotic arm, which will also orient via RFID tags. These tags should be on/in the KLT boxes so the robot can recognize what material is stored in it.

Also, the system of the main warehouse should record material type, and amount pick up. These data should be shared with the company developer so he can react fast enough for company needs.

Realization

Because with the current state of technology, it is impossible to create a smart factory transformation for this specific company directly. In this part, a list of problems and challenges will be introduced.

a) Entry warehouse

Entry warehouse can be realized with one of today standard solution where each position in the store has its identification. With this identification, we can easily search for materials with the use of manipulation techniques and also we can monitor the stock level of each type of material. This level value with planned consumption should be shared with a supplier so that he can prepare his production, as also mentioned by Sixta and Macat (2005).

b) Storage, mid-storage

The Kardex storage system can also be used in the current state. Each container should be equipped with RFID tag so his identification, content and also position can be monitored. This can navigate manipulation units. For small parts containers, they can be picked up by drones, containers with pipes should be manipulated with AGV type of unit.

According to online source Kardex Remstar (2017), vertical automated storage systems served as inspiration and source. Small versions of Kardex or carousel storage should be used at the beginning of each production line. Transport units should deliver specific identified delivery to the specific line, into specific positions in Kardex. For example, in 10 racks Kardex, each rack should have its ID (A-J), and also each ID should have several positions for store KLTs (1-10). The delivery unit will communicate with Kardex that it wants to put KLTs in the specific positions. Then following manipulation unit, which will grab material from Kardex and put it into the production line will now specific position, where required material can be found.

c) Manipulation units

As mentioned before, in this case, we could use a combination of drones and AGV transport unit. Impressive views and solutions that have been implemented are in the sources [23] and [24]. The advantage of this combination is less "collision prevent stops" when drones don't have to care about physical obstacles and AGVs. However, drones can supply only to the assembly station, where lightweight parts are used. When drones with higher carrying capacity are developed, they could pick up more containers (and reduce travelling routes count) or they could handle heavier KLTs. [25]

The production line should be supplied by AGVs trains. These trains can automatically pick up KLTs from main Kardexes and store them in the identified position in the train. Again train wagons should be identified (A-D), and each wagon should have its positions (1-5). Thanks to RFID accurate navigation, they can store the right material in the right position and also deliver the right material into the right position into production line Kardex. Here they can also pick up empty bins and deliver them back to the storage.

d) Production line

The production line is the first issue of realizing smart factory transformation. The complete production line should be assembled from modules. The idea is to create highly modular, multi-vendor production systems. [26] However, these modules are now at the experimental phase, and only CNC manufacturing could be available. But the most critical processes bending and soldering are too specific, and currently, there are no even experimental solutions for these process modules. [27] Solution with 3D metal printing also can't work, because only mass production 3D printers have such a small operation space and they are designed for small parts.

Next, and possibly the crucial, issue is with product identification. The idea of Smart factory is to monitor all products during the whole process and also after this process. This is arranged by implementing RFID tags into the product. However, RFID can't be inserted into the product at this stage of production.

Another problem is with handling. Current experimental lines are producing simple products like bottles or business cards. Our company produces a wide variety of products with different shapes which requires special handling tools. A possible solution could be creating groups of similar products and design special handling for each group. Requires more varieties of bending and soldering modules.

For production to be effective, there is also a requirement for higher quantity. That means more products should be operated at the same time, not only 1 piece. For production lines, we can only arrange challenges or requirements for possible realization.

e) Assembly

In assembly station use of robots is the highest probability. Robots like two-handed Baxter model can easily replace humans in the position of this repeated action. [28] If each product can be identified so there can be direct order to the robot. Each product should have assigned assembly workflow and parts required. The robot can determine product ID and then switch assembling the program. At the same time, the robot station should be equipped with small Kardex type of storage. This storage will communicate with the robot or with the product and can arrange the right material required. Drones supply this storage (as mentioned above). The workstation should be organized in the assembly line.

The distance between free space (caused by missing line modules) should be dealt with small AGVs, which can transport container with ready-to-assemble pipes to the assembly line. Here robot arm places part onto the conveyor. Depended on part type and ID, the robot can also set part in a specific position. Next, the part flows through the line where is assembled by the Baxter robot type. [29] [30]

The second variation of assembly is that the assembly can be one of the modules. Then there is no need for Baxter type robots. Because this type of assembly is exceptional, automated assembly in a module can be followed by human equipped with smart-glasses or another type of visualization. Based on the product ID, a smart device can project assembly workflow.

f) Control station and packaging

As mentioned in the Sawyer Intera chapter, this robot can be programmed to force use controls. In this case, it could control if products are tight enough if there are some incorrect assembly or even do some visual controls.

g) External Logistic

In this case, our product is produced in series and requires bigger transport units. This can be easily done by current truck or van delivery. However, improved unmanned our autonomous trucks bring several advantages. It is their connection to real-time data. These data can be used for algorithms that calculate the fastest track from point A to point B and should easily meet the Just-in-Time requirement.

These data should provide information about current traffic state, for example, traffic jams and their probabilities (which is currently available at Google navigations), unexpected events recording or energy renewal plans. Specific algorithms should calculate the fastest and the safest way to the customer, and it also should re-calculate tracks based on real-time data information. However, sometimes it cannot be found a way to meet the agreed date or time of delivery. The delivery unit should provide the customer with this information at the same time it finds its delay when a customer can expect required delivery and why is this delay caused. Customer can then prepare for this situation way earlier and also can save this experience for future planning.

Production System

The complete transformed system is in Figure 3. The process starts in the entry warehouse, and blue arrows present material flow within the factory. Reverse direction of material flow and starting point in the last station (packaging or export) we can imagine information flow. Detail process is described in the previous chapter.

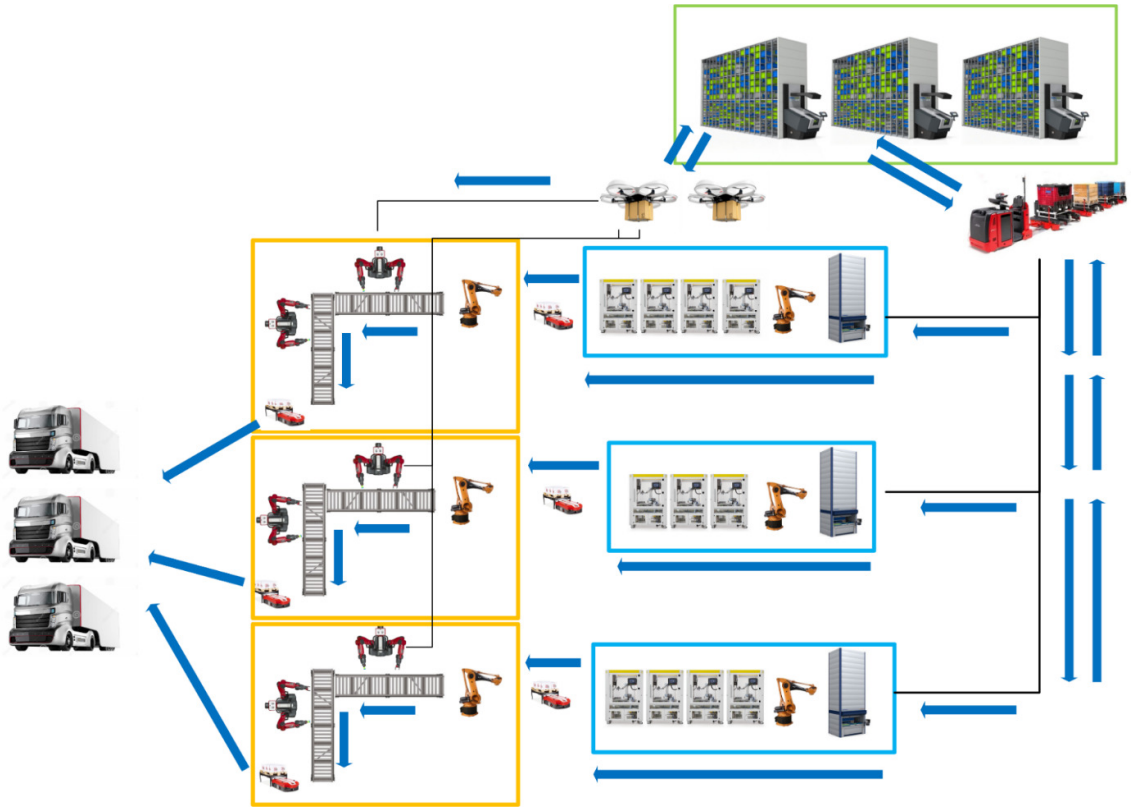

Fig. 3: Smart Factory transformation process scheme

Case Study Results

Based on the attempt of transforming the current state factory into a smart factory concept, we have found that it is not possible with current technologies. The main reason is too specific production, where crucial issues had not been solved. The crucial problems are:

1) Product identification

Because Industry 4.0 and Smart Factory includes real-time product identification, this is the main issue in our case study. Currently, there are experiments and prototypes with straightforward products (business cards, bottles, wooden desks), and in these cases, RFID tag placement is not a problem. In our case, there is no possible way to place the RFID tag that persists the whole manufacturing process (manufacturing operations like bending, CNC machining) and post-process. Also, visual recognition algorithms can't deal with this issue because the shape of products is too complicated, and their identification requires 3D shape recognition.

This is a crucial problem because, without product identification, it cannot be tracked his position and development state. Also, all machines in the factory are dependent on product ID so they can do precisely the right operations with the individual part.

2) Production line

Another problem is the production line, where the primary material is transformed into assembling ready part. It is again caused by too specific production. And there are no available technologies (bending machines) for a modular type of production line and also no available technologies or materials for mass production 3D printing (current technologies have small operation area for this

type of product). However, current technologies allow covering processes of material storage, material delivery and handling, material assembly and external logistic. Use of these solutions brings some of the current state problems:

a) Assembly Line Replenishment

An employee now does a current check of supply state in assembly lines. During his routes around the production, he only visually checks the state of storage, and he replenishes storage when it is empty (not when it is needed). That means he picks up more material from the entry warehouse, and that leads to higher consumption of material. However, automatic replenishment requirement signal based on the order solves this problem and replenishment is also faster.

b) Material Evidence

In the current process, every time employee picks up material from main Kardex, and he has to remove cards from a material container used and give them to the employee who scans these cards and sends a record of material consumption. However, this employee is not available all the time. That means supplier employee has to wait for him for only scanning the card, and this waiting time is waste. Our solution does this evidence automatically, so there is no need for waiting or particular individual employee.

Also, the most significant advantage is coordinated overall communication between all systems and components, then flexible production lines, that can react to order deflections or changes.

The next steps in the case study will be an attempt to simulate processes and communication between components and reveal other possible issues and challenges. The current static model is in Figure 4.

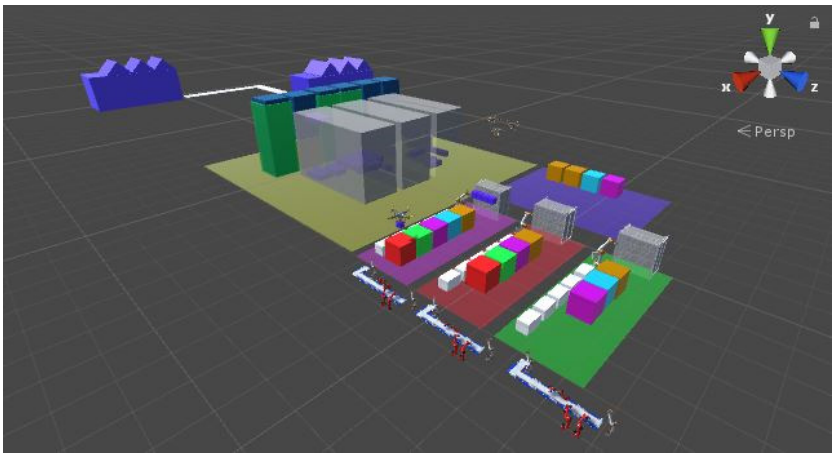

Fig. 4: Base model of the transformed factory

Conclusion

The paper is concentrating on Industry 4.0 and Smart Factory concepts. Principles of these concepts were first introduced. The main chapter of the paper is a case study. There is a proposal of transforming selected production company into Smart Factory version. The case study firstly concentrates on the current state analyses. There the current processes and its weaknesses are described. Then Smart Factory transformation with specified technology is described. During the attempt of a transformation of the assembling process with current technologies, two crucial issues were found. The issues are linked with product identification during and after the process, which is one of the main principles of Industry 4.0 and Smart factory. Based on the Smart Factory transformation, the realization of this solution is determined and also issues, and obstacles are mentioned. The problem is linked with the production line - the case study products are too specific, and there is no possible solution for their manufacturing. Current production machines for Smart

factories are prototypes for straightforward products, or they can't deal with the production quantity. These two issues bring possible challenges for future progress.

The primary purpose of the article is to show the Smart Factory concept implemented. These results can help others to be inspired by Smart Factory concept implementation and to take in consideration specific issues during the implementation. The future plans linked the topic will be a simulation of specific scenarios in the created 3D model. These simulations should show communication between components within factory systems and can reveal other possible issues or challenges. Also, the model can be used for future work, and example, real-time data flow visualization etc.

Many companies still do not believe in the benefits of Industry 4.0 for their business or have difficulty finding a suitable way to apply new technologies. But many others are already introducing changes and are preparing for a future where smart devices will streamline and optimize their businesses. Companies that are suitable for robotics and automation in the automotive, electrical, plastics, machinery and equipment (engineering) sectors have the highest potential to digitize and implement Industry 4.0 elements. Industry 4.0 will also make progress in many other areas such as the aerospace and consumer industries, the mining industry.

However, Industry 4.0 also offers excellent chances for smart, digital manufacturing processes for SMEs. SMEs have a chance to become specialists with unique know-how that will play an essential role in the chain. Connecting the commercial, academic and governmental spheres is crucial.

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The Business Model as The Subject of Disclosures In Integrated Reporting on The Example of Selected Polish Companies

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Abstract

The growing interest in the business model (BM) as a reporting element reflects the view that it is a key starting point for analysis conducted by investors. The integrated report (IR) should answer the following question: What is the BM of the organization and how sustainable is it? (IIRC, 2013b). To this end, the International <IR> Framework provides specific guidance on how to present a high-quality BM disclosure. However, current global research clearly indicates that the method of disclosing information about the business model is very diverse, hence the purpose of the article is to discuss the practice of disclosing the business model in integrated reporting of selected Polish listed companies. The article uses literature studies, content analysis of corporate publications and observation of business practice, case studies of selected Polish companies were presented. The study was conducted in the form of a case study of some entities. Five companies were analyzed Most companies adopt their own individual solutions, only some listed companies disclose the business model in accordance with the International <IR> Framework proposed by IIRC. However, there are many reservations about the quality of disclosures in published integrated reports. The disclosures about the business model are a relatively new research area at an early stage of implementation in business practice. Our findings have important implications for confirming the role of the integrated reporting project in improving reporting on the business model.

Keywords: Business Model, Integrated Reporting, Integrated Report, Value Reporting.

Introduction

The term "business model" gained importance in reporting as discussions on the importance of non-financial information in enterprise reporting developed (ICAEW 2010).[i] As stated in The Business Model Background Paper for IR (Integrated Reporting) "business model thinking provides an interesting paradigm for developing financial reporting standards". The term "business model" was discussed in the September 2011 International Integrated Reporting Council (IIRC) discussion paper Towards Integrated Reporting – Communicating Value in the 21st Century, in which it was identified as one of the two main topics for the future orientation of organization reporting (IIRC 2013c).

The paper clearly emphasizes that despite the lack of a uniform, commonly accepted definition of the term "business model", the concept is often perceived as a process through which an organization/company strives to create and maintain value. It also indicates that reporting on the business model should be a component of the content of integrated reporting.

The aim of the article is to discuss the practice of disclosing the business model in integrated reporting of selected Polish listed companies.

The business model in IR

The business model has been identified by the International Integrated Reporting Council as the basic (key) element of integrated reporting. The International <IR> Framework (IIRC 2013a) clearly emphasizes that integrated reporting should focus on the organization's business model, its resources and the relationships it established and develops. The organization's business model has been identified as one of the key disclosures of integrated reporting. The business model is a fundamental concept allowing to understand how organizations operate and how they create value.

The International <IR> Framework emphasizes that the business model is at the heart of the organization and is based on various capitals as inputs, which through business activities, convert into outputs (products, services, by-products and waste). The organization's activities and outputs lead to outcomes in terms of impact on capitals. The ability of the business model to adapt to changes affects the long-term profitability of the organization.

Inputs include key capitals (resources) that the organization possesses. The capitals are the basis for business operations, and are significant for the ability to create value in the short, medium and long term, and the sustainability of business model (IIRC 2013b, p. 10). Business activities include core activities, i.e. planning, design, production or launching and use of specific skills, as well as activities that contribute to the long-term success of the organization, such as innovation, employee training and relationship management. The International Integrated Reporting Framework states that the company's activities are located in the very center of the business model, and by consuming and/or transforming capitals (resources) and assets (inputs) into outputs in the form of products and services, they have to generate valuable business results. The description of key business activities should include:

- characteristics distinguishing the organization on the marketplace (e.g. through product distinction, market segmentation, supply channels and marketing),
- the way the business model generates revenue,
- the organization's approach to innovation,
- how to adapt the business model to changes.

Outputs include not only the main products and services, but also by-products and waste (including emissions) that are relevant to the organization. Outcomes are defined as “the internal and external consequences for the capitals as a result of an organization’s business activities and outputs” (IIRC 2013b, p. 1). Description of the business model requires disclosure of both internal effects (e.g. employee morale, organization reputation, income and cash flows) and external effects (e.g. customer satisfaction, tax payment, brand loyalty, and social and environmental effects). The International Integrated Reporting Framework also indicates positive outcomes i.e., those that result in a net increase in the capitals and thus create value, and negative outcomes i.e., those that result in a net decrease in the capitals and thus reducing the value (see IIRC 2013a, p. 26).

The Business Model Background Paper For <IR> also lists features that can increase the efficiency and comprehensibility of the description of the business model. They include:

- explicit identification of key elements of the business model together with their presentation in the form of a simple diagram (a simple chart/diagram showing key elements, supplemented by a transparent explanation of the relevance of those elements for the organization),
- an appropriate description (narrative) that explains the conditions and circumstances in which the organization operates,
- identification of key stakeholders and other dependencies as well as important factors affecting organizations,
- description of key value drivers, value generators,

- description of the organization's position in the value chain, connection to other aspects of reporting, including reporting on the organization's strategy, opportunities and risk, and also key performance measures (IIRC 2013b, p. 13).

The International Integrated Reporting Framework also mentions organizations using diverse business models. When organizations use more business models at the same time (IIRC 2013a, p. 26), which are a reflection of, for example, different market segments in which the organization operates, it is required to separately consider and discuss each of them (if relevant) and attach a comment about the links between the business models used (the benefits of using synergies).

Reporting information on the business model is generally assigned to five categories. The aforementioned Business Model Background Paper for <IR>, preceding the publication of The International <IR> Framework, indicates elements of the description of the business model:

- company presentation – what the organization does, its structure or in which areas it conducts business,
- business strategy – key aspects of the company's strategy,
- value chain – position in the value chain and dependence on key inputs,
- financial results – how does the business model control profitability or revenue generation,
- creating value – how the company's inputs, activities and dependencies increase value and ensure desired results (IIRC 2013b, p. 13).

In order to organize the description of the business model, a map of the business model was also proposed (Figure 1).

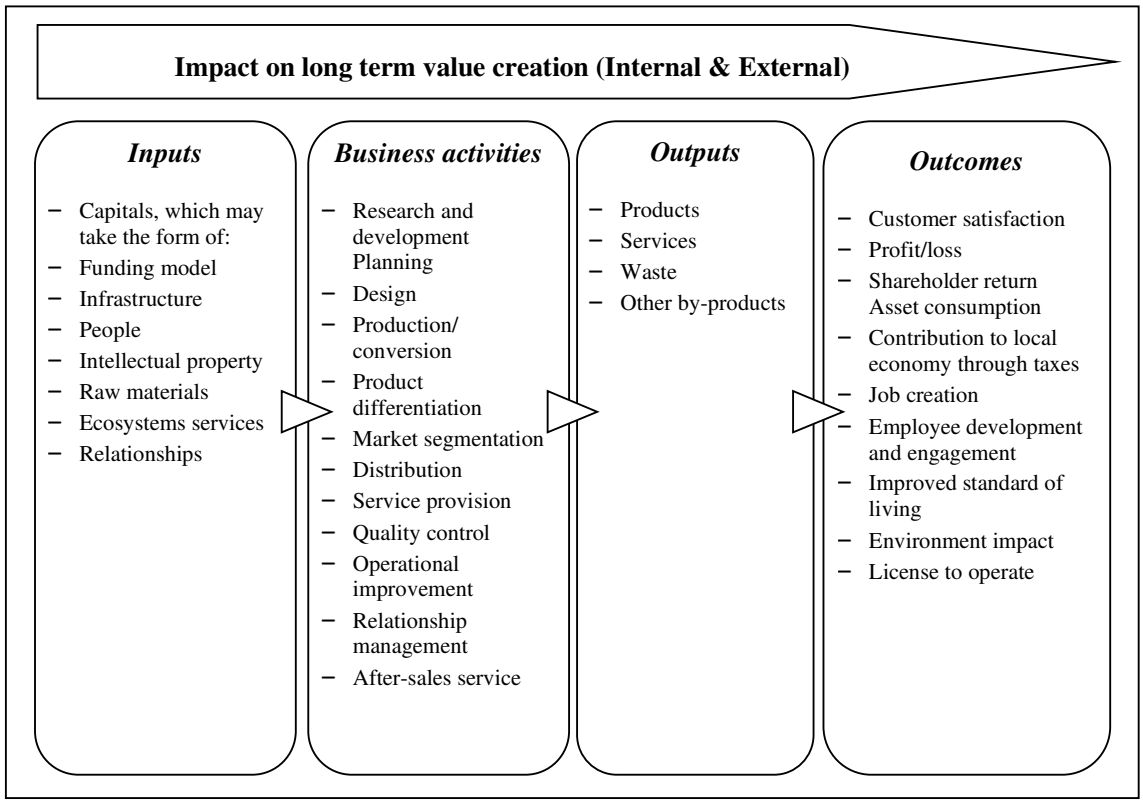

Fig. 1: Business model disclosure map (IIRC 2013b)

The qualitative features of disclosures about the business model also include (Bini et al. 2016, pp. 87-88):

- Completeness: disclosure should offer complete identification and description of items that are aggregated in a company's business model, distinguishing them from other concepts. In this regard, research and practice indicate that the concept of business model is distinct and different from the concept of strategy (Bini, Dainelli, Giunta 2016).
- Focus: in order to be relevant, the description of the business model for external stakeholders should be focused on the contribution of the business model components to the uniqueness of the company's value creation process (Bini, Dainelli, Giunta 2016).
- Connectivity: disclosures about the business model should show the connections between key tangible and intangible factors in the process of creating value, enabling stakeholders to assess this process over time (Świderska et al. 2016).

Currently, companies disclose information about the business model in a variety of ways[ii], for example, in the form of strategy descriptions or by presenting business results or general information about the company. A more precise and transparent definition of the business model (for reporting purposes) and related guidelines can contribute to ensuring greater consistency and compliance of the procedures and methods used by companies. The results of the analysis of over 500 examples of disclosures of enterprises regarding the business model from around the world can be found in the cited Business Model Background Paper for IR. It emphasizes the impact of legal and statutory regulations, the corporate governance code and public disclosure rules on the adoption/selection of a specific reporting method on a business model.

Business Model in Selected Integrated Reports

The theoretical concepts of the business model presented earlier have been confronted with reporting practice in order to answer the question: how the business model is presented in the practice of listed companies. The study analyzed disclosures about the business model in integrated reports prepared by five capital groups: Orange, PGE, Bogdanka, Pelion and Orlen.

Key elements of the business model (IIRC 2013b) were analyzed in accordance with The International <IR> Framework, namely:

- Inputs (IIRC, 2013a, paragraph 4.14–4.15),
- Business activities (IIRC, 2013a, p paragraph 4.16–4.17),
- Outputs (IIRC, 2013a, paragraph 4.18),
- Outcomes (IIRC 2013b, paragraph 4.19–4.20).

It should be emphasized that the study is illustrative, case studies were used.

Orange Polska in its IR for 2016 revealed a business model using the approach suggested by IIRC based on 6 capitals[iii]. The company presented the business model in an integrated report in the chapter "Our business model and value creation"[iv]. In turn, the results of its business model were presented in a separate chapter "Outputs & outcomes"[v]. As part of disclosures about the business model, the company discussed key natural resources (spectrum, energy), financial (debt, equity), manufactured (network infrastructure, software, points of sale), human and intellectual (employees, innovations, customer and market knowledge) and social and relationship (brand, relations with market regulator, local authorities and the financial community, relations with business partners, social impact). The company also presented a scheme of the company's business model and provided information on the strategy of Orange Polska, which is based on network quality, convergence, improving customer experience, increasing efficiency and responsibility in operation. As part of individual sections, the company also presented sample KPIs[vi] (see: Michalak, Bek-Gaik, Karwowski 2018).

As part of financial KPIs, Orange presented adjusted revenue, revenues from mobile services, revenues from fixed-line services, other revenues, adjusted EBITDA, adjusted CAPEX, Adjusted OCF, net debt/adjusted EBITDA evolution, dividend payment. The elements of the Orange Polska business model are presented in Table 1.

Table 1: Orange business model title here

Resources	Business activities	Non-financial performance	Outcomes
Financial – debt and equity. **Manufactured** – network infrastructure, distribution network **Human and intellectual** – Orange Polska created Orange Labs to support development of new technologies and innovations. **Social and relationship** – global and widely recognized "Orange" brand **Natural** – the company manage natural resources efficiently, monitoring the consumption of energy and other resources, as well as carbon dioxide emissions related to its operations.	**Business activities** – Licenses and regulations – Network development driven by customer needs – Products and services – Sales and distribution – customer care **Social responsibility activities –** implementing a policy of corporate business responsibility in all areas of business **Environmental activities** – optimization of energy use; increase in number of recycled, re-use and refurbished devices **Activities in favor of the employees** – Volunteering programme – Training programmes	– Workforce data – Accidents at work – Environmental data – Energy consumption – CO2 emissions – Electronic and electrical waste collection	– Adjusted revenue – Adjusted EBITDA – Adjusted CAPEX – Adjusted OCF – net debt/adjusted EBITDA evolution – DPS

Source: Orange Integrated Report 2016, http://raportzintegrowany.orange.pl/raport2016/en/index [Retrieved January 6, 2019]

Subsequently, disclosures about the business model at Polska Grupa Energetyczna (PGE Group) were analyzed (Table 2). The company in its integrated report for 2016[vii] presented a business model schema - an infographic showing how the company creates value for the company, the environment and society (including the main segments: conventional energy, renewables, distribution and supply). The company revealed a business model presenting inputs, business activities and outcomes. Presenting its value creation model, the Group characterized the following issues: clients, natural environment, public affairs, investors, local communities, employees and social contribution. The Group has not precisely characterized the individual elements of the business model suggested in the IIRC IR Framework, which significantly hinders the analysis. It can therefore be said that the Group has adopted its individual way of describing the business model.

Table 2: PGE Group business model

Inputs	Outputs	Non-financial performance	Outcomes
Amount of – lignite extracted from own deposits – lignite resources – hard coal delivered – natural gas supplied – water and wind energy – biomass contracted from suppliers Capital expenditures Equity	**Energy safety**: Net electricity generation Revenues from ancillary control services Centrally Dispatched Generation Units capacity Intervention Service **Stability of supply:** Regulatory Asset Base Distribution volume Distribution grid	**Social contribution:** Taxes and fees paid to local budgets Support of sport team PGE Foundation **Environmental protection:** Operating in line with emission standards Diversified sources of energy **Services meeting expectations**	**Financial contribution:** Revenue Net profit EBITDA

Source: PGE Integrated Report 2016, https://raportzintegrowany2016.gkpge.pl/en/growth/value-creation-model.html [Retrieved January 20, 209]

The Lubelski Węgiel BOGDANKA Capital Group, when presenting the business model, applied the six-capital approach and presented the business model in accordance with the guidelines of the integrated reporting framework[viii]. The Group's business model has been described in the "About Bogdanka" and "Integrated model of creating value" chapters. The following subsections discuss business model and scale of the organization, business model and supply chain, development strategy for the upcoming years, account of the state of implementation of the strategy objectives for 2016 (presenting both the declared and the achieved level).

Disclosures about the business model focus on value creation (Table 3). Inputs are presented in detail as capitals on the basis of which the organization creates value. As part of disclosures about individual types of capital, the Group discussed key figures and cash transfers related to the capitals, risk management and relations with stakeholders. Six capitals – financial, manufactured (operating), human, intellectual, social, natural – on the basis of which the Group conducts its business activities, are presented in the chapter "Integrated model of creating value".

The individual capitals were discussed in detail. The following contents were included in each capital:

- Financial capital: shareholding structure, dividend policy, governance, governing bodies of LW Bogdanka SA, internal control and risk management in drawing up financial statements, selected financial results;
- Manufactured (operating) capital: effective business model, infrastructure and investments, integrated management system, management and corporate social responsibility, integrated enterprise risk management system;
- Human capital: social dialogue as component of the management culture, management of occupational, health and safety, ethics as a component of the organizational culture;
- Intellectual capital: technological innovation, cooperation with the academia, sector initiatives,
- Social capital: building social and community relationships, mine's economic impact, engagement in social life, mining damage;

- Natural capital: environmental management, biosphere, water management, waste management focused on effectiveness, consumption of raw and other materials, energy and emissions.

The rest of the report presents the Group's activities in terms of the abovementioned capital, while focusing on those aspects of the business that, due to the nature of the business activity, are key areas of economic, social and environmental responsibility. The company then presented financial and non-financial performance measurement indicators.

Table 3: Business model of Lubelski Węgiel BOGDANKA Group

Capitals	Activities	Outputs	Outcomes
Financial capital – total assets, equity, revenue, net profit **Manufactured (operating) capital** mining, energy and transport infrastructure, advanced IT infrastructure Examples of measures: – Non-current assets – expenditure on investment and development **Human capital** Employees' knowledge, experience and qualifications Examples of measures: – number of employees – expenditure on OHS **Intellectual capital** knowledge and innovations that constitute the Smart Mine concept Examples of measures: – hours of training courses – net book value of intangible assets **Social capital** participation in important local social initiatives and sponsorship of sport Examples of measures: – income tax – transfers: to the communities, for removing mining damage, for charity **Natural capital** – owned natural assets Examples of measures: – recovered mine water used for economic purposes – expenditure on environmental protection	**Operational activities** – extraction of commercial hard coal; – heat supply to the mine, mine's water and wastewater management operations; – delivering heat to external recipients; – waste transportation and logistics services **Social activities** – support for local social initiatives – professional cooperation with universities – charitable activities **Environmental activities** Integrated system of quality, environmental and enterprise risk management **Activities in favor of the employees** – The first study of the organizational culture and internal communication – The Code of Ethics	– extracted hard thermal coal – heat supply services – the mine's water and wastewater management operations – delivery of heat to external recipients, – repairs and refurbishments on the ground, – by-products	– Revenue – EBITDA – Net profit – EBIT margin – capital expenditure

Source: LW BOGDANKA Group Integrated Report 2016, https://www.lw.com.pl/file,106,bogdanka_raport_zintegrowany_2016.pdf [Retrieved January 25, 2018]

Another business model was presented on the example of Pelion[ix]. The company has adopted a completely different solution than other companies. In general, disclosures about the business model should be found throughout the entire report, which makes analysis much more difficult, data are dispersed and difficult to interpret. The report is divided into the chapters and each of them contains disclosures about the business model. The only aspect the company presented according to the basis of the business model is six capitals. Individual elements of the business model are contained in the following chapters:

Pelion family

- Pelion family members and their mission
- Value creation model
- Pelion's growth strategy

2016 on market and in Pelion Family

- Pelion family in 2016
- Pelion S.A. at the WSE
- Market environment

Consolidated financial performance

- Sales and financial highlights
- Consolidated statement of financial position

Business philosophy and non-financial results of operations

- Serving Patients and society at large
- Innovation and development
- Ethical business conduct and support for development

Corporate governance and risk management

- Compliance with corporate governance principles in 2016
- Risk management

Our report

Table 4 illustrates the key elements of business model of Pelion.

Table 4: Pelion business model

Capitals	Business activities	Outcomes
Financial capital – funds used to finance operations Key data: – Revenue – EBIT Objective Continued cooperation with capital market participants and lenders, receivables management **Working capital** – infrastructure, warehouse network, order picking line, distribution and logistics network, vehicle fleet, a chain of company-owned pharmacies and pharmacies working with Pelion, manufacturing plant, a hospital. Key data: – number of: pharmacies, warehouses and hospitals supplied – products sourced from manufacturers Objective ➢ development of a proprietary model for cooperation with external partners ➢ use of innovative solutions and communication channels through **Human capital –** a team of people who are open to teamwork and ready to share their ideas Key data: – number of employees – employee training hours Objective ➢ fostering a friendly work culture **Intellectual capital** –research on innovative particles, educating healthcare professionals Key data: – clinical trials of an experimental anti-atherogenic drug – combination of a medical knowledge website with the possibility of drug ordering through website and mobile Objective ➢ Willingness to create alliances and partnership with academic institutions **Social capital** Participating in treatment and protection of human health, involvement in the lives of local communities. Key data: – number of patients served – support for 35 organizations – the DOZ Marathon Łódź Objective ➢ Dialogue with local communities and NGOs **Natural capital** Helping to reduce negative environmental impact ensuring safe disposal of expired medicines. Key data: – amount of collected medical waste – collections of expired medicines from the pharmacies Objective ➢ participating in the Healthy Choice programme	Manufacture of medicines Conducting advanced clinical trials Pharmaceutical distribution CSR initiatives	Revenue EBIDTA EBIT Profitability ratios presented at individual capitals

Source: http://raport2016.pelion.eu/ [Retrieved January 25, 2018]

Polski Koncern Naftowy ORLEN S.A.[x] presented a completely individual, own approach to the presentation of its business model. The Integrated Report of the PKN ORLEN Group 2016 revealed a scheme of the business model, not referring to its individual elements. In turn, the implementation of the business model was presented by indicating the outcomes in individual business segments. The company presented other information about the business model in various parts of the report – for example, the ORLEN Group and the environment, Strategy, Financial results. Compared to 2015 (Walińska, Bek-Gaik, Gad 2015) – it can be said that the capital approach in the presentation of the business model has been abandoned. The Group has not characterized individual capitals. The section on the business model in Orlen Group integrated report lists the following key elements in detail:

1) operating segments along with specification of the products offered under each segment, i.e.
    a) upstream (crude oil, natural gas)
    b) downstream (refinery, petrochemicals, power generation)
    c) retail (petrol, diesel oil, LPG)
2) dedicated staff in each of the segments
3) key financial results in each of the operating segments
4) strategy implementation by segment in 2016, e.g.:
5) sources of competitive advantage, e.g .:
    a) implementing environmental management systems and investing in innovation,
    b) efficient logistics infrastructure,
    c) modern management culture.

Conclusions

The business model is a very important disclosure in IR. It should be emphasized that a properly articulated business model is useful in communicating organization's business for stakeholders. Good knowledge of the business model would make it possible to assess the performance of entities and the accountability or fulfillment of management tasks by the management of these entities. The concept of the business model encourages a proactive, independent way of thinking and the attitude of the persons responsible for preparing the report, its auditors and users, because it requires them to consider how the business model works, and thus – how it increases the value of the organization. In addition, accurate and reliable presentation of business model would increase the substantive relevance and reliability of financial information.

The analysis (case studies)[xi] shows that the way the business model is presented in an integrated report in the practice of the surveyed companies is very different. The companies partly apply the solutions proposed in the IIRC structure but also use their own individual solutions. In practice, we observe:

1) various forms of presentation of the business model,
2) the wide range and dispersion of topics related to the business model among various parts of the integrated report,
3) lack of interrelationships, and the value chain presentation,
4) a differentiated presentation of performance measures (indicators),
5) various business model diagrams.

Terminology is also a problem – companies use different terms for the term "business model" and some of them do not use the term, but instead use the terms "value creating model" or "business model". It can definitely be said that the surveyed companies use mixed solutions, partly using IIRC and GRI guidelines, what does not promote transparency of content related to the business model of the organization.

Preferred by IIRC so-called the six-capital approach, in line with the International <IR> Framework guidelines, was used only by Bogdanka, Orange and partly PELION. In turn, PKN Orlen and PGE applied their own individual approach to the presentation of business model. The companies that

applied the capital approach generally presented financial capital in the form of the amount of equity, liabilities and cash held. In case of production capital – companies presented data on the value of property, plant and equipment at the end of the reporting period, possibly distinguishing analytical items. In turn, intellectual capital is disclosed in the form of intangible assets, which include, among others, patents, licenses, concessions, carbon dioxide emission rights, etc. Human capital is presented in the form of a description of human resources – companies presented the number of employees, gender structure, form of employment and age structure. In turn, disclosures about social and relational capital include descriptions of ethical values, implemented codes of ethics and codes of good practice, organizational culture, awards and certificates, membership of organizations, etc. Natural capital, which is the last category of inputs, is disclosed in the form of land area owned, the area covered by mining concessions, the volume of natural resources, etc. (Michalak, Bek-Gaik, Karwowski 2018).

The second essential element of the business model – i.e. business activities – is presented in the form of a description of operational activities of companies and other selected activities, e.g. production and environmental activities, activities in favor of the employees.

The third element of the business model are the outputs, i.e. products, services, waste and other by-products, and include information on the volume of production, both value and quantitative.

As the last element of the business model consistent with the International <IR> Framework – outcomes – the companies presented both financial and non-financial KPIs. Most often, as the financial indicators they present EBITDA, investment expenditure, adjusted cash flows from operating activities, and among the non-financial indicators dominate data on employment, the number of accidents at work, carbon dioxide emissions. Describing the business model, companies also present relations with stakeholders, risks and corporate governance. The indicated conclusions are consistent with the results indicated by other authors.

It can therefore be stated that the presentations of the business model are very differentiated and chaotic. The current practice of enterprises in disclosing information about the business model is very diverse. Admittedly, the companies in their integrated reports refer to almost all elements of the business model proposed by the IIRC in the International <IR> Framework, but in very different ways. The quality and accuracy of individual disclosure categories vary widely. A major drawback are very poorly articulated links between individual elements of the business model and their impact on creating value. The size and dispersion of topics related to the business model means that some disclosures can be considered factually non-informational because they do not relate to the topic (e.g., relate to strategy, corporate governance or risk) or because they are so general that they cannot be fall into any category adopted in IIRC International <IR> Framework.

Considering the fact that the business model is a very important disclosure in the integrated report, it appears that companies should more closely follow the guidelines formulated by the IIRC and Business Model Background Paper for IR. The important barrier in disclosure about the business model is the concern of management boards against disclosing some information – in particular the disclosure of key competences, suppliers, business strategy etc.

To sum up, the business model is a very important element of reporting for investors, used to assess the organization's ability to create and maintain value over time, it is necessary to constantly update and improve the business model description form proposed in the framework structure in order to provide all stakeholders with transparent and reliable information on the way of conducting business in companies.

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[i] The business model is defined differently, which is the result of looking at the "business model" from many different points of view and scientific disciplines. Most often it is referred to as a general concept representing the logic of doing business. A comprehensive overview of the business model

definition can be found, among others in: Falencikowski (2013), see also IIRC (2013b, pp. 15-19). In addition, the concept of the business model was presented in e.g.: Nogalski (2009), Osterwalder, Pigneur (2009), Richardson (2008), Rudny (2013), Michalak (2012).

[ii] When analyzing the literature on the subject, empirical research on disclosures about the business model can be divided into two main groups: the first, which deals with the problem of compliance of disclosures on the business model with the framework structure of the integrated report proposed by IIRC, e.g.: Eccles, Krzus, Ribot (2015, p. 108), Bek-Gaik, Rymkiewicz (2015a, 2015b, 2016a, 2017), Walińska et al. (2015), Michalak (2015), and a second group aimed at assessing the quality of information disclosed about the business model, e.g.: Eccles, Krzus (2014), Lai, Melloni, Stacchezzini (2013),Bagnoli, Redigolo (2015), Bini, Dainelli, Giunta (2016).

[iii] http://raportzintegrowany.orange.pl/raport2016/en/index [Retrieved January 6, 2019]

[iv] raportzintegrowany.orange.pl/raport2016/en/our-business-model-and-value-creation [Retrieved January 6, 2019]

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[vi] http://raportzintegrowany-orange.pl/docs/Wersja_internet_Orange_raport_rozdzial_6.pdf; 4–8 [Retrieved January 6, 2019]

[vii] https://raportzintegrowany2016.gkpge.pl/en.html [Retrieved January 20, 209]

[viii] https://www.lw.com.pl/file,106,bogdanka_raport_zintegrowany_2016.pdf [Retrieved January 25, 2018], p. 6

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[x] https://raportzintegrowany2016.orlen.pl/pl-2016 [Retrieved March 09, 2018]

[xi] It should be emphasized that the conducted research is for reference only

MIDAS Models And Db.Nomics.World Database In Gretl – Example of Nowcasting and Short Term Forecasting

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Abstract

In this paper we show the implementation of an automatic economic nowcasting and short-term forecasting procedure using MIDAS approach in gretl. We also demonstrate possibilities of gretl's interface for direct downloading macroeconomic time-series from db.nomics database. In empirical illustration we show how to predict quarterly gross domestic product using a mixture of quarterly and monthly explanatory variables. In all cases, the MIDAS generates more accurate forecasts comparing to benchmark model. Results of our study confirm that MIDAS approach may have better forecasting performance than other ADL specifications.

Keywords: short-term forecast, MIDAS models, db.nomics, gretl.

Introduction

Assessment of the current macroeconomic situation together with accurate nowcasts and short-term forecasts is an important element of effective economic, fiscal, monetary or social policy in many countries. Delivering the short-term forecasts of gross domestic product (GDP) allows the analysis of macroeconomic evaluation of state policies. However, this category is measured on a quarterly basis, while many of the explanatory processes which may drive GDP dynamics, like inflation, employment, imports and exports are measured on a monthly basis. Incoming economic signals measured monthly, weekly or daily can be used to construct quarterly GDP forecasts. The expected trends in economic development may formulate the basis for further analyses of the expected reactions of economies.

A useful tool for forecasting processes of different observation frequencies is MIDAS (MIxed DAta Sampling regressions models) described in following papers: Ghysels, Santa-Clara & Valkanov (2004), Ghysels, Sinko and Valkanov (2006), Ghysels and Wright (2009), Ghysels, Andreou and Kourtellos (2010) or Ghysels (2015).

The aim of the paper is verification of usefulness of automatic procedures for countinous forecasting of economic processes. The main research goal is implementation of an automatic short-term economic forecasting procedure using MIDAS approach in gretl scripting language. We formulate the following research question: whether combaining Open data repositories (db.nomics) with Open source econometric software (gretl) may be used as an automatic forecasting tool by both academics and practitioners?

In Section Open data we briefly describe db.nomics database with example of gretl script for automatic collecting data from db.nomics.world repository. The empirical illustration is provided for predicting quarterly gross domestic product (GDP) processes using monthly exogenous variables for

selected countries and is presented in Section Empirical results. The paper is concluded in the last Section. Additionally, we include the whole gretl script for replicattion our research in Appendix.

Forecasting macroeconomic phenomena using mixed frequencies data for U.S. real output growth was provided by Clements and Galvão (2008), while Ghysels, E., & Ozkan, N. (2015) used MIDAS for modeling U.S. current federal government expenditures and receipts. León, Nave and Rubio (2007) examined usage of MIDAS approach for risk-expected return trade-off for stock indices in European countries and found that specifying asymmetric variance parameters can improve the relationship between expected return and risk. Emre, Fendoglu and Saltoglu (2012) compare MIDAS approach to GARCH(1,1) model in out-of-sample forecasting of stock markets in ten emerging countries and obtained statistically better forecast precision.

MIDAS framework was introduced as an ideal base for extension to many different econometric models and conceptions. Foroni, Guérin and Marcellino (2015) presented an application of MIDAS approach toMarkov-switching Mixed-Frequency VAR (MSMF-VAR) models and found it useful to estimate the condition of economic activity. The proposition of single equation Markov-Switching MIDAS (MS-MIDAS) was introduced in Guérin and Marcellino (2013). Barsoum and Stankiewicz (2015) proposed solution where they allow for changing parameters according to a Markov-switching scheme and applied it to empirical U.S. GDP growth. Extension of MIDAS conception to vector autoregressive modeling (VAR) is presented in Foroni, Ghysels and Marcellino, M. (2013), while improvement to vector error correction models (VECM) was made in Seong, Ahn and Zadrozny (2013). They modeled quarterly US real GDP using monthly monthly coincident indicators. Kuzin, Marcellino and Schumacher (2011) compared MIDAS approach to mixed-frequency VAR for quarterly GDP in Euro zone countries and discovered that those methods are complementary. MIDAS gave more accurate forecasts in short-term, while MF-VAR is better in forecasting for longer horizon. Schorfheide and Song, D. (2015) used Bayesian estimation to monthly-quarterly data of vector autoregression model in state-space form. Foroni, Marcellino and Schumacher (2015) discussed of unrestricted MIDAS regression and evaluate its usability in Monte Carlo experiments and in empirical application on short-term forecasting monthly indicators in Euro area and US GDP. Bayesian methodology for mixed frequency data was used in Schorfheide, Song and Yaron (2018) to analyze annual consumption, monthly consumption and asset return data.

Schumacher (2016) compared single-equation MIDAS regression with bridge equations in modeling GDP growth for Euro area countries. Proposition of smooth transition mixed data sampling (STMIDAS) conception with application to financial time series can be found in Galvão (2013). Marcellino and Schumacher (2010) combined MIDAS methodology with modeling based on factor models, which are useful in forecasting using large data sets of macroeconomic variables. Lima, Meng and Godeiro (2019) combined MIDAS framework with quantile combination approach and applied the proposed model to the growth rate of the industrial production index. The combination of MIDAS and quantile approach gives more accurate results in terms of forecasting. Bai, Ghysels, E. and Wright (2013) performed wide comparison of MIDAS regression with Kalman filter for forecasting purposes. They examined many circumstances like: misspecifications, small samples or ideal conditions obtaining more accurate results for state space models, but with bigger computational requirements. Pettenuzzo, Timmermann, and Valkanov (2016) proposed new approach for modeling density of first and second moments with MIDAS effect and applied it to monthly growth in industrial production and inflation, gaining better performance in the volatility equations in both: out-of-sample and in-sample density predictions. Extension of standard DCC-MIDAS by employing t-student distribution is introduced in Xu, Chen, Jiang, and Yuan (2018). Results concerning Chinese banking industry showed that DCC-MIDAS-t model can be applied for measuring systematic risk or financial returns with fat-tailed distribution. The implementation of MIDAS framework for open-source and free software was accomplished in R package (see Ghysels, Kvedaras and Zemlys (2016)) or in gretl (see Cottrell & Lucchetti (2017)).

Open data - db.nomics.world

The phrases: open data, open government data open access, open algorithms, open source, open knowledge or open science indicate new paths in the development of science, research, analysis, as well as making algorithmsand software freely available as ready-made tools for their implementation. The results of these analyses (publications) should be available without any restrictions for everyone (see Ruijer, Grimmelikhuijsen & Meijer (2017)). Open data is data that is accessible to anyone, can be reused without any legal or technical restrictions and stored in a way that allows for its automatic processing.

We may use the term "open data" for data that meet the following conditions together:

1. accessible - the data are accessible to the widest possible range of users;
2. current - the data are available quick enough not to lose its value;
3. complete - individual public data sets are available with integrity;
4. machine-readable - the data are structured and can be processed automatically;
5. accessible without discrimination - the data are accessible to anyone, without the requirement to register;
6. sharing without licensing restrictions - i.e. they can be used e.g. for business purposes

It is also important that Open Data can be freely used, modified and shared by anyone for any purpose. The addresses of 140 Open Data websites with macro and micro data for economic and financial research usage are included at the page: http://www.businesseconomics.com/economic-data-links.html. Most of these addresses provide data free of charge, which can be very useful for research and empirical work. Among these addresses the db.nomics.world database is indicated and deserves more attention.

The db.nomics.world repository was established in 2018 and it is a part of the Macroeconomic Observatory project carried out by CEntre Pour la Recherche EconoMique et ses APplications (CEPREMAP) in Paris (macro.nomics.world). The aim of this project is, among other things, to develop tools and resources to support international macro-economic research by running the data repository db.nomics.world.

The db.nomics.world website satisfy all six features of Open Data and is a valuable source of information for researchers working with macro-economic data00. It provides national and international macroeconomic data from 62 providers and contains over 21,000 databases and over 602 million of series. The website contains information about downloading data via its own web interface or directly from econometric and statistical software via application programming interface (API). The 62 providers contain all major statistical offices (global, European and national) as well as global banks, among others: WB, WTO, OECD, IMF, UNDATA, ILO, ECB, FED or Eurostat.

All databases are accessed by using an uniform three element syntax (Identifier): Provider / Database / Series. For example:

Identifier: [IMF/BOP/Q.ES.BFFR_BP6_USD]
Provider: IMF - International Monetary Fund
Database: BOP - Balance of Payments
Series: Q.ES.BFFR_BP6_USD - Quarterly – Spain – Supplementary Items, Financial Account, Net, USD

For Stata, R, Phyton or gretl software, specialized tools have been developed to automatically download and update data. The gretl econometric software (Gnu Regression, Econometrics and Time-series Library) allows you to automatically download data from the db.nomics repository (Dbnomics for gretl is avaiable from 2019a version of gretl). Data collection is possible through the

graphical user interface (GUI). Additionally, one can also use an internal gretl scripting language for data acuisition. An example of a data collection script for series used in this article is as follows:

```
open dbnomics
setobs 4 1995:1 --time-series
string COUNTRY = "EU28 AT BE BG HY CY CZ DK EE FI FR GR GB IE IT LU
LV LT MT NL PL PT RO ES SE SK SI"
loop foreach KR @COUNTRY
  data   ECB/MNA/Q.N.$KR.W2.S1.S1.B.B1GQ._Z._Z._Z.EUR.V.N         --
name=$KR_GDP
endloop
```

The db.nomics repository's development team has prepared a tool for automatic update of the repository using the API interface, so the db.nomics repository is a valuable tool for all kinds of automatic short-term economic analyses. An example of such analyses is presented in Section Empirical illustration.

MIDAS In Gretl

Since most macroeconomic data are observed monthly or quarterly, there is a potential issue for forecasters related with a fact that not all time-series are sampled at the same frequency. One of the potential solution for this phenomena is to use methods for dealing with mixed frequency data. The most know approach for this kind of analysis is so-called MIDAS (Mixed Data Sampling) regression models proposed by Ghysels, Santa-Clara & Valkanov (2004), i.e. regressions that may base on time-series datasets observed at different frequencies. From a econometric point of view, in MIDAS we specify conditional expectations on lags distribution of explanatory variables sampled at some higher frequency than endogenous process. However, we have two possible ways of understanding lags in MIDAS (see Cottrell & Lucchetti (2017)):

1. high-frequency lag 0 corresponds to the first sub-period within the current low-frequency period, or
2. high-frequency lag 0 corresponds to the last sub-period in the current low-frequency period.

The very simple explanation of differences in these two approaches is that in the case of the first quarter of some year the first way of understanding lags in MIDAS assigns lag 0 to January, while the second to March. In gretl, the the first approach is used.

Following Ghysels, Santa-Clara & Valkanov (2004), let's consider autoregressive distributed lag (ADL) with high-frequency explanatory variables:

$Y_t = \alpha + \sum \beta_i L^i Y_t + \gamma \sum \Phi(k;\theta) L_{HF}^k X_t + \varepsilon_t$, where L^i is a back-shift operator such as $L^i x_t = x_{t-i}$ for any variable x_t and $\Phi(k;\theta)$ is a some polynomial which defines weights for aggregation in time. Two the most commonly used $\Phi(k;\theta)$ polynomials are:

1. beta – $\Phi(k;\theta_1,\theta_2) = \dfrac{f\left(\frac{k}{m},\theta_1,\theta_2\right)}{\sum f\left(\frac{j}{m},\theta_1,\theta_2\right)}$, where

$$f(k;\theta_1,\theta_2) = \frac{i^{\theta_1-1}(1-i)^{\theta_2-1}\Gamma(\theta_1+\theta_2)}{\Gamma(\theta_1)\Gamma(\theta_2)},$$

2. Almon – $\Phi(k;\theta_1,\theta_2)=\frac{\exp(k\theta_1+k^2\theta_2)}{\sum(j\theta_1+j^2\theta_2)}$.

In gretl, midasreg command takes one of the following five options:

1. „u-midas", unrestricted MIDAS (OLS);
2. "almonp", which stands for normalized exponential Almon (NLS);
3. "nealmon", which stands for exponential Almon; in this case, the weights of Almon polynomial sum up to 0 (NLS);
4. "beta0", which stands for normalized beta polynomial with zero last lag; in this case, there is no coefficient for the last lag (the newest high frequency observation) and the weights of beta polynomial sum up to 0 (NLS);
5. "betan", which stands for normalized beta polynomial with non-zero last lag; in this case, we have coefficients for all high frequency lags and the weights of beta polynomial sum up to 0 (NLS).

In next Section we present the results of the short-term forecasting using MIDAS approach and we evaluate the prediction accuracy in comparison to autoregressive models.

Empirical Illustration

An empirical example concerns the short-term forecasting of gross domestic product (GDP) for quarterly data for 28 EU countries. This category is measured at quarterly frequency, but many exogenous processes are measured at monthly frequency. MIDAS models are built for quarterly data using monthly exogenous processes.

The MIDAS model is described by the quarterly endogenous GDPt process (at market prices in Euro) for a given country and the monthly exogenous processes for that country: ICPt (Indices of Consumer prices), UNEPt (Standardised unemployment Rate) and CARRt (Car registration - new commercial vehicles in absolute value). The proposed exogenous processes, concerning price inflation and unemployment rates are used in the economic situation models, while the process concerning the value of registered new cars is a barometer of investment sentiment and indicates the anticipation of the economic situation.

Each monthly series has been recorded in the form of three laged processes, e.g. ICPt as ICP_m1 (January, April, July, October, etc.), ICP_m2 (February, May, August, November, etc.) and ICP_m3 (March, June, September, December, etc.).

For each country, 6 models are estimated with an AR(4) model is used as the benchmark. The next 5 models are the MIDAS regressions for 5 types of laged schedules and additionally autoregressive component with lags equals 4. All statistical data (quarterly and monthly) are taken from several data providers via the db.nomics.world repository: GDPt from the ECB (Europen Central Bank), ICPt from the ICP (Indices of Consumer Prices) database and UNEPt and CARRt from the STS (Short-Term Statistics) database. Quarterly data are available until Q3 2019, and monthly data until November 2019. Models were estimated for the period from 2000q1 to 2018q4, that is for T=76 quarters. The forecast was built for the horizon of 4 quarters of 2019. For the first 3 quarters (2019q1-2019q3, where the actual data are available) RMSE and MAPE measures are determined. The prediction for Q4 2019 (nowcasting) was based on the two-month signals (October and November 2019) coming from monthly processes.

In the Appendix Section we present the full gretl script for all EU countries, but the results presented in the paper concern 5 selected countries, namely Spain, Great Britain, Poland, Portugal and Sweden.

The selection of these countries was imposed by the limitation of the article space and the fact that empirical illustration is not the foreground aim of this paper.

All MIDAS models, which were estimated using nonlinear least squares (NLS) method, have reached the convergence criteria and fits the data at a sufficient level. The basis for evaluating the usefulness of MIDAS models for automatic short-term forecasting are the results of the forecasts and their ex post errors, which are presented in Table 1.

Table 1: Results of forecasts and ex-post errors for the AR(4) and 5 MIDAS models for the 5 countries: Spain, Great Britain, Poland, Portugal and Sweden.

Data	Actual	Model AR(4)	MIDAS Models				
			U-MIDAS	Beta0	BetaNZ	neAlmon	Almonp
Spain							
2019q1	298005.0	301377.9	302109.4	301315.1	288387.3	300464.1	300446.7
2019q2	315322.0	313367.7	316725.3	313428.9	304068.3	316195.6	316155.1
2019q3	305566.0	298789.5	305339.7	298751.8	290986.9	304467.2	305527.0
2019q4	-	320674.8	324360.3	320712.3	313725.4	324577.6	321163.3
RMSEs:		4513.6	2507.7	4508.3	11995.8	1634.8	**1489.7**
MAPEs:		1.323%	0.632%	1.314%	3.856%	0.487%	**0.365%**
Great Britain							
2019q1	633358.0	617379.5	617018.1	617325.0	599310.9	616066.6	615094.7
2019q2	624216.0	633430.3	633616.2	633376.6	615116.5	635875.6	635152.7
2019q3	611329.0	622349.0	621872.4	622303.5	603806.1	623239.5	625270.6
2019q4	-	606346.7	598847.9	606294.9	587858.1	605401.4	603775.5
RMSEs:		12405.0	12470.2	**12401.7**	20805.3	13866.0	14691.6
MAPEs:		1.934%	1.937%	**1.931%**	2.688%	2.182%	2.305%
Poland							
2019q1	120874.0	128333.8	128201.4	128882.6	128422.1	129042.8	129961.1
2019q2	127438.0	124898.3	124913.7	125773.7	125735.1	125889.2	126066.9
2019q3	129920.0	123638.1	125990.3	126671.6	126775.2	126772.4	124711.3
2019q4	-	141496.3	137340.8	140890.0	140186.0	141067.3	136537.6
RMSEs:		5818.1	5016.6	5081.1	**4822.0**	5132.5	6098.5
MAPEs:		4.333%	3.689%	3.477%	**3.333%**	3.465%	4.201%
Portugal							
2019q1	50461.2	50178.8	50690.8	49967.0	50837.2	49967.0	51418.0
2019q2	52855.5	51454.7	53018.9	51384.8	52362.1	51384.8	53232.0
2019q3	53814.7	52354.4	53532.7	52235.8	53223.9	52235.8	53926.7
2019q4	-	53395.5	54002.8	53365.5	54592.8	53365.5	55120.2
RMSEs:		1179.6	**230.1**	1278.0	494.6	1278.0	597.2
MAPEs:		1.974%	**0.429%**	2.232%	0.925%	2.232%	0.939%
Sweden							

2019q1	116140.0	115641.2	115653.9	117142.6	117144.8	117478.8	118024.4
2019q2	122028.0	128319.1	126001.6	127414.3	127433.4	127620.3	127871.5
2019q3	112498.0	112839.5	113292.2	113315.1	113319.2	113390.3	113642.8
2019q4	-	120012.1	121848.1	120844.9	120777.6	120351.4	121623.3
RMSEs:		3649.1	**2356.5**	3198.3	3209.6	3359.8	3606.0
MAPEs:		1.963%	**1.460%**	2.001%	2.008%	2.176%	2.476%

According to the results presented in Table 1 all forecasts are close to the actual values. For all cases the MIDAS model gave more accurate predictions that benchmark AR(4) model. This means that including additional exogenous processes, which are observed at different frequency then depended variable, gives better results in terms of forecasting performance.

Conclusions

This paper presents an automatic algorithm for downloading, modeling and forecasting MIDAS datasets. Our contributed algorithm, which implements non-trivial econometric methods, can be performed automatically at any time for the most actual data available at dbnomics repository. Empirical examples show how MIDAS modeling can be easily realized in the gretl program with reasonable run-times. It's worth to mention that modeling open data in an open source software is an unique connection in this area.

Results presented in Table 1 show, that short-term GDP forecasts generated by MIDAS models have smaller errors than AR(4) specification. It seems to be encouraging, since it enables updating forecasts of quarterly GDP as new observations of monthly explanatory variables are available.

The db.nomics.world repository, with common single interface for retrieving and updating data, provides datasets from the worldwide government, banking and statistical institutions (62 providers). It is a tool that may speed up any macroeconomic analysis and may be used by either academics or practitioners.

Appendix

```
# GRETL - script for estimated AR(4) and MIDAS models with time series
db.nomics with ECB.

# [ECB] European Central Bank - provider
# [MNA] Gross domestic product at market prices - Euro - Current prices -
Non transformed data (quarterly)
# [ICP] Indices of Consumer prices (monthly)
# [STS] Short-Term Statistics - Standardised unemployment - Rate, Total
(all ages), Total (male and female) (monthly)
# [STS] Working day adjusted, not seasonally adjusted - Car registration -
New commercial vehicles - Absolute value (monthly)

# KR - country
# KR_GDP  - quarterly (Y)
# KR_ICP  - monthly   (X1)
# KR_UNEP - monthly   (X2)
# KR_CARR - monthly   (X3)

# Lags number = s

set echo off
set messages off
dataset clear
open dbnomics
```

```
nulldata 100
setobs 4 1998:1 --time-series
delete index
set stopwatch

string COUNTRY = "AT BE HU CZ DK EE FI FR GR IE IT LU LV LT NL PL PT ES SE
SK SI"
s = -4   # lags number for $KR_GDP (quarterly)

loop foreach KR @COUNTRY

data ECB/MNA/Q.N.$KR.W2.S1.S1.B.B1GQ._Z._Z._Z.EUR.V.N   --name=$KR_GDP
data ECB/ICP/M.$KR.N.000000.4.ANR      --compact=spread --name=$KR_ICP
data ECB/STS/M.$KR.S.UNEH.RTT000.4.000 --compact=spread --name=$KR_UNEP
catch data ECB/STS/M.$KR.W.CREG.CV0000.3.ABS --compact=spread --
name=$KR_CARR
if $error != 0
   data ECB/STS/M.$KR.W.CREG.CVL000.3.ABS --compact=spread --name=$KR_CARR
endif

printf "\n\n=================  COUNTRY = '%s' =================\n\n", "$KR"
list X = $KR_ICP* $KR_UNEP* $KR_CARR*         # form list of high-frequency
list XL = hflags(3, 11, X)                    # and a list of their lags
matrix FC = {}                                # to collect forecasts
setopt fcast persist --out-of-sample --static
smpl 2000:1 2018:4                            # estimation sample

printf "\n========== OLS - AR(%1.0f) ===========\n", s
$KR_OLS <- ols $KR_GDP(0 to s) 0
fcast --out-of-sample --static
eval $fcast
FC ~= $fcast

print "=== U-MIDAS ==="
$KR_U_MIDAS <- midasreg $KR_GDP 0 $KR_GDP(-1 to s) ; mdsl(XL, 0)
printf "midas coefficients:\n%10.5f\n", $model.midas_coeffs[,1]
fcast 2019:1 2020:1
FC ~= $fcast

print "=== beta (zero last lag) ==="
matrix theta = {1,5}
$KR_Beta0 <- midasreg $KR_GDP 0 $KR_GDP(-1 to s) ; mdsl(XL, 2, theta)
printf "midas coefficients:\n%10.5f\n", $model.midas_coeffs[,1]
fcast
FC ~= $fcast

print "=== beta (non-zero last lag) ==="
theta = {1,1,0}
$KR_BetaNZ <- midasreg $KR_GDP 0 $KR_GDP(-1 to s) ; mdsl(XL, 3, theta)
printf "midas coefficients:\n%10.5f\n", $model.midas_coeffs[,1]
fcast
FC ~= $fcast

print "=== normalized exponential Almon ==="
theta = {0,0}
$KR_neAlmon <- midasreg $KR_GDP 0 $KR_GDP(-1 to s) ; mdsl(XL, 1, theta)
printf "midas coefficients:\n%10.5f\n", $model.midas_coeffs[,1]
fcast
FC ~= $fcast

print "=== Almon polynomial ==="
theta = {0,0,0,0}
$KR_Almonp <- midasreg $KR_GDP 0 $KR_GDP(-1 to s) ; mdsl(XL, 4, theta)
```

```
printf "midas coefficients:\n%10.5f\n", $model.midas_coeffs[,1]
fcast --out-of-sample --static
FC ~= $fcast

printf "================= Forecast - COUNTRY = '%s' =================\n",
"$KR"
printf "\n  AR(4)     U-MIDAS   Beta0     BetaNZ    neAlmon   Almonp
\n%10.2f\n", FC

smpl 2019:1 2019:3 # forecast range
matrix my = {$KR_GDP}

print "Forecast RMSEs:"
printf "%10.2f",   fcstats(my,FC[1:3,1])[2]
printf "%10.2f",   fcstats(my,FC[1:3,2])[2]
printf "%10.2f",   fcstats(my,FC[1:3,3])[2]
printf "%10.2f",   fcstats(my,FC[1:3,4])[2]
printf "%10.2f",   fcstats(my,FC[1:3,5])[2]
printf "%10.2f\n", fcstats(my,FC[1:3,6])[2]

print "Forecast MAPEs:"
printf "%10.4f", fcstats(my,FC[1:3,1])[5]
printf "%10.4f", fcstats(my,FC[1:3,2])[5]
printf "%10.4f", fcstats(my,FC[1:3,3])[5]
printf "%10.4f", fcstats(my,FC[1:3,4])[5]
printf "%10.4f", fcstats(my,FC[1:3,5])[5]
printf "%10.4f\n", fcstats(my,FC[1:3,6])[5]

smpl 2000:1 2018:1  # revert to estimation sample
endloop

stop=$stopwatch
printf "Time = %10.4f\n", stop
```

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Russian Regions Differentiation by Living Standards

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Abstract

The regions of the Russian Federation have different economic potential, which affects their development. The economic task of typologizing the regions of the Russian Federation is determined by the need to separate the regions into homogeneous groups when conducting inter-regional comparisons, or by studying economic processes at the regional level. In this study, the differentiation of the territories of the Russian Federation refers to the establishment of qualitative relationships between groups of regions with close values of economic indicators characterizing the standard of living of the population. Homogeneous groups of regions are distinguished on the basis of a statistical (cluster) analysis of a multidimensional vector of variables. The main factors for the assessment were the share of the population with incomes below the regional living wage, the ratio of the average per capita income to the regional living wage and the ratio of the average per capita spending to the regional living wage. According to the study, the regions of Russia are divided into 7 classes according to the standard of living of the population. In the framework of the classification of regions of the Russian Federation according to the characteristics of inter-regional differentiation of the standard of living of the population, classes of regions with relatively uniform indicators of living standards are identified. The results of solving this problem can be used in further studying the regional problems of the economic and social development of Russia and developing recommendations in the field of social policy and public support.

Keywords: Clustering, Differentiation Of Regions, Standard Of Living, Poverty, Ward Linkage Method.

JEL Classification: C38; I32; P46

Introduction

The territory of the Russian Federation is vast and diverse. The structure of the Russian Federation until 2014 included 83 subjects of the Federation, and since 2014 – 85. The regions of the Russian Federation have different economic potential, which certainly affects their development. The economic task of typology of the regions of the Russian Federation is due to the necessity of dividing the various constituent entities of the Russian Federation into homogeneous groups when conducting inter-regional comparisons or studying economic processes at the regional level. A study by Violin (2018) examined various approaches to typologizing the Russian regions. The region typology basis developed by Buts et al. (2002), make up three blocks of indicators that characterize the standard of the population living, the region investment activity and the region economic potential. The study by Tikhomirova (2016) considers the classification of Russian regions according to the state and loss of health of the population.

In this study the typology of the constituent entities of the Russian Federation means the establishment of qualitative relationships between regions with close values of economic indicators characteristic of the standard of living of the population. Homogeneous groups of regions are presented solely on the basis of a statistical (cluster) analysis of multidimensional values that determine the factor of the standard of living of the population. The situation in the region for 5 years (2014–2018). Within several years, it is possible to establish the stability of the selected types, as well as the conversion between different types or between regions within the same type. Inter-regional differences in the living standards of the population provide not only the poverty level of the population, but also internal and external (from other residents of other regions) demand for goods and services in the region, inter-regional flows of cash and labor resources, social situation, inter-regional differences in price levels.

Materials and Methods

In this paper, we prefer the analysis of the aggregate data by region over several years before the analysis of annual distributions, which allows us to identify more general types of economic behavior of the regions in 2014-2018 including the dynamics of the characteristics under consideration from year to year. Analysis of the results of cluster analysis for individual years can play a supporting role and can be used to explain the belonging of a region to a certain class (type) of subjects of the Russian Federation.

Consider the main hypotheses about the allocation of possible groups of regions and the choice of indicators to characterize the standard of living of the population. In the framework of the general differentiation of the regions of the Russian Federation, we will consider the vector of indicators characterizing the interregional differentiation of the standard of living of the population: x_1 – the absolute poverty level of the region's population, characterized by the share of the population with incomes below the regional subsistence level; x_2– the relative poverty level of the region's population, characterized by the ratio of the per capita income of its population to the regional subsistence level; x_3 – ratio of average per capita expenses to the subsistence minimum by Region.

During 2014-2018, the gap in per capita income between the richest and poorest regions reached 5 times. The differentiation of living standards between individual regions of the Russian Federation remains extremely high by the standards of developed countries, as well as countries with economies in transition. The dynamics of per capita cash income of the population in the context of the Federal Districts of the Russian Federation is presented in Fig. 1.

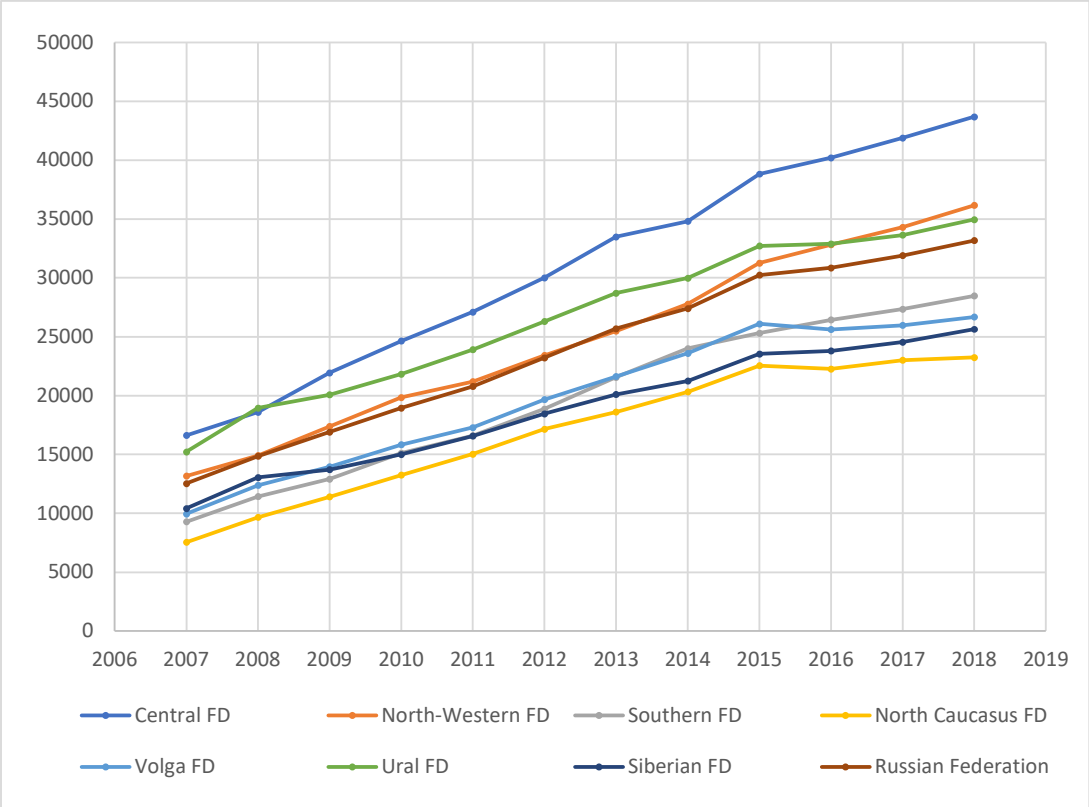

Fig. 1: Average per capita cash income dynamics of the population by the Russian Federation federal districts (per month; rubles)

The indicators used for clustering characterizing the interregional differentiation of the standard of living of the population are heterogeneous. Therefore, we will standardize the selected three indicators by converting:

$$\tilde{x}_{i,t}^{k} = \frac{x_{i,t}^{k} - E\left(x_{i,t}\right)}{\sigma\left(x_{i,t}\right)} \tag{1}$$

$\tilde{x}_{i,t}^{k}$ – the standardized value of indicator x_i in the *k*-th country in year t, *i* = 1, 2, 3;

k – number of region, *k* = 1,…, 85;

$x_{i,t}^{k}$ – initial value of indicator x_i in the *k*-th country in year t, *i* = 1, 2, 3;

$E\left(x_{i,t}\right)$ – average of the *i*-th indicator in the year *t*;

$\sigma\left(x_{i,t}\right)$ – standard deviation value of the *i*-th indicator in the year *t*.

We classify the regions of Russia (85 regions) in the corresponding three-dimensional space according to statistical data for 2014-2018 (Rosstat, 2019) in accordance with normalized indicators by the method of hierarchical cluster analysis.

The essence of hierarchical clustering consists in sequentially combining smaller clusters into large ones or dividing large clusters into smaller ones. Hierarchical algorithms are associated with the

construction of dendrograms, which are the result of hierarchical cluster analysis. The dendrogram describes the proximity of individual points and clusters to each other, presents in graphical form the sequence of combination (separation) of clusters.

The measure of similarity is determined by the Ward method (Ward, 1963). In this method, the intragroup sum of the squared deviations, which is nothing more than the sum of the squared distances between each point (object) and the average of the cluster containing this object, is used as the objective function. At each step, two clusters are combined that lead to a minimum increase in the objective function, i.e. intragroup sum of squares. This method is aimed at combining closely spaced clusters. A measure of the distance between objects is Euclidean distances. The selected clustering method leads to the most evenly distributed classification of regions.

Results

In accordance with the Ward Linkage method and data for 2014-2018, we obtained a different number of regions in the clusters. The clustering results are presented in table 1.

Table 1: Number of Regions in clusters in 2014-2018 by Ward Linkage method

Cluster	Number of Regions in clusters				
	2014	2015	2016	2017	2018
1	11	9	1	17	2
2	5	3	7	5	5
3	2	12	8	17	4
4	25	17	18	21	13
5	14	5	15	9	21
6	11	10	7	16	9
7	3	13	14	1	16
8	4	3	3	2	1
9	8	2	3	3	2
10	0	11	9	9	3
11	0	0	0	0	9
Total number of Regions	83	85	85	85	85

A qualitative analysis of the clusters obtained for normalized indicators by the Ward Linkage method shows that clusters, from the point of view of differentiating living standards, can be assigned to several economically fairly homogeneous groups. We identified such groups on the basis of comparison and ranking of all the clusters of normalized values of the three considered indicators of living standards. Based on the results, we distinguish five groups of clusters (regions).

1. Regions with a low standard of living.
2. Regions with a high standard of living.
3. Regions with low poverty and low levels of expenditure and income.
4. Regions with low poverty, high incomes and low spending.
5. Regions with an average standard of living.

Isolation of economically homogeneous cluster groups, i.e. the reduction in the number of groups of regions with a uniform level of differentiation of life simplifies the task of dynamically classifying regions of the Russian Federation in terms of differentiation of living standards during 2014-2018. The movement of the constituent entities of the Russian Federation in 2014-2018 for the indicated groups of regions is presented in table 2.

Table 2: Movement of the Russian Federation regions by cluster groups obtained clustering with Ward Linkage method to standardized data for 2014-2018

Subject of the Russian Federation	Group number				
	2014	2015	2016	2017	2018
Adygeya Republic	5	5	5	5	5
Altai Republic	1	1	1	1	1
Altai territory	3	3	5	3	3
Amur region	5	5	5	5	5
Arkhangelsk region	5	3	5	5	5
Astrakhan region	5	5	5	3	3
Belgorod region	2	2	2	2	2
Bryansk region	3	5	5	5	5
Chelyabinsk region	3	5	3	3	3
Chukotka Autonomous Okrug	4	4	4	4	4
Chuvash Republic	3	1	3	3	3
Ingush Republic	1	1	1	1	1
Irkutsk region	3	1	3	3	3
Ivanovo region	5	5	5	3	3
Jewish Autonomous region	1	1	1	1	1
Kabardino-Balkar Republic	3	1	1	1	1
Kaliningrad region	3	5	3	3	3
Kaluga region	5	5	5	5	5
Kamchatka territory	3	3	3	3	3
Karachay-Cherkess Republic	1	1	1	1	1
Kemerovo region	5	5	5	3	3
Khabarovsk territory	3	5	5	5	5
Khanty-Mansi Autonomous Okrug-Yugra	5	5	5	5	5
Kirov region	5	3	5	3	3
Kostroma region	5	5	3	3	3
Krasnodar region	2	2	2	2	2
Krasnoyarsk region	5	5	5	3	3
Kurgan area	3	3	3	3	3
Kursk region	5	5	5	5	5
Leningrad region	5	5	5	5	5
Lipetsk region	2	2	2	2	2
Magadan region	5	5	3	5	5
Moscow	2	2	2	2	2
Moscow oblast	2	2	2	2	2
Murmansk region	5	5	3	5	5
Nenets Autonomous district	4	4	4	4	4
Nizhny Novgorod region	2	2	2	2	2
Novgorod region	3	5	5	3	3
Novosibirsk region	5	5	5	5	5
Omsk region	5	5	5	5	5
Orel region	5	5	3	3	3
Orenburg region	3	5	3	5	5
Penza region	3	5	3	3	3
Perm region	5	5	5	5	5

Primorsky Krai	5	5	5	5	5
Pskov region	5	3	3	3	3
Republic of Bashkortostan	2	2	2	2	2
Republic of Buryatia	3	5	5	3	3
Republic of Chechnya	5	5	5	3	3
Republic of Crimea	-	1	1	3	3
Republic of Dagestan	5	2	5	5	5
Republic of Kalmykia	1	1	1	1	1
Republic of Karelia	5	3	5	3	3
Republic of Khakassia	3	3	5	3	3
Republic of Komi	5	5	5	3	3
Republic of Mari El	3	1	3	3	3
Republic of Mordovia	1	1	3	3	3
Republic of North Ossetia-Alania	5	5	3	3	3
Republic of Sakha (Yakutia)	3	3	5	3	3
Republic of Tatarstan	2	2	2	2	2
Republic of Tuva	1	1	1	1	1
Rostov region	3	5	5	5	5
Ryazan region	3	5	3	3	3
Saint Petersburg	2	2	2	2	2
Sakhalin region	2	2	2	2	2
Samara region	5	5	5	5	5
Saratov region	5	5	5	3	3
Sevastopol	-	3	5	5	5
Smolensk region	5	3	5	3	3
Stavropol territory	5	5	5	5	5
Sverdlovsk region	2	2	2	2	2
Tambov region	5	5	5	5	5
Tomsk region	5	5	5	3	3
Tula region	5	5	5	5	5
Tver region	5	5	3	3	3
Tyumen region	5	5	5	5	5
Udmurt Republic	5	5	3	3	3
Ulyanovsk region	5	5	5	3	3
Vladimir region	5	5	3	3	3
Volgograd region	5	5	3	3	3
Vologda region	5	5	3	3	3
Voronezh region	2	2	2	2	2
Yamalo-Nenets Autonomous Okrug	4	4	4	4	4
Yaroslavl region	5	5	5	5	5
Zabaikalsky Krai	3	1	3	3	3

The analysis of the movement of regions between these five groups of clusters indicates the presence of seven main classes of regions:

1. Regions with a consistently high standard of living. 12 regions belong to this class: Belgorod region, Krasnodar region, Lipetsk region, Moscow, Moscow oblast, Nizhny Novgorod region, Republic of Bashkortostan, Republic of Tatarstan, Saint Petersburg, Sakhalin region, Sverdlovsk region, Voronezh region.

2. Regions with low living standards. This class includes 20 regions: Altai Republic, Ingush Republic, Jewish Autonomous region, Kabardino-Balkar Republic, Karachay-Cherkess Republic, Republic of Kalmykia, Republic of Tuva, Altai territory, Chelyabinsk region, Chuvash Republic, Kaliningrad region, Kamchatka territory, Kurgan area, Penza region, Pskov region, Republic of Mari El, Republic of Sakha (Yakutia), Ryazan region, Zabaikalsky Krai, Irkutsk region.
3. Regions with a stable average standard of living. 23 regions belong to this class: Adygeya Republic, Amur region, Arkhangelsk region, Bryansk region, Kaluga region, Khabarovsk territory, Khanty-Mansi Autonomous Okrug-Yugra, Kursk region, Leningrad region, Magadan region, Novosibirsk region, Omsk region, Perm region, Primorsky Krai, Republic of Dagestan, Samara region, Stavropol territory, Tambov region, Tula region, Tyumen region, Yaroslavl region, Murmansk region, Rostov region.
4. Regions in which there is an increase in living standards. 3 regions belong to this class: Republic of Crimea, Republic of Mordovia, Sevastopol.
5. Regions in which a decline in living standards is observed. 17 regions belong to this class: Astrakhan region, Ivanovo region, Kemerovo region, Kostroma region, Krasnoyarsk region, Orel region, Republic of Chechnya, Republic of Komi, Republic of North Ossetia-Alania, Saratov region, Tomsk region, Tver region, Udmurt Republic, Ulyanovsk region, Vladimir region, Volgograd region, Vologda region.
6. Regions with an unstable situation, fluctuations in living standards from year to year without an obvious trend in one direction or another. 7 regions belong to this class: Kirov region, Novgorod region, Orenburg region, Republic of Buryatia, Republic of Karelia, Smolensk region, Republic of Khakassia.
7. Regions with low poverty, high incomes and low spending expenditures. 3 regions belong to this class: Yamalo-Nenets Autonomous Okrug, Nenets Autonomous district, Chukotka Autonomous Okrug

Table 3 presents the average values for the classes obtained.

Table 3: Average values of three characteristics of the living standard for the classes obtained

Group	The population share with incomes below the subsistence level	Ratio of average per capita income to the subsistence level	Ratio of average per capita expenses to the subsistence minimum
Regions with a consistently high living standards	9,06%	3,68	2,97
Regions with a low living standards	20,39%	2,23	1,63
Regions where the living standards increase	12,65%	2,90	2,31
Regions where the living standards is declining	17,09%	2,27	1,85
Regions with unstable situation, fluctuations in living standards from year to year without a trend	14,59%	2,58	1,97
Regions with consistently low levels of poverty, but also persistently low incomes and expenditures of the population	16,13%	2,46	2,01
Regions with low poverty, high incomes and low spending	8,27%	4,09	1,68

Regions with the unstable situation is concentrated mainly in the Central European part of Russia, Eastern Siberia and the Far East. Any uniformity of geographical distribution regions for selected classes are not observed. Subjects of the Russian Federation belonging to the regions class with stable low living standards are located in the North Caucasus and the southern part Siberia along the border of the Russian Federation.

Conclusion

It is advisable to pursue a regional policy in relation to the selected groups, taking into account the territorial differentiation of the level of socio-economic development of the regions. Each of the identified types of regions is distinguished by its own set of problems, the solution of which (taking into account the specialization of the regions) requires federal and regional authorities to apply differentiated approaches to stimulate economic activity and provide state support.

In the framework of the classification of regions of the Russian Federation according to the characteristics of inter-regional differentiation of the standard of living of the population, classes of regions with relatively uniform indicators of living standards are identified. Further research of the authors is devoted to the expansion of the feature space. The results of solving this problem can be used in further studying the regional problems of the economic and social development of Russia and developing recommendations in the field of social policy and public support. The above typology of the regions once again shows the need for a differentiated economic and social policy, depending on the region's affiliation with one or another type.

Multidimensional statistical methods among the many possible probabilistic-statistical models allow one to reasonably choose the one that best fits the initial statistical data characterizing the real behavior of the studied set of objects, to evaluate the reliability and accuracy of conclusions made on the basis of limited statistical material.

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Changes of The Environment as A Creator of New Trends in Consumer Behavior

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Abstract

The purpose of this paper is to identify the behaviours of contemporary consumer determined by ongoing social and technological changes. The layout of the paper is dictated by the implementation of the objective. The first part introduces the subject matter of consumer behaviour. Part two focuses on the issue of social changes as contribution to the creation of new trends in consumer behaviour, whereas part three focuses on the issues of technological changes as contribution to the creation of new trends in consumer behaviour. The paper has a theoretical character. It is based on a critical literature review.

Keywords: Consumer, Trends, Consumer Behaviour.

Introduction

Enterprises functioning in the conditions of market economy are forced to observe constantly the changes occurring in their environment and to adapt their own activity to the conditions around them. Consumers are the most important entity on the market on the demand side. Understanding consumer activities and behaviours allows a given enterprise to tailor its offer to their needs and preferences more effectively than its competition.

In times when change is a permanent element of the functioning of economic entities it is very important to observe, pay attention to changes occurring in the areas and factors determining consumer behaviour. These activities allow one to notice the changes occurring in the behaviours of individual groups of consumers quickly, to identify consumption trends and to predict changes in recipients' decisions.

In view of the above, the purpose of this paper is to identify behaviours of the contemporary consumer determined by the occurring sociological and technological changes. The paper has a theoretical character. It is based on a critical literature review. It is an introduction to pilot studies currently being prepared in terms of the impact of social and technological changes on the behaviour of the contemporary consumer.

Consumer behaviour – introduction to the subject matter

One of the fundamental roles played by a man, apart from the role of a citizen and maker, is the role of a consumer. The notion of a consumer is used in different contexts and has not been defined unambiguously. In the economic theory, the term "consumer" occurs as a symbolic notion representing entities that create demand and serving to present the theory of choice (Kieżel (ed.), 2000; Yeoman, 2011).

A slightly different approach to the notion of "consumer" is presented by disciplines related to broadly understood marketing issues. This difference has its source in the modern marketing concept in which it is the consumer who is the starting point for undertaken marketing measures. Examining consumer needs, desires and wishes becomes in this case the most important element of producers' and sellers' strategies (cf. Barmola et al., 2010; Argyriou & Melewar 2011).

In the case of a consumer, it is key to address his behaviours, which is of interest to a number of disciplines, in particular economy, sociology, psychology, anthropology and management. These fields address various aspects of the purchasing process and consumption of goods and services.

The literature lacks one single definition of the term "consumer behaviour" (Schiffman et al., 1994; Assael 2004; Perner 2007). One can assume that this is ''(…) the processes involved when individuals or groups select, purchase, use or dispose of products, services, ideas or experiences to satisfy needs and desires'' (Solomon et al., 2013, p. 5). In turn, according to other researchers, consumer behaviour includes psychological and physical activities, together with their motives and causes, carried out by persons or groups in the cycle of consumption and implementation of their goals and values, as a result of achieving satisfaction and prosperity, taking into account individual and social effects of these behaviours (Antonides & van Raaij, 2003). There are also approaches to the term "consumer behaviour" which emphasize the role of external conditions of consumer functioning on the market and in the consumption phase for example: consumption behaviour means a coherent whole of measures, activities or steps related to making choices in the process of satisfying consumption needs in specified social, cultural and economic conditions. Consumer behaviours mean steps related to the consumption process, which is composed of a market (purchasing) behaviour and behaviour during the phase of consumption of the purchased product (Kieżel (ed.), 2010).

It is worth noting that consumer behaviours are influenced by their attitudes which are shaped by their own experiences or by opinions created by the environment, including contemporary media. Consumer attitudes mean relatively permanent likelihood of positive or negative position towards the object of the attitude, which may involve a specific or abstract thing, people or events. Attitudes may also be created on the basis of emotions and convictions which in turn are an object of experiences with the object of the attitude (Stasiuk & Maison, 2014). Therefore, attitudes involve an evaluation of something or somebody, while consumer behaviour means the way he acts in all phases of satisfying physiological and psychological (emotional) needs (see more: Madichie 2012).

Consumption and consumer behaviour are determined by a number of factors dependent of the consumer himself as well as his external environment (Grzega & Kieżel, 2017). The literature features many classifications thereof. One can identify e.g. a classification into internal determinants (i.a. disposable income, professional activity, property and savings, current level and structure of consumption) and external determinants, or a broader one which classifies consumer behaviour determinants into three equal groups: economic (i.a. income, supply, prices, marketing information, free time), social-demographic (social i.a.: social groups and reference groups, family, opinion leaders, culture and subculture; demographic i.a. (cf.: Walsh & Mitchell, 2005) age, sex, (Rahman, 2012) household size, consumer's marital status) and psychological (i.a. attitudes, personality, perception and emotions), let alone the supreme role of macroeconomic determinants (Kieżel (ed.), 2000).

It needs to be emphasized that globalization of economies, social and technological changes (expansion of the use of information and communication technologies) have a specific impact on consumer behaviour in the 21st century. The consumption itself is also subject to globalization processes, which is related to the homogeneity of needs of purchasers and in consequence to mainstreaming consumption models which spread on a pan-national scale and create a global consumption culture (Bywalec, 2010).

Social changes as contribution to the emergence of new trends in consumer behavior

The issue of social changes is examined mainly in sociology. Most generally, a social change is defined as a difference between the status of a social system at a specified time and the status of the same system at a different point in time (Sztompka, 2002). It features a broad scope and refers to transformations of institutions, norms, culture and social structure, thus everything that matters for social life and development. Three main trends can be identified among the changes of social nature:

- customization of consumption,
- fragmentation,
- paradoxical juxtaposition of opposites.

Customization of consumption is the main trend of the current changes. At the moment, households are made up of increasingly fewer members while there is an increase in the number of single-person households. Numerous consumption goods, such as the radio, the telephone or the car, have become individual goods while a few decades ago they were e.g. family goods.

The observable social changes are to a large extent associated with demographic changes around the world (United Nations, 2019). The practice of taking up employment by women outside of the house is developing and fathers get involved in the life of the family in a broader scope. Spouses plan and impellent tasks jointly, they spend their leisure time together. The type of a partnership marriage is appearing more and more often and is getting stronger (Kwak, 2005). A trend among young people to enter into partnership relationships, not marital ones is also noticeable. It is also observable that not only fewer people get married, but the average age of people entering into marriage is increasingly higher – the phenomenon of "postponing marriage" , occurs, the same trend of "putting off" applies to women having their first child .

The above changes lead to i.a. customization of consumption demonstrated in independence and individual preferences while consumers strive to be seen as autonomous persons. This direction of changes is proof that expressing oneself is gaining importance for consumers, which is evidenced among others by the more and more popular personalization of products (Tiihonen & Felfernig 2017). One of its aspects involves e.g. acquiring and possessing luxury and unique products (Janoś-Kresło & Mróz, 2006). A contemporary consumer also feels like participating in taking decisions on the product's features before its final production. For this reasons, interior designers, car manufacturers and clothing companies contact consumers in order to take into consideration their private preferences for an individual product. Having higher incomes, consumers have the need to stand out on the market. This customization also steps into the sphere of services, for example before choosing a face cream, a cosmetologist will examine the customer's skin.

An individualistic attitude is a privilege today, not an obligation. People lead independent lives, create their identity, and take decisions on norms and values. Observable and progressing psychologization of life has a great impact on customization (Szlendak, 2008).

Another change in the social nature involves fragmentation. This term has a number of meanings. Fragmentation is expressed among others in market sentimentalization (consumers live the current state of soul, they live the moment) and isolated experiences. Consumers as members of their households, encouraged by numerous promotional messages, play various roles, at the same time concealing their own "self", depending on what products they are using at that given moment. They are, according to a marketing concept of a specific product, creative managers, caring mothers, resourceful hostesses.

Segment-based production, that is the so-called Kotler's "mass customization" is also an expression of fragmentation (cf.Tseng et al., 2017). A decision on buying a certain good is often made before it is produced. This process is particularly seen on the furniture market or primary car market.

Mass media are also accommodated in the discussed trend. Specialist magazines and specialized TV channels are developing on the market the aim of which is to provide exciting stimulation. Brutal murders intertwine with adverts for sweets and an erotism-rich programme is followed by religious ones. A presenter dressed in a sports t-shirt and a tuxedo at the same time does not raise eyebrows anymore.

The last example concerns another change of a social nature, namely paradoxical juxtaposition of opposites. There are no role models or a single permissible style. Quite the opposite, pluralism and tolerance to all styles are present. A shift form few styles to numerous genres is observable. New matches and juxtaposition of opposites create new forms (Mruk, 2007).

Apart from the said main trends of changes of social nature, one needs to point out to a few additional elements which also affect the creation of new trends in consumer behaviour.

For example, it needs to be noted that the contemporary man suffers from a permanent shortage of time, and his life often involves pursuit of money. In mature societies consumers more and more often flag up problems with free time which result from work overload. This situation is associated with the increase in the demand for time-saving products and services such as dishwashers, ironing washing machines as well as ready-made meals, etc. As a consequence a new trend called personal outsourcing has emerged. It is expressed in an attempt to save time through the purchase of products and using services which guarantee it. It contributes to an increase in the demand for nanny services and services of domestic workers.

The permanent shortage of time entails negative consequences – it has an impact on i.a. the decline of values and of contact with loved ones as well as on simplifying everyday life through e.g. eating out, buying ready-made meals, using advanced technologies or shopping in shopping centres (Szlendak, 2008). Therefore, it can be concluded that consumers are interested in products that may be conveniently used and easily purchased.

Another observable change occurs in terms of caring for one's health. An increase in wealth as well as knowledge and awareness of societies contributed to changes in terms of health. In this framework consumers take up various activities aiming to improve their quality of life. More and more people use goods and services contributing to caring for one's looks and health. More and more households get different types of sporting gear, home-use medical devices or spa packages. This interest is accompanied by buying the so-called safe food and non-food products or eco products (Zaharia & Zaharia 2014; Trivedi et al., 2011), by a change in eating habits or by employing professional principles of healthy eating. Interest in a healthy lifestyle is growing which is confirmed by observable evidence – a lot of people do sports, use food supplements, take up stress-reducing activities, and care for their looks and wellbeing. One can find a broad offer of many producers on the market who use natural ingredients (Schena et al., 2015). Advertisements and names of products feature such terms as: "bio", "fit", "natural" or "healthy".

Popularity of food products coming from different sides of the world is constantly growing. The search for new taste sensations for consumers also means an interest in new forms of food services – they are associated with celebrating most important life events. Particular attention is drawn at the moment to companies specialising in organising wedding parties. Restaurants compete in innovative ideas for creating value for the customer. They offer original menu items, surprising locations and arrangements.

When analysing changes occurring in social behaviour the impact of the economic downturn also needs to be mentioned. Changes in behaviour refer here mainly to money-spending tendencies, ways for taking decisions on purchases, and the types and quantities of purchased products. During the economic downturn consumers are mainly focused on shopping in smaller quantities or on decreasing purchase costs (Zalega, 2013). We may then deal with the so-called phenomenon of smart shopping (por. Mano & Elliott 1997; Atkins & Kim 2012). In a situation of demand limitation in the period of economic recession consumers protected their achieved level of consumption adjusting shopping habits to the new situation. Smart shopping activities include rational planning of the household budget by buying necessary products at a low price ("expect more, pay less") (cf. Schindler 1998).. Meeting household needs occurs as a result of increasing shopping in discount stores, purchasing store brands, searching for information from various sources about cheaper products and special offers, buying products online, more careful preparation to shopping and avoiding compulsive shopping.

To sum up, one may refer to the findings of Euromonitor International, where it was concluded that at the social level we are dealing with changes concerning four main questions (Euromonitor). Firstly, it involves an aging society – in highly developed countries the number of people aged 65 and above is going up, which involves the increase in demand for care and medical services and there is demand

for products and services relevant to persons at this age. The second question involves the phenomenon of the rich getting richer – the income of well-off persons grows, and so do disproportions between them and poor persons. The rich getting richer contributes to an intensified feeling of threat and to a rise in the demand for products and services enhancing security. Migration – movement of people between countries permanently or temporarily - was named as the third issue (Sztompka, 2005; United Nations 2019).Migration often causes a change in consumer needs or consumer choices. The fourth issue involves cocooning – also called home-focused nature of consumption. This trend involves transferring consumption form public places to one's own home (Hines, 2009). Home is becoming a place for satisfying educational or recreational needs. The cause of home-focused consumption involves on the one hand being tired of constant changes and the need to be active, and better equipment of homes which allows for spending time in an interesting way. This trend is demonstrated in reinforcing the need for products that make the time spent at home nicer. Microsoft word in bits and pieces. This will cause the figure to be distorted during formatting and production. You have to use a drawing tool and import the figure to word.

Technological changes as contribution to the emergence of new trends in consumer behavior

The turn of the 20th and 21st century was the time of intense development of new technologies which have significantly influenced the change in the functioning of economic entities, which also applies to consumers.

The changes of a technical nature include in the first place surreality of means of stimulation and communication (Mruk, 2007). A consumer can, by means of media and technical tools, create his own world and play a role in it specified by him. Examples of such situations include creating a virtual community (computer games, thematic portals or fora where the participant can be whoever he wants) or cyber space (generally available flight simulators, PlayStation games, multidimensional film shows in the cinemas).

Other changes of a technical nature include also the so-called realisation of values (Euromonitor). In post-modernist times consumption is more important than production. People define their identity through what they buy and what they use and not like earlier by what they are or what profession they have. A post-modernist man is what he buys and what he can operate.

It is also not difficult to notice now the occurrence of the phenomenon of reversing production and consumption caused by another change of a technical nature – complexity (Mruk, 2007). The consumer is able to understand the significance and values that products entail only when he starts using them. This results in the pursuit to "handle" things becoming one of the most important objectives of a contemporary consumer (Zalega, 2013). It seems that products increasingly set conditions and ways of consumption (Mruk, 2007). A consumer must act according to product instructions in order to avoid trouble and to achieve a benefit. Creating additional benefits also leads to consumers' ever greater dependence on producers because without specific instructions and in certain cases even training they cannot fully use and enjoy the purchased products. Because of that, very often buyers are not able to use all functions of high-tech products since they do not have the relevant skills.
Thus, interest in services performing supplementary functions, that is those that enhance usability of products, grows. It needs to be emphasized that using the achievements of newest technology blurs the differences between fiction and reality as it allows living the experiences in a simulated reality. Virtual reality is universally available, which gives a possibility to create one's own world and one's own role in this world. Technology-saturated products on the one hand make it easier to satisfy needs and on the other expand their scope stimulating demand for new services related to the use of equipment.

A significant role must be attributed here to the development of the Internet. It is a modern and fastest developing medium, which provides an attractive environment for various social groups. Its virtues which include i.a. (cf. B. Świecka, 2008): interactivity, global reach (without territorial or time

restrictions), speed of communication, saving time, flexibility of action, low cost, large capacity of provided information or universality – mass nature bring benefits to all its users (Bajdak, 2003). More and more enterprises around the world have recognized the Internet as a very cost-effective tool for finding new clients, obtaining products, research, sale and information supporting business activity (Smoleń, 1996). Consumers also use the Internet more and more i.a. to shop (Dennis et al., 2009), to obtain information about products and services (also to look for opinions on them) and to compare products and services in terms of their price as well as quality (Kułyk & Michałowska, 2016). Among the advantages of online shopping consumers name saving time, lower prices, choice, easy access to information about products, possibility to do shopping day or night, diversified range of products, access to unique goods or numerous special offers (Akar & Nasir 2015). One also needs to note that some consumers fear shopping in this way or are reluctant to do so. This is determined mainly by the fear of receiving a good that is different to the one ordered, the lack of possibility to inspect and evaluate the product before purchasing it, high delivery costs at a low value of the purchase. Certainly, the trend of visualisation of consumption or e-consumption is strengthened thanks to the widespread use of mobile devices and benefits of using them.

The functioning of an electronic economy is the result of the development and widespread use of technology, including a rapid development of global networks. It is also defined as a digital economy, cyber-economy, e-economy or new economy that is a new paradigm of business. It is a virtual arena in which activity is carried out, transactions are performed and values are created and exchanged. Currently it is a phenomenon with a growing economic significance that changes the essence of carrying out economic activity.

E-commerce, which is defined in various ways in the literature, is a demonstration of electronic economy. It can be understood as using internet websites and electronic mail to conclude contracts (Stosio, 2002) or as transactions done by means of electronic communications, especially the Internet (Kocot, 2004). It is worth stressing that initially e-commerce served to facilitate transactions concluded by electronic means and tools, and only with the advancement of the Internet its mass scale development occurred. The development of e-commerce contributed to the advancement of electronic means of payment (i.a. virtual payment cards, prepaid cards, instant transfers, electronic money).

The development of information and communication technology has also contributed significantly to the widespread occurrence of the so-called collaborative consumption, the so-called sharing economy (Felsona & Spaetha 1978, pp. 614–624) (that is a consumption model based on free and paid sharing, reselling, exchanging and lending goods and services, which is a new trend in consumer behaviour (Botsman & Rogers 2010; Belk 2010; Gansky 2010; Mróz, 2013), as it makes it easier to connect the supply of and demand for "available" goods and services. The increasingly popular consumers' access to the Internet or social portals and having modern mobile devices to access online payment systems allows for initiatives undertaken as part of collaborative consumption (cf. John 2013)..

In the context of shaping new trends in consumer behaviour one can then assume that as part of the observable expansive development of technology three factors play the greatest role. The first of them involves the widespread presence of the Internet, which makes it possible to access information and all types of entertainment without the need to leave the house. Today thanks to the Internet one can watch the latest movies, read a book or press. Its strength is built up along with its reach. This leads to changes in the manner of manufacturing and distributing products, changes in communicating with buyers, demand for new services and at the same time an increase in threats related to cyber space. The second factor involves the so-called media on demand, which contribute to changes in modes of distribution of offered products.

The third factor includes mobile technologies, which made mobile phones become small telecommunication centres, since apart from the calling functions they also have features such as: taking photos, browsing the web, listening to the radio, making small payments or sat nav. Next to mobile phones, smartphones and tablets also enjoy popularity. Mobile technologies contribute to easier access to information, to changes in communicating with buyers as well as to demand for new

services. Modern communication technology ensures continuous flow of information throughout the world (Euromonitor).

Conclusion

Dynamic structural changes occurring in the environment create new challenges that the entrepreneurs find more and more difficult to face. Changes in consumer behaviour are the strongest factor affecting the way contemporary enterprises operate. A true challenge for enterprises is to realise the emergence of new trends in consumer behaviour, to understand them and use as inspiration for their development in the future (see more: Shaw, 2009).

New trends in consumer behaviour are a certain response to challenges coming from the environment and at the same time a way to adjust to new circumstances. There are seven main global trends. These include the aging societies, the rich getting richer, migrations, cocooning, media on demand, widespread Internet and mobile technologies. The first four trends concern social changes while the last three technological ones.

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The Diversity of Organisation Members and Organisational Performance in The Light of Literature Reports

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Abstract

In-depth analysis of literature in the field diversity management does not clear answer about the nature of the relation between workforce diversity and organizational goals. The article seeks, first of all, to verify the relationship between national diversity and organizational performance and, secondly, to examine the relationship between national diversity and the results obtained by the organizations composed of women and composed of men. The research objects were European football clubs. The main results of the studies disclosed that there is a positive relationship between national diversity and clubs' performance. This positive relationship between national diversity and clubs' performance pertains to both women's and men's clubs and it is stronger in the case of women footballers. However, the national diversity in women's clubs is smaller than in the men's ones. The article presents valuable insight – it calls into question the results of previous empirical studies concerning diversity management as the studies carried out on teams composed mostly of men can be different when women are the majority in those teams (and women constitute a higher and higher percentage of those employed).

Keywords: Personnel, Workforce Diversity, Performance, Management

Introduction

What can be observed in the literature is that for a long time management scholars have been discussing and analysing mainly the positive influence diversity has on the functioning of an organisation (Tsui *et al.*, 1992; Van der Vegt 2002; Allen *et al.*, 2007; Wu *et al.*, 2010; Wziątek-Staśko, 2012). The theoretical discussions are obviously present in the empirical studies which, as will be discussed at length in the further parts of this paper, not only do not provide a unambiguous confirmation of those ponderings but they are also characterised by relatively considerable simplifications both in the way of understanding diversity as well as in the assessment of the functioning of the organisation with the use of financial measures. What can be regarded as some way of overcoming those limits was an attempt at analysing diversity in the European football clubs. In such studies, the scholars focused, on the one hand, on footballers' nationality and age and, on the other, on the position in the table occupied as a result of football games (Tworek *et al.*, 2020). The relatively readily available and objective data concerning footballers' nationality and age and the explicitly shared goal for all the teams cause the authors of this study to regard the analysis of diversity in football clubs as a promising research direction. As a result, another dimension which can be studied is the football players' gender while another research problem is the functioning of the organisation composed of the representatives of one gender in the context of diversity resulting from various nationalities. This problem refers to the long-

lasting discussion on gender differences in the workplace (Linehan, 2001; Ng, 1998; Delfgaauw *et al.*, 2013; Wang and Hsieh, 2016), the impact of those differences on interactions in the workplace (Ibarra, 1992; Andaleeb *et al.*, 2004) as well as the differences in the hierarchy of values between women and men (Buckley *et al.*, 2000; Kallar and Hampton, 2000; Giacomino and Eaton, 2003). For instance, from among the collections of values such as family security, true friendship, mature love, freedom, equality, the world at peace, social recognition, national security, the world of beauty, women show a stronger preference for the world at peace than men. However, as regards such values as health, self-respect, inner harmony, sense of accomplishment, salvation, comfortable life, wisdom, pleasure and exciting life, in comparison to men, women demonstrate a stronger preference for pleasure and the weaker one for wisdom and exciting life (Giacomino and Eaton, 2003). Thus, there arises a question about how the differences between genders translate into the results obtained by less or more diversified organisations and/or teams. This question becomes even more important particularly in the situation, in which more and more women in the world take up gainful employment and, as if, enter the areas so far controlled by men (Ortiz-Ospina and Tzvetkova, 2017).

Therefore, the article seeks, first of all, to verify the relationship between national diversity and organisational performance and, secondly, to examine the relationship between national diversity and the results of football clubs obtained by the teams composed of women and men. In the first part of this paper, the authors present an overview of the empirical studies concerning both diversity in organisations and diversity in football clubs. Then, the authors discuss the results of the empirical studies on the relationship between national diversity and the organisational performance of football clubs based on the EUFA club coefficient and the comparable results of the studies obtained for female and male clubs. The final observations and conclusions referring to both the practice of management as well as to potential avenues for further studies finish the article.

Workforce Diversity and Organisational Performance – Literature Review

What can be found in the discussion about diversity management is the view that it brings many benefits to the organisation. It supports such areas as:

- the innovation of organisational behaviours,
- the increase in organisation adaptability,
- the increase in organisational learning,
- the increase in competitive advantage,
- the reconfiguration of human resources (Allen *et al.*, 2007; Wu *et al.*, 2010; Wziątek-Staśko, 2012).

However, although less frequently, management scholars also point to several weaknesses, among which are:

- communication problems,
- supporting social divisions and interpersonal conflicts (Tsui *et al.*, 1992; Van der Vegt, 2002; Wziątek-Staśko, 2012).

Is there then a relationship between organisation members' diversity and organisational performance? The authors of this paper sought the answer to this question within the frameworks of the empirical studies which can be classified into two groups. In one of them, the intervening variable, which combines diversity with performance, is used whereas, in another, the direct relationship between the studied variables is examined.

The following facts can characterise the studies belonging to the first groups:

- Diversity is most often studied with the use of the dimensions of the so-called primary identity (age, race, gender (Joshi and Roh, 2009)). The secondary and organisational identity

dimensions such as education or the diversity of the tasks are less frequently analysed (like in the study of Wu *et al.*, 2019).

- Among the intervening variables are organisational culture (Richard *et al.*, 2004), employees' morale (Webber and Donahue, 2001), innovation (Østergaard *et al.*, 2011), strategy (Pieterse *et al.*, 2013), perceived organisational justice (Blouch and Azeem, 2019) or task complexity (Hsu and Lawler, 2019).
- The relationship between the intervening variable and organisational performance is not empirically verified but its existence is assumed on the basis of the literature review (Stahl *et al.*, 2010; Joshi and Roh 2009).

What draws attention in the less numerous studies of the second group is that:

- the personnel view personnel diversity mostly as gender diversity (Bell *et al.*, 2011; Adler and Gundersen, 2007).
- like in the first group studies, organisational performance is determined through financial indicators (Cannella *et al.*, 2008; Carter *et al.*, 2010).

Generally speaking, the results of the meta-analyses of the relationship between personnel diversity and the performance of the organisations, selected on the basis of the articles published from 2000 to 2019 by means of such keywords as "diversity" and "performance", point to the fact that it this relationship is either weak poor or does not exist (Bell *et al.*, 2011; Schneid *et al.*, 2015; Tworek *et al.*, 2020). However, there are also studies which statistically confirmed the existence of this relationship. Nonetheless, they were not included in the meta-analyses because they do not include the typical keywords. It refers mostly to the statistically significant relationship between personnel's gender diversity and financial indicators disclosed in the report prepared by the Catalyst group (2004) and by Adler and Gundersen (2007). Besides, there are also such studies which demonstrate the negative relationship between personnel diversity and organisational performance (Hogan and Huert, 2019).

Summing up, the following conclusions can be drawn:

- What dominates in the literature on diversity management is the view that it has many positively assessed effects. Its weak points are less frequently discussed.
- The empirical studies of this relationship do not allow explicitly determining its character. Most of them indicate that it is non-existent or that it is weak. However, there are such research projects, in which its occurrence was explicitly found.
- Organisational performance is typically understood in a somewhat narrow way, i.e. it is associated with financial indicators.
- The studies on the relationship discussed in this paper are dominated by American authors, which situates them in a specific cultural context (Tworek *et al.*, 2020).

Thus, it seems justified to carry out the studies which would:

- consider, on the one hand, various dimensions of diversity and, on the other hand, effectiveness indicators which are more appropriate than the financial ones;
- pertain to the organisations characterised by at least considerable diversity of their personnel but which are at the same time free from discriminatory prejudices which always hinder the analysis of the studied variables;
- encompass organisations based in many countries.

To some extent, those requirements were fulfilled by the studies conducted by some of the authors of the present paper. The objects of those studies were football clubs whose position in the final table shows the effectiveness of their activities in a given year. Moreover, they are, to a significant extent, free from the behaviours characterised by prejudices and in their management, nearly all problems related to the management of a modern organisation occur (UEFA, 2014; Bolchover and Brady, 2006).

The studies were carried out on 166 football clubs belonging to ten leagues, divided into three groups: the group of the best clubs, the group of the average clubs and the group of the weakest clubs, based on the UEFA league coefficient. However, the focus was on two groups – the best one and the average one. Five leagues with the highest number of points within each group were selected. Two primary dimensions of diversity were studied, i.e. national diversity and footballers' age diversity whereas the results were the points scored in matches by a given club in the league in the season 2016/2017 as well as the standing of the club in the final table of this season. The analysis showed no correlation between national diversity and the points of the clubs and their positions in the final table (Table 1).

Table 1: Correlation between national diversity and club performance and club market value (Spearman[1] correlation test)

National diversity		Club points	Club position
LaLiga (Spain)	Correlation coefficient	0.163	-0.163
	(Two-sided) significance	0,492	0.494
	N	20	20
Premier League (England)	Correlation coefficient	0.292	-0.266
	(Two-sided) significance	0.211	0.257
	N	20	20
Bundesliga (Germany)	Correlation coefficient	-0.182	0.165
	(Two-sided) significance	0.471	0.512
	N	18	18
Serie A (Italy)	Correlation coefficient	0.368	-0.368
	(Two-sided) significance	0.110	0.110
	N	20	20
Ligue 1 (France)	Correlation coefficient	0.138	-0.144
	(Two-sided) significance	0.562	0.546
	N	20	20
First Division (Cyprus)	Correlation coefficient	0.279	-0.279
	(Two-sided) significance	0.334	0.334
	N	14	14
Ekstraklasa (Poland)	Correlation coefficient	0.481	-0.462
	(Two-sided) significance	0.059	0.071
	N	16	16
Liga I Bergenbier (Romania)	Correlation coefficient	0.383	-0.380
	(Two-sided) significance	0.177	0.180
	N	14	14
Premyer Liquasi (Azerbaijan)	Correlation coefficient	0.143	-0.143
	(Two-sided) significance	0.736	0.736
	N	8	8
Allsvenskan (Sweden)	Correlation coefficient	0.300	-0.312
	(Two-sided) significance	0.259	0.239
	N	16	16

***Correlation which is significant at the level of 0.01 (in a two-sided way); *correlation which is significant at the level of 0.05 (in a two-sided way). Source: Tworek et al., 2020*

[1] The interpretation of the r-Spearman's coefficient: 0-0.3 means that the correlation is weak or non-existent, 0.3-0.5 means that the correlation is moderate, 0.5-0.7 means that the correlation is strong, 0.7-1.0 means that the correlation is very strong.

As a result of the univariate analysis of variance for independent groups, it was also disclosed that the best groups are essentially more diversified than the groups belonging to the average leagues (Tworek *et al.*, 2020).

What was also shown in the course of the studies is that there is no correlation between footballers' age diversity and club performance. Only for the French league, the table position positively correlates with the footballers' age diversity whereas it correlates negatively in the case of the Cypriot league (Table 2). What is also attention-grabbing is lack of no significant differences between age diversity in particular groups for all the leagues (the Kruskal-Wallis test for k independent samples).

Table 2: Correlation between age diversity and club performance (Spearman correlation test)

		Club points	Club position
LaLiga (Spain)	Correlation coefficient	0.190	-0.205
	(Two-sided) significance	0.421	0.387
	N	20	20
Premier League (England)	Correlation coefficient	0.028	-0.033
	(Two-sided) significance	0.907	0.890
	N	20	20
Bundesliga (Germany)	Correlation coefficient	0.264	-0.286
	(Two-sided) significance	0.290	0.250
	N	18	18
Serie A (Italy)	Correlation coefficient	0.035	-0.035
	(Two-sided) significance	0.885	0.885
	N	20	20
Ligue 1 (France)	Correlation coefficient	0.452*	-0.462*
	(Two-sided) significance	0.045	0.040
	N	20	20
First Division (Cyprus)	Correlation coefficient	-0.574*	0.574*
	(Two-sided) significance	0.032	0.032
	N	14	14
Ekstraklasa (Poland)	Correlation coefficient	0.071	-0.176
	(Two-sided) significance	0.794	0.513
	N	16	16
Liga I Bergenbier (Romania)	Correlation coefficient	0.262	-0.253
	(Two-sided) significance	0.366	0.383
	N	14	14
Premyer Liquasi (Azerbaijan)	Correlation coefficient	-0.524	0.524
	(Two-sided) significance	0.183	0.183
	N	8	8
Allsvenskan (Sweden)	Correlation coefficient	-0.296	0.303
	(Two-sided) significance	0.266	0.254
	N	16	16

***Correlation which is significant at the level of 0.01 (in a two-sided way); *correlation which is significant at the level of 0.05 (in a two-sided way). Source: Tworek et al., 2020*

If the best European leagues are most diversified nationally than others, it marks the direction for further in-depth studies on the diversity of footballers and club performance. It is so since every year UEFA publishes the club ranking which takes into consideration the points obtained by the club in the Champions League and the Europa League in the last five seasons. However, it should be stressed that it does not contain many of the clubs belonging to the best leagues – those clubs which did not manage to go through to the European matches. Therefore, a question may be posed: is the national diversity

of the footballers of the ranking clubs, i.e. of the best European clubs, related to their performance (their position in the table)?[2] Such studies are also appealing for they make it possible to consider the relationship between performance and one more dimension of primary identity – gender since UEFA also publishes the ranking of the best women's clubs. Therefore, it is possible to carry out an analysis which so far has not been reported in the literature. This is the analysis of the relationship between personnel diversity and the performance of the organisations of the same type when they are composed of only women or only men.

The Results of The Empirical Studies

The interesting and ambiguous outcome of the previous empirical studies on the relationship between national diversity and organisational performance, in which the European football clubs were analysed (Tworek *et al.*, 2020) was an incentive to reflect upon the research methodology used as well as to extend the scope of the aforementioned studies. As a result, the empirical studies had two objectives.

The first objective of the studies was to verify the relationship between national diversity and organisational performance. This is the same objective which was to be achieved in the previous studies (cf. Tworek *et al.*, 2020). However, the research method of verifying the studied relationship was different. The previous studies concerned European football clubs. Based on the UEFA country coefficient for five seasons from 2013/2014 to 2017/2018, five best leagues and five average leagues (totally 166 clubs) were selected for the analysis. In the studies, national diversity was related to the points obtained by the club in the league in the season 2016/2017 and the club position in the league table in the season 2016/2017. As aforementioned, the studies showed no significant correlation between the national diversity of the clubs and the results obtained in the league. However, the beast leagues turned out to be more significantly diversified nationally than the average leagues (Tworek *et al.*, 2020). European football clubs continue to be the research object in the present study. Moreover, no changes were made to the manner of measuring national diversity whereas the method of qualifying clubs for the analysis underwent changes. Instead of the UEFA country coefficient, the UEFA club coefficient was used. It is calculated on the basis of the results of the clubs for five previous seasons of the UEFA Champions League and the UEFA Europe League. As a result, in these studies, the position of each club is examined with reference to all several hundred UEFA clubs and not with reference to a dozen or so or several dozen clubs in the league. As a consequence, the manner of measuring club performance was changed. Instead of the result obtained by a given club in the league (points or the league table position), the result of the club obtained in competition with all other UEFA clubs was adopted. The position in the UEFA ranking is not tantamount to the number of points obtained in the ranking and therefore in the course of further analyses, club performance was assessed in two ways: the points scored by the club in the EUFA club ranking for five seasons and the position in the table of the UEFA club ranking in a given season.

Moreover, the second objective of the empirical studies was formulated. It was the verification of the relationship between national diversity and organisational performance depending on organisation members' gender. Many professions are clearly feminised (e.g. office employees, service sector employees, shop assistants, welfare employees or education sector employees) or masculinised (e.g. mechanics, electricians, IT sector specialists, or construction industry workers). Therefore, what is of interest is the issue of the relationship between national diversity and the organisational performance of the typically feminine and masculine organisations. Thanks to the analysis of football clubs, it is possible to study this phenomenon in the organisations of the same type, which differ in terms of gender.

In the course of the studies, the following hypothesis was verified: the greater national diversity of men/women footballers, the better club performance. In order to measure national diversity, the author adopted the following WZN national diversity coefficient (Tworek *et al.*, 2020):

[2] In this article, women footballers' and men footballers' age diversity is not examined.

$$\forall z \quad WZN = \frac{n_z}{N_z}, \tag{1}$$

Where: z – a given club,

n_z – the number of women/men footballers in the club of a different nationality than league membership,

N_z – the number of all women/men footballers in the club (women/men footballers whose total time spent on a football pitch in the matches during the season was not shorter than 90 minutes).

The coefficient has the following values: <0;1>.

The points scored by the club in the UEFA club ranking for five seasons (from 2014/2015 to 2018/2019) as well as the position in the UEFA club ranking for the season 2018/2019 were the measures of club performance. The research sample was selected in the following way:

- It was assumed (with reference to men's clubs) that the sum of the points scored in the seasons from 2014/2015 to 2018/19 should be over ten (the best club obtained 146 points). There were 90 clubs with such numbers of points. However, in the case of three clubs, the information concerning footballers' nationality was not complete and therefore finally 87 men's clubs were subjected to the analysis (the UEFA ranking included 450 clubs in the season 2018/2019). The source of data: https://uk.soccerway.com/.
- As regards women's clubs (in the season 2018/2019, the UEFA ranking included 112 clubs), the lowest number of points allowed was five (with the best club having 100 points). 58 clubs met this condition; however, in four of them, the data concerning footballers' nationality was unavailable. For this reason, the sample consisted of 54 clubs. The source of data: https://uk.women.soccerway.com/.

Table 3 presents the descriptive statistics of the women and men footballers' national diversity variable. The Kolmogorov-Smirnov test was performed and its results indicate that it is not possible to refute the hypothesis concerning the fact that the national diversity variable was distributed normally for both subgroups. The analysis performed by means of the t-Student test for the independent samples showed that the level of national diversity in men's clubs (M = 0.55, SD = 0.17) is statistically higher than in women's clubs (M = 0.30, SD = 0.20), t(139) = -8,07; p<0,001.

Table 3: Descriptive statistics for the national diversity variable

	N	Minimum	Maximum	Average	Standard deviation
Women's clubs	54	0.00	0.85	0.30	0.20
Men's clubs	87	0.08	0.86	0.55	0.17

Source: the authors' own study

The results of the analysis of the correlation between the level of national diversity and the club's position in the EUFA ranking (season 2018/2019) and the points scored for five seasons (from 2014/2015 to 2018/2019) in the ranking are presented in the next table (Table 4).

Table 4: Correlation between national diversity and club performance (Pearson's correlation test)

National diversity		Club points (seasons: from 2014/15 to 2018/2019)	Club position (season 2018/2019)
Women's clubs	Correlation coefficient	0.356**	-0.433**
	Two-sided) significance	0.008	0.001
	N	54	54
Men's clubs	Correlation coefficient	0.233*	-0.254*
	(Two-sided) significance	0.030	0.018
	N	87	87

***Correlation which is significant at the level of 0.01 (in a two-sided way); *correlation which is significant at the level of 0.05 (in a two-sided way). Source: the authors' own study*

It is easy to observe that there is a significant, though weak, positive correlation between national diversity in men's clubs and their performance. However, as regards women's clubs, what can be noticed is the significant moderate positive correlation between the studied variables.

Observations and Conclusions

The results of the studies disclosed the following facts:

- there is a positive relationship between national diversity and clubs' performance;
- this relationship pertains to both women's and men's clubs;
- the studied relationship is stronger in the case of women footballers;
- national diversity in women's clubs is smaller than in the men's ones.

It allows adopting the hypothesis formulated at the beginning of the research procedure. It means that the differences between the results of football clubs can be accounted for by the differences between the national diversity of women and men football players. However, it seems equally justified to account for national diversity by means of the diversity of the results obtained by a club. It means that the best, and at the same time the most diversified, football clubs[3] employ the best players who come from different countries. To put it differently, the great national diversity of footballers can be the "side effect" of looking for the best footballers who, as it is today, represent different countries. It also refers to women's football (although to a smaller extent) because women's football is continually less popular. For instance, in Germany, where the largest number of footballers in the world is registered (more than seven million), eight hundred thousand are women (https://www.dfb.de/fileadmin/_dfbdam/202541-bestandserhebung.pdf).

The stronger relationship between national diversity and women's club performance can mean that the contextual variables have some impact. One of them seems to be the organisational culture which, based on the studies conducted by G. Hofstede (2011), is not likely to be the same in men's and women's clubs. What is essential in women's culture is, among others, friendly interpersonal relations, equality, solidarity and work quality whereas men's culture values such aspects as assertiveness, justice (showing tenderness and care of interpersonal relations are less significant). It would, therefore, lead to the conclusion that it is easier to implement diversity, i.e. to overcome one's anxiety about diversity,

[3] The studies carried out on 166 European football clubs revealed a significant strong correlation (0.641) between the club's market value and the points collected at the end of the season.

in women's clubs. By the same token, it is easier to build what many football managers regard as a critical factor of success – the so-called team spirit which is "(...) a combination of harmony, brotherhood with the desire for good presentation not only as regards a single individual but also as regards the whole team. It's a combination of harmony, brotherhood and a desire to do well not only for oneself but for each other. In short, it's team spirit" (Bolchover and Brady, 2006, p. 201).

However, what should be highlighted is that team spirit does not equal friendship. It is stressed by a former football player who is now a commentator - A. Hansen, who holds that: "Human nature dictates that if you have 16 players, two coaches and a manager, they won't all like each other. But that doesn't matter as long as you can rely on each other. The only way you can do that is by having a great team spirit, so that when you go on to the pitch you have a bond and unity that holds you together" (Bolchover and Brady, 2006, p. 204).

However difficult it is to develop the team spirit in men's football, it would be erroneous to refute the hypothesis concerning the occurrence of at least a weak correlation between the results obtained and this strong collective will to win. This is supported by A. Ferguson, a manager with many years of experience who was in charge of Manchester United, who stated that: "Selfishness, factionalism, clique-ishness are all death to a football team. As a manager in football, I have never been interested in simply sending out a collection of brilliant individuals. There is no substitute for talent but, on the field, talent without unity of purpose is a hopelessly devalued currency" (Bolchover and Brady, 2006, p. 202).

Thus, it is possible to formulate a hypothesis that in football, the relationship between national diversity of women (men) footballers undergoes modifications as a result of the organisational culture (Figure 1).

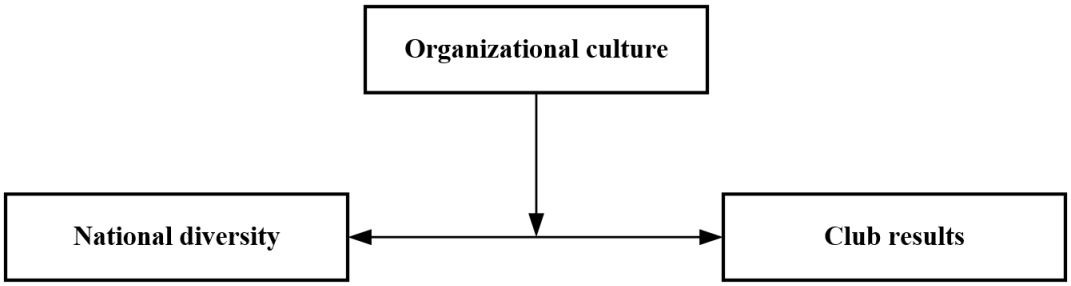

Fig. 1: Organisational culture as a variable modifying (moderator) the relationship between diversity and performance.

Generally speaking, the more culture is focused on the care of others and their protection, obviously apart from pressure and the will to win, the stronger the studied relationship is. Furthermore, vice versa, the weaker it is, the less important the abovementioned cultural norm is.

Can the results of the studies have any significance for business entities? However different from football clubs they are, several fundamental similarities can be pointed out (Table 5).

Table 5: Some similarities and differences between football clubs and business organisations

Similarities	Differences
Football clubs and business organisations are: • the entities which have a hierarchical construction, • socio-technical entities, • open entities, • the entities which can perfect themselves, • the organisations whose management subsystem is embedded in culture and refers mostly to people, • the organisations whose management subsystem relies on the collections of indicators used for evaluation purposes, • the organisations which bring benefits to society and which, at the same time, maintain financial fluidity.	• Football clubs are limited-size organisations, *i.e.* they are small- or medium-sized whereas business organisations can be large-sized. • The average remuneration in the best clubs is many times higher than the remuneration in efficiently functioning business organisations (*e.g.* in FC Barcelona, it amounts to EUR 10 million). • Football clubs are more transparent than business organisations.

Source: the authors' own study

It seems that the similarities which were identified justify the formulations of the following observations:

- It appears that what may play an essential role in designing a business organisation which is free from prejudice is the concept of the so-called heterogeneous culture, based on the experience of the best women's football clubs. Not only does it support the reduction of disapproving behaviours but it can also be positively correlated with organisational performance. It should be stressed that it is of hybrid character for it combines the values of women's culture (people and interpersonal relations are important) and of men's culture (success, including financial success, is what is appreciated). Moreover, it is characterised by the atmosphere of openness which in both women's and men's football clubs is a commonly occurring phenomenon but it seems to be in short supply in business.
- In the light of these considerations, it seems justified to ask the following question: do business organisations achieve better results because their personnel is nationally diversified or do they attract the best employees from foreign countries because of better results? Therefore, the relationship between the personnel's national diversity and the performance of a business organisation cannot be so simple and obvious as some supporters of diversity management seem to claim. The mechanical increase in diversity, which is known in the practice of management, does not have to yield better results.
- In the case of the better treatment of diversity in the group of women as well as in the situation of management structure change (when women constitute a higher and higher percentage of those employed), the results of the studies can point to the certain relativity of the conclusions made so far concerning diversity management. It turns out that the results of the studies carried out on teams composed mostly of men can be different when women are the majority in those teams. Obviously, it is not the first case when the theory of organisation and management changes the face of changes in organisations and their environment.
- In the article the critical factor of success is the so-called team spirit – a combination of harmony, brotherhood with the desire for good presentation not only as regards a single individual but also as regards the whole team. Obviously, it is perhaps typical for football clubs but in other organizations there are different driving forces of increasing productivity. In the context of complex organization the management of workforce diversity will be always only one of many other success factors.
- The results and conclusions of this article may be an inspiration for people who have an impact on team formation, e.g. in the area of project management. In the context of the obtained

results, a project team composed of members from different countries will function differently if we form it from women or men. Gender is therefore an important factor of demographic composition of project team. Men and women differ not only in their levels of conformity, preference of power distribution and behavioural norms, but also in the manner how they (men or women) face the diversity of other project team members.

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Measurement of Training Efficiency Rationalization and operationalization

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Abstract

Developing a method for the efficient management of training process in the organization, including the process of assessing training effectiveness, is a key challenge for most organizations. The quality of the method adopted for the assessment of the effectiveness of training is of particular importance in knowledge-based organizations, where the proper selection of training determines the compatibility of employees' competence to the tasks performed. The model described in this paper puts emphasis on the responsible participation of employees in the process of planning and evaluation of training results, which, in accordance with the adopted assumptions, is to increase the effectiveness of training. The purpose of this paper is presentation of the concept and the method which allows to measure the effectiveness of training.
Design/methodology/approach: The conceptual model was tested on a research and control sample, covering 200 full-time employees employed in a public sector unit in Poland. Qualitative data was collected through group interviews, one-on-one interviews, and secondary sources.
Findings: This study analyzes the usability of information from the most popular models, which allow to predict training effectiveness. It should be emphasized that this concept has also been positively verified and scientifically reviewed as well as positively tested in one of the public administration units. **Implications**: A model and related proposals combining self and collective effectiveness with efficiency trainings, team cooperation and organizational efficiency, solutions offered in this field can support HR staff in management and measurement of training effectiveness.

Keywords: education, human resources management (HRM), training efficiency measurement, training management.

Introduction

How does the study of training effectiveness look like in most organizations? For about 80% of enterprises, this process usually ends with completing a post-training response survey, in which HR department employees or a training company asks participants, to assess the content of the training, substantive preparation of the trainer, organization of the training, etc. The opinion of participants is often the basic information material used to assess the effectiveness of training . However, employee satisfaction with the course of training is definitely not a sufficient reason to justify expenses on training and understand the benefit to the company from the employer's perspective. Expenses on training should contribute to increasing work efficiency, improving its quality, increasing the level of achievement of business goals or building a competitive advantage of the company. Therefore, it cannot be denied that the assessment of the effectiveness of training is a necessary and even critical component of an integrated human resource management system, as it allows to determine what benefits the organization has gained and whether a given training investment was justified at all. The question arises why so many companies assess the effectiveness of training in a fragmentary way, stopping at assessing employee's satisfaction, or does not deal with the profitability of training investments at all? Undoubtedly, measuring the effectiveness of training is the most important parameter of the training management process, but at the same time it is the most difficult one to quantify. The models available on the market in most cases seem to present very universal solutions, but they do not clearly present methods of operationalization of the proposed concepts and usually have a very extensive structure. In

addition, taking into account organizational restrictions (time, competence, human, financial, etc.), the systematic generation of useful information about training turns out to be a great challenge.

All managers would like the money invested in employee training to bring immediate and real benefits. However, it is not always possible to quickly determine the results of training projects (Arasanmi, 2019). Unfortunately, the organization's common experience in the area of training is the lack of desired effects. This is because they are rarely evaluated (Janowska, 2010). A critical aspect of the training effectiveness assessment process is the high level of complexity of this process. Among the reasons why training is so difficult to assess, the following arguments are most often raised:

- The goal of the management is to increase the work efficiency, and not necessarily to increase the knowledge of employees. Nevertheless, effectiveness of learning is the basis for training evaluation by trainers,
- most activities focused on measuring the effectiveness of training, focus on processes related to learning rather than results (Cassidy et al., 2005, Leimbach, 2010).
- Poor work results are almost always only partly caused by the need for training.
- Training effects are often wasted because the skills and knowledge acquired during the training are not used at work (Loomba and Karsten, 2019).
- Only 10% of the knowledge acquired during training is used by employees, which means that the transfer of knowledge to the work environment is ineffective and uncontrolled (Latif, 2012).
- Direct business effects are difficult to analyze and capturing direct economic translation is complicated (employee knowledge and skills can be quite accurately determined using the development center method, for example). Additionally there are no simple tools to conclude that after conducting a given training, the company's revenues increased e.g. by 10% (PARP, 2009).
- Obsolete methods are used to measure and evaluate training (Stolovitch, 2007), (Bates, 2004), (Griffin, 2012). Additionally tools and expertise are not available in the organization to assess the impact of training on the organization's effectiveness.
- Literature on measuring efficiency is "extensive, non-empirical, not theoretical, poorly written and boring, moreover, it is characterized by constant discussion and very few empirical examples" (Skylar et al., 2010).
- It is a complicated, difficult process and often depends on a long-term perspective to which many managers have no patience (Griffin, 2012).

Often, among those involved in training, opinions are heard that training evaluation is difficult, time-consuming, complicated and,-
\ consequently, expensive. R. Griffin (2012) describes training evaluation as: "one of the most difficult tasks of training specialists". However, despite various restrictions, companies are forced to analyze the effects of training for management purposes.

Literature Review

There are many models available on the market. The solution that is the starting point for most is the D. Kirkpatrick model, which assumes the assessment of training at four levels: reaction, learning, application (behavior) and business effects. The J.J.Phillips ROI model completes the D. Kirkpatrick model with a fifth level assessment: estimating return on investment in training (ROI) - measuring profitability. In general, the overwhelming majority of models use Kirkpatrick solutions. The table below presents an overview of the methods available to measure training effectiveness.

Table 1: Overview of the most commonly used methods to measure training effectiveness

The four-level D. Kirkpatrick model	The most popular method of assessing training effectiveness, developed in the late 1950s, includes four levels of assessment: (1) level of response - at this stage, participants are asked if they were satisfied with training, training methods, trainer, housing conditions, etc., (2) level of learning - at this stage, an appropriate knowledge test is usually used to determine whether the training has resulted in retention of training content, (3) level of behavior - at this stage the degree to which the effects of training are transferred to the work environment is determined, (4) level of effects - at this stage changes in business results as a result of training should be demonstrated / the benefits of training should be estimated, e.g. absence, staff turnover, efficiency gains and cost reduction (Kirkpatrick, 2001).
The five-level ROI model of J.J.Phillips	J. Phillips's ROI methodology is based on a five-level model. In general, Phillips supplemented the D. Kirkpatrick model with a fifth level, which is the return on investment (ROI), i.e. the question of whether the monetary value of the results exceeds the cost of the training program. To calculate ROI, you need to convert the results from the fourth level into monetary values and compare with the costs of the program, taking into account all components of costs and benefits, also irrational. So, in a sense, it is a combination of the Kirkpatrick model and BCA (benefit-cost analysis). As part of the J. J. Philips model, two basic indicators: ROI (Return on Investment) and BCR (Benefits / Costs Ratio) are calculated. These indicators allow to answer the question about how much money the company will gain in exchange for the expenses that it incurred for a given training project or other project in the area of personnel management. The ROI method obviously has pros and cons. The single numerical value obtained thanks to it combines all the basic "components" of profitability and can be used to make comparisons with other investment possibilities. However, ROI has several major disadvantages. A difficult element here is isolating the impact of training from the effects of other factors on the company's results. Model critics also point at its complexity and the fact that it is mainly used by large companies (Phillips, et al., 2009; Steensma, and Groeneveld, 2010).
Model Leslie Rea	The author systematically presents the next stages of training, from identifying the needs of the company, defining the objectives of the training and designing the appropriate program, to the preparation of individual training sessions and estimating the effects of training. The author presents many techniques and methods along with procedures for conducting trainings and training sessions (Rae, 2006).
A model for assessing the knowledge and skills of Marshall and Schriver	. This is a five-stage model in which knowledge and skills are assessed separately. At the level one, the opinions and feelings of training participants are examined. On the second level written tests checking the knowledge of trainees are employed. At the level three, the employee performs standard tasks to verify the level of acquired knowledge and skills. The fourth level concerns the transfer of skills, and the fifth - the impact of training on the economic results of the form and return on training investment (Phillips, et al., 2009).

Six sigma	Method of managing the list at Motorola in the mid-1980s by B. Galvin and B. Smith. In statistics, sigma means the standard deviation of the variable. Six sigma means the distance between the set of deviations of the measure of central tendency (e.g., arithmetic mean for normal operations) left and right. The Six Sigma method was used for the first time in a production plant. Now it is increasingly expanding to such areas as e.g. sales and HR. Six Sigma is not only a technique, but also a philosophy (Pandey, 2007; DeFeo, 2000). Six Sigma means an organization's way of thinking in which people make decisions based on data, look for the root causes of problems, try to control changes, track leading indicators of problems to allow preventive measures. (Fleming, 2005).

The literature on the subject also provides other solutions that recommend, in addition to testing of the level of satisfaction of training participants, several other contexts / levels of training assessment. At the same time, many studies confirm the low level of implementation in practice of assessments at higher levels. Therefore, the question arises: what factors influence low level of application of available training effectiveness testing models? The rest of the work will present those imperfections in the training management process (methodical and operational) that are most closely observed in training practice

Methodological dysfunctions (on the example of the Kirkpatrick and Philips model - ROI):

- The hegemony of the Kirkpatrick model occurs despite fear of its actual effectiveness - for example, the degree to which the results of one level are correlated with the results of later levels is doubtful (Berge, 2008). The results of studies carried out by G. Alliger and E. Janak (1989) show a very low correlation between reaction and learning at r = 0.07 and a correlation between reaction and behavior at r = 0.05. A slightly higher correlation was found between learning and behavior (r = 0.13); learning and effects (r = 0.40) and behavior and results (r = 0.19).
- The D. Kirkpatrick model does not provide specific solutions for use by organizations at every stage of the training program evaluation, for this reason many organizations do not use the whole model, focusing only on the first two stages, to put it simply, the model lacks practical guidelines on how to develop results at individual stages (how to generate, process and analyze data).
- The relationship between training and long-term results is unfortunately often blurred. Additionally long-term effects have many causes, and training can be just one of them.
- Although the logic of the ROI method seems uncomplicated, the assessment of the elements included in the method (inflow of returns obtained from a given investment, outflow of resources balancing these returns to carry out a given investment, course of inflow of returns and outflow of resources in each of the future periods) is quite subjective (Boudreau and Casio, 2007).
- Typical ROI calculations allow you to focus on only one investment in human resources and do not allow you to consider how these types of investments interact with each other as an investment portfolio. Training can, for example, lead to a value creation that outweighs the cost of conducting it, but wouldn't this value be even higher if combined with relevant investments in individual incentive programs correlated with training results?
- In practice, objective determination of ROI is difficult and complicated, and the assessment is totally time dependent. If the ROI model includes the collection of post-training data, the effects of the training on which the data were collected should be extracted. This "cleaned" data must then be converted into monetary values in order to calculate the return on investment and identify specific benefits. It is also important to assign a value to the costs of a given

training program, as this also affects the final return on investment. In fact, when it comes to trying to measure ROI, the calculations are very complex. In addition, to correctly determine ROI of each part of the training process, a baseline should be determined so that you can try to measure progress / development / improvement (Little, 2014).

- The clear definition of ROI is quite problematic, as it always requires a reference to hard indicators; the problem of isolating training effects also arises.

These dysfunctions should be supplemented with an opinion on the currently fashionable six sigma method in HR applications. According to W. Cascio and J. Boudreau one of the basic limitations of this measure is the fact that in reality it is not a measure that can be transferred to HR areas. This is a performance indicator that can be used to monitor overhead costs for almost any job. As a result, talent focus is not included when emphasizing performance. Paying special attention to reducing costs usually leads to the rejection of "more expensive" decision-making options, which may be often more valuable. Thus, although this measure seems attractive financially, it cannot be used to reflect the value of talent (Cascio and Boudreasu, 2011) and the added value of investment in training.

Operational Dysfunctions

- D.Kirkpatrick, J.J.Phillips models are a multi-stage evaluation of training programs. The detailed analysis means that the assessment requires both a certain amount of time and the acquisition of skills in using the assessment scheme, in other words, the models referred to require a high level of HR department involvement and line managers at the stage of planning, implementation and assessment of training, which means their application value is perceived as doubtful, moreover, too much labor-intensive use of models reduces the effectiveness of potential benefits from their use, which is why in practice the evaluation is often performed fragmentarily.
- Measuring the effects of training at level four is very complicated, even in cases where organizations have clearly indicated which long-term goals should be achieved. It is difficult to provide convincing evidence of the causal relationship between the training effect and the desired effect. Therefore, level four is often overlooked.
- Deferred assessment of the effects of a single training, without the adopted reference object, often results in the loss of objectiveness of such assessment and its exaggeration.
- Along with the popularization of the D. Kirkpatrick model, questionnaire satisfaction / response surveys of training participants, by whom the program is evaluated, the manner of conducting training and the conditions in which it took place, became widely used. An important limitation of this tool (surveys measuring the response to training) is often the faulty design of questions in the survey (excess of open questions, too many questions regarding organizational and social issues during the training), as well as the way employees approach it, which is not fully specified (e.g. high assessment does not require further explanation or tendency to transfer non-substantive assessments to assess the usefulness of training, etc.). Naturally, employee opinions can be taken into account in organizing subsequent training projects, but they are difficult to consider as a sufficient basis for assessing the value of training (Andrzejczak, 2010).
- The survey (the basic tool used in stages I-III) does not provide measurable information, as most people tend to average or overstate the ratings even when they are anonymous. The survey rating can also be misleading, among others if the last part of the training was spectacular and effective, because it is this element of the training that is usually taken into account by the assessors (training participants).
- The expectations of training participants are emphasized too strongly in the model, which is formulated as if the training was to meet only the expectations of the participant as the sole beneficiaries of the training.
- The model does not solve the problem of the low level of employee responsibility for training results and their own professional development.
- The determination of the measurement effects of training programs is often unrealistic because of the difficulties in finding the right control group and the need for a large commitment of

resources. As a result, it is often unclear whether training was needed at all (Demerouti et al., 2011). It is recommended that control group assessments are included in models, which strongly involves all stakeholders of the training. As a consequence, a large amount of materials for analysis leads to a reduction of the most important stages of assessment due to system failure, it is also worth mentioning that in practice it is rarely possible to carry out the same observations and tests involving control groups several times (Bramley, 2001).

- Another important problem in obtaining important measurement data is the usuall reluctance to disclose issues regarding knowledge of a foreign language, real skills in operating IT and operating systems, technological skills, qualifications etc. The fact is, however, that it is not enough just to watch people and talk to them to assess their learning experience, or to determine that this type of activity is consistent with the company's goals.
- Activities that lead to employee development in terms of such abilities as soft skills, are difficult to translate into monetary values. Managers really do not know what is important to measure, how to collect and analyze data and synthesize the data obtained (Abernathy, 1999).
- The problem is the lack of proper and reliable diagnosis of training needs - very often the training becomes a form of "benefit" for employees, or an element of personnel marketing, rather than satisfying actual and strategically important training needs of the organization. Employees report their own training needs, based on their often subjective feelings, which are aggregated throughout the organization. As a result, the company collects training "whims" rather than needs (Sienkiewicz, 2010).
- The top management is responsible for the relevance of the training since the expenditure for training is an investment. However, in practice, even in small companies, tasks related to the organization of the training process are delegated to employees who quite often do not have appropriate competence to organize them.

Of course, it is impossible not to mention that there are many other reasons as a result of which training expenses are wasted, such as unclear expectations of the management, little support in the workplace, no monitoring of post-training effects, resource shortages in HR departments and competence deficits to implement new skills, no incentives to apply new skills and knowledge, training discomfort related to organizational change. To sum up, the training process should also be supported by activities that take into account environmental factors, such as appropriate information mechanisms on the results achieved and employee incentives (Berge, 2008).

MTE Model

The tool has been tested in organizational conditions in a government administration unit. The testing procedure consisted of comparing the effects of two systems of training management procedures, the procedure based on the D. Kirkpatrick model and the MTE model. It is worth adding that the overall concept of the model has been scientifically verified and has received positive implementation recommendations (Ziebacz and Tychmanska, 2016). The big challenge for implementing the tool was to develop a plan that would allow to minimize disruption of the workflow caused by the MTE testing. The basic assumption, at the stage of model development, was to lower labor, cost consumption, and complexity of the process of measuring training effectiveness compared to the methods and systems available on the market. Another important assumption was to increase employees' direct responsibility for effectiveness in the area of professional development. The issue distinguishing the presented model is that the measurement of effectiveness does not refer only to a single training, but to the entire portfolio of trainings implemented in the organization. The model assumes that measuring the effectiveness of a single training is inefficient, and often impossible in practice. Attempts to measure the effectiveness of a single training require a large commitment of resources (human, financial, organizational), as a result, the boundary between the effectiveness of training activities is often lost, and the actions taken are often end with superficial (surveys, knowledge studies) which are not sufficient in the process of measuring training effectiveness. For this reason, it seems more reasonable to analyze aggregated training results and the impact of all training activities on significant organizational variables, as well as to analyze the trend of these results. In other words, the MTE model examines the ratio of the effectiveness of the entire training policy in a company to the value of strictly business indicators. This approach, first of all, improves the measurement process, secondly makes it

more effective, thirdly - makes all bills more meaningful, and fourthly, allows you to capture trends in the development of indicators and their relationships. The problem of isolating training effects can be more effectively verified (estimated) on a macro scale than on a micro scale. When conducting analysis on aggregate values, the measurement of training effectiveness should be replaced with the term - estimation of training effectiveness. The model is presented in diagram 1.

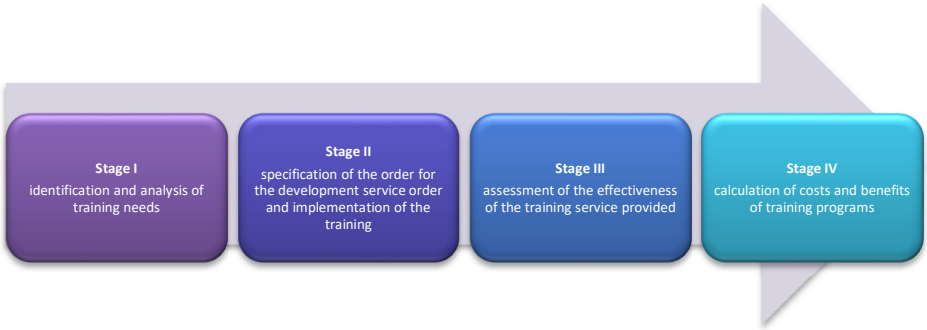

Fig. 1: The MTE method

In most of the models for training effectiveness , recognition of training needs is the first stage of the process, and the starting point for its initiation is the observed problem diagnosed in the organization (lack of knowledge, skills, qualifications). In the "MTE" model it is assumed that the starting point - the information object, constituting the reference point for identifying training needs is the TASK.

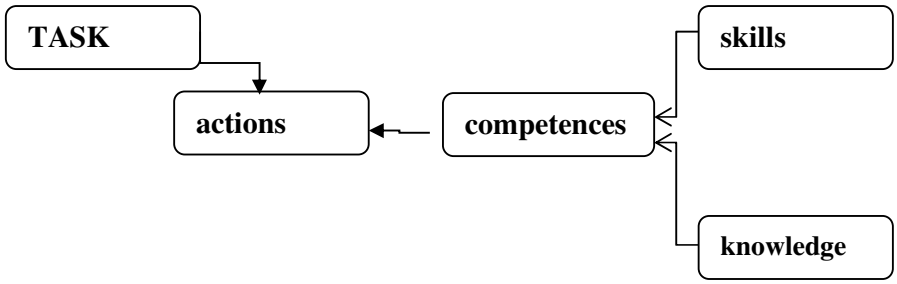

Fig. 2: The structure of information objects used at the stage of identifying the training needs of the "MTE" model.

The structure of information objects in the model results from the assumption that "training" is of a short-term nature - this is not a so-called school education (from scratch). It is assumed that the employee has a certain base of knowledge and skills as well as professional experience that allows him to actively participate in planning of the development. During the training, the employee can obtain instructions focused on the assimilation of a specific activity.

Stage I: Identification and analysis of training needs.

The process of testing training needs, according to the concept of MTE, moderates the definition of training needs in such a way that it is possible to determine the level of satisfaction of these needs after training in relation to real information objects - i.e. tasks included in action plans for individual organizational units. It is worth emphasizing that the question about training needs without reference to tasks does not generate material for verification of training results at the level of behavior change, or at the level of impact on employee work results, and, consequently, on business indicators describing company's activities. In the "MTE" model, it is assumed that not only employees but also their superiors

can have information about the competency gaps of employees (ie potential areas for the development of employees' knowledge and skills). Managers monitor employees' work on an ongoing basis, noticing unsatisfactory results of implemented tasks and competence gaps that may be their cause. Observations regarding work effects are often accompanied by reflections on insufficient skills or knowledge of employees. The on-line training database enables the introduction of currently observed information - data on employee competence gaps, and thus the objectives to be developed during training. The supervisor supplements the database using the same form as the employee, i.e. he enters the same type of data. Entries in the "database" are at the same time the material for preparing the specification of the subject and scope of the training.

The entry in the electronic sheet of the individual record of training needs begins with the selection of tasks from the scope of duties in the workplace and a description of the activities that will, according to the employee, run more efficiently, as a result of acquiring specific new skills or specific knowledge. So training needs are defined in two forms:

a) as skills - the ability to apply knowledge to perform tasks and solve problems,
b) as an area of knowledge - a set of justified judgments (descriptions of facts, theories and principles of conduct) resulting from human cognitive activity (National Qualifications System as a tool for lifelong learning, Educational Research Institute). An example was prepared for an employee of the Human Resources Department, Training, Recruitment and Development Section.

The training need has been identified in relation to the job task: *"Preparation and implementation of development programs for employees".*

Table 2: Template of the form for entering data into the database /form- Training needs study sheet

STAGE I IDENTIFICATION AND ANALYSIS OF TRAINING NEEDS			
INSTRUCTIONS FOR FIELDS			
Select a task from the drop-down list. The list includes your tasks at the workplace	**Please enter the activities for which the knowledge and skills acquired during the training will be particularly useful**	**What KNOWLEDGE do you absolutely need to EFFECTIVELY perform the indicated action → task? (complete if applicable)**	**What SKILLS do you absolutely need to EFFECTIVELY perform the indicated activity → task (complete if applicable)?**
EMPLOYEE			
TASKS AT THE WORKPLACE	**Actions**	**knowledge**	**Skills**
Preparation and implementation of development programs for employees	Development of assessing competence Assessment Center / Development Center (AC / DC)	1) learning the Assessment Center / Development Center methodology: diagnosis, describing the competences tested, creating competence models; 2) learning the rules for conducting sessions: giving instructions, keeping records	1) acquisition of skills in the preparation of AC / DC sessions: development of tasks and assessment scale, session logistics 2) acquisition of skills such as: providing feedback, analysis and evaluation of AC / DC sessions (classification of information from the records, discussion of assessors), session reporting

The method of collecting information on training needs described above is based on the following assumptions:

1) the employee has the best potential to self-diagnose the competence gaps hindering achieving the planned results of actions,
2) the employee may describe the competence gaps he / she observes in such a way as to assess the level of filling these gaps as part of the training at the stage of training assessment,
3) the employee to whom the training initiative belongs is active in the assimilation of the training objectives he or she has articulated

The following analysis is needed for training, and the result is the output structure below.

Table 3: Template of the form for entering data into the database /form-

Training needs study sheet

INSTRUCTIONS FOR FIELDS	
Define the importance of increasing the indicated knowledge / skills in the context of the results of the task	**Please select the appropriate status of your training need**
SUPERIOR	
Choose priority	**STATUS according to the supervisor's assessment:** **P - to be implemented this year** **N- to be implemented within the next 2-3 years** **O- no implementation possible**

Stage II: Specification of the development service order and implementation of the training

Information on the status of entries made by employees regarding their training needs - is available on an ongoing basis, with the option of supplementing when new tasks appear and, as a consequence, new training needs. The employee receives feedback on the opportunities for development of the skills and knowledge specified by him under the programs offered by the employer.

Stage III: Assessment of the implementation of the training service

The employee evaluates the effectiveness of the training service provided twice:

- immediately after the training (using the freshness effect: comparing the "ordered" training results with the results obtained through the training),
- after 3 months from the end of the training, during which the employee should closely monitor his or her proficiency in the knowledge and skills acquired during the training in the context of the task being carried out,

In a situation where the assessment of training effectiveness is lower than 90%, the employee fills in the electronic sheet with the field: "list of deficiencies in the training results", entering the identified elements / aspects of the training that were covered by the program (order) and which were not implemented

Table 4: Sheet for recording individual training needs

III STAGE OF TRAINING EVALUATION			
INSTRUCTIONS FOR FIELDS			
Evaluate the benefits of training. Evaluate immediately after the training (on the day of the training or 1 day after the training)		Evaluate the benefits of training. Evaluate 3 months after the training, but no later than	Indicate missing elements in the training program if identified
EMPLOYEE			
Assessment of the training result immediately after the training (0 ... 100)%	Deadline for final assessment	Final evaluation of the training result / TRAINING EFFECTIVENESS (0 ... 100)%	List of deficiencies in training results

Stage IV: Calculation of costs and benefits of training programs

The benefits and costs of training programs are not assessed at the level of a single training. The effectiveness of the implemented training policy is assessed in the context of organizational efficiency and effectiveness. The interdependencies and dynamics of changes in training cost-time indicators and general organizational indicators will be analyzed. Information entropy can be used to study these changes as a measure of information. According to E. Kolbusz in the field of management, and especially when solving specific management problems, it is necessary to operate with a synthetic definition of qualitative information features, so that each configuration of the listed features falls within the definition of this term (Kolbusz, 1993). In an information system, specific information is useful if it is used to solve a particular management problem, or more precisely, when it is an important condition for solving a given management problem (Unold, 2004). Mathematically, entropy can be expressed using the following formula (Mitzenmacher, 2009):

Formula 1.

$$H = -\sum_{i=1}^{n} p_i log(p_i)$$

where:
H- entropy
pi - probability specified on set {1, ..., n}

This formula expresses, according to the formulation of C. Shannon himself, the entropy of the probability distribution (p1, p2, p3 ... ..pn), specified on the set {1, ..., n}. It defines the amount of information in terms of value (choice, indeterminacy). From this formula it follows that H = 0 if and only if one of the probabilities equals one, i.e. when all other probabilities are zero. This is a state of certainty. The statement that from a set of events that may occur with a certain probability, one actually occurred brings uncertainty to zero, which according to Shannon's formulation qualifies H as a reasonable quantitative measure of choice or measure of information (Mitzenmacher and Upfal 2009). The goal of management is to ensure the development stability of the enterprise by skillfully controlling its functioning in the environment so that it maintains its separateness on the one hand, and maintains an optimal level of exchange with the environment on the other. Energy resources (understood as competences) embodied in the employees who make up the organization must be regulated on the one hand in such a way that no excessive clusters of them are created anywhere that can "disrupt" it from the inside (excessive concentration of similar competences), on the other so that the organization has

energy resources enabling its current functioning and development as well as effective process management, also in adverse conditions. From this perspective, management is the implementation of compensatory processes - to achieve functional balance.

Conclusion

The issue of managing the effectiveness of the training process in contemporary, modern organizations operating on the market, forces widely understood changes, where individualization of the approach becomes a necessity. Individualization is understood as the implementation of tailor-made systems. It should also be accepted that testing the effectiveness of training is continuous and long-term process. Moreover, the lasting results of investment in training are visible only after a long time, and the results of such activities can also be typically non-material. It is therefore difficult to express them in a quantified form. The main problem is therefore to clearly define the extent to which the training has contributed to the observed changes. The greater achievement is showing the trend of change. In this context, developing a method for efficient management of the training process in the organization, including the process of assessing the effectiveness of training, is a key challenge for most organizations.

In the proposed model, training effectiveness is understood as the effectiveness of training policy. The assessment of the effectiveness applies to the time period - the period of time analyzed (e.g. year) and not a single training, which gives a more favorable perspective on the analysis of the effects / benefits of training processes for organizational needs. A significant difference, that distinguish the MTE method from other methods available on the market, concerns the study of training needs. The model replaces the information object proposed by various authors: "problem" with the object "task" - "task element - activity". From the point of view of the usefulness / value of the information obtained, it is better to start the training evaluation process not with "defining the problem", but with "the description of the activity / task, which according to the employee will run more efficiently after the acquisition of specific skills and knowledge." In accordance with the model assumptions, this structural change (shifting the emphasis in the process of identifying training needs and in the process of assessing training results to the tasks of employees) should promote the effectiveness of training. An equally important element of the method is the way in which data on the training needs of employees are collected. This helps to build the responsibility of trainees for the results (learning outcomes) obtained in the training process. The MTE model allows to increase the responsibility of trained employees by defining their needs and creating opportunities to verify the quality of training (comparison of expectations for acquiring skills and verification of their mastery by the manager). This is an important transition from passive participation to active mastering of the effects of training. The goal is responsible participation of the employees in the planning and evaluation of training results. Another aspect of this approach is to eliminate the negative connotation associated with the word "problem", the use of which can inhibit the motivation to actively participate in the training process, as well as to link the results (learning outcomes) with specific occupational tasks and their components (activities). The process of collecting information in MTE provides synthetic information for the specification of the subject training order, which significantly facilitates the work process of HR cells in determining training needs when choosing training companies, and also reduces the time needed to organize training. It also provides the basis for assessing the level of implementation of ordered results (learning outcomes) of a given training process. Therefore, it is possible to evaluate the implementation of the training policy and relate its effects to company-wide indicators.

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Territorial Development Capacity of Small-Towns – Evidence from Poland

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Abstract

The study scrutinizes the development process of small-towns in polish region, Lower Silesia. It analyses an original data set of all 56 units. Final comparison considers period 2012-2018. The conducted analysis based on taxonomic method that examines local explanatory factors towards territorial aspect of development. The evidence from the research shows that small-towns can be important link in regional settlement unit, but only those who developed specific, endogenous functions performing well and respond to changing economic patterns and economic globalization.

Keywords: Territorial Development, Territorial Capital, Small-Town

Introduction

The rapidly changing patterns of development constantly challenge the economies of cities and town, which are exposed to the turmoil of economic globalization (Kaufmann, Wittwer 2019). In the recent publication the effects of economic significance and transformation is focused on big cities (metropolises). At the same time small-town are playing important role in regional economy, but did not received the same amount of scholar attention (Servillo 2017; Meili, Mayer 2017, Kaufmann, Meili 2019). In European urban system small and medium-sized-towns is currently inhabited by 27% of population and constitutes important links in network of towns and cities form many decades (Servillo 2017).

The present paper scrutinizes the territorial aspects of development of small-towns in one of Polish regions, Lower Silesia. The aim of this paper is also to investigate chosen endogenous, embedded factors of development of small-towns in Poland and the distance between development pace of small-town and big cities in Lower Silesia.

Modern paradigm of local and regional development shifted towards territorial concept of development strongly disseminated among scientist and in real-life activities. Economics theories such as New Economic Geography or endogenous growth theories don't grow into complexity of processes that determine social and economic activity concentration in territory. Theoretical concepts that respond to factors and relations that occur in place but cannot be simply quantifiable (social capital, networking) are local development theories (Capello 2008, 2009). Local development theories focus mainly on exogenous and endogenous potential. In the second mentioned group include well-known concepts such as: industrial district theory (Becattini 1989), bottom-up development (Stör, 1990), learning region (Lundvall 1992), and territorial capital theory. Support to these concepts can be found in institutional or evolutionary economics. In institutional economy approach to local and regional development "space" become a "territory", active participant of development processes, not only a concentration of land and capital. Its essence comes to connection of physical space with cognitive and social dimensions that represent inhabitants' approach to inhabited area and mutual correlations between inhabitants. All these aspects make up for "specificity of place" (Jewtuchowicz 2017, Sokołowicz 2015).

In modern conditions of increasing mobility and connections of population, goods and information there are some institutions responsible for development process that are located in space (although we could read a lot of virtualization of certain social and economic activities). In other words, certain activities and actors are embedded in local community and shaping directions of development local

units. Another aspect stressed in literature is proximity that seems to have important implication for local scale. From economic point of view embeddedness means that certain decisions are made under net of social connections that are connected with specific territory (some of this social connection can be also virtual). As a background to further analysis territory can be understood as a system of spatially concentrated and historically shaped technical, production, institutional activities performed and coordinated in various ways by various organizations: companies, research centres, the local community, economic organizations, etc., as also human activities more or less specific depending on the activities developed locally (Jewtuchowicz 2005). Each territory is a historical product, so it has its own time, dimension, and the shared past of the local community creates its culture, material heritage and determines its identity. Another important aspect at local level is diversity that emphasizes the local nature of development (defines its specific socio-economic, cultural and natural features) and the openness of local communities and their willingness to compare problems and exchange experiences (Jewtuchowicz 2005).

Territorial Keys and Endogenous Potential

Each policy's intervention must be adjusted to specific territorial condition. It means also supporting of relationship network, pursuit of dialogue, sharing power or promoting comprehension as different forms of governance based on reciprocity (Amin 1999).

In the current development policy (in which the EU regional policy plays an important role), territories are assigned a key role in development processes, which means assigning 'places' to specific sets of features that affect local development more than other places (Barca 2009; Noworól, Noworól 2018; Markowski 2011). According to the European Commission, 'territorial cohesion means ensuring the sustainable development of all places and ensuring that all citizens enjoy the maximum benefits from the resources of their territories. This means that diversity is transformed into an asset that helps in the extensive development of the entire EU (Rogowska 2019).

Territorial potential support by EU is connected with territorial capital that is in the literature understood as several territorial keys that can be used as linking issues in conducted research (Zaucha 2014):

- accessibility (in different scale by different model of transportation and communication),
- public service (access to public service);
- territorial assets (such as specificity of local environment, local system and innovation net, renewable energy, city revitalization),
- connection inside cities net.

In contemporary condition for development, including globalized economy, turbulent milieu, global environmental changes many small-town important factor for development perceived in endogenous potential, by relying on local tradition and identity, search for newcomers (inhabitants, entrepreneur, tourists)

Small-towns have great meaning in overall social and economic processes. Recently a lot of research is directed into the spatial aspects of its development. As an example of publications focused on small-towns development aspects in Poland can be mentioned: Marszał (2009), Poczobut (2009), Korcelli (2007).

Methodology

The conducted analysis based on taxonomic method with a hypothetical pattern of development, against which taxonomic distances of the examined objects are measured. The assessment of tendency of development process of small-towns requires defining indicators characterizing the main aspects related to local development (with the special emphasis put on territorial dimensions of development), which was the first step of undertaken analysis.

In the second stage of the research selection of diagnostic variables was conducted, aimed at creating the final set of diagnostic features. Throughout the study period, formal criteria were used, which are primarily associated with access to statistical data. It was considered that the selection of variables for the model should ensure measurability of features, comparability for all facilities and study periods, completeness of data for all towns in study periods.

It needs to be mentioned that the final data matrix was dictated by final possibility to access them. Not all the data that seems to be important in the conducted analysis was available in public statistic, not all of them were comparable in longer period. That is why finial analysis considers period 2012-2018. The main source of data used in conducted research was: Central Statistic Office in Poland, Local Data Bank, information and data presented on municipalities websites.

The set of potential diagnostic variables was then verified by means of statistical procedures. The selection of diagnostic variables took into account the fact that they should not show similarities in the sense of information about objects. The coefficient of variation was used to assess spatial variability. With this procedure the features for which it reached a value lower than the arbitrarily accepted size (10%) were eliminated. The second step was to eliminate those variables that easily reach high values. The asymmetry factor was used for this purpose (Ostasiewicz 1998).

Small-town in this paper can be understood as spatial unit with ≤10.000 inhabitants. In this case study it was 56 units. Additionally, in comparison the same procedure was conducted on big cities of Lower Silesia with certain status in polish self-government system: Legnica, Jelenia Góra, Wrocław, Wałbrzych. Further on the distance in development between these two groups of cities in Lower Silesia was measured. The third group of cities are middle-sized, but they were not included into the analysis. The first stage of building a synthetic measure of development for the examined cities was the division of diagnostic variables into stimulants and destimulants, followed by the transformation of the destimulants into stimulants. The next stage of the study was to reduce the established diagnostic features to comparability, which is a necessary condition for the description of complex social, economic and spatial phenomena using selected diagnostic variables. The diversity of such defined features entails the need to use multiple measuring units, which makes it impossible to create comparisons. The next step was to receive standardize variables, by using the following formula:

$$z_{ijt} = \frac{x_{ijt} - \bar{x}_{jt}}{s_{jt}}, \quad i = 1,2,...n\ , j=1,2,..., p\ , t=1,2,..l$$

z_{ijt} *- value of j-th variable after standardization*

x_{ijt} *- value of j-th variable of the i-th object in the year t*

$\bar{x}_{jt}$ *- arithmetic average*

s_{jt} *- standard deviation*

For such described set of features development pattern with standardized coordinates was created (assuming that it is maximum value for each of the features). Further analysis is conducted on the basis of distance and Euclidean distance. This method is widely applied to measure the distance between objects and can be expressed as:

$$d_{i0t} = \sqrt{\sum_{j=1}^{m} (x_{ijt} - x_{0jt})^2}, (i = 1,2,..,n, t = 1,2,..l)$$

The more the object similar to the development pattern (the less distant from it), the higher the level of the complex phenomenon of this object. To order the results obtained and to put them in the range [0,1], where values closer to 1 indicate a higher level of development of the examined object, the

Hellwig development measure was used. The last stage of the process was therefore to determine the development measure for each object according to the formula:

$$m_{it} = 1 - \frac{d_{i0t}}{d_{0t}}, (i = 1,2,..., n, t = 1,2,..l)$$

where:

$$d_{0t} = d_{i0t} + 2s_{dt}, (i = 1,2,..., n, t = 1,2,..l)$$

s_{dt} *- standard deviation of development measure for each object*

The measures of development have been constructed in such a way that they meet the following properties (Bąk 1999):

• the higher the level of the complex phenomenon, the greater the value of the measure of development,
• the values of the development measure are included in the range [0; 1], where the measure calculated for the development pattern is 1.

Based on the results obtained, due to the level of the phenomenon under study, a ranking of communes was broken down into 4 typological groups, guided by the assumption that in group I there will be groups with the highest development rate, while in group IV the least developed communes.

Case Study. Data Description

The paper explores differences in local development conditions of small-towns in comparison to main cities of the region. Research presents Polish case based on Lower Silesia region. It is located on southwest part of country and in its history, we can observe periods where the small-towns (with industrial background) were basis for region's development. Now there is a tendency to decreasing meaning of small-towns on the map of the region. According to statistic office level of urbanization of this area reached level of around 70% in 2016 (Statistic Office in Wrocław 2016). Settlement system of the region is well developed, hierarchical, represented by a large network of various sizes cities, with an extensive network of connections, with a clearly shaped centre, which is the city of Wrocław. The largest population inhabits cities in the range from 10 to 100.000 it is almost 25% of the urban population of the region (Korenik 2009). Smallest towns (less than 5.000 inhabitants) are usually stable and long-lasting link of settlement net. Share of smallest unit in overall number of cities shaped under level 34% at the beginning of 21th Century with population 3,9% (Zaniewska 2011). In Lower Silesia at the same time the population of small-towns was around 9,4% of population of the region, and in comparison, lost 6,3% of inhabitants (between 1995 and 2008). Some small-towns lost population because the structural changes and the collapse of industrial functions. Towns that despite negative demographic tendencies during that period increase its population were units located near main city, Wrocław. Towns that showed highest drop of inhabitants were located in peripheral areas but with dominant function (touristic and resort towns).

Table 1: Main indicators included in conducted analysis

Name	Characteristic
Demographic load factor	This indicator represents social sphere of development. The ratio of the number of people in non-working age to the number of people in working age. Important especially on the background of demographic tendencies (aging society, migration of young people)
Percentage of population using the sewage system/gas installation	Strongly connected with quality of life in urban unit. Illustrate infrastructural gap
Value of contracts / decisions on co-financing projects with EU funds	Counted for 1 inhabitant. Can be perceived as a factor connected with human capital and quality of local

	authorities. Stimulant that gives us potential information of investments focus on improving quality of life in local units
Newly registered entities from professional sector	Newly registered entities from sectors: finance, insurance, real-estate, professional, science, technical activity. Illustrate economic sphere of development and level of development of non-tangible assets (knowledge, creativity)
Number of small entities	Small entities are the most important unit in local economy. Usually connected with local tradition, strongly embedded
Green areas/ Recreation zones	Surface of green areas to total areas of a city/town. Territorial asset, connected with quality of life in local unit
Newly completed dwellings	Newly completed housing areas *per capita.* Represents quality of life, the higher the number there is a possibility to increase inhabitants
Long term unemployment	Number of long term unemployed in total amount of unemployed inhabitants. Represents economic condition in local unit, is one of the factors responsible for hindering social and economic growth, lowering living standards
Women councillor in local authorities	Women councillor in local authorities to total number of councillors. Illustrate social aspects of population, can show community approach to policy making process
Water consumption in households	Water consumption in households / thousand inhabitants. Illustrate environmental aspect of development, can represent social awareness to environment protection and sustainable development
Length of bicycle paths	Length of bicycle paths in reference to total area of municipality. This indicator can represent quality of life in local unit, possible chance to develop tourism in urban unit
Road accessibility	Territorial aspect of development. Represents average time to reach local unit by car from main city of the region
Investment expenditure	Investment expenditure *per capita*. Represents economic sphere of development
Total number of entrepreneurs	Represents economic sphere of development, include small, embedded entities with less then 9 employees

Source: own elaboration.

Results from Research

Conducted research is presented in following tables. Table 1 shows the results on the differences across small-towns in terms of development capacity (with special impact place on territorial aspects) To understand better the result it is important to known certain condition that are created in each unit. For the purpose of this paper only general conclusion will be presented.

Table 2: Synthetic measure of development and position of small-towns in 2012 and 2018

Municipality	Synthetic measure of development in 2012	Position in 2012	Municipality	Synthetic measure of development in 2018	Position in 2018
Bardo	0,1564	41	Bardo	0,0915	42
Bierutów	0,5409	2	Bierutów	0,0792	45
Bolków	0,3203	11	Bolków	0,3151	2
Bystrzyca Kłodzka	0,1943	33	Bystrzyca Kłodzka	0,1251	37
Chocianów	0,1637	38	Chocianów	0,1369	32
Duszniki-Zdrój	0,4075	7	Duszniki-Zdrój	0,1706	16
Głuszyca	0,1579	40	Głuszyca	0,1631	18
Gryfów Śląski	0,300	12	Gryfów Śląski	0,1510	24
Jaworzyna Śląska	0,1859	36	Jaworzyna Śląska	0,1519	23
Jedlina-Zdrój	0,1401	48	Jedlina-Zdrój	0,1761	14
Karpacz	0,4833	3	Karpacz	0,2752	3
Kąty Wrocławskie	0,4820	4	Kąty Wrocławskie	0,2305	8
Kudowa-Zdrój	0,1521	43	Kudowa-Zdrój	0,0773	46
Lądek-Zdrój	0,2441	22	Lądek-Zdrój	0,1290	36
Leśna	0,2352	24	Leśna	0,0873	43
Lubawka	0,2127	29	Lubawka	0,1558	21
Lubomierz	0,1504	45	Lubomierz	0,0620	48
Lwówek Śląski	0,2792	19	Lwówek Śląski	0,2072	10
Mieroszów	0,0666	54	Mieroszów	0,0854	44
Międzybórz	0,1079	51	Międzybórz	0,1071	39
Międzylesie	0,0535	55	Międzylesie	0,0291	54
Mirsk	0,0855	53	Mirsk	0,0528	51
Niemcza	0,2296	26	Niemcza	0,1626	20
Nowogrodziec	0,2892	16	Nowogrodziec	0,2312	7
Oborniki Śląskie	0,4516	5	Oborniki Śląskie	0,1707	15
Olszyna	0,1635	39	Olszyna	0,1629	19
Piechowice	0,1904	35	Piechowice	0,0735	47
Pieńsk	0,1564	42	Pieńsk	0,0111	55
Piława Górna	0,1789	37	Piława Górna	0,1345	35
Polanica-Zdrój	0,3988	8	Polanica-Zdrój	0,2323	6
Prochowice	0,2830	18	Prochowice	0,1872	11
Prusice	0,2139	28	Prusice	0,1504	25
Przemków	0,1497	46	Przemków	0,1467	27
Radków	0,1403	47	Radków	0,0954	40
Siechnice	0,5760	1	Siechnice	0,3344	1
Sobótka	0,2918	15	Sobótka	0,1643	17
Stronie Śląskie	0,2065	30	Stronie Śląskie	0,1764	13
Syców	0,2946	14	Syców	0,1482	26
Szczawno-Zdrój	0,3249	10	Szczawno-Zdrój	0,2380	5
Szczytna	0,1185	50	Szczytna	0,0375	52
Szklarska Poręba	0,4485	6	Szklarska Poręba	0,2591	4
Ścinawa	0,2885	17	Ścinawa	0,1525	22
Środa Śląska	0,3480	9	Środa Śląska	0,1358	33
Świeradów-Zdrój	0,2371	23	Świeradów-Zdrój	0,1448	29

Świerzawa	0,1924	34	Świerzawa	0,0536	49
Twardogóra	0,2336	25	Twardogóra	0,1086	38
Wąsosz	0,2741	21	Wąsosz	0,1442	30
Węgliniec	0,1058	52	Węgliniec	0,0084	56
Wiązów	0,1188	49	Wiązów	0,1348	34
Wleń	0,2040	31	Wleń	0,1436	31
Wojcieszów	0,0493	56	Wojcieszów	0,0529	50
Zawidów	0,2174	27	Zawidów	0,0929	41
Ziębice	0,1518	44	Ziębice	0,0350	53
Złoty Stok	0,2036	32	Złoty Stok	0,1455	28
Żarów	0,2962	13	Żarów	0,2150	9
Żmigród	0,2747	20	Żmigród	0,1839	12

Source: own calculation based on Local Data Base

General results from analysis can formulated as follows:

- Small-units in both years are located far from created ideal development pattern;
- the best results reached small-towns located in closes neighbourhood of main regional city (located in agglomeration area), where we can observed some positive aspects of development (people and location of foreign investors): Siechnice, Kąty Wrocławskie;
- second group of municipalities that have reached good results in research are small-towns that evolve some specific functions (taking into consideration regional cultural and environmental heritage in this group appeared cities such as Karpacz, Szklarska Poręba, Polanica Zdrój, well known for its spa facilities and touristic attractiveness);
- the worst results achieved municipalities without specific functions, with rural tradition and units located on periphery of the region (in mountain areas), with poor accessibility (by car or train). In this group we can point for example Międzylesie.

Table 3: Synthetic measure of development and position of big cities in 2012 and 2018

Municipality	Synthetic measure of development in 2012	Position in 2012	Municipality	Synthetic measure of development in 2018	Position in 2018
Jelenia Góra	0,9753	3	Jelenia Góra	0,9817	2
Legnica	0,9784	2	Legnica	0,9744	3
Wrocław	0,9918	1	Wrocław	0,9893	1
Wałbrzych	0,9631	4	Wałbrzych	0,9669	4

Source: own calculation based on Local Data Base

In comparison the same procedure of research was conducted to main cities in the region. All of then reached high value of synthetic measure of development in both years, with leading city Wrocław.

Conclusion

The carried-out analysis contributes to findings what are the main factors for development in small urban units (less than 10.000 inhabitants) and what are their capacities to support the development on endogenous, unique factors. Additionally, the research shows what is the distance between main, well-developed cities of the region in comparison with small units. Small-towns are important unit in development process of whole region that is also supported by European Unions regional policy. In Territorial Agenda for European Union (2011) it is strongly mentioned that new connection between different categories of cities needs to be created, mainly to overcome increasing polarisation of social and economic space.

The main findings from research showed that mainly small-towns that are located in close location to big city or inside functional areas (agglomeration areas) tend to gain good results. The data used in analysis are chosen to show new assets and phenomenon that should be important in development of modern spatial units, respond to contemporary challenges. Some small-towns of the region can be definitively described as areas in stagnation (in research period does not decrease the distance to development pattern, but opposite to that, increase it). The results can be also interesting in broader scale, especially in conditions where we should look at small units as an opportunity to spread social and economic processes outside of concentrated metropolitan areas.

Another conclusion concerns regional settlement system. Lower Silesia has a polycentric urban system with a clear dominance of the central city of Wrocław. Its basic disadvantages include significantly advanced fragmentation and enclave. Individual urban centres, especially small ones have only local significance, but they are not important in the region's economy. The settlement network itself in the region is very diverse in terms of both size and space. In recent years we can observe intensification of its transformation processes and the growing importance of the metropolitan system of Wrocław and the urbanized area of Jelenia Góra. Despite these trends, still small-towns in the region are an important element of the socio-economic space of the region. However, to maintain their position, it seems necessary to undertake diversification of the development process in the region's space.

The Author is aware that the findings generated from the analysis should be generalized with caution given do specificity of Polish conditions, but also believes that it can help to understand better the conditions for endogenous development and importance of small-towns in settlement network.

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Análisis Del Rol De Intermediación Sobre La Cooperación Para Innovar

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Resumen

Este artículo analiza el efecto de los intermediarios en el establecimiento de acuerdos de cooperación para la innovación. En el estudio se analizan tres roles de intermediación (financiación, concertación y regulación) y se distinguen cuatro tipos de cooperación en función del objetivo perseguido (desarrollo de actividades de I+D; adquisición de conocimiento incorporado en maquinarias y equipos; trasferencia tecnológica y consultoría). El análisis es realizado con base en los microdatos derivados de la octava Encuesta Nacional de Innovación de Colombia (EDIT VIII), la cual recaba información sobre el comportamiento innovador de las empresas manufactureras durante el periodo 2015-2016. Los resultados muestran que el relacionamiento con actores intermediarios favorece el establecimiento de acuerdos de cooperación entre las empresas y diversos acores del sistema de innovación, y que el efecto de los mismos depende del rol de intermediación que ejerzan.

Palabras Clave: Innovación, roles de intermediación, cooperación, objetivos de cooperación

Introducción

La actividad innovadora de las empresas ha sido un campo ampliamente abordado en la literatura. Enfoques como la innovación abierta (Chesbrough, 2003) y los sistemas de innovación (Cooke & Cardiff, 1992; Lundvall, 2005; Malerba, 2005) han permitido comprender la innovación como un proceso cooperativo, por lo tanto, la actividad innovadora en la empresa se entiende como un proceso que trasciende más allá de sus capacidades y recursos internos, por lo que para innovar, se requiere de la articulación de la empresa con otros actores de su entorno.

Son varios los estudios que se han enfocado en entender los procesos de cooperación de las empresas desde diferentes puntos de vista. Barge-Gil (2010) analiza no solo los determinantes de la cooperación, sino las características de las empresas que hacen de la cooperación la principal estrategia de innovación. Weber & Heidenreich (2016), por otro lado, se han concentrado en analizar la importancia de cooperar para fortalecer capacidades internas de innovación. De igual manera, uno de los elementos clave que se han estudiado ampliamente en la literatura son las relaciones de cooperación entre actores específicos de un sistema tales como empresas, universidades, instituciones del estado, entre otras (Ranga, Mroczkowski, & Araiso, 2017; Weber & Heidenreich, 2017).

El estudio de los intermediarios y su rol en los procesos de innovación, ha generado grandes aportes en la literatura de la última década, permitiendo entender de una forma mucho más amplia la

dinámica alrededor de los procesos de cooperación para innovación. En este sentido, se han desarrollado investigaciones para entender de qué manera éstos intermediarios, facilitan el establecimiento de procesos de cooperación, eliminando o reduciendo fallas del mercado y del sistema (Shou & Intarakumnerd, 2013), e incluso deficiencias en capacidades internas de la empresa (Du, Wu, Lu, & Yu, 2013).

A pesar de que existen gran cantidad de aportes en la literatura sobre los diferentes tipos de intermediación, son muy pocos los estudios que han analizado "como la intermediación afecta el desarrollo de acuerdos de cooperación de empresas con otros actores de su entorno con miras a desarrollar procesos de innovación." Cantner, Meder, & Wolf (Cantner, Meder, & Wolf, 2011), han intentado aproximarse a dicha relación a través de la percepción sobre la importancia de los actores intermediarios..

Llegar a comprender con mayor profundidad el rol de intermediación y establecer un análisis en función de objetivos de cooperación como los ya mencionados anteriormente, constituye un aspecto sobre el cual todavía no se ha profundizado en la literatura; Y por lo tanto dicho análisis, constituye el foco de esta investigación. De esta manera el objetivo principal de este trabajo de investigación es: *analizar el impacto que tienen los intermediarios sobre el establecimiento de acuerdos de cooperación orientados a diferentes objetivos*.

Para llevar a cabo el análisis propuesto se hará uso de los daos derivados de la *Encuesta de Desarrollo e Innovación Tecnológica (EDIT)* aplicada por el *Departamento Administrativo Nacional de Estadística (DANE)* en Colombia. Esta encuesta sigue los lineamientos internacionales contenidos en el Manual de Oslo – Tercera Edición – y es similar a las aplicadas en el contexto europeo (*Community Innovation Survey*). No obstante, una particularidad del cuestionario aplicado en el contexto colombiano es que no solo indaga sobre los actores con los cuales cooperan las empresas para innovar, sino que además pregunta sobre los objetivos específicos que se persiguen con dicha cooperación (por ejemplo, desarrollo de actividades de I+D conjunta, consultoría, adquisición de conocimiento incorporado en maquinarias y equipos, etc.). Adicionalmente, la encuesta indaga sobre si las empresas han establecido relaciones con actores del Sistema Nacional de Ciencia, Tecnología e Innovación como apoyo para la realización de actividades de innovación en lo que respecta al uso de servicios de intermediación relacionados con el acceso a fuentes de financiación, la concertación, divulgación o debates acerca del estado de la Ciencia, la tecnología e innovación, o aspectos asociados a la regulación en materia de derechos de propiedad intelectual e industrial.

Se resalta entonces, la relevancia que toma la variable dependiente de este estudio dada su novedad dentro de la literatura. En este sentido no se aborda la cooperación desde un punto de vista genérico, sino desde un nivel más detallado, resaltando precisamente los objetivos de cooperación en: investigacion y desarrollo (I+D), transferencia tecnológica, consultoría, formación y adquisición de maquinaria y equipo.

Teniendo en cuenta lo anterior, este articulo busca contribuir a la literatura general sobre innovación en dos vías: en primer lugar, analiza de manera más detallada el rol de los intermediarios, destacando diferentes roles que estos actores pueden llegar a tener dentro de un sistema de innovación de acuerdo con hallazgos en este campo de literatura. En segunda instancia también se pretende contribuir, con un análisis de la variable cooperación, no desde un punto de vista general o cooperación con actores específicos como tradicionalmente se ha abordado en la literatura, sino que se centra en analizar la cooperación y su orientación hacia diferentes objetivos como: I+D, consultoría, adquisición de maquinaria y equipo, y finalmente, transferencia tecnológica y adquisición de tecnológica.

Teoría E Hipótesis

Intermediación Y Cooperación

El rol que cumplen los intermediarios es de gran importancia dado que ayudan a reducir las fallas del mercado (Agogué et al., 2017; Aquilani, Abbate, & Codini, 2017), y más recientemente fallas del sistema (Chunhavuthiyanon, 2014; Shou & Intarakumnerd, 2013). Desde el punto de vista de fallas de mercado, se encuentran dificultades para acceder a recursos de financiación para el desarrollo de actividades de innovación, o la dificultad en la provisión de infraestructura. Y por otro lado, fallas del sistema que se orientan más a la identificación de socios adecuados para cooperar y el establecimiento de acuerdos de cooperación entre las empresas y sus socios.

La literatura refleja múltiples categorías de intermediación, sin embargo esta investigación contempla los roles desde un punto de vista amplio donde se destacan tres tipos de roles: ~~E~~(e)n primer lugar, están los *intermediarios de financiamiento* (Hayter, 2016; Wang & Wang, 2017), los cuales inyectan recursos económicos a procesos de innovación especialmente en etapas precompetitivas. En segundo lugar, los *intermediarios de concertación* (Agogué et al., 2017; Dossou-Yovo & Tremblay, 2012), mayormente enfocados en la generación de espacios de discusión, dialogo y articulación en torno a procesos de innovación, facilitando la cooperación para el desarrollo de iniciativas interinstitucionales e incluso facilitan el desarrollo e implementación de políticas públicas (Chunhavuthiyanon, 2014; Wang & Wang, 2017). Adicionalmente, otro de los tipos de intermediario encontrados, son los de *regulación* (Howells, 2006), los cuales se orientan al establecimiento de parámetros de control sobre determinados procesos de innovación en las empresas. (para una facil lectura, usar la letra cursiva para resaltar los tipos de intermediarios)

Intermediarios de Financiación

Las políticas de apoyo a la innovación se han orientado tradicionalmente a corregir las fallas de mercado, estableciendo esquemas de financiación que disminuyen los riesgos asociados a los procesos de innovación. Tal rol de proveer y distribuir recursos económicos ha sido asumido por los intermediarios de financiación.

Como ya se ha mencionado, la existencia y operación de algunos intermediarios financieros~~,~~ representa un mecanismo con el que tradicionalmente muchos países han buscado superar barreras financieras estructurales en los procesos de innovación (Polzin, von Flotow, & Klerkx, 2016) en pro del desarrollo económico. Una característica que resalta en estos esquemas de financiamiento estatal es que normalmente se busca apoyar a una gran cantidad de actores en función de iniciativas que se relacionen con elementos prioritarios de política pública. De esta manera se alcanzan mejores indicadores de distribución de recursos y al mismo tiempo se fomenta la necesidad de cooperar para acceder a dichos recursos económicos. Por lo tanto, la existencia de intermediarios de financiamiento puede facilitar el establecimiento de esquemas de cooperación empresarial que dinamicen el sistema a través del fortalecimiento de procesos de innovación (Lichtenthaler, 2013).

Las actividades de financiamiento direccionadas a través de intermediarios de carácter público, pueden variar según el contexto, sin embargo, gran parte de dicha financiación se orienta en gran medida a etapas precompetitivas de los proyectos de innovación e incluso fases previas al lanzamiento de productos al mercado, donde es posible que la financiación tenga como destino actividades de investigación y desarrollo. En este panorama, el apoyo financiero se orienta a fomentar la cooperación con actores de carácter científico, como universidades, centros de investigación, parques tecnológicos etc. (Vega Jurado, Manjarrés Henríquez, Castro Martínez, & Fernández de Lucio, 2011).

> *H1: El rol de los intermediarios de financiamiento favorece la cooperación de las empresas con actores orientados al desarrollo de actividades de I+D y la transferencia tecnológica.*

Intermediarios de Concertación

Los intermediarios de concertación apoyan la creación de redes y el enlace entre una gran variedad de actores dentro de un sistema de carácter regional o sectorial. La función del intermediario se destaca en torno a la generación de posibles conexiones entre diferentes actores e incluso personas dentro de un ecosistema de innovación (Agogué et al., 2017).

Uno de los aspectos que se destaca en la literatura como factor clave para el establecimiento de acuerdos de cooperación es grado de confianza existente entre los diferentes actores del sistema (Cantner et al., 2011). Tal confianza se puede llegar a generar a partir de espacios de concertación previos, donde los posibles socios pueden llegar a interactuar, intercambiando información y generando lazos importantes, antes de iniciar procesos de cooperación.

Tal proceso de concertación y de generación de lazos de confianza es mucho más relevante cuando la cooperación se orienta: 1) al relacionamiento con actores que fortalezcan los procesos internos, a través de actividades de consultoría, 2) la adquisición de activos específicos, 3) al desarrollo de actividades que por su naturaleza comprometen el core de la empresa, o son susceptibles al comportamiento oportunista de un tercero. Ejemplo de lo anterior, son el desarrollo de actividades de I+D, o la transferencia tecnológica, donde se necesitan vínculos de confianza previos para que la cooperación misma sea dinámica y se facilite el proceso de negociación. A diferencia de otros procesos como la adquisición de maquinaria y equipo donde, en términos generales, el relacionamiento puede regularse fácilmente a través de transacciones de mercado y las salvaguardas que los contratos ofrecen en este sentido.

> *H2: Los intermediarios de concertación favorecen los procesos de cooperación orientados a la I+D, transferencia tecnológica y consultoría.*

Intermediarios De Regulación

La función de este tipo de actores es fortalecer el sistema estipulando condiciones o parámetros adecuados en las que deben gestarse cierto tipo de procesos tales como: certificaciones de funcionamiento y operación, aspectos relacionados con la propiedad industrial y derechos de autor (Bardhan, Demirkan, Kannan, Kauffman, & Sougstad, 2010; Lichtenthaler, 2013).

La literatura resalta que en la medida en que la empresa apuesta por mejores procesos de innovación, su sector puede llegar a demandar mayores estándares en función de calidad o certificaciones especiales según su sector, de tal forma que el relacionamiento con intermediarios de regulación puede llegar a tener algún tipo de importancia como una orientación de los procesos de cooperación. De la misma manera los intermediarios de regulación pueden llegar a tener un papel importante en procesos de protección de la propiedad industrial, por lo que la articulación con este tipo de actores puede llegar a fomentar procesos de cooperación orientados al desarrollo de actividades de I+D.

> *H3: Los intermediarios de regulación favorecen los procesos de cooperación enfocados especialmente a actividades dirigidas a la adquisición de maquinaria y equipo e I+D.*

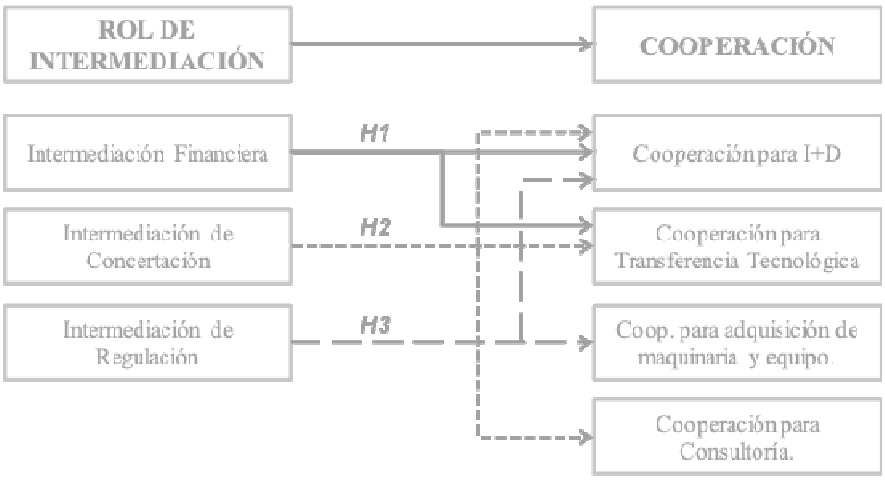

Ilustración 1: Hipótesis de la investigación.

Fuente: Elaboración de los autores.

Descripción del estudio Empírico

Los datos se obtuvieron de la 8va Encuesta de Desarrollo e Innovación Tecnológica (EDIT) aplicada a empresas de la industria manufacturera y recopilada por el Departamento Administrativo Nacional de Estadística (DANE) en Colombia para el período 2015-2016 (Dirección de Metodología y Producción Estadística - DIMPE 2018). El objetivo principal de la encuesta es explorar los factores que influyen en el comportamiento innovador de las empresas, es decir, las estrategias, los incentivos y las barreras a la innovación, el alcance de las diversas actividades de innovación y examinar los resultados y los efectos de la innovación. El método para recopilar datos fue un censo; se incluyeron todas las empresas que cumplen con los criterios de selección determinados por el DANE.

La base de datos de la encuesta presenta información de 7947 empresas, sin embargo, las preguntas relacionadas con la cooperación para innovar, así como el relacionamiento con actores intermediarios son respondidas únicamente por las empresas orientadas a la innovación, es decir, aquellas que realizan esfuerzos para el desarrollo de actividades de ciencia, tecnología e innovación. Lo anterior conlleva a que se disponga para el análisis solamente de 2007 registros válidos, conformados por la submuestra de empresas orientadas a la innovación. Esta selección puede generar un posible sesgo en el análisis, por lo que se hace necesario aplicar un procedimiento que permita controlar este aspecto (Heckman, 1990)

Debido a que las variables dependientes se calcularon teniendo en cuenta si la empresa ha cooperado o no con actores externos en el marco de distintos objetivos (variables dicotómicas), los modelos de selección lineal de Heckman no son adecuados para ajustarse a los datos debido a violaciones de supuestos tales como la continua variable dependiente normal y distribución de errores (J. Heckman, 1990; J. J. Heckman, 1976; Wyszynski & Marra, 2018). Bajo este escenario, los modelos de selección de *muestra de cópula* semiparamétrica son opciones para lidiar con estas restricciones teóricas. El *modelo de cópula* permite una gran flexibilidad al especificar las distribuciones conjuntas y marginales de las ecuaciones de selección y resultado, y tiene la propiedad de mantener la consistencia de los estimadores, incluso a la hora de eliminar las suposiciones distributivas. Los modelos de selección de muestras semiparamétricas utilizan técnicas de máxima verosimilitud para la estimación simultánea de todos los parámetros del modelo, asegurando estimadores consistentes,

eficientes y asintóticamente normales (Marra & Wyszynski, 2016; Wojty's, Marra, & Radice, 2016; Wyszynski & Marra, 2018)**.**

Como los modelos de selección de muestras semiparamétricas utilizan técnicas de cópula para determinar la asociación entre las ecuaciones de selección y resultado, se incluye una estimación de parámetro θ en la función de cópula para medir la dependencia entre las dos funciones de distribución acumulativa marginal. A pesar del hecho de que θ no se puede interpretar directamente, se puede transformar en el rango de τ de Kendall en el intervalo [-1, 1] produciendo una interpretación general para todas las cópulas. En la investigación presentada, las familias de cópulas implementadas en modelos de ajuste fueron normales, Joe y Ali-Mikhail-Haq (AMH). Las pruebas de selección de modelos se realizaron con los criterios de información de Akaike y Bayesian para comparar entre modelos, y las pruebas de Vuong y Clarke para comparar dos modelos de la competencia, es decir, sobre la elección de la cópula. El ajuste y la prueba del modelo se realizaron en R (R Core Team 2019) con el paquete SemiParSampleSel (Marra & Wyszynski, 2016; Wojty's et al., 2016; Wyszynski & Marra, 2018)**.**

La variable dependiente de cooperación, es abordada en la encuesta a partir de ocho variables dicotómicas (SI/NO) y reflejan diferentes objetivos de cooperación, de los cuales se analizarán aquellos que en la literatura reflejan un mayor grado de profundidad, por lo que en este trabajo solo se abordan: la cooperación para investigación y desarrollo (COOPID), cooperación para adquisición de maquinaria y equipo (COOPMAQ), cooperación para consultoría (COOPCONS), y cooperación para transferencia tecnológica (COOPTTEC).

Tabla 1: Listado de variables

DEPENDIENTE (COOPERACIÓN)		
Variable	**Descripción**	**Valores**
COOPRD	Cooperación para investigación y desarrollo	SI=1; NO=0
COOPMAC	Cooperación para adquisición de maquinaria y equipo.	SI=1; NO=0
COOPTTEC	Cooperación para Transferencia Tecnológica	SI=1; NO=0
COOPCONS	Cooperación para Consultoría	SI=1; NO=0
INDEPENDIENTE (INTERMEDIACIÓN)		
Variable	**Descripción**	**Valores**
INTFIN	Relación con intermediarios de financiamiento	SI=1; NO=0
INTREG	Relación con intermediarios de regulación	SI=1; NO=0
INTCON	Relación con intermediarios de concertación	SI=1; NO=0
CONTROL		
Variable	**Descripción**	**Valores**
PERPROCTI A	Porcentaje del personal dedicado a ACTI	%
INTRD	Intensidad en I+D	Ordinal
IMPRD	Importancia del Departamento interno de I + D	SI=1; NO=0
IMPPROD	Importancia del Departamento de producción	SI=1; NO=0
IMPSAL	Importancia del Departamento de ventas y mercadeo	SI=1; NO=0
SECT	Sector económico	Baja; Media-Baja; Media-alta; Alta
SIZELOG2	Tamaño: Total personal ocupado promedio (Cantidad de Empleados)	Logaritmo natural

Fuente: Elaboración de los autores.

Con respecto a la variable independiente de intermediación, la encuesta aborda la relación de las empresas con actores específicos, por lo cual se han construido las variables de Intermediarios de financiación (INTFIN), a partir de la agrupación de aquellos actores que son los encargados de implementar políticas o programas públicos de fomento a la innovación y que son reconocidos en el sistema principalmente por ser fuente de financiamiento para el desarrollo de proyectos de innovación , tales actores son: COLCIENCIAS, SENA, Ministerios, PROEXPORT – PROCOLOMBIA, BANCOLDEX y Cámaras de Comercio, los cuales reflejan un Cronbach's Alpha de 0,700; la variable intermediación de regulación (INTREG) está compuesta por actores que cumplen el rol de regulación de aspectos como la propiedad industrial y derechos de autor, entre otros, dichos actores son: la Superintendencia de Industria y Comercio SIC, ICONTEC y la Dirección nacional de derechos de autor, cuyo Cronbach's Alpha es de 0,530. Finalmente, para los intermediarios de concertación (INTCONS) se han agrupado actores que, por su naturaleza, fortalecen las actividades del sistema a partir de la generación de espacios de concertación y dialogo de cara al desarrollo de acuerdos de cooperación y la generación de aportes importantes para el desarrollo de políticas públicas, esta categoría está compuesta por: Centros Regionales de Productividad, Consejos Departamentales de Ciencia y Tecnología (CODECyT) y Comisiones Regionales de Competitividad presentan un Cronbach's Alpha es de 0,637.

Como variables de control se han trabajado la Intensidad en Investigación y Desarrollo (INTRD), la importancia percibida en los departamentos de I+D (IMPID), producción (IMPPROD) y ventas y mercadeo (IMPVEN), adicionalmente se abordan otras variables como: el tamaño, expresado como el logaritmo natural del número de empleados (SIZELOG2); el porcentaje del personal vinculado a actividades de ciencia, tecnología e innovación (PREPROCTIA) y la variable sector, que será analizada a partir de la distribución de los registros de actividad económica de las empresas encuestadas, según la clasificación sectorial de la Organización para la Cooperación y el Desarrollo Económicos (OCDE) que está conformado por: baja tecnología, baja y media tecnología, media y alta tecnología y alta tecnología.

En este sentido, la especificación del modelo econométrico es el siguiente:

$$COOP_i = INTFIN + INTREG + INTCON + INTRD + IMPRD + IMPPROD + IMPSAL + PERPROCTIA + SECT + SIZELOG2$$

Donde i = COOPID, COOPMAQ, COOPTTEC, COOPCONS

Resultados

La tabla 2 presenta los resultados del modelo de regresión. De forma general, los resultados muestran que el uso de intermediarios favorece los procesos de cooperación entre empresas y otros actores del sistema, lo cual es coherente con lo señalado previamente en la literatura. En el contexto analizado los intermediarios están cumpliendo con su rol de fomentar el desarrollo de acuerdos de cooperación entre las empresas y diferentes tipos de actores.

El análisis también refleja que los diferentes tipos de intermediarios ejercen un efecto distinto en función de los objetivos perseguidos en los procesos de cooperación.

En relación a la variable de intermediación de financiación, se encuentra que su importancia para el sistema es fundamental. El efecto positivo que tiene este tipo de intermediación sobre los acuerdos de cooperación orientados a objetivos como: I+D, transferencia tecnológica, consultoría, e incluso adquisición de maquinaria y equipo, es significativa. Por lo tanto, se respalda la hipótesis 1.

Con respecto a la variable de intermediación de concertación, se demuestra que existe un impacto positivo sobre los diferentes tipos de orientación de la cooperación, siendo significativos al 0.01%

sobre la cooperación orientada a la I+D, consultoría y transferencia tecnológica, Por lo tanto, se respalda la hipótesis 2.

Tabla 2: Influencia de los tipos de intermediación sobre objetivos de cooperación

	COOPID	COOPMAQ	COOPCONS	COOPTTEC
(Intercept)	-1.76347	-6.67968	-2.92648	-4.90309
	(0.04982)*	(< 2e-16)***	(0.011664)*	(0.00428)**
INTFIN	0.86778	0.44716	0.97372	1.12852
	(1.41e-09)***	(0.001814)**	(7.3e-10)***	(2.41e-06)**
INTREG	0.33475	0.55243	0.58806	0.31676
	(0.01295)*	(0.000189)***	(0.000131)***	(0.09068).
INTCON	0.76216	0.49574	0.82697	0.95027
	(0.00255)**	(0.020159)*	(0.002460)**	(0.00106)**
INTID	2.86144	4.07335	5.32716	2.67443
	(0.13452)	(0.144400)	(0.056740).	(0.27851)
IMPRD	0.85721	0.27607	0.53077	0.57370
	(2.82e-08)***	(0.049809)*	(0.000280)***	(0.00312)**
IMPPROD	0.32737	0.84208	0.27261	0.65315
	(0.02865)*	(5.5e-05)***	(0.100085)	(0.02451)*
IMPSAL	0.54058	0.29433	0.49703	0.68923
	(0.00023)***	(0.052407).	(0.001759)**	(0.00570)**
PERPROCTIA	0.23170	0.52797	0.47930	0.47415
	(0.15684)	(0.002175)**	(0.010729)*	(0.07891).
INTSEC1	0.23170	-0.17256	0.28758	-0.09329
	(0.01573)*	(0.275092)	(0.057717).	(0.67365)
INTSEC2	0.27875	-0.02341	0.46587	0.39283
	(0.04805)*	(0.884026)	(0.005277)**	(0.06063).
INTSEC3	-0.16407	-0.11530	-0.16346	0.14157
	(0.52795)	(0.729239)	(0.589352)	(0.70269)
TAMLOG2	-0.02514	0.46263	0.06093	0.15158
	(0.75885)	(< 2e-16)***	(0.574067)	(0.31096)
-2LL	9954.418	10115.58	10171.86	9606.094
Theta	-0.697	63.644	-0.348	-0.224
Tau	-0.4913419	0.9691955	-0.22647	-0.1439885

Fuente: Análisis de los autores
*Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1*

Finalmente, la variable de intermediación de regulación refleja al igual que las otras variables independientes tener un impacto positivo sobre los objetivos a los cuales se orienta la cooperación, siendo los más significativos la consultoría y adquisición de maquinaria y equipo. De esta forma al no existir una relación significativa entre las variables de intermediación de regulación y el objetivo de I+D, y al sí existir una relación significativa entre las variables de intermediación de regulación y la adquisición de maquinaria y equipo, se respalda parcialmente la hipótesis 3.

Al observar las variables de control, se puede encontrar que la intensidad tecnológica del sector tiene efecto significativo sobre cooperación para I+D y consultoría; para el cálculo de dichos resultados se utilizó la variable de empresas de alta tecnología como variable de referencia. Sin embargo, los datos sugieren una posible relación de u invertida, que refleja que en la medida en que la intensidad tecnológica va aumentando, es más probable que se fomenten acuerdos de cooperación, pero en casos donde la intensidad tecnológica es muy alta comparado con las empresas de baja tecnología, no hay una diferencia significativa dado a que estas empresas tienen tantas capacidades internas, que no necesitan buscar tantos acuerdos de cooperación. Lo cual representa una posible explicación, que requerirá mayor análisis y que puede representar una oportunidad para profundizar de manera empírica en este foco de investigación.

Con respecto a otras de las variables de control, específicamente las que tienen que ver con la importancia que la empresa atribuye a sus diferentes departamentos como fuentes de ideas para la innovación como: investigación y desarrollo, producción, ventas y mercadeo; esta variable relaciona de cierta forma el perfil innovador de la empresa en términos del origen de sus actividades de innovación. Los hallazgos reflejan que aquellas empresas que perciben mayor importancia en fuentes internas para innovar como el departamento de I+D, se encuentran más orientados a una cooperación para I+D y consultoría, e incluso de transferencia tecnológica que refleja una significancia al 0.01%. Mientras que aquellas empresas que perciben mayor importancia en el departamento producción, reflejan una cooperación más enfocada en la compra de maquinaria y equipos, lo que posiblemente se puede atribuir a la intención de una empresa por mejorar sus procesos de producción a partir del uso de equipos y maquinaria cada vez más avanzados o de mayor capacidad de producción.

Discusión y Conclusiones

El primer hallazgo general, es que en función de la naturaleza o del rol principal de los actores intermediarios, existe un efecto positivo, pero al mismo tiempo distinto, sobre las diferentes orientaciones de cooperación.

En primer lugar, los resultados han permitido respaldar la hipótesis 1 y 2, que tienen que ver con el impacto positivo de los intermediarios de financiamiento sobre la cooperación orientados al desarrollo de actividades de I+D y la transferencia tecnológica; y el impacto positivo que los intermediarios de concertación sobre los procesos de cooperación orientados a la I+D , la transferencia tecnológica y consultoría. Por otro lado, se ha respaldado parcialmente la hipótesis 3 que expresaba un impacto positivo de los intermediarios de regulación sobre la cooperación enfocada a la I+D y la adquisición de maquinaria y equipo, sobre la cual solo se consiguió demostrar el impacto mencionado sobre la adquisición de maquinaria y equipo, pero no sobre la I+D.

Limitaciones Y Oportunidades Para Futuras Investigaciones

Este estudio representa una aproximación basado en la función o rol de los intermediarios, en este punto se han asociado cierto tipo de actores del sistema de innovación con su rol principal dentro del sistema de innovación (financiación, regulación y concertación), sin embargo, en algunos casos existen actores que pueden llegar a cumplir una o más funciones dentro del sistema y por lo tanto resultaría difícil ahondar en detalle realmente el tipo de interacción que se generó entre un intermediario específico y cada una de las empresas que suministraron información en la EDIT. En este sentido, el análisis de los actores agrupados por su rol principal y respaldado por el Alpha de Cronbach, representa una solución interesante que proporciona un elemento a fortalecer en futuras investigaciones.

La Encuesta de Desarrollo e Innovación Tecnológica (EDIT) en su mayoría es diligenciada mayormente por empresas manufactureras que desarrollaron procesos de I+D por lo que el análisis de las variables de este estudio se puede fortalecer a partir del desarrollo de una encuesta ad-hoc que desarrolle a mayor profundidad los análisis descritos en esta investigación, sin embargo, el uso de las copulas ha sido fundamental para poder llegar a generar los resultados ya proporcionados.

Es importante resaltar la importancia de profundizar aún más sobre el rol de los intermediarios, dado que la revisión de la literatura desarrollada para esta investigación refleja aún debilidades en la forma de categorizar dichos roles, dicha circunstancia parte del mismo concepto de intermediación que actualmente es concebido de diferentes formas, y que por lo tanto incide en la forma en la que se orientan las diferentes clasificaciones que actualmente existen en la literatura. En este sentido se identifican claramente dos enfoques, uno donde se perciben a los intermediarios como organizaciones de enlace entre otras organizaciones del sistema, y otro donde los intermediarios aparte de cumplir con dicho rol, también pueden cumplir con un rol de cooperación directa en términos de cooperación o en calidad de proveedores directos.

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The Macroeconomic Stabilisation Pentagon as An Indicator of The Competitiveness of The Country. A New Approach to Comparative Analysis

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Abstract

The main goal of this article is to assess which of the surveyed countries is the most competitive. The authors employ an innovative method similar to the Macroeconomic Stabilisation Pentagon (MSP). Analysis of basic macroeconomic indicators as sources of competitive countries can create an alternative to the existing assessment index for economies. Macroeconomic stability is reflected in five indicators: economic growth rate, unemployment rate, inflation rate, budget balance relationship to gross domestic product (GDP), and the relationship between current account balances and GDP. Such an analysis can supplement current studies, which use the method of MSP exclusively for countries undergoing transformation. In this case, the 'magic' pentagon will be applied to countries that reside at the top in terms of competitiveness rankings.

Keywords: Competitiveness, Comparative Studies Of Particular Economies, Macroeconomic Stabilisation Pentagon

Introduction

Competitiveness is one of the most important economic problems. In the literature, *competitiveness* initially referred to the microeconomic level and the performance of enterprises. However, the focus on competitiveness has not just been a microeconomic phenomenon. Today, economic literature studies competitiveness at the enterprise, regional, and country levels. *International competitiveness* denotes a complex phenomenon and is defined in various ways. It is both a relative and subjective concept (Dobrzanski 2018).

Definitions of *competitiveness* can be divided into two main groups. The first relates to the country's place in the global economy and the results achieved in foreign trade. In this case, *competitiveness* is defined as the ability to maintain and even increase market share (e.g. Dollar and Wolff 1993; Hatsopoulos et al. 1988). The second group of definitions places a much stronger emphasis on the overall or staple results achieved by the national economy (e.g. Fagerberg 1988, Porter 1990, Landau 1992, Tung 2008, Porter 2008).

Two global reports serve to assess international competitiveness. First of them, Global Competitiveness Report, published by the World Economic Forum (WEF) defines competitiveness as "the set of institutions, policies, and factors that determine the level of productivity of a country. The level of productivity, in turn, sets the sustainable level of prosperity that can be earned by an economy" (Schwab 2009). Second, World Competitiveness Yearbook, published by the International Institute for

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Management Development's (IMD) defines competitiveness of nations as a "field of economic theory, which analyses the fact and policies that shape the ability of a nation to create and maintain an environment that sustains more value creation for its enterprises and more prosperity for its people" (Garelli 2005). Both reports indicate a huge role in improving the competitiveness of factors such as stable macroeconomic situation and the effectiveness of the state.

There is no single, generally accepted definition of *international competitiveness*. It is a dynamic, multi-faceted, and multi-dimensional category. Creating stable economic foundations is the basis for increasing competitiveness. Therefore, in further analysis, the authors define *competitiveness* as a country's ability to maintain a stable macroeconomic position. The main goal of this article is to assess which of the surveyed countries is the most competitive.

In literature there are several studies regarding MSP is applied mainly to transition economies (Misala and Bukowski 2003, Matkowski 2005, Gotz 2011, Zuchowska, 2013). In this article authors propose a new approach to comparative analysis using an innovative method similar to the Macroeconomic Stabilisation Pentagon (MSP).

MSP as an alternative measure of competitiveness

The Macroeconomic Stabilisation Pentagon (MSP) concept was popularised by Kolodko (1993). Macroeconomic stabilisation manifests itself in the following five characteristics, which secure its sustainability: gross domestic product (GDP) growth rate, unemployment rate, inflation, budget balance as a percentage of GDP, and current account as a percentage of GDP. MSP consists of five triangles. The area of the first, triangle a, called the real sphere triangle, is delimited by appropriate parameters expressing the rate of change in the real product and unemployment. The area of triangle b, which can be defined as the shortageflation (or slumpflation) triangle, is delimited by the unemployment rate and the dynamics of inflation. The area of triangle c, the budget and inflation triangle, results from the dynamics of inflation and the budget balance. The size of triangle d (financial equilibrium triangle) depends on the amount of the budget and current account balances. Finally, the area of triangle e, called the external sector triangle, is defined by the variability of the current account balance and the dynamics of the global product (Kolodko 1993).

Figure 1 depicts the GDP growth rate in Poland from 1991 to 2015.

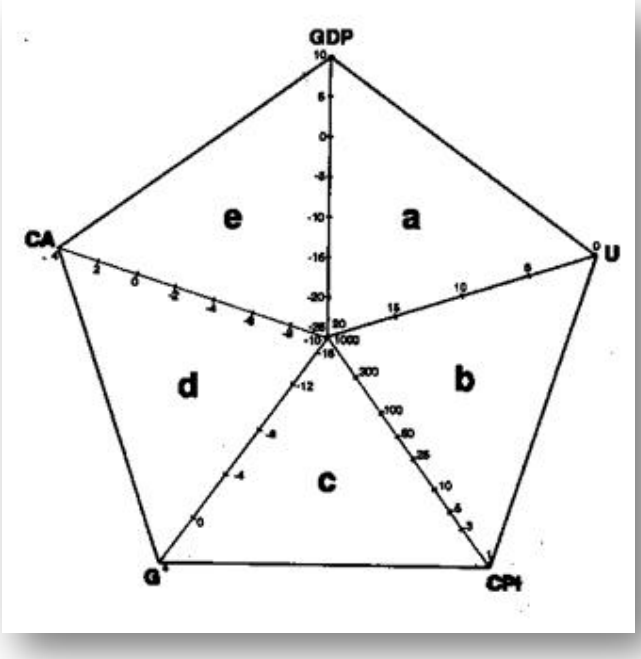

Fig. 1: GDP growth rate in Poland (1991-2015)
Note: GDP – economic growth rate
U – unemployment rate
CPI – inflation rate (consumer price index)
G – relation of the budget balance to the gross domestic product
CA – relation of the current account balance to the gross domestic product
Source: (Kolodko 1993).

Theoretically, a country whose results were at the vertices of the MSP pentagon would have achieved full macroeconomic stabilisation. In fact, this situation is practically impossible to achieve. According to the MSP idea, the area of the pentagon would then be equal to one (MSP = 1 = 5x0.2). The total area of a pentagon can be determined by the following formula:

$$PSM = [(\Delta GDPxU) + (UxCPI) + (CPIxG) + (GxCA) + (CAx\Delta GDP)]xK,$$
$$where\ K = \frac{1}{2} sin72° \cong 0{,}475$$

The tops of the MSP are scaled such that the further away from the centre a specific point is, the better the macroeconomic situation of the country is. In the case of the axis of unemployment and inflation, the scale is decreasing because these variables are destimulants. The MSP method evaluates the area of the resulting pentagon: the larger the area is, the more favourable the macroeconomic stabilisation is.

The indicators in the MSP model are closely linked to one another. Changing the value of one of the adopted parameters leads to a change in the surface area of the two adjacent triangles. The MSP model allows for isolating internal (msp1) and external (msp2) factors. The msp1 field stands for macroeconomic stabilisation that mainly depends on internal factors. This field includes the sum of the fields of the triangles a, b, and c. Conversely, the msp2 field indicates a stabilisation situation that depends primarily on external factors. This field includes the fields of the triangles d and e. This

analysis provides the opportunity to show the progressing stabilisation or the deepening destabilisation of the country.

When conducting the analysis based on MSP, it is worth paying attention to the fact that the data received are not real. The maximum nominal field area limited by GDP and U is $(\Delta GDPxU)xK = 0{,}2$, while the real surface of triangle a can be $[(\Delta GDP^r xU^r)xK]/n$, where ΔGDP^r means the real value of the growth rate in a given year and the registered unemployment rate in a given year, and n = 5 is the number of triangles in the pentagon. This implies the need for great caution when interpreting the results. In addition, the model does not assume the existence of surpluses of unrealised production and non-marketable inventories.

Competitiveness in Accordance with The MSP Method – Empirical Analysis

The stabilisation pentagon model was used to analyse three highly developed economies: the United States, Japan, and Germany. The research period covers the years from 2000 to 2012. Research period was chosen before, during and after subprime crisis, which give information how economy is handling in different business cycle phases . Data from the International Monetary Fund (IMF) were used for the analysis.

The MSP method, as presented by Kolodko, examined countries undergoing systemic transformation. The study presented in this paper covers the most developed economies of the world. Therefore, it was necessary to introduce significant changes to the model. The research conducted by Kolodko concerned countries where hyperinflation was common. To simplify the large fluctuations in inflation, Kolodko used a logarithmic scale. In the analysis of three highly developed economies, the inflation rate is below 5%, and its changes in the analysed period are small; thus, symmetrical data axes were introduced in this study, in which the logarithmic scale on the inflation axis was abandoned. In addition, the vertices of the pentagon were scaled from -14 to 14%. This scale was chosen based on the minimum and maximum values of the indicators achieved by the analysed countries. Thanks to the introduction of the same scale, it was possible to compare three countries at the same time. Many analyses are based on a scale that is determined by the minimum and maximum values of the indicators in a given country. In the analysed case, this concept would not be correct, because in each country there are different minimum and maximum values of indicators, thus the fields of the triangles and the pentagon would be incomparable. The proposed method is innovative, as it enables comparison of many developed countries at the same time. In addition, the introduction of symmetrical axes allows for visually determining which of the pentagons is larger (better). In the original form of the MSP pentagon, the calculation of the triangle area is difficult due to the logarithmic scale for the inflation index and various quantities that are scaled in the pentagon. Under the adopted assumptions, the unemployment rate is scaled in the negative (-14; 0) and positive (0; 14) ranges. Since there is no negative unemployment rate in the economy, there are two 'blind spots' in triangles a and b on the pentagon presented here. However, this fact does not hinder the analysis; indeed, it even facilitates visual assessment of the economic situation.

The U.S. economy was analysed first.

United States

Table 1 presents the basic U.S. economic development indicators for the period from 2000 to 2012.

Table 1: Basic U.S. economic development indicators for the period from 2000 to 2012 (%)

Year	GDP growth rate	Unemployment rate	Inflation	Budget balance	Current account
2000	4.091	3.967	3.367	1.485	-4.046
2001	0.949	4.742	2.817	-0.521	-3.733
2002	1.776	5.783	1.596	-3.765	-4.169
2003	2.791	5.992	2.298	-4.730	-4.505
2004	3.798	5.542	2.668	-4.240	-5.126
2005	3.351	5.083	3.366	-3.077	-5.649
2006	2.667	4.608	3.222	-1.969	-5.762
2007	1.790	4.617	2.871	-2.659	-4.927
2008	-0.291	5.800	3.815	-6.496	-4.629
2009	-2.802	9.283	-0.320	-12.930	-2.647
2010	2.507	9.625	1.640	-10.796	-3.005
2011	1.847	8.925	3.141	-9.746	-2.947
2012	2.779	8.075	2.076	-8.340	-2.711

Source: The authors' own study based on data from the IMF.

It can be seen that in the first decade of the 21st century, U.S. GDP growth was weakened by two crises. The first occurred in 2000 and was caused by the bursting of the 'speculative bubble' on the investment market. A significant drop in GDP from 4.1% to 0.9% can be observed. Another crisis that shook the U.S. economy was the so-called subprime crisis, where the GDP fell from 1.79% in 2007 to -0.29% in 2008. The recession was also felt in 2009, as evidenced by a decline in GDP to -2.8%. The situation on the labour market deteriorated because unemployment rose steadily from 3.97% in 2000 to 8.1% in 2012. The opposite situation can be seen in the case of inflation and budget balance. The rate of change in the general price level dropped to 2.1% in 2012, whereas the inflation rate in 2000 was 3.4%. During this period, the sustainable balance of public finances improved. In terms of shaping the current account balance, the situation deteriorated as a widening deficit emerged.

Table 2 presents the values and relative importance of U.S. macroeconomic stabilisation indicators in the period from 2000 to 2012.

Table 2: Values and relative importance of U.S. macroeconomic stabilisation indicators in the period from 2000 to 2012

Specification of indicators										
Year	a	b	c	a+b+c = msp 1	d	e	d+e = msp 2	msp 1+ msp 2	msp 1/(msp 1+msp 2)	msp 2/(msp 1+msp 2)
2000	0.0463	0.0272	0.0420	0.1155	0.0393	0.0459	0.0853	0.2008	0.5754	0.4246
2001	0.0353	0.0264	0.0385	0.1002	0.0353	0.0392	0.0745	0.1746	0.5736	0.4264
2002	0.0331	0.0260	0.0324	0.0915	0.0257	0.0396	0.0652	0.1567	0.5837	0.4163

2003	0.0343	0.0239	0.0277	0.0859	0.0225	0.0407	0.0631	0.1490	0.5764	0.4236
2004	0.0384	0.0245	0.0282	0.0911	0.0221	0.0403	0.0624	0.1535	0.5935	0.4065
2005	0.0395	0.0242	0.0296	0.0933	0.0233	0.0370	0.0602	0.1535	0.6077	0.3923
2006	0.0399	0.0258	0.0331	0.0988	0.0253	0.0350	0.0603	0.1591	0.6210	0.3790
2007	0.0378	0.0266	0.0322	0.0966	0.0262	0.0365	0.0628	0.1594	0.6061	0.3939
2008	0.0287	0.0213	0.0195	0.0695	0.0179	0.0328	0.0507	0.1202	0.5781	0.4219
2009	0.0135	0.0172	0.0039	0.0346	0.0031	0.0324	0.0355	0.0701	0.4935	0.5065
2010	0.0184	0.0138	0.0101	0.0423	0.0090	0.0463	0.0553	0.0976	0.4336	0.5664
2011	0.0205	0.0141	0.0118	0.0464	0.0120	0.0447	0.0567	0.1030	0.4499	0.5501
2012	0.0254	0.0180	0.0172	0.0606	0.0163	0.0483	0.0646	0.1252	0.4839	0.5161

Source: The authors' own calculations based on data from Table 1.

Calculations of the pentagon were done on the basis of the data contained in Table 1. The obtained results confirmed the deteriorating economic situation in the United States from 2000 to 2012. The fields of the five triangles, a, b, c, d, and e, in 2000 were 0.0463, 0.0272, 0.0420, 0.0393, and 0.0459, respectively, whereas the fields of the five triangles in 2012 were 0.0253, 0.0180, 0.0172, 0.0162, and 0.0483, respectively. Remembering the interpretation according to which the larger the areas of the triangles are, the better the situation in the country is, it can be stated that in the case of the United States, the situation in fields a, b, c, and d worsened from 2000 to 2012, while the situation in field e slightly improved.

Figure 2 illustrates the MSP in the United States in 2000 and 2012.

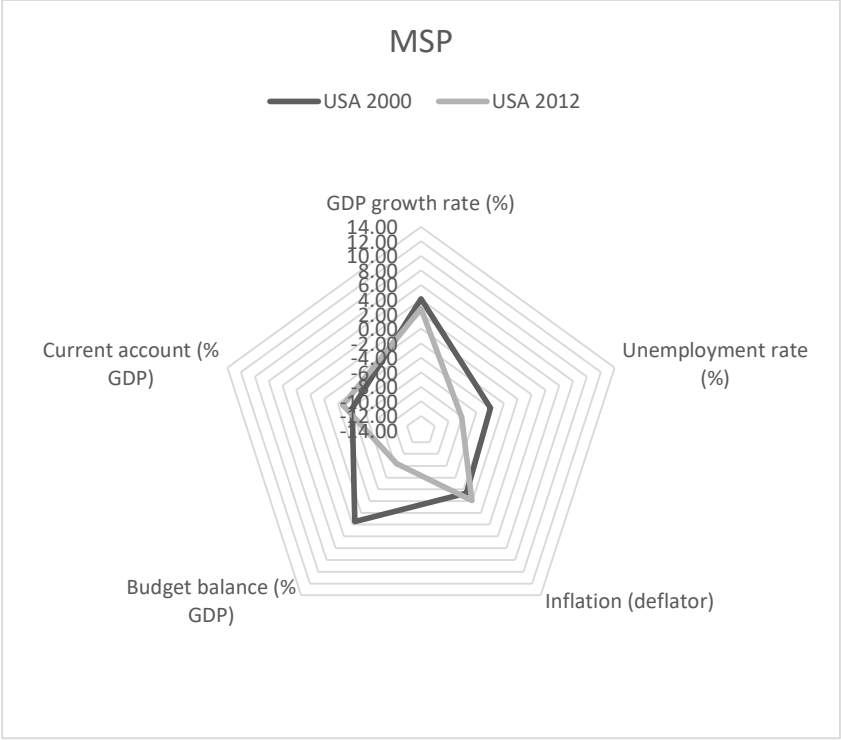

Fig. 2: The MSP in the United States in 2000 and 2012.

Source: The authors' own study based on the data from Table 2.

Figure 2 and Table 2 indicate that from 2000 to 2003, there was a notable decrease in the values in the fields a, b, c, d, and e. The decrease in the values in these fields implies a decrease in the values in the fields msp1 (internal sphere) and msp2 (external sphere), which in turn causes the entire MSP field to drop. The highest value of the MSP indicator was recorded in 2000 and amounted to 0.208. The lowest value was recorded in 2009 and amounted to 0.701. Currently, the United States is improving its competitive position, which is demonstrated by the value of the MSP index, which has been increasing every year. In 2012, it amounted to 0.152.

Japan

Table 3 presents the basic indicators of Japan's economic development in the period from 2000 to 2012.

Table 3: Basic indicators of Japan's economic development in the period from 2000 to 2012 (%)

Year	GDP growth rate	Unemployment rate	Inflation	Budget balance	Current account
2000	2.257	4.733	-0.651	-8.034	2.528
2001	0.355	5.042	-0.804	-6.039	2.110
2002	0.290	5.358	-0.900	-7.706	2.831
2003	1.685	5.242	-0.250	-7.787	3.166
2004	2.361	4.717	-0.010	-5.947	3.697
2005	1.303	4.425	-0.274	-4.814	3.634
2006	1.693	4.117	0.243	-3.650	3.924
2007	2.192	3.833	0.061	-2.088	4.869
2008	-1.042	3.983	1.378	-4.110	3.297
2009	-5.527	5.050	-1.342	-10.393	2.911
2010	4.652	5.050	-0.719	-9.303	3.713
2011	-0.585	4.575	-0.287	-9.943	2.023
2012	1.957	4.350	-0.038	-10.142	1.014

Source: The authors' own study based on data from the IMF.

Analysing the GDP growth rates, it can be seen that the Japanese economy is strongly dependent on the U.S. economy, achieving worse results in the same periods as the U.S. economy. This relationship is evinced in the low GDP growth rate in 2001 (0.36%) and the negative growth rate in 2008 and 2009, where decreases in the GDP growth rate can be observed. These were accompanied by budget imbalances and a widening deficit. The pace of changes in the general price level fluctuated at around 0, but deflation was often seen in the period under review. However, it is worth noting that despite the economic slowdown, the situation on the labour market in Japan was stable. The unemployment rate fell slightly and remained below 5% throughout. A similar situation can be seen in the case of the current account, which was positive. The values and relative importance of Japan's macroeconomic stabilisation indicators in the period from 2000 to 2012 are presented in Table 4.

Table 4: Values and relative importance of Japan's macroeconomic stabilisation indicators in the period from 2000 to 2012

Specification of indicators										
Year	a	b	c	a+b+c = msp 1	d	e	d+e = msp 2	msp 1+ msp 2	msp 1/(msp 1 + msp 2)	msp 2/(msp 1 + msp 2)
2000	0.0384	0.0346	0.0223	0.0954	0.0252	0.0685	0.0937	0.1891	0.5044	0.4956
2001	0.0328	0.0338	0.0301	0.0967	0.0327	0.0590	0.0917	0.1884	0.5132	0.4868
2002	0.0315	0.0328	0.0239	0.0883	0.0270	0.0614	0.0884	0.1767	0.4997	0.5003
2003	0.0350	0.0318	0.0226	0.0895	0.0272	0.0687	0.0959	0.1854	0.4827	0.5173
2004	0.0387	0.0332	0.0288	0.1007	0.0364	0.0739	0.1102	0.2109	0.4774	0.5226
2005	0.0374	0.0349	0.0334	0.1057	0.0413	0.0688	0.1102	0.2159	0.4896	0.5104
2006	0.0396	0.0347	0.0363	0.1106	0.0473	0.0718	0.1191	0.2297	0.4815	0.5185
2007	0.0420	0.0362	0.0424	0.1205	0.0573	0.0779	0.1353	0.2558	0.4711	0.5289
2008	0.0331	0.0323	0.0318	0.0972	0.0436	0.0572	0.1008	0.1980	0.4909	0.5091
2009	0.0193	0.0350	0.0141	0.0685	0.0156	0.0366	0.0521	0.1206	0.5679	0.4321
2010	0.0426	0.0336	0.0176	0.0938	0.0212	0.0843	0.1055	0.1993	0.4707	0.5293
2011	0.0323	0.0344	0.0148	0.0814	0.0166	0.0548	0.0714	0.1528	0.5326	0.4674
2012	0.0393	0.0346	0.0138	0.0877	0.0148	0.0611	0.0759	0.1635	0.5360	0.4640

Source: The authors' own calculations based on data from Table 3.

The slightly worsening macroeconomic situation in Japan can also be inferred from Table 4, in which it can be seen that the fields of the five triangles, a, b, c, d, and e, in 2000 were 0.0384, 0.0346, 0.0223, 0.0252, and 0.0685, respectively, whereas the fields of the five triangles in 2012 were 0.0393, 0.0346, 0.0138, 0.0148, and 0.0611, respectively. The situation in fields c, d, and e deteriorated during the period under review, while the situation in fields a and b slightly improved.

Figure 3 depicts the MSP in Japan in 2000 and 2012.

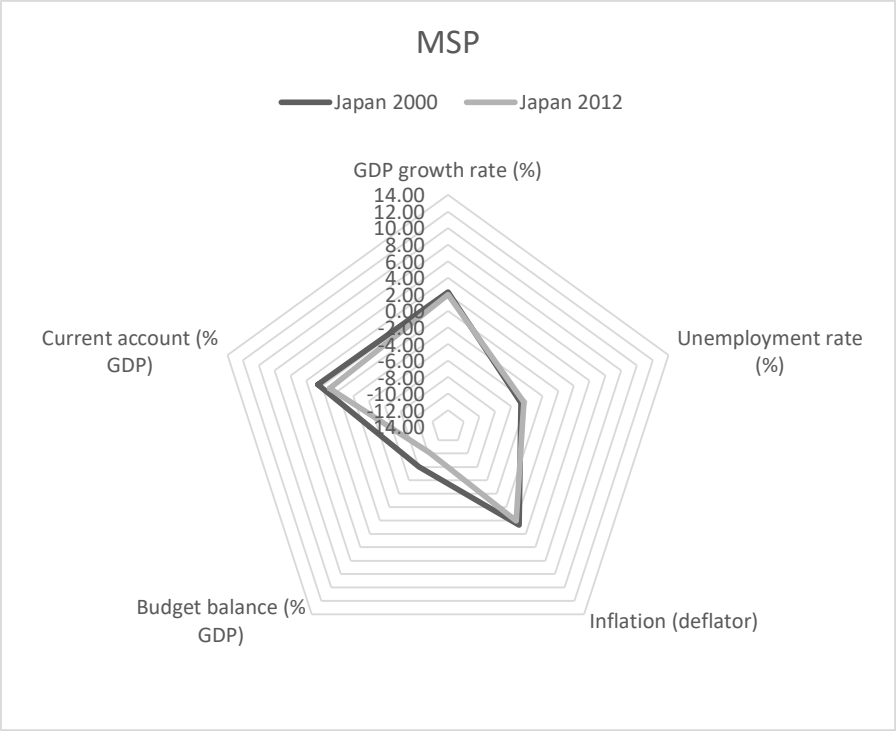

Fig. 3: The MSP in Japan in 2000 and 2012

Source: The authors' own study based on the data from Table 4.

In the years from 2000 to 2007, Japan systematically improved its economic results. One cannot speak of very large increases here, because the crisis of the 1990s continued to make itself felt. The positive GDP growth trend continued until the 2008 subprime crisis, which, although it started in the United States, also significantly affected the negative results of the Japanese economy. These changes can be observed by analysing the data from Table 4 and Figure 3. The most significant problem faced by the Japanese economy is the phenomenon of deflation, which has plagued it since 2000 (with several periods of very low inflation). In addition, the budget balance has been upset. In the years after the subprime crisis, Japan's budget deficit oscillates at around 10% of GDP. These relationships are visible in the drawings of the pentagons of macroeconomic stabilisation, where fields c and d reach much lower values than in previous years.

In the case of Japan, the highest value of the MSP index was recorded in 2007 and amounted to 0.256. The lowest value was recorded in 2009 and amounted to 0.121. Currently, Japan is improving its competitive position, as demonstrated in the value of the MSP index, which has been growing every year. In 2012, it amounted to 0.164.

Germany

Table 5 presents the basic indicators of Germany's economic development in the period from 2000 to 2012.

Table 5. Basic indicators of Germany's economic development in the period from 2000 to 2012 (%)

Year	GDP growth rate	Unemployment rate	Inflation	Budget balance	Current account
2000	3.298	8.000	1.400	1.137	-1.732
2001	1.638	7.883	1.904	-3.076	-0.001
2002	0.030	8.700	1.355	-3.846	2.001
2003	-0.387	9.783	1.031	-4.151	1.887
2004	0.694	10.517	1.790	-3.760	4.662
2005	0.846	11.208	1.920	-3.332	5.062
2006	3.886	10.192	1.784	-1.653	6.255
2007	3.389	8.783	2.276	0.228	7.450
2008	0.807	7.600	2.754	-0.074	6.210
2009	-5.085	7.742	0.234	-3.075	5.961
2010	3.857	7.058	1.150	-4.152	6.252
2011	3.399	5.950	2.482	-0.753	6.176
2012	0.896	5.467	2.137	0.139	6.954

Source: The authors' own study based on data from the IMF.

In the first decade of the 21st century, large economic fluctuations in Germany can be observed. The GDP growth rate in 2000 was 3.3%, but in subsequent years, until 2005, it was falling and was within the range of -0.39% to 1.64%. It is also worth noting that the worse results in terms of the GDP growth rate up to 2005 contributed to the deterioration of the situation in the labour market in this period. The unemployment rate, which was 8% in 2000, increased until it reached a maximum value of 11.21% in 2006. It is worth noting, however, that subsequent years brought an improvement in the situation in the labour market, where a decreasing trend of the unemployment rate, which was only 5.46% in 2012, was observed. A fairly stable situation can be observed in the case of the public finance balance, which reached fairly stable values. The current account balance was also faring well, growing higher each year. A surplus in this account, which reached its highest value, amounting to approximately 7% of GDP, in 2012, can be seen every year from 2002 onwards. The pace of changes in the general price level remained at a similar level throughout the entire research period.

The values and relative importance of Germany's macroeconomic stabilisation indicators in the period from 2000 to 2012 are presented in Table 6.

Table 6: Values and relative importance of Germany's macroeconomic stabilisation indicators in the period from 2000 to 2012

Specification of indicators										
Year	a	b	c	a+b+c = msp 1	d	e	d+e = msp 2	msp 1+ msp 2	msp 1/(msp 1+msp 2)	msp 2/(msp 1+msp 2)
2000	0.0265	0.0193	0.0487	0.0944	0.0474	0.0541	0.1015	0.1959	0.4819	0.5181
2001	0.0244	0.0189	0.0337	0.0770	0.0390	0.0558	0.0949	0.1718	0.4480	0.5520
2002	0.0190	0.0171	0.0328	0.0688	0.0414	0.0573	0.0987	0.1675	0.4108	0.5892
2003	0.0146	0.0140	0.0326	0.0612	0.0399	0.0552	0.0951	0.1563	0.3915	0.6085
2004	0.0131	0.0108	0.0319	0.0558	0.0487	0.0700	0.1187	0.1745	0.3198	0.6802
2005	0.0106	0.0086	0.0329	0.0521	0.0519	0.0722	0.1241	0.1761	0.2956	0.7044
2006	0.0174	0.0119	0.0385	0.0677	0.0638	0.0924	0.1562	0.2239	0.3024	0.6976
2007	0.0231	0.0156	0.0426	0.0813	0.0779	0.0952	0.1730	0.2543	0.3197	0.6803
2008	0.0242	0.0184	0.0400	0.0825	0.0718	0.0763	0.1481	0.2306	0.3577	0.6423
2009	0.0142	0.0220	0.0384	0.0746	0.0556	0.0454	0.1010	0.1756	0.4247	0.5753
2010	0.0316	0.0228	0.0323	0.0867	0.0509	0.0923	0.1431	0.2298	0.3771	0.6229
2011	0.0357	0.0237	0.0389	0.0983	0.0682	0.0896	0.1577	0.2560	0.3839	0.6161
2012	0.0324	0.0258	0.0428	0.1010	0.0756	0.0796	0.1552	0.2562	0.3943	0.6057

Source: The authors' own calculations based on the data from Table 5.

The improving situation can also be inferred from Table 6, where it can be seen that the fields of the five triangles, a, b, c, d, and e, in 2000 were 0.0265, 0.0193, 0.0487, 0.0474, and 0.0558, respectively, whereas the fields of the five triangles in 2012 were 0.0324, 0.0258, 0.0428, 0.0756, and 0.0796, respectively. It can be stated that the situation in fields a, b, d, and e improved, while the situation in field c worsened.

Figure 4 illustrates the MSP in Germany in 2000 and 2012.

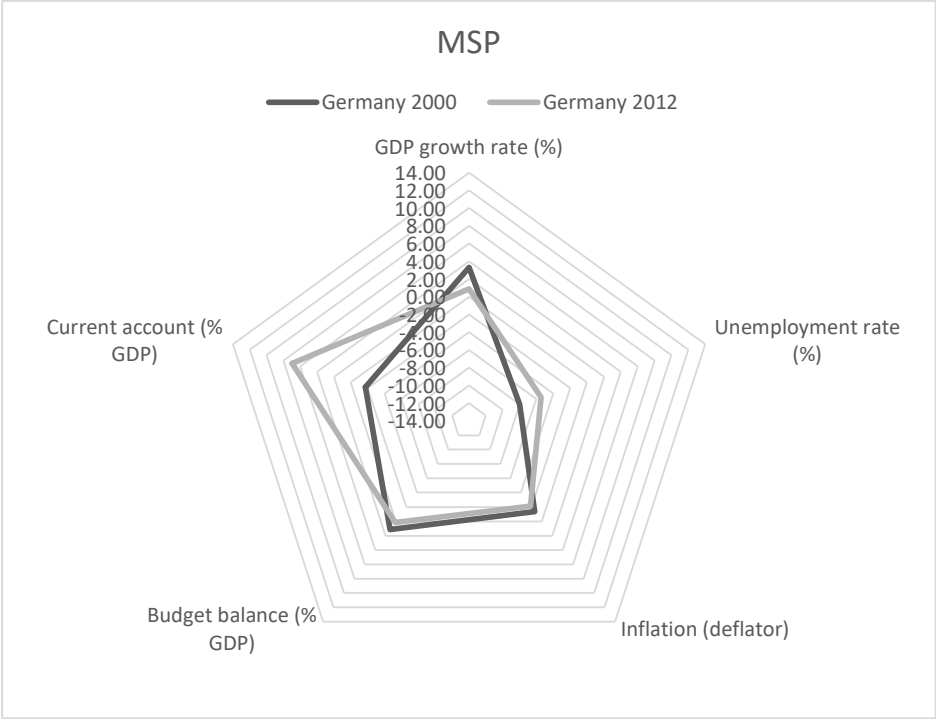

Fig. 4: The MSP in Germany in 2000 and 2012

Source: The authors' own study based on the data from Table 6.

The years from 2000 to 2007 can be divided into two stages. The period from 2000 to 2005 was a transitional stage in which internal indicators deteriorated strongly and external indicators slightly improved. However, the years from 2005 to 2007 brought a significant improvement in all indicators of the MSP pentagon. The positive GDP growth trend continued until the 2008 subprime crisis, which also negatively affected the results of the German economy. These changes can be observed by analysing the data from Table 6 and Figure 4. The large decreases in fields a, b, c, d, and e in the period from 2008 to 2009 demonstrate that the German economy was severely impacted by the crisis. This is due to the export factor, which plays a significant role in the German economy. Nevertheless, it should be noted that the years from 2010 to 2012 engendered a significant improvement in both internal and external factors. These relationships are visible in both the MSP drawings and Table 6.

The highest values of the MSP indicator in Germany were recorded in 2007, 2011, and 2012 and amounted to approximately 0.255 (± 0.002). These high values were caused by a very effective export policy. The lowest value was recorded in 2003 and amounted to 0.156. Currently, Germany is improving its competitive position, as demonstrated by the value of the MSP index, which has been increasing every year. In 2012, it was 0.256.

Based on the results of the Macroeconomic Stabilisation Pentagon, the author constructed a ranking of MSP competitiveness (Table 7). This ranking was constructed by awarding points from 1 to 3. A value equal to unity was given to the country with the worst result, which in this ranking means the smallest area of a pentagon. The analysis contains 13 periods, starting from 2000 and ending in 2012.

Table 7: MSP for the United States, Japan, and Germany in the period from 2000 to 2012

	United States	Japan	Germany	POINTS		
Year	**MSP**	**MSP**	**MSP**			
2001	0.174627	0.188411	0.171844	2	3	1
2002	0.156690	0.176656	0.167536	1	3	2
2003	0.149005	0.185359	0.156268	1	3	2
2004	0.153452	0.210921	0.174504	1	3	2
2005	0.153524	0.215857	0.176121	1	3	2
2006	0.159145	0.229652	0.223936	1	3	2
2007	0.159427	0.255785	0.254305	1	3	2
2008	0.120190	0.198028	0.230624	1	2	3
2009	0.070145	0.120604	0.175601	1	2	3
2010	0.097606	0.199333	0.229795	1	2	3
2011	0.103037	0.152808	0.256039	1	2	3
2012	0.125222	0.163549	0.256241	1	2	3
sum	1.622070	2.296963	2.472814	13	31	28
Rank				III	I	II

Source: The authors' own calculations based on data from tables 2, 4, and 6.

The country that took first place turned out to be Japan, which received 31 points. Second place was awarded to the German economy (28 points), and third place was awarded to the United States (13 points).

Conclusion

The presented conclusions are based on the years from 2000 to 2012. It can be observed in the analysis that economic relations between world leaders are a derivative of the state of the economies of partners. In the conducted analysis, it was observed that the poor economic condition of one country led to the worsening of the situation of the other countries. Strong trade links between the countries studied are crucial because they belong to the group of the world's largest exporters. The analysis confirmed that the phenomenon is compounded when the crisis concerns the U.S. economy. The economic crisis of 2008 to 2009 highlighted the nature of international interdependence. All analysed countries achieved the best results in the MSP model a year before or a few years before the crisis. Immediately after the subprime crisis, the MSP fields fell in all the countries studied. Despite the worse results achieved in 2008-2009, a slight improvement in the following years in the economic situation could be seen in all the countries analysed. It was also observed that in countries in the face of the crisis, the policy of state protectionism was beginning to achieve success. This fact can be observed in Tables 4 and 6, where it can be seen that internal sphere indicators in Germany and Japan strengthened.

When the values in the fields in the MSP are analysed, it can be seen that the leader of the ranking from 2000 to 2012 is Japan, which achieved such a good result thanks to a very stable and low unemployment rate. In addition, a favourable situation can be seen in the case of the current account, which took values greater than zero.

Second place in the ranking is occupied by Germany, which recorded very positive results after the subprime crisis. The German economy would occupy first place if the analysis had focused exclusively on the years after the crisis. The MSP fields for Japan and Germany in 2007 were at the same level of 0.255 (± 0.001). However, the German economy in 2012 achieved a much better result, achieving an

MSP value of 0.256, while this indicator in Japan was only 0.164. Germany achieved good results in terms of current account balance and public finances. It is also worth noting that the external sphere is dominant in the German economy.

The United States achieved the worst results and thus took last place. The analysis reveals that economic policy issues are a very important aspect in the United States. State policy should focus on the fight against high public debt and the level of unemployment. It is also worth mentioning that in recent years, the United States has stood out positively in terms of GDP growth and inflation.

To better illustrate the results of the MSP model, the charts in figures 5 and 6 are presented. An important difference that distinguishes them from the previously presented MSPs is the presentation of the three economies simultaneously on the Macroeconomic Stabilisation Pentagon chart in 2000 and 2012.

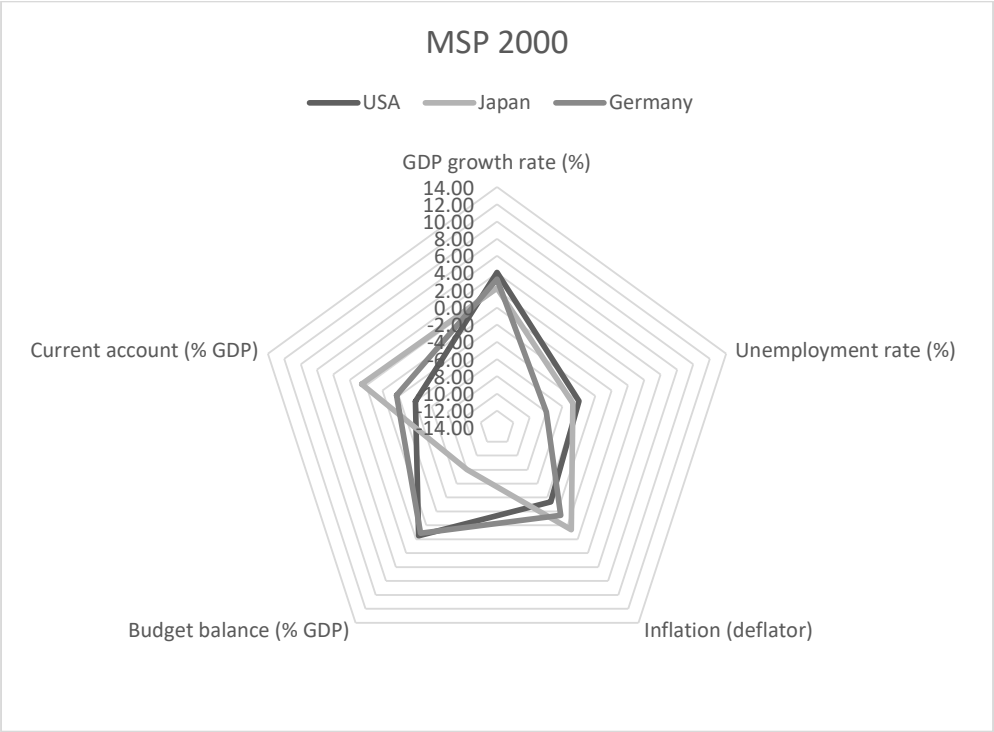

Fig. 5: The MSP in the United States, Japan, and Germany in 2000.
Source: The authors' own study based on IMF data.

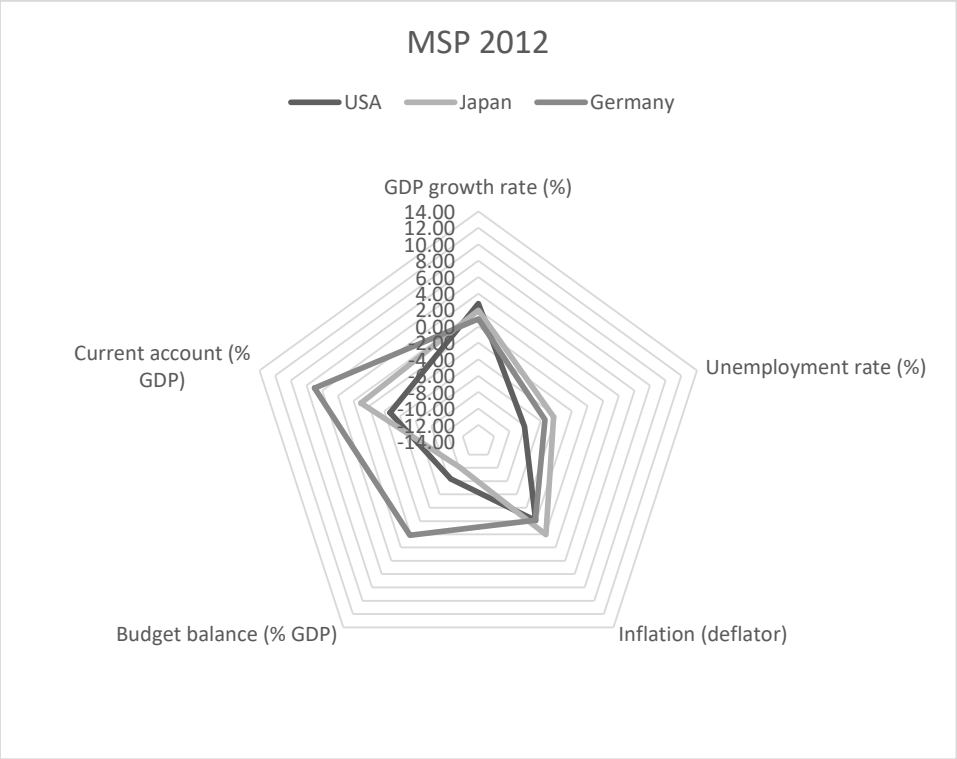

Fig. 6: The MSP in the United States, Japan, and Germany in 2012.
Source: The authors' own study based on IMF data.

This study complements the existing analyses based on the MSP method, as previous case studies have mainly focused on countries undergoing systemic transformation. In this case, the 'magic' pentagon was applied to highly developed countries.

The analysis revealed similarities and differences between the studied economies. The correct interpretation of macroeconomic indicators provides a basis in today's world to achieve better results in the future. The analysis of the 'magic' pentagon can be treated as an alternative to synthetic indicators that offer insight into the overall situation of the country's economy.

Acknowledgement

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Thirty Years of Transition, Fifteen Years of Membership in The European Union: Challenges of Capacity Building in Poland

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Abstract

Political changes in 1989 enabled former Soviet Union satellite countries to initiate processes of political and economic transformation from a centrally planned economy to a market economy. In the early years of the 1990s, the post-communist countries adopted the Washington Consensus. It was based on three key pillars: fiscal austerity, privatisation, and liberalisation. These changes have radically changed the Polish economy. Poland had to face many challenges, which included high unemployment and hyperinflation. In addition, the accession of Poland to the European Union opened a new stage of changes in its economy. The authors focus on the main changes in the Polish economy during the past three decades. The study period begins in 1989, when Poland transformed from a centrally planned economy to a market economy. The other important period starts in 2004, when Poland become a member of the European Union. The main aim of this paper is to asses performance of Polish economy referring to main macroeconomics indicators. This article also discusses main challenges for Polish economy. Although Poland is performing rather well in the region, it still lags behind other European Union countries. The most important challenges that the authors present are the demographic trap, the average product trap, the weak institutions trap, the lack of balance trap, and the middle-income trap. Due to the complexity of the topic, the research requires the use of diverse methodological approaches. The main method is a comparative analysis using data collected from the International Monetary Fund and the Polish Statistical Office. The method employed also includes historical case studies, which are used to present the role of the Polish economy.

Keywords: Transition Economy, Capacity Building, Integration.

Introduction

Today, the capacity of the economy for growth is the most important factor in the economic success of individual countries in the long term (Samuelson and Nordhaus 2007). Economic growth occurs as a result of various factors. Over the years, the role of the individual factors of economic growth has changed. In multiplying the wealth of nations, the classical economy stressed the importance of factors other than the ones emphasised in the modern economy, especially the most recent one (Wozniak 2004). Two opposite points of view can be traced in the history of economic thought. The first is known as the catching up/convergence hypothesis. The other one is called the divergence hypothesis. According to the first theory, a developing country can make the 'jump', through which it can significantly accelerate its economic development (Jablonski 2012). Paul Romer disputes the convergence hypothesis. The main assumption in Romer's concept is a parallel increase of the economic growth rate and income, which means that developed countries grow faster than underdeveloped countries (Romer 1986).

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In the 1990s, the concept of capacity building became an essential component in development theory and practice. New theories emphasised the importance of capacity building or capability development for achieving long-term growth. International organisations, governments, private companies, and societies have adopted the concept, especially in developing countries, which have identified capacity building as a key in the implementation of the concept of sustainable development. In accordance with the United Nations Development Programme, 'capacity building is the process through which individuals, organizations, and societies obtain, strengthen, and maintain the capabilities to set and achieve their own development objectives over time' (UNDP 2008). The World Bank introduces a similar definition: 'the proven ability of key actors in a society to achieve socioeconomic goals on their own. This is demonstrated through the functional presence of a combination of most of the following factors: viable institutions and respective organizations; commitment and vision of leadership; financial and material resources; skilled human resources' (World Bank 2006).

Capacity building has been defined as a process or activity that improves ability. Capacity building can be seen from two perspectives. In one extreme, capacity building is linked to an increase in the knowledge and skills development of individuals through training programmes. In a broader context, capacity building integrates a wide range of systems, such as policy making, management, and finance (LaFond et al. 2002).

In publications related to the subject of catching up, economic growth is a very popular concept of countries' capability. J. Fagerberg and M. Srholec (2005) identified a number of different capabilities that developing countries could potentially exploit to catch up. The set of capabilities that might be assumed to be of critical importance for catching up is presented in Figure 1.

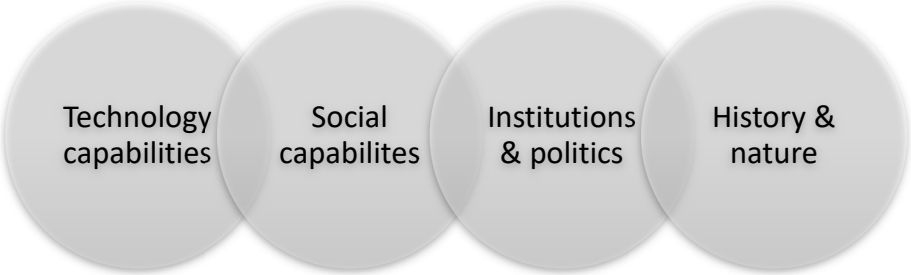

Fig. 1 : Capabilities for economic growth

Source: Fagerberg and Srholec (2005).

History, geography, and nature are important for development, especially at an early stage. In addition, the importance of institutions, governance, and policies necessary for the efficient functioning of the economic system is generally acknowledged in the literature. The significance of education (or human capital) for the assimilation and creation of knowledge is shown as social capabilities. Technological capabilities refer to the ability to develop new goods and services and new production methods. They are closely related to the country's innovation system (Fagerberg and Srholec 2005).

Polish history as a Background of Capacity Building

To understand how the Polish economy has changed, it is important to recall how it worked in the 20th century. Poland was one of the most devastated countries after the Second World War, with human losses amounting to around 17 per cent of its population and completely damaged infrastructure. Soviet pressure forced the Polish government to reject the Marshall Plan in 1947 and to join the Soviet-Union-dominated Comecon in 1949 (Schain 2001). The communists, supported by the Soviet Army, came

into absolute power. The leading role in the state was played by the communist Polish United Workers' Party (PZPR) (Shleifer and Treisman 2014).

The economy was centrally planned: the state decided what would be produced and in what quantities, what the wages would be, and what prices would be charged in stores (Kozlowski 2011). The state owned most properties. In the 1970s and 1980s, a food-rationing system was used in Poland to keep prices under control and fight speculation with food and goods that were difficult to procure. Poland was deeply affected by the economic depression. Between 1975 and 1980, Polish debt to Western countries increased from 7.4 billion to more than 21 billion USD (Aslund 2012).

When the communist empire began to fall apart, Poland was looking for new opportunities that came with the change in 1989. Poland's new shape has been strongly affected by global trends: the development of trade and finance, changes in the supply chain, developments in technology and communications, growing international cooperation, and the mutual convergence and interdependence of states (ThinkThank and CMS 2016).

Poland was the first country in communist Europe that unshackled itself from communism. The first free elections were held in June 1989, and then in September of the same year, the first democratic government was introduced, long before the fall of the Berlin Wall. The new government under Prime Minister Tadeusz Mazowiecki introduced an ambitious programme of economic reforms to transform Poland from a centrally planned to a market-oriented economy. The commission led by Leszek Balcerowicz prepared plans for market reforms in late 1989. These reforms became known as *shock therapy*, a term coined by Jeffrey Sachs, a Polish reform adviser (Lipton et al. 1990). The main reforms indicated full openness of the market to domestic and foreign trade: the Polish zloty became convertible, prices were liberalised, subsidies for state-owned enterprises were cut, privatisation was initiated, and banking sector reform was accelerated (Balcerowicz 1995). Although the post-transition recession was much deeper than initially predicted, costing Poland almost 15 per cent of its GDP (Piatkowki 2013), four more major reforms of health, pension, and educational systems as well as regional reform had been implemented by the end of the 1990s. Those two blocks of reforms were very important for the further development of the Polish economy. The first set of reforms brought Poland back to the market economy through macroeconomic stabilisation, price liberalisation, and import liberalisation policies. These reforms released the creativity of new private and state-owned enterprises to engage in a restructuring process, that is, to modify the production process, to engage in marketing, and to reduce unproductive labour. The second large block of reforms from 1999 can be considered modernising reforms, as they transformed ineffective institutions to improve the competitiveness of the Polish economy and to ensure sustainable government finances (Lehmann 2012).

The next step for Poland was to apply for European Union (EU) membership. Not only was Poland's accession to the EU important, but the long process of adapting to the requirements of the membership was also important. This involved further reforms of the Polish economy, its justice administration, its laws, and the functioning of local government. In effect, Poland has adopted the European standards and rules of operation (ThinkThank and CMS 2016). On 1 May 2004, Poland became a member of the European Union, concluding the long process of striving to join this organisation. These efforts were initiated by the international transformations of the Autumn of Nations, which resulted in an essential redefinition of Polish foreign policy, manifested in a purely pro-Western orientation and striving towards integration with western European institutions (Kolodziejczyk 2016). In 2007, Poland joined the Schengen area. This area includes 26 European countries that have abolished passport and any other type of border control at their mutual borders (European Commission 2008). Furthermore, thanks to its accession to the European Union, Poland will continue to receive support from the EU Structural Funds. In the EU financial perspective 2014-2020, Poland is the largest beneficiary of EU funds, receiving around 106 billion euros, which in fact exceeds the value of the post-WWII Marshall Plan, which Poland missed for political reasons.

The Macroeconomic Situation of The Polish Economy

The country's macroeconomic situation is, on the one hand, its background for capacity building. On the other hand, it is also a measurable result of the increasing capacity of each country. Twenty-five years after the end of central planning, Poland has achieved remarkable economic progress. Nevertheless, the post-transition downturn in Poland was much deeper than initially predicted. This reaction is illustrated in Figure 2: in 1990 and 1991, Poland lost around 15 per cent of its GDP. However, some economists argue that the fall in GDP was actually less, as lost production also reflected goods and services that did not meet quality standards of the market economy (Orlowski 2010).

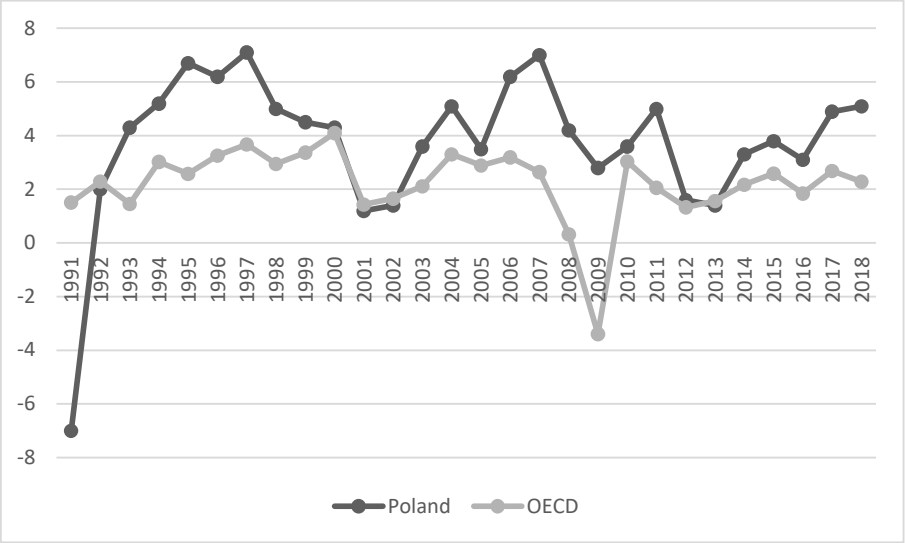

Fig. 2. GDP growth rate in Poland 1991-2018

Source: authors' own study based on International Monetary Fund (IMF) (2020).

In 1992, the Polish economy started to grow very rapidly. In 1992, Poland's GDP growth rate was 2%, but the highest value was observed in 1995 and reached 7% of GDP. Two declines can be observed after 1997. The first occurred in 2001 as a result of contractionary monetary policy, and the second occurred in 2009, after the onset of the global crisis. But despite this, it is interesting to note that GDP growth was recorded in Poland before, during, and after the subprime crisis. Over the past 10 years (2006-2018), the Polish economy has grown by almost 4% per year, which is one of the highest growth rates in the EU. Growth in Poland has been approximately 2.3% higher than that in OECD countries (Poland: 4%, OECD: 1.7%). Poland was the only country in the EU that avoided the outright recession during the global financial crisis.

There have also been positive changes in the productivity of the Polish economy. Thanks to technological changes and improvements in the production process as well as changes to and modernisation of economic structures, Poland has improved both its pure labour and structural productivity growth. However, the impact of changes in structural productivity was much more significant than the impact of changes in pure productivity, especially after the accession period (Dobrzanski and Grabowski 2019) Productivity increased in all sectors; however, the most significant rise was noted in financial intermediation and real estate, renting, and business activities. Simultaneously, employment decreased the most in agriculture, hunting, and forestry and fishing, the sector with the lowest productivity (Dobrzanski and Olszewski 2019).

Figure 3 presents GDP per capita in Poland from 1990 to 2018.

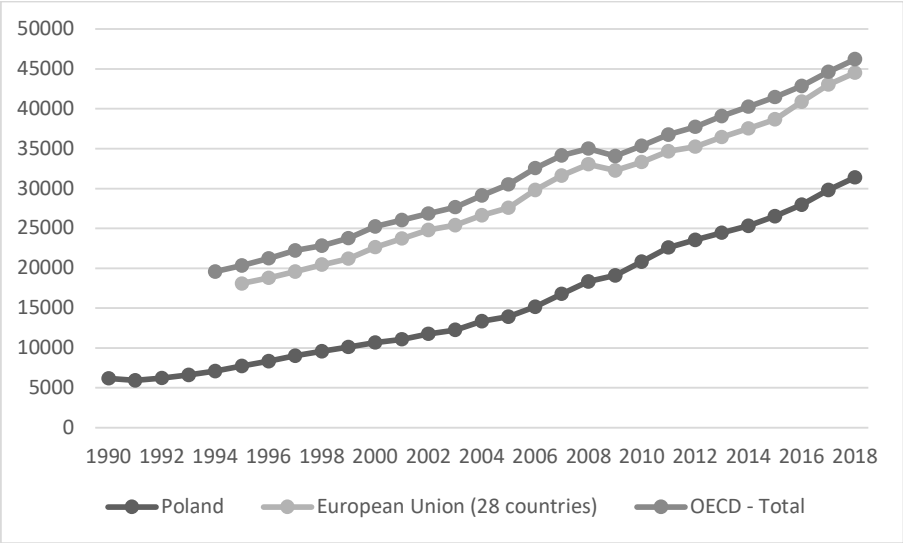

Fig. 3: GDP per capita (purchasing power parity (PPP)) in Poland (1990-2018).
Source: authors' own study based on IMF (2020).

Compared to the OECD average and the average for the 28 EU countries, Poland's performance is strong. GDP per capita in terms of purchasing power increased from $6,125 in 1990 to $31,393 in 2018. The performance is very strong, but Poland's GDP per capita is only 45% of the United States' GDP per capita.

Figure 4 depicts inflation in Poland from 1980 to 2013 and predictions for the period from 2014 to 2018.

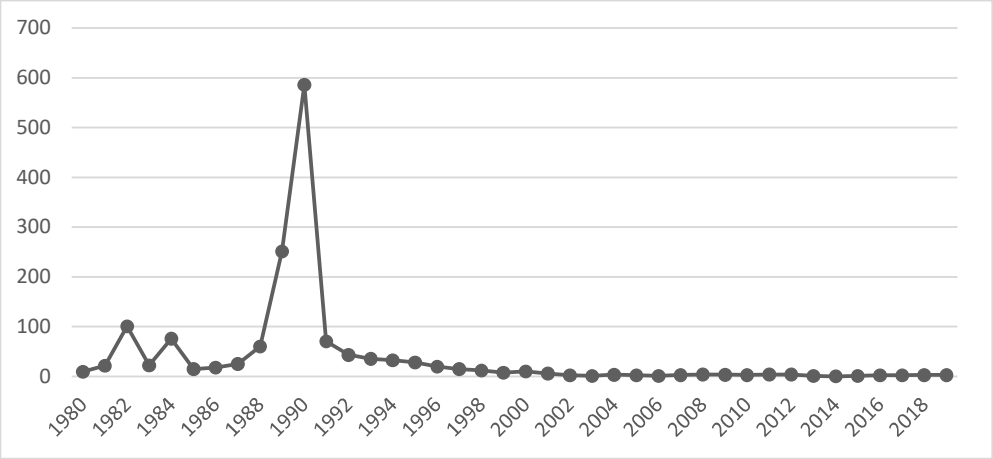

Fig. 4: Inflation in Poland (1980-2018).
Source: authors' own study based on IMF (2019).

In 1990, prices rose rapidly in Poland. This caused higher inflation, which increased up to 853.5% in 1990. The government used contractionary monetary policy to reduce it, and interest rates grew very rapidly up to a few dozen.

Figure 5 illustrates the unemployment rate in Poland from 1980 to 2018.

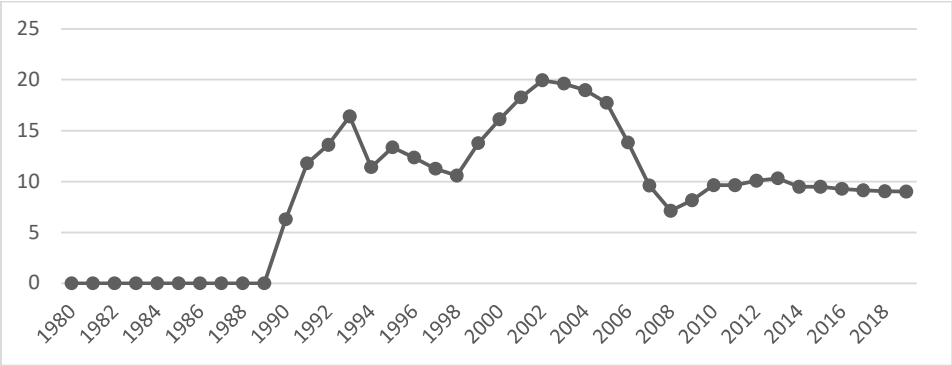

Fig. 5: Unemployment rate in Poland (1980-2018).

Source: authors' own study based on IMF (2019).

Another important factor is the unemployment rate. In socialism, everybody worked, but they worked inefficiently. In the market economy, many people lost their jobs. Until 2003, employment in Poland fell precipitously to very low levels from an international perspective, while the unemployment rate was much higher for most of the period, reaching a peak of 20 per cent in 2002. Dynamic growth of the employment ratio and a steep decline in the unemployment rate, which reached the single-digit level from 2007 to 2009 for the first time since 1992, can be observed only since Poland's accession to the European Union. In addition, many people have emigrated to Germany, the United Kingdom, and other countries in the EU. This can be observed in Figure 6.

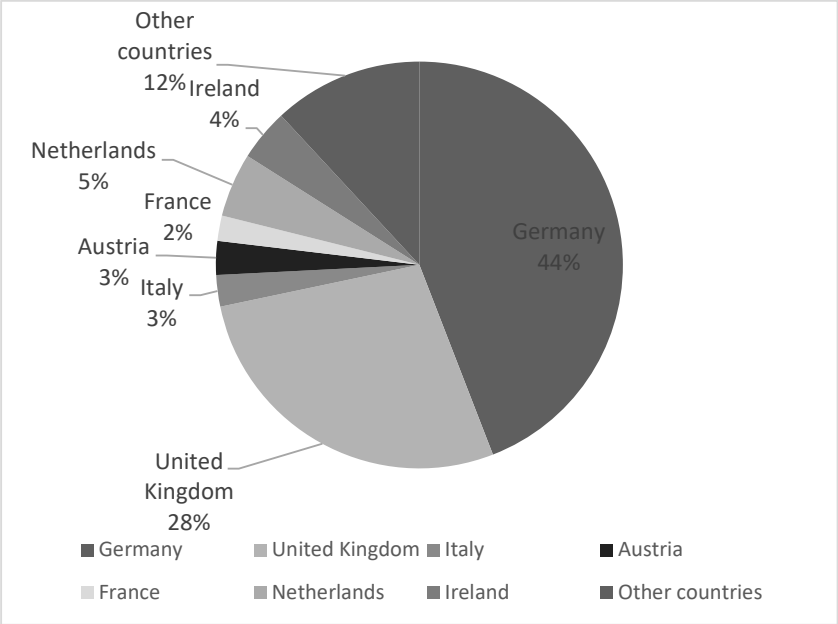

Fig. 6: Share of Polish immigrants in 2013.

Source: Statistics Poland (2014, 26).

Challenges for capacity building in Poland

The analysis in the second paragraph, which focuses on the main macroeconomic indicators, demonstrates that Poland has generally improved its macroeconomic indicators. The Polish economy

has been able to achieve a stable macroeconomic situation, which is a necessary background for capacity building. Capacity building is one of the main goals of the Polish government. The Ministry of Development publishes many reports regarding this topic, mainly about the main challenges for long-term growth. Figure 7 presents the main challenges identified by the Ministry of Development (MoD).

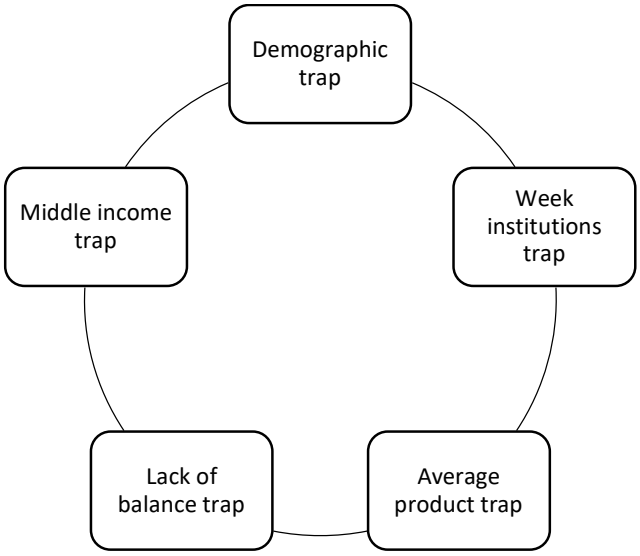

Fig. 7: Five development issues for Poland.

Source: MoD (2016).

The first challenge for the Polish economy is the demographic trap. The number of Poles who fall within the working age is declining, and society is growing older. In 1975, the Polish population was relatively young demographically. Young people accounted for a higher percentage of the total population than old people. Today, the proportion of young people has significantly decreased, while the number of older people has increased (Wilk and Pietrzak 2014). In the near future, the decline of the population will accelerate. According to the forecast of the Central Statistical Office, the Polish population will have decreased by 2 million people by 2035, from 38 to 36 million. Almost an additional 2 million people have already migrated. These trends may have serious consequences for the labour market, such as depopulation, significant shortfalls in the qualified labour force, and mismatching of skills. Reduction of the fertility rate is a global problem; however, this rate is specific for each country or region. The decrease in the fertility rate in Poland has been observed since 1950; however, during the 1960s and 1980s, the situation was more or less stable. In 1989, the fertility rate dropped below 2.1, the replacement level. Although the ageing of the Polish society is ongoing, Polish society is relatively young in the European Union: the proportion of people aged 65 or over in the population is one of the lowest in the European Union, and it is significantly below the average for EU 27 countries (OECD 2013). The Polish government is working on solutions to improve the fertility of Polish women, limiting the emigration of Poland's citizens, creating conditions for their return, and increasing the scale of labour immigration to Poland. One of the programmes aimed to boost birth-rates is Family 500+ introduced in April 2016. Under the programme parents can receive a tax-free benefit of PLN 500 (about EUR 120) per month every children until they reach the age of 18. Latest statistics shows increase in childbirth, however, it is difficult to assess the contribution of the 500+ program to this increase. There are other factors that could affect the increase in the number of births as a stable economic situation or an increase in births associated with the births among the people of the baby boom of the 80's.

The second challenge for capacity building is weak institutions. Poland lacks a comprehensive and long-term vision of public administration. The increase in the operating costs of administration has not been accompanied by an increase in its effectiveness. There is a gap in the inflow of taxes on goods,

and companies' revenue is approximately 20 billion USD. Combatting value added tax (VAT) fraud remains a major challenge for Poland. Since 2004, there have been 44 changes in the tax regulations, but those changes have not allowed for increasing tax collection. Reforms are needed to improve the effectiveness and efficiency of the Polish tax administration, as Poland's cost-of-collection ratio, that is, the administrative costs per net tax revenue collected, is the highest in the EU. Moreover, compared with most EU member states, Poland still has low online interactions between public authorities and citizens (European Commission 2016). Poland was one of countries with the highest level of non-compliance and non-collection of VAT till 2016, when the VAT gap was reported at the level of approximately 20 %. In recent years it has decreased at a rate not observed in other EU countries (to approx. 9-10 % in 2019), due to i.a. VAT regulations introduced already in September 2015 and gradually (in years 2016-2018) embracing companies of various sizes.

The third issue is the average product trap. According to the rankings and reports of the international institutions, Poland's economy is not innovative. Another EU report (European Commission 2014) reveals a very low evaluation of Polish innovative capabilities: Poland is the fourth least innovative country in the European Union. Expenditures on research and development (R&D) are less than 1% of GDP, and only 5% of exports are high-tech products. In the EU scoreboard, Poland is presented as 'a moderate innovator'. This report emphasises low investment in innovations. This indicator has slightly improved since 2006, but it has been deteriorating compared to the EU average, which has been increasing much faster. Most indicators for Poland are below the European Union average, the worst of them being a small number of PhDs from outside the EU, a small number of patent applications concerning social challenges, and low income from Polish licenses and patents abroad. The Europe Strategy 2020 (European Commission 2010) clearly shows the way and the percentage of its GDP that Poland should spend on research and development. Many Polish companies are delivering basic products at the lowest price to build their competitiveness. Poland's product specialisation is biased towards low- or medium-low-technology goods. Furthermore, Poland's product specialisation has been relatively static, with little progress towards a higher share of medium- or high-technology goods (Bogumil and Wieladek 2014). In this case, to improve the quality and variety of goods, the Polish state must collaborate with the business sector and the academic environment and also must itself become a technologically demanding customer through its public procurement system.

The fourth challenge is the lack of balance trap. Since its economic transition and integration into the EU, Poland has received a significant amount of capital inflows, which have supported the catching-up process in the region. Today, the Polish economy is mainly built on foreign capital. The presence of foreign capital in Poland is desirable and important, since it allows for increasing GDP and contributes to technology transfer. This fact was magnified after Poland's accession to the EU in 2004. Capital inflows to Poland have concentrated in the manufacturing and services sectors, supporting the development of the tradable sector. Each year, approximately 25 billion USD flows out to foreign investors. In addition, 50% of industrial output originates from foreign companies. Moreover, 66% of Polish exports originate from foreign companies (Bogumil 2014). Nevertheless, to maintain healthy economic growth, it is necessary to maintain an appropriate balance between domestic and foreign capital. In this case, besides foreign investors, domestic capital needs to be strengthened on a larger scale to ensure Poland's future and a stable path of development.

The final issue presented in this article is the middle-income trap. The middle-income trap occurs when after several years of relatively high rates of growth, a country's growth rate becomes low, and eventually the country stagnates after reaching middle income levels (Garrett 2004). The middle-income trap refers to a country that has already used the advantages of cheap labour and other resources and now is unable to offer better quality and more technologically advanced products. As a result, such countries become stuck between richer countries, which compete using their innovations, and poorer countries, which compete by means of low prices (Pruchnik and Toborowicz 2014). Although GDP per capita in Poland is growing rapidly, some weaknesses can still be observed. The alarming fact is that approximately 50% of working people earn a net income of less than 650 USD, to compare Poland's GDP per capita amounts only to 45% of the United States. This fact is evinced in the large social inequalities. While short-term economic growth forecasts for Poland are positive, long-term projections support the thesis that Poland might lose its dynamic drive. According to the Organisation

for Economic Co-operation and Development (OECD), Poland's economic growth in the next few years will reach around 3.0 to 3.5% of GDP. However, the long-term forecasts predict that in the next 50 years, the Polish economy's growth rate will be among the lowest in OECD countries (OECD 2014). If Poland wants to avoid becoming stuck in the group of countries with middle income, Poland needs to find new drivers of growth because low labour costs have run out. This goal can be achieved by building global specialisations of the Polish economy. Economic growth must be accompanied by the growth of salaries.

Poland has reached a stage of economic development where efficiency gains and sustained growth are more difficult to achieve. Although the Polish economy has made steady progress over the past two decades, continuing to close the income gap with the EU average is becoming more difficult (European Commission 2016). The abovementioned challenges and the depletion of existing growth factors require action from Poland to boost its socioeconomic development. In 2016, the Council of Ministers adopted the Responsible Development Plan. This plan is a set of tools to make the development of Poland more dynamic. These are actions that will result in a positive and high-quality expansion of the Polish economy. The Responsible Development Plan is based on five pillars: reindustrialisation; the development of innovative companies; capital for development; foreign expansion; and sustainable social and regional development. Sustainable social and regional development means an emphasis on inclusion in the development process, not only in large urban areas but also in smaller towns and rural areas (Pinkas 2016)

Conclusion

Catching up with the West is a marathon, not a sprint. Poland has a very difficult history. More than 50 years in the Soviet Bloc caused economic delay in Polish development. Today, Poland, as a member of the North Atlantic Treaty Organisation (NATO) and the European Union, is experiencing the best years in its history, but this new Golden Age has only just begun. To maintain positive economic and social growth, Poland must work on its capacity-building challenges.

With a population of around 38 million, Poland is the largest economy in Central Europe. Since its accession to the European Union, Poland has achieved very positive results in terms of its economic performance so far. However, if Poland wants to catch up with the core of the European Union and other developed countries, which are in the third stage of development in terms of economic growth and standard of living, then it must improve cooperation between business and science at the micro and macroeconomic level. Such improvement could be achieved by creating business and innovation ecosystems using triple-helix concept. The Polish economy also needs more investment and higher innovation expenditures. Such actions would exert a positive impact on its innovation capacity. Increase budget revenues from the seal of the tax system will definitely help in achieving this objective. Human capital is one of Poland's most significant advantages, but its ageing society will be a huge problem in the future. Poland needs to use a coherent set of policies to respond to long-term challenges and opportunities in an effort to maintain balance between working society and population. Especially further assessment is necessary for Family 500+ program. In addition, Poland needs to further reform its institutions in an effort to make them more efficient. State institutions are creating a background for effective public and private activity. Poland should retain foreign capital and encourage foreign companies to make further investments through preferential lending and tax incentives

Poland's economic performance over the past 30 years has been remarkable, and this has been translated into significant welfare gains across the entire income distribution. In this case, it would be useful to emphasise that Poland had a very high absorption of European Union funds. During the 2007–13 programming period, a large percentage of the European Union funds were directed towards hard infrastructure assets. The period from 2014 to 2020 has seen a shift of funds from hard infrastructure to funds that will create and promote competitiveness, innovation, and entrepreneurship.

The growth prospects for the Polish economy are strong. Poland needs to improve in many areas, such as infrastructure, labour, high-tech industry development, productivity, and business environment. In

addition, Poland should take advantage of its central geographical location in Europe. If Poland addresses its problems, it can become one of the most powerful engines of the EU.

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A Generic Proposal for Competence Mapping: A Case Study from Information Systems Discipline

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Abstract

The competence literature uses a set of terms whose definitions have a high degree of ambiguity and intersection. This situation causes difficulties when applying competence frameworks for describing the content of jobs and planning the evolution of competences, both at an individual and organizational level. This work focuses on the competence construct, reviewing related concepts and identifying relationships between them. The authors provide a structure for the competence construct, which integrates and articulates the concepts of knowledge, skill, ability, capacity, posture, disposition and behaviour. The structure supports the proposal of a mechanism for mapping the internal competences of an organization. The mapping may assist the organization to compare its current set of competences with the desired competence blueprint. Underlying this mechanism is the assumption that individuals working in an organizational environment are the source of competences for the organization. The mechanism may also assist an individual to set a course for professional development. To illustrate the application of the mapping mechanism a scenario informed by an Information Systems and Technology framework is used.

Keywords: competence, information systems, information systems and technology competences, competence mapping

Introduction

The central theme in this paper – competence – has been the subject of many scientific discussions and investigations. However, despite the number of works that have been published (exceeding 8,000 in 2019 according to the Web Science and more than 14,000 based on Scopus), additional research is required, as some concepts related to competence are considered synonyms by some authors or overlap in their meanings in the view of others. The existing mix of conflicting views may raise doubts regarding the approaches adopted by works on professional competences. To mitigate the drawbacks of that situation, this study promoted searches and analysis in several dictionaries and frameworks in order to better organize concepts and, subsequently, to identify relationships between them and influences they exert on each other. The starting point of the study were several competence frameworks, lately complemented by the analysis of additional references and dictionaries.

The literature review suggested an absence of criteria to make sense of the terms associated to competence, hindering the development of a conceptual structure capable of defining a profession. This state of affairs was recognized in spite of the existence of explanations for the meanings of career, function, job, work, and even profession. The absence of criteria may also interfere with the design of training programs or graduate and postgraduate programs, as these programs need to focus on learning objectives that take into account the professional profile required by the labour market. Hence, we argue for the need of conducting research studies on competence-related concepts and on their relationships.

In order to produce a structure for the competence construct, we compared, grouped and contrasted the definitions of related concepts found in the literature reviewed. Then, we advanced revised definitions

for the concepts so there was no overlapping and incompatibility in the proposed structure for the competence construct. This made possible a visual display to show how concepts relate and to trace the path an individual may take to evolve in his/her professional field.

Building on the structure for the competence construct, in this paper we propose a mechanism for mapping competences. This mechanism assists in diagnosing existing competences, suggesting paths to develop individual competences and defining requirements to meet organization's competence demands.

Following this introduction, we briefly describe competence frameworks. These frameworks include various concepts present in the proposed mechanism for competence mapping. In the subsequent section we present definitions for the concepts, based on competence frameworks and other references, such as scientific articles and dictionaries. The section includes a display of how the concepts relate at an individual level of analysis. The next section presents a competence measurement mechanism and shows how it can be used to map an organization's competences. Afterwards, representations are provided to exemplify some applications of the mechanism, based on a scenario, for both measurement and mapping purposes. For the sake of illustration, the example provided uses a framework from the Information Systems and Technology (IST) domain. The proposed mechanism allows the use of other frameworks for the purpose of competence measurement that the user of the mechanism (an individual, a group or an organization) considers appropriate. In the final sections of the paper, the authors draw conclusions and propose future work.

Competence Frameworks

Different competence-based approaches have been developed, serving as guidance in diverse professional areas. A well-known framework is the European Competence Framework (ECF), which in 2016 was recognized as a European Standard, aiming to standardize an approach to competences, skills, knowledge and proficiency levels (European Union, 2016), for the IST area, and providing descriptions for typical professional role profiles. Its architecture divides competence into four dimensions. Dimension 1 refers to the purpose of the competence. Dimension 2 includes the name and a generic description for the competence. Dimension 3 covers proficiency levels for the competence and its equivalence with the European Qualification Framework (EQF). Dimension 4 covers two fundamental concepts for competence, namely knowledge and skill. The framework includes examples of skills and knowledge for each competence, although recognizing that competence is not limited to the examples provided and may involve other skills and knowledge not mentioned in the framework.

In addition to the ECF, there are other frameworks that aim to standardize the approach of competences, such as the Skills Framework for the Information Age (SFIA) (SFIA Foundation, 2015, 2018) and the i-Competency Dictionary (i-CD) (Hayashiguchi et al., 2018), both in the IST ares. SFIA divides Skills into categories and subcategories, with each skill having specific levels of responsibility, which include descriptions about the practical application of the skill. Focusing on skills, i-CD provides more than 2,200 task items and 10,000 knowledge items.

Other frameworks are transversal to professional areas of activities. The framework used in the United States of America, O*NET (National Center for O*NET, 2008), represents an approach to competences, in which the professional occupations that an individual may have during his/her active professional life are the central theme. Another approach focusing attention on the scope of job specificities and proficiencies is ROME (ETALAB, 2020), maintained by the French government. This framework covers synonyms for jobs, i.e., occupations that have different names, but that in practice are equivalent. Similar approaches are found in other countries. For example, the Brazilian Catalogue of Occupations (CBO) provides an extremely simplified structure, targeting the profession/occupation that an individual will perform, classified in a base group, which, per se, belongs to a subgroup. The CBO, as well as the Portuguese Catalogue of Professions (CPP), pay attention to the profession, offering no support that indicates the path an individual may follow to reach that position.

These frameworks, as well as several dictionaries, do not always attribute the same meaning to the concepts addressed and, although they do not enter into irremediable disagreement, there is a need for more attention in the application of the concepts, at least to prevent an uncritical and generic use. Hence, taking into account the different approaches adopted by each framework, it is advisable to highlight the specificities associated to each concept employed in this work – Competence, Ability, Proficiency, Skill, Knowledge, Posture, Disposition and Behaviour – and to advance revised definitions for each of them.

Main Concepts

The motivation for this paper resulted from the difficulty to depict ways for an individual to acquire professional competences. The first phase of this study took advantage of a set of definitions that made use of other concepts in a coherent way, allowing the authors to formulate a competence structure. ECF, for example, portrays competence as "demonstrated ability to apply knowledge, skills, and attitudes for achieving observable results".

Frameworks such as O*NET, ROME, CBO and CPP do not directly portray the term competence, but refer, as a central theme, to occupation or profession, containing descriptions that complement the ECF's approach, having competences as the central theme. SFIA places skill as a central theme and considers the levels of responsibility as the specifics of the skill, which are grouped into categories and subcategories.

The i-CD uses the concept of competence as a central theme and considers that its origin is placed in the human resource, which is the source of the organization's capability since it provides the needed competence for the business execution. Fleury and Fleury (2001) corroborate this view, indicating that competence refers to the stock of resources that the individual holds. However, McClelland (1973) draws attention to the fact that competence can be observed in the performance of a position exercised by the individual, provided that the individual has skills, knowledge, behaviors, attitude, ability and necessary dispositions corresponding to the individual's professional occupation. Nordhaug and Gr⊘nhaug (1994) advocate that the elements that make up competence are knowledge, skill, and ability related to the work performed by the person. The work of these authors provides important support for the definition proposed in this study for the concept of competence.

Looking to the ECF framework, it makes sense to say that competence relates to a professional area where individuals employ their abilities, such as Programming and Software Development, Network Systems, Quality Assurance, among others. The proposed definition of ability by the Cambridge Dictionary (Cambridge, 2012) indicates ability as an occurrence that enables someone to be able to do something, supported by the Oxford Dictionary that complements the explanation of the concept, referring to ability as the capacity to do something, physically, mentally, legally, morally, etc. (Oxford, 2020).

Taking into account these delineations, we define competence as a combination of the individual's abilities and postures to attend to a certain task at a specific moment. The definition emphasizes the temporality of the occurrence of the competence, as it is not something permanent or static, but an event that occurs at the right time and involving appropriate people to accomplish a task.

Among the cited frameworks, only O*NET mentions the concept of abilities. However, its context of use does not match the one addressed in this paper. This is justified by the fact that the authors of the present work consider that competences have different specificities. For example, in a particular area of professional activity it is possible for different professionals to work together and collaborate in a project, with the specificities of competence being responsible for different groups of tasks. In the case of ECF, which articulates skills, knowledge, and attitudes as elements of competence, the specificity of competences is taken into account and reflected in the level of abilities. ECF establishes a relationship between the concepts of knowledge and skills, so that different combinations of knowledge and skills imply varying levels of proficiency related to ability in the context of a competence.

In what concerns abilities in O*NET, the framework treats it as the natural resources of the individual. However, the authors of this paper consider the need to separate what is natural from what is acquired. Abilities have a broader view and include natural resources, which are defined as aptitude, being a factor that influences positively or negatively on the variables that indicate the level of abilities of the individual, corresponding to the natural talent possessed by the professional. The APA Dictionary (APA, 2018) defines aptitude as a potential in a particular area, while the Cambridge Dictionary (Cambridge, 2020) refers to a natural skill or ability. In addition to the facility in some aptitude or some ability, the Business Dictionary (Business Dictionary, 2020) complements by indicating that the individual's interest in some task or responsibility is also a factor that will influence professional performance when putting his/her ability into practice, which will also enable the occurrence of fitness improvements resultant from practice. Therefore, practice is one of the ways to improve competence, that is, it refers to the possibility of someone doing a task in a more efficient way than he/she already does, through experience. The other way to improve competence is to look for training or qualifications that promote professional development, whether through the acquisition of knowledge or the practice of new skills.

Knowledge, considered here as one of the ways that leads to obtaining abilities, is what can be acquired through training courses and education, which, according to IT2017 (IT2017, 2017), must appear in the official documents of the training programs. In the context of EQF (European Communities, 2008), knowledge is referred to as the result of the assimilation of information through learning, which may come from facts, principles, theories, and practices that are related to a field of work or study. Grant (1996) emphasizes that the creation of knowledge is an individual activity and that knowledge is the primary source of value and may be the factor that will differentiate one organization from another, due to the amount of knowledge it might have. Takeuchi and Shibata (2006) emphasize the division of knowledge into two categories, corresponding to tacit and explicit. They refer to the knowledge that can be expressed in words or numbers and that can be shared as explicit knowledge. However, the authors refer to the existence of knowledge that cannot be easily perceived and expressed, called tacit knowledge. This category of knowledge is deeply rooted in an individual's actions and experiences, as well as in its ideals, beliefs, values or emotions.

Another way to support and acquire the ability at the individual level is the skill of the individual. The skill is the knowledge put into practice, considering the possession of the means for such an occurrence. The EQF refers to the skill as the possession of the means to apply knowledge and use know-how to complete tasks and solve problems (European Communities, 2008).

There is a close relationship between the concepts of knowledge and skill since some skills are dependent on the existence of knowledge for their realization. In this relationship, some skills refer to the application of one or more acquired knowledge or natural knowledge. Regarding skill, the fact of "thinking analytically", for example, supports the execution of skills acquired through experience, which can also refer to the execution of skills that reflect the application of knowledge acquired through training courses. The "thinking analytically" skill may be understood as a natural skill, once it is not acquired from graduate or undergraduate courses.

However, the possession of knowledge and skills, which form the ability, is not a unique condition for competence, since the ability holder needs to put it into practice in the service of something. The abilities are fundamental for the execution of tasks inherent to the professional; however, the practice of the abilities implies the maintenance of an adequate posture, supported by dispositions, which will lead him/her to have appropriate and expected behaviors. Personal factors have great relevance to make the skills hold by the professional generate concrete results. The relationship between the concepts, on a personal level, originates from the observed professional posture, which includes dispositions for certain behaviors to be performed (Collins Dictionary, 2020). Thus, posture is defined as a classifier of recurrent behavior in the individual, that is, the moment when the individual responds to a received stimulus. It is necessary to mention that the answer may simply be "non-action".

What sustains the relationship between stimulus and response is the disposition of the professional, considered as an exclusive inclination or tendency of the individual (OXFORD, 2020) to choose an

alternative over others, basically supported by individual preferences (Strickland, 2001). The result, therefore, is the behaviour, conditioned to the environment in which it is located. According to Fonseca (2016), the behaviour is directly influenced by experience, and Peppard and Ward (2004) note that the behaviour of the individual is the result of organizational demands, social demands, and personal demands.

Figure 1 represents the relationships between concepts related to the construct individual competence.

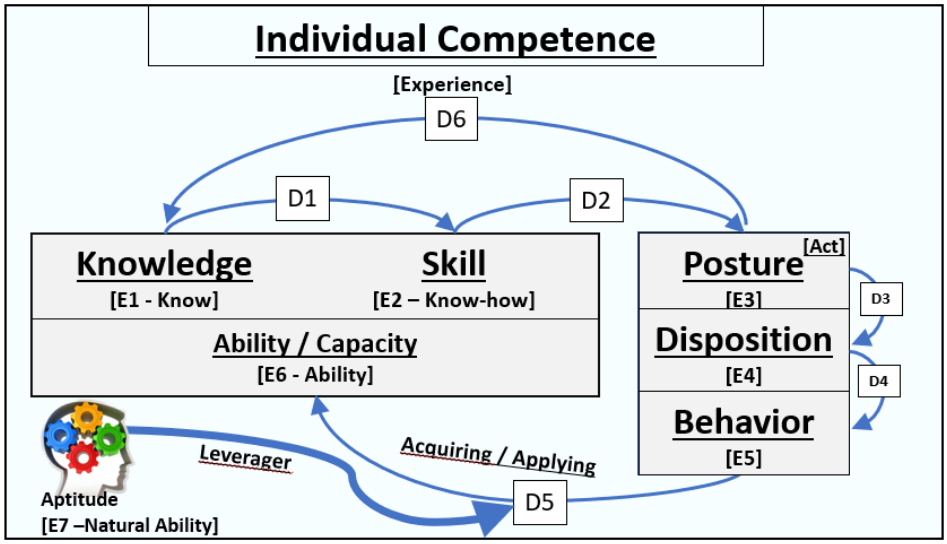

Fig. 1: Relationship between concepts related to individual knowledge

Through Figure 1, it is possible to see that the competence construct, at the individual level, is supported by two main concepts, which are the practitioner's ability [E6] and posture [E3]. The formation of the ability occurs through the combination of knowledge [E1] and skill [E2], and this formation allows even greater possibility to measure the ability and indicate their different levels of proficiency. The posture is dependent on the existence of disposition [E4], which will lead the person to perform different behaviors [E5]. Professional ability can be more easily practiced or improved when there is an individual's aptitude, which is considered a natural ability for an area of professional activity. The arrows in the picture indicate the points where there is a relationship between the concepts, when one considers the dependencies between them, being:

D1: Dependence of skills related to the acquisition of knowledge;

D2: After the possession of the means to perform an action, there is a dependence on the professional posture to effective action;

D3: Dependence on the disposition so that the posture is maintained by the professional;

D4: Behaviors that will result from the disposition;

D5: The behavior of the individual leads to the acquisition of new abilities or leads to the application of abilities already possessed;

D6: Considering knowledge as the basis of skills, there is the possibility of being improved precisely through professional posture and behavior arising from the posture. The fact that occurred at this moment is the acquisition of experience, which influences the attitude of the professional.

Although the relationship between the concepts is clarified in Figure 1, it must be acknowledge that an organization is formed by different people with different backgrounds and experiences. In the next section, it will be discussed the proposal of a generic mechanism that enables the mapping and identification of competences and the indication of a path for improvement, according to measures defined by the organization itself.

Proposal of a Measurement Mechanism

An organization is made up of people, who, at their different hierarchical levels, will have different experiences, although the professional path followed by some individuals may be equivalent. The training may be similar, as well as the professional experiences, but the way of interpreting them will be unique, referring to the beliefs and inclinations hold by the professional, which influence its behavior for the application of its ability.

Considering the different professional profiles present in the organizational environment, it is relevant to monitor the resources that the organization has, which may provide support to identify possibilities for improvement and situations in which the organization's potential is being underutilized. It is also possible to define internal action plans, like offer of seminars, workshops, training, reformulation of the team regarding the projects in execution, to meet gaps related to the identified needs.

Figure 2 is a representation that has eight different points of analysis, related to the concepts covered in the previous section. It is arranged in a way that makes it possible to position the organization at a specific point that corresponds to the relationship proposed, contemplating the training of professionals and their experience in their area of professional activity. This relationship is a proposal that addresses two parameters but that does not define measurement scales. The definition of measures for the parameters should be defined by the organization, eventually by making use of external references, such as widely used competence frameworks or specific references for some area of knowledge. In any case, a document that can assist in the definition of the measurement scale can be the plan of the organization, considering that it contemplates the area of human resources and is in communication with the other sectors of the organization, which will present the demands related to the professionals necessary for the continuity of the organization.

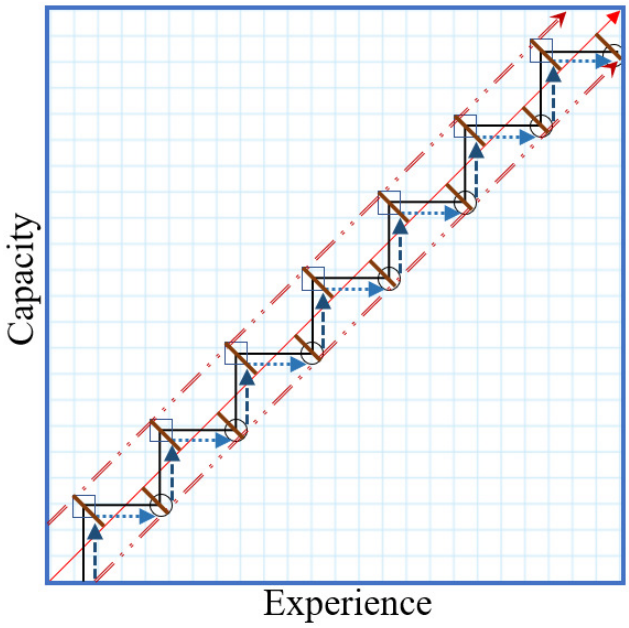

Fig. 2: Evolution of Competence

To facilitate the understanding of the representation in Figure 2, Table 1 provides a legend for the symbols used in the picture.

Table 1: Representations about Competence evolution

ID	Symbol	Meaning
(1)		Evolutionary line of competence
(2)		Aptitude
(3)		Capacity (acquiring Knowledge / Skill)
(4)		Gaining experience
(5)		Ability expansion
(6)		Demonstrated ability
(7)		Posture
(8)		Natural limitations (lack of aptitude)

The first sign, corresponding to *(1)*, represents how competence should evolve. According to the example, the evolution of a professional is measured in terms of experience and capacity, corresponding to the training of the organization's professionals. The second sign *(2)* is the influence of the natural talent, which serves as a facilitator for the evolution of the level of ability. In the representation of phases, the evolution of competence is based on two variables, one vertically and the other horizontally. The vertical renders the moment when knowledge and skills are acquired *(3)*, either through internal training, hiring employees, etc., while the horizontal reflects the moment when the acquired knowledge and skill are placed in practice *(4)* and experience is gained, serving as an influence on the evolution of ability. The sign equivalent to (5) represents the moments when there is an expansion of the ability, motivated by participation in training or qualifications that meet the metrics defined by the organization. In the sequence, *(6)* corresponds to the improvement of the results in the context of professional practice, that is, what the professional can do considering his/her ability. The evolution of ability occurs through the posture of the professional, which leads to the acquisition of knowledge and skill, as well as when faced with a specific scenario, he/she sees the opportunity to apply the ability he/she possesses, being represented by *(7)*, which is the line that is directly related to all the elements of the representation. The *(8)* corresponds to the limitations that a professional may have when exercising his profession, depending on the level of proficiency of his ability.

The Mechanism in Practice

In order to illustrate the application of the mechanism, the following scenario is considered: An organization has 100 employees, 80 of which have an undergraduate degree, 15 have a master's degree and 5 have a PhD degree. The average time of experience of the Bachelors is 1 year and 8 months, while the Masters have 5 years and 7 months of experience and the PhDs have an average of 5 years of experience. Using the proposed mechanism to perform the organization's competences mapping, the result would be as shown in Figure 3. Figure 4 also uses the proposed mechanism; however, it presents greater refinement, referring to the existence of groups of professionals with equivalent values. This representation indicates the existence of different profiles in the staff. To this end, the proposal allows the definition of action plans, to meet the organization's objectives of seeking to level the abilities and experiences of its employees.

Thus, using the concept related to the evolutionary line of competence, proposed in this work, it is supposed that the organization seeks professionals who have more experience in their area of expertise, making possible the leveraging of its employees' competence.

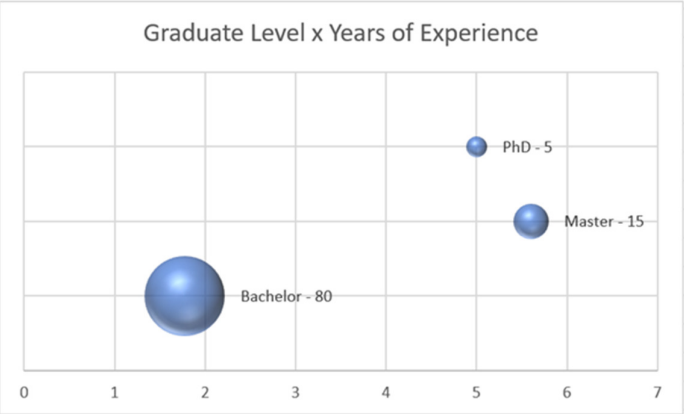

Fig. 3: Competence Mapping

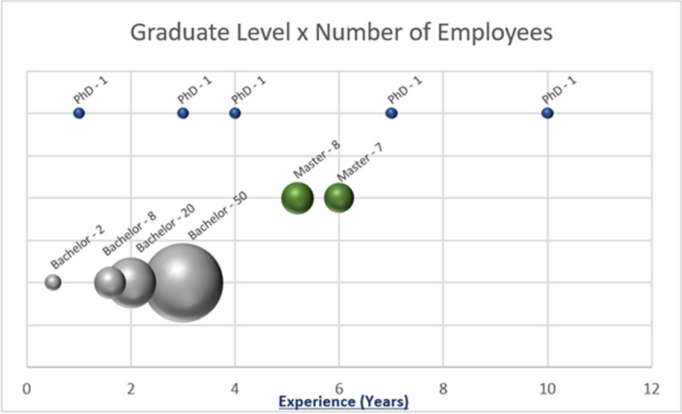

Fig. 4: Group of Competences

Table 2: BPMM Maturity Levels
Based on Object Management Group (2008)

Maturity Level	Description
1-Initial	The processes are performed in inconsistent, sometimes *ad hoc* ways. Results are difficult to predict.
2-Managed	The management stabilizes the work within local work units to ensure that it can be repeatable. However, work units performing similar tasks may use different procedures.
3-Standardized	Standard processes are synthetized from best practices identified in the work groups, providing an economy of scale and a foundation for learning from common measures and experience
4-Predictable	Capabilities enabled by standard processes are exploited and provided back into the work units. Process performance is managed statistically. The process outcomes can be predicted from intermediate states.
5-Innovating	Both proactive and opportunistic improvement actions seek innovations that can close gaps between the organization's current capability and the capability required to achieve its business objectives.

The scope of the proposed mechanism is illustrated in Figure 5. This representation involves the application of the Business Process Maturity Model (BPMM), proposed by the Object Management

Group (OMG) (Object Management Group, 2008). The OMG considers that the adoption of a maturity model provides a way to implement vital practices in one or more domains of the organizational process. This model consists of five levels, which evolve from an organization that has no maturity in the process, with an inconsistent or *ad hoc* process and results that are difficult to predict, to an innovative, proactive organization.

Table 3: Knowledge & Skills for each BPMM Maturity Level Based on Object Management Group (2008)

Maturity Level	Knowledge	Skill
1-Initial	K1- Individualized Methods	
2-Managed	K2 - Planning and management process; K3 - Requirements control; K4 - Costs, schedules, renting	S1 - Develop, prepare, deploy, operate and support products and services; S2 - Follow plans, processes, and procedures
3-Standardized	K5 - Work process; K6 - Support process; K7 - Management people; K8 - Input; K9 - Standards and procedures; K10 - Work activities; K11 - Verification mechanisms; K12 - Results; K13 - Output criteria;	S3 - Develop, prepare, deploy, operate and support products and services across the organization; S4 - Record lessons learned
4-Predictable	K14 - Methods and measures for managing work; K15 - Regression graphs; K16 – Histograms	S5 - Establish and manage assets; S6 - Integrate processes from different disciplines; S7 - Establish processes and plans; S8 - Establish and maintain organization's capability data S9 - Manage job performance and variation; S10 - Manage achieve quantitative performance and quality goals
5-Innovating	K17 - Business goals; K18 - Business implications; K19 - Improvements in defect and problem prevention; K20 - Continuous improvement	S11 - Analyse cause-effect; S12 - Implement corrective actions; S13 - Identify continuous improvement

Table 2 represents the maturity levels of the model proposed by OMG, with the respective description of the scenario and Table 3 contains the Knowledge and Skills corresponding to each maturity level.

Through this representation, following the example of using a maturity model with a relevant contribution for professionals in the IST area, it is possible to align it with managers in decision-making processes that involve the context of available human resources.

In a punctual analysis, the professional can also make use of this mechanism by him/herself. Considering that the professional holds a set of knowledge and skills, these can be put to the test at some point of its professional career, for example, to get a certification. To this end, the mechanism proposed for the mapping of competences may define, in the vertical axis of attitude (7), the values corresponding to the metrics that will be required for getting the certification, as well as depicting, in the horizontal axis of attitude (7), the length of professional experience working in a given position.

The scope of the proposed mechanism, based on the relationship between the concepts related to competence, allows its application in different scenarios since the measures can be defined by the user of the mechanism who, after mapping, may resort to the guidance provided by the concepts covered in this work.

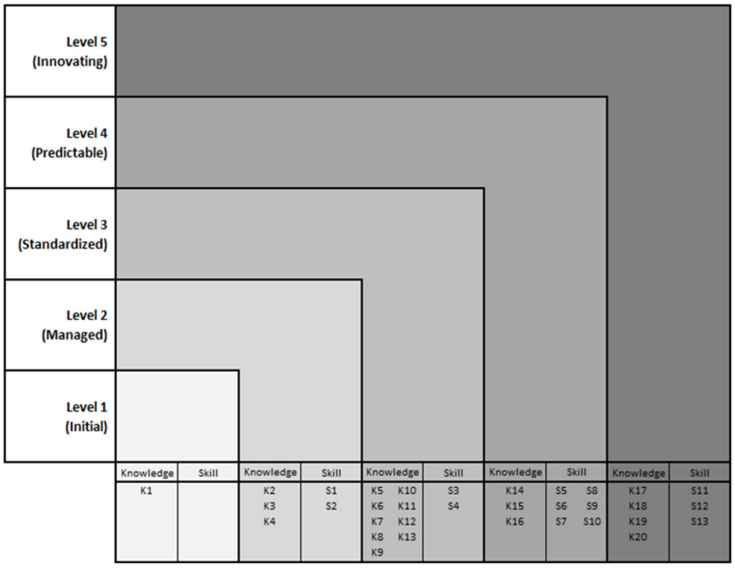

Fig. 5: Competence mapping for BPMM Maturity Levels

Conclusions

During the study of the concepts coved in this work, it was found that measuring competences was also noted as being difficult. Thus, the search for a mechanism that would assist in the mapping of competences began to be defined, emphasizing the importance of meeting different demands, be at an individual or organizational level. Parameters used to measure will certainly be different from one organization to another, as demands are different, as well as the specifics of any given environment. At the individual level, the proposed mechanism also makes it possible to define measures in a generic way, since a professional should be able to identify the appropriate measurement units by using some reference or benchmark in its professional field.

Although the aim of this study is comprehensive and not restricted to particular contexts, exhaustive application of the mechanism is necessary, both as a diagnosis tool and as a tool for monitoring and following up competences and to prove its effectiveness in supporting decisions related to competences.

Future Work

In addition to the definition of a mechanism for managing and monitoring competences, the central theme of this study requires greater attention in situations involving the relationship among competences at different levels of the organizational hierarchy, such as on the individual, group, and organization level. Further studies could focus on portraying the interaction among those levels and finding out how to achieve mutual benefits for improving global competences of organization. In view of the existence of incongruences between the frameworks that used the concepts related to competences, we suggest carrying out work aiming at specifying the components of competences in specific contexts of professional practice and thus contributing to minimize certain misunderstandings, perhaps caused by the lack of criteria for defining those concepts.

Considering the concepts covered in this paper and their relationships, an additional research goal is to develop a set of rules for classifying items related to the competence construct that are currently being used in an *ad hoc* manner, strengthening the scientific research on competences. The purpose of this planned work is to make it possible to pay attention to problems instead of, for example, paying attention to the framework of a profession and the composition of its elements. It is our belief that communication between practitioners and academics will facilitate the structuring of professional careers. Academic institutions would also benefit, insofar as they can better understand the relationship between companies' needs for professionals and training requirements.

Acknowledgments

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Factors Influencing the Life Cycle of Enterprises in the Creative Industries in Slovakia

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Abstract

The aim of the paper is to analyse the life cycle of the enterprises in the Slovak creative industries according to the various determinants such as the economic development and clusters. Creative industries tend to localise mainly around large and medium sized cities forming creative local clusters. The study provides a first empirical evidence of the forces behind clustering of creative industries influencing the success of the creative industries' entities as well as the length of the life cycle. The analysis has been performed for Slovakia. The results show different patterns of clustering of creative employment in Slovakia. The average size of creative industries, the productive diversity and the concentration of human capital and creative class have been found as common aspects of clustering in Slovakia. Our findings provide empirical evidence of the small positive role of historical and cultural endowments as influences of clustering. We make suitable recommendations required to conclude that the length of the entities' life cycle in the creative industries is influenced by the several factors linked mainly to culture, economic progress, modernization and local clusters. The paper contains just the partial results of our research.

Keywords: Creative industry, life cycle, clusters, economic development, Slovakia.

Introduction

The question of how the life cycle model should be implemented to the research of organizations is still an open debate. There have been several attempts to define an organic approach to progress and growth. Many of the previous researches on the lifecycle of small firms have concentrated on its growth path. Key researchers in the field (Miller & Friesen, 1984; Quinn & Cameron, 1983; Rayna & Striukova, 2016) have examined stages of small business progress from beginning to maturity and in so moving, they analysed the formation of a business, their reply to growth and external demands. Overall, they break down to agree on one model. Notwithstanding, they get to the opinion that the failure to determine and integrate business systems and processes can generate a production crisis and stops progress for small firms. In summary, these scientists provide useful templates to reinforce the expansion of small business. Using the manual prepared by Churchill and Lewis (1983), we are prepared to record what could be expected as the first "fruits of success".

The Life Cycle Model of Creative Businesses

For owners and executives of small firms, such an understanding of the business life cycle can assist in evaluating current challenges (de Jong & den Hartog, 2010; Pellikka & Malinen, 2014). As an example, we mention the demand to boost an existing computer system or to employ and train second-level managers to provide planned growth. It can aid in preparing for the key needs at various stages – for example the unconscionable time engagement for owners during the first stage (start-up period) and the need for organization and shifts in their managerial roles when enterprises develop into larger and more complex.

Figure 1 below displays the five stages of small business progress - from birth to resource maturity. In stage 1 – which is the birth stage of the business, the most significant business choices for the future are proposed. Some of these decisions consist of the market capacity for the product, the start-up finances, the extension of production and the capability of the employees. However, as crucial as these activities are, they simply become significant when the small business turns into the survival stage - stage 2. At this stage, the business requires to prove that it is a working entity with clients who are satisfied with its products. The turnover of sales can generate sufficient cash to breakeven. Breaking even and turning to the next stage which is success - stage 3 means a major change because the business owners - they may prefer to stay at the survival stage - maintains supervision over the firm and only they have to decide on the firm's future paths.

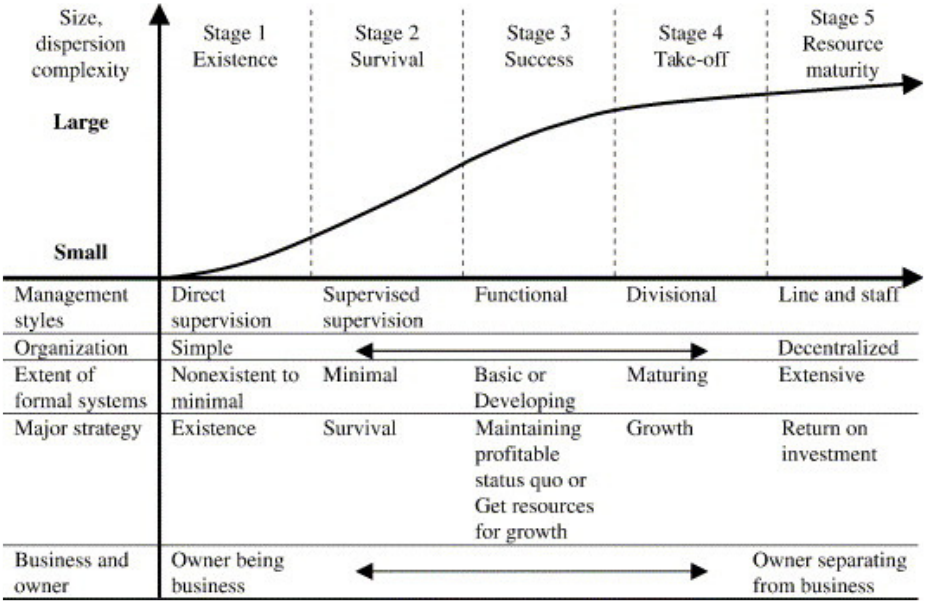

Figure 1: Five stages of a business life cycle

Source: Churchill and Lewis, (1983)

Creative business owners manage to hold back at this stage there by threatening the progression towards resource capability (stage 5).This is because the resolution to move to the following stage (stage 3-D) requires plentiful liquidity, above average profitability and effective financial management with proper production systems (Figure 2). The owner is also supposed to totally or partially withdraw from the firm (Mota et al., 2020). This fear of carrying out these modifications in a healthful manner leaves a number of owners holding back at the value of the increase of the business. In breaking stage 3 into stages of success, Churchill and Lewis (1983) demonstrated that small businesses are located in a continuity from which it can go forward or last the same. It is frequent to encounter that the condition of disengagement by owners of creative business is painful and turn into the seed of its eventual breakdown.

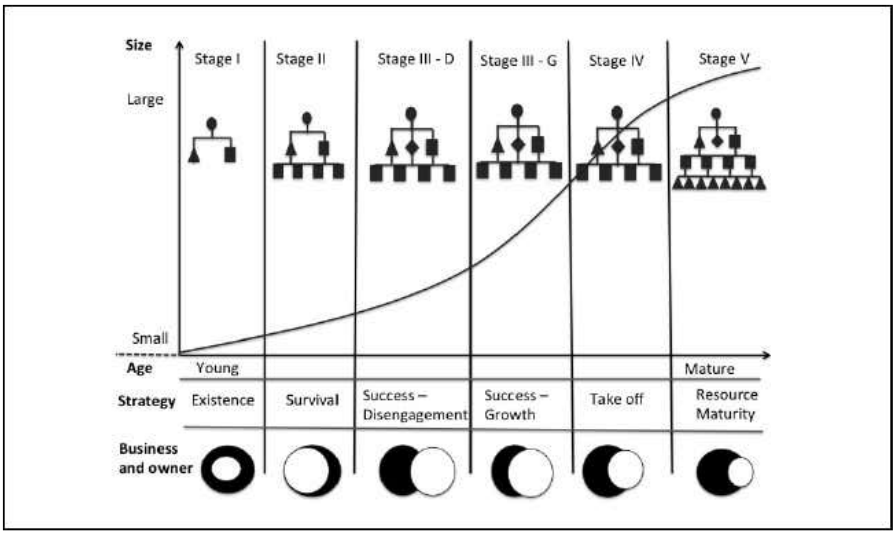

Figure 2: Development of the ownership throughout the business life cycle

Source: Churchill and Lewis, (1983)

The modern theories in industrial dynamics present a way to explain the spatial expansion of industries as a transformative process (Lazzeretti et al., 2019). Using data on the access and quit of companies, the additional information on the location of enterprises provides one with an expanding spatial placement of entities in the creative industries. One can suggest the question to what extent an expansion in spatial concentration derives from differential spinoff rates (considering that spinoffs locate in the same province as their parent enterprise) as well as to what extent spatial concentration influences the survival percentages of new enterprises through agglomeration effects (Rodrigues & Franco, 2020; Zhou & Verburg, 2020).

The rest of our paper is structured as follows. Section two presents data and the methodology used, section three provides results and discussion related to our research, while the last section concludes the results of the research.

Data and Methodology

The aim of the paper is to analyse the life cycle of the enterprises in the Slovak creative industries according to the various determinants such as the economic development and clusters located in Slovakia. Creative industries tend to localise mainly around large and medium sized cities forming creative local clusters. The study provides a first empirical evidence of the forces behind clustering of creative industries influencing the success of the creative industries' entities as well as the length of the life cycle.

The industrial geography literature generally describes the clustering by place-specific elements and agglomeration economies. This approach covers interests that can be utilized by companies that are settled in a region. It is trivial to separate between localization and urbanization economies. Such local assets entail better infrastructure and a larger diversification in local industries and relevant technologies. The research questions were following:

- **Research question no. 1** - Are the biggest creative industries' clusters of the by the number of businesses located in the regions with the highest GDP?
- **Research question no. 2** - Are the birth of the enterprises in the creative industries influenced by the economic situation of the country?

The data used in the research were provided by the Eurostat Database and the Finstat Database. The Finstat Database provides various data about business entities located in Slovakia. The most important data sources processed in the mentioned database are Business Journal, Business Register, The Trade

Register of the Slovak Republic, Register of Financial Statements, Bankruptcy Register, lists of debtors from insurance companies, lists of financial administration and court decisions (Finstat, 2020).

Our research sample consists of 3 978 businesses in the Slovak creative industries and we have selected the following four specific activities included in the creative industries:

- Other professional scientific and technical activities (SK NACE 74.900),
- Organization of congresses and business exhibitions (SK NACE 82.300),
- Providing the artistic education (SK NACE 85.520),
- and Supporting activities related to performing arts (SK NACE 90.020).

Results and Discussion

The economic development of the country can be measured by the various indicators. We chose the GDP as the most relevant economic indicator for our research. Figure 3 shows the development of the GDP reached by the regions in Slovakia (in mil. EUR).

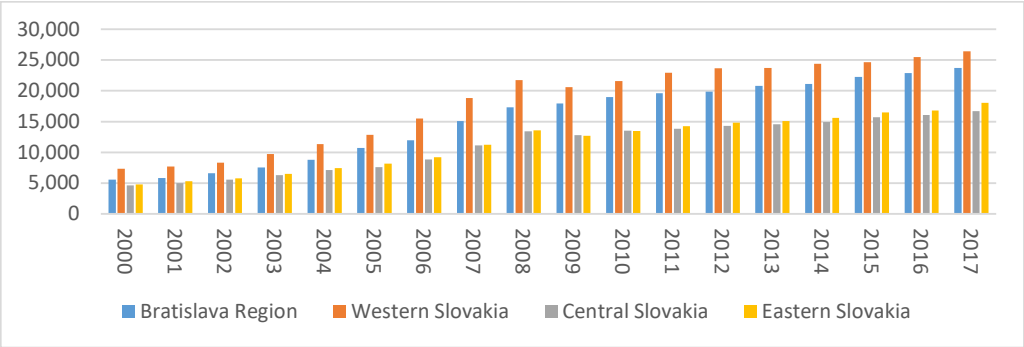

Figure 3: Development of Regional GDP in the Slovak Republic (2000-2017)

Source: own processing, data extracted from Eurostat database.

The economic conditions in clusters may radically influence the first stage of the creative business life cycle. In another words, clusters represent the density of the creative industries' entities. Creative industries contribute to cluster in specific places and the reasons of this aspect can be due to a plenty of factors related mainly to culture, creativity, innovation and local development (Vitálišová, Vaňová & Borseková, 2015). Five concepts have been examined: the reasons of creative clustering linked to the existence of historical and cultural heritage and the relations of this method to cultural cluster and region, the influence of agglomeration economies and the organization of the industry, the approach of "related variety" and its contribution to the clustering of creative projects, a fourth approach deals with the role of human capital in clustering and the fifth relies on the creative class. The interpretation of the process of clustering of creative industries has been mainly concentrated from a descriptive and conceptual point of view rather than modelled or mathematically determined. According to the research provided by Baculáková (2018), Slovakia has four clusters. Cluster 1 is presented by the Bratislava Region with the highest density of creative industries' entities, Cluster 2 consists of following regions: Trnava, Žilina, Banská Bystrica and Prešov; Cluster 3 covers the Trenčín and the Košice Region; and the Nitra Region represents Cluster 4. Cluster 1 with the highest number of creative industries' businesses is located in the Bratislava Region. Western Slovakia (the Trenčín, Nitra and Žilina Region) has reached the highest GDP, but the biggest clusters in the number of businesses are not situated there. The research assumption that the biggest cluster is situated in the region with the highest GDP was false.

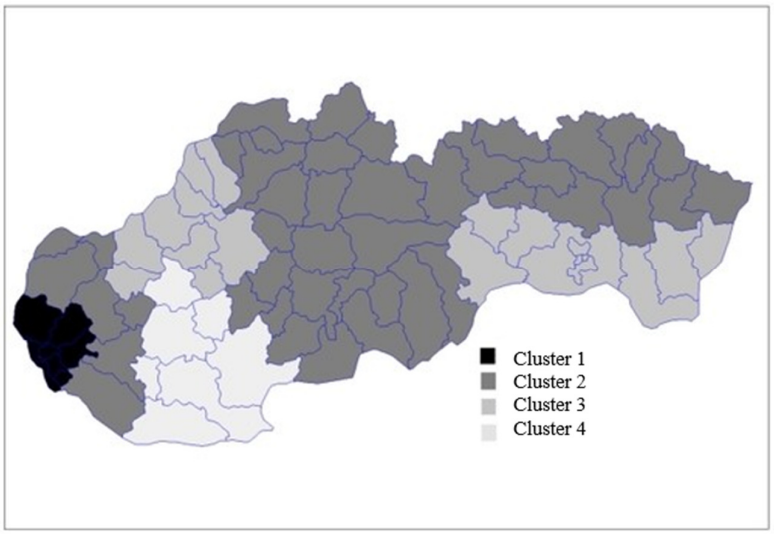

Figure 4: Regional Clusters of Creative Industries in Slovakia

Source: Baculáková, 2018.

Figure 5 illustrates the development of the GDP in Slovakia from 1995 till 2018. The data for year 2019 are not available yet. Real GDP growth rate data in Slovakia are available from 1995 to 2018, with an average rate of 4.3 % (Eurostat, 2020). The data reached an all-time high of 13.9 % in Q4 2007 and a record low of -5.9 % in Q1 2009. The decrease of the GDP growth rate was caused by the global financial crisis which started in 2008. One can see the constant growth of the GDP excluding the beginning of the financial crisis.

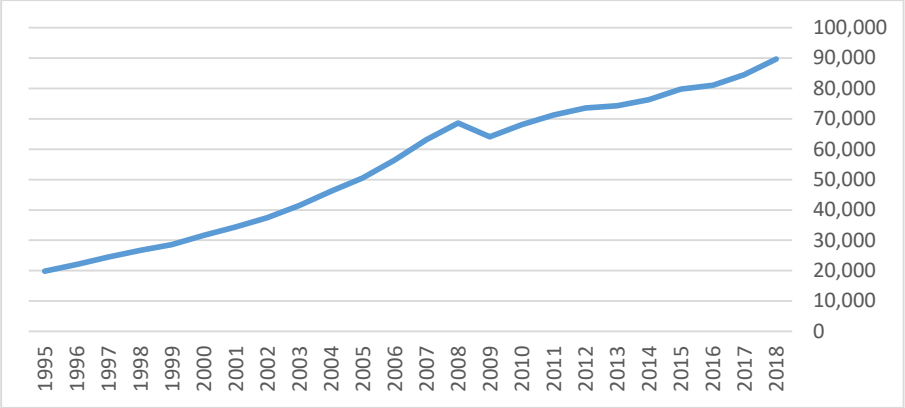

Figure 5: Development of GDP in Slovakia (1995-2018) in current prices (mil. EUR)

Source: own processing, data extracted from Eurostat database.

As we mentioned above, the significant growth has been reported in the group of enterprises providing other professional scientific and technical activities (SK NACE 74.900). In overall view, we may confirm that the development of enterprises providing other professional scientific and technical activities is related to the economic development in Slovakia. On the other hand, the enterprises organizing the congresses and business exhibitions (SK NACE 82.300) are stagnating (Figure 6).

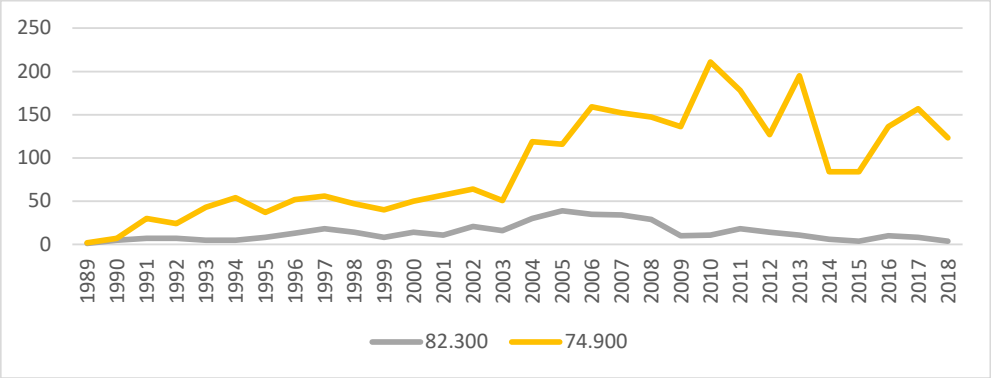

Figure 6: Development of enterprises providing other professional scientific and technical activities and organization of congresses and business exhibitions (1989-2019)

Source: own processing, data extracted from Finstat database.

Figure 7 illustrates the development of enterprises providing the artistic education (SK NACE 85.520) and enterprises focused on supporting activities related to performing arts (SK NACE 90.020) from 1989 till 2019. The progress of enterprises providing the artistic education is opposite to the development of the Slovak GDP. In this case, we have to reject the assumption that the number of the enterprise's birth is influenced by the economic development. For the group of enterprises focused on supporting activities related to performing arts (SK NACE 90.020), the research assumption is confirmed.

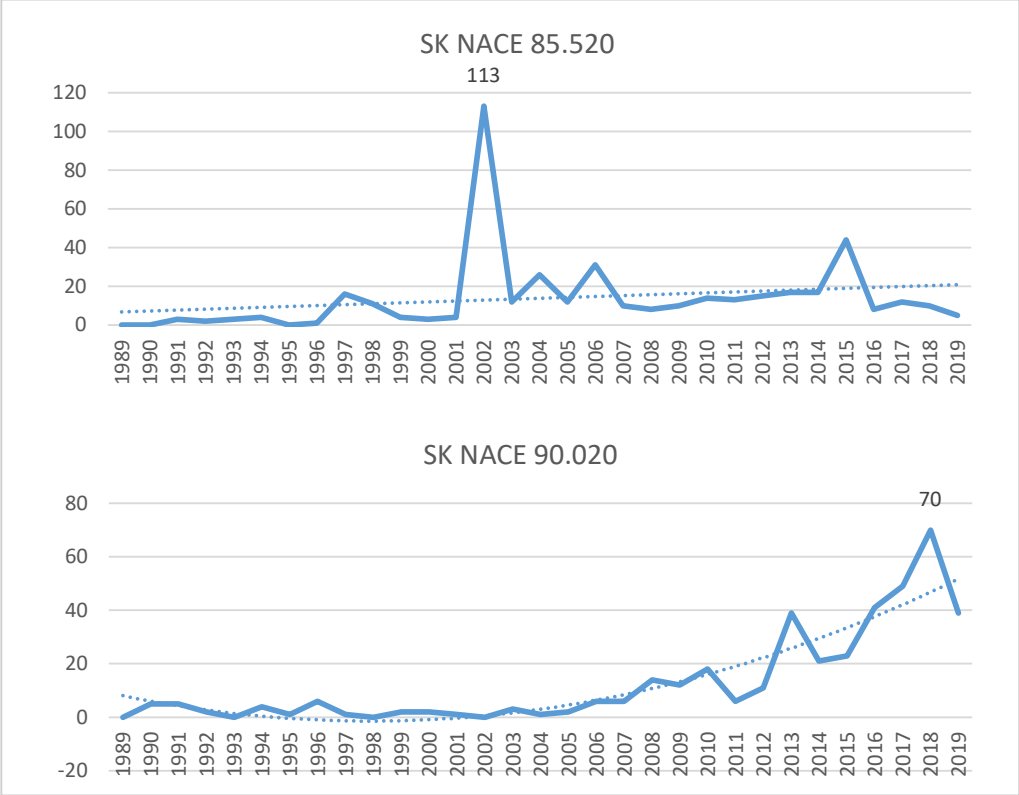

Figure 7: Development of enterprises providing the artistic education and enterprises focused on supporting activities related to performing arts (1989-2019)

Source: own processing, data extracted from Finstat database.

Conclusion

As the literature review in the first part of this paper proved scientists in East Central Europe followed the academic discussion on creative economy after the beginning of the new millennium. This was partially related to the prosperous economic restructuring of these regions and the increasing role of creative industries, and partially the intrusion of EU policy measures and programmes. Results of global comparative research projects, as well statistical reports focusing on the macroeconomic position and local pattern of creative economy in different countries became commonly distributed. Our paper fits to the second group of studies, as we analysed the varying geographical pattern of creative economy in Slovakia, based on statistical data.

A firm's development stage affects the managerial considerations that must be dealt with. Realizing its development stage and subsequent plans enables managers, owners, business partners and investors to make more knowledgeable decisions and to strengthen themselves and their enterprises for later challenges. While each company is special in many ways, all deal with similar issues and all are subject to considerable changes.

Cluster 1 with the highest number of creative industries' businesses is located in the Bratislava Region (the second highest GDP in Slovakia). Western Slovakia consisting of the Trenčín, the Nitra and the Žilina Region) has reached the highest GDP, but the biggest clusters in the number of businesses are not situated in these regions. The research assumption that the biggest cluster is situated in the region with the highest GDP was rejected.

The progress of enterprises providing the artistic education and the enterprises organizing the congresses and business exhibitions is opposite to the development of the Slovak GDP. In these two cases, we have to reject the assumption that the number of the enterprise's birth is influenced by the economic development. For the group of enterprises providing other professional scientific and technical activities and enterprises focused on supporting activities related to performing arts, the research assumption is confirmed.

Acknowledgments

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Impact of Cloud Mobile Solutions in the Education System

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Abstract

The number of mobile phones and mobile phone subscriptions has grown significantly in the last years. More and more powerful phones are launched in the market. This has driven the development of various mobile applications for different fields of activity, one of them being the education area. Also, the cloud in mobile solutions is increasingly present, having the role of enriching the user experience by boosting the capabilities of the mobile devices through increased processing power and increased storage capability. The goal of our paper is to analyse the impact of cloud in mobile solutions for educational systems. Our methodological approach in this paper is to obtain statistical data about the usage of mobile devices, the cloud services and educational applications in order to analyze the role of cloud in mobile solutions and its impact for the educational systems. In our research we observed an increasing usage of mobile devices and a preference of those devices over desktop computers. Also cloud mobile data traffic increased in recent years compared to non-cloud mobile data traffic. Given the fact that the educational systems require more computational power and more storage capability, cloud is a natural option for those. Also, the number of mobile solutions in educational systems has increased in the last years, fact that changed the way an individual can learn and manage activities in schools.
From our results of the analysis we've concluded that cloud mobile solutions already have a high impact in the educational systems and will continue to change the schools for the upcoming years, by offering easier access to learning resources. The impact will be more felt in the developing countries which currently have difficulties in accessing decent learning resources.

Keywords: Mobile Applications, Education System, Cloud, M-Learning

Introduction

In the last years the number of mobile phones users has grown significantly, which has led to a continuous improvement of the phones capabilities over the years (Kemp, 2020). The rapid development of phones has resulted in the emergence of various mobile applications for different fields of activity, one of them being *education*. In the last years worldwide there have been created various mobile applications that help students in their learning processes.

The best mobile phones in the world come from the most important manufacturers, including Apple, Samsung, Huawei or Sony, but also new companies such as OnePlus or Xiaomi (Jessica, 2020). In the last 10 years many features of the phones have changed enormously, most of them for good, since they are really true mini-computers. If we were to think of a few minuses, the biggest one is that the top models are extremely expensive, other minus is that the batteries rarely last for more than one day of use, and another negative aspect is that the phones weight, most of them can be considered as heavy (Jessica, 2020).

More and more advanced technologies have strongly penetrated in the field of education (Raja & Nagasubramani, 2018). There have been created various mobile applications around the world that help students in their learning process like Smart Vocabulary, Zoom, Edmodo, Kahoot!, Socrative Student, Quizlet, Evernote, Google Classroom, Google Earth, Duolingo and many others (Group, 2020). More software and hardware resources are included in the process of developing the educational applications

and by that are offered courses and teaching materials with rich educational content, supporting learning and assessment to those interested.

Cloud computing technologies have become increasingly popular in recent years. Cloud computing allows to store data and applications and provides very powerful computing services. A big attraction of the cloud is the fact that it reduces the cost to build your own infrastructure. The increasing capacity of the networks to transmit data over long distances, cheaper high performance computers and mobile devices and also the low cost storage units have increased the popularity of the cloud. (Kushida, et al., September 2011)

Mobile technologies in the cloud environment face an increasing interest nowadays by bringing richer computing resources for the users of mobile devices. Although mobile devices are becoming better and better in terms of resources and computing power, they are still considered limited. Our current technological evolution is leading to an increase in the volume of data, which calls for more demanding programs to process it. In this case, Mobile Cloud Computing attacks the limitations of mobile devices such as: processing capacity and storage capacity, delegating these requirements to other systems with better performance and richer resources. (Akherfi, et al., 2018) (Noor, et al., 2018)

In this paper our methodological approach is to obtain statistical data about the usage of mobile devices, the cloud services and educational applications in order to analyze the role of cloud in mobile solutions and its impact for the educational systems.

This paper is structured in 4 chapters, an introduction in which we make a general presentation about mobile devices, education and cloud computing. After that we have 2 chapters for the literature review and the analysis of the mobile solutions for the education sector. At the end of the paper we have the conclusions chapter in which we draw a line and conclude about the impact of the cloud for mobile solutions in education.

Literature Review

In the last years the number of mobile phones users has grown significantly from 2.5 billion users in 2016 to over 3.2 billion in 2019 and it is forecasted that in 2021 there will be 3.8 billion mobile users **(Holst, 2019)**. This has resulted in a continuous improvement of the phones over the years, as shown in figure 1.

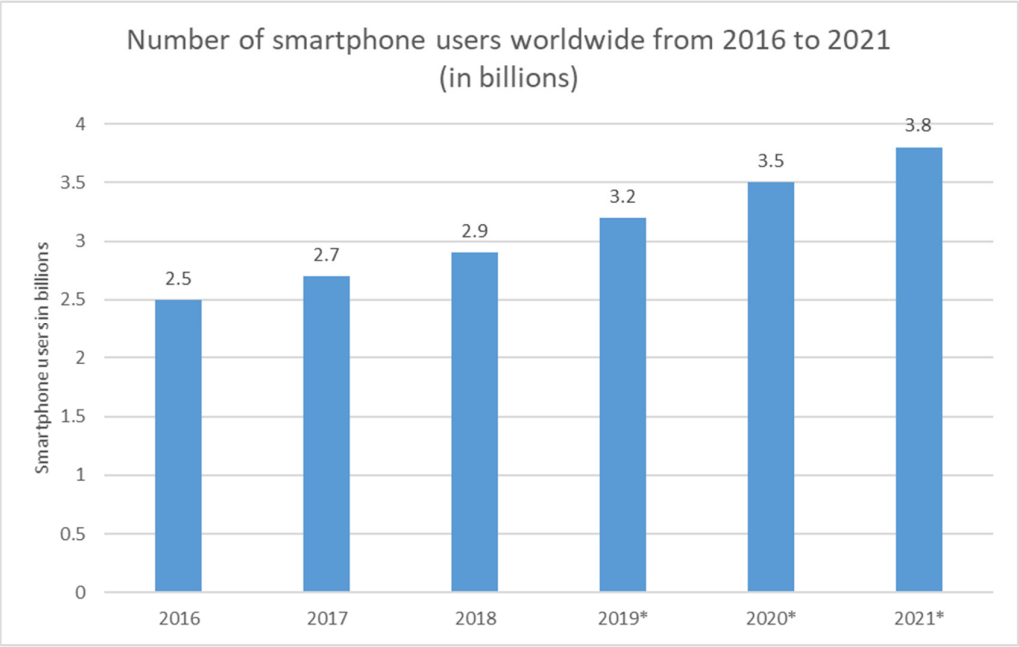

Fig. 1: Number of smartphone users worldwide from 2016 to 2019 and the forecast for 2020 and 2021 (Holst, 2019)

Also recently, the usage of mobile devices has outgrown the usage of desktop/laptop devices (StatCounter, 2016). Being easier to carry from place to place, mobile devices are the preferred choice for accessing information at anytime from anywhere.

A research from Statista made last year that present the findings of Mary Meeker, published in the annual Internet Trend report suggests that smartphones consume about a quarter of our day for an individual (Anon., 2019). Although, we can see from the chart in figure 2 that in 2018 from the total of 6.3 hours per day in a digital environment, people from U.S. spend 4 hours in front of their phones, a significant larger time than the time spend in front of desktops or laptops and this is emphasized by the stronger networks to which mobile devices are connected, especially due to the last jump in mobile network connectivity, 5G (Anon., 2019).

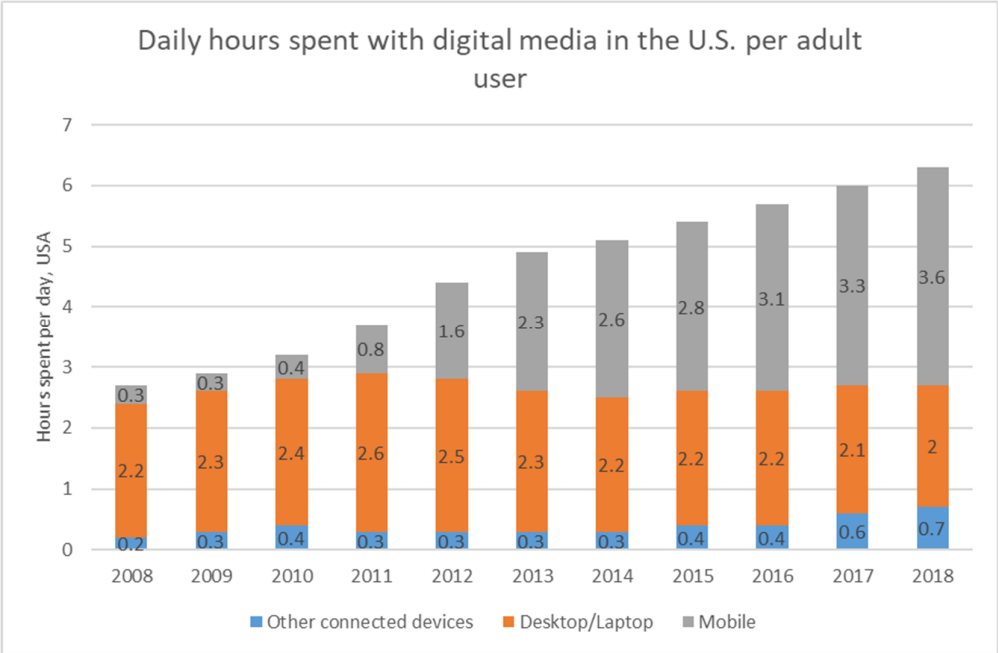

Fig. 2: Daily hours spent with digital media in the U.S. per adult user ***(Anon., 2019)***

Mobile devices, although more powerful in terms of resources, which allow them to run more demanding applications, are still limited. They are currently on the same level in terms of processing power with some laptops but their highest limitation is the battery lifetime which doesn't last long. So, running demanding applications, although being possible with the current processing capacity of the mobile devices is not recommended, because this will shorten the battery lifespan.

In order to preserve the battery and limit the calculations made by mobile devices, the answer is mobile application offloading. With offloading, the mobile application and the device become just a client, tasking a server with the processing, increasing the efficiency of the device and thus extending the battery life. Cloud services are perfect for this task, they are already being used to host applications that run in the cloud. Also, the cloud has another benefit for mobile devices, such as extending the storage of the device. This is particularly important for educational platforms, which require large storage and processing power.

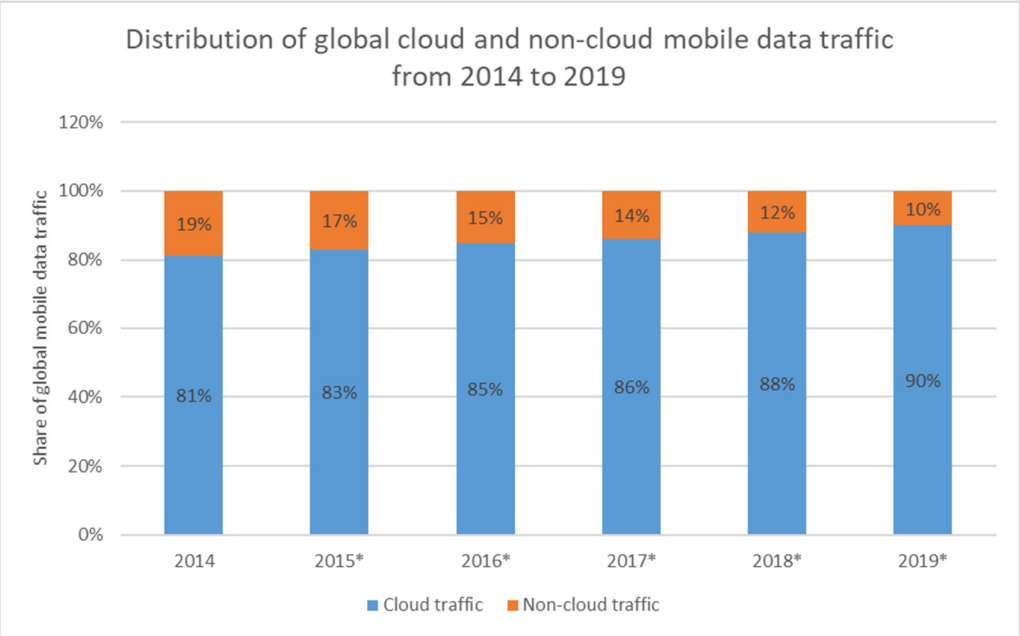

Fig. 3: Distribution of global cloud and non-cloud mobile data traffic from 2014 to 2019 ***(Anon., 2015)***

Mobile devices and the cloud work well together, the cloud being able to reduce the deficits of mobile devices, processing power which drains the battery and storage limitations. This is also shown in a survey made by Cisco Systems in 2014 which was released in February 2015 and published also on Statista. This survey indicates, as shown in figure 3, that in 2014 cloud traffic for mobile devices was already 81% of the total traffic globally with 19% being non-cloud traffic. They also made a forecast for the next years up to 2019 that shows a growth in cloud traffic and a decrease in non-cloud traffic (Anon., 2015).

Analysis of mobile solutions for the education sector

In the context of the current technological development, the educational area is facing more and more challenges in adapting to the ever-changing needs of the students (Litvinov, et al., 2018). The increasingly diversified expectations and the presence of mobile phones in everyday life has led to the emergence of a new method of learning, learning through mobile devices (m-learning), attracting the interest of more and more researchers (European Students' Union (ESU), n.d.). Conventional methods of learning can now be joined by other non-conventional methods, more adaptable to rapid progress, one of these methods being represented by the notion of learning by electronic devices (e-learning).

In the last fifteen years, e-learning has become a real viable alternative to the traditional educational practices, being implemented in more and more institutions. The concept of electronic learning can be defined as a form of formal or non-formal education with established learning objectives, where the interaction between participants is facilitated by computer or communication technologies (European Students' Union (ESU), n.d.).

Over time mobile learning has become an important tool for education, preferred due to the flexible and personalized approach of learning (Ally & Prieto-Blazquez, 2014). Also, the interest in mobile learning grown because the students spend a lot of time using their mobile devices. When using mobile devices students can access online platforms, attend online courses, read books, contact teachers or take exams as they would do in the formal education (Ally & Prieto-Blazquez, 2014). The notion of mobile learning comes as a natural extension of the broader concept of electronic learning. The main difference is due to the higher degree of availability and accessibility that can be achieved using a

mobile learning environment. The implementation of this notion brings substantial benefits to the quality of education within the whole community (teachers, students or parents). There are also opinions in the literature that, in addition to support for the learning component, mobile learning also includes all the interactions that take place between teachers, students or other members who can be part in the learning process (Andrews & Haythornthwaite, 2007). In a simplistic approach, the m-learning can be defined as "the ability to access educational resources, tools or other materials at any time, from any location, using a mobile device" (Development Fund, 2010).

The mobile market experienced an accelerated growth rate from $2936 million in 2014 to $3522 million in 2017 (Technologies, 2017). Moreover, within the Apple app store, education applications were among the top three most used apps in the May 2019 (Technologies, 2017).

A survey published by J. Clement, based on more than 10,900 mobile devices, from September 2019 shows that worldwide the mobile educational applications are present in almost 29% of the mobile devices, while almost all of the devices have tools, communication, travel and local, social, music and audio mobile applications (Clement, 2019).

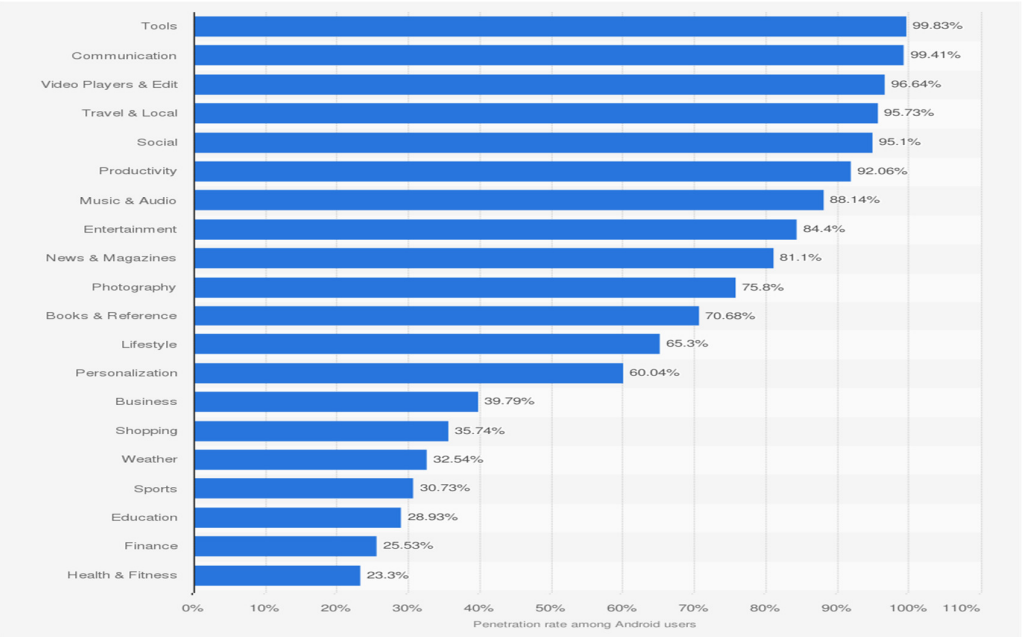

Fig. 4: Popular Android app categories worldwide, September 2019 (Clement, 2019)

All this research and improvement of mobile cloud solutions has led to the emergence of the mobile educational solutions. Worldwide can be found thousands of mobile educational solutions. A very good example is Mobitti, which is an application that provides mobile services and applications for universities and colleges. The main features of the solution are Android & IOS support, exams, grades, timetable, check student attendance, push notifications, social capabilities, private mobile messaging service for students and faculty, in-campus navigation, links to social networks, high security and many more (Mobitti, 2020). Other example is Creatrix Campus, which is a company founded in 2006 that has clients in 18 countries, with more than 150 clients, more than 12 years of mobile and web development and has developed more than 250 web and mobile projects. Creatrix Campus is a campus management system that helps colleges or universities to align their core academic and administrative processes with the current technologies and gives them the ability to compete in today's market. Creatrix Campus offers an automated scheduling software, online evaluations and assessments, learning management system, curriculum management, chat bots, and many others services (Creatrix Campus, 2020).

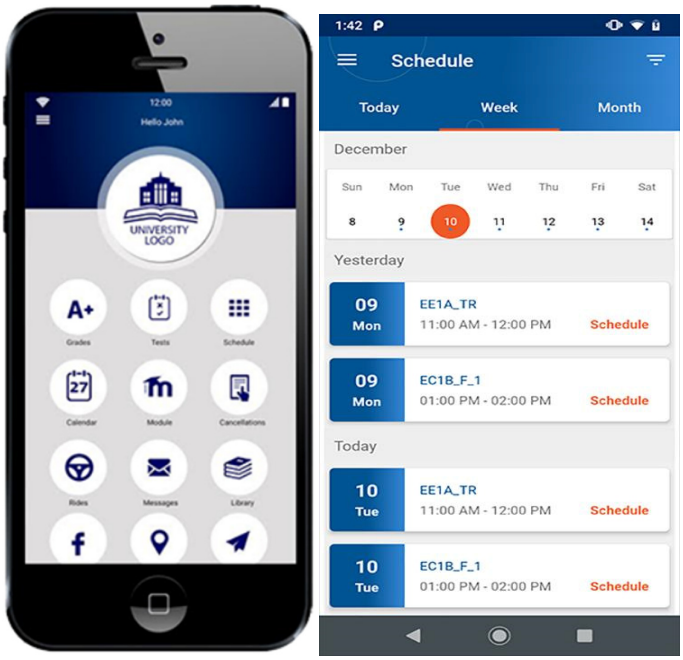

Fig. *5*: Mobitti and Creatrix Campus mobile cloud based applications (Mobitti, 2020) (APKPure, 2019)

The Creatrix Campus mobile application improves the collaboration and engagement between the faculty, teachers, administrators, students and parents. The users can easily get access to information related to profile, attendance, assignments, grades, fee payments, events, etc. Also, they can track all their activities and schedules in real time such as grades, transport, attendance to courses, news, events and more. The application can be used to store and retrieve files and documents such as assignments and assessments without syncing to the mobile service. We can say that the Creatrix Campus application is an important tool for education, preferred due to the flexible and personalized approach of learning (Sriram, 2015).

Conclusions

Our research resulted that the number of educational solutions for e-learning is increasing. Also, these solutions are becoming more and more complex and are helping more in the educational processes, like organizing classes project and exams, take quizzes give grades and share educational resources. M-learning is more present with the increased usage of mobile devices, which is a consequence of the increasing number of these type of devices. From our research we have seen that the majority of the traffic for mobile devices is cloud traffic and with the benefits of the cloud we are convinced that the cloud is having a big impact in improving the mobile solutions for education.

The biggest impact will be encountered in the developing countries, like the countries in Africa. The fact that the costs with mobile devices are not high and those devices are more and more available will convince the authorities to buy them in favour of desktop PCs. Mobile devices are a better choice especially because they are easier to be deployed in schools and are easier to be moved from unit to unit, depending of the needs of each unit and the changing number of children learning in those.

The cloud will be also be a big game changer by allowing the schools, especially those in developing countries to use an existing infrastructure without the need to build one in house. This will save costs and time in developing a hardware and software architecture that might fail as a project, if the people involved don't have the right skills. Also this will take the need for administration for such a system which would take considerable resources in man power to keep this kind of system alive.

There are already many educational resources available on the market, which are ready to use, further reducing the cost and time for development. Those solutions will need the cloud infrastructure because of the demanding computing power required and large storage needed. Those systems could be used not just for storing courses for students, but also manage teachers, students and gradebooks. Also, complex educational systems can be used for managing exams and allowing children to take tests on mobile devices connected to the cloud, further enriching the educational experience.

In conclusion, we can say that the mobile solutions in cloud have currently a strong impact in the education system and can change the future for education worldwide.

Further research is required on this subject and a future direction in this research will be a case study for the schools that adopted e-learning solutions based on the cloud and the analysis of the changes that these solutions bring to the conventional methods of learning in these schools.

Acknowledgment

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The Impact of State Reforms on The Russian Federation's Agriculture Development

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Abstract

The article outlines the main stages of Russia's agricultural development in the wake of state reforms since the beginning of the 90s until the present time. It studies the agrarian reform of the 90s, which formed private ownership and created interest in getting profit from economic operations. At the same time poor legislation, severing of economic ties, the lack of due support of farmers undermined large-scale agrarian companies, reduced agrarian lands and led to a significant dependence of the country on food imports. The article focuses on a priority national project of agriculture development fulfilled in 2006-2007, its contribution to the recovery of agriculture, and stresses insufficient elaboration of support measures for companies of various sizes, the weakness of financial support channels. Special attention was paid to a state agriculture support progamme of 2013-2020.The article assesses the effectiveness of the state measures with the help of financial indicators of agricultural companies. Our critical approach demonstrates that further modernization of Russia's farming is only possible, if there is long-term financial stability in the segment. At the same time the technologies producing high-quality local seeds and modern equipment should become the priority directions for investment. A state import substitution programme had a significant positive effect on the investment attractiveness of agriculture.

Keywords*:* Agricultural Companies, Agro-Industrial Complex, State Reforms, Development.

Introduction

The share of agricultural products in Russia's GDP is growing thanks to an agriculture programme adopted by the Russian Federation government in 2012. The share rose from 4.64% in 2012 to 5.4% in 2019. The GDP is to grow by 0.3% and the current trend of expanding food exports will persist until 2024 (Deloitte, 2019). This demonstrates that agriculture accounts for a significant share of the Russian economy and the share increases. At the same time, we should note that the share of agriculture in GDP fell both in developing and developed states in the last decade. The question arises: is this change good for the national economy's competitive advantages? The positive factors include higher independence of the Russian economy on all types of food imports, creation of jobs at farms and agricultural organizations, a better food quality, the launch of innovative technologies in plant growing and cattle breeding. The positive effect from agriculture exports support spreads to transport, wholesale, construction, machines and equipment. There are also negative factors – for instance, plant growing greatly depends on the weather, while cattle breeding can be prone to the loss of livestock from epidemics. There are also difficulties in forecasting the agricultural market trends, which translates into fluctuations of the financial result. This is why to assess the effectiveness of farming on the whole, we have to assess financial indicators of Russian agricultural companies in the wake of the government's supportive measures.

Literature Review

The Russian agriculture has undergone large-scale reforms in the last three decades. First, the agrarian reform of the 90s, which introduced a sea change to all the farming processes. D. Sedik, Z. Lerman, N. Shagaida, V. Uzun, R. Yanbykh analyzed the results of Russia's agrarian reform from1990 to 2015 (Sedik, Lerman, Shagaida, Uzun, & Yanbykh, 2018). Privatization, forming of

private ownership in agriculture, the appearance of interest in the financial result and the possibility of reinvestment in development made this industry attractive for dozens of thousands companies, hundreds of thousand farmers and millions of independent farms. Simultaneously, the unwise policies of the 90s led to a lower turnover of land used for agricultural purposes from 214 mln ha in 1990 to 195 mln ha in 2002, or 8.8%. It was only thanks to a new developing and preserving concept of agriculture in the new millennium and implementation of a 2014–2020 federal target programme Development of Russian Agricultural Land Reclamation, which produced positive signs (Brooks, K., & Lerman, Z, 1994). However, the situation is far from ideal, because not all agricultural land is used for that purpose.

Priority national project Agriculture Development implemented in 2006-2007 (Barsukova, 2007) is the proof the necessity and good reason behind state support for the achievement of state strategic purposes. It is worth mentioning that it was one of the four projects launched by the Russian Federation government in that period. The agribusiness, of course, is one of the country's priorities capable of ensuring long-term strategic security.

The key development vectors under the priority national project were faster development of cattle breeding, incentives for the spread of small farms, provision of young farmers with housing in the rural settlements. Initially, the programme amounted to 35 bln rbls, but the priority national project was replaced with a 2008-2012 State Program for the Development of Agriculture and Regulation of Markets for Agricultural Products, Raw Materials and Food in 2008 (Svatoš, Smutka, Ishchukova, 2014).

A wholly new state programme was developed in 2012 until 2013-2020 (State Program, 2019). This programme has attractive conditions for boosting investment in agriculture as one of the key goals. This programme ensures comprehensive development of agriculture, all-encompassing initiatives both in cattle breeding and plant growing, it counts 11 subprogrammes, which ensure comprehensive agriculture development and support to hi-tech innovative solutions.

Concept Headings

The negative factors of the 90s were so strong that by 1998 agricultural production volumes amounted to just 56% of the 1990 levels in comparable prices. In fact, farmers found themselves in very tough conditions in the 90s due to the collapse of old and the absence of new effective development mechanisms, pauperization of households, the end consumers of food, multiple price growth for materials and resources compared with agricultural goods and the overall collapse of parity in interindustry relations (Barsukova, 2017). To be fair, we should note that no country has agriculture functioning totally on market principles. Subsidies exist both in the developed and developing states neutralizing the risks immanent in agriculture because of the impossibility of creation of full protection from drought, floods, hurricanes and simply harsh weather. Of course, financial provision for this activity created in the Soviet times ceased to exist, while new instruments did not work, the crediting system failed to create conditions for production and promotion of food. Besides, the integration links between agriculture, the producers of agricultural equipment, the processing industry and retail were severed. Such business conditions explain the low attractiveness for investors, falling investment, a critical level of fixed assets deterioration. There was no prestige in being a farmer in the 90s, and even if some industries did produce a margin, it was much lower than the one in production and exports of raw materials (oil, timber, metals, etc) or creation of financial pyramids.

The Russian companies received a positive impulse for development in 1998 after ruble devaluation and as a result better competitiveness of local products thanks to low prices. However, the scale of the agricultural crisis was so vast that the 1990 production level was only achieved in 2004. The ensuing international oil price growth prevented long-term development of agriculture thanks to the1998 ruble devaluation. The farming margins shrank fast compared with other industries because of price growth for fuel and other resources (Barsukova, 2007). This means that agriculture cannot be effective without state support and bring the margins comparable with other businesses.

Under the priority national project Agriculture Development in 2006-2007, the following measures to develop cattle breeding were chosen – subsidies for commercial credits with duration of up to 8 years with targeted use for construction, reconstruction and modernization of cattle breeding farms; the purchase and leasing of highly-productive pedigree cattle as well as machines and equipment for cattle breeding farms. The method of financial support was seriously discussed before the launch of the project – whether they should be direct subsidies or interest subsidies. It became Russia's first programme, which did not provide for direct investment in agriculture. It was consistent with the decisions adopted in the last decade of the XXth century, and on the whole financing of farmers on the basis of subsidized crediting proved to be good for market relations and is still applied taking the accumulated experience into account. It is important to note that the subsidized crediting system under the project did not mean state credits, the credits were issued by commercial banks, which set the interest rate. It was up to the government to decide who receives a long-term credit and how large the subsidy from the federal and local budget will be. For instance, in a credit at 14.5% annual, its cost for the borrower amounted to 3% as a result of a subsidy from the federal budget (2/3 of the refinancing rate) and local budget (up to 1/3 of the refinancing rate of 11.5% in 2006). However, the project was of a narrow nature, it focused on cattle breeding and small farms, while the volumes and variety of financial resources were insufficient to upgrade fixed assets and launch innovative technological solutions.

1. Crediting volumes under the project exceeded the government plan significantly, which testifies to the high popularity of the mechanism. The choice of cattle breeding as a driver project can be explained by the fact that the country in 2006 only produced about 50% of meat produced in 1990. Import dependence was critical bordering on a threat to the national security. Small private farms accounted for the bulk of cattle and poultry output in 2005 - 52.7%, agricultural organizations accounted for 45.8%, farmers for 2.5%. This is why small private farms had no restrictions in raising credit, while for the others it was conditioned against development of cattle breeding.
2. The leasing programme of the project changed the leasing structure significantly– previously machines and equipment prevailed, while the project increased the share of pedigree cattle in accordance with the goal of upgrading the livestock and increasing its productiveness. The advance payment on the leasing amounted to 7% and although the interest rates were higher compared to debt, it was this form that helped develop the farms lacking credit collaterals. The project also ensured a 8.1 bln rbl financing of the chains of agricultural consumer cooperatives for procurement, supply and sale of products of small private farms and farmers. However, the project had no clear scale and performance indicators for the cooperatives, only their number, while the land and mortgage lending received insignificant resources. Also, only a handful of agricultural producers can boast of land ownership, necessary for this type of crediting. The third point of the project -- to provide young specialists with housing had a very modest budget (4 bln rbls), but thanks to mutual financing federal budget money is augmented with regional budgets' funds and outbudget sources of municipalities, employers and employees.
3. The project prevented reduction of cattle livestock, increased cow productivity to a milk yield of higher than in the best years of the Soviet era (in 2006 – 3,600 kg, compared with the Soviet peak of 2,800 kg (Barsukova, 2007). Despite criticism of the project, on the whole it introduced positive changes and created conditions for the recovery of Russian agriculture. But we would like to point again to the fact that the project did not create conditions for all the agriculture directions with cattle breeding being the priority; not all types of operations were covered, small private farms had priority; the financial support channels were not diversified, the main method of financial support under the programme was subsidizing of the interest rate.

Let's discuss a wholly new agriculture programme adopted by the government in 2012.

It has many types of financial support forms for agriculture, including the following instruments:

1. Subsidizing. Subsidies can be received to compensate for direct costs of creation and modernization of agricultural facilities, for production of equipment for the agricultural producers as well as for its purchase.

2. Compensation of part of an interest rate to increase credit affordability for agricultural producers.
3. Grants for young farmers, development of family cattle breeding farms, etc.
4. Measures to develop country infrastructure, including to improve housing, development of roads, gasification and water supply.
5. State support to insurance for a harvest loss of 20% and more.

The key goals of the programme are presented in figure 1.

State support, a balanced and comprehensive development of Russian agro-industrial complex helped increase investment indicators. Investors became interested, agriculture can now be profit making and generate stable financial incomes despite its specific risks of the epizootic situation and the weather.

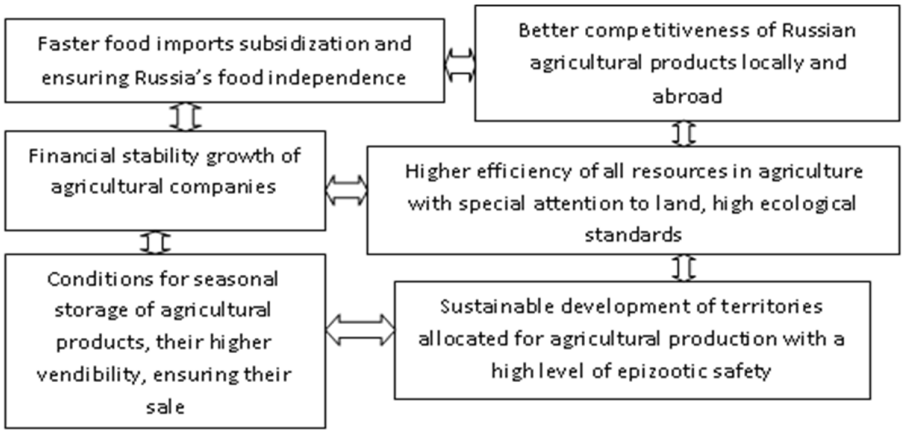

Figure 1: The key directions of the State Programme for Agriculture Development and Regulation of Agricultural Goods, Raw Materials and Food Market for 2013 - 2020 (created by the author on the basis of (State Program, 2019))

Investment in fixed capital of plant growing, cattle breeding and hunting companies increased from 492.5 bln rbls in 2014 to 707.7 bln rbls, demonstrating an average annual growth of 7.5% and outstripping annual inflation of 7.2% for the period (Russia in figures, 2019). Agricultural margins between 2014 and 2018 exceed the average by 7.5% and amounted to 15.6% on average. It is important to note that in 2013 agricultural organizations' margin amounted to only 6.3%, while the average indicator for all types of activities stood at 7.7%. According to rating agency Expert Online (https://expert.ru/expert/), Russia's top agricultural companies are Miratorg and Cherkizovo. Let's calculate the financial coefficients for their cattle breeding subsidiaries.

Table1: Financial coefficients of Miratorg–Belgorod

Indicators	2012	2013	2014	2015	2016	2017	2018
Total Asset Turnover Ratio (TAT)	0.38	0.52	0.72	0.67	0.65	0.51	0.62
Gross Profit Margin (GPM)	0.47	0.23	0.51	0.44	0.43	0.47	0.50
EBIT margin	0.42	0.20	0.49	0.41	0.41	0.45	0.48
Net Profit Margin (NPM)	0.45	0.35	0.40	0.38	0.35	0.39	0.40
Return on Equity (ROE)	0.69	0.50	0.72	0.59	0.43	0.33	0.36
Debt – to – Equity Ratio (D/E)	0.47	0.81	0.73	1.12	1.41	2.51	2.67

Own calculations based on financial statements from the Internet resource: https://www.audit-it.ru/
As follows from table1, comparison of the indicators for 2013 and 2018 demonstrates higher profitability ratios: the Gross Profit Margin (by 27%), the EBIT margin (by 28%), the Net Profit

Margin (by 5%). The fall of Return on Equity is due to a significant increase of capital, although this increase has failed to curb financial leverage growth by 230%.

Table 2: Financial coefficients Cherkizovo – Pig Breeding

Indicators	2013	2014	2015	2016	2017	2018
Total Asset Turnover Ratio (TAT)	0.34	0.49	0.34	0.51	0.65	0.72
Gross Profit Margin (GPM)	0.03	0.46	0.40	0.24	0.29	0.35
EBIT margin	-0.04	0.41	0.33	0.18	0.23	0.30
Net Profit Margin (NPM)	-0.03	0.40	0.30	0.09	0.13	0.23
Return on Equity (ROE)	0.00	0.31	0.25	0.14	0.25	0.51
Debt – to – Equity Ratio (D/E)	2.192	1.90	0.57	0.56	0.71	0.41

Own calculations based on financial statements from the Internet resource: https://www.audit-it.ru/
Using table 2, we can conclude that the profitability ratios increased significantly in 2018 compared with 2013. At the same time the dynamics is negative in the middle of the period. We should also note that sanctions against the Russian economy prompted Cherkizovo to delist from the London Stock Exchange. The shares of the company are traded in Russia. At the same time the following indicators grow: Total Asset Turnover Ratio and Return on Equity, dependence on creditors decreased (Morozova, Akhmadeev, Bykanova, & Philippova, 2019).

Positive results were also achieved in imports substitution. According to table 3, meat sales rose by 12.9%; milk by 5.8%; vegetables and cucurbits by 3.1%. Grain production is significantly higher than self-sufficiency. At the same time self-sufficiency in fruit and berries falls behind the plan significantly.

Table 3: Russian Federation's food self-sufficiency (Agriculture in Russia, 2019) and (Decree, 2020)

	2000	2014	2015	2016	2017	2018	target
Grain	102.5	153.8	149.1	160.0	170.6	147.2	>95%
Meat	67.0	82.8	88.7	90.6	93.5	95.7	>85%
Milk	88.3	78.1	79.9	80.7	82.3	83.9	>90%
Potatoes	99.6	98.0	102.1	93.2	91.1	95.3	>95%
Vegetables and cucurbits	85.6	84.1	86.8	87.4	87.6	87.2	>90%
Fruit and berries	55.7	32.5	32.5	36.5	33.1	38.8	>60%

In the new Russia's Food Safety Doctrine adopted in January 2020 (Decree, 2020), there appeared an item devoted to the level of self-sufficiency in the seeds of the key agricultural crops of local selection with a target of no less than 75%. Unfortunately, experts say that the target is very far away as Russian companies now strongly depend on foreign seed suppliers.

Discussion

First, further development of Russian agriculture should ensure, on the one hand, security of the national economy and the absence of its dependence on the key foods imports.

Second, export potential of the Russian agriculture should be boosted further. The programme should logically be extended not only to ensure high food production indicators in Russia, but also export development and as a result inclusion in 2017 in the priority project Export of Agricultural Products. Russian agricultural products exports grew between 2014 and 2018 by 5.6% annual on average. At the same time we should note that the growth was uneven-- for instance, in 2015 agricultural products

exports fell by 15% compared to 2014, while in 2018 the exports rose by 20% to the previous period. Nevertheless, the trend of the last few years encouraged optimism about the exports. For example, wider grain sales helped increase its production by 40%, meat and subproducts by 26%, fish and crustacean by 23% in 2018. (Deloitte, 2019). The countries importers of Russian food are diversified. Exports to China and the Asian region on the whole increased strongly. At the same time the volume of exports increases not only under the existing contracts, -- Russia obtained the right to sell various types of meat products to Egypt, Iran, Jordan, Iraq, of dairy products to the UAE and Iraq, fish products to Serbia, Iran and Brazil, honey to Serbia, and collagen to the E.C. states from 2016.

Third, new projects to boost food export are needed. Under the federal project Agricultural Products Export, the Russian food exports should rise to 45 bln rbls by 2024, growth should amount to 80.6% as compared with 2018. This means that we should not only continue to increase the food exports, where Russia leads the market (wheat, sunflower oil, corn, etc), but continue working to promote Russian regional subbrands like internationally known products with a clear geographical reference. We all know that subbrand has a different goal than just increasing the product line of a brand. A subbrand aim sat strategically important goals, primarily at widening the consumer group by forming a new target group. Subbrands become a wonderful solution, when the master brand creates a poorly attractive image to motivate a purchase. Subbrands are also meant to ensure image support to the master brand. The following registered and legally protected Russian brands have a promising future – Vologda Butter, Tula Gingerbread, Mozhaisk Milk, Astrakhan Watermelons, Astrakhan Tomatoes, Belyov Pastila, Altai Honey, Lukhovitsy Cucumber, etc. Regional subbrands should become the drivers of the national products promotion as ecologically safe, high quality and diverse food and form an attractive image on the foreign markets. It will be a quantum leap in Russian agricultural exports structure, which mainly consists of raw materials -- cereals, fish and sea food, vegetable oil. The products we suggest will help achieve a good added value and increase investment attractiveness of agriculture. The Russian Export Center takes an active part in the promotion of the umbrella brand Made in Russia.

Results

Our analysis of the reforms' impact on Russian agriculture between 1990 and 2020 helps us conclude that despite several existing problems, agricultural companies demonstrate positive financial dynamics. As tables 1 and 2 and official statistics demonstrate agriculture's investment attractiveness grows as their margins grow despite their significant volatility. Thus, investment in farming under the new conditions can become attractive despite the natural conditions and epizootic epidemics.

National security of all countries depends on agriculture. We can note significant achievements in self-sufficiency in the key food types, although there are areas requiring systematic and responsible work.

Agriculture needs all-encompassing financial support measures from the government aimed at introduction of new innovative technologies, especially for the creation of a seed basis of our own and a pedigree cattle livestock as well as for the development of agricultural machine-building, ensuring stable profitability targets for agricultural companies. This is why the inclusion of the Russian companies' seeds self-sufficiency target into the Food Security Doctrine in 2020 became very timely.

Future belongs to the products with a high added value. Exports of such food will help create sustainable competitive advantages for the economy, which calls for the development of regional subbrands and cementing of the Made in Russia umbrella brand.

The efficiency of state programmes will depend on the speed and degree of innovative solutions penetration into the farmers' operations to ensure higher labour productivity, low energy, materials and funds consumption. Agriculture needs new technologies, modern equipment and advanced environmental standards.

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Migration of The Romanian Rural Population

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Abstract

The research aims at identifying the current situation regarding the migration of the Romanian rural population, as well as the causes of migration due to the country's accession to the European Union in 2007. The analysis also relies on data provided by the European Commission about the destination of the Romanian rural population, which chose to expand their professional horizons outside the borders of Romania. In order to statistically reflect the latest trends, the methodology included an analysis of the following indicators: the population by place of permanent residence; the change of permanent residence from rural or urban areas and the dynamics of urban and rural migration caused by moving house. During the period of time analysed, the highest domestic migration from both rural and urban areas nationwide was seen in 2017, when approximately 380,202 people decided to change their permanent residence. This study is a first step in designing a strategy for repopulating rural areas in Romania, and entrepreneurship is considered a major factor of economic growth, related to population migration.

Keywords: Migration, Population, Rural, Urban

Introduction

Following the fall of the communist regime (in December 1989), Romania engaged in a democratisation process and in the transition towards a market economy, applying numerous reforms in all the major social sectors and in all the economic sectors. During the last two decades there appeared temporary (circular and seasonal) forms of migration of the labour force which developed at a more accelerated pace than permanent migration (own contribution). With more than 15% of the population outside its borders, Romania is among the countries with the highest emigration rate within the European Union. Romania's emigrant population comprises an equal number of men and women and it is relatively young, 65% of it being between the ages of 18 and 39, Italy (43%) and Spain (30%) are the main countries of destination, also accounting for the highest concentration of Romanians working abroad (according to the European Commission).

As for domestic migration, between 1970 and 1990 its main flow was from the rural areas to the urban ones. Starting with 1992, the number of people who moved from the rural areas (villages) to the urban ones (cities) began to decrease, while the mobility in the opposite direction (from urban to rural areas) went up, which was mostly due to the economic transition and the decrease of work opportunities in cities. After 1997, the migration from urban to rural areas surpassed the number of people who moved from villages to urban centres, which is only partially due to the suburbanisation phenomenon (own contribution based on statistical data from National Institute for Statistics).

Emigration and domestic migration are phenomena which emerged within the previously existing framework of acute disparities between the level of economic development of the different regions of the country, as well as between the urban and rural areas, The Romanian regions characterised by a high loss owing to domestic migration are also regions of origin for considerable emigration flows. The

top three regions with the highest net population loss due to migration are the North-East, South-East and South. These are predominantly rural regions with high rates of employment in the agricultural sector, relatively high poverty rates (including of people who are in employment), which are faced with the danger of the rapidly aging population, with a generally low development of the infrastructure and managing to produce a GDP per capita which is much lower than the country average level (50-60%) according to the European Commission.

Migration and socio-economic transformation have been central topics for both scientists and members of the general public since the collapse of the former Eastern bloc. Romania is one of the countries affected in a special manner by these processes from which the country has to suffer particularly hard (Wilfried H.). Basically, Romania still is in a process of modernization and adaptation to European requirements.

Results and Discussion

From the social perspective, a phenomenon which is impacting the evolution of the rural area is the high number of people who chose to leave their birth place in search for other opportunities in urban areas or in other European Member States. In order to have a statistics overview of the last 30 years, we will consider indicators such as: population by permanent residence, change of permanent residence situated in the rural area or the urban area and the dynamics of the gross domestic rural and urban migration due to the change of permanent residence.

A, Analysis of the rural population by permanent residence

The density of the rural population is an important aspect that is taken into consideration by the entrepreneurs who intend to start a business in this area. Our analysis will cover the current situation of each of the eight development regions in Romania, by gender. As for the methodology used to obtain this indicator at country level, we have taken into account the total natural population growth and the total permanent international migration. The analysis by region took into consideration the different administrative situation, which is calculated based on the total natural population growth, the total permanent international migration and the total domestic migration (change of permanent residence).

Table 1: Rural population by development region, between 2013-2018

Gender	Development region	Year				
		2013	2014	2015	2016	2017
		UM: Number of people				
Male	**TOTAL**	**3,281,183**	**3,295,220**	**3,303,202**	**3,362,847**	**3,378,015**
-	NORTH-WEST	438,166	439,308	440,508	448,056	450,181
-	CENTRE	356,372	357,958	358,780	364,808	366,443
-	NORTH-EAST	719,506	726,827	735,239	752,302	758,681
-	SOUTH-EAST	436,338	438,010	437,237	444,376	445,367
-	SOUTH-MUNTENIA	632,185	632,396	629,982	638,412	637,806
-	BUCHAREST-ILFOV	69,118	71,192	72,746	75,699	78,373
-	SOUTH-WEST OLTENIA	376,563	376,036	374,725	380,457	380,817
-	WEST	252,935	253,493	253,985	258,737	260,347
Female	**TOTAL**	**2,693,579**	**2,700,162**	**2,706,975**	**2,767,984**	**2,774,049**
-	NORTH-WEST	363,214	364,030	364,791	373,158	374,626
-	CENTRE	296,967	297,606	297,913	304,375	304,886
-	NORTH-EAST	580,775	585,952	593,171	609,102	613,125

Gender	Development region	Year				
		2013	2014	2015	2016	2017
		UM: Number of people				
-	SOUTH-EAST	354,701	354,776	354,557	361,984	361,879
-	SOUTH-MUNTENIA	521,229	519,518	517,927	526,936	525,108
-	BUCHAREST-ILFOV	62,714	64,631	66,243	69,329	71,724
-	SOUTH-WEST OLTENIA	300,334	299,909	298,923	304,512	303,901
-	WEST	213,645	213,740	213,450	218,588	218,800

Source: Processed data from the National Institute for Statistics

The male population reached its maximum level in 2013, in the North-East region, with 719,506 people, while the minimum number was in the Bucharest-Ilfov region, with 69,118 people. As for the female population, the highest value was also in the North-East region, where it stood at 580,775 people, the minimum being 62,714, in the Bucharest-Ilfov region. During the 2013-2017 time interval there were some fluctuations in the number of both males and females at local level. In the South-Muntenia region, although the male population experienced a decrease in 2015 in comparison with 2013, there was an upward trend, while in the South-West Oltenia region the numbers went down as well, but in two consecutive years, 2014 and 2015.

The female population also saw a regional fluctuation, but different as compared to the males. At the same time, in 2015, in the South-East region, there was an insignificant decrease in the female population, but in the South-Muntenia and South-West Oltenia regions there was the same pattern as for the male population between 2014-2015.

Likewise, the county with the highest density of rural population is Iasi, accounting for 23.3% of the total regional value (according to Appendix 1). The same situation is true for the female population, where the same two regions (North-East and Bucharest-Ilfov) have the most extreme values (according to Appendix 2).

B, Moving out of rural areas

The migration of the population from the rural area in the period 2013-2017 is a topical problem faced by the entrepreneurs operating in this area. As a consequence, the analysis will focus on the current situation of each development region in Romania. From the methodological point of view, this indicator will be determined without taking into account the changes of residence within the same locality, from one street to another or from one village to another, within the same commune. The change of residence is considered effective the moment the police has written the change of residence in the identity card and the respective citizen has received it back.

Table 2: People moving out of rural areas between 2013-2017

Development region	Year				
	2013	2014	2015	2016	2017
	UM: Number of people				
NORTH-WEST	17,575	18,328	18,405	19,308	19,400
CENTRE	13,708	14,505	14,179	15,171	15,545
NORTH-EAST	30,573	33,290	33,106	35,474	34,770

SOUTH-EAST	19,170	20,659	20,779	22,025	22,095
SOUTH-MUNTENIA	26,574	28,727	28,196	30,225	30,095
BUCHAREST-ILFOV	2,584	3,165	3,397	3,770	4,099
SOUTH-WEST OLTENIA	17,847	18,643	18,654	20,041	19,551
WEST	11,445	12,157	12,428	13,537	13,652
TOTAL	**139,476**	**149,474**	**149,144**	**159,551**	**159,207**

Source: Processed data from the National Institute for Statistics

The lowest number of people moved house from rural areas in 2013, when 2,584 people were recorded in the Bucharest-Ilfov region, while the highest value was in the North-East region. During the analysed period, the maximum number of people who moved out of the urban area was also in the North East region, when 35,474 people decided to move dwelling in 2016 in search for a better paid job. On a positive note, we can notice that in 2017 this migration flow experienced a downward trend, Likewise, at national level, several fluctuations can be observed due to the manner of reporting the moving of residence out of the rural areas, which resulted in an upward trend of the migration rate in the North-East, South-East and Bucharest-Ilfov regions, while in the Centre, North-East, South-Muntenia and South-West Oltenia the situation differed from one year to another.

C, Moving dwelling out of urban areas

The migration of the population from urban areas between 2013-2017 was indicated separately for each of the eight development regions and it was calculated without including the people who moved within the same locality, from one street to another or from one village to another, within the same commune. Also, the change of residence was considered effective as of the date when the police entered the change of residence on the identity card.

Table 3: Moving out of urban areas between 2013-2017

Development region	Year				
	2013	**2014**	**2015**	**2016**	**2017**
	UM: Number of people				
NORTH-WEST	19,411	21,276	20,800	22,880	21,988
CENTRE	20,681	21,538	21,174	22,733	22,278
NORTH-EAST	29,051	31,606	29,401	31,460	30,458
SOUTH-EAST	23,675	25,523	25,493	27,157	26,639
SOUTH-MUNTENIA	22,499	23,569	23,240	25,853	24,422
BUCHAREST-ILFOV	58,281	58,733	51,397	54,665	52,985
SOUTH-WEST OLTENIA	18,072	19,286	19,396	22,091	19,491
WEST	19,410	20,672	21,038	22,983	22,734
TOTAL	**211,080**	**222,203**	**211,939**	**229,822**	**220,995**

Source: Processed data from the National Institute for Statistics

During the baseline year, the minimum number of people who moved dwelling out of urban areas was in the South-West Oltenia region, while the Bucharest-Ilfov region accounted for the maximum number of 58,281 people. It was also in the latter region that the highest number of people moved out in 2014,

when approximately 58,733 people made the decision to leave the capital city. The main social categories were young university and/or master graduates who returned to their places of origin or went abroad for internships or to various workplaces, retired people who decided to move to the countryside in order to enjoy the beauty of this environment or employees, especially of big corporations, who were requested to temporarily change their residence (based on a Gfk study made in 2017). Another important aspect is the fact that all the development regions in Romania experienced a fluctuation of the migration from urban areas.

D. Dynamics of urban and rural domestic migration due to change of permanent residence

Domestic migration from both urban and rural areas between 2013 and 2017 is represented in Table 4 in terms of number of people and per mil, and it is broken down into four migration variables: from rural to urban areas, from urban to urban areas, from rural to rural areas and from urban to rural areas. The methodology used to obtain this indicator consists in a calculation basis which does not include the changes of residence within the same locality, from one street to another or from one village to another within the same commune. Also, the change of residence was considered effective as of the date when the police entered the change of residence on the identity card.

Table 4: Structure of urban and rural domestic migration flows due to change of permanent residence between 2013-2017

Domestic migration flows	Year									
	2013		2014		2015		2016		2017	
	UM: Number of people, per mil inhabitants									
	Number of prople	Per mil	Number of prople	Per mil	Number of prople	Per mil	Number of prople	Per mil	Number of prople	Per mil
Total	**350,556**	**15.7**	**371,677**	**16.7**	**361,083**	**16.2**	**389,373**	**17.5**	**380,202**	**17.1**
From rural to urban areas	74,023	5.9	78,411	6.2	77,878	6.2	82,612	6.6	87,097	7
From urban to urban areas	108,370	8.6	111,545	8.9	105,292	8.4	108,872	8.7	115,592	8.9
From rural to rural areas	65,453	6.7	71,063	7.3	71,266	7.3	76,939	7.9	72,110	7.4
From urban to rural areas	102,710	10.6	110,658	11.4	106,647	11	120,950	12.5	109,403	11.3

Source: Processed data from the National Institute for Statistics

At national level, the maximum value of the domestic migration to and out of the rural and urban areas was recorded in 2017, when approximately 380,202 people made the decision to move dwelling. The maximum number of people moving from rural to urban areas was reached in 2017, while the migration from urban to rural areas peaked in 2016, when it stood at 120,950 people. This aspect is due to government programmes which offer various subsidies for moving back into rural areas, as well as to the National Rural Development Programme offering various facilities to the current and future entrepreneurs who can bring added value and innovation to the rural areas. In addition to the above

mentioned aspects, people who are 65 and above move to rural areas because they want to remain active and enjoy the beautiful landscapes of rural Romania.

The indicator analyzed in this section is very common in the analyzes of the European Commission at national level, but less at the regional level, as based on this research I have tried to show that there is not always a symmetry between the migration of the population from the urban area to the rural zone in all regions of a country.

Conclusions

Regarding the migration of the Romanian population, the study has found that, at national level, the maximum value of domestic migration from and to urban and rural areas was in 2017, when approximately 380,202 people decided to change their permanent residence.

The complexity of the factors related to the migration of the rural population of Romania is an issue of general interest and a concern for the decision makers. The topic tends to gain political importance during periods of time marked by economic difficulties. The need to support entrepreneurship comes from an understanding of the fact that profitable and highly adaptable businesses can thus be created and that they represent the main pillar of the repopulation of the rural areas.

To conclude, we consider this research to be a first step towards a strategy for the repopulation of the Romanian rural areas, where entrepreneurship is a major factor of economic growth, innovation, competitiveness, employment and social integration. As such, it has enjoyed support at European level for a long time. At the moment, the promotion and development of entrepreneurship is one of the main directions of the Europe 2020 Strategy, aiming at creating work places and ensuring a decent living to the population within the community space.

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Appendices

Appendix 1: Male population by residence in rural areas

Development regions and counties	Year					
	2013	2014	2015	2016	2017	2018
	UM: Number of people					
TOTAL	**3,281,183**	**3,295,220**	**3,303,202**	**3,362,847**	**3,378,015**	**3,385,146**
NORTH-WEST Region	438,166	439,308	440,508	448,056	450,181	451,694
Bihor	101,105	101,291	101,633	103,347	103,770	104,233
Bistrița-Năsăud	68,553	68,415	68,318	69,236	69,278	69,198
Cluj	78,939	79,848	80,611	82,858	84,214	85,635
Maramureș	72,658	72,762	72,867	73,838	73,855	73,712
Satu Mare	71,224	71,335	71,415	72,352	72,556	72,492
Sălaj	45,687	45,657	45,664	46,425	46,508	46,424
CENTRE Region	356,372	357,958	358,780	364,808	366,443	367,426
Alba	53,553	53,523	53,549	54,288	54,227	53,917
Brașov	55,626	56,110	56,470	57,657	58,329	58,934
Covasna	38,100	38,248	38,249	38,827	38,876	38,897
Harghita	63,225	63,417	63,331	64,238	64,206	64,088
Mureș	94,632	95,105	95,288	96,797	97,231	97,588
Sibiu	51,236	51,555	51,893	53,001	53,574	54,002
NORTH-EAST Region	719,506	726,827	735,239	752,302	758,681	764,328
Bacău	136,574	137,193	137,536	139,800	140,344	140,493
Botoșani	83,899	84,377	84,799	86,372	87,303	88,440
Iași	154,742	158,513	164,735	171,317	174,305	177,178
Neamț	119,361	119,887	120,121	122,094	122,478	122,758
Suceava	137,095	138,571	139,541	142,647	143,828	145,013
Vaslui	87,835	882,86	88,507	90,072	90,423	90,446
SOUTH-EAST Region	436,338	438,010	437,237	444,376	445,367	444,843
Brăila	41,715	41,824	41,714	42,357	42,455	42,516
Buzău	91,882	92,005	91,616	92,970	92,878	92,441
Constanța	82,182	82,708	82,750	84,296	84,829	85,161
Galați	94,743	95,612	95,795	97,605	98,016	97,831
Tulcea	44,647	44,507	44,081	44,574	44,515	44,263
Vrancea	81,169	81,354	81,281	82,574	82,674	82,631
SOUTH-MUNTENIA Region	632,185	632,396	629,982	638,412	637,806	634,871
Argeș	112,837	112,934	112,491	114,102	113,954	113,396
Călărași	63,140	63,299	63,228	64,103	64,194	63,772
Dâmbovița	123,664	123,749	123,541	125,299	125,205	125,032
Giurgiu	61,809	61,919	61,812	62,864	63,134	63,064

Development regions and counties	Year					
	2013	2014	2015	2016	2017	2018
	UM: Number of people					
Ialomița	51,184	51,316	51,176	51,898	52,017	51,880
Prahova	137,488	137,756	137,116	138,699	138,461	137,990
Teleorman	82,063	81,423	80,618	81,447	80,841	79,737
BUCHAREST-ILFOV Region	69,118	71,192	72,746	75,699	78,373	80,612
Ilfov	69,118	71,192	72,746	75,699	78,373	80,612
SOUTH-WEST OLTENIA Region	376,563	376,036	374,725	380,457	380,817	379,761
Dolj	102,743	102,816	102,806	104,742	105,274	105,391
Gorj	66,913	66,930	66,751	67,656	67,708	67,598
Mehedinți	47,868	47,811	47,518	48,360	48,434	48,296
Olt	88,205	87,813	87,298	88,397	88,283	87,638
Vâlcea	70,834	70,666	70,352	71,302	71,118	70,838
WEST Region	252,935	253,493	253,985	258,737	260,347	261,611
Arad	70,343	70,415	70,400	71,516	71,540	71,643
Caraș-Severin	47,259	46,919	46,544	47,139	46,998	46,614
Hunedoara	36,036	35,823	35,687	36,072	35,957	35,724
Timiș	99,297	100,336	101,354	104,010	105,852	107,630

Source: National Institute for Statistics

Appendix 2: Female population by residence in rural areas

Development regions and counties	Year					
	2013	2014	2015	2016	2017	2018
	UM: Number of people					
TOTAL	**2,693,579**	**2,700,162**	**2,7069,75**	**2,767,984**	**2,774,049**	**2,774,797**
NORTH-WEST Region	363,214	364,030	364,791	373,158	374,626	375,544
Bihor	84,439	84,437	84,505	86,320	86,521	86,493
Bistrița-Năsăud	56,713	56,699	56,633	57,590	57,461	57,338
Cluj	64,754	65,681	66,474	69,018	70,487	71,825
Maramureș	60,055	59,989	59,961	61,177	61,056	60,871
Satu Mare	60,302	60,411	60,479	61,596	61,632	61,637
Sălaj	36,951	36,813	36,739	37,457	37,469	37,380
CENTRE Region	296,967	297,606	297,913	304,375	304,886	30,5290
Alba	42,627	42,472	42,362	43,113	42,858	42,520
Brașov	47,054	47,278	47,473	48,792	49,264	49,680
Covasna	32,057	32,104	32,038	32,644	32,614	32,556
Harghita	53,202	53,340	53,307	54,370	54,215	54,028
Mureș	78,668	78,825	78,938	80,637	80,722	80,934

Development regions and counties	Year					
	2013	2014	2015	2016	2017	2018
	UM: Number of people					
Sibiu	43,359	43,587	43,795	44,819	45,213	45,572
NORTH-EAST Region	580,775	585,952	593,171	609,102	613,125	617,119
Bacău	110,919	111,355	111,780	114,285	114,423	114,390
Botoșani	64,785	652,64	65,671	67,272	67,859	68,669
Iași	123,964	126,644	131,275	136,499	138,579	140,945
Neamț	98,902	99,150	99,393	101,527	101,810	101,724
Suceava	115,671	116,607	117,682	120,670	121,412	122,229
Vaslui	66,534	66,932	67,370	68,849	69,042	69,162
SOUTH-EAST Region	354,701	354,776	354,557	361,984	361,879	360,340
Brăila	32,828	32,857	32,819	33,423	33,345	33,221
Buzău	74,252	74,125	73,891	75,291	75,214	74,583
Constanța	69,188	69,343	69,391	70,957	71,122	71,221
Galați	76,173	76,503	76,887	78,677	78,944	78,680
Tulcea	35,318	35,008	34,649	35,153	34,779	34,353
Vrancea	66,942	66,940	66,920	68,483	68,475	68,282
SOUTH-MUNTENIA Region	521,229	519,518	517,927	526,936	525,108	521,843
Argeș	93,243	93,044	92,882	94,700	94,414	93,768
Călărași	52,412	52,356	52,361	53,321	53,177	52,734
Dâmbovița	104,819	104,580	104,455	106,331	106,189	105,605
Giurgiu	50,968	51,019	51,026	52,089	51,997	51,910
Ialomița	41,188	41,027	40,928	41,688	41,618	41,430
Prahova	115,563	115,057	114,340	115,956	115,502	115,024
Teleorman	63,036	62,435	61,935	62,851	62,211	61,372
BUCHAREST-ILFOV Region	62,714	64,631	66,243	69,329	71,724	73,864
Ilfov	62,714	64,631	66,243	69,329	71,724	73,864
SOUTH-WEST OLTENIA Region	300,334	299,909	298,923	304,512	303,901	301,746
Dolj	82,971	83,128	83,314	85,247	85,529	85,388
Gorj	54,139	54,104	53,918	54,774	54,593	54,164
Mehedinți	37,625	37,587	37,476	38,199	38,114	37,883
Olt	68,576	68,390	67,877	69,016	68,691	67,961
Vâlcea	57,023	56,700	56,338	57,276	56,974	563,50
WEST Region	213,645	213,740	213,450	218,588	218,800	219,051
Arad	60,501	60,325	60,059	61,291	61,037	60,736
Caraș-Severin	38,958	38,641	38,285	38,898	38,580	37,997

Development regions and counties	Year					
	2013	2014	2015	2016	2017	2018
	UM: Number of people					
Hunedoara	29,093	28,717	28,363	28,915	28,549	28,212
Timiș	85,093	86,057	86,743	89,484	90,634	92,106

Source: National Institute for Statistics

Organizational and Economic Mechanism for Managing the Digital Potential of a System-Forming Innovative-Active Industrial Cluster

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Abstract

The current development of economic sectors cannot be imagined without the using of information technology. An increasing number of countries around the world are developing government programs aimed at digitalization and robotization of various spheres of economic activity, where industrial production occupies one of the leading positions. Today, an increasing number of industrial enterprises are clustering, which allow companies to significantly better withstand the risks that arise in the market, reduce costs, receive higher rates of profit, and produce goods with significant competitive advantages. In the context of the Fourth Industrial Revolution (Industry 4.0), the active using of ICT tools, which underlie the system-forming innovative-active industrial clusters operating on digital platforms, has become especially urgent. In this regard, consideration of issues related to the assessment of digital potential and the creation of a mechanism for its effective management are particular importance. The authors conducted studies to substantiate assessment methods, develop a conceptual approach and methodology for assessing the cluster's digital potential, and create an organizational and economic mechanism for managing the digital potential of a system-forming innovative-active industrial cluster.

Keywords: Digital Economy, System-Forming Innovative-Active Industrial Cluster, Digital Potential, Organizational and Economic Mechanism.

Introduction

The modern economic development of industrial sectors is inextricably linked with the processes of the active introduction of advanced digital technologies that allow enterprises to be more efficient, reduce costs, receive a high rate of return, producing goods with higher added value. In the scientific articles by Anokhin et al (2019), Babkin et al (2013, 2016, 2019) digital transformation issues are becoming even more relevant in the context of actively forming and developing integration industrial structures - clusters. In a research study by Babkin and Tashenova (2019) industrial enterprises realized the necessity and advantages of such interaction, and with the active introduction of information

technologies, industrial structures began to take a new form - a more complex one, which is characterized by the active using of various innovative systems operating on digital platforms, and therefore a new form of association of industrial enterprises, called the "system-forming innovative-active industrial cluster" (hereinafter - SFIAIC) as the authors Babkin and Tashenova (2017, 2019) suggest, the characteristic features of which are presented in Figure 1.

The analysis of the sources showed that in the modern scientific literature insufficient attention is given to the study of the concept of "digital potential (hereinafter - DP)". For 2015-2019, the authors conducted an analysis of literary sources using the Scopus, Clarivate Analytics and RSCI databases, which showed that the number of scientific works on digital potential over the past 5 years is small.

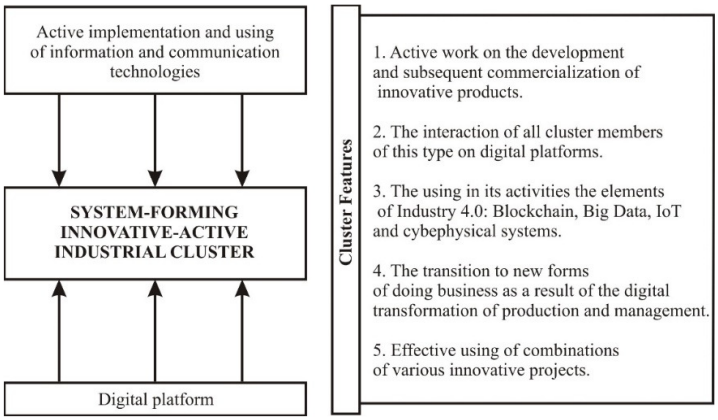

Fig. 1: Characteristic features of system-forming innovative-active industrial clusters
Note - the figure is developed by the authors.

At the same time, about 95-98% of all published articles are mainly devoted to studying not "digital potential", but such branches of knowledge as: Du et al (2020) consider in the framework of digital twins, Sanasi et al (2020), Viriyasitavat et al (2019), Wu (2020) and Dudin (2020) within the digital economy, Barry (2019), Roblek et al (2020) and Jacob et al (2019) in the structure of digitalization of the public sector, Dneprovskaya et al (2019), Tien (2019), Kwok et al (2019), Guillemot and Privat (2019) within the digitalization of economic sectors, Jin et al (2019), Sturgeon (2019), Ojanpera et al (2019) like the digital transformation and Foa (2019), Lebedeva (2019), Pearce et al (2020), Khodaiemehr and Kiani (2020) in the course of digital communication, the effectiveness of Internet technologies and etc. In essence, works that fully and comprehensively reflect the authors did not find the essence and component composition of digital potential of the industrial clusters. More and more often, scientists in their scientific works consider innovative potential, sometimes identifying it with a digital one. Today, the question of what, nevertheless, is appropriate to understand by the innovative potential of an industrial enterprise, given the capacity of the concept, also remains open and not fully understood. The issue of identifying the concepts of "innovative" and "digital" potentials, as a rule, is associated with the fact that "digitalization" is a new phenomenon, which has been reflected in scientific publications relatively recently.

It should also be noted, that innovative and digital potentials are not equivalent in size or scale to the economic potential of the industrial cluster (Figure 2).

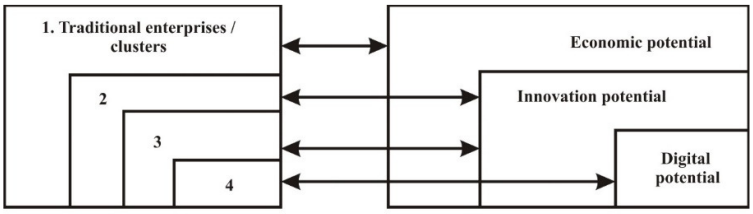

2. Innovative enterprises / innovative industrial clusters
3. Innovative-active enterprises / innovative-active industrial clusters
4. Digital enterprises / System-forming innovative-active industrial clusters

Fig. 2: The essence of the digital potential

Note - the figure is developed by the authors.

In general, on the basis of the analysis, we believe that the "digital potential of a system-forming innovative-active industrial cluster" should be understood as a combination of various sub-potentials (material-technical, scientific, organizational and managerial, infrastructural, financial and economic, personnel and information and communication), which should reflect two aspects of the enterprise / cluster: opportunities and its abilities; the difference between them is the efficient using of cluster resources with the active implementation of various ICT tools and without them (or with their partial presence).

In this regard, the question arises of substantiating effective approaches to assessing the digital potential of system-forming innovation-active industrial clusters. It should be noted, that the analysis of literary sources also did not reveal works on the issues of assessing digital potential, therefore, we believe that in the context of poorly studied issues related to assessing the digital potential of a system-forming innovative-active industrial cluster, the existing uncertainty in the choice of methods, it is most expedient to highlight the following *generalized assessment approaches:*

1. Resource - based on the using in the evaluation of indicators of economic activity of industrial enterprises included in the cluster, as well as indicators directly related to digital infrastructure.
2. Result - based on the search for possible effects that an industrial cluster can receive from the implementation of active innovation and the active introduction of digital technologies in all the processes of its activity.
3. Integrated - this approach is represented by a combination of both resource and result approaches, which are considered in combination to obtain the most optimal and complete integrated assessment of the digital potential of a system-forming innovative-active industrial cluster.

This approach is considered detailed in Figure 3.

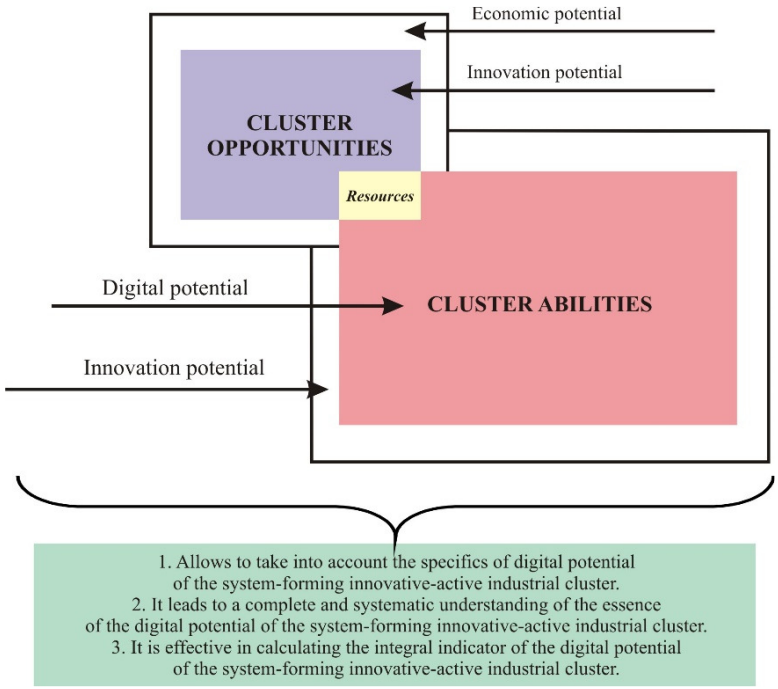

Fig. 3: Characteristic and advantages of an integrated approach for assessing the digital potential of the system-forming innovative-active industrial cluster

Note - the figure is developed by the authors.

The advantages in assessing the digital potential of the system-forming innovative-active industrial cluster using an integrated approach are obvious:

1. this approach is represented by a combination of a resource and result approach, which makes it possible to use in the analysis a set of factors characterizing the level and efficiency of the cluster's economic activity, as well as factors forming its direct digital infrastructure and the so-called "digital capital";
2. allows us to take into account the specifics of assessing digital potential, which is an integral part of economic and innovative potentials;
3. leads to a complete and systematic understanding of the essence of digital potential and the directions of its development based on the results of the assessment.

Carrying out an effective assessment of the digital potential level of a system-forming innovative-active industrial cluster using the considered approach and the methods indicated below allows developing an organizational and economic mechanism for managing digital potential, the main purpose of which is to increase the industrial cluster's digital potential through the using of organizational and economic levers.

Methods

Speaking about methods for assessing the digital potential of the system-forming innovative-active industrial cluster, it can be divided into 3 key groups:

1. *quantitative,* including analytical, statistical and graphical methods that allow structural and more detailed analysis of the digital potential of an industrial cluster;
2. *qualitative methods* presented by the method of expert evaluations, "Delphi", in-depth interviews, and other methods that allow us to study the nature of the data obtained;
3. *mixed methods* include both quantitative and qualitative assessment methods.

At the same time, speaking about the using of certain groups of methods, it should be noted, that the using of quantitative methods for analyzing the digital potential of a system-forming innovative-active industrial cluster is due to the fact that quantitative estimates are a universal way to obtain final results, prove or refute hypotheses put forward during analysis, while the conditionality of the choice of qualitative methods is the complexity of the study, the inability to give answers of the "yes" or "no" format, as well as a wide scope of their application.

Table 1 presents, according to the authors, the most effective methods for assessing the digital potential of a system-forming innovative-active industrial cluster, which form the basis of the author's methodology, which is included and mediates the organizational and economic mechanism, the development of which is the aim of the study conducted in this scientific article.

Table 1: Research methods used to assess the digital potential of the system-forming innovative-active industrial cluster

The features of the task	Type of the method	The feature of using the method within the selected section (s) / direction of the research
Studying the theoretical aspects of the formation and development of the system-forming innovative-active industrial clusters in the context of digital transformation	Analytical: methods of tabular analysis, link analysis, cross-tabular analysis, cartographic method	Tabular and cross-tabular analysis methods can be used to build tables characterizing the e-commerce market and the development of IoT; in the study of the main approaches to the concept of a cluster and the allocation of its types; as part of the study of clustering in the regions of the world; when studying leaders in the ranking of innovative companies in the world, as well as analyzing the current state of the digital economies of the world. The cartographic method can be reflected in the study of cluster initiatives in the regions of the world.
	Statistical: scaling and cluster analysis	The scaling method can be used to build scales for assessing the level of digital activity of an industrial cluster. The cluster analysis method can be used, for example, to differentiate the regions of a country according to the level of development of industrial production.
	Graphic: building 2M and 2M-categorized graphs	The graphical method is usually widely used to display statistical information using linear, bar and other types of categorized and uncategorized graphs.
Development of tools for assessing the digital potential of the system-forming innovative-active industrial cluster	Analytical: methods of tabular analysis, link analysis, cross-tabular analysis	Tabular methods of data analysis are widely used to display the structural components of the digital potential and the parameters, which are characterized them.
	Statistical: correlation analysis method, scoring method	The correlation method can be used to isolate from a variety of parameters precisely those that maximally satisfy the requirements in the framework of the research.

	Graphic: building categorized figures and algorithms	The widespread using of the graphical method is usually dictated by the need to clearly display parameters that include representatives of the scientific community in assessing the digital potential. In addition, this method is used in the development of the author's stages and an algorithm for assessing the digital potential of a system-forming innovative-active industrial cluster.
Development of an organizational and economic mechanism for managing the digital potential of the system-forming innovative-active industrial cluster	Analytical: methods of tabular analysis, link analysis, cross-tabular analysis, flow analysis method	In the research of the economic activity of the system-forming innovative-active industrial cluster is often used the method of flows.
	Statistical: correlation-regression and factor analysis	The methods of correlation-regression and factor analysis are widely used in the process of business analysis of an industrial cluster and the identification of factors that have the greatest influence on the development of its digital potential.
	Graphic: building structured figures with highlighting groups and components	The graphical method is used for building the model and developing the structure of the organizational and economic mechanism for managing the digital potential of the system-forming innovative-active industrial cluster.
	Qualitative analysis methods: expert interview and content analysis method	These techniques are used to analyze the economic activity of the system-forming innovative-active industrial clusters (using specific examples) and to correlate the results of their digital potential development with the certain values within the framework of the selected scale.
Note - the table is compiled by the authors.		

Thus, to assess the digital potential of the system-forming innovative-active industrial cluster, a wide range of both qualitative and quantitative methods and the mixed methods can be used.

The most important step in assessing the digital potential of the SFIAIC is the development of a methodology for its assessment, which includes the following components: allocation of subpotentials, determination of a set of factors within each of the subpotentials, expert survey, calculations to determine the reliability of the obtained expert estimates, final determination of the set of factors, reduction of the obtained values to a unified measurement system, determination of weighting coefficients, calculation of the integral estimate for each of the subpotentials, as well as the final estimate SFIAIC digital capacity allocation received value to a certain level of the DP, according to Harrington scale (Figure 4).

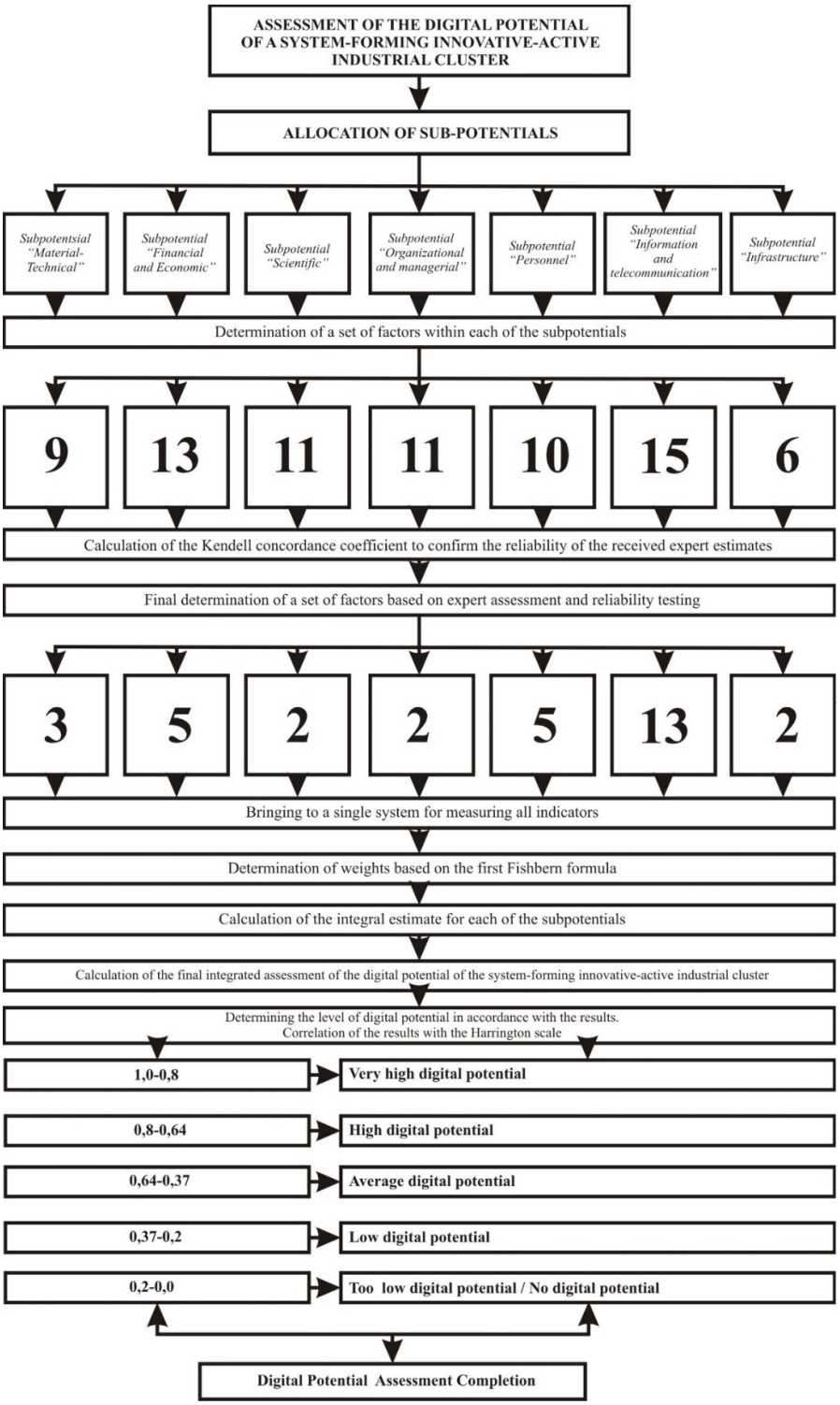

Fig. 4: Methodology for assessing the digital potential of the system-forming innovative-active industrial cluster

Note - the figure is developed by the authors.

The methodology presented by the authors is comprehensive and allows a clear range of estimates to be obtained with the digital potential of the system-forming innovative-active industrial clusters.

It is important to note that after the development of a methodology for assessing the digital potential of a system-forming innovative-active industrial cluster is advisable to develop an organizational and economic mechanism.

Results

Based on the developed methodology and the methods studied, which may be most applicable for assessing the digital potential, it seems possible to develop an organizational and economic mechanism for managing the digital potential of a system-forming innovative and active industrial cluster, the main purpose of which is increasing the efficiency of the using of digital potential by all cluster members, and also the increasing the level of digital potential based on the right combination of resources awns and abilities of the industrial integrated structure under consideration (Figure 5).

The presented organizational and economic mechanism reflects in detail the SFIAIC structure, the distinctive features and characteristics of which are shown in Figure 1, as well as the subjects and objects of management. The subjects are state authorities implementing cluster policy in the country, cluster development centers (for example, the Cluster Development Center of St. Petersburg, created as a structural unit of JSC Technopark of St. Petersburg), cluster observatories (for example, the Russian Cluster Observatory, opened in 2012 in the structure of the Institute for Statistical Studies and Economics of Knowledge of the National Research University "Higher School of Economics"), as well as directly the management of the companies included in the SFIAIC. The management object in the presented scheme is innovation potential. As levers, we distinguish:

1. **economic**, including targeted financing of SFIAIC to provide ICT with the necessary funds, for example, through existing government programs aimed at implementing initiatives in the field of the digital economy, preferential taxation and lending, as well as a flexible investment policy;
2. **organizational**, which, according to the authors, it is advisable to divide into two groups:

– *external*:

1. compliance of the SFIAIC production process with existing state and industrial standards and norms;
2. continuous accounting of enterprises and industrial clusters involved in the active implementation and using of ICT technologies, including for the creation and effective functioning of digital platforms on which they should be based; compliance of SFIAIC activities with all legal norms and rules adopted both in the territory of the state where the cluster operates (in the case of a geographically allocated cluster with a limited territory) and beyond (if the industrial cluster is international, in which the territorial borders are, in fact, conditional);

– *enternal*:

1. collection, processing and analysis of scientific, technical and management information; building an effective management system using business models adapted to the needs of industrial clusters and enterprises operating and communicating on digital platforms;
2. presence of a mechanism for the commercialization of innovative SFIAIC's products;
3. using of an effective automated resource allocation system, as well as the formation and widespread using of the system for creating and managing human resources that are necessary to implement the strategy and achieve the target indicators in the field of digitalization.

In addition, it is important to understand that such mechanism should be based on certain principles (among which the principle of continuity, adaptability, stability, efficiency, compatibility, scientific validity, planning, motivation and democratization of management), functions (planning, organization, motivation and control) and management standards; the implementation of the measures presented in the mechanism is possible only when assessing the level of digital potential of the SFIAIC on the basis of an integrated approach using the methodology presented above.

The most important point in the effectiveness of using this kind of a mechanism is the continuous monitoring of activities, as it will allow in the intermediate stages to identify inaccuracies and make appropriate adjustments to all aspects of the organizational and production activities of the SFIAIC.

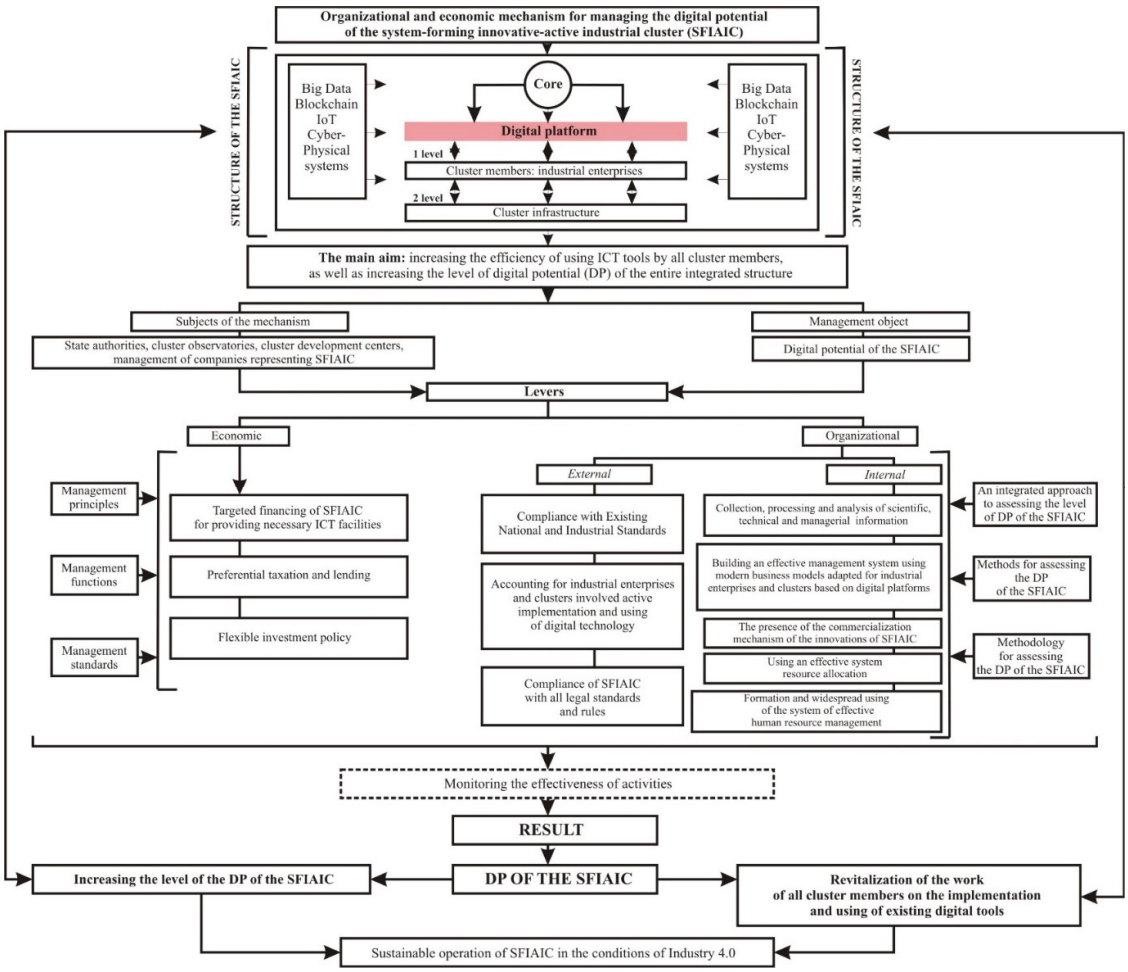

Fig. 5: Organizational and economic mechanism for managing the digital potential of the system-forming innovative-active industrial cluster

Note - the figure is developed by the authors

The result of the using of the organizational and economic mechanism for managing the digital potential of a system-forming innovative-active industrial cluster is either an increase the DP in the SFIAIC or an intensification of the work of all cluster members (both first and second levels - Figure 5) on the implementation and widespread using of existing digital information and communication technologies, as well as Industry 4.0 tools:

– *Big Data* - a set of methods and approaches for processing structured and unstructured a large volume of data and the different types;

– *Industrial Internet of Things* - equipping a variety of physical objects and systems with IT technologies to reduce their interaction with humans in the process of industrial production;

– *Blockchain* - a continuous system of blocks containing information built according to certain

algorithms that can establish relationships with decentralized databases;

– *Cyberphysical Systems* - the processes of interaction of sensors installed at different objects of the production process, equipment of the industrial cluster and information systems (including digital platforms) for forecasting, self-tuning and adaptation to changes in production in the shortest possible time.

In the case of the successful implementation of these types of activities, it is possible to talk about the stable functioning of the SFIAIC in the conditions of the Fourth Industrial Revolution, which will undoubtedly provide significant competitive advantages to all enterprises that are part of the industrial cluster.

Within the framework of this section, it is advisable to consider further directions of the authors' research: in the near future, the researchers will study the economic activity of the innovative-active industrial clusters in St. Petersburg (Russia) and Karaganda (Kazakhstan), as well as the development of practical proposals for the development of organizational -economic mechanism for managing the digital potential of these clusters.

Conclusions

Based on the research conducted by the authors, the following conclusions can be made:

– in the conditions of modern economic development and the active introduction of digital technologies in almost all spheres of human life, including in industrial production, the study of the essence of digital potential and its structure is particular importance, but this is especially true for integrated industrial entities, for example, represented by industrial clusters; on the whole, the analysis shows that publications devoted to assessing the digital potential of system-forming innovative-active industrial clusters (functioning, as a rule, on digital platforms) are small, since the economic phenomenon considered by the authors is a new, so far poorly studied economic category, which , in turn, once again emphasizes the need for research of this kind, taking into account the fact that now an increasing number of industrial enterprises have realized the role and importance of integration, as well as the introduction of modern information technologies at all levels of their activity - from production and organizational to communication;

– in the developing the organizational and economic mechanism for managing the digital potential of the SFIAIC, it is necessary, first of all, to determine the existing level of the cluster's DP based on an integrated approach, using the developed methodology, only after that it is advisable to shift the key aspects of the mechanism under consideration to the DP management process;

– the implementation of the organizational and economic mechanism is aimed at obtaining a certain result; in our case, it means raising the level of the DP of the SFIAIC, or activating of all cluster members in introducing and using various digitalization tools, which, in turn, will contribute to the sustainable functioning of SFIAIC in the conditions of Industry 4.0;

– the most important aspect in the development of such a mechanism is to take into account existing principles, functions and management standards, without which the effective functioning of the mechanism is not possible.

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State Management of The Tourism Sector: Essence and Content

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Abstract

The article defines the essence and content of the state management of the tourism industry. It is proved that the state should provide in its policy mechanisms that would inhibit the spontaneous development of the industry and guide its evolution in this direction in order to preserve the natural and cultural environment for future generations. The main areas of state support for the implementation of the strategy for the development of public administration in the tourism industry, based on the direct participation of the state in the implementation of special programs of the target appointments by appropriate funding for all components of a comprehensive public tourism policy.

Keywords: Tourism, Travel Industry, Travel Policy, Governance.

Introduction

Currently, tourism has developed considerably and became a massive socio-economic phenomenon of international scope, since it is among the leading sectors of the global economic complex. The expansion of the interstate political, economic, scientific and cultural relations contributes to the spread of intensive tourism. It should be noted that the tourism industry is closely linked with a number of components as a service industry and the production sector of the economy, which calls for effective implementation of appropriate governance arrangements.

Based on this, there is every reason to believe that the development of the tourism industry requires regulation and government support. The need to influence government agencies to promote tourism proven international practice. Most countries in the world do not use centralized tourism management methods, but do not rely entirely on market self-regulation of the industry. It is believed that it is impossible to fully market tourism and develop it without harming the natural and cultural values of a country or region.

It is up to the State to provide in its policy mechanisms that would inhibit the spontaneous development of the industry and direct its evolution in such a direction as to preserve the natural and cultural environment for future generations.

A variety of factors affecting the development of domestic tourism, as well as the complexity and contradictory nature of its constituent processes require mining multilevel mechanism of state regulation of tourism in Russia, aimed at creating an enabling legal and administrative, organizational and economic condition of the tourist activity of economic entities.

Methodology

Methodology of scientific research in this article is based on the theory of tourism (tourismology, turizmovedenii, tourist logistics), whose main goal is the systemic reflection of the phenomenon of tourism in the context of its impact on the socio-economic development of the territory. Dialectical method of research was used to organize and generalize scientific approaches to the organization of state regulation of tourism development; analysis and synthesis, induction and deduction - for the detail of the study; a systematic approach is to justify the definition of a comprehensive public policy in the tourism sector.

Results

For Russia, the role of tourism is important not only in terms of ensuring the constitutional right of citizens to rest, but also to increase the amount of state budget revenues from the results of tourism business activities. The development of tourism business has a positive impact on the state of the labor market, contributes to the reduction of unemployment due to the increase in employment in this area (Bespartochny, Cherkashin, 2010).

Based on this, the tourism business can be rightly considered as a key at the current stage based on the fact that he is now developing dynamically and is the most profitable of all the service sector in the economy. The development of the tourism business directly affects the competitiveness of a region, its attractiveness (Spitsina, Cherkashin, 2015, p. 221). With regard to socio-cultural and historical aspects, tourism allows you to demonstrate the features of a unique Russian mentality.

Based on the above, the role of tourism is a priority in the formation of cultural communications in Russia and its well-being in modern conditions.

Thus, the development of the tourism sector creates favorable conditions for increasing state budget revenues, generating new jobs, developing the infrastructure of the economic sector, protecting and restoring monuments of historical and cultural significance, and protecting the environment, which, accordingly, contributes to the active development of the tourism industry.

In the most general form, the tourism industry can be defined as a set of organizational forms of business that provide accommodation, transportation, food in the process of organizing knowledge and entertainment, recreation, business activities, sports and other tourism-oriented events. If you turn to the scientific literature, you should pay attention to the point of view of scientists V. I. Zorin and V. O. Kvartalnov, who affirm that the tourism industry, in addition to enterprises that provide accommodation and food, should also include tourism infrastructure of tour-rating, transport, entertainment, cultural, religious, communicative, informational, educational, scientific, medical, and commercial orientation (Zorin, 2003, p. 86). Based on this, it can be assumed that the tourism industry is a complex of inter-sectorial nature, which combines various components of the sphere of material production and services of the national economy to ensure the consumption of goods and services for tourist purposes. Because of the functioning of this cross-industry complex, it is possible to obtain a comprehensive tourist product.

The necessity for state management of the tourism industry is a consequence of scientific reasons for this need in all spheres of public life, as well as due to the specifics of the tourism industry itself. In fact, the main goal of state management of the tourism industry can be considered to be the formation of favorable conditions for the functioning and development of the tourism sector and related areas and industries related to material production and services of the national economy.

One of the curiosities of public administration research is that in many languages there is no significant difference between the terms used to describe politics and public policy (Hall & Jenkins, 1995). This means that in many studies, including in the field of tourism, the terms politics, public policy, and public administration are often used interchangeably (Hall & Campos, 2014).

One of the central concepts in the tourism industry is the concept of tourism policy. It is the basis for the management of tourism services at the national, regional and local levels. Therefore, before proceeding to the consideration of methodological issues of regulation of the tourism sector, it is necessary to determine what constitutes a tourist policy.

The concept of "tourism policy" originates from the time when tourism has become a mass socio-economic phenomenon and has become an important role in the economy of many countries, including Russia. By its etymological origin, it is associated with the Greek word "polis", which in ancient Greece defined the space where different interests collide, and, accordingly, require urgent solutions to the problem of regulating certain social relations. In our time, this concept refers to purposeful actions to develop rules for the functioning of individual social groups and the state as a whole. However, despite its significance and prominent place among other basic concepts of tourism science and practice, the definition of "tourist policy" does not have a generalized interpretation in specialized information sources, which causes its different meaningful interpretations.

Thus, I.T. Balabanov and A.I. Balabanov define tourism policy exclusively as "the state's activities for the development of the tourism industry and the subjects of the tourist market (tour operators, travel agents), improving the forms of tourist services for citizens and changing their political, economic and social potential on their basis (Balabanov, 2000, p. 40). Kvartalnov V. A., exploring the essence of tourism policy, focuses exclusively on its goals (Kvartalnov, 1999). In particular, he defines that tourism policy pursues both economic and non-economic goals. In his opinion, to the economical aims we can regard a promotion of some types consumption by increasing the production in the specific sectors of the economy, in the specific geographical zones, control of export trade, employment and economic growth. To the non-economic aims we can regard : freedom of peoples movement ,revival of the natural and cultural heritage.

An objective necessity in the tourist policy has emerged and grow in a result of statement of an important role of the tourism in a societys life. This happened in certain historical moment, when a real possibility of self-regulation of a tourist development exhausted.

Considering a level of processes in the hierarchical structure » tourism policy» we can highlight the next its types: an international, tourism policy, state, regional and the tourism policy of the separate company.

The tourism policy has the characteristic features of the common policy of a government. Along with that there are some specific factors under influence which it forms : natural conditions of country , development of the transport connections ,the social factors(conditions of peoples life, the vacation system).Factors is associated with a creature of the economical base for development of a tourism (stable monetary and financial ,foreign economic relations)and legal factors is associated with creating and functioning of the tourist legislation.

The important component of the state tourism policy are its target landmarks. They are defined by a subject of the regulatory actions, they are submitted by the common state or international policy and

depends on concrete economical and historical conditions of the development of the country and degree of a maturity of the tourism policy itself.

The state regulation in a sphere of the tourism is one of the fundamental factors of a management and development of an industry (Potapova,2016). With absence of an effective mechanism of public administration the industry can render a recessive influence on a socio-economic development of a territory. Most widespread problems which mostly arise as a result of an uncontrolled (massive) tourist flows are:

-In a social aspect is an outflow of the labour resources to a tourism industry from others industry of the economy, especially of the agricultural industry; of an occurrence of an excessive irritation between a tourist and local population; a gain of a criminogenic situation; an excessive consumption by tourists an alcohol and tobacco;

- In an economic aspect is a high decree of a dependence from the tourism; an excessive export of currency due to a predominance of volumes of a offsite tourism; a shadowed of the intrepreneurial activity due to an absence of the effective mechanisms of the tracking fact of a provision of a tourist service; an outflow of the investment capital from others industries an economy to the tourism such a highly profitable;

- In an environmental aspect are an occurrence of the environmental problems through a recreational digression (a negative influence of the tourists on the natural environment, an excessive tourist-recreational load on the territory);

- In a cultural aspect is a device of the local and national features to the tourists interests; the destraction of objects have the historical and architectural value due to an excessive tourist recreational load;

- In an educational aspect is a mastering by tourists the foreign cultures and customs , a lifestyle due to a predominance of the host country in a socio-economic development , a stimulation of the excessive of the migration mobility;

- In a globalization aspect is a leveling of the cultural differences, the language barriers, the ethical standards through a periodical stay of persons on a territory of the foreign countries in a tourists status.

In our days, an understanding grows that the role of the government says more than never important in a tourism. Perhaps, increasingly than before considering the reactions on the recent financial crises and the natural disasters. There are again the researches in an area of the state policy in a sphere of the tourism reflects more widely shifts in a thinking about a role and a character of the public administration (Jenkins and Hall, 2014).

The negative influences of the tourism industry is conditioned by the emergency sensitivity of the tourism to the factors of the external sphere (meso (direct interaction) and macro setting (an indirect interaction) , which in turn itself are characterized of the range of the indicators which play the role of basis for a forming the strategic directions of the implementation of the functions of the public administration. By the exogenous factors of meso-setting performs: subjects of the tourist activity, intermediaries on the market of the tourist services , consumers of the tourist services, public authorities, public companies, scientific companies, educational institutions. To the exogenous factors of the macro setting belongs the natural, socio-economic, demographic, socio-cultural, political-legal, environmental, scientific, technical and international factors.

Thus, state management of the tourism industry should be directed not only to achieve a positive effect from the implementation of tourism functions and eliminate possible threats from the influence of the

industry, but also to assess the level of influence of the relevant environmental factors, which together should create favorable conditions for the development of tourism in the relevant territory.

State management of the tourism industry should be understood as a type of state activity that involves purposeful influence on the industry or its individual components through an effective mechanism of state management in order to achieve certain strategic objectives.

State regulation of the tourism industry is a set of methods of influence of management entities on the tourism industry as an object that have a practical nature and functional focus on achieving certain goals. A feature of state regulation that distinguishes it from management is the consideration of market laws in the course of implementing management functions. In other words, public administration is the theoretical shell and conceptual basis for the implementation of the relevant mechanism, and state regulation is reflected in the practical dimension with the mandatory inclusion of current market processes and their forecasts.

Taking into consideration that the state management of the tourism industry is carried out through the appropriate state policy in the field of tourism and resorts, its priority areas for tourism activities are:

- improvement of legal norms of state management of the tourism industry;

- promoting the development of tourism as a highly profitable part of the service sector of the national economy of Russia; attracting domestic and foreign investors to enhance the development of the tourism industry, creating new jobs;

- promotion of rural and green tourism, inbound and domestic tourism;

- development of international cooperation, integration of Russia into the world tourism market;

- creating favorable conditions for the development of the tourism industry by simplifying and harmonizing such areas of state regulation as: tax, currency, customs, border;

- ensuring the availability of tourist and recreational services for children, young people, the elderly, the disabled and low-income segments of the population through the introduction of a preferential system for these categories of persons.

Based on the national policy in the field of tourism and resorts, local tourism authorities determine the appropriate regional goals that can be achieved by relying on the local potential of the tourism sector. In accordance with these goals, local authorities form tourism development programs that set specific goals. Such tourism development programs at the local level may include the following provisions:

- promoting the conservation and rational use of natural, historical and cultural resources of a tourist nature;

- attracting domestic and foreign investment in the development of the tourism industry;

- determining the procedure for standardization, certification and licensing in the tourism industry;

- introduction of statistical reporting of tourism market entities;

- identification of the status of certain tourist centers;

- creating a system of scientific support for the tourism industry and promoting its development;

- organization of training, retraining and advanced training of personnel;

- creating favorable conditions for increasing tourism activity in Russia.

In General, state management of the tourism industry is necessary because of the need to develop a framework for planning the activities of the tourism sector from strategic positions, in particular, such as:

- ensuring the development of the entire existing potential of tourist areas in General and the needs of the leisure infrastructure in particular;

- conducting research in a specialized field;

- design and placement of tourist facilities;

- control of environmental pollution;

- assessment of the potential use of tourist territories and calculation of their permissible maximum capacity to receive tourists, avoiding excessive load on territorial ecosystems;

- justification of the feasibility of placing tourist destinations from an economic point of view.

The importance and scope of tourism show its belonging to the strategic sectors of our country's economy. The economic effects tourism activities are not limited to direct financial results. They go far outside the framework of tourism sector, influencing whole economic body of the country. Thus, the tourism sector requires direct State regulation in order to provide proportional development both territorial and branches of economic complexes, as well as inform employment policy, supporting growth of budget revenues and management the whole state's balance of payment (Trukhachev, Varivoda, 2014, pp. 155-160).

Conclusions

The content of state regulation of tourism development is determined by the goals, faced by the government bodies, as well as the tools, which the state has for the implementation policy. In the most common form, the government policy's strategical goal of the tourism development can be defined as follows: formation of a competitive tourism complex, meeting citizens' requirements in tourism services and contribution to the country's economic development. Effectiveness of the government policy in the tourism development should be evaluated according to the goal based on the following criteria: economic and social effectiveness, environmental implications of implementing the targeted programmes and activities.

At the same time, the government control in the tourism industry should not allow negative impact on tourist areas, as well as encourage the implementation of tourist functions, which, in turn, allow getting comprehensive socio-economic effect.

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Innovación Abierta:
Un Análisis de sus Determinantes a Nivel de Firma

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Resumen

El concepto de innovación abierta ha cobrado especial relevancia no sólo como objeto de estudio en el ámbito académico, sino también como marco para el desarrollo de nuevos modelos de gestión empresarial. Este artículo explora los determinantes de una de las dimensiones de la innovación abierta asociada con el uso del conocimiento externo para el desarrollo de l os procesos de innovación empresarial. El análisis es realizado con base en los microdatos de la Encuesta de Desarrollo e Innovación Tecnológica EDIT 2015 – 2016 realizada por la agencia estadística en Colombia (DANE). Para ello se introduce una medida que captura el grado de apertura de la empresa con relación al uso de fuentes externas de información para el desarrollo de actividades de innovación. Como posibles determinantes se tienen en cuenta variables relacionados con las capacidades tecnológicas de la empresa, las barreras para innovar y la estrategia de apropiabilidad.

Palabras clave*:* Innovación abierta; fuentes de información; I+D; Estrategias de apropiabilidad

Introducción

La importancia de las fuentes externas de conocimiento en los procesos de innovación empresarial ha sido destacada ampliamente en la literatura reciente. En esta línea, ha cobrado particular relevancia el enfoque de la innovación abierta catalogado por algunos autores como el nuevo paradigma en la gestión de la innovación. Chesbrough (2003) define la innovación abierta como un enfoque que asume que las empresas pueden y deben utilizar durante el desarrollo de sus procesos de innovación, no sólo ideas internas, sino también el conocimiento existente en su entorno. De igual forma, destaca que las empresas pueden emplear diversos caminos para explotar eficientemente sus capacidades tecnológicas e introducir productos y/o procesos nuevos en el mercado.

En términos generales, el enfoque de la innovación abierta permite integrar numerosos estudios enfocados en la importancia de conocimiento externo para el proceso innovador de la empresa. Pero no sólo se queda allí, el enfoque es mucho más amplio en la medida en que incluye estrategias de apertura no sólo entrantes (inbound), sino también salientes (outbound) (Dahlander & Gahn, 2010; Saebi & Foss, 2015).

A pesar de la distinción antes señalada, lo cierto es que el mayor interés desde el punto de vista académico se ha centrado en el estudio de los procesos de entrada, es decir, en analizar cómo la empresa

accede y explota el conocimiento externo en sus procesos de innovación. La atención sobre esta dimensión en particular se encuentra justificada por la complejidad actual de los procesos de innovación y la necesidad de las organizaciones de apalancar sus recursos y capacidades internas con el conocimiento disponible en el mercado (West et al. 2014).

El presente artículo tiene como objetivo explorar los determinantes del grado de apertura empresarial para el desarrollo de actividades de innovación en el contexto de la industria manufacturera Colombiana. Este análisis es interesante si se tiene en cuenta que la mayor parte de las investigaciones realizadas hasta la fecha han sido abordadas a partir de la consideración de sectores intensivos en tecnología en países desarrollados (Greco et al. 2015; Ghisetti et al. 2015) y poco se ha hecho en contextos tecnológicamente menos dinámicos. Además, si se tiene en cuenta que en estos contextos las empresas tienen una mayor necesidad de recurrir a las fuentes externas de conocimiento debido a sus debilidades tecnológicas internas, identificar los factores que inciden en el grado de apertura constituye un tema de especial importancia desde el punto de vista de la gestión empresarial.

El análisis realizado en el presente artículo emplea como fuente de información los datos derivados de la encuesta nacional de innovación, realizada por el DANE en Colombia. Esta encuesta, al seguir las directrices del Manual de Oslo, es similar a los cuestionarios empleados por los países europeos en el marco de la Community Innovation Survey, lo cual facilita la comparación de los resultados obtenidos con aquellos encontrados en contextos más desarrollados.

La estructura del presente documento está compuesta por tres secciones adicionales a la presente introducción. A continuación se presenta la revisión de literatura del concepto de innovación abierta, explorando cómo ha evolucionado y los factores que se han analizado en la literatura como posibles determinantes del mismo. En el capítulo siguiente, se describe la metodología utilizada en el estudio empírico, describiendo los datos, las variables y el método de estimación empleado. Posteriormente se presentan los resultados y finalmente se destacan las conclusiones más relevantes derivadas el estudio.

Revisión de la Literatura

En las últimas décadas ha emergido una literatura que establece que la empresa no puede innovar en solitario y que esta actividad depende de la interacción con otros actores que le permita a la empresa no sólo compartir costos y disminuir riesgos, sino más importante aún compartir recursos complementarios. Uno de los enfoques que ha destacado de forma especial los aspectos antes mencionados y que ha tenido un amplio grado de difusión es el de la innovación abierta. Chesbrough (2003) definió la innovación abierta como un paradigma que establece que las empresas pueden y deben emplear fuentes de conocimiento externo para avanzar tecnológicamente.

La literatura ha abordado el paradigma de la innovación abierta desde múltiples perspectivas y unidades de análisis tales como el individuo, la empresa, el sector o incluso el sistema nacional de innovación (Saebi & Foss, 2015). Dahlander & Gahn, (2010), a partir de una extensa revisión de más de 150 artículos, concluyeron que los investigadores han empleado múltiples definiciones y enfoques para sus estudios, lo cual genera dificultades en la construcción de un marco analítico uniforme. En función de lo anterior, estos autores identificaron que el proceso de apertura puede comprender un flujo de información entrante o saliente, y que este a su vez puede ser una interacción pecuniaria y no pecuniaria.

Usualmente el concepto de innovación abierta es contrastado con innovación cerrada, es decir, prácticas en donde las empresas realizan las actividades de generación de ideas, construcción de mercados, distribución, servicios y finanzas de manera independiente y solitaria. Sin embargo, en la realidad, no muchas empresas siguen una estrategia completamente cerrada, el constante desarrollo por fuera de la organización hace necesario procesos más abiertos (Laursen & Salter, 2006). En este sentido, más que la distinción entre innovación abierta y cerrada, la apertura empresarial debería entenderse como un proceso continuo de interacción en el cual las empresas pueden implementar diferentes niveles de apertura en función del grado de importancia que tengan las fuentes externas de conocimiento para el desarrollo de las innovaciones.

Como se mencionó anteriormente, la falta de un marco analítico uniforme ha dado origen a la puesta en operación de diferentes constructos que conciben el concepto de innovación abierta de diferentes formas. Una práctica empleada recientemente ha sido abordar el análisis de esta temática empleando

los datos derivados de las encuestas de innovación aplicadas en muchos contextos nacionales y basadas en las directrices planteadas en el Manual de Oslo (OECD, 2005). En esta línea se destacan los aportes realizados por Laursen & Salter (2006), los cuales emplearon la información derivada de la Encuesta Nacional de innovación en el Reino unido. En este trabajo, los autores se aproximaron al estudio de la apertura empresarial a través del análisis de las fuentes externas de conocimiento empleadas por las empresas británicas en sus procesos de innovación, distinguiendo entre dos constructos clave: amplitud (número de fuentes externas usadas) y profundidad (número de fuentes externas consideradas de alta importancia para los procesos de innovación). Los resultados mostraron que existe una alta correlación entre la búsqueda amplia y profunda a través de diversos canales y la captura de ideas que generan retornos a la empresa por medio de la explotación de innovaciones.

En la literatura existen diversos trabajos que han explorado los factores, tanto a nivel de firma como a nivel de sector, que influyen en la adopción por parte de la empresa, en mayor o menor grado, de una estrategia abierta para el desarrollo de sus actividades de innovación.

En lo que respecta a los factores empresariales, los aspectos más analizados han sido el tamaño y los esfuerzos en la realización de actividades internas de I+D. En términos generales, la literatura no es concluyente con respecto al efecto de estos dos factores. Con relación al tamaño, por ejemplo, algunos estudios sostienen la idea de que la apertura es más relevante para las grandes empresas, teniendo en cuenta la mayor disponibilidad de recursos y capacidades complementarias que estas poseen y que, por lo tanto, le facilitan la búsqueda de socios y la gestión de los convenios de colaboración (Veugelers, 1998). No obstante, existen otros estudios que argumentan que, debido a la falta de recursos internos, las pequeñas empresas tienen una mayor necesidad de estar abiertas al medio ambiente para desarrollar sus actividades de innovación (Nieto & Santamaría, 2010). Para estas empresas el uso del conocimiento externo constituye un elemento estratégico debido a que no disponen de las capacidades necesarias para afrontar proyectos de manera solitaria y son más vulnerables a aspectos como la incertidumbre de los proyectos de innovación y la alta probabilidad de fracaso asociado a los mismos (Bayona et al. 2001).

Con respecto a los esfuerzos empresariales en I+D, existen también visiones contradictorias. Uno de los argumentos más extendidos, especialmente desde que Cohen y Levinthal propusieron el concepto de capacidad de absorción, es el que establece una relación positiva entre los esfuerzos internos en I+D y el grado de apertura empresarial. Atendiendo al concepto de capacidad de absorción (Cohen & Levinthal, 1990), se ha establecido que la I+D interna no sólo contribuye de manera directa al desarrollo de nuevos productos y procesos, sino que, además, le permite a la empresa desarrollar capacidades internas que le facilitan el acceso a fuentes externas de conocimiento y su explotación económica en términos de innovaciones. Sin embargo, algunos autores sostienen que desde la perspectiva del enfoque de los recursos y las capacidades, las empresas con las capacidades de I+D altamente desarrollados pueden beneficiarse de economías de escala internas por lo que les resulta menos necesaria la participación de los socios externos en sus procesos de I+D (Cassiman & Valentini, 2009).

Tal como se observa en los párrafos anteriores, la lógica detrás de la innovación abierta recae en la posibilidad que esta estrategia tiene para acceder a recursos externos complementarios. Estos recursos pueden ser recursos de conocimiento, pero también recursos financieros. El uso de fuentes externas de información o la colaboración con actores externos, puede ser relevante para disminuir los costos de los procesos de innovación, al permitir a la empresa acceder a un mercado de conocimiento y tecnología en condiciones económicas más ventajosas en comparación con el desarrollo interno (Chesbrough & Bogers, 2014; West & Bogers, 2014). Igualmente, la innovación abierta puede contribuir a disminuir las barreras asociadas con la incertidumbre de los procesos de innovación, derivada de los cambios potenciales en el entorno en cuanto al mercado y la tecnología. La incertidumbre del mercado se refiere a las fluctuaciones y a la imprevisibilidad de la demanda, mientras que la incertidumbre tecnológica está relacionada con la incapacidad de la organización para predecir acertadamente los requerimientos tecnológicos (Robertson & Gatignon, 1998). Algunos autores señalan que si bien la incertidumbre puede incrementar los costos del desarrollo externo, la flexibilidad que otorga la cooperación o la adquisición externa de tecnología puede compensar dicho incremento (Klein et al. 1990). Así, por ejemplo, la incertidumbre que se genera como producto de la rapidez del cambio tecnológico puede hacer que la empresa encuentre el desarrollo interno una estrategia menos atractiva para el desarrollo

de sus innovaciones, dada la alta probabilidad de que las capacidades internas se queden obsoletas. Para las empresas que afrontan una alta incertidumbre tecnológica, la cooperación con agentes externos y el uso de fuentes externas de conocimiento puede convertirse en un mecanismo importante para acceder a recursos y conocimientos complementarios que le ayudaran a introducir productos en el mercado con una mayor rapidez (Steensma et al. 2000)

Adicional a los aspectos anteriores, otro factor que ha sido relacionado con el grado de apertura es el relacionado con la estrategia de apropiabilidad que implementa la empresa. Dicha estrategia está asociada con la capacidad de las empresas para capturar los beneficios derivados de sus esfuerzos en innovación, disminuyendo lo máximo posible las filtraciones de información y conocimiento hacia otros actores del mercado (Teece, 1986). En la literatura actual de innovación abierta no existe un consenso acerca de la relación entre la apropiabilidad y el nivel de apertura empresarial. Por una parte se señala que cuanto mayor es la importancia que la empresa atribuye a las condiciones de apropiabilidad dentro de la estrategia empresarial, menor será su nivel de apertura (Laursen & Salter, 2014). En este sentido se ha indicado que las firmas que sobreprotegen su base de conocimiento son más propensas a perder oportunidades para intercambiar conocimiento valioso con diferentes actores (Bessen & Maskin, 2009). Por otro lado, algunos autores argumentan que el grado de apropiabilidad existente en una industria puede favorecer el nivel de apertura de una organización (Chesbrough, 2006). La existencia de fuertes mecanismos legales de protección, por ejemplo, aumenta la confianza de los gestores empresariales para la adopción de mecanismos de transferencia de conocimiento con agentes externos. En estos casos, la existencia y uso de fuertes mecanismos de protección le aseguran a la empresa la posibilidad de capturar el mayor valor posible de la innovación realizada y, por ende, en ausencia de estos, los incentivos a usar fuentes externas de conocimiento son menores.

Además de las características empresariales antes mencionadas, en la literatura se han analizado una serie de factores asociados con las dinámicas sectoriales como posibles determinantes del grado de apertura empresarial. Entre estos factores se destaca la intensidad tecnológica del sector en el que opera la empresa. En este sentido, algunos autores señalan los beneficios que tiene el implementar una estrategia de innovación abierta en sectores catalogados como de alta tecnología (Tödtling et al. 2006). Lo anterior debido a que en estos sectores existe, por lo general, un mayor nivel de oportunidades tecnológicas que incentiva a las empresas a realizar una búsqueda más amplia y profunda con el fin de obtener acceso a recursos que son críticos para el desarrollo de procesos de innovación (Laursen & Salter, 2006). Sin embargo, algunos autores (Tether, 2002).

Metodología

Datos Y Variables

Para el análisis empírico se tomaron los datos de la Encuesta de Desarrollo e Innovación Tecnológica (EDIT) de la industria manufacturera de Colombia entre los años 2015 y 2016, realizada por del Departamento Administrativo Nacional de Estadística (DANE). La EDIT tiene como propósito investigar sobre las actividades de desarrollo e innovación tecnológica adelantadas por las empresas industriales en Colombia con personal mayor o igual a 10 personas.

La encuesta recoge datos de 7947 empresas, sin embargo, el detalle de la encuesta en preguntas relacionadas a aspectos de innovación, condiciona la posibilidad de responder la totalidad de las preguntas para empresas que no se consideran *innovadoras*, o que aún no tengan clara tal dinámica. Por lo tanto, este trabajo se centra en 2237 registros de empresas manufactureras que cuentan con la totalidad de los registros necesarios para abordar este análisis, por lo que el análisis de datos censurados requirió implementar un enfoque de para evitar el sesgo de selección de la muestra.

En la tabla 1 se presentan las definiciones de las variables utilizadas en los modelos econométricos. La variable dependiente en el estudio es el grado de apertura empresarial. Siguiendo la estrategia empleada en investigaciones previas (Laursen y Salter, 2014; Huang et al., 2014), esta variable se ha definido teniendo en cuenta el uso de agentes externos como fuente de información para el desarrollo de los procesos de innovación empresarial. En la EDIT indaga en total por el uso de 15 actores como fuentes externas de conocimiento e información, entre los que se encuentran gentes industriales (clientes, proveedores, competidores, etc.) como agentes institucionales (universidades, Centros de Desarrollo Tecnológico, parques tecnológicos, etc.).

Tabla 1: Definición de las variables y estadísticos descriptivos

Variables	Descripción
GRAPER	Mide el grado de apertura de la empresa en el periodo 2015-2016. Es una variable de conteo que toma valores enteros positivos de 0 a 15.
INTID	Es una medida de intensidad del esfuerzo interno de la empresa para investigación y desarrollo. Representa la inversión en I+D sobre el total invertido en actividades de innovación en el año 2015.
TAM	Número de empleados de la empresa en el año 2015.
SECT	Clasificación sectorial acorde a la clasificación de intensidad tecnológica empleada por EUROSTAT. SECT0(sectores de intensidad tecnológica baja) SECT1(sectores de intensidad tecnológica media) SECT2(sectores de intensidad tecnológica media-alta) SECT3(sectores de intensidad tecnológica alta)
BAR_COS	Valoración de una serie de factores como obstáculos para el desarrollo de actividades de innovación. Se calculó un indicador compuesto teniendo en cuenta los siguientes factores: Escasez de recursos propios; dificultades para acceder a financiamiento externo. Alpha de Cronbrach 0,71
BAR_CON	Valoración de una serie de factores como obstáculos para el desarrollo de actividades de innovación. Se calculó un indicador compuesto teniendo en cuenta los siguientes factores: falta de personal cualificado, escasa información sobre mercados, escasa información sobre tecnología. Alpha de Cronbrach 0,79
BAR_INC	Valoración de una serie de factores como obstáculos para el desarrollo de actividades de innovación. Se calculó un indicador compuesto teniendo en cuenta los siguientes factores: Incertidumbre frente a la demanda de bienes y servicios; incertidumbre frente a la ejecución técnica del proyecto. Alpha de Cronbrach 0,79

Método De Estimación

Para el análisis econométrico se empleó un Heckman (1979) en dos etapas. La necesidad de este modelo se sustenta en el hecho que existe un sesgo de selección muestral, al tomar sólo las empresas activas en innovación, es decir, aquellas que realizaron inversiones en actividades orientadas al desarrollo de procesos de innovación. De estimarse directamente el modelo principal la inferencia seria errada, ya que los estimadores de la ecuación objetivo serían inconsistentes.

En este orden de ideas, la ecuación de selección corresponde a un modelo que mide la probabilidad de estar en la muestra, en este caso de haber realizado inversiones en actividades de innovación. A partir de dicha estimación, se obtiene la razón inversa de Mills que captura la magnitud del sesgo. Posteriormente, se incorpora en el modelo de regresión principal, que en este caso obedece a un modelo de regresión binomial negativa debido a las características de la variable dependiente (datos de conteo que toma valores enteros no negativos).

Resultados Y Discusión

La tabla 2 presenta los resultados del modelo principal con la inclusión del inverso de Mills para controlar por el posible sesgo de selección. Con respecto a las características empresariales, los resultados muestran (ver tabla 2) que el tamaño ejerce un efecto significativo y positivo sobre el grado de apertura de la empresa. Este resultado es consistente con los argumentos planteados en estudios previos que señalan que las empresas grandes, debido a su mayor disponibilidad de recursos, pueden implementar una estrategia más abierta en lo que respecta al uso de fuentes externas de conocimiento.

Por otra parte, la variable que refleja los esfuerzos en I+D interna (INTID) no presenta efecto significativo. A pesar de ello hay que destacar que la variable que mide la intensidad tecnológica del sector en el que opera la empresa sí juega un papel determinante en la definición de su grado de apertura, aunque hasta cierto nivel. Comparado con los sectores intensivos de baja tecnología (categoría empleada como referencia), los sectores de media baja (SECT 1) y media alta (SECT2) son más propensos a emplear un mayor número de fuentes externas de conocimiento en sus procesos de innovación. No obstante, pertenecer a un sector catalogado como de alta tecnología (SECT3) no muestra un efecto significativo. En parte, este resultado está en línea con lo señalado en diversos estudios previos en los que se ha asociado una mayor intensidad tecnológica del sector con un mayor uso de fuentes externas de conocimiento, pero al mismo tiempo señala que para el caso de los sectores más avanzados es posible que las empresas tengan menos necesidad de buscar externamente conocimiento o que tengan mayor dificultad para encontrar fuentes que le ofrezcan recursos complementarias, por lo que su grado de apertura resulta menor en comparación con sectores de menor intensidad tecnológica.

Los resultados anteriores pueden también entenderse a la luz de lo propuesto por Barge-Gil (2011) en su estudio sobre el caso español. Esta autor, a través de la distinción de tres niveles de apertura (abierta, semi-abierta y cerrado) señaló que el efecto del tamaño y de la intensidad en I+D sobre el grado de apertura empresarial se encuentra determinado por dos aspectos: la capacidad de absorción y la necesidad de conocimiento. De esta forma las empresas muy pequeñas y poco intensivas en I+D si bien tienen una gran necesidad de conocimiento externo, carecen de la capacidad de absorción necesaria para beneficiarse de un acuerdo de colaboración con agentes externos. En este caso, las empresas optan por una estrategia cerrada. Por el contrario, las empresas grandes y con una alta intensidad en I+D, tienen una gran capacidad de absorción pero una necesidad menor de recurrir a fuentes externas. Estas empresas, por lo tanto, recurren a una estrategia semi-abierta, en la cual si bien captan cierta información del entorno siguen basando sus procesos de innovación en sus capacidades tecnológicas internas. Finalmente, son las empresas con una intensidad media en I+D que - en nuestro caso podría asociarse con la pertenencia a sectores de intensidad tecnológica media y media alta - las que tienen a basar sus procesos de innovación en el uso de fuentes externas de conocimiento (estrategia abierta) debido a que en ellas se conjugan dos factores clave: poseen un nivel de capacidad de absorción que le permite explotar el conocimiento que tienen otros agentes y, además, tienen la necesidad de recurrir a fuentes externas debido a que no poseen capacidades tecnológicas suficientes para adelantar procesos de innovación por sí solas.

Co relación a las variables asociadas a las barreras para la innovación, los resultados muestran que las barreras de incertidumbre (BAR_INC) y las barreras de conocimiento (BAR_CON) tienen un efecto significativo y positivo sobre el grado de apertura, mientras que las barreras de costos (BAR_COST) resultó ser no significativa. Este resultado sugiere que, en el contexto analizado, el grado de apertura en los procesos de innovación está más asociado con la posibilidad de acceder a conocimientos e información complementaria que disminuya las barreras derivadas de la falta de conocimiento propio o la incertidumbre (tanto de mercado como tecnológica), que con el hecho de disminuir el costo de la innovación.

Tabla 2: Resultados del Modelo

	Grado De Apertura (GRAPER)	
Variables Independientes	Coeficiente	Error Estándar
Constante	0.34055	0.43383
INTID	1.74626	0.96980
TAM	0.09615*	0.04802
SECT1	0.16934 **	0.06376
SECT2	0.18233 **	0.06755
SECT3	0.04187	0.13425
BAR_CON	0.26028 **	0.05744
BAR_COST	0.09271	0.05679
BAR_INC	0.17877 **	0.05733
RDI	-0.11551	0.25472
RMS	0.22388 **	0.07227
PAT	0.24838	0.21376
DA	0.26872	0.32028
MEST	0.22155 ***	0.05403
INVMILLS	-0.57477 **	0.21227
No. Observaciones	2237	

Fuente: cálculo de los autores

En lo que concierne a la estrategia de apropiabilidad de la empresa, dos variables presentan un efecto significativo y positivo: el uso de registro de marcas (RMS) y el uso de mecanismos de protección estratégicos (MEST). En general, estos resultados ponen de manifiesto que las empresas que implementan estrategias para proteger los resultados de sus esfuerzos en innovación y apropiarse en la mayor parte posible de los beneficios derivados de los mismos, tienen a abrirse más al uso de fuentes externas. En este sentido, el uso de las estrategias de apropiabilidad pueden disminuir los riesgos asociados a un "derrame" involuntario de conocimiento en los procesos de relacionamiento con actores externos, dando mayor tranquilidad a las empresas para interactuar con otros actores. Las variables asociadas con el uso de patentes (PAT) y derechos de autor (DA) aunque tienen coeficientes positivos, son no significativas, pero esto podría estar relacionado con el hecho que estas estrategias son muy poco habituales en el contexto analizado.

Conclusiones

La innovación abierta se ha convertido en un enfoque relevante para el análisis de los procesos de innovación empresarial. Su importancia es, si cabe, mucho mayor en el contexto de los países en desarrollo donde las empresas poseen pocas capacidades internas y difícilmente pueden adelantar actividades de innovación sin recurrir a la colaboración con agentes externos o al uso del conocimiento disponible en su entorno. En este sentido, el análisis de los factores que influyen en la adopción por parte de la empresa de una estrategia de innovación abierta constituye un aspecto de interés no sólo desde el punto de vista académico, sino también en el ámbito de la gestión empresarial.

Este artículo ha explorado este fenómeno tomando como caso de estudio la industria manufacturera de Colombia y empleando como fuente de información los datos derivados de la Encuesta nacional de Desarrollo Industrial y Tecnológico (EDIT), realizada por el DANE.

En el estudio, dentro del conjunto de posibles determinantes del grado de apertura, se han considerado factores internos de la empresa como también características del sector en el que opera la empresa. En general, los resultados muestran que el tamaño influye de forma significativa en el grado de apertura de la empresa. En este sentido, si bien las pequeñas y medianas empresas pueden tener un beneficio marginal mayor al abrir su estrategia de innovación, es probable que sus recursos limitados les impidan buscar y acceder a una mayor diversidad de fuentes de información. Asimismo, los resultados sugieren

que, en el contexto analizado, las empresas implementan una estrategia de innovación abierta para subsanar las debilidades internas en materia de conocimiento o las barreras asociadas a la incertidumbre de los procesos de innovación, pero no con el fin de solventar los problemas relacionados con los costos de dichos procesos. En otras palabras, la apertura es vista fundamentalmente como un proceso para acceder a recursos de conocimiento, bien sea para el desarrollo en sí de la innovación o la validación tecnológica y comercial de la misma, pero no tanto como una estrategia para la disminución de costos.

Finalmente, los resultados ponen de manifiesto que en la medida que las empresas perciben que existen escasas posibilidades de imitación de terceros, éstas tienden a emplear un mayor número de fuentes externas de conocimiento. Por el contrario, cuando sea difícil proteger sus resultados, la compañía tiende a recurrir menos a agentes externos, quizá con el objetivo de evitar fugas involuntarias de información o que terceros entren en contacto con un conocimiento relevante.

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Consumer Ethnocentrism and The Consequences for Marketing in The Countries of East-Central Europe

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Abstract

The fall of the Soviet Union and the accession of Poland, the Czech Republic, Slovakia, Hungary and the Baltic States to the European Union deepened the progress of globalization and with it the liberalization of trade in Central and Eastern Europe. Although tariff restrictions have decreased significantly over the past few decades, the recent economic crisis, Brexit, Russian-Ukrainian crisis and trade wars are raising the discussion about the importance of non-tariff barriers and new subtle forms of protectionism again. These events (although they are not the only ones) seem to activate national identity and strengthen consumer ethnocentrism. Based on the review of literature, the author discusses the phenomenon of consumer ethnocentrism in selected Central and Eastern European countries and formulates its marketing consequences. The results presented may help managers, who can use this phenomenon to optimise their marketing strategies or to segment buyers in the context of their attitudes towards domestic and foreign products.

Keywords: Consumer Ethnocentrism, Consumer Behavior, Product Origin.

Introduction

Based on the review of literature, the author discusses the phenomenon of consumer ethnocentrism in selected Central and Eastern European countries and formulates its marketing consequences. The results presented may help managers, who can use this phenomenon to optimise their marketing strategies or to segment buyers in the context of their attitudes towards domestic and foreign products. The concept of consumer ethnocentrism was first defined in 1987 by Shimp and Sharma (1987), who suggested that from the perspective of ethnocentric consumers buying foreign products is inappropriate as it leads to negative changes in the domestic economy, resulting in job losses (Shimp and Sharma, 1987). Shimp and Sharma (1987) created the CETSCALE research tool for this purpose, which was later tested successfully in many countries, including France, USA, and Japan (Netemeyer, Durvasula and Lichtenstein, 1991).

Buying domestic products allows consumers to express their attachment to the country where they live and is an expression of support for the local community. As suggested by (Siamagka and Balabanis, 2015), the source of consumer ethnocentrism is also the pro-community attitude of individuals and the desire to care for the welfare of others. Ethnocentric tendencies in the purchasing process are also a manifestation of consumers' openness to other cultures; this openness is acquired through travelling abroad a lot. On the other hand, a better knowledge of foreign cultures leads to weaker ethnocentrism (Shankarmahesh, 2006).

Consumer Ethnocentrism in Central and Eastern European Countries

The first research on consumer ethnocentrism in Central and Eastern European countries was conducted as late as after 1989, when the post-communist countries gaining their sovereignty started the extended process aimed at building free markets, and consumers were given the full freedom to choose products and services according to their own needs. The long-standing neglect during the

communist times led to a delay in the technological development of the region. Research conducted in the '90s showed that the level of consumer ethnocentrism in countries such as Poland, Czech Republic and Estonia was low (Vida and Fairhurst, 1999). The main reason for this was the distrust in domestic goods, which were of lower quality compared to imported products. Over time, the post-communist countries carried out a number of activities including promoting export, building a positive image of the country and technological investments, and their main goal was to become competitive and quickly adjust production quality standards in the single European market. Research conducted in Russia and Poland shows that Western products were preferred in the early stages of the political transformation, as a sign of looking for better quality and product novelties. However, as the economy goes through successive phases of transition, consumer ethnocentrism increases (Good and Huddleston, 1995).

According to research conducted in 2012 by Maison (2014), 86% of Poles agreed, more or less strongly, that domestic companies should be supported by buying domestic products, and 84% of respondents declared that they often buy Polish products. Research conducted in the Czech Republic (an individualistic country) suggests that the ethnocentrism of Czech consumers is the result of a sense of superiority and domination of the Czech nation (Balabanis et al., 2001). It should be added that the level of consumer ethnocentrism varies across product categories. Czech consumers believe that domestic products are of high quality and, as in many Central and Eastern European countries, consumer ethnocentrism is strongest in the food category (Kreckova, Odehnalova and Reardon, 2012). As observed by Minta (2015), the market of regional products attracts an increasing interest as consumers look for unique, healthy, organic, and traditionally manufactured products (Minta, 2015). Moreover, among Slovak consumers, consumer ethnocentrism is positively correlated with age (Petrovicova, 2014). It can be concluded that with further economic development of Central and Eastern European countries, the level of consumer ethnocentrism will increase. This may be important for marketing managers, especially while making decisions related to how to shape the image of foreign brands operating in this region. Due to the fact that consumer ethnocentrism is strongest in the food category, retail chains should adjust their product range with products from the consumer's country and cooperate with local suppliers. Consumer ethnocentrism can also be useful in managing own brand portfolios of retail chains. In the categories where this phenomenon is strong (bakery products, dairy products, alcoholic and non-alcoholic beverages), newly created brands should relate to national motives of the buyer's country.

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Macroeconomic Factors Affecting Household Indebtedness

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Abstract

The financial sector is considered stable when it performs its core functions even with negative phenomena in the external and domestic financial environment. The aim of the article will be to describe the state of the economy of the state, which contributes to the greater indebtedness of the population, which may ultimately pose a risk that will appear on the domestic market. The indebtedness of the Slovak population and businesses in relation to GDP has been growing almost continuously since 2012 and exceeds the average of Central and Eastern European countries. The development of the credit market is the result of low interest rates and stable economic growth. The Slovak Republic records the highest year-on-year growth in loans to the entire European Union. In 2018, the volume of loans almost doubled. Also, income growth and increasing credit availability have fueled debt. Continuing pressure on low interest rates and indebtedness of NBS principles has taken many measures to adjust the limits for credit scandals. These changes in lending conditions should mitigate the risk of excessive debt growth. The aim of this article is to bring readers closer to these financial market restrictions.

Keywords: Debt, GDP Growth, Credit Market, Financial Stability

Introduction

The main scope of this article is to introduce to the readers the current economic situation of Slovakia and how the indebtedness of the Slovak population develops and its possible impact on the country's financial stability. In Slovakia, indebtedness receives great attention from the National Bank of Slovakia, but also from the media. Household funding is a topic that is currently affecting a large number of people across Europe, and this topic is becoming more and more prominent in Slovakia. Increasing household indebtedness affects not only the lives of the people themselves, but also affects the country's financial stability. The current trend in Europe, and especially in the Slovak Republic, is increasingly borrowing for housing as well as for the normal functioning of households. Slovakia is on the top of the European Union in the indebtedness of the population. Given the fact that this topic is currently up to date, we have decided to analyze the situation.

Despite a number of consolidation measures and the intervention of the National Bank of Slovakia, the borrowing rate in Slovakia is still at a high level, which may cause major problems for the economy of our country in the coming years, given that our economy may not be ready for the expected economic cycles.

In this article we will focus on defining the indebtedness of Slovak households and the current economic situation of the household. First, we will focus on the development of GDP, inflation, minimum wage, average wage and unemployment in Slovakia, which have a significant impact on the country's economic situation. Then we define the household and its needs, we will focus on consumption and income of Slovak households and an overview of their total financial income and expenditure. In the last part of the article, we will deal with the situation on the financial market, loans

and mortgages, as a source of housing finance and consolidation measures of the National Bank of Slovakia, which was forced to tighten the conditions for providing loans and mortgages to households, in response to the very rapid pace of indebtedness of Slovak households.

Household Consumption in Slovakia

Net financial expenses for Slovakia are expenditure on food and non-alcoholic beverages, alcoholic beverages and tobacco, clothing and footwear, housing, furniture, hotels, education and other net expenditure. The main net financial expenditure for the Slovak household is the housing item, which is due to the need for households to acquire their own housing.

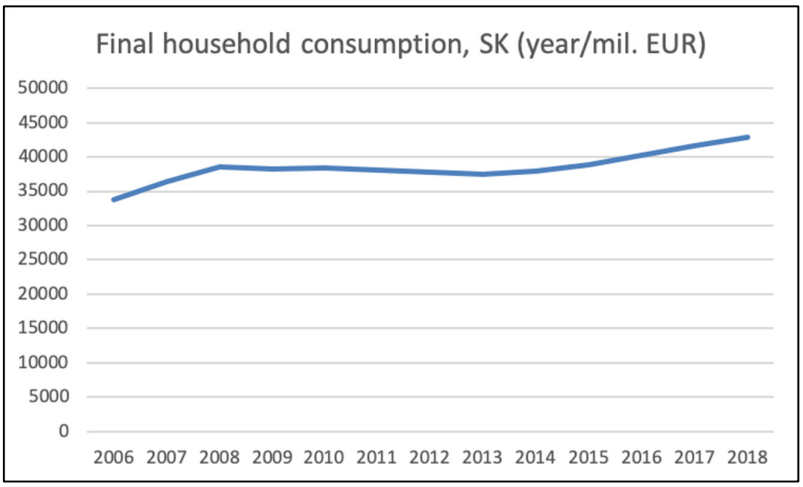

Fig. 1 : Final household consumption, own data processing, source: Eurostat

From this graph we can see that household expenditures in the monitored period from 2006 to 2018 can be divided into three main periods.

The first period is a period of steep growth since 2006-2008. In this time period, consumption increased, also due to the attractiveness of Slovakia as an investment site, which was given by several factors. In addition to being incorporated into the European Union (2004) and the geographical location (proximity and accessibility of the central part of the EU, especially the western part of the SR), it also included cheap labor. These factors also contributed to increased household consumption growth.

The second period has been recorded since 2008-2013, which can be called post-crisis convalescence, as the Slovak economy was hit by the financial crisis in 2008-2009, but its impact was not as much as that of other EU economies. In the period under review, we have seen growth beyond 2009 and the period between 2012 and 2013, which is likely to be attributed to high unemployment rates.

The third monitored period is the period between 2014-2018, where we see a steady increase in the main macroeconomic indicators, which is also reflected in the final household consumption, which recorded an average year-on-year increase of 2.7%. Based on the data, we can say that household consumption also reflects to some extent the development of net financial income of households.

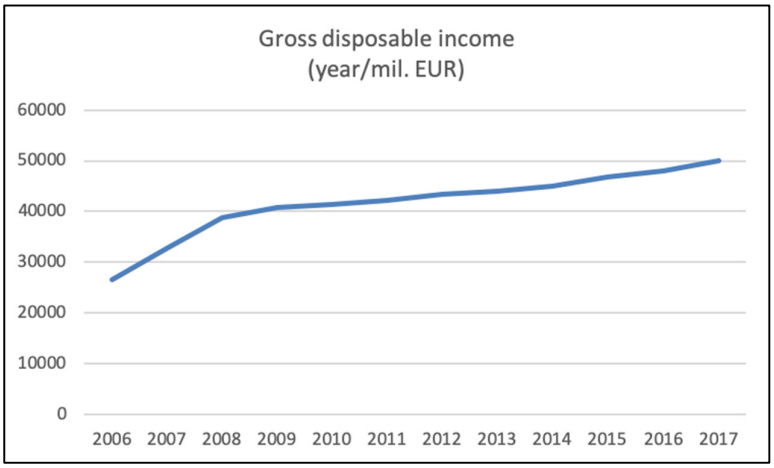

Fig. 5: Gross disposable income, own data processing, source: National Bank of Slovakia

It can be deduced from the above graphs that the Slovak household does not have much room for saving in the future. It is best to see the phenomenon visible in the disposable income curve, which grows very much like the household consumption curve, which can be dangerous, in a badly evolving economy and in debt repayment problems, despite the fact that the Slovak economy is not following a very favorable global trend in the saving-to-debt ratio, which is one of the worst in the EU for Slovak households. However, a few facts need to be considered when interpreting these economic indicators. The net financial position does not take into account non-financial assets, which are mainly real estate and therefore need to be careful when interpreting.[1] Slovak households have one of the highest property ownership rates they live in. It is very likely that the relative lack of savings of Slovak households is probably directly related to their non-financial assets, ie. j. with apartments and houses. Therefore, it is not necessary to be under the illusion that Slovak households are poorer, only property is represented in their property to a greater extent.

Loan as a foreign source of property coverage

In this chapter of our work we will devote to specific loans that Slovak households receive. In the first chapter we proved that the Slovak economy is in good condition and this fact supports the growth of loans. Slovak households most often receive a mortgage loan or a consumer loan.

[1] Vilčeková, L. Mucha, B. Peráček, T. and Strážovská, L. (2018) 'Selected issues of family business in selected countries with emphasis on the Slovak Republic 2020, Milan Italy

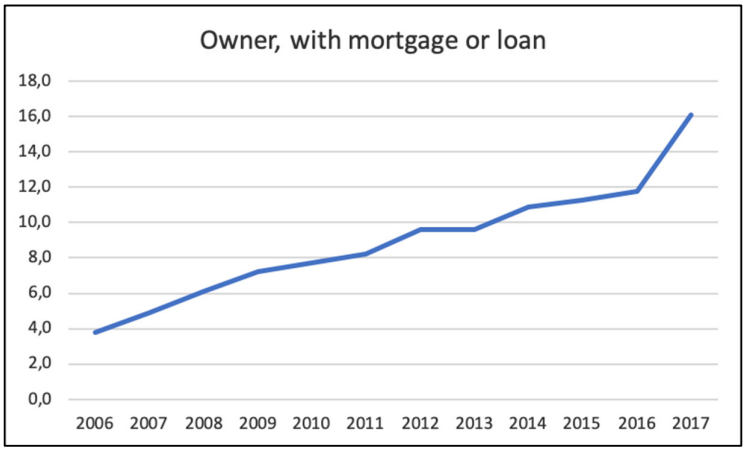

Fig. 6 Gross disposable income, own data processing, source: Eurostat

The weak spot of Slovak households is still high credit debt. Demand for loans has increased since 2010 in Slovaks more than the average in the region. Last year, our debts increased by 10.3%, each Slovak owed an average of € 6,792, while the region's average is € 4,564. On the above chart, there is a visible up to 5% year-on-year increase in property owners who are burdened by mortgages or loans.

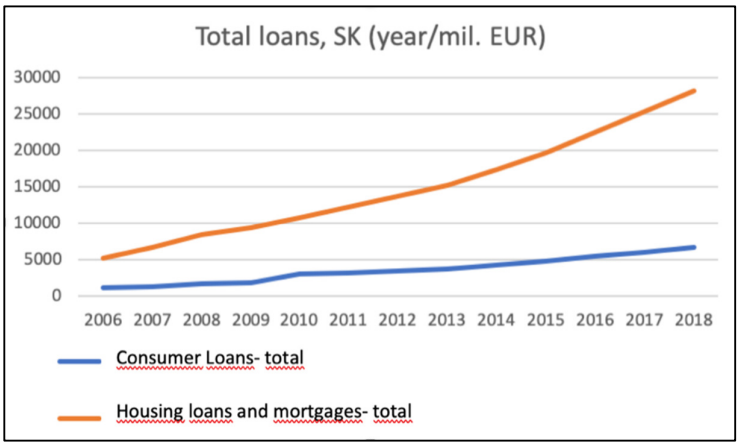

Fig. 7 : Total volume of loans, own data processing, source: National Bank of Slovakia

Slovak households' financial assets grew by only 5.5% last year, which is almost half compared to the previous year (9.8%). In particular, this may be due to deposits in banks, where Slovaks accumulate up to 60% of their savings and have only increased by 4.2%. Neither securities, insurance and pension assets, which recorded double-digit growth, helped. In the wealth list, Slovaks with savings of 6,190 euros per person rank up to 40th out of 53 countries. The average in the region is significantly higher, reaching EUR 10,381. In the region, all other countries outperformed us, with the exception of Romanians (4521 euros), when, for example, Czechs have saved more than double, namely 15 291 euros, Hungarians 13 404 euros, Poles 8 273 euros and the average Bulgarian has savings EUR 7 678.

The richest nation is traditionally Swiss with savings of almost 174,000 euros, in close ties with the US, where households have savings of 169,000 euros. Thanks to the strong euro, the old continent was doing well last year - up to 12 European countries in the first 20 richest countries.[2]

Tightening Of The Measures For Mortgage Market

Maximum Debt (DTI- debt to income)

Gradually, the proportion of loans that would unduly debt clients in comparison with their income will be reduced. These are loans where the total debt (including the new loan) exceeds 8 times the net annual income of the loan applicants (Debt to Income, DTI).

A new and substantial change in the assessment of the ability to repay the loan and the provision of loans to individuals and households should, according to the recommendation of the NBS, introduce a condition of maximum acceptable indebtedness. The maximum indebtedness is set at 8 times the net annual wage. Total overdrafts on current accounts, credit cards, leasing, consumer loans and mortgage loans will be included in the total maximum indebtedness.

Over time, this step can be signed by a gradual reduction in housing prices. However, it should be noted that there will still be a possibility to provide some of the loans above this value, similar to LTV. This share will only gradually decrease. From 1 July 2018, up to 20% of new loans will be able to exceed this value.

Determination and compliance with the internal limit on the client's ability to repay the loan

The indicator of the consumer's ability to repay a housing loan (hereafter the ability to repay) is calculated as the proportion of the total amount of expenditure on the consumer's monetary obligations under paragraph 3 to the total consumer income under paragraph 4, reduced by the total cost to ensure the necessary conditions to meet basic living needs consumer under paragraph 5.

Fixed living minimum is € 199.48 per month. The mandatory reserve (the amount that cannot be borne by the repayment of a loan product) will increase to 20% of the net wage net of wages and loan product repayments from July 2018 (currently, this provision is set at 15% of the net wage net of the subsistence minimum) credit products).

Cash liabilities represent the monthly cost of credit products. Thus, for a net salary of € 800 a month, a living minimum of € 199.48 is to be deducted for an individual and a 20% reserve is deducted from the rest of € 600.52, ie. 120,104 €. The total installment space will therefore be € 480.416 for a € 800 net salary (which represents a mortgage of about € 135,000 under current conditions). This example is valid provided that the client does not use other credit products.

Keeping the limit on the client's ability to repay the loan even under adverse conditions

The Bank is advised to ensure in the provision of retail credit that in the case of loans for which the interest rate is not fixed throughout the loan repayment period, the limit on the client's ability to repay credit under Art. Also retained in paragraph 1, provided that the same retail loan would be granted at an interest rate of at least 2 percentage points higher than the rate provided and its maturity would be at the level of the longest recommended maturity referred to in Art. VIII paragraph 1, taking due account of the assumption of a decrease in income if the client's retirement age is reached.

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[2] ALLIANZSP.SK (2018). *Slováci sú rekordéri v zadlžovaní. Bohatstvo však máme rozdelené najrovnomernejšie* Available at: https://www.allianzsp.sk/slovaci-su-rekorderi Accessed: 27 May 2019

This recommendation applies mainly to mortgage loans because the maturity of mortgage loans is in most cases 30 years, with interest rate fixation in most cases agreed for 3 or 5 years (minimum fixation period is 1 year and maximum 10 years). In practice this means that if the bank approves interest of 1.69%, for example, the bank will have to find out if you would be able to repay the same loan with a 2% surcharge, as at 3.69%. A client with a net salary of € 800 will receive a loan of up to € 104,000 after deducting the subsistence minimum, the mandatory reserve and taking into account the increased rate.

Loan to Value (LTV)

The loan may not exceed 90% of the value of the property. This limit may exceed a maximum of 10% of new loans, but these loans may not exceed 100% of the property price. In addition, the share of new loans in excess of 80% of the property price can be up to 40%.

Loan to Value (LTV) is the ratio of the funded amount over the loan product to the value of the property. 100% financing mortgages are no longer practical. At the moment, it is realistic to fund a mortgage with a maximum of 90% funding. But in the near future, it is more reasonable to assume that the bank will provide you with a maximum of 70-80% funding for the value of the property. The remainder must be financed through another credit product or paid for by own savings, bearing in mind that loan product repayments must not exceed those limits.

Conclusion

In this article, we looked at the indebtedness of the country's population in relation to the country's financial stability. At the beginning, we have readers read about the current economic situation in Slovakia. On the basis of current data from Eurostat, the National Bank of Slovakia and the Statistical Office of the Slovak Republic, we can say that the Slovak economy has gained a rising trend after joining the European Monetary Union and all macroeconomic indicators show favorable values. Indicators such as inflation and registered unemployment are at historically lowest levels, which is good for the economy. On the other hand, household incomes and their expenditures are in very similar values, which means that there is no greater space for households to generate savings. Therefore, several households opt for consumer loans or mortgages as a source of financing their own property. This fact is also aided by a low base rate and low interest rates on house purchase loans, which have been below 2% for the past 3 years. With high employment, favorable inflation, rising GDP and low interest rates, households are not afraid of debt.

Precisely because of the rapid growth rate of the indebtedness of Slovak households, the National Bank of Slovakia has opted for consolidation measures and tightened the conditions for providing loans and mortgages. Especially the two principles of Loan to Value (LTV) and Debt to Income (DTI) are very effective measures. The future for Slovak households is certainly the savings that are being made more difficult in the current situation, but the highest savings and the lowest possible debts will be crucial for the forthcoming economic cycles that are waiting for the Eurozone in the coming years.

Acknowledgment

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Power, Leadership & Organizational Politcs

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Abstract

The aim of this work is to examine the meanings of power, leadership and organizational politics in the managerial environment. This article also aims to outline the differences in the field of power, leadership and organizational politics.

Keywords: Power, Leadership, Manager, Employer, Employee, Organization

Introduction

Management is one of the most important tools an organization has. It has an interdisciplinary character and has an immediate effect on the performance of a community.
Therefore, the leaders, managers, power-holding persons should be aware of the vast impact their decisions may have on the others. Once we have clearly set our vision and mission, we shall start thinking about how we want to accomplish those goals. The main resources an organization has are its employees. Their knowledge and experiences present an endless option of opportunities for growth. Related to the communication and motivation of employees, it is really important for an employer to know what kind of leader he/she wants to be and how he/she is willing to put on with his/her power to reach the expected outcomes. The aim of this article is to clarify the various types of approaches a power-holding, decision-making person can have.

Methodology

In the first part of this article we are going to focus on power and its five types we identify. After making understandable each type, we continue to understand and deepen our knowledge in the field of leadership. On the top of the twelve leadership types we recognize, we will briefly outline and distinguish the difference between power and leadership.

In the third part we will focus on the organizational politics and its four types, using a graph which bases on two axis – x,y. The X axis stands for source of power, and the Y axis declares the level of political activeness within an organization.

Power

The word power is being explained by the Cambridge Dictionary as „the ability to control people or events. “ [1] The singe meaning of the word gives us already a great insight what and how do people use power. Obviously, there are plenty of explanations of the meaning of the word. Another one, published by the Merriam-Webster Dictionary states, that is can be „a legal or official authority, capacity or right. My personal favorite one is the statement, that power is a mixture of „possession of control, authority, or influence over others.” [2]

All the above-mentioned words are kind of synonyms, yet there are some major differences in their understanding.

Power can be explained as the ability to influence others. Meanwhile the word influence in a process of conscious affecting of thoughts, behavior and feelings of others.

The authority, does all of the mentioned patterns of behavior and approaches, only the authority holds the legal right to do so.

In a great comparison it was stated that:

“- Authority has the right to influence others, but power is the ability to influence the others.
- Authority is legitimate while power is not.
- Authority confers legitimacy to power, but power itself need not to be legitimate.”[3]

When talking about power, all of us have dealt with or have observed situations, where the attitude of the power holding person and their way of leadership were the direction showing and approach changing points. Mostly, the person who holds the power it is the moment, when the subordinates and co-workers are being faces with the manners of the upcoming coworking relationship.
Power has more forms and types. Therefore, it is necessarily to know and distinguish them.

Coercive Power

When referring to the usage of this power, it comes with a lot of negativity and fear. Using this power in an working environment means, that the power holding authority is threatening the employees with some kind of unpleasant outcomes in case of not performing as wished. The performing employees are threatened by being fired, financial loses, demotion.

Reward Power

This approach bets on the motivation of employees with rewards. Those rewards can be monetary, tangible or as well intangible. It depends on the management and the style they choose how to enhance the performance of the workers.

[1] POWER | meaning in the Cambridge English Dictionary. In *Dictionary.cambridge.org*. [online]. [Cited 2020-01-31]. Available from Internet: <https://dictionary.cambridge.org/dictionary/english/power>
[2] Definition of POWER. In *Merriam-webster.com*. [online]. [Cited 2020-01-31]. Available from Internet: <https://www.merriam-webster.com/dictionary/power>
[3] Definition of power. In *Ebrary.net*. [online]. [Cited 2020-01-31]. Available from Internet: <https://ebrary.net/2986/management/definition_power>

Legitimate Power

This kind of power comes from the position the order giving person has in the hierarchy of a company. This power gives the right to a superior to give orders to his/her subordinates in the company. The power-holding persons power reaches only to a certain point, which is being defined by the role and position held by this person.

Referent Power

Referent power doesn't really come from a strictly stated power position within a company. It refers more to the sympathy a person and his or her ability to influence people around them. This power has more and interpersonal character, as the liking of the one is base on the fact, that more people can identify themselves with his/her actions and lifestyle.

Expert Power

This power that comes from the fact that, positions requires an expertise and knowledge in a certain specific field. For example, the word – power of knowledge, is a really helpful explanation, as this Expert power, doesn't come from the hierarchical position in a company. This power is the one where the knowledge in a specific, hard-reachable area of demesne is demonstrated. [4]

The last form of power, which is not officially stated, we could count the power which comes by being part or a member of a powerful entity. By the word powerful entity, we mean members of royal families and other relationship-based affiliation to a powerhouse which can be inherited or gained by marriage and birth.

When writing about the power and all the functions and forms it has we are coming to a point, where we are asking ourselves, where and what are the main differences between the power and leadership. As we already have stated, power is the ability to control some other individual's actions and activities. While leadership is the ability to influence individuals to perform voluntarily our instructions without havening to use any source of force.

The traditional view on power is, that is has evolved from leadership. But in real life, we can witness that having the power leads us to leadership traits. Because of the fact that these two are closely interrelated, it may be hard to distinguish and understand the difference. The one thing we have to keep in our mind is, that a good leader has power. Leadership comes with having end executing power.

Leadership

„A leader is an effective individual who creates a vision, motivates people to work towards achieving the vision, coaches and builds the team that will pioneer the completion of the vision and manages the end delivery of the vision. " [5]

When it comes to leadership, we have found out and determined 12 different styles of leadership.

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[4] MSGManagement Study Guide. In *Managementstudyguide.com*. [online]. [Cited 2020-01-31]. Available from Internet: <https://www.managementstudyguide.com/types-of-power.htm>

[5] Difference Between Power and Leadership. In *Differencebetween.net*. [online]. [Cited 2020-01-31]. Available from Internet: <http://www.differencebetween.net/business/difference-between-power-and-leadership/>

1. Autocratic leadership

This leadership styles is centered on one decision making body, who mostly is the so called boss, CEO or the owner. The responsibility and decision are being held by the same person and is being not consulted by any subordinates. The flow of information is downwards and the coworkers are taken as the implementation making employees.

2. Democratic leadership

Unlike the previous leadership style, democratic one involves the employees in the decision-making process but the responsibility is still in the hand of the democratic leader. The communication flows both sides through the hierarchy of a firm.

3. Strategic leadership style

This style of leadership involves more individuals at different levels of the organization. The responsibility doesn't necessarily have to be at the top management level of the organization. This leadership style demands strategic thinking, with a view on the long-term goals of the group or corporate, and having the ability to react quickly to the present challenges of the environment.

4. Transformational leadership

Unlike other leaderships, this boosts constant changes in working groups. This approach expects the working team to set challenging goals and to improve themselves and keep gaining new work-related knowledge. The responsibility is mainly held by the leader and the leader are empowering the subordinates to make decision, and by doing so, part of the responsibility is being carried over the subordinates.

5. Team leadership

This approach is creating a positive picture of the group's future, using their beliefs and enthusiasm about the issue to create a more efficient working collaboration. The responsibility and the flow of information is shared within the groupmates.

6. Cross-Cultural leadership

This leadership style is being used the most in the globalized world of huge concerns all around the world. By this approach the managers are making sure that are well aware of the diversity of different cultures and their backgrounds. The main positive side of this approach is that, by demonstrating this approach it enhances the possibility to an individual to outshine in a certain field, which is typical for the region/country the ones come from.

7. Facilitative leadership

The outcomes are the measurement tool of the effectiveness of a group. If the group is highly effective and shows good functioning, the need for a facilitative leadership is low.

On the other hand, if the group is lacking in performance, the facilitative manager will give more command orders, to help the group to stay on track with the set goals.

8. Laissez-faire leadership

The main characteristics of this leadership style is that the power over is giver over to the subordinate. The employee makes the decision, either he/she wants to participate and to what level of interest.

9. Transactional leadership

Having the employees performing the roles they are given in a correct way, leads the leaders with transactional leadership style to the point of rewards their subordinates with tangible or monetary rewards as a immediate reaction to their well performed actions.

10. Coaching leadership

The tenth leadership style is based on teaching, mentoring, coaching the subordinates, which helps them to improve their skills and knowledge right in the field and with their hands-on work.

11. Charismatic leadership

This type of leadership affects the belief system and core values of a follower. The charismatic leader manifest strong personal power and positive conduct performance to which a lot of people can relate to, therefore charismatic leaders are well spoken about and are well known for their big follower basis.

12. Visionary leadership

Visionary leadership style performers are keeping in their minds the big picture and are not being stopped or bogged down by technical issues. These leaders know, that their visions can be implemented to the reality, if the processes and strategies are well executed within the company in the cooperation with its biggest assets – employees. [6]

Outlining the precise differences between the Leadership and Power[7]

Organizational Politics

„Organizational politics are informal, unofficial, and sometimes behind-the-scenes efforts to sell ideas, influence an organization, increase power, or achieve other targeted objectives. "[8]

Referring to organizational power, we are coming to the point, where we admit the need for a leader in an organizational environment holding tight power in his/her arms with the goal in their minds to meet strategically set targets using the core values and beliefs of an organization. Having the ability to manage and be more politically aware of the power within organization helps the governing person to execute the necessary steps to meet organization's goals.

The use of organizational power doesn't necessarily has to be in the hand of a superior one. The need and occurrence of organizational politics power in a great variety comes from bad time management, or with the need to meet goals in a short time and under a lot of pressure. An other motivation for working with organizational politics are the fact, that some inequalities can be managed better and the reverse side of the politics is, that it can be misused for personal beneficial outcomes and motivations. To be able to change and react to certain changes and challenges in the working environment, it is necessary to be able to work with 4 so called fields, with different set of rules and norms.

1. The weeds
2. The rocks
3. The high ground
4. The woods

This dimension differs on 2 levels, on both X and Y axis.
On the X axis we track the source of power. It can be informal or formal.
On Y axis we follow the levels of source of political activity. It can be either on a lower level – individual level, or on a higher level – organizational level.

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[6] 12 Different Types of Leadership Styles. In *WiseToast*. [online]. [Cited 2020-01-31]. Available from Internet: <https://wisetoast.com/types-of-leadership-styles/>

[7] Difference Between Power and Leadership. In *Differencebetween.net*. [online]. [Cited 2020-01-31]. Available from Internet: <http://www.differencebetween.net/business/difference-between-power-and-leadership/>

[8] Brandon, R., & Seldman, M. (2004). *Survival of the savvy: High-integrity political tactics for career and company success*. New York: Free Press; Hochwarter, W. A., Witt, L. A., & Kacmar, K. M. (2000).

The four types of organizational politics

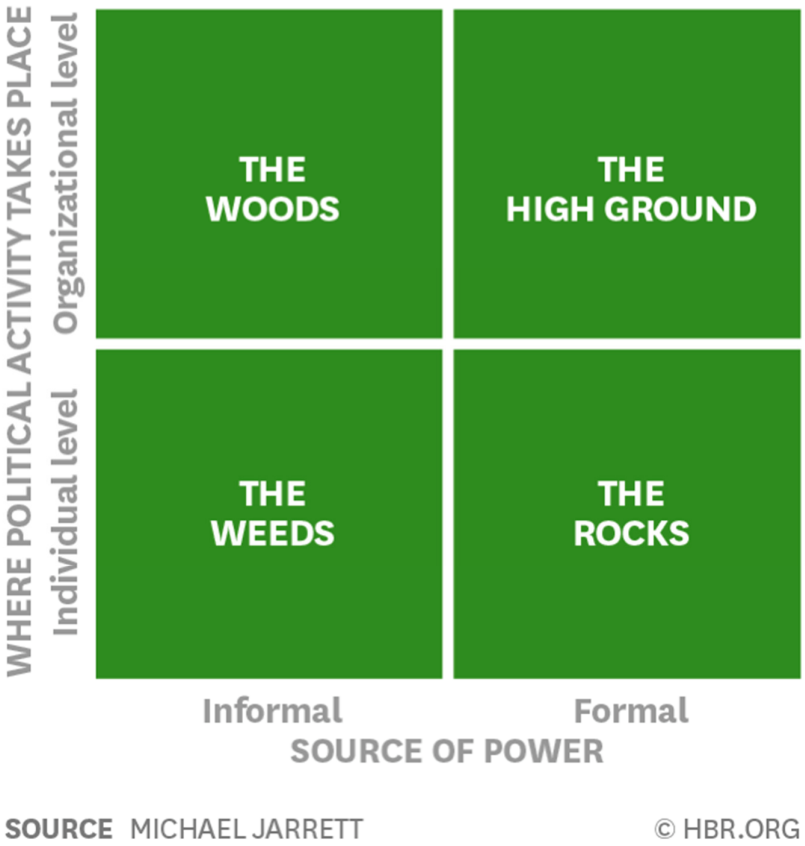

1. THE WEEDS

The first quadrant belongs to weeds, it is a mixture of the lower levels of the two axis. This mixture combines the individual level of an individual and informal source of power within the organization.

2. THE ROCK

In this dimension, the point on the X axis is higher, which demonstrates a higher level of the source of power. It is a combination of formal source of power on a level of individual interaction. In these cases, we can see that a formal role in an organization and a superiors single interest could differ from the attitude of the rest of the group.

3. THE WOODS

It is a combination of informal source of power on an organizational level. By the word “woods\l we often refer to the hidden and unspoken attitudes and routines in an organization. The woods can create a great space for cover and safety for single ones. On the other hand, it can be a place, where fresh and new ideas can get easily burned down.

4. THE HIGH GROUND

Combines formal power on organizational level. This type of organizational politics gives space for rules, strictly set structures and guidelines. This type of organization uses the written rules, and in case

of any variance, are not afraid to use sanctions or other forms of threat to keep the organization in compliance. [9]

Conclusion

All things considered, the above-mentioned definitions and statements are interlinked on multiple grounds. What all of them have in common is, that there is always a target that someone wants to reach. And by reaching the wished goals, they need to allocate the required actions within others (subordinates, co-workers) in order for achievement. By allocating the work, we can see the leadership methods and how the power held by authorities are being used. In the organizational politics we could monitor how all the power and leadership are being used and shaped based on the form of the organization and the rules, terms and policies governing within.

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4. MSGManagement Study Guide. In *Managementstudyguide.com*. [online]. [Cited 2020-01-31]. Available from Internet: <https://www.managementstudyguide.com/types-of-power.htm>

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6. 12 Different Types of Leadership Styles. In *WiseToast*. [online]. [Cited 2020-01-31]. Available from Internet: <https://wisetoast.com/types-of-leadership-styles/>

7. Difference Between Power and Leadership. In *Differencebetween.net*. [online]. [Cited 2020-01-31]. Available from Internet: <http://www.differencebetween.net/business/difference-between-power-and-leadership/>

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La Resiliencia Organizacional: El Caso De La Clínica De Maternidad Rafael Calvo En Cartagena- Colombia

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Resumen

La Resiliencia Organizacional (RO) se considera un proceso sistémico orientado a identificar y promover los recursos personales y colectivos de una organización para mitigar los efectos adversos que conllevan las amenazas y las crisis internas o externas presentes en el devenir de las empresas. El objetivo principal fu comprender cómo emerge la RO desde las propias concepciones, significados y experiencias de los funcionarios de la clínica. Se empleó la metodología de estudio de caso único, con el análisis de múltiples dimensiones de la categoría central; participaron 24 colaboradores entre personal administrativo, médicos y paramédicos, en entrevistas a profundidad y grupos focales, a partir de lo cual emergieron narrativas resilientes que permitieron configurar una matriz de categorías y dimensiones. Los resultados evidencian la confluencia de factores protectores como relaciones positivas e introspección; recursos y practicas saludables como trabajo en equipo y compromiso; de la resiliencia colectiva como capacidad de aprendizaje y adaptación del empleado entre otros rasgos positivos de la organización que atenúan factores de riesgo como la escasez de recursos físicos y económicos, adversidades que se han podido afrontar y han permitido posicionar a la clínica por la prestación de servicios gineco-obstreticos oportunos y de calidad que ofrece a comunidades en condiciones de vulnerabilidad social . Se espera con los resultados, visibilizar la importancia de la promoción de los recursos personales y colectivos para mejorar el clima laboral, la autoeficacia en el trabajo y la productividad del sector empresarial.

Palabras clave: Resiliencia, Organizaciones, Recursos, Adversidad

Introducción

La clínica de maternidad Rafael Calvo, es una institución de carácter público prestadora de servicios en salud, referente en el departamento de Bolívar-Colombia por su portafolio de servicios variado, centrado en la prevención, diagnóstico y tratamiento de enfermedades gineco-obstetricas; especialmente atiende con un alto sentido social y de manera oportuna, a comunidades que viven en condiciones de vulnerabilidad social para así garantizarles el derecho a una salud digna. El logro de este propósito es amenazado por la presencia de algunos factores de riesgo como su situación de iliquidez, cambios en la dirección, escasa dotación y falta de una política de bienestar del personal. Frente a estos riesgos, la empresa realiza esfuerzos por mejorar los procesos administrativos, financieros y de capacitación de su capital humano, como factor clave en el éxito de la organización.

Meneghel, Salanova y Mª Mart (2013), definen la RO como procesos que ayudan a las organizaciones a mantener los recursos de una forma suficientemente flexible, sostenible en el tiempo, almacenable, convertible y maleable como para evitar las tendencias menos adaptativas y hacer frente de manera positiva a lo inesperado. Al analizar el concepto de RO, se pudo encontrar un marco de referencia pertinente para fundamentar el estudio de un caso como el de la Clínica Rafael Calvo, desde la perspectiva de sus procesos resilientes, de sus potenciales capacidades para enfrentar sus amenazas, crisis y adversidades, aprender de ellas, sobrevivir y salir adelante en un entorno competitivo como el de las empresas prestadores de servicios en salud.

Cada día las organizaciones buscan prever las fallas que puedan afectar el logro de sus objetivos, el poder identificar la resiliencia dentro del sistema organizacional es fundamental para la toma de decisiones y para planear nuevas estrategias en la recuperación de posibles fallas y eventos inesperados. Para Blanco y Caicedo (2016), la viabilidad y la sostenibilidad de las organizaciones depende de la manera como ellas afrontan las incertidumbres de un mundo cambiante y por lo tanto deben ser capaces de emplear estrategias novedosas, ajustadas a sus necesidades y también recurriendo a prácticas saludables y exitosas que, en el pasado, les permitieron afrontar y superar la adversidad con la recursividad del equipo de colaboradores.

En los estudios que se han realizado sobre RO se nota el interés de las empresas por descubrir el rol de algunas variables positivas como la identidad colectiva para superar las crisis (Angarita, 2015); las ventajas competitivas de la RO (González, Delgado y Jordán, 2009) y la correlación positiva que existe entre resiliencia y la percepción de autorrealización en el trabajo con lo cual se previene el desgaste emocional del empleado (Sánchez, 2015). Del análisis de estos referentes se evidencia el impacto positivo de los factores protectores sobre la sostenibilidad de una empresa, como potenciador de las competencias del personal para sobrepasar las dificultades y mejorar sus resultados.

La realización de este estudio generará una fuente de información esencial para apoyar los procesos de mejora continua (capital intelectual, financiero, tecnológico, etc.) en los cuales siempre permanece la empresa, y así describir y comprender sus características resilientes, sus factores de riesgo o adversidades vividas como dimensiones a tener en cuenta por las directivas y funcionarios para la toma de decisiones en los ámbitos administrativos, académicos y especialmente del capital humano como factor clave en el desarrollo de toda organización.

Para la Clínica Rafael Calvo y para su cuerpo directivo fue interesante realizar este proceso investigativo desde la auto observación y auto reflexión de los directamente involucrados e interesados en el crecimiento y desarrollo de la empresa y por ello se procedió a la realización de un estudio de caso, sin pretensiones de generalización, pero sí de profundizar en la dinámica compleja del quehacer profesional y laboral de un colectivo de administrativos y personal médico y paramédico que de manera articulada buscan un mismo propósito de servir, cuidar y proteger la salud sexual y reproductiva de la mujer en la región norte del caribe colombiano. La pregunta central que orientó el estudio fue: ¿Cómo se comprende el proceso de la Resiliencia Organizacional (RO) en la ESE Clínica de Maternidad Rafael Calvo desde la perspectiva de las personas y los grupos que conforman la organización?

Método

Estrategia metodológica

El estudio se llevó a cabo bajo la estructura del estudio de caso único que consiste en una descripción detallada de un sistema, individuo, institución, comunidad o grupo, a partir de la recolección de datos desde diferentes fuentes como entrevistas, grupos focales observaciones y documentos institucionales (Creswell, 2013). A través de esta estrategia se describen y analizan sentires, pensamientos, experiencias buscando su sentido a la luz del contexto teórico y practico donde ocurren los hechos en un lugar y espacio particular (González, 2013) empleando la subjetividad e intersubjetividad como herramienta para la interpretación de los datos o relatos de los participantes (Barrera, Tonon y Salgado, 2012).

Participantes

El tipo de muestreo para los estudios cualitativos es intencional por cuanto va a depender del criterio del investigador que se orienta por una teoría para escoger a aquellas personas que representen una diversidad de perspectivas, que conozcan en profundidad el fenómeno a estudiar y que estén dispuestos a participar en la investigación (Creswell, 2013).

Se escogieron varios funcionarios, nuevos, antiguos de distintas dependencias y en distintas posiciones jerárquicas. La decisión sobre el número de casos no estuvo predeterminada por cuanto dependió de la calidad y cantidad de información recogida, hasta saturar las categorías de análisis. Para la realización de este proyecto se trabajó con veinticuatro personas (Ver tabla 1).

Tabla 1: Fichas Demográficas

FICHAS DEMOGRÁFICAS							
No.	**Nombre**	**Edad**	**Sexo**	**Nivel Educativo**	**Profesión**	**Cargo**	**Tiempo en la Empresa**
1	DBV	38	F	Técnico	Auxiliar de secretariado	Recepcionista	2 años
2	AVM	22	F	Universitario	Admón. de empresas	Asistencia Sub. Dirección Científica	1 mes
3	CAPC	24	M	Técnico	Auxiliar de contabilidad	Auxiliar de archivo	2 meses
4	CRVM	59	M	Técnico	Auxiliar de Enfermería	Auxiliar estadística	4 años
5	GMAE	51	M	Bachiller	Auxiliar de Servicios generales	Auxiliar de Servicios generales	23 Años
6	FGD	30	M	Universitario	Admón. de Servicios de Salud	Coordinador de Admisiones	3 años
7	CUS	34	F	Técnico	Técnico Auxiliar Administrativo	Técnico de Admisiones	2 meses
8	GSP	32	F	Universitario	Trabajadora Social	Coordinadora SIAU/TRA	3 Meses
9	ALM	28	F	Tecnólogo	Tecnólogo Administrativo en Salud	Auxiliar de referencia	4 meses
10	GDM	29	F	Técnico	Auxiliar de Enfermería	Auxiliar de Enfermería	3 años
11	SOM	32	F	Universitario	Ing. de sistemas	Auxilia TIC	5 Meses
12	ZAA	35	F	Técnico	Auxiliar de Enfermería	Auxiliar de Enfermería	10 años
13	WSB	38	M	Técnico	Auxiliar en Salud	Camillero	10 Años
14	HJPQ	42	M	Posgrado	Admón. Financiero	Profesional de Cartera	no registro
15	CMB	42	F	Técnico	Auxiliar de Enfermería	Auxiliar de Enfermería	14 años
16	KJM	43	F	Universitario	Instrumentadora Quirúrgica	Coordinador Programación	24 años
17	MIHV	45	F	Técnico	Auxiliar de Enfermería	Auxiliar de Enfermería	5 años

18	DEJR	49	F	Técnico	Auxiliar de Enfermería	Auxiliar de Enfermería	22 Años
19	CDOG	49	M	Universitario	Admón. de empresas	Auditor de cuentas	18 años
20	SRP	51	F	Posgrado	Enfermera	Enfermera	10 años
21	CAE	52	F	Universitario	Enfermera	Enfermera	5 años
22	MMF	54	F	Técnico	Auxiliar de Enfermería	Auxiliar de Enfermería	21 Años
23	LTH	60	M	Técnico	Auxiliar de Enfermería	Auxiliar de Enfermería	30 años
24	JCPM	NO REGI	M	Universitario	Medico	Medico	5 años

Fuente: elaboración propia

Técnicas de Recolección de Datos

Se utilizó la entrevista cualitativa definida como una reunión para conversar e intercambiar información entre una persona (el entrevistador) y otra (el entrevistado), a partir de la formulación de preguntas evocadoras, abiertas y neutras que permiten conocer de la manera más exacta posible, la realidad construida desde otro que la ha vivido, puede narrarla y reelaborarla (Sandoval, 2002). Se realizaron veinte entrevistas en profundidad, con una duración de 45 a 90 minutos cada una.

Se realizaron tres grupos focales que consisten en una reunión de grupos pequeños o medianos (3 a 10 personas), en las cuales los participantes conversan a profundidad en torno a uno o varios temas bajo la conducción del equipo investigador (Hernández, Fernandez & Baptista, 2014). Más allá de hacer la misma pregunta a varios participantes, su objetivo es generar y analizar la interacción ente ellos y cómo se construyen grupalmente significados.

También la observación sirvió como fuente de recogida de datos, la cual consiste en observar conductas, reacciones, gestos, posturas corporales, entre otros rasgos visibles de los participantes, simultáneamente al desarrollo de las entrevistas y de los grupos focales. La información que surge de la observación sirve para complementar el proceso de recolección de datos que se deja por escrito en un protocolo de observación (Aguiar, 2015).

Finlamente los documentos de la clinica referidos a la historia, enfoque y politicas de la empresa fueron utiles para contextualizar el problema de investigación, seleccionar a la clinica como un caso especial e identificar los momentos, crisis y desafios de la organización desde la ultima decada.

Procesamiento y Análisis de los Datos

Para el procesamiento de los datos, inicialmente se utilizó el programa Nvivo versión 12, para la codificación abierta de las narraciones, luego se agruparon los códigos que apuntan a una misma etiqueta o categoría, iniciando un proceso de clasificación y agrupamiento en categorías y dimensiones para su posterior relacionamiento. Finalmente se hicieron asociaciones entre categorías que emergieron en los relatos de los sujetos (Domínguez y Aleán, 2020).

Para validar el análisis de los datos se llevó a cabo un proceso denominado saturación de la información, que consiste en agotar el análisis cuando al hacer comparaciones constantes entre los datos, las categorías y dimensiones no surgen nuevas categorías (San Martín, 2014). También se hizo triangulación que consiste en seleccionar aquellas categorías coincidentes que surgen tanto en los grupos focales, las entrevistas y las observaciones.

Resultados

Los resultados se muestran en tres partes, la primera (figura 1), muestra una codificación selectiva que integra en una red las categorías, dimensiones, sus relaciones y condicionantes y representa como está conformada en general RO en la clínica Rafael Calvo; la segunda parte, detalla todas las categorías y dimensiones encontradas, se fueron denominando con relación a las convergencias y divergencias encontradas al darle el sentido a los relatos en función de los objetivos de la investigación (tabla 2).

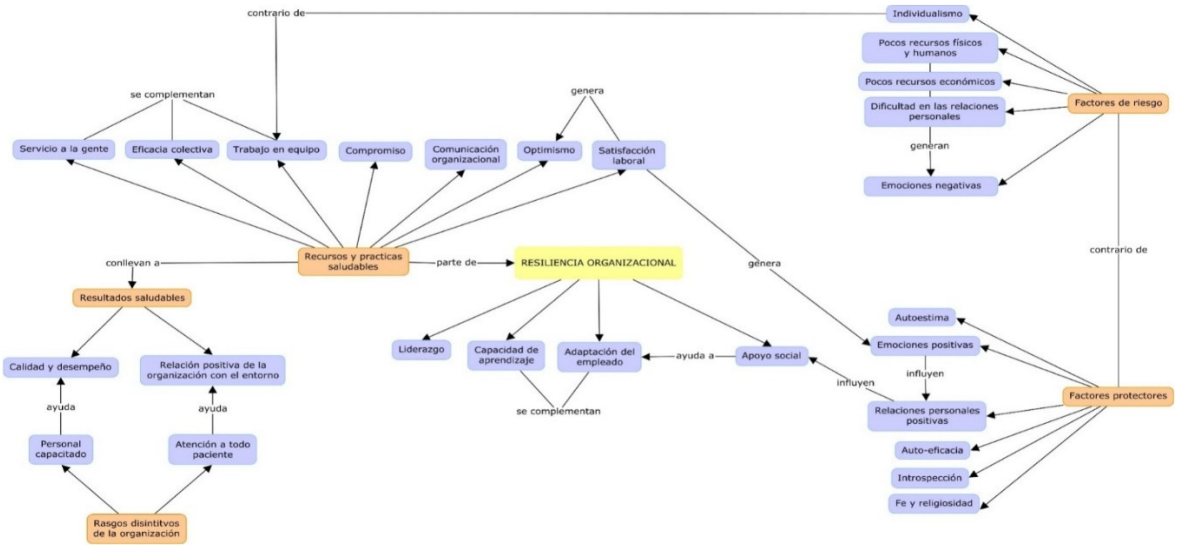

Figura 1: ***Integración de categorías y dimensiones***

Las categorías y dimensiones que aparecen en las matrices de resultados, con sus respectivos códigos que las soportan, se fueron denominando con relación a las convergencias y divergencias encontradas al darle el sentido a los relatos en función de los objetivos de la investigación. Aparecen unas nomenclaturas al final de cada relato que, permiten identificar el autor del texto y el total de menciones al terminar cada dimensión, para visibilizar la recurrencia de las evidencias.

El análisis e interpretación de los relatos de los participantes permitió que los resultados pudieran organizarse en 5 categorías principales y sus dimensiones que hablan acerca de la RO, a saber:

1. **Factores protectores,** con 8 dimensiones: autoestima, iniciativa, introspección, moralidad, fe y religiosidad, relaciones personales positivas, emociones positivas y autoeficacia.
2. **Resiliencia organizacional**, con cuatro dimensiones liderazgo, capacidad de aprendizaje, adaptación del empleado y apoyo social (de compañeros y de la empresa).

3. **Factores de riesgos:** pocos recursos económicos, pocos recursos físicos y humanos, dificultades en las relaciones personales, emociones negativas, dificultad en la comunicación, individualismo y múltiples ocupaciones de la mujer.

4. **Recursos y prácticas saludables** con sus respectivas dimensiones que se componen por comunicación organizacional, trabajo en equipo, optimismo, compromiso, satisfacción laboral, eficacia colectiva y servicio a la gente; siendo la última una dimensión emergente de los relatos de los profesionales

5. **Resultados saludables** y se divide en dos dimensiones, las cuales son: relación positiva de la organización con el entorno y calidad y desempeño.

La siguiente figura recoge la codificación selectiva que integra en una red las categorías, dimensiones, sus relaciones y condicionantes y representa como está conformada la RO en la clínica Rafael Calvo:

Por asuntos de espacio, solo se muestran las evidencias de una de las categorías, con sus respectivas dimensiones y códigos representativos de la RO (Ver **Tabla 2).**

Tabla 2: Factores de RO

Categoría	Dimensiones	Códigos
Resiliencia organizacional Minolli (2000) la define como aquellas empresas capaces de absorber cambios y rupturas, tanto internos como externos, sin que por ello se vea afectada su rentabilidad y que incluso desarrollan una flexibilidad tal que, a través de procesos de rápida adaptación, logran obtener beneficios extras, sean estos pecuniarios o intangibles, derivados de circunstancias adversas y/o imprevistas (citado en Hoffman, 2014).	Liderazgo De acuerdo al planteamiento de Robbins (2015), el liderazgo implica la habilidad para influir en un grupo y dirigirlo hacia el logro de un objetivo o conjunto de metas (citado en Finol, 2019).	*- "… yo llegué ahí y organicé la cuestión, porque las comidas con los pacientes no eran las adecuadas. Pero ya hasta el momento mejoró…" E5* *- "… para lo que yo encontré yo he ido ajustando con mi equipo pues cosas que desde mi experiencia encaminado a corregir cosas que no se hacían de cierta manera…" E6 GF P1* *- "… Trato de resolver todos los inconvenientes que se presenten dentro del día a día aquí en cirugía…" E14* TOTAL MENCIONES: 10
	Capacidad de aprendizaje Esta capacidad es entendida como la habilidad que tienen las personas de aprender de las experiencias para desarrollar formas nuevas de conocimiento. Así mismo, describe la habilidad de una comunidad para contribuir a la adaptación como resultado de un desastre (Cretney, 2016 citado en Casado, Muñiz y Milanés, 2019).	*- "… de aprender mucho más, o sea he aprendido muchas cosas que cuando llegué aquí no las sabía, y sí, me he superado aquí poquito a poco…"E5* *- "… cada día que uno vive aquí, que uno trabaja aquí es una experiencia, cada día uno ve un caso nuevo que uno cree que es relevante y vamos a ver que viene otro día y… también es relevante…" E9* *- "… me han ido ascendiendo porque yo trato de brindar todo lo humanamente posible y de resolver todos los inconvenientes que se nos presentan…" E14* *- "… No se puede uno ni desesperar, ni estar de mal humor, ni responder de mala manera, además que todo esto es un aprendizaje para lo que a futuro venga… Saber esperar y tratar de darle soluciones a las cosas…" E17* TOTAL MENCIONES: 29
	Adaptación del empleado Se refiere a la habilidad para restablecerse en el entorno (Chakravarthy, 1982 citado en Romero y Rivero, 2017).	*- "…a pesar de las dificultades económicas le presto más atención a la parte asistencias, y trato de olvidar ese tema…"E19* *- "… el cambio fue como un poco abrupto porque llegar a un sitio donde hay personas que llevan*

		mucho tiempo trabajando acá… como cuando tu llegas eres como nuevo…" E15 *- "… Estamos en ese proceso… armando nuevos teclados, nuevos equipos sobre todo pues, para que las personas puedan trabajar bien en ellos…"E15* *- "… así nadie sepa hay que investigar, hay que tratar de solucionar para poder resolver la situación que se presente…" E15* TOTAL MENCIONES: 15
	Apoyo social Provisiones instrumentales o expresivas, reales o percibidas, dadas por la comunidad, redes sociales y amigos íntimos (Lin, Dean y Ensel, 1986 citado en Romero, 2017).	*- "... Me dieron de pronto la oportunidad de un puesto que no tenía mucha idea y pues pensé que iba a ser difícil, pero me desenvolví y me fue excelentemente bien..."E1* *- "… Siempre la administración pues, nos está capacitando para que en la clínica siga, siga adelante…" E4* *- "… nos ayuda a investigar dentro de la clínica, estamos a la vanguardia de muchos temas… estamos innovando cosas…" E19* *- "... Se han portado muy bien conmigo, me han brindado una buena acogida..."E2* *- "...siento que somos, digamos que nos ayudamos un poco, si tu no entiendes algo yo te lo explico, o si tú de pronto no puedes hacer algo yo te ayudo, y así..."E2* *- "…las personas son muy amables, el ambiente laboral en general es bueno, hay compañerismo…" E16* TOTAL MENCIONES: 22

Fuente: elaboración propia

Discusión y Conclusiones

Teniendo en cuenta el discurso de los participantes, respecto a sus fortalezas personales y a las de la organización, referidas a las características de la Clínica, se puede notar la emergencia de una resiliencia organizacional que incluye una diversidad de factores protectores personales y relacionales, entre los que se destacan por su mayor recurrencia: la autoestima (15 menciones), las emociones positivas (21 menciones) y las relaciones personales positivas (22 menciones).

Dentro de esos factores, estudios recientes han dejado en claro que la autoestima está estrechamente asociada a la resiliencia, ya que una alta autoestima y una buena dosis de eficacia personal hacen más probable el éxito en la superación de las dificultades (Salami, 2010; Fuentes, 2018).

De la misma manera Estrada y Martínez (2014), apuntan a que las emociones positivas optimizan la salud, el bienestar subjetivo y la resiliencia psicológica, favoreciendo un razonamiento eficiente, flexible y creativo. Un razonamiento de este tipo es clave para el desarrollo de un aprendizaje significativo. Así es como las emociones positivas ayudan a otorgar sentido y significado positivo a las

circunstancias cambiantes y adversas. Así mismo, se pudo observar en los relatos cómo las emociones positivas influyen directamente en que se den relaciones personales positivas en la organización. Como expone Vecina (2006), las emociones positivas son parte de la naturaleza humana y se han convertido en una clave indiscutible para la consecución de las relaciones sociales.

Por el contrario, existen algunos factores de riesgo que pueden influir en la ejecución del trabajo de los empleados dentro de la empresa, entre estos se encuentran la falta de recursos económicos (31 menciones), físicos y/o humanos (14 menciones) que traen consigo dificultades en las relaciones interpersonales (10 menciones), generan emociones negativas (14 menciones) y poca motivación hacía el trabajo.

Un factor de riesgo hace referencia a situaciones contextuales o personales que incrementan la probabilidad de desarrollar problemas emocionales, conductuales o de salud (Villanueva, 2015). Fernández (2004) señala que identificar y reconocer los riesgos de un individuo, grupo o comunidad significa poder estimar la probabilidad de que se produzcan daños (Fuentes, Medina, van Barneveld y Escobar, 2012).

Uno de los principales problemas en la organización es el atraso en los pagos, esto de acuerdo con los relatos les genera a ellos desmotivación, porque aunque se identifican con su trabajo y lo realizan de la mejor manera, les hace falta el incentivo económico. Por lo tanto, clasificamos al factor económico como un factor de riesgo para la satisfacción laboral de los empleados.

Cabe destacar que los diferentes factores protectores, al igual que los de riesgo, no actúan de manera aislada sino ejerciendo un efecto de conjunto, donde se establecen complejas relaciones funcionales que traen como resultado la atenuación de los efectos de las circunstancias adversas y los eventos estresantes (Fuentes, Medina, van Barneveld y Escobar, 2012).

Por lo anterior, se considera que una de las virtudes del concepto de resiliencia radica en la observación o tendencia de que una persona por el hecho de vivir en un ambiente exiguo y en condiciones de extrema necesidad, adversidad o desigualdad, no implica que esa persona esté abocada al fracaso social, personal o de salud. Lo que demuestra la investigación empírica es, que a pesar de las adversidades una persona resiliente es capaz de superar y aprender de las adversidades (García del Castillo, García del Castillo, L., López y Días, 2016). Con relación a la resiliencia organizacional se destacaron diferentes aspectos de acuerdo con los relatos de los participantes, entre esos están: la capacidad de aprendizaje (29 menciones), el apoyo social (22 menciones) y la adaptabilidad del empleado (15 menciones). Estas dimensiones coinciden con las planteadas en el Modelo Hero (Salanova, Llorens, Martinez, & Cifre, 2012), que hace referencia a una organización saludable y resiliente.

Se define como una organización que tiene un modelo HERO como aquella que lleva a cabo acciones sistemáticas, planificadas y proactivas para mejorar los procesos y resultados tanto de los empleados como de la organización como un todo. Además, son resilientes porque mantienen un ajuste positivo bajo circunstancias retadoras, se fortalecen ante situaciones adversas y bajo presión son capaces de mantener su funcionamiento y sus resultados (Salanova, Llorens y Martínez, 2016).

En las intervenciones positivas del Modelo Hero se destaca la palabra 'resilear', como el desarrollo de la capacidad para adaptarnos de manera positiva en contextos de gran adversidad donde se pongan en marcha mecanismos de afrontamiento de la situación amenazante donde los cambios se perciban como una oportunidad y no como un peligro(Salanova, Llorens y Martínez, 2016). Así mismo, García-Vesga y Domínguez (2013) consideran a la resiliencia como una adaptación positiva que supera las exposiciones de riesgo o la vulnerabilidad.

Con relación a lo anterior, en los relatos de los participantes encontramos una conexión entre adaptación y aprendizaje. Siguiendo a Cumming, Olson and Chapin (2013) y Beichler et al. (2014), la generación de conocimiento y el aprendizaje social contribuyen al desarrollo de la capacidad adaptativa, y por tanto, de la resiliencia (Casado, Muñiz y Milanés, 2019).

Además, desde la resiliencia organizacional nace una teoría de aprendizaje organizacional que pone el acento en la capacidad de aprendizaje como la fuente de supervivencia a largo plazo de las

organizaciones. El aprendizaje se considera un mecanismo fundamental por el cual las organizaciones, como sistemas abiertos, interactúan con su entorno, procesan información, y se adaptan a las cambiantes condiciones externas e internas (Meneghel, Salanova y Mª Mart, 2013).

Desde la perspectiva del modelo HERO también se destaca el liderazgo transformacional, considerado uno de los principales recursos sociales, que tiene un efecto positivo en los niveles de autoeficacia y el compromiso de los trabajadores tanto individual como colectivo, incrementando sus niveles de confianza organizacional (Salanova, Llorens y Martínez, 2016).

Así mismo, del Modelo Hero surgieron en la investigación dos componentes que lo conforman: los recursos y prácticas organizacionales saludables y los resultados organizacionales saludables. En la primera parte se destacan las dimensiones de: trabajo en equipo (44 menciones), optimismo (26 menciones), satisfacción laboral (22 menciones) y servicio a la gente (29 menciones), esta última surgió como dimensión emergente.

Se ha demostrado en investigaciones anteriores que los recursos laborales, definidos como aquellas condiciones del trabajo de tipo físico, social y/u organizacional que favorecen la consecución de las metas en cuanto estimulan el crecimiento y el desarrollo personal y profesional (Bakker y Demerouti, 2007), tienen un efecto positivo en el clima de apoyo social y coordinación, y la resiliencia grupal (Meneghel, Salanova y Mª Mart, 2013).

Eso es debido a que las relaciones positivas y de calidad entre compañeros de equipo (demostradas a través de un buen clima de apoyo social y de un alto nivel de coordinación) facilitan el compartimiento de informaciones, los procesos de aprendizaje y el desarrollo de soluciones adaptativas para los problemas que se presentan, influyendo por tanto en el incremento de la resiliencia (Meneghel, Salanova y Mª Mart, 2013).

Así mismo, de la propuesta de Horne y Orr (1998) de las siete pautas dentro de una organización, en la investigación surgieron cuatro: conexiones (que en este caso sería apoyo social), compromiso, comunicación y coordinación. Los autores recomiendan que estas pautas deben ser evaluadas a nivel general, ya que conjuntamente ayudan a la organización a cumplir sus objetivos en tiempos de crisis. Eso porque, a nivel organizacional, tales pautas conducen a resultados favorables a través de la facilitación del procesamiento de la información en condiciones de estrés (Meneghel, Salanova y Mª Mart, 2013).

También es importante destacar el papel del optimismo que resulta en los relatos de los participantes. Fredrickson (2009) afirma que el optimismo constituye uno de los factores más importantes para crear las condiciones de satisfacción y de felicidad. Incluye las expectativas de control sobre los resultados de las propias acciones, las expectativas sobre la posibilidad de alcanzar resultados positivos en el futuro, así como un cierto componente de eficacia personal (Fuentes y Medina, 2012).

El segundo componente, son los resultados saludables. De acuerdo a los relatos se destacan: la relación positiva de la organización con el entorno, la calidad y desempeño. En la relación positiva de la organización con el entorno, se destaca el agradecimiento por parte de los pacientes que asisten a la clínica, debido a que los profesionales atienden a todo paciente (independientemente de dónde venga o con qué recursos cuente) y a su vez, lo hacen de una manera eficiente y profesional.

Las organizaciones saludables cuidan no sólo de las relaciones entre los empleados y dirección dentro de la propia organización, sino también de las relaciones de la organización como un todo con su ambiente extra-organizacional, con la comunidad cercana y la sociedad en general. Uno de los objetivos de estas organizaciones es tener un impacto positivo en el ambiente local externo a la organización, así como ofrecer una imagen positiva y saludable de la empresa hacia el exterior (Montilla, 2014).

Para finalizar, es pertinente decir que la organización estudiada, muestra de acuerdo a los relatos de los empleados que cuenta con rasgos que la distinguen de otras clínicas y que así mismo cuentan con una actitud propositiva. Son capaces de adaptarse y atender a todo paciente que llegue a la clínica, sin importar sus recursos o la procedencia, y así mismo todo el personal cuenta con diferentes capacidades

para cada atención. Esto último se debe a que la clínica tiene una característica de rotación de personal y de realización de capacitaciones para los empleados.

La resiliencia organizacional toma un papel muy importante en las organizaciones, ya que con los recursos personales y colectivos de los empleados se superan los momentos de crisis, y con las capacidades de aprendizaje y adaptación se logra salir renovado ante las dificultades. También es importante que desde el Modelo Hero se empleen todos los recursos y prácticas como un conjunto para lograr así que las organizaciones logren sus objetivos.

Por todo lo anterior, se considera que los empleados de la ESE Clínica de Maternidad Rafael Calvo cuentan con diversos factores protectores, recursos y prácticas saludables para poder superar las crisis económicas que se presenten a futuro.

Así mismo, dando cumplimiento al compromiso adquirido con la clínica al inicio de este proyecto se devolverán los resultados para la validación por parte de los participantes y hacer recomendaciones.

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Internet in purchase processes of Polish SMEs

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Abstract

Growing popularity of information and communication technologies has a significant impact on the way how enterprises are conducting their purchase processes and make them less time and resource consuming, as well as environmentally aware due to the paperless communication. For quite a long period of time, mostly big enterprises have benefited from these solutions and attention of most researchers has been focused on them. The aim of this paper is to examine how small and medium-sized enterprises use Internet in their purchase processes (12 actions itemized in the purchase process were analysed). The available Internet tools included homepages of suppliers, company blogs, social networks, B2B e-commerce websites, B2B e-marketplaces, e-catalogues, e-requests, etc. The matter of the sources of information about suppliers was also raised. The author conducted a survey among 126 small and medium-sized enterprises from the Lower Silesia Region. It was aimed at learning their preferences as to how to use the Internet in the purchasing process, at evaluating the usage rate of individual solutions and at identifying the types of products bought via the Internet.
Results of the research proved that Polish SMEs are familiarized with Internet tools that can be applied in the purchasing process, although these solutions are not very common, especially in small enterprises. A further research should be based on the interviews to identify deeply the reasons that prevent enterprises from using available solutions. Moreover, the author would like to verify whether there are some industries less amenable to using the new opportunities.

Keywords: SME, purchase process, Internet tools

Introduction

Use of the information and communication technology (ICT) in purchasing process is not a new idea born during the recent years only. As early as 50 years ago, Electronic Data Interchange (EDI) was applied, the solution that made it possible to exchange business documents between various computer systems with use of established message formats. However, the traditional EDI was an expensive solution and, in consequence, was used mostly by large, well-funded companies having many suppliers. Emergence of the World Wide Web and a drop in prices of personal computers resulted in common and comprehensive application of the ICT in enterprises. Nowadays, it strongly influences many aspects of a company operation and one of the processes clearly modified by these changes is the procurement process. The Web offers numerous solutions that facilitate and speed-up the actions related to purchases in the enterprises. It makes it possible not only to search for potential suppliers, establishing contacts with them, exchange of information and also, more and more often, execution of the purchase itself and making the payment.

Small and medium-sized enterprises significantly affect economies of many countries (Sila & Dobni, 2012). They significantly contribute to the GDP, generate the majority of employment (Morais et al., 2011) and influence economic growth not only at the local or regional levels, but at the national level as well. The SMEs appreciate importance of the supply management in the enterprise and are aware of the relation between correct execution of the purchasing process and the results reached by the company. However, because of numerous restrictions present in this size companies, they are often described as “normative” or “conservative” buyers. This concerns also adoption of the solutions related to using the ICT in purchases – many publications indicate that SMEs are lagging in implementing modern solutions in their businesses.

The issues related to using the Internet at purchasing process in the SMEs do not take too much place in the literature. Attention of most researchers is focused on big enterprises, which usually apply modern solutions supporting the procurement processes. This publication concerns employment of the Internet in purchasing process by SMEs, is aimed at determination of goals and the application level, as well as at identification of possible differences occurring in this area by enterprises of individual sizes.

Therefore, the goal the author set for this article is: firstly, to identify the available Internet tools, that can be appropriable in purchasing process of SMEs, both as a source of information and as place of transaction, and secondly, to explore the ways they are used. These included the homepages of suppliers, company blogs, social networks, B2B e-commerce websites, B2B e-marketplaces, e-catalogues, e-requests, etc. The author conducted a survey among 126 small and medium-sized enterprises from the Lower Silesia Region. It aimed at learning their preferences as to how to use particular tools in purchasing process and the usage rate of individual solutions.

Review of the subject literature

Clear differences are observed between the SMEs and large companies as regards the levels of using the ICT solutions (Eurostat Statistics Explained, 2019). Researchers indicate several types of barriers hampering acceptation of these solutions by the enterprises (Levy & Powell, 2005). These barriers can be divided to the external ones (related e.g. to legal, cultural or technological aspects) and the internal ones (having their sources in the organisation itself). In the case of the SME companies, the latter is above all limited level of financial and human resources and also insufficient knowledge about available possibilities and missing support from the management (resulting from insufficient time and underestimation of the opportunities offered by these solutions (Cox et al., 2001), (Kapurubandara & Lawson, 2006).

These factors affect also adoption and use of the e-commerce solutions by the SME companies (Morais et al., 2011). However, it is worth to note that some aspects of operation of this size enterprises can next contribute to easier implementation of the e-commerce related solutions. They include, first of all, closer contacts with customers, better skills to adapt to new situations and ability to implement changes faster.

Companies use the e-commerce solutions to different degrees. Sila and Dobni (Sila & Dobni, 2012) distinguished three usage patterns of e-commerce in SME: E-Limiteds, E-Leaders, and E-Laggards, taking into consideration the following three groups of factors: technological, organizational, as well as inter-organizational and environmental factors.

Because of limited resources and sometimes insufficient knowledge about purchasing and supply management, the SMEs less often treat this activity as a strategic one (Ellegaard, 2006]) Results of Paik (Paik et al., 2009) show however that the persons making purchases realize a strong influence of the purchased products and services on the company results. They also believe that market position of their company is highly dependent on the way, how their procurement is executed. The companies emphasized also the problems of finding new suppliers to replace those currently collaborating, which can mean that they may have insufficient purchasing leverage.

Even if there are no significant differences in the access level to the Web between different-size enterprises, there are differences between them in their way of using the Internet in purchases. However, the profits identified in researches are similar and the following can be mentioned among them: quick access to information, easier communication with the current suppliers, its lower cost, less paper work, easier and faster searching for new suppliers (Moon, 2005), (Stankovska, 2016). Sometimes, financial benefits connected with lower purchase costs are mentioned (Stratopoulos & Dehning, 2000), but the authors claim that the advantage is rather short-lasting, since the competing companies usually implement a similar technology in a few years.

The e-procurement is the process that, according to van Weele (2010) "..includes web technology-based purchasing solutions aimed at simplifying commercial transactions within and between organizations and information technology solutions for ordering, logistics and handling systems as well as for payment systems". Even if elements of this process are more and more often executed by companies, they are not so common in the SME sector as among large companies. Chan and Lee (2003) developed a model of behaviour of small and medium-sized companies connected with adoption of the electronic procurement solutions. They found that the factors like the value of e-procurement adoption, power of the e-procurement, trust on a supplier, trust on the IT and power of suppliers, decisively affect adoption of these solutions. The same authors pay attention to the role of intermediary institutions (like B2B e- marketplaces) in promoting the purchasing solutions using the Internet and in building confidence to this type solutions. In addition, the government institutions should conduct a wide-scale educative action and implement the necessary legal regulations (Chan & Lee, 2003), (Prałat, 2017).

The sector of micro, small and medium-sized enterprises represents the prevailing majority of enterprises in Poland – as many as 99.8% of them (according to 2018 data of Polish Agency for Enterprise Development). The most numerous group, 96.5%, are 2 million of microenterprises. The fractions in the structure of Polish companies are: 2.6% (53.8 thousands) for small enterprises and 0.7% (15.3 thousands) for medium-sized enterprises (PARP, 2019). Moreover, in 2017, the SME sector made nearly a half (49.8%) of the GDP and was the workplace for 68.3% of total employees in the business sector.

The high importance attached by the SMEs to the purchase area is confirmed by the results obtained in 2012 by Dorożyński and Urbaniak (2013), who examined the factors that facilitate or hamper running a business on a sample of 171 small and medium-sized enterprises from the Lodz Metropolitan Area. In the opinion of the companies, "cooperation with suppliers and subcontractors" appeared the most significant factor from among 30 of those examined and was rated 5.5 in the 7-degree scale (standard deviation 1.43 and coefficient of variability 26%) (Dorożyński & Urbaniak, 2013).

Procurement is also indicated as the most important area of the knowledge partnership on the grounds of results of the examinations carried-out within 2010-2012 on the sample of 247 SMEs representing both the regional, national and international ranges (Adamik & Flaszewska, 2013). The actions aimed at the knowledge partnership in the procurement area are carried-out by 69.7% of the companies operating in the regional market and by 56.9% of those with the national range. The examined enterprises gathered the knowledge about their closer and further environment utilizing mostly professional press/literature and the Internet (61.8% and 52.2%, respectively).

Supply purchasing in the enterprises

According to Lysons and Farrington (2005), the term "supply purchasing" means the function responsible for "acquisition of equipment, materials, components (semi-products), parts and services by buying, leasing or in another legal way in order to use them for production or to resale them".

Purchases in the enterprise market are made in the three situations: new purchase, renewed purchase and modified one. Each of these options is connected with a different way of action and, in consequence, emphasis is put on the other ones from the described below stages of the purchasing process. The purchasing process of an enterprise can be divided to several stages, whose description and number is different depending on the source. The most often quoted one is the Buy-Phases model, presented by Robinson (Robinson et al., 1967), comprising of the following eight decision stages:

1. Need recognition – awareness of the problem, need or a potential benefit gives a pulse to begin the purchasing process;
2. General need description – determination of the features that the product or service identified at the previous stage should have and the approximate demand;

3. Definition of technical and qualitative specification – the need is precisely described and the request for quotation can be prepared;
4. Supplier search – on the grounds of own market analyses and possible external opinions, the enterprise can identify the manufacturers, which should be considered at sending-out the requests for quotation;
5. Proposal solicitation – requests for quotation are sent to the selected suppliers, their answers are analysed and possible counter proposals are prepared;
6. Evaluation of proposals and selection of suppliers – final quotations are evaluated considering the previously elaborated evaluation criteria. Finally, one or a number of proposals is selected and, possibly, negotiations with the suppliers are carried-out. The stage is finalized with conclusion of a contract.
7. Specification of the order routine – detailed conditions of the transaction are agreed (qualitative parameters, delivery terms, warrantees, claim procedures, etc.);
8. Performance evaluation and feedback – the purchased products are verified from the viewpoint of fulfilling the previously determined need. Information on cooperation with the supplier are also collected to be used for its future evaluation.

Internet as the information source and place of purchases

The problems related to incomplete information or its insufficient reliability are the elements most often (36.9% and 32.2% of indications) mentioned by the B2B buyers in 2018, as causes of delays in accomplishment of their purchases (ShowPad Report, 2018). At the same time, nearly 60% of the buyers admit that they often experienced the situation when they did not receive any response to the question related to the purchase (Time Trade Report, 2018). The more and more common use of Internet and various types of ICT tools contributes to increasing accessibility of electronic information sources in companies and to their increasing importance. The greatest advantages of using the Internet in the supply market search are: access to comprehensive data resources not restricted by spatial and temporal barriers, saving of time, convenience and low cost of data acquisition [Sobczyk].

The Internet is also the place of searching the information about the suppliers for possible collaboration and their products. This enables the buyer to collect the most important information quickly and independently, as well as to be better prepared for negotiations with sales representatives of the potential supplier or even for the purchase. Among new information sources, the following can be distinguished:

- The B2B e-commerce websites They are online stores acting on the B2B market, whose offer is designed only for the logged-in customers. Here, it is possible that the products can be searched not in the standard way only, by their names, but also in the advanced way by bar codes, manufacturers' names or their attributes (in some sectors, the offered products are described by numerous technical parameters). The service can also include the information about substitutes, as well as photographs and engineering drawings. A useful function can be a comparison website considering numerous criteria that makes it possible to select the product best fitted to the customer's needs.
- The B2B e-marketplaces. These solutions present the offers of numerous suppliers and were created in order to automate the purchase and sale process. They make it possible to find the required products, as well as to conclude the transaction and to settle it. These services are also a perfect place for searching the information about potential suppliers of goods or services, entering into communication with them and being informed about details of co-operation with individual suppliers (delivery and payment terms). This is provided by catalogues containing current offers and by advanced searching and communicating tools (Radzikowska, 2014).
- Company blogs. In addition to the product information, the suppliers' websites more and more often include the sections named "blog" or "knowledge base", where reports, webinars, case studies, novelties, customers' opinions and experts' advices concerning the offered products or services are placed. These contents are oriented to the potential customers and are aimed at increasing reliability of the company, creating its image as an expert in its field and at distinguishing it against the competitors (Szamrowski & Pawlewicz, 2013). An additional advantage is the possibility to reach the

future customers for free, the more that publishing the blog gives higher position of the company website in the Google browser results.

- Answers to the inquiries sent-out by the customer. There are three basic kinds of these inquiries: Request for information (RFI), Request for proposal (RFP) and Request for quotation (RFQ). Selection of a specific inquiry or the sequence of using the inquiries depends on the knowledge that the potential buyer has about the product and the suppliers' market. In the case of the RFI, the buyer needs a general information and expects from the suppliers the information about their market position, financial position, products and their parameters. In reply to the RFP, the customer expects that the potential supplier suggests how to solve the specific problems. A reply to the RFQ should include a declaration whether the exactly specified requirements can be met (in order to compare offers coming from many suppliers). The inquiries (in particular the RFI) can be the preliminary steps in preparation of purchase auctions or be used to obtain some knowledge about the market. They are more and more often sent in the electronic form by e-mail or via trading platforms that usually make it possible to assess the responses automatically on the grounds of the previously defined criteria.
- Social networks. To search products and suppliers or to seek an opinion, the buyers in the B2B markets more and more often use various social networks. Both in the LinkedIn and in the Facebook thematic groups, one can search for information about solutions and recommendations, exchange experiences or verify reliability of potential suppliers (Sitarska, 2019).

Employees of purchase departments more and more often expect obtaining, through the Web and with no necessity to contact a sale agent, not only general marketing data, but also comprehensive information about products and purchase terms (e.g. technical details or legal aspects), that is the knowledge necessary at the final stage of the purchase process. This approach is well-grounded the more that many B2B products and services can be acknowledged as standard solutions. If the buyers' information needs can be completely fulfilled thanks to the information presented in the electronic form, this can suggest that implementation of a trading platform should be considered in order to utilize its advantages (including lower selling costs and savings of the salesmen time to utilize them where the personal contact is really necessary). It should be stressed that the buyers in the B2B market readily transfer their habits, experiences and inclinations from the private life to the professional area and as many as 75% of them think that using B2B e-commerce websites is more convenient than purchases at the trade representatives (Bielobradek, 2018).

However, this does not mean complete withdrawal from contacts with the seller's agent – lack of such need was indicated by merely 30% the surveyed B2B buyers. As many as 70% of them still need an agent's help at some purchase stage or when it concerns complex and complicated products, of that 38% higher appreciate contacts with the sale rep than independent searching the information and 32% prefer a combination of these two information sources (ShowPad Report, 2018).

Information sources in the purchase process

The actions aimed at a supplier selection can be classified to the tactical ones, however, the selection alone and its consequences are of a great meaning for the company. Staff of the departments responsible for purchases can have insufficient knowledge and understanding of the market (especially regarding a new purchase), so they should search for many various sources of information about the potential suppliers. Monczka (Monczka et al., 2011) indicates both traditional and modern sources of this information:

- personal contacts,
- participation in fairs, exhibitions and other specialised events,
- professional papers, catalogues and brochures,
- opinions and advices obtained from independent experts or institutions (e.g. from chambers of commerce or commercial counsellors),
- opinions issued by other companies (recommendations concerning a specific supplier or their absence),
- Internet,

- catalogues (databases) available in electronic version.

Polish authors additionally indicate the following sources of the knowledge about potential suppliers and their offers: suppliers' offers sent independently or in reply to the requests sent-out or published in periodicals, websites of companies, stock exchange news, experience acquired by buyers, tenders and telephone directories (like Panorama Firm) (Urbaniak, 2013).

It results from the research carried-out by Urbaniak (2013) on a group of over 130 Polish small and medium-sized enterprises that the most common source of information about suppliers were fairs and exhibitions, suppliers' websites, recommendations of other companies and commercial representatives (Fig. 1). Each of these sources was used by 67.4% to 71.2% of the examined companies. The lowest interest (18.2%) was shown to chambers of commerce or chambers of commerce and industry. However, when small and medium-sized enterprises are analysed separately, the results are different. This is especially visible for small enterprises, where most popular appear recommendation of other companies (77.6%) and then the suppliers' websites and fairs or exhibitions (67.2% each). As relates to medium-sized enterprises searching for information about suppliers, they used most frequently fairs and exhibitions (74.3%) and then the information obtained from commercial representatives and websites (73.0% and 71.6%, respectively).

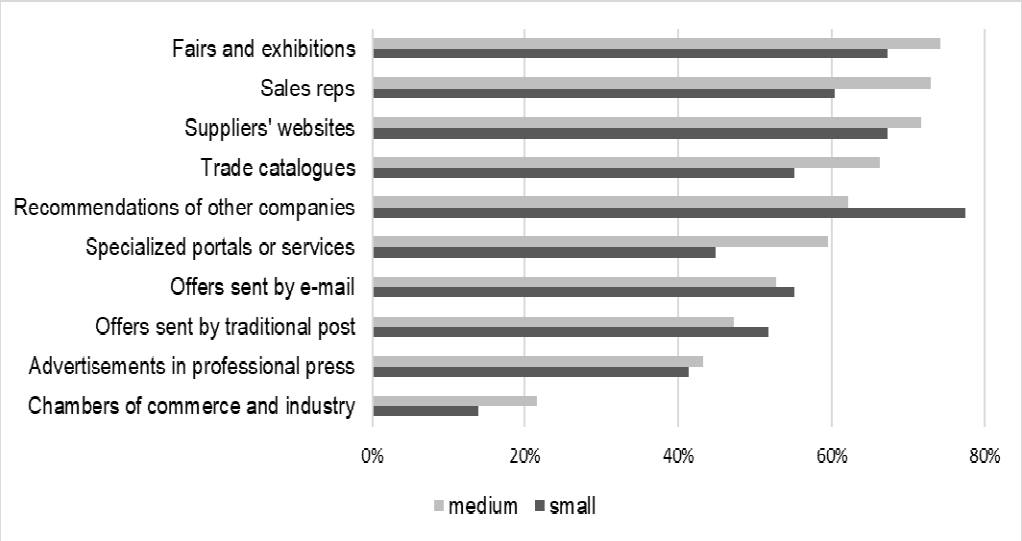

Fig. 1: Sources of information about suppliers used by small and medium-sized enterprises
Own presentation based on (Urbaniak, 2013)

Research Methodology

In order to evaluate the use of Internet as a source of information in purchasing process, a study was conducted among small and medium enterprises from the Lower Silesia Region. This research was a part of more extensive research works carried-out by the author, related to purchases in small and medium-sized Polish enterprises. The research tool was the questionnaire form and the CAWI survey technic was used. Discussed will be that part of the questionnaire only, whose results are used in this paper. The main hypothesis was

- to identify the sources used by the enterprises searching for suppliers;
- to ascertain, whether the SME companies use the Internet in the purchasing process;
- to determine the level of using the Internet on individual stages of the purchasing process;
- to identify the type of products that are frequently bought via the Internet;
- to examine possible differences in actions between small and medium-sized enterprises.

The mentioned part of a questionnaire consisted of seven questions, most of them close-ended, with nominal or ordinal scale. Moreover, the respondent's particulars part included five questions concerning the enterprise size (like in the previously discussed research, the only division criterion was number of employees: small enterprises employed 10 to 49 persons and medium-sized ones employed 50 to 249 persons), industry, business line, etc. After verifying the questionnaire in a pilot survey and introducing necessary changes, the main survey was conducted. 144 questionnaires were obtained, of which 126 really concerned small and medium-sized enterprises and were correctly completed.

Discussion and Results

90 small and 36 medium-sized enterprises took part in the research. They conducted trading, manufacturing and service activities (more than one answer was often indicated). Small enterprises operated first of all in local and regional markets, and medium ones – in regional and national markets. The enterprises that operated in the market longer than for five years represented nearly three-fourths of medium-sized enterprises (72.3%) and over a half of small enterprises (52.3%).

In the question concerning sources on information about suppliers, the cafeteria of responses was significantly extended in relation to the proposal of Monczka (Monczka et al., 2011). First of all, new sources related to use of the Internet in this area were added. When searching for suppliers, the examined companies use various sources, what is shown in Fig. 2. The source most often used by the examined enterprises appeared their sale services, traditional recommendations of other companies, as well as fairs and exhibitions. Results are different depending on size of a company. Small enterprises use mostly recommendations (63.3%), sale services (53.3%), fairs and exhibitions (44.4%), but medium-sized enterprises search for information in sale services (72.2%), in fairs and exhibitions (69.4%), in electronic trade catalogues (58.3%), but use also recommendations of other companies and information from commercial representatives (55.6% each). Among the analysed companies, the lowest interest was shown to the information coming from chambers of commerce and industry. Sending-out requests for offers by traditional post was rarely practised and offers were also rarely obtained this way. Small enterprises sporadically (5.6%) searched for information on trade B2B platforms and every fifth medium-sized enterprise searched for information this way.

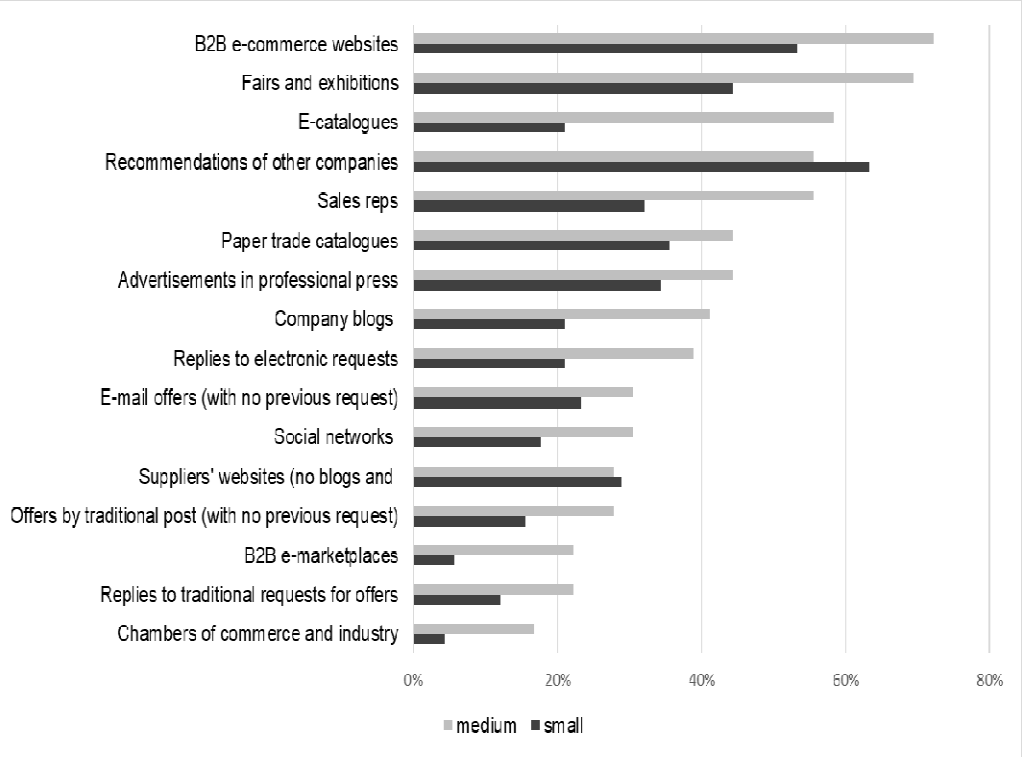

Fig. 2: Extensive sources of information about suppliers used by small and medium-sized enterprises

Source: own work

All the companies taking part in the survey confirmed use of the Internet in the purchasing process. In the questions related to purchases, the previously described stages of the Robinson's Buy-Phases model were used. The actions executed just after the purchase were also added, namely payment, exchange of trade documents, warranty and complaint handling, as well as keeping contacts with the suppliers. The examined companies used the Internet in all their actions related to purchases, which is shown in Fig. 3. In individual actions being subjects of questions, over a half (at least 54.5%) of the examined companies used the Internet often or very often. Most often, it was used at payments and at the initial stage of the purchasing process, that is at searching for the product. In both these actions, the Internet was used often or very often by over 90% of the examined companies (93.9% and 90.9%, respectively). The actions most rarely executed with use of the Internet was searching for opinions about the specific supplier and establishing conditions of the contract. It results from discussions with representatives of purchase departments that the contract negotiation is the action carried out (depending on the contract) usually during a telephone call or a personal talk and still confirmed by paper documents. Almost each of the actions was more often performed with use of the Internet by medium-sized enterprises and the only exception was searching for opinions about suppliers. The reason can be less widespread contacts of small enterprises and their smaller market research abilities.

As for searching for an opinion, there are no services strictly designed for the supplier evaluation in the B2B market, especially in the case of direct purchases (related to production). The buyers can possibly ask for opinions about suppliers or warn against collaboration with some of them by means of social networks.

Fig. 3: Frequency of using the Internet at individual stages of procurement process by small and medium-sized enterprises

Source: own work

Depending on sizes of the examined companies, there are differences between levels of using the Internet in individual actions related to purchasing. For small and medium-sized companies, average scores showing frequency of using the Internet for each of the actions were calculated (0 points were attributed to the answer "never" and 4 points were attributed to the answer "very often"). The results shown in Fig. 4 indicate that small enterprises less frequently use the Internet in 11 of 12 analysed actions. The largest difference in results between small and medium-sized enterprises appeared in the case of "placing orders" and was equal to 0.91 points. An advantage of medium-sized enterprises was also big in the case of the final stage of the purchasing process, i.e. searching the product and establishing contacts with the supplier. In both cases, the difference was equal to 0.75 points.

In the actions related to execution of the purchasing process, all the examined companies use the e-mail, the Web browser and the online banking. In the case of online shopping, B2B e-commerce websites are mostly used, where 84.2% of medium-sized and 47.4% of small enterprises do their purchases. The B2B e-marketplaces are used much less frequently, by 19.4% of medium-sized and 1.1% of small enterprises only. Use of these platforms is generally payable, so it may be the reason, moreover companies can be afraid of their insufficient skills or have no knowledge about the benefits that can be reached by use of such a solution.

A significant part of the examined companies buys also products (first of all indirect ones) on open trading platforms like Allegro.pl, Amazon or AliExpress. This concerns mostly small enterprises (53.4%), but also a part (23.7%) of those medium-sized. This markets make it possible to recognise product prices and to find new suppliers for cooperation also outside the platform. A small percentage of the companies purchased also in online shops.

Among the products bought by small and medium-sized enterprises through the Web, there are first of all: equipment and appliances related to the business operation, office supplies and computer hardware (Fig. 5). The differences appear in popularity of these purchases. Most of medium-sized companies buy this way their business-related equipment/appliances and office supplies (83.3% each), as well as computer hardware (72.2%). In the case of small companies, nearly the same part

buys online computer hardware (71.1%), but the other results are much lower at 53.3% for business-related equipment/appliances and 46.7% for office supplies.

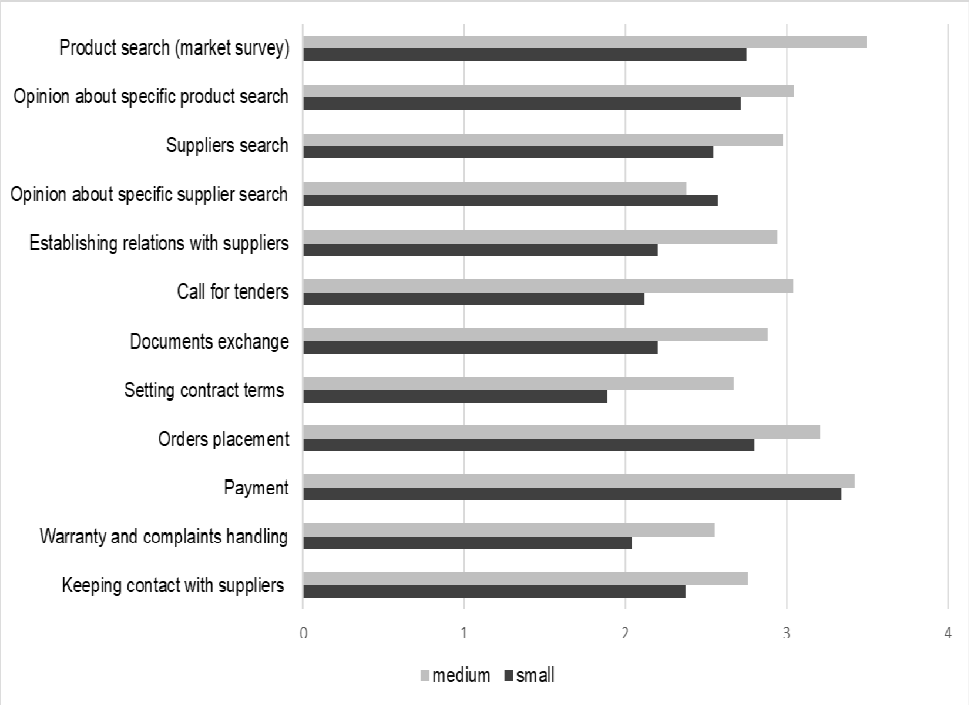

Fig. 4: Differences in using the Internet at individual stages of procurement process between small and medium-sized enterprises

Source: own work

Small and medium-sized enterprises were significantly different with regard to the range of goods purchased through the Internet. Percentage of medium-sized enterprises that clearly more often bought office supplies, business-related equipment and appliances, as well as groceries, was at least 30% higher than for small enterprises. This can result from small volume of purchases, which does not stimulate them to resign usage of traditional wholesalers.

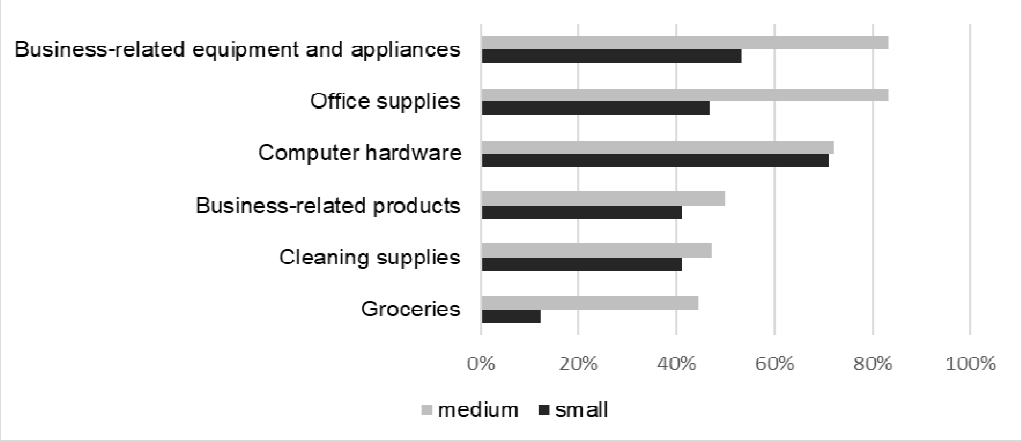

Fig. 5: Percentages of small and medium-sized enterprises using the Internet in purchases of individual product types

Source: own work

The following aspects were indicated as the greatest advantage of online shopping: convenience (72.7%), possibility to reach a great number of suppliers (66.7%) and possibility to obtain lower prices for goods and services (61.2%).

Results of the questionnaire survey showed that they more and more often searched for information about suppliers by means of ICT solutions. The most popular were B2B e-commerce websites of individual suppliers and e-catalogues. Percentages of the enterprises using individual solutions were different between small and medium-sized organizations. In comparison to the Urbaniak results, increasing interest in using the information that can be obtained by Internet is visible. However, the examined companies use modern solutions not in place but in addition to those traditional and do not resign the information acquired during fairs and exhibitions, from commercial representatives or by advertisements in professional press (that is also more and more often in electronic form).

Conclusion

Low purchase costs of computer hardware and open access to the Internet (in 2018, 95.6% of Polish companies used the Internet) compose one of two most important causes of growth of electronic purchases in enterprises. The other cause is popularization of the idea of electronic purchases in companies, which became possible due to common knowledge of online shops and auction services acting on B2C market. In spite of indisputable advantages of online purchases (convenience, promptness of reaching the seller, savings resulting from both usually lower price and the transaction costs themselves), there exists a great discrepancy in using this type solutions by different size enterprises. According to the data published by the Statistics Poland, in 2017 percentage of Polish enterprises placing orders by the Web was 33.6%. Even if these actions concerned 2/3 of big enterprises, the percentages among small and medium-sized enterprises were much smaller, amounting to ca. 43.6% for medium-sized enterprises and ca. 29.8% only for small ones (Statistics Poland, 2018). Central Office of Statistics publishes two values: percentage of the companies purchasing through websites and mobile applications and percentage of the companies purchasing with use of Electronic Data Interchange (EDI). However, these numbers can not be totalled, since the two groups are not disjoint sets.

This paper concerns using the Internet non only in execution of purchases, but in the entire process connected with purchases of small and medium-sized enterprises – starting from market researches (searching for both the products meeting specific requirements and, in the next step, their suppliers), establishing contacts with the suppliers by acquiring their offers, negotiations and concluding contracts, up to making payments for completed deliveries. Another question raised in the work is analysis of sources of information about suppliers, used by companies from the SME sector, with the special emphasis on application of online sources.

This study is focused on the impact of Internet tools on purchasing process of small and medium-sized enterprises. The information sources used by these enterprises were examined, with a particular emphasis to various types of online sources. Moreover, it was determined, how often the analysed organisations use the Internet in individual actions connected with execution of the purchasing process. Results of the questionnaire survey carried out among 126 small and medium-sized enterprises show that Polish SMEs are familiar with Internet tools that can be applied in purchasing process, however, these solutions are not very common. Moreover there is a noticeable difference between small and medium enterprises. The conclusion arising from the research is the enterprises should aim at more and more comprehensive usage of the possibilities offered by ICT, by improving their supply management routines. By using these solutions and proper performing the tasks in the sourcing and procurement areas, they can increase their ability to compete with bigger market players, as well as improve their performance and efficiency.

Further research could identify the reasons that prevent enterprises from using the available solutions. Moreover, the author would like to verify whether there are some industries less amenable to the new opportunities and conduct the interviews in depth in such companies.

Acknowledgment

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The Situation of Capital Markets in The Current Context

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Abstract

The outlook for 2020 depends on the balance between political risks and fiscal and monetary policy responses. This will create two possible outcomes: either the slowdown observed at the end of 2018 will be stopped and a moderate recovery will occur, or the economy will go into recession. The trends of inflation and the interest rate also depend on this policy combination. Continued over-confidence in monetary policy is likely to keep yields and inflation expectations low, as monetary policy approaches its limitations. Other policy levers, such as fiscal incentives, would boost economic growth and returns.

Keywords: Capital Markets, Fiscal Policy, Recession, Investors.

JEL code: G11, G12, G15.

Introduction

The capital market can be defined as the place where financial instruments are sold and bought (see https://www.financialmarket.ro). This covers the markets of various financial instruments, as well as the financial institutions that activate and are involved in its proper functioning (https://admiralmarkets.com).

In other words, the capital market consists of a set of economic relationships and associated mechanisms with which investors who have capital surplus and want to make use of it come in contact with the issuers of securities (financial instruments), that is, those in need of investment. Thus, the exchange of money funds takes place through securities or financial instruments. Therefore, the capital available from the economy reaches those who need it for the development of economic activities. The most well-known forms of the capital market are the stock exchanges, the shares and bond markets, but also the currency markets. Most capital markets are found in large financial centres, including New York, London, Frankfurt, Hong Kong, Tokyo.

The purpose of capital markets is to improve the efficiency of transactions. In order to achieve this objective it is necessary to refer to a longer period of time, i.e. those investments that block capital for periods longer than one year (see https://ing.ro).

The Troubles of 2020

2020 is marked by uncertainties, which is why we have pointed out a few questions that will probably bother us during the year.

1. Will global expansion continue in 2020?
2. Will we escape political uncertainty in 2020?
3. Will inflation return in 2020?
4. Will fiscal policy help?
5. What could cause the next recession?
6. How is Romania in this context?

The answers we can offer at the moment are based on the decisions taken last year and the context in which we find ourselves, so we can state that at the moment, the risks associated with the US-China trade war and Brexit have diminished considerably, but the global political situation is a volatile one if we refer to the US-Iran conflict.

Political uncertainty is fueled by power imbalances in the economic and political system, the fundamental indicators that support it remain present.

Regarding inflation, for now we can say that it will not increase soon, the role of central banks is to temper the expectations of markets regarding the inflation and to stabilize the level of unemployment.

Fiscal policy may be supportive, but for the moment, it faces many constraints, such as very low interest rates and inflation.

Political uncertainty can discourage company investments and increase productivity (see https://beleggingsvisie.ingbank.nl).

The Current Context

The challenges facing the global economy have increased in 2019. If we refer to the political situation, we can say that tensions related to global trade have continued to wane over time, threatening Brexit without agreement has diminished, however, nevertheless remaining a challenge for European financial markets.

Social unrest has increased throughout the world, fuelled by rising income inequality, but also by the on-going uncertainty of climate change. As a result of these factors, we noticed a decrease in the risk appetite of investors, this fact reducing the yields of the government bonds in the developed markets (https://www.zf.ro/burse-fonduri-mutuale). Investor appetite has recently improved due to the reduction of political risks and the stabilization of macroeconomic indicators. The evolution of markets in 2019 shows how difficult it is to identify a solid anchor in an uncertain world.

2020 brings a global economy approaching a crossroads. The challenges generated by the political uncertainty we are in continue to influence financial markets. Bond yields and inflation expectations have been pushed down due to excessive confidence in monetary policy. However, we can mention that the fiscal stimulus measures have increased the confidence in the business environment and consumers, thus boosting the economic growth. Meanwhile, the US and China have reached a preliminary trade agreement, and the uproar caused by Brexit is reaching a stable resolution.

In terms of asset performance, 2019 proved to be an exceptional one, given that both low-risk asset classes (government bonds) and high-risk assets (equities) recorded solid performances, as table no. 1 reflects. The main global stock indices registered increases of 15%-25% in 2019, a notable evolution, considering the tendency of the global economy to slow down compared to 2018. At the same time, investors in government bonds were rewarded with consistent yields, taking into consideration that the cost of borrowing for the major developed states ended the year at lower levels than at the end of 2018 (see https://www.nnip.com).

Table 1: The performance of the main classes of global assets in 2019 and in the last 5 years

Asset classes	Index	Performance 31 Dec 2018-31 Dec 2019	Performance 31 Dec 2014-31 Dec 2019
Emerging market shares	MSCI Emerging Markets	15.42%	16.56%
American markets shares	S&P 500	28.88%	56.92%
European markets shares	Stoxx Europe 600	23.16%	21.40%
US Government Bonds	Bloomberg Barclays US	6.86%	12.35%

	Treasury Total Return		
Government bonds in emerging markets	JPM EMBI Global Diversified	15.04%	35.34%
European government bonds	Bloomberg Baclays EU Govt All Bonds	6.76%	13.30%
European high risk bonds	Bloomberg European Ccy High Yield	12.29%	26.04%
Raw materials	Bloomberg Commodity	5.44%	-22.47%
Oil	Crude Oil Brent	22.68%	15.12%
Real estate US	Dow Jones US	22.34%	60.12%

Source: Bloomberg

In 2019, there was a paradox in which markets ticked increases both on the background of positive macroeconomic news and on the news regarding the deterioration of economic data. In other words, when the economic data indicated an economic slowdown, analysts interpreted this as an argument for the continuation of the monetary stimulus, therefore a strong impulse for the markets. At the same time, if subsequent data signalled the recovery of the economy, the effect on investor sentiment was also positive. Taking into account all the aspects presented, we can state that the year 2019 has been a positive one, for both the prudent investors and those with a higher risk appetite.

With regard to the outlook for 2020, it is possible that solid performances similar to 2019 may be more difficult to repeat.

The United States is experiencing one of the longest stages of growth in the economy, which may increase the risk of an economic slowdown, according to several analysts. In the meantime, Europe is facing structural growth problems. Monetary policies have pretty much exhausted their arsenal, and any additional measures appear to have little chance of making a truly material impact. As far as fiscal policies are concerned, the second main economic stimulus channel, for 2020 analysts do not expect fiscal aid in any of the big economies. At this time, the price of the main categories of assets is already high, thus investors could also opt for global shares in 2020, at the expense of those with fixed income, given that their current levels leave little room for compressing yields, especially in Europe (see https://nnip.com).

Local Developments

At the end of 2019, Romania faced negative economic data. First, the data on economic growth in the third quarter of the year fell behind the expectations of analysts, indicating a slowdown at 3% compared to the third trimester of 2018, when in the second trimester of 2019, the economy grew by 4.4%. Annual inflation for November 2019 accelerated to 3.8% from 3.4% in October 2019. This level is outside the central bank's inflation target range of 1.5% -3.5%.

Romania ended 2019 with a budget deficit with 1% of GDP higher than the initial target of 3%. From a fiscal point of view, the year 2020 remains a difficult one for the current Government in the challenge of keeping the electoral commitments eluded by the previous government and at the same time keeping the budget under control. An example in this regard is the pension law adopted last year which provides for large pension increases in the public system (40%).

In this context, the national currency began to depreciate. The EURO/RON rate recorded at the end of 2019 had a 2.5% lower level than the end of 2018. During the whole of 2019, the RON had a constant tendency of depreciation, a situation that is easy to explain, if we look at the general vulnerability of the economic situation during the year (see https://www.bursa.ro).

In early December, the rating agency Standard & Poor's announced the change in Romania's rating outlook, from stable to negative. They justified their decision against the background of increased risks regarding fiscal and economic stability. They also stated that Romania is at the lower limit of the rating

range recommended for investments, which means that a future rating change will have an impact on investors' appetite for Romanian bonds.

However, despite the announcement of Standard & Poor's agency, the level of the Romanian bonds did not react significantly to this announcement. The level of the Romanian government bonds reflects the risks regarding the fiscal situation and Romania had to pay significantly more to investors compared to other countries with a similar rating over the last year. However, delaying the correction of imbalances can have consequences on financing costs, and the rating agencies will have to be convinced that the economy is kept under control (see https://www.conso.ro).

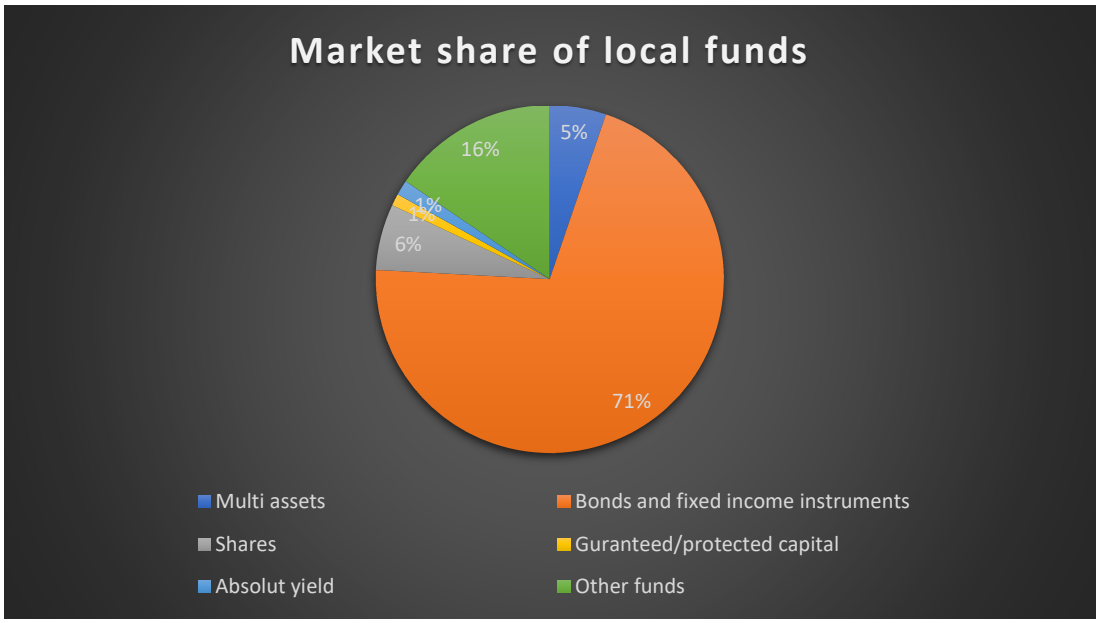

Chart 1: Market share of local funds

Source: own representation based on informations retrived from ***http://www.aaf.ro***

The graph above shows the structure of mutual funds invested in 2019. We can note that most of the subscriptions were in bonds, followed by other funds and shares.

Table no. 2 structures the situation of the investments made in 2019 in Romania, a situation that demonstrates that the investors were not discouraged by the current context of the country, continuing to trade on the basis of the previously obtained returns.

Table 2: The situation of the investment funda traded in Romania in 2019

Name	No funds	Net assets	Subscriptions	Redemptions	Net subscriptions	No investors
Local shares	21	1526.6	51,3	23,60	27,70	14463
Foreign shares	46	291,9	30,10	32.9	-2,8	0
Other local funds	9	3862,9	178,6	140,8	37,9	43983
Other foreign funds	2	0,1	0	0	0	0
Guaranteed/protected local capital	2	277,3	1,9	12,5	-10,6	3261
Local multi-shares	37	1297,7	57,9	28,3	29,6	64190

Foreign multi-shares	11	486,4	31,1	5,8	25,3	0
Local bonds	20	17606,2	578,2	420,1	158,1	215199
Foreign bonds	41	174,5	5,7	2	3,8	0
Absolute local yield	8	345,9	4,4	11,4	-7	3399
Absolutely foreign yield	2	25,2	1,1	0,3	0,8	0
Total closed funds	24	1596,4	14,1	3,1	11	88707
Total local	97	24916,6	872,4	636,7	235,7	344495
Total foreign	102	978,2	68,1	41	27,1	0

Source: http://www.aaf.ro/indicatori-fonduri/

Chart no. 2 surprises the evolution of local funds in the year 2019. If at the beginning of the year the net subscriptions exceeded the subscriptions, which means that the investments still recovered the losses recorded in 2018, we can see that by the end of the year they had yields that fuelled the investors' desire to continue to subscribe important amounts.

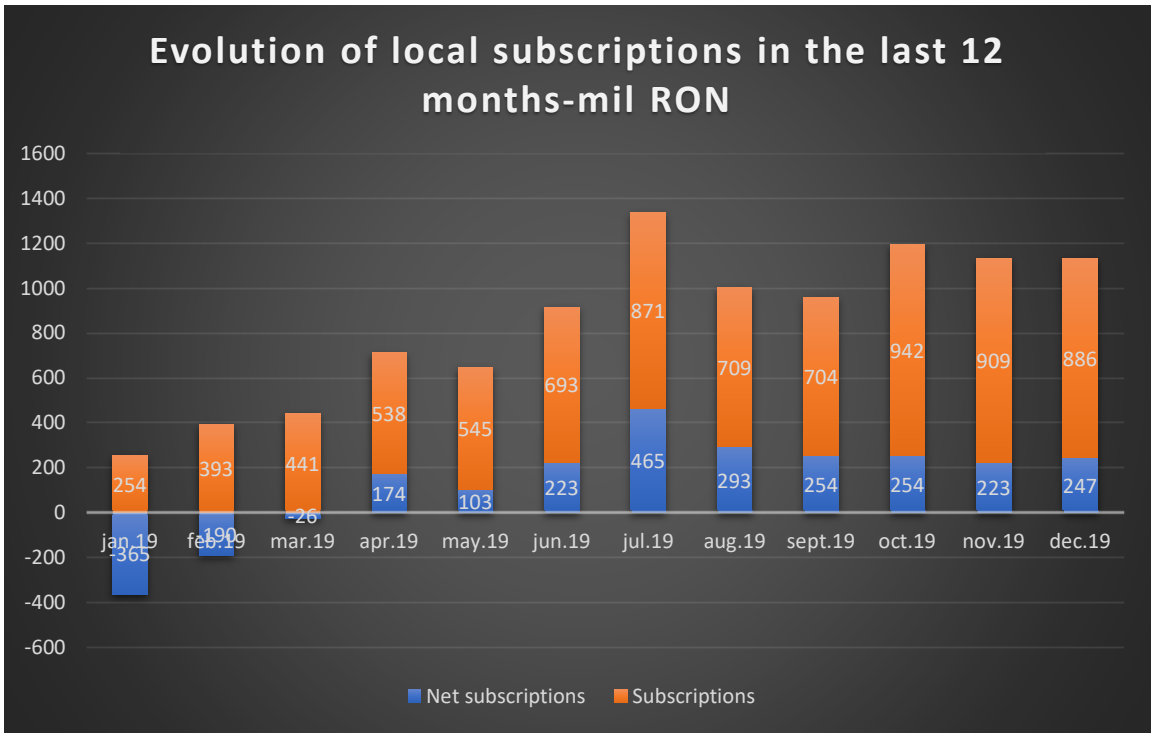

Chart 2: The evolution of local subscriptions in the last 12 months

Source: own representation based on informations retrived from ***http://www.aaf.ro***

Conclusions

The challenges facing the global economy increased in 2019. Tensions related to global trade continued to grow throughout the year, and Brexit will bring major changes in the capital market. At the end of 2019, investors' appetite improved due to the reduction of political risks and the stabilization of macroeconomic indicators. However, the year 2020 is a crossroads in economic growth. New political uncertainties can influence financial markets. Thus, the year 2020 depends on the balance between

political risks and fiscal and monetary policy responses. We can talk about two possible scenarios, namely: either to stop the slowdown observed at the end of 2018, or the economy will go into recession. In this context, for an optimistic scenario of 2020, policy makers are crucial. To stop the slowdown in economic growth, governments will need to implement measures that complement monetary policies and support the confidence of the business environment and consumers.

As far as the banking sector is concerned, in a prolonged slowdown in economic growth, credit spreads will not increase significantly, continuing to benefit from considerable protection from the yield search. As a result, bank financing costs should remain relatively low. On the assets side of the balance sheet of the banks, the rate of non-performing loans should not increase substantially. This should prevent a considerable narrowing of the credit offer. In the event of a recession, things will be very different, and the narrowing of the loan offer will harm the labour market even more.

Assessing the risk of recession is very difficult, being near impossible in the present circumstances, which are practically unprecedented in modern economic history. It thus becomes difficult to draw conclusions based on past experiences. First, the usual cyclical economic imbalances are largely absent, inflation remains subdued and may even be too low. In addition, there is no sign of over-indebtedness or over-investment. However, there are more structural imbalances such as adverse demographic developments, rising inequality and increased concentration in different sectors, all fuelling secular stagnation.

The essence of these forces lies in the low willingness to take risks, both in the real economy and in the financial sphere. Since the engine of capitalism is clearly the ability and willingness to take risks, it becomes a big problem. From a cyclical perspective, increasing secular stagnation forces makes the economy more vulnerable to shocks, as it reduces real balance rates and thus increases the risk of bank rates reaching level zero.

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Provisions and Reserves in Banking Sector Under Conditions Of Excess Liquidity Exemplified by Selected Banks Operating in Poland

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Abstract

Excess liquidity of banking sector implies that banks hold too much free funds instead of investing them, thus an undesired or even detrimental phenomenon occurs. Nevertheless, excess liquidity has also some strong points when we look at it as a "tool" supporting a bank's safety and stability. Under uncertainty conditions, prudential regulations become more restrictive and result in more reserves and further security buffers in addition to basic capital requirements. The paper aims at researching the significance of bank's excess liquidity for the creation of loan loss provisions and capital adequacy ratio as well as the contribution of an individual bank to liquidity of the whole sector. The research was conducted with financial data from selected banks listed on the Warsaw Stock Exchange.

Keywords: Banking Sector, Provisions and Reserves, Capital Adequacy Ratio, Excess Liquidity

Introduction

Excess liquidity has been for many years characteristic of many banking sectors worldwide. The last global financial crisis motivated banks to accumulate funds in precautionary intentions and most banks do hold considerable surpluses. However, banking sector comprises different banks and some of them have got no excess liquidity. Baldo et al. (2017) examined liquidity distribution in the euro zone and show the countries with excess liquidity and with deficits of liquidity. In this context, the strength of banking sector is noticeable, as excess liquidity from one country can be transferred to those in need. A similar case happens within domestic banking sector, where such transfers are accomplished by means of an interbank market. But when a bank experiences serious financial trouble, its ability to borrow funds is lost, and this can spell trouble for the whole sector. In this situation, excess liquidity is appreciated for its safeguarding value, as provisions and other reserves can be created, if financial condition of the bank deteriorates in future.

The main goal of the paper is to examine the significance of a bank's excess liquidity in the creation of loan loss provisions and the capital adequacy ratio, as well as the role played by an individual bank in the shaping of liquidity of the entire sector.

Section one of the paper characterizes the phenomenon of excess liquidity in banks, indicating its weaknesses and strong points. Based on the analyzed literature, examples of distinguishing two portions of excess liquidity are given: precautionary excess liquidity and involuntary excess liquidity, emphasizing advantages of the former one. Section two of the paper deals with the creation of loan loss provisions and loan loss reserves, with special attention drawn to a problem of dynamic reserves model. Section three of the paper presents the phenomenon of excess liquidity of banking sector in Poland. Based on financial data from selected banks which are listed on the Warsaw Stock Exchange, an examination of the dependency between excess liquidity of banks, levels of reserves and capital adequacy ratio was attempted.

Excess liquidity of Banking Sector

The start of financial crisis in 2008 revised banks' approach to a liquidity problem and they began accumulating considerable amounts of excess financial means on their accounts with central bank, as reported by Baldo et al. (2017).

In Polish banking sector, excess liquidity measured by the issuance of NBP money bills and standing facilities has been occurring since 2004, i.e. since the beginning of stabilization process as a result of transition to a market economy. In 2009 a considerable increase of excess liquidity occurred due to adoption of prudential policies in banking sector and this situation has been continuing with a slight decline of excess liquidity, as discussed by Losiewicz-Dniestrzanska (2019).

A huge excess liquidity of banking sector is assessed as negative for every banking system, as emphasized by Barik Bathaluddin et al (2012). The surplus of free funds in the interbank market results in a decline of the price of money, whereas almost zero or negative interest rates impede the effectiveness of monetary policy transmission, do not encourage the economic growth, obstruct inflation control, as well as instigate speculative bubbles, e.g. in real estate market. It is also a serious obstacle for central banks and brings about difficulties in accomplishment of monetary policy targets. However, an excess of liquidity is not a burden for banks or an impediment to effective transmission mechanism of monetary policy as a whole. Bathaluddin et al (2012) divide the excess liquidity into two portions: precautionary excess liquidity and involuntary excess liquidity. In its first portion, the excess liquidity is useful as a buffer against the threats of withdrawal of funds by customers and of volatile currency rates as well as it influences bank capital. The other part of the excess liquidity is unnecessary and may negatively influence the effectiveness of monetary policy.

Agénor and El Aynaoui (2008) argue that bank excess liquidity may increase because of "precautionary" motivation when banks decide that lending in a volatile environment is too risky.

Provisions and reserves in a bank

Banks create reserves first of all for the purpose of safeguarding financial security and protecting against consequences of uncertainty and bank risk. Isa et al (2015) and Wang et al (2019) classify reserves into two categories: loan loss provisions and loan loss reserves. Provisions can be created when a banks sets aside a certain amount of money to fund an expected liability resulting from past events. They are created when the expected liability was recognized and the loss will be incurred, e.g. provisions for nonperforming / outstanding loans, for depreciation. Another category of safeguarding is represented by reserves that can be defined as a separated portion of bank's profit set aside to be used in future for any needs, such as increasing assets or compensating for unexpected losses. The category of loan loss reserves accomplishes tasks of prudential concept in regulatory and supervisory functions.

Olszak (2014) emphasizes popularity of dynamic reserves as an accounting tool of managing banks' ability to survive under adverse external conditions, e.g. during recession. She notices a problem of incoherent definition of this model, because according to one interpretation it can be associated with increase of general reserves during economic expansion, it generates surpluses which can be used to back possible loan losses incurred by banks during recession. Another definition states that it is a model of reserves equal to expected loan loss at the moment of extending a loan. However, irrespectively of the nature of dynamic reserves applied in different countries, the function they perform is similar. The main purpose of those reserves is to reduce procyclicality of banks' lending activity, by means of limiting the amplitude of variation of loan growth rate, with respect to GDP. Reaching this objective can be possible due to equipping banks with additional reserves for general risk. These reserves should be increasing during expansion when banks show less prudence in examining borrowers and assessing their creditworthiness. During recession, these reserves should slowly decrease, as a result of absorbing losses which were incurred because of bad loans extended during the credit boom. A similar opinion on dynamic reserves is presented by Ozili and Outa (2017) and by Wang et al (2019), who notice that a dynamic model of bank reserves is aimed at increasing safety and stability of banks by means of

higher levels of loan loss provisions (or reserves) set aside in time of expansion so as to be able to cover losses incurred during economic downturn.

Haan and Van Oordt express their criticism in the discussion about models of reserves applied by banks. Based on own research they infer that most of examples in banks under study about models of loan loss reserves are mainly retrospective and procyclical. Previously, formal model of incurred losses, implemented according to International Accounting Standards 39 (IAS 39) did not allow to create reserves for bad loans before loss event occurred. After the global financial crisis, the Basel Committee on Banking Supervision replaced the incurred loss model by expected loss model and now, in accordance with International Financial Reporting Standard 9 (IFRS 9) banks are required to create loan loss reserve for past losses which already occurred, but also for loans which are expected in future.

Level of provisions in banks in Poland

A high level of excess liquidity observed in Poland indicates banks' prudence while expanding their investment activity due to concerns about worsening financial condition. New regulations obligate banks to hold more liquid assets and to exhibit a higher Capital Adequacy Ratio, thus limiting liquidity in banks. However, one should emphasize the difference between liquidity of banking sector and liquidity of individual banks. On one hand, liquidity risk of the whole banking sector can be smaller than of a particular bank separately, on the other though individual positions of banks can be extremely different. For many years, banks in Poland have been dynamically engaged in lending activity characterized by diverse profiles of credit risk. The quality of loan portfolio in 2018 remained stable according to the report on banking sector condition (Sytuacja sektora (2019)), but the introduction of IFRS 9 in January 2018 resulted, among other things, in new rules of presentation, classification and valuation of financial instruments, including recognition and calculation of their impairment. The consequences of new accounting standards can be experiences in the following years. Some banks holding loan portfolios of worse quality, mostly because of lending in foreign currency, will be forced to increase their reserves in view of failure to repay loans or judicial sentences unfavorable to banks in court cases concerning the abrogation of loan contracts.

Banks operating in Poland are obliged to comply with Polish legal regulations corresponding with European Union regulations. The fundamental principles regulating the formation of reserves for general risk are written in the Banking Act, which stipulates that reserves belong to prudential regulations and aim at mitigating risk. The principal objectives of banks' reserves according to the act of law are: to ensure financial security for banks, to protect from consequences of uncertainty and bank risk, to recognize authentic financial profit or loss and to protect interest of banks' owners. The amount of annual write-off to create a reserve for general risk equals at the most 1.5 percent of unpaid loans and advances reduced by the sum of loans and advances classified 'loss', in accordance with separate regulations, as of the end of previous financial year.

In accordance with the *Regulation of the Minister of Finance of* 2019 *on the principles of creating special provisions for risk associated with the activities of banks* allowances for loan losses are created on the basis of the assessment of individual risk generated by a given exposure. The provision is equal, at the least, to a required level of reserves and write-offs that represents the following percentages of the basis to create special provisions and write-offs adjusting receivables associated with credit exposures:

1) 1.5 percent – for credit exposures classified "special mention";
2) 20 percent – for credit exposures classified "substandard";
3) 50 percent – for credit exposures classified "doubtful";
4) 100 percent – for credit exposures classified "loss".

The research into relationship between excess liquidity of banking sector in Poland and levels of loan loss provisions (LLP) conducted with data from different periods between 2006 and 2019 did not confirm the dependency. However, in some periods, as presented in figure 1, and in determined levels

of correlation measured by the Pearson correlation coefficient, the results may indicate the existence of dependency. It was the motivation to examine mentioned relationships in particular banks.

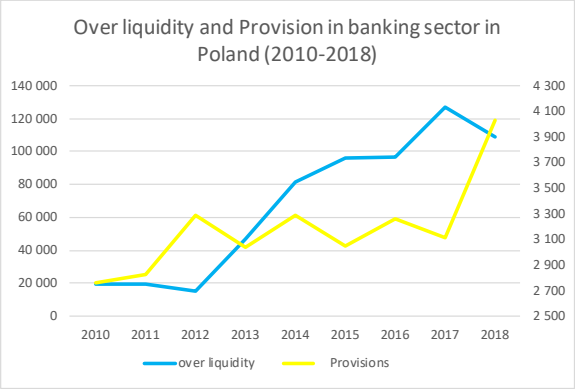

Figure 1: Over liquidity and provisions in banking sector in Poland, 2010-2018

Source: own elaboration based on data from NBP, https://www.nbp.pl/homen.aspx?f=/en/publikacje/instruments/instruments.html&navid=5508

The research was carried out with data from 13 banks listed on the Warsaw Stock Exchange (GPW) in the period between 2000 and 2019 (Notoria database), but due to lacking data some time series are shorter. A relationship between excess liquidity in individual banks and levels of loan loss provisions (LLP) and capital adequacy ratio (CAR). Excess liquidity was measured by an item from bank's balance sheet: cash and operations with central bank, i.e. a sum of cash in treasury and funds on current account.

Measurements for LLP and CAR were sourced from Notoria database. A sample of banks under study was quite diversified, hence they were grouped by the value of their assets (table 1). Besides, two banks were rejected, because after the merger with one of the largest banks in Poland they terminated own operations.

Table 1: Statistical dependency of bank's excess liquidity on loan loss provisions (LLP) and capital adequacy ratio (CAR)

Bank	Statistical dependency	
	Loan loss provisions	Capital adequacy ratio
A1	-0,355	0,566
A2	0,661	0,157
A3	0,217	-0,254
A4	0,669	0,685
B1	0,644	0,136
B2	-0,508	0,064
B3	0,519	-0,147
B4	-0,496	0,686

C1	0,511	-0,346
C2	0,337	-0,272
C3	-0,501	-0,727
X1	-	-
X2	-	-

Source: own elaboration based on data from Notoria database - Program Minigranty (project number 015/RID/2018/19).

Levels of correlation between excess liquidity and LLP or CAR presented in table 1 do not actually confirm the existence of such dependency. Banks from group A are characterized by very high levels of cash and central bank balances, as a result, their sensitivity to increased levels of LLP is lower (fig. 2).

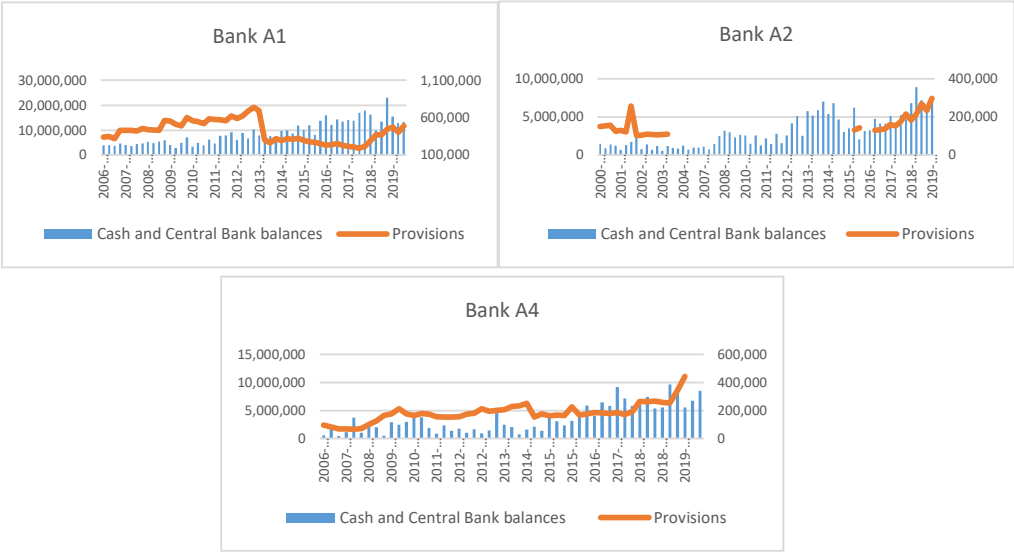

Fig. 2: Levels of loan loss provisions (LLP) during high excess liquidity of banks A1, A2, A4
Source: own elaboration based on data from Notoria database.

Banks in group A were able to "invest" in their financial safety by means of increased reserves. In addition to high levels of LLP, they also exhibit very high levels of CAR (from 16 percent to 20 percent), as illustrated in figure 3.

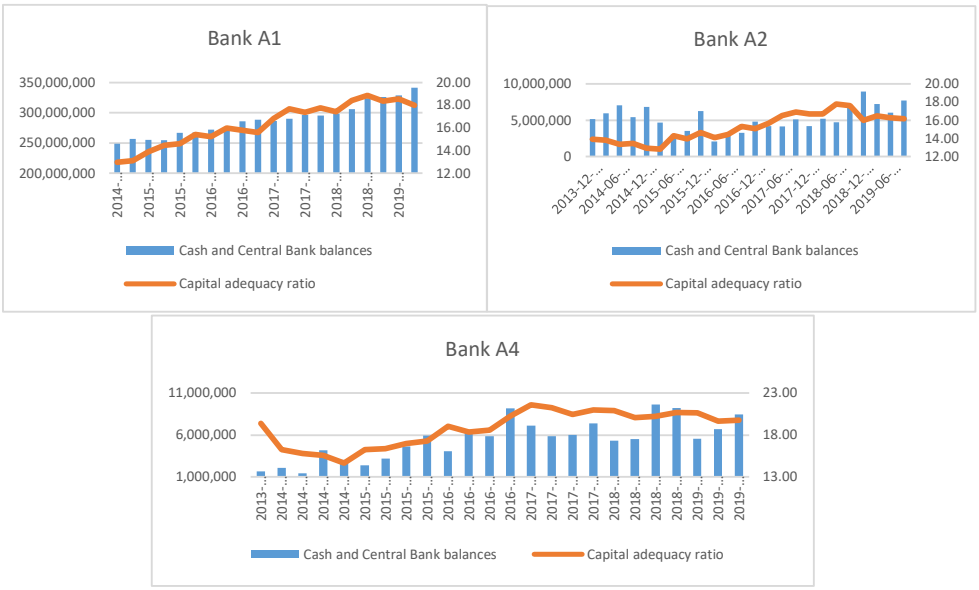

Fig. 3: Capital adequacy ratio against excess liquidity of bank's A1, A2, A4
Source: own elaboration Source: own elaboration based on data from Notoria database.

Group C contains financially troubled banks experiencing problems with liquidity and consequently, they were covered by remedial actions. Increased levels of LLP in these banks mainly correspond with increased threats to repayment of loans and advances by customers.

Liquidity position of banks C1 and C2 in 2018 reached low levels as a result of the need to increase the level of LLP (fig. 4) and withdrawal of funds from deposit accounts by banks' customers. A low level of liquidity in bank C3 was predominantly caused by the increase of the LLP level.

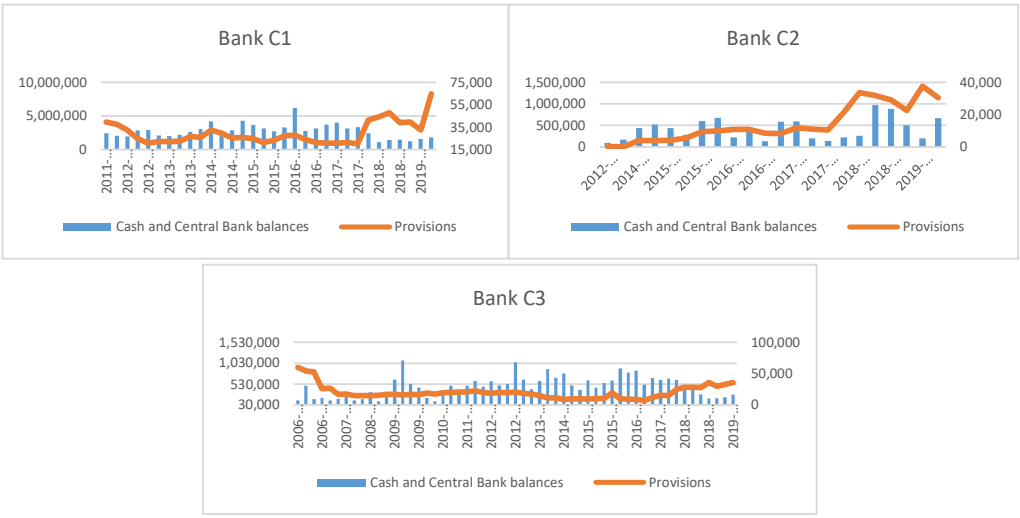

Fig. 4: Increasing levels of LLP in banks C1, C2, C3 with low levels of liquidity
Source: own elaboration based on data from Notoria database.

In 2018, levels of CAR decreased significantly following the Ordinance of the Minister of Development and Finance (2017). This ordinance imposed higher risk weighting equal 150 percent for credit

exposures secured by mortgages on residential properties, whose repayment depend on exchange rate of currency different from the currency of borrower's earnings.

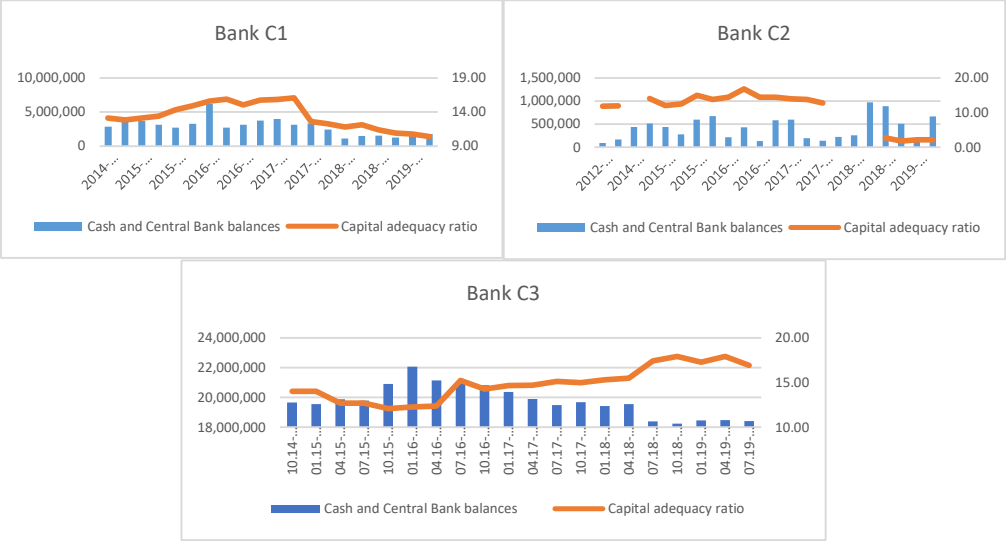

Fig. 5: Capital adequacy ratio (CAR) in banks C1, C2, C3 with low levels of liquidity
Source: own elaboration based on data from Notoria database.

The ordinance forces the increase of CAR at the cost of liquidity or when liquidity was not available – CAR was decreased below a required level. CAR levels of banks in group C are presented in figure 5.

Presented examples demonstrate smaller sensitivity to changes in levels of liquidity in those banks which have got large excess liquidity, accompanied by holding sufficiently high levels of assets. Bawazira (2018) notes that Implementation of Basel III framework may result in reduced excess liquidity following more severe capital requirements, but also in reduced funds available to finance the growth.

Summary

Banking sector in Poland has been characteristic for many years for its high excess liquidity and also very much diversified in regard to individual liquidity and levels of safety built by respective banks. Completely different is the situation of banks with largest assets, as they also present high liquidity and create reserves with add-ons. The in-between state is presented by banks from the 'middle' of the banking sector, exhibiting some surpluses along with compliance regarding basic regulatory requirements to create safeguarding reserves. A worse situation is characteristic for banks from the weakest group; they made imprudent investments, got into financial trouble and were covered by remedial actions. The funds held by these banks (often insufficient) were directed to the creation of loan loss provisions at the cost of the capital adequacy ratio.

The examined correlations of excess liquidity with LLP or CAR do not actually confirm the existence of those dependencies, but the analysis in a short accounting period clearly indicates the response of banks to more severe prudential regulations by means of decreased excess liquidity with respect to the levels of loan loss provisions and capital adequacy ratio.

Acknowledgment

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Systemic Quality Aspects of Innovative Processes

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Abstract

The technical and organisational knowledge of the manufacturing methods is recorded in the literature and technical documentation. However, much of the technical knowledge is contained in the practical skills and qualifications resulting from the laborious acquisition of professional experience. Technical progress, as a fundamental factor in the growth of production, is made by inventions, i.e. the discovery of new knowledge and innovation, i.e. the application of new knowledge in the production process. This article presents the essence and sources of innovation processes in the company. Five generations of innovation models have been characterised. The analysis of the qualitative aspect of the inclusion of innovations in the selected competition of sub-measures from the source of financing the innovative economy and the European Union was carried out.

Keywords: Innovation, Process, Enterprise, Competition, Quality, System

Introduction

Technical and organisational knowledge of the manufacturing methods is indicated in the literature and technical documentation. It can be said that technical knowledge is included in practical skills and qualifications which are the result of gaining specific professional experience. Technical progress, as a fundamental factor in the growth of production, is made by inventions, i.e. the discovery of new knowledge and innovation, i.e. the application of new knowledge in the production process.

The essence and sources of innovation processes in an enterprise indicate the characteristics of innovation models. Here, the analysis was carried out in the qualitative aspect of the inclusion of innovations in a selected competition of sub-measures from the source of financing the innovative economy and the European Union.

The Essence and Sources of Innovation Processes in An Enterprise

There are many definitions of the term referring to innovation in the literature. It is worth mentioning that they are synonymous with new ways of satisfying specific needs, which can be applied to all aspects of human activity J.A. Schumpeter was one of the first to define the role of innovation in the economy and defined it as the introduction of a new product, the introduction of a new or

significantly modernised production method, the opening of a new outlet or the entry of a new type of organisation (Schumpeter, 2000, pp. 51-75).

The authors of this study indicate that innovation in a company is therefore associated with the introduction of innovations in production or organization. Schumpeter's approach corresponds to a static approach to innovation. This means that then the result of innovative processes undertaken in the company may be a new product, a new production method, a new market or a new type of organisation. The process understanding of innovation is much broader and includes not only the result, but the whole of the activities preceding its creation. In this case, we are talking about an innovation process that includes idea creation, R&D, design, implementation and dissemination. This process is a sequence of time-based activities necessary to make a specific innovative concept come true and turn it into a new state of affairs. The innovation process is closed from the first concept to the first implementation. In this sense, the innovation process means material and immaterial changes of elements in an enterprise. The basic event in such a process is the implementation of a new product or solution in practice (Lazzarotti, Dalfovo, Hoffmann, 2011, pp. 121-135).

However, it should be stressed that each innovation process has its own specific features, depending on the size of the company or the type of activity, where each case requires an individual research approach. In the process of innovation, it is fundamental to identify the sources of innovation. P.F. Drucker considers the most important sources of innovation to be: unexpected events, incompatibility between reality and imagination, the need to introduce a new process, changes in the structure of industry or market, demography, changes in perceptions, moods and values, new knowledge. The source of innovation can be anything that creates an environment that stimulates change processes. It is important for the company to pay attention to knowledge resources and information from different sources (Drucker, 1996, pp. 1-9).

The primary objective of innovation is to develop the company. The company, striving to achieve this goal, pursues a number of intermediate objectives, which are: adapting the company to changes in the environment, achieving a higher quality of products, increasing competitiveness, modernizing manufacturing processes, increasing efficiency and quality of work, expanding the market of customers, developing marketing activities, increasing the prestige of the company, increasing the overall efficiency and effectiveness of operations, or improving the conditions and safety of specific work (Miciuła, I. 2015). The basic classification of innovations includes product and process innovations in manufacturing and production technologies. Product innovation is any kind of change in a product or service that is an improvement or extension of a new range or service. They involve the use of new technologies, new applications of existing technologies or new knowledge. Process innovations are changes in the production methods used, as well as in the ways in which products or services reach customers. An example of process innovation can also be the change of office procedures for a service. Usually these types of innovation occur simultaneously, as many product innovations could not exist without process innovations. However, process innovation differs from product innovation in that product innovation is more sensitive to market factors (Chesbrough, H. 2004).

In the course of developing the theory of innovation, 5 generations of innovation models have emerged. The characteristics of these models are presented in Table 1.

Table 1: Characteristics of innovation models

Generation	Name	Features
1	technology pus	The increase in innovation depends on the expenditure on B+R
2	market pull	Research directions and innovative processes reflect market needs.
3	coupled model	A link between the needs and technological possibilities, where the intensity of R&D and marketing is balanced.
4	integrated parallel model	Innovations are the result of close cooperation and cooperation with suppliers, leading customers and between teams. Integrated development and emphasis on close links between the research sector and producers.
5	integrated network model	Innovations are the result of integrated parallel development and application of expert systems, simulation modeling, cooperation and other links with edge customers and suppliers in research and marketing.

Source: Jasiński A.H, Technical innovations and marketing activities. Higher School of Enterprise and Management, Warsaw 1998, p. 13-14

The innovation models presented in Table 1 differ in their degree of complexity. The first two are simplest and linear. In these models, the innovation is the result of needs reported by the market or R&D activities. The third model is a juxtaposition of the previous two. The last two models are based on inter-organisational cooperation. The network of connections then facilitates the process of creation and introduction of innovations to the market, naturally assuming certain quality (Smith, K. H. 2005).

Qualitative Inclusion of Innovations in The Sub-Measure Competition 1.6.3

The owners of individual business entities could learn about the financial perspective of the European Union for the years 2014-2020 for entrepreneurs, current possibilities of obtaining support for the development of business activity in the form of grants and preferentially interest-bearing repayable instruments, regional and national EU programmes offering support for entrepreneurship. The meeting was organized by the Main Information Point of European Funds in specific cities throughout Poland (Pavitt, K. 2005).

The competitions implemented by information projects, the European Union and other entities aim to improve the quality of innovation processes, including management aspects.

Innovative solution, i.e. it is a product, process, marketing or organization which can be a result of the company's own research and development activity, cooperation with other companies and institutions and can be a result of purchase of knowledge in an intangible form, i.e. patents, licences, software, know-how, services of technical, marketing, organizational, training, etc. or material character, i.e. machines and devices with increased parameters (Smith, K. H., 2005). Figure 1. below presents data concerning the ROP sub-measures 1.6.2.

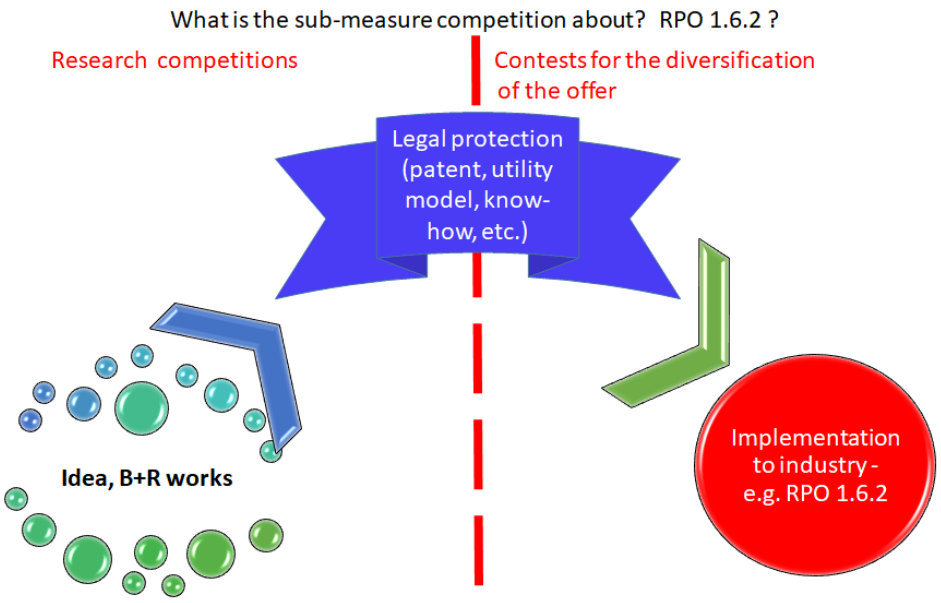

Fig.1: What is the sub-measure competition about RPO 1.6.2.

Source: research presentation and diversification of the offer created by the Main Information Point of European Funds in Bydgoszcz by Marcin Kościelna. Internet (1/6/2 INNOVATIONS) access (01.12.2019. Slide 4 Polish version, different colors have been adopted.

The competition of the above sub-measure indicates legal protection in terms of a patent, utility model, idea and R&D works and implementation in industry.

The concept of INNOVATION is best reflected in the definitions contained in the *Proposed Guidelines for Collecting and Interpreting Technological Innovation Data* - Oslo Manual*, which* distinguishes product, process, marketing, organisational and eco-innovation (Sundbo, J. 1998).

Calculation data indicate that at least one technological innovation is usually mandatory and innovations should be optional and sometimes additionally scored (Smith, K. H. 2005).

A product innovation is the implementation of a product or service that is new or substantially improved in terms of its functional characteristics or the intended use. This includes, in particular, improvements to the technical characteristics, components and materials used and the software that is an integral part of the product, as well as improvements to facilitate user use. This is basically user-friendly.
Improvements may include technical characteristics, components, materials, embedded software, more user-friendly operation and other functional features (Goffin, Keith, and Rick Mitchell. 2010).

The Scale of Process Innovation

A process innovation is the implementation of a new or significantly improved production or logistics method. This includes in particular significant changes in the techniques, equipment and software used. Process innovations are introduced by companies with a view to reducing unit production costs, increasing quality and implementing the production of new or significantly improved products (Verspagen, B. 2005).

Process innovations also include new or significantly improved methods of creating and providing services (Miciuła, I. 2018). This may involve substantial changes to the equipment and software used in service companies and changes in procedures and techniques used to provide services.

Marketing innovation - it means the implementation of a new marketing method that includes significant changes in the scope:

- design and packaging;
- promotion and advertising of products and services;
- methods (strategies) for pricing products and services.
A marketing innovation can relate to both new and old, already implemented products of a company (Chesbrough, H., Vanhaverbeke, W., & West, J. 2006).

Organizational innovation - this is the implementation of a new organizational method in terms of business practices, workplace organization or relations with the external environment (Smith, K. H. 2005).

The aim of its implementation is to increase a firm's performance by reducing administrative and/or transaction costs, improving employee satisfaction with the way the workplace is organised and consequently increasing its efficiency, gaining access to assets not subject to sale, such as uncodified external knowledge, and reducing the cost of supply delivery (Miles, I. 1995).

This is one of the most frequent so-called borderline cases, i.e. cases where a change introduced by an enterprise contains features of more than one type of innovation (Sundbo, J. 1998).

Breakthrough innovation - called radical innovation refers to the effects of innovation and not to the novelty aspect. It may result, among other things, in a change in the structure of the market, the creation of new markets or a situation where existing products become obsolete. Innovations that change the course of development are very risky, as the information needed for new investments is often lacking (Nelson, Richard, R. 1993).

A breakthrough innovation is obligatory in several R&D competitions for entrepreneurs, e.g. *POIR 4.1.4 Application projects* (Mahayan, V. 2010).

Eco-innovation - are innovations that directly or indirectly contribute to the reduction of various environmental burdens. They may manifest themselves, e.g. by reducing the negative impact on the environment, increasing the resistance to environmental stress or achieving a more efficient and responsible use of natural resources (Bruns, T., & Stalker, G. M. 1961).
An example of eco-innovation is the 4R principle:

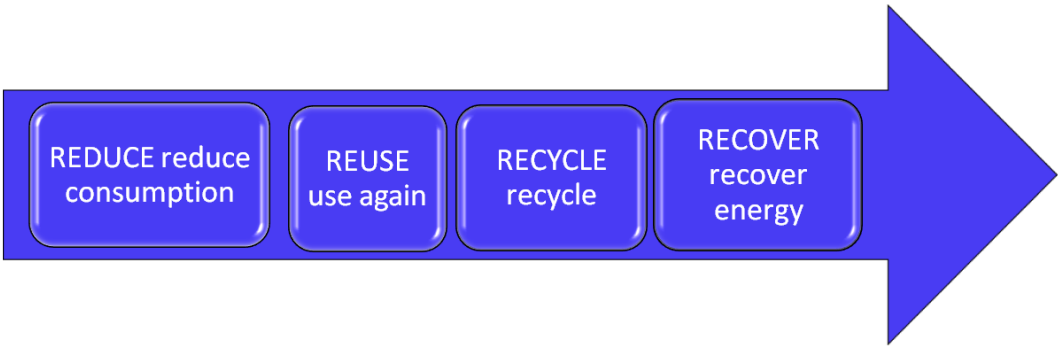

Fig. 2: Example of eco-innovation principle 4R

Source: Own study

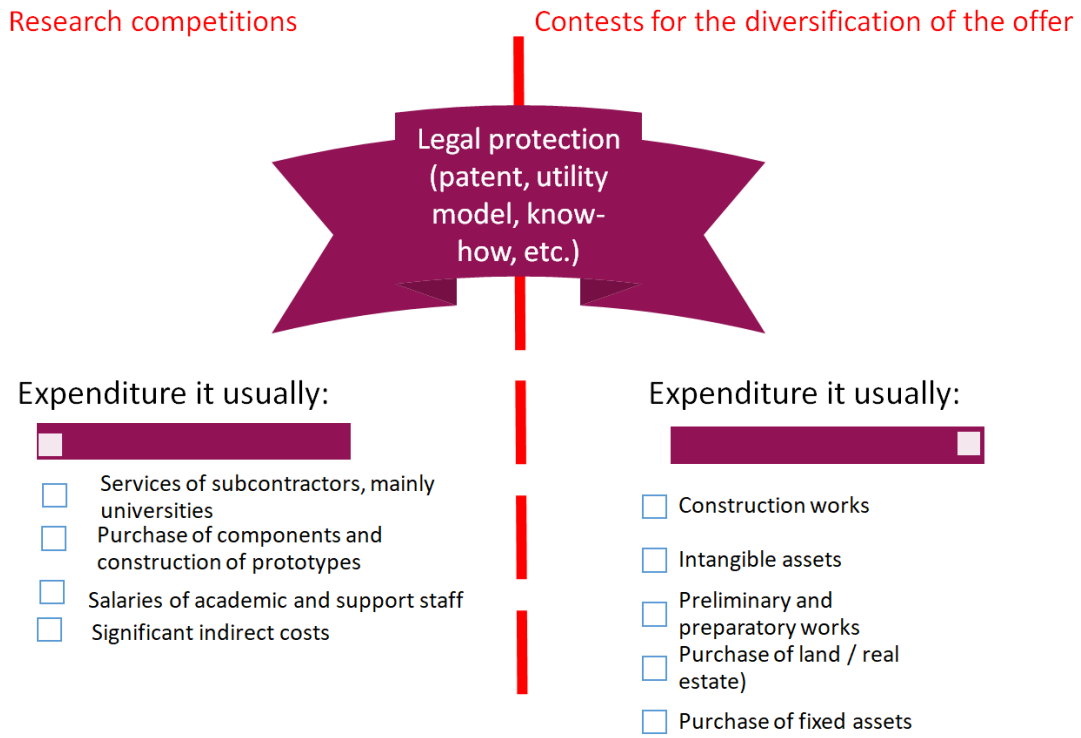

Fig. 3: Redearch comprtitions od contests for the diversification on the offer

Source: Own study

Example of RPO application documentation

In the ROP 1.6.2 application documentation, the issues of innovation should be addressed in points:
a) application for funding:

C.3 Compliance of the project with the objective of the measure/sub-measure of the ROP JPC for 2014-2020

The compliance of the project with the objective of the measure/submeasure indicated in the MPC ROP for 2014-2020 should be demonstrated.

-> Increased use of innovation in SMEs
(b) Business Plan:

B.2 Compatibility of the project with the types of projects supported under the competition*
B.3 Project innovation, including eco-innovation

C.1.1 - Support for implementation of objectives specified for Sub-measure 1.6.2, including project innovativeness

Has the applicant submitted an analysis of innovation confirming
that the undertaking which it intends to implement fits into the definition of innovation, at least on a regional scale, applied for less than 3 years?

-> it is not necessary to reattach the same documents that were
submitted with the preselection application

How do "Project Selection Criteria" score innovation, in the relevant application
for dof.?

C.1.2 - Implementation of R&D results

- The subject of the implementation has been developed by the applicant itself
and activities on legal protection are conducted - 15 points;
- The subject of implementation was developed by the applicant himself, but was not applied for in
the Patent Office - 10 points;
- The subject of the implementation was developed at the request of the applicant -5 pt.
How do "Project Selection Criteria" score innovation, in the relevant application
for dof.?

C.2.3 - Promoting eco-innovation

Does the applicant assume, within the framework of the planned project, the implementation of eco-innovation, including modern solutions enabling the reduction of operating costs through the reduction of energy consumption or more effective - 0/3 point.

How do "Project Selection Criteria" score innovation, in the relevant application
for dof.?

C.2.4 - Level of project innovation

Whether the project includes innovative product or process solutions:
- nationwide (applicable less than 3 years) - 5 points.
- worldwide (used less than 3 years) - 7 points.
No points will be allocated for non-technological innovation

How do "Project Selection Criteria" score innovation, in the relevant application
for dof.?

C.2.9 - Sustainable innovation links

It shall be assessed whether the applicant has established or maintained a relationship with the scientific body within the last 3 years:
- carried out the R&D project together with the scientific unit;
- has taken on an internship or hired highly qualified personnel.

The applicant should identify and justify the type/type of innovation and its scale.
The criteria suggest necessity:

(a) validation of innovative solutions by means of, inter alia

- of the opinion on innovation;
- an inventory of basiss/data sources on the basis of which the degree of innovative solutions applied in the project was determined (with indication of the source).
-> the basis for the statement of innovativeness cannot be based only on general advertising and writing texts. Links to unknown sites, articles from newspapers, non-technical magazines, etc.) also seem unreliable.

(b) justification of innovation by means of, inter alia
- information on which elements of the project are innovative and which are complementary;

- an analysis of what the innovation is about;
- comparison of the new offer with similar products on the market.

The applicant should identify and justify the type/type of innovation and its scale.
Is there an opinion about innovation?
It is an independent expert opinion on a given technology that the entrepreneur wants to implement in his company. Such an opinion, as required by the Ministry of Development, is proof of the application of process or product innovation in the planned investment.

The applicant should identify and justify the type/type of innovation and its scale.
Is there an opinion about innovation?

The opinion prepared includes, among others:

- the characteristics of the technology to be implemented by the company;
- determines the time it is applied in the region, in Poland
or in the world;
- declaration of impartiality and confidentiality.
The applicant should identify and justify the type/type of innovation and its scale.
Who "should" give an opinion on innovation?
- scientific unit within the meaning of Article 2, point 9, excluding letter g of the Act of 8 October 2004 on the principles of financing science (Journal of Laws of 2008 No. 169, item 1049), i.e.:
scientific unit - conducting continuous scientific research or development work, such as:
a) basic organisational units of higher education institutions within the meaning of their statutes,
(b) scientific institutions of the Polish Academy of Sciences,
(c) research and development units,
(d) international scientific institutes established under separate regulations,
(e) organisational units having the status of research and development unit,
(f) the Polish Academy of Arts and Sciences,
The applicant should identify and justify the type and type of innovation and its scale.
Who should give an opinion on innovation?
...or
- research and development centre within the meaning of the Act of 29 July 2005 on certain forms of support for innovative activity (Journal of Laws No. 179, item 1484);

- a nationwide scientific and technical association or an industrial chamber of commerce whose scope of activity is related to the investment subject to the application, which are not related to the applicant.

Conclusions

The sources and the essence of innovation make it possible to clearly outline information about the direct application of certain activities aimed at creating something new - in fact, something that will be considered new.

Many factors need to be taken into account and observed.

Innovation models have different degrees of complexity, which has a positive impact on their scope of operation. Innovation is the result of needs reported by the market or R&D activities. The models are also based on inter-organisational cooperation. In principle, the network facilitates the process of creating and introducing innovations to the market with the assumption of a certain quality, which is the basis in this particular example of operation.

In the financial perspective of the European Union for entrepreneurs, the current possibilities of obtaining support for the development of business activity in the form of grants and preferentially

interest-bearing repayable instruments, regional and national EU programmes offering support for the entrepreneurship of individual business entities.

The competitions implemented by information projects, the European Union and other entities aim to improve the quality of innovation processes, including management aspects.

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Project Control the Primary Function of Managing European Union (Eu) Projects

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Abstract

The considerations contained in the article concern project management issues with particular emphasis on the functions of the control process. The aim of the article is to diagnose control in EU project management, systematize theories constituting the genesis of control as a management function, and to synthesize the concept of control in project management. The research hypothesis is: control procedures are the factor that determines the efficiency of project management by establishing rules of operation and the implementation of corrective actions. The research method used in the research was the analysis of existing data, the so-called desk-research.

Keywords: Management, Control, EU Projects.

JEL Classification: A13, E21, G18, H23, H71, J11.

Introduction

The term control is a term that has its origin in the French and British traditions. It is derived from the words contra, meaning 'against', and roles, meaning 'role'. Initially, the name explained the activities that consisted of verification and assessment of the correctness of legal acts. Over time, both the concept and scope of control have been used more broadly and deeply.

The concept of control in the literature has many meanings and definitions, which are characterized by quite a wide variety (Gołębiewski, 2001, p. 97). It should be emphasized that the control concerns many organized forms of human activity, regardless of whether their organizer is an entity located in the structures of public administration, an economic entity or a citizen who is a private person (Kirsch, 1996, pp. 1-21)

In management sciences, controlling is one of the key management processes in an organization, in addition to planning, organizing and managing (Hejduk, 2016, pp. 33-34). Control, which is a management function, consists of checking and correcting the organization's activities to ensure that the tasks undertaken are carried out and plans are developed so that these tasks are carried out correctly. In the simplified version of the management cycle, control is its final stage. It should also be noted that control is increasingly becoming an indispensable source of information in the processes of making the right decisions at individual management stages (Bisbe, Otley, 2006, p. 710).

As a function, it closes the management cycle, while as a process it permeates and binds together all management functions (Abdel-Kader, Luther,2006, p.230). An audit is necessary to verify that the development of the organization is proceeding in a set direction, whether the organization achieves its intended goals, undertaking realistic tasks. It also allows the identification and verification of any adverse trends and changes in the organization's activities, providing the knowledge necessary for day-to-day management of the organization.

The paper deals with control, audit and controlling. Those terms are very important and similar, not identic. In the literature on the subject a control is always comparison between actual situation (as it is) and plan or internal standards or should be.

Audit compares actual situation (as it is) with widely (international) accepted standards, norms, rules (as accounting standards, auditing standards).

Controlling is more than control, it is management support system and it includes minimum of goals settings, planning, control and reporting.

The article was prepared on the basis of literature studies in the field of management, organization, planning and control of EU projects, national and European documents in this subject area. The aim of the presented work is to diagnose control in EU project management, systematize the theories constituting the genesis of control as a management function, and to synthesize the concept of control in project management.

Literature Review

The concept of control in the literature has many meanings and definitions, which are characterized by quite a wide variety (Gołębiewski, 2001, p. 97). K. Winiarska writes that "along with the formation of statehood, there was a need to exercise control over the state (Plato 427-347 B.C.) about politics (Aristotle 384-322 B.C.). The necessity of control was also noticed by the rulers citing censors or auditors, knowing that the authorities' attributes are control activities. Every power administrator must have an executive apparatus to check that his decisions are correctly made. It was realized that without control over the execution of orders, power became ineffective over time. Trusted subordinates informed the rulers about threats to sustainability and security" (Winiarska, 2010, p. 16).

Control is a process characteristic of each area of human life. It usually means comparing the actual state with the required state and determining possible deviations; checking whether something complies with applicable regulations, but also the person or institution performing the control (Morris, Jamieson, 2005, p. 5).

When analyzing the views of authors dealing with this issue, one should recall the extensive literature on the very definition of the concept of control in management. Control is a process that makes it possible to ensure compliance of real operations with those previously planned. Proper, it is extremely important and necessary for efficient operation (Snell, 199, pp. 292-327). Generally speaking, the control consists in comparing the actual state with the planned standard and it should answer the question: where are the deviations and what are their nature (Kirsch, 1996, pp. 1-21). In contrast, P. Szczepankowski claims that control is a comparison of information about what actually occurs during the implementation of the plan with estimates, budgets, programs, as well as patterns that were developed during the planning process (Szczepanowski, 2000, p. 200). Table 1 presents selected control definitions that relate to management sciences.

Table 1: Selected control definitions

AUTHOR	DEFINITION OF CONTROL
M. Ward	it consists of constantly checking to what extent the plan corresponds to reality and immediately neutralizing adversity; goal plan is usually divided into small segments, making it easier to control
J. Penc	is the function that closes the complete management process and determines the effectiveness of the organization
T. Grzeszczyk	is a routine verification operation carried out at random and irregularly to determine the actual state of the project, compare it with the intentions and plans, detect the cause of the non-compliance of the actual state with the required state, and indicate the way to repair the resulting irregularities
R. W. Griffin	is the regulation of the organization's activities. helping the organization achieve its goals more easily and making it easier to manage
K. Adamiecki	it is checking if the performance is in line with the plan, i.e. the pattern
J. Zieleniewski	is a comparison of implementations with an appropriate pattern

Generally speaking, control is a process of assessment, comparison of the actual state with the state that is required, i.e. with the pattern. Standards are norms that regulate specific activities, i.e. legal, financial, organizational, technical norms, but also limits, plans, board decisions and all determinants that are the benchmark when assessing specific phenomena, such as planned data or data means of the period taken for analysis (Osmanagić BN, Lalovac B, 2007). In the absence of such standards, the benchmark in control assessments is the specific experience and results of other entities, similar in nature and type of activity to the entities that were included in the audit. It should be remembered that in general assessments should be measurable (Sveiby, 2017). The audit process consists of the following activities (Boć, 2000, p. 364):

- checking the compliance of the status as it exists in relation to the postulated status,
- determine the scope and causes of non-compliance,,
- forwarding the results of this determination, and sometimes resulting instructions, to the controlled entity and the superior organization.

S. Kałużny notes that "the essence of control always comes down to the act of determining the existing state, comparing it with appropriate models, assessing and formulating post-control conclusions, in other words, it is an action consisting in examining the existing state of affairs, comparing facts with this, what should be and draw conclusions. Thus, the starting point for defining the concept of control - in praxeological terms, in terms of organization and management sciences - are two basic elements of human activity:

- designations - e.g. legal norms, ethical norms, procedures, so-called good practices - indicate what the activity should be like, determine the current status, being models of real activity, are also a criterion for its assessment;
- performance - in contrast to designations, the actual actions of individual persons or teams, which may constitute complete or partial implementation of designations, may also be partly or completely inconsistent with the designations; the purpose of the audit is therefore to compare performances with designations to determine their compliance and to explain the reasons for the differences found between performances and designations "(Kałużny, 2008, p. 21).

The element connecting the above definitions of control is the aspect of checking and comparing the existing state with what is actually required. The ideal of control is self-control aimed at revealing deviations from the standards, even before they arise, or in the shortest possible time, to allow correction of actions taken before they are completed (Miciuła, 2015, p. 314). To sum up, the presented review of the interpretation of the concept of control is probably not exhaustive, because this concept can be considered on many levels and from many perspectives. The purpose of the comparison can be assumed that this concept functions in three aspects of meaning (Martan, 2002, p.11):

- in a general - broad sense - as management, e.g. "such and such government exercises control over the situation in one territory or another",
- in a technical sense - narrower than the previous one - as an examination of facts, e.g. "control of river water level"
- in the organizational and legal sense - the narrowest - as a study of model and real behaviors of people, devices and causes that have been identified in terms of deviations.

Management is to a large extent controlling, i.e. setting standards for given processes and activities and constant supervision over their course (Engwall, 2003), as well as undertaking interventions when the control reveals deviations from the assumed norms (Kirsch, 1996, pp. 1-21). Control which is a management function is definitely also a source of information for the management, used to assess the actions taken by employees employed in the organization and subordinate organizational structures (Morris, Jamieson, 2005, p. 5). However, one cannot ignore the fact that it is only a supplement to the information system, whose key task is, however, to provide the management with full, reliable and accessible information enabling assessment of the current situation in the organization.

It should be clearly stated that there are no significant differences in substance between the audit and control, such as definition, purpose, authority, location, methodology of operation. This applies to both internal and external aspects. All opinions expressing statements about the significant differences between audit and control - sometimes even statements that they are opposite - are unjustified and unauthorized. As the in-depth analysis of these issues has shown, audit and control are two different words that mean one action. All the cited differences relate to secondary and tertiary issues, and therefore irrelevant.

Results of the research and analyses

The Marshal's Office The control, which is a specific type of process, aims at comparing the actual state with the postulated and determining all irregularities and passing the results in the form of conclusions and recommendations to the authorized body (Zysińska, 2007: 226). Control is a routine verification activity, carried out in a fragmented and irregular manner, but aimed at determining the actual state of a given project, comparing it with the intentions and plans, identifying the reason for the incompatibility of the existing state with the state that is required, indicating possible corrective actions, to repair existing irregularities (Meredith, 2002). The audit is usually concise and applies to representative areas, for example expenses incurred. Inspection of a representative research area allows inferences to be made regarding the population of data covered by the study (Rydzewska-Włodarczyk, 2011: 296-305). An important element of an effective project control system is how changes are made. The project is not properly managed if uncontrolled changes occur during its implementation. This situation ultimately introduces chaos, as a result of which the entire project is destabilized (Webb, 2008, p. 124). Stabryła proposed to include the organization of the control system in the following aspects (Stabryła, 2006, p. 122):

- identification of control fields,
- establishment of controlling entities,
- developing procedures with control instruments.

The areas of control are various types of objects and processes subject to examination and assessment. The basic fields include:

- "economic and financial condition of the enterprise,
- human resources management,
- manufacturing technique,
- market and marketing,
- financial policy,
- organization of the project management process "- which is the subject of this study's interest.

As mentioned earlier, the control system requires control entities (figure 1) that exercise this control based on the commercial code, statutes, organizational regulations and instructions. The control system may take an extensive form, and then precise delegation of powers becomes necessary. The system is characterized by (Stabryła, 2006, p. 123):

1) "strict division of tasks and rights among individual entities,
2) instance, treated as a subordinate of controlling entities, established in connection with a specific mode of performing research and evaluation activities,
3) mutual complementarity of control areas "

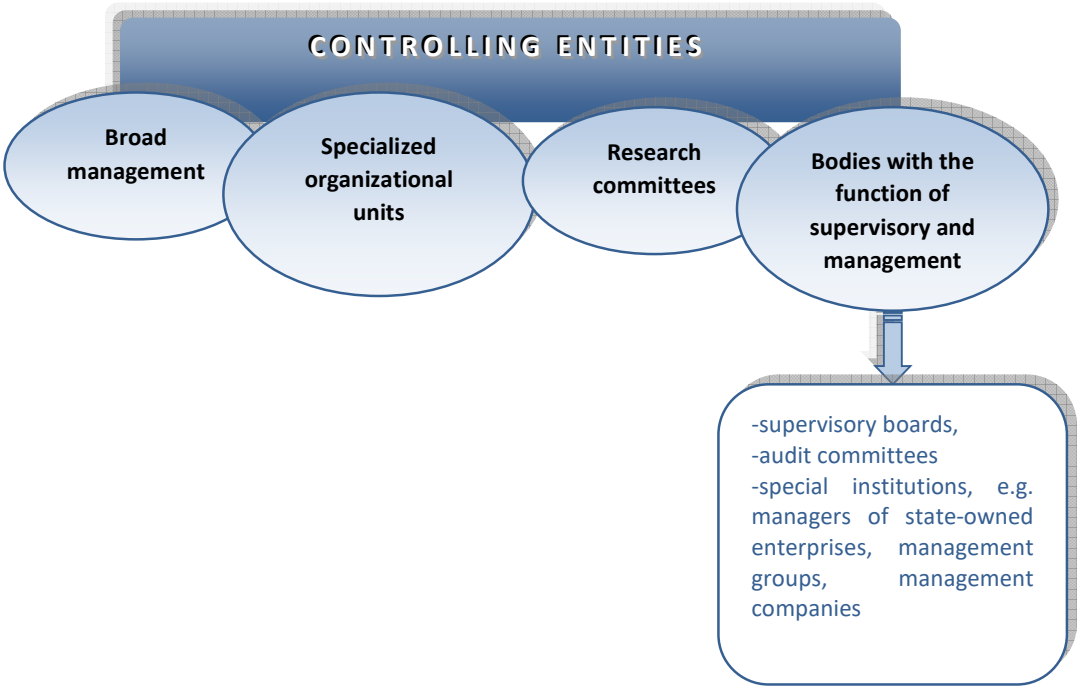

Fig. 1: Controlling entities in the control system

On the other hand, the procedures and control instruments at individual stages measure parameters, determine the deviations between the actual and planned state, possibly postulated, as well as analyze and evaluate the degree of implementation of projects that were previously assumed (Snell, 1992, pp. 292-327). In addition to the typical control, as part of the control process itself, mention should also be made of controlling, whose primary goal is to make corrections and supervise the business of the enterprise, regardless of the field in which it operates. In this process, coordination, information, planning and control activities are consolidated (Wojtaszek, Miciuła, 2019). If controlling is developed, then controlling task teams are created, which include coordinators, planners and controllers of various specialties (Stabryła, 2006, p. 125). Based on the above, the overarching task of controlling is the concentration of detached control activities into a coherent whole, which distinguishes them from control processes that are often performed by independent units of the

organization and relate to a limited area of its operation (Ostapenko et. al, 2016, p. 106). The basic differences between control and controlling are presented in figure 2.

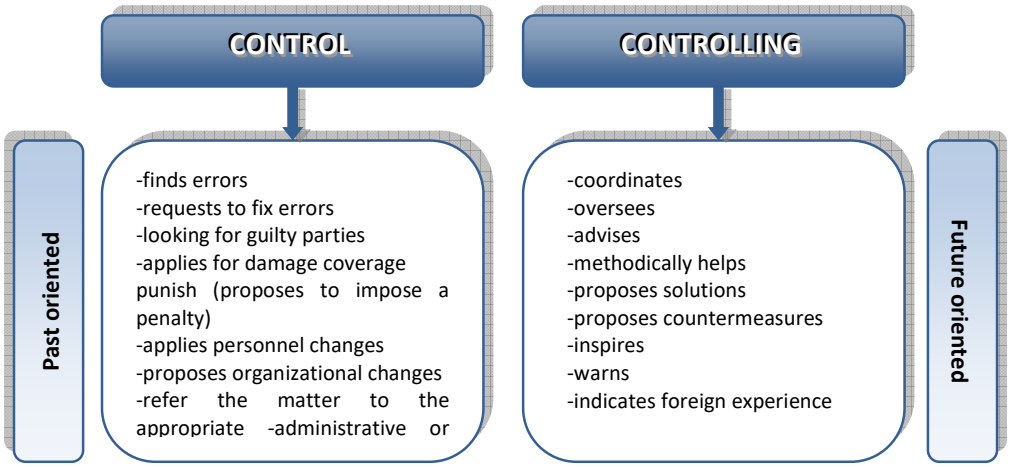

Fig. 2: Basic differences between control and controlling

In addition, when considering the concept of control in project management, it is worth extending this aspect to the type of control that is exercised in the management of European projects. The legal foundations of the operation of management and control systems for the spending of European funds can be found both in EU and Polish legislation. One of the key Polish documents that regulate the main rules for controlling the spending of EU funds are "National guidelines for the eligibility of expenditure under the Structural Funds and the Cohesion Fund in the 2007-2013 programming period". Regulations relevant from the point of view of project audits are included in the "Guidelines on the audit process as part of the responsibilities of the Operational Program Managing Authority". This document indicates the control procedures implemented by the managing authorities of a specific operational program (European Union, 2012). Considering the concept of control, taking into account EU projects, noteworthy are also such controls as: financial control, on-the-spot check or sample check. Referring to the first of the above, it is constituted by mechanisms and measures that ensure the proper operation of the process of collecting and managing European Union funds (Nowakowska-Grunt, Kabus, 2014, p. 192). It should be noted that this control also includes management control and audit. Financial control is most often carried out with an audit. The controllers' interest is primarily the contribution intended for the project implementation, taking into account the correct spending of public funds and the products and / or effects produced under it (Trocki, 2013, p. 231).

In the case of an audit, its main purpose is "to establish legal and financial regularity in the spending of European Union funds, always in relation to the functioning of a specific institution (e.g. managing, intermediate, implementing or final beneficiary. This audit process it is carried out in a group of projects in a comprehensive, regular and irregular manner, as opposed to control carried out on a random basis and covering only certain areas of the project. Audit can be carried out both during the project implementation and after its completion, i.e. up to 5-10 years after the end of the project implementation period, and the subject of his interest are "products (results), legality and economy in spending the European Union funds by a given institution". The scope of the audit covers the entire project is carried out in the institution, in which project was or is being implemented, and in the center of his interest are products (results), legality and economy in spending European Union funds by a given organization, as mentioned in the Public Finance Act. The unit being audited may be subject to internal control, which is carried out in English by internal audit, which is carried out by the organization's own employees or, which occurs more often, by external auditors. External audit, always based on formalized recommendations and standards. External auditors, i.e. auditors, have the

power to issue certificates that relate to the proper use of European Union funds. The audit is carried out in the following areas (Rydzewska-Włodarczyk, 2011):

- system audit directed towards implemented management and control systems,
- financial audit directed towards the eligibility of expenditure,
- systems and finance audit - an integrated approach that includes examining both previous aspects at the same time.

Another type of control is the so-called on-site control, which focuses on funded operations and management systems, and as the name implies, is performed at the place of project implementation. The decision on undertaking such control is made by the final Beneficiary or managing authority (Zysińska, 2007, p. 226). This control includes, among others, verification of compliance of the project implementation with its assumptions and the project co-financing agreement, in particular taking into account (Nasalski, 2014, p. 110):

- correctness of financial settlements,
- the way final beneficiaries are recruited,
- the way data about project participants are acquired, stored and processed,
- compliance of the data that is provided in the payment application in the part related to physical progress with the documentation regarding project implementation,
- the correctness of awarding public contracts, if they take place in the project,
- correctness of granting public aid,
- the way promotional activities are carried out,
- the way project documentation is kept and archived.

Another type of control is sampling, carried out on a representative group of projects approved for implementation. In the case of projects co-financed from EU funds, the key role is played by inspections carried out by the Managing Authority (MA). They take the form of systemic control and expenditure verification (figure 3).

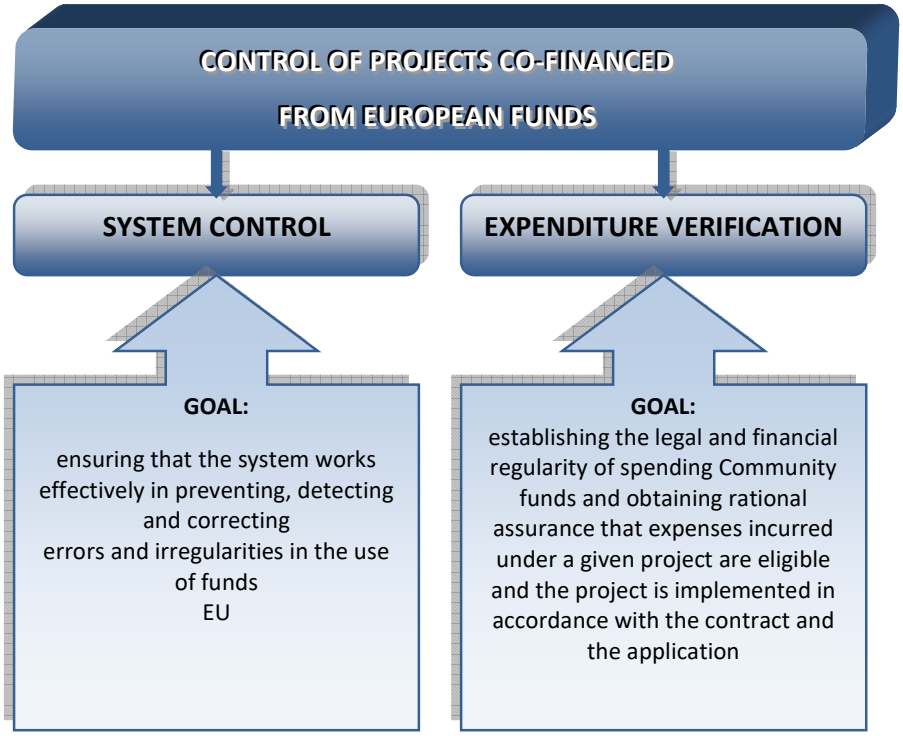

Fig 3. System control and expenditure verification

The system audit is aimed at assessing the efficiency of the management system as well as the functioning of the specific operational program. The purpose of this check is to check the correctness of the control procedures and activities of the institution in terms of their compliance with the law and intended results. The expenditure review is directed towards checking the correctness of project implementation and takes the form of verification and certification. The verification covers:

- supplies of goods and services that are co-financed under projects,
- compliance of spending with Community and national rules.

Due to the fact that the Polish system has a large number of institutions participating in the implementation of EU programs, expenditure verification is delegated to lower levels of management (Miciuła, 2016). In this regard, it is the managing authority that formulates the conditions for carrying out expenditure verification as well as allocates responsibilities under the management and control system.

In addition to system audits and verification of expenditure under audits of projects co-financed from EU funds, other types of audits take place, namely cross-checks and ad-hoc audits. The main purpose of cross-checking is to eliminate double financing of expenses. Ad-hoc controls are carried out in situations where there is a suspicion of occurrence (Kirsch, 1996, pp. 1-21):

- a key institution that is involved in the implementation system - this refers to system audits,
- serious irregularities in the spending of funds by the Beneficiary - this refers to the verification of expenditure.

Reconciliation of the facts is an extremely important task of the audit procedure. It is equally important to carefully document and evaluate the audited activities. To sum up, control is a routine activity involving familiarizing yourself with the project plan, checking the current stage of project implementation, and then drawing and comparing conclusions from both observations. The main purpose of the control is to block the derailment of the project by constantly supervising its progress. Effective control is the ability to read relevant information about the implementation of the project in specific situations and conditions, and developing a management efficiency methodology will allow identifying areas of change in EU projects in relation to control as one of the management functions.
The delay in the implementation of a task identified during the audit allows the manager to make early decisions about the location of resources in the right areas to make up for lost time (Farme, 2001, p. 150). Control in the project also creates the possibility of supervision over the quality of tasks and the project budget.

Summary

One of the overarching goals of proper management of EU projects is to create mechanisms to control spending that effectively reduces the scale of errors or irregularities. With regard to funds from both EU funds, the highest degree of responsibility, related to project control issues, is attributed to EU Member States, and above all to institutions responsible for implementing programs and initiatives subsidized from EU funds. It is the responsibility of each Member State to develop appropriate project control procedures that will not only allow effective identification of irregularities before making payments from public funds, but will also provide assistance to Beneficiaries in implementing projects. In connection with the above, in order to counteract undesirable actions on the part of beneficiaries, many regulations were introduced in the scope of project control, allowing to minimize the level of fraud and irregularities. The research conducted by the authors of the dissertation shows that the control process is an indispensable element of management and implementation of the rich offer of EU projects. Completed studies, based on theoretical analysis, emphasize in particular the importance of conducting systematic audits of EU projects so that the audit process is efficient and effective, while contributing to the improvement of the position of controlling institutions.

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Implications of Job Satisfaction on the Turnover of Workers in Information, Communication and Electronic Technologies Sector

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Abstract

Worker retention is one of the challenges faced by firms in any industry. Since the performance of any business unit depends on its employees, the ability to retain qualified labour contributes significantly to the success of the business. This study explores how job satisfaction influences workers' turnover and retention in firms operating in the Information, Communication and Electronic Technologies (ICET) sector. This research is relevant because mobility and the difficulty in retaining employees in the ICET sector is a reality. A descriptive approach was adopted, and data were collected from firms in a technological cluster in Aveiro, Portugal, using a structured survey, sent by email. A total of 100 respondents were included in this study. The results reveal that workers seem to be not very satisfied with the financial rewards, which may have an impact on employee retention and turnover. Moreover, women are generally more satisfied compared to men, in their current jobs.

Keywords: Job Satisfaction, Worker Retention, Employee Turnover, ICET sector.

Introduction

Human resources management would be much easier if everyone were the same. However, each individual is very different due to personal characteristics and their background (the way in which they were brought up). Some people also consider gender, race or disability as factors that affect people's behaviour at workplace, although holding this view readily leads to discrimination. In addition, there will be differences in ability, intelligence and personality (Armstrong and Taylor, 2014; Krabel and Flöther, 2014).

Employee turnover may be defined as the rate at which people leave an organization (Armstrong and Taylor, 2014). Worker turnover has been one of the most widely investigated organizational phenomenon (Hom, Griffeth and Sellaro, 1984). The turnover of a talented employee constitutes the loss of a valued resource and has implications on firm costs such as recruitment, training and general administration that subsequently hinder companies' growth and success (Agyeman and Ponniah, 2014).

Numerous studies addressing the workforce in the field of Information Technology (IT) have looked at intentions to turnover as a result of job satisfaction (Carayon et al., 2006). Job satisfaction may be defined as the attitudes and feelings that people have towards their work (Armstrong and Taylor, 2014).

Some research points out that micro, small and medium-sized enterprises (MSMEs) have been an essential instrument for growth and economic development in developed and developing economies.

However, labour turnover has had a greater impact on the survival of firms on those dimensions (Agyeman and Ponniah, 2014). Notably, employee retention and commitment in Information, Communication and Electronic Technologies (ICET) MSMEs must be a matter of concern for employers because "employee mobility" is very common in this sector (Scholarios *et al.*, 2008).

Various studies (Holbeche, 1998; Anitha, 2014) on the factors that help the retention and motivation of highly qualified workers include providing career development opportunities, challenges and achievements, mentors, self-assessment and realistic feedback.

Technology employees are among the most sought-after professionals in the world, which causes high turnover. The study by Booz (2018) shows that the problem of retaining talent in technology is the high demand of these workers and the increase in remunerations in the sector, because as employers and offers become more competitive and attractive, the main talents would want to seize new opportunities.

This study aims to contribute to understand the perception of workers in the ICET sector regarding the satisfaction they feel in their current jobs and the impact it has on the willingness of quitting their jobs (possibility of turnover). To this end the study explores the answers to the questions: "How satisfied are you with your current job?", "How often do you think about quitting your job?" and "How many jobs have you had in the past 5 years?". In addition, the study is relevant because it identifies the factors that human resources management should improve and give more attention so that they are able to increase the retention of their employees and reduce the turnover of labour in the firms of this sector.

Literature Review

A literature Review was conducted as a preliminary step to support the empirical study aiming to identify variables that have identified in previous studies as being determinants for employee turnover.

Upfront, a set of demographic characteristics are often mentioned, according to the literature review, including gender, age, qualification (Agyeman and Ponniah, 2014), district (Biagi et al., 2018), and type of occupation (SamGnanakkan, 2010). These were mentioned in past research as the ones with stronger impacts on retention and turnover of employees.

Proxy Variables for Job Satisfaction

Satisfaction has been advanced as the major determinant of employees' turnover (Freeman, 1978; Mudor and Tooksoon, 2011) the variables adopted for the purpose of this study were:

Table 1 : Proxy Variables for Job Satisfaction

1. Financial and non-financial rewards	• Compensation (Financial rewards) • Benefits (Financial rewards) • Work-life balance (Non-financial rewards) • Performance management and recognition (Non-financial rewards) • Development and career opportunities (Non-financial rewards)
2. Organizational related variables	• Corporate image • Role of the organization in society
3. Working Conditions	• Work environment • Flexible working • Possibility to combine work with issues related to health • Functional flexibility • Remote working • Equal treatment in the organization

4. Management System	• Management skills to communicate and lead • Performance evaluation system • Supervision support (mentoring)
5. Motivation	• Education and training • Working methods • Internal communication • Challenge • Teamwork
6. Supporting infrastructures	• Pub • Job infrastructure • Canteen

Financial and Non-Financial Rewards

Financial rewards are a job-based pay, which provides pay related to the value of the job, and person-based pay, so it is reward that recognize the individual's contribution. They may also include employee benefits and pensions and financial recognition schemes (Armstrong and Taylor, 2014). Bussin and Brigman (2019) consider compensation and benefits as variables of financial rewards.

Non-financial rewards: focus on the needs people have for different types of recognition, achievement, personal growth and acceptable working conditions. They include the non-financial recognition of achievements, the design of fulfilling jobs, giving people the scope to develop their skills and careers and offering a work environment that provides a high quality of working life and an appropriate relationship between work and private life (work–life balance). Non-financial rewards can be extrinsic, such as praise or recognition, or intrinsic, associated with job challenge and interest and feelings that the work is worthwhile (Armstrong and Taylor, 2014). Bussin and Brigman (2019) account the following variables of non-financial rewards: work-life balance, performance management and recognition and development and career opportunities.

Organizational Related Variables

Corporate image is the immediate mental picture that audiences have of an organization (Gray and Balmer, 1998). Riordan, Gatewood and Bill (1997) found that employee's perceptions of corporate image can positively influence job satisfaction, and negatively influence turnover and turnover intentions through strengthening their identification with the organization.

Role of the organization in society: Wood (1991:695) stated that 'The basic idea of corporate social responsibility is that business and society are interwoven rather than distinct entities; therefore, society has certain expectations for appropriate business behaviour and outcomes.'

Working Conditions

Work environment: Increasing organizational engagement through the work environment means developing a culture that encourages positive attitudes to work, promoting interest and excitement in the jobs people do, reducing stress and recognizing the importance of social interaction (Armstrong and Taylor, 2014). Whilst some workers might be happy to accept a poor working environment in exchange for higher pay, the reality is that this choice is not binary and poor working environments rarely result in higher wage (Taylor et al., 2017).

The work environment comprises the design of jobs, working conditions and the ways in which people are treated at work by their managers and co-workers as well as the work system. Work design is closely associated with organization and job design in that the latter is conducted within the context of the system of work and the work environment (Armstrong and Taylor, 2014).

Flexible working: is a pattern of working practice or working hours that deviates from the standard or normal arrangement. The aim is to provide for greater operational flexibility, improve the use of employees' skills and capacities, increase productivity and reduce employment costs. Flexible working has become increasingly important as a means of enhancing operational effectiveness. Flexible working means reconsidering traditional employment patterns. This could include operational flexibility, multiskilling, the use of subcontracting and outsourcing, or introducing working arrangements such as flexible hours, job sharing and remote working (Armstrong & Taylor, 2014; Carayon et al., 2006).

Possibility to combine work with issues related to health: while having employment is itself vital to people's health and well-being, the quality of people's work is also a major factor in helping people to stay healthy and happy, something which benefits them and serves the wider public interest (Taylor *et al.*, 2017).

Functional flexibility: so that employees can be redeployed quickly and smoothly between activities and tasks. It may require multiskilling – workers who possess and can apply a number of skills, for example, both mechanical and electrical engineering, or multitasking – workers who carry out a number of different tasks in a work team (Armstrong and Taylor, 2014; Van der Heijde *et al.*, 2018).

Remote working: allows employees to work from home or away from their normal workplace on an occasional basis (Armstrong and Taylor, 2014). The study of Fonner and Roloff (2010) provides initial evidence that teleworking the majority of the time allows employees to filter out some of the distracting and stressful aspects of the workplace and in turn experience greater job satisfaction.

Management System

Management skills to communicate and lead: Communication is the process by which information is transmitted from one person to another and it is also the way of relating to other people through ideas, facts and values. Communication is the process that brings people together to share feelings and knowledge, and that includes transactions between them (Chiavenato, 2009). Leadership is the capacity to inspire individuals to give of their best to achieve results and to maintain effective relationships with people and the team (Armstrong & Taylor, 2014).

Performance evaluation system: Performance management processes can be used to define individual goals and responsibilities, offer feedback on performance and provide the basis for developing skills and planning career development. Although the organization can create a performance management system, its effectiveness will depend on the interest and competence of line managers (SamGnanakkan, 2010; Armstrong and Taylor, 2014).

Supervision support (mentoring)**:** Organizations largely function by means of managers and supervisors who exercise leadership in order to get their teams into action and ensure that they achieve the results expected of them (Armstrong and Taylor, 2014; Taylor *et al.*, 2017). Supervisory support is positively related to employee engagement as is involvement in decision making and day-to-day control over tasks and schedules (Hakanen, Bakker and Schaufeli, 2006; Agyeman and Ponniah, 2014).

Motivation

Motivation is enhanced by leadership, which sets the direction, encourages and stimulates achievement and provides support to employees in their efforts to reach goals and improve their performance generally (Armstrong and Taylor, 2014). IT professionals are knowledge workers who may have personal knowledge transformed by the firms into shared social knowledge. The knowledge workers, described by the motivation and capacity to co-create new insights and capability to communicate, coach and facilitate new ideas, are seen as less loyal to their current employers (Korsakienė et al., 2014).

Education and training**:** As stated by Ehrenberg and Smith (2012: 278) human capital theory indicates that: 'The knowledge and skills a worker has – which comes from education and training, including the training that experience brings – generate productive capital'.

Teamwork: The ability to work cooperatively and flexibly with other members of the team with a full understanding of the role to be played as a team member (Armstrong and Taylor, 2014). The work team, especially at the informal level, has great significance for feelings of satisfaction, and the dynamics of such teams have a powerful effect on the behaviour of their members (Armstrong and Taylor, 2014; Hassan, Juhdi and Ali, 2019).

Working methods: A self-managing team enlarges individual jobs to include a wider range of operative skills (multiskilling); decides on methods of work and the planning, scheduling and control of work; distributes tasks itself among its members; and monitors its own performance, taking corrective action when required (Armstrong and Taylor, 2014)**.**

Internal communication: The communications processes used in organizations have a marked effect on how it functions, especially if they take place through the network. E-mails encourage the instant flow of information (and sometimes produce information overload) but may inhibit face-to-face interactions, which are often the best ways of doing things (SamGnanakkan, 2010; Agyeman and Ponniah, 2014; Armstrong and Taylor, 2014).

Challenge: takes place when the scope of jobs is broad, job responsibility is high and there is a high workload. It enhances engagement because it creates potential for accomplishment and personal growth (Calisir, Gumussoy and Iskin, 2011; Armstrong and Taylor, 2014).

Supporting Infrastructures

Job infrastructure: workplace arrangements that equip workers with the proper abilities to do their jobs, provide them with the means to do their jobs, and give them the motivation to do their jobs. These practices must be combined to produce their proper effects (Armstrong and Taylor, 2014; Biagi *et al.*, 2018).

Employee welfare facilities in the organization has impact on the behavior of the employees as well as on the productivity of the organization. The management should provide required good facilities to all employees, as canteen and pub, in such way that employees become satisfied and they work harder and more efficiently and more effectively (Srinivas, 2013).

Methodology and Data

The study builds on data collected from companies in the ICET sector belonging to a technological cluster in the region of Aveiro, Portugal, using a structured questionnaire online and sent by email to 75 executive managers, requesting that they ask employees to fill it. To measure job satisfaction, respondents were asked to classify their degree of satisfaction towards the following aspects in their organization: financial and non-financial rewards, organization, working conditions, management system, motivation and, finally, support infrastructure. The unipolar Likert scale of 5 points was used: 1 - not at all satisfied, 2 - slightly satisfied, 3 - moderately satisfied, 4 - very satisfied and 5 - extremely satisfied. The question "How often do you think about quitting your job" had the scale 1 (never), 2 (rarely), 3 (sometimes), 4 (often) and 5 (always) (Vagias, 2006).

In order to investigate if there is a significant difference in the preferences of ICET sector workers to remain in the organization based on the number of years working for the respective company, two questions in the survey were asked, as Bussin and Brigman (2019): "How long have you been working for this company?" and "How long do you plan to keep working at this company?". To measure turnover in the last 5 years, respondents are asked: "How many jobs did you have before the current one, in the same area? (consider the last 5 years)".

Our research follows Calisir, Gumussoy and Iskin (2011) hypothesis: 'Job satisfaction will negatively influence the intention to leave among Information Technology professionals'. Two questions in the survey will allow it: “How satisfied are you overall with your current job?” and “How often do you think about quitting your current job?”.

The data were analysed trough descriptive statistics, comparisons between groups considering demographic factors of the individuals and a Pearson correlation. Version 26 of the Statistical Package for the Social Sciences (SPSS) IT software was used to meet the necessary requests regarding data analysis.

Descriptive Data Analysis

The 40 managers of ICET companies associated with the Aveiro technological cluster were contacted by email to send the survey to their employees (about 2000 workers from 40 companies). The collected sample consists of 100 workers from companies in the ICET sector, of which 69 are men and 31 are women. Most respondents are between 25 and 44 years old. 92% of respondents live in the district of Aveiro. From the total 58% of workers have 5 years of service or less and 42% have more than 5 years. Most respondents have a degree (68%), 7% are senior technicians (post-secondary education) and 25% have no degree (figure 1).

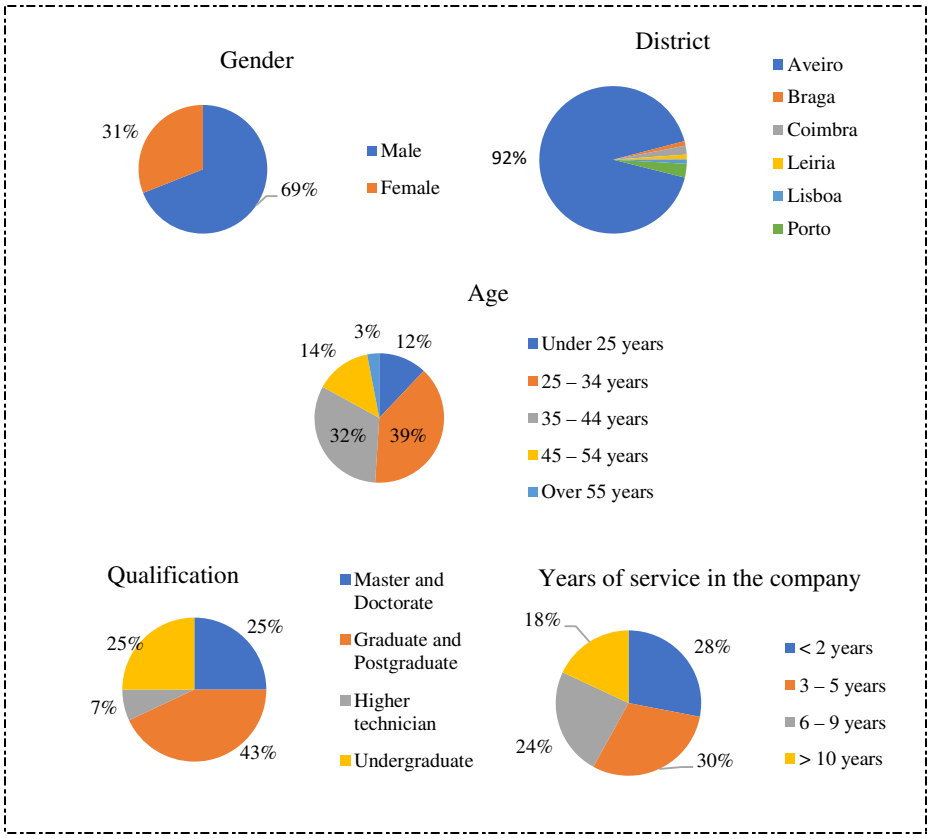

Figure 1 : Characteristics of the Respondents (N=100)

In our sample there are workers from firms of very different dimensions: 40% of workers work in large companies, 28% work in small companies and with smaller percentages are workers in small and medium-sized companies (19% and 13% respectively). Regarding the age of firms 45% of the workers work in companies over 22 years old, 21% work in companies aged between 7 and 14 years old (Table 3). It should be noted that most of the companies contacted are small size (<50 workers).

Table 2: Classification of companies where employees perform their work

	Labels	%
Size of enterprises	Micro enterprise (< 10 company employees)	19
	Small enterprise (<50 company employees)	28
	Medium enterprise (<250 company employees)	13
	Great enterprise (>250 company employees)	40
Age of enterprises	< 7 years	15
	7 – 14 years	21
	15 – 22 years	19
	> 22 years	45

Results and Discussion

Gender and Job Satisfaction

Overall, respondents reveal that they are more satisfied with non-financial rewards (work-life balance, performance recognition and development and career opportunities) than with financial rewards (remuneration and benefits). There are differences in responses between the two genders: women are more satisfied, on average, with all aspects of financial and non-financial rewards (figure 2).

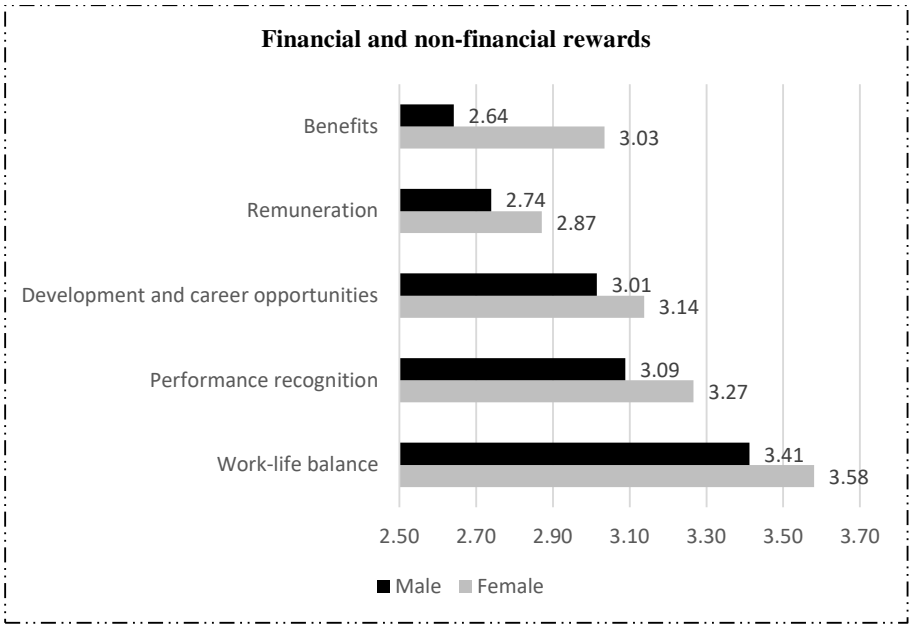

Figure 2 : Gender and financial and non-financial rewards

On average, respondents are satisfied with the corporate image and the role of the organization in society, however, it is evident in figure 3 that this satisfaction is higher in the female gender.

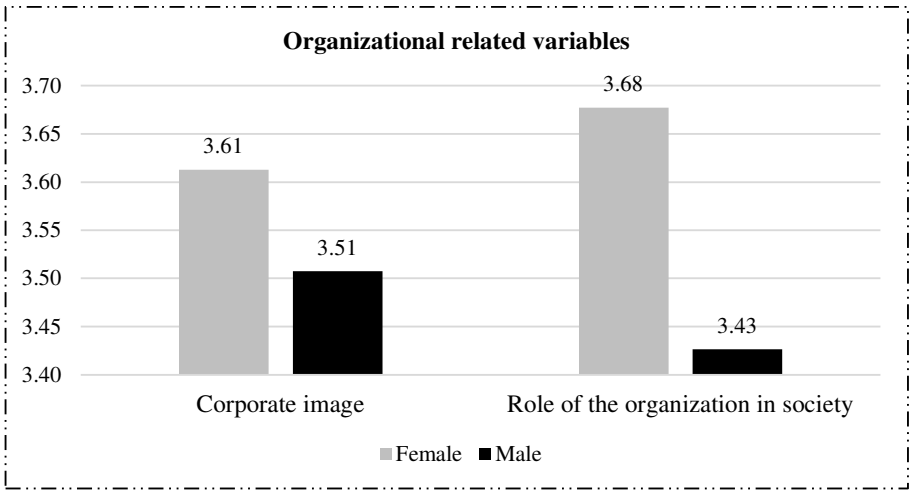

Figure 3 : Gender and characteristics of the organization

The female gender classifies better all aspects related to working conditions, that is, they are satisfied with remote work (M = 3.88), functional flexibility (M = 3.90), equal treatment in the organization (M = 3.84), work environment (M = 4.23), flexible schedules (M = 4.29) and the possibility of combining work with issues health-related (M = 4.48). Men are not very satisfied with remote work (M = 2.86) (figure 4).

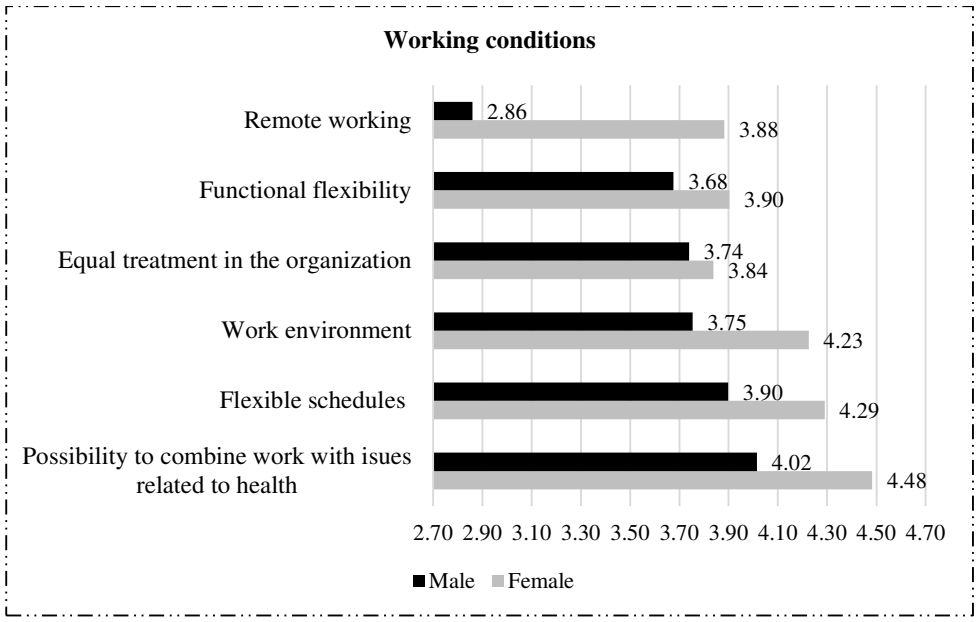

Figure 4 : Gender and working conditions

As exhibited in figure 5, male respondents expressed low satisfaction with the performance evaluation system (M = 2.90) compared to the female (M = 3.27), that is, they are not satisfied with the way they are assessed, being this an aspect that deserves special attention by firms in the future. On average, respondents are satisfied with management's ability to communicate and lead and with the support of supervision.

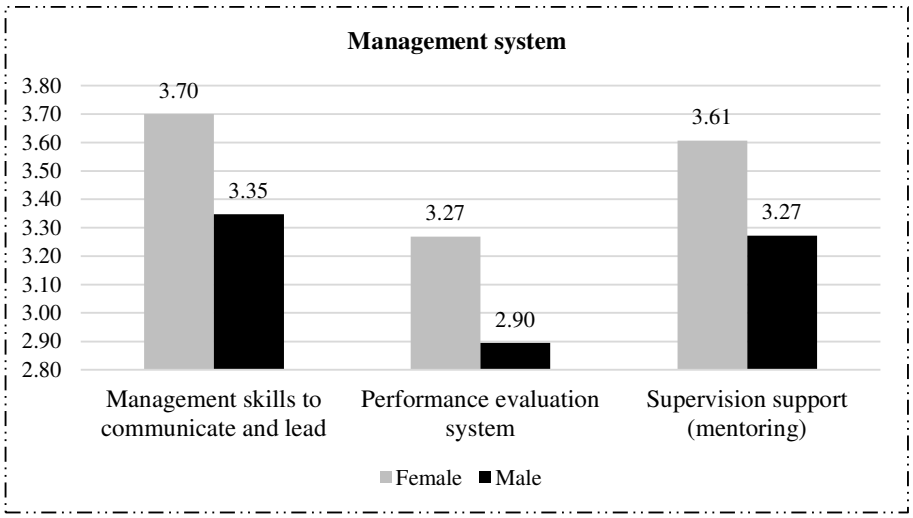

Figure 5 : Gender and management system

The work team is the aspect recognized by the of ICET workers, with the best degree of satisfaction, contributing to the motivation felt in companies. Men are more satisfied with the challenge of their tasks (M = 3.40) than women (M = 3.34). In figure 6, a great difference between genders is visible in two aspects: Education/Training and working methods, Men seem to be less satisfied than women, therefore, these aspects must be improved in order to increase satisfaction and, therefore, retention on male workers.

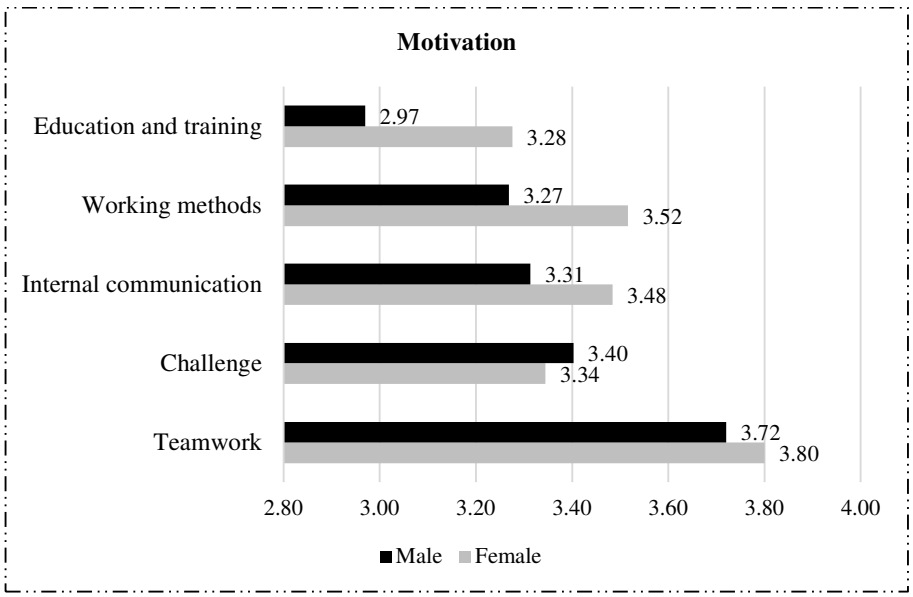

Figure 6: Gender and motivation

Finally, women are more satisfied with the support infrastructures, that is, with the job infrastructure (M = 4.10), canteen (M = 4.17) and pub (4.10). These infrastructures are relevant to the well-being of workers (figure 7).

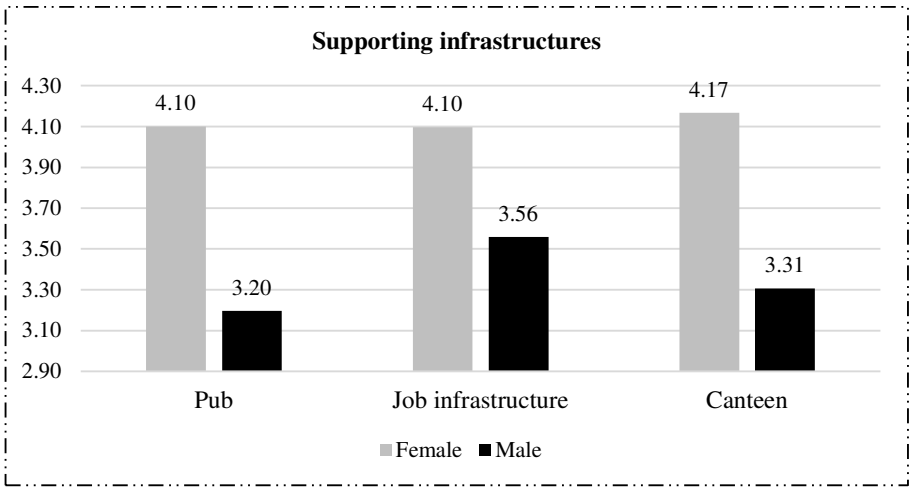

Figure 7: Gender and supporting infrastructures

Qualification and Job Satisfaction

It is visible in figure 8 that non-graduates are more satisfied (M=3,54) with their current job than graduates/post-graduates (M=3,26), higher technicians (M=3,14) and masters/doctorates (M=3,31).

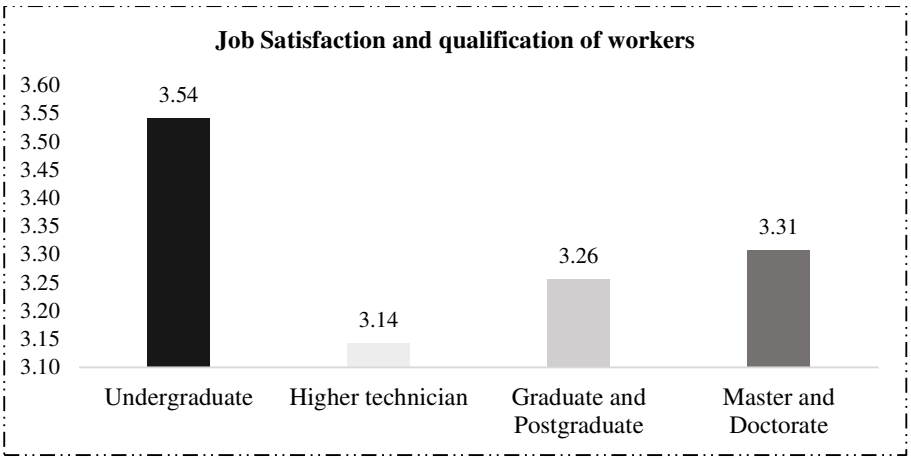

Figure 8 : Job Satisfaction and Qualification of workers

Years of service in the firm and Intention of quitting their job

Figure 9 shows that workers with 3 to 9 years of service in current companies think more often about leaving their jobs than workers with less than 2 years of service (M = 2.07) or with more than 10 years of service (M = 2.10) that rarely think about this.

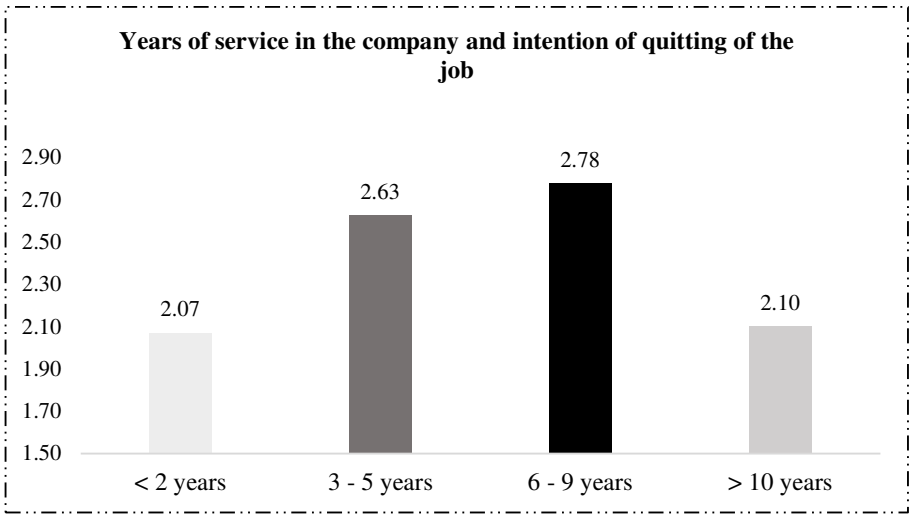

Figure 9: Years of service in the company and Intention of quitting of the job

Age and Turnover of the employees in the last 5 years

To the question "How many jobs did you have before the current one, in the same area? (consider the last 5 years) "the graph in figure 10 shows that the most mobile group is the one that is over 55 years old (they had, on average, 1.33 jobs in the last 5 years, in the same area) and the less mobile is the one who is less than 25 years old (they had, on average, 0.17 jobs in the last 5 years, in the same area). There is also a growing tendency for mobility to increase with age.

Figure 10 : Age and Turnover in the last 5 years

Significant Correlations

Concerning the appreciation of the current job, two different parameters were evaluated - "Satisfaction with current job" and "How often do you think about quitting your job". A Pearson correlation test was performed to measure the existence of a linear correlation between these two parameters (table 3). Through this correlation, we have the intensity of a linear relationship between two datasets (Pallant, 2007).

There is a significant negative correlation that indicates a moderate correlation between these two variables, that is, if job satisfaction increases, then the intention to quit a company decreases (r = 0.543) which is in accordance with the literature and the sense common.

Table 3 : Correlations between job satisfaction and thinking about quitting your job

Correlations			
		Job satisfaction	Think about quitting your job
Job satisfaction	Pearson Correlation	1	-.543**
	Sig. (2-tailed)		.000
	N	100	100
**. *Correlation is significant at the 0.01 level (2-tailed).*			

Conclusions

The review of the literature identified that Human Resource (HR) practices are the most important and valuable means for employee retention in any organization. The retention factors are strongly associated to different demographic characteristics of gender, age, qualification, and years of service.

The sample of this study showed that both men and women seem to be not very satisfied with the financial rewards: wage and benefits/premiums. In this way, workers may be tempted to take advantage of better paid employment opportunities. Managers must act quickly. On the other hand, respondents are moderately satisfied with the non-financial rewards.

In relation to the satisfaction of other aspects: organization, motivation, working conditions, management system and support infrastructures, the women revealed to be more satisfied that men, except for the challenge variable and men seem to feel challenged in their jobs.

Non-graduates in the sample are more satisfied with their current jobs than graduates. Highly qualified workers tend to be more demanding and managers must find strategies to retain them, improving for example the rewards that have proved low for these individuals. On average, workers with 3 to 9 years of service often think about quitting their jobs.

HR managers struggle to retain their qualified ICET employees due to a general shortage of brilliant candidates. According to the findings of the current study, HR executives and ICET executives must work together to build more supportive organizational climate in order to foster retention and recruitment. Thus, reducing ICET professionals' turnover intentions is very crucial for key employee retention as a strategic human resource management activity.

Limitations and Recommendations for Future Research

This study had the limitation of some employers thinking that the questionnaire would make workers reflect on mobility and turnover and could lead them to a future departure from companies and, therefore, they did not share it with their employees. The request made by email to employers to share the questionnaire link with their workers proved to be an inefficient method. There was a low response rate (5%) on the part of the employees of the member companies of the technological cluster.

Increasing the number of responses is a challenge to make the study results more valid. A method that seems to be more efficient than email is a face-to-face visit to firms and their workers, explaining the aim of the study.

Acknowledgment

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Supplier Selection Model Based on the Multi-Criteria Decision-Making Method and Implementation of the 5W2H Method to Reduce the Order-to-Delivery Lead Time in Manufacturing SMEs

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Abstract

Currently, Peruvian manufacturing companies have had an increase of 3.7% over the previous year, that is, 16.5% of the national GDP, whereas manufacturing SMEs have been reduced by 8.4% so far this year. Thus, we proposed a logistics enterprise architecture model aimed at reducing the supplier lead time through a multi-criteria decision-making (MCDM) method for supplier selection. This helps to make strategic decisions together with the suppliers and thus provides a better service to the end customer. We validated the model in a real case where we achieved a reduction of 48.8% in the total supplier lead time and an increase of 27.47% in perfect order fulfillment according to the specifications.

Keywords: Logistics, Manufacturing, Suppliers, Delivery Delay

Introduction

Today's business environment is increasingly influenced by international competitors, demanding customers, rapid technological change, and shorter product life cycles. Thus, several companies have decided to focus on their core competencies and outsource to suppliers, such that the supplier's value-added share has increased from 50% to 70% in several industries. However, 7 out of 10 companies choose to carefully evaluate and select their suppliers, which then become strategic suppliers. Additionally, some companies have begun to strategically enhance their suppliers' capabilities and, thereby, their supply base competitiveness through knowledge transfer or buyer involvement (García, 2013) (Gil, 2018) (Concha, 2000).

Purchasing plays an important role in process development and/or improvement in manufacturing companies and, to a lesser extent, in manufacturing organizations. Several authors agree that strategic suppliers enable organizations to work more effectively and efficiently. Suppliers help companies to improve product quality, decrease product development costs, and provide valuable information about their product design. However, poor supplier performance can cause losses in a company; thus, companies must analyze the current understanding of supplier development strategies and buyer–supplier relationship approaches for improvement. Furthermore, there is an increased need for buyers and suppliers to strategically collaborate to build a stronger long-term relationship (Concha, 2000)

(Torres, 2012) (Paul, 2011). Some authors and many case studies on supplier selection have focused on long-term supplier-customer operations.

However, because of the large number of suppliers and limited resources for supplier development, not all suppliers in the supply base can be improved; this generates a problem in supplier selection and development. Thus, we propose a logistics management model that addresses the sales and supplier departments based on supplier selection using a MCDM method. In addition, the 5W2H tool is proposed for the analysis of problems in the luminaire company under study. This method consists of asking seven questions about a problem to determine its root cause. Its name comes from the initials of each English word corresponding to the questions "What," "Why," "When," "Where," "Who," "How," and "How much." It is a comprehensive tool intended to determine all the aspects of a problem to have a broader view thereof and improve our actions.

State of the Art

Supplier Selection

Many of the scientific articles on supplier selection discuss the problems faced by companies; thus, they seek to improve supplier development to achieve more effective communication with suppliers. Furthermore, these suppliers present better potential for establishing a supplier–buyer relationship and aligning with the buyer's development and cordiality efforts in the post-selection stage (Amin, 2015) (Vieri, 2018). However, Fernandez (2011) argue that effective supplier development positively impacts the buyer–supplier relationship, improving long-term cooperation. Finally, the Grey relational analysis method is used to develop a decision-making process that, unlike in other models, needs simple linguistic scales as input for comparison to generate possibility values in numerical figures regarding the organizational decision-making process.

Multi-Criteria Decision-Making Methodology

All the reviewed methods and procedures focus on selecting the best suppliers based on average data and supplier eligibility, using criteria such as preference, value, and efficiency among other measures to rank suppliers and decision-making. Chen (2012) and Chang (2011) include processes such as the analytic hierarchy process, analytic network process, and the Technique for order preference by similarity to ideal solution in their research methods to manage the total logistics costs, which include price, warehousing, and transport cost. The data envelopment analysis model is used to improve and compare supplier performance through a data analysis that describes a multi-attribute theory to establish optimal purchasing strategies for procurement (Kahraman, 2003) (Beikkhakhian, 2015).

To evaluate suppliers with a mixture of historical quantitative data and qualitative judgments, the causal relationship of the suppliers' factors is calculated, without any requirement for large amounts of data. Researchers have implemented these methods in industrial engineering, particularly in SCM, for decision-making in supplier selection (Junior, 2014) (Junior, 2017).

Contribution

Proposed Model

The proposed model contributes through the implementation of the 5W2H methodology to the analysis and management of logistics area planning. Likewise, a MCDM method called weighted point rating system will be applied for supplier selection, contributing to the novelty of this model. As shown in Figure 1, the model consists of three components, namely, the problem diagnosis (through the 5W2H method), the improvement proposal, and the MCDM method. Each of them is briefly explained below:

5W2H: This component results from the analysis of the company's current state where the problem is identified through seven dimensions: what, why, when, where, who, how, and how much. This information is based on processes, policies, and supplier relationship management, among other components.

Improvement proposal: In this stage, the purchasing area is restructured; policies, structure, and roles are implemented; and a multifunctional management is proposed. This must be approached based on the three fundamental pillars that will be seen later.

MCDM method: This method explicitly evaluates multiple conflicting criteria in decision-making such as cost or price, which is usually one of the main criteria. At this stage, the MCDM weighted point rating system is carried out.

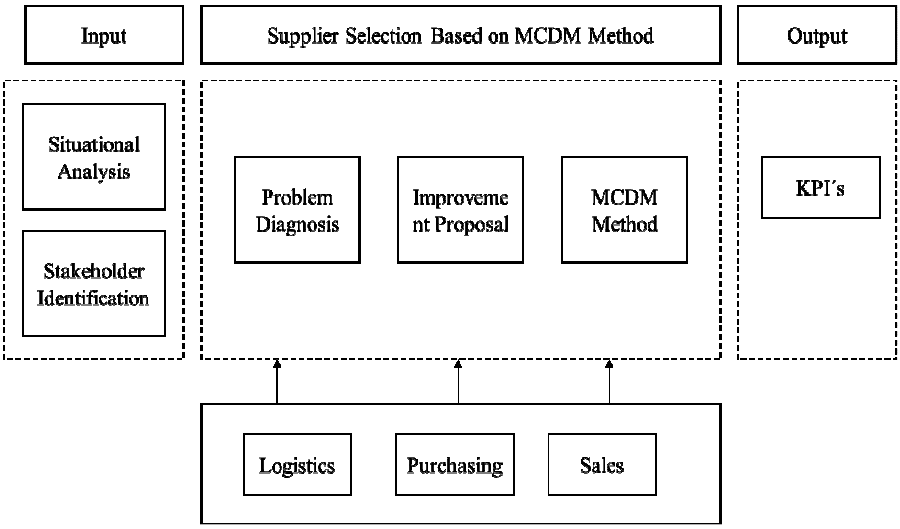

Fig. 1: Suppliers selection proposed model

Proposed Method

Figure 2 shows the implementation steps of the 5W2H method, the improvement proposal, and the MCDM method.

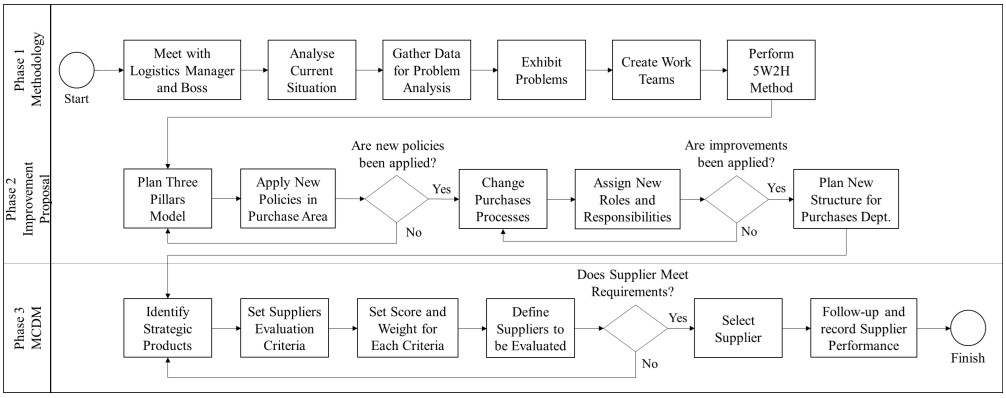

Fig. 2: 5W2H applied to the problem

Indicators

The indicators used before and after the implementation of the methodology are shown and explained below:

Delayed deliveries (Dd): Refers to the percentage of orders with late delivery over the total number of orders sent to the selected suppliers. It is calculated as follows.

$$Dd = \frac{Number\ of\ delayed\ orders}{Total\ number\ of\ orders} \times 100 \quad (1)$$

If the volume of losses found is less than 10%, it is an optimal result; 10% to 20% is a matter of concern; and more than 20% is a critical stage.

Perfect order (Pf): This indicator refers to the percentage of orders that meet all the specifications stipulated in the purchase order.

$$Pf = \frac{Toyota\ perfect\ orders\ delivered}{Total\ number\ of\ oarers} \times 100 \quad (2)$$

If the number of orders that meet specifications is greater than 95%, it is an optimal result; 70% to 95% is a matter of concern; and less than 70% is a critical stage.

Lead time (Lt): Refers to the percentage of orders with late delivery over the total number of orders sent to the selected suppliers. It is calculated as follows.

$$IRA = delivery\ due\ date - request\ date \quad (3)$$

If the number of calendar days is less than five, it is an optimal result; five to ten days is a matter of concern; and more than ten days is a critical stage.

Validation

Case Study

The supplier selection method was implemented in the Peruvian company ABC, part of the luminaire manufacturing sector. This company is dedicated to the design, manufacture, commercial management, technical advice, and after-sales service of lighting systems. However, to manufacture the products, it needs suppliers of parts for assembly or different key products. Most of its suppliers are from the Asian continent; thus, export is a key process in its logistics.

Current State

The main problems faced by the company ABC are supplier lead time delays, the lack of planning by the company's purchasing department, and the reduced supplier portfolio. Thus, they often fail to comply with commercial agreements such as order specifications, payments, and shipping time. Because of these problems, the company has experienced a significant reduction in its sales and loss of market share. Table 2 shows the initial indicator values during August 2019, which is compared to that of the case study.

Table 1: Initial Diagnosis

Indicator	Initial result
Delayed orders	57%
Perfect order fulfillment	68%
Lead time	90 days

Application of the model in case study

Phase 1: Analysis of the current state: The company's manager was made to understand that to solve the latent problem of delivery delays on the part of suppliers, a plan using the 5W2H tool must be set up. First, a meeting with the logistics area team took place, where some relevant data for implementation, validation, and control was provided. Then, the 5W2H method and the tools were developed, and we proceeded with the first part of the improvement.

Problem analysis: Problem analysis using the 5W2H method.

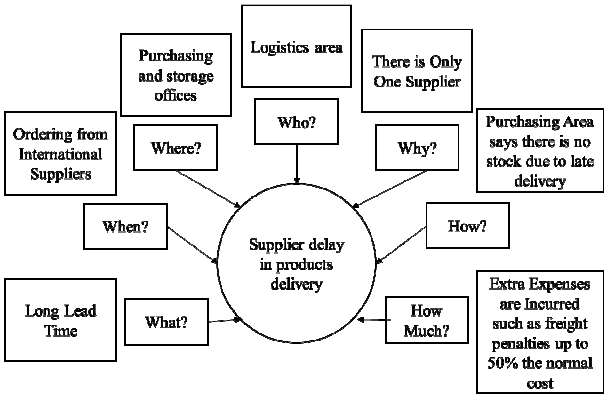

Fig. 3: 5W2H applied to the problem

5W2H: We studied supplier lead time delays using the 5W2H method by which all perspectives can be analyzed to find the root cause and to address it. Graph 5 shows that this problem begins when the sales area requests for orders and the purchase area notifies that there is no stock because of late delivery; thus, it turns out that the situation is due to the lack of suppliers

Phase 2: Implementation of the improvement proposal:
Three-pillar model: All regulations explained previously in phase 2 should be aligned to the three-pillar model.

Purchasing policy: Although these new policies are designed to improve the purchasing area, they must be aligned and must work in conjunction with the general organizational policies.

Restructuring processes in the purchasing area: The recommended purchasing process specifically focuses on the time of sending the order to the suppliers abroad and ends when the product is in ABC Company's offices.

Roles and responsibilities: We redefine the roles and responsibilities of the area's personnel to optimize work and avoid task repetition

Logistics area structure:. We build a solid structure for the area so that having established roles, there is an order and knowledge of who to report to and who to supervise

Phase 3: MCDM method: The steps of the MCDM method were as follows:

Kraljic matrix was proposed to inform the suppliers about the products that would be assessed (strategic products).

The supplier portfolio was defined through internal company information and a search for catalogs was brought in from the company's trade fairs.

The abovementioned suppliers were evaluated, taking into account the criteria and weights that our model suggests. Table 8 shows supplier evaluation.

We selected the suppliers that were in the range of 3–4 points.

Initial and post-implementation indicators

Below, we present variations in the indicators' values after the implementation of the supplier selection method through the MCDM in the luminaire company ABC SAC during August 2019.

Table 2: Kraljic Matrix Applied to the Case Study

Leveraged Items	***Strategic Items***
Classic lightbulbs	Luminaire lamp parts
Non-critical Items	***Bottleneck Items***
Office supplies	90 days

Table 3: Results Obtained from MCDM Method Applied to Suppliers

Luminaire supplier									
Criteria	***Weight***	***Supplier 1 VANMOLD***		***Supplier 2: ALDER***		***Supplier 3: VENEZINA***		***Supplier 4: MINHOU***	
		Score	***Total***	***Score***	***Total***	***Score***	***Total***	***Score***	***Total***
Price	20%	3	0.60	3	0.60	1	0.20	2	0.40
Quality	15%	4	0.60	4	0.60	3	0.45	3	0.45
Leat time	20%	3	0.60	4	0.80	3	0.60	3	0.60
Terms & conditions	15%	3	0.45	4	0.60	2	0.30	2	0.30
Supply capacity	15%	3	0.45	4	0.60	2	0.30	2	0.30
Flexibility	15%	3	0.45	4	0.60	2	0.30	2	0.30
Total	100%	19	3.15	23	3.8	13	2.15	14	2.35

Table 4: Initial Indicators vs After implementation Results

Indicators	**July 2019**	**September 2019**
Delayed deliveries (%)	57.00%	12.06%
Perfect order fulfillment (%)	68.00%	95.47%
Lead time (days)	90	46.00

As can be seen, the indicators have improved significantly. The volume of delayed deliveries decreased by 44.94%, the perfect order fulfillment increased by more than 27%, and the lead time was greatly reduced.

Conclusions

This study has led to the improvement of supplier performance in terms of the main variable: time. We identified the following conclusions.

Delayed deliveries were reduced by about 44.94%, while the lead time was reduced by more than 50% because of the correct implementation of supplier evaluation using the MCDM method.

This model contributes to the restructuring of the purchasing area to later implement supplier selection. This improvement proposal can be adapted to any company that has problems in this area.

The alternative of the MCDM method in supplier selection can be applied in any type of company because of its simplicity and flexibility; it guarantees sustainable competitive advantages over time.

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Paradoxes of Degressively Proportional Allocations

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Abstract

The crucial problem in the theory of integer proportional divisions is how to find the allocation that is both a sequence of integers and also the best approximation of the sequence of quotas of such division, i.e. a not necessarily integer sequence determined by the exact proportions. It turns out that very intuitive and natural solutions in this area lead to quite unexpected properties called paradoxes. The best-known and widely researched in the literature are the population paradox, the Alabama paradox and the new state paradox. It was proved that there is no repeatable algorithmic way to solve this problem and free from all defects. One of the streams of theoretical analysis of degressively proportional divisions relates to the methods applied in proportional allocation. As a result, one can consider the problem of existence of similar paradoxes in this case. The paper demonstrates that there exist the circumstances when any degressively proportional integer approximation leads to the occurrence of all basic paradoxes.

Keywords: Degressive Proportionality, Paradoxes of Fair Division

Introduction

The best known and most widely spread rule of allocating gains and burdens is the principle of proportional allocation stemming from Aristotle. According to this rule, all agents participating in division are either allocated some amount or a number of goods or charged with burdens proportionally to the quotient of their values to the total value of all agents. The value of one agent can be explained in a number of ways. For example, when dividing profits of companies it is the number of shares held by an agent, when assigning investment costs it is a degree to which individual investors benefit from investment, and when determining the parliamentary representation it is the population of a given election district. The problem tackles both the division of gains and burdens, but for the sake of clarity in the remainder we shall deal with the division of goods.

Formally speaking, the division $a=(a_1,a_2,...,a_n)$ of total amount $A=a_1+a_2+...+a_n$ of goods among n agents whose values are represented by the sequence $v=(v_1,v_2,...,v_n)$ is consistent with the principle of proportionality if and only if $a_i=A\cdot(v_i/V)$, where $V=v_1+v_2+...+v_n$. In a special case, when the sequence v is constant, applying the principle of proportionality results in a equal division, i.e. one with $a_1=a_2=...=a_n=A/n$.

Proportional allocation is a perfect solution of the task of goods division in the case of insignificant differences in values of the sequence v. Otherwise, its application results in the marginalization of roles played by the agents with the smallest values. This is especially noticeable when divisions are integer. It can happen specifically that the value of the quotient $a_i=A\cdot(v_i/V)$ is so small, that when integer representation is elected, the respective agent will not be allocated the divided good at all. In

many cases this solution is not viable because of other significant reasons. For example, the investment should be accomplished with the contribution of all agents or else common interest if not solidarity of all agents do not allow to exclude anyone.

In such circumstances one can attempt another solution of the allocation problem, i.e. the principle of degressive proportionality. This principle was put forward as a rule of apportionment of the seats in the European Parliament. The reason of this decision was a significant dissimilarity of populations in member states, particularly in Malta and in Germany, i.e. the least and the most populated countries in the European Union. If the sequence of populations in all countries in the community were assumed as the sequence of values v , Malta would have practically no representation in the assembly. Its calculated share is smaller than one, therefore it is allocated just one seat in the European Parliament. Aiming at the suitable position of every state in the European Union the Lisbon Treaty decided to abandon the classic rule of Aristotle with respect to degressive proportionality.

Degressively proportional allocation is a solution that reduces the right of agents with greater values to possess the goods to the benefit of agents with smaller values. The reduction is obviously in comparison with the allocations generated by the exact proportions of agents' values to the total of all values, i.e. by the quotients v_i/V . More precisely, a nondecreasing sequence $a=(a_1,a_2,...,a_n)$ is a degressively proportional allocation with respect to a nondecreasing sequence of values $v=(v_1,v_2,...,v_n)$, if and only if

$$(1) \quad \frac{a_i}{v_i} \geq \frac{a_{i+1}}{v_{i+1}} .$$

Therefore, the degressive proportionality can be interpreted as a transfer of entitlements to obtain goods expressed by the sequence v from entities with greater values to those with smaller values. The boundary of such operation is the complete equalization of entitlements and consequently, reaching the equal division.

Hence, the principle of degressively proportional division can be satisfied by many sequences a and this is the significant difference from the principle of proportional allocation. In this regard, one seeks additional conditions so as to be able to select one particular solution in practical applications. Furthermore, one also often introduces the so-called boundary conditions which define minimal and maximal values of the sequence a (Dniestrzański, Łyko, 2014a, Łyko, 2013). The boundary conditions significantly reduce the set of all possible solutions, but do not remove ambiguity of solutions.

The problem of degressively proportional integer allocation is central in the context of apportioning the seats in the European Parliament, i.e. all the terms in the sequence a are integers. Two major research streams emerged in the theoretical analysis of the problem. First, the principle is approached literally, i.e. the inequality (1) must be satisfied by the terms of the sequence a (Dniestrzański, Łyko, 2014b, Łyko, Rudek, 2013). This approach is called RDP (rounded degressive proportionality). The methods applied here include numerical methods, combinatorics and relations theory. A general idea of these methods involves finding a solution that is optimal with respect to a given additional criterion. The criterion can be specified by conditions of the order type (Cegiełka et al, 2017) or metric type (Cegiełka, Łyko, 2014). The second stream deals with the condition of degressive proportionality in its weaker variant. The inequality (1) must be satisfied before finding the integer representation. This approach is called UDP (unrounded degressive proportionality).Thus, a sequence of real numbers is indicated that is degressively proportional with respect to the given sequence of values v, and then its integer representation that does not have to satisfy the condition (1) (Cegiełka et al, 2018). The methods applied here are sourced from the theory of integer proportional divisions where a proportional allocation $a_i = A\cdot(v_i/V)$ that is not necessarily integer is approximated in a specific way by the sequence with integer terms (Cegiełka et al, 2017, Grimmett et al, 2017, Słomczyński, Życzkowski, 2012).
The choice of a specific approximation method is a major difficulty when solving proportional division problems. It turns out that the most natural and intuitive solutions involve some paradoxes.

What is more, one may prove that there is no solution to this problem that would be flawless. The choice of one particular approximation is always a compromise that agrees to some flaws and paradoxes while avoiding others. The paper proves that this problem becomes completely different in the area of degressively proportional divisions. Some examples are shown proving that when selecting an integer representation of a degressively proportional sequence, it is not possible to avoid any of basic paradoxes. Therefore, what is most important for proportional divisions, i.e. finding a concrete allocation with integer terms based on any sequence that satisfies the rule of division, is marginalized and completely insignificant in practice, since there are some cases when, regardless of the method applied, one is not able to avoid all disadvantages resulting from the occurrence of paradoxes.

Formulation of the Problem

Theoretical analyses of integer proportional divisions started in the 18th century. The interest in this problem was motivated by the event of voting for parliamentary representation. Researches were conducted at the same time in the US and in Europe (Young, 1994). In spite of different ways of reaching the conclusions by means of various methods, the inference turned out to be similar. The most important conclusions, unfortunately negative, state that there is no a method indicating, based on a sequence of quotas, an integer allocation free from unexpected and undesired features.

Formally approached, the question was about indicating an integer sequence a, which could be regarded as approximation of the so-called sequence of quotas $q_i = A \cdot (v_i / V)$, i.e. the sequence that expresses the exact proportions of shares in the allocated good. The first and most natural proposal consists in a suitable downward-rounding of the quotas and allocation of obtained numbers of goods to agents in the first step of division. If the total number of goods distributed in this way equals A, the stage concludes the allocation. Otherwise, the next stage is performed, and remaining goods are allocated by one piece to each agent, in the order of decreasing fractional parts of quotas, until the entire pool is depleted. The method is called Hamilton method or the largest remainder method.

When Hamilton method was a legally binding rule adopted to apportion the U.S. House of Representatives, it was discovered that the method is not resistant to the so-called **Alabama paradox**. The Alabama paradox refers to any case when increasing the total number of goods to be allocated, with unchanged entitlements of agents, would decrease one of the shares, compared to the case with smaller pool of available goods. The paradox was called after discovering in 1880 that for a House size of 299, Alabama would receive eight Representatives, but if the House increased to 300, Alabama's delegation would have dropped to seven. The Hamilton method is also vulnerable to the **new states paradox**. It refers to any case when increasing the number of agents entitled to goods may result in increasing the number of goods allocated to one of the old agents, compared to the case before a new agent emerged, given the same total number of goods and the same entitlements of agents.

Vulnerability of Hamilton method to paradoxes was one of the reasons why the so-called divisor methods became more popular; their authors were Jefferson, Webster, Hill, Adams and Dean. All divisor methods put forward by these authors are similarly structured as one-step procedures. Given the number of goods A and the sequence of entitlements $v = (v_1, v_2, ..., v_n)$, one seeks a coefficient a in the function of proportional allocation of the form $f(x) = ax$, with $\sum_{i=1}^{n} [f(v_i)]_r = A$, where $[\ \ ]_r$ is one of the five types of rounding adjusted to a given method. Afterward, each agent i is allocated the number of goods equal to the appropriate rounding of the value of $f(v_i)$ to the integer. The values $f(v_i)$ are called modified quotas. The term "divisor methods" originates from the algorithm that generates the allocation, as put forward by the authors of these concepts. They proposed to find a number d called a divisor and a modified quota of each agent, i.e. the quotient of the entitlements v_i and the divisor d in such a way that, after a suitable rounding of modified quotas, all available amount A of goods is allocated. Divisor methods are free of the Alabama paradox and new states paradox, nevertheless it turned out that they are flawed in such a way that generated

divisions do not satisfy the quota rule. A division is said to **satisfy the quota rule** when no agent is allocated more than its upper quota or less than its lower quota.

A requirement to satisfy the quota rule is quite natural when approximating the exact proportions represented by a sequence of quotas. It turns out however that possibly seeking additional methods of proportional allocation, different than divisor methods, which might satisfy the quota rule, does not solve the problem of paradoxes bias, since all the allocations found on the basis of meeting the quota rule are significantly flawed by vulnerability to the so-called **population paradox**. This paradox occurs when an agent whose entitlement decreased gains an extra good at the cost of an agent whose entitlement increased.

The known methods of integer approximation of quotas characterizing strictly proportional divisions are flawed by paradoxes, so one of the consequences is plenty of solutions to this problem applied in electoral systems worldwide. They reflect an approval of some flaws in favor of avoiding other shortcomings. It turns out that similar problems, to a greater degree, accompany degressively proportional allocations.

Results

Degressive proportionality is exposed to all above-mentioned paradoxes: Alabama, new states and population paradox. Moreover, in this case, in contrast to proportional allocations, there is no choice available, because regardless of possible additional restrictions imposed on the method leading to a degressively proportional allocation, a risk of flaws is unavoidable.

Example 1 (Alabama paradox for degressive proportionality)

If the entitlements of three agents have values $v_1 = 10$, $v_2 = 11$, $v_3 = 40$, then, given the total amount of the good $A = 5$, a single degressively proportional allocation is given by $a_1 = 1$, $a_2 = 1$, $a_3 = 3$. If we now increase the total number of goods by one, there is also just one degressively proportional division, given by values $v_1 = 2$, $v_2 = 2$, $v_3 = 2$. Therefore, increasing the number of goods by one unit decreases the number of goods allocated to agent 3 by one unit. Since in both cases, given $A = 5$ and $A = 6$, the set of all degressively proportional allocations includes one element, thus irrespective of adopted method to generate the allocations, the Alabama paradox is unavoidable. The values of entitlements and allocations generating the Alabama paradox are presented in table 1.

Table 1: Alabama paradox for degressive proportionality

Entitlements v_i	**Division DP for** $A = 5$	**Division DP for** $A = 6$
10	1	2
11	1	2
40	3	2

Source: own elaboration.

Example 2 (New states paradox for degressive proportionality)

Let $A = 10$ be the total amount of goods to be distributed among four agents with entitlements $v_1 = 10$, $v_2 = 30$, $v_3 = 40$, $v_4 = 40$. In that case, a single degressively proportional allocation is given by $a_1 = 1$, $a_2 = 3$, $a_3 = 3$, $a_4 = 3$. If a new agent entitled by $v_5 = 60$ joins the group, then the only degressively proportional allocation will be $a_1 = 2$, $a_2 = 2$, $a_3 = 2$, $a_4 = 2$, $a_5 = 2$. Increasing the number of agents, with the same total number of goods to be allocated, increases the number of goods allocated to the first agent compared to the previous case of four agents. Thus we deal with the new states paradox for degressively proportional allocation. The values of entitlements and allocations generating the new states paradox are presented in table 2.

Table 2: New states paradox for degressive proportionality

Entitlements v_i	Division DP for $A=10$	Entitlements v_i	Division DP for $A=10$
10	1	10	2
30	3	30	2
40	3	40	2
50	3	50	2
		60	2

Source: own elaboration.

Example 3 (Population paradox for degressive proportionality)

A total number $A=11$ of goods is to be allocated among three agents with entitlements $v_1=20$, $p_2=40$, $p_3=50$. A single degressively proportional allocation is $a_1=2$, $a_2=4$, $a_3=5$. If now the entitlements of agents increase and equal $v_1^{'}=15$, $v_2^{'}=70$, $v_3^{'}=80$, then the only degressively proportional allocation will be $a_1^{'}=3$, $a_2^{'}=4$, $a_3^{'}=5$. Agent 3 whose entitlements increased from $v_3=50$ to $v_3^{'}=80$ loses one unit of the good for the benefit of agent 1 whose entitlements decreased from $v_1=20$ to $v_1^{'}=15$. Consequently we deal with the population paradox for degressively proportional allocation. The values of entitlements and divisions generating the population paradox are presented in table 3.

Table 3: Population paradox for degressive proportionality

Entitlements v_i	Division DP for $A=11$	Entitlements $v_i^{'}$	Division DP for $A=11$
10	1	15	2
20	3	70	2
40	3	80	2

Source: own elaboration.

Conclusions

The practical applications of proportional allocation, among other difficulties, involve the choice of integer representation of the sequence of quotas. Natural schemes leading to suitable rounding may generate the mentioned paradoxes. As a consequence, adopting some solution is always a compromise that consists in avoiding some flaws at the cost of tolerating other shortcomings.

The problem looks differently in case of the rule of degressive proportionality. First, there is no uniquely determined equivalent of the sequence of quotas here, and therefore considering the allocations which satisfy the quota rule is not possible. Second, the listed paradoxes may occur independently from the rule that generates the integer representation of any degressively proportional sequence. The presented examples demonstrate such cases when every integer allocation generates all described paradoxes.

The practical consequence follows that a choice of integer approximation of a degressively proportional sequence is actually arbitrary, as every method of its creation is at risk of paradoxes. One might therefore postulate the most natural choice that was proposed as the first one in the area of proportional divisions, consisting in minimization, in standard metrics, of the distance from the sequence of quotas, i.e. the method based on the idea of Hamilton. The Hamilton method, rejected in case of proportional divisions because of the Alabama paradox, is flawed by risk of paradoxes similarly as any other method applied to degressively proportional divisions, but its intuitiveness in terms of metric properties is its remarkable strong point. This point of view is different than for

example in the proposition called Cambridge Compromise. The authors of this idea proposed rounding down as a method of integer approximation. There is no explanation of such choice in literature, so the proposition of applying Hamilton's method is in our opinion better. Our further research will focus on the problem of the importance of particular boundary conditions for the existence of paradoxes. We will try to figure out conditions such that for the set of all feasible degresivelly proportional allocations the paradoxes do not exist.

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Problems of Healthcare System in Poland And A Platform for Remote Consultation Between Primary Care Physicians and Specialist Doctors in The Light of a Qualitative Research[1]

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Abstract

The aim of this paper is to present problems of healthcare system in Poland. The subject of the analysis is Polish healthcare system, and in particular the possibility of using remote consultation platform that will improve cooperation/communication between primary care physicians and specialist doctors. Qualitative research methodology was used to acquire the knowledge and determine organizational solutions to improve cooperation and communication between primary care physicians and medical specialists, as well as to improve patient service processes, and public healthcare system.

Keywords: Healthcare, Healthcare System, Cooperation Barriers

Introduction

Primary healthcare (PHC) addresses the majority of a human's health needs throughout their lifetime. This includes physical, mental and social well-being, it is people-centred. PHC is a whole-of-society approach that includes health promotion, disease prevention, treatment, rehabilitation and palliative care. Primary healthcare approach includes three major components: meeting people's health needs, taking care of a broader range of determinants of health through multi-sectoral policies and activities and empowering people to take charge of their own health (World Health Organization 2020). According to World Health Organization (2020) "all people, everywhere, deserve the right care, right in their community. This is the fundamental premise of primary healthcare".

According to Polish regulations "basic healthcare are preventive, diagnostic, therapeutic, rehabilitation and nursing health services in the field of general, family and pediatric medicine, provided as a part of an outpatient healthcare" (Ustawa z dnia 27 sierpnia 2004).

The basic healthcare is a part of the healthcare system, granting access for all people entitled to benefits, residing/staying on the territory of Poland, of comprehensive and coordinated healthcare services at the place of residence. The benefits can be provided both on an outpatient basis (in an office, an outpatient clinic) and in medically justified cases, also at the patient's home (also at a social welfare home). The services also include preventive activities, i.e. child and youth care by a nurse/hygienist in a teaching and education environment (Narodowy Fundusz Zdrowia 2017).

It should also be emphasized that a necessary condition for the functioning of the healthcare system is a fact that: "the public health is the most important component of a national wealth; and a concern for

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achieving positive health standards is a responsibility of a state, local governments, NGOs, public and private organizations, as well as every citizen" (Nosko 2005).

In the recent decades, the basic healthcare has started to play an increasingly important role in healthcare systems across Europe (Mackenbach and McKee 2013). The effective primary care system requires a consciously conducted and a well-defined policy, includes a division of roles between individual levels of care, therapeutic and preventive services on the primary care level, coordination of functions in the healthcare system and incentives for the healthcare providers (European Observatory 2016).

The exchange of experience and knowledge between the primary care physician and the specialist in a given field is crucial for the best possible treatment of patients. The primary care physicians often feel uninformed. They think they are not qualified enough to make a diagnosis, change the dosage of a drug or treatment method.

The aim of this research was to characterize pro-quality activities and organizational solutions in the healthcare system facilitating access to inexpensive, durable and high-quality health services in healthcare units. In addition, interviews served to acquire the knowledge and identify organizational solutions to improve cooperation and communication of primary care physicians and specialist doctors.

Research Methodology

According to the American Marketing Association „marketing research is the function that links the consumer, customer, and public to the marketer through information – information used to identify and define marketing opportunities and problems; generate, refine, and evaluate marketing actions; monitor marketing performance; and improve understanding of marketing as a process. Research specifies the information required to address these issues, designs the method for collecting information, manages and implements the data collection process, analyses the results, and communicates the findings and their implications" (American Marketing Association 2018).

Another definition of research comes from UK Market Research Society „…one of the most useful tools in business, any business. It is the way in which organisations find out what their customers or potential customers need, want and care about" (Bredley, 2013, p. 7).

According to G.A. Churchill (2002, p.15) „marketing research is diagnosis of information needs of the company (organization), variable's selection and collection, analysis and interpretation of data used to make marketing decisions."

According to K. Mazurek-Łopacińska (2016), "research includes the diagnosis of information needs of an enterprise (institution), a selection of variables, and a collection, analysis and interpretation of data that are the basis for making decisions".

The main task of this research is to provide information necessary to improve decision-making processes. Three research goals can be identified (Mazurek-Łopacińska 2016):

- obtaining the necessary knowledge about the phenomena and the processes on the market and factors that shape them,
- support for decision-making processes,
- verification of the effectiveness of a decision.

The type of research methodology used, was a qualitative research. An individual in-depth interview (IDI) technique was used, whereby a researcher conducts an individual interview with a respondent, selected because of his/her relation to the subject of the study. In the IDI research, the researcher has the opportunity to ask the respondent about issues that seem particularly valuable for achieving research goals, which further increases the quality and value of the obtained research material. The in-depth

individual interview is more detailed than other data collection techniques, thus increases the value of the study, and is also a solid basis for formulating conclusions and practical recommendations.

Qualitative research is primarily about understanding reality, not measuring it. The results are not generalized to the population, the method of interpretation is more flexible, subjective, but it answers the questions which in the case of quantitative research are not discussed. Qualitative research is aimed at a closer look at the analyzed topics and a description, interpretation and even explanation of some behavior (Gibbs, 2011).

W.G. Zikmund, B.J. Babin (2010, p. 97) claim that "qualitative research can be performed in many ways using many techniques. Orientations to qualitative research are very much influenced by the different fields of study involved in research. These orientations are each associated with a category of qualitative research".

The most popular methods of collecting primary data in qualitative research are individual in-depth interviews and focus group interviews. These methods are most often carried out in the form of a free discussion between the respondent or a group of respondents with the moderator. Without a rigid "sticking" of questions as in the case of a questionnaire, and with the help of a topic guide only, the moderator gradually deepens those areas that are most important from the point of view of the purpose of the research.

Individual in-depth interview (IDI), depending on the level of formalization of the intelligence structure (the freedom to ask questions), can take the form from a free interview to a fully structured interview. However, the most popular used is a semi-structured interview, that is, such in which „the researcher uses the list of problems that should be raised during the interview: a list of questions to be asked, in the form recognized by the researcher as appropriate and in any order (…)This type of interview gives the researcher more flexibility during its execution, and at the same time allows a certain unification of data that is obtained in interviews on the same subject" (Sztumski 1995, p. 121). Questions in the IDI interview are not standardized, and the respondents have full freedom in their answers. During an individual in-depth interview, exploratory research questions, attempts to explain or understand motivation, attitudes or behaviors are undertaken. Its results allow to specify the created service, and at the same time can be used to verify the results obtained in the quantitative study.

An individual in-depth interview is a very useful method in planning services. It is used when there is a need for more in-depth knowledge and information that cannot be obtained with the help of data analysis. The argument for using this tool is the ability to capture essence of the problem, its flexibility and the ability to deepen the received information about the attitudes or motivations of the respondents. However, its disadvantage is subjectivity.

It should also be noted that the in-depth interviews minimize the risk of omitting issues relevant to the study. In addition, the interviews were conducted adequately to the needs and capabilities of the respondents. The research using the IDI technique was performed in medical facilities of primary care physicians and specialist doctors. A total number of 16 interviews were conducted:

- 6 IDI with primary care physicians,
- 10 IDI with specialist doctors.

The final effect of the research was the preparation of conclusions and recommendations on the cooperation of primary care physicians and specialists. The survey was conducted in November/December 2018.

Current diagnosis of the healthcare system and its problems

Nowadays technological innovations influence service delivery advancements. Despite a number of improvements, the processes have just began and patients have just started to experience the changes. The process of the computerization still faces some problems. The medical field currently faces four main challenges: service integration, service quality, Internet connected medical device security and publicly sustainable pharmaceutical pricing. While innovations promise to change healthcare service delivery forever, it will take some time before the advancements reach their full potential.

According to the report issued by the PwC Health Research Institute, patients have an access to innovations available due to recent healthcare reform and technological innovation, resulting in service delivery when and where patients want and need it. The advancements come in a moment when patients need particular information to manage complex and increased caregiving expenses. This process results in rethinking and improving management of retirement funds by many clients. This prudence will likely carry over into other fields connected to healthcare service delivery (Managed Healthcare Executive 2020).

While these changes are significant, they will take place at a moderate pace. Caregiving organizations want some empirical evidence that each innovation will provide returns, and while a unified patient database moves toward fruition, conflict over information rights slows the progress substantially. Finally, legislative wrangling over healthcare delivery policies additionally slows down the advancement in the medical field (Managed Healthcare Executive 2020).

In 2019, during the The HealthCare Executive Group (HCEG) Annual Forum, more than 100 C-suite and director-level executives were asked to pick the top 10 critical challenges, issues, and opportunities they expect to face in the year 2020. The executives were given a list of 25 topics to choose from. The final list included among others the following challenges, issues, and opportunities (Managed Healthcare Executive 2020):

1. Costs and transparency. Implementation of strategies and tactics to address growth of medical and pharmaceutical costs and impacts to access and quality of care.

2. Consumer experience. Understanding, addressing, and assuring that all consumer interactions and outcomes are easy, convenient and timely.

3. Delivery system transformation. Operationalizing and scaling coordination and delivery system transformation of medical and non-medical services via collaborations between healthcare and community-based organizations to overcome barriers.

4. Data and analytics. Leveraging advanced analytics and new sources of disparate, non-standard, unstructured, highly variable data to improve health outcomes, reduce administrative burdens, and support transition from volume to value and facilitate effectiveness.

5. Interoperability/consumer data access. Integrating and improving the exchange of member, payer, patient, data provider, and workflows to bring value of aggregated data and systems on a near real-time and cost-effective basis to all stakeholders equitably.

6. Holistic individual health. Identifying, addressing, and improving the member/patient's overall medical, lifestyle/behavioral, socioeconomic, cultural, financial, educational, geographic, and environmental well-being for a frictionless and connected healthcare experience.

At the beginning of the interview, the respondents were asked to evaluate the current healthcare system and its organization. In their opinion, positive changes in the current healthcare system are certainly the increasing use of technology (electronic medical records, e-prescriptions and e-sick leave) and modern treatments as well as greater access of patients to medicines. In the opinion of one the respondents: "(...)

It is better, first of all when it comes to technology and modern methods of treatment. Than when it comes to patients' access to medicines, to modern methods, to better educated people, to better hospitals (...) ".

On the other hand, the weaknesses are low expenditure on healthcare. According to WHO, this should be 6.8% of GDP. The level of expenditure on healthcare in Poland is one of the lowest in the European Union. Poland occupies one of the last places both in nominal terms and in relation to GDP. According to the data published by Eurostat, Poland is in the tail of the EU rate when it comes to the level of expenditure on healthcare (in all entities of this sector). According to the latest available data, the nominal level of expenditure on this purpose per capita in Poland in 2016 was EUR 731. Among the EU countries, only Bulgaria (EUR 556) and Romania (EUR 432) had lower results. Luxembourg, Sweden and Denmark are at the other extreme with amounts above EUR 5000. Even more is allocated to healthcare in Switzerland and Norway (Banker 2019).

The contact with the patients is also negatively evaluated. There is no continuity of care and the patients are often lost in the current system (concerning data gathering), sometimes the same tests are repeated several times, because the specialist doctors are not aware of the fact that the patient has already had the ordered tests. This may be a result of a lack of referral cards from specialist doctors. There is a poor flow of information between primary care physicians - patients - specialist doctors.

One of the basic problems in the respondents' opinion is the shortage of doctors, medical personnel of all categories/specializations. The organization and pricing of services, contracting are issues that also need to be improved. Another problem of the system is the lack of stabilization of legal system in the area of health protection. There is chaos and misinformation. „(…) A lot of things need improvement. Shortage of doctors and medical staff is the first basic problem. The organization of services, contracting, these are all things that need improvement. Financing new equipment for many entities. What worries the most is the lack of doctors - all of the specializations. There is emigration, but I would not suspect that this causes such shortcomings. These are many years of negligence in the educational system, in the number of trained doctors (…)" – sums up one of the respondents.

The next extremely important problem are long queues to specialists. In the mentality of the patients, primary care physicians still do not get much trust, and in principle, patients do not know what competences these doctors have. There is a widespread attachment to visits to specialist doctors. The system's second problem is the lack of preparation of patients for visits and the lack of cancellation of previously planned visits.

Computerization is a chance for the healthcare system, however, this raises concerns among the older generation of doctors and may increase readiness to leave if electronic documentation is introduced. „(…) Now technical innovations are introduced to improve the functioning of the system. But the doctors who have been working for many years in the profession, just like me, see this as a certain burden, because we are used to work "on paper". We are definitely more skilled at working with paper documentation than working with a computer. For young people who communicate and do most things on computer (30-year-old generation) in 20 years there will be no problem. Introducing it at the moment, i.e. what is happening now through e-prescriptions, sick leave forms, e-referrals is a challenge for older doctors. Many doctors who have already finished their work, e.g. 65-year-olds - for many of them it is tantamount to leave the profession. This is very bad for the system because there are very few doctors. Any experienced physician who leaves the system is a waste. Young people who have just started to work in the profession do not have experience in action, practice, knowledge of procedures. Although their theoretical knowledge is better, more timely than those who leave (…)" - states one of the respondents.

The table below sums up problems in primary healthcare in Poland.

Table 1: Strenghts and weaknesses of PHC

Strengths of PHC	Weaknesses of PHC
The use of modern technologies (electronic medical records, e-prescriptions and e-releases)	Shortage of doctors, medical personnel of all categories/specializations
New treatments	Low expenditures on healthcare
Greater patient access to medicines	Organization and valuation of services, contracting
	Lack of stabilization of the legal system in the area of health protection. There is chaos and misinformation
	Queues to specialists, long waiting time for visits to specialist doctors
	Poor contact with the patient, there is no continuity of care

Source: Authors' own study

The respondents were also asked to assess how currently functioning system affects organizational solutions in their facility. In the respondents' opinion, organizational solutions in healthcare facilities are influenced by legal regulations, infrastructure and competences of employees, as well as the procedures performed by primary care physicians. Regulations come from the central level, through law, financing, the level of relationship between a service provider and the patient, the level of quality of services and patient safety.

In addition, the complex contracting system is a hindrance, which is constantly modified and still does not work, which is associated with procedures for first-time, multiple-time visits, complicated reporting to the National Health Fund.

Respondents say that the system often forces referrals for examinations to specialists in order to obtain a referral for diagnostic tests that are not on the list of primary care physicians. In the opinion of the respondents, there is also a problem in the lack of an update of regulations. There are situations when new guidelines, new procedure cards, new requirements are introduced, especially before the medical procedures, although the old ones are still in force, which causes confusion and a waste of time for bureaucracy. Some activities are done only to make an effect visible quickly, e.g. e-sick leaves were introduced without cooperation with the doctors and their comments were not taken into account. „(…) There is a change in regulations that requires something from us, but the old regulations are not withdrawn. There are more and more regulations. Something new is coming, and at the same time there are regulations from the fifties that shouldn't exist anymore but we continue to do them (…)". "(…) There are new guidelines, new procedure cards, new requirements, especially before the treatments. Often in my field these are unnecessary things. There is no rollback or documentation update. Whatever they introduce, we must comply, if the control comes they won't pay (...) " – emphasizes one of the respondents. Another surveyed adds "(...) Now e-sick leaves have been introduced, the system freezes – we were informing about it before. This is all done to make an effect, and cooperation with us and our comments are not taken into account. You could sit in a panel, work on it. We are not against computerization, but it must be done wisely - on the first day the system was inefficient (...)".

The current system enforces record keeping, which, with such a huge number of responsibilities, is a big problem. There is a time limit for an appointment, which means that primary care physician cannot do what he/she has full competence and education for. "(...) There are too many papers. We keep records, nobody analyzes them. A part of what we write goes to the National Health Fund, on the basis of which they divide money (I do not know exactly how it is). In our specialization there is too much of it, it is troublesome, there is no time for it, there are no medical secretaries and this is a system error (...) "- notes one of the respondents.

The respondents were also asked whether they perceive the possibility of improving this state of affairs and what actions could improve the situation. In their opinion, the system would improve, if the path of patient care was visible – to what specialists did the patient go, what tests he performed, doctors must have information on how the system works. It is natural that the system could be improved through adequate financial outlays. The cooperation of doctors would also facilitate the work, so they would not have to duplicate diagnostic tests.

The respondents claim that to enhance the effectiveness of the healthcare system, business environment organizations, agreements, employers' unions, various types of hospital unions and all other significant organizations that bring together members who are responsible for implementing legislative solutions in practice, should be involved.

The respondents say that business environment organizations, agreements, employers' associations, various types of hospital unions, all significant organizations that bring together members who are generally those who are responsible for implementing legislative solutions should be involved in increasing the efficiency of healthcare system activities in practice. "(...) All organizations must cooperate. There must be business environment organizations, employers' associations, various types of hospital unions, all those large organizations that bring together members who are generally, those people who do what politicians come up with. The cooperation of these organizations and the joint determination of activities, tools, at a specific time, schedule, acceptable to all parties, is the solution. This should not work on the principle that an idea is being created and needs to be implemented the next day. It must go from bottom to top, as it is done in the other countries. Due to political turmoil, the role of SDC (Social Dialogue Council) diminished, due to the fact that some organizations operate in a chaotic manner. This means that for now the partner for the government is unstructured, but there are more and more strong institutions that know what they want, that cooperate with each other. Listening to the other side, considering your own arguments, is important as it is in the West. If this is not done, conflicts arise or projects fail (...) ´points out one of the respondents.

The respondents also note that often corrective actions are carried out at the level of the entity that tries to compensate for system errors through more effective organizational activities, e.g. through good communication with the patient. In addition, the system would be streamlined with easy-to-use, intuitive equipment that will not slow down the process but will speed it up. In the opinion of the respondents, a medical assistant could be a solution to the problem of documentation and data entry.

The cooperation platform between primary care physicians and specialist doctors

One of the major problems of the current healthcare system is also the lack of cooperation and communication between primary care physicians and specialist doctors. The basic problem noticed by the specialist doctors surveyed is not enough information on referrals, which results from the lack of time of primary care physicians.

Respondents (specialist physicians) believe that communication problems are not present to such exstand if they occur directly, within one unit. It is definitely harder to cooperate if doctors work in various medical entities. Often, for example, there is no feedback after a patient's visit to a specialist.

A potential solution to the current state of affairs could be a platform for remote consultations, which should improve the cooperation/communication between primary care physicians and specialist doctors. In the course of qualitative research, both primary care physicians and specialist doctors were asked to evaluate the concept of such a platform and the possibility of using it in their current work.

Most of the surveyed think that this is a good idea. A consultation at the right time is well received by each party. There are doctors who could only help in this way. The consultation would require real interest in the patient. „(...) I like this idea very much, it is an important element that needs to be developed, just like all the telemedicine and teleconsils, the possibility of using modern communication media. To solve

the patient's problem in a short way, consultation can be obtained electronically. We use an electronic sending of information on an ongoing basis. We are computerized (...)" - states one of the respondents.

„(...) I think it is a good idea, though I don't know if it works yet. The question remains who will pay the doctors for their time? This time will be taken away from the patient (…)" – another respondent notes.

The respondents believe that such a consultation would allow a more informed approach to the patient, would allow to find out what routine specialist disease management looks like, which will speed up the diagnosis and avoid repetitive visits. „(...) That's what I've heard. I think it is a good idea because every day such an action is also needed. A direct access to specialists is difficult. We contact them through referrals. Phone or mail - there is no custom or tradition. However, very often there are questions that I would like to ask when something happens, and it is not an urgent matter (…)" – says one of the respondents.

However, there are doubts about payment and time, due to staff shortages and workload - there is a suggestion of consultation in the afternoon/evening, after work. Computerization may also be a barrier, which older doctors refrain from.

Further reservations relate the trust in the information received on the platform as well as medical confidentiality and discussing specific cases, without detailed personal data. The opinions about consultations appear as an introduction to further action, not as a basis to make a final diagnosis. "(…) This is a good solution. I think that I would use it. This can be used to suspect the occurrence of a disease, but not to diagnose it, because it cannot be done without examination of the patient. This may be an introduction to further proceedings (...) "- notes one of the respondents.

In the next question, the respondents were asked if they had already had the opportunity to familiarize themselves with the remote consultation platform and whether such solutions in their opinion improves communication. The respondents were asked if anything requires improvement, and in what other way cooperation/communication between primary care physicians and specialist doctors could be improved?

Only a small group of respondents had the opportunity to familiarize themselves with the platform for remote consultation at a test meeting. They assess this tool well as an additional possibility of contact, and sometimes as the only contact with specialists.

Respondents suggested that a standard question protocol should be prepared that would guide the diagnostic path so that the primary care physician would not waste time writing questions. Such questions could be asked first by the nurse, the coordinator, who would direct the question to a specialist if necessary. „(...) This should be the simplest possible protocol of questions, to help guide the patient to the appropriate diagnostic path. The point is that the primary care physician would not waste time asking questions, e-mailing, but would simply ask questions with "yes/no" answers. On the other hand there will be a coordinator, or a nurse (not a specialist) who determines who to direct the questions to (based on the check list), or requests being given a referral (...)" – one of the respondents noticed.

The telemedicine and the teleconsils are seen as a way to improve communication, but require improvement. "(...) There are now a number of ideas - you can consult by phone, telemedicine – but it requires medical assistants who will watch over it, who will prepare the environment, the room. So the telemedicine needs improvements (...). "- claims one of the respondents.

Summary

The healthcare industry nowadays is facing many changes that pose new challenges to healthcare organizations in many countries in the world. In particular, the fast-evolving government regulations, technological innovations, and patient expectations create a new environment in which running a medical practice isn't just about treating patients anymore.

Even though, the healthcare system has undergone many changes in the recent decades, it still remains not as effective as it could be. There are many problems connected with the system, starting from financing, through staffing and infrastructure shortages to the cooperation and coordination of activities between medical entities and on the line of cooperation between primary care physicians and specialist doctors.

A faulty information flow system does not guarantee the physician an access to comprehensive information about the patient's state of health. There is a lack of a lot of relevant medical information about patients, and the data that exists is often inconsistent and incomplete. This significantly limits the possibility of making decisions.

As the results of the research indicate, the problems of the healthcare system are, among others:

- the ineffective flow of information about the treatment process and its effects (e.g. in connection with the insufficient development of modern electronic information circulation systems),
- the low expenditure on the healthcare,
- the shortage of doctors, medical personnel of all categories/specializations,
- the organization and pricing of services, contracting that need improvement,
- the lack of stabilization of the legal system in the area of health protection,
- the long queues to specialists, because in the mentality of patients, primary care physicians still are not trusted, and in principle, patients do not know what competences these doctors have,
- the increase of patients' expectations regarding medical care,
- the failure to prepare patients for visits and the lack of cancellation of previously planned visits,
- sending the patient to various medical entities (for specialist examinations), which in turn negatively affects the quality of medical services.

The positive changes in the current healthcare system are certainly the increasing use of technology (electronic medical records, e-prescriptions and e-sick leave) and modern treatments, as well as greater access of patients to medicines. For sure, computerization is a chance for the healthcare system, which, however, raises concerns among the older generation because it may contribute to the retirement of a group of doctors.

An important role in the effectiveness of this system is also played by the cooperation between the primary care physician and a specialist doctor, and thus a frequent problem with the incorrect flow of information about the treatment process and its effects. That is why understanding the role of this cooperation and improving communication include using the platform for remote consultations between primary care physicians and specialist doctors, which is one of the most important elements of improving the healthcare system in Poland.

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Agile Inventory Management Model Applying Cycle Counting And 5S´S to Improve Inventory Record Accuracy in SMES Engaged in Trading Hardware and Construction Items

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Abstract

This research study proposes an agile inventory management model, implementing cycle counting and 5S methodology, in order to increase inventory accuracy rate by more than 90% in a glass, aluminum, and hardware trading enterprise. The initial scenario showed a 30% inventory accuracy rate for the Class A glass family group. We proposed a cycle count program that improved this rate so that in the first audit it grew to 35% and went up to 95% in the fifth audit. Finally, the results of the study show that the integration of Lean concepts and inventory management methodologies in an agile framework improves the state of an enterprise that faces an inventory inaccuracy problem.

Keywords: Agile model, Scrum, 5S´s, Inventory Record Accuracy.

Introduction

The global trade sector has been experiencing slower growth because of different trade disputes between various emerging markets. However, a 2.6% growth is forecast by the end of 2019 (Banco Mundial, 2019). China, the world's largest exporter of goods (16.2%), has increased its export value by 17% (World Trade Organization - WTO, 2019). The hardware business is considered to be one of the country's most dynamic industries. Besides, large enterprises are not the ones with the largest market share as they only represent 12% and barely had a four-percentage-point growth in the last 4 years. Rather, it is the small- and medium-sized enterprises (SMEs) that represent 88% and exceeded the 20-percentage-point-growth mark in the same period (INEI, 2019).

This sector comprises various product trading enterprises, and most of them face inventory inaccuracy depending on the business: those who market small products have higher inventory inaccuracy, and conversely, those with large products have less inaccuracy. In either case, this problem generates two detrimental situations for the enterprise: selling something that is not in physical inventory or stopping the provision of any product that is physically in the warehouse. This is related to the enterprise's poor management and control, which is the key to long-term sustainable sales (Norazira et al, 2018). In addition, the elimination of inventory record inaccuracy can improve the match between supply and demand and reduce inventory costs and transaction costs for shipping wrong items to customers (Norazira et al, 2018) (Ismail et al, 2018) (Chen et al, 2015).

This research work studies inventory record inaccuracy that is based on the following causes: poor warehouse distribution; the lack of controls and policies; the lack of training in service areas; and the lack of induction for dispatch area employees. In addition, the study focuses on SMEs that do not have the high purchasing power to invest in technology solutions, such as the plastic supplier in a case where a model for the assessment of radio frequency identification (RFID) technology's impact on the inventory accuracy is proposed (Hellström et al, 2010).

The following research is aimed at improving inventory record accuracy and at the same time reducing the number of invoices cancelled because of inventory inaccuracy in hardware and construction enterprises. Another goal is to increase scientific evidence regarding inventory accuracy improvement through both quantitative and qualitative research as there is no evidence until now of any study focused on integrating 5S tools and cycle counting into an agile framework such as Scrum in a retail sector. The products to be audited will be classified using the activity-based costing (ABC) method in cycle counting to prioritize the most profitable products.

State of the Art

Cycle Counting Inventory Management

We aimed at reaching total inventory improvement by implementing, in conjunction with the above, the cycle counting method, an inventory auditing procedure that comprises physically counting inventory items and comparing them with the quantities recorded in the system (Aghazadeh, 2001). Similarly, other studies concluded on the effectiveness of this method in controlling inventory and maintaining control actions. In addition, this technique was associated with ABC analysis so as to prioritize the selection of products to be audited (Jugraj, 2017) (Norazira et al, 2018). Furthermore, both authors reach similar conclusions, i.e., cycle counting should not only be performed once at year-end but also periodically. This is much more reasonable when it comes to trading enterprises in terms of achieving results (Harrington et al, 1990). In addition, they argue that to be effective, cycle counting must be based on order and cleanliness (Harrington et al, 1990) (Norazira et al, 2018).

Agile Approach to Inventory Management

The agile approach proposed in this work of research, Scrum, is considered to be an agile framework, and to date, there is very little evidence regarding the implementation of this tool outside of an IT project context. Likewise, studies agree that Scrum leads to the development of successful projects because of its flexibility vis-à-vis the unforeseen requirements that arise in each project in addition to integrating all the employees involved. Moreover, another author argues that team size and project duration have an effect on the results that its implementation can provide. In sum, both authors conclude that enterprises should be aware of Scrum implementation as the choice should be based on the context, practical needs, and project resources (Jugraj, 2017) (Qing, 2015).

Contribution

Proposed Model

The proposed model (Fig. 1) is aimed at complying with the guidelines so that an enterprise with a context that is similar to the one under study may implement an inventory management model that is based on cycle counting and 5S methodology along with Scrum tools in order to reduce inventory inaccuracy.

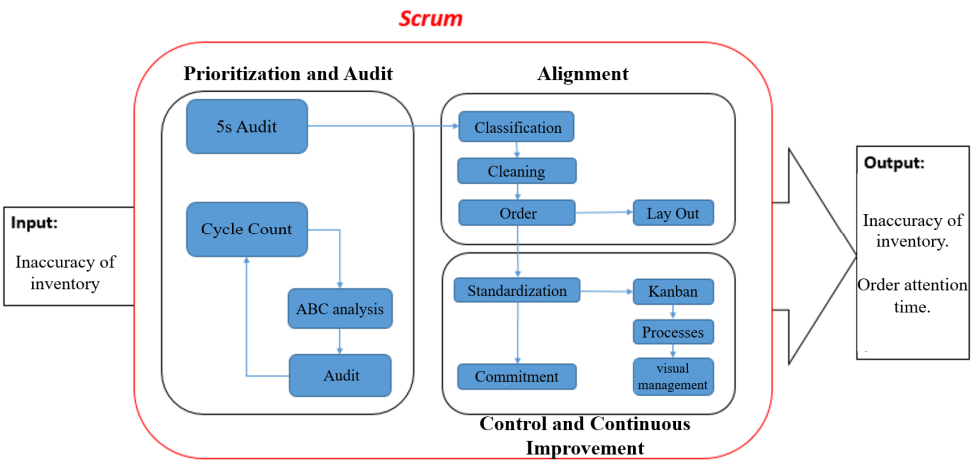

Fig. 1: Proposed Model

Proposed Method

This view details the sequences of activities to implement the proposed model. Further, we reconsider whether certain activities should be implemented so that the model can be adapted to different organizational contexts. (Fig. 2).

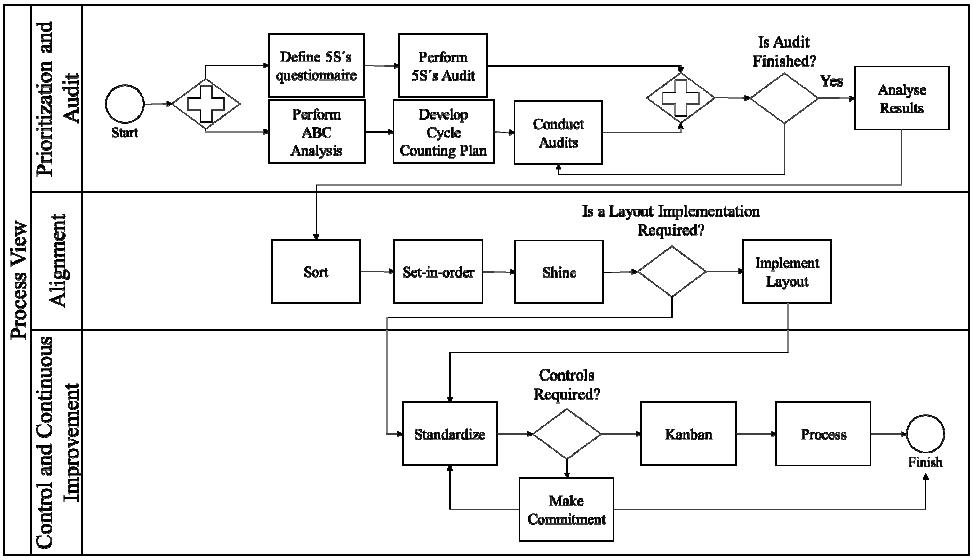

Fig 2: Proposed Method

Indicators

The ratios that will be analysed to measure the impact of the contribution proposed in this research are the following:

Inventory record accuracy (IRA): This shows how accurate the physical quantities are when compared with the quantities recorded in the system. The calculation formula is as follows:

$$IRA = \frac{Number\ of\ successful\ counts}{Number\ of\ counts\ performed} \times 100 \quad (1)$$

Equation (1) yields a percentage number, i.e., the accuracy level that exists between the physical and logical (system) inventory. That is to say, the higher the IRA the greater the accuracy between the two factors.

Order fulfillment (OF): This calculates the average time taken by a worker in the dispatch area to fulfill an order. The calculation formula is as follows:

$$OF = \frac{60\ minutes}{Number\ of\ orders\ dispatched} \tag{2}$$

Equation (2) shows a number that is equivalent to the average time taken by a worker to dispatch per hour. The exiting amount is assumed to be uniform for the remainder of the hours worked.

Index of products not reentered into the system: This shows the index of commercially-sized scraps (larger than 30 cm × 30cm) that are not reentered into the system for sale. The calculation formula is as follows:

$$\frac{Total\ leftover\ products\ with\ trade\ sizes}{Total\ worked\ products} \tag{3}$$

The index yielded by Equation (3) is interpreted as the percentage of commercially-sized glass that could be reentered into the system.

Index of improperly cut products: This shows the percentage of improperly cut glass out of the total glass worked during the day/week/month depending on the analysis. The calculation formula is as follows:

$$\frac{Total\ improperly\ cut\ products}{Total\ worked\ products} \tag{4}$$

This ratio shows how much glass out of the total glass worked per day/week/month was cut outside of customer specifications and subsequently discarded.

Table 1: Initial Diagnosis

Ratios	Current state
IRA	30%
Average order fulfillment time glass	9 minutes
Glass scraps not re-entered into the system	72%
Improperly cut glass	28%

Validation

Enterprise Presentation

This case study was implemented in a Peruvian enterprise that sells glass, aluminum, and accessories. The enterprise also performs aftersales work at the client's request, such as glass and aluminum cuts, and has 43 employees. The model will be implemented in the services area and in the accessories and aluminum warehouse, located on the third level, and the glass warehouse, located on the first level.

Initial Diagnosis

On the basis of the main problem, we analysed the causes, i.e., the lack of warehouse distribution, lack of controls and policies, lack of service area training, and lack of dispatch area induction. Table 4 shows the results of the initial diagnosis carried out in the enterprise under study.

Implementation of the Proposed Model

The model is based on Scrum, an agile project management methodology. The tools and events presented above were adapted to the enterprise's context.

We classified the staff involved and the responsibilities in the process as shown below:

Scrum: Sprint retrospective meetings, As the enterprise had no history of improvement project implementation, we validated the work and whether the implementation was working. At the end of each deliverable, accompanied by work appreciation and in order to document the lessons learned, a form was completed with the following questions: (1) What worked well? (2) What can be improved? (3) How can we improve it?

Prioritization and audit: In this implementation stage, 5S audits used an employee questionnaire to identify the area in which this methodology will be implemented and found warehouse and service areas to be critical in terms of 5S. Subsequently, we performed an ABC analysis to identify the products that represent higher sales revenue in the enterprise. Table 2 below shows the analysis:

Table 2: ABC Analysis

Product family	% Accumulated Profit	Criteria
Glass	78.03%	A
Aluminium	12.02%	B
Accessories	9.95%	C

Alignments: We implemented the first 3S (Sort, Set in Order, and Shine). In the second stage, we redesigned the warehouse material flow on the basis of ABC analysis of product distribution order by glass area. Both contribute to the reduction of order fulfillment times. Fig. 3 shows the warehouse design implemented for glass.

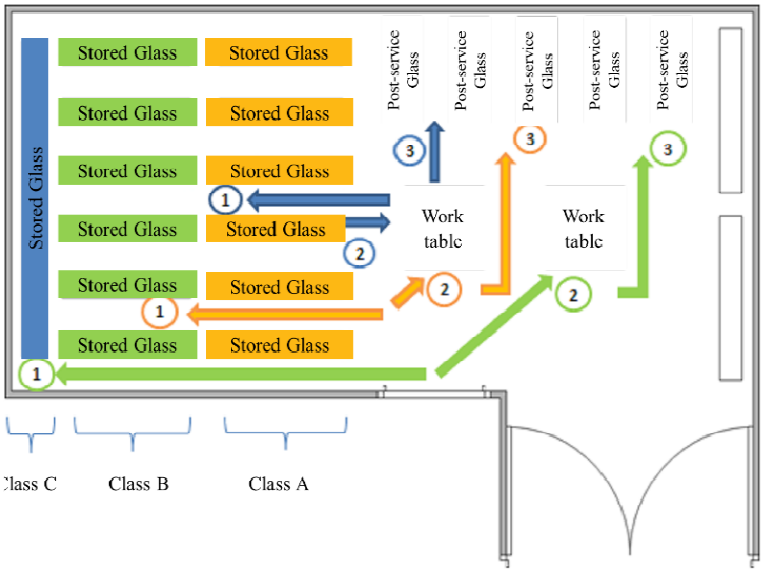

Fig. 3: Material flow design in glass warehouse

Control and Continuous: Furthermore, we proposed the implementation of a Kanban system to maintain control over this process and show the products that will be re-entered to reduce the IRA ratio. Fig.4 shows the proposed Kanban board and cards.

Fig. 4: Kanban board and cards implementation

Results

The following Table shows the final state after proposal implementation versus the initial state, thus highlighting an optimistic variation compared to the initial ratio.

Table 3: Ratio Results

Ratios	Initial	Final	Variation
IRA	30%	95%	217%
Average lead time or glass order fulfillment	9	2	7
Index of products not re-entered into the system	72%	37%	-49%
Index of improperly cut products	28%	18%	-36%

After total 5S implementation, a second audit was carried out to show how many improvements were made and above all that the enterprise has a sense of continuous improvement about its workplace. Fig.5 shows the results obtained with respect to the critical areas, services, and warehouses.

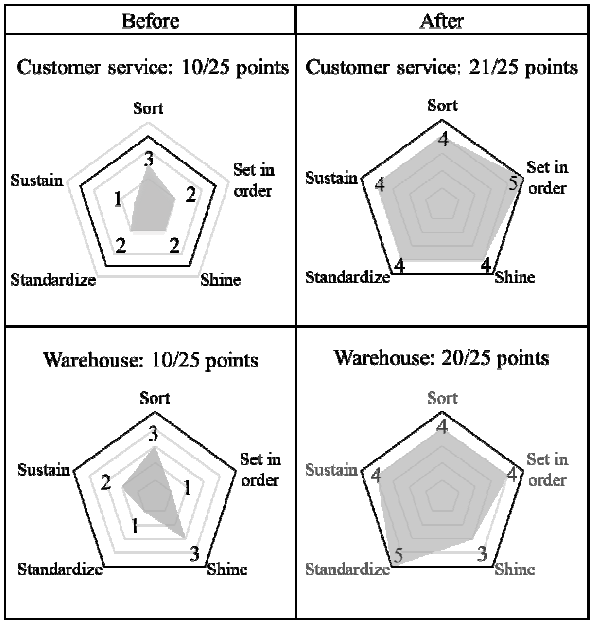

Fig. 5: Kanban board and cards implementation

The above Fig. 5 shows a considerable change in the 5S audit scores, which varied from 10 to 21 and 20 points, respectively, in glass services and warehouses.

Finally, there was a decrease in the number of invoices canceled because of inventory inaccuracy. The following figure shows that the trend of canceled invoices in 2019 is decreasing when compared with the previous year, thereby accounting for a drastic variation, from 188 invoices canceled due to inventory inaccuracy in December 2018 to only 21 invoices in December 2019.

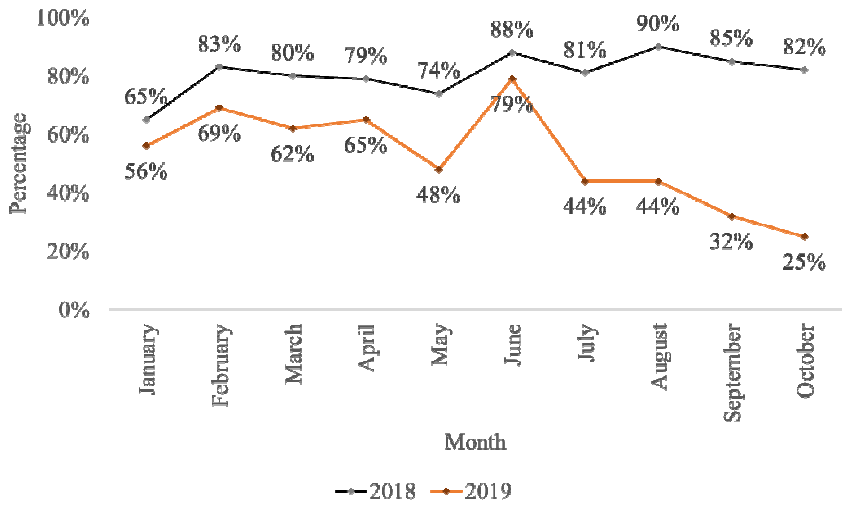

Fig. 6: Percentage comparison of invoices canceled because on inventory inaccuracy in 2018 and 2019

Conclusions

This study shows that the integration of Lean concepts, an agile framework, and inventory management methodologies is effective in improving the state of an enterprise that faces an inventory inaccuracy problem.

We raised the hypothesis of achieving more than 90% for the IRA ratio; however, 95% was accomplished. Thus, we conclude that the 5S methodology, cycle counting, and layout are aligned in the implementation area and complement each other in audits because order and hygiene improve product identification.

The proposed model is intended to be adapted to other marketing enterprises. Similarly, it provides flexible implementation in SMEs with a small work team.

The proposed model helped to reduce lead time from 9 minutes (initial state) to 2 minutes, i.e., an index variation of 7 points. As for the index of products not reentered into the system, there was a negative variation of 49%, from 72% (initial state) to 37%. Finally, the index of improperly cut products went from 28% to 18%, i.e., signifying a 36% decrease.

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Lean Model of Warehouse Management for MSEs in the Textile Sector for Reducing Shrinkage Costs Using ABC Inventories

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Abstract

Peruvian micro and small enterprises (MSEs) constitute 99.08% of Peru's business density and have the highest rate of problems in performing and managing their operations. This precedent is reflected in the high expenses and costs incurred, creating low profitability in their activities. Peruvian MSEs have found an extremely difficult bridge to gap in order to improve the main areas and become more competitive in the market. One of the main problems of the enterprises in this sector is warehouse management; it is known that 49.9% of the companies in the country have warehouses and that, out of this total, 41.9% have some type of problem when storing their products. This article has selected an MSE from the textile sector as a case study, and this is where the Warehouse Management Model based on DMAIC methodology is applied. This method seeks to improve processes in the area and achieve its objective, continuous improvement, and cost reductions. To implement the model, the various techniques and tools used were grouped into five phases of the DMAIC methodology, and then, they were divided into 3 pillars: purchases, indicators, and location and storage. These are the ones most relevant for organizations with the aforementioned characteristics.

Keywords: DMAIC, Warehouse, Purchase KPIs, 5s.

Introduction

Among the organizations in Peru, microenterprises represent 94.6%, while small businesses constitute 4.4% and medium and large enterprises together—including public administration—represent 1% (INEI, 2015). Considering the aforementioned data, we can conclude that 99% of the enterprises in the country are MSEs. Furthermore, the business density represented by MSEs amounts to 99.08%. It is known that MSEs constitute 85% of the country's enterprises (Agencia Andina, 2018). In contrast, textile is one of the most important sectors in Peru, contributing 5.873 million to the country's total GDP: 1.3% to the national GDP and 8.9% to the manufacturing GDP. In 2015, 37,112 micro, small, and medium enterprises provided 411331 jobs through the employment assistance program in Peru (Ministerio de la Producción, 2015). As mentioned earlier, the textile sector is a main sector, providing income and work to the country, and thus, the efficiency level of its operations must be considered, as most SMEs in the sector are failing to meet the objectives raised in their different areas. The enterprises, regardless of the business segment they belong to, are disputing over how to meet the customers' needs and become more efficient in their operations. A main problem of these companies is supply change management where findings obtained were divided into the following four pillars: lack of automation, difficulty in finding trained personnel, improvement opportunities for SCM, and the opportunity to outsource services (PAD, 2015).

Enterprises have several problems when conducting their operations and offering their products and/or services, as shown in the study conducted by the National Institute of Statistics and Information Technology (INEI), which sets out the importance that warehouses have for enterprises.

INEI reports that 49.9% of the companies in Peru store their products, and from this total, it is known that 57.7% use some type of model for their inventories. Moreover, it was identified that out of the total number of companies that store their products, 41.9% indicated having some type of problem in their warehouses (INEI, 2015).

To solve the warehouse problems, a management model is proposed to reduce the shrinkage costs in the purchasing and storage processes. The DMAIC methodology consisting of the five phases that form the acronym will be used, and the tools were selected to be used in each of the five steps. The model to be implemented in the case study uses the following tools: Selection and Supplier Evaluation, 5S, value-stream mapping, Kardex, and ABC distribution of inventories.

State of the Art

Lean Philosophy

To reduce waste that does not generate value for the company, the Lean principle suggests eliminating the 3Ms (i.e., Muda, Mura, and Muri). The objective of the implementation is to increase productivity and reduce costs. The benefits of implementing the Lean philosophy in warehouses are increased efficiency and flexibility, continuous improvement, and adjustments to the requirements of suppliers and customers (Oey et al, 2018) (Reis et al, 2017). The Lean tool seeks process optimization, reduction of worthless activities, efficiency improvement, and cost reduction (Baeza, 2015) (Ben et al, 2019). The Lean philosophy has several variants such as the "lean office," which is used for handling computerized data, and ensures that by implementing this approach, benefits may be obtained in the management and administration of databases and files. The goal remains the same, which is to eliminate waste by reprocessing and ensuring that activities add value (Monteiro, 2017).

The main results of the Lean philosophy in warehouses are the restructuring of scope space, increasing the layout, and reducing costs and times in operations (Oey et al, 2018) (Reis et al, 2017). Moreover, the reduction in operating time and significant economic savings for companies were obtained as a result (Baeza, 2015) (Ben et al, 2019). Implementing Lean office results in processing time and sending information and feedback (Monteiro, 2017).

ABC Inventory Classification

ABC inventory classification is a method focused on material inventory storage, using various criteria such as inventory value, annual demand, and average cost. This analysis can be performed according to various criteria such as cost, requirement, and affinity, with an aim of process optimization (Li et al, 2016) (Li et al, 2017). Furthermore, good inventory and warehouse management is of vital importance to organizations, and thus, the priority of the warehouse is to manage materials efficiently, as this is the link between the purchases and sales of a company (Sathish et al, 2019) (Arunyanart et al, 2019).

The results of correctly implementing the ABC inventory method are a reduction of runs being made and less time in operations carried out (Li et al, 2016) (Li et al, 2017). By implementing the method correctly, benefits are achieved such as the time taken to dispose materials, leading to 59.46% stock reduction and 13.73% storage increase (Sathish et al, 2019) (Arunyanart et al, 2019).

Contribution

Proposed Model

This model is divided into three areas: suppliers, warehouse and inventories, and processes and indicators. The DMAIC methodology is taken as a framework and is focused on process and continuous improvement. DMAIC is an acronym composed of five words: define, measure, analyze, improve, and monitor. For each of the phases, techniques, tools, and methods belonging to the Lean

philosophy and the ABC inventory method will be selected to solve the main problems of textile MSEs.

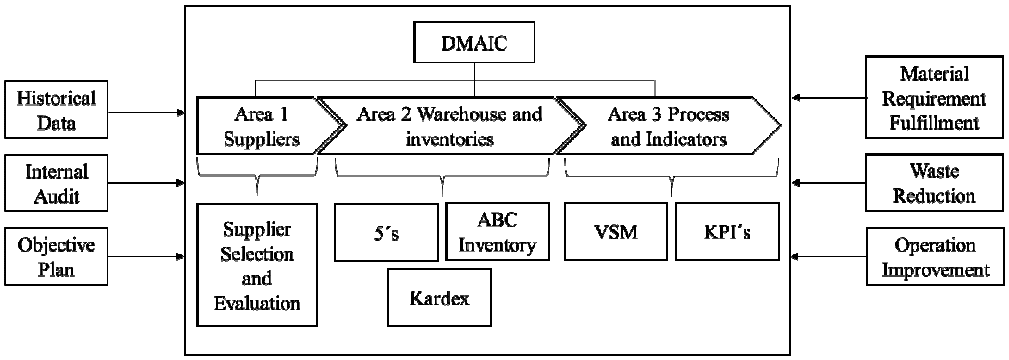

Fig 1. Proposed Model

Area 1 - Suppliers: In this stage, the supplier selection and evaluation processes will be presented. The objective is to implement a method that ensures the supplying of the materials required to perform the operations. By implementing this model, it is possible to have suppliers with the flexibility and possibility to fulfill the orders requested.

Area 2 – Warehouse and Inventory: In this stage, the distribution and control processes of materials in the warehouse will be shown. The objective of this area is to control the receipt and issue of material, reduce shrinkage in processes and material, and take advantage of the space in the warehouse.

Area 3 – Processes and Indicators: This stage will present the purchasing and inventory end-to-end processes of materials. The objective is to implement a process map that covers activities and to implement measurement indicators for operation control.

The proposed process for the model is based on DMAIC methodology, which serves as a framework to implement methods, techniques, and tools in each of its five steps. It seeks to implement various tools that achieve synergy between them to bring a solution to a common objective, which is to improve supplier selection and evaluation and efficiently manage the inventories and warehouse.

For each of the areas, methods will be selected to help meet the objective of each step; the methods will be distributed in the phases of the DMAIC methodology to focus the proposed model on continuous improvement. The benefits obtained will be costs reduction; process, operations, and management improvement; supplier control; control in materials receipt and materials issue; traceability; waste reduction; waiting times; and production downtime. Figure 2 presents the process that will follow the proposed warehouse management model.

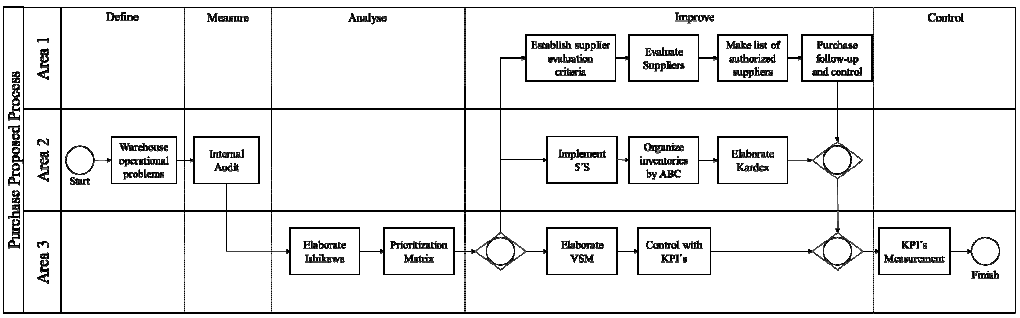

Fig. 2: Purchases improved proposed process

Indicators

The indicators used to control the model are as follows: purchase quantity per month, non-conforming purchases, damaged material deliveries in purchases, raw material shrinkage, inventory turnover, and compliance with the monthly production plan.

Purchase quantity per month: The objective of this indicator is to measure the purchase quantity—supplier interactions—that are made per period. The indicator is based on measuring how the number of purchases varies per month and if the purchasing planning and inventory control was conducted correctly. The indicator will be compared with the results of previous periods to identify if a good purchasing plan exists.

$$\frac{Purchase\ Quantity}{Number\ of\ Months} \tag{1}$$

If there are many purchases, the indicator will be compared with the results of previous periods to identify if a good purchasing plan exists.

Non-compliant purchases: The purpose of this formula is to measure supplier compliance in relation to the requirements made by the organization. Supplier compliance relating to the issue of purchase orders will be controlled. Whether the supplier meets the purchase orders made will be checked.

As the result approaches 100%, this shows a poor requirement fulfillment by suppliers. The closer the result is to 0%, the better the supplier performance will be.

$$\frac{Non\text{-}conforming\ purchase}{Total\ purchases\ issued} \times 100 \tag{2}$$

Results will show worse fulfillment of requirement by suppliers when the result is closer to 100%. The closer the result is to 0%, the better the performance of the suppliers.

Damaged material deliveries in purchases: The measurement of deliveries of damaged material by suppliers seeks to identify supplier performance and the quality used in its products and services.

$$\frac{Total\ purchasing\ cost}{Damaged\ material} \times 100 \tag{3}$$

As the result approaches 100%, it will show a low compliance for damaged materials. The closer the result is to 0%, the better the supplier performance will be concerning material delivery. The level of raw material shrinkage will be measured to be able to quantify what the percentage of loss is owing to raw material waste.

Raw material shrinkage: The level of raw material shrinkage will be measured to be able to quantify what the percentage of loss is due to raw material waste.

$$\frac{Cost\ of\ raw\ material\ loss}{Warehouse\ products\ total\ cost} \times 100 \tag{4}$$

As the result approaches 100%, it will show a high level of raw material shrinkage. When the result is closer to 0%, there will be less raw material shrinkage.

Inventory turnover: The indicator is used to measure raw material input use ratio in relation to the raw material total cost held by the organization.

$$\frac{Warehouse\ material\ issue}{Current\ input\ quantity} \tag{5}$$

As the result approaches 100%, it will show a high level of inventory turnover. When the result is closer to 0%, the raw material inventory turnover will be worse.

Production plan compliance: The percentage of production downtime in a given period, caused due to a poor inventory, and purchase management is measured.

$$\frac{Real\ production}{Planned\ production} \tag{6}$$

As the result approaches 100%, the real production increases, showing a low warehouse performance. If the result is close to 0%, a good inventory and purchase management will be ensured.

Validation

Model Implementation

To show the proposed model behavior in relation to the main problems encountered in the case study, the model presented will be followed. This is divided into three areas, as shown below.

Define, measure and analyze:

These stages were included in the situational analysis of the organization to provide solutions for the main warehouse problems. The process to perform these activities is described below.

- The first activity carried out was the definition of the main problems that happen at the warehouses.
- An internal audit was carried out to identify the cause of poor performance operations and gather information as the basis of the analysis.
- The information was analyzed using the Ishikawa tool and prioritization matrix to identify the causes and root causes and to weight them for identifying their importance.

Improve:

Area 1 - Suppliers: The first activity carried out was the implementation of a supplier evaluation criteria matrix. To implement this matrix, information was collected from the ISO 9001 guide (Yadav et al, 2018) and from scientific articles (Gupta et al, 2017). The most relevant criteria for the context wherein the organization is developed were identified and the following seven were chosen: purchase requirement fulfillment, delivery time, coordination with supplier, order capacity, replacement or return guarantee, price and payments. The measurement criteria were divided into “very good,” “good,” “regular,” and “bad,” and according to these, the respective specification belonging to the quadrant is described.

The evaluation criteria will provide a clear criteria that a supplier must have to attend to a need. Thus, the supplier aligning with the objectives and needs of the organization will be assured
After this, a supplier evaluation chart is prepared, which uses the criteria that were shown. The objective is to measure the fulfillment of the enterprises to cover any organizational need. The format requires specific information from the supplier and contact person and shows the most relevant criteria. Moreover, it shows the evaluation chart where the evaluation is carried out, and according to the result, it is identified whether the organization evaluated can be considered as a supplier. The re-evaluation date according to the score obtained is shown at the bottom of the document.

The implementation function is to have a control method that ensures that the chosen supplier can meet a need with the required specifications in cost, time, quality, and service.

A supplier list box was created to identify the data required for contact. This implementation cannot be shown owing to the suppliers’ request and legal restrictions.

Finally, an inspection box for supplies was introduced, where all interactions (purchases) and their correct fulfillment are monitored.

Area 2 – Warehouse and inventory: The Area 2 implementation was carried out in the fabric warehouse, as the company to which the case study was made imposed this limitation. This point is divided into 3 tools, which will be shown below:
5S:

- Classify: At this stage, the materials and objects that were in the warehouse were selected. All materials were classified to eliminate the unusable ones; the walkways were delimited and the materials that interrupted the walkway were removed. Those were classified according to their specifications.
- Sort: Fabrics were sorted in the warehouse, so that they are easy to identify. Conversely, materials and tools not belonging to the area were removed.
- Clean: At this stage, the overall area (shelves, passageways, etc.) was cleaned, an analysis of the requirement functionalities such as light and connectors was made. Finally, a cleaning plan was made consisting of specific activities per day.
- Standardize: Formats for monitoring activities and daily controls were implemented.
- Discipline: For this stage, monthly training meetings and discussions of the results were proposed. Moreover, reports on problems and non-compliances will be made.

ABC: Inventory classification. After this, the implementation of the ABC inventory distribution is carried out. Codes were used in the stage to classify the 5S for input identification.

Kardex: Finally, Kardex warehouse of the materials belonging to Warehouse 1 was implemented. Codes in the setep were used to classify the 5S for input identification.

Area 3 – Processes and indicators:
Processes: The first activity for conducting the value flow mapping was to gather the information of all activities, including the implementations made. The flow of activities along with the functions creating the greatest value for the processes and the organization were identified.

Indicators: Finally, the implementation measurement was performed using the indicators shown in previous sections. The obtained results are shown in Table 1.

Table 1: Implementation Control

Indicator	Value after model implementation
Purchase quantity per month	7.00
Non-conforming purchases	28.57%
Damaged material deliveries in purchases	6.40%
Raw material shrinkage	6.63%
Inventory turnover	32.77%
Monthly production plan compliance	76.92%

Control:

The variation of results before and after the implementation are shown in Table 2.

Table 2: Comparison Results

Indicator	Value before model implementation	Value after model implementation	Savings from the model
Purchase quantity per month	18.00	7.00	PEN 283.54
Non-conforming purchases	38.89%	28.57%	PEN 438.45
Damaged material deliveries in purchases	11.02%	6.40%	PEN 593.13
Raw material shrinkage	14.34%	6.63%	PEN 627.65
Inventory turnover	19.63%	32.77%	PEN 408.88
Monthly production plan compliance	73.87%	76.92%	PEN 1,902.30

Following are the results obtained when implementing the warehouse management model in the Central Uniforms EIRL enterprise.

- The proposed model managed to improve warehouse operations, reduce costs, and improve quality.
- Total monthly costs were reduced by 9.24%, in comparison to the average monthly costs of the previous year.
- Total monthly savings was 4253.95 soles compared with the monthly average of the previous ones.

Results

The proposed model was implemented in other warehouses of the organization and another textile MYPE, to validate the viability of the proposal. The results obtained are presented below (The case study is warehouse 2).

Table 3: Implementation of the model in other warehouses

	MP 1 warehouse		MP 3 warehouse		MP 4 warehouse	
Indicator	Value before model implementation	Value after model implementation	Value before model implementation	Value after model implementation	Value before model implementation	Value after model implementation
Purchase quantity per month	16	12	20	12	17	11
Non-conforming purchases	31.83%	24.77%	22.65%	16.98%	27.16%	21.45%
Damaged material deliveries in purchases	12.84%	10.22%	10.99%	9.77%	11.02%	10.76%
Raw material shrinkage	13.11%	11.47%	13.98%	12.87%	17.55%	13.19%
Inventory turnover	29.45%	35.55%	31.65%	36.66%	38.56%	42.14%
Monthly production plan compliance	71.83%	72.91%	75.21%	77.11%	79.76%	82.76%

Conclusions

The proposed model meets the objective of improving the results of the warehouse area.

The model considerably improves supplier selection and evaluation operations and inventory control, reducing time in operations and reprocessing.

The average of deliveries of material damaged by purchases decreased by 18.94%.

When comparing the results of the 4 implementations, it is observed that the average losses were reduced by 24.76%.

The inventory turnover level was increased by 28.18%.

The model achieved that compliance with the production plan increased by 2.98%.

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Continuous Improvement Model Based on Lean Manufacturing and Ergonomic Assessments to Reduce Non-Conforming Products and Losses in the Printing Industry

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Abstract

Approximately 16.9% of Peruvian manufacturing companies experience losses and damaged product issues in their production processes. In the face of our current digital era, which has impacted all business areas, markets in general have become more competitive. Moreover, the digital printing industry now represents approximately US$ 5 million of the Peruvian production sector and exhibits further growth opportunities. Within this context, a continuous improvement model was developed to increase productivity in a flexographic printing press through process optimization and implementation of an appropriate work environment using Lean and Ergonomics tools. The application of these tools was not only aimed at increasing process productivity but also the working condition and workstation design. The results herein achieved an 88% reduction in waste and 90% in defective products.

Keywords: Waste, Non-conforming Products, Continuous Improvement, Lean Manufacturing.

Introduction

The paper and printing industry accounts for 11.6% of the Peruvian production sector (INEI, 2017). Moreover, this industry represented 8.61% of the 2018 production GDP (INEI, 2018), being one of the primary non-primary manufacturing contributors.

The graphic arts industry is experiencing significant growth, which is partially fueled by the 20% rise in the use of digital technology expected for 2020 (Diario Gestión, 2015). Prior to this digital growth, this study seeks to assess other printing techniques that continue to be relevant in Peru. In this light, the initial case study assessment revealed that the main issues currently faced by this industry are non-compliant products, losses, absenteeism, unprocessed orders, and work-related accidents. Furthermore, this assessment identified that non-conforming products and losses represented 90% of the company's expenses owing to internal failures (Villarreal, 2019).

Therefore, this study proposed the implementation of a continuous improvement model, coupled with the application of 5S, Poka-Yoke, and Ergonomics tools, to increase ink-tinting productivity and reduce non-conforming products and losses. Similarly, this process will be standardized through the creation of control indicators. Finally, the authors wish to share the learnings during model implementation within other areas to create a feedback environment and establish joint goals that will lead to the successful achievement of company objectives.

This paper is organized as follows: the State of the Art section reviews the existing literature on the subject matter and states the research problem. The subsequent section describes the expected contribution from this work, followed by the model validation section, wherein the improvements implemented are validated. Similarly, this section also reveals our results and findings from the research study. Finally, the conclusions section discusses our conclusions, constraints, and recommendations for future studies based on our assessment herein.

State of the Art

Application of Lean Manufacturing in the Production Sector

When reviewing the Lean model literature, there is an evident demand from organizations for effectively removing non-value-added operations to reduce costs and foster continuous process improvement. Lean is used in multiple sectors and there are several definitions and perspectives as per different authors (Bhamu, 2014). For example, Hallgren et al (2009) define Lean as a main objective approach seeking to increase operations efficiency, identify value and waste, develop knowledge, and create a continuous improvement culture at work to promote process operations and business management sustainability. Therefore, reducing reprocesses will increase the employee awareness regarding organizational sustainability. On the other hand, Mostafa et al. (2013) argue that a successful Lean initiative must be well structured, designed, and sufficiently comprehensive so that it can be completely understood by all staff, without neglecting human and technical factors. Therefore, Lean can be defined as a main objective approach aimed at obtaining benefits through tool implementation, eliminating waste, fostering knowledge development, and promoting organizational culture. As for the application of Lean, Mathur et al. (2012) suggest that small and medium-sized companies should only implement simple and affordable Lean practices. In addition, Chaplin et al. (2016) recommend small and medium-sized enterprises to implement a “Lean Lite” approach (limited number of Lean practices) owing to their limited financial and knowledge resources. Therefore, instead of adopting Lean in all its dimensions, small and medium-sized businesses must select specific Lean practices within the reach of their operations.

One of these Lean tools is the 5S, which focuses on organizing, cleaning, and establishing the workplace environment in order. Further, Gajdzik (2009) states that the 5S method contributes to creating and maintaining an organized, clean, efficient, and an optimal quality workplace. In addition, Pepper and Spedding (2010) consider that the 5S helps to organize, classify, clean, standardize, and improve processes to foster their systematization and standardization within organizations so that they may become the norm and routine followed there. Another Lean tool is

Poka-Yoke, which focuses on error prevention. As stated by Stewart et al. (2001), Poka-Yoke uses processes or design features to prevent errors or their negative impact. On the other hand, Middleton (2001) defines Poka-Yoke as the systematic practice of eradicating errors by determining their root cause. Finally, Plonka (1997) considers that a Poka-Yoke is a mechanism for detecting, eliminating, and correcting errors at their source, prior to them being identified by the client.

Manufacturing companies have benefited from implementing the 5S principles as it is a basic practice for improving the use of space by cleaning and organizing workplaces, thereby obtaining higher levels of quality, better delivery times, and improved cost reduction. For example, Alves et al. (2012) implemented the 5S methodology to facilitate deliveries of raw materials and tools to minimize travel time and downtimes. On the other hand, Agrahari et al. (2015) implemented the 5S methodology in a small-scale industry to improve cleanliness and productivity. Furthermore, to sustain the improvement, they encouraged staff feedback through questionnaires, which allowed them to get feedback and identify process improvement opportunities.

Regarding Poka-Yoke implementation in production companies, Sundaramali et al. (2018) focus on minimizing rejection rates at piston manufacturing lines and guaranteeing maximum rejected material recovery through the tool. Once the tool had been implemented, they were able to inspect the transformed raw material before it was transferred to the assembly line, thereby identifying defective components and avoiding unnecessary assembly. In addition, the recovery of defective components helped to minimize waste, generating savings in terms of money, resources, time, and labor.

Application of Ergonomic Assessments in the Production Sector

As evidenced by the several ergonomics application cases reported, companies must effectively account for ergonomics in their processes and facilities to reduce musculoskeletal disorders affecting their staff. Furthermore, this problem has been assessed from various perspectives. For instance, Muntaner et al. (2016) assert that guaranteeing safe working conditions is a key factor in workforce empowerment. Demirel et al. (2016) further argue that we must first completely comprehend the relationship and synergy between improving working conditions and the quality of manufacturing processes, which can be achieved through the proactive implementation of improvement measures in the field of ergonomics. In addition, Cadavid et al. (2015) conclude that companies that invest resources in improving ergonomic conditions at their facilities achieve a more favorable external projection. Similarly, some certifications allow companies to prove that they are interested in providing health care to their employees, which identifies them as a great place to work. Consequently, these initiatives generate greater integration between employees and the company's vision, which reduces turnover rates and improves organizational development.

In the manufacturing industry, the application of ergonomic assessments ultimately reduces expenses related to disabilities, overtime, medical care, and penalties (Chang, 2016). For example, Munguía et al. (2017) discuss ergonomics opportunities that facilitate sustainability in the manufacturing industry. Through the implementation of Rapid Entire Body Assessments, Rapíd Upper Limb Assessments, and a worker perception survey, they confirmed that ergonomics is an effective means to cultivate higher levels of sustainability in the manufacturing industry. In this sense, daily exercise sessions or active breaks also contributed to reduce stress among participating employees, consequently, stimulating productivity through the development of new activities at the facilities under study.

On the other hand, Brandl et al. (2016) performs a comprehensive ergonomic assessment of employee postures using the Ovako Working posture Analysis System (OWAS) with an

individual sampling strategy in the semi-trailer assembly industry to implement corrective measures and improve uncomfortable work postures. This study reported that the 11 most frequent work postures defined by OWAS had a relative frequency of more than 90%. In the assembly of semi-trailers, work postures such as kneeling, lying down, or squatting could be almost completely avoided through a better ergonomic design at the workplace.

Contribution

Proposed Model

Based on our research, as well as our previous literature review, this study proposed the implementation of a continuous improvement model based on Lean Manufacturing and Ergonomics for reducing non-conforming products and losses in the flexographic printing industry. As denoted in Figure 1, this model encompasses the following five phases: identify opportunities for improvement, assess defects at a qualitative level, implement improvements, control processes, and share knowledge.

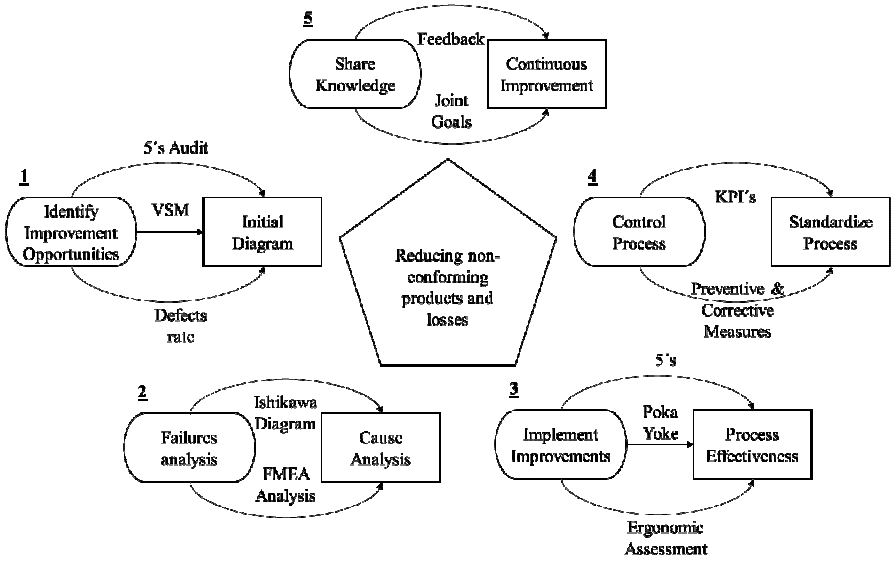

Fig. 1: Proposed continuous improvement model for reducing defective products and losses.

Identify Opportunities for Improvement: Subsequent to assessing the current situation of the company, opportunities for improvement are identified with respect to defective products and losses related to the ink-tinting process. This phase seeks to evaluate the company in terms of the 5S to completely map all current processes and measure their performance to prepare an improvement proposal

Assess Defects: This phase provides an in-depth assessment of the defects presented during the ink-tinting process through the Ishikawa and Failure Mode Effect Analysis tools to determine the impact exerted by these failures.

Implement Improvements: During this stage, a 5S implementation method is developed as per its five steps: sort, set in order, shine, standardize, and self-discipline. In addition, a Poka-Yoke system is also designed and implemented to detect and remove process errors, and subsequently

provide employee training sessions on its application. Finally, ergonomic assessments aligned with the improvements needs of the company are conducted.

Control Processes: Once the improvement implementation stage has been completed, processes must be subsequently controlled through KPI's and by taking preventive and corrective.

Proposed Method

Figure 2 depicts the implementation steps for the continuous improvement model in the ink-tinting process.

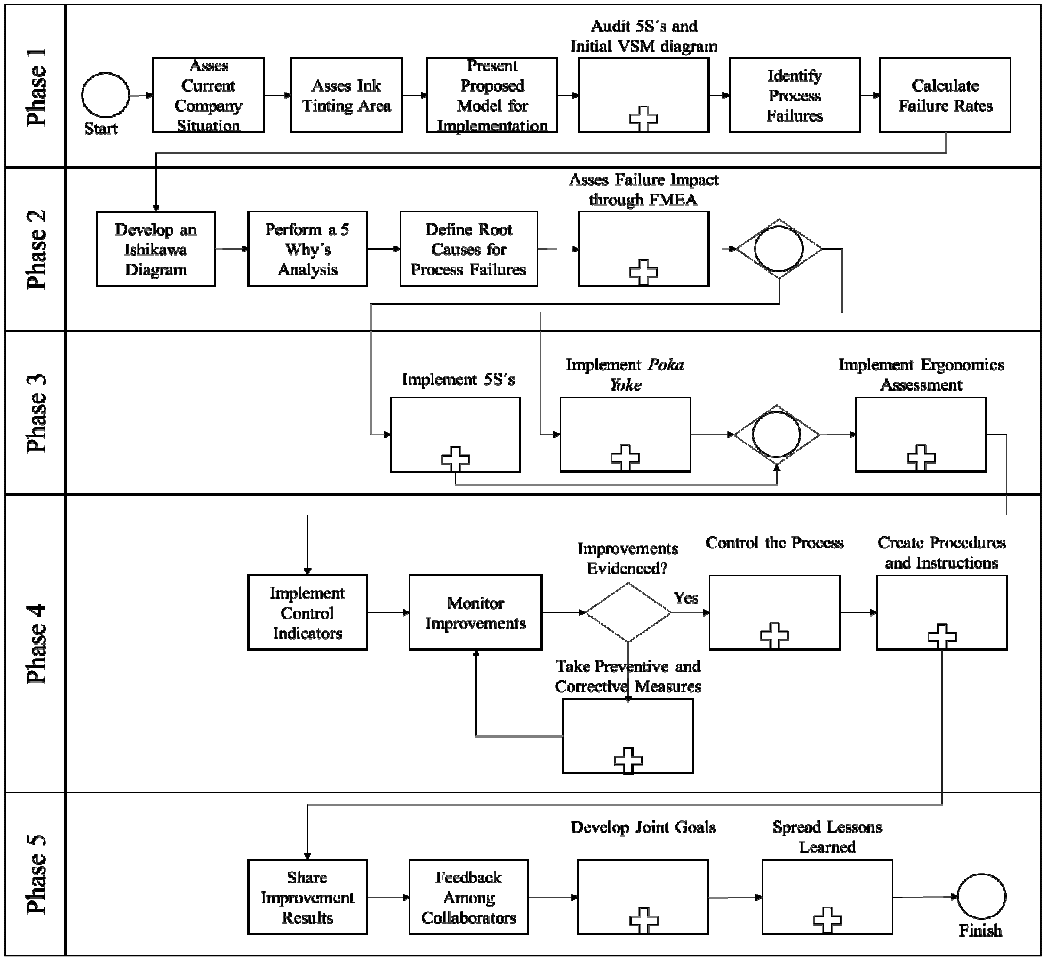

Fig. 2: Breakdown of the proposed model for implementation

The following figures display a specific view for each tool implemented in Phase 3.

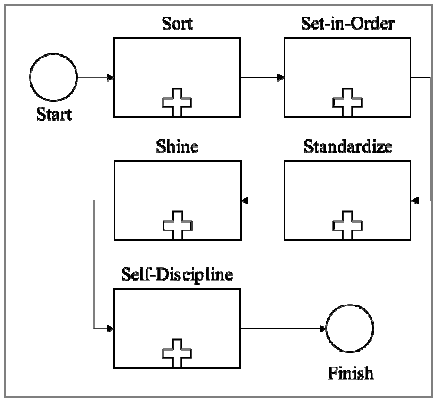

Fig. 3: Specific 5S´s implementation view

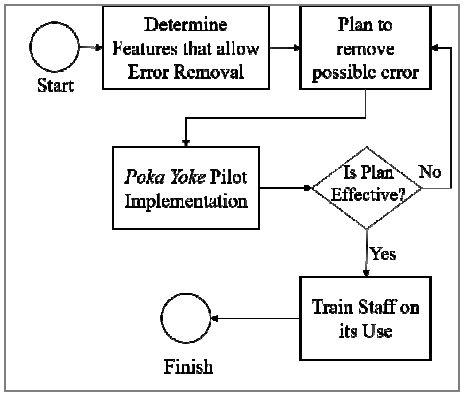

Fig. 4: Specific *Poka-Yoke* implementation view

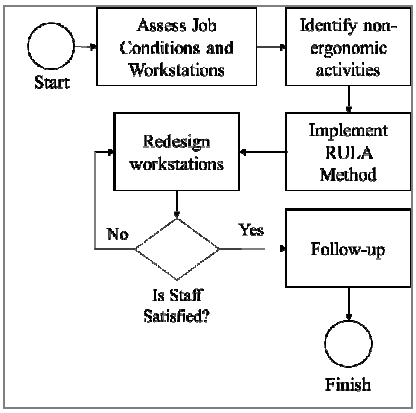

Fig. 5: Specific ergonomic assessment implementation view

Indicators

The indicators measured prior and subsequent to the model implementation are listed and explained below:

Non-conforming product rate: Measures the number of non-conforming labels delivered against the total number of labels delivered (in thousands).

$$IpNc = \frac{Non\text{-}conforming\ labels}{Labels\ delivered} \quad (1)$$

Traffic Light Indicator		
Optimal	***Regular***	***Deficient***
Less than 0.7	Between 0.7 and 1.5	Over 1.5

Loss rate: Measures the total number of labels lost during the production process against the total number of labels produced (in thousands).

$$Im = \frac{Labels\ lost}{Labels\ produced} \quad (2)$$

Traffic Light Indicator		
Optimal	***Regular***	***Deficient***
Less than 0.3	Between 0.3 and 0.7	Over 0.7

Validation

Case Study – Simulation

This paper focuses on the case study of a printing press. The company produces prime label packages and coding, representing 89% and 11% of its annual sales, respectively. Therefore, this research exclusively focuses on the prime label production and its corresponding problems.

Initial Assessment

The main probable causes for the problems reported (non-conforming products and losses) were identified as variations in ink shades and excessive physical efforts from workers while performing the ink-tinting process.

The following are the initial indicators for the ink-tinting area:

Table 1: Initial indicators

Non-conforming labels owing to the colour shade	98,000 per month
Losses owing to colour shade	125,000 per month

Next, the authors performed a representation of the current ink-tinting process, observing two process reprocesses. The first was the ink testing with a 20% probability and the second was the tinting validation with a 35% probability (Fig. 6).

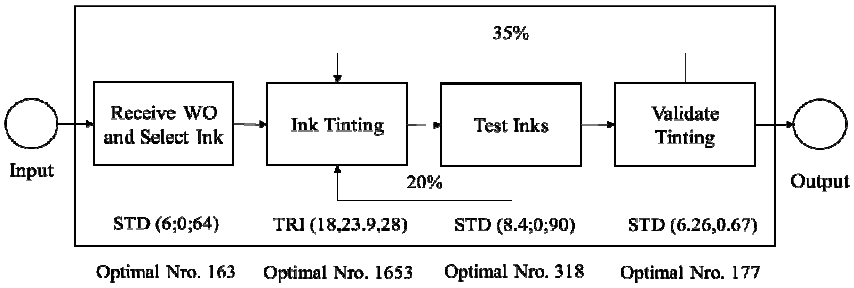

Fig. 6: Current system representation

Proposed Model Application

Subsequent to the proposed scenario being implemented, reprocesses were eliminated and tinting times decreased by 20% from the initial times.

Proposed Model Application

A simulation of the current ink-tinting process was performed, with a confidence level of 95% and a margin of error of 10%, with the following results:

The results from the proposed model are (Table 2 and Table 3)

Table 2: Simulation Indicators

Factor	Current	Proposed	Results
Processing times	112 min	89 min	Decreases
Older queue	12 units	9 units	Decreases
Incoming orders	15 units	17 units	Increases
Resource	0.98	0.86	Decreases
Orders fulfilled	9 units	17 units	Increases

Table 3: Control Indicators

Indicator	Current	Proposed
Non-conforming labels due to colour shade	98,000 per month	10,000 per month
Losses due to colour shade	125,000 per month	15,000 per month

Conclusions

In this case study, an 84% integration rate was reported for Lean tools and Ergonomic Assessments.

By integrating Lean tools and Ergonomic Assessments, the proposed model can be adapted for any other company production area.

Subsequent to the implementation of the proposed model, the number of non-compliant products owing to the color shade was reduced by 90%.

Furthermore, the total number of losses owing to the color shade was reduced by 88%.

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Outdoor Advertising Effectiveness Forecasting Model Applying Enterprise Architecture to Increase Sales in Small Businesses

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Abstract

The present research focuses on the importance of forecasting outdoor advertising effectiveness in the placement of advertising items in the public thoroughfare, especially in the implementation of billboards, as every damage entails a percentage decrease in the investment in Latin America compared with the previous year. The inexistent effectiveness measurement and a process lacking structure have caused loss of service in trade marketing companies because customers prefer a more expensive service such as digital advertising, which has an effectiveness measurement system. To solve this problem, we developed a placement process flow and used a linear regression model to demonstrate the placement time influence on sales of 40 stores, in two scenarios: 2018 and 2019. Thus, placement time was reduced by approximately 74.35% and sales increased by 145%.

Keywords: Advertising, public road, effectiveness, POS.

Introduction

Advertising is the means by which companies in the mass consumption sector communicate with the final consumer by providing information, promotions, and product launches. Hence, companies make a significant investment in the area or company engaged in the placement of advertising items. According to Zenith, in the Global Intelligence report of March 2018, advertising spending in America stands at 8.2 % as opposed to Europe and Asia (Sainsbury et al, 2017). This shows America's opportunity for growth. The same magazine mentions the average annual growth in terms of advertising, where we find outdoor advertising (2.7%) as opposed to the average of digital advertising (12.7%) (Sainsbury et al, 2017), although there has been a decrease in outdoor advertising investment and an increase in digital advertising owing to technological trends in recent years. Similarly, in Peru, according to the Peruvian Advertisers Association (ANDA), investment in advertising has increased considerably from 2017 to 2018, owing to sports and political events (Hutter, 2014). However, these events are seasonal, as they

occur every four years. Without these events, investment in advertising would have continued to decline. According to the Peruvian Superintendence of Customs and Tax Administration (SUNAT), the payment made by advertising media from 2015 to 2018 shows a decrease in public advertising investment with a share of only 4%, as opposed to previous analyses, owing to an 8% increase in digital advertising (Shvetsov, 2010).

The previous research showed an opportunity for improvement, as companies must prepare themselves to offer results in the reach of their investment. Thus, companies, especially small ones, must have a structured process to meet requests and counteract existing problems. Optimal process implementation to improve quality, costs, and productivity levels requires firm discipline, work ethic, and culture, seeking customer satisfaction.

We propose a process aimed at boosting investment in the visibility element implementation through an effectiveness forecast model applying enterprise architecture and continuous improvement. The model aims to create added value and, in this case, to determine a scope of investment. For this research, we propose the use of enterprise architecture and, in each phase, to use service optimization tools, such as continuous improvement and key performance indicators (KPIs) focused on measuring advertising scope on the public road. These tools are implemented for the improvement of the problem faced by small enterprises or marketing and advertising areas.

State of the Art

Model of Outdoor Advertising Effectiveness in Small Enterprises

Some authors argue that the forecast of outdoor advertising effectiveness has not been sufficiently studied; thus, they researched on different outdoor advertising means, such as transportation, trains, and buses, in static and moving billboards placed in different areas and of large dimensions. However, not all outdoor advertising media have the same variables, due to different case studies (Henningsen et al, 2011) (Perlich et al, 2014) (Browning, 2009) (Ross et al, 2004) (Kumar et al, 2016). The authors state that outdoor advertising has a greater reach than digital media such as television, radio, and social networks, but that there is no way to quantify it. Therefore, they used data processing tools, element recognition surveys, forecasts, and variable measurement (Henningsen et al, 2011) (Perlich et al, 2014) (Browning, 2009).

Enterprise Architecture

The authors summarize that overall enterprise architecture encompasses the entire business life cycle: from business process reengineering to continuous process improvement to streamline high-priority activities. However, in reality, the small businesses' processes are not structured from the beginning of their operation because their only goal is to subsist (Scheer et al, 2000) (Winter et al, 2007) (Laroche et al, 2001) (Rosset et al, 2006). Other authors disagree and choose to develop enterprise architecture based on a workflow to reduce the bottleneck activity in a company, as it generates a delay in business execution (Scheer et al, 2000) (Kong et al, 2002) (Lee et al, 2010).

Outdoor Advertising Effectiveness Forecasting Model Applying Enterprise Architecture

The authors agree that small enterprises must take advantage of the changing climate to maximize their profits and achieve an effectiveness model in outdoor advertising. They are currently in a constant search to define and improve their processes, through workflow and continuous improvement (Sainsbury et al, 2017) (Shvetsov, 2010) (Kumar et al, 2016). Small businesses lacking a well-defined process structure

generate bottlenecks that affect the flow time. Therefore, the goal of enterprise architecture (EA) is to organize the flow and increase outdoor advertising effectiveness, which is reflected in sales; because the lesser the installation time, the longer the advertisement will be exposed to consumers (Sainsbury et al, 2017) (Shvetsov, 2010).

Contribution

Proposed Model

Phase 1: Plan :Companies must achieve commitment from the sales executive and the staff involved in the task and, conversely, must have access to the prior-year investment data regarding the placement of elements in the chosen campaign and the consequently achieved sales. The case study consisted of a Pareto chart of the point-of-sale tops and the panel element, followed by an analysis of KPIs.

Phase 2: Do: Based on the study conducted, we created a process applying EA, involving phases, stakeholders, database, and decisions, to improve process activity control. Staff is trained in requesting legal permissions and in the process flow, and the company places the process on a website using business intelligence to achieve better results.

Phase 3: Check: The third phase consists of checking the control of advertisement placement and trainings. On the other hand, activities are followed up during the process, i.e., response time, checks, and decisions are controlled in the activities.

Phase 4: Act: In improvement actions, the process carried out must be addressed to continuously improve their performance. If any defect, error, or waste is found, the Plan-Do-Check-Act model should be applied to solve it as shown in Fig. 1.

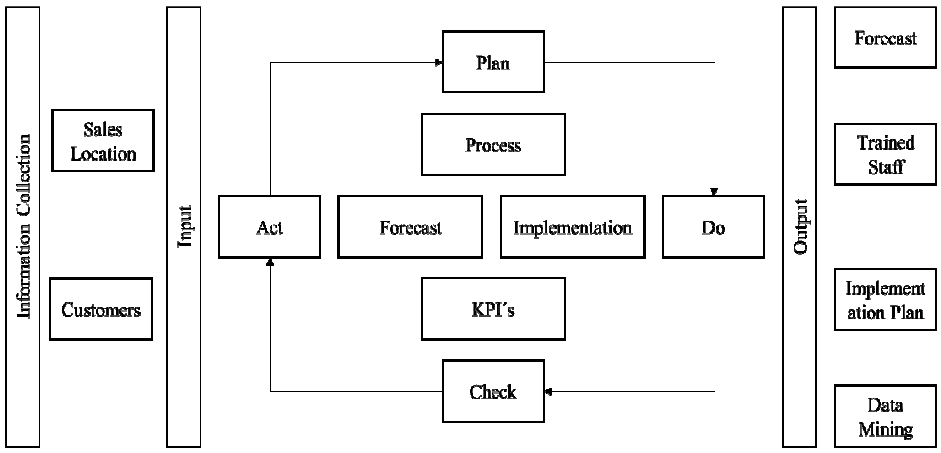

Fig. 1: Proposed Model

Indicators

Indicator 1: Item placement process time (PT).
Objective: To achieve a level greater than 90% in placement time.

$$\frac{Optimal\ Placement\ Time}{Average\ Placement\ Time} \times 100 \quad (1)$$

Interpretation: If the result is higher than 85%, it is optimal; if the result ranges between 60% and 84%, it is regular; and finally, if the result of the indicator is lower than 59%, it is poor.

Indicator 2: Response time per stakeholder (RT).
Objective: Achieve a higher level of 90% in response time per stakeholder in the placement process.

$$\frac{Optimal\ Placement\ Time \times Phase}{Average\ Placement\ Time \times Stakeholder} \times 100 \quad (2)$$

Interpretation: If the result is higher than 85%, it is optimal; if the result ranges between 60% and 84%, it is regular; and finally, if the result of the indicator is lower than 59%, it is poor.

Indicator 3: Placement Efficiency (PI)
Objective: Achieve 95% placement efficiency.

$$\frac{Number\ of\ Efficiently\ Placed\ Elements}{Total\ Number\ of\ Placed\ Elements} \times 100 \quad (3)$$

Interpretation: If the result is greater than 95%, it is optimal; if the result ranges between 70% and 94%, it is regular; and finally, if the result of the indicator is less than 69%, it is poor.

Indicator 4: Goal Achievement (GA)
Objective: Achieve 90% of goals.

$$\frac{Number\ of\ Item\ Placed}{Total\ Forecast\ of\ Items\ to\ be\ Placed} \times 100 \quad (4)$$

Interpretation: If the result is higher than 85%, it is optimal, if the result ranges between 60% and 84%, it is regular; and finally, if the result of the indicator is lower than 59%, it is poor.

Validation

Case Study

The validation will be performed for the company Reyplast SAC, identified with tax identification No. 20125508716; this company is engaged in the production, processing, and distribution of plastic products for industrial and household use.

Initial Diagnosis

The diagnosis made in the case study is shown in Figure 2 (Year 2018).

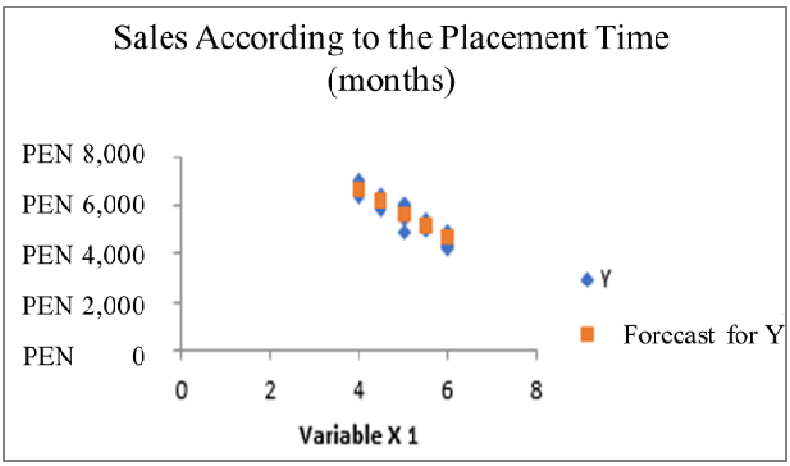

Fig. 2: Sales figures according to placement time

First, the PT indicator showed that 66% of the item placement process time is regular. Second, the RT indicator is divided into process phases and all are at a poor level, except for phase 5, which is at a regular level. Third, the PE indicator was 75, which means that placement efficiency was regular and the AO of 80% means that goal achievement (GA) was regular.

Contribution Development in the Scenario

Plan: We classified the staff involved and the responsibilities in the process as shown in Tab. 1.

Table 1: Duties According to the Staff Involved

Process Role	Position in the Organization	Duties
Customer	Sales executive	• Enter advertising request • Approve photomontage • Draft letter of approval
Service	Controller	• Assess POS and forecast the required amount • Manage route and photomontage • Budget investment amount • Communicate budget disapproval and photomontage • Receive approvals • Enter proformas • Cancel request • Monitor item placement process • Generate final photo report • Approve advertising placement
Customer	Sales Supervisor	• Approve request • Fill out the application
Customer	Marketing Manager	• Approve budget • Generate approval • Validate advertising placement

Customer	Procurement Manager	• Approve correct *pro forma* • Generate purchase order

Do: The regression equation is used to forecast sales according to the time it takes to place the advertising element.

$$b = \frac{N\sum xy - \sum x \sum y}{N\sum X^2 - (\sum X)^2} = -1{,}006.22 \quad (5)$$

$$a = \frac{\sum y - b\sum x}{N} = 10{,}703.20 \quad (6)$$

$$Y = a + bx \quad (7)$$

$$Y = 10{,}703.20 - 1{,}006.22x \quad (8)$$

According to the process flow, activities are established according to their phases and the time required by each one. Thus, the number of days spent by each defined process is shown.

Table 2: Estimated Time per Phase

Year	**2019**
Phase 1: Request Collection	
Activity	***Estimated Time***
Enter advertising request	2
Phase 2: Justification for Request	
Evaluate POS and forecast required amount	4
Fill out the application	3
Phase 3: Application Specifications	
Manage route	4
Generate photomontage	4
Budget investment amount	2
Generate approval	2
Phase 4: Request Approval	
Generate approval letter	4
Communicate budget disapproval	1
Receive approvals	1
Phase 5: Processing and execution	
Start processing	19
Finish processing	19
Execute placement	15
Enter 3 proformas	1
Approve proformas	0.5
Generate purchase order	1
Phase 6: Verification and quality control	
Monitor advertising placement	1
Generate final report	1
Validate advertising placement	2.5
Total days	87

Check:

Table 3: Regression Statistics

Multiple Correlation Coefficient	94.4%
R-Squared Coefficient of Determination	89.2%
Adjusted R-Squared	88.9%
Standard Error	241.9
Comments	40

Table 2 and 3 show the high influence between time and sales (94.4%).

The shorter the time, the greater the sales, as advertising will be found from the beginning of the campaign and not days later as shown in Table 4.

Table 4: Sales Forecast According to Advertising Placement Time

***Y* = 10703.20–1006.22 x**	
Sale (PEN)	***Time (Months)***
6,678.34	4
5,672.12	5
4,665.91	6
3,659.69	7

With increase in the placement time of an advertising item, sales will decrease. Therefore, the model is aimed at reducing placement time.

Act

Table 5: Indicators

Year	**2018**	**2019**
PT	66%	75%
	50%	100%
	58%	100%
RT	43%	75%
	30%	50%
	88%	97%
	22%	44%
PE	75%	87.50%
GA	80%	88.80%

First, the PT indicator increased to 75%, but remains at a regular level over the time the item placement process is regular. Second, the RT indicator shows the change in level from regular to optimal in phases 1 and 2 (100%). Phase 3 increased to 75%, from a poor level to a regular level. Phase 4 increased to 5%, but remained at a poor level. Phase 5 went up to 97%, remaining at an optimal level. Phase 6 increased to

44%, but remains at a poor level. Third, PE stood at 87.5%, improving from its regular level to an optimal level. Fourth, the GA indicator amounted to 88.8%, remaining at an optimal level.

Conclusions

We applied the model in three additional scenarios to implementation. With respect to indicator 1, the result in scenario 0 (75%) is not far from the average analyzed in the four scenarios (68%). This analysis shows that the model used to measure outdoor advertising placement effectiveness can be applied to any advertising item. However, we recommend the collection of process information with other items to adjust total time to a future final process.

Indicator 2 (78%) is not far from the average analyzed in the four scenarios (71%); the analysis shows that the model used to measure the effectiveness of outdoor advertising placement can be applied to any advertising item, since the proposed phase time has been determined with maximum placement times.

The analysis of indicator 3 shows that the average of the four scenarios is 100%, which, when compared with the application scenario—scenario 0—indicates a significant difference, as this result was 79% getting a result or so optimal considering another type of item in work effectiveness. Thus, we believe we did not measure some external factors that generate this variant with respect to scenarios.

Indicator 4, which refers to GA, shows that according to the analysis, the average is below the required target of 72%, and the result obtained from scenario 0 was 75%, which is also not far from average. This analysis shows that the effectiveness measurement model complies with the measure of GA ultimately reflected in sales.

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Lean Production Management Model Using an Agile Approach Applied to Increase Productivity in Small and Medium-Sized Chemical Companies

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Abstract

Currently, the chemical sector continues to consolidate itself as one of the key business sectors of the Peruvian economy, especially as its products are on high demand as essential components used by other industries, such as construction, mining, and textile. This reflects the great responsibility that chemical companies have regarding efficiently managing their material and human resources, which includes assessing productivity in terms of growth rates and levels. Within this context, Lean Manufacturing tools are used to measure these indicators and propose improvements and/or solutions that may generate added value to the company. However, Peru does not report a wide variety of research that focuses on the chemical industry productivity. In this light, this study proposes using the abovementioned tools to assess the current situation and determine opportunities for improving production processes in this industry. However, the literature review also reveals that Lean projects may sometimes not be successful owing to implementation issues. Therefore, this proposal will be developed using an agile approach to quickly make decisions in the event of any problem. This model was validated through a pilot run at a small Peruvian chemical company, which reported low productivity issues owing to idle operator times, non-conformities with production requirements, reprocesses, and poor purchasing planning. The pilot implementation was conducted for a month and the results were assessed through a simulation, which reflected an increase in productivity coupled with a decrease in reprocesses and service levels.

Keywords: Agile, Lean Manufacturing, Chemical-sector, Scrum

Introduction

In 2017, the chemical industry contributed $1.1 trillion to the global GDP, effectively becoming the fifth largest production sector in the world. (ICCA, 2019) Moreover, the chemical industry has recently played a key role in Peruvian exports, ranking third among the economic sectors in 2017.

(Posada, 2018) According to a recent study, there are 3,744 small and medium-sized chemical companies in Peru, accounting for 86% of all companies operating within the sector, and all of these companies largely depend on increasing their product exports. (SUNAT, 2017) However, their growth rate is often affected by deficits caused by low process productivity. Therefore, the lack of technological advancement and innovation must be offset through the application of new development trends aimed at streamlining and optimizing production processes and avoiding unnecessary expenses that could decrease their profits. (Posada, 2018)

Given the importance of guaranteeing competitiveness for the chemical industry, the operational plan for the chemical sector proposes the following eight objectives: (i) to adapt legal and technical standards for the needs of the sector, (ii) to promote research and associativity within the chemical sector, (iii) to train highly qualified human resources, (iv) to foster the development of petrochemical complexes, (v) to increase value-added product exports in the chemical sector, (vi) to endorse specialization in products with export potential, (vii) to develop an efficient business intelligence system, and (viii) to encourage new products and exporters. These objectives are embodied in specific action items assigned to individual owners and employees. (MINCETUR, 2016)

Lean Manufacturing is effective in achieving desired results for any organization. Moreover, several authors confirm that the selection of Lean Manufacturing as the system of choice for improvement is quite unanimous. (MINCETUR, 2016) (PRODUCE, 2015) The transformation capabilities of Lean Manufacturing do not depend on the size of the organization. Therefore, the proposed model is aimed at improving the operational productivity in small and medium-sized chemical businesses. The pilot implementation will be performed at a Peruvian company that produces adhesives and their accessories and has reported low productivity issues owing to operator downtimes, non-conformities with production requirements, reprocesses, and poor purchasing planning. The development of the Lean model will also be grounded on the Scrum agile development approach, which is easy to understand and will follow Lean action plans to ensure quick responses to any market changes that may arise.

This paper is structured as follows: state of the art (correlation between the results from previous research studies), contribution (methods and tools), validation (results) and conclusions.

State of the art

Production Management in the Chemical Sector

Acquiring knowledge on advanced production management systems (Materials Requirements Planning (MRP), JIT, OPT, TOC, and others) can help improve customer service, result in greater inventory control, and leverage other benefits related to production costs and quality. (Matias, 2013)

Renowned authors have used Lean tools and managed to implement an 18%–25% reduction in downtimes as well as reported an 8%–12% increase in productivity. (Xavier, 2015) (Hai, 2012) Some authors are committed to the development of a production management strategy in which market demands and manufacturing capacities are utilized for observing problems arising during the purchase and sale analysis. These authors assess the company and discuss the technological improvements that could be beneficial for it, concluding by providing feedback and repeating the cycle to determine opportunities for improvement. (Saravanan, 2017) (Marmolejo, 2016)

Lean Tools used in the Chemical Sector

Lean tools improve the production capabilities of manufacturing companies through a group of tools and measures adapted for different crises that the company could face. (Szwejczewski, 2016) Currently, renowned authors of scientific papers have reached different conclusions regarding the use of these tools within the sector. Many of them argue that the application of Lean tools such as VSM, 5S, and KAIZEN may help decrease the downtimes, improving company productivity. (Feldman, 2013) (Silva, 2014) However, other authors state that implementing Lean in the chemical sector increases profitability, reduces costs, increases customer satisfaction, provides greater environmental protection, and improves skills, morale, and job satisfaction among workers. (Amrina, 2017) (Fredj, 2016)

On the other hand, the benefits from standardized work include the documentation of changes to current processes, decreased variability, easier training of new operators, less number of injuries and stress, and a baseline for improvement activities. (Muganyi, 2018) (Szwejczewski, 2016) This tool could also facilitate problem solving (Cournoyer, 2013). Similarly, through work standardization, other authors have been able to reduce the cycle times by over 20% when removing non-value-added activities from the final product, thereby increasing their productivity by approximately 10%. (Pereira, 2016) (Wigglesworth, 2012). However, despite being an extremely useful tool, its use is usually neglected either because of outdated methods or lack of training; therefore, there must be an update plan for each tool that is implemented. (Miroslava, 2016)

Agile Approach in the Chemical Sector

The agile approach is not only based on Continuous Improvement but also seeks to redesign project development approaches, allowing simultaneous execution in project cycles. (Nallusamy, 2016) Moreover, as it is an adaptive process, the Scrum agile methodology can manage projects in a more efficient manner. (Mor, 2016)

Although Scrum was designed primarily for software development, it can also be used for managing non-technological projects as evidenced by authors who have used Scrum to improve project development in terms of problem solving and assigning tasks to stakeholders. Furthermore, the limited studies wherein this methodology has been applied to the production sector have reported good results; however, no other studies that specifically focus on the chemical industry have been found. (Angappa, 2018) (Hu, 2009) Implementing the agile approach in a small company may have certain limitations owing to external interruptions. As these companies usually have limited number of employees, each one often plays more than one role in the organization. Therefore, project stakeholders are usually interrupted by issues related to other projects. (Omer, 2018)

Lean Production Management in the Chemical Sector Using Agile Approaches

Production management implementation involves determining certain functions such as MRP, Warehouse Management, Manufacturing Equipment Management, Workshop Management, Documentation Management, and Knowledge Management. (Matías, 2013) Supporting Lean Manufacturing principles with an agile approach can achieve productivity gains and improvements in customer satisfaction as well as develop capabilities for providing quick responses to market changes. (PRODUCE, 2015) (Paasivaara, 2016) During the actual application, adapting an agile or Lean environment can generate opportunities for improving profits up to 12%, considering low-variation demands and small production batches. (Breno, 2015) An essential project monitoring

component is the integration of Kanban boards or monitoring programs, like Trello, which can be used in any type of planning or organization. This application, in addition to supporting Scrum processes, has a number of advantages, including making progress visible to the entire team and adding details to each task (for example, comments, checklists, due dates, and attachments). (Sunil, 2015)

Contribution

Rationale

In this section, three typologies previously used will be analyzed, as well as the model used and the results obtained (Table 1).

Table 1: Rationale Summary

Typology	Production Management in the Chemical Sector Model	Lean Tools used in the Chemical Sector	Agile Approach in the Chemical Sector
Model	Strategy Implementation in a Manufacturing Network	Lean Model for Cost Reduction	Scrum Model for Project Development
Results	Increased production plant efficiency	Higher profitability and lower costs. Higher customer satisfaction.	Problem Resolution and Task Assignment

Regarding the first production management typology in the chemical sector, we found a paper that implements a manufacturing network strategy. This strategy aimed to increase the production plant efficiency and has proven to be replicable in most manufacturing industries, including the chemical sector. On the other hand, we have the typology of Lean tools that have previously been used in chemical companies. In this branch, there is a Lean model for cost reduction that increased profitability and in turn reduced costs by improving customer satisfaction.

Proposed Model

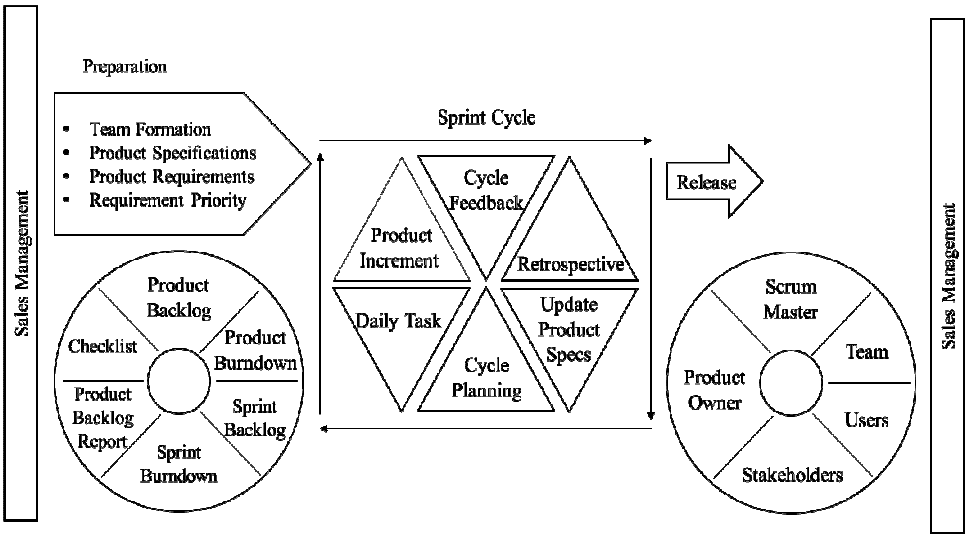

Fig. 1: Lean Manufacturing model using an agile approach

Model Components

- Stage 1: To start with the implementation of an Agile model, a team comprising a project owner, a Scrum master, and project members must be formed.
- Stage 2: Subsequent to establishing a team, the project or product owner will be responsible for providing the objective to be achieved and its corresponding requirements. These requirements are broken down into stories, where a priority order will be established for tasks required for completing the said requirement, in addition to determining the work cycle length.
- Stage 3: Depending on the task priority, the team starts rating the tasks based on a pivot activity, which is a simple task that everyone can perform. The score is given through the SCRUM POKER prior to the team selecting who would perform each activity based on the number of work hours required and how much the team members are able to work during the sprint.
- Stage 4: Once the tasks to be executed during the cycle have been planned, Lean Manufacturing tools are used to diagnose the current process status. At the end of the cycle, the progress made by the team will be communicated to the stakeholders, the Scrum Master, and the Project Owner, so that they can provide feedback and incorporate the necessary changes to the project and/or the product.
- Stage 5: The previous step is repeated for a maximum of four times, wherein the tangible and intangible results of the project may be observed.
- Stage 6: Finally, the completed project is presented to the project owner.

Proposed Method

The proposed flowchart is shown in Figure 2.

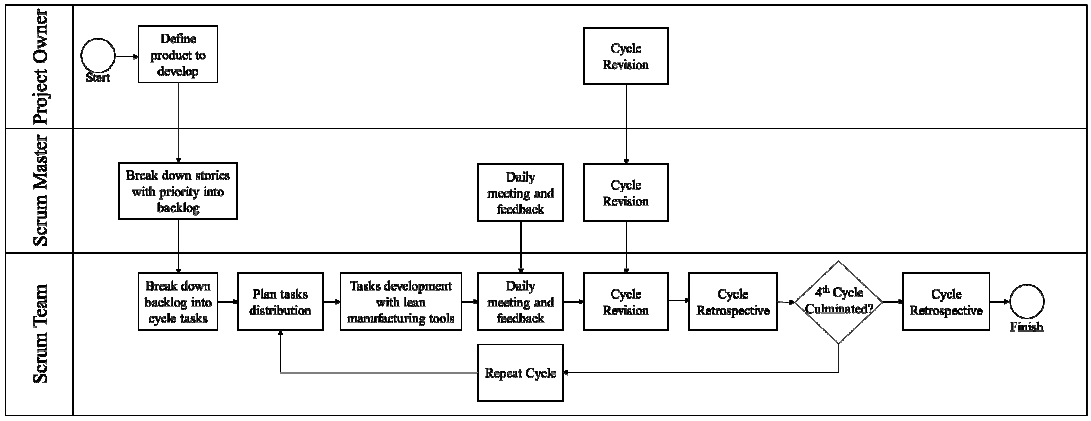

Fig. 2: Design flowchart

Indicator

To measure and monitor the improvements implemented as a part of this study, proposal indicators were established. The results are divided into three colours as shown in Table 2 and Table 3.

Table 2: Colour meanings

Within Control	Moderately within control	Outside of Control. Critical

Table 3: Traffic light indicator

Indicator	Formula	Results		
		Optimal	**Regular**	**Dangerous**
Downtimes	$\frac{Downtime}{Operation\ Time} x\ 100$	<=10%	<=15%	>15%
Defective Containers	$\frac{No. Defective\ Containers}{Total\ Number\ of\ Containers} x\ 100$	<=2%	<=4%	>4%
Product Reprocesses	$\frac{No. of\ Batches\ Reprocessed}{No. of\ Batches\ Requested} x\ 100$	<=1%	<=3%	>3%
Internal Audit Progress	Audit Score	>=50	>=40	<40
Shortage of Production Containers	$\frac{Times\ containers\ are\ missing}{No. of\ containers\ required} x\ 100$	<=5%	<=10%	>10%
Conformity with Product Requirements	$\frac{Units\ Addressed}{Units\ Requested} x\ 100$	>=90%	>=75%	<75
Productivity	$\frac{Units\ Produced\ (kg)}{Time\ Dedicated\ (hr)} x\ 100$	>=60 kg/hh	>=50 kg/hh	<50 kg/hh

Validation

The proposed improvement was validated both through a pilot implementation and an Arena software simulation.

Validation Through Pilot Implementation

To validate the expected results, a work standardization pilot was implemented using the three tools proposed in section III: the 5S, PA, and MRP. The traffic light indicators are presented below, wherein the original values recorded prior to the improvement are compared against the expected values and the results from implementing the tools proposed in Table 4.

Table 4: Validation of traffic light

Indicator	Current Value	Expected Value	Actual Value
Downtimes	25%	10%	12.54%
Defective Containers	5%	2%	4%
Product Reprocesses	5%	1%	2%
Internal Audit Progress	17	40	45
Shortage of Production Containers	25%	5%	10%
Conformity with Product Requirements	73%	90%	84%
Productivity	**53 kg/hh**	**60 kg/hh**	**57.8 kg/hh**

As observed in the indicators, operator downtimes decreased from 25% to 15%, thereby placing them within the (yellow) range as the study expected to obtain downtimes of 10%. As for the number of defective containers received, it was possible to detect 4% of abnormalities in the batch that supplied the plant. Regarding the audit score, there is an improvement in the implementation of the 5S, yielding a 50% increase between the final score as compared with the original score.

ARENA Software Simulation

To chart the proposals and obtain results from the changes implemented, AS IS and TO BE simulations were executed to compare times. For these purposes, process times were considered as variables.

The results subsequent to the simulation and exhibited in Table 5 and Table 6 revealed a notable reduction in downtimes and an increase in value-added times.

Table 5: Statistical analysis by scenario and indicator

Time	
VA time 1	Average
Entity 1	776.90
Wait Time	Average
Entity 1	16464.71

Table 6: Statistical analysis by scenario and indicator

Time	
VA time 1	Average
Entity 1	799.01
Wait Time	Average
Entity 1	3294.84

A 3% increase was reported for value-added times, whereas non-value-added times decreased by 80%.

This implementation expected to achieve the green levels that have been established in the traffic light indicators. For these purposes, the indicators obtained both from the pilot implementation and the simulations were measured. The results are denoted below.

Conclusions

This study addressed the low productivity issues reported by companies operating within the chemical industry. Based on this context, a case study of a small producer of adhesives and their accessories was assessed, including an in-depth analysis of the causes responsible for low-operational productivity. Similarly, subsequent to reviewing the existing literature, the implementation of a production management model supported by Lean tools was proposed owing to its numerous success stories reported worldwide.

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Recent Empirical Results of The Impact of Digitalisation on The Labour Market

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Abstract

The most important determinant for future labour market trends is technological change. Although the evolution of digital technologies has already gained momentum, the main impacts of this new era of technological change remain largely in front of us. Given this, it is essential to understand what are the impacts caused by digitalisation in the labour market. The purpose of this work is to conduct a systematic review of the literature of how the emerging digital technologies may influence the gaps of the labour market. This understanding may allow an assessment of the spread of skills and the persistence of unemployment, and if these situations are absent, slowed down or intensified by digitization. Evaluate the relevance of digitization for structural issues in the labour market, focusing on topics such as recruitment difficulties and skills shortages, persistent unemployment and changes in forms of employment. The relevant drivers of the identified structural issues can serve as a basis for the development of a region that is facing structural problems in the labour market caused by digitalisation. In addition, it can assist a region that needs highly qualified human resources and is aware of the type of workers it wants to attract, as this identification helps to predict skill gaps and develop training. The conclusions can be used to align companies' strategies and public policies to generate greater efficiency and success in the search for sustainable growth solutions in a regional economy.

Keywords: Digitalisation, Impact of Digitalisation on the Labour Market, Problems of Digitalisation on the Labour Market.

Introduction

The future of work depends on several factors, such as the long term and demographic development (Walwei, 2016). Currently one of the key drivers of competitiveness are the technological changes associated with the digitization, notably the adoption of digital logic circuits and their derived technologies, including computers, intelligent automation and information technology (IT). These changes will lead to considerable changes in the employment structure, for example, in what concerns the characteristics of production, professions and relevant skills (Walwei, 2016). Thus, the economic development of countries depends directly on the consequences of digitalisation processes, and the answers to its emerging demands (Plutova, Lagutina and Sadkova, 2019).

A country's readiness for the digital economy is largely determined by the network's readiness index, the Information and Communication Technologies (ICT) development index, the cybersecurity index, the digital compatibility index and the digital evolution index (Plutova, Lagutina and Sadkova, 2019).

According to Acemoglu *et al.* (2018), automation succeeds trough the replacement of human labour. This type of substitution has a direct displacement effect, reducing the demand for labour. According to the same author, if the effect of this displacement is not counterbalanced by other economic forces,

it will reduce the demand for labour, wages and employment (Agrawal, Gans and Goldfarb, 2019). However it has been acknowledged that with the development of the digital economy, people management functions are not minimized, but on the contrary, they acquire greater importance (Plutova, Lagutina and Sadkova, 2019).

Increased productivity due to new technological changes affects processes, products and prices. More efficient processes tend to cause reductions in rationalization and work, while the emergence of new products is often associated with new jobs (Shkodinsky *et al.*, 2019). Price reductions due to technological changes have the potential to create new demand in two ways. First, due to lower prices, economic agents can spend money elsewhere, which can generate demands in other areas of the economy. Second, depending on the elasticity of demand, a price reduction for a given product can have adverse impacts. Therefore, digital technologies have been considered an advantage with important future gains in productivity (Shkodinsky *et al.*, 2019). This nullifies the threat of massive technological unemployment due to digitization. However, the obsolescence of (technological) skills can be a much more realistic challenge for companies and the labour market (Walwei, 2016).

In this context, the regional labour market is subject to positive and negative changes, which are a response to the economic and political phenomena that occur in the country (Astafurova, Borisova and Kulagina, 2019).

In a recent study by Astafurova (2019), addressing the digitalisation process of the labour market in the Volgograd region in Russia, the author emphasises that the need for staff with digital skills exceeds the volumes available in the labour market. Furthermore, the author proves that the successful adaptation of the labour market to the technological changes that have occurred in the economy of the Volgograd region are associated with socially responsible restructuring. Advanced recycling of workers' skills and continuing professional education were the most important aspects of such restructuring (Astafurova, 2019).

In this context, companies increasingly report that the limited availability of skills imposes a barrier to corporate investment. Skill constraints can negatively affect labour productivity and hinder the ability to innovate and adopt technological developments (Zhuravleva, Grigoryan and Riet, 2019). Lack of the right skills can limit prospects for employability and access to quality jobs. In general, persistent skills gaps and incompatibilities have economic and social costs (Dodel and Mesch, 2020).

On the other hand, Kolokytha *et al*. (2018) argues that despite the concern about the fact that automation may result in job losses, in many countries there is a serious problem of labour shortages. This means that digitization can really be a solution to the problems of the labour market and instead of a social and economic problem (Kolokytha, Kolokythas and Perdiki, 2018).

The mismatch of skills at the macro level refers to the gap between supply (aggregate) and demand for skills. This usually refers to a specific geographical unit (region, country or group of countries) and to the fact of the correspondence between available workers, jobs offered by companies in terms of skills and / or qualifications are not ideal. Skills mismatch at the micro level occurs when workers have a different skill level than necessary for the job (Walwei, 2016). Skill shortages arise when employers are unable to recruit employees with the necessary skills in the affordable labour market and with the continuous rate of pay and skill surpluses occur when the supply of certain skills exceeds demand (Pulkka, 2019).

For Acemoglu *et al.* (2018), in the traditional view, workers with good skills are protected in the automation process. This happens since according to the author, they are retained by the system because they are more able to qualify for more complex tasks that require human judgment, problem solving, analytical and personal skills.

If, in addition, the change in the structure of labour supply by skill level is considered, we should expect an increasing share of academics in the working age population. For this reason, long-term projections

reveal likely bottlenecks, especially with regard to occupations that require medium skill levels (Walwei, 2016).

As the digitization of the economy will affect the quality and composition of jobs, changes in priorities for professions, necessary skills and inequalities must be the subject of debates in the processes of digitization of the economy. In this way, the government plays a necessary supporting role (Astafurova, Borisova and Kulagina, 2019).

Considering the previously mentioned, this study offers a contribution for the understanding of the impacts of the implementation of digitalisation in the labour market. The study tries to highlight the most important trends, building on asystematic review of the recent literature on topics discussed about the future of work.

An up-to-date survey on digitalisation and the labour market

This study employs a method of systematic literature review. Literature reviews depend on a systematic process to identify and develop an interpretation of contributions from previous research. The purpose of this type of study is to provide a summary of the existing literature, identifying patterns and themes, thus contributing to the development of the theory and the identification of lines of research. This work used an inductive approach to synthesize existing research on the impacts of digitization on the labour market to extract knowledge about the impact of the implementation of new digital technologies.

The selection of articles was based on the following criteria. Firstly, research was carried out using the keywords: "problems of digitalisation on the labour market" and "impacts of digitalisation on the labour market", "automation impacts on the labour market", "impacts of industry 4.0 on the labour market", "impacts of digital transformation on the labour market". For the search, the following databases were used: Scopus, ISI Web of Knowledge and academic research at Google. Next, we examine the bibliographic references of the identified articles to find additional works that the previous research was unable to capture. Then a screening was carried out to remove duplicate articles or articles considered not applicable.

The selection and refinement process lead to a final sample of 50 works published in the last 3 years (2018 to 2020), that addressed issues related to the digitization process and the labour market. Of these 50 works, eight were published in 2018, thirty-two in 2019 and ten in 2020. In addition, we selected the digitalisation impacts used in these 50 research outputs and performed a word frequency analysis of the abstracts works to find out dominant impact topics. For better visualization of this analysis a word cloud was created. The word cloud was built through the pro word cloud, which is a Windows extension for the office package. This method was chosen because it allows, through graphic resources, to perceive through the size of the words what is their frequency in bulky hypertexts.

The results reveal the mastery of words, which are shown in figure 1. From these words, we selected the 4 main impact themes related with digitalisation on the labour market: demand for new competences and skills, employment, inequality and wages.

Fig. 1: Word cloud of the dominant words

After the analysis of the main keywords, the works were again analysed to identify which works debate which theme, in order to help this and future research (Appendix 1). The classification in figure 2 allows the comparison between the main impact topics/ themes find with most frequency in research outputs. The employment (45%) and demand for new competences and skills (37%) are the most explored impacts of digitalisation on the labour market, followed by wages (11%) and inequalities (7%).

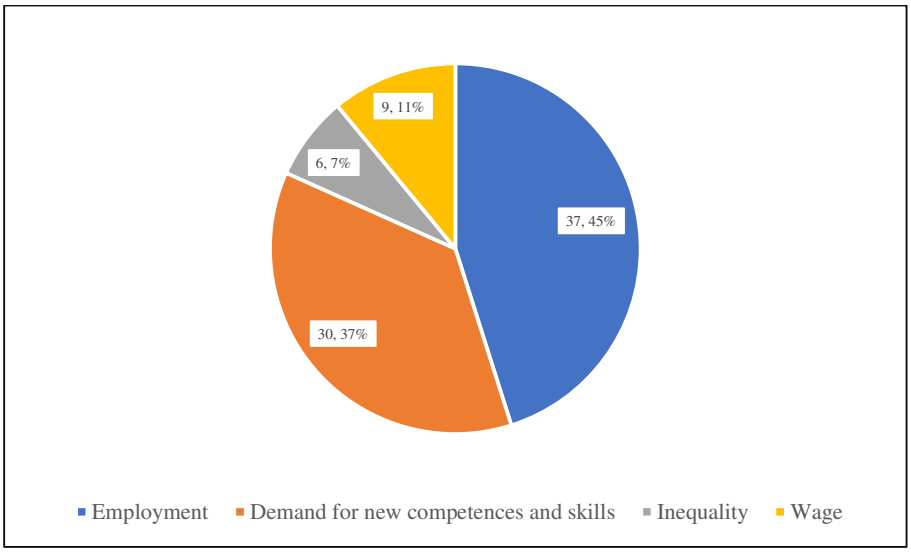

Fig. 2: Distribution of the most frequent topics/themes across the 50 works

Furthermore, the main themes identified were crossed with the countries in table1. This table allows for a better understanding about the prevalence of the main themes relating to digitalisation on the labour market, by country. The results suggest a particular prevalence of words referring to Russia investigating the impacts of digitalisation on the labour market. This suggests that Russia gives a special attention to the process of implementing digitalisation in the economy. Regarding the impacts, we can see that employment and demand for new competences and skills received greater prominence. This can be a path on which countries must dedicate themselves when going through the digitisation process.

Table 1: Cross tabulation main impact themes and countries

Impact / Country	**Employment**	**Demand for new competences and skills**	**Inequality**	**Wages**	Total
Bulgaria	1	1	0	0	2
Canada	0	1	0	0	1
China	3	0	0	1	4
Czech Republic	0	1	0	0	1
Denmark	1	1	0	0	2
Finland	2	1	0	0	3
France	3	0	0	0	3
Germany	2	1	1	1	5
Greece	1	1	0	0	2
India	1	1	0	0	2
Iran	1	0	0	1	2
Italy	1	2	0	0	3
Japan	1	0	0	1	2
Netherlands	1	0	0	1	2
Romania	1	1	0	0	2
Russia	10	15	2	2	29
Slovenia	1	0	0	0	1
Slovakia	0	1	0	0	1
Spain	0	1	0	0	1
Sweden	1	2	0	0	3
Switzerland	1	0	0	0	1
USA	5	0	3	2	10
Total	37	30	6	9	82

Employment

The available labour market scenarios show several trends in relation to the future and the development of employment. According to Palier (2019), employment in services and employment in manufacturing increase. The same authors also state that there are indications that, in relation to employment levels, particularly management-oriented services and the health sector will gain importance. Likewise, the demand for specific occupations (for example, doctors, nurses, management consultants) in these sectors will also increase (Palier, 2019)

According to Rogulenko *et al.* (2019), the future of the labour market under digital economy conditions is influenced by two factors. First, demographic trends in the socio-economic system, which determine the structure of digital personnel, their accessibility and level of digital skills mastery. And the second factor is the automation of production and distribution processes, which leads to a reduction in the demand for digital personnel in the labour market due to the competition between intelligent machines and digital personnel (Rogulenko, Ponomavera and Krishtaleva, 2019).

The introduction of the digital economy and modern innovative technologies brings the need for professional readiness of graduates from educational institutions to work according to information

skills, which will lead to a more efficient use of work resources and, as a result, to increase labour productivity in all sectors of the economy. Improving the quality of work and achieving a balance between supply and demand for the regional labour market will be facilitated by a timely response to changes in its quantitative and qualitative composition (Astafurova, Borisova and Kulagina, 2019; Pulkka, 2019).

Dobel and Mesch (2020), in his work on "Perceptions about the impact of automation in the workplace", indicate that individuals employed in jobs involving manual or physical tasks had more negative perceptions regarding the impact of technology on their careers, whereas those involved in managerial and data analysis tasks reported more positive views. Young employees with higher incomes and more education, who use the Internet almost constantly, expressed more positive views of technology's impact on their jobs. Nonetheless, technological unemployment and under-employment were associated with age, income, race and negative perceptions regarding the intrusion of new digital technologies on the workplace.

The introduction of digital technologies contributes to the formation of a class of workers with partial or temporary employment and transforms the working process itself into a set of small operations that make up the skills of the new professions. This brings about changes in the relationship between workers, employee and employer (Astafurova, Zapryagaylo and Kulagina, 2019; Basu, 2019; Zhuravleva, Grigoryan and Riet, 2019).

It is important to identify all structural changes caused by the labour market, especially at the regional level. For this assessment, the demand model in a regional labour market must contain at least three main components: parameters of compliance of the skills required with the digital technologies introduced in the region; built-in mechanism for analysing indicators of territory development and personnel compliance; a temporary matrix to generate new skills, taking into account all educational systems (Zhuravleva, Grigoryan and Riet, 2019; Xu, Chin and Cao, 2020).

Expected changes can also lead to additional demand for highly skilled workers (academics), slightly less demand for workers with medium skills (graduates) and considerably less demand for workers with low skills (Basu, 2019).

The study by author Houngbonon and Liang (2018) on France on the impacts of broadband Internet on employment showed that the direct effect is job destruction. But this job destruction occurs in manufacturing activities, unlike the service sector with the adoption of broadband on the Internet creates jobs, which in the end does not affect the unemployment rate (Hounbonon and Liang, 2018).

An interesting question about the impacts of technologies on the labour market is the analysis of who will be affected in the substitution of work by digitalisation processes. The authors Zhou *et al.* (2020) make this approach of substitution by occupation in the Chinese labour market. The results of this study show that artificial intelligence is more likely to be substituted in jobs performed by women, workers with advanced age, low education and low income (Ito, 2019; Zhou *et al.*, 2020).

The approach on the subject of replacing workers by occupation is also made by the author Fedyaeva (2019). For these authors, robots and bots can replace routine production work, but all creative and innovative activities will never be automated. The massive introduction of robots and computers allows the labour market to reach a new level, and domestic workers can meet international criteria and standards through retraining and additional training (Fedyaeva, 2019).

In the substitution of labour, we can also see that at the regional level, it is clear that urban service centres and some rural areas have a much smaller share of employees working in a highly substitutable occupation compared to manufacturing regions (Dengler, 2019). This difference in the ratio of the impact of labour substitution between regions can be corrected. Close monitoring of future labour market developments and (further) education are of great importance in meeting the challenges of the digital transformation (Dengler, 2019).

The implementation of technology in the labour market not only causes the effect of job substitution, according to the authors Fossen and Sorgner (2019), there is also the transformative effect. Transforming digitalisation for these authors alters the content of occupations without necessarily replacing human workers (Fossen and Sorgner, 2019).

A study conducted in Switzerland by the authors Balsmeier and Woerter (2019), points out the increase in investment in digitization is associated with an increase in the employment of high-skilled workers and a reduction in the employment of low-skilled workers, with a slightly positive net effect. This evidence improves the understanding of the possible economic implications of the digitization process, where digital technologies constantly change production methods and generate new products and services. The advancement of machine-based digital technologies requires a better technological infrastructure (faster Internet connections, ubiquitous Internet access, cloud technologies, etc.) and this knowledge develops technologies and workers sufficiently skilled to use them effectively (Aghion, Antonin and Bunel, 2019; Balsmeier and Woerter, 2019; Cijan *et al.*, 2019).

Different skill levels and digital technologies affect the demand for work and the speed of scanning. This can cause not only the destruction and transformation of jobs as already mentioned, but can also bring about new forms of work (freelance, remote employment), as an impact we have on the breakdown of organizations and the active use of outsourcing, which can cause job insecurity (Bannykh, 2020). In this sense the government role in the field of education, skills and jobs is necessary to balance the labour market and create digital capital (Bannykh, 2020).

Another point about the implications of technology at work is related to productivity (Acemoglu and Restrepo, 2019a). New technologies not only increase the productivity of capital and labour in the tasks they currently perform, but also affect the allocation of tasks to these production factors - what we call the content of the production task. Changes in the content of the production task can have important effects on how the demand for labour changes and also on productivity (Acemoglu and Restrepo, 2019a; Ismail, 2019).

Shkodinsky (2019) points out that human resources are responsible for the sustainability of digitalisation. They have the potential to stimulate the development of labour and entrepreneurship, which can ensure that the increase in the standard of living of the population accelerates the rate of economic growth.

Demand for new competences and skills

The relationship between technology and employment is mediated by the organisation of work, the reconstruction of professionals, skills and learning, human resources management, social dialogue, economic and social processes of diffusion and the adoption of innovations. Technology is just one of the factors that shape the future of employment (Lebedeva, 2019).

The digital transformation is not just about implementing new technologies. Digital tools are one of the edges of this transformation that must be accompanied by a digital mindset by people who use technology daily. If they are not compromised, digital transformation will not have a strong impact on the organisation and the economy (Astafurova, Borisova and Kulagina, 2019; Habanik, Grencikova and Krajco, 2019). When talking about digital skills, we refer to the ability to use technological knowledge and skills to optimize processes and make them increasingly efficient (Astafurova, Borisova and Kulagina, 2019).

These changes will have a major impact on the required qualifications and the job market in general, considering the social aspects of these impacts (Skoludová and Cerovská, 2018).

Specifically, investment in human capital is the necessary mechanism to face technological progress. New skills are needed, especially light skills, some basic skills that must be developed to facilitate learning or faster knowledge acquisition: content skills such as active learning, oral expressions, reading comprehension, written expression. As well, literacy and ICT process skills such as active

listening, critical thinking, self-monitoring and interdisciplinary skills are also very important (Walker, Bowkett and Duchaine, 2018; Maimina *et al.*, 2019).

Pulkka (2018), in his study on future prospects for the Finnish digital labour market, points out that younger generations have a more optimistic view of the labour market. The same survey pointed out that workers believe that educational reforms with acquisition of new skills are decisive to combat technological unemployment (Pulkka, 2019).

Minimising the negative impacts of digitisation on the labour market as technological unemployment in Sweden should also be tackled by acquiring new skills according to Ismail (2019). These authors state that there is an emerging need to reform the structure and content of the educational system to provide the skills and competencies needed to compete in a world of digitalisation. This concerns both the role of higher education and secondary education, as well as discussions about new structures for adult education to facilitate career development and lifelong or continuing learning (Ismail, 2019).

An interesting approach to the acquisition of digital skills is the one advanced by Joseph (2020) in the study on the impact of digitalisation on the professional performance of employees. The study states that younger people are more adaptable and with a positive approach towards learning and digitalisation when compared with more experienced employees. This shows the positive sign that young people are showing a willingness to know and study modern tools and prepare for the digital future (Joseph, 2020).

Lladós-Masllorens (2019) states that there is a biased technological change, which requires professionals with a complex set of skills. Digital technologies are inciting a task-oriented technological change, decreasing the demand for workers who perform routine tasks (Lladós-Masllorens, 2019).

Horbach and Ramer (2020) in their work on labour shortage and innovation claim that a shortage in the supply of qualified labour can, therefore, prevent innovation activities, resulting in lower productivity gains. Innovative companies are likely to be subject to skills shortages and skills shortages lead to the cancellation of innovation projects. The effects are strongest in the lack of labour related to professional occupations and less in academic qualifications (Horbach and Rammer, 2020).

There is an urgent need for substantial spending on human resources to take steps to ensure the timely digital transformation of the labour market (Astafurova, Zapryagaylo and Kulagina, 2019). Close monitoring of future labour market needs and (additional) education appear to be of particular importance in addressing the challenges of digital transformation (Cirillo *et al.*, 2019; Habanik, Grencikova and Krajco, 2019; Kutsuri *et al.*, 2019).

The ideal scenario understood by Astafurova *et al*. (2019), has several aspects, among them, maximum provision of the labour market with qualified personnel, maximum acquisition of digital skills, minimization of unemployment, minimization of labour migration (Astafurova Olga, Borisova Anna and Kulagina Irina, 2019).

Inequality

Digitization, artificial intelligence and automation have the potential to change the nature of production processes, increase productivity and reshape labour markets. On the other hand, because they occur at a time of low real wage growth and a drop in labour participation in national income, technology can generate insecurity and doubts. As with most periods of technological interruption in the past, this trade-off between income gains and distribution costs should pose significant challenges (Mönnig, Maier and Gerd Zika, 2019).

Digitization can exacerbate the problem of income distribution and the main problem is that the potential increase in the prosperity of the use of robots is not distributed fairly, since it benefits only a portion of the population (Krämer, 2019). Ownership of capital is already highly concentrated today,

if the main beneficiaries of robotization are a small number of capital owners, the vast majority of workers do not participate in wealth and this further exacerbates economic inequality (Krämer, 2019).

The increase in wage inequality is already implemented due to structural and demographic changes (Genz, Janser and Lehmer, 2019). The digital transformation reinforces the impact of structural changes on wage inequality, especially in the long term, as the growing demand for highly qualified employees is reflected in the increase in wage inequality (Genz, Janser and Lehmer, 2019). However, the relatively low impact of digitization on low-skilled employees prevents a further increase in wage inequality (Gurova, Laas and I, 2018; Krämer, 2019; Mönnig, Maier and Gerd Zika, 2019).

For the author Nafchi and Mohelská (2018), the industry 4.0 is particularly useful in very developed countries with regard to competitive advantage because wages are high in such countries. In developing countries like Iran, wages are low, there are relatively high levels of unemployment, and substantial developments are required in other basic but vital infrastructures. Automation surges the unemployment rate with no regards for how well a country is developed. The mere difference is how large is the magnitude of the impact of this change on the economy of the country, and whether or not that country is able to cope with the consequences of such a change (Nafchi and Mohelská, 2018).

To manage the negatively impact or potentially increase performance in the labour market, governments must balance or encourage the qualification and requalification of their human resources (Maimina *et al.*, 2019; Zhuravleva, Grigoryan and Riet, 2019). Labour reforms, investments in digital infrastructure and economic integration can facilitate technological diffusion and efficient resource allocation (Mönnig, Maier and Gerd Zika, 2019).

Meanwhile, labour policies and safety nets can benefit workers. Tax and benefit systems can help ensure that growth is distributed (Korneeva *et al.*, 2020). Education has the main potential to meet the demand for more flexible skills and lifelong learning, especially for negatively affected professionals (Astafurova Olga, Borisova Anna and Kulagina Irina, 2019; Astafurova, Zapryagaylo and Kulagina, 2019; Kelchevskaya and Shirinkina, 2019).

To deal with this, it is necessary to understand the role of technology in transforming new processes of production, productivity and relations in the labour market. However, data on the participation of the digital economy in national accounts and labour market statistics is incomplete, so it is necessary to create new measures of productivity and monitor structural changes, such as new forms of work organized around new digital technologies (Acemoglu and Restrepo, 2019b).

Wages

The sharp increase in digitisation, automation, machine learning and other new digital related technologies leads to an intense debate about their social impacts. How occupation transitions and effects on labour demand and workers' weights are still open questions (Genz, Janser and Lehmer, 2019).

The creation of new tasks and other technologies that increase the labour intensity of production and labour force participation are vital for the continuous growth of wages, proportional to productivity growth (Acemoglu and Restrepo, 2019a).

Acemoglu (2018) in his work on the implementation of automation in the labour market, developed a task-based model in which workers of high and low skills compete against machines in the production and tasks. For the same author, the low-skill automation corresponds to tasks performed by low-skill labour being taken over by capital. Automation displaces the type of labour it directly affects, depressing its wage. Through ripple effects, automation also affects the real wage of other workers. Counteracting these forces, automation creates a positive productivity effect, pushing up the price of all factors. As capital adjusts to keep the interest rate constant, the productivity effect dominates the real wage. While low-skill automation reduces wage inequality, high-skill automation increases wage inequality (Acemoglu, 2018).

Wages increase significantly for highly qualified professions, but wage gains for medium and low-skilled workers do not point to a further deepening of wage polarization. This implies that there are also losses of compensation after the introduction of robots in industries (Nafchi and Mohelská, 2018).

In the work of Genz *et al.* 2019, the results of the estimates of fixed effects at the individual level suggest that investments in new digital technologies at the establishment level positively affect the salaries of the establishment workers. For the authors, investments in new digital technologies increase wages in knowledge-intensive production establishments and knowledge-intensive services. The effects of the salary increase of employees in digital pioneer establishments in relation to the specific reference group of workers in late digital establishments are more pronounced for low and medium skilled workers (Genz, Janser and Lehmer, 2019).

In a paper that seeks to understand some key patterns in the rise of digitalisation in Chinese industry, author Cheng *et al.* (2019) explains that one of the drivers of robotization is the rising cost of labour. Due to the increase in wages and labour costs that generate a high cost for the employer, robotization becomes more attractive (Cheng *et al.*, 2019).

Bessen *et al*. (2019) also conducted a study on the impacts of automation on individual workers in the Netherlands and had the negative impact on wages as a result. Automation at the firm increases the probability of workers separating from their employers and decreases days worked, leading to a 5-year cumulative wage income loss of about 8% of one year's earnings for incumbent workers (Bessen *et al.*, 2019).

To minimize the social risks related to digital transformation in the area of work it is necessary to establish arrangements that support the expected digital development. Actions should be aimed at minimizing the global polarization of the labour market leading to the definitive displacement of the standard form of employment with its atypical forms, such as remote work and outsourcing. Conduct that prevents high technological unemployment related to the rejection of human resources in favor of intelligent robots and further decline in the wage level of remaining human workers (Popova *et al.*, 2020; Putilo, Volkova and Antonova, 2020).

Conclusion

A huge amount of literature has emerged in recent years, in the context of future work. This topic is also the subject of political discussions that determine how the future of work is changing and how we can shape it. The labour market will undergo major changes, but there is still no universal definition of exactly how this will happen. This work offers a systematic view of the topics discussed on the impact themes of digitization on the labour market, highlighting the most important trends.

We can see that the global effects on the quality of employment, working conditions, ways of working are difficult to accurately assess. There seems to be an emerging consensus on the growth of new skills and professions that must demand the sustainability of digital transformation.

The literature shows that the skill set required in old and new occupations will change in most sectors and transform where and how people work. Average wage jobs are expected to be at greater risk of being replaced by smart machines. Digitization presents enormous opportunities, challenges and risks. Managing the challenges and risks of digitization is a joint responsibility of all stakeholders.

Sustainable development is a process of change that aims to ensure that today's needs are met. Without compromising the ability of future generations to meet their own needs. This can be achieved by ensuring that the exploitation of resources, the direction of investment, the orientation of technological development and institutional changes are in harmony and increase the current and future potential to meet human needs and aspirations,. Job creation policies should focus on the final stages of the production chain, characterized by high intellectual performance and high levels of income. Therefore,

the educational system must reflect these trends in order to prepare the young generation for changes in the labour market (Habanik, Grencikova and Krajco, 2019).

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Appendix

Author	Year	Country	Approach	Main impacts themes			
				Employment	Demand for new competences and skills	Inequality	Wages
Acemoglu D., Restrepo P.	2019	USA	Understand the effects of automation and other types of technological changes on U.S. labour demand	X			
Acemoglu D., Restrepo P.	2019	USA	Analyze how artificial intelligence can affect production and the economy	X		X	
Acemoglu, D.	2018	USA	Analyze how the different types of automation technologies, which are possibly permeating our lives even more deeply, will affect the labour market	X	X		
Aghion P., Antonin C., Simon B.	2019	France	Understand the effect of robotization on employment in France and its potential to stimulate economic growth	X			
Agrawal A., Gans J., Goldfarb A.	2018	USA	Create a structure for the study of the implications of automation and AI in the demand for work, wages and employment	X		X	
Astafurova O.	2019	Russia	Analyse the effects of the influence of digital transformation on the regional labour market	X			
Astafurova O., Borisova A., Kulagina I., Zaprygaylo V.	2019	Russia	Describe how the digitalisation of the economy will affect the quality and composition of jobs, occupations and skills.	X	X		
Astafurova O., Zapryagaylo V., Kulagina I.	2019	Russia	Analyze the impact of the digitalisation of the economy on the development of the labour market, designing possible scenarios of transformation at regional level for practical application	X	X	X	

Astafurova O., Zapryagaylo V., Kulagina I.	2019	Russia	Identify problem areas of the labour market in the context of digital transformations in the economy	X			
Balsmeier B., Woerter M.	2019	Switzerland	Analyze the relationship between changes in investment in digital technologies within the company and changes in employment within the company	X			
Bannykh G.	2020	Russia	Assess the possibilities of interconnection and mutual influence of the Russian labour market on the digital economy and the digital capital of workers and organisations	X	X		
Basu K.	2019	India	Analyze how increasing digital technology can reduce demand for labour and create an increasingly common labour market for the world	X			
Bessen J. *et al.*	2019	Netherlands	Estimate the impacts of automation on individual workers	X			X
Cheng, H. *et al.*	2019	China	Describe some key patterns in the rise of robots in the Chinese labour market			X	
Cijan A. *et al.*	2019	Slovenia	Understand job satisfaction, work-life balance and worker autonomy in the face of the digital labour market	X			
Cirillo V. *et al.*	2019	Itália	Explore the relationship between the digitization of work processes, the routine level of tasks and changes in employment	X			
Dengler K.	2019	Germany	Investigating the impact of digital transformation at the regional level with a focus on replacing occupational tasks	X			
Dobel M., Mesch G. S.	2020	USA	Identify the effects of new technologies on employment prospects and loss of employment and salary due to computerisation	X			X
Fedyaeva O.A.,	2019	Russia	Analyze the chances of optimizing and adapting the human resources market in Russia to the time of scientific and technological progress and digital economy	X	X		

Fossen F., Sorgner A.	2019	USA	Investigate the impact of new digital technologies on individual occupations	X			
Genz S., Janser M., Lehmer F.	2019	Germany	Determine the degree of digitisation at the establishment level and at the worker level as a means of creating a digital index	X			
Gurova E., Laas N, Romanova I.	2020	Russia	Understand the vision of employees of Russian state and private companies on topics such as the digitalisation of labour relations	X		X	
Habanik J., Grencikova A., Krajco K.	2019	Slovakia	Analyze selected sustainable development indicators and the effects of Industry 4.0 on its development in Slovakia	X			
Horbach J., Rammer C.	2020	Germany	Measuring labour shortages for vacancies that were not filled due to digital skills shortage	X			
Hounbonon G. V., Liang J.	2018	France	Explore massive data on the broadband Internet option in France to investigate the impact of broadband Internet on employment	X			
Ismail M.	2019	Sweden	Determine a better understanding of the impact of labour market restructuring driven by digitalisation	X			
Ito A.	2019	China	Examine the universal and unique characteristics of the digitisation process in the Chinese labour market	X			
Joseph E.	2020	India	Analyze the impact caused by digitization on the different factors of the employees, such as satisfaction, attitude and perception.	X			
Kelchevskaya N. R., Shirinkina E. V.	2019	Russia	Determine the main directions in the management of processes related to the accumulation and use of human capital as the main factor of production in the context of digitalisation	X			
Kolokytha E., Kolokythas G., Perdiki F.	2018	Denmark, Sweden, Finland, Netherlands, Italy, Greece, Bulgaria, Romania	Analyse the digitisation processes in the labour market in order to cover the labour shortage problem	X	X		

Korneeva T.A. *et al.*	2020	Russia	Identify the importance of human capital for the sustainability of the digital economy	X			
Krämer H.	2019	Germany	Seek the trends towards monopoly, which can be observed in digital goods markets, in addition to the impact on the labour market through robotization and artificial intelligence	X			
Kutsuri G.N. e*t al.*	2019	Russia	Outline the concept and value of the digital economy focused on work results	X			
Lebedeva L.	2019	Russia	Understand the challenges of digital transformation in relation to labour relations regulations, workforce and social safety nets, focusing on the shortage of IT skills	X			
Lladós-Masllorens, J.	2019	Spain	Analyzing how the digital revolution is affecting the labour market in Spain	X			
Maimina E. *et al.*	2019	Russia	Ilustrate and justify the prospects of emerging professions in the labour market associated with innovative economic development through the introduction of robotics.	X			
Mönnig A., Maier T., Zika G.	2019	Germany	Determine quantitatively the impact of the 4.0 economy on wage inequality based on ex post analysis	X			
Nafchi M. Z., Mohelská H.	2018	Japan and Iran	Identify the impact of Industry 4.0 adoption on Iranian and Japanese labour markets based on their current infrastructure, economy and policies	X			X
Palier B.	2019	France	Understanding the impacts of digital technology on the economy and employment, including the phenomena of labour market polarisation	X			

Plutova M.I, Sadkova I.V, Lagutina E.E	2019	Russia	Understand the readiness of labour resources for labour activity in the context of digitalisation	X			
Popova A. L. *et al.*	2020	Russia	Understanding the impact of digital inequality on the development of rural areas as socio-economic systems.	X			
Pulkka, V. V.	2018	Finland	Explore the Finnish labour market development forecasts for the next ten years and shed light on preferred policy responses to the digital economy	X			
Putilo N.V., Volkova N.S., Antonova N.V.	2020	Russia	Examining the transformation in the area of labour and employment in the context of the new technological revolution	X	X		
Rogulenko T. M., Ponomavera S. V., Krishataleva T. I.	2019	Russia	Analyze the influence of demographic and technological factors on the future of the Russian labour market	X			X
Shkodinsky S.V. *et al.*	2019	Russia	Determine the prospects for labour market optimisation and its harmonisation with the educational market based on wireless technologies for the use of the possibilities of the digital economy	X	X		
Skoludová J., Cerovská J.	2018	Czech Republic	Map opportunities, threats and changes in the requirements for knowledge and skills of generation Y workers brought by Industry 4.0.	X			
Walker V., Bowkett G., Duchaine I.	2018	Canada	Explore ways to broaden the set of skills needed for the digitization of the economy	X			
Xu Z., Chin T., Cao L.	2020	China	Investigate how Chinese manufacturing workers behave in the face of a declining labour market due to the implementation of technologies	X			

Zhou, G. *et al*	2020	China	Estimate the real probability of replacement by artificial intelligence for various occupations in China	X			
Zhuravleva, N., Grigoryan, M. and Riet, K.	2019	Russia	Evaluate the structure of supply and demand in the regional labour market, as well as the formalization of changes that occur under the influence of digital technologies	X	X	X	

Stablecoins – Potential New Money and Potential New Problems for Regulators

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Abstract

Cryptocurrencies with a stabilised value called stablecoins are supposed to become the solution to the problem of a significant variability of the value of cryptocurrencies against fiat money. Despite their imperfection, stablecoins are developing dynamically. The aim of the article is to indicate substantial problems of international character that regulators and supervisors of the financial market need to face in the context of developing stablecoins in every country with the access to the internet.
On the basis of the information included in the four main parts of the article, a doubt may arise whether the cooperation of supervisory national and international institutions itself in the style practised so far is enough. It raises the question concerning the necessity and possibility to institutionalise and centralise international cooperation of regulators and supervisors of by its very nature global market of cryptocurrencies and stablecoins.

Keywords: Stablecoins, Cryptocurrencies, Bigtech, Financial Regulation

Introduction

The development of globalisation and the internet has brought about changes in many aspects of our life, and since the first Bitcoin cryptocurrency appeared in 2009, it has also influenced the realm of money and accounts.

The volatility of their price expressed in money issued by the public authorities constitutes a significant problem of cryptocurrencies, which does not let them perform a few important functions typical for money – a store of value, a means of payment and unit of account.

On 16th December 2017, Bitcoin cost USD 19296, exactly one year later, on 16th December 2018, only USD 3271, and another year later, on 16th December 2019, much more, USD 7164. It means that the value of Bitcoin in USD first fell by six times within 12 months, and then doubled its value during the next year (CoinMarketCap, 2020a).

Cryptocurrencies with a stabilised value called stablecoins are supposed to become the solution to the problem of such a significant variability of the value of cryptocurrencies against fiat money. However, the value of key stablecoins functioning currently, though they reduce the volatility of their value against fiat money, is not fully stable yet. As Bullman et al. (2019) calculated, averaging the annualised, standardised seven-day rolling averages from 27 December 2017 to 28 July 2019, the price volatility for Tether USDT amounted to 10%, and for Dai as much as 28%.

Despite their imperfection, stablecoins are developing dynamically. Even Christine Lagarde, the Governor of the European Central Bank and former Managing Director of the International Monetary Fund admitted that significant demand for cryptocurrencies and stablecoins existed, and regulators and supervisors of the financial market should not neglect it (Lagarde, 2019a; Lagarde, 2019b).

The aim of the article is to indicate substantial problems of international character that regulators and supervisors of the financial market need to face in the context of developing stablecoins in every country with the access to the internet.

The first part of the article presents the problem of defining stablecoins, which intends to prove the validity of the question whether building one stable and internationally accepted definition of stablecoins is possible taking into consideration their volatility and dynamic development.

The second part presents an outline of problems appearing when stablecoins need to be classified, which is naturally connected with the problem of their defining, therefore also in the context of the question concerning arrangement and coordination of regulatory and supervisory activities internationally.

The third part includes the key features of the most important stablecoin functioning on the cryptocurrency market, that is Tether. The objective is to show the importance of institutional and transaction connections between entities issuing classical cryptocurrencies and those issuing stablecoins and cryptocurrency exchanges and other intermediaries. Additionally, the aspect of using transnational networks of companies with non-transparent capital links appears. This raises a question concerning the effectiveness of individual national regulatory and supervisory actions in the field of cryptocurrencies, stablecoins in particular, even with quite advanced exchange of information between financial authorities of different countries, but without a strong centre coordinating activities on the global level.

The fourth part concerns controversies surrounding the Libra stablecoin, which, though not existing at the time of writing the article, stirs emotions as does the whole project strongly promoted by social media giant Facebook. An obvious issue how to regulate and supervise combining their basic activity with financial activities (starting with payment services) by BigTech global companies appears alongside Libra. However, a question can also be asked what factors encouraged a global BigTech company like Facebook to promote an unprepared (and certainly not disclosed) in detail venture consisting in creating an alternative global payment system, in fact ignoring financial regulators and supervisors in different countries at the stage of its designing. What are national financial authorities for business giants?

The article is not able to indicate a set of solutions for the described problems or to answer the questions comprehensively. It rather indicates in the author's opinion important directions of financial regulators and supervisors' work, and lines of research which could support socially and financially safe development of stablecoins and the cryptocurrency market.

Taking into account the character of the discussed issue, the descriptive method was chosen. Official publications of institutions regulating and supervising financial markets, particularly in the USA (Fed) and in the euro zone (ECB) were mainly used, as were scientific articles by authors affiliated with those institutions. Recognised websites specialising in the subject matter of stablecoins like CoinMarketCap (2020b), press agencies like Reuters and official publications of companies issuing stablecoins (Tether) or planning their issuance (Libra) were used when presenting the situation on the cryptocurrency market.

What stablecoins are (and are not)

In defining stablecoins, it is commonly agreed that it is a cryptocurrency designed to minimalize the variation in its price (Blockchain, 2019; Blockdata, 2019). However, definitions not underlining the cryptographic character of stablecoins can be found, like for example Bullman et al. (2019) giving them a wider name as "digital units of value". Further on, differences in in relation to what this volatility is to be reduced, or otherwise, to what a stablecoin is supposed to be stabilised. Numerous definitions emphasise the stability of parity of stablecoin exchange into the national currency (fiat currency), into the USA dollar in particular, or alternatively into euro (Bullmann et al., 2019; Blockchain, 2019). Together with the market development, various stablecoin constructions appeared, which intended to

build their international popularity thanks to the exchange rate stability not against one currency, but a basket of many currencies or even based on the prices of raw materials and/or securities. It was reflected in different definitions of stablecoins; however, disagreements appear with reference to the distinction of formulations indicating what the reference point, the anchor for the purchasing power of a given stablecoin should be (BIS, 2019) from the formulations indicating by means of what the convertibility of a given stablecoin is achieved and stabilised (Blockdata, 2019). This problem is also reflected in the ways of classifying the types of stablecoins, which is discussed in the further part of the article.

Therefore, it is not possible to define the essence of stablecoins in one short sentence. Almost each attempt to define stablecoins involves elements of their classification and together with the development of those digital instruments, their new categories appear. For this reason, the following attempt to define the essence of stablecoins reflects the state of affairs at the end of 2019 and may soon require a revision in certain details.

For the purpose of the article, stablecoins can be defined as digital units of value, which are supposed to perform functions possibly similar to those of the current money, mostly using solutions typical for cryptocurrencies and normally based on distributed ledger technology (DLT), blockchain in particular. Stablecoins are supposed to maintain possibly stable purchasing power as regards selected assets when compared to regular cryptocurrencies and other crypto-assets with a high variability of value. Different assets, such as national currency, a basket of national currencies, other financial assets such as securities or monetary gold, non-financial assets such as raw materials (e.g. gold), other cryptocurrencies and other connected algorithms or a basket of the groups of those assets, are the reference point for the stability of stablecoin purchasing power (an imitated unit of value, an anchor) and resources allowing achieving the assumed stability of value (a tool).

In the above attempt to present the essence of digital constructions named stablecoins synthetically, it is not clarified whether they can be categorised as crypto-assets or electronic money (e-money). In relation to the definition of crypto-assets accepted by ECB Crypto-Assets Task Force (2019), those stablecoins which have an identified issuer and in specific conditions can be categorised as e-money under some national legislation should be excluded from it. As a result of such a situation, it is not possible to define clearly whether stablecoins as a category are (or rather can become) money from a formal and legal point of view or are not, since it turns out to depend on the institutional side of their emission and possible other conditions taking into account the specificity of a given country. By its nature, the creators and issuers of stablecoins want them to be considered money and used like it by their purchasers, which is reflected in the suggested working definition of stablecoins.

Types of stablecoins

When the Libra project (mentioned in the introduction) appeared, defining the concept of stablecoin became more complicated. The distinction between the projects with a so far limited international importance for payment systems preceding Libra (together with the two most important functioning stablecoins, that is Tether i Maker/Dai) and by definition a global payment concept of Libra (and possible further initiatives of big tech firms or large financial firms with similarly international scope like Facebook) has become important particularly for central banks and other regulators (Ehrentraud et al., 2020; FSB, 2019). The name ”global stablecoins”, which currently cannot be attributed to any existing cryptocurrency, was created. Equally promising character is manifested by the distinction made by the G7 Working Group on Stablecoins (BIS, 2019) between *retail or general purpose stablecoins that could be used by anyone and wholesale stablecoins used only by a limited set of actors, i.e. financial institutions or selected clients of financial institutions*. There is however a substantial likelihood that, apart from retail and general purpose, a third example of type of stablecoins, business-to-business (or institutional) stablecoin will be created. It will be a stablecoin called JPM Coin “representing a fiat currency” that is USD, announced 14th February 2019 by JP Morgan, one of the biggest financial holdings in the world JP Morgan (JP Morgan, 2019).
However, the types of stablecoins are the most often classified according to the kind of collateral of their value stability. Those collaterals are commonly divided into the following kinds:

1. Traditional collateral (called off-chain – outside blockchain technology)
    1.1. Asset- or commodity-backed
        (gold, securities – e.g. DGX, OneGram, HelloGold, SendGold)
    1.2. Fiat-backed
        (currencies issued by the central banks: USD, EUR, etc. – e.g. Tether, USD Coin, Gemini dollar, TrustToken)
    1.3. Asset-and-Fiat-Backed
        (mix of gold or other precious metals, securities and fiat currencies – e.g. Libra?)
    1.4. E-money
        (becoming an EU electronic money institution – e.g. Monerium)
2. Crypto Collateral (called on-chain – with blockchain technology)
    2.1. Cryptoasset-Backed
        (Ethereum – e.g. Dai, Huobi, Steem, Alchemint)
    2.2. Crypto-and-Fiat-Backed
        (Ethereum and USD – e.g. Money on Chain)
3. Algorithmic (no collateral assets as such – e.g. karbo, Terra, Ampleforth, Element Zero)
    3.1. Algorithmic-Backed
    3.2. Fee-backed
    3.3. Seigniorage Share

Blockchain (2019) and Blockdata (2019) were the main sources for creating the above classification.

While the basic tripartition is common, the subgroups in the above classification are partly copied and partly changed in different classifications. The assignment of the exemplary stablecoins to a category can also be debatable with regard to more and more frequent use of combinations of collaterals and corrections of constructions introduced by issuers of stablecoins and of regular cryptocurrencies.

On the basis of the above classification, it is peculiar that FINMA, a Swiss financial regulator, adopted a seemingly simple classification, dividing stablecoins into four categories: linked to currencies, commodities, real estate and securities. The classification grows however to eight categories taking into account two variants of stablecoins based on a single type of assets in a given category or a basket of assets, and two types of users' claims on the issuer, independent of and dependent on price movements. Detailed categories with their supervisory classification can be found in the table below.

Table 1: Typology of stablecoins according to the Swiss Financial Market Supervisory Authority FINMA

Categories	**Indicative supervisory classification (in addition to anti-money laundering legislation)**
1. Linked to *fiat currency / cryptocurrency* with fixed redemption claim	Deposit under banking law
2. Linked to basket of *fiat currencies / cryptocurrencies* with redemption claim dependent on price development	Management of the currency basket and risk-bearing: – for the account of the issuer: deposit under banking law3/4 – for the account of the token holder: collective investment scheme
3. Linked to *commodity* (incl. "bank precious metals") with contractual claim	Bank precious metals: deposit under banking law Commodity: security and possibly derivative
4. Linked to basket of *commodities* (incl. "bank precious metals") with redemption claim dependent on price development	Collective investment scheme

5. Linked to *commodities* (incl. "bank precious metals") with ownership rights	No prudential licensing requirement
6. Linked to *real estate* with redemption claim dependent on price development	Collective investment scheme
Linked to specific *security* with contractual claim	Security and possibly derivative
Linked to basket of *securities* with redemption claim dependent on price development	Collective investment scheme

Source: FINMA (2019), Supplement to the guidelines for enquiries regarding the regulatory framework for initial coin offerings. [Online] [Retrieved January 11, 2020], https://www.finma.ch/en/~/media/finma/dokumente/dokumentencenter/myfinma/1bewilligung/fintech/wegleitung-stable-coins.pdf?la=en

FINMA underlines however that the whole classification is purely for indicative purposes (FINMA, 2019). From a supervisor's and a financial regulator's point of view, it is crucial how the stablecoin typology is organised. Otherwise, it will be difficult to develop appropriate and flexible enough legal regulations, within the framework of which issuers can create stablecoins, and financial authorities can supervise issuers and market intermediaries.The assets by means of which a stablecoin issuer secures the stability of their value and/or with whose value links the value of his stablecoin unit, may but do not have to be and often are not assets to which an issuer guarantees the exchange of his stablecoins. For instance, accepting USD as a reference currency, securing stability by means of assets denominated in USD does not imply exchangeability of a given stablecoin on USD guaranteed by an issuer. Together with new issuances of stablecoins on the market and an increase of their popularity, a proper recognition of this construction differentiation of stablecoins can cause considerable problems not only for their users but even for financial regulators (FSB, 2019; FCA, 2019; EU, 2019; ECB, 2019). As the German central bank rightly notes, stablecoins are therefore not payment tokens which have an inherently stable value (in their respective reference fiat currency). It results from the fact that the price of a stablecoin is additionally determined by fluctuations in supply and demand on digital trading platforms (Deutsche Bundesbank, 2019).

The problem of the transparency of stablecoins functioning illustrated with the example of Tether

Tether in its version stabilised to USD, hence its code USDT, is the best known stablecoin functioning on the cryptocurrency market. Also Tether CNHT is being developed, and it is stabilised to the Chinese currency renminbi, better known as yuan (CNH abbreviation for yuan traded in Hongkong corresponds to CNY in the ISO standard, used also in the SWIFT payment system – see ISO, 2020). USDT market cap amounts to USD 4.64 billion on 28th January 2020. It gives Tether the sixth position among all cryptocurrencies according to CoinMarketCap (2020c). Bitcoin BTC takes the first position with the market cap of USD 164.9 billion.

The principles of Tether functioning described in its Whitepaper seem to present the mechanisms of issuance and safeguarding stability against USD reliably and in details (Tether, 2016). The indicated technological connections between Tether and Bitcoin, also the location of the Tether Ltd company as an issuer in Hongkong belonging to the Tether Holdings Ltd company from British Virgin Islands (BVI Business Company), are open to public.

However, it was Tether in connection with Bitcoin that made regulators of financial market sensitive to uncertainties in the mechanisms of stablecoins issuance, stabilisations of their listings and trading. The mentioned USDT market cap is questioned due to manifestations of wash trading, which means manipulating the market by simultaneous selling and buying the same assets by the same investor, which overstates the actual volume of trading of these assets (Bullman et al., 2019). Apart from that, in 2019 doubts arose and resulted in legal actions regarding the actual amount of cash and its equivalents to back USDT and correlation between USDT issuance by its parent company and growths in the prices of Bitcoin. A class-action lawsuit was filed against Tether and associated entities in connection with suspicion of unfair practices (IFRS, 2019). It is noteworthy that in connection with the case of disappearance of USD 850 million of Tether collateral from the Bitfinex cryptocurrency

exchange, connecting the threads of Tether and Bitcoin cases, the New York Attorney General experienced certain problems with finding the domicile of the exchange. The report made in 2018 indicated Taiwan (Underwood, 2018), and in May 2019 it was established that the actual domicile of the Bitfinex exchange was in Hongkong, just like of the iFinex Inc. company, which was the actual operator of the exchange and also the owner of the Tether Ltd company (Hougan et al., 2019; Larson et al., 2019; Igna, 2019).

The above events made regulators pay a close attention to the most significant functioning cryptocurrency and connected stablecoin, as soon as it became clear that the cryptocurrency market can demonstrate irregularities significantly similar to those of a classical financial market. Particularly with reference to cryptocurrencies of the stablecoin type, the mechanisms of connections between stablecoin resources and national currency resources and transformations of those resources in both directions constitute an important issue for regulators. A national currency is exchanged into cryptocurrencies by their purchasers and taken over by cryptocurrency issuers. Some cryptocurrencies can also be bought with other cryptocurrencies, like for instance purchasing Dai with Ethereum (The Maker Team, 2017), but a national currency is always a reference point at the beginning of a transaction chain. A considerable differentiation of solutions securing the stability of the purchasing power of individual stablecoins must be remembered as it was indicated in the part of this article discussing the kinds of stablecoins.

In those circumstances, it is natural that the appearance of the Libra stablecoin project endorsed by Facebook has caused distrust of the financial market regulators, not only in the USA, since the very beginning. Although central banks and other public regulators of the financial market in principle shape this market in the best interest of society and constitute a part of a complex network of institutional connections within the structures of a given country, the transparency of their activities is not fully guaranteed (Krivoluzky & Kim, 2019). All the more private entities issuing cryptocurrencies are able to use transnational organisational structures, the global character of the internet and resulting limitations in the efficiency of control of national jurisdictions, and even international organisations.

Stablecoin Libra and its path to conflict with financial regulators

Facebook, which is the worldwide leader among all online social media and social networking services, on 18th June 2019 announced the Libra project and specified it as a "modern, low-friction, high-security payment network". However, the cryptocurrency based on the blockchain technology called Libra (like the whole project), constitutes the essence of this payment network and it will be stabilized to reserve assets (Libra, 2020). For this reason, the concept of the Libra currency is frequently called global stablecoin (Cœuré, 2019; Claeys & Demertzis, 2019). There are almost 3,000 cryptocurrencies in circulation, most of which basing on blockchain (CoinMarketCap, 2020c), but none of them has such a widely recognised promoter. According to an internal report, in September 2019 Facebook had on average 1.62 billion active users daily and 2.45 billion active users monthly on 30th September 2019 (Facebook, 2019). For this reason, the Libra project was exposed to fierce criticism of the regulators of the financial markets in the USA, the European Union and other countries. As a result, in the first half of October 2019, a few important companies like Visa, Mastercard, eBay, Stripe, PayPal and a less known Mercado Pago withdrew from the Libra project (De & Dale, 2019). However, this did not prevent the remaining 21 charter members from signing the statute of The Libra Association on 15th October 2019 as an independent, not-for-profit membership organization, headquartered in Geneva, Switzerland and establishing its management structures. It was also announced that over 1,500 entities had indicated interest in joining the Libra project, and approximately 180 entities had met the preliminary membership criteria required by libra.org (Libra, 2019). However, the basic institutional structure of the Libra project was not changed despite the financial regulators' serious doubts concerning the control mechanisms within the consortium of companies belonging to the Libra Association and the actual influence of Facebook on the whole entrepreneurship. Yves Mersch, Member of the Executive Board of the European Central Bank, at the ESCB Legal Conference in Frankfurt am Main on 2nd September 2019 said that "Libra's ecosystem is not only complex, it is actually cartel-like" (Mersch, 2019).

Less than a month later, on 12th November 2019, a press release announced another payment system – Facebook Pay, which is supposed to constitute an addition to the existing payment system for national cryptocurrencies. Facebook Pay is to consist in adding an appropriate integrated payment functionality to the existing applications, firstly to Facebook, Messenger, Instagram and WhatsApp. Therefore, it does not mean giving up on the Libra project, which is confirmed by the mentioned Facebook's press release: "Facebook Pay is built on the existing financial infrastructure and partnerships, and is separate from the Calibra wallet which will run on the Libra network" (Liu, 2019).

The unstable and unclear presentation of the financial principles of Libra cryptocurrency functioning mechanisms stands in contrast to the consistency in institutional organizing of the Libra project manifested by Facebook. In an official document presenting the Libra project principles (Libra, 2020), it was claimed that the Libra currency would be neither backed by gold nor pegged to a single currency. It will be backed by a collection of low-volatility assets, such as bank deposits and short-term government securities in currencies from stable and reputable central banks.

A few days after the meeting of Facebook and JP Morgan with the representatives of the key world central banks (16th September 2019), Facebook announced the percentage composition of the currency basket of global importance (23rd September 2019), which would constitute an anchor of the stable value of the Libra currency (Mayer, 2019). The basket was supposed to include US dollar (50%), euro (18%), the yen (14%), the British pound (11%) and the Singapore dollar (7%). However, on 20th October 2019, Facebook Inc informed the media that the initiative could use cryptocurrencies based on national currencies such as the dollar, instead of the synthetic ones it initially proposed. David Marcus, the project leader in the name of Facebook said that "… we could have a series of stablecoins, a dollar stablecoin, a euro stablecoin, a sterling pound stable coin, etc.". He added that "having a multitude of stablecoins that represent national currencies in a tokenized digital form" (Shalal, 2019) was one of the options. It was considered an answer to the adverse criticism of the original version of the Libra project by the world financial regulators (Palmer, 2019a).

On 6th November 2019, Libra co-creator Christian Catalini said that the Libra Association will be able to expand its founding member set. Consequently, he added that the initial breakdown of the Libra basket was just a proposal, and that the final composition of the basket would be decided by the final members of the association (Sarkar, 2019).

All the confusion in connection with the Libra construction was briefly concluded by the Governor of the US Federal Reserve Lael Brainard during his speech in Germany (18th December 2019): "What would set Facebook's Libra apart, if it were to proceed, is the combination of an active-user network representing more than a third of the global population with the issuance of a private digital currency opaquely tied to a basket of sovereign currencies". He expressed additional reservations considering the transparency of the Libra project saying that "it is not even clear how much price risk consumers will face since they do not appear to have rights to the stablecoin's underlying assets." (Brainard, 2019; Palmer, 2019b).

Another version of the Libra Whitepaper of 29th January 2020 does not include any changes in the financial construction of the project when compared with the version of May 2019 criticised by the financial regulators in numerous countries. The new version does not answer any questions concerning the details of the Libra Association functioning and Facebook's position, the Libra cryptocurrency issuance principles, establishing and stabilising its value or the mechanisms of the reserve assets management (Libra, 2020).

In conclusion, as at the end of January 2020, the Libra stablecoin project is continued by the consortium led by Facebook according to the original principles, despite justified reservations of the key financial regulators regarding the transparency, stability and safety of the Libra cryptocurrency construction and its ecosystem.

Summary

Quoting the statement of the Governor of the European Central Bank, Christine Lagarde, which she made during the Hearing at the Committee on Economic and Monetary Affairs of the European Parliament on the 2nd of December 2019 seems an adequate summary of the above considerations: *Innovations – including stablecoins – will only be beneficial if the associated risks are mitigated through effective regulation and oversight. So I believe we should follow the golden rule of supervision: "same business, same risk, same rules"* (Lagarde, 2019a).

At the same time, Governor Legarde mentioned the global context of stablecoins on numerous occasions referring to the works of the international forum G7 Working Group on Stablecoins and to the cooperation with other central banks.

On the basis of the information included in the four main parts of the article, a doubt may arise whether the cooperation of supervisory national and international institutions itself in the style practised so far is enough to "*ensure that stablecoins do not compromise the safety and efficiency of the payment system or the soundness and stability of the financial and monetary system*" (Lagarde, 2019a).

The problems the regulators and supervisors of financial systems face in connection with the development of stablecoins are of various character. It was not possible to indicate all of them in this article. A uniform definition and classification of stablecoins is necessary for the international cooperation of financial regulators and supervisors in the issues concerning stablecoins to be effective. It is not however possible without arranging the whole network of interrelated concepts, e.g. in connection with blockchain and cryptocurrencies.

However, creating international mechanisms for controlling institutional connections between stablecoin issuers and cryptocurrency exchanges and other intermediary companies may prove to be much more difficult. Differences between countries in the forms and principles of registration of economic activity with limited extension of national jurisdictions create opportunities for such entities to form non-transparent organisational and financial links, like in the case of Tether.

The issue of an actual authority of national regulatory and supervisory powers in the light of the activities of global BigTech companies is of a different character, as it was illustrated with the example of the Libra project. Building the credibility of financial authorities cannot however be limited to bans paralysing any initiatives problematic from the regulatory and supervisory point of view.

The above comments raise the question concerning the necessity and possibility to institutionalise and centralise international cooperation of regulators and supervisors of by its very nature global market of cryptocurrencies and stablecoins. How to design such a global regulator and supervisor and also the possible scenarios when such an institution is not created constitute an interesting research problem.

In the author's opinion, there is a danger that over-strict regulations introduced by public authorities of different countries may block, or at least significantly slow down the evolution of stablecoins into a useful and safe financial instrument. However, without an appropriate regulatory framework, stablecoins will not gain both the approval of authorities and wider acceptance by business participants. This situation may continue as long as the potential benefits of using stablecoins are overshadowed by the high risks involved.

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Animal Spirits and the Business Cycle – the case of Poland

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Abstract

The paper integrates the 'animal spirits' hypothesis and business cycle in the new environment i.e. emerging market of bonds with non-residents as the investors in Poland. The main aim of it is to show the investments and investors from a different perspective. The paper will prove that according to macroeconomics factors, non-residents should buy bonds, but they behave irrationally.

Keywords: animal spirits, behavioral macroeconomics, business cycle, bonds.

Introduction

The efficient market hypothesis says that it is impossible to beat the market. This hypothesis assumes that people buying and selling stock rationally process the information that they have about the stocks' underlying value. But there is a long tradition suggesting that the fluctuations on the stock market are psychological. In 1930s, economist John Maynard Keynes suggested that assets markets are driven by the "animal spirits" of investors – irrational waves of optimism and pessimism. In Keynes's 1936 publication, 'The General Theory of Employment, Interest, and Money', he speaks of animal spirits as the human emotions that affect consumer confidence.

In 2009 the term animal spirits returned to popularity when two economists: Akerlof and Shiller published their book, 'Animal Spirits: How Human Psychology Drives the Economy, and Why it Matters for Global Capitalism'. The authors argue that although animal spirits are important, it is equally important that the government actively intervene to control them via economic policymaking when necessary. Otherwise, the authors postulate, the spirits might follow their own devices—that is, capitalism could get out of hand, and result in the kind of overindulgence that we saw in the 2008 financial crisis.

The main idea of this paper is to show the different kind of investments and investors from different perspectives. The paper concentrates on the market of bonds in Poland. The paper discusses according to different research papers, the correlation between the Real Business Cycle model and the Animal Spirit Hypothesis. The Real Business Cycle model assumes rational expectations in contrast to the animal spirit hypothesis where people prefer to follow trends and behave with irrational expectations. However, the main idea of this paper is to check if the animal spirit hypothesis can be the answer if the business cycle fluctuation depends on the investors' mood.

Animal spirits and the business cycle – the review of literature, methodology and empirical research

'According to the real business cycle theory, there is nothing the government can do to eliminate business cycle fluctuations. According to Farmer and Guo, in contrast, governments may be able to design policies to moderate economic fluctuations.' (see Espinosa-Vega and Guo (2001)).

Do business cycle represent optimal responses by rational agent to erratic changes in technology, or are they also influenced by the 'animal spirit' of investors? (see Farmer and Guo (1994)). They

observed that politicians should not care about allocations, when the economy is Pareto Optimal. This means that when the supply of random products embody business fluctuations, appears as Arrow-Debreu models. Moreover, they discuss economic activities and how it impacts the reduction of fluctuations and the increase of economic welfare based on decisions made by the policy marker. In the beginning, the term of 'animal spirit' was the way that people explained the Keynesian concept of recession. Then people began to doubt it due to the influence of many new results on the subject, which was the basis of economic fluctuations. Furthermore, people created theories about animal spirits, which told us that the animal sprit was not related to real business cycles. For that reason, they started that the animal spirit was letter as *'sunspots' or* '*self-fulfilling prophecies'* (see Azariadis (1981)).

The literature extended by Farmer and Guo (1994) disagreed that it is impossible to calibrate the business cycle model to the same level as the real business cycle (RBC) model. Therefore, they conducted their own surveys, which were based on the first moments of time series data to prove their point of view. However, rational expectations are self- fulfilling prophecies for that reason macroeconomics variables such as: output, consumption, employment and investment transfer as erratic fluctuations. They wanted to show that a simultaneous correlation between the macroeconomics variable mentioned above in US time series in the context of real business cycle model existed and they thought that it would be a better explanation of the dynamics of US data.

Hall's observation (1989) was the starting point on the discussion of animal spirits, which was based on the Solow residual that it is not correlated between any variable with productivity - under competition, constant return-to-scale and Solow residual might be unbiased estimates. Hall tried to prove that there is a positive correlation in U.S. post-war data – with Solow residual and various instrument. Moreover, he observed that we possibly could not understand economic fluctuations through monopolistic competition and increasing returns-to-scale. In some period of time, Hall's observation was the reason that more people started to investigate that US data can be explained by technology under increasing return- to-scale.

Papers of Caballero and Lyons (1989), and Bexter and King (1995) were the next step of discussion of the paper of Famer and Guo. Caballero and Lyons discusses evidence about the proof of external effect in production functions whereas Bexter and King focused on increasing return-to-scale technology in the real business cycle. Moreover, they wanted to show that a demand driven model could obtain correlation by supply disturbance under the assumption of increasing returns. Then Benhabib and Farmer (1994) have estimated that increasing returns' assumption had potentially more radical implications.

When shock to the technology does not occur, we can say that two-dimensional dynamical system around a stationary state that is the saddle point in the standard real business cycle model. When the standard assumptions are not familiar with Benhabib and Farmer observations, then appearing an indeterminate steady state – self-fulfilling beliefs and the increasing return-to-scale by population technology described as instability of the steady state.

Farmer and Guo in their paper created three kinds of economics model, which were the main tools of their research. The first model was presented as a real business cycle model with Hansen. The next two models represent monopolistic competition and increasing returns. The next step was calibrating those three models based on the first moments of the US time series data. They keyed theoretical constructs with accounting data by elasticity in calibration. However, in the case of monopoly power, uncertainty in the US economy appeared, and they assumed that it could be due to the distinct feature of the average mark-up of price over marginal cost. Their assumption lends to the comparison of two models, repressed monopoly competition and increasing returns. Farmer and Guo thought that this elasticity is in a position to explain the difference between model 2 and model 3. The second model obtains 0.63 for labour share and 0.3 for the price-cost-margin – a determinate saddle point in steady state. The third model obtained 0.7 for labour's share and 0.42 for the price-cost-margin - an indeterminate a drop in steady state.

There are many alternative approaches to modelling animal spirits. For example, De Grauwe presents (2008) in his papers that the notions of "animal spirits" and rational expectations do not mix well. However in contrast the author underlines the role of the animal spirits hypothesis developed by Keynes based on the fact that individuals only understand small parts of the total information set, and they are not capable of describing the statistical distribution of economic shocks. This limitation of individuals has been documented by psychologists and brain scientists (e.g. Kanhnemman and Thaler (2006), Della Vigna (2007). De Grauwe and Yuemei (2016, 2017) continued a test of "animal spirits" in two countries where the synchronization of the business cycle is produced endogenously.

These are the limits of the De Grauwe models because they are applicable only to the closed economy. The development of this model for the open economy was made by writer Tae-Seok (2019).

The research in the presented areas concentrated mainly on the instruments role of monetary policy, not exactly on the instruments of the fiscal policy (see De Grauwe and Foresti (2018). This paper shows that fiscal policy is also very important for the decisions that drive investors.

The Animal Spirits Hypothesis and The Market of Bonds in Poland

Over the last few decades, the demand for government bonds increased significantly. This demonstrated that the proper direction of public debt management determined the future government debt price level. In other words, bond yields are depended on interest rates and price, bond yields are defined as the expected profit from the purchase of bonds. The price increase when yields, interest rate and payment discount decrease (see Andritzky (2012)). There is a link between the investor base and bond yields.

The number of non-residents investing increased due to lower yields. More broadly, the question is of the risk to the global financial market by non-residents in a local market. The empirical evidence has motivated the hypothesis that the expansion of non-residents investors should be limited through diversified investor base (see Arslanalp and Tsuda (2014)). It is possible to distinguish three main categories of bonds: treasury, municipal and corporate. In my research I am concentrated on the category of treasury bonds.

The regression model in this paper is presented as the main result for the empirical question of this paper: which macroeconomic factors have an influence on the share of non-residents in the market of bonds in Poland. The macroeconomic situation of Poland in recent years has been stable according to the Standards and Poor rating which is at the level of BBB+.

Poland's gross domestic product has changed during the years 2006-2018. The data shows that the GDP annual growth rate could be at the level of 7% as in 2007, as well as at, above 1% like in 2013. Since 2017 has been around 5%.

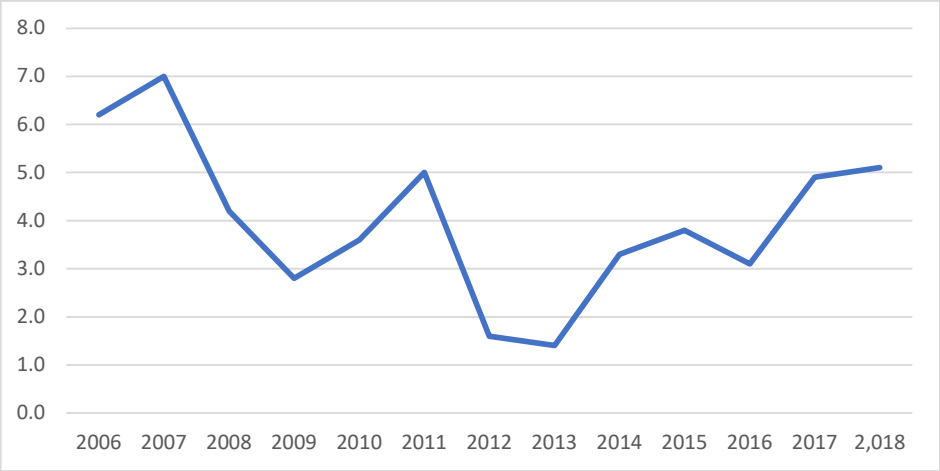

Fig. 1: GDP Annual Growth Rate of in Poland during the years 2006-2018 in %
Source: Central Statistical Office of Poland.

Another macroeconomic factor that influenced the pessimistic or optimistic decisions of inventors on the market of bonds is general government deficit.

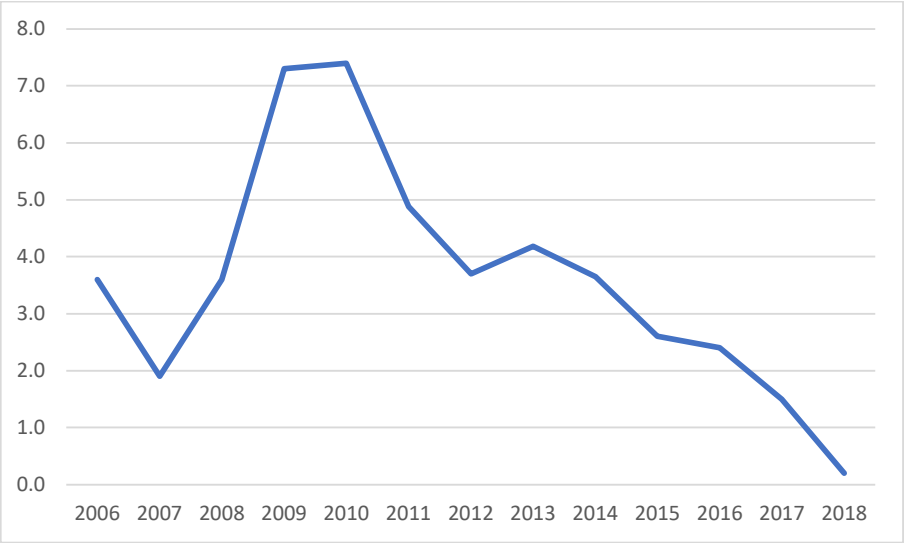

Fig 2: General government deficit in Poland as the % of GDP during the years 2006-2018
Source: Central Statistical Office of Poland.

Even though the deficit decreased as a level of debt as the % of GDP is still at the very high level – 48 % of the polish GDP.

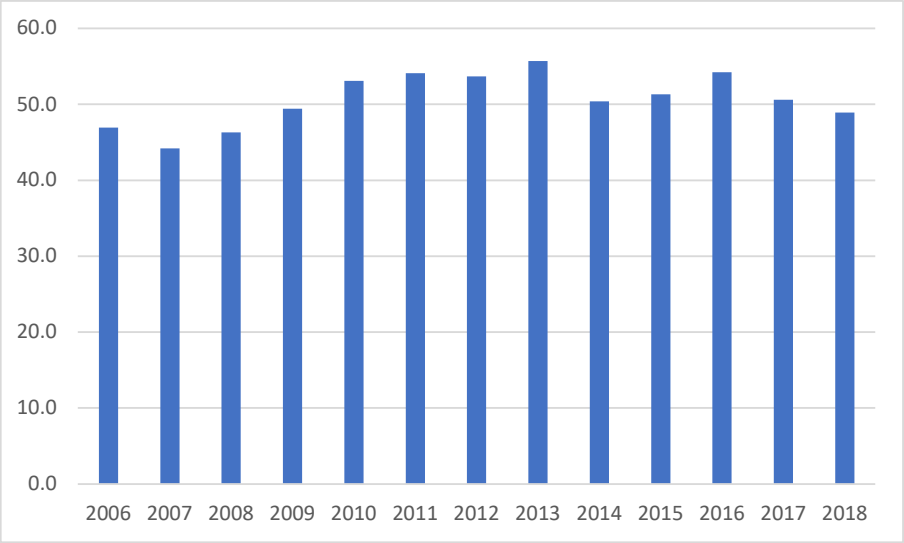

Fig. 3: Debt as the % of GDP of Poland during the years 2006-2018 in %
Source: Central Statistical Office of Poland.

One of the ways to finance public debt is the issue of bonds, as well as for home (residents) and foreign investors (non-residents).

The Polish Ministry of Finance has been issued bond' shares and foreign debt to non-residents investors since 2004/2005. In mid-2007 the yields on Treasury bond were decreased significantly in Poland and the largest boom was during 2009-2011. Comparing the difference between 2007 and 2014, the nominal value of foreign debt increased from PLN 558 828 to 1251 028. In 2016, the foreign debt reached 1403 997. At the end of 2014, half of the Polish debt was held by foreign investors - profitability level decreased.

Foreign debt determines longer payment terms than domestic debt. For instance, in 2014, the average foreign debt payment was 7 years and the national debt was 4 years. At the end of 2014, Poland occupies t eleventh place in the European Union in terms of the share of non-residents in public debt. In 2014 the ten-year bond yields were 3,5%, in contract to 2008 - 6,1%. Foreign investors / non-residents generate an increase in foreign currency in the State Treasury debt.

During the full analyzed period the total value of external debt increased. This was caused mainly by the debt of residents. The participation of non-residents in external debts during the last 3 years has decreased. This was probably caused by the level of the 10Y bond yield which has been decreasing year by year since 2016 – 3,6%, 2017, - 3,3% 2018 – 2,8%, 2019 – 1,9% (Trading Economics).

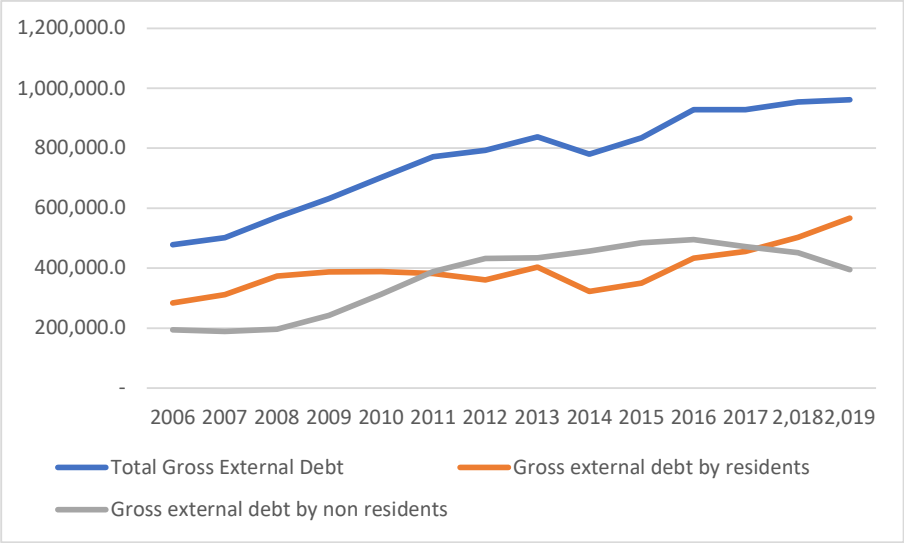

Fig. 4: Gross External Debt Position by Sector in Poland during the years 2006-2019 in mln PLN

Source: Ministry of Finance in Poland

The results show that GDP growth does not have any impact, in contrast to the cross-section model. Public debt and deficit are negatively significant, so a lower level of public debt and deficit increase the share of non-resident. It is logic assumption and it was expected to be met. Investors are not likely to invest when a government spends more money than it takes in (expenditure exceeds its revenues). When a country's ability to make future payments on its affected it is exactly what the results of estimations shows.

Table 1: Results of cross section regression model for Poland

	coefficient	standard deviation	t-sudent	p value
const	-55,7828	33,9958	-1,6410	0,1352
GDPannualgrowthra	1,1821	1,3004	0,9090	0,3870
DeficitasofGDP	3,9387	0,7342	5,3650	0,005**
DebtGDP	0,8384	0,5897	1,4220	0,1888

Source: based on the own calculations using Gretl.

The results of the estimations show that the highest influence on the GDP growth rate, is public debts, not the deficit. When the growth rate increases the investor's mood should be much more optimistic and they should want to buy bonds. But in Poland we see that rather residents want to buy bonds since 2016. For non-residents a much more important factors can be public debt, and the deficit.

For instance, examining the reaction of the ratio between public debt held by non-residents, the result shows "better fiscal positions increase the share of non-residents held debt" and "crisis since 2009 flags the reduction of the share of non-residents held debt (see Afonso and Silva, (2017)). However, the regression model provided a similar outcome. Mainly with non-residents investors, a fiscal position has significant effect or decreasing public debt. While decreasing the share of non-residents may have contributed to the financial crisis - less stable financial situation on the market and ("public debt"). Therefore, the improvement of financial positions and stress and financial volatility has an impact for

higher shares of non-residents holding debt. However, this paper is not focused on provided the evidence of policy actions and any regulation reform for non-residents (see Jalles (2018)).

Conclusions

The main aim of this this paper was to show the different kind of investments and investors from different perspectives. The paper shows that there is a lot of factors that influenced on the decisions of investors. The case of Poland proved that investors, especially non-residents, didn't buy bonds even annual growth rate of GDP suggested the effective annual yield. In other words, they are like 'animal spirits', because maybe they have some instinct or intuition what can happened on the financial markets. The paper is a prove that there is the negative correlation between the Real Business Cycle model and the Animal Spirit Hypothesis in case of the polish economy. It causes that Poland should create the special policy for non-residents investors of bonds. They behave in opposite way in comparison with the residents. This conclusion is the main contribution of this research. This paper steps away from investigating how the share of non-residents held debt influences on the yields. However, have provided evidences reduction of non-resident holdings debt decreasing the yields.

This paper just wants to show how non-residents react in the stable and in an unstable economic situation, only in Poland.

However, these kinds of problems could be provided more wide analysis of non-residents and residents behavior on the financial market for many countries from different region of world.

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Ontological Approach Toward Security Knowledge Management for Secure Software Engineering

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Abstract

Secure software engineering involves very complex and unconventional development processes; that require a great deal of security knowledge that is continuously evolving and hard to discern. This significant bulk of knowledge is currently scattered, unstructured and difficult to be reused in a specific application domain and in every software development phase (specification, design and implementation) by security inexperienced software developers. In order to manage this knowledge in a formal and widely shareable representation, this paper presents an ontological approach which aims security knowledge management (security knowledge and security experiences) to support the engineering of secure software product. Firstly, we propose a literature survey, analysis and classification of some existing security ontologies that are candidates for full use in secure software development processes. Based on this survey, we propose an ontological approach for modeling, capitalization and sharing of security knowledge covering both dimensions of software: product and project and taking into consideration the context of the application domain and the risk analysis and deals with the different phases of software development process.

Keywords: Security Ontology; Secure Software; Security Knowledge; Knowledge Management.

Introduction

Nowadays, it is universally accepted that, proactive and ongoing security assessment and treatments are the only ways that could guarantee security assurance of software product (Standard 27034, 2011). However, adopting these ways still quite limited and software security is not always ensured or guaranteed because of the considerable effort they generate, the skills required and, in particular, the developer's lack of experience. The selection of required security features and mechanisms often presents serious challenges for the system owners and application developers (Karyda, 2006). Whilst significant efforts (processes, methods, models, standards, security tools, etc.) have been undertaken to improve software security, they have clearly proved to be insufficient. Recent statistics show that security problems still persist even in the recently developed software for many reasons, namely: the widespread deployment of the Internet, the emergence of new application domains and technologies e.g. the spread of smart cities with new weaknesses which introduce new possibilities of attacks that could affect even human lives, the well-known attacks are still frequent, the exploits of old (déjà vu) vulnerabilities, and the propagation of hacking tools making the task of hacker much easier. According to the security reports such as the National Vulnerability Database (NVD), 22% of vulnerabilities in 2016 are rated as critical and the software product is the privileged target in security attacks. This is mainly due to the ever evolving number and forms of attacks (e.g. zero day attacks), to the continually rising of new threats and risks, hence new mitigating actions have been devised. Likewise this is due to the limited proposals that aim at the intersection of both disciplines: the secure software engineering and the knowledge management.

Therefore, the discipline of secure software engineering requires even more than the improvement of the development processes. These later require additional knowledge about the product which is related to its security. According to McGraw (2005), knowledge constitutes one of the main pillars to

guarantee the development of secure software product. However, Security knowledge is not easy or obvious to be defined for a specific domain and to be precisely integrated in the development cycle. This knowledge often results from past experiences, historical incidents and in-depth analysis of experts. Thus, it is scattered, scalable and dependent on several factors associated to software products.

Considering these facts, it becomes clear that the current secure software engineering practices are not reliable and relevant enough and there is a growing need for an efficient management of security knowledge and experience that address every phase of the software development process (specification, design and implementation) and every application domain. For that purpose, this paper focuses on the representation of the security knowledge management approach. Our method, exploits three disciplines namely (knowledge management, ontological engineering and secure software engineering). In this context, ontology seems to be a promising tool to formally represent and manage security knowledge compared to other methodologies. They are mainly used as a means to model information, they have reasoning and high-level decision-making mechanisms (Wang, 2009; Souag, 2012b), they are more structured and provide better computational inference (Blanco, 2008) facilitating hence the secure software engineering.

The rest of the paper is structured as follows: Section 2 describes the software security issues. In section 3, we present a deep and comparative study of the existing literature on ontological engineering applied to the security field. We propose in section 4 an ontological approach for security knowledge management required for the development of secure software. Finally, section 6 presents our overall conclusions and future work for the evolution of our approach.

Secure Software Engineering

Secure software aims to ensure dependable software in order to prevent any malicious act (unauthorized access, manipulation or attack) that could affect security services and criteria (confidentiality, integrity and availability). The discipline of secure software engineering has provided several proposals to improve the quality of software products, while they are mainly concentrated on improving the development processes. Nevertheless, these processes require more additional knowledge about the product which is related to its security. The resort to a knowledge base to serve as complementary information about secure software product has been suggested in some works as catalogue, security patterns, security knowledge repositories, taxonomies, models, so forth (Carl, 1994; McGraw, 2005; Tsipenyuk, 2005; Dritsas, 2006; Essafi, 2006; Young, 2014; Munawar, 2012). However, the proposals found in the literature do not adequately reflect the developer's needs and do not provide sufficient support to be used throughout the development process and serve in the different phases.

We identify five key factors contributing to define adequately the required software security knowledge: (1) The application domain factor serves in formulating security requirements which correspond to a specific domain (e.g. nuclear energy, social media or e-commerce). (2) The Activity sectors of the same application domain are a key factor contributing to provide different security knowledge. For instance, in the health field, the impact on the data integrity of the surgical operations (activity sector) is more important and higher than on the availability and the confidentiality, while the latter is the most crucial and critical in psychiatry sector. (3) The security properties priority provides the most important security properties that should be taken into consideration for a specific domain. In fact, risks in the health field affect the confidentiality of patients' private data. However integrity and availability are actually the cause of the most serious security problems, since information technologies were integrated into the daily practice of doctors with computerized medical records, telemedicine and appointment management software and connected biomedical devices. (4) The environment of software product (e.g. web-oriented, desktop software, etc.) contributes to the determination of security level and objectives. For instance, a medical software product running on a single isolated workstation in a doctor's office will have very different security requirements from those in a similar web-based software product or from the ones in a public space in a hospital. (5) The software development life cycle factor aims at integrating security in the

different phases (principal phases) of software life cycle namely specification, design and implementation to mitigate the vulnerabilities risks.

Consequently, in order to manage and exploit this bulk of constantly evolving security knowledge in the different phases of software life cycle, we are particularly interested in the ontological engineering. In this context, many research studies exposed the importance of using ontologies to represent and manage information security knowledge (Ekelhart, 2007; Souag, 2012a). We will demonstrate thereafter the ability of these ontologies to ensure a secure software product by the study of the existing proposals in ontological engineering applied to security.

Security Ontologies Survey

Based on the literature, there are three main surveys that focus on security ontologies; each one of them targets a different objective. Blanco (2008) was based on manual evaluation security ontologies modeling criteria (number of concepts, instances, taxonomic relations, etc.) using a comparison framework of basic elements (Ontometric framework). The study of Souag (2012b) concerns security requirements engineering in Information Systems. It is based on the analysis and classification of security ontologies that could be used to support the requirements engineering process. Singh et al (2014) focuses mainly on semantic representation of security issues and countermeasure in cloud computing. They provide a critical study of security ontologies to ensure the implementation of cloud computing security using the appropriate and complete security knowledge specific to this field. Our work aims at providing an overview and a new classification of security ontologies -as illustrated in (figure 1)- compared to the one proposed in (Singh et al, 2014). First, we have extended the classification of security ontologies proposed in (Souag, 2012b) which presents among other two limited categories to a basic taxonomies "Beginning security ontologies » and « Security taxonomies". Our update in (figure 1) aims mainly at adding two other categories (secure network and source code) providing hence five categorization criteria (development phase, typology, network, risk analysis and web oriented security). Then, we have presented a brief outline of the most relevant proposals to ensure their efficient analysis and to identify the security ontologies that could be able to ensure a secure software product.

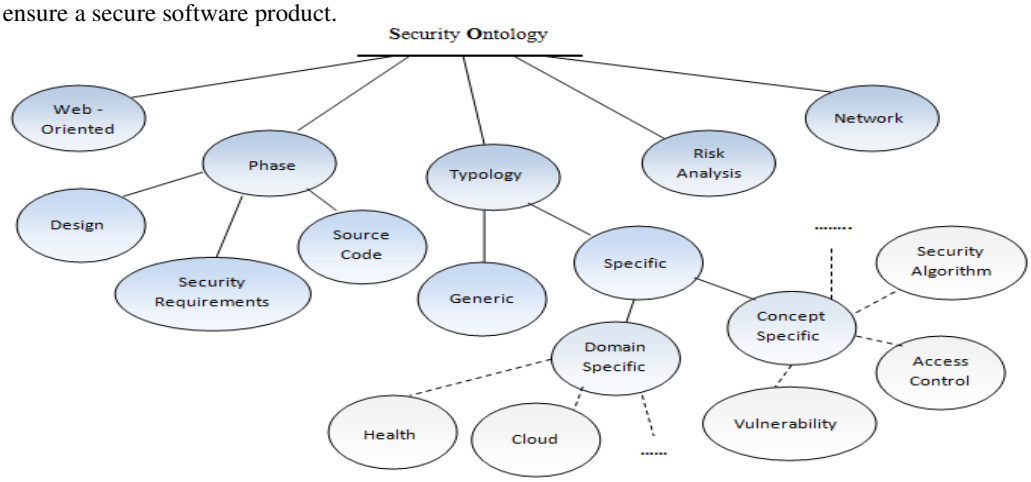

Fig.1: Classification of security ontologies

a- *Web-oriented security ontologies (*Maamar*, 2006;* Vorobiev*, 2006;* Garcia et al, 2011): The proposals described in this category focus mainly on developing distributed defensive mechanisms for web service-based systems; and on providing context reconciliation between web services in order to avoid heterogeneity and security vulnerabilities that threaten their integrity.

b- *Security ontologies by phase*

- *Security requirements ontologies (*Lasheras*, 2009; Vasquez, 2012; Souag, 2015):* This category presents the proposals that contribute to the security requirements specification derived from risk analysis or from application domain or based on the use of security requirements patterns in order to mitigate the effect of the lack of security engineering expertise, to ensure formal security requirements representation and to improve thus the information system's security.

- *Modeling security ontologies (*Massacci, 2011)*:* This category mostly describes security modeling using ontology, similar to misuse-case, abuse-case and I* approaches.

- *Code source security ontologies (Herzog, 2007;* Al-Qahtani, 2017)*:* This category describes the different vulnerabilities and errors of the source code a developer could avoid during the programming phase likewise the best secure coding practices such as black-box testing, threat modeling, bug tracking system and static analysis.

c- Security ontologies by typology

- *General security ontologies (Herzog, 2007; Fenz, 2010; Ramanauskaitė, 2013):* This category includes mainly the general proposals which cover (IS, network, software, infrastructure, organization, etc.) and their corresponding concepts. It includes generic concepts and technical detailed ones independent of all application domains.

- *Specific security ontologies(*Dritsas, 2006; *Karyda, 2006;* Geneiatakis, 2007 ; Wang, 2009; Lekhchine, 2009)*:* Specific security ontologies refer to the specific area e.g. E-health, mobile agent technology or to the specific concept on which the ontology is developed e.g. the security vulnerabilities of the Session Initiation Protocol (SIP) used by VoIP, threat ontology to discover new system requirements.

*d- Risk based security ontologies (*Ekelhart, 2007; Assali, 2008)*:* Risk analysis forms a paramount factor to success the development of secure software product (Essafi, 2006). This category contributes to define exactly the security requirements based on the impact and the type and level of risk in order to ovoid bad decisions and to improve quantitative risks analysis of organizations.

e- *Network security ontologies (*Liu, 2007)*:* aims to manage the network security risks and controls. The proposed ontology based on security standard 27001 as well as good practices BS7799 in order to ensure a reliable and full exchange with a minimum acceptable risk.

Although interesting proposals have been made for the definition of security ontology, these latter are not prepared for reusing and extending (Salini, 2012). The literature study carried out allows us to identify relevant criteria which are presented in table I in order to answer the problem of the security knowledge management.

Table 1: Comparative study of security ontologies

	Criteria				
	Domain	***Development phase***	***Covers Core Security Concepts****	***Ontology***	***Standards***
Alqahtani 2017	traceability of source code vulnerabilities found in APIs	Source Code Analysis	No	Security Vulnerability Onto (SEVONT) + Software Evolution Onto (SEON) + Software Build Systems Onto (SBSON)	No
Souag 2013	Security requirements for IS	Requirements engineering	Yes	Security onto + domain onto	No
Vasquez 2012	Security requirements for IS (based on risks analysis)	Risk analysis + security requirements identification	No	Risk Onto + security requirement onto	Yes

	Criteria				
	Domain	***Development phase***	***Covers Core Security Concepts****	***Ontology***	***Standards***
Fenz 2010	IT security metrics for organization	–	No	Security Onto	Yes
Herzog 2007	Information security	–	No	Security Onto	No
Karyda 2006	E-government applications	Security requirements identification	No	Security Onto	No
Ramanauskaite 2013	Adaptive mapping of security standards	–	No	Security Onto	Yes
Lekhchine 2009	Mobile agent security	–	No	Security Onto	No
Massacci 2011	Security requirements for organization	Modeling security requirements	No	Security modeling Onto	No
Lasheras 2009	Security requirements for IS (based on risks analysis)	Requirements engineering	No	Risk analysis onto + requirement onto	Yes
Wang et al 2010	System security	Assessment (Risk analysis)	No	Vulnerability management Onto (OVM)	Yes
Tsoumas et al 2006	Security management of IS	–	No	Security Onto	Yes
Leo Obrst 2012	Cyber security	–	No	Cyber Security Onto	No
Salini 2012	E-Voting System	Security Requirements engineering	No	Security requirement onto	No
Salinesi et al 2008	Banking Sector	Requirement elicitation	No	Threats Onto (RITA)	No
Daramola et al 2012	Security Requirements Specification process	Security Requirements Specification	No	Basic Threat Onto (BTO)	No
Dobson and Sawyer (2006)	Semantic Web	Dependability Requirements engineering	No	Dependability Onto + Requirements Onto	No
Geneiatakis 2007	VoIP) services based on the Session Initiation Protocol (SIP)	–	No	SIP Vulnerability	No
Abou assali 2008	Industrial Risk Analysis	Risk Analysis	No	Risk Analysis Onto	No
Dritsas et al (2006)	E-health applications	security requirements identification	No	Security Onto	No
Liu and Lee (2007)	Enterprise information network security risk management	–	No	Three sub-onto: domain, task, and problem-solving	Yes
Ángel García-Crespo (2009)	Semantic web	Security requirements identification (access control)	No	SecurOnto for access control	No
Parkin (2009)	Human security behaviour within organization	Security requirements identification	No	Security Onto	Yes
Lee et al (2006)	Information Systems Certification and Accreditation	Certification and Accreditation security requirements	No	Problem Domain Onto (PDO)	Yes

	Criteria				
	Domain	***Development phase***	***Covers Core Security Concepts****	***Ontology***	***Standards***
Maamar (2006)	Web service	–	No	Secure Context Onto	No
Vorobiev (2006)	Web service	–	No	Security Attack Onto	No
Ekelhart (2007)	Improving Quantitative Risk analysis for organization	Risk Analysis	No	Security Onto	No

As shown in Table I, the proposals present significant results in terms of formal and consensual representation of security knowledge. However, they are still far from the expectation in the field of secure software engineering because of their restriction to certain concepts, development phases or specific application areas with a limited set of security properties and their negligence to risks analysis and security standards. Besides, we have observed that the greatest part of security ontologies do not specify which vulnerabilities correspond to each phase and the associated security requirements and countermeasures. Hence, once a software is deployed it will be difficult for the developer to specify the source of vulnerability and to address it, especially those specific to the architecture and design phase. In order to improve the software security, developers have to be aware about the different types of vulnerabilities a threat can exploit based on theirs classification (a flaw in the specification, a defect in the design phase and a bug in the implementation).

Ontological Approach for Software Security Knowledge Management

Due to the amount and dynamic nature of security knowledge, we propose the required knowledge that should be used during the development process to avoid security failures in software products. Therefore, as illustrated in (figure 2), our approach is mainly composed of two views for secure software engineering, the "project" view and the "secure software" view which cover the dimensions describing a secure software product, namely:

- The "secure software" dimension: provide the product security knowledge required throughout the development cycle such as its requirements, specification, documentation, environment, etc. We distinguished two main classes of product knowledge to manage:
    - A wide knowledge typology used during the development of secure software product (based on standards, guideline, knowledge base, etc.)
    - The previous projects experiences as security artifacts depicting undertaken security decisions in a particular situation.
- The "project" dimension: explicitly presents knowledge about the process, i.e. secure software engineering context in the form of process, engineering activities, resources, and engineering artifacts. It describes how to develop a software product (process, procedure, etc.) and helps to identify the strategies and tasks to be performed.

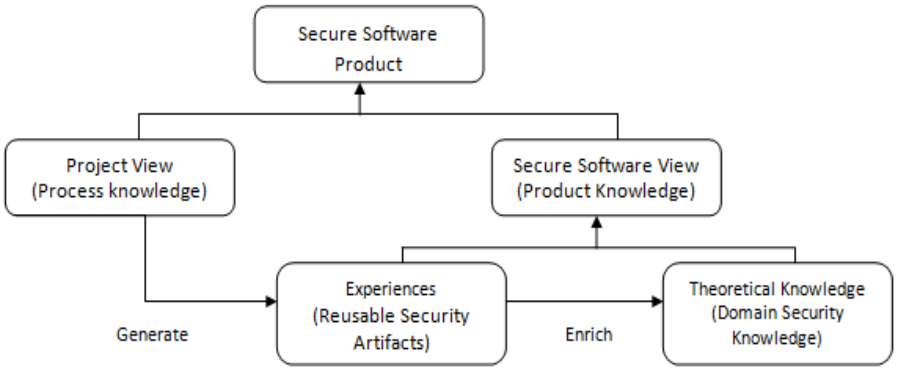

Fig.2: Security knowledge typology in the different view of software product

This research study focuses mainly on the "secure software" dimension to manage the product knowledge (Theoretical and Experience). The security experiences (cases of previous projects) that result from the software development process could enrich security knowledge.

Our approach encompasses the three pillars of knowledge management namely: (modeling, capitalization and sharing) to provide a vocabulary of discovered security issues and their resolutions needed for the engineering of secure software. A high-level schematic overview of our approach is presented in (Figure.3). It guides in fact, the discovery and the utilization of security knowledge using an ontological framework and the classification and reuse of previous projects experiences in a specific domain, phase and context. In the following section, each component of the approach will be described in details.

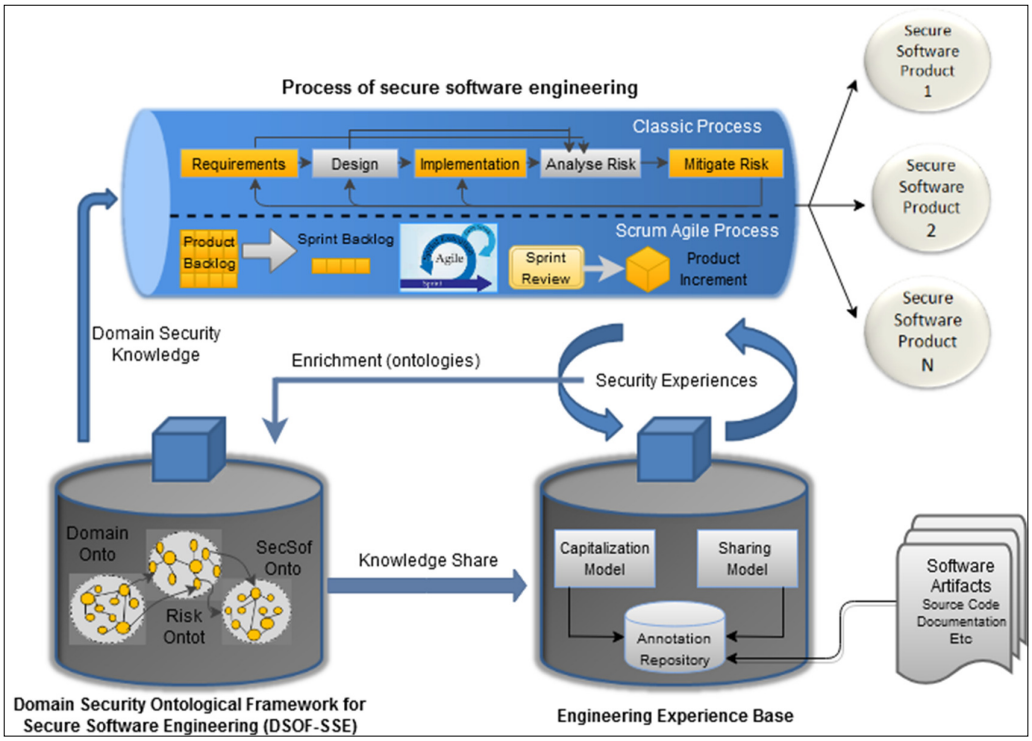

Fig.3: Ontological approach for software security knowledge management

a- Explicit and Consensual Modeling of Domain Security Knowledge for Secure Software Engineering:

We have identified three main facets characterizing the security knowledge management: application domain, risk analysis and secure software product. The modeling of these facets relies on the ontological engineering as it supports browsing and search semantic contents and on the ontology alignment process in order to retrieve and provide the main security concepts and risks in different application domains. In this context, we propose a generic domain security ontological framework for secure software engineering (DSOF-SSE) depicted in (figure 4), encompassing three ontologies representing the identified facets respectively. This generic framework presents domain security knowledge in a formal and structured way. It could be used in the different software development methodologies (Agile or traditional process) as it provides security knowledge by phase and objective (security functionality). The security functionalities (e.g. access control, authentication, cryptography, etc.) could be integrated into the Agile development process particularly in the Scrum methodology (ex. described in user stories and implemented in sprints). This will allow us to avoid the vulnerabilities that could emerge due to the accelerated development process and to reduce the time and effort required to solve security issues, preserving therefore the characteristics of Agile methods (in terms of time and size). Likewise, DSOF-SSE framework acts as a semantic foundation for security experiences management.

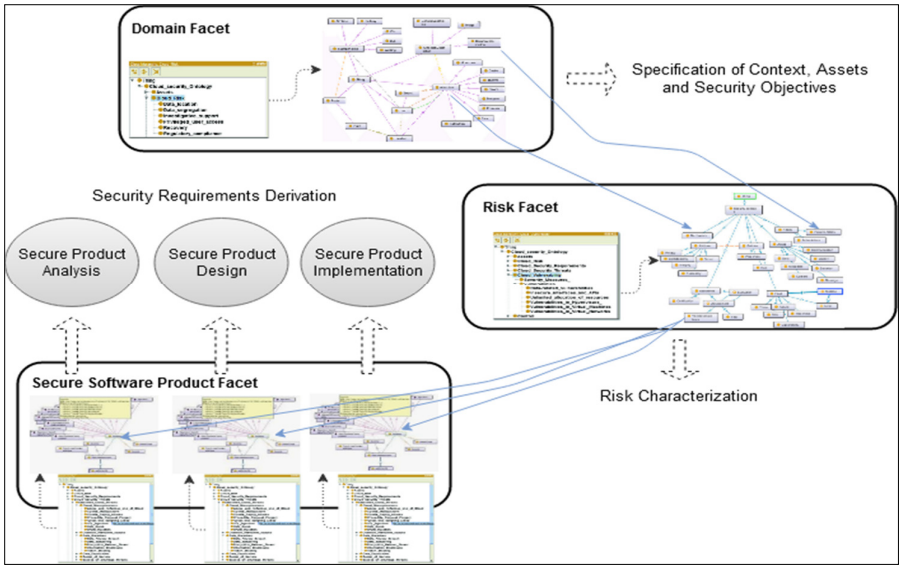

Fig.4: Domain Security Ontological Framework for Secure Software Engineering (DSOF-SSE)

The originality of the proposed generic ontological framework lies in the use of the application domain context and the risk analysis to derive the required security requirements that deal with full life cycle of software product development. Likewise, it provides all the relevant security concepts based on the software security standard (ISO 27034) and the reasoning services about security concerns to make software developers aware of the main security risks, vulnerabilities and countermeasures in a given domain. The DSOF-SSE would reduce the required effort to design and implement secure software product for any domain.

b- Capitalization and Sharing of Security Experiences:

Experience management is a special kind of knowledge management. It aims at the acquisition and spread of specific knowledge emerged and generated during a particular problem-resolution situation in previous projects. The security experience management (SEM) method adopted in our approach relies on the case-based reasoning (CBR) which exploits the ontological framework proposed

previously. This latter plays an important role in capitalizing, describing and sharing security artifacts that present decisional and contextual dimensions of security knowledge. In fact, security artifacts are an important source of knowledge. They incorporate specific security knowledge situated in a particular problem-solving context and can be reused in the development of similar future projects. These artifacts are a powerful tool for three reasons: First, they help in indicating the best method to integrate security during the development of software and to choose the appropriate technology depending on application domain and process. Second, they facilitate the exploitation of the know-how emerged during the development process by software developer. Third, they help in reusing tested and validated previous experiences to improve the resolution of current problems. In this case, we propose security experience management to support an easy development of secure software by integrating approved security solutions during the different phases of the software development (misuse case, abuse case, threats model, specific security ontology, secure source code in a specific programming language, etc.). Our goal is to provide software developers with real and similar cases that deal with full life cycle in order to adapt and reuse them to the considered case. We propose two models to manage security experiences: capitalization model and sharing model.

c- Enrichment of security ontologies

With the current state of technology constantly evolving, we guarantee the enrichment of the proposed ontologies to address the emerging security problems. In fact, the knowledge represented in security artifacts populates and extends in return our ontological framework. Accordingly, this latter has the ability to evolve over time.

Conclusion and Perspectives

This study has shown the significant role of ontology in ensuring the knowledge management for secure software engineering. We presented a classification and analysis of existent security ontologies based on relevant criteria (domain, context, risk analysis, phase, security standards, etc.) identified for secure software. The survey has demonstrated the lack of security ontology that covers all the required criteria for the development of secure software. Accordingly, we have described an ontological approach for security knowledge management and security experience management, specific to software product. We have also proposed Domain Security Ontological Framework for the modelling of security knowledge which would be more suitable for secure software engineering and which would support the capitalization and sharing of security experiences from previous projects. We believe that the proposed approach can substantially help the developer to search, retrieve and reuse domain security knowledge. Moreover, it addresses software security related issues in every phase without the need of a high level of security expertise in the required domain. Regarding future work, we envisage the development of the proposed framework and provide a case study to test the effectiveness of our contribution. We plan to make this ontological framework a fundamental base for the management of security experiences and to associate security knowledge with security artifacts produced in the development of software.

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The Marketing of Experiences Applied to Hotel Management – Study Case

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Abstract

The purpose of the study was to understand if the hotel, being the bond between real experiences in the destination and the guest, would increase their satisfaction and possible loyalty. Based on the internship carried out in the Guest Relations department of one Hotel in Oporto, a qualitative and quantitative analysis was carried out on the comments left by guests on Booking, Tripadvisor and Google, the main online tourist platforms for the unit - best current way in order to be aware of the customer's needs and preferences. From the analysis carried out, we can conclude that although there is a great importance with the main services that a hotel can offer, namely the room, it is the intangible aspects that are most important. Currently, tourists need to add value to the tangible through experiences that make them evaluate the service in a positive way. With the evolution of technology, and the fact that information available is increasingly quickly, it is necessary to be constantly analyzing the preferences and wishes of the guests, as this knowledge is an advantage for the units and therefore it would be advantageous to cover this study to other units in order to achieve a better objective - increasing all the Portuguese hotel service.

Keywords: Experiences Marketing, Hospitality, Loyalty, Satisfaction

Introduction

As a result of the exponential increase in tourism, all areas were forced to develop and evolve in order to be able to sustain themselves in the market. Hospitality was no exception, and so, these days, it is not just about offering an accommodation service, or a restaurant service, but a memorable experience that the guest will not be able to forget.

Guests demand for a higher quality of service is increasing and the great trend in recent years is the offer experiences (entertainment, aesthetics, escapism and education), (Sipe & Testa, 2018). The customer is no longer looking for just an accommodation service or a catering service, but to live an experience that remains in his memory, the moment he lived or passed through. Nowadays, this reality is already common knowledge and is already beginning to be applied in the hotel units, however, very little is known about how they can influence the satisfaction of a tourist or guest and establish practices of what to do. Thus, experience marketing emerged and took shape, and this involves "providing customers with unique and memorable experiences to establish a positive relationship between the customer and the brand has become one of the main challenges for brand managers." (Wiedmann, Labenz , Haase, & Hennigs, 2018, p. 103).

In an era in which more and more information is available and it reaches people in a short time, the needs and preferences of the individual, more specifically of a tourist, has been changing and thus, we are witnessing a transformation in this economic sector. All the information that future customers receive can influence them before they use the unit. According to Malheiro, Sousa & Ferreira (2019) the information given by tourism blogs can be considered an attempt to express tourism consumption, that is, the user reveals their experiences throughout the trip from boarding to destination as well as accommodation, meals and its final impression of the trip.

Therefore, we try to understand with this study if this type of marketing that has grown in relevance in the last few times, can influence and increase customer satisfaction in relation to a hotel and, consequently, allow customer loyalty to the brand. It is intended to develop a project in the area of experience marketing, more specifically, to understand whether the offer of experiences to guests that involve them in the local community leads to a greater degree of satisfaction and even to their loyalty to the hotel.

Taking into account this last factor and the fact that little is known about how to "design multisensory experiences that lead to a high and sustainable brand strength and offer customers a high perceived value" (Wiedmann *et al*., 2018, p. 121) , the objective of this project was to understand whether a possible relationship between the hotel unit and the local community in order to offer unique experiences, adapted to the destination so that the tourist lives and witnesses the true customs of the local population, raises their satisfaction and possible loyalty. According to Sipe & Testa (2018) "Destinations provide a combination of products and services." (p. 181). Thus, the goal is to create programs of activities or experiences to awaken the 5 senses in order to create a life experience for guests, realizing if the degree of satisfaction achieved in this can be such that it leads to their loyalty to the hotel unit / group. With that goals in mind, the starting question was: How can the relationship between the hotel and the local community influence customer satisfaction? For this, the comments of guests left on the online platforms were analyzed, as we considered that this was the most effective way of knowing their feedback.

Literature Review

One of the tourism composites is the hotel industry and, at this moment, it occupies a central and essential place in this economic sector. According to Melik & Ingram (2002) these activities take on enormous importance not only for visitors, but also for society, in terms of being adapted for business transactions, meetings and conferences. In addition to the specific workforce of the hotels, we also have as examples the collaborators that are needed, such as decorators, civil construction, material suppliers. All these dynamics contributes to the economy and hotels are an important instrument for society itself. In recent years what we have seen is an exponential increase in tourism, worldwide, but mainly in Portugal. A radical change, not only at an economic level, but also at a professional level, in cultures, in the rehabilitation of cities, all because of this activity. If we consider all Europe, in turn, in the same year, remains the most visited continent in the world. "Once again, the strong economic performance of the tourism sector proves its power as a tool for governments to generate prosperity while creating jobs around the world." Gloria Guevara Manzo, President & CEO of WTTC, in 2019 (p.2).

Now moving to Portugal, and according to the WTTC, in 2018, tourism grew more than the world result by around 8% and the main source market remains the United Kingdom.

Several authors claim that the internet was a determining factor in the evolution of the hotel industry. In addition to a greater booking and online purchase of different tourist services, it appears that tourists are more informed and, consequently, more demanding.

Therefore, internet means more information and more information implies an evolution in the motivations of consumers that have led to new forms of hospitality. Due to the high existing competition, the differentiation is found on the experiences offered. Igreja, Silva & Sousa (2020) defend that the quality of service has proved to be one of the key elements to obtain a sustainable competitive advantage in the market. A tourist is no longer looking for just a room, a meal, he is

looking for an experience "as a whole", that is, that encompasses all these elements and remains in his memory - unique, authentic, memorable experiences, complementary to the offer, such as resorts, charming hotels, design hotels, thematic hotels. Ferreira & Sousa (2020) defend that tourist activity is performed for leisure purposes, although there is also tourism for business reasons and other reasons, and more and more tourism is conceived for playful moments and escapades to the routine. And this is where a Guest Relations comes in. One of the tasks or the major task of a Guest Relations is to understand and get to know the guest in order to encounter their needs and exceed their expectations. Already in 2015, they warned that with the changes that we have been observing in this area, we cannot forget the essentials - always keep in mind that hospitality is the "art of welcoming" and that the so-called "human warmth" is what it turns a mere stay into an experience to repeat and recommend (Costa & Sousa). There are other resources equally important and taken into account when you talk about the relation with customers, and through activity on their social media pages, hotels are able to provide feedback on how their strategy is developing. (Malheiro, Sousa & Ferreira, 2019)

Marketing in Hospitality

Everyday problems appear, difficulties and needs arise that need to be sought and found a solution. Consequently, Marketing emerged to give some answers. Marketing can vary from company to company, but it is then used to solve customer problems with the ultimate goal of maximizing results. This area emerged in the 1920s (the production era) and the emphasis was on products. Producing as much as possible, at low costs, was the objective at the time, but a stage was reached when it was difficult to sell so much product, thus entering the era of sales. In the 20s and 30s, companies realized that the starting point must be the market and, therefore, the emphasis is on the customer. In the 1950s (the era of marketing), it was when it started to effectively speak and develop marketing strategies in order to satisfy the needs of the market. With a view to satisfying customers, promotions began to be created, for example, "take 2 pay 1".

Today, we are in the age of relationship marketing that is related to customer loyalty and with the objective of establishing a long relationship with the consumer, it allows to give the service to the respective consumer.

In hospitality, for most hotel units it was only in the mid-1980s that marketing evolved from the act of just selling. (O'Fallon & Rutherford, 2011). According to O'Fallon & Rutherford (2011) Hotel marketing has its own characteristics and is defined as a "global attitude of the company in the continuous search for excellence in customer satisfaction to win and retain its market share, in search of changes in the market and new solutions to satisfy customers with different requirements, and exceed your expectations, and finally in the search for the best possible profitability" (p. 21). Costa and Sousa (2015) point out as characteristics of the hotel service that must be met:

• Intangibility: the reminder of the service after it has already been used, hence the importance of creating, for example, objects that not only create value for the customer, but also create a souvenir;

• Simultaneity: the hotel as a whole, including employees and management who work together not only to serve one, but several customers at the same time; these are the interactions that are established between the hotel and each client between clients, as a necessary condition for the existence of the service itself;

• Heterogeneity: each service depends on the client that is presented, the number of clients, nationalities, and the worker who is providing the service;

• Perishability: the hotel service is limited to selling rooms mostly, and these cannot be stored, hence the famous phrase, "a room not sold today, will never be again". (Costa & Sousa, 2015, pp. 19-22).

Therefore, it is clear that the hotel industry has several aggravating factors and characteristics that require their own strategies - hotel marketing strategies.

Marketing services vs. Product Marketing vs. Experience Marketing

Product marketing was the first type of marketing to be analyzed and for which they began to outline marketing strategies and plans. With the emergence of service marketing, the focus turned to the customer, on what the company could, in addition to the product, have at its disposal in order to add value, such as delivery, packaging and tracking. If, on the one hand, a product is predominantly physical and tangible, a service is the result of the application of human

efforts to people or objects. And last state is considered the type most complete marketing and is characterized by being all that is received by an exchange process, all that can be offered to a market for acquisition, attention, use, or consumption and that can satisfy a desire or need, a set of tangible and intangible attributes, including functional, social psychological benefits or utilities. It can be an idea, a service, a good, a place, a person or combination of several and includes support services –

facilities, guarantees, information, among others. Arises from the fact that services are becoming increasingly common and repeated and, in this case, factors such as price, category, location and brand in the hotel industry already not sufficient to differentiate themselves from the competition. Most units offer the same kind of services and, therefore, it is necessary to create additional value - experiences that make the customer forget the routine and stress daily. It happens when "a company intentionally uses services as a stage and products as supports to attract consumers in a way that creates a memorable event " (Beni, 2004, p. 303).

Perfect examples of experience savings are: (1) the Walt Disney theme park and (2) the Hard Rock Cafe´, where you can see the use of its products as entertainment and food as a means of entertainment. Developing and triggering real experiences is the secret and also the great challenge, considering that two people cannot have the same experience. The experience to have the desired effect has to be adapted to each client and will always depend on the interaction between the event and the person's mood at the time.

In a study carried out in 2014, determining the contribution of sensory marketing to the marketing of experience, the authors concluded that it is a trend, mainly in rural tourism, that one begins to practice in order to awaken positive emotions, enhancing a high level of satisfaction and loyalty. It is a type of marketing that appeals to the five senses of the human being - sight, smell, taste, touch and hearing - and leads to the processing of sensory stimulation and initiates the process of perceiving the tourist experience. That is why it is so important to adapt the experiences in order to trigger positive reactions. (Agapito *et al*).

On the other hand, already in 2004, it was stated that the best environment to trigger a good reaction is the harmony between destiny and what it has to offer and what it expects to experience, that is, to have the perception of what the tourist seeks, desires and needs (Beni). The total assimilation of the meaning of cultural heritage, knowledge, tradition is a key to this reaction and it always depends, in the case of tourism, on the interaction between residents, visitors and tourists. The author even believes that by entertaining tourists from the big cosmopolitan centers and taking them to places with great patrimonial value, where they can really absorb the moment and away from the temptation of consumption, this will lead to the satisfaction of the experience and the creation of memories. Authenticity is the key and can only be transmitted by the local community. A study, carried out in 2020, by Ferreira & Sousa, contributes to this theory demonstrating that an activity as typical and traditional as handicrafts and its craftsmen, in the target city of the study being used as a marketing strategy, contributes to the experience of tourists and your decision making in that same destination. Thus, experiential marketing begins to gain prominence today, following the preference of consumers.

In a hotel unit, several are authors who can contribute to the guest having a true experience , from the receptionist who, for example, in the city of Oporto, welcomes the client with the well-known northern hospitality, to the floor maid who contributed to the comfort and cleanliness (feeling at home), to the barman, who can either serve an Oporto Wine when telling the story of the wine, or giving recommendations and suggestions.

Today, a hotel employee is not limited to his function, there is a synergy of functions that contributed to the true experience. The role, in the various tourist developments, that contributed most and that can help in carrying out the experiences has several designations depending on its location in the world: Concierge, Guest Relations, Guest Service Collaborator, among others.

Social Responsibility and Perception (Impact of tourism on local development)

With experiences more authentic and more real, we give to tourists the opportunity to know how the locals really live in the destination tourist and what are the true traditions.

They are not limited to passing through the so-called "most touristic" places, if possible, even avoiding them, but taking them to see characteristic places with authentic details, buildings and history, places that make them feel that they have returned to their homes, truly knowing the area they are visited and their people and traditions. This communication between tourists and destination, can and should be done through the hotel not only because it is the place where guests ask for more advice and clarify their doubts about visits and tours, such as the hotel employees themselves being citizens in the destination, have the knowledge of what is really true in the city and know how to advise the guest.

This interpersonal relationship is fundamental when we talk about the hotel service, which involves the customer, the service recipient and the employee, the service provider. Only if there is a relationship between these two parts can there be an economic development.

Satisfaction and Loyalty

The main purpose for which the hotels are in constant change and try to adapt to the client and meet their needs is to get their satisfaction and loyalty to his unit and, therefore, already Costa in 2008, explain the importance of offering a service of quality.

In addition to a service with quality, we are in an era of experiences and the administrators in order to raise the satisfaction most invest in improving the various services of the hotel or improve the perception of customers in relation to their experiences lived. The latter is the best and least expensive method. (Sturman *et al,* 2011).

Regarding the guiding guests ' experiences, the goal is to reinforce the customer's attention to the positive aspects of their experiences and avoid focusing on the negative aspects. One way to guide experiences is to pay attention to guests ' feelings. And how can we act? Raising the awareness of guests, involving them in sensations and leading them to think. The guests emotionally involved are those that most enhance the "word of mouth" and the promotion of unity than merely satisfied and are these that we have to work. Consequently, it is necessary to apply strategies that meet the needs and preferences of the guests and satisfy them and create this emotional link. (Sukhu Choi, Bujisic, & Bilgihan, 2019). With the importance of the internet and social networks, sharing experiences on online channels started to be a concern for hotel managers. Today, these help in making decisions and the definition of strategies marketing as they help to understand what generates satisfaction and what are the new preferences. (Ahani *et al*, 2019). In 2019, Malheiro *et al*, concluded that the biggest advantage they bring is their help in publicizing the hotel, promoting it, facilitating the brand exposure as well as interacting with customers quickly, creating an impact and thus arousing a desire and consequent action. However, these must be implemented with due care and rigor and, if so, their influence should be immediate. On the other hand, the budget for them is very low because hotels still do not feel the need to invest in their online promotion and this leads to a decrease in possible effects such as attracting users and leads to a need to create value for the brand. Therefore, the intention of this study was to evaluate the online platforms where guests share their comments more, since 2017, in order to answer the question previously mentioned.

Methodology

In order to answer the question "*Can, the relationship between the hotel and the local community in offering real experiences, influence customer satisfaction*?" an analysis of all online reviews since 2017 was carried out on the Tripadvisor, Booking and Google channels. These three platforms were analyzed because the unit in study considers the most important, and focus the attention when it comes to advising customers to leave their message, those that are subject to evaluation by the Guest Relations department, which evaluates and responds (100% response rate) and which contribute to the company's annual goal.

According to official hotel figures, the average annual occupancy rate is around 62%. Thus, considering that the hotel has a capacity of 107 rooms, we can conclude that the hotel establishment has an average number of rooms nights sold of approximately 24.214 per year. Also considering that until the mentioned dates, the combination of comments from both Booking , Tripadvisor and Google was 3.064 and considering that the occupancy rate of groups is around 54% (guests who already come with a defined program of what to visit and therefore, there is no margin for contact with the hotel services and everything they visit and experience is defined by the guides), the rate of sharing of comments is around 10%, with a greater adhesion by the guests who make reservations through Booking with a rate of 39.65%, on Tripadvisor 36.29% and on Google 24.05%.

The sample was the subject of a longitudinal study, that is, in a first phase the sample was analyzed, which is the adherence over the years and its contribution to the position of the hotel online, and in a second phase, the comments were analyzed, which were the guests' needs, what kind of experience influenced their satisfaction in order to increase their satisfaction and led to a possible return of the customer. The data collected were analyzed between the dates of sixteen and twenty-one of September. Comparing the three, we find that 2018 was the year with the most affluence, in which the top two categories lead the table, however, at the same time last year, the number of comments was lower in about 118 shares and therefore , it is estimated that this year the shares will be more, keeping the number in the categories of 4 and 5 stars, but observing a substantial increase in the two lower categories. So, to conclude, the unit on both platforms is in an excellent position, remaining in the TOP 10 of the Oporto region. On the other hand, there seems to be a decline mainly on Tripadvisor for comments and a greater appearance of negative comments. So, as a response, the hotel should try to analyze these negative comments and understand what happened so that they are specific events and in order to improve the service for future customers, and on the other hand, they must find strategies to encourage guests who express their satisfaction in sharing their comments on online platforms in order to increase their annual volume.

Results Analysis

First, a qualitative analysis divided into several categories (based on the monthly analysis table for online comments) and classifications, and then a quantitative analysis to determine the weight of each category in scores and guest satisfaction; and finally.

In short, making a division between satisfied guests (ratings of 4 and 5 stars or from 7 to 9 and more than 9 points on Booking) and dissatisfied (ratings 1, 2, 3 or from 1 to 3, from 3 to 5 and from 5 to 7 points, respectively), we can formulate the following conclusions:

- There are categories common to all scores, namely the room, service, breakfast, spa, cleaning service and facilities, and thus, it can be said by referring to the marketing concepts, these are the main "products" of the Hotel;

- Especially in the lower scores, not obtaining satisfaction with the main products, the reference only goes through these aspects and in which point they had an experience with them, not to mention other categories;

- In the higher scores, the positive rating dominates the negative while in the lower scores, the opposite occurs;

- In the lower scores, more specifically in the 2 and 3 stars (1 to 3 and 3 to 5 points), although the same categories have both positive and negative expressions, in the lower one, breakfast is more criticized and in the upper one, the cleaning service is more congratulated, the service and the room more criticized;

- The categories mentioned above, as main products, are therefore the target of the highest criticism in the lower scores, and it is in these that the hotel has to evaluate and analyze what can be improved in order to achieve global satisfaction;

- In the higher scores, with their satisfaction already achieved through the main products, the criticisms focus more on intangible aspects and on those that can add value to the "product". In the score 3, there is also a marked negative percentage in the concierge service and, therefore, the function of recommending, suggesting, influencing the customer experience, wi-fi, maintenance of facilities, security, parking and air conditioning are targets also for analysis and that matters to guests and that when improved can lead to an increase in their satisfaction or full;

- Adding the two highest categories, most guests leave the hotel willing to recommend or return the next time and about 39% mentioned the concierge actions, such as surprises in the room, welcome amenities, city recommendations, among others. The services of this department appear in these two as a well-mentioned positive point, and thus, we conclude that it is aspects like these that make the difference and distinguish higher from lower scores. In this way, we can conclude that in the unit of analysis the so-called "main product", despite failing, in the majority is very well achieved; and with the type of price it charges, guests expect more and, therefore, the biggest concerns focus on adding value and extra services and that customers "demand" quality. However, it is necessary to maintain regular control over essential services and invest in improvement in order to reach a state of full satisfaction that reaches everyone.

Based on the above, satisfaction can only be achieved when a hotel bets on improving its services, or when strategies are developed to appeal to the 5 basic senses of its guests and shifting the focus to the positive points of their experience , of what you can enjoy and help the client to "stop" and live real and memorable experiences, deep down, escape from your daily life. Thus, in Tables 1 and 2, a set of actions is developed for both scoring fields (satisfied and dissatisfied), for the main and most mentioned categories and based on the referred strategies.

Table 1: Actions to increase satisfaction in higher categories

Category Fields	Actions	
	Improvement of services	Sensory and experiential awareness
Satisfied	**Spa**	Put on the turndown service (bedding), robe, slippers, candles, blindfold for example, in order to refer the client's awareness to the spa part of the hotel and to help him relax on the premises;
	Increased space;	
	Space renovation;	
	Knowledgeable, professional and friendly service, that is, hiring a permanent person who knows the space and relax the guests you receive;	
	Personal Trainer service to accompany guests;	Creation of references and actions with a view to the relationship between the guest and social networks, such as a hashtag specific to the hotel, of a specific space in the unit designated for guests to take pictures in order to promote sharing and draw attention to the service of internet;
	Regular maintenance check;	
	Wi-fi	
	Enlargement and strengthening for the total area of the hotel;	
	Maintenance	Promotion of the hotel's history and the originality of its façade with references throughout the unit, for example, in elevators, corridors etc; A way to awaken vision and touch, inviting guests to touch Portuguese stone for example;
	Hiring an own hotel team and not an outsourcing service;	
	Regular control of the condition of the facilities;	
	Long-term maintenance plan;	
	Parking	Insist on a professional service, awakening the sense of smell and exceeding expectations by placing, for example, a source of smell in the car, for the guest to go with the memory of their trip home, a farewell message and water for the trip;
	It is not possible to own parking, investment in a permanent vallet service.	

Table 2: Actions to increase satisfaction in the lower categories

Category Fields	Actions	
	Improvement of services	Sensory and experiential awareness
Dissatisfied	**Service**	Impeccable presentation, according to company standards - awakens the vision;
	Continuous training and new employees with a view to improving cordiality, keeping in mind the company's philosophy, going beyond what is expected to serve the customer;	Knowledge of the hotel, its history, the city, warmth, friendliness and a focus on going further to satisfy guests' needs, is the focus and that elevates an experience - making customers feel they can count on them;
	Creation of a network of restaurants, taxi services, tours, etc. reliable and safe to recommend to guests;	Betting on local, Portuguese decoration that promotes tranquility - vision and a sense of refuge; placement of show-cookings to increase the sense of smell and empower the client;
	Breakfast	
	Opening the breakfast area for greater capacity;	Promote smell, with a typical incense left when cleaning the rooms;
	Differentiated, local, quality products, varied every day;	
	Definition of a more competitive price;	Creation of a relationship between the customer and the cleaning team with the placement of a card with the name of the employee who performed the cleaning and with space for the customer to be able to say what they want in their cleaning in the coming days;
	Facilities	
	Redefining the organization, practicality and design of the facilities;	
	Housekeeping Service	Betting on a constant presence, on the part of the concierge, in the customer experience and accompanying him on his visit to the city and showing the best places according to his requirements and thus awakening all the senses feeling that they are with a security person and that you can count on it;
	Correct formation of good cleaning, and chain standards;	
	More control by the floor housekeepers;	
	Motivation and assurance of human resources;	
	Concierge	
	Regular attendance indicating your presence at the hotel;	
	Portfolio of reliable partners and differentiated knowledge of the city.	

Conclusion

For the eighth consecutive year, tourism is the economic sector that has registered a greater increase than the world economy. In this way, the President and CEO of WTTC draws attention to the fact that governments begin to see this development as a "lever" for the improvement of national economies. Despite the economy showing signs of slowing down, tourism is expected to remain resilient and constantly changing.

The majority of the responsibility attributed to this change is the internet. The technology and quick information available being increasingly present in our daily lives, the tendency to leave an online comment about your stay in a hotel seems to be fading, however, on some platforms more than others, the estimate in 2019 it seems to follow the 2018 numbers.

Stress and pressure also seem to dominate our routine and that is why it is imperative to think of ways to escape from everyday life and create memorable and real programs. If, on the one hand, tourists are looking for the best experience at the best price, on the other, hotels and destinations want more and more tourists, to spend more and more and be satisfied in order to be able to return and recommend to others. Loyalty and *wom* are fundamental for business loyalty and sustainability.

Marketing appears as a response to the needs of consumers and, consequently, in hospitality, the marketing of experiences begins to gain a prominent place. Unique experiences, adapted to each person, according to their preferences and needs and memorable. On the other hand, in response to this new trend and high competition, the challenge for hotel units is to create something with different added value, at the best price, in order to create satisfaction.

Thus, it was important to understand if these were really affirming needs, what kind of experiences they were looking for, and if the hotel, by creating a relationship between these two agents, could bring advantages such as possible satisfaction, or an increase in this (as a way of adding value) and possible loyalty.

A study was carried out, first qualitative based on the attribution of categories and classifications, and in a second phase, a quantitative analysis was performed in Excel file, to determine its weight. Responding to the proposed objectives, it is concluded that although there is a need for something more on the part of the visitors, the basic needs of sleeping, eating and cleaning, remain their biggest concern. In view of the above, it can be concluded that a hotel unit can and has the need to be a link between the destination and the guest, taking advantage of the role of Concierges/ Guest Relations, to create a close relationship with the guest. It is essential that he feels that he can always count on someone to help him and provide the best experience, that he has a vast knowledge of the sights and secrets of the city and thus, complementing with basic services, reach a level of maximum satisfaction and possible loyalty to the enterprise.

Thus, a set of actions and practices were developed based on the comments analyzed and based on the strategies referred to in the literature review (strategies that the authors defend are the secret to increase consumer satisfaction), in order to achieve the greatest objective of a tourist enterprise that is the greatest satisfaction with a greater profitability.

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E-Tutoring and Learning Organizations

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Abstract

In the presented paper, the authors deal with the topical issues of e-tutoring in the context of (learning) organizations and attempt to describe the factors which can be important from the aspect of its application's success within an organization. The purpose of the paper is to highlight the benefits of e-tutoring as a cost-saving and effective solution for working individuals as well as organizations. For the elaboration of the topic, traditional desk research methods together with the methods of analysis, synthesis, description, comparison, generalisation, and idealisation were used.

Based on the results of the literature review, it can be assumed that for the so-called learning organizations promoting their personnel's learning activities - which on one hand, are willing to invest in their education, but on the other hand, want to reduce its costs in order to use their resources effectively - e-tutoring is the optimal solution. E-tutoring with its openness, flexibility and accessibility brings benefits for individuals as well; and the experience indicates that it could be suitable both for organizations and the majority of their personnel.

Key words: E-Tutoring, Learning Organizations, Learning, Personnel

Introduction

The ongoing process of implementation of digital technologies into organizations and business communication brings radical changes into companies. Innovations and technologies are being introduced with the aim to make people's lives and work easier but, to make their usage meaningful, purposeful and efficient, certain changes in organizations' structure and functioning, as well as in human resources management must be carried out.

Using technologies and working online have become a commonplace in our times – both at traditional and virtual (digital) workplaces. Moreover, the current trends indicate a further enormous development of digital technologies and an increasing tendency of working in the digital environment, which, under certain circumstances, can lead to higher efficiency of employees' activities. In this context, Faith (2015) highlights the opportunities which more than 2,000 emerging sophisticated technologies under development can bring.

Based on the above, companies must face the challenge of making changes in their cultures and adapt to the newest trends (Snow et al., 2017). They must recognize that digital space promotes collaboration, but at the same time, several threats and difficulties, as well as new opportunities can occur.

With the implementation of new trends and modern technologies, competition in the labour market increases and new needs and requirements occur. In organizations, personnel must be prepared in order to cope successfully with challenging situations and therefore, companies should invest into the

education of their employees – whether they offer learning opportunities at the workplace or support their personnel in their individual learning activities outside the organization. It means that they should provide them with sufficient opportunities for their professional and personal development and so, create favourable conditions increasing their job satisfaction. Organizations must recognize the fact that learning is among the factors that help individuals adapt quickly and easily to the changing reality both in their private and professional lives. In this context, e-learning and e-tutoring with their benefits for both employers and employees appear to be the most suitable option.

Learning Organizations

Organizations paying sufficient attention to the education and training of their personnel have an undeniable advantage in the labour market, as opportunities for further education and promoting personnel's learning activities have the potential to accelerate the processes inside organizations and increase the efficiency and the quality of their services provided to their customers (Barna, 2019). Moreover, learning opportunities and sufficient space for professional and personal development of personnel increase their job satisfaction and it is employees' job satisfaction which can be the decisive factor from the aspect of an organization's success on the market (Krásna, 2015).

Promoting learning activities forms an integral part of most successful organizations' personnel management policy as they have realized that investment in human capital can be considered among the best investments (see Matúšová, 2015; Hužovičová and Jakúbek, 2014; Oberuč et al, 2016) in the current era of high expectations placed on organizations. Also managers are well aware of the fact that if they want to develop and expand, they must create such working environments, which enable their personnel's adaptation to new conditions and expectations quickly and easily. It means preparing them for permanently changing conditions and circumstances, teaching them how to behave in unexpected situations, to be creative and to apply critical thinking. This is only possible by means of education (Tamášová et al., 2018).

As indicated above, available research results suggest that employees' knowledge and learning activities have an impact on the success and productivity of an organization on one hand and on the other hand, they increase their job satisfaction (Krásna, 2016). But for organizations, there is a wider range of benefits which can be used in argumentation for supporting their personnel's learning activities - e.g. better developed skills and competencies, increased effectiveness of workforce, up-to-date knowledge and information about the latest development in their segment, increased competitiveness in the market, higher profit, etc. It is undeniable that for every organization, personnel's involvement in educational activities has many positive aspects.

Learning organizations go even further than traditional organizations, they do not only support their personnel in their learning activities - promotion of education has become a part of their culture. They recognize the importance of up-to-date knowledge and information, and well-developed skills in the context of their functioning. They know that for rapid progress, they need to undergo certain changes. The shift from a traditional organization into a learning one is a complex process. Truneček (2004) draws attention to four basic requirements which must be fulfilled:

1. Creation of a favourable climate which motivates individuals to learn and to develop their skills and abilities voluntarily.
2. Spreading the culture of learning outside the organization - to suppliers, customers, partners, etc.
3. Application of a specific strategy for human resources development and including the processes of individual learning into that strategy.
4. Continuous transformation of the organization based on the results of individual and collective learning.

In learning organizations, development is a systematic process. They do not promote isolated activities; the emphasis is on personnel's continuous improvement. Senge (1990) defines learning organizations as those paying special attention to increasing their personnel's ability to achieve the expected results

and to their involvement in joint learning activities aiming to teach them how to participate in creating and improving the reality. In these organizations, high quality personnel management and charismatic leadership have a big role to play.

Pokorná and Ivanová (2010) characterize learning organizations as follows:

1. They have a clear vision. The direction of personnel education and training is given - the organization's goal in this fields is explicitly formulated and individual, collective, and whole-organizational systematic activities are targeted at achieving it. A special emphasis is placed on the importance of learning and particular attention is paid to its forms, methods, and the overall context of educational activities.
2. The overall concept of learning organizations is based on high-quality human resources and personnel management activities. They pay increased attention to human resources, creation of favourable working conditions, and make efforts to provide their employees with a range of opportunities to learn.
3. They work on changing their personnel's way of thinking, which is a very long and complicated process, and focus on their overall development. Such an approach must be first adopted by the leaders in the organization - changes start from the management. Managers are charismatic leaders who apply positive thinking and openness in communication. These factors can be considered among the basic preconditions for success. Managers' task is to become role models for other personnel in the entire organization.
4. In learning organizations, team work is applied and the importance of open communication is emphasized. They form an inevitable part of an organization's system of work which should be adopted by every employee. In practice, real team work is very difficult to achieve and the possibility of its full and flawless functioning within the entire organization is questionable.
5. Strict rules apply to handling information produced, gathered, and used by employees.
6. Within learning organizations, untraditional forms and methods of learning are often used. They see learning in its broadest sense and are open to "experiments" in order to achieve the best possible results.

From the point of view of a learning organization's success, the choice of a suitable strategy is decisive. It is very important to motivate employees to learn and to find appropriate forms and methods of personnel training which meet the needs of both the organization and individuals working in it. They must be meaningful, purposeful, attractive and diverse as especially adult learners must face various problems in the process of learning. They often complain about a lack of motivation or opportunities. For them, it is also difficult to find time for learning as it is demanding to synchronize their work, family life, friends, and hobbies with their studies. Therefore, such forms and methods of learning must be found for them, which are accessible and affordable (Barnová and Krásna, 2018a).

For dynamically developing organizations, traditional forms of education - e.g. learning from textbooks or school based learning - are not suitable anymore (Pokorná and Ivanová, 2010). In learning organizations, the offered educational opportunities are flexible, learners' preferences and interests are taken into account and formal learning is partially replaced by non-formal learning activities. Traditional learning environments are often changed for learning online as with the working population, highly individualized forms of learning appear to be the most effective.

(E-)Tutoring in Learning Organizations

In the last two decades, it has come to radical changes in the educational needs and requirements of individuals, organizations, as well as the whole society. Especially employees and organizations must deal with a range of new and demanding situations on a daily basis (Lajčin et al., 2014), which is mirrored in their strong need for replacing traditional forms of education by those more corresponding with the current needs. The methods of individualized instruction have become very popular, which, compared with the traditional ones, can be characterized as more open and flexible. This is an important issue for learning organizations, which want to find the most efficient way of education and training for their personnel.

Based on the above, it can be assumed that currently, highly individualized, tailor-made forms of education are frequently opted for among employees because they can be adjusted to every learner's needs, requirements, and expectations. For the same reasons and because of time restrains, individual learning is becoming more popular than learning in groups or on the organizational level. At workplaces, the virtual learning environment is often used for the purposes of both self-directed learning and guided learning - including tutoring.

Tutoring can be defined as a process based on the relationship of a tutor and a tutee of any age in the process of personal or professional development (What is tutoring?). Tutors are experienced and competent professionals who provide their tutees with guidance, counselling or supervision.

It is often wrongly assumed that tutors exclusively work with school children or university students. Not only children and adolescents but also adults often need someone who can guide them through their learning, professional advancement or personal growth and adult-to-adult guidance with its advantages appears to be an effective form of adult education (Barnová and Krásna, 2019b). Besides mentoring and coaching - which are based on different types of relationships - tutoring is the option frequently applied in working environments.

The purpose of tutoring in the context of organizations is to prepare independent workers, to show them how to handle various situations, how to find answers without their tutor's help. Tutors do not offer ready-to-use solutions, they lead their tutees towards knowledge and help them develop skills, knowledge, competencies, and abilities they need for their personal and professional growth.

E-tutoring is the innovative form of tutoring realized online, i.e. in the virtual environment, which occurred with the development of new technologies. It can make use of the advantages of a recent phenomenon - permanent connectedness. Connectedness has a significant impact on the way people access, publish and share information, but also on the way they learn. In learning, it must be taken into account that the ability to actively deal with digital information and media and to communicate with others in the virtual environment (OECD, 2012) are important. One of the advantages that connectedness brings is that it helps creating communities and changes the character of social interaction and relationships - connectedness changes communication to interaction (Barnová and Krásna, 2018b, 2019a).

E-tutoring can be considered the optimal solution in contexts, in which regular face-to-face communication is difficult. For organizations, it is among the suitable form of workplace training as it is flexible, open, accessible at any time and from everywhere, and highly efficient. Its advantage for the learner is that the development of social networks has made "here and now" real-time communication between the tutor and the tutee possible.

The history of online tutoring started with the implementation of digital technologies into the educational practice. Online tutoring emerged with e-mail communication, which provides learners with the opportunity to submit their tutor questions anytime a problem occurs, they needed help or a question arises, and, subsequently, they receive answers online. The problem of this form of contact lies in the time gap between sending a question and receiving a respond - students cannot expect immediate answers. This kind of asynchronous online tutoring has several benefits as well - e.g. it gives the tutor time to think about the answer, to search additional information and formulate the answer carefully. E-mail tutoring is especially suitable for reviewing writings or evaluation of written assignments.

With the ongoing rapid development of technology, the synchronous form of online tutoring was introduced. Both the learner and the tutor are online and they can chat on social networks or in the applied virtual learning environment in real time - they can interact simultaneously.

E-tutoring is undoubtedly an effective form of learning combining several benefits for both the organization and the learner. It completely eliminates travelling costs as there is no need to commute

and the relationship between the tutor and the tutee is not limited by distance. It is also time saving as it is available 24/7 and it is accessible any time and from anywhere with no time restrictions, which means that it reduces stress from being absent at the workplace and saves time for tutees to be with their families and for leisure time activities. E-tutoring enables self-paced personalized learning where, if needed, the same topic can be discussed several times, the entire communication can be recorded and learning can be enhanced by using individualized tools.

Is e-tutoring for everyone?

Even though both face-to-face and online tutoring presuppose self-motivated and independent learners, if we compare traditional tutoring and e-tutoring, e-tutoring is a more open and convenient form of education for those who not only possess the motivation, sufficient competences, skills, and abilities to use digital technologies for learning, but also positive attitudes towards learning online are important.

As e-tutoring is most frequently used with new personnel who need guidance and advice in the initial stages of their careers, it is usually (but not exclusively) applied with the younger generation, i.e. the "Digital Natives". It is broadly accepted that the young generation tend to use digital technologies for educational purposes more than their older colleagues as they have been born into the digital era and technologies represent an inevitable part of their existence - they cannot even imagine their lives without them. But in available resources, they are often wrongly considered a homogenous group. In fact, not all of them are digital learners, many of them prefer face-to-face communication or more traditional forms of learning, which should be taken into account when planning to introduce changes in organizations. Digital technologies can make a difference only if its users have the appropriate set of competences, skills, and attitudes - e.g. their inability to fully evaluate the validity of information can represent a barrier in their learning. In this context, the extent to which the "Digital Natives'" expectations have changed is questionable and it is not clear whether all of them want to transform the more or less traditional forms and methods of learning. Therefore, e-tutoring should be an option, not the only choice for employees.

Conclusion

Organization, if they want to maintain their competitiveness in the labour market and increase their productivity, must pay sufficient attention to creating a favourable learning environment for their personnel. Nowadays, it is not a matter of questioning whether the creation of such conditions and application of newest knowledge from the field of pedagogy brings any benefits (Várkoly et al., 2015) for organizations and learners. Providing learning opportunities as a part of personnel management policy generates skilled and educated personnel, which possess up-to-date information and know what the current trends in their segment are.

For organizations promoting their personnel's learning activities - on one hand, they are willing to invest in their education, but on the other hand, want to reduce its costs in order to use their resources effectively - highly individualized forms of learning are the optimal solution. Digital technologies and connectedness offer new opportunities for online learning which is open for everyone, flexible and accessible at any time and from everywhere - they make learning possible even for those adults, which, for any reason, cannot be involved in traditional education. E-tutoring combines the advantages of highly individualized forms of leaning and learning online and so, represents an attractive and effective option for both the organizations and their personnel.

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Structure of the Value Chain on Creation of the Internet - Business: Case of Kazakhstan

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Abstract

This research includes the analysis of the current state of the information environment of Kazakhstan, assessment of the effectiveness of regulatory activities of government agencies in this area of information environment, the analysis of the need for permits, identification of promising areas for the development of entrepreneurship in the Internet industry. The article also focuses on the formation of value chain structure for Internet projects in Kazakhstan. Justification for value chain development is based on the experience of developers and experts of this research in the development of the information environment in Kazakhstan.

Keywords: Kazakhstan, economics, digitalization, value added, internet projects, information technology, budget investments

JEL Classification: L86, H11, H54, O14,

Introduction

An essential part of the new information society is its global nature. Today's large-scale transformation around the world is driven by the rapid development of information and communications technologies. The Charter of the Global Information Society states that "information and communication technologies are one of the most important factors influencing the shaping of the twenty-first century society. Their revolutionary impact concerns lifestyles, education and work, as well as the organization of interaction between government and civil society. Information and communications technologies are rapidly becoming a vital driver of the world economy".

Information has an immeasurable potential for impact, both positive (creative) and negative (destructive). It is obvious that the global information network Internet is the largest and most massive source for the world information space. Information in the global network has become a key

strategic resource of any state, and the scale and methods of use of information are actively used in political processes in many countries, on a par with traditional resources.

The information space in Kazakhstan is undergoing significant changes due to both political developments in the world and the rapid development and wide spread of new social and media Internet technologies. Businesses in Kazakhstan have started to actively use online resources to promote their products and services on the global Internet. The impact of the information environment on the business community of the country and the economy of Kazakhstan has increased and requires a separate study on this topic.

The global informatization and development of Kaznet on the one hand, and the unpreparedness of the state and business on the other hand, have led to the fact that the country's information and communication infrastructure and national information resources have become the most vulnerable objects of influence from hostile states, terrorist organizations, criminal groups, individual attackers and special compromising material created. The threat of international information terrorism and information wars have become important geopolitical factors.

Development of the information environment of Kazakhstan in the Internet space is an intersectoral, interdepartmental and state task requiring coordination of actions of many participants of this process. Such coordination is possible only on the basis of complex assessment of information environment in the Internet space of Kazakhstan and assessment of its impact on the business community of the country.

In this regard, the issues of development of information environment and assessment of its impact on the business community of Kazakhstan become particularly important. It becomes obvious that in modern conditions Kazakhstan concedes its own information environment to external influence of business companies from Eurasian Economic Union countries.

The purpose of this research is to identify the potential for entrepreneurship development in the Internet industry and to improve the system of its support based on the review of the current state of the information environment and the Internet in Kazakhstan, assessment of the impact of the information environment on the business community of Kazakhstan, making suggestions and recommendations for further development and promotion of Kazakhstani products in the world, assessment of risks and possible negative consequences on the business community of the country in the current economic conditions.

The materials of the article are the result of the research on the development of information environment, assessment of its impact on the business community of the Republic of Kazakhstan and development of recommendations on promotion of Kazakhstani manufacturers in the Internet space.

The objects of research, analysis and evaluation are the information environment of Kazakhstan and participants of the business community working in it.

The research methodology provides an integrated approach to the analysis and evaluation of the information obtained. The following works were carried out to collect, analyze information and develop recommendations:

- collection of relevant statistical information in the information environment;
- primary processing of information on the current state of the information environment;
- inventory of permit documents, obtaining of which is necessary for business activity in the information environment;
- working meetings with representatives of associations of the information environment - identification of problem questions of the information environment;
- primary analysis of the level of development of the information environment;
- conducting surveys, interviews with representatives of the business community;

- extended analysis of the current state of the information environment and identification of key players in the information environment from a regional perspective;
- analysis of internal and external factors affecting the information environment;
- life cycle analysis of products (services) - value chains, pricing, availability of related services;
- identification of barriers that hinder entrepreneurship development in the information environment;
- analysis of permissive documents, obtaining of which is necessary for carrying out entrepreneurial activity in the information environment, with a view to identifying the list of necessary documents required for obtaining permissive documents, state bodies and organizations that issue them, place and time of issue;
- identification of promising areas and key investment projects for entrepreneurship development in the information environment.

The subject of the study is the processes of providing online services and services on the global Internet, improving the efficiency of existing business structures and identifying promising areas for the development of entrepreneurship in the information environment.

The subjects of the research are Internet resources of the Republic of Kazakhstan and business community of information environment.

In conducting the research the authors of the article used the following methods:
- complex (continuous) assessment of the entire information environment as a complete system based on the study of statistical data, expert assessment by leading Kazakh specialists in the field of media, journalism, business and political science;
- continuous, selective, documentary, actual, analytical and combined verification of the results obtained.

Analytical procedures used in the study consisted in studying significant indicators and trends in the information environment processes, including the resulting interrelationships and deviations, as well as identifying the causes of possible deviations.

Main Part

The system approach to creation of structure of a chain of the added values of information resources demands to consider all set of problems of creation and functioning of Internet resources, maintenance of possibilities of their modernization, reconstruction and development at various stages of their existence. Justification of value chain development is based on the experience of developers and experts of this research in the development of information environment in Kazakhstan.

As a result of the present research, the following reasons were found out, which slow down the development of the industry:

a) Lack of reliable statistical information in the industry and financial costs;
b) Lack of trust of the Internet user in Internet shops in Kazakhstan;
c) Large territory of Kazakhstan and, as a result, difficulties in the logistics chain;
d) Lack of legal framework for e-commerce.

The findings of the Value Chain Survey will be of interest to entrepreneurs who apply a value chain approach to their business development.

In the context of identifying the structure of the value chain for the creation of Internet resources, one of the most relevant issues is to determine the composition of financial costs for the creation of Internet resources in the range of minimum and maximum values for the creation and operation of information resources. In the future, it is necessary to determine what types of services can be outsourced in order to reduce the financial costs of maintaining the business and, ultimately, to determine the full value chain for the creation of Internet business.

Feature of construction of a chain of the added value in the information environment is modularity of construction of the Internet project. The global nature of business information environment gives significant advantages over traditional types of business. For example, a significant reduction in costs for the production of goods and services, as well as the possibility of twenty-four-hour unrestricted trade allows you to never stop the business process. Increasing the number of consumers (users) requires only the improvement of software and technological equipment. In addition, it should be understood that the industry participates in the GDP of the country and is, at the same time, providing for many sectors of the national economy of Kazakhstan.

With regard to the information environment, the following feature of the value chain operates. If in traditional production or ICT-industry the final product is material, then in the process of information service provision the product is intangible and the term "virtual value chain" is used. In this case, value is added through working with information and applying certain technologies to work with information, through the knowledge of specialists in the field of these technologies. In this case, the value chain takes the form shown in the figure 1.

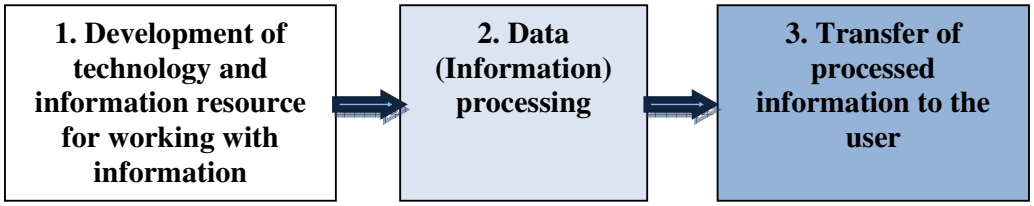

Fig.1: Internet project value creation algorithm

Source: composed by the authors

Services in the information environment represent a fast-growing business sector worldwide. And the development of related technologies allow to occupy an increasing number of niches in the market of information provision. Based on this, we can highlight the following features of value chain organization in companies operating in the industry:

1. Software development and information transfer technology is often sufficient for the successful functioning of the company;
2. The value chain in the field of information immediately brings them to the inter-corporate level;
3. the source of competitiveness is the availability of own developments and technologies.

For the information and communication technology and information environment industry, the most important factor is the technology and knowledge that provides the greatest value in the value chain. The examples of value chain construction discussed above provide the basis for the value chain construction in figure 2. For the first part of the project, as a rule, there are at least 60 working days (Step 1), information content can take 30 working days depending on the amount of content and its multimedia applications.

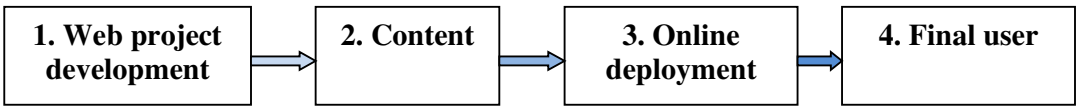

Fig. 2: Internet project value chain

Source: composed by the authors

Many performers are involved in creating the value chain, namely:

1. Directly influencing:
1.1 KazNIC -Registrar (domain name for the time period);
1.2 hosting provider (hosting and virtual equipment);
1.3 equipment supplier (own);
1.4 developers and technical specialists;
1.5 editors (team) of the resource;
1.6 providers of browsers and applications;
1.7 developers and technicians;
1.8 editors (team) of the resource;
1.9 providers of browsers and applications;
1.10 search engines.
2. Indirectly affecting
2.1 authorized body (regulatory, supervisory and executive authority);
2.2 marketing company;
2.3 PR-specialists;
2.4 technical specialists in Internet promotion;
2.5 statistical providers;
2.6 specialized systems for providing statistics;
2.7 payment systems, banks;
2.8 transportation and logistics companies;
2.9 cloud service providers.

For this purpose it is possible to note expenses for development of an Internet resource and expenses for maintenance of necessary infrastructure for input of the Internet project into pilot, and then into industrial operation. The mentioned works include the following expenses:

- pre-project survey and development of technical documentation, as well as costs for project management;
- development of graphic design and structure of the Internet resource;
- development of the software part of the information resource;
- preparation of materials (including advertising) and their subsequent placement on the information resource;
- providing technical, communication and organizational infrastructure, namely, placement on the Internet and ensuring the resource's operability;
- promotion and search engine optimization of the Internet resource;
- technical support and update the Internet resource during the period of trial operation.

In terms of complexity of creation, Internet projects in Kazakhstan can be divided into three categories:

1. Initial complexity;
2. Medium complexity;
3. Highest complexity.

Initial complexity category, which includes Internet projects of several (up to hundreds) interconnected pages with simple structure.

A category of medium complexity, which includes Internet projects that are up to a thousand interconnected pages with a complex structure.

As a rule, Internet projects of the ***highest complexity category*** are unique, or intended for limited adaptable replication.

Table 1 provides information on the structure of costs to create an Internet business in Kazakhstan based on the complexity of the project and the type of costs, without taking into account the purchase of software and hardware complex (a set of hardware and software tools that work together to perform one or more similar tasks), connections and communications.

Table 1: Structure of costs to create an Internet business in Kazakhstan based on the complexity of the project and type of costs, %

Costs to total infrastructure development and construction costs	Project complexity category		
	Initial	Medium	Highest
Project Management	5	5	10
Costs of development	45	50	45
Costs of content creation and placement	50	45	15
Costs of infrastructure creation without taking into account purchase of software and hardware complex, connections and communications			30
Total	100%	100%	100%

Source: composed by the authors

For projects on creation of Internet projects of initial and medium categories of complexity it is possible to result the minimum work costs expressed in natural indicators.

For projects of the highest category of complexity detailed financial costs are calculated individually when making business plans to create an Internet project, so this study examines the lower limit of the cost range, expressed in natural terms (man-hours) spent on the creation of an Internet resource.

Financial costs for creation of Internet business in Kazakhstan, expressed in kind (man-hours) are shown in Table 2.

Table 2: Costs of labor for creation of Internet business in Kazakhstan, man-hours

Specialist working costs in man-hours	Project complexity category		
	Initial	Medium	Highest
Project Leader	4	8	108
Development			
System Analyst		4	66
System Architect		16	66
Database System Architect		12	
Designer	32	64	86
System programmer	36	62	354
Specialist in database management systems		8	46
System Administrator	2	32	48
Content creation and placement			
Chief Editor	40	64	162
Journalist		68	186
Translator		142	206
Commissioning and creation of the necessary infrastructure, without taking into account the purchase of software and hardware complex, connections and communications			
Tester	2	16	76
Controller		8	34
SEO Specialist	2	12	68
Marketing Specialist	2	16	162

Specialist working costs in man-hours	Project complexity category		
	Initial	Medium	Highest
Systems engineer		26	34
Content Specialist (copywriter)	2	16	72
Sales Specialist	2	16	86
Technologist		18	68
Training Specialist		28	44

Source: composed by the authors

Table 3 provides information on the structure of costs of creating the infrastructure required to develop and operate an Internet project in Kazakhstan. Costs are expressed as a percentage of development labour costs. For primary and secondary complexity categories, all the necessary infrastructure is provided by hosting companies. For projects of the highest complexity category it is provided that the necessary infrastructure, including engineering, is created by the customer or developer of the Internet resource. By infrastructure, we mean the hardware and software complex of an Internet resource. Engineering infrastructure means systems of guaranteed uninterruptible power supply, security systems (alarm systems, access control and environmental control, automatic fire extinguishing), industrial air conditioning systems.

Table 3: Information on the structure of costs to create the infrastructure of the Internet project in Kazakhstan, %

Costs of building the necessary infrastructure as a percentage of labour costs	Project complexity category		
	Initial	Medium	Highest
	20	40	80

Source: composed by the authors

The analysis of the composition of work on the creation of an information resource makes it obvious that the performance of all actions to create an Internet resource by the organization itself is virtually impossible, if this type of activity is not the main one for the organization. Development of information resource requires the organization to have competent specialists in the field of graphic computer design, software, significant financial investment in the purchase of hardware and software complex and install your own server on the site of a hosting provider with good bandwidth, payment for such hosting, which can afford not every small business. For qualitative performance of all the above works and saving money it is reasonable to use on a contractual basis the services of outsourcing organizations specializing in this area.

For the organization it is expedient to approach to the analysis of the composition of costs differentiated, based on the ratio of business object, purpose and requirements to the information resource. So, acquisition of own server and the accompanying equipment for accommodation of an information resource are necessary only in the event that the sum of financial expenses for a hosting exceeds the sum of financial expenses for performance of the above-stated actions. In addition, the organization can take advantage of alternative options such as renting a dedicated server, renting space for the server in the server room, etc. To develop the technical design and structure of the information resource, as well as to perform work on programming and promotion of the resource by the organization's own forces is appropriate if this type of activity is the main for the organization and the staff is staffed by highly qualified specialists in the field. In terms of financial costs of resource maintenance, we note that if there is a need for constant support and regular updating of information on the pages of the resource of the organization it makes sense to purchase software resource management system and provide human potential for this process. Value chain analysis will be used to evaluate the relationships between all actors within the chain, as well as to understand the economic, social benefits and costs of these relationships.

Experience of state support - results of the State Budget Program "Information Kazakhstan 2020"

As a result of the assessment of the implementation of the state budget program "Information Kazakhstan-2020" (with the period of implementation of 2013 - 2017), we found a lack of updated information on the availability and functioning of information systems of government agencies. There was no monitoring and control over their planning, creation and commissioning at the time of the state audit.

For example, 43,964.7 million KZT were envisaged in the national budget for 2017 for implementation of the State Program, out of which 43,769.5 million KZT or 99.7 % were executed. There were not performed 195,2 million KZT, out of which 48,8 million KZT were savings, 146,4 million KZT were not mastered due to the failed tenders for the government purchases.

Despite the allocation of significant amounts of budget funds, the achievement of key indicators of the development of information and communication technologies in certain sectors of the economy was not ensured, which indicates a weak elaboration of mechanisms for the implementation of the Programme.

The measures of the above-mentioned State Programme aimed at developing information and communication technologies in education and science, health care and tourism have not been fully implemented. The e-learning system "E-learning" developed by the Ministry of Education and Science of the Republic of Kazakhstan has not been put into industrial operation (cost 35 billion KZT).

In the health sector, it was planned to provide 60% of the population of Kazakhstan with "electronic maps" by 2017, but the work on the delivery and implementation of the platform for the informatization and interoperability of health information systems for the exchange of medical data and the creation of a unified medical space was not completed in time. In this regard, at the time of the audit, the integration of health information systems with a single integration platform had not been implemented.

The measures taken within the framework of the State Programme did not allow the tourist infrastructure facilities to be fully connected to the Internet (76.2%). However, only 39.7 per cent have their own Internet portal. It was noted that the tourism infrastructure is poorly integrated with international systems of Internet booking, which is 22.6% (65% plan). All this is a limiting factor in the development of tourism in Kazakhstan.

The tariffs applied by JSC National Information Technologies for lease of terrestrial digital communication channels are considerably higher than the tariffs of JSC Kazakhtelecom for commercial entities of the market, which leads to higher prices for telecommunication services for the state bodies and agencies, as well as their subordinate organizations.

For example, in 2017 JSC National Information Technologies leased from JSC Kazakhtelecom 9,822 land communication channels (republican and oblast ports IP VPN) for the amount of KZT 6,638.6 million at the agreed marginal tariffs.

Whereas, commercial entities of the market (JSC Samruk-Kazyna, including JSC KazMunaiGas, JSC Kazpost) leased the same number of land communication channels (9,822) for the amount of KZT 4,570.8 million.

Thus, the tariff of JSC "National Information Technologies" on rendering telecommunication services for state bodies and institutions, as well as their subordinate organizations is more expensive than for JSC "Samruk-Kazyna" by KZT 2,067.8 million.

Implementation of the state program "Information Kazakhstan-2020" did not ensure the growth of Kazakhstan's position in the rating of the WEF GIC, and on some indicators of information and communication technologies development there is a decrease.

Subsidies of universal services in the sector of telecommunications, provided in rural areas, is carried out without sufficient regulation of procedures and methods of calculation of their cost.

In general, implementation of the State Program "Information Kazakhstan-2020" was aimed at the transition to an information society, which in 2017 lost its relevance. Further development of the country is aimed at the introduction and application of digital technologies under the new program of the Central Committee.

At the same time, the Government did not ensure the continuity of policy in this area. As a result, certain indicators that allow an objective assessment of the development of the information and communications technology industry are not included in the state program "Digital Kazakhstan". (with implementation period 2018 - 2022).

In 2018, 42.5 billion tenge were allocated for implementation of the state program "Digital Kazakhstan", the execution on which amounted to 40.3 billion tenge, or 95%. Savings on the allocated funds amounted to 932.8 million KZT.

It should be noted that in 2018 the amount of allocated funds significantly exceeded the amount envisaged in the State programme "Digital Kazakhstan". (for 21 billion tenge, or almost twice).

The funds from the national budget in the amount of KZT 54.5 million were not used due to late submission of contracts for registration to the treasury authorities (KZT 47.2 million) and failure of the supplier to meet its contractual obligations for software supply (KZT 7.4 million).

The majority of the allocated funding was not executed by the quasi-government sector (own funds): KZT 1.1 billion out of KZT 13.9 billion due to the extension and change of contractual obligations.
Based on the above, it can be concluded that there is state support for the information sector in Kazakhstan, but the motivation of performers to achieve the target indicator and perform specific tasks is weak.

Conclusions and Recommendations

Currently, the information environment in Kazakhstan has potential opportunities for entrepreneurial initiatives. The virtual space provides business activities without any restrictions. The main parameter and factor affecting the profitability is the number of users on the Internet resource. That is why reliable statistical data is very important for business development in the information environment. On the basis of this data is based on the business model of the enterprise, the development of marketing strategy, selection and qualification of personnel and prospects for the development of the enterprise. Obviously, there is no need to stimulate the development of the entire value chain, but only those elements that contain the greatest added value, or those elements that provide an opportunity to enter the world markets and further move towards economic activity with higher added value. The approach to identified gaps in the value chain should be comprehensive, rather than focusing on individual elements. In other words, support should not be provided to an individual element or company, but across the entire value chain of enterprises or key enterprises in an industry linked by a single value chain.

Value chain analysis cannot be carried out without market-based analytical research. It is necessary to create a domestic market of consulting services in marketing and in-depth research of the information environment. Enterprises of the industry have a great need for analytical market research, carried out at the world level.

The identified niche areas in terms of the impact of the value chain on the company's competitive position in the information environment will allow to have a significant competitive advantage in the market. Building the company's processes from technology to the end user allows it to retain its competitive advantage.

The information environment industry allows companies to use free or unfilled niche areas. It is possible to note the following niche directions in the chain of added values, using the modularity and possibility to provide components for goods/services:

1. Outsourcing work related to software development for ERP, ECM and CRM systems;
2. Development and creation of modular visualization packages for various industries not only in Kazakhstan but also in other countries (engineering, aviation, energy, modeling systems, etc.);
3. Development and implementation of services for production of high-tech components for companies that specialize in the production of the final product. Delivery of constituent parts will allow entrepreneurs to enter into close partner relations with the companies-customers.
4. Development and creation of applications for mobile devices that provide services to the end user (car parking services, provision of statistics and operational data on new media, accounting and control of children's movement and much more).
5. Organizing the work of online stores.

No special permission documents are required for entrepreneurship in the information sphere of Kazakhstan.

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Social Impact Bond – Outcome and Outcome Measurement on The Basis of Selected Sibs

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Abstract

The article introduces the essence of social impact bonds and presents the analysis of the outcomes formulated by SIBs, outcome metrics and evaluation methods of the achieved results, based on the example of SIBs functioning in the area of counteracting unemployment. The first part of the study presents the subject literature overview in the area of SIBs, including the important features of SIBs and the associated concepts. The second part of the study offers the respective analysis and assessment of the outcomes formulated by the selected SIBs, outcome metrics and the evaluation of the applied methods. The conducted analysis allowed formulating answers to the research questions presented in the introduction to the article as well as verifying the following hypothesis: Despite the discretionary system for determining outcomes, the presented outcomes and outcome metrics as well as the applied evaluation methods guarantee both independence and objectivity of the results achieved by SIBs and may contribute to the stakeholders' greater interest in SIBs.

Keywords: Social Impact Bonds; Impact Investing; Impact Measurement; Social Finance.

Introduction

Unemployment, homelessness, disability, poverty, civilization diseases and migrations represent just a few social problems faced by the societies worldwide. These problems generate the continuously increasing expenses from the budgets of states and local governments, which translates into the reduction of funds to be allocated to other purposes. Moreover, it is worth emphasizing that a single problem may determine the next to follow and thus generate additional costs for the entire society.

The outcome payers, i.e. state governments and local government units have been looking for years for the efficient and, above all, cost-effective tools to reduce them. It is true that the traditional tools for solving social problems result, on many occasions, in the desirable effects, however, they are frequently just the short-term ones, whereas the main reason for this situation is the fact that the results of individual actions are mostly measured only through the prism of the expenditure incurred or the number of interventions made, etc. Such approach is more an assessment of the "support provider's" effectiveness, which is often focused on the result alone and in no way addresses the impact assessment of such actions on the beneficiaries covered by this measure. Conducting trainings for the unemployed does not have to result in them finding either a temporary or a permanent job, resulting in e.g. the reduction of expenditure on benefits. As a consequence, the budget spending may continue to increase and the problems may still be present. The disadvantage of traditional problem solving methods is also the fact that the entire risk of ineffective operations has to be handled by the "owner of the problem" alone.

Social impact bond (SIB) can play the role of a tool to fight social problems more effectively – innovative ways of funding social services based on the payment-by-results mechanism, where a specific, usually a long-term result (e.g. finding and sustaining employment, permanent recovery from addiction, permanent or temporary recovery from homelessness) is paid for. Importantly, in this mechanism the outcome payer does not bear the risk associated with funding the project, because it is passed on to investors and the

return on capital, along with the possible interest, depends on the actually achieved – measurable and verifiable – outcomes affecting beneficiaries of the individual projects.

The purpose of this article is to diagnose the outcomes planned by SIB and the methods of their evaluation based on the example of SIBs functioning in the area of fighting unemployment. Achieving the defined goal is facilitated by providing the original author's answers to the following research questions:

1. Is there a uniform system, within the analysed SIBs, for defining outcomes which they intend to achieve?
2. Are the defined goals measurable and thus offer a greater guarantee for their verification (validation)?
3. How are the defined outcomes verified to form the basis for funds' payment to investors?

Following the adopted purpose of the article, the below research hypothesis was formulated: Despite the discretionary system for determining outcomes, the presented outcomes and outcome metrics as well as the applied evaluation methods guarantee both independence and objectivity of the results achieved by SIBs and may contribute to the stakeholders' greater interest in SIBs.

Social impact bonds outcome and outcome measurement – literature overview

Social bonds are based on the payment-by-results (PBR) mechanism, invented in 1988 by the economist from New Zealand – R. Horesh. It is a funding mechanism consisting in payment for achieving a specific – previously adopted – measurable outcome. The subject literature provides many terms referring to social bonds, however, it is worth highlighting that the term "bond" used in some of these terms is misleading, because SIBs do not represent traditional bonds, but rather future liabilities (contracts) depending on the obtained results.

SIBs cover the features of various financial instruments because, just as in the case of:

- derivatives, the profit payment depends on the occurrence of a specific event, i.e. the achievement of a specific social result,
- debt instruments, the investment has a specific timeframe, the maximum return rate is fixed in advance and, additionally, the capital can be fully or partially secured,
- shares, the invested capital is subject to risk,

therefore, they can be referred to as hybrid instruments (Bolton, Savell, 2010, Maier, Meyer, 2017, Edmiston, Nicholls, 2018).

As observed by Fox C. and Albertson K. SIBs should be the response to the problem of funding social services, while also contributing towards increasing the efficiency, effectiveness and innovation of the services provided (Fox, Albertson 2011). According to Chiodo V. SIBs are characterised by 3 important features, i.e.: focus on preventive actions (interventions), application of the PBR mechanism and the development of a complex network of stakeholders, including public and private organizations (Chiodo, 2015). In addition, Mulgan draws attention to the commitment of the outcome payers to return the capital with interest after achieving the adopted measurable outcomes and savings in public expenditure (Mulgan et al., 2010).

In the context of the above discussion, it should be noted that one of the key determinants of SIB's success is the clear definition of the intended social outcome, specified in the agreement between stakeholders. It is also important that this outcome is better than the ones achieved based on traditional interventions. The supporters of SIBs attach great importance to the robustness of the outcomes which, among others, results from the fact that payments to investors depend on these outcomes. In addition, the focus is also on the correct identification of the outcome metrics. (Dear et al., 2016).

In order to fully understand the importance of outcomes for the success of SIBs and to be able to indicate the advantage of SIBs over traditional mechanisms for providing social services, it is worth defining the terms used in describing these mechanisms. Following a classical approach, the discussed concepts can be divided into two groups. The first of them includes planned work and the related internal results, which a given entity has impact on – inputs and activities. The second group covers primarily the intentional, intended results of external nature, on which the entity implementing the task has either lower or insignificant impact. The following terms are used in this respect: output, outcome and impact. The aforementioned differences between modern and traditional forms of social services provision depend on these three concepts and the respective approach to them.

Thus, output should be approached as tangible products from the activity (measurable actions or conditions that assess progress against specific operational activities, e.g., number of people reached, items sold). Whereas outcome should be understood as changes resulting from the activity (measurable actions or conditions that demonstrate progress towards specific outcomes, e.g. increased access to education or increase access to employment). Depending on the horizon over which outcomes are measured, an intermediate outcome may be used, which specifies a result proximate to an intended outcome, but likely more achievable in the lifetimes of a project. For example: Teachers use the new teaching methods (intermediate outcome) to improve learning among students (final outcome). Impact means broader change occurring in communities or systems resulting from the activity (effects on broader target population, e.g. sustained drop in poverty, increase in literacy rates. (So, Staskevicius, 2015, Investing in social outcomes…, 2013).

As indicated earlier, the desired social outcome should be expressed by an appropriate metric, determined jointly by stakeholders while developing the SIB structure (Disley, 2011, Tsukamoto, 2017). In the process of determining the appropriate outcome metrics, attention should be paid to the following characteristics: measurability, avoidance of perverse incentives, ability to evaluate success, and the potential for independent verification of results (Investing in social outcomes…, 2013).

Outcome metric used to measure the success of a SIB should fulfil two functions. First, it needs to provide ongoing feedback on intervention progress. It is imperative that all parties with a vested interest in the bond succeeding be able to gauge how effective program interventions are prior to the completion of the program. This will allow any deficiencies to be corrected and provides a higher chance at the desired outcome. Second, it should be strongly correlated with the financial benefit that the program expects to achieve. Metrics that have too weak of a correlation may end up causing investors to be rewarded without any savings being realized to pay them with (Liang et al., 2014).

Since the outcome measurement determines the payment to investors, it is important that the presented outcomes are statistically significant and confirm that they result from intervention, rather than a coincidence. For this purpose, it is necessary to select the target group (cohort) for the given project correctly. As Mulgan indicates, small outcomes will require large cohorts to ensure statistically significant results, while large outcomes can have smaller cohorts (Mulgan et al, 2010, Floyd, 2017).

Of course in practice, the presented outcomes are subject to monitoring and evaluation, in many cases, by independent evaluators. These activities also play a significant role because they promote accountability and help keeping the projects at the right level. Close monitoring and regular evaluation also provide a mechanism by means of which projects can be stopped due to exceeded cost as well as facilitate the learning process in the context of the future implementation of SIB projects (Chamaki et al., 2019). Regardless of who carries out the evaluation process, one of 4 evaluation methods is used, such as: validated administrative date, historical comparison, quasi-experimental, randomized control trial (RTC). The last 3 are included in the group of comparative methods.

And so, in the administrative data model, the project result is evaluated based on the data submitted by the provider or, possibly, the specialized agencies. Historic data can also be used in this case, to determine the initial values for the needs of the scorecard. It should be remembered that this model does not offer the direct comparison between the outcomes achieved by SIBs' beneficiaries and those accomplished by

non-beneficiaries. This model is most often used in these SIBs, in which the payment of invested capital is based on a scorecard, where the individual outcome metrics are assigned maximum payment values for the investor. It is worth highlighting that in this type of solutions a large number of outcome metrics is quite often present.

In comparative models, the outcomes achieved by SIBs' beneficiaries are compared with the ones achieved by a comparable group of people, who were not subject to intervention by SIBs. Mostly historical comparison, quasi-experimental and randomized control trial are used in this case. These methods allow answering the following questions: What would have been if the program or intervention had not taken place? and What are the changes in outcome directly attributable to the implemented intervention or program? (Floyd, 2017, So, Staskevicius, 2015).

Research Methodology

The selected research methods were used to carry out the purpose adopted in the introduction to the study. Therefore, in order to address the essence of social bonds and the characteristics of their planned outcomes, as well as the measures used to evaluate these results, the critical subject literature review was applied and the data available on websites were used.

However, as part of the diagnosis of the planned outcomes as well as the outcome measures and the evaluation methods, the method of analysis and observation, including comparative analysis, was used. The main source of information was the data available at the website https://sibdatabase.socialfinance.org.uk/, which is the basic source of information about the launched and in development SIBs worldwide. However, it should be emphasized that the data provided by the abovementioned database, run by the Social Finance, were retrieved from the public domain materials and were not independently verified, which results from the fact that part of the information on the selected SIBs is not fully publicly available, thus the information presented below may be incomplete. In addition, the data from the available SIB reports were used, as well as the data published in the subject literature.

The actively functioning SIBs, focused on counteracting unemployment only, were adopted as the research sample. The argument supporting their choice was the fact that they constitute the most numerous group among the SIBs dealing with the broadly understood labour support. As at January 15, 2020, as many as 44 SIBs were functioning in this area.

As a result of data availability verification, 17 SIBs functioning in the years 2012-2019 in Great Britain, the Netherlands, Germany, Belgium, Switzerland, Finland, Portugal and France were selected for the analysis. Within the framework of SIBs a larger number of projects either were or still are being implemented, therefore the total number of analysed projects is 31. To describe the research sample used in the analysis, the following parameters were used, e.g.: outcome, outcome metric, evaluation methods.

Research Findings and The Resulting Conclusions

Within the framework of carrying out the adopted research goal, i.e. the diagnosis of planned outcomes and methods of their evaluation, the analysis of the selected SIBs' functioning in the area of counteracting unemployment was conducted. The analysis resulted in providing the author's answers to the research questions formulated in the introduction to the study. The results of the analysis are presented in Tab. 1.

Therefore, answering the first research question: is there a uniform system, within the analysed SIBs, for defining outcomes which they intend to achieve? It should be observed that there is no uniform system of defining goals for SIBs addressed to the same area of social activity, which translates into the differently defined outcomes. This situation results primarily from the characteristics of the target groups covered by SIB support, which differ from each other. Considering this criterion, the presented outcomes can be assigned to 4 following groups:

1. increasing the employment prospects of young people, in particular those at risk of becoming NEET,
2. gaining and sustaining a job to move off state benefits,
3. gaining and sustaining a job by persons with disabilities or emigrants,
4. finding a job in the form of self-employment.

It is worth emphasizing, however, that despite the differences in formulating main objectives, the activities implemented under individual SIBs may result in the outcomes which have not been explicitly articulated in specific SIBs. For example: the desire to improve employment prospects of young people, in particular those at risk of becoming NEET may result in reducing the number of people covered by benefits, although the outcome itself was not intended in any way. Also, the activities aimed at finding a job by persons with disabilities may, in consequence, contribute to the reduction in the amount of paid benefits or, e.g., health condition improvement, which can, e.g., result in the reduction of healthcare costs.

Obviously, in the case of some SIBs, the adopted outcomes as well as the outcome metrics are either the same or very similar. The British or Dutch SIBs can serve as the example. It should, however, be highlighted that often, despite the same goals, the manner of their implementation may differ, which is evidently confirmed by the example of SIBs from DWP IF group.

The differences between the main goals are also visible in the established outcome metrics for the individual SIBs, although also in this case there are SIBs with identical outcome metrics. The nature (form) of the adopted indicator depends primarily on the agreed outcome, but also on the method of combining the payment with the intervention outcome and its verification method.

There are two methods for defining outcome metrics in the group of analysed SIBs. The first one is based on the tariff model (using Rate Card) and forces SIBs to specify many outcome metrics in relation to a single beneficiary. As a result, payment by results depends on the achievement of specific outcomes and, most frequently, represents the sum of payments for the actually achieved outcomes related to a single beneficiary. This method is used by SIBs classified as DWP IF and Youth Engagement Fund. The same Rate Card is used in both SIBs, which evaluates 13 outcomes in 3 problem areas. Due to the lack of data, it cannot be unequivocally ruled out that a similar method is used by the Dutch Venlo SIBs and the French SIBs. However, in the case of these SIBs, the author believes they use the other methods – presented below.

The remaining SIBs most often indicated one outcome metric, which results from the fact that they adopted a separate method of determining payments for investors from those previously mentioned. These outcome metrics can be divided into the following groups:

1. number of days during which beneficiaries do not use benefits,
2. number of people who found either a permanent or a temporary job,
3. number of initiated (adopted) business activities and the number of jobs created,
4. other (e.g. number of people covered by support, covered by the test).

Regardless of the form of the adopted outcome metrics, they should be characterised by the appropriate, indicated earlier, features such as: measurability, avoidance of perverse incentives, ability to evaluate success, and the potential for independent verification of results. This is primarily covered by the following research question: are the defined goals measurable and thus offer a greater guarantee for their verification? As far as measurability is concerned, it should not be questionable. In fact, the analysed outcome metrics are measurable (expressed in value or quantity) and, most importantly, to a large extent, obtaining the data needed to evaluate SIBs' intervention outcome should not be a major problem or generate excessive costs for all parties to the contract. The more so, that part of the data needed for the verification represent the data provided by public agencies. This also refers to the outcome metrics applied by SIBs using the Rate Card. For selected SIBs, measurement and evaluation require more complex activities, being the consequence of both the adopted outcome metrics and the applied evaluation methods. In this case, e.g. Dutch SIBs are a good example.

In the author's opinion, the proposed outcome metrics are so clearly defined that they are also free of the intentional influence of any incentives which could contribute to their manipulation. In addition, they offer full opportunity to assess the success or failure of a given social intervention.

Finally, it is important that the adopted outcome metrics provide the possibility of an independent verification of the outcomes achieved by SIBs. This is related to the last research question, i.e.: how are the defined outcomes verified to form the basis for funds' payment to investors?

The conducted analysis shows that in 9 cases, SIBs used validated administrative data model to verify and evaluate the outcomes. It referred to British SIBs (DWP IF, Youth Engagement Fund) and Eleven Augsburg SIB. In the case of British SIBs, it resulted from the tariff model adopted for payment implementation. The German project additionally used the qualitative evaluation method carried out by the Faculty of Economics and Social Sciences at the University of Hamburg. In terms of Veldhoven SIB, Venlo SIB and 3 French projects - due to insufficient information - such an assumption was made based on their outcomes and outcome metrics. However, it is possible that they used (use) other methods of evaluation.

Other SIBs used comparative models. The Dutch SIBs used historical comparison. The Belgian Duo for Job and the Swiss Bern SIB applied quasi-experimental methods, whereas the least recognized Finland SIB used randomized control trial.

As it has been shown, none of the evaluation methods used by the analysed SIBs outweigh the others. It should also be considered that in the case of individual projects, the evaluators could have used mixed evaluation methods for better verification of the achieved outcomes. Unfortunately, not all information on individual SIBs is available in the public domain, which significantly impedes their analysis. The research conducted so far, covering a large number of SIBs addressing various social problems, shows that the majority of SIBs use a validated administrative data model for the evaluation purposes. The reason may be both cheaper and faster access to specific data, generated by the specialized public agencies. The remaining evaluation methods are more labour-intensive and, therefore, more expensive.

Conclusion

To sum up, in recent years, social impact bonds as an innovative mechanism for funding social services have been gaining popularity, which is confirmed by the development of these instruments in terms of quantity and quality. The further success of this tool will be determined by many factors having impact on payment-by-results contracts, among which the key role will be played by the correct determination of the intended outcomes, as well as the methods of their measurement and verification.

In the author's opinion, the conducted analysis of the presented case study, supported by the literature analysis, allowed formulating answers to the research questions presented in the introduction to the article as well as confirming the following introductory hypothesis: Despite the discretionary system for determining outcomes, the presented outcomes and outcome metrics as well as the applied evaluation methods guarantee both independence and objectivity of the results achieved by SIBs and may contribute to the stakeholders' greater interest in SIBs. Although the formulated outcomes differ in content and dimension depending on individual SIBs, they are fully measurable and, according to the author, free of the manipulation risk. In addition, the applied evaluation methods ensure full guarantee of their verification and confirmation, in particular by the independent evaluators.

The author approaches the considerations presented in the article as a voice in the discussion on the problem of social bonds and the starting point for further research and analysis focused on the role and importance of social impact bonds in funding social services. Certainly, the effectiveness of the already completed projects should be subjected to a more extensive assessment, both from the perspective of implementing the adopted outcomes and the funds paid to investors. It is worth emphasizing, however, that if this mechanism is to become one of the alternative ways for providing social services and turn out

a more common instrument used as part of social investments, the information on the current results of SIBs and their effectiveness for all stakeholders should be more available

Figures and Tables

Table 1: Selected SIBs operating in the area of unemployment

LP	Name of SIB, Target group, Evaluation methods	Outcome	Outcome metrics
1	**DWP Innovation Fund Round 1 GB** (6 projects) Disadvantaged young people (11 887) **DWP Innovation Fund Round 2 GB** (4 projects) Disadvantaged young people (4 120) *Validated administrative data – tariff model*	To increase future employment prospects for teenagers at risk of becoming NEET (Not in Employment, Education or Training) (Age 14+).	**Improvements at school**: Improved: attitude to school/education; school attendance; school behavior **Qualifications**: Qualifications and Credit Framework accredited Entry Level Qualification Basic skills First Level 1, First Level 2, First Level 3, First Level 4 NQF Qualification English for Speakers of Other Languages **Employment**: Entry to first employment (13 weeks / 26 weeks)
2	**Youth Engagement Fund GB** (4 projects) Disadvantaged young people (7 900) *Validated administrative data – tariff model*	as above in DWP IF	as above in DWP IF
3-5	**Rotterdam SIB** (2 projects) Unemployed young people (160) / Unemployed jobseekers (750) **Utrecht SIB** (2 projects) Unemployed young people (792) **Eindhoven SIB** Unemployed young people (400) *Historical comparison - based on the personal characteristics of an individual*	To enable unemployed young people to move off state benefits.	The reduction in benefit days saved from moving people into employment / reduction in unemployment is measured using a model that predicts an expected duration of unemployment based on personal characteristics for each individual.

6	**Enschede SIB** Adult jobseekers (138) *Historical comparison to relative to control group**	To find work in Germany over the next 2.5 years.	The reduction in benefit days saved from moving people into employment.
7	**Flemish SIB Antwerp** Young people unemployed (270) *Historical comparison to relative to control group**	To increase future employment prospects for NEET teenagers.	The number of the young people on the program who find work compared to a comparable group (10%).
8	**Veldhoven SIB** Refugees with a residential status (70) *Validated administrative data**	To increase language skills and gain employment.	The number of beneficiaries who remain employed for two years.
9	**Venlo SIB** Unemployed people in Venlo *Validated administrative data**	To help people with a big distance to the labour market return to work / happy participants and fewer people dependent on state benefits.	1. Better personal circumstances. 2. More stability. 3. Better health. 4. Increased social participation. 5. Better labour market position. 6. Paid employment.
10	**Eleven Augsburg SIB** Unemployed young people (100) *Validated administrative data. There is an additional qualitative process evaluation taking place, run by the Faculty of Economic and Social Sciences at the University of Hamburg*	To gain and sustain employment.	The number of members of the target group placed into work or apprenticeship for more than 9 months. 20 young people (20%) must reach this outcome
11	**Duo for a Job Brussels SIB** Unemployed migrants aged 18-20 (180) *Quasi-experimental (matched comparison group)*	To gain and sustain employment.	The one-year reemployment rate, defined as having accumulated more than 90 days of employment or obtained a permanent employment contract in the year following the program.
12	**Bern SIB** Refugees and applicants with temporary permits (120) *Quasi-experimental (matched comparison group)*	To provide a better opportunity for financial independence and sustained employment.	To place 60-70 beneficiaries in lasting employment after completing and apprenticeship. The agreed targets are based on similar, but non identical, integration programs.

13	**Finland SIB** Unemployed refugees and migrant (3000) *Randomized Control Trial and measured through differences in tax collections and unemployment benefit payments between control and target groups*	To gain and sustain employment / the integration and employment of immigrants and refugees.	*unknown*
14	**Porto SIB** Young unemployed adults (150) *Validated administrative data**	To gain and sustain employment.	The outcomes are both entry into employment (40%) and 6-month job sustainment (20%).
15	**France SIB Access to mobility for vulnerable people** Vulnerably individuals (10 000) *Validated administrative data**	To increase access to employment for 10 000 beneficiaries / To help to return to or remain in employment.	1. Number of realized Mobility Tests on beneficiaries (10 000). 2. Proportion of beneficiaries benefiting from mobility support following Mobility Tests (80%). 3. Proportion of Mobility Test performed by the prescribing structures (17%).
16	**France SIB Job creation in deprived areas** Entrepreneurs and jobseekers in deprived communities (1000) *Validated administrative data**	To reduce the barriers to entry for entrepreneurs starting franchised businesses in designated socially deprived areas.	1. The number of viable businesses created (200 to 300). 2. The number of jobs created (1000 to 1500). 3. The number of completed training qualifications (350 to 500).
17	**France SIB Rural unemployment** Job seekers those in unstable employment (1000) *Validated administrative data**	To access to sustainable employment.	1. The number of people funded and supported by the service (500). 2. The number of people permanently employed as a result of the program (320)

Source: authors' compilation based on: Gustafsson-Wright, 2015, Floyd, 2017, Tsukamoto, 2019, https://sibdatabase.socialfinance.org.uk/.

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Business or Marriage?
The Review of Startups and Relationships

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Abstract

The aim of the article is to present the essence of relationships in the process of the enterprise emergence in the perspective of strategic management. Based on the pilot of in-depth studies analyzing the most important aspects of mutual relations between entrepreneur (CEO) and Angel Investor (INV), the author attempts to analyze informal relationships as the basis for the successful exchange of resources between the business partners in the creation and development of start-ups. The results of the study lead to one conclusion: the success of a start-up is the result of a unique relationship of successful people.

Keywords: Start-up, relations, resources, multi-relations, inter-organizational relations, competitive advantage, strategy, entrepreneur, Angel Investor

Introduction

In the turbulent global business environment of the 21st century, impressive technology development, growing market saturation and increasing monopolization in individual sectors, the level of difficulty to create new successful enterprises and develop existing ones constantly grows. Despite this, there are business initiatives on the market that quickly allow their creators to achieve not only above-average financial results, but also to create global enterprises, making millionaires from their creators. Start-ups in the second decade of the 21st century along with their brilliant creators are presented as a synonym of entrepreneurship, and innovation. The most often discussed examples are these achieving a very high return on investment. Unsuccessful ventures, that the market has not accepted, are rarely analyzed. However, the question about the source of startup success, especially at the stage of establishing and initial rapid growth, is constantly repeated in the strategic analyzes of these projects. What do really causes that some startups quickly gain advantage not only on the local but also global market? What is the source of start-up success? Is it a competitive idea, the characteristics of the creator and his knowledge of the sector, or the size of investment capital at the beginning? Or maybe the market environment of the enterprise…?

The discussion about start-ups is very exciting, however discussion in strategic management perspective is a challenge, mainly because of its blurred boundaries of the venture and its partial ambiguity. The most often frequently indicated reasons for the fall of start-ups are errors made in implementing the market strategy, for ex.: poor marketing, lack of financial strategy and insufficient level of cash, no market need for the product/service, lack of business model, high competition in the sector etc.… In the first perspective the causes of the potential failures looks easy to obey. To succeed it is just enough to have innovative project and to try not to fly on the mentioned flanks. However, when we look at the variety of survival reports from different countries we can find out that about 90% of business initiatives does not survive for first 5 years… We also find out, that these are not engineers with innovative know-how that win that game -the majority of the most successful start-ups CEOs were studying the humanities and social sciences (Startup Poland, 2019) and they were matured experienced adults (60 year old entrepreneur is 3 times as likely to build a successful start-up than a 30 year old one (Embroker, 2020) with international business experience (ex. the 46% of Polish entrepreneurs lived abroad) and about 18% of them are scientists (Startup Poland, 2019)… The image of the successful new entrepreneur doesn't have face of young man in his 20s like in the start-ups advertising. More often it is face of mature, experienced, energetic gentleman who using his experience and personal

charm, enters into mature partner relationships with others building on his social networks. His relations lead to happy marriage and there is high probability, that "they live happily ever after". If an entrepreneur reminds a mature gentlemen who is the successful starts-up-marriage investor and what is the start-up relation?

In his several years of work with start-ups, the author of that paper noted that in the creation of new enterprises one of the most key sources of success are the relationships that arise between the entrepreneur and the investor. That was the inspiration for further dialog with business partners – investors (INVs) and entrepreneurs (CEOs), then to creation of the pilot-survey to confirm the observations. Two groups of respondents presented very interesting, however slightly different perspectives on relations in emerging new business ventures, that are presented in that paper.

Literature Review

Relations as Resources Bonding Organizations

Publications in the field of management are full of both examples of business success based on the ideal conditions of the external environment of the company (e.g. Porter, 1969), as well as examples describing the internal potential of the organization as a source of competitive advantage (e.g. Resource Based View (Barney, 1991, Barney and Clark, 2007; Barney at all, 2011), Core Competence Approach (Hamel and Prahalad, 1990), Dynamic Capabilities Approach (Teece et al. 1994, 1997) However, in the perspective of establishing new enterprises, special attention deserves a relational approach, which uses relational bonds (Dyer and Singh, 1998; Zakrzewska-Bielawska, 2011, 2014, 2016, 2019) Assuming that the elements of the organizational structure are people, technology and goals, it is only the relationships between them that form the binder that enlivens the construction (Zakrzewska-Bielawska, 2012, p. 251). These relationships are referred to as organizational ties complexity and diversity of elements in enterprises resulted in a variety of definitions of the organizational structure. The organization is presented as a set of structural elements used to shape the organization, a result of using in the form of a specific arrangement of organization elements and their connections, a way of dividing work into tasks, as well as coordinating those. The organization appears as formalizing the distributed relationships between responsibility for the tasks, people and resources of the organization, or as the functions of relations and functions which, as a whole, formalize the mission of individual organizational units in a formal manner, as well as organizational principles between individual parts of the organization. It is also treated as a set of relations between elements of the whole and between them and the whole, analyzed in a specific perspective, a functionally and hierarchically organized system of dependencies that occur between organizational positions, cells and higher-level units. The organization can be treated as a set of elements and specific relationships that occur between elements of the organization, without taking into account elements per se, and also as the entire relationship between elements of organization: people and material components, as well as the way they are ordered, which allows distinguishing the structure of things (organization elements) and structure of processes (sequence of events) (Gryffin, 2010; Mintzberg, 1993; Cliffs, Pearce and Robinson, 2007; Zakrzewska-Bielawska, 2012, p. 252).

Between the individual elements of each organization there is a wide and diverse number of identified and unaware relationships - organizational ties. Zieleniewski (1976) proposes variety of ties examples. First one is service bond (hierarchical, linear, vertical), which concerns the location of decision-making powers and expresses parental relations and subordination. Due to his verticality (one superior - one subordinate) he meets the rigor of the principle of unity of order: one source is the source of orders, instructions and prohibitions, decisions and suggestions. This bond organizes the organization, defining and assigning each workplace to individual cells. It also establishes service dependencies and distribution of power. The second bond is functional (advisory) bond is expressed by providing consultancy services between specialists in various fields and regarding the diversity of professional competences (mainly employees' knowledge and skills). Combining workstations occurs in different cells and at different levels, it can have two characters. The first of these is the functional-hierarchical character expressed in the business relationship between functional managers located in different places of the organizational structure who work with employees at lower levels, which leads to having many

superiors depending on the specifics of the implemented project (breach of the principle of unity of order). The second character of functional bond is functional and supportive, which is based on advising, reviewing and consulting tasks performed by managers and specialists who have been specialized in a given function and who have not received the right to make decisions. In this situation, the employee asks another manager or specialist for help and advice. This relationship contributes to the increase of knowledge at various levels of the organization. A technical bond (cooperation bond) third tie proposed by Zieleniewski (1976). It is a horizontal bond that occurs in the division of labor and describes the relationships between units involved in one technical process or one set of activities. It connects positions at the same level and is limited to the organizational cell framework. The fourth one is the information bond (the so-called Fayola footbridge / bridge) is another horizontal bond that is expressed in the exchange of information and knowledge, imposing an obligation to inform each other on all participants of the organization. In contrast to the technical bond, it goes beyond one organizational unit, which promotes learning and expanding knowledge resources in the organization (Zakrzewska-Bielawska, 2012, p. 257).

It is also worth paying attention to the ties presented in a different way from the classic. Such an example is Sikorski's synthetic approach (2006), which distinguishes cooperation, coordination and communication relationships. Cooperation relations arise as a result of division of labor, coordination as a result of division of power, communication as a result of information flow. On the other hand, Nalepka and Kozina (2007) creates a very extensive typology of bonds based on the foundation, which is the source of addiction or because of the characteristics of the relationship in relation to individual relations. In relation to the source of addiction, they distinguish hierarchical relationships (including commanding and regulatory ones) and functional dependencies (operational and informational advisory), and due to their characteristics they analyze features in the perspective of an addictive member, addicted member, subject of addiction, type of addiction, form the information provided, the form of feedback, the direction of addiction in the structural perspective, the formalization of addiction and its measures, and the sanctions that the addictive member uses in relation to the addicted member (Zakrzewska-Bielawska, 2012).

It is worth noting that relationships often overlap, and the type of dominant relationships can determine the nature of the enterprise's structure and the culture of its conduct. The level of formalism of relationships within an organization (e.g. formal, informal) may also affect the company's strategy. Depending on the proportion and nature of the relationship, an enterprise may gain or lose a competitive advantage. The proportions of formal to informal and informal relationships can also evolve at various stages of an organization's life.

Inter-Organizational Relations

Inter-organizational relationships are increasingly treated as a source of competitive advantage and a profitable source (Dyer and Singh, 1998; Uzzi, 1997; Grandori, 2012, Stańczyk-Hugiet, 2016). They deal with the relational approach, analyzing both relationship configurations and the direction of their development, especially in organizational networks (Stańczyk-Hugiet, 2016; Dyer and Singh, 1998). Unlike organizational relationships, inter-organizational relationships in the space between different entities. In an increasingly saturated market, where competitors with similar material resources and intra-organizational relationships provide almost identical products to the global market, and changes in the environment require flexibility and dynamics, inter-organizational relationships appear as sources of competitive advantage (Zakrzewska-Bielawska, 2017). Competition for products and markets, resources and competences cannot exist without relational resources (Stańczyk-Hugiet, 2012, in: Zakrzewska-Bielawska, 2017), and the multi-level organization, as well as an increasingly complex network of stakeholders along with dynamic changes in the environment have an impact on growing uncertainty of the environment (Romanowska, 2016), as well as forcing the creation of a relational strategy. In this perspective, relationships create the form of a relational strategy understood as "a continuous and dynamic process of choices regarding the establishment, development and withdrawal of inter-organizational relationships, made in conditions of uncertainty (constraints, pressures and opportunities) in order to create and capture value, maintain development potential organization and receipt of a relational pension“ (Zakrzewska-Bielawska 2017, p. 181). As indicated by Zakrzewska-

Bielawska (2017), the basis of relational orientation is the willingness to cooperate with other entities in order to obtain an economic rent (Niemczyk, 2013) or online (Krzakiewicz and Cyfert, 2014).

Inter-organizational relationships can occur between various entities, both in the market space (suppliers, competitors, customers) and non-market space (government institutions, non-profit, media, residents…). (Baron, 1995; Zakrzewska-Bielawska, 2016). The selection of a partner can have operational and strategic significance leading to competitive advantage. The relationship that arises, its type, determines the durability and length of cooperation. However, the formation of an improper relationship can be toxic to the organization. Emden, Calatone and Droge (2006) list three types of matching as the main factors affecting the quality of relationships: technological fit (resources, knowledge, skills), strategic fit (goals and motivation) and relational fit (culture, flexibility, perspective) (Zakrzewska-Bielawska, 2017).

However, trust seems to be the most critical in relationships, which reduces uncertainty and the risk of failure (Casciaro and Lobo, 2008; Kim at al., 2009). A competing or uncompetitive partner influences the level of trust and inter-organizational dynamics (Bengstsoon and Kock, 1999): competition, coexistence, coopetition and cooperation, and cooperation between partners is the main source of competitive advantage (Ritala and Ellonen, 2010). Relationships based on coopetition and cooperation are burdened with the least risk of failure, and relationships created on them have the chance to benefit both parties (Zakrzewska-Bielawska, 2017).

Just as choosing a partner is the first strategic choice when creating a relationship strategy, the next is how to build relationships. Relationships can be intentional and purposeful (planned and established), or they can naturally be formed during the cooperation of entities (Krupski, 2010). Due to the external environment of the organization, the choice of relationship partners is made both in a conscious and planned manner, as well as incremental (emergent), based on the use of emerging opportunities. The purpose of the relationship, partner, and inter-organizational dynamics that make up the content of the relationship strategy are mutually coupled (Zakrzewska-Bielawska, 2016)

An important element of relationship strategies is their non-market dimension. In the integration perspective, however, relational strategies are defined as complementary to market strategies (company dimension and market dimension), because in the approach of relational strategies an additional dimension defined as the 'external market dimension' becomes critical (STRATEGOR, pp. 262-268, Krupski, 2007, p. 42). It indicates the need to supplement the internal competences of the organization by the possibility of a large number of relationships with external objects and is a consequence of current competitive conditions, and is also the basic conditions formulated in the concept of strategic management as: "relationship portfolio" (Zakrzewska-Bielawska 2012, p. 20). The fundamental premise of research on the relationship between institutions and enterprises is, that they can create and use “personal and institutional links between companies and public authorities (Sun, Mellahi and Wright, 2012, p. 68 in Feinberg, Hill & Darendeli, p. 4), which is a source of benefits for the parties. An example of such links are political links, which can be a source of financial benefits and institutional change. Links between politicians and the business environment (Feinberg et al., 2015) may be derived from the shared past of entities (e.g. a joint university), family connections, belonging to the same political party or business group (Khanna and Pelepu, 2000). Links can also be part of corporate policy strategy (Feinberg et al., 2015). This is related to the phenomenon of revolving door - employing former politicians, placing them on supervisory boards as well as placing high-level managers in important institutions, co-financing events political lobbying (Feinberg et al., 2015). The value of a relationship for an enterprise depends on the severity of the problem. This type of relationship can protect the company against external risk (e.g. legislative change), or it can bring benefits (e.g. lowering taxes, lifting customs barriers). The depth of the relationship, the company's presence in political and social life can be a source of strategic advantage for the company (Wang and Jiang, 2008; Feinberg et al., 2015), but it can also lead to a catastrophe, e.g. cronyism and corruption that could lead to the collapse of the company (Feinberg and others, 2015; Doh et al., 2012).

Relationship in The Perspective of Building Competitive Advantage

Building an advantage in the dynamic, competence and positional views were based on a competitive struggle. In the increasingly turbulent 21th century, organizations began to combine their potentials "to more effectively counteract the negative effects of increased competition and to make the most of the opportunities of the modern economy" (Zakrzewska-Bielawska, 2014). Such examples are network strategies in inter-organizational relations or coopetition strategies, which are manifested in the processes of competition and collaboration that occur simultaneously (Dagnino et al. 2008; Zakrzewska-Bielawska, 2014). Zakrzewska-Bielawska (2014) draws attention to how complicated and equally unobvious the coopetition process can be, due to their opposite dynamics, boundaries, as well as different planarity. The dynamics of competition and cooperation may concern many aspects. The author (2014, p. 132) points to such aspects as the level of intensity of competitive and cooperative activities, value chain level, direction of relationships between partners (horizontal, vertical and mixed coopetition), the number of competitors, geographical coverage of competitors, the position of competitors in the hierarchy of economic systems (micro, mezo, macro, global), economic commitment, social bonds, purpose of coopetition, type of coopetition agreements. Coopetition is found in all sectors, but especially occurs in the high technology sector, the so-called high-tech, where coopetition is used to create a competitive advantage (Zakrzewska-Bielawska, 2014). High complexity and variability, resulting from a wealth of exo- and endogenous factors linked to each other, are characteristic of coopetitive relationships.

According to the author, the intensity of competitive and cooperative activities was the most commonly accepted criterion used to describe the types of coopetition. The proposal to divide coopetitive relations in the perspective of building competitive advantage is very interesting, adopted depending on the intensity of competitive and coopetitive activities (Zakrzewska-Bielawska, 2014, p. 134). Zakrzewska-Bielawska (2014) divides coopetitive relations due to the intensity of competition and cooperation, distinguishes four types of strategies. The first is the loners' strategy, which is used by narrowly specialized entities to protect their unique resources. There are often high-tech companies among loners who, adopting a passive attitude, expect a monopoly pension. In the opposite situation: the adopted adaptation strategy, there is a high level of cooperation and competition. An attempt to balance the competition-cooperation relationship is here the strategy of the integrator/adapter, consisting of a clearly defined and separated area of cooperation and competition. It is often found in the high-tech sector, in research and development (R&D), supply or production in the so-called activities inside the organization (input activities). On the other hand, competitive activities refer to the so-called outdoor activities regarding sales, distribution and marketing. In this case, a syncretic rent arises, which arises as a result of active competitive and cooperative activities (so-called elastic coopetition). The rival's strategy is based on significant aggression and the confrontational nature of competitors. The rival's strategy leads to the highest possible economic rent. In the higher technology sector, enterprises seeking innovative leadership in their sector introduce the rival's strategy. The convergence of competitors' goals, relying on the same sources of competitive advantage, product similarity and resource independence results in the domination of competition over cooperation, where coopetition is mixed (Zakrzewska-Bielawska, 2014).

The opposite situation to the opponent's strategy is the partnership strategy. It is characterized by a higher level of cooperation over the level of competition. The partner's strategy is found in relationships where companies with market separation have resources that are complementary. In this type of coopetition, it can lead to the creation of competitive barriers for other players in the sector. In the high-tech sector, there is a noticeable relationship between the amount of ownership of resources and their redundancy, as well as the desire to divide risk and costs, especially development (R&D), into an increased level of intensity of cooperative activities. Pressure on the integration of the global value chain and response to the impact of the institutional environment have an impact on the dominance of cooperation relationships over the relationship of competition. This leads to an increase in bargaining power and the creation of an annuity (Zakrzewska-Bielawska, 2014). As Zakrzewska-Bielawska (2014) writes, a critical determinant in coopetitive relations is the partners' trust in each other, and previous experience in the current relationship as well as existing relationships with other business partners (so-called path dependence), because conditions change due to the turbulence of the external

environment business environment and strategic moves of competitors. The greater the confidence, the greater the flexibility in a "relationship". Negative experiences, lack of trust, opportunism or insufficient rent (or lack thereof) can force the evolution of the existing partnership strategy towards a competition strategy or isolation strategy (loner).

Methodology

The pilot survey discussed below was adopted prior to the future, large-scale research to explore the basics of importance of relations in start-up strategies. Based on his own experience of working with start-ups, author of the article selected critical aspects of business partners' mutual relations and put them to the vote by respondents. The research sample includes twenty Polish-born enterprises that have been present on the market for min. 2 years.

The adopted research method for pilot study was a scaling (ranking) survey allowing the respondents to rank the available answers to the questions on the scale of 1- 4 (where the 1 was the lowest- “not important” and 4 was the highest “very important”). The survey was fulfilled by 20 CEOs and 20 Angel Investors (INVs) (Tab. 1). The weighted results are presented in the graph (Fig. 1).

Table 1: The pilot survey: the important issues in start-up successful relations. Two perspectives: CEOs & INVs

Using X describe the most important issues for start-up successful business relations	Not important (1)	Unconcerned (2)	Important (3)	Very important (4)
Available capital (cash)				
Business achievements				
Personality				
Business interests				
The industry of activity				
Sens of humor				
Temperament				
Internal discipline				
Ability to listen				
Communicativeness				
Personal values				
Openness				
Business connections				
Trust				
Start-up business idea				

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Results

The results of the survey initially confirmed the author's observations on the relationship between CEOs and Angel Investors (INVs) in emerging competitive enterprises. What is very interesting and worth future investigation, that answers of both groups of respondents differ from each other (Tab. 2, Fig. 1). The personal issues were critical to create successful start-up relation from the investor’s point of view. The Angel Investors rated very high the openness (3,4), personal values (3,7), communicativeness (3,9), ability to listen (3,9), internal discipline (3,8), temperament (3,5), sense of humor (3,3), at nearly the same level as start-up business idea (3,5). In opposition, the CEOs valued quite low the “human

issues". The personal values (2), sense of humor (1,3), temperament (1,3), internal discipline (2), openness (1,5) have got very low grade. Only two phenomena were similarly important for both groups: trust and ability to listen. The trust was as important for CEOs as for INVs achieving the highest level (4). As we could assume, the ability to communicate is important for both groups of members, because both groups described it as very important (CEO- 3,3; INV- 3,9).

The features selected by:	CEO	INV
Available capital (cash)	3,7	1,3
Business achievements	3,7	2,9
Personality	2,7	3,5
Business interests	2,9	3,6
The industry of activity	3,7	2,9
Sence of humor	1,3	3,3
Temperament	1,3	3,5
Internal discipline	2	3,8
Ability to listen	3,7	3,9
Communicativeness	3,3	3,9
Personal values	2	3,7
Openness	1,5	3,4
Business connections	3,7	2,5
Trust	4	4
Start-up business idea	2,5	3,5

Table 2: The weighted results of the rating survey:
1- not important, 2- unconcerned, 3-important, 4-very important

The issues like available cash (INV-1,3; CEO-3,7), business connection (CEO-3,7; INV-2,5), the industry of activity (CEO-3,7; INV-2,9) looked much more important in perspective of entrepreneurs than their investors.

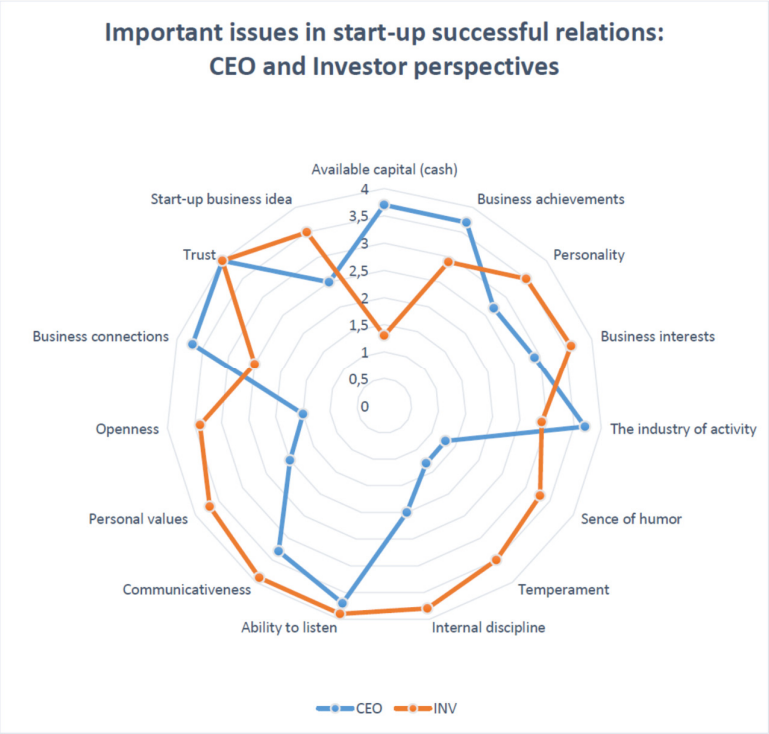

Fig. 1: Important issues in start-up successful relations: CEO and Angel Investor perspective

Discussion and Conclusion

When we look at the similarities and life cycle of marriage and entrepreneurship we can find out a variety of similarities from enthusiasm and hope on the beginning, through hard work and success or failure at the end. More they members have in common, more they share (time together, values, passion, excitement, hard work, engagement, support, trust, will, goals, dreams etc.) the probability of survival and success grows. The more you tie, the more likely you are to survive. Marriage needs tangible resources to exist, however based only on work and money it becomes only informal company- it will not survive storms without bonding, deep emotional engagement, sharing. Creating the new business entrepreneurs must also acquire a set of valuable resources. Critical become financial resources to develop the product/service, to deploy marketing strategy, to recruit and hire qualified staff. However, as Huang and Knight (2018) reminds, that the money and all it provides is not enough to create sustainable and competitive business. "Entrepreneurs must acquire social resources, such as access to partners and advice to help hone the strategic position of the venture" (Huang and Knight, 2018, p. 80). These social resources become critical especially for start-ups with their structure involving number of different partners helping to create business venture (business angels, accelerators, investors, advisors, mentors). These are the relations, their positive aspects of bonding, the flow, the exchange that builds the happy permanent marriage and successful sustainable entrepreneurship. "Relationships are conduits through which financial and social resources flow, promoting the growth of new ventures and aiding investors in profiting from their investments. […] Without the relations between investors and entrepreneurs, however, ventures lack access to the resources they need, increasing the odds of failure" (Huang and Knight, 2018, p. 80). Relationships allow for exchange process between the partners: for investors they allow for potential return on an investment in a venture and for entrepreneurs – for business growth (Cropanzano and Michel, 2005; Huang and Knight, 2018).

As the start-up ecosystem is quite complex, the type of relations depends on the type of investor. In start-ups we can find two major sides creating core of the company: the entrepreneur/s and investor/s: angel investors (AI) and venture capitalists (VC). Angel investors are wealthy individuals or groups

providing their own financial capital to early-stage ventures. They are more emotionally involved than venture capitalists and have more freedom in managing business- they are more focused informal signals from entrepreneurs (Huang and Knight, 2018). Venture Capitalists are institutional investors managing other people's financial capital. In comparison to the angels they are more focused on the market aspects of strategy (business models, profits etc.). The VCs invest in new businesses for earning a return for their clients and earn the margin of the profit for themselves. This intermediation aspect appearing in VC- entrepreneur context influences the relationships between the entrepreneur and two different styles of investors (Brander at al., 2002 in: Huang and Knight, 2018). This way the slightly different values are provided to the partners and exchange may appear at different levels of relationship. Huang and Knights (2018) selecting two different major exchanges: financial resource exchange and social resource exchange. They reminds that financial resource exchange is the most studied aspect of start-ups (Huang and Knight, 2018; Kerr et al., 2011) and it is mainly economic process based on formal transfers of tangible resources and controlled by negotiated terms (Huang and Knight, 2018; Takahashi, 1999). The value of exchange is physical- instrumental (despite the choice that cash provides in business growth). The second type of exchange proposed by Huang and Knight (2018) is social resource exchange. Building on Foa and Foa's (1980) the authors describe "social resources […] as relatively more particularistic and less concrete than financial […]. for example, the transfer of strategic advice (from an investor to an entrepreneur) in return for being and feeling involved in growing an impactful new business (from an entrepreneur to an investor. […]" In this perspective the trust and similar norms between the entrepreneur and investor are the fundament for creation and "serve as governance mechanisms" and allow for mutual commitment. The appearance of positive feeling, affection (Collins, 1990; Niedenthal and Brauer, 2012) the relationship embeddedness increase: the investor becomes a fiancé, ready to help, protect, guide, assist and advice. The protection of the business and positive emotional engagement appear (Lawler, 2001; Casciaro and Lobo, 2008). It allows for the openness and dialog, and the business problems are not hidden from investors anymore, only become challenges the couple face together in their business adventure.

The above-mentioned pilot studies proved to be a fascinating introduction to the study of relationships in emerging enterprises and their role in building a competitive advantage. The study showed, that experienced Angel Investors (INVs), who have achieved lasting success and thus can invest in new ventures, appreciate the most values that are characteristic of mature friendship or a happy long-term marriage based on dialogue, understanding, trust ... On the other hand, the results studies present the future entrepreneur (CEO) as focused mainly on material benefits, which the relationship treats more like "here and now" than "forever". Can we say in this connection, that the success of a start-up is the result of a synergy of mutual benefits: the investor introduces maturity, experience, capital to the relationship, and a novice entrepreneur with passion and willingness to profit while winding up the emerging business venture...? Why, then, the results of the studies Startup Poland (2019) and Embroker (2020) show, that the majority of the most successful start-ups CEOs were studying the humanities and social sciences (Startup Poland, 2019) and they were matured experienced adults (60 year old entrepreneur is 3 times as likely to build a successful start-up than a 30 year old one (Embroker, 2020) with international business experience (ex. the 46% of Polish entrepreneurs lived abroad) and about 18% of them are scientists (Startup Poland, 2019)? When we compare the most important issues in successful business relation provided by Angel Investors (INV) we could see the features of the successful entrepreneur presented by Startup Poland (2019) and Embroker (2020). Is it evolution of entrepreneur, that allow him for growth in relation with Angel Investor? Or maybe it is this readiness for rapid maturation in business, that is not only the basis for creating a good relationship with the investor, but also the source of building competitive advantage at an express pace? Maybe just a start-up that achieves quick and lasting successes is not a typical marriage? Maybe it is the great relational collision of two business neutron stars, resulting in the emergence of a successful enterprise taking over its external environment in order to create and sustain its competitive advantage..?

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Information Security Training Technology Based on The Updating of Personal Experience Using Modern Formats of Communication Between Teacher and Students

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Abstract

The paper substantiates the need to create information security training technology, which will allow students to realize the importance and rigor of the implementation of legal and technical measures to protect information. Digital data is becoming the main carrier of professional, state, commercial and personal information. The mathematical algorithms provide high resistance to hacking in a reasonable time. However, the human factor is presented in ensuring information security is able to level all technical solutions. It is proved that the traditional teaching technology does not contribute to the awareness of the importance and vital necessity of fulfilling the requirements and rules of information security. The technology of conducting the lessons, developed by the authors, allows to solve the problem. The practical examples demonstrate the technology of building a lesson, focused on ensuring that all the questions studied are considered from the point of view of the student's personal safety; they confirmed the social significance and scale of the problem by the obtained data of a scientific experiment. The leading approaches, principles and methods in the development of technology are: a holographic approach, vitagenic training, heuristic training, the principle of interactivity, "inverted training", authentic assessment and observation included. All used pedagogical approaches and methods correspond to the modern level of development of digital education and the mentality of a modern student.

Keywords: Information Security, Updating Personal Experience, Digital Education, Vitagenic Learning

Introduction

The aim of the work is to present the technology of training developed by the authors for informational, programmatic, physical, and organizational and legal measures for protecting information, which will allow students to realize the need for compliance.

Currently, all sectors of the economy and household life of people undergo significant changes or transformations under the influence of digitalization. Digital data is becoming the main carrier of professional, state, commercial and personal information. The personal security of a person, the national security of the country and the financial profit of the enterprise depend on the degree of information protection.

The mathematical algorithms underlying the software and hardware information protection provide high resistance to hacking in a reasonable time. However, the human factor present in ensuring information security is able to level all technical solutions. The irresponsible actions of users of information systems or, conversely, their inaction, are caused by a lack of knowledge about the possible consequences of their actions and a lack of understanding of the seriousness of the situation.

The traditional teaching technology, which involves acquainting students with information in lectures and further solving problems in practical classes, does not contribute to the awareness of the importance and vital necessity of fulfilling the requirements and rules of information security. Therefore, we have developed a technology for conducting classes in such a way that all the questions studied:

- were considered in terms of the personal safety of the student;
- confirmed the social significance and scale of the problem not declaratively, but by the obtained data of a scientific experiment, independently initiated and conducted by the student;
- based on life situations that students, their friends or relatives encountered in real life;
- demanded the involvement of personal experience in solving this issue, both successful and ended in failure.

Up-to-date information and knowledge testing for each lesson is presented not as a set of files or text, but with the help of modern information and software of the educational process, which involves demonstrating text, images, videos with the possibility of organizing feedback in the form of consultations with the teacher, answers to thematic quizzes showing results, voting, organizing a brainstorming session.

The developed technology involves the constant use of computer technology. The main idea is not the introduction of information and communication technologies in education, but the use of pedagogical technologies that correspond to the modern level of digital technologies and allow using multimedia formats familiar to students from each other and the teacher in the process of preparing for classes.

Pedagogical Approaches, Methods and Principles Used to Implement the Goal and Objectives

To implement the goal and objectives, we used pedagogical approaches, methods and principles:

- holographic approach - an approach used for multidimensional modeling of an object and an object of study and involving the use of pedagogical methods and techniques in order to present the object of study in all its manifestations and from the point of view of different participants in the process (Belkin and Vozhenikova, 2004);
- vitagenic education (lat. Vita - life) - education based on the actualization and demand for the student's life experience for educational purposes (Kukushin, 2002);
- heuristic education (Greek heurisko - I seek, find, discover) - education, the purpose of which is to find and realize a student's own meaning, goals and content of education, the continuous discovery of new, often unexpected, aspects and aspects of the subject being studied;
- the principle of interactivity (eng. Interaction - interaction) - a principle based on the interaction between the participants in the educational process, the teacher and students, students among themselves using modern means of communication. The purpose of using this principle is to create comfortable learning conditions that encourage students to feel their success and intellectual viability (Lebedeva and Pavlova, 2010). The learning process involves discussions and dialogues leading to a joint solution to personally significant problems for each student;
- the principle of facilitation (eng. Facilitate - to facilitate, facilitate, create favorable conditions) - the principle implemented in conjunction with the principle of interactivity. When facilitating training, the teacher takes the position not "above", but "together" with the students, he forms the ability to draw conclusions, find new facets of problems in the situation in question (Tatarenkova and Kibets, 2015);
- included observation – a research method that allows you to conduct research in everyday life circumstances, to study the problem "from the inside", to find out the reasons for the internal motivation of people who have made certain correct or erroneous operations with information through their activities (Smyth, Bossu and Stagg, 2017);
- the technology of "inverted learning" - the technology of constructing classes that are based on previously studied material, viewed recorded lectures with their subsequent discussion in the audience. Educational materials and access to any information on the Internet allow students to advance on the topic at a convenient pace for them, to revise the record to review important points and skip the parts that are already familiar to them, to think about the required material. As a result, students come to classes prepared to participate in the discussion and solve practical problems (Broumi at al.,2018);
- authentic assessment - assessing the formation of skills of students to protect information by putting them in a situation as close as possible to real everyday or professional life.

In the process of implementing the technology, we used the following informational software of the educational process.

1. Google Forms (https://forms.google.com).

The purpose of using this application is ¬ to provide students with the opportunity to create surveys in on-line format for collecting data in order to conduct research on various aspects of information security.

The results:

- students see the real and current situation in the field of information security;
- make sure of the truth or falsity of their assumptions;
- can make scientifically based proposals to reduce the risk of information security threats.

2. Kahoot (https://kahoot.it/).

The service is designed to create online quizzes, tests and surveys. Questions or tasks are displayed on the projector, students answer the tests created by the teacher from tablet computers, laptops, smartphones, that is, from any device that has Internet access. Created tasks allow you to include images and video clips in them. Possible command mode for entering responses.

Purpose: conducting testing at the modern level of digital technologies, corresponding to the mentality of modern youth.

The result: a form of positive competition with other students motivates for further deeper study of the subject.

3. Dotstorming (https://dotstorming.com).

A tool for collaboration between students and a teacher in the “wall” mode with the ability to chat, add images and videos, group exchange of information, implement brainstorming technology and make decisions.

It is used to organize discussions in a group by posting ideas, suggestions, answers to a common panel (wall), discussing them in a chat, organizing voting and building ideas and suggestions by rank. Each student contributes to the discussion and can comment on other students' posts.

Purpose: to provide students and the teacher with a convenient environment for the exchange of information, ideas and work results.

Result: operational updating of information in formats familiar to students (texts, images and video with comments), the usual way of online communication with each other and teachers in the process of preparing for classes. Students become more motivated to further work, as they can make a personal contribution to solving the problem and get public approval.

The content and technology of the seminars. The achieved results

We give practical examples of seminars at bachelors of economics using the described technology in the framework of classes on the subject "Information Technologies in Professional Activities".

The seminar 1.

The essence of information security. Types of threats and methods of influence on information security objects. Methods of protection against each type of exposure.

Technology of the lesson

1. Presentation of the theoretical part of the topic by the teacher.

2. On the example of specific information systems in different fields of activity, students analyze existing threats and identify subjects who are interested in influencing objects of the information system, evaluate the approximate damage that occurs in the event of successful impacts. The teacher participates in the discussion and prompts if students themselves have not noticed the existing threat to information security.

3. Students offer specific ways to counter the identified threats and formulate recommendations to the leaders of the hypothetical organizations under consideration that will minimize threats to information security. For example, the rules for restricting user access to information system resources, conducting periodic training of personnel, organizing security and access to the system, organizing the accounting, storage, use and destruction of documents and information carriers, organizing explicit and hidden monitoring of users, creating physical obstacles to ways of penetration of violators, etc (Nagar at al., 2016).

Homework:

- interview, if possible, relatives or acquaintances about the real situation related to the topic being studied. Find out if there were cases of loss of information at their workplace, and what caused its loss;
- analyze the existing threats of your own home computer, perform operations to minimize risks;
- prepare a short report on the results of the mini-study and specific proposals for the protection of information.

The achieved results:

- the ability to identify internal and external causes of threats to information security of various types and eliminate the causes of their occurrence;
- awareness of the possibility of real damage if non-compliance with the simplest rules of information security;
- skills to minimize information security risks on a home computer. Understanding that the home computer also contains information, the discrediting of which can lead to financial and temporary losses;
- students who are interested in this topic continue their more in-depth study. The topic becomes the basis for future research and presentations at scientific and practical conferences.

The seminar 2.

Identification, authentication, user authorization. Varying attacks and mutating defenses. Password selection rules. Social engineering. Calculation of entropy and bit space of passwords.

Technology of the lesson

1. Students' reports on the results of a mini-study on the topic of the previous seminar.
2. Presentation of the theoretical part of the topic by the teacher.
3. Analysis of specific examples, ranging from fabulous (“Sesame, open”, to modern ones - the university’s information system, ATM, online store, bank, and identifier, authenticator, owner, authentication mechanism, access control mechanism. Students make and substantiate proposals according to the necessary and sufficient number and types of authenticators in each case (password, smart card, e-token, biometric data).
4. The study of the method of calculating the entropy and bit space of passwords. Determining the strength level of your own passwords used in email and social networks.
5. Familiarization with the psychological aspects and basic patterns of social engineering - methods and techniques of cheating people, which lead to the fact that they themselves provide passwords or other information that helps attackers to violate the security of the system.

6. Conducting a business game, during which students take turns playing the role of attackers trying to acquire the required information on the Internet by sending emails or making phone calls and users of information systems targeted by crackers (Ovsyanitskaya, 2015).

Homework:

– calculation of the entropy and bit space of passwords and justification, based on the received data, the required number and options of characters for various information systems;
– brainstorming: creating your own mnemonic rules for the ability to remember a password that is cryptographically resistant to hacking attempts (active use of the Dotstorming environment is provided);
– the beginning of compiling a questionnaire in Google forms for conducting a large-scale study, which is aimed at identifying the real current situation of literacy in the field of information security, with respect to compliance with information security rules, and compliance with copyright.

The achieved results:

1. Understanding that behind each case of the appearance of a malicious program or spam, there is a financially interested person financing this project. Virus creation and spamming is not an annoying factor, but a well-organized business.
2. Understanding the need to install modern licensed anti-malware software.
3. Skills for performing elementary actions that prevent viruses from entering the computer.

The seminar 3.

Cryptology. Protecting information by converting it. The main directions of using cryptographic methods: the transfer of confidential information through communication channels, the authentication of transmitted messages, the storage of information on media in encrypted form.

Technology of the lesson

1. Students' reports on the results of a mini-study on the topic of the previous seminar.
2. Presentation of the theoretical part of the topic by the teacher.
3. Electronic signature as the main tool for confirmation of authorship and authenticity of electronic documents.
4. The study of encryption algorithms used to organize a secure electronic document management.

The lesson is held in the format of a business game that simulates the process of electronic document management: students create electronic encryption keys, exchange self-encrypted and / or signed electronic messages, work out the behavior patterns of bona fide document participants, imitate the actions of intruders trying to replace the text or authorship of the document and using social engineering methods to access passwords (Mikhnev, Mikhneva and Salnikova, 2018).

Homework:

– substantiate the feasibility, requirements for the functionality and tariff of the certificate of an electronic signature key in certification centers and prepare a short message about the results;
– to continue to compile a questionnaire in Google forms, taking into account the knowledge acquired in the lesson, initiating the emergence of new ideas for the study;
– study independently in preparation for the next seminar materials on malware, viruses, spam and protection methods.

Results Achieved:

1. Understanding the simultaneously existing stability of mathematical algorithms for protecting transmitted information and the possibility of compromising it in case of violation by users of the elementary rules considered in the topic of Workshop 2.

2. Formation of a competent attitude to the generation, use, storage and destruction of electronic signature keys, which excludes the interference of the human factor in information protection algorithms (Dorozhkina, Dorozhkin and Shinkevich, 2019).
3. The ability to choose the best option certificate key electronic signature at the workplace.

Conclusions. The results of the implementation of technology in the educational process

The developed technology of teaching information security based on the actualization of personal experience using modern information software allowed us to consider all the issues studied from the point of view of the student's personal security, based on life situations that students, their friends or relatives encountered in real life.

The result is an awareness of the possibility of real damage if the simplest safety rules are not followed.

Presentation of training materials and knowledge testing was carried out in the usual multimedia formats for students. All pedagogical approaches and methods used correspond to the modern level of development of digital education and the mentality of a modern student.

The teacher got the opportunity to observe the discussion from the side and intervene at the moment when it is necessary to move the discussion into a new direction or, on the contrary, having heard an interesting proposal, not to let him get lost, to continue the conversation in this direction.

Students gained the ability to identify and eliminate the obvious internal and external causes of threats to information security and eliminate the causes of their occurrence; skills to recognize attackers and competent work with an electronic signature. Students realized that behind each case of malware or spam, there is a financially interested person financing this project.

The presented examples of technology for conducting seminars allow teachers of higher educational institutions to scale the experience of authors and implement it in the educational process.

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Modern Ways to Build Good Reputation and High Recruitment. Case Study: Polish Universities

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Abstract

Many researchers around the world have been devoting their attention to marketing education for years, but it is also of interest to specialists in the marketing and public relations industries. As a research area, we chose several dozen of the best promotional and information campaigns created at Polish universities over the years after 2010, proposing both the typology of these campaigns, analyzing their place and role among stakeholders, as well as the scope and impact of the campaigns themselves. Among the most important tools here are social media, and the variety of their applications, the ingenuity of the creators of selected campaigns and spectacular successes in recruitment and image seem to be a sufficient reason to subject this area of university operation to closer analysis.

Keywords: Marketing For Higher Education, Reputation, Recruitment, Promotion Campaign, Media

Introduction

The dominant belief that universities are entities that should finance their activities, as well as other entities present on the market, means that all marketing and image techniques that can provide this state have become everyday management in the university. Sometimes, universities are subsidized by the state to some extent, and the amount of this subsidy is associated with complicated calculations (1), but generally does not exceed - as in the case of higher education in Poland, 50 percent of the total annual costs of doing business, and the final amount depends on many elements, including cost intensity, number of students, scale of scientific research, etc.

The emergence of electronic media, and shortly thereafter social media, has given very wide opportunities to create new forms of promotion for universities around the world. And although the elite universities on individual continents oscillate within the same dozens of universities, the significant advancement of many of them in the global rankings is worth noting. To a large extent, this is due to a very efficient use of electronic tools, but also traditional forms are gaining in importance as a result of increasing professionalization of actions, extensive research into target groups and specialized public relations techniques. For example, more and more attention has been paid to consistency all university materials addressed to the international market when it was discovered that a few small graphic "peculiarities" were enough to prevent the essence of the promotional message from reaching a potential student from another cultural area (Zimnak 2018:129).

Many researchers around the world have devoted their attention to higher education marketing for years (for example, Hayes in the early 1990s and modern Lowrie research); it is also the object of interest for specialists in the marketing and public relations line of business as well as for bloggers gaining mainly practical experience, but also theoretical knowledge.

In highly integrated global economy, in which many companies operate across national borders, the strategy is by nature an international matter. Some theorists ignore the

international arena as irrelevant, uninteresting or too complex, but most theorists, especially those interested in the content of the strategy, recognize the importance of the international context and write extensively about international competition and global strategy (De Wit). It is mentioned here for a reason. Few texts from this part of the university world can be found in international science publications. Therefore, it may be worthwhile to confront observations regarding such a competitive area of economy from time to time. And although Poland records only 16 positions in the first thousand universities in the world, this parameter is growing every year (QS World University Ranking). Is this situation also influenced by modern marketing tools and what is this influence? We will try to answer this question. Several dozen of the best promotional and information campaigns created at Polish universities over the years after 2010 have been chosen as a research area; the typology of these campaigns has been proposed, their place and role among stakeholders as well as the scope and impact have been analyzed. This resource seems worth confronting with similar activities elsewhere in the world.

Since the beginning of the 21st century, universities in Poland have been increasingly investing in staff professionally involved in promotion, image creation, creating relationships with the outside world as well as managing internal communication. These processes are to ensure such a position for a university in the academic world at the international or national level that allows for improvement of the image and reputation in the face of identified threats. The demographic decline is just one of many (Antonowicz, Gorlewski 2011).

This phenomenon is not indifferent to recruitment processes around the world. While some question the value of branding in the higher education sector, in the Canadian community, for example, it has been suggested that the demographic trend in smaller social groups causes higher education institutions to increase their branding activity (Pringle, Fritz 2019:22).

The intense increase in the number of private universities at the turn of the century meant that they began to compete with one another. This is happening not only in Poland. Similar occurrences appear both in post-communist countries and on other continents (Guzman 2019). Shortly thereafter, they also competed with public universities, which in turn was influenced by the second factor - a smaller group of people wanting to study. After 2010, the first symptoms of a reduction in the number of private universities were observed due to their bankruptcy or consolidation into larger organisms, for example, the creation of network universities with many extension divisions. Despite the shrinking number of students, some types of universities are still increasing their enrollment. This category includes, first of all, universities in the largest urban centers, medical colleges and universities subordinate to the Minister of National Defense. The third factor limiting recruitment was Poland's accession to the European Union - it widely opened the door to foreign studies for Polish young people, although it had already been half-open thanks to various international exchange programs (wprost.pl). The abolition of compulsory military service probably also had an impact on the declining number of people interested in studying immediately after graduating from high school - studies ceased to be a place of escape from this controversial social commitment.

As a ubiquitous and democratic source of information from the last decade- social media, has been widely accepted by marketers as a viable marketing tool. This also applies to universities where social media, such as Facebook, Instagram, Twitter and YouTube, prove to be an effective tool to engage potential and current students, graduates and other supporters and donors (Lund). For several years, therefore, several hundred promotional teams in Poland (2) have prepared information and promotional campaigns, managed the university media, created the images of universities, created a message for the internal and external world, and avoided communication crises, including media crises. All these cases are an opportunity to demonstrate creative talent (Lucian et al. 2008, 90). PR begins with good media relations. If the university has something good and interesting to say about itself (new products and achievements), university specialists start to make sure that each professionally written press release is available and widely distributed. Of course, it is not the role of the marketer from the

higher education industry to create graphics, brochures and websites (it is advisable to limit the ambitions in this matter and whenever possible - leaving it to professionals) (van Rooijen 2008, 31).

Tens of thousands of such actions - to examine, measure and analyze - appeared in this period. They constitute an impressive research resource for every management theoretician or one of the management sub-disciplines - public relations (Thieme). Descriptive methodologies seem to be a more accurate research tool for the tasks discussed here. It is also worth trying to approach the topic in a more empirical way. An opportunity for such an approach is given thanks to analyzing applications for competitions for the best image promotion projects, namely science, university, faculty, field of study or researcher. This allows projects to be assessed in terms of impact range, selected technique or thematic area. And the methodology used, placed between empirical research and case analysis, turns out to be the only possible one with such an extensive topic (Babbie).

The main thesis, which the author will try to prove in this text, reads as follows: growing competition among universities has forced management teams to take university marketing as well as professional promotion and information about the university more seriously (Zimnak 2015). Let us also point out the supporting theses as they should accompany the above thesis:

- promotion teams at universities are hiring better prepared specialists, which allows them to create projects with a higher degree of professionalism;
- the phenomenon of digitization that changes all the aspects of our life has significantly increased the level of university promotional projects and strengthened the impact of these projects;
- the widespread use of social media has both increased the level of professionalization of created information and promotion campaigns as well as the field of competition among universities, which has resulted in the increased international recruitment for universities that use these tools most efficiently.

Bulotaite (2003) claims that despite criticism of the value of marketing and branding activities at universities, university names still have the power to evoke associations, emotions and images, suggesting that one of the roles of the university and the marketing department is to build, manage, develop and use these impressions for achieving your own competitive advantage, emphasizing the importance of choosing and passing on strong brand promises to external stakeholders.

Sources and Inspirations

At the turn of the century, only few universities in Poland (including University of Warsaw and University of Gdańsk) had the function of a spokesperson; marketing/promotion/ information offices were nowhere to be found. Today, 4,000-6,000 people work in this business at Polish universities. In this relatively short time, promotional teams had to learn the basic tools and techniques useful in their actions. This knowledge originated from several sources:

(1) Information and promotion departments, spokespersons and their offices have become, at the universities in Western Europe, centers of memory for these educational institutions about themselves. They store data about where, what, who, when and in what form said or wrote about the university. Archiving is their important, but side task. They are primarily a direct and everyday link between the university and the outside world (media, business, administration, and society). Thanks to their competences they know how to manage internal university media and how to neutralize possible media and communication crises. They stand directly by the university authorities, obtaining full information about the current condition of the university to be able to support and protect the university in a

manner adequate to the situation. The qualifications of these departments are respected and needed. And it was them that created the European Universities Public Relations & Information Officers Association (Euprio.com) in 1986 - an association in which people from many European countries exchange experience in the field of university marketing. EUPRIO invited colleagues from Poland to join the group at the beginning of the new century and since then employees of Polish universities have participated in trainings and conferences every year. It is difficult to overestimate the impact of EUPRIO on the community of Polish promotion specialists. It can be said that a certain elitism and fewness of the Polish representation in the European organization (for purely economic reasons these trips are strongly limited) caused the increased interest in solutions from abroad. Fortunately, it turned out that Polish specialists are talented students and today there are no significant differences in the pragmatics of university teams in Poland and abroad. The proof of this is the fact that a project from Poland, submitted by *PRom* Association in 2009 at the conference in Aveiro (Portugal), took the second place in the annual competition for the best promotional project from the university.

(2) When the first promotional teams were set up at universities between 2001and 2005, the line of business employing the discussed tools on the most demanding markets - in broadly understood economy, had already been professionally operating for several years on the Polish market. The social potential released after deep system changes in 1989, created the conditions for the emergence of many new business entities. Especially those of them based on foreign capital efficiently operated public relations tools. These lessons were painful for Polish business. Often, a Polish product lost to a worse foreign one due to poor communication with the surrounding world, poor advertising campaigns, and just any information folders. The differences were blurred quickly due to the active appearance of public relations agencies offering business assistance, thanks to the migration of specialists from these agencies to full-time jobs at companies, etc. The multitude of competitions organized by business media or chambers of commerce caused that some of the campaigns were widely known and discussed, creating a natural role model. University specialists just had to select good ideas and adapt them to the university reality.

(3) The digital revolution turned out - from the perspective of the author of this article in 2019/20 - probably the most serious inspiration. At the turn of the century, many universities already had websites, although many of them gave the user a headache. Communication via email was also struggling. Its more widespread use began between 2003 and 2005. Marketing departments were - for natural reasons - the forefront of new communication channels at those universities where there was excessive respect for traditional forms of communication. The first promotional and information campaigns were created using websites, the first newsletters addressed to the internal or external environment were created (3). However, it was only the emergence of social media after 2010 that gave campaigns organized at universities a completely new pace. The range, multimedia of the message and the change of the communication model - the possibility of instant contact between the sender of the message and its recipient - created the possibility of a different qualitative impact on the surroundings that had never been seen before. As we will see, many universities have managed to use these opportunities, sometimes in a model way.

Comparing more offers in order to choose the best one has its history in most civilizations and does not require special empirical research. The present day has shaped their form mainly in the fields associated with the concepts of “public tenders”, “design competitions”, “auctions”. They have the nature of a public promise - the organizer undertakes to hand over a specific prize for an act or work if they meet certain conditions (4).
However, the competitions for which entries are to be analyzed in this text, have a slightly different character. The appearance of this formula is the result of intensive development of public relations techniques in Poland, starting from the middle of the 1990s. The game is

about image, and the Polish Business Club as one of the organizers of this type of competition, awarding special medals to winners, explains the essence of the competition: "In business, the company's results, market position and reputation, successes in exports, possession of quality marks and certificates, etc. are assessed, while in other areas - creative achievements, social recognition and prestige, prizes and awards received, and promotion of European values." (5). This form of competition is therefore fundamentally different from offer-type competitions. The evaluation does not include the offer, at the end of which there is an option of implementation and - as a consequence - remuneration. There is no offer or project here, there is no remuneration in this sense. As a project, we submit existing achievements in the form of business results, role on the market, in a specific environment, the results of social, charitable educational and artistic actions. We subject them to public assessment. If the organizer of such a competition skillfully compares achievements sometimes difficult to compare, if they create reasonable regulations and the results can be publicized in social groups interested in the subject of the competition – there should be no shortages of those willing to participate.

In this text we are not to refer to image competitions in various other economic or social disciplines. We are interested in competitions for projects in the area of marketing and public relations implemented by universities in Poland. And although there are many such competitions in the discussed area in the country and in Europe (6), there are only two such events within the academic community in Poland. Both appeared on the stage of the universities' efforts to improve the image and to promote at a similar time - just after 2010. In Genius Universitatis competition, organized by Prospects Educational Foundation (*Perspektywy*), the submitted projects that "use the magic of the place in a creative way to promote their university" (7) are awarded. The competition focuses on employing marketing tools for recruitment purposes in several categories such as:

- press advertising,
- recruitment supporting event,
- social media campaign or
- online video.

However, it is the second competition that is used as research material in this article – *proMYKi* (8) – organized by *PRom* Association of PR and Promotion of Polish Universities (9). It aroused our interest for several reasons, but the most important is the fact that the submitted projects of colleagues - members of the Association - are evaluated by other colleagues - the winners of the editions from previous years - and by people from the board of the Association, i.e. colleagues from various universities performing their term functions. In the first five years, the jury of *proMYKi* was additionally supported by the Polish public relations senior Piotr Czarnowski and the organizer of Protons (*Protony*) competition (a known competition for Polish PR agencies) - Kinga Kubiak (10). This mode of appointment of the jury has two important advantages:

- the best projects are selected by people who are able to assess their value from the side of implementation in university conditions, which is decisive for the objectivity of assessment,
- no less important is the fact that the awarded projects are announced publicly to the entire community at the Association's annual summer conference, giving a sense of well-deserved pride in the group of "equals".

They are also an undoubted inspiration for other universities, which have missed honors in a given year.

Projects Categories – Methodological Challenge

The organizers of *proMYKi*, when creating the first version of the competition regulations, anticipated the upcoming difficulties related to heterogeneity (both thematic and scope), the scale of the project, the size of the university and many other factors.

That is why, two fairly broad competition categories were adopted, allowing for free assignment of each submitted project to one of them. These were:

- science promotion,
- university promotion.

Despite such a cautious approach, reality turned out to be even more complex. There were projects promoting the academic center or region:

- University of Szczecin,
- University of Economics in Katowice,
- Janusz Korczak Pedagogical University in Warsaw.

The essence of projects from:

- Gdańsk University of Technology and another project from
- University of Economics in Katowice

was promotion of the new media. Warsaw University of Technology dedicated its project to girls, and University of Silesia and Adam Mickiewicz University in Poznań presented important social campaigns. Anniversary and jubilee projects of Cracow University of Economics and Łodz University of Technology turned out to be a separate category. Should the fact that the first of these universities collected over PLN 400,000 from sponsors be assessed higher, or the fact that the second one presented striking possibilities related to one ordered faculty (bankier.pl)? And other universities subtly included concepts from the field of ecology (not ecology studies, but pro-ecological behaviors) to promote science or universities.

Not everyone took advantage of the opportunities created by the application form, for example, presenting measurable effects mixed with irrational ones or in the category "measurable" by writing "numerous press releases". In this situation, the applications that already assumed the evaluation were especially appreciated. However, it is worth remembering that evaluation alone does not make a project more valuable than other, it only allows you to measure the results. Considering the promises of a given brand in prepared and implemented campaigns, it turned out that future students take into consideration the following issues:

- attitude to student diversity (gender, race, religion),
- location of the institution,
- employability of graduates,
- image and its "atmosphere" (Ali- Choudhury, R., Bennett, R., & Savani, S.)

and this finding was broadly confirmed in the projects that are the research resource in this article.

Further methodological dilemmas appeared in subsequent editions. In smaller academic centers, the only university functioning there often performs not necessarily strictly scientific but also culture-creating and integration functions towards the city. Should this disqualify projects presented by them, and if not - how to evaluate such projects, since universities from large academic centers do not have such obligations? Can and should a project in which all the scientific and organizational potential of a great university is involved, supported by the actions of a promotion office compete with projects endorsed solely by the activity and ingenuity of individual people who created a work with strong promotional values basically on their own? Such examples were provided, for example, by the edition of *proMYKi* competition in 2013, when two projects from Wrocław University of Economics were small original projects; these were:

- a serial video blog on the dedicated YouTube channel showing the life of a couple of first-year students in a dorm, and
- a book with extensive indexes about the university - its history, characters, events, architecture, and development perspectives.

Although successful, they had no chance to compete with projects with a much larger scale. The introduction of the so-called independent projects category the following year was unsuccessful because in the subsequent years no such project appeared anymore - teamwork dominated. Perhaps this would be the field to organize a separately promoted competition for individualists.

As the years went by, more and more projects carried out solely using social media were submitted to the competition. The university teams working on them showed far-reaching ingenuity and included - in addition to Facebook - Twitter, Snapchat or Instagram into their actions, gaining significant audience share and positive reactions among young people - potential students. Blogospheres grouping thematically the creation of people associated with universities started to appear, many universities created their channels on YouTube and are still placing current promotional and information activity there. In this situation, the jury of the competition decided that a new category related to the use of the new media should be created. In the case of *proMYKi*, the category was called Andrzej Sołtysiak Award – to commemorate a prematurely deceased administrator of *PRom* Association website, a promoter of all the technical solutions enabling universities to optimize their actions on the Internet.

Projects and Implementations – An Attempt at Typology

During the analysis of the resource of projects submitted to *proMYKi* available to the author between 2011 and 2016, intersecting categories often appeared, which also cause some methodological cognitive anxiety. Their presentation below is the result of what reality, not the regulations of the competition organizers, brought. Assuming, however, that the methodology of the competitions is not the subject of this text, let us present the categories that have emerged as a result of this analysis.

1. *Communicating science* **-** universities submitting such projects assumed that a fragment of some scientific reality presented in an attractive way has such a strong promotional potential that the presenting entity gains the opinion of an expert and a university where it is worth studying. Of a dozen analyzed, three projects submitted in 2013 and 2014 by the Faculty of Materials Science and Engineering (*WIM*) of Warsaw University of Technology (inmat.pw.edu.pl) deserve special attention:

- As part of the first of them, invited children from Warsaw primary and secondary schools met "Tu*WIM* Engineer" (11), watched Warsaw University of Technology Theater performances, searched for the relationship of the subject with art, music and film. Fairytale characters inspired by Tuwim's poetry brought them closer to the issues of materials engineering. Tommy the locomotive talked about the history of trains and modern rail vehicles, and Paddington Bear about the weather and biomimetics. Children learned why polar bear and penguin inspired contemporary designers, then tested samples of outdoor materials from Wolf Gang company. Brainy Smurf in "Glasses" talked about "repairing" a man and bioimplants, and Floppy Bear - in the episode called "Bird Radio", about acoustic and sound emission. The employees of the Institute of Physiology and Pathology of Hearing presented an ear model, talked about hearing implants and showed how a piece by Antonio Vivaldi changes when we hear only low or high sounds.

- The second project – "Bio-*WIM*", involved the dissemination of knowledge about bioengineering and building the faculty brand as an expert. Desiring to reach various social groups, the authors used the press, television, radio, theater and the Internet. Contact with children was made using a simple language, for example, definitions such as "bioimplant is something you put on when something breaks down in your bones" were presented. The fables about pirates and the Flower Eater Dragon were written, an art contest and stylization of Richard the skeleton were organized. Older children were told about bioengineering during a picnic and a science festival, a bio-conference for high school graduates and an implant knowledge competition for students were held, and young women were encouraged to study

bioengineering at the faculty ("Girls to Universities of Technology"). Lifestyle magazines inspired the authors to prepare a lecture entitled "Medical Haute Couture", during which bio-implants were compared to nineteenth-century costumes created by the first tailors.

- Finally, the third project from the same authors, the inspiration of which were the International Year of Crystallography and the idea to show the great importance of this science for the development of materials engineering. Katarzyna Kołys, the creator of the aforementioned projects, also prepared this one, and it was aimed at making children and young people aware that crystallography enabled them to acquire knowledge about DNA structures, create proteins in cells, design modern materials, and develop electronics. The uniqueness of "BaWIMy się kryształami/ We play with crystals" project was based on a combination of chemical and physical aspects with art and design. The author created the project in cooperation with Maria Skłodowska-Curie Museum, the Polish Chemical Society, scientific journalists, an art restorer and designers. Interdisciplinarity definitely increased the interest of recipients in materials science, physics, chemistry, art, upcycling, and design. At the same time, the campaign promoted Professor Czochralski, called "the father of materials science", and his methods famous in science (janczochralski.com).

It should be mentioned that all the faculty projects from Warsaw University of Technology were implemented on many communication platforms:

- meetings,
- discussions,
- lectures,
- articles on the university website, and
- publications in traditional media)

and gained a significant number of recipients. No other faculty from Polish universities submitted such a competitive achievement - although it cannot be ruled out that they implemented various other projects within the university, but did not submit them to any of the competitions.

In this category, the author's attention was also drawn to two initiatives endorsed by University of Gdańsk:

The Year of Mathematics appeared in the 2015 edition of the competition. The assumption of the project was to present the importance of mathematics as approachable and accessible to everyone, helpful in self-development, necessary in the development of the region, and encouraging to study exact sciences. Actions planned as part of the Year of Mathematics at University of Gdańsk were targeted at children, students at all the levels of education, teachers and residents of Pomerania, regardless of age. A multitude of initiatives, specific results measured by the number of participants, events, competitions and volunteers earned the university a well-deserved prize in the competition.

- "The Brains Day" submitted in 2016 – a recurring event, organized and endorsed by University of Gdańsk since 2011, was equally appreciated by the jury. Thanks to skillful promotion, lectures, workshops and laboratory shows addressed to all that allow to deepen knowledge about the structure and functioning of the brain as well as to get to know the work of neuroscientists, neurosurgeons and psychologists, every year are of great interest to the city and region communities.

2*) Event for city and region* (12) – in this category, interesting proposals appear every year, indicating that universities understand their role in urban organisms much more widely than it would appear from the status of the university as a teaching unit or a research institution. The awareness that the university's logo can be used to mark an event that would not otherwise reach the local community is in such cases also supported by a specific image calculation - if a given university can create such an interesting and popular event, it is probably good and it is

worth beginning studies there. Such a message, reaching both young people and parents, can bring measurable recruitment results.

In this category, therefore, we include the project of University of Lower Silesia called "Promotion and education through culture" awarded in the first edition of the competition (2011). A series of lectures organized as part of it in Wrocław's Multikino, their attractive titles and interesting content attracted a large number of participants. We can also find here a project from a small town of Piła (73,000 inhabitants) awarded in 2012, and submitted by the local PWSZ (State Higher Vocational School), which is the initiator and sole organizer of science festivals in Piła. This largest public university in northern Greater Poland Voivodship has taken over the culture-forming and city-forming role as well as the mission of expanding the perspectives of the local community, whose needs (due to remoteness from large urban centers, post-collectivist traditions and - as a consequence - material deficiencies) have been marginalized so far. The event called "The Propaganda of Success – The Success of Propaganda" organized with a grain of salt, during which interesting guests also appeared, for example, Jan Miodek (tmjp.pl) or Michał Ogórek (pl.wikiquote.org), attracted crowds from Piła and from surrounding villages and towns.

In 2013, Opole University of Technology submitted two similar projects, this time addressed to the region, namely:

- "It railway's turn for orchestra, that is Opole wind express train" and
- "With the orchestra down the Odra River".

The assumption and expected result of the organizers of this artistic event with the participation of the university orchestra was to create the image of an open university that is not only focused on technical education as well as promotion through culture and art and, at the same time, supporting the recruitment process. In the same year another project appeared: a large university - University of Łodz - took on information obligations towards the city's inhabitants by launching and running the city's Cultural Portal. Two years later (2015) Koźminski University, which at that time overtook its competitors in public rankings of economic public universities, submitted a project well illustrating the methodological dilemmas of the competition organizers. YouTuber Sailing Championships of Poland were organized. It is hard to say what the event was. Promotion of the new media? Of the university itself? Because, after all, not of science that was not discussed during the competition. And yet the event should be assessed as a great success in terms of image, taking into account the number of entries, statements, links on social media, etc. Probably never before was there so much talked about one university on social media in Poland in such a short time. The organizers emphasized in particular that the tone of all the comments was friendly, properly deprived of hate that characterize Polish part of Internet. Within public relations actions at YouTuber Sailing Championships of Poland:

- 57 press publications,
- 32 video materials on YouTube,
- 95 mentions on Instagram and
- 80 Facebook posts with a total coverage of 17,935,186 impressions were generated.

3) *University recruitment campaigns* – in this category, universities have undertaken and continue to take on the greatest challenges. Generally, it is the senates of universities that decide to launch a campaign, and their hopes are directly linked to the results of recruitment, on which the existence of the university depends a lot, namely the number of student groups, the number of hours of classes, demands placed on the workers and filling the teaching load, the amount of budget subsidy, etc.

This kind of activity of specialists from university promotion offices requires careful preparation, considerable budget and reasonable deadline planning. As a rule, it turns out that there are too few people, too little money and too much work and too many expectations of

superiors. Achieving the set goals is uncommon, but it brings the implementers a lot of satisfaction.

In this category, it is worth taking a closer look at two campaigns that brought the expected results to the organizers and were also appreciated by the jurors of *proMYKi*.

- In 2013, University of Wrocław submitted its campaign called "Good to Know"(13). This promotional campaign was aimed at the candidates for undergraduate and graduate full-time studies, and its concept assumed a change in view on studying. It was assumed that this is a period in life that builds identity, develops competences, encourages consistent lifelong learning, that studying is the sum of the most important experiences, the best moment to make friends, a way to search for your place in the world. Furthermore, it was assumed that studies no longer give a restricted set of knowledge; studying is creating a specific attitude, lifestyle, and not "learning a profession" (so there are no references to various artifacts symbolizing specific types of study). It has been noticed that studies are diverse, as are study motivations and lifestyles. These assumptions were the basis for building a new line of advertising materials that show *studying as a lifestyle*. The production of these materials took place at the university with the participation of students. The Internet became the basic communication channel, also the versions for mobile devices (web versions of newspapers, professional websites, social media, video services, media packages of web publishers) were included; in addition, the press, outdoor advertising (murals, citylights), cinema and festival screenings were employed. Media purchases were made both directly and through agencies. As measurable results of the campaign, the organizers mentioned the following: halting the downward trend in the number of full-time students compared to previous years:

  - over 380,000 entries to the recruitment website of University of Wrocław,
  - over 13,000,000 views of various advertising forms prepared in the campaign,
  - over 23,000 views of "Good to Know" video on Vimeo.
- Two years later, the competition jury received an application from AGH University of Science and Technology. The title of the application was "#AGH - comprehensive social media actions promoting the university and science"(14). The organizers presented not only the impressive ranges of their presence on Facebook (40,000 fans), Instagram (2,100 followers), Twitter (1,800 followers) and YouTube (over 1,000 subscribers). Let's list just a few of the lots of promotional campaigns that resulted in a high turnout on the university's social media:

- launching the fastest supercomputer in the history of Poland;
- creating a place for discussion, exchange of opinions and comments (for example, 85 user comments on how to use space on the university campus);
- unusual, entertaining undertakings, for example, Miss of the Internet users and runner-up Miss Poland Paulina Maślanka (surname translated as *buttermilk*) visiting the Rector of AGH prof. Tadeusz Słomka (surname translated as *straw*) sipped buttermilk through a straw;
- playful and humorous posts, for example, "Jagiellonian University thinks that AGH is the first three letters of the alphabet";
- "I study" »at« or »on« AGH?" Or maybe on »AGieHu«? How to say that?" - Jan Miodek was asked to resolve this very emotional issue, and the video on YouTube channel had over 17,500,000 views;
- photos of the rectors of AGH during spring break;
- current events, sports achievements, students successes.

As a kind of subcategory, let us point out to the type of projects in which the university informs the surrounding world about a significant change in its way of functioning, which has a significant impact on its image. Such projects include the Press Center created for the needs of the media by SWPS University of Social Sciences and Humanities in 2011 (15), the new logotype book of Poznań School of Logistics or the successful project of merging two vocational universities - from Polkowice and Lubin - into one organism called Jan Wyżykowski University and their image-related activities. These projects required their

creators to use specialized sociological tools to check their ideas in a series of tests, try out the results on a selected group of stakeholders: what they think when they hear the proposed advertising slogan. Do their associations match the will of the creators? Especially for large enterprises, these preparatory works are of great importance (Marcos 2003, 9).

4) *New media* – is a category of projects showing forms of university promotion that would not have been possible without these media. Lund's study provides evidence of a link between popularity and interaction with the best university's Facebook fanpages and the attributes of these universities. As social media continue to evolve and serve as a source of marketing information, the prospect of identifying these relationships to increase the impact of university marketing campaigns is extremely important. Specific solutions can give universities a competitive advantage. Although Lund's study has not reached this level, it has presented preliminary findings that may be an interesting getaway in the future for more focused research (Lund, 14).

- Already in the first edition of the competition in 2011, Gdansk University of Technology submitted the blogosphere of scientists of one of the faculties,
- We have already mentioned the video blog presenting recurring episodes from the life of a couple of students of Wrocław University of Economics,
- Wrocław University of Environmental and Life Sciences submitted the film series – *Passions*, posted on the university's YouTube channel - scientific mini-biographies of a group of young scientists performing unusual professions,
- Warsaw University of Technology created a profile on Facebook, where candidates for studies could ask various, often even quite intimate questions to those already studying, with guaranteed response. This University of Technology also successfully included the Snapchat service in the promotion of the undergraduate studies.
-

In the opinion of the author of these words, the most successful "new media" project in the assessed resource was, however, the blogosphere submitted in 2015 by Koźminski University (Warsaw), containing blogs of foreigners - university students, addressed to their colleagues - other foreigners. They described their lives in Poland, their studies, new friendships, etc. The creators of the "Students in Warsaw" project assumed that young people do not trust the messages created by the institutions. They trust more Internet users, reference groups, and people similar to them. Simultaneously to the blogging platform, the authors of the project created the New Media Club - an English-language scientific club, in which participants got various incentives to engage in editing the blog - specialized photography workshops, video editing workshops, meetings with bloggers, etc. Recruitment for people involved in the project was conducted among the New Media Club participants, appropriate functions were also assigned, namely the editor-in-chief, a text editor, etc. Thanks to this, it was possible to select really engaged and willing to cooperate people, and to maintain a high level of motivation through monthly workshops and informal meetings. In addition, leaving students a large influence on the shape and development of the project meant that they began to identify strongly with it and naturally became its ambassadors.

- Thirty-six bloggers from the USA, Germany, Belarus and Ukraine,
- nearly 800 subscribers,
- first place in the browser when entering "students Warsaw"

- these are measurable results of the campaign(16). We can wish similar results many official actions supporting the internationalization of studying in Poland.

5) *Conventional media* – using traditional communication tools, universities inform about themselves, sometimes creating very successful projects.

- University of Warsaw prepared a calendar for 2013 - the roles of twelve monthly stars were played by mathematical equations.

- Two years later, Adam Mickiewicz University in Poznań published a series of volumes which were the first in Poland to promote science and the university, presenting memories of students, lecturers and studying.
- The academic yard is a metaphor of the subjective side of the university - people, personalities, emotions, values, and attitudes. The creators of the project decided to popularize unusual personalities, previously unknown to the wider audience. The volumes talk about serious issues of academic education in a light and friendly manner.
- State Higher Vocational School from Legnica submitted a CD with jazz recordings from the university club,
- Warsaw University of Technology prepared a series of articles about the greatest Polish innovators in exact sciences,
- Wrocław University of Environmental and Life Sciences presented a new concept of the monthly magazine which has been a university periodical for years.

- 6) *Other* – a few more categories appeared, represented by a few (sometimes two) submitted projects, so we are obliged to mention them. Sometimes these projects were very interesting. As for projects addressed to girls, Warsaw University of Technology showed probably the largest activity in the country,
- Children's books, in a graphically beautiful and linguistically clear way promoting science, were presented in the competition in various years by Nicolaus Copernicus University, Cracow University of Economics and AGH University of Science and Technology.
- There were projects addressed to a Ukrainian recipient,
- medical volunteering for Africa prepared as a comprehensive project by Collegium Medicum UMK from Bydgoszcz,
- Exemplary cooperation with business was presented in projects of Cracow University of Economics, Poznań School of Logistics and Warsaw University of Life Sciences - SGGW, which made an interesting promotional tool out of its internship program.
- And finally, projects related to the university jubilees - from the 650th anniversary of Cracow's Alma Mater to the 20th anniversary of University of Lower Silesia. The project of SGGW, which celebrated its 200th anniversary in 2016, could impress with the momentum, scope, financial resources, variety of actions and events (Kocoń 2009:498).

The jury of *proMYKi* could see that the seemingly unattractive anniversary celebration can be turned into a well-oiled mechanism for creating the image of the university.

Limitations of the Study

The use of modern forms of promotion and caring for the image of the university dates back only twenty years in Polish reality. Therefore, there is no important business continuity in this area that allows both to gather experience and make significant strategic adjustments. Almost every action is new and intuitive.

The adopted research methodology, located between empirical research and case analysis, has its limitations resulting from the different characteristics of the analyzed entities. Whether - from the point of view of marketing success - a few thousand visits to the social media profile of a small university in a city of 100,000 residents should be assessed higher than several thousand visits to a large university profile (over 20,000 students) from the capital of the country? And the variables may in this case also apply to the topic of information, how it is displayed, the author's reputation, date of publication, and how this supports the changes in the relative importance given by prospective students to three institutional attributes – course content, location and reputation (Moogan 181)?

Can a project in which all the scientific and organizational potential of a great university is involved, supported by the activities of a promotion office, and should it compete with

projects branded solely by the activity and ingenuity of individuals who have created a work with strong promotional values in principle alone?

How to compare the value of the university dissemination campaign among high school students in the city with the promotion of knowledge through open lectures of authorities invited by the university for all those interested in the city?

The need to indicate the winner in subsequent editions of the competition determined the jury and their decisions. One should hope that they made the right choices - as experienced practitioners, but we are aware that as a research category this approach may raise some doubts.

The student's general satisfaction with his or her educational experience has most often been measured by a simple yes or no question or by one question assessing overall satisfaction. (Elliott&Shin). Although this type of question can be easily answered and analyzed, students may not think about their previous responses to the questionnaire on satisfaction with individual educational attributes when asked to assess their overall university satisfaction based on one question.

Discussion

University leaders, that is university rectors and senates, when deciding on public actions such as higher education and research, make decisions with publicly felt effects, so it is right to expect that they will be accurate and purposeful, and the organization will demonstrate efficiency (Kieżun 1994:18-28). The basic conditions for this efficiency include completeness, reliability and speed of information. They require staff who can add these assets to the information process. What is more, if the university wants its projects to be circulated publicly to be considered fresh, innovative and dynamic, then you probably need to reach for lively and contemporary design and youthful language (Ries, Ries 2003, 31).

Promoting academic education comprises primarily routine activities - a complementary set of actions:

- maintaining media relations,
- traditional and digital publishing,
- organizing events around the university,
- lobbying,
- image advertising.

However, there is a narrow margin for non-standard actions, for creating your own narrative, message. If a university is able to stimulate dreams, create a vision of the future, trigger potential student's interest to study there - it probably meets the most important requirements on a competitive market. Consequently, those institutions unkown to the students will simple be disregarded or ignored (Moogan 180). Ewa Hope claims that "the 21st century will certainly be the age of the Internet and public relations, just as the 20th century was the age of television and advertising" (Hope 2010: 75). Conclusions must be drawn. As it results from the review of promotional and information actions at universities after 2010, Polish universities have drawn these conclusions. Today it can be said - and proven in many ways - that universities compete for their image (Iwankiewicz-Rak 2004:53) at the regional, national or even international level. It means the necessity to strive for full professionalization of:

- actions,
- selection of appropriate staff,
- application of recognized and effective techniques –

and in many cases it works. Balancing supply and demand is a real challenge. You must be extremely active in dialogue with the international market (Belch, Belch 1995, 10).

For a significant number of large, prestigious universities, matters of image, good press, visibility in spaces important for the place and line of business are unambiguous to impact on the expected level of recruitment. At the same time, awareness emerged that it could not succeed without a qualified team of specialists. The rest of these positive phenomena were forced by the market (Buszman-Witańska 2011:223), which many researchers predicted. The planned and sustained attempt to establish contacts showing good will eventually led to mutual understanding between the organization and the groups surrounding it (Kotler 2004, 6).

Every successful campaign on social media of a university is closely watched by others; promotional teams are maturing and raising qualifications at courses, conferences and training sessions, but above all, in everyday work that involves ever greater challenges. A significant part of these positive comments also applies to smaller and private universities, but their situation is definitely more difficult for reasons beyond their control. However, the game is about brand recognition in the surrounding world. A number of other non-academic factors, such as the student's feeling of 'belonging' and perceptions of the institution's responsiveness and concern, also contribute significantly to overall satisfaction (Gibson). Communication effects are relatively permanent mental associations, connected with the brand, in the mind of potential buyers. They are necessary to position the brand as inspiration for the expected action. Universities are trying to cause specific communication effects and, as a tool, choose any form of marketing communication - advertising, events similar to ads, promotional offers and personal sales presentations. These effects are the need for categories, brand awareness, brand attitude, intention to buy the brand and - finally - to facilitate the purchase (Rossiter, 1997:109), and thus - effective recruitment.

Future Directions of The Research

There are many studies analyzing the reasons for the satisfaction or dissatisfaction of students with their higher educational experience (e.g. Helgesen 2008, Douglas, Douglas, McClelland, Davies 2014, Elliot, Shen 2010, Gibson 2010). However, it is difficult to find an article analyzing the main attributes of the educational program plus various aspects of student life, which are most often significant predictors of student satisfaction. Academic factors: the curriculum, its quality and acquired knowledge and skills are the most important determinants of overall satisfaction, but they do not take into account non-academic factors such as the student's sense of belonging and perception of the institution's reaction and care. They contribute significantly to overall satisfaction. It seems that relevant research will appear in this area. No major university can afford noticeable imperfections in teaching or research. However, non-university factors also contribute to student satisfaction. A high level of satisfaction with life on campus, with the quantity and quality of cultural or sporting events in the immediate vicinity may become an important argument in the information and promotion campaigns of universities in the coming time.

According to the basic assumptions of Customer Relations Management, deeply settled in business, maintaining and developing cooperation with clients are of equal or maybe even more important to a business unit than acquiring clients. Due to the growing global competition between institutions offering higher education, ideas from CRM should be very interesting for university managers and marketers. The CRM approach means that great importance is attached to creating such values for students that determine their satisfaction, reputation and loyalty. To this end, various student surveys should be conducted and the collected data carefully analyzed so that managers and marketers can gain insight into processes and activities that will improve university-student relationships. Marketers need to know what creates value for students so that they can create relevant marketing campaigns. Managers must know which processes provide students with value to ensure their quality. (Helgesen 78).

A separate category of future research in a topic that interests us will be the measurement of those phenomena in which the change caused by the passage of time will have a significant impact on the tools of both creating the image of the university and recruitment tools. The theoretical foundations of the importance of the passage of time in educational processes have already been pointed out many times (eg Robertson 2017, Adam 1995) Both increasingly advanced IT techniques, big data and the use of artificial intelligence should be carefully observed in this area, as the quantity professions, where artificial intelligence has more to say, is constantly growing. (Frey 2013).

The communication crisis triggered at the university by activity in social media is a separate topic for broader research. Although their subject is very well recognized and described by public relations researchers, there is very little material regarding such situations at universities. It seems that as the social media's importance to university life differs, this type of research will become an important part of college marketing.

Footnotes

(1) Regulation of the Minister of Science and Higher Education of February 2012 on the rules for the distribution of subsidies from the state budget for public and private universities: http://www.bip.nauka.gov.pl/

(2) Between 2006 and 2010, there were about 460 public and private universities in Poland. As a result of several processes, the most important factor of which seems to be the demographic decline, by 2018 this number decreased - according to data from POLON system to 350 (95 of them are public universities).

(3) eBIP – a newsletter of Wrocław University of Technology issued in electronic form and addressed to all the university employees - premiered in June 2003. Issue No. 1050 appeared in June 2018. See http://ebip.pwr.edu.pl/index. php? edition = 1049 (access date: 17th May, 2018).

(4) cf. Civil Code, Articles 919–921.

(5) http://pkb.org.pl/medale-aps/ (access date: 10th May, 2018).

(6) In Poland, there are Golden Clips (*Złote Spinacze*), Protons and many competitions related to advertising, in which often a very strong relationship with public relations can be seen. Among European competitions such as the IPRA's Golden World Awards for Excellence or the PR Daily's Nonprofit PR Awards can be mentioned.

(7) http://www.perspektywy.pl/genius/ (access date: 24th Apr, 2018).

(8) On the one hand, the idea was to refer to the name of the Association, on the other - an indication of the element of "PR" and the word "*MYK*" meaning someone made a wise purposeful move. See https://www.miejski.pl/slowo-Myk (access date: 10th May, 2018). The word has interesting connotations related to the popularization of higher education.

(9) All discussed and categorized campaigns in this text can be found in the official competition results, available at the link http://www.prom.edu.pl/pl/laureaci-minionych-edycji (access date: 21th May, 2019).

(10) The author of this article had the undoubted privilege and honor to be the president of this jury between 2011 and 2016

(11) Quibble - Julian Tuwim was an outstanding Polish poet (1894-1953), creating, among others, for children.

(12) The use of English in this case is justified by the widespread recognition of a new phenomenon in our reality, i.e. event marketing, defined as a marketing communication tool for companies based on direct contact with the company's brand. See http://forumbranzyeventowej.pl/ (access date: 14th Mar, 2018) and others.

(13) Data based on Press Service monitoring - according to the competition entry ALK, May 2015.

(14) See https://www.facebook.com/Juwenalia.AGH/ (access date: 19th May, 2018).

(15) See https://www.swps.pl/centrum-prasowe/ (access date: 15th May, 2018).

(16) cf. http://www.studentsinwarsaw.com/ (access date: 17th May, 2018).

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Determinants of Market Concentration: Case of the Manufacturing Sector in the USA

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Abstract

The level of market concentration varies between industries. According to the findings of many authors, the level of market concentration is affected by many determinants. The previous empirical studies have tried to detect the determinants that have a crucial impact on the level of concentration. The findings of empirical researches are not particularly matched, and in some cases are even contradictory. We think that differences in findings result from methodological differences, and the difference of the data sets, which were analyzed. In this paper our attempt was, based on correlation and regression analysis, to detect the dominant determinants of market concentration. We used the data for US manufacturing industry.

Keywords: concentration ratio, Herfindahl-Hirschmann index, determinants of market concentration, manufacturing industries

Introduction

Market or industrial concentration varies in a very wide range, from very low levels in some industries to very high levels in other industries. Due to such differences, it is logical to ask why one industry is characterized by low and some other by high level of market concentration. After numerous studies, however, the findings are still different and even contradictory. These differences are partly due to the use of different analytical procedures and partly stem from differences in the data that were analyzed. We believe that the US manufacturing industry, given the size of the industry and high-quality statistical base, is a good base for exploring the determinants of industrial or market concentration.

Starting from the fact that between a concentration of the market, on the one hand, and variables such as size of the network, capital requirements, economies of scale, expenditure on research and development, advertising and many other variables, on the other hand, could be a connection, this paper presents the results of researches. This study was conducted on an example of the American manufacturing industry. The required data were taken from the US Census, and the analyzed years were 1997, 2002 and 2007. In order to visualize the observed problem as fully as possible, as indicators of market concentration we used the concentration ratio (CR) of four, eight, twenty and fifty largest companies in each industry and the Herfindahl-Hirschman Index (HHI) for fifty largest companies in each industry.

A special feature of this research consists in the fact that the connection between the observed variables was analyzed at all levels of aggregation of the data. Specifically, the analysis was performed at the level of aggregation that the NAICS code displays with three, four, five and six digits.

The Determinants of Market Concentration

Theoretical explanation of the determinants of market concentration

Many authors have analyzed the question what determines or influences the level of market concentration. This interest of scientists is motivated by the belief, largely supported by the results of empirical research, that there is a positive correlation between the level of concentration and market power, especially profit as the most direct expression of market power. In this sense, scientists have tried to identify and explain which variables determine the level of concentration. There are numerous variables on their lists, as well as explanations of their effect on concentration.

Among a number of variables that are connected to market concentration, some variables were especially interesting, such as market size, economies of scale, initial capital, advertising intensity, R&D expenditures, quality of competition, mergers and acquisitions, technological changes, private sector entry into the public sector and foreign direct investment.

Market size is one of the most commonly mentioned determinants of market concentration. This variable is considered to be negatively correlated with concentration. This view is based on the fact that a larger number of companies can always exist in a larger market than in a smaller market. In each market or industry, there is an optimal size of the plant, that is, a capacity size that minimizes the cost of production. At the optimal size, an increasing number of companies will exist on the market, when the demand curve is more distant from the origin. This variable is exogenously given.

Economies of scale is also often highlighted as important, in some cases even the most important determinant of concentration. The meaning of economies of scale derives from the behavior of the average cost curve with changes in output. There are three types of average cost behavior with changes in production volume.

One type is represented by an L-shaped curve, which means that at lower output levels, with increasing output, the average cost drops sharply, and then maintains the attained level with increasing output. In such industries, small businesses and small capacity plants can survive, resulting in low levels of concentration. The second type is characterized by a steadily declining average cost curve, so after a certain level of output, there is often only one company left in the industry. The third type of the average cost curve, which is also the most common in practice, is a U-shaped curve, that is, at lower output levels the average cost decreases with increasing output and increases at higher outputs. At a certain level of output, the curve reaches its minimum value. This means that in equal markets, greater concentration will be in that market where the average cost curve reaches a minimum value at a higher level of output. Similar to the previous one, this variable is exogenous.

The required initial capital, that is, the capital needed to build the capacity of the optimal size, can be a significant determinant of concentration. Industries that need large capital to build optimal size capacities are typically smaller in number of investors than industries where investors can more easily solve this problem. Examples of such differences are the cement or automobile industries, on the one hand, and the bakery industry or the hospitality industry, on the other. This variable, which is otherwise exogenously given, acts as an entry barrier, that is, it makes it difficult to enter those industries that require higher initial capital. In other words, the required initial capital and concentration are positively correlated variables.

Advertising intensity is also considered a determinant of concentration. However, unlike the previous variables, the impact of advertising intensity is not so simple or uniform. Different authors see the impact of advertising on concentration in different ways. Some see the intensity of advertising as a variable that is positively correlated with concentration, others are of the opinion that the intensity of advertising may increase until the concentration reaches a certain level, and thereafter the expenditure on advertising decreases as it does not lead to further growth of the concentration.[i] The third group of authors associate advertising intensity with product differentiation, holding that those companies that are more successful in product differentiation have the need for greater advertising intensity. In this sense, product differentiation requires advertising, which results in greater concentration. There are also attitudes that emphasize that advertising can affect concentration, but the direction of influence can be uncertain.

Differentiated or new products are generally in the function of R&D expenditures, ie the higher these expenditures, the more likely it is to expect that the process of differentiating existing and new product creation will be more successful. Any successful differentiation, especially a new product, increases the market share of such companies at the expense of those companies that have not invested in or failed in research and development, resulting in increased concentration. In other words, R&D expenditure is positively correlated with concentration, ie in industries characterized by a strong R&D preference, it is expected that over time they will reduce the number of enterprises in favor of those who will remain in the industry as more successful. In addition, those investors who do not have sufficient research potential will bypass industries where companies are forced to invest large amounts of R&D, such as the pharmaceutical industry, so this variable can also be treated as an entry barrier.

R&D, in addition to products, can also relate to technology. The development and application of new technologies is imperative to the increasing globalization. The ability of this type of development, especially in some industries, is inherent in large companies, which are becoming technology leaders, and further protect their competitive advantage with patents. This fact can be an entry barrier for new investments into the industry, and in this sense, technological development can also be accepted as a determinant of concentration, and in industries where patents are more common, higher market concentration can be expected.

Most countries in the world protect competition in different ways. One of the more effective ways is legal protection of competition. The higher the legal protection, the lower the concentration. Thus, some authors[ii] have linked the rise in concentration in the United States to, among other things, a decrease in the intensity of antitrust enforcement during the presidential term of G. Bush and B. Obama, which was supported by a decline in the number of antitrust cases. Based on their findings, they concluded that the concentration and number of antitrust cases were negatively correlated variables.

Mergers and acquisitions are also linked to market concentration, whereby mergers and acquisitions are undertaken not only to increase market power, but also for other reasons. For example, in the pharmaceutical industry, mergers and acquisitions are a common occurrence, and the key motive is to provide more funding for more serious research activities, although in this case the ultimate consequence is also a concentration increase. In any case, whether the effect on concentration is direct or indirect, there is a positive relationship between the number of mergers and acquisitions and the level of concentration.

In the last few decades, foreign direct investment has often been used as a means of entering a market. Foreign investors increase the number of enterprises in the industry and reduce the market share of domestic companies. In such a case, a decrease in market concentration, or a negative link between FDI and concentration, can be expected, as confirmed by some empirical research.[iii]

Empirical studies of Market Concentration Determinants

Many researchers are trying to determine the main determinants of the level of market concentration. Each study is an attempt to prove, confirm or contradict certain assumptions about the connection of the concentration and different variables. We present here researches that may help in better understanding of this issue, based on theoretical explanations, methodological approaches and empirical studies.

J. Bain[iv] explores the changes in the concentration in manufacturing industries in the United States in the period 1954-1966. He shows that from 1954 to 1963 there was a moderate trend of increasing concentration in individual manufacturing industries, both indicated by the relative frequency of increases and decreases in concentration and by the relative average sizes of increases and decreases. This trend continued and accelerated from 1963 to 1966. During the period 1954 to 1966 there was a notable relationship between the relative frequency rise and the fall of the concentration ratio of individual industry. The author concludes that there is a moderate centripetal tendency for individual-industry concentration ratios to become more similar or less disparate over the time.

T. Saving[v] discuss the estimation of optimal factory size by a survival technique, exploring the link between optimal factory size and various economic variables, including concentration. P.

Pashigian[vi]compares the concentration ratio in order to answer the question whether the differences between the United States and Great Britain can be explained by the size of the market. P. Pashigian[vii]in his other paper, tests how increasing market size decreases concentration.

W. Comanor and T. Wilson[viii] show that advertising has statistically significant impact on profit rates in consumer goods industries, which provides a measure of market performance, as well as indicates the existence of market power. L. Telser[ix] examines whether advertising is a source of monopoly and shows that there is little empirical support for the inverse relationship between advertising and competition. D. Greer[x]examines the impact of advertising on market concentration in the following types of goods: the standard "convenience" goods, luxuries or near luxuries and specialty-convenience goods.

Mann et al.[xi] base their research on the theoretical standpoint according to which the degree of product differentiation is positively correlated with seller concentration. L. Guth[xii] examines the effect of advertising on the market structure and the market concentration. M. Sawyer[xiii] examines the level and trends of concentration in British manufacturing industry in the period 1958-1963. This author tests the impact of certain economic variables to changes in the level of concentration. Ornstein et al.[xiv] analyze the impact of different variables on the concentration of four largest companies, using the regression model with different variables.

M. Porter[xv] investigates the determinants of concentration for two groups of goods, convenience goods and non-convenience goods. A. Strickland and L. Weiss[xvi] connect the level of industrial concentration (C) with the ratio between advertising expenditure and sales (Ad/S) and the ratio between the minimum value of the effective volume and sales (MES/S). The relationship is explained by the equation $C = 0.2638 + 1.1613\left(\frac{Ad}{S}\right) + 4.1852\left(\frac{MES}{S}\right)$ (R2 = 0.485).

B. Lyons[xvii] defines the relationship between the number of companies and the industrial concentration. Lieberman[xviii] asks what determines the number of competitors in the homogeneous production industry. D. Kamerschen[xix] tested empirically the thesis from Nelson[xx] and Shepherd[xxi] about industrial growth, which tends to reduce seller's concentration. S. Martin[xxii] explores the simultaneous causality between advertising intensity ($ASR = f(PR, CR, D)$), seller concentration (CR), profitability (PR) and demand side of the market (D). F. Jenny and A. Weber[xxiii] explore the determinants of concentration trends in the French manufacturing sector on a sample of 204 three-digit industries in the period 1961-69. M. Marcus[xxiv] studies the impact of advertising on the changes in concentration. Mr. Norman et al.[xxv] investigated the correlation among other advertising expenditure and market concentration.

R. Basant and P. Mishra[xxvi] investigate the role of market concentration in determining the cross-industry variations in terms of in-house investment in research and development in Indian manufacturing sector. T. Mamodia[xxvii] analyzed the determinants of market concentration such as age of the firm, firm size, R&D intensity, capacity utilization, leverage, margin, goods dependence, material import and export dependence. The results showed that the intensity of research and development has a positive relationship with HHI. L. Lien and N. Foss[xxviii] connect market concentration and the related industries.

G. Grullon, Y. Larkin and R. Michaely[xxix] concluded that US industries are becoming more concentrated. They also analyzed the effect of the size of the industry on the increase of concentration. The increase of concentration was the result of insufficient antitrust laws and technological innovations that created barriers to entry for new companies. R. Forte and P. Sarmento[xxx]analyze whether FDI increase market concentration. The authors found a significant negative impact of FDI on the concentration in the industry.

Based on previous researches, it can be concluded that many researches have tried to answer the question what affects the level of concentration in an industry or a market. Variables such as market size, economies of scale, industry growth rate, advertising intensity, absolutely needed capital, initial level of concentration, local market significance, product differentiation and number of companies in the industry were often included in the various research models. In addition, some authors have used composite variables such as, barriers to entry, as well as variables that represent the relationship or multiplication of two or more variables.

The ways in which different authors attempt to confirm or deny the influence of selected variable on concentrations also ranges widely. Mostly they use the form of single regression, for analyzing the individual impact of one independent variable on concentration, and multiple regression, trying to identify the simultaneous effect of two or more independent variables on concentration as a dependent variable.

The Model

Based on the results of numerous other studies presented, it one can conclude that there is no agreement as to which variables have the most significant influence on the level of industrial or market concentration. It can only be said that there is a general agreement that entry barriers, such as economies of scale, product differentiation, start-up capital, government regulation, often affect the concentration level to a greater extent than other variables. It is also important to emphasize that there is agreement that there is a positive relationship between the above variables and the concentration level.

Why are the results of conducted studies so different? Firstly, we believe that this is a very complex relationship, but it is very difficult to present it in a simplified way, especially without taking into account all the specifics of samples on the basis of which the research is conducted. We believe that a sample based on the data on the high level of aggregation, most often based on three- or four-digit NAICS, leads to various findings and additional confusion. Simultaneously with this, we think that differences can result from models by which the influence of selected variables on concentration was analyzed.

In order to remove the above shortcomings, we have conducted a research that differs from other studies in several important features. Firstly, we emphasize that our research is based on the data relating to the NAICS[xxxi], sectors 31-33: Manufacturing, which were taken from the US Census Bureau for 1997, 2002, 2007 and 2012. According to the NAICS, sectors 31-33 are displayed at four levels of aggregation, ie at the 3-digit, 4-digit, 5- digit and 6-digit codes. At the level of the 3-digit code, we have covered 21 subsectors, at 4-digit code 86 industry groups, at 5-digit code 184 industries and at the 6-digit code 225 industries, due to the inability to complete all the necessary data for each of 473 industries total.

The data on market concentration, as well as for all other variables, were taken from the US Census Bureau, 1997, 2002 and 2007: Economic Census. It is important, however, to say that this variable on each of the four levels of aggregation is observed through five indicators of concentration: the concentration ratio for 4, 8, 20 and 50 largest companies in the industry and the Herfindahl-Hirschman index for 50 largest companies in the industry.

The research of the determinants of concentration is based on the calculation of correlation between the selected variables and the calculation of the regression. The correlation is first established between each of the five measures of concentration, on the one hand, and each variable included in the research, on the other hand. Through this analysis, we wanted to detect the direction and intensity of the connection between market concentration and other selected variables. Correlation analysis has served as an introduction to regression analysis. In fact, based on the results of correlation analysis, we have made a regression model with the purpose to determine the direction and intensity of the impact of independent variables on the market concentration.

The correlation between the studied variables

In our research we have conducted correlation analysis based on the concentration ratio of four (CR 4), eight (CR 8), twenty (CR20) and fifty (CR50) largest company in the industry and the Herfindahl-Hirschman Index for 50 largest companies (HHI50). In this way, we wanted to eliminate the possible errors that occur due to the use of different indicators of concentration. Results of this study allow the comparability of our results with other studies that are based on only one indicator of concentration. In addition, this approach allows to detect certain rules in terms of differences that could arise from the number of companies according from which individual indicator of concentration is calculated. It is also important that we have conducted our analysis at the level of aggregation which is identical to NAICS classification, starting from 3-digit to 6-digit. This approach allows the comparability with

those studies that are based just on one of these levels of aggregation. Data on which we did the calculation refer to 2007, except in cases in which we have calculated changes over time.

Finally, it is necessary to point out that we have started our analysis with relatively wide list of independent or explanatory variable. The focus of our interest are variables such as the number of enterprises, value of delivery, number of employees, capital expenditures, expenditures for advertising and variables that were constructed from the combination of above-mentioned variables. In the latter case, we have created two indicators of the average size of the company. The first one is calculated from the ratio between the value of deliveries and the number of companies, while the other one is obtained from the ratio between employment and the number of companies.

Previous analysis was done using, on one hand, the concentration and, on the other, each of the nine selected variables. The correlation between the independent variable is determined based on the concentration ratio of the four largest companies, starting from three-digit to six-digit level of aggregation.

Observed for the four largest companies in the subsector, there is extremely high correlation between the average value of capital expenditures by the company and the average value of the delivery, as well as between the average value of capital expenditures and the average value of delivery. The correlation coefficient is greater than 0.9, positive and statistically significant. There are also four cases when the correlation is greater than 0.8, so that these variables in terms of their impact on the concentration should be paid special interest.

Compared to the correlation at the three-digit, the correlation level six-digit is very similar. The highly correlated variables at a higher level of aggregation are also highly correlated at the lower level of aggregation. The only difference is that it is at the six-digit correlation coefficients are slightly lower than at the three-digit level.

The analysis of correlations between variables that are highly correlated with concentration indicates that there is a high correlation between the number of companies and the average value of delivery, the number of companies and average capital expenditure per company, the average value of delivery and the average number of employees per company, as well as the average value of delivery and average value of capital expenditure per company. Their high correlation indicates the possibility for the existence of multicollinearity.

Regression between the analyzed variables

Our attempt to find the answer to the question what affects the level of concentration is based on various analytical methods and research models. We have used the regression analysis, single or multiple, non-linear or linear, and we have tried to explain the concentration as the dependent variable with different independent variables, such as economies of scale, size of industry, number of companies, required initial capital, growth of industry, investment in research and development, advertising spending and others.

Regression analysis was first conducted as a single, and then as multiple in terms of individual and aggregate independent variables that influence the concentration.[xxxii] Table 1 provides results of a single regression analysis. The calculation is based on the data for 2007, where the dependent variable represents the concentration ratio of the four largest companies in the six-digit level of aggregation.

Table 1: Regression Summary for Dependent Variable CR4

	Constant	Std. Error	p-value	Coefficient	Std. Error	p-value	R^2
N	2.408	0.051	0.000	-0.335	0.021	0.000	0.535
S	1.920	0.231	0.000	-0.048	0.034	0.158	0.009
L	2.615	0.156	0.000	-0.237	0.036	0.000	0.158
K	1.960	0.174	0.000	-0.069	0.033	0.035	0.019
A	2.045	0.093	0.000	-0.048	0.022	0.000	0.100
S/N	0.415	0.100	0.000	0.268	0.023	0.000	0.379
S/L	0.864	0.120	0.000	0.289	0.047	0.000	0.140
K/L	0.913	0.067	0.000	0.240	0.023	0.000	0.317
L/N	0.906	0.065	0.000	0.367	0.034	0.000	0.342

These variables, each in its own way, measure the average size of the company. Given their statistical significance and the value of the coefficient of determination, the conclusion is that the average size of the company significantly determines the concentration. The individual impact on the concentration of these composite variable is, except for the number of enterprises, greater than the influence of any other individual variables.

We have further conducted the multiple regression analysis to show the simultaneous impact of these variables on the concentration. Between numerous models, we have chosen four that best describe the effect of the concentration. Table 2 shows the results.

Table 2: Regression Summary for Dependent Variable CR4

Variables	Model 1	Model 2	Model 3	Model 4
N	-0.406^{***}	-0.422^{***}		-0.328^{***}
	(0.0301)	(0.0256)		(0.0325)
S	0.165^{***}	0.0946^{***}		
	(0.0453)	(0.0243)		
L	-0.0558		-0.297^{***}	
	(0.0592)		(0.0564)	
K	-0.0529		-0.053	
	(0.0449)		(0.0449)	
A	0.0657^{***}	0.0580^{***}	0.066^{***}	0.0580^{***}
	(0.0205)	(0.0198)	(0.0205)	(0.0198)
S/L			0.165^{***}	
			(0.0453)	
L/N			0.406^{***}	
			(0.0301)	
S/N				0.0946^{***}
				(0.0243)
cons	1.707^{***}	1.738^{***}	1.707^{***}	1.738^{***}
	(0.152)	(0.149)	(0.152)	(0.149)
N	225	225	225	225
R^2	0.605	0.599	0.605	0.599

$^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$

The results of the multiple regression analysis shows that all models are statistically significant and that their R^2, for both enter and stepwise method, are very similar. Given the fact that the second and

fourth model contain only statistically significant variables, we analyze these models more detailed. There are certain similarities and differences between these models. Similarities reflect the fact that all the variables included in the model are statistical significant at the level of 99% and that their coefficient of determination is identical.

The differences are the variables that are included in the model. Variables N and A are contained in both models, while the variable S is included only in the second model and S/N in the fourth model. We conclude that concentration is determined by a number of companies, advertising expenditures and the average size of the industry measured by the average value of delivery. These findings are similar to the findings of many other empirical studies.

Following these findings, we wanted to analyze if the results would be different if, instead of the concentration ratio of the four largest companies we use a different measure of concentration. In this sense, we have analyzed the impact of the above-discussed variables using stepwise method for the concentration measured by concentration ratio for eight, twenty and fifty largest companies, as well as HHI50. Table 3 shows the results.

Table 3: Regression Summary for Dependent Variable CR4, CR8, CR20, CR50, HHI50

Variable			Stepwise metod		
	CR4	CR8	CR20	CR50	HHI50
N	-0.328***	-0.384***	-0.281***	-0.229***	-0.815***
	(0.0325)	(0.021)	(0.016)	(0.014)	(0.051)
S		0.078***			0.152***
		(0.020)			(0.045)
A	0.0580***	0.056***	0.057***	0.052***	0.126***
	(0.0198)	(0.016)	(0.012)	(0.010)	(0.039)
S/L			0.089***	0.055***	
			(0.022)	(0.019)	
S/N	0.0946***				
	(0.0243)				
cons	1.738***	1.895***	2.068***	2.125***	3.208***
	(0.149)	(0.123)	(0.076)	(0.065)	(0.275)
N	225	223	221	215	210
R^2	0.599	0.646	0.660	0.660	0.593

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Observed on the basis of the value of the coefficient of determination, the results of regression analysis are becoming slightly better with an increase in the number of covered companies, compared to the concentration ratio of the four largest companies.

Due to a disputable role of the number of companies as independent variables in previously analyzed regression models, we tested the situation that retained all the previously discussed variables except number of companies (N). Table 4 shows these results with the omitted variable N.

Table 4: Regression Summary for Dependent Variable CR4, CR8, CR20, CR50, HHI50

	(1)	(2)	(3)	(4)	(5)
	CR4	CR8	CR20	CR50	HHI50
S	-0.328***	-0.306***	-0.199***	-0.214***	-0.663***
	(0.032)	(0.056)	(0.033)	(0.017)	(0.039)
L			-0.072*		
			(0.036)		
A	0.058***	0.056***	0.054***	0.046***	0.126***
	(0.020)	(0.016)	(0.013)	(0.010)	(0.0039)
S/N	0.422***	0.384***	0.287***	0.247***	0.815***
	(0.026)	(0.021)	(0.019)	(0.013)	(0.051)
cons	1.738***	1.895***	2.034***	2.107***	3.208***
	(0.149)	(0.123)	(0.094)	(0.073)	(0.275)
N	224	223	221	215	210
R^2	0.599	0.646	0.661	0.658	0.593

Standard errors in parentheses
* *p <0.1, ** p <0.05, *** p <0.01*

Omitting the variable N, we obtain the regression models in which variables S, A, and S/N determine the concentration in all analyzed cases except in the case of CR20, where one more variable appears – L. The sign with the variable S is in all cases negative, which means that with an increase in the size of the industry, concentration is decreasing. The sign of the coefficients with the variable A is positive in all cases, as well as that with the variable N in the models that included it, which confirms the hypothesis that the increase in advertising expenditures leads to the growth in concentration. The average size of company measured from the ratio of the value of delivery and the number of companies (S/N) has positive sign, which confirms the expectation that the industrial concentration will be higher in those industries with the economies of scale, or with higher minimally efficient volume.

Thus, it can be concluded in a certain way that the influence of the three variables is crucial to the level of industrial concentration. These are industry size (S), advertising expenditures (A) and economies of scale (S/N)

Conclusion

The question what determines the level of market concentration is one of the most important theoretical and practical issues, covered by many scientists. Their answers are often different, partly because of different economic models, and partly due to differences in the type and the size of the sample. In our research, we used correlation and regression analysis and we have covered four levels of aggregation: 3-digit, 4-digit, 5-digit and 6-digit, all this for the US manufacturing industry.

Correlation analysis included nine variables, and the objective was to determine the correlation between the concentration level and each of the selected variables. This analysis showed that there is a relatively high correlation between market concentration and the following variables: number of companies, average value of delivery, average number of employees per company and average value of capital expenditure.

Regression analysis was first carried out as a single, and then as a multiple regression analysis. Talking about individual impact on the level of market concentration, composite variables that display as the average size of company play an important role. The individual impact on the concentration of these variables, except for the number of companies as a single variable, is greater than any other individual variable.

Multiple regression showed that, among a number of different models, four models describe the determinants of market concentration well. Between these four models, the first two models are based on individual variables (number of firms (N), value of delivery (S), number of employees (L), capital

expenditures (K), and advertising expenditures (A)). Other two models include also the remaining four composite variables. Our calculations show that the concentration is determined by the number of companies (N), advertising expenditures (A) and the average size of the industry, measured by the average value of delivery (S/N). These findings are similar to the findings of many other empirical studies.

Previous findings are based on the concentration of the four largest companies in the industry, so we wanted to see what happens if we use some other measure of concentration. Regression results show slightly better results with an increase in the number of companies included in the concentration measure. It is interesting, however, that in the regression model for eight largest companies, we have variables N, S and A, while in the regression model for four largest companies variables are N, A and S/N.

Omitting the variable N, we obtained the regression models in which variables S, A, and S/N determine the concentration in all analyzed cases, except in the case of CR20, where one more variable appears – L. The sign with the variable S is in all cases negative, which means that with an increase in the size of the industry, concentration is decreasing. The sign of the coefficients with the variable A is positive in all cases, as well as that with the variable N in the models that included it, which confirms the hypothesis that the increase in advertising expenditures leads to the growth in concentration. The average size of company measured from the ratio of the value of delivery and the number of companies (S/N) has a positive sign, which confirms the expectation that the industrial concentration will be higher in those industries with the economies of scale, or with higher minimally efficient volume.

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Millennials' Perception of Informal Institutions in Central and Eastern Europe

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Abstract

The aim of the article is to identify and define changes in the importance of informal institutions to Generation Y from Central and Eastern Europe in the process of acquiring knowledge in several dimensions: trust, social groups and networks, social activity, as well as a comparison of informal institutions between young people of different nationalities. The article examines whether the knowledge gained by the Millennials from Central and Eastern European (CEE) countries during higher education is connected with the change of social competences reflected in the changes of informal institutions. The results of a survey carried out among Millennials who are educated at universities in Poland, Lithuania and Slovakia were used. The article takes into account such categories of informal institutions as social standards, trust, networks, informal social activities. The results of the research indicated that the social competences of young people in the dimension of informal institutions do not change significantly under the influence of academic education and remain at a low level in many dimensions. In addition, it was found that there is a diversity in the importance of informal institutions to CEE Millennials by country of origin.

Keywords: Informal Institutions, Institutional Economics, Social Capital, Central and Easter Europe

Introduction

In the analysis of economic phenomena and processes, models proposed by the neoclassical current are most often used. However, the model's assumption about a universal individual who makes decisions rationally regardless of the social, political or historical environment is criticised in literature. In opposition to the concept of homo oeconomicus, an institutional economy was created with the concept of homo - socialist, i.e. a unit functioning in an institutional environment and using institutional rules to allocate resources (Lloyd & Lee 2018). Taking into account cultural norms, tradition, conventions and law, Institutionalists treat the market as a process of behaviour based on principles, and to a lesser extent on free and rational decisions. The phenomena and processes concerned, the resolution of economic dilemmas and the effects of specific actions are attributed to a specific economy, social situation and historical period, so they are free from universalism (Ostój 2010). Every society has its own institutions which cannot be regarded as neutral in the economic process (Chavance 2002; 2008). As North (1990) indicates, institutions are not the same as organisations. Following it, this distinction is made by the authors in this article, for whom institutions are not identified with organizations.

Using the division of institutions proposed by North (1990), the subject of the article is informal institutions. Unlike formal institutions such as the Constitution, laws, regulations, regulations and other provisions which, by being transparent and quantifiable, are relatively easy to identify and analyse, informal institutions, i.e. values, habits and standards of behaviour and informal networks, pose a major research challenge for researchers (Wang 2000). This difficulty results from the

multidimensionality of informal institutions, the difficulty of separating and analysing separately and quantifying them (Ostrom 2008).

Literature shows that despite these difficulties, informal institutions are worth analysing because they are an important determinant in not only social but also economic relations (Meyer & Peng 2005; Lew 2013). It is worth noting their impact on the reduction of uncertainty in economic decisions, i.e. those related to entrepreneurship (Aparicio, Urbano & Audrestsch 2016; Escandón-Barbosa et al. 2019), in the choices made by managers (Halabi, Alshehabi & Zakaria 2019), including those concerning the strategy and efficiency of international business (Keig, Brouthersb & Marschall 2019; Bae & Salomon 2010) or illegal activities (Ramirez, Vélez-Zapata & Madero 2018). They determine economic growth (Porter et al. 2011; da Silva, Weins & Potinkara 2019), affect the efficiency of local government (Ananth-Pur & Moore 2010; Mohmand 2016) and bureaucracy (Gauchat 2012; Kaufmann, Hooghiemstra & Feeney 2018). As Helmke and Levitsky (2004) indicate, when informal institutions are ignored, then formal institutions become ineffective and exist only on paper.

Taking into account the above arguments and the hitherto areas of interest of the literature on the subject, the authors intend to focus on the analysis of informal institutions among young people, more precisely Generation Y, who at the beginning of their professional career have to face the challenges of the labour market, in particular its mobility, multiculturalism or globalization. It was found that there is a research gap in determining the impact of education on the development of non-formal institutions while taking into account the assumption of institutional economics that institutional environments differ from country to country. Interesting research questions arise here. First, does the period of academic education change the importance of informal institutions in the lives of young people? Second, are there differences between Millennials of different nationalities with regard to the importance of informal institutions in their lives?

Therefore, the aim of the article is to identify and define changes in the importance of informal institutions to Generation Y from Central and Eastern Europe in the process of acquiring knowledge in several dimensions: trust, social groups and networks, social activity, as well as a comparison of informal institutions between young people of different nationalities. The first is that academic education influences the importance of formal institutions among young people. The second is that in the Central and Eastern European region, nationality does not cause differentiation in the importance of informal institutions in the surveyed social group.

The research undertaken in the article should contribute to complementing existing literature for several reasons. Firstly, they contribute to the discussion on the importance of informal institutions among Generation Y. Admittedly, literature has so far studied the personality traits of the Millennials and their difference from other generational groups (Bencsik, Horváth-Csikós & Juhász 2016; Miłaszewicz & Nagaj 2018; Bento, Martinez & Martinez 2018). However, this social group was not studied from the point of view of changing the importance of informal institutions in young people's lives in the process of gaining knowledge. Secondly, the research takes into account not only the time aspect (two research periods) but also the spatial aspect. It shows a comparison based on a sample of 3 countries from the CEE region (Poland, Lithuania, Slovakia), which allows to enrich the study of institutional economics with a regional analysis of countries that have similar political and socio-economic conditions. All three countries share a common, not distant history that is related to their functioning in the doctrine of socialist states and institutional changes initiated in the 1990s (Stolle & Howard 2008; Maloney & van Deth 2010), deepened by the entry of these states in the EU structures in 2004. Nevertheless, based on the Hofstede model (2011), it can be assumed that there are differences between these nations and cultures. A third reason for the added value of this article is that these research results can be used to develop higher education curricula that would improve social competences in line with the Bologna process.

By analysing the collected statistical material, the authors provide empirical evidence relating to the importance of informal institutions to people of Generation Y and changes in this field. The obtained test results were subjected to statistical processing, including the use of the chi-square test of independence, as well as the U-Mann Whitney and Kruskal-Wallis tests. The analysis of the research

was preceded by a theoretical part, in which brief considerations on informal institutions were presented. It should be noted that the conclusions formulated here concern the examined group of populations. Furthermore, it is assumed, in line with the educational outcomes of the Bologna system, that the knowledge of people who leave higher education is higher than that of the same people when they started their education.

Literature Review

Institutionalists in the analysis of socio-economic phenomena use the research category which are institutions (Kaufman 2004; Furubotn & Richter 2005; Rutherford 2001). Due to the scope of the study, a sociological approach was used, according to which social institutions are "a set of established activities of an individual in the normalized activity of the group. Institutions allow for forecasting and anticipating future reactions of members of society in response to events they will be able to experience in the future". (Znaniecki 1988, p. 70). They are a combination of values and norms that are considered appropriate in a given society to act and build social relationships. These normative patterns define the expectation that individuals behave towards each other in a way that will perpetuate relationships between them (Lopez & Scott 2000). Turner (1998) points out that norms of behaviour are crucial in the creation of institutions, as they create values and beliefs common to a given community. Their aim is not to restrict people, but to create relationships based on accepted values, including those of an informal nature, which increase the ability to act (Searle 2005). As North (1990; 1991) indicates, institutions can be divided into formal and informal institutions. Informal institutions, which are the subject of this article, are the rules of the game of social life, rules shaping interactions facilitating social contacts, which are created, communicated and enforced outside officially sanctioned channels (Milgrom, North & Weingast 1990; Brinks 2003). These are social norms, religion, ethics, tradition, culture, customs, unwritten codes of behaviour, ideologies, taboos, networks and bonds that shape society (de Soysa & Jütting 2007; Tonoyan et al. 2010). Helmke and Levitsky (2004, p. 127) define informal institutions as "social, common rules, usually unwritten, created, communicated and enforced outside officially sanctioned channels". They are inherent in human nature and are needed to feel a sense of belonging to the community (Ariely 2017, Szkudlarek & Biglieri 2016). As Wirth et al. (2013) points out, informal institutions are not homogeneous in nature and are visible in many ways in information processing and ultimately in decision making. Due to the fact that informal institutional pressures arise mainly from history, traditional practices and culture (Peng, Wang & Jiang 2008), institutional economics assumes that each country has a unique set of these attributes for its community.

Given the interdisciplinary nature of institutions, they can be analysed using a social capital aggregate (Szczepkowska & Szkudlarek 2018). It is pointed out that social capital provides a forum for a better understanding of the relationship between social links and institutional change (Horak & Restel 2016). The issues of social capital raised by their leading researchers such as Bourdieu (1896), Coleman (1990), Putnam (1995) and Fukuyama (2000) take into account the categories that are the subject of research undertaken in the study. Bourdieu (1986) stresses the importance of sustainable networks, more or less institutionalised links of knowledge and mutual recognition. Coleman (1990) draws attention to social structures that facilitate the activities and achievement of the objectives of individuals within these structures if relationships are based on standards or trust. Also according to Putnam (1995), social capital, i.e. trust, norms and relations increase the efficiency of society and facilitate coordination of actions. He also points out that there may be other effects in the case of bonding social capital, i.e. family or friends, and others in the case of bridging capital, i.e. colleagues, neighbours and further surroundings. In turn, Fukuyama emphasizes the importance of trust that leads to the interaction of two or more units. It creates new people-to-people links and facilitates the establishment of civil society groups, associations and organisations (Fukuyama 1999). All the attributes of social capital indicated by literature are inseparable from institutions of an informal nature. Social capital does not produce goods or knowledge, because it is a function of physical capital. On the other hand, it helps to reduce the behavioural uncertainty of market players (Matysiak 2003, Manolova et al. 2007).

Literature shows that society is not homogeneous and there are generational differences in consumer behaviour and preferences (Lissitsa & Kol 2016), including those concerning social capital and attitudes towards the state (Nagaj & Szkudlarek 2019). For this reason, using research on social capital, the authors in this study attempted to assess the state and changes in the importance of informal institutions among Generation Y, called Millennials. This is the first wave of the digital generation to be born in the world of technology (Hopkins & Stephenson 2014; Garikapati et al. 2016). More often than previous generations, they use electronic word-of-mouth (e-WOM) through social media (Bento, Martinez & Martinez 2018). And within the framework of these virtual social media, a willingness to co-create is created in people of this generation. According to Krishnan et al. (2013), their circle of friends is mostly virtual and they present their relationships on social networks, besides they easily accept cultural differences and really like to live fast.

Followed the Brosdahl and Carpenter (2011), this is a generation that easily accepts change, live and keep their thoughts in "today" and they do not like planning ages ahead. They are focused on achieving their own life goals, regardless of others, and rather want to play in their own world (Bencsik, Horváth-Csikós & Juhász 2016). This is due to the fact that people of Generation Y have often limited contact with their parents due to their careers or their entering into numerous relationships. This results in a very low level of family relationships (Barford & Hester 2011). In the labour market, they are looking for challenges and an exciting and ambitious career path (Maxwell, Ogden & Broadbridge 2010), which will allow them to achieve high income in a short time (Tari 2010). Traditional values are much lower in the hierarchy of their needs (Bencsik, Horváth-Csikós & Juhász 2016; Nagaj & Žuromskaitė 2016). Thus, they are attributed individualism and self-reliance (Gursoy, Maier & Chi 2008; Murphy & Gibson 2010). They are characterized by multicultural and global thinking (Williams & Page 2011). A similarly high mobility concerns Polish Y Generation (Schmelter 2018).

Methodology

The aim of the article is to identify and define changes in the importance of informal institutions to Generation Y from Central and Eastern Europe in the process of acquiring knowledge in several dimensions: trust, social groups and networks, social activity, as well as a comparison of informal institutions between young people of different nationalities. This analysis was carried out on the basis of the results of surveys conducted among people of Generation Y of the first and last year of the bachelor's degree studies at the Faculty of Economics and Management University of Szczecin in Poland (1st year: n=267, 3rd year: n=229), at the Faculty of Faculty of Politics and Management Mykolas Romeris University in Vilnius in Lithuania (1st year: n=113, 3rd year: n=73) and at the Faculty of Economics Matej Bel University in Banská Bystrica in Slovakia (1st year: n=153, 3rd year: n=158).[1] Out of the total number of students enrolled at the indicated universities, in the case of each university, the proportions of the respondents were as follows: 58.0% and 88.1% (Poland), 51.4% and 63.5% (Lithuania), 51.0% and 52.7% (Slovakia). At the above mentioned universities, an invitation to participate in the survey was published, while participation in the survey was voluntary and fully anonymous. There were two criteria for participation in the survey research: the first was to undertake academic studies and the second was to be born after 1981 - followed the classification of generational presented by Brosdahl and Carpenter (2011). The research was carried out in the studied populations twice. First among people starting their academic education (in the first months of their studies), then after 2.5 years among the same research sample, at the end of their academic education. The survey consisted of a questionnaire for the characteristics of the respondent and a set of 36 survey questions developed according to the World Bank's logic model (Grootaert et al. 2004). For the purpose of this analysis, the authors chose 6 questions concerning informal institutions. The first two questions concern trust, understood as a belief or expectation built on personal experience and which depends on the credibility of others (Robbins 2016). The subject of analysis here is both general trust (Fig 1) and, using the typology presented by Sztompka (2007), personal (further and closer) and public trust (Fig 2). The third question (Fig 3) is used to evaluate networks and social integration among young people. The type of Millennials' relationships with other people was examined here, i.e. whether they have an exclusive dimension, resulting from primary relationships creating bonding social capital, or inclusive, i.e. resulting from secondary relationships and creating

bridging social capital (Putnam 1995). The last three questions (shown in Fig 4 and Fig 5) concern social activity, which informs about the degree of acceptance by young people of Generation Y of values and behaviour patterns building social bonds which are respected in a given society. It has been assumed that social activity is a process in which individuals influence in an individual or collective way the community in which they operate (André, Martin & Lanmafankpotin 2012; Mastalerz 2019). The activity of the Millennials was assessed in three dimensions: informal social interaction (informal community meetings), formal activity, manifested by participation in formal groups, i.e. NGOs (Fig 4), and individual activity for the benefit of society by helping others (Adams, Leibbrandt, and Moon 2011) (Fig 5).

The comparison made in the paper, taking into account the time aspect, allows to assess whether within three years (i.e. academic learning and acquiring knowledge) there were changes in informal institutions among the Millennials. It is assumed here, in line with the educational outcomes of the Bologna system, that the knowledge of those who leave academic education is higher than their knowledge when they began their education.

In addition to the survey and descriptive statistics, a statistical analysis of the relationship was carried out using the chi-square independence test, the Mann-Whitney U test and the Kruskal-Wallis test assuming a significance level of $\alpha=0.05$. The application of non-parametric tests resulted from the fact that the important assumptions for the application of parametric tests (including the normal distribution and equivalence of individual groups) were not met.

A general null hypothesis was adopted that individual populations come from the same population. Two different criteria were adopted for the division: level of study (year of study) and nationality.

It should be noted that all the above tests allowed one to determine whether there are statistically significant differences in informal institutions among Generation Y respondents in Central and Eastern Europe. However, they cannot be seen as tools to identify the causes of possible differences. Therefore, given the lack of unitary data on learning outcomes, statistical inference could not be used to verify the hypothesis about the importance of achieving particular levels of knowledge, in line with the classification of learning outcomes and the importance in the life of young informal institutions.

Research Results

The first key attribute of informal institutions that has been examined is trust. Figure 1 presents data on the overall level of trust among the Millennials surveyed.

Fig. 1: General trust in the environment of young people in Poland, Lithuania and Slovakia* (Q.1. Do you agree with the statement that people should be given limited trust? Answers "rather yes" and "definetely yes")

** PL1 - respondents in Poland, 1st year of study; LT1 - respondents in Lithuania, 1st year of study; SLV1 - respondents in Slovakia, 1st year of study; PL3 - respondents in Poland, 3rd year of study; LT3 - respondents in Lithuania, 3rd year of study; SLV3 - respondents in Slovakia, 3rd year of study.*
Source: own elaboration.

The results of the research indicate that the vast majority of young people believe that it is necessary to be cautious when dealing with people and to give others limited confidence (average for all respondents - 78.6%). It is worth noting that regardless of the level of academic knowledge, the lowest percentage of Millennials who give limited confidence to other people among the countries surveyed occurs in Poland and this percentage is below the average. Relatively more caution in relations with others is declared by respondents in Lithuania and Slovakia. Only in the case of respondents finishing academic education (third year of study) from Lithuania this percentage is lower than the average calculated for all the studied groups.

The next step was to examine whether the young people differentiated their trust according to their environment (Fig 2).

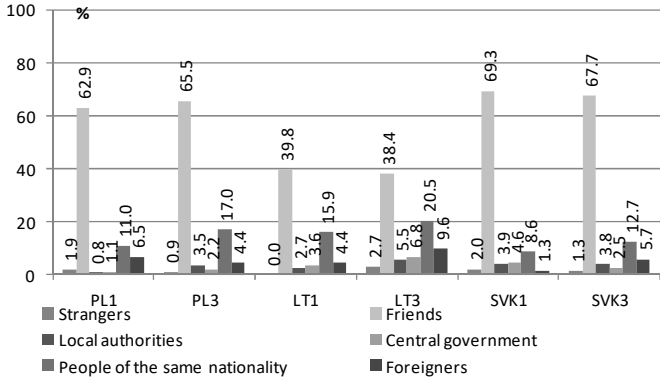

Fig. 2: Private and public trust of young people from Central and Eastern Europe* (Q.2. How much trust do you have in the following people? Answers "I trust strongly" and "I trust very strongly")

** The same markings for variables on the X axis as in Fig 1.*
Source: own elaboration.

Research results indicate that regardless of the research sample or level of education, people of Generation Y have the greatest trust in their friends, and much less in strangers. Interestingly, the trust in friends indicated by Lithuanian respondents is much lower than in other research samples (in this research sample, trust in friends on an average level dominates). On the other hand, however, trust in strangers is relatively the highest among research samples in this group, but it is still at a dramatically low level, just like in other research groups. The results of the research also indicate that the Millennials differentiate their trust by nationality. They have a higher level of trust in people of the same nationality than in people of a different nationality. It should be added that in Poland and Lithuania the majority of people declare an average level of trust in people of different nationalities, while in Slovakia the lack of trust in people of different nationalities dominates.

As regards public trust, it should be noted that a very low percentage of respondents trust the government, both at central and local level. A total lack of trust in public authority, regardless of the level, is declared by as many as 1/4 of respondents. This demonstrates a very low level of trust in government institutions. It should be noted, however, that a higher percentage of people do not trust the central government than the local government.

Another analysed dimension of informal institutions concerned networks and social integration among Generation Y (Fig 3). The results were intended to provide information on whether

respondents in the surveyed countries show greater adherence to informal institutions created by exclusive groups (parents) or by inclusive groups (neighbours).

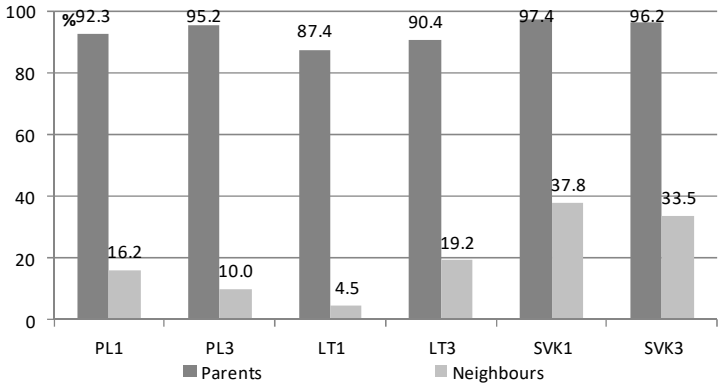

Fig. 3: Social groups and networks of Millennials in Poland, Lithuania and Slovakia* (Q.3. Are you attached to the following people? Answers "rather yes" and "definetely yes")
** The same markings for variables on the X axis as in Fig 1.*
Source: own elaboration.

Millenniums most often form social groups in which bonds have an exclusive dimension. This pattern refers to research samples of all three countries and everywhere this attachment is at a relatively similar level. However, there are greater differences between countries with regard to inclusive relationships. In Slovakia the attachment to neighbours is at a much higher level than in Poland and Lithuania. Moreover, in Poland and Slovakia the attachment to inclusive relationships has decreased quite significantly during academic education, while in Lithuania the opposite trend was observed.

Although the attachment of Slovak students to their neighbours is much less than to their parents, it is on a relatively high level compared to the respondents in Poland and Lithuania. For example, among people who have started higher education, Lithuania is dominated by those who definitely don't trust their neighbours, Poland by those who rather don't trust their neighbours, and Slovakia by those who rather trust their neighbours.

The last part of the analysis of informal institutions will present the results of research on the activity of Generation Y people. Figure 4 presents data on two dimensions: informal social interaction (informal community meetings) and formal activity manifested by participation in formal groups, i.e. NGOs.

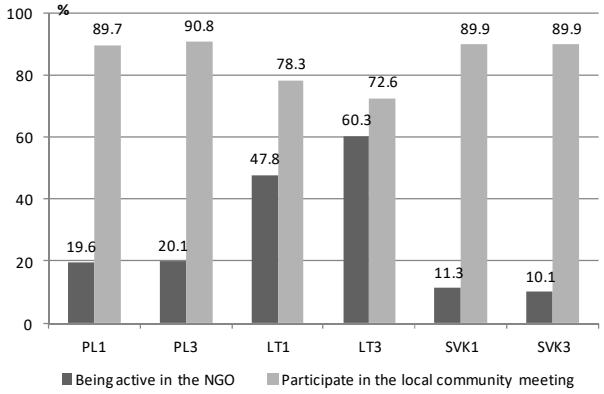

Fig. 4: Social participation of young people in Poland, Lithuania and Slovakia* (Q.4. Have you ever been active in an NGO? Q.5. Have you attended a community meeting during the year? Answers "yes")

** The same markings for variables on the X axis as in Fig 1.*
Source: own elaboration.

The comparison between activity in NGOs (formal aspect of social activity) and meetings of the local community (informal aspect of social activity) allowed to conclude that the respondents in Poland and Slovakia express their values and behaviour patterns mainly through informal forms of social activity. In the case of a research group from Lithuania, such an unambiguous assessment is no longer possible as both forms of social activity (formal and informal) are relatively favoured by these respondents. As in Poland and Slovakia, Lithuanians prefer informal social activity in most cases, although they also express their readiness to act for the benefit of the community through formal organisations, i.e. NGOs.

One form of social activity of young people of Generation Y is also participation in charity actions (Fig 5). Millennials' households quite rarely participate in charity actions (most often 1-2 times a year). Among the analysed countries, the lowest activity for the benefit of society was shown by the families of respondents from Slovakia, where over 40% declare that they never do it. According to the survey results presented, the percentage of people, regardless of their year of study and country, whose households participate in charity actions 5 and more times is negligible and amounts to only a few percent. Moreover, regardless of the year of study and country, the percentage of households that are willing to participate in charity actions at least 5 times a year is negligible and is only a few percent.

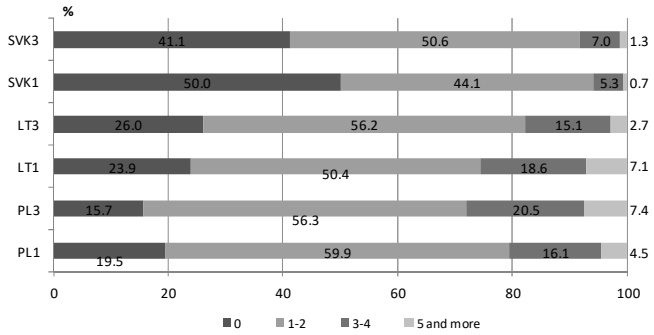

Fig. 5: Participation in charity actions by households of young people of generation Y in Poland, Lithuania and Slovakia* (Q.6. How many times during a year did your household participate in charity actions?)

** The same markings for variables on the X axis as in Fig 1.*
Source: own elaboration.

In the last part of the analysis of empirical data, the zero hypothesis that the communities come from the same population was verified, i.e. that there are no statistically significant differences between individual research samples in the context of individual informal institutions. The null hypothesis was verified in two dimensions:

a) between the Millennials of the first and third year of study in a given country,
b) between Millennials from the same year of study in all countries.

A compilation of data on values for the statistics and p-value for the first verified dimension (only for cases where differences between populations are statistically significant) is shown in Table 1.

Table 1: Statistical independence between the Millennials in their first and third year of studies in the analysed countries

Itemisation	Type of statistical test used	Country	Value of statistics	*p-value*
Q.2. (Fig 2) People of the same nationality	U-Mann-Whitney test	Poland	-2,057	0,040
Q.2. (Fig 2) Foreigners	U-Mann-Whitney test	Poland	2,023	0,043
		Slovakia	-4,749	0,000
Q.2. (Fig 2) Local authorities	U-Mann-Whitney test	Poland	-2,951	0,003
Q.3. (Fig 3) Parents	U-Mann-Whitney test	Poland	2,300	0,021
		Lithuania	-2,467	0,014
Q.3. (Fig 3) Neighbours	U-Mann-Whitney test	Lithuania	-6,234	0,000

Source: own calculations.

The results indicate that only in 7 out of 36 cases (16.4%) there were reasons to reject the null hypothesis, i.e. it was found that there are statistically significant differences between people entering and leaving academic education. This means that in these 7 cases, higher academic knowledge has changed the importance of informal institutions to Generation Y respondents. Four such cases concerned Millennials in Poland, two in Lithuania and one in Slovakia. These differences occurred in relation to private trust (towards persons of the same nationality and towards foreigners) and public trust (towards local government), as well as to social networks and integration (i.e. the nature of relationships that Millennials have with people from closer and further surroundings). On the other hand, no statistically significant changes in informal institutions with regard to the dimension of social activity were found in any of the surveyed nationalities.

A compilation of data on statistical values and p-value for the second of the dimensions to be verified, i.e. differences between countries, is presented in Table 2 (data are only presented for cases where there are statistically significant differences between populations).

Table 2: Statistical independence between Millennials of the first and third year of studies, taking into account the nationality criterion

Itemisation	Type of statistical test used	Year of study	Value of statistics	p-value	1 – do not reject H0 2 - reject H0	There are differences between countries*
Q.1. (Fig 1)	Kruskal-Wallis test	1st	13.868	0.001	2	A/C, p=0.004
		3rd	8.503	0.014	2	A/C, p=0.031
Q.2. (Fig 2) Foreigners	Kruskal-Wallis test	1st	39.946	0.000	2	A/C, p=0.000; B/C, p=0.000
Q.2. (Fig 2) Local	Kruskal-Wallis test	1st	10.782	0.005	2	A/B, p=0.022

authorities						
Q.2. (Fig 2) Central government	Kruskal-Wallis test	1st	18.755	0.000	2	A/B, p=0.000; A/C, p=0.026
		3rd	9.143	0.010	2	A/B , p=0.023; B/C, p=0.028
Q.2. (Fig 2) Strangers	Kruskal-Wallis test	1st	21.217	0.000	2	A/B, p=0.000
		3rd	11.932	0.003	2	A/B, p=0.008
Q.2. (Fig 2) Friends	Kruskal-Wallis test	1st	32.126	0.000	2	A/B, p=0.000; B/C, p=0.000
		3rd	26.322	0.000	2	A/B, p=0.000; B/C, p=0.000
Q.3. (Fig 3) Parents	Kruskal-Wallis test	1st	36.224	0.000	2	AC, p=0.002; B/C, p=0.000
		3rd	16.686	0.000	2	A/C, p=0.039
Q.3. (Fig 3) Neighbours	Kruskal-Wallis test	1st	89.938	0.000	2	A/B, p=0.000; A/C, p=0.000; B/C, p=0.000
		3rd	45.584	0.000	2	A/B, p=0.038; A/C, p=0.000
Q.4. (Fig 4)	Chi-square independence test	1st	52.248	0.000	2	A/B, p=0.000; B/C, p=0.000
		3rd	73.053	0.000	2	A/B, p=0.000; B/C, p=0.000
Q.6. (Fig 5)	Kruskal-Wallis test	1st	49.755	0.000	2	A/C, p=0.000; B/C, p=0.000
		3rd	42.756	0.000	2	A/C, p=0.000

**A – Poland; B – Lithuania; C - Slovakia*
Source: own calculations.

Comparing the populations according to the country of origin criterion, in 18 out of 72 cases (25.0%) the null hypothesis was rejected. It allows to conclude that in these cases there are statistically significant differences between young people of Generation Y representing different national groups. The most cases concerned the differences between the Millennials in Poland and Lithuania, and the least between the respondents in Lithuania and Slovakia. Taking into account the criterion of the year of studies, i.e. comparing people starting academic education with those finishing education, it was found that there are more statistically significant differences between Millennials being in the first year of studies than in the third year (18 and 11 cases respectively). It should also be added that statistically significant differences between respondents from different countries occurred in each of the analysed dimensions of informal institutions (only in one case concerning social activity in the dimension of informal social interaction, no statistically significant differences between nationalities were found regardless of the level of education).

Discussion and Conclusions

The research conducted has become a field for discussion about the importance of informal institutions to the people of Generation Y. The authors decided to identify the importance of informal institutions for Millennials in Central and Eastern Europe, their changes during the period of education, as well as to compare in this study the three analysed nationalities in this region (Polish, Lithuanian and Slovakian). Thus, the research gap with regard to informal institutions has been filled, contributing to completing the existing literature. It should be noted that the research contributes to the discussion on the importance of informal institutions to the Millennials. In addition, the research enriched institutional economics with a regional analysis of countries with a similar socio-political-economic environment, taking into account the time aspect related to the duration of learning.

Moreover, the results of the study also have an applicable value and can be used to develop higher education programmes that would improve social competences in accordance with the Bologna process.

Verifying the first research hypothesis, it was found that the knowledge and social competences acquired during 3 years of studies are in most cases not reflected in the change of informal institutions in Poland, Lithuania and Slovakia. The lack of grounds for rejecting the null hypothesis in most cases leads to the general conclusion that there is no link between the knowledge acquired in higher education and the importance of informal institutions to Millennials in Poland, Lithuania and Slovakia. Such a relationship was found in only 16.7% of cases relating to trust in people of the same nationality, foreigners, local government, networks and social integration (family and neighbours). In most cases, these changes occurred amongst the Millennials in Poland. It should also be stressed that the lack of statistically significant changes in informal institutions amongst students in Poland, Lithuania and Slovakia, which in most cases existed, coincided with their generally low level. The only exception is trust in the immediate environment and participation in the local community meetings. Thus, the authors called into question the implementation of educational results in terms of social competences. It can be assumed that the previously formed values, behavioural patterns and social activity patterns are so strong that a period of three years of academic education does not bring changes in this area. Thus, it can be concluded that when learning in higher education, there is no realisation of learning outcomes in the area of social competences. This should be a premise to draw attention in educational programmes to such didactic forms, which could create greater trust, build social relations based on inclusion relationships and promote behaviour which is directed towards social activity.

Verifying the second research hypothesis, it was found that in the CEE region, nationality does not result in a differentiation of importance of informal institutions in most cases. However, it should be noted that the results of the research allowed to reject the null hypothesis in 25% of cases. Thus, it has become possible to confirm the assumption, derived from institutional economics, that the institutional environment differs from country to country (Lissitsa & Kol 2016; Hofstede 2011). Thus it is possible to reject the hypothesis of similarity between Millennials of different nationalities. In a quarter of cases it was found that there are statistically significant differences in the importance of informal institutions to the Millennials in the analysed countries of Central and Eastern Europe.

The characteristics of young people participating in the research do not fully confirm the characteristics of Millennials presented in the literature in relation to informal institutions. The results of the research do not confirm, above all, the existence of weak relationships with the family. Research conducted amongst young people on personal trust indicates that they are rather cautious in their relations with people. At the same time, most of them have no strong relationships with people outside the family (Barford & Hester 2011). It must therefore be assumed that inclusive relationships are firmly rooted in their communities and their caution in relations with other people primarily concerns strangers. However, the Millennials characteristics presented by the literature (Bencsik, Horváth-Csikós & Juhász 2016) are confirmed by the results of the authors' research relating to helping others. This is the lack of a wide range of altruistic activities amongst the Millennials. The results of the research carried out by the authors also confirmed the individualism of the Millennials, as raised in literature (Gursoy et al. 2008; Murphy & Gibson 2010). Respondents (except Lithuanians) are not inclined to take an active part in formal organizations that provide an opportunity to create patterns of behaviour accepted in a given society.

The topic taken up by the authors requires further in-depth research. This is partly due to the research limitations. Therefore, it is recommended to undertake a research effort which would allow to identify the causes of limited importance of informal institutions to young people. The authors believe that the study can be extended to the analysis of other countries to assess whether informal institutions differ in there and change during education. In addition, it is proposed to carry out comparative research on informal institutions amongst students with different teaching profiles or among countries with different social and institutional contexts that might enrich the research results.

Notes

1. In Poland and Lithuania the authors conducted the study together with employees of the Department of Macroeconomics at the Faculty of Economics and Management University of Szczecin as part of statutory research financed by the Polish Ministry of Science and Higher Education. In Slovakia, however, the research was conducted only by the authors of this article.

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Modelling of Digital Transformation Processes in Organizations

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Abstract

The aim of the article is to indicate research directions on the complex process of digital transformation in organizations. According to the assumptions of industry 4.0 and smart city most organizations from various industries will face the challenge of digital transformation in the next few years. This will mean a change in the current functioning through the use of information technology, the Internet of Things and the automatization and digitalization of many basic (including office) processes. The digital transformation process is a complex undertaking and requires the involvement of the entire organization. It covers a number of changes in the existing business and administrative activities. The transformation process changes not only the functioning of the organization in the environment, but also its internal processes and structures. Due to the scope of changes, the digital transformation process of an organization is tied with a high risk that is not fully explored and identified. Therefore, in this article there is an identyfication of key areas of changes (named "perspective of transformation") which should be analyzed and monitored during the organization's digiatal transformation. In this article there is characteristic of four currently identified perspectives: perspective of projects, processes, technologies and organizational culture. Identification and research on such perspectives is necessary to build a model of digital transformation process for better management of changes and transformation risk.

Keywords: Digital Transformation, Process Of Transformation, Organizational Transformation

Introduction

Gartner estimates that over 90% of companies will be implementing digital transformation over the next two years. This transformation means a radical change in functioning by increasing the level of computerization, use of data and IT solutions (systems and infrastructure). According to industry reports, the role of system suppliers (i.e. IT organizations) will also increase, distribution channels, as well as methods of creating and developing products will change, especially in the field of solutions using the Internet of Things (IoT). As a result of digital transformation, production or service processes will also change, and digital transformation processes will be applicable not only to companies but also to public sector entities. [2]

The organization's transformation process is always a complex, cost-intensive and high-risk process. It is estimated that over 50% of IT organizations have initiated transformation processes in recent years (e.g. in the field of agile transformation), but only a small percentage of them have successfully transformed. Data on unsuccessful transformations, interrupted or reinitiated ones, indicates that this process is a legitimate subject of scientific research. It seems that researching such an important process for organizations as digital transformation is of particular importance in the era of Industry 4.0 and smart cities. Companies and cities are changing their functioning more often, through the use of advanced technologies supporting both operational and strategic processes. [1]

Research Problem

The complexity (as defined by the Cynefin method) of the transformation process, its dependence on many organizational and external factors is the basic scope of the research discussed later. [5] The

author, using the experience in business modeling and process modeling, attempts to develop a model of digital transformation in organizations. Searching for the optimal model of transformation from the management point of view seems justified for two reasons. Firstly, organizations entering the transformation should assess the chances of successful transformation and minimize the risk of a failed transformation by accurately determining the level of transformation readiness. Secondly, the implementation of the transformation should be subject to constant monitoring based on a set of indicators and the manner of conducting the transformation, which none of the previously created models provides. Models such as CMMI are limited to determining the state (current or desired) but do not discuss the processes of transition from one state to another. When developing the digital transformation model, it seems reasonable to include both measures that allow you to estimate the success of the transformation (by determining its status) and determining the method of the transformation as a complex process interfering in the entire value chain of the company (including key resources and activities, suppliers and recipients).

Research conducted on organizational transformations allowed to classify the transformation process depending on the level of significance of the organization as well as in the context of formalization.

Table 1: Process level and formalization level (source: own study)

PROCESS LEVEL	FORMALIZATION LEVEL	Examples of the transformation process
Very high	Very general process description, rarely formalized, currently tested only in the macro scale , with no reference to the organization's state	Digital transformation of enterprises
High	Processes described in a system layout (input/output)	Agile transformation in the IT industry
Medium level	Processes described with the use of a model with graphic notations	Restructuring of a single organization
Low level	Processes described in a methodical way	Transformation in the field of project management methodologies
Very low level	Processes described in a procedural way	Team transformation

A clear lack of formalization of the digital transformation process leads to the search for ways to standardize or describe the process so important for the functioning of enterprises. The transformation model was used to conduct research as a starting point for the formalization of the digital transformation process.

Current status of work on the model

The current state of research is based on participant observations and qualitative research of nearly 100 companies in Poland. Based on experience and observations from two years, key areas of change were identified. The implementation of digital transformation processes is associated (in the author's assessment) primarily with a set of adaptation activities at all levels of the organization. From an inside of the organization point of view, transformation implies the following changes:

- **Changes in structure** – these changes are caused by the appearance of new roles in organizations. New roles result directly from those that are recommended in IT project

management methodologies, especially in the context of agile methodologies. Implementation of projects, often with external suppliers, requires the separation of project teams and in turn such roles as Project Managers, Project Portfolio Managers, Scrum Masters or Product Owners) appear.

- **Changes in project management** – the implementation of the digital transformation process requires agile techniques that naturally have the strongest impact at the operational level of the organization, causing changes in the way projects are carried out. Adaptation of good practices and new methodologies to project implementation and management results in reorganization in project management, their greater formalization and monitoring of compliance with the overall transformation plan.
- **Changes in processes** – transformation has a very strong impact on the internal processes of the organization, causing changes in existing processes or even their complete reengineering (designing from scratch). The use of modern technologies significantly changes production or service processes, very often leading to the automation of these processes. The transformation results in dimming some processes as well as in appointing of new ones (such as the ordering process based on the electronic product configurator or sales based on market-place systems).

Initial Model

Initial research on the model focuses on decomposing the digital transformation process to reduce its complexity. As an effect of these works transformation sub-processes are isolated. The research also includes the analysis of input parameters and resources that organizations should use to implement the complex process of digital transformation and study the results of these transformations (meaning changes in the resources or products of the organization).

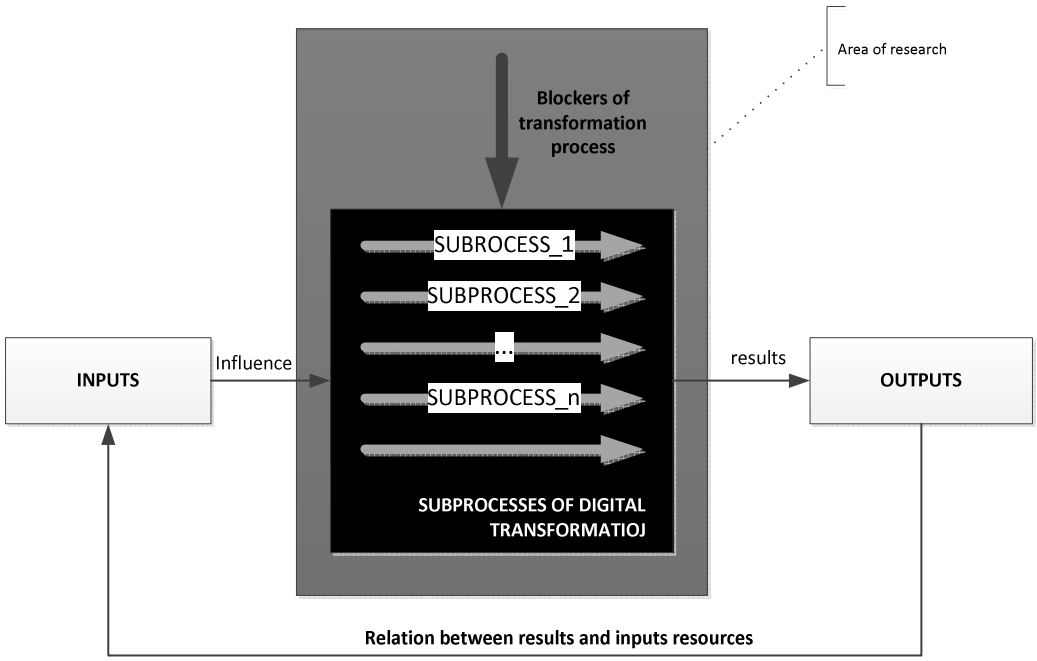

Fig. 1: Initial model – digital transformation (source: own study)

The current state of research in the area of isolating transformation processes has enabled the identification of sub-processes within four key areas of the company's operation. These areas are called model perspectives. The perspectives of processes, projects, technology and organizational culture are currently distinguished. The perspectives gathers similar transformation sub-processes,

which summed up result in the implementation of digital transformation and achieving a new (post transformation) state by the company.

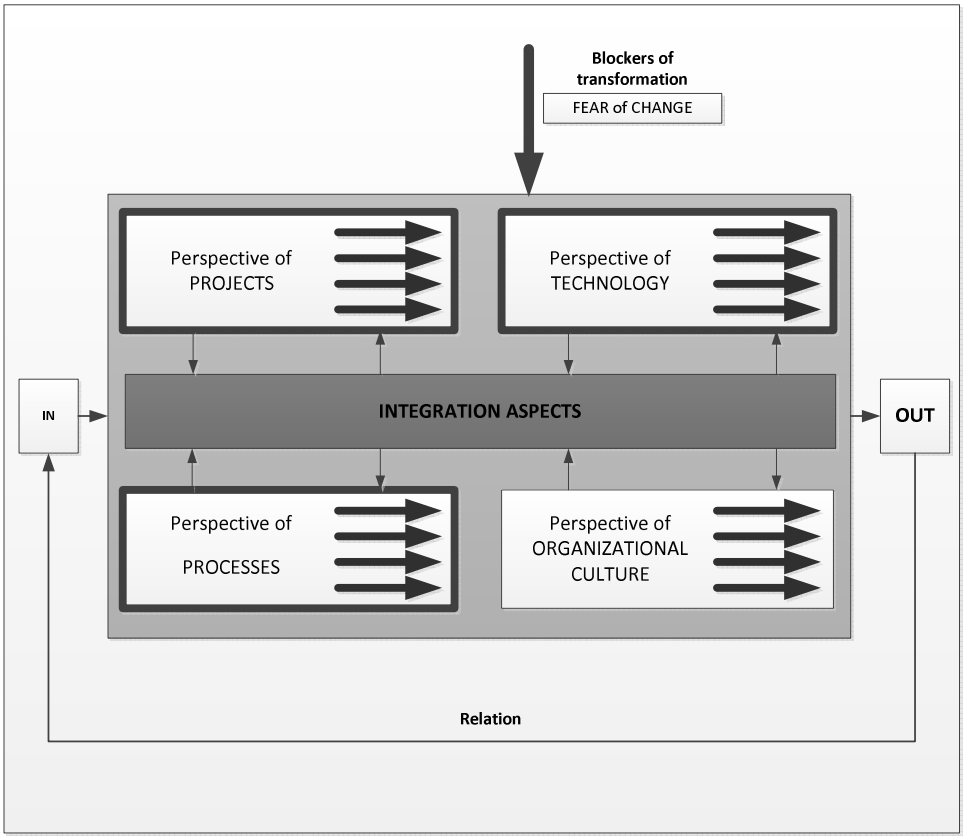

Fig. 2: Detailed model of digital transformation (source: own study)

Transformation perspectives gather sub-processes which cause a significant change in the functioning of the organization in a logically separated area of its functioning. In the case of organizations implementing digital transformations, the project perspective seems to be the first (and probably the main) that implies changes in the next ones. The relationships between change perspectives are also the subject of research. The current status of work on the model has allowed basic descriptive characteristics of transformational perspectives.

Project Perspective

Project perspective seems to be representative of any organization that, when implementing projects related to digitization meaning temporary action, completed with a specific result) most often uses specific methodologies for implementation and management. The significance of changes in the design area is symptomatic for digital transformation, therefore learning about changes within this perspective was considered fundamental. For the purposes of research of the model in this perspective there was main research questions about the role of changes in the perspective of projects [6] as an initiating other changes and the role of IT projects affecting change – from a classical organization to a digital organization (using ICT for advanced development purposes).

Technology Perspective

Organizations implementing the digital transformation process need a change in technology (IT tools, systems, applications). During the transformation process, a number of changes occur in the systems used and changes also occur due to the use of technology [3]. For transforming organizations, this means that they often need to look for completely new tools or develop existing ones with new functionalities. This, in turn, means the need to implement a number of sub-processes forcing changes in the approach to IT solutions that not only support company management but also support creation functions (e.g. analysis supported with sensors, which provides more knowledge about customer preferences and allows to change / modify the scope of the service provided).

New sub-processes for the selection of technologies and their application in organizations that appear in connection with the transformation and undergo the digital transformation process are of great importance for the market success of these companies. The sub-process of selecting technology to meet the needs of an organization, based on its functional expectations rather than a comprehensive tool seems to be particularly important [4]. This means that organizations are trying to take technology optimization actions by selecting or developing existing tools in a way that allows to obtain information for the development of the company, offer and sales channels.

Process Perspective

While computerization projects seem to be the basis of the digital transformation process, it is processes that change under the influence of implementing new IT solutions should be identified in the process perspective. Therefore, the examination of the process perspective in the context of digital transformation includes processes supporting the implementation of main processes in the organization. It should be noted that the examination of organizations in the perspective of processes is aimed at both identifying potential sub-processes of the digital transformation process affecting the radical change in the functioning of the organization as well as the possible dependence of these changes on previous changes in the project and technology perspective.

Organizational Culture Perspective

Conducting research in project, technology and process perspective has allowed to distinguish sub-processes significant for the course of transformational changes. During in-depth research and experiments conducted in order to verify the significance of these sub-processes for the course of transformational change, and thus the course of the complex process of digital transformation, a number of aspects related to the people and culture of the organization were observed, which seemed significant from the point of view of the success (efficiency?) of the transformation. Cultural aspects are mainly associated with certain organizational behaviors, best practices, norms and values. Therefore, it was considered necessary to look for the relationship between the perspectives of the previously separated sub-processes of the digital transformation process and the culture of the organization and the readiness of people for a change based on modern technologies. The cultural perspective is the most difficult to analyze but also inherent in the strategic change resulting from the implementation of the digital transformation process.

Next Steps

Identification of key perspectives for change resulting from the implementation of a complex digital transformation process does not close the research, but rather opens it. The author and his team try to identify other perspectives that would constitute groups of change processes resulting from the implementation of the digital transformation process. There also is an ongoing research on the detailed decomposition of each of the perspectives and isolation of key sub-processes in them. The purpose of identifying sub-processes is to be able to build an assessment model of the organization's readiness for change and assess the risk linked to project implementation. Current research on the process of digital transformation can be considered an early stage, but it is worth adding that the

author and his team have been researching the phenomenon of agile transformation for many years, therefore the research apparatus used is similar and allows quick identification of key areas of change. The following research will aim at identifying the transformation causes (change triggers) and creating a risk measure and a measure for the readiness of an organization for a digital transformation. The measure will be based on own and based on own and acknowledged in the literature rating models.

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Start-Up Leaders in The Media – Results of Qualitative Content Analysis of Online Press News

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Abstract

Start-up activities constitute a crucial area of modern economy. At the same time, a leader is an essential factor contributing to the success of a company, especially as young and dynamically changing as a startup. Also, like all enterprises, start-ups are expected to build their brand, and their leaders should create their personal brand. One of the factors that affect the perception of a brand, also a personal one, is its media image. This article diagnoses the problem of the media image of Polish start-up leaders, using the qualitative content analysis method. As a result, it was possible to identify categories of media coverage about start-up leaders, and to determine how they affect the image of these entrepreneurs.

Keywords: Entrepreneur, Media, Content Analysis, Personal Brand, Start-Up

Introduction

The challenge of creating a personal brand of an enterprise leader is a recognized scientific problem in the management sciences literature. It was found that the CEO reputation is directly linked to organizations' higher profits and their competitive advantages (Ranft, Zinko, Ferris, & Buckley, 2006) – in other words, the CEO is a crucial factor contributing to the corporation success. It was even suggested that the CEO personal brand is more effective in generating goodwill and brand equity than a business brand because society trusts people more than businesses (Montoya, 2002). It was attempted to measure scales for quantifying a CEO's personal brand (H.-M. Chen & Chung, 2018; H. M. Chen & Chung, 2016). However, this research concerned the internal context of an organization. It should be expected that start-ups, understood as young, innovative, and continuously changing enterprises, will regard the role of the CEO's personal brand as particularly important. The presented article addresses the issue of a start-up CEO image created by the media. In this study, the media image of a start-up CEO is considered from two angles – as an element of personal brand equity and as a factor of the company's brand equity.

It should be noted that start-up activity is a very popular topic, as start-ups represent "from rags to riches" myth and uniqueness. The "entrepreneurial myth" is particularly vivid in Poland, which, due to the ongoing changes in the political system, is a hospitable place to develop a start-up. Currently, there are about 3,000 of them in Poland (ExMetrix, 2018). In 2019, Poland was voted the seventh most friendly country in the world for start-ups, in a survey by "CEO World Magazine" (Westerby, 2019).

This favorable climate for start-ups is also visible in media publications. According to a report from 2017, prepared by the Press Service Information Agency, during the eight months of the year 2017, 37,537 publications on the start-ups activities appeared in the Polish media, whose coverage, expressed in the potential number of contacts, was 13 831 509 496, and estimated AVE, i.e. Advertising Value Equivalency, amounted to 347 215 625 PLN (~ 90 298 456 $). The vast majority, nearly 85% of all publications, were published online (Press Service Press Service Information Agency / Agencja informacyjna Press Service, 2017). To the best of the author's knowledge, no qualitative research on the content of media communications about start-ups has been undertaken so far.

Research Method and Assumptions

Method of Research

In the article, the method of qualitative content analysis was used. The content analysis is one of the research methods used mainly in sociology, communication sciences and related social sciences, which involves determining and describing the linguistic features of texts in order to explain the non-linguistic properties of their authors, such as attitudes, assessments or intentions. According to the classic definition by Krippendorff, it is *"a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use"* (Krippendorff, 2004, p. 18).

There are two basic types of content analysis - quantitative and qualitative. They differ primarily in the research procedure and inferences based on the obtained results. Using qualitative content analysis, a researcher uses inductive reasoning: formulates research questions instead of hypotheses, and answers them, reads through the data and scrutinizes it to identify concepts and patterns (White & Marsh, 2006, p. 34). As White & Marsh note, *"conclusions from the content analysis can be drawn about the communicator, the message or text, the situation surrounding its creation-including the sociocultural background of the communication-and/or the effect of the message"* (White & Marsh, 2006, p. 27).

Despite the sociological connections, content analysis is a universal and highly flexible research method with varying possible research goals and objectives (White & Marsh, 2006, p. 22). Although the method is relatively rarely used in management sciences, it can provide interesting conclusions regarding, among others, image management of, for example, enterprises or entrepreneurs, which is the subject of the presented paper.

Research Questions

According to theoretical assumptions quoted above, in qualitative content analysis method, the research questions instead of hypotheses are formulated. They may relate to the sender of the message, the message he or she sends, the sociocultural background of the communication and expected effect of the message.

Considering the above assumptions and the research problem identified in the introduction to this article,
it was decided to formulate the following research questions:

1) Do press articles about start-ups contain information about their founders?

2) What kind of information about start-up founders is provided in general articles about start-up activities?

3) What image of entrepreneurs, start-up founders does such information create? Is it positive or negative?

Method of Sample Selection

In the methodological articles on the content analysis method, great attention is paid to the method of research sample selection. The first issue is the sample size. In qualitative studies, it is common that data is based on 1 to 30 unit of analysis (Bengtsson, 2016, p. 10). In this study, one online article is considered as one unit of analysis.

Another issue is the proper selection of a research sample. Methodologists note that the sampling should be theory-based and purposive, and *"it may have as its objective providing the basis for identifying all relevant patterns in the data or characterizing a phenomenon"* (White & Marsh, 2006, p. 36).

As part of the study, the content of online articles on start-ups was analyzed. The selection of analyzed start-ups was based on a summary prepared by the opinion-forming Internet portal MyCompanyPolska.pl entitled "25 best Polish startups", which was chosen because of its timeliness in relation to the situation on the start-up market in Poland (My Company Polska, 2019).
Due to a large number of such materials and the aim of the paper, the research sample was additionally limited to:

1) texts published in 2018, 2019 and 2020 and available online (free access),
2) texts written in Polish,
3) texts in the form of an informative article (articles in the form of an interview, short articles and articles describing more than one start-up were excluded from the research sample),
4) texts published in the opinion-forming portals with the highest viewership, according to PBI/Gemius Research [PBI/Gemius, 2019] and in popular business media.

The research sample includes no more than one article per one start-up. The selection was based on the date of publication, choosing the most recent text on each start-up (according to recent Google search results).

Due to the wide variety of start-up definitions, it should be noted that as part of the study, the accuracy of a start-up definition was not thoroughly analyzed and the specific criteria were not applied. The article focuses on the topic of start-ups primarily due to the fact that they are entities commonly identified with innovative, active entrepreneurship and in this study their business model plays a lesser role. In this article, texts on start-ups are treated as an exemplification of media reports about entrepreneurship and entrepreneurs in general.

Considering the above findings regarding the sample selection, a unified and coherent collection of 16 Internet articles was created. The list of the analyzed text is presented in the **Appendix 1**. A synthetic diagram of the research procedure is presented in **Figure 1**.

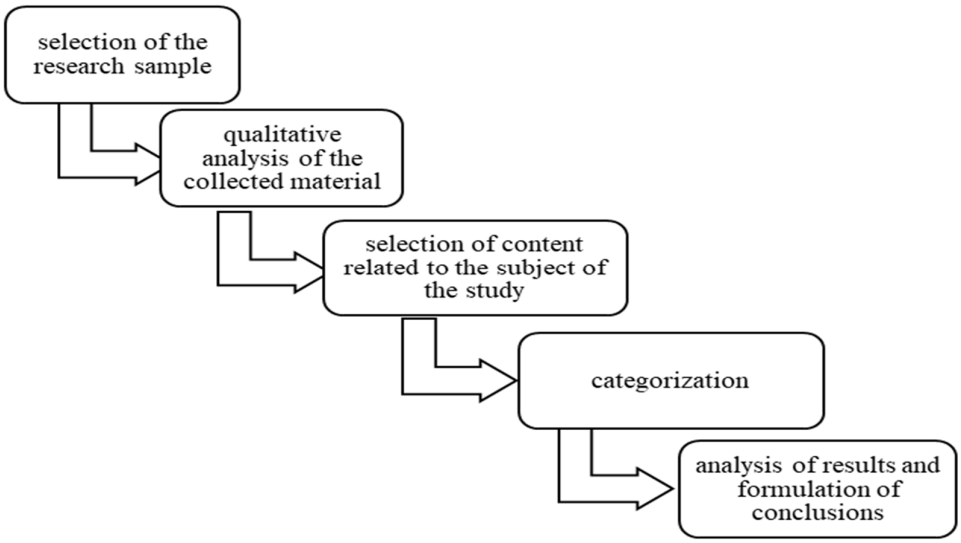

Fig. 1: Research procedure.
Source: own elaboration.

Results

The analysis showed that one can talk about a specific structure of the article about the start-up, which relates to the so-called "inverted pyramid". It is a metaphor used by journalists and other writers to illustrate how information should be prioritized and structured in a text. In the studied texts, information about the start-up leader can be found in all elements of this structure: **(Figure 2**):

1) in the lead – only surprising, eye-catching information is provided about the leader/leaders of the start-up,
2) in the body - fragments of interviews, statements about startup leader/ leaders, mainly related to the implemented projects, actions taken and funds obtained,
3) in the conclusion - information about the leader/leaders of the start-up, data on education, age, professional experience, character traits, attitudes; the information here is provided as a context, supplementing the start-up information.

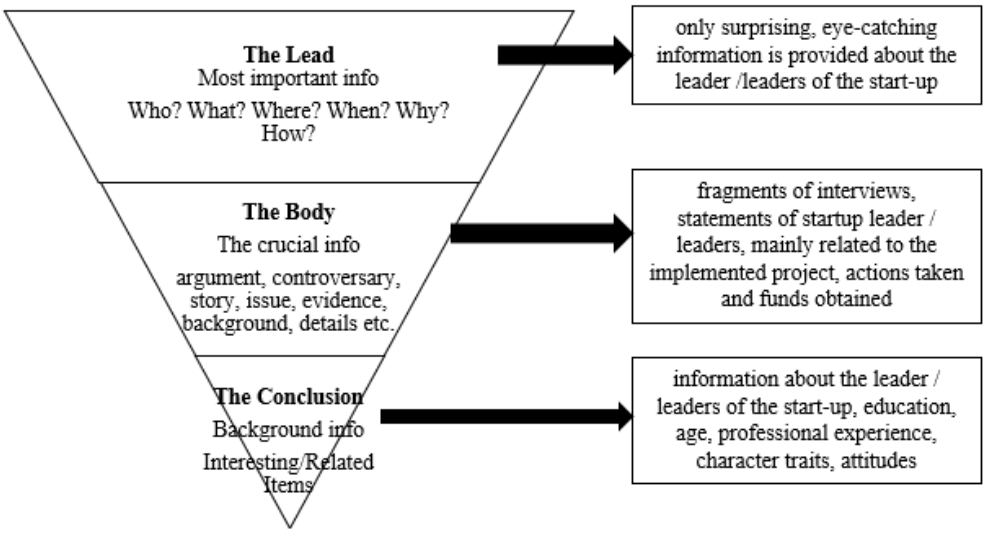

Fig. 2: Placing information about start-up leaders in press texts, in relation to the so-called "inverted pyramid".

Source: own elaboration.

Categorizing content regarding start-up leaders was another element of the study. The qualitative content analysis enabled to identify six key categories of information about start-up leaders, which are presented in the analyzed media.

The following categories of information have been identified:

1) age,
2) nationality,
3) profession,
4) the past and experience,
5) relationship and teamwork,
6) plans and vision.

The categories identified above are presented in **Table 2**, together with its the most illustrative examples.

Table 2: Identified categories of startup CEO-related information in media

	Category	Examples
1.	Age	• "they are in their mid-twenties" • "young founders", • "he is 27 years old, manages a start-up worth 80 billion PLN", • "the 29-year-old leader has always shown a flair for the Internet of Things", • "became a serial entrepreneur long before his eighteenth birthday",
2.	Nationality	• "Ukrainian developers took the start-up market by storm", • "Poles bring a revolution in veterinary medicine",
3.	Profession	• "doctors and scientists", • "team of engineers",
4.	Past and experience	• "it was not their first adventure with business", • "they used previous work experience", • "one of them sold the business for several million zlotys, the other helped build a large technology company, now they are joining forces", • "they decided to use their experience in marketing, sales, printing and IT", • "company founded by engineers related to Warsaw University of Technology", • "it is possible thanks to their experience in scientific work", • "both founders: (...) have extensive experience in the industry", • "as a teenager, he built websites, created his own interactive agency and wrote the first internet game", • "a team from Krakow AGH (University of Mining and Metallurgy)",
5.	Relationship and teamwork	• "four friends founded the company", • "together with colleagues", • "behind the firm stands a team of engineers and doctors", • "there are currently 30 people on board",
6.	Plans and vision	• "has ambitious plans", • "is not enough for them", • "together with startup colleagues they have ambitious plans", • "an ambitious expansion plan", • "start-up intends to strengthen its position", • "we're going to change it" • "however, this is not all about ambitions - asked for further plans, he boldly makes a vision"

Source: results of own research. Author's translation.

Conclusions and Managerial Implications

It should be noted that, apart from exceptional examples, information about the start-up leader is additional, complementary and is usually found in the conclusion of the general info articles. Furthermore, the study allowed to identify six categories of information about start-up leaders that can be found in the analyzed media. This information, therefore, relates primarily to age, nationality, profession, past and experience, relationship and teamwork and plans and vision of the leader.

Particularly visible trends are:

1) highlighting the young age of many startup leaders, especially in the context of huge success and high profit achieved by the start-up (Age category),

2) highlighting their previous business and - often - scientific experience (Past and experience category),

3) showing the character and personality traits of leaders, especially traits such as perseverance, creativity and grit (Plans and visions category),

4) emphasizing the role of teamwork and relationships (Relationship and teamwork category).

The information presented in the analyzed articles builds a positive image of a start-up leader and an entrepreneur in general. Primarily, they focus on offering innovative business solutions that result from the creativity of leaders and the hard work that underpins the success of growing businesses. Therefore, it should be recognized that the media image of Polish entrepreneurs constitute the favorable conditions for them to build a strong and recognizable personal brand.

Managerial Implications

The above findings have a number of managerial implications. Primarily, the results of analysis confirm that the image of the startup leader is an important factor in shaping the image of the whole enterprise and it should be taken into account in start-up image-building activities and should be included in the start-up business strategy. They also show that the start-up leader is an interesting topic for journalists (especially their age, nationality, profession, the past and experience, relationship and teamwork and plans and vision). Therefore, it should be assumed that the conscious and strategic creation of start-up leader personal brand is important in the category of start-up success.

Further Research Questions

The study presented in the article is preliminary. The author of the article intends to continue the qualitative and quantitative research on the importance of the entrepreneur's personal brand in Poland and in the world. Another prospective study, currently in the initial phase, is quantitative research of start-up founders in Poland, which will examine their attitude to building their personal brand and their opinion on its role in the success of implemented business ventures.

Appendix 1: Start-up media coverage analyzed in the research

1	https://wyborcza.pl/7,156282,24899446,jak-umawianie-zacheca-lub-zniecheca-do-wizyty-l-oreal-wchodzi.html?disableRedirects=true
2	https://www.forbes.pl/pierwszy-milion/callpage-start-up-trzech-ukraincow-zachwycilo-inwestorow/vfechwx
3	https://lifestyle.newseria.pl/biuro-prasowe/kariera/tylko-startup-z-branzy,b513580066
4	https://mamstartup.pl/warszawski-startup-cosmose-pozyskal-ponad-10-mln-euro
5	https://www.pb.pl/packhelp-dostal-paczke-pieniedzy-956112
6	https://zdrowie.radiozet.pl/Medycyna/Diagnostyka-medyczna/Dziecko-meczy-kaszel-Niedlugo-osluchasz-je-w-domu-sam
7	https://www.money.pl/gospodarka/wiadomosci/artykul/polski-startup-z-wynalazkiem-ktory-podbija,88,0,2408536.html
8	https://www.forbes.pl/biznes/symmetricalai-czyli-pozyczkowa-rewolucja-piotra-smolenia-i-daniela-wartolowskiego/6yw35pj
9	https://www.forbes.pl/technologie/hyper-poland-ma-srodki-finansowe-na-testy-w-zmigrodzie/b75bxqe
10	https://www.forbes.pl/pierwszy-milion/infermedica-nastepca-doktora-google-zbiera-finansowanie/4j5rwj1
11	https://www.money.pl/gospodarka/polacy-niosa-rewolucje-w-weterynarii-6379083649865345a.html
12	https://businessinsider.com.pl/technologie/nowe-technologie/intel-capital-inwestuje-w-polski-startup-elmodis-z-krakowa/pdsfzk5
13	https://www.forbes.pl/biznes/tytus-golas-tworca-tidio-ma-27-lat-warty-80-mln-zl-start-up-i-juz-140-tys-stron/q3xwy62
14	https://www.money.pl/gospodarka/swietlana-przyszlosc-miast-6374138616576129a.html
15	https://innpoland.pl/138547,firma-z-wroclawia-sprawila-ze-urzadzenia-domowe-zaczely-ze-soba-rozmawiac-potrafia-dogadac-sie-nawet-z-kominkiem
16	https://www.money.pl/gospodarka/sztuczna-inteligencja-pomoze-znalezc-prace-w-pko-bp-bot-pogada-z-kandydatem-na-messengerze-6341661042476673a.html

Source: Own elaboration based on (My Company Polska, 2019).

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Mechanisms for Managing Changes in the Socio-Economic Development of Lagging Regions

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Abstract

The Russian Federation is a country with significant inter-regional economic differentiation. the main macroeconomic indicators of developed regions-leaders and lagging regions-that determine the level and quality of life of the population differ tenfold. Managing changes in the functioning of lagging regions by creating a basis for their self-sustaining development, building competitive competencies, and digitalization can be an effective way to equalize territorial disparities. **The purpose of the study** is to reveal the specifics of the functioning of lagging Russian regions, systematize the problems of their functioning and determine the directions of their future self-sustaining development. **Methods used in the study:** economic and statistical analysis, grouping method, logical, induction and deduction, comparative-historical. **The information base of the research** is official materials and reports of the Federal state statistics service of the Russian Federation, analytical data and expert reports of Bankstoday, Fincan, Expert RA and the Analytical center under the government of the Russian Federation**. Research result**. Identification of lagging regions was made. for this purpose, the method of calculating the index of the current level of economic health of the region and its dynamics was applied. The key problems of lagging regions of Russia are systematized: budget restrictions; investment problems; employment problems, reduction of income of the population and reduction of quality of life. It is proved that the existing problems of lagging regions are reference points for their future self-sustaining development. It is determined that an effective way to equalize territorial disparities can be to manage changes in the functioning of lagging regions through the formation of a basis for their self-sustaining development, as well as building competitive competencies and digitalization.

Keywords: Region, Differentiation, Inequality, Lagging Region, Change Management, Digitalization, Macroregion

Introduction

The problem of territorial disintegration between economic centers and lagging regions is typical for almost any state. This is due to the obvious competitive advantages of some regions that have a

strong natural resource potential, greater capacity of the consumer market or their proximity to the centers of redistribution of financial flows (for example, developed Metropolitan regions) and unfavorable conditions for conducting economic activities in other regions (distance from developed infrastructure, unfavorable geographical location, lack of its own resource base). In turn, the disproportions of economic development between territories determine the emergence of a number of social inequalities.

Of course, this problem is more specific in Russia than in European countries. Thus, the value of the decile coefficient in Germany in the period from 2014 to 2017 on average remained at the level of 1.8, in France – 1.4, in Italy-2.1, while in Russia its value reaches the level of 7.1 (EMISS 2019).

In 2018, more than half (52.1%) of the total GRP of all Russian subjects of the Federation was formed by only ten regions (Moscow, Saint Petersburg, Moscow region, Sverdlovsk region, Khanty-Mansi Autonomous Okrug-Yugra, Yamalo — Nenets Autonomous Okrug, Krasnodar territory, Krasnoyarsk territory, Tatarstan, Bashkiria). Russia ranks 22nd among 28 countries in terms of inequality between urban and rural areas (the ranking leaders are Tajikistan, Georgia and Romania) (RBK 2018).

Of course, the uneven territorial development creates prerequisites for the inefficiency of the entire economic system of the country. The state should support lagging regions through regular Federal budget transfers, and in the event of crisis situations in the external world (sanctions restrictions, falling oil prices, etc.), the probability of future development in these regions is approaching zero.

The way out of this situation can be the search for new models and mechanisms for leveling territorial disparities, taking into account the ongoing changes in the global environment and digitalization.

Materials and Methods

The scientific hypothesis of the study is based on the assumption that in any economic system there is a socio-economic differentiation of territorial units. Managing changes in the functioning of lagging regions by creating a basis for their self-sustaining development, building competitive competencies, and digitalization can be an effective way to equalize territorial disparities.

H1: the existing problems of lagging regions are reference points for their future self-sustaining development.

H2: the formation of a new territorial structure is a vector of the state policy of spatial alignment.

H3: the mechanism for implementing the state policy of overcoming territorial disintegration between economic centers and lagging regions has both optimistic and pessimistic development scenarios.

Differentiation of spatial development is one of the problems that are relevant for almost any economic system, the world experience of smoothing socio-economic differentiation is reflected in the works Tyunen (1926), Kochnov (2011), Krivko (2012), Shtul′berg (1997), Seliverstov et al. (1996), Granberg (2003).

The authors studied works Zubarevich (2019), Atanov et al. (2014), Kim (2009), dedicated to the formation of the foundations of economic activity of lagging regions and the development of a strategy for their spatial development.

Models for managing changes in the socio-economic development of lagging regions are presented in publications of Filatov (2017), Karpunina et al. (2018a).

The information base of the research is official materials and reports of the Federal state statistics service, analytical data and expert reports of Bankstoday, Fincan, the Expert RA, the Analytical center under the government of the Russian Federation, and others.

Among the methods used in this study, we will highlight: economic and statistical analysis, the method of grouping, logical, induction and deduction, and comparative-historical.

The object of the study is lagging regions. In this regard, it is necessary to clarify the terminology used.

From the point of view of the theory of regionalism, problem regions are regions that have socio-economic difficulties and need external support. Regional problems can be of an economic, social, demographic, ethnic, or geopolitical nature. Among the problem regions, Granberg identifies two types - backward (underdeveloped) and depressive (Granberg 2003).

Depending on the Federal center's assistance, regions can be divided into donor regions (self-sufficient) and recipient regions (receiving subsidies). Note that the number of donor regions, i.e. dynamically developing regions, is constantly decreasing in Russia. According to official criteria, their number decreased several times in the period 1993-2019: in 1993 there were 35 donor regions; in 1997-8 regions; in 2001-25 regions; in 2015-14 regions; in 2019 – 13 regions (Bankstoday 2019).

Khanty-Mansi Autonomous Okrug – Yugra (2252 billion rubles), Moscow (1076 billion), Yamalo-Nenets Autonomous Okrug (855 billion rubles), St. Petersburg (499 billion), Tatarstan (329 billion rubles), Krasnoyarsk Krai (272 billion rubles), Moscow oblast (234 billion rubles), Samara oblast (224 billion roubles), the Orenburg region (199 roubles), Perm Krai (192 billion) are leaders in the contribution to the Federal budget in 2019 (Bankstoday 2019).

The most problematic regions receiving the maximum amount of subsidies from the Federal budget in 2019 are: the Republic of Dagestan (a total of 66,3 billion rubles), the Republic of Sakha - Yakutia (46.9 billion rubles), Kamchatka Krai (37.4 billion rubles), the Altai Krai (RUB 26.8 billion), Chechen Republic (30.4 billion rubles), Stavropol Krai (22,1 billion rubles), the Republic of Crimea (20.4 billion rubles), the Republic of Buryatia (19.9 billion rubles), the Republic of Tuva (16.9 billion rubles), Bashkortostan (15.6 billion) (Fincan 2019).

Thus, in 72 regions of the Russian Federation in 2019, the budget component is insufficient to Finance social and infrastructure expenditures on its own, so the Federal budget sends money transfers to the budgets of these regions to Finance additional expenditures.

However, the amount of subsidies from the Federal budget, in our opinion, does not fully reflect the current level of development of the region and the possibility of its classification as lagging regions.

For a more objective assessment of the level of development of the region and the changes taking place in it, as well as to develop a criterion for classifying the region as lagging behind, we use the method of calculating the index of economic «health» of regions, proposed by «Expert RA» (Expert RA 2019). In accordance with this method, indicators of the current level of economic health of the region and indicators for assessing the dynamics of the regional economy are calculated.

Indicators for assessing the current level of development of the region include: indicators that characterize the economic health of the region's population (purchasing power of average per capita income; the share of the population with monetary incomes below the subsistence minimum; retail trade turnover per capita; overdue loans to individuals); indicators of the state of economic health of regional business (investment in fixed capital per capita; housing commissioning per capita; income income tax in the consolidated budget of the region per capita; income taxes comprehensive income in the consolidated regional budget per capita); the indicators of the economic health of the consolidated budget of the region (direct debt of the consolidated budget of the region to tax and non-tax revenues of the consolidated budget of the region; the expenditures of the consolidated budget of the region for debt servicing to tax and non-tax revenues of the consolidated budget of the region; tax and non-tax revenues of the consolidated budget per capita).

Indicators for assessing the dynamics of the regional economy reflect changes in the same three groups of indicators - the economic health of the region's population, the economic health of regional businesses, and the economic health of the region's consolidated budget.

This approach allows, in our opinion, to more fully monitor both the current state of the region's economic "health" and the direction of its change.

Using the Expert RA method, we can conclude that the current level of development of Russian regions is characterized by a high degree of differentiation. Thus, the Sakhalin oblast has the highest index value of the current level of economic health of the region – 89%, while the lagging region is the Karachay-Cherkess Republic with an index value of the current level of economic health of the region -67,2% (the index of the economic health of the region's population is -92%, index of the economic health of regional business -89%) (Fig.1).

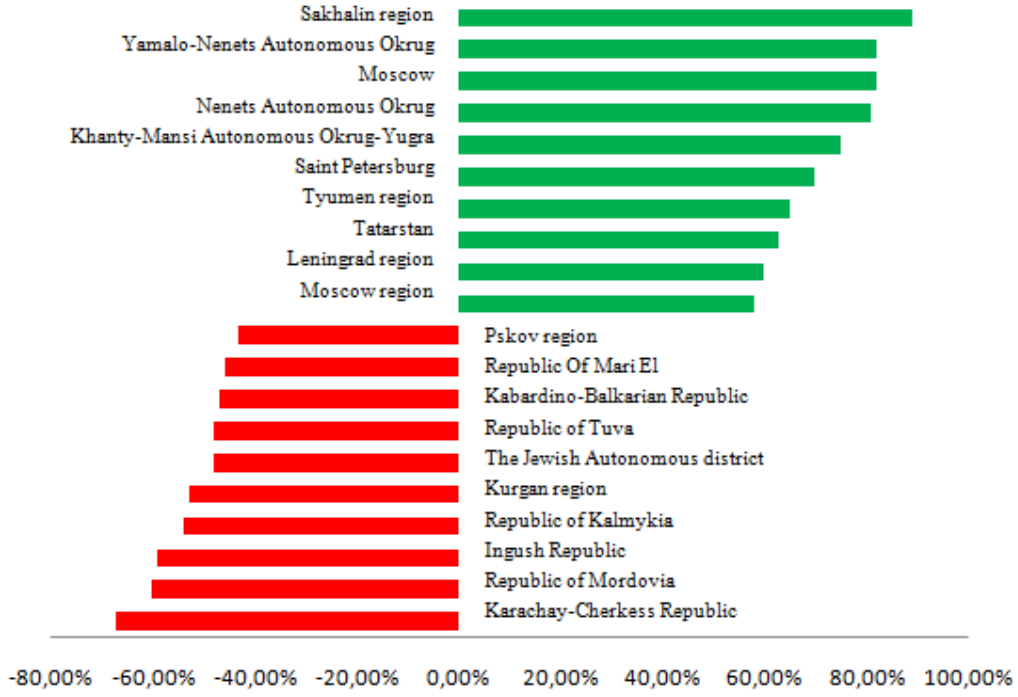

Fig. 1: Regions of Russia with the highest and lowest index of the current level of economic health of the region, 2018 (according to GKS 2019 and Expert RA 2019 methodology)

The calculation of the index of dynamics changes in the economic health of the region allowed to conclude that in 2018 the index value has improved for many Russian regions 29 regions showed a positive trend (significant improvement), 36 regions showed moderately positive dynamics. Neutral dynamics of indicators was recorded in 14 regions. Moderately negative dynamics were observed in 6 regions (including the Republic of Tyva (12%) and the Republic of Mordovia (-14%), which are among the ten regions with the lowest values of the current level of economic health). This confirms the assumption that the structure of the Russian regions ' economy as a whole is a fairly mobile substance that is prone to changes as a result of various factors, primarily regional policy.

In addition, there is a significant gap between the values of key groups of indicators of regions with high and low current levels of development. So, in 2018, 12 regions had the current level of development at the "high" level, 20 regions - "above average", 19 regions - "average", 20 regions - "below average", 14 regions- "low".

Thus, first, the object of the study will be lagging regions - regions that have the value of the index of the current level of economic health of the region "below average" and "low" with moderately positive, neutral and moderately negative dynamics of development, that is, 25 subjects of the Russian Federation. Second, the possibility of accounting for the dynamic (changes) in the process of

calculating the economic health of the region will assess the result of the changes as a result of the implementation of regional development policies in lagging regions, i.e., the effectiveness of change management.

Results and Discussion

To substantiate the H1 hypothesis "existing problems of lagging regions are reference points for their future self-sustaining development", we will diagnose the key problems and contradictions of lagging Russian regions.

Filatov (2017) systematizes the key problems of Russian regions on the following grounds: budgets; investments; income of the population, quality of life and the labor market.

As a rule, the budgets of lagging regions tend to slow down the growth rate of their own income, exhaust the sources of growth of the tax base, the state of deficit, debt dependence, imbalance and dominance of social obligations (Filatov 2017).

Investments in fixed capital in lagging regions tend to fall in growth rates due to stagnation of production, dampening of business activity, exhaustion of the reserve strength and resources of the region's basic enterprises, slowing down the growth rate of GRP, increasing the separation of production and economic potential from other regions.

As a result, there is a shift in investment flows in the direction of competitive regions with budgets that provide a high share of the development maneuverability resource. As practice shows, lagging regions increase the gap in the volume and share of priority sources of external, extra-budgetary, and foreign investment. In conditions of stagnation of the real economy, weakening of investment attractiveness and unbalancing of budgets of lagging regions, social inequality, wage differentiation, unemployment and informal employment of the population are growing. Table 1 shows a systematic view of the problems of Russia's lagging regions.

Table 1: Systematization of development problems of lagging regions (created by authors)

Budget constraint	Investment problems	Problems of employment, reduced income and reduced quality of life
1. Dynamics of the industrial production index. The volume of manufacturing production in lagging agricultural regions in 2018 decreased by 2.9%, a key role was played by a decrease in the Karachay-Cherkess Republic by 18.4%. Production volumes in the sphere of water supply and pollution elimination in regions with a raw material export-oriented economy decreased by 4.3%, the main impact was a decrease in output in the Khanty-Mansi Autonomous district by 8.4% (Analiticheskij centr pri Pravitel'stve RF 2019). At the same time, financial and	Eight of the sixteen regions (mostly lagging regions) in the first half of 2018 reduced investment in fixed assets (against the background of a 3 percent increase in Russia). In other regions, the rating was lowered against the background of positive investment dynamics, but in some cases this dynamics is lower than the national average, and in other cases it is the result of the "low base effect". That is, in fact, it is not a breakthrough growth, but only a recovery of investment activity after the strong failures of previous years. In particular, in Khakassia, a twofold increase in investment	1. According to the data published by Rosstat on labor productivity for 2015-2017, the share of industrial workers in employment in the country as a whole in 2017 was 19.0% (13.7 million people) and differed greatly by type of regions: the highest values of the indicator were observed in raw material regions with an export-oriented economy (25.5%), developed regions based on mining (22.9%) and manufacturing (22.2%), as well as in industrial and agricultural regions (22.5%).%); the lowest values are found in regions that lag behind in development - 14.1%, where a large share of the population is employed in the service sector, and in less developed agricultural regions

economic centers have become leaders in the growth of manufacturing production (+9.3%), and developed regions with diversified economies have shown maximum growth in the sector of electricity, gas and steam; air conditioning (5.7%). 2. Budget deficit: the maximum level of deficit in the consolidated budget in 2018 in the Republic of Mordovia (-7 billion rubles, or -24.5% of the national income tax), the Republic of Kalmykia -0.1 billion rubles, the Kurgan region -0.3 billion rubles, the Yaroslavl region -2.1 billion rubles (Expert 2019). 3. Tax and non-tax revenues of consolidated budgets in the Chukotka Autonomous Okrug (-14.6%), the Novgorod region (-13.7%) and the Republic of Kalmykia (-11.2%), the Kurgan region (-10.1%), the Ivanovo region (-7.6%), and the Pskov region (-6.8%) showed the largest decrease in real terms in 2012-2018. *4. The debt burden* on Russian regions is 2.115 trillion rubles. The highest state debt as of 01.02.2019 is typical for the following lagging regions: Kostroma region (20.5 billion rubles), Kurgan region -16.5 billion rubles, Pskov oblatsi (16.3 billion rubles), the Republic of Mari El (13.3 billion rubles). At the same time, in the period up to 2017, there was an increase in the debt burden of lagging regions, in 2017-2018, its reduction began (Fincan 2019).	activity in the first half of 2018 followed a steady and significant contraction in investment in 2016-2017. in the Bryansk region, the index of investment in fixed assets (1 half of 2018) was 76.1%, in the Kostroma region -77.1%, in the Tver region -82%, the Republic of Buryatia -68.9%, and the Republic of Dagestan-96.1% (for all regions of Russia-103.2%) (Ra-national 2018). The results of the 2018 rating are in good agreement with the statistics on the domestic distribution of fixed capital investments. The share of 24 regions whose investment attractiveness is rated as "high" in the NRA rating accounts for about 62.3% of the total investment in fixed assets. At the same time, 27 regions with "moderate" investment attractiveness account for only 10% of this volume.	(11.3%), where most of the population is employed in agriculture. 2. The average per capita cash income in Russia in 2018 is 32,609 rubles, and the average cost of living is 10,287 rubles. The ratio of the subsistence minimum to the monetary income is 31.5%. Each region has its own amount of income and its own subsistence level. For example, in the Republic of Tyva, the monthly cash income is 14,379 rubles, and the cost of living is 9957 rubles. The ratio of the subsistence minimum to the monetary income is 69.2%. The top 5 poorest regions in Russia include lagging regions such as the Republic of Dagestan (61.6%), the Jewish Autonomous region (53.9%), the Republic of Kalmykia (53.8), and the Republic of Karachay-Cherkessia (53.2%) (Zenyandex 2019) 3. Many indicators of quality of life in different regions of the Russian Federation differ at times. For example, the unemployment rate in October – December 2018 varies from 1.2% (Moscow) to 26.8% (the Republic of Ingushetia), the accrued salary in November 2018 varies from 101.7 thousand rubles per person (in the Magadan region) to 24.6 thousand rubles (in the Republic of Dagestan), the total area of residential premises per person on average – from 31.8 square meters per person (in the Moscow region) to 13.9 square meters per person (in the Republic of Tyva). The difference in life expectancy in Russian regions is 15.5 years. Infant mortality rates and many other indicators vary greatly in the regions. Outsiders of the rating of regions for quality of life in 2018 are the lagging regions: Kabardino-Balkarian Republic, Republic of Buryatia, Jewish Autonomous region, Kurgan region, Republic of Altai, Republic of Kalmykia, Republic of Ingushetia, Zabaikalsky Krai, Karachay-Cherkess Republic and Republic of Tyva (RIA 2019)

Conclusion: lagging regions characterized by decline in industrial production, slowdown in revenues, the deficit and the imbalance of regional budgets, rising debt burden and the dominance of social obligations expenditure budget.	Conclusion: in lagging regions, there is a slowdown in investment growth rates, their shift to regions with balanced budgets and a high share of the resource maneuverability of development, the lack of strategic investors and a decrease in the number of promising investment projects	Conclusion: in lagging regions, there is a decrease in the level of wages and incomes of the population (except for regions with a high share of employees of budget organizations, which are financed by Federal funds), a decrease in the level and quality of life of the population, an increase in unemployment due to the outflow of qualified personnel to more developed regions, an increase in informal employment, and a demographic and migration decline in the active population.

In addition, the analysis of scientific sources allows to identify the main inertial constraints thwarting the development of regional economy: significant disparities in the level of wages in various sectors of the economy that determine the generally low income levels; limited access to different types of capital; a limited number of enterprises with a high growth potential as targets for investment; the geographic remoteness and the poor transport infrastructure; imbalance in the structure of regional economic complex; low level of inter-regional and inter-municipal communication interaction; undeveloped institutional environment that has a decisive influence on the size of transaction costs, which determines the nature of contractual relations; lack of development strategy, low efficiency of individual projects and the regional economy as a whole (Karpunina et al. 2018b).

We believe that the reference points for the future self-sustaining development of lagging regions can be the existing problems of their development (Fig.2).

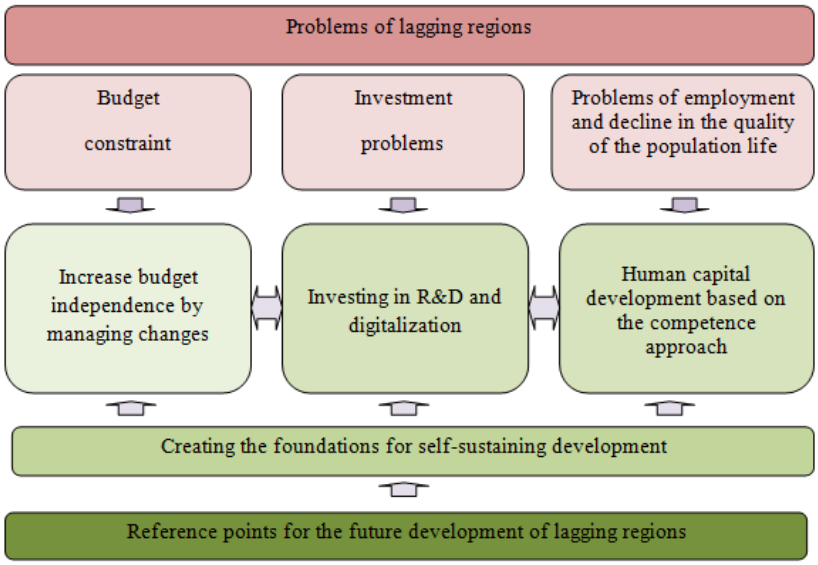

Fig. 2: Reference points for self-sustaining development of lagging regions

(created by authors)

Arguing the H2 hypothesis "the formation of a new territorial structure acts as a vector of the state policy of spatial alignment", we note that the process of managing changes begins with the formation of a new territorial structure in order to enhance interaction with neighboring more developed regions within the framework of the "open door" policy, which can contribute to the use of the lagging regions ' own resources to stabilize national development.

One of the forms of the new territorial structure can be a macroregion as part of the country's territory, which includes the territories of two or more regions and is formed for strategic planning purposes.

Japan has a positive experience of regional development based on the creation of a spatial structure of the economy based on autonomously developing macro-regions. Regional strategies are guided by the principles of mutual assistance and independence of regions, competition of ideas and innovations, creation of sustainable regional communities by stimulating the local economy and creating local jobs. The regions plan and act independently, and the national government performs a supporting function. At the same time, interaction between 8 macroregions (Kanto, Tohoku, Tokai, Kinki, Shikoku, Hokuriku, Chugoku, and Kyushu) is envisaged to minimize the negative consequences of a monocentric spatial structure (Atanov et al. 2014).

In South Korea, starting in the 2000s, the tasks of balanced development and mobilization of growth in the peripheral regions were also solved through a policy of decentralization. 5 economic macroregions were created within the framework of spatial modification, each of which has a population of more than 5 million people and consists of 2-3 provinces or provincial cities connected to each other by common historical, economic and social ties (Kim 2009).

In 2009, Autonomous regional headquarters were established for effective cooperation between provinces within the borders of one economic macro-region. They develop regional development plans for their macroregion and promote horizontal cooperation among local authorities. Thus, the advantages of regional development based on regional specialization, decentralization and local autonomy, interregional cooperation and joint development are obvious.

It is the formation of macro-regions that is referred to in the Decree of the President of the Russian Federation No. 13 of 16.01.2017 "On approving the foundations of the state policy of regional development of the Russian Federation for the period 2025" (Kremlin 2017).

New macro-regions can be based on the following strategies: strategy for the removal of production; the strategy of substitution production; incentive strategy; strategy of growth through domestic demand in the Federal district and regions; strategy of growth through demand from the national economy; strategy of growth through development programmes of natural monopolies and state corporations; strategy of growth through attracting foreign investment and joint ventures; growth strategy through the establishment of territories with special conditions for business activities (Filatov 2017). The choice of a particular strategy for creating a new territorial structure will be determined by the peculiarities of the geographical location, as well as the socio-economic potential of the lagging region. The result of the creation of macroregions should be the stabilization of territorial development and increase of budget independence due to the emergence of new opportunities to use the potential of the region.

The second element of change management in order to form the basis for self-sustaining development of the region is investment in R&D and digitalization.

The main principles of regional policy are the mobilization of unused sources of growth and innovative potential by stimulating bottom-up initiatives and the creation of new growth engines through R&D in key areas of the lagging region.

The experience of the Scandinavian countries shows that the sphere of research and development (R&D) was and continues to be an important recipient of budget funds (in the late 2000s, the share of R&D expenditures in Finland reached a record 3.7% of GDP, in Sweden-3.6%, in Denmark-3.1%). However, in addition to the state, private business should play a significant role in the development

of this area. For example, in the Scandinavian countries, almost every large enterprise is focused on creating its own research center or working in close connection with scientific and research centers, laboratories, and institutes. This system reduces the time period for innovation, i.e. the path from invention to commercialization (Demidova 2018).

An effective tool for building the region's innovation potential is the creation of industrial clusters and the promotion of innovative developments and venture capital in the regions. For example, the Ministry of education, culture, sports, science and technology of Japan has been promoting the creation of such clusters in the regions since 2001.

The third element of change management is the development of human capital based on a competency-based approach. At the same time, we are talking about groups of competencies that lagging regions have, and that function separately, often locally, without being involved in solving the problems of national economic development (Filatov 2017). The emergence of lagging regions as centers of competitive competence is a factor in the intensification of regional development.

Gennaioli et al. (2013), after examining a database of 1,569 subnational regions from 110 countries, provide evidence of the paramount importance of human capital and professional competencies in accounting for regional differences in development. In this analysis, human capital, as measured by education, is the most consistently important determinant of both regional income and the productivity of regional institutions.

Firstly, the human capital of employees is included as a contribution to the neoclassical production function, but the human capital of the entrepreneur/manager affects productivity at the firm level independently. In the models of allocation of talent between work and entrepreneurship (Lucas 1978, Baumol 1990) the return on entrepreneurship training may appear more as a profit than as a salary. Secondly, there are external effects of human capital for the region, resulting from the fact that people in a given place spontaneously interact with each other and learn from each other, so knowledge is transmitted through people without payment (Jacobs 1969, Lucas 1988). Thirdly, in different countries, the impact of education and regional development institutions is difficult to separate: both variables are endogenous, and potential tools for them are correlated (Glaeser et al. 2004).

The hypothesis of the conducted research H3: the mechanism of implementation of the state policy of overcoming territorial disintegration between economic centers and lagging regions has both optimistic and pessimistic scenarios of development.

Indeed, investing in R&D and developing competitive competencies, even if well-organized and funded, does not lead to quick and obvious results (a pessimistic scenario) for three reasons, which are limited to targeting only the academic and business environment: changes in basic science and education are focused on the long term; providing a favorable innovation environment in the region leads to innovation activity with a time lag; support for regional technology projects and startups has a limited effect in the absence of domestic demand (Key 2011).

Conclusions/Recommendations

The authors used the method of calculating the index of the current level of economic health of the region and its dynamics to identify lagging regions that are the object of the study. The authors determined that the possibility of taking into account the dynamic component (changes) in the process of assessing the economic health of the region will allow determining the result of changes occurring as a result of the implementation of the regional development policy of lagging regions, i.e., the effectiveness of change management.

The authors systematized the key problems of the lagging regions of Russia and divided them into three groups: budget constraints; investment problems; problems of employment, reduced incomes and reduced quality of life. The authors proved that the existing problems of lagging regions are reference points for their future self-sustaining development. It is determined that an effective way to

equalize territorial disparities can be to manage changes in the functioning of lagging regions through the formation of a basis for their self-sustaining development (the formation of a new territorial structure in the form of macroregions), as well as building competitive competencies and digitalization.

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Similarity Assessment in the Design of Graphic Marketing Messages: The Case of Drain Cleaner Packaging

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Abstract

One of the crucial function of packaging is communication with a potential client which shapes the customer product perception. Thus, knowledge on which factors and how influence buyers could be critical in gaining market share. In the face of high market competitiveness, companies are struggling to provide distinctive marketing messages. On the other hand, they may also face unfair activities from manufacturers trying to use packaging similar to those of a well-established brand. The present paper examines similarities of packaging products from companies that newly entered the market with packaging designs of a well-known drain cleaner. We take advantage of the cognitive psychology based methodology proposed by Luce (1963), determine consumers' perceived similarities, and estimate probabilities of correct and incorrect selections for all pairs of nine examined products ($n = 50$). The results shows that three products decidedly exceed recommended level of similarity. We also provide practical suggestions about possible interpretations of the outcomes. The presented methodology along with obtained findings could be theoretically and practically applied in various types of marketing activities, especially related to the design of graphical marketing messages.

Keywords: Marketing Message, Unfair Competition, Digital Presentation, Correct Identification, Multidimensional Scaling

Introduction

Communication with the customer is one of the basic functions of the product packaging (Robertson 2006). The importance of this role has already been noted in the middle of the last century. For example, Dichter (1957) described the packaging as the "*silent salesman*". Many modern research confirms the belief that packaging is invaluable in both attracting attention and shaping the propensity to buy among customers and transferring basic product knowledge (Littel & Orth, 2013; Orth & Malkewitz, 2012).

Shaping customer perception translates into the final purchasing decision and as shown in, for example, Bloch (1995), Orth et al. (2010), Reimann et al. (2010) is closely related to the quality of the packaging design. Therefore, much attention is paid to the analysis of factors determining the customer's perception of the packaging design. Much of this research concerns low engagement products – for everyday use. A broader review of the directions of these investigations is presented, among others, in the work of Grobelny & Michalski (2015).

The constantly growing competition in the area of production of the same or similar categories of goods is a special incentive to design original, distinctive marketing messages. In this perspective, it

is crucial to design products' packaging in such a way that they stand out among competing ones that are often placed on the common shelf in the market or in the same virtual store's web page (e.g., Ryynanen & Hakatie, 2013).

The other side of this context is, unfortunately, the market's inclination to unfair competition. If the products belong to the so-called low-involvement goods, that is, everyday use at a low price, consumers' cognitive engagement while shopping is small. In such a case, purchase decisions usually take a few seconds. The use of packaging similar to those of a known brand by an unknown company causes mistakes or activation of the mechanism of transferring positive associations from the original trademark. As a result, it facilitates the market expansion without spending on advertising, promotion, etc. Potential threats of this type are the basis for the research described in this work .

In the current study we analyze the similarity of packaging products from companies that newly entered the market with packaging designs of the well-known sewer pipe cleaner (Kret). The methodology and analysis of these similarities among packages of drain cleaners available on the Polish market is the subject of the present research. In addition to practical solutions, the research's special purpose was to show designers and companies the application of the cognitive psychology based methodology for determining consumer perceived similarity of objects and the possibility of using such analyzes in marketing activities.

In the following paragraphs, the idea of this methodology is first discussed, then the design of the experiment was described and the obtained results were presented. The discussion and conclusions section indicate, apart from the summary of the outcomes, possible practical consequences of using the results of these type in the marketing activities.

Method

Since the examined products, as mentioned earlier, belong to the so-called low-engaging goods, the consumers' cognitive involvement is also small. In this situation, it is possible to examine both the packaging similarities and determine the likelihood of incorrect identification, which leads to choosing competing goods instead of the proper one, using the selection model proposed by Luce (1963). A detailed description and justification of the conduct methodology is available in the works of Getty & Swets (1982) or Falkowski (2002). The general procedure is reduced to the following steps:

1. Subjects assign a level of subjectively assessed similarity to each pair of analyzed objects on the ordinal scale (i.e., 0 – absolutely different ... 10 – identical).

2. The obtained scores are averaged across all participants.

3. Similarity relations are presented in two-dimensional space using the multidimensional scaling method. The technique place points representing the examined objects in such a way that the distances between each pair of objects are proportional to their average degree of similarity.

4. For each pair of investigated objects their Euclidean distance $Distance_{ij}$ is calculated in the space used in the multidimensional scaling procedure.

5. Based on d_{ij} distance, a similarity measure is determined for each pair. The following exponential formula is used for that purpose: $Similarity_{ij} = \exp(-a \cdot Distance_{ij})$, where a is the coefficient of perceptual sensitivity in differentiating stimuli.

6. The calculated similarity measures allow for determining the probability of correct and incorrect object identification in the selection process regarding the pair of i and j objects. These likelihoods are calculated according to the formulas: $Probability_{Correct(i,\,i)} = 1 / (1 + Similarity_{ij})$, and $Probability_{Incorrect(i,\,i)} = Similarity_{ij} / (1 + Similarity_{ij})$, respectively.

This approach is a consequence of the practical application of the results of similarity research formalized as the Luce's theoretical choice model (1963). The starting point of this theory is an error matrix obtained by direct identification of objects. This confusion matrix includes probabilities estimated by frequencies of incorrect identification for each pair of compared items.

In a series of laboratory experiments Getty & Swets (1982), among others, showed that using procedure 1 – 6 described above, the probabilities of correct and incorrect identifications of objects reproduce those obtained in direct comparisons accurately. The percentage of a common real variance and the approximated error matrix, in 33 experiments, ranged from 96–99%). In addition, detailed practical research has shown (Getty et al., 1979; Nosofsky, 1986; Chlewinski & Falkowski, 1992) that the adoption in the multidimensional scaling procedure (Kruskal, 1964) employing a two-dimensional representation space with (–1, 1) range and parameter $a = 2$ (fifth step of the presented procedure) gives the best fit of the estimated error matrix to the matrix obtained in real consumer choices. Therefore, such parameters were used in present study analyzes.

Participants

Fifty adult subjects, aged 24–69, took part in the study, of which 60% (30 persons) were women and 40% (20 people) men. The results presented in the *Gender Consumer in Marketing* (2020) report, based on a sample of 986 adult Poles (50.8% women and 49.2%), show that in Poland mostly women (61.7%) are responsible for shopping in households. This outcome was taken into account when selecting the sample for the present investigation.

Almost all participants ran their own households and used chemicals to unblock pipes in the past. The respondents purchased household chemicals, most often in self-service stores, where products are selected on their own. Among the surveyed brands, they subjects, the most frequently, associated the *Kret* product with pipe clearing agents, followed by *Tytan*. None of the examined persons ever participated in such experiments before. Subjects did not receive any remuneration for participating in the study.

Apparatus

The paper-based survey used in the current research consisted of three main parts. The first part contained general questions characterizing the person completing the questionnaire: age, gender, and questions related to the use of chemicals for pipe unblocking, for example, *Do you run your own household*? or *Have you ever used chemicals for pipe unblocking*? The second and third parts comprised pairwise comparisons of nine packaging photos: two products from a leading manufacturer and seven being the natural context for a potential consumer. Sample page fragments from the second and the third survey parts are illustrated in Figs. 1 and 2.

In order to reflect the real differences in the sizes of the tested packages, the photos used for comparisons were taken in pairs at the same distance between the camera and products. The camera was fixed to the tripod. A uniform and neutral background was also used not to disturb the perception of the examined packages. Only photos showing the front of the packaging were used, which roughly corresponds to the situation in which a potential customer sees the products on store's shelf.

Fig. 1: Fragment of the sample page from the second part of the survey

Fig. 2: Fragment of the sample page from the third part of the survey

Experimental Design

Nine product packaging for drain cleaners used in households were considered in the study. Among them there were two packages leading in the market (Fig. 3), that is, 1. Kret (silver, KSr), 2. Kret

(red, KCz) and three disputed products entering the market (Fig. 4): 3. All (All), 4. Rater (Rat), 5. Wicuś (Wic).

1. Kret silver (KSr) 2. Kret red (KCz)

Fig. 3: Product packages of the leading manufacturer

3. All (All) 4. Rater (Rat) 5. Wicuś (Wic)

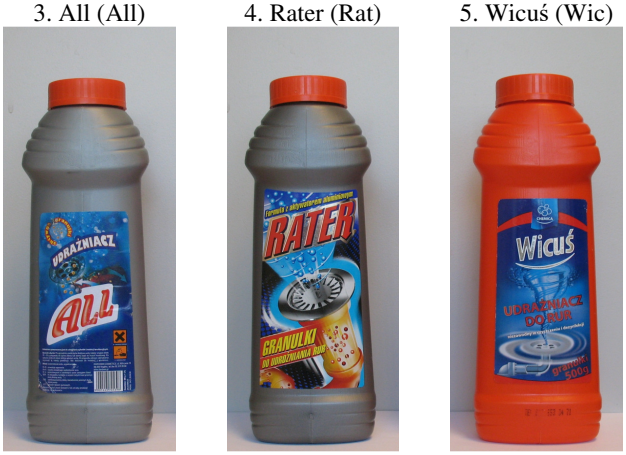

Fig. 4: Packages of new products being brought to market

In order to simulate the natural context of choice that consumers face in the store, the study also involved packaging from other companies that produce similar chemicals. The list of direct competitors included the following six products: Ludwik, Mr. Muscle, Rorax, Sansed, Tiret, and Tytan.

In our research methodology, the number of simultaneously analyzed objects should not be too large due to the rapidly increasing number of necessary pairwise comparisons. They are proportional to the number of examined objects squared. Therefore, the number of contextual products has been limited to four brands that successively have the largest share in the market of chemical pipe purifiers (Fig. 5), that is, 6. Tiret (Tir), 7. Tytan (Tyt), 8. Ludwik (Lud), 9. Sansed (San). According to the manufacturers data, 500 milliliters/500 grams containers are the best-selling, thus packages with this capacity were used in comparisons. The exception is Tytan because it was only available in a 600 or 250 milliliter bottle. In this case, the 600 milliliter version was chosen.

6. Tiret (Tir) 7. Tytan (Tyt) 8. Ludwik (Lud) 9. Sansed (San)

Fig. 5: Context product packages in order of decreasing market share

The research used a standard experimental within-subjects design, in which each participant evaluated all nine packaging variants by assessing similarity levels for all possible pairs. For nine product variants, the number of all possible pairwise comparisons amounts to 36. Four distinct sets of comparisons were elaborated. In each set, the order of comparisons was different and set at random.

The order of comparisons in the second part of the survey, presenting photos of the investigated product packages, corresponded to the order of similarity questions from the third part. To assess the, Subjects rated the similarity level for each pair of products on a 11 item Likert scale ranged from 0 to 10 (compare Fig. 2). Marking the leftmost square meant that the given pair of packages was completely different (value 0), and choosing the rightmost one indicated that the packages were identical (value 10).

Procedure

The subjects were informed about the purpose and exact scope of the examination. After obtaining the permission to participate in the study, a questionnaire regarding personal data and containing questions related to drain cleaners was filled in. Next, the examined person was asked to look carefully at photos of pipe unblocking products presented in the second part of the survey. Then, in the third part of the survey, respondents marked the degree of perceived similarity for each pair of products.

Results

Similarities based on all subjects

The summary of the obtained similarity results are presented as scores averaged across subjects and put together in the lower triangle of the matrix in Table 1 below. The presented outcomes were then subjected to the multidimensional scaling procedure supported by the PerMap program. The software allowed the creation of the so-called consumer mind map. This map is used to illustrate, in two-dimensional Euclidean space, how a potential customer perceives the differences in the packaging of all examined products. Perceptual distances provided by this procedure in the assumed coordinate system with values ranging from –1 to 1, for all possible combinations of the analyzed products, are given in the upper triangle of the matrix in Table 1.

Table 1: Average similarity ratings of the analyzed product pairs (lower triangle of the matrix) and Perceptual distances in Euclidean space for all combinations of products (upper triangle of the matrix).

	All	KSr	KCz	Lud	Rat	San	Tir	Tyt	Wic
All	×	0.33	0.60	0.99	0.08	0.97	0.69	0.91	0.55
KSr	6	×	0.40	0.97	0.39	0.81	0.96	1.03	0.54
KCz	1.7	6.5	×	0.64	0.62	0.40	1.00	0.84	0.32
Lud	1.4	1.6	3	×	0.95	0.45	0.92	0.43	0.45
Rat	8.5	5.3	2	2	×	0.97	0.61	0.84	0.52
San	1.5	1.1	3.5	2.7	1.5	×	1.19	0.82	0.50
Tir	1.9	2	1.5	0.9	1.8	0.8	×	0.56	0.72
Tyt	1.1	1.1	3.6	2.4	1.1	2.4	2.2	×	0.52
Wic	4.8	1.7	6.1	3.8	4.5	3.7	1.1	3.4	×

Graphical illustration of the multidimensional scaling results is provided in Fig. 6. These results should be interpreted as follows: the closer to each other the objects are on the map, the greater the similarity between them. In the analyzed case, the disputed packages of new products entering the market are in close proximity to *Kret* products that are the leaders. It is quite clear that *All* and *Rater* products are located the closest to the silver *Kret* packaging, while *Wicuś* is situated near to red *Kret*.

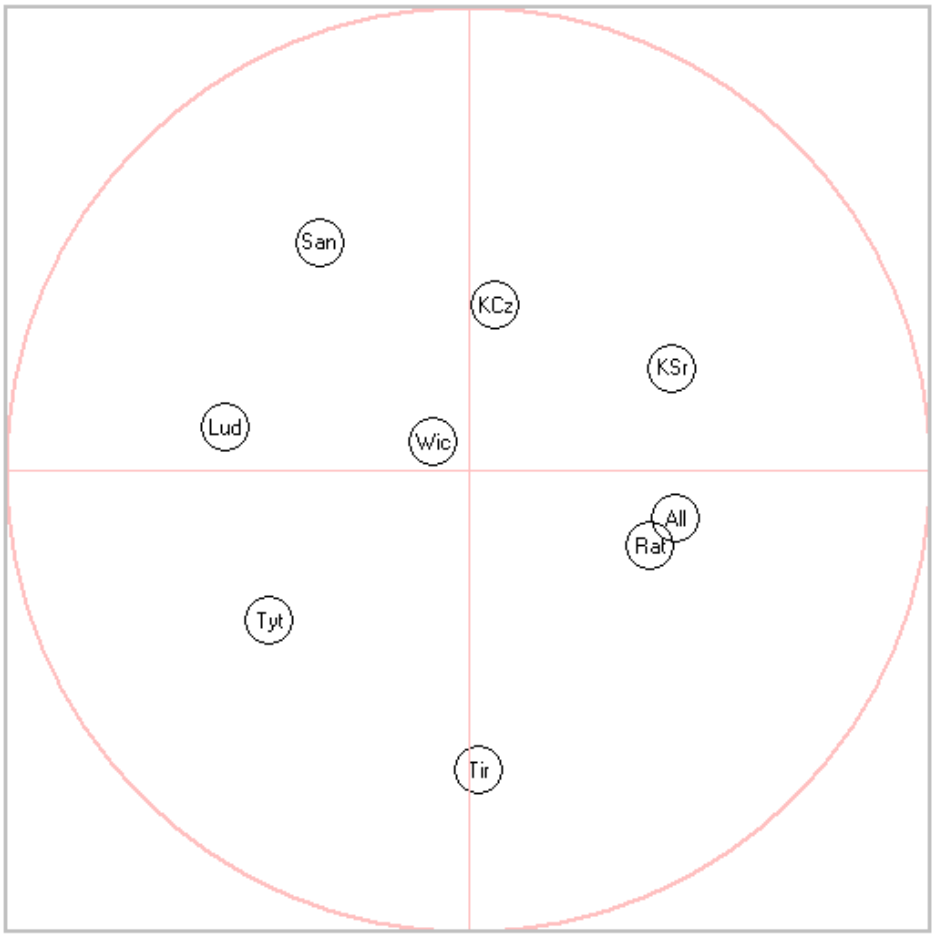

Fig. 6: Representation of packages' similarities of examined products in Euclidean two-dimensional space. The graph presents vales on a scale from -1 to 1 in both dimensions.

Products' distances computed by multidimensional scaling procedure and along with the application of Luce's similarity model (1963) allow to determine probabilities of incorrect identification, that is, the likelihood of choosing one product instead of the other, as well as probabilities of correct identification. The results of these calculations are presented in upper and lower triangles of the matrix from Table 2, respectively.

Table 2: The probability of correct (lower triangle of the matrix) and incorrect (upper triangle of the matrix) identifications for all possible combinations of investigated products

	All	KSr	KCz	Lud	Rat	San	Tir	Tyt	Wic
All	×	34.3%	23.0%	12.1%	46.0%	12.5%	20.1%	14.0%	25.0%
KSr	65.7%	×	30.8%	12.5%	31.6%	16.6%	12.7%	11.4%	25.4%
KCz	77.0%	69.2%	×	21.8%	22.5%	30.8%	11.8%	15.8%	34.4%
Lud	87.9%	87.5%	78.2%	×	12.9%	29.0%	13.7%	29.9%	28.9%
Rat	54.0%	68.4%	77.5%	87.1%	×	12.6%	22.8%	15.7%	26.1%
San	87.5%	83.4%	69.2%	71.0%	87.4%	×	8.5%	16.2%	27.1%
Tir	79.9%	87.3%	88.2%	86.3%	77.2%	91.5%	×	24.7%	19.3%
Tyt	86.0%	88.6%	84.2%	70.1%	84.3%	83.8%	75.3%	×	25.9%
Wic	75.0%	74.6%	65.6%	71.1%	73.9%	72.9%	80.7%	74.1%	×

The results presented in the above tabular form were used to illustrate likelihoods of correct and incorrect identifications for the disputed *All*, *Rater*, and *Wicuś* products with silver and red *Kret* containers. As it can be seen on these graphs, the chances for mistakenly selecting new products are quite significant – they exceed 30% in all three cases. This could be treated as an unfair facilitation in gaining consumers for companies entering the market.

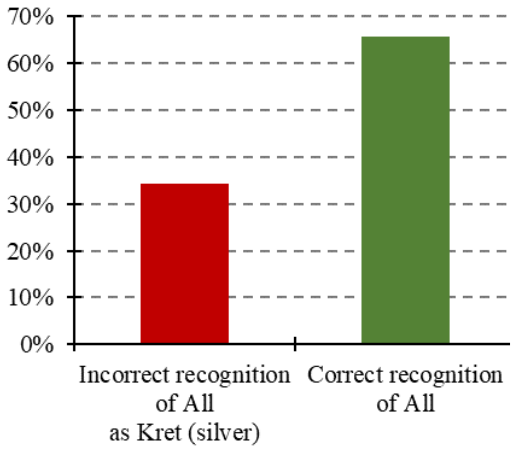

Fig. 7. Probabilities of correct and incorrect identifications for a pair of *All* and silver *Kret* products

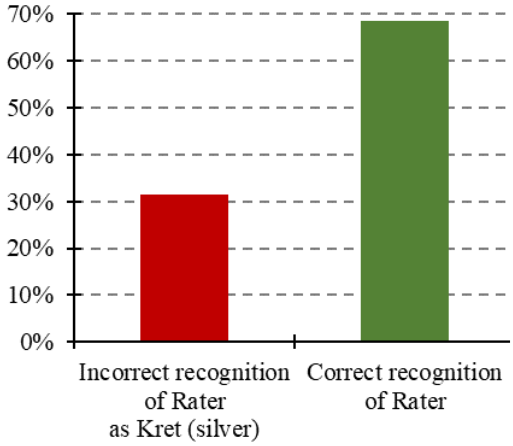

Fig. 8. Probabilities of correct and incorrect identifications for a pair of *Rater* and silver *Kret* products

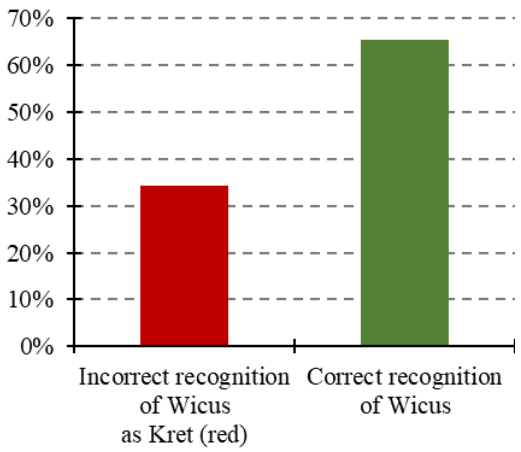

Fig. 9: Probabilities of correct and incorrect identifications for a pair of *Wicuś* and red *Kret* products

Discussion and Conclusions

Likelihoods of products' misidentifications shown in Figures 7–9 can be interpreted as the predicted percentage of errors while choosing in individual object pairs. These values are relatively high. In Falkowski's paper (2002) it was pointed out that in the economic practice of highly developed Western countries, including the United States, the accepted decent limit for the error probability in similar situations amounts to maximum 15%.

The results presented in this report significantly exceed this threshold and suggest dishonest use of the *Kret* brand by the manufacturers bringing new products to market. From the practical point of view, the leading manufacturer could use these results for persuading its competitors to make significant changes in their disputed product packaging designs, before taking any more formal legal steps against them.

Another theoretical and practical perspective of taking advantage of the discussed research outcomes and methodology is to analyze the direction towards which designers of new packages should follow to distinguish their projects from the existing on the market spectrum of solutions. For example, it is easy to read from the graphic representation of the dimensional scaling (Fig. 6) that the position of *Tiret* in the perceptual space differs the most from all the others. Direct analysis of the visual features of this product's packaging indicates significant differences in colors applied in this solution.

Both directions of using the presented approach seem to be a promising proposal for methodological support in various marketing activities. A special area of application is the analysis and design of visual communication.

Acknowledgments

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Challenges of Operational Business Excellence in Telecommunication Companies of Middle East

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Abstract

Efficient operations management is key for delivering excellent customer services likewise any other industry. Telecommunication companies in the Middle East have more employees than the rest of the world with increased competition in the sector, which creates many issues of operations need to be resolved for achieving operational excellence. Numerous authors have conducted studies on operation management and have identified a large gap for delivering operational excellence by the telecommunication companies. The study employed both qualitative and quantitative methods of data collection. The primary data was gathered through a structured questionnaire from 500 regular customers of the telecommunication companies in the Middle East. The study also measured the respondents' satisfaction towards customer care service. The results helped to identify the key gap areas in operations of telecommunication companies which can help organizations in a simple way to understand and overcome the challenges of operational excellence.

Keywords: Operational excellence, telecommunication industries, customer services, operational challenges, Middle East business excellence

Introduction

The telecommunication industry plays a vital role in providing customer services to organizations and individuals with a dire need of managing operations efficiently. Operation management is considered as an area of management that ensures the efficiency and effectiveness of all the business operations in terms of resources of the organization and requirements of the customers (Slack, Chamber, & Johnston, 2010). For every organization, the satisfaction of the customers is the first step towards their growth. Thus, they need to resolve the existing issues in the operational services of the company to win the interest of the customers. In this study, the current operation management issues of different telecommunication companies in the Middle East have been analyzed.

Telecommunication companies in the Middle East have more than employees in all the branches of the world (Makhas, 2015). But because of the increased competition in the sector, the telecommunication companies are facing some issues that need to be resolved for maintaining the position. This study makes an attempt to analyze the situation of the company and the issues faced by the company with the help of primary as well as secondary methods. This research paper will provide real-time accurate challenges in the form of simple graphics from real-time data collected from customers of the telecommunication industry. Telecom Industries can use them further to overcome their challenges in their operational excellence (Susanti, Dachyar, & Yadrifi, 2015).

Literature Review

Various authors have conducted studies on operation management and have identified numerous issues in the operational strategies of the telecommunication companies (Ali, 2012). Operation management plays a significant role in every organization because it involves the management of resources for

production and transfer of products and services (Slack, Chamber, & Johnston, 2010; Al-Weshah, Alnsour, Al-hyari, Alhammad, & Algharabat, 2013)). Operational functions of every organization include two core activities product development and marketing of products. Many authors have expressed their views on the issues in operation management pertaining to the telecommunication companies. These operational management issues are believed to create hurdles in the growth of the company. Landry (1998) in his analyses of the operation management issues of the telecommunication companies has mentioned that the first problem faced by the companies is regarding the GSM facility which according to him is one of the biggest issues. He further mentioned that various consumers of the telecommunication companies have complained regarding the quality of service and network availability of the GSM services. Operational excellence requires excellence performance and combined management effort enabling organizations to achieve high capabilities to compete in the market and achieve operational excellence for the organization and customers (Armstrong et al., 2013; Barki, Henri, Ryad, & Celine, 2007). Operational excellence is one of the important issues raised by the business leaders on various forums since decades, and commonly debated to lower the financial impact on the organizations (AL-Harahsheh & Tareq, 2015; Azila & Noor, 2011).

Wu & Pagell (2011) explained that the other issues mentioned by various other authors in their studies are related to the problems related to internet connectivity in the Blackberry phones. Various consumers do not want to purchase phones because of these issues (Armstrong, Curtis, & Tor, 2013). Many of the consumers also complained regarding the locking code of the phones which is referred to as pin code most of the time (Wu & Pagell, 2011). Zuckerman (2002) in his study mentioned that the telecommunication companies have recently offered Smartphone's but the companies are not able to provide efficient services to the customers regarding this, thus the customers are losing interest in purchasing products from this company (Alnasar, 2014; Alghaswyeh, 2014; Cahe, Kim, Kim, & Ryu, 2002). It is essential for every telecom company to support the customers when they complain regarding the services of the products of the company. Hence, it is imperative to be active in support and complaint handling to attract customers (Upadhava, Munir, & Blount, 2014; Urbanskiene, Zostautiene & Chreptaviciene, 2008) But customers of telecommunication companies are not satisfied with the services provided (Mentzer, 2001). There are a large number of complaints regarding the support system of the company (Barki et al., 2007; Chang et al., 2012). Other competitors in this industry are becoming very active for their e-support service to win the interest of the customers (Al Weshah & Al-Zubi, 2012; Elkordy, 2014). Performance is another important factor that creates an integrated system for the organizations based on internal and external units of the organizations that helps to organizations to achieve their objectives and customer satisfaction within time limit (Deng & Chu, 2012; Fitzgibbon and White, 2004). Organization objectives are commonly based on the stakeholders requirements to analyze the success of strategies and processes used for achieving the operational excellence (Doll, Deng, Raghunathan, Torkzadeh, & Xia, 2014; Ekinci, Gillet, Stone & Stone, 2007; Everington, 2017). Telecommunication companies often require both tangible and intangible elements for efficient business, not only the organizations need latest infrastructure as well as software for efficient operations (Gavrea, Ilies, & Stegerean, 2011; Hung; 2013; Hsieh, Rai, Petter, & Zhang, 2012; Kim, 2010)). Telecommunication organizations rely on efficient storage and transfer of the data which is based on different devices using the Internet, and technology systems that require constant maintenance for providing consistent services to the customers (Karazijiene & Saboniene. 2013; Khalif & Jallouli, 2014; Khodakarami, & Chan, 2011). Customer service software's also have vital impact on the customer services and organizational performance focusing on the knowledge and customer management (Lebans & Euske, 2006; Mentzer, 2001; Muhammad, Feng, Naz, & Fahad, 2014).

The above literature review presents that most of the authors have tried to explore the different aspects of the operational issues of the telecommunication companies with the help of primary as well as secondary resources. Several authors in their studies have mentioned that the customers of the company can better reflect on the flaws in the services of the company (Rogers & Wright, 1998; Setia, Venkates, & Joglekar, 2013; Slack, Chamber, & Johnston, 2010). Different parameters like cost efficiency, customer satisfaction and process improvement are used to measure the operational excellence of businesses (Sun, 2012, Mentzer, 2001; Susanti et al., 2015). This study uses one such critical factor of operational excellence- 'customer satisfaction'. Satisfaction of customers is one of the most significant yet challenging goals for the organizations (Tsai, Chien, & Tasai, 2014). Hence, this study makes an

attempt to measure the customer satisfaction towards telecommunication service in the Middle East as one of the fundamental factor of business operational excellence.

Methodology

The study employed both qualitative and quantitative methods of data collection. The primary data was gathered through a structured questionnaire from 500 regular customers of the telecommunication companies in the Middle East. Only 435 customers returned the complete questionnaire, hence the response rate was 87 percent. The questionnaire consisting of 15 questions that aimed to assess the views of the customers regarding the issues in the operational services of the company. A convenience sampling method was used to select the respondents. Qualitative data were collected from the selected sample and the findings are presented with the help of bar graphs for better analyses of the responses of the customers.

Data Analysis and Findings

The collected data was analyzed with the help of Microsoft Excel and have presented the results of all the questions in the form of a bar graph. The results are plotted in a simple way for better understanding of the data on all levels of operations including from customer service to managerial level for achieving operational excellence.

Demographics of the Respondents

This section highlights the demographics of the respondents in terms of gender and age. It was found that 68 % of the respondents were male and 32 % were female (Fig1). Of the total sample, 25% of respondents were of age group 18-23, 20% of respondents were of age group 23-28,10% fell between 28-33, 35% of respondents are of age group 33-37 and 10% of respondents are of age group more than 37. The data revealed that the highest number of respondents is of age group 33-37 (Fig 2). People of this age group were recognized best to identify the operational issues of the company. Thus, it was assumed that the sample population would best recognize the operational issues of the company.

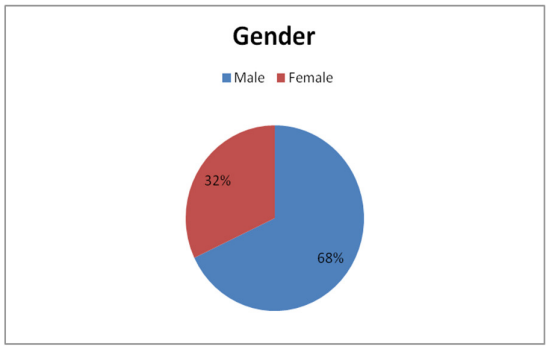

Fig. 1: Classification of respondents on the basis of Gender

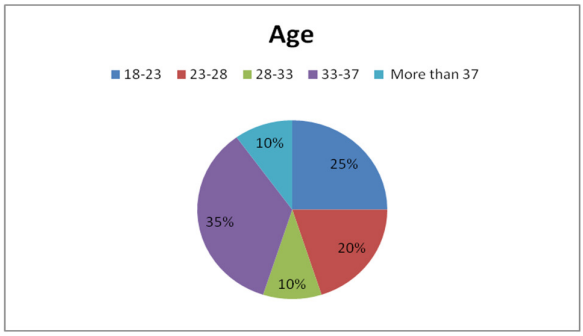

Fig. 2: Classification of respondents on the basis of Age

Customer Preference

The study made an attempt to get an insight into the preference of the customers of the type of connection, the duration of the service period and also the type of internet service availed. Prepaid connections were found to be very popular among the respondents with 64% of the respondents use prepaid connections and 36% of the respondents use postpaid connections (Fig 3). Only 5% of respondents were customers of telecommunication services for more than 2 years. The study revealed that a large percentage of the respondents (40%) that participated the service was availing the services since 1-2 years, 30% of respondents from 6-12 months 25% of respondents were the new recipients of the telecommunication services and were using the services from less than 6 months (Fig 4). About 40% of respondents were the users of 3G mobile internet services, 45% of respondents used broadband internet services and 15% of respondents used prepaid and postpaid internet services (Fig 5).

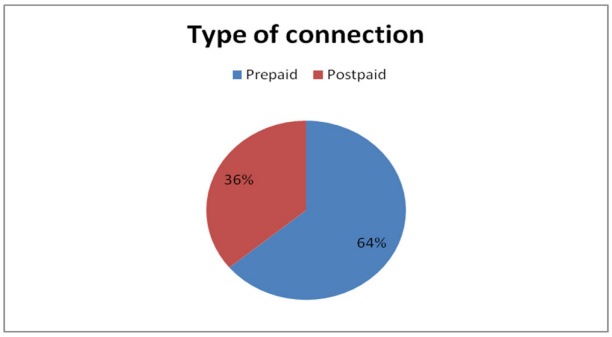

Fig 3: Type of Connection Preferred

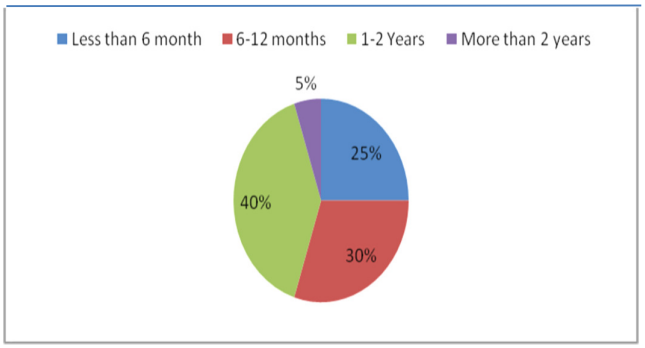

Fig. 4: Duration of Service Usage

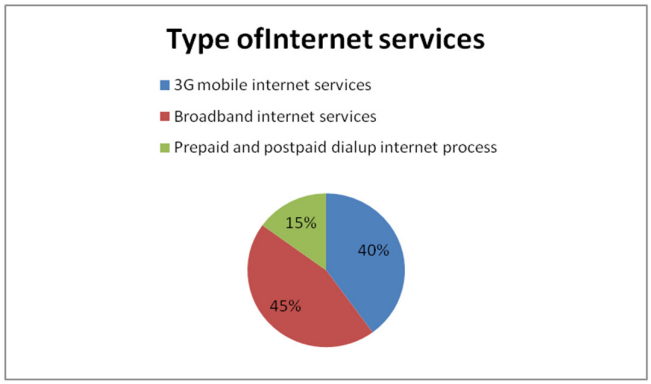

Fig. 5: Types of Internet Services Availed

Customer Satisfaction

To better understand the level of operational efficiencies, the research endeavored to gauge the satisfaction level of the customers towards wireless operation, network service provided, SMS rates satisfaction, the overall customer care service and also Total Quality Management in Operational Services.

The result indicated that 35 percent of the respondents were dissatisfied with the wireless operation service whereas 30 % were strongly satisfied with the services (Fig 6). Further, merely 20 % of the customers were strongly satisfied with the provider's network service, 25% showed their satisfaction. and 20% of respondents were extremely dissatisfied with the network services (Fig 7). As far as the SMS rate satisfaction was concerned, it was found that 25% of respondents showed their strong satisfaction and 20% showed their satisfaction, the response of 5% of respondents was neutral, 25% of respondents expressed their strong dissatisfaction and 25% showed their dissatisfaction (Fig 8).

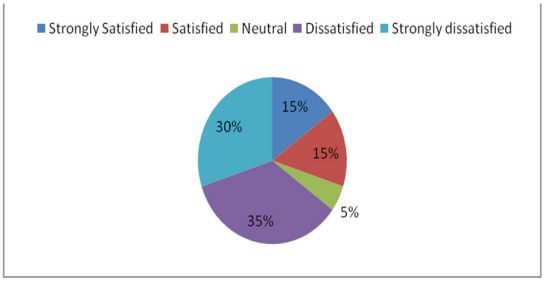

Fig. 6: Customer Satisfaction towards Wireless Operations Service

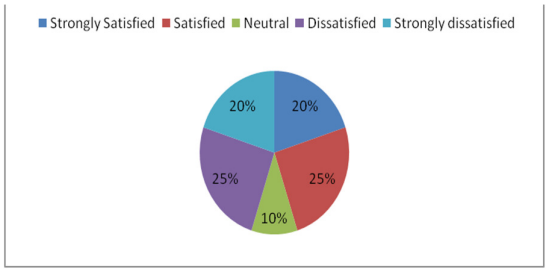

Fig. 7: Network Service Satisfaction

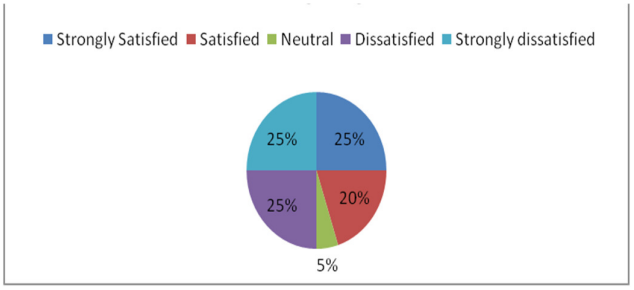

Fig. 8: SMS Rates Satisfaction

The study also measured the respondents' satisfaction towards customer care service and it revealed that 35% of respondents were strongly satisfied with the customer care services provided by the telecommunication service providers, 25% were merely satisfied, the response of 2% of respondents was neutral, 20% expressed their dissatisfaction and 18% of respondents were strongly (Fig 9).

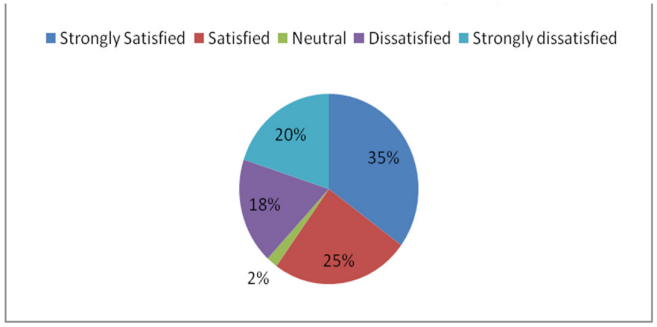

Fig. 9: Customer Care Service Satisfaction Level

From the statistics provide (Fig 10), it can be analyzed that 30% of respondents were strongly satisfied with the implementation of Total Quality Management (TQM) in the operational services whereas 20% showed their satisfaction. The response of 10% of respondents was neutral. 20% of respondents are not in favor of the statement and showed their strong dissatisfaction and 20% showed their dissatisfaction.

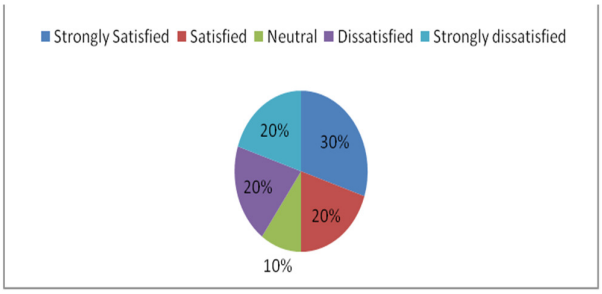

Fig. 10: Total Quality Management in Operational Services

Figure 11 indicates that 32% of respondents were strongly satisfied with the overall telecommunication services in the Middle East and were willing to recommend it to other potential users. But 20% of respondents were dissatisfied and 25% were strongly dissatisfied with the telecommunication services and were not in the favor of recommending it to other customers. This reflects their lack of trust and poor satisfaction levels with the service providers.

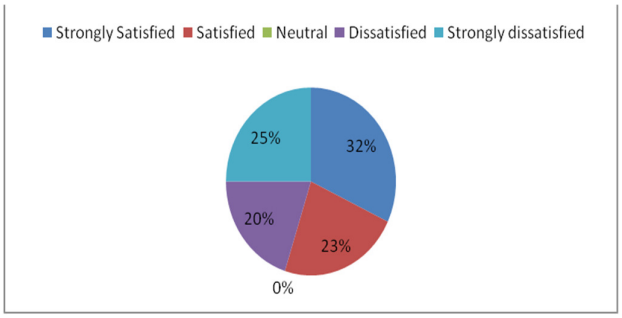

Fig. 11: Recommendation of service to other people

Discussion and Conclusion

The above data analysis revealed that customers are facing various issues in the operation management process of telecommunication companies. Very few customers are satisfied with the internet services offered by the company. The customers also explained that the company was not able to provide reliable services as provided by its competitors. From the given analysis, the major operational issues of the company were identified. These issues included the price of the products offered by the company, operational viability, and risks. Due to improper operational management, the companies were not able to cut the cost of production. Thus, the prices of the products offered by the companies were high as compared to the existing competitors of the companies. The operational viability of the company is not so efficient to address the issues related to the optimization of tasks and cost-saving. Managerial key processes of the companies are adding no value to the profitability of the company. The companies also need to deal with risks such as errors from the service provider. These risks directly influence the sales of the company. Companies can use the above research to know the root cause locations of problems in their services. The data might look simple but provides a deep approach to recognizing the actual problems.

The main limitation of the research is that only one aspect i.e. customer satisfaction was used to measure the operation management of the company. There are various other aspects that can help in the measurement of operational business excellence. Further research can be conducted with the help of interviews with different operational staff and by considering other aspects of operation management.

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Looming Sustainability Measures in Supply Chain Management of Oil and Gas Sector in the Middle East

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Abstract

The energy industry in the middle east has continued to witness rapid growth. The operations of the industry are often intensive, which prompts the need to apply the sustainability concept. Supply chain management is one of the utmost essential elements of an organization. Implementing sustainable supply chain management has proven to advance the social, economic, and ecological outcomes of a firm. However, there is a lack of research on the measures that can be used to measure SSC in the oil and gas industry, which necessitates the current research. The current study aims at understanding the most appropriate measures for SSCM. Further, the research aims at identifying the economic impacts of SSCM to a company. The current study is a cross-sectional qualitative study that will utilize secondary data to reach conclusions. The results of the study indicate that sustainable supply chains have positive economic outcomes for the company. Further, the results indicate that the best way to measure the effectiveness of SSCM is to use a zero wastage approach. However, more research needs to be done on the same to provide more measures.

Keywords: Sustainable Supply Chain Management, Oil, And Gas Industry, Sustainability, Social-Economic Effect, Economy .

Introduction

The energy industry plays a dominant part in the contemporary economy (Florescu, Ceptureanu, Cruceru, & Ceptureanu, 2019). The supply chain is a central element of operations management considered to be the most significant to the performance of an organization. For the success of a company, the supply chain must operate with optimum levels of efficiency. Companies that understand the importance of the supply chain utilize numerous strategies and models to achieve effectiveness. Achieving efficiency in the supply chain has grown into an overwhelming undertaking for companies in the modern business environment (Florescu et al., 2019). The current business environment requires that businesses embrace sustainability in their supply chain operations (Florescu et al., 2019). Available literature significantly ignores the importance of sustainability-related challenges in the SCM in the petroleum industry.

Sustainability of the supply chain is a vital topic because of the significant concerns of the petroleum industry's impact on the environment. The present topic of research is, therefore, important because it will provide solutions to an issue that is significant to the survival of the petroleum industry within the middle east.

Research Objectives

The current research aims to improve sustainability in supply chains in the petroleum industry. To achieve this aim, the objectives of the project are to collect data on sustainability in supply chains through the use of a literature review. The report will majorly focus on the management and evaluation of sustainability in the supply chain within the energy industry. The research will further focus on understanding their sustainability measures. The research objectives are as follows;

1. To evaluate the best sustainable supply chain management practices to craft a framework to help companies' achieve sustainability in their chains
2. To collect indicators to help organizations evaluate suppliers' sustainability practices.

Research Questions

RQ1: What impact does the employment of SSCM practices have on the economic outlook of an oil and gas company?
RQ2: What pointers do organizations utilize to evaluate sustainability in their supply chains?

Literature Review

The following literature review discusses significant changes in the energy sector value chain introduced by the need for sustainability. The review will start with a brief discussion on the notions of sustainability and SCM in the petroleum industry. The review will further discuss various theoretical frameworks to provide a comprehensive understanding of the utilization of scarce resources and supply chain operations within the middle east. It will further explore the critical elements required to sustain supply chain activities to achieve optimum effectiveness. The review aims at establishing the most effective model for optimal resource allocation while maintaining healthy profits and ensuring sustainability in the petroleum industry in the middle east. The current review will take the form of a systematic review. According to Touboulic and Walker (2015), a systematic review is a more methodical approach because it involves a detailed description of the process taken to choose, scan, and analyze literature to decrease bias and improve transparency. A systematic review involves the integration of different works on similar topics, proving a summary of common themes, and contrasting the differences (Touboulic & Walker, 2015). Therefore, it is an appropriate method to utilize deliberate future research inferences and proposals.

Supply Chain Management and Sustainability

SCM in the petroleum industry is highly complex. There is a lack of consensus on the definition of sustainable supply chain management (SSCM). There is a challenge in integrating the two concepts. Florescu et al. (2019) define SSCM as the efficient incorporation of a vital business process that lets organizations and their supply chain to realize cost-effective, ecological, and social aims. Ahmad, de Brito, Rezael, and Tavasszy (2016) define SSCM as the tactical integration of crucial business techniques in resource management and products and services delivery involving managerial decisions and actions aimed at ensuring an organization and the supply chain is efficient economically, environmentally, and socially. Toubloulic and Walker (2015) define SSCM as a system that meets all the social, environmental, and economic performance of a firm. SSCM is essential for the energy industry because of the intensive use of scarce resources within the industry.

Companies within the middle east, being the major oil producers in the world, need to apply sustainability in their supply chain. A sustainable supply chain in the petroleum industry is not only fundamental because of the scarce resources, but because the demand for energy will continue to rise (Ahmad et al., 2016). The ecological and social consequences of negligent exploitation of these resources can be damaging. For this reason, companies that choose to implement SSCM help reduce, if not eradicate, the adverse effects while enjoying success economically (Ahmad et al., 2016). The

integration of a sustainable chain within the energy industry will require cooperation from every stakeholder within the industry.

Theoretical Framework

There are numerous theoretical concepts that SSCM has used to explain their understanding of the field. Theories are vital because they represent the basis of knowledge creation, and helps readers and researchers assess any academic field (Touboulic & Walker, 2015). Stakeholder theory is one of the theories that researchers have used to explore the drivers and enablers of SSCM (Touboulic & Walker, 2015). Stakeholder theory was introduced in 1984 by Freeman (Touboulic & Walker, 2015). An organization's stakeholders play a crucial part in facilitating effective operations of the supply chain. Various stakeholders place pressure on sustainability in firms (Meixell & Luoma, 2015). According to Touboulic & Walker (2015), stakeholder theory emerged as a result of various groups impacted by business operations. Stakeholder holder has been used to evaluate the influence of parties or individuals towards the achievement of a firm's goals.

The stakeholder theory states that "values of the corporation and its managers, the expectations of stakeholders and the societal issues, which will determine the ability of the firm to sell its products" (Meixell & Luoma, 2015, p.70). For this reason, stakeholders have the capability of influencing decisions undertaken by the firm, in terms of sustainability. In the current business environment, a majority of stakeholders are concerned with the changes in the environment and the contributory operations of firms in the petroleum industry. The industry's consumption of raw materials is high, and its impact on the environment is detrimental. By adopting SSCM on the operations undertaken by a firm, it becomes easier for firms to realize their economic, social, and environmental goals (Meixell & Luoma, 2015). Every organization's stakeholders require it to introduce sustainable practices to improve its profits as well as social standing. Firms release information on sustainability to meet the needs of their stakeholder.

Methodology

According to Creswell (2014), research methodology is a technique that lets a methodical and rational understanding of the research question. A methodology offers a comprehensive tactic to procedures utilized to provide a solution to a research objective, and the aim for the approach taken (Creswell, 2014). For the current research, a research onion will be utilized to provide a reasonable and intelligible method. According to Saunders, Lewis, and Thornhill (2012), the research onion can be altered to various types of research methodologies because it can be applied to various contexts.

Research Approach

There are two kinds of approaches, namely deductive and inductive (Creswell, 2014). The former involves challenging an existent theory, while the latter deals are devising new theories acquired from data (Creswell, 2014). The primary purpose of petroleum organizations is to attain optimal outcomes from their activities. Therefore, supply chain management is a substantial element in the operations of the energy industry. An organization should have the ability to administer and achieve its supply chain operations in an optimum fashion with the objective of cost reduction. Further, these companies need appropriate solutions to guarantee well-organized supply chain activities. For this reason, the current research will utilize an inductive approach to come to provide new theories that can be utilized to increase sustainability to the supply chain (Creswell, 2014).

Research Choice and Strategy

Research methodology can be qualitative, quantitative, or mixed methods (Creswell, 2014). Quantitative research involves the use of numerical representations with statistical implications. On the other hand, qualitative methods involve methods of data collection that does not involve non-numerical data. The current research utilized qualitative methods (Creswell, 2014). Further, the cross-sectional study strategy, where data was collected at one point rather than a prolonged time. Further, the research

strategy sought to understand various methods that organizations utilize to gauge the sustainability of their supply chain within the region.

Data Collection and Analysis of Data Collection

The research utilized secondary data to attain, analyze, and reach conclusions. The use of secondary data is inexpensive and is not time intensive as compared to the collection of primary data (Creswell, 2014). Furthermore, secondary research provides researchers with a vast scope of data, which is easily accessible. The nature of this research favors the use of secondary data because of the evident advantages. The current study used multiple peers reviewed publications to gather information on the current topic. Peer-reviewed articles allow for consistency and quality in areas coveted in SSCM. Data was sourced from Annual Reports and Sustainability reports of different oil and gas organizations. Further, a search was carried out on internet databases such as Goggle Scholar. Scholarly materials and peer-reviewed articles were chosen based on their applicability to sustainability in supply chain management (Creswell, 2014).

Analysis Tool

Data used for this research was collected through electronic sources. The search process resulted in 220 papers, structured around the type of study, results, research methods, and aims. After the data was collected, the researchers started by evaluating the appropriateness of the data set. Creswell (2014) suggests that the first step of evaluation is to determine the purpose of a selected study. Secondly, identify the individual accountable for data collection and the type of information collected (Creswell, 2014). Thirdly, approaches of data collection, and finally, the consistency of data collected with other sources. For the current research, data collected was coded into various themes, which involve various categories and subcategories (Creswell, 2014). The next step was to identify any patterns and interconnections between the data collected (Creswell, 2014). The patterns were then mapped, which gave rise to different themes. The themes helped the researchers build and verify theories used for the current research to reach the required conclusions.

Data Analysis and Findings

RQ1: What impact does the employment of SSCM practices have on the economic performance of a company?

Over 70% of resources utilized found that SSCM greatly influenced the economic outcome of an organization. Younis, Sundarakani, and Vel (2016) found that only green buying had any significant effect on the economic performance of the firm. According to the researchers, companies within the middle east that embraced sustainable purchasing experienced better economic performances as compared to those that did not. 20% of the literature found that the introduction of sustainable supply has positive effects on the firms' performance on a social and environmental level. For firms with scarce resources and need to attain profits in the short term, they should practice sustainable buying. However, the research did not find a connection between other sustainable practices and the economic performance of the firm (Younis, Sundarakani, & Vel, 2016). Among other impacts of the application of SSCM include a reduction in costs, improved services, and increased revenues from the supply chain operations, as shown in figure 1 below. Florescu et al. (2019) further found that issues such as supplier selection played a vital role in the economic and social impact of the supply chain on a firm.

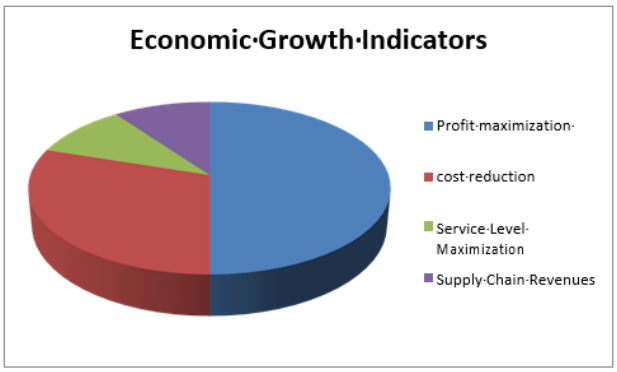

Figure 1: Economic impact of implementing SSCM in a firm

RQ2: What pointers do organizations utilize to evaluate sustainability in their supply chains?

There is limited research on factors that companies use to evaluate the sustainability of their supply chains, particularly in the petroleum industry in the middle east. For this reason, the secondary data utilized did not emerge from the middle east but was based on the energy company around the world. According to Lakhal, H'Mida, and Islam (2007), companies use various perimeters to determine the sustainability of the supply chain. Zero waste throughout a supply chain is one of the indicators that companies can utilize to gauge their sustainability. According to Lakhal, H'Mida, and Islam (2007), the zero-waste approach enables all resources used to be reverted at the end of their life as industrialized raw materials. The approach encourages zero wastage of resources and reduces the operating costs, reducing demand on natural resources, and ensuring higher productivity for all (Lakhal, H'Mida & Islam, 2007). While oil and gas organizations have not reached the zero waste stage, they are struggling towards reaching to the point of zero waste. Florescu et al. (2019) further provide other parameters that companies in the energy industry can use to gauge their sustainability. Zero emissions and the production of green products will result in more SSC.

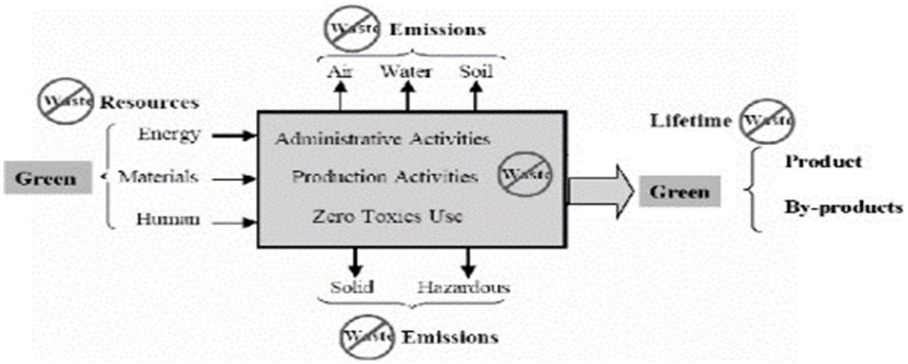

Figure 2: Zero wastage approach, source Lakhal, H'Mida & Islam (2007).

Discussion and Conclusion

For this research, the economic performance of a firm is the monetary and marketing performance developments from applying SSCM that result in the improvement of a firm's position as paralleled to standard industry rates (Younis, Sundarakani, & Vel, 2016, p.223). A firm's financial enhancement refers to the lower costs of energy usage, lower expenses for waste discharge, and reduced costs related to environmental accidents (Younis, Sundarakani, & Vel, 2016). Organizations have introduced technology to ease the activities of the supply chain. According to their sustainability reports,

organizations should save on issues such as waste management as well as water management. Water is one of the main ingredients in the energy industry. With the looming shortage of water in the middle east, companies must adopt methods to reduce water wastage throughout the supply chain.

The organization's sustainability reports provide various ways that they have incorporated SSCM practices and the effect on their finances. According to the report, the companies should introduce technology such as Enterprise Resource Planning (ERP) and Vendor Relationship Management (VRM) to enhance operations of the supply chain. VRM provides the company's customers to have a relationship with vendors while helping assess their performance and

Satisfaction. The company's sustainability reports indicated that the company adopted upstream and downstream firms of production to increase profits and value, respectively. Organizations having registered high levels of success in the reduction of waste and water wastage in their sustainability report should take preventive measures for features.

As the stakeholder theory holds, stakeholders are always pushing the company to implement sustainable practices in all its operations. The organization should embrace SSCM by using local supply chains and managing greenhouse emissions. Most of the greenhouse gases happen through the various points of the supply chain. According to its sustainability reports, the organization is working towards increasing energy efficiency, decreasing flaring, venting, and reducing emotions in their activities. However, organizations further introduced technology to ensure value through its supply chain.

Recommendations

The energy industry is vital in the modern business world. Further, stakeholders have become more demanding on matters of sustainability. As witnessed from the above research, the introduction of SSCM has a positive effect on the environment and economic performance of a firm. Further, in the case study utilized, organizations have substantially integrated technology in their supply chain to ease the movement of their goods as well as ensure that their less damage to the environment. Introduction of technology to the supply chain management for any business in the middle east, either in the petroleum industry or other, will significantly improve its sustainability, which will, in turn, improve their environmental, social, and economic outcomes. However, some managers may not be fully aware of the importance of integrating technology into their systems and their importance. Therefore, senior managers and every participant of the supply chain must be educated on the importance of the introduction of the information technology system to streamline their supply chain activities to improve efficiency.

Conclusions

SSC improves a company's environmental, social, and economic outcomes. From the findings of the current studies, a majority of the studies found that companies that guarantee that their supply chain management operations are sustainable, they save financially and have a better social standing. There is a lack of a uniform way that companies in the oil and gas industry measure their level of sustainability of the supply chain. However, the most feasible way provided for by this research is the zero wastage approach. The zero wastage approach provides companies with the best way to understand how their activities are impacting their supply chain. Lack of literature that addresses how organizations in the petroleum industry can measure their sustainability within their supply chain prompts the need for further research. The energy industry is an important industry that is gradually growing, especially within the middle east. The activities of the industry have a massive impact on the environment, which makes it necessary to embrace sustainability. Future research should provide appropriate pointers for sustainability for supply chain management within the energy companies.

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User Centered Human-Computer Interaction and Agile Development: A Systematic Model for Useable Product Case Study

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Abstract

Agile development has increasingly changed software development across all software industries by delivering highly productive results. Researchers have focused on different agile development approaches to achieve a high level of software development efficiency by enabling user-centered human-computer interaction (UC-HCI). Agile offers handling of software product development changes in an efficient way through incremental and iterative processes that offer various benefits to software industries. Although there are more significant advantages of using an agile development process, it lacks usability engineering, which plays a vital role in understanding different aspects of each software product. Usability has further deep roots with human-computer interaction as a core part of delivering quality software products. There is a dire need for a model that can combine both user-centered human-computer interaction approach with agile development processes. This paper focuses on proposing a model that will help to overcome the gap between both of the approaches with the assembly of various practices. Further, the proposed model will help to deliver useable products with a more enhanced software life cycle and user satisfaction.

Keywords: Agile methodology, Usability engineering, Human-Computer Interaction, User-Centered, UC-HCIAD, CASI

Introduction

The importance of software in daily life has increased a lot with rapid development approaches and practices which enable software development industries to overcome the shortcoming of quality and product development. The growing need for the approaches has provided the ability to the software industries to deliver the product in the shortest time and handling change requests. One of the issues faced by software production is the iteration of the changes during the software development process, which is often hard to handle during the intricate development process (Garcia et al. 2017; Bertholdo). The change handling process makes it more complex with each different type of software product that creates a drawback on the selection of the best-suited model for the software development that offers the shortest time with the efficient change management process (Cockton et al. 2016). Traditionally, the journey of the software development started with the waterfall model, which was further enhanced with the iterative models and introduction of iterative waterfall model that provided software houses a single-model approach to iterate back for the changes (Arar et al. 2018). However, that does not fully unlock the ability of the software development industries to handle the rapid changes in the development of technology and user requirements (Brhel et al. 2015; Ferreira et al. 2011). Agile development was introduced to overcome the gap of handling changes in the software development along with providing a rapid product delivery through an iterative and incremental approach (da Silva et al. 2015). The combination of the approach provided more enormous benefits over the previous approaches with an efficient change handling process. However, the rapid development lacks the usability engineering that is based on the concepts of human-computer interaction for increasing better usability with the end-users and delivering products that can handle change management with increased usability (Larusdottir et al. 2017).

Agile provided the basic usability handling and change management but was not able to provide a system that integrates both to deliver a highly efficient user-centered agile-based system (Rojas & Macias, 2015). Different systems were developed to address the gap, but it led to failure due to the uneasy approach of non-technical users (Begnum and Thorkildsen, 2015). The usability failure can be prevented by understanding the requirements of the users and providing a product that matches the goal of the end-user (Sfetsos et al. 2016). The integration of both areas of agile development and usability engineering will enable the software development industry to deliver a quality and usable product. Various authors have researched the issue, but a model was not developed, which is based on the integration of a user-centered human-computer interaction approach and agile development processes. A systematic, integrated model can be developed that will enable to overcome the gap and solve the existing model problems too. This paper proposes a model that is based on the UC-HCIAD (User-centered human-computer interaction agile development). UC-HCIAD is based on the integration of both fields in the most effective way of delivering a highly productive approach with efficient useable products. Further, coaching methods and CASI will be integrated into the proposed model and model with being validated through the case study.

Background

Agile Development

Agile software development methodology plays an active role in software development to overcome the barrier and deliver the required product to the end-user with complex change management (Zaina and Alvaro, 2015; Begnum and Furuheim, 2016)). Some organizations still focus solely on the usability analysis at the end of development instead of following a user-centered approach from the beginning (Caballero et al. 2016; Teka et al. 2017). Lack of usability, late interaction with usability, complicated interfaces, is probably the main reason leading towards the failure in the achievement of usability (Cayola and Macias, 2018). Figure 1 shows the abilities of agile and influencers.

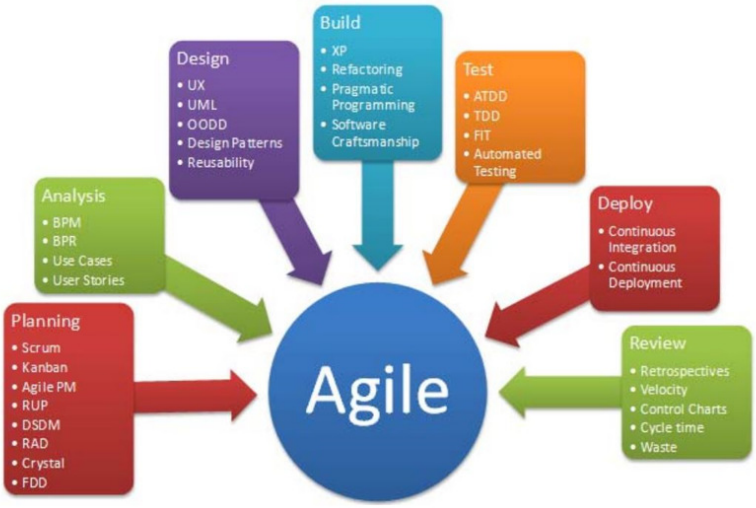

Figure 1: Agile Influencers

Usability Engineering

Usability is about developing interactive and straightforward design interfaces that can be understandable, effectively, and efficiently used by the people (Costa et al. 2015). Usability deals with different aspects like memorability, learnability, and efficiency. The ISO 9241 defines usability as "The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use". Usability engineering provides structured ways for achieving usability within the system development method (Arroqui et al. 2016). It is an iterative style and analysis that facilitate customers to produce feedback concerning the merchandising utility, usefulness, and design during the overall development cycle (Cockton, 2016). It emphasizes that UCD is the methodology for carrying out usability. User's experience (UX) can be measured by usability when communicating with the system whether or not it is an online website, a software application, or any user-operated mobile device (Forbig and Herczeg, 2015). The practices and theories agile and usability have much in common are: Both follow cyclic development cycles, human-centered, and emphasize on team coordination and communication (Blomkvist et al. 2015).

Literature Review

An authentic standard ISO 9241-210 is used by software development industries for different HCI process like HCD (Human-Centered Process) that consist of different phases, including the planning phase, which is performed iteratively. Figure 2 provides an overview of the HCD process, but unfortunately, it does not provide the complete description and understanding about the integration of Agile into HCD. It can be a great model if agile start giving attention to the HCD aspects.

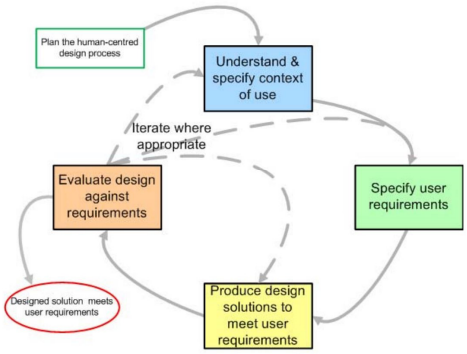

Figure 2: The design process from ISO 9241-210– Human-centered design process

The design integrated model by Paelke et al. (2008) named as Agile UCD process. This process gives little explanation about the developer phase and HCI specialist, but it is not entirely clear about the sequence of activities. SBD (scenario-based design) starts with a comprehensive requirement analysis process followed by iterative evaluation cycle that was longer than XP iteration, and it focused more on requirement gathering and low-fidelity prototyping early in the development process. This design process results in an improvement in usability, but it is not suitable in many agile practices that focus on the continuous working of software and minimal upfront design. Agile practitioners need to explore the way that can incorporate usability engineering into Agile (de Freitas et al. 2016). However, there are many issues in integrating them because agile is incremental and iterative and does not support any kind of overview about architecture interface, which is the most important aspect to develop usable software with interactive interfaces. Kollmann et al. (2009) state that the fantastic methodology agile can deliver quality code, but it does not assure consistency interfaces, because its main focus is to deliver a working piece of software after each iteration. Microsoft also focused on the usability advantages in software development. The reason behind the involvement of usability engineering is to minimize the cost of training that is necessary for users to understand the software and enhance the life of software by getting long-lasting acceptance and satisfaction from

end-users (Lusky et al. 2017). Another issue is the identification of real end-users because in many cases others business representation presents their selves as end-user (Almughram and Alyahya, 2017).

Identification is essential because end-users are an essential aspect during requirement elicitation and over-all project development (Potts et al. 2015). Another model for integration was developed by Lee et al. (2007) named Extreme Scenario-based Design (XSBD). The main concept of this model was the central design record (CDR) to maintain communication between stakeholders, agile experts, and usability tester. Sharp et al. (2006) focus on the customer and Extreme programming collaboration and effectiveness of integrating UCD to improve usability in XP. McNeil (2000) states that low-reliability prototyping and storyboarding is an iterative approach that focuses more on interface design than code module, and it can be improved by involving the main topic of HCI (UCD) in agile. Therefore, agile needs to adopt usability engineering for the production of quality and usable products (Cockton, 2106). Although usability and agile have much in common, there are still some issues in merging them. It often substitutes the client as the user-advocate as it has multiple iterations. In Extreme Programming (XP), Software engineers value the" input from the on-site customer," but they do not focus on the concept of user-centered design. The agile development can be improved by incorporating the User Experience Design (UED) practices in it, and it can also improve product usability by involving the User Experience team due to which user research and testing can be utilized to prioritize features in the product backlog which will result refine and better usability of products (Blomkvist et al. 2015; Arroqui et al. 2016).

Proposed Model

We have proposed a model in our paper for the solution to previous problems. We have used different usability evaluation process to check the usability incorporation in our model. There are different phases includes in our model. We have discussed them one by one.

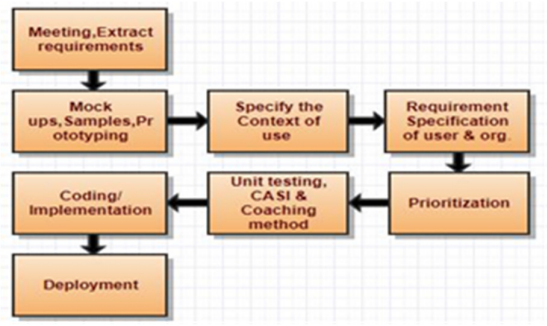

Figure 3: Proposed Model

Figure 4: Proposed Framework

A. Meetings

The first step in the process will be meeting. This step takes a lot of time and effort because all requirement gathering from different sources is held in this step, and real user identification will also be made in this step with the help of different open-ended questions regarding the project. Identification of real users in necessary because the working of the whole project depends upon requirements. Unlike the traditional software development process, agile has less documentation. It works iteratively and incrementally which is very helpful for dividing a large project into small modules. If any change occurs according to customer feedback will be added in the next iteration. This process will collect all the requirements of the first module to perform the task before efficiently meeting the deadline.

B. Mockups

In this phase, designers used the Mockups mainly to accumulate feedback from the user side regarding styles early within the process of design. It is a very early prototype made from low-fidelity materials or cupboards. The user power-associated by the designer might take a look at the model (imagining that it works) and therefore give valuable feedback regarding practicality, usability, understanding of the basic style plan. The design of mockups can be collectively changed by the user and designer using commonly used tools like scissors, pencils, and pens. As such, mockups are a discussion to help and bridge gaps between users and designers.

C. Specify the Context of Use

In this step, which is the actual practice of HCI, beneath that a given artifact/software product is employed or are employed in a traditional day to day scenario. It is vital to hold out usability related tests, meetings, prototyping sessions, user studies, and alternative user-dependent sessions within the context of use to include as high rationality of discoveries as doable.

D. Requirements Specification of User and Organization

The user necessities specifications define the desires of business for what user needs from the system during this step. They are written in an early phase within the validation method before the system is formed. Specifications are unit written by the end-users and system owner, with input from Quality Assurance. Public necessities in this step are usually tested by User acceptance testing and performance qualification. It must not be a technical document, so readers knowing the system solely ought to be able to perceive the necessities highlighted.

E. Requirement Prioritization

In this phase, requirements will be prioritizing which is used in software product management for outlining that someone needs a software package that must be enclosed and enforced in a very bound unharness. The leader of the team will collect all requirements of the customer, and then he will prioritize the elicited requirements according to the user level of interest. Prioritization is also done to minimize risk during development so that the designer will implement the most critical or high-risk requirements first.

F. Unit Testing, CASI (Cognitive Analysis of software inter-faces) and Coaching Method

The phase of software system testing in which individual units/elements of a software system are tested is termed as unit testing. The purpose of this testing is to validate that each unit of the software performs its tasks as designed. In the coaching method, we will allow participants to raise associate degree system related queries to a professional coach, and the coach will then answer to the best of

his/her ability. The basic goal of this system is to find the data as needed by the users to produce higher coaching and documentation. Moreover, as probably plan the interface to avoid the requirement for the queries which will enhance the usability. Tester and expert users will serve as a coach. After understanding users, CASI evaluation is started. CASI is an evaluation expert who checks all mockups according to user-defined requirements with the help of some questions. The process will stop working if the answer to any question will be NO from the user side. The mockup will send back to the previous iteration for modification according to the user perspective until all answers become YES.

G. Coding and implementation

In the coding phase development of code and implementation of interactive and straightforward design interfaces will be done that will be understandable and learnable for each user. The primary job of this part is to convert designing into source code using the programming language agreement/decided in the designing part. The well-developed code in this phase can help to reduce the efforts required in testing and maintenance

Methodology

In the methodology flow of framework is described.

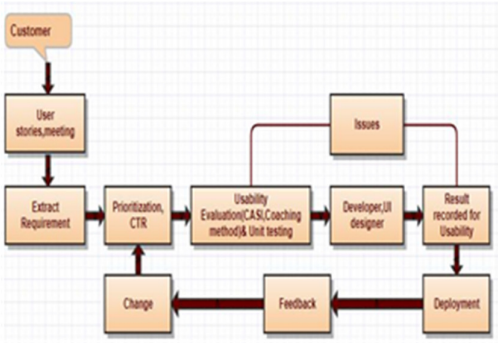

Figure 5: Methodology

A. Deployment

At the end of iterations, the software is ready for deployment at the customer side. If a user wants any change,the proposed model can welcome and fix that change to reduce the failure chance.

B. Integration

The integration of the proposed model with an agile UI designer will enhance the working and usability of the software. It will also reduce the cost, which causes failure, short life of software, the occurrence of changes again and again due to lack of understanding. Table no.1 will show the integration of the proposed with Agile.

Table 1: Integration of the proposed solution with Agile

	Agile methodology	Proposed work
Requirement elicitation	Manuals, wish list	Meetings
Usability	Not defined	CASI, Usability Expert
Testing	Unit, Acceptance testing	CASI, Coaching Method, Unit and Acceptance test
Achievements	Working software	Working Software along usability
Deployment	Not Defined	Get users feed-back

Case Study

For the validation of our proposed model's feasibility, we have applied our model step by step in an organization project that was using Agile approaches, but they were unaware of usability. The main objective was to check the proposed model working according to its requirement and generating the project with usability features or not. The case study of Gophers project will be presented describing the integration of HCI practices in agile. The Gophers project successfully adopted the proposed model and generated positive results in contrast to the previous project. The one reason for success is the proper involvement of users with projects throughout the development. The main concern of the project was to create websites with attractive interfaces for online shopping because online shopping trend is increasing nowadays, but still some people especially women face many complexities in interfaces while placing their orders. Division of project was based on three iterations and had a team of five members, including Domain expert, UI designer, Coder, Tester, Usability expert.

A. Proposed Model in Action

The first step of our model was meeting with the client to gather data and extract requirements from different sources, including domain experts. Every requirement was noted in a wish list then the wish list got prioritized according to the stakeholder priority. In the next step, UI designer designed the mockups according to priority by keeping in mind the context of the project for which the user wants the software. The developer designed attractive interfaces for easy use and only having the essential features to make interfaces simple. After this, the mockup was evaluated through users and sent back those having errors or any difficulty in understanding. The evaluation part was done by tester and Usability experts using CASI and Coaching methods. These methods were considered as surety that the product is understandable and easy for the user. At the end of testing, Coder starts the coding and implementation of only those mockups which were accepted. Rejected mockups were returned to UI designers. The final phase was the deployment, and feedback from the user side was recorded to fix in the next iteration.

Results

When all the process is done results were concluded, which shows the difference. The project done by integrating HCI practices in Agile was much better than the old techniques. It also increases the life of software and decreases the failure rate with the achievement of usability features. Our proposed model made the product more impressive and useful. The graph shows the increasing success rate of usability with agile. More people can understand and use the web site.

Figure 6: Success rate with Agile

Figure 7: The success rate after integration of proposed work

Conclusions

In this paper, it was discussed that agile alone could not guarantee usable software. To increase the software life cycle, many HCI techniques should be incorporated in agile methodology, for example, a lot of unvaried/iterative approaches and testing of usability during the whole project lifecycle, which can enhance the usability. The agile method needs to work with aspects of usability, like developing mockups in the starting phase and usability specialist in the team. We have proposed a model (UCD-HCIAD) in which we have integrated the HCI methods in agile methodology, which will produce interactive software. With the help of the case study evaluation, that shows that our proposed model will contribute to achieving high usability. The future can still provide work for much elaboration about integration and fix /bridge the gap between HCI and Agile for better results in the development field.

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The Role of Parental Instruments of Financial Socialization in Forming the Tendency to Repeat Parents' Saving Patterns

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Abstract

The main area of interest in this contribution is parental financial socialization, which includes the following two types of socialization: parental role-modelling and parental teaching. Of particular interest here is the tendency to repeat parents' patterns, in which the financial attitudes and behaviors imitate those of parents/guardians. The purpose of this paper is to identify the factors determining the adoption of saving attitudes by children, where it is identical to the attitudes of their parents/guardians - i.e. adoption of the propensity to save by children raised by parents/guardians with the same propensity. Based on the review of previous studies, the following research hypothesis was formulated: parental role-modelling and parental teaching determine the children's tendency to repeat parents' saving patterns. The following research methods were used to verify the hypothesis: CART algorithm, review and critical analysis of the subject literature and the descriptive method. The necessary empirical data of quantitative and qualitative nature were collected through surveys carried out in the middle of 2019 through CAWI on a sample of 800 Poles. The study results have demonstrated that the following instruments of parental teaching are particularly important in the context of the problem analyzed: the transfer of knowledge and skills regarding expenditure planning and money management by parents/guardians, encouraging saving and offering pocket money for performing household chores, as well as the children's perception of as people who managed the household budget well (parental role-modelling).

Keywords: Financial Parental Socialization, Parental Role-Modeling, Parental Teaching, Repeat Parents' Saving Patterns.

Introduction

Saving is an important area of personal finance management. The environment in which you grow up has a significant impact on your financial attitudes in adult life. This phenomenon is called socialization, which is defined by Zigler and Child (1969) as "a broad term for the whole process by which an individual develops, through transaction with other people, his specific patterns of socially relevant behaviors and experience". J.H. Turner (1994) presented the general principles of the socialization process. He stated that: 1) early socialization has a much greater impact on the formation of human characteristics than that in later life; 2) interaction with people with whom we have an emotional relation has a much greater impact than contacts with other people; 3) interaction within primary groups is much more important for forming personality and attitudes than contacts in secondary groups; 4) long-term relationships with other people have a greater impact on personality than short and accidental ones. Many authors prove that parents, peer groups and mass media play a very important role in the socialization process (among others, Bakir et al, 2006; Mandrik et al, 2005). Keranne and Hogg (2012) emphasize that the family is argued to be the primary socializing agent with the most influence on values, attitudes and practices, often throughout life.

The main area of interest in this article is parental financial socialization, which includes the following two types of socialization: parental role-modelling and parental teaching. Of particular interest here is the tendency to repeat parents' patterns, in which the financial attitudes and behaviors imitate those of parents/guardians. The purpose of this article is to identify the factors determining the adoption of saving attitudes by children, where it is identical to the attitudes of their parents/guardians - i.e. adoption of the propensity to save by children raised by parents/guardians with the same propensity.

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Financial Socialization Versus Financial Education – Literature Review

In order to meet the increasingly demanding market conditions and correctly make complex financial decisions, households must have an adequate level of financial literacy. There are several definitions of this term in the subject literature. According to ANZ Banking Group (2008), it involves having the knowledge necessary to make informed judgments and make effective decisions regarding money management, i.e. budgeting, saving, investing and borrowing. A.C. Worthington (2006), in turn, defines financial knowledge as the competence for rational, informed judgment in the field of money management.

In a broader sense, financial literacy may include an understanding of economics and of relationship between the economic conditions and the decisions taken by households in the sphere of finance. Frączek (2013) points out also that financial knowledge, including the ability to understand financial terminology and conditions, translates into the behaviors of entities who possess such knowledge.

The concept of financial literacy is often used in parallel with the concept of financial capability and financial awareness. According to Policy Research Initiative (2005) financial capability has a broader meaning and refers to a combination of knowledge, skills and financial responsibility that enables an individual to make informed and effective decisions affecting his financial situation. Kuchciak et al (2014) emphasize that having financial awareness is construed as economic culture, i.e. a set of views and behaviors related to the management of own resources acquired as a result of one's own life experiences, upbringing and the influence of social environment.

Having the appropriate level of financial literacy and financial competences is a prerequisite for proper personal finance management, facilitates building financial resilience as well as achieving and maintaining household's financial stability. The results of scientific research prove that people with greater financial knowledge and skills are much more effective in the financial market [cf. Van Rooij et al 2007, Lusardi and Tufano 2009, Hastings and Mitchell 2001] while households with low financial awareness find it harder to multiply their savings effectively or more easily accumulate excessive debt.

Given the unsatisfactory level of financial awareness of the public, financial education should play an important role in managing personal finances. It is education that raises the level of financial knowledge and develops financial competences. B. Świecka (2016) defines financial education as a continuous learning process aimed at acquiring knowledge and ultimately using it in practice. It can and should be implemented from an early age, and its systematic implementation should contribute to raising financial awareness, developing appropriate habits and reducing the risk of making adverse financial decisions. Due to the fact that education is a new research area, it has no explicit, universally applicable definition in the subject literature. Selected definitions of financial education are shown in Fig. 1.

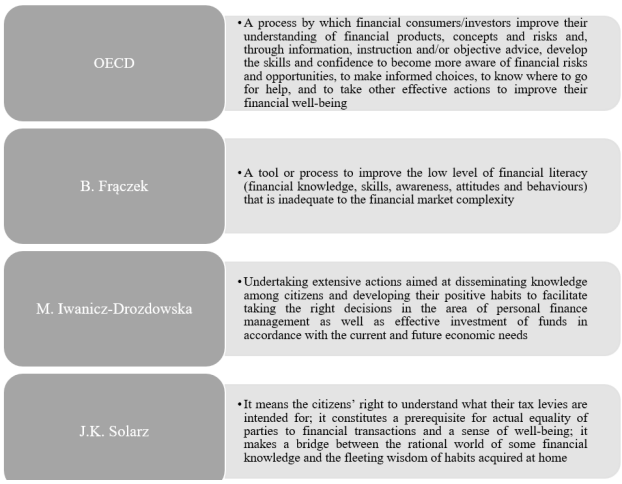

Fig. 1: Selected definitions of financial education

Source: OECD PISA (2014), M. Iwanicz-Drozdowska (2009), Frączek (2014), Solarz (2019).

As emphasized Maison et al (2018), in the context of the process of acquiring economic skills, including financial skills, the subject literature mentions not only the concept of financial education, but also the one of financial socialization. Danes (1994) claims that financial socialization means the process of acquiring and developing values, attitudes, standards, norms, knowledge, and behaviors that contribute to the financial viability and well-being of the individual. Financial socialization involves also five major concept areas: earning, spending, savings, borrowing, and sharing. Scientific research in the area of financial socialization was conducted by, among others, Ashby, Schoon, Webley (2011), Brown, Taylor (2016), Tang (2017), Afsar, Chaudhary, Iqbal, Aamir (2018), Zhu (2018), Antoni, Rootman, Struwig (2019).

The border between financial education and financial socialization is a bit blurred. Maison et al (2015) note that financial education is usually understood as a more formalized process - the transfer of specific knowledge through the child's environment: school, institutions, organizations or media - and is often systemic and based on syllabi and educational tools supporting this process. Roland-Lévy (2004) highlights, in turn, that financial socialization is defined more broadly and less formally, not only as acquisition of an understanding of the economic environment, but also as acquisition of the skills that guarantee proper functioning in it.

Parents are the most important socialization agent. Roberti (2014) proved that they represent an implicit role model that children can refer to, thereby learning to evaluate different consumption choices, as well as have the possibility of expressing direct and conscious indications, in order to explicitly share their values and consumption practices with their children. As Allen (2008) notes, parental socialization instruction usually involves modeling consumer behaviors, making rules about children's consumer behaviors as well as engaging in direct discussions.

Interesting research on parental socialization was also conducted by Webley and Nyhus (2006), Jorgensen and Savla (2010), Palaci et al (2017), Meuleman et al (2018), Dangol, Maharjan (2018), Antoni et al (2019), Yeung et al (2019). In these papers the authors examine various problems regarding the influence of parents on children. Research conducted by Moschis and Moore (1979), Clarke et al (2005), Webley, Nyhus (2006), Shim et al (2010) as well as Xiao et al (2014) shows that parents play a significant role in financial socialization of their children. In literature the terms "maternal" and "paternal" socialization can also be found - cf. Axpe et al (2019), Yi et al (2016). Violato et al (2011) distinguish two types of parental financial socialization: parental role modelling and parental teaching.

Parental role-modelling can be implicit, involuntary, and includes social interactions that parents and children engage in. As Sabri (2011) points out, this type of socialization focuses on acquiring financial

knowledge by observing parents' behaviors. In this context, we may refer to Bandura's (2007) concept of behavior modelling processes which assumes that observing parental behaviors can lead to their duplication by children. In the area of finance, for example, money spending styles can be transmitted when children, by observing the functioning of parents, adopt their financial management style, e.g. mismanagement or foresight. Webley and Nyhus (2006) prove that by observing the economic behaviors of mother and father, the child learns to manage money in a more or less rational way.

Observed parental behaviors may get misinterpreted by the children and, as a consequence, may lead to their inappropriate, irresponsible financial behaviors. Inadequate financial socialization in childhood can result in negative functioning of the individual in adulthood, including difficulties in income management, lack of saving skills, and incorrect assessment of financial risk while making investment decisions.

As Violato et al (2011) claim parental teaching is a type of financial socialization that involves parents' transferring their own knowledge and financial skills to their children. This direct approach helps young people understand many financial issues and motivates them to engage in specific behaviors. One of the instruments used can be parents' encouragement to save money (Webley and Nyhus 2013), as well as money control or giving advice about saving and budgeting (Bucciol and Veronesi 2014). On the basis of the study of wide literature regarding to: social learning theory as well as mechanism and instruments of socialization, in particular relating to problems of financial, family and parental socialization, M. Swacha-Lech (2020) points the following set of instruments of parental financial socialization in this area:

- open communication (e.g. discussion about money management, benefits and threats relating to saving, investing and debts),
- giving advices focused on budgeting, saving, investing and debt,
- establishing orders and prohibitions referring to children's financial attitudes and behaviors,
- giving allowance,
- keeping track of allowance spending.

As a result of the parents' employing financial socialization tools, children's behaviors and attitudes may be the same or different from those of their parents. Intergenerational correlations related to money management styles have been described in the publications of Clarke et al (2005) and Rettig (1983), while those related to saving and managing money in the article by Solheim (2011).

Method

The study was conducted in mid-2019 with the CAWI method applied to a sample of 800 people aged 15-50. The sample was selected in a random and quota-based manner. The structure of the sample was corrected with an analytical weight to match the population structure of Poles aged 15-50 in terms of key features related to the study subject. The weight construction process took into account such socio-demographic variables as gender, age, education and size of the town of residence.

With the gender criterion taken into account, the structure of sample analyzed was as follows: 50.57% were women and 49.43% - men. Fig. 2 shows the division of respondents into four age groups.

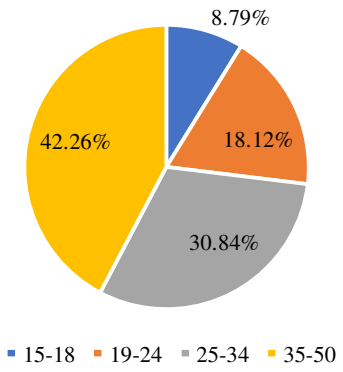

Fig. 2: Sample structure by age (in %)

Source: own study.

People with tertiary education accounted for 22% of the sample studied, the share of those with secondary education was larger by 15 percentage points, and the other respondents (41%) declared to have only primary, junior secondary or semi-secondary vocational education. Fig. 3., on the other hand, shows the structure of the same sample in terms of population size of their place of residence.

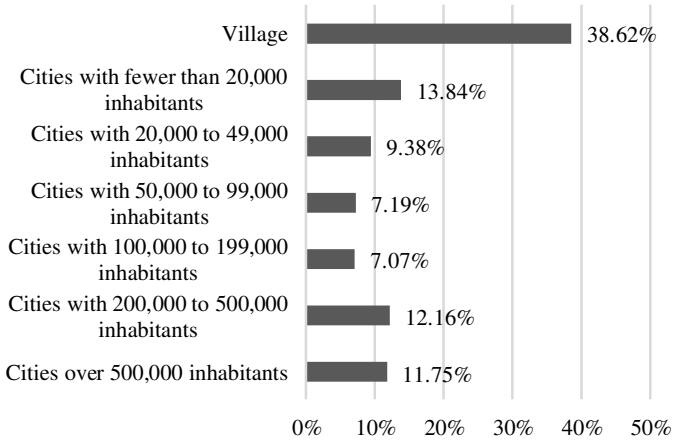

Fig.3: Breakdown of the respondent group by population of their place of residence

Source: own study.

Approximately 8.99% of the population sample were single-person households. Respondents who declared that their household consisted of two persons constituted 21.54% of the total. A similar proportion of respondents (20.9%) lived in three-person households. The other respondents declared that their households were shared by four or more people.

The sample structure by the income criterion is shown in Fig. 4.

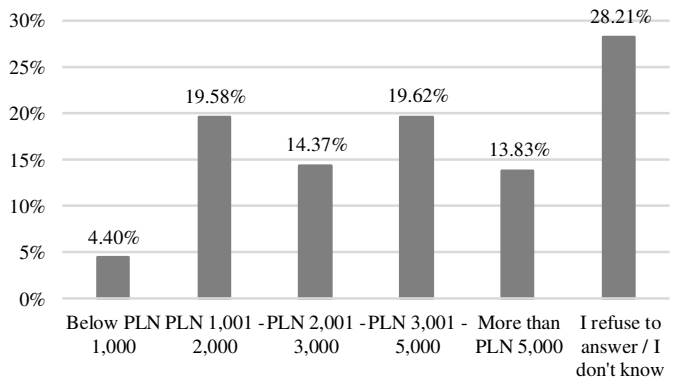

Fig. 4: Breakdown of the respondent group by net income of their households

Source: own study.

Most respondents (19.62%) declared a monthly net income per household within the PLN 3,001-5,000 bracket. The percentage of respondents within the PLN 1,001-2,000 bracket of net income per household was similar (19.58%).

In this study, the Classification and Regression Trees Method (CART) was used to determine the classification tree. The calculations were carried out with the use of Statistica 13.0 software, with the assumptions as presented in Table 1.

Table 1: Assumptions adopted for the CART method

Specification	Assumptions
Costs of misclassification	Equal
Fit measures (partitioning rule)	Gini index
Stopping rule	If misclassification
Minimum number	80
Maximum number of the tree levels (depth)	10
Maximum number of nodes	20
Error estimation	10-fold test validation

Source: own study.

The dependent variable adopted for the classification of respondents who demonstrated a saving attitude, which is the same as the attitude displayed by their parents/guardians (Y) was coded on the basis of the answers given by the respondents to four selected questions about the propensity to save, about possessing some savings and about the similarity between their own style of home budget management and the one of their parents or guardians.

The propensity to save was determined on the basis of two answers – to questions Q1 and Q2 – in which respondents were put in two hypothetical situations. The first of these questions (Q1) concerned the choice of a method to finance the necessary expenses associated with Christmas. The respondents' tendency to save is manifested in the answer: "I start saving small amounts already during summer" (see Table 2). The number of such responses in the population studied was 461 (57.6%). Other options for answering required a loan decision.

Table 2: Responses to Q1

Imagine that your regular income is not sufficient to finance the necessary expenses associated with Christmas. What would you do in such a situation?	Response selected [%]
• I'd start saving small amounts already during summer	57.6%
• I'd cover the extra expenses for Christmas with my credit card	12.0%
• I'd borrow money from family / friends	24.2%
• I'd take a consumer credit	2.2%
• I'd use an offer of some lending institution, e.g. Provident	4.0%

Source: own study.

In question Q2, the propensity to save was determined on the basis of selecting either of the two options: I will put the money into a savings account with a view of future expenses, e.g. on holidays or car replacement" and "I will put aside money with a view of future retirement" (312 respondents). Detailed breakdown of responses to question Q2 is presented in Table 3.

Table 3: Responses to Q2

You're paying off a mortgage. Currently you still have PLN 150,000 to repay. Your employer has paid you a bonus of PLN 10.000. What will you do with the extra money you receive?	Response selected [%]
• I'll use the money towards repaying the mortgage	39.0%
• I'll put the money into a savings account with a view of future expenses, e.g. on holidays or car replacement	35.2%
• I'll save the money with a view of my retirement	3.8%
• I'll spend the money on current expenses	22.0%

Source: own study.

Putting respondents in hypothetical situations, where saving coincided with indebtedness, enabled identification of their propensity to save, while responses to question Q3, What financial products do you use?, disclosed their actual behaviors in the area of financial decisions (Fig. 5). Here, 62.1% (497 respondents) declared their current use of savings products.

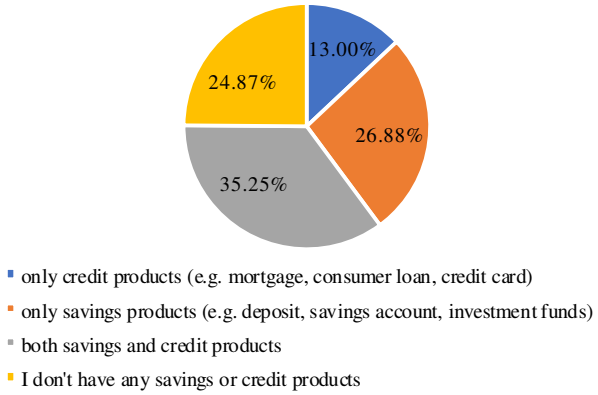

Fig. 5: Financial products used by respondents (in %)

Source: own study.

The compliance of the respondents' home budget management style with the management style exhibited by their parents or guardians was determined on the basis of responses to question Q4: Is your personal budget management style similar to how your make financial decisions? Over 42% (337 respondents) indicated that their style of home budget management is similar in most cases, while approx. 12% (95 respondents) declared that it is definitely similar (see Fig. 6).

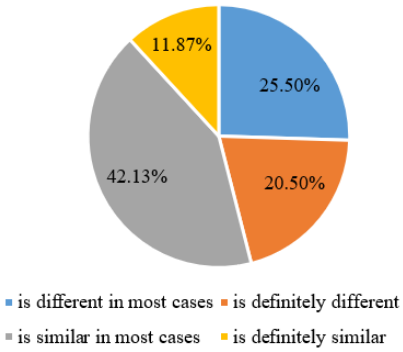

Fig. 6: Compliance of the respondents' home budget management style with the style exhibited by their parents/guardians

Source: own study.

To sum up, 269 respondents were qualified as showing the attitude to savings identical with the one displayed by their parents, and as those who:

- have demonstrated a propensity to save,
- actually have savings, and
- have declared that their style of managing the home budget is consistent with the one of their parents or guardians.

On the basis of a broad review of the literature on issues related to parental socialization, financial education and saving determinants, candidates for dependent variables of psychological, socio-demographic and economic nature were selected to build the model (cf. Table 3).

Table 3: Candidates for dependent variables

Nature of the variable group	Candidates for dependent variables
Variables relating to parental role-modelling	• children's perception of parents/guardians as persons who effectively managed the household budget
Variables relating to parental teaching	• encouragement from parents/guardians to earn money • transfer of knowledge and skills related to expenditure planning and money management by parents/guardians • receiving pocket money unrelated to household chores • receiving pocket money for performing home chores • encouragement to save
Socio-demographic variables	• age • gender • education
Economic variables	• monthly income per person in the household; • monthly levels of expenditure

Source: own study.

After verifying their degree of variability (variability coefficient Vx was above 30%), we proceeded to the selection of candidate explanatory variables. The significance of correlation was tested by means of the Yule's Q, Phi, Pearson's C and Cramer's V methods. Finally, eight variables were selected for further research, as they proved to be most strongly related to the dependent variable and at the same time the least related to each other. These included the following predictors:

- X1 - encouragement to save (non-parametric binary variable, where 1 - a person who in his/her childhood was encouraged to save by parents/guardians, 0 - a person who in his/her childhood was not encouraged to save by parents/guardians);
- X2 - receiving pocket money for performing home chores (non-parametric binary variable, where 1 - a person who received pocket money from parents/guardians for performing home chores, 0 - a person who did not receive pocket money for performing home chores) ;
- X3 - receiving pocket money unrelated to household chores (nonparametric binary variable, where 1 - person who received pocket money unrelated to home chores from parents/guardians, 0 - person who did not receive pocket money unrelated to home chores from parents/guardians);
- X4 – children's perception of parents/guardians as persons who effectively managed the household budget (nonparametric binary variable, where 1 - the person who perceived the parents/guardians as persons who effectively managed the household budget, 0 - the person who perceived the as people who managed the household budget ineffectively);
- X5 - transfer of knowledge and skills related to expenditure planning and money management by parents/guardians (nonparametric binary variable, where 1 - a person whose parents/guardians transferred the knowledge and skills related to expenditure planning and money management, 0 - a person whose parents/guardians did not transfer the knowledge and skills related to expenditure planning and money management);
- X6 - encouragement from parents/guardians to earn money (e.g. in odd jobs) (nonparametric binary variable, where 1 - a person who was encouraged by parents/guardians to earn money, 0 - a person who was not encouraged by parents/guardians to earn money);
- X7 - gender (nonparametric binary variable, where 1 - male, 0 - female).
- X8 - age (non-parametric multi-category variable, ordered by interval, where 1 - a person of 15-18 age group, 2 - a person of 19-24 age group, 3 - a person of 25-34 age group, 4 - a person of 35-50 age group).

The explanatory variables X1-X6 were coded based on the respondents' answers to questions about the parental financial socialization instruments used by in shaping a saving attitude in children (see Table 4).

Table 4: Respondents answers given to the question of: *Indicate which of the following statements apply to you* (total sample n = 800)

Indicate which of the following statements apply to you	Percentage of positive responses	Percentage of negative responses
• my encouraged me to save	44.28%	55.72%
• I received pocket money for performing household chores	12.46%	87.54%
• I received pocket money unrelated to performing household chores	40.90%	59.10%
• my parents/ guardians managed their home budget effectively	44.91%	50.09%
• my parents/guardians taught me how to plan expenses and manage money	29.24%	70.76%
• my parents/guardians encouraged me to earn money (e.g. in odd jobs)	35.49%	64.51%

Source: own study based on the results of own survey.

Other explanatory variables of a demographic nature - i.e. age and gender - have been described in the part of this paper which describes the surveyed sample.

Research Results and Discussion

As a result of the CART method application, sequences of 4 classification trees were obtained. In the next stage, based on the analysis of the graph showing the level of cross-test costs and the costs of resubstitution against the background of the tree complexity, the two best trees were selected (the smallest difference between the cross-check cost and the resubstitution cost was decisive). Then, both trees were evaluated for complexity and for the number and importance of predictors used; usefulness of the rules generated was also important. Ultimately, the classification tree with 5 split nodes and 6 terminal nodes was considered the best (Fig. 7).

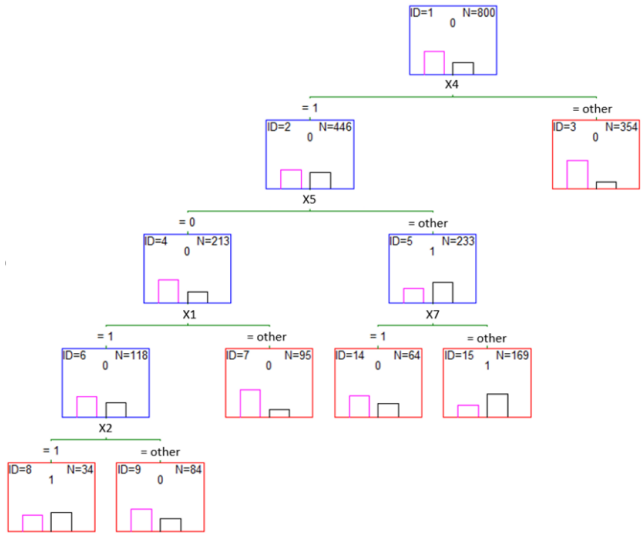

Fig. 7: Classification tree

Source: own study.

The resubstitution cost was 0.24, and the error rate after 10 cross-validations - 0.26. The ranking of predictor significance indicated that the dependent variable was mostly affected by (see Table 5):

- transfer of knowledge and skills regarding expenditure planning and money management by parents/guardians,
- encouraging the propensity to save,
- sex.

Table 5: The significance of predictors

Predictors	Significance
X_5 - transfer of knowledge and skills related to expenditure planning and money management by parents/guardians	1.00
X_1 - encouragement to save	0.98
X_7 - gender	0.71
X_4 – children's perception of parents/guardians as persons who effectively managed the household budget	0.55
X_2 - receiving pocket money for performing home chores (non-parametric binary variable	0.53

Source: own study using the Statistica 13.0 software.

The risk level indicator and classification tables were used to assess the model quality. The risk was estimated at 0.248, which means that the category predicted by the model (propensity to make a savings decision) is inappropriate for approximately 25% of cases (risk of misclassification). The results collected in the classification table proved to be consistent with the estimated level of risk. The model correctly classified almost 75% of cases, while the correctness of classification for households with a propensity to save exceeded 80%. This means that the model obtained is well suited to the data.

Finally, on the basis of the survey conducted, two classes of people showing a saving attitude identical to the attitude displayed by their parents/guardians were selected (on the classification tree these are the terminal nodes, with label 1 indicating success - Fig. 7). Due to the low count at node 8, only node 15 will be further analyzed. It includes 169 respondents:

- perceiving their as persons who managed the household budget well;
- to whom parents/guardians passed the knowledge and skills of expenditure planning and money management;
- being female.

Most of them, i.e. 112 or 66.27%, are persons with a propensity to save, who in this respect follow the footsteps of their parents/guardians. The analysis of this group clearly shows that the most important factors determining the adoption of a saving attitude consistent with the one displayed by their parents/guardians include:

- parental role-modelling in the area of financial behaviors,
- attitude modelling by means of conversations on expenditure planning and money management (instrument of parental teaching).

Upon analyzing the data belonging to nodes 14 and 15, it should be noted that among people showing a propensity to save just like their parents (137), a vast majority (81.75%) are women.

The receipt of pocket money in exchange for the performance of household chores may also affect children's financial behaviors. Of the entire sample (n = 800), only 12.46% of respondents received pocket money in exchange for work, while among those exhibiting a propensity to save that is consistent with the attitude displayed by their parents (n = 269) they made a solid 19.23%. Analyzing the data belonging to the terminal node ID=8, it can be seen that this instrument of financial socialization by parents has also proved effective. However, due to the low count (34) of people classified into this node, this result cannot be considered statistically significant.

While analyzing the data presented in the classification tree (Fig. 7) attention should also be paid to the X4 variable, "children's perception of as persons who effectively managed the household budget", because it was the first to divide the entire sample into two groups. The first one includes respondents who perceive parents/guardians as persons who managed the household budget well (446 people). In the second group there were 354 people who thought that their parents/guardians had problems with effective budget management (liquidity problems, no savings whatsoever, excessive debt or even a debt loop).

Taking into account the assessment of financial behaviors of parents/guardians by the respondents, four types of children's financial behaviors can be distinguished. The possible variants of the relationship between the financial behaviors of parents/guardians and those of their children are presented in Fig. 8.

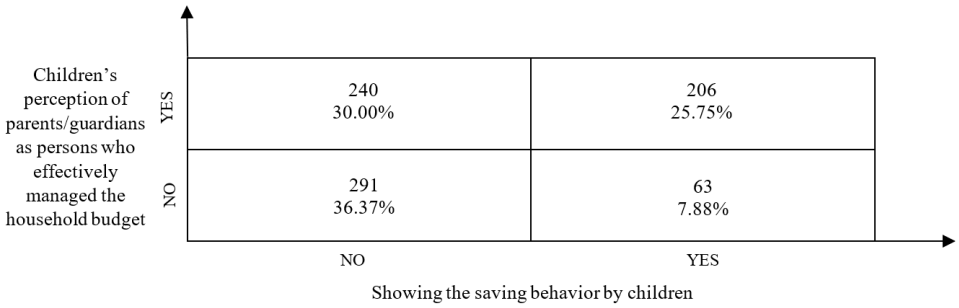

Fig. 8: Relations between the financial behaviors of and those of respondents (number of responses and percentage of all respondents)

Source: own study.

Fig. 8 also presents the percentage of people belonging to each of the four groups of respondents. Among the respondents who perceived their parents/guardians as effectively managing the household budget, 46.19% (i.e. 25.75% of the entire sample) showed the tendency to copy their parents' patterns.

Women constituted 77.67% (160 people), which may prove that they are more predisposed to duplicating family patterns.

The next group shown in Figure 8 included 240 people. These are the respondents who perceive their as effectively managing the household budget, but at the same time by themselves they do not show the propensity to save. A detailed analysis of this group of respondents revealed that the reasons for the lack of savings are the respondents' young age and the declared low net income per month. A vast majority of these respondents belong to the 19-34 age group (63.33%, which is 14.37 pp more than the figure for the entire sample). Only 23 people (i.e. 9.58%) indicated that their household's net income per person exceeded PLN 3,500. In the respondent group of 240 people, 73.34% declared that their monthly net income did not exceed the gross national average for November 2019. In addition, the answer "I don't know/hard to say" was given by 9 respondents (3.75%), and "I refuse to answer" – by 32 respondents (13.33%). According to GUS (2019), during the period analyzed, the gross national average was PLN 5,229 (i.e. PLN 3,775 net). For comparison, it can be pointed out that in 2019 the minimum wage was PLN 2,100 gross (i.e. PLN 1,530 net).

An overwhelming majority (82.20%) of those 354 respondents who observed improper - in their opinion - financial behaviors of their did not demonstrate any propensity to save. Only 63 (including 45 women) out of those 354 people reveal a propensity to save and in fact have savings. These are the people who do not want to reproduce mistakes made by in the area of personal finance management.

Research on intergenerational correlations was also conducted by Solheim (2011), who proved the existence of three paths of financial socialization in the area of savings and money management, leading to varying outcomes:

1) the first, positive path – the students who watched their parents save money and manage their budgets well also appreciated the importance of saving and managing money;
2) the second path refers to the students who observe their parents' negative patterns of saving and budget management but do not reproduce their parents' mistakes;
3) the third path refers to people who duplicate the parents' patterns of non-saving and poor budget management.

As far as the importance of predictors is concerned, the results of research conducted indicate that the most important of them is the transfer of knowledge and skills regarding expenditure planning and money management by (see Table 5). Analysis of the results of previous research on financial socialization in the family suggests that parental teaching instruments prove to be more effective than parental role-modelling. Jorgensen and Savla (2010) proved that the college students who declared that their parents taught them budgeting skills had more financial knowledge than those who gained knowledge solely through observation of their guardians' behaviors. Grinstein-Weiss et al (2011) proved that parental teaching of money management skills early in life is associated with positive financial outcomes in adulthood.

Conclusion

Parents, their financial attitudes and behaviors play an extremely important role in forming their children's financial attitudes and behaviors. Shim, Barber, Card and Serido (2010) proved that the role of parents in this area is greater than the impact of both work and high school financial education combined. This paper focuses on the question parents' / guardians' influence on the formation of behaviors and attitudes identical to their own. The tendency to repeat parents' savings attitudes was selected as the subject of analysis.

As a result of the research, the hypothesis formulated in the introduction to the article to read 'parental role-modelling and parental teaching determine the children's tendency to repeat parents' saving

patterns' has been confirmed. The results of the study showed that the following parents' actions are particularly important in the context of the analyzed problem:

- the transfer of knowledge and skills regarding expenditure planning and money management by parents/guardians,
- encouraging saving and offering pocket money for performing household chores,
- property financial behavior in the context of managing household budget.

While the first two of these activities belong to parental teaching instruments, the last of them involves parental role-modeling. The conducted research proved that the perception of parents/guardians by children as persons who managed the household budget well is also a strong determinant for adopting a saving attitude by children in the future.

The results contribute to bridging the research gap in the area of identifying effective parental instruments to model the future behaviors and financial attitudes of their children in the area of saving.

Maison et al (2018) indicate that parents often lack the knowledge, skills and awareness to effectively carry out the process of financial socialization, hence, apart from various forms of financial education activities aimed at children, it is also worth considering the activities directed at parents. Such activities should be oriented towards increasing both their knowledge of finance and their competence for financial education of their children. In the authors' opinion, it also seems important to identify other barriers that limit the positive impact of parental instruments of financial socialization on children's financial attitudes and behaviors, as well as suggest corrective actions.

In the context of influence of on the financial attitudes of children, it is also important to thoroughly examine the tendency to repeat parents' patterns regarding debt. It is because mistaken credit decisions may lead to excessive debt, which can have a particularly negative impact on the financial situation of a household. This problem is an inspiration for the authors' further research.

Acknowledgment

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Employer Branding in IT Industry – Research Findings

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Abstract

Employer branding in IT industry has continued to gain popularity due to the significant position it occupies in the conscious efforts being made by Polish It companies to keep their best employees engaged and retained. There is need for new insight that would provide an explanation about the influence of employer's brand's over the construction of employees' identity in IT sector. The main objective of the article is to answer the question: What role does an organization's brand play in decision making by employees regarding a new job and the likely effect of a brand on individual job satisfaction, commitment as well as productivity.

Keywords: IT, empolyer branding, IT industry, Poland

Introduction

Employer branding is all about the process by which an organization presents a positive image prospective employees in the labor market so that the organization attractive to them (Chmielecki, 2013a). In this context, the image of the firm may not be considered in the singular form, but seen as " a plural form of individual identities consistent with the firm's own identity (Martin and Hetrick, 2006). Consequently, one can theoretically submit that there is need for new insight that would provide an explanation about the influence of employer's brand's over the construction of employees' identity, all within the literature of "employer branding". The role of the new insights are to give an explanation on whether or not positive /negative "employer brand image", significantly influences the preference as well as choice of employees to either continue working for an organization or leave.

Branding as a concept, cuts across so many disciplines. Special attention has now been placed on, rather than just goods and services, the organization, personnel as well as day to do business activity.

Employer branding has continued to gain popularity due to the significant position it occupies in the conscious efforts being made by Polish employers to keep their employees engaged and retained (Chmielecki, 2013b). It is also concerned with efforts aimed at securing the services of the very best employees. Employer branding that is effectively constructed is in a position to provide a strong support base for the corporate identity of a brand as well as aiding the improvement of the productivity of the brand in all aspects. The IT sector has been through several years of rapid growth coupled with major organizational challenges. These challenges significantly revolved around structural organizational policies as well as proper and effective staffing. The situation of the sector has brought to the fore, the need to concentrate on the opportunity as well as challenge inherent in the building of strong future teams. Notably as well, is the increasing demand for the best available IT talent. This trend has continued to take more concrete shape, despite the cautiousness exhibited by firms and various other corporate organizations in face of lingering focus on how to optimize productivity and values offered by the staff on ground. While there is steady increase in the demand for talent, a lot of IT employers continue with the struggle of delivering in line with what their employees as well as stake holders expect from them. Most organizations are very much interested in attaining lofty heights and reputation, such as being called the owner of the most popular and trusted IT brand in Poland. In this process, however, there are lots of such organizations whose attention are diverted from what their employees

really need. It goes without saying therefore, that there is a misunderstanding on the opportunities capable of bringing out the uniqueness of their brand.

Theoretical Background

There are many areas of consideration when assessing any organization with an operational base on the competitive market. These areas of consideration include, in addition to the image such an organization portrays as an employer, the products and services they offer the public. Another name for the image is employer brand. A company whose reputation on the market is very high is on the way to becoming a sought after employer and such an image makes it possible for to them to magnetize employees that are most talented and know what value they are capable of adding to the organization. As a result of this, the company is capable of maximizing product innovativeness and labor productivity. In time, their competitiveness on the market also increases. The image of a company has an effect on the perception of consumers on their products. Business owners for this reason are very concerned about the kind of image they are portraying and how potential employees view them. An organization which wants to have the best crop of talent has therefore to embark on a systematic building of employer brand. Recently employer branding as a concept came to the fore. According to Ambler and Barrow (1996, p. 187), employer branding functions as the package of functional, economic, and psychological benefits provided by employment, and identified with the employing company. Employer branding is the result of marriage between two disciplines: marketing and human resources management which mutually derive from one another. This notwithstanding, global surveys conducted during the downturn have provided data that indicate a close tie between employer branding and strategic management. There have been efforts by scientists to properly understand the concept of employer branding as highlighted in management concepts. These include customer relationship management and psychological contract (see: Dunmore, 2002, p. 195; Beaumont & Graeme, 2003, p. vii; Rosethorn, 2009, p. 4). Employer branding should be considered more in a broader context as a key factor in strategic management of human resources, successful leadership and competitive market strategy (Minchington, 2013, pp. 2–3).

There is a gradual change in the perspective of employees and employers relations (Sulkowski, 200). Gone are the days when employees were viewed as relatively inferior to employers. Any company interested in becoming highly competitive, market-wise has to secure the services of the very best talents available (Sulkowski 2012). Companies whose competence stem from the ability and productivity of their employees cannot afford to be left behind in this trend. An organization is assumed to become irresistibly attractive to employees when they have an attractive brand value. What then is employer brand? Definitions of this concept abound in the literature as attempted by various authors (see table 1)

Table 1 : Definitions of employer branding

Definition	Sources
"the package of functional, economic and psychological benefits provided by employment, and identified with the employing company"	Ambler and Barrow, 1996: 187
"the process explicitly designed to shape employees' expectations by establishing and nurturing an emotional connection to the firm"	Crain, 2009: 1205
"(…) the two-way deal between an organization and its people – the reason they choose to join and the reasons they choose – and are permitted – to stay,"	Rosethorn, 2009
"(…) a set of attributes that make an organization distinctive and attractive to those people who will feel an affinity with it and deliver their best performance within it,"	CIPD, 2006
"(…) the image of the organization as a great place to work in the minds of current employees and key stakeholders in the external	SHRM, 2008

market (active and passive candidates, clients, customers and other key stakeholders),”	
A sum of the key qualities current and prospective employees identify with organization as an employer, such as: economic (compensation and benefits), functional (e.g. learning new skills) or psychological (e.g. sense of identity and status)	Mosley, 2009, p. 4

Source: own compilation

It can be proposed that an employer brand is a set of attributes and qualities – often intangible – that make an organization distinctive, promise a particular kind of employment experience, and appeal to those people who will thrive and perform their best in its culture. It is a complex concept based on various intangible factors, including perception, image versus identity, and the ability to differentiate between them (Chmielecki, Sułkowski, 2014).

"Corporate brand" was the choice term used by D. Aaker to explain the concept of brand of organization, with emphasis on organizational values, communications and culture centered on workers capable of creating positive associations and bring about competitive advantages (Aaker D., 2003). D. Aaker and L. De Chernatony both submit that workers are capable of placing a corporate brand on a ladder of competitive advantage. The mission and values of the company then becomes a key factor in constructing desirable employees’ behavior. According to L. De Chernatony, the Human Resources Department (HR) has highly significant duties in the effort to shape corporate brand. "With corporate branding employees not only make a significant contribution to the value of the brand, they also signal about brand evaluation. In this case, the head of HR should be estimated as the main member of the branding team as it develops the policy that influences the creation of brand, in particular recruitment programs, adaptation of new employees, training and rewarding" (De Chernatony, L., 2006). Corporate branding therefore has to go hand-in-hand with staff branding.

Employer Branding and Building Competitiveness of An Organization

A conscious effort to build the competitiveness of an organization on the market also requires building of its brand as a notable and choice employer. Certain factors such as company’s reputation, sector attractiveness, products/services quality, work environment, location, employee benefits, pay, work/life balance, corporate social responsibility, economic conditions as well as people and culture can be key dominant factors in this aspect. An organization’s employer brand has always been in existence in one form or the other. It is not built out of nothing and has somehow existed, albeit spontaneously, by using or failing to use certain strategies. Failure of the company to take conscious steps in building an image could translate into a lack of influence on its public’s perception as an employer. Therefore, the quality of the products it churns out remains the only way to affect the customers.

Within the last few years, employers have come to recognize and acknowledge the “employer of choice” concept. For instance Moroko and Uncles (2009) describe “employer of choice‟ as a concept that Europe, U.S and Japan situated firms are highly concerned about. However, the benefits of being an “employer of choice” have been identified by many studies. Some of these identified benefits are: EoC helps organizations in retaining beneficial customer image, can increasingly retain their workforce as a result (Sullivan, 1998, cited in Lenaghan and Eisner, 2005), maximize financial performance (Becker and Huselid, 1999) as well as higher shareholders return (Shellenbarger, 1998). Scholars in marketing and human resource management (Ambler and Barrow, 1996; Moroko and Uncles, 2008) made an attempt to examine the factors responsible for attaining “employer of choice‟. According to their findings, the employer preferences of individuals were majorly tied to certain factors like the attractiveness of the employer, in-house identification level and individual-organization balance.

These findings are the foundation for previously presented definitions of employer branding. The focus of these studies was more on the external perspective on “employer attractiveness‟ than the perspective of in-house employees. Theoretically, this suggests that individuals would rather be employed by an organization that is seen as an “employer of choice‟ .Literature within “employer branding‟ was

therefore tilted towards building a positive framework which is easy for the existing employees to associate with. A sound argument therefore could be the effect which employer branding has on the gradual transitioning of the identity of employees until they conform with a set of stable and fixed values (Alvesson et al. 2008) these values are expected to blend with the organization's positive image that has already been reframed. Another point for consideration is brought to the fore by recent studies on "identity" as well as "identity work", these studies suggest that "employees identity" deals more about employees displaying an "individualized approach", which is basically a personal definition of their own role in an organization, and may act independently despite "managerial identity regulation" (Alvesson and Wilmott, 2002). In more precise words, it would be a safe argument to refer to employer branding as the new process of identity management, using managerial capacity. Alvesson and Wilmott (2002: 625) described "identity regulation" as "the more or less intentional effects of social practices upon processes of identity construction and reconstruction".

Employer Branding and Organizational Identity

Martin and Hetrick (2006) stated that "employer brand image" depends on "organizational identity". This he explained to be an answer collectively given on "who we are" by first, managers, followed by employees and finally, combination of individual identities that are not dependent on the "organizational identity. The focus of "Employer branding" is to make others see the organization in good light. Therefore, when there are elements of cynicism from some members of the organization, it might present a source of conflict to combine them with the identity of the organization. There have been no empirical studies recently conducted to explore the level of success recorded by "employer branding" within the context of the organization, nor reasons many people would rather pitch their tent with companies of no particular sound reputation and like to keep their jobs.

In recent years, some studies have sought to explain the reason for preference for some employers. These studies highlighted the significance of the identity mechanism to social construction. Some of the studies linked this preference to "employee's engagement with the development of self-image and work orientation to make a meaning of their work (Alvesson and Wilmott, 2002); individual's effort to portray a positive and distinctive identity independent of totalized managerial discourses (Kuhn, 2006); individual's ability to maintain discursive tensions without eliminating these and thus contributing towards an empowered occupational identity (Meisenbach, 2008). The studies presented a similar analysis framework on individual's engagement in the process of identity negotiation. The framework of "identity negotiation" was however presented in an empirical manner, failing to explore such concerns as the method of negotiating identity within organizational image context. Hatch and Schultz (2002) opined that, there is a significant influence which the image has on the organization's identity. Unfortunately, there was no organizational studies research to examine how organizational image and identity work relates. It is worthy of note that, as far as organizational context communication research is concerned, there is self significance in organizational association (Kuhn, 2002).

Working under the assumption that the concept of "employer branding" is deeply rooted within marketing literature, the studies carried out on the concept too remained equally deeply immersed in marketing literature. A good example is why this concept is important to prospective employers. Collins and Stevens (2002) hammered on why external marketing is important to the concept of "employer branding". On the other hand, Cable and Turban (2003) explained how an employer brand that is perceived as strong can positively impact the organizational membership of an individual. It is worthy of note, all these studies within "employer branding" failed to give any pointers on how it influences the construction of employee identity.

However, there have been only few studies on the influence of "employer brand" on employee's identity, empirically backed up with evidence in particular situations of negative corporate reputation. Dutton and Dukerich (1991) conducted a study about New York Port authority, subsequent upon which they provided a description on the crushing effect of the firm's negative external reputation on organizational identification which gave employees a hard time. Highhouse (et al. 2007) agrees that within an organization where negative corporate reputation prevails, employees reportedly had to grapple with accompanying embarrassment and shame. This shows that better corporate reputation of

an organization may be the antidote for negative reputation, preventing the resultant damaging effects on the ability of the firm to recruit and retain the best of hands. (Fomburn and Van Riel, 2007). Fomburn (et al. 2007), opined that an external reputation that is positive appeals to employees because they of the positive appreciation which they have on others. This suggests that a positive external employer brand can compel employees to act in line with organization values. The overall effect of this is that it uplifts the organizational identity, encouraging construction of positive images by employees. These arguments however failed to give an explanation on the damaging effect which "employee identity work" suffers from negative reputations from others, when such are not in tandem with the organization's values. To give an explanation on such issues, literature studies within the "Dirty Work" concept can be applicable.

Methodology, Results and Discussion

Distinct practices, whether well-known organizations or niche specialists, stand to benefit from employer brand's values. The main objective of the research was to answer a question: "What role does an organization's central brand play in decision making by employees regarding a new job and the likely effect of a brand on individual job satisfaction, commitment as well as productivity?"

The research was conducted in the last two months of 2017 and had a quantitative character. This article presents the unique results obtained from 231 employees representing 65 companies from IT sector in Poland. The 231 participants were mainly IT managers, project managers, business analysts, system analysts and developers. The sample was selected via non-probabilistic methods, i.e. purposive and snowball sampling techniques.

Table 3: The female and male participants' characteristics

Respondents' gender (number)	Female (42)	Male (189)
The average age	31 years old	29 years old
Higher education	42 people	172 people
The average work experience	6 years	5 years

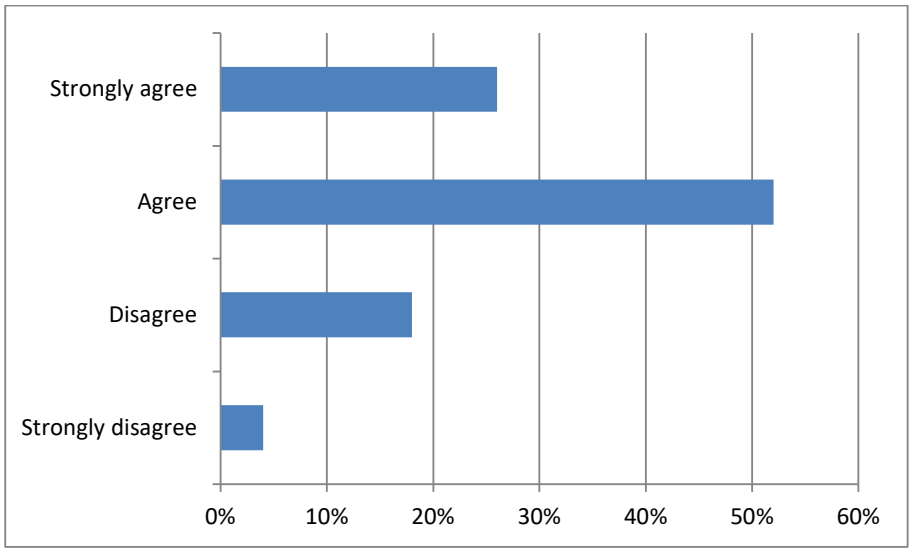

Fig. 1: A reputable employer brand takes central stage when I need to make up my mind about a new responsibility.

A highly reputable employer brand plays a huge role in the consideration of a new job by vast majority of respondents. 78% employees respectively indicate that a highly reputable brand is crucial to the decision making process.

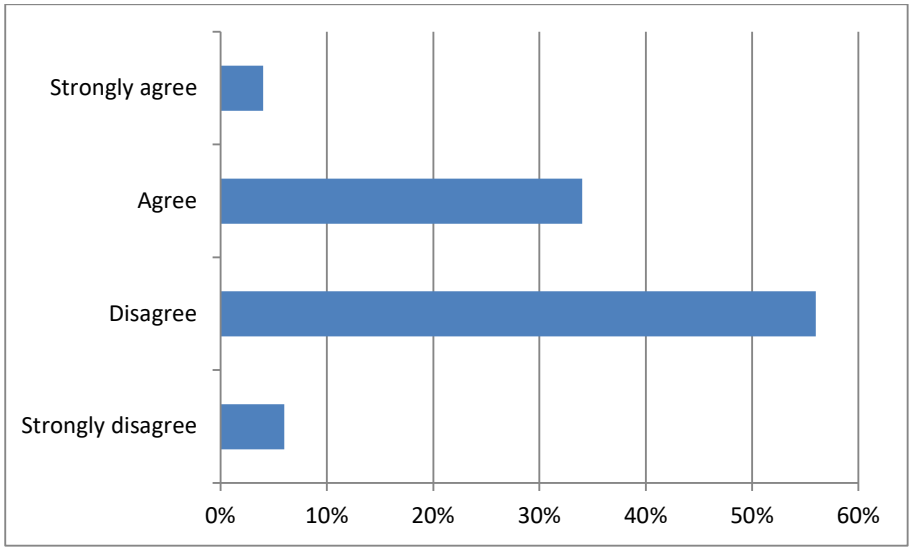

Fig. 2: A reputable employer brand comes first before pay and bonus in consideration of a new job

Although pay is usually a huge factor in consideration of a new job, 38% of employees would rather choose a trusted employer brand over pay and bonus.

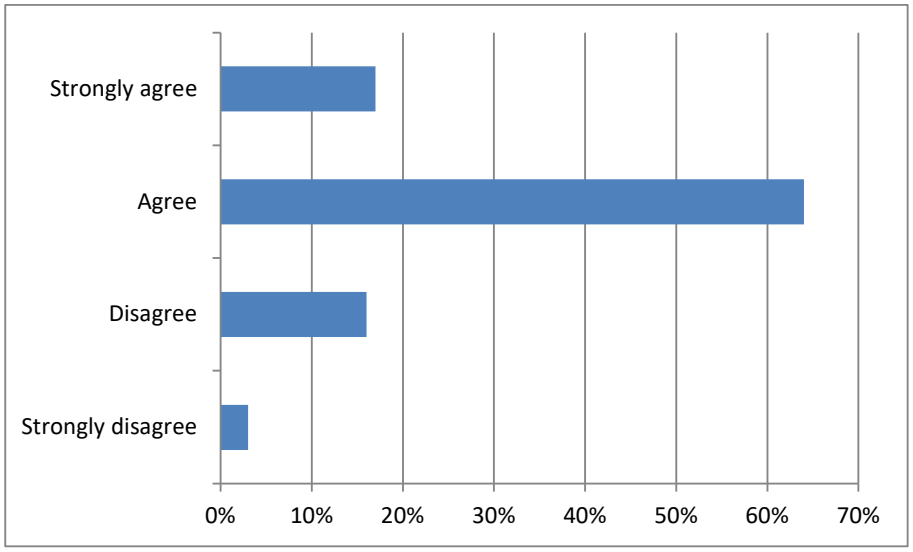

Fig. 3: A reputable employer brand could have a positive impact on my job satisfaction

Majority of employees (81%) agree that a reputable employer brand could could have a positive impact on their satisfaction.

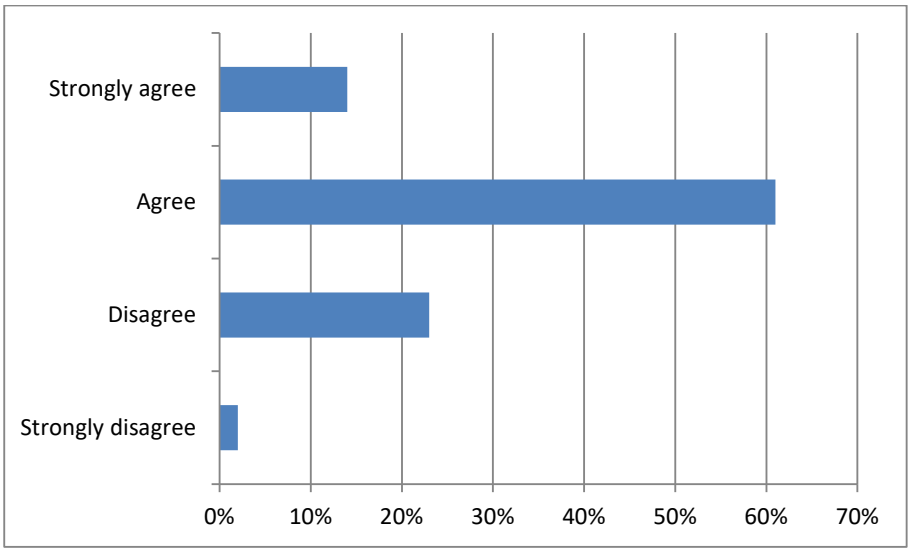

Fig. 4: A reputable employer brand could have a positive impact on my level of commitment as well as productivity

Majority of employees (75%) agree that a reputable employer brand could make them committed to their job and consequently be more productive. An insignificant number of employees, 3% respectively strongly disagreeA distinct and strong brand attracts candidates. These brands are viewed as having the total package comprising excellent employee welfare, salary and career development. Studies and statistics show that while financial rewards may be a factor, it does not solely guarantee the creation and sustenance of competitive advantage as far as the attraction of candidates is concerned. Top IT employers are keying into new understanding of the prospects, creating 'total reward programmes' in building a powerful employer brand that employees find irresistible.

While rewards have a critical role to play in employee behavior, regular check should be carried out to find out whether the employer brand derives additional value from the rewards package prepared for the staff. This can be determined with the use of HR metrics, including employee surveys and performance management data. Business metrics such as customer service and budget reductions can also be highly useful.

Employers with challenging working culture and great career plans are in a position to attract the best of talent in the market. An engaged worker will more probably than not, be motivated by an organization's well-laid out staffing arrangement, rewards and promotion plans through consistent appraisals and performance assessment.

It is therefore important that you keep staff in the knowledge circle of the kind of brand the company is trying to build (Chmielecki, 2015). Employees are the strongest supporters of the company brand and they are the ones who need to have an understanding of the internally-communicated brand ideas. While external marketing is important, internal marketing is not any less important. The millions spend on marketing campaigns will be fruitless if it has first failed in-house (Chmielecki, 2017).

In most instances, employees serve as the representatives of the brand in the presence of suppliers, customers and even potential employees, and every communication line and attitude must reinforce the organizations brand. It is very important too, that organizations keep their eyes fixed on the bigger picture and maintain the flow of brand strategy, whether the times are favorable or less. Consistency in brand building is a great way of providing staff with much needed confidence and security. The purpose

of communication as far as brand building is concerned, is to make clear what the organization is doing. This can also be effectively done through your actions. There is no single unimportant encounter which an individual might have with the brand. Even an advert which the consumer comes in contact with, the experience they get when they place a call to helpline, or the feedback they receive after they have sat through an interview conducted by the company. HR departments, recruitment partner as well as marketing functions all need to work with you so that every experience will be "on brand".

Organizations that are ranked high on the list of best employers usually offer tasking duties, attractive development and training prospects that make them go for only the best. On the other hand, it may be because of the leading market products they make available, and this external perception can be magnetizing. What these companies have done is to develop and communicate clear messages about the things they do and their position in the market. The survival and achievement of employer branding within the business strategy is highly connected to activities of senior management. The management of the firm has to be fully involved, actively and visibly in the strategies aimed at brand buildings. To build a great brand requires combining the strengths of various different teams, not by corporate communications or isolated marketing only.

Poor practices in the recruitment process are capable of harming the brand building efforts of an organization. One way this occurs for instance, is the use of rude interviewers or unqualified ones who leave job seekers with a bad first impression about the company. The impact of this kind of attitude on employer brand could be damaging, just like the one experienced by a consumer who gets a purchasing experience that is way below their expectations. It is therefore important that whether applicants are accepted or rejected, the experience they have is highly positive. When new staff is hired, they already have been given some measure of organizational goodwill at their first contact with the company, and this should be maintained. There is need for a blend between the external brand of an organization and the internal brand as well. A company that has a shinning external brand and weak workforce, absent training opportunities, poor management-staff interaction has contradicting values that may be hard for formerly impressed employees to reconcile. This may cause disappointment as well as cynical thoughts .

Contributions and limitations

The research contributions and limitations are as follows. This paper contributes to the research on employer branding in IT industry. With regards to the research limitation, it must be highlighted that it was a pilot study and the results cannot be generalized. The empirical findings serve as a starting point for further in-depth research in this area. It is recommended that in order to gain a complete picture of the issues underlying the results, both qualitative and quantitative research on a bigger sample should be undertaken. Additionally, further research could focus on a comparative approach to employer branding among different industries as well as between Poland and other countries.

Conclusion

For the past decade, there has been an increase in the number of human resource leaders who have embraced employer branding. Nowadays, markets are becoming more sophisticated, just as employers are on the lookout for outstanding talents, and making efforts to retain them for the value thy add to their firms. In IT industry in Poland a highly reputable employer brand is crucial to attracting the very best employees in matters of staffing. It covers everything the employee perceives about an organization, from the time they first come in contact with the job till their exit.

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La Politique De Cohésion En Slovaquie : Enjeux Et Perspectives

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Résumé

La Slovaquie a connu un fort développement économique depuis son adhésion à l'Union européenne en 2004. Pourtant les inégalités territoriales se sont accrues durant cette période créant des frustrations venant nourrir les populismes et l'euroseptiscime. Certes les fonds européens de cohésion ont permis de financer de nombreux projets structurants qui ont aidé les régions les plus démunies à se développer mais cela n'a permis d'endiguer l'accroissement exponentielle des niveaux de développement notamment entre la région de Bratislava et certaines régions enclavées à l'Est du pays. Plusieurs facteurs structurels ont eu un impact négatif sur le processus d'utilisation des fonds et la rigidité des procédures a été néfaste au cours de l'actuelle période de programmation. Pour être plus efficace, la politique de cohésion devrait pouvoir octroyer plus de flexibilité aux pays membres afin de mieux prendre en compte les spécificités nationales.

Mots clés : Slovaquie, Politique De Cohésion, Union Européenne, Inégalités Régionales

Abstract

Slovakia has experienced strong economic development since joining the European Union in 2004. However, territorial inequalities increased during this period created frustrations that fueled populism and euroseptiscime. European cohesion funds have certainly made it possible to finance many structural projects which have helped the poorest regions to develop. Nevertheless, this did not stem the exponential increase of disparities of development, particularly between the Bratislava region and certain landlocked regions in the east of the country. Several structural factors have had a negative impact on the process of using the funds and the rigidity of the procedures has been harmful during the current programming period. To be more effective, cohesion policy should be able to grant more flexibility to member states in order to take better account of national specificities.

Keywords: Slovakia, cohesion policy, European Union, regional inequalities

Introduction

Dès le départ la construction européenne a été confrontée à d'importantes inégalités territoriales qui ont eu tendances à croître au fil et à mesure des différents élargissements. Le traité de Rome de 1957 qui soulignait la nécessité d'obtenir un développement harmonisé au sein du « Marché commun » (Buzelay, 2019) avait prévu des mécanismes de solidarité en matière sociale et agricole mais il faudra attendre l'adhésion du Royaume-Uni, qui connaissait à l'époque un grave déclin industriel et qui bénéficiait peu de la PAC, pour que soit créer en 1975 le Fonds européen de développement régional (FEDER) (Petit, 2019). Pour plus d'efficacité, ce fonds sera combiné avec ceux d'autres entités aidant indirectement à lutte contre les inégalités tels que le Fonds européen pour les affaires maritimes et la pêche (FEAMP), de l'initiative de l'emploi des jeunes (IEJ)

auxquels il faut ajouter les investissements de la Banque européenne d'investissement (BEI) et du Fonds européen pour les investissements stratégiques (FEIS), initié par le Commission européen de M. Jean-Claude Juncker (Buzelay, 2018). Ces financements sont aussi appelés Fonds structurels parce qu'ils aident, directement ou non, à l'amélioration des structures régionales d'activité (Buzelay, 2019). Plus de la moitié des fonds de l'UE transitent par les Fonds structurels et d'investissement européens (Fonds ESI) qui sont gérés conjointement par la Commission européenne et les pays de l'UE.

Les pays d'Europe centrale qui ont rejoint l'Union en mars 2004 ont largement bénéficié de ces fonds car une large partie de leurs territoires connaissait un développement économique largement en dessous de la moyenne de l'Union. C'est le cas en Slovaquie où la politique de cohésion a eu un impact très positif. Entre 2004 et 2006, première période de programmation pour la Slovaquie, cet Etat d'Europe central a pu réaliser de nombreux projets financés par les fonds de l'UE. Celle-ci a été suivie par la première période complète de programmation de 2007-2013 avec une allocation d'un montant de 13,2 Mrd d'euros. Pendant la programmation de 2014-2020 en cours, le montant total de 15,3 Mrd d'euros affecté à la Slovaquie permet encore de financer de nombreux projets structurants. Les autorités slovaques se réjouissent du renouvellement de cette politique pour la période 2021-2027 même si les montants alloués à la Slovaquie risquent d'être revus à la baisse du fait du Brexit et de la définition de nouvelles priorités d'investissement (Petit, 2019). Globalement les indicateurs macro-économiques de l'économie Slovaquie sont plutôt positifs et les fonds de cohésion ont contribué à cette « succes story » mais « le miracle slovaque » (Giansily and Mossé, 2009) ne doit pas occulter les inégalités territoriales grandissantes notamment entre l'Est et l'Ouest du pays.

Une Economie Qui A Connu Un Fort Développement Mais Qui Est Marquée Par De Fortes Inégalités Territoriales

Des Indicateurs Macro-Economiques Satisfaisants

La Slovaquie n'est pas un des grands pays de l'Union européenne, ni par sa superficie ni par sa population. Elle a une superficie de 49 000 mètres carrés et sa population est de 5.45 millions d'habitants. La Slovaquie est considérée par beaucoup d'économistes comme un pays ayant connu une « succès story » depuis les années 90. Les indicateurs économiques affichés ces dernières années par la République slovaque en sont la preuve. La politique de cohésion et les investissements directs étrangers (Lacová, 2016) ont largement participé à cette réussite.

La République slovaque a connu une importante croissance du PIB au cours des dernières années En 2018, le chiffre était de 4,2 %, en 2019 4,1 % et cette tendance devrait se poursuivre en 2020 avec une croissance prévisionnelle du PIB estimée à 3,5 %. Comparé à la moyenne de l'UE, qui est de 1,4 % en 2019 et de 1,6 % en 2020, ce sont des perspectives exceptionnellement favorables. Cet indicateur place la Slovaquie au 2ème rang de tous les pays de l'UE.

Nous pouvons également considérer la situation en ce qui concerne le niveau du chômage est plutôt satisfaisante. En 2018, le taux de chômage est descendu à 6,1%, ce qui représente un minimum historique. A titre de comparaison, le taux de chômage en 2011 était de 13,5%, le chômage des jeunes atteignant le taux effroyable de 33,5%. En comparaison, le taux de chômage en France en 2018 était de 9,1 %. Le troisième et dernier indicateur est le niveau de la dette publique, qui est en dessous de 47% du PIB. Cet indicateur place la Slovaquie au 10ème rang de tous les pays membres de l'UE. Dans le cas de la France, la dette publique représente plus de 98% du PIB.

Des Inégalités Territoriales Très Importantes

En 2011, une nomenclature statistique commune (NUTS) divisera le territoire européen en régions et territoires homogènes pour permettre une meilleure comparaison territoriale et de mieux concevoir les interventions européennes dans la cadre de la politique de cohésion.

Carte : Division de la Slovaquie en 4 NUTS 2

Le plus grave problème de la Slovaquie reste cependant les disparités régionales. Parmi tous les pays de l'OCDE, la République slovaque se situe quatrième par les plus grosses disparités régionales. La disparité entre la région la plus développée (celle de Bratislava), et la région avec le niveau de développement le plus bas (la région de Prešov) est d'un énorme 131 %. Dans le cas de la région de Bratislava, le niveau du PIB par habitant était aux alentours de 184 % de la moyenne de l'UE, alors que dans le cas des régions de la Slovaquie orientale, le PIB par habitant était seulement de 53 %. Pour illustrer cette situation, des disparités régionales plus grandes parmi les pays de l'OCDE se trouvent seulement en Turquie, en Israël et au Mexique (c'est-à-dire dans des états en dehors des structures de l'UE). Dans le cas de la France, la disparité la plus importante existe entre la région de l'Ile de France (175 % de la moyenne de l'UE) et le Languedoc-Roussillon (76 % de la moyenne de l'UE). Il est également intéressant de comparer les niveaux du PIB par habitant entre les régions les « plus riches » en France et en Slovaquie. C'est un paradoxe intéressant de constater que la région de Bratislava s'en tire mieux que la région française la plus riche, l'Ile de France.

Les succès et les difficultés dans la mise en œuvre de la politique de cohésion sur la période 2014-2020

Les Réussites De La Politique De Cohésion

En 2012, lors de la réelle préparation de la période de programmation 2014-2020, la République slovaque était confrontée à des défis majeurs. Le taux de chômage était de 13,5% (tout en dépassant les 20% dans plusieurs régions). La crise économique avait eu un fort impact sur l'économie slovaque ; la compétitivité générale du pays était très faible, à quoi s'ajoutait un environnement patronal également faible. Il existait à cette époque en Slovaquie un système insuffisamment développé de recherche et d'innovation. La fonction publique était peu efficace, et la pauvreté et l'exclusion sociale étaient répandues dans la société, en particulier dans les communautés marginalisées des Roms. Autrement dit, presque chaque branche de l'industrie nationale souffrait de graves problèmes structuraux, et la Politique de cohésion était l'un des moyens principaux pour remédier à ces problèmes. L'allocation pour la période de programmation 2014-2020 représentait plus de 15,3 Mrd d'euros pour la Slovaquie, et a servi aux onze objectifs thématiques de la Politique de cohésion. A titre de comparaison, l'allocation pour la région Grand Est est de 1,4 Mrd d'euros. Pendant cette période de programmation, la République slovaque soutient des projets dans onze domaines.

1. **Recherche et innovation –** l'aide à l'investissement pour cet objectif est de 1,8 Mrd d'euros. Des projets de modernisation de l'infrastructure de recherche, le développement de coopération entre entreprises, centres de recherche et universités ont reçu du soutien, tout comme des innovations de produits et de technologie, la recherche appliquée et le développement expérimental ;

2. **Technologies de l'information et de la communication** – l'aide à l'investissement représente 0,8 Mrd d'euros, utilisés surtout pour soutenir les services électroniques de l'état pour les citoyens et les entreprises (eGovernment) et la cybersécurité ;

3. **Aide aux PME** – l'aide à l'investissement représente 1 Mrd d'euros et finance des projets pour l'achat de nouvelles technologies dans les entreprises, la modernisation dans la production agricole et le soutien aux jeunes agriculteurs ;

4. **Aide à la transition vers une économie à faibles émissions de carbone** – une aide à l'investissement de 1 Mrd d'euros, utilisés pour soutenir des projets pour la production d'énergie de sources renouvelables, y compris la biomasse, et pour réduire la consommation énergétique des bâtiments

5. **Aide pour l'adaptation au changement climatique -** une aide à l'investissement de 1 Mrd d'euros, utilisés pour soutenir des projets de protection contre les inondations, des mesures préventives contre les incendies de forêt, des mesures de retenue d'eau et les systèmes de gestion de situations extrêmes ;

6. **Préservation et protection de l'environnement -** une aide à l'investissement de 2 Mrd d'euros, utilisés pour soutenir des projets de traitement de déchets, d'amélioration de la qualité des eaux, de l'air et du sol, pour la protection et le rétablissement de la variété des espèces animales et végétales;

7. **Transport** - une aide à l'investissement de 2 Mrd d'euros, utilisés pour soutenir des projets d'infrastructure ferroviaire, routière et fluviale et le transport public des personnes ;

8. **Aide à l'emploi** - une aide à l'investissement de 1,3 Mrd d'euros, utilisés pour soutenir des projets pour faire baisser le taux de chômage, éliminer les inégalités entre les sexes, renforcer la mobilité professionnelle et proposer des services publics à l'emploi;

9. **Aide à l'intégration sociale et à la lutte contre la pauvreté** - une aide à l'investissement de 1,4 Mrd d'euros, utilisés pour soutenir des projets destinés aux personnes menacées d'exclusion sociale et de pauvreté, au logement pour les communautés marginalisées de Roms et à la désinstitutionnalisation des services sociaux ;

10. **Aide à l'éducation** - une aide à l'investissement de 0,7 Mrd d'euros, utilisés pour soutenir des projets de construction et de reconstruction d'écoles maternelles, pour la formation de futurs enseignants, pour la création de liens entre les écoles et les employeurs;

11. **Renforcement de l'efficacité de la fonction publique** - une aide à l'investissement de 0,3 Mrd d'euros.

Les Difficultés Rencontrées Dans La Mise En Œuvre De La Politique Régionale Durant Cette Période De Programmation

Il est possible d'identifier quatre facteurs structurels qui ont un impact négatif sur le processus d'utilisation des fonds et créent des difficultés pour l'accès des demandeurs à ces fonds financiers. Il s'agit d'abord des retards récurrents dans la mise en œuvre de la politique régional, d'un manque de savoir-faire des demandeurs dans le montage des dossiers, la complexité de la procédure d'appel d'offres et d'attribution des marchés publics et enfin le non respect des délais par les organismes de gestion.

La mise en œuvre de la politique régionale en Slovaquie souffre de retards récurrents en début de période de programmation. Pour la période de programmation 2014-2020, la première réalisation de projets n'a eu lieu qu'en 2015, voire 2016. L'adoption tardive de la législation au niveau de l'UE a causé un retard dans l'adoption des textes en Slovaquie, ce qui a ensuite eu pour effet de retarder l'appel d'offres et l'approbation des projets de la part des organismes de gestion.

La faible capacité administrative des demandeurs dans le montage des projets est un handicap pour faire face à des procédures qui sont perçues généralement pour être administrativement lourdes. Les représentants des petits demandeurs en particulier (les petites communes, les PME etc.) souvent ne disposent pas des capacités administratives et des compétences adéquates pour monter un projet et en assurer l'administration. Ces demandeurs ont souvent besoin d'une aide externe, ce qui représente une charge financière supplémentaire. D'après les sondages effectués par le bureau du vice 1er ministre en charge de l'informatisation de la République slovaque, plus de 80 % des demandeurs ont recours à des agences externes pour monter leurs projets. Pour y remédier, ce service a créé en 2016 le réseau des « Centres d'Information et de Conseil ». Ces centres de conseil gratuits ont été ouverts dans les sept capitales régionales en dehors de la capitale pour donner des conseils gratuits et aider les demandeurs à monter leurs projets.

Il existe également des difficultés inhérentes à la complexité des procédures d'appel d'offres et processus d'attribution des marchés publics. Les différentes **r**éformes en conformité avec la législation européenne toujours plus exigeants dans ce domaine visaient à rendre plus transparent et plus juste ces procédures mais cela entraîné une complexité accrue. Les appels d'offre et les procédures d'attribution de marchés publics qui se matérialise par un formalisme rigoureux constituent aux yeux des demandeurs l'aspect le plus difficile à gérer surtout pour les petites structures n'ayant pas d'expérience dans ce domaine très technique.

Enfin, il y a le problème du non respect des délais par les organismes de gestion. Les problèmes de la mise en œuvre et de l'utilisation des fonds de l'UE ne sont pas uniquement le fait des demandeurs. Il s'agit souvent de manquements de la part des organismes de gestion qui ne respectent pas les délais définis dans le règlement, ce qui a pour résultat de prolonger le processus. L'exemple le plus marquant est le non-respect des délais pour l'approbation des projets. La réglementation prévoit que le processus d'approbation des projets ne devrait pas dépasser les soixante-dix jours, or ce délai n'est que très rarement respecté par les organismes de gestion. Seule la moitié de tous les projets a été approuvée dans un délai de 70 jours et le dépassement moyen de ce délai est de plus de 100 %. Cela a des conséquences négatives sous forme de report de la mise en œuvre et du non-respect du calendrier défini à l'origine.

Ces quatre facteurs ont de graves conséquences sur la mise en œuvre des fonds de l'Union européenne. Ils permettent notamment d'expliquer que la Slovaquie a perdu un total de 120 millions d'euros en 2018, qu'elle n'a pas eu le temps d'utiliser selon la règle N+3. En 2019 des fonds européennes ont été perdus même si les mesures adoptées au cours de derniers mois de l'année, tant par les organismes de gestion et par les différents ministères ont permis de limiter les pertes. Une autre conséquence négative des problèmes de la mise en œuvre est également un intérêt décroissant

de la part de plusieurs demandeurs pour les fonds de l'UE. Les contraintes administratives, ainsi que la lenteur du processus les découragent à monter des projets. Cela explique le faible taux d'utilisation des fonds européen en Slovaquie qui est inférieur à la moyenne de l'Union européenne. En novembre 2019 seulement 25 % de toute de l'allocation financière attribuée à la Slovaquie avaient été utilisés. A titre de comparaison, le taux moyen d'utilisation dans toute l'UE était de 33 %, et dans le cas de la France, ce chiffre est d'environ 41 %. Compte tenu de la fin proche de la période de programmation 2014-2020 et du début d'une nouvelle période, cette situation est inquiétante.

Les Perspectives Offertes Par La Politique De Cohésion En Slovaquie Pour La Période 2011-2027

Une Enveloppe Globale Revue A La Baisse

La République slovaque a intérêt au maintien de la Politique de cohésion après 2020 qui permet une solidarité économique, sociale et territoriale. C'est pour cela que la République slovaque soutient l'idée d'une politique de cohésion ambitieuse pour le prochain programme financier pluriannuel de l'UE. La Politique de cohésion devrait aider toutes les régions, tout en se concentrant naturellement sur celles qui sont les moins développées. Pourtant pour être plus efficace en Slovaquie, la politique de cohésion devrait cependant être simplifiée de manière fondamentale au niveau européen. Elle devrait également octroyer plus de flexibilité aux pays membres. La rigidité des procédures a été néfaste au cours de l'actuelle période de programmation. La nouvelle règle proposée de N+2 pour remplacer la règle existante de N+3 est également un élément négatif pour la Slovaquie, et les autorités slovaque militent pour son abandon. Malgré une baisse relativement forte de l'allocation allouée à la Slovaquie de 22 % par rapport à la période en cours (11,8 Mrd d'euros), la Politique de cohésion représentera un outil d'investissement clé dans la lutte contre les disparités régionales.

Des Evolutions Nécessaires Afin De Lutter Plus Efficacement Contre Les Inégalités Régionales

Il existe plusieurs problèmes structurels qui freinent le développement de la Slovaquie et ont un effet négatif sur la compétitivité du pays et sur la création de nouveaux emplois. Malgré un taux de chômage faible, certains économistes prévoient qu'un tiers des emplois seront menacés dans les années qui viennent par la numérisation et la robotisation. Cet indicateur fait de la République slovaque l'un des pays les plus vulnérables de l'UE.

La République slovaque a également du retard dans le professionnalisme et l'apolitisme de la fonction publique, ainsi que dans l'indépendance de la justice.

Le niveau de la corruption perçue est également exceptionnellement élevé en Slovaquie. Dans le cas de cet indicateur, la République slovaque occupe la peu flatteuse 23ème place parmi les 28 membres de l'UE. Le niveau de la corruption perçue est comparable à des pays tels que la Bulgarie, la Grèce ou la Roumanie qui occupent de longue date les derniers rangs avec la Slovaquie.

Conclusion

La République slovaque est sans aucun doute un exemple de transition réussie. Elle a su tiré de nombreux avantages de son adhésion à l'Union européenne. En termes financiers, la Slovaquie a obtenu plus de 18,6 milliards d'euros du budget de l'Union européenne. Déduction faite de la contribution de la République slovaque au budget européen, cette somme dépasse les 12,1 milliards d'euros. L'apport de la Politique de cohésion s'illustre également par d'autres chiffres. Les analyses et les évaluations démontrent que la Politique de cohésion a contribué augmenter le niveau de vie moyen en Slovaquie, le rapprochant peu à peu du niveau de vie des pays de l'Europe occidentale.

C'est également notamment grâce à la Politique de cohésion que le niveau du PIB est passé de 55 % de la moyenne de l'UE en 2003 (c'est-à-dire avant l'accession à l'UE) au niveau actuel de 77 %. Certes des changements fondamentaux des procédures s'avèrent nécessaires, en particulier dans le domaine de la réduction des lourdeurs administratives. Il semble nécessaire de tirer les leçons des erreurs du passé et de procéder à l'échange de bonnes pratiques entre les pays européens. Même si de grandes disparités demeurent, sans la Politique de cohésion le processus de convergence se serait probablement arrêté dans six des huit régions de la Slovaquie. L'impact de la Politique de cohésion a également été confirmée par lors de la crise financière car elle a contribué à en atténuer les effets. Enfin elle s'est concrétisée par la baisse du chômage, qui a atteint un minimum historique cette année. Il semble donc crucial pour la Slovaquie qu'une politique de cohésion ambitieuse perdure au déjà de 2020 malgré le ralentissement économique que semble annoncer la crise sanitaire liée au Covid-19.

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Approaches of Management to Financing Specific Services of Local Governments

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Abstract

Ensuring security in local self-governments is becoming increasingly complex as negative effects increase in a globalized environment. Local authorities have an impact on safety by delegating certain tasks that are based on legislation. Local governments must strive to be prepared to deal with various crisis phenomena that have a negative impact on the environment and especially on the people themselves. These phenomena are earmarked for civil protection funding. The sub-program is included in the security program. The article focuses on the analysis and conclusions from the use of funds in eight regional cities in Slovak Republic. The funds for civil protection are compared with the share of funds in the security program. We have analyzed the period from 2011 to 2018. The year 2018 is currently the last closed year with the implementation of local government budgets. For a better comparison between cities, we have recalculated the share of funds per capita in those cities. These earmarked funds should help cities to handle various specific tasks.

Keywords: Security, Civil Protection, Local Government, Crisis Phenomena.

Introduction

Local governments have an impact on the daily lives of their residents. It also includes an assessment of how the urban environment affects human life. Security is one of the main indicators of quality of life. It can be characterized by subjective perception of citizens or by objective statistical indicators. Security has long been one of the strongest perceived human needs, and local governments have sought to provide it as a service to citizens. By investing in security, they try to minimize adverse determinants that would endanger citizens and have a negative impact on their lives. However, some negative phenomena are not always preventable. The earmarked funding in the civil protection sub-program should serve precisely to maximize the city's preparedness in times of crisis.

Local governments and civil protection tasks

Local territorial self-government can be defined as territorial self-government at a level lower than the region. In Slovakia, it is creating of municipalities as legal entities Act No. 369/1990 Coll. on municipal establishment. The Act defines the position of the municipality as an independent territorial self-governing unit of the Slovak Republic, which associates persons with permanent residence in its territory. Štofková, et al. (2019) writes, the municipality is also a legal entity that can independently manage its own property and its own income under the conditions laid down by law. Its basic role in the exercise of self-government is to take care of all-round development and the needs of its inhabitants. Act 369/1990 Coll. define it may be subject to restrictions and obligations only by law and under an international treaty. The municipality also has the right to associate with other municipalities in order to achieve a common benefit Figure 1 shows the hierarchy of local

government in Slovakia. In this article, we focused specifically on the financing of security from local government funds.

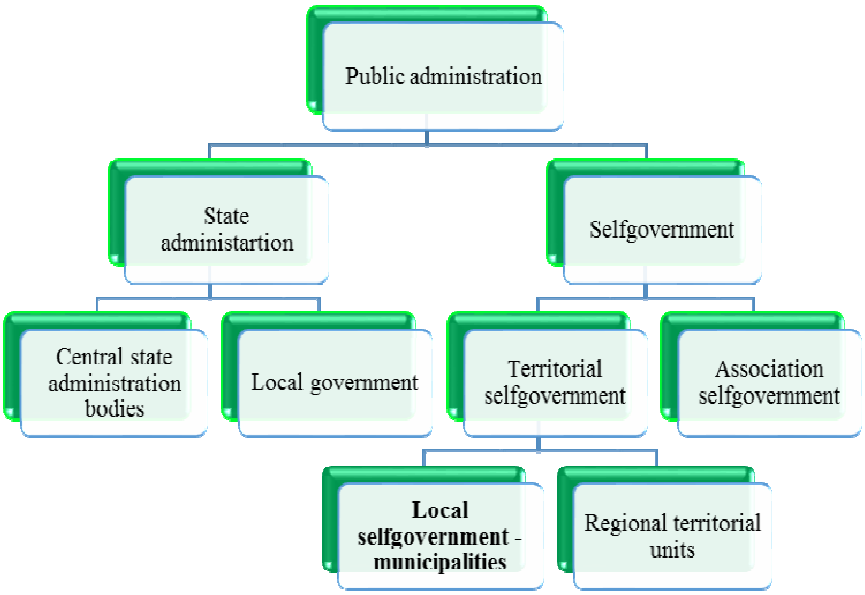

Fig. 1: administration scheme

Zánická Holla, K., et al (2010) writes in the territory of local governments, various crisis phenomena can arise which have a negative impact on their security. Crisis managers use different methods to overcome them. They need to try to anticipate their emergence and, in the event of emergence, be prepared for their early conquest. According to Mitasova and Soltes (2017) Crisis managers need to expand their knowledge and skills. That is why they should receive training on the subject. These training sessions should take place at regular intervals, but also with various new knowledge that experts should inform the public and managers. It is this education that helps them to more easily tackle crisis phenomena. Civil protection is the basic component. No. 42/1994 Coll. define Civil protection is a system of measures and tasks aimed at protecting property, health and life in particular. It consists in analyzing the potential threat and consequently taking risk reduction measures and, last but not least, the various activities and procedures used to remedy the consequences of emergencies. Zagorecki, A.T., et al. (2013) mentioned to better prevent crisis and disaster events, cities should also pay attention to event analysis and comparison of available data. It is through different methods that crisis managers can better anticipate and manage various emergencies. Havko (2017) writes than cities should be prepared for some emergencies. It is precisely some unpredictable events that can be foreseen and that is why cities should have the money earmarked to deal with these situations. Soltes (2016) mentioned than local governments have the funds they use to run. It is important that they are effectively divided and used as appropriate as possible. It is the optimization of the economy that enables the municipality to improve its services. Law 42/1994 directs them to participate in the financing of civil protection. Civil protection tasks and measures include:

- and carrying out rescue operations, which mainly consist of rescuing persons, providing pre-medical and medical assistance, rescuing persons and removing the wounded;
- organization and provision of reporting and information services,
- provision of emergency supplies and emergency accommodation,
- provision and execution of shelter and evacuation,
- implementation of anti-radiation, anti-chemical and anti-biological measures,
- organization, management and implementation of civil protection training,

- assessment of the location of buildings and land use and observance of civil protection interests in the territorial and construction proceedings and technical parameters of civil protection facilities,
- provision and implementation of editorial, scientific and research activities in civil protection.

Last but not least, it includes complementary activities such as planning, organizing, material security and controls. In the field of civil protection act defines the scope of the following municipalities:

- draws up a population protection plan, familiarizes itself with the emergency plans of companies and operations on its territory and informs the population and the public;
- coordinates the fulfillment of tasks in cooperation with legal entities, natural persons - entrepreneurs and other natural persons,
- manages rescue work if it does not fall within the competence of state administration bodies, legal entities or natural persons - entrepreneurs in the municipality; in the management of rescue operations may impose obligations,
- stores, cares for and secures the expenditure of civil protection material to the civil protection units established by the municipality and means of individual protection to the population of the municipality for which these funds are not provided by legal entities or natural persons - entrepreneurs,
- determined as appropriate personal protective structures useful for sheltering people and providing them the necessary adjustments.
- provides permanent reporting and civil protection information service, which is notified to the district office and provides the necessary and immediate emergency assistance, especially shelter, food or other material assistance to the population of the municipality and persons located in the municipality,
- plans, announces, manages and ensures evacuation and provides emergency accommodation and emergency supplies to the evacuated,
- creates civil protection units from the population of the municipality and ensures their operational capacity,
- ensures and carries out the preparation of civil protection units of the municipality and, in cooperation with public institutions with a humanitarian mission, ensures the preparation of the population for self-protection and mutual assistance,
- represents and refers emergencies and establishes a mode of life of the population in the municipality in the event of an incident and immediately inform the district office,
- keeps records of evacuated persons and lists the evacuated persons subject to conscription, giving the evacuation point to the relevant district office at the seat of the region,
- manage the allocated civil protection funds;
- requires the reimbursement of actual civil protection expenditure, which is financed from the state budget, from the budget of the local district authority.

Stofko (2015) writes, the municipality is obliged to cover from its own resources expenses related to the storage of civil protection material, preparation for civil protection and education. No. 42/1994 Coll. defines than it also spends funds associated with the maintenance of civil protection structures. Expenses do not include compensation for warehouseman, trainer, and spending on reconstruction, rebuilding protective structures, periodic inspection, replacement of technical equipment and the consequences of the damage incident. It is important that it is able to warn all its inhabitants in time of danger. Just early warning can minimize damage to property, health or life of people who are in the area (Buganova, 2013)

Use of The Funds of Regional Cities for Civil Protection

Malichova (2018) mentioned, all cities use funds from various sources for their activities. They also provide funding for individual programs and sub-programs. The municipality management must try to use all its resources effectively. It is necessary to use managerial skills and various methods that help them to make appropriate decisions in budget planning. In the paper we compared and analyzed the budgets of regional capitals in Slovakia. It is in these cities that the largest population. That is why the security and preparedness of these places should be provided at the highest level. Regional capitals have a different population. Therefore, it was necessary to make a comparison based on certain features.

Figure 2 shows a comparison of regional capitals for the period 2011-2018. The comparison was based on the earmarked funding for the Security Program from the overall budget. Not all cities had the same sub-programs in the security program. For this reason, we have tried to calculate security-related funding in the same way. Subsequently, the program included earmarked funding for the municipal police, civil protection, fire protection and public lighting. This ratio is displayed as a percentage. The least amount of money was spent by the city of Bratislava, which is also the capital. Over the years, the cities spent approximately a similar share of security. The increase in funding was mainly due to modernization and repair of public lighting. It was the modernization of lighting that caused the city of Žilina in 2018 to allocate the highest funding for security of all monitored cities and periods.

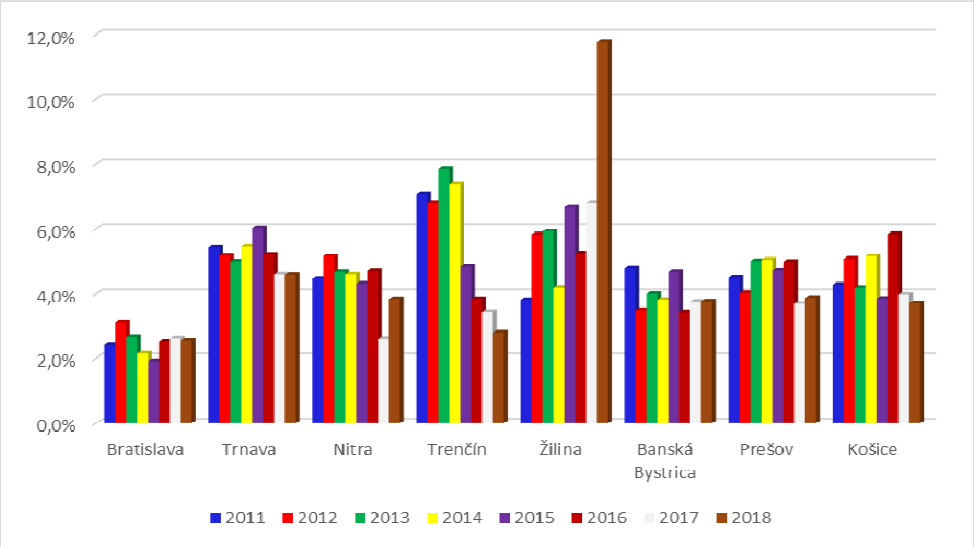

Fig. 2: The share of security finance from the expenditure part of the budget

Subsequently, we compared the percentage of security funding earmarked for civil protection. The least funds were spent by the cities of Bratislava and Žilina. The city of Trnava earmarked a higher share of civil protection than the majority of cities. More funds were spent by the city of Prešov for the years 2015 to 2018. The increase of these funds was due to investment in reconstruction and renewal of civil protection shelters. The city of Kosice had the largest annual spending on civil protection. These changes and the size of investments were also due to the fact that the city also earmarked funds in this program to cope with the declared crisis situations.

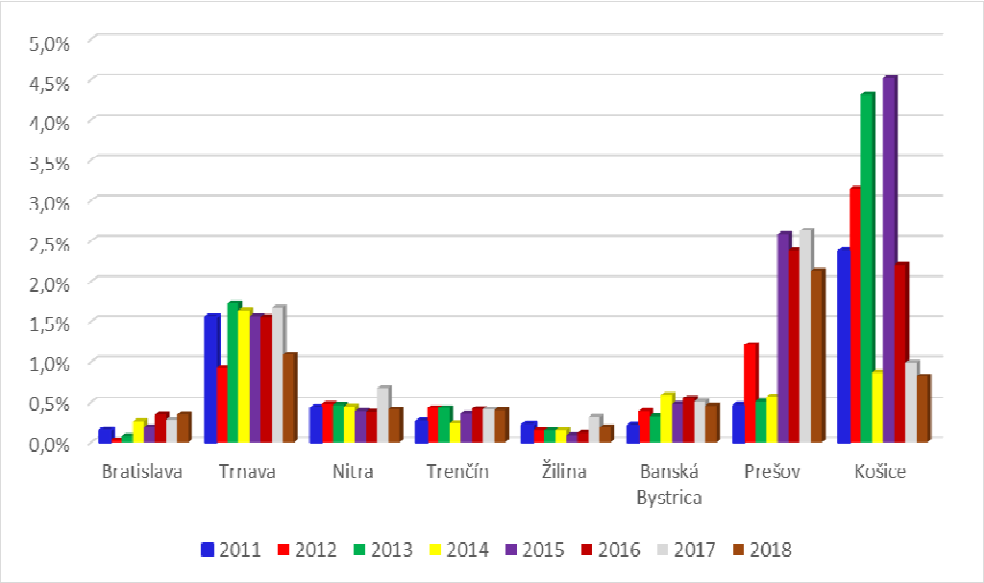

Fig. 3: The share of civil protection funding from the security program

The last comparison, which is shown in Figure 4, was focused on the conversion to civil protection per capita in euros. The least money was spent on average by the city of Bratislava and then by Žilina. The towns of Trnava, Prešov and Žilina spent much more. This comparison implies substantial different amounts of per capita earmarked funding.

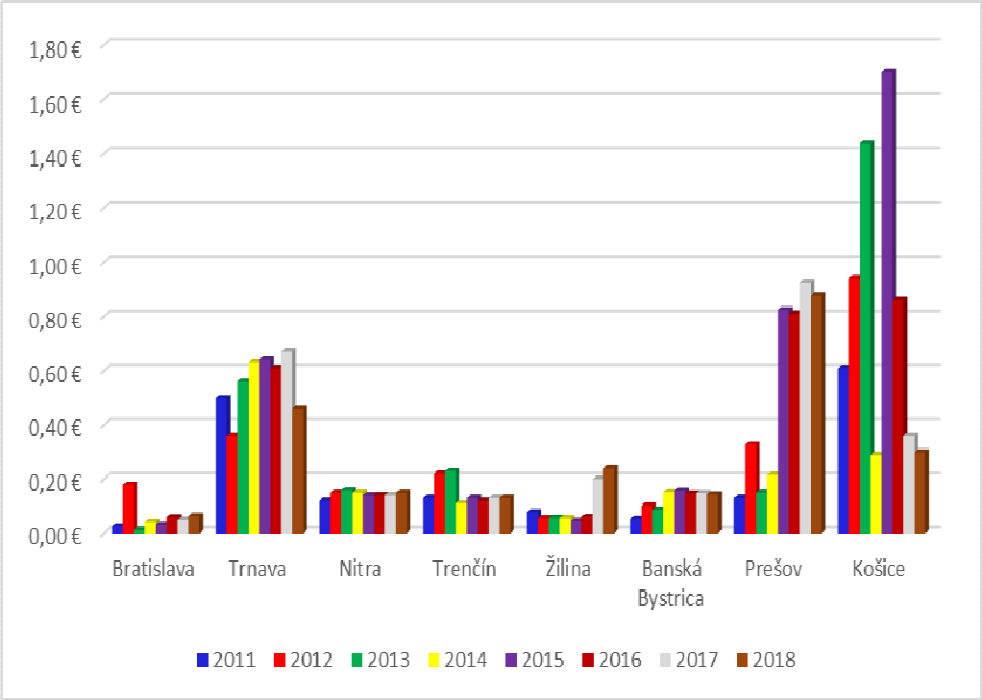

Fig. 4: The amount of civil protection funding per capita

Conclusion

Local governments are trying to create a safe environment for their residents. In terms of security, it is important that they be prepared for crisis phenomena that have a negative impact on the environment of the towns and residents there. It is civil protection that addresses readiness for these phenomena. Cities allocate funding to this sub-program, which is included in the security program. We pointed out the money spent on security in regional capitals in the Slovak Republic. When analyzing the budgets, imperfections in the final budget reports were identified. In Slovakia, there are laws and methods that determine how to compile a budget in cities. The problem arises, but in the actual budgeting, where each city can choose which activity to include in each program. This makes it more difficult to compare cities with each other. A possible solution would be to develop a new methodology that addresses budgeting in more detail, and all cities complete the same programs with the same sub-programs.

Focusing on the earmarked funding in the security program as well as in the per capita spending ratio, high differences between cities were found. These differences were also caused by delegated tasks to the district office. Other differences were caused by spending money in dealing with emerging crisis phenomena and declared emergency situations. The municipality may use the funds from the reserve fund for their solution. Some cities count these funds directly to the civil protection sub-program, and others do not. Therefore, there is another irregularity in the spending of civil protection funds.

The solution would be in more sophisticated and uniform creation of individual sub-programs. Also the Decree of the Ministry of Interior of the Slovak Republic No. 599/2006 Coll., Laying down the details of expenditures on civil protection of the population from the state budget funds, determines which tasks are paid from the state budget funds through the budget chapter of the Ministry of the Interior of the Slovak Republic. These would be appropriate if they were registered at a specific point in the civil protection sub-program. It would also be appropriate to set a minimum amount of earmarked civil protection funding per capita.

Acknowledgment

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A Study of Employees' Satisfaction with New Media Usage in Universities

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Abstract

Employees' satisfaction with the New Media Usage in universities is the focus of this short paper. It shows the extent of corporate communication influence on the employees' usage of new media for internal interaction within six selected universities based in the southwest region of the country. The data were generated through the administration of questionnaire to 121 teaching and non-teaching employees of six universities in Nigeria. Analysis of Variance (ANOVA) was uses to process the data gathered. This paper is produced for potential team work with investigators from other universities all over the world.

Keywords: Corporate communication, Decision, Public relations, New Media

Introduction

Corporate communication is defined as a strategic management function that offers a framework for the effective coordination of all internal and external communication of an organisation (Ekanem *et al*., 2020; Amodu *et al*., 2019; Saha, 2014; Goodman, 2006; Argenti & Forman, 2002). It serves the purpose of establishing and maintaining mutually beneficial relationships, understanding and goodwill with all interested groups within and outside an organisation (Mohammad, et. al., 2014; Ekanem, *et al*., 2018). Communication is the kernel of universities' management, albeit with increasing complexities, especially in new media age (Fashiku, 2016; Anyakoha & Ezeike, 1995; Hussain, 2012; Abdulkareem & Gabadeen, 2015; and Olatunji, 2014).

This study can help communicators, university administrators, regulators of higher education all over the world to uncover how universities are able to factor in the new media as an internal tool of corporate communication. The study would show the level of acceptance and usage of available new media applications such as *Twitter, Facebook, Instagram, LinkedIn* and many others. Specifically, it would show the role of employees who with traditional mould in using the new media for the success of universities.

Subject area	Public Relations
More specific subject area	Corporate Communication and New Media Studies
How the study was executed	Survey through the use of a questionnaire
Study format	Quantitative
Experimental factors	The data for the survey was obtained from one hundred and twenty-one respondents that were teaching and managing communication in six public and private universities in Lagos, Ogun and Oyo States, Nigeria. The instrument-questionnaire- was designed by the researchers and the data was analysed using ANOVA and Coefficient model of interpretation.
Experimental features	Corporate communication is the offshoot of public relations which focuses on exchange of messages within an institution or organization. Universities rely on traditional media for internal communication but the advent of new media poses a challenge on how to replace or co-use new media channels between the management and employees. It is imperative to examine whether the employees of the universities are satisfied or dissatisfied with the use of new media as channels of communication within the university environment.
Preliminary study location	Nigeria
Data accessibility	Study is available for further collaborations

Value of this study

1. This preliminary study will reveal the perception of employees on internal communication management in universities.
2. It could serve as a basis for additional enquiry on the usage of new media of communication among the employees of universities.
3. It could serve as indicators of employees concerns about new media usage by corporate communication units in universities.

Experimental Design, Materials and Method

The data for the survey were obtained from teaching and non-teaching employees of six selected universities in Nigeria. Census was used for the administration of the copies of questionnaire to employees over a period of three months. The reason for using the census method was to avoid thin data since the employees were few in number. It was, however, observed that Nigerian universities were registered on new media platforms and the most used new media platforms were *WhatsApp* and *Facebook*. Other new media platforms that universities registered with were redundant. This could not be accommodated in the research considering that the subject is based on satisfaction with the use of these platforms. The instrument used to gather the data was designed by the researchers to elicit response on the variables under consideration. The data was analysed using the Statistical Package for Social Science (SPSS).

Preliminary Study Results

This study is based on the gender, age, level of satisfaction of teaching and non-teaching employees of six universities in Nigeria. Three were private and three were public universities. Analysis of Variance (ANOVA) and coefficients were used to process the data obtained through the questionnaire as shown in Tables 1 to Table 6:

Table 1: Gender Distribution

Gender Distribution									
			Universities						
			LASU	Caleb	FUNNAB	Babcock	UI	Lead City	**Total**
Gender	Male	Units	30	6	7	13	13	12	81
		%	73.2	66.7	77.8	52	57	85.7	66.9
	Female	Units	11	3	2	12	10	2	40
		%	26.8	33.3	22.2	48	44	14.3	33.1
Total		**Units**	**41**	**9**	**9**	**25**	**23**	**14**	**121**
		%	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Though men were more, women were well represented in the survey.

Table 2: Age Distribution

Age Distribution								
		Universities						**Total**
Age		LASU	Caleb	FUNNAB	Babcock	UI	Lead City	
18 - 22 years	Units	1	0	0	0	0	0	1
	%	2.4	0	0	0	0	0	0.8
23- 27 years	Units	2	0	0	1	0	3	6
	%	4.9	0	0	4	0	21.4	5
28- 32 years	Units	6	0	1	9	4	3	23
	%	14.6	0	11.1	36	17.4	21.4	19
33 years & above	Units	32	9	8	15	19	8	91
	%	78	100	88.9	60	82.6	57.1	75.2
Total	**Units**	**41**	**9**	**9**	**25**	**23**	**14**	**121**
	%	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Employees aged 33 and above constituted majority of the respondents.

Table 3: Employees' satisfaction with new media usage in universities

Universities		**Very Satisfied**	**Satisfied**	**Not Sure**	**Dissatisfied**	**Total**
LASU	Units	11	25	2	3	**41**
	%	26.8	61	4.9	7.3	**100**
Caleb	Units	1	4	4	0	**9**
	%	11.1	44.4	44.4	0	**100**
FUNAAB	Units	4	5	0	0	**9**
	%	44.4	55.6	0	0	**100**
Babcock	Units	5	13	5	2	**25**
	%	20	52	20	8	**100**

UI	Units	1	14	7	1	**23**
	%	4.3	60.9	30.4	4.3	**100**
Lead City	Units	2	11	1	0	**14**
	%	14.3	78.6	7.1	0	**100**
TOTAL	Units	24	72	19	6	**121**
	%	19.8	59.5	15.7	5	**100**

Majority of the employees were satisfied with new media usage in universities.

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.198[a]	.039	.031	.64151
a. Predictors: (Constant), Corporate Communication				

R in the model shows the strength of relationship which is valued at 0.198. It suggests that significant relationship between corporate communication and employees' satisfaction with the new media usage is low.

Table 5: ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1.999	1	1.999	4.857	.029[b]
	Residual	48.972	119	.412		
	Total	50.971	120			
a. Dependent Variable: Employee Satisfaction with the New Social Media Usage						
b. Predictors: (Constant), Corporate Communication						

Following the p-value of 0.029 which is less than 0.05 threshold of ANOVA coupled with the fact that the F value is 4.857 at 0.029 significant level as shown in Table 5. It means that corporate communication has significant influence on employees' satisfaction with the new media usage in selected universities.

Table 6: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.076	.394		7.816	.000
	Corporate Communication	.534	.243	.198	2.204	.029
a. Dependent Variable: Employee Satisfaction with the New Social Media Usage						

The significance level below 0.05 implies a statistical confidence of above 95%. This suggests that corporate communication has significant influence on employees' satisfaction with the new media usage in selected universities. Therefore, the null hypothesis (H_{01}) was rejected and the alternative was accepted.

Conclusion

There are signals in this preliminary study that employees of the six universities surveyed are in tune with the new media usage in their institutions. One must also not be oblivious that the average employee wants to positively promote their university. There is the need to use this study as benchmark for examining same scenarios in any university anywhere in the world. It is for this reason, further studies through co-authoring collaborations are required to expand the scope, and multidisciplinary potential of this research.

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The Role of Digital Competence in the Impact of Digitalization on Labor Productivity

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Abstract

The purpose of this paper is to investigate the role of digital competence in the impact of digitalization of economy on labor productivity in Russian regions. The dataset covers the data on 85 Russian Regions for the 2015-2017 years collected from Unified Interdepartmental Information and Statistical System (EMISS) and Federal State Statistics Service of the Russian Federation (Rosstat). We applied mediation analysis with structural equation models (SEM) to achieve research goal. The study showed the negative direct effect of digitalization on labor productivity in Russian Regions. The indirect effect of digitalization on labor productivity through the mediator variable digital competence is positive and significant with one-year lag. Our model showed small, but positive and significant total effect of digitalization on labor productivity.
The study results can find practical implications in suggestions development for adjusting Regional Development Strategies. Based on the study results new activities in the regional subprojects of the National project of the Russian Federation "Labor Productivity and Employment Support" can be proposed.

Keywords: digitalization, information economy, ICT literacy, regional development.

Introduction

The past decades have been characterized by a tremendous rise of computing power (Arntz et al, 2019). Information and computations technology (ICT) enhances productivity and GDP growth (Bloom et al, 2012; Ceccobelli et al, 2012; Dahl et al, 2011; Engelbrecht and Xayavong, 2006; Hofman et al, 2016; Jorgenson, 2001). However, it appeared that ICT becomes productive only if is supported by complementary factors, such as innovations (Arendt and Grabowski, 2017, 2018), ICT investment-specific technological change (Chung, 2018) etc. Some researchers find the productivity paradox: intensive digital-using industries are contributing most to productivity slowdown (Van Ark et al, 2016, October). However, based on the analysis of the causes of the productivity-growth slowdown, we have an opportunity to boost productivity growth through a focus on education and skills (Bughin et al, 2018).
Among authors who evaluated the influence of various factors on the dynamics of labor productivity at state and regional level of the Russian Federation the following should be highlighted: Bessonov et al (2009); Drobyshevsky and Glavatskaya (2005); Ilyin et al (2010); Mikheeva (2014, 2015); Polterovich (2014); Voskoboinikov and Gimpelson (2015); Zaitsev (2013, 2016); Panshin et al (2019). The relationship between intellectual capital (mostly between its elements, namely human capital) and labor productivity is also the subject of recent research (Benos and Karagiannis, 2016; Chalfin et al, 2016; Chang et al, 2016; Chojnicki and Rabesandratana, 2018; Koh et al, 2015; McGrattan, 2017; Mellander and Florida, 2018; Onkelinx et al, 2016).
A considerable effort has been devoted, in recent years, to the analysis of impact of ICT on labor productivity. Researchers' opinions differ. Some studies show that ICT implementation has a positive impact on productivity (Arendt and Grabowski, 2017, 2018; Chung, 2018; Dahl et al, 2011), other researchers note the decline in labor productivity (Van Ark et al, 2016, October; Akhvlediani, 2016; Antonioli et al, 2018), decrease in labor productivity growth (Cette, 2014), and lack of impact on labor productivity (Bertschek et al, 2013). Benesova et al (2016) confirmed the positive relationship only

partially. Capital productivity or return on invested capital decreases with the introduction of ICT. Indeed, in the fast-growing IT sector, investment growth is often faster than revenue growth, and returns are reduced. However, productivity per employee must increase, because digitalization usually reduces the number of employees. However, some studies report the reverse trend.

In conditions of limited investment resources, the most promising solution to the problem of increasing labor productivity should be to increase the contribution of labor resources to the generated value added by using the advantages of the digital economy. In this regard, it is interesting to study the relationship between the level of digitalization and labor productivity under the influence of the level of digital competence. The impact of digitalization on labor productivity is the subject of active discussion in recent years. However, the mediating role of digital competence in the impact of digitalization on labor productivity remains insufficiently studied.

The purpose of this paper is to investigate the role of digital competence in the impact of digitalization of economy on labor productivity in Russian Regions.

1. Research methodology

It is necessary to define the concept of digital competence in economics for the purposes of our research. Some authors use term ICT or digital literacy in their researches (Bolek et al, 2018; Nevado-Pena et al, 2019; Scherer and Siddiq, 2019). Other researchers call it digital competence (Cabero-Almenara and Palacios-Rodriguez, 2020; Guillen-Gamez et al, 2020; Ojeda et al, 2019).

International ICT Literacy Panel (Educational Testing Service, 2002) defines ICT literacy in the following way: ICT literacy is using digital technology, communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society. However, this definition does not adequately reflect the role of digital competence in economic processes, such as value creation. Therefore, we propose to define digital competence in economics as an evaluation characteristic of person's knowledge, skills and abilities to use digital technology, communications tools, and/or networks in all spheres of life in order to participate more effectively in social and economic processes.

In Figure 1, digital competence plays the mediating role in transmitting the indirect effect of digitalization level to labor productivity.

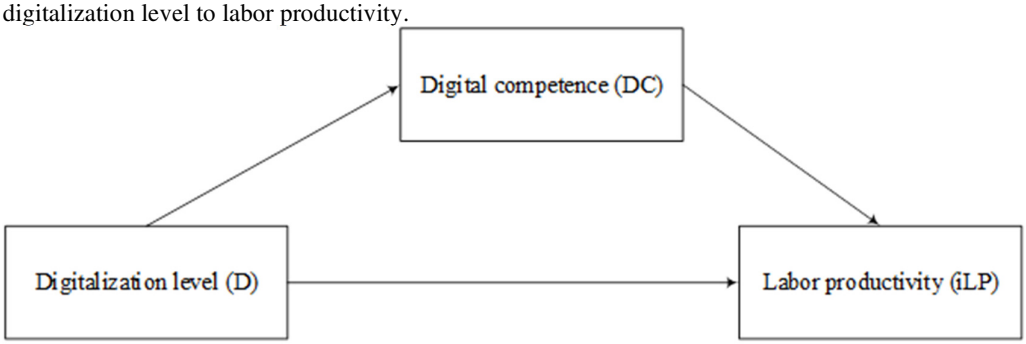

Source: authors' elaboration

Fig. 1. Theoretical relation between digitalization level, digital competence, and labor productivity

1.1. Measurement of digitalization level in regions

The Ministry of Digital Development, Communications and Mass Media of the Russian Federation has developed a consolidated list of indicators used to assess the level of development of the information society in the regions of the Russian Federation. It served as the basis for selecting the indicators that we included in the study. It is not appropriate to use the entire list, since some indicators duplicate others.

In the process of selecting the indicators for assessing the level of digitalization of Russian regions we considered the suggestions of Kuzovkova et al (2019) who proposed the index, that contains such groups of indicators as the sufficiency and security of ICT infrastructure, the demand for digital technologies, platforms and networks, the level of electronic production of goods and services, and the impact of digitalization on economic growth.

The set of indicators for assessing the level of digitalization of Russian regions is shown in table 1. We chose these indicators because we made an attempt to cover most of the areas of digitalization of the economy: the population, organizations, the Internet, and television. It should be noted that Rosstat (Federal State Statistic Service of the Russian Federation) began to collect data on some indicators relatively recently, which is the limiting factor for our study.

Table 1: Digital development indicators

Variable	Description of the indicator
D1	Sufficiency and security of ICT infrastructure
D1_1	Density of active mobile subscribers, units per 100 population
D1_2	Digitalization level of telephone communications, %
D1_3	Digital TV coverage, %
D1_4	Degree of information security of the Internet, %
D2	Demand for digital technologies, platforms, and networks
D2_1	Density of mobile broadband Internet users, %
D2_2	Share of organizations using broadband Internet, %
D2_3	Share of organizations with a web site, %
D2_4	Share of population using the Internet, %
D3	Level of electronic production of goods and services
D3_1	Share of e-government services, %
D3_2	Share of e-procurement in organizations, %
D3_3	Share of electronic sales in organizations, %
D3_4	Share of population using the Internet for services, %

Source: authors' elaboration

We normalized the above indicators to calculate the digitalization level (D). Normalized indicators are calculated as follows:

$$y_i(x_i) = \frac{x_i - x_{min}}{x_{max} - x_{min}},$$

where:
y_i – normalized indicator,
x_i – indicator,
x_{min} – minimum value of indicator among Russian Regions,
x_{max} – maximum value of indicator among Russian Regions.
We calculated the generalizing indicators D1, D2, D3 based on individual normalized indicators of digital development. Next, we calculated the integrated indicator of digitalization level (D) as the arithmetic mean of the generalizing indicators of digitalization.

1.2. Labor productivity measurement

Rosstat does not calculate the indicator "Labor productivity level" in the context of the Russian Federation subjects, limiting itself to calculations of the labor productivity index. Therefore, we used the labor productivity index (iLP) as a dependent variable for testing hypotheses.

1.3. Digital competence level measurement

We calculated the digital competence index (DC) to assess the level of digital competence of residents and workers in the regions. The digital competence index is based on the indicators shown in table 2. These indicators were normalized and the digital competence index was calculated as an arithmetic mean.

Table 2: Digital competence

Variable	Description of the indicator
DC1	Share of employed in the ICT sector in the total number of employed, %
DC2	Share of population with digital skills, %
DC3	Share of ICT specialists in the total number of employees of organizations, %
DC4	Share of highly qualified specialists among specialists in ICT, %

Source: authors' elaboration

1.4. Estimation method

With the proposed theoretical and empirical research model, the study used variable DC as mediator, so this model is also known as the mediation model, which is a kind of Structural Equations Models (SEM) (Stata, 2017).

According to Baron and Kenny (1986), in a mediation model, an independent variable influences the dependent variable in two directions (direct and indirect) through the mediator variable, and the total effect of the independent variable on the dependent variable is equal the direct effect plus the indirect effect.

To estimate the SEM model, the study uses the method of "maximum likelihood estimation" and performs necessary model tests, such as goodness-of-fit.

2. Data and results

This research study is based on region-level data collected from Unified Interdepartmental Information and Statistical System (EMISS) and Federal State Statistics Service of the Russian Federation (Rosstat). The dataset covers the data on 85 Russian Regions for the 2015-2017 years. At the moment, it is all available data on some indicators of digital competence like share of population with digital skills, share of ICT specialists in the total number of employees of organizations and share of highly qualified specialists among specialists in ICT.

Descriptive statistics for the above indicators are presented in Table 3 below.

Table 3: Descriptive statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
D1	246	.6876778	0.0935303	0.254643	0.998815
D1_1, units per 100 population	246	181.6732	57.82085	2.06	466.4
D1_2, %	246	89.86116	9.371814	41.76784	100
D1_3, %	246	92.74168	11.49106	15.5	100
D1_4, %	246	87.11374	7.092181	58.5124	100
D2	246	0.525405	0.128241	0.216259	0.951245
D2_1, %	246	66.52484	16.67171	0.6	114.09
D2_2, %	246	81.2489	7.579773	56.19835	96.02273
D2_3, %	246	44.51569	8.301878	28.68888	73.81818
D2_4, %	246	69.56667	6.068845	49.7	83.5
D3	246	0.417759	0.1493124	0.017474	0.880686
D3_1, %	246	24.61707	15.15053	0.9	74.3
D3_2, %	246	40.50151	6.667637	18.11377	57.12013
D3_3, %	246	17.48445	4.846834	5.003207	36.1973
D3_4, %	246	22.14837	9.013639	5.4	60.2
D	246	0.543614	0.1084093	0.203092	0.933379
iLP, %	246	101.3435	2.761207	94.3	113.5
DC1, %	246	1.461112	0.5921883	0.215098	3.3651
DC2, %	246	32.99848	8.059921	11.7	55.125
DC3, %	246	1.031536	0.3400127	0.389162	2.962645
DC4, %	246	55.85359	8.821126	26.58908	72.18835
DC	246	0.448234	0.1325914	0.057293	0.989033

Source: authors' elaboration

We estimated two models. The first model assumes that digital competence is the mediator in the process of digitalization influencing the labor productivity at the current time. The second model assumes that in order for digitalization to have a positive impact on labor productivity in the current period, it is necessary to increase digital competence one year earlier. The digital competence index is used with the one-year lag in the second model. The results of SEM estimation are presented in table 4.

Table 4: Summary of regression results by SEM estimation

	Coeff.	**Std. Err.**	**z**	**P>z**	**[95% Conf. Interval]**	
MODEL 1						
iLP (dependent)						
DC	0.183206	1.554454	0.12	0.906	-2.86347	3.229879
D	2.263312	1.901195	1.19	0.234	-1.46296	5.989587
DC (dependent)						
D	0.643513	0.066313	9.7	**0*** **	0.513541	0.773484
MODEL 2						
iLP (dependent)						
DC_lag1	0.159933	0.067045	2.39	**0.017** **	0.028526	0.291339
D	-7.97619	4.107296	-1.94	**0.052* **	-16.0264	0.073961
DC_lag1 (dependent)						
D	52.13248	2.512394	20.75	**0*** **	47.20827	57.05668
Note: *** stat. significance on 1%, ** stat. significance on 5%, * stat. significance on 10%.						

Source: authors' elaboration

Model 1 shows that the impact of digitalization on the labor productivity index is insignificant. This applies to both direct and indirect influence (taking into account digital competence).
Model 2 confirms the role of digital competence as mediator for the impact of digitalization on labor productivity. Model 2 was tested for goodness-of-fit. The results are presented in Table 5.

Table 4: Summary of regression results by SEM estimation

Test	**Result**	**Description of result**
RMSEA	0	RMSEA (root mean square error of approximation) of the model is less than 0.6, as suggested by Hu and Bentler (1999).
CFI	1	CFI (Satorra-Bentler comparative fit index) is greater than 0.9 (Hu and Bentler 1999).
TLI	1	TLI (Tucker-Lewis index) is greater than 0.9 (Hu and Bentler 1999).
SRMR	0	SRMR (standardized root mean square residual) is less than 0.08, as recommended by Hu and Bentler (1999).
CD	0.73	The CD value (equivalent to R^2 in the normal regression model) is 0.73. This means that the variables in the model account for 73.0% of the variance in iLP.

Source: authors' elaboration

The test variables in Table 5 show the overall fit of the model.

3. Discussion

Based on the results of the SEM model regression, the study discusses the effects of digitalization on labor productivity through the mediating role of digital competence.

3.1. The structural effect of digitalization on labor productivity

D has three types of structural impact on iLP: a direct effect from D to iLP, an indirect effect from D

to iLP through the mediating effect of DC, and the total effect from D to iLP (equal to indirect effect plus direct effect). These three types of effects are illustrated in Figure 2.

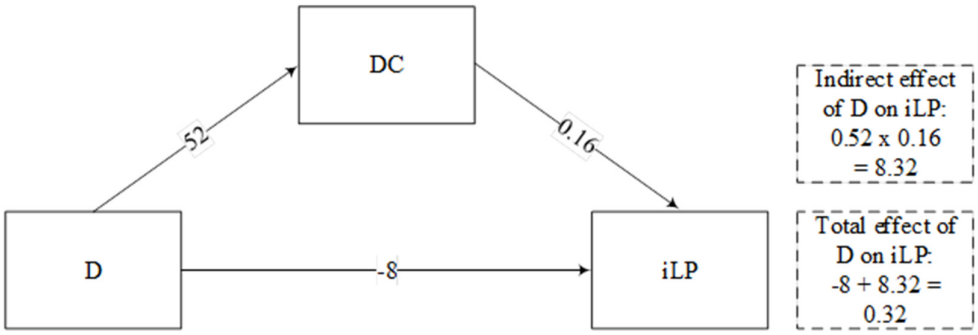

Source: authors' elaboration

Fig. 2. Structural effect of D on iLP

3.2. The direct effect of digitalization on labor productivity

The direct impact of digitalization on labor productivity index is statistically significant, but negative. This result can be explained as follows. Indeed, the effect of digitalization can be negative if the process of introducing advanced information technologies is not set up. It is well known that there is a tendency to resist innovation. People who have worked with certain technologies for a long time are not always easily accustomed to using new technologies. It happens for a variety of reasons. However, with appropriate training and the acquisition of necessary skills by people, digitalization should begin to bring great positive effects, significantly affecting the growth of labor productivity.

It is the lack of the necessary knowledge, skills and abilities of people (digital competence) that does not allow them to effectively use new digital economic tools to increase their productivity. The share of people with the right level of digital competence in the economy is insignificant. The complexity of digital technologies for this category of people can even lead to the drop in labor productivity.

3.3. The indirect effect of digitalization on labor productivity through the mediator variable digital competence

The indirect impact of digitalization on labor productivity index through digital competence is positive and significant. The hypothesis of the mediating role of digital competence in the impact of digitalization on labor productivity is confirmed.

3.4. The total effect of digitalization on labor productivity

The total effect of digitalization on labor productivity equals the direct effect plus the indirect effect. Our model showed small, but positive and significant total effect. It follows that labor productivity will grow faster with the growth of digital competence and the effect of digitalization will be greater.

4. Conclusions

The aim of this study was to investigate the role of digital competence in the impact of digitalization of economy on labor productivity in Russian regions. The main findings of the study are:

We proposed to define digital competence in economics an evaluation characteristic of person's knowledge, skills and abilities to use digital technology, communications tools, and/or networks in all spheres of life in order to participate more effectively in social and economic processes.

We developed a research model in which the digital competence plays a mediating role in the impact of digitalization on labor productivity. We also estimated the proposed empirical relationship using the SEM and found that it satisfied all the required goodness-of-fit tests. The regression results from the SEM yielded some noteworthy results.

In terms of the structural impact of digitalization on labor productivity, the study explored the direct impact of digitalization on labor productivity and the indirect impact of digitalization on labor productivity through digital competence with one-year lag. Digitalization had the direct impact on labor productivity with statistically significant coefficient of -8. Regarding indirect effects, the impact of digitalization on digital competence was very high (52), the indirect effect of digitalization on labor productivity through digital competence was 8.32. Then, we calculated the total effect of digitalization on labor productivity (0.32). Our model showed small, but positive and significant total effect. It follows that labor productivity will grow faster with the growth of digital competence and the effect of digitalization will be greater.

Mediation analysis with SEM confirmed the hypothesis of the mediating role of digital competence in the impact of digitalization on labor productivity.

The study results can find practical implications in suggestions development for adjusting Regional Development Strategies. Based on the study results new activities in the regional subprojects of the National project of the Russian Federation "Labor Productivity and Employment Support" can be proposed.

It should be noted, that our findings cannot be applied to each Russian region. They describe the average situation in the country.

Further research may be aimed at studying the impact of information security of labor resources on labor productivity.

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Case Study of Tourist Satisfaction with Services in the Slovak Karst National Park in the Context of Sustainable Development

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Abstract

The main objective of our paper was to evaluate the satisfaction of tourists with selected services in the Slovak Karst National Park, in the Domica Cave and in the Ochtinska Aragonite Cave, both of which are on the UNESCO list of natural monuments. Given that these caves are located in the national park, the theoretical introduction deals with the terminology related to sustainable development and subsequently also in the context of sustainable tourism. In total, we addressed 146 respondents and evaluated the obtained data by appropriate mathematical-statistical methods. We found that visitors to the Domica Cave are significantly more satisfied with the information services as well as the infrastructure at this cave, as visitors to the Ochtinská Aragonite Cave. However, visitors to the Ochtinská Aragonite Cave are much more satisfied with the guide service at this cave than visitors to the Domica Cave. The dissatisfaction of the visitors in the case of Domica cave is caused by the price of souvenirs and the variety of its offer, while the negative response to the Ochtinská Aragonite Cave can be attributed to the quality of the access road, which was reconstructed after the survey in 2019.

Key words: the Slovak Karst National Park, Sustainability, Sustainable tourism, Domica Cave, Ochtinska Aragonite Cave

Introduction

The World Travel Organization (UNWTO) defines tourism as: "the activity of a person who travels and stays in places other than his usual place of work for no more than 1 year for entertainment, business and other reasons". It excludes day-to-day trips, regular and frequent trips between home and work and other routine trips (UNWTO 2018). According to this organization, tourism is one of the top five exported categories for 83% of countries and the main source of foreign currency for 38% of them. The size of a country's direct income depends on three variables: number of visitors, normal length of stay, average daily spending. Tourism has both positive and negative impacts on many areas. These depend on the quantity and characteristics of each of the tourists. It is the number of days spent on the site, the form and type of tourism, the chosen transport, etc. In economics, impact measurement has a long history, which does not include environmental and social impacts. The analysis of secondary and tertiary effects is largely lacking. Quantification of these impacts on tourism is also a problem. Where the numbers of tourists are too high, there has traditionally been a tendency to minimize negative impacts. The change in recent years has come to the conclusion that previous developments and growth have brought, among other things, negative environmental impacts (Bryden 1973, Eadington and Redman 2011, Amanthaswamy 2004).

Sustainability and sustainable tourism

The issues of sustainable living and consumption are not only of the interest of so-called "green" consumers, but of all conscious citizens. The financial crisis, compounded by social and environmental problems and an increasing sense of consumer responsibility, is changing the economic and business environment. Customers are more likely to direct their money towards purchasing goods for which they perceive values in excess of their financial cost. Consumers are increasingly demanding value for every product or service they buy. Sustainability issues thus also come into the tourism sector itself in the form of sustainable tourism. In particular, protected areas are under pressure to stimulate tourism in the context of environmentally friendly development. Tourism has a unique position in the sense that it is able to become an economic and social benefit for local

communities, and at the same time has the means to maintain and protect the environment. However, all stakeholders are responsible for sustainability (Tožička 2012).

Sustainability as such is a theme that translates into almost every area of human action. This is a very topical topic in a number of scientific conferences, and that is why there are so many different definitions from many scientists with a different focus. Sustainable development is an essential prerequisite for future generations that will be able to live in the same or similar conditions on Earth as they are today. There are many discussions not only at national level, but above all at international level, where various associations are being established to promote sustainable development. The emergence of sustainable tourism is therefore a practical outcome of the principles of sustainability in the everyday life of tourists and businessmen in this field (Ferencz et al. 2017; Huttmanová and Valentiny 2019).

The concept of sustainability arises from the idea that there is a "green" customer who wants to buy environmentally friendly and human society products. However, the idea of a homogeneous group of green customers is misleading and incorrectly simplistic. It is this group of customers that is the most diverse in nature. According to Horner and Swarbrook (2003), light green and dark green types of green customers can be distinguished according to their interest in green issues. ***Sustainable tourism is the application of the principles of sustainability to the field of tourism. It is a tourism concept that connects the needs of today's generation and future generations.*** Sustainable tourism underlines the need to minimize negative impacts and maximize positive impacts for society, the environment and other areas. The interest of tourism in the concept of sustainability is given logically. Tourism uses its environmental resources - both physical and human - for its product.

Sustainable tourism meets the needs of current tourists and host regions. It has a low impact on the environment and local culture, helps generate income and jobs for local people, and also helps to preserve local ecosystems. The aim is to maintain the economic and social benefits for tourism development while reducing or mitigating any adverse effects on the natural, historical, cultural or social environment (UNWTO 2018). Global Tourism (2005) defines sustainable tourism as a tourism that consciously uses and conserves resources to benefit from their long life span. Epstein (1996) draws attention to the potential dangers of a sustainable concept. What on the one hand looks like a sustainable concept, on the other, may not look the same. The global impact on tourism at local level is moderated by a number of processes and relationships that influence whether sustainable tourism will be successful or not (Grah, Dimovski and Peterlin 2020). The English Tourism Council (2010) defines sustainable tourism as managing the effects of tourism on the environment, the public and the economy, ensuring that the effects are positive rather than negative for the benefit of future generations. It is a management approach that applies to all types of tourism, regardless of whether it takes place in cities, cities, rural areas or on the coast. The WTO (2018) offers an economic-environmental definition: Sustainable tourism is the ability of a destination to maintain potential competition in competition with new, historically less-used destinations, attract both first and repeat visitors, maintain cultural uniqueness, and be in balance with the environment. Pásková and Zelenka (2002; 2018) argue that sustainable tourism is based on several principles. The first is the conservation of resources. Sustainable development is associated with the life of not only environmental resources but also economic, social and cultural resources. The second principle is the future. This means the future of future generations that could benefit from the resources, opportunities and opportunities that should last as long as possible. The third principle is justice. Some argue that fair play needs to be maintained in the distribution of economic, social, cultural and environmental benefits and costs of human activity (Global Tourism 2005). Determining whether something is sustainable or not can only be done in a retrospective. EIA (Environmental Impact Analysis) methods are often used for decision making. Long-term monitoring is important for management and strategic management (Wall, Mathieson 2006). With the demand for sustainability in tourism comes a fundamental change for managers of tourism businesses. While in the past the goal was to maximize economic gains, the need to balance all three aspects - environmental protection, benefits for human society and stable economic growth - will become increasingly important in the future. This requirement illustrates the "three P" scheme - PLANET - PEOPLE - PROFIT by prof. Donald Hawkins of George Washington University, New York (Burian 2010).

History of sustainability issues

The first international organization to focus its activities on studying the development of human civilization and addressing global issues was the NGO Rome Club. It was founded in 1968 in Rome thanks to Italian founder Aurelius Peccei. The Rome Club brought together scientists, statesmen and well-known personalities from the business community. It has focused on addressing the evolution of human civilization and global problems in the knowledge that the uncontrolled growth of anything (population, production, consumption, pollution) can have a huge impact on an environment with limited resources (The Club of Rome, 1968 cit. in. Black 2012).

The first conference on environmental issues took place in 1972. The Stockholm Human Environment Conference declared 26 principles on development and the environment (Slovak Environmental Agency 2004). The concept of Sustanability and Sustainable Development began in 1987 at the First World Summit in Stockholm (United Nations Conference on Human Environment) of the United Nations World Commission on the Environment. The result was an important document called the Brundtland Report (Black, 2012), which first defines this term - sustainable development - as a development that meets the needs of today's generation without jeopardizing future generations' ability to meet their own needs (Brundtland UN 1987 cit in Black 2012).

The second United Nations World Summit on Sustainable Development and the Environment (UNCED) was held in Rio de Janeiro in 1992. Documents on the environment and its development were adopted here. The resulting documents were:

- Framework Convention on Climate Change;
- Convention on the conservation of natural biodiversity;
- Declaration on the Environment and Development,
- Agenda 21 (universal care for the environment on Earth with a view of the 21st century)
- Principles on the use, protection and sustainable development of all types of forests (Offertalerová 2017).

The Third World Summit on Sustainable Development (WSSD) was held 10 years later in the largest city in South Africa, Johannesburg. The main themes were the evaluation of the overall development of the world, addressing the issue of poverty, the use of energy, access to drinking water and health care. The priority theme of the conference was the Integrated Approach to Nature and Natural Resources Protection, which comes from Agenda 21. The output documents of this summit were: the Johannesburg Plan of Implementation and the Johannesburg Declaration on TUR (Offertalerová 2013; Molnárová 2019).

Rio +20 The United Nations Conference on Sustainable Development was held again in Rio de Janeiro, Brazil in 2012. The resulting document outlines concrete practical measures for its implementation in national policies. The conference adopted basic regulations on green economy policies, a strategy for financing sustainable development, a policy forum for sustainable development. At the conference, they asked the United Nations Statistical Commission to launch a program of measures to inform and check that the political decisions of the entities were in line with the rules for sustainable development. The message of this conference was the statement: The future we want. (The future we want.) The starting point of this conference was A/ CONF.216/5 containing a 10-year program and models of sustainable production and consumption patterns. It contains the steps necessary to put these methods into practice. Rio +20 has also taken future decisions, including energy, food security, ocean and urban pollution (Offertalerová 2013; Molnárová 2019).

The last Sustainable Development Summit was held at the UN Headquarters in New York City in September 2015. At this summit, 150 world leaders adopted The Global Goals for Sustainable Development and the Agenda 2030 for Sustainable Development for 2015 - 2030. Agenda 2030's message is "People, from people, to people" (Zajac et al. 2016). This document serves as a starting document for international communities and national governments (Euroreporter 2015). Agenda 2030 activities focus not only on achieving the quantity of the objectives set, but in particular on the quality of the objectives set. The 2030 Agenda for Sustainable Development is the most comprehensive set of global priorities so far, consisting of 17 main objectives elaborated into 169 partial objectives (Statistical Office of the Slovak Republic 2019).

The ambition is to guide the political, economic and social transformation of individual countries in the world in response to the threats that humanity is currently facing. An integrated element of the agenda is the interconnection of economic, social and environmental areas. Countries are not legally bound by this document. The intention is that, when the 2030 Agenda is adopted, countries lead their development in a sustainable way and set policy, strategy, development and planning to ensure that global goals are achieved. At world level, the concept of implementing Agenda 2030 is based on the documents adopted by the UN in 2015, which are:

- 2030 Agenda for Sustainable Development
- Addis Ababa Action Program on Financing for Development
- Paris Agreement to the United Nations Framework Convention on Climate Change.

At the European Union level, the implementation concept builds on the European Strategy Papers, which are: Next steps for a sustainable European future and Revision of the European Development Consensus (Molnárová 2019).

People have become aware of the consequences of mass tourism and are therefore increasingly interested in softer tourism, but we must also be careful about it. Although the environmental impact of an individual is almost negligible, if the number of visitors increases 1000 times, the negative impact is more visible. In Slovakia has natural tourism has great potential, and is increasingly sought after by tourists. "We need to start from each of us". Holidays in protected areas, in rural areas or in historically and culturally places with the motto: "Experience experiences and protect values" offer a solution. According to some authors, there are forms and types of tourism that are sustainable in nature. Marketing activities and presentation of the destination is very important (Gallo et al 2017).

Materials and methods

The place of our research was the Slovak Karst National Park – Domica Cave and Ochtinska Aragonite Cave. In our contribution, we have used a questionnaire survey of visitors' satisfaction with the provided information services, sale of souvenirs, guide services, social facilities, parking and infrastructure in the area of interest. The total number of respondents was 146, of which 71 are men and 75 are women. Initially 173 questionnaires were distributed, 8 questionnaires were incorrectly filled and 19 questionnaires were not returned. We distributed the questionnaires personally to visitors of the Slovak Karst caves in Domica and Ochtinska Aragonite Cave during the summer and autumn months of 2018.

We have tested several hypotheses by statistical verification, but in this article we only mention two:
H1: We assume that there is a statistically significant positive relationship between the age of cave visitors and their degree of satisfaction with the various types of services provided when visiting the cave.
H2: We assume that there is a statistically significant difference in satisfaction with the services provided in the Domica Cave and in the Ochtinska Aragonite Cave.

We used SPSS for Windows version 21.0 to analyze and process the collected data. At the level of statistical inference, we used Spearman's correlation analysis to analyze ordinal variables. In the case of continuous variables, prior to the selection of adequate statistical tests, we determined the fulfillment of the normality of the distribution of the individual dependent variables, based on the skewness coefficients, and the coefficients of skewness, respectively. their z-score (Field 2013). Since the assumption of normality was confirmed for all continuous variables, we preferred parametric Student's t-tests for two independent selections, Student's t-tests for two dependent selections, and Pearson's correlation analysis.

Results

Visitors rated their satisfaction with the services provided on the numerical rating scale 1 - 5, where rating 1 meant very satisfied, 2 partially satisfied, 3 neither satisfied nor dissatisfied, 4 partially dissatisfied, 5 very dissatisfied. The results of visitor satisfaction with the different types of services provided in the Domica Cave are presented in Table 1 below.
On this issue, we were interested in the level of visitor satisfaction with the various types of services in the Domica Cave. From the answers we found out that the visitors not very satisfied with the price

of souvenirs and the variety on offer. They were very satisfied with the information available on the Internet, the way the guide is done, the cleanliness and order of social facilities, the quality of the access road and the walking distance from the parking lot.

Table 1: Visitors' satisfaction with the different types of services provided in the Domica Cave

Types of services assessed		assessment levels				
		1	**2**	**3**	**4**	**5**
		respondents' response rate				
Information Services	Information leaflets	18	60	35	5	0
	Information on the Internet	**26**	**70**	21	1	0
Sale of souvenirs	Price	2	54	46	9	2
	Variety of offerings	4	57	38	14	0
	Seller staff	10	61	36	6	0
Guide services	Approaching the guide	**21**	**60**	32	5	0
	Approaching other staff	7	65	38	8	0
	Interpretation quality	18	64	35	1	0
Social Department	Cleanliness and order	**23**	**72**	22	1	0
Parking	Price	21	61	32	4	0
	Parking capacity	8	63	38	9	0
Infrastructure	Access path quality	**20**	**67**	30	1	0
	Walking distance from the parking lot	**28**	**62**	27	1	0

(Source: own processing)

The answers given by visitors to the Ochtinská Aragonite Cave show that they are most dissatisfied with the quality of the access road to this cave. The greatest satisfaction was expressed in the area of information services, namely satisfaction with the quality and good availability of information on the internet about the cave. In the area of guide services, respondents are satisfied with the performance of the guide and with the quality of their interpretation.

Table 2: Visitors' satisfaction with the different types of services provided in the Ochtinská Aragonite Cave

Types of services assessed		assessment levels				
		1	**2**	**3**	**4**	**5**
		respondents' response rate				
Information Services	Information leaflets	6	62	38	6	0
	Information on the Internet	**25**	**57**	28	2	0
Sale of souvenirs	Price	4	64	32	13	1
	Variety of offerings	7	58	42	5	0
	Seller staff	10	60	32	10	0
Guide services	Approaching the guide	**27**	**57**	24	4	0
	Approaching other staff	8	75	22	7	0
	Interpretation quality	**29**	**67**	15	1	0
Social Department	Cleanliness and order	19	77	14	2	0
Parking	Price	17	60	28	7	0
	Parking capacity	7	57	28	20	0
Infrastructure	Access path quality	0	38	28	**32**	**12**
	Walking distance from the parking lot	0	67	34	9	0

(Source: own processing)

H1: We assume that there is a statistically significant positive relationship between the age of cave visitors and their degree of satisfaction with the various types of services provided when visiting the cave.

The assumption of a statistically significant positive relationship between the age of cave visitors and the degree of their satisfaction with the individual types of services provided when visiting the cave was verified by Pearson's correlation analysis. Its results confirmed that the age of cave visitors is significantly positive with their satisfaction in information services, r = .164, p (1) =. 024 and guide services, r = .191, p (1) = .011. The relationship between the age of visitors and their satisfaction with the quality of other services - sale of souvenirs, sanitary facilities, parking, infrastructure - did not reach the required value of statistical significance (p <.05). It follows that the older the cave visitors, the higher their satisfaction with information and guide services. The satisfaction of visitors with other types of services was not related to their age. Based on the results of the analysis, the H1 hypothesis was not confirmed. The results are summarized in Table 3.

H2: We assume that there is a statistically significant difference in satisfaction with the services provided in the Domica Cave and in the Ochtinská Aragonite Cave.

The question of the existence of significant differences between the visitors of the Domica cave and the Ochtinská aragonite cave in satisfaction with the individual types of services provided during the visit of the cave was examined by means of a series of Student's t-tests for two dependent selections.

Table 3: Pearson's Correlation Analysis - Mutual Relationships between the Age of Cave Visitors and Their Satisfaction with Individual Types of Cave Visits

	Deskripce			**Age**	
Satisfaction in the area	***N***	***AM***	***SD***	***r***	***p(1)***
Information Services	*145*	*2,268*	*,4587*	**,164**	**,024**
Sale of souvenirs	*140*	*2,475*	*,4970*	**,089**	**,149**
Guide services	*145*	*2,166*	*,4881*	**,191**	**,011**
Social Department	*145*	*2,048*	*,6273*	**,068**	**,207**
Parking	*145*	*2,400*	*,7207*	**,046**	**,293**
Infrastructure	*143*	*2,477*	*,7132*	**-,012**	**,445**

(Source: own processing)

Table 4: Student's t-test for two dependent selections - Differences between visitors of Domica cave and Ochtinská aragonite cave in satisfaction with individual types of services provided when visiting a given cave

Dissatisfaction with selected services		Domica cave		Ochtinska aragonite cave		Student's t-test		
	N	***AM***	***SD***	***AM***	***SD***	***t***	***df***	***p***
Information Services	85	*2,027*	*,5473*	*2,251*	*,4540*	**-3,19**	**84**	**,002**
Sale of souvenirs	80	*2,479*	*,5027*	*2,408*	*,4773*	**1,586**	**79**	**,117**
Guide services	85	*2,196*	*,5352*	*2,086*	*,4774*	**2,223**	**84**	**,029**
Social Department	85	*1,918*	*,6213*	*1,918*	*,6213*	**-**	**-**	**-**
Parking	85	*2,218*	*,6701*	*2,218*	*,6612*	**,000**	**84**	**1,000**
Infrastructure	85	*2,035*	*,6892*	*2,629*	*,6369*	**-6,08**	**84**	**,000**

(Source: own processing)

The results of the analyzes showed that the visitors to the Domica cave are significantly more satisfied with the information services, $t(84) = 3.194$, $p = .002$, as well as the infrastructure, $t(84) = 6.077$, $p < .001$, aragonite cave. On the other hand, visitors to the Ochtinská Aragonite Cave are much more satisfied with the guide services at this cave than visitors to the Domica cave, $t(84) = 2.223$, $p = .029$. From the point of view of the satisfaction of visitors to both caves with other types of services (sale of souvenirs, sanitary facilities, parking) there were no statistically significant differences between the Domica cave and the Ochtinská aragonite cave. The results are summarized in Table 4.

Discussion

Tourism is inevitably linked to the provision of services, the primary mission of which is to uncover the needs of customers, to make meaningful use of time, and to support the living standards of the local population. The importance of services is increasing in the target location due to the fact that visitors outside their home tend to increase their needs, which is also the significance of the services themselves (Jakubíková 2012). Tourism is currently one of the dominant, global social factors, acting directly or through all social activities (Tremboš and Trembošová 2014). Several authors agree that tourism services are multidisciplinary in nature (information, dietary, accommodation, transport, guide, spa, sports, recreation, etc.), which means that they can be delivered to customers individually or as a package of services through travel agencies or travel agencies (Gúčik, Gajdošík and Lencsésov 2016). Slovakia has a high natural and cultural potential for tourism development. As far as the most important natural monuments in our territory are concerned, there are caves whose research and protection are of a high standard. In such cases, an environmental approach is also important (Adamišin, Kotulič, Mura et al. 2018), e.g. negative consequences of tourism and so on. The main goal of our work was to evaluate and compare the satisfaction of visitors with selected services of natural monuments registered in the UNESCO list (caves of the Slovak Karst). In order to achieve this goal, we conducted a questionnaire survey in two caves, namely in Domica and in the Ochtinská Aragonite Cave. In the questionnaire survey we found out from visitors that while waiting for entry into caves they would like to use services in some restaurant or in a cafe. They would also welcome some children's activities or a short educational film about the visited cave. After talking to several visitors, we found that they visited the Baradla Cave in Hungary and are more satisfied with the services provided on the Hungarian side than on the Slovak side.

According to Gučík (2001), it is not possible to develop tourism without accommodation and catering services. The level of accommodation facilities significantly influences the quality of provided services and thus affects the satisfaction of visitors. There are no accommodation facilities near Domica Cave. The nearest tourists have the opportunity to stay in Rožňava approx. 25 km from the cave, or at Baradla Cave 4 km away in Hungary. The Domica Resort was closed in 2010. It was a modern building complex that, in addition to accommodation and catering services, also offered wellness stays for visitors. After two years of operation, the area has been closed for reasons not yet explained, and since then it resort has decayed. A significant difference between the caves located in the Slovak and Hungarian territories can be seen in the period of their operation during the year for visitors. Caves on the Hungarian side are all year round for visitors. Exceptions are periods when the cave is impossible for visitors to visit due to the high water level in the caves.

Conclusion

In Slovakia, natural tourism has great potential and is increasingly sought after by tourists. The current trend in tourism is to shorten holidays and actively use them to gain experiences, which predicts great development opportunities for sustainable forms of tourism. Sustainability issues are often seen in the context of the impact of tourism on the destination, and these impacts tend to be divided into environmental, socio-cultural and economic, depending on their impact on the environment. Regarding the negative impacts on the economic environment, economic leaks, seasonal inflation, excessive dependence on tourism income, seasonality of production and low return on investment are often mentioned. These are positively reflected in the growth of employment, an increase in living standards and investments. Among the negative impacts of tourism on the natural environment include eg. reduction of water quality, air quality, noise pollution, emissions, erosion, loss of animals or damage to natural values and biodiversity. Increasing awareness of the need for nature protection is considered positive. In contrast to the impacts on the natural environment, the impacts on the socio-cultural environment are harder to identify. The most frequently mentioned are:

dualization of society, increase in crime, tourist irritation, change in the value system and others. They consider positively strengthening regional values and traditions or increasing the level of local interest.

Based on the collected responses and their subsequent analysis, we found that visitors to the Domica Cave are significantly more satisfied with the information services as well as the infrastructure at this cave, as visitors to the Ochtinská Aragonite Cave. However, visitors to the Ochtinská Aragonite Cave are much more satisfied with the guide service at this cave than visitors to the Domica Cave. The dissatisfaction of the visitors in the case of Domica cave is caused by the price of souvenirs and the variety of its offer, while the negative response to the Ochtinská Aragonite Cave can be attributed to the quality of the access road. It was reconstructed after the survey in 2019.

New theme, new product, new possibilities. This is also how ecotourism can be defined as a modern market segment in the tourism sector. Revenues of this product grow year-on-year also because mankind is already aware of the consequences of insensitive human intervention in nature and landscape. An example is the numerous discussions on global warming and climate change.

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Comparison of Satisfaction the Slovak and Foreign Visitors in the Slovak Paradise National Park in the Context of Ecotourism

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Abstract

The main aim of the paper is a comparison of foreign and Slovak visitors contentment with accommodation, restaurant and transport services in the northern part of the National Park Slovak Paradise. The analysis was performed on the basis of personally collected data from the questionnaire survey conducted during the summer season from June to September 2017. We addressed the requested respondents personally in accommodation and restaurant facilities in the most famous tourist resorts of the northern part of the Slovak Paradise National Park - Podlesok, Čingov, Hrabušice and other nearby localities and car parks. The survey sample consisted of 211 respondents, of which 100 were Slovak and 111 foreign visitors. The questionnaire was developed in 6 language mutations. We found out from our survey that both Slovak and foreign visitors are equally satisfied or dissatisfied with the provision of accommodation, restaurant and transport services in the Slovak Paradise, which they used during their stay. Most visitors, however, were satisfied.

Keywords: The National Park Slovak Paradise, Ecotourism, Sustainable tourism

Introduction

Ecotourism is a type of tourism, which is focused mainly on learning about nature in order to avoid excessive disturbance. Characteristic attributes for ecotourism are sustainable, responsible, naturally oriented. In the early days of the development of ECOTURISM, the term was often identified with the terms NATURE TOURISM or WILDLIFE TOURISM, whose main aim was to move in a natural, unchanged environment. In the literature it is possible to meet with the designation GREEN TOURISM. At present, ecotourism is viewed as a symbol of alternative tourism, resp. access to current commercial forms of mass tourism. Terminologically, ecotourism is sometimes considered synonymous with natural tourism, but in this approach it loses its very important aspect, namely the cultural aspect (Matlovičová, Klamár and Mika 2015).

Sustainable tourism and ecotourism

Sustainable tourism is the application of the principles of sustainability to the field of tourism. It is a tourism concept that connects the needs of today's generation and future generations. Sustainable tourism underlines the need to minimize negative impacts and maximize positive impacts for society, the environment and other areas. The interest of tourism in the concept of sustainability is given logically. Tourism uses its environmental resources - both physical and human - for its product. Sustainable tourism meets the needs of current tourists and host regions. It has a low impact on the environment and local culture, helps generate income and jobs for local people, and also helps to preserve local ecosystems. The aim is to maintain the economic and social benefits for tourism development while reducing or mitigating any adverse effects on the natural, historical, cultural or social environment (Moreli 2011; UNWTO 2018). Global Tourism (2005) defines sustainable tourism as a tourism that consciously uses and conserves resources to benefit from their long life span. Epstein (1996) draws attention to the potential dangers of a sustainable concept. What on the one hand looks like a sustainable concept, on the other, may not look the same. The global impact on tourism at local level is moderated by a number of processes and relationships that influence whether sustainable tourism will be successful or not (Grah, Dimovski and Peterlin 2020; Ferencz et al. 2017). The English Tourism Council (2010) defines sustainable tourism as managing the effects of tourism on the environment, the public and the economy, ensuring that the effects are positive rather than negative for the benefit of future generations. It is a management approach that applies to all

types of tourism, regardless of whether it takes place in cities, cities, rural areas or on the coast (Navrátil et al. 2015). The WTO (2018) offers an economic-environmental definition: Sustainable tourism is the ability of a destination to maintain potential competition in competition with new, historically less-used destinations, attract both first and repeat visitors, maintain cultural uniqueness, and be in balance with the environment. Pásková and Zelenka (2002; 2018) argue that sustainable tourism is based on several principles. The first is the conservation of resources. Sustainable development is associated with the life of not only environmental resources but also economic, social and cultural resources. The second principle is the future. This means the future of future generations that could benefit from the resources, opportunities and opportunities that should last as long as possible. The third principle is justice. Some argue that fair play needs to be maintained in the distribution of economic, cultural and environmental benefits and costs of human activity (Global Tourism 2005; Burian 2010). The definition of ecotourism is not uniform, but it usually includes expressions such as: responsible travel, visiting the natural area, economic benefits for local people, consideration for the natural environment and culture, nature conservation, links to study or education. It also includes promoting recycling, energy savings and creating economic opportunities for local communities. It respects the cultural heritage, does not harm the environment, supports the local economy and cultural exchange. Ecotourism thus gives tourists the opportunity to support the local population, enjoy nature while respecting it and appreciating its beauty (Augustinová 2008). The history of ecotourism is very short. In the 1980s, the term did not appear in dictionaries and lexicons, as did the terms sustainable or alternative tourism (Page and Dowling 2002). This term was first used in 1983 by Hector Ceballos - Lascurain, a Mexican architect and environmentalist who drafted an often cited definition in the early 1980s: Ecotourism is traveling to relatively intact and unpolluted natural areas with the primary goal of studying, admiring and enjoying nature, plans growing plants and wild animals, as well as existing cultural expressions (both past and present) found in these areas (Fennel 2006). Its participants visit national parks, nature reserves, cultural monuments, events and various attractions. There are many ecotourism activities, often overlapping with activities of agrotourism or adventure tourism. These include e.g. hiking, photography, observation of wild animals and wild plants, cycling and participation in cultural events (Pásková, Zelenka 2002; 2018). According to Honey (1999), the origin of the term ecotourism can also be traced back to the growth of the environmental movement in the 1970s, as well as the increase in dissatisfaction with mass tourism (mass tourism or large-scale tourism), which is based on at a high level of comfort and convenience. A well-known example is "3S" from the English Sea, Sun and Sand, a large concentration of people in a relatively small area leads to mass tourism, and many developing countries around the world are beginning to perceive mass tourism as bad At first, only the richest traveled, but this “fashion” spread very quickly to other social strata, and these countries are concerned about the negative social and cultural byproducts of mass tourism - the black market, drugs and the leakage of tourist profits back to these destinations. Therefore, they are beginning to consider ecotourism as a cleaner, "greener" alternative, alternative forms of ecotourism are trying to be the opposite of mass tourism, several authors (Holden 2000; Page and Dowling 2002) agree on several characteristics of ecotourism, and eg: small scale, local property, mi minimizing negative environmental and social impacts, maximizing links with other sectors of the local economy (eg agriculture - reducing dependence on goods imports), active travel, reconciliation with nature, leaving much of the profits in place, locating power sharing, including participation in decision-making processes (Eadington a Redman 2011, Amanthaswamy 2004).

Materials, methods and results

Slovakia has a high natural and cultural potential for tourism development. As far as the most important natural monuments in our territory are concerned, there are caves whose research and protection are of a high standard. In such cases, an environmental approach is also important (Ko 2005; Adamišin, Kotulič, Mura et al. 2018), e.g. negative consequences of tourism and so on. The main goal of our work was to evaluate and compare the satisfaction of visitors with selected services in the National Park Slovak Paradise. A total of 211 questionnaires were collected and correctly completed, of which 47.4% were from Slovakia (100 respondents) and 52.6% were from abroad (111 respondents). Foreign visitors represent 21.8% from the Czech Republic, 13.3% from Poland, 7.1% from Germany, 2.8% from Hungary and 7.6% from other countries, ie. from Israel, the Netherlands, Italy, France, the US, and Ireland. We divided the age of respondents into 5 age intervals. 27.5% of respondents were 36-45; 46-50 (24.2%); 23.7% of respondents were 15-25 years old; 13.7% of respondents aged 26-35 and the

smallest age group (10.9%) were respondents over 56 years. The average age of domestic visitors was 35 years, of the foreign visitors was 42 years.

Evaluation of visitors' satisfaction with accommodation services

When are you staying at? respondents responded as follows: most in the locality Podlesok (the most famous tourist resort in the Slovak Paradise), 55.0% foreign and 52.0% visitors from Slovakia. In the village Hrabušice 38.7% foreign and 29.0% domestic visitors. In the Čingov resort 6.3% of foreign visitors and 16.0% of visitors from Slovakia. In Smižany there were only 3% of domestic visitors. We have selected the accommodation category in the next question. The most used accommodation facility was a hotel, where up to 44.1% of foreign respondents were accommodated. The second was camping (22.5%). Domestic visitors preferred accommodation in the camp (29%), compared to foreign visitors only 28% of domestic respondents were staying in a hotel. 19% of domestic respondents were accommodated in the cottage and 19% were in private. Least foreign respondents used the possibility of accommodation in the guesthouse (6.3%) and in the cottage (8.1%). To the question ***How satisfied are you with the quality of the accommodation services provided in the accommodation?*** Most respondents stated that they were very satisfied, with 68.5% of foreign respondents and 66.0% of domestic respondents giving this answer. Nearly the same number of domestic and foreign respondents were partially satisfied (approx. 28%). There was very little dissatisfaction with both domestic and foreign respondents (foreigners were less than 2% more dissatisfied than domestic respondents). According to the results of the answers to the question whether the quality of the provided accommodation services corresponds to their price, both respondents from abroad and domestic respondents answered. 91.9% of foreign respondents gave yes and 92% of domestic respondents also answered. Only 8.1% of foreign respondents and 8.0% of domestic respondents did not respond. Up to 89.2% of foreign respondents answered the question whether they would use the same accommodation facility again. Only 10.8% of them would not use the same accommodation. Domestic respondents responded similarly (92% would stay in the same accommodation and only 8.0% would use another).

Determining visitors' satisfaction with transport services

Asked: ***What kind of transport did you use to get to the National Park Slovak Paradise?,*** foreign visitors mentioned as a means of transport the car (73.9%) and the train (24.3%), who came to the Slovak Paradise. The main means of transport for home visitors was a car of up to 78.0%, only 14% of respondents came by train and 9.0% of respondents used intercity bus services. Up to 49.5% of foreign respondents and 52.0% of domestic respondents rated the transport accessibility as very good and 26.1% of foreign respondents and 30.0% of domestic respondents, respectively. It was partly assessed by foreign respondents (7.2%) and by domestic respondents (3.0%). Overall, transport accessibility is very good. 32.4% of foreign visitors were very satisfied with ***the price for parking services***, domestic customers were 6.6% more satisfied than foreign visitors. Also partially satisfied with the price was more by 6.3% domestic (27.0%) than foreign respondents (20.7%). 5.4% of foreign respondents responded partially dissatisfied. I cannot judge rated up to 39.6% of foreign respondents and 31.0% of domestic respondents. More domestic respondents (48%) than foreign (40.5%) were ***very satisfied with enough parking space in the Slovak Paradise***. This also applies to partially satisfied domestic respondents 28% and 20.7% foreign respondents. Overall, the respondents were satisfied with the services in the car park.

Determining visitors' satisfaction with catering services

What kind of catering facilities do you use?, respondents could give a number of options. The most frequently used catering facility was a restaurant. Up to 71.2% of foreign respondents and 66.0% of domestic respondents were eating in a restaurant. 68.5% of foreign respondents and 42.0% of domestic respondents used meals in the facility where they were staying. The buffet was attended by 27.0% of foreign and 25.0% of Slovaks. 10.0% of the Slovaks brought in, and therefore their own diet was sufficient. According to foreign (80.2%) and domestic respondents (73.0%), the supply of food and beverages in catering establishments was sufficient. 27.0% of domestic and 19.8% of foreign respondents were not satisfied with the offer. 67.0% of domestic respondents and 13.8% less foreign respondents (53.2%) were very satisfied with the quality of services in these facilities. The answer was partially satisfied by 32.0% of domestic and 36.0% of foreign respondents. Domestic (76.0%) and foreign respondents (79.3%) answered the question whether the quality of the provided catering services

corresponds to their price. Respondents according to which the quality of catering services did not correspond to their price were 24.0% domestic and 20.7% foreign.

Comparison of satisfaction of Slovak and foreign visitors

In this part of the thesis we analysed the established research hypotheses by means of Chi-square independence test. It is a statistical method used to determine whether there is a demonstrable significant relationship between two variables. We set out research hypotheses:

Research hypothesis 1

H1: We assume that foreign visitors prefer hotel accommodation and private visitors accommodation during their stay in the Slovak Paradise.

Part of the research hypothesis 1 is to find out the differences in the choice of accommodation between domestic and foreign visitors. From Chart 1 it is obvious that most foreign visitors (44.1%) prefer hotel accommodation and domestic visitors prefer camping accommodation (29%). The second most used facility of foreign respondents was camping (22.5%) and domestic respondents it was a hotel (28%). The same percentage (19%) of domestic respondents were accommodated in the cottage and used private accommodation.

Table 1: Chi-square independence test. Difference in choice of accommodation between domestic and foreign visitors

Null hypothesis	*$H1_0$: there is no difference in the choice of accommodation between domestic and foreign visitors.*
Alternative hypothesis	*$H1_A$: in the choice of accommodation there is a difference between domestic and foreign visitors.*
p-value	**p= 0,0502** > 0,05

(Source: own processing)

Given that the p-value is more than 0.05, we do not reject the null hypothesis; j. there is no significant difference in the choice of accommodation between domestic and foreign visitors. Our hypothesis has not been confirmed.

Research hypothesis 2

H2: We assume that foreign visitors consider transport accessibility to the Slovak Paradise National Park very good and that domestic visitors are not satisfied with the transport accessibility.

Up to 52.0% of domestic respondents and 49.5% of foreign respondents rated transport accessibility as very good. 26.1% of foreign respondents and 30.0% of domestic respondents gave a partially good response. It was partly assessed by foreign respondents (7.2%) and by domestic respondents (3.0%). Nevertheless, according to domestic and foreign visitors, the overall transport accessibility to the national park is very good. Given that the p-value is greater than 0.05, we do not reject the null hypothesis; j. there is no significant difference in the assessment of transport accessibility to the national park by domestic and foreign visitors. The hypothesis was not confirmed.

Table 2: Chi-square independence test. Traffic availability evaluation by Slovak and foreign visitors.

Null hypothesis	*$H1_0$: there is no difference in the accessibility assessment between domestic and foreign visitors.*
Alternative hypothesis	*$H1_A$: in the traffic accessibility assessment, there is a difference between domestic and foreign visitors.*
p-value	**p= 0,6915644** > 0,05

(Source: own processing)

Research hypothesis 3

H3: We assume that more foreign visitors than domestic visitors were satisfied with the quality of services in accommodation facilities.

Percentage 68.5% of foreign visitors and 66.0% of domestic visitors were very satisfied with the quality of accommodation services. Almost equally domestic and foreign respondents were partially satisfied with the quality of accommodation services (approx. 28%). There were very few dissatisfied foreign and Slovak respondents with the quality of accommodation services (foreign by about 2% more than domestic).

Table 3: Chi-square independence test. Quality assessment of services in accommodation establishments by Slovak and foreign visitors

Null hypothesis	*$H1_0$: there is no difference in the quality of service evaluation in accommodation facilities between domestic and foreign visitors.*
Alternative hypothesis	*$H1_A$: in the evaluation of quality in accommodation facilities there is a difference between domestic and foreign visitors.*
p-value	**p=0,393376175** > 0,05

(Source: own processing)

Since the p-value is greater than 0.05, we do not reject the null hypothesis, and the result is evaluated as not statistically significant, i. j. there is no significant difference in the quality of service in accommodation facilities by domestic and foreign visitors. The hypothesis was not confirmed.

Research hypothesis 4

H4: We assume that more foreign visitors than domestic visitors were very satisfied with the quality of the catering services.

Slovak respondents were very satisfied with the quality of services in catering establishments as much as 67.0% and foreign respondents 53.2%, i. 13.8% less than domestic visitors. 42.0% of domestic and 36.0% of foreign respondents responded in part to the answer. There were no dissatisfied respondents with the quality of services in catering facilities. Part of the research hypothesis 3 is to find out differences in the evaluation of the quality of services in accommodation facilities by domestic and foreign visitors.

Table 4: Chi-square independence test. Evaluation of the quality of services in the restaurant facilities by Slovak and foreign visitors

Null hypothesis	*$H1_0$: there is no difference in the quality of catering services between domestic and foreign visitors.*
Alternative hypothesis	*$H1_A$: in the evaluation of quality in catering establishments there is a difference between domestic and foreign visitors.*
p-value	**p= 0,853229517** > 0,05

(Source: own processing)

Since the p-value is greater than 0.05, we do not reject the null hypothesis, and the result is evaluated as statistically insignificant, i.e. j. there is no significant difference in the quality of catering services provided by domestic and foreign visitors. The hypothesis was not confirmed.

Discussion and conclusion

The high quality of service and guest´s satisfaction are important factors in the success not only in today's globalized tourism market and space, but also in small tourist regions. Given the current trend of customer orientation is the concept of quality in particular generated by guests. Examples of customer satisfaction surveys indicate that services as intangible quality indicators have a significantly greater impact on customer satisfaction than on tangible products. The main aim of the paper is a comparison of foreign and Slovak visitors contentment with accommodation, restaurant and transport services in the northern part of the National Park Slovak Paradise, which is a karst area with a great natural and landscape-aesthetic value and richly embossed relief.

The analysis was performed on the basis of personally collected data from the questionnaire survey conducted during the summer season from June to September 2017. We addressed the requested respondents personally in accommodation and restaurant facilities in the most famous tourist resorts of the northern part of the Slovak Paradise National Park - Podlesok, Čingov, Hrabušice and other nearby localities and car parks. The survey sample consisted of 211 respondents, of which 100 were Slovak and 111 foreign visitors. The questionnaire was developed in 6 language mutations. The results were evaluated using the mathematical-statistical method Chi-quadrate independence test. This testing has shown that all of our hypotheses have not been confirmed and that there is no difference between the satisfaction of slovak and foreign visitors in the northern part of the National Park Slovak Paradise with the services provided.

Both domestic and foreign visitors were very satisfied with the quality of accommodation services provided in this accommodation facility, with 68.5% of foreign respondents and 66.0% of domestic respondents providing this answer. Nearly the same number of domestic and foreign respondents (approximately 28%) were partially satisfied with the quality of accommodation services. There were very few dissatisfied respondents with the quality of accommodation services for both domestic and foreign respondents, while foreigners were less than 2% more dissatisfied than domestic respondents. Most respondents were satisfied with the accommodation services in their given accommodation facility. When asked if they would use the same accommodation again, up to 89.2% of foreign respondents would use the same accommodation and 10.8% did not. Domestic respondents say the same, with up to 92% staying in the same accommodation and only 8.0% choosing another accommodation.

Foreign visitors mainly used the car (73.9%) and the train (24.3%) as a means of transport to which they came to the Slovak Paradise. Likewise, the main means of transport for domestic visitors was the car, i.e. up to 78.0%, only 14% of respondents came by train and even 9.0% of respondents also used intercity bus services. Up to 49.5% of foreign respondents and 52.0% of domestic respondents rated the traffic accessibility as very good and 26.1% of foreign respondents and 30.0% of domestic respondents, respectively. It was partly assessed by foreign respondents (7.2%) and by domestic respondents (3.0%). Nevertheless, according to domestic and foreign visitors, transport accessibility to the Slovak Paradise National Park is good.

The most frequently used catering facility was a restaurant. Up to 71.2% of foreign respondents and 66.0% of domestic respondents were eating in a restaurant. 68.5% of foreign respondents and 42.0% of domestic respondents used meals in the facility where they were staying. The buffet was attended by 27.0% of foreign and domestic respondents (25.0%). 10.0% of the domestic respondents brought in, and therefore their own diet was sufficient.

According to foreign (80.2%) and domestic respondents (73.0%), the supply of food and beverages in catering establishments was sufficient. 27.0% of domestic and 19.8% of foreign respondents were not satisfied with the offer of food and drinks. 67.0% of domestic respondents and 13.8% of foreign respondents were very satisfied with the quality of services in canteens (53.2%). 42.0% of domestic and 36.0% of foreign respondents responded in part to the answer. Both domestic and foreign visitors were satisfied with the quality of services in the catering facilities. Domestic (76.0%) and foreign respondents (79.3%) answered the question whether the quality of the provided catering services corresponds to their price. Respondents according to which the quality of catering services did not correspond to their price were 24.0% domestic and 20.7% foreign.

We found out from our survey that both Slovak and foreign visitors are equally satisfied or dissatisfied with the provision of accommodation, restaurant and transport services in the Slovak Paradise, which they used during their stay. Most visitors, however, were satisfied.

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Possibilities of Reducing Regional Disparities and Supporting Regional Development

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Abstract

The aim of each country must be to care for the development of its territory, but also for the development of citizens living there. The development of the territory as a whole is influenced by a number of aspects, which can include natural, human, financial, infrastructure, but also security aspects. Uneven development of individual aspects may result in regional disparities in the country, which cause uneven development of regions and decrease of competitiveness of regions, which may lead to lower living standards of inhabitants in less developed regions. The role of the state is to support the least developed regions and reduce regional disparities through the implementation of strategy documents and fulfilling action plans. The paper deals with the analysis of the development of selected regional disparities and the determination of the main factors of regional development. The aim of the paper is to set priorities and goals of development strategies of individual regions.

Keywords: Regional Disparities, Regional Development, Support, Economic Growth, Standard of Living.

Introduction

The main task of each territorial unit is to take care of the development of the territory and the development of the population. As a separate territorial unit can be considered not only the city, the district, the region, but also the state as a whole. The regional policy of a modern democratic state must be based on reducing regional disparities through various measures stimulating the least developed regions. The regional policy of the Slovak Republic is based on this principle, which aims to balance regional disparities, increase the competitiveness of regions, increase the standard of living of the inhabitants of the least developed regions and thus contribute to the development of society as a whole.

Regional Development Policy

Regional policy should be one of the priority areas of each state. As Čadil (2010) writes, regional policy means a coordinated set of activities and practices of the competent authorities and organizations at national, regional and local level that contribute to the economic development, social development and territorial development of the regions. According to Oulehlová et al (2016), regional development can be understood as a set of social, economic, cultural and environmental processes and relations that take place in a region and which contribute to increasing its competitiveness, sustainable economic development, social development and territorial development and balancing economic and social disparities among regions. For this purpose, it is also necessary to

define the term region itself, which can be defined as a territorial unit defined according to The Nomenclature of Territorial Units for Statistics (NUTS).

The NUTS is a hierarchical division of the country into territorial units, which was introduced by Eurostat for the European Union member states in 1988. This classification is currently regulated by the Regulation of the European Parliament and of the Council no. 1059/2003. The NUTS consist of at least three regional levels - NUTS 1, NUTS 2 and NUTS 3, aiming to provide comparable regional statistics data within the European Statistical System. As Šoltés et al (2019) write, in the Slovak Republic this classification is determined by the Decree of the Statistical Office of the Slovak Republic no. 438/2004 Coll. The NUTS classification in Slovakia consists of three regional and two local levels as shown in figure 1.

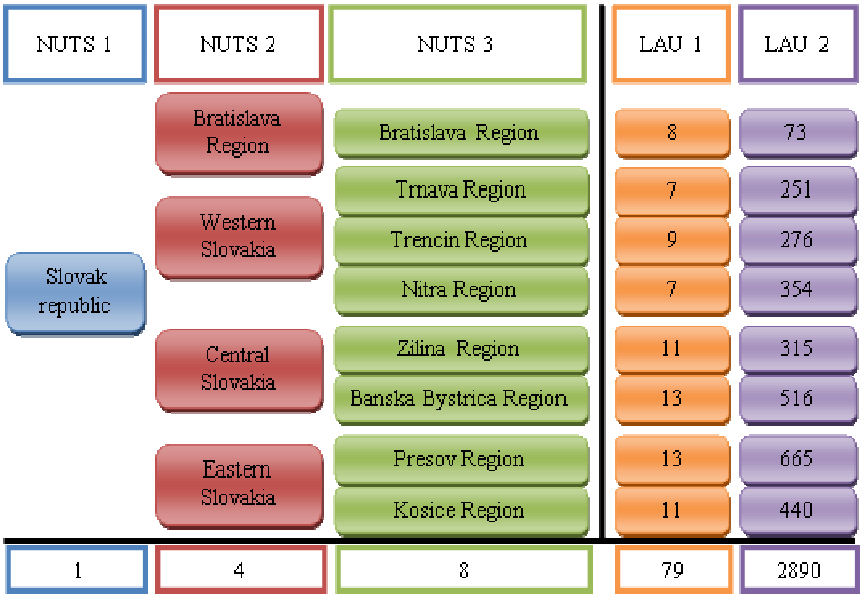

Fig. 1: NUTS statistical regions of Slovakia

According to Act no. 539/2008 Coll. on support for regional development, the main objective of promoting regional development is:

- to eliminate or reduce undesirable disparities in the level of economic development, social development and regional development of the regions and to ensure the sustainable development of regions,
- to enhance economic performance, competitiveness of regions and development of innovation in regions while ensuring sustainable development,
- to increase employment and living standards of the population in the regions while ensuring sustainable development.

The main document of regional development support in Slovakia is the National Strategy of Regional Development of the Slovak Republic (National Strategy). Štofková and Štofková (2011) define the National Strategy as a strategic and conceptual document defining a comprehensive and systemic approach of the state to regional development of the Slovak Republic. Priority is based on the analytical framework of economic, social, environmental and territorial development needs of the state. Čorejová and Štofková (2007) writes, National Strategy defines a long-term vision of support of regional development of the Slovak Republic, strategic goals and priority areas, as well as concrete measures and activities that will need to be undertaken to ensure sustainable regional development

based on increasing economic performance and the competitiveness of the economy, including social stability and social cohesion. According to Výrostová (2010), the role of the National Strategy for the NUTS 3 level region is to:

- identify the internal potential of the region and specify its potential competitiveness within the Slovakia,
- to characterize its specific aspects and the resulting competitive advantages within the Slovakia as well as in the European context,
- identify its development strategic objectives and priorities.

Another generally binding legal regulation dealing with the support of the least developed regions is Act no. 336/2015 Coll. on support for least developed districts, which governs the conditions, system and forms of granting support to least developed districts. For the purposes of this Act, the least developed district is considered to be a district that is included in the list of least developed districts. As Repková Štofková et al (2018) write, a district is included in the list of least developed districts if the registered unemployment rate, calculated from the available number of job seekers reported by the Central Office of Labour, Social Affairs and Family, has been higher in the preceding twelve consecutive calendar quarters for at least nine calendar quarters as 1.5 times the average registered unemployment rate in Slovakia for the same period and at the same time reached at least 8%. Figure 2 shows the development of the number of least developed districts per quarter.

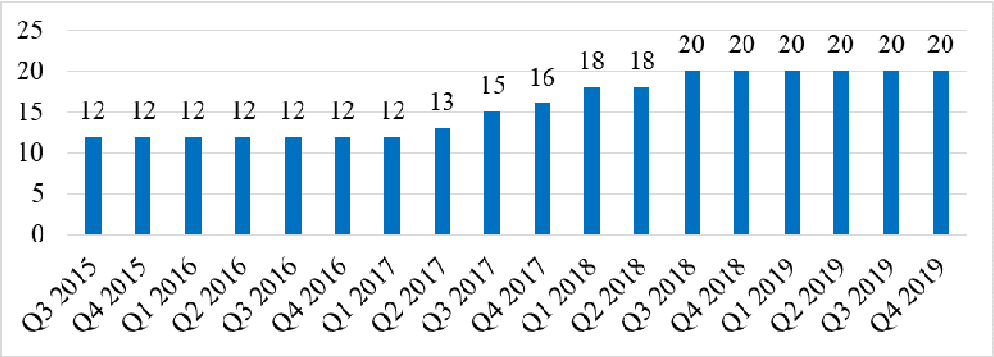

Fig. 2: Number of least developed regions in Slovakia

Figure 3 provides a view of a map of the Slovak Republic in which the pink color represents the geographical distribution of the least developed districts.

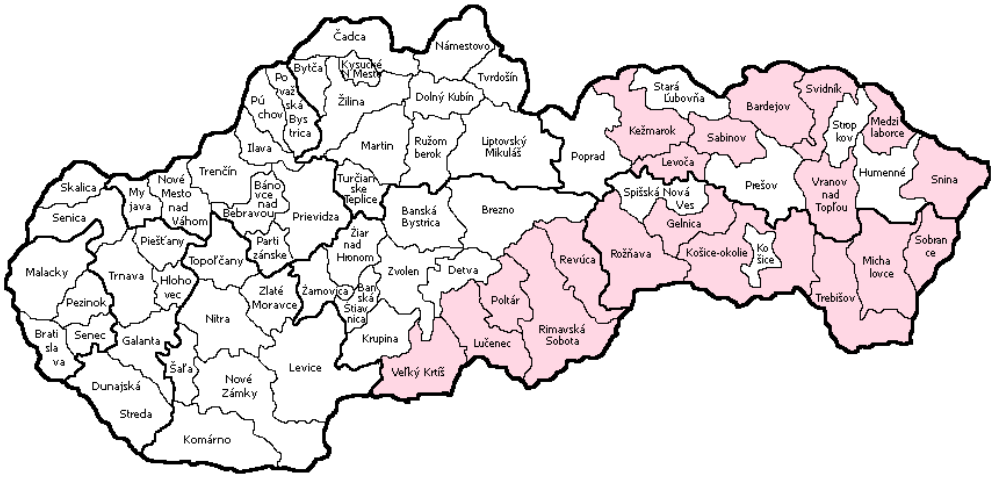

Fig. 3: Map of Slovakia with the highlighted least developed districts

The only criterion for inclusion of districts in the list of least developed districts depends on the development of the unemployment rate. Figure 4 shows the development of the unemployment rate of individual districts in the third quarter of individual years.

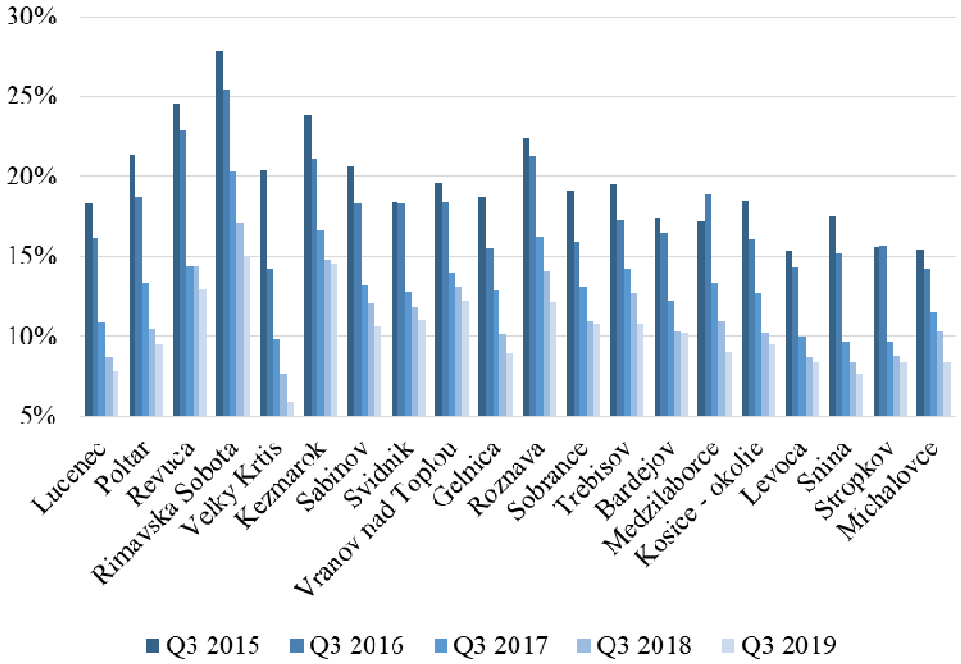

Fig. 4: Development of unemployment rate in least developed districts

Regional development is according to Act No. 539/2008 Coll. on regional development, financed by:

- the state budget, including funds from ministries' budget chapters;
- state special-purpose funds;
- budgets of higher territorial units,
- municipal budgets,
- financial resources natural persons,
- financial resources of legal entities,
- loans and contributions from international organizations;
- funds resulting from international grant agreements concluded between Slovakia and other states,
- other financial resources, if specified in a special legal regulation.

Hudáková et al (2018) provide, that in order to achieve the objectives of the National Strategy, it is necessary to provide financial resources from the state budget according to the following aspects:

- national resources should help to implement the National Strategy,
- domestic resources must be directed to areas not supported by the EU,
- by national resources help drawing of development resources,
- national resources should help realize the professional, local and territorial development policy tasks.

So far, almost EUR 1.8 billion has been earmarked for the least developed regions. This funds should help create more than 23 000 new jobs. Figure 5 shows the average amount of money spent per creation one job in each district.

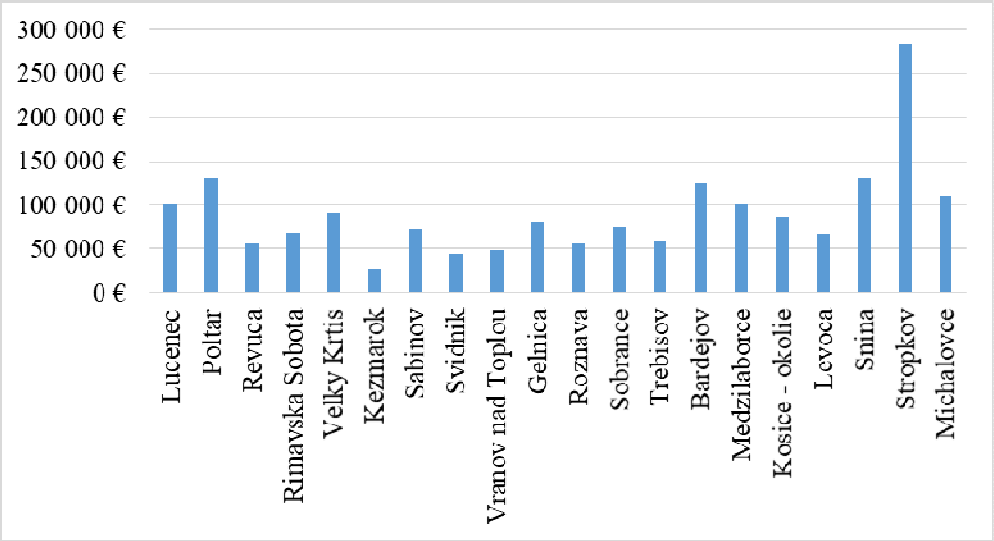

Fig. 5: Money spent per creation one job in each district

Creating one job position will require an investment of over € 90,000 on average. According to NUTS, districts are assign among LAU 1 regions in Slovakia. These districts can be assign to a higher level - NUTS 3 level regions. Table 1 gives an overview of the financial assistance to the least developed districts assign to the NUTS 3 level.

Table 1: Support of the least developed regions at NUTS 3 level

NUTS 3	Total number of districts	Number of least developed districts	Estimated budget	Planned number of created jobs	Expenditure on the created job
Banska Bystrica region	13	5	538 908 000 €	6 412	84 047 €
Presov region	13	9	709 539 483 €	10 183	69 679 €
Kosice region	11	6	510 934 100 €	5 342	95 645 €

Slovakia has a total 8 regions of NUTS 3 level. However, all the least developed districts are located in only three such regions - Banska Bystrica region, Presov region and Kosice region. Most of the least developed districts in terms of the total number of districts are in the Presov region. These are 9 districts which should be supported from the state budget by a subsidy for regional development of more than 700 mils. €. This subsidy should create more than 10 000 jobs, which means that the creation of one job should cost almost 70 000 €. In the Kosice region, there are 6 least developed districts form the total number of 11 districts. The state should support the creation of more than 5,000 new jobs with a subsidy of more than 500 mils. €, which means that the creation of one job will cost approximately € 95,000.

Out of 13 districts, the 5 least developed districts are in the Banska Bystrica region. The state plans to support these least developed districts with funding of approximately 538 mils. €. These investments should create almost 6,500 new jobs. Thus, the price of a newly created job will reach almost € 58,000.

Analysis of NUTS level 3 regions with least developed districts

The Banska Bystrica region is a rural, slowly growing, more stagnant, low-level readiness for innovation, an average attractive and low-competitive region of Slovakia, outside the center of EU development activities and with the possibility of cross-border cooperation with Hungary.

Presov region is a mostly rural, slowly converging, industrial, slowly growing region, a more stagnant region of Slovakia, with a low degree of readiness for innovation, on average attractive and competitive, developing outside the center of EU development activities and with the possibility of cross-border cooperation with Poland and Ukraine.

The Kosice region is a rural, slow-growing, more stagnant region of Slovakia, industrial, with an adequate degree of readiness for innovation, on average attractive and competitive, but developing and converging outside the center of EU development activities and with the possibility of cross-border cooperation with the Hungary and Ukraine.

Priorities for Regional Development Support

As all the least developed districts belong to only three NUTS 3 level regions, regional development measures need to be taken, particularly for this three regions. The following proposed measures for individual regions should bring the arrival of new investors, increase the competitiveness of regions, create new jobs, increase the standard of living of the population and thus reduce regional disparities.

Within the framework of regional development, the Banska Bystrica region should focus mainly on:

- increasing employment, particularly in rural areas and new technologies,
- increasing the use of domestic resources,
- better quality of the environment,
- modernized transport infrastructure and improved road quality,
- improving transport accessibility by public passenger transport,
- Improving performance in agriculture and forestry, woodworking and logging,
- development of sustainable tourism with the aim of increasing the competitiveness of the region.

In order to support regional development, the Presov region should invest funds in:

- increasing the use of regional resources,
- increasing regional employment, export performance in new markets and competitiveness,
- improving the quality of the environment and increasing efficiency in the use of natural resources,
- modernized transport infrastructure, higher quality roads of local importance,
- improving transport accessibility by public passenger transport,
- creating new jobs in rural areas and rural development, increasing the share of organic farming,
- establishing new links among science, research, innovation, business community and educational institutions,
- improving the quality of human resources and improving social cohesion.

Within the framework of regional development, the Kosice region should focus on:

- economic growth, increasing export performance and competitiveness of the economy, growth of employment,
- increasing the educational structure of human resources,
- extension of research and innovation infrastructure,
- exploiting the innovative potential for regional GDP and productivity growth,
- strengthening the links between science, research, innovation, business and educational institutions,
- Introduction of new ICT applications for companies grouped in IT Valley
- rural development and rural employment through diversification of production, support for agriculture, processing of local products and their distribution,
- development of small and medium-sized enterprises and strengthening of their competitiveness, development of subcontracting networks,
- reducing long-term unemployment and social exclusion,
- increasing the use of renewable energy sources,
- improving transport accessibility by public passenger transport,
- modernized transport infrastructure,
- reducing the level of environmental pollution,
- increasing the quality of life by creating suitable conditions for the availability of quality education, suitable and sufficiently financially appreciated employment, quality social and health care, equal opportunities and leisure activities.

Conclusion

Supporting the least developed regions to reduce regional disparities is one of the key tasks of each state. The development of society can only be achieved if the standard of living of all inhabitants of the country is the same and there are no big social, economic, educational or other differences in society. Within the framework of regional policy, the Slovak Republic seeks to support the least developed regions through subsidies given to create new jobs. According to Act No. 336/2015 Coll. on the promotion of the least developed regions, a list of the least developed regions has been established. Currently, there are 20 least developed districts of LAU 1 level in Slovakia, all of which belong to three NUTS 3 level regions. Each such district has an approved action plan which sets out precise measures to promote employment in that district. The costs of implementing the measures related to the creation of new jobs are covered by the state budget in the form of subsidies. The total amount of subsidies for the 20 least developed districts reached almost 1.8 billion. €. Overall, more than 23 000 new jobs should be created in this way. However, the three NUTS 3 regions themselves, to which all 20 districts belong, should also support regional development. As each such region is specific, there are also specific measures that these regions should implement in their regional policy.

Acknowledgment

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Sustainability of Local Innovation: Waste Management as Catalyst toward Social–Cultural and Economic Change

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Abstract

Village development that uses community participation needs the commitment of all stakeholders. The process is a complicated matter and requires innovative strategies. Previously, the Indonesian government believed that improving the well-being of people through financial capability is the primary indicator to help people get a better quality of life. In contrast, the economic factor as a single approach leads to increasing inequality in the village. Financial aspect as single domain approach could risk the environment because people tend to achieve economic prosperity. However, the development process in Panggungharjo Village showed a different situation. The village government used multitude aspect to develop their area. Environmental sustainability approach was the main factor in changing socio-cultural and economic aspects in Panggungharjo Village.

This study used a qualitative approach, by collecting data through in-depth interviews, focus group discussions, observation and literature studies. Total informants were 18 informants, using purposive and snowball sampling. The finding showed that empowerment through environmental domain became a catalyst toward change in socio-cultural and economic aspects. Starting with waste management, Panggungharjo Village could overcome their unmet needs. The existence of waste management enabling collaboration of stakeholders in some issues: environmental, education, health, spiritual and economical for the wellbeing of people in the village.

Keywords: Environmental Factors, Social and Cultural Empowerment, Economic Empowerment, Government.

Introduction

Enhancing the quality of life of people living in rural areas is the primary goal of village development. The process of poverty reduction in rural areas requires a community's participation. Furthermore, the commitment of the stakeholders responsible for improving essential services for needy people is notable. To accelerate poverty alleviation, the government need to use the development scheme. Social security, as one of the development scheme, has become the central social policy. Social security is crucial to fulfilling the human rights of all citizens, every human being, and disadvantaged population should enjoy for a life in health and dignity, social security must be a national system so no one leave behind (Symonides, 2003; Hujo, 2017; ILO, 2019). Those benefits are essential to help needy people and prevent unwanted conditions, and this is especially true in the context of Indonesia, which has many hazardous areas that had a catastrophic event, such as landslide, flood, and volcano eruption (Wibowo et al., 2017).

Social security has some domains among others is economic empowerment scheme such MSME and has great potential for promoting rural women's economic empowerment, and reducing gender inequalities

(Campos, 2015; Setyonaluri, 2016). Additionally, a social development programme such social security and empowerment should use a sustainable approach. The implementation of economic empowerment scheme does not use 'profit-making' as the primary goal. The process of uplifting needy people also considers environmental factors. Thus, improving the well-being of people through economic aspects is not the only means. This perspective leads to the development of the village without exploitation of the environment to achieve economic prosperity (Hall and Midgley, 2012).

Panggungharjo Village, located in Central Java, Indonesia, is one of the villages that use social protection development through a comprehensive scheme. The village does not only provide social assistance and social insurance in providing social protection for its citizens. Panggungharjo Village also organizes community empowerment and protection for children where all the schemes are implemented based on economic empowerment activities through waste management. Starting from the change in society about irregular waste management, causing an increase in the volume of waste and polluting the cleanliness of the village environment. In 2014, garbage in the village of Panggungharjo received 55 m3 or the equivalent of 6 trucks each and received 92% of household waste. Rapid population growth and urbanization make waste production increase due to continuous welfare improvement. The waste management should consider various dimensions, such as from technical, economic, and social aspects on a sustainability basis. Panggungharjo village managed their households' waste through community organizing for fundraising (Lay, 2017).

There have been many studies on Desa Panggungharjo. However, previous studies have only identified the various potentials of the village. They described the possibility of local institutions, local culture, and the protection of children separately while this study examines multiple village potentials through the concept of empowerment in social protection schemes that emphasise sustainable development (Wulandari, 2008; Hasyim and Salam, 2015; Sudrajat, Wulandari and Wijayanti, 2015; Pratama and Pambudi, 2017; Edi and Wardhani, 2019).

Previous research examines sustainable community development and sustainable socio-economy development. One of those research focuses on the unwanted relationship of businesses matters with social and environmental development (Latief, 2016). The other discusses marginal farm households (Cole et al., 2019; Aeria 2016). To comprehend the importance of sustainable development, Oroma and Ali (2018) strengthen the existence of indigenous knowledge by using technology. Through technology, traditional wisdom from the past would help society in coping with their problems and the environment. For the social aspect, Okubena (2016) and Gupta and Basak (2016) discussed empowerment. However, they only focused on the economic domain.

There was a study that one discussed economic empowerment that also considering sustainability aspect over Pos Pemberdayaan Keluarga (Family empowerment post or Posdaya). The result showed that economic empowerment at Posdaya also considers environment aspect as one of a group-level indicator. Among other farmer group activities, the activity of woman farmers and farming cultivation activities (Muljono, Purwono, and Cahyadi, 2019) whereas Doorgapersad (2014) studied development assessment tool called Gender-based economic empowerment for sustainable development (Doorgapersad, 2014). However, the previous study did not come up with the descriptive analysis of sustainable development that considers the participation of all elements in society, such as local government, private sector, community, vulnerable people, and also a traditional system in the neighbourhood as a complex system.

As a complex system, we used a system theory to analyse our findings in Panggungharjo village. The application system theory has been in various scientific papers. One of the discussions related to international relations is how the relationship between the two countries using the central-peripheral Theoretical Analysis (Hanh, 2019). There are also other scientific papers discussing the critical part of the system theory that reveals the various actors involved in the organisational environment (Berit, Berg Tjorhom, 2019; Soni 2017).

The previous scientific paper discussed the system theory to explain the environment, especially waste management (Afolabi et al., 2018; Ebenezer 2019; Chhay et al., 2018). They used system theory to analyse the problem of solid waste management. Solid waste problems become crucial problems in developing countries, including in Africa and China. System theory could explain the problem comprehensively. Besides, system theory helped to simplify data among the complexities in the environment. This research also uses system theory to define sustainable development that involves all elements in a complex society, especially at Panggungharjo Village, Indonesia, which successes in managing their waste to be a valuable matter for social Protection in the local community.

Based on our research in Panggungharjo Village, environmental factor did not become a subordinate factor in development. Through Strengthening Environmental Factors, social development in the village became sustainable and facilitated the other aspect evolved. Furthermore, it answers the question of "can 'traditional system' in society reconciled with modern ideas of citizenship?" (Latief, 2016). Within comprehensive strategies, Panggungharjo Village showed that social development in a rural area is possible for enhancing the quality of life. While previous literature has stated that the economic aspect was the essential matter, this study showed that empowerment through environmental issues moved as a catalyst for empowerment in socio-cultural and economic aspects to encourage sustainable development.

Methods

The key informants were the chief of Panggungharjo Village; the Committee of BUMDesa (Badan Usaha Milik Desa or Village-Owned Enterprises) (three informants), KUPAS (Kelompok Usaha Pengelolaan Sampah or (Waste Management Enterprise Group) Bapel JPS (Badan Pelaksana Jaring Pengaman Sosial or executing agency of Social Safety Net) (two informants), and PAUD (Pendidikan Anak Usia Dini or Early Childhood Education) (two informants). We conducted Focus Group Discussion by involving the villagers who get benefits form waste management programmed through KUPAS (six informants). Moreover, we also included the members and beneficiaries of social security (five informants). In this study, we also conducted a non-systematic observation. We chose the method because non-systematic observation is an approach to study and help in developing a hypothesis.

Moreover, a non-systematic observation also helped us to learn the structure of findings. Understanding human behavior and environment need time (Farkas & Tharp, 1980). For three months, the non-systematic observation helped to develop the model of waste management in Panggungharjo Village.

In analyzing the data, we used steps of qualitative data analysis from Neuman (2014). The levels were sort and classify, open code, axial code, selective code, then interpret and elaborate. Before condensing the themes of our data, we sort and organize the data based on our purposes of research. Objectives of the study were examining the implementation of socio-cultural and economic empowerment at Panggungharjo Village. Then we step up to the first step of coding the data: open code. In open coding step, we got some of the main points of the data that became new themes as the first findings. Then, in the second steps, we examine the connection between the themes for developing the model of waste management in Panggungharjo Village. At the third phase, we check the data based on the themes at the model of waste management in Panggungharjo Village. Based on the selective code, we examine the trustworthiness of our findings. At the last step of our analysis method, we interpret and elaborate the result based on the system theory and the literature.

Results and Discussion

As a basic need, the people in Panggungharjo Village have the right to an education. To fulfil their essential obligations, the people in Panggungharjo Village developed PAUD (Pendidikan Anak Usia Dini or education for early childhood). The villagers used the social entrepreneur system from their waste management system. The Village-Owned Enterprise (BUMDESA) is the village institution responsible

for maintaining the waste management system in the village. As a valuable source, the profit of BUMDESA through the waste management system was used for many social security systems in many domains through economic and environmental aspects, that is, not only education but also health, social issues and culture.

Based on system theory, the waste management system in Panggungharjo Village has described a complex system. So, the actors involved are in various layers. So the layers in the community system are indeed a unified whole. The one part and the other are related to each other. Development of the environment must still depart from the development of individual aspects. Awareness of protecting the environment is part of the psychological and emotional issues. Where it develops based on the 'drive' which comes from the spiritual-religious aspect (Fitzpatrick 2005; Healy 2005; Payne 1991; Ritzer and Goodman, 2008)

Environmental Sustainability Approach Was The Main Factor In Changing Economic Aspects: Basic Services For Fulfilling Basic Needs

Based on the profit of the waste management system, the people in Pangungharjo village developed many programmes. In addition to PAUD, BUMDESA Panggung Lestari had another application called Smart Card. Implemented in 2013, Smart Card was supposed to help children in the village earn a higher education. Another programme was initiated by the government for villagers to increase their level of learning called ‘Satu Rumah Satu Sarjana’ (one house one scholar). ‘Satu Rumah Satu Sarjana’ provided support for children from needy families. In other words, with access to the social insurance scheme, disadvantaged families could have an opportunity to offer more years of education for their children.

In general, the waste management system subsidized social development programmes in the village. This is because the waste is managed and then sold. Profit from waste management is what can provide subsidies to the village government. By BUMDESA Panggung Lestari, the waste management system’s benefits were distributed to Anggaran Pendapatan dan Belanja Desa or Domestic Revenue at Village (APBDesa). APBDesa is APBDesa shared the donation with the local Social Safety Net who has a Smart Card program. Villagers could use the Smart Card for various purposes. The purposes were, for example, Kartu Pintar (Smart Card) for the education domain, Maternal and Child Health (MCH), and Kartu Sehat (Health Card) as in figure 2:

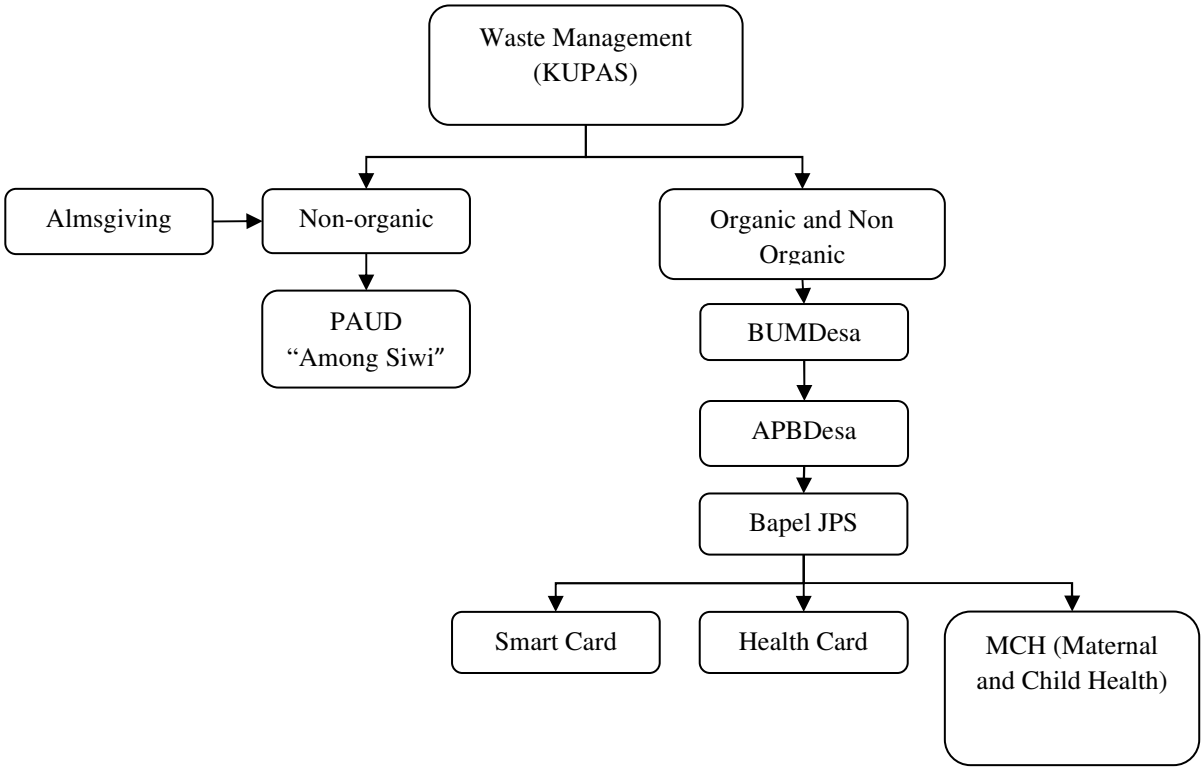

Figure 1: Waste management As Catalyst Toward Change in Socio-cultural and Economic Aspects

This research confirms the system theory in understanding waste management in Desa Panggungharjo. In developing the social welfare delivery system, Desa Panggungharjo shows that policy makers need to pay attention to all aspects of human beings especially disadvantage people or community. Fitzpatrick (2005) also stated that in the development of social policy always involves aspects of psychology, emotion and body. These three individual aspects are not only present in villagers. The policymaker itself has three elements that determine their perceptions, beliefs and values in developing where good welfare for villagers. In connection with the findings in the Panggungharjo village itself, "good welfare" is defined as a regional system that has social protection, economic empowerment, and protection for children. The social policy provides benefits for all service recipients. The interests do not only involve the body (biological) and psychological aspects of villagers. Expediency also includes the emotional issue by developing feelings of the beneficiaries. Thus, behaviours that support the implementation of empowerment activities in Desa Panggungharjo become a habit.

The local government endeavoured to reduce poverty in Panggungharjo Village. The primary means to achieve the vision was providing a better education for the villagers. The local government in Panggungharjo Village supported the basic notion that education must start in early childhood. PAUD also called PAUD 'Among Siwi', was implemented. By using the profit from waste management in the village, the Panggungharjo Village government helped fund early education for children. The Panggungharjo Village government operated the waste management in their area. The potential of smart cities in remediating environmental problems in general and waste management (Esmaeilian 2018). Individual concern on the environment, especially the waste, happened for cultural factor (Nash, Whitmarsh, Capstick, Gouveia, & Araújo, 2019). The culture became the central point in managing the waste. The awareness of villagers in Panggungharjo Village started from small matters. Every individual

care about the cleanliness at their home. They also became aware of the cleanliness at the public space. The "little matter" of altruistic behaviour was "valuable matter". It was even precious for the ability to finance PAUD Among Siwi.

The children at Panggungharjo village could get an early education. The institution responsible for administering waste management in the village was the village apparatus and employees of BUMDESA Panggung Lestari. The waste management system was under one of the business units of BUMDESA Panggung Lestari, namely, KUPAS (Waste Management Enterprise Group). The waste management system included organic waste and nonorganic waste. BUMDESA Panggung Lestari collected nonorganic waste as a valuable asset to earn a profit. They received dry waste (e.g., bottles and glass materials) three times per week: Monday, Wednesday and Friday. As mentioned previously, the surplus from those wastes was for the children who qualified for PAUD.

The waste management system in Panggungharjo Village, namely KUPAS, had a slogan: 'bersodaqoh'. 'Bersodaqoh' means 'be genuine in giving to the others'. Based on sincere behaviour, the people who performed 'bersodaqoh' were said to receive a precious return from God in future life. Based on the trademark of KUPAS, villagers were encouraged to put their waste in the appropriate place. Villagers had to sort their waste based on the type of wastes: organic and nonorganic waste. Their positive behaviour in separating the wastes became a behaviour of 'bersodaqoh'. Categorising the waste in advance minimised the operational costs of waste processing. Thus, the contributions to Bapel JPS were from the margin in the operation cost. In KUPAS, the needy people must be a member, so that they could get reliefs in paying social security contributions.

The development of the Village Revenues and Expenditures Budget or APBDesa received a real contribution from the spiritual-religious aspect. As stated by Payne (2005), the spiritual point of religion is actual. It is unity in the welfare delivery system. Without any spiritual-religious elements, the development of the organisation of social welfare is empty. The spiritual aspect is indeed individual. Its existence again explains that the individual part has a vital role in penetrating a broader layer: the development of social policy at the local level.

In complex systems (Healy, 2005), the description of the person in the environment becomes too simple to describe the problems and needs of the community. The findings in this study regarding Community Empowerment through the Sustainable Approach showed that every aspect of society crosses domain boundaries because of the strengths that exist in individual systems, communities and even central government support. With the collaboration of forces from various layers, the right of people to get a better education.

Waste Management Overcome Their Unmet Needs of The Villagers

Empowerment through environmental factor became a catalyst toward change in economic aspects of the stakeholders collaborates in some issues, not only environmental matters. The stakeholders also have to give attention to many elements, exceptionally fundamental aspect such as education and health. However, the findings in Panggungharjo Village showed that environmental factor became a crucial matter for the wellbeing of people in the village. The existence of KUPAS contributes financially to APBDesa (Anggaran Pendapatan dan Belanja Desa or Domestic Revenue at The Village.

APBDesa is village regulations that contain sources of income and allocation of village expenditure within one year. Village budget consists of village income, village expenditure and financing. One of source APBDesa is from The Village Funds Programme (Programme Dana Desa). Dana Desa supported many unmet needs in the rural area. Most notably, the social security function that became the responsibility of local government in Panggungharjo Village. The number of village funds was Rp.

800.000.000,00 to Rp. 1.000.000,00. APBDesa in the Panggungharjo Village government had a budget allocation to provide social assistance for the poor, unhealthy, and orphans, including unexpected expenses. However, the unmet needs were higher than the resources.

Environmental Sustainability Approach was The Main Factor in Changing Socio-Cultural Aspects

The environmental factor will become a catalyst toward change in socio-cultural if the stakeholders at the village collaborate in many aspects. The question is, why the stakeholders in Panggungharjo Village could make a collaboration to achieve wellbeing for people in Panggungharjo Village? The study showed that the existence of sustainable waste management in the village attract local governments, private sectors, communities, needy people to participate. They participated in every stride, including the first phase of community organisation: the assessment phase.

Every element in the village (i.e. local governments, private sectors, communities, needy people) participated in assessing their needs in social security. Regarding the provision of basic needs, some aspects had to be considerations: how to improve the provision of education, public health (social and health services for high-risk pregnant women and drop-out children from school), and services for senior citizens people with disabilities. Through empowering activities that used the waste management system in the village, local governments, communities and private sectors formulated their needs. The stakeholders involved were all villagers who met informal meetings. Panggungharjo Village also held village development deliberations. Pos Pelayanan Terpadu (Integrated Service Post) as an unofficial form also became one of the communication channels. Moreover, the villagers had Kampung Dolanan, nonbureaucratic activist institutions run by activists and people within the disability community.

Even though there were many stakeholders, the village government had a dominant role in identifying the needs of the villagers. The stakeholders in the village held Dukuh meeting. The agendas always led citizens to propose programmes that pay attention to humanism. The needs assessment intended to form an institution that provided social services for citizens. This institution was for all people: orphans, neglected elderly, malnourished children, high-risk pregnant women, disabled and drop out children from school.

Social planning is a process that involves the community to plan, coordinate, and fulfil social needs that use services and resources to the fullest (Ife, 2013). Based on research in Panggungharjo Village, including environmental aspects, could provide a positive effect. Panggungharjo Village was a good example. The programmed of the waste management system (KUPAS) could give villagers many social services. Those social services deliver some benefits that improved the quality of education and health for the villagers.

Implementation of village development in Panggungharjo Village used a locality development model. The villagers overcame their limited resources. The change started with the commitment to care for their environment, and as a result, the villagers could develop their social safety nets. Bapel JPS also undertook this effort, and they mobilized all the resources in the community. Moreover, Bapel JPS coordinated with stakeholders.

The basic principle of Bapel JPS membership was critical in nurturing the development of the village. The policy was simple: inclusivity. Thus, all villagers in Panggungharjo could participate. The beneficiaries were vulnerable groups such as women, children, elderly individuals and people with disabilities. Bapel JPS Panggungharjo Village became a vital tool of the village government to deliver social services to vulnerable people. The service delivery system that uses environmental caring as the

necessary activity makes the villagers' waste as a valuable asset. By using the waste management system, the local government could fulfill a villager's need for improved health, more years of education and healthier food.

Overall, participation is a fundamental principle in the development of empowerment. The sustainability of the program can penetrate the various layers that exist in the community system. It shows that the complexity in the Village of Panggungharjo does not break away from the "small" things that are in the individual aspect.

Waste Management Enabling and Reinforcing Stakeholders Collaboration

The state had an obligation to provide social security services. However, citizens could not always rely on what the state could provide. Citizens also had a notable role in social development. The purpose of the citizen as a community member and stakeholder in rural areas could prevail, such as in Panggungharjo Village. In this village, we observed a collaboration between stakeholders in social development: the village government, community and stakeholders. The collaborative governance in Panggungharjo Village strengthened the community welfare structure (Ife 2013, Midgley 2014; Payne 2005; Sunit 2014). The strength was within the government, who had the initiative to design a local institutional system that provided social security services: the Social Safety Net (Bapel JPS).

The local government realized the potential of the village. The promising capital consisted of many aspects of society: economic, physical, human and social. Next, the government had the initiative to strengthen those capitals to support social security for the villagers. Thus, in the future, the villagers could have a better quality of life.

Encouraged by Village Law No. 6 of 2014, strong beliefs began to develop regarding the local social security programme. The local government in Panggungharjo Village's actions corrected the state's applications that implemented the development of rural areas. Their innovation program flourished compared with the current model of development, which only focused on the concepts of local wisdom, self-reliance, democracy, participation, social capital, authority, village funds, and empowerment (Eko 2014; Zamroni 2016).

As an independent institution, Bapel JPS was entirely responsible for their financial needs. Although Panggungharjo Village had a lot of financial resources from the Village Funds Programme, it could not accommodate the number of people who qualified for social security. For that reason, Panggunghajo needed other sources to fulfill the needs of villagers. Another education insurance scheme was available for wealthy individuals in Panggingharjo Village: the premiums of education insurance, which were paid by Bapel JPS. The implementation of the programme used cooperation with the private sector, namely, Bumi Putera Education Insurance.

This education programme also assisted students that did not accept insurance. They could benefit from the plan occasionally, namely, a cash scholarship. The source of funding was APBDesa. The programme assisted by paying the school fees for needy people. The Head of the neighborhood, Head of Dusun and Team from Bapel JPS had to verify the beneficiaries. The beneficiaries received the funds from their school. The parents and students did not receive funds directly from Bapel JPS.

Bapel JPS provided additional assistance for the students. The students could obtain extra lessons from the Smartgama course. The students who could qualify for the services were in sixth grade (elementary school to junior high school), ninth grade (junior high school to high school/vocational high school), and twelfth grade (high school/vocational to university).

Other donation schemes were available, such as donation from community members. They could give it directly to the Bapel JPS office. The contribution was cash, and the goal was for specific purposes. The ultimate goals were for helping successful people in the village, but they unfortunate. Therefore, the needy people have to get some help to uplift their quality of life.

Social security program in Panggungharjo Village became a successful programme for communicating the social safety net programme regularly. Annunciated application was part of the organization in managing an open system. Furthermore, besides disseminating social security programme, local government in Panggungharjo Village and Bapel JPS reporting their agenda regularly to the society.

The Bapel JPS programme also accepted CSR funds. In 2018, Bapel JPS was receiving CSR funds from the Numani Food Stall and BUMDESA Panggung Lestari. Warung Makan Numani donated Rp. 1.000.000,00. every month. BUMDESA, based on the Articles of Association and the House Budget, allocated 5% of net income for social activities. Other funders provided health care. Healthy House (Rumah Sehat) National Zakat Institution (Baznas), Medical Center and Maternity Ward and Weni Midwife Clinic were some of the donors.

Notably, the providers of education services were not only Bumiputera. Leather Academy of Yogyakarta and the College of Economics AL Muksin also participated. Moreover, Bapel JPS also worked with Rumah Zakat, and they collaborated as business partners to become an accountable organisation. The village government was responsible for being the main guarantor in the process of collaboration.

Donations from Stakeholders and the Corporate Social Responsibility (CSR) Fund show that substantial aspects at the individual and community level will be a firm root for the process of social intervention to develop. This determination is inseparable from meeting the basic needs of individuals and communities so that the system in the Panggungharjo Village area is organic. As stated by Ritzer & Goodman (2008), organic systems tend to be open to various surrounding environments. Thus, the village of Panggungharjo becomes freer to receive feedback and develop itself (negentropic).

Conclusion

Empowerment through environmental aspect in Panggungharjo Village played the role of catalyst. The role of the catalyst was successful in changing socio-cultural and economic empowerment. Through the waste management programme, Through waste management, the villagers received some benefits. The children in the village could access a better early childhood education. Early childhood education will give many advantages for the villagers in the future.

Previously, The social security system from the government did not fulfil all the basic needs of its citizens. A waste management system, namely, KUPAS, became the leading provider of financial support that enabled the local government to overcome obstacles. The contribution of profit-making trough waste management system in the village became necessary to support in developing Bapel JPS. Waste management also helped the development of Bapel JPS and became essential services for fulfilling basic needs. The Bapel JPS itself gives many impacts on some programme. The local innovation is sustainable and becomes community-own assets. Moreover, the villagers get assistance from local sources, such as almsgiving and funder as individual and other formal organisation.

The programmes still arise and deliver much assistance to the whole society in Panggungharjo Village. If the stakeholders could make a good collaboration in many aspects, such as environmental, education, health, spiritual and economical, the villagers would have a better quality of life in the future.

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Determinants of Collecting Voluntary Savings for Retirement: Evidence from Poland

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Abstract

According to OECD forecasts for Poland, the retirement benefits paid out from the compulsory part of the universal pension system will be very low (replacement rate at approx. 30% in 2060). Meanwhile, only about 12% of Poles make voluntary savings for future retirement. The purpose of the article is to identify the factors which determine making voluntary retirement savings. The applied research methods included: critical analysis of the subject literature, diagnostic survey and logistic regression model. The data necessary to conduct the analysis were collected in the course of the nationwide survey studies conducted in September 2019 using the Computer-Assisted Web Interview method. The obtained results show that making additional retirement savings is more probable among people with a monthly net income equal to or higher than the national average, who have taken appropriate measures connected with retirement planning and their retirement awareness presents average or very high level.

Keywords: Retirement Savings, Financial Literacy, Pension, Retirement Planning, Pension System

Introduction

The disturbing forecasts regarding the financial situation of future pensioners in Poland result, e.g. from the unfavourable demographic situation illustrated by: one of the lowest fertility rates in Europe and the rapid pace of population aging. Retirement benefits paid out from the compulsory part of the universal pension system will be low, their amounts will not meet all the needs of retirement age population. It was confirmed by OECD (2017) or EU (2018) forecasts indicating the expected large decline in replacement rates from the base part of the universal pension system. According to various estimates, the respective ratio will reach the level of approx. 30% in 2060. Poland was ranked with one of the worst results among the OECD countries.

The risk of retirement exclusion, i.e. either complete or partial deprivation of financial resources affecting the retirement age population, is becoming more realistic (Kondzielnik and Majka 2019). Such exclusion can be caused by endogenous and exogenous factors. The latter are beyond an individual's control, whereas the endogenous ones include reluctant attitudes towards accumulating additional retirement savings within the framework of the pension system voluntary part. This problem scale and possible consequences in the socio-economic sphere make it worth analysing, diagnosing, determining its reasons and investigating solutions.

In the context of the above discourse, the primary purpose of the article was formulated, i.e. identifying factors determining the accumulation of voluntary retirement savings. The realisation of the aforementioned purpose was based on providing answers to the below research questions:

- What is percentage of Poles who accumulate additional retirement savings?
- How many respondents have ever tried to find out/calculate how much capital they should accumulate to receive the retirement benefit at a satisfactory level?
- What is the level of financial literacy presented by the respondents regarding the issues related to the pension system?
- What factors determine the accumulation of voluntary retirement savings?

The following research methods were applied in the course of writing this article: critical analysis of the subject literature, diagnostic survey and logistic regression model. The data necessary to conduct the analysis were collected by the author during the nationwide survey studies carried out in September 2019 using CAWI (*Computer-Assisted Web Interview*) method. The research was financed from the statutory funds of the Department of Finance and Accounting at Wroclaw University of Economics and Business.

Selected Aspects of Accumulating Savings for Retirement Purposes

The subject literature defines the pension system from the perspective of an individual as a tool for allocating income or consumption smoothing over the life cycle (Barr and Diamond 2006; Blake 2006; Góra 2003). This process is carried out by using retirement savings, accumulated in the period of an individual's professional activity with the perspective of using them during retirement. Unfortunately, many countries worldwide face the so-called crisis of retirement savings (Rhee and Boivie 2015), which are increasingly lower and inadequate to the existing needs.

Polish pension system was reformed in 1999 and, as a result, pension funding based on the defined benefit principle was abandoned in favour of the defined contribution. This change transferred part of the responsibility for retirement income from the state/public system to the individuals. Current pension system consists of two parts: pay-as-you-go (PAYG) system, which is compulsory and managed by the Social Insurance Institution (ZUS), and the capital system, which is voluntary and the accumulated funds are entrusted to and invested by the selected private financial institutions.

The efficiency of the pension system is determined by both state-made pension decisions regarding the structure and principles of the pension system's public part and the individual pension decisions at the discretion of the person involved. Among the latter, F. Chybalski (2012) lists the decisions regarding: the participation scope in the voluntary pension system, the form of making savings, the choice of a financial institution offering pension products, the savings rate in the voluntary pension system, or the length of the saving period, including the decision to start and stop making savings.

Determinants of Saving for Retirement Purposes – Literature Review

The subject literature pays much attention to the analysis of household savings determinants (e.g. Brown and Taylor 2006; Salotti 2010; Rószkiewicz 2014; Adema and Pozzi 2015; Kolasa and Liberda 2015; Le Blanc et al. 2016; Beckmann 2019). Researchers from various countries are seeking answers to the question about the reasons for wrong retirement decisions, manifested in the absence or insufficient retirement savings, and thus low retirement benefits not meeting the pensioner's needs at a satisfactory level. The factors most frequently mentioned as responsible for this situation are as follows:

- economic factors (e.g. current income, owned financial and tangible assets) – people with higher income and permanent employment are more likely to make retirement savings, while those without their own property either rent it covering the respective costs, or take a mortgage, thus reducing their financial surpluses for retirement purposes from their current income (Kowalczyk-Rólczyńska 2017; Marcinkiewicz 2018; Vivel-Búa et al. 2019);
- psychological factors – the individual saving rate is significantly influenced by the attitudes towards saving, e.g., willingness to save, saving habits, self-control, temporal orientation, risk aversion, retirement anxiety (Hershey and Mowen 2000; Neukam and Hershey 2003; Rey-Ares et al. 2015; Glasman and Albarracin 2006; Finke and Huston 2013; Topa et al. 2018);
- financial literacy – people presenting higher literacy level and financial skills make more frequent voluntary decisions about retirement savings and their choices of pension products or financial institutions offering them are more accurate (Lusardi and Mitchelli 2007; Van Rooij et al. 2011; Czapiński and Góra 2016; Hsiao et al. 2016; Nolan and Doorley 2019; Elinder et al. 2019);
- managing personal finance ability, including retirement planning – people developing long-term saving plans set clear goals, they are more effective in accumulating retirement savings

comparing to those who refrain from retirement planning (Stawski et al. 2007; Rabinovich and Webley 2007).

Research Method and Sample Description

The research purpose defined in the introduction to the study determined the selection of variables for the econometric model. Y dependent variable (a person collecting voluntary savings for retirement purposes, where 1-success, 0-failure) is of dichotomous nature. Therefore, nonlinear analyses should be applied. The regression model used for this type of dependent variables takes the form of logistic regression (logit model), a binomial one in this case.

The candidates for independent variables were selected based on the previous research and the author's similar observations in the field of personal finance management (Solarz 2019) and the subject literature overview presenting research results of other scientists analysing this area.

In September 2019 the author carried out a survey covering a representative sample of 818 Poles. The obtained results were adjusted, using analytical weights, to the population of Polish residents ensuring representativeness regarding gender, age category, residence size class and education. After eliminating the contradictory and incomplete answers, 616 correctly completed questionnaires were qualified for further analysis.

Gender was the first parameter characterizing the research sample. Women constituted 48.9% of the surveyed population, men 51.1%. Information about the respondents' age is important for later analysis. The survey was addressed to people of working age only. The questionnaire was completed by 168 respondents aged 30 and younger, 151 aged 31-40, 130 in the range 41-50 and 167 were 51 or older, however, not over 60. A detailed distribution of the research sample by age is presented in Fig. 1. In terms of education, the smallest group of respondents (1.5%) indicated they had primary or lower secondary education, 6.8% – basic vocational, 44.0% – secondary and 47.7% – university education.

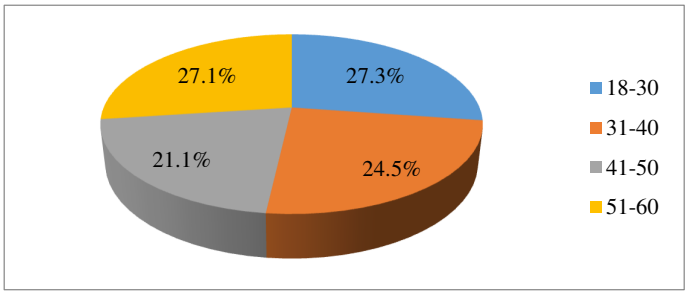

Fig. 1: Respondents by age

Place of residence was the fourth parameter describing the research sample. Most respondents (40.1%) declared living in rural areas and slightly more than a fifth (20.3%) indicated a city of 20,000 up to 99,000 residents. 12.3% of the respondents represented the population of the largest cities, i.e. over 500,000 residents, while small (up to 20,000) and large (200-499 thousand) cities were represented by – 8.9% and 10.1%, respectively. The least numerous group (8.3%) lived in cities populated by 100 to 199 thousand residents.

Considering the amount of net monthly income, 8.9% of the respondents earned less than PLN 1000, 26.4% declared their income in the range PLN 1001-2000, 29.9% received monthly remuneration at the level of PLN 2001-3000, 24.4% indicated earnings from PLN 3001 to 5000 and 64 (10.4%) individuals answered that their salary exceeded PLN 5000 per month.

In the first part of the survey, the respondents answered questions about their expectations regarding future pensions and the respective retirement decisions. The question "Do you make additional

retirement savings?" was answered positively by 247 people, i.e. 40.1%. Negative responses were provided by 369 out of 616 respondents (59.9%). These answers were used to encode the dependent variable (Y) of the model, where 1 stands for a person making voluntary savings for retirement purposes, and 0 – a person not making any voluntary savings for these purposes.

Several independent variables of demographic and socio-economic nature were selected for the analysis. They included: expected replacement rate, retirement awareness, retirement planning, gender, age, number of years before retirement, education, net income, place of residence.

After verifying their degree of variability (coefficient of variation over 30%), the candidates for independent variables were selected. Pearson's C and Cramer's V methods were used in correlation analysis. Finally, three nonparametric variables (Table 1) were adopted for further study, the most closely related to Y dependent variable and, simultaneously, the least correlated with each other. Since independent variables represent qualitative variables, they were presented in the form of zero-one variable systems, i.e. the variable with *m* variants was represented by *m-1* zero-one variables (which allowed avoiding the collinearity phenomenon).

Table 1: Independent variables included in the logistic regression model

Variable		Categories
X_1	– retirement planning	1 – a person who developed or attempted to develop an individual retirement plan; 0 (reference) – a person who neither developed nor attempted to develop an individual retirement plan
X_2	– net income	1 – a person whose net monthly income is equal to or higher than the average national salary; 0 (reference) – a person whose net monthly income is below the average national salary
X_3	– retirement awareness	4 – very high retirement awareness ($X_{3[4]}$); 3 – high retirement awareness ($X_{3[3]}$); 2 – average retirement awareness ($X_{3[2]}$); 1 (*reference*) – low retirement awareness ($X_{3[1]}$)

The first independent variable (X_1) is of dichotomous nature and was coded based on the responses to the question "Have you ever tried to find out/calculate how much capital you should accumulate for the future retirement benefit to be satisfied?" Only 170 out of 616 respondents (27.6%) answered "yes" and the variable for this group equals 1, whereas the reference value (0) for X_1 variable was assigned to 446 answers, i.e. 72.4% of the respondents who presented the opposite opinion.

The next variable (X_2) is dichotomous and divides the studied population into two groups: people with monthly net income equal to or higher than the average national net remuneration, i.e. PLN 3,000 (according to the Statistics Poland data (2019) the average monthly gross remuneration in Poland in 2018 was PLN 4094.98 (median), i.e. approx. PLN 2919.54 net) and the people whose remuneration does not reach this ratio. The first group covered 37.3% and the second one 62.7% of the respondents.

The third variable (X_3) refers to retirement awareness. To assess and manage risks associated with retirement decisions properly, the knowledge about the pension system functioning remains crucial. Ignoring basic issues, e.g., the defined contribution vs. the defined benefit system, PAYG vs. capital system, contribution periods, average life expectancy, seniority, retirement age, replacement rate, etc., can result in unrealistic expectations about the amount of future retirement and "lull into a false sense of security", thus resulting in inappropriate decisions regarding the accumulation of pension savings.

In order to determine the surveyed Poles' retirement awareness level, they were asked, in the second part of the questionnaire, to evaluate the truthfulness of 7 statements. Table 2 shows the received answers.

Table 2: Truthfulness evaluation of the statements regarding retirement problems

No.	Statement content	Correct answer		Incorrect answer	
		Number of indications	%	Number of indications	%
1	Using the "Start-up relief" by an entrepreneur opening a business means exemption from paying social insurance contributions for retirement, disability, accident, sickness and health insurance	489	79.38	127	20.62
2	Projected replacement rate of 35% means 65% of the last salary at retirement age	523	84.90	93	15.10
3	Sickness benefit periods are non-contributory in determining the retirement entitlement and calculating its amount	151	24.51	465	75.49
4	Reaching the retirement age entitles to at least a minimum pension	406	65.91	210	34.09
5	A woman and a man retired at the age of 65 presenting identical seniority and amount of retirement contributions, therefore they will receive the same pension	530	86.04	86	13.96
6	Retirement and disability pension contributions of the individuals receiving maternity allowance are financed from the state budget	166	26.95	450	73.05
7	After Joe Public's death, the funds remaining on his account in ZUS are inherited by his wife and/or children	490	79.55	126	20.45

The first statement referred to the contributions collected and redistributed by ZUS. Entrepreneurs starting a business can use the so-called "Start-up relief" and refrain from paying retirement, disability, sickness and accident contributions for the first six months. This relief does not, however, waive the obligation of sickness contribution payment, collected by ZUS and transferred to the National Health Fund. Most respondents (79.38%) evaluated the first statement correctly. It is worth emphasizing that the "Start-up relief" period is non-contributory and not included in calculating future retirement.

The simplest was the second statement truthfulness evaluation regarding the "replacement rate". Approx. 85% of the respondents understand its essence (Table 2). Assuming Poles' awareness of the available expert forecasts for the coming years, indicating the expected significant decline in replacement rates from the base part of the universal pension system down to even 30% in 2060, it seems surprising that the risk awareness is not manifested in retirement decisions about accumulating retirement savings.

75.49% of the respondents are unaware that, under Polish regulations, the periods of receiving sickness benefits are treated as non-contributory when calculating the pension amount (statement 3). Thus, this amount may be disappointing for people who reached the retirement age, but often took sick leaves. Moreover, only every fourth respondent (26.95%) knows that the maternity allowance is financed by the state budget (statement 6).

Reaching the retirement age, in Poland 65 for men, 60 for women, entitles to receive a pension, however, to reach the min. amount guaranteed by the state – PLN 1,100 in 2019 according to ZUS (2020) data, it is necessary to prove the contributory and non-contributory periods (women – 20 years, men five more years), with non-contributory periods representing max. one-third of contributory periods. 65.91% of the respondents evaluated the fourth statement as false, proving their knowledge in this regard (Table 2).

Next statement "A woman and a man retired at the age of 65 presenting identical seniority and amount of retirement contributions, therefore they will receive the same pension" was to diagnose whether the

respondents are aware that the retirement benefit amount depends not only on the accumulated capital, but also on life expectancy and the number of months they will receive pension. Statistically, women live longer and finish professional activity earlier, thus receiving lower pensions than men. 86.04% of the respondents answered correctly, evaluating the fifth statement as false.

The first pillar of Polish universal pension system is based on the principle of intergenerational solidarity, so ZUS's funds accumulated on insured accounts are not inherited. Only 20.45% of the respondents were unaware of it, which should be assessed positively (statement 7).

The financial literacy indicator about the pension system, i.e. arithmetic mean of the respondents' statements presented a slightly higher than average 4.47 level. The answers provided allowed encoding X_3 variable. The entire studied population was divided into 4 parts. The first included 124 respondents with low retirement awareness who answered max. 3 questions correctly (Table 3). The highest percentage – 35.88% referred to those with high retirement awareness who evaluated correctly 5 out of 7 questionnaire statements.

Table 3: Variable X_3 coding method – retirement awareness

Number of correct answers	Number of respondents	Percentage of respondents	Retirement awareness level
0-3	124	20.13	Low [1]
4	168	27.27	Average [2]
5	221	35.88	High [3]
6-7	103	16.72	Very high [4]

The next stage of logistic regression model construction was identifying research hypotheses determining the impact of specific factors (independent variables) on an individual willingness to accumulate voluntary retirement savings (dependent variable).

- H_1: Probability of accumulating additional retirement savings depends on the individual retirement planning activities;
- H_2: Probability of accumulating additional retirement savings depends on the individual net monthly income;
- H_3: Probability of accumulating additional retirement savings depends on low ($H_{3[1]}$), average ($H_{3[2]}$), high ($H_{3[3]}$) or very high ($H_{3[4]}$) individual retirement awareness.

Next, zero hypotheses should be formulated, negating the aforementioned probabilities. They assume no significant impact of dependent variables on Y variable.

Logistic Regression – Research Results

The logistic regression model should be verified in three areas: adjustment quality, individual hypotheses' significance and the theory predictive power. First, collinearity has to be performed. Cross-correlations between predictors clearly indicate weak relationships, not exceeding 0.2. Moreover, variance inflation factor (VIF) for all variables is below the critical value (VIF<3). Therefore, the undesirable collinearity can be ruled out.

The results of three subsequent adjustment quality tests of the logistic regression model are presented in Table 4.

Table 4: The model's goodness-of-fit coefficients

Test	Coefficient
Likelihood ratio test	-2log(L)=751.60
	χ^2=78.04 (df=5; p=<0.000001)
Hosmer-Lemenshow test	χ^2=5.39 (df=7; p=0.61)
R^2Nagelkerke	0.17

G statistics for model deviance amounts to 751.60, whereas $\chi^2_{citical}$ for α=0.05 and five degrees of freedom equals 78.04, making the test result statistically significant. Therefore H_0 can be rejected and allow adopting that the model is definitely better than the random one. The second – Hosmer-Lemeshow test result (1980) also confirms good model adjustment as it remains insignificant at 0.05 level, because $\chi^2_{critical}$ for α and seven degrees of freedom equals 14.07, whereas in the analysed case $\chi^2_{received} < \chi^2_{critical}$ (5.39<14.07) for p>α (0.61>0.05). The determination coefficient R^2Nagelkerke shows that 17% of the dependent variable variance is explained by the independent variables' variance. It proves the existence of variance percentage explained by other predictors absent in the model. To sum up, the theory confirmed the adjustment quality being better than the random model and providing a new explanation for the dependent variable behaviour.

Model adjustment quality test is followed by hypotheses verification. Table 5 shows the logistic regression results.

Table 5: Logistic regression results

Specification	coefficient β	β error	-95% CI	+95% CI	Wald statistic	p-value	odds ratio	-95%CI	+95%CI
intercept	-1.4779	0.2272	-1.9231	-1.0326	42.3197	<0.000001	0.2281	0.1462	0.3561
X_1	0.8195	0.1944	0.4385	1.2006	17.7722	0.000025	2.2695	1.5504	3.3220
X_2	0.7540	0.1806	0.4001	1.1080	17.4332	0.000030	2.1256	1.4919	3.0283
$X_{3[2]}$	0.7466	0.2623	0.2324	1.2607	8.0995	0.004428	2.1098	1.2617	3.5281
$X_{3[3]}$	0.2329	0.2541	-0.2651	0.7309	0.8404	0.359294*	1.2623	0.7672	2.0768
$X_{3[4]}$	1.4637	0.2957	0.8840	2.0433	24.4944	0.000001	4.3217	2.4206	7.7160

**p>0.05*

Variable X_1 – retirement planning is statistically significant at a high level (p<0.001), which allows rejecting H_0 about no influence of this predictor on the dependent variable and accepting an alternative hypothesis H_1 ($\chi^2_{critical}$ for α=0,05 and df=1 equals 3.842, Wald statistics reached the value of 17.7722 in the model). Odds ratio (OR) for the analysed variable is 2.2695 (Fig. 2), i.e. greater than one, demonstrating the stimulating, positive retirement planning impact on the accumulation of additional retirement savings. OR value can be interpreted as follows: the probability of accumulating additional retirement savings more than doubled (2.2695) if an individual tried to calculate the satisfactory capital level for the future retirement benefit. The variable confidence interval ranges from 1.5504 to 3.3220.

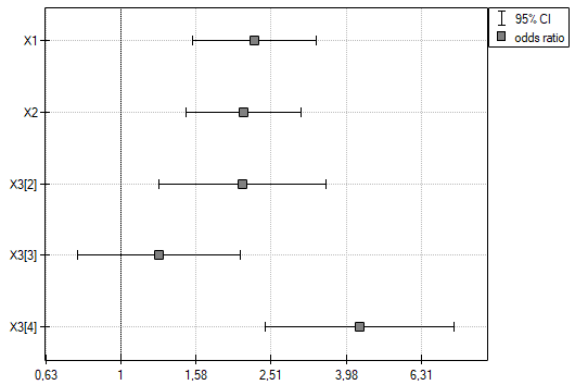

Fig. 2: Odds Ratio

Next variable X_2 – is statistically significant at a high level (p<0.001), which allows rejecting H_0 about its no influence on the dependent variable and accepting an alternative hypothesis H_2 ($\chi^2_{critical}$ for α=0.05 and df=1 equals 3.842, Wald statistics reached the value of 17.4332 in this case). OR for the analysed variable is 2.1256, proving the predictor's stimulating and positive impact on an individual's willingness to make additional retirement savings. Hence, people whose monthly net income is equal to or higher than the average national salary are more than double (2.1256) willing to accumulate additional retirement savings compared to those earning lower monthly salaries. The respective confidence interval ranges from 1.4919 to 3.0283.

Variable $X_{3[2]}$ – average retirement awareness is also statistically significant (p<0.0001), allowing to reject H_0 about no influence of this predictor on the dependent variable and accept an alternative hypothesis $H_{3[2]}$ ($\chi^2_{critical}$ for α=0.05 and df=1 equals 6.635, Wald statistics value for this predictor is 8.0995). OR for the analysed variable is 2.1098, i.e. higher than 1, proving the predictor's stimulating and positive impact on an individual's willingness to make additional retirement savings. This value can be interpreted that the probability of making additional retirement savings doubles (2.1098) with an average against low retirement awareness. Confidence intervals show that 0.95 probability allows expecting OR ranging 1.2617-3.5281 regarding retirement savings accumulation at average retirement awareness.

Variable $X_{3[3]}$ – high retirement awareness is statistically insignificant (p=0.359294), which does not allow rejecting H_0 about no influence of this predictor on Y dependent variable ($\chi^2_{critical}$ for α=0.05 and df=1 equals 6.635, Wald statistics value for this predictor reached 0.8404).

The last analysed variable $X_{3[4]}$ – very high retirement awareness is statistically significant, since p is below 0.05, which allows rejecting H_0 about no influence of this predictor on the dependent variable and adopt an alternative hypothesis $H_{3[4]}$ ($\chi^2_{critical}$ for α=0.05 and df=1 equals 6.635, Wald statistics reached 24.4944). OR for this variable is 4.3217, i.e. significantly higher than 1 proving the predictor's stimulating and positive impact on the individual willingness to make additional retirement savings. OR can be interpreted as follows: probability of accumulating additional retirement savings increases over four times (4.3217) along with a very high, comparing to low, retirement awareness. Confidence interval of the analysed independent variable ranges from 2.4206 to 7.7160.

The hypotheses' verification is followed by the model predictive power analysis. Table 6 shows the theory's classification capacity. The model (ACC) accuracy at 0.4 cut-off is 66.7%, thus higher comparing to the model with an intercept alone, confirming its added value. Other coefficients, i.e. sensitivity and specificity are C=53.4% and S=75.6%, respectively.

Table 6: Classification

Classification		Observed value		
		1 (positive)	0 (negative)	Σ
Predicted value	1 (positive)	132	90	222
	0 (negative)	115	279	394
	Σ	247	369	616

The model classified successfully about 67% of the decision classes, with 53% positive and 76% negative cases grouped correctly. Therefore, while the theory can well predict the attitudes of individuals unwilling to accumulate additional retirement savings, it is less successful in predicting preventive behaviours.

Based on sensitivity and specificity, ROC curve was constructed (Hosmer and Lemeshow 2000). The area under the curve (AUC) was 0.694 at $p<0.000001$, i.e. greater than 0.5, proving the model to be classifying cases better than the random one (Fig. 3).

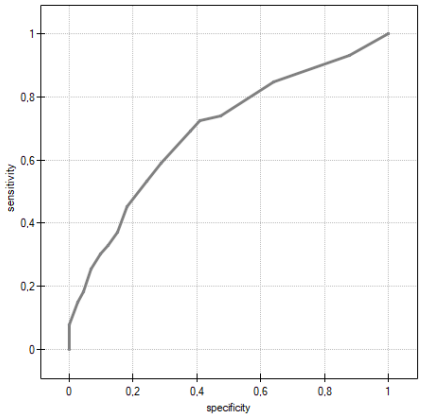

Fig. 3: ROC curve

In summary, making additional retirement savings is more probable for people with monthly net income equal to or higher than the national average, who decided to plan their retirement, presenting average or very high retirement awareness.

Discussion

The results of the author's empirical research allowed answering the question about the percentage of Poles accumulating additional retirement savings. Only 40.1% of the survey participants declared making savings on their own for the purposes of future retirement. The remaining respondents do not take up such activities, thus accepting the fact that their future retirement benefits will come from the public part of the pension system only, and according to the forecasts of OECD experts for 2060, it may amount to approx. 30% of the last salary. Therefore, their standard of living in retirement will clearly decline.

The fact that the savings accumulated by Polish households are growing should be assessed positively. At the end of September 2019 they amounted to PLN 1,518.9 billion – PLN 14 billion more than in the previous quarter. Approximately 70% of Poles declare making some savings which, for slightly over 24% of the respondents, range between 1-3 monthly net income (Pogorzelski 2019). Unfortunately, the study conducted by the Kronenberg Foundation at Citi Handlowy and the Think Foundation! (2018) showed that, in 2010-2018, only 12% of Poles saved additional retirement funds. According to the statistics of Polish Financial Supervision Authority (2019) regarding the voluntary part of the pension system, Poles accumulated PLN 25 billion for private pensions at the end of June 2019, of which PLN

12.8 billion is attributable to employee pension schemes (data for the end of 2018), PLN 9.5 billion for individual retirement accounts and PLN 2.7 billion for individual retirement protection accounts. For comparison, the total of PLN 2,000 billion was recorded in the public pension system. Concluding, the voluntary retirement savings made by Poles are still very small.

The next research question, presented in the introduction to the article aimed at identifying how many respondents have ever tried to find out/calculate how much capital they should accumulate to receive the retirement benefit at a satisfactory level. It turns out that only 170 out of 616 respondents (27.6%) provided positive answers. At the same time, it should be emphasized that among the decisive factors influencing the quality of individual retirement decisions was the retirement planning process (cf. Tab. 5), which facilitates taking optimal advantage of the available financial resources to accomplish life goals. In other words, financial planning means managing one's own money, allowing financial freedom and independence. Financial plan development helps in achieving financial, and also retirement, goals. It shows the pursuit and the individual's current situation (Samsel 2019). People who have a well-prepared retirement plan are aware of their decisions' effects, thus being more consistent and rational in their actions. Therefore, in the opinion of the article author, raising social awareness of retirement planning remains very important for future pensioners. It can be implemented individually or with the help of retirement consultants representing either public or private sector.

The respondents' assessment regarding the correctness of seven statements included in the questionnaire allowed determining their financial literacy level in terms of issues related to the pension system. On average, each of them assessed correctly the rightness of 4.47 out of 7 statements presented to them, thus the indicator of financial literacy level regarding the issues related to the pension system covering the analysed population was at a slightly higher than average level. In addition, the results of logistic regression clearly indicate that the probability of a given person saving additional funds for retirement does increase more than four times (4.3217) when their retirement awareness reaches a very high level, compared to the individuals presenting a low level of retirement awareness. The adequate level of retirement awareness provides the basis for making correct choices affecting the quality of future retirement. In this context, in the opinion of the article author, all information activities and the properly targeted comprehensive financial education are very important. They support individuals in understanding the essence of financial products and services to make informed choices, avoid traps and ask for advice to improve their current and future financial wellness (Musiał and Świecka 2016). It is desirable to intensify the activities carried out by various state institutions, offices, schools and universities providing retirement education for Poles.

The answer to the last research question, a most important one from the perspective of achieving the research objective, i.e. "What factors determine the accumulation of voluntary retirement savings?" was provided by the results of the analysis carried out using the logistic regression method. Based on an overview of domestic and foreign scientific research addressing the factors determining the accumulation of voluntary savings for retirement purposes, several demographic and socio-economic variables were selected. At the same time, the results of own research clearly show that the accumulation of additional retirement savings in the surveyed population depends on the amount of net monthly income, taking up activities related to retirement planning and the level of retirement awareness presented by future pensioners. Other factors, i.e. the expected replacement rate, gender, age, number of years till retirement, education or place of residence turned out to be statistically insignificant.

Conclusion

The end of professional activity and the subsequent retirement is an important moment in everyone's life. The amount of retirement benefit, directly determining the level and quality of the senior citizen's life, depends on the retirement decisions taken in the period of performing paid work. The presented scientific article is focused on the problem of insufficient retirement savings accumulated voluntarily by future pensioners, and the author seeks to answer the question about the factors determining such financial behaviour. The obtained results of conducted empirical research allow making the statement that making additional retirement savings is more probable among people with a monthly net income

equal to or higher than the national average (odds ratio 2.1256), who have taken appropriate measures connected with retirement planning (odds ratio 2.2695), and their retirement awareness presents average (odds ratio 2.1098) or very high level (odds ratio 4.3217). The answers to the research questions formulated in the article introduction act as an incentive for conducting further scientific research, which could cover assessing the risk awareness taken into account by Poles while making their retirement decisions.

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Internal Audit Development Priorities in Russia

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Abstract

Relevance. In the context of the financial and economic crisis that has covered almost all areas of activity, the importance of internal audit in the commercial management system is growing. In this regard, the practice of companies forming an internal audit system deserves special attention. Research objective: Based on the data on the internal audit departments of four agricultural holdings operating in the Russian Federation, to identify the main constraints of the development of these services; identify perspective directions of their development with a projection on the vast majority of Russian companies. Research methods: In the research process, general scientific and economic-statistical methods were used: classification, grouping, method of expert assessments, comparative analysis, generalization. Achieved results and significance of the study: the features of the implementation of internal audit in Russian companies are revealed, the main obstacles and current directions of its development are identified. The authors of the study concluded that the determining requirement for the development and improvement of the internal audit system today is precisely the interest of owners and senior management of a company.

Keywords: Internal Audit; Internal Audit Service; Business Processes; Corporate Governance Planning.

Introduction

Sustained interest in internal audit is due to the absolute desire of owners and senior management to streamline the company's business processes. Despite the fact that today internal audit services exist in almost all large and medium-sized companies, the role of internal audit in the corporate governance system remains clearly underestimated. At the same time, an optimally built system of

internal control at the enterprise is an effective tool to identify promising reserves for improving business efficiency.

Materials, Methods and Research Conditions

For processing and systematization of information, classification method, grouping, expert assessment method, comparative analysis, and generalization were used. When conducting this study, we relied on educational materials, works of domestic economists on auditing, as well as international standards of audit. The information base was the internal regulations, methodologies, regulations, working papers of the internal audit and reporting service of a number of public companies.

Research Results and Discussion

The mission of the company's internal audit department is to assist senior management and the board of directors by providing them with an objective, independent judgment on the appropriateness of the implemented internal control and risk management system. Internal audit performs its functions based on a systematic audit of aspects of company's business activities.

The status of the internal audit service, the nature of its employees responsibilities, can vary greatly depending on the size and structure of organization itself, as well as the requirements of management and authorized representatives of company owner.

To conduct this study, we obtained data on the internal audit departments of four agro-industrial holdings operating in the Russian Federation. We evaluated the internal audit service in the companies we selected taking into account the responsibilities of its employees and directly the place of this service in the organizational structure of the enterprise itself.

Conducted research allowed us to draw the following conclusions.

The internal audit service is a function that confirms to shareholders through the board of directors and management that the Group's internal control systems are reliable and effective as a matter of principle and in practice, and is also the center of expertise for all aspects of internal control.

According to the policy, in recruitment, internal audit and control services hire specialists only with higher economic education and at least 3 year work experience in this field. From applicants for the position, mandatory certificates in internal control and auditing are not required. The staff turnover in the internal audit and control service is low, the staff of the internal audit service is constant. At the quarterly Audit Committee, internal auditors report on the work accomplished and the bad-faith actions identified, along with the measures taken to eliminate them.

The Audit Committee monitors results of the work of internal auditors by discussing the report on the work done.

After reviewing matrices of controls on business processes in these companies, we concluded that the internal audit department receives appropriate and sufficient audit evidence for making reasonable conclusions. The conclusions drawn and the prepared reports correspond to the actual results of the work, since the internal audit department is independent from other business units.

To assess the objectivity of the work of internal auditors, we considered the following issues:

1) The status of the internal audit service in the organization and its impact on the objectivity of the internal auditor's judgments – internal auditors of a number of companies are under the organizational control of the financial director, that definitely affects the objectivity of the information presented in the report.

2) Is there a duty on the internal audit service to report to authorized representatives of the owner or to persons with appropriate authority, and whether internal auditors have the direct access to these persons – internal auditors have unrestricted access to the board of directors and submit quarterly reports to the Audit Committee on the work done, identified misstatements, reserves for improvement and related recommendations.

3) Do the internal auditors have any responsibilities that contradict each other - the internal audit staff do not simultaneously hold positions in other functional units, we analyzed the organizational structure of the service and found that the responsibilities of employees are strictly delineated and do not contradict each other;

4) Do authorized representatives of the owner supervise the employment decisions regarding the internal audit service - the Audit Committee under the board of directors approves candidacy of the head of the internal audit department, who provides the financial director with employees;

5) Are there any restrictions or pressure on the internal audit service from the management or authorized representatives of the owner – this issue is difficult to evaluate due to the lack of information;

6) Does management act in accordance with the recommendations of the internal audit service, as well as the extent to which such recommendations are implemented and how this action is confirmed - the heads of the audited departments act according to the recommendations and, according to the adopted schedule, report to the internal auditors on the work done.

To assess the technical competence of internal auditors, the following issues should be reviewed:

7) Have the auditors completed the appropriate technical training and do they have the necessary professional skills – internal audit department employees regularly attend professional trainings and always have qualification certificates;

8) Whether there is an established policy for internal auditors hiring and training - companies have written conditions and criteria for employees recruitment in the internal audit department, as well as procedures for training new employees.

To assess the professional diligence of internal auditors, the following issues should be considered:

9) Whether activities of the internal audit service are properly planned, controlled, checked and documented - the internal auditors act according to the adopted plan, which sets out the goals that they pursue. Control over the activities of internal audit is carried out by Audit Committees;

10) Are there audit manuals or other similar documents, work programs and documentation on internal audit, and how appropriate are they - internal auditors have internal audit methodologies and procedures, a description of testing procedures (Plaskova, Mosoyan, 2019).

To assess the possibility of exchanging information between internal auditors with other divisions of the Group and external auditors, the following issues should be considered:

11) Are there regular meetings of internal auditors with functional units to discuss testing procedures;

12) Do they receive consultations and do external auditors have access to the relevant reports of internal auditors, do they inform them of all significant violations identified during internal audits.

Based on the information studied, we came to the conclusion that the internal audit service in the selected agricultural holdings was organized properly. Internal auditors act in accordance with the goals prescribed in the annual plans, regularly present reports on the work done to representatives of

company owners. Employees of the service have relevant economic and technical knowledge, skills for conducting their inspections, and do the necessary qualification trainings throughout the year. The internal audit function is independent of the functional units.

An internal audit activity is effective, if the service provides representatives of company owners and senior management with the necessary confidence, especially on such issues that management can rely on the systems and processes of the enterprise in the field of risk management to achieve their goals. This is equivalent to providing guarantees regarding the possible risks of the enterprise.

We assessed the performance of internal audit departments by calculating the quantitative indicators presented in table 1.

Table 1: Traditional evaluation methods

Criterion / Indicator	Accomplishment
Audit plan implementation rate	97%
Number of checked objects	Above 8%
Recommendations provided and implemented	92%
Survey results of audited departments (from 0 to 5)	4.4
Internal audit department budget	3% below budget

As we can see, the given example of quantitative indicators characterizes the work of internal audit services as effective. However, it is not correct to rely only on this data, since the risks may change significantly during the period and do not correspond to the accepted audit plan.

According to a survey presented by the PricewaterhouseCoopers audit company, only 48% of users of reports and performance of internal auditors do indeed consider internal audit to be a serious business consultant. This number has significantly declined compared to previous periods, which is mainly due to the fact that owners and management expect to receive more benefits from internal audit activities than were recorded (State of the Internal Audit Professional Study, 2017).

Our study showed that the main shortcoming of using internal audit in companies today is its use only in terms of verification and confirmation. In our opinion, for a proper assessment of the internal audit activity, it is necessary to consider the internal audit as a structure that is part of the company's management system and allows to influence the decisions made by the management and contribute to their forecasting.

We believe that in large enterprises, holdings, the internal audit department should be centralized. The centralization of internal audit provides a single management vertical on the part of owners and the board of directors. With centralization of internal audit, a unified department development strategy is introduced, which takes into account the group’s strategy, goals and coordinates activities according to its structure; unified methodology and criteria are used in the analysis of individual companies and divisions of a holding company.

Qualification of the auditor is highly important. Representatives of owners, top management consider it important that the internal auditors have specific, technical knowledge inherent to this business, in addition to their economic knowledge and professional skills. The internal auditor should become a specialist who identifies risks and implements appropriate systems and mechanisms for their control. We recommend creating subdivisions within the internal audit service that will specialize in particular issues and produce the best result in synergy. For example, a group responsible for information technology risks, a group specializing in accounting, etc. can be created within the internal audit department.

Definitely, discussing issues with senior management on the identification and management of strategic risks is a crucial stage for the head of the internal audit department. Regarding the issues of expanding the scope of activity of internal auditors and going beyond traditional financial, operational, compliance risks to the strategic level, the owners and top management of the enterprise should also be interested and prepared. Board of directors and senior management do not always recognize the role of internal audit in matters related to strategic risks. In this direction, internal auditors need to carry out active awareness-raising activities. In its development, internal audit should be one step ahead of business development, but not to be behind it.

Conclusion

In the context of modern economy, the role of internal audit and internal control in the system of commercial management is strengthened. Undoubtedly, the future of internal audit in Russian companies largely depends on whether it is able to deeply understand the company's business, whether it can play an active role in risk management, and whether it is able to reach a level of strategic risk management quality assessment in his activity (Golubeva, 2017). At the same time, in our opinion, the main and paramount condition for the development and improvement of the internal audit system is precisely the interest of the owners and senior management of the company.

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What Will You Be Like Doctor 'Z'? – The Results of Research on Medical Students in Poland

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Abstract

Medical universities in Poland are attended by students who are representatives of generation 'Z'. The first doctors of this generation are also preparing to enter the labour market. Academic literature as well as business practice provide evidence that the generation ‘Z’ differs significantly in many respects from representatives of generations 'Y', 'X' and 'Baby Boomers'. The purpose of this paper is to recognize the life values, motivations and expectations of future doctors who are representatives of generation 'Z'. These factors determined their choice of medical studies and the decision to practice medicine.
The authors of this paper used two research methods. In the theoretical part the applied method consisted in analyzing Polish and foreign state-of-the-art. In the empirical part the authors used the results of the survey conducted among final year medical students at the Wroclaw Medical University, Poland. The study was conducted in the second quarter of 2017 (n = 152) and in 2018 (n = 170). The obtained results allowed the authors to outline the profile of the future doctor 'Z'. The profile shows that individuals who are preparing themselves for the role of doctors are very different from representatives of previous generations. They have a different hierarchy of values and are guided by different needs and motivations. They exhibit a different approach to learning, work, leisure or development, etc. Gathering and using the knowledge on this subject is very important for health educators, policy planners and makers and health workforce managers.

Keywords: health care system, generation 'Z', motivation, expectations, medical students, Poland.

Introduction

Health is one of the basic goods valued in Polish society. Over half (57%) of Poles believe that maintaining good health, along with family happiness, is one of the most important values in life (Public Opinion Research Center, 2016). The country's health care system (HCS) plays an important role in delivering this value. The purpose of this system is to promote and maintain public health. The results of inspections carried out by Supreme Audit Office (2019) in recent years show that the HCS in Poland is in poor condition. It does not sufficiently ensure efficient use of public funds, creates problems for managers of medical entities and their personnel, and above all is not very patient-friendly. Unfortunately, the HCS in Poland is also reported to be taking one of the last places in the international rankings in European Union (EHCI, 2018; OECD/EC, 2018). Poles themselves also share negative feelings about the system. According to opinion polls, as many as 93% of Poles negatively assess the functioning of the health service (Public Opinion Research Center, 2018).

Doctors play an important role in the HCS. This profession in Poland falls into the group of professions of public trust. Thus, it is attributed with the requirement to complete university studies, continuously develop knowledge and possess very high competences (Barcikowska-Szydło et. al, 2014). These high requirements are difficult to meet while working in the conditions of the existing HCS in Poland. The community of doctors is almost always examined and presented in the context of its weaknesses. Over 60% of surveyed Poles say they appreciate the medical competence of Polish doctors, both in the diagnosis and treatment of diseases. Every fourth respondent presents the opposite opinion. Poles are strongly differentiated in terms of their assessment of doctors' commitment to work and in terms of trust and confidence in doctors. Only 43% of respondents believe that doctors are committed to their work, compared to 45% who disagree with this opinion. Over 40% of respondents say they have little confidence in doctors. Additionally, it is worth emphasizing that the respondents assess the level of soft competencies of doctors very low, including primarily their communication with the patient (Kilijanek-Cieślik, 2018).

Other serious problems concerning the environment of doctors include: their low number (an average of 2.4 doctors per 1,000 inhabitants (OECD/EC, 2018)) and the dynamic aging of this professional group - with the average age of 52 years (Statistic Poland, 2018). At the same time insufficient number of young doctors enter the Polish labour market, which is caused, among others, by admission limits to medical universities, difficult access to specialization and economic emigration of young doctors. Bearing the above in mind, the entities responsible for the quality of the HCS in Poland have to face numerous problems of various nature. Rational planning of medical staff becomes one of priorities. The cooperation of these entities with the education sector is of key importance, specifically as regards rational planning of the number of admissions to medical studies (Statistic Poland, 2019).

According to the authors of the paper the above issue is of particular importance as medical universities admit representatives of generation 'Z' these days and that the first graduates of this generation enter the labour market. Many researchers emphasize that generation 'Z' is very different from its predecessors - the 'Baby Boomers', generations 'X' and 'Y'. They were born in the 1990's and raised in the 2000's during the most profound changes in the century. The representatives of generation 'Z' form the first social group that does not know the world without computers, mobiles, internet or electronic gadgets (Singh and Dangmei, 2016). They are not familiar with the analog world and its logic. They can function alongside in the real and virtual worlds. In their opinion, these two worlds are complementary (Chomątowska and Żarczyńska-Dobiesz, 2014). Most representatives of generation 'Z' cannot imagine their lives without new technologies or internet to which they are connected 24/7. The literature on the subject underlines the high potential of this generation, related to its creativity and fluency in the use of modern technologies (cf. Hardey, 2011; Sidorcuka and Chesnovicka, 2017). Apart from 'Z's strengths, their weaknesses are also pointed out. They are addicted to modern technologies. Living online impairs their verbal communication skills as well as the ability to make interpersonal contacts in the real world. They also

have problems with concentration, their attention is diffused, and the analysis and assessment of information is very superficial (see Friedrich and Peterson 2010; Mizuko, 2008; Csobanka, 2016). For these reasons they are referred to as overwhelmed, overcommitted, overconnected (Elmore, 2016). According to Twenge (2019), the representatives of generation 'Z' are afraid that in such a competitive environment "they will not enter the game" and they will not have a good job. They go to college to get a better job and earn more. The representatives of generation 'Z' often raised by over-protective parents need similar behaviors on the part of teachers, lecturers, and superiors (Chomątowska and Żarczyńska, 2016), who will have to act like trainers, coaches expected to provide support, comfort and clear instructions and tips (Twenge, 2019). 'Zs' are frequently characterized by contradictory features, thus can be referred to as "the generation of paradoxes". At the same time they are: open and closed, brave and fearful, expecting a lot from others and "energy saving" on their part (Sladek and Grabinger, 2014; Tulgan, 2009; Chomątowska and Żarczyńska, 2016).

In view of the above it is important to get to know and understand the youngest generation of future doctors, to see what they are like, to learn about values and expectations they hold on to, to understand what motivates them and why they behave this of that way. It will directly influence the kind of doctor the representative of generation 'Z' will become and how this young doctor will find his way in the Polish HCS. Therefore, the purpose of this article is to recognize the life values, motivations and expectations of future doctors - representatives of generation 'Z' regarding their choice to study medicine and enter the medical profession. This article presents only a fragment of a more extensive research conducted by the authors among the students of the Medical University in Wroclaw, Poland.

Research Methods

Research methods consist of two parts. The reviewed literature posed a theoretical basis for conducting an empirical research with the aim to recognize and designate the problem. The method applied in the theoretical part consisted in reviewing the existing Polish and foreign literature, statistical reports and official reports published by organizations. The empirical part presents the results of survey conducted by the authors among the students at the Medical University in Wroclaw, Poland. The study covered a period of two years and was conducted in the second quarter of 2017 and in 2018. The selection of the research sample was intentional due to the authors' interest in the profile of people who graduate from medical studies. Their opinions, declarations and experience in the field of issues considered within the article can be treated as the most mature, thought-through and current. Hence, the respondents were students of the last, i.e. sixth year of study at the Faculty of Medicine, just before graduation, respectively in 2017 (n = 152 of 244 students registered in 2016/2017) and in 2018 (n = 170 of 218 students registered in 2017/2018). The respondents are representatives of generation 'Z'. The demographic characteristics of the research sample are presented in Table 1.

Table 1: Research sample characteristics

Variable	Percentage point
Total N	N=322
Gender	
Woman	57.8%
Man	42.2%
Mean age	25.3

Residence before entering University	
Rural areas	9.3%
Small city (<20 k.)	15.5%
Medium city (20-100 k.)	28.6%
Large city (> 100 k.)	46.6%

Source: study based on the self-conducted research.

Participation in the survey was voluntary and anonymous. Data shown in this article is based on students' responses/declarations. The object scope concerned selected issues related to the key life values of future doctors as representatives of generation 'Z', their motivations and expectations regarding the choice of medical studies and practicing medicine.

The questionnaire used in the research was complex. This article presents the results of only selected issues related to the topic under consideration. The part of the questionnaire, related to the issues, consisted of closed questions. The respondents used a 4-point type scale to assess several items asked in the questionnaire. Depending on the characteristics of the question the 4-point scale offered the following sets of answers *(1- 'unimportant'; 2- 'of little importance'; 3- 'important' 4- 'very important')* or *(1- 'definitely not'; 2- 'probably not'; 3- 'rather yes'; 4- 'definitely yes').*

For the purposes of this article the following research questions were formulated:

RQ 1. What life values, motivations and expectations drive future doctors who represent generation 'Z'?
RQ 2. Which of the identified life values, motivations and expectations may rise concerns from the viewpoint of practicing the medical profession?

Empirical Results

The first question addressed to future doctors concerned their life values. The respondents assessed each value on a 4-point scale: *very important, important, of little importance* and *unimportant* (Table 2).

Table 2: Evaluation of importance of life values by respondents in percent points

Value	Evaluation of importance			
	very important	important	of little importance	unimportant
work	15.5%	73.3%	11.2%	0.0%
family	72.0%	25.5%	1.9%	0.6%
health	75.2%	22.4%	2.5%	0.0%
religion	19.9%	23.6%	24.8%	31.7%
friends	49.7%	45.3%	5.0%	0.0%
personal development	49.1%	47.2%	3.7%	0.0%
pleasure	57.8%	27.3%	14.3%	0.6%
responsibility	34.2%	52.2%	13.0%	0.6%

Source: study based on the self-conducted research.

The analysis of table 2 leads to the observation that 3/4 of future doctors representing generation 'Z' attribute most value to: *health* (75.2%) and *family* (72.0%). More than half of the respondents consider *life pleasures* (57.8%) very important. Further places in the ranking of the most important values are taken by *friends* (49.7%) and *personal development* (49.1%). In view of the above *responsibility* is very important only for 1/3 of respondents (34.2%), and it is important for every second (52.2%) future doctor from generation 'Z', while for almost every eighth respondent *responsibility* is of little importance. Some analogy can be seen in the value of *work.* It is very important only for every sixth respondent (15.5%), and for almost ¾ (73.3%) of future doctors it is only important. Note that the indications regarding the last analyzed value, i.e. *religion*, were the most diversified. Analyzing the significance of *religion,* for ¼ (24.8%) of respondents it is of little importance, and for nearly 1/3 (31.7%) completely unimportant.

The next question addressed to future doctors concerned their internal beliefs about the choice of medical studies. According to the collected responses as much as 93.8% of respondents considered the choice to be thought-through and conscious. Only 6% admitted that the choice was incidental. The continuation of the above question was to identify the motivations that prompted students to undertake these specific studies. These premises are of particular importance in the faculty of medicine. Several motivations were analyzed in detail (Table 3).

Table 3: Evaluation of the validity of motivations determining the decision to choose medical studies according to respondents in percent points

Motivation	Motivation importance evaluation			
	very important	important	of little importance	unimportant
security of employment in the acquired profession	49.1%	47.8%	2.5%	0.6%
decent remuneration	32.9%	57.8%	7.5%	1.9%
high remuneration	20.5%	58.4%	18.0%	3.1%
appreciation/recognition by others	46.6%	39.1%	11.2%	3.1%
prestige of the profession	24.2%	52.2%	18.0%	5.6%
desire to help others	46.0%	42.2%	8.7%	3.1%
desire to fulfil own dreams	36.0%	39.8%	15.5%	8.7%
development of interest in natural science	54.0%	38.5%	6.8%	0.6%
suggestions from family members	8.1%	17.4%	40.4%	34.2%
suggestions from others	5.0%	7.5%	34.8%	52.8%

Source: study based on the self-conducted research.

While analyzing the degree of importance of individual motivations for the respondents it seems evident that some motivations are particularly distinguishable. The most important motivation was the *security of employment in the acquired profession*. Almost all respondents (96.9%) declared this assigning this premise to very important (49.1%) or important (47.8%). Equally high appreciation was gained by (Table 3):

- *development of interest in natural science*. As many as 92.5% of respondents considered this premise very important (54.0%) or important (38.5%);
- *decent* (90.7%) and *high remuneration* (78.8%). In this aspect, it is worth considering two issues. First, *decent remuneration* turned out to be more important for respondents compared to *high remuneration*. Secondly, there is a consensus of the opinions that both motivations are more frequently declared as important than very important;
- *desire to help others*. Despite the relatively high total indication of the importance of this motivation, amounting to as much as 88.2%, for almost half (42.2%) of future doctors from generation 'Z' this motivation is not very important but only important. In addition, for almost every

tenth of respondents, this premise is considered to be of little importance (8.7%) or unimportant (3.1%);

- *appreciation/recognition by others*. This premise proved to be at least important for 85.7% of respondents, including almost half of the respondents (46.6%) who marked it very important and 2/5 (39.1%) who marked it important. It is worth noting that such a percentage of indications makes this motivation almost as important for future doctors as the *desire to help others*. Therefore, it may seem justified that for more than ¾ (76.4%) of the respondents, another of the analyzed motivations i.e. the *prestige of the profession*, was of great significance while choosing the field of study.

In view of the above the following two motivations with definitely lower indications also deserve attention: *suggestions from family members* (25.5%) and *suggestions from others* (12.5%). For ¾ (74.6%) of the respondents, the *suggestions from family members* were of little importance (40.4%) or completely unimportant (34.2%). *Suggestions from others* had even lower impact on the respondents' decisions (respectively: of little importance (34.8%); unimportant (52.8%)).

The above research thread was followed through further questions in the survey. The questions concerned the respondents' satisfaction with the chosen field of study, as well as the evaluation of benefits achieved through the studies. The individual benefits were assessed on a 4-point scale: *definitely yes*, *rather yes*, *probably not* and *definitely not*. Despite the fact that over 80% (81.4%) of respondents were satisfied with their choice, nearly every fifth respondent (18.6%) did not share this opinion. The relatively high degree of satisfaction with the choice of medical studies is reflected in the collected indicators regarding the benefits obtained by the respondents (Table 4).

Table 4: Evaluation of the degree of benefits obtained from higher education according to respondents in percent points

Benefits from studying	Evaluation of obtained benefits			
	definitely yes	rather yes	probably not	definitely not
theoretical professional qualifications	6.2%	68.9%	21.1%	3.7%
preparation for practical work	2.5%	14.3%	57.1%	26.1%
preparation to an adult life	16.8%	51.6%	23.6%	8.1%
preparation to teamwork	10.6%	52.2%	29.8%	7.5%
development of the need for continuation of learning	17.4%	52.2%	22.9%	7.5%
development of personality	23.6%	42.2%	23.6%	10.6%

Source: study based on the self-conducted research.

Analyzing the 'definitely yes' and 'rather yes' indications, it is concluded that the respondents are mostly satisfied with: *theoretical professional qualifications* (definitely yes - 6.2%; rather yes - 68.9%), *preparation to an adult life* (16.8%, 51.6%, respectively), as well as with *preparation to teamwork* (10.6%, 52.2%, respectively). In addition, they strongly feel the *need for continuation of learning* in the medical profession (17.4%, 52.2%, respectively). In their opinion, the studies also helped them *develop and shape their personalities* (23.6%, 42.2%, respectively). It is worth noting that in Table 4 one can notice much higher indications of the 'rather yes' rating in comparison with other answers. As many as 83.2% of respondents believe that they are not well *prepared for practical work*. The last important question of the questionnaire was related to confirmation or denial of the desire to work in a learned profession. Despite anxiety and uncertainty about professional practice mentioned by the respondents, the vast majority (92.6%) would like to work in the medical profession. Only few people did not give an unequivocal answer, choosing 'I do not know' (5.6%) or 'intend to work in another profession' (1.9%).

Discussion and conclusion

Motivations that make young people decide to study medicine have been researched for many years. As emphasized by Gąsiorowski et al. (2015), in this respect researchers analyzed applicants to medical school (McManus et al., 2006), freshmen (Vaglum et al., 1999; Draper and Louw, 2007), final year students/graduates (de Vries et al., 2010; Dastjerdi et al., 2012) and students in selected years (Drinkwater et al., 2008; Amin et al., 2009; Pastor et al., 2009). The results of these studies are often inconsistent. Until now, no such analyzes have been carried out from the perspective of generations. No consideration has been taken about how the above-mentioned choices of medical students are influenced by the fact that they belong to a particular generation, e.g. generation 'Z'? How belonging to the generation will affect what doctors they will become? What challenges does it pose for decision-makers within the HCS, for the education system, but also for health workforce managers?

The authors believe this is an interesting research area. Particularly as the experience of both employers and the authors of the article shows that 'Z' is the most problematic generation of employees (Twenge, 2019). They need different methods of human capital management and working conditions than generation 'BB', 'X' and 'Y' (Deloitte, 2018; Chomątowska and Żarczyńska, 2014).

The research conducted by the authors of the article allows to outline the profile of the future doctor from generation 'Z'. *Health* and *family* are the highest rated values. Further places in the ranking of the most important values are occupied by *pleasures, friends* and *personal development* (Table 2). *Work* and *responsibility* are only important. Given the nature of the future medical profession, the identified hierarchy of values raises concerns. Similar conclusions can be drawn regarding the motivations that determined the decision to enter medical studies. While the very decision to study medicine was conscious for Dr.'Z', the motivations that governed him raised some concerns of the authors (Table 3). The biggest concerns pertain to a relatively low rating of *the desire to help others* in relation to relatively high ratings of *the amount of expected salary*, *the need for recognition/appreciation by others* and *the prestige of the profession*. These motivations may adversely affect the later professional life of Dr.'Z', especially as regards his attitudes and behaviors towards patients and building proper relationships with them. The future Dr.'Z' highly rated motivations such as: *security of employment in the acquired profession*, *development of interests in natural science* and *desire to fulfill own dreams*. *Suggestions from family members* and *suggestions from others* are of little importance to him in this context. It is worth emphasizing that the future doctor 'Z' is satisfied with his studies. He particularly appreciates being prepared for medical profession from theoretical standpoint (Table 4). Then in order: *preparation to an adult life* and *preparation to teamwork*. In addition, the studies developed his personality and made him aware of the need for continuation of learning. Unfortunately, the future doctor 'Z' rated low the degree to which the studies prepared him for the profession from the practical point of view, he is not quite sure of his competence. Hence, he feels some anxiety and stress resulting from the need to start working. The appearing image of the future doctor 'Z' falls under the general characteristics of generation 'Z' presented in the literature on the subject. The future doctors under study would like their professional life not to be burdensome and not to interfere with everyday comforts. They do not value work as the most important. They want to pursue their hobbies, interests and dreams. They expect a "return on investment" made during many years of difficult medical studies. Although they have precise expectations, they are apprehensive about their future as doctors.

It is difficult for the authors of the article to give an explicit answer to the question "What will you be like Dr.'Z'?". Undoubtedly, the professional group will be enriched by representatives of generation 'Z' in coming soon. They adhere to a different hierarchy of values, they are guided by different needs and motivations. They exhibit a different approach to learning, work, leisure or development. Therefore, will they find their way in the difficult conditions of the current HCS in Poland, will they meet the growing needs of patients? These questions intrigue and motivate the authors to conduct further, more in-depth research in this area. Finally, it should be emphasized that it is important not only to acquire knowledge

about representatives of generation 'Z', but also for older generations to try to understand them, search mutual compromises and learn each other. Ignoring or expressing disapproval of their differences brings about a risk of frustrated and demotivated employees, which in particular in relation to the medical profession can have serious consequences. This is a very important information for health educators, policy planners and makers and health workforce managers.

Due to the limitations of the research sample it is valid to underline that generalizing the research results must be done with caution.

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Configuring Organisational Resources and Coordinating Business Operations in the Practice of Polish MNEs: Towards Excellence in International Management?

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Abstract

The starting point for discussion in the paper is the belief that being present on international markets offers only an opportunity, not a guarantee, of benefiting from internationalisation, in particular in relation to the most advanced transaction "Ot" advantages (according to the OLI paradigm). Thus, the following paper focuses on two main aspects of international management, i.e. the spatial configuration of organisational resources and the coordination of business operations, which both largely condition benefits from multinationality. The main purpose of this study is to assess the degree of resource configuration and activity coordination among MNEs representing the so-called latecomers in the global economy (in this case MNEs from Poland). In order to achieve this goal, we use firm-level data obtained from a survey conducted among Polish MNEs and their foreign affiliates. Our findings indicate that resource configuration and activity coordination are limited among the surveyed enterprises (they remain at a medium level). Although Polish MNEs report benefits from undertaking international activities, the majority of them are not yet able to maximise the results at the current stage of their development.

Keywords: Multinational enterprises, MNEs, Organisational resources, Business operations, Configuration, Coordination, International management, Latecomers in the global economy, FDI

Introduction

Internationalisation of enterprises is guided by various reasons (Jaworek et al. 2019: 2–9). However, looking at the motives driving foreign expansion, it can be considered in its four basic variants, i.e. as (Dunning 1998: 53; 1993: 56; 2000: 164–165): resource-oriented, market-oriented, efficiency-oriented, and strategic asset or capability-oriented. It must be stressed – as Dunning and Lundan (2008b: 68) point out – that many multinational enterprises (MNEs), especially the larger ones, frequently pursue multiple objectives when engaging in foreign expansion that combines more than one of the above categories. According to the eclectic theory of international production (the OLI paradigm), meeting these objectives will be possible mainly thanks to the appropriate use of the so-called specific ownership (or proprietary) "O" advantages, i.e. unique firm-specific assets, both tangible and (largely) intangible, which are not available or not available at such favourable terms, to other enterprises (Dunning 1993: 80; Markusen 1995: 174–175; Rugman 2010: 2).

The concept of "O" advantages has changed over time (Eden: 280–291; Eden and Dai 2010: 13–34), starting with the most traditional view (Dunning 1981: 27), through approaches that integrate different perspectives – including new forms of international business (Dunning 1995: 461–491), strategic management theory (Dunning 1998: 13) or institutional theory (Dunning and Lundan 2008a: 573–593; 2010: 1225–1246), to the least obvious ones which focus on the specifics of emerging market multinationals (Antalóczy et al. 2014: 47–61; Williamson and Wan 2018: 557–567). From the point of view of the internationalisation process logics and the consequences for international management, the identification of the asset "Oa" advantages and transaction "Ot" advantages was one of the more important approaches (Dunning 1983: 333–351) (later also institutional "Oi" advantages – Dunning and Lundan 2008a: 573–593; 2010: 1225–1246; Lundan 2010: 51–70). The first group of advantages relates to the protected ownership of specific enterprise assets in relation to the advantages held by other entities and are a consequence of structural market imperfections – they are mainly initial advantages that enable foreign expansion (Dunning 2001: 176). The second group

of advantages is a consequence of the hierarchical organisation of MNEs, which have the ability to generate transaction benefits (or reduce transaction costs) by managing assets located in different countries (Dunning 1988: 2). However, the most advanced "Ot" advantages are uniquely related to multinationality (Eden and Dai 2010: 17). Thus, they can become an attribute of enterprises with a higher level of internationalisation and relate to a situation in which MNEs are able to take advantage of "multiple sources of external authority and multiple denominations of value" (Sundaram and Black 1992: 729) or – in other words – discount benefits of international scale of operation and functioning in diverse socio-economic environments. At this stage, there is a possibility and legitimacy of targeting the expansion of MNEs not only on the previously mentioned acquiring resources (resource-oriented expansion) or gaining access to new markets (market-oriented expansion), but also using "foreign activities as means by which they can improve their global market position by raising their efficiency or accessing new sources of competitive advantage" (Dunning and Lundan 2008b: 68). In reality, however, it is neither simple nor obvious. It is essentially a challenge for managers rather than an absolute benefit of business activity internationalisation.

Guidelines and Literature Review

Although many studies highlight major benefits of foreign expansion (in terms of improving MNE performance, employment parameters, export, investment activities, productivity and overall competitiveness – UNCTAD 2006: 170–175; Sunesen et al. 2010: 31–34; Szałucka 2010: 5–13; Imbriani et al. 2011: 369–381; Gibb and Szałucka 2012: 49–80; Shiau et al. 2013: 184–196; Chen and Yang 2013: 17–38; Foster-McGregor et al. 2014: 244–257; Jaworek et al. 2018b: 137–152), Gupta and Govindarajan (2001: 45–58) state explicitly that being present on international markets, or even becoming a "global player", merely creates an opportunity to gain a competitive advantage. This opportunity can be used as long as MNEs are able to effectively discount benefits within the five key areas – potential sources of value creation, i.e. adjusting their offer to the specifics of local markets, using transnational scale and scope of activity, optimising spatial configuration of resources and implemented business processes as well as maximising knowledge transfer between units in different locations. In this sense, the internationalisation of an enterprise becomes a necessary condition, but not always sufficient for the full implementation of the objectives related to foreign expansion (Kuzel 2018: 387). It is worth noting that the lack of an absolutely positive relationship between the expansion and the results achieved by MNEs is highlighted by the results of the research conducted among enterprises representing the new European Union member states (Damijan and Decramer 2014: 1–49; Damijan et al. 2017: 74–97).

Looking at the possibility of gaining the most advanced "Ot" advantages by MNEs, the most important aspects are the ability to integrate dispersed resource management and the effectiveness of actions in order to optimise their spatial configuration (including relocation and reconfiguration) and the coordination of business operations (activity coordination) towards increasing global organisational efficiency. In literature, these two basic elements of international management (i.e. configuration and coordination) are most often considered from the perspective of value chains, understood by Porter (1985: 36–39) as a systematic set of activities of strategic importance related to project creation, the production process, marketing activities, deliveries and service. The expansion and spatial distribution of individual elements of the value chain and the entities participating in it describes the configuration, and the integration and harmonisation of activities at the transnational level make up the effect of coordination (Zorska 2007: 161–162). The condition for obtaining benefits from the spatial configuration is the location of the individual elements of the value chain in those locations where they bring the highest value added, while the results of international coordination depend on the appropriate shaping of the network of connections, cooperation and arrangements between enterprise units and its partners in different countries (Koźmiński 1999: 68, 76).

The above approach is fully described by Grunwald and Flamm (1985) and later on developed in the context of international business (Buckley 2004: 1–25; Buckley and Ghauri 2004: 88–89) in the concept of "global factory". According to it, modern MNEs are increasingly pursuing the postulate of hybridisation of various forms of foreign expansion, conducting flexible activity based on a network

of geographically dispersed units, related by capital relations and cooperation ties, but above all a bundle of goals whose implementation is coordinated by a central entity – a network integrator (usually represented by the parent company). Buckley (2011: 270) emphasises that MNE managers have already learned to a large extent how to decompose processes to optimise the location of their individual stages, as well as how to properly coordinate the entire course of the value chain, even if its individual phases are not implemented "inside" the company. Such activities – as indicated by the analyses (Rosińska-Bukowska 2016: 112–115; 2017: 323–326) – reveal mainly among the most powerful MNEs in the world. At the same time, however, it is clearly emphasised that their experiences are not obvious at all (Yamin 2011: 285–293). Moreover, the intensity of these processes may differ significantly in individual cases, also due to the degree of enterprise internationalisation, the specific nature of particular sectors, socio-economic, cultural or political conditions (Kuzel 2018: 439), as well as the consistency of previously adopted modes of action, experience gained or even historical considerations (Buckley 2009: 309–321; Fitzgerald and Rowley 2015: 449–456).

From the considerations carried out so far emerges a potentially interesting research question: ***To what extent is the postulate of spatial configuration of resources and activity coordination implemented by MNEs from the group of the so-called latecomers in the global economy*** (i.e. representing countries already partially advanced on their way to win the "developed" status – Storper et al. 1998: 1–9), ***in this case by enterprises from Poland?***

Before attempting an answer to this question, however, the specifics of foreign expansion of Polish MNEs need to be outlined briefly. First of all, their expansion has a relatively high growth rate. According to the last World Investment Report (UNCTAD 2019: 216), by the end of 2018, Polish outward foreign direct investment (OFDI) reached the value of $28,510 million, which is over 106 times more than at the end of 2000 ($268 million, nominal values). At the same time, the number of companies holding their shares/stakes in 3941 entities abroad was estimated at 1838 in 2017, which means an increase of over 27% compared to 2010 (Statistics Poland 2019). Secondly, despite an intensive growth in OFDI stocks, it must be emphasised that Polish MNEs concentrate mostly on European markets (NBP 2018; Statistics Poland 2019), and the level of their internationalisation (taking into account both the scale and the scope of their activities) is generally at a medium level (Jarosiński 2013: 173–179; Trąpczyński 2016: 283–306). Thirdly, the internationalisation of Polish enterprises is primarily market-oriented (Götz 2011: 47–70; Gorynia et al. 2013: 61–75; Kowalewski and Radło 2014: 365–374; Ciesielska et al. 2016: 80–81; Jaworek et al. 2018a: 19–30), their relationships with external entities remain limited (Sagan 2015: 249–258; Adamczyk and Sagan 2015: 38–53; Poland, Go Global! 2015), and expansion is carried out using mainly their own resources (Poland, Go Global! 2015).

Given the above characteristics of the internationalisation of Polish MNEs, below considerations were placed within the basic structure of the links between a parent enterprise and its foreign affiliates, i.e. ignoring their external relationships. This is consistent with an approach presented in the literature (Yaprak et al. 2011: 179–192; Sinkovics et al. 2011: 124), according to which the fundamental conditions for a successful integration and coordination of MNE business processes are within the ability to properly shape the architecture of intra-organisational relationships (i.e. between entities located in different countries, but tied by ownership relations).

Research Methodology

The results presented in this paper come from a survey conducted among Polish MNEs (the first part) and their foreign affiliates (the second part) as part of the project called "Investment Activity of Polish Enterprises Abroad: Factors and Effects", conducted between 2010 and 2013 at Nicolaus Copernicus University, Poland as Research Grant No. N N112 322 338, financed by the Ministry of Science and Higher Education. The first part of the study covered 622 companies – Polish foreign direct investors. The research was carried out using the CAPI (Computer Assisted Personal Interviewing) method. A total of 64 valid answers were obtained, which means a return of 10.3%. The respondents were mainly representatives of senior and top management. It must be stressed that companies that participated in this part of the study had completed 278 OFDI projects. Among them,

52% were M&A projects and 48% greenfield investment. The majority of completed OFDI projects (44%) were associated with commercial activities and another 37% with services, 11% with production and trade, 4% with production only, 2% with trade and services, and 2% with production, trade and services. The lion's share of OFDI projects (97%) was located in Europe, particularly within the European Union (45% in the EU-15, and 22% in the EU-12).

All foreign affiliates of Polish MNEs identified in the preparatory proceedings were invited to participate in the second part of the study (a postal survey). There were a total of 659. Fifty correctly completed questionnaires were received, which means a return of 7.6%. Most foreign affiliates surveyed were located in countries directly bordering Poland, mainly in the Czech Republic (24%), Ukraine (16%), Russia (10%) and Germany (8%). The activities of foreign affiliates focused mainly on trade (36% of enterprises), services (32%) and production (18%).

Research Results

The results of the survey confirm that the two elements of international management discussed in the paper (i.e. configuration and coordination) were reflected in the practice of Polish MNEs (Table 1). An appropriate configuration of organisational resources was confirmed in 92% enterprises and the coordination of business operations in 96% of the surveyed enterprises. It should be emphasised, however, that the level of both resource configuration and activity coordination proved to be rather limited.

Table 1: The configuration of organisational resources and the activity coordination among the surveyed enterprises – assessment of foreign affiliates (the second part of the survey)

The level of organisational resource configuration / activity coordination:	Resource configuration	Activity coordination
high (%)	14.0	24.0
medium (%)	58.0	50.0
low (%)	20.0	22.0
Lack of proper configuration / coordination (%)	6.0	2.0
Prefer not to say (%)	2.0	2.0
Total	**100.0**	**100.0**

Source: own study based on survey results.

A vast majority (63%) of entities that declared having an appropriate spatial configuration of organisational resources, described its level as "medium", while 21.7% of them considered it "low" and only 15.2% said it was "high". Similarly, the majority of enterprises (52.1%) assessed their activity coordination to be at a "medium" level. 25% described their scale of coordination as "high" and 22.9% declared that it was "low". Therefore, despite a significant amount of activity among the surveyed enterprises in both analysed areas, the assessment of its effects remains only moderately positive.

It is not so much the concentration of efforts aimed at obtaining an appropriate spatial configuration of resources or activity coordination that is of most importance for a more complete evaluation of the degree of management integration at the transnational level, but a combination of both these elements. Only together, they can form the foundations for a desired architecture of a company's internal system. Taking into account the above postulate, a summary of the study results seems to confirm the previously formulated conclusion about the limited (medium) level of resource configuration and activity coordination among the surveyed Polish enterprises (Table 2). The results of the study revealed that relatively the highest percentage of enterprises surveyed (13.8%) showed a "medium" level of both spatial resources configuration and activity coordination. On the other hand, a slightly smaller proportion of entities declared "medium" configuration and "high" coordination

levels (10.5%) or "medium" configuration and "low" coordination levels (10.2%). The results of the study indicate that a "medium" or higher level of both resource configuration and activity coordination was declared by 37.3% of the surveyed enterprises, which is definitely less than when considering these two key areas of international management separately. Only 4.8% of the entities participating in the survey said that level was "high". A similar percentage of respondents (5.4%) assessed the level of configuration and coordination in their enterprises as "low", and 1.0% declared a complete lack of effort in these areas.

Table 2: The level of organisational resource configuration with coordinated activities in the surveyed enterprises – an assessment of foreign affiliates (the second part of the survey)

Level of resource configuration:	**Level of activity coordination:**			**Lack of proper coordination (%)**
	high (%)	medium (%)	low (%)	
high (%)	4.8	8.2	4.6	2.0
medium (%)	10.5	13.8	10.2	7.7
low (%)	5.6	8.9	5.4	2.8
Lack of proper configuration (%)	3.8	7.1	3.6	1.0

Source: own study based on survey results.

Table 3: Actions aimed at optimising spatial configuration of organisational resources and their importance from the perspective of international competitiveness of the surveyed enterprises – an assessment of parent enterprises (the first part of the survey)

Actions taken:	**Frequency (%)**	**Importance Rating:**	
		Indicator	**Rank**
delegating to work in foreign affiliates/branches	54.7	3.69	6
transfer of knowledge and skills	51.6	3.89	5
recruiting employees from foreign affiliates/branches	34.4	3.55	7
moving business units abroad	29.7	4.43	1
transfer of production technologies	28.1	4.03	4
creating profit centres abroad	21.9	4.21	2
performing R&D abroad	17.2	4.09	3

Notes: the importance indicator has a weighted average arithmetic structure and takes the value from 1 to 5; respondents rated the importance of individual types of activities on a scale from 1 – "invalid" to 5 – "very important".

Source: own study based on survey results.

From the point of view of increasing MNE global organisational efficiency, activities aimed at optimising spatial distribution of available resources, i.e. their appropriate geographical relocation and configuration (or reconfiguration) are extremely important. However, the results of the study revealed that nearly half (48.4%) of the participating entities did not take such action at all, 18.8% refused to answer this question, considering the subject to be too sensitive, and 6.2% said they did not have sufficient knowledge to express an opinion. Therefore, only 26.6% of enterprises from the sample (the first part of the survey) confirmed the implementation of activities aimed at optimising spatial configuration of organisational resources. The activities undertaken included mainly (Table 3) delegating employees to foreign affiliates/branches (54.7% of responses) and the transfer of knowledge and skills (51.6%). As part of the efforts in sharing experience and raising skills, 34.4% of

the surveyed entities also posted employees from abroad to the parent company in Poland. Other activities undertaken by the surveyed enterprises included transfer of enterprise units abroad (29.7% of entities), transfer of production technologies (28.1%), creation of profit centres abroad (21.9%), and performing research and development (R&D) abroad (17.2%).

The results of the study revealed that the highest rated actions from the point of view of international competitiveness of the surveyed enterprises are, paradoxically, those that were undertaken least frequently (Table 3). From the point of view of competitiveness, the most important factors were the following: moving business units abroad (4.43 rating), creating profit centres abroad (4.21), performing R&D abroad (4.09), and transfer of production technologies (4.03). The other factors were considered to be important, but not the most important, so they ranked lower even though these actions were implemented most often by enterprises. They were as follows: transfer of knowledge and skills (3.89 rating), delegating employees to work in foreign affiliates/branches (3.69), and recruiting employees from affiliates/branches located abroad (3.55).

Discussion and Conclusions

Summing up the considerations presented in the paper, it must be pointed out that the spatial configuration of organisational resources and the coordination of business operations within the transnational structures of Polish MNEs remain limited (their level can be generally defined as medium). This means that Polish enterprises experience benefits from international activities, but at the current stage of development, most of them are not yet able to maximise the effects achieved or fully realise the most advanced "Ot" advantages. It seems that this state of affairs may significantly affect the level of their international competitiveness, all the more so nearly half of the entities surveyed did not take active steps in order to optimise the spatial distribution of organisational resources, i.e. their appropriate geographical relocation and configuration (or reconfiguration). Moreover, the identified initiatives focused primarily on better utilisation of human capital throughout the enterprise (mainly by delegating employees to foreign affiliates/branches and knowledge transfers). So they concerned potentially important activities, but – as it turns out – not the most important ones in the context of international competitiveness. Paradoxically, actions identified as the most important (i.e. moving business units, creating profit centres, and performing R&D abroad as well as transfer of production technologies) were undertaken the least often. They obviously require much more organisational effort than the primarily mentioned initiatives. Nevertheless, there is no reason to reject them without careful consideration and thereby to ignore possible economic gains for a company. Our observations suggest, first and foremost, that in the case of Polish MNEs there are many areas of international management that still need improvement. Their managers must be fully aware of the possibility of reaping benefits from multinationality, then identify and monitor emerging opportunities and integrate business activities around the postulate of MNE global organisational effectiveness. The bundle of tasks outlined above will probably constitute the most important challenge for managers in the near future.

Although the results cited here do not directly relate to the types of effects obtained by Polish MNEs thanks to foreign expansion, they correspond well with the work of other authors. Namely, according to a number of studies (Szałucka 2015: 125–149; Trąpczyński 2015: 129–137; Jasiniak 2017: 49–55; Kuzel 2018: 355–366) the benefits highlighted by Polish enterprises as a result of FDI are positive, although their scale remains rather moderate. It seems that the level and range of benefits obtained from the internationalisation of Polish MNEs are essentially related to the current (i.e. medium) stage of their internationalisation. Therefore, they correspond to present possibilities and take into account the consequences of being latecomers in the global economy. It can be expected that the pursuit of a fuller use of already existing resources, access to new ones offered by foreign locations and their appropriate absorption, compilation, reconfiguration and utilisation in the economic systems of Polish MNEs will most likely be one of the most important activities undertaken and intensified in the future. This is mainly so because it is a consistent and logical consequence of the changes accompanying foreign expansion and one of the key aspects of further development of multinational enterprises. Secondly, the results of research on Polish MNEs (Kuzel 2016: 44–53) already indicate that enterprises with relatively the highest degree of internationalisation are the most oriented towards

increasing international competitiveness through appropriate spatial configuration of organisational resources.

We hope that the presented considerations may be an inspiration for further in-depth studies on ways of obtaining and using the most advanced "Ot" advantages, in particular by MNEs representing emerging, developing and less-developed economies. Further research should concentrate on a fuller recognition of how enterprises operate, including the degree of their internationalisation, the scale and scope of their activities as well as their external relationships, the specifics of sectors, socio-economic, cultural or political conditions, as well as comparisons of management styles and MNE development in various parts of the world.

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Globalization and Man

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Absrtact

Man is the inspirer of but also himself the subject of globalization. However, is this process always beneficial to him? It is sometimes worth pausing for a moment in the run and listening to the opinions of those - who are personally affected by the globalization process, those who participate in it - what do they think about this process? The purpose of this article is to propose joint research on the threats of globalization that people of different cultures living in different parts of the world pay attention to. The practical aim of such research would be to develop a dataset of problems and threats that the average person faces. In January 2020, pilot studies were conducted, using the diagnostic poll method, survey technique. The aim of the research was to find out students' opinions from Poland on the subject: How do they perceive the dynamically developing globalization process? In the opinion of the respondents, one should be open to external influences, enjoy and feel a part of the world, but also remember one's own roots.

Keywords: Globalization, Social Threats

Introduction

Globalization is an ongoing unavoidable process benefiting countries and societies.
This process concerns global economy, technology, trade, communication, transport, culture, tourism, etc., it perhaps influences every aspect of human life and in modern times has spread at a tremendous pace.

Man is the inspirer of but also himself the subject of globalization. However, is this process always beneficial to him? It is sometimes worth pausing for a moment in the run and listening to the opinions of those -who are personally affected by the globalization process, those who participate in it - what do they think about this process?

The purpose of this article is to propose joint research on the threats of globalization that people of different cultures living in different parts of the world pay attention to. The practical aim of such research would be to develop a dataset of problems and threats that the average person faces.

Research Goal and Methodology

In January 2020, pilot studies were conducted, using the diagnostic poll method, survey technique, on a group of 200 students majoring in pedagogy of the Wyższa Szkoła Bankowa, an off-campus branch in Chorzów.

The aim of the research was to find out students' opinions on the subject: How do they perceive the dynamically developing globalization process?

In particular: What general and individual benefits do they see and what threats does globalization bring with it?

Test Results

Based on the analysis of the research results, the respondents' opinion on globalization can be summarized in the following sentence: students from Poland believe that globalization is a process that brings many benefits, but also many costs and threats.

The details of the research results are as follows.

Firstly, students were asked to explain the term "globalization" in their own words.

The most frequently used terms:

- International trade development;
- Blurring of borders, mixing of cultures;
- Economic and technological development with the benefit for people and a chance for a better life;
- The flow of goods, merchandize, services, technology, capital and workforce;
- Ease of communication (transport, Internet);
- Integration of countries, societies, cultures, creating a common world with the benefit for people;
- Progress, development;
- Cooperation, inter-dependence, unification;
- Broadening of horizons.

As a result of globalization, many areas, functioning of countries, societies, individuals have improved, which was noted by the surveyed students.

Most respondents 115 (57.5%) noticed that the access to broadly defined information increased.
Further positives concern the development of the economy and inter-personal contacts.

Some of the respondents' statements are presented below:

- Access to goods and services has increased (exchange of goods, including culture, development of technology and medicine);
- There has been a development of goods transport, trade development, export increase;
- Increased competitiveness in the quality of products and services;
- New management methods have been introduced;
- New workplaces have been created;
- Life opportunities, possibilities for human development and their living conditions has increased;
- Fast and easy contact with people is possible, simplicity of movement, transport developed, tourism travel possibilities are great, infrastructure related to this has developed;
- There is noticeable development of communication with another man, improvement of interpersonal relations, opening up to diversity, increase of tolerance;
- There has been intercultural development (drawing on the experience of others);
- There has been an increase in people's awareness thanks to travel and the Internet.

Next, the respondents were asked to list the benefits of globalization they had personally experienced.

Statements of the respondents were usually focused on the following areas:

- Access to information at any place and time, e.g. by using a smartphone. Such answer was given by 140 (70%) respondents.
- Fast flow of merchandise, availability of technology, products and goods from distant countries (e.g. food, music). 125 (62.5%) respondents turned their attention to this aspect.
- The opportunity to travel, meet people and cultures (travel is not only available to the selected, so that ordinary people also broaden their horizons, it also allows the development of language skills). This is an important benefit for 158 (79%) respondents.
- Increased access to workplaces, especially in international companies and for people who are open to learning a foreign language. 97 (48.5%) respondents turned their attention to this aspect.
- Facilitated interpersonal contacts through new technologies, development of means of transport (e.g. good contact with loved ones during labor migrations). 109 (54.5%) respondents noticed this benefit.

Threats associated with the globalization process that the students in Poland pay attention to.

Fear of the disappearance of tradition and regional and family customs was in first place, among the threats related to globalization. Losing one's individual distinct cultural identity and replacing it with uniformity, universalism, introduction of new customs taken from other cultures. Blurring the concept of patriotism.

This threat is important for 139 (69.5%) respondents.

Further problems which respondents most often noted were:

- The disappearance of natural environments through global development and the wasteful exploitation of natural resources;
- Dependence on the Internet and over-digitization (everything can be done without leaving home. On the other hand, information chaos may exist - too much information on the Internet that may be turn out to be false and useless;
- Increased dependence of poor countries on wealthy countries, widening the gap between them;
- The development of capitalism and the growth of international corporations that may dictate terms to individual countries;
- Excessive economic migration, exploitation of employees, failure of employers to respect employee rights. Increase in unemployment in traditional sectors of the economy, decline of small businesses;
- Decline of private interpersonal contacts, weakening of family ties, breakdown of the family, online contacts;
- Mental illnesses, depression caused by the pace of life and inability to adapt to it;
- Spread of terrorism and increased access to weapons;
- Loss of control of the size of globalization.

Conclusions

Based on this research, it is clear that the spectrum of threats associated with the globalization process is very wide. The surveyed students from Poland, however, paid the greatest attention to the fact that it is good to have and cultivate their local traditions, customs, values related to the family and their small homeland, and in their opinion those values are most threatened by the rapid pace of globalization.

It can be concluded that, in the opinion of the respondents, one should be open to external influences, enjoy and feel a part of the world, but also remember one's own roots.

This is the opinion of respondents from Poland.

As mentioned above, a larger-scale study would allow for the discovery of opinions about the risks of globalization process from the point of view of people living in different parts of the world and coming from different cultures.

It is necessary to pay attention to the threats connected with the globalization process and speak out about them loudly.

Evaluation of the Influence Blockchain Technologies on the Development of the Financial System

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Abstract

The world economic system is currently transforming due to the massive introduction of information and communication technologies that have permeated all sectors of economic development. Completely new areas of economic development arise under the influence of the development and application of innovative digital technologies in the traditional areas. They are based on the latest advances in information technology, which allows these innovative areas to form completely new organizational forms of management. One of the drivers of digital transformation is the financial sector. It was in it that fintech received a new innovative direction, which is a synthesis of financial and the most advanced innovative digital technologies, within which completely new forms of financial institutions are formed. Besides, new types of banking products and services are created to expand the horizons for conducting business in a new format. Today, big data, artificial intelligence, cloud computing are successfully used in the financial sector, and on the basis of blockchain technology, the world's first digital currency - bitcoin - was created. Blockchain technology is used with great success in many financial areas. In connection with this, the possible ways of developing a financial system under the influence of the development and application of blockchain technologies are analyzed in this study. The technology of blockchain as a new technological paradigm is analyzed in the article that will allow to achieve outstanding heights in innovation in the financial sector. The advantages and disadvantages are explored that hinder the rapid implementation and use of these technologies in financial institutions. Possible areas in the financial sector are considered and analyzed, within which the use of blockchain technologies will be as efficient and optimal as possible. A study of the global market of blockchain technologies in the financial sector was carried out, its quantitative and financial indicators were determined, the main players in this market were identified. Further directions and prospects for the development of the financial system are identified based on a comprehensive analysis of the development and application of blockchain technology in the financial sector.

Keywords: Information Technology Management, Digital Economy, Innovation, Blockchain Technology, Financial Institutions, World Market, Development Prospects.

Introduction

The widespread adoption of information and communication technologies has contributed to the digital transformation of the global economic system. The massive introduction of innovative digital technologies has contributed to the formation of a new economic direction - the digital economy. It is based on the introduction of the most advanced information technologies that can provide a new qualitative leap in economic development, which allows to move to a new stage of economic

development, creating the so-called “smart economy” that can adapt according to the needs and requirements of each individual.

In the past few years, under the influence of digital transformation, the completely innovative directions have been formed as a part of traditional economic directions that contribute to the digitalization of the economy.

In the industrial sphere, Industry 4.0 has become such a direction, implying a transition to fully automated digital production controlled by intelligent systems in real-time in constant interaction with the external environment, going beyond the boundaries of one enterprise, with the prospect of combining things and services into a global industrial network.

Another innovative direction in the field of finance, which emerged under the influence of the development and application of digital technologies, was the fintech direction. This is an industry consisting of companies using technology and innovation to compete with traditional financial organizations represented by banks and intermediaries in the financial services market. Currently, fintech includes numerous technology startups and large established organizations trying to improve and optimize the financial provided services.

Fintech uses the most advanced information and communication technologies to create new innovative banking products and services, as well as transform the financial system itself by creating completely different organizational forms of financial institutions.

Blockchain technology became one of the breakthrough technologies used in the financial sector, the development and use of which allowed in 2008 to create the world's first cryptocurrency – Bitcoin. Today it is the most capitalized virtual currency in the world. The emergence of cryptocurrencies has given impetus to the development and application of technologies in the financial sector. At present, many financial institutions are developing in the field of research and application of this technology in the financial sector. Entire banking consortia are being created, including leading financial institutions from different countries that are engaged in research in the field of blockchain. For example, in 2014, the R3 banking consortium was created, which brought together 45 financial institutions from different countries, the main task of which was to research in the field of blockchain technologies and the possibility of applying them in the financial sector. Today, the number of participants in the consortium has become more than 70 credit organizations. (Rybyantseva et al, 2017; Treleaven, 2017)

Along with private business, states are also investing in the development and application of blockchain technologies. For example, in China, about $ 6 billion has been allocated for the state program for the introduction and use of blockchain technologies.

Today, blockchain technologies in the financial sector began to be used not only to create new cryptocurrencies, which have been created more than two thousand different types around the world but also found application in other areas, for example, organization of payments, accounting of banking operations. In the future, all financial institutions are expected to switch to using blockchain technologies, which will allow them to become more flexible and transparent for running their business. This can ensure a new level of business process implementation within the entire financial system.

Key Research Findings

Features of the implementation of blockchain technology

Blockchain is a truly revolutionary, fundamentally innovative way of storing and transmitting information over the network, with many possibilities for practical use.

Blockchain is an incorruptible digital book of economic transactions, which can be programmed to record not only financial transactions but also almost any value.

Blockchain is a “chain of blocks” that accurately reflects the essence of the phenomenon. Information blocks are collected in a sequential chain and are protected by cryptographic encryption. Chains of information are not stored on any particular server, but exist simultaneously on all computers connected to the network. The widespread adoption of blockchain technologies is believed to change the entire world economic system, because a decentralized blockchain system cannot be changed, i.e., hacked or forged.

At the same time, there is no need for intermediaries to carry out operations related to the transfer of important information. Information is transmitted via peer-to-peer protocol - from user to user. In this case, each participant has information about other participants, as well as access to the entire history of transactions committed in the system. The blockchain is self-sufficient, but at the same time extremely open structure and for its operation, third parties are not needed.

Not only monetary operations but also any other operations in which there is a risk of one of the parties' inability to fulfill certain conditions, will be protected and ensured by a block procedure. Blocks are connected in a circuit using complex mathematical algorithms. Each new block is tied strictly to the previous one, has a unique signature and timestamp. Adding a new link to the chain is confirmed by each participant in the system and leads to automatic updating of the registry. If a new block appears, information about this appears in all databases. To crack this system, one needs to get access to more than half of all computers involved in the network, and this is technically unlikely.

Blockchain technology has many advantages - it is decentralized, almost impossible to crack, and all information that is formed into blocks is automatically encrypted. (Chatterjee and Chatterjee, 2017)
Transaction transparency. All data embedded in the network remains transparent - information about all operations is available to each user.

Lack of a central server. Due to the lack of centralized information storage, it is almost impossible to control the block system - to change data immediately throughout the network, unlimited computing power is required. The base is distributed among all participants, so it remains almost invulnerable.

Availability of a full copy of the database for each user. Since each member of the block network has an updated copy of the database, there is no need to coordinate information with other users.

Fast and accurate transactions. A decentralized system with built-in burglary protection allows carrying out operations quickly, accurately and without intermediaries. Banks, exchanges, payment systems, notaries are no longer needed - the authenticity of transactions is verified and confirmed by all participants in the system.

Data encryption. The data that is generated in the block is encrypted automatically. Cryptography is a guarantee of complete data protection. Hashing in blocks ensures the irreversibility of the entire transaction chain, and digital signatures and two types of keys make information inside the blocks inaccessible.

The main drawback in the field of blockchain technology is scalability problems: many participants have to keep updated copies in order to work with the blockchain. This means that the same database is stored on thousands of nodes. It is pretty inefficient.

The innovative potential of blockchain technologies in the financial sector

The modern banking system is not perfect. Customers pay banks high commissions. Banks must have a large staff and use the not always reliable SWIFT interbank transfer system. States carry risks of being sanctioned and financially blocked.

Using blockchain eliminates intermediaries in banking operations and automates many processes. The efficiency of the banking system is also enhanced by lowering costs. Banks can obtain additional sources of income, thanks to the emergence of new business models and products based on blockchain.

So in March 2019, German banks Commerzbank and Landesbank Baden-Wuerttemberg conducted test transactions on the new blockchain platform for trade financing Marco Polo, which offers services of factoring, discounting receivables and payment of obligations. Now it is one of the leaders among blockchain platforms for trade finance: its business model is aimed at rapid expansion, due to its low entry threshold and the ability to integrate with other blockchain platforms.

The main areas of blockchain application in the banking sector.

Fast and cheap transfers. This is particularly relevant for cross-border transfers and micropayments, where the banking commission may be comparable to the amount of the transfer. While in banks, such transactions take a long time (up to 3-5 business days) and are expensive (from 1% of the amount). Globally, this is a huge expense. In cryptocurrency networks, transfers take several minutes and cost significantly less. So, a transaction worth 45.5 thousand bitcoins (about $ 280 million) in the summer of 2018 on the blockchain cost only $ 0.04 and took several minutes to complete. The same amount cost a transaction on the Litecoin network for $ 100 million in spring 2018.

Ability to automate processes and quickly process operations. This allows reducing costs and staff. Blockchain makes it possible to get rid of a complex workflow, because any operation can be traced. The guarantee of the permanency of the data is the technology itself, the human factor is excluded. There are already projects on the blockchain in the field of loans, customer identification, and corporate finance.

Ensuring immutability of transactions. That is, the inability to make retroactive changes and falsify reports. The banking system is not transparent. Blockchain will make all operations transparent and increase the level of trust between all participants.

Despite the interest in blockchain technology from financial institutions decreased at some point, which was just related to the problem of scalability, nowadays, research is continued by banks in this area. In 2019, the International Association for Trusted Blockchain Applications - IATBA, the European International Association of Trusted Blockchain Companies, appeared in Europe, which included 9 banks. Its work should contribute to the creation of blockchain infrastructure in Europe in compliance with all security requirements and the elimination of regulatory uncertainty. The founder of the Association is the European Blockchain Partnership. (Ahram et al, 2017; Beck et al, 2017)

Despite the absence of a revolution on the blockchain, banks have not given up research on this technology. Financial institutions are actively registering blockchain patents. For example, the People's Bank of China has registered 40 such patents, the Bank of America - more than 50. Patents have Western Union, Visa and MasterCard payment systems.

The Global Market for Blockchain Technology in The Financial Sector

Today, blockchain technologies are used not only in the financial sector, but have found their application in the public sector, manufacturing, healthcare and many other industries. In 2019, the entire global market for blockchain technology was estimated at $ 1.02 billion, of which more than $ 0.78 billion was in the financial sector (Fig. 1). (Ibrahim, 2019)

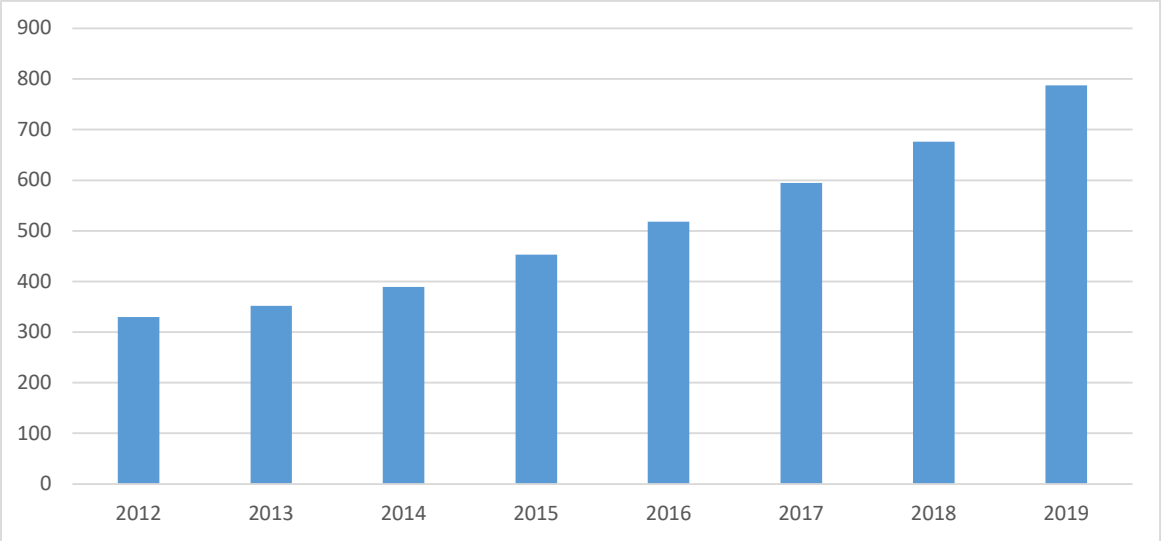

Fig. 1: The global blockchain technology market in the financial sector, millions of dollars

The leader among the regions of the world in introducing blockchain technology in the financial sector is North America, which accounts for over 41% of the entire market (Fig. 2). (Meyer, 2018)

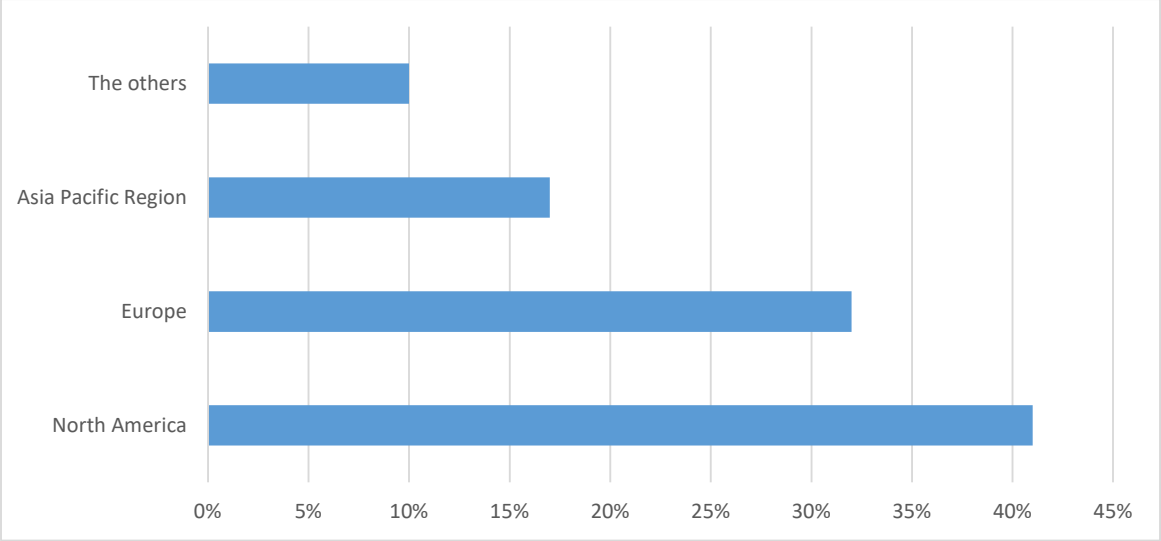

Fig. 2 : Breakdown of the global market for blockchain technology used in the financial sector by region of the world

The United States is the undisputed leader in implementing blockchain technologies in the financial sector, accounting for over 38% of the entire market (Fig. 3). (Bhargava, 2019; Szewczyk, 2016; Yoo, 2017)

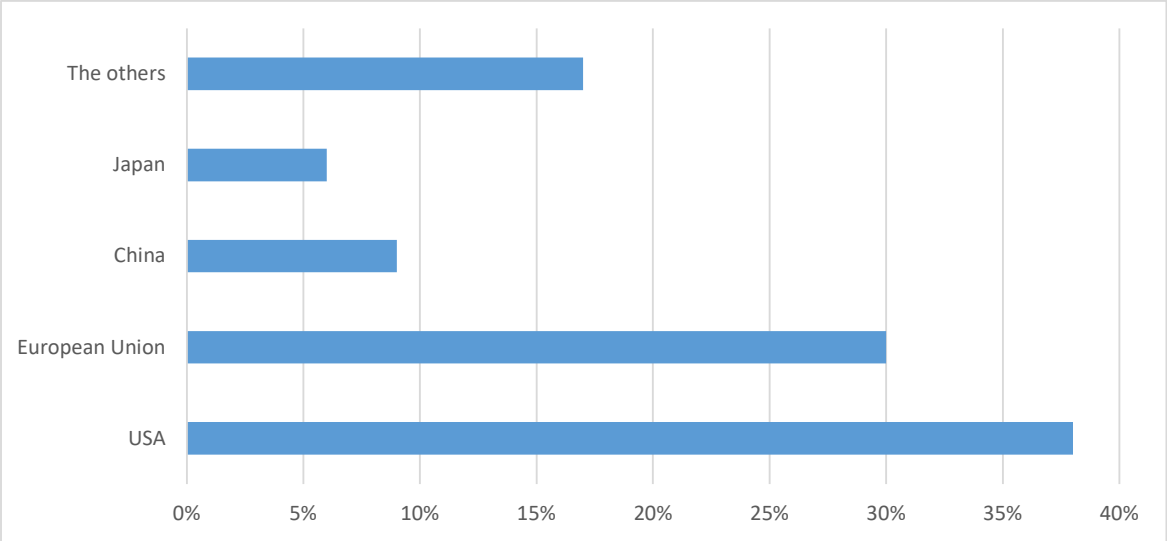

Fig. 3 : Leading countries in terms of investment in the use of blockchain technology for the financial sector

Today, the number of financial institutions using blockchain technologies in one form or another is about 376 credit organizations (Fig. 4). (Kaiser and Kirton, 2019)

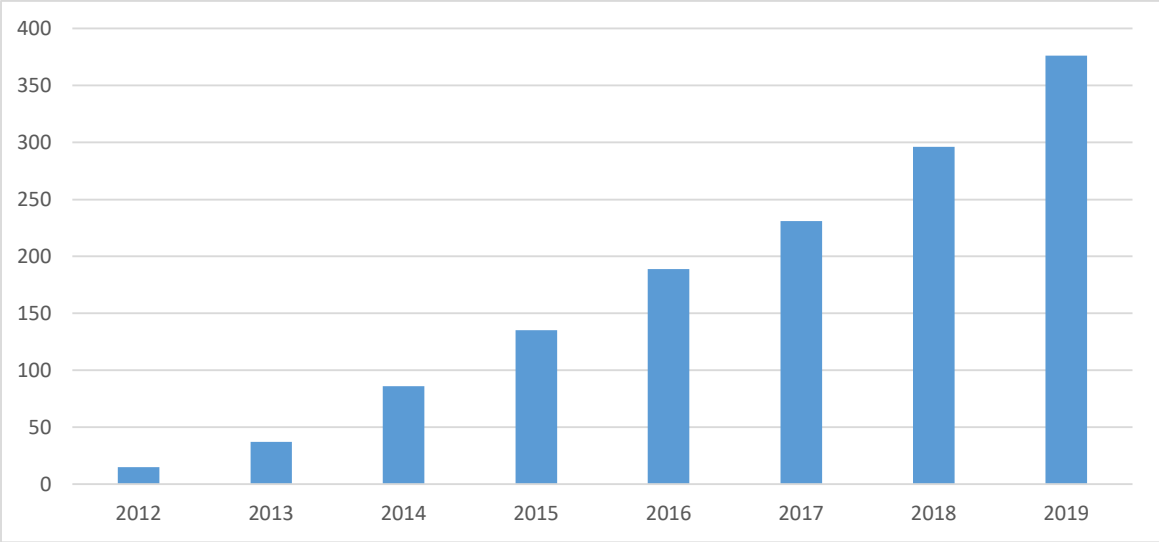

Fig. 4 : The number of banks using blockchain technology, units

Among the financial institutions implementing blockchain technologies, the Santander bank can be singled out as the largest UK bank, which uses blockchain to develop an international payment service or China Construction Bank, which implemented a cross-border transfer platform for small companies using blockchain technologies.

Using blockchain technology in Russian financial institutions is singular. One of the national projects is the Masterchain project. This is the Russian national blockchain network, which is designed to transfer digital values and information about them between the participants, organized with the direct participation of the Central Bank of Russia.

The market for using blockchain technology in the Russian Federation is expected to be about $ 24.7 million by 2020 (Fig. 5). (Chernov and Chernova, 2018; Yeoh, 2017)

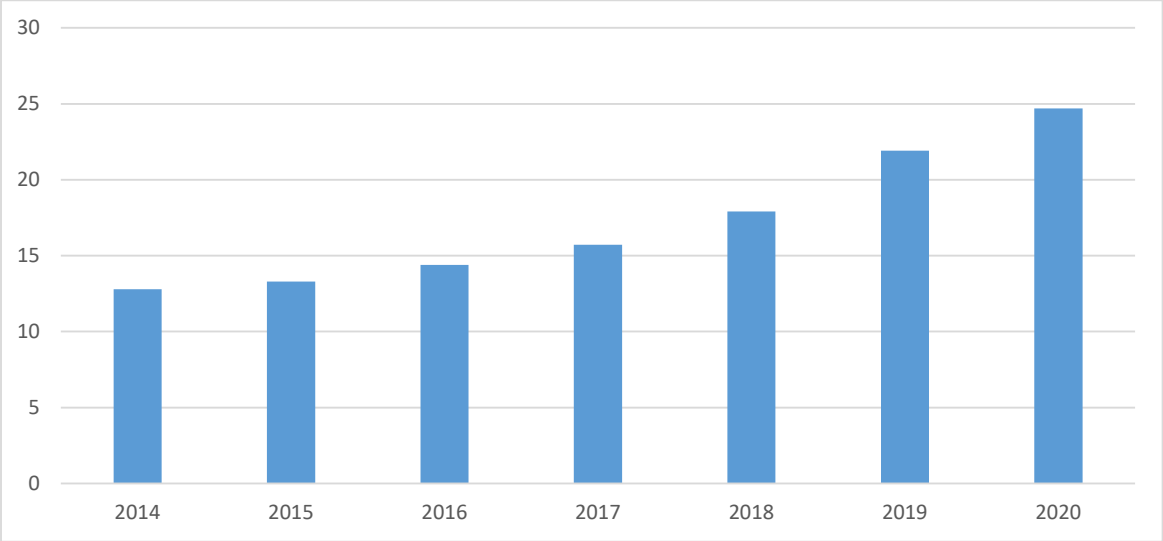

Fig. 5: The volume of the Russian blockchain technology market in the financial sector, millions of dollars

Nowadays, in Russia, the market for the application of blockchain technology in the financial sector is at the very initial stage, its players are several leading financial institutions of the country, for example, Sberbank.

Areas of using blockchain technologies in the financial sector

Blockchain has the potential to solve many problems that exist in the financial sector. The blockchain technology has all the attractive features required for a reliable cash flow technology. It is safe, reliable, decentralized, transparent and relatively cheap.

Blockchain provides a very high level of security and reliability in the exchange of data, information and money. It allows users to take advantage of transparent network infrastructure and low operating costs through decentralization. These characteristics make blockchain a reliable, promising and sought-after solution for the banking and financial industries.

Financial institutions perform the necessary function of ensuring security and, therefore, processes require a large number of intermediaries, which makes banking operations more expensive. Moreover, with the participation of too many people and manual processes, the likelihood of errors and fraud always increases. Blockchain technology ensures transaction security and makes them less costly for customers.

Today, the banking sector is actively looking for new areas and applications of blockchain technology. The American multinational investment bank JP Morgan Chase has created Quorum, specifically for the research and implementation of blockchain technology. Quorum is a distributed accounting system and smart contract platform for enterprises that supports fast transactions and high throughput, solving problems for the financial industry, banks and companies.

Bank of America has filed a patent that describes the implementation of an authorized blockchain to protect records, as well as verify the authenticity of business and personal data. The system will allow only authorized participants to access data and keep a log of all records. In addition, the proposed

system will use blockchain technology to combine several existing storage platforms into one. This secure single platform will increase overall efficiency and reduce user storage space.

Another Goldman Sachs bank, which is actively researching and supporting distributed ledger technology, has invested in a cryptocurrency project called Circle. The project is considered one of the most well-funded startups in the blockchain space. It aims to solve the key problem of volatility in the space of digital currencies, which makes the financial sector more reliable with the help of cryptographic options.

In the future, using blockchain technology will go into four main directions (Table 1). (Bril, 2017)

Table 1: The main areas of blockchain technology application in the financial sector

Smart contracts	Digital currency	Record keeping	Securities
Escrow	Equity	Healthcare	Derivates
Wagers	Private markets	Title records	Crowdfunding
Digital rights	Crowdfunding	Ownership	Debt
	Derivatives	Voting	Private markets
	Debt	Intellectual property	Equity

With the further development of blockchain technology, the range of areas in the banking sector will expand if problems with scaling this technology are solved.

Prospects for Using Blockchain Technology In The Financial Sector

Today, financial institutions have begun to take a more pragmatic look at the development and application of blockchain technology in the financial sector. At the beginning of the development of these technologies, blockchain was considered as a means of completely transforming the banking industry. Now a more balanced approach has been outlined that determines the introduction of blockchain in those areas that may transform, taking into account developments in this area. In the future, with the development and improvement of blockchain technologies, they will find their application in other areas of the financial sector.

According to a study of leading world financial institutions, about 30% of banks today are involved in one way or another in the application of blockchain technology (Fig. 6). (Guo and Liang, 2016)

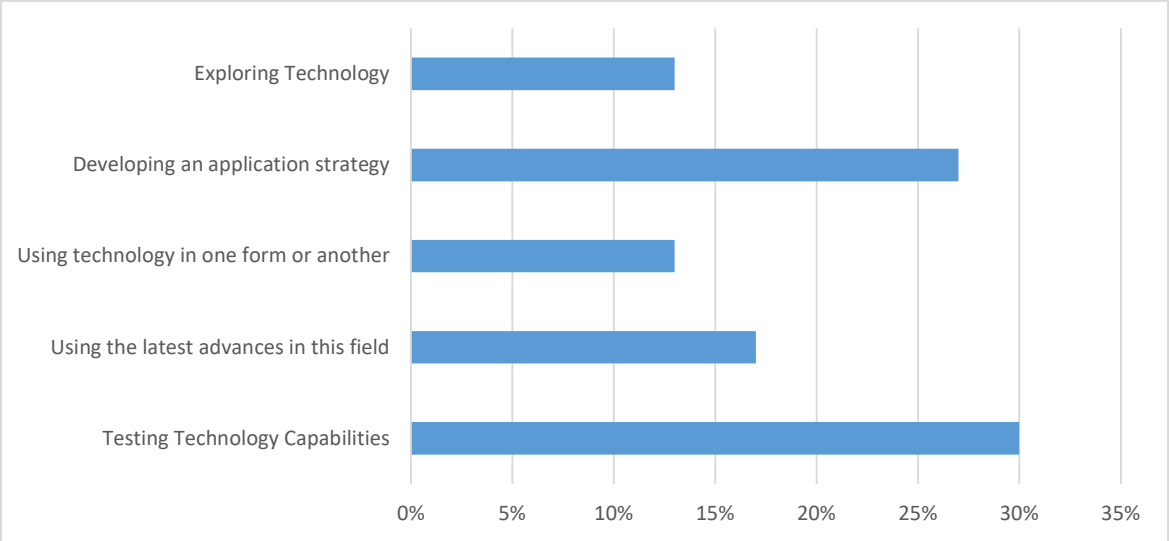

Fig. 6 : The willingness of financial institutions to implement blockchain technologies, in percent

More than 70% of credit organizations take a wait-and-see attitude, looking closely at the results of their colleagues and the possibilities of using blockchain technologies in the financial sector.

Nevertheless, despite most banks are being waited, those will be able to achieve impressive results who is the first to effectively realize the opportunities provided by the blockchain.

According to a Javelin study, financial institutions lose between $ 15 and $ 20 billion annually from just one identity fraud. Banks are also regulated by customer data protection regulations. The EU General Data Protection Regulation, which entered into force in May 2018, strengthened citizens' rights to access data and agreed on protection rules. Some European financial institutions have invested up to 30 million euros to ensure their implementation, to ensure the reduction of the problem of money laundering. A WealthInsight report said global anti-money laundering (AML) spending exceeded $ 8 billion in 2017, up 36 percent from 2013. The number of AML employees has increased tenfold at major US banks over the past five years. (Cocco, 2017; Morozova, 2017)

Retail banks are making significant efforts to combat fraud, protect data and prevent money laundering, invest in automation and standardization, implement real-time information exchange and create predictive models. These initiatives have increased efficiency, but have led to longer logging times and higher costs, reflecting significant changes in the operating model and increased manual work.

In this case, blockchain may be a potential solution. Blockchain technology allows customers to use a digital fingerprint to register or open an account, which, as a real fingerprint, can be used as a unique identifier. It can be stored in a distributed register and refer to any bank on the network. The owner of the digital fingerprint can use it to submit new applications for the account and universal proof of identity.

The decentralized blockchain structure eliminates duplication of compliance checks with the KYC (user identification) and AML (banks exchange authentication information) protocols, eases the information load and allows banks to distribute data as they are updated.

According to experts, blockchain solutions for connecting customers can provide up to $ 1 billion in operating expenses for retail banks around the world and reduce penalties by $ 2-3 billion. In addition, block solutions are expected to reduce annual fraud losses by $ 7–9 billion. (Table 2). (Li, 2018)

Table 2: Cost reduction for financial institutions in the implementation of blockchain technology in the field of personal identification

Type of operation	Range of values, $ billion
Regulatory fines	2.0-3.0
Customer on-boarding operating costs	0.5-1.0
Lost/stolen	0.5-1.0
Counterfeiting	3.0-3.5
Card not present	3.5-4.5

The blockchain is tested and implemented when fraud is detected using identifiers, for example, by creating digital identification networks. Bluzelle, a blockchain storage system, worked in 2017 with a consortium of three banks in Singapore - HSBC, Mitsubishi UFJ Financial Group and OCBC Bank - to test the platform for KYC. The project showed that a blockchain platform would increase efficiency, reduce the risk of financial crime, and raise the ability to respond to performance and planning needs. The expected cost reduction is 25-50% when using. (Adamenko, 2017; Kiseleva et al, 2017)

In this regard, a further expansion of using blockchain technologies in the financial sector and, as a result, an increase in the global market over $ 20 billion are forecasted by 2027 (Fig. 7)

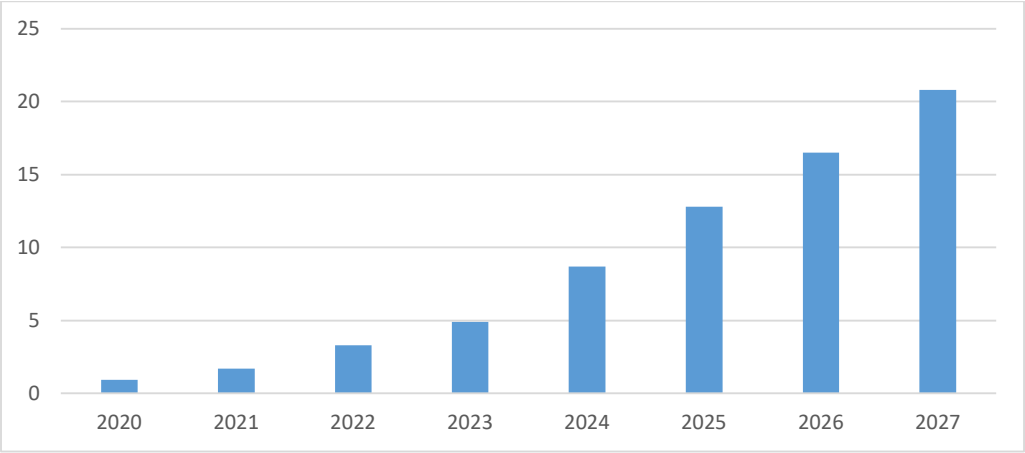

Fig. 7: Forecast of the dynamics of the global market in the financial sector, billions of dollars

Further introduction of blockchain technologies in the financial sector will allow financial institutions to reduce costs in conducting business and expand the horizons for the implementation of innovative business processes.

Conclusions

The massive introduction of information and communication technologies in all economic spheres has led to the formation of a new type of economy - a digital one, based on the implementation and use of the most advanced innovative technologies. New areas have appeared within the innovative economy in traditional sectors of the world economic system: Industry 4.0 in industry and Fintech in finance;
The financial sector is one of the drivers of the development of the innovative economy. Nowadays, financial institutions are successfully developing and applying technologies of artificial intelligence, big data, cloud computing. One of the breakthrough areas in the development of information technologies in the financial sector has become blockchain technology, on the basis of which the first

cryptocurrency in the world - Bitcoin - was created in 2008. It is the most capitalized virtual currency in the world today;

During the development and application of blockchain from the field of cryptocurrency formation, it has become widely used in the financial sector. Today about 380 credit organizations use these technologies in one form or another to develop the banking business. In addition, the volume of the global financial market was about 0, 78 billion dollars in 2019;

The development and application of blockchain technologies in the banking sector open up broad prospects for business development. For example, only in the field of identifying customers of financial institutions, annual cost savings of banks can be from $ 9 to 13 billion, while more than 70% of financial institutions take a wait-and-see position on the implementation of this technology. First of all, this is connected both with legal issues of legislation and with technical issues, in particular, problems of scaling the blockchain associated with the storage of vast amounts of information;

Nevertheless, it is worth noting that despite the imperfection and incomplete development of this technology, the areas of application in financial institutions is quite large. In the near future, these technologies will find further development in the field of virtual money, securities, accounting for transactions and smart contracts. Expanding the range of areas in the financial sector will lead to further growth in the global market for blockchain technology in this sector, which is expected to exceed $ 20 billion by 2027.

Acknowledgement

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Aspects of Development of World Robotics within Industry 4.0

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Abstract

The development of the modern world economic system is accompanied by the massive introduction of information and communication technologies in all sectors of economic development. The development and application of innovative information technologies have led to the digital transformation of the economy; today the landscape of the global system is rapidly changing. The introduction of innovative technologies is very rapid, which ensures the high dynamics of technological development. In today's world, a completely new innovative direction of economic development has emerged - the digital economy, which is based on the use of the most advanced information and communication technologies. The basis of any economy is the manufacturing sector, on the basis of which the entire economic system is formed, it is no coincidence that the manufacturing sector is undergoing a powerful digital transformation. One of the drivers for the development of a modern innovative economy is Industry 4.0, a direction that has been developed over the past few years, which involves the innovative development of not only industry, but also related areas. One of the main components of Industry 4.0 is the development of robotics, designed to provide full automation and autonomy of jobs. The goals and tasks that have to be solved within Industry 4.0 are analyzed in this study, the main components of this area are considered and investigated, it is determined that one of the basic components of the development of Industry 4.0 is the introduction and application of modern robots that can provide opportunities for the development of the manufacturing sector in direction of full autonomy of management and organization. In this regard, modern trends in the development of robotics are analyzed, a study of the world market of robots and robotic systems within the concept of Industry 4.0 is carried out, the dynamics of its development, average annual growth rates are determined, market leaders are determined, both among countries and among world robot manufacturing companies. Such key indicators as the density of industrial robots in different countries were determined in this study; the dynamics of changes in the cost of robots were evaluated under the influence of the development of innovative technologies. Based on the comprehensive analysis, further prospects of the global robotics are identified, within further digital transformation, determined by the direction of Industry 4.0.

Keywords: Information Technology Management, Digital Economy, Industry 4.0, Innovation, Robotics, Industrial Robots, World Market, Development Dynamics, Development Prospects

Introduction

The introduction of advanced innovative information and communication technologies at the beginning of the twenty-first century contributed to the beginning of a large-scale transformation of the global economic system. The development and application of digital technologies have ensured the formation within the traditional economy of completely new economic areas that provide new opportunities for

doing business, expanding the boundaries of development in all areas and moving to a new qualitative stage in the global economic system. Industry 4.0 in the manufacturing sector and Fintech in the financial sector are the main drivers of the digital transformation of the global economy.

Nowadays, innovative technologies of cloud computing, processing large amounts of information, artificial intelligence, blockchain, cyberphysical systems are widely used in various areas of the global economic system. In today's world, there is not a single direction, which would not be subjected to change under the influence of digital technologies.

The basis of any economic development is the production sphere; it provides the basis on which the entire framework of the economic system is built. Further advancement is impossible without modern high-tech production; it can ensure the creation of a new innovative economy that can meet the needs of each individual in accordance with his or her wishes and preferences. Therefore, one of the main components within Industry 4.0 is the development of robotics, as the basis for creating smart manufacturing. “Smart manufacturing” is a convergence where the capabilities of several components converge. Its main goal is to increase productivity and efficiency, in which intelligent business processes are combined into one whole using “smart” operating processes and technological equipment, and the result is the release of “smart” products. (Kusiak, 2018)

In recent years, the global robotics market has experienced a boom in its development, demonstrating amazing growth rates. Many countries of the world have joined the race associated with the creation of autonomous industries capable of providing not only production but also the design of new products. Today, China is one of the leaders in the global robotics market, which in 2019 introduced more than 230 thousand industrial robots, leaving behind many countries of the world that were recognized leaders in this field.

The research of modern trends in the development and application of robotics in the world, the progressive movement of which is due to Industry 4.0 is an extremely important and urgent task, the consideration of which should help to understand the prospects for the development of "smart production".

Key Research Findings

Definition and main directions of Industry 4.0

The concepts Industry 4.0, the fourth industrial revolution are becoming more and more popular and they are no longer just words, they are backed by real projects that are part of our lives. The Fourth Industrial Revolution is a combination of industry and digital technology, leading to the creation of digital industries or smart factories where all devices, machines, products and people communicate with each other through digital technology and the Internet. Klaus Schwab, President of the World Economic Forum in Davos, formulated the concept of the fourth industrial revolution in 2011. Klaus Schwab saw the global changes of humanity in the fourth industrial revolution, not the products will change in this revolution, but the people themselves and, accordingly, the whole world. (Xu et al, 2018) The concept of "Industry 4.0" is a synonym for the fourth industrial revolution, under this name the projects of the fourth industrial revolution are combined and implemented in enterprises. This direction was created in Germany and was presented at an exhibition in Hanover, and this happened due to earlier the German government demanded a wider introduction of digital technologies in production. The term "Industry 4.0" is also called the state program of Germany for the development of the economy by creating automated, communicating with the external environment, as well as personalized digital productions. Nowadays, Germany is the leader in the pace of development of Industry 4.0. However, similar programs are being implemented in other countries, for example, “Made in China 2025” - in China, “Connected Factories”, connecting factories to the network - in Japan, Industrial Internet - in the USA, etc. These programs will greatly enhance the competitiveness of manufacturers in these countries, and become market leaders.

Industry 4.0 is a transition to a fully automated digital production controlled by intelligent systems in real time in constant interaction with the external environment, going beyond the boundaries of one enterprise, with the prospect of combining things and services into a global industrial network.

Industry 4.0 leads to the massive introduction of cyberphysical systems in production, to the automation of most production processes, the endowment of devices with artificial intelligence and the introduction of many other modern technologies. All of this significantly influences the increase in productivity and lower production costs. (Demidenko, 2018; Zheng, 2018)

In addition, Industry 4.0 allows to make the market personalized, i.e. development and production of products individually for each person become a priority.

The basic principles of Industry 4.0 are:

1. Compatibility - all devices and machines have to be able to communicate with each other in the same language through the Internet of things, i.e. they have to be compatible.
2. Transparency - creating a digital copy of the product, collecting data from microchips and sensors through which devices communicate.
3. Technical support - the software collects, analyzes, systematizes, visualizes the data received from sensors, and helps a person make decisions or makes them automatically, thereby freeing up human resources.
4. Decentralization of management decisions, automation of various decisions by systems, the most complete human substitution.

One of the important components of Industry 4.0 is not the product, but the data. Digitalization of production is associated with data, large amounts of data that need to be read, collected, analyzed, systematized, processed, stored, transmitted, presented in the right form and much more. This requires appropriate information systems, software, wireless data transmission, cloud services for the exchange and storage of data.

Almost all objects and devices will include microchips and sensors, through which they will communicate with each other. By 2025, it is planned to connect 75.4 billion items to the Internet. (Ślusarczyk, 2018)

The main components of Industry 4.0 are:
1. Additive technology, 3D printing
2. Modeling and visualization
3. System integration
4. Internet of things
5. Cybersecurity
6. Cloud services
7. Augmented reality
8. Virtual reality
9. Autonomous robots, robotics
10. Planning and analysis online
11. Artificial intelligence
12. Energy-efficient technologies
13. Alternative energy
14. Big data and analytics
15. Remote service

The combination of all these components of Industry 4.0 will make the enterprise as automated and competitive as possible.

Analysis of the Global Robotics Market

The first industrial robots appeared in the 1950s, their implementation was sporadic and their fields of application were related to the military sphere. After the appearance of the first microcircuits capable of providing a new high-quality level of control in robotics, it facilitated the mass introduction of robots in many industrial areas.

Despite the development of robotics, it was only at the beginning of the twenty-first century with the advent of new technologies in the field of artificial intelligence, the development of computer technology that the introduction of robots became widespread. (Boden, 2017; Landsiedel et al, 2017) All robots today can be divided into two large groups.

Industrial robots are used in the manufacturing sector and are designed to automate manufacturing operations.

Service robots perform tasks related to the automation of operations useful to humans or equipment. In turn, service robots are divided into two large groups.

Professional service robots whose task is to obtain material benefits in the provision of certain services. *Personal service robots* that are designed for use in everyday life.

The total volume of the global robotics market amounted to over 81.3 billion dollars in 2019 (Fig. 1). (Gorodetskiy and Tarasova, 2019)

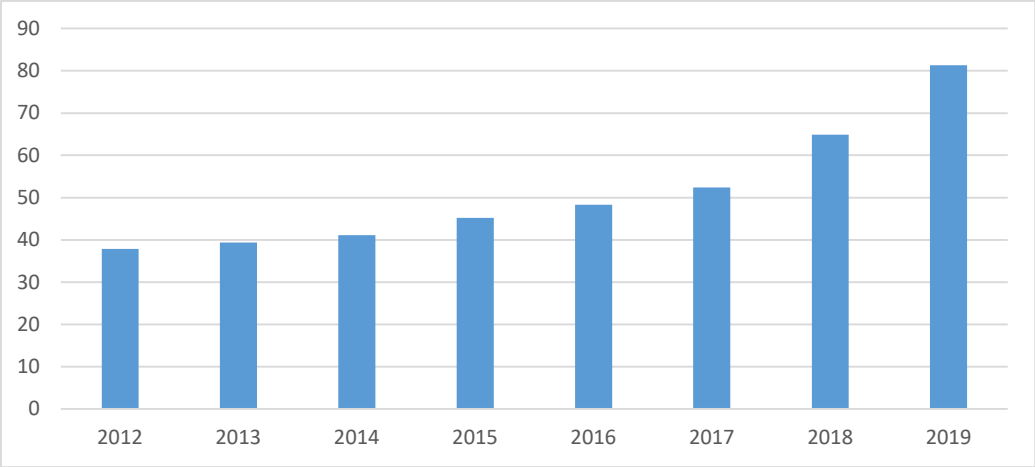

Fig. 1 : The global robotics market, billions of dollars

At the same time, the average annual growth rate of the global robotics market was 11.8%. Today, industrial robots occupy about 68% of the global market (Fig. 2). (Dailami, 2020)

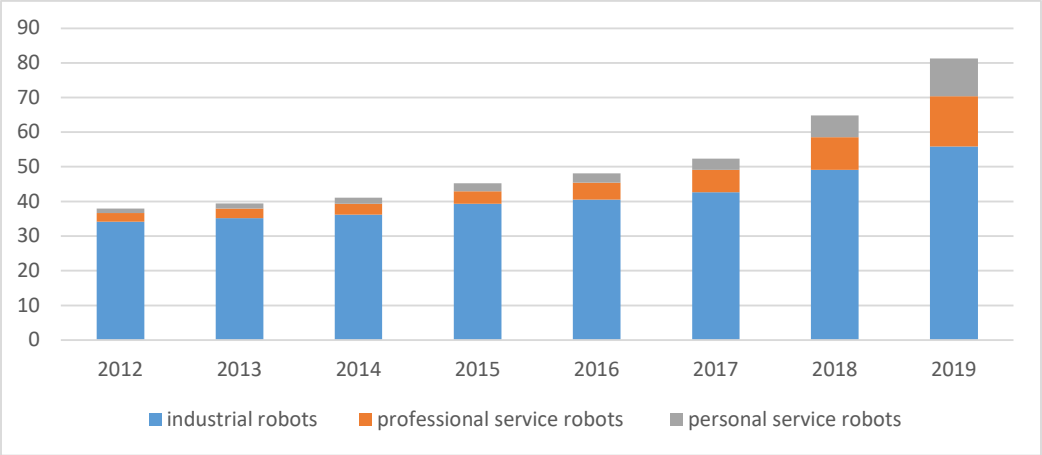

Fig. 2 : The global robotics market by segments, billions of dollars

It should be noted that service robotics is significantly ahead of industrial 32% versus 8%, respectively, in terms of growth rates.

Currently, sales of robots have grown significantly in 2019; about 484 thousand industrial robots were sold (Fig. 3). (Gorodetskiy and Tarasova, 2019)

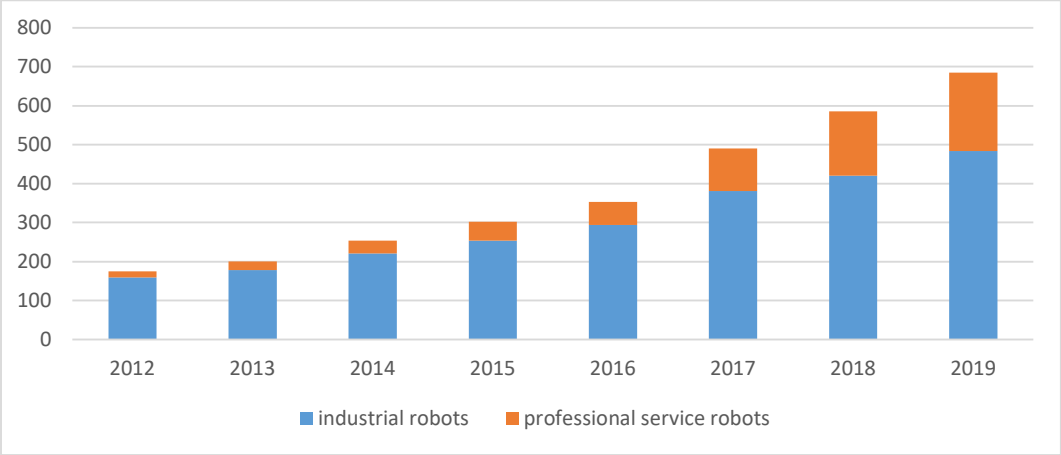

Fig. 3: Sales dynamics of industrial and professional service robots, thousands of units

Sales of personal service robots around the world were estimated at approximately 17.4 million units in 2019.

The increase in sales in all segments of the robotics market is primarily associated with a decrease in the cost of manufactured robots, due to improved manufacturing technologies, cheaper materials, as well as automation of most technological operations. Today, the cost of one industrial robot averages about 40 thousand dollars (Fig. 4). (Bogue, 2016)

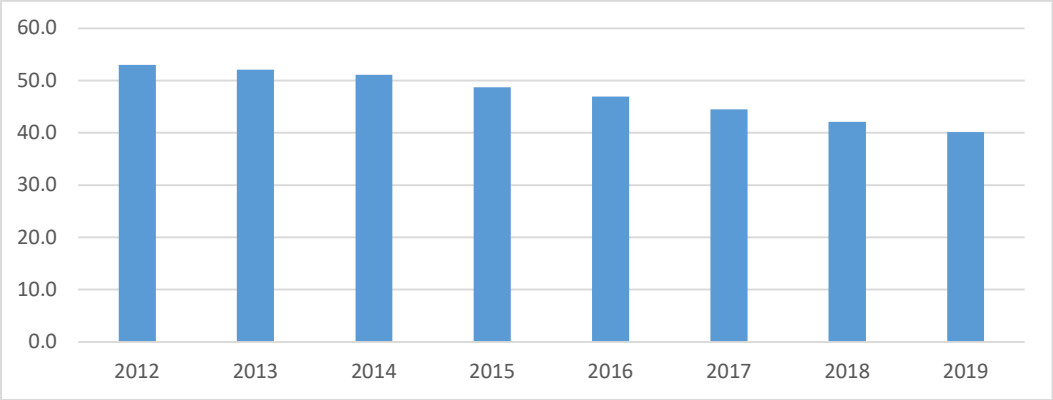

Fig. 4: The cost of one industrial robot in the world, thousands of dollars

Asia is still the fastest growing robotics market in the world: in 2019, sales of industrial robots increased to 351 thousand units (Fig. 5).

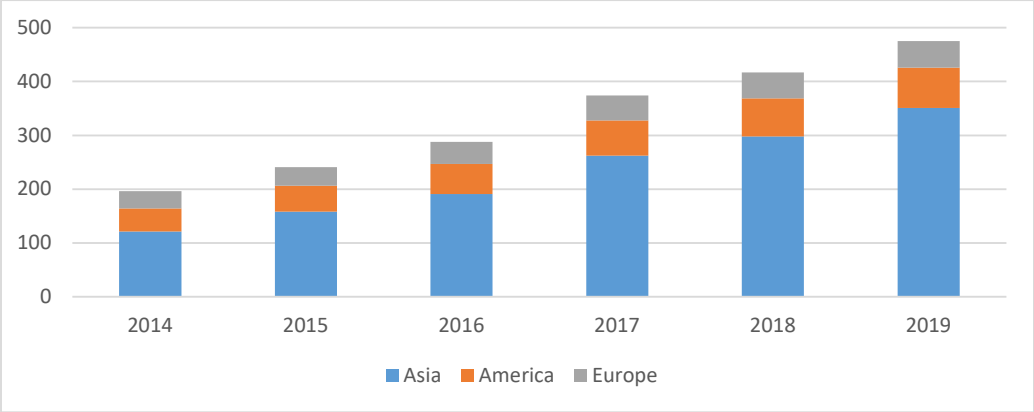

Fig. 5: The global market for industrial robots by region, thousands of units

China is the absolute leader in the market of industrial robots, whose sales exceeded 135 thousand units in 2018 (Fig. 6).

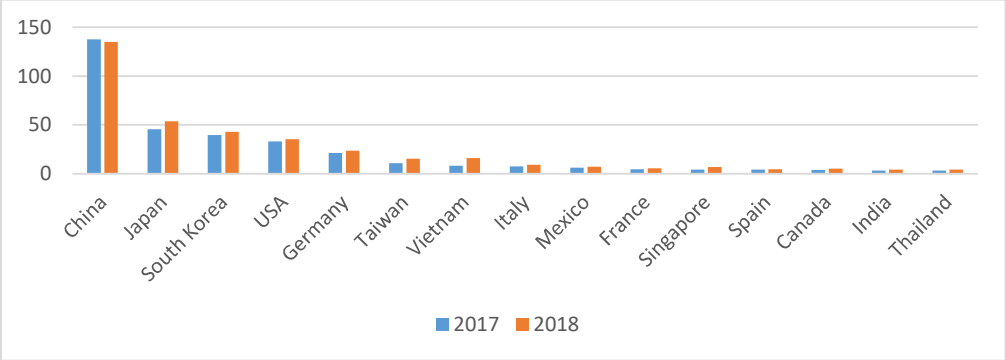

Fig. 6: Countries leaders in the implementation of industrial robots, thousands of units

Japan is the absolute leader in the market of industrial robotics for the production of robots. In the ranking of the largest robot manufacturing companies, seven out of thirteen are Japanese (Fig. 7). (Kaivo-Oja, 2017; Pagliarini and Lund, 2017)

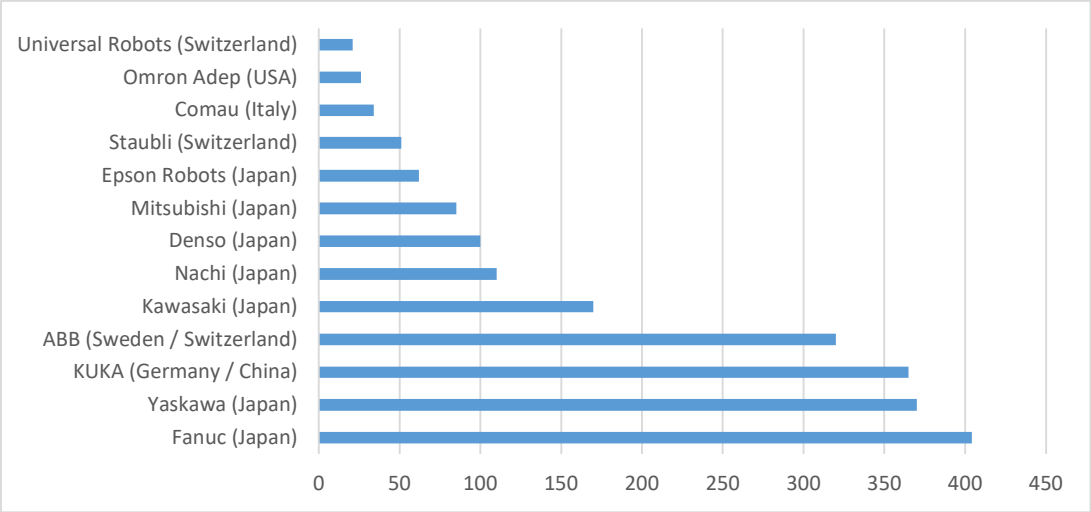

Fig. 7: Companies of world leaders in the production of robots, released over the entire time of their existence, thousands of units

If Asia is the leader in the market of industrial robots, then America is the leader in the market of professional service robots. (Wolfgang, 2017) In 2019, the volume of sold robots of this type amounted to 140.8 thousand pieces (Fig. 8).

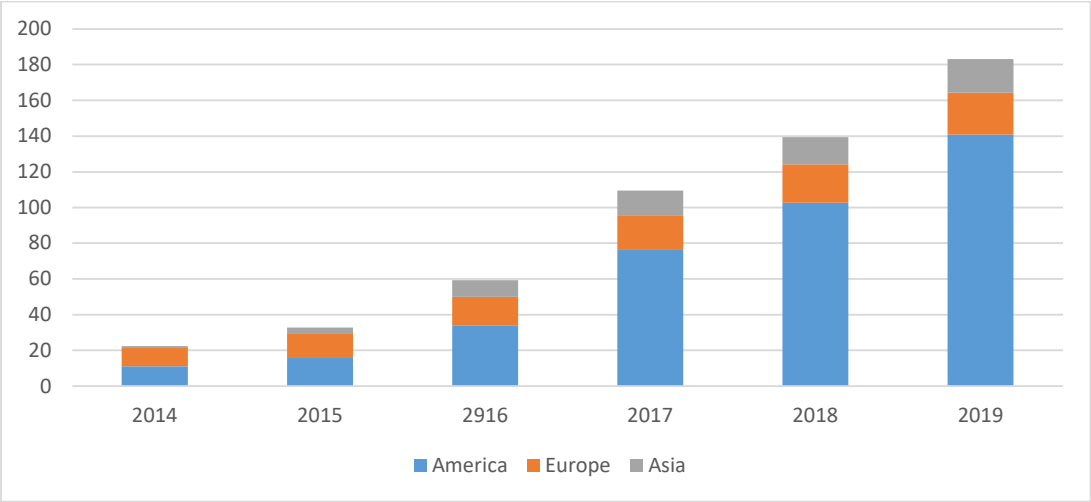

Fig. 8: Market dynamics of professional service robots by region, thousands of units

The situation is similar in the market of personal service robots, where the leading positions also belong to America. (Nikolova, 2017) In 2019, over 9.6 million of these robots were sold in this region (Fig. 9).

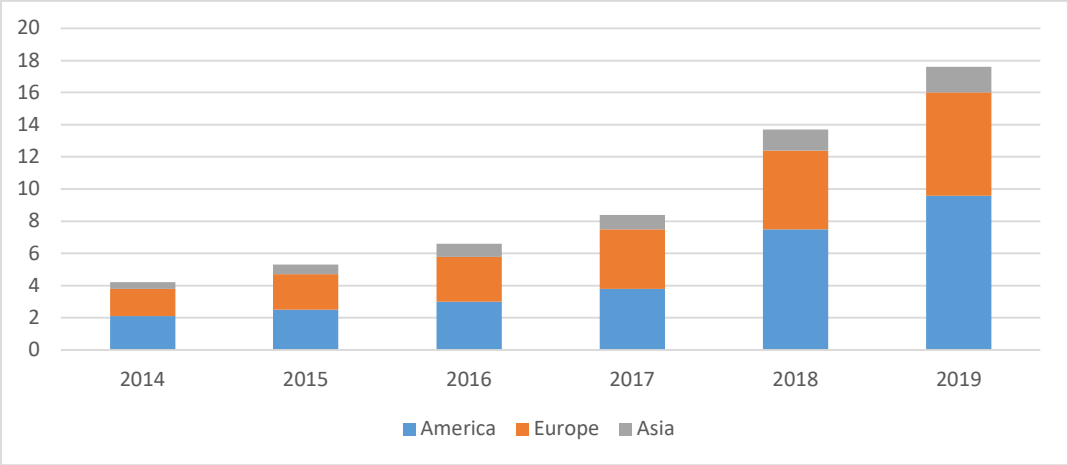

Fig. 9 : The market of personal service robots by region, millions of units

While China dominates the industrial robotics market, the United States holds absolute leadership in the field of service robotics. In 2019, 389 service robotics-manufacturing companies were registered in this country (Fig. 10).

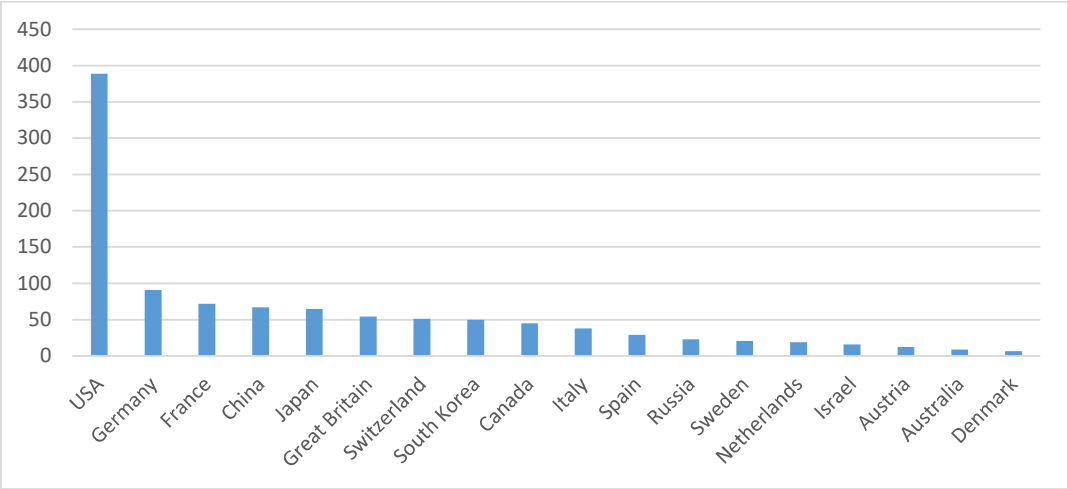

Fig. 10: Countries by the number of companies in the field of production of service robotics, units

One of the most important indicators of industrial automation is the density of robotization, which is determined by the ratio of the number of robots per ten thousand people employed in production. In 2019, the average level of density of robotization in the world was 117 units (Fig. 11)

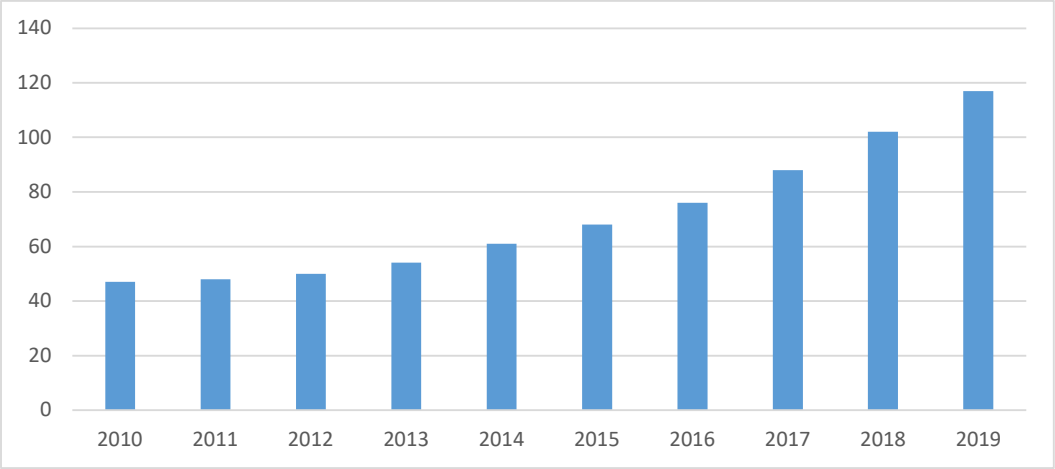

Fig. 11: The average density coefficient of robotization in the world, units

South Korea is the leader in robotic density, in which the value reached 740 units in 2019 (Fig. 12).

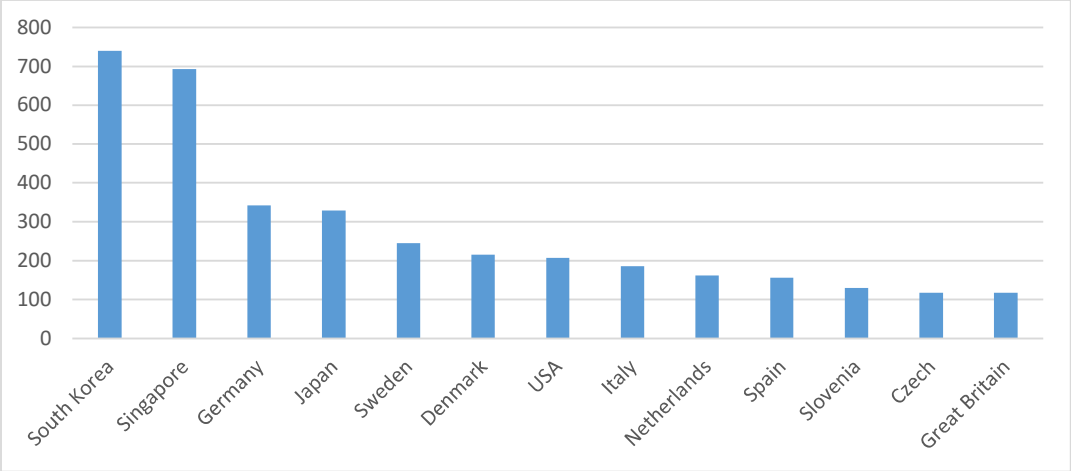

Fig. 12 : Leader countries in terms of density coefficient of robotization, units

For comparison, the density coefficient of robotization was at the fourth level in 2018.

The main areas of robot application

The spheres of industrial robots are expanding today, but, for all previous years, the leader is the automotive industry. The automotive and electronics industries consume almost two-thirds of all industrial robots manufactured in the world. These industries account for 34% and 33% of all sales, respectively (Fig. 13). (Van Wynsberghe, 2016)

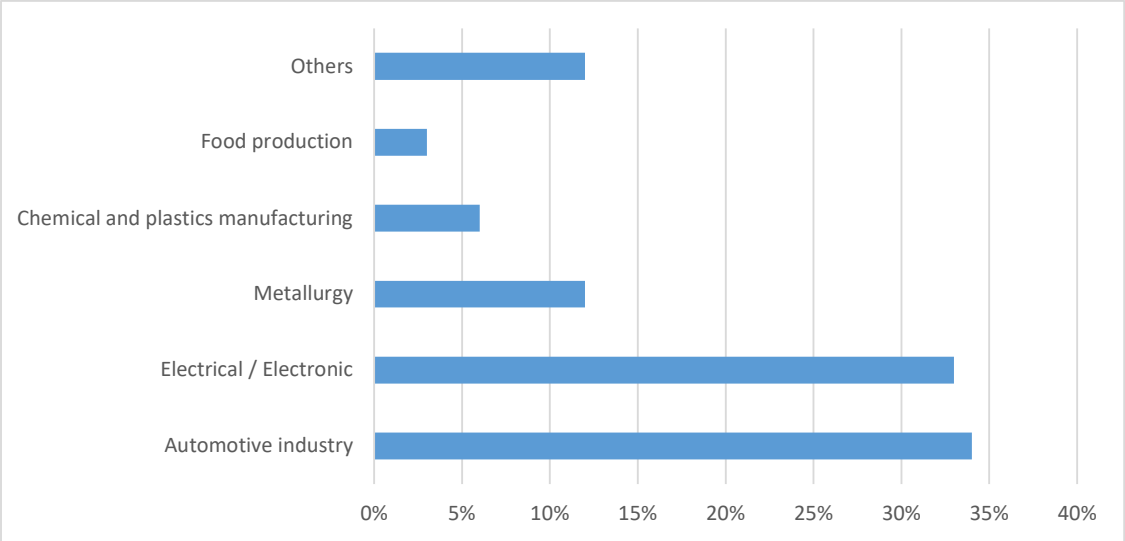

Fig. 13: The main areas of using industrial robots, in percent

The automotive industry is undergoing major changes and therefore requires new, more advanced robots. In connection with the European Union emission reduction program, European automakers are planning to increase the production of cars with low carbon emissions by 2030 and are gradually switching to fully electric transport. All this against the background of high consumer requirements for quality and product customization. As a result, sales of robots in the automotive industry grew by 24% in 2018. (Chen, 2018)

Over the years, the demand for robots in the automotive industry has largely determined the overall flow of investment in installing robots in the world. However, the status of the main robotics market has moved to another industry in recent years. In the leading countries of the robotics industry - Japan, China, South Korea - the main driver of demand for robotics was the production of electronics. The electronics industry accounts for 33% of the world's supply of robots. Demand for robots in this industry is growing rapidly: in 2018, sales increased by 35% compared to 2017. (Agarwal, 2017)
It is the growing demand for consumer electronics and the need to automate the entire production that continues to be the main factor in the global growth in sales of industrial robots.

Along with the expansion of the areas of application of industrial robots, the areas of using service robots are also growing. The main area of application of these robots is the logistics sector, which accounts for about 63% of the supply of all service robots (Fig. 14). (Webster and Ivanov, 2020)

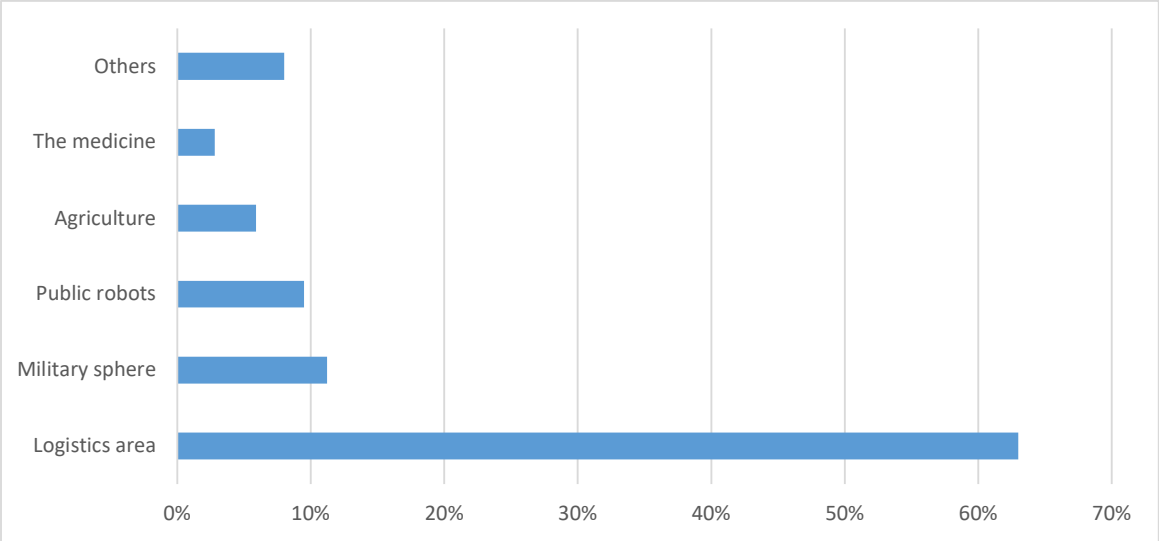

Fig. 14 : Areas of using service robots, in percent

In 2017, sales of such robots increased by 162% compared to 2016. We can say that in the market of professional service robots there are only two types of robots - logistics and all the others. According to IFR estimates, in 2018, sales of logistics robots increased by another 66%. High demand for mobile logistics robots will be supported by the development of all types of trade, including electronic. In particular, experts estimate that e-commerce has created more jobs in logistics than it has declined in offline stores. (Goncharova and Bezdenezhnykh, 2018)

Prospects for the implementation and use of robots in the modern economy

According to the WEF International Economic Forum, 29% of global production is automated. For comparison, in 2022, the share of machines and algorithms in working time will be 42%, 52% - in 2025. Robots will do more and more work for people, but they are not able to take on all the work, only part of the tasks. According to some estimates, only a quarter of jobs can be automated by more than 70%. Automation performance may vary depending on the application. For example, about 47% of all processes are currently automated in the field of data processing, there will already be 62% by 2022, and only 19% (up to 28% - by 2022) - in the field of managerial decision-making.

Using technologies that are available today, it is can be automated 45% of the tasks of an ordinary company. If we consider individual sectors of the market, then, according to experts, the hotel and restaurant business sector are considered the most vulnerable to robotization - about 75% of the processes there can be automated by existing technologies. Mining (63%) of processes is in second place. About 30% of all processes can be automated in production. A small percentage of automation in this industry is associated with a high current level of automation - production is close to saturation point in contrast to other industries (Fig. 15). (Wirtz et al, 2018)

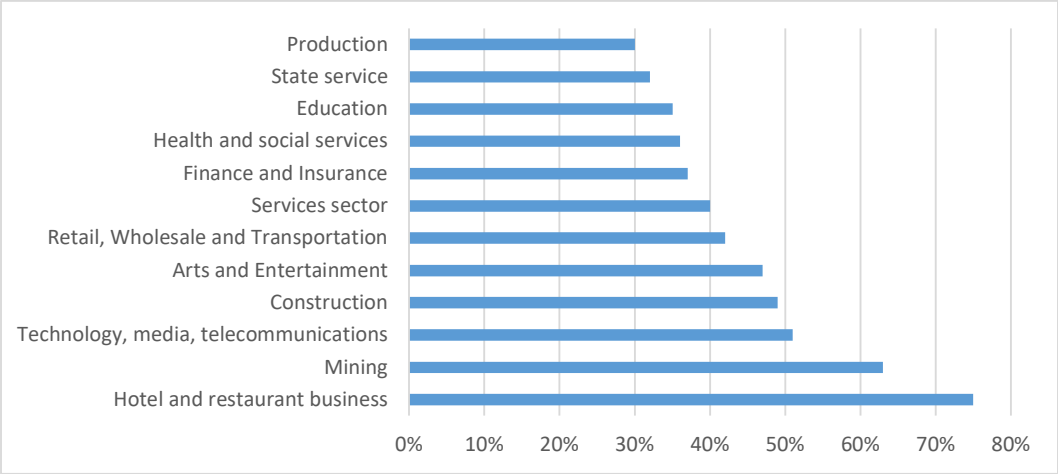

Fig. 15: Rating of directions, where the percent of works that can be automated is indicated, in percent

Further expansion and deepening of the areas of automation contribute to increasing the volume of the global robotics market, which will exceed $ 505 billion by 2025 (Fig. 16).

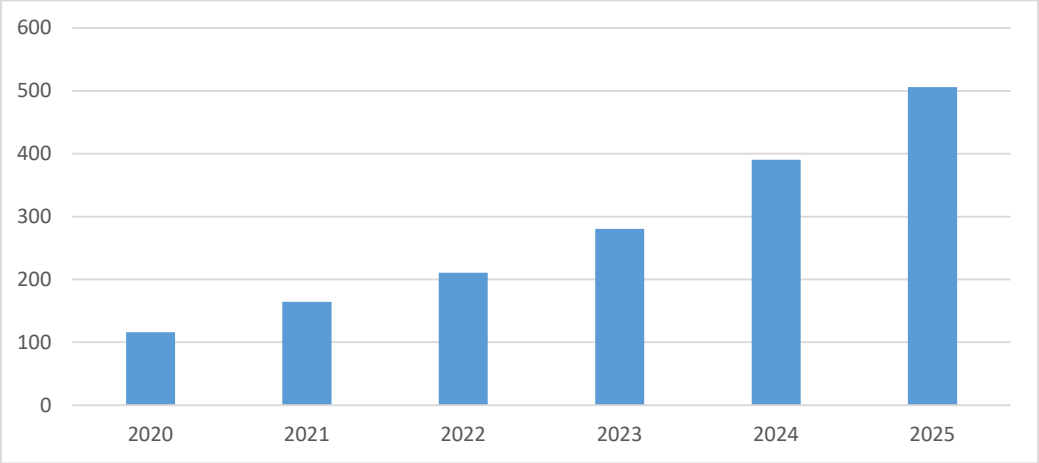

Fig. 16 Forecast of the dynamics of the global robotics market, billions of dollars

The number of industrial robots sold in the world market in 2025 is supposed to be about 920 thousand units.

At current growth rates, the share of revenue of service robots in the world market by 2025 is expected to exceed the figure of 60% and amount to about $ 300 billion.

Conclusions

One of the drivers for the development of digital transformation of the global economic system is Industry 4.0; a “smart economy” should be formed within this concept, capable of adapting to the needs and requirements of each individual;

One of the fundamental directions within Industry 4.0 is the digital transformation of the manufacturing sector, which implies a transition to a new qualitative level of development, involving going beyond a single enterprise and moving to a single global production system. Therefore, one of the most important

components in the concept of Industry 4.0 is robotics, the main task of which is to provide full automation of workplaces;

In today's world market, which is estimated to be at $ 81.3 billion in 2019, there are two large groups of robots: industrial robots, which should provide automation of production technological operations, and service robots, which are designed to perform maintenance operations. Industrial robots account for 68% of the global market, but this ratio is projected to change by 2025 in favor of service robotics, which will occupy about 60% of the global market;

One of the main areas of using industrial robots is the automotive industry, which accounts for over 34% of all implementations. However, in the last few years, the emphasis has shifted from it to the field of electronics production, which currently occupies about 33%. The main application of service robots is the logistics direction, which accounts for over 63% of all implementations. In the future, service robots can be used in the military sphere, agriculture, medicine;

The development and application of Industry 4.0 will contribute to the expansion and deepening of automation processes not only in the manufacturing sector but also in other economic areas. Therefore, according to the forecast, the growth of the global robotics market by 2025 is supposed to exceed the figure of 505 billion dollars, and the number of implemented industrial robots reach a value of 920 thousand units.

Acknowledgement

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Digital Transformation of the Economy: Features of the Development of Robotics in Russia

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Abstract

The development of the global economic system is in the trend of large-scale implementation and use of information and communication technologies. Innovative digital technologies are changing the entire landscape of economic relations, creating completely new forms of management and organization of economic entities. The development and use of digital technologies have contributed to the formation of an innovative type of economy, the main drivers of which are the most advanced information technologies: artificial intelligence, cloud computing, blockchain and many others. Entire innovative areas that provide a powerful digital transformation of the economy have appeared within traditional areas of the global economic system. One of the main directions in the digital economy in the manufacturing sector is the development of Industry 4.0. The main task of it is the creation of "smart manufacturing" that can provide a new qualitative transition in the development of industrial relations and building production to meet the needs and requirements of each person. One of the main components of Industry 4.0 is the development and application of robotics, without which it is impossible to fully automate technological processes. It is no coincidence that in the past few years, most countries have joined the process of creating and applying innovative robot models. Sales of robots around the world are growing very fast. In many countries, programs to digitalize the economy have been adopted at the state level, where one of the main points is the development of innovative robotics and the full automation of both industry and all other areas of economic development. Russia has also joined the process of digital transformation of the economy, the main aspect of which is the development of robotics in the country. Goals and main directions of digitalization of the Russian economy are considered in this study. The tasks for creating high-tech industries based on the introduction and application of industrial robots that can provide a sharp increase in labor productivity are defined as part of the digitalization of the production sector. In this regard, modern trends in the development of Russian robotics are analyzed, an analysis of the Russian robot market is carried out, its main parameters are determined: market development dynamics, average annual growth rates, and the main players of the Russian market are identified. Identifying areas of using robots in the Russian economy is paid great attention in this article; areas for their wider application are defined. The reasons that hinder the introduction of robots in the Russian economy are identified and analyzed in this research. Based on a comprehensive analysis, further prospects and development paths for the Russian robotics market are identified.

Keywords: Information Technology Management, Digital Economy, Industry 4.0, Innovation, Robotics, The Russian Market, Development Dynamics, Perspectives.

Introduction

The development of the modern world economic system is moving towards the creation of a new type of economy - a digital one, based on the latest achievements in the field of information and communication technologies. Despite the rapid introduction of innovations in all spheres of economic development of the world system, it is impossible to build an innovative economy without digital transformation of the production sphere. Production is the basis on which the entire economic system is built. Therefore, it is no coincidence that Industry 4.0 is one of the main directions in the digital economy, which provides for a qualitative change in the production sphere.

One of the main components of Industry 4.0 is robotics, whose task is to create fully autonomous robots that can independently make decisions within their competencies.

Today, robotics is one of the fastest growing sectors of the global economic system. China is one of the leaders in the market of modern robots, which increased the introduction of robots to 135.8 thousand units in 2018. It is increasing the production of its robots along with the purchase of foreign-made robots, both through the creation of purely Chinese companies, and through acquisitions of companies of world leaders in robotics. For example, the German company KUKA, which is now more focused on the Chinese market. Such a dynamic development of the Chinese robotics market is due to the development of the state program on digitalization of the Chinese economy, under which up to $ 6 billion is allocated annually for the development of promising technologies.

One of the leading leaders in the market of service robots in the US over the past few years has been creating its production of industrial robots, which has almost been minimized, seeing the possible prospects for the introduction and development of innovative robot models in this area.

In general, the global robotics market is developing with an average annual growth rate of about 20%, while maintaining the pace of development, the market volume from the current $ 81.3 billion should grow to $ 505 billion, and sales of industrial robots should increase from 484 thousand units in 2019 up to 920 thousand units in 2025.

At the same time, the market will be expanded due to the coverage of new areas for the introduction of robots. By 2025, the number of service robots in the global robotics market will grow from the current 32% to 60%, which exceeds $ 300 billion. (Smirnov et al, 2018)

Russia, positioning itself as one of the leaders in world economic development, is trying to find its way in the digital economy, implementing innovative technologies.

One of the areas of development of an innovative economy is precisely the production sphere. Therefore, research in the direction of development and application of modern types of robotics is an important and relevant direction, allowing us to assess the possibilities of digital transformation of the Russian economy within Industry 4.0.

Key Research Findings

Digital Transformation of The Russian Economy

Today, the digital transformation of the economy has reached a level where investors have begun to receive real dividends from the introduction and use of information and communication technologies, when innovative digital technologies from the field of research have moved to the real sector of the economy, which has contributed to the acceleration of investment by potential investors.

Today, in many countries that are world leaders in the development of the digital economy, there is an investment growth from both the private business and the state in the development of promising technologies. For example, over 40 billion euros are allocated for the development of Industry 4.0 in

Germany under the state -private partnership, which allows it to be one of the leaders in the digitalization of the economic sphere. (Borremans et al, 2018)

In Russia, in 2017, the national state program "Digital Economy of the Russian Federation" was approved, the implementation of which should be completed in 2024.

The main end-to-end digital technologies that are part of this Program are:

Big data;
neurotechnologies and artificial intelligence;
distributed registry systems;
quantum technologies;
new manufacturing technologies;
industrial internet;
components of robotics and sensors;
wireless technology;
virtual and augmented reality technologies.
One of the important directions in this program is the development of robotics as the basis of modern production, which gave hope for the accelerated development and use of robots in the Russian economy.

About $ 43.3 billion was allocated for the entire program in 2018, the federal government invested $ 20 billion of which, and the remaining funds would be received from extrabudgetary sources.

In 2019, the program was adjusted to reduce funding for the program to $ 24.6 billion, while the federal budget would allocate $ 17 billion for it. In addition to reducing the cost of the program for digitalization of the Russian economy by almost half, out of the twelve priority programs, the Digital Economy of the Russian Federation program takes the last place in terms of budget spending (Fig. 1). (Raevskaya and Stogova, 2018)

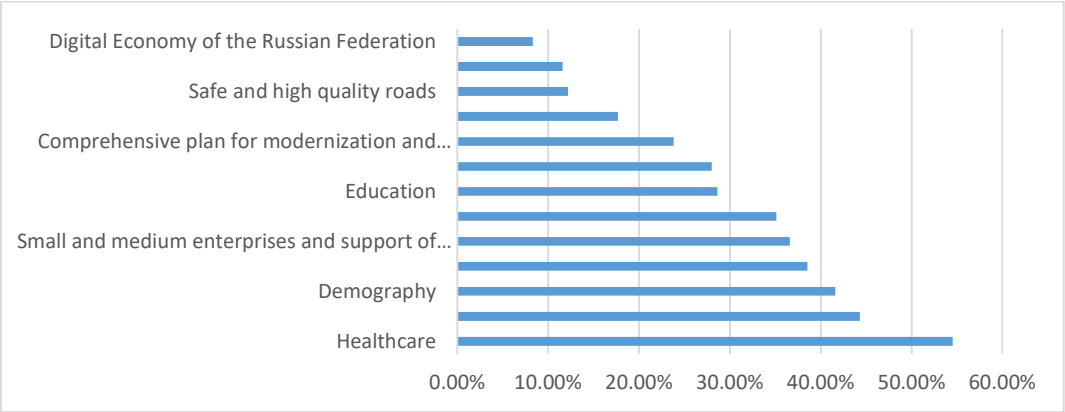

Fig. 1 : The level of budget spending on Russian government programs, in percent

Such parameters for the implementation of the state program “Digital Economy of the Russian Federation” suggest that today the digitalization of the Russian economy is not a priority area of the Russian government. Accordingly, the prospects for the development and use of robots in the Russian economy are foggy; one of the indirect confirmation of this is the decrease patent activity in the field of robotics in Russia (Fig. 2). (Korneeva, 2020)

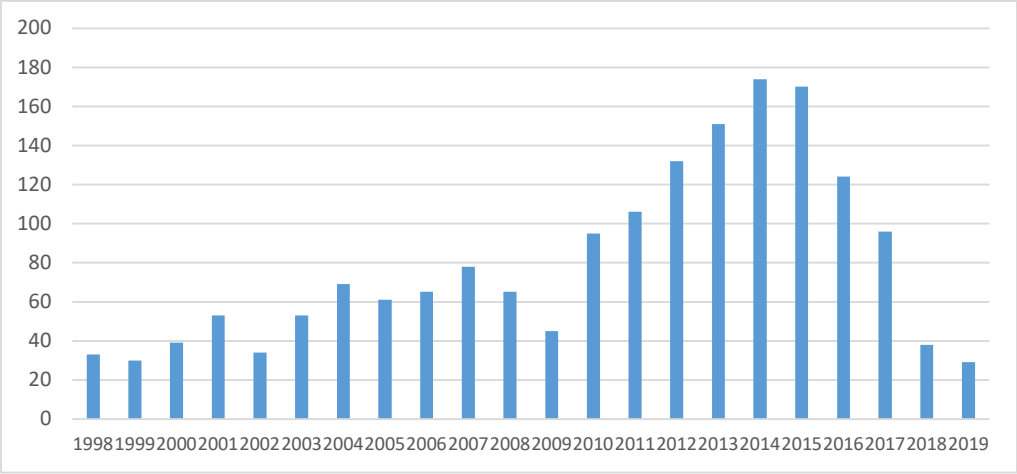

Fig. 2: Patent activity in Russia in the field of robotics, units

In terms of patent activity in the field of robotics, Russia returned ten years ago, which may indicate a decrease in interest in this area, in plans for scientific and practical developments.

The Russian robotics market

The first industrial robots in the USSR appeared in the 1960s; their production was single and was used in space and military spheres.

Mass production of industrial robots in the USSR began in the 1970s. In 1972, work in the field of robotics took on a planned character on a national scale: the first 30 commercially suitable industrial robots were created, including universal ones for servicing machines on pneumatic, hydraulic and electric drives, stationary and mobile. In particular, they were created and introduced commissioned mobile industrial robots MP-1 and Sprut-1. To continue this work, a production program was designed for the next five years. As a result, more than 100 brands of industrial robots were created and mass production of 40 brands of robots was organized. By the end of the 1970s, the industrial robot park in the USSR covered the main industries. The largest concentration of industrial robots was observed in the Ministry of Defense Industry - 255 units. The forecasted need for industrial robots in the USSR was determined - more than 120 thousand units by 1990.

The development and application of robotics practically stopped because of the collapse of the USSR. The first major introductions of robots in Russia began at the beginning of the twenty-first century. Today's Russian robotics market is estimated at approximately $ 50.1 million (Fig. 3). (Zatsarinnyi and Korolev, 2019)

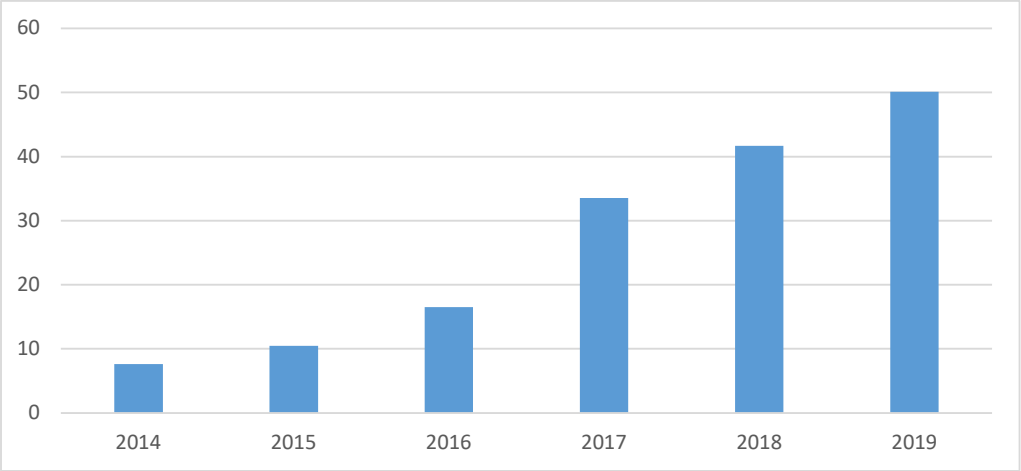

Fig. 3: The Russian robotics market, millions of dollars

Russia occupies one of the last places in the world in the number of introduced robots, their number amounted to 983 units in 2019 (Fig. 4). (Levina, 2019)

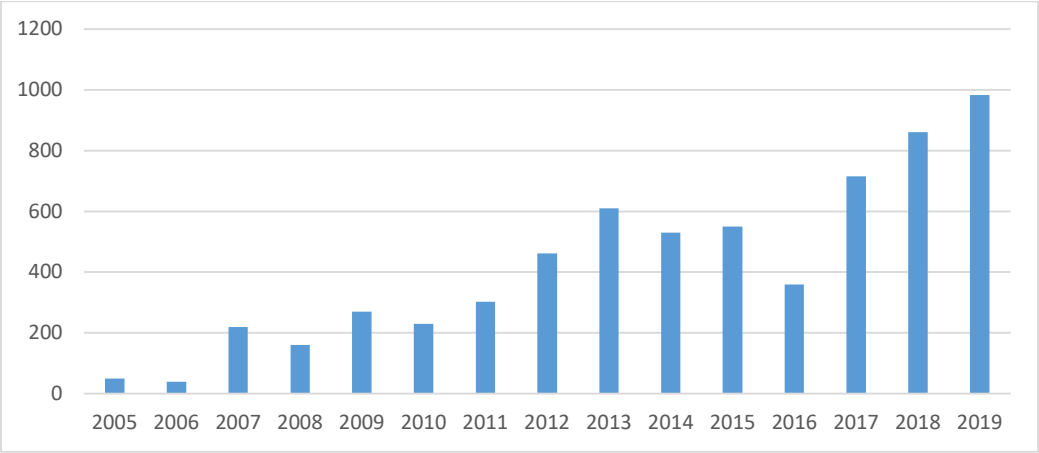

Fig. 4 : The dynamics of the introduction of industrial robots in the Russian economy, units

One of the positive trends in the Russian market of industrial robotics can be noted its positive dynamics for the third year in a row. Despite this, the share of the Russian market in relation to the world continues to decline (Fig. 5). (Tkacheva et al, 2017)

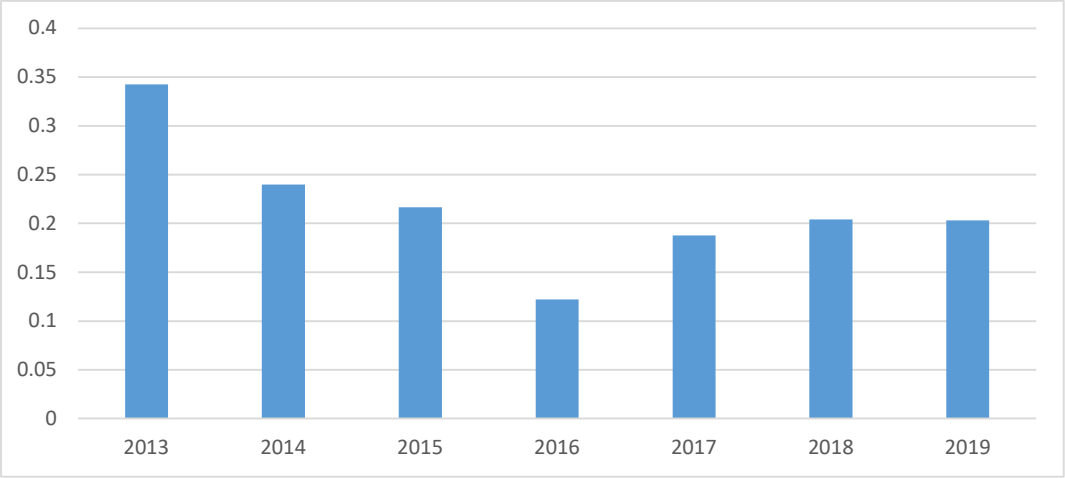

Fig. 5: Changes in the Russian robotics market in relation to the world, in percent

Nowadays, the share of the Russian market from the world is about 0.2%.

One of the main indicators in the field of automation of production is the degree of density of robotization, which is determined by the ratio of the number of introduced robots per 10,000 people employed in industry. In Russia in 2019, this indicator was 4 units, with a world average of 117 units (Fig. 6). (Ashmarina et al, 2019)

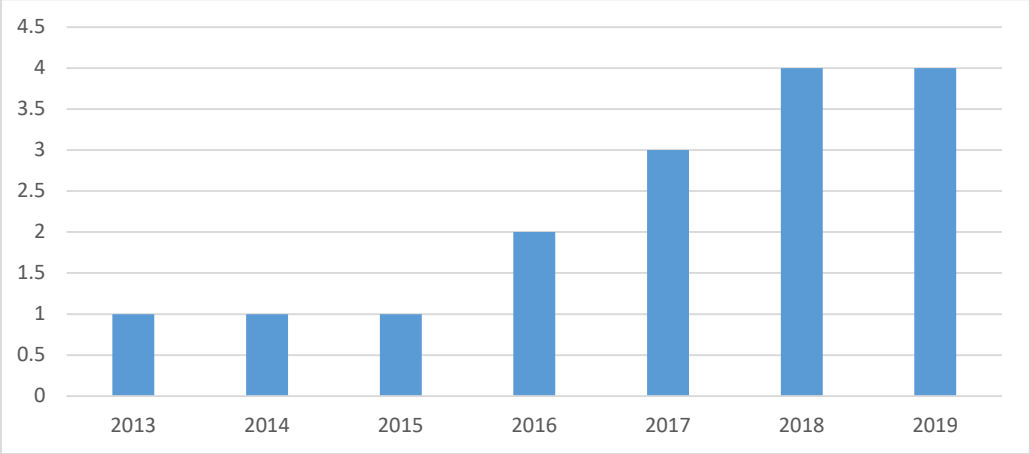

Fig. 6: The density coefficient of robotization, units

The growth of the density of robotization in Russia is primarily due not to an increase in the number of robots deployed, but to a reduction in jobs.

The leaders in the density of robotization are the countries of Southeast Asia, for example, this figure is 740 units in South Korea.

Attracting robots to production is an expensive investment, so if there is cheap labor, it makes little sense to install high-tech equipment. It would seem that it is for this reason that the number of industrial robots in Russia is so small. However, this is not the only reason why the country has such a low level of robotization.

There is another characteristic, where the number of robots per 10,000 production workers is normalized by the level of wages of these workers (Fig. 7). (Afonasova, 2018)

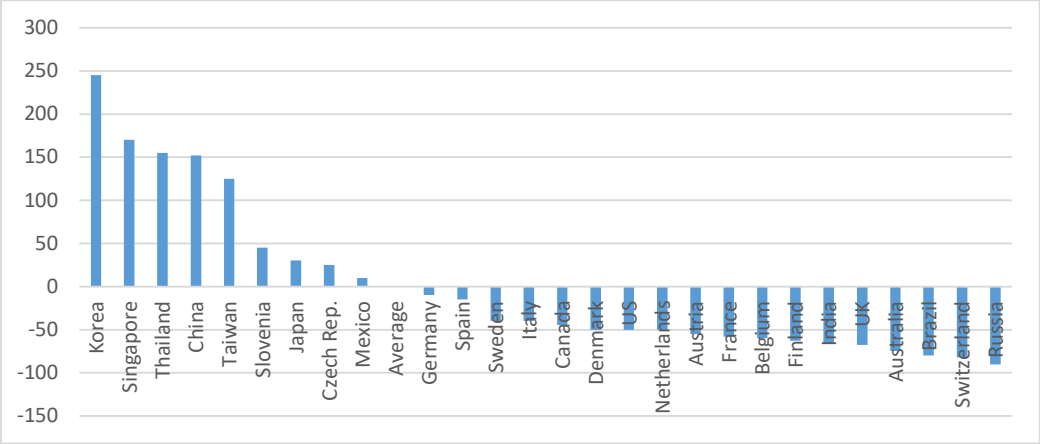

Fig. 7: The rate of introduction of industrial robots to normalize salaries, in percent

According to this indicator, the countries of Southeast Asia occupy a dominant position. The top lines are South Korea and Singapore with acceptance rates of about 2.4 and 1.7 times. The adoption rate is calculated relative to the average of what might be expected based on the current average wage. Even countries like Thailand, which has only 48 industrial robots per 10,000 production workers, have acceptance rates 159% higher than wage levels that could be predicted.

On the other hand, it turns out that most countries in America and Europe implement robots much more slowly than expected. The United States and Great Britain showed an acceptance rate of 49% and 68% less than expected, this is due primarily to the fact that the markets of these countries today have a high degree of automation.

Even after the normalization of wages, Russia occupies the last place in the ranking; here it is inferior even to India, although the degree of robotization surpasses it.

In the Russian robotics market, there are about five domestic companies that manufacture robots (Fig. 8). (Kozlova, 2019)

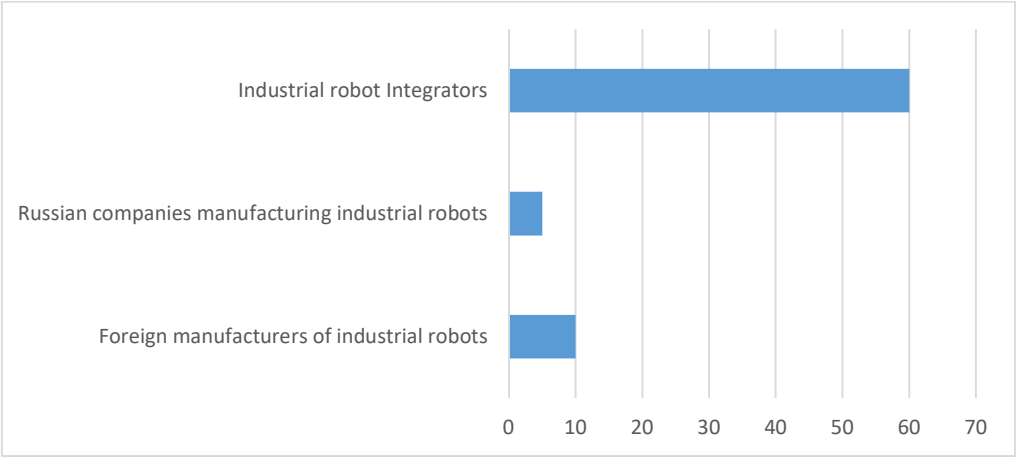

Fig. 8 : Robotic companies in Russia, units

Among domestic companies, one can distinguish "ARKODIM" has two production bases located in Kazan and Novosibirsk. The company has been manufacturing industrial robots since 2014. The first experimental model of the robotic arm appeared in 2015, and since 2016, the company has been supplying industrial robots to customers. (Rudskaya and Rodionov, 2017)

The AvangardPLAST group of companies carries out the development, production and implementation of industrial robots. The company cites simplicity of management and quick parameter settings as the key advantages of its products. The company produces robotic manipulators for working with injection machines (injection molding machines, with different maximum loads and different axial travels). The robots-manipulators of this company GRINIK are manufactured in series, but individual models can be designed by the customer.

Among foreign manufacturers, the Japanese company FANUC is the leader in the domestic market, which occupies about 43.5% of the entire Russian market (Fig. 9). (Zueva and Gorovoy, 2018)

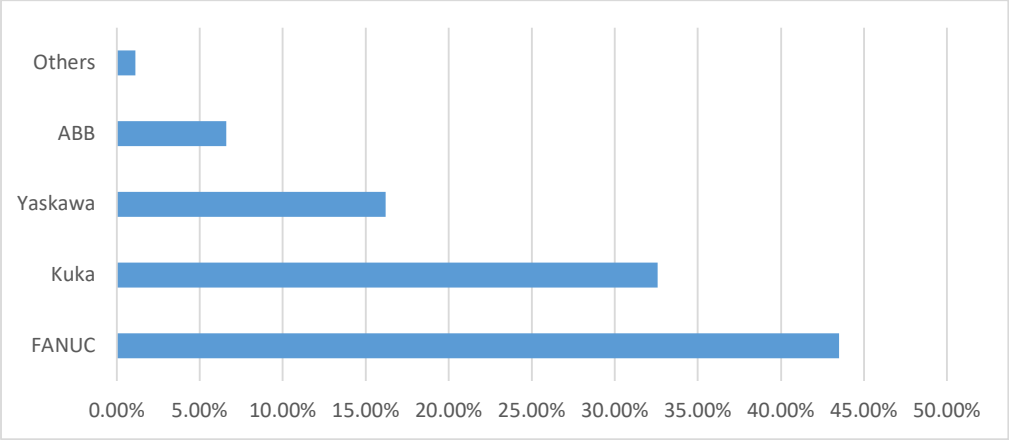

Fig. 9: Global companies manufacturing industrial robots in the Russian market, in percent

In the field of service robotics, Russia occupies the twelfth position in the number of companies producing robots of this type (Fig. 10). (Veselovsky, 2018)

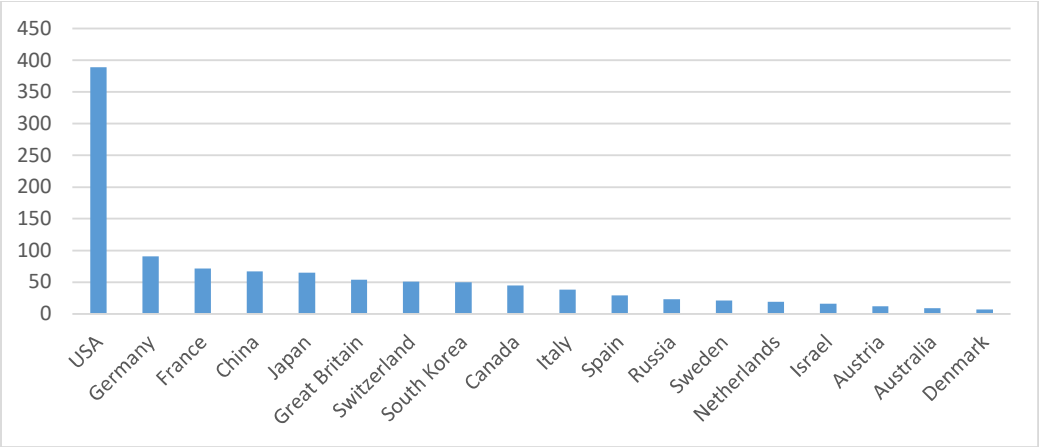

Fig. 10: Rating of countries by the number of companies manufacturing service robotics, units

Despite a large number of service robotics manufacturing companies in Russia, the market size is relatively small and amounted to about $ 17 million in 2019 (Fig. 11). (Iskhakov, 2019)

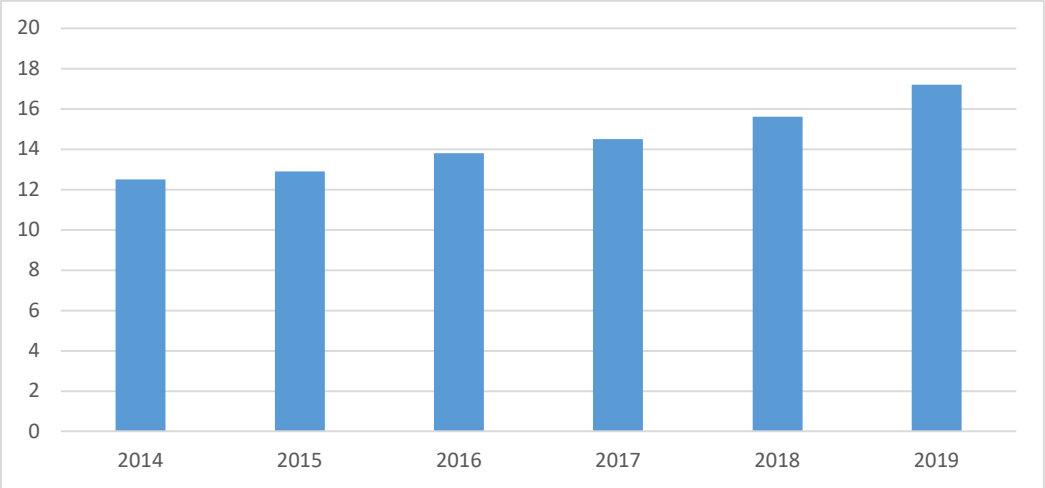

Fig. 11 : Volume dynamics of the Russian service robotics market, millions of dollars

Russia has better chances in the development of service robotics, than in the development of industrial robots.

Areas of robot application in Russia

The main field of application of industrial robots in the Russian market is the automotive industry, which occupies about 38% of the entire market (Fig. 12). (Balashova and Gromova, 2017)

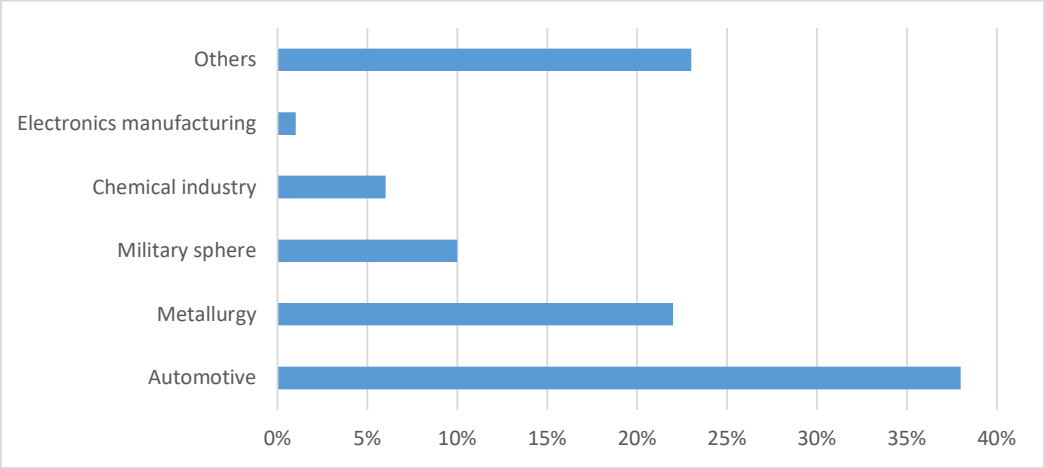

Fig. 12: The main areas of application of industrial robots in Russia, in percent

The automotive industry is a traditional field of application of industrial robots, both in the world and in Russia. Today, the automotive industry in Russia is experiencing difficult times, car sales are falling for several years in a row, and, consequently, production is also declining, which affects the introduction of robots in this industry.

Nowadays, using industrial robots in the field of electronics production, which occupies about 33% of the global market, is in the global trend. In the Russian industry, this share is about 1%, which is primarily due to the almost complete absence of such industries.

The most performed robotic operation in Russian production is the welding process - approximately 47% (Fig. 13). (Ossewaarde, 2019)

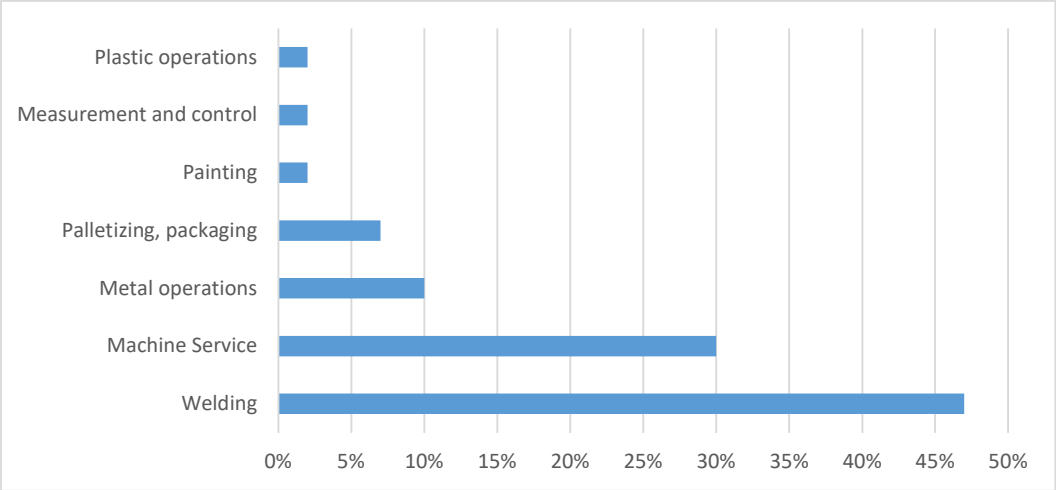

Fig. 13 : The main operations performed by industrial robots in Russian production, in percent

As you can see, most of the operations are related to the automotive industry to one degree or another. Promising areas for using industrial robots in the near future can be agriculture, mining, nuclear industry, shipbuilding and aircraft manufacturing.

Prospects for the development and use of robots in Russia

From the analysis above, it follows that the prospects for the development of robotics in Russia at the pace of investment, both from the state and from the private business, are very sad. Given the continued growth rate of the Russian robotics market, there may be a further lag behind world leaders, which already reaches truly catastrophic proportions.

Nowadays, there are more problems than opportunities in the development of robotics in Russia. One of the main systemic problems in the development of robotics in Russia is the lack of a clear industry development program (Fig. 14). (Petrenko and Voronkov, 2018)

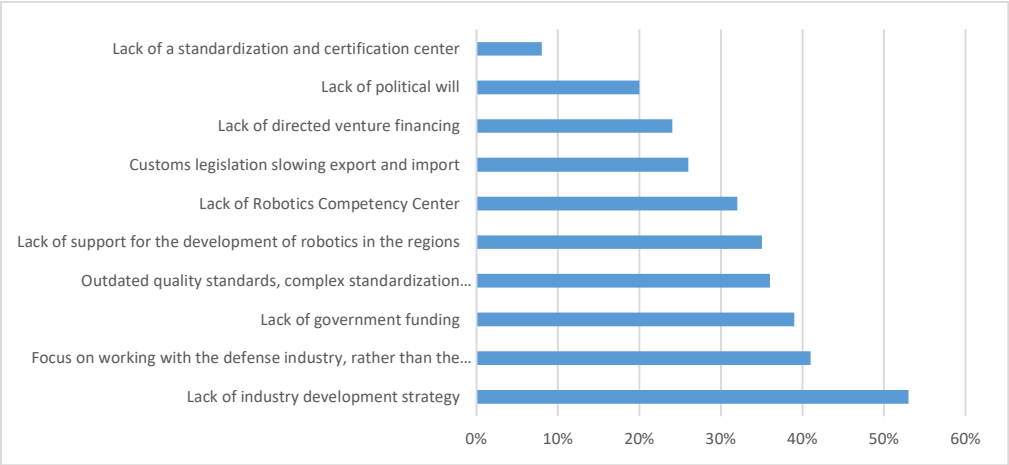

Fig. 14: Systemic barriers to the development of robotics in Russia, in percent

In addition to systemic problems that stand in the way of the development of robotics in Russia, there are practical difficulties. One of the main in this regard is the low level of R&D organization in domestic companies (Fig. 15). (Balashova and Gromova, 2017)

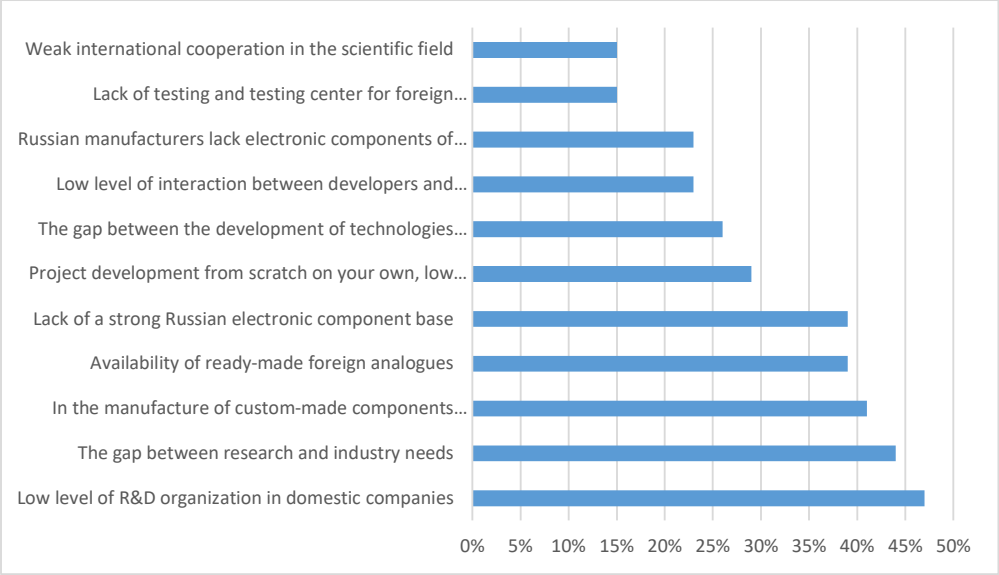

Fig. 15: Practical barriers that hinder the development of robotics in Russia, in percent

Further development of the Russian robotics market will go at a slow pace; in the near future, there are no reasons for its acceleration. According to the forecast, the volume of the Russian market of industrial robots may reach $ 108.3 million by 2025 (Fig. 16).

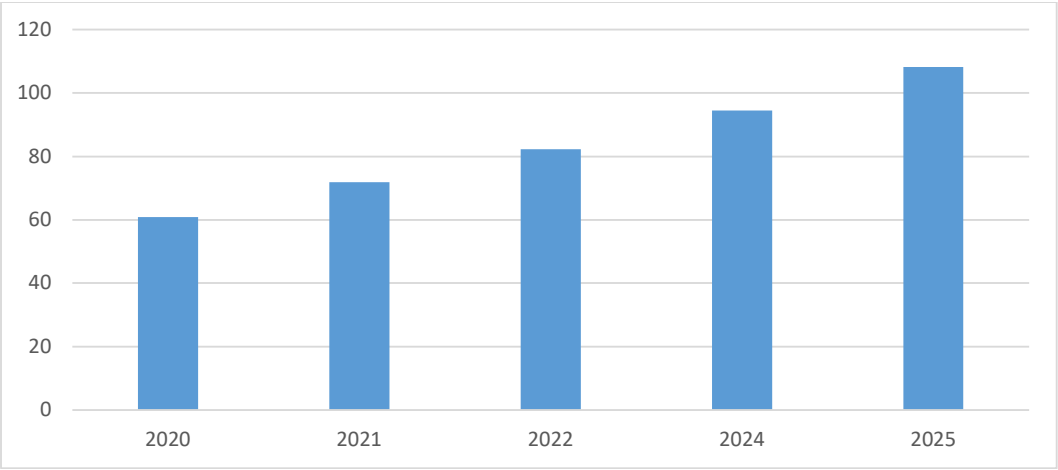

Fig. 16: Forecast on the dynamics of the volume of the Russian robotics market, millions of dollars

The service robotics market, despite Russia's stronger position in this segment, will also not show impressive results; its growth will be more likely to be progressive without any acceleration opportunities (Fig. 17). (Ronzhin, 2018)

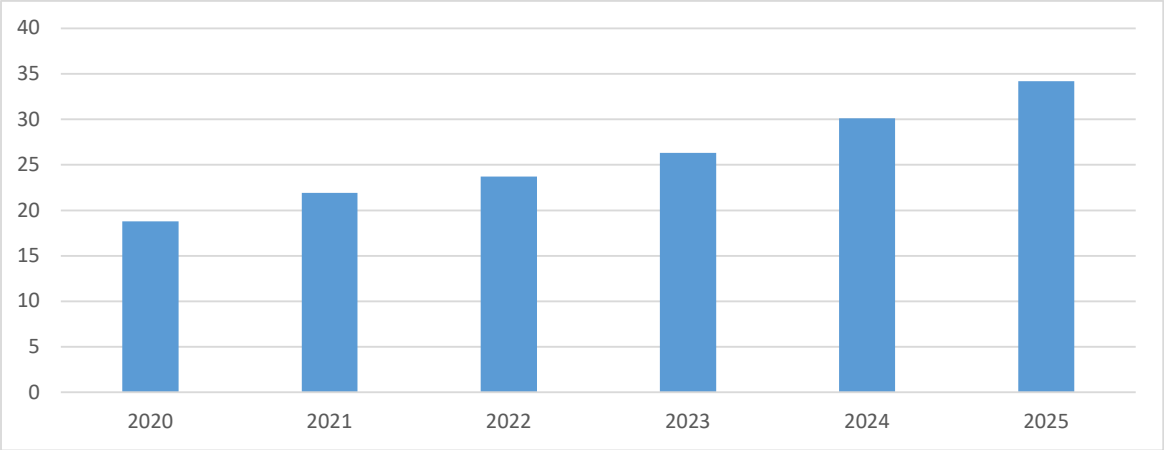

Fig. 17 : Forecast of the dynamics of the market volume of the Russian service robotics, millions of dollars

In general, it should be noted that the development of robotics in modern Russia is far from modern trends in this area. The lag behind world leaders in this direction is increasing and is taking on threatening prospects associated with the inability to provide a new technological breakthrough in the manufacturing sector and to modernize its economy to the new standards proposed by Industry 4.0.

Conclusions

An innovative sphere of economic development - the digital economy - has emerged under the influence of the large-scale introduction of information and communication technologies within the global economic system. One of the main directions of this is Industry 4.0, which is designed to ensure the transition of the manufacturing sector to a new high-quality stage of its development, the creation of "smart manufacturing", which allows adapt to the needs of a single individual;

One of the main components of the development of Industry 4.0 is the development and use of modern robots that can provide full automation of production. Therefore, it is no coincidence that the process of introducing industrial robots is ongoing around the world. One of the world leaders in this field - China -introduced about 135 thousand industrial robots in 2018, and the volume of the robotics market is supposed to exceed $ 0.5 trillion by 2025. Therefore, now many countries of the world invest in this area as part of a public-private partnership;

A program to digitalize the economy is adopted in Russia. One of the main components of it was the development of robotics, about $ 43 billion was allocated for the entire program until 2024, but by 2019, it had already been cut to $ 24 billion. While the budget execution level of these programs is at the level of 8%, which shows the corresponding attitude from the state to the digitalization of the economy and robotics in particular;

The volume of the Russian market of industrial robots is negligible. Its volume is about $ 50 million, which is about 0.2% of the entire global market. Russia occupies one of the last places in the world in the number of introduced robots; about 980 robots were introduced in 2019, another indicator, the density of robotization of the economy is at level 4, with an average world level of 117 units. This indicates the almost complete absence of automation using robots at Russian plants;

It can be stated that the development and application of robotics in Russia are practically not going on. The Russian market will lag behind world trends in this area with the financial support provided by both the state and private business. Moreover, the country will not be able to transform its production sector and, consequently, the entire Russian economy without developing one of the main components of Industry 4.0.

Acknowledgement

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Relational Capital in Cross-Sector Partnerships

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Abstract

When the public administration (the first sector) started to feel a need or an absolute necessity of executing the public tasks by non-public entities (NGO sector - the third sector, and business sector - the second sector), a need of creating the formal - and sometimes informal - "associations" of organizations descended from these three various sectors. Such activities were firstly identified as cross-sector cooperations (mostly run as informal associations of these organizations) and later as cross-sector partnerships (associations created within a framework of formal regulations). Therefore, the author assumes that both internal and external relational capital is a necessary determinant of creation, functioning and, most of all, the legitimacy of cross-sector partnership existence. The author wants to justify the thesis with the analysis of formal solutions and based on almost 10 years (2009-2019) of empirical research which was conducted in NGOs and public institutions in Silesia, Lower Silesia and Greater Poland voivodeships, as well as during the work with students. The following research tools have been used: participatory observations, interviews, analysis of literature and Internet sources. The aim of this article is an attempt to identify the relational capital within the cross-sector partnerships. Creation of research conclusions and a postulative layer will undoubtedly enable the realization of the article's goal.

Keywords: Relational Capital, Cross-Sector Partnerships, Interorganizational Relationships

Introduction

Cross-sector partnerships are a "phenomena" or specific "organizational structures" which have been increasingly identified and explored to show a need of establishing them for a modern state, economy, and citizens. These activities have intensified at the time of faster and more dynamic development of NGO sector (the third sector).

The partnerships are often quite complex because of the complexity of matters they are established for. They are often run in unpredictable circumstances, and their members come from different sectors. Each of them has a different language, culture, interests and strategies. The knowledge about these processes is nothing new, yet it has been poorly analyzed so far, especially in the area of shaping the relational capital.

An important factor conditioning the creation and functioning of cross-sector partnerships is a trust which is a concept hardly to define and identify. It cab interpreted as a specific kind of expectation that eliminates fear of the partner's opportunistic attitude [Kale 2000], a belief that none will take the advantage of other partners' weaknesses [Barney, Hansen 1994]. Trust between the entities of cross-sector partnership can be based on their reputation. However, it often has an individual dimension - a specific kind of mutual trust, respect and friendship is made at the individual level between the members of these partnerships. This phenomenon can be defined as internal relational capital, while the external relational capital are the structures for maintaining the proper relations with the environment. They include the receivers search system, sales networks, R&D projects, customer bases, brand and company's reputation, and strategic partnerships among others [Wilk 2004]. But it most often means a set of relations with the stakeholders of the environment - both contractual and institutional [Perechuda, Chomiak-Orsa, 2013].

During the creation of the theoretical basis of this study and the identification of relational capital phenomenon the question has arisen: what is the origin, basis and foundation of this capital.

Modern organizations have started to notice the intellectual capital in their resources, which is the difference between the market and accounting value of the organization, and which consists of the following subsets [Herman 2008, Łopaciuk-Gonczarczyk 2008, Wróbel 2009, Kasiewicz, Rogowski, Kicińska 2006]:

- human capital
- structural capital

Structural capital is considered as the reflection of relational capital created by the organization.

The basic premise when identifying the relation capital is that the employees, their knowledge, experience and competences are the key resources in the organization. Organizations which enter the alliances are seeking to minimize the risk resulting from the cooperation with unknown partners. Therefore, creation of the relation capital becomes one of the processes reducing the uncertainty of taken actions. An incentive to establish safe relations is an employee's knowledge about partners or previous experience of recent cooperation.

Relational Capital - A Conceptual Analysis

What is the relational capital? In the preparation phase, the author has reviewed the literature in terms of conceptual and definitional analysis, and the result was a bit of a surprise. Each of researchers who analyzes the relational capital comes up with his own definition depending on the represented research field. Therefore, it is true to state that there is no one ruling definition. The question is: what does it mean? Before the answer, it is worth to highlight the most convincing ones. At this point, it is important to mention that the relational capital term occurs in many fields, like: sociology, economics, management, psychology - the social and business psychology in particular.

The relational capital is relatively new concept recognized by both researchers and entrepreneurs. From the management perspective, it was initiated by the "relation paradigm" which became the basis of analyzing the relations within companies and between organizations as the intangible asset of companies [Danielak, 2012; Hormiga et al., 2011]. At the initial phase of interest in analyzing the relational capital, the focus was on the customer relations [de Castro, Lopez Saez, Navas Lopez, 2004; Agostini, Nosella, Soranzo, 2016; Ryals, 2005; de Leaniz, Bosque 2013]]. Some of the theoretical approaches define the relational capital as the set of partnerships - bilateral or multilateral based on trust and common behaviors and values [Camagni, Caragliu, Perucca, 2011; Elfenbein D.W, Zenger T. R 2014]. The other part of definition concerns the network and systematic nature of relational capital. N. Przybylska defines the relational capital as a network of connections and its development is determined by the cooperation of its members. This network concerns clients, suppliers, employees, business partners, institutions, and also competitors [2015]. J.D. Garcia-Merino, L. Garcia-Zambrano and A. Rodriguez-Castellanos present a broader view considering the relational capital is a network of all connections of enterprise with its business environment. In this context, relational capital is known as the potential knowledge enabling the quicker access to necessary resources [2014]. The relational capital is similarly defined by E. Hormig, R. Batista and A. Sanchez [2011] underlining the relations with business environment which creates dynamic-driven connection systems which the companies operate in. Also, A. Barao and A. Rodrigues da Silva define relational capital as the value of all social relations of the organization, both external and internal, which directly or indirectly contribute to achieving the company's objectives [2012]. In other words, for the organization's relational capital, the relations between stakeholders are important which are determining each other, forming a system as a whole [Danielak, 2012]. The perspective of internal and external dimension of relational capital was also defined by D. Duparc [2012]. The internal dimension of relational capital includes relations between employees, while the external dimension concerns all stakeholders. A similar understanding of relation capital was proposed by K. Perechuda and I. Chomiak-Orsa [2013], citing the definition by J. Wilk. The internal relational capital is defined as a set of intellectual property of organizations, working methods and processes, executive procedures, databases, and the informative and communicative infrastructure. In addition, the internal relational capital of organization primarily are relational resources formed by stakeholders who sub-form the organization, create an atmosphere and

trust within the organization. The external relational capital is considered as the structure needed to maintain a proper relations with the environment including, among others, the search system of recipients, sales network, R&D projects, customer bases, company's brand and reputation, strategic partnership.

The concept of relational capital gains a new significance when the technological changes are taken into consideration, as well as the current possible rate of information exchange between the entities. Then, it turns out that the relational capital is an ability to form a relation network, and not the set of already existed relations. This approach is proposed by K. Still, J. Huhtamaki and M.G. Rusell [2015], while underlining that the relational capital works within a certain framework of dynamic ecosystem. The dynamics of relational capital is also emphasized by I. Chomiak-Orsa as an ability to form and maintain close and lasting relations based on trust and cooperation [2013].

Most of presented definitions of relational capital describe this phenomenon in terms of the phenomena occurring on the organizational level. Having regard to the analyzed matters in this article, it is worth to combine this approach with the relational capital in regard to the interpersonal relations.

To sum up, it is worth to specify the answer on the previous question: what does it mean that researchers use a few definitions of relational capital? The answer is quite complex and should be a subject of separate scientific discourses. In the author's view, such conceptual variety shows that this concept has actually endless interpretive and cognitive possibilities.

Cross-Sector Partnership as An Example of Forming the Relational Capital

Following the main theme, it is important to present its cognitive foundations.

Because the purpose of this article is an attempt to identify relational capital in the cross-sector partnerships, it is worth to delineate the basics of cross-sector partnerships functioning. In the author's opinion, the following definition reflects the essence of cross-sector partnership in the most accurate way: "Cross-sector partnership involves two or more organizations from public, private and non-governmental sectors which form an unique relation going beyond unilateral actions and conventional contracts due to complementary usage of the partners' resources, as well as the effective risk and benefits sharing.[1]

While analyzing the cross-sector partnership in terms of the implementation system of social policies, the author assumes that it is described comprehensively as self-adapting form in regard to environmental conditions, which takes existing resources into account and the fact that its functioning is determined by external and internal factors. Within the definition that the system can be described as the set of elements remaining in mutual relations [Von Bertalanffy L., 1984], it is also true to treat cross-sector partnership as a consistent form whose foundation enables the implementation of added values, i.e. achieving socially useful and justified goals.

Cross-sector partnerships are often quite complex due to their foundation reason to solve complex problems. Moreover, such partnerships are often run in unpredictable circumstances, as well as the partnerships' members are the entities derived from various sectors representing different strategies, cultures, and interests of actors. Therefore, it is important to realize the need of forming and "cultivating" the cross-sector and interorganizational relations, and transforming these activities into capital, which could be necessary and useful in some cases of cross-sector partnerships functioning.

As part of the author's long-standing cooperation with organizations participating in the cross-sector partnerships, some interesting activities have been observed, mostly to form and enrich the relational capital. Also, some intriguing research questions have been raised:

- are the actions taken to identify, form and strengthen the relational capital conscious, intentional, repeatable and consolidated?

- are these activities undertaken from an organizational perspective?

- or are they rather an individual resource of organization's member participating in the cross-sector partnership?

- what incentives should be brought to encourage a member of organization to share its own individual resource?

The answers are complicated particularly in the aspect of activities undertaken by and towards the individual. Therefore, it is important to present the perception and capabilities of relational capital identification through the prism of an individual.

When we are born as an infant laying in the cradle, we unconsciously start forming first relation networks with our relatives and broadening them when growing up. At the time of their formation, they become important for individuals and are based on trust and cooperation. During the growth, some bonds become less important, and the new ones appear which reflects in the dynamics of relational capital, and therefore it is in certain sense a potential, value, but only for ourselves, while for someone else our relational capital can be completely worthless. Those formed bonds remain in our memory and could be brought when needed. How many times have we wondered where do we know each other from? The relations, made by the man which have been appropriately preserved and nurtured, form their own individual and unique relational capital.

The neurobiological basis of social functioning clearly points that we are social individuals. In prehistory, a tribe consisted of about 150 people. Our brain, despite of the technology development and industrial revolution, remained a prehistoric need of staying in a group of about 150 people. Despite the fact that, for instance, we have thousands of Facebook friends, we can only identify, associate and allocate the mentioned 150 ones according to our brain's knowledge. Nowadays in the high-tech world, we tend to notice a kind of substitution of establishing relations in a real world by using the Internet technology, and social media lead the way as cognitive tools. Bloggers and vloggers are becoming increasingly popular with a high number of followers. But, is this a positive phenomenon? Is the substitutability of traditional way of making relations a positive process? And again answer is difficult as the older generation cherishes the moments from their childhood, for instance, writing postcards, sending Christmas cards etc., were the best, and the current state is just a destruction of humanity. The result is so-called "generation gap", and this phenomenon is nothing new. Plato has already warned about the phenomenon of writing as he stated that the writing skills cause people to stop care about their memories. Can any of us imagine that one could not write anything? Take notes at the lecture, write down an interesting thought of the research authority or prepare the shopping list. All those things we do more often on devices such as smartphones, laptops, and tablets which is beneficial for us and for our environment. And it is the same with our relational capital. Nowadays, we are comfortable that - within the boundaries of legal, ethical and moral norms - we can act accordingly to our will, preferences, interests, and nobody should deny us because of this.

Therefore, each of us should cultivate our real relations taking an advantage of the boon that the modern world offers.

The above thoughts bring us closer to the answer on raised questions.

When undertaking the activities within cross-sector partnerships, the attention is paid to the creation and consolidation of relational networks. In order to support undertaking activities within cross-sector partnerships, the benefits should be identify consciously, creatively and repatably. Such benefits include [Mendryk 2007]:

- an increased acceptance of environment to form partnership initiatives between members from various sectors

- a preservation of a positive image of such initiatives

- a creation of solid foundation to build a high reputation, which is reflected in the increasing social and donors awareness

- more effective acquisition of resources which are necessary to operate and create the unique resources

The above benefits show how the relational capital values is being made and noticed from the organizational perspective. They also indicate the relational capital as an ability to create and maintain close and lasting relations based on trust and cooperation. In such approach, relational capital is located at the frontier of networking understood as the information exchange process, resources, mutual support, and the capability of forming optimal network of mutual contacts.

Last but not least, the author would like to address the matter related to relational capital, which is somehow overlooked by the research community, namely the relational capital formed and generated by the individuals. They form, as mentioned before, their own individual relational capital. Can it be associated with pulling some strings? At this point, another connotation comes to one's mind regarding a widespread phenomenon of nepotism in Poland. Nepotism[2] [definition after the Management Encyclopedia] is understood as abuse and pathology of public life. It derives from the fact that it disturbs a fair and equitable relations in the democratic state by giving an unjustified advantage to relatives over other equal entities. The definition narrows the pathological activities to relatives, but in practice the concept is expanded to friends and fellows, and so on. References to formal and professional relations established in the past are completely different phenomenon and has positive connotations. In this context, relational capital defines resources related to interpersonal relations. Or more precisely - the ability to maintain close and lasting relations and openness to the others. In the simplest terms, it is important of how and what friends and fellows an individual does have and how those relations can be used in a professional life.

However, many people are afraid of describing their relations as “contacts”. They prefer terms like “reference” or “recommendations”. Why is that? - the reason is that contacts are still being associated one-dimensionally and pejoratively as protection or nepotism, which was mentioned before, while in a modern world the so-called networking is an important element of relational capital which have been built throughout the life, and affects our professional relations. When it is said that someone was hired thanks to his contacts, a conviction occurs behind this statement that if such individual relied only on himself, he would have never got this job. This belief is a result of low level of social trust in our country - Poles simply do not trust each other, they often look for intrigues and pacts even if there is none. Contacts we established during studies, scholarships, previous work, are valuable part of our relational which should one not be ashamed of and just use them.

Conclusion

From over 10 years of empirical research (participating observations, interviews, analysis of literature and internet sources) of undertaking initiatives and functioning the cross-sector partnerships, the author has drawn following conclusions and formed some postulates that can be treated as a set of importance basics of using the relational capital in such endeavors. They can also be a kind of proof of the existence of relational capital in cross-sector partnerships:

- relational capital is the basis of the existence of cross-sector partnerships, a kind of “collection” in its philosophy of different organizations that “merge” to achieve a common goal that requires a prior relation establishment

- relations between partners of cross-sector partnerships should be based on trust, honesty, and solidarity

- cooperation of partnerships’ leaders can assure a steady flow stream of relational benefits

- cooperation of “benefits” usually generates additional knowledge and resources

- a possibility to identify relation managing processes based on experience of other countries and previous collected experiences
- identification of activities may start while establishing the informal relations
- relational capital emphasizes the awareness of the necessity of taking a leadership, not managerial, role in cross-sector partnerships
- social relations provide partners with prospects of cooperation thanks to which the resources of individuals can be supplied
- recipients/beneficiaries of cross-sector partnerships can gain a support, new information, establish new relations and deepen the integration skills
- partners of cross-sector partnerships learn collective actions, trust, integration with partners and recipients.

The above descriptions, assumptions and postulates show the validity of author's thesis regarding a necessary determinant of creation, functioning and legitimacy of the existence of cross-sector partnerships, which is the relational capital.

Summing up, in the light of the author's opinion, we should notice a need of building, nurturing, and supporting the individual relational capital throughout our lives, which is a very valuable resource. Everyone, whether an organization's member or an organization, should form it as wide as possible, which is relatively easy, e.g. the number of friends, or as deep as possible, which has already been difficult because it shows a commitment (knowledge about interests, marriage status, or place of residence) and quality of relational resources which form the relational capital. How to make it happen? It is an individual choice, because everyone - organization or a man - are different so that is their relational capital.

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[1] Definition of partnership from the Partnership declaration from September 25, 2006 in Cambridge by a group of 130 world leaders of partnership and corporate social responsibility

[2] "Nepotism" derives from Latin word "nepos" meaning grandson, nephew or niece. Nepotism was originally defined as privileged treatment of illegitimate children and relatives by church hierarchs [Jones 2011, Wypych-Dobkowska 2010]. Currently, according to the PWN Encyclopedia, nepotism means a favouring relatives by high-ranked and influential officials when awarding a dignity and filling the attractive job positions [Koralewski 2016].

Technological Innovation in Hotels: Open the "Black Box" using a Systematic Literature Review

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Abstract

The goal of this paper is to perform a systematic literature review (SLR) on technological innovation research in hotels. Based on 47 papers published in refereed journals indexed to the Scopus database, it was possible to identify, explore and systematize the main themes of the topic technological innovation: 1) Information and communication technologies (ICT) in general; 2) Internet usage (clients vs managers/hoteliers); 3) Mobile technologies (e.g., mobile apps and mobile devices); 4) Automation/self-service technologies (SST); 5) Mix of technological innovations; 6) In room-technologies (e.g., music system, video gaming console and satellite TV); 7) Radio frequency identification (RFID); 8) Biometric technologies; 9) Sustainable management technologies (efficient technologies); 10) Intelligent agent technology (IAT); 11) Teleconferencing and 12) Technology revenue management system (TRM). The analysis shows a significant lack of scientific papers on biometric technologies and green/ sustainable technologies, which represent important opportunities for further research.

Keywords: Innovation, Technological innovation, Hotels, Systematic Literature Review

Introduction

Technological innovation is a source of service quality improvement in the tourism industry in general and in the hotel industry in particular (Cruz *et al.*, 2016). Technology is having a significant impact on all businesses, and the hotel industry is no exception. Hotels are facing an increasingly competitive market, continually inundated by many similar services (e.g., Öztayşi, Baysan and Akpinar, 2009). Thus, to differentiate themselves, they must innovate, focusing on customer preferences, quality, and technological interfaces.

The adoption and implementation of such innovation depends on the customers, managers and employees characteristics (e.g., demographic factors such as education and age and traveler type - business and leisure traveler), which influence their willingness (i.e., perceived usefulness and perceived ease of use), and, also, hotel features (e.g., size and star rating) (Varol and Tarcan, 2009; Kim and Bernhard, 2014; Kim, Connolly and Blum, 2014; Lim *et al.*, 2018).

Technology is becoming a critical source of sustainable competitive advantage in the hotel industry since it facilitates/improves the offer of personalized services, enhances customers' experience, customer satisfaction, market share and performance (e.g., Öztayşi, Baysan and Akpinar, 2009; Brochado, Rita and Margarido, 2016; Dar, Joshi and Bali, 2016; Šerić, I. G. Saura and Praniĉević, 2016).

The main purpose of this paper is to report the results of a SLR based on 47 papers focused on technological innovation in the hotel industry. Therefore, this paper provides significant contributions both to the technological innovation and hospitality literatures: (1) to the best of our knowledge this is

the first SLR performed in the field, (2) the review provides an overview of the past research, identifying, exploring, and systemizing the literature on technological innovation in hotels, and (3) the survey highlights some limitations and future lines of research. In other words, the paper systematizes the main conclusions of the past research, identifies the main gaps, and provides some opportunities to further research.

The remainder of this paper is structured as follows. Section 2 reports the methodological procedures followed to perform the SLR. Section 3 presents a sample description and a systematization of the main contributions and methodological approaches of the 47 papers selected and analyzed. Finally, section 4 provides the main conclusions, limitations, and directions for future research.

Methodological Procedures

As stated above, this paper aims to perform a SLR on technological innovation research in hotels. Contrary to the traditional narrative review, which is subjected to bias by the researcher, the SLR secures replicability for future researchers (Tranfield, Denyer and Smart, 2003). Given its more objectivity and replicability, this approach has been increasingly used by management and organizational researchers (see, for instance, Keupp, Palmié and Gassmann, 2012; Bocconcelli *et al.*, 2018; Castillo-Vergara, Alvarez-Marin and Placencio-Hidalgo, 2018).

According to Denyer and Tranfield (2009), the SLR comprehends the following five steps: (i) question formulation; (ii) locating studies; (iii) study selection and evaluation; (iv) analysis and synthesis; and (v) reporting and using the results. In accordance, on 18 January 2019 it has executed a search in the Scopus database, which according to Durán-Sánchez *et al*. (2019) covers more indexed publications in this field of research than Web of Science database, using as keywords "innovat*" AND "hotel*" in the fields of "title, keywords, and abstract". To ensure the homogeneity, the sample was restricted to articles written in English, and allocated to the subjected area of "Business, Management, and Accounting". In addition, the sample was restricted to articles published in international journals by the end of 2018. This process resulted in a total of 505 papers. After analyzing the title and abstract of the all papers, 264 papers were eliminated because they are not related with the field of innovation in hotels. Therefore, 241 papers remained.

Using the VOSviewer 1.6.8 software and the bibliographic coupling method those papers were analyzed in order to identify the current trends on innovation in hotels. The analysis enabled to identify nine research streams related to the innovation in hotels (Fernandes and Pires, 2019). One of these research streams is related with the technological innovation in hotels. Consequently, all the 241 papers were analyzed in order to select only the papers focused in the study of technological innovation in hotels. This process allowed to identify 47 papers focused in the study of technological innovation in hotels that constitute the sample of this paper.

Results

This section encompasses two parts. The first one presents a brief description of the sample, exploring the publications' evolution and the words (and terms) most quoted in the papers' title and abstract. The second one contains the classification and analysis of the papers according with the focus of study and approach adopted.

Sample Description

Figure 1 shows the number of papers on overall innovation and technological innovation in hotels published by year. As can be seen the first publication found was in 1982, the number of papers on innovation in hotels published until 2004 is small and the number of papers on technological innovation until this year is very small. Nevertheless, this trend changed and there is a substantial increase of the publications until 2018, which reflects the growing importance of this topic of research. Regarding the publications on technological innovation in hotels 2016 was the most productive year with 10 papers.

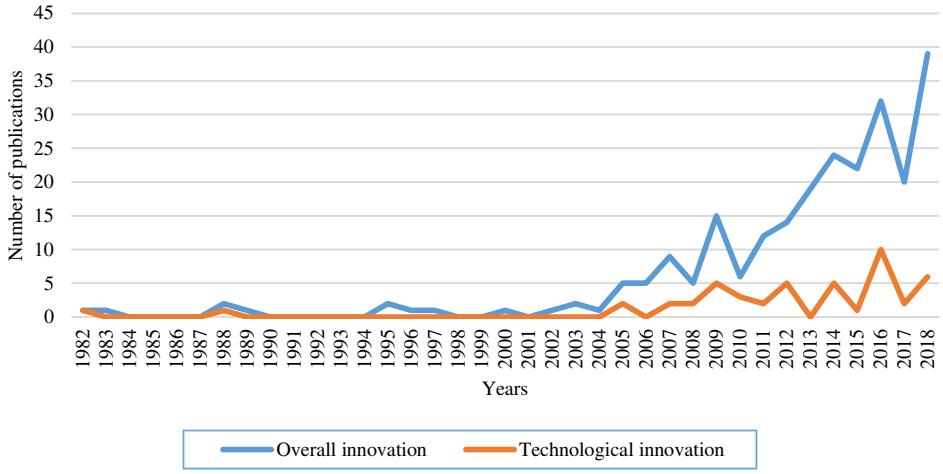

Figure 1: Number of papers on overall innovation and technological innovation in hotels by year

Using the VOSviewer software it was identified the words (and terms) most quoted in the title and abstract of the papers on technological innovation in hotels. Figure 2 highlights the results and represents the 37 words (and terms), from 47, quoted more than six times in the papers' title and abstract. 10 words (and terms), such as data, paper, research and study, were excluded because they are quoted in the majority of the studies independently of their focus. In other words, these words (and terms) are not specific of the field under study in this paper.

As Figure 2 shows, the words (and terms) that most stand out are hotel, technology, adoption and innovation, which match the goal of this paper. These words (and terms) appear interrelated with a secondary level of other words (and terms), with less emphasis in the Figure below, such as application, factor, guest, intention, service and hotel industry. Figure 2 also highlights words (and terms) related with some technological innovations used in the hotel industry such as information technology, internet innovation and Radio Frequency Identification (RFID).

Figure 2: Representation of the 37 words (and terms) most quoted in the title and abstract of the papers analyzed

As a whole, those words (and terms) suggest that the papers of the sample focus on the study of the adoption of technological innovations in hotels (e.g., Lim, 2009; Tarcan and Varol, 2010; Chan, 2012; Theodosiou and Katsikea, 2012; Pace, 2016), the intention to use some of these innovations (e.g., Aluri and Palakurthi, 2011; Morosan and DeFranco, 2016) and the factors that influence the adoption and intention to use (Aluri and Palakurthi, 2011; Fernández, Cala and Domecq, 2011; Kim and Bernhard, 2014). They also signal the study of some technological innovations such as information and communication technologies (e.g., Morosan and DeFranco, 2016; Ŝerić, I. G. Saura and Praniĉević, 2016; Sarmah, Kamboj and Rahman, 2017) and RFID (e.g., Aluri and Palakurthi, 2011; Cobos *et al.*, 2016).

Focus of technological innovations and approach of papers' sample

Table 1 presents the types of technological innovations identified in the 47 papers analyzed and the main theoretical and empirical contributions. The most studied technologies are information and communication technologies (ICT) in general, internet usage and mobile technologies (e.g., mobile apps and mobile devices). More recently, these latter technologies have been received increased attention from researchers and gained significant preponderance.

Table 1: Focus of the papers analyzed

Focus of technological innovations	Authors	Contributions
Information and communication technologies (ICT) in general	Jacob and Groizard (2007), Tseng, Kuo and Chou (2008), Karadag and Dumanoglu (2009), Varol and Tarcan (2009), Tarcan and Varol (2010), Fernández, Cala and Domecq (2011), Singh and Munjal (2012), Farsani, Sadeghi, Shafiei, and Sichani (2016), Ŝerić, Saura and Praniĉević (2016), Sen and Kaushik (2016) and Nikolskaya *et al.* (2018).	- Analysis of ICT innovation for management, provision and commercialization (e.g., manner in which customers interface with service providers and customer relationship management), for new services offer, productivity of guest-related ICT applications and their benefits (e.g., maximizing service effectiveness while keeping costs low for long-term sustainability). - Investigation of the internal and external antecedents of ICT innovation and the challenges that hotels face in their adoption.
Internet usage (clients vs managers/hoteliers)	Gregory, Kline and Breiter (2005), Hashim and Murphy (2007), Vadell and Orfila-Sintes (2008), Kang and Brewer (2009), Lim (2009), Simmonds and Lupi (2010), Chan (2012), Theodosiou and Katsikea (2012), Verma, Stock, and McCarthy (2012), Capocchi (2014), Hashim *et al.* (2014), Zeng, Gonzalez, and Lobato (2015), Brochado et al. (2016), and Dar, Joshi and Bali (2016).	- Understanding the determinants and hoteliers' intensity of internet technologies adoption and explanation of the main barriers to their adoption. - Investigation and discussion of the importance of factors determining the internet innovation for internal use (e.g., internal communications and administration) and for external relations (e.g., use of domain names for online branding, additional marketing channels to extend the offer to new markets, hotel search and selection and online reservations). - Analysis of the perceptions that hotel sales and marketing professionals have about Internet and Web integration in the group sales process. - Analysis of the relationship between the internet adoption and customer stay, customer satisfaction, customer loyalty and organizational performance.
Mobile technologies (e.g., mobile apps and mobile devices)	Verma, Stock and McCarthy (2012), Kim, Connolly and Blum (2014), Dar, Joshi and Bali (2016), Morosan and DeFranco (2016), Sarmah, Kamboj and Rahman (2017) and Morosan (2018).	- Study of the use of mobile technology, by travelers, to learn more about available hotels and their intentions to co-create value, as well as managers' willingness to use such technology and the factors influencing their willingness to use it. - Investigation of the individual roles of hotel guests' intentions to use hotel apps and also the impact of such apps and websites on customer satisfaction and customer loyalty.
Automation/self-service technologies (SST)	Chandrasekar (1988), Kucukusta, Heung and Hui (2014), Kuo, Chen and Tseng	- Investigation of the factors that influence the extent of automation in a hotel, such as keyless system and service robots.

	(2017), Lim *et al.* (2018) and Montargot and Lahoue (2018).	- Examination of business travelers' perceptions of SST adoption as well as sensemaking and acceptance of SST implementation from the perspective of the front-line employees.
Mix of technological innovations	Orfila-Sintes, Crespí-Cladera and Martínez-Ros (2005), Jacob and Groizard (2007), Sharma (2016) and Bowie (2018).	Analysis of the innovation activity (e.g., security, kitchens, dinning-rooms and bars, cleaning and laundry, gardening, health and nutrition, reception area) in the transformation of hotel industry, namely in the improvement of the customer experience.
In room-technologies (e.g., music system, video gaming console and satellite TV)	Capocchi (2014), Bilgihan *et al.* (2016), and Brochado *et al.* (2016).	Description of how hotels implement new in room-technologies to enhance competitiveness, namely, improving guests' stay. In particular, Bilgihan *et al.* (2016) analyze both leisure and business travelers' perceived importance and satisfaction of in-room technologies, which contribute to enhancing the customer experience and increase guestroom revenues.
Radio frequency identification (RFID)	Öztayşi, Baysan and Akpinar (2009), Aluri and Palakurthi (2011) and Cobos *et al.* (2016).	- Examination of the process of RFID adoption and implementation in the hospitality industry and investigation of the demographic factors' influencing consumer attitudes and their intentions to use it. - Study the use of RFID as a tool for increasing performance (e.g., service quality, customer satisfaction, market share).
Biometric technologies	Morosan (2012) and Kim and Bernhard (2014).	Examination of the factors that influence customer's attitudes and intentions to use biometric systems in hotels (e.g., fingerprint systems and iris image).
Sustainable management technologies (efficient technologies)	Jacob and Groizard (2007) and Pace (2016).	Investigation of how hotel industry combines its capabilities and learning in order to adopt and transfer efficient technology innovations (e.g., energy saving systems, water saving systems and treatment of wastage and recycling).
Intelligent agent technology (IAT)	Alsethoohy and Ayoun (2018).	Investigation of the influence of IAT on hotels' food procurement practices and food procurement performance.
Teleconferencing	Hansen and Knuff (1982).	Analysis of how teleconferencing works and suggests ways in which operations can profit from it.
Technology revenue management system (TRM)	Guadix *et al.* (2010).	Test of the TRM system, an advanced technology in the management of hotels' reservation, that sets the revenue maximization criteria, helping managers in the decision-making process.

As pointed out in the Table 1, the existing research analyses the internal and external antecedents, adoption and use, and, also, the influence of technological innovation, as well as the actors involved in this process: customers/guests, managers and employees.

The literature review highlights that mobile technologies have been captured the researchers' interest, particularly used in the process of co-creation to customize services and, consequently, to fulfil customer needs and expectations (Sarmah, Kamboj and Rahman, 2017; Morosan, 2018). Moreover, the literature survey also reveals the lack of studies focused on the biometric technologies and green technologies. Considering the topicality of such types of innovations, in particular the increasing pressure to reduce the impact of tourism firms' activities on the environment and adopt environmental innovations, further research is clearly needed.

Finally, Table 2 shows the types of approaches used in the 47 papers analyzed. The majority of papers are empirical (42), using quantitative (31), qualitative (7) or mixed (4) approaches, while the remainder apply a theoretical approach (5). The quantitative papers use, mainly, questionnaires to collect data (e.g., Orfila-Sintes, Crespí-Cladera and Martínez-Ros, 2005; Jacob and Groizard, 2007; Varol and Tarcan, 2009 Aluri and Palakurthi, 2011; Kim, Connolly and Blum, 2014; Zeng, Gonzalez and Lobato, 2015; Morosan, 2018) and a broad variety of statistical techniques to analyze them, such as structural equation modelling (e.g., Aluri and Palakurthi, 2011; Kim, Connolly and Blum, 2014; Zeng, Gonzalez and Lobato, 2015; Morosan, 2018). In turn, qualitative papers use interviews to collect more in-depth data (e.g., Chan, 2012; Cobos et al., 2016; Montargot and Lahoue, 2018) and some of them use

qualitative data analysis software to code the data (e.g., Cobos et al., 2016; Montargot and Lahoue, 2018).

Table 2: Types of approaches used in the papers analyzed

Types of approaches		References
Empirical	Quantitative	Chandrasekar (1988), Gregory, Kline and Breiter (2005), Orfila-Sintes, Crespí-Cladera and Martínez-Ros (2005), Hashim and Murphy (2007), Jacob and Groizard (2007), Tseng, Kuo and Chou (2008), Vadell and Orfila-Sintes (2008), Kang and Brewer (2009), Karadag and Dumanoglu (2009), Varol and Tarcan (2009), Guadix *et al.* (2010), Tarcan and Varol (2010), Aluri and Palakurthi (2011), Morosan (2012), Theodosiou and Katsikea (2012), Verma, Stock and McCarthy (2012), Capocchi (2014), Hashim *et al.* (2014), Kim and Bernhard (2014), Kim, Connolly and Blum (2014), Kucukusta, Heung and Hui (2014), Zeng, Gonzalez, and Lobato (2015), Bilgihan *et al.* (2016), Dar, Joshi and Bali (2016), Farsani, Sadeghi, Shafiei, and Sichani (2016), Morosan and DeFranco (2016), Ŝerić, Saura and Praniĉević (2016), Sarmah, Kamboj and Rahman (2017), Alsethoohy and Ayoun (2018), Lim *et al.* (2018) and Morosan (2018).
	Qualitative	Chan (2012), Singh and Munjal (2012), Cobos *et al.* (2016), Pace (2016), Sen and Kaushik (2016), Sharma (2016) and Montargot and Lahoue (2018).
	Quantitative and qualitative	Simmonds and Lupi (2010), Fernández, Cala and Domecq (2011), Brochado *et al.* (2016) and Kuo, Chen and Tseng (2017).
Theoretical		Hansen and Knuff (1982), Lim (2009), Öztayşi, Baysan and Akpinar (2009), Bowie (2018) and Nikolskaya *et al.* (2018).

Conclusions, limitations and Avenues for Future Research

This paper performs a SLR on technological innovation in hotels based on 47 papers published in refereed journals indexed to the Scopus database. To our knowledge, it is the first SLR conducted in this specific field, and brings contributions both to the technological innovation and hotel management literature, providing an overview of the past research, identifying and systemizing the existing literature and detecting some gaps that may be addressed in the future.

The academic community's interest on the technological innovation in hotels seems to emerge in 1982, with a non-linear growing of publications. The review identifies 12 types of technological innovation presented in Table 1 and shows the methodological approaches used, in Table 2.

From a theoretical point of view, the review allows researchers to characterize the current state of art and identify future research streams (not mutually exclusive) – biometric technologies and sustainable/environmental technologies – not extensively analyzed in the existing literature.

From a practical point of view, the review allows managers to have a wider vision of the determinants of technological innovation adoption and implementation, not only their own characteristics but also the characteristics of their employees, and their benefits. This means that in a recruitment process managers should carefully consider the features of employees that, according to the academic research, better match technological innovation in hotels.

A limitation of this paper is that, as can happen with any SLR, in our selection process some references, related to the issue studied, may have missed. However, the SLR shows several types of technological innovation with impact on current and, predictably, on future hotel industry activity. So, this review may be an inspirational root for further research on such a relevant issue.

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Defective Products Management with Reverse Logistics Processes in Micro, Small, and Medium-Sized Production Companies

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Abstract

The paper is addressing the issue of defective products, their returns, and their management. It is concentrated on the sample of micro, small, and medium-sized Polish production companies, as in these entities the defective products have the biggest percentage share as well as the responsibility for them. The research findings proved that the intensity and quality of the defective products management processes depend on the size of the manufacturing enterprise. They can be of considerable application significance when referred to the enterprises' practices, and the recommendations for managerial staff can be formulated on their base. However, it is necessary to adopt an individual approach here because of differentiated parameters of the enterprises. The presented research is the only study on the defective products management in manufacturing sector of Polish industry up to date.

Keywords: Management, Defective Products, Production Company, Reverse Logistics.

Introduction

The objective of the paper is to compare the intensity and quality of production enterprises divided in accordance to the employment size into micro, small, and medium. The used methodology covers the results of survey studies and their statistical analysis with the Mann-Whitney U test. Research results point out the significant differences and similarities in defective products management in micro, small, and medium production companies.

The paper is divided into five sections. The first section is the literature review, addressing the issue of defective products, their returns and management, and showing similar researches review. The second presents the research methodology used to investigate the issue of defective products management in production companies. This section consist of the research sample and the survey research in manufacturing companies, as well as the Mann-Whitney U test method. The third section of the paper is dedicated to the presentation of the results obtained and their comprehensive interpretation. The fourth part is a short discussion for the research results and direction of future studies. And finally the last section of the paper presents briefly the conclusions and summarizes the paper.

Literature Review

Production companies have always struggled with the diverse requirements of consumers, markets, economics, and/or business partners. One of such challenges are the defective products for which in most cases the producer is responsible.

A defective product is a product that is not waste, which however does not meet the quality and/or functional requirements against which it was manufactured in various stages of its life (Starostka-Patyk 2017).

Defective products appear in production companies in the form of returns. The category of defective product returns includes the used and no longer functional products that need to be disposed of in the form of market, manufacturing and/or distribution returns (Fleischmann 2001). Defective product returns present the value that is possible to be recovered and all or some part of that value might be used again in the market or for the production in the form of second value products, secondary raw materials, by-products or components after the appropriate processing (Nitkiewicz, Starostka-Patyk 2017). In general, there are five main recovery options for the defective product returns handling: repairing – returning the used products to working order, refurbishing – bringing the used products up to a specified quality, remanufacturing – bringing the used products up to the quality standards that are as good as those for new products, cannibalization – recovering a limited set of reusable parts from the used products or components, and recycling – the aim is to reusing materials from the used products or components (Grant et al. 2014).

In practice of production companies, a lot of defective product returns are present, so to recover their value manufacturing enterprises have to manage them properly (Nitkiewicz 2013). Management of defective products is defined as the management of all processes and operations related to returned defective products by final and original users to the supplier or manufacturer with the intention of cost-effective recovery and compliance with all legal standards (Shulman et al. 2011). This means that the management of defective products covers the full range of activities related to the implementation of processes aimed at value recovery from defective products to supply the same or other enterprise or its business environment with this value (Fig. 1).

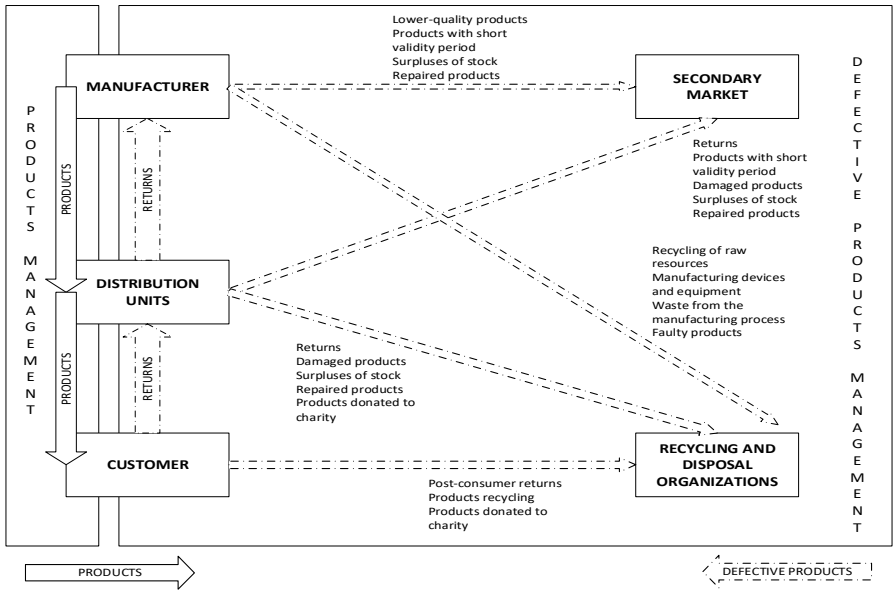

Fig. 1: Products and defective products management in an enterprise and its business environment (own elaboration based on Monahan 2004).

The enterprises never function independently, but rather in cooperation with the business surroundings where they remain. Therefore, the defective products management covers not only the structure of a given enterprise, but also involves other participants of its surroundings. The groups of entities that participate in the defective products management can be listed as following (Jeszka 2014): base entities (manufacturer, agent, and retailer), specialized intermediaries (recycling points, recovery organizations, etc.), and public-private and charity organizations. These entities, by taking part in the

defective products management, deal with numerous types of returns towards which the defective products management processes are implemented.

In the literature thematically related to defective products, returns, and their management, it is evident that the use of its processes in business activities brings tangible benefits to diversified profiles and industries as well as entire sectors and branches of the economy (Nowakowska-Grunt, Kabus 2017). Examples of remains management in specific companies and industries (sectors) are presented in the following studies: Kodak and recovery from the market of construction elements of original final products (Jayaraman, Luo 2007); Dell and reverse logistics processes on the computer assembly line (Kumar, Craig 2007); publishing sector and possible, supposed benefits after implementation of reverse logistics (Wu, Cheng 2006); electronics industry in China and problems related to the implementation of reverse logistics processes (Lau, Wang 2009); manufacturing industry in China and the issue of development of products with a completed life cycle in reverse logistics flows (Subramanian et al. 2014); food containers and reverse logistics in their recycling and reuse (Jayaraman et al. 2003).

The implementation of remains management processes in various sectors is presented in the works: carpet production (Biehl et al. 2007); retail trade (Bernon et al. 2011); bottling and bottling industry (González-Torre et al. 2004); paper production (Ravi, Shankar 2006); enterprises packing goods (González-Torre, Adenso-Diaz 2006); production of mobile phones (Rathore et al. 2011); pharmaceutical industry (Narayana et al. 2014); recycling of batteries and accumulators (Wang et al. 2014).

Regarding the increasing importance of defective products management, many manufacturing companies began to take its processes as a strategic tool for gaining economic benefits and improving the social image of the company (Kannan et al. 2012). Enterprises have also noticed that better understanding and utilization of defective products management, as well as effective implementation, allow a competitive advantage (Stock, Mulki 2009). Although many industries now use defective products management processes in their activities (Bajdor 2017), perceiving them in terms of sustainable competition and gaining market advantage (Szkutnik 2010), there are still inaccuracies and lack of information regarding the adaptation and implementation of these processes (Richey et al. 2004; Grondys 2017).

Methodology of the research

Research sample

Within the project realization (details in acknowledgment), in the first quarter of 2014 a survey was conducted in Polish manufacturing enterprises from sectors with high potential for defective products, mainly from the automotive sector, household industry, furniture industry, electronic and computer equipment, toy and clothing production, etc. (Starostka-Patyk 2017).
While designing the research that would adopt the representative method, the goal was the maximum possible reduction in the sample size but at the same time to maintain the required certainty and accuracy of conclusions. Classic sampling schemes offer some formulas that allow to calculate an approximate size of such a sample. In cases of fraction estimation (structure ration, percentage) in the simple random sampling scheme, the minimum sample size can be identified from the following formula (1):

$$n = \frac{u_a^2 p(1-p)N}{u_a^2 p(1-p) + (N-1)d^2} \tag{1}$$

where:

α – statistical significance (0.1–0.01);

u_α – value from normal distribution tables for the assumed level of significance;

p – structure ratio (fraction) based on the pilot study; where the fraction value cannot be determined even as an approximate value, the least advantageous situation is assumed $p = (1 - p) = 0.5$;

d – maximum estimation error determined on the level of 1-5%.
The assumed significance level for the performed research was 0.1, and the maximum estimation error was 5%, thus the minimum sample size was identified with 267 companies. On this base, the sample of 302 enterprises identified for the research is the representative sample.
The next stage was where the researched population was stratified according to operational activities undertaken the enterprises, based on the Polish Classification of Activity (pl. Polska Klasyfikacja Działalności, PKD), into 13 strata identified from the following formula (2):

$$n_h = \frac{N_h}{N} n \tag{2}$$

where:
n_h – estimated size of the sampling units in subsequent strata,
h – number of strata,
N_h – size of subsequent strata,
N – size of the researched population (41,680),
n – sample size (302).

These 13 strata reflect the industries with high potential for defective products. In case of stratified sampling, a specific number of units sampled from each strata is searched for, so the average error of the parameter evaluation is as low as possible. Proportional allocation was selected in case of the researched sample out of other methods. It consists in sampling of subsamples from particular strata in such a way that the relation between each subsample's size to the general sample's size is equal to a fraction of particular strata, expressed in relation to the size of the whole general population. This results in a self-weighting sample that meets the requirement stating that probability of getting into the sample should be identical for all units that compose the general population.

Identification and surveying of the representative sample of 302 Polish manufacturing enterprises allowed the analysis of the collected results with interference extended to the general group of the enterprises. The sampling process consisted in selecting a certain number of Polish manufacturing enterprises, as this was the population of theirs that was the base for the research. Thanks to randomness of the sampling process, the sample is a mini picture of the whole population, reflecting the research features and variables (Zawada 2004).

The final sample structure is presented in detail in Table 1 providing the general characteristics of its operations and its size (with percentage share).

Table 1:Research sample's structure

Type of Major Activity according to PKD	Description	Size in the sample
14.13	Manufacture of other outwear	87 (28.8%)
14.19	Manufacture of other wearing apparel and accessories	11 (3.6%)
26.3 and 26.4	Manufacture of (tele)communication equipment Manufacture of consumer electronics	6 (2.0%)
26.7 and 26.8	Manufacture of optical instruments and photographic equipment Manufacture of unrecorded magnetic and optical media	4 (1.3%)
27.2	Manufacture of batteries and accumulators	1 (0.3%)
27.5 and 27.9	Manufacture of domestic appliances Manufacture of other electrical equipment	5 (1.7%)
28.0	Manufacture of machinery and devices, not elsewhere classified	45 (14.9%)
29.3	Manufacture of spare parts and accessories for motor vehicles	10 (3.3%)

30.9	Manufacture of transport equipment, not elsewhere classified	3 (1.0%)
31.0	Manufacture of furniture	120 (39.7%)
32.2	Manufacture of musical instruments	2 (0.7%)
32.3	Manufacture of sports goods	3 (1.0%)
32.4	Manufacture of games and toys	5 (1.7%)

Research Survey

A survey questionnaire was composed of 15 substantive questions, particulars, and a confidential part. In the first stage there was a pilot study, carried out on a sample consisting of 10 Polish manufacturing enterprises. Afterwards the main research was performed on a representative sample of 302 Polish manufacturing enterprises.

The main survey questionnaire was performed in the first quarter of 2014. It was carried out as an interview via a telephone, with the CATI method. The group of respondents covered representatives of the enterprises working in managerial positions on the level of whole companies or persons that they designated as responsible for management of the defective products' flows, i.e. receiving returns of products and developing the company's strategy and policy in that field.

The survey questionnaire was comprised of notions related to the defective products and their management. There were mostly closed and multiple-choice questions, such that it allowed scores to be ascribed to particular items. Other questions were also of a closed character, but with a single answer. While beginning the phone interview each respondent needed to specify whether there are any defective products in the represented enterprises, revealed via returns. Only a positive answer for this question allowed further participation in the research. Therefore it was possible to examine the whole group of companies, which the representative sample's size was specified for, and it was not necessary to eliminate the surveys out of formal reasons.

The main part of the survey questionnaire allowed acquisition of information about the management of defective products in Polish manufacturing companies. The raised notions were focused on the following thematic areas: (1) defective products (returns) categories, places of their emergence, their quantitative condition and occurrence intensity; (2) return period, duration of the returns processing cycle; (3) politics and motifs for acceptance of returns, influence of the return on the company's profitability and development of the competitive position; (4) problems related to processing of defective products - implementation of actions in reverse flows management, an analysis of barriers for effective management of returns, systems supporting the reverse logistics processes.

The Mann-Whitney U test

To determine the differences and similarities in the management of defective products in Polish manufacturing companies a study of the interdependence between variables related to the defective products management was made. To be more precise, in order to determine the significance of differences and similarities between the characteristics of the defective products management in groups of Polish manufacturing enterprises selected regarding the number of employees, the Mann-Whitney U statistical significance testing was carried out.

The Mann-Whitney U test (a non-parametric test for means significance differences) is intended to compare two independent groups of given samples. The zero hypothesis says that the samples come from the same population, i.e. there are no significant differences towards them, in comparison to the alternative hypothesis stating that the samples being compared come from various populations, i.e. they are significantly different (Szajt 2014). The testing statistics is as follows (3):

$$Z = \frac{\left(R_{\min(k)} - \frac{n_k(n_k+1)}{2}\right) - \frac{n_1 n_2}{2}}{\sqrt{\frac{n_1 n_2 (n_1+n_2+1)}{12} - \frac{n_1 n_2 \sum_{i=1}\left(t_i^3 - t_i\right)}{12(n_1+n_2)(n_1+n_2-1)}}} \tag{3}$$

where:

$R_{min(k)}$ – sums of ranks for the group where the sum is lower
n_k – number of observations in the group with a smaller sum of ranks
n_1 – first group size
n_2 – second group size
t – number of observations with the same rank

p (p-value) is the probability of making the I type error (rejecting the tested hypothesis). It is the lowest significance level leading to rejection of the tested hypothesis. If p (p-value) is lower than the assumed significance level, then the tested hypothesis is rejected to the benefit of an alternative hypothesis.

The Mann-Whitney U test was employed to the discussed research to find out whether the differences in evaluation of the main characteristics of the defective products management are statistically significant in the groups of manufacturing enterprises selected according to the number of their employees. The lack of statistically significant differences means that characteristics of the defective products management are similar in the groups of manufacturing enterprises selected according to the number of their employees. On this base the values of the Mann-Whitney U test allow to determine the differences and similarities in the management of defective products in Polish manufacturing companies.

The manufacturing enterprises that took part in the research were divided into groups regarding the employment level - i.e. micro, small, medium and large-sized enterprises. Participants of the research were mainly the representatives of production companies employing up to 9 persons (micro-sized enterprises) – over half of the respondents (54.1%). The next two groups in terms of its size were composed of small-sized enterprises – 10 to 49 persons (30.3%) and medium-sized enterprises – 50 to 249 persons (12.3%). The lowest percentage share was taken by big-sized companies that employ more than 250 persons (3.3%).

According to the Mann-Whitney U test methodology the large enterprises were not considered in the research because the share of their representatives taking part in the survey was too low. Therefore, the performed test compared: (1) micro and small enterprises; (2) micro and medium-sized enterprises; (3) small and medium-sized enterprises.

Results and interpretation of the research

The Mann-Whitney U test results with ranges and mean evaluations for particular variables in selected groups of Polish manufacturing enterprises are presented in a table form.

At first the emergence intensity (Tab. 2) and quality (Tab. 3) of particular returns categories were assumed as a variable. This data allows to assess the scale of the occurrence of defective products in manufacturing enterprises, and in the next step it will allow to analyse characteristics related to the management of these products.

Table 2: Mann-Whitney U test values, ranges and mean evaluations for emergence intensity of particular categories of defective products returns as variable in the assumed groups of the Polish manufacturing enterprises

Variable	micro/small		micro/medium		small/medium		Mean evaluations of the enterprises			
	Z	*p*	*Z*	*p*	*Z*	*p*	ranges*	micro	small	medium
Damaged products	**4.7680**	**0.0000**	**3.4766**	**0.0005**	0.0366	0.9708	1-4	3.7	3.3	3.3
Outdated products	1.3586	0.1743	1.8016	0.0716	0.5829	0.5600	1-4	4.0	3.9	3.9
Seasonal products	0.9351	0.3497	1.7511	0.0799	0.8994	0.3684	1-4	3.9	3.9	3.8
Unsold products	0.5077	0.6117	**4.1084**	**0.0000**	**3.0485**	**0.0023**	1-4	4.0	3.9	3.7
Products withdrawn from sales	0.6989	0.4846	0.9069	0.3644	0.3286	0.7425	1-4	3.9	3.9	3.9
Products erroneously taken as defective	**3.0221**	**0.0025**	**2.9190**	**0.0035**	0.3787	0.7049	1-4	4.0	3.8	3.8
Product components	0.2187	0.8269	0.8645	0.3873	0.6011	0.5477	1-4	3.7	3.6	3.6
Waste and by-products	-1.7244	0.0846	-1.4773	0.1396	-0.1841	0.8540	1-4	2.6	2.8	2.8
Packaging	1.2017	0.2295	1.2902	0.1970	0.3648	0.7153	1-4	3.7	3.6	3.5

**Ranges: 1-numerous, 2-medium, 3-marginal, 4-not present.*

Table 3: Mann-Whitney U test values, ranges and mean evaluations for quality of particular categories of defective products returns as variable in the assumed groups of the Polish manufacturing enterprises

Variable	micro/small		micro/medium		small/medium		Mean evaluations of the enterprises			
	Z	*p*	*Z*	*p*	*Z*	*p*	ranges*	micro	small	medium
Damaged products	0.6394	0.5226	**2.0243**	**0.0429**	1.4947	0.1350	1-6	3.5	3.4	3.1
Outdated products	0.9790	0.3276	0.6620	0.5080	0.4518	0.6514	1-6	4.2	3.7	3.8
Seasonal products	1.9167	0.0553	0.2013	0.8405	–0.9527	0.3408	1-6	5.5	4.2	5.0
Unsold products	0.9595	0.3373	1.6594	0.0970	0.0955	0.9239	1-6	5.4	4.3	4.1
Products withdrawn from sales	0.7859	0.4319	-0.9760	0.3291	-1.2725	0.2032	1-6	4.3	3.7	5.0
Products erroneously taken as defective	**–2.4027**	**0.0163**	-0.5974	0.5502	0.6213	0.5344	1-6	3.5	4.6	4.1
Product components	0.4618	0.6442	1.3125	0.1894	0.3014	0.7631	1-6	3.0	2.8	2.8
Waste and by-products	**2.1017**	**0.0356**	0.4664	0.6410	-1.1586	0.2466	1-6	2.6	2.3	2.6
Packaging	0.8859	0.3757	0.4203	0.6743	-0.3066	0.7591	1-6	2.3	2.0	2.3

**Ranges: 1-terrible, 2-poor, 3-satisfactory, 4-good, 5-very good, 6-perfect.*

Indicating the statistically significant differences for emergence intensity and quality of particular categories of defective products returns in micro, small, and medium-sized Polish manufacturing enterprises it is possible to point out that: (1) the emergence intensity of damaged products in the micro enterprises is significantly different (smaller) than in case of small enterprises ($Z = 4.7680$; $p < 0.0001$) and medium enterprises ($Z = 3.4766$; $p = 0.0005$); (2) quality condition of the damaged products returns in micro enterprises is significantly better when compared to returns of those products in the medium

enterprises (Z = 2.0243; p = 0.0429); (3) the products unsold in retail emerge significantly more often in the group of medium enterprises than in micro (Z = 4.1084; p < 0.0001) and small enterprises (Z = 3.0485; p = 0.0023); (4) the products erroneously taken as defective emerge significantly less often in the group of micro enterprises than in small (Z = 3.0221; p = 0.0025) and medium enterprises (Z = 2.9190; p = 0.0035); (5) the quality condition of the products erroneously taken as defective in micro enterprises is significantly worse when compared to small enterprises (Z = –2.4027; p = 0.0163); (6) the qualitative condition of the waste and by-products is significantly better in micro enterprises than in small enterprises (Z = 2.1017; p = 0.0356).

All the rest of the test results do not state statistically significant differences which means that it is possible to assume that they indicate the similarities for emergence intensity and quality of particular categories of defective products returns in micro, small and medium-sized Polish manufacturing enterprises. The emergence intensity and quality of outdated products, seasonal products, products withdrawn from sales, product components and packaging has the similar level in micro, small, and medium manufacturing companies in Poland. The same is in case of unsold products quality and waste and by-products emergence intensity.

The next Mann-Whitney U test was made for the following variables: the most frequent period for the defective product returns (calculated from the moment of handing it to distribution), duration of the average returns processing cycle in the enterprise, evaluation of the enterprise's policy in the scope of the defective products returns acceptance, impact of the returns on reduction in the enterprise's profits, and influence of the manner of defective products management in an enterprise exerted on implementation of the enterprise's objectives (Tab. 4).

Table 4: Mann-Whitney U test value, ranges and means evaluations for the return period, duration of the returns processing cycle, restrictiveness of the returns policy, impact of the returns to profitability and implementation of the enterprise's objective as variables in particular groups of the Polish manufacturing enterprises

Variable	micro/small		micro/medium		small/medium		Mean evaluations of the enterprises			
	Z	*p*	*Z*	*p*	*Z*	*p*	ranges*	micro	small	medium
The most frequent return period	-1.2656	0.2057	-0.3253	0.7450	0.7036	0.4817	1-10[(a)]	2.0	2.2	2.0
Duration of the average processing of returns	1.7173	0.0859	-0.2085	0.8348	-1.3250	0.1852	1-8[(b)]	3.5	3.1	3.5
Evaluation of the returns acceptance policy	-0.7829	0.4337	0.7587	0.4480	1.2941	0.1956	1-6[(c)]	4.6	4.8	4.4
Reduction in the enterprise's profitability because of the returns	1.8255	0.0679	1.3639	0.1726	0.0189	0.9850	1-3[(d)]	2.7	2.6	2.6
Impact of the reverse flows management on implementation of the enterprise's objectives	0.6077	0.5434	-0.0363	0.9710	-0.4839	0.6285	1-6[(e)]	5.1	5.2	5.2

**Ranges: (a) 1-up to 1 week, 2-from 1 week to 1 month, 3-from 1 to 3 months, 4-from 3 to 6 months, 5-from 6 to 12 months, 6-from 12 to 18 months, 7-from 18 months to 2 years, 8-from 2 to 3 years, 9-from 3 to 5 years, 10-more than 5 years; (b) 1-less than 1 day, 2-from 1 to 2 days, 3-from 2 days to 1 week, 4- from 1 to 2 weeks, 5- from 2 weeks to 1 month, 6-from 1 to 2 months, 7-from 2 to 6 months, 8-more than 6 months; (c) scale from 1 to 6 points where 1-very restrictive and 6-very liberal; (d) 1-significant reduction, 2-slight reduction, 3-no reduction; (e) scale from 1 to 6 points where 1-negative and 6-positive.*

The results of Mann-Whitney U test allow to state that the differences in the scope of variables: return period, returns processing cycle duration, restrictiveness of the returns policy, influence of the returns on profitability and implementation of objective in micro, small, and medium Polish manufacturing enterprises, are not statistically significant.

Lack of differences means there are similarities within the pointed out characteristics of defective products management activities in micro, small, and medium production companies. It is possible to assume that all groups of manufacturing enterprises most often receive the returns in a period from 1 week to 1 month, only in case of small companies the return period might be longer, but in rare situations. Duration of the average time for returns processing in researched groups of enterprises takes in general from 2 days to 1 week, in cases of micro and medium enterprises longer periods are possible, but not very often. The returns policy was rated by micro, small, and medium Polish production enterprises as liberal or even very liberal, only in case of some companies from each group its rating was at lower level, but still with the liberal direction at the scale. Similarly the reduction of profitability because of returns acceptance was rated by surveyed companies. Micro, small, and medium production enterprises pointed out no or slight reduction of profitability that is connected with returns of defective products. Also the defective products and their management activities have a positive impact on the implementation of enterprises objectives in micro, small, and medium companies. They rated its influence with 5 or 6 positive points on the scale.

Table 5 presents the Mann-Whitney U test values where the assumed variable was the motive for the defective products returns acceptance by the manufacturing enterprises.

Table 5: The Mann-Whitney U test, ranges and mean evaluations for motives of the defective products returns acceptance as variables in particular groups of the Polish manufacturing enterprises

Variable	micro/small		micro/medium		small/medium		Mean evaluations of the enterprises			
	Z	*p*	*Z*	*p*	*Z*	*p*	ranges*	micro	small	medium
Improvement in customer service quality	–0.7838	0.4332	-0.0363	0.9710	0.5248	0.5998	1-3	2.0	2.1	2.0
Getting rid of unnecessary products from the market	**–2.6472**	**0.0081**	**–2.0842**	**0.0371**	-0.2230	0.8235	1-3	1.4	1.7	1.7
Meeting the legal and environmental requirements	-1.6314	0.1028	0.2701	0.7871	1.5286	0.1264	1-3	2.1	2.3	2.1
Recovery of materials and components	-1.7790	0.0752	-1.0286	0.3037	0.1696	0.8653	1-3	1.8	2.0	2.0
Development of an environmentally-friendly company reputation	-1.3416	0.1797	-1.0831	0.2787	0.0739	0.9411	1-3	1.9	2.0	2.0
Prevention of displacement of new products by products from the secondary market	-1.4966	0.1345	**–2.3234**	**0.0202**	-1.2040	0.2286	1-3	1.5	1.7	1.8
Reduction in the loss of value of unsold or defective products	-1.4030	0.1606	-1.0348	0.3008	0.0577	0.9540	1-3	2.0	2.1	2.1

**Ranges: 1-non-significant, 2-significant, 3-very important.*

The test results suggest two main differences between micro, small, and medium enterprises: (1) micro production companies perceive that getting rid of unnecessary products from the market motive is significantly less important when compared to evaluation of this motive for the defective products returns acceptance by small ($Z = –2.6472$; $p = 0.0081$) and medium enterprises ($Z = –2.0842$; $p = 0.0371$); (2) micro enterprises see that preventing displacement of new products by the secondary-market products is less important when compared to evaluation of this motive by medium enterprises ($Z = –2.3234$; $p = 0.0202$).

To highlight the similarities in micro, small, and medium manufacturing enterprises it is important to notice that none of the motives were evaluated as a very important one. All the mean evaluations of motives of defective products acceptance are around 2 points, i.e. significant motive. The best rates were given to the improvement in customer service quality, meeting the legal and environmental requirements, and reduction in the loss on value of unsold or defective products motives. The lowest attention seems to be paid to getting rid of unnecessary products from the market and prevention of displacement of new products by products from the secondary market.

While managing the defective products in manufacturing enterprises, the very important characteristics are the actions regarding this issue. Table 6 covers test values where the assumed variables are the actions undertaken in the scope of the defective products management by micro, small, and medium Polish manufacturing enterprises. Because some actions might not be undertaken by the enterprise at all, and some might be done independently and/or might be outsourced, respondents had to choose the way of the action realization while answering the questions.

Table 6: The Mann-Whitney U test, ranges and mean evaluations for actions related to the defective products management as variables in particular groups of the Polish manufacturing enterprises

Variable	micro/small		micro/medium		small/medium		Mean evaluations of the enterprises			
	Z	*p*	*Z*	*p*	*Z*	*p*	ranges*	micro	small	medium
Returns acceptance	**4.5058**	**0.0000**	**2.8389**	**0.0045**	-0.3592	0.7194	1-3	1.9	1.4	1.4
Charity donation	1.8154	0.0695	0.5514	0.5813	-0.6526	0.5140	1-3	2.7	2.5	2.6
Repackage and sales as new	1.9548	0.0506	**2.8572**	**0.0043**	1.1934	0.2327	1-3	2.7	2.5	2.3
Sales in the same form as the product was accepted	**2.7307**	**0.0063**	1.6194	0.1054	-0.3244	0.7456	1-3	2.7	2.5	2.5
Remanufacture	1.8879	0.0590	1.3310	0.1832	-0.1264	0.8994	1-3	2.1	1.9	1.9
Production from recovered components or raw materials	**2.9245**	**0.0035**	**3.3651**	**0.0008**	0.8431	0.3992	1-3	2.6	2.3	2.2
Sales	**2.7153**	**0.0066**	**2.7774**	**0.0055**	0.6510	0.5150	1-3	2.6	2.3	2.2
Recovery of components	1.1743	0.2403	**3.6522**	**0.0003**	**2.5344**	**0.0113**	1-3	2.7	2.6	2.2
Recycling	-0.1324	0.8947	0.7955	0.4263	0.8630	0.3881	1-3	2.2	2.2	2.1
Scrapping	0.5469	0.5844	1.8792	0.0602	1.2927	0.1961	1-3	2.8	2.7	2.6

**Ranges: 1-independently, 2-outsourced, 3-not undertaken.*

With the results of the Mann-Whitney U test the following differences may be concluded regarding the actions related to the defective products management micro, small, and medium Polish manufacturing enterprises: (1) micro enterprises undertake actions intended to defective products returns acceptance significantly less often when compared to small ($Z = 4.5058$; $p < 0.0001$) and medium enterprises ($Z = 2.8389$; $p = 0.0045$); (2) micro enterprises undertake actions intended to repackage the defective products returns and sell them as new products significantly less often when compared to the medium enterprises ($Z = 2.8587$; $p = 0.0043$); (3) micro enterprises undertake actions intended to sell the defective products returns as accepted significantly less often when compared to the small enterprises ($Z = 2.7307$; $p = 0.0063$); (4) micro enterprises undertake actions intended to perform production from recovered products or components significantly less often when compared to the small enterprises ($Z = 2.9245$; $p = 0.0035$) and medium enterprises ($Z = 3.3651$; $p = 0.0008$); (5) micro enterprises undertake actions intended to organize sale significantly less often than the small enterprises ($Z = 2.7153$; $p = 0.0066$) and medium enterprises ($Z = 2.7774$; $p = 0.0055$); (6) medium enterprises undertake actions intended to recover the components significantly less often than the small enterprises ($Z = 2.5344$; $p = 0.0113$) and micro enterprises ($Z = 3.6522$; p = 0.0003). Analysing the similarities in micro, small, and medium enterprises regarding the actions undertaken to defective products management, it is possible to assume that all researched groups do not realize independently the charity donations and scrapping. Only a small share of enterprises outsource these two actions. Activity of remanufacturing the defective products seems to be undertaken independently or outsourced in micro, small, and medium enterprises, and scrapping mostly is not undertaken at all or outsourced in small share.

The Mann-Whitney U test was also done for barriers of effective defective products management in the manufacturing enterprises as assumed variables (Tab. 7).

Table 7: The Mann-Whitney U test, ranges and mean evaluations for barriers of effective defective products management as variables in particular groups of the Polish manufacturing enterprises

Variable	micro/small		micro/medium		small/medium		Mean evaluations of the enterprises			
	Z	*p*	*Z*	*p*	*Z*	*p*	ranges*	micro	small	medium
Company's policy	-0.0330	0.9737	**-2.1413**	**0.0322**	-1.8786	0.0603	0-1	0.1	0.1	0.2
Aspects of competitiveness	0.0497	0.9604	0.3263	0.7442	0.2727	0.7851	0-1	0.1	0.1	0.1
Financial resources	1.0255	0.3051	-0.4251	0.6708	-1.1854	0.2358	0-1	0.1	0.0	0.1
Non-significance	-0.0584	0.9534	0.1175	0.9065	0.1466	0.8834	0-1	0.0	0.0	0.0
Lack of adequate organizational solutions	-0.5614	0.5745	-0.6521	0.5143	-0.1786	0.8583	0-1	0.0	0.0	0.0
Legal circumstances	0.7676	0.4428	-0.0759	0.9395	-0.6656	0.5057	0-1	0.0	0.0	0.0
No attention from the managerial staff	0.7495	0.4535	-1.1354	0.2562	-1.5684	0.1168	0-1	0.0	0.0	0.0
Incompetent personnel	0.7495	0.4535	-1.1354	0.2562	-1.5684	0.1168	0-1	0.0	0.0	0.0

**Ranges: 0-not selected, 1-selected.*

Results of the test confirm only one difference regarding the barriers of effective defective products management in the micro, small, and medium manufacturing enterprises: medium enterprises, when compared to micro enterprises, stress the company's policy significantly more often as the barrier for effective defective products management ($Z = -2.1413$; $p = 0.0322$).

At the same time the research points out one important similarity of production companies regarding the barriers issue - enterprises, regardless of their size, basically do not consider any of the mentioned barriers to be significant for the efficiency of defective products management.

The next test was done for variables related to evaluation of particular aspects significance in the scope of defective products management of manufacturing enterprises in development of their competitive position (Tab. 8).

Table 8: The Mann-Whitney U test, ranges and mean evaluations for particular aspects significance in the scope of defective products management in development of competitive position as variables in particular groups of the Polish manufacturing enterprises

Variable	micro/small		micro/medium		small/medium		Mean evaluations of the enterprises			
	Z	*p*	*Z*	*p*	*Z*	*p*	ranges*	micro	small	medium
Costs reduction	-0.1076	0.9143	-1.2983	0.1942	-1.0906	0.2754	1-6	3.0	3.0	3.0
Price	-0.1861	0.8524	0.5730	0.5666	0.6291	0.5293	1-6	4.9	4.9	5.1
Quality	-0.2731	0.7848	-0.1503	0.8805	0.0445	0.9645	1-6	5.3	5.3	5.2
Returns policy	-1.2931	0.1960	0.1830	0.8548	1.1500	0.2501	1-6	5.4	5.4	5.5
Delivery time	-1.3832	0.1666	-0.3581	0.7203	0.6230	0.5333	1-6	4.3	4.7	4.4
Diversity of products	0.0871	0.9306	0.2667	0.7897	0.1940	0.8462	1-6	5.0	5.2	5.2

**Ranges: scale from 1 to 6 points where 1-completely non-significant and 6-very important.*

Within the rest of the results it was found that the differences regarding significance of the aspects of defective products management in developing a company's competitive position in particular groups of Polish manufacturing enterprises are not statistically significant.

However, in this case the similarities are important. Micro, small, and medium manufacturing enterprises pay attention mainly to the aspects of return policy, quality and diversity of products in

defective products management, as they perceive these characteristics as significant in developing their competitive position. Less attention is paid to the delivery time and price, and cost reduction seems to be the aspect that does not influence the competitive position in opinion of surveyed enterprises.

The last Mann-Whitney U test covers the values for assumed variables that are the state of the implementation of hardware and software solutions supporting the defective products management in micro, small, and medium Polish manufacturing enterprises (Tab. 9).

Table 9: The Mann-Whitney U test, ranges and mean evaluations for state of the implementation of hardware and software solutions supporting the defective products management as variables in particular groups of the Polish manufacturing enterprises

Variable	micro/small		micro/medium		small/medium		Mean evaluations of the enterprises			
	Z	*p*	*Z*	*p*	*Z*	*p*	ranges*	micro	small	medium
Bar codes	**3.2437**	**0.0012**	**5.7304**	**0.0000**	**2.5677**	**0.0102**	1-3	2.9	2.7	2.3
2D codes	**3.4735**	**0.0005**	**4.2070**	**0.0000**	0.8642	0.3875	1-3	3.0	2.8	2.7
Computerized returns tracking system	**4.0477**	**0.0001**	**5.7283**	**0.0000**	1.7356	0.0826	1-3	3.0	2.8	2.5
EDI	**3.3305**	**0.0009**	**4.0032**	**0.0001**	0.9629	0.3356	1-3	3.0	2.8	2.6
RFID	1.6104	0.1073	**2.1586**	**0.0309**	0.6040	0.5459	1-3	3.0	3.0	2.9

**Ranges: 1-installed, 2-planned, 3-neither installed nor planned.*

In case of IT support of defective products management in micro, small, and medium production enterprises the following statistically significant differences can be observed: (1) bar codes existing or planned installation in micro enterprises is considered significantly more intensively when compared to small ($Z = 3.2437$; $p = 0.0012$) and medium enterprises ($Z = 5.7304$; $p < 0.0001$). This issue is also considered less often in small enterprises when compared to the medium ones ($Z = 2.5677$; $p = 0.0102$); (2) two-dimensional codes existing or planned installation in micro enterprises is considered significantly more intensively when compared to small ($Z = 3.4735$; $p = 0.0005$) and medium enterprises ($Z = 4.2070$; $p < 0.0001$); (3) computerized returns tracking systems existing or planned installation in micro enterprises is considered significantly less often when compared to small ($Z = 4.0477$; $p = 0.0001$) and medium enterprises ($Z = 5.7283$; $p < 0.0001$); (4) electronic data interchange (EDI) existing or planned installation in micro enterprises is considered significantly less often when compared to small ($Z = 3.3305$; $p = 0.0009$) and medium enterprises ($Z = 4.0032$; $p < 0.0001$); (5) radio frequency identification (RFID) existing or planned installation in micro enterprises is considered significantly less often when compared to medium enterprises ($Z = 2.1586$; $p = 0.0309$).

Also some similarities regarding IT support of defective products management in micro, small, and medium manufacturing companies can be observed. In general almost all surveyed enterprises, regardless of their size, do not have installed any IT system, as well as they do not plan to do so. Especially this trend is observed in case of micro enterprises, and next in small enterprises. Only a small share of medium production companies declare that some IT solutions are already installed or are in plans for future implementation.

Discussion of obtained research results

Presented research findings allow to determine some significant differences and similarities in the defective products management of Polish manufacturing enterprises, divided in accordance to the employment size. Because individual differences and similarities in micro, small, and medium-sized production enterprises have been detailed, identified, and discussed in the previous section, at this stage it is possible to summarize them in general.

First of all, attention should be paid to the fact that each enterprise, regardless of its size, functions in a given environment and on the basis of developed, individual patterns of activity. Thus, the

comparative analysis of differences and similarities gives only a general view of the functioning of enterprises in a given area.

Polish micro, small, and medium manufacturing enterprises in general undertake various activities to manage the defective products. Differences related to these activities result from the specificity of production in a given company, from the financial and human resources available to the company, as well as from the technical and technological development of the enterprise. And similarities in defective products management come from the economic, market, and legal environment of the company that may impose certain activities.

It is difficult to compare the results obtained with other studies, because so far in Poland such research has not been done until now. In fact the presented survey is the only study on the defective products management in manufacturing sector of Polish industry up to date. Jeszka (2014) made a similar research study according only to the clothing sector in Poland. There is also research made by Skapa and Klapalova (2012) from the Czech Republic that mainly refers to the results that the enterprises can obtain by employing reverse logistics processes.

In this paper content several worldwide studies should be also mentioned, besides these ones listed in the introduction as similar ones, which cover the returned products management issue. These would include Carter and Ellram (1998), Rogers and Tibben-Lembke (1999), de Brito and Dekker (2002), Chanintrakul et al. (2009), Mutha and Pokharel (2009) and Sheriff et al. (2012).

For this paper perspective the important research was made by Rogers and Tibben-Lembke in 1999. It is one of a small number of publications presenting the universal approach to the processes in reverse logistics and defective products management. It contains the general studies about the reverse logistics practices in the USA, as well as common recommendations for the entire economy, not only for the chosen industry branch.

On that basis, the presented research and obtained results should be treated as basic ones and should be deepen in the future. Especially some new similar research should be done in other countries to allow the detailed comparison of defective products management practices, as well as to indicate the differences and similarities. Also, the methodology of case studies could be used to explore the specificity of analysed issues in different types of industrial sectors.

Conclusions

Management of contemporary enterprises in the present economic reality undergoes continuous transformations. There is a need to consider the notions of sustainable development, globalization processes, changes in the social attitudes directed at ecologic preferences or dynamic development of markets in the management of enterprises. Therefore, it is crucial to seek, select, and employ the most innovative ways allowing to adjust the management of enterprises to those changing conditions. The production enterprises, as entities that are especially prone and sensitive to changes in the economy, have recently developed the concept of defective products management which provide significant support to the returns management. The issue of the defective products management receives big momentum for developing scientific and practical capacities to serve the industries in a more beneficial manner. The reasons for these opportunities are diversified and include: current policy making and regulations on goods, environmental information and performance, consumer rights and manufacturer duties, and business opportunities or scientific workshop development.

The studies performed and partially presented in this paper prove that the defective products management in Polish manufacturing enterprises is employed and the implementation and utilization of its processes allow to manage the defective product returns effectively.

Both the intensity and quality of the defective products management processes depend on the size of the manufacturing enterprise, which was proved by the performed statistical research.

The research results presented in this paper allow to determine some significant differences and similarities in the defective products in the Polish manufacturing enterprises, divided in accordance to the employment size. Based on the results, it may be concluded, among others, that the size of the Polish manufacturing enterprises influences the intensity and quality of the defective products management, as well as determines its effects.

The presented contents can be of considerable application significance when the presented results are referred to the enterprises' practices, and the recommendations for managerial staff will be formulated based on that. However, it is necessary to adopt an individual approach here, as otherwise, the differentiated parameters of enterprises, as well as specificity of the defective product returns will not allow indiscriminate adaptation of generally developed conclusions, only some illustrative use of their values.

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Relations in The Food Supply Chain Management – The Context of Cooperation in The Production Cycle on The Fruit and Vegetable Market

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Abstract

Nowadays, in the sustainable conditions of economy and logistics, the full operational cycle stands for a very modern and desired trend at the markets. As the market of fruit and vegetable is a specific one – fragile and quick actions demanding, the production cycle in this regard has a crucial meaning.
The paper aim is to present the production cycle on the fruit and vegetable market in the context of relations in the food supply chain management. It refers to the food sector in Poland, and is based on the research results.

Keywords: Food Supply Chain Management, Production Cycle, Full Operational Cycle, Fruit And Vegetable Market

Introduction

The most important role of food industry is providing all basic and necessary goods that support various human activities and behaviours. The food industry is one of the largest and most complex production sectors in the world economy. It covers the entirety of material production processes related directly and indirectly to the production and distribution of food.

Once harvested or produced, the food should be stored, delivered, and retailed so that they could reach to the final customers by due date. Meat, bakeary products or fruit and vegetables, such perishable food is wasted by millions tons worldwide every year due to the inefficient and ineffective food supply chain management. Therefore, food supply chain management is significant to save the food.

The purpose of this paper is the literature review research analyse about food supply chain management and its relations in the context of cooperation in production cycle.

Literature Review

The full operational cycle is part of the concept of logistics supply chains management. The supply chain covers every organization, regardless of the business profile, which has any contractors, because such a system provides appropriate raw materials and materials to produce and then deliver products and services to final customers (Wu et al. 2016).

In simple terms, the supply chain means the flow of raw materials, materials, semi-finished products or finished products, which begins at the moment of obtaining raw materials or materials, and ends at the moment when the finished product is delivered to the final customer (Genovese et al. 2017). The supply chain can be divided into three basic phases: mining (supply), production (manufacturing) and sales (distribution) (Kamalahmadi, Parast 2016). There are participants in the supply chain, among which can be distinguished their main groups: suppliers, producers, distributors, sellers and final

customers (Jraisat, Sawalha 2013). In addition, transport and storage play a key role within the supply chain, thanks to which a connection takes place between units participating in a given supply chain (Kilger, Reuter, Stadtler 2015). On the other hand, an integral part of the supply chain are three types of flows: material, financial and information (Chopra, Meindl 2007) (Fig.1).

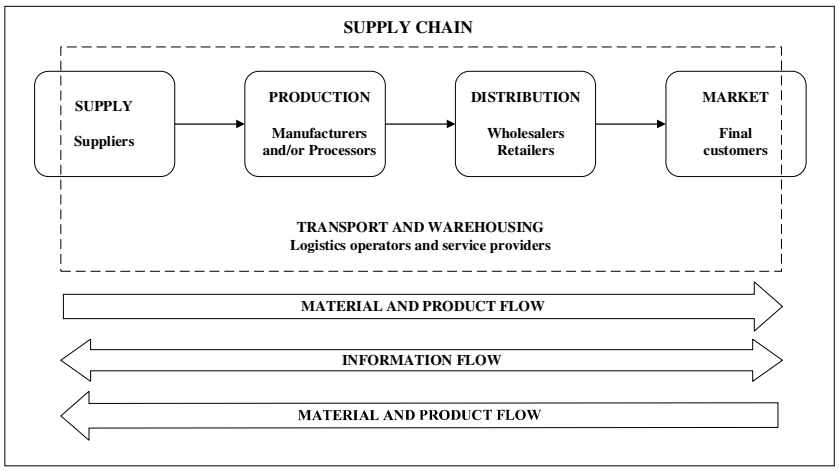

Fig. 1: Supply chain basic structure. (own elaboration)

Supply chains function in the economy creating specific and unique structures depending on the specifics of a given industry, sector or branch (Zhou, Kai, Liang 2015). In recent years, studies on food supply chains have appeared in the literature (MacCarthy et al. 2016). These chains connect three important sectors of the economy - agriculture, food processing and logistics (Manning et al. 2016). Their structure is specific due to the specificity of the food industry (Gómez, Ricketts 2013), where the flow of materials and products must be fast and well-planned to reduce and minimize losses (Marucheck et al. 2011).

Once harvested or produced, the food should be stored, delivered, and retailed so that they could reach to the final customers by due date (Zhong, Yang, Chen 2015). It was reported that about one-third of the produced food has been abandoned or wasted yearly (approximately 1.3 billion tons) (Manning et al. 2016). Two-third of the wasted food (about 1 billion tons) is occurred in supply chain like harvesting, shipping and storage (Fritz, Schiefer 2009). Take fruit and vegetables for example, such perishable food was wasted by 492 million tons worldwide in 2011 due to the inefficient and ineffective food supply chain management (Gustavsson et al. 2011). Therefore, food supply chain management is significant to save the food.

Research Methodology

Research Background

The fruit and vegetable market is one of the most important segments of the food industry in Poland. Poland is one of the leaders on the European fruit and vegetable market. Fruit production in Poland in 2016 amounted to 4.6 million tons compared to 4.05 million tons in 2015. Pears and plums increased by 20%, apple production increased by 14.6%. The drop in production was recorded only in the case of strawberries and raspberries. As a result of the increase in the harvest, the production of fruit and vegetable products increased (by approx. 20,000 tons) in the 2016/17 season to 1.15 million tons compared to the previous season.

Poland is an important producer of fruits and vegetables in Europe. In 2016, fruit production in the European Union amounted to 39.5 million tons, where Poland's share was 4.6 million (an increase of 14.7% compared to the previous year). Poland has also strengthened its position as the largest producer

of concentrated fruit juices and frozen fruit in the EU. The Polish market is responsible for about 50% of production in the EU. Domestic vegetable production amounted to 5.9 million tons, which is over 9% share in EU production (64.2 million tons), and keeps Poland in the second place in the production of frozen vegetables. In 2017, as a result of spring frosts, the production of fruit and vegetables was lower than in the previous year. A slight decline in the harvest of fruit and vegetables was recorded, which had consequences in the form of a reduction in the production of fruit and vegetable preserves. Nevertheless, Poland has maintained its high position on the European and global market of fruit and vegetable products (www.portalspozywczy.pl).

Research Sample

For the reaching the purpose of this paper the results of the survey studies were used. The research was made in January of 2018 year in the form of the questionnaire. The study concerned the assessment of the food supply chain management characteristics and its aim was to determine the main practices of business entities operating within the food supply chain. The survey was addressed to polish manufacturing and/or trading companies in the sector of food industry. The selection of a research sample covered, according to the Polish Classification of Activities (PKD), entities operating in the area of food production and / or trading, so:

1. PKD 10.1 - processing and preserving of meat and production of meat products;
2. PKD 10.3 - processing and preserving of fruits and vegetables;
3. PKD 10.7 - production of bakery and farinaceous products.

According to Central Statistics Office data, these areas constitute the largest share in the Polish food market, therefore it is assumed that enterprises from these areas of activity constitute a sample representative for the whole population of food products.

Research Approach

For the purpose of this paper only a part of the research results was chosen to be presented, i.e. data covering the answers of representatives the entities operating within the area of processing and preserving of fruits and vegetables (PKD 10.3).

The research sample total size was equal to 250 entities, 11% (28 entities) of them was the representatives of processing and preserving of fruits and vegetables enterprises and they are the research base of this paper.

Among the surveyed enterprises, a significant part of them (71.4%) are micro-enterprises employing up to 9 people with the turnover ≤ 2 million Euro. Small sized enterprises employing 10 to 49 people with the turnover ≤ 10 million Euro were represented by 14.3% of respondents, medium sized enterprises employing 50 to 249 people with the turnover ≤ 50 million Euro were represented by 10.7% of respondents, and big enterprises employing more than 250 people with the turnover ≥ 50 million Euro were represented by 3.6% of respondents.

As the whole research sample was representative for the polish food industry, also this partial sample is representative for the polish sector of processing and preserving of fruits and vegetables entities.

Almost one third of researched enterprises has been operating at the market more than 16 years already (Fig. 2).

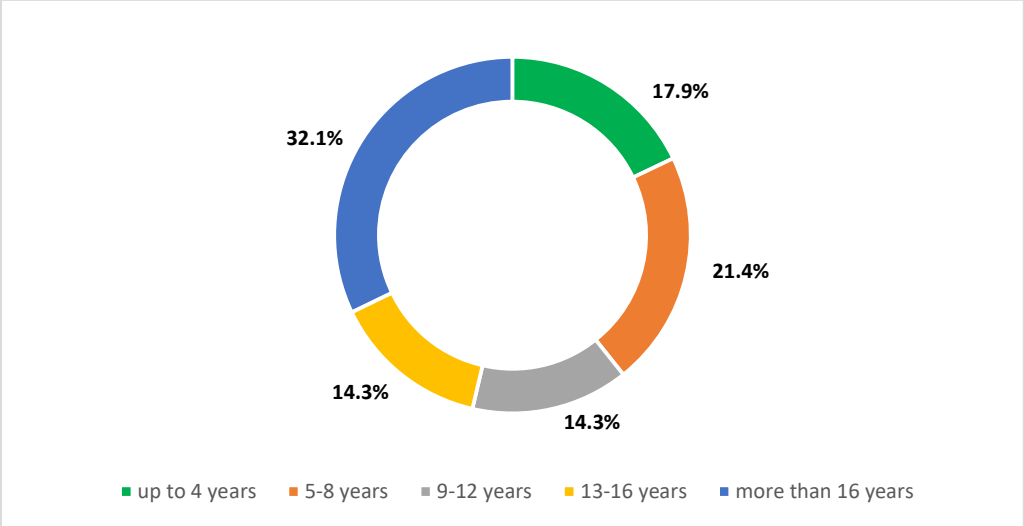

Fig. 2: Processing and preserving of fruits and vegetables entities structure according to the length of operating in the business. (own elaboration)

Around 30% of enterprises operate in business from 9 to 16 years, 21.4% operate in business from 5 to 8 years, and only 18% of companies are functioning in the business up to 4 years. This structure points out that the researched enterprises in general conclusion operate in fruit and vegetable business for many years, and they state the developed and experienced sample to give the overall inference.

Processing and preserving of fruits and vegetables enterprises were also asked to submit their main position in food supply chain. Half of the respondents pointed out the service providers' position, 25% state for trade position and 25% for manufacturing and trade position.

According to the information that polish food industry has a big share in foreign food market creation it is important to highlight the market where researched enterprises operate. It was a question of multiple choice answer and its results are presented in Tab. 1.

Table 1: Markets at which the processing and preserving of fruits and vegetables enterprises operate. (own elaboration)

Type of the market	Share of fruit and vegetables enterprises
Local market (city, province)	60.7%
Regional market (voivodship)	17.9%
National market (country)	21.4%
Foreign market (other countries)	100%

While all enterprises declared their activity at the international market it was checked for how long and where they do business. 43% declared operating at foreign market for 3-4 years, 29% for 5-8 years and 28% for 9-12 years. It means that all fruit and vegetables companies have a medium practice at the foreign market, as none declared 1-2 years section as well as 13-16 and more than 16 years sections.

In the same time respondents were asked to submit the countries where their business operate. Mainly fruit and vegetables enterprises pointed out the cooperation with European Union general market (75%). Than they also highlighted cooperation with such countries as Germany (10.7%), South Korea (3,6%), Norway (3,6%), Russia (3,6%), Hungary (3,5%).

Regarding the operating at foreign market of processing and preserving of fruits and vegetables enterprises, they are forced by the market powers to start the cooperation with other entities present at this market. It is a necessary activity to construct the food supply chain and to manage its functionality in a proper manner.

In this regard investigated enterprises pointed out the start of collaboration at the foreign market with different entities. It was a question with multiple choice answer possibility and the results are presented in Table 2.

Table 2: Collaboration of fruit and vegetables enterprises at the foreign market with different entities. (own elaboration)

Foreign market entity	Share of fruit and vegetables enterprises
Supplier	57.1%
Foreign distributor	25%
Logistics or/and distribution center	21.4%
Competitors	10.7%
Financial institutions	10.7%
Broker	14.3%
Foreign agent	3.6%
Foreign customers	7.1%
Exporters group	3.6%

Polish fruit and vegetables enterprises cooperate at foreign market with many different entities, but mostly with suppliers, distributors, logistics or/and distribution centers and brokers. They do not collaborate at all with food industry organizations or state institutions. Based on such a distribution of responses it is possible to notice the strong tendency of polish fruit and vegetables enterprises to create the food supply chains for their unique needs and requirements.

Research Results

The research among the processing and preserving of fruits and vegetables enterprises in Poland were made in purpose to present the full operating cycle approach. It is important to notice here that:

1. The length of operating cycle depends on the industry/sector/branch.
2. The research has a qualitative not quantitative form.

According to these restrictions two main parts of the research were taken into account:

1. The effects of the collaboration in the food supply chain.
2. The main characteristics of enterprises collaborating in the food supply chain.

For the first part of analysis the respondents of the processing and preserving of fruits and vegetables enterprises were asked to determine some effects of the collaboration in the food supply chain that have an impact (direct or/and indirect) on the full operating cycle. The effects with a share of the positive and negative answers are shown in Table 3.

Table 3: The effects of the processing and preserving of fruits and vegetables enterprises` collaboration in the food supply chain

Effect of collaboration	Positive answers share	Negative answers share
I. It reduced the operational/ investments costs	59.6%	40.4%
II. It improved the level of customer service	68.8%	31.2%
III. It influenced the strengthening of market position	64.8%	35.2%
IV. It contributed to the increase in profits or the reduction of volatility in the profit and loss account	62.8%	37.2%

All effects of the collaboration in the food supply chain were divided into four groups that into four groups that have the following extensions:

I. inventory rotation cycle costs, warehousing costs, inventory maintenance costs, information exchange costs; as well as such features as: managerial efficiency, improvement of forecasting and planning accuracy, improvement of cash flows, etc.
II. timely delivery, shortening the payment deadline, better monitoring of the flow of goods, services and finances, electronic processing of orders, duration of transport, reliability of deliveries, process innovations, etc.
III. increase the promotional service, timely repayment of liabilities, increasing the price advantage, increasing the potential and product innovations, extending the geographic range, access to modern technologies, etc.
IV. development, cyclical planning, seasonal planning, punctuality of settlements, stability of participation in a given market, sales volume, supply assurance, etc.
Researched companies assessed all the above effects positively, with responses shares 60% or more. It means that the processing and preserving of fruits and vegetables enterprises see the benefits of collaboration in food supply chains and they pay the attention to these activities. Also, regarding the full operating cycle the results of this assessment mean that collaboration in food supply chain has an impact on it.

Another, second part of the research proofs the above statements. In this part the main characteristics of enterprises collaborating in the food supply chain were investigated. Here, three aspects were taken into account:

- Respondents assessed if the collaboration in their supply chain has a smooth, non-problematic course. They had to specify it regarding the cultural and business aspects. Cultural aspect (1) means that all collaborating enterprises put emphasis on commitment, there is constancy of goals, employees are perceived in the long-term perspective, external shareholders are important for cooperating companies. This aspect was assessed by respondents in 82.1% positive. Business aspect (2) means that while collaborating in food supply chain there are consistent goals and strategic plans, commitment to creating common ideas and willingness to overcome change. Here, the respondents were also in 82.1% positive.
- Respondents were asked about the management of organizational structure (3) – commitment to continuous improvement, managerial support, the use of incentive incentives and the importance of teamwork – 85.7% assessed these features positively. Also, they were asked in regard to management about the collaborating partners (4): do they have a predisposition to build joint relations in the food supply chain, i.e. management is qualified in terms of mutual activities, defining common goals and expectations, predicting long-term mutual respect for partners, management expresses willingness to share financial information and system integration. 75% of answers were positive.

- Also, respondents had to assess whether companies cooperating in the supply chain show a similar perception of factors affecting the success of cooperation (5) in terms of sales volume, market share, financial strength, productivity or technological specialization. 85.7% of respondents gave here the positive answer.

Due to the fact that in the case of opinion research on cooperation in the food supply chain, a large majority of respondents were in favor of the positive side of such activity, a correlation was carried out to confirm the positive effects of cooperation in food supply chains. The correlation results are present in Table 4. Rows and columns are numbered accordingly to the features pointed out in the text.

Table 4: Correlation results regarding the effects of cooperation in food supply chains for the processing and preserving of fruits and vegetables enterprises. (own elaboration)

	I.	**II.**	**III.**	**IV.**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
I.	1	0.466**	0.264**	0.311**	0.116	0.192**	0.187**	0.114	0.205**
II.	0.466**	1	0.317**	0.375**	0.190**	0.163**	0.246**	0.205**	0.248**
III.	0.264**	0.317**	1	0.646**	0.158**	0.175**	0.156*	0.235**	0.311**
IV.	0.311**	0.375**	0.646**	1	0.114	0.131*	0.156*	0.191**	0.188**
(1)	0.116	0.190**	0.158*	0.114	1	0.333**	0.242**	0.218**	0.320**
(2)	0.192**	0.163**	0.175*	0.131**	0.333**	1	0.380**	0.254**	0.380**
(3)	0.187**	0.246**	0.156*	0.156*	0.242**	0.380**	1	0.430**	0.249**
(4)	0.114	0.205**	0.235**	0.191**	0.218**	0.254**	0.430**	1	0.357**
(5)	0.205**	0.248**	0.311**	0.188**	0.320**	0.380**	0.249**	0.357**	1

**Statistically significant values on the level of 0.01
* Statistically significant values on the level of 0.05

According to the correlation results it is obvious that there are significant interdependencies between the effects of the collaboration and the main characteristics of enterprises collaborating in the food supply chain. The study indicates the presence of strong dependencies among the variables studied. These values of correlation are significantly strong as well as they indicate bilateral relations of investigated features.

Conclusions

Enterprises from the fruit and vegetable industry operating in Poland are increasingly expanding their activities to include international markets. However, they face intense competition on foreign markets, which forces them to seek solutions that allow them to gain a competitive advantage and a good position on the foreign food market.

Expanding business is inseparable from undertaking cooperation with other entities, which in turn leads to the creation of supply chain structures.

Food supply chains are specific due to the specificity of the products they concern. Therefore, cooperation in these chains is characterized by the necessity of significant involvement of partners.

The presented research highlighted the characteristics of mutual partner relations in food supply chains and their effects. On their basis, the necessity of undertaking such cooperation by enterprises from the fruit and vegetable industry is clearly visible, as well as the dependencies between this cooperation and the effectiveness of functioning on the foreign market.

Cooperation in the food supply chain also affects the efficiency of the full operational cycle in the financial area. Essentially, this cooperation determines the correctness of this cycle. Any disruptions in cooperation in the supply chain cause problems in the implementation of the full operational cycle. The more so because the cycle itself is dependent on the industry, so in the case of food products, where

supply chains are specific, so the cycle is also unique, managing relationships with supply chain partners is crucial.

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The Determinants of Non-Financial Reporting in Portuguese Listed Companies

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Abstract

The level of globalization presented in the 21st century generates in the companies an extremely complex and competitive business environment, requiring efforts to improve the information disclosed, to ensure a higher level of transparency and comparability between different countries. In this context, the Non-Financial Reporting Directive 2014/95 / EU as implemented, since 2017, the obligation for public interest companies with more than 500 employees to disclose information with a description of the business model, policies, risks, environmental and social performance, as well as measures for workers, respect for human rights, gender equality and the fight against corruption and bribery. This study assessed the degree of compliance with Decree-Law (DL) No. 89/2017, which transposed that directive to Portugal, by companies listed on Euronext Lisbon, through an analysis of the content of their management reports, accounts and sustainability reports, based on a disclosure index, built on eight mandatory disclosure items. Through a linear regression model, we have also identified the explanatory factors for the disclosure index of each entity. The results allow us to conclude that the degree of compliance with DL 89/2017 is quite high, since the average disclosure index is around 0.875. The least disclosed items were the fight against corruption and bribery attempts, bodies diversity policies and human rights. From the linear regression model, we have concluded that only the size of the company and the type of report are statistically significant factors, explaining 30.40% of the value obtained in the disclosure index.

Keywords: Disclosure non-financial information, directive 2014/95/EU, Decree-law No. 89/2017

Introduction

Facing the global financial crisis, organizations have developed their activities in a climate of economic instability and uncertainty, focusing their attention on long-term viability and sustainability (Adams, 2011).

Currently, companies face an extremely complex and competitive business environment, which led to the need to improve the information disclosed in order to guarantee a higher level of transparency and comparability between different countries (Lourenço, 2017).

The annual financial report is no longer seen as a disclosure tool capable of meeting the new requirements of stakeholders. This stagnation in the financial reporting model led to the dissatisfaction of the information necessities of the different stakeholders, who needed to conceive expectations regarding the future of organizations, and for this reason, they have been requesting for concrete data on external factors (such as, political, environmental and social), risk management, business and management models, among others, that enable a properly grounded decision-making (PWC, 2013).

In this context, Directive 2014/95/EU, 22 October 2014, on the reporting of non-financial information marks the beginning of a new stage in reporting of companies in the European Union (EU). This directive had to be transposed into the legislation of the various EU Member States by the end of 2016, applying to large companies that are entities of public interest and that have more than 500 employees. In Portugal, these entities include companies listed on the stock exchange, insurance companies, banks, investment funds and venture capital companies and public companies.

Since it is a recent theme and given the scarcity of studies of this nature in Portugal, we believe that the chosen theme represents a contribution to the literature, through the development of a study that we consider innovative, but with great potential for future research.

In view of the above, it is therefore important to study the Portuguese reality with regard to non-financial reporting, especially after the transposition of Directive 2014/95/EU, through the Decree-Law (DL) No. 89/2017. In Portugal, public interest entities with an average number of employees over 500, are already obliged to disclose non-financial information since the 2017 financial year. That diploma represents a paradigm shift in terms of reporting, so it becomes appealing to understand how it was internalized by companies and how its practical application has been developing.

So far, the existing studies on the subject in Portugal are those of Lourenço (2017) and Ribeiro (2019). The first performs an analysis from the perspective of the directive, before being transported to our country. The second already includes the DL but considers few explanatory variables.

In this sense, the general objective of this work is to study the non-financial reporting practices adopted by companies listed on the stock exchange in Portugal, seeking to assess the degree of compliance with the DL 89/17 and its determining factors. In addition, we seek to ascertain which theoretical model of report/framework has been the basis for companies to make their non-financial report.

This work aims to contribute to international research in the field of non-financial reporting by providing empirical evidence in our country, Portugal, where existing studies are still scarce. The results obtained may contribute to the accounting regulatory bodies, with regard to potential enforcement mechanisms, in case of non-compliance with the diploma. They can also serve as a learning process for unlisted companies, or other types of companies not covered by the diploma, who are interested in implementing non-financial reporting practices.

Considering the above, after this introduction, the article is divided into 4 points. In the first point, we present a theoretical framework of the non-financial reporting theme, both in the European context and in our country, Portugal. The second point concerns the objectives of the study and the formulation of research

hypotheses. Next, the sample and the methodology used are presented, specifically the models developed and the operationalization of the variables, being, in point four, performed an analysis and discussion of the results. This article ends with the presentation of the main conclusions and limitations of the study, also pointing out some suggestions for future research.

Non-Financial Report

The last few years have been marked by a series of catastrophes associated with climate change and the international financial crisis, which has reinforced the need for the adoption of an economic development model - sustainable development - that allows the satisfaction of the needs of present generations without mortgaging the needs of future generations (Portuguese Securities Market Commission, CMVM, 2019).

This crisis has not only been a financial crisis, but it has also been a crisis of confidence that has driven the demand by interest groups for transparent information on the behaviour and future plans of the companies. In fact, within the scope of the strategy followed at international level to achieve sustainable development, it is increasingly recognized that the dissemination of information on matters of social responsibility/sustainability is a key element in the transparency and accountability of organizations.

Over the past few decades, the European Commission (EC) has adjusted its definition of Corporate Social Responsibility (CSR), presenting it in its Communication "Corporate social responsibility: a new EU strategy for the period 2011-2014", as "the responsibility of companies for their impacts on society". In order to fully fulfil their social responsibility, companies must adopt processes that integrate social, environmental and ethical concerns, respect for human rights and consumer concerns in their activities and strategies, in close collaboration with stakeholders, in order to: (a) maximize value creation for shareholders, other interested parties and society in general; and (b) to identify, avoid and mitigate its possible negative impacts (CE, 2011).

With the extremely complex and competitive business environment, the annual financial report no longer satisfies the demands of stakeholders, requiring a permanent capacity for adaptation, in order to guarantee competitiveness regarding competitors (Lourenço, 2017). The literature is unanimous in considering that traditional financial reports contain limited information for different stakeholders, who increasingly demand social and environmental information in financial reports.

Non-financial reporting has moved from a voluntary basis to a standardized and mandatory practice (Bedenik and Barišić, 2019). In fact, although the number of companies that have voluntarily published reports with non-financial information (namely sustainability reports and/or integrated reports (KPMG, 2017) is growing, in recent years, countries such as India, Brazil, China, Denmark, South Africa and Malaysia made the disclosure of non-financial information on CSR mandatory (Boodoo, 2016; Hoffmann et al., 2018). The same scenario is currently experienced within the EU, under Directive 2014/95/EU, which has been transposed into the internal rules of each Member State, establishing the obligation of non-financial reporting for some types of entities.

Therefore, it is important to present, in the following points, the developments in the field of non-financial reporting within the EU and in the Portuguese context.

European Context

At European level, the first effort of accounting regulation of the environmental issues arised with the Recommendation of the European Commission of 30 May 2001, concerning the recognition, valuation and reporting of environmental issues in the annual accounts and in the management report of the companies. Among other aspects, this recommendation intended to start demanding the disclosure of information of social character in the annual accounts of European companies covered by the IV and VII Community directives, in particular in the management report.

Afterwards, the topic of non-financial reporting was introduced by Directive 2003/51/EC of the European Parliament and of the Council, of 18 June 2003 (known as the Accounting Modernization Directive), namely with its article 46th, which establishes that the management report should "cover both financial aspects and, when appropriate, key indicators of non-financial performance relevant to the specific activities of the company, including information on environmental issues and issues concerning workers". This approach was in line with the Commission Recommendation 2001/453/EC of 30 May 2001, previously referred to.

However, in the same article 46th of the Modernization Directive was added that Member States could exempt smaller companies from the obligation to provide non-financial information in the annual report. Thus, according to Kinderman (2015) the measure introduced by the Accounting Modernization Directive had an insignificant effect on the quantity and quality of the non-financial reports produced, as it does not cover all entities.

However, after the economic crisis, in the context of the Europe 2020 Strategy and, more specifically, of the EU Strategy for Corporate Social Responsibility (2011-2014), it is recognized that the disclosure of non-financial information is a key element in the accountability provided by companies and for the development of a climate of trust. Facing social responsibility in a strategic perspective was increasingly important for the competitiveness of companies, allowing to build lasting relationships of trust with workers, consumers and citizens.

It was, therefore, important for social responsibility to encompass concerns about human rights, labour and employment practices (such as training, gender equality, health and well-being of workers), environmental issues (biodiversity, climate change, efficient use of resources, life cycle assessment and pollution prevention) and the fight against bribery and corruption.

Thus, at the beginning of 2013, the EC issued two reports, "Corporate social responsibility, responsible and transparent corporate behaviour and sustainable growth" and "Corporate social responsibility: promoting society's interests and a route to sustainable and inclusive recovery". These reports ensure that the current global economic crisis has resulted from fundamental errors in terms of transparency and accountability, as well as a short-term view.

Therefore, the commission recognizes the importance of disseminating information on sustainability, which should be based on generally accepted frameworks, such as those of the Global Reporting Initiative (GRI) - on sustainability reports - or the International Integrated Reporting Council (IIRC) - regarding the integrated reporting. It emphases, however, that any eventual dissemination solution should not comprise administrative burdens, especially for small and medium-sized enterprises (SMEs), since they represent more than 90% of the European business fabric. It considers, therefore, that a disclosure system based on the obligation to "comply or explain" is a useful tool.

It is in this context that, still in 2013, the European Parliament issued the Directive 2013/34/EU, of 26 June, on annual financial statements, consolidated financial statements and related reports of certain types of companies. Although it didn't yet foresee a specific document for non-financial information, it does mention that the information in the management report should not be limited to the financial aspects of the company's activity, including an analysis of the environmental and social aspects of the company's activity required to understand the company's development, performance or situation.

This is where a regulatory path begins, which again leaves SMEs free from the obligation to provide non-financial information, depending on the framework of each Member State. In this context, a series of debates and negotiations between the Member States begins, with the exposition of each Member States version, in order to create a regulation on non-financial reporting. According to Kinderman (2015), France and the United Kingdom were its main defenders, unlike Germany, who strongly opposed. About twenty-

four other Member States had no regulation for non-financial information, adopting a stance of indifference during negotiations.

With the negotiations over, in 2014, Directive 2014/95/EU, of 22 October, is published on the reporting of non-financial information, that marks the beginning of a new stage in the reporting of EU companies. The objectives of the Directive are linked to greater transparency, which makes companies more resilient and efficient, both financially and non-financially, which will progressively lead to more solid growth and employment, as well as enhanced confidence among stakeholders, including investors and consumers.

The directive applies to large companies that are entities of public interest and that have more than 500 employees, allowing the disclosures to be made at group level, and not necessarily by each subsidiary integrated in the group. However, the management of the parent company must ensure a strategic orientation of the company and an effective management control, as the group is considered as a whole and responsible for any adverse impact caused by its subsidiaries, even if it does not function as an integrated group. (Sorensen and Szabó, 2016).

As previously mentioned, in 2011, the European Council called for a reduction in the regulatory burden for SMEs. Thus, the new disclosure requirements should apply only to some large companies and groups. However, this does not prevent Member States from requiring disclosure to groups not covered by the Directive.

The directive states that companies must create a non-financial statement, to be included in the existing management report, or create a new statement for that purpose that contains information related, at least, to environmental, social and worker-related issues, to respect for human rights, corruption fighting and bribery attempts. This non-financial statement should include a description of the policies, results and associated and already registered risks. They should also disclose the policy of diversification in relation to the administrative, management and supervisory bodies, in terms of age, sex, qualifications or professional background. If no diversity policy has been planned, they are not required to create it, but they must include a clear explanation for that.

The directive considers that companies can rely on various frameworks based on national systems of the EU (such as the Eco-Management and Audit Scheme (EMAS)) or even international (such as the United Nations Global Compact, the OECD Guidelines; ISO 26000; the Tripartite Declaration of Principles of the International Labour Organization concerning Multinational Enterprises and Social Policy, the GRI guidelines or other recognized international frameworks, such as the IIRC.

In order to provide a methodology for the implementation of the directive, the EC (2017) published a document with guidelines on the communication of non-financial information. The document's objective is to provide balanced and flexible guidelines on the reporting of non-financial information, in order to help companies to disseminate relevant information, in a consistent and systematic manner. The Directive defines a concept of materiality to be taken into account when assessing the relevance of the information, stating that it must be "enough for an understanding [...] of the impact of its activities" on the company. Companies should explain the governance mechanisms and processes used to perform their materiality assessment, which should be reviewed periodically to ensure that those issues remain relevant.

Disclosure requires the use of simple and coherent language, as well as the formulation of definitions for technical terms, whenever necessary. Using a reference language from the business world, in addition to the official language of the company's country, will improve the company's transparency and make information more accessible to investors and other relevant stakeholders. However, according to Lourenço (2017), as these are not disclosures that can be easily translated into numbers, they can introduce distortions according to the objectives and image that organizations intend to transmit to the market.

The content of the non-financial report should be consistent with the other elements of the management report and systematic over time, allowing users to understand and compare changes, as well as having reliable information as a reference.

The report must also include comparability and consistency, as most of these companies operate in more than one Member State. Subsequently, investors demand an increase in the credibility of these disclosures through certifications issued by external and independent entities (Lourenço, 2017).

The legal mechanism that they created was to entrust this function to the Statutory Auditors, but they should only make sure that the non-financial statement or the report exists, without the need to analyse its content. However, it has become common, especially in the entities audited by the Big 4, to issue an opinion on the quality of the information, guaranteeing the reliability and transparency of the principles, practices and performance disclosed. It should also be noted that most of these audits are based on ISAE 3000, approved by the International Auditing and Assurance Standards Board (Lourenço, 2017).

Directive 2014/95/EU had to be transposed into the legislation of the various EU Member States by the end of 2016, to enter into force in 2017. It is, therefore, important to analyse its transposition to our country, Portugal.

National Context: Portugal

In Portugal, the first effort to regulate the reporting of non-financial information, more specifically environmental information, dates back to 2006, with the approval of Accounting Directive (DC) nº 29 – Environmental Matters, which transposed to the Portuguese accounting framework the precepts of the Recommendation of the European Commission of 30 May 2001, which we previously referred to. DC No. 29 was later revoked, when the Accounting Standardization System (SNC) came into force, which now includes Accounting and Financial Reporting Standard (NCRF) No. 26 – Environmental Matters, whose content does not depart, substantially, from DC 29. The Portuguese regulations establish a set of disclosures to be made on environmental matters, both in the Management Report and in the Annex.

Recently, the type of non-financial information to be disclosed by companies has been expanded, not being limited to merely environmental information. Thus, Decree-Law No. 89/2017, of 28 July, transposed the Directive 2014/95/EU to the Portuguese legal system, which proceeds, to this purpose, to the amendment of articles 65th, 451st and 528th of the Commercial Companies Code (CSC) and the addition of articles 66th -B and 508th -G, as well as the amendment to article 245th -A of the Portuguese Securities Code (CVM). The diploma creates two obligations for the presentation of non-financial information, one related to environmental, social and labour aspects, and the other centred on the diversity policies of members of the higher bodies of companies.

The diploma establishes that large companies and the parent companies of a large group, which have the legal status of public interest entities[1] and which have an average of more than 500 workers, must present annually, and as of the 2017 financial year, a non-financial statement, included in the management report or presented in a separate report.

The information requested in this non-financial statement includes an comprehension of the evolution, performance, position and impact of its activities, referring at least to environmental and social issues, as

[1] They are entities of public interest, those qualified as such by article 3rd of the Legal System of Audit Supervision, approved under the terms of article 2nd of the Law no. 148/2015, of 9 September. Large companies are those that exceed at least two of the three limits defined in paragraph no. 3 of article 9th, determined under the terms of article 9th -A, both from DL no. 158/2009, of July 13, with the wording given by DL nº 98/2015, of June 2.

well as measures aimed at workers, respect for human rights, gender equality and corruption and bribery fight.

In fact, Article 66th-B of the CSC, added with that diploma, provides that companies must include:
"a) A brief description of the company's business model;
b) A description of the policies followed by the company in relation to these issues, including the due diligence procedures applied;
c) the results of these policies;
d) The main risks associated with these issues, linked to the company's activities, including, if relevant and proportionate, its business relationships, its products or services that are likely to have negative impacts in these areas and the way these risks are managed by the company;
e) Key performance indicators relevant to your specific activity."

If the company does not disclose any of these items, it must present a clear and reasoned justification. It should also include a cross-reference to the amounts recorded in the annual financial statements and their additional explanations in order to be able to make a quantitative and qualitative interpretation and improve the quality of the report.

The key point will be the materiality of the information, identifying how to measure whether the information is relevant and appropriate, through a qualitative and non-quantitative analysis, always bearing in mind the recipients of the information. Content analysis can be carried out, resulting from questionnaires and meetings with stakeholders or the GRI materiality test, which is one of the most used methods both in Portugal and in the rest of the world (BCSD, 2016).

Portuguese legislation followed the guidelines of the directive, still leaving some indicators recommended in the various areas, namely in:

- "Environmental issues: current and predicted impacts of the company activities on the environment, health, safety, water use and air pollution;
- Social and workers related issues: equality between women and men and non-discrimination, application of the main international labour organization conventions, working conditions, social dialogue, respect for workers' rights, respect for union rights, health and safety at work, dialogue with local communities, and/or actions taken to ensure the protection and development of these communities, measures adopted in the context of promoting reconciliation between the professional, personal and family life of workers, as well as the exercise of rights of protection in parenting;
- Human rights: information regarding the prevention of human rights violations;
- Fighting corruption and bribery: instruments used to fight corruption and attempts at bribery,
- Description of the diversity policy that is applied to its management and supervisory bodies, namely in terms of age, sex, qualifications and professional background, (only required for large companies, issuers of shares admitted to trading on a regulated market in a member state of the EU" (DL nº 89/2017).

As mentioned, in addition to this DL, some articles were altered and added to the CSC, introducing the legal obligation for the members of the management to prepare the non-financial statement, or the separate report, with this information within three months from the closing date of each financial year or five months in the case of consolidated accounts. They must also disclose non-financial information on the company's public website, or published together with the management report, within a period not exceeding six months from the balance sheet date.

The models that entities should use to prepare this non-financial statement are described in the DL itself, which suggests that companies can use national, EU or international systems, in which case the system used must be specified. Refers to the Community Eco-Management and Audit System, or international systems, such as the United Nations Global Compact, to the guidelines of the Organization for Economic Cooperation and Development for multinational companies, the ISO 26000 Social Responsibility standard of the International Organization for Standardization, the Global Reporting Initiative (GRI) Initiative on the preparation of sustainability reports or other recognized international frameworks (such as that of "Integrated Reporting") and the methodological reporting guidelines prepared by the European Commission.

It also includes an indication to the company's Statutory Auditor to certify whether the annual management report includes the non-financial statement or whether it was presented in a separate report. However, these measures are only a verification feature if it exists, since the reviewers do not have any competence to issue an opinion on the quality, relevance and pertinence of the information disclosed (article 451 of the CSC).

There is an estimated fine of 50€ to 1500€ for the manager or administrator of companies that do not meet the established deadline or do not submit non-financial information in any of the reports (article 428th of the CSC).

Study Objectives and Research Hypotheses

Based on what was exposed in the first part of this article, it is important to study the Portuguese reality with regard to non-financial reporting, especially after the transposition of Directive 2014/95/EU, through DL no. 89/2017.

It was exactly in 2017 that public interest entities, with an average number of over 500 workers, became obliged to disclose non-financial information in Portugal. In this sense, the main objective of this work is to study the non-financial reporting practices adopted by companies listed on the stock exchange in Portugal, seeking to assess the degree of compliance with the provisions of DL 89/2017 and its determining factors. In addition, we seek to ascertain which theoretical model of report/framework (the GRI standards or the Framework IR, or other framework) has served as a basis for companies to make their non-financial reporting.

The studies by Lourenço (2017) and Caputo et al. (2017), with regard to the degree of compliance with Directive 2014/95/EU, in the Portuguese and Italian context, respectively, adopted the content analysis combined with the score analysis as a methodology. In our study, we sought to assess the degree of compliance with the Portuguese diploma, using a disclosure index, similar to other studies that deal with the degree of compliance with a certain accounting standard. This disclosure index will be built based on the mandatory disclosure requirements provided for in DL No. 89/2017, based on a dichotomous scale to identify whether a certain mandatory requisite/item is disclosed or not, based on the content analysis of the documents obtained, relative to the 2017 period. This disclosure index will be the dependent variable of the multiple linear regression model that will be developed, in order to identify the factors that explain the degree of compliance with the normative.

Thus, based on studies previously performed, the hypotheses of the relationship between the degree of disclosure of non-financial information by companies listed in Portugal and certain characteristics are raised, specifically:

a. Size

Used in most studies, size is one of the most common independent variables in explaining the degree of information dissemination. The main argument for its consideration is the fact that the largest companies

are obliged to provide more complete information and have more advanced information systems (Teixeira 2015).

The variable can be justified through the contingency theory, which argues that the company's dimensions have an impact on its control systems (Major, 2017). These improvements in the control systems contribute to more and better disclosures. This variable is also supported by the theory of stakeholders and legitimacy (Gaio and Mateus, 2014). In fact, larger companies, when subject to greater exposure and visibility, both before the media, society and regulators, face greater pressure from different stakeholders to disseminate more information, compared to small companies. On the other hand, larger companies are increasingly concerned with improving their public image and reputation before society, considering that communicating information about their environmental performance is a good way to legitimize themselves.

Thus, like other authors (Caputo et al., 2017 and 2018; Buitendag et al. 2017; Romão et al., 2018), we hope to obtain a positive relationship between the size of the company and the level of disclosure of non-financial information, so we formulate the following hypothesis:

> **H1**: The level of disclosure of non-financial information is greater the larger the size of the company.

b. Profitability

Teixeira (2015) states that as a way of crediting the values presented in the levels of profitability, the largest companies bet on the quantity and quality of the information provided, clearly showing the origin of their profitability. However, some authors present a contrary perspective, as less profitable companies may tend to disclose more information in order to defend less satisfactory results (Gaio and Mateus, 2014).

Although the literature is not consensual, we follow the logic of Buitendag et al. (2017), which had a positive association regarding this variable. Thus, we define the following hypothesis:

> **H2:** The level of disclosure of non-financial information is higher the higher the company's profitability

c. Indebtedness

According to Al Shammari et al. (2008, referred to by Teixeira, 2015) generally, indebted companies present greater risk to shareholders, since the scarcity of capital generates a need for financing, and as such arousing interest and trust with stakeholders becomes essential.

According to Mutawaa (2010, referred to by Teixeira, 2015), indebtedness is a variable unfrequently used in this type of studies on information dissemination. However, it should be considered because, in an attempt to show confidence in companies and in their financial structure, companies with a high degree of leverage feel obliged to disclose more information and with higher quality.

Thus, we define the following hypothesis:

> **H3:** The level of disclosure of non-financial information is greater the greater the company's indebtedness.

d. Auditor Type

According to Gaio and Mateus (2014), company audits thrusted higher levels of financial information disclosure, seeking to maintain and raise their reputation. Similarly, Branco et al. (2015) consider that with the increase in audits of sustainability reports (mainly in Big4), there has been an increase in the number of disclosures and associated quality.

Lopes and Rodrigues (2007) refer that the disclosure practices made by companies can also be influenced by their type of management, which is why independent people are needed to monitor and control. This variable fits into the agency's theory, since the auditor is our agent for controlling the information disclosed.

Although Caputo et al. (2017) and Fuster et al. (2019) have not found evidence to justify the influence of this variable, Gaio and Mateus (2015) and Caputo et al. (2018) obtained a positive association, with respect to financial and non-financial information, respectively. In this sense, we define the following hypothesis:

> **H4:** The type of audit company has an influence on the level of disclosure of non-financial information.

In this case, we will distinguish the companies that are audited by the BIG4 (EY, PwC, Deloitte and KPMG) as they are the four largest companies specialized in auditing and consulting in the world. These companies are world leaders in the sector, and as such they enter as a dummy variable, which is assigned a rating of 1 if the audit of the companies is performed by a Big4, and a rating of 0, if the audit of the companies is performed by another audit firm.

e. Internationalization Activity

Gaio and Mateus (2014) claim that entities operating in several international markets need to improve their management control systems due to the complexity of the operations. As such, the systems are designed to allow the production of more and better information.

Internationalization is measured according to its location, that is, companies with factories or stores operating in other countries are considered multinationals. National companies only produce in Portugal, although they can export their products or services internationally.

In the study by Romão et al. (2018), statistically significant results were obtained for this variable, even though the same wasn't verified in the study by Fuster et al. (2019). However, we formulate the following hypothesis:

> **H5:** The level of disclosure of non-financial information is greater the greater the entity's international activity.

f. Activity Sector

The main reasons given for the use of this variable are the existence of sectors with greater social and environmental impacts and, as such, to which higher levels of disclosure are required. Another reason will be based on the mimetic institutional isomorphism theory (DiMaggio and Powell, 1983), since companies tend to follow the examples applied in the same sector, and thus avoid distrusts/pressures from the markets.

The sector is also a variable that is widely used in studies and that normally has a positive association with the level of disclosure of social/environmental information (Buitendag et al., 2017; Romão et al., 2018), despite some studies (Caputo et al., 2018; Ribeiro, 2019; Fuster et al., 2019) have not proven their significant influence.

> **H6:** The activity sector of the companies has an influence on the level of disclosure of non-financial information.

We will assign a traditional classification to the economic sectors, specifically to distribute companies among services, commerce and industry. As it is not possible to predict the expected association signal for each of these sectors, we consider it relevant to separate the industry since at the environmental level they

have stricter and more demanding rules. The main argument underlying the Theory of Legitimacy is that industrial companies, with more potential environmental impact and greater exposure to the media, tend to publish more information.

g. Type of Report

Despite being a factor only considered by some of the other authors analysed (Ribeiro, 2019; Fuster et al., 2019), we consider relevant to analyse whether the type of report where non-financial information is disclosed influences the level of disclosure. We consider that when the company creates its own report for non-financial information, it dedicates more time to it, in order to prepare information focused on the theme, with the appropriate framework for its internal and external environment. It exposes its applied policies and methodologies, showing a more complete image.

When the information is included in the report and accounts, the information is more dispersed among the different chapters, namely the part of the framework is mostly found in the management reports. Despite being larger reports in number of pages, the quality and relevance of the information ends up being neglected.

So, we define the following hypothesis:

> **H7:** The use of an own report, where non-financial information is disclosed, positively influences the level of non-financial information disclosure.

h. Reference Framework

This variable is also not widely explored in the literature, only Caputo et al. (2018) and Fuster et al. (2019) considered it in their studies. However, we consider relevant to include it in our study, since, although the DL does not oblige to follow any model for non-financial reporting, it advises a series of them, of which the most used is the G4 version of the GRI. As such, we decided to test the use of the GRI framework has a positive effect on disclosure, even knowing its limitations, as previously mentioned.

Thus, we formulate the following hypothesis:

> **H8:** The use of GRI guidelines influences the level of disclosure of non-financial information.

In view of the above, it is expected that there is a positive relationship between all variables and the level of disclosure of non-financial information, according to the following table, where the way in which quantitative variables are measured is also presented.

Table 1: Independent variables, calculation formulas and expected association with the level of disclosure

Research Hypotheses	Independent variables	Calculation Formula	Expected Association
H1	Size	Total Assets logarithm	+
H2	Profitability	$\frac{\text{Net income}}{\text{Total Owner's Equity}}$	+
H3	Indebtedness	$\frac{\text{Total Liabilities}}{\text{Total Owner's Equity}}$	+
H4	Auditor Type	*Big4* = 1; otherwise 0	+

Research Hypotheses	Independent variables	Calculation Formula	Expected Association
H5	Internationalization Activity	0 - National; 1- Multinational	+
H6	Activity Sector	0 - Trade and Services; 1- Industry	+
H7	Type of report	0 - Report and Accounts; 1 - Separate Report	+
H8	Reference Framework	0 - No model or different from GRI; 1- GRI	+

Research methodology in the collection and processing of data

The sample and data collection

Within the scope of this study we will include entities listed on the Portuguese stock exchange, which meet the cumulative criteria required by DL No. 89/2017, that is, which have a legal status as a public interest entity and an average of more than 500 workers.

After consulting the Euronext Lisbon website[2], on November 16, 2018, we found that there were 47 listed companies. The collection of reports and accounts, sustainability reports, integrated reports or other type of report disclosed by the companies for the period of 2017 was performed, which corresponds to the first mandatory period for the adoption of DL 89/2017. These documents were collected on the websites of each of the companies.

After a brief search for their management reports, we found that about 10 companies did not meet the minimum requirement of 500 workers, so only 32 met the requirements for the analysis, those being our sample (see Appendix I - List of companies in the sample).
In the following table we can see how the sample is characterized, based on the variables previously identified, when formulating the research hypotheses.

Table 2: Characterization of the sample by sector

Size (total Assets)	N	%
Up to 1 billion euros	16	50%
>1 billion and <10 billion euros	11	34,38%
>10 billion euros	5	15,63%
Auditor Type	**N**	**%**
Big4	28	87,5%
Not Big4	4	12,5%
Internationalization Activity	**N**	**%**
Multinationals	22	68,75%
National companies	10	31,25%

[2] https://www.bolsadelisboa.com.pt/cotacoes/accoes-lisboa

The table allows us to verify that half of the companies have a total asset of less than 1 billion euros, with only 5 companies having more than 10 billion euros of assets. Most companies in the sample (87.5%) are audited by a Big4. With regard to the internationalization activity of companies, the sample is divided with 22 multinational companies (68.75%) and 10 national companies (31.25%).

In the following table we can see how the sample is constituted, framing it by sector.

Table 3 : Characterization of the sample by sector

Sector		N	%
	Banks	2	6,25%
	Consumer goods	3	9,38%
	Industry	9	28,13%
	Health	1	3,13%
	Consumer services	9	28,13%
	Communications	4	12,50%
	Energy, Gas and Oil	4	12,50%

When we carry out an analysis of the sectors of activity, we can see that Industry and Consumer Services are the most representative in the study sample with 28.13% each, which means more than half of the sample together.

Methodology: Dependent variable and model

In the first part of the study, we tried to study the non-financial reporting practices adopted, evaluating whether the listed companies make their non-financial reporting by including all information (financial, non-financial and management) in a single report or if divide between the report and accounts (for financial information) and the management report (with non-financial and management information).

Regarding the framework followed by the Portuguese companies that disclose their non-financial information, we will evaluate which of the theoretical references is the most chosen by the analysed companies.

The non-financial information reports issued by the companies were subject to a content analysis, in order to analyse the impact and applicability of the regulation in Portugal. To assess the degree of compliance with DL 89/2017, a disclosure index was created, based on a set of 8 items of information, corresponding to mandatory information by DL nº 89/2017, Article 66th -B of the CSC and the guidelines on the communication of non-financial information from the European Commission, as shown in the table below.

Table 4 : Disclosure items

Disclosure Items
1. Understanding the company's evolution (Business Model and associated risks)
2. Position of the company (Policies and due diligence)
3. Company performance (Results / Key Performance Indicators)
4. Impact of its activities on environmental issues
5. Impact of its activities on social and workers related issues, Equality between women and men and non-discrimination
6. Impact of its activities on human rights issues
7. Impact of its activities on anti-corruption issues and bribery attempts
8. Description of the diversity policy applied regarding its management and supervisory bodies

Thus, the value of the Index is the result of dividing the total score obtained by each company, by the maximum number of points awarded (8), as described below:

Table 5 : Formula for calculating the Disclosure index

$IND_j = \sum_{n=1}^{i} i_n / i$	IND_j	Disclosure index of non-financial information of the company j
	i_n	Non-financial information item i under analysis. Dichotomous variable (dummy) with value 1 if the company discloses information about the element and value 0 if the company does not disclose information about the element
	i	Maximum number of items (8)

The calculation of this index has two main characteristics:

- Dichotomous: when the item is disclosed, a score of 1 is assigned, otherwise the absence of information will be signalled with 0;
- Unweighted: the result is achieved through an unweighted sum, assuming that each item has the same relevance for the entity.

Thus, the index varies between 0 and 1, where 1 means that the company discloses information about all the items. This disclosure index will constitute our dependent variable, allowing us to measure the level of disclosure of non-financial information that we seek to associate with the independent variables present in the previously defined research hypotheses. For this purpose, a multiple linear regression model will be created, as described in table 6.

Table 6 : Multiple Linear Regression Model.

$$Ind = \alpha_0 + \beta_1 Size + \beta_2 Prof + \beta_3 Indeb + \beta_4 TAud + \beta_5 Inter + \beta_6 TSet + \beta_7 TRep + \beta_8 Ref + e_i$$

Where:
Size – Size, measured by the Total Asset Log
Prof – Profitability of owner's equity (ratio between net income of the period and total owner's equity)
Indeb – Indebtedness (ratio of liability to total owner's equity)
TAud – Auditor type, dividing into two groups (dummy variable):
0 – Auditor does not belong to Big4;
1 – Auditor belongs to Big4;

Inter – Internationalization activity, dividing into two groups (dummy variable):
0 – Company works at a national level;
1 – Company working in a multinational scope;
TSet – Activity Sector, dividing into two groups (dummy variable):
0 – Company does not belong to the industry;
1 – Company belongs to the industry;
TRep – Report type, divided into two groups (dummy variable):
0 – Non-financial information disclosed in the report and accounts;
1 – Non-financial information in a separate report;
Ref – Reference framework, divided into two groups (dummy variable):
0 – Does not mention any model, or other than the GRI;
1 – Mentions the GRI as the model used.

After compiling all the necessary information from the companies, we used the Statistical Package for Social Sciences (SPSS) software to create a database and carry out the respective statistical treatment and data analysis.

Analysis and Discussion of Results

Analysis of Non-Financial Reporting Practices

We now proceed to the analysis and discussion of the results obtained, as a way of answering the research questions. Thus, firstly, we begin by analysing the non-financial reporting practices adopted by the 32 companies listed on the stock exchange in Portugal and with more than 500 workers, and afterwards by looking to assess the degree of compliance with the established on DL 89/17 and its determining factors.

Report type

Since the main theme is the non-financial report, we start with an analysis of the type of report used by companies, and its form of disclosure, as we can see in the following graph.

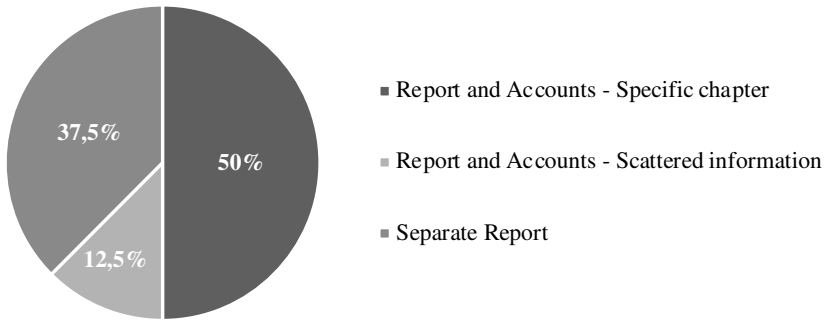

Figure 1: Type of non-financial information report

To be noted that only 37,5% of the companies (12) chose to create their own report, separate from the report and accounts, usually called the "Sustainability Report". Of the 20 companies that include non-financial information in the report and accounts, about 16 dedicate their own chapter, unlike the other 4 companies that leave information dispersed throughout the report and accounts.

When the information is included in the report and accounts (62% of the cases), we can find a specific chapter for non-financial information, required by DL nº 89/2017, called "non-financial statement", "non-financial information" or also "sustainability" information. It should be noted that no company presents an integrated report.

Disclosure of Non-Financial Information Items

The figure below summarizes the number of companies that present information on each of the items under analysis (which are part of the disclosure index, to be analysed later), as predetermined in DL 89/2017.

Figure 2 – Number of companies that disclose regarding the information items

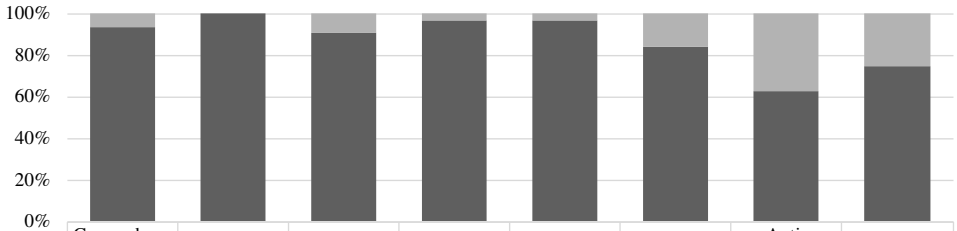

	Comprehension of the company's evolution	Company's position	Company's performance	Environmental	Social and workers related	Human Rights	Anti-corruption and bribery attempts	Diversity and bodies policy
Don't disclose	2	0	3	1	1	5	12	8
Disclose	30	32	29	31	31	27	20	24

With this figure we can see that the item "company's position", where companies refer to their policies and procedures, was disclosed by all companies included in the sample, since all companies had a maximum score in this item.

We can also verify that the item related to the fight against corruption and bribery attempts is the least disclosed by the companies, since 12 companies did not disclose about this item. Similarly, the items related to human rights and the diversity policy of the management bodies are also the items least disclosed by companies.

Reference Framework

Regarding the reference framework that companies followed to create their non-financial report, we used the GRI as a basis, since 53.13% of the sample mentioned it. This is especially visible in companies with multinational activities, where around 55% of these companies refer to the GRI in their non-financial reports, as we can see in the following graph.

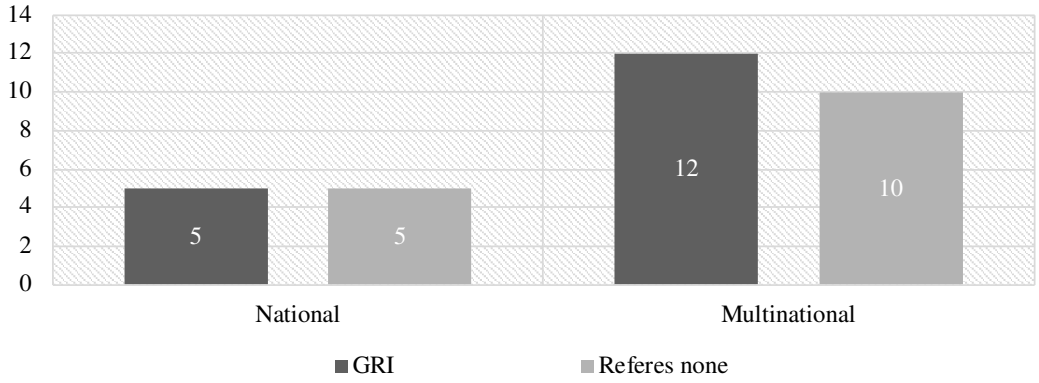

Figure 3: Reference Framework used by companies

It should be noted that there is a very large difference in the number of pages, when the report is based on the GRI or not. The average number of pages in reports based on the GRI structure is 80 pages, with an average of 20 pages when there is no reference to GRI.

The same is reflected when comparing the company's internationalization, since national companies present an average of 34 pages of non-financial report pages, and at the level of multinational companies the value is almost double, around 60 pages.

Degree of Compliance with DL 89/2017: the disclosure index

As previously mentioned, our study aims to assess the degree of compliance with DL 89/2917, which is measured by our disclosure index, based on the 8 items of non-financial information mentioned above. This index varies between 0 and 1, representing the presence (1) or absence (0) of the disclosure of the item under analysis in the non-financial report.

After collecting and processing the data, we can see in the following table, that the disclosure index varies between 0.5 (minimum value obtained) and 1 (maximum value obtained), with an average of 0.88 and standard deviation of 0.15. Thus, we consider that the degree of compliance with DL 89/2017 is quite high, with an average disclosure of 7 items out of 8 possible.

Table 7 : Statistical measures of the disclosure index

	Minimum	Maximum	Average	Standard Deviation
Disclosure Index	0.50	1.00	0.875	0.1455

The table below allows us to observe that around 43.8% (14 companies) obtained the maximum score (index = 1), namely Altri, SGPS, Banco BPI, Cofina, SGPS, Corticeira Amorim, CTT Correios Portugal, EDP Renováveis, EDP, Estoril Sol N, Mota Engil, Semapa, Sonae, SonaeCom, SGPS, Teixeira Duarte, VAA Vista Alegre.

The company with the lowest score was Reditus, SGPS, which didn’t disclose 4 items in its non-financial report, namely the understanding of the company's evolution, human rights, fighting corruption and bribery

attempts, and the policy of diversity of management and supervisory bodies. We can also observe that the index does not present values below 0.5, that is, the minimum number of items disclosed is 4.

Table 8 : Disclosure of non-financial information

Disclosure Index	No. items disclosed	No. items not disclosed	N	%
0.5	4	4	1	3.1%
0.625	5	3	4	12.5%
0.75	6	2	3	9.4%
0.875	7	1	10	31.3%
1	8	0	14	43.8%
		Grand Total	32	100%

Determining factors of the degree of compliance with DL 89/2017: multivariate analysis

After a descriptive analysis of the results, we started to verify the relationship between the independent variables and the dependent variable, using a multiple linear regression model. According to Major et al. (2017, p.196) a regression consists of a "method of prediction or estimation between a dependent variable and one or several independent variables, such that the values of the variable can be explained by the values of the independent variable (simple regression) or independent variables (multiple regression) ".

As part of our multivariate analysis, based on the linear regression model previously outlined, we begin by analysing the correlations (and the respective level of significance) between each of the variables studied (see Appendix III).

Through the correlation matrix, we observed that the variables, size, profitability and report type correlate positively and significantly with the Disclosure Index, with a moderate association greater than 0.35 for a confidence level of 5%, which means that these variables have more than 35% of common variability.

According to Pestana and Gageiro (2008), the correlation coefficient between the variables studied must not be greater than 0.9 (in absolute value), as they indicate the existence of multicollinearity. However, by the correlation matrix, note that profitability and indebtedness exceed this limit. Therefore, we performed two linear regression simulations, removing each one individually. We concluded that the results were very similar, so we chose to remove the profitability of the model, since the net result for the period is more susceptible to changes depending on the year used in the study.

This way, we proceed with the model and the method used was the stepwise, since its main advantage is the removal of variables whose importance in the model is reduced. In other words, in its process it includes the significant variables, one by one, excluding all other non-significant variables.

Table 9: Results of the Linear Regression Model

Model		Non-standardized coefficients		Stand. Coef.	t	Sig.	Collinearity statistics	
		β	Standard Deviation	β			Tolerance	VIF
1	(Constant)	.831	.030		27.352	.000		
	TRep	.117	.050	.394	2.351	.025	1.000	1.000

2	(Constant)	.163	.270		.605	.550		
	TRep	.125	.046	.422	2.715	.011	.995	1.005
	Tam	.073	.029	.386	2.487	.019	.995	1.005

a. Dependent Variable: Ind

Along with the model, it is also relevant to make a diagnosis of the multicollinearity, which translates to the study of the relationships between the independent variables, in order to assess whether there are no linear relationships between them.

The multicollinearity intensity is analysed through the correlation between the independent variables and of tolerance and VIF (Pestana and Gageiro, 2008). Tolerance measures the degree to which a given variable is explained by all other independent variables. It varies between 0 and 1, and the closer it is to zero, the greater the multicollinearity. The VIF value is the inverse of tolerance and, therefore, the closer it is to zero, the lower the multicollinearity will be (Pestana and Gageiro, 2008). As we can analyse in the previous table, the VIF are 1.005, that is, very close to one, fitting the ideal values.

Through the stepwise we can observe (in the previous table) that it resulted in two models, that is, only two of the variables - size and type of report - proved to be statistically significant to explain the value of the disclosure index.

Table 1 : Summary Template

Model	R	R^2	R adjusted square	Standard deviation of the estimate	Durbin-Watson
1	.394[a]	.156	.127	.13591	
2	.551[b]	.304	.256	.12550	1.131

a. Predictors: (Constant), TRep
b. Predictors: (Constant), TRep, Size
c. Dependent Variable: Ind

The Report type variable explains about 15.60% of its value, which together with the size of the company, explains 30.40% of its result (R square = 0.304).

In view of the above, through the multivariate analysis we conclude that our results are in agreement with empirical evidence that indicate size as one of the main explanatory factors for the degree of disclosure of non-financial information (Caputo et al., 2017; Buitendag et al., 2017 ; Caputo et al., 2018; Romão et al., 2018 and Ribeiro, 2019). In the same way, similarly to Ribeiro (2019) and Fuster et al. (2019), the use of a separate report to disclose non-financial information influences its level of disclosure. Thus, it was possible to validate hypotheses 1 and 7.

Contrary to what was expected, in relation to the other independent variables, no statistically significant results were obtained, and, therefore, it was not possible to validate the remaining hypotheses formulated.

In the case of indebtedness, the positive relationship between indebtedness and the disclosure index, provided for in hypothesis 3, has not been proven. It should be noted that this variable is underused in this type of studies, as the empirical literature is not consensual as to its explanatory power. Likewise, we did not prove the association between the audit variable and the disclosure index, and consequently hypothesis 4 was not validated. Our results follow the same line as Fuster et al. (2019).

Regarding the internationalization activity, we were unable to prove the existence of a significant association with the disclosure index. Unlike Romão et al. (2018), which obtained statistically significant

results, our results are in line with the study by Fuster et al. (2019). To be noted that the fact that almost 70% of the companies are multinational, leads to some homogeneity of the sample with regard to internationalization, which may explain the difficulty in proving H4 statistically.

Similarly, the fact that the sample concentrates a large number of companies from non-industrial sectors has not allowed to prove the sector's influence on the advertising index, leading to the rejection of the research hypothesis 6. Our results are, however, similar to those of Caputo et al. (2018), Ribeiro (2019) and Fuster et al. (2019).

Finally, and contrary to the results of Caputo et al. (2018) and Fuster et al. (2019), in our study we were unable to prove hypothesis 8 that the framework used influences the degree of disclosure of non-financial information. However, our sample was quite divided, with 53% of companies using the GRI and the remaining 47% applying other models or even without mentioning any model suggested in the standard.

Conclusion

Through DL nº 89/2017, the Directive 2014/95/EU on the disclosure of non-financial information, mandatory in the 2017 financial year for public interest entities with an average number of employees above 500, was transposed to Portugal. This article sought to study the impact of that legal normative, ascertaining its degree of compliance in companies listed in Portugal, as well as its explanatory factors. This study sought to extend and complement the study by Lourenço (2017), which focused on the degree of compliance with Directive 2014/95/EU in 2015, as well as to expand the explanatory variables used by Ribeiro (2019).

Based on the content analysis of the 2017 period reports, we found three types of non-financial reporting: the use of own/separate report (in 12 companies, i.e., 37.5% of the sample) and the inclusion of information in the report and accounts (in the remaining 20 companies, i.e., 62.5% of the sample), with the majority (16 companies) presenting the information in a specific chapter or the remaining (4) dispersing the information across several chapters.

Regarding the degree of compliance with DL 89/2017, we conclude that it is quite high, since the average of non-financial disclosures is around 0.875, which means that, on average, companies leave only one of the items to be disclosed (of 8 items under review). We observed that the least publicized items were the fight against corruption and attempts at bribery, the diversity policy of the organs and human rights. The results of the disclosure index focus on four or more items disclosed, since no company discloses less than half of what is required by the DL. A very positive fact is that about 14 companies (about 44% of the sample), obtained maximum score in the index. This shows a concern on the part of companies in non-financial matters.

Another objective of this article was to identify the factors that determine the degree of compliance with DL 89/2017. For that purpose, using a multiple linear regression model, we related the disclosure index (dependent variable) with the following independent variables: size, profitability, indebtedness, type of auditor, internationalization activity, sector of activity, type of report and the reference framework.

From the linear regression model, we concluded that only the size and type of report are statistically significant, explaining 30.40% of the value obtained in the disclosure index. Thus, hypotheses 1 and 7 were validated. Although only these two variables are considered statistically significant, when we relate them individually to the disclosure index, we observe the limitations of our sample, since only 32 companies were considered and with very homogeneous characteristics. Aspects such as the type of auditor and the internationalization activity, follow a pattern of choice considered normal, since they are all listed on the stock exchange.

As for the sector, the sample ended up with few companies in the industry sector, about 28%, which negatively influenced the use of the sector variable. Although 53% of the sample refer to the GRI framework, and in the literature review it is considered an important variable, it was not proven with an explanatory factor of the degree of compliance with DL 89/2017.

As a general conclusion, we can say that the results were quite satisfactory, and prove the impact of the regulations on the reporting of companies that, increasingly, have other types of concerns besides financial ones. Thus, the high degree of compliance with DL 89/2017 demonstrates a process of institutionalization and homogenization of non-financial reporting practices on the Portuguese stock exchange, which is based on a coercive isomorphism, in light of the Institutional Theory. On the other hand, compliance with the law, i.e., the company's desire to be seen as complying with the law, is one of the assumptions underlying the theory of legitimacy. In coercive isomorphism, the main focus is to avoid the sanctions derived from the organization's non-compliance with the rules existing in the institutional environment (DiMaggio and Powell, 1983), so the company's legitimacy is obtained by complying with such rules.

One of the limitations found in the investigation is related to the methodology used, since we use a content analysis where we only confirm whether or not the item was disclosed, but we did not analyse the extent of its content or the quality of the information, and the information disclosed may add no value to its stakeholders (Gray et al., 1995). A score analysis could have been applied to identify the different dimensions of disclosure, as already applied by Caputo et al. (2017).

Given the fact that the analysis is related to the economic period of 2017, the first year of mandatory application of the DL 89/2017, it limits our study, making it impossible to compare and analyse evolution. Thus, we suggest, in the future, a longitudinal study that allows the evaluation of the evolution in the disclosure of non-financial information, specifically with regard to the framework model used. We believe that the future will pass through the increase of integrated reports, as a way to comply with the diploma.

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Sustainable Development Goals Reporting: Evidence from Portuguese Listed Companies

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Abstract

The Sustainable Development Goals (SDG) of the UN 2030 Agenda are an opportunity to improve the management of organizations, in order to seek solutions that add value and solve the greatest global challenges, by linking organizational strategies and global priorities. The SDG provide an integrated framework for future-oriented Corporate Social Responsibility (CSR) engagement. The way in which organizations evaluate their contributions to the SDG is the key to informing and shaping future engagement and action. Organizations will need to be able to assess their impact on the achievement of the SDG and review their strategies and practices, needing to collect and report new data. Thus, it is important to align the organizations' strategy and the corporate reporting with the SDG. Among the goals of Agenda 2030, we highlight target 12.6 that encourages companies to adopt sustainable practices and to integrate sustainability information into their reporting cycle. Although many companies mention the SDG in their annual or sustainability/integrated reports, particularly on topics related to climate change, sustainable water management or employment, organizations need a reporting approach that takes into account not only the importance of specific SDG, but also how to measure the level of progress against them. The aim of this study is to explore how Portuguese listed companies have started to engage with the SDG and how this expresses itself into their corporate reporting. Concerning the methodology, a content analysis of their sustainability reports was conducted, seeking to identify the companies that are concerned with SDG-related disclosure, disclosing information about theirs practices promoting SDG achievement.

Keywords: Sustainable Development Goals, Agenda 2030, Corporate Reporting, Sustainability Reporting

Introduction

The most well-known and quoted definition of Sustainable Development (SD) is that of the Brundtland Report which defines SD as "one that meets the needs of present generations without compromising the ability of future generations to meet their own needs" (World Commission on the Environment and Development, 1987:16).

Since the United Nations Conference on Environment and Development (UNCED) - ECO 92 or Rio Summit (1992), some structural documents have emerged from a sustainable approach to development, notably Agenda 21, which consolidates the SD strategy and its concept. The European Union (EU) has been present at ECO 92 and endorsed its declaration of principles for the SD. Sustainable development has been at the heart of the European Project for a long time. In the past, an EU Sustainable Development Strategy was launched in 2001 (COM, 2001), revised in 2009 (COM, 2009). Since 2010, sustainable development has been mainstreamed into the Europe 2020 strategy (COM, 2010).

In 2015, Member States of the UN adopted an ambitious agenda for poverty eradication and global economic, social and environmental development until 2030, known as Agenda 2030, containing 17 Sustainable Development Goals (SDG) and 169 targets. This agenda, adopted by almost all countries in the world, define the priorities and requires global action by governments, business, and civil society.

Agenda 2030 for Sustainable Development covers all areas and sectors of any country. The European Commission is fully committed to delivering the 2030 Agenda and, since 2017, regularly reports on the EU's progress in implementing the 2030 Agenda (COM, 2016). Thus, organizations will need to know how to assess their impact on SDG and review their strategies, accordingly, requiring the collection and reporting of new data, as well as how they relate.

In the European context, the EU Strategy for Corporate Social Responsibility (2011-2014) recognizes that the dissemination of information in this area is a key element in transparency and accountability, leading to the publication of Directive 2014/95/EU[1], of 22nd October 2014, on the provision of non-financial information with regard to social, environmental and corporate governance areas by companies.

The European Directive marks the beginning of a new stage in the reporting of large companies towards the non-financial reporting. However, within the EU, "The next steps towards a sustainable European future" are already being considered (COM, 2016). Based on the disclosure requirements of Directive 2014/95/EU, the guidelines proposed in that document make an important contribution to the SDG.

Among the goals of Agenda 2030, the target 12.6 that encourages companies to adopt sustainable practices and to integrate sustainability information into their reporting cycle. The development of sustainability reporting models in the last years leads companies worldwide to disseminate information related to sustainable development (KPMG, 2017). However, none of the sustainability/non-financial reporting frameworks (such as those of the Global Reporting Initiative and the International Integrated Reporting Council) include specific guidance on SDG disclosures. Thus, the linkage of SDG into corporate reporting is still at a very embryonic stage and it is, therefore, necessary to promote their progress.

A first UN report produced in 2019 by independent scientists, titled “The Future is Now: Science for Sustainable Development,”, assess the compliance with the SDG adopted four years ago. The 10 most sustainable developing countries are members of the EU, and Portugal is ranking among the 30 most sustainable countries of the world. A concerted and effective corporate action towards Sustainable Development is, therefore, possible if Portuguese companies align their activities to incorporate the SDG. Thus, it is important to analyse whether Portuguese companies are monitoring and reporting their impacts in relation to their alignment with the SDG.

The aim of this study is to explore how Portuguese listed companies have started to engage with the SDG and how this expresses itself into their sustainability reports. Concerning the methodology, it was

[1] In Portugal, the transposition of Directive was made to the Portuguese legal system by Decree-Law (DL) nº. 89/2017, of July 28. The diploma creates two non-financial reporting obligations, one related to environmental, social and labor aspects, and the other related to the diversity policies of members of higher corporate bodies. Specifically, DL nº. 89/2017 stipulates that companies must present a non-financial statement, as a general rule included in the management report, as from 2018, with reference to the financial year 2017, but may be presented in a separate report (either as an annex to the management report or thereafter, not later than six months after the balance sheet closure date). The information requested in this non-financial statement includes a description of the business model, policies, risks, environmental and social performance, as well as measures aimed at workers, respect for human rights, gender equality and anti-corruption and bribery.

used a content analysis, seeking to characterize the companies that are concerned with SDG-related disclosure, analysing the information about theirs practices promoting SDG achievement.

This paper is structured as follows: after this introduction, the first and second sections are related to the background on SDG reporting and some empirical literature review. The third section presents the research design, following by the empirical results and discussion. Finally, the main conclusions are presented.

Reporting on the Sustainable Development Goals

In 2015 United Nations approved 17 Sustainable Development Goals (SDG) within the UN 2030 Agenda. The SDG are an opportunity to improve organizations management, in order to seek solutions that add value and achieve the global goals. Organizations will need to assess their activities' impact on the SDG achievement and to review their strategies and practices. For that purpose, they need to be able to collect and report new data. It is important to align the organizations' strategy and corporate reporting with the SDG.

Over the past decades, frameworks have been developed to help assess and manage the current state of sustainability of an organization and communicate it to interested parties. The guidelines/standards developed by the Global Reporting Initiative (GRI) are identified as the main international benchmark for sustainability reporting, widely accepted and recognized worldwide (KPMG, 2015).

Since 1999, GRI has published a set of guidelines for the preparation of sustainability reports, a generally of voluntary adoption, initially contemplating performance indicators grouped by the economic, environmental and social areas. In a logic of continuous improvement, several versions of GRI´s guidelines have been published (in 2000, 2002 and 2006), and the G4 version, published in 2013, intended to give the report a higher level of information concentration and relevance (Adams, 2014).

More recently, in 2016, the GRI Standards was launched, representing the transition to a set of global standards that replaced the G4 version, which applies since July 2018. The GRI Standards, are basically a restructuring of the G4 for a new Standards architecture, in order to make the content clearer and more logical, based on a modular structure that can be kept up-to-date.

Despite the fact that sustainability reporting has acquired great importance in recent decades, as a result of the work developed by GRI, the information disclosed in sustainability reports is not always presented in the context of a business model or an organizational strategy, making it difficult for stakeholders to understand how sustainability (social, economic or environmental) can affect an organization's value creation process (Eccles and Serafeim, 2015). In this context, Integrated Reporting emerges as a viable alternative as it has the potential to make organizations' strategies and business models more transparent to stakeholders.

Traditionally companies have been publishing separate financial reports and sustainability reports because the strategic link between them was not recognized. In this context, the concept of Integrated Report emerges as a model that values the reporting of financial and non-financial information, under duly defined parameters, interconnecting investment decisions with the strategic and operational options and the conduct of the organization.

In 2013, the International Integrated Reporting Council (IIRC) published "The International <IR> Framework", with guidelines for the preparation of an Integrated Report, defining it as a concise document capable of evaluating the capacity to generate organizations' value, identify the main strategic points and anticipate risks and opportunities, internal or external, in business.

Integrated reporting allows organizations to think in an integrated way ("integrated thinking") about their strategy, facilitating more informed decision-making, good risk management, increasing the trust of different stakeholders, with the main objective of improving the performance of the organization as a whole (Guthrie et al., 2017). It is intended to increase the relevance, consistency and comparability of the information disclosed, adding in the same report all the components / "capitals" (manufactured,

intellectual and organizational, natural, human, social and relational) that contribute to business success and to creating value over time.

As we state before, considering the Agenda 2030, it is important to assess how organizational practices can be developed in order to meet the goals proposed in Agenda 2030, and how to articulate the organizations' strategy and reporting with the SDG. Integrating the SDG into the reporting process is, therefore, one of the major challenges for the organizations.

However, none of the above frameworks (GRI or <IR>) include specific guidance on SDG-disclosures. Thus, reporting needs to evolve in order to quantify, verify and effectively communicate the impact that companies have on SDG (KPMG, 2017).

In order to facilitate the integration of the Sustainable Development Goals in the Organizational Report, the UN Global Compact Network together with the GRI have developed two key[2] documents that should be used together as part of the business reporting cycle. It is not intended to create a new reporting structure, but to help companies to highlight their contribution to SDG and provide relevant information to stakeholders through qualitative and quantitative disclosures for the SDG targets (that are likely to be relevant to business, regardless of the size, sector or location of operations). Organizations can use these documents to disclose their impacts and contributions to the SDG, for example, reporting according to GRI standards and/or the 10 principles of the UN Global Compact.

However, Adams (2017) considers <IR> Framework is the best approach to disclose the organizations' contribution to the SDG, by integrating them into the strategy and the organizational report. Organizations can illustrate how and for whom they create value and can develop strategies that contribute to the 17 SDG, through the 6 capitals of <IR>.

The most recent development in this matter was promoted by the global accountancy bodies[3], with the report "The *Sustainable Development Goals Disclosure (SDGD) Recommendations"*, authored by Adams et al. (2020), which offer a new approach for organizations to address sustainable development issues aligned to the <IR> Framework (IIRC, 2013), the Task Force on Climate-related Financial Disclosure (TCFD, and the GRI. These recommendations are an opportunity to establish a best practice for corporate reporting on the SDG and enable more effective and standardized reporting and transparency on climate change, social and other environmental impacts. The disclosures are grouped into four themes, which converge with terminology used by the IIRC, GRI and TCFD: Governance, Strategy, Management approach and Performance and targets.[4]

The recommendations build on a suggested approach to contributing to the SDG aligned with long term value creation in Adams' (2017) report. The report set out a five-step process to align an organization's approach to the SDG with integrated thinking and long-term value creation for organizations and society as set out in the <IR> Framework.

Previous Empirical Research

Empirical research is still very embryonic in the scope of SDG reporting. A PwC (2017) study refers that a third (38%) of companies a global level (sample of 470) and more than half of the 35 Portuguese companies surveyed (57%) did not mention the SDG in their report. KPMG (2018) has developed a study to provide a base level view of SDG reporting majority among the G250 large companies worldwide. The KPMG study concludes that 4 in 10 (40%) of the world's largest companies already

[2] UN Global Compact Network and GRI, "Integrating the Sustainable Development Goals into Corporate Reporting: A Practical Guide", http://globalcompact.pt/images/pdf/Practical_Guide_SDG_Reporting_08_2018.pdf e "Business Reporting the SDGs "Analysis of the Goals and Targetshttps://www.globalreporting.org/resourcelibrary/GRI_UNGC_Business-Reporting-on-SDGs_Analysis-of-Goals-and-Targets.pdf

[3] Namely, the International Federation of Accountants (IFAC), Association of Chartered Certified Accountants (ACCA), Institute of Chartered Accountants of Scotland (ICAS), Chartered Accountants Australia and New Zealand (CA ANZ), the International Integrated Reporting Council (IIRC) and the World Benchmarking Alliance

[4] Organizations might draw on the following the targets and indicators proposed by the GRI and UN Global Compact (2017).

reference the SDG in their corporate reporting (specially talking about their positive impacts on the SDG). The Annual Report Insights of Deloitte (2019) noted that 24 companies referred to the SDG in their annual reports – just under one quarter of their sample.

These results suggest that business interest in the SDG has grown quickly since their launch in 2015. However, there is not yet an established process, benchmark or standard for reporting on the SDG. Large companies from Europe (Germany, France and the UK) are significantly more likely to report on the SDG than companies in other countries. However, the numbers are currently too low to draw meaningful regional or sector conclusions.

Bebbington and Unernam (2018) highlight some of the large companies that have readily incorporated the SDG into their sustainability reports, for example Telecoms group, BT and Unilever. Also, Schramade (2017) mentioned Novozymes, as one of the few companies that has clear impact targets derived from the SDG. Another two leaders in SDG integration are Safaricom and Philips. Schramade (2017) found that only a minority of companies currently mention the SDG in their reports. He found that "40% of the Dow 30, 28% of the Eurostoxx 50, and 28% of the largest 30 companies in the Nikkei 225 mentioned the SDG in their 2015 reporting". The author concluded that one of the key challenges in terms of SDG and implementation is linking them with specific incentives that might influence the choice to invest in the SDG.

Calvo Centeno et al (2018) analysed the degree of contribution to the SDG of the groups listed in the IBEX 35, through the non-financial information disclosed in the consolidated non-financial report required by Spanish legislation (Decree-Law 18/2017 following 2014/95/EU Directive). A disclosure index based on the 17 SDG of Agenda 2030 was developed to measure the degree of compliance with the SDG. The results indicate that 6 of the 35 (17,14%) companies of the IBEX 35 do not mention any of the SDG included in Agenda 2030 and 2 companies (Telefónica and Iberdrola) include all of the 17 SDG. However, 50% of IBEX 35 companies incorporate less than 41.18% of the SDG in their reports.

Concerning the determinants factors of SDG reporting we can highlight the studies of Rosati and Faria (2019a and b). In their first study, Rosati and Faria (2019a) investigated the relationship between adoption of SDG reporting and some internal organizational factors. Using a logit model based on data from 408 organizations worldwide, the study concluded that only 16% of the sample addressed the SDG in the reports published in 2016. SDG reporting is related to a larger size, a higher level of intangible assets, a higher commitment to sustainability frameworks and external assurance, a higher share of female directors, and a younger board of directors.

The second study of Rosati and Faria (2019b) contributes to understand the relationship between an organization's willingness to address SDG in its sustainability report and some external institutional factors related to the organization's country. The authors conduct an analysis of the country-level institutional factors related to the decision to address the SDG in sustainability reports. The research was undertaken by considering 27 institutional factors belonging to six different national institutional systems, and it relies on data from 2413 sustainability reports published by organizations located in 90 different countries. The results show that SDG reporting are more likely to be located in countries with higher levels of climate change vulnerability, national corporate social responsibility, company spending on tertiary education, indulgence and individualism, and lower levels of market coordination, employment protection, power distance and long-term orientation.

Research Design

Sample and Methodology

The results the studies above suggest that business interest in the SDG has grown quickly since their launch in 2015 and have increased their reporting. However, the results are not enough to draw meaningful regional conclusions. In Portugal, as far as we know, our study is the first that provides insights into reporting's linkage with SDG from a Portuguese perspective. This study aims to verify if the corporate reports listed companies in Portugal mention the SDG.

Based on the companies listed in Euronext Lisbon, in November 2018 (in a total of 47) we have selected the companies that have published sustainability reports or integrated reports, referring to 2017. None of the companies had an integrated report, and 11 companies have published a sustainability report, but 3 of these reports did not have any reference to the SDG, so we have excluded them. Thus, we focused on those 8 reports (representing 17% of the sample).

We have also tried to assess whether in the following year, 2018, there was any significant evolution in the content of these reports. When collecting the reports, we found that a company (CTT) failed to present the sustainability report and has presented its first integrated report in 2018. Yet one entity (Sporting) did not present a sustainability report in 2018. Thus, for the analysis of the 2018 reports, we have focused our analysis on only 7 sustainability reports and 1 integrated report.

Concerning the methodology, it was applied a content analysis approach, as it is the most commonly technique used in disclosure studies.

Results and Discussion

Considering these 8 sustainability reports under analysis, in the period 2017, only 2 companies (25%) did not aligned their reporting with the SDG, as we can summarize in the table 1. This represents an higher percentage, compared to the results of Calvo Centeno et al (2018), in the Spanish stock market (only 17% companies of the IBEX 35 did not mention the SDG in their 2017 corporate reporting).

The table shows that in all the reports, the 8 companies have applied the GRI framework. Only 1 company used the G4 version; the others have used GRI Standards. Only in 2 companies (Navigator and EDP), the selection of the indicators was made in order to adopt the most demanding option of GRI, corresponding to the highest level of comprehensiveness: in Accordance-Comprehensive; the other companies use the option "In accordance – Core". In most cases, reports had an external verification by GRI. In our opinion, collecting data is important but request verification of that data to a competent entity makes the process more credible. In most of the cases, reports had an external verification by GRI. In our opinion, collecting data is important but request verification of that data to a competent entity makes the process more credible.

The companies of our sample are not all in the same stage of SDG reporting. In other words, most of the companies have their mission/strategy aligned with the UN goals, however three of them (SONAE, Media Capital and Sporting) do not prioritize their SDG. Three companies (EDP, Navigator and CTT) are at a more advanced stage, aligning the reporting with the SDG, considering them in their strategy and prioritizing the most important goals.

Considering the 2018 period, it should be noted that most companies maintain the type of report they had already done in the previous year, with the exception of Sporting (which does not present a sustainability report in 2018) and CTT (which, for the first time, prepares integrated report). Also noteworthy is Semapa, whose company strategy is now aligned with the SDG, and whose priority of some SDG was also proposed in the IIRC <IR> Framework (2013), while maintaining the GRI guidelines (version G4) for the calculation of environmental, social and economic performance indicators, with respective correspondence with the SDG.

Table 2 summarizes the content analysis of the 8 listed companies' reporting, in 2017 and 2018, demonstrating their linkage with the SDG.

Table 1: SDG in Sustainability/Integrated Reports: summary

	Framework (level of declaration, GRI)		No. pages		External verification (GRI)		SDG -reporting alignment		Strategy/mission includes SDG		Priority SDG	
	2017	**2018**	**2017**	**2018**	**2017**	**2018**	**2017**	**2018**	**2017**	**2018**	**2017**	**2018**
Navigator	GRI Standards 2016 *In accordance - Comprehensive*	GRI Standards 2016 *In accordance - Comprehensive*	130	134	yes	yes	yes	yes	yes	yes	yes	yes
SONAE	GRI Standards 2016 *In accordance – core*	GRI Standards 2016 De acordo – Essencial.	105	77	yes	yes	yes	yes	no	no	no	no
SEMAPA	GRI Standards 2016 *In accordance – core*	GRI Standards 2016 *In accordance – core*	83	68	no	no	no	no	no	yes	no	yes
Media Capital	GRI Standards 2016; sectorial supplement Media G4 *In accordance – core*	GRI Standards 2016; sectorial supplement Media G4 *In accordance – core*	97	87	no	no	yes	yes	yes	yes	no	no
EDP	GRI Standards 2016 In accordance - Comprehensive	GRI Standards 2016 In accordance - Comprehensive	171	212	yes	yes	yes	yes	yes	yes	yes	yes

CTT	GR I -G4 *In accordance – core*	Integrated report GRI -G4 *In accordance – core* IIRC	80	340	yes	_	yes		yes	yes	yes	yes
Corticeira Amorim	GRI Standards 2016 *In accordance – core*	GRI Standards 2016 *in accordance – core*	53	69	no	yes	no	yes	yes	yes	yes	yes
Sporting	GRI Standards 2016 *in accordance – core*	_	106	_	yes	_	yes	_	yes	_	no	_

Table 2: Summary of the SDG disclosures

Navigator	
2017	**Sustainability Report 2016/17** "The Company is aligned with the United Nations Sustainable Development Goals, which are identified and associated with the broad lines of action and objectives along its value chain" (page11). Presents its sustainability road map (pages 17-18). To do this, a table shows 27 commitments made for sustainability related to 10 most relevant topics (materials), establishing the action line, goals and key performance indicators (KPI) that allow monitoring the implementation of actions. It should be noted that each of the commitments associates the corresponding SDG (s). In the scope of its mission / vision it has "taken into account the major market trends and the needs of our stakeholders and is in line with SDG" (page 26). Under item 5: Challenges of the international agenda, a sub-item is dedicated to the 13 SDG identified as priorities for the company. It presents a detailed analysis of each material topic in identifying the applicable SDG, the goals to be fulfilled and what the stakeholders say.
2018	**Sustainability Report 2018** "The 2018 Sustainability Report is a reflection of work that is the result of the involvement of all areas of the Organization and is expressed in goals to be reached in the 2020-2025 horizon. The plans and goals outlined by Navigator are in line with the United Nations Sustainable Development Goals, particularly those that have been identified as priorities for the Company's harmonious growth, and seek to contribute to meeting sustainability challenges on a global scale" (message from management, page 5). The point 2.4. (page 34) refers to material topics and Navigator's response to the SDG, grouped into 4 axes: forest and industry, people, partnerships and innovation. Based on the Sustainability Roadmap defined in 2017, it includes 27 Commitments, broken down into lines of action, objectives/goals, and the 7 SDG considered to be priorities, that is, those where the Company has greater influence, in addition to also identifying other SDG to which the Company contributes. On pages 34-37 it describes the impact of each SDG on the Company and how they were responded to with concrete initiatives carried out in 2018. "The 2018 Sustainability Report was prepared in accordance with the Global Reporting Initiative Standards (GRI Standards2016 version), under the option 'Comprehensive'. It is in line with the United Nations Sustainable Development Goals and responds to the requirements of Decree-Law 89/2017 – about disclosure by large companies and groups of non-financial information and information on diversity" (page 94).
Sonae	
2017	**Sustainability Report 2017** "The activity report shows our performance at the level of the UNGC Principles and the SDG" (page 4). The GRI Supplement, which appears in the report, presents the indicators around a set of 5 axes, where the interconnection with the UNGC principles and the respective SDG are made.

2018	**Sustainability Report 2018** Presents the indicators around a set of 5 axes, where the interconnection with the UNGC principles and the respective SDG are made. “The report was prepared in accordance with the GRI Guidelines (GRI Standards) for the level "In accordance - Essential". The activity report highlights our performance at the level of the United Nations Global Compact (UNGC) Principles and the SDG …” Noteworthy is the 1st Scientific Council Meeting on the theme “Sustainable Production and Consumption” (objective 12 of the Sustainable Development Goals), which brought together all the Club's producers, members of the Scientific Council, Sonae teams, Zero Association and a UN representative.
Semapa	
2017	**Sustainability Report 2017** "Semapa assumes the sustainable development goals defined by the United Nations in its strategy, investments and operations" (page 28). Semapa assumes its responsibility towards society in this common project, committing itself to being an active part in pursuing these goals. It is our intention to align our sustainability strategy with the SDG, establishing goals and programs of action. “Point 4.3: Agenda 2030 states that a work program with short and medium-term actions, structured in 4 pillars and in the material topics identified, is being developed. The company undertakes to incorporating their approaches to the SDG. Bearing in mind the resources, value chain and evaluation of the material topics, will during the next exercise identify the goals to be prioritized and where to focus their efforts.
2018	**Sustainability Report 2018** Dedicates point 2 of the report to the SDG (pages 12-18): “Semapa assumes its responsibility towards society in this common project, committing itself to be an active part in the pursuit of these objectives. It is our intention to align our sustainability strategy with the Sustainable Development Goals (SDG), establishing goals and action programs. The United Nations SDG, ratified by practically all countries in the world, including Portugal, identify 17 objectives that aim to guarantee sustainable development. The SDG explicitly assume the importance of companies and economic agents so that their goals are achieved. Throughout 2018, the SDG were one of the topics under discussion at the meetings of the Strategic Sustainability Committee of Semapa, which identified 3 levels of application of these objectives in companies: Priorities (SDG 8.12 and 13), Aspirational (SDG 3, 4 and 9) and Instrumental (SDG 17). This exercise was based on the value chain of each of the subsidiaries, the assessment of their material topics and the mission of the group and each of the companies”. At GRI table (end of the report) shows correspondence with the requirements of DL 89/2017, but not with the SDG.
Media Capital	
2017	**Sustainability Report 2017** "Our contribution to the United Nations' 2030 Sustainable Development Goals is to empower all our resources in raising awareness and empowering consumers to respond collectively to the major environmental and social challenges facing the future" (page 1).

	The assessment of the material themes for Media Capital's stakeholders was based, inter alia, on "(...) the objectives defined by the United Nations in the context of its global sustainable development initiatives - Sustainable Development Goals (SDG) and United Nations Global Compact (UNGC) "(page 14). The GRI table, which appears at the end of the report, presents the different indicators, and is matched with both DL 89/2017 and their respective SDG. The report concludes by referring to "Media Capital intends during 2018 to define a sustainability governance strategy and model, aligned with the Group's business strategy for the next three years. In this first exercise, an initial approach is taken to map the Contribution of the Media Capital Group to the United Nations Sustainable Development Goals. However, in 2018 the Group will develop its internal approach, as well as a base of key indicators, objectives and targets for monitoring their contributions to the implementation of the United Nations Agenda 2030 "(page 97).
2018	**Sustainability Report 2018** The GRI table presents the different indicators matched with their respective SDG. Refers that, in 2019 the Group will develop its internal approach, as well as a base of key indicators, objectives and targets for monitoring their contributions to the implementation of the UN Agenda 2030. “Future developments: During 2019 Media Capital intends to review the most relevant topics for the organization by conducting a consultation with internal and external stakeholders. This survey will be the basis for defining a sustainability governance strategy and model, in line with the Group's business strategy for the next three years. In this report element, only the Media Capital Group's contribution to the United Nations Sustainable Development Goals is mapped. During 2019, the development of the sustainability strategy will define its approach, and constitute a base of key indicators for the pursuit of the objectives and targets of its contributions to the achievement of the United Nations 2030 Agenda”(page 75).
EDP	
2017	**Sustainability Report 2017** The report "Includes the commitments made to goals and targets and their relationship to the United Nations' 2030 Sustainable Development Goals" (page 4). In the framework of the strategy, "these objectives also correspond to contributions to the common agenda established by the United Nations Sustainable Development Goals (SDG), which EDP endorsed at the launch of this initiative in 2015" (page 39) “(…) EDP's commitment to 8 of the 17 Sustainable Development Goals "(page 101). It presents contributions to SDG 7,9, 12 (on the axis of economic value creation); SDG 5 and 8 (in the axis: developing people); SDG 13 and 15 (how to manage climate and environment); SDG11 and 17 (to strengthen confidence) (page 39) "Through its Social Investment Policy, EDP actively contributes to the United Nations Sustainable Development Goals, namely for SDG11, SDG13 and SDG15." (page 109)
2018	**Sustainability Report 2018** “In 2018, we extended our commitments regarding the Sustainable Development Goals of the UN Agenda 2030 (SDG) and included the ambition to contribute to the achievement of SDG 17 - Partnerships for the Implementation of the Goals, now covering 9 of the 17 SDG (message by the President, page 16)”. "EDP paid particular attention to the United Nations' Sustainable Development Goals, either through its activity in financing the third sector, or by promoting the SDG in international and national forums" (page 17).

	“The EDP Group's sustainability goals and targets, an integral part of the Business Plan and updated periodically, align with strategic priorities and detail around the 4 axes below. These objectives also correspond to contributions to the common agenda established by the United Nations Sustainable Development Goals (SDG), which EDP subscribed to in launching this initiative in 2015” (page 51). It presents contributions to SDG 7,9, 12 (on the axis of economic value creation); SDG 5 and 8 (in the axis: developing people); SDG 13 and 15 (how to manage climate and environment); SDG 11 and 17 (to strengthen confidence).
CTT	
2017	**Sustainability Report 2017** In the President's message it refers "We were one of the first Portuguese and industry companies to integrate the United Nations Sustainable Development Goals (SDG) into their business strategy." (page 5). “In the case of CTT, we mapped and prioritized the SDG to our value chain using the SDG Compass methodology developed by the WBCSD, UN Global Compact and GRI. We have identified the SDG targets that can contribute to promote positive impacts or minimize / avoid negative impacts and allocate them to each stage of the value chain, taking into account risks and opportunities "(...) Consultation with SDG Compass supported the identification and selection of the specific indicators and objectives of CTT "(page 20). They present targets for SDG 3, 4, 7, 8, 13 and 16. The 3rd edition of the participatory carbon offset initiative in 2018 "confirms the alignment of CTT with UN SDG 12 and 13, which CTT subscribes to" (page 14). Among other initiatives (conferences, trainings, workshops ..) there is also the "publication of two case studies of CTT (SDG 12-Ecoportfolio and SDG 13-Drivers' Challenge), in a document BCSD Europe on SDG." (page 58)
2018	**Integrated Report 2018** CTT publishes its integrated report for the first time. The Integrated Report contains information on strategy, management and performance of the Group's main business drivers, from the perspective of creating sustainable value. The inherent risks of the activity are also analyzed and the way CTT incorporates the various capitals (financial, human, intellectual, social and natural) is addressed, according to the guidelines proposed by the International Integrated Reporting Council (IIRC). The structure and content of the report respect the GRI Guidelines (version G4) and the respective protocols for the calculation of indicators. CTT, in addition to also aligning its environmental management strategy with the priority SDG for the sector, mapped and prioritized the SDG for it’s value chain, using the SDG Compass methodology. They have identified the SDG targets that can contribute to promoting positive impacts or minimizing/avoiding negative impacts, allocating them to each stage of the value chain, taking into account risks and opportunities. Most of the goals are already part of the Company's activities and programs, under several aspects, and are part of the Sustainability Commitments framework. The SDG Compass has supported the identification and selection of specific CTT indicators and targets. It presents an index of Environmental, Social and Economic performance indicators organized according to GRI4, with respective correspondence with the SDG.

Corticeira Amorim	
2017	**Sustainability Report 2017** "This circular profile of Corticeira Amorim contributes in a very relevant way to the SDG 12 ... However, from the crossing of the SDG with the areas of operation of the organization we verified that the sustainability strategy is clearly in line with other 10 SDG... "(page 103). This is reinforced on page 117: "The sustainability strategy of Corticeira Amorim is particularly aligned with 11 of the SDG". The strategic priorities .... taking into account the alignment with the United Nations SDG "(page 117). "(...) the company has begun a detailed analysis of its practices, which is still ongoing, and therefore considers it appropriate not to proceed in this report to the concrete definition of objectives and targets for the following years "(page 117). During the year 2017 (...) it took the first step towards aligning its sustainability strategy according to the 17 SDG, crossing them with its material areas of action."
2018	**Sustainability Report 2018** "We believe that our efforts contribute to the 2030 Agenda and the United Nations Sustainable Development Goals (SDG) (...) During the last year, after listening to the most participated stakeholders ever, we have reviewed our sustainable development strategy and have identified priority goals that are in line with the SDG "(message from the president, page 102). The Strategy is aligned with 12 of the 17 SDG. "In 2018, Corticeira Amorim has revised its sustainable development strategy based on the analysis of materiality in order to promote alignment with stakeholder's expectations and feedback. It also proceeded to identify the most related to material issues SDG, selecting performance indicators and key targets for each relevant SDG. Thus, 12 SDG and 44 goals were identified as being the priorities for Corticeira Amorim's sustainable development strategy" (page 120).
Sporting	
2017	**Sustainability Report 2016/17** In his message, the President states that it is a strategic concern, "... to ensure that we are aligned and committed to the United Nations Sustainable Development Goals. In the GRI table, which appears at the end of the report, it presents the different indicators and is matched with the respective SDG.

Conclusion

Major challenges are faced by companies in identifying priority SDG for their operations/activities and stakeholders, incorporating them into their strategy, setting goals for their success, and measuring and reporting on their progress. Integrate the SDG assessment in the report to show the stakeholders their effective performance, using the emerging non-financial reporting models.

The results of our study indicate that from a sample of 46 listed companies, in 2017 none published integrated reports, and only 11 published Sustainability Reports, using the GRI framework, and 8 of those companies refer to the SDG in their reports. In other words, most of the companies have their mission/strategy aligned with the UN goals, however three of them (SONAE, Media Capital and Sporting) do not prioritize their SDG. In 2018, the company Semapa is added to this group, which now considers its strategy aligned with the SDG, identifying those that are a priority. The most significant differences to be noted, in terms of reporting on the SDG, compared to the previous year, concern the company Sporting (which does not produce any sustainability report) and CTT, which have prepared their first sustainability report, following the IIRC Framework (2013) with respect to the various capitals (financial, human, intellectual, social and natural), continuing to adopt the GRI framework for the preparation of indicators, with respective correspondence to the SDG.

The companies are not in the same stage concerning the SGD reporting. Although the majory of the reports made a linkage with the SDG, only 3 - EDP, Navigator and CTT - can be considered at a more advanced stage: align the reporting with the SDG, consider them in their strategy and prioritize the most important goals.

A PwC study (2017) concludes that 37% of companies globally (in a sample of 470 companies) selected specific SDG as priorities in their reporting. But when compared to Portugal, they found that only 26% of the 35 companies surveyed selected specific SDG as a priority in their financial or sustainability reporting. We share PwC's (2017) view that in companies that fail to prioritize their critical goals, this may suggest that there is no significant level of commitment to them. PwC add that it is therefore a challenge for Portuguese companies to identify which objectives are most relevant to their business and then prioritize it and define how to approach it.

Mapping the SDG represents an essential source of inspiration for improving the structure and presentation of both sustainability and integrated reports. The integrated report can be considered as another step to be developed in the near future, but there is still a long way to go. Whether through sustainability reports or integrated reports, we believe that what is important is to align these reports with the structure and scope of the SDG and should, therefore, be a research area to be explored in the future.

This paper represents a starting point for deepening the research on SGD-related disclosure. By analysing the SDG reporting from Portuguese listed companies, this study can help non-listed companies to benchmark their own reporting. We expect that listed and non-listed Portuguese companies will increasingly report about their contributions to the goals in the next few years. Thus, in the future we intend to explore the relationship between SDG disclosure and corporate governance attributes (like size, economic performance, board of directors, etc.), in order to understand the characteristics that are related to the decision to engage SDG in corporate reporting.

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Contextualización De La Realidad Del Sector Productivo, Como Estrategia De Fortalecimiento Para La Formación En Educación Superior

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Resumen

El presente documento sintetiza el desarrollo de la investigación realizada con respecto a la identificación de la problemática y las necesidades de las pequeñas y medianas empresas de la ciudad de Bogotá en Colombia en su funcionamiento y operación integral orientada a formular estrategias de acción en la formación de los profesionales en ciencias empresariales de la educación superior, como insumo para atender dichas necesidades por parte del futuro egresado de las ciencias mencionadas.
A través de una metodología con enfoque cuantitativo, de tipo descriptivo y mediante el muestreo aleatorio probabilístico, se diagnosticaron las necesidades en materia de gestión organizacional de las empresas de los sectores económicos industrial, comercial y servicios con el fin de postular a futuro posibles estrategias educativas a ser aplicadas por las instituciones de educación superior en la atención a los requerimientos del sector productivo. Finalmente se describen algunas de las estrategias recomendadas a las universidades para cubrir las necesidades de las empresas en las diversas áreas funcionales de las mismas.

Abstract

This document synthesizes the development of the research carried out with respect to the identification of the problems and the needs of small and medium-sized companies in the city of Bogotá in Colombia in their operation and comprehensive operation aimed at formulating action strategies in the formation of professionals in business sciences of higher education, as an input to meet these needs by the future graduate of the aforementioned sciences.Through a methodology with a quantitative approach, of a descriptive type and through probabilistic random sampling, the organizational management needs of companies in the economic, industrial, commercial and service sectors were diagnosed in order to apply possible future educational strategies. to be applied by higher education institutions to meet the requirements of the productive sector. Finally, some of the strategies recommended to universities to meet the needs of companies in the various functional areas of the same are described.

Palabras Clave: Sector Productivo, Estrategia, Pymes, Educación Superior.

Keywords: Productive sector, strategy, SMEs, higher education.

Introducción

El desarrollo económico de un país y el origen de su riqueza se genera a través de diversas fuentes siendo una de ellas la creación y fortalecimiento de su estructura empresarial. Por esta razón es necesario en el día a día de las ciencias empresariales generar nuevas estrategias que contribuya al

fortalecimiento del sistema productivo empresarial; orientadas todas al crecimiento, desarrollo y proyección de las organizaciones que lo componen. Para la generación de dichas estrategias es necesario que de manera estructurada y en forma periódica se identifiquen las necesidades y problemáticas del sector empresarial en sus diversos niveles y actividades económicas con el objetivo de reconocer y formular alternativas de solución y enriquecimiento a la gestión de las mismas.

Dentro de las alternativas a considerar como insumo de apoyo al fortalecimiento empresarial se destaca el rol de las instituciones educativas que desde su interior deben ser generadoras de procesos de acompañamiento a cada una de las áreas organizacionales en las cuales se desempeña los profesionales egresados de las mismas. Ante esta situación una de las tareas de las instituciones de educación superior consiste en reconocer que requieren las organizaciones que esperan a los profesionales en formación; no solo para actualizar la oferta educativa institucional, sino para diseñar estrategias efectivas de gestión que les permita a dichos estudiantes; cumplir puntualmente la atención de las necesidades y problemáticas que dichas organizaciones poseen a su interior.

Bajo esta premisa surge el desarrollo de la investigación realizada con el objetivo de contextualizar la realidad del sector productivo colombiano específicamente de la ciudad de Bogotá como insumo de la formulación de estrategias educativas que contribuyan al fortalecimiento del sector empresarial; el proyecto desarrollado se centró en el diagnóstico de las necesidades y problemáticas organizacionales del sector productivo; y específicamente el de las pequeñas y medianas empresas de las actividades económicas industrial, comercial y de servicios de la zona sur de la ciudad de Bogotá; así como del análisis de las actuales estrategias educativas de formación estudiantil y proyección social de las instituciones de educación superior (IES), identificando algunas de ellas como: convenios, contratos, pasantías y en general todas las formas de la práctica profesional, su dinámica, su alcance y operatividad como un espacio de acercamiento efectivo y apoyo por parte de la institución a través de sus estudiantes; a la generación de soluciones a las problemáticas organizacionales de las empresas a atender por los futuros egresados.

El desarrollo de dicha investigación desde su planteamiento, así como el diseño metodológico empleado, se reseñan en el siguiente documento, presentando de manera explícita los resultados alcanzados al realizar la contextualización y la descripción de las posibles estrategias, susceptibles de ser aplicada en cualquier contexto educativo, siendo simplemente ajustadas a las necesidades del mismo; y al cumplimiento como es obvio a las normativas no solo institucionales sino legales en materia educativa y laboral [1] Así pues y mediante un diseño metodológico de enfoque cualitativo, de carácter descriptivo y soportado en la revisión documental y trabajo de campo (grupos focales y cuestionarios [2,3,4]se identificaron aspectos claves que permitirán a futuro plantear una propuesta de espacio de acercamiento en el cual las organizaciones se beneficien del saber, del hacer y del ser del estudiante que allí realiza su práctica, siempre con el sentido social e inclusivo que se requiere.

Como aspecto introductorio para abordar el proceso investigativo desarrollado, es importante destacar las siguientes concepciones que como contexto del entorno en el que se ejecutó el proyecto; se hacen necesarias para entender su alcance e importancia; siendo adicionalmente conclusiones de la investigación realizada. Las pequeñas y medianas empresas objeto de estudio del proyecto, a nivel mundial se han convertido en un tema relevante en la actualidad económica para muchos países; los cuales, generan interés en la creación y fortalecimiento de empresas cada vez competitivas como motor de desarrollo de sus gobiernos [5] Dicho interés se refleja en el incremento porcentual que de manera considerable ha tenido el empleo, la producción y el comercio gracias al desarrollo de las Pymes [6]; razones todas válidas para entender que el sector educativo debe abordarlas investigarlas y proponerles soluciones desde su alcance.

Metodología

La investigación realizada fue de tipo descriptiva con un enfoque cualitativo, que permitió conocer el contexto general de las pymes en su gestión, como insumo para el análisis de su situación interna en los sectores de industria, comercio y servicio. Se realizó un análisis general utilizando la técnica de revisión documental con relación al estudio de las pymes en Colombia específicamente en las

ubicadas en el sur de la ciudad de Bogotá; para dicha revisión se consultaron fuentes secundarias de orden cibergrafico y bibliografíco tales como informes, investigaciones y estudios de carácter gremial, público y privado a nivel internacional, nacional y local de los años de los últimos cinco años de vigencia. De la misma manera en el proceso investigativo se utilizó la técnica de Grupo focal para el trabajo de campo, pues esta permite identificar desde la fuente empresarial las necesidades de las pymes en la gestión organizacional para la búsqueda de soluciones; tal y como lo afirma [7] quien afirma que para el desarrollo de un producto o servicio, es útil probar el mismo en el contexto real; de igual es importante destacar que a través de los grupos focales se puede trabajar con instrumentos de análisis en profundidad y detalle, donde la discusión grupal se utiliza como un medio para generar entendimiento profundo de las experiencias de los participantes.[8]

Para la recolección de datos de los Focus Group se trabajaron: memorias en audio, notas de campo durante la sesión donde se identifican las ideas principales y observaciones relevantes y grabación en video [9]

Para la selección de la muestra se utilizó el muestreo probalistico aleatorio simple en el cual, cada una de las pequeñas y medianas empresas tuvieron la posibilidad de ser elegidas del total poblacional de las mismas ubicadas en el sur de la ciudad de Bogotá. Los participantes son seleccionados porque tienen alguna experiencia en común en grupos homogéneos para que se produzcan fácilmente el intercambio de ideas. [10] Considerando lo anterior se determinó realizar un total de 12 grupos focales abordando la problemática en cinco localidades del sur de Bogotá, con el fin de conocer conductas y actitudes de los pequeños y medianos empresarios en cada sector y de acuerdo con la actividad económica que desarrollan. Adicional a los grupos focales se aplicaron encuestas semiestructuradas a los empresarios, para la recolección de la información de conocimientos explícitos necesarios para analizar las características socioeconómicas, laborales y empresariales; con el fin de complementar la información recolectada en la investigación cualitativa para el análisis con mayor profundidad. [11] Para el análisis de la información se toman los documentos relacionados con el tema, y los resultados obtenidos en el estudio; que tienen como objetivo documentar las experiencias de los empresarios en su gestión empresarial a partir de los aspectos administrativos, contable y financiero, de tal manera que permita desde la realidad elaborar supuestos que aborden la problemática. Una vez aplicados los instrumentos de recolección de información; se procedió a tabular y sistematizar la totalidad de datos recolectados para lo cual se utilizó la técnica de triangulación metodológica, en la cual y mediante la observación directa del investigador, el cuestionario semiestructurado y el grupo focal se generaron las conclusiones conducentes a identificar el contexto de gestión organizacional de las pymes analizadas. La aplicación de diversos métodos para obtener información que pueda ser comparada y retroalimentada entre sí como insumo para llegar a conclusiones. [12]

Resultados

Una vez sistematizada la información luego de haber aplicado la totalidad de los grupos focales con forme al diseño metodológico planteado se presentan los siguientes resultados en las respectivas categorías definidas:

Aspectos Relevantes De La Revisión Documental A Nivel Internacional

Varias organizaciones no gubernamentales adelantan estudios sobre el comportamiento de las PyMes o pequeñas y medianas empresas en los países, como es el caso del Grupo del Banco Mundial y la Corporación Financiera Internacional [13] quienes realizaron encuestas a 45.000 empresas en 106 países en desarrollado, en función de la medición basada en la percepción de indicadores ampliamente utilizados para la clasificación y calificación crediticia e inversionista a nivel internacional, estos resultados dan a conocer los principales obstáculos que atraviesan las Pyme en el sector privado; se identifican las 15 dificultades más relevantes: el acceso al financiamiento con un 16.5%, el acceso a la electricidad 13.5, informalidad con casi 12%, tasas impositivas 11.3%, inestabilidad política 8.2%, mano de obra calificada 8%, corrupción 6.5%, robo y crimen asociado

5.3%, reglamentos, licencias comerciales, permisos, transporte, administración de impuestos, regulación personalizada y laboral un 3% y tribunales 1% como se muestra en la Figura 1.

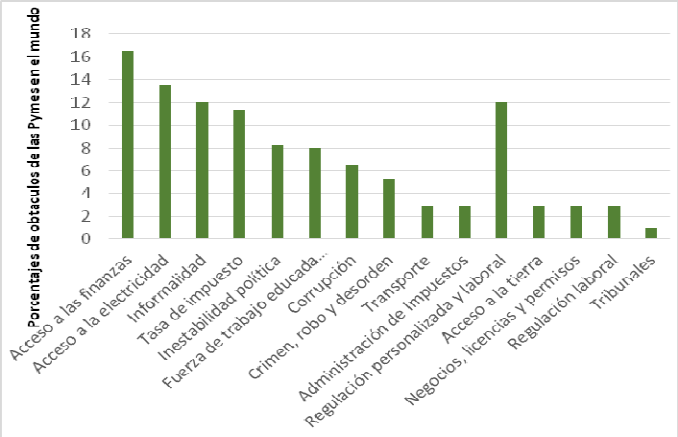

Figura 1: Principales restricciones que afrontan las empresas para sus operaciones.

Fuente: IFC Jobs Study Assesing Private Sector Contributions to Job Creation and Poverty reduction January 2013. World Bank Group Enterprice Surveys

Las Pymes en Colombia constituyen un grupo sobresaliente de empresas, considera que: "Su estructura productiva se caracteriza por la existencia de pequeños establecimientos que contribuyen significativamente a la creación de empleo, a la generación de riqueza y a satisfacer necesidades de mercados poco atractivos a las grandes empresas" [14, p.33]. Como se ha dicho en el mundo las PyMes o pequeñas y medianas empresas representan un sector empresarial importante para la economía de cada país y requiere un estudio detallado para conocer su comportamiento. El sector empresarial de las pequeñas y medianas empresas, desempeña un papel importante en el desarrollo actual del país, ya que influye en el crecimiento de la economía; en cierto modo, este sector de pequeños empresarios es uno de los más vulnerables frente a las exigencias del mercado que los obliga a ser cada día más competitivos, enfrentándose a problemas como escasa capacitación técnica y empresarial, así como su gestión administrativa, financiera y operacional entre otros, son algunas de las dificultades por las cuales atraviesan las pymes actualmente, tal como lo afirma la Universidad Escuela de Administración de Negocios EAN en la investigación realizadas por el grupo de investigación en PyMes o pequeñas y medianas empresas.

Según el grupo de investigación G3Pymes de la Universidad EAN, las pymes representan el 99,9% del total de las empresas en Colombia, cerca de 1,6 millones de unidades empresariales las cuales de igual manera han aportado cerca del 38% del PIB total, teniendo una importancia muy relevante en la generación de empleo. Sin embargo, el tiempo de sostenibilidad de las mismas es muy corta; solamente el 50% de ellas sobreviven el primer año y solo el 20% al tercero, debido a la poca importancia que le dan a la innovación y al conocimiento; lo que genera falta de competividad y permanencia en el mercado [15]. Entre las grandes debilidades de las pequeñas y medianas empresas que se han identificado en Colombia se encuentran: capacitación, programas de emprendimiento, falta de proyección operacional, desconocimiento legal para exportación, manejo logístico entre otros [16]. De igual manera las pymes colombianas presentan dificultad en la proyección de su negocio de manera global, muy pocas exportan porque cuentan con limitaciones organizacionales, financieras y técnicas, desconocimiento de normas de otros países para exportar rezagándolas al mercado local; las operaciones logísticas se considera otra limitante referente a canales de distribución y volúmenes de producción, De esta forma como lo mencionan Codina, Pagan, Brown, Carmona, Cursi, Dorsey del Ángel, Sandoval. (2005) citado en [17]. la administración de las Pymes demanda un profundo conocimiento de las áreas que afrontan problemas por la globalización, ya que no solo se trata de manejar empíricamente un negocio, sino también es necesario tener conocimientos de administración

para enfrentar el mercado actual en las áreas de: gerencia y planeación estratégica, mercados, recursos humanos, comportamiento organizacional, análisis financiero y evaluación de proyectos y adopción de las tecnologías de la información y comunicación Tics. En este orden de ideas otros aspectos de la problemática de las Pymes son: obstáculos del entorno, problemas macroeconómicos, barreras institucionales de infraestructura y de servicios y dificultades a nivel empresa; limitaciones que impiden llevar a cabo procesos de fortalecimiento para su crecimiento económico [18]

En lo que respecta a la diferentes problemáticas que los empresarios enfrentan, se puede decir, que según un estudio de la Asociación de Emprendedores de Colombia ASEC, radica en la falta de capacitación en lo que se refiere al emprendimiento; tal estudio revela que el 56% de los colombianos consultados creen que en las instituciones de educación superior no se brinda suficiente formación en emprendimiento, lo que indica que el empresario busca la forma de crear un mercado más competitivo pero la falta de oportunidades en adquirir las herramientas suficientes para competir y obtener resultados a largo plazo, radica en las falencias en la academia.

Resultados Significativos Por Sector Económico

Según el análisis de las experiencias de la gestión de los empresarios analizados en los diferentes grupos de enfoque y encuestas aplicados a los mismos se puede concluir que hay aspectos propios para cada actividad económica posibilitando identificar las principales necesidades de cada grupo de empresarios dedicados al comercio, industria y prestación de servicios como se muestra en la Figura 2.

Figura 2: Aspectos relevantes de las necesidades según actividad económica de las mipymes de las localidades del sur de Bogotá.

Fuente: Elaboración propia resultado de la investigación. Triangulación de caracterización económica, empresarial y laboral, Focus Group y encuestas

Así mismo después de la triangulación de la información de revisión documental, grupo focal y encuestas realizadas se evidencian las necesidades de los empresarios que predominan en cuanto a temas administrativos, contables, y financieros. Ver figura 3

Figura 3: Principales necesidades en gestión empresarial mipymes del sur de Bogotá

Fuente: Elaboración propia resultado de la investigación. Triangulación de caracterización económica, empresarial y laboral, Focus Group y encuestas.

Conclusiones

Una vez analizado los resultados ya presentados de manera global, se puede concluir entre otros aspectos con relación al contexto del sector productivo evaluado, los siguientes elementos:

1.A nivel interno la problemática se genera principalmente por falta de apoyo de entidades financieras, que les permitan a las pequeñas y medianas empresas adquirir créditos para la ampliación de su negocio, debido a que no tienen capacidad de endeudamiento, respaldo o vida crediticia.

2. Las necesidades mencionadas en los resultados se basan en capacitación oportuna y asertiva en los campos relacionados con el área administrativa, contable y financiera, puesto que el principal interés de los empresarios se ha limitado a la comercialización de productos.

3. En aspectos financieros y comerciales se destacan como relevantes, la deficiente estrategia para la fijación de precios, así como la ausencia de gestión en mercadeo ventas y publicidad.

4. De igual manera la influencia del entorno externo como por ejemplo las políticas del gobierno en materia laboral, fiscal y tributaria, la competencia desleal, la incursión de productos extranjeros en el mercado colombiano entre otros factores ha generado disminución en ventas considerablemente afectando la estabilidad de sus negocios.

Finalmente, a partir de los resultados obtenidos se genera la necesidad de proponer estrategias de gestión para fortalecer la formación de los estudiantes universitarios de Ciencias Administrativas específicamente desde la visión de la práctica profesional en el sector real productivo.

En países como Colombia y dentro de su modelo educativo, se contemplan desde la normativa institucional leyes y decretos que amparan el fomento del emprendimiento, la creación de empresa y generación de empleo; legislaciones que desde el gobierno central buscan atender la proyección del sector empresarial y especialmente el de las pymes quienes representan un protagonismo significativo en la economía nacional. Pese a ello, es muy general lo mencionado por lo cual y frente a las necesidades detectadas se sugiere que desde los ejes de la educación superior de proyección social, investigación y docencia se deben generar espacios de acercamiento de los estudiantes de pregrado a la realidad del sector productivo; dichos espacios se materializan en alternativas como la práctica

profesional, dinámica en la cual el estudiante de último semestre de formación se incorpora a una organización empresarial bien sea con o sin vínculo laboral y de manera temporal; para desarrollar tareas de diagnóstico, apoyo y gestión a la dirección de la empresa; aportando desde su disciplina respectiva soluciones y alternativas de mejora al empresario esperando la implementación de las mismas a criterio de la organización.

Junto a la práctica mencionada la cual es avalada tanto por la gerencia de la empresa como por la institución de educación y que cuenta con un docente tutor que guía el proceso, existen otras alternativas generados desde la educación superior que sin duda marcaran la tendencia en los años venideros y que buscan todas ellas atender las necesidades del sector productivo al que finalmente llegan los egresados profesionales, entre ellas se mencionan:

- Revisión de contenidos curriculares y fortalecimiento de los mismos en las áreas de asesoría y consultoría en temas organizacionales, técnicos, comerciales, legales y financieros.
- Formulación de proyectos de investigación orientados al diagnóstico y caracterización de los diversos sectores empresariales con el ánimo de atender sus necesidades.
- Creación de laboratorios y consultorios empresariales y contables que permitan acceder a las empresas a dichos servicios prestados por las universidades.
- Desarrollo de habilidades emprendedores y de empresarialidad en los estudiantes como insumo para la creación de emprendimientos reales y generación de empresas competitivas.
- Fortalecimiento en la formación de áreas como innovación y desarrollo empresarial enfocados a las tendencias de los negocios.
- Incorporación a los procesos de formación de didácticas tales como simuladores y juegos de roles reales aplicados al sector productivo.
- Seguimiento a los graduados y egresados en sus aspectos laborales, empresariales y profesionales para establecer indicadores de generación de emprendimientos y creación de empresas.

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Elements Concerning the Interaction – Public-Private Partnership - Foreign Direct Investments

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Abstract

Collaboration between the public and private sectors is important for promoting the economic development of a country, the adoption of this process being present in a wide range of activities in the field of infrastructure and services. Practicing the public-private partnership in financing the various projects is accompanied by the attraction and promotion of Foreign Direct Investments, these being an important source of private capital and, at the same time, an engine of development through the contribution of advanced experiences. The study highlights the beneficial role of the policies of practicing the public-private partnership with the commitment of Foreign Direct Investments, and the relevance of the involvement of the two sectors in the economy, by the advantages brought (the fulfilment of the investment flows needed for new objectives or for the development of others, the creation of new jobs etc.). The issues of the penetration of foreign capital, through the Public-Private Partnership, in the Romanian economy, is shown, with some examples regarding the impact on some fields of activity. The purpose of the paper was to point out some issues regarding the cooperation of the two sectors, public-private and the effects of their action in the economy, the public-private partnership being an important instrument for attracting and promoting of Foreign Direct Investments. The limits of the survey reside in the fact that the situations presented in the study, supported by concrete examples are representative for the impact of foreign direct investments, without exhausting all the forms manifested, during the analyzed period. The conclusions present, in short, the importance of achieving public-private partnerships by accessing Foreign Direct Investments, with an impact on the development of the economy and of increasing competitiveness in the host countries; noting, therewith, the likelihood of risk that may occur, which implies appropriate measures from the host country governments. The method used to carry out the study was the documentation from the foreign and domestic specialized literature, the synthesis and processing of the relevant ideas, by capturing the interaction - Foreign Direct Investments – Public-Private Partnership.

Keywords: Foreign Investments, Public-Private Partnership, Interaction.

Jel Classification: F21; H42; H44; H54; L32

Introduction

In promoting the economic development of a country, it is important to know the potential contribution of collaboration between the public and private sectors, in the context of the participation of a wide range of actors, belonging to central/local governments, private agents.

The objectives of the partnership are aligned on a wide range of infrastructures and services achievement, this form of cooperation aiming at optimizing the experience of the two entities. The adoption of this procedure, in ensuring the provision of certain public activities, is not new; during the evolution of society, the forms of cooperation between the public and private sectors have manifested since ancient times, continuing and evolving until now. The first and most known form practiced throughout history was the concession, with a role in the development of infrastructure and services.

In the last three decades of the last century, the public-private partnership got involved in the economy, in the context of the decrease of the economic governmental performances and of the penetration of the techniques of the New Public Management (Savas, 1982).

The specialty literature concerning public-private partnership, at the end of the last century, integrates it into the New Public Management phenomenon, (Osborne and Gaebler, 1992), considering it as the one of the basic element of the public administration reform, alongside other processes, such as privatization, decentralization, emphasis on results, customer orientation (Osborne, D. et Gaebler, T., 1992) [1].

Involved, initially, in projects aimed to urban development and infrastructure works, the concept of public-private partnership evolved, subsequently, by its using in other fields, too, comprising technologies, ecological projects, education, health (Vaillantcourt, 2000) [2], thus, enriching the range of forms of collaboration between the two sectors.

Practicing the public-private partnership is an instrument for attracting and promoting Foreign Direct Investments, the method being widely used in financing different projects in sustainable sectors (infrastructure, environment, services) (Wang, 2017; Ruwo and Makarudze, 2015). Since the end of the ninth decade, yet, Foreign Direct Investments have become an important source of private capital, especially, in the case of developing countries, being preferred to other forms of capital (Negrițoiu, 1996).

Policies of promoting public-private partnership and encouraging Foreign Direct Investment are beneficial to an economy, from the perspective of creating a possible balance, between the role of the public sector in relation to the private one, the involvement of the two processes, in the economic activity, being useful, through the advantages brought (Wang, 2017).

Through the contribution of advanced experience, the Foreign Direct Investments are constituted as a mobilizing factor of the development, being able to determine a better harness of resources and an increase of added value (Negrițoiu, 1996).

The Importance of Public-Private Partnership Development by Attracting Foreign Direct Investments

One of the significant premises for the development of an economy is represented by Foreign Direct Investments, a means of promoting them, being through the instrumentation of the public-private partnership, a method widely used in financing different global infrastructure projects (Wang, 2017, Bernardinetti, 2018).

The prospects of co-operations achievement between public authorities and the business environment, in order to develop public-private partnership projects, are due to the challenges that the economy is aware of: the shortage of public funds in relation to the capital requirements needed to promote investments in sustainable sectors (infrastructure, environment, services). In this context, governments are determined to resort to the private sector, for the participation with funds, the orientation being both towards the domestic and international investors (Ruwo and Makarudze, 2015).

One of the definitions given to Public Private Partnership considers that it represents:*"A long-term contractual arrangement between a government entity and one or more private entities, whereby the resources, capabilities and core competencies of each party are combined with the aim of designing, financing, building and operating a facility for the use of the general public"*[3].

Practicing public-private partnerships and policies to incentive Foreign Direct Investment are beneficial to an economy, for the possibility of creating a relative balance, between the role of the public sector in relation to the private one. The involvement of the two sectors, public-private, in the economic activity is relevant for the expected economic advantages (Wang, 2017):

- the public sector – ensures the production of public goods, regulations in the economic field, respect of the consumer rights;
- the private sector – contributes with the resources needed for the project (partially, totally), efficiency in their allocation, meeting market requirements, infusion of experience in a specific field, modern technology, customer-oriented services, all being actions motivated by the interest of maximizing profit.

In the category of *public partners*, central administration bodies, local authorities, public enterprises, other public institutions are included; domestic or international investors, relevant to financial resources and technical experience*,* are found among *the private partners*.

The mechanism of public-private partnership enhances the financial capacity of a country, given the potential it has, by attracting private investments in infrastructure, services, increase the efficiency of the public sector, balancing public and private investments, internally (Wang, 2017).

Regarding the cooperation relations of the two parties, according to the typology of the World Bank, having as a reference, the level of risk assumed by the private environment, the public-private partnerships of infrastructure investments are differentiated on the following categories of contracts [4]:

- *of management and leasing*:
  - in the *management contract*, the private partner has management responsibilities and the risk transfer is reduced, the operational risk belongs to the public sector;
  - in the *leasing contracts*, the private partner takes over the operational risk, too, if it is granted a right of use over the public good, with the payment of a tariff;
- *concessions* - are subject of the contracts: Rehabilitation-Operation-Transfer (ROT). Rehabilitation-Leasing/Rent Transfer and Construction-Rehabilitation-Operation-Transfer.
- *greenfield projects* - are the subject of contracts with a mixed company - joint venture that executes a new infrastructure work, and at the end, the sector can choose, yes or no, to take it over in its heritage.
- *privatization* - refers to the situations in which the shares of a state unit are sold to a private unit (operators, investors) in whole or, in part, achieving total privatization, respectively partial privatization.

Therewith, the public-private partnership schemes bring their contribution in stimulating economic diversification and attracting foreign direct investments, planting foreign companies on the internal market, interested in new contracts and expanding on new markets. Thus, reciprocal relations favourable to both parties (regarding the risks assumed and the benefits obtained) can be created, the public actor benefiting from the service provided by the competent experienced international

operator, and the latter having the perspective of a stable source of income and of extension, over time (Bernardinetti, 2018).

The concern of the governments to promote the Public-Private Partnership in order to attract Foreign Direct Investments and to obtain the financing from private actors is motivated by the perspective of opening long-term external investment flows, needed to achieve new major objectives or to continue the development and modernization of infrastructure works, of the possibility of creating new jobs.

At the same time, both for the large investors and for the small and medium-sized ones, who obtain funds from syndicated loans, the public-private partnership arrangements with foreign bodies have proved, in the long term, profitable, stable and attractive. These have meant an element of support in making attractive investment decisions, in economies of some host countries where they have found the opportunity to hire contracts, to expand into new markets.

Taking into account the gradual increase in the volume of transactions, in the last years, it is the task of governments to implement and consistently improve, the legislative framework associated with investments, through public-private partnership, ensuring a favourable environment for Foreign Direct Investment (Bernardinetti, 2018).

Certain aspects concerning the penetration of foreign capital through Public-Private Partnership, in the Romanian economy, after 1990

In Romania, the restructuring of the economy after 1990 consisted of integration the specific risk determined by internal factors and, also, by the risk of the implications of the world economy on the Romanian economy (Popescu and Ciucur, 1995).

In this context, one of the possibilities considered useful for the restructuring of the economy was the *Foreign Direct Investment through the public-private partnership*; from this perspective it was possible to favour the process of optimizing the allocation of resources, of establishing market economy behaviours, increasing competitiveness and access to the external market (Prelipceanu, 2006).

The introduction and expansion of market forces in the public sector field, as a result of the substantive changes initiated by governments, since the last decades of the last century, has occurred on the basis of some political mechanisms and institutional structures, in which the public-private partnership is also aligned.

Developed both at European and international level, during the last fifty years, the public-private partnership is constituted as an advantageous solution for the implementation of some major importance projects in the economy of a country, the cooperation of the two sectors being profitable for both parties: investors, public authorities.

The manifestation of the public-private partnership, in Romania, unfolded in the context of the structural changes in the economy during the transition period, of the restructuring of relations between the governmental sector and the non-governmental one, as an echo and response to the social and economic problems, characteristic of the stage.

The introduction and materialization of this concept has been made gradually, both through the creation and the efforts of the parliament and government to improve the legal framework, as well as through projects achievement in some areas of the economy.

The penetration of private capital, through investments in various fields, concretized in partnership forms, by the development of some capacities or the fulfilment of new investments, concessions to private, foreign, but, also, domestic investors. The transfer of public capital to the private one,

usually, led to the majority stock holding by the private investor, this taking over the control of the company's activity.

Among the first actions initiated, considered efficient for the restructuring of the economy, there was the privatization, whose development was carried out in close correlation with the flow of Foreign Direct Investments (Popescu and Ciucur, 1995; Prelipceanu, 2006).

The privatization in our country took place gradually, begining with 1991, by the adoption of the Privatization Law, covering several methods: mass privatization (the years 1991-1995), direct selling (1996-1997), auction sale (beginning in 1998), privatization through the capital market (Prelipceanu, 2006).

Overall, the privatization process achieved successes, firstly, in the case of small enterprises and as concerns large companies, the pace was slower.

In the first stage of the transition (1991-1996), there were significant disparities concerning the volume of Foreign Direct Investments attracted, between Romania and the other Eastern European countries, future members of the European Union (Prelipceanu, 2006).

After 1997, the flow of foreign direct investments accessed by Romania achieved increases compared to the previous period, the form supported by foreign investors, being the creation of *joint-venture* enterprises, for example, Daewoo with Oltcit (Rudoševic și Dycker, 1996) [5], continuing the tradition prior to the 1990s (RENAULT and DACIA - 1970) (Prelipceanu, 2006, p. 110).

The liberalization of the capital flow and the launch of privatization constituted a favourable element for the penetration of foreign direct investments; after the years 1997-1998, a number of major companies entered the Romanian market, which meant a significant impact in the process of market formation. A number of large investments are involved, such as the privatization of ROMTELECOM, DACIA Pitesti, privatization of banks and others (Prelipceanu, 2006, p.114).

Along with acquisitions, investments through new registrations, capital increases appear, the external investors existing on the Romanian market, aiming to increase the market share and strengthening the position held.

The stake of foreign investments in the Romanian economy reside in the comparative advantages that it offers, from the considerations [6]:

- the size of the internal market, attractive for foreign investors interested in capitalizing on the possibilities existing in some segments of the economy, respectively industry, services, trade;
- the possibilities of access to the export markets, favoured by Romania's relations with European markets;
- the quality of the workforce, capable of assimilating and developing technical skills that give them competitiveness.

The assessment of the impact of foreign direct investments instrumented through the public-private partnership, on the economy, takes into account:

- *the quantitative contribution* - through the financial infusion of supplementing the internal investment resources having favorable consequences on the development of the economy and employment (Negrițoiu, 1996, p. 177);
- *the qualitative contribution* through the contribution made to overcome and regulate some distortions of the economy, as effect of technology transfer, expertise in management and marketing, increasing the level of training of the workforce;
- *increasing the volume of investments domestically* in the form of direct and portfolio investments (Negrițoiu, 1996, p. 17; Moise, 2005, p. 69).

The penetration of foreign capital was carried out on several segments of the economy, its intervention being relevant through the favourable impact, corresponding to the objectives pursued, respectively:

• ***Transfer of high-performance technologies, machines and equipments***, with effects on production results, for example:

- technologies of deep sea exploration in the Black Sea used by Enterprise Oil led to the reduction of the checkout period (about ten times) compared to those practiced by the Romanian industry (Negrițoiu, 1996, p. 177);
- the companies Alcatel Lucent - a French company in Romania and Siemens - its parent company - have transferred modern technologies for the manufacture of interurban digital stations (Negrițoiu, 1996, p. 178-179);
- Romanian-Canadian factories IKOS Conf SA and NORADA SA belonging to the Seroussi factories group [7] have built modern clothing companies, equipped with ultra-modern and performance machines, used in garments (Negrițoiu, 1996, pag, 179).
- at the industrial complex "Petromidia-Constanța" (refinery and petrochemical plant), there was achieved a decrease in fuel consumption, by 50,000 t/year, as well as the increase of the processing capacity from 3.5 million t/ year to 4,8 million t/year [8] (Moise, 2005, p. 69); the technologies of the companies UOP, Mitsui, Snam Progetti, Heat Research are used. The company was privatized on October 31, 2000, by taking over 70% of the shares, by ROMPETROL Group, BV Rotterdam - $ 50.5 million [9].
- MATIZOL Ploiești company - controlled by the Swiss group - Swisspor-Romania – endowment with a new technological line for bituminous waterproofing materials has led to an increase in labor productivity (by 300%) and, at the same time, a decrease in energy consumption (by 20%) [10].

- ***Creating new jobs***

  - The American company The COCA-COLA Company is present on the Romanian market; through the investments made, jobs were created, both in the production activity and in the distribution network [11] (Moise, 2005, p. 70).

- ***Transfer of experience and managerial training***, by using some modern methods of qualifying the workforce, such as: organizing personnel training courses on various activities: market research, financial management, human resources development, distribution (for Colgate - Palmolive and Coca-Cola companies) (Negrițoiu, 1996, p. 179).

- ***Integration of the activity of foreign investors in the local economy***, significant by contribution to the development of the horizontal industry. The action was carried out by involving the local suppliers of goods and services in the activity of foreign capital firms unfolding. The process materialized in the delivery, by the Romanian producers, of some components and raw materials or the provision of transport services, by the Romanian suppliers, to the multinational companies (Negrițoiu, 1996, p. 177-187; Moise, 2005, p. 69).

- ***Contribution to the development of commercial services***

There was a special interest of foreign investors for commercial activities evolution in Romania, immediately, after 1990, being considered an attractive, profitable area.

The impact of foreign capital in this sector has been felt quantitatively, through the contribution of financial resources in complementing the national ones, for the achievement of profile investments, jobs ensuring and creation, as well as from a qualitative perspective, by transfer of modern

technology, of the experience. in the field of management and marketing, with favourable effects on the qualification of the workforce.

From the cooperation of the foreign capital with the domestic one, an increase and diversification of the services supply to consumers has resulted in, such as (Moise, 2005, p. 83):

- specialized stores by product categories (clothing, footwear, domestic appliances, electronics);
- units of "supermarket" type on food profile, developed all over the country;
- large size commercial complexes, organized for the sale of a wide range and in large quantities of products, as for example, the retail networks.

There are commercial services which resulted from the investment of foreign capital intertwined with the domestic one, relevant through a series of advantages (Moise, 2005, p. 83-84):

- economic relations of collaboration by also, using of products provided by the Romanian producers;
- a superior managerial technique, aimed at ensuring the prestige of the company and a good satisfaction of the client's requirements;
- a diversified supply of products intended for consumer choice.

- ***Contributions to changes and developments of the Romanian banking system***

The involvement of foreign capital in the Romanian banking system occurred gradually, after the year 1990, simultaneous with the internal structural changes, brought to the sector. The initiatives of the privatization of this field of activity have attracted the interest and confidence of foreign investors who have oriented themselves towards the Romanian capital market. The assets of the state-owned banks were partially acquired, with foreign investors becoming co-owners.

By involving the foreign capital, a series of changes and improvements were brought in the activity of the Romanian banking sector, among the novelty elements, being (Moise, 2005, p. 85-86) [12]:

- the recapitalization of commercial banks;
- measures initiated to resolve the debts of the insolvent debtors;
- orientation of labour force qualification according to the new approaches regarding banking products and services;
- using new software (information and computer systems which to ensure a working environment suitable for good customer servicing).

There has been a continuous concern of banks for approaching those strategies (opportunity management, risk management) oriented towards new services and banking products supply, with their diversification. The aim was to: increase the competitiveness, maintain a favourable position in the sector's competitive market.

Representative for the involvement of foreign capital in the banking sector, using the form of Public-Private Partnership, was the privatization of some Romanian state-owned banks (Moise, 2005, p. 84).

It can be appreciated that the development of public-private partnerships with the contribution of foreign direct investments, in the Romanian economy, has proved beneficial, with favourable expectations of growth for medium and long-term. This implies, forward, concerns at the level of the government, as well as of the Romanian business environment, in order to ensure a stable and attractive economic and political climate, to the external investors.

Conclusions

The impact of Foreign Direct Investments in relation to the public-private partnership, on the Romanian economy can be appreciated from several perspectives:

- the achievement of the public-private partnership with the participation of foreign direct investments can be considered advantageous compared to the private domestic participation, since there is the probability of a higher contribution of the volume of capital;
- the instrumentation of the public-private partnership having greater resources of funds through the contribution of foreign direct investments (relative to those from internal resources), presents prospects of achieving important investments, through the committed values, leading to the creation of new objectives or development of those existing (Wang, 2017).

Fulfilling partnerships with the participation of Foreign Direct Investments is important in the perspective of economic growth, given the significant role that the involvement of Foreign Direct Investments has in development.

It should be noted that for the receiving countries, foreign investment flows mean advanced technology, modern management techniques, increasing employment and qualification, export development, therewith, offering the possibility of integration into the regional and global economy.

By the impact exerted, Foreign Direct Investments accessed in public-private partnerships, represents a significant potential, for the economic development and the increase of competitiveness in the host countries, but, also, presents some risks, among the disadvantages being: changes that occur in the structure of the business environment, the loss of market positioning of local companies, sometimes, the elimination of local producers or even their bankruptcy, as an effect of foreign competition (Horobeț & Popovici, 2017).

Also, it must be taken into account that the presence, in excess, of foreign capital in the economy of a country may create it, dependence. The situation would imply a high share of the foreign, prosperous companies present in the host country, the national ones having a lower investment capacity. Therefore, it is advisable to maintain a correspondence between the volume of investment flows attracted and the development potential of a country (Șerbu, 2007).

The policies supported by the governments of the host countries can be oriented according to the interests of the national economies, through actions that should increase the positive impact of the public-private partnership with the participation of Foreign Direct Investments (Trufin, 2016, Horobeț & Popovici, 2017, Șerbu, 2007)

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Column Versus Tabular Layout of Paragraphs in Message Conveyance: Visual Processing Study Based on Eye-Tracking Data

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Abstract

Human visual activity has been investigated by researchers from various scientific fields for many years. It has been shown many times that eye-tracking studies can be helpful in objectively evaluating usability of interacting systems. The present paper study extend this direction of research by examining visual scan characteristics registered while performing search tasks in mock-up web pages. For this purpose, four different, simple web pages were prepared. They differed by two factors specified on two levels: the background and text color combination (black text on white background and the other way round) and the text layout (one or two columns). Male participants performed 16 experimental tasks on each web page variant. A stationary, infrared eye-tracking system was employed to gather visual activity data of subjects placed in an isolated room with Venetian mirror. The data were further examined qualitatively by analyzing heat maps, and quantitatively by applying three- and two-ways ANOVAs for fixation durations, saccades' durations and amplitudes. The results showed the combined, interactive impact of the analyzed factors on information is searched characteristics. They also suggest the most efficient combination of factors: white background and two-column layout of paragraphs. The presented findings are valuable for designers of information such as web pages or visual marketing messages.

Keywords: visual activity, message effectiveness, digital presentation, marketing

Introduction

Human visual activity has the subject to investigation in the field of psychophysiology of vision for many years (e.g., Wolfe, 1994; Zelinsky et al., 1997; Findlay & Gilchrist, 2003). The research is aimed at understanding the mechanisms that govern acquisition and visual information processing strategies in humans. It is also the area of interest for designers of all kinds of visual communication artifacts. Knowledge of relationships between the features of information communication projects as well as its effectiveness and efficiency is a condition for creating optimal interaction and information systems such as broadly understood human-machine systems, marketing communications or computer interfaces. The eye-tracking technique has recently been gaining more and more interest in this type of research. The ability to record parameters of the visual scanning path in various contexts allows for analyses regarding search strategies.

A number of parameters related to the nature of the visual scan path may form the basis for an objective assessment of the usability of visual information conveyance designs (Goldberg & Kotval, 1999; Morimoto & Mimica, 2005; Grobelny et al., 2006). Learning about relationships between factors that shape this message and visual activity indicators characterizing the scan path is, in fact, an element of expanding knowledge about effective and efficient design of visual communication.

Research on the influence of factors shaping visual messages in various areas and contexts are focused mainly on performing factorial experiments to study the impact of individual factors and their interactions on the spatio-temporal nature of the visual scan path. Studies on graphic factors in virtual product packaging designs were presented by, for example, Grobelny & Michalski (2015) or Michalski & Grobelny (2016). Other, recent examples include the works of Ozkan & Ulutas (2017) or Muñoz Leiva et al. (2018). A broad literature review covering similar examinations in the area of marketing applications is presented in the work of Huddleston et al. (2018).

The field of human-machine interaction occupies a special place in eye-tracking research, which mainly concerns graphic interfaces' usability. On the one hand, it deals with control systems for modern industrial machines, and on the other, for example, regards human interaction with graphical interfaces operated commonly on a daily basis. The layout and shape of graphic elements in the virtual machine interface were the subject of experiments described in the works of Grobelny & Michalski (2017) and Michalski (2017, 2018). Pernice et al. (2014), in turn, using eye-tracking experiments revealed strategies of reading texts on websites depending on their context and content.

The main inspiration for the current research were the results of Schaik & Ling's (2001) experiments. The authors examined the effectiveness and efficiency of searching for information on websites varied in terms of the background-text contrast and layout. The obtained outcomes showed that the location significantly affects the accuracy and speed of information retrieval. However, the contrast is only relevant when interacting with the layout. These studies did not include any visual activity analysis.

In the present study, we attempt to analyze the visual activity while searching for information on websites differentiated by two factors: the background and text color combination and the text layout. Due to the large amount of information gathered in eye-tracking examination, factors were limited to two levels and, hence, four design variants were investigated. The main goal of the research was to answer the question of whether and how the examined factors affect the spatio-temporal nature of the visual path. We were in particular interested whether the effect of these factors' interaction significantly influence visual path parameters, as it was the case in Schaik & Ling's research (2001).

Method

Experimental Design

The experiment included two factors: background-foreground color set and paragraphs' layout. They were examined on two levels each. The design involved white background and black text and black background and white text for the first factor. The latter examination effect was specified on the following levels: one-column layout of the presented paragraphs and their tabular-like two-column arrangement. All combinations of the examined factors provided four experimental conditions according to which four graphical panels in the form of mockup web pages were designed. They are illustrated in Fig. 1. Four questions regarding contents of paragraphs were elaborated. Each question corresponded to one paragraph. A full factorial, within-subject design was employed. Therefore, all participants tested four experimental conditions and searched for answers for all four questions, which resulted in 16 trials per person.

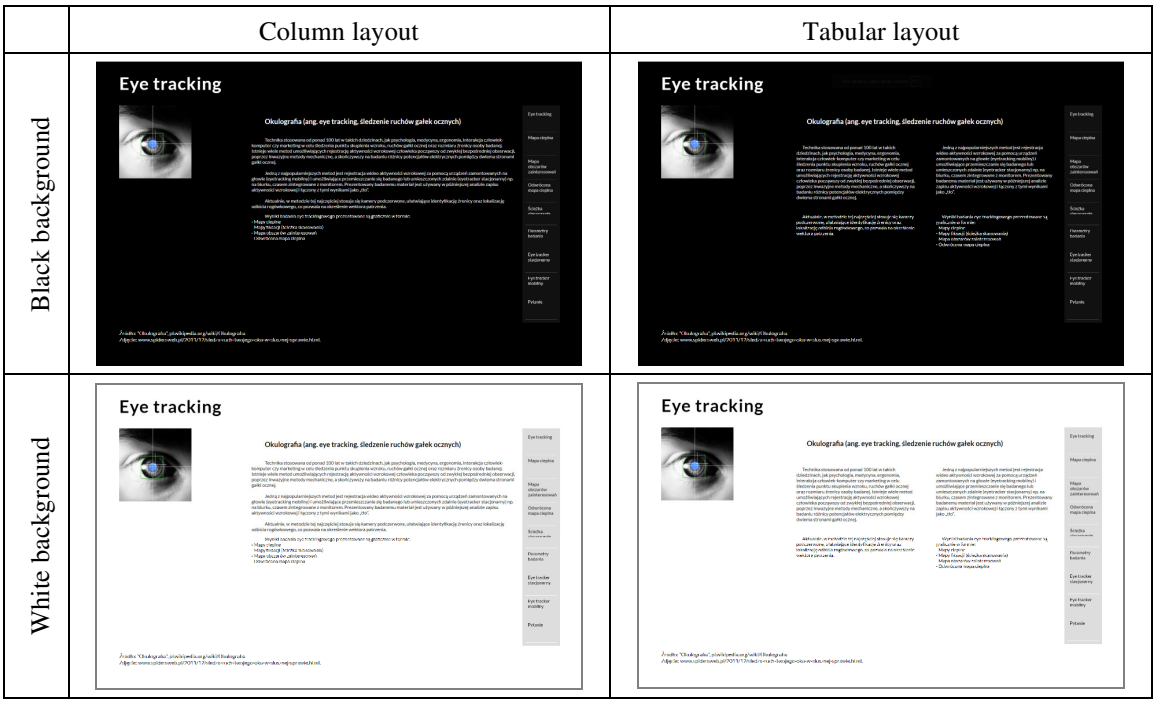

Fig. 1. Mockup web pages used as stimuli

Apparatus

The experiment was conducted in the Laboratory of Information Systems Quality of Use which is a part of a BIBLIOTECH project co-funded by the European Union through the European Regional Development Fund under the Operational Programme Innovative Economy 2007–2013. There is a separated room where the examination takes place. It is equipped with the SMI RED500 eye-tracking device, a computer screen, as well as a typical keyboard and computer mouse. The interior is uniformly lit and resembles a classic office work station (see. Fig. 2).

Fig. 2. Experimental setup

On the other side of the Venetian mirror, there is a place for examiners who have a computer with software controlling the whole eye-tracking system and registering all tracked data.

Procedure

At first subjects were informed about the goal and the general procedure of the investigation, and after completing the written informed consent they were asked to enter the isolated chamber. The examination started with answering some typical background questions as gender, age, eye-sight problems. The proper eye-tracking study began with a five-point calibration, then subjects were presented with one of the four questions. When the question slide disappeared after 3 s, a white panel with a back ✖ at the center of the screen showed up. It was visible for 1.5 s, and then followed one of four examination conditions. Participants were to find the paragraph with the answer for the presented question and click on it with a mouse. After selecting the appropriate area, the next question appeared, and the procedure repeated itself (see Fig. 3). The examination was finished after answering all four questions for all four experimental conditions. The order of appearance of both questions and designed panels were randomized individually for all subjects.

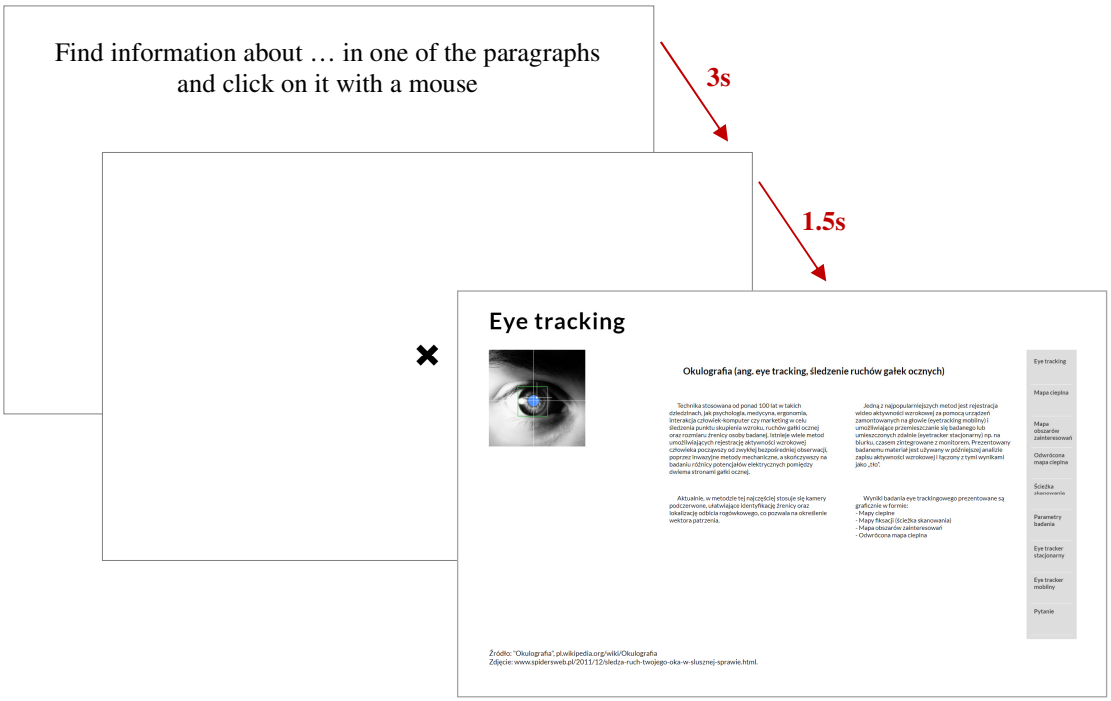

Fig. 3: Full page presenting the stimulus with a white background and paragraphs presented in a tabular form

Participants

Nine male subjects participated in the examination. Their age ranged from 19 to 24 years, with the average of 20.9 and a standard deviation 1.83. They all were students of Wrocław University of Science and Technology and reported normal or corrected to normal visual acuity. Three subjects wore eye-glasses, however it did not affected the quality of gathered eye movement data. The mean tracking ratio

was as big as 96.1% with a standard deviation 6.11. The minimum value of this parameter equaled 80.2 whereas the maximum – 99.2%

Results and Discussion

Qualitative Analysis

The qualitative analysis of the obtained eye-tracking data is usually based on the so-called heat maps that graphically present mean fixation durations superimposed on examined graphical stimuli. More reddish colors denote longer average fixation durations. Colder colors correspond to shorter mean durations. Heat maps related to the examined conditions are provided in Figs. 4-7, they present results for all examined subjects.

A fairly clear difference in the nature of the colorful areas can be seen between projects with a white and black background. Generally, because fixations are associated with overt attention and conscious information acquisition, it can be said that this process was relatively slower on black background interfaces. However, the process of searching for information as suggested by the heat maps shown is similar for single- and two-column layouts.

In the first layout for both color variants, attention is drawn by a bulleted paragraph, which is significantly distinct from other graphic elements. In two-column designs, attention is generally focused on the left edges of the paragraphs and their centers except for the bulleted paragraph, which is processed only left-handed. The obtained qualitative data are further examined in the following section.

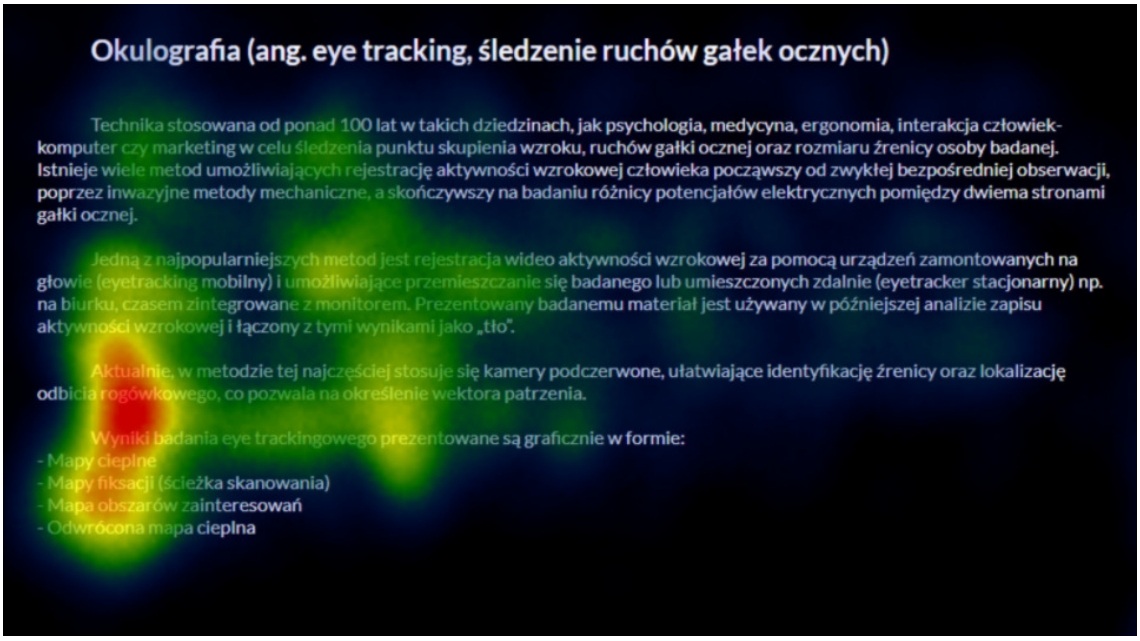

Fig. 4: Heat map for black background, one column layout condition

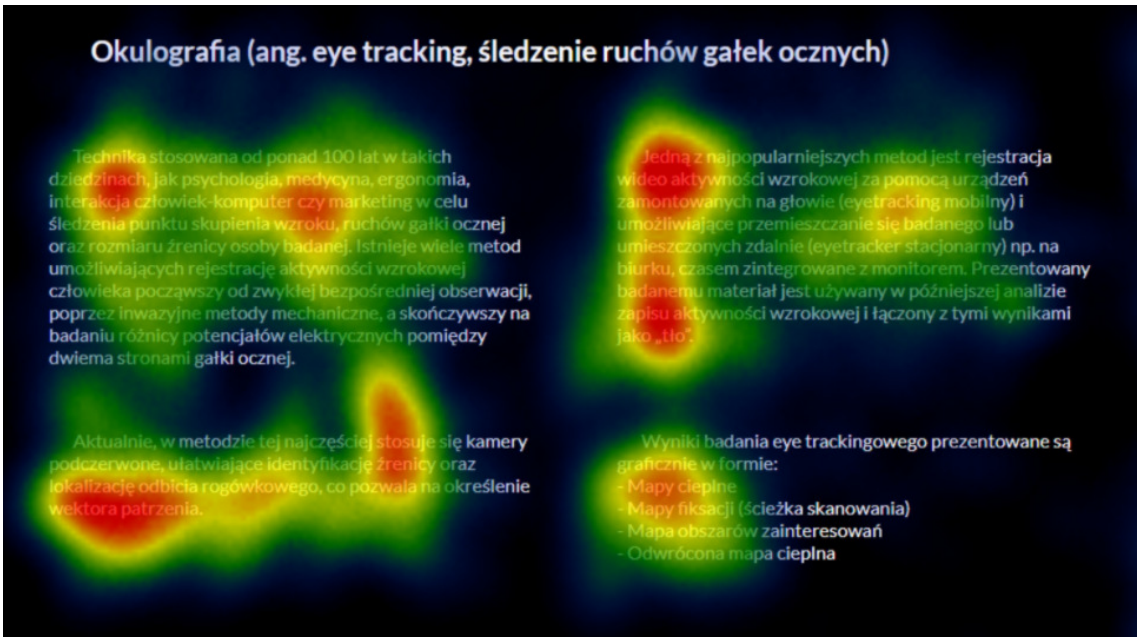

Fig. 5: Heat map for black background, two column layout condition

Fig. 6: Heat map for white background, one column layout condition

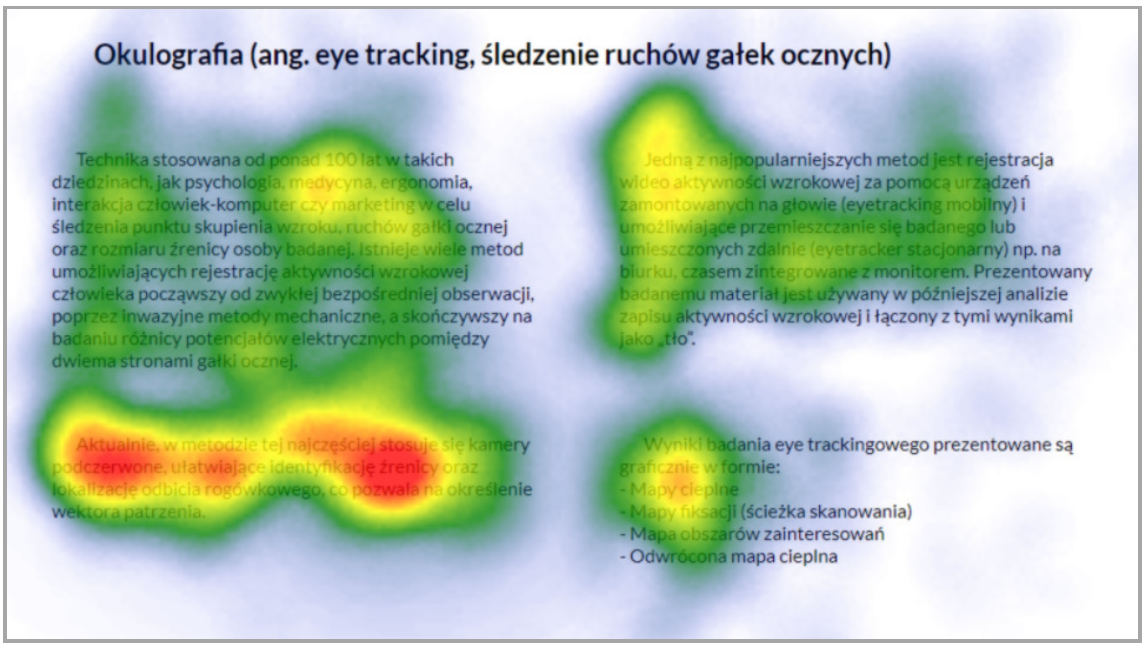

Fig. 7: Heat map for white background, two column layout condition

Quantitative Analysis

Basic visual activity statistics for all experimental conditions (full pages) were averaged across subjects and trials and are put together in Table 1. These data were categorized as measures of processing and search associated with fixation and saccade parameters, respectively. The first group includes fixation count and duration along with the fixation to saccade ratio. In the second category there are saccade count, duration, amplitude as well as scan path lengths.

Fixation durations confirm partly informal, qualitative analysis of the heat maps described in the previous section. Average values of this parameter for stimuli with a black background are longer than those obtained for designs with a white background but within the same layout.

Table 1: Basic visual activity statistics for all experimental conditions (full pages) averaged across subjects and trials

No	Experi-mental condition	Measure of processing			Measure of search			
		Fixation count	Fixation duration [ms]	Fixation to saccade ratio	Saccade count	Saccade duration [ms]	Saccade amplitude [°]	Scan path length [pixels]
1.	Black_Col	27 (3.4)	204 (12)	0.56	47 (7.4)	44 (1.1)	4.1(0.38)	4139 (531)
2.	Black_Tab	31 (5.1)	219 (16)	0.58	54 (9.5)	42 (1.2)	3.1(0.13)	4598 (809)
3.	White_Col	43 (6.6)	198 (13)	0.63	68 (9.2)	45 (1.8)	6.2(2.7)	6949(1138)
4.	White_Tab	25 (3.8)	209 (15)	0.54	47 (11)	44 (1.4)	3 (0.14)	3725 (592)

Values in brackets denote *SEM*s.

From quantitative characteristics of saccades, it can be deduced that their amplitude depends mainly on the way information is distributed. Saccades for tabular layouts (four paragraphs in two columns) are shorter than those in a single-column arrangement. The examination condition with a white background turned out to be the best in terms of visual search efficiency. This is clearly demonstrated by the shortest scan path shown in the last column of Table 1.

Detailed relationships between visual activity parameters and factors differentiating the examined designs were examined by performing a number of multi-way analyses of variances. The influence of paragraphs, colors, and layout on mean fixation durations were investigated by a three-way analysis of variance.

The obtained results, put together in Table 2, revealed than none of the examined factors was important alone. However, all two-way interactions, that is, *Paragraphs* × *Colors*, *Colors* × *Layout* and *Paragraphs* × *Layout*, occurred to be statistically significant. These meaningful interactions are graphically illustrated in Figs. 8, 9, 10, respectively.

Table 2: Results of the three-way Analysis of Variance *Paragraphs* × *Colors* × *Layout* for mean fixation duration. Data registered only in the AOIs specified on paragraphs

Effects	**SS**	**df**	**MS**	**F**	**p**	**η^2**
Paragraphs (P)	33 025	3	11 008	0.521	0.668	
Colors (C)	1497	1	1497	0.071	0.790	
Layout (L)	1515	1	1515	0.072	0.789	
Paragraphs × Colors	*214 898*	*3*	*71 633*	*3.39*	*0.017**	*0.0027*
Paragraphs × Layout	*316 660*	*3*	*105 553*	*4.99*	*0.0018**	*0.00398*
Colors × Layout	*89 801*	*1*	*89 801*	*4.25*	*0.039**	*0.00113*
P × C × L	54 435	3	18 145	0.86	0.462	
Error	79 225 035	3748	21 138			

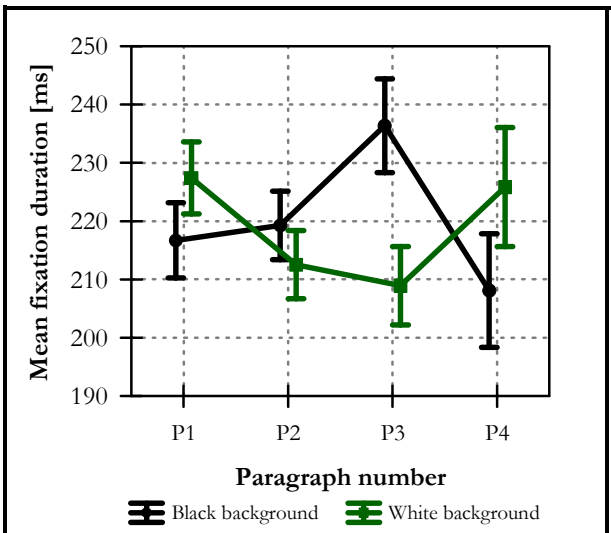

Fig. 8. Mean fixation durations for the *Paragraphs* × *Colors* interaction

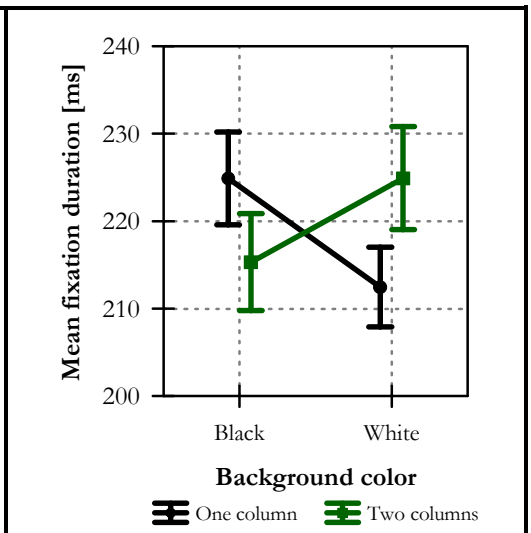

Fig. 9. Mean fixation durations for the *Layout* × *Colors* interaction

Figure 8 illustrates the dependence of average fixation duration times on their location in individual paragraphs separately for conditions with white and black backgrounds. The almost symmetrical graphs suggest that during the information acquisition from paragraphs 2 and 3, subjects' attention was concentrated for a shorter time in interfaces with a white background. This fact can indicate more efficient reading for these cases. Such a result is consistent with many experimental results in the field of psychophysiology of vision.

The reverse relationship for paragraphs 1 and 4 is quite unexpected. It may result from the location of these paragraphs in the first and last positions of the Western civilization cultural reading model.

For a light background, visual information analysis strategies of paragraphs might have been influenced by surrounding objects like, e.g., right menu. Though these items were in the peripheral field of view, they were more distinct in white background conditions than their black equivalents. This, in turn, could affect attention distribution differently for these two cases.

The relationship from Fig. 9 supports for such a view. For tabular designs it was easier (shorter fixation duration times) to obtain information on a black background interface than on the white one as direct surrounding is less distracting. On the other hand, in the single-column organization, peripherally processed distracting environment is generally, on average, much farther away than in the previous case.

Table 3: Post-hoc mean fixation duration analysis results for the *Paragraphs* × *Colors* interaction. Data registered only in the AOIs specified on paragraphs

Colors		**Black background**				**White background**			
	Paragraph No	P1	P2	P3	P4	P1	P2	P3	P4
Black background	P1	×							
	P2	0.93	×						
	P3	0.17	0.14	×					
	P4	0.60	0.64	0.098**	×				
White background	P1	0.94	0.87	0.18	0.55	×			
	P2	0.38	0.41	0.028*	0.87	0.32	×		
	P3	0.27	0.30	0.020*	0.70	0.23	0.77	×	
	P4	0.40	0.36	0.73	0.24	0.42	0.13	0.09**	×

** $\alpha < 0,1$; * $\alpha < 0,05$;

The detailed post-hoc analyses of differences between consecutive factor levels from Table 3, shows that the biggest contribution to the significance of the relations illustrated in Fig. 8 have differences between scanning information strategies for P3 on black and P3 on white background, as well as between P3 on black and P2 on white interfaces.

Relations demonstrated in Fig. 9 mainly result from the differences between the search in white background conditions with one and two columns, and single-column designs with different backgrounds. Therefore, the suggested hypotheses require further detailed research.

Table 4: Post-hoc mean fixation duration analysis results for the *Colors* × *Layout* interaction. Data registered only in the AOIs specified on paragraphs

Color		**Black background**		**White background**	
	Layout	One column	Two columns	One column	Two columns
Black background	One column	×			
	Two columns	0.65	×		
White background	One column	0.053**	0.13	×	
	Two columns	0.74	0.43	0.024*	×

** $\alpha < 0,1$; * $\alpha < 0,05$;

Figure 10 and the post-hoc analysis from Table 5 present the relationships between average fixation durations in paragraphs P1–P4 and the stimulus layout (one-column, tabular). The data show differences in search strategies in paragraphs P1 and P4. In a single-column design, fixations in P1 last the shortest while in P4 the longest.

This relation can be justified by the fact that the P4 area in a one-column layout is the most probable area of the first fixations in the experiment. It lies near the position of the reference starting point (see Fig. 3). The first fixations are usually longer (compare zoom-lens hypothesis [xx]). In general, the differences in fixation durations between paragraphs P1 and P4 are the most important reason for the obtained interaction (Fig. 10).

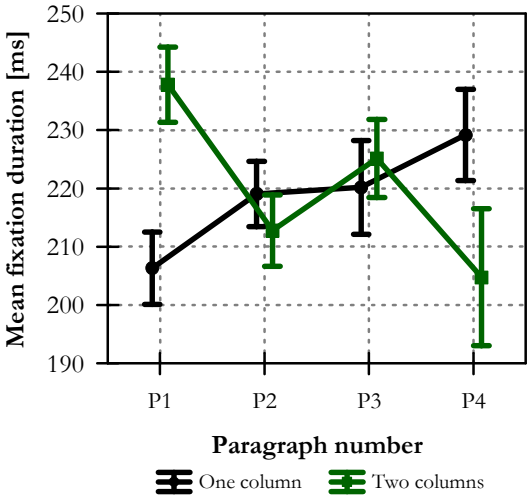

Fig. 10. Mean fixation durations for the *Paragraphs* × *Layout* interaction

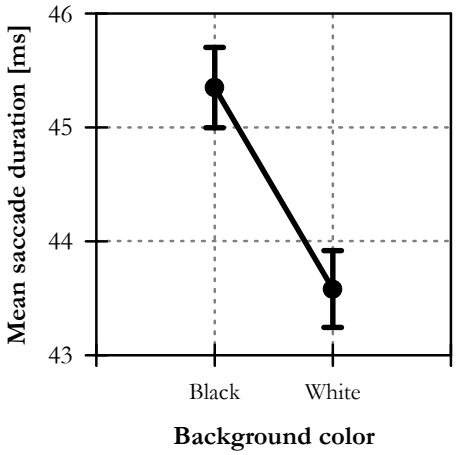

Fig. 11. Mean saccade durations for the *Background color* effect

Table 5: Post-hoc *Paragraphs* × *Layout* for mean fixation duration. Data registered only in the AOIs specified on paragraphs

Layout		**One column**				**Two columns**			
	Paragraph No	P1	P2	P3	P4	P1	P2	P3	P4
One column	P1	×							
	P2	0.17	×						
	P3	0.53	0.60	×					
	P4	0.027*	0.28	0.16	×				
Two columns	P1	0.001*	0.036*	0.024*	0.48	×			
	P2	0.50	0.51	0.96	0.11	0.009*	×		
	P3	0.042*	0.42	0.24	0.74	0.25	0.17	×	
	P4	0.84	0.29	0.54	0.09**	0.019*	0.53	0.13	×

** *α < 0,1;* * *α < 0,05;*

The examination of factors affecting the duration and amplitude of saccades was carried out using a two-factor analysis of variance taking into account the layout and background color factors. The results are presented in Table 6 and 7 and received data are illustrated in Figs 11, 12, and 13. The average saccades' lengths reflect the ease of searching for subsequent places of analyzed experimental conditions, it is easy to notice that tabular projects and those with a white background color are more effective. However, the effect of color is reduced in tabular layouts.

Table 6: Two way Analysis of Variance *Colors* × *Layout* for mean saccades duration

Effects	**SS**	**df**	**MS**	**F**	**p**	**η^2**
Colors (C)	*5924*	*1*	*5924*	*13.15*	*0.00029**	*0.001695*
Layout (L)	45	1	45	0.10	0.75	
Colors × Layout	5	1	5	0.012	0.91	
Error	3 488 888	7746	450			

Table 7: Two way Analysis of Variance *Colors* × *Layout* for mean saccades amplitudes

Effects	SS	df	MS	F	p	η^2
Colors (C)	51	1	51	2.43	0.118	
Layout (L)	*213*	*1*	*213*	*10.2*	*0.0014**	*0.00132*
Colors × Layout	*84*	*1*	*84*	*4.03*	*0.045**	*0.00052*
Error	161 591	7746	21			

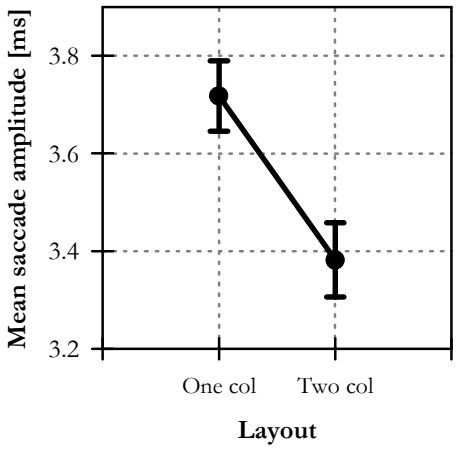

Fig. 12. Mean saccade amplitude for the *Layout* effect

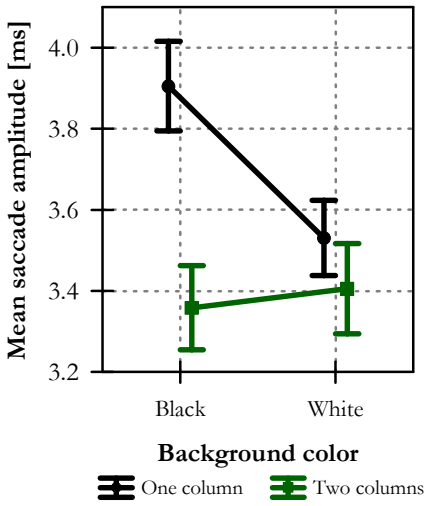

Fig. 13. Mean saccade amplitude for the *Layout* × *Colors* interaction

Table 8: Post-hoc *Colors* × *Layout* for mean saccades amplitudes

Color		***Black background***		***White background***	
	Layout	One column	Two columns	One column	Two columns
Black background	One column	×			
	Two columns	0.0003*	×		
White background	One column	0.0096*	0.22	×	
	Two columns	0.0015*	0.76	0.39	×

Conclusions

The results obtained in the experiment described in the present work document primarily the possibilities offered by the eye-tracking technique in the field of human visual activity research. The computer

interface context studied here is an example of the practical application of this technique. The main advantage of this pragmatic application is the precise and objective relationship between the factors that shape the interface design and the nature of the users' search strategy.

The study outcomes showed, for example, the combined, interactive impact of the analyzed factors (background color and layout) on the way information is searched in this type of visual stimulus. This result confirms the effect obtained earlier in studies Shaik and Ling (2001) made without visual activity analyzes. The obtained results suggest clearly the most efficient combination of factors, that is, white background and two-column layout of paragraphs. Such an experimental condition led to the shortest visual scanning path of the interface. This is valuable information for designers of visual information messages, e.g., in various marketing activities.

In addition to the design practice, the obtained results and analyzed relationships suggested interesting and more universal phenomena. For instance, the received relatively long fixations for paragraphs located at the center of the screen (Fig. 10) seem to confirm the hypothesis of the widespread occurrence of zoom-lens strategies (Wolfe, 1994; Findlay & Gilchrist, 2003) in visual search mechanisms. Furthermore, according to the authors' best knowledge, the eliminating influence of tabular layouts on the statistical significance of the background color factor for mean fixation durations (Fig. 13), has not yet been documented in the literature. Of course, the pilot nature of the current investigation requires further studies to confirm and explain these findings.

An interesting eye-tracking research perspective is the ability to identify human behavior in a given context based on visual path analyses. The present paper findings and various relationships shown in this study suggest that one could probably infer about designs' graphical characteristics from recorded and computed visual activity parameters. The formal analysis of such possibilities is undoubtedly an interesting research direction.

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Digital Transformation in Healthcare. The Challenges of Translating Knowledge in A Primary Research, Educational and Clinical Centre

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Abstract

The global healthcare system is currently facing an increasing technological swift, also driven by the need to engage the patients and other stakeholders in developing healthcare products and services. Knowledge Translation (KT) is getting increasing attention both from scholars as well as managers and professionals, due to its crucial role in fostering innovation, when most actors share different backgrounds, competencies, and skills. Such features represent severe challenges to the sharing and transfer of knowledge. The various actors need effective KT enablers to share, transfer, and create new knowledge. This paper aims to investigate such dynamics through a qualitative case, analyzing how KT is managed at IHU Strasbourg, the Institute of Image-Guided Surgery, one primary research, clinical, and educational centre, together with the Research Institute Against Digestive Cancers (IRCAD), the surgical minimally-invasive training centre. At such Institutes, several digital technologies are implemented and adopted to foster innovation in new surgical tools and methodologies. Findings demonstrate that KT at IHU Strasbourg/IRCAD can be defined at four different levels, corresponding to the Institutes' aims: education, innovation, technological transfer, and care. For each dimension, a galaxy of stakeholders, KT processes and flows, and instruments emerge. KT enablers vary, from the ones more linked to digital technologies and procedures to the ones that are more creative and based on the soft and interpersonal skills of the professionals involved. Results suggest a mix of different methods, and the search for always new techniques.

Keywords: Knowledge Translation, Surgery, Healthcare, Technologies.

Introduction and Research Question

Nowadays, the healthcare ecosystem is undergoing a relevant change. Being initially a closed system, it is now turning to an open one, in which different professionals (beyond physicians), industrial organizations, research centres and universities, policymakers, citizens, and patients must cooperate to reach the outcome, the increasing wellbeing of the society (Schraagen *et al.*, 2011; Bowser *et al.*, 2019). Such stakeholders need to engage in different ways, and there is a call for effective tools to

share, transfer, and create new knowledge (Ardito and Messeni Petruzzelli, 2017; Secundo, Toma, *et al.*, 2019; Biancuzzi, Dal Mas, Barcellini, *et al.*, 2020).

Within such context, the process of Knowledge Translation (KT) is gaining attention both from scholars as well as managers and professionals due to its crucial role in fostering and enhancing innovation in several sectors (Lander, 2016). KT can be defined as "the synthesis, exchange, and application of knowledge by relevant stakeholders to accelerate the benefits of global and local innovation in strengthening health systems and improving people's health" (Wallace, 2012). Keeping up and innovating new products and services can indeed be challenging since most actors involved feature varied backgrounds, competencies, and expertise. Such differences can represent severe obstacles and challenges to the sharing and transferring of knowledge and thus, the creation of new ideas and outcomes (Dal Mas, Massaro, *et al.*, 2019).

KT is crucial in many business fields. Said that it is even more predominant in the healthcare and medicine sector, for a variety of reasons. There is a call for clinical researchers to translate scientific research into clinical practice (Cobianchi *et al.*, 2016; Turin *et al.*, 2018; Vitolo *et al.*, 2019). Stakeholders include not only professionals with several backgrounds but also the patients, who often need to be directly engaged in the cure or treatment to co-produce the healthcare products and services (Batalden *et al.*, 2016; Biancuzzi, Dal Mas, Miceli, *et al.*, 2020). According to the literature (Savory, 2006), there is the need for a complete translation, recalling the concept of an unknown language which is translated into a different language in another context (Simeone, Secundo and Schiuma, 2017, 2018; Secundo, Del Vecchio, *et al.*, 2019)

Moreover, digital transformation and new technologies are changing the whole healthcare scenario. Artificial intelligence, robotics, augmented, mixed and virtual reality, cloud computing, cybersecurity, big data analytics, additive manufacturing, wearables and sensors, genome-sequencing, and blockchain-based technologies (Bagnoli *et al.*, 2018; Bagnoli, Dal Mas and Massaro, 2019; Rippa and Secundo, 2019; Massaro *et al.*, 2020; Ruzza *et al.*, 2020) are affecting the way surgeons and healthcare professionals work, the way the healthcare processes are managed, the resources to be monitored, the methodology to educate and train young physicians and residents, and to ensure lifelong learning to all healthcare professionals (Dal Mas, Piccolo, *et al.*, 2019; Dal Mas *et al.*, 2020; Dal Mas, Piccolo and Ruzza, 2020; Presch *et al.*, 2020). Digital technologies are pushing an increased performance of main healthcare business processes, particularly those that can be simplified with the adoption of information technology. More specifically, digital technologies could increase efficiency (IBM, 2013; Gordon, Perlman and Shukla, 2017; Siemens, 2018; Chen *et al.*, 2019) and, at the same time, allow for the delivery of better quality and reduced response times, with many benefits for several stakeholders, such as national health systems, clinicians, and patients (Brubakk *et al.*, 2019; Barach and Johnson, 2020).

While several previous studies have investigated how the scientific research can be translated into clinical practice, no prior research has deepened, to our knowledge, how KT works in highly skilled healthcare environments, meaning what types of KT flows emerge and which digital technologies and tools are employed to facilitate the dialogue and knowledge sharing among the various actors. Thus, our study aims at investigating such dynamics, also considering the evolving digital transformation scenario, by answering the following research question (RQ):

RQ. What are the knowledge translation dynamics and technologies adopted within a highly skilled educational research, and clinical centre?

Methodology

The paper employs a qualitative case study approach (Yin, 2014). According to Massaro et al. (2019) “qualitative methods allow researchers to discover to reveal and understand relationships between variables even within complex processes, and to illustrate the influence of the social context.”

Hereafter, we present the research context, the data collection, and the analysis process followed by the researchers to ensure transparency (Massaro, Dumay and Bagnoli, 2019).

Research Context

Our paper aims to perform a qualitative case study concerning the KT dynamics within a primary research, educational and clinical centre, IHU Strasbourg, the Institute of Image-Guided Surgery, and at nearby IRCAD, the minimally-invasive training centre. Both institutes are located in Strasbourg, France. At such centres, several digital technologies are implemented to foster innovation in new surgical tools and methodologies. According to Eisenhardt (1989), researchers ought to select case studies in which the action of observation is "transparently observable," representing, therefore, polar types, avoiding random selection. Taking into consideration the mission of the selected institutes, and their results in innovation, education, and clinical practice, we may argue that IHU Strasbourg/IRCAD may represent a critical case study to investigate our research question. Therefore, the case meets the notion of a polar type permitting finding transferability (Shah and Corley, 2006).

Data Collection and Analysis

Data acquisition and analysis entailed several actors from both organizations. Data was collected from multiple sources, as reported in Table I to ensure validity and data triangulation (Yin, 2014). Several researchers are part of both institutes; others are external with different competencies (business and management, engineering and new technologies, surgery, and medicine). One of the researchers attended all the steps of the process. All the results were discussed within the project team with an iterative approach, repeatedly moving between the concepts identified and the theoretical framework of KT.

Table I: Data collection details

Methodology	**Object of analysis**
Interviews	M.G. – Chair of Excellence in Percutaneous Surgery, Institute for Advanced Studies, University of Strasbourg and Scientific Director of Percutaneous Surgery at IHU-IRCAD
	S. P. – Professor of Surgery, University of Strasbourg, Director of Education IRCAD-IHU
	J.D. - Managing Director, IHU
	L.S. - Chief Innovations Officer, IHU
	A.G. - Industry Relation Manager, IHU
	F.W. - Veterinarian and Preclinical Projects Manager
	A.T. - Chief of Clinical research projects
	A.H. - Director of Research & Development, IRCAD
	B.M. - Project Manager, IHU
	T.P - Chief Technical Officer, WeBSurg
	J.M.V. - Surgery & Innovation Fellow at IRCAD/IHU
	A.G. - Surgery & InnovationFellow at IRCAD/IHU
Analysis	The Institute's website
	Presentations given by the various chiefs
	Participation in the Master class of "Image-guided Therapy" (February 2020)

Findings

KT's dynamics at IHU Strasbourg/IRCAD are strictly related to the different aims of the Institutes as well to the stakeholders involved and are supported by several tools implied in digital technologies. IHU and IRCAD are jointly active in four main areas:

1. education
2. innovation
3. technology transfer
4. patient care.

KT at Education

The institutes are active in training physicians and surgeons from different specialities, employing different training methodologies:

- ***In-person training***: More than 4.300 healthcare professionals have attended in-person training in Strasbourg. The Institute runs several courses every year; most programs are intense and last for one week. Moreover, the Institutes, together with the University of Strasbourg, run a two-year master class called The Business Engineering Surgical Technologies Transfer (B.E.S.T.T.) devoted to multidisciplinary students who are willing to work as innovators in the field of healthcare. The program applies a blended teaching methodology, mixing e-learning and virtual classes with five weeks/year onsite workshops. Innovation, project management, entrepreneurship, team building, are included in the studied subjects. One intense B.E.S.T.T. week devoted to university students is usually organized between August and September every year.
- ***Online training***: The Institutes are active in online training and knowledge sharing. Besides managing online classes within the Institute's program (as the B.E.S.T.T.) Prof. Marescaux, the founder of IRCAD, launched in 2000 the free platform "WebSurg," a website specialized in minimally invasive surgery fully dedicated to the promotion of clinical and surgical training skills. The site is translated into seven languages, and it is accessible from every type of device. Every month, multimedia contents are uploaded on the platform, targeting ten different specialities (from general and digestive surgery to gynecologic surgery) and five technologies. Videos include surgical procedures (interventions), operative techniques using interactive videos, expert opinions from conferences, debates, ... and contributions submitted by the 371.000 community's members. WebSurg represents the largest community of surgeons worldwide.

KT flows at education involve not only lecturers and students, with a mutual relationship (most of the students are expert surgeons and physicians), but also industrial customers and experts.
A variety of different tools is used (Table II). Design elements (such as videos, images, graphs, sketches, …) and digital tools (such as platforms, simulations, image tagging, mobile electronic records) are prevalent.

KT at Innovation

The IHU Strasbourg commits in R&D to develop new therapeutic approaches using tools for image-guided minimally invasive surgery.

IHU Strasbourg's research strategy relies on the inclusion and integration of multidisciplinary stakeholders: clinicians professionals, researchers, industrial engineers, and IT experts take active parts in project teams.
The project portfolio is assessed yearly using a rigorous and transparent methodology by the International Scientific Committee of the Institute. Priority research areas include computer-assisted surgery, flexible endoscopy, hybrid instrumentation, and chemistry applied to medical imaging.

Besides the internal R&D teams, stakeholders include private industrial companies and partners, experts in niche technologies, not part of IHU, policymakers, universities and research centres worldwide. Students from master courses are also involved as innovators, experts, or potential users of surgical technologies.

KT flows concern the processes within multidisciplinary teams, which include physicians and surgeons, vets, IT experts, researchers, engineers and industrial partners, among others. The efforts can be connected to the most traditional definition of KT, trying to translate scientific research into clinical practice and processes. Moreover, IHU's best practices are often translated into validated clinical policies for hospitals and clinical centres all over the country. Again, KT tools and techniques vary (Table II). Digital tools include the use of web portals and the latest technologies, social media channels, mobile medical records, and online apps, simulations, and forums.

KT at Technology Transfer

The IHU Strasbourg works actively to translate its research findings into industrial applications, providing technologies that could improve outcomes. Social sustainability to give patients a better life melts with the financial sustainability of the Institute.

In doing so, IHU Strasbourg actively promotes patenting and intellectual property rights, encourages entrepreneurship and boots industrial partnerships.

The Institute cooperates with two business incubators, SATT Conectus Alsace (supported by the University of Strasbourg) and SEMIA business incubators. Healthcare industrial companies, investors and venture capitalists, and incubators engage with IHU's multidisciplinary project teams in translating the outputs of the scientific research into clinical practice, tools, and thus outcomes for the patients. Among the various KT tools, as described in Table II, problem-based approaches, boot camps, and clinical immersion, stand as relevant creative methods to ensure effective KT.

KT at Patient Care

At IHU Strasbourg, physicians work in digestive and endocrine diseases such as those gastro-oesophageal (e.g. reflux, cancers), morbid obesity (e.g. bypass, sleeve), colorectal (e.g. tumours), hepatobiliary (e.g. calculus, tumours), endocrine (e.g. tumours, thyroid and parathyroid). Patients are treated within the gastroenterology and digestive surgery department of the nearby University Hospital (Nouvel Hôpital Civil of Strasbourg). The two buildings are connected through a bridge. Interventions are carried out by a multidisciplinary clinical-surgical team with a personalized therapeutic approach, providing less invasive procedures and counting on high-quality imaging.

In this scenario, the patients and their families engage directly with healthcare professionals of different specialities. Although there is no direct contact between patients and researchers, experts of IHU follow the clinical cases, get engaged with the physicians in spotting the best and less invasive solutions, and are inspired for new potential innovations. KT flows include the dialogue from the medical doctors to the patients and their families and reverse, within a Narrative Medicine approach. Other flows concern the debate between the physicians and the multidisciplinary research teams, aiming to find the best solutions for the patients, but also the most promising research and innovation avenues that may lead to new projects. KT methodologies, as reported in Table II, encompass tools more related to soft skills, such as the use of ethics, a less technical language, kindness, metaphors, and examples, leading, whenever possible, to co-production processes. Again, digital technologies such as electronic clinical records, image tagging, simulations are employed.

The following Table II summarises the stakeholders involved, the types of KT, as well as the main KT techniques employed for each of the Institutes' aims.

Table II: KT at IHU Strasbourg and IRCAD – An overview

	Education	Innovation	Technology Transfer	Patient Care
Stakeholders	IHU/IRCAD Faculty + external lecturers Students Venture capitalists HC companies Universities	IHU multidisciplinary teams External HC professionals HC companies Policymakers Universities Master students	IHU multidisciplinary teams External HC professionals HC companies Incubators Universities Investors/Venture capitalists	HC professionals Patients Families Researchers
Types of KT (KT flows)	Lecturers to students Students to lecturers Lecturers/Students to industrial customers Industrial customers to lecturers/students Experts to experts/Lecturers/Students Lecturers/Students/Experts to Experts	Multidisciplinary teams Scientific research into clinical practice HC practice into clinical policies HC institutions to the central government	Scientific research into clinical practice	HC professionals to patients and families Patients and families to HC professionals Researchers to HC professionals HC professionals to researchers
Main KT Techniques	The pathogenesis and mechanisms behind diseases Web portals Tours to share experiences with others In person visit and talking Leaflets and brochures Clinical guidelines New Technological tools Multidisciplinary people Prototyping Use of simple language Social and Mass Media channels Recreational activities Think tanks Press releases Ethics Mobility	The pathogenesis and mechanisms behind diseases Web portals Tours to share experiences with others In person visit and talking Clinical guidelines New Technological tools Multidisciplinary people Prototyping Use of simple language Conferences seminars presentations Social and Mass Media channels Think tanks Press releases Ethics Mobility	Web portals In person visit and talking Clinical guidelines New Technological tools Multidisciplinary people Prototyping Use of simple language Conferences seminars presentations Social and Mass Media channels Think tanks Press releases Ethics Mobility Mobile electronic Medical records and online tools Image tagging Committees and meetings	The pathogenesis and mechanisms behind diseases Web portals In person visit and talking Leaflets and brochures Clinical guidelines Engaging with the patient's family Use of simple language Social and Mass Media channels Press releases Ethics Mobile electronic Medical records and online tools Image tagging Use of interpersonal skills Empowerment Simulations Questionnaires

	Mobile electronic Medical records and online tools Image tagging Trainings Use of interpersonal skills Mentoring, leadership, champions Use of evidence-based methods practice-based evidence Simulations Short term successes making the invisible visible Online education Q and A sessions Design Lesson Learned and Best Practices Clinical cases Discussions, debates, curiosity Testimonials Quality assessment by stakeholders Self-assessment Longevity of key actors Communities of practice – CoPs Knowledge synthesis and reviews Routines and procedures Roleplay Dedicated time Metaphors and examples Facilitators	Mobile electronic Medical records and online tools Image tagging Committees and meetings Establishment of mixed teams Trainings Use of interpersonal skills Mentoring, leadership, champions Use of evidence-based methods practice-based evidence Simulations Short term successes making the invisible visible Design Lesson Learned and Best Practices Journal publications Clinical cases Discussions, debates, curiosity Quality assessment by stakeholders Self-assessment Longevity of key actors Communities of practice – CoPs Knowledge synthesis and reviews Routines and procedures Dedicated time Metaphors and examples Facilitators Brainstorming Ideation Needs finding/screening Strategic Focus Need Statement deployment Concept generation Strategy development	Establishment of mixed teams Use of interpersonal skills Use of evidence-based methods practice-based evidence Simulations Q and A sessions Design Journal publications Clinical cases Discussions, debates, curiosity Quality assessment by stakeholders Self-assessment Longevity of key actors Communities of practice – CoPs Routines and procedures Dedicated time Metaphors and examples Problem-based approaches Bootcamps Clinical immersion	Data collection Kindness, empathy Q and A sessions Design Co-production Clinical cases Discussions, debates, curiosity Quality assessment by stakeholders Self-assessment Routines and procedures Role play Dedicated time Metaphors and examples Sketch, drawing

Discussions and conclusions

More than ever before the topic of KT is relevant, as it helps to foster and to enhance innovation. KT techniques can facilitate the way the actors involved can transfer, share, and create new knowledge, despite their various backgrounds, skills, and expertise. The healthcare and medicine sector need to face the introduction of new technologies, and an increasing variety of stakeholders, who need to engage in innovating and co-producing healthcare services and products. A new open system requires healthcare professionals, researchers, innovators, industrial partners, patients, and policymakers to work together to reach the outcome, the wellbeing of the whole society.

We decided to investigate such KT dynamics, in terms of stakeholders involved, KT flows, and KT methodologies in a unique healthcare environment, analyzing the case of IHU Strasbourg and IRCAD.

In replying to our RQ: *"What are the knowledge translation dynamics and technologies adopted within a highly skilled educational research, and clinical centre?"* our findings suggest the presence of a variety of actors, with different features in terms of backgrounds, education, aims, age, passions, and routines. The open ecosystem now includes thus healthcare professionals; researchers coming from engineering, information technologies and computing, life sciences, and management; the patients and their families; investors; incubators; industry partners; governmental policymakers; universities, and students. KT flows are thus not limited to the need to translate the scientific medical research into clinical practice and tools but involve almost all actors. A long list of methodologies emerges. Such techniques vary from the more technological ones (such as online medical records, platforms, social medias, image tagging, simulations and prototyping, …) to others which aim to foster creativity and engagement (like bootcamps, clinical immersion, brainstorming, debates, ideation, strategic focus, strategy development). Hard-skill-based tools, like the use of best practices and clinical cases and guidelines, are used together with soft-skill-base methods, like ethics, kindness, empathy, and the use of interpersonal attitudes. New methodologies are always added to the ones that are in place, with a learning-by-doing approach. A galaxy (Edvinsson, 2000) of different methods emerge, and a blend of different approaches is required to facilitate adequate KT flows.

Being our case of polar nature, results may be transferred to other institutes or different business environments (Shah and Corley, 2006).

Our initial study opens up to further research avenues. Specific KT flows would deserve an in-depth analysis, especially those less present in the healthcare literature, like the ones in executive and higher education, or those involving policymakers and industrial partners. Moreover, unique tools like boot camps, strategy focus, concept generation, and their role in the evolving digital scenario may deserve attention. Matching with other clinical centres could also represent a valid new research implication.

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Problems of Investing in The Entrepreneurship in Vietnam

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Abstract

Entrepreneurship is one of the main factors of production and it plays a key role in determining the level of production and employment. When the more the entrepreneurship culture is common in the society, the less unemployment occurs. Nowadays, together with globalization process, entrepreneurship has become a fundamental determinant of economic growth and development.
Currently, according to many organizations, Vietnam is an emerging economy with a golden population structure and a low unemployment rate. The entrepreneurship has been seen as driving power on develop of state. Incentive policies of the state in investment in entrepreneurship help investors take risks making it easier. Provided supports, exemptions, exceptions, and reductions tax to the entrepreneurs by the state make entrepreneurship sustainable. In this paper, the importance of investment in the entrepreneurship in Vietnam will be emphasized. Status of investments in the entrepreneurship in Vietnam be described and solutions will be discussed to resolve this issue.

Keyword: Entrepreneurship; Venture Capital; Investments; Startup; Innovation.

Introduction

Entrepreneurship plays a vital role in a country's growth and overall economic development by creating new jobs, supporting emerge of new products and sectors, introducing innovation, spurring competition and productivity, and promoting knowledge dissemination (Audretsch, 2007).

Many studies have shown that along with macroeconomic factors and business regulation (Djankov et al., 2002; Klapper, Laeven, Rajan, 2006), investment is one of the crucial determinants to evolve the entrepreneurship (Evans, Jovanovic, 1989; King, Levine, Finance, 1993).

Therefore, we should understand the reality of investment in the entrepreneurship from that determining the necessary policies to increase the level of economic growth and development of the country.

The Vietnamese Government sees the technology sector as the linchpin of the country's economic growth. Vietnam has invested heavily in many high-tech parks. The Government has also passed economic policies encouraging both domestic and international entrepreneurs to start businesses.

Vietnamese cities are becoming fast-paced innovation hubs especially Hanoi, Ho Chi Minh City and Da Nang. They have created acceleration programs, incubators, and co-working spaces. With a young population, Vietnamese citizens are tech-savvy and digital activism. High rates of internet connectivity

and mobile penetration are driving e-commerce and enthusiasm for digital startups. Today, Vietnam's innovative ecosystem provides special opportunities for technology investors.

Entrepreneurship and financing entrepreneurship

Entrepreneurship has been defined by many researchers, but there is no unified definition for the entrepreneurship in literature. Schumpeter (1934) defined entrepreneurs as innovators that create entrepreneurial change in markets, in which entrepreneurial change has 5 manifestations: the introduction of a new (or improved) product; introduce a new method of production; opening a new market; exploitation of a new supply; restructuring/organizing business management processes. This definition equates entrepreneurship with innovation in the business sense; which is identifying market opportunities and using innovative approaches to exploit them. For Schumpeter, the entrepreneurial process is a major reason in economic development and the entrepreneur is the key to economic growth. This definition equates entrepreneurship with innovation in a business sense; which is identifying market opportunities and using innovative approaches to exploit them. For Schumpeter, the entrepreneurial process is a major reason for economic development and entrepreneurship are key to economic growth.

But Drucker has argued that entrepreneurship merely creates a new organization and that any person who starts a new business venture is an entrepreneur; even those that main target is not to make a profit (Drucker, 1985).

And Ireland (2003) said that entrepreneurship is a process of identifying potential business opportunities and exploiting them through combine existing resources or create new ones to develop and commercialize new products and services.

According to the Commission of the European Communities (2006), entrepreneurship is the individual's ability can turn ideas into action. It includes creativity, innovation, and risk-taking, as well as the ability to plan and manage projects to achieve objectives. This supports people in their lives. It makes employees more aware of the context of their work, to seize opportunities, and provides a foundation.

Also, according to research Kuratko, entrepreneurship is dynamic process of vision, change, and creation through application of energy and passion toward the design and implementation of innovative ideas and solutions for entrepreneurs establishing a social or commercial activity (Kuratko, 2016).

Drawing on the above analysis and arguments, the following definitions are therefore proposed:

Entrepreneurs are people who seek to generate new value. They are creation or expansion of economic activity, by identifying and exploiting new products, processes or markets. Entrepreneurship is a phenomenon associated with entrepreneurial activity. And entrepreneurial activity is the enterprising action in pursuit of generating value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets.

According to the Global Entrepreneurship Monitor 2008, there is a high agreement of important entrepreneurship to economic development. Entrepreneurs promote the creative process: they strengthen changes in the structure of the economy and companies in the old industry have to reform to create an indirect contribution to productivity.

There are 5 main factors affecting entrepreneurship: infrastructure; research institutions and human capital; entrepreneurial finance; culture and amenities, and policies and governmental environment (Delgado, Porter, Stern, 2014).
A startup often has difficulty in financing. These companies are generally riskier and failure rates are high. Therefore, the access to debt financing through bank loans is a challenge for a startup.

Equity capital provided by outside professional investors like venture capital (VC) is considered the most popular solution (Mina, Lahr, Hughes, 2013). VC investor is those who have superior screening capability startups. They have required several contractual clauses to protect their investment (e.g., veto power, super majority voting, etc.). And work along the founders to increase the value of the venture, by providing managerial competencies, networking, marketing advice. Most of the empirical shows a positive impact of VC on startups companies' performance (Kortum, Lerner, 2000; Puri, Zarutskie, 2012). On the other hand, it is often linked to technological innovations by firms (Chemmanur, Krishnan, Nandy, 2011). Many academics and business leaders believe that the prosperity of places like Silicon Valley owes much to the considerable amount of VC and entrepreneurship in those places.

When assessing lending applications and evaluate investment opportunities in startup companies, the problem banks and investors face is information asymmetry. Because differences in investment type so the risks of banks and venture capitalists are not the same.

The benefit the bank receiving is contractually determined interests and the paid back principal. But losses will happen if the startup companies fail. Because banks are unable to monitor entrepreneur activity after the loan concession. So, they must consider two important issues before lending: exist a collateral and the ability for the company to generate cash flows to pay back the principal and the interests.

Unlike banks, venture capital is equity capital. On the one hand, if startups fail, they will lose all and face the debt. But on the other hand, if the startups succeed, they enjoy all the upsides. So, they would appreciate high risk high return projects. And the bank could be more prone to finance startups with a steady and foreseeable growth path.

The success of startups often depends on whether they can find external investors who are willing to fund their projects. Startups' strategy often relies on taking advantage of early mover advantages. If, delayed execution may not succeed. Therefore, the initial capital is especially important. Banks rarely to lend to startups. And always require collateral, business plans, little repayment history, and negative cash flows. This is a huge challenge for startups.

The financial issues are an important driver, but investors in their investment criteria put great emphasis on the capability of the management team, product characteristics, market characteristics and potential returns.

Investment in the entrepreneurship in Vietnam

The government policy of the entrepreneurship support

Entrepreneurship and innovation have been key to implementing growth strategies. The Vietnamese government has tried to provide a better environment for the entrepreneurship and innovation by lowering barriers, strengthening public services and encouraging students, scientists, and engineers join to startup.

In May 2016, the Vietnamese Government issued Project 844 to build a platform to support the national startup ecosystem through to 2025. Project 844 was established in order to create a national startup portal to link policy making agencies, ministries, localities, startup incubators, investors and startups. It provides full details of the results of scientific and technological research, technologies transferred to Vietnam, and tens of thousands of domestic and foreign inventions. In addition, it includes state policies and procedures to establish startup and a list of experts and consultants. The portal is especially useful in helping to promote connectivity within the national innovative startup ecosystem.

Currently, state policies have begun to encourage investment in startups. The Ministry of Justice of Vietnam has issued Official Letter 1154 / BTP-QLXLVPHC & TDTHPL on the plan to monitor the implementation of laws in key and interdisciplinary fields in 2017 and the database of legal documents

with content related to startup. The list of documents is divided into two subjects: Group of general adjustment documents and Group of documents with specific characteristics. In total, there are 100 legal documents related to investment activities and the establishment of innovative start-up businesses.

In Article 17 of Law on support of small and medium enterprise also contains provisions on support for entrepreneurs: will be supported in technology, training and information; support the commercialization of results of scientific research and technological development, exploitation and development of intellectual property; interest subsidies for loans granted to small and medium sized enterprises innovative startups.

A special tax scheme was also approved to provide the following incentives for eligible startups: Startup in the high tech sector and/or in high tech zones are eligible for preferential tax rates of 10% and 17% for 15 years and 10 years, respectively, as opposed to the regular rate of 20%; A two year to four year tax exemption and a four year to nineyear, 50 percent reduction for those operating in certain areas. These tax incentives are attractive to investors.

In June 2017, the Law on Technology Transfer was revised to promote technological advances and the commercialization of technologies. The new Decree No. 38/2018 / ND-CP has added regulations on investment funds for innovation activities. Since then, increasing capital for innovative startups with new investment channels and more diversified investment forms.

In general, Government policy is quickly changing in favor of investment. The current legal policies of the Vietnamese government are quite comprehensive and cover all aspects of the startup sector. They are in Investment Law, Enterprise Law, and Securities Law. However, they are still inconsistent, non-specific, and contradictory. The procedures are ambiguous leading to difficulties for investors in the implementation process.

Policies related to start-ups in Vietnam are still at a very new level, to complete the legal framework as well as supporting policies, it needs more time. So, necessary to have more specific laws on investment and protection of investor interests in the field of entrepreneurship to create dynamism, the new force for the development of quantity and quality of entrepreneurs.

Situation of investment in entrepreneurship in Vietnam

In recent years, the startup movement in Vietnam has increased rapidly. Therefore, the year 2016 was chosen by the Government as "the year of national business start-up" and the Government continued to implement the Ecosystem Business Support Project for National Innovation and Innovation until 2025. Although experiencing the challenges and results recognized by the international. According to the 2019 Global Innovation Index, Vietnam has made significant progress, from 59th out of 128 (in 2017) to 42th out of the total 129 countries (in 2019). This is the highest ranking that Vietnam has organized and ranked first on the innovation index among low-income countries. This is the first time Vietnam has ranked so high in a global ranking.

The Vietnamese government has identified four key priority industries by 2050, including: Emerging technologies (AI, robotics and smart system); education and training; high-tech agriculture and food processing; green energy, environment, health & tourism.

Global Entrepreneur Monitor's assessment of Vietnam's startup ecosystem over the years shows that, among the 12 indicators, the entrepreneurial finance index is a relatively low score. In 2017, this index of Vietnam reached 2.27/5 (ranked 39/54) the fourth lowest index. However, this index has improved much compared to 2015. In 2015, the entrepreneurial finance index of Vietnam reached 2.12/5 (ranked 50/62), is the second lowest index.

Currently, there are 3 types of financial support for startups in Vietnam: The State support fund, venture capital fund, and bank credit fund. In total there are about 70 investment funds including state, private and foreign. Typical foreign funds are IDG Ventures Vietnam, Cyber Agent, Mekong Capital, DFJ

(VinaCapital), ESP Capital, and Innovatube. Domestic venture capital funds have been established and participated in the venture capital market such as SeedCom, FPT Ventures, CMC Innovation Fund, VPBank Startup, VIISA, ESP, VSV, 500 Startups Vietnam. Of the three types of support, government funding follows policies to promote entrepreneurship. However, the state's assistance funds operate with the principle of "preserving capital" and complicated mechanisms and procedures, thus, it is difficult to effectively influence the entrepreneurship movement of Vietnam. So, support from the state will be to gradually reduce, increase venture capital funds and capital from banks. The government needs to create a financial mechanism to create funds in line with market rules and not necessarily increase the financial resources from the budget to support entrepreneurship.

The events connecting the startup ecosystem such as the National Innovation Day (Techfest Vietnam) and regional, local linking events are organized aims to create a playground for startups to call for international investment, help Vietnam introduce and promote an innovative startup ecosystem, as well as attract high-quality experts to return to promote connectivity internal and international resources of the ecosystem startup.

The National Innovation Startup Portal is in beta. It is a favorable online environment that provides information to investors about potential startups in particular and the Vietnamese startup ecosystem.

Vietnam has the third highest rate for startups in Southeast Asia, trailing behind only Indonesia and Singapore. The amount of invested capital and the number of startup deals done have grown six fold from H1 2017 to H1 2019.

In 2016, the major financial sources of domestic investors came from three major venture capital firms: IDG Ventures Vietnam, Cyber Agent, and DFJ VinaCapital. Altogether, they invested over 100 million USD in funding and consulting for several brands. Vietnam startups raised a total of 246 million USD in H1 2019, of which, 3 largest investments (Tiki, VNPay, VNG) captured 63% of the funding.

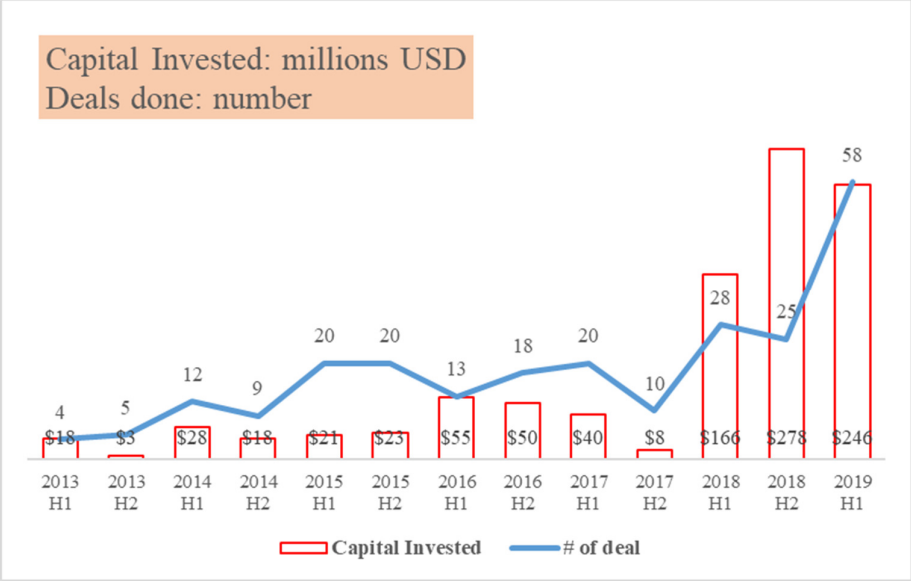

Fig. 1: Investment capital in Vietnam in 2013-2019

Source – Cento Ventures and ESP Capital Research 2019

Currently, the economy of Korea and Southeast Asia is growing at an average of 3%, Japan does not even grow. Japanese and Korean funds do not have too many opportunities to invest in big markets like Indonesia or Malaysia because of the number of investors is too much, the company value is too high. Vietnam's market is currently attractive because of good growth, more than 6%, and a moderate start-up project valuation. So together with the same amount of money, they have a great advantage

when investing in Vietnam. Therefore, in 2017-2018, most deals were from Singapore and Japan investors. In 2019, Korean investors have participated in almost 30% of the deals. The Vietnamese investors were active in 36% of the deals.

Vietnam has experienced a surge in both the amount of capital invested and the number of deals done since the beginning of 2018, with 2018 totaling 444 million USD and in 2019 is expected to reach 800 million USD. Startups operating in Fintech, E-commerce, TravelTech, Logistics and Edtech are attracting many venture capitalists. Despite the rapid growth, the total investment in Vietnamese startups is still much lower than that of other countries in the region.

State funding will only be provided to support startups in their initial stages. Subsequently, support from private investors and organizations will play a vital role in ensuring the efficiency and sustainability of the startup ecosystem in Vietnam. Despite the positive development, however, it is hard to convince local investors to take risks and invest in early stage startups. Early stage startups may rely heavily on funding from angel investors, but to date, this type of investor is new to the scene and has not had much impact.

The protection of intellectual property rights is particularly important for startups. There are currently too few startups focusing on intellectual property registration as well as brand management. Because in Vietnam, the registration procedures for intellectual property protection are time consuming, without high efficiency (poor protection). That leads to, startups having trouble facing disputes and litigation; effort to create technological barriers to compete. And reduce attractiveness to investors.

On the other hand, venture capitalists are always looking for attractive start-up projects to invest in. They are not only concerned with the creativity of the idea but also other issues such as the feasibility and profitability of the project. Therefore, to persuade the venture capital firm to make a decision to invest in its business quickly, the startup needs to prepare a business plan, financial plans, cash flow forecasts detailed, clear and convincing. However, Vietnamese startups lack the ability to plan and the quality of startup projects is not high, so it is difficult to attract capital from venture capitalists.

In short, the investment capital market for entrepreneurship in Vietnam is diverse and relatively active from both domestic and foreign capital. However, the scale of capital, as well as the cooperation in entrepreneurship investment in Vietnam, are still small, not commensurate with the potential and needs of the entrepreneurship ecosystem in Vietnam.

Discussion and conclusions

Central Government policies and programs are designed to help connect individuals and organizations in investment. Overseas capital and enterprise are welcome. Foreign venture capital funds and international technology organizations are growing their own footprint in Vietnam's innovation economy. However, Vietnam needs to make further changes to encourage investment in the entrepreneurship.

The first, most startups in Vietnam are in the initial stages of the startup process. They need capital. At this stage, besides equity, capital from family and friends; Capital from angel investors, venture capital is the highest rate and most important. Because they themselves cannot mobilize capital by bank credit. Many individuals and organizations want to invest in potential startups but there are no regulations on venture capital. Fund formation and operation are extremely difficult. Therefore, Vietnam lacks the Law on Venture Capital. The introduction of the Law on Venture Capital will make the startup capital market in Vietnam more developed. Bankruptcy law needs to be more complete to create psychological peace of mind for individuals to accept risks, fail at startups, created conditions for startups to return to operation after failure. Examples of regulations on asset liquidation or business restoration. This should probably refer to the US bankruptcy law model.
The second, Vietnam also needs to enhance its legal framework around protecting Intellectual Property. Vietnam is a member of the World Trade Organization and World Intellectual Property Organization, and the country's Intellectual Property legislation covers most aspects of IP protection required by the

Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS Agreement). However, Vietnam needs to strictly enforce the provisions of these agreements. Government should to reforms to make the registration process of intellectual property rights clear, specific and fast. And raise awareness of the importance of IP issues to Vietnamese startups.

The third, the provisions of the law also need to be clearer to simplify investment procedures. Supplements content of protection and encouragement of foreign investors. Improve the investment environment. Because the current FDI of Vietnam FDI capital is not commensurate with its potential. Investment value is not high, mainly focusing on processing industry. High-tech industries and innovation have not yet attracted foreign investors. Some countries have developed stock exchanges for startups, helping startups access to lower standards capital, more flexible market, which is beneficial for both startups and investors. For example, Korea's KONEX trading platform for startups has been successful after more than 2 years of operation.

The fourth, venture capitalists often look for startups with promising projects. Startups in Vietnam are many but not really attractive and attract investors. Most important is to support the development of the quantity and quality of startup through universities. It is the place to create many scientific research results. The main forms are nurseries and technology transfer training centers. Business incubators and advisory services are one of the most ubiquitous and persistent forms of university support. They may stimulate the entrepreneurship, attract venture capital, and promote innovation to the extent that coaching and support services fill a needed service. On the other hand, these programs may be more likely to be put into economically depressed areas and attract entrepreneurs that are in greater need of support. Incubators help to encourage entrepreneurial births, mitigate deaths, and facilitate venture capital investing, and patenting activity. When educational levels are deficient, entrepreneurs will not have the necessary skills and access to information that will help them to start new firms. University R&D may give rise to spillover benefits associated with high quality new firm creation, thereby in a pronounced way attracting venture capital and stimulating patents.

Startups have a strong relationship between regional and local economic development. In addition to making a positive contribution to GDP, startups create jobs for society and establish increased business opportunities. In emerging economies like Vietnam, small and medium sized startups are the main and essential type of business for the development of the economy. Despite the potential for great growth, Vietnam's entrepreneurship has not yet grown. Because Vietnam has not yet formed a comprehensive and effective start-up ecosystem, including founders, networks of investors, consultants, service providers, and capital mobilization channels... The financial support for startups is mainly implemented through separate programs with goals and criteria vastly different, lack of cohesion, sharing and support among participants of ecosystems. On the other hand, the quality of startup projects is not really attractive. Entrepreneurs lack the management, finance and marketing capabilities to grow their businesses and attract investors. As a result, it is difficult for a startup to access venture capital. The paper discusses and provides some key recommendations for reforming the investment environment through the government's legal system. And improve the quality of startups through education and support from the university. With population, increasing prosperity, and a rapidly rising number of people using mobile phones and the Internet. Vietnam has attracted considerable attention among local and foreign venture capitalists as a new-frontier market. Positive changes in the future will help Vietnam become an attractive investment market for venture capitalists in Asia.

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Analysis of The Level of Expenditure on Food and Superior Goods in The European Union Countries

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Abstract

The aim of this paper is to analyse the level of household expenditure on food and superior goods in the European Union countries. The research is based on expenditure data on these goods in the period of 1996 - 2017 in 27 European Union countries (excluding Croatia). When the society becomes wealthier, the overall consumption increases and the spending structure of households changes. Therefore, the analysis covers the changes in the level of expenditure and their equalization. Higher goods include expenditure on restaurants and hotels as well as expenditure on recreation and culture. In order to assess the consumption possibilities of households, the Working demand model was estimated for each country for both groups of goods and boundary values for the level of expenditure on food and superior goods were determined. In addition, income elasticity of demand for both types of goods was calculated in order to identify their nature. Then, the paper proceeds with the analysis of convergence process of EU households spending using the dynamic β-convergence model based on panel data with constant effects. The study only considered the absolute convergence approach.

Keywords: Convergence, Elasticity, Food Expenditure, Superior Goods Expenditure.

Introduction

Expenditures on food and superior goods are the elements of the households expenditure plan that indicate the level of their wealth. The level of expenditure is certainly dependent on household income. Richer households spend more regardless the category of consumed goods (Jankiewicz, 2018b). Both expenditure on food and superior goods increase in line with an increase in disposable and the possibilities to generate surpluses and savings (Trębska, 2018; Verba & Kudinova, 2019; Kusairi et al., 2019). However, according to Engel's law, the share of food expenditure under these conditions is reduced (Engel, 1985; Jankiewicz, 2018a; Jankiewicz, Pietrzak, 2019). This means that expenditure on superior goods increase with a higher pace than food expenditure.

The level of household consumption expenditure depends on the socio-economic situation of the country (Balcerzak, 2016; Hadaś-Dyduch et al., 2016; Šoltés & Nováková, 2016, Szopik-Depczyńska et al., 2017; Miłek, 2018; Nowak, 2018; Pietrzak, Jankiewicz, 2019), the enrichment of society and building structures for long term sustainable growth (Bilan, 2013; Fogarassy et al., 2018), where the process of income distribution supporting the social stability is considered as one of basic factors (Tvaronavičienė & Gatautis, 2017; Malkina, 2019; Landmesser, 2019). Therefore, in the case of effective long term policies, increasing consumption, as a driver of the national economy, leads to the socio-economic development of the country (Balcerzak, Pietrzak, 2017b; Simionescu et al., 2017, 2018; Szopik-Depczyńska et al., 2018a, 2018b; Pietrzak, 2019; Kuc-Czarnecka et al., 2020). The increase in consumption is also associated with an improvement in the macroeconomic situation of countries, level of trade (see Pietrzak, Łapińska, 2015; Łapinska, 2016;), entrepreneurship and innovation (see Pietrzak et al., 2017; Bieszk-Stolorz, Dmytrów, 2019; Jakimowicz, Rzeczkowski, 2019; Kijek, Matras-Bolibok, 2019), institutional changes (Balcerzak, Pietrzak, 2016; Hadaś-Dyduch et al., 2019; Balcerzak, 2020; Balcerzak et al., 2019). In addition, digitization processes, globalization also affect the increase in consumption (Balcerzak & Pietrzak, 2017a; Bilan et al., 2019; Pietrzak & Ziemkiewicz, 2018a, 2018b, 2019; Victor et al., 2019, Sánchez-López et al., 2019). The level of international cooperation of countries, including growth and problem of interdependencies between capital markets, is also a very important factor (see Meluzín et al., 2017, 2018a, 2018b, 2018c;

Skalickáet al., 2019a, 2019b). The ongoing process of increasing socio-cultural similarities (Horáková, 2015) and economic convergence of states means that the level and their consumption structure should also be harmonised.

The aim of this paper is to analyse the level of expenditure on food and superior goods in European Union countries (excluding Croatia) in the years 1995-2017. Therefore, there is a limit set for each country on the level of expenditure in the analysed groups of goods. The average income elasticity was determined over the entire period in the examined group of countries. In addition, the process of harmonizing the consumption level of food and superior goods in selected territorial units was analysed.

Data

The analysis was based on data from the database of the European Statistical Office (Eurostat). The level of expenditure on food was directly taken from the database, while the level of expenditure on superior goods was determined by adding up expenditure on restaurants and hotels as well as recreation and culture. Figure 1 shows the average level of expenditure on food goods throughout the entire researched period.

The highest average level of expenditure on food goods in the period of 1996-2017 was recorded by households of Luxembourg. The Nordic countries (Denmark, Sweden and Finland), as well as the other Benelux countries (Belgium and the Netherlands) and neighboring France were high in the spending ranking for this type of goods. Bulgaria, Romania, the Visegrad Group countries (Hungary, the Czech Republic, Poland and Slovakia) and the Baltic States (Lithuania, Latvia and Estonia) spent the least on food from the European Union countries. The difference between average food expenditure for EU households was EUR 4,163.99. The Pearson's linear correlation coefficient between the level of expenditure on food goods and the rate of their growth is negative and amounts to -0.7615 (with a p-value close to 0). This allows to set the hypothesis on the level of expenditure on these goods between EU countries. Figure 2 shows the spatial differentiation of average expenditure on food goods in the European Union in 1996 and 2017. It is worth noting that in both extreme years of the study there is a distinction between expenditure in the eastern and western parts of the analysed area. Households from its eastern part spend less on food than northwestern countries.

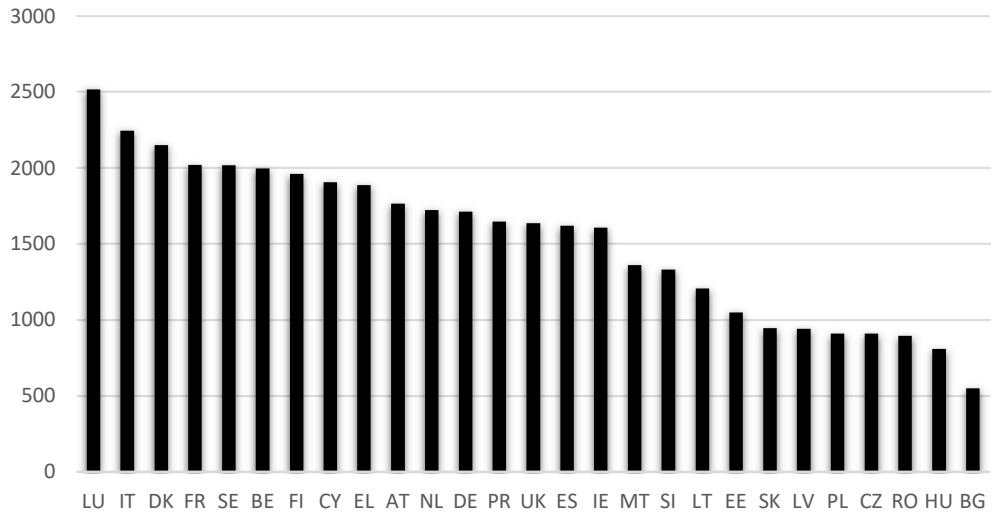

Fig. 1: Average household expenditure on food in 1996-2017

Source: own elaboration

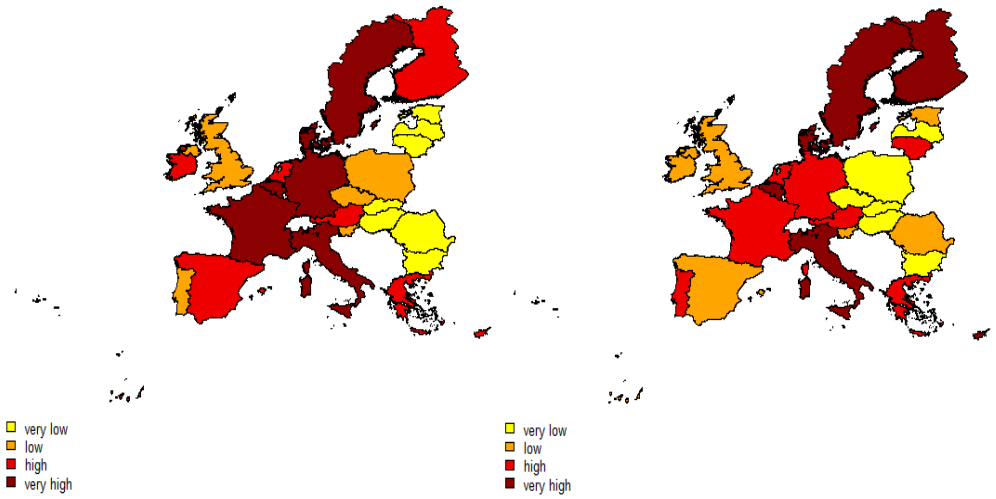

Fig. 2: Spatial differentiation of household expenditure on food in 1996 (map on the left) and 2017 (map on the right)

Source: own elaboration.

Figure 3 shows the development of average expenditure on superior goods in the European Union countries. The highest level was recorded in British households. Austria and Ireland are ranked higher than in the case of expenditure on food expenses. Belgium, France or Finland were placed further away from the country with the highest level of expenditure on superior goods.. The lowest level of expenditure on superior goods, similarly to previous group – expenditure on food goods, was recorded in the Visegrad Group countries as well as Bulgaria and Romania. The difference between the country with the highest and the lowest level of expenditure on superior goods is EUR 11876.96, which is a much larger difference than in the case of food expenditure. The Pearson's linear correlation coefficient between expenditure on superior goods and their growth rate is -0.7038 (with a p-value close to 0), which may indicate a convergence process for this type of goods. Figure 4 shows the spatial differentiation of the expenditure level on superior goods in the European Union countries in 1996 and 2017. An analogous trend in space that has occurred for food expenditure can be observed. Households in the western part of the EU spend more on restaurants and hotels as well as recreation and culture than those in the eastern part in both extreme years of the study.

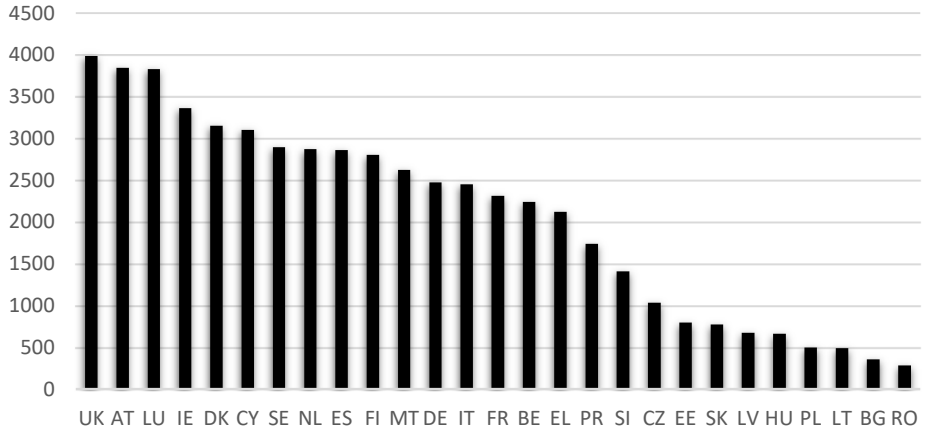

Fig. 3: Average expenditure of households on superior goods in the years 1996-2017

Source: own elaboration

The most important determinant of the level of household expenses is the level of disposable income per capita. It is the only determinant of expenditure that can be found in the most commonly used microeconomic models to study demand - the Törnquist model and the Working model. The very strong relationship between the two processes is confirmed by statistically significant values of the Pearson linear correlation coefficient, which are: 0.8830 for food expenditure and 0.8966 for expenditure on superior goods.

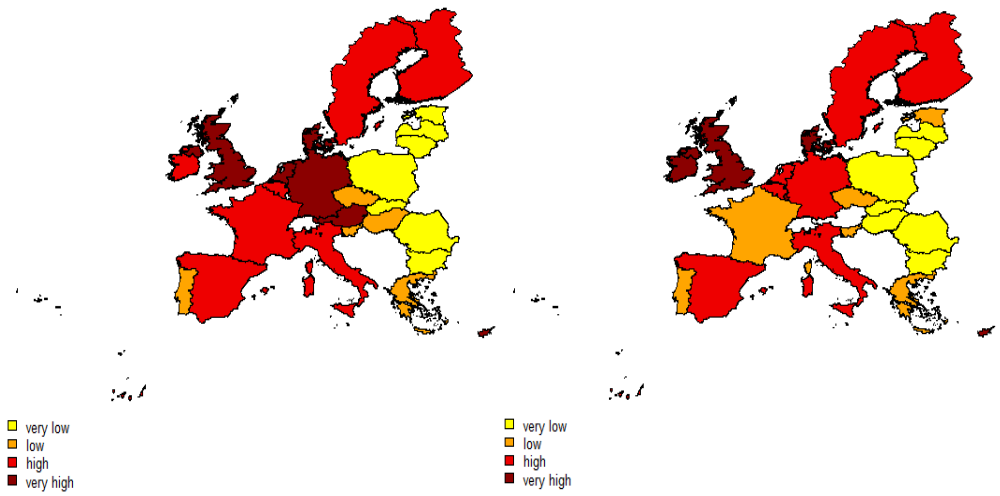

Fig. 4: Spatial differentiation of household expenditure on superior goods in 1996 (map on the left) and 2017 (map on the right)
Source: own elaboration

Methodology

In the first part of the study, the level of expenditure on food and superior goods is to be analysed. To determine the level of expenditure for individual types of goods, the form of the Working function was used, given by the formula:

$$Y = e^{\alpha_1 + \beta_1 \frac{1}{X}}, \tag{1}$$

where: Y - the level of household expenditure on the selected type of goods, X - gross disposable income of households per capita.

The function form (1), in order to estimate the model by the method of least squares, has been reduced to a linear form given by the formula:

$$lnY = \alpha_1 + \beta_1 \frac{1}{X}. \tag{2}$$

The horizontal asymptote of the function, which is also the level of expenditure saturation, was determined from the formula:

$$\alpha_0 = \lim_{X \to +\infty} e^{\alpha_1 + \beta_1 \frac{1}{X}} = e^{\alpha_1}. \tag{3}$$

Income elasticity of demand for food goods and superior goods for the Working function was determined in accordance with the formula:

$$E(X) = \frac{\partial Y}{\partial X} \cdot \frac{X}{Y} = \frac{-\beta_1}{X}. \tag{4}$$

In the next step of investigation, the panel data model is used for convergence process analysis (absolute) (Kuc, 2017a, 2017b). The panel data model for absolute convergence is estimated in the following forms (see:):

$$y_{i,t} = \gamma + \delta y_{i,t-1} + \eta_i + u_{i,t}, \quad (6)$$

where: $y_{i,t}$ – dependent variable Y, η_i – individual effect for i[th] spatial unit, $u_{i,t}$ – error component model. The model (6) – *fixed effects* model is estimated using least squares dummy variables (LSDV) method.

The δ parameter serves to calculate the $t_{\text{half-life}}$ value, which presents the time needed to reduce the difference by half. It is expressed as follows (see:):

$$t_{half-life} = \frac{\ln(2)}{b}, \quad (10)$$

where: : $b = -\ln(\delta)$ expresses the convergence rate.

Empirical Results

Empirical analysis starts with the modeling of expenditure on selected types of goods in 27 European Union countries. Therefore, the model was used in order to show the relationship between the level of household expenses and their disposable income, proposed by Working. Table 1 shows the results of estimation and verification of models for the level of food expenditure. Luxembourg has the highest saturation level of food expenditure, EUR 5169.18, then Greece (EUR 5076.92), which does not have the highest average level of expenditure for this group of goods during the considered period (see Figure 1). This means that with a further increase in disposable income of households in Greece, food expenditure will increase at a higher pace than in countries with a higher level of disposable income. Denmark and Sweden may be placed much lower in the future (ahead of Finland and Belgium and others) if the current trends are maintained. In all models included in Table 1, the coefficients indicating the impact of disposable income on the level of expenditure on food are negative and statistically significant. In addition, it should be noted that Working's models are well suited to empirical data and parameter signs consistent with the economic theory.

Table 1: Results of estimation and verification of the Working model for household expenditure on food

Country	α_1	p-value	β_1	p-value	R^2	α_0
Luxembourg	8,550	0,000	-20615,401	0,000	0,966	5169,18
Greece	8,532	0,000	-11329,148	0,000	0,822	5076,92
Italy	8,491	0,000	-13221,710	0,000	0,990	4870,08
Belgium	8,481	0,000	-15984,146	0,000	0,910	4824,29
France	8,421	0,000	-14455,897	0,000	0,962	4539,45
Finland	8,388	0,000	-14132,155	0,000	0,948	4394,08
Denmark	8,356	0,000	-12744,160	0,000	0,950	4256,78
Sweden	8,356	0,000	-13070,791	0,000	0,974	4255,93
Portugal	8,323	0,000	-9487,044	0,000	0,911	4118,90
Netherlands	8,309	0,000	-14910,780	0,000	0,923	4058,34
Austria	8,293	0,000	-16315,824	0,000	0,950	3994,91
Germany	8,185	0,000	-14504,034	0,000	0,926	3587,76
Cyprus	8,134	0,000	-7386,552	0,000	0,766	3407,66
United Kingdom	8,100	0,000	-14691,100	0,000	0,940	3296,08
Slovenia	7,899	0,000	-6472,082	0,000	0,939	2693,58

Malta	7,793	0,000	-3548,365	0,000	0,879	2423,42
Ireland	7,767	0,000	-6438,024	0,000	0,923	2361,98
Spain	7,765	0,000	-4616,327	0,000	0,817	2356,74
Estonia	7,640	0,000	-3168,204	0,000	0,926	2080,65
Lithuania	7,622	0,000	-2198,320	0,000	0,861	2042,59
Romania	7,547	0,000	-1790,565	0,000	0,965	1895,33
Czechia	7,533	0,000	-4197,681	0,000	0,937	1869,62
Slovakia	7,501	0,000	-3043,236	0,000	0,935	1809,91
Poland	7,479	0,000	-3020,737	0,000	0,951	1770,20
Latvia	7,369	0,000	-2011,347	0,000	0,884	1586,73
Hungary	7,355	0,000	-3063,636	0,000	0,954	1564,70
Bulgaria	6,914	0,000	-1219,916	0,000	0,946	1006,19

Source: own calculations

Table 2 presents the results of estimation and verification of Working models for household expenditure on superior goods. The statistical properties of the models for all 27 countries are analogous to those estimated for food goods. Parameters indicating the impact of disposable income are statistically significant and, according to theory, have a negative sign. In addition, the fitting of models to empirical data is as high as in the case of the models in Table 1. Austria (EUR 12527.19) has the highest level of saturation of superior goods expenditure, which in comparison with the place in Figure 3, was ahead of Great Britain (10438.72). This may indicate a higher growth rate of both disposable income and expenditure on this type of household goods in Austria than in Great Britain in the near future. Luxembourg recorded a significant decrease compared to its place presented in Figure 3. At the bottom of the table, no other countries appeared than those which so far had the lowest level of superior goods expenditure.

Table 2: Results of estimation and verification of the Working model for household expenditure on superior goods

Country	α_1	p-value	β_1	p-value	R^2	α_0
Austria	9,436	0,000	-23696,952	0,000	0,965	12527,19
United Kingdom	9,253	0,000	-20260,155	0,000	0,958	10438,72
Italy	9,103	0,000	-22285,143	0,000	0,956	8981,87
Denmark	9,021	0,000	-18112,267	0,000	0,958	8277,73
Malta	8,979	0,000	-6882,511	0,000	0,952	7936,26
Sweden	8,872	0,000	-15817,161	0,000	0,989	7130,32
Ireland	8,851	0,000	-12336,299	0,000	0,976	6978,85
Finland	8,842	0,000	-15826,545	0,000	0,978	6916,73
Luxembourg	8,801	0,000	-15730,691	0,000	0,978	6639,53
Netherlands	8,795	0,000	-14467,897	0,000	0,973	6598,32
Belgium	8,767	0,000	-19059,422	0,000	0,978	6415,87
Germany	8,751	0,000	-18397,031	0,000	0,902	6315,40
France	8,644	0,000	-16026,575	0,000	0,969	5678,69
Cyprus	8,563	0,000	-6630,225	0,000	0,818	5233,24

Greece	8,545	0,000	-10126,414	0,000	0,780	5139,76
Spain	8,456	0,000	-6158,068	0,000	0,829	4703,41
Portugal	8,382	0,000	-9534,849	0,000	0,940	4368,82
Slovenia	8,120	0,000	-7997,342	0,000	0,978	3360,04
Czechia	7,756	0,000	-4748,485	0,000	0,985	2334,63
Slovakia	7,552	0,000	-4373,243	0,000	0,986	1903,69
Estonia	7,505	0,000	-3894,407	0,000	0,960	1816,36
Latvia	7,368	0,000	-3523,175	0,000	0,952	1584,71
Hungary	7,361	0,000	-4072,246	0,000	0,978	1572,94
Poland	7,139	0,000	-4283,954	0,000	0,944	1260,40
Lithuania	6,945	0,000	-3353,791	0,000	0,921	1037,45
Bulgaria	6,860	0,000	-2152,870	0,000	0,961	953,00
Romania	6,477	0,000	-2035,474	0,000	0,951	650,23

Source: own calculations

Based on the results of the Working model estimation, average income elasticities for food expenditure and superior goods were determined for the period 1996-2017. The results are presented in Table 3.

Table 3: Average income elasticity values of expenditure on food and superior goods in the European Union countries

Country	Food Elasticity	Higher-order elasticity	Country	Food Elasticity	Higher-order elasticity
Belgium	0,8922	1,0639	**Luxembourg**	0,7290	0,5563
Bulgaria	0,6916	1,2204	**Hungary**	0,6983	0,9282
Czechia	0,7759	0,8777	**Malta**	0,5864	1,1373
Denmark	0,6914	0,9826	**Netherlands**	0,8676	0,8418
Germany	0,7453	0,9453	**Austria**	0,8270	1,2012
Estonia	0,7858	0,9660	**Poland**	0,6961	0,9872
Ireland	0,3925	0,7521	**Portugal**	0,9327	0,9374
Greece	1,0073	0,9004	**Romania**	0,8607	0,9784
Spain	0,3816	0,5090	**Slovenia**	0,7229	0,8933
France	0,8188	0,9078	**Slovakia**	0,7341	1,0549
Italy	0,7787	1,3125	**Finland**	0,8276	0,9269
Cyprus	0,5944	0,5335	**Sweden**	0,7620	0,9221
Latvia	0,6024	1,0553	**United Kingdom**	0,7081	0,9765
Lithuania	0,6255	0,9542			

Source: own calculations

The average income elasticity of food expenditure in all countries, except for Greece, is below 1, which means that each additional increase in disposable income by 1% causes an increase in expenditure on this good by less than 1%, which confirms the theory that food is a basic good. Income flexibility related to expenditure on superior goods is higher than for expenditure on food. The fact that the average level of this elasticity is below 1 in many countries indicates a progressive change in the nature of these goods. In 1996, in almost all European Union countries (excluding Spain, Cyprus and

Luxembourg), income elasticity of superior goods expenditure was above 1, and in many countries even close to 2 and above.
In the next part of the study, absolute β-convergence models were estimated in order to check the hypothesis about the leveling of household consumption expenditure on food and superior goods. The results of the estimation and verification of these models are presented in Table 4.

Table 4: Estimation and verification results of convergence models of expenditure on food and superior goods

Food convergence			**Higher-order convergence**		
Parameter	**Estimate**	**p-value**	**Parameter**	**Estimate**	**p-value**
γ	80,845	0,000	**γ**	175,219	0,000
δ	0,974	0,000	**δ**	0,946	0,000
LSDV R-kwadrat		0,989	**LSDV R-kwadrat**		0,993
b		0,026	**b**		0,055
$t_{half\text{-}life}$		26,303	$t_{half\text{-}life}$		12,497

Source: own calculations

The parameters behind the lagged dependent variable in the models in Table 4 (δ) are statistically significant and smaller than 1, which means that there is a convergence of the level of expenditure on the analysed groups of goods. The models are characterised by a very good fit to empirical data. Every year, the differences decrease by 2.6% in the level of expenditure on food, which means that the reduction of inequality by half will take place only after about 26 years. In the case of the level of expenditure on superior goods, the differences will be reduced by half after about 12,5 years, which results from their annual convergence rate by 5.5%. A faster pace of convergence than in the case of food goods may be associated with the allocation of a larger portion of additional disposable income to superior goods (as evidenced by higher values of income elasticity).

Conclusion

The level of household consumption expenditure reflects their wealth. Both in the case of expenditure on food and superior goods, households from developed countries spend more than households from less developed countries. Undoubtedly, the macroeconomic situation of countries is one of the most important determinants of the society's wealth. It causes changes not only in the level of consumption, but also in its structure (Jankiewicz, 2018a; 2018c; 2019). Institutional changes in countries and the openness of economies to international cooperation (see: Cheba, 2015; Cheba, Szopik-Depczyńska, 2017) are also important determinants of the level and structure of consumption. Moreover, they are also affected by the level of digitization and globalization (see: Hadaś-Dyduch, 2017; Pietrzak, Ziemkiewicz, 2018b). Households in relatively high developed EU countries also have greater potential for spending their incomes in the future, as shown by the analysis of the limit values of the expenditure level on food and superior goods using the Working function. The economic potential of countries from the lowest positions demonstrates that it is going to be less likely that there will be the leveling of spending levels over the next few years.

Nevertheless, as a consequence of the convergence of EU economies (see: Kuc, 2017a, 2017b) and the convergence of disposable income, the process of leveling of expenditure level on both types of analysed goods is progressing. The analysis showed a faster convergence rate for superior goods, households spend on their consumption more extra income units. With a further increase in disposable income, the differences in the increase in expenditure on the analysed goods will increase, which works in favor of the leveling of expenditure on restaurants and hotels as well as recreation and culture.

Getting wealthier can mean that restaurant consumption will slowly displace traditional home consumption.

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Tourism Consumption of Generation Z – Comparative Analysis of Polish and Ukrainian Students

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Abstract

The current study focuses mainly on characteristic behaviour of young tourists representing generation Z. The survey was conducted on Polish and Ukrainian students and particular interest was given to the differences between aforementioned consumer groups. Factors which dominated the area of research included destination preferences, accommodation, satisfaction during the stay as well as recommendations shared with others after the travel. The survey was adopted for data collection. To analyse the data pair wise correlations were inferred and a logistic regression classifier with a binary target was used. The results, however, do not reveal any significant discrepancies between the surveyed groups.

Keywords: Generation Z, Tourism Industry, Tourism Consumption, Millenials

Introduction

According to the data of the WTO, tourism represents approximately 10% of global GDP, creating a comparable percentage of work places (UNWTO Tourism ... 2017). Young people should be considered to be an important segment on the market. Tourist market of young people in 2009 was estimated at nearly 190 billion dollars while in 2014 at 286 billion (Richards, 2016). Such a significant change confirms both the size of the segment and the increase in its importance.

Tourism undertaken by young people have its specificity, which is highlighted by the definition, stating that those are journeys lasting less than a year, motivated, partially or wholly, by the desire to learn about new cultures, gain life experience and/or the possibility of formal or informal learning outside their environment (Dionysopoulou and Mylokanis, 2013, p. 23). Presented definition indicates two features of such tourism - curiosity about the world and willingness to learn. Additionally, young people seek novelties as they can discover new destinations. Young people will not be discouraged by inconveniences as social unrest, illness or natural hazards (Vukic, Kuzmanic and Stankovic, 2015, p. 482). They want to become acquainted with new customs and cultures, be close to nature but as well as local communities (Buffa, 2015, p. 14051).

Young people belong to the so-called Generation Y and Generation Z. The authors deliberately decided to focus on the latter due to the assumption that both of these groups have different characteristics in terms of tourism consumption. In the case of Generation Y, there is still small amount of research dedicated to tourism (Buffa, 2015, p. 14046). In the case of Generation Z, the

shortage of sufficient research in the area of tourist consumption analysis is to a large extent related to legal restrictions concerning the examination of representatives of this group (Sauthgate, 2017, p. 227).

The purpose of the research is the preliminary identification of factors determining choices of young people on the tourism market and their behaviour both during and after tourist consumption. The above analysis is important from the perspective of marketing activities both for businesses and tourist regions. A special focus was given to search for differences between consumer behaviours of representatives from two countries in Central and Eastern Europe - Poland and Ukraine. The selection of target group was deliberate. These are the countries in which numerous changes have been made in the last two decades. At the same time, situation of each country is diverse. Poland is a country that undergone social transformations, nonetheless after political and economic transformation was able to grow in entrepreneurial sense (Marjanski, Sulkowski, Marjanska-Potakowska and Staniszewska, 2019; Sulkowski, Seliga and Wozniak, 2019). However political and economic situation in Ukraine does not facilitate the development of tourism, therefore making it interesting to analyse how it affects tourist habits of young, mobile consumers.

In order to achieve the aims, the following layout was adopted. The paper first analyses literature, focusing on the presentation of research results showing the specifics of young people's behaviour and consumption in the field of tourist consumption. Second, the research model is presented. In the further part of work, the research methodology is described and the respondents of the study are analysed. The article is summarized with conclusions and discussion.

Literature Review

The term "generation" might be defined as "cluster of people who were born at a similar time, are shaped by the same events and are affected by similar social, economic, technical and political circumstances" (McCrindle and Wolfinger, 2010; Lazanyi and Bilan 2017, p. 79). Kachniewska (2014) suggests to identify members of the generation on the basis of the year of birth, assuming that each generation has different interests, expectations, beliefs and features common to all its representatives influenced by the conditions of life during their maturation and personality development. However, it still remains unclear what age range should be taken into account in order to identify young people. Kachniewska (2014) adds that the timeframe of births of representatives of particular generations is arbitrary, there is lack of consensus among researchers about the correct version of this division. Anderson and Sharp (2010) suggest that young people are those under 30 years old. According to a common classification, they belong to Generation Y as well as Generation Z.

The literature defines representatives of these groups using various characteristics and academics have mentioned different age rage to categorize them. For instance, Generation Y included people born between 1978-1994 (Walsh, Mitchell and Henning-Thurau, 2001), 1981-2001 (Black, 2010), 1979-2000 (Garikapati, Pendyala, Morris, Mokhtarian and McDonald, 2016). Additionally, they are described as well-educated, mature, advanced in the use of technology and individualists (Syrett and Lammiman, 2003). They have high purchasing power and are more powerful than their predecessors in terms of the Internet usage. (Farris, Chong and Danning, 2002). However, reaching this community with an effective message is not an easy task (Lester, Forman and Loyd, 2005). They are consumers that to a lesser extent than their predecessors are susceptible to communication generated by traditional media, including advertising (Cimitillo, 2005), while favouring some forms of online advertising (Smith, 2012). Another important feature of young people was the need for quick access to information (Pendergast, 2010), which is associated with the strong use of social media used also to seek opinions about products (Bilgihan, Peng and Kandampuly, 2014).

Several features of the Generation Y have deepened into the so-called Generation Z. The study of intergenerational differences is in itself the subject of research (Grencikova and Vojtovic, 2017). As an example, both groups make strong use of new technologies in communication processes, but representatives of the generation Z are more eager to accept video communication. It includes people

born between 1995 and 2010 (Lazanyi and Bilan, 2017, p. 79; Vallone et al, 2016). The adoption of such an approach means that these are people between 10 and 25 years old, which clearly translates into a deficit of research describing them. What is more, there are no unambiguous criteria describing the following groups: Generation Y, Millennials, Generation Z, which may result in vagueness of studies, in one study people belonging to the youngest among generation Y in others will be included in the generation Z (Skinner, Sarong and White 2018, p. 95).

Representatives of the generation Z are called "digital natives" (Jones and Shao, 2011) - for them the Internet or mobile devices are the natural environment (Zajadacz and Kugiejko, 2016). These people expect that everything happens immediately. Consequently, they also expect a quick reaction, which is vital for marketing activities (Description and Cenusa 2017, p. 683). The use of new technologies by young users, means that promotional communication should also adopt an innovative approach (Hamed, 2017, p. 2).

Independence is one of the traits that defines them (Desai and Lele, 2017, p. 802), more than adults, they trust their peers, which affects their relationships at work. Superiors are not granted automatic respect. However, using capabilities of technology, young people are very happy to share various information (Lazanyi and Bilan, 2017). Especially, the last feature is important from the business perspective, entrepreneurs must be aware that young people very quickly share opinions about products. It is also harder to build their brand loyalty compared to the generation Y (Gutfreund, 2016-2017, pp. 246-247).

For many economic sectors young people are an attractive segment of the market. There are also, though not many, studies focusing on the tourism market. According to the general characteristics of young people, they strongly use the Internet when planning trips in which they desire intense experiences (Vukic, Kuzmanovic and Stankovic, 2015). They want to be more travellers rather than ordinary tourists, looking for unique and authentic experiences (Santos, Veiga and Aguas, 2016). This characteristic for the generation Y is also underlined by other researchers (Leask, Fyall and Byron, 2014). Xiang, Magnini and Fesenmaier (2015) put strong emphasis on independence in organizing trips. It has been observed that starting from the generation of Baby Boomers, through Generation X and Y, tourists seek independence during trips and more people organize their travels without the help of travel agencies (Nusair, Bilgihan and Okumus, 2013). It seems that looking at cultural changes and increasing access to information, we can expect a deepening of this trend for Generation Z. It is also pointed out that online tools are an effective method of building loyalty for hotel enterprises (Prayag and Del Chiappa, 2014) and the creation of word-of-mouth marketing - e-WOM (Litwin, Goldsmith and Pan, 2008; Styven and Foste, 2018), which is of key importance for them when deciding about tourist consumption (Kim, Xiang and Fesenmaier, 2015). According to Skinner, Sarong and White (2018), even small tourism enterprises can take advantage of new technologies to meet the needs of young customers.

It seems that the feature of the Generation Z, which is strong use of the Internet and related tools, is the area most often analysed in relation to young people. It is suggested that young tourists are responsible for the highest percentage of people using new technologies (Bizirgiannia and Dionysopouloub, 2013, p. 653; Zajadacz and Kugiejko, 2016). The Internet, including social media, is particularly important for tourism (Pan and Fesenmeier, 2006). Rudez and Nemec (2015) analysed students' use of social media during travel processes. The results showed that they use social media the most before leaving, at the planning stage, but less during and after the trip. These researchers identified two main dimensions of the use of social media: "search for opinions" and "information and comparison". Another important source of information about destinations are their websites (Hamed, 2017). The concept of the use of online tools in the tourist consumption was also discussed by other authors. It is argued that young travellers with higher education are receivers but also producers of information on the web, which would confirm previous observations (Ip, Lee and Law, 2012).

Yousaf, Amin and Santos (2018) suggest that new needs emerge for young people related to tourism. This may be striving to experience an adventure and taking risks associated with it (Williams and

Balaz, 2015). Even the need to experience the feelings of adrenaline is hidden behind the thefts in hotels conducted by the representatives of the generation Z (Goh and Kong, 2018). In addition, it is argued that young people can treat travel as part of their education and personal development (Veiga, M. Santos, Aguas and Santos, 2017, p. 605).

It is also worth paying attention to the results of Han, Kim and Kiatkawsin (2017), which may contradict certain stereotypes about young people. Their results provide evidence to support the hypothesis that they care about the environment and are prone to pro-ecological behaviour. As studies show, young people, including those who have been part of the generation Z, have their own characteristics and are worth analysing.

Conceptual Model

This study focuses on issues related to preferences, methods of searching for information and making choices. For the purposes of analysis, a conceptual model was developed (Figure 1) in which three phases of tourism product consumption process were identified. This structure also appears in other studies, for example Rudez and Vodeb (2015) or Huertas and Marine-Roig (2018).

The identified phases of tourism are as follows:

1. Before the trip - in this area the identification of preferences and the way of choosing the destination as well as the place of accommodation is of key importance. Knowledge about them would make it easier to prepare and promote an attractive product.
2. During the trip - in this area the identification of preferred forms of spending time during the trip and related factors that build the satisfaction with the stay become the most significant. Knowledge about them would make it easier to prepare a product that would generate satisfaction with consumption.
3. After the trip - learning about the behaviour of consumers at this stage of consumption process would help to optimize the process of building relationships with clients and stimulate word-of-mouth marketing.

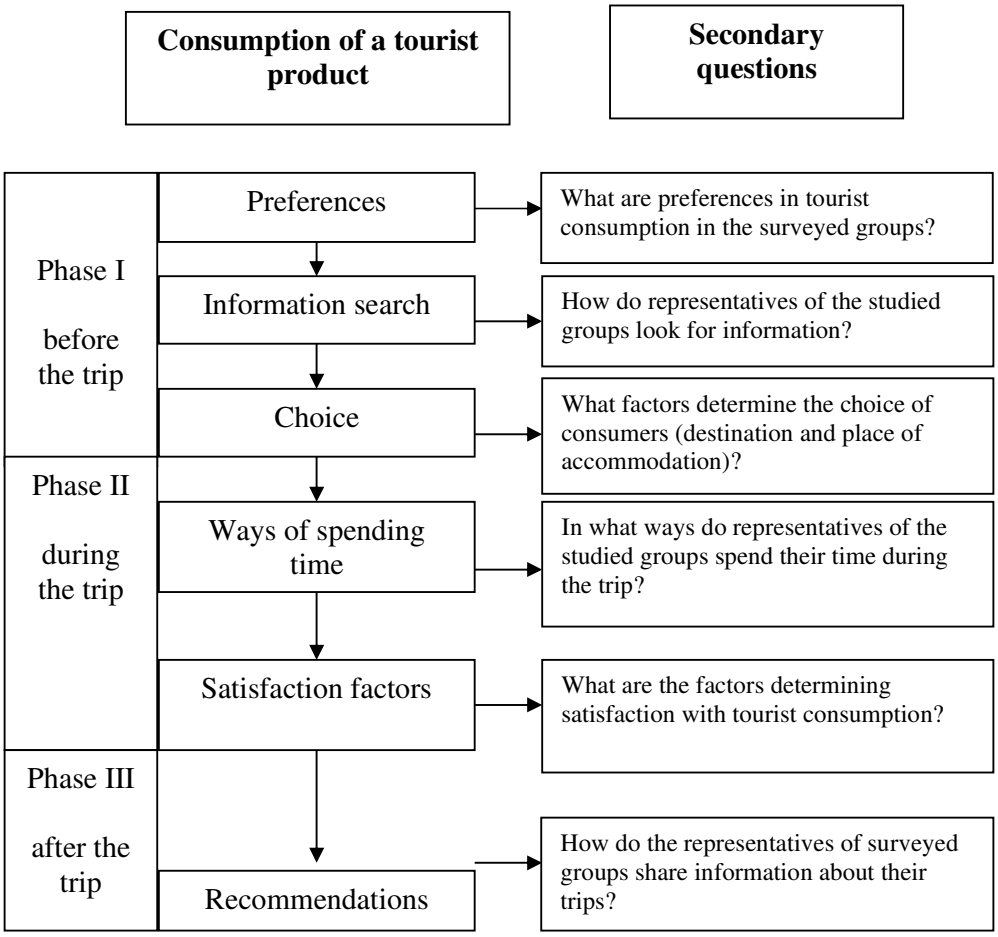

Fig. 1: The process of consumption of a tourist product

Source: Debski, M., Krawczyk, A. and Dworak, D. (2019). Wzory zachowań turystycznych przedstawicieli Pokolenia Y. Zeszyty Naukowe Kolegium Zarządzania i Finansów, 172, 9-21.

Methodology

The study attempts to identify the tourism behaviours in two target groups: (1) Poles belonging to the Generation Z and (2) Ukrainians belonging to the Generation Z.

The data was collected with the use of questionnaires, which were correctly filled in by 137 Poles and by 204 Ukrainians. In total 341 responses were collected. Questionnaires are commonly known as a survey strategy to gather data, and is widely used in business studies (Oppenheim, 2000). The survey offers a useful way in describing the characteristics of a larger target population (Saunders, Lewis and Thornhill, 2015).

Results

The main purpose of the analysis was to identify preferences in both groups of respondents and, as a consequence, their comparison. In order to compare two groups, the data was analysed by φ_K correlation test (based on Pearson's χ^2 contingency test) (Baak, Koopman, Snoek and Klous, 2018) and by means of building a binary classifier based on logistic regression.

Data overview

After initial cleaning of the raw questionnaire data, answers from 341 subjects were selected as the input for further analysis. This sample includes individuals between 16 and 23 years old, which belong to the generation Z (Lazanyi and Bilan, 2017, p. 79; Vallone et al, 2016), and are residents of Poland or Ukraine. From the total of 88 questions in the survey, 7 open-ended questions ("other, please fill in") where excluded from the further analysis as it was filled in less than 10% of cases. For the other questions percentage of missing values was under 4%, with the only exception of question 2b, where 24% answers were missing. Hence, 81 questions in total were considered: 79 behavioural questions with answers recorded with Likert scale (0-5), age (answers represent whole numbers from 16 to 23), and the country question with two possible answers – "Poland" or "Ukraine".

It should be noted that Ukrainians were over-represented in the sample with 60% versus 40% Poles (204 and 137 cases correspondingly). Further, looking at the age distribution in the sample, significant imbalances become apparent (see Figure 2).

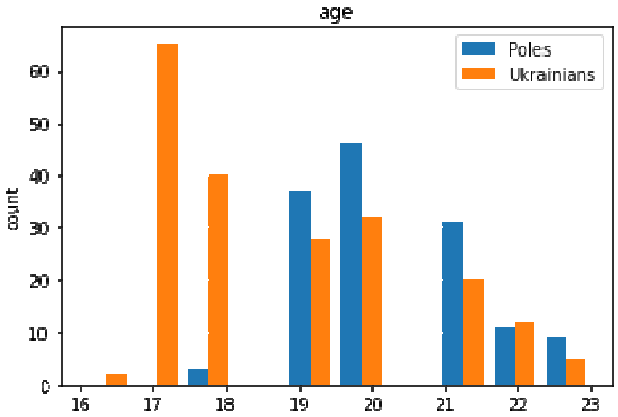

Fig. 2: Age distribution of Poles and Ukrainians in the sample.

Thus, the youngest age groups (16, 17, 18) are represented almost exclusively by Ukrainians, at the same time Poles are prevailing in nearly all other age groups (18 to 23). These imbalances may play an important role in case of possible differences in the attitudes of different age groups within the generation Z itself.

Overall, the attitudes of the two groups demonstrate many similarities, which are usually attributed to the generation Z (Lazanyi and Bilan, 2017). Thus, both Poles and Ukrainians use Internet as the main source of information beforethe trip (Figure 3.1). Possibility of active rest, security and comfort of the place were equally found highly important by both groups (Figure 3.2).

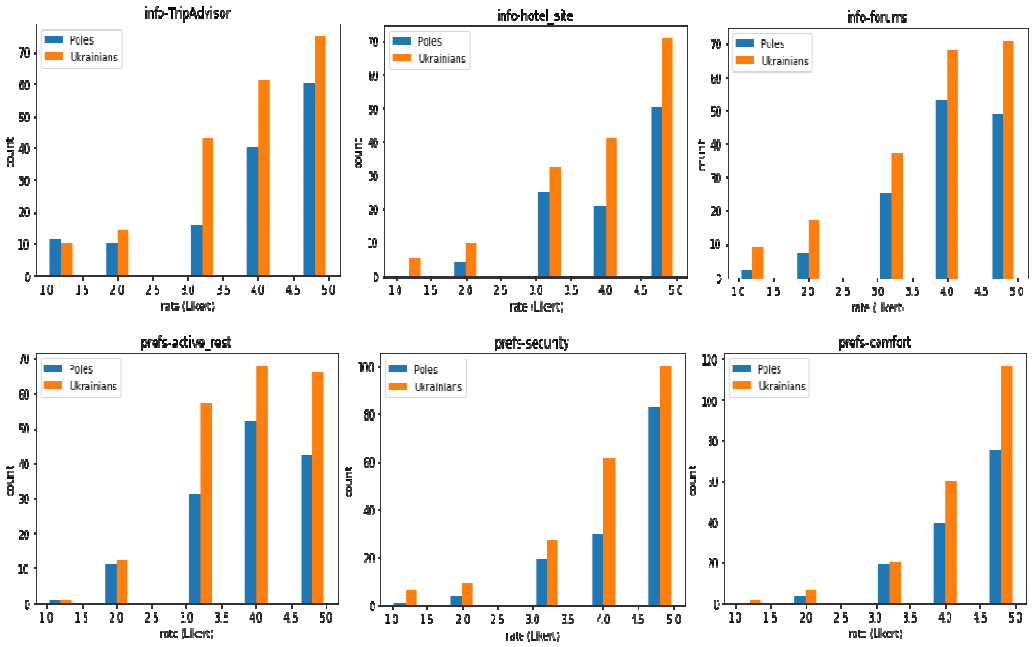

Fig. 3. 1: source of information when planning a trip: a) Trip Advisor and Booking.com, b) website of the accommodation, c) reviews on the Internet, comments on forums; 2: most important during a trip a) possibility of active rest, b) security, c) comfort.

Pair Wise Correlations

In order to test the proposed hypotheses and answer the question about differences in tourist consumption between Poles and Ukrainians, the inference has to be made into the mutual statistical dependence between the country variable and the other variables (age and the answers to the 79 survey questions). Usual choice in testing differences between two or more groups is ANOVA or MANOVA (Fisher, 1925; Stevens, 2002; Warne, 2014), other possible choices could for example include rank correlation tests Spearman's ρ (Spearman, 1904), Kendall's τ (Kendall, 1938), Goodman-Krustall's ϒ (Goodman and Krustal, 1954), or Pearson's χ^2 contingency test (Barnard, 1992). Given the number of variables in our set (81) MANOVA, and the following post-hoc paired tests appears cumbersome. Other multivariate tests could be a good choice, tough continuous (age) and ordinal variables, strictly speaking, would have to be treated separately. Another similar and also elegant test is φ_K correlation test, which is derived from Pearson's χ^2 contingency test and can be uniformly applied for interval, ordinal and categorical variables (Baak, Koopman, Snoek and Klous, 2018). Additional advantage of this test is its good interpretability – the correlation coefficient has the same meaning and range (but positive only) as Pearson's ρ, at the same time it is able to capture non-linear patterns.

The results of φ_K test are provided in the form of two 81x81 correlation and significance matrices. There, in correlation matrix pairwise correlation coefficients should be read in a similar way to the Pearson's ρ (0 for no correlation and 1 for complete correlation between two variables). Significance of the correlations, presented in significance matrix, is given in terms of Z-values (number of standard deviations from the mean).

For finding answer to the main question about the differences in questionnaire answers between Poles and Ukrainians, the matrix row, which corresponds to the "country" variable in both matrices is of interest. A quick glance at the correlations between our target and the rest of the variables in the data

set gives that such pair-wise correlations are in general very weak, if present. This is with the exception of the high correlation with the age variable, 0.68, which just confirms our concerns regarding age-imbalanced between two groups. The two strongest correlations between variables of interest (79 questionnaire answers) were found as 0.3 and 0.265 for the questions 3d: "*What factors determine your choice of destination: the opportunity to brag about staying somewhere*" and 7c: "*Do you share information and how … about your stay: report my stay in social media*" correspondingly. These two pair wise associations also show relatively high significance of 6.16 and 5.17 correspondingly. Despite these correlations are relatively weak in absolute values, they deserve further investigation. It can be seen from bar charts in Figure 4 that the major difference between answers of Poles and Ukrainians to both these questions is the following: a) more Poles in comparison to Ukrainians give their answer on the lower side of Likert scale (1-no importance), and b) more Ukrainians than Poles choose the middle (3-average importance) and upper middle (4-quite important) of the scale. It should be noted that these differences per scale step were also found significant in outlier significance evaluation (Figure 5).

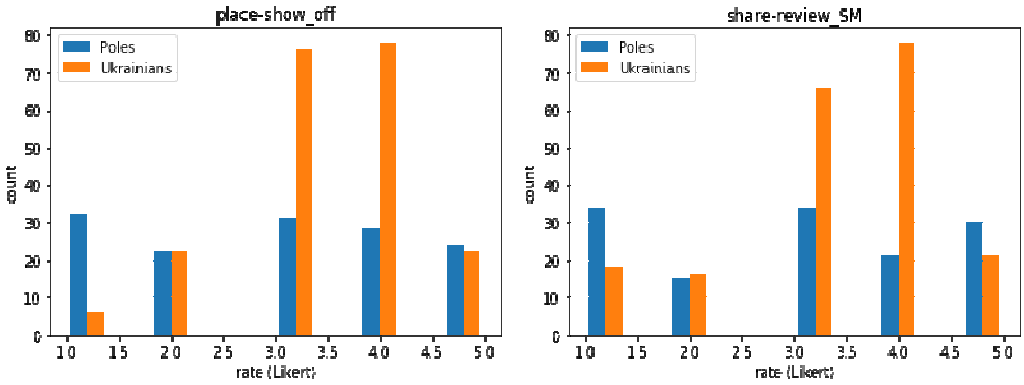

Fig. 4: Barcharts questions 3d ("*choice of destination: the opportunity to brag about staying somewhere*") and 7c ("*share information about your stay: report in social media*").

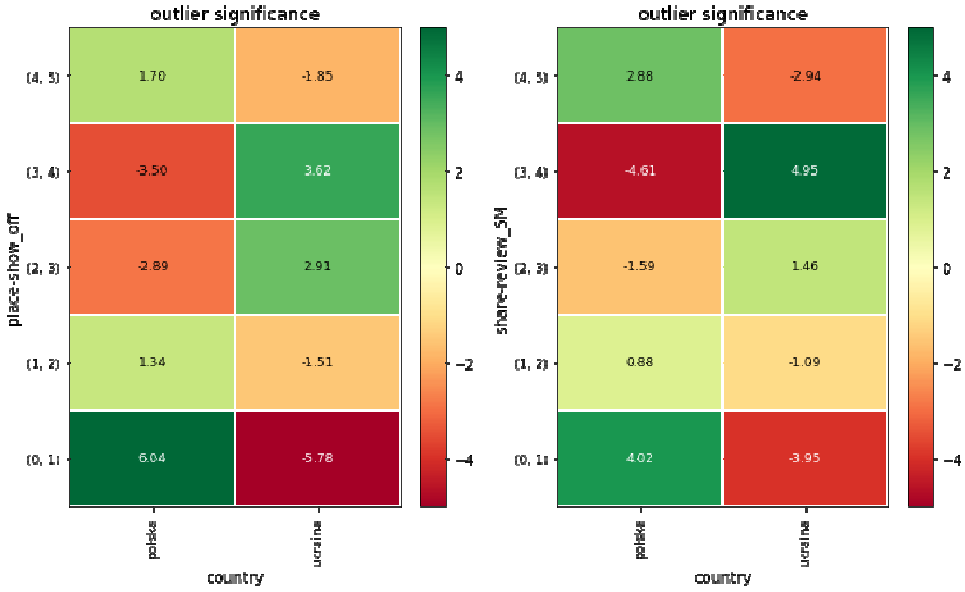

Fig. 5: Outlier significance questions 3d and 7c (shown in Z-values).

It is important to mention here that this difference between Ukrainian and Polish parts of the sample is apparently not unique for these two questions, a quick glance at the bar charts for most of the other questions in the survey suggests rather universal character of such pattern. Indeed, it can be noticed that overall for the given survey questions Ukrainians more than Poles tend to choose either the middle "no difference" answer (3), or the next fairly positive (4). At the same time Poles more readily give negative (1) answer. That to be said, for many questions the Polish and Ukrainians answers were found to be overall fairly similar.

Despite such "tiny" differences in the answers it seems reasonable to speculate that exactly this pattern manifests the key difference between the Polish and Ukrainian Gen-Z population in given questionnaire. That is, young Poles tend to more readily demonstrate a more assertive attitude in the answers, whereas Ukrainians show slight preference for middle "all equal", or somewhat positive type of answers. Such pattern, if proven to be significant as a general trend, could be possibly explained by a comparatively higher level of travelling experience in young Poles. However, such speculations could hardly be seriously scrutinised within the framework of this paper and the collected data. This kind of analysis would shift the goal from finding observable differences in consumption patterns of two groups to a casual analysis of such differences, which is outside of scope of this paper. At the same time authors would recommend this kind of research, as it could doubtfully provide valuable insights into the touristic consumption behaviour and its differences between Poles and Ukrainians.

Logistic Regression model

Although pair wise correlation analysis helped to visualise some (tough relatively small) differences in touristic consumption attitudes between Poles and Ukrainians, it did not give clear answer whether these two groups can be clearly distinguished based on the constructs in focus – surveyed in the questionnaire.

When a large number of multi-dimensional observations are coming from two or more different groups, a classification model can be built, which is able with certain accuracy to assign each observation to one of these groups (Bishop, 2006; Geron, 2019). The more information about differences between classes is captured in the variables, the better classifier would perform (e.g. measuring shape and weight to distinguish between apples and pears). Opposite, if the observed variables are not carrying groups differentiating information (e.g. only looking at colour when trying to separate apples from pears), a classifier would perform not significantly better than random guess.

Our survey observations, together with the goal of assessing possible differences between Poles and Ukrainians from generation Z, essentially represents binary classification problem. Thus, 79 questionnaire answers as independent variables, or features can be used to predict binary target variable – observation subject belonging to either Polish or Ukrainian group. Without unnecessarily complicating the procedure, a simple linear model can be built with 79 independent and 1 (binary) dependent variable. Assessing an elevated with respect to the base line (random guess) performance of such model would show whether the two groups significantly differ. Measuring features importance would allow to identify exactly which variables capture the differences between the groups.

Before proceeding with this analysis, two important hindrances should be addressed. First, regression model can be built on continuous independent variables, but not ordinal, which is the case in the given data set. Second, a procedure for dealing with missing values should be defined.

Addressing the first issue, it can be noted that treating ordinal variables as continuous is often used in statistical analysis of applied problems (Johnson and Creech, 1983; Norman, 2010). It seems to be a good choice for Likert scale measurements given the assumption of the equidistant spacing between the categorical variables (Pasta, 2009). Considering answer options provided in all the questions in the given questionnaire (Likert scale 1 to 5, which goes from 1 being "not important" or "do not do

this" to 5 - "very important" or "do this often"), it can be assumed that the equidistant spacing assumption holds well. It can be also noted that a uniform scaling (1-5) used in all 79 questions eliminates the need of additional re-scaling of the variables.

For the treatment of missing values, the easiest and arguably most "unbiased" method is imputing the missing answers with the middle, "neutral" value 3.

After the missing values imputing, a series of experiments were performed. Logistic regression with L1 regularization was used as a model of choice (Python scikit-learn implementation (Bishop, 2006). L1 penalty λ was found as a hyperparameter in k-fold cross-validation with k=10 and prediction accuracy as a performance measure. In order to account for age imbalances in the data set and also to evaluate possible effect of these imbalances, two different samples were created. First sample included entire data set of 341 cases (age-unbalanced sample), in the second sample the number of cases in each age group was equalised in both target groups (age-balanced sample). Thus, 80 records, mainly Ukrainians in the youngest age groups and Poles in the older age groups (see histogram in figure 2) were randomly removed from the initial data set to create age balanced groups.

In the first stage of the experiment, the logistic regression model included all 79 independent variables. Model was trained on 85% of the records in the sample (training set), then trained model accuracy was measured on the other 15% of the records (test set), which were not used in the training. The model performance - accuracy of assigning the test set records to Polish or Ukrainian group, was compared with the accuracy of a random choice base line. For the base line, the group assignments were made by drawing a random number from the left or right side of a uniform distribution. In this experiment two different models were independently trained and tested, one on the balanced and the other on unbalanced samples.

The major weak point in our experimental design is the relative scarcity of data. Thus, the linear model in 80-dimensional space (80 independent variables) is trained on as little as about 300 data points (observations). Naturally, we can expect the model to be seriously unstable and thus demonstrate high variation in accuracy for different train-test divisions of the data. To address this, random splitting of the data into training and test set with consequent training and evaluation of the model was repeated 20 times, mean accuracy over 20 repetitions was calculated and further used as a more reliable estimate of model performance. This procedure was carried out for both unbalanced and balanced samples, resulting accuracies of the model and the base line, together with the corresponding mean accuracies are shown in Figure 6.

The accuracy fluctuates considerably in from one trial to another. Remarkably the fluctuations are high also for the base line, which clearly originates from the small size of the test sample. Indeed, increased range of such fluctuations is observed in the balanced sample, were the test size is smaller than unbalanced.

The model, despite high fluctuations in accuracy, appears to perform better than the base line in the case of age-unbalanced sample. It shows average accuracy of 0.7, at the same time the base line fluctuates about 0.5, as expected. In case of age-balanced sample model mean accuracy drops to around 0.6, which appears to be only marginally above the base line.

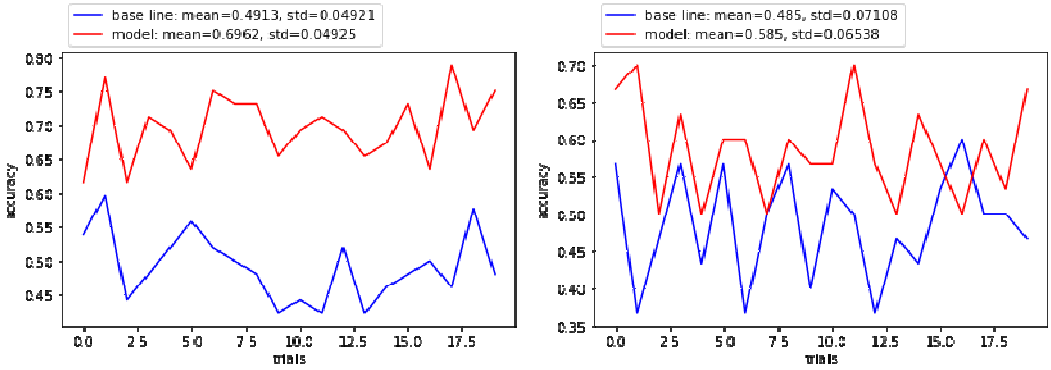

Fig. 6: Accuracy of the age-imbalanced (a) and age-balanced (b) models compared to the random base line in 20 trials.

Although the above findings seem to provide the answer to the question about differences between Polish and Ukrainian groups, it would be premature to draw reliable conclusions without attempting to improve our model.

To increase model stability, we could either increase the number of cases in our data set, or reduce the number of model parameters. With no new questionnaire data, only the second option is feasible. Dimensionality reduction was done using 3 methods: 1) PCA and 2) Factor Analysis with the number of components determined based on the best performance in explaining variance, and 3) PCA with the number of components determined by maximum likelihood estimation (MLE) method (Minka, 2000). Resulting accuracy in 20 trials graphs are present in figure 7. Despite significant dimensionality reduction (from 80 to around 10), the balance and the average accuracy of the models hardly changed in both age-balanced and age-imbalanced samples.

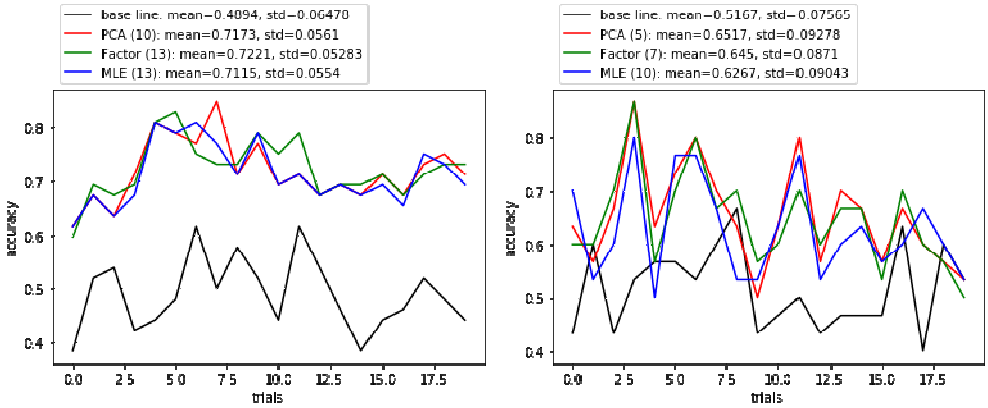

Fig. 7: Accuracy of the age-imbalanced (a) and age-balanced (b) models with reduced dimensionality.

Summarising these results, the regression model performs poorly on the age-balanced sample, where it is doing only marginally better job than the random guess assigning observations to the two categories. The model performance improves significantly in the original sample with significantly unbalanced age distribution. This seem to point at the age as a mediating variable, and as such possibly the major difference factor between Polish and Ukrainian groups in the given data set.

Conclusions and Discussion

The literature analysis shows that young people, including those from the generation Z, play a significant role in creating tourism demand and are important area of research. Another interesting area are Ukrainians and their behaviour in Poland (Sulkowski, Przytula and Migdal, 2020).

Based on the findings, two elements should be taken into account particularly. Firstly, young people take advantage of the Internet while searching for tourist options. This takes place at the stage of travel planning, and then subsequently during and after the travel when the participants share their experiences in social media, which may be an important source of recommendations. Therefore, it seems advisable to continue research in this area in order to compare the behaviour of representatives of the generation Z with other age groups. Strong use of the Internet at the stage of trip planning is related to the fact that young tourists are independent, which is not good news for travel agencies. The second element that the results of the analysis indicated is the fact that the responders did not really reinforce the stereotype that young people strive to minimize travel costs. On the contrary, the responders take the comfort, hygiene or convenient transportation into consideration rather than the cost. Entrepreneurs organizing trips should take these issues into account.

The aim of the analysis was to look for differences between young Poles and Ukrainians. Differences in the level of income as well as certain cultural differences were the premise for assuming their occurrence. However, greater mobility of generation Z and easy Internet access, make this generation more similar. Also, the disproportions between the countries will not be significant as it would be in the case of older people.

The results showed no significant discrepancies between the two studied groups. They have similar preferences, they look for information about the destination in a similar way and similar factors create satisfaction. It is vital information for people responsible for creating tourist products as well as their promotion.

The results should be approached with caution. This was an explorative pilot study. There were some disproportions in the size of both groups, which were not characterized by high numbers. The selection of the sample was intentional, it concerned students of selected fields of study, which consequently limits the quality of assumptions.

The received result can be the subject to further analysis. Is there a similar situation compared to other nationalities in the region? Are there any differences regarding the representatives of the so-called Western Europe? What is the situation with regard to representatives of other age groups, for example Generation X or Generation Y.

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Modelo Gravitacional Para Explicar El Comercio Exterior Del Acero De Estados Unidos Con Sus Principales Socios Comerciales En El Marco De La Guerra Comercial Del Año 2.018.

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Resumen

En el presente artículo se hace un análisis del comercio exterior del acero de Estados Unidos con sus principales socios comerciales a partir de una presunta guerra comercial en el año 2018. Para ello, se estudió el desempeño de las distintas variables: Comercio Exterior del Acero Estados Unidos con los principales socios comerciales (variable independiente), Distancia, PIB, producción del acero, arancel, inflación, exportación e importación de metales (variables dependientes). La técnica de econometría utilizada para el procesamiento de datos fue un panel de datos. Los datos empleados para el desarrollo del modelo econométrico utilizado abarcan el periodo comprendido entre el año 2001 y 2016, para un país importador y diez exportadores. Los datos fueron recolectados de las bases de datos del Banco Mundial y del World Steel Association. Se concluye que la variable distancia tiene un efecto significativo al 10% y negativo, donde un aumento de un kilómetro genera una disminución en las toneladas de acero importada del 119.27 toneladas. De igual manera, se verifica la importancia de los acuerdos internacionales en el comercio del acero, lo cual afecta si hay un aumento en el arancel, incitando presuntas guerras económicas en el comercio internacional, como lo vemos hoy en el mercado.

Palabras Clave*:* Modelo Gravitacional, Comercio Exterior, Estados Unidos, Guerra Comercial.

Abstract

This article presents an analysis of US foreign trade of steel with its main trading partners of an alleged commercial war in 2018. To this end, the performance of the different variables was studied: Foreign Trade of Steel of the United States with its main trading partners (independent variable), Distance, GDP, steel production, tariff, inflation, export and import of metals (dependent variables). The econometrics technique for data processing was a data panel. The data used for the economic development model covers the period between 2001 and 2016, for an importing country and ten exporters. The data was collected from the databases of the World Bank and the World Steel Association. The difference between distance had a significant effect at 10% and negative, where an increase of one kilometer generates a decrease in imported steel of 119.27 tons. Similarly, the importance of international agreements in the steel trade is verified, which gives an increase in the tariff, inciting alleged economic wars in international trade, as we see it today in the market.

Keywords*:* Gravitational Model, Foreign Trade, United States, Commercial War.

Introducción

La investigación que se presenta a continuación tiene por objetivo explorar la validez de la teoría gravitacional en el comercio exterior del acero de Estados Unidos con sus principales socios comerciales, en el marco de la guerra comercial del año 2018.

La guerra comercial en el año 2.018 nace como consecuencia de la protección de Estados Unidos a su sector de metal y acero, respondiendo a los empresarios y trabajadores siderúrgicos que han exigido que se disminuyan las importaciones para estos productos, debido a los precios más económicos de los mercados externos, que son difíciles de afrontar. El presidente Donald Trump impone el arancel 25% para las importaciones de acero y un 10% para el aluminio, con el fin de disminuir el comercio exterior con los países, afirmando que "si no tenemos acero, no tenemos país" y tacha de "prácticas comerciales injustas "a países que subsidian y dan productos con precios más bajos al establecido por el mercado nacional (Mir de Francia, 2018)

Causa de lo anterior es el acelerado crecimiento desde el año 2.000 de la producción de acero en el mundo aumentó el comercio intrarregional, tal como lo expresa Camacho (2.011).
Así mismo es importante tener en cuenta que las industrias desde el año 2.000 impulsaron la reconversión productiva, la disminución de precios y la incursión de nuevas tecnologías para hacer frente a la globalización, procesos que ocasionaron una disminución de la industria del acero en países como EEUU, Japón y la Unión Europea, permitiendo el surgimiento de la industria en India, China, Corea del Sur, México y Brasil. (Restrepo y Taborda, 2017).

La comercialización del acero de Estados Unidos frente al mundo, demuestra una constante interdependencia con sus principales aliados regionales Canadá y México, y un aumento a su dependencia con China, con el cual no cuenta acuerdo regional. Si bien es cierto que trae beneficios como la diversificación de productos y la posibilidad de intercambio más eficiente cuando el país no cuenta con todos los recursos, este intercambio comercial puede afectar el mercado por las pérdidas de producción en el mercado nacional, déficit en la balanza comercial y aumento de desempleo.

Posiblemente estas son las razones por las que Estados Unidos decide intervenir para la protección de su mercado aumentando aranceles, en este caso el del acero. Contrarrestando la llamada globalización de mercado para favorecer su mercado nacional.

En consecuencia y en respuesta a la protección del mercado, los países productores de acero y aliados principales de Estados Unidos en el comercio exterior de acero, apelaron ante la Organización Mundial del Comercio, para reclamar por la aplicabilidad de los acuerdos firmados y por el derecho y fomento del libre comercio.

De acuerdo a la presunta guerra comercial y a los datos de intercambios comerciales de los países demandantes ante la OMC, surge el cuestionamiento, sí es totalmente válida la teoría gravitacional - la cual mide PIB y distancia al país destino-, o realmente hay algunos factores que han influido a que esta relación comercial con Estados Unidos llegué a tal punto de afectar la economía nacional.

Razón por la que resulta de interés estudiar el fenómeno de la guerra comercial desde la perspectiva de la teoría gravitacional tomando información de las base de datos de Banco Mundial y del World Steel Association; a partir de las variables objeto de estudio: Producción en toneladas, inflación, Flujo de insumo al mundo, Acuerdo comercial, Porcentaje de exportación de metales y PIB per cápita. Estas variables se estudiaron mediante un modelo econométrico para mostrar relaciones entre variables con efectos positivos, sin efecto y negativos.

Marco Teórico

Modelo Gravitacional: Definición Y Uso Para Explicar La Dinámica Del Comercio Exterior

Este modelo consiste en la adaptación del concepto físico de Newton a los métodos econométricos, utilizando la ecuación de gravedad, en la cual la atracción entre dos cuerpos es directamente proporcional a la masa de los mismos e inversamente proporcional a la distancia que los separa, en la presencia de una constante gravitacional (Bolívar, Cruz, y Pinto, 2015; Rodríguez y Dávalos, 2017; Díaz y García, 2016)

Este concepto resulta ser una analogía, en la cual los cuerpos corresponden a los países; la masa de los mismos equivale al tamaño de la economía o su nivel de producción; y la distancia que los separa es medida tanto desde lo geográfico como de otras variables. Así, en la práctica, el modelo se construye con el uso de las principales variables de comercio, producción nacional, población y características culturales, geográficas y político-administrativas (Bolívar et al., 2015, p.249).

En este sentido, se puede considerar que este modelo muestra de forma resumida la relación existente entre el volumen comercial y las variables asociadas a los costes comerciales (Ulloa, 2017), prediciendo la existencia de una relación directa entre el comercio y el tamaño de los países, debido a la atracción generada por los intereses que existente entre ellos, e inversa con relación a la distancia, debido al aumento de los costos de transporte de las mercancías. (Bolívar et al., 2015).

La ecuación general del modelo, expresado en logaritmos, puede especificarse de la siguiente manera:

$$\ln Xijt = \ln\beta 0 + \beta 1 \ln Yit + \beta 2 \ln Yjt + \beta 3 \ln Dij + \beta 4\, \Gamma ijt + \varepsilon ijt$$

Donde,
$Xijt$ es el comercio entre los países i y j en el año t,
Yit es el producto del país i en el año t,
Yjt es el producto del país j en el año t,
Dij es la distancia entre el país i y el país j, es un vector de variables explicativas adicionales, y
εijt es el error, normalmente distribuido y con media cero.

A estas variables, se pueden sumar otros factores que afectan el comercio, tales como las características institucionales, culturales, económicas e históricas existentes entre los diferentes países (Gil-Pareja, Llorca-Vivero y Martínez-Serrano, 2018, p.202).

Se ha demostrado una relación gravitacional en casi cualquier modelo de comercio que incluya costos comerciales que aumentan con la distancia, permitiendo estimar la estructura del comercio internacional, a partir de factores geográficos y espaciales, convirtiendo al modelo gravitacional en una herramienta que se ajusta a los postulados teóricos (Bolívar et al., 2015; Díaz y García, 2016, Herrera, 2018, Díaz 2017)

Las diferentes formas y variaciones del modelo econométrico pueden ser utilizadas para lograr diferentes objetivos de investigación económica, en pro de obtener efectos predictivos y explicativos en aspectos como el comercio, el crecimiento económico y la evaluación de política monetaria, entre otros (Bolívar et al., 2015). De manera que el modelo de gravedad se puede considerar como una herramienta exitosa en la explicación del comportamiento del comercio internacional frente a la influencia de diversas variables de interés (Gil-Pareja et al., 2018, Aguirre, Candía, Antón, y Beltrán, 2018, Ahcar ,2018)

Evidencia Empírica De La Aplicabilidad Del Modelo Gravitacional

Se realiza una revisión de los antecedentes investigativos frente al uso del modelo gravitacional en comercio exterior, encontrándose que pueden ser agrupado en tres categorías principales, relacionadas con: el análisis de las exportaciones hacia países con quienes no existe un tratado comercial; la incidencia de los tratados de libre comercio en las exportaciones; y las relaciones comerciales entre países donde existe un tratado comercial.

En cuanto al uso general del modelo y el análisis de las exportaciones hacia países con quienes no existe un tratado comercial, encontramos por ejemplo la investigación realizada por Fuenzalida-O'Shee, Valenzuela-Klagges, y Corvalán-Quiroz (2018), quienes analizaron los efectos de la facilitación del comercio en las exportaciones chilenas durante el período 2006-2014, a través de revisión de las evidencias existentes y la estimación de un modelo gravitacional ampliado relativo a flujos del comercio exterior bilateral chileno con 89 países.

Por su parte, Rodríguez y Dávalos (2017) utilizaron un modelo gravitacional para estimar el impacto de una disminución de las barreras comerciales del Perú frente a potenciales socios comerciales con los que aún no tiene un acuerdo establecido, analizando el periodo 2005 a 2015 en busca de identificar a los posibles socios con el mayor potencial exportador. El análisis dio como resultado que el crecimiento económico de los socios comerciales tendría un efecto positivo en el potencial de comercio, sin embargo, no presenta evidencia que indique que la reducción de las barreras comerciales permitirá el aumento significativo del comercio bilateral con los países estudiados como potenciales socios.

Por otra parte, la investigación realizada por Aguirre, Candía, Antón, y Beltrán (2018) tuvo como objetivo encontrar los factores determinantes de las exportaciones agrícolas nicaragüenses, para lo cual formularon un modelo de gravedad y realizaron una estimación utilizando los mínimos cuadrados ordinarios, analizando 12 países, 8 de los cuales tienen acuerdos de libre comercio con Nicaragua. En los resultados tuvieron en cuenta tanto la evaluación de la bondad del ajuste global como la evaluación individual de los parámetros utilizados; llegando a la conclusión de que los tratados de libre comercio han mejorado el desempeño económico de las exportaciones agrícolas nicaragüenses.

De igual manera, Olegário, Monteiro, y Almeida (2017) realizaron un estudio que les permitió analizar el comercio internacional de algodón, con énfasis en las principales políticas comerciales adoptadas y en sus efectos, basándose en el modelo gravitacional. Donde los resultados apuntaron a la necesidad del establecimiento de políticas comerciales equitativas que permitan a los países menos desarrollados competir de forma justa y continuar ganando participación en el mercado internacional de algodón.

Otra investigación al respecto es la realizada por Ahcar (2018), la cual identifica el potencial comercial entre Colombia y la Unión Europea, teniendo en cuenta el acuerdo de libre comercio que entro en vigor en 2013, a través de la realización de predicciones dentro de la muestra sobre la base de estimaciones realizadas con el método de pseudo-máxima verosimilitud de Poisson aplicado a un modelo gravitacional. La muestra tomada fue de 153 países y se tuvo en cuenta el periodo comprendido entre 1980 y 2012, llegando a la conclusión de que existe potencial sin explotar para las exportaciones de Colombia a algunos países de la Unión Europea y viceversa.

Por otra parte, Méndez, Gómez, Romero, y Fajardo (2017) realizaron un análisis de los efectos económicos de las relaciones comerciales entre Colombia y Chile a partir de la implementación del Tratado de Libre Comercio, a través de la estimación de la ecuación de un modelo gravitacional que representa la influencia de las relaciones comerciales entre los dos países, en el periodo comprendido entre 1998 y 2016, lo que permitió estudiar el desempeño de las importaciones y exportaciones por sectores económicos y explorar la dinámica de la inversión extranjera directa efectuada entre los dos países. Este estudio llega a la conclusión de que el acuerdo comercial ha permitido el incremento en el comercio bilateral, las inversiones y la producción, y por tanto ha favorecido a los dos países.

Siguiendo los principios del modelo gravitacional para construir un modelo econométrico que le permita identificar los determinantes que influyeron en la variación del volumen de exportaciones entre Colombia y sus socios económicos, Ávila (2017), analizó el periodo comprendido entre los años 2000 a 2015, tomando como muestra 49 países. Llevó a cabo pruebas de diagnóstico que le permitieron elaborar un modelo que ofrece una estimación cercana a la realidad. También, destaca la relevancia adquirida por la ecuación de gravedad para la estimación de flujos comerciales y su uso para examinar los resultados de los acuerdos de integración económica regional.

Así mismo, Cardoso, Schneider, y Bechlin (2016) analizaron los efectos de la constitución del Mercado Común del Sur - MERCOSUR en los flujos de comercio de los países miembros en el período de 1994 a 2009, para lo cual utilizan un modelo gravitacional extendido, que permite analizar los diferentes sectores de la economía y a cada país. Concluyendo que el MERCOSUR logró aumentar el intercambio comercial, siendo de relevancia para los países miembros, principalmente en la exportación de productos del sector agrícola.

Metodología

Esta investigación es eminentemente cuantitativa, la estimación econométrica que se efectuó, esta cimentada en los modelos de datos numéricos. La literatura revisada en la disciplina de economía internacional ha situado a los modelos de Gravedad, como una alternativa para evaluar los flujos de comercio exterior entre distintos países sin importar su ubicación geográfica, por ello la utilidad de ese modelo para alcanzar los objetivos propuestos en esa investigación. Al respecto, se desarrolló un modelo econométrico gravitacional como herramienta para el estudio del comercio exterior del acero en EEUU, por lo que se procedió al análisis sobre la dinámica de ese sector industrial, mediante un modelo de panel de datos para determinar las variables más significativas.

Estimación Del Modelo

La técnica econometría utilizada para el procesamiento de datos fue un panel de datos, que permite relacionar una variable dependiente que contiene información de varios individuos en diferentes momentos del tiempo con variables independientes que cuenta con las mismas características. Es decir, los paneles de datos combinan dos tipos de datos: (a) datos de sección transversal y (b) datos de series de tiempo. En este estudio la ecuación que conforma el modelo tiene las siguientes características.

$$Y_{it} = \emptyset_{it} + \emptyset_t + B_1X_{1\,it} + B_2X_{2it} + B_3X_{3it} + B_4X_{4it} + B_5X_{5it} + B_6X_{6it} + B_7X_{7it} + B_8X_{8it} + B_9X_{9it}$$

Donde:

$\emptyset_{it}$= Es el coeficiente que absorbe efectos específicos para cada país e incorpora las variables específicas de cada país como la cultura, lenguaje, etc.

$\emptyset_t$ = Es una variable que intenta absorber efectos que ocurren en cada año.

Y_{it} Es el flujo de acero el país exportador i hacia Estados Unidos en el año t.

$X_{1\,it}$ Porcentaje de exportaciones de metales y minerales respecto al porcentaje de mercaderías.

X_{2it} Distancia en km desde la capital del país exportador i hasta la capital de Estados Unidos en el año t.

X_{3it} Producto interno bruto en dolares per cápita del país i en el año t.

X_{4it} Exportaciones de las cantidades de acero del país i hacia el resto del mundo en el año t.

X_{5it} Producción de toneladas de acero del país i en el tiempo t.

X_{6it} Inflación reportada del país i en el tiempo t.

X_{7it} Variable binaria que muestra si el país i tiene un acuerdo comercial con Estados Unidos en el tiempo t.

X_{8it} Variable que representa el Producto Interno Bruto (PIB) de un país en el tiempo t.

X_{9it} Número de habitantes que residen en la zona urbana del país i en el tiempo t.

Resultados

Los datos empleados para el desarrollo del modelo econométrico abarcan el periodo comprendido entre el año 2001 y 2016, para un (1) país importador y diez (10) exportadores. Los datos fueron recolectados de las bases de datos del Banco Mundial y World Steel Association (2019).

Como primera medida, se optó por emplear las técnicas de panel de datos fijos y datos aleatorios. Luego, se procede a utilizar el test de Hausman con la finalidad de identificar cuál de dos técnicas es la adecuada. En el primer modelo, se obtuvo un valor de p igual a -6.64[1], por lo tanto, existen problemas con el supuesto de asintoticidad del modelo. Por ende, se decide ejecutar un segundo modelo que extraiga la variable PIB per cápita y se opta por mantener la variable PIB, debido a que estas dos variables están relacionadas. Además, las variables población, PIB, flujo de insumos, distancia y producción fueron logaritmizadas en este modelo con el fin de reducir la escala de estas variables.

Del segundo modelo, se obtuvo un valor de p igual a 0, entonces, la corrida del segundo modelo muestra que la técnica a utilizar es la paneles de datos con efectos fijos. Al aplicar la prueba de Factor Inflación Varianza (VIF) se obtuvo que todas las variables que fueron aplicadas logaritmos tenían un VIF[2] mayor 350, por lo tanto, existen problemas de multicolinealidad. En la tabla 3 se puede apreciar los valores de los factores para cada variable.

Tabla 1: Factor Inflación Varianza no centrado para el segundo modelo

VARIABLE	VIF	1/VIF
Logaritmo de la población	2872.58	0.000359
Logaritmo del PIB	1817.88	0.000550
Logaritmo del flujo de insumo	1085.43	0.000921
Logaritmo de la distancia	787.40	0.001270
Logaritmo de la producción	359.38	0.002783
Acuerdo comercial	9.68	0.1032

[1] Si el valor de p es negativo significa que dentro de los datos existe una variable que viola los supuestos de asintoticidad del modelo, por lo tanto, hay un error en la aplicación del test de Hauman. Por otra parte si el valor p es mayor a 0 pero menor a 0.05 se asume que los datos de paneles de tipo fijo son el modelo de estimación adecuado para la corrida econométrica. Si el valor p es mayor a 0.05 de se utilizan los paneles de datos con efectos aleatorios.

[2] Valores superiores a 10 en el Factor de Inflación Varianza (VIF) indica que dicha variable tiene problemas de multicolinealidad.

Porcentaje de exportaciones	8.54	0.1157
Porcentaje de importación	5.58	0.1790
Inflación	3.64	0.2749

Nota: El cálculo del factor fue realizado en el software Stata 14.

Con el fin de arreglar los problemas asociados a la multicolinealidad, se opta por trabajar con las variables sin aplicación de logaritmos. Además, como los logaritmos de la variable población y PIB, tuvieron los factores de inflación varianza más altos se decide extraer las variables población y PIB sin logaritmos en tercer modelo. El test de Hausman de este modelo muestra que el valor de p es igual a 0, por lo tanto la técnica utilizada es panel de datos con efectos fijos. Posteriormente, se aplica el test de multicolinealidad y se observa que la variable porcentaje de importación presento un valor de factor mayor a 10, lo que permite concluir que esta variable está aumentando la multicolinealidad del modelo. En la tabla 4 se aprecian los diferentes valores de los factores obtenidos para cada variable.

Tabla 2: Factor Inflación Varianza no centrado para el tercer modelo

VARIABLE	VIF	1/VIF
Flujo de insumo	3.49	0.2865
Distancia	8.16	0.1225
Producción en toneladas	4.96	0.2015
Acuerdo comercial	1.64	0.6110
Porcentaje de exportaciones	4.49	0.22227
Porcentaje de importación	11.47	0.0871
Inflación	2.30	0.4346

Nota: El cálculo del factor fue realizado en el software Stata 14.

Se decide construir un cuarto modelo que no tenga en cuenta la variable porcentaje de importación, PIB y población urbana, pero se decide incorporar nuevamente la variable PIB per cápita, debido a que se considera necesario analizar los efectos de alguna de las dos variables relacionadas con el producto interno bruto sobre la cantidad de acero exportado hacía Estados Unidos y se desea observar los efectos que tiene sobre la multicolinealidad. Al nuevo modelo se le aplica el test de Hausman y el valor de p obtenido es 0.27, es decir, que la técnica de econometría a aplicar son los paneles de datos con efectos aleatorios. Luego se aplica el test de multicolinealidad y se observa que ninguna variable obtuvo un factor de inflación superior a 10. Tabla 5.

Tabla 3: Factor Inflación Varianza no centrado para el cuarto modelo

VARIABLE	VIF	1/VIF
Flujo de insumo	4.21	0.2376
Distancia	5	0.20
Producción en toneladas	2.91	0.3441
Acuerdo comercial	1.61	0.6199
Porcentaje de exportaciones	6.54	0.1528
PIB per cápita	4.21	0.2376
Inflación	2.77	0.3661

Nota: El cálculo del factor fue realizado en el software Stata 14.

Por lo tanto, el cuarto modelo tiene la siguiente forma $Y_{it} = \emptyset_{it} + \emptyset_t + B_1X_{1\,it} + B_2X_{2it} + B_3X_{3it} + B_4X_{4it} + B_5X_{5it} + B_6X_{6it} + B_7X_{7it}$. Luego del análisis de los test estadísticos se procede a analizar los coeficientes arrojados por la regresión que están organizados en la Tabla 5.

Tabla 4: Resultados de estimación del modelo de panel de datos aleatorios

Número de observaciones	160	
Número de grupos	10	
Flujo de acero	Coeficiente	Estadístico z
Porcentaje de exportaciones	212383.2	6.01***
Distancia	-119.27	-1.72*
PIB per cápita	14.06	2.31**
Flujo de insumo	0.041	5.14***
Producción en toneladas	-0.4798	-0.70
Inflación	11129.69	0.82
Acuerdo comercial	1374298	2.81***

*Nota: *** significativo al 1%, **significativo al 5%, * significativo al 10%*

Con respecto a la interpretación de los coeficientes:

- La variable producción e inflación en toneladas e inflación no tuvieron efectos significativos sobre el flujo de acero del país exportador a EEUU.

- La variable producto interno bruto per cápita se mostró significativa al 10%, y se observa que un aumento unitario de un dólar en el PIB per cápita genera un aumento de 14.06 toneladas de acero sobre el flujo comercial del país i con respecto a EEUU.

- La variable distancia tiene un efecto significativo al 10% y negativo, donde un aumento de un kilómetro genera una disminución en las toneladas de acero importada del 119.27 toneladas.

- La variable porcentaje de exportación fue significativa al 1% y positiva. Se muestra que un aumento porcentual en las exportaciones de metales respecto a las exportaciones de mercaderías genera un aumento de 212383.2 toneladas de acero exportado del país i a EEUU.

- Tener un acuerdo comercial con EEUU genera, a lo largo del tiempo, un aumento de 212383.2 en las exportaciones toneladas de acero respecto a aquellos que países que no lo tiene. La variable acurdo comercial fueron significativa al 1% y positiva.

- Un aumento en las toneladas exportadas de acero del país i hacia el resto del mundo generan un aumento de 0.041 toneladas de acero exportados hacia EEUU. La variable tuvo un efecto positivo y significativo al 1%.

Conclusiones

Se ha trabajado con el modelo gravitacional, a fin de extraer conclusiones sobre las principales variables que caracterizan el comercio internacional del acero con los principales socios comerciales de EEUU.

El modelo gravitacional confirma una vez más que la distancia tiene un efecto negativo, donde a mayor distancia menor es el intercambio comercial del acero. Así mismo un aumento del PIB afecta positivamente el comercio de acero con EEUU.

Al considerar otras variables como la inflación y la producción de acero, se demostró que tienen un efecto nulo sobre la variable intercambio comercial. Por otra parte, se encontró que los acuerdos comerciales con el transcurso del tiempo es una variable significativa para el aumento del intercambio comercial con EEUU. Lo cual nos indica que, al hacer un aumento de arancel, podría contraer el flujo comercial afectando de esta manera la economía de los países socios, principalmente Canadá y México, como países más cercanos a EEUU.

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Effective Methods of Project Management – between the Coercion and Subsidiarity

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Abstract

The article presents a critical analysis of project management methods. The evolution of these methods against the background of development of Management and Organization studies is discussed. Pressure methods, characterized by the usage of coercion and even violence in project and organization management, are contrasted here with the supportive methods. Despite favoring the modern methods (which exclude the coercion and violence) of project management in source literature, the parallel and simultaneous usage of various methods is noticeable though. The thesis that the effective project management requires the usage of flexible tension between the pressure and supportive methods is being defended in the article analogously to the Aristotle's Golden Mean rule. This is confirmed by the following concepts: Six Action Shoes by E. de Bono; situational leadership by K. Blanchard or D.McGregor's and W.Ouchi's theories which are a strong backup to the project management. Research methods used in the article are based on the literature study and case studies included in the previous cited articles of the author.

Keywords: Project Management, Coercion and Violence in Management, Subsidiary Methods in Management

Introduction

Elements of the coercion and even the violence in management can be found in every organization. Using the analogy of organization as a machine, a hierarchy, a culture and a political system (Morgan 1996), the various forms of the usage of coercion and violence can be indicated. In case of the mechanistic and hierarchical approaches to the organization, a coercion is inscribed in the idea of the functioning of these formations which reveals in the form of strict procedures, structures determining the roles of supervisors and subordinates, or the governance approach. Two subsequent analogies concern the coercion as an important element of the management; however, it is manifested in more veiled form. The cultural analogy is about developing consistent objectives of the organization's members to define a distinctive culture of this organization. Manipulation (a form of violence) in persuading people to behave in accordance with the external goals was interestingly depicted by F.Hayek (2003, p. 169,173). There is no better way than convincing people to believe in these goals, and the most effective method is to show these purposes as values which they have always recognized but had wrongly perceived or had not understood them before.

Coercion in the political analogy appears in the decision-making process by the majority of votes or compromise. This is usually not the win-win case for all involved parties, and not even the win-win-...-win case. This results in open or hidden opportunism among stakeholders who feel lossy in the final compromise (Jokiel 2016).

On the other hand, management concepts, methods and techniques, which emphasize the role of bottom-up initiatives of employees and require the loyalty and taking responsibilities, are developed. The examples of such concepts are: the theory of Y D. McGregor, brigade systems, management by objectives (MBO), empowerment (Conger, Kanungo 1988), and the turquoise organizations (Laloux 2014).

The aim of this article is a reflection on the evolution of project management methods. The methods which use the coercion (direct and indirect), as well as those using the supportive approach (subsidiarity) to employees/subordinates will be analyzed and evaluated in terms of their effectiveness in project management.

Pressure Methods (Based on Coercion)

Scientific methods of management and organization using the coercion and even the violence have a long time theoretical basis. The homo oeconomicus concept of Adam Smith is an unnatural model of human behavior particularly harmful in the field of management. Adopting this behavior model as a human nature, leads to a man's objectification in the result. Because the human nature is the same and is marked by a native egoism, it is easy to predict the motives behind the individual's behavior. Based on the selfish motives the one can easily control the man's behavior by stimulating the economic incentives. Employees lose their subjectivity and individuality becoming an impersonal workforce. This approach results in demands to pay sufficient salaries to enable them working the next day (Ikonowicz 2014). Works by O.A. Jermanski (Martyniak pp.244-252) have developed in the same vein – the author tried to normalize the work by calculating the intake of calories needed to perform physical activities. This mindset about employees had a significant impact on the management and organization at the end of 19th and the beginning of 20th century. An administrative approach by M.Weber was analogous to mentioned above. The concept of bureaucratic theory (Weber 2002 pp.160-168) is the basis for the systemic formation of any organization and is designed to ensure efficiency by procedures and instructions regulating the behaviors of the members. Therefore, it moved the interest of management and organization studies to systemic regulations (rules, procedures, etc.), and tuned out the mental sphere of employees at the same time. The mechanistic approaches to the organization of human work were only weakened after the Hawthorne Experiment. (Weber 2002).

One more example which links the past and the modern times is a matter of organizational structures. The functional structures introduced by F.W. Taylor at the beginning of the 20th century (Nalepka 2001 p.71), based on the division of labor and the concentration of job positions per functions, have survived in many companies to date. They are still doing well despite the criticism from many sides: a process approach, development of process-based business IT, logistics as an integrating approach, project optics, and others. The most common consequence is a strong position of CFOs due to their closeness to the main business efficiency measure which is a profit.

Coercion was implemented to the management methods based on these theoretical assumptions. 10 out of 14 management principles, which derive from H.Fayol, assume the authoritarian approach of superiors (Fayol 1947 p.56-58):

- Division of labor
- Authority
- Discipline
- Unity of order
- Management uniformity
- Subordination of individual interest to general interest
- Rewarding employees with fair and motivating salary - satisfactory, but not unduly high
- Centralization
- Hierarchy
- Governance - ensuring the right place for everything and every individual in the organization.

Only the last four emphasize the human face of management:

- Humane treatment of employees

- Staff stabilization - employees can achieve a proficiency in carrying the tasks
- Initiative - supervisor should partially give up his ambitions, so his subordinates can take the initiative
- Staff harmony - cooperation

In the 1960s, D.McGregor formulated the management theory X based on the assumptions of a bad human nature not without reason. Management based on the coercion has not passed the project management. Two types of such coercion can be indicated: direct coercion and indirect coercion.

1) Direct coercion

a) An autocratic management style. It is used not only in crisis conditions when the quick and indisputable decisions are made, but also in other projects. It depends on the superior's personality, rather than the project status. Orders are preferred then (which are one of the management functions deriving from H.Fayol).
b) Strict procedures, rules and regulations, and responsibilities as per some project processes are conducted (e.g. compliance with the tender procedures). In addition, the procedural correctness is often a smokescreen or a shield for those responsible for the project, its stage or a task. Formal arrangements and orders are the basis for proving one's arguments in conflict situations, which form a kind of protection and legitimization of made decisions.
c) Control and periodic appraisal of an employee's job performance, which in case of projects is related to the assessment after the completion of the entire project, stage or milestone. Is related to the results check. Prior to this check, controlled employees can feel the fear and take initiatives to hide the failures from the inspectors. The game starts and the controller and the controlled individual often take schematic roles. Even if the fear is rejected, the information about the work progress in relation to the plan will be exposed to deformation in the controlled one's favor, as the individual will always try to present and interpret them in more positive light. Also, such control can evolve into pathological cases of seeking dirt on colleagues etc. In case of failed projects, the common audit purpose is to look for someone to blame or so-called witch-hunting.
d) Overload and overtime. The unpredictability of projects and scale of the new cause that - as the proverb goes - each project lasts... two weeks, two days and two nights. The common crisis in many projects appears when the management or project managers realize that the schedule, scope and quality are at high risk. This moment usually appears at the end of the schedule. The simplest solution is to catch up with the works and take overtime hours with non-stop work for 48 hours. A business command or psychological pressure are used by management "for the good of the project".
e) Linear organizational structures which can also be found in projects. Coercion and the power resulting from the supervisor-subordinate relation often turns into an open violence - mobbing, financial and disciplinary penalties, reprimands, ignorance, humiliation, etc.

2. Indirect Coercion

a) Deadline. Project management through deadlines is a veiled coercion because it is basically limited to setting these deadlines. Project management limited only to defined deadlines and the task execution is convenient and not time-consuming. It enables the manager to manage several and sometimes a dozen of projects simultaneously, and the manager's work efficiency increases in such case. However, management based on deadlines could be a cause of many pathologies which have an impact on the task implementation and the work efficiency of subordinates. First of all, the situation of managing a dozen of projects simultaneously, which are supervised quite rarely (on deadline days), results in a decrease of management quality and thus the acceptance of "crumminess". Secondly, a demand for high probability of completing the task (e.g. 99%) to the fixed deadline, can activate protective efforts which are sometimes not even realized by the individuals. One of such mechanisms is a formation of time buffer to preserve contractors when the circumstances are unfavorable. This buffer is greater when the desired probability of meeting the deadline is also greater, and when more risk factors are included. Studies show that

the size of such buffer is statistically formed within the 100-200% efficient time level of work, that is the time required by contractors to complete the task (Goldratt 2000 p.54). Much of this time buffer is wasted at the beginning of the projects due to a phenomenon which was called in Management and Organization studies a "student syndrome", while in the health sciences a "procrastination" (King 1998). Even if the phenomenon does not occur (when the individuals who act according to the "no time to waste" rule are present), the task which is finished before the deadline is not being delivered with completed status. Responsible for such behavior are defense mechanisms which preserve the buffer for the future. In given situation, a slack time was not needed because the circumstances were favorable and the task was done before the deadline, however, there is no guarantee that such favorable conditions will occur in the future. Also, a bad time planning is a case, and one can expect that the similar time buffer might not be negotiated in the upcoming projects and which could be needed then. In addition, it is worth to mention a peer pressure, i.e. managers of parallel and similar tasks which missed the deadlines due to the student syndrome or were affected by the risk factors. The effect of mentioned behaviors of implementers who work on fixed deadlines is a significant level of time waste which has a direct impact on the cost perspective.

b) Formalized bonuses and penalties system. Interestingly, reward can be considered one of the coercion methods. A.Kohn, the author of "Punished by Rewards: The Trouble with Gold Stars, Incentive Plans, A's, Praise and Other Bribes", noticed that any rewards for higher efficiency is doomed to fail. He indicates four reasons why: 1) Rewards are a kind of punishment. Failure to receive a reward can often be seen as punishment, while receiving it often causes a sense of control resentment 2) Rewards can damage a relations between the people, and instead of cooperation, the competition to gain a reward or avoid the punishment starts 3) Focus is on the results, and interest of what have triggered the results is reduced 4) Rewards can discourage to take risks (Kohn 1993 p.61). Similar arguments are brought by A.Blikle (2016 p.81-96) who calls such acts a "carrot-and-stick". They are responsible for turning off the ethics and moral attitudes among employees interested in achieving the prize in fixed conditions. Also known and widely used are the methods of avoiding the control indicators by employees like (Sasin 2015 pp.268-272): periodic appraisals, the Parkinson's law, fraudulent taxi driver syndrome, etc.

c) Focus on the errors and imperfections. Project control and evaluation is focused on the identification of deviations from the planning assumptions. The attention is focused on the negative deviations (exceeding the timeline, budget, incomplete tasks, or low quality). These are important factors as they threaten the implementation of the project. It means that positive deviations such as early execution, cost savings, high quality or extra work are less important for project managers than the negative deviations

Methods to Humanize the Process Management

The result of Hawthorne experiment was placing a human in the center of interest of Management and Organization studies. Mechanistic paradigms have lost their explanatory power, while the following roles have been recognized in the specialist literature:
a) informal interpersonal relations (Czupiał, Karaś 2001, p.42)
b) bounded rationality (Kahneman 2012)
c) emotional intelligence (Golemann 2005)

If the main actor of Management and Organization studies is a human individual, the management methods should be adapted to the character of a person. Based on the theory of Y.D. McGregor, but also on many other recognized theoretical approaches such as: Theory of Constraints by E.Goldratt, where one of the basic pillars is a good nature of human, or 14 principles by E.Deming, many management methods excluding the coercion and violence have been defined. In the literature, those methods are known as humanized (Mendel 2004):

a) a Management by Objectives (MBO) concept developed and published by Peter Drucker (Carroll 1973)
b) Aggressive task planning in projects at the 50% probability level of completion within given time brackets (Jokiel, Marciszewska 2019). The Critical Chain Project Management concept assumes the "aggressive task planning" (Marek-Kołodziej, Łapuńka, Jagoda-Sobalak 2017

p.320) secured with a buffer at the project manager's disposal and not in the hands of executors of single stages. The concept of critical chain is a recognized solution to implement projects within set criteria such as time, budget, and scope. It eliminates phenomena such as student syndrome (procrastination), Parkinson's law, or multitasking.

c) Supporting control (Koził 2015 p.27). The concept makes sense only if the one could identify all threats related to completing the tasks. And again this is only possible in the full trust conditions between the supervisor and subordinate, which is determined by the lack of negative consequences for not completing the plan by the auditee.
d) Projects evaluation. Instead of control, the concept of evaluation is used nowadays. It is primarily intended to reveal problems and deviations from the set purposes, and not to seek the wrongdoers to punish them, but rather to improve the project management in the future. Problems and errors revealed in the evaluated projects are important for future ventures to not commit the same mistake again.
e) Supporting management/reverse leadership. The problem was noticed by Ch.Handy (1996 p.114) and proposed the reverse delegation as solution. The idea is to make way for individuals, who are lower in the structure, to ask the higher ones for help (delegate the rights or responsibilities), when they cannot find a solution alone.
f) Trust in the company or manager that they will share the end benefits of a project. The lack of rules of how the bonus pool is divided causes a confusion among employees and can lead to pathological and discretionary bonuses granting, but on the other hand it also has a positive impact. All interested parties should participate in the process of bonus funds distribution. The benefits of such method are a better information flow, participation in management decision-making process, knowledge of arguments and different points of view, necessity of cooperation within a team, group integration, etc. The best and most obvious way to divide these funds is through a dialogue.
g) Self-managed brigades. Forming teams managing their own work, taking over the responsibilities of planning, self-control, and self-evaluation. As well as the quality circles and Kaizen teams.
h) Empowerment. Encouraging people to be involved in decision-making process, developing the real impact of employees on the organization functioning, increasing employees' rights (Conger, Kanungo 1988, Mantel, Meredith, Shafer, Sutton, p. 107).
i) Replacing penalties with the motivating tools such as profit sharing or differentiated values of contracts, e.g. depending on the time of project execution. Higher rates for the execution within the "aggressive" time range, lower rates for late project execution.
j) Introducing the range of tasks instead of regulations. It is not possible to form completely closed procedures and instructions due to inability to predict all situations that might occur. That is why a general description of rules is sufficient to adapt a conduct to the needs of a specific problem situation (deBono 1997). Similar conclusions are drawn by K.Blanchard (2016).
k) Turquoise organizations as the management model in which the level of organization management awareness is the most decentralized and equal for all members of the organization. The concept was proposed and popularized by the Belgian author F.Laloux in 2014. This system was called a "partner democracy" by A.Blikle (Blikle 2017).
l) Positive Organizational Scholarship (POS). Instead of focusing on the identification and solution solving, it is worth to get inspired by best practices of successful projects. POS is based on the analogies to positive psychology by M.Seligman (Seligman, Csikszentmihalyi 2000).

Table 1 compares the coercion and supportive methods

Table 1: Pressure and supportive methods in project management

Pressure methods – coercion	Supportive methods (subsidiary)
1. Deadlines assume the 99% execution probability within set time frame	1. Aggressive planning of the 50% execution probability within set time frame
2. Appraising control	2. Supportive control, project evaluation
3. Authoritarian management	3. Supportive management, manager acts subsidiarily, reverse leadership by Charles Handy
4. Penalties and rewards, "carrot-and-stick"	4. Trust in the company or manager that they will share the end benefits (the bonus pool)
5. Set of duties, procedures and instructions, performance appraisals	5. Self-managed brigade, Empowerment self-assessment, quality circles, Kaizen teams, internal know-how
6. Contractual penalties	6. Share in savings, various contract values
7. Detailed regulations	7. General and flexible rules, situational leadership, developmental coaching
8. Linear structures	8. Turquoise organizations
9. Focus on errors and failures	9. Positive Organizational Scholarship

Source: self-study

A Pragmatic Approach

Criticism of both pressure and humanized methods can be found in the source literature. There is no only one right and the best method, technique or tool in the Management and Organization studies. Recognizing any management method as the leading one in the theory (which would be equal to achieving a paradigm) would deny the sense of competition between companies because any organization which would follow these methods would be eventually successful (Jokiel 2006, p.61).
Context, environment and specific situation are of significant importance in the Humanities. Hence, the following concepts have been developed:

1) Theory Z, initiated by D.McGregor and completed by W.Ouchi. It was a synthesis of company's interest and the individuals' aspirations for self-realization. The theory includes both needs of low and of a high order, and combines some elements of theory X and Y. Companies which have implemented this approach are characterized by teamwork, organizing trainings for their employees, strengthening the employees' involvement in the company's affairs, high care for their employees, permanent employment, an excellent information flow (Ouchi 1981).
2) Six Action Shoes by E. de Bono (1997)
3) Situational leadership by K.Blanchard (2016)

Mentioned researchers indicate that different situations require the use of different action models - orange wellies for crisis situations or pink slippers when the sympathizing efforts focused on the other person's feelings are needed. However, the existing conditions do not usually match the ideal situations described by the specific color of shoes. Therefore, the action styles should be mixed and modified as well as include a hybrid of two or more styles, because one usually wears a pair of shoes.
Similarly, K.Blanchard postulates the matching of leadership styles [S-1 (Instructing) high performance-based and low-relational; S-2 (Selling) high performance-based and high-relational; S-3 (Supporting) low performance-based and high-relational; S-4 (Delegating), low performance-based and low-relational] to the level of employee's readiness [R-1 low competences and high willingness, R-2 low competences and low willingness, R-3 high competences and low willingness, R-4 high competences and high willingness].

To effectively manage the projects, it is necessary to compose an appropriate mix of pressure and humanized methods according to existing circumstances and the context. Similarly to the Aristotelian postulate of the Golden Mean, a flexible tension should be formed between the pressure and

supportive methods in accordance with the principle: "a subtle coercion is a basis of the spontaneous commitment".

In addition, projects are carried out in different countries, cultures, environments by various managers. Sometimes pressure methods work and sometimes they don't. It means that an effective management requires various methods. Chronologically, the pressure methods were the earliest developed ones in Management and Organization theory. A sign of our times is a focus on the humanization of project management processes, because the basis of project management is a process approach (Trocki 2012, p.50). However, it does not mean that the old pressure methods have definitely been abandoned. There are projects carried with pre-scientific, forcing, and authoritarian methods, e.g. in the army, and not only in the underdeveloped countries. Also, there are projects implemented by the turquoise organizations not only in the highly developed countries. These projects are successfully implemented simultaneously. It is feasible due to the fact that only some organizations/projects move to the next era of Management and Organization studies development - this is the avant-garde of changes, and the rest remains in the realities of their development stage, especially when they are not forced by the external factors.

Conclusion

Organizations are just like people - not all of us have evolved into the postmodern era yet, e.g. in the field of literature. The vast majority of people read the last fiction book at school time and stopped their literary development at this stage of life. Functional illiteracy is also the case in society - and sometimes a person who is illiterate gets along - which for the literacy development means the 0 level. Analogously, primitive organizations possibly exist in the economy, and can do well on the market. The use of literary periods as a metaphor for subsequent organizational concepts has one more advantage. The phenomenon of certain manner, of vogue for writing, has accompanied the passing of old one and the beginning of the new literary period. The same phenomenon occurs while popularizing the management concept. Some of them were fashionable in the past, e.g. Taylorism, the cascade model of IT projects (waterfall model), linear model (Wysocki 2019, p. 409) or project life cycle (e.g. PMBoK 2017), and some are currently promoted, e.g. knowledge management or agile methodologies in project management. (Morris 2013 s. 90). Ch. Bredillet (2008) lists until Nine Schools of Project Management Research.

When reviewing the latest management literature, the researchers' attention is focused on improving the management in a group of organizations/projects belonging to the avant-garde of changes. One can get the impression that other organizations/projects do not exist in modern economies of highly developed countries. Meanwhile, a number of agile projects or learning organizations is relatively low when compared with a total number of organizations. However, the focus of researchers on the modern organizations is justified. Many studies have been carried out, for the sake of organizations/projects which are managed with the spirit of previous organizational periods, and can be found inspirational and useful. This is why moving forward is the only development path for Management and Organization studies. Considering these observations, it is true to say that we live in many eras of scientific thoughts of Management and Organization studies at the same time, however, more in the concept of agile project management (Jokiel 2012).

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Work-Life Balance - Employees' Private Lives as An Element of The Concept of Corporate Social Responsibility

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Abstract

In the current socio-economic conditions, people may experience a fusion of work and family life. This situation may lead to a disturbance between key areas of human life. Therefore, new challenges are emerging for Polish organizations in the field of work-life balance related to the organization of work and working time and the expectations of employees. The selection of CSR tools should be a response to the needs of diverse employee groups.The paper presents the issue of balancing professional work with non-professional life in the context of CSR strategy. The first part of the paper is theoretical and was based on a literature analysis of the main issues and assumptions of the concept of corporate social responsibility in relation to employee issues. The second part is the presentation of the results of the survey. Its purpose was to obtain information on the expectations of employees of different generations towards the organization in terms of facilitating the reconciliation of professional and personal life.

Keywords: Corporate Social Responsibility in Organization, Employees of Different Generations, Expectations, Stakeholder, Work-Life Balance

Introduction

At present, corporate social responsibility is widely recognized by both theoreticians and management practitioners. Business entities, realizing the positive impact of CSR on the environment, more and more often decide to undertake practical activities related to its implementation. It is now believed that CSR is a major factor that has a significant impact on achieving long-term business success because it draws attention to the needs of various stakeholder groups.

The concept of corporate social responsibility indicates the importance of including prosocial, economic and environmental issues in the organization's activities. It applies to all areas of activity. One of them concerns employment and responsibility in the workplace. CSR requires employers to create work conditions that meet the needs and expectations of employees. Nowadays, efforts to balance work and private life are particularly important, as we are dealing with the invasion of work "on a life outside work, whose time is constantly shortened. As a result, employees are completely focused on professional duties, and work is seen as an autotelic value. The cult of work is growing, because being busy is one of the highest values, it is an indicator of status and prestige, and is also a testimony of dedication of employees to the organization employing them" (Pluta 2014, p. 181).

Organizations adopting a proactive strategy in the field of creating working conditions should implement solutions aimed at reconciling two spheres of life - professional and private. Maintaining harmony between them requires an open attitude of both employers and employees leading to the achievement of the desired state.

The implementation of this task requires the support of the company's management, manifested in activities focused on the proper organization of working time, so that employees can make individual choices. To find solutions, it becomes necessary to shift the focus to alleviating the conflict related to work-life balance, rather than focusing on maintaining an ideal state of balance between these spheres of human life (Gotowska 2014, p. 64).

The aim of the study was to recognize the expectations of employees of different generations towards organizations in terms of facilitating the reconciliation of work and personal life.

The concept of CSR and Stakeholder Theory

In contemporary literature on the subject, many definitions are explaining the term corporate social responsibility. When interpreting it, the author of the study refers to the definition proposed by K. Anuszkiewicz, according to which corporate social responsibility means the voluntary obligations of entrepreneurs to include social and environmental issues in business activities and to take responsibility for decisions made and their impact on relations with the environment in which the organization is functioning (Anuszkiewicz 2012, p. 34). This view is shared by G. Wolska, who writes that "the social responsibility of the organization is based on the voluntary, ethical and responsible implementation of the principles contained in this concept not only in the own interest (...) but in the interest of all stakeholders with whom the organization conducts business" (Wolska 2015, p. 86).

Stakeholders are a key concept in creating and implementing corporate social responsibility activities. Stakeholders are defined as people or groups that can influence the organization or are influenced by its activities (Buczkowski 2014, p. 17). Stakeholders can be divided into two categories. The first category includes people associated with the organization based on formal contracts or agreements that have an impact on building its market position. It includes employees, managers, and shareholders whose interests are connected with the functioning of the organization. The second category of stakeholder group includes clients, suppliers, recipients and other groups located in the external environment of the organization (Hąbek 2009, p. 78).

According to the basic assumption of stakeholder theory that employees are the most important part of an organization, specific expectations should be expected from them. It is emphasized that meeting these expectations determines the survival of the organization. Therefore, the relationship between the organization and its stakeholders should bring measurable benefits to both parties. By building positive relationships, which are based on the principle of acceptance of the organization’s goal, it becomes possible to succeed in business (Furmańska-Maruszak, Sudolska 2017, p. 254).

It is worth noting that the theory of stakeholders prompts the organization to focus attention on all interested parties expressing readiness to engage in its activities. This approach is consistent with maximizing value, and this means that efforts should be made to acquire stakeholders capable of taking initiatives to increase the value of the organization (Wójcik-Karpacz 2018, p. 10). The increase in requirements for organizations in the context of the implementation of CSR principles leads decision-makers to seek answers to the question: Which actions towards employees as key stakeholders should be undertaken by socially responsible organizations so that they can be considered consistent with the needs and expectations of employees?

The answer to the above question requires determining based on which relations with employees, organizations are ready and should realize their own goals in business. The theory of stakeholders assumes that values are a necessary condition for the proper functioning of an organization. The organization's activities should be implemented based on the highest standards of corporate social responsibility so that they are a source of inspiration for their stakeholders and create relationships that are beneficial to all parties (Zbierowski 2012, p. 33). A responsible organization should conduct a dialogue with employees as key stakeholders, enabling the organization to recognize and meet employees’ needs and expectations.

An important area of activities of socially responsible organizations towards employees is to provide them with proper working conditions conducive to the reconciliation of work and private life. Managers have a special role in this aspect. As part of their role, they should engage in identifying the needs of employees and seeking opportunities to meet them. This can have a positive impact on the development of mature relations between the supervisor and the employee, based on a sense of mutual understanding and trust. Strong professional relationships can lead to the formation of bonds

with subordinates in the long term, which is usually reflected in an increase in employee's involvement in the performance of assigned tasks. Maintaining work-life balance is beneficial for both employees and the employer.

An employee whose professional and personal life is in harmony has a better frame of mind and health, eagerly pursues passions, and uses the opportunities for development. According to their preferences and needs, the employee properly divides time and energy to professional and private life (Walentek 2019, p. 20). From the employee's point of view, the benefit is also the ability to perform work-related activities without feeling guilty towards one's family. In turn, the employer gains greater work efficiency of employees who are not at risk of burnout. A more rested and relaxed employee can perform the tasks in a shorter time, which in turn leads to a greater job satisfaction.

Work-life balance as a Manifestation of Corporate Social Responsibility

In literature, the term work-life has various definitions. The lack of agreement in the interpretation of this wording results from the ambiguity of the concept of "life", which consists of many human activities not related to work. These include areas such as family, social and personal life (Hildt-Ciupińska 2014, p. 14). As suggested by S. Borkowska, the condition for achieving a work-life balance is the ability to maintain communication between work and other dimensions of human activity. Generally speaking, this balance occurs when work does not conflict with non-professional functioning and vice versa (Borkowska 2011, p. 18).

L. Machol-Zajda, talking about maintaining a work-life balance, takes into account the possibility of human influence on when, where and how much time to spend on the implementation of tasks in the quest to integrate these two spheres of life. Achieving a state of satisfactory balance can take place when the right proportions in the relationship between work and private time are maintained (Machol-Zajda 2008, p. 29). It should be noted that there are different individual proportions in which people engage in particular spheres of life, they may even change depending on the phase of the life cycle (Sadowska-Snarska 2014a, p. 35).

When considering the issue of a healthy balance between professional and family commitments, D. Clutterbuck believes that a person can deal with problems related to the separation of work from the rest of life, striving to achieve security and stability in individual spheres. Among the main determinants of synergies in the relationship between work and private life, an important place is occupied by (Clutterbuck 2005, p. 26):

- becoming aware of different requirements and making informed choices about investing time and energy,
- selecting the values on which these choices should be based.

If the above conditions are not met, there is a risk of conflict between the sphere of professional and non-professional life. D. Clutterbuck points to the existence of complicated relations between these spheres by describing five states concerning the interaction of professional and personal life (Lipińska-Grobelny 2014, p. 52):

- "existence, that is, a state of continuous work in the absence of resources to invest in other areas of life;
- conflict, when one part of life excessively or even dysfunctionally enters the other;
- integration, which describes the situation of greater or lesser reconciliation of various aspects of life;
- inactivity, i.e. involuntary or voluntary reluctance to engage in work;
- hedonism, which means no desire to work and devoting all energy to play".

Only the state of integration influences the balance between work and private life.

In the context of the discussed issues, there are terms referring to the issue of reconciliation of work and time for the family. According to the concept of P. Voydanoff, work-life balance is closely

related to the quality of professional and family roles. It allows to assess the extent to which labor resources help meet family needs and the positive impact of family resources on carrying out tasks related to professional responsibilities (Lipińska-Grobelny 2014, p. 52). In turn, according to the theory of J.H. Greenhaus, K.M. Collins and J.D. Show, in maintaining balance, great importance is attributed to certain factors that include (Smoder 2015, p. 134):

- balance of time which means the same amount of time allocated to commitments related to fulfilling professional and family responsibilities;
- balance of commitment, closely related to commitment to work and household responsibilities;
- balance of satisfaction, which is associated with the same level of satisfaction with the role of the individual in the professional and family sphere.

Everyday life can cause many difficulties in maintaining balance. In the opinion of C. Sadowska-Snarska, the assumption that we should show equal commitment in various spheres of our life is not sufficiently justified. This is because the balance between work and family life varies from person to person depending on age, gender, education, and family situation (Clutterbuck 2005, p. 35; Sadowska-Snarska 2014a, p. 35). Throughout life, social roles and obligations change. Therefore, employees need support in various forms in the field of balancing professional and family roles. Support provided to them should be tailored to their individual needs and everyday situations (Smoder 2015, p. 135). One can speak of achieving a work-life balance at a satisfactory level when it provides satisfaction and joy to a specific person at a given time (Sadowska-Snarska 2014b, p. 52).

Research Methodology

The survey was conducted from September 2018 to March 2019 among people working in Poland in the Śląskie Voivodeship. The study aimed to identify the expectations of employees of different generations towards organizations in terms of facilitating reconciliation of professional and personal spheres. The questionnaire was conducted in electronic form (CAWI) available through a web browser and completed by the participants of the study. Each participant received an e-mail invitation containing a link to the survey and individual and one-time access to the questionnaire. The survey used a questionnaire, which consisted of closed or semi-open questions and metrics. 820 invitations to participate in the survey were sent. The survey was anonymous and voluntary. The author received 734 correctly completed questionnaires. The author used stratified sampling and included in the study employed people only, therefore the number of employees is equal to the sum of people participating in the survey.

The analysis of the socio-demographic characteristics of the respondents participating in the study was based on such variables as: age, gender, and seniority. Women dominated in the population of working people in the Śląskie Voivodeship who agreed to take part in the survey. It can be assumed that this was due to a greater desire to answer survey questions.

The characteristics of the research sample are presented in Table 1.

Table 1: The characteristics of the research sample

Specification	Baby boomers	X	Y	Z
Women	9%	19%	15%	8%
Men	8%	16%	18%	7%
Seniority				
up to 1 year	0%	0%	1%	5%
2-5 years	0%	0%	6%	9%
6-15 years	1%	2%	13%	1%

16-25 years	2%	20%	12%	0%
26+ years	14%	13%	0%	0%

Source: author's own research

$\chi 2$ independence tests were performed for the given test sample. They were to determine whether there is a statistically significant correlation between individual answers and the respondent's age, gender, and seniority.

The null hypothesis (H0) assumes that there is no statistically significant relationship, whereas the alternative hypothesis (H1) indicates that such a relationship exists. The tests were carried out with a significance level of α=0.05. The results are presented in the tables 3 and 4.

Expectations of employees of different generations towards the activities of organizations supporting reconciliation of work and personal life in the light of empirical research

Nowadays, society is exposed to difficulties in reconciling work and personal life. The reason for the conflict between work and private life may be the lack of adequate amount of time as well as its improper planning during the day or week, which in turn leads to the overlap of certain obligations. The average weekly working time in Poland compared to the average for all EU Member States in 2010-2015 is presented in Table 2.

Table 2: Weekly working time by distinguished categories in Poland and the European Union (in 2010 - 2015)

Year	Employed		Self-employed		Helping family members	
	EU	Poland	EU	Poland	EU	Poland
2010	36.5	39.7	43.8	45.3	34.5	35.5
2011	36.4	39.7	43.4	44.8	34	35.2
2012	36.4	39.8	43	45.2	33.7	35.9
2013	36.3	39.8	42.7	45.3	33.8	36.7
2014	36.3	39.9	42.6	45.2	34	36.6
2015	36.3	39.9	42.5	44.8	33.8	37.4

Source: (Jarmołowicz, Kuźmar 2017, p. 88)

The table above shows that the highest number of hours per week was for self-employed workers (in the EU). Fewer hours were reported for employed persons and for helping family members. Similar trends could also be observed in Poland. Considering the ongoing changes in working time among the specified categories, the working time of employed persons remained at a relatively constant level not exceeding 40 hours during the week. In turn, the working time in the group of self-employed persons gradually decreased. In addition, it is worth noting the increase in the average working time among helping family members, which increased from 36.7 hours a week in 2013 to 37.4 in 2015. On the other hand, a decreasing trend occurred (in this category of employment) in the case of the average for EU countries.

One of the main instruments for reconciling work and personal life is undoubtedly the organization of professional work. Respondents were asked to indicate the solutions they expect in order to achieve a balance between both spheres of human life. Table 3 presents the results regarding the expected solutions from employees of different generations. Column headings are constants.

Table 3: Expected support from the organization, conducive to reconciliation of work and personal life

	Flexible schedule	Partial work from home	Flexible break hours	Possibility of leaving work in case of emergency	Task-based working time	Additional paid leave	Part time work
Generation							
Baby boomers	27%	19%	85%	79%	61%	93%	81%
X	40%	29%	78%	77%	40%	96%	53%
Y	65%	53%	51%	67%	69%	44%	28%
Z	62%	45%	48%	79%	70%	41%	31%
χ^2	65,03	53,92	76,62	10,48	52,87	236,90	108,93
Hypothesis	H1	H1	H1	H1	H1	H1	H1
Gender							
Women	53%	51%	56%	77%	56%	52%	49%
Men	44%	33%	53%	68%	69%	43%	41%
χ^2	5,94	24,33	0,67	7,47	13,18	5,95	4,74
Hypothesis	H1	H1	H0	H1	H1	H1	H1
Seniority							
<1 year	39%	24%	13%	41%	76%	10%	13%
2-5 years	63%	61%	54%	80%	64%	56%	33%
6-15 years	49%	58%	81%	91%	69%	82%	38%
16-25 years	38%	15%	83%	99%	50%	79%	87%
26+ years	19%	23%	87%	53%	38%	87%	98%
χ^2	64,24	123,52	147,81	193,37	46,79	142,47	306,18
Hypothesis	H1	H1	H1	H1	H1	H1	H1

Source: author's own research

The obtained research results will be presented based on the occurrence of statistically significant relationships between the expected solutions in the field of work-life balance, and variables regarding age, gender and seniority.

One of the factors differentiating the results obtained is the age of the respondents. People representing generations Y and Z more clearly articulate their expectations for activities supporting the reconciliation of work and personal life in terms of the ability to decide on the start and end times of work, compared to previous generations. The differences between generations Y and Z in this matter were not large and were within 3 percentage points, while much larger compared to the baby boomers' generation where the difference amounted to 38 percentage points. Here, a greater number of positive responses were also identified among employees of generation X, and the difference between them and generation Y was 15 percentage points. It is worth comparing the above results to those obtained by American scientists from the University of New York. Studies conducted among graduates of this University have shown differences between individual generations in beliefs regarding the work-life balance. Respondents from the baby boomers' generation group admit that

they are less likely to use Work Life Balance programs compared to representatives of generation Y. The younger generation, describing their attitude to WLB, expressed their will to use the facilities designed to combine both areas of human activity - work with family life, despite the belief that their implementation involves risk. This approach can result in raising the level of employee control in achieving a balance between work and private life (Parker, Citera 2010, p. 37). In the light of the above, the literature on the subject expresses the position according to which there is a direct relationship between the employee's control over working time and the reduction of imbalances between the professional and private spheres. This control reduces the negative impact of working time (including long working hours) on work-life balance. Employees who have an impact on making decisions about their working time and free time schedule are less likely to neglect their family obligations because of work (Geurts et al. 2009, p. 231).

The results of the study conducted by M. Uba, J. Dark, M. Duquette, M. Yendt, M. Gnatek, and B. Gallanti confirm that the age criterion is important for the perception of flexible working conditions and that generation Y in comparison with other generational groups, perceives more benefits resulting from their implementation. Flexible working time is a priority for generation Y. It is a good solution to meet family expectations, take care of one's health and maintain relationships with others (Uba et al. 2012).

Analyzes have shown that the expectation of partial work at home is positively correlated with age if the profession allows it, as it enables remote contact and sending information to the company. It turned out that this solution was also most expected by generation Y. This type of solution is seen as an advantage especially by young parents caring for a small child and other people of this generation who could not be in the company every day. The smallest differences in expectations regarding this type of support were recorded between generation Y and Z, and they amounted to 8 percentage points, while the differences in expectations between generation Y and the baby boomers were very noticeable and amounted to as much as 34 percentage points.

Task settlement of work turned out to be another popular solution among respondents of different generations. Employees of generation Z (70% of responses) and Y (69% of responses) feel the need to apply this solution to a comparable degree. They believe that it is a beneficial solution for them, because they can plan their work time and can be accounted for effects, i.e. tasks. The advantages of this type of support are noticed by the oldest of generations - baby boomers. The differences between representatives of baby boomers and employees belonging to the youngest generation in terms of expectations associated with this type of support were not significant, they were within 9 percentage points. Attention should be paid to the high level of awareness of these generations regarding the expectations related to the possibility of leaving work in case of emergency (generation Z - 79% of indications, baby boomers - 79% of indications). Older employees, on the one hand, play an important role in the family - caring for dependents (children, grandchildren, disabled family members), on the other, care is often a barrier to their professional activity – its continuation or resumption (Hildt-Ciupińska 2016, p. 6). Therefore, combining work and care, according to older respondents, would be significantly facilitated by their ability to leave work in case of an emergency.

Another issue related to age was the part-time employment. It could be observed that expectations regarding this dimension of working time were at a high level among employees of the baby boomers' generation (81% of responses) and generation X (53% of responses). In turn, there was a large disparity in expectations between the older generation of baby boomers and employees belonging to generation Y. The older generation, achieving a high result, exceeded generation Y by 53 percentage points. Feeling the need for them to perform work on a lower hourly basis may result from the need to organize work and working time in various ways according to the individual preferences of the employee and their family obligations.

Another solution conducive to combining family and professional life is the possibility of taking additional paid leave, which is most strongly indicated by representatives of two generations - X (96% of responses) and baby boomers (93% of responses). Such high indications of respondents may result from the fact that these employees are often more burdened with care obligations than younger

people. It can be observed that people aged 50 plus take care of their own children, grandchildren and older parents at the same time. This study shows that this solution is also expected by employees from the generation - Y (44% of responses) and Z (41% of responses). Especially in the group of employees from generation Y, the fact of taking care of younger children deserves special attention, which is often associated with the need to take additional paid leave.

Statistically significant correlations between the gender of respondents and the selected answer in the area of the expected action supporting the maintenance of work-life balance were also confirmed. The obtained research results show differences in the assessment of flexible working conditions among men and women. They show that women (most often from generation Y) would appreciate the possibility of flexible working hours more than men. Similar conclusions were obtained by research conducted by Greek scientists S.K. Giannikis and D.M. Miahail, which indicates that women need more time flexibility than men. Positive opinions about work characterized by flexibility of time are perceived among women through the prism of benefits resulting from the possibility of better reconciliation of work and personal life, employment and being more productive. In contrast, men's perceptions show the risks associated with work in alternative forms, which most often include: the possibility of lowering income, reducing opportunities for career development, limiting the possibility of building good relationships with colleagues (Giannikis, Miahail 2011, pp. 417-432).

In this study, the author attempts to verify the hypothesis about the effect of the gender factor on the perception of flexible working conditions in the context of work done at home. Research results indicate that the perception of flexible working time solutions varies according to gender. Polish women (51% of responses) would like to perform their professional duties remotely more than men (33% of responses). Women from generation Y and Z pay more attention to this aspect than men. The differences amounted to 18 percentage points in favor of women. The undoubted advantage of this solution, especially noticed by women, is the possibility of avoiding the need to stop working, even in connection with temporary obstacles resulting from personal situations. (e.g. childcare obligations).

Similar findings result from research conducted by C. Sullivan and J. Smithson. They point to a different approach to this issue in terms of gender. This is due to the multitude of roles that a woman takes as a wife, mother, housewife. Women who fulfill their professional obligations as part of flexible solutions use the time saved for taking care of children and performing housework, while men show greater interest in complying only with obligations arising from professional work even when they do it at home (Sullivan, Smithson 2007, pp. 448-461).

The obtained results show that men clearly prefer task-based work settlement. There were significant differences between men and women in terms of expectations associated with this type of support. The differences amounted to 13 percentage points in favor of men. The results of the analyzes confirm the importance of solutions regarding the social roles of women and men related to childcare. Childcare absorbs women and men to a high degree, especially from generation X and Y. The involvement of men in caring for children or grandchildren is relatively high compared to women. Combining work and care would greatly facilitate their part-time work - women (49% of responses), men (41% of responses).

Seniority is another variable that significantly correlates with expectations for solutions that can help maintain a balance between work and personal life. Persons with seniority over of 2-5 years most expect the use of flexible hours (63% of responses). On the other hand, people with over 25 years of experience (19%) reported lower expectations in this respect. The difference in expectations in this case was 44 percentage points. A similar situation occurred at the level of the relationship between seniority and work from home. Visible disproportion should also be confirmed between the expectations of people whose seniority was in the above specified range, and people with seniority in the range of 16-25 years. The difference between them was at the level of 46 percentage points. It has been observed that with increasing seniority, expectations regarding the use of flexible break times are increasing. The highest percentage of respondents awaiting the implementation of this solution was recorded in persons with more than 25 years of experience (87% of responses), 16-25 years of experience (83%), 2-5 years of experience (54% of responses), and the lowest among employees with

up to 1 year of experience (3% of indications). The highest percentage of respondents expects the possibility of leaving work if necessary in the group of people with 16-25 years of experience (99% of responses) and 6-15 years of experience (91% of responses), and the lowest among people with up to 1 year of work experience (41% of responses). In the group of people with the lowest seniority, there is a tendency to increase the percentage of positive statements in response to the analyzed questions about task settlement of work (76% of responses). This solution also maintains a high level of indications in the group of respondents with 2-5 years of experience (64% of responses) and 6-15 years of experience (69% of responses). In addition, it was noted that the demand for part-time employment increases along with the increase in seniority. The advantage of this type of solution, as indicated by respondents, is the ability to perform work in a constant or flexible working time. This gives them great flexibility, because it avoids exceeding the daily working time norm.

Employees of different generations also expect solutions to support families with children. Table 4 shows the solutions enabling achieving the synergy effect between family life and work. Column headings are constants.

Table 4: Expected forms of support for families with children

	Longer maternity and paternity leave	Part-time work	Reduction of employment hours or overtime work	Telework	Help in finding a childcare facility	Organizing company kindergartens	Partial coverage of the cost of the child's stay in kindergarten	Financial or material help for the holidays
Generation								
Baby boomers	6%	73%	19%	17%	41%	5%	87%	74%
X	23%	42%	39%	19%	74%	32%	61%	71%
Y	40%	33%	43%	73%	97%	42%	87%	82%
Z	37%	31%	47%	93%	84%	43%	85%	84%
χ^2	55,64	63,01	25,82	283,37	153,74	59,41	62,93	12,28
Hypothesis	H1	H1	H1	H1	H1	H1	H1	H1
Gender								
Women	35%	44%	57%	74%	91%	42%	84%	82%
Men	24%	28%	19%	38%	63%	31%	81%	83%
χ^2	10,62	20,29	111,58	96,71	82,39	9,55	1,15	0,13
Hypothesis	H1	H1	H1	H1	H1	H1	H0	H0
Seniority								
<1 year	58%	25%	17%	43%	69%	29%	78%	81%
2-5 years	30%	29%	52%	74%	77%	45%	82%	75%
6-15 years	29%	21%	58%	82%	98%	46%	97%	73%
16-25 years	5%	61%	19%	27%	40%	20%	39%	86%
26+ years	2%	55%	34%	48%	46%	2%	99%	88%
χ^2	149,90	82,37	79,23	132,04	147,89	114,85	265,64	18,33
Hypothesis	H1	H1	H1	H1	H1	H1	H1	H1

Source: author's own research

Analyses show that there were statistically significant relationships between the selected solutions in the field of work-life balance and variables regarding age, gender, and seniority. Studies show that there is a positive correlation between:

- age of respondents and indications for longer maternity and paternity leave (generation Y 40%, generation Z 37%, generation X – 23%, baby boomers – 6%);
- respondents' gender and indications for: longer maternity and paternity leave (men 35%, women 24% - difference of 11 percentage points), part-time work (women 44%, men 28% - difference of 16 percentage points), reduction of employment hours or overtime work (women 57%, men 19% - 38 percentage points difference), telework (women 74% , men 38% - 36 percentage points difference), help in finding a nursery or kindergarten for a child (women 91%, men 63% - 28 percentage points difference), organizing company kindergartens (women 42%, men 31% - 11 percentage points difference);
- seniority of respondents and indications for: longer maternity and paternity leave (the largest number of indications among employees with short seniority up to 1 year - 58%, the smallest - people with seniority over 26 years - 2%), part-time work (employees with 16-25 years of experience - 61%, and people with 6-15 years of experience 21% - 40 percentage points difference), reduction of employment hours or overtime work (people with work experience in the range of 6-15 years - 58%, and people with 1 year of experience - 17%, the difference of 41 percentage points), telework (a slight difference in percentage indications was observed between persons with a seniority of 26 years and older - 48% of indications and persons with short seniority up to 1 year - 43% of indications, the difference between them was 5 percentage points), help in finding a nursery or kindergarten for a child (a slight difference in percentage indications was noted between persons with 26 years of work experience or older - 46% of indications, and people with 16-25 years of work experience - 40% of indications, which gives a difference of only 4 percentage points), organizing company kindergartens (a similar percentage of indications was obtained among people with 2-5 years of experience and 6-15 years of experience - the difference between them was only 1 percentage point), partial coverage of the child's stay in the kindergarten (the highest number of expectations is signaled by employees with work experience in the range of 26 and more years of work - 99% of indications and from the 6-15 years of experience - 97% of indications - the difference between them amounted to 2 percentage points), material or financial assistance for the holidays (high and similar results were obtained among employees with 16-25 years of work experience - 86% of responses and with seniority of 26 years or more - 88% of indications - a difference of 2 percentage points and between persons with 2-5 years of experience - 75% of indications, and persons with seniority in the range of 6-15 years of work - 73% of indications - difference 2 points rates).

In conclusion, expectations reported by employees concern many aspects, such as the organization of working time, solutions facilitating childcare, maternity and paternity leaves, and social assistance. In the context of implementing facilities to provide support in solving problems related to work-life balance, the question arises - who should benefit from these solutions? As A. Smoder notes based on of R. Gerlach's statements: “(...) are their purpose really to ensure the balance discussed here, or maybe more to facilitate the employee's better / more engaged performance of professional tasks by providing child care, health care, recreation, rest and social assistance" (Smoder 2015, p. 145). Research shows that flexible work organization is primarily subordinated to the needs of employees, from which they derive many benefits. It is conducive to the proper distribution of tasks and responsibilities among family members, helps to synchronize working time with facilities providing childcare (Ratajczyk 2010, p. 57). Only employees who are satisfied with the working conditions will repay with effective work. One cannot ignore the fact that these solutions make it possible to satisfy the interests of business entities. In the opinion of H. Foltyn, flexibility in the organization of working time can be understood as "an adaptation of working time to the various needs of business organizations expressed by both employers, employees and various external entities interested in the activities of the organization" (Fołtyn 2012, p. 298). It is worth noting that these solutions can be mutually beneficial to all stakeholders.

Conclusions

According to the concept of corporate social responsibility, business organizations should take into account the expectations of their key stakeholders, including employees. Based on the research carried out by the author of this paper, it should be stated that employees are aware of the problem of maintaining work-life balance and set their expectations for organizations. In the aspect of expectations reported by employees, the most visible are those that indicate solutions that are supposed to support solving problems between personal life and work. In this context, solutions regarding many aspects - organization of work and working time, organization of childcare, social assistance, extension of paid maternity and paternity leave - become particularly important. Work-life balance initiatives should be an integral part of human resource management strategies. Employers need to be aware that private time is now perceived by employees as a value. Disturbance of harmony between private time and work is associated with resignation from work, and thus loss of knowledge and experience of an employee.

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Public Direct Financial Support for Organic Farming and Its Development in Poland – The Assessment Based on The Empirical Study

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Abstract

Public support for sustainable agriculture is one of the priorities of the European Union's Common Agricultural Policy. Organic farming is an important part of this type of production. It contributes to the delivery of public goods and generates positive external effects from agriculture. That is why the EU and Member States implemented the system of subsidies for organic farms. The goal of this study is to assess the subsidies for organic farmers as factors influencing the development of the supply side of the organic food market in Poland. These were evaluated in the context of other factors of profitability of production. The authors characterised the system of these payments in the years 2003-2019 and presented the results of two rounds of empirical surveys (in 2011 and 2019) held with farm owners, holders of organic agriculture certificates. In the years 2003-2013, the payments contributed to a 1240% increase in the number of organic farms, and a 1078% increase in the utilized agricultural area. From 2014 to 2020, the production potential has been in regress - largely due to political failures (poorly designed regulations) related to the system of subsidies. In the opinion of the majority of respondents, difficult and unstable procedures were recognised as the most important barrier to the development of organic farming. The second obstacle was the low profitability (yields and revenues in organic farming are lower, while costs are higher than those in conventional production). Growth in the profitability of organic farms should be based on increased rates of subsidies but it must go hand in hand with the improvement of the procedures (including systems of certification and control), to reduce the bureaucratic burden and to improve its effectiveness. The largest opportunity for the development of organic farming can be seen in the increase in demand, growing environmental awareness of consumers and appeal of organic consumption patterns.

Keywords: Organic Farming, Ecological Products Markets

Introduction and Methodological Aspects

The development of organic farming contributes to the sustainable development of agriculture under the conditions of EU membership (Kociszewski 2013). The main goal of the study was to assess the subsidies for organic farmers as the factors influencing the development of the supply side of the organic food market in Poland. For this purpose, the authors used a descriptive and comparative analysis of the system of subsidies implemented in Poland in the years 2004-2020, based on the factual evidence, strategic documents, legal acts, and statistics. These, along with surveys of data and figures representing changes in Polish organic agriculture, were used as basis for construction of two rounds of empirical studies (the results were presented in the section 4 and 5). The first survey study was initiated in 2011 and was addressed to 70 individual organic farms (certified organic producers) with acreage of more than 1 hectare each, and with production as their declared form of activity. The second round was conducted in 2019 among 65 owners of organic farms with the same characteristics. Questions concerned factors of organic production profitability, in relation to regulations of the present financial support system. The respondents also assessed the level of subsidies. The results were useful in identifying barriers and factors conductive to the development of the supply-side of the market. The research was conducted by means of CATI (*Computer Assisted Telephone Interview*), using

questionnaires prepared by the authors. The distribution of the number of surveyed farms between Polish voivodeships was proportionate to the distribution of source data. The respondents were also selected in such a way that the number of respondent farms, divided by size (UAA - utilized agricultural area), was similar to the actual structure observed on the national level. Lastly, the authors' intention was to formulate policy and regulative system recommendations in relation to organic farming subsidies.

Justification of Environmental Subsidies

Public goods may be supplied without public intervention if they are produced incidentally (i.e. as a by-product) in the course of other activities or driven by other motives (for instance, a farmer may decide to limit the use of nitrogen fertiliser to reduce cost; as a result, nitrogen run-off to the local river may decrease, thus leading to an unintended effect of tangible improvement in water quality). Similarly, no public incentives are required in relation to goods produced at marginal cost or at no cost whatsoever (e.g., yields from a patch of low-value unproductive land characterised by high biodiversity). However, there are risks associated with relying on these conditions to deliver the public goods for society needs (Kipling 2019).

The markets alone are often not sufficient to ensure that all farms deliver a full suite of positive and socially commendable environmental and socio-economic outcomes expected from them. Therefore, if markets fail to fully reward these public goods, it is up to the public policy to intervene in support of such goods by means of dedicated financial incentives (Meredith, Lampkin, Schmid 2018). Consequently, governments are expected to conduct public policies designed to support the implementation of subsidies and related regulations.

As the average costs of organic production are higher than in conventional production, their cost-effectiveness is conditioned by the higher level of final prices. When external benefits occur and the level of prices is not sufficient to cover production costs (as in the case of insufficient demand), public regulation is considered necessary. In light of the principles of external effects internalisation, such types of produce require some form of subsidisation. In this context, the main instrument for supporting organic farming is the system of payments, which are intended to compensate for the additional costs and for the lost income (Kociszewski 2013). To justify huge expenditures for CAP budget, its reforms were directed to deliver more public goods from the EU agriculture (Hart et al. 2011). This was reflected in these reforms' priority areas, which included viable food production, sustainable management of natural resources, and balanced territorial development throughout the EU (European Commission 2013). Public goods associated with agriculture include the provision of environmental and social goods such as farmland biodiversity and animal welfare which cannot be adequately supplied by the existing markets (Cooper, Hart, Baldock 2009). This is why the CAP reform was primarily focused on the integration of environmental concerns as part of the governmental policy. The above trend is manifested in the support for organic farming which was recognised as a contribution to public goods (Stolze et al. 2016).

The first aspect of the intervention is the EU organic regulation which has a major impact on organic farmers, processors, traders, retailers, certifiers, researchers and consumers. This type of the EU policy framework for supporting organic sector development consists of legally defined production and labelling rules for production and supply chain development. The second aspect is the financial support for farmers. Compensation is provided for the costs of managing farmland under the organic production regime, with benefits for the environment and animal welfare as well as additional environmental and land management actions through the CAP (Meredith, Lampkin, Schmid 2018).

In the area of the environment, payments for converting or maintaining farmland assigned to organic production are multi-objective measures that offer a more cost-effective solution for sustainable agriculture than the one offered by single-objective agri-environmental measures. This is because organic farming results in more synergies as well as trade-offs with other environmental actions, and has lower transaction costs compared to individual interventions. These efficiencies are further complemented by greater market returns (Sanders 2013). Lohr, Salomonsson (2000) found that farmers

requiring subsidies tend to manage large and diversified farms and are more concerned about organic inspection, quality, and adequacy of technical advice compared to conventional farmers.

Subsidies for organic farming and its development in Poland

Between 1990 and 1998, Poland offered no subsidies for organic farms. During this period, their number increased from 27 to 417, and the area from 300 hectares to 5.5 thousand hectares. There were no strong impulses for market growth in this segment. In 1998, Polish government introduced subsidies for farm control costs during the conversion to organic production. In 1999, subsidies for organic production (per crop acreage) were implemented. During this period (1998-1999) the number of farms increased by 34.1% and the utilized agricultural area (UAA) by 27.1%[i]. In 2000, the rates of payments were increased by 200-300% (depending on the type of crop). As a result, the number of farms increased by 156%, and UAA by 66% compared to the previous year.

In 2004, after Poland joined the EU, organ ic farming received extra financing from the II Pillar of the CAP, as part of the Rural Development Programme 2004-2006 (RDP 2004-2006). There was another large increase in rates of payments (by 96-208%), resulting in a 95% increase in farm number and a 99% increase of UAA in 2005, compared to 2004. It is worth noting that these increases were much higher than in the years preceding Poland's accession to the EU (2002-2003), when the growth rate in the number of farms was 16.7% per year, with the growth rate of UAA at 14%, annually. The rates of subsidies for organic farming were much higher than for other RDP packages, which had the effect of strengthening their stimulus function. We can observe a clear impact of the introduction and subsequent increase in the rates of subsidies on the growth in the number of farms and organic farming areas. Public support until 2004 was conducted as part of the national agricultural policy. After integration with the EU, it was funded under the Agri-Environment Programme (AEP), one of the most important instruments of the II Pillar of the CAP. Further increases in the rates of subsidies were observed in the subsequent perspective of CAP funding (Ministerstwo 2011) and ranged from 23% (agricultural crops) to 38% (vegetable crops). In its present form, the system should be favourable for organic production, however, some irregularities in the financial support have been observed, limiting the effectiveness of discussed measures – i.e. the stimulation of increased production and provision of environmental services. Apart from cases of fraudulent use of subsidies, problems were also found with respect to ineffective and erroneous RDP control systems and low efficiency of certification bodies in organic agriculture. In effect, owners or tenants of large agricultural areas applied for agri-environmental payments often without actual cultivation (primarily walnut and raspberry production)[ii]. In 2013 these errors were limited through the use of more restrictive requirements for farmers. This had the effect of weakening the stimulus function responsible for the increase in the number of organic farms.

In 2014-2020, the CAP reform singled out a specific instrument to support organic farming (Ministerstwo 2017). It was decided to incise support for organic production and separate it from other environmental activities of farmers. Changes in payment rates were more differentiated than in previous financing periods[iii]. For horticultural crops, they were reduced by 2.5%. In relation to agricultural and vegetable crops, the rates remained unchanged in nominal terms. They were increased for permanent grasslands – by 30% (during the conversion period) and by 64% (for certified holdings). It was due to the fact that they have not been actually raised since the beginning of the EU membership. It is a good example of effective support for public goods delivery. The financial support for organic farming within the RDP 2014-2020 was over 200 EUR million, of which 150 EUR million was from EU funds and 50 EUR million from domestic funds[iv].

The years 2003-2013 brought rapid development of organic farming, following the implementation of subsidies under the agri-environmental programme, and, later on, as the 'organic farming support' measure of development. The number of farms increased by 24.8 thousand during this period (1078%), and the UAA increased by 62,000 hectares (1240%) (Najwyższa 2019). Between 2013 and 2018, this trend was reversed - the number of organic producers fell by 6000 (by 24.3%) and the acreage by 18.5 thousand (by 27.6%)[v]. In comparison, in the EU (the years 2012-2017), the acreage increased by 25% to 12.8 million hectares (7.2% UAA) (Willer, Lernoud 2019). In Poland, organic crop acreage was 0.484 million hectares (3.4% UAA) in 2019 (IJHARS 2020). The above decrease in organic production potential was partly due to the tightening of the rules applicable to grant beneficiaries. Procedures for

obtaining organic certification, or participating in agri-environmental programmes, were designed to prevent frauds and other pathologies in applying for subsidies, but they had a discouraging effect on farmers. Problems in the grant system were also caused by the lack of coherence and orderliness in the content of the governmental policy. Procedures have been subject to frequent modifications (seven major changes between 2014 and 2020)[vi], producing further obstacles for farmers intent on applying for the subsidies and, consequently, reducing the effectiveness of the Agricultural Restructuring and Modernisation Agency (Polish organization responsible for the management of the agricultural payments system). Some of the beneficiaries of the RDP 2014-2020 had to deliver 80% of the crop to the market, and not less than 30% under later provisions (Najwyższa 2019). Other farmers (in years 2015-2017) received financial support without such a requirement (under the regulation implemented before 2014). One of the results of frequent changes was the delay in payments. These factors reduced farmers' willingness to start organic production, but they should not be seen as evidence of unfavourable prospects for development. Between 2013 and 2018, the number of organic processors increased by 90% due to 210% growth in imports of organic raw materials from other EU countries and third-party suppliers (Najwyższa 2019). Polish organic food market does not fully utilize the possibilities of domestic production. Therefore, it may be interesting to identify and examine factors that affect its cost-effectiveness, with special consideration for subsidies.

Factors influencing the profitability of organic production, on the basis of empirical findings

Subsidies for organic production contributed to the increase in the incomes of farmers. This is confirmed by studies of changes in yields, revenues, and costs associated with conversion to organic methods of production. In the opinion of 45.6% of respondents, the year 2011 saw an increase of revenues after conversion. Most farmers declared a parallel decline in yields - as basis for their revenue (Figs. 1 and 2). At the same time, the majority of respondents reported increases in most of their cost categories after the conversion (Fig. 3).

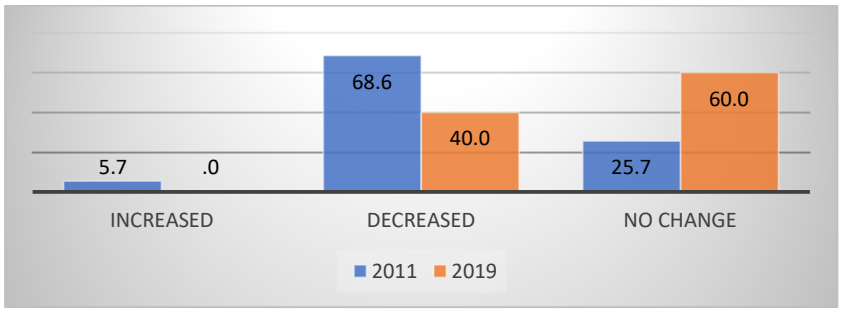

Fig. 1: Comparison of yields in organic and conventional production according to opinions of organic farmers from 2011 and 2019 (% of responses).

Source: Authors' own study

This suggests that market-led profits are decreasing after conversion (smaller yield); thus, the increase of farm revenue and income can be attributed to the impact of subsidies. In 2019, the answers were different, but clearly indicative of the fact that yields and revenues had not contributed to the increase in profitability of production. According to 60% of farmers, their yield remained unchanged after conversion. At the same time, 66.15% of farmers reported no change in revenues.

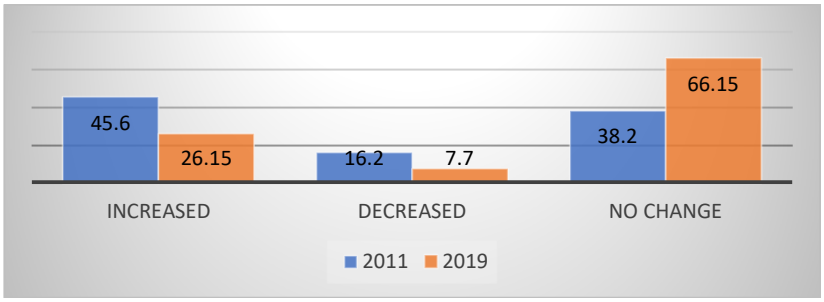

Fig. 2: Comparison of revenues in organic and conventional production according to opinions of organic farmers, (% of responses from 2011 and 2019).
Source: Authors' own study

The second factor influencing the profitability of production is the cost (fig. 3). In 2011, in the opinion of most farmers (51.19%), organic farming resulted in cost increase (relative to conventional agriculture). In 2019, this view was shared by 35% farmers (55.64% of responses indicated no change).

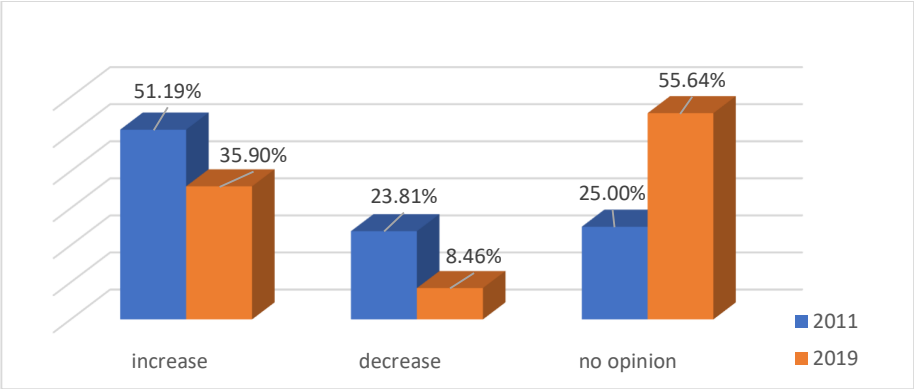

Fig. 3: Change of production costs after conversion to organic farming (% response)
Source: Authors' own study

In terms of response frequency, the most important categories of inputs associated with an increase in production cost are: coping with documentation and other requirements associated with organic farming procedures (bureaucracy in Fig. 4), and labour – 82.9% indications in 2011 and 43.08% in 2019 (fig. 4).

Bureaucratic burden hinders the operation of organic farms; however, it is necessary in many cases, due to the requirements of the certification process, designed to ensure the credibility of the product in the eyes of consumers. On the other hand, administrative procedures could be unstable, chaotic and overcomplicated – as was the case in the years 2013-2018 (see section 3 above). Under such conditions, they serve as effective barriers to development of the supply side of the market, as confirmed by organic farmers taking part in the surveys both in 2011 (91.4% of responses) and in 2019 (the third most frequent answer indicating factor, which contributed to the increase of a production cost – 49.23% of responses).

Expenditures associated with the fulfilment of environmental standards were the third (in 2011) and the second category (in 2019) - in terms of frequency – related to the increase in the cost of organic business. Accepting the legitimacy of such transaction cost, it is necessary to ensure the effectiveness of regulations, so as to eliminate or reduce the pathologies in applying for subsidies (as mentioned above). Furthermore, environmental measures are also necessary to deliver agricultural public goods (rural amenities). It should be noted that the study showed a significant difference between answers from 2011 and 2019 related to the cost of fertilisers and plant pesticides. 2011 data show prevalence of responses indicating the decline in expenditures on fertilizers and plant protection products (after

conversion) over the number of responses attesting to an increase of these expenditures. This may be seen as evidence that organic farming was characterised by lower external environmental costs than in conventional agriculture.

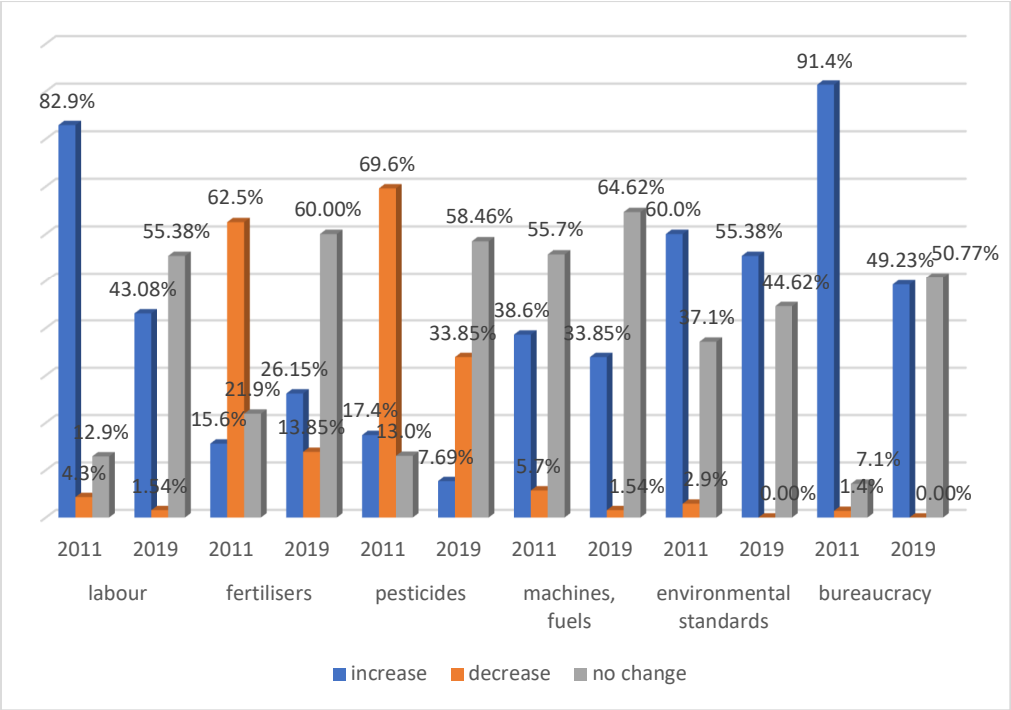

Fig. 4: Change of expenditures related to selected categories of production costs after conversion to organic farming (% response)

Source: Authors' own study

In 2019, the majority of respondents saw no change in the level of expenditures for fertilisers (60% of responses), together with an increase in the level of expenditures for plant protection products after conversion (69.6% of responses). This may suggest that, along with the development of production, farm holders were not only required to limit the use of conventional pesticides and fertilisers (decreased cost) but also to invest in specific, more expensive products approved under the organic farming regime (increased cost).

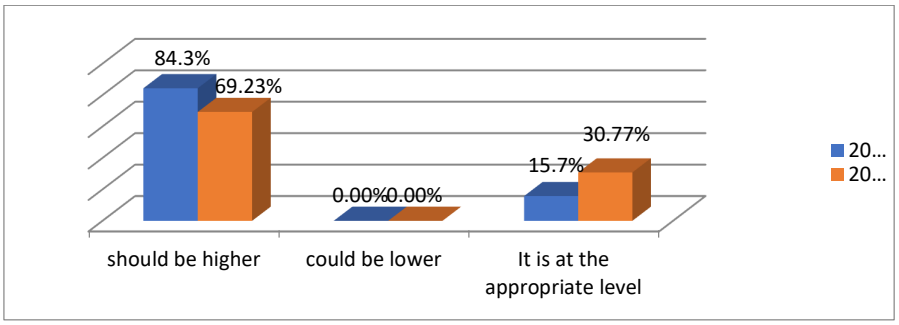

Fig. 5: Evaluation of the level of price of organic products (% responses among the owners of organic farms)

Source: Authors' own study

It should be remembered that organic fertilisers and pesticides present no harm or hazard for the natural environment, including soil and water, so the associated external environmental cost remains low. In

the previous survey (conducted 9 years earlier), the above factors of production were not that prominent, due to a notably lower volume of production. At that time, farmers were much more focused on producing organic goods for captive use.

Another element included in both studies was the evaluation of the price of organic products. Most of the respondent farmers assessed it as too low. Its level should be higher according to 84.3% of responses in 2011 and 63.23% in 2019. These results are suggestive of a decrease in revenues and yield from organic production in comparison to conventional agriculture. Since the cost increased and the price remained low, it may be assumed that the profitability of organic farms is conditioned by the level of support from EU subsidies. This observation was also confirmed in a study by Runowski (Runowski 2012).

Subsidies as A Factor Influencing the Development of Organic Farming

A large part of the owners of organic farms (64.3% in 2011 and 75.38% in 2019) – believed the rate of subsidy per hectare from the CAP II pillar to be excessively low. Similar evaluations were found with reference to the level of support offered to farmers for their conversion into organic farming. This opinion can be weighed against the unfavourable assessment of the level of prices (as being too low) and retail margins. In 2011, this factor was too high in the opinion of 75.80% of responding farmers, because a significant part of the added value from organic production – particularly in relation with poorly-developed distribution systems – is being captured by commercial intermediaries. The present distribution system is much better developed than it was in 2011, offering potential for a decrease in retail margin (thanks to the economy of scale) and, consequently, is perceived by farmers as more acceptable. In 2019, 15.4% of responses placed it as too high, while the remaining ones perceived it as adequate. An increase in subsidies could effectively counteract such disincentives to organic production development as the low price and the loss of a part of the added value (after retail margin).

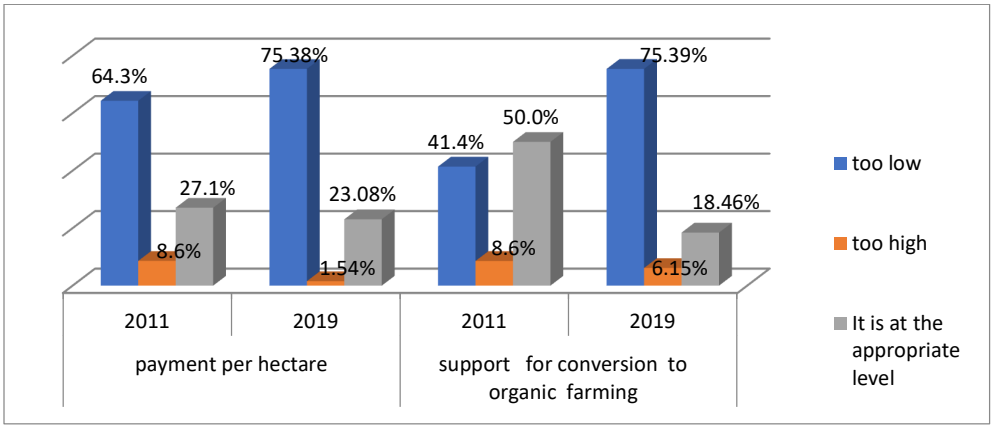

Fig. 6: Evaluation of the level of payments for organic farming (% of responses among the owners of organic farms)

Source: Authors' own study

In the opinions of farmers (both in 2011 and 2019), the biggest prospect for the development of organic farming is placed with the growing environmental awareness of consumers (Fig. 7). Respondents expect a growing demand and popularity of organic consumption patterns.

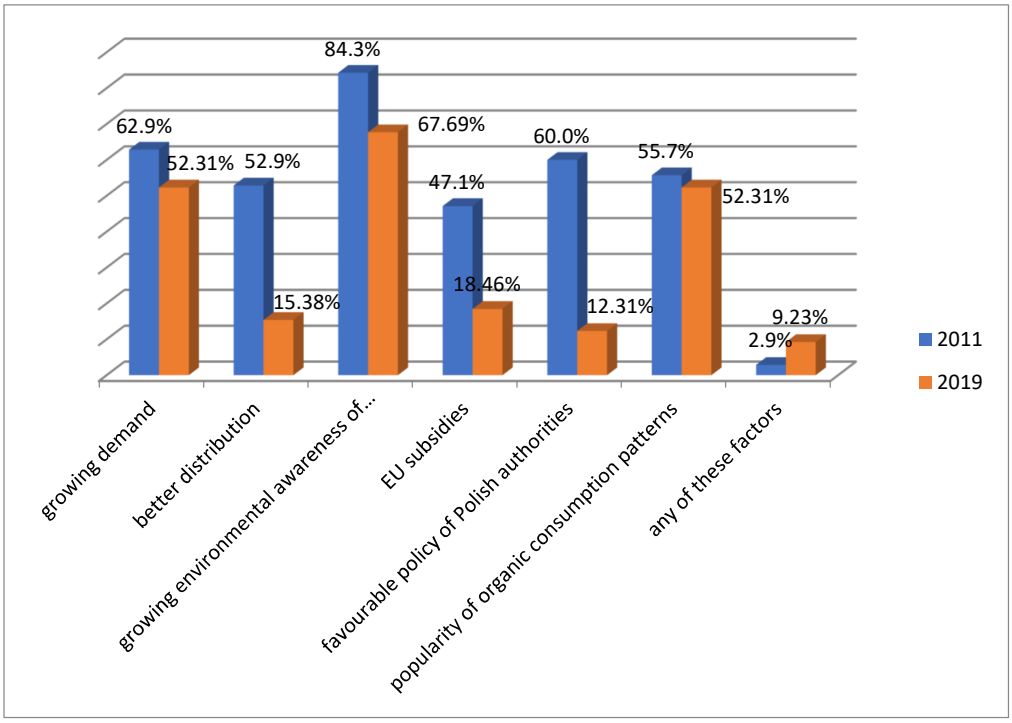

Fig. 7: Prospects for the development of organic production (% of responses)
Source: Authors' own study

In terms of frequency of answers indicating opportunities for the development of organic farming, these two factors were placed on the second and third position. The EU subsidies were indicated by a relatively small number of respondents. This may confirm the previously presented evaluations of payment rates. Perhaps the farmers are not expecting any effective increase of subsidy rates in the future. Similar conclusions are suggested by the assessment of the policy of Polish authorities. In 2011, it was perceived as an opportunity by 60% farmers. In 2019, the opinion was only shared by 12.31%. The majority of producers may have been disappointed in the policy's performance in the years 2014-2020 (as explained in section 3 above). This conclusion can also be justified in the light of the results of the study related to bureaucracy (as described in section 4).

Some of the previously presented observations of factors negatively influencing the profitability of organic farming are confirmed in the evaluation of barriers to its future development (fig. 7), particularly those related to the cost of production. The most important barrier, according to responses to both studies (2011 and 2019), is that of bureaucratic obstacles.

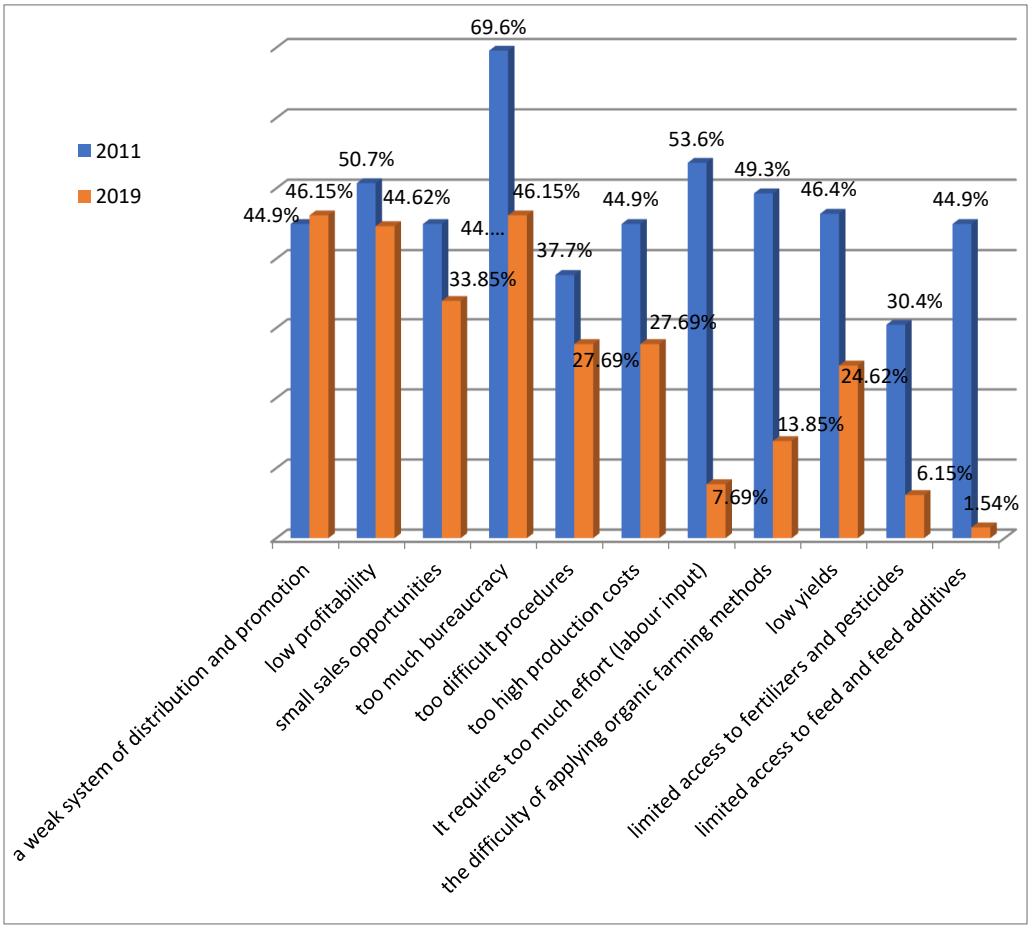

Fig. 8: Barriers to the development of organic farming (% of responses)

Source: Authors' own study

Taking into account the fact that the procedures related to organic farming have proven to be ineffective in many cases, their improvement should be regarded as one of the conditions for the development of organic production. Other barriers were identified in relation to the poor design of the distribution system and the low profitability. The former factor has seen some improvement over the last few years (Najwyższa 2019). The latter may be addressed through an increase in subsidy rates.

Conclusions and Recommendations

Organic farming contributes to the supply of public goods and positive environmental externalities. In the light of the social well-being in general, it is justified to support its development from public funds. In Poland, the subsidies were initially financed from the Polish state budget. Following Poland's accession to the EU, subsidies were implemented under the second pillar of the CAP. The programme contributed to a dynamic increase in the potential of organic production between 2003 and 2013 (1240% increase in farm number and 1078% increase in utilized agricultural area). From 2014 to 2020 there is a decrease in the number of farms and areas of cultivation (UAA). This is largely due to political failures and wrong regulations related to the system of subsidies. Changes to procedures introduced by the Polish government were too frequent, and their poor implementation had discouraged farmers from involvement in organic production. Based on empirical studies conducted by the authors, the tediousness of documentation and other requirements connected with organic farming procedures (bureaucracy) was recognised as the most important category to contribute to the increase in organic production cost. At the same time, most of the respondent farmers also perceived bureaucracy as the main barrier to the development of organic farming. The second place in the ranking of obstacles was

attributed to low profitability. In the opinion of the majority of respondents, yields and revenues in organic farming are lower but costs are higher than in conventional production. That is why, in 2011, the need for an increase in the prices of organic foods was indicated by 84.3% of the owners of organic farms (and by 63.23% in 2019). Higher prices could be a barrier to the increase of demand, so the main source of growth in the profitability of organic farms should be based on public support for organic farming. An increase in the subsidy rates is demanded by most of the surveyed farmers (64.3% of responses in 2011 and 75.4% in 2019). However, farmers do not perceive it as a chance for the development of organic farming. This opinion may be influenced by their negative experiences related to the former failures of the Polish system of subsidies in the years 2014-2020. Farmers generally expect an increase in demand for organic products arising from changes in consumer attitudes and ecological awareness. These were recognised as the biggest prospects for further development of the market.

Results of the study suggest that the current level of rates of payments is too low to act as an adequate stimulus for organic farming development. A rise in the rates of subsidies may be affected through certain changes in the CAP in the years 2021-2028. Support for organic farming and agri-environmental instruments should receive a larger share in the expenditures from the RDP and entire CAP budget, as the present value for the years 2014-2020 (Ministerstwo 2017) is much lower than in it was in the years 2007-2013. Such prospective increase of subsidies must go hand in hand with improvements of the certification and control system, designed to ensure greater efficiency, effectiveness, and reduction of the bureaucratic burden. Such a scenario would be beneficial for the market - in the context of improving the efficiency in the use of public funds, in the light of building potential for organic production, and in the context of increasing consumer trust for organic products.

Acknowledgment

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Endnotes

[i] Own calculations based on (IJHARS 2004, 2005, 2009, 2015, 2017). The growth rate of the number of farms is calculated as the quotient of the change in this number (compared to the previous year) and the base number. Similarly, the growth rate of UAA crop area was calculated

[ii] These pathologies have been described, among others, by Stalenga and Tyburski (2012)

[iii] Authors' own calculations based on strategic documents (Ministerstwo 2017)

[iv] Authors' own calculation based on IJHARS data (IJHARS 2004, 2005, 2009; IJHARS 2015)

[v] Authors' own calculation based on IJHARS data (IJHARS 2015, IJHARS 2016, IJHARS 2017; IJHARS 2018; IJHARS 2019; IJHARS 2020)

[vi] These included changes of: application procedures, rules for their introduction into IT systems, and administrative control

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Competences of Engineers 4.0 And Their Knowledge on The Industry 4.0 Conception

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Abstract

Development of the Industry 4.0 conception does not only refer to the technological aspect, but also to the procedural-organisational and human aspect. Therefore, implementation of the Industry 4.0 conception means undertaking measures in various areas and multi-faceted approach to the issue from the viewpoint of business processes. It poses specific challenges not only to the management in organisations operating on the market, but primarily, to schools and universities aimed at proper preparation of graduates to professional work. One of the most significant aspects influencing the development of this conception consists in developing awareness regarding its potential, including consideration of threats and opportunities and proper creation of competences and skills of prospective employees 4.0. These factors influence the role and significance of contemporary education, especially in the areas of shaping future engineers. The aim of this study is to present results of own research regarding future engineers' awareness of the 4.0 conception and the assessment of developing specific skills within current didactic classes. A survey method has been used in the research conducted among Polish students of technical faculties. An actual assessment of these skills conducted on the basis of specific works' performance by the students participating in the research would constitute a valuable supplementation of the research. Obtained results indicate that students participating in the research have knowledge on the selected technologies constituting the foundation of the Industry 4.0 and the hitherto classes conducted within studies develop both, technical and soft skills.

Keywords: Industry 4.0, engineer 4.0

Introduction

There are many factors that determine implementation of the Industry 4.0 conception. They include development of IT and information infrastructure, knowledge and ability to use new technologies, as well as education and development of competences, soft skills and the use of a relevant procedural-organisational approach. The implementation of the ICT technology itself and digitalisation of many areas of the organisation's activity will not ensure its effectiveness or competitive advantage. There are visible effects of using digital technologies which have impact on changing business models or requirements of digital transformation from employees and managers (Buchi G. and others, 2020, Ślusarczyk B., Herbuś A., 2014; Haseeb, and others, 2019). Furthermore, the Industry 4.0 conception has a significant impact on work and employment terms and conditions, skills, roles, duties and strategies of soliciting employees (Johansson J. and others, Ch. Prinza and others, 2016). Creation of the Industry 4.0 conception predominantly requires acquisition of relevant knowledge and awareness of threats and opportunities resulting from implementation thereof and specification of significant elements creating its proper implementation. Irrespectively of the fact, whether the question is to improve qualifications, recruitment or retraining, knowledge transformation has impact on the

workplace culture, community of practice and identity (Wenger, 1998, Fenwick, 2006, Johansson J. and others, 2016, Shpak and others, 2019). The first and basic element in the light of the Industry 4.0 conception's implementation consists in preparing employees to function in a digital world, which concerns both, those who are already working and those, who just start their professional lives. Preparation of employees 4.0 should include not only undertakings in the area of technology, but also human and procedural elements (Iwaniuk M., 2019, Smoląg and others, 2016, Ślusarczyk, 2018; Ungerman, Dedkova, Gurinova, 2018).

It seems legitimate that the first significant step in the development of the Industry 4.0 conception constitutes knowledge on the concept itself and the scope thereof. In the subject literature many authors attempt to define the concept of Industry 4.0 and stipulate the framework encompassed by this conception (Culot, G. and others, 2020). The conducted research on Industry 4.0 implies that this conception, irrespectively of an organisation, is characterised with several common features. These features include: development of competences of managers, engineers and line employees, care for operational excellence, development of digital infrastructure and digital flow of information, as well as policy and tools in the area of cybersecurity (Gracel, 2019).

The study presents characteristics of Industry 4.0 by leading technologies that enable implementation of the conception in business practice. Furthermore, the issue of educational processes of future engineers has also been characterised. The methodology of own studies and obtained results of studies have been presented. The aim of the research was to assess the awareness of future engineers of the 4.0 conception and the assessment of developing specific skills within current didactic classes.

Basis of the Industry 4.0 conception and preparation of engineers 4.0

The term Industry 4.0 (German: Industrie 4.0) was first used in the public domain in 2011 at fairs in Hanover as a name for the common initiative of business, politics and science representatives promoting the idea of reinforcing the competitiveness of Germany's industry (Müller and others, 2018; Rao and Prasad, 2018). From the technological point of view, the concept of Industry 4.0 is inseparably related to various technological solutions including, among others: Internet of things, Cloud Computing, Big Data, 3D printing, Augmented Reality or multi-purpose production lines (table no. 1) (Dalmarcoa G. and others, 2019).

Table 1: Technological aspect of the Industry 4.0 conception

Technology	Characteristics
Internet of things (IoT)	Interrelation of material objects through the agency of a computer network, mainly the Internet. Due to the use of IoT it is possible to communicate between devices and between devices and humans. Application: • as equipment of intelligent houses, among others, in household appliances and electronics, lightening, heating, meters; • in the industry, primarily as detectors built in various devices; • in an intelligent city as detectors optimising energy networks, intelligent management of water consumption or parking meters.
Cloud Computing	Processing model based on using services provided by external organisations. A cloud is a technologically advanced IT infrastructure (servers, software, optical fibres), which is accessed via the Internet. It is a symbol of Industry 4.0, without which solutions in this area would not be available. Application of Cloud Computing is related to Cloud Computing models, including: IAAS - Infrastructure as a Service, PASS - Platform as a Service and SASS - Software as a service. Depending on the customer's need, it is possible to provide IT infrastructure as a service, that is, equipment, software and servicing, a set of more or less developed applications or specific, selected software functions.

Big Data	In other words, large sets of data that cannot be processed with the use of commonly available technologies. This term refers to searching, downloading, collecting and processing available, heterogeneous data in real time from various data sources. Technologies of processing large sets of data from various sources are used in many areas of economic and social lives. Big Data allows getting to know customers, their needs and expectations, as well as the organisation's environment better, and is more and more often treated as a crucial production factor.
3D printing	The process of producing three-dimensional, physical objects on the grounds of a computer model. 3D print is used in, among others: industry, architecture, medicine, education and advertising.
Augmented reality (AR)	Technology that connects digital reality (virtual world) with the world in which we physically exist (real world). AR techniques can be classified by used devices to three categories (Azuma and others, 2001): • using head-mounted displays (HMD), protective equipment such as googles or helmets; • using mobile screens such as smartphones and tablets, or stationary screens such as monitors to display virtual objects; • using projectors to project virtual information directly to real objects (Azuma and others, 2001), enabling user's interaction with a virtual object. The AR technology is applied both, in everyday situations, such as e.g. shopping or analysing road conditions, as well as in tourism, marketing, sales, entertainment or education.
Multi-purpose production lines	Universal production lines aimed at performance of various elements, e.g. assembly of different elements without the need to modify machines. Due to the use of such solutions, it is possible to provide flexible production, support for the employee at the workplace (personalised instructions for tasks concerning currently manufactured product).

Source: own study on the grounds of Oriwoh E. and others, 2013; Ferber S. 2019; Fernando de Souza Cardosoa L and others, 2020; Azuma R. and others, 2001; Lioutasa E. D. and Charatsaric Ch., 2020; Ibanez M. B. and others 2020; Loebbecke C. and Picot A. 2015; Loureiro S. M. C. and others 2020; Smoląg K., 2011.

An important element in creating the Industry 4.0 conception is understanding the issues, challenges and assumptions which have to be faced by the organisation in the transformation process resulting from the use of solutions of this conception. One of the most significant challenges constitutes proper preparation of employees. Competences of an employee of Industry 4.0 include not only hard competences in the scope of using digital technologies' solutions, but soft competences are also very important. Until recently, an engineer was a person with strictly specific technical skills (Gracel and Stoch, 2019). Technology development significantly contributed to the change concerning the once learned competences and skills. Thus, the need of life long learning is growing every year and it promotes a change of trends also in the education of engineers. As underlined by D. Guerrero, M. Palma, G. La Rosa technical competences of an engineer will not be enough in today's world (Guerrero and others 2014), where a dynamic development of organisations and commonness of ICT technologies forces prospective employees to acquire the skill of continuous learning, soft skills (Gracel and Stoch, 2019), including, in particular communicative skills, as well as digital competences. It especially refers to engineers 4.0. Also M.S. Saad stated that both, technical skills and soft skills of engineers related to solving problems, communication, teamwork and leadership are important for graduates-engineers (Saad and others, 2013). Therefore, including technical and non-technical, soft skills in the educational process of engineers 4.0 can contribute to acquiring bigger ability to employ graduates (Saad and Izaidin, 2014, Prifti and others, 2017, Baenaa and others, 2017, Siddoo and others, 2019). Therefore, the most important task of education is to shape and develop competences of engineers 4.0 (Tsankov, 2017) related to work in an interdisciplinary team and openness to changes and variety both, in contacts with people and performed tasks (Gracel and Stoch, 2019).

The issue of developing competences and skills of engineers for the needs of the contemporary labour market, including the Industry 4.0 conception, requires joining the theoretical and practical knowledge at each level of education. The targeted cooperation of science and business and properly drawing up a curriculum taking into account developing skills and competences of engineers 4.0 constitute grounds for their proper preparation to professional work (Smoląg and others, 2015, Durana and others, 2019).

Research Methodology

The aim of the conducted research was to assess the knowledge on assumptions of the Industry 4.0 conception and present how competences are shaped in the opinion of respondents (students). The following theses were formulated in the research:

T1. Students know assumptions of the Industry 4.0 conception (Industry 4.0).

T2. In the students' opinion, the university properly educates in the scope of hard and soft competences in the context of the Industry 4.0 conception (Industry 4.0).

For the purposes of this research, own studies have been conducted. The research tool constituted an independently drawn up survey questionnaire consisting of two basic parts and an imprint. The first part included 9 questions and concerned only the assessment of the knowledge on assumptions on the Industry 4.0 conception. The other part concerned developing soft and hard competences. The 5-grade Likert scale was used this part. The survey was anonymous. The research can be treated as a pilot study, as such a trial was not fully representative. The study was conducted in the period between November and December 2018 on a group of 201 students of technical faculties of the Czestochowa University of Technology, i.e. IT, electrical engineering, engineering logistics, management and production engineering. The sample selection was layered. Students were randomly selected from these groups where education finishes with obtaining the engineer degree.

The knowledge of Industry 4.0 Concept

According to the research, only 8% of respondents admit knowing of the Industry 4.0 conception. The knowledge of the concept of Industry 4.0 itself is not correlated with the technical knowledge on its aspects. Therefore, the survey respondents were asked to subjectively evaluate the knowledge of basic technical solutions that constitute the foundation of Industry 4.0 development. Many more students know and use technological solutions constituting foundations of the Industry 4.0 conception (Fig.1).

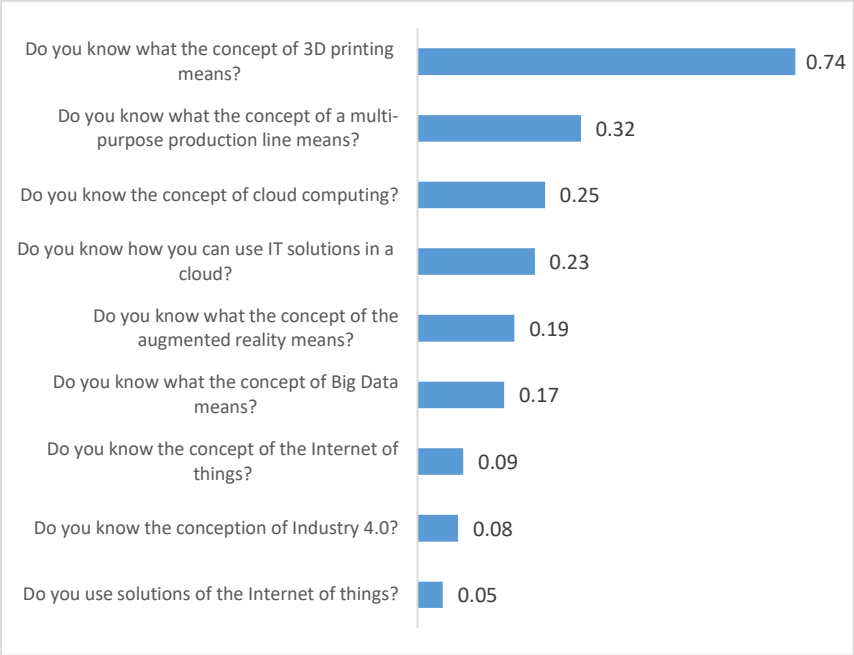

Fig. 1: Knowledge on the Industry 4.0 conception

Source: own study

A statistically significant dependency between knowledge on the majority of issues in the area of the Industry 4.0 conception is observed (table 2). The smallest number of statistically significant correlations has been indicated for knowledge on 3D printing and other categories. Virtually all studied elements are statistically significantly related to knowledge on Cloud Computing. It is similar with regard to knowledge on the concept of Big Data, however, here, methodological limitations did not allow confirmation of significance of the correlation with one of the features.

Table 2: Values of coefficients Chi-square, phi – Yule and the level of rejecting the hypothesis on their significance for features specifying the Industry 4.0 conception

feature	parameter	Knowledge on the concept of the Internet things	Using solutions of the Internet of things?	Knowledge on the concept of cloud computing	Knowledge on the use of IT solutions in a cloud	Knowledge on the concept of Big Data?	Knowledge on the concept of the augmented reality	Knowledge on the 3D printing	Knowledge on the multi-purpose production lines
Knowledge on the Industry 4.0 conception	χ^2	14,489*	8,202*	4,612*	0,448	7,778*	1,190	0,003	8,892*
	φ	0,268	0,202	0,151	0,047	0,197	0,077	0,004	0,210
	p	0,000	0,004	0,032	0,503	0,005	0,275	0,953	0,003
Knowledge on	χ^2		46,893*	35,008*	19,284*	25,073*	14,815*	0,607	2,166

the concept of Internet of things	φ		0,483	0,417	0,310	0,353	0,271	0,055	0,104
	p		0,000	0,000	0,000	0,000	0,000	0,436	0,141
Using solutions of the Internet of things?	χ^2			6,987*	6,609*	6,744*	0,082	0,060	2,623
	φ			0,186	0,181	0,183	0,020	0,017	0,114
	p			0,008	0,010	0,009	0,774	0,807	0,105
Knowledge on the cloud computing	χ^2				67,725*	16,425*	17,154*	9,199*	6,768*
	φ				0,580	0,286	0,292	0,214	0,183
	p				0,000	0,000	0,000	0,002	0,009
Knowledge on the use of IT solutions in a cloud	χ^2					10,453*	18,297*	10,373*	2,192
	φ					0,228	0,302	0,227	0,104
	p					0,001	0,000	0,001	0,139
Knowledge on the concept of Big Data?	χ^2						24,498*	-	36,426*
	φ						0,349	-	0,426
	p						0,000	-	0,000
Knowledge on the concept of the augmented reality	χ^2							12,239*	10,230*
	φ							0,247	0,226
	p							0,000	0,001
Knowledge on the 3D printing	χ^2								27,812*
	φ								0,372
	p								0,000

Source: own study.

Skills of Future Engineers and The Knowledge of Industry 4.0 Concept

At the next step, the impact of conducted didactic classes on the respondents' assessment of own hard competences and knowledge on the Industry 4.0 conception was studied (table 3). While analysing the soft and hard competencies these skills were considered that are common and result from implementing the assumptions of higher education curriculum in particular courses.

Table 3: Values of coefficients gamma (Γ) and the level of rejecting their significance for elements of conducted classes in the scope of hard competences and particular elements of knowledge on the Industry 4.0 conception

feature	**coefficient**	**Professional specialisation e.g. logistics, design, construction**	**Solving engineering problems**	**MS Office skills**	**Specialist software e.g. AutoCad skills**	**Machines and devices operating skills**	**The skill of using remote software**	**Analytical skills**	**Knowledge on technologies and IT solutions**	**Language skills e.g. communicative English**
Knowledge on the Industry 4.0 conception	Γ	0,060	- 0,116	- 0,163	- 0,396	- 0,374	- 0,145	- 0,103	- 0,177	- 0,049
	p	0,659	0,385	0,221	0,004	0,009	0,293	0,458	0,210	0,725
Knowledge on	Γ	0,048	0,326	- 0,332	- 0,230	- 0,071	0,151	0,256	0,090	0,130

the concept of the Internet of things	p	0,704	0,011	0,008	0,073	0,591	0,229	0,050	0,492	0,323
Using solutions of the Internet of things	Γ	0,138	0,179	- 0,047	0,057	- 0,311	0,091	0,114	- 0,406	0,021
	p	0,395	0,287	0,776	0,729	0,078	0,583	0,504	0,016	0,901
Knowledge on the concept of cloud computing	Γ	0,031	0,264	- 0,111	- 0,221	0,038	0,196	0,355	0,332	0,276
	p	0,719	0,002	0,191	0,009	0,667	0,022	0,000	0,000	0,001
Knowledge on the use of IT solutions in a cloud	Γ	0,180	0,057	- 0,039	- 0,153	- 0,049	- 0,002	0,097	0,101	0,119
	p	0,046	0,527	0,662	0,087	0,592	0,978	0,286	0,261	0,183
Knowledge on the concept of Big Data	Γ	0,096	0,183	- 0,115	- 0,160	- 0,112	0,177	0,325	0,084	0,049
	p	0,339	0,069	0,246	0,108	0,276	0,071	0,001	0,408	0,629
Knowledge on the concept of the augmented reality	Γ	0,104	0,182	- 0,032	- 0,027	- 0,056	0,167	0,177	0,143	- 0,002
	p	0,277	0,057	0,735	0,779	0,562	0,078	0,066	0,139	0,980
Knowledge on the 3D printing	Γ	0,037	0,035	0,237	- 0,054	- 0,130	0,003	0,202	0,075	0,149
	p	0,663	0,684	0,005	0,532	0,135	0,976	0,019	0,389	0,082
Knowledge on the multi-purpose production lines	Γ	0,065	0,096	- 0,059	- 0,223	- 0,014	0,006	0,172	0,015	0,076
	p	0,423	0,232	0,461	0,005	0,859	0,937	0,034	0,850	0,352

Source: own study.

The analysis of relations between knowledge on issues in the area of the Industry 4.0 conception and having hard competences indicates interesting conclusions:

- Knowledge on 4.0 conception correlates basically negatively with all hard competences, including, in two cases, in a statistically significant manner. We probably deal with a lack of identification of this concept by the respondents.
- The best known concept related to hard competences (positively) turns out to be cloud-computing.
- Analytical skills are positively correlated with the knowledge on some of the elements of Industry 4.0.

Table 4: Values of coefficients gamma (Γ) and the level of rejecting their significance for elements of conducted classes in the scope of soft competences and particular elements of knowledge on the Industry 4.0 conception

feature	coefficient	Teamwork skills	Cooperation skills	Speaking skills	Decision taking skills	The need to develop own competences	The skill of solving problems	Basic management skills	Own time-management skills	Creativity and innovativeness skills	Flexibility	Openness to changes
Knowledge on the Industry 4.0 conception	Γ	- 0,064	0,103	0,152	0,040	- 0,012	- 0,079	0,143	0,071	- 0,058	- 0,088	- 0,090
	p	0,645	0,469	0,283	0,783	0,934	0,592	0,285	0,606	0,677	0,524	0,515
Knowledge on the concept of the Internet of things	Γ	- 0,365	- 0,361	0,004	0,002	0,158	0,334	- 0,223	- 0,128	0,017	0,020	- 0,226
	p	0,004	0,005	0,977	0,986	0,240	0,014	0,072	0,316	0,895	0,878	0,078
Using solutions of the Internet of things	Γ	- 0,028	- 0,095	0,231	- 0,099	- 0,207	- 0,082	- 0,040	- 0,278	- 0,229	0,072	- 0,224
	p	0,872	0,581	0,172	0,560	0,227	0,632	0,807	0,092	0,189	0,677	0,214
Knowledge on the concept of cloud computing	Γ	- 0,253	- 0,169	- 0,085	0,091	0,157	0,229	- 0,168	- 0,182	0,044	0,028	0,005
	p	0,004	0,056	0,337	0,313	0,081	0,011	0,053	0,035	0,617	0,754	0,953
Knowledge on the use of IT solutions in a cloud	Γ	- 0,134	- 0,041	0,029	- 0,031	0,060	0,110	- 0,017	- 0,037	0,094	0,022	- 0,006
	p	0,141	0,655	0,746	0,737	0,517	0,238	0,850	0,682	0,307	0,808	0,950
Knowledge on the concept of Big Data	Γ	- 0,063	- 0,024	0,201	0,167	0,087	0,206	0,062	- 0,055	0,189	0,219	0,096
	p	0,538	0,820	0,048	0,109	0,401	0,046	0,535	0,586	0,064	0,032	0,350
Knowledge on the concept of the augmented reality	Γ	- 0,224	- 0,231	- 0,313	- 0,054	- 0,087	0,023	- 0,115	- 0,171	- 0,043	0,128	0,044
	p	0,020	0,016	0,001	0,587	0,376	0,816	0,231	0,070	0,654	0,186	0,650
Knowledge on the 3D printing	Γ	0,268	0,203	0,151	0,139	0,044	0,102	0,016	0,010	0,111	- 0,007	0,119
	p	0,002	0,021	0,087	0,117	0,613	0,243	0,855	0,911	0,197	0,938	0,158
Knowledge on the multi-purpose production lines	Γ	0,062	0,077	0,178	0,137	0,096	0,073	0,095	- 0,042	0,053	0,042	0,158
	p	0,450	0,360	0,031	0,097	0,250	0,385	0,237	0,602	0,516	0,609	0,056

Source: own study.

In table no. 4, the impact of conducted didactic classes on the respondents' assessment of own soft competences and knowledge on the Industry 4.0 conception was studied (table no. 4). The teamwork

and cooperation skills correlate positively (significantly) only with the assessment of knowledge on 3D printing. Other statistically significant correlations concern negative dependencies with regard to the knowledge on the concept of Internet of things, augmented reality and cloud computing. Positive correlations of particular elements of Industry 4.0 in this compilation also refer to the skills of solving problems and in the case of the knowledge on the concept of Big Data - flexibility. What is strange, the skills of own-time management correlate negatively with the knowledge on the concept of Cloud Computing. The results indicate significant discrepancy in relations between particular soft competences and particular elements that make up Industry 4.0.

Conclusion

Implementation of the Industry 4.0 conception seems to be an inevitable process for contemporary organisations. Of course, the level of implementation of solutions in the scope of Industry 4.0 is different, however, several common features can be distinguished, among others: knowledge on the conception itself and modelling relevant competences of employees. Shaping competences has a particular meaning for engineers 4.0, whose education has until recently been mainly focused on technical skills. Our contribution to the discussion consists in underlining that development of the Industry 4.0 conception requires further research oriented on studying the dependence between knowledge of technological solutions and developing skills important for this conception. Research results presented herein indicate that:

- knowledge on selected technological solutions constituting the basis of Industry 4.0 is not satisfactory (Fig. 1 and table 2);
- soft and hard skills do not translate directly into better knowledge on the characteristics of Industry 4.0. Significance of this relation has been confirmed for a relatively bigger number of areas within hard competences, although, in the case of soft competences, these correlations more often had a positive direction (table 3 and 4).

The conducted research contains certain limitations. In the present research it has not been indicated to what extent participation in classes, level of courses and their types have an influence on perceiving the concept of Industry 4.0 and developing soft and hard competencies.

Furthermore, research results mean the necessity of undertaking relevant activities aimed at levelling off differences presented in the research results (table 3 and 4). Future research should cover not only subjective assessment of the respondents, but also actual assessment of their skills conducted on the grounds of performance of tasks specified by the respondents.

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Coaching as An Effective Approach in Corporate Training of Sellers

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Abstract

Corporate training is one of the most important factors in the sustainable efficiency and competitiveness of an organization based on human capital development. In this context, the attention in the presented paper is paid to the possibilities of coaching as an educational tool for sellers. Accentuated is not only the selection of suitable people for the position of sellers, but above all the continuous training of these people. Coaching is one of the important tools of comprehensive development of work potential of sellers that respects the individual specifics of coached persons. Connected with it, the paper presents the results of the assessment of coaching using the AC-BEC method. The analysis conducted was based on a comparison of the responses of coached and non-coached sellers. The results confirmed the existence of statistically significant differences between the responses of the coached and non-coached sellers in terms of Behaviour, Emotions and Cognitions. The coached sellers assessed the impact of coaching on their willingness to change their habits, develop their potential, behave more efficiently, and realize their own responsibility for themselves and their lives more positively than the non-coached ones.

Keywords: Coaching, corporate training, sellers.

Introduction - Coaching as a Method of Human Capital Development

The development of human capital through coaching is one of the main methods to help people utilize their potential (Thorne, Pellant, 2007). It is necessary to listen to people if we want to manage them (Nejedlý, 2015) When asking questions, listening and learning, managers acquire answers on what is inevitable to change to be successful. Successful people become great leaders when they have learned to convey attention from themselves to others (Goldsmith, et al., 2012).

Haberleitner et al. (2009) claim that coaching means developing potential of all workers according to their current level of development to optimize their performance while considering their aims, interests and needs. It involves revealing potential, developing and formulating tasks and goals, exchanging mutual expectations and providing a reciprocal feedback. Suchý, Náhlovský (2007) add that coaching can reveal not only our existing potential but also develop it.

The results brought by coaching are based on a supportive relationship between a coach and the coached person and on the communication style the coach uses. A coach has to be a strong personality, mature and positively oriented that is eager to work on himself/herself and is willing to develop. A coach needs to be well experienced and enthusiastic so that he/she has energy to give it to

the others (Suchý, Náhlovský, 2007). The coached one requires facts not from a coach but from his/her inside (Whitmore, 2009).

A coach shares his/her knowledge and skills to improve the performance of those he/she coaches. A coach gives a part of himself/herself, time, effort, and ability to help others to improve it (Clegg, Birch, 2004). A coach is primarily a person who, through continuous work with himself/herself, enables the development of others.

Each qualified coach should be able to demonstrate the skills defined by the International Coach Federation (ICF, 2009; 2011). A coach can be a manager at all levels of management.

Coaching can be described as an aid to the development, learning, and performance of the other person. Developing potential is a common element for all coaching approaches. It provides a certain form of "accompaniment" for the coached ones in their personal lives as well as working situations and issues. Coaching helps to learn something rather than teaches something (Crkalová, Riethof, 2012).

The process of coaching allows people to discover and use solutions that are the most appropriate for themselves personally. It is used as an effective approach in corporate training of managers, but also for example, sellers who make up our research sample. Coaching is carried out in a form of a dialogue enabling the coached people to see new perspectives, acquire greater clarity in their ideas, emotions, deeds, situations, and the people around them (Wilson, 2007). According to Downey (2003), coaching is an art, practical inspiration, energization, facilitation, performance, learning, and development.

Critical thinking, feedback and coaching are reflective methods used in the process of learning. They are used to support the development of managers, sellers, and other professions, improve their ability to individually analyse situations and subsequently make a decision on an appropriate solution (Hudec, Suhányi, Urbančíková, 2014).

The issue of supporting the development of the potential of individuals in different areas is addressed by several authors in their research. Kot and Pigoń (2014) talk about verifying the level of competence of individuals' potential, Gavurová et al. (2018) focus their attention on performance related to loyalty, Kubák et al. (2019) describe efficiency improvement. In this context, Antony et al. (2017) analyze the prediction of tourism development, Kot et al. (2017) stress the need for self-education.

Corporate Training

It was already mentioned that coaching can be applied as an effective approach to corporate training. As it results from their research, Savery and Luks (2004) claim that corporate training is a highly profitable and thus the most important investment for an organization.

The primary goal of corporate training is to provide conditions for the effective fulfilment of the organization assignments by intentional and constant development of labour potential. Investing in human resources results in increased performance of people, their self-fulfilment, satisfaction, and loyalty to their organization, as well as saving time and costs in placing the working force (Kachaňáková, Nachtmannová, Joniaková, 2008).

In the development of people through coaching, it is necessary to comprehend the fundamentals of human learning. Learning is a process of gaining experience, knowledge, attitudes, and habits based on which we change our behaviour. In a broader sense, learning can be perceived as the adaptation to gradually changing conditions (Koubek, 2014).

The goal of corporate training is to provide an organization with the prerequisites so that the organization can manage the tasks coming from the internal environment and that arise from the

external environment. It is learning in the process, learning through experience, and searching for new options. If an organization wants to learn, it needs to operate as an open dynamic system. It needs to be open to external and internal incentives (Hroník, 2007). This can be also reached through coaching.

Training can help organizations to solve problems that hinder to reach their objectives (Babić, Boljanović, 2013). In analyzing needs, training determines current gaps in skills and knowledge that affect managers' performance.

As Vodák, Kucharčíková (2011) state, corporate training is targeted on the creation of working capabilities in a broader sense allowing also to develop social competences of individuals significant for making good interpersonal relationships among people employed in an organization.

As already mentioned, the main goal of corporate training is to create a suitable environment with good terms for successful fulfilment of organization assignments. Investing in human resources results in their appreciation. One of the main organization goals is to offer conditions in which a hidden potential of individuals will be revealed and their loyalty to the organization will be assured. This hidden potential can be developed through coaching. It must be seen as an ability to gain and apply new knowledge and skills as well as the so-far unused amount of thoughts and suggestions for better operation of an organization (Armstrong, 2007).

Coaching offers particular capabilities (knowledge and skills) that are directly related to participants' actions. But under completely changed conditions, the procedures learned by participants in the reality-oriented programmes can be unusable. In such a case, it is necessary to believe in the ability of people to generalize the knowledge they have gained (Plamínek, 2008)

Coaching can be described as a training process used at a workplace that aims to increase and enhance the potential of people (Belcourt, Wright, 1998). Kachaňáková, Nachtmannová, Joniaková (2008) explain coaching as a long-term, planned instigation, and heading towards initiative and desired results. It takes place in the working environment and involves meeting special assignments, specifying personal responsibilities etc. These activities are recorded in a long-term plan and are in compliance with the long-term objective of one's career development.

Corporate Training of Sellers

Bass, Vaughan (1967) describe corporate training as a permanent change in behaviour that is acquired through practice or experience. Information, skills and knowledge of sellers are inevitable in business today. Brum (2007) claims that the business environment is changing rapidly and that the most successful sellers are capable to adapt most effectively. Armstrong, Taylor (2005) present that corporate training means investing in sellers to achieve their better performance and to make the most of their natural abilities.

Vodák, Kucharčíková (2011) claim that work ethics and general satisfaction of employees, and thus also sellers, are considered very important. Satisfied sellers increase their productivity, are more responsible and improve the quality of sales. Heyes, Stuart (1996) found that sellers are more involved in trade when they approach to their lifelong learning responsibly. Support and evaluation create an environment in which sellers are more involved and able to achieve better sales results (Bartlett, 2001).

Čopíková, Bláha, Horváthová (2015) describe the benefits of corporate training that can be applied to the area of trade (Horváthová et al., 2014), such as improving the qualification, knowledge, skills, and abilities of sellers, improving their motivation, work performance and labour productivity. Increasing their productivity will increase the overall performance of a company, and according to Krueger, Rouse (1998), this should be reflected in higher wages and career growth opportunities.

Armstrong (2007) claims that corporate training can take the form of coaching. This method is mainly used because it is possible to achieve a high quality of sellers' potential development through coaching.

Research Project

The main goal of the research was to enlarge the state of knowledge in the field of corporate training of sellers through coaching.

The data were acquired using the questionnaire method of AC-BEC – Assessment of Coaching from the point of view of Behaviour, Emotions, and Cognitions (Birknerová et al., 2020). The methodology includes 23 statements related to the assessment of coaching. Each statement has 6 possible ways of responses to the level of identification and agreement with a given statement (1-definitely no, 2-no, 3-rather no than yes, 4-rather yes than no, 5-yes, 6-definitely yes). The following statement can be used as an example: "I am willing to try new things or different ways of doing things at work". In looking for and evaluating different dependences and differences of coaching assessment and its three attributes, the lowest value 1 means the lowest degree of agreement with a given statement of the coached persons and the value 6 means the maximum degree of agreement with a statement.

227 sellers were addressed, out of whom 166 did not undergo coaching activities and 111 participated in coaching activities. The group of respondents included 144 women and 81 men aged from 20 to 60 years. Their average age was 28,6 years (standard deviation was 5,115).

By factor analysis using the Principal Component method with Varimax rotation, 3 factors of coaching perception were extracted. Birknerová et al. (2020) named and described them as following:

- F1: COGNITIONS. The respondents who scored higher in this factor are willing to change their usual behaviour, try new manners of behaviour at work, develop their potential, perform in a more effective way, alter their conventional working procedures and their aim is to acquire better outputs at work (Cronbach's alpha 0.818).
- F2: BEHAVIOUR. The respondents who scored higher in this factor realize their own responsibility for themselves and their lives, show higher degree of self-reflection, think about their behaviour and relationships with other people, they show higher degree of empathy and transfer the acquired knowledge into their private lives (Cronbach's alpha 0.940).
- F3: EMOTIONS. The factor is connected to how individual persons experience coaching. It is aimed at the joy from a relationship between a coach and a coached person, whether these persons are full of expectations before coaching and are looking forward to it, on the balance and relaxation during a coaching session and positive emotions after it. It also focuses on whether they like to work on themselves through coaching and perceive it as a way that helps to work more effectively. This factor is saturated with eight items (Cronbach's alpha 0.931).

Results

The selection of mathematical-statistical procedures for the analysis of the data obtained was based on the verification of the normal distribution of the data obtained. Based on skewness and kurtosis values, the normal distribution of data was confirmed (Table 1).

Table 1: Distribution of data – testing normality

	Cognitions	Emotions	Behaviour
Skewness	-,446	-,369	-,246
Kurtosis	-,064	,372	,396

The results of the research confirmed the fact that coached and non-coached sellers perceive the coaching working meeting differently. This differentness was reflected in the assessment of the factors of Cognitions and Behaviour (Table 2, Graph 1).

Table 2: Assessment of coaching by coached and non-coached sellers

Factors	Coached sellers	Non-coached sellers	U test	Significance
	Median values			
Cognitions	5,20	5,40	3043,500	,175
Emotions	4,75	4,50	2862,500	,045
Behaviour	3,70	4,00	3162,500	,325

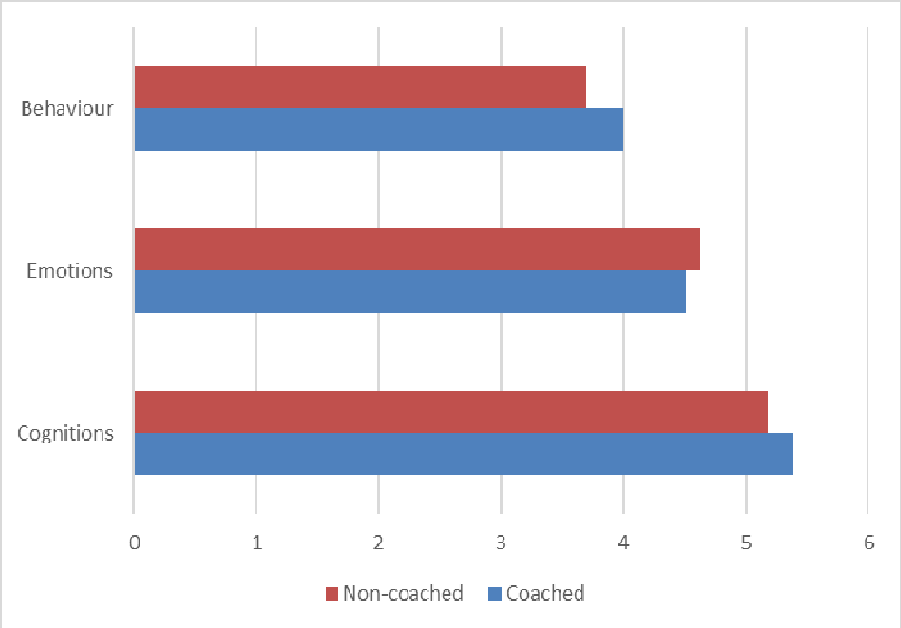

Graph 1: Assessment of coaching by coached and non-coached sellers

Coached sellers are more willing to change the established manners of behaviour, develop their potential, and behave more effectively. Their aim is to achieve better results at work. Coached sellers are more aware of their own responsibility for themselves and their lives, show a greater degree of self-reflection, reflect on their own behaviour, relationships with other people, show a greater degree of empathy compared to non-coached sellers. It should be noted that both coached and non-coached sellers rated each coaching attribute positively. Interpreted statistically significant differences were found only in the degree of positivity of the assessment of the factors of Cognitions and Behaviour.

Discussion and conclusion

Coaching can be seen as a useful managerial tool for the development of human capital because it is aimed at awareness and actions (Emerson, Loehr, 2008). This concept was also reflected in the presented research, in which the perception of coaching was identified on the basis of three factors Behaviour, Emotions and Cognition (Birknerová et al., 2020).

The results of the conducted experiment confirmed the fact that the sellers who have had working meetings with coaching elements scored higher in the factors of Cognitions and Behaviour. Compared to the control group of the non-coached sellers, these coached sellers showed higher self-reflection and empathy after completing these meetings. These competencies are essential for improving the quality of seller's behaviour (Bass, Vaughan, 1967, Brum, 2007, Heyes, Stuart, 1996, Bartlett, 2001, Armstrong, 2007 and others).

In relation to the information gathered, we can say that the coaching session is perceived more positively than the working meeting where the supervisor gives feedback, recommendations, and fixed tasks. Coaching can have thus a significant impact on the performance of individuals and consequently on the success of the organization (Shaw, Linnecar, 2007). Self-reflection and empathy are important attributes of the quality of the work environment which is related to the performance of the individual and the whole organization (Fleming, Taylor, 2004). Coaching is the key to creating an open and friendly organization that can appreciate the skills and ideas of its people.

As already mentioned, currently, coaching is an effective method of developing human capital and the potential of individual sellers. According to Green, Grant (2003), coaching improves communication among employees, improves performance and reduces fluctuation.

The results achieved are another contribution to the theory, methodology and practice of human capital development with the use of coaching methods. The necessity to accept a holistic theoretical and methodological approach to the research and application of coaching techniques was confirmed. At the same time, the presented methodology of finding out the feedback on coaching respects the individual specifics of the coached persons. Limitations of the interpretation of the results obtained are related to a specific sample of respondents, the number of respondents. With regard to limiting the level of generalization of knowledge, it should be emphasized that the presented concept of coaching assessment is one of the possible concepts that can be discussed in this context.

Acknowledgement

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The Special Section "Pricing and Price Policy of The Companies' Price and Competitive Advantage of The Company. Cost Advantage and Differentiation Advantage

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Annotation

From a financial point of view, competitive advantage is the ability of a company to beat the competitors on the key indicator — profitability. Formulating corporate strategy, management identifies the markets and industry in which the company competes, the main sources of profit. In the formation of business, strategy (competitive strategy) is the most important question: how the company competes in selected industries and on certain markets, i.e., here we consider its competitive advantage. There are two basic types of competitive advantage: cost advantage and differential advantage.
If the company has a goal to capture a certain market share, the company must set the price for these products based on the calculation of the current cost and the calculation of cost, which will be achieved when the amount that will meet projected penetration of the market. This so-called price of the introduction (penetration pricing) as opposed to the traditional price based on all costs (full cost pricing). However, if all players do it, they will incur losses because of excessive investment in equipment and a price war. To maximize sales to achieve economies of scale, it is necessary: to sell certain, but not excessively wide range of; to expand its presence in new markets, going into other regions and countries. There is a correlation between market share and cost per unit of production, but if sales growth is accompanied by discounts and aggressive advertising, a situation may arise achieve market share at the expense of reducing profitability. So today the practice of strategic management is considered unreasonable to consider market share as the main goal in isolation from the financial goals of the company and assess the success of the company as a whole, in achieving financial and non-financial goals.

Keywords: Cost, Competitive Advantage, Ccost Advantage And Differentiation Advantage.

INTRODUCTION

From a financial point of view, a competitive advantage is the company's ability to beat competitors in terms of the main indicator - profitability. Formulating a corporate strategy, management defines the markets and industries in which the company competes, the main sources of profit. When forming a business strategy (competitive strategy), the most important question is how does a company compete in selected sectors and in certain markets, i.e. It examines its competitive advantage. There are two main types of competitive advantage: cost advantage and differentiation advantage (Figure 1).

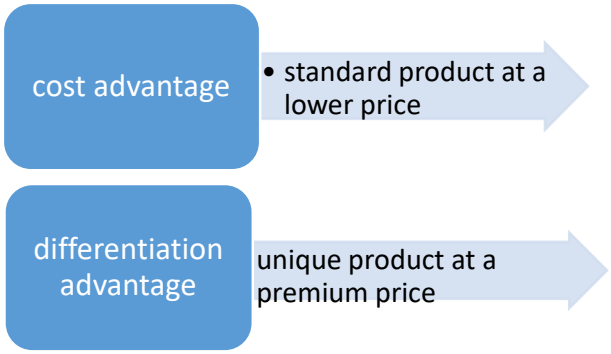

Figure 1: Competitive advantage of the company

Methods of Research

If a firm is considering the cost advantage as the basis of competitiveness, its goal is to become the cost leader in the industry or a particular segment of the industry. Distinctive advantage (differentiation) is achieved if the company offers something unique, more valuable to buyers than the supply low price (focus on brand, creative idea, design, and quality, service).

Regardless of, whether the company relies in its strategy on cost or differential advantage, there is first-mover advantage. First-mover advantage gives the company the first to enter the market, preferential access to market opportunities, information, resources and benefits, while following those competitors will not have. The simplest form of such benefits — a patent or copyright. Savings training (economy of learning) is an additional competitive advantage because it is assumed that because of greater production experience and accumulated knowledge of the firm-a pioneer can achieve a cost advantage over followers. Active advertising and promotion of the company as a pioneer, despite the additional costs can lead to an increase in market share that will allow you to take advantage of economies of scale to create cost advantages.

Consider first the cost advantage as the basis for price competition. Price is an important mechanism of competition, but competing on price is possible only under the condition of cost effectiveness. In the twentieth century, the strategy of big corporations, including transnational, fueled by the desire to achieve cost advantages through economies of scale. As a result, companies have made substantial investments in mass production and mass distribution. In the 80s and 90s of the twentieth century, cost efficiency remained a priority but the focus has shifted towards cost reduction through restructuring, reduce the size of the business (downsizing) and outsourcing, sources of cheap labor and raw materials, reengineering of business processes (re-engineering) etc. Even if the company's strategy is based on differentiation and strong, competition forces companies to strive for cost-effectiveness as a necessary condition for survival and profitability.

If the company has a goal to capture a certain market share, the company must set the price for these products based on the calculation of the current cost and the calculation of cost, which will be achieved when the amount that will meet projected penetration of the market. This so-called price of the introduction (penetration pricing) as opposed to the traditional price based on all costs (full cost pricing). However, if all players do it, they will incur losses because of excessive investment in equipment and a price war.

To maximize sales to achieve economies of scale, you need to:

- To sell certain, but not excessively wide range;
- expand presence in new markets, going into other regions and countries.

There is a correlation between market share and cost per unit of production, but if sales growth is accompanied by discounts and aggressive advertising, a situation may arise achieve market share at the expense of reducing profitability. So today the practice of strategic management is considered unreasonable to consider market share as the main goal in isolation from the financial goals of the company and assess the success of the company as a whole, in achieving financial and non-financial goals.

The main driving forces cost advantages are:

1) Economies of scale;
2) save learning;
3) New technology and automation (robotics);
4) Effective use of raw materials;
5) Sources of cheap raw materials and labor force;
6) Managerial / organizational effectiveness (at the level of management and line staff).

Let us consider them in detail.

Economies of scale: if increase in output reduces the unit cost of production. This savings is achieved within the production. With the growth of volume of production the cost of equipment, research and product development, brand building, advertising campaigns, distribution shall be distributed among a larger volume of production, respectively, the total cost per unit of output is reduced. For example, the cost of production and the demonstration of commercials on television will not change, will release the company 5000 or 25 000 tonnes of products per year. To achieve economies of scale in manufacturing are practiced specialization and division of labor. Specialization helps learning, reduces the time cost associated with changing activities and helps in mechanization and automation of processes.

Consolidation in the global automotive industry was caused by the enormous costs that are associated with the development of new models. Companies had to recruit the required production volume on which to allocate costs associated with the development of new models. It is the quest for economies of scale became the main driving force of globalization.

Literature Review

The theoretical and methodological prerequisites for the emergence and development of existing theories of value were the scientific works of the largest researchers in the theory of value, such as: W. Petty, D. Ricardo, A. Smith, J.B. Say, J. St. Mill, K. Marx, V. Lenin, McConnell K., Bru S., O. Cournot, V. Pareto, W. S. Jevons, A. Marshall, C. Menger, O. Bem-Baverka, F. von Wieser , L. Walras, J. B. Clark, C. Wicksell, J. Hicks, M.I. Tugan-Baranovsky, A.N. Rich. Subsequently, the main principles of the classical school of value theory were reflected in the theoretical concepts of Russian and foreign scientists studying the formation and transformation of modern value theories, theories of company value management in the post-industrial economy: E.K. Vasilyeva, N.I. Vedernikova, A.L. Dmitrieva, T.G. Evdokimova, V.E. Esipova, I.A. Zheltjakova, S.A. Kotlyarova, A.D. Krykanova, G.A. Makhovikova, E.E. Pavlova, S.V. Preverzeva, N.Yu. Puzynia, M.S. Abryutina, Kapelyushnikova R., Tambovtseva V.L., V.M. Halperina, Elster U., North D., Davis L., Eggertesson T., J. Commons, Stigler J., Williamson O., E. Glyn, J. Itwell, M. Milgate, P. Newman.

The pursuit of economies of scale inherent in new industries. The main feature of most digital products is that the initial costs to develop them are very high, but once created; these products may be reproduced and distributed at negligible cost. In such sectors of the economy, profitability depends significantly on market share.

Savings training (economy of learning): according to the theory of the curve of experience with increasing number of products reduced the time required to produce a unit of product, reducing unit cost of production. As learning and performance, increase reduces the number of errors and defects, improved coordination between different areas of work. Learning can happen at the individual level (mentoring) and group (through the development and improvement of management system and routine procedures in the organization).

New technology and automation can radically reduce costs. In late 1912, to assemble the car model "Ford T" was required 106 hours. A year later, after Ford introduced the moving Assembly line and interchangeable parts for this Assembly was to require only six hours of working time. From luxury, items to rich man the car turned into a means of mass transportation. However, in addition to mechanization and automation, the biggest improvement of productivity derived from innovation, was the result of improvements in the field of work organization.

PROBLEM STATEMENT

In the 1990s, years of widespread re-engineering of business processes — fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical indicators of the company such as costs, quality, speed, service. The purpose of these events is to give an answer to the question "If we were starting from scratch, how would we have organized this process?" The result should be recommendations to improve business processes, for example:

- combine several jobs into one;
- execute milestones in their natural sequence;
- To allow the line staff to make decisions;
- Effectively use raw materials, to optimize the interaction between production and warehouse;
- reduce reporting, bureaucracy and control to a reasonable and justifiable level from the point of view of efficiency.

It should be noted that many of the results of reengineering events have been disappointing. This is because often the recommendations at the beginning of reengineering give external consultants or specially hired professionals. However, the decision to optimization of processes requires a deep understanding of all operations, the specific business and industry. This requires more than one year of work at the enterprise, often at several sites. Reengineering without a full understanding of the processes of functionality of each Department and the complete value chain can become useless and in some cases even harmful.

Possession of cheap sources of raw materials and labor can be the main source of cost advantages, particularly in sectors with intensive use of raw materials or labor. In addition, to achieve cost efficiency organizational efficiency is the ability of staff to do everything quickly and without errors compared with the staff of competitors.

Need to identify opportunities for cost reduction. For example, can reduce payroll costs by reallocating responsibilities or by moving production to another location? If any activity cannot be effectively implemented within the company, can it be carried out by an external contractor (outsourcing)? The desire and pressure to cut costs more in those industries where strong price competition. Currently, however, the pursuit of cost effectiveness must be inherent in varying degrees to all companies, especially those in new high-tech industries.

Important dynamic rather than static approach to cost-effectiveness, i.e. the need to constantly analyze costs, sources of cost. In 1980-ies in Japan in the management of the widespread theory of "continuous improvement" (continuous improvement — kaizen) along with the widespread commitment to "total quality". The methodology of continuous improvement contributes to a dynamic approach to cost-effectiveness and encompasses elements such as process simplification, training, delegation of rights to the level of masters, foremen, direct executors.

In addition to continuous improvement, there is a more revolutionary way of corporate restructuring (the corporate restructuring). The term "corporate restructuring" refers to a radical and often dramatic changes in strategy, structure and management systems of the company, such occurred in the number of Mature corporations in the period of 1980-1990.Such measures aimed at reducing costs are:

1) The closure of factories or industrial sites in order to more efficiently use capacities or abandon obsolete technologies;
2) Staff reduction;
3) Redistribution of functions;
4) Reduction of duplicate units (in case of a merger or within the holding);
5) Getting rid of units that are not of strategic importance (when changing corporate strategy);
6) Outsourcing of components, services, personnel in cases where it is cost-effective.

These organizational changes aimed at getting rid of the junk and inefficiencies, greater accountability, transparency and speed and, as a result, increase business profitability.

Cost control is today a necessary but not sufficient condition of profitability of the business. In the dynamic and highly competitive external environment to reduce costs, it is important to focus on those activities where it has a cost advantage, and translate other works on outsourcing, the regularity of rethinking and improving production and administrative processes. Companies today must look for opportunities to implement innovative management approaches and redesign business processes in order to obtain new sources dynamic cost-effectiveness.

In the last decade, the lack of effectiveness of costly policies led to the collapse of thousands of firms. The resource cost advantage is limited because of the possibility for cost reduction is not infinite, there will always be a company that may have higher productivity based on new technology, large scale of production and, consequently, lower costs per unit of output. It must be emphasized that price wars between competitors is detrimental to all parties except the buyer, but it is not a victory if together with the price of reduced quality. Therefore, experts in the field of strategic management do not recommend teaching customers to a low price, unless it is the standard mass product, for example, a local milk producer. If this premium unique or branded product perceived value, people are willing to pay more. High quality products should cost more.

Let us now focus on the distinguishing advantage. If the company bases its strategy on the distinctive competitive advantage or differentiation, this means not only the offer of some special goods (services), but also relates to all possible ways of interaction between the firm and its buyers, the firm and other stakeholders of the business. You need to constantly reflect on how these interactions can be improved or changed in order to create and increase value.

The analysis used in the selection of differentiation strategies requires a careful look on the very firm (supply-side) and its customers (demand side). Supply analysis allows us to estimate the firm's potential to create uniqueness. Does this unique product / service offer create value for consumers and does the created value cover the costs of differentiation? On the other hand, correctly understanding what consumers want, how they make their choice, what their motives are, a company can determine the possibilities for profitable differentiation. Thus, differentiation is the science of understanding consumers and what needs the proposed product will serve.

To assess what a consumer wants, it is important to understand what product features are important to him. This requires not traditional market research and consumer surveys, managers involved in the decision-making process. Many firms involve consumers directly in the process of product creation. Use hotlines, interactive websites, the possibility of ordering product for individual performance, for example, machine design or Assembly of the computer, etc. In consumer electronics, representatives of firms-manufacturers often get a job in specialty stores in order to understand current and evolving needs of customers. Identifying needs, competitive companies need to provide quick response and result.

The potential for differentiation of a product is partly determined by its physical characteristics. However, as a rule, the differentiation goes beyond physical characteristics of the goods and covers everything that affects the value of the product in the eyes of the consumer, is an innovative idea, status, emotion, style, and quality of life, additional services, unique location, etc. regarding the mass standard products (e.g., food), and complex (car, vacation, etc.), the opportunities for differentiation are limitless

and depend on the power of the human imagination.

Differentiation is not only the activities related to the design and marketing of the product is the combination of all of the activities of the company, and this alloy is embedded in its identity and corporate culture. With the corporate brand acts as a guarantor of quality, the "umbrella" corporate identity and with the success of the Reaper "fruit of glory" and power steering growing reputation and fame of the company.

There is no material (tangible) and immaterial (intangible) differentiation. Material differentiation is associated with the visual and tangible characteristics of the product (services) that affect the preferences and choices of consumers (size, shape, weight, color, design, material, technology). Material differences include the reliability, consistency of quality, taste, speed of service, security. When you create the differentiation potential of important products and services that are complementary, for example, before - and after-sales service, free repair, accessories, spare parts, availability of goods in stock and the speed of delivery, the loan and the ability to improve the product (or exchanged for a better future).

Opportunities for intangible differentiation arise because the value that consumers see in the product or service is determined not only by the material aspects of the proposal. Social, emotional, psychological and aesthetic aspects are present in a wide variety of products and services and influence the decision to purchase. The desire for status, exclusivity, expression of individuality, the need for love, security, communication are extremely powerful motivational forces that affect the subconscious of consumers.

Differentiation is different from segmentation. Differentiation answers the question “How, with what help does the company compete?” Segmentation answers the question “Where does the company compete?” I.e. Consumer groups (target audience), geographical location and product type are considered. A segmented market is one that can be divided into shares in accordance with the characteristics of consumers and their demand. Differentiation is responsible for the positioning of the company within the market (market segment) depending on the parameters of the product, image characteristics that affect the choice of consumers. The company can position itself in the mass market (not necessarily in the niche or premium segment), and nevertheless practice a differentiation strategy.

There is now a trend towards focusing and differentiation, which gradually replaces the wide differentiation. Indeed, it appears that the consumer should prefer targeted product offer that meets exactly its preferences and tastes, compared with a product created to satisfy the widest tastes. On the other hand, this segment-focused approach to differentiating risky. In addition to the higher cost per unit of production characteristic of service is narrow, not broad market segment, there is a risk that the firm incorrectly will determine the market segment or market segments can change over time (e.g. some consumers will not want to be associated with this segment).

Working in mass segment producers know that too wide range is not the best way of differentiation. The wealth of choice often complicates the purchase decision. In this regard, but also because of the additional costs and complexities of managing a wide range, many companies have gone the way of substantial reductions of range.

Michael porter has identified the drivers of uniqueness, which the manufacturer can control is:

- Features of product performance;
- Additional services (repairs, shipping, credit);
- Intensity of marketing activity (the level of spending on advertising and promotion);
- Technology in design and manufacture;
- The quality of raw materials and components;
- Professionalism and experience of staff;
- Location;
- Degree of vertical integration.

Differentiation is only then efficient and effective when it is consistent and constant and when she communitywide and communicated to the consumers. Consumers are not always well informed and understand the special properties of the products they buy. Brand names, guarantees, original and expensive packaging, guaranteed payment, sponsorship of sports and cultural events, unique retail environment of the product — all these non-verbal signals of quality that may be acquired by the consumer. If you want to say about the high quality combination of premium prices and advertising are more effective than the high price and the is separately.

Results

Brand names and is particularly important as signals of quality and consistency. For most consumer goods, the brand is their most valuable asset. Brands fulfill multiple roles. Brand identificeret of the product manufacturer. He communicates to the market that the manufacturer is legally and morally responsible for the products supplied to the market. In this case the more expensive product category, the more important for the consumer reliable brand name. Those firms that were able to make their brands international and work in many markets, earn more than companies focused on a single market do.

Differentiation adds costs. Direct costs include higher quality raw materials, training of employees. Increase the cost of advertising, branding, after-sale service, special design of places of sales. The indirect costs of differentiation are manifested differently. For example, if differentiation involves the narrowing of the market segment, it limits the potential for economies of scale. If differentiation requires continual product improvement, it would interfere with saving from training, as the staff will constantly technologically to be retrained.

Thus, the company can achieve higher level of profitability compared to competitors either through deliveries of similar goods produced with lower cost (cost advantage), or offering products that are different so that the buyer is willing to pay a premium to the price that exceeds the extra costs associated with differentiation.

Low costs showed a less durable basis for competitive advantage than differentiation, since in a global dynamic market, the cost advantage can be easily and unexpectedly disturbed because of the emergence of new technologies or strategic innovation. In most industries, firms establish market leadership that best respond to consumer demands, successfully combining differentiation strategy with reasonable and effective policy in the area of costs. One of the ways of linking differentiation with cost efficiency is to schedule a differentiation at a later stage of business development.

Conclusion

In the modern economy, the growing intensity of competition and increasing price sensitivity of customers, as a result, beneficiaries often become consumers, not companies and their shareholders. The Internet has provided a new way for communication and distribution, leading to opportunities for rapid entry into markets, enhancing competition, reducing costs of customers to search and switch from one supplier to another and increased the transparency of prices (market participants are constantly comparing the prices).

Currently, the problem for top management of companies is that the main traditional sources of increasing profitability (cost reduction, dumping of non-core assets and reengineering) are already exhausted. These “low-growing fruits” are already ripped off, and in the future, creating benefit will require access to other less accessible sources of profit.

For many companies, the solution may be to switch behavior from the “cost reduction” model to the “revenue growth” model, as a rule, by creating and operating a competitive advantage. This path is not easy in modern conditions. The main thing is that the long-term attention of top managers should be constantly focused on factors that lead to long-term profit: operational efficiency, customer satisfaction, development of new products, and demand.

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The Special Section "Pricing And Price Policy of The Companies' Analysis of The Market Environment Based on The Competitive Market Map and Price Index Indicators

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Annotation

This paper aims to propose an algorithm of formation of price policy as an integrated system, which includes data on individual prices, the specific variables and fixed costs, the proportion of operating profit to specific types and groups of goods (works, services). The construction of price policy and price control is based on financial, marketing, factor analysis of the activities of the company. The final brief version of the pricing policies is based on the integrated result. Of particular importance in marketing activity has an analysis of the implementation of goods, works, and services and forecast the level of monopoly power in the market. This is because an increasing role in determining the volume of demand for a product play client-oriented pricing factor. When conducting accounting and preparation of financial statements in accordance with the provisions of accounting standards, companies receive information about the results of activities in the reporting period. Based on retrospective information, the drawing up of forecasts about changes in major financial indicators of the company. Implementation of the strategy of pricing involves the preparation of forecast data on pricing, cost structures, volumes of realization of goods (works, services). Building a competitive card market, the company aims at determining the correlation of forces in a particular market, allowing you to select the model of the strategic position of competing firms, to conduct a situational analysis and design of competitive strategy of the analyzed company on the market.

Keywords: Pricing Policy, Pricing Strategy, Index.

Introduction

The construction of price policy and price control is based on financial analysis of the company's activities. According to methodical recommendations of the Ministry of Finance on the development of pricing policy of the company is a collection of one or more pricing strategies. The final version of the pricing policies is based on the basis of the results of the segmented market analysis, including definition of the level of competition and the determination of the degree constraints as a result of state price regulation in the field of activity of the analyzed company.

Of particular importance in marketing activity has an analysis of the realization of goods, works and services. This is because an increasing role in determining the volume of demand for a product is played by such factors as the preference of consumers; the level of effective demand from real and potential consumers; the presence of possibility of expanding existing market share with an index of concentration; potential and re-Alina the capacity of the market.

For the formation of the algorithm of analysis of the market environment in the price management system in the first phase of development pricing strategy of the company monitors and collection of baseline information, surveys are made in the following areas: assessment of costs; clarification of the financial goals of the enterprises; identifying potential buyers; a detailed marketing strategy; identify potential competitors. It must be borne in mind that the search for competitive advantage may not be meaningful if the market has growth potential. The capacity of the market, the nature of its distribution among the competitors, intensity of competitive struggle is, on the one hand, the key factors determining the attractiveness of business — the basic para-meters that determine competitive advantage. Their assessment is needed to identify potential growth opportunities on the investigated commodity market.

Methods of Research

To assess the degree of monopolization of the market, which is inversely proportional to the intensity of competition, the following factors, as reflected in the table. 1.

Table 1: Aggregated factors that determine the nature of the distribution of the market between competitors

Indicator	The contents of the index	Disadvantages of using
CR4 CR10	Four-digit concentration coefficient, which characterizes the total share of the four firms with the maximum volume of goods in the analyzed market A ten-digit concentration coefficient that characterizes the total share of the ten firms with the maximum volume of goods in the analyzed market	Indirectly, it can increase the level of monopolization of the market, since it does not take into account the import of the product, the effect of high concentration among buyers The complexity of using goods and services in a market formed by vertically integrated mining and manufacturing enterprises, the number of which may not exceed ten
IL	The Linda index is calculated only for a few of the largest companies that have formed the core of the industry	It does not take into account the market situation on the "periphery", which significantly distorts information about the market as a whole
IHH	Herfindal — Hirschman index, which assesses the uniformity of distribution of market shares of firms in the analyzed market	This is not the final result, but further analysis of the concentration coefficients in the product section is required

In the conditions of market relations, establishment of the producer prices of products is influenced by internal and external factors. Accounting and analysis of environmental factors in determining prices contributes to a more accurate establishment of inter-shaft variation of prices on the goods (work, service) in the conditions of market relations. To external pricing factors, include:

- ✓ the sensitivity of consumers to changes in the price level;
- ✓ stage of the life cycle of the goods (work, services);
- ✓ the degree of elaboration (originality) of product: traditional, improved (modified), innovation;
- ✓ level of inflation expectations (forecast, actual);
- ✓ the degree of market concentration;
- ✓ The level of development of institutional environment in the country.

The price level is the generalizing indicator characterizing the absolute or relative weights of the magnitude of individual price reflecting the level of public costs and revenues in a particular period. When predicting price changes in the current market conditions the starting point is the observation with respect to the individual current prices for goods (works or services). The next stage of monitoring you-stepping the calculation and assessment of average prices for selected groups of goods (works or services) over a certain time interval. The obtained results affect the financial indicators such as revenues, total expenses of the population for the purchase of consumer goods and services, the costs of purchase of inventories, capital expenditure on the acquisition, modernization and reconstruction of fixed assets, etc. of the following statistical methods to determine the average prices of goods (work, service) simple chronological average; weighted chronological average; the average price of the goods to the specified name. You can use them as a reference point for the forecast.

Discussions

The main provisions of the classical school pricing was reflected in the concepts of scientists studying the issues of formation and transformation of modern theories of value, theories of value management in the post-industrial economy: E. K. Vasilyeva, N. And. Vedernikova, A. L. Dmitriev, T. G. Evdokimova, V. E. Esimova, I. A. Jeltkovo, S. A. Kotlyarova, A. D. Krikunova, G. A. Mahovikova, E. E. Pavlo-ing, S. V. Pereverzeva, M. S. Abryutina, R. Kapelyushnikov, L. V. Tambovtseva, V. M. Gal-feather beds, Elster J.,North D., Davis L., Eggertsson T., John. Of Commons, Stigler J., Williamson, O. E. Clay, George. Itwell, M. Milgate, And P. Newman.

Author Bykovskaya, N. In. (2014) draws attention to the analysis of the commodity market and the procedure of selection of goods-representative. Author Kovalenko A. I. (2012) notes the importance of social networks in marketing policy in shaping pricing policy. Authors Alexandrova L.Yu. (2015) and Guseva M.I. (2017) draws attention to the role of factors of the international market and imported inflation.
Consider the example of finding a simple chronological average price for a product (work, service).

Example. The following data on the price of goods for 12 months are available, see table 2.

Table 2: Data on the price of sales of goods

Period	1	2	3	4	5	6	7	8	9	10	11	12
Price	48	42	45	45	48	50	50	50	55	55	57	60

A simple chronological average price will be 50.09 monetary units.
Let's consider an example of finding a weighted chronological average price for a product, according to table 3.

Table 3 : data on the sale price of the product

Period	1	2	3	4	5	6
Price	50	52	54	55	58	600
Multiplicity of registration of this price level	3	1	1	4	1	2

The weighted chronological average price will be 54.5 monetary units
The price index is a relative indicator that allows you to combine disparate values and analyze price dynamics. As you know, the following types of price indexes are used: individual price indexes; summary price indexes.
The following formulas in table 4 serve as the methodological basis for calculating aggregate price indices:

Table 4: Content and methods for calculating aggregate price indices1

Index formulas	The name of the index	
	volume index and other primary features	price index and other secondary features
According to the Laspeyres formula (based on base weights)	$I_q^л = \frac{\sum q_1 p_0}{\sum q_0 p_0}$	$I_p^л = \frac{\sum p_1 q_0}{\sum p_0 q_0}$
According to the Paasche formula (according to the reporting weights)	$I_q^п = \frac{\sum q_1 p_1}{\sum q_0 p_1}$	$I_q^п = \frac{\sum p_1 q_1}{\sum p_0 q_1}$
Fisher Index	$I_q^ф = \sqrt{I_q^л x I_q^п}$	$I_p^ф = \sqrt{I_p^п x I_p^л}$

Note. q1 — quantity of the product sold at the individual price in the current period;
q0 — quantity of the product sold at the individual price in the base period;
p1 — individual price of the product (work, service) in the current period;
p0 — individual price of the product (work, service) in the base period.
The level of inflation expectations is shown in an indicator such as the consumer price index (CPI) that has developed in the country, as shown in table 5. As a rule, the Laspeyres price index is used in the form of an average arithmetic index.

Table 5: consumer price Index for goods and services in Russia for the period 1991-2018[2]

Years	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**
CPI	112,1	125,2	112,5	116,44	103,2	101,42	100,96
Years	1998	1999	2000	2001	2002	2003	2004
CPI	111,61	101,26	101,64	101,6	101,54	101,1	101,14
Years	2005	2006	2007	2008	2009	2010	2011
CPI	100,82	100,79	101,13	100,69	100,41	101,08	100,44
Years	2012	2013	2014	2015	2016	2017	2018
CPI	100,54	100,51	102,62	100,77	100,4	100,42	100,31

1 Rosstat order No. 734 of 30.12.2014 (ed. Of 27.11.2017) "on approval of the Official statistical methodology for organizing statistical monitoring of consumer prices for goods and services and calculating consumer price indices". The source is available at the link: http://www.consultant.ru/document/cons_doc_LAW_174490/#dst100034

2 www.cbr.ru

Forecasting price changes in modern market conditions, as part of the company's pricing policy, is based on the structural elements of the price and its factors [3].

The activities of organizations in a market economy are aimed at achieving goals such as cost recovery (production and overhead) and achieving the established level of profitability (profitability), i.e. Profit from sales as a key result of the operating (current) activities of the company. The company's profit function tends to the maximum in the short and long term. The goals of forming a profit indicator in the company are: obtaining the possibility of paying taxes; the needs of the educational sector of the economy to cover the costs of maintaining the housing stock; obtaining potential and real opportunities to expand operational activities as part of a self-financing strategy; increasing the financial stability of the company and minimizing the risk of a bankruptcy; the ability to cover operating and non-operating expenses of the company, in particular, payment of interest payments on borrowed capital, rent and lease payments, etc.

PROBLEM STATEMENT

In accordance with the requirements of financial statements, the following types of company profit are determined: gross profit; sales profit; profit before tax; net profit.

The structure of the company's expenses, including taxes, recorded and displayed in the statement of financial performance, includes: cost of sales; commercial expenses; management expenses; Percentage to be paid; other expenses; Current income tax.

The movement of goods from the manufacturer through the wholesale intermediary organizations to the retail trade is accompanied by the summation of the full cost of the manufacturer of the wholesale and trade allowances, as well as tax charges.

The pricing strategy developed by the company directly depends on the structure and composition of the price, its legal regulation in relation to the establishment of the recommended levels of profitability (profitability) indicators, the value of tax rates in value terms, various types of premiums and discounts to the price.

Normative legal regulation presupposes, first, tax elements in price. Methods of analyzing the market environment, which determines the upper bounds of the price when implementing the pricing strategy, are presented in table 6.

Table 6: Comparative characteristics of pricing methods in forecasting price changes

Factors	**Cost plus methods of pricing**	**Market pricing methods**	**Value pricing methods**
Basic price level	Production cost based on accounting for total and variable costs	The prices of your competitors	Price of a technologically new product
Type of market	The manufacturer (seller)	The consumer (buyer)	The consumer (buyer)
Price level	Low (basic)	The average (equilibrium)	Tall
Price discounts	Wide system of discounts as a result of refusal of additional options	Flexible discount system to meet the customer's need for the product	Absent
Quality management	Assumes a marriage rate of 10%	Assumes a marriage level of 1-2%	The lack of marriage (the

3 Information on CPI values for the Russian Federation for the period 1991-2018. URL : http://www.gks.ru/free_doc/new_site/prices/potr/tab-potr1.htm

			theory of "6 Sigma»)
The level of risk in forecasting financial results	Low	Average	Tall

The combination of the above methods for setting the sale price of a product (work, service) (table 7) depends on the company's position in the market segment. One of the tools for determining the company's competitive advantages in setting the sales price of a product is a competitive market map.

Companies must take into account the actions and opportunities in the market of their main competitors in order to assess the price-forming factors. An example of building a competitive map for the chemical segment of the Russian economy is presented in tables-7-9

Table 7: structure of indicators for building a competitive map

№	Company name	Q-revenue, thousand rubles		market share of the company (d), %		growth Rate d, %	Square of the market share	
		Database	Report	Database	Report		Database	Report
1	PJSC "Akron"	50 382 355	50 216 034	0,04	0,04	103,32 %	0,00159	0,00170
2	PJSC "Uralkali"	189 189 000	151 731 000	0,15	0,12	83,14 %	0,02247	0,01553
3	PJSC "FosAgro"	189 742 000	187 732 000	0,15	0,15	102,57 %	0,02260	0,02378
4	PJSC "KuibyshevAzot"	38 091 870	37 911 005	0,03	0,03	103,17 %	0,00091	0,00097
5	PJSC " Tolyattiazot"	63 289 000	44 348 000	0,05	0,04	72,64 %	0,00251	0,00133
6	JSC "EuroChem"	260 281 065	250 807 722	0,21	0,21	99,89 %	0,04253	0,04244
7	PJSC "Dorogobuzh"	26 654 915	23 253 619	0,02	0,02	90,44 %	0,00045	0,00036
8	Nevinnomysskiy Azot JSC"	47 460 914	42 791 884	0,04	0,04	93,47 %	0,00141	0,00124
9	PJSC "SIBUR"	379 852 000	411 812 000	0,30	0,34	112,39 %	0,09059	0,11442
10	PJSC " Shchekinoazot"	17 123 922	16 837 573	0,01	0,01	101,93 %	0,00018	0,00019
	Subtotal	1 262 067 041	1 217 440 837	1,00	1,00		0,18526	0,20196

Building a competitive card market, the company aims at determining the correlation of forces in a particular market, allowing you to select the model of the strategic position of competing firms, to conduct a situational analysis and design of competitive strategy of the analyzed company on the market. The algorithm for constructing competitive card market is based on the following processes:

1. grouping firms depending on their market share;
2. grouping firms depending on the growth rate of the market share;
3. The construction of the matrix "competitive map of the market".

METHOD AND METHODOLOGY

Consider the algorithm for the main stages.

Step 1. Definition of outcome parameters evaluation criteria market shares of the companies
Define the boundaries of groups of firms in terms of market share. The market leader, as seen in table 7 is PJSC "SIBUR", its share is maximum and is:30,10%.
The outsider market is PJSC "Shekinazot, he has a minimum share of 1.36%.
Find the arithmetic mean market share for all firms in table 7 (on the condition the method should be not less than five companies), in our case the arithmetic mean equals: 10.
Step 2. Divide the company into groups.
In the group of weak firms includes companies with: R<10. This is a company number: 1,4,5,7,8,10.
In the group of strong firms included companies with: R>10. This is a company number: 2,3,6,9.
Step 3. Find the arithmetic mean market share for the group of companies
Find the arithmetic mean market share for the group of weak firms: n=6=2,95%.
Find the arithmetic mean market share for the group of strong firms is n=4=of 20.58%.
Step 4 building a competitive card market

Mapping occurs according to the following parameters:

- The market leader (112,39%) - PJSC "SIBUR";
- Market outsider (72,64%) of JSC "Togliattiazot";
- Average growth rate of market share 96,30%;
- Weak players in the market company number: 2,5,7,8 in table 7;
- Strong players in the market company number: 1,3,4,6,9,10 in table 7;
- Average growth rate of market share in the group of weak firms 84,92%;
- Average growth rate of market share for the group of strong firms 103,88%.

Table 7: Outcome assessment criteria of growth market shares of the companies

Characteristics of the situation	Average rate market share growth	The company
The company	84,92-122,86	EuroChem, PhosAgro, KuibyshevAzot, Nevinnomysskiy Azot, Dorogobuzh, Shchekinoazot
with the deteriorating	72,64-84,92	Uralkali, Togliattiazot

Stage 5. Calculation of aggregated coefficients that determine the nature of the distribution of market parts between competitors
Market concentration index by CR3 companies (table 1): base -0.65755; reporting-0.69847. As you can see, the market is competitive, but the dynamics of concentration are negative.
IHH Index (Table 1): basic — 0.18526; reporting-0.20096
As you can see, the market is highly concentrated and concentration is increasing.
The calculation of the coefficient of relative market concentration is summarized in table 8.

Table 8: coefficient of relative market concentration

B	0,3	30	
a(database)	66	a(report)	70
K(database)	1,67287078	K(report)	1,57486001

As you can see, the market is concentrated
Stage 6 Accounting for competitive positions in pricing using the porter model, table 9

Table 9: porter Model for the leader company of Akron PJSC"

Competition level	High threat	Medium threat	Low threat
The competitiveness of goods			
	3	2	1
The goods are substitutes		2	
Price-quality		+	
Intra-industry competition		7	
Number of players		+	
Growth rate			+
Level of differentiation		+	
A limitation in the growth rates		+	
Threat of new players		17	
Economy of scale			+
Brand and loyalty		+	
Product differentiation	+		
Barriers to entry			+
Access to distribution channels	+		
Government policy		+	
Competitors ' willingness to lower prices	+		
The growth rate of the industry		+	
Threat of consumer withdrawal			
Buyer's market power		8	
For customers with a large volume of sales	+		
The propensity to substitutes		+	
Price sensitivity		+	

Customer dissatisfaction with quality			+
Threats from suppliers			
Market power of suppliers		5	
Number of suppliers			+
Resource constraints			+
Switching costs			+
Priority of the direction for the supplier		+	

The market is concentrated and competitive. Dynamics of index of congruence in the negative, indicating that the decrease in attractiveness of the industry. Indeed, the average gain in the market is small. According to the model of five forces of Porter Company PJSC "Akron" has a medium level of threat: small threat of substitute products, so the quality of fertilizers is negligible. but different; the presence on the market of intra-industry competition; the possibility of market entry of new players in connection with open distribution channels and the ability to differentiate the product in terms of quality; work in the sector-linked with a small dependence on the consumers consistently buyers purchase large volumes of goods.

According to the results reported in tables 7-9, a large company that occupies the largest volume market, with a growth in market share and weak ability to dictate prices, so the price level in the chemical industry are often below market for the past three years. Therefore, in establishing the sales price can be the strategy of active pricing, particularly given the magnitude of costs.

Depending on the degree of concentration of market the company — an economic entity can implement various models and strategies pricing strategy of "follow the leader", "skimming", "and focus on the actions of competitors."

At the stage of development of pricing strategy of the company "Financial analysis" carrying out research in the following areas:

Liquidity and solvency the company's activities;
Business activity and financial stability of the company;
The profitability and yield of the main activity of the company;
Factorial analysis of the main indicators of profitability of the main activity of the company.

Further, according to the methodical recommendations, development of price policy of the company and forecasting the level of prices assume the use of the received results of the financial analysis of the company's activities. When conducting a financial analysis of the company using the actual data on the prices of goods (work, service) the reporting and previous periods:

Formed price levels (price options) in the implementation of various scenarios of company development depending on the stage of the life cycle of products (works, services);

Qualitative and quantitative characteristics of the goods;

The structure of the production cost, forming of production and full se-bastakoti an item;

The conditions that determine the market segment and the achievement of planned sales volumes in the presence of competitive advantages.

CONCLUSIONS

The financial analysis allows you to determine companies that market segment, which allows meeting the effective demand either due to increased costs in terms of value, either through optimization of the cost structure through the optimization of organization and technology of production, which will lead to a decrease in the total unit cost of production of goods. This assumes a definition:

• The value of the net profits of the company from the production and sale of each type of commodity when the actual price level of the implementation.

• The likelihood of increased sales volumes in quantitative terms, with a reduction-Institute of sales price;

• marginal drop in sales of all goods in the event of a price increase implementation, in which the total amount of net profit of the company will be reduced to the existing level.

In the result of price control for a given level of profits and the availability of information about the cost structure may determine the selling prices of goods.

When compiling balance sheet management key indicators revenue, costs and profit metrics are classified by main activity (industry, construction, retail trade, wholesale trade, social services) or the main groups of goods (works, services). In pricing in the first place is the factor analysis of the activities of the company. The assumption in factor analysis is the prices and was part of the price. The impact of direct and indirect taxes on the sales price of the product is not taken into account in the factor analysis.

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The Special Section "Pricing and Price Policy of The Companies' Forecasting Prices in Terms of Volatility of The Foreign Exchange Market

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Annotation

Pricing in the product market depends on the fluctuations of currencies. Insignificant purchasing power of citizens becomes a cause of limiting the growth of prices by retailers on the value of the volatility of the currency, so the price dynamics are not comparable with the imported inflation. However, the pricing policy is necessary to forecast exchange rates. You must know the factors that affect the rate of the national currency. You should be able to use in practice hedging instruments that give the opportunity to generate forecasts of prices in the future. You must master the skills of assessment of price dynamics and its trends, given the variability of the exchange rate of the national currency, which is closely related to the rate of inflation in the country.

Keywords: Currency, Forecasting, Pricing, The Price Of Oil.

INTRODUCTION

Let's start with the preparation of the forecast impact of exchange rate on the pricing process. Often the task of making a forecast of the price dynamics in a market economy. Thus, it is necessary to take into account the change rate of the Russian ruble against the U.S. dollar. The Russian ruble is the numerical expression of his price using that currency in a specific period.

STATEMENT OF THE PROBLEM

The national currency becomes known after carrying out of currency trading, which are carried out on the foreign exchange market. Players that carry out trade relations, face the problem of making a prediction of the behavior of the national currency. While actors of trade relations face serious problem related to establishing measures of impact of numerous factors on the course.

The rate of the national currency against the key currency is highly dependent on the dynamics of prices of oil. The Russian ruble has a significant impact on the dynamics of prices on imported goods.

The price of oil is the current price for one oil barrel. Oil in different grades and sold in conditions of the futures market. The most famous grades of oil are WTI crude oil US oil and Brent North Sea. The price of oil exports brands such as Siberian Light Urals REBCO is determined based on the price of Brent crude oil. The exchange rate of the Russian currency against the US dollar significantly affects the prices of foreign goods, as well as the level of budget revenues. The course affects the price of Russian oil abroad.

Figure one shows how the exchange rate of the Russian ruble depends on oil prices that have developed on the world market. We can draw conclusions of this kind: the trend lines have a similar direction, which allows us to conclude that the changes in oil prices and the Russian currency exchange rate are rather closely.

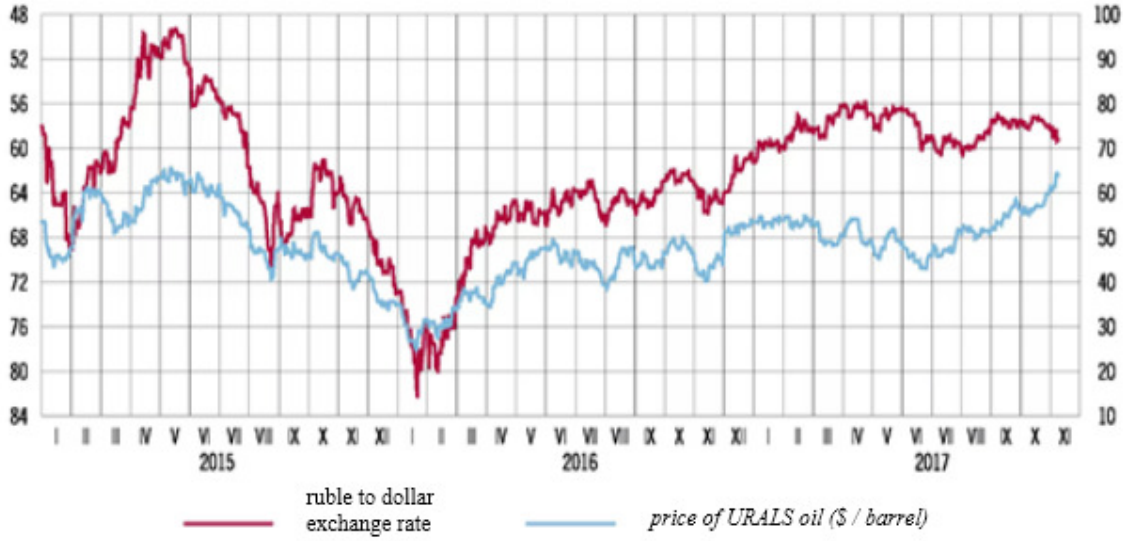

Figure 1: Dynamics of URALS oil price ($ / barrel) and ruble to dollar exchange rate, 2015-2017

Source: Thomson Reuters.

The exchange rate of the Russian currency, which according to the figure is decreasing in relation to the US dollar, affects the macroeconomic state of the Russian economy. Moreover, it is worth noting the indirect and direct influence of exchange rate differences on the Russian economic system. With the growth of the dollar against the Russian ruble, national products produced in the domestic economy become cheaper compared to imported ones. Imported products for Russian consumers are becoming more expensive. This state of affairs with the exchange rate leads to the following: the output of goods in Russia is increasing, which can be said about the volume of foreign currency earnings expressed in Russian currency.

The budget of the Russian Federation is formed from the revenues that exporting companies generate from the sale of oil for US dollars. Revenues received at the current rate are converted into Russian rubles. The national currency exchange rate depends on the amount of revenue generated by oil exporters in US dollars. If the exchange rate of the domestic currency against the US dollar rises, then this leads to the fact that the revenues of the Russian budget are reduced. In case of depreciation of the national currency, the budget revenues of the Russian Federation are growing.

Figure 2 shows the dependence of the Russian currency on inflation. It should be noted that there is an indirect conditionality of the Russian ruble rate of inflation.

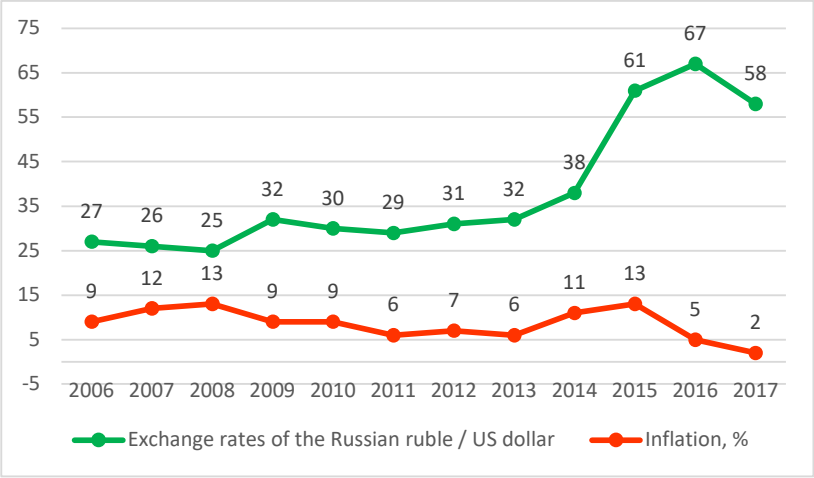

Figure 2: The relationship of the ruble / dollar to inflation

Source: Bank of Russia.

The insignificant purchasing power of citizens makes it impossible for retailers to raise prices by the amount by which the US dollar has changed. Import prices are not caused by inflation, which can be compared with the dynamics of the US dollar.

In order for such a dependence to acquire a small scale, it is necessary to establish a full cycle of production and sale of goods within the country. Only in such a case, the price of them will be less dependent on the dynamics of the national currency. In the case of rising prices for imported substitutes for goods, national producers raise prices at a constant cost of production.

The key rate set by the Russian mega-regulator affects price dynamics. Owning a similar tool of monetary policy, the Bank of Russia regulates interest rates that are traded in the economic system. This approach allows you to gradually reduce inflation and control it. The key rate is the lower limit of the interest rate. Guided by this indicator, the regulator provides loans to banking institutions. The key rate is also the upper limit of the rate at which the regulator accepts deposit funds from banking institutions.

Figure 3 shows the results of the change in the key rate of the Central Bank of the Russian Federation.

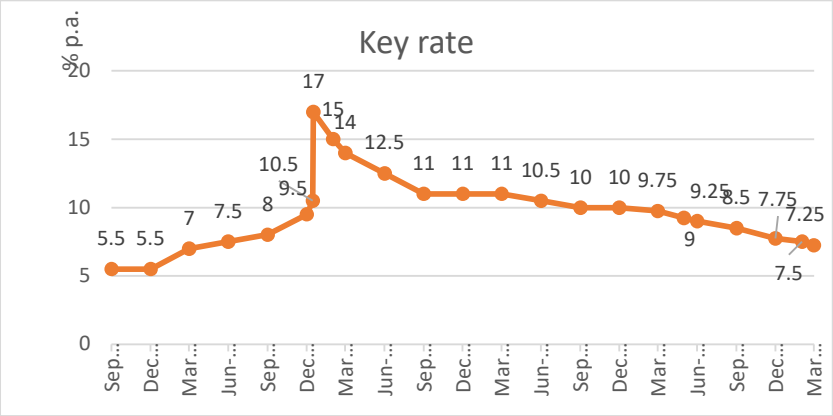

Figure 3: Dynamics of the key rate of the Bank of Russia.

Source: Bank of Russia.

The Bank of Russia used key rate to regulate the level of prices in the economy. However, prices on specific products are beyond its influence. The key rate is an important tool to create value of money using interest rates applied by banking institutions. By adjusting the key rate controller corrects the level of interest rates. By reducing, the key rate reduced interest rate used by the credit institutions. This allows the economy to develop sustainably because a growing amount of money circulating in it. This becomes the cause of the weakening of the domestic currency. Rising inflation and prices.

Increase the regulator's key rate leads to an increase in interest rates of banking institutions. The situation is complemented by a reduction in the circulating money supply. The Deposit rates of credit institutions also increased. The market gets rid of free money. Is moving on Bank deposits. Inflation takes a downward trend, prices are stable or declining. This is an increase rate of the domestic currency.

Against Russia are introduced in 2014, Western sanctions – measures of a restrictive nature, has imposed a serious negative impact on the activity of enterprises and separate physical entities. Sanctions pressure makes the situation in Russia is unstable. The Russian ruble is also in stable depends on the pressure of sanctions. You must take into consideration these factors. This approach significantly increases the accuracy of forecasting the prospective price movements. Also used the results of this forecast for economic decision-making. All these factors lead to the need for hedging of currency risks.

LITERATURE REVIEW

In an economic system, in a market, prices show significant volatility. The authors Petrov, S.S., Medvedev, MV., Kashina, OI (2013) write that according to the classical theory, equilibrium asset prices add up as a result of optimizing the structure of investor portfolios; a mechanism for restoring stable equilibrium in the case of a small deviation of prices from equilibrium. The change in the overall exchange activity of large participants carries information about the stability of the market situation. The subjects of the economy create effective mechanisms that help protect themselves from stressful price dynamics, which helps to minimize this impact. Author Azarova A.I. (2012) notes the presence of more than 40 different indicative prices, which vary greatly in level at the same point in time due to factors such as the quality, density and location of crude oil. Companies carry out their activities, undergoing financial risks that accompany all their operations. However, there is a significant risk of impairment of invested capital. Many enterprises have a risk of losing business or may generate a small profit, despite the amount of investment. Profit may decrease because the prices of assets used in carrying out commercial operations will suddenly change. The author is Glubokova, N.Yu. (2010) notes that such situations may arise in an organization when transactions are concluded not for profit, but to minimize risks, including tax ones.

THEORETICAL BACKGROUND

If a hazard can take place as loss and gain in the form of unexpected income growth. Many entrepreneurs do not want to risk it. They like to reduce the risk of loss that leads to the inability to obtain large amount of profit. Risk reduction is possible with the use of derivative financial instruments. The most widely used derivatives are options, forwards, and futures. Operations for the reduction of the level of risk using these derivatives is called hedging.

Risk is the probability of loss of financial capital for carrying out some operations with them. Assets and cash flows are subject to risks of impairment over time. These risks can be classified on interest and price. There is also the risk that contractual obligations will not be performed. This is due to the nature of the financial instruments, which are in the form of contracts. This risk is called credit risk.

Hedging gives an opportunity to use some tools that will reduce the level of risk. The risk due to the negative impact of market factors on the value of the related financial instrument or on cash flow, which was created with his direct participation. Hedging is an insurance risk of volatility in prices of assets, currency exchange rates, interest rates with this derivative.

Under the financial risk, understand the risk to the operations or assets of the exchange rates, interest rates and prices of products and services. Financial risks are hedged by transferring them to other financial market participants. Hedging is carried out in efficient and developed markets. The basis risk hedging is the strategy of minimizing risks of undesirable character. Because of the operation reduces the potential volume of profit generated due to the inverse nature between profit and risk. Conversion operations are operations related to the purchase and sale of non-cash foreign currency and are directed towards non-cash and cash Russian currency. Operations that are characterized by immediate delivery are mainly carried out.

Table 1: Advantages and disadvantages of hedging instruments

Exchange instruments	OTC instruments
Advantages 1. Significant market liquidity due to opening and closing a position in any period. 2. Significant reliability due to the presence of a counterparty to transactions represented by the exchanges. Clearing house. 3. Minor overhead costs for transactions. 4. Financial transactions due to their availability can be carried out anywhere thanks to advanced telecommunications technologies.	Advantages 1. The instruments take into account to a large extent the client's requirements for the terms and type of financial transaction 2. The period for concluding a financial contract can be long 3. There are no daily requirements to ensure that the operation is financially or financially secured 4. There are no restrictions on the market share 5. Excessive secrecy
Disadvantages 1. There are significant restrictions on the terms of operations 2. Additional security requirements are made every day. This is done after the quote price is set. 3. There is an illiquidity of a large number of exchange instruments. Some exchange instruments are only liquid within a certain time frame	Disadvantages 1. Low level of liquidity. Termination of financial transactions is associated with high costs 2. Significant overhead costs 3. Restrictions on the minimum possible batch size 4. It is difficult to find a counterparty for financial transactions 5. There is a significant risk that the parties to a direct financial transaction will not meet their obligations under it

The operation of the type "TODAY" is a transaction, with the conversion characteristics. The transaction differs in that the value date coincides it with the time of its conclusion. The operation of the type "TOMORROW" is a transaction, characterized in that the value date for her in the next day that the day. Operation of type "SPOT" is a special transaction conversion type, characterized by the value date, coming on the second day of the transaction banking day. The share of such operations accounted for 90 % of all Forex transactions. Currency according to transactions acquired on the second working day from the date of conclusion. The counterparties to take into account the course that was installed at the time of signing of the contract. In the calculation, take into account the working days in the context of all currency transactions.

Currency risk is the potential loss of funds caused by the dynamics of the exchange rate. The cause is the fact that the composition of each currency, the assets and liabilities unbalanced among themselves and on the amount and period. In the process of trading instruments and currency, money market is protected from the dynamics of interest rates and exchange rates.

The basis of the exchange quotation is the cross-rate. Under the cross rate understand the relationship that there is between currencies. The cross rate comes from the rate of these currencies in relation to the third currency. Use the following example to describe such a situation. It is necessary to determine

the level of spread in the cross rate of the Euro against the Swiss franc. It was found these quotes in the dollar for these currencies:

BID		ASK
USD/CHF	1.1810	1.1820
USD/EURO	0.9810	0.9820

Then:

EURO/CHF bid = USD/CHF bid/ USD/EURO ask = 1.1810/ 0.9820=1.2026

EURO/CHF ask USD/CHF ask/ USD/EURO bid = 1.1820/0.9810 = 1.2048

Two-way quote of the EURO/CHF 1.2026 – 1.2048 cross rate

To determine this value, you need to make a cross-division of rates. This will allow you to get the cross-rate value that is typical for currencies with a direct quote. The exception is the definition of a cross-rate with the currency "pound sterling". In relation to the pound, the quotation of any currency is as follows: the pound is the base currency (pound/other currency). You should multiply the dollar exchange rates to determine the cross-rate of the English currency. Let's give the following example:

GBR / USD 1.5920 – 1.5925

USD/EURO 0.9810 – 0.9820

GBR/EURO = GBR / RUR bid * USD/EURO bid = 1.5920 * 0.9810 = 1.5617

GBR/EURO = GBR / RUR ask * USD/EURO ask = 1.5925 * 0.9820 = 1.5638

GBR/EURO = 1.5617 - 1.5638

A currency can be quoted at a certain premium. This situation occurs if the forward rate exceeds the spot rate. The currency is also quoted at a discount if the forward rate is set at a level lower than the spot rate. There is such a scheme for calculating the level of the forward rate:

Forward rate = spot rate + / - forward points

The amount of bonuses and discounts on a forward contract is determined as follows:FD (Pm:Dis) = fr – sr /sr ×100% × 360 / t forward rate, (4.1)

where: FD (Pm:Dis) is the forward differential (premium or discount);

Fr-forward rate;

Sr-spot rate;

T – term (in days) of the forward contract.

Under a futures contract is an agreement, which provides for the supply of a certain volume of foreign currency on specified conditions in the future. Futures contracts are similar to forward transactions. Futures is a standard financial product. The futures circuit is carried out in conditions of special exchanges. In a futures contract are clearly spelled out name of the currency its value, the value of the orbital period. There are dates of the period of treatment of futures transactions on exchanges: December, March, September, June.

Futures markets have their advantages. First, they are liquid. Cost cheaper futures forwards. However, the forwards have the ability to solve specific customer issues. A futures transaction involves as a partner the client the estimated exchange chamber. The Bank acts as intermediary. The task of the Clearinghouse is supervising such activities.

Futures exchanges have a difference. The difference of these exchanges lies in the peculiarities of the procedures of carrying out of such operations and the scale of the contracts that are there to make the circuit. There are advantages of futures agreements:

- The price is set just in the implementation of trading. The implementation of arbitration is subject to the preservation of the price level, which is close to the current market. Forward contracts do not provide this.
- Futures transactions are easy to implement and relatively low cost compared to forward;
- The price of the futures transactions is determined each day automatically.

- Risky operations are hedged in the futures market is not particularly expensive, so there is considerable advantage, which enjoyed the market operators.

There are some disadvantages of futures hedging:

- Remains uncovered is the difference in the case of inequality, the standard value of the future value of the hedge. In some cases, this difference is subjected to hedging under the terms of the forward contract;
- In case of a mismatch of the hedging period and the period of turnover of futures for forward contract starts carrying basis risk.

Futures are traded within the exchanges and act as a standardized tool to hedge financial risks. Banking institutions and private brokers do not act as actors in these operations. These actors serve as mediators between the exchange chamber and the client.

In the calculation of the exchange chamber, the client shall Deposit the value of the initial margin. Reassessment of contracts for futures are provided daily. In the case of a contract, establishing the loss put a certain requirement. Requires the additional amount of security. Thus, the essence of the requirements is that the margin was less than the amount that is required.

Currency swaps are also widely used for hedging risks. Operation swap provides for the conduct of banking transactions. In the structure of such transaction, there are two opposite conversion transactions for the same amount. Moreover, these operations are enclosed in one day. One of the deals you will be urgent in nature. The second operation acts as transactions with immediate delivery.

Conclusion of spot transactions occurs on such conditions: a calculation of the transaction will be made after 2 days after the operation will be performed. There are ultra-short-term swap, which reduces the calculation time and sets the period at 1 day. The currency, which becomes essential when it is purchased in the spot market. There is a condition – implementation of the calculation in 2 days.

There is an implementation of the swap transaction related to the purchase of a currency for delivery the term "tomorrow". The sale is with the supply set at "date spot". Such operations are called ("torn next" tomorrow – next day). The essence of such operations – to postpone the settlement date under the contract for the day ahead. Swap points are used to reduce the difference in interest rates. All of the above illustrates the following example. The contract was signed on 6 March. For USD/CHF. Value date for this contract is March 8.

	Buy rate	**sell Rate**
Spot	1.5005	1.5015
Tom-next swap on March 7	+1	+2
Forward course for March 7	1.5006	1.5017

To make a decision on the need to conclude a currency swap, the following should be done. Comparison of the interest income from the swap with the possible income, which is generated in another way.

Customers in different markets are characterized by varying degrees of creditworthiness. The differences in this indicate that some transactions will allow you to receive significantly more income than others. In this case, the effect of the equalization of arbitration does not occur.

Forward exchange rates are based on interest rates on the European market. The base of deposits and loans is made up of national rates. The term for forward transactions is no more than five years. Rarely are such contracts concluded for a period of more than one year. A significant problem is that there are no indicative rates characterized by reliability, which are used to determine the difference in interest

rates and swap points. Another problem is that you need to look for accurate hedging instruments that allow you to pay interest and capital on financial transactions.

Holders of options have the right to carry out certain operations. They have the right to buy or sell a financial asset at a certain date at a specified price. The buyer in this case is called the option holder. The option seller is the writer. His duty is to buy or sell assets in the future at a fixed price earlier.

The premium is the cost paid by the option buyer to the option seller. There is the following classification options:

Options type Put (the sale of an asset);
- Options Call-type (right to acquire asset).

There are European options, which are executed on the expiration day. Takes place one day for delivery and payment on the underlying assets. According to the American call, option can be purchased or you can implement the underlying asset at any period remaining until the date of expiry.

American options are characterized by a significant level of flexibility and provide for the payment of high premiums. Moreover, the amount of this award on the American option exceeds for European options. The options are implemented on the following conditions: option type of Call (prospective price is below the strike price of the option). The option of this type is not realized in the case that a promising spot price will be less than the exercise price of the option. The holder of the option acquires the asset in the spot market at an affordable price. In this case, lost the prize that will be given to the option seller.

Option type of Call (prospective price is greater than strike price). In case of exceeding the spot price above the exercise price, the holder sells the option. The asset is bought at a price cheaper prices operating in the spot market. The profit the option holder is not generated in the case of not exceeding the difference between the spot price and the strike price of the award on it option type put (prospective price exceeds the strike price).

The option of this type is implemented in case of exceeding the promising spot price over the price of its execution. The option holder can realize it in the spot market and receive a good income. Premium goes to the seller of the option type put (prospective price of the option is below the price of its execution).

In case of determining the spot price of the option at the level of the strike price, a put option the following will occur: the holder of the option sell his requesting a price higher than the option price. Before calculating the final amount of profit is deducted the amount of the premium. Option transactions are asymmetric. The purchaser of the option assumes the risk of loss, but it can also get profit in unlimited amount.

The profitability of the option is limited to the premium. The risk of loss when such an operation is not limited. Loss of option holder may receive in case of adverse price changes. The premium reflects the profitability potential. The seller will be willing to take the risk of loss in the event of a significant profit. The low premium convinces the buyer that he can make a good profit.

The value of the premium is due to the action of several factors. The intrinsic value of an option is the profit that the holder receives if the option is immediately exercised. When using European options, the determination of the intrinsic value of an option is as follows. The forward price of the asset and the price at which the option is exercised are taken into account. If there is a positive difference, the option is considered an option by type ("inthemoney"). If the strike price of the option is equal to the price of the forward contract, the option is considered to be "atthemoney". Moreover, the intrinsic value of such an option is zero. If there is a negative difference, the option is called the option "outofthemoney". The prize was not taken into account.

It depends on the duration of the option that the price of the asset will become positive for its holder. How long this period is, the greater the likelihood. In this case, the seller's risk level increases. If the option is characterized by a long term of execution, then a significant premium is paid. The price of time is an important element of the option price. The shorter the exercise period, the lower the price of the option. The time price on the exercise date of the option is considered equal to zero.

CONCLUSION

In conditions of instability, the price deviates from its average value over a certain period. More mobile than the price of the asset, the greater the probability that the option is exercised and the holder will get the profit. The higher the volatility, the larger size should have a prize.

The increase in costs associated with interest payments, leads to the fact that growing and opportunity costs, which are charged to the buyer of the option. The money that was paid for the award, can alternatively invest in a certain asset, which can generate income. The buyer in this case as before is not ready. The award provides the opportunity of earnings for seller's interest. If interest rates rise, you can reduce the value of the award. This will give you the opportunity to get some net profit. Raising interest rates has a downward effect on the value of the option awards.

The smaller value takes the difference between the option execution price and the spot price of the asset, the greater will be the probability that spot price will increase and exceed the exercise price of the option. The magnitude of this difference depends on the value of the award. The smaller it is, the higher such an award.

Widespread options "retail". These options are negotiated between the banking institution and the client. They do not participate in trade. Despite that, such positions will be closed at any time. While in the Bank is the reverse deal. An example of such options are European options. This option is the last day of action. The last maturity of such option falls on the third Wednesday of September, March, June and December.

The media continually publish information on the value of premiums on options.

On the Chicago, international money market has made the treatment of such options:

Options GBR/GBR USD 62,500; 1 step = 12.5 USD

Options DEM/USD to USD 125,000; 1 step = 12.5 USD

The calculation of the initial margin is based on the requirements for the size of margin for futures. The sum of these demands multiply by a risk factor. The dynamics of the premium depends on the trends of the contract. These changes then have to be debited or credited to the parties to the contract.

In case of reduction of the balance on the client, account is below the margin that is not reduced, it is necessary to make additional provision.

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The Special Section "Pricing and Price Policy of The Companies' Transfer Pricing: International Experience and Russian Practice

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Annotation

Transfer pricing is increasingly becoming in demand in the implementation of operations by companies within their structures. In Russia, unlike foreign countries, there are problem
s in ensuring effective interaction between company structures, as well as with entities that control these operations. The study clarifies the conceptual and categorical apparatus, indicates the importance of the proper organization of intra-group financing. Based on the results of the study, the main methods for regulating intra-group transactions in modern Russian companies are determined taking into account foreign experience. Foreign tax systems ranked for priority in choosing methods for regulating internal corporate transactions.

Keywords: Transfer Pricing, Transfer Price, Transactions Between Related Parties, Tax Base.

INTRODUCTION

Currently, such definitions as transfer price, transfer pricing, beneficial owner are not clearly contained in the Russian legislation, which leads to a different interpretation of these concepts in the expert community. Thus, in the current conditions of regulation of transactions between interdependent companies, this leads to an increase in the level of financial risks in the implementation of intra-group transactions, which indicates the importance of specifying these concepts.

Analysis of transfer prices used in controlled transactions is a new type of tax control and is carried out based on the provisions of the Russian legislation on transfer pricing, and is also built taking into account international standards. However, there are a number of differences from classical international practice.

The transfer price appeared in the 1960s, when transnational corporations began to open in developing countries, which were aimed at producing a product in one company and transferring it to another interdependent company. The prices at which goods (services) were sold between interdependent companies were called transfer prices, and the process of setting them was transfer pricing.

Methods of Research

Functioning in the 1990s offshore companies represented by countries (territories, states), which attract the capital of foreign companies by providing the latter with special tax and other benefits, allowed

significant savings on taxes, using the transfer price in the calculations. It did not match the market price level. Thus, companies moved taxable profits between states, with profit centers located offshore. However, transfer pricing according to Mambetaliev A.N. (2010) - this is primarily an objective market need and a powerful incentive for the development of the economy.

The first studies on transfer pricing were published in 1950-1960. scientists such as J. Hirshleifer and Ch. Argyris. Scientists have studied transfer pricing as a tool for the internal distribution of financial flows in multinational corporations. Transfer pricing was considered in the form of a financial instrument that allows generating profit for each structural unit of such companies, which contributes to increased productivity and increased profitability of the entire corporation (Anthony R.N., Dearden J., 1984).

Foreign researchers interpret the transfer price largely as the price that is set between different divisions and branches belonging to one company (Milgat, M., Newman P., Eatwell J., 1998). There is another identical definition: the transfer price is the price at which divisions of one organization transfer goods (work, services) among themselves.

In Russian studies, many authors adhere to the point of view that the transfer price is a certain internal price at which one unit of the company (workshop, department, etc.) transfers products or services to another (Kuznetsova E., 2011).

Thus, M.A. Bakhrushina (2000) interprets the transfer price as the price at which one center of responsibility transfers its products or services to another center of responsibility, while the author indicates that transfer pricing is the process of establishing internal settlement prices between segments of one company.

According to the generally accepted OECD standards applicable in many countries, transfer prices are the prices at which the transfer of goods, including intangible assets, work is performed and services are provided between related parties (associated enterprises).

The normative concept of the transfer price is reflected in the Protocol on the exchange of information on control of transfer pricing between the tax and customs authorities of the EurAsEC member states of June 6, 2006: “The transfer price is the price of goods, work, services, which differs from the objectively formed market (free) prices for international transactions.”

From the point of view of tax regulation, the transfer price is a price that may differ from the objective market price.

Thus, there is no single approach to determining the transfer price.

Analysis of approaches to the term "transfer price" and "transfer pricing"
To clarify the term “transfer price”, several approaches to the definition were summarized (table 1). From the point of view of the authors, the transfer price in this study refers to the price set between interdependent persons in cross-border and in-country transactions for the sale of assets (works, services).

Table 1: Transfer Price Definition Approaches

Approach	Source	Interpretation
Economic	Foreign sources	Transfer price is the price at which divisions of one organization transfer goods (works, services) among themselves.
	Russian sources	Transfer price - the internal price at which one unit of the organization (workshop, department, etc.) transfers products or services to another.
Tax	Foreign sources	The transfer price is a price that differs from market prices that are applied by unrelated parties in the open market.
	Russian sources	Transfer price is the price formed in a non-market way at which goods (works, services) are sold in transactions between related parties
Legal	OECD: Transfer Pricing Guide	The transfer price is the price at which goods, including intangible assets, are transferred, work is performed and services are provided between related parties.
	UN: Transfer Pricing Guide	Transfer price is the amount a segment of a company receives by delivering goods, assets or services to another segment of the same organization
	EAEU: Protocol on the exchange of information on the control of transfer pricing between tax and customs authorities of states of June 6, 2006	The transfer price is the price of goods, work, services that differ from the objectively formed market (free) price in international transactions.

A source: based on research.

Under the market price of a product (work, service) is understood the price that has developed during the interaction of supply and demand on the market for identical similar goods (work, services) in comparable economic and commercial conditions.

The transfer price is formed not based on supply and demand, but primarily based on the goals of the company when setting it. Thus, the deviation of the transfer price from the level of market prices does not depend on market conditions, but on internal corporate processes.

Transfer pricing is the variation in the contract price of transactions between related organizations in relation to its market values.

According to, Mukhina G.A. (2012) transfer pricing refers to a method of tax evasion, and in business, practice refers to one of the classical optimization schemes for tax planning.

Foreign authors (Velloso F.C., Brigagao G.A., 2012) interpret transfer pricing as manipulating expenses and revenues in transactions between related parties in a way different from that, which would be applied in market conditions, in order to obtain tax benefit.

In the United Nations Guide for Transfer Pricing, this definition is interpreted as the process of setting prices in cross-border, intra-company transactions between related parties related to the sale of property or services.

The most important distinguishing features of transfer pricing are:

1) acts as a method of tax evasion;
2) Is realized between interdependent persons;
3) Leads to financial losses of the state in the form of non-receipt of tax revenues;
4) Is subject to state regulation.

In this study, transfer pricing will be understood as the process of setting prices in cross-border and in-country transactions between interdependent persons for the sale of assets (works, services).

In the process of determining the transfer price, the subjects of transfer pricing interact with the internal and external environment of the organization.

In this study, the external environment of the transfer pricing process will be understood as a set of factors at the macro level that directly (e.g., tax regulation) or indirectly (e.g., the political situation in the country) influence this process.

By the internal environment of the transfer pricing process, we understand the totality of factors at the corporate level that directly affect this process.

It is advisable to formulate an approach to the mechanism of transfer pricing, which implies a set of methods for setting the transfer price in cross-border and (or) in-country transactions between interdependent persons for the sale of assets (works, services) in such a way that common objectives are achieved under the influence of environmental and internal factors such persons.

In this regard, it is necessary to define goals. The financial objectives of the company when applying transfer pricing include:

• Reduction of financial losses in the form of tax and customs payments in the whole group of the corporation;
• Operational financing of subsidiaries (intra-group loans);
• Management of financial indicators of subsidiaries (profit (loss)).
Organizational goals of companies include:
• The need to manage the company's decentralized structures;
• cost control due to the effective distribution of fixed and variable costs throughout the production chain of goods;
• Assessment of the activities of managers and departments for the subsequent increase in their motivation;
• Other goals of corporate management.
Thus, we can say that at present, the effective organization of transfer pricing in Russian companies is one of the most important tasks of financial activity.

PROBLEM STATEMENT

It is customary to single out the mechanism of transfer pricing, which involves the use of a set of methods for determining transfer prices (table 2).

Table 2: International Transfer Pricing Methods

№	Method name	Method essence	Method Group
1	Comparable uncontrolled price method	Comparison of transfer price with market price range	Traditional methods
2	Cost plus method	Comparison of the gross cost-effectiveness of the analyzed person with the market level of gross cost-effectiveness	
3	Resale price method	Comparison of the gross profitability of the analyzed person with the market interval of gross profitability	
4	Transactional net margin method	Comparison of operating profitability with market indicators	Methods based on analysis of profitability of transactions
5	Profit split method	Distribution of the total profit of the subjects of a controlled transaction in proportion to their share in such profit	

Source. Designed based on: OECD Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations 2010. URL: http://www.oecd-ilibrary.org

The use of transfer pricing by companies leads to the formation of controlled transactions, which in Russian practice are called controlled transactions.

Summing up, it should be noted that transfer pricing is a special mechanism for mutual settlements between interdependent persons with transfer prices. At the same time, transfer pricing is not a market process, since this process is not formed based on supply and demand, but based on the goals of interdependent organizations.

TRANSFER PRICING REGULATION

The Organization for Economic Co-operation and Development (OECD), the United Nations (UN) and the European Union, represented by the European Commission, the Directorate General of Taxation and Customs Union (EU), play a significant role in the foreign practice of implementing international regulation of transfer pricing.

In many countries, national legislation is gradually being improved, which regulates the principles and methods of regulating transfer pricing. In Russia, the term "deoffshorization" is increasingly used.

The first country in the mid-1960s to introduce special provisions for transfer pricing into national law was the United States.

Moreover, the financial law and tax laws of the United States of America are significantly different from the laws of other countries. This led to the search and development of transfer pricing standards and institutions that would be acceptable to most countries.

In 1976, the issue of regulating transfer pricing was first agreed internationally. OECD countries have approved the Declaration on International Investments and Transnational Corporations, containing recommendations for corporations on the inadmissibility of using financial schemes that may distort the tax base in the country where such a multinational corporation operates. Later, in 1979, the Organization for Economic Cooperation and Development issued a corresponding document, in which

corporations were recommended to refrain from using internal corporate financial flows for dishonest purposes (O. Golovchenko, 2013).

In 1995, the OECD approved the Transfer Pricing Guidelines for international corporations and tax administrations or, as it is called in business circles, the OECD Transfer Pricing Guidelines, the provisions of which are fully or partially taken as the basis for the development of national legislation on the regulation of controlled transactions in most countries. This guide is regularly supplemented (revised) by the OECD based on information on the current economic situation in the global economy, modern mechanisms for optimizing financial costs and other aspects of the international regulation of financial flows in controlled transactions.

In international practice, the concept of "transfer pricing" is closely related to controlled transactions. Moreover, in the economic literature transfer pricing is often formulated as a way of manipulating cash flows between interdependent companies in order to avoid tax payments, fees, customs duties and in business practice refers to one of the classical optimization schemes of tax planning (G. Mukhin, 2012). In international documents, the provisions that are used in many countries as part of tax legislation, intra-corporate transactions are transactions that transfer goods, including intangible assets, carry out work and provide services between related parties (associated enterprises).

In the framework of this study, intra-corporate transactions (or transactions between interdependent companies) are the movements of tangible and intangible assets, including monetary resources, between separate but interconnected business entities.

Results

Imagine groups of documents that regulate transfer pricing and controlled transactions.

Group 1. Documentation on the development and application of international rules for regulating transfer prices and transactions between related parties both for tax administrations and for transnational corporations. They include the main approaches to regulating transfer pricing in order to comply with the "outstretched hand" principle, as well as signs of internal corporate transactions, methods and tools for analyzing internal corporate financial flows (functional, economic, financial analysis of controlled transactions, comparability procedures for controlled and independent transactions).

Group 2. Conventions aimed at avoiding double taxation of the same income in different jurisdictions, which is extremely important in the conditions of activity of both transnational corporations and companies engaged in foreign trade activities. International conventions serve as the basis for the formation of interstate bilateral treaties (agreements) on the avoidance of double taxation. For example, the Russian Federation, when concluding bilateral agreements, takes into account the OECD Model Convention on Income and Capital Taxes.

Group 3. Documents containing information on the conclusion of preliminary agreements on the principles of pricing transactions between related parties (Advance Pricing Agreements, APAs). For example, between a company and the tax administration or a tripartite agreement between the tax administrations of different countries and one multinational corporation. The main goal of APAs is to prevent arbitration disputes by creating fair financial flows for previously known transactions between related parties, taking into account the analysis of data on upcoming transactions provided by the taxpayer. First, APAs are concluded for several years and are necessary to resolve current and potential disputes regarding such transactions in cooperation with the tax administration.

Group 4. Documentation explaining certain issues of regulation of transactions between interdependent persons, causing the greatest difficulties for both tax administrations and taxpayers. For example, the European Union approved a single (standard) package of documents for such transactions, having prepared the EU Code of Conduct on the effective application of the double taxation avoidance convention in connection with the adjustment of profits of associates (2009). The standard allowed for

certainty in the regulation of transactions between interdependent companies and reduced the risks of financial losses of transnational corporations in connection with additional costs and penalties in the preparation and submission of tax documentation.

The latest editions of the Organization for Economic Co-operation and Development and UN Guides recommend the use of the most appropriate method for a particular case. This method in business circles is usually called the "best method" (the best method rules). However, only some countries have such a rule in their legislation. Most of the laws of foreign countries provide a special order of priority (gradation) of transfer pricing methods.

In order to improve the legislative regulation of transfer pricing in the structure of the Federal Tax Service of the Russian Federation, the Transfer Pricing and International Cooperation Office has been formed, which checks the completeness of the calc
ulation and payment of taxes in respect of transactions between related parties committed by Russian taxpayers.

In connection with the active development of foreign trade, the regulation of transfer pricing and internal corporate transactions is becoming especially relevant.

INTRACORPORATE TRANSACTIONS OF COMPANIES

As noted earlier, transfer pricing and transactions between related parties are closely related. Let us examine in more detail the essence of these transactions.

In the first studies (50-60 years of the XX century), intra-corporate transactions were considered as a financial mechanism that allows generating profit for each structural unit of the company, which helps to increase productivity and increase the profitability of the entire organization.

In modern conditions, a transaction between interdependent entities means the movement of tangible and intangible assets within a single economic entity in the absence of movement of the relevant cash flows.

The objects of a transaction between interdependent entities are financial flows that are generated as a result of the movement of tangible and intangible assets, including cash between interdependent economic entities. At the same time, the subjects of such transactions are interdependent entities that may influence the financial flows in these operations.

The subject of an internal corporate transaction is the movement of tangible and intangible assets, including cash, in order to obtain related benefits for related parties.

After analyzing internal corporate transactions, it was determined that in the process of implementing this operation, interdependent persons interact with the internal and external environment.

The external environment of the transaction between interdependent parties is a combination of factors at the macro level that directly (financial, tax, currency regulation, etc.) or indirectly (the political situation in the country, etc.) influence the process of its implementation.

The internal environment of such a transaction is a combination of factors at the corporate level that directly affect the process of implementing an internal corporate transaction.

An important aspect in interstate relations is the formation of common international standards for state financial regulation of internal corporate transactions.

In the study, under the state financial regulation of controlled transactions it is customary to understand the continuous process of activities of state institutions that analyze, control and oversee the financial

flows of interdependent companies in order to counter irregularities in the movement of financial flows and eliminate imbalances in their concentration.

In the legislation of the Russian Federation, state regulation of transactions between related parties is implemented based on the provisions of the Tax Code of the Russian Federation, corresponding to OECD documents. At the same time, in this area, Russian companies face serious financial and tax risks associated with the peculiarities of national legislation. An example is the method of intragroup cost allocation on the principle of cost sharing, provided for by the OECD Guidelines, but not reflected in Russian law. As a result, some companies incur significant financial costs for litigation due to the use of this method in their financial strategy[1].
Intracorporate transactions are understood as a separate type of economic relations between interdependent persons, focused on the development of vertically integrated structures in the national and world economy. This means an increasing need for economic entities to develop a system of internal corporate financial regulation of transactions between related parties.

Despite active work to improve legislation-governing transactions between related parties, one should not allow the creation of an excessive tax or other burdensome burden on bona fide taxpayers when introducing new rules and regulations, especially in Russia.

The international and national methods for regulating intra-company transactions are based on the arm's length principle. This principle is to establish market prices in transactions between related parties that correspond to prices used in similar transactions between independent parties.

The risk of double taxation of corporate income on financial flows in internal corporate transactions arises if such companies use prices other than the market level. Therefore, in the conditions of activity of multinational companies, if the tax administration of one country adjusts the tax base of a resident of such a country, the multinational company will incur financial losses for double taxation of the same income in different jurisdictions.

The subjects of international regulation of internal corporate transactions include interdependent persons and tax administrations of the states of which such persons are residents.

The object of international regulation of internal corporate transactions is the size of internal corporate financial flow, which is determined in transactions between interdependent companies in the conditions of national regulation of such financial flows.

The subject of international regulation of internal corporate transactions are economic relations between related parties to the operation.

Let us single out the elements of the process of international regulation of internal corporate transactions:

- identification of a controlled transaction;
- functional, economic and financial analysis of a controlled transaction;
- information for further comparison of a controlled transaction with uncontrolled (market) transactions;
- methods of calculating the market price (profitability) according to the "outstretched arm" principle;
- tax sanctions in case the transfer price differs from market indicators;
- mechanisms for adjusting the tax bases of companies in the absence of double taxation of their income;
- documentation of companies on controlled transactions;
- Tools to minimize financial and tax risks in controlled transactions.

[1] Source: Determination of the Supreme Arbitration Court of the Russian Federation of July 15, 2013 No. VAS-7048/13. URL: http://kad.arbitr.ru.

The following is a ranking of foreign tax systems for priority in choosing regulatory methods (table 3).

Table 3: Ranking of foreign tax systems for priority in choosing methods for regulating internal corporate transactions

Group	Priority method	Country
1	-	France, Ireland, Brazil
2	Comparable Uncontrolled Price Method (CUP)	Venezuela, Spain, Italy, Kazakhstan, Bulgaria, Mexico, Montenegro, Russia
3	Best method rules	Argentina, India, Peru, Singapore, USA, South Africa, Chile, China, Japan, Portugal, South Korea, Norway
4	Conventional OECD Guidelines	Germany, United Kingdom, Latvia, Denmark, Israel, Netherlands, Norway, Poland, Finland, Sweden, Malaysia
5	Method that provides the highest degree of certainty for the determination of an arm's length	Austria, Belgium, Canada, Czech Republic, New Zealand

A source. Formed based on research by international companies PWC, KPMG, EY.

The choice of the method of regulation of internal corporate transactions is one of the most important stages in the determination and justification of schemes of internal corporate financial flows. In foreign practice, two groups of OECD methods have gained international recognition: traditional and methods that are based on an analysis of the profitability of transactions.

The financial regulation of transactions between interdependent companies (controlled transactions) is a form of state control in Russia over the financial flows of interdependent persons, the introduction of which is directed by Federal Law No. 227-FZ of July 18, 2011 "On Amending Certain Legislative Acts of the Russian Federation in Connection with Improvement pricing principles for tax purposes. " This law is based on the OECD Recommendations, which have received international recognition and are applied in most developed countries.

A particularly important change in Russian legislation on the regulation of controlled transactions is the introduction of a comparative analysis. Such an analysis makes it possible to analyze the commercial and financial conditions of transactions, to assess the risks and functions that are performed by the parties to such transactions in order to make a decision on the compliance or non-compliance of the conditions of the controlled transaction with comparable transactions.

Let us formulate the definition of internal corporate financial flow, which is understood as the movement of financial resources in connection with the inflow and (or) outflow of tangible and intangible assets in transactions between related parties.

In addition, we note that an internal corporate transaction is a process of moving tangible and intangible assets within a single economic entity in the absence of movement of the corresponding cash flows.

In turn, controlled transactions of companies are cross-border and domestic transactions between interdependent entities subject to state regulation.
So, controlled transactions of companies and transfer pricing are closely related. Essential in ensuring effective intragroup transactions is the use of the transfer pricing method.

Conclusion

Because of the study, attempts were made to clarify the terms included in transfer pricing, including intra-group financing, in Russian practice. The relationship between transfer pricing and transactions between interdependent parties (intra-corporate transactions) is indicated. The paper presents groups of documents regulating transfer pricing and controlled transactions. The ranking of foreign tax systems was also carried out for the availability of priority in the choice of methods for regulating internal corporate transactions. Taking into account the analysis of international practice, the need for refinement of transfer pricing procedures in the activities of Russian companies is shown.

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The State Higher Education Institutions Financing in Ukraine

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Abstract

The article shows the topical issues of financing higher education institutions. The study includes general estimates of higher education indicators in Ukraine and abroad. The analysis of the current state and trends of financing higher education institutions has identified the problematic aspects and threats to its further development in the light of experience. The author has offered the ways of further development of the mechanism of financing of higher education institutions. And this allows to expand the range of sources of attraction of financial resources for activation of their economic activity, as well as to achieve greater autonomy. The purpose of the article is to deepen theoretical and methodological foundations and to develop practical recommendations for financing higher education institutions that will give the opportunity to provide the necessary prerequisites for their development.The article is based on general scientific methods of cognition: analysis and synthesis, functional and system analysis, induction and deduction, historical-logical method, system-structural method, analogies and quantitative and qualitative comparisons, graphic, economic-statistical methods of information collection and processing, in particular sample studies, groupings, statistical comparisons of absolute and relative values, the method of logical generalization, the method of analysis of hierarchies. Results. Financing of higher education institutions is a process of providing the necessary financial resources for subjects of all institutional sectors of the economy, types of economic activity, in particular education and its institutions. The stages of evolution of the development of higher education institutions in Ukraine have been identified and it has been made an appropriate forecast. There were highlighted the threats to the functioning of institutions of higher education according to the level of risk (from the lowest to the highest) which was based on the method of hierarchy analysis. According to the particular groups of threats there were proposed the appropriate mechanisms and tools for their elimination.

Keywords: Institutions of Higher Education, State Ownership, Financial Resources, Estimates.

Introduction

Nowadays all spheres of social life providing are getting more and more developed so that need for research and scientific substantiation of methods of state influence on economic development is increasing. The issue of state participation in the financing of higher education is of particular importance, as practice shows that every year the conditions of activity of higher education institutions (hereinafter referred to as HEI) are becoming more complicated.

The main reasons are that, firstly, the reduction of budgetary funding for higher education requires the HEI to constantly look for alternative sources of financial resources for its sustainable development; secondly, Ukraine's entry into the European educational and scientific space exacerbates the competition between domestic and foreign defense law, and as a result the first ones are absolutely uncompetitive comparing with the others; and finally, the strict selection of HEI which want to work in the market of higher education services [1]. In addition, it is worth to note that more and more higher education institutions are joining that is happening thanks to their mobility, advanced logistics and, to some extent, more flexible pricing policies provided for a gradual increasing their share of the higher education services market [2].

Determining the value of the scientific achievements of scientists from different countries in the development of the theory and practice of HSI financing, the modern processes and phenomena in the conduct of educational activities call for a scientific rethinking of existing conceptual approaches to improving their financial provision, in particular, they need to change the financing model and find promising ways of forming their budgets.

In our work we will focus on the coverage of theoretical and methodological foundations and the development of practical recommendations for financing higher education institutions to provide the necessary prerequisites for their development.

The Main Part

The essence of higher education according to S. Bergan can be grouped into 4 categories: 1) preparation of specialists for the labor market; 2) preparing active citizens for life in society; 3) personal development; 4) development and support of the accumulated knowledge base [3]. It is worth to note that all four categories are equally important and should complement each other.

At the same time it is worth to consider J. Horyn's definition who says that “higher education is a market for educational services… supply and demand, their interaction, the existence of a mechanism for forming a market equilibrium and establishing an equilibrium price for educational services” [4]. The author emphasizes that higher education is a type of economic activity and its result is a service or product. Many foreign scholars, such as J. Philip [5], R. Barnett [6], L. Zhu [7], Yu. Messiad [8], hold this position. Thus, the production of higher education services is a key requirement of the economic relationships of all stakeholders and is the result of educational activities. According to this there is a definition of higher education as a system, which includes the process of production of educational services by educational establishments and the result of obtaining specific knowledge, skills that form a number of general and professional competences in the applicant for such education.

According to all official documents, Ukraine has moved to the principles of a free market economy, so the authorial team with the leadership Y. Vitrenko [1] found out that it is natural to move financial relations in higher education to the principles of a market economy. This is particularly emphasized by the fact that in a market economy, each type of activity has its own result. This result is a product (service). We think this practice in a market economy is logical and correct. According to the standpoint of the System of National Accounts (SNA-2008), education is one of the equal 21 types of economic activity that makes the country's GDP. In Ukraine, we use the Classification of Economic Activities (CEA-2010), according to this education has the code P [9] (Table 1).

It is important to note that higher education is one of the key programs which makes the professional training for professionals in our society, provides the constant activity and development of not only the individuals but also the whole state.

Table 1: Position of Education in y CEA–2010

Code	Name	CEA (Rev. 1.1)	ISIC (Rev. 4)
P	Education	–	P
85	Education	–	85
85.4	Higher education	–	853
85.42	Higher education	80.30	8530

The source: based on [9].

Researches of scientific approaches, which are used to understand the nature of financing HEI, have shown that mainly it is a process of providing the necessary financial resources for subjects of all institutional sectors of the economy, types of economic activity, including education and their institutions. Concerning the state financial resources of HEI, they are budgetary and extra-budgetary funds (with the formation of general and special funds) at their disposal, determined for the smooth functioning of HEI and contribute to improving its competitiveness and autonomy within the current legislation. In this context, they are classified as following: 1) types of services; 2) the method of formation; 3) activities; 4) the form of ownership; 5) consistently income; 6) belonging.

Research Methodology

The founders of the concept of human capital, T. Schultz and G. Becker [10], pointed out that education is an investment in individuals that generates a return, like any other investment.

One of the representatives of neoclassicism, Nobel laureate R. Schiller (2013), in his work Finance and a Good Society [11], stated: "… government intervention… should not adversely affect market decisions. In this case, the task of the state is to establish clear rules that protect consumers, promote actions that are in the public interest and allow players to compete in areas where they have the most advanced business capabilities and provide the best goods and services.

Mentioned rules should have an international dimension, as the different features of today's markets are global reach and instant impact "[12]. Issues related to economic relations in the field of higher education are addressed in some way in the chapters "Educators", "Finance Specialists in the field of public goods" and "Managers of non-profit organizations and trustees". Particularly, it is noted that teachers are one of the central places in view of the functioning of the financial system as a whole, there are also offered recommendations to improve the teaching of finance and business in colleges and universities, and on the implementation of economic activity by universities in the status of non-profit organizations.

M. Friedman, the winner of the 1976 Nobel Prize in Economics, in his work "Capitalism and Freedom", in the Chapter "The Role of the State in the Field of Education", admitted that the role of the state in the field of education is "thoughtlessly" expanded even on private enterprises in the countries which have their own organization and philosophy [11]. In his opinion, state intervention in economic activity in the field of education should be limited only in cases where it is impossible to provide "free exchange" and in "paternalistic" care of children and other incapacitated individuals. As a result M. Friedman proposes to the state "… to provide a certain minimum compulsory level of education, which would be financed by the issuing "vouchers" to parents/ And according to this each child would get certain annual financial sum and would use it only for "officially approved" training.

Adam Smith was the first who realized that the methods of organizing economic cooperation which we came across could not be only in limits of our knowledge and perception.

So that, the post-Keynesians (J. Robinson, N. Kandor, P. Sraffa), and first of all J. Robinson, directly pointed to the reorientation of military expenditures on health care, education, and social insurance. When we characterize Keynesianism, neo-Keynesianism, and post-Keynesianism, we have to admit that we have not been able to find jobs that deal with the problems of economic relations, both in education as a whole, and in higher education in particular, that have received considerable attention that does not give us reason to use Keynesianism, neo-Keynesianism and post-Keynesianism is the theoretical basis of our study.

J.M. Mayer, D. E Rauch and A. Filipenko in their study "The main problems of the development economy" said "There are several ways to determine the rates of return on investment in education and they are following: type of investment (private or public); level of economic development of the country; type of curriculum – general or vocational secondary education; type of economic sector in which the worker operates (modern wage or self-employment), and also gender way" [13].

Results of the Research

Education is the basis in the development of national economies. Success is achieved by those countries which have been able to provide high levels of educational development, produce new knowledge, use new technologies. For many of them, higher education is a priority area of the economy, where considerable financial resources are invested in order to ensure its development. So Fig. 1 shows the share of education expenditures in Ukraine and some other countries in 2018.

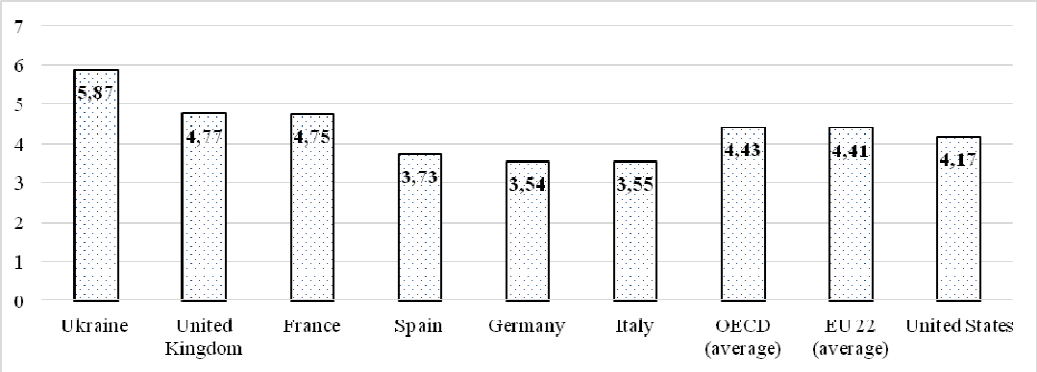

Fig. 1: Share of education expenditures in Ukraine and some other countries in 2018
The source: based on [14].

The main result and product of education is an educational service and which, in our opinion, is the production of a specific intellectual product of some value, with its satisfaction of the consumer's needs to obtain an appropriate level of theoretical knowledge and practical skills for their further using in the field of professional activity. It includes the production of pre-school, secondary and tertiary education services. As a rule, the Ukrainian theory is based on the fact that the services are provided to the consumer. But according to the foreign theory they are sold to the buyers (consumers), although CEA-2010 is the exception, because production of services is provided in all institutional sectors of the economy. Fig. 2 shows higher education services according to the levels of ISCE (2011) in some countries in 2018. Data show that the contribution of higher education services output to GDP in 2018 in Ukraine and the United States exceeds the values of the analyzed countries and was 2 , 65% and 2.68% while it was 1.81% in the UK, 1.23% in Germany, 1.48% in France, 1.26% in Spain, 0.97% in Italy.

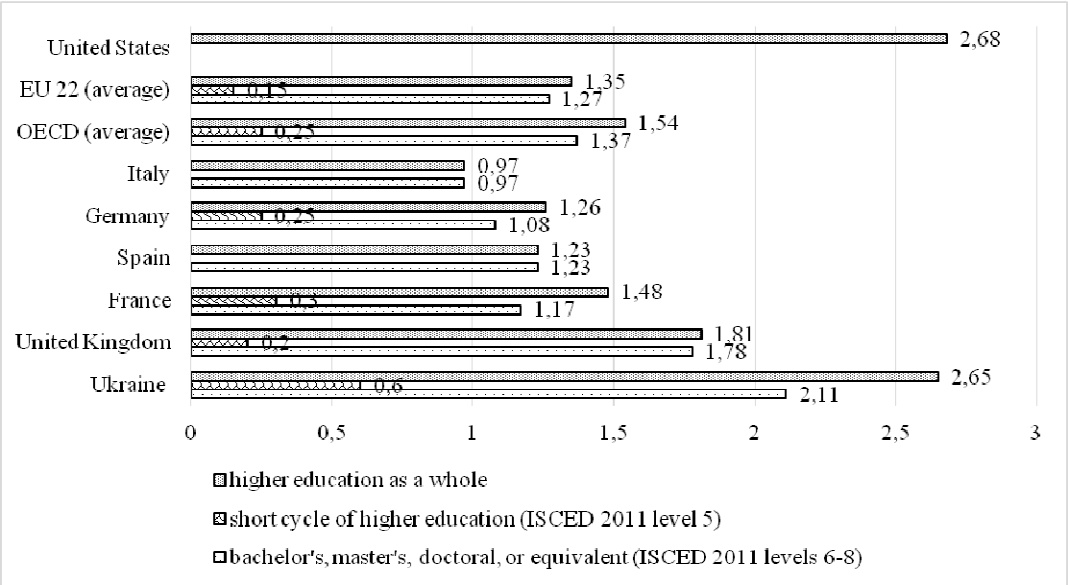

Fig. 2: Higher education services according to the levels of ISCE (2011) in some countries in 2018,% of GDP

The source: based on [14].

On Fig. 3 we can see the higher education services according to the source of payment in some countries in 2017.

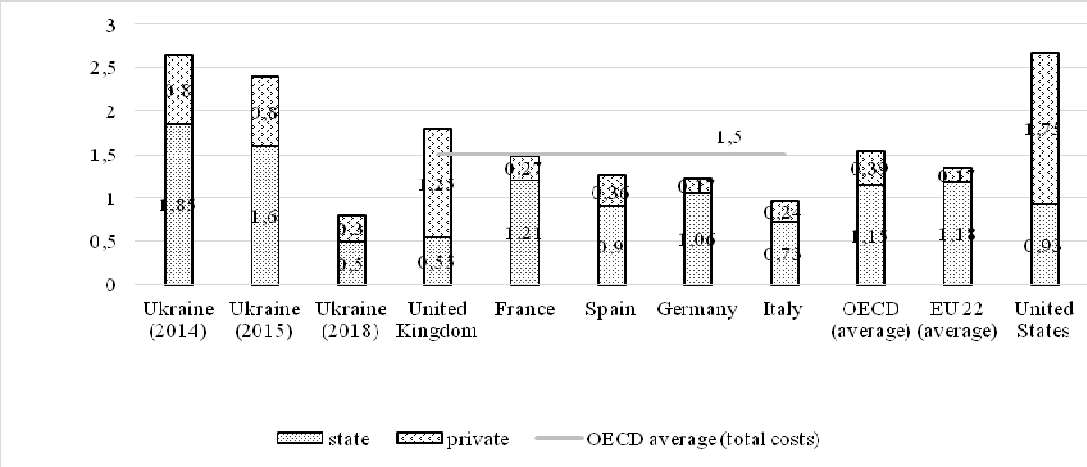

Fig. 3: Higher education services according to the source of payment in some countries in 2017, % of GDP

The source: based on [14].

We believe that the evolution of the development of HEI financing in Ukraine took place in several stages, depending on the changes in its institutional and financial support, in particular: 1) the formation of the regulatory framework (1991-1995); 2) modern foundations of educational activity (1996-2001); 3) implementation of the Bologna system (2002-2014); 4) informatization and innovation (2015-2017); 5) reforming. New High School (2018 – present days).

During the collapse of the USSR in 1991, there were 742 HEI of the II-II accreditation levels (AL.) and 149 - III-IV (AL)., and in 2018 - 370 and 282, so that is almost twice the reduction of the number of the former, while the number of HEI III-IV (AL) has a steady tendency to increase their share in

the total number of HEI. At the same time, there is a decrease in the contingent of higher education applicants, and this fact leads to a loss of individual funds of educational services and, consequently, to a reduction in the number of HEI (Fig. 4). Trend analysis of the amount of HEI has illustrated that in the future there will be a stable tendency to decrease the forecast indicators. Thus, in 2021-2022 there will be 327 HEI I-II and 247 HEI III-IV (AL).

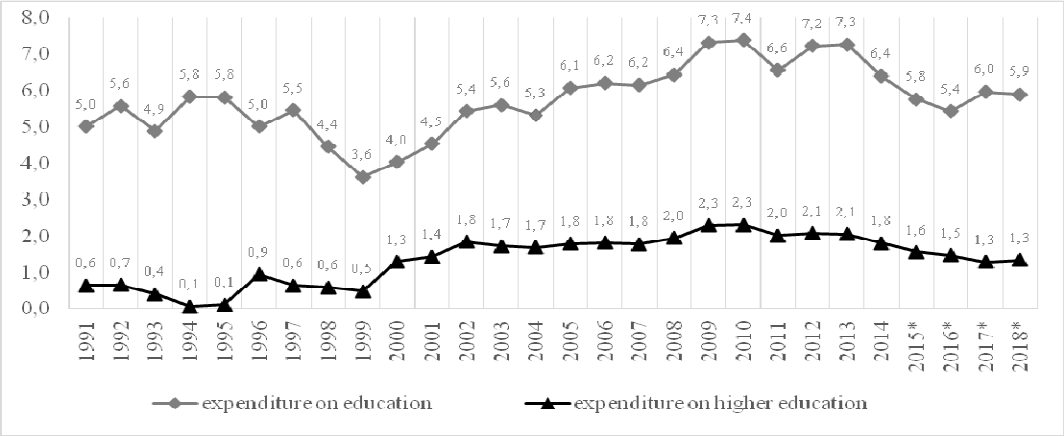

Fig. 4: Dynamics of the number of HEI and Higher Education Applicants in 1990-2018 in Ukraine

The source: based on [15].

To implement the effective educational activities, modern HEIs need adequate financial support. Currently, there is a growing trend in financing education (Fig. 4), which is rather nominal in nature due to the merger of public funds and private sector revenues as well as inflationary processes by the State Treasury.

According to the percentage of total expenditures, the amounts of funding fluctuate insignificantly. We have the same situation with the part of higher education budgets to GDP (Fig. 5).

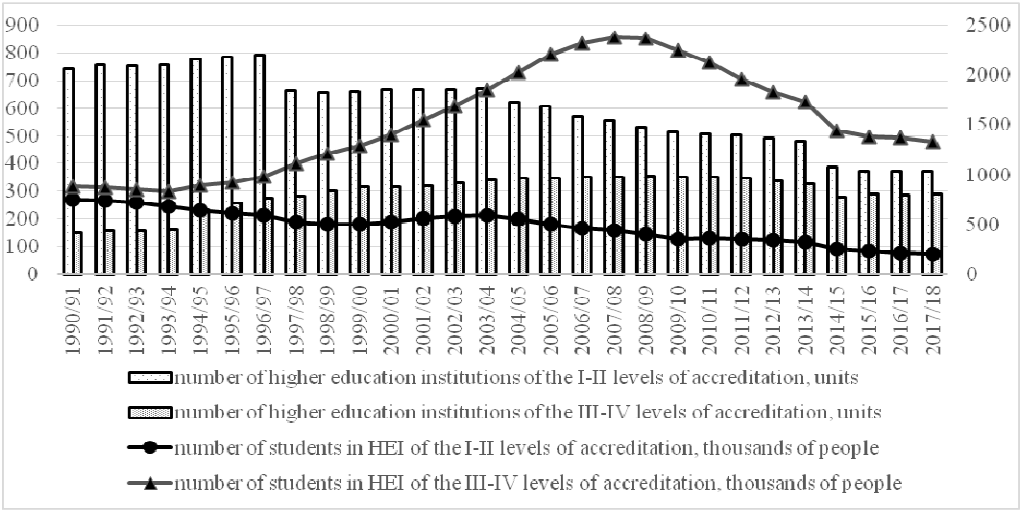

Fig. 5: Dynamics of expenditures on education and higher education in Ukraine, 1991-2018, % of GDP

The source: based on [15]

According to the current legislation, the state is obliged to provide at least 7% of GDP on education at the expense of state, local budgets and other sources of financing, which are not prohibited by law. Instead, in 1991, the figure was 5% and in 2018 was 5.9%, with the lowest one in 2000 (3.6%) and the highest one in 2010 (7.4%). As a result it leads to a significant decrease in the competitive advantages of Ukrainian HEI, inhibiting the development of educational and scientific activities.

Determining the effectiveness of using the budgetary funds for their main managers and subordinate HEI revealed the need to formulate a comprehensive methodology for such assessment. Besides, when we determine the forms of budget financing of HEI, we should apply the differentiated approach because of the specifics of their general and specific tasks. With regard to capital expenditures, budget investments should be increased to further stabilize public finances.

We believe that it is important to carry out threat modeling and to build an economic and mathematical model that will cover different parameters and identify the problematic aspects of educational institutions financing. Timely identified threats that can have a negative impact on the functioning of educational institutions, as well as prompt measures taken to eliminate or minimize the negative impact contribute to the effective and stable development not only of individual higher education institutions, but in the whole educational field. Using the method of analyzing the hierarchy of threats to the effective functioning of these establishments, they can be ordered by the importance of influencing the process, and the Saati method will identify the components to strengthen or weaken the effect of the causative factor.

Suppose that the set $Z = \{z_1, z_2, \ldots z_m\}$ contains threats to the functioning of higher education institutions in today's economic, social and political realities. Therefore, it is necessary to identify the key threats by which the set $Z1 = \{z_1, z_2, \ldots z_n\}$ of the set Z ($Z_1 \subset Z$) is given. We form a table showing the list of factors (threats) and their mathematical designation (Table 2).

We show a subset of factors Z_1 and possible causal relationships between them by means of an oriented graph (Fig. 6) consisting of 13 points where the edges connect adjacent pairs of vertices (zi, zj). The arrow is pointing from factor z_1 that depends on the factor zj (end of arrow). For example, the low level of training of graduates of the HEI is caused by insufficient financing of innovative needs of these institutions and development of scientific and pedagogical potential.

Table 2: List of factors and their mathematical notation

Mathematical notation	Factor name	Mnemonic name
Z_1	low level of internationalization of domestic higher education institutions	LLI
Z_2	inconsistency of the positions of scientists and politicians on the development of education	IPSP
Z_3	moral and physical deterioration of fixed assets and intangible assets in higher education institutions	MPDFA
Z_4	the relative slowdown of the rates of development of education in comparison with the rapid modernization of modern society	RSRDE
Z_5	the gap in the quality of education in comparison with the educational systems of the developed countries of the world	GQE
Z_6	low level of training of graduates of higher education institutions	LLTG
Z_7	imbalance of higher education funding sources (significant over-balancing of the state share)	IHE
Z_8	oversaturation of the labor market by graduates of higher education institutions	OLMG
Z_9	separation of training from practice	ST
Z_{10}	insufficient financing of innovative needs of higher education institutions and	IFIN

	the development of scientific and pedagogical potential	
Z_{11}	lack of clear strategy of financing higher education institutions	LCSF
Z_{12}	Status inconsistency of higher education institutions "budgetary institution" as subjects of economic activity to the principles of market economy	SI
Z_{13}	competition of domestic higher education institutions with foreign educational institutions	CDI

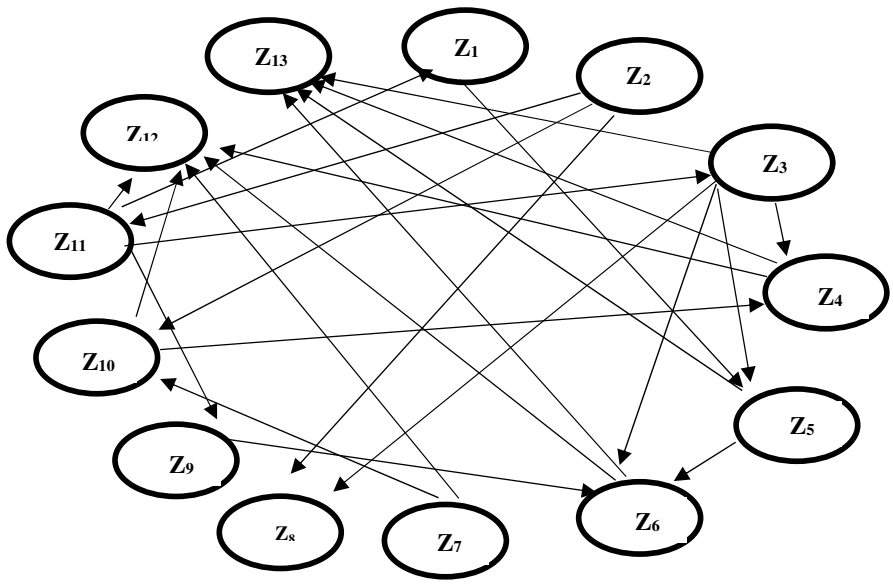

Fig. 6: Graph the causal link between the major threats of effective HEI financing

Using the data of Fig. 6 it is possible to construct a binary dependence matrix $B = (b_{ij}, \quad i,j = \overline{1,13})$ where each of the elements of the matrix

$$b_{ij} = (0,1) \tag{2}$$

1, if vertex I depends on the vertex J
0, if vertex I doesn't depend on vertex J
According to the results of the binary relation "depends on" all the elements in the matrix can take two values of 0 and 1.

Table 3 shows a binary dependency matrix, where the first column and the first row of the table indicate the threat number and the second row and the second column indicate its name. The created matrix satisfies the condition of transitivity.

Table 3: A binary matrix of the relationship of causal relationships between the major threats of effective functioning of higher education institutions

	Mnemonic Factor name	1	2	3	4	5	6	7	8	9	10	11	12	13
		LLI	IPSP	MPDFA	RSRDE	GQE	LLTG	IHE	OLMG	ST	IFIN	LCSF	SI	CDI
1	LLI	0	0	0	0	1	0	0	0	0	0	0	0	0
2	IPSP	0	0	0	0	0	0	0	1	0	1	1	0	0
	MPDFA	0	0	0	1	1	1	0	1	0	0	0	0	1
4	RSRDE	0	0	0	0	0	0	0	0	0	0	0	1	1
5	GQE	0	0	0	0	0	1	0	0	0	1	0	0	1
6	LLTG	0	0	0	0	0	0	0	0	0	0	0	1	1
7	IHE	0	0	0	0	0	0	0	0	0	1	0	1	0
8	OLMG	0	0	0	0	0	0	0	0	0	0	0	0	0
9	ST	0	0	0	0	0	1	0	0	0	0	0	0	0
10	IFIN	0	0	0	1	0	0	0	0	0	0	0	1	0
11	LCSF	1	0	1	0	0	0	0	0	1	0	0	1	0
12	SI	0	0	0	0	0	0	0	0	0	0	0	0	0
13	CDI	0	0	0	0	0	0	0	0	0	0	0	0	0

We construct a reach matrix I + B, where I is a single matrix of order 13. The obtained matrix corresponds to the condition:

$$(I+B)^{k-1} \leq (I+B)^{k} = (I+B)^{k+1}, \quad (3)$$

where k is an integer.

From the set Z1 we have previously defined, for each of the thirteen factors, there are two subsets: R (zi) is the reach set, and A (zi) is the previous set (the set of previous vertices). The achievable vertex can be considered provided that the vertex zj can be reached from the vertex zi n in the graph (Fig. 6), there will be a path leading from the vertex zi to the vertex zj. The vertex zi is the vertex zj the precursor if it can reach its vertex.

Formed sets R (zi), A (zi), as well as their cross section are presented in Table. 3. From those vertices of the graph for which the condition is satisfied

$$A(z_i) = R(z_i) \cap A(z_i), \quad (4)$$

the first (lower) level of the hierarchy is formed. These vertices can be considered as out of reach of all other vertices of the graph.

It is necessary to determine the first level in the threat hierarchy (the lowest in terms of the greatest impact on the object under study). For this we construct the table (tab. 4), according to the above algorithm.

The fulfillment of condition (4) is clearly presented for the threats: Z2 - inconsistency of the positions of scientists and politicians in the development of education; Z7 - imbalance of higher education funding sources (significant over-governmental share). The next step is to remove from the table the rows that correspond to the selected vertices (Z2, Z7), as well as to remove the numbers 2, 7 from the entire table. According to the Oriented column, all vertices that meet the identified threats are removed.

We have got results in seven levels of hierarchy (from smallest to largest) thanks toc computer-aided modeling: 1) imbalance of financing sources (significant prevalence of government share); the inconsistency of the positions of scientists and politicians on the further development of higher

education; 2) lack of a clear financing strategy of HEI; 3) separation of training from practice; moral and physical deterioration of fixed assets and intangible assets; low level of internationalization and academic mobility; 4) oversaturation of the labor market by graduates of ZVO; the gap between the quality of education and the educational systems of developed countries; 5) insufficient financing of innovative needs and development of scientific and pedagogical potential; low level of preparation of graduates of HEI; 6) the relative slowdown in the development rate of education in comparison with rapid modernization of society; 7) inconsistency of the status of "budgetary institution" as a subject of economic activity with the principles of market economy; competition with foreign HEI in attracting entrants. HEI are constantly forced to seek additional sources of financing for their own needs for sustainable development, which is a decisive factor in ensuring their competitiveness. This will contribute to the integration of HEI in the international market. [18].

Table 4: The first iteration of the causal link between the major threats of the effective functioning of higher education institutions

Z_i	$R(z_i)$	$A(z_i)$	$R(z_i) \cap A(z_i)$
Z_1	Z_1, Z_5	Z_1, Z_{11}	Z_1
Z_2	Z_2, Z_8, Z_{10}, Z_{11}	Z_2	Z_2
Z_3	Z_3, Z_4, Z_5, Z_6, Z_8, Z_{13}	Z_3, Z_{11}	Z_3
Z_4	Z_4, Z_{12}, Z_{13}	Z_3, Z_4, Z_{10}	Z_4
Z_5	Z_5, Z_6 ,Z_{10}, Z_{13}	Z_1, Z_3, Z_5	Z_5
Z_6	Z_6, Z_{12}, Z_{13}	Z_3, Z_5 , Z_6, Z_9	Z_6
Z_7	Z_7, Z_{10}, Z_{12}	Z_7	Z_7
Z_8	Z_8	Z_2, Z_3, Z_8	Z_8
Z_9	Z_6, Z_9	Z_9, Z_{11}	Z_9
Z_{10}	Z_4, Z_{10}, Z_{12}	Z_2, Z_5, Z_7, Z_{10}	Z_{10}
Z_{11}	Z_1, Z_3, Z_9, Z_{11}, Z_{12}	Z_2, Z_{11}	Z_{11}
Z_{12}	Z_{12}	Z_4, Z_6, Z_7, Z_{10}, Z_{11}, Z_{12}	Z_{12}
Z_{13}	Z_{13}	Z_3, Z_4, Z_5, Z_6, Z_{13}	Z_{13}

Currently, all state higher education institutions are in the status of “budgetary institution”, which according to the Budget Code of Ukraine “is fully maintained at the expense of the state or local budget” and is not profitable. In this context, we agree that the “budgetary institution” status makes it impossible for higher education institutions to obtain economic (including financial) autonomy (autonomy)” [1]. Autonomy needs to be expanded as it works abroad. Therefore, in this context, the Cabinet of Ministers considers it is necessary to change the system of financing and “predicts that within 5 years at least 70% of state higher education institutions will withdraw from the status of budgetary institution”. It is necessary to choose the target buyer and use the positioning scheme with a focus on the "hero" for successful positioning of educational services [19].

Higher education institutions need to carry out economic activities in a status that will give them full financial autonomy. These include statuses such as a nonprofit organization and a non-financial corporation. The status of a non-profit organization, in accordance with the SNA-2008, implies that the profit earned by an educational institution may remain completely at its disposal [1].

We have proposed appropriate mechanisms and instruments for their neutralization according to the given identified groups of threats, in particular: transition from the principle of retention at the expense of the state budget to state support of the HEI in practically possible sizes; ensuring efficient allocation of financial resources from state and local budgets with appropriate control; development of financing standards with minimum social standards; enhancing the prestige of intellectual work; development of educational crediting system; stimulating effective demand for quality educational services; formation of educational and scientific clusters, creation of attractive conditions for receiving promoter’s funds; assistance in raising funds through investment programs in the form of grants; granting to HEI tax privileges for income from the realization of independent profitable

activity, etc. So higher education funding is important because it affects the GDP of a country. It should be noted, GDP is one of the main indicators determining the level of economic growth in countries and regions across the globe [20].

Conclusion

HEI financing is a process of providing the necessary financial resources to subjects of all institutional sectors of the economy, types of economic activity, in particular education and its institutions. The main sources of HEI financing include funds from local and state budgets, receipt of HEI resources from educational, scientific, industrial activity, rental property payment, proceeds from the sale of property, preferential state loans for higher education, payment for applicants training at the expense of firms and enterprises. , charitable contributions, grants and gifts, funds received for the execution of specific assignments from legal entities and individuals.

When we study the stages of the evolution of the HEI in Ukraine and the corresponding forecast, it has been established that they require financing increasing. There is a growing trend of financing education in absolute and relative terms, but inflationary processes are outpacing funding. At the same time, the increase in the amount of education expenditures was achieved by combining public and private expenditure on education through the State Treasury. Education budgets, including higher education, as a percentage of GDP are remaining too low and have no steady upward trend.

We have to pay attention to the impact of threats to their sustainable development improving a mechanism of financing the activities of the HEI. The main threats to the effective functioning of the HEI are the problems of general development as well as financial problems. We have developed threats according to the degree of risk which were based on the method of hierarchy analysis. And as a result it is possible to propose appropriate mechanisms and tools for overcoming them for the sustainable financial development of HEI.

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Asset Tokenization and Trading Using Blockchain Technology
- Strategic Use of Technology in The Financial Sector -

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Abstract

This paper is analyzing the use of Blockchain technology to issue and trade digital tokens representing real-world assets. From the beginning of trading (in ancient history) to the modern stock exchange, technology made a powerful impact on how this industry works. Until very recently (the 2010s), the technology only affected the trading itself and how assets are priced and traded, but now, digital assets are reinventing the commodities themselves (like Bitcoin). The paper will present in-depth how asset tokenization is done, as well as what are the advantages of using digital assets in accomplishing settlements between buyers and sellers on a free market. An in-depth analysis of the real-estate tokenization will be presented, diving into the process itself as well as the advantages and disadvantages over the traditional market.

Keywords: Blockchain, Decentralized Finance, Tokenization.

Introduction

The financial world, as well as the digital world, have come up with two different types of assets. Traditional assets (like gold, oil, etc.) that started being traded as real physical assets (like gold bars, Brent crude oil, etc) have slowly evolved into being digitalized in the 20th century with the introduction of CFDs and other derivatives. Trading in ancient history meant that a value was established between the goods traded, without any central monetary system (in the form of money). Trading also meant that goods were physically transferred from one person to another. (Bernstein, 2008)

Starting in the 1970s, a more significant portion of transactions have shifted to electronic trading platforms. These include electronic communication networks, alternative trading systems, "dark pools" and others. The first electronic trading platforms were typically associated with stock exchanges and allowed brokers to place orders remotely using private dedicated networks and computer terminals. During the period from 2001 to 2005, the development and proliferation of trading platforms saw the setup of dedicated online trading portals, which were online electronic venues with a choice of many electronic trading platforms rather than being restricted to one institution's offering. (Lins, 2013-2014)

One of the first and most popular electronic stock exchange is NASDAQ (was initially an acronym for the National Association of Securities Dealers Automated Quotations). Stock exchanges trade securities (as shares/stocks in companies), but investors can also buy commodities (such as gold and oil) through ETFs (Exchange Traded Funds). An exchange-traded fund (ETF) is an investment fund traded on stock exchanges, much like stocks. An ETF holds assets such as stocks, commodities, or bonds and generally operates with an arbitrage mechanism designed to keep it trading close to its net asset value. (Investopedia, 2004)

Trading assets electronically are raising a number of issues regarding the security and market practices done by exchanges. Stock exchanges are using a centralized ledger (database) to store order books and make settlements (matching orders) between buyers and sellers.

Introducing Digital Assets

Digital assets (like Bitcoin and other cryptocurrencies) have appeared in the early 2010s. They have rapidly been taking a share of the financial market, reaching a total market cap of over 800 billion dollars in 2018. Digital assets are powered by blockchain technology to ensure the validity and immutability of transactions. (Stringham, 2015)

Digital assets are a new emerging asset class of digital, virtual, and cryptocurrencies that share characteristics and operate in similar ways. Cryptocurrencies are the most common form of digital assets that are traded on digital asset exchanges. Cryptocurrencies record transactions on public ledgers known as "blockchains". They are the first form of digital money where an intermediary is not required to send funds from one person to another person.

Comparison with Traditional Assets

In order to analyze digital assets against traditional assets, we need to compare the most popular item of each class. In the table below we compare one of the most popular commodities (gold) against the most popular currency (USD), and against the most popular digital asset (Bitcoin):

Table 1: Gold vs FIAT vs Cryptocurrency (iHodl, 2018)

Traits of money	Gold	Fiat (US Dollar)	Crypto (Bitcoin)
Fungible (Interchangeable)	High	High	High
Non-Consumable	High	High	High
Portability	Moderate	High	High
Durable	High	Moderate	High
Highly Divisible	Moderate	Moderate	High
Secure (cannot be counterfeited)	Moderate	Moderate	High
Easily Transactable	Low	High	High
Scarce (Predictable supply)	Moderate	Low	High
Sovereign (Government issued)	Low	High	Low

Decentralized	Low	Low	High
Smart (Programmable)	Low	Low	High

The main advantages of digital assets are the transparency and ease of use. A straightforward comparison can be made between one of the oldest and most known real-world assets (gold), and the first and most popular digital asset (bitcoin). Bitcoin is developed to act as a digital gold and has many of its attributes: scarcity, being a medium of exchange, source verification, intrinsic value (because of the mining cost).

In the last decade, Bitcoin has attracted a lot of interest from investors since it offers some benefits when compared to gold.

Precise Existing and Total Supply

Mathematics/algorithmics power Bitcoin and its total supply is limited to 21 million units. At this moment, there are around 18 million bitcoins in existence. The number is exact and can be independently verified on the public Bitcoin blockchain. One of the most popular Bitcoin blockchain explorers is http://blockchain.info/.

Gold has been used for thousands of years as a store of value. The exact quantity of gold mined through the centuries is not well-known. A figure that is widely used by investors comes from Thomson Reuters GFMS (formally Gold Fields Mineral Services), which produces an annual gold survey. Their latest figure for all the gold in the world is 171,300.00 tonnes, but not everyone agrees with the GFMS figures. Estimates range from 155,244.00 tonnes, marginally less than the GFMS figure, to about 16 times that amount - 2.5 million tonnes. Part of the reason is that gold has been mined for a very long time - more than 6,000 years, according to gold historian Timothy Green. (Prior, 2013)

The amount of gold mined each year is not foreseen or well-known. This situation creates an issue for potential investors, as they don't know if certain actors control vast amounts of gold that can drive the price down.

Verifying and Sourcing

The gold is usually verified by using X-Ray machines that are very expensive and not widely available. X-Ray machines can only penetrate a few centimeters of the gold bar, so fraudsters can replace the interior of large gold bars with Tungsten (an element that has the same density as gold but only costs one-fifth of the price). (Wile, 2012)

Bitcoin can be easily verified in a few seconds from any internet-connected device in the world. The verification of a transaction is free, safe, and instantaneous. Bitcoin balance or transactions can be verified by running a node or by using a public explorer.

Another big difference between gold and bitcoin is the traceability of the asset. Sometimes gold has been stolen or mined under illegal conditions, causing the proceedings to finance organized crime or terrorism. Gold can be re-minted, and new bars can be issued from existing ones. A new technology called "gold fingerprinting" has been used to lay claim to stolen or relocated gold. This method is used to characterize gold or a gold-containing item by its trace elements, fingerprinting the sample by mineralizing event, and to the particular gold mine or bullion source.

There are well-known issues with stolen gold over the centuries. Some of these examples are:

Gold stolen by Nazi Germany from the occupied countries that were never recovered (around 1,000.00 tons). The criminal proceedings are used to finance terrorism, or organized crime with gold has thus created a name called "dirty gold".

Bitcoin can be easily traced and cannot be "re-minted". Once a bitcoin was involved in illegal activity, it can be marked any future buyer will be notified of this illicit history.

Cost and Security

Storing gold is expensive, as well as transporting it.

Bitcoin is free to be stored, and transactions only takes minutes and is almost free (a transaction costs only a few cents). This means that investing in gold also comes with a management fee that needs to be covered by the investor. Such a fee doesn't exist for Bitcoin investments.

How Asset Tokenization Works

In order to issue digital assets that represent real-world assets, an in-depth analysis of the process needs to be done:

1. Real-world asset fungibility
2. Blockchain platform
3. Governance

Asset Fungibility

There are 2 main types of assets that can be tokenized: fungible and non-fungible assets.

- *Fungible assets*

Fungibles goods refer to items that are equivalent or consist of many identical parts such that, for practical purposes, they are interchangeable. Material items, securities, and other financial instruments may be considered fungible goods. If goods are sold by weight or number, then they are probably not fungible goods. (Kenton, 2019)

Tokenizing fungible assets means issuing a single digital token that represents an asset of it's kind. The most straightforward token representing a fungible asset is a digital gold token. Gold, in a specific form, like LBMA (London Bullion Market Association) standard, is a fungible asset since any gram of gold is identical to any other gram of gold of the same quality. Certain cost elements like bar size, the location, or the minter of the bar can make a small difference in the price of the asset, but this difference is small when compared to the price of the underlying asset.

One of the most significant tokens is called ERC-20, which has emerged as the technical standard used for all smart contracts on the Ethereum blockchain for token implementation.

- *Non-fungible assets*

Non-fungible assets are items that cannot be replaced between them. Some examples are real-estate assets, collectibles, paintings, rare gold coins, etc.Tokenizing a non-fungible asset means issuing a token for each asset individually. Non-fungible tokens are usually called collectibles.

ERC-721 is a free, open standard that describes how to build non-fungible or unique tokens on the Ethereum blockchain. While most tokens are fungible (every token is the same as every other token),

ERC-721 tokens are all unique. (@dete, n.d.). After the fungibility of the asset is determined, a standard is selected for issuing its digital counterpart.

Blockchain Platform

Because the newly issued digital asset needs a distributed ledger (blockchain) to store its transactions. A blockchain platform has a few characteristics that are important for the tokenization process:

- *Public or private blockchain:*

If the transaction ledger is public, all the information can be independently verified by 3rd parties. If the transaction ledger is private, only certain parties can verify transactions.

Table 2: Public vs Private blockchains

Public	Private
Open, anyone can join the network.	Restricted and permissioned, a new member joins the network via invitation.
Each node has equal transmission power (distributed)	Only certain nodes can create new transactions.
Low speed of transaction accomplishment due to network size/latency.	Fast speed of transaction accomplishment.
Long transaction approval frequency.	Short transaction approval frequency.
High cost of each transaction.	Comparatively cheap cost of each transaction.
Proof-of-work, proof-of-stake consensus protocols for the adding of a new block.	Pre-approved participants initiate adding of a new block.
Anonymous	Identified parties.
Trustless environment. Members don’t need to trust each other.	Trustful environment. Members need to trust each other.
Large energy consumption.	Low energy consumption.

- ***Anonymity:***

Certain blockchain technologies offer users the anonymity of their transaction history and balances. Projects like Monero or Zcash use cryptographic technologies such as ring signatures or zk-SNARKs (Zero-Knowledge Succinct Non-Interactive Argument of Knowledge). This enables the blockchain to verify transactions without knowing what its origins are and thus not enabling the tracing of the tokens.

Most popular blockchain platforms for issuing tokenized assets are: (Laurent, n.d.)

- Ethereum: *Ethereum* is an open-source, public, blockchain-based distributed computing platform and operating system featuring smart contract (scripting) functionality. Ethereum ecosystem uses the ERC (**E**thereum **R**equest for **C**omment) methodology to issue standards for tokens on its platform.
- Bitcoin: Transaction ledgers for tokens can be stored on the public Bitcoin blockchain.

Governance

A tokenized asset represents ownership of the underlying real-world asset. This means that a set of rules (Governance) needs to set in place in order for the digital asset to be trusted. Usually, a digital asset is created as a smart-contract, and most of the contractual aspects of the financial instrument are built in the source code.

For a tokenized asset governance to work, a few characteristics need to be determined:

- *Issuance rules*

The smart-contract needs to be developed, so only certain players can issue new tokens. For example, in the case of a non-fungible token that represents the ownership of a building (real estate asset), after the initial minting of tokens, no new tokens should be minted.

In the case of a fungible gold-backed digital token, new tokens can be minted by adding more gold reserves.

- *Burning rules*

Certain digital assets enable the burning (destroying) of tokens under certain conditions. For example, withdrawing a gold bar from a vault requires the burning (destroying) of its digital counterpart.

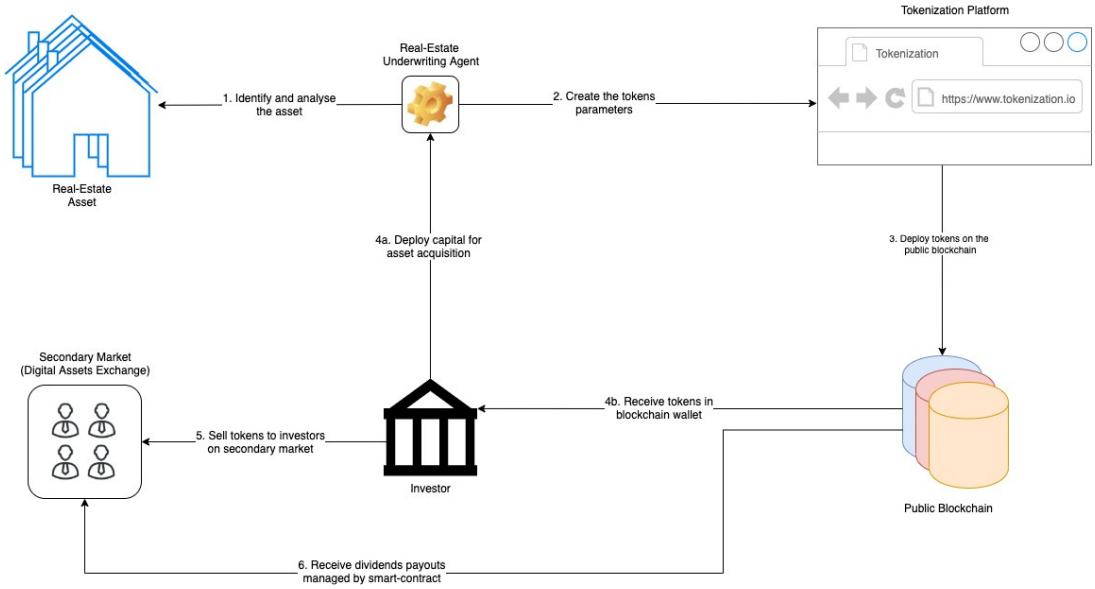

Fig. 1: Real-estate tokenization flow

- *Advantages of asset tokenization*

There are multiple advantages of asset tokenization. Trading digital assets that represent real-world assets enables investors to manage their portfolio more easily and eliminates the trust between them and the brokers.

Liquidity of an asset represents the ease of converting the respective asset to cash, with cash being fully liquid. Certain asset classes have different liquidity, as well as assets in the same class can have a big variation in liquidity in certain markets and at certain times. (Damodaran, n.d.)

The main factors that influence the cost of illiquidity is the Cost of Trading. The cost of trading in a certain asset class has a couple of components such as:

Table 3: Comparison of asset class

Cost Component	Fungible Asset (gold, oil)	Non-fungible Asset (real estate)	Tokenized non-fungible asset
Brokerage cost The transfer cost for the asset.	**Low**	**Medium** *(notaries, land titles)*	**Low** *(no intermediaries, low to no transfer fees)*
Bid-Ask Spread The difference between the price at which you can buy the asset and the price you can sell the asset at a certain point in time.	**Low**	**Large** *(limited number of buyers/sellers)*	**Low** *(small minimum order size reduces the bid-ask spread)*
Price Impact The price impact that a buyer or seller has on the trading price. Large orders can move the price of assets with small liquidity.	**Low**	**Medium** *(the market is localized in a city/country)*	**Low** *(asset can be sold/bought in traches without)*
Opportunity Cost This cost component covers the difference in price due to waiting to trade the certain asset.	**Medium** *(prices can move swiftly)*	**Low** *(market is reacting slow)*	**Low** *(token is backed by the underlying asset, market is stable)*

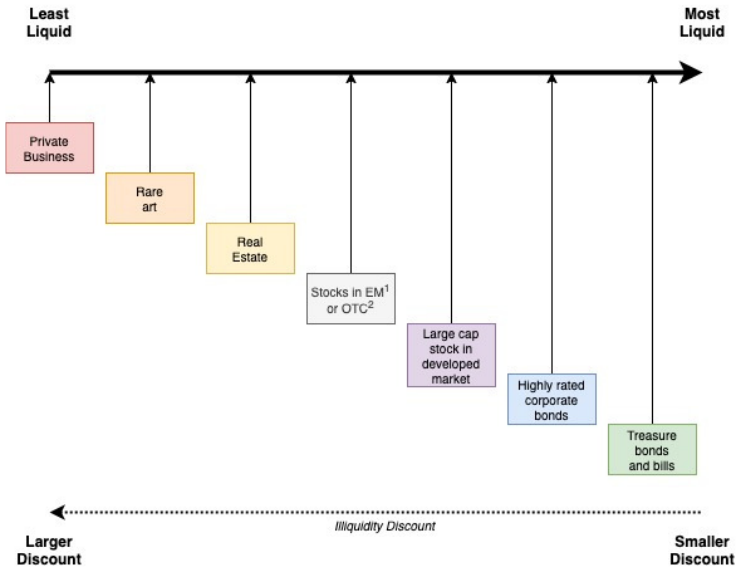

Fig. 2: Liquidity and illiquidity discount by asset class

[1]*EM: Emerging Markets*
[2]*OTC: Over-the-Counter trading*

Tokenization Impact of Illiquidity Discount

Highly illiquid assets like real-estate or art can be tokenized using blockchain technology in order to reduce the discount of illiquidity in their respective markets. The illiquidity discount is even more noticeable on non-fungible assets since trading such an asset often involves its entire value. One of the most discounted markets because of the illiquidity is the real estate market. Since most buildings cannot be split and sold individually, the only option is to sell the entire asset. Selling the asset as the whole means asking the full price, and thus, reducing the potential buyers to only entities that have the necessary capital.

Even fungible assets such as gold can have a higher discount because of their physical structure. Larger gold bars can be sold at a premium because any buyer needs to buy the entire bar. Re-minting gold bars is often and can solve part of the issue, but it comes with additional costs.

Investing in non-fungible assets can also lead to liquidity issues for investors. Since non-fungible assets can only be sold as a whole, if the investor needs urgent liquidity, he cannot sell parts of his investment. Selling the whole property also comes with a discount, and this reduces the yield of the investment in a non-fungible asset. Tokenizing assets can reduce both the transaction costs, as well as the holding costs of these assets.

One of the essential features of the blockchain technology is the elimination of intermediaries in making transactions. Especially in real-estate, deals come with considerable fees since both notaries and land-title companies need to keep ledgers of past sales and current owners.
Trading tokenized real-estate securities on a digital asset exchange platform removes most of these intermediaries and dramatically reduces the transaction fee.

Digital Asset Exchanges

Tokenized assets are traded on digital asset exchanges, the act as intermediaries between buyers and sellers. Since tokenized assets are registered on a blockchain, the digital assets exchanges are also

powered by blockchain technology to enhance the discovery of price and settlement between involved parties.

There are two main types of digital asset exchanges: centralized (CEX) and decentralized exchanges (DEX).

- *Centralized Digital Asset Exchanges (CEX)*

The first digital asset exchanges are CEX (Centralized EXchange). These are traditional exchange platforms similar to Forex (FOReign EXchange market). They work by maintaining order books and intermediate settlements between buyers and sellers. Since a central authority does not control digital currencies (cryptocurrencies), accounts cannot be blocked. This is a big issue with the security and custody of digital assets. Numerous exchanges have been hacked, and user funds have been lost.

In the past, the word "centralized" was given to all institutions that managed finances.

To be centralized means that there is a trusted middleman to handle whatever asset may be in a trade. In a bank, for example, a customer gives their money over to the bank to hold for them. This one institution is now in complete control of the customer's money.

In many cases, this is much safer than a person finding some way to manage themselves. Banks have many securities and a team to watch over their customers' money. The bank can also offer a variety of services, such as loans because the bank has a large amount of money and has created a trust relationship with the customer. (Dedi, 2018)

- *Decentralized Digital Asset Exchanges (DEX)*

Besides powering token transfers and storing, the blockchain technology is also enhancing trading those securities on decentralized exchanges. Decentralized exchanges have appeared in late 2010s as a measure to combat the cybersecurity risks of operating centralized cryptocurrency exchanges. (Jeong, 2018)

A DEX operates in a decentralized way, without a central authority. Decentralized exchanges allow peer-to-peer trading of cryptocurrencies as well as tokenized securities. Because users do not need to transfer their assets to the exchange, decentralized exchanges reduce the risk of theft from hacking of exchanges. Decentralized exchanges can also prevent price manipulation or faked trading volume through wash trading, and are more anonymous than exchanges which implement know your customer requirements.

Tokenized FIAT

Most of the time, trading assets (utilities or securities) on a blockchain platform means exchanging its value to traditional currency. The term *fiat* derives from the Latin *fiat* ("let it be done") used in the sense of an order, decree or resolution. (Mankiw, 2014)

Fiat currencies are managed by banks using traditional centralized ledgers and central authority (usually a central bank). A wire transfer or ACH (Automated Clearing House) transfer usually involves several intermediary organizations (banks or payment institutions).

Blockchain technology is about removing the intermediary in financial transactions and giving the customer custody and control over his assets. Managing traditional currencies on a blockchain platform is not possible without using a so-called "stablecoin".

Stablecoins represent the digitalized version of traditional currencies deployed on a distributed ledger (blockchain). They are one of the most relevant developments in the crypto ecosystem and one that has been increasingly getting traction.

At a high level, stablecoins can be divided into three main categories:

- *Fiat-Backed Stablecoins*

This type of stablecoins is typically pegged to a fiat currency or other real-world assets. Projects such as Tether or TrueUSD as examples of stablecoins backed by fiat currencies, while tokens such as Digix Global represent a commodity-backed stablecoin. (Rodriguez, 2019)

- *Crypto-Collateralized Stablecoins*

This type of stablecoins are backed by pools of crypto-assets. Typically, crypto-collateralized stablecoins tend to over-collateralized in order to address market volatility. Projects like Maker are notorious examples in this category. (Rodriguez, 2019)

- *Non-Collateralized*

This type of stablecoins are not backed by any real-world or cryptocurrency asset, and instead, it maintains value by people expecting it will maintain a specific value. The most-common non-collateralized method is seigniorage shares, which uses smart contracts that automatically expand and contract the supply of the non-collateralized stablecoin using algorithms to maintain its value. Projects like Carbon are relevant examples of this category. (Rodriguez, 2019)
The most important stablecoins on the market are:

Table 4: Comparison of major Stablecoins

Stablecoin	Type	Blockchain Platform	Marketcap/ Volume
Tether First stablecoin launched on the market powered by the Bitcoin blockchain. Started operations in October 2014. (https://tether.to)	**Fiat-backed**	**Multiple** *(Omnichain, Ethereum, Tron)*	**$4.6b** *(24h volume: $44b)*
USD Coin CENTRE stablecoins are issued by regulated and licensed financial institutions that maintain full reserves of the equivalent fiat currency. (https://centre.io/usdc)	**Fiat-backed**	**Ethereum** *(ERC20 token deployed on Ethereum platform)*	**$434m** *(24h volume: $457m)*
TrueUSD The first regulated stablecoin fully backed by the US Dollar. (https://trusttoken.com)	**Fiat-backed**	**Ethereum** *(ERC20 token deployed on Ethereum platform)*	**$138m** *(24h volume: $1b)*
DAI Crypto-collateralized algorithmic stablecoin backed by a number of cryptocurrencies. (https://makerdao.com)	**Crypto-Collateralized**	**Ethereum** *(ERC20 token deployed on Ethereum platform)*	**$111m** *(24h volume: $17m)*

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Contribution A Etude Des Déterminants Relationnels De La Fonction Achat Sur La Performance De L'entreprise : Une Etude Exploratoire -Cas Du Maroc-

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Résumé

La fonction achats a occupée depuis longtemps un rôle marginal, réduit à l'approvisionnement, dans l'entreprise. Le changement de l'environnement et sa complexité a imposé depuis le début des années 1970 le passage d'une fonction support à une fonction stratégique. Dans les faits, elle est considérée comme source de valeurs ajoutée et de compétitivité pour l'entreprise. Actuellement, la place et le rôle de la fonction n'est plus à démontrer. Parallèlement à cette transition, le rôle de l'acheteur à beaucoup évolué, ses relations avec les acteurs internes et externes de l'organisation se sont multipliées. Ses interactions continues avec les acteurs déterminent largement la performance de la fonction achats et l'entreprise. L'objectif de cette communication est de dégager les déterminants relationnels de la performance de la fonction achats dans le contexte des PME marocaines. Pour ce faire, une étude exploratoire qualitative a été entreprise pour un échantillon constitué de 36 intervenants de services achats. Le choix de la méthode qualitative, fondée sur l'entretien semi-directif, est motivé par la pertinence cette approche à la compréhension des phénomènes complexes. Les résultats obtenus permettent de constater que dans le contexte marocain, les déterminants relationnels jouent un rôle important et influencent la performance de la fonction achat.
Cette communication est structurée en deux sections. Dans un premier temps, le rôle de la fonction achats et les déterminants relationnels de sa performance sont présentés. En second lieu, les résultats obtenus de cette exploration qualitative sont présentés et discutés.

Mots clés : Fonction Achats, Performance, Relation Acheteur-Clients Internes, Relation Acheteur-Fournisseurs.

Introduction

Les déterminants relationnels de la performance de la fonction achat ne cessent de s'imposer dans la littérature et dans la pratique, il prend de l'ampleur dans la littérature marketing et dans le domaine professionnel.

L'objectif de ce papier est de présenter une revue de littérature sur les déterminants relationnels de la performance de la fonction achat. En effet, la relation responsable achat et client interne ne cesse de s'affirmer en tant que relation de premier ordre en marketing relationnel.

Nous cherchons à travers notre article à expliquer le rôle de la fonction achat sur la performance de l'entreprise marocaine tout en passant par une analyse de la revue de littérature en relation avec les concepts clés de notre article.

Notre recherche se situe dans une posture épistémologique positiviste aménagée. Nous cherchons à travers cette thèse à expliquer le rôle des déterminants relationnels de la fonction achat sur la performance de l'entreprise marocaine. En premier lieu, nous passerons par une analyse de la revue de littérature en relation avec les concepts clés de notre thèse afin de formuler le modèle théorique. Pour s'assurer de la pertinence du modèle théorique, une étude exploratoire sera effectuée suivant une démarche inductive dont l'objectif est d'enrichir notre modèle théorique des observations issues du terrain. En deuxième lieu, une démarche hypothético-déductif sera adoptée pour formuler des hypothèses et les confronter par la suite à la réalité. C'est en combinant une démarche hypothético-déductive et une approche inductive que nous nous positionnons dans un courant positiviste aménagée.

Problématique :

Nous cherchons donc à comprendre et à expliquer comment les déterminants relationnels la fonction achats participent à la création de la performance de l'entreprise ?

Hypothèses :

.**<u>L'objectif principal poursuivi par cette recherche est:</u>**

- Mettre en évidence les déterminants relationnels de la fonction achat sur la performance de l'entreprise marocaine.

<u>A cet objectif, s'ajoute des objectifs spécifiques que sont :</u>

- Identifier l'évolution dela fonction achat.
- Déceler et apprécier le rôle de l'acheteur avec les clients internes et les fournisseurs.
- Préciser le rôle de la fonction achat et sa participation à la création de la performance de l'entreprise.

Section 1 : Revue De La Litterature

I- Evolution De La Fonction Achat.

La fonction achat est de plus en plus considérée comme une source d'avantage concurrentiel, qui ne peut être réduit à un simple outil de maîtrise des coûts, permettant la performance de l'entreprise.

1- FONCTION ACHAT SUPPORT.

Longtemps la fonction achat considérée comme une simple fonction support mobilisant en priorité un savoir-faire administratif, Les achats ont été vus comme un mal nécessaire au sein des entreprises. En1916, Henri Fayol n'hésite pas à présenter les achats comme une sous-fonction de la fonction commerciale, qui consiste alors selon lui à acheter un peu et à vendre surtout. Même Mickael Porter, pourtant visionnaire, présentait les achats, dans sa fameuse chaîne de valeur 1986 comme une simple fonction support.

La fonction achats a tardé à prendre une importance majeure dans le management des entreprises industrielles. Ammer (1989) note qu'avant le choc pétro- lier de 1973-1974, le top management la

voyait comme ayant un rôle passif dans la conduite des affaires. En France, Barreyre (1976) tente très tôt dévaloriser l'image d'une fonction achats moderne en précisant sa contribution à l'élaboration et à la mise en œuvre de la stratégie globale.

2- FONCTION ACHAT STRATEGIQUE.

La fonction achats revêt dorénavant une forte dimension stratégique. Effectivement, dans un monde de ressources rares. L'expression est empruntée à Erik Orsenna (2007), qui décrit bien, dans le livre éponyme, les problèmes que ne va pas manquer de poser la raréfaction de toute une série de ressources essentielles aux activités économiques, mais aussi à la survie des populations.

Par ailleurs, la rencontre entre le personnel de l'entreprise et le client trouve toute son ampleur dans le domaine des services. En raison du caractère intangible de ces derniers, les aspects humains sont particulièrement à l'épreuve pour vérifier la capacité du management de faire rencontrer les attentes du client interne et externe autour d'une expérience de qualité (Couzon, 2011).

Ii – Le Role De L'acheteur.

La fonction achat n'est plus considérée depuis un moyen de recherche et de sélection des fournisseurs ou un simple outil de maîtrise des coûts, mais plutôt chef d'orchestre des interactions de la firme avec son écosystème, et plus précisément la satisfaction du client interne. La perspective dyadique – acheteur-client trouve son origine et sa définition dans les travaux de Homans (1974) qui considère l'interaction entre acheteur -client comme un échange de biens matériels ou immatériels (Homans, 1974). Cette définition se base sur *la théorie de l'échange social* (Homans, 1958, 1974)). *La théorie de l'échange social* est un des premiers cadres théoriques employés pour examiner les relations d'affaires (Rao et Perry, 2002).

1- ROLE CLASSIQUE DE RECHERCHE ET SELECTION DES FOURNISSEUR.

Les rôles de l'acheteur peuvent être définis à l'aide de la matrice des achats, définie par Kraljic (1983) pour déterminer les différentes stratégies d'achats développées à l'égard du marché des fournisseurs (voir figure 1). Ces axes sont l'importance de l'achat réalisé (coût de l'acquisition sur le coût total, valeur ajoutée dans le produit vendu, etc.) et la complexité du marché des fournisseurs (marché oligopolistique/ monopolistique, maturité de la technologie, etc.).

Nous prolongeons cette approche en déterminant pour chacune des cases le rôle type de l'acheteur associé. Quatre catégories sont ainsi identifiées : l'acquéreur, le négociateur, le technicien et le stratège. Selon le rôle tenu par l'acheteur, les activités à réaliser et les compétences attendues ne sont pas les mêmes. Si l'acquéreur effectue pour l'essentiel des activités opérationnelles (accompagnement des salariés dans leurs demandes d'achats, suivi et gestion des problèmes courants avec les fournisseurs), qui nécessitent des compétences que Cavinato (1987) désigne par « techniques achats » (maîtrise des aspects contractuels, de l'outil informatique, etc.), le négociateur passe davantage de temps sur les activités en amont de l'acte d'achat ;

Enfin, le stratège réalise les rôles du négociateur et du technicien qui nécessitent, au-delà des connaissances et savoir-faire précités, des compétences stratégiques que Giunipero et Pearcy (2000) nomment « world-class purchasingskills » : capacité à orienter ses actions selon la stratégie de l'entreprise, savoir-faire en matière de gestion des processus, compétences de travail en équipe, etc. Si ces quatre catégories correspondent à la représentation habituelle de la fonction, l'élargissement du périmètre d'intervention des acheteurs depuis quelques années et la complexification de leurs tâches les conduit à adopter de nouveaux rôles.

2. EXTENSION DU ROLE RELATIONNEL DE L'ACHETEUR

La littérature en marketing place la confiance dans le cadre de l'échange établissant « le développement et le maintien de relations entre les partenaires comme rôle essentiel d'un réseau de distribution (Anderson et Weitz, 1989; Anderson et Narus, 1990; Morgan et Hunt, 1994) ou notamment entre vendeurs et acheteurs de biens (Ganesan, 1994; Ganesan et Hess, 1997; Schurr et Ozanne, 1985) .

La satisfaction de la relation est souvent considérée comme une variable relationnelle cruciale lors de l'analyse des comportements post-achat. Elle correspond à l'état affectif ou émotionnel du client vis-à-vis la relation (Oliver et DeSarbo, 1988). Alors que, la satisfaction de la relation ne reflète que la satisfaction du client interne envers la relation et ne tient pas compte de la satisfaction globale dans son ensemble (Palmatier et alii, 2007). Enfin, l'état émotionnel du client envers la relation est mesuré de façon cumulative en se basant sur l'historique de l'échange alors que la satisfaction globale tient compte de l'échange dans sa globalité (Palmatier et alii, 2006).

Selon Palmatier et alii (2006), la performance objective d'un vendeur est principalement influencée par la qualité de la relation, suivie de la confiance, de la satisfaction de la relation et de l'engagement.

Ainsi, la réputation de l'acheteur sera construite par l'exposition d'actions réalisées par celui-ci, actions évaluées comme pertinentes par les clients (Gardberg, 2006; Gardberg et Fombrun, 2002; Ponzi, Fombrun et Gardberg, 2011).

Section 2 : Etude Exploratoire

1- Présentation De La Méthode

Grâce à la collecte des données primaires sur les pratiques des 12 entreprises qui disposent d'un service achat, leur 12 client interne et leur 12 client externe ; via des entretiens semi directifs avec les responsables, objet de recherche.

1- Resultats Obtenus

Les six variables conditionnant la bonne conduite de la fonction achat selon le guide d'entretien sont les suivantes:

- La satisfaction.
- La collaboration.
- La sincérité.
- La communication.
- La confiance
- L'engagement

Les résultats obtenus sur le terrain, permettent de confronter les hypothèses de recherche théoriques aux résultats empiriques afin de les vérifier si elles sont tous confirmées et évaluer leur degré d'acceptation. Après avoir présenté et analyser les résultats dans les 36 répondants qui évoluent dans des secteurs différents, on observe que les résultats de l'analyse qualitative ont permis d'apporter un certains nombre d'éléments significatifs et de confirmer les hypothèses de départ sur trois angle de vue :

- Responsable achat.
- Client interne.
- Client externe.

Sur les 12 entreprises étudiées, l'engagement est un facteur de croissance de chiffre d'affaires conformément aux travaux de nombreux auteurs qui soutiennent que les entreprises, pour être

performantes, doivent avoir des pratiques satisfaisante et collaborative [PERRETI, 2004;HONDEGHEM et PERRY, 2009 ;NASSE, 2012]. La perception de la sincérité par l'individu l'amène à adopter des comportements confiants et avantageux pour l'entreprise ; Au contraire la conception d'opportunisme l'amène à adopter des comportements qui ne sont pas bénéfiques à l'entreprise [PERRETI, 2004; NASSE, 2012].

Conclusion

La recherche a permis de mettre en avant des résultats principaux : elle précise la notion de la satisfaction en général et plus spécifiquement celle de la collaboration perçue par le client interne et permet de constater que l'orientation globale à une influence sur la confiance du client interne. L'intégrité a bien des effets sur la croissance du chiffre d'affaires des entreprises au Maroc .

La sincérité a bien des effets sur la satisfaction des clients interne d'une entreprise. Cette recherche montre que la confiance a des effets sur la satisfaction du client. [PERRETI, 2004 ; NASSE, 2012].

Enfin en s'efforçant d'éliminer les pratiques malsaines les entreprises augmentent la qualité de leurs produit et service. Cela contribue à renforcer leur compétitivité et améliorer la relation acheteur client interne et client externe [AKOUERABOU et BAKO, 2014].

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The Theoretical Framework for the Study of Globalization and Regionalization in the Eurasian Region

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Abstract

Being based on the analysis of existing definitions, the article gives the authors' clarification of the notion of globalization. Globalization is considered as the objective process of internationalization of the world economy, which is based on scientific and technological progress and the growth of the international division of labor, liberalization of the economy and its transnationalization, environment. The subjective side of globalization is considered as the policy of highly developed countries, pursued by them in their interests concerning other countries. The reasons for globalization slowdown in recent decades are identified, while the positive and negative consequences of globalization for the economies of the world are classified. Classification of existing points of view on the essence of regionalization is presented, and the authors' refinement of this category is given. The reasons for the intensification of regionalization processes in the global economy and the Eurasian region are identified. The characteristic features of modern regionalism are determined, the peculiarities of a closed and open model of regionalization are defined, and it is noted that the countries of the Eurasian region are moving to a model of open regionalization. is proved that regionalization creates the prerequisites for the transition from a unipolar to a multipolar world.

Keywords: Globalization, Regionalization, Region, Regional Integration, Eurasian Region, Unipolar and Multipolar World.

Introduction

The relationship between globalization and regionalization is the most debated in modern economic science. The problems of globalization are investigated by such scientists as Alle M., Arigi D., Wallerstein I., Castells M., Levitt T., Ome C., Rutland P., Fukuyama F., Huntington S, Held D., etc., including Russian economists: Akopova E., Buzgalin A., Gubanov S., Delyagin M., Nekipelov A., Ovchinnikov V., and others. Economists devoted their problems to regionalization and regional integration: Balash B., Weiner J., Meyer K., Pinder J., V. Repke, Schiff M., Winter L.A. and so on,

including Russian scientists: Vardomsky L.B., Kotlyarov N.V., Krotov M.I., Mirishli F.R., Mikheev V.V., Ryazanov V.T., Stepanova S., Shishkov Yu.V., Schegoleva N.G., etc. The problems of regionalization have become of particular interest in the last decade in connection with the global financial and economic crisis of 2008-2009, the slowdown of globalization processes and the growing contradictions between developed and developing countries. Regionalization was a kind of protective reaction of countries of the same region in the current situation of the global economy. Regionalization processes are actively going on in the Eurasian region, where a new world economic development pole is being formed and new integration unions are emerging. The processes of regional integration in this region are subject to general laws but have their specifics. Regionalization creates the prerequisites for the transition from the unipolar world to a multipolar one, which makes the concept of world order more fair and harmonious. That is why the topic of this study is the most relevant issue.

Statement of the Problem

In the context of the slowdown in globalization processes, the slowdown in the global economy and the growing contradictions between developed and developing countries, the increase in regionalization processes, it becomes necessary to find out the essence of globalization and regionalization, the relationship between them, to show the reasons for the intensification of regional integration processes in the Eurasian region, and to identify their features.

Research Questions

To give a more precise definition of the category "globalization" based on the analysis of the existing ones.

2. To identify the causes of the slowdown in globalization in the XXI century.

3. To determine the basis and the reasons for the growth of regionalization in modern conditions.

4. To demonstrate the features of regionalization in the Eurasian region.

5. To prove that the growth of regionalization creates the prerequisites for the transition from a unipolar to a multipolar world.

The purpose of the study

The purpose of the study is to determine the reasons for the regional integration process growth, their peculiarities in the Eurasian region, based on determining the essence of globalization and regionalization, and to demonstrate that the growth of regionalization creates the prerequisites for the transition from a unipolar world to a multipolar one.

Research Methods

1. The method of dialectics makes it possible to present globalization and regionalization as the unity of opposites and reveal the essence and internal contradictions of these processes.

2. The evolutionary and systemic methods allowed us to identify the main trends of globalization and regionalization in the modern world economy.

3. The method of the comparative analysis revealed the characteristic features and peculiarities of the regionalization process in the Eurasian region.

Results of the study

The essence, the stages, and the consequences of the economy globalization

The problems of globalization and regionalization are the current subject of the discussion by scientists, politicians, and practitioners. The essence of the category “globalization” is treated ambiguously. Firstly, the scientific term was offered by the American scientist T. Levitte (1983), designating it as “the phenomenon of the markets of the individual products manufactured by large multinational corporations merging.". Nobel laureate J. Stiglitz (2002) defined it as the removal of the barriers to free trade and the closer integration of national economies. American scientists: I. Wallerstein (1987), Russian economists: Asaul A.N. (2010), Bulatov A.S. (2019) and the others consider globalization as the form of the global economy modernization. Globalization, in their opinion, is a new stage in the internationalization of the world economy, which is the result of shifts in the economy in the conditions of scientific and technological progress, thanks to which mankind is drawn into a new technological era associated with the latest achievements of science and technology. In the interpretation of world financial organizations, the World Bank and the IMF, globalization is the rapid integration of rich and poor countries in terms of trade and investment, enhancing the merger of markets due to the cross-border movement of goods, capital, information, technology, and people (Reinert, 2014). There is an interpretation of globalization as “planetary domination of market principles and information and communication technologies that make up the global economic and information space” (Dendac, 2014). Russian scientist Yu.V. Shishkov (2001) defines the essence of globalization of the world economy as a new quality of internationalization at the stage of its maximum possible development in breadth. There is a point of view that “globalization occurs in the form of international flows of goods and capital in the framework of global supply chains and the value of transnational corporations” (Kondratyev, 2018).

Summarizing the existing points of view, the authors of the article interpret globalization as the objective process of internationalization of the world economy, which is based on scientific and technological progress and the growth of the international division of labor, liberalization of the economy and its transnationalization, of the environment; globalization is manifested in the free movement of production factors, capital, information, goods and services and is contributed to interaction increase and interdependence of national economies. At the basis of globalization at any stage of its development, three patterns are observed: the emergence of new technology; the presence of "core" countries (or "economic pole") which own this technology; the formation of supranational global governance institutions (IMF, World Bank, UNCTAD, UNIDO and others).

The internationalization of production and capital, as the components of globalization, is an objective and progressive process, because increase production efficiency, contributes to the accelerated spread of scientific and technological achievements in the world. At the same time, the degree of a positive influence of the internationalization of production and capital on the economy of individual countries depends on their place in the hierarchy of the world economy. The largest winners are industrialized countries, which can reduce production costs by focusing on the output of high-tech sectors of the national economy. These countries transfer labor-intensive and environmentally dirty production to developing countries.

Globalization, on the one hand, acts as an *objective process*, which foundation is laid on the geo-economic segment of world space; on the other hand, globalization has a *subjective side* and appears in the form of economic policies pursued by the developed countries of the world, global financial organizations and transnational corporations in their interests (Stiglitz, 2002). This gave rise to some scientists to consider globalization as an effective tool for establishing a "new world order" by highly developed countries. The ideology of globalism is based on a clear underestimation of the role and importance of non-European peoples. (Delyagin, 2003).

The question of the positive and negative effects of globalization is debatable. Table 1 attempts to summarize these ideas.

Table 1: Positive and negative consequences of the economic globalization process

The positive impact of globalization	The negative effects of globalization
Strengthening international competition and, as a result, improving the technological level and product quality. The development of hypercompetition.	The benefits of globalization are not evenly distributed: several leading countries control the significant part of production and consumption.
The emergence of transnational corporations operating in the financial and information markets and creating 80% of the latest technologies, including hyper technologies. Speeding up the spread of new technology.	The de-industrialization of the economies of the semi-periphery and periphery countries is arising due to the growth of openness of economies and increasing the international co-competition. Vanek-Reinert effect.
The growth of foreign direct investment, far exceeding the growth rate of world trade, contributes to the transfer of technology, the formation of global enterprises.	The transfer of the parts of production capacities by firms of countries with high labor costs to countries with low wages and the formation of unemployment in countries where capital is exported.
The rapid development of financial markets, which makes it possible to develop the real sector of the economy.	Strengthening financial globalization is becoming the most important cause of the vulnerability of the global economy.
The global value chain formation, leading to economies of scale and contributing to cost reduction and lower prices, resulting in increased labor productivity and sustained economic growth.	Placement of environmentally dirty production by the “core” countries of globalization in developing countries.
The consumer wins, having the opportunity to buy more goods and services of higher quality at a lower price due to increased competition.	The socio-economic inequality between the countries of the world is growing.
The specialization and the international division of labor are deepening.	80% of the planet’s resources are used by the countries of the “golden” billion, where 20% of the population lives.
The ability to mobilize more significant financial resources for the use of wider financial instruments in an increased number of markets.	The countries of the periphery are turning from the subject into the object of globalization.
More and more global problems can be solved by combining the efforts of the world community.	Globalization strengthens the unipolarity of the world, which strengthens the dependence of underdeveloped countries on the "core" countries of globalization.
The emergence of supranational institutions of environmental regulation can contribute to solving global environmental problems.	Localization of environmental problems in the territories of countries of the world periphery as consequences of negative external effects of anthropogenic impact on nature.
Increased involvement of developing countries and countries with economies in transition into international trade, processes of international lending and investment, international labor migration.	The advantages of development are obtained by industries supplying products for export, while other industries are losing competitiveness.
The income growth of all worldwide countries.	The socio-economic inequality between developed and developing countries, the threat of instability of the world order are strengthening.
The capital flows liberalization contributes to	The external debt of developing countries to

the rapid integration of national capital markets of developing countries into the global financial system.	international financial organizations is growing.

Resource: compiled by the authors based on a review of literature concerning the problem of globalization

As can be seen from the table. 1, globalization, as an objective phenomenon of the global economy, contributes to economic development. Globalization, as a subjective phenomenon, as the policy of the "golden billion" countries, is carried out in their interests and has negative consequences for developing countries (countries of the periphery). This was one of the reasons for the strengthening of regionalization processes in the global economy. There are also economic, political and military reasons for the intensification of regionalization processes in the modern world. The crisis state of the global economy stimulates regionalization. The powerful processes of digitalization of the world economy serve as a kind of catalyst for regional integration.

The essence, forms, and consequences of regionalization of the economy

The 1st point of view**:** regionalization is an element of globalization (Slutsky, 2018), (Wardomsky, 2008). Russian scientist Ryazanov V.T. (2019) defines regionalization as "small globalization", as a kind of alternative to "big globalization". Shishkov Yu.V. (2008) argues that globalization itself stimulates the massive regionalization of the global economic space to counter rising risks.

The 2d point of view: the essence of regionalization is that its representatives interpret regionalization of the economy as a form of interstate integration, as a response to increased competition and uneven development of the global economy: (Schiff, 2005), (Dendac, 2011), (Starodubtseva, 2015) and others.

The 3d point of view: lies in the fact that the essence of regionalization of the economy is interpreted as the integration of geographically separate markets: (Liebman, 2011), (Lenkov, 2015) and others.

The 4th point of view: lies in the fact that regionalization is seen as a form of integration of economic activity in a certain region of the world: Rozov (2014), Schegoleva (2019). The German economist M. Bree (2005) considers regionalization of the economy as "the process of integration of large regions and their closer cooperation with each other", bearing in mind the ethnic, civilizational, socio-cultural and economic specifics of integrating countries.

The authors of the article, summarizing the existing points of view, define regionalization of the economy as the association in the economic block of states of the same region of the world that have similar civilizational, ethnic, national-historical, sociocultural characteristics, political structure, based on close and stable economic ties between business entities of these countries.

According to the authors of the article, regionalization does not oppose, but rather complements globalization, which at the present stage, due to the processes described above, requires the solution of existing contradictions. At the same time, globalization and regionalization cannot be equated, since as a result of regional integration processes, the close interdependence of individual states in a certain region of the world is formed.

A feature of the current competition stage in the global economy is the following: the interstate competition is complemented by a new form of competition - competition between interstate integration associations (blocs).

The process of regionalization involves improving the geo-economic situation for integrating countries: stabilizing economic growth, strengthening the competitiveness of national economies; expansion of sales markets, sources of raw materials, capital, technologies; strengthening the economic and communication interconnection of integrating countries; the growth of their political benefits and institutional homogeneity; security enhancement. This is now well explained with the help of the geo-economic law of "autarchy of large spaces", which was deduced in the 19th century by the German economist Frederick Liszt (1891). According to this law, only a sufficiently large,

economically integrated space is capable of full-fledged economic development; at the same time, the most developed country receives a positive effect.

The institutional forms of regionalization are agreements on free trade, customs, and economic unions, etc. The formation of regional groups, in our opinion, is an attempt by the countries of the region to resist jointly the negative consequences of globalization and the policy of globalism pursued by highly developed countries. In the formation of regional economic unions, specific ethnic, cultural, historical, religious, national and other features of the countries of the region are taken into account. At the same time, new institutions are being formed which help to harmonize the interests of the economic union countries members.

Features of regionalization in the Eurasian region

The ideology of globalism, as the policy of highly developed countries, is based on a clear underestimation of the role and importance of non-European peoples (Delyagin, 2003). In particular, the processes of regionalization are intensively going on in the Eurasian region.

A feature of the current stage of regionalization for the countries of the Eurasian region is the transition from the model of "closed regionalism" to the model of "open regionalism". This is due to the current level of liberalization of international trade, lower tariff restrictions, and the presence of supranational institutions for regulating the global economy. Closed regionalism restricts third-country access to the regional market. It aims to protect against the negative effects of globalization, which is essentially protectionism (Streltsov, 2019).

The Russian Federation at the present stage is the member of several regional integration unions with Eurasian states: Shanghai Cooperation Organization (SCO); Eurasian Economic Union (EAEU); BRICS and others. When creating the SCO, regional security was a priority. The goal of the creation of the EAEU is regional economic integration.

The countries of Eurasia are characterized by the specific patterns of development and this is reflected in their model of regional integration. Today, the study of Eurasian economic integration, its relationship with globalization is gaining special importance. One can agree with the opinion that "the Eurasian-liberal-conservative course is replacing the western - radical-liberal course of globalization" (Slutsky, 2018), that at the present stage, *a new type of Eurasian integration is emerging* (Glazyev, 2016).

Before the global financial and economic crisis, many Russian researchers believe that the post-Soviet integration should follow the path of the European Economic Union and emphasize integration on a global rather than regional level. However, later scientists began to argue that the dominance of the Anglo-Saxon model in the world economy in the 1990s was fiercely competitive by new centers of economic power, which are rapidly developing within the framework of "their unique models," where they primarily note economies of China, Russia, and other Eurasian countries (Dykin, 2018).

In the late 1990s, after the Asian crisis, concepts of Asian regionalism began to take shape. The specificity of regional integration associations in Asia, in contrast to European regionalism, lies in the absence of the European Union type interstate structure.

There are several points of view on the essence of Asian regionalism:

- the first: Asian economic and financial integration is seen as an alternative to American and West European dominance in the world and Asian markets;

- the second (represented by Japanese scientists): Asia-Pacific economy is seen as a single economic and financial space, which is not opposed to North American or Western European integration and will allow to move to a single world market in the future;

- the third: the phased development of Asian economic integration at a subregional level (Mikheev, 2002) of regionalism, lies in the absence of the European Union type interstate structure.

Features of regionalization in the Eurasian post-Soviet space

The evolution of regionalization in the post-Soviet space is associated with the main integration groups transformation: CIS, EurAsEC, Union State of Belarus - Russia, Customs Union, Common Economic Space, Eurasian Economic Union (EAEU).

The following features of economic regionalization in the Eurasian post-Soviet space can be distinguished:

- the participation in the integration of the former union republics (now independent states), which previously cooperated as elements in the USSR single national economic complex;

- the integration processes take place on a vast territory and sparsely populated Eurasia with an underdeveloped infrastructure;

- the contact of the post-Soviet Eurasian space in the west with the countries of the European Union, in the east - with the most dynamic economy of the world - China, which imposes its characteristics on the processes of the regional integration of the former union republics;

- the lack of historical experience of interaction at the interstate level among the administration of the former union republics, now independent states;

- the principal role of the political factor in the process of post-Soviet regionalization;

- different scales of economies and levels of socio-economic development of integrating countries;

- the tendency to copy institutions of foreign countries;

- the inter-civilizational association of the Eurasian post-Soviet countries;

- the possibility of rhe clash of national interests integrating countries, that hinders integration;

- the economic dominance of Russia;

- the various models of reforming the economies of post-Soviet countries;

- the different level of government intervention in the economy.

At the end of 2011, Russian President V. Putin stated that the post-Soviet integration (an attempt to jointly enter globalization) passed into Eurasian integration, to form a large regional economic association as a part of the new world architecture.

A striking example of regional economic integration in the post-Soviet space of Eurasia is the Eurasian Economic Union (EAEU), which was created in 2015, and in 2020 celebrates its fifth anniversary. Its creation was the result of the evolution of regional post-Soviet integration. The EAEU is the largest integration association in the territory: an area of more than 20 million square kilometers (14% of the world's land), the total population is 182.7 million people (2.5% of the world population), the market capacity is 3,7% of global GDP (Selishcheva, 2017). Over 40 countries have expressed a desire to enter into negotiations on the creation of a free trade zone with the EAEU.

The member countries of the Eurasian Economic Union have formed a huge market, within which the free movement of goods, services, capital, and labor is ensured. According to the law of “autarchy of large spaces”, one can expect an increase in the functioning efficiency of all five countries that are members of the EAEU. With the entry into force of the agreement on the EAEU, about 80 various barriers were eliminated: from free movement of citizens, to freedom of choice in employment on the territory of the union with recognition of educational documents (pedagogical medical, legal and pharmaceutical diplomas became an exception), but problems still remain.

The heterogeneity and uneven development of the Eurasian socio-economic space determines the specifics of the Eurasian market, particularities of national economies integration, socio-economic policy, institutional transformations in the countries of the region.

Within the EAEU, a system of supranational institutions has been created: the Eurasian Economic Commission; EAEU Court; Eurasian Development Bank, designed to implement projects to strengthen mutual trade and investment; The Eurasian Fund for Stabilization and Development, whose tasks include crisis management and financial stabilization in the region. The most important element of the integration model in the post-Soviet space should be the formation of a common not only economic, but also socio-cultural space, a kind of "security community" which may help to increase the pace and improve the quality of economic growth.

One of the features of regionalization in the Eurasian region in 2015 was the Chinese mega-project "One Belt - One Way", which combined two projects: "The Economic Belt of the Silk Road" and "Sea Silk Road". Chairman of China Xi Jinping formulated 5 main directions for the implementation of the considered megaproject: the coordination of political guidelines for development between countries; the cooperation in transport infrastructure; trade and investment freedoms; finance and humanitarian contacts.

In 2015, Russia and China signed the Agreement on the pairing of the EAEU and the Chinese project "Silk Road Economic Belt" (SREB). This is a new model of Eurasian integration, from which the participating countries can derive number of economic benefits: Russia and other EAEU countries - investments, infrastructure projects, enhanced industrial cooperation, accelerated regional development, etc. China, promoting a new model of regional integration, gets an opportunity for the country's economy to receive resources and develop further, expand its sales markets, and strengthen its influence in Eurasia. The EAEU and the SREB could become the core of a more ambitious cooperation project - "Greater Eurasia", which could turn into a new centre of global economic development.

Conclusion

We can thus conclude that the slowing down processes of globalization, its conflicting consequences and the crisis state of the global economy stimulate, in its tern, the processes of regionalization. The digitalization processes of the global economy serve as a kind of catalyst for regional integration. Economic, political, military reasons may underlie regionalization. The processes of regional economic integration are particularly active in the Eurasian region, where a new geo-economic development pole is being formed. The processes of regionalization in the Eurasian region are characterized by general patterns, but there is also its specificity. It is characteristic of Asian regionalism which cultural and civilizational factors, along with economic and political ones, play a more significant role than in the regional integration of European countries. The peculiarity of the Eurasian model of regional integration is that it unites not only individual countries, but also civilizations, and the inter-civilizational association creates the prerequisites for the transition from a unipolar to a multipolar world, to a fair and harmonious concept of the world order.

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The Network Values and the Network Effects in the Digital Economy Institutes System

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Abstract

The article considers the conditions of the fifth neural-network technological revolution and the development of a new generation global network - Neuronet. The features of the network human capital formation using highly qualified specialists in the digital economy are disclosed. The basic principles of organizational interactions in the global network are formulated. The contents of the concepts of “network value”, “network effect” are revealed and their characteristics as new elements of the institutional structure of the digital economy are given. The provision of the action in the digital economy of the law of increasing marginal productivity is justified. The principles of the emergence and accounting of network effects in the modern digital economy are formulated. The theoretical views of scientists on the interpretation of the concepts of "network capital" and "network effects" are considered. Methodological approaches to the assessment and measurement of network effects are presented. The methodological approach to accounting and evaluating neural network effects as new objects of intellectual network property are substantiated. It is concluded that it is necessary to include the magnitude of network effects in the value of the gross national product.

Keywords: Digital Economy, Technological Revolution, Network Human Capital, Institutions, Value, Neural Network Effects.

Introduction

Today, processes of total informatization, digitalization and networking are unfolding around the world, an active form of a new generation of the global computer Internet network, called "Neuronet", is underway. Under the influence of the modern fifth neural-network technological revolution and Neuronet, a qualitative change in the principles of organizing the global economic system in all spheres and institutions of the world and national economic systems is taking place. Today, under the influence of the digital neuro-network technological revolution, an active form of a new technological structure and institutions of the digital economy is underway. The main characteristics of all processes and phenomena in the digital economy, which are of an informational nature (Dyatlov, 2017), are digitalization, networking, integration, convergence, and mass use of neurosociomorphic interfaces.

In the digital economy, various networked institutional management structures are being formed, including government institutions at global, federal, regional, and local levels. The leading place in the structure of the management and regulation institutions of the globalizing digital economy is occupied by the electronic network management, regulation, and control institutions, the most important of which is the electronic (digital) government. There is a transformation of all spheres and

elements of the world and national economies, all state, public and private institutions, a digital cyber-state and a digital government are being formed. The rapidly developing global neuro-computer network "Neuronet", which includes network socio-neuro-morphic interfaces, digital cloud platforms, blockchain technologies and universal ecosystems based on self-learning artificial intelligence, qualitatively transforms the nature and content of relationships between people in modern information and network society. The emergence of qualitatively new, breakthrough energy-network technologies and network effects is designed to decisively ensure the realization of the advantages of leading countries and leading companies in the face of increasing global innovation hypercompetition.

Statement of the problem

In the modern digital neural network economy, it is important to study some new phenomena, which include network values and network effects, which are important elements of the institutional structure of the digital neural network economy. In this regard, the urgent, important and difficult task is to disclose the content of these concepts and develop theoretical approaches to assessing and accounting for neural network effects and the need to take into account their value (network added value) in the value of the gross national product produced.

Research Questions

- The deployment of the fifth neural-network technological revolution and the development of the global network of the new generation Neuronet.

- Formation of new institutions and regulatory mechanisms for the digital neural network economy.

- The transformation of human capital into the network human capital of highly qualified specialists in the digital economy.

- Network values and network effects as new elements of the institutional structure of the digital economy.

- Methodological approaches to the assessment and accounting of network (neural network) effects in a digital hyper-competitive economy.

The purpose of the Study

Digital Economy operates with Smart Big Data. According to GIV-25 analysts, the digital economy is estimated at 23 trillion US dollars. By 2025, 85% of services will be in digital clouds, 86% of the largest companies will implement artificial intelligence, the share of big data will grow to 80%. 180 billion terabytes of data will be generated annually, which will become a source of innovative intelligent technologies and the creation of new added-value (Huawei, 2018).

In the digital economy, based on the emerging global network of the new generation Neuronet, there is a dynamic formation and development of new institutions, new activities, new types of network employment and network training. As a result of a qualitative change in the substantive characteristics of labor, a new employment model arises, which is called "Work 4.0". Education is becoming a leading area of production of networked human capital, which is becoming a critical factor in the development of the digital economy. In the Digital Economy of the Russian Federation program, which was put into effect on July 28, 2017, it is planned to allocate 46.2 billion rubles to finance the federal project "Personnel for the Digital Economy" in 2019-2021. By 2024, 120 thousand people will study at higher education programs in the field of information technology; 10 million people will be trained in online digital literacy development programs; most public universities implement the digital university model (Digital Economy, 2019).

In the global digital economy, traditional human capital is transforming into a new kind – a network human capital. The network human capital is a system of network abilities, skills and competencies of highly qualified specialists, used for effective interaction through global networks with network government structures, network business structures, scientific and educational structures, and with social networks that are used to obtain a variety of public goods, market benefits and network effects (Dyatlov, 2017).

The network human capital in the modern digital economy is the main driver of dynamic and sustainable innovative development. The digital economy places increased demands on the network knowledge abilities and competencies of workers. In the digital neural network economy, based on neural networks with a socio-neuromorphic interface, a modern specialist is multidimensionally included as a creative element into an integrally-distributed neural-network intellectual-cognitive environment, is more and more involved in neuro-cognitive processes and acquisition mechanisms and the multiplication of new knowledge, the use of neurocomputer interfaces, the use of virtual and augmented reality elements, hybrid devices, expert intellectual systems, and artificial intelligence. In modern conditions, the training of specialists should include the development of network cognitive thinking.

In the digital economy, a highly qualified specialist must possess the skills and competencies of flexible interaction with the network structures of electronic government, electronic business, electronic commerce, as well as with social networks. Functions such as digital literacy, cognition, creativity, multifunctionality, network flexibility, and mobility, focus on achieving career growth and status success, are the basic competencies of a modern specialist.

Within the framework of the Gig-economy concept, the employer forms a demand for the hiring of such an employee whose work is of a design nature, aimed at the final result. Today a new network model of the labor market and employment is being formed. There is such a modern form as a virtual team, which is a network of workers who work together through global networks without traditional market intermediaries. Such a structure of the network organization of labor is flexible and is formed from specific specialists uniting to carry out certain joint projects. At the same time, the responsibility of employees and specialists included in such network associations increases for the results (Fleming, 2017).

Currently, the principle of “national innovation capacity” inherent in highly skilled employees is the most important indicator-driver of development. R. Florida calls network workers “the creative class” (Florida, 2012). Modern employees are carriers of national innovative ability, become universal specialists, turn into multifunctional workers with developed digital abilities and competencies, which are characterized by high network mobility and focus on achieving results. At the same time, there is a reduction for specialists to make decisions while increasing their effectiveness, which, in turn, leads to an increase in the combined effect of joint activities on the Internet.

It is necessary to distinguish between the concepts of "human capital" and "network human capital". In an industrial market economy, the ability of workers to work is realized in the form of human capital. In the digital economy, the ability of employees to work is realized in the form of network human capital. At a mature stage in the development of the digital economy, the neuro-network human capital is being formed within the framework of the new system of socio-neuro-network education, a whole class of new scientific-educational neuro-network effects is emerging, the cognitive and analytical abilities of the specialist are being strengthened, the volume and speed of information transfer are increasing, knowledge acquisition and integration into a universal ecosystem. New forms of training and advanced training through neural networks will arise and be widely developed; virtual research and modeling; application of neuro-virtual reality (virtual smart spaces, libraries, databases). It should also be borne in mind that a modern network specialist must be able to work and make effective decisions in the face of rising risks, uncertainty and increased innovation hyper-competition in local, regional, national and global markets.

Research Methods

Within the framework of the information paradigm, it is substantiated that various economic phenomena and the relationships between them are of an informational nature, i.e. the substance of socio-economic relations and ties is information (Dyatlov, S.A., Lobanov, O.S, Selischeva, 2017). The connection between virtual network spaces and their participants has an information-network nature. One of the distinguishing features of information is that it realizes its properties only by receiving the opposite answer through a system of multi-level direct and feedback connections. That is, a communication based on information is multilateral and multilevel. Computer theorist Manuel Castells points to the genesis of knowledge and information as the main source of productivity. He believes that the “information society", a society of a new, modern type, is based on networks activated by technology (Castells, 2000).

To research the concept of “value”, the basic approaches of the theory of value of Adam Smith, who wrote about the separation of the value of goods in consumption from value in exchange, as well as the concepts of well-known institutionalists John Rogers Commons, Torstein Veblen, Clarence Aires, who wrote about the impact of social and institutional processes on the individual preferences of consumers of goods and their value. The notion of “network value accumulator” introduced into circulation uses the idea of T. Veblen as its basis, who noted that technology and industrialization themselves are a source of value since production develops with their help (Veblen, 1984). We should also use the idea of A. Commons that “the reasonable value of the good” (Commons, 1990).), that is the intrinsic value assigned to a product or service in an exchange is determined during the transaction process, supplemented today by a significant increase in the role of global network institutions.

The scientific literature (Dyatlov, 2018) substantiates the position that “in the conditions of the latest electronic neuro-network technological revolution, neuro-network intellectual capital arises with completely new unique properties and functions that contribute to the production and receipt of a variety of neuro-network effects” (neural network effects). In the global digital economy, there are various information-network effects. Information and network effects are effects of innovations, network interaction, business integration. In fact, these are synergistic network (integral) effects, expressed in various forms. H.R. Verian identifies two main types of network effects: direct network effects (directnetworkeffects) and indirect network effects (indirectnetworkeffects) (Verian, 2005).
There are several approaches to assessing intellectual capital and network effects in economic literature. A synthesis of various methods for measuring intellectual capital has been carried out by Karl-Eric Sveiby (Sveiby, 1997). The appraisal of the cost of technology, research and development were carried out by Boer F.P. (Boer, 2007). Currently, there is no one universal method and methodology for assessing the value of intangible assets, intellectual capital, network effects.

Results of the study

Network value in the Digital Economy

In the modern neural network economy, a new type of value "network knowledge value" (the value of network knowledge) is emerging. Network knowledge value arises in the Internet and is an integral network effect. In the conditions of the fourth industrial revolution, and after it and the upcoming fifth neural network technological revolution, the main accumulator of value is human capital (the neuro-network human capital), which has hyper-competitive network competencies, which allows creating added value and neuro-network effects. The process of development of the global market for goods and services implies the need for a newly created object to appear exclusively in the form of a conversion of the existing accumulator of value based on the accumulated monetary and network effects acquired with the help of the latter. The information gave rise to technologies for its efficient distribution and storage, which proved to be suitable for transferring not only traditional resources and data but also a special kind of resource - network value as a general utility category in the digital economy.

Therefore, as the digital integration of the global market for goods and services develop, the point of determining the intrinsic value of a product shift from production to consumption. At the moment, the world economy is just beginning to begin the transition from the stage of determining value in the sphere of production and exchange to the stage of its determination by the consumer in the field of consumption. In this regard, the following fundamental methodological position available in the scientific literature can be noted. In the global neural network economy, in which integrated network effects take place, a completely new quality of the process of social production and determination of value arises: the opposition between production, distribution, exchange, and consumption is overcome, and a new network value is created simultaneously by all participants in neural network interactions (manufacturers, intermediaries, and consumers) (Dyatlov, 2018).

In the neural-network economy, value has an informational multifunctional nature, which is expressed in the fact that it exists in itself - in the form of an accumulator of value, representing the costs of universal human labor in the information sense, embodied in innovative technologies, goods, services, knowledge, and is at the same time a means of incrementing the value of other objects and participants in neuro-network interactions. At the same time, achieving the optimal level of costs (reducing costs) for the production, distribution, exchange, and consumption of the "new" accumulator of value leads to an increase in its internal network knowledge value, which is the basis for the growth of capitalization and potential monetary profit in the future for those who invested and participated in the production, use, and appropriation of this immaterial digital value.

It should be emphasized that in the neuro-network economy, the main carrier and accumulator of this network knowledge value is a person(s), their network human capital. At the same time, transaction costs are minimized. In the neuro-network economy, through the integrated network interaction in the production, distribution, exchange, and consumption of information, production, distribution, exchange, and consumption of network knowledge are simultaneously occurring. Based on the foregoing, it is logical to draw a conclusion about the emergence of the Internet of neural-network knowledge values and network effects, which replaces the traditional Internet and which is called Neuronet.

The transition from the Internet of Information to the Internet of Values is marked by the emergence of the possibility of exchanging values with minimal costs. At the same time, it is important to note that while value in an industrial market economy was mainly understood as money, then in a digital neural network economy we are talking about a wide range of knowledge network values and integrated network effects. For example, "smart contracts" and network interactions allow to minimize transaction costs associated with the exchange of any kind of assets, including electronic financial and public services.

The Law of Increasing Returns in The Digital Economy

The current stage of development is characterized by the dynamic deployment of processes of integration and convergence of technologies, regulatory and accounting methods, companies, institutions, information spaces, and databases. Additional network connections arising in the process of integration and convergence can be defined as the synergy of convergence of information spaces, characterized by the appearance and receipt of network synergetic effects (Dyatlov, S.A., Lobanov, O.S. and Zhou, W.V., 2018).

In the context of global information and network economy, it becomes possible to receive and assign various networks, information, and intellectual effects. In the industrial market economy, the law of diminishing returns (returns) applies. In the information economy, as a result of large-scale innovations, the efficiency of the use of production factors increases, and under the influence of ICT, the law of increasing returns begins to apply. The effect of this law is due to a number of factors: digitalization, the dominance of information products and services, innovation, productivity growth, business integration, the emergence of social networks, the emergence of network effects.

The production and distribution of information products and services differ from the production of traditional industrial products. C. Shapiro substantiates the important point that information is expensive to produce but cheap to reproduce and copy (Shapiro, 2000). The production of an information product (service, a network effect) is associated with high fixed costs, but with low (constantly decreasing) marginal costs. In the conditions of innovation and information production, there are high fixed costs and low marginal costs. Under these conditions, the manufacturer should strive to produce and sell the maximum possible volumes of information products (for example, software products for computer systems) to make big profits and compensate for the high initial costs of developing an original information product. As R. Vaiber notes, in the information and network economy, in contrast to the industrial economy, it is not the law of diminishing marginal returns that dominates, but direct network effects and positive feedback, which is expressed in increasing marginal returns (Viber, 2003).

Multifunctional incomes of participants in network interactions can be expressed in various forms - in the form of public goods, market goods, and neuro-network effects. An important but extremely complex problem is the assessment of neuro-network effects, which as phenomena of socio-economic reality have an immaterial, intangible, informational nature. The most difficult problem is how, along with the assessment and taking into account the market value of the provided network service (effect), to evaluate and take into account its non-market, social-network component, which cannot be directly estimated in monetary units at a given time in a linear way. For example, the possible additional occurrence of a capitalized monetary effect (direct and indirect, linear and non-linear), which can be obtained in the future, depends on the number of users of this energy network service in a social network both in the present and in the future. In this regard, it is important to determine the principles for evaluating multifunctional neural network services and effects, their inclusion and accounting for GNP, an income of firms and citizens.

The Concept of "Network Effects"

The concept of “network effects” was introduced in 1908 by Theodore Vail, who studied the optimization and distribution of telephone services. Network effects, on the one hand, express specific effects arising from the introduction of ICT, the implementation of electronic business and interactions in global networks, and, on the other hand, contribute to the growth of efficiency and productivity in the economy. These effects can also be obtained as a result of applying advanced methods of hypercompetition, integration of ICT business, coordination of network interactions, anticipating programming and managing the economic behavior of competitors and consumers, using hypercompetitive creative neuromarketing, management, logistics, etc.

The network effect takes on a significant value when a certain number of users of an information product (service) is reached, which is called the “critical mass of users”. After this point, the value obtained from the use of an information product (service) becomes more than the price paid for it. The network effect is a phenomenon of growth in the consumer value of a network as the number of nodes in this network grows, as the number of its users and the number of connections between users increase. The greater the number of users involved in the network, the more significant the fact of use becomes for consumers, the more loyal the consumer, the less willingly he switches to alternative products (networks). Using the loyalty of consumers and their significant number, manufacturers or providers are connected to this network and provide additional goods and services. As a result, a huge number of people who carry out transactions and spend significant resources can be involved in the network. including financial resources, time resources, etc.

H.R. Varian noted the important side of the integration effect, which is expressed in the fact that “the combined effect of Moore’s law, the Internet, computer awareness and financial markets led to a period of“ rapid innovations ”(Verian, 2005). Sebastian Knol identifies a special type of cross-business synergy - information synergy, which is generated by the use of common information channels, the wide availability of these channels and their effectiveness, a significantly greater opportunity to obtain reliable and complete information about competitors, national and regional stock markets and business initiatives (Knool, 2008).

The basic principles of network interactions, the emergence, and receipt of network effects should be formulated:

1. The principle of polysubjectivity and multifunctionality of the network.
2. The principle of free access to the network.
3. The principle of the critical mass of network participants.
4. The principle of growth and complication of relations between nodes, elements, and network participants.
5. The principle of privileges and bonuses to network members.
6. The principle of transaction security and the protection of personal data of participants (users) within the network.
7. The principle of retention and complexity of leaving the network.
8. The principle of significance (status) of the network.
9. The principle of optimizing costs and benefits.
10. The principle of the possibility of determining and accounting for network effects.
11. The principle of valuation, capitalization (monetization) and assignment of a network effect.
12. The principle of registration and protection of rights to the network effect as a specific object of intellectual-network property (Dyatlov, 2018).

Information and innovation activity is extremely complex, multi-aspect and non-linear, contains much direct communication and feedback, direct and indirect network effects. In the modern digital economy, there are processes of integration, networking, and convergence of manufacturers, generators, marketers, and consumers of network intelligence and information benefits and innovative knowledge technologies, as well as the commercialization of various network effects.
It is necessary to justify an important theoretical position. In the global neural network economy, hybrid neural network effects – the effects of interaction between human intelligence and artificial intelligence-become an important value. The technological basis of these hybrid neural network effects is integrated digital platforms and socio-neural-morphic interfaces.

Methods for Evaluating Network Effects

An important regularity characterizing the production of information products (chips) in 1965 was formulated by one of the founders of Intel, Gordon Moore. According to Moore's law, the computing power of microprocessors and the density of memory chips doubles approximately every 18 months at a constant price, i.e. unit prices are halving every 18 months.

The content of the concept of “network value” was introduced by Robert Metcalfe, who was one of the developers of the Ethernet network system. He formulated a law called Metcalfe’s law, according to which the value of any network for a user is equivalent to the square of the number of connection nodes, that is, if there are n users in the network, then the value of the network for each is proportional to the number of other users (Reingold, 2006). Following Metcalf’s law, the utility or use value of networks rises sharply with an increase in the number of subscribers (users). The usefulness of networks as a direct network effect begins to increase only after reaching the so-called critical mass, which is understood as the minimum number of users, starting from which the system acquires a certain level of utility that ensures long-term operation of the network. In general terms, Metcalf's law can be expressed as follows:

$$Ц_n = (n-1)\, w\,,$$
$$P_n = n\,(n-1)\, w\,,$$

Where:

$Ц_n$ - the value of the network (n - nodes) for each subscriber;
P_n - the total value of the network (n-nodes) for all its subscribers;
w – the assessment of the ability to negotiate with one subscriber.

So, if the value of the network for one user is $ 1 for each of the other users, then the total value of the network of 10 users is approximately $ 100, and the total value of the network of 100 users is about $ 10,000.

For production and network systems that require the accumulation of a critical mass of users (participants), starting (basic) support is required, which consists in creating a basic number of users, providing special conditions for network activities, services, differentiating services and tariffs, influencing the formation of favorable consumer expectations and etc. After reaching a critical mass, new users will perceive the value of an information service more than its price due to the action of positive network externalities. It should be noted that network externalities can also be negative, for example, in the event of a malfunction or slow down when the computer network is overloaded.

Another law regarding IT effects is formulated, called the Zipf Law. Its discoverer is George Zipf, an American linguist from Harvard University. Zipf's law expresses the empirical regularity of the frequency distribution of words in a natural language: if all words of a language (or just a long text) are ordered by decreasing frequency of their use, then the frequency of the nth word in such a list will be approximately inversely proportional to its ordinal number n - the so-called rank of this words (Zipf, 1949). Formally, Zipf's law expressing an estimate of the increase in network utility (NE) can be defined as follows:

$$NE = n \log (n) ,$$

Where:

NE – the network utility;
n - the number of network elements (nodes).

The American engineer and scientist Claude Shannon in 1948 published a fundamental article, "The Mathematical Theory of Communication" (Shannon, 1948). In this article, he, solving the problem of transmitting information through a communication channel subject to noise, proposed a probabilistic approach to the amount of information transmitted and introduced a measure of the discrete probability distribution over the set of alternative states of the transmitter and receiver of messages. C. Shannon proposed a formula for determining the amount of information, defined as the reciprocal of the entropy:

$$IH(q) = -\sum_{j=1}^{n} q_j \cdot \log_2 q_j ,$$

Where:

IH – the information entropy, which determines the amount of information;
n - the number of characters from which a message (alphabet) can be composed;
q_j – the probability values; the probabilities can be replaced by their statistical estimates: $q_j = \frac{N_j}{N}$,
which represent the relative frequency of the jth character in the message;
N - the number of all characters in the message;
N_j - the absolute frequency of the jth symbol in the message, i.e. the number of occurrences of the jth character in the message.

The formula proposed by C. Shannon is used to measure the amount of information, defined as a negative value of entropy. Boltzmann had previously proposed a formula for measuring entropy.
In our opinion, for the integrated assessment and measurement of various network effects and network benefits arising in a certain complex network-type system, the following components should be taken into account:

- the number of elements, the amount of information and the number of links;
- the nature and method of network connections;
- the level, type, structural and functional organization (architecture) of networks;
- the quality and measure of internal information links between elements and their functions within the system;
- the target dominant (main target function) of the development of this system;
- the entropy-synergy network balance of this system.

Based on the dependencies formulated by Zipf and Shannon, we propose a methodological approach to determining the information network effect, which in the most general form we define as follows:

$$INE = C \times (IH \times NE) ,$$

Where:

INE – the information network effect;
IH - the amount of information (information negentropy);
IH – the network utility;
C - the dimensionality coefficient that determines the choice of a specific unit of measure for the network effect (Dyatlov, 2018).

In the modern digital economy, as a result of the law of increasing returns (growth of integrated productivity), neural network effects bring integrative value distributed in space and time, the evaluation and accounting of which leads to an increase in the value of the gross world and gross national product and the distributed neural network interaction income of the participants.

Conclusion

It should be concluded that a new generation of global networks has emerged - the Neuronet of network knowledge values and network effects, which replaces the traditional Internet. In the modern digital economy, the network human capital is the main driver of dynamic and sustainable innovative development. In the context of the upcoming fifth neural network technological revolution, the main accumulator of value is human capital (the neuro-network human capital), which has hyper-competitive network competencies, which allows creating added value and neuro-network effects. In the industrial economy, the law of diminishing marginal returns applies. In the digital economy, in contrast to the industrial one, the law of increasing marginal revenues (returns) applies, which is due to network effects and positive direct and feedback links between participants of the global network.

In the global hyper-competitive information-network economy, the most important and most difficult task is the specification of various rights to new neural-network objects of intellectual-network property. We offer a general authors' approach, which is being developed as part of the information paradigm of social development and which defines a new, promising direction in the search for a solution to this complex problem. The essence of our proposed methodological approach is disclosed in the following provisions. In the context of the emerging neuro-network economy, there is a whole class of new neuro-network effects. Multifunctional neural network effects are embodied in various objects of intellectual network property (materialized and personified, material and non-material, linear and non-linear, localized and cloudy). In our opinion, the general methodological principle is as follows: all the integrally distributed in time and space results and effects from production-supply-consumption-assessment (accounting) of multifunctional neural network goods and services aimed at real satisfaction of actualized and verified needs of people and the resulting new specified rights to neural network objects of intellectual network property are subject to accounting and evaluation.

Emerging new neural network effects require specification and classification as new objects (elements) of intellectual network property, should be adequately evaluated and taken into account when calculating the expanded (taking into account the integrated network benefits and effects) GNP. This implies the expansion of the traditional system of national bookkeeping by including new

integratively distributed multifunctional neural network effects, as well as the need to adjust (increase) the GDP estimate by their value, in particular, by the value of the specification of rights to new neural network objects of intellectual property (Dyatlov, 2018).

In a global hyper-competitive information-network economy, an urgent, important and difficult task is to develop a methodology for assessing and accounting for the magnitude of neuro-network effects as new objects of intellectual-network property, as well as to develop a universal methodology for identifying and specifying various rights to new neural-network objects of intellectual network ownership and ensuring their legal protection. In this regard, it is quite natural to propose the creation of a completely new section in the international law "Protection of rights to network intellectual property".

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Principles, Tools and Indicators for Sustainable Development

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Abstract

The article summarizes and formulates the main principles of sustainable development. The interrelation of economic, social and environmental goals of sustainable development is revealed. Theoretical views of scientists on the interpretation of sustainable development goals are considered. The analysis of the main economic instruments for achieving sustainable development in Russia, including economic measures to promote cleaner production, reduce risks of environmental pollution, create markets for organic food, taxation of natural resources, insurance, investment in environmentally hazardous production. Indicators of sustainable development are presented: Environmental performance Index, Resource - Adjusted net Domestic Product, and Green gross national product.

Keywords: Sustainable Development, Concept, Ecology, Environment, Indicators, Green National Product

Introduction

In modern conditions, ecology becomes the most important factor limiting the limits of economic growth based on the use of traditional factors. The Economics of sustainable development and environmental conservation is a new field of research that reveals the relationship between natural ecosystems and socio-economic systems. The concept of sustainable development and ecological economy is based on the principles of close relationship between economy and ecology, which consider people, economy and ecology as important elements of a common geo-ecosystem. People in this system occupy one of the key places, because they are responsible for understanding their role in the global biosphere system, for its maintenance and management to ensure sustainable development. This ideology is closer to the ecological worldview of the biosphere, where natural resources are not considered unlimited, and humanity is one of the biological species. (Our general the future, 2018).

Environmental Economics believes that human preferences, perspectives, technologies, and culture should develop in conjunction with nature and reflect the expansion of environmental opportunities and environmental constraints. (Bobylev, Girusov 2019).

The environmental situation in the world, which can be described as a state of environmental crises combined with the aggravation of global social, economic and political problems, requires a change in the course of development of modern civilization. One of the main contradictions is the struggle between economic growth and the need to reduce its intensity in order to preserve the environment. To solve this complex problem, it is necessary to combine political will, international efforts and a

paradigm shift in the economy, which consists of a transition from the economic system of civilization to the ecological and economic system.

Every time economic interests clash with environmental requirements, we are referring to the human impact on nature, the consumption of natural resources, and environmental pollution. Natural resources, conservation of natural values, and adaptation of the human environment are elements of the economy. The development of the modern economy has led to a large amount of consumption of technological resources and environmental resources. These factors, along with a large number of people, have become the main causes of natural imbalances and environmental degradation.

Statement of the Problem

Sustainable development is development that implies the ability to meet the needs of humanity without putting future generations at risk of also meeting their own needs. This concept shows the inextricable link between the socio-economic environment and the environment. Environmental sustainability refers to the ability of an ecosystem to maintain its structure, features, and functions when exposed to external and internal factors. This concept is also referred to as "environmental stability". The model of long-term sustainable development is based on the idea of equal environmental interests for present and future generations.

Today, the study of complex problems of sustainable development has a number of features related to the formation and development of the digital economy. A separate area of research should be identified that reveals the relationship between the goals (tools) of digitalization of the economy and the goals (tools) of sustainable development (Dyatlov, Didenko, 2019).

The main contradiction between economic and environmental development is that, on the one hand, the economy must develop, on the other-this development has an adverse impact on the environment. The development of a monitoring system and a system of indicators for sustainable development in the regional, national and global economy is particularly important.

Research Questions

The main directions (issues) of research in the field of sustainable development and environmental Economics are:

- Sustainability as the content of life support systems;

- Criteria for sustainable development;

- Assessment of natural resources and natural capital;

- Macroeconomic accounting in the environmental system and economy;

- Creation of innovative environmental management tools;

- Environmental and economic instruments at local, regional and global levels;

- Indicators and indicators of sustainable development in the regional, national and global economy.

The purpose of the study

The concept of sustainable development has become a new qualitative approach to economic, social and environmental balanced development. R. Costanza and K. Folke identify three interrelated hierarchical problems, the solution of which is associated with sustainable development:

- sustainable economy that is compatible with the life support system;
- Equitable distribution of resources and opportunities not only among the current generation of people, but also between current and future generations, as well as between people and other species;
- Efficient allocation of resources over time, allowing for proper examination of natural capital.

It is important that the problem of size and distribution cannot be solved using a market mechanism. These problems must be addressed outside the market, and the market can be used as a tool for implementing these solutions. (Karakean, 2018).

The main ideas of sustainable development were developed at the UN conference on the environment in Rio de Janeiro. They include the following provisions:

- both the natural and human environment are important for the existence of society and for ensuring basic human rights, including the right to life;
- the preservation and improvement of the environment is primarily an important responsibility of local authorities and all national governments, which should be responsible for implementing policies and activities in this area within their jurisdiction;
- pollution and environmental degradation have reached dangerous proportions;
- the human environment must be protected and improved for present and future generations by the joint efforts of countries and peoples in accordance with the main goals set for international and global socio-economic development.

These provisions were developed and set out in the Stockholm Declaration on the human environment, adopted at the Conference, which is related to the formation of special environmental norms of international law. For the first time, it provides for special principles of international law that are directly aimed at regulating state cooperation in the field of environmental protection. These include the following principles: protection and improvement of the environment for present and future generations, and the inalienable sovereignty of States over their natural resources, without causing damage to the environment beyond the limits of national jurisdiction. (Korobkin, 2019.

The documents developed by the International Commission on environment and development under the chairmanship of the Prime Minister of Norway, H. H. Brundtland, are of great importance, in particular, the task of developing proposals for long-term environmental strategies that will ensure sustainable development for a longer period of time, as well as identifying ways and means by which the international community can effectively solve environmental problems. The result of the Commission's work was the report "Our common future", which focused on the concept of sustainable development, which means development that meets the needs of the present, but does not compromise the ability of future generations to meet their own needs.

Documents adopted at UN conferences on environmental issues are a source of international law and recommendations in the field of sustainable development. It contains principles for the conduct of individual States and the international community in relation to environmental protection. These documents serve as guidelines for developing the most important areas of environmental protection in States, as well as for defining, observing and protecting the environmental rights of people and society.

At the present stage of transition to sustainable development, all the necessary conditions are created to ensure the balanced functioning of nature, population, and economy. At the same time, decision-making mechanisms should be focused on environmental priorities and take into account the consequences of implementing these decisions in the economic, social and environmental spheres.

The sustainable development mechanism ensures that environmental effects are prioritized and that costs, benefits and risks are fully assessed in accordance with the following criteria: no economic activity can be justified if the benefit from it does not exceed the damage caused; environmental damage must be as low as can reasonably be achieved, taking into account economic and social factors.

An urgent and complex task is to identify, define and evaluate various synergistic effects that arise from the integration and sharing of human, economic and environmental factors based on digital convergence (Dyatlov, Selischeva, 2017).

Research Methods

The basic principles enshrined in the Rio Declaration of sustainable development are the basis for creating a new institutional and environmental-economic mechanism for global partnership aimed at concluding international agreements that ensure respect for the interests of all and guarantee the integrity and development of the global system of environmental protection. The most important of these principles are:

- the inalienable sovereignty of States over their natural resources, taking into account the principle of non-harm to the environment beyond the limits of national jurisdiction (principle 2);
- meet the needs of present and future generations in the areas of development and the environment as an integral part of the right to development (principle 3);

- addressing environmental issues with the participation of all concerned citizens and ensuring that everyone has access to environmental information and its wide dissemination to the public (principle 10);

- international cooperation in the field of environmental protection in the context of sustainable development with a view to eradicating poverty (principle 5); recognition of common responsibilities and responsibilities in the field of environmental protection (principle 7); building scientific capacity (principle 9); creating a favourable and open international economic order (principle 5); countering or preventing the movement and transport of harmful activities, hazardous and environmental substances (principle 15);

- adoption of effective legislation in the field of environmental protection (principle 11);
- development and adoption of national laws on liability for damage caused as a result of activities that harm the environment (principle 13) (Kuznetsov, 2018).

Economic mechanisms for solving problems of sustainable development should be based on interrelated principles of Economics and environmental management. Balanced environmental and economic regulation of market relations has two goals:

- limiting inefficient competition in order to remove non-environmental products, technologies and equipment from the competitive environment;

- development of appropriate market mechanisms (environmental insurance and trade in various types of quotas in nature management).

Results of the study

Economic tools for achieving sustainable development goals

The main economic instruments for achieving sustainable development goals in Russia can be classified into four groups:

I. Formation of a system of economic measures to stimulate the greening of production. It should gradually move from existing mainly indirect taxation to direct taxation of natural resources. The latter has several advantages:

- contributes to the conservation of resources and the preservation of the natural environment; contributes to better tax collection;
- creation of effective funds for the protection and reproduction of natural resources;
- increases the commercial effectiveness of environmental protection for all owners, as resource conservation is promoted;
- creates the necessary prerequisites for improving the system of national accounts. (Lukyanchikov, 2018).

Direct taxation of natural resources should take into account rental indices in payments for traditional natural resources, rather than quasi-equivalent ones (as is now done); accounting for payments for environmental pollution. Changes to the tax system may include:
- consistent replacement of budget revenues at various levels with income tax, personal income tax, value added tax, excise taxes, and income from natural resource taxation;
- implementation of measures for gradual adaptation of taxpayers to new tax conditions by developing a tax credit and benefits for individual natural tax payers;
- taxation of allotment of land plots and other types of real estate, taking into account the shift of the center of gravity of taxation from buildings and structures to allotment of land plots as part of real estate;
- formation of reserve funds in higher budgets to support lower budgets for the period of transition to the new tax system.

Tax reform should be carried out gradually in order to adapt taxpayers to the new tax conditions. Tax restructuring should first of all be based on the principle of "tax neutrality".

II. Creating markets for environmentally friendly products, technologies, and equipment.

Promote activities for the creation of markets involves a number of economic and administrative measures:

- improvement of national accounts microeconomic;
- international bans on the export and import of certain goods is not environmentally friendly;
- the introduction of quota trading on the permissible impact on the environment;
- creation of environmental innovation programs and projects. A special role is played by the gradual tightening of standards and control over the impact on the environment.

The introduction of environmental technologies and equipment is stimulated by improving microeconomic indicators, using the principles of "tax and credit neutrality", increasing the effectiveness of payments for pollution, introducing trade in pollution rights, creating environmental innovation programs, and so on. Waste management plays an important role. A competitive environment should be created in the environmental equipment market by selecting the most cost-effective types of equipment with comparable environmental indicators (Makar, 2017).

Excessive payments for pollution are the main environmental and economic tool that affects business profits. In most cases, enterprise emissions are determined by a balance sheet method based on the values of technological education, waste management, and waste release to the environment. Payments are made based on the information that the polluters provide about themselves. The possible uncertainty in the balance sheet and the lack of direct control over emissions create a demand for consulting services to understate excess payments. This phenomenon can be prevented by directly controlling the emissions of regional environmental authorities using special tools.

III. Consideration of the environmental factor in privatization. Neither the current environmental legislation, nor the proposed new draft legislative documents on privatization, nor the methods of

privatization provide for a realistic mechanism for regulating the relationship of the new owner (joint-stock company, partnership, private person) with environmental funds (Petrov, 2019).

The transfer of state ownership to another status without taking into account the environmental factor leads to an increase in the alienation of environmental activities from the owner of the means of production, loss of control over environmental equipment, and sometimes the refusal of the new owner from environmental funds as an additional financial burden. There is no economic mechanism to support the company's environmental activities and its bankruptcy.

Taking into account environmental requirements when privatizing national economy objects can become a serious factor in improving the environment of privatized enterprises and ensure that investors ' funds are attracted for these purposes. Some of the provisions of this environmental and economic instrument can be implemented taking into account privatization (including secondary and tertiary). Preference should be given to those investors who are committed to ensuring that the environment of privatized enterprises is restored as soon as possible. At the same time, guarantees should be taken into account and a procedure should be developed for returning to the new owners part of the funds they spent on the purchase of the enterprise, provided that the funds are used exclusively for financing environmental activities. The formation of a set of requirements for taking into account environmental factors related to privatization is connected, in particular, with the creation of a specialized Fund for the environmental rehabilitation of privatized objects. (Protasov, 2018).

IV. Consideration of acceptable environmental risk factors in decision-making. An important element of sustainable development is the mandatory analysis and assessment of acceptable environmental risk due to the uncertainty and unpredictability of many natural processes and phenomena. Any environmentally significant economic event is subject to an environmental assessment to determine its environmental feasibility. Risk accounting for such an assessment is necessary at the pre-project and post-project stages.

In current practice, the environmental impact assessment is aimed at meeting the maximum permissible concentration standards for pollutants in the environment, but does not take into account the risks. Practical implementation of projects in industries related to environmental risk has shown the need to review approaches to environmental assessment. To determine acceptable risk, it is important to identify individual elements of risk, give an overall assessment of it, and compare the results with similar indicators in less risky industries. A set of risk management measures can be considered sufficient if the overall assessment of the project is comparable to the specified actual indicators, for example, for the key parameter of human mortality and injury.

Among the management decisions to reduce the risk of environmental pollution, the most developed economic mechanism for environmental insurance can be identified. Environmental insurance is based on a system of distribution of responsibility for possible accidental pollution of the environment. An important point here is the Law of the Russian Federation "on mandatory environmental insurance". Its characteristic features are: more complete compensation for damage from accidental pollution, which is currently almost non-existent; formation of mandatory funds for financing environmental insurance companies; insurance of sources of increased risk of damage to natural objects (Perelyet, 2018).

Environmental insurance is developing in three directions.

1. Creating a system of responsibility distribution based on probabilistic characteristics of environmental pollution risk.

2. Creation of a flexible insurance system for objects whose activities are associated with a relatively high risk with great uncertainty in assessing the consequences of accidents. (Abroad, this type of insurance is based on the principle of "Deposit-return". It is known, for example, that the destruction of the ozone layer negatively affects the health of the population, but it is impossible to determine the

sources of destruction of the ozone layer. Flexible liability insurance for companies that produce ozone-depleting products can be a solution (Novoselov, 2019).

3. Insurance of investments in environmentally hazardous production and projects. In particular, foreign investments under the carbon credit; investments made under the production sharing agreement. It should be borne in mind that economic mechanisms for achieving sustainable development can only be effective with significant institutional support. This requires improvement of standards, improvement of legislation, control, assessment and certification of environmental impact, environmental audit, inventory of natural resources and development of a system of regional, national and regional environmental monitoring.

Indices and indicators of sustainable development

The following indicators are used to characterize the stages of transition to a sustainable development model:

- levels of reduction of anthropogenic load on the natural environment of individual territories, countries, continents and the planet as a whole;
- real positive results in solving the problems of conservation and restoration of various natural complexes, certain types of natural resources, and improving the habitat of the population;
- reduction of disproportions between the volumes of total national wealth attributable to different social groups, segments of the population, regions and territories;
- reducing the material and energy intensity of a unit of gross national output (produced product);
- increase in the total national wealth in accordance with the optimal proportions between the environment, natural resources, favorable environmental conditions, environmental protection measures, national product, national wealth, the level of education and skills of the population, social security.

There are a number of large-scale macroeconomic indicators similar to those used by traditional statistics for gross domestic product and gross national product, which take into account the cost of environmental components (various environmental costs, benefits, and effects). These include a number of indicators.

The traditional "net domestic product" indicator, calculated as the difference between GDP and the depreciation (depreciation) cost of anthropogenic (or man-made) capital, does not take into account the depletion, degradation of conditionally renewable or mineral resources or the negative effects of pollution. It turns out that a country can Deplete its natural resource base, while GDP can grow. Thus, the cost of deforestation increases GDP, but worsens the natural potential. The resource-adjusted net domestic product is used to account for this situation.

The Resource - Adjusted net Domestic product (RANDP) is equal to the gross domestic product minus the depreciation of man-made capital, the cost of degradation of conditionally renewable resources, and the depletion of non-renewable resources. This indicator is poorly related to the environmental aspects of the economy, since it is not possible to determine from the point of view of sustainable development whether the growth or decline of RANDP is a positive or negative trend. Therefore, environmental economists suggest using the indicator eco-GDP or Green GDP.

Environmentally adjusted gross domestic product or "green domestic (national) Product" is an adjusted GDP that includes environmental costs, benefits, and absolute (net) changes in all assets, including changes in environmental assets (resources, benefits). Green GDP is formed by subtracting environmental costs from resource-adjusted GDP (Dyatlov, 2017).

Within the framework of the model concept of sustainable development adopted in Russia, in order to manage the transition to sustainable development and evaluate the effectiveness of the means used, targets and restrictions should be set, with a procedure for monitoring their achievement and compliance.

Targets can be expressed in indicators that characterize the quality of life, the level of economic development and economic well-being. These indicators should reflect the levels at which Russia's economic, social, environmental, defense, and other aspects of security are ensured.

Key indicators of quality of life:

- human life expectancy (expected at birth and actual);
- health status of the population;
- level of education;
- deviation of the state of the environment from the standards;
- level of knowledge and educational skills;
- income as measured by gross domestic product per capita;
- level of employment;
- the extent to which legal, economic and environmental rights are realized.

Indicators that determine the degree of environmental intensity of the economy are a system of indicators that characterize the level of consumption of natural resources and the level of the disturbed ecosystem as a result of economic activity (per unit of final product).

Similar indicators per capita are informative, as well as macrocharacteristics that Express the relationship between the needs for natural resources and their availability (reserves).

As targets and limiting indicators of sustainable development in the economic sphere, the levels of specific (per capita and per unit of gross domestic product) consumption of energy and other resources, as well as waste production can be set. The production and use of all hazardous substances used in the economy are subject to control.

The target parameters for sustainable development should include characteristics of the state of the environment, ecosystems, protected areas, and environmental health of the population. This group of indicators, called controlled parameters, includes indicators of the quality of the atmosphere, air, water, territories that are in a natural and modified state, forests, taking into account their productivity and degree of preservation, the number of species that are threatened with extinction, etc. Similar indicator systems can be used to solve the problem of transition to sustainable development in the country as a whole, as well as in individual regions.

The level of environmental sustainability is assessed by The Environmental Performance Index, which was developed in 2006 by the Yale center for environmental law and policy (Yale University, USA) and the Columbia center for the international earth science information network (Columbia University, USA). The report is compiled on the basis of an international study, which includes a rating of countries in the world in terms of environmental load and rational use of natural resources. This index is calculated together with a group of independent international experts using analytical developments and is based on statistical data from national institutions and international organizations. The purpose of this study is to reduce pressure on the environment, promote the viability of environmental systems, and ensure the stability of natural resource management. This study is published every two years and is based on 22 indicators in 10 categories. In turn, the categories are divided into two large groups: environmental health and ecosystem viability. Each country under study is evaluated according to each indicator. After that, each state gets a certain number of points on a one-hundred-point scale-from the worst (0) to the desired goal (100). The desired goal is formed in the course of international standards and treaties (EPI).

In November 2019, the second peace forum was held in Paris, France, where, after numerous meetings, conferences and seminars, several projects were selected that, in their opinion, are worthy of receiving international financial support. The purpose of the forum was to promote international cooperation and collective action to solve global problems. More than 6 thousand people took part in the forum. They had the opportunity to learn about the 100 best public initiatives selected in the competition in 6 thematic areas: peace and security, environment, development, new technologies,

inclusive economy, culture and education (Project of FoE Russia).

Interfax– Era, an environmental energy rating Agency, has been created in Russia to analyze the environmental and energy efficiency of the economy and rational use of natural resources. Interfax-Era also prepared a report on comparisons of the country's regions on fundamental factors of production efficiency for the International day of environmental protection, which was held on June 2019. Fundamental factors include energy and resource efficiency of economic activity, technological perfection of the equipment used in production, development of municipal infrastructure, social responsibility of business and General dynamics of efficiency. This set of criteria reflects the ability of regional businesses to perform useful work with low environmental impact, economical use of resources and energy, with minimal loss of ecosystem stability in the regions where they operate, with increased efficiency and a socially responsible approach to disclosure of environmental reports of companies.

Conclusion

The world community is tasked with creating an effective environmental and economic mechanism for implementing sustainable development goals. This mechanism includes the following elements:

- national, interregional and global institutions for achieving sustainable development goals;
- economic measures to promote greening of production and reduce carbon emissions into the atmosphere;
- a system for integrated monitoring of the environment, public health and environmental protection;
- tax incentives for energy-saving and environmental projects;
- environmental insurance;
- system of indicators, indices and indicators of sustainable development: index of sustainable development.

All the positive world theoretical, methodological and practical experience should be used in the member States of the Eurasian economic Union (Selischeva, 2018). Ultimately, the use of interrelated criteria and indicators should ensure that the main goals and objectives of the transition to sustainable development are met. The transition to sustainable development should ensure a balanced solution to the problems of socio-economic development and the preservation of a favorable environment and natural resource potential at all levels and in all areas of the national and global economy. The basis of sustainable development is the balance of economic, environmental and social interests of society. Russia, which is actively involved in international cooperation, must take effective measures at the state level aimed at implementing the principles and goals of sustainable development set by the international community.

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The Concept of Researching the Accounting Information System in The Management of Small and Medium - Sized Enterprises

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Abstract

The purpose of the article is to present the concept of research in the field of the accounting information system in the management of small and medium – sized enterprises in Poland. The article presents a review of the literature on the accounting information system. Planning the research, the impact of the financial accounting and management accounting subsystem on the management function in a small and medium-sized enterprise were taken into account as well as the growing role of outsourcing in financial and accounting services among enterprises in the SME sector. Formulated research goals and hypotheses that the author wants to verify and the research plan are presented. The conclusions justify raising the subject and conducting the research.

Keywords: Accounting Information System, Management, SME.

Introduction

The dynamics and complexity of changes taking place in the functioning of small and medium-sized enterprises in the Knowledge-Based Economy means that the accounting information system is gaining new significance. Accounting is a fundamental source of information used in the assessment of enterprises by intensifiers as well as making operational and strategic decisions. The demand for information from the accounting system results from various decision-control situations arising in the management process. According to Stoner, Freeman and Gilbert, management is "a process of planning, organizing, leading and controlling the work of members of the organization and using all available resources of the organization to achieve its goals". Management and information are closely related. The concept of information has gained scientific value after the quantitative definition of information was presented by C.E. Shannon in 1948 (Shannon 1948). According to Błażyńska J. (Błażyńska 2015), information should have features enabling its evaluation and assessment of usability, while information can be considered useful when it brings the user closer to achieving the intended goals. Enterprises in the SME sector play a key role in the economy of highly developed countries. They have an impact on building economic growth and bring a competitive advantage to all industries. Small and medium-sized entrepreneurs operating on local markets are entrepreneurial, hard-working, inventive and committed, which results in innovation and the development of advanced technologies.While building a competitive advantage, managers use information from the accounting system. Good information is therefore the basis of the decision-making process, which is based on the information necessary for making the appropriate decisions. The true and fair view principle is considered one of the most important ideas, concepts and essence of financial accounting goals. This principle appeared in the accounting of European countries with the accession of Great Britain to the EU in 1973. In British legislation, it was included as early as in 1948 in the Commercial Code - Companies Act and then also to European Union countries, through the provisions of the Fourth Directive (Haskins et al. 2000). The overriding aspect of accounting is generating true faithful and reliable information. The importance of information from accounting is underlined by the definition presented by the American Accounting Association (AAA) - "accounting is the process of identifying, measuring and passing information on economic content for making assessments and decisions by information users" (Martyniuk 2016, Świderska 2012).There is no explicit definition of accounting in the literature on the subject that would apply in Poland or worldwide. The concept of accounting as the information system was used in Poland by (Jaruga

1992), who stated that "accounting is now understood as the information system that allows users to make economic decisions, especially the financial ones, and evaluate the management's for responsibility and effectiveness the of entrusted assets." Other definitions highlighting the importance of accounting as an information system: J.L. Evanstone (1966), W.B. Meigs, R.F. Meigs, (1986), A. Kinserdal, (1995), Micherda, (2014). Along with the changes taking place in the economy of highly developed, knowledge-based countries, caused by globalization processes, there was the demand for new information necessary in the decision-making process (Lawson 2019). New challenges faced accounting (Micherda 2011) states that "in literature and economic practice of countries with a developed market economy the pragmatic convention of functional accounting division was adopted leading to the distinction of financial accounting and management accounting". Modern accounting has a dual role:

• the source of reliable retrospective information enabling settlement and assessment of the business entity and meeting the information needs of the external environment,
• the source of prospective information, allowing for rational management of managerial behavior ensuring market success, capital increase and economic development of the enterprise.
The essence of management accounting is the provision of information supporting the implementation of the management process. Its goals have been described, among the others, by Hansen D.R., Mowen M.M., (2003), indicating that they include:
a) providing information on the costs of services, products and other facilities of interest to managers,
b) providing information for planning, control, evaluation and continuous improvement,
c) providing information needed to make decisions.

Definitions of management accounting are also provided by the International Federation of Accountants (IFAC) "management accounting is the process of identifying, measuring, collecting, analyzing, preparing and communicating financial and non-financial information that is used by managers for the purposes of planning, evaluation and controlling the organization, as well as ensure the efficiency use of resource and accounting for its consumption".

The accounting information system as a component of the enterprise information system provides information necessary in the process of making management decisions. Reliable information from the accounting information system allows you to effectively compete on the market to reduce the risk of making decisions.

Research Methodology

The main objective of the research will be to assess the degree of the use of information from the accounting information system in the management process of small and medium-sized enterprises and to indicate scenarios for the use of information from the accounting information system for the needs of management.

Five auxiliary goals were developed in the research designing process:

1. Identifying information coming from the accounting system used in decision-making processes.
2. Determining the degree of use of the financial accounting subsystem tools
and management accounting used in decision-making processes.
3. Identifying the of dysfunctional phenomena of the accounting system focused on decision making processes.
4. Establishing the relationship between the size of the enterprise and the information needs provided by the accounting information system.
5. Developing of scenarios for the operation of the accounting information system
based on one's own finance and accounting department or using outsourcing services.

Main hypothesis
The accounting information system for small and medium-sized enterprises is not adapted to support decision-making processes within management.

Specific hypotheses:

1. Information provided by the accounting information system is the subject to dysfunctions.
2. The area of using financial accounting and management accounting tools is insufficient in managing a small, medium enterprise.
3. There is a relationship between the size of the enterprise and the information provided by the accounting system in the management process.
4. Outsourcing of financial and accounting services fills in the competence gap related to the low level of knowledge in the field of tax and legal provisions.
5. The weak side of the cooperation of SME sector enterprises with accounting office's is related to communication processes and errors in financial and accounting documentation

The research sample was divided into 3 groups:

Group I – SME sector:
- owners, directors, managers of enterprises with headquarters in the Kuyavian-Pomeranian Voivodeship,
- enterprises that meet the statutory definition of micro, small and medium-sized enterprises,
- enterprises from the production, trade and services industry,
- enterprises with their own financial and accounting departments,
- companies using outsourcing services,
- companies which keep accounting books in accordance with the provisions of the Accounting Act

Group II - employees of financial and accounting departments and accounting office's participating in training and specialized courses in finance and accounting organized by the Accountants Association in Poland, District Branch in Bydgoszcz.
Group III - Expert interview with the Directors of Regional Branches of the Accountants Association in Poland and the Presidents of Members Associations in the Kuyavian-Pomeranian Voivodeship.
- District Branch in Bydgoszcz,
- District Branch in Toruń,
- District Branch in Włocławek,
- Branch in Grudziadz,
- Member Association in Inowrocław,
- Member Association in Chojnice.

The research methods and techniques used are shown in Table 1

Table 1: The research methods and techniques

Group 1	Group 2	Group 3
research methods –diagnostic method	research methods - diagnostic method	research methods - diagnostic
research techniques - questionnaire CAWI	research techniques– questionnaire	research techniques – interview script

Source: Own study.

The following methods will be used in the research:

- literature study
- analysis of legal acts
- conducting empirical research
- application of the synthesis method to determine the conclusions of the tests carried out
- application of qualitative methods and factor analysis in the development of empirical material from the conducted research.

In Poland, the research on the accounting information system in making management decisions in enterprises was carried out by Turyna (Turyna 1997). The study did not concern the SME sector, since at that time it was underdeveloped in Poland. In recent years, numerous studies have been conducted on the provision of financial and accounting outsourcing services in the SME sector, e.g, Wysłocka 2011, Jóźwicka, Zakrzewska – Bielawska 2014, Marcinkowska, Sawicka 2015, Halmeenmäki 2015. Due to the dynamic development of small and medium-sized enterprises, some research has been done, e.g. the research on the significance of cost information in the opinion of SME managers (Jaworski 2014) or the accounting organization in the opinion of managers (Jóźwicka 2013). The analysis of the literature on the subject, the lack of comprehensive studies on the impact of the accounting information system on the management process of a small and medium - sized enterprise led the author to plan the research in such a way. The development of modern technologies in IT accounting systems, such as the use of advanced ERP technologies or the automation of RPA processes (Robotic Process Automation) create new opportunities to use information from the accounting system.

The identified scientific gap relates to updating the results of research on the information accounting function in the system approach implemented by internal or external accounting services in the SME sector. In the empirical aspect, the results of the study will allow to identify the accounting system solutions resulting from the internal needs and context factors that meet the information needs of SMEs. The main research problem will focus on learning, understanding and explaining the role of the accounting information system in managing micro, small and medium – sized enterprises. The planned research will determine the relationship between financial and management accounting and the basic management functions: planning, organizing, motivating and controlling. Financial accounting provides information resulting from accounting documents, allows for ongoing cost calculation. The financial accounting subsystem is responsible for the information derived from the financial statements. Information from financial accounting is used by the management accounting subsystem. On their basis operational and strategic decisions are taken in enterprises of the SME sector. Financial accounting has an informative, analytical, control and reporting function. Both management and accounting are related to the same control function. The management practice shows that the planning process is based on analytical function, motivating and organizing is related to reporting.

The research project also noted the development of outsourcing of financial and accounting services, which was part of the management concept of "Lean management". The use of outsourcing of financial and accounting services by micro, small and medium-sized enterprises on a large scale has contributed to a different view on the accounting information function (Gopal 2009). A special role is assigned to the internal accounting information function within management accounting, strongly focused on the decision-making process by entrepreneurs.

The research will allow to develop a concept of for adjusting the financial accounting and management accounting subsystem to the needs of managing a small and medium - sized enterprise. The author will also develop scenarios for the functioning of the accounting system in managing a small and medium - sized enterprise when running her own finance and accounting department or using outsourcing services.

Conclusions

According to R.W. Griffin (2004) "information resources are all data useful for effective decision making." The dynamics, intensity of changes in the external and internal environment of the enterprise and competitive struggle make management of an enterprise from the SME sector difficult. It sets new requirements for entrepreneurs. To be successful on the market, an entrepreneur must anticipate changes using the available information resources, including those from the accounting system (Xing, Yan 2018). The management information system is a system of collecting and processing data into information based on information and communication technologies, and then into knowledge which is useful for managers to make decisions, i.e. for management at various levels (Jelonek 2018). Part of the management information system is the accounting information system,

and in it the most important information functions today. Modern accounting is an important element of an enterprise's information system. The accounting information system is used primarily for making business and financial decisions (Stoica, Stefan 2018), simultaneously constituting the basis for assessing the effects of managing the company's assets by their management.

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Analysis of Consumer Demand in The European Union Countries Based on The Working Model: Spatio-Temporal Approach

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Abstract

The article presents an analysis of consumer demand in the European Union countries in the years 1996 - 2017. The aim of this paper is to analyse changes in household consumption expenditure caused by changes in the level of disposable income of households and the imitation effect. Economic changes in the EU countries influence disposable income of households, and as a result cause changes in their level and structure of consumption. The analysis concerns the level of expenditure on two types of goods: food goods, as well as superior goods, which include expenditure on restaurants and hotels, recreation and culture. The model proposed by Working was used to analyse the demand for both types of goods. In addition, in order to show the impact of the imitation effect on the level of consumer spending, the Working model was extended to include spatial effects - i.e. the impact effect of consumer spending and disposable income level of households from neighbouring countries. The study uses spatial autoregression models (SAR) and spatial error models (SE) that allow estimating and examining the statistical significance of spatial effects on consumer spending.

Keywords: Elasticity, Food Expenditure, Spatial Models, Superior Goods Expenditure.

Introduction

The largest share of the state's consumption expenditure is household consumption expenditure. Consumption is one of the factors driving the economy, which is influenced, among others, by the socio-economic development of the country (see: Cheba, 2015; Łapińska, 2016; Cheba, Szopik-Depczyńska, 2017; Simionescu et al., 2017; Kurowska-Pysz et al. 2018; Nowak, 2018; Simionescu et al., 2018; Cyrek, 2019; Pietrzak, 2019; Kuc-Czarnecka et al., 2020). Economic growth is a determinant of changes in the disposable income of society, which causes changes in the level and structure of household consumption (see: Gavurova et al., 2017; Głodowska, 2017; Jankiewicz, 2018a, 2018c; Jankiewicz, Pietrzak, 2019; Pietrzak, Jankiewicz, 2019). Thus, the level of consumption and the level of economic development of a country interact on each other. In addition to economic growth, the level and structure of consumption are influenced by: households' savings (see: Trębska, 2018; Verba, Kudinova, 2019), quality of institutions (see: Balcerzak, Pietrzak 2016; Balcerzak, 2020); the process of digitization (see: Balcerzak, Pietrzak, 2017), level investment and innovation (see: Jakimowicz, Rzeczkowski, 2019), progressing globalization and international relations, including interdependencies between capital markets (Pietrzak, Łapińska, 2015; Meluzín et al.,2017; Pietrzak et al., 2017; Meluzín et al., 2018a, 2018b, 2018c; Skalická et al., 2019a, 2019b; Skare, Porada-Rochoń, 2019a; 2019b).

The most important determinant of the level and structure of consumption is households' disposable income (Banks et al. 1997, Cupák et al. 2015, Jankiewicz, 2018b, 2019a). Richer households can afford to consume more goods. In addition, their consumption is also more diverse. According to Engel's law (1895), as the disposable income increases, the share of food consumption in total final expenditure decreases. Thus, the increase in the level of disposable income increases the possibilities of spending money on goods that are not basic goods. Not only economic determinants have an impact on the level and structure of household consumption, but also demographic (age of households' members, its structure), technological and cultural (De Mooij M., Hofstede, 2002; Schaefer, Crane, 2005; Zukin, Maguire, 2004, Bywalec 2009; Jankiewicz 2019b; Janoś-Kresło, Mróz 2006) determinants. The imitation effect plays an important role in research on household consumption. Less wealthy households tend to change the structure of consumption, making it more similar to richer households.

This is partly due to the ongoing process of economic and social convergence (Carnicky et al., 2016; Dall'Erba, Le Gallo 2008; Kulhánek, 2012), which leads to the levelling up of disposable income among households. Nevertheless, an excessive desire to make the level and structures of consumption similar to those set by wealthier households may lead to the development of consumerism.

In classic consumption demand models, such as the Törnquist model or the Working model, it is hard to look for a reference to the imitation effect. This approach assumes the dependence of consumer spending only on its most important determinant, i.e. the amount of disposable income. A good reflection of the imitation effect may be to include spatial interactions in the model. In the consumer demand study, spatial models were applied, among others, by Ciccarelli and Elhorst (2016, 2018) who used spatial interactions in the study of cigarette demand. They examined such demand in Italy at NUTS-3 level. In addition to shifting the dependent variable in the model, they used the impact of disposable household income from neighbouring units. The conclusions were based on the estimation of the dynamic spatial panel model for 69 Italian provinces in the years 1877 - 1913. The demand for cigarettes using spatial models was also examined by Yang (2006), who, in addition to disposable income, added other consumption determinants, such as the price of a pack of cigarettes or demographic structure of the population. He used data on the demand for cigarettes in the United States in 1963–1992. In another study, Baltagi and Li (2006) applied spatial models to study the demand for alcohol in the United States (based on data from 43 states) in 1965–1994. In each of these studies, spatial interactions are added to the linear form of the demand model.

The aim of the study is to assess the occurrence of the imitation effect in households of the European Union countries in the years 1996 - 2017 using the Working consumption model. The level of expenditure for two groups of goods - expenditure on food (variable Y1) and expenditure on superior goods, including expenditure on restaurants and hotels as well as recreation and culture (variable Y2) will be analysed. In addition to disposable income (variable X), spatial interactions will be included in the Working model. The spatial scope of the survey is 27 European Union countries (excluding Croatia due to unavailability of data). The adopted temporal and spatial range of the study allows the use of spatial econometry tools to study the level of consumption. The hypothesis set out in the study says that the level of household consumption in a given territorial unit is influenced by both the level of disposable income in this unit and the level of consumption and disposable income of households in neighbouring units.

Methodology

In the first stage of the analysis, the presence of spatial interactions in the level of expenditure on food, expenditure on superior goods and the level of disposable income in the European Union countries will be examined.

The similarity of the households consumption levels and disposable income level is analysed, based on the Moran's *I* statistics (and its significance). The test statistic takes the following form (Schabenberger and Gotway 2005, Suchecki 2010):

$$I = \frac{1}{\sum_{i=1}^{n}\sum_{j=1}^{n} w_{ij}} * \frac{\sum_{i=1}^{n}\sum_{j=1}^{n} w_{ij}\,[y_i - \bar{y}][y_j - \bar{y}]}{\frac{1}{n}\sum_{i=1}^{n}[y_i - \bar{y}]^2} = \frac{n}{S_0} * \frac{\boldsymbol{z}^T\boldsymbol{W}\boldsymbol{z}}{\boldsymbol{z}^T\boldsymbol{z}}, \tag{1}$$

where: y_i – an observed value of the phenomenon in the region i, $\boldsymbol{z}$ – a column vector with elements $z_i = y_i - \bar{y}$, $S_0 = \sum_{i=1}^{n}\sum_{j=1}^{n} w_{ij}$ – a sum of the corresponding elements of the weights matrix **W**, n – the number of regions. In this research the matrix **W** of connections based on the common border is used. This part of the analysis will show if there are conditions to introduce spatial interactions into the model of food demand and superior goods. In the next step of the study, the classic Working models for panel data (2) - Pooled model and panel Working models with individual fixed effects (3) - FE model (Baltagi, 2008) will be estimated, given by the formulas:

$$Y_{i,t} = e^{\alpha + \beta\frac{1}{X_{i,t}} + \varepsilon_{i,t}}, \tag{2}$$

$$Y_{i,t} = e^{\alpha_i + \beta\frac{1}{X_{i,t}} + \varepsilon_{i,t}}, \tag{3}$$

where: $Y_{i,t}$ – the level of consumer expenditure (on food or superior goods) of households, : $X_{i,t}$ – the level of households' disposable income, $\varepsilon_{i,t}$ – residual component of the model. For estimation purposes, models (2) and (3) were transformed to a linear form, respectively:

$$ln(Y_{i,t}) = \alpha + \beta \frac{1}{X_{i,t}} + \varepsilon_{i,t}, \tag{4}$$

$$ln(Y_{i,t}) = \alpha_i + \beta \frac{1}{X_{i,t}} + \varepsilon_{i,t}. \tag{5}$$

The model selection between the Pooled and the FE model was made using Wald's test (Baltagi, 2008). Then, in order to show the significance of the imitation effect, spatial effects were introduced to the models (2) and (3), resulting in the following models :

$$Y_{i,t} = e^{\alpha+\beta\frac{1}{X_{i,t}}+\gamma \boldsymbol{W}\left(\frac{1}{X_{i,t}}\right)+\rho \boldsymbol{W}\left(ln(Y_{i,t})\right)+\varepsilon_{i,t}}, \tag{6}$$

$$Y_{i,t} = e^{\alpha_i+\beta\frac{1}{X_{i,t}}+\gamma \boldsymbol{W}\left(\frac{1}{X_{i,t}}\right)+\rho \boldsymbol{W}\left(ln(Y_{i,t})\right)+\varepsilon_{i,t}}, \tag{7}$$

$$\begin{gathered} Y_{i,t} = e^{\alpha+\beta\frac{1}{X_{i,t}}+\gamma \boldsymbol{W}\left(\frac{1}{X_{i,t}}\right)+\varepsilon_{i,t}} \\ \varepsilon_{i,t} = \lambda \boldsymbol{W}(\varepsilon_{i,t}) + \eta_{i,t}, \end{gathered} \tag{8}$$

$$\begin{gathered} Y_{i,t} = e^{\alpha_i+\beta\frac{1}{X_{i,t}}+\gamma \boldsymbol{W}\left(\frac{1}{X_{i,t}}\right)+\varepsilon_{i,t}} \\ \varepsilon_{i,t} = \lambda \boldsymbol{W}(\varepsilon_{i,t}) + \eta_{i,t}. \end{gathered} \tag{9}$$

Models (6), (7), (8) and (9) were transformed to a linear form (similarly to models (2) and (3). As a result, there are two forms of spatial autoregression models and two forms of spatial error models (Pooled and FE):

$$ln(Y_{i,t}) = \alpha + \beta \frac{1}{X_{i,t}} + \gamma \boldsymbol{W}\left(\frac{1}{X_{i,t}}\right) + \rho \boldsymbol{W}\left(ln(Y_{i,t})\right) + \varepsilon_{i,t}, \tag{10}$$

$$ln(Y_{i,t}) = \alpha_i + \beta \frac{1}{X_{i,t}} + \gamma \boldsymbol{W}\left(\frac{1}{X_{i,t}}\right) + \rho \boldsymbol{W}\left(ln(Y_{i,t})\right) + \varepsilon_{i,t}, \tag{11}$$

$$\begin{gathered} ln(Y_{i,t}) = \alpha + \beta \frac{1}{X_{i,t}} + \gamma \boldsymbol{W}\left(\frac{1}{X_{i,t}}\right) + \varepsilon_{i,t} \\ \varepsilon_{i,t} = \lambda \boldsymbol{W}(\varepsilon_{i,t}) + \eta_{i,t}, \end{gathered} \tag{12}$$

$$\begin{gathered} ln(Y_{i,t}) = \alpha_i + \beta \frac{1}{X_{i,t}} + \gamma \boldsymbol{W}\left(\frac{1}{X_{i,t}}\right) + \varepsilon_{i,t} \\ \varepsilon_{i,t} = \lambda \boldsymbol{W}(\varepsilon_{i,t}) + \eta_{i,t}. \end{gathered} \tag{13}$$

Model (10) is a classic spatial autoregression model for spatio-temporal data (SAR_Pooled), model (11) is a spatial autoregression model with individual fixed effects (SAR_FE). Model (12) is a spatial error model for space-time data (SE_Pooled), while model (13) is called a spatial error model with individual fixed effects (SE_FE). The choice between the SAR model and the SEM model was made using Lagrange statistics significance tests in the basic version and robust to poor model specification (Anselin et al., 2004).

From the presented Working models, income elasticities of demand for food and superior goods can be determined. In this study, two types of elasticity were calculated: income elasticity related to changes in disposable income in directly spending households (14) and elasticity related to changes in disposable income in neighbouring households (15).

$$E(X) = \frac{\partial Y}{\partial X} \cdot \frac{X}{Y} = \frac{-\beta}{X}, \tag{14}$$

$$E\left(\boldsymbol{W}\left(\frac{1}{X}\right)\right) = \frac{\partial Y}{\partial \boldsymbol{W}\left(\frac{1}{X}\right)} \cdot \frac{\boldsymbol{W}\left(\frac{1}{X}\right)}{Y} = \gamma \cdot \boldsymbol{W}\left(\frac{1}{X}\right). \tag{15}$$

Empirical Results

The first step of the study examines the spatial differentiation of the level of expenditure on food and superior goods as well as the spatial differentiation of households' disposable income in the European Union countries. Figure 1 shows the spatial differentiation of the expenditure level on selected types of goods in the boundary years of the survey.

Territorial units were divided into two groups - the limit between them is the median of consumer spending on a given type of goods in the respective years of the survey. Figure 1 shows the differences between expenditure in the eastern and north-western part of the European Union. Western countries, recognized as more developed, are characterized by higher values of consumer spending on both food and superior goods. There is a similarity noticed in the level of expenditure between neighbouring countries. Figure 2 shows the spatial differentiation of disposable income in the European Union in 1996 and 2017. Territorial units were divided - as in the case of Figure 1 - into two groups, where the limit value was the median of disposable income in 1996 and 2017, respectively.

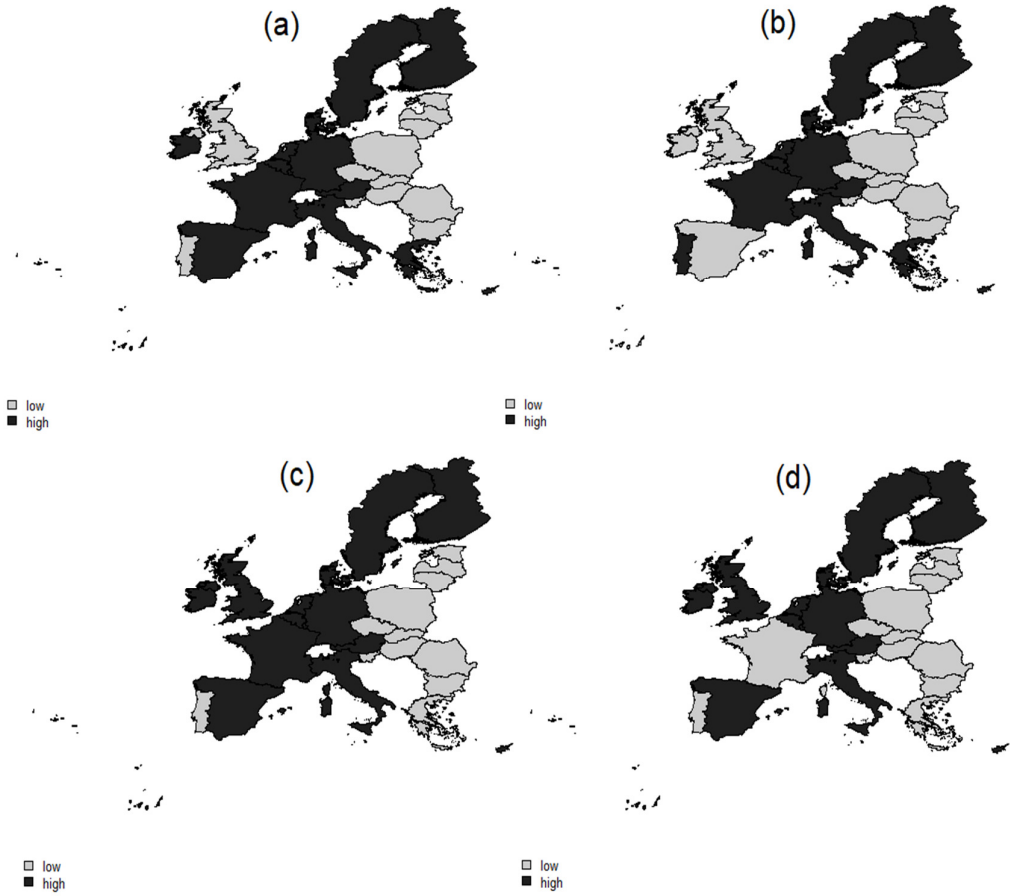

Fig. 1: Spatial differentiation of expenditure on food in 1996 (a) and 2017 (b) and expenditure on superior goods in 1996 (c) and 2017 (d)

Source: Own study.

Similarly to the situation with the development of consumer expenditure, on the basis of Figure 2, it can be stated that there is a division of the European Union into the eastern and north-western parts. More developed countries have higher values of disposable income than less developed ones. Based on Figures 1 and 2, it can be assumed that the EU countries with similar values of examined processes

are clustered. In order to verify this assumption, the values of Moran I statistics were estimated and their statistical significance examined. The results are shown in Table 1.

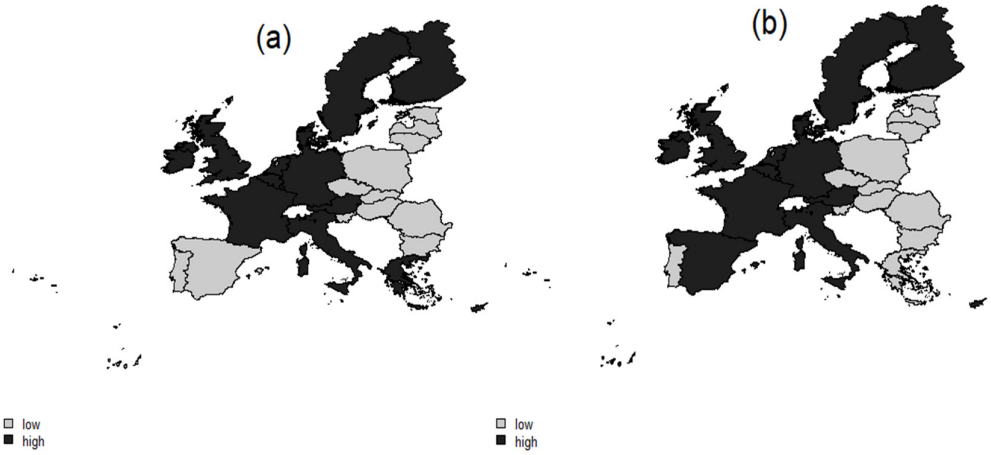

Fig. 2. Spatial differentiation of disposable income of households in 1996 (a) and 2017 (b)
Source: Own study.

Table 1: The results of spatial autocorrelation test

Year	Food expenditure (Y_1)		Superior expenditure (Y_2)		Disposable income (X)	
	Moran's I	p-value	Moran's I	p-value	Moran's I	p-value
1996	0.6423	0.0003	0.5104	0.0024	0.6234	0.0003
1997	0.5984	0.0006	0.5307	0.0018	0.6242	0.0003
1998	0.6042	0.0005	0.5377	0.0016	0.6299	0.0003
1999	0.5951	0.0006	0.5484	0.0013	0.6275	0.0003
2000	0.5990	0.0006	0.5650	0.0010	0.6242	0.0003
2001	0.5768	0.0008	0.5548	0.0012	0.6481	0.0002
2002	0.5526	0.0012	0.5608	0.0010	0.6421	0.0002
2003	0.5131	0.0023	0.5627	0.0010	0.6361	0.0003
2004	0.4976	0.0030	0.5600	0.0011	0.6271	0.0003
2005	0.4615	0.0051	0.5509	0.0013	0.6259	0.0003
2006	0.4333	0.0074	0.5324	0.0017	0.6134	0.0004
2007	0.3704	0.0172	0.5344	0.0017	0.6011	0.0005
2008	0.2935	0.0421	0.5014	0.0029	0.5790	0.0007
2009	0.3435	0.0239	0.4925	0.0033	0.5743	0.0007
2010	0.3993	0.0119	0.5231	0.0021	0.6056	0.0004
2011	0.3915	0.0128	0.5257	0.0020	0.6249	0.0003
2012	0.4431	0.0062	0.5144	0.0023	0.6262	0.0003
2013	0.4728	0.0039	0.4951	0.0031	0.6331	0.0003
2014	0.4451	0.0059	0.4961	0.0031	0.6187	0.0003
2015	0.4366	0.0068	0.4911	0.0032	0.6219	0.0003

2016	0.4363	0.0069	0.5092	0.0025	0.6410	0.0002
2017	0.3849	0.0139	0.4961	0.0031	0.6374	0.0002

Source: Own calculations.

Moran I statistics for disposable income as well as the level of expenditure on food and expenditure on superior goods have positive values throughout the entire period considered. In addition, in all years of the survey it is statistically significant, because p-value is lower than the adopted significance level of 5 %. Thus, there is a positive spatial autocorrelation, indicating the similarity of neighbouring countries in relation to the level of expenditure on selected types of goods and disposable income. The Moran I coefficient for disposable income over the entire study period is higher than for expenditure, which means a greater similarity of neighbouring countries in relation to this process. The occurrence of positive spatial autocorrelation entitles to include the spatial aspect in the analysis of food demand and superior goods.

At the beginning of modelling demand for selected types of goods in the European Union, classic Working models were estimated - covering the dependence of household expenditure only on their own disposable income. Table 2 presents the results of estimation and verification of Pooled and FE panel models for food expenditure (Y1) and expenditure on superior goods (Y2).

Table 2: Results of estimation and verification of Working's panel models for food and superior goods

Parameter	**Food (Y_1)**		**Superior (Y_2)**	
	Pooled	**FE_IND**	**Pooled**	**FE_IND**
α	7.599 (0.0000)	-	8.026 (0.0000)	-
β	-2427 (0.0000)	-2005 (0.0000)	-4675 (0.0000)	-2905 (0.0000)
Wald test	F = 37.0001, p-value = 0.0000	-	F = 136.975, p-value = 0.0000	-
Moran test	0.3004 (0.0000)	0.4921 (0.0000)	0.4117 (0.0000)	0.6029 (0.0000)
LMerr	57.1603 (0.0000)	153.35 (0.0000)	107.361 (0.0000)	230.220 (0.0000)
LMlag	0.8855 (0.3467)	236.07 (0.0000)	16.573 (0.0000)	232.616 (0.0000)
RLMerr	59.6636 (0.0000)	6.6459 (0.0099)	131.191 (0.0000)	57.321 (0.0000)
RLMlag	3.3889 (0.0656)	242.72 (0.0000)	40.603 (0.0000)	59.716 (0.0000)

Source: Own calculations.

In all estimated models in Table 2, the β parameter describing the impact of disposable income on household expenditure is statistically significant (p-value is less than 5%). According to economic theory, the sign of the parameter is negative, which indicates that there is an increase in the level of expenditure with an increase in disposable income. The impact of income on expenditure is stronger in the case of expenditure on superior goods than on food. This means that each additional unit of income causes a greater increase in expenditure on restaurants and hotels as well as recreation and culture. Wald's test indicates the significance of fixed effects in spending models for both types of goods, which means significant differences in the formation of parameter α for each country. The Moran test for residuals indicates the importance of spatial relationships in analysing the demand for both goods. Based on LM tests, spatial error models for Pooled models and spatial autoregression models for FE models should be selected for further analysis. Nevertheless, both types of spatial models (for Pooled and FE models) have been estimated for both food expenditure and superior goods. Table 3 shows the results of estimation and verification of panel spatial models for the level of food expenditure.

According to the results of the model estimation in Table 3, the significance of the individual fixed effects of the model resulting from the statistical significance of Wald's F statistics can be noted. In the SAR_FE and SE_FE models, the β and γ parameters describing the impact of disposable income from a given territorial unit and neighbouring units are statistically significant. Nevertheless, the signs at the parameter γ differ. The correct estimate was obtained for the SE_FE model - in this case the γ parameter is negative. The spatial effects included in FE models are statistically significant. It is worth noting that there is a weaker impact of the increase in disposable income of households in neighbouring units than on the level of expenditure on food (the value of parameter γ is smaller as compared to the absolute value than parameter β) in a given unit. Table 4 presents the results of estimation and verification of Working's spatial models for panel data in relation to the level of expenditure on restaurants and hotels as well as recreation and culture.

Table 3: Results of estimation and verification of Working's spatial panel models for food expenditure

Parameter	Food expenditure (Y_1)			
	SAR_Pooled	SE_Pooled	SAR_FE	SE_FE
α	7.6289 (0.0000)	7.6181 (0.0000)	-	-
β	-2330 (0.0000)	-2299 (0.0000)	-1112.9 (0.0000)	-1389.1 (0.0000)
γ	-159.240 (0.0000)	-178.930 (0.0091)	208.12 (0.0016)	-866.49 (0.0000)
ρ	-0.0032 (0.5206)	-	0.6364 (0.0000)	-
λ	-	0.3204 (0.0000)	-	0.6589 (0.0000)
Wald test	F = 134.6962, p-value = 0.0000	F = 117.425, p-value = 0.0000	-	-
Moran test	0.3114 (0.0000)	-0.0129 (0.3977)	-0.0899 (0.0198)	-0.0945 (0.0152)

Source: Own calculations.

Similarly to the case of models of the expenditure level on food, the individual effects of each EU country proved to be significant under the Wald test (p-value less than 5% for statistics F). Therefore, spatial panel models with constant effects (SAR_FE and SE_FE) have been estimated. The β parameter for both FE models is statistically significant and its sign is negative. Differences occur for the parameter γ, describing the impact of changes in disposable income from neighbouring countries. For the spatial shift model this parameter is positive, while for the spatial error model it is negative. On the economic theory basis, the correct estimation of the γ parameter was noted in the SE_FE model. The spatial interactions introduced in FE models are statistically significant.

Table 4: Results of estimation and verification of Working's spatial panel models for expenditure on superior goods

Parameter	Superior expenditure (Y_2)			
	SAR_Pooled	SE_Pooled	SAR_FE	SE_FE
α	8.3108 (0.0000)	8.2157 (0.0000)	-	-
β	-4335.7 (0.0000)	-4220.9 (0.0000)	-2079.5 (0.0000)	-2274.8 (0.0000)
γ	-688.71 (0.0000)	-1190.0 (0.0000)	102.37 (0.0000)	-555.21 (0.0000)
ρ	-0.0352	-	0.6671	-

	(0.0001)		(0.0000)	
λ	-	0.5779 (0.0000)	-	0.6696 (0.0000)
Wald test	F = 394.2223, p-value = 0.0000	F = 226.2988, p-value = 0.0000	-	-
Moran test	0.5214 (0.0000)	0.0395 (0.1672)	-0.0769 (0.0395)	-0.0527 (0.1170)

Source: Own calculations.

Analysing the models in Tables 3 and 4, it was found that spatial error models with individual permanent effects (SE_FE) best describe expenditure on both food and superior goods. There was a positive impact on the expenditure level of factors not included in the model observed in neighbouring countries (positive and statistically significant parameter λ). The impact of a unit change in disposable income causes greater changes in expenditure on superior goods than in food expenditure. To confirm this relationship, income elasticity coefficients were calculated for both types of goods, using data from models with the best verification characteristics (for the classical model and with spatial interactions). The results are presented in Table 5.

Table 5: Average value of the income elasticity coefficient in the years 1996-2017

Elasticity	**Food**		**Superior**	
	Model			
	FE	**SE_FE**	**FE**	**SE_FE**
$\boldsymbol{E(X)}$	0.2999	0.2078	0.4345	0.3403
$\boldsymbol{E\left(W\left(\frac{1}{X}\right)\right)}$	-	-0.1246	-	-0.0799

Source: Own calculations.

An analysis of income elasticity shows that every one-percent increase in disposable income of households causes a higher percentage increase in expenditure on superior goods than on food. Elasticities vary depending on the estimated model - for models without spatial interactions, the percentage increases in consumer spending (regardless of the type of goods) resulting from a one-percent increase in their own disposable income are higher than for spatial models. Nevertheless, the effect of the total increase in income (both in households of a given country and neighbouring countries) is almost identical for spatial models and for models without spatial interactions. A one-percent increase in the disposable income of households of neighbouring countries also indirectly increases the level of household expenditure in a given territorial unit. Income elasticity coefficient in this case has a negative value, because it is calculated for the inverse of disposable income.

Conclusion

Household consumption expenditure is closely linked to the country's economic development. Richer societies tend to spend more and their income is considered to be spent in more diverse way. Therefore, their consumption structure differs. Consumer demand is of interest to many researchers who often use classic methods of analysis such as the Törnquist function or the Working function. Nevertheless, there is no literature to supplement these models with spatial interactions that illustrate the effect of imitation among consumers. There is demand analysis using spatial models, but these models are only linear.

The study supplemented the Working model with spatial effects, analysing the level of expenditure of EU households on food, restaurants and hotels as well as recreation and culture. A positive impact of income growth on the level of consumer spending on both types of goods was noted. Nevertheless, most of the additional households' income is allocated for superior goods, which results from the analysis of the income elasticity coefficient of demand. In addition, the process of getting wealthier by households in neighbouring countries results in an increase in the level of consumer households'

expenditure in a given territorial unit. Therefore, the so-called consumer imitation effect turned out to be significant. The society (in order to show its wealth) tends to increase the level of consumer spending regardless of the type of good purchased.

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Building Enterprise Reputation by Doing Sustainable Socially Responsible Business

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Abstract

The recent turbulent market development is causing problems to numerous enterprises, and it raises a question: how can be a positive reputation maintained in the long term? Even today, enterprises still tend to underestimate the power of reputability and reputation management, depriving themselves of what they have been building up for years – their good name and image. It does not take much for the enterprise to lose everything in a short time – a small misstep is just enough, for instance a false step having the form of the lack of environmental friendliness or of unethical or arrogant conduct towards customers and the public. Customers and the public can sense each and every foul trick, act of disrespect or lie, and after getting disappointed, they spread the information further (even unconsciously sometimes), which contributes towards the destruction of good name and the public's positive feedback. The enterprise can lose its reputation easily. However, repairing a damage takes much longer and requires a careful practice of reputation management. Currently, a majority of enterprises and stakeholders are aiming at protecting their good name in the off-line world as well as on the internet by trying to avoid problems endangering enterprise reputation. Avoiding problems and crises lies in doing sustainable socially responsible business. Therefore, the following research has been carried out based on an analysis of enterprise crisis situations that have affected the overall reputation of an enterprise. Conducting the research, it was subsequently possible to deduce and produce recommendations and principles to be followed in order to build enterprise reputation by doing a socially responsible business.

Keywords: Reputation, socially responsible business, sustainability.

Introduction

Enterprises are becoming more and more interested not only in marketing activities and tools that can sell their products, establish their brand and relationship with customers but also in their reputation. Reputation represents any opinions, judgements, standpoints about the enterprise and its products shared by customers based on ongoing activities in all spheres of the enterprise's life, determining the attractivity of the enterprise, its employees and management, products and its brand. The enterprise's ability to meet expectations of customers, the public and other interested parties affects individual opinions and standpoints shaping an overall view of the enterprise. That ability should be mastered by enterprises, and it should be one of their fundamental priorities and main business objectives. In order to work properly, the enterprise needs to manage activities concerning its reputation like it runs its business activities. Therefore, the article is focused on an analysis of actual negative events and crisis situations, revealing the enterprise's missteps not only in the field of socially responsible business.

Reputation, Reputation Management and Socially Responsible Business

Reputation is a strong accelerator driving the enterprise forward even in unfavourable times of an economic crisis. The enterprise must do its activities with respect to possible consequences because a single unfavourable event may cause a loss of its competitiveness and customer base in favour of its competitive rivals. Monopolies are perhaps one of few enterprises that do not need to worry about their reputation, but that may be true only temporarily until market conditions change and someone starts competing with them. Klučka (2006) defines reputation as a complex of attitudes, expectations and judgements of the entities who are relevant for the enterprise, which implies that all interested parties' opinions, attitudes and judgements have a direct or mediated impact on the enterprise and its activities. Gattiker (2008) like Klučka (2006) states that reputation represents the expression of several interested parties' view on the enterprise based on an effort the enterprise has made. According to Farmer and Glass (2010), reputation means the information which is used for creating a value judgement about an object or a person, that is about the enterprise and its representatives. Reputation represents individuals' opinions on the enterprise, its products or its employees, which are often connected with their personal experience or based on the information obtained from others and the mass media. Positive reputation helps the enterprise to be competitive, and it may affect its market value. According to Argenti and Druckenmiller (2004), enterprises are recognizing the importance of enterprise reputation more and more as a tool for achieving business objectives and maintaining competitiveness. Reputation shows a prognosis of future conduct which is based on the assessment of how its past conduct met the expectations following the comparison of social status (Barnett, 2012). In the present day, reputation is very important and highly recognized not only in business, and the public has become aware of its importance in other fields as well. It represents a concept of the creation of the enterprise's positive image. The concept not only offers the enterprise a positive image of itself from the viewpoint of the public, but it also helps it to gain a certain level of prestige and positive references, creating something like a brand in essence. (Ferenc et. Al, 2017; Jankalová, Jankal, 2016).

An objective and a role of reputational management is predominantly to maintain, enhance and build favourable positive reputation inside out, that is in relation to all interested parties, and to determine acceptable procedures, strategies, systems, methods and standards that will prevent enterprise reputation from being ruined; reputational management also aims at developing guidelines for solving individual situations that have occurred especially in case where enterprise reputation has been tarnished (Schultz, Werner, 2017). According to Svoboda (2009), "reputation" is a better synonym to "image", even though the means and forms of implementation are not the same as in case of image formation. There are four essential attributes of reputational management: (Svoboda, 2009)

- credibility,
- reliability,
- conscious responsibility,
- trustworthiness.

Currently, online environment plays a significant role in building reputation. Users or potential customers, as well as rivals, keep generating a huge amount of various data having a significant informative value for decision-making processes taking place in the enterprise (Soviar et. al, 2017). From that perspective, reputational management refers to comprehension, understanding and influencing a certain subject or entity's perception in online environment. Online environment allows the enterprise to acquire data about potential business opportunities (Stokes, 2008). Therefore, it is necessary to include online environment in reputational management, i.e. online reputational management. Online reputational management refers to the practice of monitoring the online reputation of a human, a brand, a product or business, and it represents a solution for dealing with negative changes by eliminating, supressing or reducing the visibility of those changes in browsers by pushing them down (e.g. If the negative content is displayed in the first page of Google search results, it will be moved to the tenth page). Managing enterprise reputation in online environment does not mean getting rid of negative references to the enterprise or its products completely, but it is

about mitigating their negative impacts by means of a strong, visible and consistent content (Lieb, 2019). In reputation, a significant role is played by the enterprise's sense of values, social responsibility as well as ethics. Social responsibility frequently refers to the enterprise's duty to implement strategies, adopt decisions and proceed in such a way that is required and compliant with the public's objectives and values, thus being in line with the ones of the whole society. In this respect, the enterprise does not have a right to criticise general values, and it is expected to avoid ignoring socially acceptable values and promoting its business objectives or enterprise values over the society's values. (Varmus et. al, 2015; Beal, 2014; Veber, Srpova, 2012)

Nowadays, a higher number of enterprises is devoted to social responsibility and philanthropy than it used to be in the past, not only due to legislation but also as a result of the pressure exerted by the public, investors, the media, clients and various organisations. Enterprises keep monitoring what their customers and potential clients believe, how to treat their employees and how to approach their rivals and the environment. Currently, the enterprises predominantly adhere to a broader view of the interested parties expressed through their effort to satisfy the parties' needs in line with ethical and socially responsible conduct with the final impact on shareholders – increasing a profit. Socially, it is an endeavour to help, strengthening mutual relationships with interested parties as well as reputation in the upshot. In addition to socially responsible business, the activity that also is important for the enterprise is philanthropy or similar initiatives, such as volunteering, donating and the like. As regards philanthropy, appreciation or even respect from the interested parties bring about a similar effect on the enterprise as socially responsible business, besides a good feeling of helping others. In the present, philanthropy constitutes a modern form of donation that helps a receiver solve their issues which occur in the society, who can use resources for education, skills or potential development of people who will thus not be dependent on alms but be able to take care of themselves on their own. (Hittmar et. al, 2015; Marošiová, Majchrák, 2004)

Materials and Methods

The material for preparing this article was obtained from the research carried out. The research was conducted by identifying and analysing negative reputation based on the online information available about the enterprises' crisis situations and events having global or regional consequences. The situations and the enterprises were selected intentionally in order to get the greatest information value as possible. The analysis of negative reputation cases aimed at producing possible recommendations for mitigating crisis situations and at identifying principles for avoiding the occurrence of such situation and risk of the loss of built-up positive reputation. A subject-matter of the analysis was the cases of the enterprises that were solving a crisis situation while the items that were analysed were crisis situation impacts on the enterprise, steps taken by the enterprise in the crises and consequences occurring after the measures carried out, that is the way how customers and the public reacted, allowing us to deduce recommendations for mitigating the impacts on the enterprise' reputation. Analysis criteria included a size of the enterprise, which means that big enterprise was analysed, connection with a conduct against socially responsible business, and the fact that a case study must show a connection with a damage to reputation and crisis situation consequences. The analysis of the cases of solving negative reputation comprises solutions to crisis situations adopted by the enterprises, that is particular steps taken by the enterprises in order to live up to their reputation, and it also points out crisis situation impacts on the enterprise and its reputation.

Analysis of Negative Reputation Solution Cases

The past saw various events that pointed out the importance of enterprise reputation, especially in case of an unfavourable situation that was perceived by customers as a huge lack of ethical conduct on the part of the enterprise. Providing an example of a negative impact on enterprise reputation, we may mention the Bhopal disaster in December 1984 when gas and chemicals leaked in the American enterprise Union Carbide in Indian Bhopal, killing 20,000 people and injuring 100,000 up to 200,000 people. The event caused the disappearance of the enterprise while the accident had a direct impact on enterprise reputation, leading to the drop in the enterprise's shares and product sales (Shaw, 2011).

In addition to making forecasts and doing regular check-ups of online reputation, it is necessary to know options to solve a potential crisis situation in order that the enterprise can avoid suffering severe damage associated with the loss of positive reputation.

Johnson & Johnson – Tylenol crisis

Johnson & Johnson is a global American pharmaceutical company with a 130-year tradition which hires more than 130,000 employees across the world, producing consumer products and doing research in this field. Secondly, it is devoted to development and production of medical devices, for instance for surgery, and its third field of activity is pharmaceutical products (Johnson & Johnson, 2020). Tylenol, which contains paracetamol as its main active substance and reduces pain, fevers etc., had a negative impact on Johnson & Johnson's reputation in 1982. Johnson & Johnson Company was selling the product in the USA. The product caused the death of seven consumers as a result of its improper quality. (The Tylenol Crisis, 2020)

Originally, Tylenol had 37% market share, and revenues from the sale of the product amounted to 1.2 million dollars. The subsequent crisis caused product withdrawal, inflicting the loss of 100 million dollars on the company. In addition to withdrawing the most profitable product, the company stopped all promotional activities to avoid damaging its reputation as much as possible. After achieving the required quality, the product was launched onto the market again. However, the company ran a campaign to restore customer trust. Sales support for the new products was ensured by various promotional activities and discounts (e.g. discount vouchers, TV commercials, a new price strategy etc.) In order to recover professional trust, the enterprise was giving presentations and organising conferences for medical community for the product to win their trust and for them to recommend it to consumers afterwards. That resulted in restoring customer trust, thanks to which the company still exists in the present day. (The Tylenol Crisis, 2020)

Based on the afore-mentioned findings, it is obvious that if the enterprise wants to remedy a damage that was suffered during and after crises, it needs to mind its customers' opinions and feelings – in such a sensitive matter as a death of customers, it was indeed reasonable to withdraw all products from the market and confirm its customers in the fact that the company strives for their safety and health. Subsequently, when the enterprise intended to put its product on the market again, it had to make convincing changes in the product and packaging to assure the customer that nothing is going to happen to them in future. The important thing is to communicate your intention to the public, and in that case, it was a confirmation of product safety, restoration of trust and customer motivation to purchase the product. As the enterprise invested huge financial resources, it needed to attract as many new and former customers as possible.

Jonson & Jonson's procedure for solving the crisis situation and rebuilding their reputation

- withdrawing the product from the market,
- terminating marketing activities connected with the product,
- research and innovations in the old product,
- after the situation calms down, relaunching the renewed product onto the market,
- a new promotional campaign for sales support,
- PR activities to restore trust with emphasis on safety,
- new price strategy,
- addressing the professionals and gaining a positive feedback on the product from them.

Volkswagen – Dieselgate

Volkswagen, which is an automobile manufacturer who created the term "clean diesel", admitted that up to 11 million diesel vehicles globally were equipped with a faulty device or a sophisticated

software that was able to hide actual levels of vehicle emissions. In the USA, the vehicles having those control units were exceeding a permitted level of emissions by 40 times under applicable standards. Environmental Protection Agency (EPA) prohibited the sale of VW vehicles in 2016. The tested cars having the faulty software included the following models with the year of manufacture: Jetta (2009-2015), Jetta SportWagen (2009-2014), Beetle a Beetle Convertible (2012-2015), Passat (2012-2015), Golf (2010-2015), Gold SportWagen (2015) and Audi A3 (2010-2015). (Majerčík, 2017; Jung, Park, 2016; Reputation Institute, 2016)

The automobile manufacturer admitted that a total sum to have been paid for the incurred scandal amounted to a sum higher than its budget of 18.2 billion dollars which it had planned to use to settle the affair. When the problem arose, and the public learned about it, a value of the automobile manufacturer's shares dropped by 40 % below 100 dollars per share in the course of a few days. Even though the value of its shares is currently around 152 dollars, it has still not regained the value it had prior to the crises, which was more than 160 dollars (Jung, Park, 2016; Reputation Institute, 2016). In 2015, a reputation survey study Global RepTrak 100 was carried out, and the company took fourteenth place in the first quarter. In the last quarter after the scandal erupted, the company dropped from leading places by 20 points in Europe and by 9 points in the USA. According to Reputation Institut, more than 50 % of Volkswagen' s reputation consisted of its ability to be a reliable company offering high-quality products, having sound corporate culture and doing socially responsible business. The scandal is significant for reputation, and it has created huge impacts especially due to the fact that the revelation of reality has shown what the company considered important in fact. Albeit, the reality revealed bad company management, a lack of ethical conduct, intentional reduction of vehicle quality, misleading representations, non-ecological behaviour and associated ignorance towards the environment. The scandal led to reduction of saleability, loss of customer trust, loss of interested parties' trust, negative economic results and a drop in the price of its shares. (Soviar et. al, 2018)

After the fraud over emissions was revealed, the vehicle manufacturer admitted that the cars are not all right and emissions were manipulated. They apologized and replaced the CEO in the next step. Firstly, the Group reacted to the situation by trying to change its management style and structure as well as its corporate ethics. New Director General declared that he was aware of the urgency of the situation and his main task was to restore customer trust. Its second reaction was the creation of "recall" with service interferences to modify control and drive units. The company assured customers that it had begun developing more ecological technologies, in order to confirm its clients in the company's willingness to change. Right after the scandal broke in the USA, the company also started to communicate with customers through PR and personal meetings with journalists at public meetings when they highlighted that they had ruined the most important part of their business, namely trust, and they assured customers that the faulty vehicles will be repaired. Simultaneously, Volkswagen stopped "clean diesel" promotional campaigns. (The Tylenol Crisis, 2020; Bizibl Marketing, 2020; Soviar et. al, 2019; Majerčík, 2017)

In 2017, their tarnished reputation was still visible, which was implied by 422 top negative reviews and comments concerning VW Jetta. However, in 2018, customers began to show more trust in Volkswagen vehicles. According to FOcus2move, the 5th best-selling vehicle in the world was Volkswagen Golf, which had shown a year-on-year drop like Volkswagen Jetta taking 20th place. However, the 6th and 7th place went to Volkswagen Tiguan and Volkswagen Polo with a year-on-year increase above 10 %, which can imply that management replacement, communication improvement, willingness to redress and settle a damage incurred by customers and all endeavour and activities to restore reputation have been successful and beneficial for the company. (Soviar et. al, 2019; Consumer Affairs, 2019)

Volkswagen's Procedure for Solving the Crisis Situation and Rebuilding Their Reputation

- acknowledging the mistake of manipulating emissions, and apology,

- changing the enterprise's management style and structure,
- replacing CEO with bad management,
- new strategy aimed at restoring customer trust,
- withdrawing the "clean diesel" advertisement,
- PR activities and public meetings,
- indemnification in the form of "recall" for service interferences to repair vehicles,
- Indemnification in the form of the repurchase of vehicles
- research and development in more ecological technologies

Alfa Bio – Chickpea Spread

In 2015 Slovakia, a scandal over chickpea spread erupted, as it allegedly contained dangerous botulinum-producing bacterium Clostridium botulinum. After years, the accusation has not been proved to be truthful. Nevertheless, the State Veterinary and Food Administration of the Slovak Republic (ŠVPS SR) issued a notice about the findings concerning the Chickpea Vegetable Spread during the period when the scandal was being publicized. The spread concerned was tested for the presence of botulinum toxin, which resulted in a final recommendation for consumers to avoid consuming the product Chickpea Spread with the best before date of 21 August 2015 from producer Alfa Bio, s.r.o. and to return the product to a store where they had bought it. Based on the findings, the Regional Public Health Authority ordered the withdrawal of the given batch of Chickpea Spread from the market. However, accredited laboratories did not confirm the presence of dangerous poison based on analyses carried out. But the crisis situation brought about an impact on business. Slovak and Czech retail chains considered cancelling orders not only for the spread concerned from the enterprise. (Mikula, 2018)

When solving the crisis situation, the enterprise used its own marketing department consisting of several employees from foreign big enterprises, conducting customer market surveys when making changes and developing new products. The enterprise is trying to communicate that they produce tofu in a traditional way with a long-term history, presenting the fact that they do not use any preservatives and artificially produced soya products in their products. As regards direct steps for solving the crisis, the given batch of Chickpea Spread was withdrawn from the market, and its distribution was suspended. The enterprise collaborated with national authorities without reservation, which supported its trustworthiness (Adamický, 2019). The enterprise inspected the whole production process ranging from the maintaining temperatures, through pasteurization up to storage, and it preventively withdrew the respective batch of Chickpea Spread not only from the market but also from its warehouse (Čimová, 2019). After multiple tests on samples were done, the enterprise's fault was ruled out, and the enterprise issued a declaration, assuring the public of its maximum endeavour to produce non-toxic and high-quality products (Lunter, 2019). Currently, the enterprise strives to strengthen its position on the market, replacing Seesame agency, which was providing it with services in product communication, for Wiktor Leao Burnett, which is going to change the design of product packages to ensure that the enterprise achieves more positive visibility among customers and that the crisis situation with Chickpea spread, which is again in sale after the situation calmed down, is forgotten (HN, 2019; Jankalová, Jankal, 2018; Kubina, Lendel, 2015).

Alfa Bio's Procedure for Solving the Crisis Situation and Rebuilding Their Reputation

- managing the company with a new management approach, and preliminary preparation of process taking place in the enterprise for an unexpected crisis situation,
- apologizing to customers for the situation that had arisen,
- refusing the guild and pointing out their innovative certified food safety and production system ISO 22 000 in press releases,
- using the services provided by professionals - Wiktor Leo Burnett,
- a plan to change packaging and continue selling the product,
- comprehensive change in communication,

- PR statements and the company's CEO's statements,
- PR and communication through social networks under the baton of the agency,
- new strategy aimed at restoring customer trust,
- withdrawing the contaminated batch of spread from the market.

Alfa Bio's procedure for solving the crisis situation and rebuilding their reputation

The individual steps that were taken by the enterprises identically to save their reputation and solve the crisis situations are as follows:

- apology to customers for the situation that has occurred,
- indemnification of customers and refund of financial resources for a purchased faulty product,
- terminating promotional activities related to the product concerned,
- pointing out the introduction of innovations into a production process of the products,
- putting emphasis on safety and eco-friendliness,
- PR activities during the crisis situation, based on a strategy aimed at restoring and strengthening customer and public trust,
- relaunching the product concerned onto the market after the situation calmed down,
- comprehensive change and new promotional activities to support sales of the product concerned and distract attention from future reminders of the crisis situation with the help of professionals,
- early or post-crisis change in management, processes and leaders, supporting the better managing of the crisis situation and faster restoration of positive reputation in the awareness of customers and the public.

Conclusion

Based on the analysed cases, we may deduce principles to be followed by enterprises with the strong possibility of avoiding the occurrence of negative situations, and therefore, these principles should be considered a certain type of prevention when doing business. The principles which we have formulated and which the analysis indicates are basically a foundation for doing sustainable socially responsible business, and they read as follows:

- create a code of ethics in cooperation with all management levels of the enterprise in order that the code of ethics is followed, respected and received positively by all employees,
- certification and regular re-certification,
- avoid creating false recommendations, ratings and reviews,
- avoid misleading and lying to customers and the public,
- avoid covering up, and honestly admit to the act after making a false step,
- keep trying to correct mistakes, if possible,
- respect customers, making no distinction between them, and avoid judging them,
- avoid underestimating any situation that has arisen, and anticipate,
- deal with complaints in the cold light of day,
- think over answers to negative comments and ratings, and consider the legitimacy of complaints,
- respond politely and respectfully in all circumstances,
- avoid ignoring any events or risks,
- never give up and always keep trying to find a solution to all problems,
- take care of your employees,
- employee participation in decision-making and participative management is a better choice than a directive approach when expecting ideas, benefits and innovations from employees on a long-term basis.

Based on the research carried out, we can confirm that ignoring a situation that has occurred may cause and result in a reduction in saleability and business with loyal customers, occurrence of customer distrust in the enterprise, its products and brand, and in sharing negative experiences, which

brings about a negative impact on enterprise reputation in the offline and online environment. The research also shows that even if a problem or a crisis situation already exists, it is vital to keep trying to solve problems honestly with the participation of customers or clients, which implies that it is crutial to endeavour to do socially responsible business sustainably while bearing in mind that the enterprise will have to devote a considerable effort, time and even financial resources in some cases to restore its reputation.

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Event Industry in Russia: Problems and Prospects

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Abstract

Event Industry is an independent branch that includes the entire range of services associated with organizing an event. The event market in Russia is relatively young and fast-growing. The growth is accompanied by certain threats along with considerable opportunities. Research efforts in this area are very few and are undertaken mostly by the event market players. The objective of this study was to analyze the current situation in the industry, reveal the problems associated with its development and the prospects open to event marketing in Russia. It exhibits some specific features associated with the national mentality along with the government's fiscal policy. Still, Event Industry is a quite successfully developing branch of the Russian economy, since Russian business community has realized the importance and effectiveness of special events for the needs of teambuilding and creating a positive corporate image.

Keywords: Event Industry, Event Marketing, Special Events.

Event Industry is an independent branch that includes the entire range of services associated with organizing an event. "Event Industry" may be considered an "umbrella term" for a wide scope of activities alternatively referred to as MICE (Meetings, Incentives, Conferences and Exhibitions) or as just "meeting industry". There is a meaningful distinction between business and non-business events. Business events include tradeshows, seminars, workshops, product launches, team-building retreats or training sessions, etc., and non-business events include festivals, social events, holidays, sports events, etc.

The most important problem that has been accompanying the event industry development in Russia is the one that arises from a superficial understanding of the very term "event". In the consciousness of Russians an opinion has been formed that event management deals with organizing birthday, wedding and other parties, generally - with a single, one-time activity. However, the official dictionary of the IAPCO (International Association of Professional Congress Organizers) suggests the following definition for the meetings (therefore, event) industry: «The Meetings Industry consists of a broad range of organizers, suppliers and facilities engaged in the development and delivery of meetings, conferences, exhibitions and other related events which are held in order to achieve a range of professional, business, cultural or academic objectives».[i]

Currently we start to observe an important shift in public opinion. The business community has realized that in Russia, as well as all over the world, correctly organized events are a powerful tool for promoting companies to the market. Special events not only can make a company known in a wider range, but also help to build its reputation.

It is well known that an original, out of the ordinary corporate event can be widely covered by the media. The more journalists are interested in what is happening and the more interesting and rich the program is for the participants of the event, the more positive emotional and behavioral feedback the company can get. In the conditions of the oversaturated Russian advertising market, event marketing

is one of the ways to influence the audience in a subtle way, aiming primarily at forming the company's image.

One of the main advantages of event marketing is its long-term operation, since any event is provided with information support, which begins long before the event itself. It includes announcements in the media (for major events), in social networks, on posters, banners, or in internal mailings (for corporate events). If successful, the event will be discussed for a long time through various communication channels.

For example, conferences promote productive and, in many cases, long-term cooperation. They imply bringing together people from one industry at the same time and in the same place where they can comfortably communicate. Such events may be very useful, as they allow the participants to build partnerships, exchange experience, therefore contributing to the development of the industry.

Events are often entertaining in nature; they are supposed to involve active participation of the audience and subtly affect the subconscious of attendees. That is what one of the agencies claims: "We develop unconventional concepts, create performances and address all five senses of our guests: you can see our events, hear them, taste them, inhale them and touch them. They excite, involve and impress..."[ii]

The following companies can be pointed out among the main players in the Russian event management market: "Eventum Premo", "Podegiki", "Redday". They were chosen among 2019 Top-50 best event companies by the *Special Events* Magazine (US) which is the premier magazine for professionals in the special events industry[iii]. According to the *Special Events* Magazine, these companies' expected annual revenue from special events in 2019 was $15.5 million, $14.8 million, and $10.0 million with the average number of special events per year of 73, 157, and 32, respectively[iv]. Leading market players adhere to the following strategy: they try to remain in the market and increase their market share by using their competitive advantages, developing their brands, establishing long-term and mutually beneficial relationships with business partners, using various marketing tools. The second goal for them is to increase capacity of the market. According to the management of "Podegiki", the main trends are: "connecting events to digital and media channels to increase efficiency, and providing individualized experiences to attendees, enabling them to be "fully emotionally" immersed in the essence of the event and to be "a participant in the action."[v]

According to the *VTB Capital* forecast, in 2020 the Russian event market is going to be worth about $350 million[vi]. As follows from the research undertaken by the *Adindex.ru* marketing agency, companies in Russia allocate up to 20% of their marketing budgets to events and MICE[vii]. With respect to their willingness to pay for an event to be organized and hosted, the customers of the event market in Russia can be divided into five main categories:

- VIP: they spend more than $100 thousand for an event;
- business class: they spend $65−100 thousand for an event;
- top-economy class: they can pay $30−65 thousand for an event;
- economy: they are willing to pay no more than $30 thousand;
- public (state-run) organizations, whose expenditures are practically unpredictable.

Obviously, the share of each category strongly depends on the economic conditions in Russia. If we consider the three above mentioned companies, "Eventum Premo", "Podegiki", "Redday", the average revenues from one special event will be $212, $94, and $313 thousand, respectively, which means that their customers are mostly VIP, which is no wonder. Range Rover, Johnson & Johnson, Raiffeisen Bank, Avon, E&Y, Beiersdorf, PepsiCo are just some of them to mention. At the same time one of the most influential trends now is being cost efficient. That is the strategy of the majority of the regional companies. To stay afloat they have to be very creative, which is, for instance, being reflected by the shortlists of the national professional contests. According to the latest results of BEMA! (Best Experience Marketing Awards!), from year to year the number of projects from the regions is increasing - it is already more than a third, and the share of prize winners among the

applicants from the regions approaches 90%. The BEMA! figurines most often go to cities such as Kazan, Rostov-on-Don, Novosibirsk, Yekaterinburg and St. Petersburg. Very notable: the budget of the 2017 winner in the most popular HR category was only about $7 thousand.[viii]

To better understand the state of the event market in Russia, we conduct a SWOT analysis and present its results in Table 1.

Table 1: SWOT analysis of the Russian event market [developed by the authors]

Strengths	**Weaknesses**
Long-term effect of corporate events Heightened receptivity of participants during the event Teambuilding, strengthening the corporate spirit Formation of the company's image Effective building of emotional and economic ties between the event agency and the customer Maximum involvement of attendees in the event that ensures future loyalty	Lack of professional event organizers Lack of a carefully developed strategy Lack of correspondence between the format and concept of the event and the target audience Large labor costs (physical and emotional) Risks of quickly boring the audience
Opportunities	**Threats**
Growing recognition and acceptance of event industry by the business community Considerable saving prospects	Worsening economic conditions Tax legislation

As illustrated by Table 1, the event market in Russia exhibits common features that are typical to all countries of the world and stem from the undeniable advantages of this company's promotion technique along with specific features, in particular – with those associated with the national mentality.

Another problem stems from the fiscal legislation of the Russian Federation. Full costs of an event cannot be deducted from the tax due on income of the companies (customers), so they have to pay most of the costs out of their net profit. In this regard, contracts with event agencies do not reflect the full range of services that are provided to the customer. That is why very few companies announce open tenders for choosing an event agency. Therefore event market in Russia cannot operate clearly and transparently.

Nevertheless, event industry is a quite successfully developing branch of the Russian economy, since Russian business community has realized the importance and effectiveness of special events for the needs of teambuilding and creating a positive corporate image.

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[i] http://mice-contact.com/definition-of-mice.html [Retrieved February 7, 2020]

[ii] https://www.blumenkrants.com/en [Retrieved February 7, 2020]

[iii] There are more internationally recognized Russian agencies. For example, MaxMedium, MarketEmotion, Blumenkrants and some others enter The Global Eventex Top-30 creative agencies and event organizers worldwide (https://eventex.co/winners/ [Retrieved February 7, 2020])

[iv] https://www.specialevents.com/corporate-events/special-events-50-top-event-companies-2019 [Retrieved February 7, 2020]

[v] Ibid. [Retrieved February 7, 2020]

[vi] https://event.ru/trips/rossiyskiy-event-ryinok-nastoyashhee-i-budushhee-v-tsifrah/[Retrieved February 7, 2020]

[vii] https://adindex.ru/news/agencies/2017/08/3/161420.phtml[Retrieved February 7, 2020]

[viii] http://event-forum.ru/material/view?id=3576[Retrieved February 7, 2020]

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Experience of the Robotic Process Automation implementation at the accounting services enterprise: A case Study

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Abstract

The article presents the results of a case study of the implementation of the Robotic Process Automation (RPA) at the accounting services enterprise. The introduction presents a definition and the essence of the RPA and the grounds justifying the RPA application to the accounting processes automation. Then, with a literature review, the benefits and limitations of the office processes automation, especially accounting processes, are discussed. The main part of the article presents the experience of the implementation of the RPA at an accounting services enterprise in Poland. The empirical study has involved a case study method and an individual uncategorized interview. The results show that not all the accounting processes have been successfully automated and the RPA software must be still improved. The experiments justify further studies of the RPA implementations at accounting services enterprises.

Keywords: RPA, Business Process Automation, Accounting Services Enterprise, Robotic Processes

Introduction

Information Technology keeps on evolving in the world of accounting. Literature stresses a growing importance of computerization and computer science for the accounting profession (IFAC 2007). Robotizing of the accounting processes provides both many opportunities and many challenges. Entering the data manually has been gradually replaced by automation. The scope of the accountant's works keeps on changing as a result of introducing the automation (Richins et al. 2017). The report Practice of Now (Redstrom 2019) presents forecasts on the accountant's work in the decade to come. It has been mostly noted that the accountants will only monitor the process of the automatic entering of the data into the system, instead, as it has been the case so far, entering the data by hand.

The Robotic Process Automation is a relatively new yet dynamically developing IT area focused on the process automation. The RPA software operates in the user interface layer and it replaces the man with data recognition, entering and processing (Willcoks et al. 2015). The process automation involves the use of intelligent software to perform repetitive and time-consuming actions (Institute for Robotic Process Automation 2015; E*mbracing robotic automation during the evolution of finance* 2018). One of the top RPA technologies is the Optical Character Recognition (OCR), facilitating an automatic document reading and the right content recognition.

The article 'Robotic process automation: The next big disruption' in Financial Express (2016) has defined the RPA as an automated software tool the enterprises apply to process the low-class tasks without the personnel participating. The software operates autonomically based on the process pattern rules prepared and in exceptionally difficult situations it directs the process to the man. The RPA technology does not require any platform development, replacement or progress, as it supplements the existing systems.

Commercial RPA tool providers have observed an increase in the demand for such tools and hence a growing number of new RPA providers on the market, which is due to the number of accounting

services enterprises which search for cost-cutting measures. Besides, the RPA is now considered a way for a fast return on investment (ROI) (Van der Aalst et al. 2018; Hindle et al. 2018).

The study shows that the personnel spend little time on the tasks which require analytical thinking as they spend much of their working time on repetitive actions, to-much-extent involving transferring data from one system to another. Accountants should get free from such unstructured routine tasks to focus on the tasks which require strategic and analytical thinking (Kaya et al. 2019).

The RPA software can perform administrative tasks which have so far required the involvement of a few personnel and which involved e.g. the transfer of data from the input sources to the recording systems, such as e.g. the ERP. "Robot" is a software which does not require the accountant to have any programming skills. A few-week training is enough to start working using the RPA tools (Lacity, Willcocks 2015).

The main objective of the article is to present the experience of the implementation of the Robotic Process Automation at the accounting services enterprise. The presentation of the results of the empirical study has been preceded by the explanation of the term and the essence of the RPA and discussing the potential benefits of implementing the RPA to the automation of accounting processes. To do so, a literature review was made, including the journals and Internet sources which cover the RPA and IT solutions for accounting. The empirical study involved a case study and an individual uncategorized interview. The measurement tool was made up by an interview questionnaire. The interview was made with an accountant of the Liberty Tax accounting services enterprise headquartered in the kujawsko-pomorskie province.

Limitations and benefits of the RPA implementation at the accounting services enterprise

Accounting services enterprises need tools which will facilitate cost-cutting and which will release the accountants from time-consuming repetitive actions, thus enhancing their productivity. The enterprises which have chosen to implement the RPA expect a full automation, which is not quite possible yet. An ongoing improvement of the systems, however, offers more and more benefits. With the literature analysis the following benefits are found for the RPA implementation:

- cost-cutting (Willcoks et al. 2015; IRPA 2014, IRPA 2015),
- speeding up the task execution (Willcoks et al. 2015; (Lacity and Willcocks 2015; Fernandez and Aman 2018; IRPA. 2014; Schatsky et al. 2016; Chen et al. 2012),
- it does not disturb the existing systems and it can be used by non-programmer personnel (Willcoks et al. 2015),
- a decrease in the load of the repetitive simple tasks of the personnel, limiting the routine (Aguirre and Rodriguez, 2017; Fernandez and Aman 2018; IRPA 2014),
- work quality and accuracy enhancement (Fernandez and Aman 2018; IRPA 2014; Schatsky, Muraskin and Iyengar 2016; Lacity and Willcocks 2015; Chen et al. 2012),
- an increase in the personnel motivation to learn (Fernandez and Aman 2018),
- a greater competitiveness than the other such enterprises (Fernandez and Aman 2018),
- transferring the accountants to the execution of the tasks which require strategic and analytical thinking (IRPA 2014; Jędrzejka 2019; Kaya et al. 2019; Fernandez and Aman 2018),
- it facilitates working 24 hours a day for 7 days a week (Fernandez and Aman 2018).

Considering the above one can state that the performance of tasks by "soft-robots" enhances the productivity of the personnel of the accounting services enterprises. Thank to that technology it is possible to serve the business processes which involve considerable data loads; from data mining,

processing data from various documents, sending files and folders to be read and saved and from databases, etc.

The RPA at accounting services enterprises can help the automation of acquiring the monthly activity reports, entering buying and selling documents, vacation application processing.

Petersen and Rohith have indicated that the cost of the "robot" can be equal the cost of one fifth of the price of a full-time employee (2017). Interestingly, robotisation does not have to result in job losses, however, it makes it possible for the accountants to focus on more important tasks (Spanicciati, 2016).

However there are some challenges and risks that affect the expected outcome of automation. According to estimates, from about one-third to even half of RPA implementations fail first time (EY 2016). One of the reasons is targeting RPA at the wrong processes. The misstatement consists in introducing improvements in a complex process. This generates high costs. Low or medium complexity processes or sub-processes are the best initial target for RPA. Complex processes should be automated later (EY 2016). It should also be remembered that RPA does not improve processes themselves, but the tasks that create processes. If the processes are poorly designed, they will not be automated (Jędrzejka 2019). In addition, tasks that are automated should be identified and documented. Often, this documentation is incomplete or out of date.

Another limitation is forgetting about the IT infrastructure and assuming that RPA is all that' s needed to achieve a great ROI (EY 2016). Servers and storage should be secured for backup. Another limitation is the cost of purchasing software and creating preliminary processes. In subsequent years, there are costs associated with updating the implemented RPA systems (Jędrzejka 2019).

Cyber security is also a threat to RPA. Tasks performed so far by hand are converted into their digital counterparts. As a result, there is a risk of hackers (Jędrzejka 2019). There is also a threat that RPA will be used for hack and online crime (Gotthardt 2019).

Adequate management and control of RPA should help reduce these risks (PwC 2017).

Experience of the RPA implementation at the accounting services enterprise

Launching the study described in this paper is justified by the application of the RPA for the automation of accounting processes being a relatively new problem. At the same time such processes are one of the most frequently automated office processes (Mazilescu 2019). In Poland there operate a few dozen thousand accounting services enterprises serving about 2 million enterprises. For accounting services enterprises, the RPA implementation is a big challenge. For the ones which will be first to face the challenge, the RPA can assure a competitive advantage.

The study has involved a case study. It is a method used e.g. for investigating new problems, for instance the RPA application at accounting services enterprises.

An accounting enterprise located in the kujawsko-pomorskie province; Liberty Tax, established in 2008, has been selected for the study. The aim of the study has been to demonstrate the automation process implementation for entering documents at the accounting enterprise. There have been presented both the advantages and the disadvantages of the RPA software used. The research method selected was an individual uncategorized interview made with a Liberty-Tax accountant and the measurement tool – an interview questionnaire.

From the start of its operation the enterprise has been licensed by the Ministry of Finance. At the time of the project the enterprise included a chartered accountant, seven accountants, two HR specialists and two lawyers. It was serving 300 clients. The accounting software used was the Comarch ERP Optima.

Every month the company used to receive, on average, a few dozen thousand buying and selling documents to be entered into Optima.

The decision to test the RPA was taken when in the middle of last year only one client provided about one thousand purchase invoices and more or less the same number of the sales invoices. The first program used was the Scanye intelligent OCR. A poor transparency, not recognizing all the data and repeating the same counter parties are some of the program drawbacks mentioned by the accountant. At the end of last year, the program was replaced with the Invoice Digitizer. That solution has been implemented by the Liberty-Tax personnel under an IT supervision. The enterprise decided to do so mostly due to the fact that the documents can be entered directly from the Invoice Digitizer to the Comarch ERP Optima.

The system is user-friendly and it does not require any personnel's programming skills. Once the documents were collected from the client, they were adequately chronologically ordered, divided into buying and selling documents. It was also necessary to remove the staples from the documents. Once the invoices were placed in the ring-binder it was possible to start scanning. To do so the accounting enterprise purchased a special scanner to recognize the invoice data without having to take the invoices out from the ring-binders. The documents scanned were sent to computers where the accountant was verifying the data correctness. The program identified the following taxation data:

- invoice issue date,
- sales date,
- document number,
- seller's tax identification number (NIP),
- buyer's tax identification number (NIP),
- amounts of the net sales values, VAT, gross sales values divided into the VAT rates,
- bank account number of the counter party.

The Invoice Digitizer verifier facilitated an automatic data verification to make sure that the data is correct and it can be endorsed by the accountant. The Invoice Digitizer Verifier module facilitated verifying the following data:

- client identifier,
- NIP number of the counter party,
- invoice data,
- invoice number,
- VAT values divided into VAT rates.

The data verified was approved and then transferred directly to the accounting program. One employee was manually entering, on average, 80 invoices per hour into the program. The application of the program facilitated performing those actions 25% faster.

With the program it is possible to scan even a few hundred documents a day. The processing time gets shorter and so does the time of entering the documents into the program. The action not requiring any expertise is performed by an automated process. Scanning can be made by a single employee, while verifying the data – by the other ones. As a result, the documents are booked and the accountants can perform the tasks which require their specialist knowledge. The accountant has stressed that it refers only to the documents which are "recognizable" for the program. Otherwise the operation of the "robot" is much poorer than if the documents are entered by the accountant.

The problem appeared when the invoices were hardly recognizable. Most often those were the documents printed with dot-matrix printers. It was when the invoice numbers and dates were incorrect. Besides the documents which contained more than one table were recognized by the program incorrectly. The document issue dates used to be mistaken with the payment date – similarly as the amounts provided in the document, mostly net and gross.

The cost of introducing a single invoice by the program as compared with the cost generated by one employee entering the document by hand is definitely lower. However, as stressed by the accountant, the errors which are too frequent, instead of saving the time and simplifying the work, often make it longer and generate unnecessary costs.

Any incorrect recognition of the documents is notified of by the accounting enterprise to the software producer. Thanks to it, it is possible to improve the system. Despite the software corrections made by the manufacturer, an incorrect data recognition is often the case. The personnel noted some improvement, however they have been still searching for the solutions which help automating their work more efficiently.

With those suggestions in mind, the objective of this publication has been to present the potential benefits of implementing the RPA at accounting enterprises and a proposal of expanding the research with a higher number of the entities studied to improve the RPA systems offered by the providers.

Conclusions

The accounting enterprises should estimate the scope of the changes required and develop effective automation implementation strategies. The work of the accountants is mostly a huge number of documents to be processed. There are created more and more work-facilitating tools drawing on the OCR technology. Accountants gradually stop copying data from documents and start verifying the data.

The preliminary study results and the literature review have facilitated accomplishing the objective of this publication. The author decided to perform the preliminary study as the accounting enterprise has been making the first attempts at implementing the RPA to its operation. The tests show that the enterprise is open to introducing new technologies facilitating the automation of entering the documents to the accounting program. Despite the numerous benefits of implementing the RPA, some software defects making work considerably more difficult have been pointed to. Nevertheless, the accounting enterprise has not found a better method of facilitating the work of the accountants yet.

The literature seems to be lacking the empirical studies on the effectiveness of implementing the RPA systems at accounting enterprises. The case studies showing the effects of implementing such technologies are to provide more knowledge about the subject matter and to demonstrate any potential imperfections of the systems. It is then justifiable to perform further studies at accounting enterprises with the multiple case study method.

Many accounting services enterprises, despite the eagerness to launch the automation, might not have the sufficient funds to help “robots” learn and to experiment with the tasks they could optimize. The experience of the successive accounting enterprises which have implemented the RPA could be used to improve the systems by the manufacturers. They could help indicating the accounting processes most adequate for automation and those for which automation is doubtful. Additionally, the conclusions from this publication can be a guideline for the enterprises still considering the introduction of accounting processes automation.

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Formation of Intellectual Capital of An Innovation Active Industrial Cluster

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Abstract

Most countries are on the threshold of transition to the fourth industrial revolution which will undoubtedly determine the future of economic development. A study conducted on formation, development, use, impact and evaluation of intellectual capital in cluster associations revealed inadequate research of formation of the intellectual capital and its structural parts. Therefore, the purpose of this work was to study the formation of the intellectual capital of an innovation active industrial cluster. The paper defines the intellectual capital, the innovation active industrial cluster and presents the structure and formation of the intellectual capital in the innovation active industrial cluster. The authors propose stages of intellectual capital assessment in an enterprise of innovation active industrial cluster, which include estimation of intellectual capital of innovation active industrial cluster; allocation of share of value of the intellectual capital included in each unit of its products from the received value of the intellectual capital; distribution of the received share of the value of the intellectual capital included in each unit of its products among enterprises that participated in creation and production of the products on basis of individual agreements concluded between them; summing of the intellectual capital for all products of the enterprise created in the innovation active industrial cluster to determine an increase in the intellectual capital of the enterprise formed in the process of finding this enterprise in the cluster; summing of results obtained with the value of the intellectual capital of the enterprise at the time of entering the cluster.

Keywords: Intellectual Capital, Structural Capital, Relational Capital, Innovation Active Industrial Cluster.

Introduction

As noted in the work of German economist Klaus Schwab, "The fourth industrial revolution" (2017), the fourth industrial revolution is a transition from simple digitalization (the third industrial revolution) to the following:

– innovation based on combinations of technologies (the fourth revolution);
– information platforms that combine supply and demand and violate existing production structures;
– new organizational forms and business models.

In this regard, it is appropriate to say that most countries are on the way to the fourth industrial revolution, which will undoubtedly determine the future nature of economic development, as described by Shipunova et al (2018), forms of integration processes in the field of industrial production, studied

by Schepinin and Skhvediani (2018), as well as key indicators of the functioning of economic sectors, which Babkin et al (2019), Zeng at al (2019), Molina-Morales at al (2017) draws attention to. Analyses of innovative platforms and technologies can be found in different papers, for example, in the article of Alekseeva and Stroganova (2019).

In the context of economic modernization and its transition to a new level of "digitalization", the issues of innovative development of enterprises that are part of the structure of industrial clusters, studied by Babkin and Tashenova (2019), and actively implementing innovative developments, become particularly relevant. In terms of its potential and special structure, the cluster approach, which is actively applied to industrial enterprises, is an integral mechanism for improving the competitiveness of economies around the world, as analyzed by Schepinin and Skhvediani (2018), accelerating processes of innovative development in various sectors, as explored by Gutman et al (2017) and Kuzovleva et al (2019), stimulating local initiatives to intensify interaction between industrial enterprises, the state and end consumers.

The founder of the cluster approach, M. Porter (1990), considered it to be a comprehensive approach to understanding conditions and trends of the innovative development. Nowadays theoretical provisions of the cluster approach are being developed in various areas of scientific research. Tong and Tao (2017) propose a method for evaluating effectiveness of high-tech industry cluster policies based on fuzzy deployment of a quality function. Varshneya et al (2018) offer an optimization model for industrial cluster design. Buyanova et al (2018) consider clustering as an effective factor of import substitution. Selentyeva et al (2018) analyze the role of state cluster policy and results of the development of the innovative clusters and offer improved approaches to evaluating these results.

Moreover, we can emphasise studies that are devoted to the formation, development, use, and impact of the intellectual capital in cluster associations. Agostini et al (2017) focused on the study of a relationship between power of the intellectual capital and innovation activity of small and medium-sized enterprises combined in a cluster. Empirical research by Cavalheiro and Brandao (2017) shows that the formation of structural capital is more intensive in clusters than in individual enterprises. Li et al (2019) found that the cluster's innovation environment has a direct impact on the innovation activities of enterprises that are part of the cluster. These papers develop an extensive line of research on the use of the cluster intellectual capital. This topic is very relevant due to the fact that the intellectual capital, according to Roos et al (2010), is involved in creating value, according to Stewart (1994) and Sudarsanam (2003), increases competitiveness, and Skaikh (2004) and Petrash (1996) consider it a former of wealth, income, value, and increasing value, which are an important area of research for cluster formations.

A review of literature on the formation, development, use, impact and evaluation of the intellectual capital in cluster associations identified inadequate research of the formation of the intellectual capital and its structural parts in the innovation active industrial cluster and evaluation of intellectual capital of enterprise in innovation active industrial cluster. In this regard, the purpose of this work is to study the formation of the intellectual capital of the innovation active industrial cluster. To achieve this goal, we had the following tasks.

1. To define and present the structure of the intellectual capital of the innovation active industrial cluster.
2. Define and present the structure of the innovation active industrial cluster.
3. To present the formation of the intellectual capital and its structural parts in the innovation active industrial cluster.
4. Propose stages of assessing the intellectual capital of the enterprise in the innovation active industrial cluster.

Materials and Methods

The methodological apparatus of this work is based on a combination of basic methods of general scientific and natural science knowledge. The work uses methods of observation, generalization, abstraction, and a graphic method.

Results

The paper presents the structure of the intellectual capital (Fig. 1).

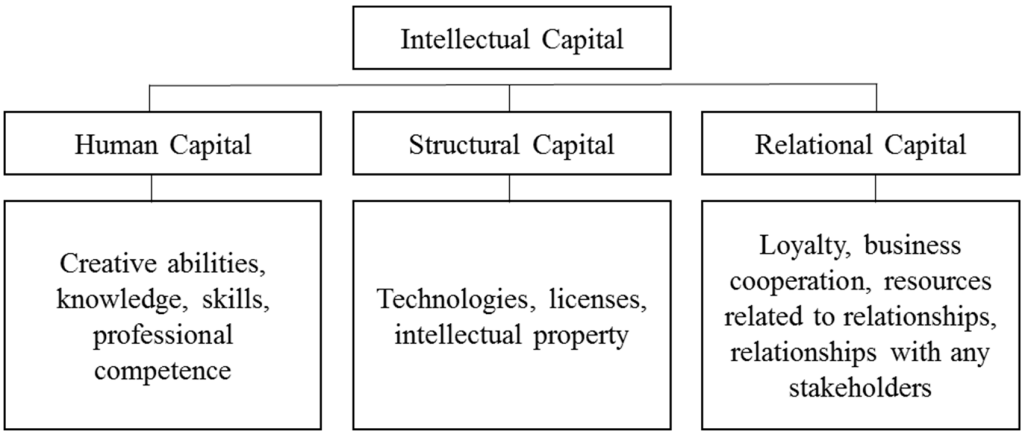

Fig. 1: Structure of the intellectual capital of the innovation active industrial cluster

The paper proposes the structure of the innovation active industrial cluster, shown in figure 2.

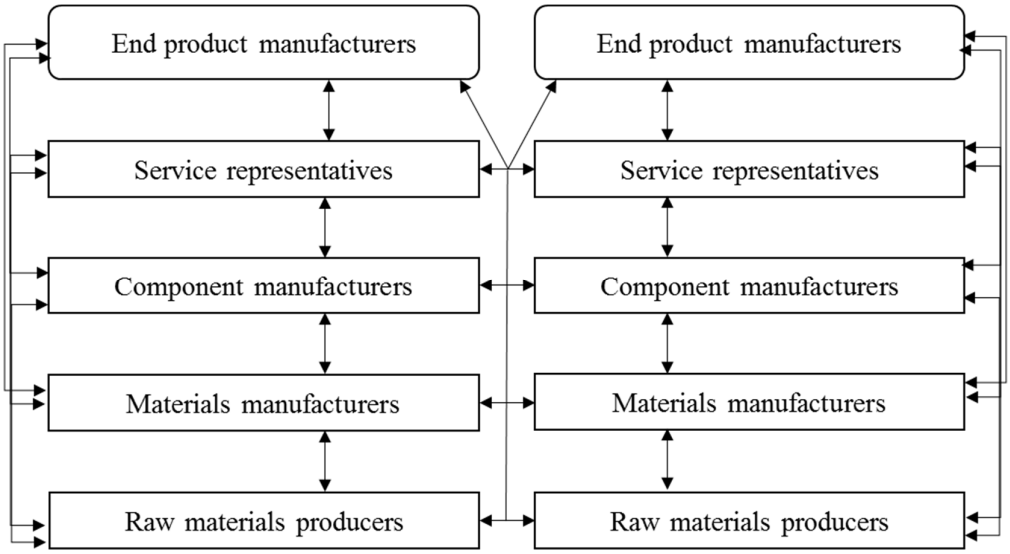

Fig. 2: Structure of the innovation active industrial cluster

Figure 3 schematically depicts the formation of the intellectual capital of the innovation active industrial cluster by creating its innovative products.

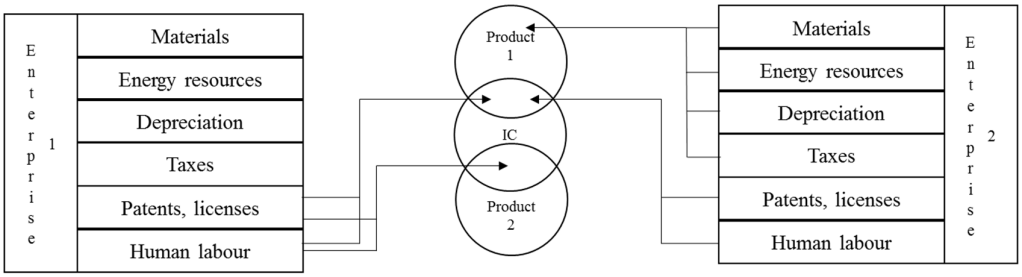

Fig. 3: Formation of the intellectual capital of the innovation active industrial cluster

Discussion

The Intellectual Capital

The intellectual capital is a set of intangible assets that bring or can potentially bring their owner income through their use. In this case, by the intangible assets we understand a much larger set of assets than it is accepted in accounting. We remove restriction on including such requirements as the availability of title documents, the possibility of the allocation and separation of the object, the absence of an assumption about the sale of the object in the composition of intangible assets. This view of the intangible assets in the management of the intellectual capital is not new and is supported by scientists such as Roslender and Fincham (2001) and Kozyrev and Makarov (2003). We include loyalty, business cooperation, resources related to relationships, relationships with suppliers, customers, partners, and any stakeholders as part of the intangible assets. The listed assets will be a part of the relationship capital. The human capital includes the creative abilities, knowledge, skills and professional competence of the staff. The intellectual capital also includes technologies, licenses, and intellectual property. In this paper we schematically present the structure of the intellectual capital in figure 1.

The Innovation Active Industrial Cluster

At this stage, it is worth defining the concept of "an industrial cluster" which should be understood as a set of subjects of activity in the field of industry and related organizations that work together and solve production, marketing and innovative tasks effectively. Development of innovations and introduction of innovations in the field of information technologies provides industrial clusters with a high level of competitiveness, as well as gives an opportunity to move to a new level of organization and effective functioning in conditions of modern economic development. Hence, we consider "innovation clusters" or "innovation active industrial clusters" to be the clusters that use innovations that have already been created or developed independently (usually technological or technical) and carry out production including innovative products.

Therefore, the innovation active industrial cluster should be understood as a group of interconnected industrial, scientific and educational enterprises, as well as other organizations (financial, consulting, engineering and other companies) actively working together to achieve key performance indicators and interacting with each other to develop, implement, and commercialize innovations and innovative products. In other words, the innovation active clusters are the clusters that actively use various innovations (process, structural, organizational, technical, etc.) in their activities and, accordingly, ensure the production of a significant share of high–tech competitive products with a high degree of added value.

Here the authors consider the structure of the innovation active industrial cluster. The innovation active industrial cluster consists of companies that produce raw materials, manufacturers of materials and components, enterprises that provide services of a production nature, and, finally, mandatory companies that produce final products. At the same time, there must be at least 1 manufacturer of the

final product. All or most of them are linked by economic relations (Fig. 2) aimed at creating the ultimate innovative and highly competitive product.

Formation of the intellectual capital of the innovation active industrial cluster

The existence of relationships between entities in figure 2 indicates the presence of relationship capital represented by business collaboration and relationships with partners in the cluster. Each entity working in the cluster acquires and strengthens its relational capital by creating trust and reliable relationships within the cluster. At the same time, the totality of all relationships between cluster entities can be classified as the relational capital of the innovation active cluster. This relational capital will be related to internal relational capital of the cluster. The formation of external cluster capital can occur due to recommendations that can be given by cluster partners to each other regarding their contacts that are external to the cluster. In case of the internal relational capital, the cluster receives all the benefits from its presence. In event of the external relationship capital, the benefit of its presence is distributed between the cluster and the entity outside the cluster. Moreover, this distribution is not necessarily equal, the proportion will depend on the benefits that each party will receive from cooperation.

Due to the fact that the cluster is interested in innovation activity, the emergence of relations between the partners in the cluster is possible in the field of research activities. Research activity is the use of creative abilities and professional skills of people; thus, the authors move to consideration of the formation of human capital of the cluster.

In the context of business and scientific cooperation, scientific and technical cooperation is greatly simplified. Modern digital communication systems also contribute to this. The management of the innovation active industrial cluster can specifically conduct events that allow employees of the cluster enterprises to meet at conferences, forums, and exhibitions that facilitate exchange of ideas and creative implementation. For example, hackathons held among IT-specialists have recently become very popular. Holding such events among the employees of the innovation active industrial cluster allows the cluster to expand its scientific and technical potential on the basis of existing enterprises. These activities can also be carried out with involvement of external entities in relation to the cluster. Therefore, occurrence of a promising and meaningful cooperation between the subjects of the innovation active industrial cluster and external subjects can affect the development of the external relationship capital or attract new partners to the cluster, which will lead to the development of the intellectual capital of the innovation active industrial cluster.

New ideas and solutions often arise in communication with new people through new information, experience, or external evaluation. In this regard, the development of research interaction is possible between the employees working in different organizations of the innovation active industrial cluster. We can say that the interaction of the human capital of different enterprises within the cluster is based on the relational capital that is acquired and accumulated there. If the employees of different organizations of the innovation active industrial cluster manage to obtain successful R&D results, create a working prototype and issue a patent for an invention or utility model because of the research interaction, then the result will be an intellectual property, which is a part of the structural capital.

Nevertheless, a complex issue of distributing the contribution of each participant of the innovation active industrial cluster that participated in cooperation and created new products exists and is subject to legal settlement, preferably at the initial stages of such interaction. However, if this invention begins to be used for the production of the final product of the innovation active industrial cluster, it can be attributed to the structural capital of the cluster. It should be noted that creating a successful invention is not enough: its use should be included in production processes to create products of the innovation active industrial cluster that requires the passage of bureaucratic procedures and is also built on effective internal communication and partnership between the enterprises of the cluster, i.e. on the structural capital.

In this part of the paper the authors want to dwell on distribution of the contribution made by each subject of the innovation active industrial cluster to the creation of a new product of the cluster. It is

obvious that the greater contribution to the creation of the product the participant makes, the greater share of the intellectual capital they have a right to claim to. Investment in creating the product can be made by transferring fixed assets, allocating time for qualified employees to create the product, paying for materials, energy resources, as well as the ability to use the company's existing licenses, patents, and R&D resources. If the licenses and patents are granted to create the new product, then we are talking about providing the part of the company's structural capital. R&D, which is unexecuted by proper documents, and the time allocated to the qualified employees represent the human capital. If several employees of the company are provided for the implementation of the project, representing a cohesive team, then we are talking not only about the human but also about the relational capital. Therefore, the enterprise can provide all the elements of the intellectual capital to create the new product.

Thus, it can be seen that the use of elements of the intellectual capital for the innovative activities of the innovation active industrial cluster is intertwined, mixed and integrated so tightly that the allocation of currently working elements becomes a very difficult task and largely depends on specific agreements between the cluster participants, which are individual in its nature, taking into account a huge number of factors of the internal and external environment.

The formation of the intellectual capital of the innovation active industrial cluster by creating its innovative products is schematically shown in figure 3.

Stages of Assessing the Intellectual Capital of An Enterprise in The Innovation Active Industrial Cluster

The diagram shown in Fig. 3 allows us to present the stages proposed for assessing the intellectual capital of enterprises in the innovation active industrial cluster, which generally consist of five stages.

1. Estimation of the value of the intellectual capital of the innovation active industrial cluster.
2. Allocation of the share of the value of the intellectual capital included in each unit of its production from the received amount of the value of the intellectual capital.

3. Distribution of the received share of the value of the intellectual capital included in each unit of its production among the enterprises that participated in the creation and production of the products on the basis of individual agreements concluded between them.
4. Summing of the intellectual capital for all enterprise products created in the innovation active industrial cluster to determine the increase in the intellectual capital of the enterprise formed during the presence of this enterprise in the cluster.
5. Summing of the result obtained in a clause 4 with the value of the enterprise's intellectual capital at the time of entering the cluster.

The first stage, which consists of assessing the intellectual capital of the innovation active industrial cluster, is proposed to be carried out using known methods of assessing the intellectual capital which are presented in the following table with the use of research materials made by Sveiby (2010), Idchenko and Elkin (2013), Lisevich (2015) (table 1).

Table 1: methods for evaluating the intellectual capital of the innovation active industrial cluster

Name of a group of methods	Essence of a group of methods	Disadvantages of a group of methods
Direct Intellectual Capital methods (DIC)	A monetary assessment of the intellectual capital is made. The assessment is based on the identification of the intellectual capital components. The components are evaluated either individually or aggregated.	The complexity of identifying the components of the intellectual capital. Possibility of double counting of the components. Laboriousness.
Market Capitalization Methods (MCM)	A monetary assessment of the intellectual capital is made. Evaluation is based on the difference between the company's value and the value of its non-tangible assets.	Application is difficult if the company's shares are not listed on the market or their liquidity is low. Laboriousness.
Return on Assets methods (ROA)	A monetary assessment of the intellectual capital is made. The assessment is based on a comparison of the return on assets of the company, whose intellectual capital is estimated, and the companies in this industry. The excess of the industry average return is attributed to the cost of the intellectual capital.	The estimation error is based on the fact that medium-sized companies also have the intellectual capital.
Scorecard Methods (SC)	The assessment is based on the creation of a system of indicators and indexes, which will be presented later in the indicator system or in charts.	The results of the evaluation are informational in its nature and do not allow us to give a monetary estimate of the value of the intellectual capital.

On the second stage, the question about how to divide the value of the intellectual capital of the innovation active industrial cluster between the products it produces arises.

Due to the fact that the use of the elements of the intellectual capital for cluster innovation is intertwined, mixed and integrated tightly, it is very difficult to allocate the cost of its elements using direct counting methods and it can only be done with a sufficiently large confidence interval. At the same time, it should be noted that all the elements of the intellectual capital of the subjects of the innovation active industrial cluster should be equal to the intellectual capital of the entire cluster. This assumption is the basis for the formula proposed by us for determining the value of the intellectual capital of the innovation active industrial cluster in each type of product that it produces.

The amount of the intellectual capital in the i-product of the innovation active industrial cluster will be determined by the following equation:

$$\boldsymbol{IC_{p_i} = IC_c \times \frac{K_i^1 \times K_i^2}{\sum_{i=1}^{n}(K_i^1 \times K_i^2)}} \quad (1)$$

where ICp_i is the share of the intellectual capital in the *i*-product; *i* – the cluster product ($1 \leq i \leq n$); *n* – the number of types of products produced by the innovation active industrial cluster; *ICc* – the intellectual capital of the innovation active industrial cluster; *K1* – the coefficient of the achieved result;

K2 – the coefficient of complexity of the problem solved.

The coefficient of the achieved result reflects the characteristics of the products that are produced using the intellectual capital. The rating scale should be created within the cluster, taking into account its industry orientation. In general, the following scale can be used.
– Secondary characteristics of the created product have improved – 1.
– Improvement of the primary characteristics of the created product has been achieved – 2.

– New products that are superior in their characteristics to those available on the market have been created – 3.
– New products that have no analogues in the market have been created – 4.

The complexity coefficient of the problem solved can generally be measured using the following score scale:

– One parameter of the mechanism has changed – 1.
– Non-basic design of the mechanism has changed – 2.
– The basic design of the mechanism has changed – 3.
– The mechanism has changed completely – 4.
– A particularly sophisticated mechanism has changed completely – 5.
–

The third stage of assessing the intellectual capital of the subjects of the innovation active industrial cluster has an individual character and takes into account the contribution made by each subject of the cluster to the creation of the new product within the cluster. The share of the intellectual capital of the company that participated in the creation of the product will be determined as follows:

$$IC_{c_j p_i} = \boldsymbol{IC_{p_i}} \times \frac{\boldsymbol{CCi\ (Mat., ER, Depr., ITA, Sal.)}}{\sum_{i=1}^{m} \boldsymbol{CCi\ (Mat., ER, Depr., ITA, Sal.)}} \qquad (2)$$

where ICc_jp_i is the share of the intellectual capital of the j-company in the i-product; ($1 \leq j \leq m$); m – the number of companies involved in creating the product of the i-product; ICp_i – the share of the intellectual capital in the i-product; CCi – the contribution made by each cluster company to the creation of the i-product; *Mat.* – the cost of materials, *ER* – the cost of energy resources, *Depr.* – the depreciation of fixed assets, *ITA* – the intangible assets in form of the patents and licenses provided to create new products, *Sal.* – the monetary value of time and skills of employees working on product creation (salary).

The sum of the intellectual capital for all products of the enterprise created in the innovation active industrial cluster will represent the added intellectual capital of the enterprise formed during the process of presence this enterprise in the cluster. The resulting value must be added to the value of the enterprise's intellectual capital at the time of entering the cluster.

Consequently, the implementation of the proposed stages allows us to get the assessment of the intellectual capital of the enterprise in the innovation active industrial cluster.

Conclusion

The authors of this paper proposed the definition of the intellectual capital which is presented as a set of the intangible assets that bring or can potentially bring their owner the income through their use and consists of the human, structural and relational capital. The paper also defines the innovation active industrial cluster as a cluster that uses innovations that have already been created or developed independently (usually technological or technical) and carries out production including innovative products. The innovation active clusters are clusters that actively use various innovations (process, structural, organizational, technical, etc.) in their activities and, accordingly, ensure the production of the significant share of the high-tech competitive products with the high degree of the added value. The innovation active industrial cluster consists of the companies that produce raw materials, the manufacturers of materials and components, the enterprises that provide services of the production nature, and, finally, the mandatory companies that produce the final products.

All the participants contribute to the formation of the intellectual capital of the innovation active industrial cluster by allocating and integrating both material and non-material resources. The use of elements of the intellectual capital for the innovation activities of the innovation active industrial cluster is intertwined, mixed and integrated tightly. The formation of the intellectual capital of the innovation

active industrial cluster happens due to the creation of trusted and reliable links within the cluster. The interaction of the human capital of different enterprises within the cluster is based on the relational capital that is acquired and accumulated there through the organization of scientific and technical cooperation.

The paper presents five stages, the implementation of which will determine the value of the intellectual capital of the enterprises in the innovation active industrial cluster, taking into account the value of the intellectual capital of the innovation active industrial cluster, the complexity of the problems solved and achieved results of the innovative products, created and produced by the cluster, the contribution made by each individual cluster to the creation of the new product in the cluster and the value of the intellectual capital of the enterprise which it had before the entrance to the cluster.

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Age Diversity, Knowledge Transfer and Organizational Performance

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Abstract

A review of the literature on the subject suggests that the potential benefits for organizations from the occurrence of diversity do not arise automatically as a result of increasing the diversity of employees due to age in the workplace, but are, among others, the result of complementarity of competences of employees from different age groups. It can be assumed that the positive effects of diversity due to age require the transfer of knowledge between employees. Knowledge transfer is understood as learning from internal and external experts, other teams and departments. On the other hand, the transfer of knowledge among age-diverse employees refers to the process of knowledge exchange among themselves, for example through discussion, imitation and cooperation. The purpose of this article is to discuss the age diversity of organizational performance and to propose knowledge transfer as a mechanism to help improve these results.

Keywords: Employee Age, Knowledge Transfer, Financial Results, Non-Financial Results

Introduction

In the recent years, scientists and practitioners have become increasingly interested in the widely understood diversity of employees in organizations (Shemla, Meyer, Greer, Jehn, 2016). The presence of age-diversity phenomenon within an organization is a more and more common and heterogeneity is becoming an increasingly important organizational issue (Avery, McKay, Wilson, 2007). The topic has recently gained importance because demographic changes have altered the age composition of workforces (Shultz, Adams, 2007): First, age diversity is increasing, which means that, in some companies, members of up to four different generations are working side –by-side, thus providing numerous opportunities for interactions between age-diverse coworkers (King, Bryant, 2017). Second, the number of older workers is increasing, requiring organizations to find ways to retain the valuable knowledge of older workers before they enter retirement (Burmeister, Deller, 2016).Results of conducted research indicate that there are differences in approach to the older and younger employees (Furunes, Mykletun, Solem, 2011). Older employees are perceived as persons not willing to acquire new skills and reluctant towards new technologies and changes (Armstrong-Stassen, Schlosser, 2008). On the other hand, very young employees are considered to lack of actual substantive knowledge and experience (Hysa, 2016).

There are conflicting views on the impact of age-diversity on the organizational performance. Some researchers claim, that it has a positive impact (e.g. (Kilduff, Angelmar, Mehra, 2000), other researchers have indicated that there is no significant impact (e.g. (Backes-Gellner and Veen, 2013), and – moreover - other studies indicate that this impact is negative (Zenger and Lawrence 1989).

As age-diversity in the workplace is increasing, we believe it is necessary to understand how to boost its positive impact on performance. We propose, that knowledge transfer may serve as an important mechanism that mediates between age diversity and performance. The purpose of the article is to discuss age-diversity on the organization's results and to propose the transfer of knowledge as a mechanism that helps to improve these results.

The Importance of Employee Diversity Based on Age

Diversity is a term describing the distribution of differences between members of a given entity (e.g. organization, group) in relation to a specific feature. When describing the diversity of a given attribute within the examined entity (e.g. group or organization), this entity is described as a whole, not the differences between members - which is the subject of most intergenerational differences currents. It is often described as heterogeneity, relationship demographics, or organizational demographics. Research from the perspective of diversity understood in this way has shifted the interest of individuals to organizations as a whole (Appannah, Biggs, 2015). Diversity can be understood as a construct composed of two dimensions: diversity at shallow and deep levels. The first level refers to the easily noticeable (and thus useful due to quick assessments) characteristics of the members of the organization, or groups such as gender, race or age. The second level contains similarities such as attitudes, values and beliefs, network connections, or even results, as well as personality, i.e. traits that are difficult to observe.

Diversity due to age is defined as differences in the age distribution among employees (Boehm, Kunze, Bruch, 2014). In previous studies on the diversity of employees by age, the focus was rather on the characteristics of a particular age group, for example on the group of employees aged over 50 and supportive measures for their work (Komp-Leukkunen, 2019). The literature on the subject rarely indicates the diversity of employees due to age and the benefits of this diversity for the organization. The concept of employee diversity due to age is primarily related to the results of the organization. This diversity can have a positive and negative impact on the organization's results (Komp-Leukkunen, 2019). This positive impact results from the complementarity of competences and professional experience of employees in such a diverse team, more diverse possibilities of problem solving, more developed motivational processes and more diverse and more effective transfer of knowledge from older to younger generations, which contributes to the synergy effect (Horwitz, Horwitz, 2007). The diversity in terms of employees' age shows a wide variety of knowledge, values and professional experience (Cannella Jr, Park, Lee, 2008). Therefore, the team, diversified in terms of age, has a greater amount of knowledge and greater opportunities to solve problems. Knowledge can be from different areas (e.g. technical, social) or at different levels (e.g. beginner or advanced). Younger people may have a high level of theoretical knowledge, but may have less professional experience, unlike older people. Connecting employees with such different knowledge, levels of competence and skills reduces the risk of one-sidedness and unwillingness to innovate compared to employees with a very similar set of features, skills and experience. It is assumed that the joint operation of employees who are different in terms of age contributes to the increase of employees' general knowledge, which has a positive impact on problem solving and increase in employee productivity (Backes-Gellner, Schneider, Veen, 2011). In teams of various age, the creativity of employees is stimulated, the ability to solve problems increases, the decision-making process is improved, and ultimately the organization's efficiency increases.

Research shows that greater diversity due to age can also help counteract problems related to employee motivation. An excessively homogeneous age group of employees may hinder promotion and development opportunities for young or older employees. A homogeneous group of employees uses incentives that suit them and thus take full advantage of opportunities for promotion or development in the company, discouraging other age groups from becoming more involved in work (Gibbons, Waldman, 2006). Conversely, greater diversity due to age should increase employee productivity by providing diverse, attractive to all, professional motivators. In addition, a homogeneous group of employees prevents the transfer of specific, often hidden knowledge, to younger employees. Only if the employee teams are diverse in terms of age will it be possible to transfer valuable specialist knowledge to younger employees, which is the basis of their development (Gibbons, Waldman, 2006). A more diverse team of employees due to age makes the transfer of tacit knowledge, important for the company, between employees easier (Backes-Gellner, Veen, 2013). To sum up, one can expect greater benefits resulting from the growing diversity of employees due to age, with proper use of human resource management tools.

Age diversity and organizational performance

Researchers distinguish between two groups of results: financial and nonfinancial. To cite only a few research on financial results, based on a review of the literature on entrepreneurship, Murphy et al. (Murphy, Trailer, Hill, 1996) identified four main dimensions of the organization's results: (1) performance (e.g. return on investment ROI, return on equity ROE), (2) growth (e.g. increase in sales), (3) profitability (e.g. net income) and (4) volume (e.g. net sales). The researchers also suggested that the fifth dimension add: survival (being competitive on the market). In turn, Woo and Willard (1983) analyzed organizational results and found the following four dimensions: (1) profitability (e.g. return on sales), (2) relative market position (e.g. product quality towards competitors), (3) change in profitability and cash flow (e.g. ROI volatility) and (4) increase in sales and market share (e.g. market share). Rowe and Morrow (Rowe and Morrow Jr. 1999) pointed to such organizational results as: (1) subjective feelings (e.g. reputation and happiness surveys), (2) finance / accounting (e.g. return on assets (ROA)) and (3) market results (e.g. Sharpe index). Similarly, Tosi et al. (Tosi, et al. 2000) analyzed over thirty measures relating to the organization's results to distinguish eight dimensions of these results. In general, these studies confirm that the results of the organization are a multidimensional construction, often depending on analytical (qualitative data sources and survey measures.

The relationship between the diversity of employees due to age and the results of the organization is most often presented at the individual or group level (Harrison, Klein, 2007) less often at the organizational level. At the organization level, the impact of dependencies on financial results is analyzed, such as: return on assets and return on equity (Wei, et al. 2005) and sales growth (Richard and Shelor 2002). The diversity of employees who have reached the age needed to achieve a positive impact on first-level results (e.g., Turnover) and second-level organizational results (e.g., Profitability). Based on the analysis of results of conducted studies, it may be stated that the age-related diversity of employees is positively related to the rate of return of assets and return on equity (Wei, et al. 2005), sales increase (Richard and Shelor, 2002) as well as the method of reaching business decisions (Goll, Sambharya and Tucci, 2001). Additionally, As the indicated correlation between the diversity of employees due to their age and results is related most frequently to the individual or to the group level than to the level of organization, it is worthwhile to carry out an empirical study facilitating the verification of assumption that the age-related diversity of employees affects the improvement of results at the level of the entire organization.

When it comes to non-economic results, most often the literature on the subject gives examples of these results e.g.: creativity, innovation and flexibility In general, non-economic goals, including social ones, are difficult to quantify and their implementation shapes the image of the company as per the record in the declaration (Backes-Gellner, Schneider and Veen, 2011). The theoretical perception of diversity that refers to nonfinancial results is indicated by Harrison and Klein (2007). The three types of diversity are essentially distinct. Separation describes the differences among unit members in their position. Diversity describes the differences among members of units from different categories, reflecting access to unique sources of knowledge. Disparity is defined as a composition of (vertical) differences in proportion of socially valued assets or resources held among unit members; inequality or relative concentration. Referring to quoted definitions, age diversity may be classified as a variety type of diversity which should produce results such as greater creativity, innovations, higher quality of the decision, less task conflicts, increased unit flexibility (Harrison and Klein 2007, p. 232). Takin above into consideration, we hypothesize:

H1. Age diversity in the workplace will be positively related to organizational performance.

H1a. Age diversity in the workplace will be positively related to financial performance.

H1b. Age diversity in the workplace will be positively related to nonfinancial performance.

Knowledge transfer as a mediator of relationships between age diversity and organizational performance

Knowledge transfer in age diverse coworker dyads refers to the process whereby two employees who belong to different age groups exchange knowledge with each other, for example, via discussion, imitation, and cooperation (Gerpott, Wenzel, Lehmann-Willenbrock, Voelpel, 2015). However, while research on ageing in the workplace has been burgeoning (Truxillo, Finkelstein, Pytlovany, Jenkins, 2015), scholars have only recently begun to examine knowledge transfer in age-diverse workforces (Burmeister, Deller, 2016). Initial empirical evidence suggests that knowledge transfer between younger and older employees can be valuable as they can benefit from each other's diverse knowledge (Gerpott, Wenzel, Lehmann-Willenbrock, Voelpel, 2015). However, age diversity can also impede knowledge transfer (Williams, 2016) as individuals have a natural tendency to prefer interactions with peers that are similar to them (Tajfel, Turner, 1986), especially with regard to their socio-demographic characteristics such as age. Thus, age differences can hamper communication, cooperation, and knowledge transfer (Ellwart, Bündgens, Rack, 2013). Accordingly, knowledge transfer among age-diverse coworkers is a difficult process that needs to be facilitated by organizations.

While engaging in knowledge transfer can benefit employees in several ways, for example, by feeling valued and connected to others, and by being able to generate more creative ideas (Burmeister, Deller, 2016), knowledge transfer is a challenging process. Specifically, knowledge transfer may be in conflict with individuals' self-interest due to the sacrifices and risks associated with sharing and receiving knowledge. First, sharing valuable knowledge may be perceived as diminishing one's individual competitive advantage as shared knowledge is no longer someone's exclusive resource (Bock, Zmud, Kim, Lee, 2005). Second, receiving knowledge is associated with considerable time investments, and the willingness to admit knowledge gaps, which might be perceived as a reputational risk (Burmeister, van der Heijden, Yang, Deller, 2018).

Yet, bidirectional knowledge transfer (i.e., the sharing and receiving of knowledge between two employees) is a difficult process that requires investments of time and effort from both actors (Szulanski, 1996). In the context of age-diverse workforces, it can be further inhibited by age effects resulting from age norms. Age norms are 'widely shared judgments of the standard or typical age of individuals holding a role or status' (Burmeister, van der Heijden, Yang, Deller, 2018). The applicability of this perspective to work context remains untested to date (Rudolph, Zacher, 2015). However, initial empirical evidence suggests that older workers seem predestined to be perceived as knowledge senders (Voelpel, Sauer, Biemann, 2012), while younger workers seem to be expected to occupy the role of knowledge recipients (Deal, Altman, Rogelberg, 2010). These perceptions seem to operate regardless of individuals' tenure, experience and expertise (Dunham, Burt, 2011), which might be indicative of normative expectations about the roles that individuals should hold at certain ages when engaging in knowledge transfer.

However, this one-directional conceptualization of knowledge transfer, in which older workers only occupy the role of knowledge senders and younger workers only occupy the role of knowledge recipients, has two main limitations. First, younger workers possess valuable knowledge that, only when shared with other organizational members, can foster individual and organizational productivity (Gerpott, Wenzel, Lehmann-Willenbrock, Voelpel, 2015). For example, younger workers can contribute their latest scientific and technical knowledge (Gerpott, Wenzel, Lehmann-Willenbrock, Voelpel, 2015), and they can function as catalysts that unlock the knowledge base of older workers through questioning and discussion (Tempest, 2003). Second, older workers, who are only required to share their knowledge but are not expected to seek knowledge, may be deprived of the opportunity to learn and further develop their career, a factor that has been shown to be important for their motivation to continue working (Kooij, de Lange, Jansen, Dikkers, 2008). Consequently, while it seems appealing to conceptualize older workers as knowledge senders and younger workers as knowledge seekers, organizations that only facilitate one-directional knowledge transfer between older and younger workers may not use the full potential of their age-diverse workforces.

It was not long ago that scientists started studying knowledge transfer among employees at a different age (Kulik, Ryan, Harper, George, 2014). Initial empirical evidence suggests that knowledge transfer between younger and older employees may be valuable, as it is possible to make use of versatile knowledge of the other person. However, age diversity may also hamper knowledge transfer, since individuals have a natural tendency to prefer interactions with one's peers, with similar characteristics, particularly with reference to socio-demographic features, such as age. Age differences, then, may make communication, cooperation and knowledge transfer more complicated. Consequently, knowledge transfer among employees are diverse in age a difficult process, which must be supported by organizations (Burmeister, van der Heijden, Yang, Deller, 2018). The study would allow providing an answer regarding the degree in which the transfer of knowledge between various age groups mediates between the age-related diversity of employees and the results of the organization. Taken together, we hypothesize:

H2. Knowledge transfer will mediate the relationship between age diversity in the workplace and o organizational performance.

Conclusions

Studies of demographic diversity in teams and organizations, including age diversity, are based on two competing theoretical perspectives suggesting that diversity is a double-edged sword with positive and negative effects on the organization's results (Kunze, Boehm, Bruch, 2011); (Kunze, Boehm, Bruch, 2013). Age diversity creates a pool of complementarity of age-specific knowledge and skills differences, which can contribute to synergies (Horwitz, Horwitz, 2007). In organizations where employees are in the similar age often compete with each other, showing a low level of feasibility of tasks (Cho and Mor Barak 2008), hence the polarization of employees' age may have a negative impact on the organization's results.

According to the information / decision perspective, mixing employees of all ages could therefore stimulate employee creativity, problem solving ability, quality decision making, employee performance, and ultimately have a positive impact on the organization's results. On the other hand, based on the theory of social similarity and categorization, researchers of demographic change argued that age diversity may also entail different references to values that may impede cohesion, social integration and employee collaboration (Carton, Cummings, 2012), ultimately having a negative impact on the organization's results. Given these competing forces, it is not surprising that empirical research on the effects of age diversity is very often fragmentary and ambiguous (Klein and Harrison 2007). For example, Kunze, Boehm and Bruch (2011) reported that age diversity has a negative impact on solid results through emotional involvement. By contrast, according Grund and Westergaard-Nielsen (Grund, Westergård-Nielsen, 2008) this age diversity has an inverted U-shaped relationship with labor productivity. In summary, these ambiguous findings "can be attributed to the neglect of researchers by possible mediators and moderators in the relationship between age diversity and organizational demographics" results (Kunze, Boehm, Bruch, 2011).

Age diversity - referring to age heterogeneity - is to be manifested by differences in knowledge, courage conducive to synergies that increase the company's efficiency. Conversely, age polarization - referring to the division of the workforce into separate homogeneous subgroups - is expected to trigger age-related subgroups of the group, causing negative effects of diversity (e.g., difficult collaboration) that diminish organization's performance. Secondly, taking into consideration recent studies on the diversity of working groups in organizations, e.g. (Carton, Cummings, 2012), (Kunze, Boehm, Bruch, 2011), we argue that the impact of the age composition of the workforce probably depends on the basic context in which people cooperate. That is why we believe transfer of knowledge between employees is so important. Knowledge transfer by may contribute to increasing employee motivation, increasing the ability to transfer and receive knowledge, exchanging knowledge not only individually but in groups for the benefit of a larger number of recipients. There is also rise in creativity and the thinking perspective expands and valuable knowledge is preserved in the company. By determining the factors that mediate or moderate the relationship between age diversity and organizational performance, we are able to reconcile opposite theoretical perspectives and take into account the conclusive results reported in the literature.

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Increasing the Diffusion of Innovation through the Development of University's Entrepreneurial Activity

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Abstract

The role of the education system as a strategic resource for the development of economic and social processes is of particular importance since it is thanks to it that the successful, dynamic sustainable development is largely ensured. The modern period for universities determines the priority tasks of their development, the main emphasis today is not only educational and scientific activities but on improving the principles and methods of management of the processes of integration of educational, scientific and entrepreneurial activities to ensure high quality education, competitiveness of in the market of research and innovative products. The purpose of this study is to analyze the effectiveness of the implementation of the research and entrepreneurial functions of universities on the materials of the Russian system of higher education and develop ways to improve of knowledge spillover efficiency. The effectiveness of the implementation of scientific and entrepreneurial functions of universities in the Russian system of science and higher education was empirically analyzed. The recommendations for the development of project activities of the university through the organization and implementation of group project learning as a tool for developing entrepreneurship activity in science and higher education are discussed. To activate universities in innovation and entrepreneurship, it is necessary not only to conduct research but also to effectively organize the processes of managing the commercialization of university innovations. The algorithm and recommendations for the using of group project training for commercialization of intellectual activity and enhancing of knowledge spillover were present.

Keywords: Innovations, Spillover Effects, Regional Innovation Ecosystem, Higher Education System, University, Group Project Training.

Introduction

Humanity, followed by the economy and the higher education system, is currently undergoing significant changes in the context of the 4th industrial revolution. These trends are changing the path of development of the education systems, determining a number of new features of its functioning. The implementation of the modern post-industrial paradigm of economic development and a knowledge-based economy is possible only on the basis of increasing the efficiency of innovation systems and the intensification of innovative processes of all its actors.

In modern conditions, the role of the education system as a strategic resource for the development of economic and social processes is of particular importance, since it is thanks to it that the successful, dynamic development of science is largely ensured.

The paper discusses the increasing role of entrepreneurial activity of the university in the transformation of the economy, science and education in conditions of modern economy.

The purpose of this study is to analyze the effectiveness of the implementation of innovative and entrepreneurial functions of universities on the data of the Russian system of higher education; to develop ways to improve its efficiency and to offer recommendations for the development of project activities of the university through the organization and implementation of group project learning as a way of developing of entrepreneurial activity in science and higher education.

Theoretical Background

The main vector of the movement of science and education determines the new status of universities as a generator of innovations and facilitator of new knowledge spillover for economic growth and development of the economy and society.

The effectiveness of the innovation process in the university ensures the efficient commercialisation of R&D and the functioning of the regional and national innovation ecosystem. Mechanisms to support and stimulate innovation in the university's innovation ecosystem are important to overcome barriers to the commercialization of innovation.

The literature discusses the transformation of the university's mission in terms of "Mode 1", "Mode 2", "Mode 3" and changes in the university's relationship with society (OECD, 2010; Pruvot, Claeys-Kulik and Estermann, 2015). The researchers identify the following stages of the university model evolution: educational university, research university and entrepreneurial university (Röpke, 1998; Etzkowitz, 2004; Kirby, Guerrero and Urbano, 2011; Gibb, 2013; Goddard, Chatterton, 2002). Today the activities of the university, which can be considered as ways of implementing innovative and entrepreneurial functions are the creation of technology parks, generation of spin-off companies, patenting and licensing, contract research for regional companies, educational courses for business, consulting, participation in grants, publication of academic results, patenting of inventions (Arbo, Benneworth, 2007; Clark, 1998).

Innovative spillover effects from universities in the innovation system contribute to the development and diffusion of new ideas and innovations as facilitators of the indirect transfer of knowledge and significantly affect regional innovation systems (Firsova, 2016; Ogurtsova, 2019). An important mechanism is the mutual influence and coordination of the priorities of regional strategic development and university trajectories and strategies. Therefore, the choice of educational models of the university is important for the directions of development of the region.

One of the models that enhance innovative spillover effects in the region's economy is undoubtedly the model of an entrepreneurial university — the University 4.0 model. This is an open innovation system that implements not only the transfer of knowledge, technology, innovations, but also initiates and commercializes innovations both at the university and outside the university, taking into account the spillover effects of the regional economy.

In these circumstances, the leading role of the university implies a change of its mission: it becomes entrepreneurial — both in education and in management. Entrepreneurial activity in universities is an innovative activity that forms and develops the educational potential of society by conducting activities in accordance with the laws of the market economy. The basic and helper functions of a modern university, which should be implemented by universities in the framework of their entrepreneurial development, presented in fig. 1. (Goryacheva, Burenina, 2016).

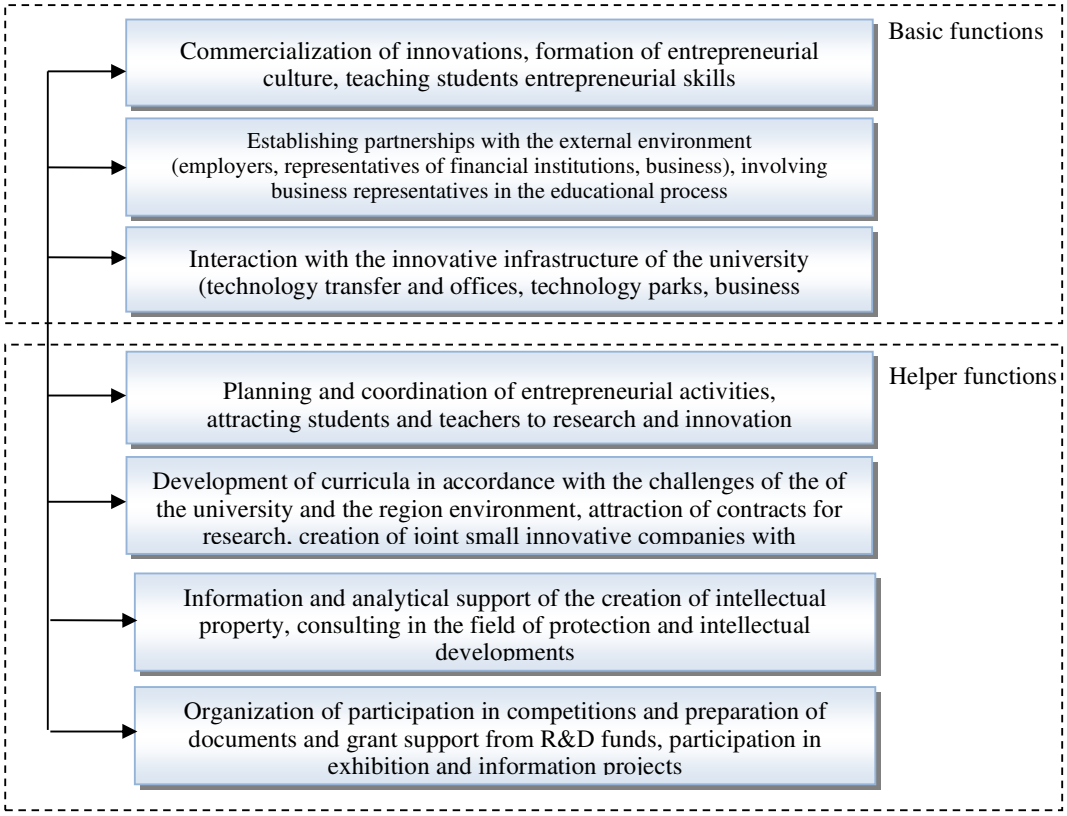

Fig. 1: University entrepreneurial functions

The modern period for universities determines the priority tasks of their development, the main emphasis today is not on educational and scientific activities, but on improving the principles and methods of management of the processes of integration of educational, scientific and entrepreneurial activities to ensure high quality education, the competitiveness of universities and regions, and the formation of entrepreneurship abilities of graduates in the market of research and innovative products and services for sustainable regional development.

Materials and Methods

Russian educational system play a significant role in producing innovation and transfer technology. There were 830 universities in 84 Russian regions, 4.4 million students were enrolled in higher education programs and 260 thousand teachers worked in the Russian Federation in 2018 (Rosstat, 2019). Because of the scale and strategic importance of higher education, assessing the role of universities in the knowledge spillovers and innovations transfer are of high relevance.

The development of entrepreneurship in the form of small innovative enterprises is a relatively new direction for the infrastructure of the education and science system in Russia. Only since 2009 university has the opportunity to become founders of economic societies and partnerships in the form of small innovative enterprises, whose activities consisted in the practical implementation of the results of intellectual activity. Within this form, it is possible to observe mutually beneficial cooperation of higher education institutions and economic society. Despite the existing different institutional preferences since 2013, the slowdown in the development of small innovative enterprises with the participation of universities has been observed since 2015 (Fig. 2).

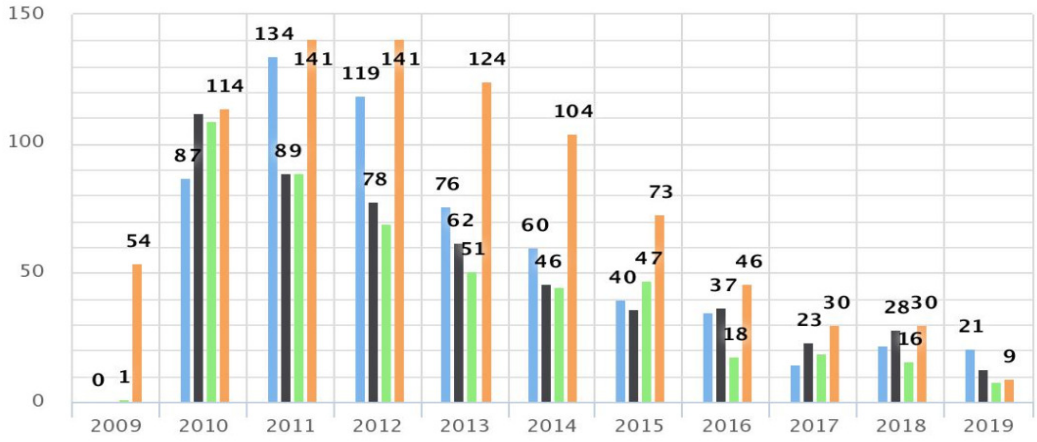

Fig. 2: Quarterly dynamics of creation of economic partnerships by scientific and educational organizations of higher education, 2009-2019, unit (Ministry of education RF, 2019)

Against the background of the decrease in innovation activity in the creation of small innovative enterprises with the participation of universities, it should be noted that universities, having a real opportunity to commercialize the results of intellectual activity obtained in the course of R&D, did not fully take advantage of these opportunities. The transformation of these results into knowledge-intensive competitive goods and services has not yet taken place (Fig. 3).

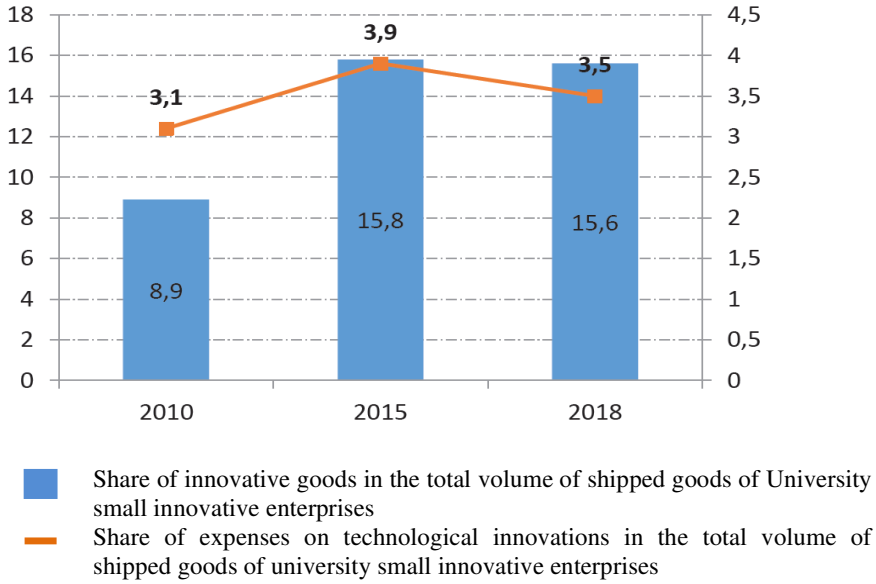

Fig. 3: Share of small innovative enterprises of universities in innovation, % (Ministry of education RF, 2019)

At the same time, it is important to note the uneven development of small innovative enterprises with the participation of universities in the regions and federal districts (Fig. 4).

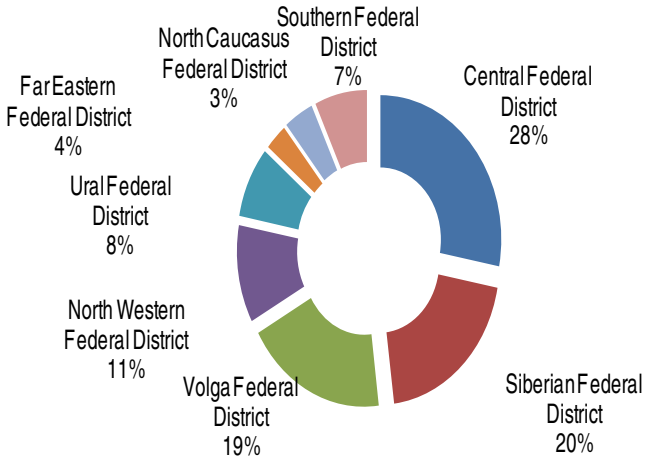

Fig. 4: Development of small universities' innovative enterprises by the Federal districts, % (Ministry of education RF, 2018)

%

More than a quarter of the established enterprises are located in the Central Federal district, together with the Siberian Federal district they give half of the total number of small innovative enterprises. Minimum indicators are recorded in the North Caucasus, Far East, and Southern Federal districts. The specificity of the location of enterprises is explained not only by the high concentration of university and scientific potential in these regions but also by the level of development of the market of consumption of innovative products and reduce the effective demand for the results of scientific and technical activities.

High concentration in the central regions of scientific and research activity inhibits the R&R results diffusion and knowledge spillover. Only a balanced structure for the spatial placement of universities as innovation centers throughout the country can enhance the flow of knowledge and diffusion of technologies and ensure the effective functioning of the national innovation system. For this, special state measures are needed to equalize the socio-economic conditions and the financing of universities throughout Russia.

Results

The needs of innovative development of the economy make relevant the research processes of transformation of universities.

The success of this activity depends on many factors, drawing an analogy with a commercial company, the university has its own staff, which should be cohesive and coordinated to work for the best results. So it is important to develop a corporate entrepreneurial spirit and university culture and to earn money to invest in the development of innovation infrastructure.

Education programs at most universities do not include entrepreneurship courses. Sometimes they are replaced by student meetings in well-known businessmen and entrepreneurs with succes stories in the region.

In order to develop the entrepreneurial functions of universities as part of the processes and changes at the university, great importance is given to introducing new educational technologies into the educational process and creating a creative space.

One of the initiatives aimed at developing entrepreneurial activity is the use of group project teaching methods in university training, which is implemented in the form of project work in teams formed from students of different areas of study on certain scientific ideas.

The effective use of group project training should be integrated into the scientific and educational activities of the university.

To activate universities in innovation and entrepreneurship, it is necessary not only to conduct research but also to effectively organize the processes of managing the commercialization of university innovations.

One of the priority initiatives for the development of entrepreneurship in the main functions of the university is the introduction of group project training and the use of the methods of project management R&D, integrated into the scientific and innovative activities of the university in the practice of organization of entrepreneurial and innovative activities.

But as practical experience shows, the university administration system, employees are often not prepared to accept such modern forms and methods (Roberts, Wallace, 2002). This greatly complicates such processes at the university, and the restructuring of perception takes a long time. Staff are slowly adapting to the new environment, and as a result, time is lost that could have been used more efficiently.

The technology of group project training also allows to include in the educational process the business community, which, on the one hand, is the main interested party in determining the goals and results of training at the university, and, on the other hand, a potential customer of the results of group project training.

The introduction of group project management techniques provides universities with a complete innovation cycle from the creation of new knowledge to their commercial implementation in the core market. New knowledge obtained in the course of fundamental and exploratory research is further implemented within the stages of a complete innovation cycle along various trajectories.

The formation of a new contour of the organizational structure of the modern university is aimed at creating infrastructure conditions for the development of entrepreneurial activity of the university, attracting students and employees to innovative activities, establishing partnerships with employers, representatives of the financial community, business and commercialization of the results of innovative activity of the university.

The achievement of the goals sets the task of corresponding changes in their organizational structures using group project training (GPT) (Fig. 5).

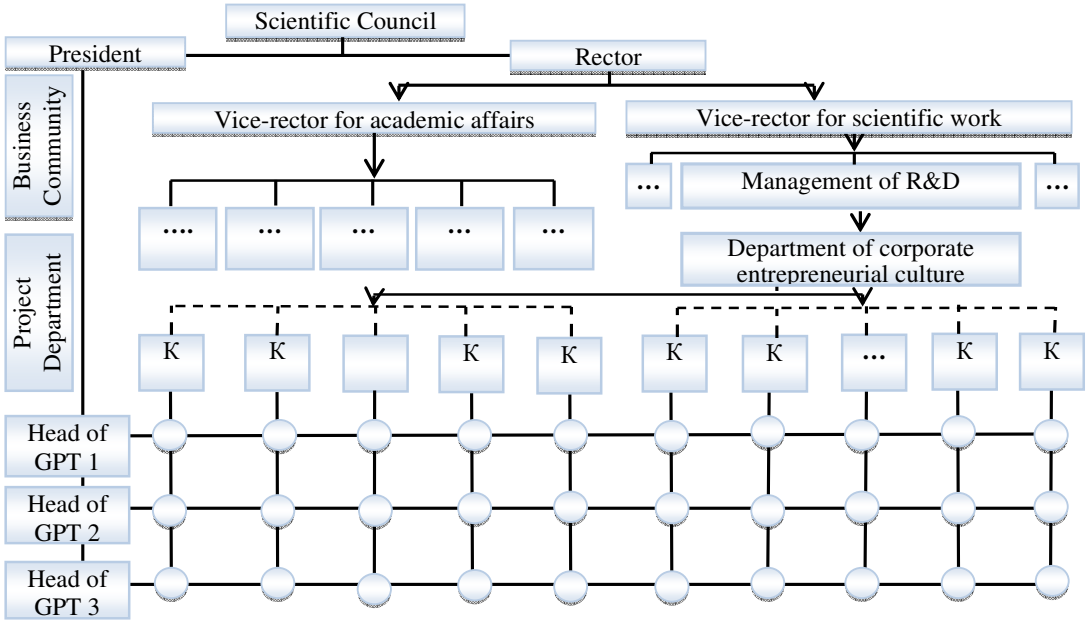

Fig. 5: Outline of the organizational structure of the university

Here we present recommendations on university R&D commercialization model thorough the use of group project training. The organizational component of the implementation of group project training methods is characterized by a clear hierarchy, from the university administration to teachers and students in the implementation of the adaptive competence approach. Responsible persons are identified for each stage of the group project training process. Projects are initiated by university staff or structural units. Research teams and researchers, in turn, hold a project competition, which selects promising projects. The best projects are presented for participation in competitions for grants and continuation of work on the project in university small innovative enterprises.

One of the two models of its implementation, according to which the work is built within the projects, can be used as the basis for the design. The first model is group project training aimed at obtaining research results within the framework of solving individual subtasks of large research projects of the university. The result of the work of the project team is integrated into the overall research system of the entrepreneurial university.

Such a model of group project training is applicable in the presence of a bank of research projects that require improvements. It is also worth noting that the reverse process is also possible, when the group project training becomes a platform for solving small tasks at the initial stage, which can later develop into a full-fledged research work.

The group project training can also be represented by the second model, in which the implementation of the project is considered as an integral independent process of achieving the final result. Such projects are initiated for further commercialization and reflect the entire chain of product creation: from idea generation to its commercialization.

This model of group project training is more related to the entrepreneurial tasks of the university and is focused more on obtaining a specific product, service, technology or methodology than on the educational process.

When implementing the project under the second model, educational goals are pursued only in the absence of the necessary competencies of the project participants. The result of such a project can be evaluated in terms of the possibility of creating companies at the university.

The implementation of the group project training under the second model contributes to the development of an integrated business culture. The ideological field created at the university allows to develop practical initiatives with the business community, thus the entrepreneurial culture becomes an important distinctive feature of improving the individualization of the university.

Group project training will allow university projects to grow into new companies that can become successful market participants in the future. Successful projects of group project training will face the task of commercialization, as in the process of commercialization there is a possibility to choose different ways of bringing innovations to the market.

We present an algorithm for commercialization of intellectual activity results (Fig. 6).

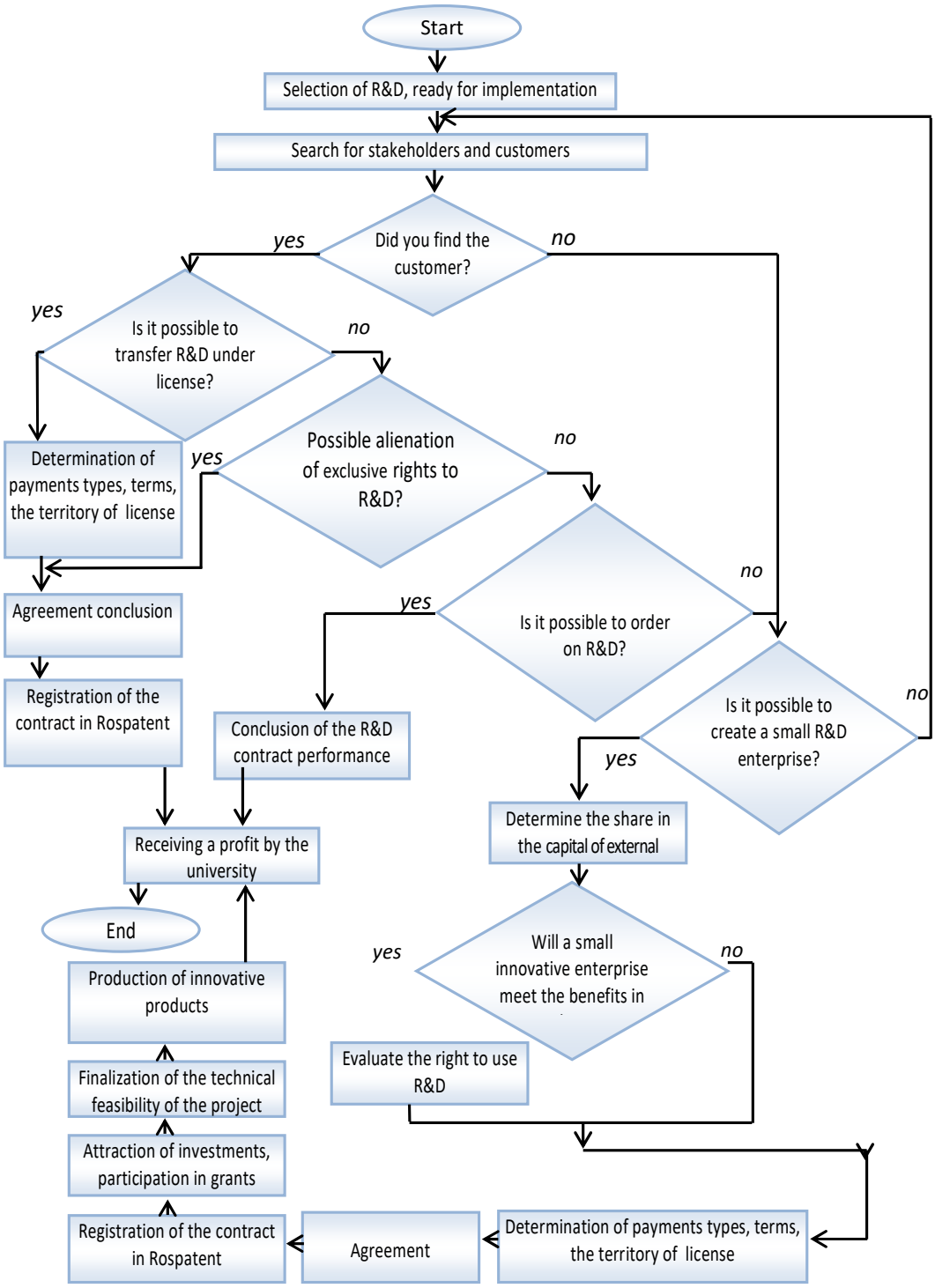

Fig. 6: Algorithm for organization of R&D activity results implementation

Discussions

Implementation of this process begins with the selection of successful group project training projects, after which there is a search for stakeholders and customers who may be interested in the results of this activity. The presence of the customer allows implementing the first way of commercialization of innovation by granting the right to use the result in the form of a license. In case of a positive decision, the following actions will be performed: determining the form of transfer of the right to use (license), determining the term of transfer of the license, the territory of action, the type of payment (lump-sum payment or royalty).

The next stage is the conclusion of a license agreement between the university and the customer. If the customer is not ready to acquire the right to use in the form of a license, it is possible to commercialize the innovation in the form of the sale of the exclusive right to R&D. In the case of a positive decision, determined by the cost of the sale of R&D, an agreement on the alienation of the exclusive right to R&D.

This model of commercialization of university's R&D is the most successful and relevant for a number of reasons:

- does not require significant financial investments in technology development;
- has a simple form of transfer of intellectual development to the market, does not require scientific and technical support of the project;
- save time for the university and the developer to transfer the development to the market.

In the event that the customer does not intend to acquire the rights to the result of intellectual activity, it is possible to commercialize the R&D in the form of a contract for carrying out custom research works.

This way is expedient if the use of R&D is periodic; if the acquisition of rights requires high costs of commercialization; there are no specialists in the enterprise who are able to competently manage R&D, etc.

To implement the model of commercialization of R&D by carrying out custom research work between the university (as a contractor) and the organization (as a customer) is a contract for research work, according to which, the university will subsequently make a profit.

If the customer is not interested in acquiring the rights to R&D, it is advisable to commercialize R&D in the form of creating a small innovative enterprise at the university. This way of commercialization is most common. But it should be noted that the commercialization of the results of intellectual activity of the university in the form of small innovative enterprises has a more complex algorithm.

In order for the results of intellectual activity in the development of small innovative enterprises to be considered as a key driver of the company, it is necessary to introduce new methods and approaches to the management of the company. To do this, the following measures can be used:

- development of new markets, including foreign ones, for the sale of own products;
- search and attraction of investors, including foreign sources;
- submission of applications to venture funds to attract venture investments;
- participation in state, regional, municipal competitions, grants on the terms of public-private co-financing;
- use of the results of intellectual activity as an intangible asset.
- international cooperation.

Thus, the developed algorithm allows to determine the most significant stages of the process of commercialization of the results of intellectual activity obtained within the framework of group project training and thus to identify the most effective way of commercialization of the university's R&D.

Conclusions

The formation of the university as an entrepreneurial center of innovative economy is a complex task and is aimed at the development of modern standards of management, research and entrepreneurship. Enhancing the influence of the university spillovers on technology transfer and regional economic development is possible only in the creation of an effective university's entrepreneurial management. The formulation of the university in the centre of the economy requires a redefinition of its role, alterations in relationships, and therefore targeted efforts to change the rules of the management and teaching staff.

The consolidation of the norms of activity and ethical principles corresponding to the new role of the university allows the implementation of the code of corporate entrepreneurial culture. The code is now an emerging institution and an element of new governance. The maturity of this institution will be determined by its influence on the development of a new role by the university — the subject of economic development. Technologies of practice-oriented and project-organized training play the role of a component of training specialists for high-tech sectors of the economy.

The development of entrepreneurial activity of the university, the introduction of group project training, improving the organization of university management and the development of the code of corporate entrepreneurial culture are aimed at the functioning of the university as a center of innovative economy and strengthening of R&D commercialisation and enhancing the knowledge spillover and innovation diffusion and increasing of effectiveness of national innovation system.

Acknowledgements

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Working Comfort Management and Its Effect to Motivation to Work in Underground Space

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Abstract

Relocating electrical facilities underground, makes planners should pay attention to several other factors, namely the design and aesthetics of underground buildings and their effects on the people who work in them. Thermal, audial, and visual comfort, influence the building design. Otherwise, there were only recent study that design and its accompanying physical symbols been considered as an upcoming factor to increase the employees' motivation. This study holds a questionnaire survey that was applied to explore how the employees conceive their comfort perception about working in the above-ground Gas Insulated Substation (GIS) and the possibility if they are placed in the underground GIS. In quantitative analysis, data from the questionnaire were analyzed by statistical assessment using SPSS software. The regression analyzes that the hypothesis "motivation of working in underground space is affected by the working comfort" is accepted. Using correlation and regression analysis as described in the result section, the most influential factor to increase motivation is thermal comfort. This study supports previous study where workspace design correlates to the organizational culture. The results show that motivation of working in underground space is affected by the working comfort. That is why thermal comfort is the most important factor for this research

Keywords: Management; Comfort; Motivation; Underground

Background

Plans to relocate electrical facilities underground, like Gas Insulated Substation (GIS) makes planners should pay attention to several other factors, namely the design and aesthetics of underground buildings and their effects on the people who work in them. A comfortable work environment creates emotional factors, motivation, and closeness of workers with the company (Soh, *et al*., 2016). Workspace design is used as physical settings in the work environment. It can be a tool to achieve higher organizational performance via changes in employee behaviour and work efficiency (Danielsson & Bodin, 2008). Workspace design is also an effective strategy for performing organizational alteration (McElroy & Morrow, 2010) This study contributes to how to improve employees' performance using thework company's physical attributes. Previous research, ranging from psychology, environment, architectural, to management, have provided a conclusion that physical attributes affect human's view, manner, and behaviours (Danielsson & Bodin, 2008; Kornberger & Clegg, 2004; Brennan, Chugh, & Kline, 2002; Cohen, 1980). The workspace environment can also influence employees' interpersonal interactions and knowledge availability (Samani, 2015). Otherwise, there were only recently study that design and its accompanying physical symbols been considered as an upcoming factor to increase the employees' motivation (Worley & Lawler III, 2006; O'Reilly & Pfeffer, 2000; Turner & Myerson, 1998).

The multidisciplinary concept is needed to explain human interaction with the physical building of its workspace (D'Oca, Chen, Hong, & Belafi, 2017). Building comfort is influenced by thermal, audial and visual comfort (Satwiko, 2009). Sakellaris, *et al*. (2016) then explain some of the parameters that affect the perception of work comfort, as described in Table 1.

Table 1: Perception Parameter of Working Comfort

No	Parameter	Indicator	Criteria
1	Thermal Comfort	Air circulation	Very disappointing – Very Satisfying
		Air Quality	Very moist – very dry
2	Audial Comfort	Noise from outside	Very disagree – very agree
		Noise from building system (heater system, plumbing, etc)	Very disagree – very agree
		Noise from the building inside (co-worker, photocopy machine, etc)	Very disagree – very agree
		Privacy	Very disagree – very agree
3	Visual Comfort	Natural light	Very disagree – very agree
		Artificial light	Very disagree – very agree
		Reflection	Very disagree – very agree
		Cleanliness	Very disagree – very agree
		Layout & decoration	Very disagree – very agree

(*Source: Sakellaris, et al., 2016*)

Many environmental factors are associated with perceptions of working in the underground space, such as air quality, noise, lighting, and thermal comfort (Soh, Christopoulos, Roberts, & Lee, 2016). These effects can be overcome by engineering a building, but there are still some aspects in the underground space that are reduced and cannot be made to resemble workspace on the surface, namely (Zhao & Künzli, 2016):

a. Above-ground visibility
b. Above-ground access
c. Visual contact to nature
d. Space inter-connection

Labbé (2016) suggests that design considerations should be given to the purpose of underground space to create large communal relationships and connections between workspaces that can influence the perception of working underground. This is in line with the opinion of D'Oca, Corgnati, Pisello, & Hong, (2014) which states that the condition of comfort is not only related to the physical building and environmental parameters, but also social aspects that reflect the beliefs, values, expectations, and motivations of building occupants. The lack of windows and ventilation affects on increasing productivity and decision making in the context of workspace design (Kaplan & Berman, 2010). Underground GIS development can also utilize online monitoring systems and system resilience analysis, which can evaluate the temperature of each GIS equipment and maintain the required temperature, thus bringing convenience to Underground GIS workers (Wang.T, Wang, Wang, & Zhang, 2018).

Methods

Survey

A questionnaire survey was applied to explore how the employees conceive their comfort perception about working in the above-ground GIS and the possibility if they are placed in the underground GIS.

The survey also investigated the correlation between the behavior and the perception of working in the underground GIS

Methodology

Data used in this research gathered from a manual survey. The questionnaire was prepared using a manual questionnaire then distributed to the 41 respondents. The form began with the introductory paragraph described this research's background and aims. Personal information of the respondent will be asked in the next page. Respondents have to fill their name, position, and work period at this position before continuing the next step of the questionnaire.

The next pages are the main part of this survey. Three variables were captured perception about working comfort management. One variable was captured behavior in working either they are above-ground and underground. Each variable contains some questions to indicate respondents' level agreement using a five-point Likert scale. In quantitative analysis, data from the questionnaire was analyzed by statistical assessment using SPSS software.

Results and Discussions

General Figures

After questionnaires were gathered, as Figure 1.a, 56 percent were supervisor, 12 percent were staff senior, and 12 percent were junior staff. Most of them, as described as Figure 1.b, have been worked for this company for more than 10 years (54%).

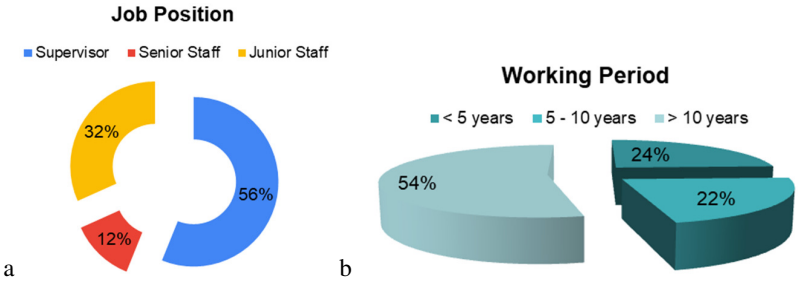

Fig. 1: Respondents information

Working comfort perception and motivation when working in underground space

The percentage of each question of the thermal comfort parameter in this study was described in Fig. 2. From those diagrams, it can be illustrated that most employees working in the above-ground workspace felt satisfied with their workspace thermal system (46%) and they did not feel any complaint with the air quality (49%).

Table 3 described that most of the empbuilding loyees did not feel auditory distracted either from outside (36.59%) or building system (36.59%) source. On the other side, they still had a noisy condition due to their office mate or the other office equipment like a photocopy machine.

Table 2 concluded that most employees felt satisfied with their above-ground visual condition, and they expected that it is the most important factor to be considered when they work in underground space. It was also described that most of the employees (90.24%) still have motivation and confidence to meet their target when they work in underground space

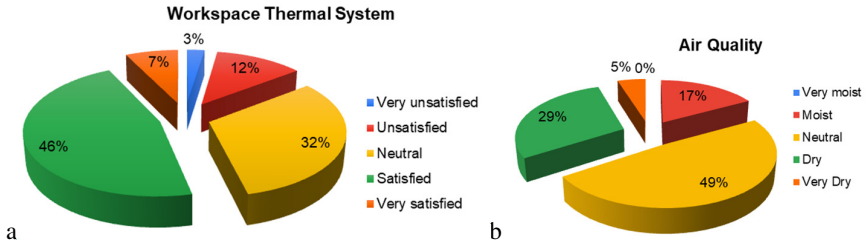

Fig. 2: Thermal comfort perception

Table 2: Visual comfort perception

	I have enough natural lighting	I have sufficient lighting	I do not feel distracted to light reflection	I feel satisfied with the workspace cleanliness	If working in underground space, I feel that lighting, decoration, and space layout are a very important factor
Strongly Disagree	2.44%	0.00%	2.44%	2.44%	0.00%
Disagree	19.51%	9.76%	12.20%	21.95%	2.44%
Neutral	17.07%	12.20%	14.63%	24.39%	12.20%
Agree	51.22%	65.85%	60.98%	39.02%	26.83%
Strongly Agree	9.76%	12.20%	9.76%	12.20%	58.54%
Total	100%	100%	100%	100%	100%

Table 3: Audial comfort perception and motivation while working in underground space

	I have auditory distracted from outside	I have auditory distracted from the building system (plumbing, heater system)	I have a noisy workspace (office mate, photocopy machine)	When working in underground space, I still have motivation and confidence to finish my target
Strongly Disagree	4.88%	0.00%	0.00%	0.00%
Disagree	36.59%	36.59%	34.15%	0.00%
Neutral	24.39%	31.71%	24.39%	9.76%
Agree	26.83%	29.27%	41.46%	70.73%
Strongly Agree	7.32%	2.44%	0.00%	19.51%
Total	100%	100%	100%	100%

Table 4: Correlation between variables

	Thermal Comfort	Audial Comfort	Visual Comfort
Motivation	-.116	.015	-.075

Table 5 : Regression result

	Constanta	Thermal Comfort	Audial Comfort	Visual Comfort	Thermal Comfort
Motivation	4.701	-.116	.015	-.075	-.116

Regression Analysis

Regression then analyzed to find correlation using SPSS. Table 4 summarized the correlation among the variables. Meeting space had the largest correlation number with organizational culture and overall job fulfillment, while distraction had the smallest one.

The regression result as informed in Table 5 measured all the variables. All sig values from that regression analyses were above .05, therefore the hypothesis "motivation of working in underground space is affected by the working comfort" is accepted.

Discussion

Using correlation and regression analysis as described in the result section, the most influential factor to increase motivation is thermal comfort. Once the workers do not feel the comfortable feelings to their thermal situation, they will not gain the optimum condition to finish their job. It is important to consider the scope of work that influences employees' characteristics in their daily job. The employees who have been a sample of this study used to work in electrical facilities. Moreover, the findings of this research can implicate senior managers to develop employee's performance by giving attention to the physical environment. The same thing with the conclusion from Kwon, Remøy, & van den Bogaard (2019), the findings of this research also influence interior designers or architects to understand how design correlates to employees' satisfaction. They can find which alternative design that relates to a user's view of the workspace.

Conclusion

This research was conducted based on the correlation between comfort attributes and motivation. Relates to the previous research, physical attributes in a workspace can assist in employee and company's competitive benefits. This study supports the previous study where workspace design correlates to the organizational culture. The results show that the motivation of working in underground space is affected by working comfort. That is why thermal comfort is the most important factor for this research. This study can be applied to map the employees' preference for the optimal working comfort that potentially increases their motivation. By collaborating core business with preferred workspace design in the company, it will be easily set the target for employees to achieve the company's goal.

Acknowledgment

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An Analysis of the Implementation of the Concept of Sustainable Ecological and Economic Development of the Russian Federation

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Abstract

The most important task in the current economic situation in Russia is GPD doubling. Taking into consideration the priorities in the development of the world community in the third millennium provided in the UN reports on poverty reduction, environment enhancement, sustainable development, etc., the objective should be focused on sustainable social and economic development. In this regard, the quantitative measurement of the sustainability of the development, the balance of quantitative and qualitative factors of the economic growth are of immediate interest. The authors analyzed the current ecological and economic security of Russia, assessed the ecological and economic situation, studied threats to the ecological and economic security of the Russian Federation, analyzed the introduction of environmental indices into the system of the assessment of the socio-economic development and economic security of the Russian Federation. Some proposals were worked out to increase the level of environmental and economic security by improving the mechanisms of environmental and economic incentives, as well as the management system of environmental and economic development. The process of creating an ecopolis as a model of sustainable ecological and economic development of an area was studied.

Keywords: Sustainable Development, Eco-Economic Security, Social and Economic Development, Indices, Hazards, Eco-Economic Incentives, Ecopolis.

Introduction

The growth of global threats to the civilization along with the progress of the modern society, instability and increasing diversity of economic, social and environmental components of the development urgently require the development of a national security strategy that would combine political, economic, defense and other needs of the country with the requirements of comprehensive environmental recovery (J. Burger, 2008). In this regard, the concept of the national security of the Russian Federation provides for the transition to sustainable development, ensuring a balanced solution of both socio-economic problems and the problems of environmental conservation in order to meet the needs of the current and future generations as an important condition for national interests ensuring (V.I. Danilov-Danil'jan, 2006).

At the end of the twentieth century, it became clear that the contradictions between the development of the economy, the growth of material needs and the limited capabilities of the biosphere threaten the sustainable development of the civilization. Increasing environmental problems indicate the impasse in the development of traditional economic models. The world is aware of the need to develop new approaches to measuring and assessing scientific and technological progress and development of economic systems, since the concept of GDP does not reflect the sustainable development goals in accordance with the provisions of UN documents and requires significant

adjustments. Nowadays, considerable experience has been gained in the development and application of sustainable development indices (L. Segnestam, 2000).

In our opinion, the integral index of adjusted net savings of the World Bank is the most developed one in theoretical terms, having a good statistical base and calculation capabilities. Currently, adjusted net savings are calculated for more than 100 countries, including Russia (World Development Indicators 2015, 2016).

Results and Discussion

Analyzing the ecological and economic state of the Russian Federation it should be noted that for the implementation of long-term tasks of socio-economic development, the primary objectives should be the development of human capital assets, the rejection of export energy-source development and the formation of an innovative economy based on structural and technological reorganization (The strategy of ecological safety of the Russian Federation until 2025, 2017). This means a different logic of the development and measurement of the socio-economic progress. It is not necessary to strive to maximize traditional quantitative indices, whether they are cost indicators (GDP, etc.) or physical volumes of production (energy resources, etc.). The new economy should focus on qualitative rather than quantitative development. Let us consider the values of indices of such sustainable development presented in Table 1, where Russian indices are compared with those of some developed countries, Eastern Europe, BRICS and CIS countries.

Table 1: Indices of sustainability in some countries

Country	Adjusted net savings (% of GNI)	Human development index	Proportion of fossil fuel (% of the total volume)	Proportion of renewable energy sources (% of total volume)	Carbon dioxide emission per capita (t)	Natural recourses depletion (% of GNI)	Forest zone (% of the area)	General satisfaction with life (0-10)
1	2	3	4	5	6	7	8	9
Norway	12.800	0.943	58.6	45.3	10.5	10.6	32.4	7.6
Australia	1.700	0.929	94.6	5.4	19.0	5.1	19.7	7.5
The Netherlands	11.600	0.910	92.5	4.4	10.5	0.8	10.8	7.5
Canada	5.800	0.908	74.9	17.0	16.4	2.3	34.1	7.7
Germany	11.400	0.905	80.1	8.9	9.6	0.1	31.8	6.7
France	7.000	0.884	51.0	7.6	6.1	0.0	29.0	6.8
The Check Republic	11.300	0.865	81.2	5.4	11.3	0.3	34.3	6.2
Great Britain	2.200	0.863	90.2	2.8	8.5	1.2	11.8	7.0
Poland	9.700	0.813	93.8	6.3	8.3	1.0	30.5	5.8
Belarus	16.900	0.756	92.1	5.5	6.5	0.9	42.2	5.5
Russia	-0.800	0.755	90.9	3.0	12.1	14.5	49.4	5.4
Kazakhstan	-1.200	0.745	98.8	1.1	15.3	22.0	1.2	5.5
Ukraine	5.600	0.729	81.8	1.4	7.0	3.8	16.7	5.1
Brazil	4.600	0.718	52.6	44.5	2.1	3.1	61.9	6.8
China	39.700	0.687	86.9	12.3	5.2	3.1	21.6	4.7
India	24.100	0.547	71.1	28.1	1.5	4.2	22.9	5.0

Source: Human Development Report 2012. Sustainability and Equity: A Better Future for All. N.Y.: Palgrave Macmillan. UNDP, NY, 2014

The analysis of the values of the human development index shows that the leading place in the ranking of countries according to this index belongs to Norway, while Russia occupies a lower position in the ranking even compared to Belarus. With a higher level of education and income per capita than those in Belarus, Russia occupies a lower position in the ranking due to the lag in the life expectancy along with the increasing longevity in the vast majority of the countries.

The analysis of the adjusted net savings index shows that in Russia, along with the formal economic growth, natural capital is depleted, and the environmental correction leads to a significant decrease in traditional economic indices, down to negative values. In practical terms, the index shows the need for a radical improvement of the resource efficiency in the country (I. Kirilchuk et al., 2018).

The analysis of the ecological and economic situation in Russia, the policy in the field of nature management and environmental protection, mechanisms of controlling and ensuring the eco-efficiency of the economic activity revealed a number of problem areas that pose a threat to further sustainable development of the country. The systematized economic, environmental and social hazards are presented in Figure 1.

In order to ensure an appropriate assessment of the country's development achievements and its compliance with the principles of sustainable development, the system of macroeconomic accounting in the Russian Federation should be supplemented with the indices of environmental development (System of Environmental-Economic Accounting). It is proposed to include the following indicators (Table 2) in the official statistics to monitor the country's environmental achievements.

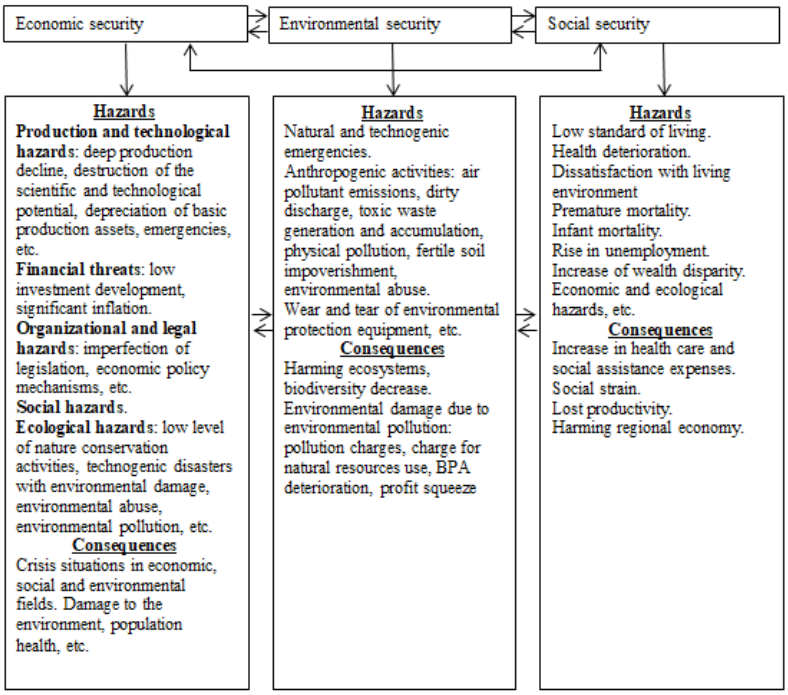

Fig. 1: Hazards in an eco-economic security system

In order to ensure an appropriate assessment of the country's development achievements and its compliance with the principles of sustainable development, the system of macroeconomic accounting in the Russian Federation should be supplemented with the indices of environmental development (System of Environmental-Economic Accounting). It is proposed to include the following indicators (Table 2) in the official statistics to monitor the country's environmental achievements.

Table 2: Ecological criteria of economic security and their threshold values

Indicator	Threshold values	Actual sate
Genuine savings, as % of GNI	0	-0.8
Proportion of renewable energy sources, %	10	0.5
GDP energy intensity, toe/$1000. at PPP	0.2	0.47
Mean utilization of wastes as secondary raw materials, %	75	30
Processing MSW, %	50	5
Volume of greenhouse gas emissions, % over the level of 1990.	100	70
Ecological footprint, gha/man	2.1	3.7

Source: prepared by the author on the basis of Federal State Statistics Service data

The comparison of the actual indices and threshold values shows an unfavorable situation. Only in terms of one index — greenhouse gas emissions — Russia is in the field of positive values. The introduction of this system of threshold indices will allow us to take into account the environmental component of the national security, to determine the level of sustainability, development of the socio-economic system in the long term. The results of various studies conducted in the EU showed that the overall macroeconomic effect of the introduction of more stringent environmental policy had no negative impact on the process of economic development expressed in GDP growth. Improvement of the mechanisms of encouragement of greening the economy contributes to innovation development, emergence of new markets of eco-products and eco-technologies (P. A. Lawn, 2003).

The ways of improvement of mechanisms of ecological and economic incentives are presented in Table 3.

Table 3: The ways of improvement of mechanisms of ecological and economic incentives

Mechanism	Development trend
IMPROVEMENT OF THE EXISTING MECHANISMS	
Ecology payments	Short-term prospects: a significant increase of the amount of ecology payments in order to assign a regulatory incentive function to them. Introduction of ecology payments for noise emission. Long-term prospects: transition to a system of licenses for emissions and creation of emission market after initial pilot project testing
Taxation	Abatement of profit tax for ecoproducts manufacturers. Reduction of VTA rate for ecoproducts. Increase of VTA rate for not environment-friendly production.
Depreciation mechanism	Introduction of accelerated depreciation of basic assets enabling the transition of an enterprise to the use of the best appropriate technology.
Government-sponsored programs	Expansion of the program of ecological development, e.g. “Power industry development based on renewable sources”, “Development of projects and creation of ecopolises”, “Development and productization of ecotechnologies”, “Ecologization of consumer culture” including some similar regional programs.
INTRODUCTION OF NEW MECHANISMS	
Tariff regulation	Introduction of fixed rates covering the expenses of power producers for a guaranteed time/amount of electric power generated applying RES. The size of subsidies on electric power depends on the renewable energy source and plant capacity
Eco-economic interregional compensatory mechanism	Inter-budget transfers based on the balance of ecosystem services and negative region’s economic impact

Conclusion

In our opinion, the development of projects and the creation of ecopolises as the objects of territorial sustainable ecological and economic development is of particular interest. Differences between ecopolises and settlements of industrial type are presented in Table 4.

Table 4: Difference between ecopolises and industrial settlements

Criterion	Industrial settlement	Ecopolis
Power generation	Centralized power generation on the basis of hydrocarbon resources (cogeneration units)	Small stand-alone generation based on the renewable and inexhaustible resources (mini hydroelectric plants, solar batteries, biodiesel and biogas plants, wind tribunes, geothermal power stations, use of biomass energy and others)
Construction	Concrete high-rise buildings with low energy efficiency. Wide use of plastics and other artificial materials.	Houses are built taking into account modern, cost efficient, energy-saving technologies. These can be quick-erect houses, using technologies of environment-friendly individual housing construction (TICE), houses of thatch blocks, etc. Local naturally-occurring materials are prevalent.
Waste management	Waste collection in special skips and further landfilling. Use of waste burning plants.	Waste recycling. All waste is first sorted by the residents, then it is sent to different places as intended. Waste effluents are recycled into fertilizers and biogas.
Water supply	Centralized water supply, chlorine treatment.	Well or artesian drinking water. The use of biotechnology in water purification. Collection of rainwater and its use for technical needs
Employment	The majority of population are employers in big companies, working 8 hours a day, concentrated in offices.	An ecopolis necessarily includes at least one or several business projects. Some citizens are employed in local production. Some work remotely via the Internet, the others are engaged in their own business projects in the city. People do not have to pay for an apartment, for light, for garbage disposal, most of the products they produce on their own. Therefore, they can afford to work 5-6 hours a day.
Transport	Gas-powered transport (traffic jams due to high population concentration)	Biofuel transport, electric cars, bicycles (low congestion of the transport system due to the low population density and reduced traffic intensity due to the increased use of communication technologies)

An ecopolis should combine interrelated components of economic, environmental, social and institutional environment. The implementation of an ecopolis model in Russia is possible on the basis of the creation of special ecological zones, as one of the types of economic zones with a special economic policy and financial support for the creation of an eco-oriented infrastructure. At the core of such settlements, there should be a number of innovative environmental business projects, construction and architecture technologies, and the involvement of people who share the value of environmental development. The state should provide support for purchasing housing in ecopolises

(long-term government loans with a low interest rate) in return for the obligations of the residents to comply with the requirements of the ecological behaviour.

The creation of ecopolises will have a significant impact on solving the following problems:

1. solution of the housing issue;
2. improvement of the ecological environment;
3. development of small businesses;
4. intensification of innovative activities;
5. development of unoccupied territories;
6. improving the demographic situation;
7. improving the quality of life of the population.

It can be argued that the creation of a healthy, environment - friendly space of a human activity is a sustainable way of development, making it possible to achieve the goal of harmonization of the economy, community and ecology.

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The Business Model Canvas Dedicated for the SMEs Operating within the Industry 4.0 Environment

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Abstract

The growing Industry 4.0 concept requires to introduce modern technologies and also change industrial management. The aim of the article is to present the new business model Canvas which includes identified needed changes in industrial management resulting from the implementation of the Industry 4.0 strategy. This model allows the Industry 4.0 strategy in manufacturing companies to be effectively implemented. Furthermore, it helps to gain competitive advantage on the market through a great increase in flexibility and efficiency and quickly produce personalized products using advanced technologies, wireless networks and mobile devices.

Keywords: Industrial Management, Business Model Canvas, Industry 4.0 Strategy, Internet of Things

Introduction

The Industry 4.0 concept is to combine physical objects with the information network and forms the basis of the Fourth Industrial Revolution. It plans to set up sophisticated business networks linked by intelligent resources that communicate by the Internet. This means that today's businesses face the next challenge of building and collaborating on cyber-physical systems. The fourth industrial revolution is a big challenge for industrial enterprises. First of all, it means integrating people with digitally controlled machines using the Internet and information technologies and creating extensive networks - Internet of Things, Connected Things and Cloud Computing (Clark, 2016; Bruner, 2013; Wyrwicka et al., 2017; Jakubowski et al., 2016).

As a result of the Industry 4.0 concept implementation, the economic production of personalized products in short production series is developing, which gives the possibility of previously unknown flexibility in adapting to the expectations of customers and the possibility of achieving a significant competitive advantage. New market expectations necessitate many changes in manufacturing companies. They mainly concern much greater automation, the use of modern IT systems and the introduction of new paradigms in management of a production company. Modern Factories of the Future require changes in the employment structure. As the experience of the model plant implementing the Industry 4.0 concept - Robert Bosch GmbH shows - the number of employed planners, constructors and managers with higher education increases (up to 23%) as well as highly qualified employees, technical managers and technicians (up to 42%) (Krzyżanowski, 2017). Manufacturing processes must be standardized. A network infrastructure is created in which data from machines, devices and production processes are obtained in real time and used in machine control systems, entire production lines not only in a given plant, but also in dispersed plants around the world (Soldaty, 2016).

Changes also appear in the company's strategy. The pace of plants in the fourth industrial evolution causes the need to very quickly determine the strategic goals of plants and equally fast their implementation. A productivity plays a big role in companies using the Industry 4.0 concept. Key Performance Indicators (KPIs) should increase, such as (Parmenter, 2015; Soldaty, 2016):

- productivity,
- reduction of machine downtime,
- reduction of warehouse costs,
- shortening the time to launch a new product on the market.

The Industry 4.0 concept means the purchase of many systems to support flexible production processes and their integration with applications that allow quickly place orders for many personalized products and comprehensive customer service. The introduction of new technologies is expensive and requires well-qualified human resources, but enables a rapid increase in production efficiency and better management of both processes and the resources. It enables improving quality and significantly shortening the time of implemented production and logistics processes, as well as high quality customer service. New solutions must bring a quick return on investment and a rapid increase in efficiency, which requires constant monitoring and control of processes implemented in the company (Jasiulewicz-Kaczmarek et al., 2019). The introduction of Industry 4.0 strategy means not only major technological and technical changes in enterprises, but also requires changes in industrial management. Therefore, there is a need to develop new industrial management solutions dedicated to the Industry 4.0 environment and completely new business models (Moeuf et al., 2017; Piccarozzi et al., 2018; Jiménez-Zarco et al., 2017; Lu Y., 2017).

The paper presents the results of research on changes in industrial management resulting from the implementation of the Industry 4.0 strategy. The aim of the article is to present the new business model Canvas which includes identified needed changes in industrial management resulting from the implementation of the Industry 4.0 strategy. This model helps to gain competitive advantage on the market through a great increase in flexibility and efficiency and quickly produce personalized products using advanced technologies of the Industry 4.0, wireless networks and mobile devices.

Advances Technologies of the Industry 4.0 Concept

The Industry 4.0 concept is based on 9 advanced technologies. The most important solutions of this concept are: Big Data and Analytics, autonomous robots, simulation, Internet of Things (IoT), Cyber Security, Cloud Computing, additive manufacturing, augment reality horizontal and vertical system integration (Want et al., 2015). The Cyber-Physical Systems (CPS), machine-to-machine components, autonomous vehicles, nanotechnologies, biotechnologies, energy storage and quantum are also a key to ensure the degree of connectivity and communication during the Industry 4.0 development (Almada-Lobo, 2016; Wang et al., 2015; Grzybowska et al., 2016). All efforts are provision for connectivity, communication, networked entities, real-time data and pervasive information throughout the entire value chains to achieve full automation, digitalization, and intelligent manufacturing environment. Manufacturing companies must construct a connection network fulfill with 3 features which are vertical integration (intra-organization systems integration), horizontal integration (inter-organization systems integration) and end-to-end digital integration of engineering to achieve the above results (Bauernhansl et al., 2014).

Internet of Things is to ensure trouble-free communication between devices and communication with people thanks to the use of a large number of intelligent sensors and controllers. For enterprises, flexibility and the possibility of a wide use of devices connected to the IoT network are particularly valuable, and consequently shortening costly downtime, increasing the efficiency of operations and reducing production costs. Big Data technology allows analyzing large amounts of data and providing end users with the needed, properly selected data in real time. Large data sets are converted into useful information. Cloud Computing allows data from around the world to be collected and accessed. The use of these technologies also allows the detection and resolution of problems related to the wear of machines and optimization of the use of manufacturing resources (Rußmann, 2015; Kagermann et al., 2013; Stock & Seliger, 2016). The growing Industry 4.0 concept requires not only the introduction of many very modern technologies, but also the use of a new business model in management of a production company. Network forms of cooperation are developing, in which many small and medium production and logistics companies (SMEs) jointly produce and deliver personalized products to the customer (Saniuk et al., 2019).

The increase in production flexibility and organization of production of more personalized products means the ability to meet the needs of the customer which is the user of the product without detriment to the profitability of the production process by dynamically aligning the autonomous modules of the entire process of preparing, producing and delivering the product to the customer using Internet of Things and information stored in Big Data and Cloud Computing (Lasi et al., 2014; Roblek et al., 2016). In addition, it is possible to significantly improve production efficiency through the use of material, manufacturing, labor resources of network partners working together with unused production capacities (Thoben, et al., 2017).

Industrial Management within New Manufacturing Paradigms

The main production paradigm in the Industry 4.0 environment, which is currently developing, is personalized production, which consists in creating own product configuration by customers from modules pre-designed by the manufacturer, and only then production. Manufacturing systems must be reconfigurable. The client becomes an active participant in product design, which completely distinguishes this paradigm from mass customization, where the client chose the configuration from the catalog of proposed options. In the fourth industrial revolution, intelligent products configure production systems using advance technologies and determine the locations of implementation of individual stages of manufacture based on the customer's location. Personalization also applies to the operational phase thanks to the possibility of individual product monitoring (Schlechtendahl et al., 2015).

Another paradigm is the change from centralized production to decentralized. The decentralization paradigm means a departure from centralized management and control by creating networks of autonomous, intelligent process units that exchange information and configure themselves for optimal implementation of the production process by processing huge amounts of data in real time (Bochmann et al., 2015; Soldaty, 2016). Operation in the network requires orientation towards the company's own key competences and shifting other activities to subcontractors. This leads to a change of business models from product orientation to service orientation. Service orientation means offering the best services in the network for the implementation of a given fragment of the manufacturing process. In the value chain in M. Porter's approach, the product or service moves one-dimensional to subsequent organizational units, which successively add value. In contrast, there are multidimensional value networks in the Industry 4.0. The source of value here is the combination of different network links that interact with each other. The functioning of the value network is based on platforms that mean a business model that creates value by connecting suppliers and customers or producers themselves and enabling the exchange of values created by

network participants (Teece, 2010; Santos et al., 2017; Grabowska et al., 2020). Thanks to the development of digitization and new possibilities of collecting, processing, analyzing and exchanging information, platforms enable building value in the business model in a completely different dimension. They create a digital layer that allows business partners to be connected and interacted with any application and device.

The paradigm shift also applies to human-machine relations. The current industrial revolution will bring a higher level of cooperation between man and robot. The development of intelligent interfaces fosters such cooperation. The employee's role will change in the direction of managing the activities performed by the robots cooperating with him. The surge in productivity will combine human contextual decision making with the precision and capabilities of robots what is called Human-centered automation. New technical solutions such as augmented reality are conducive to changing the profiles of current jobs, expanding employee capabilities and creating completely new jobs. Competence development will be integrated with production processes. It will be assisted by the introduction of employee digital assistants (Chromjakova, 2016; Grzybowska & Gajsek, 2016). Continuous skill development will become a standard. Remote communication with devices also gives the possibility of completely new business models regarding, among others participate in online production processes in various places. There will be a rapid increase in the performance of work according to the rules home office.

New business model Canvas dedicated in the Industry 4.0 environment

Currently, manufacturing enterprises can gain competitive advantage on the market, which will increase their flexibility in a stepwise manner and will be able to quickly produce personalized products. This causes the need to build completely new business models (Moeuf et al., 2017; Piccarozzi et al., 2018) that use the huge potential of modern technologies, wireless networks and mobile devices. The coronavirus epidemic also increases the need for modern solutions based on new technologies that enable the production processes realization by minimizing human participation.

The paper proposes a new business model Canvas adapted to the specifics of personalized production and modern solutions related to the Industry 4.0 concept. The model is dedicated to small and medium production enterprises that manufacture products in the network of enterprises containing other production and logistics companies communicating via the Internet. Manufacturing of products consists in planning real-time production schedules for networks of enterprises that are able to produce a given product configuration and are located closest to the customer.

The presented business model Canvas describes online production process which consists of technological process and supporting activities and three main stages can be identified. The diagram of the business model Canvas is presented in Figure 1.

Stage I begins during a confirmation of payment for the client's order. The customer places an order using the e-commerce platform by configuring the product in according to available finite sets of features.

Stage II The order is processed using Big Data Analytics technology, and the network production schedule is configured along with the schedule of logistic operations in real time. The priority of planning is the ability to produce a personalized product in the customer's closest location.

Stage III The network partners receive schedules and at the same time the production of the product starts automatically on machines, devices, robots, etc. communicating via the Internet.

Appropriate sensors and conveyors collect information from machines and devices and automatically start further technological processes and auxiliary activities such as logistics processes (picking, packaging, creating pallet loading units, transport, etc.).

<table>
<tr><td rowspan="2">Key Partners

manufacturing SMEs;
logistics SMEs;
from different places in the world;
communicated in real time;</td><td>Key Activities

e-commerce platform development;
communication by mobile devices using wireless networks;
personalization manufacturing;
machine-to-machine, machine-to-people communication by the Internet;
many different configurations of SMEs created in real time in the client's nearest location;</td><td rowspan="2">Value Propositions

highly varied products;
automatic ordering;
automatic production planning in real time;
matching production locations to the customer's location in real time;</td><td>Customer Relationships

self-service by mobile devices;
automated-service;</td><td rowspan="2">Customer Segments

demanding customers;
customer market not limited by space;
multi-sided platform;
mass market;
niche market;</td></tr>
<tr><td>Key Resources

mobile devices;
wireless networks;
new technologies:
Big Data Analytics,
Cloud Computing,
Internet of Things
Specialized staff</td><td>Channels

access to the e-commerce platform via mobile devices using wireless networks;</td></tr>
</table>

	product configuration with an extensive number of features;			

Cost Structure	**Revenue Streams**
economies of scope; expensive communication technologies connected partners; combining resources of partners for common manufacturing and sharing of costs;	yield management; high quality personalized products; real-time-market; quick production of personalized products; products with personalized properties; demanding customer segment;

Fig. 1: New business model Canvas.

The use of the new technology to process huge amounts of data in real time allows storage and transport costs to be reduced by creating production networks of enterprises located closest to the customer each time. The Internet of Things enables automatic communication of machines and devices in real time, thanks to which machine and device downtime is significantly reduced and the time of technological operations and auxiliary activities is significantly reduced.

The new presented business model Canvas includes nine elements.

Customer Segments. The main advantage of the model is the extension of the number of customers by directing it to several customer segments. The recipients of personalized products are both the segment of demanding customers who expect products tailored to their needs, preferences and tastes (niche market), as well as the segment of mass product customers due to the price of products similar to mass production (mass market). In addition, production in the enterprise network and the choice of manufacturing site closest to the customer allows personalized products quickly to be delivered and an unlimited market by location to be won.

Value Propositions. The model allows the production of highly varied products, the configuration of which is created by the customer from a limited set of available, selectable product features. The competitive advantage is ensured by automatic ordering, convenient for the customer and automatic real-time production planning taking into account the customer's location, which allows quick delivery (as in mass production) of personalized products with individually tailored configurations (as in time-consuming make-to-order production).

Channels. The model uses the e-commerce platform via mobile devices using wireless networks to reach the customer, which breaks the barriers of the local market and allows reaching customers all over the world as long as they have access to the Internet.

Customer Relationships. Customer relationships are established by mobile devices increasingly popular and willingly used by especially at young and middle age customers. Comfortable sales from anywhere in the world and at any time provides automated-service.

Revenue Streams. The model envisages several attractive revenue streams that they provide: yield management, high quality personalized products, real-time-market, quick production of personalized products, products with personalized properties and demanding customer segment.

Key Resources. The competitive advantage that builds the application of the proposed model is possible due to the use of many resources related to the Industry 4.0 concept. The most important of them are: new technologies such as: Big Data Analytics, Cloud Computing, Internet of Things; specialized staff, product configuration with an extensive number of features, mobile devices and wireless networks.

Key Activities. Key activities which guarantee the functioning of the model and generate revenues are as follow: e-commerce platform development, communication by mobile devices using wireless networks, personalized manufacturing, machine-to-machine, machine-to-people communication by the Internet and many different configurations of SMEs created in real time in the client's nearest location.

Key Partners. The proposed model is generated by a network which is built by connection resources and possibilities of manufacturing and logistics SMEs from different places in the world communicated in real time.

Cost Structure. The communication technologies connected partners are the most cost-intensive in this model. However, their use enables the benefits associated with is economies of scope and combining resources of partners for common manufacturing and sharing of costs, which is especially important for small and medium-sized enterprises whose capital is not large and the ability to raise capital is very limited, as well as enterprises from the make-to-order sector that have problems related to irregularity of demand.

Conclusions

Nowadays is observed a growing customer need of personalized products which are tailored to individual tastes, requirements, preferences and lifestyle. Therefore, industrial enterprises to gain a competitive advantage on the market have to increase enterprise flexibility in a stepwise manner. The Industry 4.0 strategy helps meet this challenge through implementation advanced technologies (such as Big Data Analytics, Cloud Computing, Internet of Things, etc.), automation and application of wireless networks and mobile devices. The Industry 4.0 concept is oriented towards high productivity of industrial systems, but requires changes in industrial management and using new business models.

In the paper a new business model Canvas is presented dedicated for small and medium enterprises which manufacture their products in the networks of industrial and logistics SMEs using the Industry 4.0 strategy. This model is a kind of a description of main firm potential includes key partners, resources, activities, customer segments, relationships, value propositions, cost structure and revenue streams. The proposed model can help to significantly improve enterprise flexibility. The advanced technologies allow machine-to-machine and machine-to-people communication in a real time what leads to shorten time of manufacturing and logistics processes and reduce downtime as well as time of planning and communication. An important advantage of using modern technologies is also the possibility of creating networks of enterprises located closest to the client to fulfill orders, which reduces the time of storage and transport.

As part of future research, the authors will develop accurate procedures for introducing advanced technologies related to the Industry 4.0 strategy into small and medium enterprises building

together production networks. The new procedures will allow quickly and effectively new technologies to be implemented and a competitive advantage to be developed.

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Is Islamic Bank stable enough? Stability Analysis of Islamic Banks in the Middle East and Southeast Asia

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Abstract

This study aims to measure efficiency and productivity and determine the factors that influence the level of efficiency of Islamic Banks in the Middle East and Southeast Asia in 2014-2018. Calculation of the level of efficiency in this study is relative, not absolute. This study uses the Data Envelopment Analysis (DEA) method. This research consists of 3 input variables namely Operational Costs (X1) and Salary Costs (X2) Socialization Costs (X3) and 2 Output Operational Income (Y1) and Distribution or Financing (Y2) output variables)). There are 5 Sharia Banks that are perfectly efficient (Constant). And the rest is fluctuating (Increasing and Decreasing). Islamic banks with the lowest relative efficiency levels are in Southeast Asia.

Keywords: Islamic Bank, Efficiency, Stability , Data Envelopment Analysis (DEA)

Introduction

The development of the Islamic banking industry in the world shows a positive trend. This can be seen from the increasing number of Sharia Banks present in countries in Southeast Asia, such as Indonesia and Malaysia, to countries in the Middle East and North Africa. The more developed Islamic banking industry, the greater the challenges faced by this sector, especially in terms of operational activities. The sharia banking industry has the same important role as the conventional banking industry, which is to meet the needs of the community in the financial sector and encourage the realization of national and global economic growth. So to carry out this role properly, Islamic banking is demanded to increase efficiency in its operational activities. The level of efficiency of a bank shows the ability of a bank to optimize all its resources and is able to provide greater benefits to the community as its customers.

According to Pramono and Darmawan (2004) there are several reasons that make the issue of banking efficiency a very important thing to study, including: (1) Increasing competition; (2) Problems arising as a result of reduced resources; and (3) improvement in customer satisfaction standards. The development of Sharia Bank performance in Indonesia can slow down, this is marked by a decrease in the growth of assets, the financing side and the side of Third Party Funds (DPK), while the ratio of problematic financing or Non Performing Financing (NPF) has increased even to exceed the BI regulation by 5 % in February 2015.academically, research on the contribution of Islamic banking industry to the quality of life for measuring the extent to its impact investment is still limited as conducted by Aggarwal and Yousef (2000), Uddin and Masih (2015), and Kumru and Sarntisart (2016). Previous research mostly tended to be concern on the effects of Islamic bank financing on economic growth as conducted by Abduh and Omar (2012), Rama (2013), Farahani and Dastan (2013), Hachicha and Amar (2015), Imam and Kpodar (2016) and Zirek et al. (2016).

Table 1
Sharia Bank Performance
Period 2011 - March 2015 (in Million Dollars)

Indicator	2011	2012	2013	2014	Jan 2015	Feb 2015	Mar 2015
Asset total	*145.467*	*195.018*	*242.276*	*272.343*	*263.468*	*264.813*	*268.356*
Total financing	*102.655*	*147.505*	*184.120*	*199.330*	*197.279*	*197.543*	*200.712*
third-party funds	*115.415*	*147.512*	*183.534*	*217.858*	*210.761*	*210.297*	*212.988*
NPF (%)	*2,52*	*2,22*	*2,62*	*4,33*	*4,87*	*5,10*	*4,81*

Source: (Financial Services Authority, March 2015)

The Financial Services Authority (OJK) Banking Supervisory Board of Commissioners, Mulya E. Siregar, also considered that the development of sharia banking in 2015 was having a difficult time. Asset growth in July 2015 was only at 7.98%. Whereas in 2013, the growth of Islamic banking assets could reach 49%. According to him, the decline in the growth of Islamic Banks did not only occur in terms of assets, but also in terms of financing and third party funds (DPK). The slowing growth in Sharia Banks was also exacerbated by the increasing non-performing financing (NPF) ratio which reached 4.89% in July 2015 (Sugiarti, 2015).

Based on the research results of Syafrida and Aminah (2015), the slowing growth in the performance of Islamic banking in 2015 was due to external factors and internal factors. When viewed from the external side, there has been a slowdown in global economic growth, including in Indonesia, which affects the performance of the Islamic banking industry. Meanwhile, from an internal perspective, the cause of the slowdown in growth of Sharia Banks was due to the sharia financing segmentation which was dominated by the retail sector, especially MSMEs, financing which was dominated by murabahah contracts, lack of variation in sharia banking financing and efficiency in bank operations.

Islamic banking is considered still less competitive with conventional banking in terms of efficiency. In 2010-2012, the efficiency of Conventional Commercial Banks reached 98.43% while the efficiency of Islamic Commercial Banks only reached 82.1% (Wahab, Hosen, & Muhari, 2014). According to Hidayat (2014: 54), the level of operational efficiency of Islamic banking, one of which is determined by the very high cost and initial investment. This has an effect on the low profits distributed to depositors. In addition, Islamic Bank financing equivalent rates are relatively higher than conventional bank loans. This can lead to decreased interest in financing customers in Islamic Banks (Syafrida & Aminah, 2015).

Efficiency is a concept that has generally been used in measuring the performance of a company. According to Srivastava (1999), a company is said to be efficient if the company can minimize costs in producing certain outputs or can maximize profits by using a combination of existing inputs. Efficiency can also be interpreted as the ability to obtain fixed output using minimal amounts of resources (Daraio and Simar, 2007).

According to Farrell (1957) the efficiency of a company consists of two components, namely technical efficiency and allocative efficiency. Technical efficiency reflects the ability of the company to produce output with a number of available inputs. Whereas allocative efficiency reflects the company's ability to optimize the use of its inputs, with its price structure and production technology. These two measures are then combined into economic efficiency (economic efficiency). A company can be said to be economically efficient if the company can minimize production costs to produce certain outputs with a level of technology that is generally used and prevailing market prices.

Previous research on this is from Miah and Uddin (2017) examining the differences between Islamic Banks and Conventional Banks with business orientation, stability, and efficiency. Data for this study were collected from 48 conventional banks and 28 Islamic banks from the Gulf States Cooperative Countries (GCC) during the period 2005-2014. The results show that conventional banks are more efficient in managing costs than Islamic banks. Islamic banks are denser in terms of short-term solvency but there is no difference in the long run. The results also showed that banks with large capital were not efficient enough.

Other previous studies are from Sghaier (2016) which measures the performance and efficiency of Islamic and conventional banks in the Middle East or MENA region and determinants. For this purpose we use the Data Envelopment Analysis (DEA) method and the Stochastic Frontier Analysis (SFA) method to calculate technical efficiency scores. The results reveal similar trends for both types of performance measurement. Analysis of the bank category reveals that conventional banks are more efficient than Islamic banks. Despite the technological changes experienced by the banking system in the MENA region, efficiency analyzes show that technical inefficiencies result from pure technical inefficiencies. Finally, the effectiveness of banks in the MENA region is sensitive to variables such as crises, deposits, capital, and includes mainly variables related to business lines. While what distinguishes this study from previous research is in terms of period, number and type of bank, and research variables. From the above background, this study is therefore entitled "Is Islamic Bank Stable Enough? Stability Analysis Of Islamic Banks In The Middle East And Southeast Asia 2014-2019" by using the Data Envelopment Analysis (DEA) method.

Efficiency Concept Review

Simply stated, efficiency can be interpreted as the ability to complete a job properly. The mathematical view states that efficiency is a calculation of the amount of output produced from various inputs used (Muharam & Pusvitasari, 2007). The concept of efficiency was first introduced by Farrell in 1957. According to Farrell, efficiency in a company is related to how to produce a maximum level of output with a certain number of inputs (Firdaus & Hosen, 2013). Efficiency in general is the ability of a business unit to achieve targets using the minimum amount of available resources (Martić, Novaković, & Baggia, 2009). Efficiency measurements can be simply formulated as follows (Tanjung and Devi, 2014):

$$\text{Efficiency} = \frac{\text{Output}}{\text{Input}}$$

According to Tanjung and Devi (2014), the formula is no longer sufficient for current conditions. In fact, there are currently a lot of inputs and outputs that have different relations with resources, activities and environmental factors. Therefore, the relative efficiency measures that are usually used are:

$$\text{Efficiency} = \frac{\text{Amount of output}}{\text{Amount of input}}$$

Based on some of these definitions it can be concluded that efficiency is one measure of performance that refers to the ability of organizations to produce optimum output by empowering existing input resources. Something can be said to be efficient if; first, using the same number of inputs can produce a greater number of outputs; second, with a smaller number of inputs producing the same amount of output; third with a greater number of inputs produces greater output.

According to Leibenstein (1966) inefficient companies are caused by two factors, namely failure to use resources efficiently and failure of companies to optimally combine resources (Hidayat, 2014:). To be clearer, Figure 1 will illustrate the concept of efficiency.

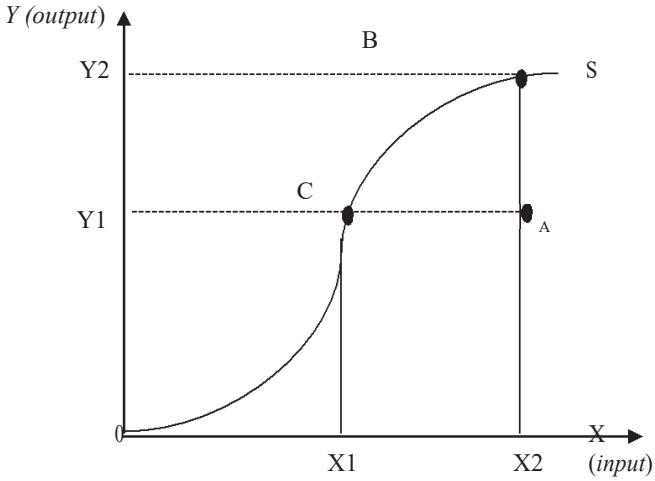

Figure 1. Efficiency Concept
Source: (Hidayat, 2014)

Hidayat (2014) explains the concept of efficiency illustrated in Figure 2.1. It is assumed that companies use one input (X1) to produce one output (Y1). The 0S line is a production frontier that describes the boundary where companies will produce optimally. For example, if a company uses X2 as an input, the optimum amount of output produced is Y2. Companies operating at point A are considered inefficient in terms of technique compared to companies operating at point B. This is because by using the same number of inputs (X2), companies operating at point B can produce more output (Y2) than the output produced by the company operating at point A is Y1. So that companies operating at point A can be efficient, the company can reduce the use of its inputs (from X2 to X1) with the resulting output Y1. From a company perspective, efficiency is known to be of three types, namely (Tanjung & Devi, 2013):

1. Technical efficiency or technical efficiency
Technical efficiency illustrates the company's ability to achieve maximum output with a certain number of inputs. The technical license will measure the production process in producing a certain number of outputs using the minimum input possible. According to Tasman and Aima (2013), technical efficiency is related to fixed resources within the company. Something is said to be technically efficient if the company is able to achieve the maximum possible output from a number of existing inputs. Meanwhile, according to Tanjung and Devi (2013), a production process is said to be technically efficient if the output of an item can no longer be increased without reducing the output of other goods.

2. Allocative efficiency or allocative efficiency
Allocative efficiency illustrates a company's ability to maximize the use of its inputs with its price structure and technology. If the input is allocated to produce output that cannot be used or needed by consumers, it means that the input is not used efficiently.

3. Economic efficiency or economic efficiency
Economic efficiency is a combination of technical efficiency and allocative efficiency. A company can be said to be economically efficient if the company uses the most minimal costs to produce certain outputs.

Methodology

Data Envelopment Analysis (DEA)

Data Envelopment Analysis (DEA) was first introduced by Farrell in 1957 (Firdaus & Hosen, 2013: 170). DEA is one of the analytical tools used to measure the efficiency of organizations both profit-oriented and non-profit-oriented organizations where operations use a number of inputs to produce a number of outputs. The DEA technique creates an efficient banking frontier set and compares it with other inefficient banks, this is done to make a score or the value of efficiency (Hidayat, 2014: 99). Furthermore, bank efficiency scores are limited between 0 and 1, the most efficient banks have a score of 1 while the most inefficient banks have a score of 0. Islamic banking efficiency levels, such as research conducted by M. Faza M. Faza Firdaus and MN Hosen (2013), Abdul Wahab, MN Hosen and Muhari Intercession (2014). Research with the DEA method is not only

done domestically, but many also use the DEA method in research abroad. As M. Abdelkarim Almumani (2013) who examined the efficiency of Islamic banking in Saudi Arabia and research conducted by O. L. Salami and A. A. Adeyemi (2015) which measures the level of efficiency of Islamic banking in Malaysia.

According to Tanjung and Devi (2013: 332), the DEA method uses two commonly used model approaches, namely the Charnes, Chooper and Roodes (CCR) model developed in 1978 and the Banker, Charnes and Cooper (BCC) model in 1984. First is Model Charnes, Chooper and Roodes (CCR), this model was developed in 1978. The DEA-CCR model is known as the Constant Return Scale (CRS) model because this model assumes that the production process follows the CRS. The CRS assumption assumes that each increase in one input will increase one output. This assumption applies to business units that have been producing at their maximum capacity (optimum scale). The Second is Banker, Charnes and Cooper (BCC) models, this second model was developed in 1984. This model assumes Variable Return Scale (VRS), which is the development of the previous model. The VRS assumption assumes that an increase in one input will not affect the increase in output because the business unit is not operating at its optimal scale.

This research framework will be explained in the following figure :

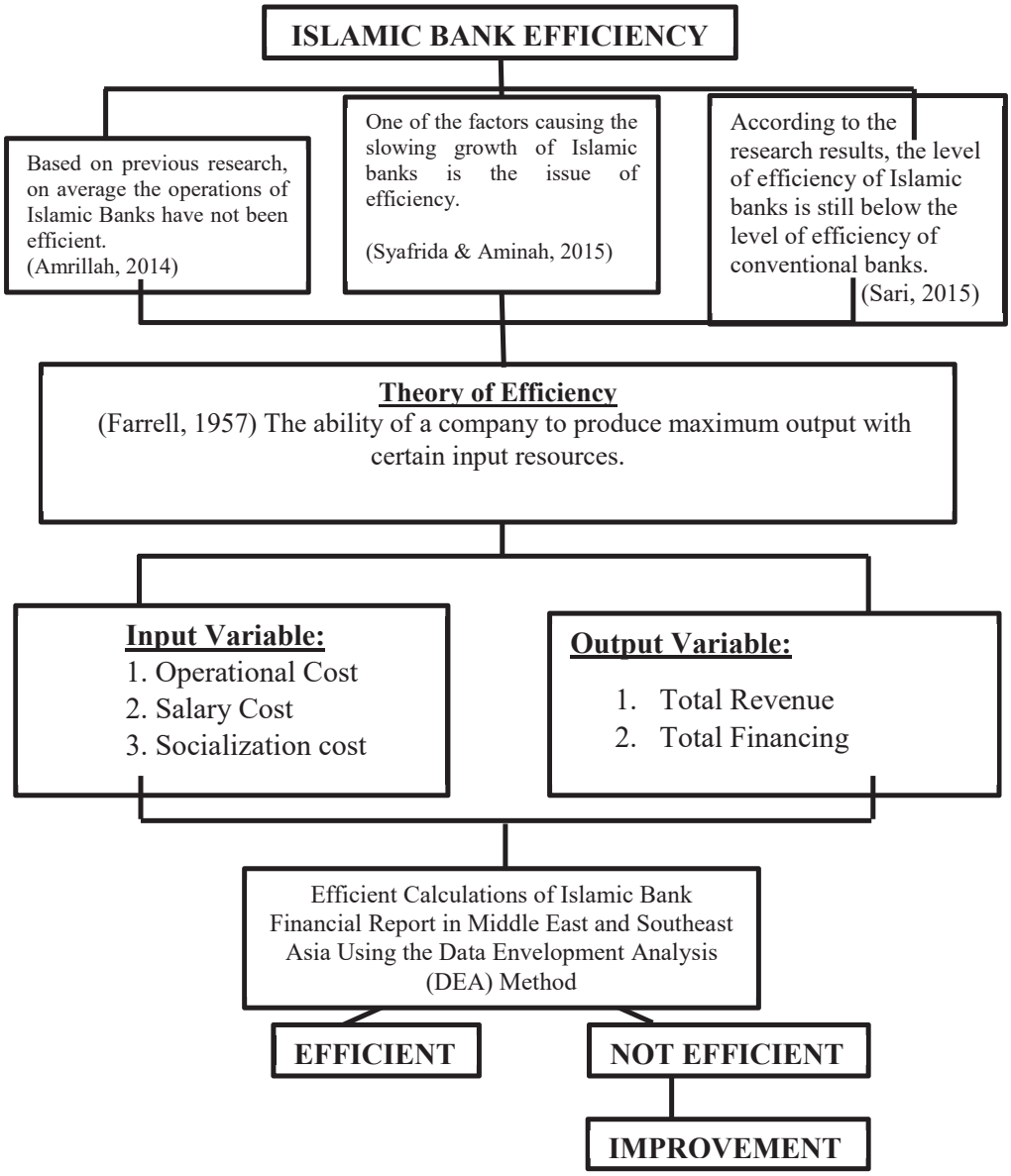

Figure 2. Research Framework

Source: Data processed by the author

Inputs to banking consist of three parties. First party funds are funds originating from paid up capital by investors and shareholders. Socialization costs such as for promotion. After the input is collected, then the bank will use the input to produce output. Output can be in the form of distribution of funds to parties in need in the form of financing, credit and services. The most important output for the bank itself is income, because the bank is a profit-oriented institution.

Results and Discussions

In the table below shows the efficiency values of each Sharia Bank analyzed from the Annual Financial Statements on the website of each Sharia Bank.

Table 2 Islamic Bank Efficiency Scores In The Middle East And South East Asia

No	Name	Period	Score	Scale
1	QATAR ISLAMIC BANK	2014	99.43	Increasing
2		2015	100	Constant
3		2016	95.54	Decreasing
4		2017	100	Constant
5		2018	100	Constant
6	BANK QATAR ARRAYAN	2014	91.48	Increasing
7		2015	89.73	Increasing
8		2016	98.64	Decreasing
9		2017	91.65	Decreasing
10		2018	85.03	Increasing
11	DUBAI ISLAMIC BANK	2014	88.01	Increasing
12		2015	97.31	Increasing
13		2016	97.01	Decreasing
14		2017	86.97	Increasing
15		2018	96.03	Decreasing
16	EMIRATES ISLAMIC BANK	2014	80.85	Decreasing
17		2015	98.99	Decreasing
18		2016	95.12	Increasing
19		2017	80.45	Decreasing
20		2018	99.13	Increasing
21	BANK MUAMALAT INDONESIA	2014	98.21	Increasing
22		2015	86.82	Decreasing
23		2016	75.54	Decreasing
24		2017	62.25	Decreasing
25		2018	71.22	Decreasing
26	BNI SYARIAH	2014	89.33	Decreasing
27		2015	79.63	Increasing
28		2016	88.34	Increasing
29		2017	99,4	Decreasing

30		2018	100	Constant
31	BRI SYARIAH	2014	96.77	Increasing
32		2015	100	Constant
33		2016	94.77	Increasing

Source: Data processed with MaxDEA 6.1

In the 2014-2018 period in Islamic Banks in the Middle East and Southeast Asia, which experienced 100% efficiency (constant) only a few Sharia Banks such as Qatar Islamic Bank in 2015, 2017 and 2018, then BNI Syariah Bank in 2018, BRI Syariah Bank in 2015 , Bank Syariah Syariah in 2016 and Bank Syariah Mandiri in 2017 the rest experienced fluctuations in inefficiency, while the lowest Sharia Bank was Bank Muamalat Indonesia in 2017. Increasing Status states that the Islamic bank is heading for efficiency and Decreasing status states that the Sharia Bank has been over the edge efficiently.

The factors causing inefficiency in Islamic banks are divided into two factors, namely input factors and output factors. The most dominant input factor causing inefficiency in Islamic banks is the factor of labor costs that are too expensive. Based on the calculation results, the labor costs incurred by the Islamic Bank are very high exceeding the specified target so that the Islamic Bank is considered wasteful in the expenditure of labor costs. The high number of workers without adequate skills and knowledge will reduce bank productivity. Given the scarcity of Human Resources who understand Islamic finance, the Islamic Bank must incur additional costs to provide training and skills for its employees. Furthermore, there are also output factors that cause inefficiencies in Islamic banks. The output factor is the lack of distribution of funding and operating income, obtained by the Islamic Bank. This is related to the still low funding rolled out by the Syraiah Bank.

MUAMALAT BANK INDONESIA

The level of efficiency of the Indonesian Muamalat Bank is one of the lowest, on a scale from 2014-2018 experiencing fluctuations, although it experienced a decline that was not too significant in 2015 and 2017, an explanation related to the efficiency trend of the Muamalat Bank Indonesia on the three approaches of each variable will explained in the following table:

Table 3. BANK MUAMALAT INDONESIA 2014-2018 Efficiency Trends

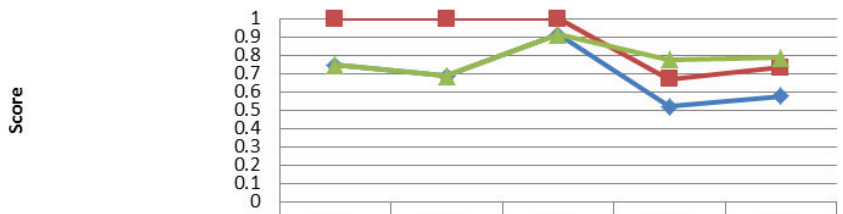

	2014-BMI (RTS : Increasing)	2015-BMI (RTS : Increasing)	2016-BMI (RTS : Increasing)	2017-BMI (RTS : Increasing)	2018-BMI (RTS : Increasing)
Technical Efficiency Score(CRS)	0.746309	0.68595	0.914283	0.52175	0.578375
Pure Technical Efficiency Score(VRS)	1	1	1	0.671511	0.733539
Scale Efficiency Score	0.746309	0.68595	0.914283	0.776979	0.788472

Source: Data processed with MaxDEA 6.1

Based on Table 3, the technical and overall calculations show a lower value than the VRS value in 2014, 2015, 2016, which shows a 100% efficient score. Bank Muamalat Indonesia's Return To Scale results show increasing from 2014-2018 which means that although there is a low level of efficiency, Muamalat Bank Indonesia can still increase the use of its inputs to provide financing and obtain greater revenue. The results of the 2017 Muamalat Bank Indonesia efficiency level according to each variable according to actual data and target data as well as recommendations for each variable based on potential improvement will be explained in the following table:

Table 4. Potential Increasing Efficiency of 2017 Muamalat Bank Indonesia Input Orientation

BANK MUAMALAT INDONESIA 2017 Efficiency Score : 0,62	Variable	Actual Amount	Target	Potential Improvement %	Reccomendation
Input	Operational Cost (X1)	$2.973.483	$550.774	-81,5 %	-$2.422.709
	Salary Cost (X2)	$1.913.918	$998.588	-47,8 %	-$915.330
	Socialization Cost (X3)	$297.671	$155.310	-47,8 %	-$142.361
Output	Total Revenue (Y1)	$9.406.889	$9.406.889	0,0 %	Rp0
	Total Financing (Y2)	$7.458.738	$7.661.369	2,7 %	$202.630

Source: Data processed with MaxDEA 6.1

Based on Table 4. with the input orientation approach, the main source of inefficiency in Muamalat Bank Indonesia in 2017 is in terms of Operational Costs. Following is an explanation of the potential improvement of each variable that must be carried out by Muamalat Bank Indonesia:

1. The operational costs used by Muamalat Bank Indonesia are too excessive 81.5%. This means that $2.422.709 of the total operational costs of Muamalat Bank Indonesia must be reduced to produce efficient output.
2. Muamalat Bank Indonesia personnel costs are too much to exceed 47.8% of the actual figure. To reach an efficient level, Muamalat Bank Indonesia can reduce $915.330 from the personnel costs incurred.
3. The cost of socializing Muamalat Bank Indonesia is too excessive 47.8%, for that the amount of socialization costs must be reduced by $142.361 to achieve efficiency.
4. Receipt of Muamalat Bank Indonesia has been efficiently seen from the same amount of actual value and target value of $9.406.889 therefore this condition must be maintained in order to remain efficient.
5. The amount of distribution of Muamalat Bank Indonesia must be increased a little more, namely around 2% or $202.630 to achieve efficiency

Comparison between actual data and target data for 2017 Muamalat Bank Indonesia for each variable will be explained in the following figure:

Figure 3. Comparison between Actual Data and Target Data for Muamalat Bank Indonesia For Each Variable

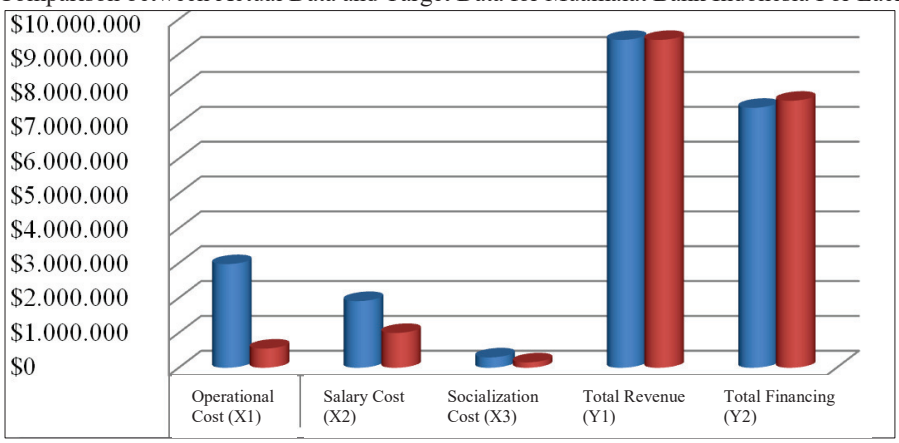

Source: Data processed with MaxDEA 6.1

Based on the explanation above, in 2017 Muamalat Bank Indonesia again experienced an inefficiency of 0.52 with operational costs as the main source of inefficiency, the increase in the amount of operational costs, personnel costs and socialization costs exceeding the target should not be offset by an increase in total revenues and distribution. So there are idle funds, and therefore it affects the efficiency of Muamalat Bank Indonesia which only reaches 52%. The recommendation is Muamalat Bank Indonesia needs to reduce costs incurred for operations, labor, and outreach, while distribution must be increased in order to realize efficiency.

QATAR ISLAMIC BANK

The level of efficiency of Qatar Islamic Bank is one of the highest, on a scale from 2014-2018 has increased. In 2014,2015, and 2016 the results of the Return to Scale Qatar Islamic Bank showed increasing meaning that the level of efficiency of the qatar islamic bank was slightly to 100% efficient, Qatar Islamic Bank could still increase the use of its inputs to provide distribution and obtain greater revenue explained in the following table:

Table 5. 2014-2018 Qatar Islamic Bank Efficiency Trends

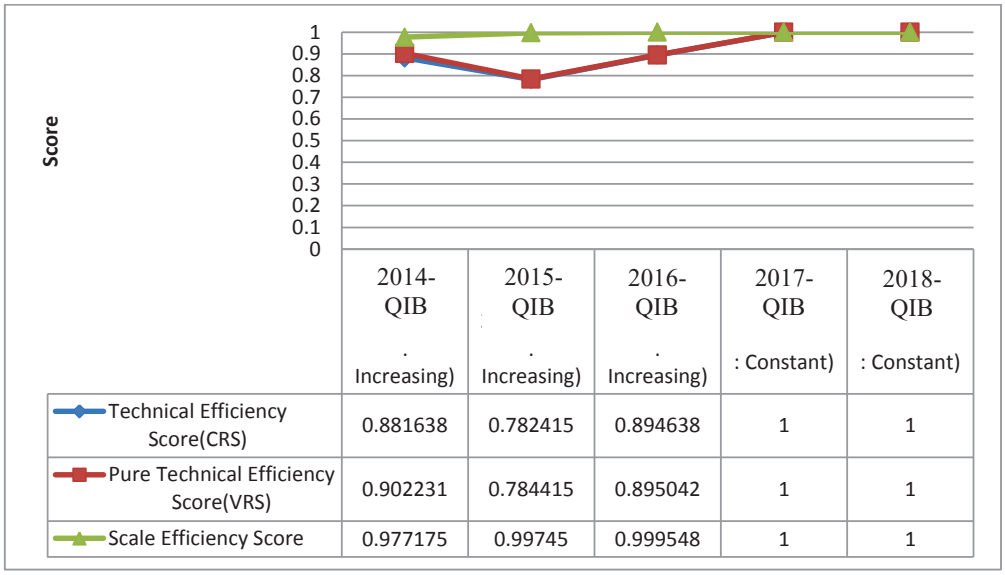

Source: Data processed with MaxDEA 6.1

Based on Table 5. technical calculations (CRS), on a scale, as well as VRS in 2015 and 2016 showed an efficiency score of 100%, as well as the Return To Scale results that showed constant, meaning that in 2015 and 2016 Qatar Islamic Bank was in the best condition, so the suggestion is that this condition must be maintained. The results of the 2017 Qatar Islamic Bank efficiency level according to each variable according to actual data and target data as well as recommendations for each variable based on potential improvement will be explained in the following table:

Table 6. Potential Increasing Efficiency of Qatar Islamic Bank 2017 Input Orientation

QATAR ISLAMIC BANK 2017 Efficiency Score : 1	**Variable**	**Actual Amount**	**Target**	**Potential Improvement %**	**Reccomendation**
Input	Operational Cost (X1)	$1.369.033	$1.369.033	0	Rp0
	Salary Cost (X2)	$3.624.999	$3.624.999	0	Rp0
	Socialization Cost (X3)	$368.904	$368.904	0	Rp0
Output	Total Revenue (Y1)	$25.157.518	$25.157.518	0	Rp0
	Total Financing (Y2)	$20.693.748	$20.693.748	0	Rp0

Source: Data processed with MaxDEA 6.1

The comparison between the actual data and the 2015 Qatar Islamic Bank target data on each variable will be explained in the following figure:

Figure 4. Comparison between Actual Data and Target Data for QATAR ISLAMIC BANK 2017 for each variable

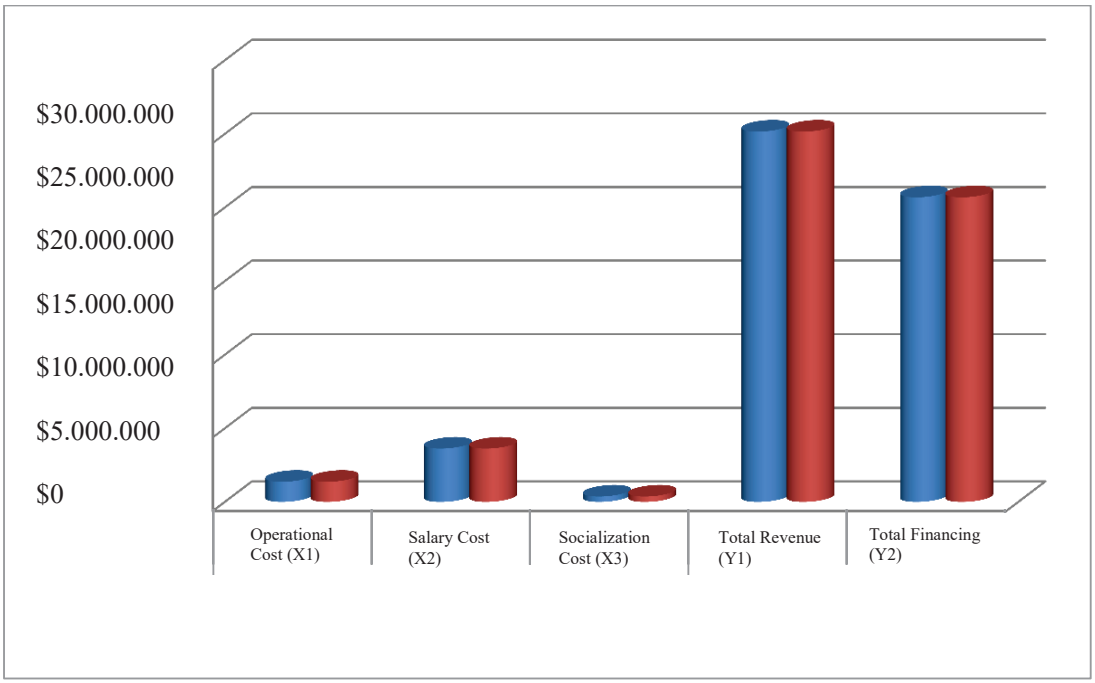

Source: Data processed with MaxDEA 6.1

Based on Figure 4. with the input orientation approach, the Actual Value and the target value of Qatar Islamic Bank have the same value, meaning that the Qatar Islamic Bank is always efficient every year from 2012-2016 and is in the best condition and produces an efficiency score of 100%, so the suggestion is this condition must be defended for the next years.

Conclusions

Based on the discussion that has been presented above, there are several implications both theoretically and managerially. Theoretical implications relate to the contribution of research results on the development of theories in economics, especially in the study of measuring the level of banking efficiency. The findings in this study also indicate that inefficiencies experienced by Islamic banks are caused by high labor costs and still not optimal operating income. Therefore this finding has managerial implications for the banks to increase the amount of financing channeled, because with a high amount of channeling, operational income can also increase. Islamic banks must be more courageous in taking the right and careful financing decisions to reduce the risk of default.

Acknowledgment
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Sharing Economy and Customer Trust: The Case of Airbnb.com

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Abstract

The sharing economy is an economic principle that has risen thanks to technological advances. With the rise of this type of C2C markets in the context of the sharing economy, it is important to understand the factors that affect the intention to use these services. Using the theory of planned behavior and the antecedents of trust, we propose a conceptual research model that outline the factors that may affect the consumer's intention to engage in such economy. We test the model on the Airbnb service using an online survey.

Keywords: Sharing economy, Theory of Planned Behavior, Trust.

Introduction

The exponential growth and advances of information and communication technology in the recent decade has led to the proliferation of new business models and economic principles that are changing consumption behaviors around the globe. The sharing economy is a recent economic principle that is driven by such technological advances as peer to peer platforms. The sharing economy has risen as a creative C2C business model that serves customers by allocating effectively excess in goods or services (Abramova et al. 2015). It allows individuals to revive unexploited assets by making them available for other individuals in exchange of money. According to Price Waterhouse Coopers (PwC) projections (2015), the sharing economy has the potential to reach global revenues of around $335 Billion by 2025.

Often described as crowd-based business model, the sharing economy has showed a great potential and enabled the startups to enjoy valuations beyond its revenues. In fact, Airbnb raised funds at a valuation of $20 Billion which is 20 times its revenues (Libert, Wind, & Beck, 2014) In addition, Libert et al. showed that companies operating under the sharing economy which they labeled network orchestrator model enjoy a competitive advantage over the other companies in terms of higher valuation over revenues, higher profit margins and faster growth. Nonetheless, the sharing economy is subject to numerous threats and obstacles. Accordingly, the sharing model implies a high context peers interaction, which eventually, makes the trust factor curtail. More importantly, companies need to focus on making the communication between the platform operators as fluid and effective as possible (Horton& Zeckhauser, 2016). Because of the nature of the model, trust is pointed as the most important factor in the long-term success of customer-to-customer (C2C) relationship (Cook & State, 2015; Strader&Ramaswami, 2002). Additionally, trust is an important factor in the notion of sharing. PWC (2015, p.16) said that "convenience and cost-savings are beacons, but what ultimately keeps this (sharing) economy spinning-and growing-is trust."

In this paper, we will analyze the role of trust in the sharing economy from the client perspective. Using the Theory of Planned Behavior (Ajzen, 1991) and the antecedents of trust developed by Gefen (2003), we empirically test a model of factors affecting client's intention to use a sharing service such as Airbnb.

Research Model and Hypotheses

The research model of our study is presented in figure 1. The model is based on the theory of planned behavior (Ajzen, 1985) and trust antecedents as developed by Gefen (2000). Our goal is to identify the factors that best predict the intention to use in the context of the sharing economy model of airbnb.com from the customer's perspective. A previous study by Mittendorf's (2016) explored trust in the sharing economy from the provider's perspective using the research model developed by Gefen (2000). Mittendorf (2016) found out that both trust constructs, trust in the room provider and trust in Airbnb, are important for a successful sharing transaction. Our research model presents trust from the renters perspective in addition to trust in the platform provider.

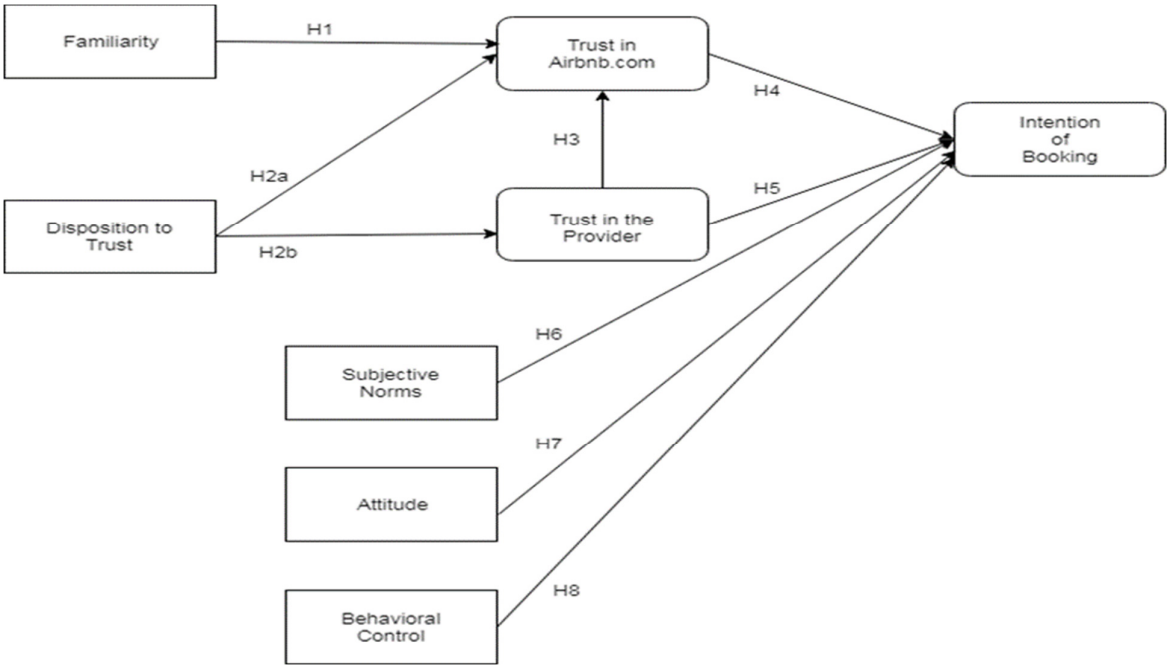

Fig. 1: Research Model

Trust in online environment and Theory of planed behavior:

Developed by Icek Ajzen (1985), the theory of planed behavior explains the human behavioral process. According to the theory, human behavior is regulated by three variables: the positive or negative evaluation toward an action (Attitude), the general beliefs towards the action (Subjective norms) and finally the level of control that the person has on the behavior (Behavioral control). Combined, behavioral control, subjective norms and attitude impact the behavioral intention, which leads to the actual behavior. The theory has been studied in different contexts such as education, m-learning, mobile apps, and e-commerce (Seyal & Mohd, 2017; Lim & Dubinsky, 2005).

Trust has always been an important factor in building business and personal relationships (Mcknight,2001). Without it, transactions would become difficult to establish, especially in situations where risk is present. The greater the risk and the level of uncertainty the more important is the role of trust in the transaction. Regardless of the nature of the risk, trust is what facilitates the transactions. Conscious about the importance of trust in E-commerce transactions, Gefen (2000) explained the role of building trust in the e-commerce industry through two variables: Familiarity with the e-vendor and disposition to trust. Familiarity refers to the understanding process of why,

how, when and what people do what they do (Luhmann, 1979). Disposition to trust deals with the degree of faith and trustworthiness that a person has toward others' future actions (Gefen, 2000).

In the sharing economy, the level of uncertainty is notably higher compared to other models. First, because of the online interaction characterized by its complexity and uncertainty. The second reason consists of the lack of regulations around the collaborative economy. Third, the triadic relationship characterizing the sharing economy model makes the notion of trust even more complex. Airbnb's users, for example, are exposed to different threats such as properties' damage and privacy issues. In this context, trust is less likely to be built, and therefore is where it is more needed. Overall, we can say that Airbnb, is one of the most trust-dependent platform, taking into consideration its sharing nature and process.

Based on our research model, we hypothesize the following:

H1: *Attitude will positively affect Trust in Airbnb.com*
H2: *Behavioral control will positively affect Trust in Airbnb.com*
H3: *Subjective norms will positively affect Trust in Airbnb.com*
H4*: Familiarity will positively affect Trust in Airbnb.com*
H5: *Disposition to trust will positively affect Trust in the provider*

H6: *Disposition to trust will positively affect Trust in Airbnb.com*
H7: *Increased degrees of trust in Airbnb.com will increase the renters' trust in the provider*

H8: *Trust in the provider will positively affect renters' intention of booking*

H9: *Trust in Airbnb.com will positively affect renters' intention of booking*

Research Method

To test and validate our research model, we used quantitative survey methods. To collect data we shall use online survey. Online questionnaires are very convenient and very feasible in this context. Especially that the target population are university students from generation Z who are very tech savvy and are potential users of the sharing economy services. Born and raised at the pinnacle of the technological development, the generation Z is comfortable with the usage of Internet platforms and E-services. Thus, we believe that our population is appropriate for testing our sharing economy-based model.

Instrument Development

To measure the constructs in our research model, we used previously validated measurement scales. Table 1 lists the variables and the source of each scale. Some scales were slightly reworded to reflect the context of Airbnb.

Table 1: Variables and their respective measurement sources

Construct	Source
Familiarity with Airbnb.com	Gefen, 2000; Kim et al. 2008
Disposition to trust	Gefen, 2000.
Trust in Airbnb.com	Gefen 2000 ; Jarvenpaa et al. 1999 ; McKnight et al. 2002.
Trust in Provider	Gefen, 2000.
Attitude	Jarvenpaa et al. 1999 ; Taylor and Todd 1995
Subjective norms	Taylor and Todd 1995 ; Mathieson 1991 ; Paul and

	Mendel 2006
Perceived Behavioral Control	Taylor and Todd 1995; Paul and Mendel 2006
Behavioral Intention	Pavlou 2001 ; Kim et al. 2008 ; Mathieson 1991 ; Taylor and Todd 1995

Conclusion

This research will enable us to enrich our knowledge, explore the sharing economy framework and attempt to widen our spectrum of future research. As a trending model, the sharing economy can be an alternative to the traditional business models and can therefore be considered as disruptive. As such, Airbnb.com is propose an alternative service in the hospitality sector and can be a source of economic growth. This study will put emphasis on the factors that influence the renter's booking intention and will therefore help shed light on the adoption of such service in the Morocco context.

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Features of Socio-Economic Stratification: Case of Kazakhstan

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Abstract

The article discusses the features of the socio-economic stratification in the Republic of Kazakhstan, including the stratification of the population of the Republic of Kazakhstan on the basis of "the level of income, quality of life index" (with the release of 5 groups of households and individuals), and proposed a classification dividing the regions of Kazakhstan in terms of income. In 2018, assistance from the state is not needed, only a third of the population of the Republic of Kazakhstan, the rest in varying degrees, need social support. The results of the socio-economic stratification of the population of the Republic of Kazakhstan will enable the social policy not only directly in need of protection, but also to determine the critical group, which will take timely measures of state support in order to maintain political stability and social cohesion of the Kazakhstan society.

Keywords: Kazakhstan, economics, stratification, income and opportunity inequality, government support, statistical research, median, middle class, poor, rich.

JEL Classification: C23, R20, Z13

Introduction

In conditions of unequal distribution of income, economic, intellectual, informational and other resources, stratification defines social identification and borders of interaction between people and groups with different social status. The term "stratification" is used to describe the structure of inequality in a society where people:

- have differentiated structural positions;
- are in layers (strata) that are evaluated hierarchically according to certain recognized standards.

The need for in-depth studies of yield stratification was articulated more than a quarter of a century ago by scientists who considered yield distribution to be one of the most important foundations of

social stratification (Esping-Andersen, 1991; Lenski, 1984; Rytina, Form, Pease, 1970; Townsend, 1979, 2013) and who have done much in this direction. Nevertheless, the need for such research is still relevant today (Ceriani, Verme, 2014). For economists, income and income inequality are integral attributes of the concept of "capabilities" based on economic theories of wealth and fair distribution. This traditional approach to measuring well-being is based on comparing levels of resources available to individuals (Sen, 1992). At the same time, the development of the problem of income inequality by economists often overlaps with key topics for the concepts of social stratification and theory of social structure in general. These are justice, inequality, poverty, and the middle class; the issue of wealth is less well researched in the literature in this context (Brzezinski, 2011; Eisenhauer, 2011). At the same time, in general, the experience of singling out certain income groups in academic literature, regardless of their sectoral affiliation, is much more often associated with the study of individual elements of the social structure (the poor, middle class, etc.) than with the description of models of social stratification of society as a whole.

Interdisciplinary advancement in the study of income stratification is significantly complicated by confusion in terms of concepts, namely, that, for example, sociologists and economists have different interpretations of the basic concepts of social structure, in particular - groups, strata, layers and classes. Despite the fact that sociology has developed a tradition of analyzing social groups, which dates back to the works of G. Simmel (Simmel, 1898), economists actively use this concept to describe the income categories and ranks allocated by them, without taking into account the traditional criteria for identifying groups in sociology. Exceptions are cases when the division of population is based on the attitude of individuals or households to this or that income percentile or index methods of income stratification (Yitzhaki, Lerman, 1991), when the division of population into groups is obviously based not on social theory but on practical needs of research (for example, the necessity to control nonlinearity of the processes under analysis). Sociologists, on the other hand, rarely use such formal divisions, preferring theoretically more elaborate classifications, for example, class schemes of J. Goldthorpe and his colleagues (Erikson, Goldthorpe, 1992; Goldthorpe, McKnight, 2006). Wright (Wright, 1989, 1997), D. Gruski and his colleagues (Liu, Grusky, 2013; Weeden, Grusky, 2005), D. Treiman (Treiman, 1977), or even express skepticism about attempts to link income differentiation of the population with the logic of social stratification (Wodtke, 2016).

Nevertheless, the task of linking social stratification and income inequality, according to current research on social and economic inequality and stratification, still remains important in Kazakhstan, not only in practice but also in theory. While income-based stratification is somewhat limited in its heuristic possibilities when analysing the social structure as a whole, it can eloquently testify to ongoing socio-economic processes, their trends and scales. At the same time, income groups themselves form an ordered single-criteria social classification scheme, albeit a simple one, but already established as a separate tradition in structural sociology (Grusky, 2001; Parsons, 1940).

As a rule, the classifications used to describe objectively existing social groups are either one-, two-dimensional or multidimensional structures. As multidimensional models by virtue of their complexity cannot be a reflection of the principles of stratification of society existing exactly in the consciousness of people, a two-dimensional model can claim for the role of a common classification representing representations of the majority of people.

Stratification of the population with allocation of certain income groups on the basis of several attributes and description of these groups is important not only from the point of view of political stability, but also for applied purposes, for example, more effective market segmentation or coordination of social programs.

In EU countries, stratification is constructed by calculating the relative poverty line. If an individual's equivalent disposable income is below 60% of the national median income, he or she is considered poor because this approach takes into account not only the minimum needs for physiological survival, but also exceptions from socio-cultural standards and norms of public life (access to information, communication, etc.).

Identification of three income groups of the population (low, medium and high income groups) allows for the analysis of income polarization, which is fundamentally different from the analysis of income inequality and poverty in that changes in income distribution are analyzed with an emphasis on changes in income distribution as compared to the center.

Thus, studying the change of three income groups, we can talk about polarization of society as a manifestation of inequality. In the case of income polarization, the shares of the upper and lower income groups increase, while the share of the average group shrinks. In people's perception, such a situation is perceived as an increase in inequality and, to a high degree, can jeopardize political stability and social cohesion of society. If the average income of a group decreases in relation to the other two, but without a decrease in the share of the group itself, we can say that there is relative polarization. In the same case, when there is an increase in the share of population with low income along with a decrease in the average income in this income group, we are talking about absolute polarization of income.

Actuality of a theme of research

on social and economic stratification of the Kazakhstan society is caused, first of all, by practical importance of object of research. **The research hypothesis:** self-stratification of society does not coincide with official statistical studies, which should already be considered an important social problem. The given mismatch for Kazakhstan is more explained by features of mentality of the Kazakhstan society.

Methodology of research

The research included a complex of methods of quantitative and qualitative analysis. The preliminary stage included the study of epistemology of the issue by analyzing the works on this problem. Further research on the stratification of Kazakh society will be based on theoretical and methodological approaches proposed by D. Gordon (Gordon, 1995, 2000, 2005), which allow to divide the population into groups on the basis of relative criterion (income level) and deprivation (number of deprivations).

In 2000, D. Gordon (Gordon, 2000) and a group of researchers presented a study conducted in the UK, which used a fundamentally new approach to defining the division of the population into two groups: poor and not poor. This approach combined the deprivational and income lines of poverty, i.e., on the one hand, the necessary benefits of household deprivation were taken into account and on the other hand, the income level was taken into account. D. Gordon recognizes that in the systems of stratification of modern societies, the material and economic elements never exhaust all its factors. Since it is the criterion of ownership and income that plays a decisive role in Kazakhstani society, which has received its own value, as well as the level of deprivation allows for a more objective assessment of the level of poverty it is the work of D. Gordon that formed the basis of the study.

Kazakhstan currently has a high degree of stratification of society into rich and poor, and this is one of the most pressing problems, especially given the declared ideas of social and economic equality of Kazakh citizens.

As mentioned earlier, modern scientific research has revealed that excessive inequality of the population is not only a destabilizing factor, creating a potential threat of conflict, but also adversely affects the economic and demographic indicators of the country, affecting the labor motivation of the population.

At the same time, according to official data from the Committee on Statistics of the Republic of Kazakhstan, between 1997 and 2018, the Gini coefficient fell markedly from 0.338 to 0.289, as did the fund coefficient (calculated as the ratio of average per capita income of the 10% of the most and 10% of the least wealthy population) from 10.2 to 5.99, the share of the population with income below the minimum subsistence level in 2018 was 4.3% (It makes it possible to numerically estimate

the degree of inequality. The Gini coefficient for 20 per cent of the population sets the degree of deviation of the actual distribution of income by quintile group from its even distribution line).

It should also be noted that according to official statistics, the average per capita income of the third and fourth quintiles (at 20% distribution) exceeds the minimum subsistence level only by 1.5-1.9 times, and this indicates that in fact 80% of the population of the Republic have income not exceeding twice the minimum subsistence level, i.e., the minimum subsistence level is not higher than the minimum subsistence level.e. 170 Euros per person (as of 2018, the minimum subsistence level is 26,440 tenge or ≈ 65.02 less than, for example, in 2014, ≈ 85 Euros, which is also due to past devaluations of the national currency in Kazakhstan), half of which is vulnerable to the risk of becoming poor.

Estimating the stratification of the population of the Republic of Kazakhstan in 2018 by the Eurostat methodology using the scale adopted in Germany:

1) 23.7% of the population belongs to the low-income group (less than 70% of the median of monetary income);
2) 56.3% belong to the average income group;
3) 20% belong to the high-income group (over 150% of the median of monetary income).

The median of monetary income in Kazakhstan is 85 euros per person, while more than half of the population of Kazakhstan had income below the average in the period under review (Fig. 1).

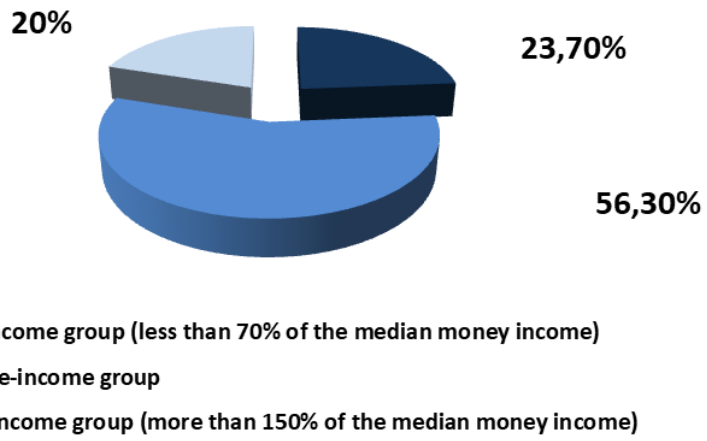

Fig. 1: Population distribution by income groups in the Republic of Kazakhstan in 2018

Source: composed by the authors

In the last 2 years, the share of low-income households has decreased by 4.2% (due to the introduction of targeted state assistance to socially vulnerable groups in Kazakhstan), but the share of high-income families has also decreased by 1.6%. The expansion of the middle layer indirectly shows a decrease in income polarization.

This survey and distribution of Kazakhstani society by income groups is quite standard and in our opinion does not allow us to get a complete and more detailed picture of socio-economic stratification in the Republic of Kazakhstan and to identify those promising groups of the population, whose social assistance will lead to a real improvement in their quality of life. According to the Committee on Statistics of the Republic of Kazakhstan, as of 1 January 2019, the population of the country was 18,376.2 thousand people. The share of the urban population increased slightly, to 55.1 per cent, while that of the rural population decreased to 44.9 per cent. Unfortunately, the rural population of

Kazakhstan is characterized by a lower standard of living than the urban population and, above all, a lower level of access to social services (e.g., lack of specialized medical care) and worse engineering and transport infrastructure. Also in 2018, the poverty rate in rural areas exceeded the urban level by more than 3.8 times; in 2009 the difference was 3.0 times.

Main Part

The model of socio-economic stratification of Kazakhstan's population proposed by the authors is based on 2 features:

- income level;
- quality of life index.

Application of this model allowed dividing the population into 4 main groups:

1) "poor", which includes households and individuals with low values of income and living standard index;
2) "vulnerable" - a group of households and individuals with low incomes but a high quality of life index;
3) "out of poverty" - households and individuals with high income but low quality of life index;
4) "not poor" - a group of households and individuals with high incomes (consumption) and a high quality of life index; from this group 5 group can be distinguished "wealthy", i.e., the population with a maximum income level and a quality of life index.

The results of calculations of socio-economic stratification in Kazakhstan, which takes into account both income and living standard index, according to the data of 2018 are presented in Figure 2, dividing households and individuals into 4 groups. This division is explained by the fact that in Kazakhstan the number of individuals in low-income households is higher than in high-income households.

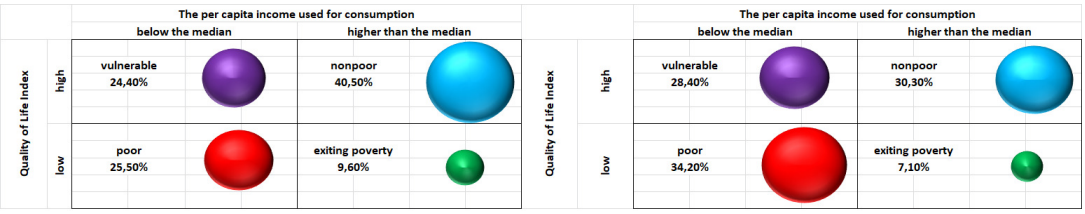

Fig. 2: Stratification of the population of the Republic of Kazakhstan in 2018 by indicators of "income level - quality of life index" (by households and individuals)

Source: composed by the authors

The "non-poor" group, which includes households and individuals with high values of income (consumption) and standard of living index was 40.5% and 30.3% respectively. This is the group to which we refer households with low deprivation rates (i.e. high living standards) and high incomes. The main location of this group is the urban population living in cities with a population of over 50,000 people. (small towns). Kazakhstan is the most urbanized country in Central Asia. The urban population accounts for more than 60% of the total number of inhabitants, there are 86 cities in total in Kazakhstan, but 54 of them are small towns, so the main part of the "not poor" group lives in 32 cities, the most populated city of Kazakhstan is its "southern capital" - Almaty, where today live about 1.5 million people. Other large cities of Kazakhstan in terms of population are: Astana (over 828 thousand people), Shymkent (over 680 thousand people) and Karaganda (over 480 thousand people).

The "poor" group, which included households and individuals with low incomes and living standard index values, was 25.5 and 34.2% respectively. The main location of this group is the rural population and the population of 28 monocities in Kazakhstan (i.e. every third city in Kazakhstan). According to the modern classification, monocities in the Republic of Kazakhstan are considered to be urban settlements with 10 to 200 thousand inhabitants, where at least 20% of the adult population in such a city works at the city-forming enterprise. Only 4 monocities of the republic have the population over or about 100 thousand (Temirtau, Rudny, Zhanaozen, Ekibastuz); the population of the rest does not exceed 50 thousand people.

The group "leaving poverty" - households and individuals with high income but low quality of life index of 9.6% and 7.1% respectively. This group is not income poor at the time of the survey, but if their income remains high, they will be able to acquire the necessary benefits over time and their quality of life will increase. Unfortunately, most of this group in Kazakhstan is rural, whose access to benefits is limited by the poor state of the engineering and transport infrastructure in rural areas.

The "vulnerable" group is a group of households and individuals with low incomes but a high quality of life index of 24.4% and 28.4% respectively. This group is not experiencing massive deprivations at the time of the survey, but with no increase in income the situation will change for the worse. The main location of this group is the urban population, both large and small cities. In Kazakhstan, a rather high share of this group is conditioned by the state policy aimed at ensuring equal access to social benefits (guaranteed volume of health care, education, quality of infrastructure in cities, etc.).

Analysis of the population groups received showed that there is a small but clearly distinguishable population group with an income above the median, with no deprivation. Allocation of such households allowed obtaining the fifth group - the wealthy ones.

Distribution by groups of households also differs from distribution by persons (Figure 3).

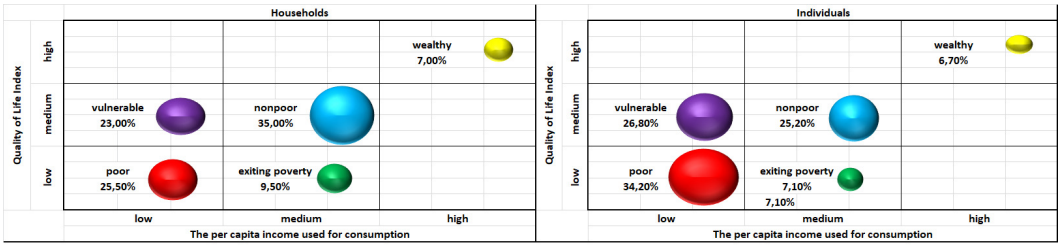

Fig. 3: Stratification of the population of the Republic of Kazakhstan in 2018 by indicators of "income level - quality of life index" (with allocation of 5 groups by households and individuals)

Source: composed by the authors

The "poor" group comprised 25.5% of households and 34.2% of individuals, the "vulnerable" group 23.0% of households and 26.8% of individuals, the "leaving poverty" group 9.5% of households and 7.1% of individuals, and the "non-poor" group 35.0% of households and 25.2% of individuals. Finally, 7% of households and 6.7% of individuals were included in the "wealthy" group.

Conclusions and Recommendations

Based on the analysis, it can be assumed that in 2018 only one ***third of the country's population did not need government assistance, while all the rest, to varying degrees, needed social support***.

Features of social and economic stratification in the Republic of Kazakhstan are due to the presence of significant regional unevenness in the distribution of income:

1) The population of capitals is in the most advantageous position: the current city of Astana and the former city of Almaty, which has the status of a city of national importance;
2) Next in profitability oil-producing regions, namely Aktau, Mangistau and West-Kazakhstan regions (there is a very strong stratification of living standards of the employed population and not in this sector);
3) Relatively stable regions of Kazakhstan - Akmola, Aktobe, Karaganda, Kostanai, Pavlodar and North-Kazakhstan regions.
4) Agrarian regions with minimal profitability - East Kazakhstan, Zhambyl, South Kazakhstan, Almaty and Kyzylorda regions.

Uneven distribution of income generates a number of problems in the leading regions of Kazakhstan:
- Large flows of internal migrants to capitals (Astana, Almaty) and oil regions of Kazakhstan from agrarian regions increase social tension. The local population is experiencing strong competition from both foreign and Kazakh workers;
- wages in the extractive sector are 4-7 times higher than in other sectors of the economy. This leads to sharp stratification of the population. High wages in the extractive sector with limited supply of goods and services in the regions lead to higher consumer prices. Consequently, the cost of living in the region is becoming more expensive;
- as a result of strong income differentiation in the extractive regions of Kazakhstan, there is an outflow of workers from the social and infrastructure sectors, which again deteriorates the quality of life of the population.

Agrarian regions of Kazakhstan also face a number of problems:
- there is a high concentration of poor people in these regions: about 50% of the poor in Kazakhstan live in three regions - Almaty, South Kazakhstan and East-Kazakhstan regions, these regions have the highest proportion of self-employed people with unstable income;
- the processing industry of agricultural products is underdeveloped, so the economy of these regions is characterized by low added value and, accordingly, low wages.
Nevertheless, despite the obvious stratification of society in Kazakhstan, the negative consequences of the crisis, rising prices for products, goods, utilities, fuels and lubricants, sociological studies, including foreign analytical structures, have long recorded a high level of satisfaction with life.

The reasons of this phenomenon can be divided into 2 groups: common for the population of CIS and specific for Kazakhstan.

The first group of reasons may include a subjective approach to self-identification, based on the mentality of CIS residents: "If I'm not hungry, I'm not poor, and if I'm not poor - I'm the middle class!" In Kazakhstan, at least 42.7% in the focus groups in 2014 identified themselves as the middle class, and in 2018 - 59%, while many of them do not allow allocating sufficient funds for the purchase of durable goods (with more specific questions). We have also brought here a desire for stability, quite organic for the general public - the fear that mass marches on a political and economic basis may turn into a large-scale, nationwide inter-ethnic conflict (in the example of Georgia in August 2008, Kyrgyzstan in June 2010, Ukraine in 2013-2014, etc.) really shows the level of protest of Kazakh society. Again, it is necessary to note the consequences of "shock therapy" of the 1990s. The overwhelming majority of the population of Kazakhstan, especially middle and older generations (age cohorts 40-50, 50-60, 60 years and older) have been fully affected by the transformation of the entire social system. They remember the sharp decline in living standards and other social costs of forced modernization. It is enough to compare the inflation rate in Kazakhstan for 2018 - 5.3% - with hyperinflation in the first half of the 1990s, when it exceeded one thousand percent year on year.

The specific reasons for the high level of satisfaction with life in Kazakhstan include the rather pronounced conservatism of Kazakh society, primarily the population living in the aul (village). On the one hand, it is socially passive, and on the other, it is quite loyal to the authorities. In particular, the loyalty of the villagers is due to several reasons. The fact is that social ties in the village are to a large extent characterized by patron-client relations, based on high loyalty to the authorities. They are projected on the whole system of relations with persons in power. This is explained by traditionalism

and social trends in the rural areas. And despite the low standard of living and income of the rural population compared to the urban population, the rural population shows an equally high degree of satisfaction with life.

And the second factor, let's call it Central Asian. Kazakhstanis in their masses, especially those living in border areas, are well aware of the standard of living of our neighbors: in Kyrgyzstan, Uzbekistan, Turkmenistan and Tajikistan, including hundreds of thousands of migrant workers. According to the CIS Statistical Agency, in 2018 the average salary in Kazakhstan was second only to that of Russia and was higher than in Belarus, Azerbaijan, Ukraine, Armenia, Moldova, not to mention Kyrgyzstan and Tajikistan, where it was 3 and 4.6 times lower than ours, respectively.

The above listed main factors form a relatively low correlation between the socio-economic stratification of Kazakhstani society, the negative impact of rising prices, utility tariffs, poor health care, education and other spheres on the one hand, and the level of protest among the population and various social groups on the other.

Until 2020, targeted social assistance in Kazakhstan was provided exclusively to low-income families in the form of cash payments and assistance in helping a family get out of a difficult life situation by providing them with training, employment and support to start a business. We recommend a comprehensive approach and targeted social support measures:

1) Introduction of state benefits for all families with many children and 4 or more underage children or full-time students under the age of 23 years;

2) Quarterly assignment of targeted social assistance to all family members as a difference between the poverty line and the average per capita income of the family, provided that able-bodied family members will work and the state will help them to find a job, engage in business;

3) Provision by the State of a guaranteed social package for children from poor families: from 1 to 6 years old - child nutrition, hygienic means and educational services, and from 6 to 18 years old - free hot meals in schools, free daily city transport, school uniforms and school supplies.

The mechanism for providing targeted social assistance should be transparent, fair and motivating to work and not to engage in idle lifestyles and benefits.

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Perfecting the Procurement Process in The Security Management System in The Supply Chain

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Summary

The aim of the article is to develop a model for perfecting the procurement process in the security management system in the supply chain based on the case of the surveyed automotive trading company.
The model uses EPC notation to present the basic disruptions in the supply chain and proposals for their elimination or reduction. The model verification was carried out based on the statistical data collected during several years of observation of the procurement execution time delays in the surveyed company and on the application of the Monte Carlo computer simulation method.

Keywords: EPC modelling, supply chain, procurement process

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Introduction

Supply chain management is a skillful way of linking the processes of sourcing, manufacturing, distribution and recovery logistics to the market needs and the way to properly adapt to the ever faster changes of these needs. The objectives of supply chain management, i.e. the minimisation of costs, improvement of the quality of goods and services, increased flexibility, diversity and responsiveness, can be achieved by treating the chain as a whole, consisting of individual processes and activities interlinked. The procedural approach allows concluding that the objectives set for each process are the components of the main supply chain objectives only and not the objectives existing for themselves.

Process management in today's supply chains addresses the increasing turbulence of the environment and the individualization of customer needs and expectations. It consists in optimizing the structure of the company's elements by striving for maximum share of value-adding elements in this structure and minimizing the share of inefficient activities.

One of the basic value-adding processes in the supply chain is the sourcing process, in which nine basic activities can be distinguished.

Action 1. The procurement of commodities

This action is related to determining the result of the process, i.e. output parameters. A demand for commodity, service or information that is accepted by a customer, may constitute a need (a product). The needs are reported to the company's procurement department based on a purchase order with a detailed specification of a commodity or a service or a reordering method.

Action 2. Description

At this stage, a detailed description of the product follows, which is a source of information for potential suppliers. There are a number of ways to describe a product or service, all of which must accurately communicate the needs of customers to suppliers. The basic methods of describing a product or service may include:

- description by quality or standard (standard products and services, partners in a supply chain know market needs),
- description by brand (products and services preferred from one supplier),
- description by specification (detailed characteristics of the product or service required, e.g. the production process, control systems, physical dimensions),
- description by result (e.g. technical support in the process of device exploitation).

Action 3. Identification and assessment of suppliers

In this action, the organisation shall define criteria for the assessment of identified potential external suppliers. These can be, for example: the possibility to design products, the competence of the management, the business condition of the company, planning and cost structuring, the possibility to establish long-term cooperation, planning and controlling systems, etc.

Action 4. Selecting a supplier

Finalisation of identification and evaluation is the other action related to selecting a supplier finally. Selecting can be made from the list of preferred suppliers, by tendering or by negotiation.

Action 5. Procurement preparation

This action involves drawing up a document which authorises a supplier to deliver a product. The document sets out the conditions, i.e. price, date and place of delivery and quality requirements. EDI (Electronic Data Interchange) technology is very often used at this stage. Based on the Internet, the real needs of customers go to suppliers, often without intermediate entities. This shortens the procurement execution time, minimises stock levels and thus reduces logistics costs.

Action 6. Control of procurement execution

This action is related to the determination of the status of procurements at each stage of their execution.

Action 7. Collection and control

This action includes the collection of a product in accordance with the procurement specification and the quantitative and qualitative check of the product. Statistical methods of receipt and quality control of goods may be used here.

Action 8. Approval of invoices and payment

After collecting the product, the company usually transfers the money electronically to the supplier's bank account.

Action 9. Updating data

The process can be repeated, so after execution of the procurement, the database on cooperation with suppliers is updated.

Among the activities described in the procurement process, **the procurement of commodities** deserves special attention. This action covers a number of complex methods for procurements of commodities in a free market economy environment. This environment is characterised by irregular demand and delivery times and is subject to a number of disruptions associated with the proper flow of goods, services and information in supply chains.

Later in the article, the term “action” shall be replaced by the synonym “process”.

Literature Review

The procurement process in the supply chain is related to different ways of procurement. It is essential to choose the right method to solve the main problem. The literature describes a number of procurement methods in both deterministic and probabilistic environments. The model of the economic procurement size, in which there is no risk of shortage in the deliveries, assumes a balance of the costs to create (order) inventory and maintain commodities in the warehouses, Goyal (1985); Goh M. (1994).

In turn, classic stochastic procurement models define:

- Minimum procurement level, at which a fixed delivery volume is executed, Peng (2018).
- Constant inventory survey periods with variable delivery volumes, Korponai and others (2017).
- The procurement method under conditions of demand discontinuity.

Stochastic models require determining a safety stock level that guarantees an appropriate level of customer service, Chan and Suk-Chul (2019); Hernandez-Ruiz and others (2016). The procurement problems also concern the group procurement methods and the associated economies of scale. The economies of scale resulting from the grouping of procurements relate to the minimisation of costs to create (order) and maintain inventories, Sarjusz – Wolski (2000).

Classic theoretical procurement models described in the literature do not always "work" under real conditions. Choosing a model that meets the company's expectations is not an easy task and depends on the strategic skills of the management. The interview with the management of the surveyed company showed the author of the article the direction of research consisting in the skilful use of combined methods to develop a model of effective management of the flow of commodities in the supply chain.

Research Question

The aim of the article was to develop a model for perfecting the procurement process in the supply chain based on the case of the surveyed automotive trading company.

The research problem was posed as the question:

How to improve the efficiency of the flow of commodities in the supply chain with selected ordering strategies and methods?

To solve this problem, the author proposed an original model. The following research methods were used to develop the model:

1. The process modelling in EPC.
2. Security inventory control strategy in a supply chain.
3. Index analysis.
4. Hybrid inventory control.
5. Monte Carlo computer simulation method.

Research Design and Methodology

- **Assumptions and limitations** of the model.

The model was developed on the basis of the EPC notation of the ARIS platform. The study concerned an analysis of the supply chain, of which the automotive trading company was a key link. The statistical data obtained, which made it possible to verify the model, covered the period from 2016 to 2019.

- **The structure of the model**

The model consists of three phases (levels). The first phase concerns the analysis and assessment of disruptions to a sustainable supply chain. The second phase consists of proposals to apply selected security inventory control strategies and methods in the supply chain. The purpose of this phase is to increase the efficiency of a sustainable supply chain by effectively eliminating possible disruptions. The third phase is related to the verification and implementation of the model in the company (Fig. 1).

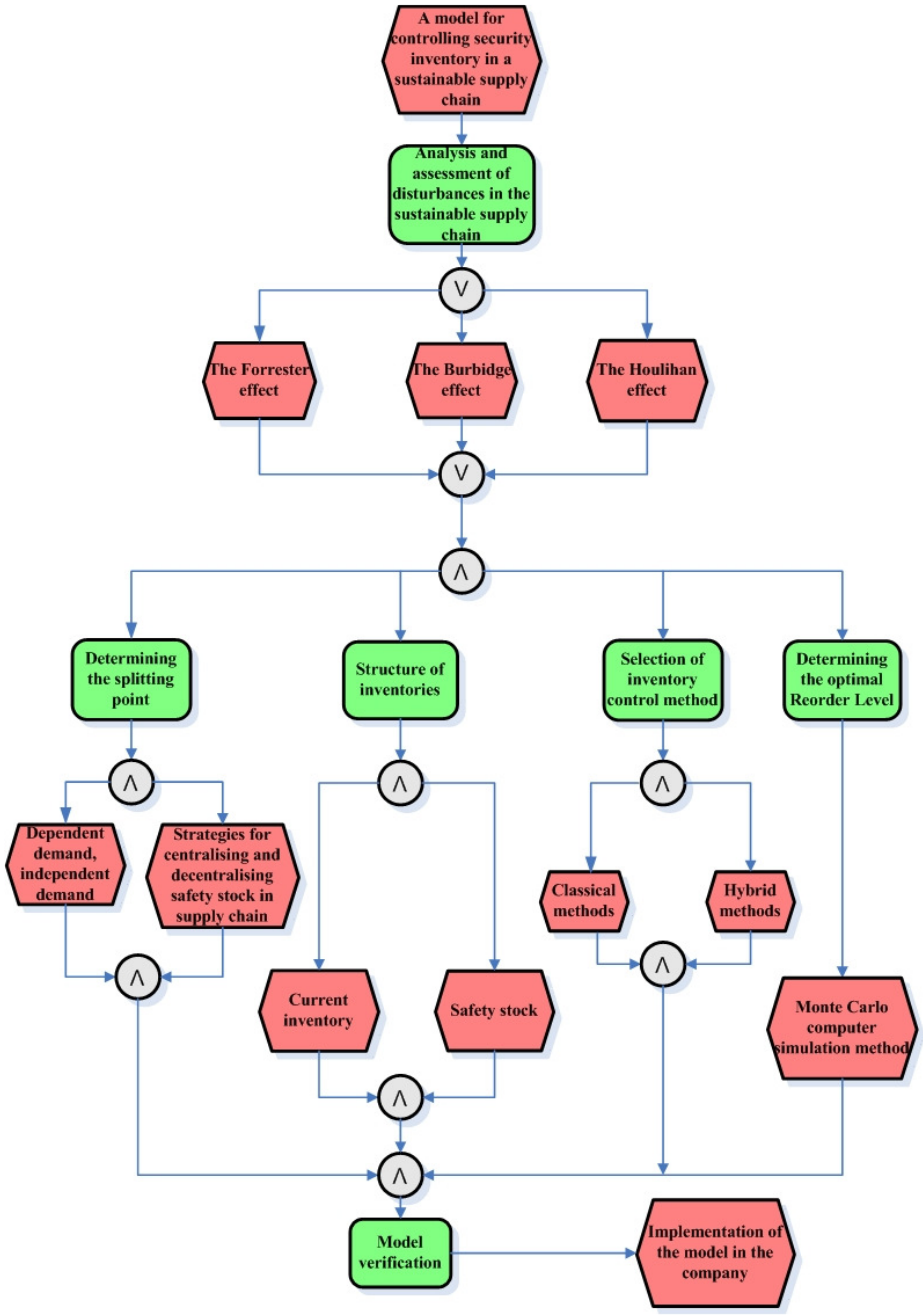

Fig. 1: The model of perfecting the procurement process in the security management system in the supply chain

Source: the in-house elaboration in EPC, Ślaski (2017).

The analysis and assessment of distortions covered three dynamic phenomena destabilising the sustainable supply chain, i.e.: the Forrester effect (bullwhip), the Burbidge effect and the Houlihan effect. The Forrester effect, also known as the bullwhip effect, consists in transferring changes in the volume of deliveries resulting from the structure and dynamic properties, as well as from ineffective ordering strategies. In the processes of information and material planning, due to inappropriate algorithms for controlling inventory levels (mainly security levels), oversized inventories are

accumulated, which generate excessive costs of their maintenance Alizadeh (2012), De La Fuente and others (2007), Disney and Towill (2003), Forrester (1961), Kristianto and others (2012), Shukla and others (2009), Panda and Mohanty (2011), Lee and others (1997).

The Burbidge effect, on the other hand, is the use of a classic ordering machine based on economical sizes. This phenomenon is also connected with group orders of goods and economies of scale in the production process. The synchronisation of group orders over time in a supply chain results in a sharp periodic increase in order volumes followed by an equally sharp decline, Disney and other (2003).

The last of the distinctions is the Houlihan effect. It concerns the reaction of company strategists to temporary shortages or delays in deliveries. In this case, decision-makers plan orders beyond the current needs to replenish security inventory, as more inventories are created at the individual links in the chain. The effect of such planning leads to a reduction in orders, which increases the effect of destabilization through a temporary lack of flow of goods, Houlihan (1987) .

The second phase contains strategies, methods and techniques for the total or partial elimination of disruptions in the supply chain. It consists of four main activities, i.e.: determining the allocation point, determining the structure of inventory, choosing inventory control methods and the use of the Monte Carlo method to determine optimal order parameters.

Inventories, especially safety stock, play an important role in determining procurement parameters, as they guarantee continuity of flow in demand and supply streams.

According to APICS (APICS The Association for Operations Management), inventories are "the inventories of commodities used in the production process (raw materials and work in progress), in auxiliary activities (maintenance and repair materials) and in customer service (finished products)".

Inventories are used to ensure continuity of production and distribution processes. Maintaining inventories is related to the need to ensure the regularity of production and to the economies of scale of production, and inventories reduce uncertainty about the deliveries themselves, their timeliness and protect against sudden events.

Other reasons for maintaining stocks include:

- the seasonal nature of raw material supplies,
- seasonal nature of demand for the products concerned,
- ensuring a constant level of employment in companies over short periods of time.

It is important from the point of view of **the structure of inventories** to divide them into an inventory used to secure current needs, called current inventory, and a safety stock, which prevents fluctuations in demand and guarantees an adequate level of customer service.

The size of the safety stock shall be determined by formula (1), Chan-Ju Lee (2019), Trapero and others (2019), Stephen and others (2000), Gary and others (1998), Sharma and others (2015).

$$\boldsymbol{Zb = \omega \cdot \delta_{pt}} \tag{1}$$

Where:

Zb– The safety stock,
ω– The security factor,
δ_{pt} – Standard deviation of demand forecasts for the replenishment cycle.

The security factor $\boldsymbol{\omega}$ is a multiple of the standard deviation $\boldsymbol{\delta_{pt}}$ and depends on the Level of Customer Service $\boldsymbol{\omega = f(LoCS)}$. This relation is shown in Fig. 2.

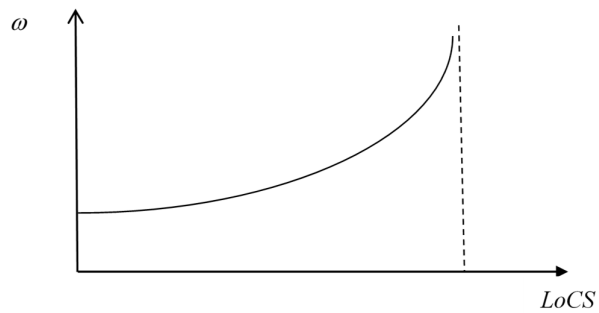

Fig. 2: The function chart

Source: the in-house elaboration.

Standard deviation of demand forecasts in the inventory replenishment cycle is determined from the formula (2) Sharma and others (2015):

$$\boldsymbol{\delta_{pt}} = \sqrt{\boldsymbol{\delta_p^2 \cdot T + \delta_t^2 \cdot P^2}} \tag{2}$$

Where:
δ_p, δ_t - Respectively - standard deviation of demand forecasts, standard deviation of replenishment cycle time

The second action is related to the identification of a contractual split point that separates the dependent demand for components from independent demand for components based on market needs. For the optimal distribution of the split point, the author of the article proposed to apply the empirical rule. The formula describing the rule determines the size of the security inventory in the central warehouse of the enterprise, the so-called centralised inventory holding (3) Krzyżaniak (2002):

$$\boldsymbol{Z_{bc} = Z_{bi} \cdot \sqrt{n}} \tag{3}$$

Where:
Z_{bc} – The security inventory of the central point,
Z_{bi} – The security inventory of the i-th warehouse,
n – Number of warehouses.

The conversion of the formula (3) allows for the decentralisation of the safety stock, i.e. its transfer to regional warehouses serving local markets. What is important here is that the level of customer service in both cases does not change.
Determining the optimum size of the safety stock is important when **selecting the inventory control method**. Classical, theoretical methods of inventory control do not always work in economic practice. In the model described above, the author proposed a method of hybrid inventory control.

The hybrid method is a combination of an information level system and a periodic review (Figure 3). The assumption of this system is a variable or fixed order volume. Procurement in the combined ordering system is carried out in two modes:

- Periodic procurement mode,
- Emergency procurement mode.

Under the periodic procurement mode, the procurement is determined and placed in accordance with to the rules appropriate for the periodic review system. The essence of this system is the fact that the procurement is placed in a specific, fixed cycle (T_0), the size of the procurement is variable and determined as the difference between the assumed maximum level (Z_{max}) and the current level of available (free) stock, while the delivery is carried out within a specific deadline (T), Korponai and others (2017), Hernandez-Ruiz and others (2016).

In the emergency procurement mode, before the T_0 procurement period, orders for a fixed volume are placed on principles appropriate for the information level system. A characteristic feature of this system is that the decision to place a procurement is taken when the level of available inventory is lower than a defined level, the so-called information level (ZI); Sellitto (2018), Peng (2018), Hernandez-Ruiz and others (2016).

The advantage of combined replenishment is, in addition to the possibility of creating collective procurements, the security against depletion of the inventory, which does not require a large security inventory. The disadvantage of the system is the need to keep track of the safety stock level at all times.

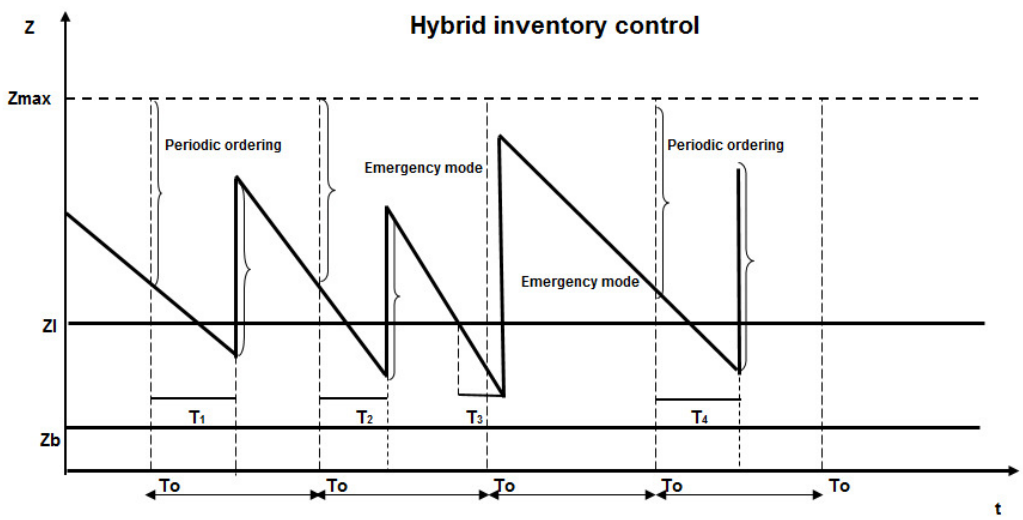

Fig. 3: Hybrid inventory control

Source: the in-house elaboration.

In economic practice, continuous monitoring of the level of available inventory is sometimes limited, and the reasons for this may be:

- Placing the delayed procurements in relation to the information level,
- Human errors, omissions, unplanned events,
- Organisational restrictions on the moment of the procurement placement or delivery deadline.

Simulation studies allow us to make a thesis:
When calculating the informational inventory level both the Expected value variance E (ΔT) of the ΔT delay and the standard deviation of the ΔT delay should be taken into account. Therefore the following formula for an adjusted information inventory is proposed Sharma and others (2015):

$$ZI = P \cdot [T + \Delta T] + \omega \cdot \sqrt{\delta_p^2 \cdot T + \delta_t^2 \cdot P^2 + \delta_{\Delta t}^2 \cdot P^2} \quad (4)$$

The research also confirmed that in this case the distribution of delays occurs in the uniform distribution form with parameters:

$$E(x) = \frac{a+b}{2};\ V(x) = \frac{(b-a)^2}{12} \tag{5}$$

Where:

$E(x);\ V(x)$ – Expected value variance of random variable
[*a, b*] – continuous uniform distribution interval

Verification of The Tests

The third phase of the model is related to the verification of the tests. Verification of the developed model was carried out based on statistical data collected during several years of observation of ΔT procurement execution time delays in the surveyed company and Monte Carlo computer simulation method. A sample of 50 delays was used for the analysis.

During this stage, it is important to determine the type of distribution of the studied characteristic. With this information, you can estimate the parameters of the distribution. The methods commonly used are: matching the empirical distribution to the theoretical and arraying. In the developed identification model, the distribution type was made by means of arraying. As a result of the measurement of the size of a specific characteristic (number of replacements of spare parts), a typical sequence of quantities is described in the form of an array. Observations can be divided into (6); Ślaski (2017), Brown (1959), Patrykiejew (1998), Sarjusz – Wolski Z (2000):

$$R = \sqrt{n} \tag{6}$$

disjoint classes of the same length equal to (7):

$$L = \frac{x_n - x_1}{R} \tag{7}$$

where:

L, R, n, x_n, x_1, denote in turn: class length, number of classes, number of observations, the nth characteristic of the ordered sequence ascending, the first value of the sequence.

In connection with the above, r-class (r=$\overline{1, R}$) includes observations that satisfy inequality (8):

$$x_1 + (r-1) \cdot L \le x_i < x_1 + r \cdot L \tag{8}$$

The mean of class can be determined from formula (9):

$$x^s{}_r = x_1 + (r - 0{,}5) \cdot L \tag{9}$$

After determining the number of classes, the number of elements in the class and the means of classes, the class probabilities should be determined using the classic definition. Couples: the mean of the class

and the probability of belonging elements to classes, create a probability distribution that can be written in the form of an array (Table 1), Patrykiejew (1998).

Table 1: Distribution of the probability of delays in order processing time of commodities (days) and the empirical cumulative distribution function of the variable x; F(x)

x	*p(x)*	*F(x)*
0	0.02	0.02
1	0.15	0.17
2	0.19	0.36
3	0.3	0.66
4	0.15	0.81
5	0.14	0.95
6	0.05	1

The code of the pseudo-random number generator has been developed (Fig. 4), which generates pseudo-random numbers according to the adopted uniform distribution. The corresponding code developed in VBA for Application uses the reverse distribution method. Randomly determined values of the y variable determining the procurement execution time delays, allowed for flexible decision making in regards of creation of appropriate sizes of information level (ZI) for different commodities procurement scenarios in the company.

```
Function sum(tabl As Range, number As Integer) As Double
 Dim i As Integer
 For i = 1 To ile
  sum = sum + tabl.Cells(i, 2)
 Next i
End Function

Function parts(tabl As Range, seed As Range) As Integer
 Dim gen As Double
 gen = Rnd(seed)
 If (gen >= 0) And (gen <= sum(Table, 1)) Then parts = tabl.Cells(1, 1)
 If (gen > sum(tabl, 1)) And (gen <= sum(tabl, 2)) Then parts = tabl.Cells(2, 1)
 If (gen > sum(tabl, 2)) And (gen <= sum(tabl, 3)) Then parts = tabl.Cells(3, 1)
 If (gen > sum(tabl, 3)) And (gen <= sum(tabl, 4)) Then parts = tabl.Cells(4, 1)
 If (gen > sum(tabl, 4)) And (gen <= sum(tabl, 5)) Then parts = tabl.Cells(5, 1)
 If (gen > sum(tabl, 5)) And (gen <= sum(tabl, 6)) Then parts = tabl.Cells(6, 1)

End Function
```

Fig. 4: VBA code for Apllication of the pseudo–random number generator

Discussion

There are the number of methods for ordering goods and inventory management described in the literature. These are the methods of ordering goods in terms of homogeneous and various groups of assortments. Ordering parameters ranging from safety stock, maximum stock, information level, optimal delivery volumes are determined statistically.

The methods described in the literature are the empirical and theoretical methods - they cannot always be applied in practice and be verified. They are burdened with large statistical errors and their design causes that they are not flexible enough to respond to the changing economic situation, Trapero and others (2019), Stephen and others (2000), Gary and others (1998), Sharma and others (2015).

In practice, a computer simulation can provide a flexible response to changes in a company. The method based on the pseudo-random number theory described in the literature allows you to make decisions based on various ordering scenarios Brown (1959), Patrykiejew (1998), Sarjusz – Wolski (2000).

The author also noticed the need of combining the empirical methods into a hybrid form because he believes that only such a combination can bring benefits in the form of optimal ordering and minimization of costs. The author also paid attention to the need of correcting some ordering parameters what minimized the risk associated with shortages in deliveries and delays in order processing. The combination of these elements into one whole resulted in an innovative ordering model that flexibly responds to any economic changes Brown (1959), Murdoch (1965), Lewis (1975), Ślaski (2017), Sarjusz – Wolski, (2000), Krzyżaniak, (2002).

The presented model for perfecting the procurement process in the security management system in the supply chain based on the case of the surveyed automotive trading company may contribute to the elimination of uncertainty, thus improving the synchronization of the activities of the links in the supply chain. The synergy effect associated with the activities integrating the optimal safety stock with the ordering and control methods will contribute to shorten the duration of supply chain processes, guarantee an appropriate level of customer service and reduce costs.

According to the author, the directions of further work related to perfecting the procurement optimization in supply chains hould be related to the use of fuzzy logic and neural networks. The use of artificial intelligence would allow better verification of classic methods of ordering goods and controlling safety stocks, and thus would increase the efficiency of flows of goods and services.

Conclusions

The research conducted confirms that the use of the hybrid method to improve the procurement process in the surveyed company, as well as the use of Monte Carlo computer simulation to correct the procurement parameters, resulted in improved efficiency of the flow of commodities throughout the supply chain.

The company decided to move the security inventory from its own local warehouses, which supply the local market, to the finished goods warehouse of the manufacturing company, with which it cooperates in the supply chain. Due to increased inventory circulation (double increase of inventory circulation ratios) and reduced safety inventory, frozen working capital was released, warehouse space was released and thus storage costs were reduced.

The EPC notation described in the article is an effective tool for analyzing business processes, as it allows for continuous monitoring, control and analysis of processes. It allowed to describe the processes in a way that is understandable for the recipient and to recognize them precisely on the technical and application level. Today's organizations struggle with problems related to maximum use of IT systems and financial resources, but linking them into a single notation or standard can be a starting point for companies to gain a lasting competitive advantage in the market.

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Towards an Inclusive Approach to City Marketing Communication

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Abstract

This paper aims at developing an inclusive approach to city marketing communication. The theoretical considerations are based on literature studies on integrated marketing communication, city branding and inclusive place branding. The author proposes to develop the concept of integrated marketing communication by adding the dimension of inclusiveness, which is particularly essential in city branding. Inclusive marketing communication is to inspire, motivate and engage diverse stakeholders in city brand co-creation processes. The author considers the inclusiveness of city marketing communication in various areas, indicating selected conditions and instruments for the concept implementation.

Keywords: City Marketing Communication, Inclusive Marketing Communication, Inclusive City Branding, Inclusiveness.

Introduction

Social inclusion generally refers to an inclusive society in which every individual has the capabilities, opportunities and resources to participate in the economy and their community (Merrilees et al., 2014). The 'inclusion' philosophy focuses beyond the concept of 'some' and shifts the group effort towards the term 'all', while taking into account diversity. In practice, it means developing an environment that increases the motivation, satisfaction and commitment of diverse people (April and Blass, 2010).

'Inclusive place branding is made inclusive by adopting the idea of participation, enhancing it and facilitating stakeholder engagement' (Lichrou, Kavaratzis and Giovanardi, 2018). Creating inclusive city brands requires a multidimensional approach to marketing communication that is not limited to transferring messages, but includes dialogue and cooperation of various stakeholders in value creation.

This paper aims at developing an inclusive approach to city marketing communication. The theoretical considerations are based on literature studies on integrated marketing communication, city branding and inclusive place branding. The author proposes to develop the concept of integrated marketing communication by adding the dimension of inclusiveness, which is particularly important in city branding. The author considers the inclusiveness of city marketing communication in various areas, indicating selected conditions and instruments for the concept implementation.

The development of the theory of inclusive branding is supported by scientific achievements in the field of marketing communication. An inclusive approach contributes to the development of the concept of integrated marketing communication by expanding its dimensions.

From Traditional Marketing Communication to Inclusive Marketing Communication

The traditional marketing communication focuses on a message, a sender and a receiver of the message, having regard for noise, miscommunication or distortion that occur and interfere in the communication process. The process is linear, beginning with one message that is to be

communicated from an active sender to a passive receiver (Finne and Grönroos, 2009, 2017). The traditional marketing communication can be briefly described as one-way and single-source.

Using several sources and coordinating messages and media (one-voice) leads to what can be labeled traditional integrated marketing communication (Finne and Grönroos, 2017). Traditional IMC is a one-way, outbound system that is controlled and directed by the marketer (Schultz, Kim and Kang, 2014), who tries to integrate all outgoing messages into one voice and achieve the synergy effect (Finne and Grönroos, 2017). The concept represents the inside-out perspective, in which the marketer drives integration and a consistent message is conveyed to the consumer (Schultz, 1996). This approach reflects IMC in the first stage of concept development.
Moriarty and Schultz (2012) present (IMC) as a dynamic concept whose development is associated with a series of evolutions of familiar and established marketing and communication concepts. They identify a number of theories that support the evolution and various aspects of IMC (Table 1).

Table 1: Theories supporting the evolution of IMC (based on Moriarty and Schultz, 2012; Schultz et al., 2014)

Theory	Short description
Perceptual Integration Theory	People automatically integrate messages and experiences to create the integrated brand perception. Brands exist in the minds of consumers only through the process of conceptual integration.
Consistency theory	The natural tendency for consumers to strive for consistency in what and how they believe, experience, feel, and act. Message consistency is presumed to lead to communication efficiency based on synergy.
Reciprocity theory	Reciprocity occurs when marketers and customers both create value and share that value in some type of exchange system. Tilting the value too far on one side or the other will likely result in the relationship failure.
Relationship theory	Brand relationships and relationship marketing rely on, as well as lead to, interactive communication, creating such relationships. Long-term brand interactions solidify positive relationships within the stakeholder network and drive brand loyalty and advocacy.
Systems theory	The movement of communication from linear chains to complex systems of networked communication.

Perceptual integration theory gives a deeper understanding of how customers integrate messages and experiences to create an integrated brand perception. Brand images and positions exist in consumers' minds as subjective impressions. The degree of brand perceptual integrity results from the connections of individual impressions and associations. Therefore managers can only use marketing communication to attempt to cue an intended favorable response (Moriarty and Franzen, 2009). Consistency theories address the need for integration without conflict when a variety of messages are presented. Therefore are relevant to IMC, primarily to message consistency, which is presumed to lead to communication efficiency based on synergy. (Moriarty, 1996; Moriarty and Schultz, 2012).

A key element in the new view of IMC as interactive communication is reciprocity. It is related to the idea that all communication must sum to "win-win" situations, in which the marketer and consumers receive value from the communication activity for it to be continued. The IMC theory is built around the concept of stakeholders (individuals and groups who have an interest in an organization or an activity) and the connected relationship theories. IMC concerns a network of stakeholders in which people and their roles overlap. Various communication activities should be interlinked with some central brand message (core brand idea) resulting from the brand and communication strategy. Related to the stakeholder concept is the idea of brand relationships that drive brand loyalty and advocacy and relationship marketing that strives to develop long-term brand interactions that solidify positive relationships within the stakeholder network. (Moriarty and Schultz, 2012).

The systems theory moves communication from linear chains to complex systems of networked communication. The social network engages stakeholders in a variety of word-of-mouth and increasingly electronically delivered digital social media. The communication system includes the organization and its stakeholders, people they contact and the voices of their various stakeholder communities. Moriarty and Schultz (2012) view IMC as a communication system, which requires the use of holistic approaches: message synergy, communication network models, and non-linear analytical approaches.

Porcu, Del Barrio-García and Kitchen (2017) reviewed extant conceptualizations, definitions and theoretical models of IMC and conducted a detailed analysis of the construct dimensions identified in prior literature. Based on a comprehensive literature review, the authors proposed the modern IMC construct composed of four dimensions: message consistency ("one voice"), interactivity, stakeholder-centered strategic focus and organizational alignment.

The "one voice" dimension refers to the coordination and coherence of messages and channels, which constitutes the most basic level and the starting point of integration (Duncan and Moriarty, 1998; Schultz and Schultz, 1998; Kliatchko, 2008). Interactivity establishes a two-way symmetrical communication, leading to a dialogue between organization and stakeholders (Porcu et al., 2017). It refers to reciprocity being the basis for building relationships, speed of response and responsiveness (Johnson et al., 2006). Interactivity is enhanced by the use of digital technologies, which play a crucial role in the implementation of an integrated approach (Kliatchko and Schultz, 2014).

The stakeholder-centered strategic focus relates to the strategic goal of creating value for stakeholders and building long-term relations (Porcu et al., 2012; Porcu et al., 2017), which requires establishing and promoting a shared vision and working towards stakeholder-oriented solutions (Luxton et al., 2017; Porcu et al., 2017). The organizational alignment dimension refers to internal communication and integration, which allows cross-functional planning and horizontal and vertical cooperation (Porcu et al., 2017).

In marketing communication, we are increasingly dealing with co-creation processes. Marketers and consumers co-create brand-related content and social experiences on social media (Barger et al., 2016). Recent research emphasizes the importance of the customer's role in brand co-creation, and the impact of brand co-creation on brand knowledge and brand value (France, Merrilees and Miller, 2015). Brand communities and interactivity provide increased opportunities to co-create brands and play an influential role in the inclusion of consumers in co-creation processes (Muñiz and O'Guinn, 2001; O'Hern and Rindfleisch, 2010; France et al., 2015).

Inclusiveness can, therefore, be considered as the goal and the important dimension of marketing communication. Inclusive marketing communication is to inspire, motivate and engage diverse stakeholders in co-creation processes. Inclusion is associated with the degree to which individuals believe that their role is critical in the organizational process (Mor-Barak and Cherin, 1998), and the feeling of value and belonging (Bourke and Dillon, 2018). Therefore marketing communication aims to demonstrate the importance and value of participation and joint actions.

Inclusive Marketing Communication for Cities

Inclusive marketing communication is to inspire, motivate and engage diverse stakeholders in city brand co-creation processes. Anholt, an authority on city branding, states that 'the people make the city'(Anholt, 2006, p. 20). Referring to the concept of the service-dominant logic (Vargo and Lusch, 2004), Warnaby (2009) claims that stakeholders create from a specific combination of city elements value-in-use, which incorporate both economic dimensions (e.g. inward investment) and social dimensions (e.g., quality of life, regeneration), or a combination of both. Therefore they are at the same time consumers and creators.

Stakeholders play a multitude of roles within the creation of city brands. They are an integrated part of city brands and their identity through their characteristics and behavior (van Gelder, 2011; Braun, Kavaratzis and Zenker, 2013). Stakeholders serve as ambassadors for the place brand, who grant

credibility to any communicated message (Braun, Kavaratzis and Zenker, 2013). The city ambassadors can be residents, people associated with the city in various ways (in the present and the past), as well as tourists who visited the city. Residents also contribute to creating the city's brand as voters, which gives them real influence on the political elections of local government authorities (Braun, Kavaratzis and Zenker, 2013). Stakeholders can contribute to the city's brand by active participation in city-related initiatives at various stages of their implementation.

In recent years, the development of place branding and city branding theory is strongly associated with concepts of stakeholder's involvement (Kavaratzis, 2012), citizen engagement and participation (Braun et al., 2013; Hereźniak, 2017; Kavaratzis and Kalandides, 2015; Molinillo et al., 2019; Rehmet and Dinnie, 2013), co-branding city brand partnerships, relationships, networks (Hankinson, 2004; Kavaratzis and Ashworth, 2007; Harrison-Walker, 2013; Merrilees et al., 2016; Lucarelli, 2018). The scientific achievements in these areas provide the basis for the development of the concept of inclusive city branding.

Inclusive city branding is a form of place branding that: goes beyond economic interests and goals; focuses on the residents; integrates the voices of many non-powerful. Inclusive city branding adopts the idea of participation, enhancing it and facilitating stakeholder engagement (Lichrou et al., 2018). The development of the theory of inclusive branding should be supported by scientific achievements in the field of marketing communication. An inclusive approach contributes to the development of the concept of integrated marketing communication by expanding its dimensions.

The inclusiveness of city marketing communication can be considered in various areas. The first refers to the activities of stakeholders for the external promotion of the city, which can be undertaken by them independently or can be inspired by organizations responsible for city promotion. Because of the perceived authenticity and trustworthiness of word-of-mouth, internal stakeholders play an important role in the place brand communication process. They are considered informal, authentic and insider sources of information about the place by external target audiences (Braun, 2011; Braun et al., 2013). Therefore, city stakeholders may be treated as ambassadors or influencers. A simple way to involve stakeholders in city promotion is to provide them with relevant and interesting information, which can be forwarded to other recipients (especially through social networks). Cities can also involve stakeholders in city campaigns in various ways. They can become co-creators of the content of official city campaigns, participating in working teams and contests or sharing their personal stories related to the city.

Marketing communication can be used to involve stakeholders in city development planning. Participation in policy-making can be implemented at various levels: listening only (receiving information); listening and giving information; consultations and discussions; participation in analysis and agenda-setting, participation in reaching consensus on the main strategy elements; and involvement in decision-making on the policy, strategy or its components. At each level, participation may be narrow (few actors); or broad (covering many stakeholders). (Bass, Dalal-Clayton and Pretty, 1995).

The purpose of inclusive marketing communication is also to motivate stakeholders to participate in urban initiatives at various stages of their implementation. Communication and cooperation platforms are the basis for the inclusion of multiple stakeholders in joint activities for sustainable development and positive social changes. Marketing communication should also encourage and create conditions for interactions and relationships between various stakeholders and entities operating in the city.

The active participation of stakeholders in the planning processes and implementation of various programs can take the form of working groups, collaborative workshops, discussions, and debates. Muñoz and Bolívar (2019) highlight that the context of smart cities favors the development of technological and innovative spaces, increasing citizen participation. Local governments offer citizens different types of e-participation, which provides support with collective knowledge, ideas, and expertise (Muñoz and Bolívar, 2019). Interactive technologies and tools (web self-service portals, social media, interactive mobile applications) provide increased opportunities for the inclusion of different stakeholders in dialog and co-creation processes.

A critical aspect of participatory processes is that of consensus thinking. Therefore coherency and the formulation of a shared vision are generally highlighted as central in city branding literature (Jernsand and Kraff, 2018). A number of authors suggest that a city should have a clearly defined, shared vision (Moilanen and Rainisto, 2009; Stubbs and Warnaby, 2015; Warnaby et al., 2015) and communicate it to its stakeholders, especially to residents and entities operating within the city. However, an inclusive process must acknowledge diverging views of diverse stakeholders, which requires an ongoing 'dialogue, debate and contestation' (Kavaratzis and Hatch, 2013, p.82).

In business management managers usually prioritize and focus on selected key stakeholders. Such an approach in public sector management and place branding increases the risk of distorted stakeholder representations (Jernsand and Kraff, 2018) and 'leads to elitism, lack of inclusiveness and stakeholder representations where only certain groups are heard' (Kavaratzis, 2012, p.13). The diversity that is associated with bringing forward different perspectives can lead to creative tensions that allow expressing the essence of the city brand through different meanings. Therefore the task of city marketing communication is to support activities for diversity and social inclusion.

The basis of inclusiveness is to be a sense of identification with a place that can be reinforced by communication activities that refer to a sense of belonging. Inclusion is associated with the degree to which individuals believe that their role is critical and the feeling of value. That is why city marketing communication is also to demonstrate the importance and value of participation and joint actions.

Conclusions and Future Research

Scientific achievements in the field of integrated marketing communication and city branding provide the basis for the development of the concept of inclusive marketing communication for cities. The inclusiveness can be considered as the essential dimension of city marketing communication, and the condition and the goal for the development of city brands. Inclusive marketing communication is to inspire, motivate and facilitate stakeholders' participation in city brand co-creation processes. The inclusiveness of city marketing communication concerns city promotion, city strategic planning and implementation of various programs serving sustainable city development.

An important task is also strengthening the sense of belonging and demonstrating the importance and value of participation and joint actions. Inclusive city marketing communication is to increase the motivation, satisfaction, and commitment of diverse people, which means undertaking and supporting activities for diversity and social inclusion. A challenge for further research is the conceptualization and development of a measurement instrument for the identification and evaluation of inclusive marketing communication for cities. The exploration and clarification of the role of inclusiveness in marketing communication can contribute to such an approach to city branding, and as a result, sustainable development of cities.

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Assessment of The Machining Centre Effectiveness on The Basis of Measures Used by An Enterprise

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Abstract

The article focuses on selected indicators and their assessment on the basis of real data from a selected machining centre used for serial production. The author, after conducting an analysis based on the indicators proposed by the enterprise, proposes to separate failure times lasting less than 10 minutes, which are valuable information but do not require the intervention of maintenance services.

Keywords : Management Decisions, Key Performance Indicators, Machine Break Codes, Production Planning, Micro-Stop.

Introduction

Ensuring high effectiveness of production lines is possible if operational management decisions are rational and based on valid data reliably recorded by operators and maintenance staff [Jasiulewicz–Kaczmarek and Bartkowiak, 2016]. Based on this data, one can more accurately replicate the work of a technical system. The said data should make it possible to learn about and analyse the studied system and processes at such a level of detail that it would be possible to develop rational and effective methods of controlling activities implemented in them. Knowledge about the operational capabilities of technical systems and accurate interpretation of obtained data may allow in the future to perform more effective planning of maintenance work and more effective time management of operated facilities [Kosicka, et al., 2006]. In relation to machining centres, one assumes the assessment of a system that is beginning to operate, presuming that the system will be able to perform functions and that it will not undergo failure during the performance of tasks.

To assess effectiveness in enterprises, a system for measuring achievements is created using various measures and indicators. These measures are used to assess key activities carried out in various functional areas of the enterprise and indicate their effectiveness in relation to the assumed organizational objectives [Jasiulewicz–Kaczmarek and Żywica, 2016]. Enterprises should also precisely define what a technical failure is and how long it can last in order to perform irregular, yet effective, maintenance depending on the execution of the production plan [Linquist, 2010; Ratnayake, 2013].

Selected Effectiveness Indicators for Technical System Operation

The implementation of activities related to the operation of machines and devices [Florek and Barczak, 2004] is a process of continuous decision making, and thus a process of deliberately choosing one of the variants of future activity identified and recognized as possible. The proper definition of a technical system effectiveness indicator requires the determination of a measurement object. This means that the features tested are measured, for example, by numerical value or by the degree of intensity of a particular feature. Among the indicators, there are fixed and variable partial measures. Fixed partial measures refer to the initial input expenditure for the construction of an object and its implementation in production and is independent of the further course of the operation

process. Variable measures depend on the variable operation process and relate to the probability of events and relationships occurring during the use of a technical system.

The choice of model assessment relates directly to the technical system in use, activities implemented with it and the technical and organizational environment. The selection of appropriate measures should be based on [Loska, 2011; Żółtowski, 1996]:

- technical condition, being a measure of the object's ability to be operated at a given time;
- reliability, describing the object's readiness for operation in statistical terms;
- quality, determining the object's ability to satisfy needs;
- functionality, referring to the machine-human relationship;
- effectiveness, related to functionality;
- serviceability, describing the object's susceptibility to performing maintenance activities;
- diagnosability, determining the object's susceptibility to obtaining information about the technical condition.

An overall assessment of the effectiveness of the operation process of machines and devices can in many cases be sufficiently obtained on the basis of the use of synthetic indicators [Loska, 2011]i.e.

- indicators related to using one machine, production line or general use of the entire technology park;
- indicators concerning device performance;
- indicators concerning profitability.

Among contemporary models, which are the basis for the quantitative assessment of the operation of technical systems, [Loska, 2011] distinguished measures which are most often described in the literature at theoretical and functional levels. They are:

- a reliability model;
- an Overall Equipment Effectiveness (OEE) model;
- a Key Performance Indicators model.

Key Performance Indicators

Effectiveness assessment measures refer to financial and non-financial key performance indicators, which are used to assess the operation of machine parks in the enterprise. They allow to use information collected by the enterprise on the operation of technical facilities for diagnostics of ongoing maintenance activities through [Biały and Hąbek, 2016]:

- measurement of the condition of the facility and operational services;
- presentation of current and historical values of measures of operational properties and relationships between them;
- comparing internal and external activities of operational services;
- diagnosing weak points in maintenance activities;
- tracking changes and progress in the operational system;
- implementing a continuous improvement process by searching for and eliminating deviations from assumed values;
- constant supervision over organizational and technical changes.

KPIs for maintenance are included in the PN-EN 15341: 2007 Maintenance – Maintenance Key Performance Indicators, developed by the European Committee for Standardization (CEN), which contains a unified set of measures. The standard contains 72 measures along with a detailed description of their elements divided according to the following criteria:

a) Type of decision, i.e. activities taken by maintenance services:
- economic measures (indicators) expressing the cost value of a selected operational aspect;
- technical measures (indicators) expressing the time value of a selected operational aspect;
- organizational measures (indicators) expressing the paraoperational value of a selected operational aspect.

b) Decision level [Adamkiewicz and Burnos, 2012]:
- 1st level describing indicators at a general level;
- 2nd level describing indicators at an intermediate level;
- 3rd level describing indicators at a detailed level.

Using the markings used in the PN-EN 15341: 2007 standard, the division of indicators is shown in Table 1.

Table 1: Structure of KPIs. (Source: elaboration based on PN-EN 15341: 2007)

Description	Technical indicators	Economic parameters	Organizational indicators
General level (machine park in an enterprise	T1, T2, T3, T4	E1, E2, E3, E4, E5, E6	O1, O2, O3, O4, O5, O6, O7, O8
Intermediate level (production line)	T5, T6, T7, T8, T9, T10, T11, T12, T13, T14, T15, T16	E7, E8, E9, E10, E11, E12, E13, E14	O9, O10
Detailed level (power supply)	T17, T18, T19, T20, T21	E15, E16, E17, E18, E19, E20, E21, E22, E23, E24	O11, O12, O13, O14, O15, O16, O17, O18, O19, O20, O21, O22, O23, O24, O25, O26

The standard shows the indicators that can be considered the most important and specifies the method of their proper selection taking into account the selection criterion (Table 1.):

– selection of indicators among those available;
– choice of a method based on the functional analysis of various machine maintenance processes.

In enterprises, in relation to the management and supervision of technical systems in operation, one strives to obtain data on reliability, serviceability and effectiveness. Among the available KPIs, the most common ones which can be found in enterprises with production lines for serial production are: MTBF (Mean Time Between Failure), MTTR (Mean Time To Repair) and Mean Time To Failure (MTTF).

MTBF - mean time between failure:

The most commonly used reliability measurement indicator shows the arithmetic mean of the times between system failures. The measure assumes that the system is ready for operation and can be used immediately after failure has been removed [Szwedzka, et al., 2017].
The measure is described by the following relationship:

$$MTBF = MTTF + MTTR \tag{1}$$

where:
$MTTF$ - *mean time to failure;*
$MTTR$ - *mean time to repair.*
The MTBF indicates how often from a statistical point of view a given technical object fails. In enterprises, this indicator is used to develop schedules for preventive reviews.

MTTR – mean time to repair:
This measure is the most commonly used measure of maintenance effectiveness and measures the average time that is needed to perform repair activities in all moving parts of the system. This indicator provides information about the time of device repair and maintenance [Pourjavad, et al., 2011].

$$MTTR = \frac{total\ repair\ time}{number\ of\ repairs} \tag{2}$$

The range of activities measured can vary, but generally includes:

- time needed to correctly diagnose the cause of failure;
- time needed to order and deliver components necessary to repair the failure;
- time needed to access the damaged part;
- time needed to replace the damaged part;
- time needed to restore the device to its operational status;
- time needed to verify that the device is functioning in accordance with its specifications.

MTTF - mean time to failure:

The measure indicates the average working time from the start of the operation of the technical system or from the time of the last maintenance activity until the moment of the next failure [Szwedzka and Jasiulewicz - Kaczmarek, 2016]. The indicator is presented as follows:

$$MTTF = \frac{available\ working\ time - failure\ time}{number\ of\ events} \tag{3}$$

The MTTF indicator defines information on the time of repair and maintenance, including, among others, time needed for: the correct diagnosis of the cause of failure, ordering and delivering components necessary to remove the failure, restoring the operational status of the technical system. In the event of replacing the damaged parts, it assumes time necessary to deliver the defective technical system element.

Scope of Research

The enterprise uses the MTTR, MTTF, MTBF indicators to assess the time of proper operation and the time of production line repair. Table 2 summarizes the measurement results obtained from each month in the period of one year for the selected machining centre.

Table 2: Example of the MTTR, MTTF, MTBF values from the period of one year for the selected machining centre

Month	**I**	**II**	**III**	**…**	**X**	**XI**	**XII**	**Average failure time in a year**
Total number of failures								
time [min]	2154	2547	1797	…	1627	1910	2538	1739
number of failures [pcs]	246	249	219	…	213	231	206	208

MTTR [min]	9	10	8	...	8	8	12	8
MTTF [min]	161	152	196	...	202	166	155	184
MTBF [min]	170	162	204	...	210	175	168	192

Adding up downtime regarding the failure status of the production line (Table 2), it results that the average failure time is 1739 minutes. One can also expect about 200 failures each month with an average repair time of 8 minutes. In such a short time it seems impossible to simultaneously locate the place of the event, determine the cause of it, call and wait for maintenance services and carry out the appropriate repair or replacement of the worn-out part. Also, the probability that a failure may occur, on average, every 184 minutes is low because of becoming acquainted with the execution times of a given product batch.

Of course, it can be concluded that the indicators (MTTR, MTTF, MTBF) used by the enterprise give information that, to some extent, provides knowledge about the state of machine failure. However, the indicators can be quite easily "manipulated" by adding "micro-failure" times (failure up to 10 minutes), which both applies to an employee's short break or refers to a machine failure. Due to this, drawing conclusions does not offer greater probability that it will actually occur. However, such information is important when preparing production plans, indicating areas that should be improved with the participation and involvement of all employees of the enterprise.

In order to make the research more detailed, it was verified how and what information is saved in the system by production line users. Reporting methods adopted by enterprises were also analyzed. Bearing in mind the object of the research, the further part of the paper focused mainly on the events and failures of machines being part of the production line.

Methods for Reporting Downtime

The enterprise under study uses a specialized IT system. The system is used to supervise the technical condition of machines and prepare reports on the production process, including the number of units produced and the times of their technological processing. The software allows to collect information on production effectiveness, constituting the basis for KPI calculations such as OEE (Overall Equipment Effectiveness), MTTR, MTTF, MTBF and defining the production planning framework. It also allows to calculate the production capabilities based on the electronic order and execution report, and makes it possible to record all events that cause each break in the operation of the machining centre. Among the information reported by operators, one can distinguish:

- records of the performance of production orders for each shift;
- records of information regarding the stoppage of the production line, including information on the failure status of its elements;
- system records of material turnover management, machine documentation, warranties and records of performed inspections;
- exchange of information by technical supervision staff between other plants with a similar profile in order to manage parts more effectively;
- archiving of information to eliminate potential errors and improve the functionality of the future machine park.

Example information about the studied complex technical system is saved in the form of codes (Table 3), which are kept by the production line operator in the system. In the event of a technical failure, additional information is supplemented to the system by a member of maintenance staff.

Table 3: Example code list with interpretation. (***Source: own elaboration based on enterprise data***)

1	Waiting for material	21	Turntable failure
2	Machine setting	22	Milling machine failure
3	Starting the machine	23	Mechanical failure
4	Adjusting during production	24	Receiver failure
5	Meal break	25	Feeder failure
6	Meeting	26	Transporter failure
7	Machine maintenance	27	Electric failure
12	Failure-undefined	32	Drill failure
13	Control failure	33	Sensor failure
14	Scanner failure	34	Lift failure

When saving information about the reason for downtime, the operator selects one of the available codes, which automatically displays the reason for the event. Descriptions and interpretation of each code are available in the system and in the event of misinterpretation, the employee can read them. An example of a code regarding failure of lifts and failure due to lack of compressed air is shown in Table 4.

Table 4: Example of codes used by the enterprise. (Source: own elaboration based on enterprise documents)

Code usage standard				
Failure time - downtime during which the machine does not produce components due to technical problems directly related to the infrastructure or the object itself.				
Code type/family	Code number	Code description	When should the code be used?	Why should the code be used?
Failure time: [min] type: *failure*	45	Compressed air	The "compressed air" code should be used to report: technical problems related to compressed air; lack of compressed air in machines/lines.	To obtain reliable data on downtime and reduce future machine and device failures.
Failure time: [min] type: *failure*	34	Lifts	The "lifts" code should be used for reporting: technical problems related to the system of lifts in machines/lines	To obtain reliable data on downtime and reduce future machine and device failures.

New Failure Reporting Concept

In the following part, codes regarding the analyzed production line related to the failure states of its elements are distinguished. Four categories of downtime are singled out [Loska, 2013; Szwedzka and Jasiulewicz-Kaczmarek, 2016]. The first group depends on the operational effectiveness in technical

terms, focusing on the observation of downtime at the time of technical system damage, i.e. transition from the state of operability to the state of inoperability. The second group was described on the basis of codes relating to the preventive actions taken for the production line. The third group of downtime was described by codes depending on the method used to manage the organization and the adopted performance standards for manufactured elements [Żółtowski, 2012]. In the fourth group, it was assumed that the failure status of production line elements lasting less than 10 minutes does not cause damage to the machining centre requiring maintenance services intervention. On the other hand, the reasons for the occurrence of micro-failures can provide valuable information about problems occurring during the implementation of technological processes, indicating the most common faults employees face. The characteristics of the downtime categories for the above concept are presented in Table 5.

Table 5: Characteristics of the downtime category

Downtime category	**Technical level**	**Preventive level**	**Management level**	**Information level**
Characteristics	Specifies the technical condition of failures of technical system elements	Specifies service activities to extend the life of technical system components	Determines the state of implemented technological and organizational processes in the enterprise	Provides information about the potential failure of technical system components
Object	Machine failures: milling machine, drill, transport, feeder and receiver, scanner, lifts, compressor, electrical and mechanical failure, starting (voltage drop)	maintenance, machine cleaning, calibration of settings, reorientation	breakfast break material shortage no space	micro-stops up to 10 min

Selection of the fourth information category (Table 5) was based on the analysis of all occurring micro-stops, where it was noted that problematic situations were solved by operators. It follows from it that there was no need to call for maintenance services to solve the problem. Examples include, e.g. the *machine cleaning* code when the operator uses compressed air to clean a photocell that indicates that the machine is to perform a specific operation. Such an event occurs as a result of excess sawdust and dust generated both during machining and drilling. This is not a failure that would require maintenance services intervention, but it provides information that the blowing system should be improved. Another example is the *feeder failure* code, where the operator noticed that an element intended to lift the semi-finished product from the pallet fell out of the feeding arm. This means that it had not been properly installed or became loose during use. The above situation can be treated in two ways. This may be a mistake made by the operator responsible for fixing the element or information that this part loosens up during operation. In each case, conclusions should be drawn to prevent such situations from occurring in the future. An example of similar events is shown in Table 6.

Table 6: Example of micro-stops recorded by enterprise operators.
(***Source: own elaboration***)

Downtime site	Event description	Stoppage time [min]
Drill	No power in the second drill	7.66
Milling-tenoning machine	Limiting switch failure	9.08
Milling-tenoning machine	Clogged lift	1.01
Receiver	Software reset	4.04

Based on the above interpretation of micro-stops (Table 6), a comparative analysis was performed in relation to calculations carried out and presented in Table 4 with the use of machine and device effectiveness indicators used by the enterprise. The obtained results are shown in Table 7.

Table 7: Values of the MTTR, MTTF, MTBF indicators for the period of one year for the selected machining centre (*Source: own elaboration based on the assumptions from Table 3.6*)

Month	I	II	III	…	X	XI	XII	Average failure time in a year
Total number of failures								
time [min]	1835	2238	1609	…	1250	1535	2211	1459
number of failures [pcs]	37	42	43	…	26	57	54	37
MTTR [min]	50	53	37	…	48	27	41	40
MTTF [min]	1079	907	1001	…	1669	680	599	1106
MTBF [min]	1129	960	1038	…	1717	707	640	1146
Production line downtime below 10 minutes/month/average per year								
time [min]	319	309	188	…	376	375	326	279
number of failures [pcs]	66	65	37	…	77	97	74	60
MTTR [min]	5	5	5	…	5	4	4	5
MTTF [min]	628	616	1201	…	575	412	463	710
MTBF [min]	633	620	1206	…	580	416	467	715

The summarized data contained in Table 7 in the last column show the average time in minutes which may be the probability of a production line's inoperability. One should expect that the enterprise, as a result of the analysis and using KPIs, may receive information on how many times a month a failure

occurred – hence, it can be concluded that approximately 40 independent events of the system failure state may take place.

The research results presented in the "information" column contain machine downtimes of less than 10 minutes, which the enterprise currently classifies as "technical failure". Comparing the numerical values presented in Table 2 with the results obtained and summarized in Table 7, there was no change in both times and frequency of stoppages as a result of planned maintenance activities carried out by maintenance services aimed at extending the life of the technical system. Also, no changes were made to the calculations relating to management methods. On the other hand, the "micro-stops" described from the information level average 5 minutes, which is consistent with the adopted assumption that they do not require maintenance services intervention. Also, the time considered from the technical level increased from the average value for one year of operation from 184 minutes to 1106 minutes (time of remaining in the operational condition). The repair time was 40 minutes on average. Both the time of correct operation of the system and the time of its repair confirms the author's belief that both the first and second values are probable.

Conclusions

The paper describes the total time of failures lasting up to ten minutes in a specified period of machining centre operation and is compared with the effectiveness assessment model used so far. It was assumed in the paper that the failure of a complex technical system cannot last 8 minutes and that the correct working time of the machining centre is longer than the obtained average of 184 minutes. Table 6 shows that the micro-failure time may be interpreted as "annoying" information and activities for the machining centre staff, not requiring, at the same time, the intervention of maintenance services.

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Financial Inclusions in Online Social Networks: Problems of Conceptualization

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Abstract

This article analyzes the potential role of financial inclusions in social networks and formulates a number of hypotheses about future financial intermediation based on social networking platforms. To describe financial inclusion in social networks, new models are needed that allow us to analyze the complex behavior of agents at different points on the complexity scale. The article identifies the main trends leading to the formation of financial inclusions, outlines a number of approaches to the analysis of the stability of these inclusions. A specific problem is discussed - the condition for generating financial inclusions in social networks and a simplified model is developed by which a real system is characterized. Financial inclusion in social networks is presented in the form of a potential set of financial services received by users of the network when using a social site. Financial inclusion is different from traditional financial intermediation and financial start-ups, but they depend on them and can act as their element, but (i) are built into social networks or (ii) financial functions that are performed directly by social sites. There are three main scenarios for the development of financial inclusions based on social media platforms: (i) super mediation - turning social media platforms into a platform for various types of mediation, including financial intermediation, (ii) stabilization of financial inclusion in social networks and becoming their main form of financial intermediation, and (iii) a re-intermediation scenario in which financial inclusion in social networks will play an insignificant role in financial intermediation and there will be a further differentiation of financial intermediation in the electronic market. The probability of each scenario depends on many factors, including the exact functions that intermediaries play in each case, usefulness for agents of the chosen methods of interactions, state regulation. The paper proposes approaches for discussing each development scenario.

Keywords: Multi-Agent Systems, E-finance, S-commerce, Social Networks

Introduction

Social networks are an example of spontaneous development (Mahmoodi et al. 2020) and a high level of self-organization (Eigen, 2017; Nicolis and Prigogine, 1977). They are constantly being transformed from one state to another. Currently, a promising area of change is, firstly, the attraction of social media platforms for the promotion of goods and services, as well as for payments, and secondly, the use of social networks by financial and commercial intermediaries as a source of information about consumers. Under the influence of electronic technologies and interactions with social networks, financial intermediation is moving to a new stage of development (Ghost, 2016), and social networks significantly expand their area of activity (Huang and Benyoucef, 2013). The interaction of social networks with financial and commercial intermediaries is capable of revolutionizing the information and financial space, the organization and structure of mediation, as well as the forms and methods of providing financial services to the end-users.

Social networks are able to offer all the same services and products as traditional financial and commercial intermediaries (Nelms et al. 2018) but, firstly, do it all in a “single window” - along with other information and during social communications, that is, transfer service to network users into omnichannel, including in this concept the whole complex of social, communication and financial interactions. However, at present, such prospects from the technological, organizational and legislative sides, as well as from the point of view of transaction security, are not yet sufficiently developed and there is no clear understanding of the conditions for their fulfillment. However, development trends in this direction are clearly visible.

Secondly, decentralize and delocalize the place of supply of services. There are opportunities to eliminate the attachment of financial services to the time and location of the office of the financial intermediary or directly to the consumption of the service. In this case, the services are combined with social interactions and performed directly at the location of the network user.

Thirdly, to personify the offer of services by reorienting the universality, mass character and homogeneity of financial services to their individualization, accurate execution and full compliance with the interests of the user. At the first stage, the digitization of financial services allowed the prevailing wholesale nature of banking to be translated into a massive wholesale and retail channel. This process took place mainly through the universalization of financial services. At the present stage, new algorithms have made it possible to switch to the personification of the offer of financial services.

Nevertheless, the prospects for the interpenetration of e-finance and e-commerce with social networks are still not completely clear. It is at the initial stage but tends to accelerate (Bharadwaj et al. 2013). At the same time, a notable trend is the monetization of social networking platforms and their participation in scaling financial services and trade. Monetization can act as a kind of guarantee for the further development of this process. Especially the problem of monetization of financial inclusion in social networks relates to smartphones and various applications (Hawley, 2019).

Modern social media platforms are a combination of Web 2.0 technologies that enable commercial activities to be included in the social platform (Constantinides and Fountain, 2008). Financial intermediaries are moving to the use of these platforms since they will allow connecting the business with end consumers. The interaction of a financial intermediary, a social network, and a user can be thought of as a multi-agent system (Jascanu et al., 2007). Doing business on a social platform provides interested parties with the information necessary to achieve the goals of each party. Information exchange, user content, and interaction with different types of users are three very important functions of social networks.

The introduction of the Internet and e-commerce has led to the automation of many tasks performed by financial intermediaries, as well as the emergence of additional intermediary links. Moreover, in a number of cases, the significance of these additional intermediary links increases significantly and, in connection with this, the role of traditional financial intermediaries changes. However, the key point is whether updated intermediaries bring value to new paradigms (Yinping 2007). Social networks have not accidentally included the position of electronic financial intermediation in their activities. For this, they had appropriate prerequisites, among which mediation in social communications stands out.

The problem boils down to the ability of social networks, firstly, to provide a variety of value-added services, as traditional financial intermediaries do; secondly, whether social networks can compensate for the negative consequences of additional costs that are added to the value chain in connection with the advent of additional mediation (Giaglis et al., 2002); thirdly, how useful are the efforts of all participants in the value chain in the context of adding a new element in the form of social networks, that is, do the utility have new functions.

A general approach to value chain analysis was proposed by Bakos (1998) and Giaglis et al. (2002). Basically, value-added intermediary services are associated with an integrated approach, including

ensuring the connection of buyers with sellers, finding a price compromise, facilitating a transaction, and ensuring the appropriate infrastructure. Social networks offered all of these features. Their platforms are fully suited to serve digital market activity (Turban et al., 2002), including financial intermediation.

The conceptualization of the behavior of financial intermediaries, social networks and their users in the process of their interaction is possible with the accumulation of statistical data. Nevertheless, a hypothetical review of changes is important both for assessing the possible options for the impact of changes on financial intermediation, and the role of mediation of social networks in the interaction of financial intermediaries with customers.

A Formal Framework for Studying

A fairly large amount of academic and practical literature is devoted to social networks and the establishment of their commercial functions (Nelms et al. 2018), to financial intermediaries and digitization of their activity (Ghosh, 2016; Oskarsdottir et al. 2020), and the development of electronic commerce (Iyer et al. 2020). However, there are extremely rare works explaining the inclusion of financial services in social networks (e.g., Nyagadza, 2019; Macmillan, 2016) and there are no works on conceptualizing the nature of financial intermediation in social networks.

Design/Approach

This article sheds light on the breakthroughs in traditional financial intermediation that are caused by the use of social networks in this area. This article aims to identify the conditions and reasons for embedding financial services in social networks.

To determine the structure of the work, it is divided into two sections:

1) Financial inclusion in a social network is considered as the result of a multi-agent system - financial intermediaries, social networks, network users. Conditions, properties and interpretations of stability and instability of the financial integration system in social networks;

2) A specification of the environment of agents is carried out - direct and indirect interactions are determined. The formulation used is based on a proposal for a model of action and reaction (Genesereth and Nilsson, 1987). The effect of direct and indirect (through social networks) impact of financial intermediation on network users is estimated.

Agents behavior in the system of financial inclusions in social networks

Currently, a new resource allocation system has been created, which is based on the Internet. This system is responsible for the distribution of information, financial, commodity resources between its users. It creates an alternative to the traditional supply and demand system and participates in the preparation of decisions at all levels of activity. It also includes the use of all types of electronic services, such as e-finance, e-commerce, electronic entertainment, and even electronic medical diagnostics. Homes, workplaces, training centers, and vehicles use web networks to offer more options. However, the overall management of such a multi-agent system remains a challenge (Perez et al. 2013), especially when matching supply and demand (Leon, 2015) in mobile and complex financial services. In this area, a system of multi-agent networks that interact with each other is emerging (Franchi E. and Poggi A., 2011). The article discusses the interaction of the financial intermediation system with the social networking system (Jiang and Jiang, 2014) and the formation on this basis of financial integration in social networks. The interaction of various sides of the system of financial inclusion in social networks can be considered as a multi-agent dynamic stochastic system.

Systems such as “financial intermediary — social network — network user (FI-SN-U)” can generate various types of behavior, from asymptotically stable to chaotic (Leon, 2015). The stability of the system is ensured by the constant formation of supply and demand for financial services, as well as

the participation of social networks in its provision (Castelfranchi, 2014). The FI-SN-U system is a multi-agent system. It has a specific architecture and is characterized by the behavior of its participants (Birkin and Wu, 2012). By dividing the system into simple interactions and finding out simple rules of behavior for individual agents, one can consider a rather wide range of behavior that helps to understand the functioning of financial inclusions and the behavior of various agents (Sun, 2009).

Any actions of various agents are based on a certain decision-making process, during which behavior is coordinated, during which certain restrictions arise. The coordination problem in such systems is a complex task, since the actions of agents, although rational, are asynchronous and on the wholly random. Variations in the behavior of individual agents can affect the state of financial inclusions and lead to further their extension or contraction.

This study does not examine an agent such as the state and its regulatory bodies, which has a significant impact on the development of the entire system. Legislative standards under development can stimulate or change and completely inhibit trend leading to the formation of financial inclusions in social networks (e.g., by licensing financial activities of social sites). An important factor in the development of this system is also a change in the behavior of agents over time (Hofbauer and Sigmund, 1988), which can be associated with both cooperative and non-cooperative behavior. As a result, changes are possible in the mechanisms, forms, and dynamics of cooperation (Novak et al., 2004) and the spread of financial inclusions.

Financial inclusion in social networks can be represented as the result of group behavior, which can be described in terms of evolutionary game theory (Smith, 1974). At the same time, the actions of random network users are evaluated using simple adaptive rules of rational behavior, rather than a form of coherency of opinions and strategies (Wallace and Young, 2015). Nash equilibrium means the coordination of behavior between a financial intermediary and a network user. Moreover, equilibrium serves as a rest point of the dynamic process at the level of network users who have chosen financial services, and not a form of coordination between beliefs and strategies. These interactions are not limited to the formation of financial inclusions. They also lead to changes in agents - financial intermediaries and social networks.

The development of financial inclusion occurs in stages. At the first stage, social networks include simpler forms of financial services, for example, related to payments for goods and services, cross-border money transfers. Gradually, there is a transition to the following stages - more difficult, including investment and stock consulting, stock trading, lending, and insurance. In this case, the transients in the system are different. They are associated with a sudden change in system properties. So, certain leaps in development are possible, for example, a change in the behavior of Facebook and its users in connection with the introduction of Facebook's own digital currency. In such cases, a certain parameter of the system undergoes a change in the threshold. Similar transitions were observed earlier in various fields, for example, in graph theory, when there was a transition to the study of random graphs (Janson, 2000). During phase transitions, agents update their state and some properties based on new information. In many cases, the problem arises of extracting basic information from noise (Liu et al. 2005). In digital systems, threshold transitions can be spasmodic (Briscoe and Wilde, 2008). In such cases, the accumulated changes overcome the threshold barrier for entering a new phase and state of agents.

Statistical and Game Interpretation Approaches

The evolution of financial inclusions can be considered from a statistical point of view as the evolution of a multi-agent system. It has the original matrix and transitions during the Markov process. The state of such a system at each time step represented is represented by a random variable Xn. It is a vector. It contains the probabilities of certain parameters that determine the actual state of financial inclusion (for example, agent positions, supply and demand for financial services and their characteristics). In this case, the system of financial inclusion in social networks can be considered stable (Moreau, 2005), since the distribution of states converges to the equilibrium distribution, that

is, to such a position: $P\ (Xn = j) \rightarrow \pi j$ when $n \rightarrow \infty$. In this case, the financial inclusion system is stable, since at large values of n the probability distribution of the states of the system is ensured regardless of the time step n (Wilde and Briscoe, 2011).

However, such an interpretation of the state of the system cannot be easily applied for multi-agent interaction, leading to financial inclusion in social networks (Mahmoodi and Gonzalea, 2019). There is a certain set of justifications for this. Firstly, the visible output of the system is discrete (expressed in several states), but continuous. Significant amounts of high noise data are difficult to process. It is especially difficult to identify unknown parameters behind a noise-contaminated system with a time delay. Different identification methods with noise correction are used for identification (Zhang and Xu, 2017). Secondly, all interactions in the financial integration system are deterministic. The slightest changes in the initial conditions change the overall picture. With a statistical interpretation of a larger number of behaviors, the probabilistic structure will only generate approximate values of the real evolution of a particular configuration. Nevertheless, the evolutionary theory of games allows one to determine the strategies of agents and their usefulness (Fogarty and Feldman, 2015), and in combination with phylogenetic methods, it is possible to establish the phased formation and phase transition from one transition to another stage and the type of financial accessibility (Greenhill, 2015). Thirdly, there is a significant accumulation of various nonlinear effects, which greatly complicates the estimation of transitions between different states of the system. The fact is that these transitions occur spontaneously and are independent of the decisions of one agent. Transitions are based on aggregated solutions of all participating agents. If we go over to a multi-agent system as a continuous Markov chain with discrete-time with a potentially unknown distribution of the transition probability, then the stability of the system is the result of the actions of all agents - it acts as a cumulative effect (Chapter 2009).

Stability is a developed and relatively well-understood concept in physics, where it is considered as a property of a system to constantly return to a state of stable equilibrium after a small disturbance. In turn, in mathematics, the definition of stability is not suitable for the context of multi-agent financial systems that are of a game nature and are stochastic systems (Chli et al., 2003). In the socio-economic sphere, the stability of multi-agent systems is defined as preserving the basic properties of the system and returning it to its initial state after various disturbances - noise, changes in parameter values, adding or removing agents.

If a small initial disturbance becomes significant, the system goes into an unstable state. A multi-agent financial system is in equilibrium when the statistical properties of its market performance indicators remain constant, including cases of changes in external conditions that can affect the system (for example, during changes in government regulation) (Lee et al., 1998). In the course of violations in financial intermediation systems (for example, under the influence of digitization of finance, the development of financial recommendation systems, etc.) and social networks, the final states of the systems change (Leon, 2014).

Multi-agent systems formed in the form of financial inclusions in social networks can be represented as a set of agents participating in a multiplayer game. In-game theory, stability is the leading property of equilibrium. In this case, the problem of finding equilibrium is reduced to choosing the optimal strategy. Then, stability can be used to describe the characteristics of a set of strategies in equilibrium. If the strategy of each player is the best response to the strategy of others and no player has an incentive to deviate from the chosen strategy, then this state is Nash equilibrium (Nash, 1950).

The stability of the financial inclusion system can also be defined as the totality of all actions that all agents in the system carry out. In this case, the equilibrium point will be the point at which each agent takes the current state and does not need further work in the system. The set of actions of various agents is stable. In this case, each agent in the set acts as if in concert and the behavior of each agent will be as if it were suggested by a crowd or predicted by many (Bracciali et al., 2004).

When considering financial inclusions in social networks as a multi-agent system, the main difference in the game approach will be that the observed behavior is taken into account, and not the decisions made by the agents.

Nonlinear Interpretations

In the context of the provision proposed by Zhang et al. (2019), systems related to financial intermediation and social networks can be represented as systems with an irreversible process of increasing entropy, which is created by many elements of these systems. Moreover, these systems are far from the equilibrium point. The state of movement of the elements seems chaotic due to instability (Klioutchnikov et al., 2017). The form of movement is very sensitive to the initial conditions and is not entirely random. The development of nonlinear science, especially the theory of chaos and fractals, allows us to consider the formation of financial inclusions in social networks in dynamics as a random deterministic process.

Interpretation of external behavior

From a practical point of view, stabilization of financial inclusion in social networks can be defined in a simple way as the absence of further changes in agent utilities, starting with a specific time step of modeling.

As Leon (2014) showed, a multi-agent system can exhibit many types of behavior, such as stable, periodic, chaotic, and non-deterministic unstable behavior. Therefore, for the system of financial inclusion, it is necessary to distinguish between stable and unstable behavior. Small periodic fluctuations in the utility function in the system are related to steady behavior.

The financial inclusion of the system may exhibit unstable behavior (deterministic chaotic or non-deterministic unstable). In this case, the agent utilities demonstrate changes throughout the simulation. System stability can be considered as statistically. According to a simple analysis of Hosseini et al. (2014), the probability of instability increases with the number of agents in the system, and the generation of random sequences increases. This conclusion is not surprising since instability clearly depends on the complexity of the interaction of agents. But it also indicates that the more complex the system and the more participants, the more successive random coincidences, which just lead to the formation of new quality - financial inclusions in social networks.

Internal interpretation of behavior

Despite the obvious usefulness of external interpretations of stability, they are not able to identify two fundamental issues of the stability of financial inclusion: the possibility of changes and even a complete change in the development vector after the occurrence of financial inclusion; the possibility of stability of financial inclusion after significant changes in the system and in the actions of agents. In fact, this solution to the problem relates to determining the conditions for maintaining the stability of the system in the long term.

The answers to these questions can be found only by opening the “black box”, which hides the actions of agents involved in the formation of financial inclusion in social networks.

Stability arises only when agent interactions follow a certain logic and have a certain structure. In accordance with the game-theoretic rules, the interaction of an agent with an agent is effective when utility arises for the first and second agents.

This situation corresponds to the following conditions: agent - financial intermediary (Z), agent - social network (X) has the greatest social result, and agent - user of the network (Y) interacts with agent X and Z (Figure 1). If all agents Y1-n continue to interact with agent Z, then the utilities they receive are the same at every time step, and their utility functions quickly converge. Moreover, if

these functions depend on Z, then the utility functions converge on the platform of social networks and participate in the formation of financial inclusion in social networks.

Agent Y's assessment of agents Z and X is very dynamic. The result of the function, the outcome of the utility for interaction agents, may decrease. In such cases, there may be a violation of the stability of financial integration in social networks. Agent Y may return to a relationship with agent Z directly, without intermediary X. In such cases, the stability of the financial inclusion system is undermined.

Three-Agent-Based Model

A hypothesis is put forward that social networks mediate the interaction of financial intermediaries and network users. In this case, the analysis can be carried out with the help of three-agent-based model: a financial intermediary, a social site and user of the site - the final consumer (Figure 1). To assess the impact of direct and indirect effects of financial intermediation on customers and the consequences on customer decisions about financial services. For this, we can consider a system in which a financial intermediary (Z) acts on a client (Y) directly or through an intermediary - a mediator (X). The formal impact on the client through additional mediation may be the problem of finding causations in a complex context (Anderson and Scott, 2012) or opening a “black box” (Bathaee, 2018; Bennett and McWhorter, 2016).

So, social networks increasingly mediate the interaction of financial intermediaries and users of social networks. An analysis of this interaction can be performed using a three-agent model: a financial intermediary, a social site, and a site user — the end consumer (Figure 1). This model allows you to evaluate the impact of direct and indirect effects of financial intermediation on clients and the consequences for decisions of clients on how to obtain financial services. You can offer a model in which a financial intermediary (Z) acts on a client (Y) directly or through an intermediary (X) - a social network. Formally, the impact on the client through an additional intermediary can be considered as a problem of searching for causality in complex circumstances (Anderson and Scott, 2012) or in the black box (Bathaee, 2018; Bennett and McWhorter, 2016).

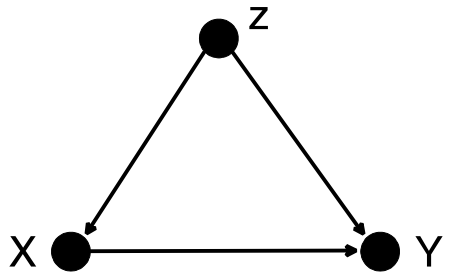

Figure 1: Direct and mediated by a social network interaction of a financial intermediary with a client

In the proposed coordinate system, the financial intermediary acts as a predictor. He offers a financial service and can affect a network user directly (Z-Y) and/or indirectly - through a social network (Z-X, X-Y).

Settings

Input: financial recommendations: direct - financial intermediary - of the client, Z-Y (B2C); indirect - financial intermediary - social network - network user, Z-X-Y (B2B2C).

Output: as a client of a financial intermediary - the consumption of financial services; as a network user - the consumption of a financial service and being in a network space.

Key terms and concepts

The variable is the central idea in the study. The change may be in quantity, intensity, amount or type. A variable may be a specific situation. For example, a mortgage loan is a variable - size, terms, interest rate, other terms are an essential role in this variable. In addition, the assessment of the borrower – credit scoring - is determined during the collection and analysis of data including social networks.

The purpose of this section is (i) to explain the operation of the predicate (financial intermediary) in two cases: direct interaction with the client (Z-Y) and mediated by social networks (Z-X-Y), and (ii) determine the nature of the variables of the intermediary and the moderator. Particular attention is paid to discussing the ways in which the definition of mediator and moderator variables can help in understanding the functioning of the entire system.

Mediator: Intermediate variable. A social network platform is an intermediate variable that can take into account the relationship between an independent and a dependent variable. The mediator is an intermediate variable that can take into account the relationship between the predictor variable and the original variable. The mediator is involved in the changes but does not necessarily explain the processes of their occurrence. In addition, the intermediary may be a proxy for one or more other variables — be a common construct used by various financial institutions.

Predictor: An independent variable, or an experimental variable, which is manipulated in an experiment to observe the effect on a dependent variable, or an outcome variable. The alleged "cause" in the non-experimental study used in correlation studies. A variable that causes changes in the mediator and through the large-scale mediator appears as a result. A mediator is an intermediate variable that is believed to take into account the relationship between the predictor variable and the original variable. Conceptually, the mediation model assumes that the predictor variable causes changes to the mediation variable, and the mediation variable causes changes to the result variable.

Mechanisms: processes or events that are responsible for the change.

Cause: a variable (including recommendations) that leads and is responsible for the result (in particular, the choice of service).

Moderator: A variable that influence or moderates the relationship between two other variables - the financial intermediary and the client. As a result, an interaction effect is generated. Financial intermediary ➛ social network ➛ client and vice versa.

If the type of recommendations affects the choice, then it is a moderator of the relationship of financial intermediaries with customers. Also, a moderator may be a way to include financial services in a social network: using financial intermediaries of social networks as a platform for providing financial services and switching social network sites to independently offer financial services to their users. Moderators are associated with mediators, mechanisms, and causes, as they suggest that various processes may be involved.

Outcome variable: The presumed effect in a non-experimental study, or a criterion variable. Further study of the intermediary and moderator variables can provide valuable information on the role of recommendation systems in social networks for retaining and expanding clients both within social networking sites and with financial intermediaries in two cases - direct and indirect.

The moderating variable has a strong conditional effect on the ratio of the conditionally independent variable and the conditionally dependent variable. The presence of a third variable (moderating variable) can change the initial relationship between the independent and dependent variables. For

example, there is a strong relationship between quality by the availability of credit resources from a financial intermediary (X) and the need for them from a client (Y). These relations depend, firstly, on the interest and tendency of the financial intermediary to provide credit, secondly, on the demand for borrowed funds, and thirdly, on the credit scoring. This means that only those customers who, on the one hand, have a demand for credit, and on the other hand, meet the criteria for lending to financial intermediaries, will interact with the financial intermediary in the system. In these relations, an important role is played by the moderating variable, that is, which moderates the strength of the connection between the variables X and Y. The attitude refers to the observed reality, in particular, to the interaction of a financial intermediary with a client both directly and through a moderator - a social network.

This article puts forward a hypothesis about the universal intermediary function of financial intermediation and mediation of social networks, which allows you to enhance the effect of financial intermediation. This function is implemented on the platform of social networks. If the phenomena under consideration turn out to be an observable reality, then these statements can be verified empirically.

We have already seen that judgments are statements about variables that are considered true or false. If the phenomena under consideration turn out to be an observable reality, then these statements can be verified empirically. A proposal that can be verified to determine its reality is a hypothesis. Therefore, we can say that the hypothesis is a testable analog of the proposal. A hypothesis can be defined as a logically assumed relationship between two or more variables, expressed in the form of a verifiable statement. Communication is proposed using rigorous logical reasoning. These logical relationships can be part of the theoretical basis of research. Let's look at some of the hypotheses: 1) The network user has an interest in financial services (variable). 2) The level of interest in financial services is related to their level of consumption. 3) The level of consumption of a network user is related to the level of income. 4) If the income level decreases, but consumption remains, then the demand for loans grows. 5) If the number of family members changes, then there is a demand for mortgage lending. These are verifiable offers. Moreover, the first hypothesis contains only one variable. And this hypothesis is quite abstract. The second and third hypotheses have two variables, which are related to each other, but the nature of the association is not defined (there is no directional connection).

In the fourth and fifth hypotheses, in addition to the relationship between the two variables, directions are given (in the fourth - negative, and in the fifth - positive, but in both cases they are aimed at increasing demand for borrowed funds). These hypotheses are checked by means of a credit scoring.

In its most general form, mediation exists when a predictor indirectly affects a dependent variable through at least one intermediate variable or intermediary. In general, financial intermediation develops according to the following principle: the owner of money, investing in a bank or investing in the stock market, affects the dependent variables - entrepreneurs and debtors. This relationship is shown in fig. 1, where (Z-X) represents the effect of the predictor variable on the proxy, (X-Y) represents the effect of the proxy on the output variable, (Z-Y) represents the effect of the predictor on the output variable in the absence of a proxy.

In its most general form, mediation exists when a predictor indirectly affects a dependent variable through at least one intermediate variable or intermediary. In general, financial intermediation develops according to this principle, when the owner of money, through investing them in a bank or through trading in the stock market, acts on dependent variables – entrepreneurs and debtors. In the proposed system, the most important participant is selected. The definition of the “most important” participant in this system depends on the goals and subject area. Although statistics in some cases make it possible to determine the most important variables in a regression model, the choice of a predicate in a model depends on the domain and analysis tasks. Analyzing the influence of financial intermediaries on consumers in order to provide financial services, the financial intermediary is a predictor, and the social network is an intermediary. If it is necessary to find out how the desires and preferences of the consumer affect the activities of the financial intermediary, then the consumer

becomes a predicate. A social networking site can also be a predictor. In this case, its influence is considered both on the financial intermediary in the direction of placing recommendation systems on the network, and on the network user, who in this way is under great influence from the network.

An assessment of the participation of parties in a triangle can be carried out from the standpoint of graph theory. Facebook launched the social graph in 2008. With their help, you can derive and calculate user interactions with each other on a social network. In addition, they allow you to introduce recommendation systems into a wide circulation, which takes a business relationship with customers to a new level and scale B2C.

Directional graphs can be used to model information flows of financial intermediaries with customers. In this connection, the connection between the nodes, give the necessary orientation. In graph theory, the Tutte-Berge formula (Berge, 1962) characterizes the size of the maximum correspondence in a graph. With its help, you can determine the smallest distances between the vertices. Typically, the formula is used when organizing traffic - search for the best routes (Bondy and Merty, 2010). However, it is quite appropriate for understanding the processes that determine the user's interest in financial services when introducing recommendation systems based on social networking sites. Thus, network users seek to minimize their time searching for the necessary financial services. This principle follows from the laws of minimizing free energy, which explains thermodynamics. Like gas molecules, network users interact with each other. Collective interactions can affect individual behavior. In the chart below, there are two routes for the movement of financial information to customers Z-Y and Z-X-Y. The first involves direct contact of a financial intermediary with a client, and social networks mediate the second. A financial intermediary strives to minimize its time and costs of maintaining customer relations.

In turn, each user of the network tries to minimize the search for necessary financial services - to find the services that are most optimal for them, based on their various characteristics. The digital channels that connect customers to a financial institution are much faster and more capacious than physical offices. In stationary mode, the direct route (Z-Y) and the route mediated by the social network (Z-X-Y) take the same amount of time. However, the first route is associated with a specific group of customers - current customers and potential customers, but those who have previously selected a specific financial institution to contact. The second route is intended for any user of a social network, that is, it has a potentially larger number of participants. Suppose that a financial intermediary decided to use a system of recommendations and chat-bots to communicate with users of social networks, as well as to communicate with customers, using a telephone line managed by bank employees. With direct contacts of a financial intermediary with a client (Z-Y), additional time is required associated with finding a phone number, dialing it, connecting and overloading a telephone line. Therefore, formally, direct contact becomes problematic for the user - and this applies both to direct analog contact and direct digital. Recommender systems in combination with chat-bots can offer a continuous and simpler service (Zarouali et al., 2018).

In fact, all three agents are independent and hysteretic agents (Macia-Perez and Garcia-Chamizo), that is, to start the changes for each agent, quite a significant start-up effort is necessary and, despite a rich information environment, they operate in conditions of insufficient da

Findings

We define financial inclusions in social networks as a potential set of financial services received by network users while using a social site. Financial inclusions differ from traditional financial intermediation and financial start-ups, but they depend on them and can act as their element, but (i) embedded into social networks, or (ii) financial functions that are performed directly by social sites. We consider the first option as a result of the expansion of financial intermediation into social networks - the use of social networks by financial intermediaries to scale their activities; the second option is the expansion of social networks into the financial sector to preserve network users, expand network traffic and monetize network services.

The results of the study of this article can serve as a guide for further studying the evolution of financial inclusion in social networks as a dynamic process with non-degenerate equilibrium points.

Social networks have the broadest communication features and properties. At present, it has become possible to use these properties for financial purposes. In general, social networks facilitate communication between consumers (P2P), financial intermediaries with consumers (B2C). Thus, various channels are provided for promoting financial services to the consumer. Therefore, social networks can be considered as tools and resources that become forms of contact between financial intermediaries with consumers. Thus, social networks are increasingly becoming the basis for the formation of new business models and business processes, among which financial inclusion in social networks currently stands out. The key mechanism ensuring the functioning and performance of financial inclusions is recommender systems.

The stability of the new financial services system depends on various internal circumstances - the development of financial inclusion in social networks, and external circumstances - associated with the activity of financial intermediaries and social networks, as well as the usefulness of the intermediary role of social networks in the interactions of financial intermediaries with end-users. In addition, government regulation can have an important impact on the stability of the system of financial inclusion in social networks.

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An Analysis of the Romanian Cultural Environment of The Main Ethnic Groups

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Abstract

The study below analyzes the cultural environment that can be found in Romania and carefully follows the similarities and differences between the cultural profiles encountered in the main two groups. The context of the two ethnic groups that we will investigate is somewhat exceptional, as in two counties of Romania, the most important minority group, became the majority one with its own values and beliefs as the dominant ones.

Keywords cultural environment, ethnic groups, ethnic minorities

Introduction

Romania is a country situated at the intersection of Central, Eastern and Southeastern Europe, having a population of 20 million people and more than 20 ethnic groups dispersed across its territory.

This multicultural situation can be explained due to the fact that throughout history, different portions of the territory of the modern state of Romania have been composed, or were under the direct administration of Dacia, the Roman Empire, the Ottoman Empire, the Russian Empire and off course the Austro-Hungarian Empire.

As a matter of fact, Romania first appeared as a state in 1859, by the union between Moldova and Wallachia, while still being a tributary state to the Ottoman Empire. In 1918, Transylvania, Bukovina and Bessarabia were united with Romania and most of the country current territory was formed.

Precisely because the country has been under various occupations throughout history, we now have in Romania various ethnicities, that can be found in the territories that were once ruled by other nations. Of course, this means that in terms of the cultural environment we have different values and beliefs that are common or specific to certain groups, and exactly these differences will be analyzed at the level of the most important ethnic groups found in Romania.

Cultural Environment of the Main Ethnic Groups

The meaning of the noun ethnicity is “the fact or state of belonging to a social group that has a common national or cultural tradition” (Oxford Dictionary, 2019). Based on the last Romanian census from 2011, Romania’s population is 20 million people and we can see that 83% (16.8 million people) of the entire population are Romanians; followed by the most important ethnic group at 6% (1.2 million people) represented by the Hungarians; while other groups are at more than 10% (2.1 million people).

Table 1: Main Ethnic Groups by Population

Ethnic Group	Population %	Population
Romanians	83.46%	16,792,868.00
Hungarians	6.10%	1,227,623.00
Other	10.44%	2,101,150.00
	100.00%	20,121,641.00

Source: Romanian National Statistics Institute (2011), adapted by author

One mention upon the Hungarians situation, is that most of the ethnics' population (33%) is located in two counties of Romania, Covasna and Harghita were we can find them as the majority ethnic group (the only situation of this kind). Also, they have kept their native language and only 1.69% speak the official language of Romania.

We can ask ourselves what the situation of the cultural environment between the majority and minority ethnic groups in Romania is, and can we see similarities between the cultural environment of Hungarians from Romania to the ones from Hungary.

In this initiative, we will use the World Values Survey Database, a global research project that examines the values and believes of people through representative national surveys. As this paper focus is to understand the cultural environment, we have chosen a list of question from the survey that follows that topic.

Table 2: List of followed questions of the survey

1. People have different views about themselves and how they relate to the world. Using this card, would you tell me how strongly you agree or disagree with each of the following statements about how you see yourself? I see myself as an autonomous individual -> Strongly agree
2. People have different views about themselves and how they relate to the world. Using this card, would you tell me how strongly you agree or disagree with each of the following statements about how you see yourself? I see myself as part of my local community -> Strongly agree
3. For each of the following, indicate how important it is in your life. Would you say it is very important: Work
4. For each of the following, indicate how important it is in your life. Would you say it is very important: Religion
5. Taking all things together, would you say you are very happy
6. How proud are you to be own nationality
7. Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Independence
8. Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Tolerance and respect for other people
9. Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people? Most people can be trusted
10. Emancipative values -> Mean

Source: World Values Survey: Round Six (2014), adapted by author

Since the cultural environment is a very important factor both from a financial, social and cultural point of view, we have chosen questions that can help us follow all these points as we consider that the cultural environment is a resource for any country, moreover as the globalization phenomenon diminishes the cultural differences more and more every year.

It can help build strategies that consider the cultural profile of a locality, region or country, in this way maximizing their effectiveness and using them appropriately for the efficiency of the actions that must be taken.

Table 3 : Results by Location

Location	Romania	Covasna	Harghita	Hungary
Autonomous Individual	28.0%	89.0%	18.9%	49.9%
Local community	34.5%	81.0%	29.3%	38.7%
Work	55.9%	47.2%	63.2%	55.1%
Religion	50.5%	90.2%	65.2%	17.1%
Happiness	13.6%	23.4%	18.6%	17.1%
National Pride	43.0%	14.1%	17.7%	43.3%
Independence - value for children	42.2%	76.0%	60.0%	81.4%
Tolerance - value for children	65.2%	82.6%	53.9%	76.1%
Trust - Most people can be trusted	7.7%	4.0%	28.8%	28.7%
Emancipative values	0.42	0.48	0.41	0.50

Source: World Values Survey: Round Six (2014), adapted by author

Analysis on the Main Ethnic Groups

There is usually in the collective mind the idea that major differences between different regions of the country can be identified. However, if we analyze the results, we can find that there are indeed differences, but are those significant enough to be categorical?

The cultural differences do not hold firmly to the magnitudes of important practical effects. Work importance, emancipative values, level of happiness, and the tolerance that is taught to children is as important for the average Romanian as his fellow countrymen from Covasna and Harghita, and like the average person from Hungary.

Or, we can find similitudes that brings closer the profile of a citizen from Covasna and Harghita to the one of a citizen from Hungary as Independence as a value for children, or the opposite as the differences found in the importance of Religion.

We can also find unique characteristics of the cultural environment, such as an increased allegiance to a community in the case of Covasna, or a low result in national pride in the case of Covasna and Harghita.

Also, we can find characteristics of the cultural environment and depending on the socio-professional groups ((Dutu, C., Luchian, A., Starcu, E., Savulescu, F., 2015, Popescu, A.L., Costache, R.S., Savulescu, F., Jinga, M., Ionita-Radu, F., 2019) in general and characteristics of the socio-professional groups within the main ethnic groups. This will be the subject of future research.

Conclusions

Therefore, these results show the existence of cultural differences between the counties where the Hungarians are the majority ethnic group and that the profile offered by this study is representative for sketching a cultural environment.

But we can say that we observe a uniformization of the environment and that the differences between them are rather important nuances, than completely different cultures. However, further studies should be undertaken to verify the relationships between the items presented in this paper, and to and expand the study with a more representative sample.

In the end, as in Romania foreign companies have employed more than 25.9% of the workforce in 2018 (Romanian National Statistics Institute, 2019) knowing the cultural environment of each county or region, will help companies to search for the right behavior in a specific location and to diminish the cultural shock when entering a new market.

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Entrepreneurial Orientation and Value Creation: Towards A Micro-Foundational Perspective

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Abstract

Purpose and research questions. The aim of the paper is to initiate the research on a micro-foundational perspective within the relationship between entrepreneurial orientation and value creation. The aim has been realized by answering the following research question: How might the micro-foundations concept in strategic management develop the understanding of the relationship between entrepreneurial orientation and value creation? **Design/Methodology/Approach**. The method that has been used is a systematic and critical literature review of the following concepts: entrepreneurial orientation and value creation, micro-foundations of value creation. Moreover, a critical literature review on the micro-foundations concept has been made as well. **Findings.** The overarching findings are as follows. First, the micro-foundational perspective constitutes a promising research direction in examining the linkages between entrepreneurial orientation and value creation. Second, the value creation (both internal – for a company itself regarding performance, competitive advantage, etc. and external – for stakeholders) is determined by entrepreneurial orientation at both the organizational level (including higher and lower order dimensions) (the Coleman's relation no. 4) and the individual one. Moreover, organizational entrepreneurial orientation determines individual-level entrepreneurial orientation antecedents (the Coleman's relation no. 1). In turn, individual-level entrepreneurial orientation is determined by individual-level entrepreneurial orientation antecedents such as, for instance, managerial cognitions. cognitive dynamic capabilities, emotions, particular values and interests, entrepreneurial proclivity, alertness, high locus of control and opened world view (the Coleman's relation no. 2). Finally, individual-level entrepreneurial orientation determines organizational value creation (the Coleman's relation no. 3). **Research implications**. The findings fill the research gap in the strategic management field concerning a micro-foundational perspective of examining the entrepreneurial orientation-based value creation concept.

Keywords: Strategic Entrepreneurship, Entrepreneurial Orientation, Value Creation, Micro-Foundations, Multi-Level Research, Coleman's Bathcub

Introduction

Value creation, as essential for a strategic success, is one of crucial concepts in the strategic management field. The value-based approach was originally developed by Brandenburger and Stuart (1996). Remarkably, different groups create different amounts of value, which reflects the heterogeneity in the underlying resources and capabilities of the players (Chatain and Zemsky, 2011). However, despite the considerable growth of the research on value creation (and value capture[1]) and its triggers, there is a need to develop both theoretical and methodological lens of this phenomenon by

[1] The paper does not involve the considerations about the concept of value capture and appropriation as, on the one hand, different mechanisms occurring at various levels of analysis are involved in those phenomena, i.e. value creation versus value capture and value appropriation and, on the other hand, the focus of the paper presented is on triggering just value creation, not value capturing and appropriating, by entrepreneurial orientation.

implementing new perspectives that allow a deeper understanding of how companies may create the value for itself and stakeholders. As such, a promising view emerges from the entrepreneurial orientation, which as one of the most predominant constructs of interest in strategic entrepreneurship research (Anderson *et al*., 2015), constitutes the organizational capability that might trigger the value creation mechanisms (Wales *et al*. 2020). Moreover, entrepreneurial orientation as an organizational phenomenon is determined by lower-level constructs. As well as this, the value creation phenomenon involves many levels of analysis, specifically individual, organizational, and network (e.g. Corte and Gaudio, 2014). As such, it is justified to ontologically and epistemologically incorporate a micro-foundational perspective and its methodological multi-level analysis.

Consequently, to address recent calls for microfoundations, the aim of the paper is to initiate the research on a micro-foundational perspective within the relationship between entrepreneurial orientation and value creation. Specifically, the following research question has been formulated: *RQ*. How might the micro-foundations concept in strategic management develop the understanding of the relationship between entrepreneurial orientation and value creation?

The method that has been used is a systematic - critical literature review. First, the papers were selected by means of the SCOPUS database with keywords ("entrepreneurial orientation" AND "value creation") including TITLE-ABS-KEY. As a result, twenty-seven papers were found dated from 2001 to 2020. They cover the following fields: Business, Management, and Accounting, Economics, Econometrics and Finance, Social Sciences, Arts and Humanities, Decision Science, and Engineering. Second, the same procedure (with the inclusion criterion: only reviewed papers) was implemented for the EBSCO database. Only four papers dated from 2013 to 2019 have been found. Then, there was a second round for selecting papers. On the basis of the SCOPUS database fourteen papers have been gained by means of keywords ("microfoundations" AND "value creation") including TITLE-ABS-KEY as well. The papers date from 1996 to 2019 and cover the following fields: Business, Management, and Accounting, Economics, Econometrics and Finance, Social Sciences, Arts and Humanities, and Computer Science. Consequently, the same procedure was incorporated into the EBSCO database and only one paper was found (dated a year 1996). After analysing seminal papers in the fields of entrepreneurial orientation and value creation as well as implementing the snowball method, additional papers have been considered. Finally, the seminal and overarching papers concerning the micro-foundations concept in strategic management have been added and critically analysed as well.

The structure of the paper is four-fold. The first section presents the micro-foundations concept in strategic management. The theoretical background of entrepreneurial orientation and the value creation concepts has been presented in the next section. Then, the insights on a micro-foundational perspective, incorporating the Coleman's diagram, within the relationship between entrepreneurial orientation and value creation have been posed. Finally, the conclusions, encompassing the most salient findings, limitations and future research directions have been presented.

Micro-Foundations – A Concept in Strategic Management

The microfoundations concept has appeared in the management theory landscape over the past decade (Foss and Linder, 2019). Micro-foundations constitute cognitive fundamentals in strategic management rooted in individual actions and interactions between individuals (Abell *et al*., 2008; Barney and Felin, 2013). It is 'an attempt to unpack collective (or 'macro') concepts and phenomena so to foster improved understanding of them (…) explaining how micro-level factors like individuals' characteristics, their decision rights, their interactions…impact meso- and macro-level outcomes (…) how the interaction of individuals leads to emergent, collective, and organization-level outcomes (…) and how relations between macro variables (…) are mediated by micro actions and interactions' (Felin and Foss, 2019, p. 2). For instance, an individual level (micro) is a key for explaining phenomena at the organizational level (macro) such as routines, capabilities, organizational performance (Foss and Pedersen, 2014). As such, micro-foundations are responsible for explaining a mediating character of influencing individual level (micro) phenomena and/or interactions between them on the relationships between organizational

level variables (Abell *et al*., 2008; Foss and Pedersen, 2014). Moreover, micro-foundations of a given phenomenon constitute its main elements and processes (Lippman and Rumelt, 2003b), because they refer to aggregated phenomena and/or relationships between aggregated variables (Barney and Felin, 2013). The explanation how individual level factors as a result of aggregation contribute to occur collective phenomena and constitute *sine qua non* the micro-foundational analysis (Barney and Felin, 2013). Hence, the 'micro-foundations' concept does not refer to individuals and theirs characteristics *per se*, but also to additive and emergent forms of aggregation (Barney and Felin, 2013; Felin *et al*., 2015). Nonetheless, aggregation is not a primary premise of micro-foundations (Devinney, 2013). The reason is that the 'micro-foundations' concept is rooted in methodological individualism which premise is to seek causality mechanisms (at the individual level) as well as it reflects how intentional activities and/or interactions between individuals constitute phenomena in the strategic management field (Abell *et al*., 2014; Molina-Azorin, 2014). Yet, it ought to be mentioned that whereas micro-foundations constitute a research programme with the main aim of understanding collective/aggregated macro level phenomena by means of actions of and/or interactions between lower level constructs, the lower level construct does not have to mean individuals (Foss, 2016). Additionally, a crucial hallmark of the microfoundations programme is emergence. Indeed, the purpose of micro-foundations is to explain (*via* seeking causality) how higher level constructs emerge from constructs that reside and interact at lower levels of analysis (Devinney, 2013; Felin *et al*., 2015; Molina-Azorin, 2014). Trying to operationalize the definition of microfoundations, Felin *et al*. (2012, p. 1353) described it 'as a theoretical explanation, supported by empirical examination, of a phenomenon located at the analytical level N at time *t* (N_t). In the simplest sense, a baseline micro-foundation for the level N_t lies at the level N - 1 at time *t* - 1, where the time dimension reflects a temporal ordering of relationships with phenomena at the level N – 1 predating phenomena at the level N. Constituent actors, processes, and/or structures, at the level N – 1 $_{t\text{-}1}$ may interact, or operate alone, to influence phenomena at the level N_t. Moreover, actors, processes, and/or structures at the level N – 1 $_{t\text{-}1}$ also may *moderate* or *mediate* influences of phenomena located at the level N_t or at higher levels (e.g. N + 1 $_{t+1}$ to N + n $_{t+n}$)'. A micro-foundational analysis therefore needs specifying the components of the micro-foundational construct, interactions between those components, causative mechanisms that contribute to emerge a collective phenomenon from micro-foundational components. The boundary conditions are necessary (Felin *et al*., 2012). Consequently, a micro-foundational analysis is multilevel (ontologically, epistemologically, and methodologically) (Foss, 2016; Molina-Azorin, 2014).

Micro-foundational studies (mainly theoretical) have been evidenced in many research fields. Referring to the recently published systematic review on micro-foundations made by Foss and Linder (2019), there are four papers considering value as *explanandum*, namely three connected with value creation and one associated with value appropriation. Specifically, Gottschalg and Zollo (2007) conceptually and theoretically examined value and rent-creation at the individual level where the *explanans* referred to different kinds of motivation. The authors stated that individual motivation is crucial to understanding organizational outcomes. In turn, Harrison *et al.* (2010) investigated (also conceptually and theoretically) that the *explanans* of firm-level value creation (*explanandum*) was organizational justice, which allows more fine-grained managerial access to employee utility functions. Obloj and Zemsky (2015) studied (conceptually and theoretically) value creation and division of value in contracting relationships (*explanandum*) and they found supplier heterogeneity as *explanans* for value creation and division. With regards to value appropriation, Lippman and Rumelt (2003a) researched resource-level value appropriation (*explanandum*) and concluded that bargaining behaviour and strengths of individual resource owners constituted the *explanans* of the resource-level value appropriation. When it comes to the entrepreneurial orientation, there is just one paper evidenced in the review made by Foss and Linder (2019). Specifically, Dai *et al*. (2016) investigated (theoretically and empirically drawing on 148 firms in China) organizational entrepreneurial orientation with regards to venture teams' transactive memory, intra-team trust, and venture's structural organicity. They explained how individuals, their social relationships, and interactions influenced firm-level behaviour, processes, and strategies. Moreover, they strongly called for the need of explaining organizational entrepreneurial orientation within the micro-foundational programme what was in line with the recent studies on the entrepreneurial orientation concept (i.e. Wales *et al*., 2020).

Entrepreneuarial Orientation and Value Creation –Theoretical Background

Entrepreneurial orientation is an important and widely researched concept in the both entrepreneurship and strategic management literature (e.g. Andersén, 2010; Anderson *et al.,* 2009; Anderson *et al*., 2015; Rauch *et al*., 2009; Wales *et al*., 2013a; Wales *et al*., 2013b; Wales *et al*., 2020). Entrepreneurial orientation is comprehended as a firm's (a firm-level) strategic posture (Anderson *et al*., 2015; Covin and Wales, 2012), an organizational attribute (Wales *et al*., 2020), and a fundamental organizational orientation (Li *et al*. 2010, Wiklund and Shepherd, 2003; 2005, 2011) towards entrepreneurship. When it comes to the components / dimensions of entrepreneurial orientation there are two approaches. The first one assumes there are three components, namely innovativeness (the introduction of new products, processes, and business models, novelty, experimentation, and creative processes), proactiveness (actively entering new product/market spaces and seeking market leadership positions, creating a first-mover advantage), and risk taking (a willingness among strategic decision makers to contribute resources to projects with uncertain outcomes, a willingness to commit large amounts of resources to projects where the cost of failure may be high) (e.g. Anderson *et al*., 2009, Anderson *et al*., 2015, Covin and Slevin, 1989, 1991, Miller, 1983, Miller and Friesen, 1978, Wiklund, 1999, Wiklund and Shepherd, 2003). Importantly, while innovativeness and proactiveness are thought to be behavioural (higher order) dimensions, the risk-taking is regarded as attitudinal (lower order) dimension. The second approach is in line with five-dimensional entrepreneurial orientation conceptualization (autonomy, innovativeness, risk-taking, proactiveness, and competitive aggressiveness) (Lumpkin and Dess, 1996). Whereas the autonomy dimension reflects 'the ability and determination of self-directed decisions and actions' (Ljungkvist *et al*., 2020, p. 286) and 'refers to the independent action of an individual or a team in bringing forth an idea or a vision and carrying it through to completion (Lumpkin and Dess, 1996, p. 140), competitive aggressiveness 'focuses on how a firm challenges and reacts to competitors' (Ljungkvist *et al*., 2020, p. 287). This approach is definitely, in contrary to the traditional strategic posture, a processual concept covering the changes of practices and new entries (Ljungkvist *et al*., 2020) and is also called a strategic entrepreneurial orientation (McKenny *et al*., 2018).

There is a limited number of studies on strategic entrepreneurship, especially entrepreneurial orientation, from a value creation perspective, however, the entrepreneurship is said to be a value creation process (Hunter and Lean, 2018). Entrepreneurial orientation corresponds to a type of entrepreneurial transformational process that enables organizations to turn inputs, broadly defined, into higher-value outputs (Lumpkin *et al*., 2013, p. 763). Remarkably, in turbulent markets a firm's internal capabilities are seen as major sources of value creation and sustainable competitive advantage (Khan *et al*., 2019). Criado-Gomis *et al*. (2019), for instance, prove that sustainable entrepreneurial orientation, determined by entrepreneurial orientation, as an organizational capability, in terms of innovativeness, proactiveness, and risk taking, significantly influence customer functional value creation, which in turn had impact on firm performance (customer and business one). In other words, their findings indicate that a sustainable entrepreneurial orientation not only has a positive and direct relationship with firm performance, but also that this relationship improves when it is mediated by customer functional value creation. In turn, Eshima and Anderson (2016, p. 772) investigated that new resource combinations exposed by firm growth, which enhance the ability to recognize ways to satisfy changing market needs, exposed specific new opportunities for value creation as well. In details, an adaptive capability uncovers new entrepreneurial opportunities for value creation since to capture this potential value, companies expand their entrepreneurial orientation. Hence, entrepreneurial orientation and value creation may also be perceived from the RBV perspective. Entrepreneurial orientation is associated with the successful exploration of resources (White and Vila, 2017). Entrepreneurial orientation is therefore vital through which companies based in emerging economies can create value by bundling and orchestrating resources thus improving performance (Zeng and Khan, 2019). Moreover, taking the form of new entrepreneurial opportunities and the presence of an exploitable opportunity is a necessary precondition for a change in the firm's entrepreneurial orientation (Slevin and Covin, 1997). Runyan *et al*. (2008) state that small companies, which adopt an entrepreneurial orientation in their business are likely to achieve competitive advantages, perform better, and create value. Mütterlein and Kuns's (2017) results show that company's (a media one) entrepreneurial orientation has positive effects on its ability to innovate value creation and value proposition, but not

on its ability to capture that value. Significantly, the linkages between entrepreneurial orientation and value creation depend on the development stage of the entrepreneurial orientation. Ljungkvist *et al.* (2020) investigated the development of the five dimensions of entrepreneurial orientation (which account for specific contexts and stakeholders) over time by taking a founder's perspective and they found that the entrepreneurial orientation dimensions changed from being personalized and directly solution-oriented *via* being administrative-based to being intangible value-creation-oriented. Significantly, intangible-focused entrepreneurial orientation is strongly affected by external-based drive promoting short-term oriented value-creation. It might be realized when internal autonomy is high, external autonomy is limited, innovativeness is high, risk-taking is high, proactivity is high, and competitive aggressiveness is limited.

Not only are the linkages between entrepreneurial orientation and value creation considered from the perspective of the organizational level entrepreneurial orientation. Criado-Gomis *et al*. (2019) highlight that the managerial predisposition to adopt a strategic position fosters value in use (instead of regular property value), according to the current school of thoughts engaged with innovation and sustainable development. Wang *et al*. (2020) examined the relationship between management's entrepreneurial orientation and its relative strategic emphasis on value-creation *versus* value-appropriation. They found that entrepreneurially oriented managers tended to focus more on value-creation (e.g., new product development) over value-appropriation (e.g., advertising), but this influence was contingent on, at least, three factors: (1) relative firm performance, (2) compensation strategy, and (3) capital market patience. Keil *et al*. (2017) investigated how CEO entrepreneurial orientation affected firm value creation and how this relationship was moderated by three sources of CEO entrenchment. As a result of a longitudinal analysis, they found that CEO entrepreneurial orientation enhanced firm value creation and that this positive effect was reduced when CEOs were entrenched (1) due to corporate governance provisions that protected them from the majority will of shareholders, (2) due to substantial ownership that provided them too much decision-making power, and (3) because their family had substantial holdings in the corporation.
Taking into account the aforementioned premises and considerations we have formulated the following proposition:

Proposition 1. The value creation (both internal – for a company itself regarding performance, competitive advantage, etc. and external – for stakeholders) is determined by entrepreneurial orientation at both the organizational level (including higher and lower order dimensions) (the Coleman's relation no. 4 – see the following section) and the individual one.

The proposition opens a black-box connected with considering the relationships between the entrepreneurial orientation and value creation form a micro-foundational perspective,

Entrepreneurial orientation and value creation – towards a micro-foundational perspective

While some studies have been conducted with regards to the associations between the entrepreneurial orientation and value creation in general, little is known about the opportunities that a micro-foundational programme might provide in that field.

Entrepreneurial orientation's influence on value-creation potential depends not only on the organizational entrepreneurial orientation on the whole, but especially on managers having some sense of the potential value of an entrepreneurial opportunity before expending critical resources to create and / or capture that value (Eshima and Anderson, 2017, p. 777). Nonetheless, when shifting utmost focus from an organizational-side entrepreneurial orientation to individual factors, the entrepreneurial orientation–based explanation of value creation requires augmenting also the lower levels conceptualizations and finding lower levels antecedents of value creation determined by entrepreneurial orientation. Given this, we draw a Coleman's conceptualization of micro-foundational interdependencies called Coleman's diagram (bathcub / boat) (Abell *et al*., 2010; Vromen, 2010). In a generic way, it depicts four relations involving two levels: a macro-level and a micro-level. The first relation is from the macro-level (higher levels conditions) to the micro-level (conditions of individual

actions). The second one is micro (conditions of individual actions) – micro (individual actions). The third relation begins at the micro-level (individual actions) and ends at the macro one (higher level outcomes). The last relation is macro- (higher levels conditions) macro- (higher level outcomes).

We have incorporated the Coleman's bathcub to conceptually reflect the potential relations in the entrepreneurial orientation-based concept of value creation. Adapting Wales's (2016) settlements and promising research directions, we follow that entrepreneurial top management / TMT style (an individual / team level) is determined by entrepreneurial orientation in terms of organizational configuration (an organizational level). Hence, we have formulated the following proposition:

Proposition 2: Organizational entrepreneurial orientation determines individual-level entrepreneurial orientation antecedents (the Coleman's relation no. 1).

We propose to consider individual-level entrepreneurial orientation (see Hughes *et al.,* 2018, Kollmann *et al*., 2017) as the one of main individual level antecedents of the entrepreneurial orientation on the whole. While it is generally recognized that individuals throughout organizations can be entrepreneurial actors, the concept of individual-level entrepreneurial orientation has not been widely embraced, largely because 'the entrepreneurial orientation was introduced to the literature as a firm-level construct by definition' (Wales *et al*., 2020). As such, while considering the Coleman's bath, it is significant to explore individual-level antecedents of individual-level entrepreneurial orientation, which in turn influences value creation processes. Given this, Wilkens *et al.* (2016) discovered the salience of managerial cognitions concerning new market opportunities, managerial perception of the necessity to change and of managers' coping patterns for resource allocation. The authors' key finding was that increasing sense-making activities inside and outside the organization help it adopt to new ways of value creation. Moreover, they found that the cognitions related to "reconfiguring resources" showed the high consciousness for an overall change process leading to new forms of value creation in interaction with the customer (Wilkens *et al.*, 2016, p. 499). Cognitive maps and shared cognitive maps (Wales *et al*. 2020): develop a shared cognitive schema among top managers characterized by an enthusiastic support for the pursuit of new entry initiatives, innovations, and value creation opportunities, even when the outcomes of such experiments are unknown (Covin and Slevin, 2002; Wales *et al*., 2020). Similarly, Wales *et al*. (2020) found that collective top managerial cognitions favoured entrepreneurial activity. As well as this, Chen *et al*. (2017) stated that managers in the fast-growing industry should have dynamic managerial capabilities to anticipate other service elements that customers consider valuable. Based on managerial cognitive dynamic capabilities, their research explored the influences of customer-perceived functional benefit, experiential benefit, financial benefit, and psychosocial benefit on perceived instrumental and terminal values of stakeholders (customers). As well as this, increasing sense-making activities inside and outside the organization to adopt to new ways of value creation is crucial (Wilkens *et al*., 2016). The authors analysed how managerial cognitions influenced a firms' capability to realize new business model opportunities and to seize and reorganize its resources in order to take advantage from these opportunities. They discovered, on the basis of a qualitative case study analysis, comprising of interviews and cognitive mapping, managers' cognitions concerning new market opportunities, their perception of the necessity to change and their coping patterns for resource allocation as crucial for value creation. Additionally, it has been evidenced that the emotions, values and interests support the cognitive and conative processes required to develop an entrepreneurial mind-set that contribute to create any value (Hunter and Lean, 2018). In a similar vein, it is believed that entrepreneurial proclivity (top managerial beliefs) have impact on entrepreneurial activities (Matsuno *et al*., 2002). Additionally, Castro-Solano *et al*. (2017) identified the entrepreneur's personality traits (alertness) as an antecedent of entrepreneurial discovery of business opportunities. Individual trait approaches and entrepreneurial orientation in enterprises may combine and explain the finding of opportunities. In turn, Ishak *et al*. (2015) found two antecedents of entrepreneurial orientation, namely locus of control and world view. They concluded that individual high locus of control and opened-world view determined the existence of entrepreneurial orientation in social entrepreneurial endeavour. With regards to the aforementioned findings we have formulated the following propositions:

Proposition 3: Individual-level entrepreneurial orientation is determined by individual-level entrepreneurial orientation antecedents such as, for instance, managerial cognitions. cognitive dynamic capabilities, emotions, particular values and interests, entrepreneurial proclivity, alertness, high locus of control and opened world view (the Coleman's relation no. 2).

Proposition 4: Individual-level entrepreneurial orientation determines organizational value creation (the Coleman's relation no. 3).

Conclusion

The systematic and critical literature review allowed us to organize the current knowledge and findings referring to the micro-foundational perspectives (on the basis of the Coleman's bathcub) of the entrepreneurial orientation-based value creation concept. Specifically, it has been stated that the value creation is determined by entrepreneurial orientation at both the organizational level (including higher and lower order dimensions) and the individual one. Moreover, we argue that organizational entrepreneurial orientation determines individual-level entrepreneurial orientation antecedents and, in turn, individual-level entrepreneurial orientation is determined by individual-level entrepreneurial orientation antecedents such as, for instance, managerial cognitions. cognitive dynamic capabilities, emotions, particular values and interests, entrepreneurial proclivity, alertness, high locus of control and opened world view. Finally, we believe that individual-level entrepreneurial orientation determines organizational value creation.

Our findings fill the research gap in the strategic management field concerning a micro-foundational perspective of examining entrepreneurial orientation-based value creation and have potential for the future development. The literature review results presented have some limitations. First, both the value creation concept discussed and stakeholders mentioned are very general (not specified). Second, individual level entrepreneurial antecedents are definitely not exhaustive. Third, the concept of value creation has been separated from the value capture and value appropriation realms. The research presented is in progress and it requires conducting empirical investigation (incorporating multi-level micro-foundational methodology) what constitutes our main research direction.

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Internal Control of Expenses for Sports and Physical Education Events Using Digital Technologies

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Abstract

The implementation of continuous internal control ensures the proper organization and conduct of sports and physical education events. Different in their orientation and sources of financing, the events have a unified algorithm for conducting internal control. To solve the problem of organizing internal control, a classification of sports was carried out, the tasks, types, methods of internal control, typical errors in accounting and planning costs for events were investigated, control procedures and technologies for their implementation were proposed. The cost estimate for the event is considered as an object of internal control of expenditure of funds for each source of financing. The digitalization of continuous internal control of the organization and conduct of sports and physical education events in the digital economy is aimed at promptly confirming the accuracy of accounting and reporting on the event, automatically ensuring transparency of calculations and the targeted nature of the use of funds received for events.

Keywords: Sports and Physical Education Events, Expenses, Internal Control, Estimates

Introduction

In matters of organizing sports and physical education events, it is important to ensure continuous internal control and create competitive advantages, including by extracting benefits from "belonging to a cluster" according to research Razminiene(2017). The ongoing transformations in sports management, the successful solution of economic, educational, recreational, and socio-cultural problems in organizing events make sport an, according to research Zuev et al (2018),"important tool for promoting the interests" of their organizers and participants. The totality and variety of costs for the organization of events require the provision of control procedures continuously and comprehensively, studies of the features of financing events taking into account their classification, the target nature of the funds used and the result. The conducted "cost-benefit analysis justifies, first of all, the social result obtained"mentioned Stratan et al (2018), which allows you to perform a socio-cultural task, ensuring the social effect of the event. In a research study by Katzer et al (2018), sport is "an effective tool for states to advertise themselves and a means of social mobilization", which "promotes public health" mentioned Ainsworth et al (2018), therefore it is important to monitor the completeness and timeliness of reflection of the received investments and their direction in accounting use. Sport as a "social phenomenon" mentioned Bykhovskaya et al (2017) makes it possible to attract various sources of financing, control over the use of which is the primary task of effectively organizing events.

Research Methodology

The primary logical determination of the purpose of the study made it possible to identify the economic content of the internal control of the organization and conduct of events. The approach adopted in the study has two aspects:

firstly, the designation of goals and objectives, the development of types and methods of internal control of the organization and conduct of sports and physical education events, taking into account the classification of sports and sports events; secondly, an analysis of the execution of control procedures in order to confirm the targeted use of funds for the event provided for in the estimate. It is necessary to carry out continuous methodological work to improve the technology of control measures, taking into account the competencies of employees exercising internal control in their area.

Research Results

The economic content of the internal control of the organization and conduct of sports and physical education events: the process carried out by the event organizers in order to obtain information on the significance and effectiveness of the event, the rational use of funds, and the reliability of reporting. The construction of an internal control system for the organization of sporting events should begin with the control of the justification of goals, objectives, methods, followed by building the technology of internal control for each type of sports and physical education events. Among the sports and physical education events include tournaments, competitions, training camps and other events held by federations, sports organizations at various levels. Participants in sporting events are athletes, referees, coaches, attendants and specialists in accordance with the rules of the competition. The variety of events requires their systematization, taking into account the classification of sports, which is presented in Table 1. In the register of sports, each sport is assigned a code number and the corresponding sports disciplines are identified. The history of sport is “a movement from local to regional, national and then global contexts” mentioned Nauright et al (2018).

Table 1: sports classification

Classification feature	Sports
Multisports	Olympic, non-Olympic, Paralympic, national
Level	interregional, all-Russian, international
Seasonality	summer, winter, off-season
nature of sports	game, non-game, the sport contains game and non-game disciplines, military-applied, service-applied
gender and age category	men, (boys, boys, juniors), women, (girls, girls, juniors), all categories
subject of development	the sport is being developed by the international sports federation; Federation recognized by the International Olympic Committee (IOC); included in the program of the Olympic Games.

With the participation of the state, exclusively official physical education and sports events are included in the Calendar Annual Plan. In it, sporting events by category of participants are combined in the corresponding age groups. When planning the costs of events, the type of sport and sports discipline are taken into account.

To implement internal control for each sporting and physical education event, we suggest using the following unified control actions algorithm:

1. preliminary and current control of estimated indicators, incomes, expenses and final results of the event;
2. preliminary risk assessment of the organization and conduct of the event, analysis of the risk matrix taking into account their significance and probability;

3. the formation of a list of control procedures for the control of individual sites and business operations, including the control of the construction of information accounting and analytical system, local acts, directories;
4. current internal control, including analysis and evaluation of the organization, support, conduct, training, sports, physical education events; control the rational use of labor, material, financial resources, assets; reflection in the contract of significant moments of interaction with counterparties; assessment of the qualitative and quantitative composition of athletes, coaches

Tasks of internal control of the organization and conduct of sports and physical education events:

– checking the stability of the composition of the participants in the events, the effectiveness of training, sports, physical education events;
– establishing compliance with the content of events to the stage, plan, program of preparation and conduct;
– prevention of risks of reducing the effectiveness of the event and adverse effects on participants;
– assessment of the level of preparedness and qualification of the coaching staff, physical development of athletes;
– generalization and dissemination of practices of internal control of sports and physical education events.

Types of internal control:

1. Preliminary control, which is leading in nature.
2. Current internal control at the stage of organization and holding of the event.
3. Thematic control in order to identify the implementation of activities for sports of the annual calendar plan.
4. Operational control in order to identify the actual state of the participants at a certain stage of the event.
5. Frontal control provides for the substantive activities of an individual trainer and the event as a whole.
6. Comparative control in order to compare the results of the event, the work of trainers, the quality of knowledge, skills of athletes.
7. Self-control, involving self-esteem, self-analysis of activity.

Methods of internal control of the organization and conduct of sports and physical education events: questioning, testing, interviewing, monitoring, observation, studying documentation, analysis of training and the results of sports training, combined testing, conversation, inspection.

The focus of internal control

Internal control is carried out in relation to:

– compliance with the standards of physical and sports training;
– the full involvement of persons who have undergone sports training in sports competitions;
– the effectiveness of sports and physical fitness;
– systematization of accounting features of training in sports disciplines of sports;
– fulfillment of the conditions for the organization and conduct of sports and physical education events in accordance with training programs for sports, in terms of personnel, logistical, infrastructural equipment in accordance with the standards of sports training.

Internal control is aimed at:

– assessment of the level and quality of professional training of trainers and sports training of event participants, collaboration of efforts to achieve the best results;
– assessment of the condition and safe use of material and technical assets for the intended purpose;

– analysis of the effectiveness and efficiency of the actions taken to organize and conduct sports and physical education events;
– adoption of decisions based on analysis of information and practices aimed at ensuring favorable conditions for the implementation of high-quality training and sports and physical education events;
– ensuring information transparency, accounting credibility and transparency for organizers and participants of events.

It is important to establish the conformity of the information contained in the estimate to the accounting data and reporting forms. A forecast analysis of the income of a sporting event should be based solely on objective information about possible sources of funding. It is important to verify the reality of assessing gratuitously received objects of fixed assets and inventory at the stage of organizing competitions, to take into account "the unrealized potential for increasing revenues from the sale of tickets to competitions, and the realization of broadcast rights" mentioned Lokhman et al (2018).

Typical errors identified during the internal control of sports events:

– lack of approved rules for document circulation and technology for processing accounting information; internal control rules;
– the reasons for writing off assets during the organization of sporting events are not justified, among which may be:

1. Physical wear, improper operation, damage as a result of emergency, other situations during sporting events.
2. The obsolescence of facilities, their subsequent modernization and reconstruction is not possible or inefficient.
3. Re-equipment and updating the material and technical base of the event organizer.
4. The decision of the property owner to write off the asset, the conclusion of the commission on the disposal of the asset based on the results of a survey of an unusable object.

– non-observance of the established limit for settlements in cash;
– low effectiveness of sports training;
– the use of financial and material resources not in accordance with the standards and for other purposes;
– carrying out events in violation of the terms and plan of events.

The verification technology in the context of the control procedures of sporting events is presented in Table 2.

Table 2: control procedures and technology

Control procedures	Technology of their implementation
Monitoring the accuracy of indicating the start and end dates of sports events in the estimates, their compliance with the period of organization, holding of events and planned sources of funding	Correlation of start and end dates with the period of planned activities in the amount of approved funding sources
Monitoring compliance of actual cash payments with approved expenses on estimates and reporting documents to them	Comparison of cash payments to approved estimated and reporting documents, excluding unreasonable payments
Identification of possible doubles of legal entities and individuals in the directories “Contractors”, “Employees”	Exclusion of duplicate entries and non-existent employees, counterparties
Identification of accounts payable and taking measures to repay them	Monitoring accounts payable for sports events
Monitoring the proper preparation of documents justifying direct and indirect costs of organizing and	Identification of compliance of these primary documents with estimated

conducting sporting events (rent, accommodation, meals, payment for trainers, communications, transportation, medical services and other expenses)	indicators, reflected facts in accounting and reporting on a sporting event

The main element of cost accounting is the estimate of a sports event, which includes:

– number of people involved in sporting events (participants, coaches, medical staff, accompanying persons), date, place of its holding, sources of financing;
– remuneration and insurance premiums;
– rental price of sports facilities and sports equipment;
– the cost of souvenirs, gifts, food;
– transportation, escort and overhead costs.

Justification of the estimate avoids inefficient costs. Analysis of the results of the event makes it possible to find discrepancies in the planned and incurred expenses and identify the causes of deviations.

Estimates can be made in different ways:

1. Index, which allows the calculation of regulatory indicators, adjusted for the current price index.

2. The analog method in which costs are calculated from the prices of similar events.

3. The resource method is based on the actual cost of the planned types of costs (labor, material, financial) and their summation. Since the estimate is preliminary, it is possible that the planned prices may change during the actual execution period, therefore it is necessary to include expenses in the estimate taking into account the inflation index and unforeseen expenses.
Estimated costs of events are compiled on the basis of the calendar plan of events, taking into account a certain number of participants, serving staff, the size of wages. This allows us to consider the estimate as an object of internal control, since it is the estimate that provides for the types of expenditure of funds, taking into account the source of funding for events. In case of joint financing of events by several organizers, the estimate reflects the amount of those expenses that each organizer agrees to pay.

Sports and athletic organizations are entitled, at their own expense and attracted funds, to change the norms of material support for events. Living expenses are based on the reimbursement of travel expenses. For traveling while traveling to and from events, participants are paid a daily allowance set for business trips. The rental costs of sports facilities and equipment, transportation and other expenses are incurred at contractual prices in the rational use of funds. Events can be carried out using the funds of participants in the competition, through application and entry fees. The implementation of "control procedures provides some practical importance for management" mentioned Mullakhmetov (2016) of the effective organization of sporting events, specially when "developing the concept of effective management in sports" mentioned Gardiner et al (2017).

The Discussion of The Results

Organizational and financial documents for a sporting event include: a provision on an event; cost estimate for the event; cost of food for secretaries and judges; list of prizes; report of the chief judge on the event and others. The purpose of budgeting is to know before the start of the event the aggregate amount of money requirement and to assess the possibility of covering it at the expense of own and attracted sources of financing. For competitions and fees of national or international scale, the estimate is presented with a detailed list of the main items of income and expenses. The target nature of the use of the amount of financing of sporting events is an object of continuous internal control aimed at identifying the accuracy of accounting, transparency of calculations and confirming the targeted nature of the use of funds received for the event for each sport event.

Conclusion

The reliability of the internal control system is rated as high with the complete exclusion of risks. The digitalization of the control procedures and methods described in the article is a priority when conducting internal control of the organization and conduct of sports and physical education events of various sports, in order to quickly reduce risks, ensure the implementation of estimates, confirm the validity and effectiveness of spending in the digital economy.

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Economic Efficiency of Employee Suggestion Systems in Manufacturing Enterprises

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Abstract

Full involvement of employees in improving enterprises and their processes is one of the flagship assumptions in modern management methods. Widely used solution supporting this approach are the employee suggestion systems (ESS), allowing the use of the intellectual potential and creativity of own staff. It is generally assumed that the main purpose of such systems is to increase employee involvement in enterprises improvement and to increase their sense of engagement and process ownership. Additionally, ESS generates savings and new revenues as a result of implemented suggestions. However, in many cases despite seemingly large number of improvement ideas submitted and implemented, they do not bring the assumed level of savings or do not generate financial benefits expected by the company. In this paper, authors present selected results of the research conducted on a group of 23 manufacturing companies from Poland, discuss resulting conclusions and research gaps and propose the direction for further work. The aim of the research was to find the answer on the following research questions: do and how applied ESS solutions allow to achieve expected results (the level of savings); are there any key factors that influence economic efficiency of ESS and if these effects are missing or if there is an insufficient level of return on investment, which problems cause it.

Keywords: Employee Suggestion Systems, Continuous Improvement, Lean Management, Economic Efficiency

Introduction

Present-day enterprises naturally operate in conditions of a high business competitiveness. The emphasis on a high quality of products or services, short delivery times and low prices, combined with the requirement to keep the costs of own activities at a sufficiently low level entails the requirement for the most effective use of the company's own resources. It is assumed that a qualified and committed crew is one of such key resources, alongside of being an element of strategy to build a company's long-term competitive advantage, which was pointed by both Womack (2011) and Balle (2019). Thus, the requirements for employees of such organizations are also growing, as they are not only expected to work effectively and efficiently, but also to be fully involved in the processes and individually propose ideas for process improvement, like Zupancic (2018) mentioned.

In this context, many authors e.g. Womack and Jones (1996), Womack (2011), or Jakubik and Kagan (2018) confirmed that it is recommended to notice the concept of Lean Management (LM), which from late 90s appears to be the critical way to achieve a competitive advantage of the enterprise. In the works of Womack and Jones (1996) and Harada (2015), the basis of LM is the elimination of all the possible waste, supported by internal processes improvement and employee involvement. The similar concept is repeated in the works of Imai (1986) and Balle (2017), where the success of LM implementation is defined as based on strongly motivated and efficient workers on each organizational level of a company.

In a widespread approach, potential inefficiencies in business management are manifested by the presence of 7 main waste types supplemented by an additional, eighth waste type, i.e. unutilized employees' skills (Figure 1).

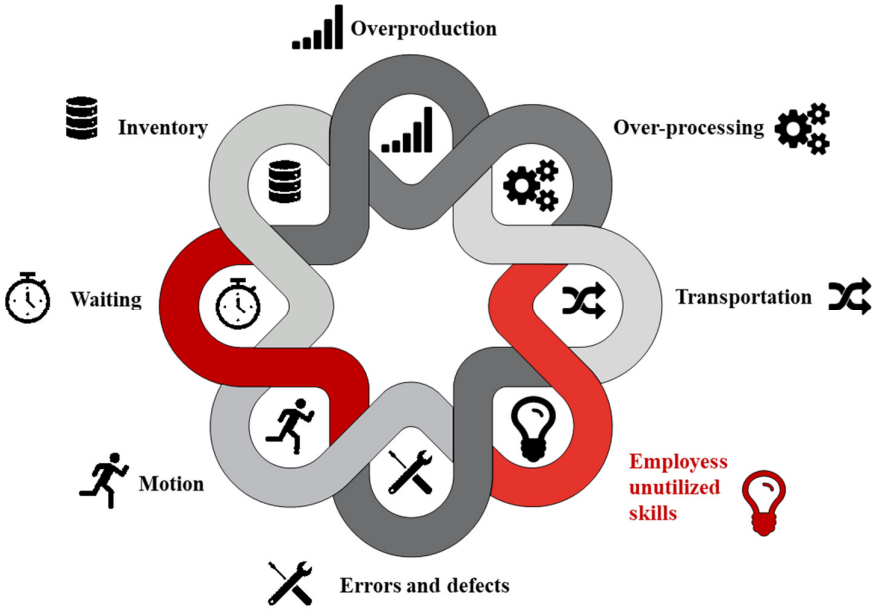

Fig. 1: 8 types of waste (sketch based on Womack and Jones (1996), graphics by PresentationGo.com)

In the vast majority of cases the occurrence of these factors results in companies achieving lower-than-expected profits and observing reduced reliability and efficiency of the main and supporting processes, thus lowering their market competitiveness. This kind of conclusions can be found in many papers and case studies e.g. Womack (2011), Koch et al. (2012), Harada (2015) or Kagan and Jakubik (2019).

The waste of an employee's unutilized potential is a crucial issue here, because it may result in the decrease of an enterprise efficiency. It may lead to an underestimation of people's potential and therefore loss of many possible ideas and concepts that could otherwise be implemented and improved. It minimizes the possible ownership of areas and processes, self-engagement and subjectivity. For that reason, Balle et al. (2018) as well as Kagan and Jakubik (2019) mentioned that emphasis should be put on the enterprise relying on development coming from workers' qualifications and their creative improvement ideas.

One of the forms of abovementioned approach is well known concept of Kaizen Teian, originating from the Japanese management school and mentioned in the works of Japan Human Relations Association (1997), Lasrado (2013, 2015) and Krasiński (2017). The idea of Kaizen Teian is based on an employee suggestion system (ESS), relying on small and medium improvements suggested and implemented directly by the employees at their workplaces, processes and working areas. Most often ESS exist in a form of formalized systems allowing employees to submit their process or product improvements suggestions, which after supervisor's assessment can be relatively quickly implemented or rejected as either not fulfilling the planned criteria or inappropriate (Figure 2). Such systems are sometimes defined, for example by Japan Human Relations Association (1996) or Lasrado (2013), as systems of *kaizen* ideas or improving suggestions. As a rule it is assumed that the company's employees have the greatest knowledge of the processes or machines or workstations they operate, thus gain wider opportunities to exert influence on their workplace, while employers receive an excellent source of benefits from reducing company's operating costs or creating additional business potential.

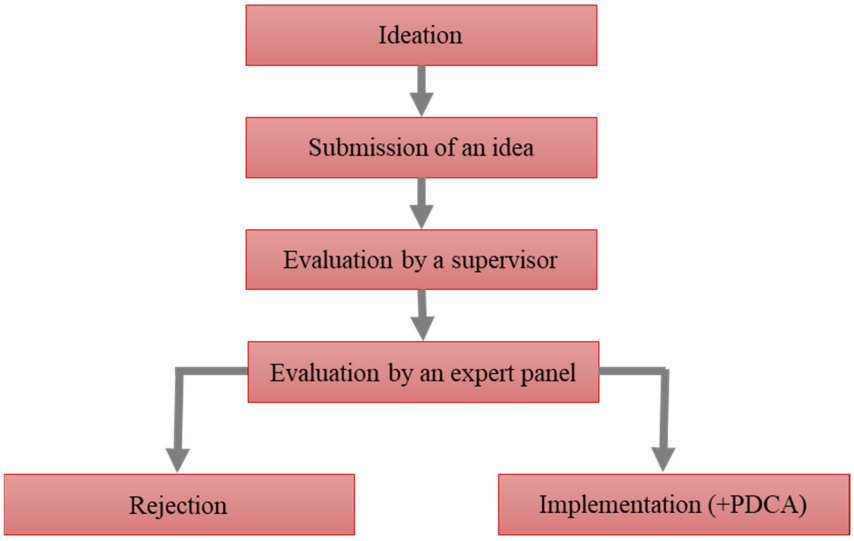

Fig. 2: Basic scheme of ESS and a flow of the submitted idea (based on Japan Human Relations Association (1997) and Gibs (2017))

ESS - Two Approaches

Practical implementation of ESS in the business environment allows to notice two main concepts of their operation. Imai (1986), Kejna (2014) and Dekier (2017) called it *Japanese* and *American* approaches. The Japanese approach is the dominant one and specific for the Japanese way of managing, it can be characterized by a high sense of teamwork and a well-established need to strive for excellence in action. It is based on the assumption, that it is worth to submit and implement every single process or product improvement, even the smallest one having an inconsiderable influence on processes. The declared aim of ESS pointed by Imai (1986), Fairbank (2001) and Tucker (2012) is to enhance the operators' morale as well as their influence on management decisions, increasing the responsibility for their own workplace and processes. In itself, this approach assumes no primary emphasis on the on the economic effects of the system implementation or individual improvement ideas, any resulting benefits and added value are treated as secondary.

What is also of high significance is the notion that the literature of the subject from Al-Noorachi (2016) and Vanharnata (2018) specifies the differences between kaizen and innovation and their implementation. The concepts assume that the true savings come from innovations, while kaizen ideas used in ESS are rather dedicated for daily and small process improvements (Table 1). The consequence of abovementioned assumptions is the fact that ESS is considered a success only when certain number of ideas are implemented in relation to the number of the company's employees, which is to be an emanation of their involvement in the company's development – Robinson (214), Witt (2015) or Dekier (2017). At the same time, ESS effectiveness is often measured by e.g. number of days from submitting to idea implementation or percentage of employees contributing to the system, unfortunately overlooking the quality of ideas.

Table 1: Comparison of kaizen and innovation concepts (based on Al-Noorachi (2016))

Kaizen	Innovations
Adaptability	Creativity
Small steps	Large steps
Every employee participates, general preparation	Only chosen specialists participate
Collective work	Individual work
Small investments	Large investments
Focus on details	Focus on the main issues
People-oriented	Technology-oriented
Relying on existing technology	Searching for new technologies
Interdisciplinary groups	Employees + top management
Strong feedback loop	Limited feedback loop

From this perspective, most of the scientific studies focus largely on the technical aspects of the ESS, aimed at the different phases of their implementation and capability: from the development and study of the effectiveness of various ways of encouraging employees to submit ideas, through methods of material and non-material motivation, to the specifics of the sheets for submitting such ideas and their translation into the number of improvement proposals, methods of supporting the implementation of ideas, the way of evaluating proposals, to methods of obtaining as many ideas as possible per one company employee.

The most often used efficiency indicators of such ESS according to Kagan and Jakubik (2019) are:

- The total number of ideas submitted by employees within a year (number of ideas/employee)
- The percentage of implemented ideas amongst all submitted ones (the higher, the better)
- The average time from submitting the idea to its implementation (working or calendar days)
- The percentage of employees submitting the ideas [%]

The second trend in the design and operation of ESS, described in the book by Imai (1986) is the so-called *American* approach which emphasizes enterprise's economic benefits resulting from the implementation of improvement ideas, thus strongly changing the function of the goal at the foundations of such a system. This is because the measurable effects of the ESS, which is supposed to provide the company with certain savings or increase other economic benefits resulting from the implementation of number of improvements, come to the fore. Often emphasized, one of the features of this approach is a common use of financial motivators which are supposed to encourage employees to be more and more active and therefore by default associate idea with money. A lot of research has been done on an *American* approach e.g. Leach (2006) or Lasrado (2015), but these methods are often boiled down to the control of the ways of financial motivation or examination of the relations between inducing and generating of ideas. For example, Lasrado (2016) and Gibbs (2017) mention the obligation of submission of minimum two ideas quarterly per employee results in enhancing the level of savings. The impressive case studies of Townsend (2009) and Lasrado (2013) showed a significant relation between the level of savings coming from ESS and the levels of return on investments (even more than billion dollars in 5:1 ratio).

The superiority of one of the above concepts is questionable. According to Dekier (2017), the *Japanese* approach is chosen by many Western companies, assuming that the system itself is a strategic tool for employees' engagement in the company's operations and that improvement of processes is in both employees' interest as well as their responsibility. Other companies, in turn, focus on the measurable effects of using suggestion systems, sometimes even going as far as sharing a large extent of the improvement-induced financial benefits with employees.

Definition of Research Problem

Although the ESS systems are not a new solution, their implementation and operation processes have not been yet examined deeply in Poland. Research study on 201 manufacturing and service enterprises in Poland made by Grycuk and Dekier (2014) shows that the dominant motive for the ESS implementation is the desire to improve the company (56%), which is to manifest itself in the improvement of processes, improvement of work organization by reducing waste, shortening the time of realization of customers' orders and reducing the emerging technical problems (Fig. 3).

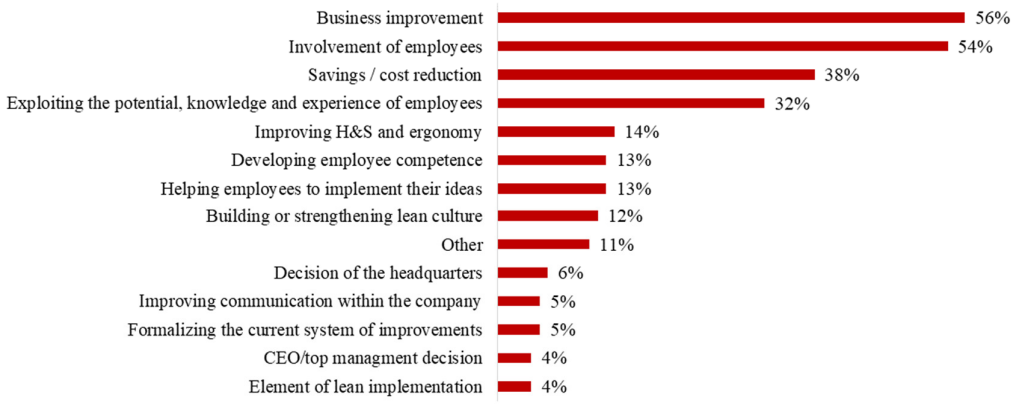

Fig. 3: Reasons for implementing ESS in Polish enterprises (based on Grycuk and Deikier 2014)

On the second place, respondents mentioned the desire for a broader and stronger involvement of their employees (54%). The third place went directly to the intention to achieve measurable savings, reduce costs and avoid excessive expenses (38%).

This way it seems that ESS implemented in Poland could be considered as a hybrid model of *Japanese* and *American* approaches, emphasizing the need for employees' involvement and anticipation of measurable effects. What is surprising over 85% of responded companies apply additional reward systems for employees submitting improvement ideas. On the other hand, only 21% of respondents measure the results of taken advantages coming from the improvements. What is more – the various methods of measurement are applied (i.e. by the amount – after 12 months period following the implementation of the idea – by the equivalent of full-time savings etc.). It is difficult to compare results from different companies and to draw conclusions.

Based on these research gaps, in 2015-2019 in-depth ESS case study examination was carried out at 23 manufacturing companies in Poland. The main goal was to check the implemented ESS solutions, especially their measurable gains and ESS economic efficiency. The research questions were also sought to determine whether and how the ESS solutions achieve the expected results (savings or additional revenues), whether are there any key factors influencing the economic efficiency of such ESSs and, in the absence of such effects or effects below the assumed level of return on investment, which problems stand most often in the way of the expected ESS efficiency.

Research Work and Selected Results

The first stage of the research was done on selected 23 manufacturing enterprises from Poland, which implemented the structured ESS. The companies represented 6 main types of manufacturing industry: automotive, home appliances, machinery, electronics, food and metal industries.

The exploration research work had been done by a direct interview method and the respondents were individuals directly responsible for the ESS implementation and maintenance in their companies (positions like Lean Manager, Lean Leader, Lean Coordinator, Continuous Improvement Specialist, Lean Management Specialist).

The questionnaire consisted of 31 questions (22 closed and 9 open questions) and was structured around three main areas:

- ESS effectiveness: what are outcomes of ESS, how these outcomes are measured, evidenced and controlled in the organization, what is the level of savings or new revenues generated as a result of implemented suggestions, what indictors are in use, where are the dominant benefit areas coming from employee suggestions, etc.
- ESS capability: how is the system organized, how is the idea submitted, how are evaluation and feedback processes structured and maintained, what kind of rewards are used for the submitted and implemented suggestions, how the management supports and motivates all employees to participate in the continuous improvement processes,
- ESS barriers: what are the main problems and largest difficulties in implementing ESS, how companies managed and addressed the organizational impediments.

Obtained information were both qualitative and quantitative. Chosen answers reflected respondents' experiences and knowledge about Lean Management and ESS. In 7 from 23 enterprises the respondents did not take a part in ESS implementation from the very beginning, but they followed the system maintenance on a daily basis.

74% of examined enterprises were considered large companies, the remaining 6 enterprises belonged to SMEs. A distribution of the surveyed companies by employment level is shown in Figure 4.

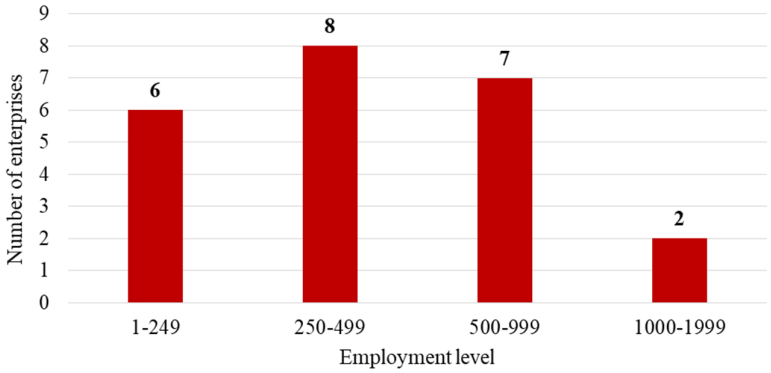

Fig. 4: Number of surveyed enterprises by number of employees

In every single case, the ESS has been performing in formalized and structured way for at least 1,5 year. The initial phase was devoted for a research on the field of a maturity level according to Lasardo-Gomiscek method described by Lasardo (2015). It allows 5 areas of operation of the ESS to be examined and each of them to be evaluated according to an appropriate scoring scale. The areas are as following: leadership and management support, system properties, system efficiency, organizational support, system limitations. Out of the surveyed companies, nearly 74% received the "Development phase" rating (average level). The phase of advanced development was achieved by only one of the examined systems (Fig 5).

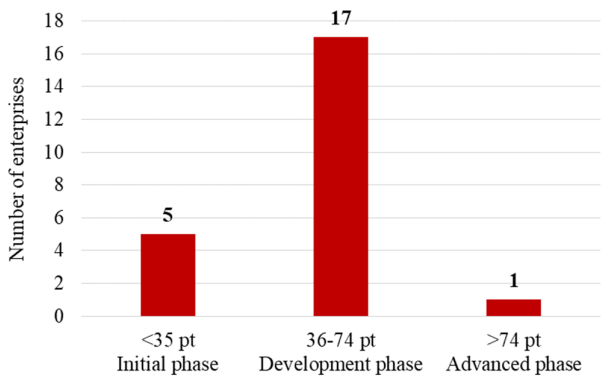

Fig. 5: Number of surveyed enterprises in the terms of the degree of maturity of the system

Respondents were asked to determine three dominant benefits that motivate the enterprise to implement and maintain ESS. The detailed results are presented in the Figure 6. Sixty-nine answers were obtained. Respondents declared: willingness to improve the processes and products (74% of all answers), direct achievement of measurable and quantifiable financial benefits thanks to the ideas submitted as part of the ESS (70%) and strengthening the employee involvement (48%).

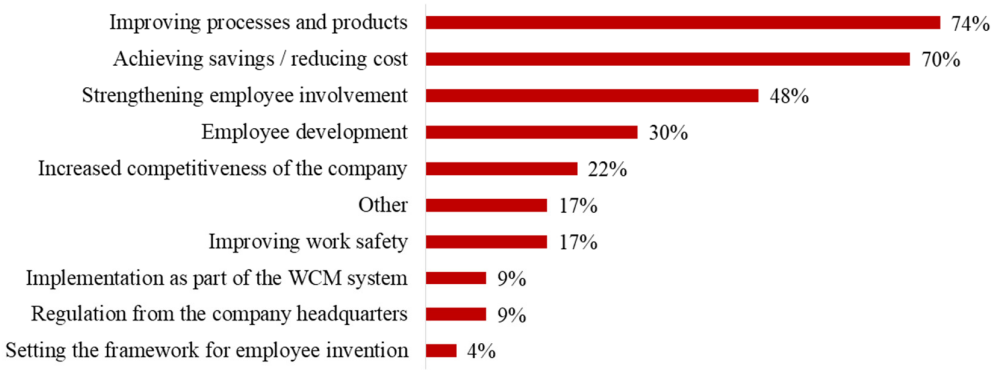

Fig. 6: Declared reasons for implementation of ESS in the surveyed enterprises

The question: *Measuring the economic efficiency of ESS has a key role for my company* turned out to be very important (Fig 7).

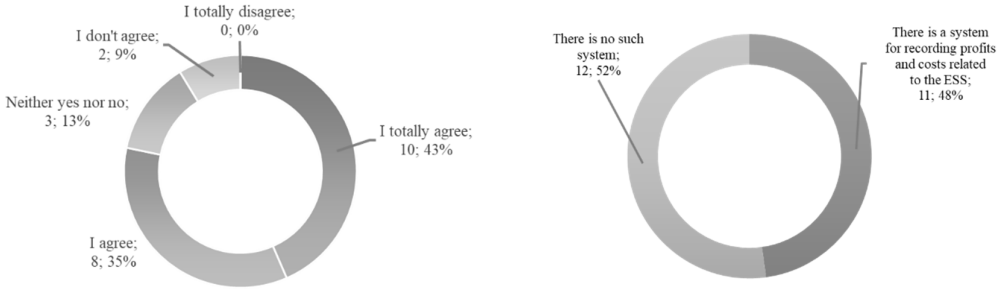

Fig. 7: Effectiveness of ESS in the surveyed enterprises - expectations versus reality

In Likert scale 78% of the questioned chose the option: *I strongly agree,* or *I agree.* It points to the high significance level of ESS operation. On the other hand, only the 43% of the enterprises turns out to possess the measurement tools. It shows the broad gap between the declarations and practical system maintenance (Fig 7).

Examined enterprises use various scales and ways to calculate the benefits coming from the implemented systems during the measurement of the financial results of ESS operation. A few main ways are listed below:

- the entire growth of company's revenues or savings, achieved thanks to submitted ideas, without considering the costs of their implementation and ESS maintenance as a whole, which are considered only in the general company's costs,
- the level of measurable company-wide savings made thanks to the ideas, taking into account direct costs, but not taking into account the translation of a given idea into areas which were not directly related to the impact of a given solution (i.e. a small structural change in the assembled product results in material savings and increases the efficiency of the process by 1.5%, and these benefits are properly recalculated, however, the same idea also eliminates the need for servicing and calibration of pneumatic wrenches from the assembly stations, which is no longer taken into account for the calculations),
- the level of financial benefits from improvement ideas according to the departments where the idea was first implemented, however with such cost allocation, where the costs of ESS operation are included partly in the overall enterprise costs and partly in the costs of operation of the departments involved,
- the level of net return on reported and implemented ideas considering the 12 months period from the time of full idea implementation,
- the level of net benefits obtained from the implemented idea within 24 or 36 months depending on the scale of proposed solution and the impact of the change on the process or product,
- the level of measurable savings calculated as the sum of benefits coming from implementation in the scale of the whole enterprise, but only considering the ideas giving more than 500 PLN (about 125 USD) net for one idea (this means the elimination of minor ideas from the list, the sum of which, however, may give a significant value, currently overlooked in the system),
- the equivalent of the full-time posts eliminated thanks to performed actions,
- additionally applied company's financial benefit indicator per one implemented idea.

Abovementioned examples make the situation even more complicated, because companies consider their general costs, or they additionally consider the cost of idea improvement. Consequently, the lack of a common ground prevents finding the correlation between solutions of ESS and the scale of obtained measurable benefits.

It should be emphasized that 6 from 23 examined companies (23%) declare caution in calculating the direct benefits of implementing employees improvement ideas. They motivate it by the fear of the entire systems' stigmatization where only financially beneficial ideas are demanded. It suggests that the ideas that do not bring benefits, are underestimated. Nevertheless, those ideas are very valuable as well (i.e. in the area of work safety, ergonomics).

Next issue concerns three areas, where the financial benefits are particularly significant. The question was addressed to 11 companies declaring application of such indicators. The results are shown in Table 2.

Table 2: Areas of highest economic impact of improvement ideas in the surveyed companies

Area of financial impact of ESS	Percentage of companies indicating the area of influence [in %]
Efficiency of production processes	91
Product quality	55
On-time delivery	45
Level of stocks of semi-finished products and materials	27
Lead time	27
Other	27
Efficiency of supporting processes	18
Consumption of materials	9

There is a clear indication of three main areas, which are production process efficiency (indicated by 91% of the surveyed companies), product and service quality and on-time delivery of products and services to customers. This is directly related to the thematic scope of submitted employee ideas. However, the areas of "safety at work" and "ergonomics of the workplace" are on default not included in the list, which, although indicated as frequent subjects of submitted improvement ideas, their translation into financial results is not counted by companies. Table 3 shows the other indicators, which refer to ESS in enterprises.

Table 3: ESS indicators used in the surveyed companies

ESS indicators	Percentage of companies using the indicator [%]
Number of ideas submitted by employees (total per company)	100
Number of implemented ideas (total per company)	100
Percentage ratio of ideas submitted to implemented	100
Number of ideas submitted and implemented by the company's organisational departments	78
Average number of ideas per employee	78
Number of ideas waiting in line for implementation (delay scale)	48
The level of savings from ideas per company and per areas	48
Number of ideas in priority areas (e.g. safety or quality)	39
Level of financial (or point) rewards for employees for implemented ideas	39
Time from notification to idea evaluation and feedback	35
Time from submission to implementation of the idea	35
Percentage of employees involved in the ESS	22
Level of financial benefit per improvement idea	17

A certain group of indicators commonly used in all companies can be observed. They concern the number of submitted ideas. The indicators showing the financial influence of improving ideas are mentioned rarely (22% and 17%).

The respondents were also asked to list the four most important problems and limitations of a proper operations of ESS in their company. Overall, 92 answers were obtained, where the percentage of the answers is showed in the Figure 8. The quality of ideas and processes show the anticipated problems in achieving measurable benefits (70%), or make it difficult or impossible for supervisors to make an accurate decision to reject the application or accept it for implementation (61%) or cause a large number of ideas to be put forward by employees, but they are insufficient in quality (52%).

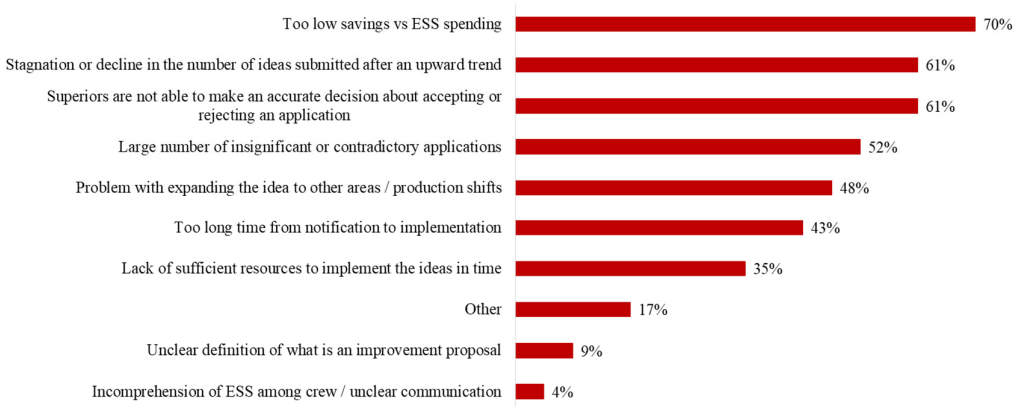

Fig. 8: Problems of companies in the operation of ESS declared in the survey

Even though all companies reported various problems in everyday operations and maintenance of ESS, only 3 from 23 enterprises analyzed the situation to investigate the source of the problem. 20 from 23 companies performed only interim corrective actions. This way of action gives little chance to draw conclusions for structural improvement of ESS and to generalize recommendations.

Discussion and Conclusions

The research was done on the group of 23 manufacturing enterprises in Poland. Even though manufacturing companies differ from service companies, the results may be generalized to formulate some common conclusions and to ask even more research questions.

1. Based on the described research probe and previous research work from Grycuk (2014) it may be assumed that the dominant reasons to implement and maintain ESS in Polish companies are both the willingness to encourage the employees in constant improvement and maximizing their sense of identification with the company (*Japanese* approach) as well as the expectation of achieving measurable effects from such a system and translating it into business results of the company (*American* approach).

2. The ESS solutions commonly used in the surveyed companies put the emphasis on the number of submitted ideas, the greatest increase in the percentage share of ideas implemented to the submitted, broad involvement of the company's employees in the system and shortening the time from idea submission to its implementation. The indicators used in these companies also focus on these aspects. Only a few of the companies have metrics allowing to measure the financial translation of the implemented ideas within the ESS into the economic effectiveness of the system itself or the whole enterprise in general. This makes it difficult or impossible to take appropriate corrective actions to increase such effectiveness. Further research in the area should be designed and conducted.

3. The measures of the economic efficiency of ESS do not share the common ground, what hinders creating the cause and effect relationship and discovering the correlation between the parts of ESS and economic results of ESS in a research probe. Largely, the way of calculating the measurable economic benefits do not consider the obtained additional indirect benefits

coming from the implementation of employee ideas in the remaining company's areas, limiting calculations to financial savings only.
The literature research like Leach (2006), Arthur (2017) or Dekier (2017) does not suggest clearly how to measure the efficiency of ESS. Many indicators are mentioned in the literature:

- The increase of the final customer satisfaction and the increase in the quality and efficiency of the processes,
- The increase in safety level of employment and trust towards an employer,
- The increase in employee engagement,
- The increase in revenue and savings level.

4. Currently used models of calculating the economic efficiency of ESS do not solve the problem of the proper quantifying the scope of the benefits, which are related to process influence, i.e. in the form of the quality-focused preventions enabling faster problem-solving process. The mentioned aspect has been already discussed by Trenkner (2015), but the subject has not been fully exhausted.

5. Characteristic of the survey is that among the problems with the operation of the ESS in their enterprises mentioned by the respondents, the first place (70% of the indications) was given to under-reported savings in terms of investment in the entire ESS. The dissatisfaction was most often related to the costs incurred for the implementation and maintenance of the system, implementation of the improvement ideas themselves and the analysis and corrective actions of the already implemented solutions (without taking into account the ideas aimed at the improvement of work safety, which were not evaluated).
At the same time, 52% of the respondents indicated problems with applications that propose mutually exclusive solutions or too trivial from the perspective of improving the process correctness. Potential causes were seen in poor communication of objectives to employees or irregularities in the way of implementing motivational solutions to submit ideas, as well as low level of employees' knowledge of continuous improvement.
By combining these two indications, it can be concluded that the problem in accomplishing a certain economic efficiency of the ESS is not a small number of submitted ideas, but their quality, which does not allow achieving an adequate rate of return on a running ESS.

6. The interesting phenomena is the stagnation effect (or even its decrease) in the number of submitted ideas at a particular time of ESS development (it occurs in 61% of the companies). This issue is relatively poorly examined and described in the subject literature. The sources of those events are supposed to come from the slowly developed competence level of the employees in the scope of the constant improvement and its methods and solutions of Lean Management, which causes persistent "exhaustion of ideas" among company's crew. The other causes may be also: the indirect negative correlation of idea number decrease and longer time from idea reporting to its realization and insufficient resources to accomplish all of the ideas, what was pointed by Jakubik and Kagan (2015) and Kagan and Jakubik (2019).

7. The additional aspect of ESS operations in the context of anticipated economic efficiency of the system is assigning the goals, creating the adequate area and the atmosphere in the company to operate effectively and to communicate these goals to the employees. In the context of the survey results, which indicate that 26% of the surveyed companies refrain from directly declaring their expected financial benefits, reasoning it by their concerns regarding the lack of submission of valuable improvement ideas from areas that are difficult or impossible to accurately quantify. It seems important to configure the ESS in such a way as to give equal priority to ideas with financial translation also to ideas outside such an impact pool.

The results collected in the research mentioned above and a review of the literature on the subject indicate clear gaps in the field of knowledge about ESS, especially in the terms of the impact of various factors on the economic efficiency of such systems. It is assumed that there is such ESS model that

will not only allow to achieve a large number of ideas submitted by employees, but also a large translation of these ideas into measurable economic results for the system itself and, therefore also for the entire enterprise.

Such studies will require the determination of an algorithm for measuring the economic efficiency of the ESS, which can be universally applied under given boundary conditions to various types of enterprises and thus enable finding a correlation between such economic efficiency and factors affecting them.

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Role of Reserves in Ensuring the Continuity of Public Catering Enterprises

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Abstract

Assessing modern approaches to manage the policy of ensuring the continuity of public catering enterprises we need to take into account multifactorial external and internal environments of their activities. A great number of elements of external and internal environments, many of which can vary widely, create a problem of choosing the accounting tool that will help these enterprises to carry out ordinary course of business in terms of the specific character of their development. The developments of a group of special reserves taking into account peculiar features of performance of public catering enterprises, and the improvement of their accounting and internal control both in theoretical and practical plans are of a great interest within the ensuring of continuity process of these business entities. In the process of solving the tasks set to achieve the research objectives scientific provisions have been formulated that are the basis for the improvement of business accounting and internal control of the reserves at public catering facilities aimed at ensuring the continuity of public catering enterprises. The scientific novelty consists of the updated set of the concepts "the continuity of public catering enterprises", "reserve complex", "special reserves" proposed by the authors, as well as the procedure for processing accounting information of public catering facilities based on the formation of a reserve complex, which is required to ensure the continuity of public catering enterprises.

The developed procedure for the formation of a group of special reserves is based on the risk-oriented approach and depends on compliance with the rules to the service provision in the field of public catering, sanitary and hygienic rules for enterprises, products, transportation and storage. The proposed methodological approach to the assessing, business accounting and identification of a group of special reserves in financial statements includes the calculation of interest and value indicators taking into account the amount of the estimates, the percentage of natural losses and product damage.

Keywords: Risk, Continuity, Reserve, Reserve Complex.

Introduction

At present, catering industry in Russia is one of the attracting scopes of activities, which is profitable from the viewpoint of investments. Large restaurant networks around the country and small cafes and canteens performing many functions represent this industry, which determines their importance for ensuring modern life. Due to the increasing competitiveness and a large selection of specific character of catering enterprises, the issue on ensuring the continuity of their activities is very topical.

To implement the principle of continuity of public catering enterprises such accounting tool as the formation of reserves aimed to support an ordinary course of business is used to a limited extent, the specific character of activities is not taken into account when they are formed. Thus, for example, the reserves related to the investing and financial activities are widely introduced in scientific research; however, they are not relevant for public catering facilities due to the lack of these types in the small business sector.

The reserves for current activities are the special category of reserves. Since the catering industry involves a special technological process, for example, a culinary processing of food products, enterprises of this area are subject to the specific types of risk. This factor significantly affects the continuity of their activities, and as a result, reserves applied to these peculiarities of enterprises are required.

In well-known economic studies there is no single conceptual approach to the formation of a reserve complex taking into account the specific character of public catering industry and helping to respond to the risks of this sector in a rational way. The reason is the lack of understanding by the administration of catering facilities of the necessity to create the reserves to ensure the continuity of their activities. The lack of research on the formation of accounting reserves at public catering facilities, and the lack of a single point to the structure of a group of risks at catering enterprises, the lack of a methodology for reserve assessing and accounting as well as the lack of internal control of reserves require a scientific study of these issues.

Thus, at present, the problems of the formation and application of reserves at public catering enterprises in Russia have not been studied enough and need further analysis, which determines the relevance, goal and objectives of the dissertation thesis.

Main Problem

The problems of functioning of accounting systems of different types of activities have been considered in the works of the Russian scientists: P.S. Bezrukikh, N.A. Breslavtseva, V.G. Getman, N.P.Kondrakov, V.F. Paliy, Y.V. Sokolov, V.I. Tkach, A.D. Sheremet, V.B. Ivashkevich, E.A. Mizikovskiy, A.M. Ilyshev, N.N. Ilysheva, T.V. Zyrianova and others. Among foreign scientists involved in business accounting, recording and analysis one should mention D. Middleton, B. Needles, J. Richard, P. Samuelson, E.S. Hendriksen, R. Anthony and others. The studies of these scientists are of great importance for the development of business accounting. However, they considered the concepts of reserves, its content and accounting in general without sector characteristics of enterprises.

The problems of ensuring business continuity are described in the works of such scientists as I.T.Balabanov, P.G. Graboviy, M.G. Lapusta, E.A. Utkin, A.S. Shapkin, A.E. Shevelev, E.V. Sheveleva and others. This category of scientists considered such concepts as “business continuity”, “uncertainty”, “risk”, and proposed methods to ensure business continuity. However, the considered types of risks and their classification are generally not applicable to public catering enterprises; therefore, further scientific research is required.

The study of business accounting of financial reserves was conducted by a number of foreign and domestic authors such as R. Adams, J. Betge, D. Middleton, R. Anthony, S.V. Romanova, L.T. Giliarovskaia, Y.V.Sokolov, A.D. Sheremet, L.R. Robinson, A.P. Rudanovskiy, I.M. Ageev, L.A. Melnikova, E.V. Riabova, E.A. Popova and others. The scientists considered the concept “reserves” and gave their assessing and accounting for different types of business activities, however, those specialists considered reserves for enterprises in general or in relation to individual industries. In this connection different approaches have been formed, which are practically inapplicable to public catering industry.

Despite the large number of articles on business accounting for reserves we may speak about the lack of a single approach to the formation, accounting and control of a complex of reserves to determine the goal of further research.

Methods

The research to improve business accounting and internal control of reserves at public catering enterprises to ensure business continuity has been conducted on the principles of an integrated and systematic approach using logical and economic analysis, monitoring, comparison and grouping.

To ensure the continuity of public catering enterprises we have proposed the procedure for accounting data processing based on the creation of a reserve complex, which helps to identify and assess risks, and create reserves based on them.

Within the public catering enterprise activities, information is obtained both from external and internal sources. Information obtained from external sources means documents from buyers, suppliers, tax services, etc., information from internal sources refers to documents created within the company by different departments.

The procedure for accounting information processing consists of the following operations (Fig.1):

1) registration of facts of business life;
2) determination of materiality of the influence of the revealed factors on business continuity. If there is no information on risks, the documents are registered further on accounts and combined statements, then in reporting (operations 7 and 9). If the documents contain information on risks, then the following operations are fulfilled;
3) identification of risks at public catering enterprises;
4) quantitative and qualitative risk assessment;
5) determination of the necessity to create a reserve complex. If the administration decides not to divert resources to create reserves, then the same operations follow as when registering documents without information on risks;
6) formation of the reserve complex: depending on the risk identified the required reserves, their amount, selection of the account are determined;
7) registration on business accounts and in combined statements;
8) reserve internal control system involving the assessment of the efficiency of a reserve complex. If there is inefficiency of a reserve complex during the internal control, the initial parameters are adjusted to create reserves;
9) preparation of financial statements.

Specialists studying the reservation and the reserve system of enterprises have offered reserves for industrial enterprises, agricultural companies but not with regard to public catering enterprises. This sector has its own specific character, which is necessary to be taken into account when developing a reserve complex. At present, the legislation regulates the creation of the following reserves: statutory (reserve capital), fair value (reserves for depreciation of tangible assets, reserves for impairment of investments in securities, reserves for doubtful debts) and reserves for future expenses. These reserves are not always created by public catering enterprises and there are no reserves that take into account the peculiar features of this industry.

The rightly assessed risks and the possibility of unfavourable events help to direct available assets into reserves for certain purposes in a rational way. It contributes to the increase of the financial stability of the company. The riskiness of public catering enterprise performance involves the necessity to form reserves to cover possible losses in order to ensure business continuity.

Thus, the use of the given procedure when processing the accounting information of public catering enterprises, which is based on the formation of a reserve complex, will contribute to the reduction of risks inherent to this industry ensuring the principle of business continuity.

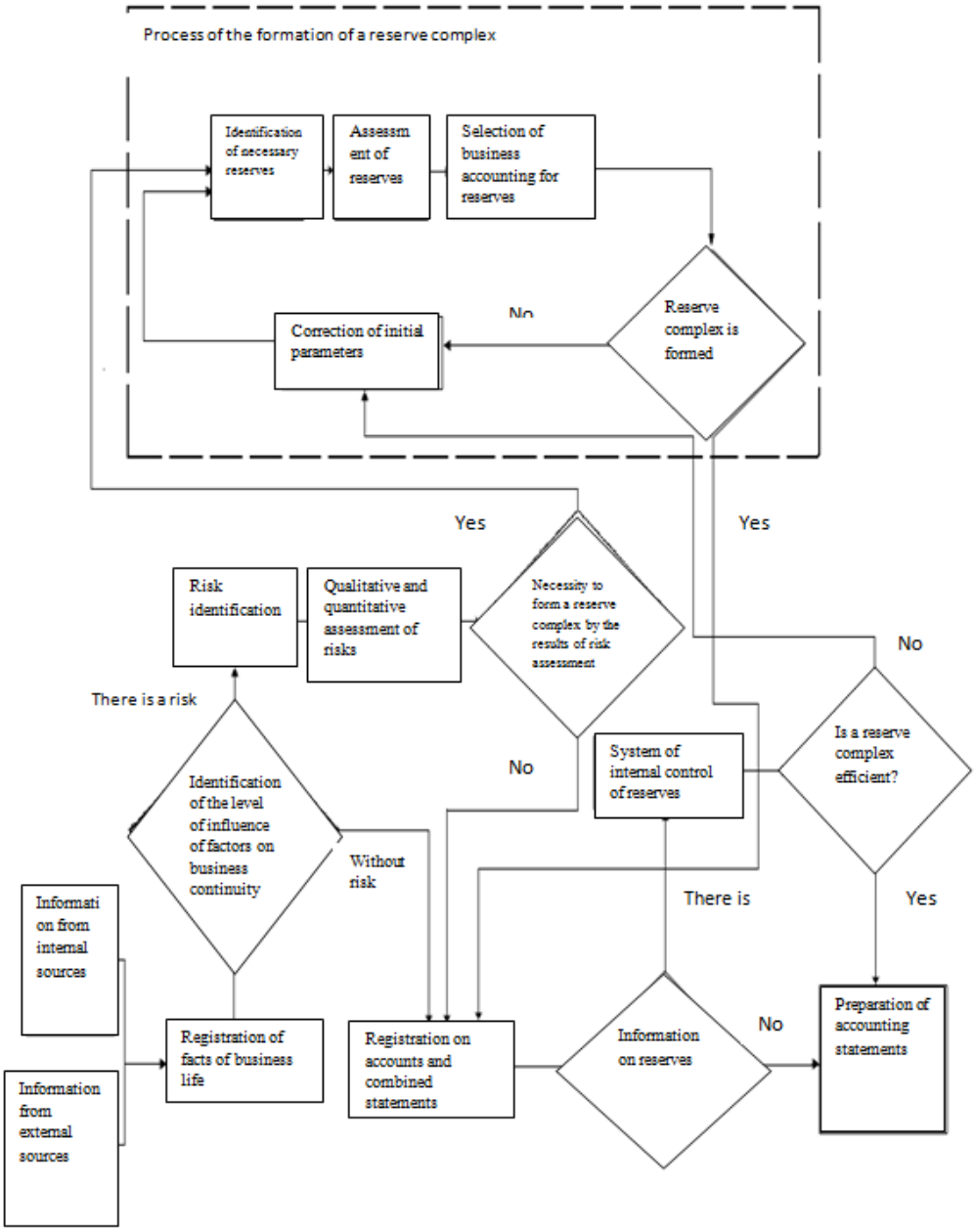

Fig. 1: Procedure for accounting information processing at public catering enterprises based on a reserve complex formation

(Source: compiled by the authors)

Results and Discussion

In order to form the efficient reserve complex for public catering enterprises it is necessary to analyse basic economic parameters to identify basic ways of the formation of reserves. Based on the analysis of statistical data on catering enterprises we may make a conclusion that the production costs are the most significant ones. The production costs include not only the cost of manufacturing goods but also the costs of writing off unsold products with a short expiry date. Therefore, it would be advisable to

form a reserve for product spoilage in order the costs would be uniform and be prepared in case of writing off a large amount of spoiled products.

In this regard the procedure for the formation of a group of reserves used at the formation of a reserve complex has been clarified, which includes the following actions:

1) identification of peculiar features of the performance of catering enterprises;
2) identification and qualitative assessment of a risk caused by these features;
3) identification of the necessary reserve using the classification of reserves.
Various situations related to the peculiar features of catering enterprises performance form different types of risks. Depending on the situation, we may accept a number of risks, while with other risks we should take actions to reduce undesirable consequences.

Based on the analysis of the reserves of catering enterprises we have concluded that we need to systematize them for the right selection during the procedure of accounting information processing.

The current catering enterprise performance includes such operations as the production of own products, their sale as well as semi-finished products, goods and services, the acquisition of goods necessary in the production process of the company, etc.

In the current catering enterprises performance the following reserves can be identified:

1) reserves, formed in accordance with the legislation and constituent documents (reserve capital belongs to this category);
2) valuation reserves:
– inventory reserve;
– reserves for doubtful debts;
3) reserves for future expenses:
- reserve for the payment of annual leave;
- reserve for the payment of remuneration for length of service;
- reserve for the repair of fixed assets;
- reserve of future expenses related to the production activities of public catering enterprises;
4) reserve for natural losses;
5) reserve for unsold spoiled products;
6) reserves related to conditional facts of business activity:
- reserve for pending litigation;
- reserve for pending proceedings with Rostekhnadzor (Federal Environmental, Industrial and Nuclear Supervision), sanitary and epidemiological station, etc;
- reserve for pending proceedings with tax authorities, the Pension Fund, etc.

The financial activity of the company is the attraction and repayment of borrowed sources of financing (credits, loans), the payment of dividends, fines, penalties, and other non-sale operations.

In the financial activities of public catering enterprises, one can distinguish such reserves as the valuation reserve for the impairment of financial investments; guarantees issued; notes payable.

The investment activity of the company is the set of processes of investment decisions making and practical actions for their implementation to achieve a stable position of the company in the market and maintain or create competitive advantages.

The following reserves can be identified in the investment activity of catering enterprises:

- reserve for the sale or termination of any type of activities;
- reserve related to the wrong choice of a "market gap".

There are both known reserves and special reserves proposed by the author. The proposed reserves considering the specific character of public catering enterprises performance will ensure the continuity of enterprises in combination with well-known reserves:

1. Reserves for guarantees issued. This reserve is formed when goods for sale are accepted for commission. Such operations are recorded on off-balance accounts; however, the issued guarantee limits the right to use their property in the amount of the issued guarantee for the terms of the contract.
2. Reserve for natural losses. These reserves are important for public catering enterprises, since inventory holdings, which tend to decrease under the influence of external factors, occupy a large share; therefore the reserve makes it possible for even losses to be included in expenses from natural losses.
3. Reserve for spoiled products. This reserve is formed when you have to write off damage to unsold products, sometimes these amounts are significant. Quite often, the following situation arises in the public catering enterprises performance, especially with canteens and cafes: they have prepared more dishes than they have sold, and the shelf life of the products was short.
4. Reserve for future expenses related to the production activities of public catering enterprises. This reserve is formed to reduce such production risks as violation of cooking technology, equipment malfunction, etc.
5. Reserves related to conditional facts of business activity. This reserve is formed, since the use of food products in production and the production of ready-made dishes is very risky, poor-quality raw materials may be used, or the production technology and sanitary rules that will affect the quality of the final product, thus causing litigation can be violated, etc.
6. Reserve related to the wrong selection of enterprise specifications. This reserve is formed at the beginning of enterprise performance when the administration of the company is not sure that the selected specifications will be in demand.
7. Reserves for the sale or termination of any type of activities. This reserve is formed before the launch of a new enterprise project, when the administration of the company is not sure that it will be profitable.

Conclusions

Thus, the proposed procedure for the formation of a group of reserves considering the specific character of public catering enterprises performance, based on a risk-oriented approach and depending on compliance with the rules for the provision of public catering services, sanitary requirements for enterprise and food products, food transportation and storage, will help to form an effective reserve complex to ensure business continuity. The results of the study can be recommended for use in economic practice of public catering enterprises.

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Methods of A Weak Market Signals for Evaluation The Economic Efficiency of Digital Investment Projects

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Abstract

The article is devoted to the problem of evaluating the economic efficiency of digital investment projects. The genesis of the development of digital projects has been formed. The genesis is based on the evolution of global digitalization processes. The topic of the presence on the market at the present time of a wide variety of projects. The paper presents a classification of digital projects identifies five features based on this classification. Based on these characteristics, various types of projects have been identified and investigated. An analysis of each type of project made it possible to identify their specific properties. In the article, the authors examined the most important properties such as the intangible nature of the objects of investment and the reduction of the project life. The latter leads to a significant increase in risks in a rapidly changing environment. The analysis of the most popular methods for assessing investment performance showed that none of these methods takes into account the identified specific properties of digital projects. The authors propose to form a system of continuous environmental monitoring at the enterprise to reduce the risks of losing the effectiveness of projects in a rapidly changing environment. The basis of such a system is proposed to use the mechanisms of weak market signals.

Keywords: Digitalization Development, Digital Project, Performance Evaluation, Acceleration of Environmental Changes, Methods, Risks, Monitoring System, Theory of Weak Market Signals.

Introduction

Nicholas Negroponte conducted the first research in the field of the digital economy *(Negroponte, 2000)*. In 1985, he founded Media Labs at the Massachusetts Institute of Technology (USA) and contributed to the development of digital literacy for children. In the next thirty years, digital technologies developed rapidly, and this caused an active discussion of these processes in science and practice. It seems to us expedient to single out five stages of this development.

The first stage falls on 1990-2000. It is characterized by the emergence of a large number of companies whose business model involves the mandatory use of Internet technologies. For example, eBay (online auction), Amazon (online store), Yahoo! The result of combining companies into a single chain was the growth of prospects for their rapid development. They actively attracted money and invested in advertising, increased brand awareness, and sent the proceeds to marketing again. Within the framework of this scheme for implementing digital investment projects, the idea is formed: "grow fast or disappear." The proliferation of digital investment projects in business has led to a reassessment of the value of companies, the formation of a bubble from dotcom companies (companies' business model is based on the Internet). This bubble burst in 2001 due to a fall in the NASDAQ. Ultimately, the reason was the lack of understanding that the Internet is a tool in a business process, but not a separate business process *(Safronov, 2019)*.

The next step in 2005-2010 is the implementation of digital investment projects to create the first digital products and electronic services, creating electronic advertising, e-commerce.

In 2010-2015, digital technologies are included in all sectors of the economy, as well as in traditional business. Using of an artificial intelligence, neural networks, and robotics confirms this trend.

Digital investment projects for the implementation of Industry 4.0 technologies are implemented in the industry from 2015 to 2020. In 2017, the Digital Economy of the Russian Federation program was approved in the Russian Federation, indicating the beginning of digital transformation across the country.

According to experts, an active transition from the implementation of single digital investment projects to large-scale digital transformation should occur starting from 2020. This transformation involves the widespread use of cross-cutting technologies of Industry 4.0.

Cross-cutting digital technology spans multiple markets or industries. At the scale of one enterprise, it covers the entire value chain, from production to after-sales service, destruction at the end of its life. At the beginning of the development of the digital economy, individual investment projects were implemented in which cross-cutting technologies were not applied, and digitalization concerned individual stages of the production process or sphere of activity, however, a trend has developed towards the implementation of complex digital investment projects involving the use of cross-cutting digital technologies since 2015 (Figure 1).

The analysis of the formed genesis shows that currently there are projects on the market for each of the formed stages. Despite the prospects for significant business growth predicted by many experts, the implementation of digital projects is low. One of the reasons for this situation is the lack of adequate methods for evaluating the effectiveness of digital projects.

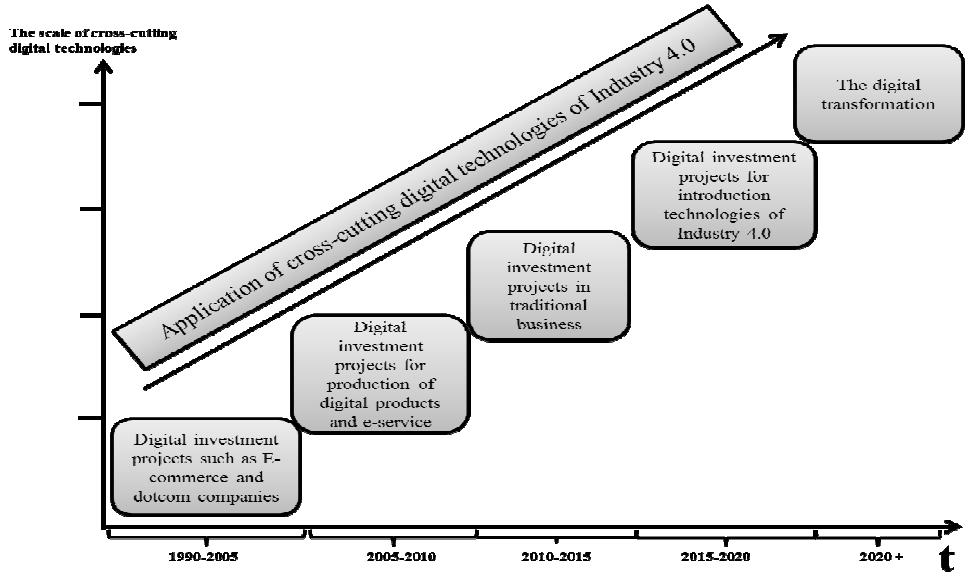

Fig. 1: The evolution of digital investment projects

(Source: compiled by the authors)

The purpose of this research is to identify the specific features of various types of digital investment projects, to review the methods for evaluation of the efficiency of investment projects in terms of their adequacy to the identified specifics, and to propose a method for analysing the key features of such projects.

Problems of Research

A significant variety of digital projects present on the market today makes it difficult to achieve this goal. We tried to classify it.

We used five features that we used to classify digital projects (table 1). Consider each identified type of project and try to characterize the specifics of each.

I. According to the scale of the on-going changes, digital projects can be classified into two groups: operational and digital transformation projects.

1. Operational digitalization projects.

These are projects related to the digitalization of a single business process. For example, the introduction of a technology or the automation of individual business processes. This type of project is typical for modern industrial enterprises in many developing countries. Its advantages are an implementation in the short term and the possibility of quickly gaining effect from the implementation.

The specificity of projects of this type is the local transformation of business processes, suggesting the need to embed digital equipment in an existing technological system. The implementation of this task is quite resource intensive, requiring time. Sometimes such projects require additional costs associated with the formation of infrastructure and training. Increased risks of implementing individual projects are associated with their short life cycle.

Table 1: Classification of digital investment projects

<table>
<tr><th>Classification characteristic</th><th colspan="5">Types of digital investment projects (DIP)</th></tr>
<tr><td>1. Scale of changes</td><td colspan="3">Operational Digital Projects</td><td colspan="2">Digital Transformation Projects</td></tr>
<tr><td rowspan="2">2. The approach to structuring and triggering changes</td><td colspan="2" rowspan="2">Fail-Fast – project</td><td colspan="2">AGILE – project</td><td rowspan="2">Waterfall- project</td></tr>
<tr><td>scrum-project</td><td>Kanban-project</td></tr>
<tr><td>3. Scope of implementation</td><td>Process management</td><td>Production processes</td><td>Product Lifecycle Management</td><td>Transaction management</td><td>Post-sale digital product services</td></tr>
<tr><td rowspan="2">4. Impact on the economic sector</td><td colspan="4">System projects</td><td rowspan="2">Cross-cutting digital project</td></tr>
<tr><td>Digital / Smart / Virtual Factory / plant</td><td>Digital/ smart city</td><td>Digital / smart road and digital transport</td><td>Smart city</td></tr>
<tr><td>5. The scale of change in the digital investment project</td><td colspan="3">Integrated Supply Projects</td><td colspan="2">Projects to the replacement of individual units and parts</td></tr>
</table>

(Source: compiled by the authors)

In a digital economy, industrial enterprises need a global restructuring of the process of organizing activities in order to maintain their competitive position. This requirement corresponds to the second type of digital project - digital transformation.

2. Digital Transformation Projects. Transformation involves the implementation of a group of digital projects that allow not only optimizing time and material costs, but also a qualitative change in the entire business model.

A key specificity of digital transformation is the on-going process of changing the business model. The specifics of this type of project are associated with the high cost of a variety of resources. At the same time, various functional centres and various specialists are involved in the transformation process. This circumstance leads to an increase in the so-called “switching costs”. Another specific feature of this type of project is the increased threat to reduce information security. Currently, the specifics of these dynamic projects are also manifested in increased risk, primarily due to great uncertainty. The latter is associated with fast, constantly accelerating changes in the environment. At the same time, scenarios and roadmaps for the implementation of such complex projects have not been developed.

Digital transformation in industry is carried out in various ways. The following approaches to digital transformation can be distinguished, depending on this.

Process approach. In this approach, digital technologies are implemented throughout the production chain, from product development to its implementation and post-sales service.

Industry approach. This approach is a model of digital transformation of industry, taking into account its interaction with other industries. This is TechNet (digital factory), digital city, FinTech (digital financial technology).

Technological approach. This approach to transformation consists in choosing the technologies used in its implementation, for example, sensors and sensors, the Internet of things, Big Data, quantum technologies.

II. As a second feature of the classification, an approach to structuring and launching digital changes was used. Depending on this, digital projects are proposed to be divided into the following groups.

1. **Fail-Fast - projects**

Projects involve rapid testing of technologies to determine their economic value and applicability. After that, projects are implemented on a limited scale and the conclusion is made: fail or success. If a positive result is obtained, the technology is introduced at the factory *(Comel, 2018)*. The specific of Fail-Fast projects is the need for a rapid estimate of their economic value, which requires the use of a scoring model.

2. **AGILE – projects**

Agile is flexible. The definition accurately reflects the following essence of the approach: it is an iterative development of the project, which involves phased work with the assessment of the results and the adjustment of the previous stages of work. Groups of specialists of various profiles carry it out. Agile projects are classified into scrum projects and Kanban projects.

Scrum project. The development team consists of universal specialists and a curator, and the work is done in parallel and divided into sprints, as a result of each a working version of the product should be obtained. The problem of implementing such a digital project is to form an effective team. This determines its specificity. Universal training of specialists can cause surface immersion in each area, resulting in a shallow study of various aspects of digitalization: ensuring information security, optimal allocation of resources, IT support. Thus, we have high "switching costs".

Kanban-projects are implemented by a team of narrow-profile specialists, a balance must be maintained in the team (specialists of different profiles have approximately the same scope of tasks). At the same time, the process is divided into the stage of performing specific tasks, for example, planning, development, testing of a product. The specificity lies in the problem of the “pulling” scheme: until one task is completed, another is not taken into work. In the context of digitalization, the scheme does not allow you to quickly adapt the entire project to changes and fix the incorrectness of the results of the previous stage in time, since an intermediate assessment of the results is not carried out, in comparison with Scrum-projects.

Waterfall Project

Waterfall - the project involves the work in stages. Each stage is strictly regulated, strictly meets the originally specified requirements. Go forward without completing the previous step, or forward is not possible. The key problem of such projects is the lack of flexibility; therefore this approach in the case of digital projects, as a rule, is ineffective

III. Depending on the scope of implementation of digital projects, the following groups of digital projects are distinguished.

1. Projects of process control systems.

Individual projects can be implemented in the management of the production process, taking into account the requirements of digitalization. For example, the management of the production process or the activities of the entire industrial enterprise using the MES (manufacturing execution system) system. The specific of digitalization projects for control systems is associated with a fairly wide range of problems; they are associated with a wide variety of management tasks, both in content and in degree of complexity. Firstly, it should be noted the lack of complete, correct and relevant information to perform these tasks of information in many examples. Secondly, the need for full integration of the software used in management. Thirdly, there are problems with reducing the number of jobs. In principle, all projects relate to the release of personnel, but management tasks without the participation of qualified experts are difficult to solve.
2. Digitalization of production processes. As a rule, these projects are related to the type of operational projects. Hence, their specificity consists in the additional costs of integration into existing equipment, the costs of training and retraining of personnel, a large degree of uncertainty.

3. Projects on digitalization of product life cycle management systems.
Lifecycle management projects are related to the implementation of PLM software. PLM-system provides data collection during the operation of the facility, identifying strengths and weaknesses, during disposal allow you to determine the value of the components of the facility, the possibility of their further use.

4. Digitalization projects of transaction management processes.

One of the first digital projects was online sales projects. Today, transaction management can be considered more broadly, including projects related to supply chain management (SCM). According to experts, the digitalization of transaction management should be carried out in three areas. The first is value creation. Secondly, the digitalization of the leverage of these processes. These include organization, personnel, performance management, and cooperation. Experts estimate that as a result, EBITDA margins can be increased by 3-5% *(Schnellbaecher, 2019).*

5. Projects for after-sales service of digital products.
For example, UAZ is implementing the PROF-IT Service Management project, optimizing the work with dealers and post-sales service processes for automobiles. The program is adapted for dealers, provides a catalogue of spare parts, routings (maintenance instructions), information on standards for service time, the possibility of interactive viewing of electrical circuits, sections with troubleshooting and training.

IV. The implementation of digital investment projects affects various sectors of the economy. Accordingly, with this feature, it is possible to distinguish system and cross-cutting project groups.

1. System projects involve changes in industry in various sectors: in production, in the transportation system, in the energy sector.

System projects are classified, in turn, into the following types:

i. digital factory (factory) (smart factory, virtual factory);
ii. digital city (smart city);
iii. digital road and digital transport (smart road and smart transport);
iv. smart home and smart goods.
The specifics of large projects are their high cost, the need for a large amount of resources, the costs of changing consumer attitudes, the problem with the release of personnel. In addition, they are characterized by a high degree of uncertainty.

2. Cross-cutting projects affect the development of several sectors of the economy.
V. Depending on the scale of the on-going changes, digital investment projects in industry can be classified into projects with integrated supply and with the replacement of individual units and parts. In the first case, it implies the replacement of the entire production line and the installation of a complex of new equipment. In the second case, only part of the production equipment is updated. Specificity is associated with the main problem of these projects - the need to incorporate new elements into an existing system.

The analysis showed that today there are many types of digital investment projects with the following specific properties.

1. Limit the long-term investment.

In modern conditions, due to the significant acceleration of technological progress, an effective technology may be morally obsolete by the time the digital investment project is completed. This trend significantly reduces the planning horizon of a digital transformation and limits the ability to use “long” money in the digital economy (Parakhina, Popovicheva and Bazarnova, 2018).

2. The high level of risk associated with cyber security and the protection of intellectual property.
Digital investment projects use large amounts of data. Even with the implementation of the pilot project, violation of their confidentiality causes serious damage to the company. In addition, digital investment projects are based on modern digital technologies that allow them to maintain a competitive position in the market. Disclosure of information about the technologies used jeopardizes the competitive advantages of the company. In this regard, the implementation of digital investment projects is associated with a high vulnerability of companies in the field of cyber security.

3. Dematerialization of assets in a digital environment.
In a digital economy, most of the assets are intangible. A special approach evaluating and accounting for the acquisition costs or development in digital projects is required. In addition to intangible assets in the classical sense, there are also informal assets known as capital equivalents. Under them is actually considered revenue growth because of increased customer loyalty through the introduction of digital technology. This indicator is not reflected in the financial statements, but at the same time, it is one of the criteria for the success of the implementation of digital investment projects.

4. The increase in the speed of launching a new product on the market.
Advanced production technologies have reduced the time to market a new product and, using an iterative approach to improve it, make changes and adapt it to customer requirements in real time. For example, Facebook updates the software twice a day, tracking user reactions and making adjustments based on observational data.

Consider whether these properties take into account modern methods of evaluating the effectiveness of investment projects.

Currently, among the existing methods, the most popular are the following.

1) Model Goldman, Sachs & Co;
2) Ernst & Young model;
3) EBRD model;
4) World Bank models;
5) The analytical model of “cost-benefit” (cost-benefit analysis);
6) Model of United Nations Industrial Development Organization (UNIDO);
7) Little-Mirrlee's model.

The first three models from this list are mainly used for business planning and creating a business plan - a key document of the investment project.

Goldman, Sachs & Co experts recommend evaluating indicators based on official statistics, which are less prone to falsification. For example, data on the average cost of energy and building materials.

Ernst & Young researchers use adjusted present value (APV) to determine the investment efficiency of investments. But this indicator corrects NPV by the amount of financial expenses for the issue of shares, and does not take into account investment risks.

The EBRD’s methodology is the most concise of this group of methods. The user needs significant experience in creating business plans and characterizing project performance indicators for applying this technique. The World Bank considers the analysis of design efficiency in terms of design analysis. However, this technique is for assessing social project productivity, not the financial and commercial side. A project is appropriate for investment if it is reliable, feasible and meets the goals of the UN. A variety of performance parameters, including NPV and PP (payback period), are used to evaluate indicators according to the Bank's methodology.

The criterion parameter of Bruno is of considerable interest. It allows you to determine design efficiency in the shadow prices of cleared savings. A serious disadvantage of this methodology is the lack of a PI index reflecting comparative project performance.

The "cost-benefit" model originally arose in France in the 19th century, and it developed in the 40s of the 20th century in the USA *(Kalinovskaya, 2016)*. At that time, the researchers decided to find the optimal balance of costs and benefits. The problem solved using the criteria of NPV and IRR.

The disadvantage of this technique is its long-term focus with a relatively low reliability. In addition, the model does not take into account non-commercial effects and the impact of resource redistribution on productivity, allows subjectivity in the estimates.

A further development of the cost-benefit model was the creation of the UNIDO's model. According to this model, in addition to the levels of commercial performance, the public performance of the implementation of the investment project is measured *(Simić, Vratonjić and Berić, 2011)*. The analysis showed that its key drawback is the poor accounting of investment risks.

We consider the methodology by Little-Mirrlees as an alternative to the UNIDO's model *(Simić, Vratonjić and Berić, 2011)*. Experts *(What is the digital economy? Trends, competencies, measurements, 2019)* note its following disadvantages:

- the parameters for choosing an investment project in an implicit form are based on the concepts of a planned economy with an endless supply of labour;
- international commodity prices are highly dependent on speculation, which can lead to errors in the characterization of project performance indicators using this model;
- the calculation of the parameters for price recalculation may contain significant inaccuracies due to lack of data or incompetence of staff;
- the model is based on a significant amount of additional calculations when implementing a capital investment project due to potential transformations in international prices and the need to establish new parameters for price conversion.

Thus, the review showed that modern popular methods for evaluating investment projects do not take into account the specifics of digital projects. Existing methods make it impossible to take into account the rapid change in the environment, and therefore the lifespan of digital projects is steadily decreasing and the risks of investing are growing.

Reducing these risks requires a system of continuous market monitoring. It seems to us that the basis of such a system should be based on mechanisms for seizing weak market signals.

Methodology of weak market signals as a mechanism to reduce uncertainty in the implementation of digital projects.

The terminological diversity of the meaning of the term "weak signal" *(Hörner, 2012)* requires highlighting the main features of the phenomenon, such as (1) the high uncertainty of the existence of the phenomenon, (2) the causal relationship between the weakly and implicitly observed phenomenon at present and the predicted significant consequences in the future, (3) lack of transparency and awareness of the phenomenon, etc.

For the purposes of this study, we define weak signals - these are early, implicit signs of upcoming significant events, both in the internal and external environment of the enterprise, the influence of which will be strictly indefinite.

The development of the concept of weak signals in particular, (Garcia-Nunes and da Silva, 2019) led to the emergence of the concept of "Management of market signals" as a management based on inaccurate and incomplete information *(Ansoff et al., 2019)*. In principle, this means control under conditions of uncertainty, i.e. precisely in the conditions in which the vast majority of enterprises are today. And this means the need for the leadership of these enterprises to begin to act at the first weak market signals.

As part of the control for weak signals, it is advisable to introduce the concept of a significant weak signal. Significant weak signals will be considered the totality of weak signals, which, with a certain set of them in the future, may have the most significant impact on the results of the project and the enterprise.

Using the theory of weak market signals in predicting environmental changes, we distinguish two key tasks: identifying signals and identifying the most significant of them. These tasks correspond to the theory of management; accordingly, the business needs constant monitoring of the market. This requires the formation of a mechanism for the systematic collection, analysis and selection of important information for companies about competitors and market conditions, internal factors of the project / activity of the enterprise.

In the framework of this study, the following steps are required to identify weak signals (Fig. 2):

- formulate a list of identifiers of weak signals;
- build a monitoring system for identifiers of weak signals;
- typify weak signals.

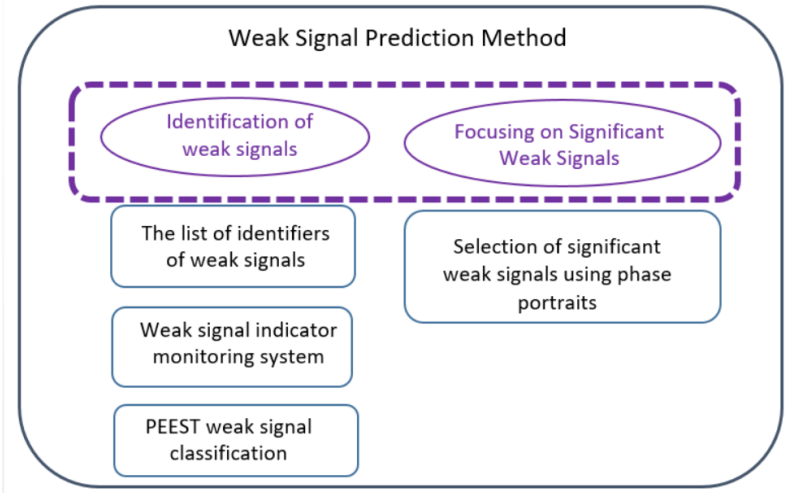

Fig. 2: Diagram of a method for predicting changes in weak signals
(Source: compiled by the authors)

Note that the Ansoff model for strategic management of an enterprise according to a weak signal involves the classification of weak signals into external and internal *(Ansoff, 1975)*.

The general list of external weak signals should include identifiers of all levels of the economy, from macro to microeconomic. It is advisable to classify this list for external weak signals based on the PESTEL methodology.

It is clear that we share Ansoff's approach to the classification of weak signals into internal and external. The author's classification of internal weak signals is based on the theory of risk management in project management. It involves classifying identifiers for internal weak signals by types of potential project risks.
It is important that for each project or enterprise an individual set of identifiers is created for both external and internal weak signals.

An extremely complex management task is to identify significant signals for the timely adoption and implementation of proactive decisions on the timely transformation of digital projects.

The complexity of the task is because each forecasting object (in the scientific, technical, political, economic, environmental, and marketing and other fields) manifests itself in various fields,

directions, expressed by indicators of different dimensions, different meanings, different nature and directions. In other words, it is among the complex, dynamic and multi-criteria, often with multidimensional problem solving. It is clear that it is necessary to determine the appropriate methods and tools for solving problems.

In the early studies of the authors of the article, it was shown that the most adequate to such tasks are the tools of nonlinear dynamics and a synergistic approach (Fig. 3).

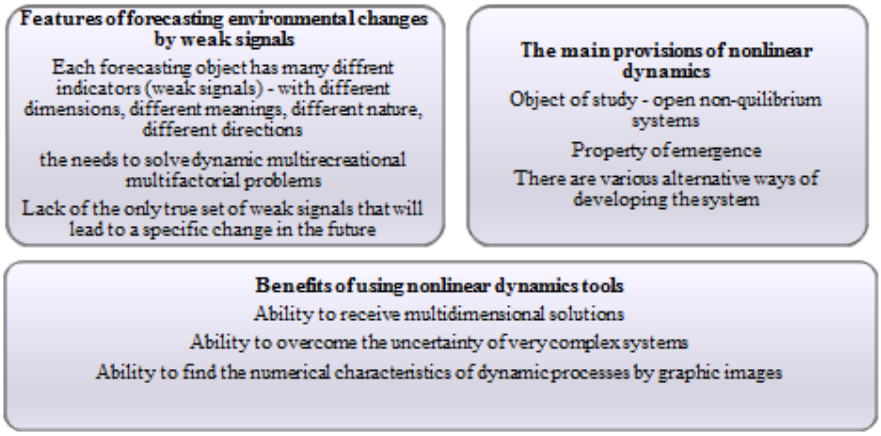

Fig. 3: Justification of the choice of nonlinear dynamics tools for predicting environmental changes by weak signals

(Source: compiled by the authors)

The advantage of such a tool of nonlinear dynamics as a phase portrait, from the point of view of the solving problem, consists in the possibility of representing an arbitrarily complex system by several, up to a single point.

The method for identifying significant weak signals is based on the construction of phase portraits of each of the weak signals.

One of the existing and proven tools for macroeconomic spline analysis of phase spaces is a split-picture, used to build and analyse the dependencies of economic indicators in the form of split-curves. The growing interest in the use of split-pictures is due to the ever-increasing rate of changes in macroeconomics, as well as a change in the nature of dependencies in macroeconomics from hierarchical to network. Split pictures are also used for visualization, interpretation and analysis of macroeconomic dependencies of two or more variables.

The next step in predicting environmental changes from weak market signals is the development of phase portrait archetypes for weak environmental signals for a specific digital project. This is the task of future research by the authors.

Conclusions

Today the development of digital projects is characterized by significant industry differentiation. The speed of their implementation in the financial sector and public administration is significantly higher than in industry. The key problem of less active use of digitalization projects in industry is the lack of adequate methodologies for evaluating efficiency. Methods should take into account the short lifespan of digital projects and the high risk of the emergence of a new, more effective solution. To mitigate this problem, it is proposed to use mechanisms of weak market signals that allow us to predict, with a certain degree of accuracy, technological changes.

Acknowledgement

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Research on Eco-Design Methods and Tools as Support for Sustainable Product Development

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Abstract

Society is increasingly aware of the environmental impact of industry, therefore, the environmental impact of the products commercialized became a current and pressing concern of customers. Individuals prefer eco-friendly and durable products and are interested in buying from companies that have implemented environmental protection measures. Due to these aspects and also due to the tightening of EU environmental protection regulations, organizations should implement environmental management systems in order to reduce the impact of their products and services in accordance with sustainable development goals. Particularly, in regard to product development companies, a fundamental aspect of an environmental management system is the use of eco-design as a design methodology. Eco-design can help companies minimize the environmental impact of their products over their entire lifecycle, reduce the raw materials use, energy and water, produce less waste and pollution and increase the products' efficiency and service life. Introducing eco-design into the product development process requires a high level of expertise regarding the potential environmental impact and advanced knowledge of the methods and tools that can be used to support this initiative. In this context, the present paper tries to highlight the importance of integrating the eco-design process when developing new products and proposes a selection of relevant methods and tools that can be used during the eco-design phases in order to help designers accomplish their environmental targets and obtain eco-friendly products. The literature review research conducted is based on the standards outlined by the ISO 14006:2020 *Environmental management systems - Guidelines for incorporating ecodesign*.

Keywords: Design, Eco-Design, Product Development, Sustainable Development.

Introduction

In the current economic context, companies whose core business is product development and manufacturing must be at the forefront of dynamic changes in customer requirements related to product customization as well as their rapid availability on the market. Therefore, in order to remain competitive in the current business environment, these companies must launch products that not only meet and exceed customer expectations, but also help grow their turnover and maximize their profits. In addition to the dynamic market changes, a company that wants to develop a new product must also take into account the current regulations on sustainable development in product design and manufacturing. These regulations mainly concern the reduction of material and energy consumption, the reduction of gas emissions and the use of recyclable materials. Consequently, starting with the product design phase, designers have to take into account, in addition to the constructive-functional characteristics, other conditions related to product life cycle – reuse/ repair/ recycling.

As stated by Fernandez (2018), product development and manufacturing companies need to demonstrate their commitment to sustainable development goals by strengthening their product life cycle with actions that demonstrate their involvement in this process. In order to accomplish this, companies should take actions and use tools which will help them make the transition from a linear economy model to a circular economy model, as mentioned in Michelini (2017), Jørgensen and Pedersen (2018) & Rosu and Rohan (2018). Regarding the transition to a circular economy, one of the main actions a company should take is using eco-design methodology when developing their products, as stated in Navajas et al. (2017), Prieto-Sandoval et al. (2018), Gallagher et al. (2019) and

Neto (2019). Additionally, Fernandez (2018) stated that eco-design has become the main methodology that can be used by companies in order to make their products more sustainable and eco-friendly, because it incorporates environmental and sustainability criteria as basic requirements in the design process. Therefore, raw materials, manufacturing, packaging, distribution, sale, use, maintenance, reuse and disposal are analyzed during the design process in order to reduce resources consumption, cut emissions and reduce pollutants output throughout the entire product life cycle, Fernandez (2018).

Since the late 1990's, when awareness regarding the environmental impact of the manufacturing industry increased, the research focus has been primarily directed towards developing eco-design methods and tools which can reduce the environmental damage during the life cycle of products, Pigosso et al. (2010), Sihvonen and Partanen (2017), Ahmadzadeh et al. (2017), Fernandez (2018). The eco-design approach focuses on obtaining sustainable solutions for products with a low environmental impact during their life cycle, without compromising their performance, functionality, aesthetics, quality and cost, as mentioned in Pigosso et al. (2010) and Dostatni (2018).

Because of the necessity of increasing attention towards the environmental impact, the European Union developed regulations and legislation regarding the way companies should use and implement environmental features when developing their products. Such regulations were also developed for eco-design, standards such as ISO/TR 14062:2002 and ISO 14006:2020 have been developed in order to provide guidance on how to integrate eco-design into the management systems of companies, Maderna-Fernández et al. (2013) and Zouari (2019).

The EN ISO 14006 standard introduced in 2011 and updated in 2020 presents the definition and the basic principles for eco-design in order for them to be integrated into the product design and development process, Maderna-Fernández et al. (2013).

Consequently, the main purpose of this research study is to identify, by literature review and analysis, the most representative methods and tools that can be used during the eco-design process as it is outlined by the ISO 14006 standard. In essence, the paper is a literature review manuscript, however, it tries to present the methods and tools developed for eco-design that, from the author point of view, simplify the design process by making it easier and faster.

Eco-Design Process – General Presentation

ISO 14006:2020 defines eco-design as a *systematic approach that considers environmental aspects in design and development with the aim to reduce adverse environmental impacts throughout the life cycle of a product*. This design approach is also known as *environmentally conscious design (ECD)*, *design for environment (DfE)*, *green design* and *environmentally sustainable design* (ISO 14006 and Ahmadzadeh et al. 2017).

Several other definitions of this concept can be found in the literature, some being listed below:

→ Pigosso et al. (2010) defined eco-design as *a new way for developing products where the environmental aspects are given the same status as functionality, durability, costs, time-to-market, aesthetics, ergonomics and quality*.
→ Chou (2014) states that most definitions conceptualize eco-design as *a systematic process that identifies the environmental aspects of a product and integrates them into the product design in the early phase of product design and development process.*
→ Marconi and Favi (2020) defined eco-design *as the integration of environmental considerations within product design and development*.

ISO 14006 presents six phases for the eco-design process (figure 1). However, even if the standard presents a set of steps for the eco-design approach, both in literature and in industrial practice there are several other approaches for this design methodology. All of these approaches, Pigosso et al. (2010), Chou (2014), Farhane et al. (2014), Sihvonen and Partanen (2017), Tao et al. (2018), Dostatni

(2018), nibusinessinfo.co.uk (2020), etc, focus on the reduction of the environmental impact of products, taking into account manufacturing, usage and disposal.

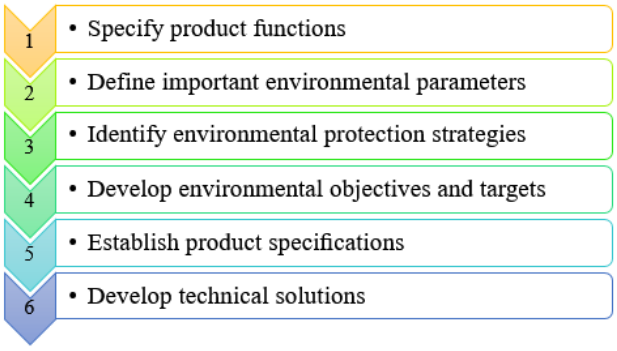

Fig. 1: Eco-design phases (ISO 14006)

As Fernandez (2018) stated, the eco-design process does not represent a new way of designing products, however it does provide a new point of view, by taking into consideration aspects of sustainability as key requirements. She presented a parallel between a traditional design methodology and the eco-design methodology (figure 2), in order to highlight the environmental criteria added to each design stage.

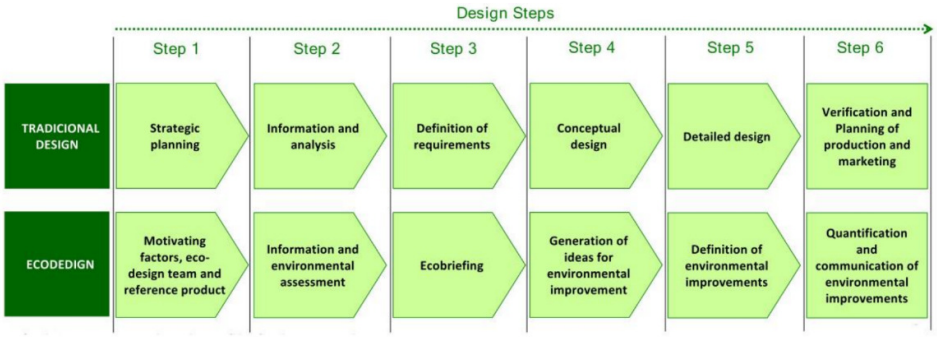

Fig. 2: Traditional design and eco-design steps [Fernandez C. (2018)]

The eco-design process is based on several principles (nibusinessinfo.co.uk 2020), as follows: → using low environmental impact materials; → reducing the resources and materials used during the manufacturing process of products; → producing less pollution and waste during manufacturing; → diminishing the environmental footprint of the distribution process; → ensuring that products attain a high degree of resource efficiency during operation; → reducing waste and pollution caused by products when in use; → optimizing product service life and maintenance sustainability; → reuse and recycling focused design; → reducing the environmental impact of products by optimizing disposal methods.

Eco-design is an eco-friendly design methodology that generates products that not only present benefits for the environment when compared to products designed with traditional methodologies, but are also able to provide potential savings and efficiencies for businesses. Ahmadzadeh et al. (2017) made a literature review and subsequently identified the following advantages of using eco-design for developing new products: → increased competitiveness; → decreased variable costs; → less use of toxic materials; → increased product functionality; → improved economic performance; → increased revenue; → increased sales volume; → less energy use; → prolonged product life; → improved company image; → reduced material use.

As it can be inferred from the above, eco-design is defined by eco-friendly and efficient products, but designing such products presents the need for appropriate and efficient methods and tools. There are

a large number of tools to support eco-design (Pigosso et al. 2010), from specific guidelines and checklists, to dedicated software and databases on materials and processes. Depending on the project target and on the availability of tools, the product designers can choose which tool they should use in order to complete each eco-design phase. However, given the existence of a wide variety of tools, it was deemed beneficial for any design team to develop a selection of tools which can be used for each eco-design phase.

Eco-Design Methods and Tools

This paper section will present a selection of eco-design tools developed by scientists and industry and used during the eco-design process. As it was also mentioned in the paper introduction, the author tries to present the relevant methods and tools that can be used in order to support the eco-design process. The main criteria used to select these methods and tools was the ease of use within the product design process. A correlation between these tools and the eco-design phases proposed by the ISO 14006 standard will be developed.

As stated by Pigosso et al. (2010), the decision regarding the methods and tools to be used when developing a product depends primarily on the product design phase. Several authors have developed methods and tools that can be used during the eco-design process. However, most of them did not corroborate their developments with the eco-design phases proposed by the ISO 14006 standard. Additionally, evidence of industrial use of currently existing tools is scarce, Vallet and Glatard Mahut (2013). Mandolini et al. (2019) identified that some eco-design tools also raise issues related to the fact that they are not or are hard to be integrated with the typical design tools, are heterogeneous (developed for a specific product sector), and require a very large amount of knowledge and knowhow on environmental issues in order to be properly implemented. During her research projects focused on eco-design tools, Lofthouse (2006) identified that designers need tools that combine guidance, information and education and simplify the process by making it easier and faster.

In order to fulfil the objective of this section of the research paper, the main phases of eco-design, as outlined in ISO 14006, and representative tools will be presented as follows.

Specify Product Functions

The identification of functional requirements is considered as a starting point for many of the classical product design process methodologies, as can be seen in Roche (1999), Campbell (2002) and Cross (2008). This design phase is regarded as a key factor for obtaining a successful design for a product and has a critical role on its entire life cycle, because a product which is not designed oriented on its functionality will never have market success.

This eco-design phase consists in the identification of the product functions and is not different from similar phases proposed in classical design process methodologies. Special tools specifically designed for tackling environmental issues are not mandatory.

The best way to represent a functional structure of a product is by means of functional models, such as: functional trees, as presented in Robotham (2002), Kitamura et al. (2006), Viola et al. (2012), Simpson et al. (2014); and Function Structure Diagram, as presented in Aurisicchio et al. (2013). There are two main methods to develop a functional tree: Functional Analysis System Technique, FAST, as stated in Bartolomei and Miller (2001) & Borza (2011), and the Subtract and Operate Procedure, SOP, approach presented in Aurisicchio et al. (2013).

Of particular importance is the fact that before starting this phase of the eco-design process for a new product development certain activities should be performed, such as: market analysis in order to identify the need for new or eco-revised products, finding and selecting product ideas in relation to the identified need, task clarification, determination of the product requirements, etc. The identified need and the customers' requirements are the main inputs when developing the product functional

structure. The survey and benchmarking are the most appropriate tools that should be used in order to perform these activities.

Define Important Environmental Parameters

In this eco-design phase, the environmental assessment of the product is determined, in order to identify which stage or process of the product life cycle will have the highest environmental impact. The main activities which should be performed are: the analysis of the environmental demands of stakeholders and the evaluation of the environmental aspects in relation to the product in development.

It is important to highlight the difference between the environmental aspects of a product and its environmental impact. The *environmental aspect* is defined by ISO 14001:2015 *as an element of an organization's activities or products or services that interacts or can interact with the environment*, and the same standard defines the *environmental impact* as *a change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects*. The product environmental aspects are related to: consumption of materials, energy and water, both during manufacturing and while in use, emissions, waste generated, etc., conversely, its environmental impact can be assessed by: pollution and contamination of the air, soil and/or water during manufacturing, use and disposal.

As stated by Vallet (2013), this phase is important for providing a good understanding of the environmental problems caused by a reference product and for the evaluation of the redesigned product.

There are several eco-design tools developed in order to support this design phase, as presented by Pigosso et al. (2010), Vallet et al. (2013) & Dostatni (2018). However, most scientists consider that Life Cycle Assessment, LCA, is the most objective eco-design method that can be used for determining the environmental profile of a product, Navajas et al. (2017).

Muralikrishna and Manickam (2017) defined LCA as *a cradle-to-grave or cradle-to-cradle analysis technique to assess environmental impacts associated with all the stages of a product's life, which is from raw material extraction through materials processing, manufacture, distribution, and use.* LCA framework is presented in figure 3.

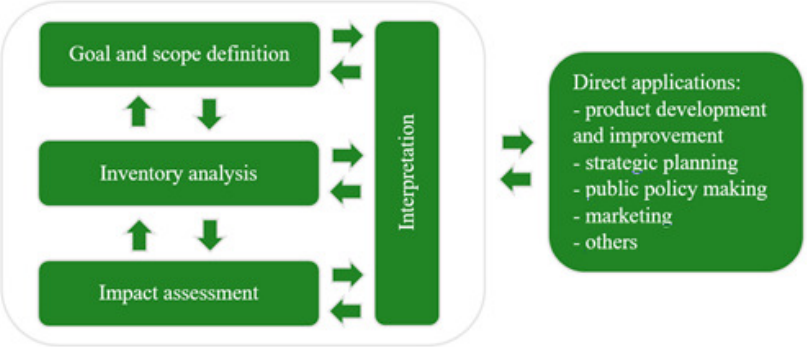

Fig. 3: LCA frame work [adapted from Muralikrishna and Manickam (2017)]

Regulations and legislation regarding LCA implementation are defined in standards such as: ISO 14040:2006, ISO 14044:2006, ISO 14047:2012, ISO/TR 14048:2002 and ISO/TR 14049:2012.

Software tools that were developed in order to facilitate the study of the Life Cycle Assessment: Open LCA developed by GreenDelta, One Click LCA developed by Bionova, SimaPro developed by PRE-Consultants, Instant LCA Packaging developed by RDC Environment, LCA Calculator

developed by LCA Calculator Ltd, LCA4waste developed by Chair of Ecological Systems Design, ETH Zurich etc.

Brezet and Van Hemel (1997) identified eight eco-design strategies, as follows:

- *new concept development;*
- *selection of low impact materials;*
- *reduction of materials usage;*
- *optimization of production techniques;*
- *optimization of distribution system;*
- *reduction of impact during use;*
- *optimization of initial lifetime;*
- *optimization of end-of-life system.*

The Eco-design Strategy Wheel (figure 4) is the tool widely used in this phase of the eco-design process. Brainstorming and Matrix prioritization are other tools that can be used in order to identify the environmental strategies and the sub-strategies and ideas for improvement, Fernandez (2018).

Fig. 4. Eco-design Strategy Wheel [adapted from Fernandez (2018)].

Develop environmental objectives and targets

After the identification of the environmental protection strategies, the environmental objectives and targets should be established by the design team and they should be in correlation with the general environmental objectives and targets outlined by the company management. There are no specific tools designed only for this phase of the eco-design process. The basis for the environmental objectives and targets should be the requirements set by the available legislation and a proper evaluation of the corporate environmental policy. Specific checklists and matrices can be used, where the objectives and targets can be correlated.

ISO 14001:2015 defines the *environmental objective* as *the objective set by the organization consistent with its environmental policy*, and the environmental target as *a detailed performance requirement, applicable to the organization or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives*.

For example, if an objective can be *to use recyclable materials for manufacturing and packing the new developed products inside the company*, then the target will be *to reduce with 15% the usage of non-recyclable materials for manufacturing and packing of products.*

Establish Product Specifications

This is the eco-design phase that consists of the design of product characteristics and specifications based on client requirements and the technical life cycle of the product. The output of this design phase is the specifications list. The listed specifications can be expressed in terms of: product geometrical and material characteristics, safety, ergonomics, manufacturability, quality, assembly, maintenance and transport possibilities, recycling characteristics, costs, deadlines, etc.

Establishing product design specifications is accomplished by applying methods such as: Quality function deployment, QFD, Theory of Inventive Problem Solving, TRIZ, Benchmarking and tree diagram. Product specifications should be precise and measurable and should detail what a product has to do in order to satisfy the identified needs. The product specifications do not explain how to address the needs, but instead they present what should be achieved in order to satisfy the needs.

The main difference between the classical design approach and the eco-design approach in this design phase, is that eco-design focuses on the critical points at an environmental level, with internal and external environmental requirements that should be taken into account, Fernandez (2018).

Develop Technical Solutions

Traditionally, this phase of the design process consists of developing technical solutions for the future product based on the specifications outlined by the design team. Eco-design proposes that these solutions should also incorporate proposals for environmental improvements. In eco-design, environmental parameters and their criteria needs to be analyzed, synthesized evaluated and improved at every stage of the design process.

Methods which can support the starting point of this design activity are QFD, TRIZ, morphological charts, etc. To support these methods, various software tools and design repositories were developed. Some examples are: QFD software developed by the Statistical Design Institute, Eco-Design Tool developed by Chang and Chen (2004), the tool developed by Dostatni (2018), etc.

In regard to software, the most useful tools for completing this eco-design phase are the CAD system-integrated tools. Dostatni (2018) made a brief review of the CAD tools which can be used for environmental impact assessment. Nowadays, specialized CAD software such as Autodesk Inventor, CATIA, Solidworks, LogiCAD, etc. have special modules which can be used for environmental assessment purposes. Granta Design Solutions developed by Granta Design and ECODESIGN+ developed by Eco-design are also tools which can be taken into consideration for this design activity.

The design solutions should be elaborated by taking into account a wide variety of aspects, including: functionality, costs, materials, manufacturing processes, distribution and sale, use and disposal. All this will be evaluated in relation to raw materials and energy consumption, impacts, generation of waste and pollution.

Conclusions

This paper contains a literature review research study on eco-design methods and tools as support for sustainable product development, based on the requirements specified by the ISO 14006:2020 standard. The first part presents general data on eco-design: definitions, process methodologies, principles and advantages of eco-design, while the second part outlines a correlation between the eco-design phases presented in the ISO 14006 standard and representative tools developed by scientists which can be used to support the eco-design phases. The presented eco-designed tools are selected by the author having as a main criteria the ease of use of these tools during the product design process and their simplicity.

Eco-design is not limited to being only a design approach, but rather it is a part of the corporate environmental management system. Introducing eco-design as a process for developing products within a company affects activities and processes at all levels, starting with corporate management. ISO 14006:2020 also provides guidelines for incorporating eco-design into the environmental management system. Implementing eco-design methodologies can provide companies with environmental, economic and social benefits. By studying eco-design methodologies, it can be determined that the eco-design process is similar to the traditional design process, the primary difference being given by the fact that in the eco-design process the environmental impact must be analyzed, synthesized, evaluated and improved at every stage of the process.

The literature review shows that there is a wide variety of methods and tools developed to support the eco-design process, however some of them require an advanced level of knowledge regarding environmental aspects and polices. Consequently, this paper tried to present the ones that, in the author point of view, can simplify the product designer's work.

The correlation of the eco-design phases proposed by the ISO 14006 standard with methods and tools which can support these phases is highly beneficial when a company decides incorporating the eco-design process as a part of the corporate environmental management system. The information presented in this paper can be used as guidance when developing and implementing a specific eco-design process into a product development company. The author contributions consists in: developing the literature review and analysis, the selection of the most relevant methods and tools to be used during the implementation of the eco-design process, making the correlation between these methods and tools and the eco-design phases as outlined by ISO 14006. This research will be also the basis of the further research of the author, research that will consist in developing an eco-design methodology to support circular economy model integration in small manufacturing companies.

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Process Innovativeness in Service Implemenetation with The Example of An Enterprise Providing Innovative Solutions

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Abstract

Innovativeness is becoming the main guideline in the policy of many enterprises intending to build its and its environment's driving force. The environments in which it is becoming more difficult to compete without building an innovation strategy, where small and medium enterprises achieve successes characterised by the following distinguishing features: awareness in which innovativeness becomes a feature strongly related to success; the sense that innovativeness leads to faster development or greater successes than in the case of non-innovative enterprises; the belief that innovativeness will lead to greater share in the market and improvement in profitability. Strictly innovative activity in enterprises is profitable in many ways. R&D activity demonstrates strong correlation between the achieved research results and new products. The purpose of the paper was to present the entrepreneur's attitude towards the executed implementation project and check the model applied by the entrepreneur. The study was conducted using the in-depth interview (IDI) method, classified as one of the basic techniques of qualitative studying. It is based on having a talk with the respondent. The interview's purpose is to obtain a detailed opinion and information from the company's owner concerning the executed innovative project. The applied technique was aimed at check whether the innovation process was executed according to the specified stages, which allowed the entrepreneur to plan and implement the innovative solutions in an effective manner. The model's aim was to check what was the process of seeking the solution that was later implemented.

Keywords: Creativity, Innovation, Innovation Process, Competence

Introduction

Innovation is key for European competitiveness in the global economy. EU implements the policy and programmes supporting the development of innovation in order to increase investments in R&D and to improve the conversion of research into better products, services or market processes. Poland is effectively adapting to these guidelines by promoting various criteria that support enterprises intending to develop their innovative potential. Companies investing in innovative solutions can count on EU subsidies both from national and regional programmes. Nearly half of Polish companies deems innovativeness as a strategic goal of their activity, as stated by the "Innovation Maturity of Polish enterprises 2014" report. According to the study, as many as 78% of medium and large enterprises is conducting works on innovative solutions. Slightly less, i.e. 71% is implementing their results. Over 80% of companies intend to increase the scale and area of related activity. In truth, the aforementioned data concerns mainly entities with stable situation and many years of presence on the market, however the trend is increasingly disseminating (Cho, H.J., Pucik, V., 2005, pp. 555-575.). An increasing number of enterprises – including small and medium – notices a chance for competitiveness and capturing new foreign markets in the creation of innovative and unique solutions or implementing processes furthering innovativeness (Maj 2017a; Maj 2017b, Maj 2018) . Migration also favors this proces (Kubiciel-Lodzinska, 2017, 2018; Kubiciel-Lodzinska & Ruszczak, 2016).

Models and features of the innovative process

R. Rothwell presented and discussed the model of executing innovative processes by relying on all kinds of changes affecting the economy, starting from the 1950s (Dodgson M., Rothwell R., 1996).

- **The supply-based model of innovation processes**

It is the first-generation model – innovations pushed by science. It functioned from the 1950s to the middle of the 1960s. Its causes were the huge needs and fast economic growth, which were characteristic in the post-war period. Enterprises awaited for the evolution of scientific discoveries that would be possible to be implemented into production. In that time, enterprises followed the dependency "the more resources and research and development, the more new products in the market", however over time the number of introduced innovations that brought no benefits and even caused losses for enterprises increased. This situation was inspiring and changed the approach, which gave way for the creation of the second-generation model.

- **The demand-based model of innovation processes**

It was established in the mid-1960s and lasted until the mid-1970s, where the battle for the market share was a specific feature of the economy. The basis for this model was the increase in competitiveness and market share losses, which pointed to the consumer needs. It is related to analysing the benefits and costs of given research projects. It is also necessary to note the establishment of stronger relations between the R&D unit and the enterprise by combining engineers and scientists into teams working on a given product. The main intent of this activity was to reduce the time of product implementation into the economy. Due to the fact that the market was the main source of the concept for R&D work, the focus was too much on improving the products available, which halted the activities on radical innovations.

- **Supply and demand chain model taking into consideration feedback**

The model functioned from the mid-1970s to the mid-1980s. The reason for it was the need to continuously monitor the environment when executing an innovative process. The main focus was on lowering the costs of development and the only work done was the developmental work that was to provide the greatest benefits.

- **Fourth-generation model – co-operation model**

The model encountered between the mid-1980s to the mid-1990s. The reason for its creation was the acceleration of civilizational development and an increase in the demand for capital. The focus was on strengthening the processes taking place inside the enterprise, which lead to expanding the entire concept. The biggest limitation of the XX century were financial resources, which is why the focus was on the overall network integration the ensure flexibility and fast growth. The basis for the above described model was the co-operation of all company elements (A. Pomykalski, 2013, pp. 5-15).

- **Fifth-generation model – strategy and integration model**

In this model, we can distinguish feedback between the processes taking place inside and outside the company. It also takes into consideration the "trade-off" type dependency between time and the innovation formulation cost. The basic competitiveness factor was the ability to effectively develop and implement a suitable innovation. This was the decisive factor in vigorously developing areas where the product's life cycle became considerably reduced (Tidd J., Bessant J., Pavitt K. 2006; Knosala R., Boratyńska-Sala A., Jurczyk-Bunkowska M., Moczała A., 2014).

When executing an innovative project, each enterprise knows that there can be a certain risk. With this in mind, the enterprises divide the projects into certain stages to systematically control the course of the executed activities and in the case shortcomings, to be able to eliminate errors or repair them

on an on-going basis, systematically evaluate the resource allocation and engage many internal structures in the project's execution (Tidd, J., Bessant, J., 2013, ; Postawka M, 2007, pp. 4-22).

Innovative Process Implementation

Service Innovativeness

Through the term of service innovativeness, we can understand both the products offered by the given enterprise and the process of the services provided by it, the logistics process, enterprise management process or the relations with the environment (Hawrysz, 2016). However, specific features referring to the services make the innovation process to be relatively different from the production activity. The main and most important factor in service enterprises is the contact with the customer, who is a very important source of innovations for the given company. This is not only a reference to the opinions issued by the customer, but also to his or her reactions during the service offering. The way that a given innovation source is used depends largely on the employees – their sensibility and competencies and positive emotions (Sauberer et. al. 2015).. It is worth noting that customer behaviours will be varied during the provision of services, which is why some of the offered innovative solutions will not be repeated by the enterprises (Kusa R., 2004, p. 380–386).

Table 1: Areas of innovation in service enterprises

Area of innovativeness	What methods should an entrepreneur use to increase its company's innovativeness?	Examples of the entrepreneur's actions
New concept of service provision	Knowledge on the existing competitive services in the market: who provides them? What is their quality? What are the prices of the offered services? Who buys them? Are there substitutes for them?	• In-house market studies • Benchmarking • Employment of a consulting company • Employment of an expert
New concept of co-operation with the customer	Knowledge on the current and potential customers	• In-house market studies • Employment of a consulting company • Employment of an expert • Inviting customers to co-operate (through crowdsourcing, i.e. creating innovation through customers, etc.)
New system of service distribution	Knowledge of our employees: their skills, attitudes. Knowledge of competitive companies' employees	• Employment on competitive conditions of the competitive companies' employees • Establishment of a customer club • Establishment of a franchise system • Watching foreign solutions (e.g. the founder of the

		Starbucks coffee shop used inspirations gained during his holidays in Italy, when he observed Italian coffee shops).

Source: Jan Fazlagić, Is your company innovative? How to seek innovations in the services sector? Advice for Small and Medium Enterprises, Polish Agency for Enterprise Development

Designing and implementation of innovative solutions

An increase in an enterprise's creativity is the main element that can support the designing of innovations, mainly with the use of inventive creation methods. The objective of such methods is problem solving using an unconventional, sometimes even unrealistic thinking which leads to the finding of new goods or processes. It allows for finding undiscovered solutions, minimising expenditure and time for innovation implementation, resulting in the company's improves competitiveness and innovativeness (P. Bębenek, 2015, pp. 165-175).

Characteristic features of the science of inventive creation:

- *"constructing and establishing new products"*
- *"solving difficulties, problems in a creative manner"*
- *"progress and supporting attributes related to the creative process"*
- *"delegation of relationships between facts"*
- *"individual result achievement"*
- *"specification of theories and assumptions"*
- *"lack of protection and guarantee of developing a solution to the problem"* (Jagoda-Sobalak D., Marek-Kołodziej K., Łapuńka I., 2018, p. 1229-1240)

An innovative enterprise uses three basic, however very important elements: creating innovative ideas, using them in practice, incurring the costs of their execution.

An innovative enterprise develops and uses pioneer products, but is also fully ready for the changes occurring in its environment. All activities executed prior to innovation implementation are aimed at gaining innovative technologies, but also preparing the company to implement specific processes. It is important for the enterprise's preparatory period to be used effectively, because it contributes to the first measurable financial benefits deriving from the implementation.

The innovation implementation in an organisation is based on two basic documents which include: the technology documentation and business plan, whereas the technology implementation consists of the following steps:

- *Implementation initiation (all activities executed in earlier stages, which allowed for obtaining the technology and developing the suitable documentation)*
- *Implementation planning (appointing the implementation team, planning the organisation and communications, planning the scope of activities, preparation of the implementation schedule, planning the resources, planning the quality, planning the risk)*
- *Preliminary implementation (infrastructure, human resources, material resources, financial resources)*
- *Proper implementation (production/manufacturing, production/manufacturing control and monitoring activities, distribution and sales, recipient surveying)*
- *Secondary implementation (technology or process modification)*
- *Implementation completion (standardised mass production, servicing)*

All innovations that can be initiated in the organisation require regulating the receivables, i.e. purchase of patent or license or purchase of software. The product's performance quality, which

is synchronised with the potential buyer's needs is obligatory during each step of activities related to the implementation. At the time of test implementation of its innovative product or service, the enterprise should establish a scope of activities enabling it to conclude whether the product or service implementation is fitting and beneficial.

Development And Implementation Works – Product Development And Testing

Development works can be defined in many ways, these especially include the developmental processes for a new product. A ***product*** is nothing but offering goods that will satisfy the consumers' needs. The term of product development is understood as the designing of a new model that will undergo testing. At the time of prototype creation, the design engineers should conduct precise reviews to their adequacy and competence, whereas the team tasked with designing the given product develops the documentation that includes an accurate technical specification (required parameters, structure, composition). The same group is also tasked with developing the technical and production documentation, which include such data as the production processes' and technologies' specification. The conducted prototype testing enable transitioning to the next step, which is the testing in laboratory conditions to check whether the given product (P. Bębenek, 2017, pp. 121-128) model complies with the expectations and the design documentation.

Potential customers can check and evaluate the product that is to be launched on the market. It is a way of testing the given goods, both in natural and laboratory conditions. This form of testing has many advantages including the ability to observe and compare the new product with other products and lack of urgency.

The testing can be as follows:

- Blank test - offering customers product samples that are encoded for the person participating in the test. Product encoding is to exclude factors that can affect the customer's opinion.
- Occasional test – based on providing answers in a survey used for information purposes. The surveyed participant knows the product he or she is testing (Frąś J., 2013, p. 175-186).

Implementation - economic analysis of a new product

In order to avoid additional costs, prior to commencing the work on the development of a prototype, an economic and financial analysis is conducted during the new product concept's implementation. This analysis should allow us to answer the following questions:

- What is the market capacity? (how many can be sell)
- What are the fixed and variable costs?
- What are the marketing costs?
- What quantity of the new product must be sold to achieve the safety margin?
- What prices guarantees the product's sales and profitability?
- What sales volume should be planned in a given period to guarantee profit?
- How should the production plan be developed to include the possessed production cycles?
- How to achieve the assumed objectives, especially the financial objectives?

The notions that can be encountered when conducting an economic and financial analysis are notions concerning the costs that will be incurred during the preparation, implementation and launching the product on the market. When we implement a new product, it is worth considering the phenomenon of the so-called cannibalism – it is a phenomenon when a part of the given company's employees gives up on purchasing the currently available products to be able to buy a new innovative product. An effect of this phenomenon is the lowering of the costs on available products in favour of the new implemented product (Frąś J., 2013, p. 175-186).

Research Method

The study was conducted using the in-depth interview (IDI) method, classified as one of the basic techniques of qualitative studying. It is based on having a talk with the respondent. The interview's purpose is to obtain a detailed opinion and information from the company's owner concerning the executed innovative project. The applied technique was aimed at check whether the innovation process was executed according to the specified stages, which allowed the entrepreneur to plan and implement the innovative solutions in an effective manner. The model's aim was to check what was the process of seeking the solution that was later implemented. By using this technique, we are able to clarify the nature of the tested phenomenon, to get to the essence of things and obtain information which would be hard to obtain by other methods, like surveys, among others.

Main subject of activity: purchase of grain, rape and legume seeds, warehousing and warehouse services, production of seed, providing services using agricultural equipment, providing farmers with materials for agricultural production, crop production on owned fields. AGROPOL Łosiów executes the project as part of measure RPOP.01.01.00. Innovation support. Project title: Development of a prototype system for the test sampling of storage mass based on visual technology and conducting industrial research and developmental works in terms of the effectiveness of the applied method in the drying process – process testing and validation

Brief description of the technological process' stages

- Weighting; the transport mean is weighted on a scale
- Sampling; the sampling from transport means (e.g. trailer) is done using a special crop sampling device (Rakoraf sampler) in various trailer points. At the same time, a device for the visual impurities' evaluation method is fastened to the penetrator's lance. The test will take place simultaneously using the conventional method and the new visual method to ensure continuous results' comparison. The basis of the conventional method: the probe collects a seed portion from the transport mean, then it transports it to the laboratory, where the seeds' parameters evaluation is conducted. In the visual method, which is strictly correlated with the conventional method, the evaluation device will be paired with the seed collecting probe and will evaluate the seed's parameters directly on the transport mean. The data will be sent via electronic impulses to the laboratory. The parameters of each sample will be confronted using two methods to achieve the best possible evaluation.
  The device is equipped with specialist accessories and software based on the so-called Artificial Intelligence (neural network), in which the crop is evaluated using various parameters and data is collected for research purposes, where the computer is learning to recognise all seed parameters.
- Unloading, internal-lift transport;
- Cleaning (separation);
- Drying; Aspiration, separation and receipt of impurities;
- Storage, transport and maintenance;

The main purpose established as result of the project's execution is the development of the seed quality evaluation devices, which will use the white light spectrum in an innovative manner to evaluate the quality of the seed accepted at crop warehouses. A prototype intended for the testing and checking of the developed device is being created to achieve the aforementioned objective. At first, it was planned for the sampling to take place during the product's acceptance and issue (from/to the warehouse). The current concept assumed the creation of a prototype from the devices available in the market. On the other hand, the warehouse sampling, which was also intended to be a prototype element, was initially based on a manual sampling system.

Innovative Process Stages

INTERVIEW – in-depth analysis
Condition fulfilment: condition met 2; condition partially met 1; condition not met 0,

Stage I – Creation of ideas

- Was there a consumer needs' analysis conducted and what was it?
- What was the basis for determining the enterprise's technical and market capabilities?
- What was the decisive factor in the selection of this branch of industry?
- Were the assumptions of a single idea achieved, what is developed gradually?
- Were the competitive solutions available in the market studied?

Result:
5 questions – maximum score: 10 points
Condition met – 4 points
Condition partially met – 2 points
Condition not met – 0 points

Stage II – Feasibility analysis

- What innovative products or services were to ensure the project's success?
- What was the project's feasibility analysis? Were the strengths and weaknesses as well as opportunities and threats analysed?
- What was the basis for establishing the initial price and was the target market analysis conducted?
- Were you focusing on a preliminary market forecast? (current market trend analysis, market tests, analysis of the factors shaping the demand and its formation)
- Was a preliminary analysis on the customers' opinion conducted and were you able to evaluate whether the offered services attract the interest of potential buyers?
- Was the project's preliminary profitability evaluation conducted?
  If so, what was it, what were its effects.
- Was there an estimation of the initial benefits deriving from the functioning of the brand and the products/services belonging to the brand conducted?
  What is a brand for you?
- Was the market analysed to get to know the suppliers' offers?
- Was there a preliminary analysis of the financing sources that would have a positive effect on the enterprise's success conducted?
- Was the project's preliminary plan developed? What did it include? Was it modified over time?

Result:
9 questions – maximum score: 18 points
Condition met – 16 points
Condition partially met – 2 points
Condition not met – 0 points

Stage III – Plan and project development

- Was the concept tested? If so, what was the test?
- Did you make a detailed product/service makeup during the plan's development? What did it include? Was the prototype developed?
- Was there an on-going demand forecast conducted to determine the demand for the offered services?
- Did you have a specific project execution plan and was it necessary (weaknesses, strengths)?
- Was the plans and indices' credibility evaluated?

Result:
5 questions – maximum score: 10 points
Condition met – 6 points
Condition partially met – 2 points
Condition not met – 0 points

Stage IV- Development and testing

- Was the production technology developed and approved, what was it and what did it include?
- Were the product's/service's performance and reliability tests conducted and what were their results?
- Was the price specified earlier changed, how was it changed?
- Was a repeated market forecast conducted?
- How was the brand's image built and how did it distinguish the brand from the competition?
- Have you received any certificates?

Result:
6 questions – maximum score: 12 points
Condition met – 2 points
Condition partially met – 4 points
Condition not met – 0 points

Stage V- Commencement of production and sales

- Were the employees trained and is there further training planned?
- How is quality assurance planned?
  What are the quality systems?
- Were promotional materials developed, if so, then what were they; what was the advertising campaign – if no, then why?
- Was a repeated product/service price correction required after the precise market analysis and competition identification?
- Was action related to the product/services distribution strategy organisation in the enterprise undertaken (were you able to select adequate distribution channels)?
- Do you recognise complaints and if so, what are the rules?
- In terms of geographic range, in which market do you operate and are you planning to expand the sales market?
- Was there a project summary and evaluation conducted, what conclusions were drawn?

Result:
8 questions – maximum score: 16 points
Condition met – 6 points
condition partially met – 1 point
condition not met – 0 points

Stage	% of execution
Stage I – Creation of ideas	60
Stage II – Feasibility analysis	100
Stage III – Plan and project development	80
Stage IV- Development and testing	50
Stage V- Commencement of production and sales	43.75

Summarising stage V – commencement of production and sales, the enterprise is focusing (simultaneously fully meeting the condition) mainly on training the employees in the implemented project and is currently applying for a subsidy for a products' storage training. Another element that is fully met by the company is the enterprise's advertising, which in comparison to others is rather specific, because if is based on sending an employee to the customer, which results in the consumer seeing the engagement of the company, which relies on aid and consulting. The condition that is also fully met is the enterprise's complaint recognition. At the moment, the company does not have any quality systems, but it cannot be ruled out that this will not change in the future. Referring to the repeated correction of the offered services or products, the company did not feel such a need, which is why it does not meet the condition. However, as for the market in which the company operates, it is currently the domestic market, but the company has a positive attitude towards changes and may enter the foreign market in the future. At the moment, the condition concerning the project's

evaluation and summary is partially met, because the project is still in progress and an in-depth summarising analysis will be conducted when the activities are concluded.

Conclusion

Innovative processes differ substantially depending on the sector in terms of degree of development, rate of process changes, relations and access to knowledge, as well as in terms of organisational structures and institutional factors (e.g. Malerba, 2005, Hawrysz, 2017). Some sectors are characterised by sudden changes and radical innovations, whereas others feature smaller, gradual changes. Research and development play a key role in innovative activity in the high-technology sectors, whereas other sectors rely more on knowledge and technology acquisition. The differences in the scope of innovative activity between sectors (e.g. advantage of incremental or radical innovations) are also related to different requirements for the company's organisational structure, whereas the role and significance of institutional factors, such as legal regulations or intellectual property protection, can vary. Important is also the possibility of use competencies of employees (Kubiciel-Lodzińska, Solga, 2019) It is important however to take these differences into consideration when creating a public policy. It is important however to take these differences into consideration when creating a public policy. They also pay an important role when conducting measurements, both when collecting data allowing for conducting a sectional analysis of various sectors and regions, and when it is necessary to ensure the measurement system's usefulness for a broad group of activity types.

The main purpose of the paper was to check whether the enterprise is implementing innovations (Malerba F., 2005, p. 14, 1-2, 63-82) and how does it used them. The innovation implementation model analysis was developed using the example of an enterprise that executes the "*innovativeness support' innovative activities*, specifically the project titled "*Development of a prototype system for the test sampling of storage mass based on visual technology and conducting industrial research and development works in terms of the effectiveness of the applied method in the drying process – process testing and validation*". The purpose of this process is to create a device that will evaluate the seed quality by using the white light spectrum in an innovative manner to evaluate the quality of the seed accepted at crop warehouses. Referring to the warehouse sampling, which as it turned out will be based on the manual sampling system and considering the fact that it is necessary to correctly shape the crop storage prism to enable the correct sampling and sample checking, the company started to analyse the market to find a device that serve the structural changes and eliminate the human factor. Thanks to these activities, the enterprise created a new prototype solution that will enable controlling the product in the future through the construction of the given device.

In summary, it is possible to state that the innovation implementation is an important factor that contributes to the high level of competitiveness (Jakubiec, M., 2016, pp. 63-76.). It does not come down solely to improving the available solutions, but also includes the generation and implementation of completely new methods that are not yet present in the market. Agropol is a great example due to the fact that the idea for constructing a new devices will not only streamline the company's activities, but also eliminate the human factor.

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Challenges of Working in Multicultural Environment From the Perspective of Members of Intercultural Teams

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Abstract

The article presents the challenges connected with working in multicultural environment. In the authors' opinion, these challenges include the employees' and managers' levels of cultural intelligence, effective intercultural communication, and the efficient and effective functioning in a multicultural team. The article is based on a review of the subject literature and the study conducted as part of the project: Social Integration Leaders (Liderzy Integracji Społecznej). The model programme for the improvement of migrants' social competence under the Operational Programme Knowledge Education Development (Program Operacyjny Wiedza Edukacja Rozwój) 2014-2020, co-financed by the European Social Fund in the field of social competence of migrants working in intercultural teams. The aim of the article is to analyse the challenges of working in multicultural environment identified by the respondents of the study conducted among the Ukrainians who live in Poland and work in culturally diverse teams. In order to compare the challenges of working in multicultural environment, the authors also referred to other studies conducted among employees of other nationalities.

Keywords: Multicultural Environment, Multicultural Teams, Intercultural Managers, Challenges

Introduction

Culture begins with the appearance of man. The results of human activity are visible immediately, and they are conditioned by certain goals, values and needs that motivate human behaviour. Every society creates culture, because culture begins when man appears. But the culture a given society creates is the culture specific to this society and represents its typical values, attitudes, and behaviours.

This article presents the analysis of the challenges of working in multicultural environment, understood as a community made up of representatives of different cultural groups in terms of their nationality. The authors present the difficulties connected with working in multicultural environment indicated by the Ukrainians living in Poland and working in intercultural teams and compare these difficulties, in the article called challenges, to the opinions of employees of intercultural teams of other nationalities.

Nowadays the challenges of working in multicultural environment include, first of all, communication, cultural intelligence, and deficits in the effective functioning in culturally diverse teams. They are primarily negative attitudes towards cooperation with other people working in the same team, the inability to appropriately react to conflict in a team, and intercultural relationships in a

team. In the authors' opinion, they are the key challenges that should be of particular interest to managers of culturally diverse teams.

In the theoretical part the authors describe the concept of multiculturalism and discuss significant, in their opinion, challenges connected with working in multicultural environment.

In the next part the authors present those results of the study which are relevant to the issues analysed in the article. The study was based on individual in-depth interviews conducted with the use of the interview scenario developed by the authors and in-depth focus group interviews. Then, the comparative research method was applied to compare the results obtained in this study and in other studies whose authors also analysed challenges in multicultural work environment.

Considering the above premises as well as the aim of the article, the following research question was formulated: What are the key challenges of working in multicultural environment in the opinion of Ukrainian employees compared to employees of other nationalities?

Cultural Diversity as A Key Element of Work in Multicultural Environment

Human societies differ in terms of culture, thus, according to Ch. Taylor (2001, p. 121), "Perhaps they are mutually disproportionate, and just as we recognize that in general the existence of certain goods depends on the existence of people, so we may have to accept that certain goods are such and not others only because of the existence of people within certain cultures". It can be reasonably claimed that members of different societies represent different ways of being a human.

As G. Mathews observes (2005, p. 17), "Cultures (...) are like a buffet table. You just take what you want. This way we can define culture as information and identities available in the global cultural supermarket". The term "cultural supermarket" is also frequently used and denotes a space where everyone has the right to choose one of the cultures that suits them best.

The term multiculturalism first entered the lexicon in the late 1960s in Canada. In the United States, Australia, and New Zealand the issue of the country's ethnic structure became the topic of public debate later, and next the term appeared in Europe. The idea of multiculturalism was an alternative to previously used assimilation concepts which supported a dominant group at the expense of minorities. One of them was a melting pot concept that aimed at turning diversity into uniform mass - into a "new man", an emigrant assimilated to the life in new conditions. The melting pot ideology did not work because many groups lost contact with their native roots, but did not adopt the patterns of their new country and did not create their own patterns. The second concept was Anglo-conformity based on the slogan: One Country! One Language! One Flag!, and the third concept was multicultural pluralism. This new approach to multiculturalism was referred to as a "salad bowl" in the United States and as a "cultural mosaic" in Canada, and meant that each culture maintained its own characteristics, did not mix with others, and did not create one homogeneous culture (Czerniejewska, 2016).

Whatever definition of multiculturalism we adopt, there is no doubt that multiculturalism has become something irreversible, just like migration or the use of the Internet. M. Krajewski (1997, p. 24) rightly observes that "multiculturalism (the interpenetration of contradictory traditions, patterns, laws, models of social regulation, thought systems, co-existence in the same neighbourhood of individuals differing in skin colour and attitude to the world, God and people) has become a necessity, something irrevocable and already existing, rather than a utopian project requiring a perfect idea and necessary justification for its realization".

A. Śliz and M. S. Szczepański (2011, p. 11) write: "the mere co-occurrence of two or more groups with different culture is not enough to talk of the existence of multiculturalism, which occurs only when permanent, multifaceted and voluntary forms of intercultural contacts appear. They result in the qualitatively new and culturally diverse whole. Its characteristic feature is the end of overt cultural domination, the end of the superior position of the previously dominant culture over other cultures".

A. Sadowski (1999, p. 14-15) adds that "multiculturalism is therefore used to designate a differentiated cultural system created on the basis of democratic principles, which, apart from this significant diversity, is characterised by elements of such coherence that allows for joint actions". Canada is an example of a country without dominant culture - the notions of majority and minority do not exist there because its society has been built by successive, equally-treated groups of immigrants. Contemporary European societies are no longer homogeneous communities in terms of their identity, history, axiology and culture (Krajewska-Kułak and Łukaszuk, 2016). The situation is similar in contemporary companies operating on an international scale. Multicultural teams are currently a normal part of the functioning of an organization.

Work In Multicultural Teams - Implications For Employees And Managers

Cultural diversity in the workplace emerged as a result of globalization. Its "one positive effect is that employees belonging to different cultures usually have different ways of thinking and can thus analyse a matter at hand from a variety of perspectives. This is hard to achieve when employees belonging to the same culture are asked to analyse the same matter" (Martin, 2014, p. 89).

Identifying work values of each culture is an important part of this process. According to Hofstede (2001), work values are significant due to two different reasons. First, they are an excellent measure of culture because they are shaped more by sociological and cultural factors than by individual psychological differences. Secondly, work values of employees of a given organization affect it in many ways, including the ability to change, conflict resolution, communication, and motivation.

Moving beyond the idea of work values as the foundation for important and popular theories of motivation, work values in and of themselves have important implications for the organization. Cultural differences in work values can be used to explain differences in the individual's performance and to predict job satisfaction, to develop committed workforce and to prepare the organization for functioning during periods of change. In addition, understanding employees' work values can aid negotiation, assist in developing effective reward systems, affect leadership and management style, and facilitate communication and organizational performance. If employees are unable to meet their work values through their work, they may become dissatisfied, envious of co-workers, or even resign from their job (Matić, 2008).

The level of cultural intelligence of employees and managers and its formation is undoubtedly a challenge in multicultural work environment. Organizations employ many different types of individuals, often those who do not want to adapt to co-workers, business partners, or customers. These employees can nevertheless be beneficial for organizations based on intercultural interactions if their motivational cultural intelligence (CQ) is increased. The motivational CQ factor can lead to adaptation through behavioural CQ. Apart from increasing their employees' CQ, organizations should guide their human resource managers to find extroverts who will be engaged in international work and train them to increase their self-confidence and self-efficacy. Multinational organizations should also develop special training programmes aimed at enhancing positive psychological capital of their employees. Such programmes will be beneficial to all employees, not only the ones who are directly engaged in international operations. It might also be a good idea to organise short cultural training programs in the host-country which are not connected with work. To improve the effectiveness of employees in multicultural organizations, efforts should be made to recruit the right people, to match them to the right managers, and to provide adequate training for them. Following these suggestions can support developing motivated and culture-savvy workforce and give the organization a competitive advantage on the market (Day, 2017).

D. Simpson (2017, p. 164) points out that companies operating on the global market should pay more attention to recruitment and training, including cultural training, of their managers, especially the ones engaged in international operations. This applies in particular to projects run by teams composed of representatives of different cultures, whose contacts are mainly or exclusively virtual. It is recommended that recruitment and selection procedures should include tests verifying the candidates'

level of cultural intelligence, which would help to plan and adapt cultural training to the employees' needs.

Another challenge in multicultural work environment is effective intercultural communication. The term *intercultural communication* refers to a process of interpersonal communication, direct and unmediated, which takes place between people aware of their cultural differences. Intercultural communication was born "due to the interaction of several common notions such as: cross-cultural communication, international communication, intercultural relations" (Jandt, 2004).

In the process of intercultural communication, it is important "to search for perspectives that will create a specific community and, at the same time, will recognize the diversity of visions and will build social unity, taking into account the diversity of views and specificity of groups. Multiculturalism seems to create a public space that enables different groups to interact and thus proposes different forms of pluralism, which can only be understood as the co-existence of different cultures, which might even lead to the creation of ordered social structures (...). The problem is how we perceive Others, whether and how we understand them, what we approve in them, and what qualities - other than our own - we value" (Nikitorowicz, 2013, p. 10).

Intercultural communication also depends on the individuals' socio-cultural identity and the degree of their (un)awareness of this identity, which is a derivative of their reflective or non-reflective life. M. Sobecki (2016, p. 99) observes that "the fact that an individual is aware of his inner cultural heterogeneity, understood as belonging to many cultural communities, is an important factor facilitating intercultural interaction".

Elaborating on the issue of developing intercultural competence, P. E. Gębal (2010) advocates training in four areas:

- perception: training should include free associations with the visual stimuli and films, noticing stereotypes and cultural standards (one's own and other's), telling the same story from the perspective of behaviour typical of one's own country, describing the material following the scheme: description – interpretation – one's own feelings - similarities and differences in the Polish culture and the listener's culture;
- interpreting utterances and situations: training should be aimed at developing strategies of interpreting the meaning of what was said and in what circumstances and include describing one's own associations connected with given concepts and comparing them with the associations of the Poles, sensitizing to conflict situations and ways of dealing with them, and role-playing in various situations;
- comparing cultures: putting on the Other's cultural shoes, creating the third culture, and developing tolerance for meeting the Other;
- communicating: being able to effectively communicate in intercultural situations, paying attention to conflict situations, polite forms of address, non-verbal communication (significant gestures, facial expressions).

The four areas of training listed above can lead to understanding other people's behaviour, tolerance of ambiguity, communicative competence, the ability to deal with uncertain situations, openness to Others and cultural differences.

Multiculturalism of organizations has markedly increased in the past three decades. As a result, organizations now face a growing need for human resource management (HRM) able to deal with the consequences of such increased cultural diversity. Among various processes and practices used in HRM, process training and negotiations seem to be most useful as far as employees' multiculturalism is concerned (Narkhede, 2011).

Methodology

The study was conducted as part of the project: Social Integration Leaders [Liderzy Integracji Społecznej). The model programme for the improvement of migrants' social competence under the Operational Programme Knowledge Education Development (Program Operacyjny Wiedza Edukacja Rozwój) 2014-2020, co-financed by the European Social Fund. 58 individual in-depth interviews were conducted with Ukrainians working in intercultural teams, i.e. in teams whose members are representatives of at least two different cultural groups (taking into account their nationality). Employees' social competence significantly determines the effectiveness of the functioning in multicultural work environment, therefore, the aim of the study was to demonstrate - on the basis of the analysis and evaluation of selected competences of the Ukrainian immigrants (members of intercultural teams) - what challenges are important for working in multicultural environment. The in-depth group interviews were held in three groups consisting of six persons and investigated, among others, the impact of employees' social competence on their functioning in intercultural teams. The results served as the basis for identifying other challenges related to work in multicultural environment.

Most respondents who participated in individual in-depth interviews (38 persons) worked in international corporations, in teams characterised by a great diversity of nationalities. The positions held by them included: project coordinator, human resources specialist, human resources manager, EU project specialist, development manager, technical director and regional manager.

A special research tool was created for individual in-depth interviews, namely a scenario of an individual in-depth interview. The interviews took place in Cracow between March and May 2019 and lasted from 45 to 85 minutes. Three focus group interviews were conducted in September 2019. All the interviews were recorded on a voice recorder and then transcribed, coded and categorised, which allowed for performing the qualitative analysis of the respondents' statements. The quantitative analysis of these statements was also conducted. In the section presenting the results of the study, bearing in mind the qualitative nature of the interviews and following the standards, the authors quote selected statements of the respondents.

58 respondents, including 36 women and 22 men, took part in the individual in-depth interviews; they were aged between 17 and 50, with the average age 31. 42 respondents were university graduates, 13 - high school graduates, 1 – did not complete his university education, 1 attended a vocational school, and 1 – a junior high school. The respondents had lived in Poland between 1 month and 14 years, with their average stay in Poland 3.5 years. The average period of employment of 48 respondents who had been working in Poland was 3 years. The study covered, among others, the following areas: communication, the functioning in a team, and the expectations of employees working in intercultural teams. In the article the authors refer only to those results of the study which are the relevant in the context of the analysed problems, i.e. challenges related to multiculturalism.

In order to compare the challenges of working in multicultural environment, the authors used the comparative research method and referred to the results of three other studies. The first one was conducted by M. Jayanthi (2014) among the employees of a leading software company in India, which operates internationally. The team consisted of two groups, one operating in Mexico and the other in India. The second one was conducted by H. Ors and N. Soğancılar (2018) among the executive directors of MNC (multinational companies) operating in Turkey, while the third one - by A. Gut, M. Wilczewski, and O. Gorbaniuk (2017) among 20 Chinese employees working for one of the largest global manufacturing companies operating in international environment (in one of the company's subsidiaries in China).

Challenges of working in multicultural environment – the results of the study

The results of the study discussed in the article refer to challenges connected with working in multicultural environment. The following facets of the respondents' social competence were investigated in the individual in-depth interviews: motivation, assertiveness, self-

presentation/building one's own image, communication - building interpersonal relationships, stress and conflict management, emotional intelligence, functioning in a team, and change management, all of which – in the authors' opinion – significantly affect working in multicultural environment. Deficits in the above mentioned competencies pose a challenge, both for employees and managers, to working in multicultural environment.

The authors of the article analysed only selected data obtained during the interviews: the ones referring to the competences specifically indicated by the respondents as linked with the greatest challenges they faced in their work in multicultural environment.

The individual in-depth interviews revealed that the respondents considered communication and efficient and effective functioning in a culturally diverse team to be the main and definitely predominating challenges of multicultural work environment. These two elements were closely related to the attitude towards cooperation with other people within a team, the awareness of the factors conductive to efficient and effective teamwork, the ability to react appropriately to conflict within a team, and noticing the positive features of working in a multicultural team.

The analysis of the results of the study (individual in-depth interviews) demonstrated that as many as 52 respondents reported communication problems. The majority of them also pointed to the knowledge of the Polish language, emphasizing that this was not the only problem in the area of communication. The analysis of the respondents' statements revealed that the spoken word was only a small part of the message, and other elements, including cultural significance, were equally important.

During the interviews, the respondents' opinions on the functioning in a multicultural team were also investigated. The analysis of this part showed that 11 persons declared a negative attitude towards cooperating with other people as a team member. These were the respondents who felt better doing the kind of individual work in which they did not have to be responsible for the work of others.

The respondents defined the characteristics of an effective and efficient team, paying particular attention to such features of its members as: positive attitude, discipline, responsibility, education, manners, honesty, and having a common goal. "People in a team should have common goals, values, purpose" (Respondent 26, male, aged 28); "Calm people, integrated, positive people" (Respondent 43, female, aged 27); "Adequate education, be disciplined, responsible, polite in relationships" (Respondent 7, male, aged 21).

The respondents were also asked about the ways of reacting to conflict in a team. Almost all of them unanimously declared that the basic method of conflict resolution is dialogue. "Dialogue is the most important, being able to explain your point of view calmly" (Respondent 3, male, aged 34); "You have to sit down together and solve the problem together, explain it" (Respondent 50, female, aged 26). 9 respondents admitted to being unable to constructively react to conflicts in a team.

The respondents answered the question whether working in a multicultural team had more positive or negative aspects. Almost all of them (56 persons) stated that multiculturalism was definitely the team's asset, and listed its following positive features: "It is better when the team is mixed because it is always some new experience, you can learn more about the country" (Respondent 22, female, aged 31); "It's nice to work in a mixed team, e.g. a wider range of foreign language skills" (Respondent 22, female, aged 31). Only 2 respondents indicated negative features of working in a multicultural team.

As the study was aimed at, among others, obtaining information regarding the challenges of working in multicultural environment on the basis of the deficits in the area of the respondents' competences, they were asked whether they had participated in any form of support or assistance in the development of their professional and language competences or in the process of adapting to their work environment, and what forms of support they would expect in this area. Nearly half of them (25 persons) declared that they were the recipients of various forms of support, including 21 persons who

attended language courses. Most of them were satisfied with the help they received, but there were also several answers (3 respondents) which pointed to failure and discouragement. The remaining persons (as many as 33 respondents) did not participate in any form of support.

The focus group interviews revealed that, in the respondents' opinion, challenges in multicultural work environment were related to the areas influenced by employees' social competence, which includes interpersonal relationships (15 persons), effective communication (16 persons), effective cooperation (15 persons), the ability to look for constructive solutions (12 persons), and the ability to solve difficult, conflict situations (15 persons). The respondents also drew attention to other challenges, e.g. the cultural context of cooperation within a team (15 persons), positive intercultural relationships (14 persons), how quickly tasks are completed (12 persons), work quality (15 persons), openness to changes (12 persons), and creativity and innovation (11 persons).

The analysis of the results of the individual in-depth interviews demonstrated that almost all the respondents (except 6 persons) mentioned communication problems as a challenge. The majority also considered their deficits in the area of effective functioning in a multicultural team to be a challenge. The analysis of in-depth group interviews pointed at the challenges of working in multicultural environment resulting from inadequate social competence of members of such teams.

Summing up, the results of the study reveal that communication and the effective functioning in a team are the key challenges related to multiculturalism in work environment, which means that special attention should be paid to them in managing culturally diverse teams. Other challenges connected with the efficient functioning of an intercultural team include: interpersonal relationships, cooperation, searching for solutions, conflict resolution, and intercultural relationships in a team.

The study investigating challenges of working in a multicultural team was also conducted by M. Jayanthi (2014). The respondents were the members of the Technology Analysts team working in a leading software company in India, which operates internationally. The team consisted of 120 members divided into two groups, one working in Mexico and the other in India. The sample size was 42, and convenience sampling was used for the sample selection. The questions used in the questionnaire were based on the conclusions from previous studies devoted to multicultural teams. The questionnaire was sent to the respondents via e-mail. The results of the study pointed to the challenges faced by multicultural teams and included communication problems, unfamiliarity with culture, attitudinal issues, perception issues and the impact of cultural diversity on the decision making process.

Another study in this area was conducted by H. Ors and N. Soğancılar (2018). Criterion sampling, which is a kind of purposeful sampling method, was used to select its respondents. The data was collected through 14 in-depth interviews held with executive managers of MNCs operating in Turkey. The managers' responses were analyzed by means of the content analysis and divided into conceptually corresponding categories. The results identified the following as the most frequent challenges faced by managers: ineffective communication, misunderstandings, different working styles and expectations of group members, as well as a lack of tolerance towards and knowledge of diversity. In order to cope with these challenges, managers suggested embracing diversity by encouraging group members to acknowledge it, by becoming approachable and eager to learn more, and, last but not least, by communicating in the simplest possible manner. Summing up, successful managers should be able to implement different management styles, depending on a situation, and be flexible enough to switch from one to another.

In May 2014 A. Gut, M. Wilczewski, and O. Gorbaniuk (2017) conducted a survey among 20 Chinese employees working for one of the top global manufacturing companies operating in international environment in one of the company's subsidiaries in China. The company has around 70 factories worldwide and employs over 100,000 people. Among the employees who completed the questionnaire, 10 were specialists, 7 - managers, and 3 - administrative workers; 9 of which worked in the support service department, 6 in the production department, and 5 in the communications department. All the managers reported that their intercultural communication took place with their

subordinates, while the remaining respondents communicated with their co-workers. Accordingly, the results refer to intercultural communication between managers and their subordinates as well as between employees at the same level (within in-groups).

The authors found that the respondents had encountered negative consequences of cultural diversity in their workplace, reflected in difficulties in communication with supervisors and co-workers from different cultures, both during work hours and after work, which, in some cases, even led to a decrease in their performance and, frequently, to a decrease in their satisfaction levels. Whatever the negative consequences were reported, the respondents displayed positive attitudes towards intercultural interactions and indicated cultural adaptability as a means to overcome those consequences. The results demonstrated that in the Chinese culture, with its collectivistic mode of making decisions and the interdependent perception of the "self", the respondents' beliefs included the following: the basic source of barriers in intercultural communication is ignoring or even disrespecting cultural diversity and stereotypical perception of the employees with a different cultural background; communication problems in intercultural interactions can be avoided when a different cultural background is respected. Chinese respondents saw cultural differences as a factor hindering the performance of their professional duties, however, it was not enough to discourage them from work. Most respondents believed that disrespecting cultural values was the greatest source of dissatisfaction and led to a decrease in their well-being and in positive attitudes towards co-workers. The results of the study indicated that the participants looked forward to cultural training as well as formal and informal meetings during which they could become familiar with other cultures (which corresponds with cultural adaptability as a way to overcome negative effects of intercultural interaction problems), so that, eventually, their cultures could be respected more.

The analysis of the results of all the studies presented in the article demonstrates that the key challenges related to working in multicultural environment are communication and the efficient functioning in a team.

Discussion

The aim of this article was to identify the challenges connected with working in multicultural environment which were indicated by the respondents - the Ukrainians living in Poland and working in intercultural teams - and to compare them with the challenges identified by employees of other nationalities.

The analysis of the results of the study conducted by the authors allowed for answering the research question. It was discovered that almost all the respondents mentioned problems with communication, although they observed that the spoken word was only a small part of the message, and other elements, including cultural significance, were equally important. Similar results were obtained by M. Jayanthi (2014): the employees of intercultural teams taking part in her study also listed communication problems as the greatest challenge in their work. Likewise, the study of H. Ors and N. Soğancılar (2018) found that ineffective communication and misunderstandings were the most common challenges faced by employees of intercultural teams. Similarly, A. Gut, M. Wilczewski and O. Gorbaniuk (2017) reported that their respondents faced negative effects of cultural diversity in the workplace, which were reflected in difficulties in communicating with superiors and colleagues from different cultures, both during working hours and after work. Ignoring or even disrespecting cultural diversity is the basic source of barriers in intercultural communication. Therefore, the comparison of the results obtained by the authors of the four studies quoted above clearly indicates that communication problems are the key challenge of working in multicultural teams.

The results of the study conducted by the authors of this article revealed that the respondents noticed deficits in their functioning in multicultural teams. The respondents defined the characteristics of an effective and efficient team, paying particular attention to such features of its members as: positive attitude, discipline, responsibility, education, manners, and honesty. They also mentioned that having a common goal was an important element conditioning effective functioning in multicultural

environment. Almost everyone unanimously declared that dialogue was the basic method of conflict resolution.

The mangers who took part in the study conduced by H. Ors and N. Soğancılar (2018) emphasized their employees' positive attitude to the challenges connected with working in intercultural teams, and encouraged them to acknowledge diversity and become approachable and willing to learn. Also A. Gut, M. Wilczewski, and O. Gorbaniuk (2017) paid attention to the respondents' positive attitude towards intercultural interactions and pointed to cultural adaptation as a way of overcoming conflict. Thus, a common conclusion drawn from these studies states that it is the employees' attitude that forms the basis for their proper functioning in intercultural teams.

The study conducted by the authors of the article also revealed that the challenges associated with working in multicultural environment include human relationships in culturally diverse teams, cooperation between employees from different cultures, and their ways of searching for solutions, resolving conflict, and maintaining intercultural relationships in a team.

Summarizing the results of the study, the authors would like to underline that the greatest challenges related to multiculturalism in work environment include communication and efficient functioning, and managers of culturally diverse teams should pay particular attention to them. Similar conclusions are offered by H. Ors and N. Soğancılar (2018), who believe that successful managers should be able to match different management styles to given circumstances, and to be flexible enough to enable their intercultural teams to function efficiently. The study conducted by A. Gut, M. Wilczewski, and O. Gorbaniuk (2017) found that the respondents expected cultural training as well as formal and informal meetings during which they could get to know other cultures better so that their own cultures could be more respected.

Conclusions

In the authors' opinion, the key challenges connected with working in multicultural environment include effective intercultural communication and efficient functioning of members of intercultural teams (which, to a great extent, depend on cultural intelligence of both employees and managers as well as their social competence), in the context of developing interpersonal relationships, shaping cooperation between employees, resolving conflict, and building positive intercultural relationships.

Culturally diverse employees are characterised by different features, working styles, motivation, needs and expectations. Managers of such teams should be aware of the challenges they pose to effective management of employees in multicultural work environment. They should extend and update their knowledge in this area and use their experience in order to, on the one hand, mitigate the negative effects of cultural diversity, such as conflicts and misunderstandings and, on the other hand, optimally develop the potential of multicultural teams, also in the area of creativity and innovation.

Multicultural teams are more susceptible to numerous challenges resulting from cultural diversity of their members. Employees and managers of such teams should be approachable, open, tolerant, willing to learn from others and possess excellent communication skills. Moreover, they should be able to understand and respect their co-workers' different values, working styles and their ways of communicating, problem solving, finding solutions, sharing knowledge and experiences.

According to the authors, the results of the study described in the article provide managers with information regarding the challenges they should pay particular attention to in multicultural work environment. Effective communication in intercultural teams is definitely more difficult than in culturally homogeneous teams and might pose a serious problem for many managers. Undoubtedly, the working styles, values and expectations of employees from various cultures differ, thus managers must be aware of these differences in order to better understand their employees and intervene in difficult situations when their intervention is required.

On the basis of their study, the authors recommend undertaking such initiatives (training and workshops) in multicultural work environment which can significantly improve the competences of employees and managers necessary to function effectively in multicultural work environment. The authors are convinced that it is crucial to increase employees' language competences and their knowledge about the culture and history of the country where they work and the countries from which they come, to extend their knowledge about multiculturalism, cooperation in culturally diverse teams, intercultural communication, as well as to implement training projects aimed at developing employees' cultural intelligence and social competence.

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Social Media Analytics for Marketing: A Theoretical Framework

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Abstract

Social media has significantly influenced forms of communication in both private and professional life. Social media users leave digital footprints of their activity that can be used to analyze their behavior on an unprecedented scale. The process of discovering knowledge about the activity of social media users is called social media analytics. SMA uses advanced techniques to analyze patterns in social media data to enable informed and insightful decision-making. This is still a growing research area. Can information explored from social media create value and affect competitive advantage through intelligent marketing? In this paper, we present a theoretical framework that explains how and why companies create value with big social data. Due this we can specify our research goal as present the benefits of big social data analytics in company on the example of the company's marketing activities. To achieve this goal, we set the following research questions: What is big social data? What is the difference between traditional data analytics versus big data analytics? Then, based on the review of the three fields (brand perception, consumer psychology and social media data as a support for business analytics system), we showed the directions of using big social data in intelligent marketing. It turns out that social media analytic can introduce many benefits for the company via sentiment analysis, network analysis or expanding knowledge of consumer psychology. Based on such conclusions, empirical studies estimating the benefits of including the social media mining process should be carried out in the future.

Keywords: Social Media, Big Social Data, Twitter, Social Media Marketing

Introduction

Currently, social media are no longer trivial and optional, it causes and redefining business landscape. A number of companies use Twitter, Facebook or Instagram to provide a variety of services and interact with consumers by official account (global and local) or / and by using global, current trends in user activity (e.g. Coca-Cola activity around Valentine's day hashtag on Twitter: 'last minute #ValetinesDay). Many consumers use different social media platforms to get information about products / services, participate in user groups with the same interests, share private life events, and track relevant information. Each activity in social media leaves a digital footprint, the set of them will be generally called as user generated content. Deep analysis of these datasets offers opportunities and challenges to business. There has been strong interest in the power of social media analytics to create new value, to support decision making and to enhance competitive advantage by track and analyse relevant user generated content. We studied how social media analytics could bring competitive advantage in marketing. Our research goal is to present the benefits of big social data analytics in company on the example of the company's marketing activities. To achieve this goal, we set the following research questions: What is big social data? What is the difference between traditional data analytics versus big data analytics? Then we showed the directions of using big social data in intelligent marketing.

Big Social Data Mining – Theoretical Background

Conceptualization of Big Social Data

One of the effects of the technological revolution was the emergence of social platforms. In a short time, a rapid increase in their popularity and a dynamic increase in their number was observed. According to Kaplan & Haenlein (2010, 2011) "social media is a group of web-based applications that are based on the ideological and technological foundations of Web 2.0 which allow the creation and exchange of user-generated content." Drab-Kurowska (2017) defines social media as "communication channels through which users interact", she lists such technologies like forums, blogs, messengers, emails, sharing music. According to Mount & Martinez (2014) social media are a set of (open to users) online tools using which it is possible to exchange the ideas, emotions and opinions by creating and editing content. Evans adds that social media allow to sharing information relevant to online communities (or virtual social group). In turn, some emphasizes the social function of social media thus, the modifies and consumed content is the result of the interaction of users in virtual social groups. Defining social media is also based on understanding the individual functional blocks that make them up: presence, relationships, communication, reputation, groups, sharing and identity. The whole creates so-called honeycomb of social media. The scheme was developed by G. Smith (2007), developing the theory proposed by Webb (2004), Butterfield (2003) and Morviell (2004) and it is presented in many papers as base definition (next to the Kaplan & Haenlein definitions). Individual blocks of honeycomb allow to understand social media aspects in relation to user experiences and behaviour. The patches consistently describe social media, which should be considered both when creating and learning about social networking sites. However, the individual honeycomb blocks are not closely integrated. The dominant honeycomb significantly affects the functionality of the website, the forms of user activity and, as a result, the set of data that describes the behaviour of users. In fact, understanding the rules that affect website functionality should be considered when conceptualizing big social data. The first functional block of social media is *identity*. It refers to the scope of information that users share in social media about their identity, such as: name, surname, age, gender, occupation, interests, and presentation in the online community. Users can publish real or fictitious information about themselves, is difficult to verify. This is part of the user's image on the web. The information that can be mining about the user makes up the accuracy of the created consumer profile. *Communication* is the second functional block of social media. It refers to forms of communication between their users. Most social networking sites built around this area have numerous conversation-related tools (for both users and user groups). Companies are starting to notice the benefits of the process of obtaining the content of these messages and the development of tools for pattern extraction (e.g. sentiment analysis). Finding out what customers think about a product and brand can bring many benefits to business. *Sharing* is another block; it concerns the exchange of content between users. We collect data about the availability of users in the virtual and real world through social media. This is done by means of shared statuses (e.g. available, hidden, busy, I come back soon, I feel, think, do, etc.) as well as so-called check-ins in the real world. Enterprises can use this area to popularize their own content because social media are perceived as new distribution channels for information about the company, product and company activities. The *relationship* block refers to the connections of social media users with other users. The patch represents the form in which social media users create groups, friends lists and make friends on social networks. Creating relationships in social media is significantly different from those created in reality, both parties involved (i.e. companies and users) must accept this form and understand it. Enterprises can engage in exploring the structure and strength of relationships. It is recommended to identify entities that have a strong influence on a certain group of users (so-called opinion leaders). Another block of social media is *reputation*, which can be viewed differently by members of online communities. For most users, it is associated with trust and applies to both users and published content. Reputation is important for companies that should be involved to protect and monitor it, in the sense of tracking information emerging about the company. The key area is the construction of indicators that objectively would allow monitoring changes in the image. The last functional block of social media are *groups*, it concerns how users can create communities. Grouping contacts, creating subgroups, groups: open, closed or secret. Enterprises should use this functionality mainly in grouping their contacts into certain categories. With social networks defined in this way, we try to specify common features: (1) social media are platforms that allow users to interact around events, topic or products and

services; (2) are accessibility for everyone; (3) the adaptation of social media technology has caused social changes in the way information is created, consumed and disseminated, we can observed visible trend to being "always-on society"; (4) social media are a fertile ground for expressing attitudes, emotions, beliefs and opinions, also the content created by users is varied: text, images, video, link; (4) social processes occurring in different platforms depend on the functionality of the site (according to the theory of social media honeycomb structure); (5) an average Internet user consumes and shares large amounts of digital content every day through popular social online services (so-called 'phenomenon of data floods').

In literature, data generated in social media are called as big social data (BSD). According to Ishikawa (2015) and Olshannikova (2017) big social data refers to large data volumes that relate to people or describe their behaviour and technology-mediated social interactions in the digital realm. We treat these data as a big data, in term of 3V dimension model (table 1), from which social insights can be extracted. Social media provide us with high-volume and highly semantic data. Dynamic sets describing the behaviour of many at one time point with varying levels of granularity. BSD are highly unstructured (photo, video, text), with a real time flow and a short time of informativeness, thus the change is visible in every dimension of data (table 1) Adjerid & Kelley (2018). The datasets are mainly utilized to extract social insights for descriptive or predictive purpose. Data for every intra-daily interaction in social platform of individual (that can be retrieved) reflects their daily behaviour, habits, emotion valence, unusual events or activity in online social network Porshnev (2016), Sprenger (2014), Stacey (2012). These data are in different formats, different frequencies and are integrated from autonomous platforms Michalak (2016).

Table 1: Characteristics of big social data in the 3V model

3 V	Characteristics
Volume	Size is driven by the popularity of social networking sites. The collected large data allow measurement of effects with high precision and sufficiently reflect the behaviour and habits of users. Access to data allows in some cases repeated sampling. In caste of Twitter, 360 million active reports events on a big scale - it is estimated that about 500 million messages are sent via Twitter per day, due to the unprecedented scale of interaction social networking sites are perceived as source of collective intelligence.
Variety	Variety is driven by the functionality of social media, for example variables explored from Twitter are mainly short text messages, from Instagram are photos, from YouTube to video.
Velocity	Real time, instant messengers allow users to contact and react, and report events in real time; spreading messages is not limited to friends but has global reach. The measurement of some behaviours is carried out at ultra-high frequency (continuous or semi-continuous), and the adjustment of the time window and the level of data aggregation can be a big challenge for the researcher (for example: Oh & Sheng).

Source: own work based on: Adjerid & Kelley, pp. 901-905.

In recent years, we recognized the potential of big social data analytics on the example of many research projects as well as in business. One of the consequences of social media development is an emergency need to develop methods and tools capable of processing big social data. Social media analytics requires advanced IT tools and models to process data. Therefore, the development of effective and efficient analytics techniques for social media analytics becomes essential. Especially data mining, sentiment analysis and social network analysis techniques are recommended. As part of scientific research, there are a number of papers that discuss the use of massive datasets and exploring the value of it Jansen (2009), Luna-Nevarez (2016), Li (2013), López-García (2016) or improving the tools and methods used for social networks analysis Sprenger (2014), Stacey (2013), Giachanou (2016), Kaplan (2011).

Big Social Data Analytics Versus Traditional Analytics

Before the rise of online social media, gathering data on opinions was expensive and usually achieved at very small scale. When users on the Web started communicating massively through their channels, social networks became overloaded with opinionated data. In that aspect, social media has opened new

possibilities for human interaction. Big data requires the use of analytical techniques that are beyond the standard set of methodological tools. Table 2 compares the traditional approach with the big data approach by showing individual stages of the analysis process. Big data sets primarily introduce the possibility of observing individuals without intervention on an unprecedented scale. Alternative data sources describing the behavior of individuals are an important source for researchers and business. Big data can be a solution to some problems: (1) costs of large-scale research and the time devoted to conducting the study. (2) some patterns are visible only at high frequency datasets and may not be revealed in a traditional study, this is especially true in dynamic constructs that should be considered over time (e.g. sentiment about product and services, brand perception), (3) Big social data may be the answer to the problem of replication, avoidance of certain measurement burdens seen in traditional studies, e.g. tendency to improve responses.

Table 2: Comparison of big data analytics and small data analytics

<table>
<tr><th></th><th colspan="3">Traditional analytics</th><th colspan="2">Big social data analytics</th></tr>
<tr><td></td><td colspan="5">data collection methods</td></tr>
<tr><td rowspan="4">1</td><td rowspan="3">Invasive data collection methods (reactive measurement)</td><td>Non-survey methods</td><td>Observation without intervention
Intervention observation (participant observation, structured observation and natural experiment)</td><td colspan="2">Observation without intervention (sensors, applications enabling registration of selected parameters from smartphones, social networking sites) **</td></tr>
<tr><td>Indirect survey methods</td><td>Indirect survey methods (postal and online survey)
Indirect (telephone) interviews</td><td colspan="2">X</td></tr>
<tr><td>Direct survey methods</td><td>Direct survey methods
Direct interviews
Direct qualitative methods (including in-depth individual interview)</td><td colspan="2">X</td></tr>
<tr><td>Non-invasive methods of data collection (non-reactive measurement)</td><td colspan="2">Examination of physical traces of behavior (traces of use)
Archival data (current record, messages transmitted by the media, other types of records).</td><td colspan="2">Non-invasive methods of data collection - analysis of archival data (digital footprints) **</td></tr>
<tr><td rowspan="3">2</td><td colspan="5">The aim and duration of the study</td></tr>
<tr><td colspan="3">The aim of the study defined, clearly defined research questions.</td><td colspan="2">data stored by owners of digital platforms, collected without a specific research purpose,</td></tr>
<tr><td colspan="3">definite duration of the study - ad hoc studies predominate</td><td colspan="2">streaming nature of data inflow</td></tr>
<tr><td></td><td colspan="5">scope of the study</td></tr>
<tr><td>3</td><td colspan="3">research sample</td><td colspan="2">all units for which data can be obtained from various autonomous sources are examined</td></tr>
<tr><td rowspan="2"></td><td colspan="5">methods and tools for data analysis</td></tr>
<tr><td></td><td>Quantitative research</td><td>Descriptive statistics + statistical inference
Correlation studies</td><td></td><td>Sentiment analysis
Network analysis</td></tr>
</table>

4	Data analysis methods		Path analysis Linear-structural equations	Methods for analyzing structured and unstructured data	Information dissemination analysis Emotion recognition Image recognition
		Qualitative research	Analysis of narrative recording (including data reduction, coding of behavioral recording in accordance with accepted criteria)		
	Data analysis tools	Various software - commercial and non-commercial		Data analysis tools	open source software: Python Orange, WEKA
5	**presentation of results**				
	Report (often verbal), basic charts: diagrams, histograms, Tabular form: e.g. descriptive statistics			Data visualization [social networks, decision trees]	

Source: own work.

Big data is a promising but demanding area - among the restrictions on the use of big data are the following: (1) little experience of researchers for the collection, preparation and analysis of massive data sets, (2) lack of technical knowledge necessary to collect and organize large data. The challenge is to manage this data in an acceptable time. Due to the high frequency and size of the data set, their analytics primarily include machine learning algorithms that look for unexpected relationships and summarize data in such a way that they are both understandable and useful in further considerations. Results from data mining are summarized in non-trivial patterns - in the form of social networks, classification models, graphs and more. How to formulate the problem of data mining to bring out the added value for the company? Due to the complexity of the problem, one should extract one source of data which is social media and build a dedicated framework for analysis.

Social Media Mining for Marketing Decision-Makers

The Importance of Social Media in Companies

Bell (1973) and Grant (1996) believe that knowledge is an important resource for enterprises. Used to develop domain knowledge, solve problems and initiate new opportunities as well as competitive advantage. In the so-called global information society, information is treated as an economic good, a basic resource and a basic economic category. In the modern world, social media are increasingly used as a source of economic insights. Companies are increasingly perceiving the information potential hidden in new technologies. For example, in 2013 the Securities and Exchange Commission (SEC), knowing that companies are increasingly using social media, approved Facebook and Twitter as the two most influential corporate knowledge sites for the organization. Among others, this is supported by Corso (2006) who believe that companies should use informal and formal channels, such as intranet or corporate portals, to access knowledge. Jarvenpaa (2011) emphasize that the rapid development of new social media platforms has contributed to building an important, important and engaging space for organizations, providing them with better and greater access to knowledge. Also, Aral (2012) note the potential of information from social networking sites by correlating the activities involved in social media with increasing competitive advantage of company. According to Iskikawa (2015) digital environments have some social (or/and psychological) properties. Ishikawa is interested in understanding the nature of bidirectional relationship between real and digital world. Adequate analysis always implies interdependence because the real world and the virtual world are closely related. Big social data have value when they represent the wisdom of the crowd.

Social media has changed the role of modern consumers and entrepreneurs. They transform passive users into powerful creators and intermediaries of corporate information. Thanks to this, anyone with access to the Internet can publicly disseminate their opinion about the company. On the one hand, this

is an unprecedented opportunity for organizations, but also a huge challenge in the proper management of the information environment.

Social Media Mining as Support for The Business Analytics System

Before the rise of social media in order to understand human behaviour, companies based on costly research characterized by small samples. These small samples are affected by replication crisis. Feedbacks are analysed with time delay; therefore, they may have lower value for decision-makers. Questionnaire data are on low granularity level of data (choosing between database size and depth). Decisions are made based on static analysis, processed by using descriptive statistics with basic data visualization. In opposite to traditional methods, based on BSD by using more sophisticated methods, most these disadvantages can be ignored. Research of social media sentiment has growth exponentially in recent years. Most of them are based on sentiment analysis. Sentiment analysis is and increasing popular instrument for the big social data analysis. The product of the analysis are sentiment scores that inform about the emotional state of the writer. Sentiment analysis is the way of summarization complex and high dimension data. Growing interest in the quantification of feeling started the methodological debates within the social sciences which indicates that proper research requires not only appropriate know-how, domain knowledge but also a deep understanding of big social data. Most of researcher are inspired by this scientifically objective approach to measuring subjective states. Discovering non-trivial patterns can be achieved by lexicon approach or machine learning approach. The second is more often used because of the better matching to the domain and as a result higher classification accuracy. The research process includes stages such relevant data retrieval, pre-processing, feature engineering model learning and evaluation Giachanou (2016). At each of these stages, tools and techniques to improve the quality of research are developed, and they make up the rich landscape of research. Sentiment may refer to various entities (e.g. products, brand, services), for each entity sub-level of analysis may be done. If we look at datasets related to product or services thus, we can get the answer to the following questions. Do consumers like our product? Which aspect of the product need change? How often the discussion about our product is repeated? As the main advantages are listening to the market with high granularity of the data, survey representativeness, capture the dynamics of the behaviour, possibility of resampling in data, low costs and continuous monitoring of the market. Product offer tailored to the expectations of the public (consumer).

Social Media as a Part of Marketing Information System

According to Cisło (2004), Kotler (1996) every enterprise needs to build an efficient information system to support decision-makers. This is influenced by the following factors, the complexity and volatility of consumer behaviour, growing competition in the industry, opening to new markets, saturation of some markets Cisło (2006). Creating and implementing marketing strategies as well as monitoring effects, managing public information requires the support of an efficient information system. The marketing information system should not only meet the information needs of the company, but exceed the expectations of decision-makers, e.g. by searching for new sources of information. Oleński (2003) as an information system understands the complex of related information processes. However, the information process defines as actions occurring in a certain sequence aimed at: (1) generating information, gathering information, archiving information. Processing and interpretation of information depending on the needs of the company. Smith writes that the Enterprise Information System is a formalized and internally related components, such as a team of people, devices and procedures created to meet the enterprise's information needs. Unold (2011) lists the following components of the marketing information system: data sources, data collection subsystem, data bank, model bank and analytical techniques, information sharing subsystem, report preparation subsystem. One of the commonly used architecture of the marketing information system was presented by the Kotler (1996). By using the architecture of the marketing information system to place big social data analytics, it can easily be linked to other information processes in the company. Social media are a new source of data describing users' activities. However, due to the nature of the data, the need to use advanced analytical techniques and adapt computer resources to big social data, the company is required to modify the system accordingly. This is in line with the concept of SIM presented by Unold (2011).

Information from social media feeds the marketing decision-makers. What can these patterns be used for? First, they are used in communication of the company with the consumers. Let's look at two sides of the communication process: entrepreneur and customer. Both sides of the process feel information needs Grębosz (2016). The enterprise meets these needs by appropriate data processing and obtaining knowledge about market behaviour. Consumer information needs are different. Consumers are looking for knowledge about products and services, they are looking for recommendations and knowledge about the company's activity. In addition, they are looking for people who will share their interests and concert together around the company. The company in social media conducts a dialogue with them. By using dialogue supported by information and behaviour of social media users, the company can perform the following functions:

1. brand management functions: through properly conducted dialogue, it affects customers through various stimuli in the form of text, graphics, symbols, and colours,
2. creating virtual communities to which you can personalize content, so – called tribal marketing,
3. build and strengthen relationships with consumers as part of broadly understood social marketing by personalizing content,
4. quickly respond to negative product and brand information that appears on the web.

Consumer Psychology

Second filed closely related to market analysis is consumer psychology. Big social data make it possible to understand the psychological aspects of consumer behaviour. Patterns explored from data are relate to (1) stable psychological traits (e.g. personality) that help explain the general trend of consumer behaviour, and (2) mental states that express consumer attitudes and feelings at some point and help describe the context of behaviour. Explored patterns are relate to daily habits and consumer preferences. This approach is in opposite with the traditional research, in which getting to know the consumer takes place through: (i) analysis of data from loyalty programs, (ii) analysis of cash and transaction records, (iii) focus groups, observations and interviews. They mainly contributed to: (i) assessing consumer preferences, (ii) understanding brand perception, (iii) inferences about future consumer purchases, while consumer attitudes and emotions received little attention in research. Matz (2017) argue that an eccentric and open-minded consumer feels more positive emotions and attaches greater importance to a retail brand that specializes in eye-catching and unusual, eccentric and creative ideas. Second example of studies that being developed are research on the personality of the user. Individuals by participating in social networks and publishing content, personalizing their profiles, reaction to the content of other users, music lists on YouTube and Spotify manifest certain aspects of their behaviour that may be correlated with personality trait Quercia (2012). On the basis of UGC, variables representing personality traits are created. The relationship between social media data and personality traits is considered on the basis of the PMO model. Many authors, for example Quercia (2021) indicate that he is the most comprehensive, reliable and useful personality concept. Two groups of data (1) profile, (2) text - linguistic analysis are taken from social media. Researchers check whether two groups of data - data from questionnaires and big social data are correlates. The system analysing data from Twitter creates a meta-base of attributes from tweets consisting of information about the user's social behaviour (average number of likes, average number of links, hashtag, mentions, etc.) and the grammar of tweets (average length of messages, number of punctuation / emoticons, average number of positive / negative words Kalghatgi (2015). The advantages of this filed is manifested in deep knowledge about the market and the ability to influence this market. Communication tools (e.g. social media profile or website) and the appearance and content are tailored to consumer expectations.

Brand Perception

Third field is impact assessment of engagement of online retails with the online brand communities on user’s perception of brand. Practitioners have been at the forefront of attempts to understand, define, and build customer engagement. Customer engagement is a key factor in competitive advantage of company. The consumer has limited time and incomplete information about the market, where there are many substitutes. By using additional attributes, among which the brand plays a key role (which not only makes the product stand out but also carries information about the product), the company

makes its products stand out from others. Social media engages users in conversation with the company. Through proper communication it is possible to build strong engagement. Communication has individual character and must be integrated with related marketing activities of company.

Summary

Increasingly, companies are using social media to promote products or services and to communicate with customers. Also, more and more customers interact with company and share their experiences and opinion about products or services. However, fewer businesses perceive social media are a new source of data for enterprises. These data are large sets, multidimensional, requiring appropriate processing techniques. Their potential is huge therefore, they cannot be overlooked by enterprises. Getting the right information from social media is only possible by develop strong social media analytical skills. The article discusses the differences between the traditional data set (the so-called small data) and big social data, places social media in the marketing information system, and shows examples of research conducted in this area. In conclusion, big social data sets are promising. By using market knowledge and skilful management of this knowledge, enterprises can gain a competitive advantage. There are many studies discussing the tools and methods of big social data analysis, but less research into the effect of including this information in the decision-making process. The information system in the company should be consistent, it is not based solely on an external data source such as social media. Therefore, according to the authors, there is a need for broad and interdisciplinary research on the development of a model for combining information with big social data and small data. Competitive advantage is manifested in the possibility of obtaining knowledge about the consumer, processes occurring in the social network, brand opinions. As a result, this knowledge is used to improve the quality of the relationship between the enterprise and the consumer.

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Motives and Ownership-Based Entry Mode Strategies: Evidence from Poland

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Abstract

Companies are driven to go international by a variety of reasons. It is crucial for managers, governments and scholars to get a deeper understanding of those reasons and location factors in host countries as they affect the success of foreign operations and the future of the company.
The aim of the paper is to present the results of research studies on identifying FDI determinants of the host country among Polish enterprises and differences in the perception of the factors depending on the ownership equity-based entry mode. The paper presents results of a field surveyed carried out in 2012-2013 through direct interviews among Polish companies – direct investors. The research results confirmed that Polish investors are mainly driven by market seeking motives and market-related factors are the most important determinants of undertaken FDI projects regardless of the ownership equity based-entry mode. Furthermore, there were no evidence of a relationship between institutional and legal framework-related factors and the ownership equity-based mode as initially we assumed.

Keywords: Foreign Direct Investment, FDI Determinants, FDI Location Factors, Ownership Entry Mode, Joint Venture, Wholly Owned Subsidiary.

Introduction

Cross-border investment carried out by multinational enterprises (MNEs) is one of the main features of today's global economy. A rapid expansion of globalization process leads managers to a higher awareness of the need to be present and compete internationally. Therefore a growing number of firms has been increasing their involvement in international operations. The past decades have witnessed a rapid and steady growth in global foreign direct investment (FDI) flows. Aggregate FDI outflows (FDI outward stock) increased over 4 times from USD 7408.9 billion in 2000 to USD 30974.9 billion in 2018 (UNCTAD, 2018). Polish enterprises seem to be an active player as well, however their share in the generation of global FDI flows is still negligible. Polish investors invested abroad by the end of 2018 capital in the form of FDI with a value of USD 28509.7 million, which is over 73% more than at the end of 2010 (USD 16406.5 million).

A decision about expansion on overseas markets is a complex and complicated process which has strong implications for a success and a performance of an enterprise. Enterprises are faced with the challenge of defining a product or products they want to deliver to a foreign market, identifying a target market or markets in which they want to offer their products, choosing the entry mode they want to use to serve the market and finally determining the timing of entry (Root, 1994). The choice of entry mode and as a part of it the choice of ownership mode is widely regarded as one of the most critical decisions in international expansion being a key element of the success of foreign operations and the future of the enterprise (Hennart and Slangen, 2015).

When a company decides to enter overseas markets by operation modes linked to ownership and equity investment (FDI), it has two entry alternatives to choose. The company may decide to enter a foreign market alone and establish a wholly owned subsidiary or involve a (local) partner and start a joint venture (a subsidiary with shared ownership). Making this decision mangers must take into

consideration many various factors including country-specific factors. However, before they do it, managers must define clearly the reasons for going abroad and company's objectives. Companies go abroad for different reasons which affect the MNE's location decision and the ownership entry mode choice. It is essential for mangers to get a deeper understanding of those reasons and investigate certain locational factors in host countries to make the key decision about the location of an investment as well as the ownership entry mode (Hill, Hwang and Kim, 1990; Dikova and Witteloot uijn, 2007).

While there is a large volume of empirical literature on the behaviour of MNEs and FDI determinants (Wheeler and Mody, 1992; Bitzenis, 2007; Jaworek, 2013; Kowalewski and Radło, 2014; Gorynia et al, 2015; Huyen, 2015; Jaworek, Karaszewski and Szałucka, 2019), the amount of studies on the ownership-based entry mode is less abundant and often limited in the research area (Hill, Hwang and Kim, 1990; Kim and Hwang, 1992; Brouthers, 2002; Chen and Hennart, 2002; Yiu and Makino, 2002; Dikova and Witteloostuijn, 2007; Chiao, Lo and Yu, 2010). Many of the scholars seem to examine firm-level factors more often than country-level factors (Dikova and Witteloostuijn, 2007). They also seem to investigate factors in the narrow scope. Thus, a clear understanding of FDI location factors in relation to the ownership equity-based entry modes is essential to develop knowledge about the inter-relationship between FDI location determinants and ownership mode choices.

The aim of this article is to present the results of research studies on identifying FDI determinants of the host country among Polish enterprises and differences in the perception of the factors depending on the ownership equity-based entry mode, i.e. whether to establish wholly owned subsidiaries or form joint ventures with local partners.

The paper is organized as follows. The following section provides a brief, general overview of the literature related to reasons why companies go abroad and FDI location determinants. Next, the methodology employed in the research is presented. The third part of the paper describes the research findings. Finally, the general conclusions are drawn with some limitations that researchers faced and useful insights regarding future research.

Literature Review

Companies go abroad for various reasons. The most popular classification, initially used by J.N. Behrman, and later extended by J.H. Dunning, identifies four types of motives for MNE activity abroad: market seeking, resource seeking, efficiency seeking, and strategic asset (or capability) seeking. When enterprises are driven by market-seeking motives, they invest in particular country or region to supply goods and/or services to markets in these and neighbouring countries. To the market-related factors which might prompt enterprises to engage overseas we include e.g. a market size, prospects for markets' growth, a need to follow main suppliers or customers or an avoidance of trade barriers (Dunning and Lundan, 2008).

The expansion on overseas markets can be also related to resource-seeking motives. This means that companies invest abroad to acquire natural resources, workforce, technological capability, organisational skills as well as management or marketing expertise. Initially, most enterprises undertake FDI because they seek new markets or resources, but when their degree of multinationality increases they might want to improve their global market position by raising their efficiency (efficiency-seeking investments) or gaining access to new strategic assets (strategic assets-seeking investments). The first are motivated by the expectation of achieving benefits from the common governance of geographically dispersed activities, which are mainly related to the economies of scale and scope, and risk diversification (e.g. the lower costs of labour, materials or natural resources and operational risk reduction). The second means that companies engage abroad to acquire the assets of foreign corporations which might improve their global competitiveness (Dunning and Lundan, 2008).

Except the factors described above, the host country-related determinants (FDI location determinants) also include a policy framework for investments (institutional and legal framework-related factors) and a business facilitation (UNCTAD, 1998; Dunning, 2006). The first group consists of rules and regulations governing the entry and operations of foreign investors, the standards of treatment

according to them, and the functioning of the markets within which they operate. The second includes proactive measures, aimed at facilitating the business that foreign investors undertake in the host country, e.g. the incentives for foreign investors or amenities that contribute to the quality of life of expatriate personnel (UNCTAD, 1998).

As mentioned earlier, there is a large volume of empirical literature about FDI determinants, but the amount of studies on FDI location factors in relation to the ownership equity-based entry modes is less abundant (see e.g. Kim and Hwang, 1992; Brouthers, 2002; Chen and Hennart, 2002; Yiu and Makino, 2002; Chiao, Lo and Yu, 2010; Morschett, Schramm-Klein and Swoboda, 2010; Shen, Puig and Paul, 2017). The research studies which focus on market-related factors give different results, which may suggest that the ownership equity-based entry mode often depends on other factors such as company's size or international experience. For example, Agarwal and Ramaswami (1992) based on a study of service companies, found that small firms with limited multinational experience preferred joint venture in high potential markets, while larger, more multinational firms more often tended to use wholly owned subsidiary. Similar conclusions received Shi, Ho and Siu (2001), who noticed that small Hong Kong manufacturing firms investing in the mainland China, which followed a market-seeking strategy, preferred joint venture to wholly owned subsidiary. On the other hand, Gil et al (2006) found that companies investing in CEE countries preferred to enter the markets by wholly owned subsidiary.

Furthermore, a study carried out by Brouthers (2002) among EU firms indicated that high growth markets had no impact on decisions about the ownership equity-based entry modes. Morschett, Schramm-Klein and Swoboda (2010) based on an analysis of 72 independent studies in 67 articles found that – in contrary to the most conceptual arguments contained in the literature – increasing market size and its growth do not lead to a higher propensity to enter a market using a wholly owned subsidiary. Also Dadzie et al (2018), who conducted a study among foreign manufacturing companies in Ghana, noticed that market-seeking motives did not have any impact on the mode of ownership. Taking into account the above conclusions and the research results indicating that the market-related factors play the most important role for Polish investors (Jaworek, 2013; Kowalewski and Radło, 2014; Gorynia et al, 2015; Jaworek, Karaszewski and Szałucka, 2018), we hypothesize that: **(H1)** Regardless of the ownership equity-based entry mode choice, market-related factors are the most important for Polish investors.

Unlike market-related factors, most empirical literature concerning other host country-related determinants in relation to the ownership equity-based entry modes – which we are aware of – points out that enterprises prefer to start a joint venture when they go abroad mainly to gain access to specific resources or new assets, or when they want to improve their efficiency (e.g. Shi, Ho and Siu, 2001; Gil et al, 2006; Kaynak, Demirbag and Tatoglu, 2007; Chun-Ping, 2018; Dadzie et al, 2018). They form joint ventures for utilizing local partners' network and resources as well as reducing operational potential risks.

Joint ventures are also a preferred option when MNEs make investments in countries with relatively less institutionally developed environment, perceived as risky (e.g. Rajan and Pangarkar, 2000; Brouthers, 2002; Demirbag, McGuinness and Altay, 2010; Dadzie et al, 2018; Lu et al, 2018). Many scholars suggest that through joint ventures with local partners enterprises reduce the investment risk due to economic and political uncertainties by limiting their resource commitment (e.g. Kim and Hwang, 1992; Brouthers, 2002) and gaining knowledge about local economy, politics and culture (Beamish and Banks, 1987) as well as a help in negotiations with host government (Agarwal and Ramaswami, 1992). In the other word, it can be said that a favourable policy framework for investments encourages to enter the market by wholly owned subsidiary. Thus, we hypothesize that: **(H2)** The institutional and legal framework-related factors as drivers of investing abroad are more important for Polish investors which enter host markets by a wholly owned subsidiary rather than a joint venture.

Research Methodology

The results presented in this paper come from a study conducted between 2012 and 2013. It covered 622 enterprises based in the Republic of Poland, which engaged their capital abroad through direct

investment. All of them, regardless of their ownership of capital, had the status of Polish companies according to the current laws. The bulk of these companies held only Polish capital (61.7%). The remaining 38.3% were companies with foreign capital, with only 26.3% of them having solely foreign capital (26.3% with majority ownership and 42.1% with minority ownership).

The research sample was selected in a non-random way (target selection). The study used a direct interview method and was conducted by interviewers from a market research company using a standardized questionnaire developed by the research team. 64 questionnaires were filled out correctly, which meant a return rate of 10.3%.

The number of enterprises in each group classified according to their type of business activity was different. Almost 40% of them conducted exclusively commercial operations. Enterprises that operated exclusively in the service sector accounted for 30% and those exclusively in production – only 5% of the total number of companies. The share of enterprises operating in all three: production, trade and services, was 19%.

Most investors participating in the survey decided to expands into foreign markets by wholly owned modes (51 out of 63 respondents indicated solely, wholly owned subsidiaries and/or branches as their ownership entry mode). 7 respondents entered strictly the foreign markets sharing control of their subsidiaries (joint ventures). The remaining 5 enterprises decided to set up their overseas subsidiaries using both wholly owned modes as well as joint ventures.

The companies that participated in the study had completed a total of 273 FDI projects. Out of these, 140 projects had been undertaken as wholly owned subsidiaries (51.3%) and 87 as branches (31,9%). Only 46 projects were completed as joint ventures (16,8%).

Research results presented in this paper refer to two out of three groups of respondents considered in this survey: enterprises that have chosen only wholly owned modes and those that entered foreign markets solely via joint ventures. Excluding from the analysis those enterprises that decided to set up overseas subsidiaries using both ownership entry modes is dictated by the fact that it cannot be definitely said to what extent each of the ownership mode choices shaped the indicated FDI limiting factors.

While analysing the results of the study, an importance index was used, which had the following formula (Karaszewski and Sudoł, 1997):

$$W = \frac{\sum_{i=1}^{k} n_i w_i}{k \cdot N},$$

where: W – importance indicator; i – evaluation index; n_i – the number of indications for a given factor at the *i-th* position; k – maximum rating on a scale of 1 to k (the order of the factors meant assigning them ratings in reverse order); N – the number of respondents who answered the question; w_i – a rating corresponding to the location of the i factor.

Furthermore, Fisher's exact test was also used to verify the hypothesis with the conventional significance levels at p<=0.01, 0.05, and 0.1. Statistical calculations were performed using the IBM SPSS Statistics software version 25.0.0.1.

Research Results

Enterprises that participated in the study, regardless of their ownership equity-based entry mode (joint venture vs. wholly owned subsidiary) identified **market-related factors** as the most important determinants of FDI. Only some minor differences were found in the position of the factors within this group. Among both groups of companies, the market factor related to the access to new markets was considered to be the most important factor. In addition, Polish investors on the second position ranked another market determinant "the proximity of existing markets". It should be noted that the main

direction of foreign expansion among the studied companies was Europe, where 97% of direct investment companies were established. Investors in both groups also evaluated similarly the importance of the factor associated with the economic growth prospects of the host country. This factor was ranked third among the companies that established wholly owned subsidiaries and fourth among those who made joint ventures. Investors who entered foreign markets via wholly owned subsidiaries regarded a factor "finding a niche market" as an important determinant of their investment (4th position vs. 5th position for joint ventures). The biggest difference among the market-related factors can be seen in the evaluation of the ability to avoid trade barriers. This factor was considered more important among the companies that made joint ventures (5th position vs. 9th position for wholly owned subsidiaries). Higher ratings in the group of companies that made a joint venture may be explained by the fact that in some countries with significant entry barriers, the only possibility to enter the market and avoid the barriers is to create a joint venture. It must be stressed out that all the market-related factors were ranked in the top 10 of the most important FDI determinants regardless of the ownership equity-based entry mode choice.

Table 1: FDI location determinants among Polish enterprises (wholly owned subsidiaries vs. joint ventures)

FDI location determinants			Wholly owned subsidiaries		Joint ventures		Fisher's Exact Test	
			Index	Pos.	Index	Pos.	Value	P-value
I. An institutional and legal framework		the tax system in the host country	0.64	10	0.62	9	4.040	0.319
		legal regulations governing business operations in the host country	0.68	8	0.64	8	2.929	0.530
		regulatory stability	0.68	8	0.62	9	2.571	0.657
II. Economic determinants	Market-related	new markets	0.85	1	0.87	1	1.259	0.704
		proximity of existing markets	0.79	2	0.80	2	0.673	0.869
		low competitiveness among companies in the host country	0.65	9	0.69	6	2.632	0.660
		finding a niche market	0.72	4	0.71	5	5.259	0.283
		avoiding trade barriers	0.65	9	0.71	5	1.360	0.919
		following clients	0.70	6	0.69	6	3.426	0.435
		favorable prospects of economic growth	0.78	3	0.73	4	1.689	0.733
	Resource-related	availability of natural resources	0.48	16	0.51	13	2.191	0.691
		availability of workforce	0.71	5	0.71	5	2.726	0.579
		availability of materials, half-finished products (auxiliary services)	0,59	12	0.58	11	3.915	0.337

		access to new technology	0.51	15	0.60	10	1.494	0.909
	Efficiency-related	the cost of natural resources	0.52	14	0.53	12	2.949	0.547
		the cost of labor	0.68	8	0.60	10	4.431	0.282
		the cost of materials, half-finished products (auxiliary services)	0.58	13	0.67	7	2.003	0.780
		property prices	0.59	12	0.64	8	5.397	0.162
		better use of own resources	0.78	3	0.64	8	7.492	0.084
		reducing operational risk	0.62	11	0.71	5	3.893	0.420
		benefits of replacing exports with production in the host country	0.47	17	0.76	3	2.215	0.732
III. Business facilitation		positive attitude to entrepreneurship	0.69	7	0.67	7	4.268	0.331

Source: own study on the basis of survey results.

When analyzing the responses related to **resource-related factors**, it should be emphasized that they were considered a little bit more important by investors who established joint ventures with a local partner than those, who created wholly owned subsidiaries. Three out of the four factors in this group were ranked higher by the first group of investors. The biggest differences in the evaluation of determinants in this group apply to the access to new technologies (10th position for joint ventures vs. 15th position for wholly owned subsidiaries). Investors who made joint ventures also evaluated higher the availability of natural resources, (13th position vs. 16th position) and the availability of materials, semi-finished products (11th position vs. 12th position). It could mean that joint ventures were a way of obtaining such resources. The collaboration with a local partner may provide MNEs an effective access to local complementary resources, including modern technology and the know-how. Ranking these factors very low by investors who established wholly owned subsidiaries may indicate that investors from this group were not interested in such assets and were not focused enough on obtaining them. However, it should be pointed out that Polish investors who entered a host market via wholly owned subsidiaries and joint ventures perceived resource-related factors as not very important ones among the FDI determinants.

Polish investors who established joint ventures with local partners evaluated **efficiency-related factors** higher than those who set up wholly owned subsidiaries. It should be noted that within this group of determinants, there were the biggest differences in the two groups of Polish investors. Benefits of replacing exports with production in the host country was ranked third by the group that made joint ventures while companies setting up wholly owned subsidiaries located the factor on the 17th position. There were also significant differences in the evaluation of the factor related to reducing operational risk. Investors who made joint ventures ranked this factor 5th, while investors who only established wholly owned subsidiaries ranked it 11th. A higher ranking of this factor among the investors who made joint ventures may result from the fact that running a business with a local partner may lead to a reduction of operational risk. These enterprises also ranked higher factor related to property prices (8th position vs. 12th position for wholly owned subsidiaries) as well as the cost of materials, half-finished products (7th position vs. 13th position). Among the efficiency-related factors, the possibility to make a better use of own resources was ranked the highest by Polish investors who made wholly owned subsidiaries. They ranked this factor third, while investors who had made exclusively joint ventures

ranked it 8th. The remaining **efficiency-related factors** connected with the cost of natural resources, regardless of the ownership equity-based entry mode choice, was ranked much lower (12th position for joint ventures vs. 17th for wholly owned subsidiaries).

In principle, there was no difference between the responses of the two studied groups of investors in relation to the FDI determinants referring to **business facilitation**. Both groups of investors ranked "positive attitude to entrepreneurship" on seventh position.

Some minor differences can also be identified in the evaluation of factors related to the **institutional and legal framework**. However, it should be emphasized that they are insignificant. Polish investors who established wholly owned subsidiaries evaluated the factor related to the regulatory stability higher than those who set up joint ventures with a local partner (8th position vs. 9th position). On the other hand investors who created joint ventures assessed the determinant related to the tax system in the host country higher than those who set up wholly owned subsidiaries (9th position vs. 10th position). The legal regulations governing business operations in the host country were evaluated in the same way by the two groups of investors (8th position).

Additionally, the statistical analysis confirms no significant differences between the two groups of companies. No relationship between the ownership equity-based entry mode and the importance of the FDI location factors was found at the 0.01 and 0.05 significance level. Only having set a threshold significance level at 0.1, the Fisher's exact test revealed a significant statistical difference once with respect to the better use of own resources ($p = 0.084$), which played a more crucial role as a location factor for companies establishing wholly owned rather than jointly owned subsidiaries (the frequency distribution and interrelated with it the value of the importance index back wholly equity-owned modes). The findings support a theory which allow us to assume that a wholly owned subsidiary will allow a company to use their own resources better as a joint venture due to high level of control over a subsidiary. A high level of control allows a company to coordinate better all operations and resources in different countries without a burden of an uncooperative partner as well as allows a company to protect its valuable resources such as technology competency (Root, 1994).

Conclusions

The purpose of this study was to identify FDI determinants of the host country in relation to the ownership equity-based entry mode choice as different factors might encourage companies to use various ownership entry modes in order to better exploit locational advantages of the host country. The findings of the study indicated that Polish investors are mainly driven by market seeking motives and market-related factors are the most important determinants of undertaken FDI projects for the companies establishing wholly owned as well as jointly owned subsidiaries. No significant differences were observed between the two groups of companies what allow us to confirm the first hypothesis.

The results of the study also clearly demonstrate that the favourable institutional and legal conditions do not play a critical role in terms of the ownership equity-based entry mode choice. The institutional and legal framework-related factors as drivers of investing abroad were not more important for Polish investors who enter host markets by a wholly owned subsidiary rather than a joint venture as we originally assumed. The findings didn't provide us enough evidence to accept the second hypothesis.

Surprisingly, the biggest differences between the two groups of companies were identified within efficiency-related factors (however based only on the importance index analysis). They seem to play more important role for companies who set up joint ventures with a local partner rather than those who established wholly owned subsidiaries. Additional studies are needed to understand these results better.

Evidently, the study has several limitations. First, data protection laws in Poland prevent researchers from accessing the database of Polish companies which are foreign direct investors (such databases are owned by the Central Statistical Office and the National Bank of Poland). This has influenced the way companies were selected for the research sample and the structure of the investor groups studied. Second, the study was also limited by the small size of the study sample, which prevented the use of

tests planned for this research procedure. It must be highlighted clearly, that due to the number of entities that took part in the study, there are no grounds for the generalization of these results. The research hypothesis can be conceived as a pointer for future research based on larger and more representative sample where also more objective based measures could be applied.

The above findings may also have some implications for future research. For instance, an integrative approach to motives, ownerships-specific advantages and FDI location factors would provide an in-depth insight for better understating of the study findings. Second, future research should explore more deeply location factors (especially to better understand the difference within efficiency-related factors) using more objective based measures. Third, international business research could benefit from cross-industry and cross-country comparison studies to identify the differences in the nature of FDI location factors between the companies investing in different sectors or developed and developing countries. Finally, a research analysing changes over time would enrich our understanding of the role of particular factors.

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Financial Aspects of the Economic Activity of The Latvian Fish Processing Sector

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Abstract

Since embargo imposed by Russia and deterioration of the situation in markets, the Latvian fish processing sector has faced difficult times. Due to political situation, fish processing companies had to lose important export channels, which led them to rapid worsening of solvency, and to improve the financial situation production was partly (in separate companies even completely) suspended and also the employees were dismissed for (in)definite period. To acquire new markets and stabilize the situation, the support of the European Maritime and Fisheries Fund and the state was used; it provided an opportunity for companies to participate in several international exhibitions. The progress made at the international exhibitions suggest that the export market is going to stabilise in the future. The aim of the research is to evaluate and reflect the most significant aspects in the Latvian fish processing sector, at the same time providing proposals for improvement of financial stability of enterprises, operating in the sector. On the basis of the available data and selected indicators, the most important aspects in the Latvian fish processing sector related to financial situation were analysed and reflected, paying greater attention to the existing situation in micro, small medium-sized and large enterprises, and simultaneously providing an insight in the need of structural reforms. The information reflected in the research can assist the institutions, entrepreneurs and researchers involved in establishment and implementation of fisheries policy to understand and plan the common policy of the sector more successfully.

Keywords: fish processing, enterprises, financial analysis, financial situation, Latvia.

Introduction

Latvian fish processing sector deals with the production of sterilized and unsterilized canned fish, production of smoked and salted fish, production of refrigerated and frozen fish, as well as production of mixed fish products, which is a part of the manufacturing industry and is the secondary sector. The fish caught in the Baltic Sea and the Gulf of Riga, as well as the oceans are the main raw materials employed in the production of fish products and canned fish. In the recent years, also the freshwater fish bred in the Latvian aquaculture are used in the production of canned fish (Agriculture Ministry, 2014). The most popular product in the fish processing sector is canned fish called *Rigas sprotes* (Riga sprats), which has been a consumer beloved dainty and one of the main export products for more than 100 years.

The total amount of fish products and canned fish sold in 2017 was 58.16 thousand tons with the market value 142.71 million EUR (Central Statistical Bureau, 2020). The main markets were Sweden, Lithuania, Germany, Denmark, Czech Republic, Poland and Estonia. The production was also exported to Hong Cong, Canada, Mexico, Mongolia, Norway, Taiwan, Japan, the United Arab Emirates, the USA, Australia, Egypt, Israel, China, Macedonia, Serbia, Switzerland, Turkey, and other countries. In 2017, fish products and canned fish were exported to more than 60 countries overall. Since 2005, the volume of the sold products has reduced per -52%, what is largely related to the embargo imposed by Russia and the deterioration of the situation in the markets. In August 2014, the ban of Russia included import of processed and fresh fish products, and in 2015 – canned fish from Latvia. The ban affected 43 Latvian fish processing companies. Due to the lost export market the solvency of fish processing companies deteriorated and in order to improve the financial situation, production was partly (in separate companies even completely) suspended and also the employees

were dismissed for (in)definite period. To stabilise the financial situation of the companies the state provided support in terms of compensations aimed at partial repayment of loan interest according to the introduced legislation (Cabinet of Ministers, 2015).

To acquire new markets and stabilize the financial situation, entrepreneurs, using the available support from the European Maritime and Fisheries Fund, participated in several international exhibitions in 2016 and 2017: 'Prodexpo', 'SEAFOOD EXPO GLOBAL', 'World of Private Label', 'Summer Fancy Food Show', 'WorldFood Moscow', 'SIAL', 'FHC China', 'Gulfood', 'Foodex', 'SEAFEX' and 'ANUGA'. In the framework of the exhibitions the entrepreneurs managed to establish new business contacts (2 322 contacts in 2016 and 3 492 in 2017) as well as to conclude new cooperation contracts (64 contracts in 2016 and 73 in 2017) (Rural Support Service, 2020). The target audience of the attended exhibitions were the countries of the European Economic Area, CIS, Eastern Europe, South America, Scandinavia, Far and Middle East, Asia and other parts of the world. The progress made at the international exhibitions suggest that the export market is going to stabilise in the future.

The operation of the Latvian fish processing sector may also face the influence of the developments related to Brexit. British fish processing companies buy important raw materials, such as mackerel and herring, which are used to produce canned and smoked products. If the tariff and custom conditions of the EU and UK become unfavorable, Latvian fish processing companies will may have to look for new suppliers of raw materials. This in turn may lead to higher prices and changes in sales markets, at the same time causing the companies lack of financial stability and uncertainty about the future.

Research aim – to evaluate and reflect the most significant aspects in the Latvian fish processing sector, at the same time providing proposals for improvement of financial stability of enterprises, operating in the sector. To reach the aim, the following work tasks were put forward: 1) to select the most important indicators for description of financial situation; 2) to evaluate the financial situation of the micro, small, medium-sized and large enterprises operating in the Latvian fish processing sector.

The novelty of the research – the most significant aspects related to the financial position in the Latvian fish processing sector reflected, focusing on the current situation in the micro, small medium-sized and large enterprises. The research provides a comprehensive insight into financial stability of the companies operating in the sector and the further measures to be taken for strengthening the financial sphere, being a valuable informative material for formation, implementation and planning of the common policy in the fisheries sector and its companies.

The general scientific research methods, statistical research methods and mathematical methods were used in the study. The author mostly applied analysis and synthesis methods in development of conclusions and proposals. Microsoft Excel, Microsoft PowerPoint and IrfanView program were used in processing and analysis of the research results.

Materials and Methods

Evaluation of financial stability will include micro, small medium-sized and large enterprises operating in the fish processing sector in Latvia. Pursuant to the EU legislation, micro, small and medium-sized enterprises are economic operators, which comply with the definition reflected in the Appendix 1 to the Regulation of the European Commission No.651/2014. Categories of the enterprises are determined on the basis of the number of employees and financial thresholds (Table 1).

Table 1: Conditions to Determine the Status of an Enterprise (created by the author **according to European Commission, 2014)**

Enterprises size	Criteria				
	Number of employees		Turnover		Balance
Micro	<10	*and*	≤ 2 million EUR	*or*	≤ 2 million EUR
Small	<50	*and*	≤ 10 million EUR	*or*	≤ 10 million EUR
Medium-sized	<250	*and*	≤ 50 million EUR	*or*	≤ 43 million EUR
Large	>250	*or*	> 50 million EUR	*or*	> 43 million EUR

In 2017, in general there were 95 enterprises in the Latvian fish processing sector according to these categories; 15 of them were micro enterprises, 29 – small enterprises, 15 – medium-sized enterprises and 1 – large enterprise. Since 2005, the number of enterprises in the Latvian fish processing sector has reduced per -15%.

The evaluation of the financial situation of the enterprises will be performed using financial analysis in the framework of which the data available from the financial reports will be analysed (balances, profit and loss accounts). Liquidity, solvency, efficiency and profitability will be assessed in the framework of financial analysis (Fig. 1).

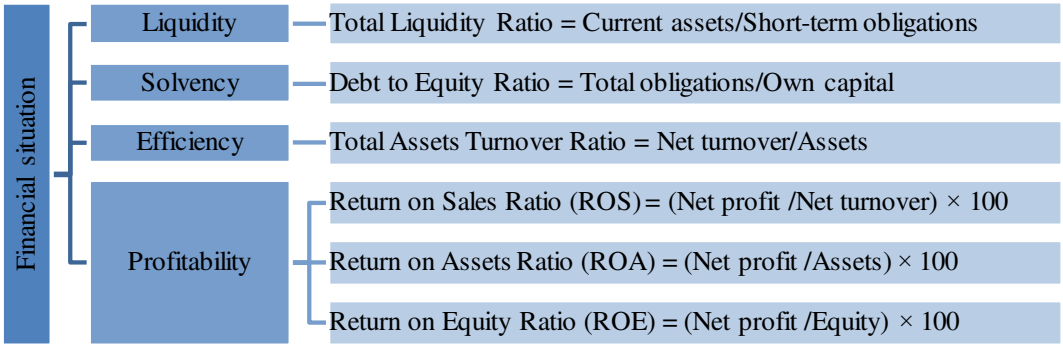

Fig. 1: Indicators for Evaluation of Financial Situation (created by the author according to Altman, 1968; Deakin, 1972; Rurāne, 1997; Saksonova, 2004; Fabozzi et al., 2007)

The liquidity analysis will include assessment whether enterprises are able to pay their short-term obligations by available current assets (Bednarskis et al., 1994). Solvency analysis will enable clarification whether enterprises are able to pay their short-term and long-term obligations by available equity (Bednarskis et al., 1994). Efficiency analysis will allow an assessment of the sufficiency of enterprise assets to generate turnover and enables a judgement whether investments in the assets are sufficient (Bednarskis et al., 1994). While profitability analysis will reflect the ratio of profit to the consumed resources, evaluating the profitability (Zariņa & Strēle, 2009). To assess the financial situation, in general there were selected 6 indicators: Total Liquidity Ratio, Debt to Equity Ratio, Total Assets Turnover Ratio, Return on Sales Ratio (ROS), Return on Assets Ratio (ROA) and Return on Equity Ratio (ROE). The evaluation was carried out for the period between 2005 and 2017. Considering data confidentiality, the evaluation does not include information about medium-sized enterprises and large enterprises in 2017.

Results and Discussion

Using the available data and chosen indicators, the liquidity, solvency, efficiency and profitability of micro, small, medium-sized and large enterprises operating in the Latvian fish processing sector were evaluated (Fig. 2).

From 2005 to 2017, liquidity in the Latvian fish processing sector can be evaluated as optimal (Total Liquidity Ratio on average 1.15), suggesting that in general the sector has no problem to pay its short-term obligations by its available current assets. The exception was 2011, when the sector showed reduced liquidity, suggesting that there is a lack of current assets for payment of the short-term obligations. Currently, the sector shows no tendency for the liquidity to get worse.

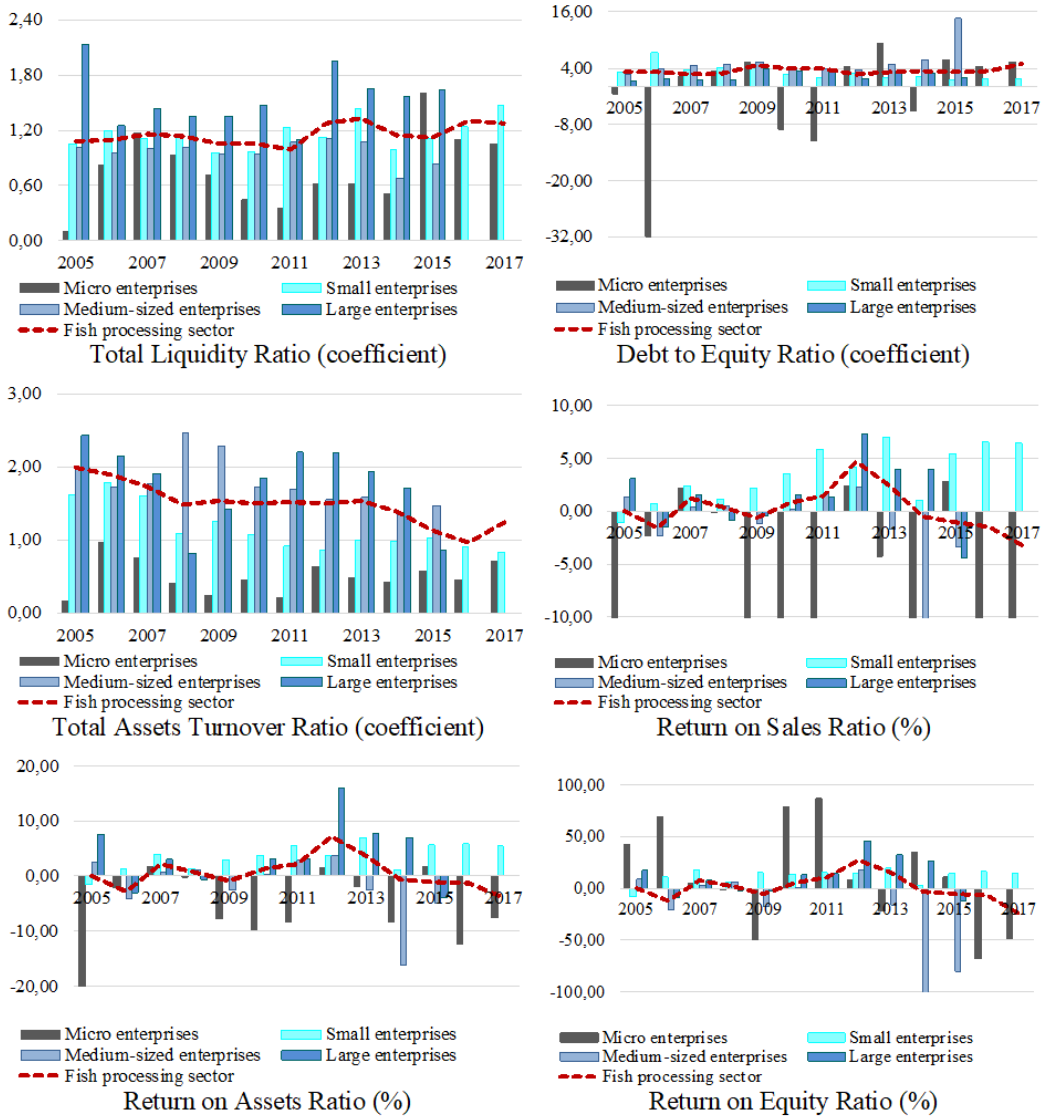

Fig. 2: The Financial Situation of Micro, Small, Medium-Sized and Large Enterprises in the Latvian Fish processing Sector from 2005 to 2017 (coefficient, %) (calculated and created by the author according to Central Statistical Bureau, 2020)

Analysis of the situation at the level of enterprises enables a conclusion that from 2005 to 2017 the large and small enterprises had a better liquidity (Total Liquidity Ratio ≥1) than the medium-sized and micro enterprises (Total Liquidity Ratio <1). The large and small enterprises were liquid enough, except for 2009, 2010 and 2014, when the small enterprises showed low liquidity suggesting that there are insufficient availability of current assets to settle the short-term obligations. The lowest liquidity, in turn, was observed in micro enterprises, except 2007 and 2015-2017, when the liquidity was within normal limits. Insufficient liquidity was observed also in medium-sized enterprises, except 2005, 2007, 2008 and 2011-2013, when the liquidity was evaluated as optimal. Since 2005, the liquidity of the micro and small enterprises has improved. Creditors usually prefer lower liquidity, as it involves lower financial risk.

From 2005 to 2017, the Latvian fish processing sector established unbalanced capital structure, suggesting that the sector used a lot of debenture capital, failing to balance it with the equity (Debt to Equity Ratio >1).

In this period, medium-sized enterprises showed especially unbalanced capital structure, the total obligations of which exceeded the equity many times, thereby exposing themselves to big financial risks. Also, the small and large enterprises created a disproportioned capital structure. The micro enterprises, in turn, were the only companies, where negative equity was observed (in 2005, 2006, 2010, 2011 and 2014 the equity was smaller than fixed capital), suggesting that the enterprises had financial difficulties. One of the ways for micro enterprises to reduce the obstacles for obtaining funding is to increase the fixed capital. Fixed capital can be increased by money investment, investment in kind and on the basis of undistributed profits. Capital structure is particularly important for creditors, as opportunities to attract financing depend on it.

Financial equilibrium in the Latvian fish processing sector can be improved by creating a well thought-out and balanced structure of equity and debenture capital, which can be achieved at the national level by stipulating in the legislation the maximum admissible ceilings of financial equilibrium when a sector could qualify for the funding of the EU financial instruments, state and credit institutions. Exceptions could be acceptable in cases of innovative, long-term viable and profitable projects, implementation of which would benefit not only the fish processing enterprises themselves but also other participants of the fisheries sector and the country in general. Setting such ceilings would defend from unhealthy debt commitments and inexpedient squandering of national budget resources.

From 2005 to 2017, the Latvian fish processing sector used its available assets in generation of net turnover effectively enough (Total Assets Turnover Ratio on average 1.49), however, not in all the groups of enterprises. The medium-sized and large enterprises used their assets the most efficiently, whereas the small enterprises – less efficiently, showing that the investments made in enterprise assets have been useful and have been used skilfully. Micro enterprises used their assets inefficiently, which indicates to insufficient investments in creation of assets and problems in facilitation of sales. The potential of the fish processing sector was not used completely; and to facilitate the efficiency of assets, the sector has to find a way to increase turnover and to utilize a part of assets unfit for production.

From 2005 to 2017, the Latvian fish processing sector can be evaluated as a profitable sector, (Return on Sales Ratio on average 0.22%, Return on Assets Ratio on average 0.47% and Return on Equity Ratio on average 1.26%), except in 2006 and 2009, when there were financial problems, and 2014-2017, when the sector lost significant markets due to embargo imposed by Russia. The large and small enterprises can be considered to be the most profitable enterprises in the sector. Conversely, micro and medium-sized enterprises can be considered to be less profitable enterprises.

The financial stability of the Latvian fish processing sector can be enhanced by creating a well thought-out and balanced capital structure and distribution of financial means. In its framework, it is desirable for the enterprises to finance their long-term investments not only from the equity but also

from the long-term obligations. In turn, it is desirable to finance current assets from short-term obligations. It is not obligatory to follow the financing conditions, but desirable from the aspect of enhancement of financial stability.

Conclusions

The most significant financial aspects of the Latvian fish processing sector were evaluated and reflected using the globally widespread and important financial management instrument – financial analysis. In its framework the liquidity, solvency, efficiency and profitability of micro, small, medium-sized and large enterprises was assessed. The indicators used in the process of evaluation allow understanding the role of financing in the management of an enterprise and acquire new techniques how to make the right decisions to ensure successful operation of enterprises analysing and evaluating the financial indicators of the enterprises. Financial analysis provides an opportunity to understand and plan the common policy of the sector more successfully, at the same time enabling the understanding about the need in structural reforms.

Financial stability of the Latvian fish processing sector in general can be evaluated as sufficiently good, but not in all the groups of enterprises. The large and small enterprises can be considered to be the most financially stable enterprises in the fish processing sector, which, despite their unbalanced capital structure, could ensure optimal liquidity and could efficiently use the available assets in generation of net turnover, thereby ensuring financial benefit. Medium-sized enterprises, in turn, showed especially unbalanced capital structure, suggesting that the enterprises used a lot of debenture capital, failing to balance it with the equity and thus exposing themselves to additional financial risks. Although the investments made in enterprise assets have been expedient and assets were skilfully used, the enterprises were unable to ensure sufficient liquidity and profitability. The micro enterprises can be considered to be the most unstable enterprises in the fish processing sector; in comparison to the other enterprises, they showed the lowest liquidity and negative equity, suggesting that there existed financial difficulties. Low level of assets was observed in the enterprises, showing that there was a lack of funding for restoration of the assets and problems in facilitation of sales. The economic activities of micro enterprises cannot be evaluated as profitable.

The financial stability of the Latvian fish processing sector can be enhanced by following several financing rules, setting the maximum admissible ceilings of financial equilibrium, and by efficiently and rationally using the production resources available to the enterprise, simultaneously providing for commensurate investments in their restoration.

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Customer Experience Management In Omni-Channel Retailing

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Abstract

The omni-channel, as an emerging trend in retail, aims to coordinate processes and technologies across supply and sales channels. This paper describes the factors that influence omni-channel consumers' experiences, their acceptance of different distribution channels and intention to use new technologies interchangeably with traditional channels during the shopping process. This study shows how digital channels can be combined with traditional retailing, in order to enhance the value of the shopping experience, and to improve customer satisfaction in omni-channel settings.
The primary purpose of this research is to study the relationships between the dimensions of omni-channel retailing and consumer shopping behavior, experiences and satisfaction.
This study developed a conceptual framework for customer satisfaction assessment in omni-channel retailing and explored properties across multiple retail and supply chain channels in the context of customer experiences management. The proposed framework can be applied to a wide range of retail supply chains. It helps managers to develop and monitor omni-channel systems with aim of better customers' requirements fulfillment. Findings of this study confirm the positive and significant influence of all customer satisfaction dimensions on shopping experiences and fulfillment of consumer requirements and expectation connected with purchase in omni-channel environment. It validates that customer evaluation is not only based on product quality, but also includes every touch point with retailer. Understanding of particular consumer experience dimensions in omni-channel retailing can be helpful to managers in executing strategies that have the most positive effect on consumers' behavior and purchase satisfaction.

Keywords: Omni-Channel Retailing, Customer Experience Management, Shopping Channel, Customer Satisfaction.

Introduction

Business competition today is getting tougher and a company can survive long only by increasing the competitive advantage, but competitive retail business requires more than just low prices and innovative products. The development of new technologies has changed the retailing process. Additional retailing channels are emerging, causing consumers to change their habits and shopping behavior. The increasing diffusion and adoption of alternative business-to-consumer retail channels through both traditional and modern retail settings has transformed retail practices and consumers' shopping behavior. Current significant advances in technology, including the emergence of new purchase and communication channels such as the Internet, mobile application and social media, have opened up a new way for customers and firms in retailing process (Pauwels and Neslin, 2015). With the growing importance of online sales, retailers are investing in their omni-channel strategies. The omni-channel, as an emerging trend in retail, aims to coordinate processes and technologies across supply and sales channels. An omni-channel strategy is a form of retailing that, by enabling real interaction, allows customers to shop across channels anywhere and at any time, thereby providing them with a unique, complete, and optimal shopping experience that breaks down the barriers between channels (Verhoef et al., 2015). A growing number of customers use various channels during their shopping process. They might research the characteristics of a product using a mobile application, compare prices on several websites, and finally, buy the product at a physical store. They use new technology to search for information, offer opinions, explain experiences and make

purchases. In an omni-channel environment, channels are used interchangeably during the product's search and purchase process. Omni-channel retailing is a perfect approach to retailing that offers a single and unified shopping experience across all accessible retail channels. The concept of customer experience has emerged as a strategy for the retail business, because customer experience includes every point of contact at which the customer interacts with the retailer, product, or service.

This paper identifies the factors that influence omni-channel consumers' experiences, their acceptance of different distribution channels and intention to use new technologies interchangeably with traditional channels during the shopping process.

The primary purpose of this research is to study the relationships between the dimensions of omni-channel retailing and consumer shopping behavior, experiences and satisfaction. This study shows how digital channels can be combined with traditional retailing, in order to enhance the value of the shopping experience, and to improve customer satisfaction in omni-channel settings.

This study applies the following research methods: analysis of scientific literature, online survey, and statistical analysis of data.

The paper is organized as follows: After this introduction the relevant literature in omni-channel retailing have been reviewed and its contribution to current knowledge and practice has been identified. Afterwards, the recommendations that can help retailers recast the customer experience and manage all interactions across channels in an integrated and consistent manner have been proposed. Then the paper presents research methodology and proposed model of customer satisfaction assessment in omni-channel shopping environment. After that the results of research have been presented and discussed. Finally, the main conclusions from the study, its limitation and recommendations for future research are summarized.

Literature Review

Omni-channel retailing integrates processes and technologies across all accessible shopping channels, to provide consistent and more reliable services for consumers (Verhoef et al., 2015). Recent years have witnessed the emergence of new retailing channels. Thanks to new technologies, retailers can integrate all possibilities of these channels (Brynjolfsson et al., 2013). Omni-channel retailing integrates shopping experiences and connects the advantages of physical stores with the experience of online shopping. The omni-channel concept is perceived as an evolution of multi-channel retailing. While multi-channel retailing implies a division between the physical and online store, in the omni-channel environment, customers move freely among channels (online, mobile devices, and physical store), all within a single transaction process (Melero et al., 2016). Omni-channel retailing has many elements, which need to interact with each other, for example in form of information and material flows (Saghiri et al., 2017).

When channels work independently of each other they create fragmented supply chains, and struggle to deliver a consistent and reliable consumer experience. Omni-channel retailing aims to address this issue by coordinating processes and technologies across all channels, to provide most favorable, consistent and more reliable services for consumers (Verhoef et al., 2015).

To enhance the consumer omni-channel experience, retailers have attempted to make the product and service information consistent across all channels (Müller-Lankenau et al., 2006). In such system, consumers can easily switch from one channel to another in their buying experience, where they may find a product in one channel, place the order via another channel, and have the product delivery from a third channel, for example in the form of home delivery.

Customers expect a consistent, uniform, and integrated service, regardless of the channel they use, they are willing to move easy between different shopping channels (traditional store, online, and mobile), depending on their preferences, their current situation or the product category (Cook, 2014). Contemporary customers want to take advantage of the benefits offered by each accessible shopping

channel. They want to use their own device to perform searches, compare products, ask for advice, or look for better alternatives during their shopping process. The omni-channel system assures maximum information availability, visibility and consistency across different shopping channels (Piotrowicz and Cuthbertson, 2014). This provides various benefits such as total sales growth, cost saving and extended trust (Kumar and Venkatesan, 2005; Tate et al., 2007). Cross-channel retailers that adopt coordinated omni-channel strategies can be more profitable than those who employ multiple channels independently (Chatterjee, 2010). But omni-channel systems may need various requirements such as: broadband Internet accessibility, well-located and well-designed distribution centers, efficient and extensive logistics network, cross-channel integration, omni-channel visibility to customers, and product digitization (Cortiñas et al., 2010; Saghiri et al., 2017).

By using integration and optimal combinations of shopping channels, retailers can explore the benefits and overcome the deficiencies of each channel to create an appealing and safe shopping experience for consumers. Shopping channels should integrate promotion, pricing, product information, transaction, order fulfillment and customer service (Oh et al., 2012; Das and Chowdhury, 2012).

Integrated promotion and product information refers to connecting and synchronizing all channels with promotion and product information. The same information about product should be distributed to all members of the omni-channel system as well as the consumers. Product information may include product description, technical data, as well as stock status. Therefore, all promotion data sources must be shared across all accessible channel types (Avery et al., 2012; Weathers et al., 2015). Integrated transaction involves different available payment instruments and linking them with existing authorization mechanisms. Transaction integration may also imply a secure accessibility to consumer transaction data via various channels (Carton et al., 2012).

Integrated pricing synchronizes the products' prices, and makes changes in them, for example in the form of discounts, visible for consumers in all available channels. The omni-channel retailing adds a new aspects of competition among retailers, and pricing integration is key to managing pricing strategies across channels (Yan and Pei, 2011; de Carvalho and Campomar, 2014; Chen et al., 2015).

Integrated order fulfillment enables easy choice and change of product, transport mode, stock keeping point or delivery point across all channels. A high level of order fulfillment integration leads to a higher service quality experiences. Integrated customer service implies the same or compatible service standards in all accessible channels. Integrated customer service should be provided prior to the purchase, for the period of the purchase, during the product delivery, and in the product return stage (Ma et al., 2014).

When channels work independently of each other they create fragmented supply chains, and insufficient customer shopping experience. Omni-channel retailing integrates processes and technologies across all accessible shopping channels, to provide consistent and more reliable services for consumers (Verhoef et al., 2015; Cao and Li, 2015).

Researchers proposed different factors crucial for customer satisfaction and high quality experiences in omni-channel shopping. Some authors emphasize that omni-channel shopping has numerous advantages, such as: online shopping possibility and its convenience (Amrouche and Yan, 2012), wide range of touch points and channels for communication and transaction with customers (Verhoef et al., 2015). Furthermore, higher synergy and more information make channels complement each other and therefore enhance high quality customer shopping experience (Blázquez, 2014). Perceived quality and risk of omni-channel shopping have been found to be affected by diverse factors like customer digital literacy and brand recognition (Schoenbachler and Gordon, 2002), offline store service (Verhagen and van Dolen, 2009), channels integration (Herhausen et al., 2015), and advanced logistics processes (Hübner et al., 2016).

The most important factors influencing consumers' preferences are: accessibility, convenience, perceived risk, uncertainly reduction, transaction security, purchase costs, immediate product

availability, website design and quality, that influence customers' use of an online channel. The degree of integration of the various channels also appears to be an important driver of customer channel preferences, so higher levels of integration and the transparency of this integration are associated with desirable customer behaviors. The different attributes and capabilities of channels help understand customer decisions to use these channels (Avery et al., 2012).

In general, researchers tend to agree that customers who use multiple channels to purchase the firm's products and services are more profitable than single-channel customers and the monetary value of omni-channel customers is almost double that of single-channel customers (Kushwaha and Shankar, 2013).

Customer satisfaction and customer experience are distinct constructs and shows a contributory relationship with each other. Furthermore, better experiences leads to positive feelings and emotions due to that consumer want to repeat these experiences that not only influence satisfaction of the customer but also results into brand loyalty (Klaus and Maklan, 2013). The appropriate combination of shopping channels enables retailers to provide value-added services to consumers, which improves their shopping experiences and satisfaction with purchase. Therefore, the present study examined the influence of different shopping experience dimensions on customer satisfaction in omni-channel retailing.

Research Methodology

Because of numerous gaps and controversies in omni-channel retailing literature, this research aims to develop a conceptual framework for customer experiences assessment in omni-channel environment.

The factors for customer satisfaction in omni-channel environment have been selected from prior literature studies. The proposed model of customer satisfaction ties together factors representing major contexts of consumer satisfaction in omni-channel environment.

The proposed methodology of customer experience assessment in omni-channel retailing divides the factors connected with customer satisfaction into two groups. The first group takes into consideration factors related to experiences connected with purchase. The second group of customer satisfaction determinants in omni-channel concerns integration of shopping channels. The proposed framework for customer experiences assessment in omni-channel environment has been presented in the table 1.

Table 1: The conceptual framework for customer satisfaction assessment in omni-channel retailing.

Experiences connected with purchase	- transaction security - shopping convenience - reduction uncertainly and risk connected with purchase - accessibility of all shopping channels - possibility of easy product return - help by product choice and recommendation tools - personalization

Shopping channels integration	- product availability in different retail channels - integrated customer support across all sopping channels - compatible customer service standards in all accessible channels - integrated order fulfillment - compatible product prices and discounts in all accessible shopping channels - synchronizing all channels with promotion and product information.

Source: own elaboration.

The empirical sample was the young customers, that make purchase with help of different shopping channels. The respondents were asked to indicate the dimensions which influence their evaluation of shopping quality and satisfaction in omni-channel environment. The study population was members of academic community. The data was collected in the form of an online survey. The online questionnaire applied in this study included two sections. The first section collected information about respondents, their shopping habits and behaviors. The second part collected the information required for running the main analyses. All survey participants were young people, aged under 25. Each participant of the study was asked to answer the survey questions. Among 92 respondents, that replied the online questionnaire, 3 of them indicated that they have little or no experience of omni-channel shopping, and 9 questionnaires were uncompleted. The remaining 80 questionnaires were the basis of the study and have been used in the analysis of data, by using correlation coefficient (V-Cramer's coefficient) analysis. Respondents included 35% males and 65 % females. All surveyed respondents, that have been taken into consideration, browse regularly e-commerce sites, have experience of online shopping and shopping in omni-channel environment. They confirm that they often join different shopping channel, for example make an order online, watch the product in physical store, use recommendation and suggestion of salespeople, and search for online opinion and recommendation of others consumers.

The reliability test used was Cronbach's alpha. For all research variables values were higher than 0,8. Cronbach's alpha for transaction security was 0,831, shopping convenience 0,843, reduction uncertainly and risk connected with purchase 0,874, accessibility of all shopping channels 0,827, possibility of easy product return 0,819, help by product choice and recommendation tools 0,876, personalization 0,869 and shopping channels integration 0,842. Cronbach's alpha showed high internal consistency, what implies that the measures are reliable and the evaluation instrument is appropriate for use in research.

In questionnaire, each respondent determines the importance of every factor with a five-point Likert scale (very unimportant, unimportant, neutral, important, very important). Correlation analyze was used to estimate the unique effect of each factor typical for shopping in omni-channel environment on consumers' satisfaction levels.

The main limitation of this research is sampling. Therefore, results of the online questionnaire and all findings can be applicable only to the study sample.

Results and Discussion

Customer experience management is considered as an important issue in today's highly competitive environment in retailing business. New technologies offer retailers opportunities to bring together Internet, mobile, and offline channels into integrated customer experiences, therefore consumers may benefit from online and offline advantages.

The proposed factors, which determine customer's satisfaction in omni-channel shopping and their correlation with customer's satisfaction have been presented in table 2.

Table 2: Customers' satisfaction assessment in omni-channel retailing

Determinants of customers' satisfaction in omni-channel shopping	χ^2 – value	V-Cramer's coefficient
- transaction security	8,67	0,917
- shopping convenience	8,52	0,651
- reduction uncertainly and risk connected with purchase	8,49	0,893
- accessibility of all shopping channels	9,23	0,694
- possibility of easy product return	8,97	0,712
- help by product choice and recommendation tools	9,41	0,548
- personalization	8,76	0,746
- shopping channels integration	9,18	0,879

Source: own elaboration.

The results in table 2 show that the correlation between all investigated factors and customers' satisfaction level in omni-channel environment is statistically significant, because the χ^2 – value is higher that critical value (8,43).

Transaction security has the greatest positive impact on customers' shopping experiences (V= 0,917). Reduction uncertainly and risk connected with purchase is the second most important element driving satisfaction level in omni-channel environment (V=0,893), because consumers can see, touch, and feel products before buying and they have easy access to product information. Results demonstrate also that shopping channel integration (V=0,879), personalization (V=0,746), possibility of easy product return (V=0,712), and accessibility of all shopping channels (V=0,694) are very important for customers satisfaction in omni-channel shopping. Shopping convenience (V= 0,651), help by product choice and accessibility of recommendation tools (V=0,548) are the next important determinants of omni-channel shopping satisfaction. The results show that all investigated factors, significant for shopping experiences in omni-channel environment, have positive relationships with customers' satisfaction.

Shopping channel integration, personalization, customer trust connected with transaction security, risk and uncertainly reduction are key factors for a successful customer experiences management in omni-channel retailing. Transaction security is crucial for customers' satisfaction, because customers are aware of all information that they give away to firms, such as purchase histories, shopping behaviors or personal data.

Reduction of risk connected with purchase plays the crucial role in creation of positive customers' experiences connected with purchase. Within an omni-channel environment consumers have an opportunity to search product information both online and through visiting stores in order evaluate the alternatives and gain higher product familiarity prior to the purchase decision.

Positive customers' experiences and their satisfaction in omni-channel environment is connected with channel integration and possibility of easy change of shopping channel according to customer needs. The various channels differ in several factors, including whether they are physical or virtual, their degree of accessibility and convenience, and their switching costs. From a customer perspective, the creation of new shopping channels has offered new opportunities to transact and communicate with the firm. As a result, customers increasingly use alternative channels to purchase products or services and to contact the firm for other purposes including requesting information, asking technical advice, facilitating feedback about the products and services, and inquiring about a product's use or availability. The results of this study show an increasing number and complexity of customer-retailer interactions. Therefore, retailers should adopt optimal channel integration, which is associated with increased consumers' satisfaction and loyalty. The appropriate combination of different channel

reduces uncertainly and risk connected with transaction and plays a critical role in creation of personalized and high quality customer experiences.

Consumers require not only information about product in different marketing channels, but their have need of help by product choice, recommendation and support by purchase, contact with salespeople, and get in touch with product before purchase, because they can make clear characteristics of the products and make sure they are taking a good decision.

The availability of a better customer support that firms can provide through various channels causes that customers' complex needs are better satisfied with a coordinated omni-channel strategy. Understanding the consequences of customer behavior with respect to the various channels is necessary for the effective customer relationships management across particular shopping channels.

Conclusions

This study developed a conceptual framework for customer satisfaction assessment in omni-channel retailing and explored properties across multiple retail and supply chain channels in the context of customer experiences management. This research can help to understand the performance of omni-channel retailing systems, their development and improvement possibilities. It create also a framework for future studies on the omni-channel, support more effective management of omni-channel systems, and contribute to both the theoretical and practical aspects of omni-channel research. The proposed framework can be applied to a wide range of retail supply chains. It helps managers to develop and monitor omni-channel systems with aim of better customers' requirements fulfillment.

Findings of this study confirm the positive and significant influence of all proposed customer satisfaction dimensions on shopping experiences and fulfillment of consumer requirements and expectation connected with purchase in omni-channel environment. It validates that customer evaluation is not only based on product quality, but also includes every touch point with retailer. Overall experience comprises every touch point between customer and company, from product searching to product delivery, therefore companies should develop an integrated omni-channel strategy, identify, understand, and respond to their consumers, with aim of increasing the possibility of profitable and long-term relationships with them. Additionally, a satisfied customer though the pleasurable and well managed experiences generally generates positive word-of-mouth about the retailer. Understanding of particular consumer experience dimensions in omni-channel retailing can be helpful to managers in executing strategies that have the most positive effect on consumers' behavior and purchase satisfaction. Consequently, this will allow to manage customer experience properly that ultimately results into customer satisfaction, loyalty and positive word-of-mouth. Furthermore, this study establishes a direct linkage between consumer satisfaction and retailers activity in their omni-channel strategy improvement.

This research has a number of limitations too. The recommended omni-channel framework lacks an empirical validation, because of the limited study sample. This limitations provide perspectives for future research. A future study should try to validate and generalize the findings by using a wider sample. Moreover, the recommended framework reflects only limited management perspectives connected with customer experiences management in omni-channel retailing, and does not address other crucial dimensions of customer satisfaction. Further research is also required about the possibilities of the use other shopping channel such as mobile channels or social media. One of the issues that most concerns customers is their privacy. Therefore, more research is required into how companies can guarantee customers privacy protection and the correct use of all their private information across the different channels. Future research should explore the impacts of other variables connected with purchase experiences in omni-channel environment, which can determinate increasing of consumers' satisfaction.

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Customer Satisfaction in Online Shopping – The Application of Kano Model in Service Quality Management of B2C E-Commerce Website

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Abstract

Customers' requirements fulfillment and their satisfaction evaluation can be accomplished via various methods. This study uses Kano model as a theoretical framework to recognize and distinguish factors influencing quality perception and explores the possibilities of a better understanding of customers' expectations connected with B2C e-commerce quality attributes. The aim of this paper is creation of a conceptual framework of quality assessment based on e-commerce customer satisfaction and application of Kano model in service quality evaluation of B2C e-commerce sites. The paper attempts to study the various dimensions of e-service quality affecting online shopping satisfaction and uses Kano model to examine customers' requirements and satisfaction level in e-commerce. The Kano model has been used on a pilot sample of respondents. This research develops and tests empirically this framework for evaluation of e-retailing quality. The results of this study provide guidelines to encourage improvements in B2C e-commerce and effective customer experiences management in online environment. This study investigates empirically the determinants of high-quality customer experiences, develops a measurable framework for customer online satisfaction assessment, and indicates factors, which are significant for fulfillment of customers' requirements and expectations in online shopping. Understanding the most influential elements for customers' decision-making is not only beneficial for future development of e-commerce but also for increasing customer satisfaction and successful improvement of quality management in e-commerce companies.

Keywords: customer requirements; e-service quality management, B2C e-commerce, Kano model.

Introduction

An increasing number of consumers shift their buying activities from physical stores to retail websites and the reasons for this changed purchase behavior range from lower prices, greater convenience, and time savings, to better product and service selection available in online environment (Brunner-Sperdin et al., 2014). The quality of this service plays a similar role as the quality of services to consumers in other domains. Therefore, companies apply to improve the design of their websites, to enhance the quality of customers' interaction experiences, and to deliver a superior service quality, which are the key determinants of online retailers' success. It could be stated, that investments into the technical as well as service quality of the website increase the possibility of attaining satisfied customers (Al-Qeisi et al., 2014). Developing the right quality of service is extremely important and essentially involves shaping and modifying its individual features. Each of them can be treated individually and perceived by a given client. In order for the client to be fully satisfied, there is a need to constantly measure the quality and customer satisfaction of these services, allowing for continuous improvement of customer experiences in online shopping. One of the models to measure customer satisfaction is the Kano model of customer satisfaction which classifies quality attributes based on how they are perceived by customers and their effect on customer satisfaction (Chu, 2002; Grigoroudis and Spyridaki, 2003; Kano et al., 1984).

The Kano method can significantly facilitate the recognition of customers' expectations in e-commerce. This method is based on the assumption that the quality features are multidimensional

and affect the level of customer satisfaction to varying degrees. Some features have an impact primarily on creating satisfaction, while others contribute to causing dissatisfaction. Therefore, understanding what the client expects allows to focus on developing the right characteristics of the e-commerce site.

Understanding the most influential elements for customers' decision-making is not only beneficial for future development of e-commerce but also for increasing customer satisfaction and successful improvement of quality management in e-commerce companies.

The aim of this paper is creation of a conceptual framework of quality assessment based on e-commerce customer satisfaction and application of Kano model in service quality evaluation of B2C e-commerce sites.

The paper attempts to study the various dimensions of e-service quality affecting online shopping satisfaction and uses Kano model to examine customers' requirements and satisfaction level in e-commerce. The Kano model has been used on a pilot sample of respondents. This research develops and tests empirically this framework for evaluation of e-retailing quality. This study investigates empirically the determinants of high quality customer experiences, develops a measurable framework for customer online satisfaction assessment, and indicates factors, which are significant for fulfillment of customers' requirements and expectations in online shopping.

The study is structured as follows. After this introduction, the theoretical foundations and literature review have been presented. Next section details the methodological procedures, followed by an analysis of data and defines the dimensions of the proposed framework and its indicators. Than the results of research have been presented and discussed. Finally conclusion and suggestions for the continuation of the research have been presented, limitation are described, theoretical and managerial implications are explored.

Theoretical Background

Studies in the field of traditional services and online services have indicated that not all service quality attributes have the same level of impact on overall service quality perceived by customers (Jiang et al., 2013). In the traditional service environment, there are many studies using the SERVQUAL scale (Parasuraman et al., 1988) to evaluate the relative importance of service quality attributes, which is composed of five dimensions or underlying factors (tangibility, reliability, responsiveness, security, and empathy). SERVQUAL has been a popular measurement scale to evaluate service quality in many different traditional service environments characterized by direct interactions between customers and employees of service providers. With advances in the Internet, ICT technologies, and the growth of e-commerce and e-services, the SERVQUAL turns out to be inappropriate for evaluating and measuring e-service quality characterized by interactions between customers and websites of service providers. As a result, a number of studies attempted to develop e-service quality measurement scales. For example, Loiacono, Watson, and Dale (2000) developed WebQual, an e-service quality measurement scale which consists of 12 items: trust, response time, ease of understanding, tailored communications, intuitive operations, visual appeal, innovativeness, emotional appeal, consistent image, relative advantage, and inline completeness.

Yoo and Donthu (2001) developed an e-service quality measure called "SITEQUAL" for evaluating website quality that includes four factors – security, processing speed, ease of use, and aesthetic design. Jun and Cai (2001) identified 17 dimensions that are grouped into three categories for measuring e-service quality – online system quality, product service quality, and customer service quality. Zeithaml, Parasuraman, and Malhotra (2002) constructed a framework that can be utilized to measure e-service quality, consisting of 11 factors: security/privacy, assurance/trust, responsiveness, personalization, efficiency, reliability, flexibility, access, ease of navigation, site aesthetics and price knowledge. Wolfinbarger and Gilly (2003) advanced e-TailQ scale, including four factors to evaluate e-service quality. These four factors are customer service, website design, security, and reliability. DeLone and McLean (2003) constructed an updated information system success model with factors

determining the success of information systems such as service quality, system quality, and information quality. Han and Baek (2004) developed a four-factor scale for measuring e-service quality. These factors are tangibles, reliability, responsiveness, and empathy. Yang, Jun, and Peterson (2004) identified credibility, security, attentiveness, reliability, access, and ease of use as important dimensions for measuring e-service quality. Parasuraman, Zeithaml, and Malhotra (2005) developed a framework for measuring e-service quality, which includes E-S-Qual as a core online service quality scale (efficiency, privacy, fulfillment, and system availability) and E-RecS-Qual as an online recovery service quality scale (contact, compensation, and responsiveness).

In recent years, various authors have identified many determinants of customer satisfaction regarding electronic commerce. In the online service environment, many studies indicated that service quality attributes are of different importance in shaping overall online service quality. Liu and Arnett (2000) argued that four factors, namely, information quality, system use, system design quality, and playfulness determined the success of websites in the e-commerce context.

Jun and Cai (2001) argued that responsiveness, reliability, and accesses were the most important online service quality attributes. In the opinion of Polatoglu and Ekin (2001), reliability, access, and savings have the strong influence on online service quality. The important role in measuring the level of online customers satisfaction play also: content, ease of use, and accuracy (Pikkarainen et al., 2006). Yang and Jun (2008) conducted a survey of the quality of online services perceived by Internet purchasers and Internet non-purchasers. The six service quality attributes perceived by Internet purchasers were: reliability, access, ease of use, personalization, security, and credibility. The seven service quality attributes perceived by Internet non-purchasers were: security, responsiveness, ease of use, reliability, availability, personalization, and access. Considering the relative importance of service quality attributes to overall online service quality, the authors argued that the quality attribute connected with reliability was the most important for Internet purchasers, while the quality attribute connected with security was the most important for Internet non-purchasers.

According to Cyr (2008), the most significant determinants of customer satisfaction in e-commerce are : navigation design, visual design and information design. Safa and Ismail (2013) identified several factors connected with customer satisfaction in e-commerce: perceived site quality; customer experience in e-commerce; less time transaction; perceived usefulness; perceived ease of use; customer segmentation; customize products; fast response to customer inquiries; variety of goods and services; rewards and discounts; system quality; information quality; personalized web feature; language options; search and comparing facilities; product and service information; using other systems; collecting and analyzing customer information; fast and easy payment.

Other authors proposed eight determinants of customer satisfaction in e-commerce: commitment - efforts of the company to ensure that there is no breakdown in customer service and the responsiveness to customer concerns, problems, and complaints; engagement - overall image projected through the website; assortment -variety of products or services provided in the website; network - customer communication among themselves through the website; interactivity - two-way communication through the website among company and customers; transaction ease - extent to which a customer feels that the website is simple, intuitive, and user-friendly; fostering - relevant post purchase information provided for customers from the website; and adaptation - customer's feeling that value propositions in the website are adapted to him (Anderson and Swaminathan, 2011).

According to Christodoulides and Michaelidou (2010) the most influential quality attributes in online environment are: convenience, information seeking, variety seeking, and social interaction. Other evaluation criteria proposed in literature are: user interface quality, information quality, perceived security, perceived privacy (Eid, 2011); navigational functionality, perceived security, transaction cost (Kim et al., 2011); information quality, system quality, service quality, product quality, delivery quality, perceived price (Lin et al., 2011).
Although many evaluation criteria are proposed in the literature, the focus here is to choose those criteria which serve to determine customer satisfaction in e-commerce. It is argued that the quality of

e-commerce systems is related to quality of factors, which are connected with web site features, e-service quality, and promised customers' expectations fulfillment. For purpose of this study, the following dimensions of e-retailing quality evaluation have been selected: features of e-commerce website, e-service quality, and reliability. The detailed criteria of service quality assessment in B2C e-commerce have been presented in the table 1.

Table 1: Quality attributes in B2C e-commerce

Features of e-commerce website	E-service quality	Reliability
- Website design, aesthetics, functionality and usability - Ease of use- easy and convenient navigation - Information usefulness, adequacy and accessibility	- Help by product choice - Transaction security - Privacy - Personalization possibilities	- Fulfillment of promised delivery time and conditions - Responsiveness and ability to solving problems - Website accessibility and its correct technical functioning

Source: own elaboration.

Thus, though all of the e-commerce satisfaction models provided in literature are different in their determinants of e-commerce satisfaction, but it can be stated that many determinants of customer satisfaction regarding e-commerce identified by different authors could be considered as equivalent.

This paper reviews the most recognized criteria of e-commerce quality assessment in the context of customer online satisfaction and proposes a general comprehensive framework for evaluating the quality of any e-commerce service regarding to website features, e-service quality, and reliability.

Research methodology – Kano's Model of Quality

In this study, an evaluation method has been developed based on Kano model, which is widely used to classify and prioritize customer requirements connected with product or service quality, based on how they affect customer's satisfaction. It illustrates the relationship between customer satisfaction and quality performance. Kano developed the model of customer requirements fulfillment which identified the impact of products or services attributes on customer satisfaction. It classifies customer preferences into five categories, that is, attractive, one-dimensional, must-be, indifferent, and reverse quality (Kano et al., 1984). Attractive quality attributes are not normally expected, provides satisfaction while being achieved fully but does not cause dissatisfaction while are not fulfilled. These attributes, which are classified as one dimensional quality, result in satisfaction while are fulfilled and dissatisfaction while are not fulfilled. The attributes, which are taken for granted while are fulfilled but result in dissatisfaction while are not fulfilled, are categorized as must-be quality. In different quality means that these attributes refer to aspects that are neither good nor bad, and they do not result in either customer satisfaction or customer dissatisfaction. These attributes for reverse quality refer to a high degree of achievement resulting in dissatisfaction for some customer groups. In addition, there is a dimension of questionable quality requirements, that contains attributes that do not influence quality perception (Shahin et al., 2013; Lee et al., 2011).

Zhang and Von Dran (2002) developed a website quality model by applying the Kano model and it was used in an exploratory investigation of customer quality expectations. The study indicated that users of a website distinguish three types of quality factors corresponding to their quality

expectations. The nature of this quality factors may change over time and the same factor may have different quality identifications in different domains.

Customer satisfaction opposed to product quality has mostly been deemed as one-dimensional relationship. But, fulfilling individual customer expectations does not represent a high level of customer satisfaction, because the definitions of two types of customers' expectations, product quality perception and customer satisfaction, are different (Matzler et al., 1996).

The Kano model employs inquiring techniques with pairs of functional and dysfunctional questions about each requirement. The functional situation considers the element sufficient, while the dysfunctional situation supposes the element to be insufficient. In a Kano questionnaire, customer is required to choose one of the following responses to express their feelings: (a) I like it; (b) I expect it; (c) I am neutral; (d) I accept it; and (e) I dislike it (Kano et al., 1984). The classification is then made using an evaluation table in which service quality elements can be classified into one of five dimensions that exhibit different impacts on customer satisfaction depending on whether customer requirements are fulfilled (Table 2).

Table 2: Kano's Model of Quality - evaluation table

Service quality elements		**Dysfunctional**				
Functional		Like	Expect	Neutral	Accept	Dislike
	Like	Q	A	A	A	O
	Expect	R	I	I	I	M
	Neutral	R	I	I	I	M
	Accept	R	I	I	I	M
	Dislike	R	R	R	R	Q
A: attractive; O: one-dimensional; M: must-be; I: indifferent; R: reverse; Q: questionable						

Source: Kano, N., Seraku, N., Takahashi, F. and Tsuji, S. (1984), „Attractive quality and must-be quality", The Journal of Japanese Society for Quality Control, 14(2), 147-156.

From the evaluation table, Kano model classifies service quality elements into categories that exhibit different impacts on customer satisfaction depending on whether customer requirements are fulfilled. Categories are evaluated and interpreted according to the frequency of answers. On basis Kano questionnaire consumer satisfaction and consumer dissatisfaction coefficient are calculated.
Customer satisfaction coefficient indicates whether the customer delight can be improved or not, by achieving the quality requirements. The normal effect on satisfaction or dissatisfaction can be calculated using the following equations (Gupta and Srivastava, 2011):

Extent of satisfaction:

$$SI = (A+O) / (A+O+M+I) , \quad (1)$$

Extent of dissatisfaction:

$$DI = (-1) (O+M) / (A+O+M+I). \quad (2)$$

Where:

SI – satisfaction index,
DI - dissatisfaction index,
A – attractive requirements.,
O - one-dimensional requirements.,
M - must-be requirements.,

I - indifferent requirements.

The minus sign is used in second equation to indicate the nullifying result on customer satisfaction if the expected quality level is not achieved. The positive customer satisfaction coefficient with range starts from 0 until 1. As the value approaches 1, the customer becomes more satisfied. However, when approaching the value of 0, the customer becomes less satisfied with the achieved requirement. If the negative customer satisfaction coefficient (dissatisfaction coefficient) approaches -1, the customer dissatisfaction is strongly affected when the quality requirements are not achieved. Last of all, the 0 value indicates a neutral impact on the customer when the requirement is not achieved (Gupta and Srivastava, 2011).

Results and Discussion

In this study, Kano model was used to find out what are the customer requirements need from their expectation for service quality in B2C e-commerce sites. A questionnaire was developed and distributed to the 80 respondents among students, aged from 19 to 24. The research was conducted in January 2020. For purpose of this study, the following dimensions of e-retailing quality evaluation have been selected: features of e-commerce website (website design, aesthetics, functionality and usability; ease of use- easy and convenient navigation; information usefulness, adequacy and accessibility), e-service quality (help by product choice; transaction security; privacy; personalization possibilities) and reliability (fulfillment of promised delivery time and conditions; responsiveness and ability to solving problems; website accessibility and its correct technical functioning). The result of Kano model questionnaire has been presented in the table 3.

Table 3: Result of Kano model questionnaire

Quality attributes	A	O	M	I	R	Q	Category
Features of e-commerce website							
Website design, aesthetics, functionality and usability	32	13	6	25	3	1	**A**
Ease of use- easy and convenient navigation	11	25	11	28	4	1	**I**
Information usefulness, adequacy and accessibility	21	19	12	26	1	1	**I**
E-service quality							
Help by product choice	18	10	7	42	2	1	**I**
Transaction security	13	23	29	12	2	1	**M**
Privacy	12	22	36	8	1	1	**M**
Personalization possibilities	38	15	6	17	3	1	**A**
Reliability							
Fulfillment of promised delivery time and conditions	15	30	14	19	1	1	**O**
Responsiveness and ability to solving problems	27	25	10	15	2	1	**A**
Website accessibility and its correct technical functioning	19	35	14	9	2	1	**O**

Source: own elaboration.

All features were classified in five categories proposed in Kano model: Must-be (M), Attractive (A), One-dimensional (O), Indifferent (I) and Reverse (R). The result shows that among ten features reflected service quality in B2C e-commerce, three are attractive (A) for surveyed customers (website design, aesthetics, functionality and usability; personalization possibilities; responsiveness and ability to solving problems) and two must-be (M) – transaction security and privacy. Two quality attributes (fulfillment of promised delivery time and conditions; website accessibility and its correct technical functioning) represent category of one-dimensional requirements (0). Help by product choice, information usefulness, adequacy and accessibility, and easy and convenient navigation are quality attributes that have indifferent (I) influence on satisfaction of surveyed customers. This type of categories, similarly as questionable attributes, does not affect any customer satisfaction.

In order to decide which requirements should be satisfied, the consumer satisfaction (SI) and dissatisfaction (DI) coefficients have been calculated. The result has been shown in the table 4.

Table 4: Customer satisfaction and dissatisfaction coefficient.

Quality attributes	**A**	**O**	**M**	**I**	**Category**	**Consumer Satisfaction (SI)**	**Consumer Dissatisfaction (DI)**
Features of e-commerce website							
Website design, aesthetics, functionality and usability	32	13	6	25	**A**	**0,6**	**-0,3**
Ease of use- easy and convenient navigation	11	25	11	28	**I**	**0,5**	**-0,5**
Information usefulness, adequacy and accessibility	21	19	12	26	**I**	**0,5**	**-0,4**
E-service quality							
Help by product choice	18	10	7	42	**I**	**0,4**	**-0,2**
Transaction security	13	23	29	12	**M**	**0,5**	**-0,7**
Privacy	12	22	36	8	**M**	**0,4**	**-0,7**
Personalization possibilities	38	15	6	17	**A**	**0,7**	**-0,3**
Reliability							
Fulfillment of promised delivery time and conditions	15	30	14	19	**O**	**0,6**	**-0,6**
Responsiveness and ability to solving problems	27	25	10	15	**A**	**0,7**	**-0,5**
Website accessibility and correct technical functioning	19	35	14	9	**O**	**0,4**	**-0,6**

Source: own elaboration.

The satisfaction with the positive values included in the scope from 0 to 1. If the value is closer to 1, the impact of customer satisfaction is greater; positive coefficient, which approaches the value 0 indicates that there is very little impact on customer satisfaction. However, it is important to see negative satisfaction values too. If the value is approaching towards -1, customer dissatisfaction is very strong. Size, approximately equal to 0, meaning that a certain property does not feature such a high level of dissatisfaction. In this case, the minus sign is placed in a formula to emphasize its negative impact on customer satisfaction if this quality requirements are not fulfilled.

For surveyed customers, the most attractive quality attributes are: responsiveness and ability to solving problems, and personalization possibilities, because they have the highest satisfaction coefficient (0,7). Less important are: website design, aesthetics, functionality and usability (with satisfaction coefficient 0,6). Fulfillment of attractive elements will lead to greater than proportional satisfaction. However, the absence of these quality attributes does not result in dissatisfaction. These elements are usually not expected and are often currently unaware by customers, but they can provide a competitive advantage.

In contrast, such quality attributes as: easy and convenient navigation and information usefulness, adequacy and accessibility have indifferent influence on customers satisfaction level in online transaction.

These quality attributes as: fulfillment of promised delivery time and conditions, and website accessibility and its correct technical functioning are classified as one dimensional quality requirements. They result in satisfaction while are fulfilled and high dissatisfaction level (-0,6) while are not fulfilled. The higher the level of these expectations fulfillment causes the higher degree of customer satisfaction. Customer expect these elements, and thus view them as essential for their requirements fulfillment.

Insufficiency of a must-be quality attributes results in extreme dissatisfaction, but basic service performance is enough to satisfy customer requirements. Customers take must-be elements for granted when they are fulfilled, but high quality attribute performance does not generate equally high customer satisfaction. The surveyed customers require transaction security and privacy in online transaction. Absence of this elements can cause the extreme level of dissatisfaction, but they have indifferent influence on performance in customers expectation fulfillment.

Conclusions

This study presents the main pilot results of Kano model implementation to better understand customers' requirements in online shopping. The findings of this research have both theoretical and practical implications. It is believed that the findings of this research enable better understanding of the complexity of customer satisfaction and the Kano model itself. Above all, the research of customer satisfaction influences the improvement of quality management and in general the performance of a company.

This research contributes to identification the most important determinants of B2C quality perception and to implementation of the Kano model for assessment of customer expectation fulfillment in e-commerce. The findings of this study indicate which factors are the strongest predictors of customer satisfaction. This study links the Kano model with measuring customer satisfaction and presents a contribution for quality management research theory. Therefore, the results could be used to support optimization of business decision-making, as well as for further scientific research. Among the possible implications and contributions of this research is the differentiation of e-commerce website design features and e-service quality attributes that customers take for granted from those that add value in the consumer satisfaction performance.

Quality management in e-commerce is an interesting area which certainly deserves more systematic attention. From the methodological point of view, limitations in the research can be found in the number of respondents. Having a sample size which is large enough, ensures a representative

distribution of the population and finding significant relationships from the data. This study has also limitations stemming from the general formulation of the questions about factors that influence customer satisfaction in B2C e-commerce. This pilot study did not investigate other important factors affecting customers' satisfaction in online transaction, but they may be interesting for further research initiatives in this area. The direction for future research could be seen in building a new model of customer value in online shopping which requires anticipating what else customers might consider valuable. Future research should enable e-commerce companies to find new combinations of value for better fulfillment of customers' expectations, which are connected with B2C service quality.

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Enterprise Risk Management Maturity, Entrepreneurial Orientation and Business Performance: Building of A Conceptual Model

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Abstract

Enterprise risk management has been in the focus of scientific interest since the beginning of the 21st century, but it gained on relevance in the period following the global financial crisis. One of the main current academic challenges in the field of enterprise risk management research is establishment of a valid measure of enterprise risk management systems maturity that would enable comparison of enterprise risk management systems in different surroundings. Therefore, the first aim of this study is to present a theoretical background for development of enterprise risk management system maturity measure that is based on concurrent academic research. The second aim of this study is presentation of a conceptual model aimed at describing the theoretical foundation for research of interconnection between enterprise risk management system maturity, entrepreneurial orientation and business performance of the company. To our knowledge, up until now there has been no scientific research oriented on exploration of connection between enterprise risk management and entrepreneurial orientation. Having on mind prevailing academic evidence concerning positive effects of entrepreneurial orientation on business performance (Rauch et al, 2009) and based on academic foundation, i.e. available academic research in the fields of enterprise risk management and entrepreneurial orientation, we are building a conceptual model and defining assumptions on path of influence between the researched constructs.

Keywords: Enterprise Risk Management, Entrepreneurial Orientation, Innovation, Proactivity, Risk-Taking, Company Performance

Introduction

Enterprise Risk Management (ERM) is a contemporary strategic approach to risk management aimed at a consistent and an all-encompassing risk management process, established at the level of the entire business entity, incorporating assessment of interconnection between different types of risks a company is exposed to. Its rapid development as a scientific discipline started at the beginning of the 21st century and may be attributed to several researchers who have realized that a new approach to risk management, in which risks are seen holistically and not in silos like in Traditional Risk Management (TRM), is required (Colquitt, Hoyt, Lee, 1999; Kleffner, Lee, McGannon, 2003; Liebenberg and Hoyt, 2003; Lam, 2004; Beasley, Clune, Hermanson, 2005; Beasley et al., 2006; Nocco and Stulz, 2006; Beasley and Frigo, 2007).

A growing body of academic literature and best business practices have focused its attention on emphasizing the importance of ERM for companies. The relevance of ERM has become evident not only in the period of recent global financial crisis that has painfully reflected the consequences of inadequately implemented ERM systems (Miloš Sprčić et al., 2016; Marc, Miloš Sprčić, Mešin Žagar, 2018), but is also reflected in daily opportunities for companies to improve their adequacy of decision making, compliance with strategic goals, improvement of business process quality and increase in company value and corporate sustainability by implementing and constantly improving ERM systems

(Nocco and Stulz, 2006; ISO 31000, 2009; Institute of Actuaries Australia, 2009; Hoyt and Liebenberg, 2011; COSO, 2017).

On the other hand, researchers accentuate that the results of ERM research indicate certain inconsistencies (Miloš Sprčić, Kožul, Pecina, 2017) and attribute it to non-existence of a unique reliable measure of ERM components and its development (Lundqvist, 2014). The first aim of this paper is, therefore, to present a background for necessity to develop an ERM maturity measure that may be used in different research and thus provide comparison between different research. On the other hand, the results of research on the relationship between ERM and company performance are very ambiguous (Pagach and Warr, 2011; Hoyt and Liebenberg, 2011; McShane, Nair and Rustambekov, 2011; Farrell and Gallagher, 2015; Kommunari et al., 2016; Florio, 2017; Miloš Sprčić et al., 2016; Danisman and Demirel, 2018; Callahan and Solileau, 2018; Peljhan, Miloš Sprčić and Marc, 2018), mainly due to the fact that different authors are using different ERM measures, but also different performance measures and perspectives. These results present an incentive for further empirical research that has a strong conceptual background based on existing scientific knowledge. While analyzing the ERM literature, we have also come to the conclusion that ERM is mostly studied isolated, i.e. there is not much research that would research ERM within wider entrepreneurial context and theory. All of the mentioned reasons have been an incentive for us to build a conceptual model that will be oriented on explanation of relationship between ERM, entrepreneurial orientation and company performance.

This paper is organized in manner that following the introductory notes we will present a literature review on ERM and current practices of ERM maturity measurement. Further on we give rationale for connecting the concept of entrepreneurial orientation with ERM and finally we will present the conceptual model of our research and conclusions together with implications for future research.

Literature Review on Concurrent ERM Topics

Historical Development of ERM

Historically seen, risk management as a business function within a company has started to develop in the United States in the insurance sector at mid-1950's (Verbano and Venturini, 2011). At the time the existing scientific theory has not been very benevolent towards risk management. Dominant scientific models in financial theory have been the Capital Asset Pricing Model – CAPM (Sharp, 1964; Lintner, 1965) and the Modigliani-Miller theorem (1958). According to the CAPM the total risk a company is exposed to may be divided in two basic components: the systemic risk component and the specific risk component. The systemic risk component reflects variation in the movement of stock prices due to the market movement, while the specific risk component arises from within the company. Key assumption of the CAPM is that the specific risk component may be eliminated by investment strategy and that, consequentially, movements within the company have no influence on market movement of stock prices. This means that within the CAPM only the systemic risk component is relevant.

According to the Modigliani-Miller theorem (1958) the structure of capital and risk management are irrelevant for companies under the perfect market assumptions, because companies are making values by quality investment that are leading to increase in operational cash flows, while the source of investment is irrelevant for the company. Further on, Modigliani and Miller (1958) also imply that risk management is unnecessary for creating additional value for companies. According to the CAPM and Modigliani-Miller theorem, risk management not only does not generate value for companies, but also has indirect influence on decrease of owner's welfare through the costs associated with risk management. But the examples from the business practice have suggested that risk management makes a lot of sense and is suitable for protection of the company from high external financing costs and costs that may arise in case of financial problems. These practical understandings have led to the need that scientific theory offers an explanation for this and corroborates on the reasoning that risk management has practical relevance for companies. This has led to intensification of scientific research in the domain of risk management. Two approaches that have offered an explanation for risk

management relevance may be pointed out. The first is related to the shareholder value maximization hypothesis (Mayers and Smith, 1982; Myers, 1984; Smith and Stulz, 1985; Shapiro and Titman, 1998, Jensen and Meckling, 1976; Dobson and Soenen, 1993, Smith and Stulz, 1985; Stulz, 1990; Froot, Scharfstein and Stein, 1993), and the other to the managerial utility maximization hypothesis (Smith and Stulz, 1985, DeMarzo and Duffie, 1992; Breeden and Viswanathan, 1996). Both of these approaches share a common characteristic and that is relaxation of the perfect market conditions that have been existent within the CAPM (Sharp, 1964; Lintner, 1965) and the Modigliani-Miller theorem (1958).

Further on, in the time period from 1980's to the end of the 20th century, the dominant approach to risk management has been the Traditional Risk Management approach (TRM), according to which risk management has been regarded as an isolated function within a company, with no clearly defined responsibility for risk management, leading to the so called risk management "in silos", where each risk a company is exposed to is managed separately and without a holistic and strategic approach to all risks. The end of the 20th century has led to the awareness that risk management should be seen from the financially-strategic aspect (Verbano and Venturini, 2011) and both a scientific and a practical move has been made towards what is nowadays called ERM. According to McShane (2018) main point of difference between the TRM and ERM is that the focus within ERM is on holistic approach that implies all risks a company is exposed to are interconnected and their correlations are assessed, while analyzing both internal and external context of risk occurrence. It is important to mention that within the ERM a mental move has been made from managing only or dominantly financial risk to all types of risks a company is exposed to, including also risks such as strategic or operational risk that are difficult to quantify. The risk management function has strategic relevance and top management and the company management board are actively included in the risk management process and are defining a clear statement on risk appetite of the company. Also, decisions on capital allocation are made, aimed at achieving the highest possible risk adjusted rate of return. All responsibilities related to risk management are clearly defined, employees are educated on all types of risks, a positive view on risks is practiced within a company. All of these ERM characteristics defined by McShane (2018) are in accordance with some other authors' findings, such as Miloš Sprčić, Kožul and Pecina (2017) who state that in TRM risks are managed isolated and within one business unit and there is no control or communication on how risks are influencing the business strategy execution, while in ERM interactive effects of different risk events are strategically considered in order to achieve balance between efficient threat from risks and seizing opportunities arising from risks. When reflecting on advantages that ERM has for the company, Cican (2014) has noticed that within the ERM philosophy risk occurrence may be seen and seized as a chance to gain extra profit or non-material advantage for the company. Hoyt and Liebenberg (2011) have noticed that by practicing ERM duplication of risk management costs are avoided and improvements in capital efficiency may be noticed.

Up until now, there has been no single definition of ERM, probably due to the fact that it is a complex process that is incorporated on all levels of a company, but although some standards for ERM implementation exist (COSO 2004; ISO 2009; COSO 2017; ISO 2018), there is no legislation that requires implementation of these standards and the companies that operate in any sector other than the non-financial sector have the freedom to organize and implement ERM as it is most suitable for them. There have been attempts to define ERM (Dickinson, 2001; Meulbroek, 2002; Miloš Sprčić, 2013 and 2014; Lam, 2014 and 2017; Mikes and Kaplan, 2014 and 2015), and the elements that are common to most definitions include: integration (ERM system is present in all business lines), all-encompassing (all types of risks are encompassed) and strategic orientation (risk management is connected with company's business strategy) (Abrams et al., 2007).

When analyzing the available ERM scientific literature, we have noticed that, although ERM is a young scientific discipline, a body of empirical research exists on the topic and it is profiled in four dominant directions: 1) basic components of ERM, 2) measurement of ERM development or maturity, 3) determinants of ERM implementation and 4) influence of ERM on company performance. All of these directions of empirical research have in common the fact that certain inconsistency and ambiguity of results is present. According to Lundqvist (2014) the most probable reason for this lies

in the fact that there is no consensus among ERM researchers which are the basic ERM components and how to measure ERM, thus making comparison of results very difficult. In the continuation of this paper we will focus our attention on giving a short literature overview on measurement of ERM development or maturity and influence of ERM on company performance.

Current practices of ERM maturity measurement and effects of ERM on company performance

The state of development or maturity of ERM systems has been a subject of researchers' interest and in this section we provide a short literature review on these findings. Desender (2007) has been one of the first researchers to measure development of ERM systems. He made a preliminary review of items important for ERM and assesses their relevance for ERM development by building a model around the COSO (2004) standard. The positive side of this model is that it is the first attempt to systematically approach measurement of ERM development and it has provided a platform to connect the practical experience to COSO (2004) framework. On the other hand, since this model has been developed, many new findings have occurred in the ERM research and therefore it cannot be considered up-to date for ERM development measurement.

Gordon, Loeb and Tseng (2009) have approached the question of ERM measurement by constructing an ERM index based on four basic aims of COSO (2004) framework (strategy, operations, reporting, compliance). Main critique of this research lies in the fact that the ERM index developed is a measure of ERM effectiveness and not of its development or maturity. Also, the index is based only on eight items which may be insufficient to encompass the ERM systems complexity. A similar research has been conducted by Callahan and Soileau (2017) who have measured the ERM development by providing a questionnaire on compliance of the company with the aims of COSO (2004) framework (strategy, operation, reporting and compliance). Their results indicate positive impact of ERM development and operational performance of the company.

McShane, Nair and Rustambekov (2011) have used the existing Standard&Poor rating for risk management maturity measurement in order to measure its connection to company performance. The S&P rating is a fully developed rating system that ranks ERM systems within five categories according to their maturity and provides a reasonable platform for ERM maturity measurement, but it must be noted that this rating relates both to TRM and ERM. Also, although McShane, Nair and Rustambekov (2011) argue that there is a positive influence on business results of companies as they advance in TRM development stage, but not when they make a transition to ERM, the authors also pose a question of external rating reliability when measuring ERM maturity and possible conflict of interest of rating agencies when assigning a certain rating to a company. The same measure of ERM maturity has also been employed by Nair et al. (2014) and Bohnert et al. (2018) in their research.

Monda and Giorgino (2013) have identified 22 items relevant for ERM development, classified them into three categories (risk culture, organization and processes) and based on their importance for ERM constructed an ERM index. Positive side of this model is its scientific foundation (scientific methodology), but the number of items identified as relevant for ERM development is rather scarce since the current scientific literature offer evidence of more variables that have proved its relevance for ERM development. Also, the structure of the index that is divided into three categories is rather simplified when having on mind the complexity of ERM systems.

Lundqvist (2014) has researched the level of ERM development in Nordic companies based on the exploratory analysis of 59 different variables that she assumed to be relevant for ERM development. The results of the research have suggested that there are four underlying factors that are relevant for ERM implementation in Nordic companies: general internal surrounding, control activities, risk management activities and attributes of ERM implementation. But the results have also led to the conclusion that only factor called "the attributes of ERM implementation" is relevant for differentiation between companies that have implemented ERM and those that have not. As Lundqvist (2014) concludes, this implies that for "full" ERM implementation a company needs to invest significant effort in some dimensions that are not directly associated to risk management (such as general internal surrounding or general control activities) and she sees this conclusion as a

confirmation that ERM is not an isolated process, but that it requires resources and support on the level of the whole company.

Beasley, Branson and Pagach (2015) have used the self-assessment questionnaire consisting of three questions for measuring ERM maturity. Although each question could have been answered on a scale, leading to a total score of ERM maturity, we believe that only three items do not fully capture the ERM dimensions.

Miloš Sprčić, Kožul and Pecina (2015, 2017) have developed an ERM index based on 14 questions related to different ERM maturity characteristics and based on the answers measured the total ERM score. The results of the research indicate that the developed index is a good measure of ERM development in Croatian large listed companies, but having on mind newer findings in the ERM research area, we believe that index may be further on improved.

Florio and Leoni (2017) have measured ERM sophistication by employing 6 items important for ERM design. Results of their research indicate a positive impact of higher ERM score on company's performance, but main critiques of this ERM measurement include scarcity of variables included in the research and searching information regarding the variables in publicly available reports of companies, since companies are not obliged to report ERM practices in their reports.

Miloš Sprčić (2019) has been rethinking on quality and efficiency of ERM systems in a conceptual paper by connecting a set of characteristics important for ERM to regulatory standard COSO 2004. This standard is based on a process approach to ERM and is made of eight components: internal environment, objective setting, event identification, risk assessment, risk response, control activities, information and communication and monitoring. This paper has been an incentive for our research to broaden and improve the existing conceptual model by revising characteristics that are important for ERM with the newest literature findings and to connect it to the newest regulatory standard COSO 2017 that is somewhat different from the previous version of COSO dating in year 2004. Primary difference between two versions of COSO lies in the fact that COSO 2017 is no more dominantly process-oriented, but it considers ERM as a strategic process that is directly connected to company's strategy and business goals. COSO 2017 also provides greater insight into the value of enterprise risk management when setting and carrying out strategy (COSO 2017).

When regarding ERM in the context of company performance, we would like to accentuate that according to Peljhan, Miloš Sprčić and Marc (2018) prevailing evidence in scientific literature suggest that adequately implemented ERM systems have positive influence on company's performance, but they also draw attention on the non-negligible corpus of scientific literature indicating adverse results. Systematization of existing research conducted by Viscelli, Beasley and Hermanson (2016) indicates a positive impact of ERM on value creation and impels future research in this domain.

When we analyzed the existing research related to ERM and company success (Beasley, Pagach and Warr, 2008; Gordon, Loeb and Tseng, 2009; Pagach and Warr, 2011; Hoyt and Liebenberg, 2011; McShane, Nair and Rustambekov, 2011; Grace et al, 2015; Farrell and Gallagher, 2015; Kommunari et al., 2016; Florio and Leoni, 2017; Miloš Sprčić et al., 2016; Yang, Isthiaq and Anwar, 2018; Danisman and Demirel, 2018; Callahan and Solileau, 2018; Peljhan, Miloš Sprčić, Marc, 2018), we have found that two directions in measuring „company success" have been profiled: first, related to measuring the value of the company, and second related to measuring company's performance. Research oriented on measuring the impact of ERM systems on company value uses Tobin Q as an indicator (Pagach and Warr, 2011; Hoyt and Liebenberg, 2011; McShane, Nair and Rustambekov, 2011; Farrell and Gallagher, 2014; Kommunari et al., 2016; Florio and Leoni, 2017; Miloš Sprčić et al., 2016; Danisman and Demirel, 2018). On the other hand, research oriented on measuring company's performance uses the traditional accounting measures, such as return on assets – ROA (Florio and Leoni, 2017; Kommunari et al., 2016), return on assets – ROA and return on equity – ROE (Callahan and Solileau, 2018), self-assessment of companies related to financial and nonfinancial indicators in period of current and previous two years (Yang, Isthiaq and Anwar, 2018),

self-assessment of companies on financial and non-financial indicators in previous year in comparison to competition (Peljhan, Miloš Sprčić, Marc, 2018).

According to Florio and Leoni (2017) higher level of ERM development has influence on ROA. Kommunari et al. (2016) have not established a relation between ERM and ROA. Callahan and Solileau (2018) found a positive impact of more mature ERM systems on both ROA and ROE. The results of the research conducted by Yang, Isthiaq and Anwar (2018) indicate clear impact of ERM development to financial and non-financial indicators of performance, while Peljhan, Miloš Sprčić and Marc (2018) found a positive impact between ERM development and one non-financial indicator used in research (development of new products), but positive impact has not been reported for other financial and non-financial indicators used in the research (profitability, sales growth rate, market share and client satisfaction). Having on mind all the evidence introduced from the scientific literature, it may be concluded that it is necessary to provide more empirical evidence on the influence of ERM systems on company performance.

In continuation to the literature review we provided in this section, we would like to conclude that although there have been many valuable efforts by researchers to capture the extent of ERM maturity or development, there is no clear consensus on how to achieve this research aim and new methodologies and conceptualizations are required in this field in order to overcome the shortages of available measures.

Entrepreneurial orientation and implications for ERM research

The entrepreneurial orientation researchers suggest that entrepreneurial orientation is a concept that pervades through all organizational levels of the company (Covin, Green and Slevin, 2006; Wiklund and Shepherd, 2005; Wales, Monsen and McKelvie, 2011). Anderson et al. (2015) argue that entrepreneurial orientation is a dominant construct of interest in cases when research is focused on the company's strategy. According to Covin and Lumpkin (2011) and Anderson et al. (2015) the background for the entrepreneurial orientation development concept may be found in the work of Mintzberg (1973) who states that "entrepreneurial strategic behavior is characterized by active pursuit of new opportunities and a dramatic leap towards uncertainty".

Miller (1983) has defined entrepreneurial company as the one that is engaged in innovation of market products, taking risky ventures and being a leader in proactive innovation, altogether leading to outperforming the competition. In continuation, Miller (1983) has defined three dimensions of the concept of entrepreneurial orientation: innovativeness, proactivity and risk-taking. According to Anderson et al. (2015) innovativeness is defined as "conceptualization of new products, processes or business models on the level of the company", proactivity as "tendency to commercialization of these innovation on new products or markets" and risk-taking as "inherent managerial propensity present at the highest management level, aimed at development and implementation of the company's performance, favourising strategic actions with uncertain outcome".

Covin and Lumpkin (2011) state that there is present ever growing interest in both research of the concept of entrepreneurial orientation, but also in its practical implications for companies. Covin and Lumpkin (2011) also argue that it is characteristic for entrepreneurial orientation dimensions to be stable in time and that its key dimensions are risen up on the level of a company and are not only a matter of an individual or a specific department of a company. According to Wales, Monsen and McKelvie (2011) entrepreneurial orientation is manifested horizontally throughout the organization and they state that top management has a key role in pervasiveness of entrepreneurial orientation in the company by defining business philosophy and defining strategic orientation of the company.

As to the authors' knowledge up until now the relationship between ERM maturity and entrepreneurial orientation has not been a subject of scientific research. There are several scientific findings that have led to the idea of creating a conceptual model oriented on research of interconnection between ERM maturity, entrepreneurial orientation and performance of the company. Firstly, Brustbauer (2016), who has conducted a research on risk management and strategic

orientation of the company, has concluded his research findings by giving a recommendation for future research that "addressing the concept of entrepreneurial orientation would be a fruitful addition to the existing model" in the context of risk management (Brustbauer, 2016, p. 82). Secondly, research conducted by Obuljen (2017, p.213) indicates a statistically relevant mild positive relationship between risk management (as a part of the corporate governance mechanism) and entrepreneurial orientation construct. Thirdly, Farrell and Gallagher (2019) include innovation orientation of the company as a variable while researching the effects of ERM maturation on company's performance. It must be emphasized that the degree of innovation is measured by research and development intensity as s proxy, which is not consistent with the entrepreneurial orientation concept, but it does suggest the growing relevance of the innovation dimension in ERM research. Fourthly, Peljhan, Miloš Sprčić and Marc (2018) have been the first to our knowledge to analyze ERM in the context of being a mediator between company strategy and performance and this paper has been a methodological incentive for us to start thinking about ERM in a wider context of entrepreneurial theory.

In previous section, a rationale for suggesting the ERM and performance relation research has been given. At this point we give a short overview of research related to measuring the effects of entrepreneurial orientation and company's performance. Rauch et al (2009) argue that conceptual arguments suggest that entrepreneurial orientation leads to improved company's performance, but the intensity of this relation varies across scientific research.

Covin and Slevin (1986), Hult, Snow and Kandemir (2003) and Wiklund and Shepherd (2005) have found a significant and strong relationship between entrepreneurial orientation and company's performance. Lumpkin and Dess (2001) have come to the conclusion that there is a positive, but weak relation between entrepreneurial orientation and performance, while George, Wood and Khan (2001) have not confirmed the hypothesized relation. According to Rauch et al (2009) the effects of entrepreneurial orientation on the performance may be characterized as moderately high with the tendency of positive relation, also indicating the robustness of research on different performance measures, i.e. both financial and non-financial indicators of performance indicate the same results.

It is important to mention that in the entrepreneurial orientation literature there have been attempts to widen the scope of the term and concept entrepreneurial orientation. Lumpkin and Dess (1996) have defined entrepreneurial orientation by five dimensions: proactivity, innovativeness, risk taking, autonomy and competitive aggressiveness. We find all of these dimensions important in order to fully capture the term entrepreneurial orientation, but we also have on mind the fact that the data on entrepreneurial orientation may be received only by survey completion from the respondents. Since practical validation of our model will require an extensive questionnaire to gather the data that we need in order to test the conceptual model, and researching additional two dimensions of entrepreneurial orientation requires additional time from respondents, we have decided to focus our attention on three basic dimensions of entrepreneurial orientation.

Conceptual Model of the Research

In previous sections of the paper we have provided a short literature overview regarding concurrent topics of interest in the field of ERM maturity research and its interconnection to the business results of the company and also of entrepreneurial orientation and company performance. We have also tried to establish a scientific literature foundation for research of ERM and entrepreneurial orientation. In this section we will present a conceptual model of our future research that is aimed at setting hypothesis related to ERM, entrepreneurial orientation and company performance. The conceptual model of research is presented by the following Figure.

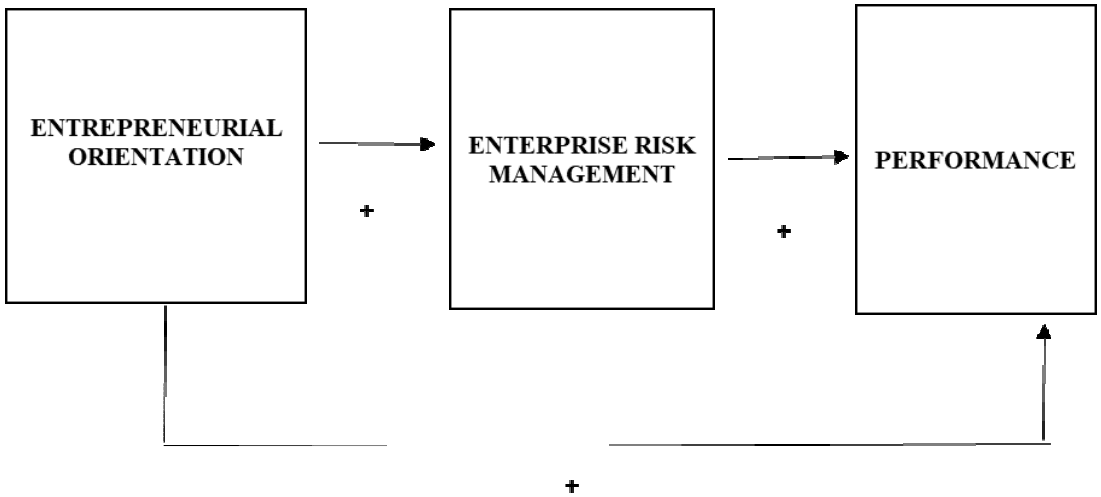

Figure 1: Conceptual research model

Source: Authors

The model is based on the following premises:

(1) Entrepreneurial orientation has a positive effect on company's performance,

(2) ERM has a positive effect on company's performance,

(3) Entrepreneurial orientation has a positive effect on ERM and thus ERM acts as a mediator variable between entrepreneurial orientation and performance.

The premises (1) and (2) are grounded in evidence from the literature review provided in previous and in this section. Premise (3) is based according to following line of reasoning:

a) According to the ERM Initiative Faculty (2014) innovation is related to wide spectrum of risks and it is therefore necessary for companies to develop and continuously improve its own decision-making model related to innovation in order to manage innovation risk more successfully;

b) Silva Etges, de Souza and Neto (2017) state that adequate risk management is a prerequisite for successful innovation introduction. Having on mind that it is in the interest of companies that the process of innovation introduction is adequately managed, primarily due to innovation-related risks, the assumption of this conceptual model is that the companies that are more prone to innovation have developed more advanced mechanisms for innovation risk protection and it is hypothesized that higher level of innovation dimension in the company has positive impact on the level of ERM maturity.

c) Proactivity may be perceived as the characteristic of the company related to seeking new market opportunities, consequentially leading to higher risk exposure, therefore we hypothesize that higher level of proactivity has positive impact on the level of ERM maturity. In an analogous manner, it should be logical for companies more prone to taking risks to seek mechanisms leading to risk mitigation and adequate risk management, therefore we hypothesize that higher level of risk-taking in company has positive impact on the level of ERM maturity.

After having defined the elements of the model, the question has arisen what the model consists of concretely, i.e. how to measure certain elements. We have therefore had to decide how to measure

ERM, entrepreneurial orientation and performance of the company. The easiest part of this design has been related to entrepreneurial orientation. Since many authors are using the standard and validated entrepreneurial orientation scale (Miller, 1983; Covin and Slevin, 1986) we have decided to use this scale in our research. The scale consists of nine items, three per each dimension of entrepreneurial orientation (proactiveness, innovation, risk-taking). These items will be estimated by respondents on Likert scale.

When reflecting on how to measure the company performance, we have decided to include both the financial and non-financial perspective, since there has been evidence that ERM might have influence on non-financial indicators (Peljhan, Miloš Sprčić, Marc, 2018). We have selected three financial and three non-financial indicators, namely: profitability, sales growth rate, market share, development of new products or services, quality of products or services and customer satisfaction. The next step has been to decide how to measure these variables. Since target respondents on the survey in companies are managers who have limited time available for participation in the research and revelation of concrete amounts of financial indicators might discourage the respondents from taking the survey, we have decided to use the approach as Peljhan, Miloš Sprčić and Marc (2018) and Kantur (2016) and the respondents will be asked to estimate the financial and non-financial indicators more generally, namely the trend of a certain indicator for the company in the previous year as compared to the competition on the scale from 1 to 5. We believe that this approach, other than being very appropriate for estimating non-financial indicators, has the advantage of possibly resulting in higher response rate on the survey.

The measurement of ERM represents a novel approach. Based on the literature analysis, we have extracted 29 characteristics of developed and mature ERM systems and the respondents of the survey will estimate each characteristic on the Likert scale from 1 to 5. We believe that, by employing exploratory factor analysis, it will be possible to extract a lesser number of factors that are representative for mature ERM systems and the calculated factor scores will be our basis for further analysis.

We plan for practical validation of our model on the sample of Croatian companies. When defining the population of the research, we took regard of the facts that the implementation of ERM requires significant material and human resources (Carroll, 2012; Lundqvist, 2014), the research that has been conducted on the sample of Croatian listed companies has indicated rather low level of implementation of ERM (Miloš Sprčić, Kožul, Pecina, 2015; Miloš Sprčić, Pecina, Orsag, 2017), the companies operating in financial sector have a strong regulatory incentive for implementing ERM (Miloš Sprčić, Kožul, Pecina, 2017) and up until now the research of ERM in Croatia has been conducted only on large listed companies. Based on these criteria we have defined the population of our research as the most profitable large and medium sized companies that operate in sectors other than the financial sector and that may or may not be listed on Zagreb Stock Exchange. The sample of the research will include two stratums: the stratum of listed companies and the stratum of other large and medium sized companies.

The methodology we plan to use in order to test our hypothesis largely depends on the survey response rate. In case we receive adequate number of responses, it would be practical to use structural equation modelling to test our model. Since structural equation modelling is a large sample technique, in case we achieve a lower number of responses, we will use classical multiple linear regression, by employing the Barron and Kenny (1986) approach to testing the mediation effect.

Conclusion

Main reflections of this paper are directed towards accentuating the importance of ERM systems and its maturity level on the performance of the company on one hand and on the other giving a rationale for determining a research model related to ERM, entrepreneurial orientation and company performance.

While analyzing the scientific literature in the field, we have come to the conclusion that researchers are "tapping in the dark" when trying to measure the maturity of ERM systems in their research. Although there have been valuable efforts related to defining a valid ERM maturity measure, there are still many open questions, possible biasness and practical research problems. Thus, we accentuate the need to develop a valid measurement instrument of ERM maturity.

We have also provided a literature foundation and premises to building a research model oriented towards explanation of relationship between ERM, entrepreneurial orientation and company performance.

Although we carefully methodologically defined our model, we must mention its possible limitations. Firstly, as we already mentioned, the questionnaire we plan to use is rather detailed and lengthy. Having on mind that the target respondents are managers with limited time available for participation in the questionnaire on one hand and that there may be certain resistance to disclosure of exact financial data of the company on other hand, we refer to approach used by Kantur (2016) and propose to gather the information regarding financial and non-financial indicators by asking the respondents to estimate these indicators for their company in last year compared to competition. Although this approach has its advantages, such as the fact that it may encourage higher survey response rate and that it is appropriate for non-financial indicators, we must remark that for financial indicators the usage of concrete financial amounts might be more precise. Also, in our conceptual model we proposed to analyze entrepreneurial orientation based on its three basic dimensions: proactivity, innovativeness and risk-taking. Since some authors also mention additional dimensions of entrepreneurial orientation, such as autonomy and competitive aggressiveness, we propose that the future research includes also these additional dimensions that might contribute to the literature and empirical findings.

In our future research we plan to provide empirical evidence based on the survey from the Croatian market. We hope to make a scientific contribution in terms of developing an appropriate ERM development measure, but also to gain new scientific insights on how ERM works and how it is connected to entrepreneurial orientation. We hope that our research will also result in practical guidelines and useful knowledge that companies may incorporate in their business activities.

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A Student Vocational Becoming Through IT Competency Development

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Abstract

The urgency of the research is determined by current processes. They are the rapid development of all means of information technology and the necessity of their use for the efficiency of student future career; a changing variety of occupations. In this regard, this paper is devoted to the review of vocational becoming of students within the context of the information society development as a dynamic, focused process of progressive personality change influenced by the information environment development, aimed at vocational competency development, including IT competence. The authors examine requirements to prepare new methodological training systems which are able to promote learners' skills to keep IT practice for the development of qualities required for future career. When doing the research, the authors applied the following methods of philosophical, psychological and educational literature review; projection and modeling. According to the study, the authors note the special logic of accomplishing the identified requirements for the development of modern methodological training systems, focused on developing a learner's skills to perform information practice and educational information interaction independently to develop the abilities necessary for future career. The content of the paper has a practical interest for undergraduates, graduate students, university professors and teachers of other educational institutions who carry out research in this field, and those who are intent to make up projection models of student personal and vocational becoming.

Keywords: Student Vocational Becoming, Student IT Competency, Technological Approaches.

Introduction

The experience of the present-day society development is materially affected by information technology observed not only in engineering systems but also in higher education. These processes develop according to the requirements for career development.

Accordingly, at a targeted level in terms of a developing information-oriented society, it is focused on training highly educated and skilled professionals able to act independently and intensively, take effective solutions and adapt flexibly to constant changes in living conditions. Drawing from the special traits of this society in the competence of professionals, the basis of the information technology should definitely be distinguished both in the activity of inclusion in further human life, and the ability to solve emerging living and vocational problems in practice.

This study examines the opinion of defining the concepts of *student personal and vocational development*, *student information competence* and their key factors, as well as the one of describing

the technological and methodological approach to arranging the vocational training based on the current need to identify effective and efficient personal and vocational becoming and information competence of trainees.

Literature Review

The nature of student personal and vocational development observed in the research is revealed through various approaches. The authors single out the approach (Polichka, 2017) of interpreting vocational and personal-vocational development of a student who studies in the institution of higher education as a dynamic process aimed at the progressive change of student personality, in circumstances of meeting the requirements for professional qualifications; taking into account the external conditions arranged by a lecturer; one's own ambition in mastering all the elements necessary for learning of trade aimed at the development and self-development of an individual, developing professional competence and a willingness for continuous career advancement. In this consideration of personal and professional development of students, the directions of development are emphasized: career competencies dedicated to preparing for work according to the invariable part of the requirements of the education system; competencies defined by the variable part of the main curriculum in the institution of higher education. In this study, the authors correlate these fields of vocational training with the phenomenon of *student information competency*.

The development of essential modern methodological training systems is considered to be a technological basis for it. They are focused on mastering skills to perform information activities and educational communication for the development of qualities required for future career.

A number of studies are devoted to examining the particularities of student personal and professional development in various types of activities (Adolf and Stepanova, 2017). The research of different aspects of personal and professional development of students is carried out in (Kabanova, 2014; Plotkina, 2010) and others. According to their studies, personal and professional development of students is a complex and many-sided structure, which is influenced by various conditions.

Current studies of the phenomenon *personal-professional becoming* are conducted mainly in the following fields of acmeological approach (Bozhovich, 1997), psychology of professional engagement (Zeer and Symanyuk, 2017), becoming of a person as an active subject transforming the world and a person himself (Slobodchikov, 2005), personal growth pedagogy (Vorovshchikov, 2006), etc.

Several distinctions are distinguished when revealing the subject-matter of human information competence: understanding the phenomenon of *human information competence*, the development of human information competence and its features, self-development of the level of human information competence in a personality structure.

Many scientists reveal the distinctions by different approaches to this issue: anthropological; phenomenological (Tabachuk, 2019); pragmatic (Kosorukova, 2014); system-related; competence-based (Vorovshchikov, 2006; Tabachuk et al., 2018) and others.

Personal and vocational development of a student based on the development of information competence with identifying a personal component as a concept of *personal information competence* and viewing it as a key metadisciplinary competence was not regarded pointedly.

It involves the necessity to do research on reasoning and characterizing mastering relevant information competencies by a learner; the influence of a personal attitude both to these competencies and such an object of activity as information processing; treating information competencies as independent and intended social standards and requirements applicable to student training outcome.

Research Methods

The subject of the study is technological approaches of student personal and professional becoming based on the development of information competence.

According to the subject and purpose, the modern requirements imposed on the development of student information competence affecting their professional development are examined. The authors detail dialectic of the development of technological predictions for actualizing relations in professional becoming and information competence of students.

A variety of mutually complementary research methods was used to take on such a role: analysis of philosophical, psychological and educational literature, projection and modeling (Novikov and Novikov, 2010). The methods used were appropriate to the tasks to be solved. So the authors could record the outcomes in the measurement of the subject of study.

Results and Discussion

The meaning and peculiarities of professional becoming of students with the development of information society: competency-based approach

Contemporary science regards that there is an entire classification of theoretical methods to define the meaning of the phenomenon of *professional development of students* (Bozhovich, 1997; Tabachuk, 2019). Thus to sum up (Zeer and Symanyuk, 2017), in particular, the training that provides professional development should be based on a pragmatic approach. The review of the approaches observed makes the professional development of students clear due to their efforts. The issues of professional development in the research lead to the concepts and components of a competency-based approach. So, in (Boyatzis, 2008; White, 1959), the development of professionally essential skills and individual types of professional behavior called *major skills* was explored. Developing this approach in (Boyatzis and Sala, 2004), five groups of major skills are distinguished. In particular, personal or individual abilities, social abilities in (Schelten, 2004) are called major skills or basic skills. In particular, operating skills are distinguished. Since in contemporary science the phenomenon of *professional competence* and its structure has been interpreted according to the research background (Adolf and Stepanova, 2017), the authors include informational competence combined with professional know-how and ways of performing work.

Along with the studies conducted in (Polichka, 2017) on the interaction of concepts *personality* and *professional development* in this research, the authors report on the professional development of a student as a dynamic, focused process of progressive personality change influenced by the development of information-driven society focused on the development of professional competence, including informational competence.

Current requirements for the development of student informational competence to ensure the influence on their professional development

According to the specific and particular demand of contemporary society for skilled professionals, the information basis of including occurring daily life and professional challenges in further activities of daily living and their practical solutions should definitely stand out. According to the studies (Platonova et al, 2016; Tabachuk, 2019), the authors insist on the necessity to observe the informational competence of an individual as a subject of activity and its impact on the personal and professional development of students.

In the studies (McClelland, 1973; Mutavchi, 2018; Zimnyaya, 2004), there are several parts of competence differentiated in professional and general competence of an employee. They are informational (Lapchik, 2017, Robert, 2017); social and ethical ones (Pechenyuk, 2008). The contemporary requirements for the development of student information competence affecting their

personal and professional development, will be revealed through current fields of active research on the interconnection and relationship of academic subjects in the curricula as the main means of education, and competencies to be trained. In particular, a number of interpretations of the meaning *competence* are connected to a dynamic, focused process of progressive personality change influenced by the development of information-driven society related to the professional qualification of a student. In this research a dynamically focused process of progressive personality change influenced by the development of information-driven society related to the professional qualifications of students will correlate with *information competence*. According to the studies (Gerova, 2014; Khutorskoy, 2017), information competence will be regarded as a component of professional competence when interpreted as an integral personality feature. Then, the concept of student information competence has such a meaning of its investigation as a learner's knowing and mastering proper information competencies required for the efficient future career that based on information technology and their means. Creative informational competence is also interpreted (Luchaninov et al., 2017) as the experience of creativeness. Creativity is conscious and depends on an individual activity. It is dedicated to the satisfaction of personal cognitive, intellectual wants to search information independently and process it in order to perform work properly.

The studies (Boyatzis and Sala, 2004; Khutorskoy, 2017) pay particular attention to the necessity of involving approaches describing student vocational training and relations of the notions *competence, competency, informational competence of students, informational competencies, informational competence of a person, student information competence, pedagogical side of information competence* in the current education reform based on the competency-based approach. When defining the concepts of *informational competence of a person* and *informational competence of a student*, it can mean as one of the constituent elements of informational competence characterized by a combination containing knowledge; skills; experience in the subject field of computer science when actualizing Information and Communication Technologies (ICT) opportunities in such activities as future professional; educational in the context of information interaction; informational one between the subjects of education considered as a key meta-subject competence consisting of cognitive, motivational and pragmatic components. The content of them is given substance to with reasoning, interpretation of one's own meanings, and practical learning of individual subjective experience.

Technological foundations of actualizing relations between professional becoming and student information competence

The technological basis of activity, as a specific type of human activity, consists of a combination of such components as a set of methods, approaches and techniques of the required activity; a set of special means necessary for performing this activity; available skilled personnel specially trained to do this work. These components are based both on the subject of activity and on its means including their content.

The authors are going to base the dialectic of the development and technological foundations of functioning relations of personal-vocational development and informational competence of students on the relations between these models of educational issues and potential IT opportunities.

Particularly, as the research review, regulatory requirements and experience of higher education show, an important tool in arranging curricula has been a set of training academic courses, subject fields and special training (Polichka, 2017).

According to the theoretical study (Polichka, 2017), the authors succeeded in interpreting the concept of pedagogical support to ensure the influence of mastering informational competencies by a student on his professional development. It consists of management and development relations of the system of special groups of units, *Setting the didactic task* (goal- setting, determining the content, determining ways of performance)*; Condition arrangement optimizing the sociality development as an integrative quality of a person during education that uses units* (determining the effectiveness of conventional and innovative forms of arrangement, educational means, training methods, mutual actualization of available resources).

In this study, the actualizing influence of mastering information competencies by a student on his professional development is based on the arrangement of a teacher's work. It is meant as a process of selecting and performing purposeful activity on coordinating integration activities and the conditions of a teacher's activities in the curriculum; achieving mutual balance of functioning the components of a teacher's work in the curriculum (functions, goals, types, forms of performance); projecting the content of a teacher's activities in the curriculum in the context of actualizing a specific training field.

The experience of carrying out such an approach to fulfill relations of professional development and information competence of students allows the authors to identify the following principles of integration types of learning activities and the conditions of a teacher's activity: noting a content-related pattern in student classroom activities which is aimed at determining and performing the style of their work using ICT tools; the appropriate use of blended learning in teaching subjects using distance learning technologies; the application of innovation common factors in student and teacher's activities; the use of information in the information and communication object environment for future career with an interactive information interaction of a student and objects of the environment that reflect the patterns and special features of this subject field.

The following methods have been identified from the experience of completing relationships of professional development and information competence of students to achieve mutual matching: matching the components of a teacher's activities based on identifying the relations between components of competency and modular approaches; actualizing the information-activity learning model while determining the research subject by a student in a chosen field of occupation; separating the information component in all types of student activities.

When projecting the content of a teacher's work, such projecting approaches are denoted: emphasizing the relationship between the information and communication object environment and a chosen career based on the original style of occupation; noting the appropriate relationship between the potential of information system development and the skills to develop technologies for their use in education; step-by-step activities (development of a sufficient set of options for obtaining outcomes; substantiated effective necessary one for completing it); using navigation features in the information and communication object environment.

Conclusion

In conclusion, the authors would like to emphasize a consistency of performing the requirements for developing new methodological training systems focused on mastering a skill for doing independent information work and educational information interaction to develop necessary qualities required for future career.

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The Market of Services for Organizing Leisure Activities for The Elderly: Formation Problems and Gerontoorientation Marketing Assessment

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Abstract

The article presents the results of testing the author's methodological approach to assessing the gerontoorientation of the consumer market. The market of leisure services was chosen as the testing area in view of its key role in the implementation of the strategy of active longevity. The study presents the demographic characteristics of the studied region of Russia and conducted a marketing study that allowed us to assess the level of gerontoorientation of each of the market participants. According to the results of the study, a conclusion is drawn about the low level of gerontoorientation of the Chelyabinsk leisure market and further areas of research are indicated. The results of the study can be used as a methodological basis for assessing the gerontoorientation of other consumer markets.

Keywords: Market Gerontoorientation, Marketing Research, Gerontomarketing, Consumer Market.

Introduction

In the context of the “silver economy” which was formed in response to global trends of the population aging, the formation and development of markets for goods and services aimed at older consumers is of particular importance. The study of consumer markets development issues in the context of aging population is one of the key tasks of gerontomarketing.

Elderly consumers are becoming a significant market segment, effective interaction with which provides companies with a stable market position and tangible competitive advantages. Nevertheless, studies show that various sectors of the Russian consumer market demonstrate an unequal desire to work with consumers of the older age group.

The article presents the results of testing the author’s methodology for marketing assessment of the gerontoorientation of consumer markets using the regional leisure services market as an example.

Methods and the Study organization

The methodological basis of the study was the classic and modern works on the theory of marketing and marketing analysis of the market, as well as research in the field of social sciences and humanities, considering various aspects of the population aging. In general, it can be stated that population aging is currently a global problem with long-term consequences and relevance for the next century.

Despite the growing influence of the effects of aging on the development of consumer markets, relevant research is currently fragmented, developing only within particular scientific schools. The earliest works on the economic and market aspects of the aging problem belong to a German scientific school (Hilbert, 2000; Pott, 2004; Kaib,2008; Nufer, 2010), the studies of which substantiate the relevance of research on the effects of aging on the economy and markets, present successful experience of practical gerontomarketing in German consumer markets. In Russia, key research in the field of gerontomarketing was developed in the works of the St. Petersburg Scientific School of Marketing (Bagiev, 2012). A feature of Russian research is that much attention is paid to the practical aspects of gerontomarketing in various market areas (Boyko, 2011; Larkina, 2014; Solovieva 2013; Khobotova, 2014). The indicated trends in research, in our opinion, are due to a significant lag in Russian consumer markets in the practical use of the gerontomarketing concept. Companies do not seek to expand the upper limit of their target audiences, which may be due to the widespread adoption of ageism. Older people, despite their numbers, continue to be perceived by businesses as an unattractive consumer segment.

In order to study the trends of increasing interest in elderly consumers in the market, in this study, we tested a methodological approach to assessing the gerontoorientation of the consumer market using the example of the leisure market in Chelyabinsk.

Gerontoorientation of the market is considered as the level of business orientation to consumers of the older age group (Astashova, 2019). According to the author's approach, the assessment of the level of gerontoorientation is carried out according to the following criteria:

- characteristics of the target audience;
- taking into account the specific requirements of older consumers in goods and services or other elements of the marketing mix;
- development and implementation of a gerontomarketing strategy.

Based on the proposed criteria, we propose the allocation of four levels of gerontoorientation, as shown in Table 1.

Table 1: methodological approach to the gerontoorientation assessment

Company gerontoorientation level	Gerontomarketing strategy	Target audience	Specific requirements
Level 0 (ignoring)	fixed bayer-ageism	Ignoring 50+ segment	no
Level 1 (neutral)	no	Upper bound not marked	no
Level 2 (intuitive)	no	Upper bound not marked	Partially implemented
Level 3 (deliberate)	yes	Older consumers are target or one of the target segments	yes

(Source: compiled by the authors)

The study is based on the analysis of secondary information: analysis of statistical data, databases, information on official websites of the companies. Also during the study, interviews were conducted

with business owners, which allowed us to draw conclusions about the elements of the company's strategy for interacting with consumers of the older age group. The research applied the methods of statistical data analysis, and the non-formalized desk methods of marketing research.

Results and Discussion

Chelyabinsk is an industrial city of Russia with a population of more than 1.2 million people. Chelyabinsk is a regional centre. The population in the Chelyabinsk region according to 2019 is 3 million 475 thousand people. The characteristics of the Chelyabinsk region population by major age groups are presented in Table 2.

Table 2: characteristics of the population of the Chelyabinsk region by major age groups, January 1, 2019

	All population, thousand people	including age:			The proportion of age groups in the total population, in percentage		
		younger than employable	employable	older than employable	younger than employable	employable	older than employable
Russian Federation	146 780.7	27 430.0	81 361.7	37 989.0	18.7	55.4	25.9
Chelyabinsk region	3 475.7	678.2	1 888.1	909.4	19.5	54.3	26.2

(Source: compiled by the authors according to the Federal State Statistics Service of the Russian Federation)

As shown in the Table 2 demographic aging in the Chelyabinsk region as a whole corresponds to the average indicators of the Russian Federation.

The organization of leisure for senior citizens is one of the most important areas for improving the quality of life in the context of active longevity. Elderly people, stopping the career, are faced with the destruction of habitual social ties, the narrowing of their circle of contacts, and often with loneliness. At the same time, the availability of free time creates opportunities for creativity, self-expression and the realization of opportunities that previously did not have enough time. Hobbies also facilitate contacts and formation of a new circle of contacts, and as a result, the extension of the social activity of senior citizens. In this regard, in each of the 7 districts of the city, social welfare agencies organized day care units that provide senior citizens with services in catering, life and leisure. The work is organized in the form of 14 shifts per year, services are provided free of charge or for a partial payment. The structure of the recreation, health and leisure program includes needlework; singing; dancing; wellness activities; Nordic walking; classes with a psychologist; legal consulting; computer literacy training; two balanced meals a day.

Nevertheless, the commercial sector of the market is not yet sufficiently focused on working with consumers of the older age group. Of the 263 organizations providing leisure services, only 23 are oriented toward working with adults. The characteristics of clubs by the type of services provided to adult consumers are presented in Fig. 1.

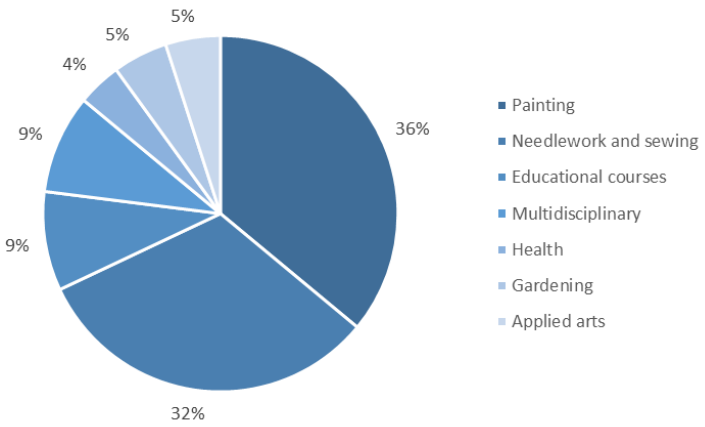

Fig. 1: Activities of organizations providing recreational services to adult consumers in the Chelyabinsk market

(Source: compiled by the authors)

The results of assessing the level of gerontoorientation of the studied organizations are presented in Figs. 2 and 3.

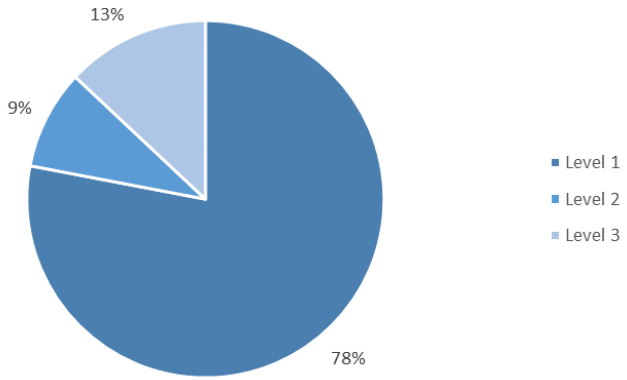

Fig. 2: Levels of gerontoorientation of leisure organizations working with adult consumers in the Chelyabinsk market

(Source: compiled by the authors)

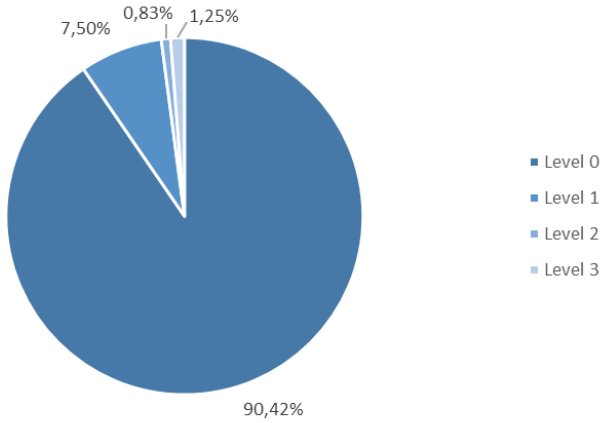

Fig. 3: Levels of gerontoorientation of all leisure organizations in the Chelyabinsk market
(Source: compiled by the authors)

As shown in figs. 2 and 3, more than 90% of organizations initially focused only on working with children and only about 2% purposefully work with older consumers, offering those specialized products and services and building targeted communications with them. This indicates an underestimation of the potential of elderly consumers' segment, the interaction with which in the conditions of demographic population aging provides companies with competitive advantages and new development prospects.

Conclusion

Thus, the results of the study confirm the low level of gerontoorientation of the Chelyabinsk leisure services market, since there are practically no offers on the market aimed at older consumers. In the context of demographic aging of the population, it is advisable to regularly conduct similar market research, which will allow us to assess trends in the development of gerontorientation.

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Proecological Strategy Failure - Case Study

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Abstract

Proecological strategies are resulting in both corporate social responsibility and environmental protection, especially when the company's competitive position relay on natural resources. Usually, companies announce-only positive effects of introduced green strategies, however sometimes disasters destroy the efforts of both companies and local communities. There are problems in the balance of relations between human activities and the natural environment that are particularly evident in the mining industry. In this sector, it is possible to identify some failures in pro-ecological strategies and this article presents a case study based on such accidents. The study has also the character of theoretical assumptions and operationalization of concepts for further empirical research, which going to be a continuation of the ongoing project of analysing strategies in a selected sector.

Keywords: Green Strategies, Mining Companies, Waste Management

Introduction

The mining industry is associated usually with a high negative impact on the natural environment and the loss of jobs in this sector during the economic and ecological crises. On the other hand, the rapid negative changes in the mining industry are the reason for many social protests documented also in modern history. Therefore, the mining industry is often classified as an element of the so-called brown economy, which stands in opposition to the pro-environmental, ecological, green economy (Bogusz and Sulich, 2019).

In the last decades, the investments in environmentally friendly businesses were growing at a high pace in almost all economic sectors, also in the mining industry (Bogusz and Ziemkiewicz, 2018). Today ecology became one of the main trends of modern business and changed environment perception among almost all members of the business environment (Kulhánek and Sulich, 2018; Sulich and Zema, 2017). Over the years the perception of the natural environment has changed. First, the natural environment was simply the source of raw materials for production and the waste collector, receiving all that was eliminated or discarded as no longer useful or required after the completion of a production process or consumption (Bogusz and Sulich, 2019). Then natural environment protection laws became an obstacle for the entities' development and example some mining industry companies, which avoided responsibility for environmental protection or just were never expected, neither asked to solve problems with pollution. Fortunately, this also begun to change and nowadays question is whether mining (especially branches which are not related to fossil fuels) can introduce successful pro-ecological strategies. There is a large group of modern business in the mining industry which present proactivity to reduce environmental scarcities and risk (Rothe et al., 2018). It is not clear whether business entities understand the difference between sustainable development (SD) and corporate social responsibility (CSR), and what kind of mechanisms stands as the background of their strategies (Demków and Sulich, 2018; Niemczyk and Stańczyk-Hugiet, 2014; Stańczyk, 2018). The distinction between these two ideas is not clear and there is no identified strategy type for this economy sector (Jonek-Kowalska, 2016; Niemczyk and Stańczyk-Hugiet, 2014; Sulich and Grudziński, 2019). Companies need to create

business strategies based on an understanding that the rapidly-shifting external context, disruptive technologies dislocation, and natural resource scarcity are not for sustainability, but are issues of business strategy (Bogusz and Ziemkiewicz, 2018; Khall Khalid, 2019). Sustainable strategy refers to an integration of business activities with environmental and social management to create economic value, healthy ecosystems, and strong communications if successfully implemented (Bogusz and Sulich, 2019; Grudziński and Sulich, 2019; Zema and Sulich, 2019). Therefore, it is often said that SD and CSR are connected or intertwined because of their aims, and there are some examples of companies' activities that can transform their perception in terms of green economy definition (Kryk and Skubiak, 2015; Sulich and Rutkowska, 2020).

This paper aims to investigate the impact of the activities performed in chosen companies which have led them to the failure in their pro-ecological strategies. Although these companies dedicated a lot of effort to be more sustainable, the natural forces were stronger and unpredictable. The adopted method was the case study of the mining industry company operating in the Americas. Based on this case study, in the future, there is a possibility to describe a model of sustainable development actions in the mining industry, which will be the next step of the research.

Introduction to the Case Study Company: Vale

Vale is a mining company operating worldwide, with a history of nearly 80 years. It is the largest mining company in the Americas and one of the largest in the world. This Brazilian corporation operates in approximately 30 countries around the world, directly and indirectly employing about 125 000 people. The core business of the company consists of the extraction of iron and nickel ore of which it has been the global leader for many years. The company produces also, among others, manganese, copper, bauxite, potassium, and cobalt. Furthermore, it is one of the largest logistics operators in Brazil. Figure 1 shows the Company's operations in terms of geographic presence (Vale, 2018a).

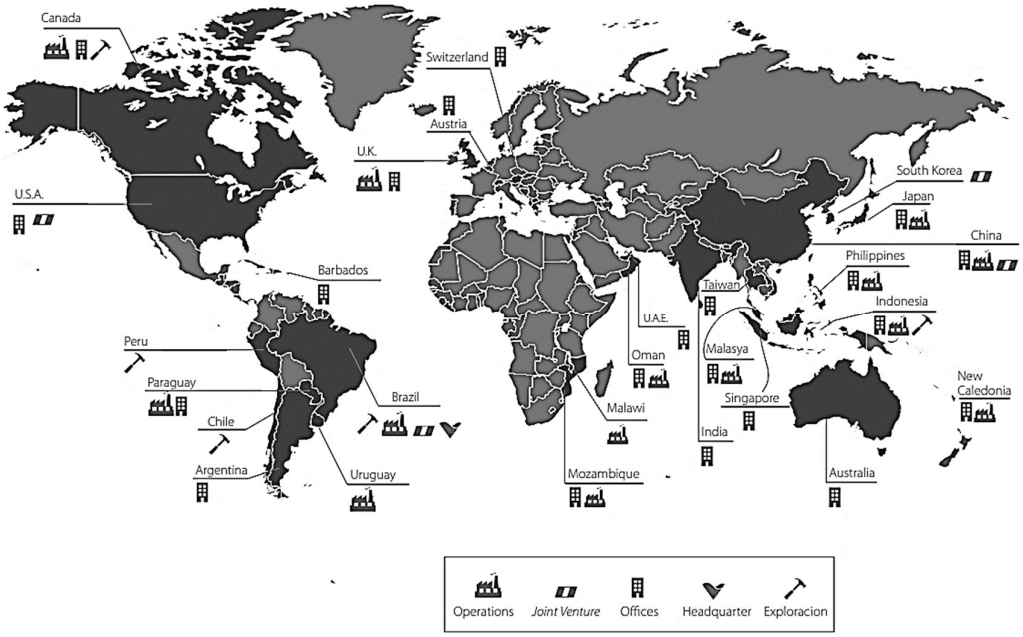

Fig. 1: Geographic coverage Vale operations
Source: Sustainability Report Vale 2018 (Vale, 2018b)

Strategy and Values of Vale

In line with the global megatrends that have been observed in the mining industry for several years, the business strategy of Vale clearly emphasizes its focus on environmental protection and sustainability. Both the mission: "To transform natural resources into prosperity and sustainable development" and the vision: "To be the number one global natural resources company in creating long term value, through excellence and passion for people and the planet" relates to the respect for our planet and nature. The company goes one step further in its statements and identifies the following guiding values (Vale, 2020a):

a) Life matters most;
b) Value our people;
c) Prize our planet;
d) Do what is right;
e) Improve together;
f) Make it happen.

The Vale 2019 strategy, published by the end of 2018, establishes five strategic pillars, including "sustainability". The main goal in this area to be achieved by 2030 is to recover 100,000 hectares of degraded land, to reduce greenhouse gas emissions by 16% and to reduce water consumption by 10% (Vale, 2018b). In its reports, Vale presents some activities and investments aimed at environmental protection and pro-social activities. Moreover, when listing its key commitments to the stakeholders, the company underlines “the aspiration to become one of the safest and most reliable mining companies in the world, always acting with due respect for its fundamental principle: life matters most” (Vale, 2020b).

An analysis of both, documentation and strategy show that Vale perfectly combines the mining business with responsibility towards the environment. And yet, an environment-oriented attitude is not always possible to maintain and some situations can suddenly destroy the image that has been fostered for years. Vale is the best example of such a sorrowful failure, and regrettably twice.

2015 Disaster at the Fundão Dam, Germano, Mariana, Minas Gerais, Brazil

In November 2015, Samarco, a joint venture of Vale and BHP Billiton (50% share each), caused one of the most serious mining disasters in the world. On 5 November 2015, in the afternoon, a dam on a post-mining waste reservoir burst, releasing an estimated 43 million cubic meters of iron ore production waste, creating a 10-meter-high wave, killing 19 people and causing irreparable damage to the environment. Contamination has spread along watercourses, by more than 600 kilometres. The Doce River, located near the cracked dam, was the most affected. 17 days later the pollution reached the Atlantic Ocean (Carmo et al., 2017). According to various estimates, the forest area affected was ca 1 200 ha, the loss of direct forest area was about 450 ha, within 74 km from the Fundão Dam (Omachi et al., 2018). Figure 2 shows the scale of damage and degradation.

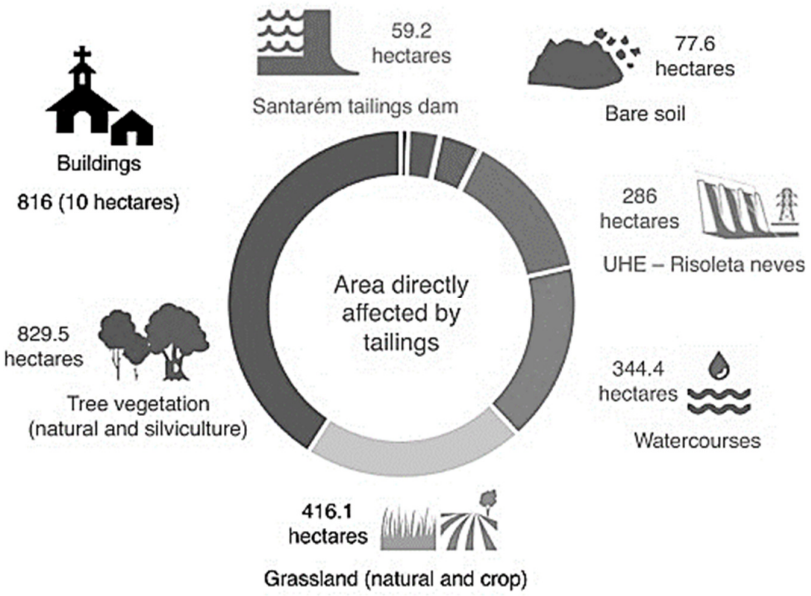

Fig. 2: Elements of natural and cultural heritage damaged by the Fundão tailings dam.
Source: (Carmo et al., 2017)

The dam burst caused many negative social and environmental impacts in the short, medium and long term. The 19 fatalities were both employees and subcontractors of Samarco, but also residents of Bento Rodrigues. Another dramatic and visible effect was the destruction of human habitats. It is estimated that approximately 1 200 people lost their homes. Infrastructure, pastures, fields, and forests have been irreversibly damaged. Thousands of region-specific plants and animals have died. A large part of the Doce riverbed has been silted, which is likely to increase the risk of flooding in the coming years and to increase the territorial spread of floods to regions not previously affected (Wanderley et al., 2016). Depending on estimates, it is reported that the disaster has affected, directly or indirectly, 1 million people in 41 municipalities, mainly by restricting access to clean water, fish resources, plant growing sites, possibility to produce water energy and raw materials. It is particularly difficult for those communities that have based their livelihoods on agriculture and fishing. The landscape and biodiversity of the region have been permanently destroyed (Fernandes et al., 2016). Satellite images showing the area before and after the disaster are shown in Fig. 3.with riverbed marked in red.

Fig. 3: Satellite images of the Minas Gerais region before and after the Fundão Dam burst in 2015

Source: Own study based on (Philips, 2019).

When analysing the causes of the tragedy, there have been accusations against the company managers that allegedly they had been aware of the poor condition of the dam's construction for many months. In 2016, 21 people, including the CEO of Samarco, were accused of homicide. The case was suspended. The prosecution claimed damages for USD 48 billion. Besides, it was proven that the population was not warned about the imminent threat in any way. As Samarco pointed out, no warning sirens were required by law. There are allegations that the company has blindly focused on cost reduction and maximization of production (Philips et al., 2018). The Company disagrees. In the face of the tragedy that followed, it activated all available means to mitigate the negative effects of the disaster. After the tragedy, the Renova Foundation was established which is responsible for implementing recovery programmes to rebuild what had been lost as a result of the dam burst, in social, environmental and economic terms. Both Vale and BHP Billiton are financially supporting the Foundation to make sure that it fulfils its obligations established in agreement with the Federal and State Governments of Brazil. The budget of the Foundation in the first three years of its operations is to amount to ca USD 1 billion. After the disaster, Vale set up a department dedicated to the supervision of its dams to assess and enhance dam management processes, improve their supervision and thus increase safety and prevent similar disasters in the future (Vale, 2019). Today we know that this objective was not achieved. Another accident happened sooner than anyone would have expected.

2019 Disaster – Córrego do Feijão, Brumadinho, Minas Gerais, Brazil

On 25 January 2019, just over three years after the Samarco disaster, the Córrego do Feijão mining dam collapsed. It was located near Brumadinho, a large city in southeastern Brazil, about 75 km from the previous disaster site. The dam, which was a wall of sand and silt, devoid of steel or concrete reinforcements, collapsed suddenly and without any warning, releasing a wave of about 12 million cubic meters of waste and mud that devoured everything it encountered on its way. To illustrate the scale, this is the capacity of 5000 Olympic swimming pools. Once again, it was one of the most dangerous mining accidents in the history of Brazil. The state of Minas Gerais, where the dam was located, is the centre of the Brazilian mining industry, producing about 53% of the country's total output. There are still 87 similar mining dams in Brazil, 27 of which are located near municipal areas, inhabited by approximately 100 000 people. According to the critics, the mining law in effect is drafted by the companies themselves, so there is no question that it could be efficient and ensure actual control over the industry. In Brazil, the companies can choose auditors to assess the dam safety of their own. The experts claim that this causes a conflict of interest, as auditors are paid by the companies they control (Darlington et al., 2019; Penner, 2019).

For a long time, it was claimed that 259 people died and 11 were missing, but eventually, 270 people are considered to have lost their lives in the disaster. According to the National Water Agency (ANA), the released mud has polluted up to 300 kilometres of rivers (Pearson and Magalhaes, Luciana Kowsmann, 2019). Figure 4 shows satellite images of the dam area before and after the disaster.

Fig. 4: Satellite images of the Brumadinho dam before and after the disaster
Source: (Darlington et al., 2019).

Shortly after the dam burst, questions were raised concerning the warning system. Vale confirmed that it owned a warning system, including cameras and warning sirens, but as this tragic experience has shown, the system did not work when it was most needed. The company explained that the warning system was not automated, and required manual activation in the rescue centre and because of the rapidity of the event, there was not enough time to react. There were suspicions that the people who were supposed to operate the rescue centre were working in the mine at the time and were killed before they could take any action (Shukman, 2019).

The second catastrophe related to Vale in several years brought about a series of social protests. Greenpeace accused the company of "corporate greed, omission, and inefficiency". "We are not dealing with an accident, but with a crime against people and nature..." Greenpeace Brazil Campaigns director Nilo D'Ávila said in a statement (Reverdosa, 2019). Moreover, accusations have been raised against the Brazilian government, which did not pass the relevant legislation after the previous disaster (Reverdosa, 2019). One year after the collapse, the Brazilian prosecution charged Fabio Schvartsman, former Vale CEO and 15 other persons with homicide. In response to the allegations, Vale's representatives emphasized that the federal police report on this matter would not be issued until June 2020. The company maintains that the dam has been regularly inspected and the collapse has been caused by continuing high water levels, which have contributed to the loss of resistance and stability of the structure. Since 2015 no more waste has been deposited in the reservoir which, due to the cracking has released millions of tonnes of extraction waste. Vale adds that there have been no indications that the dam was unstable and could pose any threat (Garcia, 2020).

Consequences for Vale

The consequences of both disasters will be perceptible for many years to come not only in terms of environmental or social impact but also economically. The company has suffered severe financial consequences of its failures. An analysis of the company's share price shows that the capital market reacted to those tragic events very quickly. This was specifically the case of the 2019 disaster. On the following business day, the share price dropped by nearly 25% (a decrease in the company's value by about USD 19 billion). It was the most important drop in history recorded during a single session on the Brazilian stock market. The sales volume increased dramatically as investors sold their shares in the company and masse. Figure 5 shows the trends of the share price and trading volume of Vale shares.

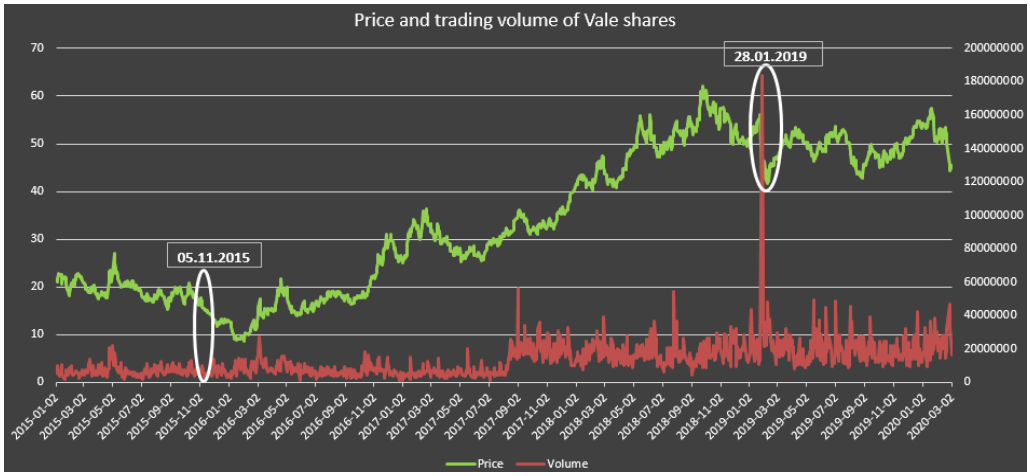

Fig. 5: Price and trading volume of Vale shares
Source: Own elaboration, based on data from Bloomberg

As follows from an analysis of the development of analytical recommendations for Vale (buy/sell/hold), the market reaction was not as obvious as in the case of the company's share price. In 2015, just after the disaster, the number of recommendations to sell increased, whereas, after the disaster in 2019, the analysts advised to hold or to buy. Perhaps those who learned from the experience maintained relative peace of mind, expecting the company to cope with the crisis and the shares to be priced up again shortly. The exact pattern of the analytical recommendations is shown in figure 6.

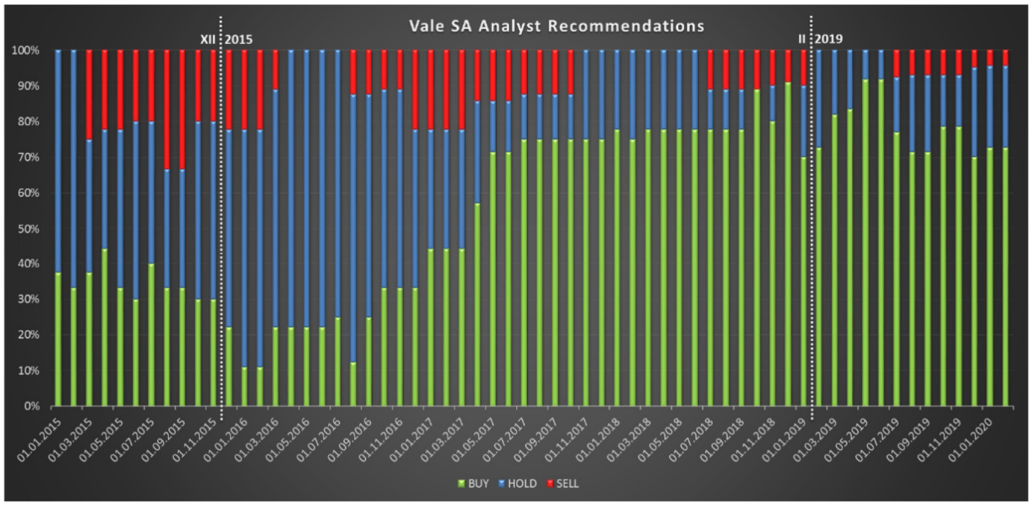

Fig. 6: Structure of analytical recommendations concerning Vale, from Jan. 2015 to Jan. 2020
Source: Own elaboration, based on data from Bloomberg

A significant drop in the production of iron ore, which is Vale's flagship product, clearly resulted from the catastrophe in 2019. In the second quarter of 2019, the company recorded a decrease in the production of this raw material by nearly 34% y/y, i.e. by ca. 64 million tonnes. The Brumadinho catastrophe brought about the temporary or total closure of a few more key companies there, reducing production, which also translated into a decrease in sales of several percents in that period (Mano, 2019).

The Company also incurred clear financial consequences in the form of damages and fines. Depending on the sources, different amounts are mentioned, which include compensation to the families of the victims, penalties imposed by the state and supervisory bodies and expenses for rescue and recovery operations. It is officially reported that in 2016 Samarco and the Brazilian government agreed to the payment of BRL 20 billion to the State (at present, equivalent to ca. USD 4.4 billion) (Darlington, 2020). The penalty did not include compensation for the persons affected and the costs of recovery of the contaminated area. Concerning the 2019 crisis, Vale informed in a communiqué that it had allocated BRL 24.1 billion (ca USD 5.2 billion) to finance recovery actions and compensations (Vale, 2020b). The 2019 financial report contained a special item, "expenses related to Brumadinho", of USD 7.4 billion. The Company's key financial results in the years 2014-2019 are presented in table1.

Table 1: Key financial results of Vale in 2014-2019

Vale SA - Financial results						
In Millions of USD	2019	2018	2017	2016	2015	2014
Net operating revenues	37,570	36,575	33,967	27,488	23,384	35,124
Total costs and expenses	23,775	23,721	22,743	19,196	20,907	26,486
Adjusted EBITDA	10,585	16,593	15,338	11,972	6,513	13,075
Adjusted EBITDA margin (%)	28	45	45	43	28	37
Net income (loss)	-1,683	6,860	5,507	3,982	-12,129	657
Capital expenditures	3,704	3,784	3,848	5,191	8,401	11,979

Source: Own elaboration, based on Reports: Vale's Performance in: 2014/ 2015/ 2016/ 2017/ 2018/ 2019 (Vale, 2018a)

The key financial ratios do correspond to the tragic events that took place in Vale in 2015 and 2019. In those years, the company recorded a substantial loss, while in the remaining years it made a considerable profit. The levels of EBITDA and EBITDA margin also reflect the deterioration of the company's condition. Few companies in the world could afford such a crisis, and yet survive and continue to operate in a relatively undisturbed manner. One should bear in mind that the company operates in an industry that is extremely vulnerable to economic developments and raw material price quotations. Therefore, the downturn reported in 2015 and 2019 need not only be due to the catastrophes but also to the collapse in the raw material market, particularly evident in the context of iron ore prices in 2015.

Vale had to pay, literally and figuratively, a very high price for failing to meet its pro-environmental commitments, expressed in the company strategy. Aside from the financial repercussions, the image of the company has also been affected. Both disasters resulted in several prosecution charges, arrests, and dismissals. The company has been regularly informing on the progress of recovery activities related to both accidents. The programme designed to repair damages in the Brumadinho area is particularly extensive. The company describes all its activities and provides figures in great detail. Sadly, even the best repair programme cannot change the past.

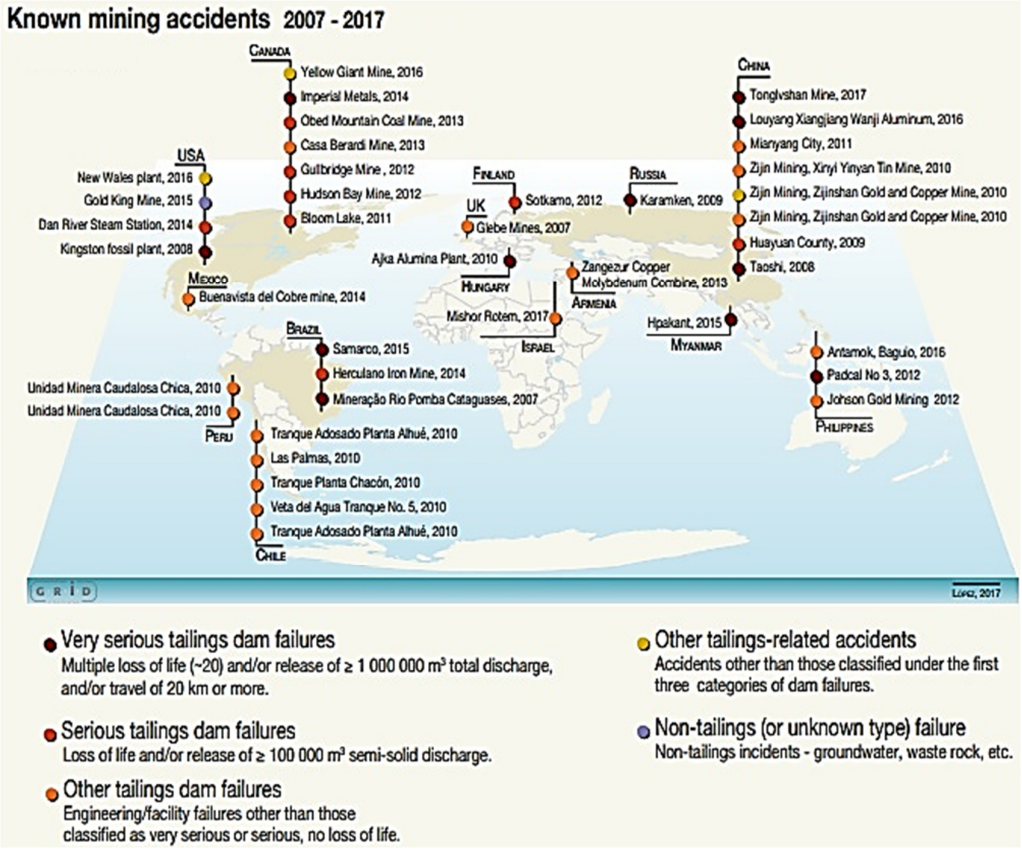

Fig. 7: Known mining accidents 2007-2017

Source: (United Nations Environment, 2018)

Conclusions: Unreliability of Environmental Strategies

Over the last decade, business strategies based on pro-environmental assumptions, strongly related to sustainable development have become the standard practice. The "green" and "eco" trends are visible among companies with a global presence. In this context, the situation mining industry is extremely difficult. On the one hand, it is an industry that strongly interferes with the environment; on the other hand, had it not been for mining, the world would probably not have been able to develop to the level that humanity knows today. It would be hypocrisy to see this sector in a bad light only. However, it is undeniably an industry that, despite its attempts to be socially and environmentally responsible, faces considerable difficulties and shortcomings in this respect. The number of accidents that are recorded in the mining industry each year is the best evidence of such difficulties. Fig. 7 shows mining accidents recorded worldwide in the years 2007-2017.

Although Vale is not isolated in its environmental problems, the disasters it encountered were so significant and multidimensional that they have become the darkest history of the mining industry. The company has not managed to restore its good image. In February 2020, information spread around the world that a ship carrying 275 000 tonnes of Vale's iron ore has started to sink off the coast of Brazil. The company informed that it has initiated preparations in the event of a potential fuel spill into the sea (Teixeira, 2020). Surprisingly, Vale has not learned its lesson after the 2015 collapse. One might have thought that such a tragedy should provide sufficient ground for the company to take greater care of the security of its operations. We can only hope that the example of Vale will serve as a warning to other companies in the industry.

Nevertheless, the reliability and legitimacy of business strategies based, at least in theory, on the principles of sustainable development remain unsure. The mining industry emphasizes in its strategies the importance of safety and health of employees as well as the environmental and social issues. One may fear that companies simply want to keep up with the trends and expectations of their stakeholders and treat their commitments more in terms of the image than genuine responsibility. Indeed, in recent years companies have been very committed to compensating for their negative impact on the environment and have taken many positive initiatives. However, sometimes these are nothing more than a form of covering up, concealing a negative impact, a typical manifestation of greenwashing. One would like to believe that companies are guided only by noble ideas, but probably they will never be as the first and primary goal of any business is still to make a profit. It is worth quoting P. Drucker: "It is not enough for business to do what it does, it must also do good... but to do good, a business must first do what it does and the way it should be done". We should, therefore, expect companies to be simply honest and responsible and only then to start developing 'doing good' strategies."

Acknowledgment

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Effective Time Management in IT Projects

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Abstract

The article undertakes considerations aimed at bringing a closer view of effective time management in projects. Paper describes the important role of project management and the importance of project effectiveness in managing modern IT organizations. Particular attention was paid to the very definition of project effectiveness. An important element of the analysis is a discussion of the project's limitations and the proposed methodology for measuring effectiveness in IT projects. A model for measuring the project's effectiveness was proposed in this paper. Time was considered as the basis for the designed project's effectiveness measure. The concept of billability has been also defined. Based on the case study, the effectiveness of billability measurement in the diagnosis of project effectiveness was demonstrated.

Keywords: IT Project Management, Time Management, Effectiveness.

Introduction

The issue of project effectiveness in the modern era of Economy 4.0 (or Industry 4.0) and society, which applies frequently projects and programs, takes on greater significance. The modern world is filled with time-oriented projects and which provide also project management-related education, research, and marketing services, which can be perceived as a Project-Oriented Society (POS) (Garais, 2002). It is important, due to the impact of technology and technique (Sulich and Zema, 2017) and generally computerization or robotization of processes on almost every branch of the economy and of course the man himself (Gracel and Makowiec, 2017; Sulich et al., 2020). Project efficiency is a multidimensional concept and, like its successful implementation of an IT project, the final recipient depends on many factors, among others: from the manner and time of project competences being implemented by project teams, treated as specific tribes cooperating and the roles of their members (Tutaj et al., 2019). All these elements affect project maturity, which is "*the ability and readiness of the organization to effectively select a portfolio of projects - supporting the organization's strategy and goals as well as the use of professional techniques and tools, project management methodologies that are to lead to the successful completion of the project and to translate this success into further projects"* (Juchniewicz, 2012). Management effectiveness is *"the result of actions taken, described by the relationship of the results obtained to the expenditure incurred"* (Jedliński and Kruszczak, 2019; Yarnada, 1972). Management effectiveness contains descriptions of internal and external phenomena occurring in a given project (Skrzypek, 2012). Thanks to the effectiveness of constant monitoring, a competitive advantage is created and built, only if managers can effectively implement and enforce their decisions in practice (Pasetta, 2005). In the efficiency essence, the most important approach to performance as an element of effective management (Pearce, 2000), in this context the effectiveness is assessed by examining the results and organizational processes critically and holistically (Gaertner and Ramnarayan, 1983; Nürk, 2019a).

The goal of this paper is to develop a model of project effectiveness. Defining the concept of project billability as a measure of project effectiveness and areas of its measurement. Model verification was performed in the realities of IT projects and these were presented in the case study.

The Effectiveness of IT Projects

The time required for the project realization defines the date of commencement of implementation and the date of completion of the given project (Kamińska et al., 2019). The critical factor of the project's success is the proper and correct task prioritization within project constraints (Walczak, 2010). In e-business ventures, the most important is the time of the delivery product to the market (time to market). In the case of a good idea and its quick implementation, a competitive advantage can be built (Ciechan-Kujawa and Goldmann, 2012) and besides that also a successful development and implementation of the IT project. Manufacturing organizations must be both effective and efficient (Heikkila, 2002). Along with the development of project management, the analysis of a highly structured and bureaucratic approach in terms of efficiency and flexibility of work was started. Therefore, project risk is defined as an event or set of uncertain events that in the event of occurrence will affect the project ('Manifesto for Agile Software Development', 2001). Effective exploitation of risk efficiency implies highly proactive risk management that takes an integrated and holistic approach to opportunity and threat management (Sulich and Zema, 2017). In particular, if it is related to the testing and iteration phases in the IT project. Further, inefficiencies associated with too many iterations to get to a given level of analysis in a given area may add to the cost of analysis significantly, depending on how iterations are managed (Sulich et al., 2020). This reinforces the case for making the identity phase as complete as possible before proceeding to the next phase. If sources, and responses, and associated secondary issues (response chains) are not properly understood, any subsequent risk management can be a complete waste of resources (Kamińska et al., 2019; Kudłaszyk and Rutkowska, 2004; Parkitna et al., 2017). It is said, that time management pressures and availability are key that people may require getting on with some of the next phases while the identify phase is still in progress. Delays associated with an incomplete define phase can aggravate this difficulty (Chapman and Ward, 2003).

Project management is a process during which the person managing it carries out deliberate planning and controlling tasks included in the project (Packendorff, 1995). Looking from a management perspective, project effectiveness should be considered as a triad, the relationship between three dimensions of efficiency: project economy, project efficiency, and performance efficiency. These dimensions can be defined as:

- cost-effectiveness of the project, based on optimal cost management from the perspective of the feasibility of the assumed budget,
- project efficiency - proper implementation of the project within a specified and assumed time,
- project effectiveness is an activity that leads to the intended effect as an objective from the perspective of project implementation.

The success of the project, considered from the efficiency model, multiplies many of its dimensions, in which a change in one of the dimensions over time, entails the consequence of changes in the others (Rutkowska and Popławski, 2008). Along with the growth of project maturity, the efficiency of managing many projects - project portfolios increases, which translates into the possibility of IT companies achieving strategic goals more effectively (Litke, 2005). Clearly defining goals precisely – defining what is desired by the organization to achieve - allows it to determine the place and position in time. Such analysis allows an organization to address the question: where is the organization at the moment, where "it was yesterday and where it wants to be tomorrow". A well-defined goal connects and motivates people to work more efficiently and effectively (Wysocki, 2013). When defining the goals to be achieved, one should be guided by the SMART principle (Piwoni-Krzeszowska, 2014). It requires a very thorough analysis of the client's needs, which significantly increases the chance of achieving the assumed goals (Walczak, 2014). A well-defined goal connects and motivates people to work more efficiently and effectively (Wysocki, 2013). It requires a very thorough analysis of the

client's needs, which significantly increases the chance of achieving the assumed goals (Popławski et al., 2011; Walczak, 2014). In the context of understanding the interdependence of each of the elements contained in the "design constraints triangle" (Wirkus, 2014) which has a "scope" in the center of the triangle (Szyjewski, 2001). An effectively executed project, i.e. a successful project, is one that is efficient, effective and economical at the same time. It is undeniable that the effectiveness of the project takes place in a continuous cycle of its elements:

$$\Delta Ek_0 \rightarrow \Delta Sp_0 \rightarrow \Delta Sk_0 \rightarrow \Delta Ek_1 \rightarrow \Delta Sp_1 \rightarrow \Delta Sk_1 \rightarrow \Delta Ek_2 \rightarrow \cdots$$

The analysis of theoretical achievements carried out by numerous researchers of this issue in the interpretation of project effectiveness can be reduced to academic discussion, which indicated it is more important: time, scope or cost. Increasing the budget is not always the same as increasing the scope, and for example, reduces the time. Each of the elements additionally is related to the qualitative sphere (Ładoński, 1994), so choosing one path affects not only the outside and inside of the design elements. Maintaining the balance between these elements is the biggest challenge of efficiency management for project managers. It uses appropriate techniques and methods to achieve the imposed requirements within a specified period and at designated costs (Jędrych et al., 2012; 'Zarządzanie projektami', 2019a). Agile methods are often used in IT projects and include short-term task planning that takes into account the dynamically changing design environment (Kozłowski, 2010). On the other hand, the lack of an established design/time frame is primarily considered to be the biggest problem of this methodology. Working in this methodology, it is not possible to estimate (or it is very difficult) how much effort and time is needed to complete the project, due to the specificity of the project, it is very difficult to find users who can present their expectations without seeing the operating system (Nürk, 2019b). That is why most IT projects are managed in an agile way. Estimating and task planning, timeliness, and costs of individual parts of projects are inseparable elements for which the scope is responsible. The Project Manager should ensure that the budget is within the set limits or if there are risks of overruns, inform the client and decide what to do next (Kloze, 2009). Time is usually budget-related for project implementation. The client usually sets a time frame when he would like to start and finish work on the project, but the length of work often depends on the available financial outlays (Hernes, 2019). The number of employees participating in the project, the use of better technologies and additional tasks will affect the size of the budget. Of course, not always increase the number of people on a project will help and accelerate work, there may be an increase in the number of people and instead of greater efficiency, there is the opposite effect. The role of the Project Manager is to keep work in the schedule and match the right employees (in terms of experience) to the task ('Zarządzanie projektami', 2019b).

Significance of Billability of IT Projects

The simplest terms are billable ('Managing billable hours key for PR firms PRSA study benchmarks billable time performance of firms', 1996), billable time (Grandy, 2003) or billable hours (Zaffrann, 2017) as the time invoiced to the customer for which the customer should pay (Falsetta and Kaplan, 2018). The Service Recipient implementing the project commissioned by the client by registering the time spent on performing all project activities. Based on this time, an invoice should be issued at the end of each billing period (USLegal, 2019). The time that directly affects the invoice value is called billing time. Referring to the meaning of the word 'billability', one should check what impact the ratio of invoiced hours has on the time management level in IT projects. The point is, of course, whether all the time actually worked on commercial projects is invoiced to customers or whether there is a situation that the company, despite the hours worked, gives them away for free and does not earn on them. It should also be taken into account that the company has non-irrevocable hours, i.e. not directly profitable. These include: holidays, training, internal meetings.

The management of numerous projects in highly hierarchical organizations focused on permanent or repetitive activity raises numerous problems related to meeting the scope, budget or time of their implementation (Prawelska-Skrzypek and Jalocha, 2014). To determine the efficient time management of IT projects, the relationship between the work involved and the goals achieved should be examined. It is important to save time and resources. For time management in IT projects can be said about the ratio of hours worked invoiced per customer to all hours worked together - this is also one of the measures of project effectiveness (Parkitna and Buczkowski, 2009).

The assessment of project efficiency reduced to project billability is based on the analysis of metadata concerning the efficiency of design tribes. The metadata is "data about data" or simply "information about information" (Encyklopedia Zarządzaniania, 2019). In other words, we can talk about structured information by which various objects are described and they provide very detailed data. These data can be used to identify the object and to find or manage it (Wyman et al., 2013; Žumer, 2009). However, in world literature, many authors try to separate information from data. Information is defined as data that is contained in a specific message (Grabowski and Zając, 2009), and the data is a string of characters or their notation, which can usually be related to e.g. processes or some specific events. They have no meaning and no purpose in themselves. However, the string of these characters should be presented in a form that allows another person to properly interpret, transfer and process it. In the table below, to illustrate the differences between these terms, the literature definitions of both terms according to various authors will be presented.

In the era of the Internet and technological development, enterprises (especially the IT industry) have access to huge databases. They can collect data on market conditions, the latest trends, and customer reviews, but and they can also collect data on the operation of the enterprise itself. Every company that wants to gain a competitive advantage, provide the best services that will be based on quality and customer satisfaction should analyze internal trends (Zema and Walczyński, 2019). Namely, it should focus on the work of employees, analyze the project situation, examine all sectors of its activity, e.g. in terms of marketing effectiveness, or in terms of accountability of their projects and working times. A design tribe is understood as "a group of specialists who, once selected, work together for a long period, oscillate around one technology and, after completing work in one of the projects, do not solve, and then move on to the next project." (FED US, 2009; Nowosielski, 2018) : programmers, testers, project managers, analysts, graphic designers, etc. In their tribes, employees not only perform work related to commercial projects but have internal tasks and meetings where each employee registers times. Each tribe is assigned specific budgets and project times worked on their behalf.

Billability as a Measure of IT Project Efficiency - Case Study

To sum up, the considerations presented above clearly indicate the key importance of billability for the assessment of project effectiveness. They also prove the need to formulate additional postulates in this area, taking into account the specifics of the implementation of many projects in an IT enterprise related

to increasing project maturity and relating to tools supporting project management. Research shown in the literature shows the positive impact of IT tools on management in enterprises implementing many projects (Dammer, 2008, 2009), on the other hand, it is emphasized that these tools should be adequate to the level of project maturity. In practice, the organization must be ready to implement a new management support tool (Weidemann, 2017). The design of project effectiveness monitoring systems should additionally be linked to remuneration as well as a rebate system, which will allow for possible negative consequences.

The 153 IT projects were implemented simultaneously in the research period, which required supervision over the effectiveness of individual activities in which shared resources implemented by 6 tribes were used, in which there were a total of 135 employees. Therefore, in managing the effectiveness of individual projects in IT sector enterprises, metadata analysis and using them for development are very important issues. At present, strong competition on the IT market forces individual organizations to look for areas that will gain an advantage through the increasing profitability of individual projects.

The proposed tool was to monitor project effectiveness and give answers to two basic questions: Is the value of time spent on behalf of the client equal to the value of the invoice issued? Does the company devote sufficient time to training, development of employees' skills and knowledge, and development of own products thanks to which can enter the technology market in any way? In this context, it is very important to analyze the effectiveness of employees' working time. In the context of defining time reserves, bottlenecks and efficiency of time use, the context of its wasting or "giving away for free" in the form of giveaway and discounts.

In response to the issues presented above, a tool was created to measure the project's accountability, thanks to which the project's effectiveness was demonstrated in practice. The spreadsheet created for the work consisted of interrelated sheets such as the main table: Tribes, Tasks Division; E-Commerce Performance; Specializations Work; Technological Division of the Project; Developers; Non-Bill Projects; Billable Projects; Project Accountability; Toggle, Budget; Toggle Vs Budget (in comparison to individual monthly settlement periods). To precisely determine the working time, a tool was introduced to record working time with the possibility of splitting time into various projects, tribes, technologies, and specializations. The Toggl program was used for work. The data collected in the system from December 2017 to March 2019 are further analyses subject.

The most important issue of the whole analysed in subsequent tables as worksheets is the value named in the file as "% Billability". The values of its markings were also determined for this measure. The value from 90-100% is a very good level with maximum efficiency. The value of 80-89% is a good level that can still be optimized in terms of efficiency. A value of 60-79% of the accountability level is an acceptable level of efficiency but requires regular management control. The level below 60% is unsatisfactory and may bring more costs than benefits and the company should pay special attention to ongoing projects.

Table 1. Billable Projects - The company's billability over months %

	2017	2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	Year 2018	2019	2019	2019
	XII	I	II	III	IV	V	VI	VII	VII/VIII	IX	X	XI	XII		I	II	III
Number of hours to work in a month by 1 people	152	168	160	176	160	160	168	176	176	160	184	160	152	2 000	176	160	168
Number of people included to compile	102	102	104	108	106	105	106	113	116	120	121	119	130	1 350	129	134	135
Number of hours worked	14709	16546	16184	18102	16493	16433	17458	19463	20105	18918	21323	18521	18679	218225	21 789	20864	21947
Number of invoiced hours	9388	12189	11800	11586	10303	9999	10902	12003	12405	11166	12434	11381	10508	136676	14 123	12770	13772
%Billability	64	74	73	64	62	61	62	62	62	59	58	61	56	63	65	61	63
% Billability adjusted	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: Own elaboration.

In the un-invoiced time, the company's client includes freebies and rebates granted, home affairs, staff unavailability, internal projects, etc. These data are used to examine whether the company X worked more time invoiced for the client on project X, whether it gave rebates and giveaways themselves and how these activities translated into the effectiveness of individual projects.

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In response to the issues presented above, a tool was created to measure the project's accountability, thanks to which the project's effectiveness was demonstrated in practice. A spreadsheet created for the work consisted of linked sheets; in comparison to individual monthly settlement periods. To precisely determine the working time, a tool was used to record the working time of the "Toggl" program.

In the case of granting a significant number of free hours to the client, one can talk about the inefficiency of project management, and the company should in such cases focus strongly on analyzing why this situation occurs. Is it due to the poor work of the project team or other technological aspects? A spreadsheet showing globally the level of project efficiency overall months. If there are few discounts or giveaway it means that the project does not have a large number of errors, so the work goes smoothly and correctly.

In terms of efficiency, it is very difficult to say what level of % accountability and time devoted to tribal tasks would be appropriate. The full analysis should be added time devoted to internal projects and include them in the time invoiced per customer. Indirectly, a company can earn on projects and products created inside the company and thanks to them it reaches a new, wider pool of customers or it has the opportunity to gain and enter a new market. Therefore, % efficiency should include not only the time invoiced per customer but the time devoted to projects and internal products. Thanks to such data, it is possible to introduce an efficiency measurement in a given category that refers to the effectiveness of generating revenue.

Table 2: The tribes' billability over months % by Developers Technology 1

Tribes	2017 XII	2018 I	2018 II	2018 III	2018 IV	2018 V	2018 VI	2018 VII	2018 VIII	2018 IX	2018 X	2018 XI	2018 XII	Year 2018
Number of hours worked by tribes	7 689	8 732	8 705	9 490	8 882	9 349	9 712	1 080 4	11 160	10 107	11 135	9 308	9 369	116 753
Number of invoiced hours by tribes	5 013	6 665	6 823	6 849	6 107	6 183	6 699	7 132	7 088	5 856	6 341	5 827	5 523	77 093
%Billability all tribes	65	76	78	72	69	66	69	66	64	58	57	63	59	66
Developers Technology 1														
Number of hours worked Developers	3 898	4 426	4 491	4 944	4 515	4 889	5 017	5 562	5 515	4 790	5 449	4 636	4 789	59 023
Number of invoiced hours	2 514	3 490	3 689	3 477	3 167	3 189	3 405	3 746	3 812	3 253	3 964	3 432	3 033	41 657
% Billability	64	79	82	70	70	65	68	67	69	68	73	74	63	71
Times Non-Billable (total)	1 384	936	802	1 467	1 348	1 700	1 612	1 816	1 703	1 537	1 485	1 204	1 756	17 366
Exemptions + Holidays	868	408	85	480	504	700	569	672	684	562	320	302	1 030	6 416
Time spent in tribes	244	237	296	333	294	411	431	594	398	317	290	190	137	3 928
Home affairs	164	161	172	215	275	335	347	195	225	230	365	329	112	2 961
Internal projects	-	-	40	131	163	116	76	134	145	344	296	245	243	1 933
Discounts, freebies	107	132	87	308	113	139	190	221	251	84	213	137	236	2 111

Source: Own elaboration.

A small amount of un-invoiced hours per customer may mean that the rebates granted are associated with maintaining customer relations (by the way and long-term cooperation). The efficiency measurement tool constructed in this way also gives the possibility to monitor the monthly level of accountability in the context of all projects carried out in the company and the total level of accountability of the entire project (carried out throughout the year). Therefore, % efficiency should include not only the time invoiced per customer but the time devoted to projects and internal products. Thanks to such data, it is possible to introduce an efficiency measurement in a given category that refers to the effectiveness of generating revenue. In terms of analyzing the work of employees, an effective level of work on IT projects was a 69% level of accountability - i.e. the ratio of invoiced hours in a given month per customer for all hours worked by the employee. Why was 69% taken as a measure of employee efficiency? This level was set since in IT companies it pays great attention to the essence of employee development and works on their skills and joint support. There are also hours devoted to supporting in recruitment, marketing, sales or development of internal products. These hours reduce the total level of accountability of individual employees, but this does not lead to a decrease in the level of project effectiveness. Analyzing the data, according to the authors, the 69% level is most appropriate for every employee. In 30% of the time, development opportunities and business matters are included. By introducing the division of employees of internal projects and those into commercial projects and by stabilizing the number of projects for one employee, work efficiency could increase significantly.

Analysis of projects according to work technology, which allows you to examine which technology "consumes" the largest number of hours per month (in theory, this can be the biggest revenue from it) and Are projects carried out in a given technology profitable - is the accountability indicator satisfactory? Theoretically, every IT company operates in specific technologies, according to tribal arrangements. Sometimes, however, there is a situation when for the development of employees, checking other development paths for the enterprise or the client, the enterprise provides services in a different technology. For example, in Technology 1, where annual accounting is at the level of 71%, which proves the effectiveness of work. Therefore, because in the hourly context (almost 50%), most of the hours the company provides its clients in technology 1. there is an example of such analysis (Table 2).

Through this structure, the company can conclude the work of specific specializations (Table 3). Each specialization should have a different level of% accountability, which results from the position held. For example, the level Chief %'s accountability should be lower because he has a lot of responsibilities involved with the organization of tribal work and hence should have a different assumed level of accountability than the Developers who are mainly employed to work on commercial projects. The appropriate level of accountability and effective distribution between positions allows you to maintain the continuity of the company's operations as well as its development and solvency.

Table 3: Billability division by specialization

	2017 XII	2018 I	2018 II	2018 III	2018 IV	2018 V	2018 VI	2018 VII	2018 VIII	2018 IX	2018 X	2018 XI	2018 XII	Year 2018	2019 I	2019 II	2019 III
Specialization 1																	
Number of hours worked	8458	9467	9145	99913	9018	9349	9712	10804	11160	10107	11126	9308	9369	118478	10318	9634	9853
Number of invoiced hours	5511	7247	7153	7160	6209	6183	6700	7132	7088	5856	6341	5827	5523	78419	7339	6601	6813
% (total) Billability	65,16	76,55	78,22	72,23	68,85	66,14	68,99	66,01	63,51	57,94	56,99	62,60	58,95	66,19	71,13	68,52	69,15
Specialization 2																	
Number of hours worked	2442	2787	2728	3230	3000	2660	2976	3410	3724	3876	4758	4073	4216	41438	5255	5407	5733
Number of invoiced hours	1679	2205	2044	2117	1996	1587	1765	2022	2549	2966	3557	3153	2790	28751	3848	3736	4062
% (total) Billability	68,76	79,12	74,93	65,54	66,53	59,66	59,31	59,30	68,45	76,52	74,76	77,41	66,18	69,38	73,23	69,10	70,85
Specialization 3																	
Number of hours worked	451	508	643	742	640	640	687	702	713	640	739	632	454	7740	630	638	841
Number of invoiced hours	257	352	312	154	102	105	356	384	271	207	235	230	228	2936	323	160	326
% (total)Billability	56,98	69,29	48,52	20,75	15,94	16,41	51,82	54,70	38,01	32,34	31,80	36,39	50,22	37,93	51,27	25,08	38,76
Specialization 4																	
Number of hours worked	382	396	394	426	451	347	325	346	345	303	283	428	426	4470	448	369	399
Number of invoiced hours	294	371	387	186	115	103	141	178	163	175	130	183	174	2306	96	49	63

% (total) Billability	76,96	93,69	98,22	43,66	25,50	29,68	43,38	51,45	47,25	57,76	45,94	42,76	40,85	51,59	21,43	13,28	15,79
Specialization 5																	
Number of hours worked	1360	1518	1456	1590	1445	1441	1503	1736	1763	1610	2026	1829	1816	19733	2173	2080	2217
Number of invoiced hours	887	1065	956	937	955	988	897	1144	1189	1070	1148	1021	969	12339	1398	1212	1356
% (total) Billability	65,22	70,16	65,66	58,93	66,09	68,56	59,68	65,90	67,44	66,46	56,66	55,82	53,36	62,53	64,34	58,27	61,16
Specialization 6																	
Number of hours worked	876	1009	999	1262	1295	1338	1528	1549	1488	1583	1533	1416	1630	16630	2065	1756	2019
Number of invoiced hours	523	601	613	671	746	866	901	913	926	760	951	840	700	9488	991	880	925
% (total) Billability	59,70	59,56	61,36	53,17	57,61	64,72	58,97	58,94	62,23	48,01	62,04	59,32	42,94	57,05	47,99	50,11	45,81
Specialization 7																	
Number of hours worked	740	862	819	940	643	658	727	916	913	799	956	835	768	9836	898	841	873
Number of invoiced hours	236	349	335	363	178	167	144	231	220	132	147	128	115	2509	139	133	192
% (total) Billability	31,89	40,49	40,90	38,62	27,68	25,38	19,81	25,22	24,10	16,52	15,38	15,33	14,97	25,51	15,48	15,81	21,99
Specialization 8																	
Number of hours worked	259	339	221	357	321	320	329	352	352	320	344	320	304	3879	341	321	336
Number of invoiced hours	148	161	172	241	216	212	196	218	179	154	121	176	138	2184	143	160	174
% (total) Billability	57,14	47,49	77,83	67,51	67,29	66,25	59,57	61,93	50,85	48,13	35,17	55,00	45,39	56,30	41,94	49,84	51,79

Source: Own elaboration.

Conclusions

The issue of billability presented in the article seems to be a critical element from shaping project effectiveness. The analysis of this issue carried out by the authors proves that the scope of problems measuring the effectiveness of IT projects from the perspective of the specificity of such types of enterprises is a complex issue. Proposals for changes in the method of measuring effectiveness based on the measure of accountability fit into the essence of this phenomenon. Identifying and diagnosing the level of project billability only can help improve project effectiveness and contribute to the economic efficiency of the entire organization. There are important elements when billability is measured, these are tools supporting project management. With the growing number of information and a high level of project complexity, the tool constructed in such a way allows supervision over the time factor and can be a key tool supporting the efficiency of project management in an organization. Thanks to the access to the program used to register working time and the possibility of including the hourly rate set for the project, an attempt was made to check whether the time worked and registered in the program agrees with the invoices issued to customers at the end of a given month. Thanks to the income analysis and the possibility of examining design effectiveness, it can gain a full picture of its current situation, whether there are deviations from the correct, assumed, stable position and functioning possibilities.

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Artificial Intelligence Usage and Ethics in the Choice Theory

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Abstract

Artificial Intelligence (AI) is surprisingly hard to define the term in the modern world. Although there are hopes harbored in development in progress based on the AI, there are also ethical doubts and questions related to this matter. The main goal of this paper is to discuss the main definitions and elaborate on one approach for future qualitative research. This paper presents a review of definitions in a view of ethics and choice theory. Definitions are presented early ideas to the big data era to set a decision-making problem. The presented research is important because most of the industry sectors depend on technology and computers in particular.

Keywords: Artificial Intelligence, Artificial Neural Networks, Decision-making Problem

Introduction

The topic of Artificial Intelligence (AI) to most people sounds like the current state of the art of the computer sciences (Yazdani and Kwaśnicka, 2016) or like a futuristic term taken from Isaac Asimov's novels (Asimov, 2004). We are living in times when AI became one of the disruptive and trendy terms and it almost seems like marketers just add it to the product as a feature (Stępień, 2019), which makes a toothbrush being advertised like a lightsaber or trashcan like R2D2 (Lucas, 1976). From the beginning of the human race, dexterity and intellect have been its domain, which enabled it to settle in almost every environment in every single place of the world (Niemczyk et al., 2018). To call a computer code Artificial Intelligence, which means that it can mimic the functionality of the brain, to some of the population is somehow offensive and it undermines the achievements of our ancestors (Sulich, Zema, et al., 2020). This term has been invented to rise this type of feeling. Some people, when they hear it automatically get offensive and contrary to that, some people see AI as a promise of a better future (Krzos and Olek, 2019). Either way, everyone will admit that this mixed usage of biological and IT terms rises a discussion at many levels. At the most recent, looking at the people's attitude to AI it seems like the majority of humanity decided, that if they cannot stop it, they may also "enjoy the ride" and get accustomed to self-driving vehicles (Gontarz and Sulich, 2019), custom phone applications, but also chatbots and surveillance of public activities.

From the Early Ideas to the Big Data Era

The scientific environment is not consistent when it comes to the definition of AI (Duan et al., 2019; Górski and Parkitna, 2008). It is widely accepted that AI refers to the ability of the machine to learn to fulfill human-like tasks based on the input data (Duan et al., 2019). The term *artificial* suggests that the model is based on the scientific approach and as an outcome, we get synthetic creation. There are several approaches to the definition of Artificial Intelligence. One of them is to put this term into the field of science of building computer-based *artifacts* or *items* mimicking various human tasks (Niemczyk et al., 2018). This approach gives a wide range of philosophical discussions about the nature of intelligence and how it is created (Sulich and Zema, 2017). It also puts under the question if the machine is making any decision because it is based on the previously-made decisions by the creator of the system (Ćwik et al., 2017). Also, automated tasks cannot be called intelligence, because there is no decision making involved. The machine is simply following given instructions and it is limited to possible situations that may occur at the time. This raises a question on how to "teach" a machine to make decisions as humans do (Niemczyk et al., 2018). Similarly, to humans, computers can learn to make decisions based on the observation of the decision-making process. The artificial intelligence algorithm always follows the similar steps which mimic the process of learning: Identification of phenomena, construction of artificial system designated to solve recognized phenomena, operation of the system in a given environment, data gathering, assessment of the outcome under given boundary conditions. This process of learning also takes under consideration failures in solution to drive them back to the database (Nürk, 2019; Steels, 1993). If we, therefore, consider AI as a field of science aimed at imitating people, we cannot omit the topic of human reasoning. The problem is that each person follows his or her reasoning while making a decision. From this point of view, AI becomes cognitive science more than a study of computers. These different views led scientists to further research on how human beings can live alongside AI and how to minimize the negative impact of technology.

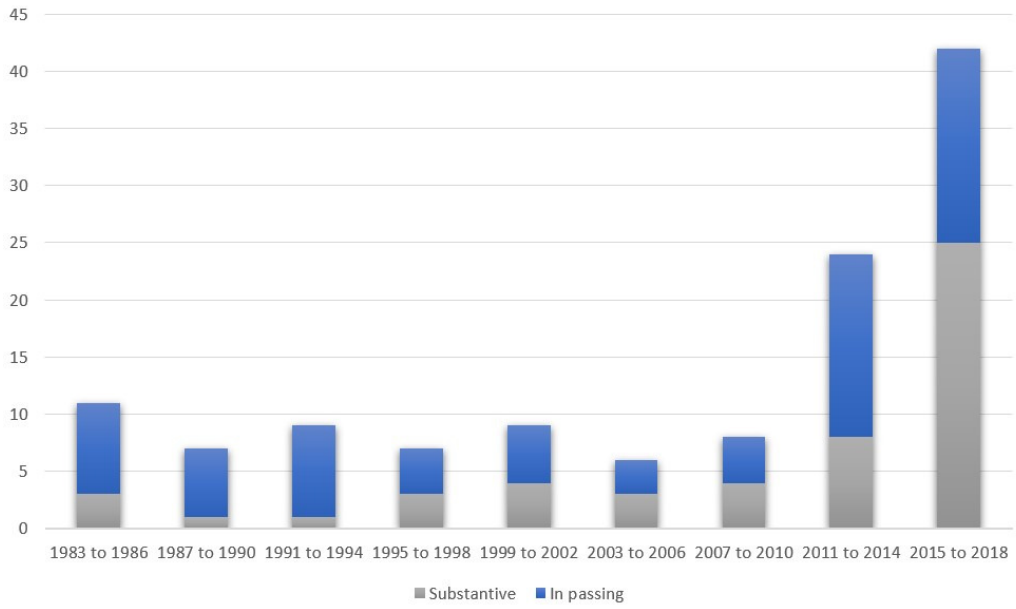

Fig 1. AI papers published in SSIS/IJJM by year. Source: (Duan et al., 2019).

Reportedly, the AI systems are heading business to the new tracks and AI-enabled systems usage in corporations is expanding rapidly. The improvement is seen in the organization's ability to make data-driven predictions and has significantly reduced the cost of model preparations. According to some surveys AI is listed as the most strategic technology, which will reinvent business models and ecosystems, enhance decision making and reinvent the customer experience. The potential payoff of investment is predicted to happen in 2025 since 59% of organizations are still on the phase of information gathering and building their AI models, while the remainder is at the early stages of adaptation (Panetta, 2017). Although AI comes with great promises, early adopters are being cautious and pilot programs always give valuable lessons to future utilities. There is still a certain dose of dissatisfaction among academics with the lack of theoretical fundamentals and formulations. The aforementioned "AI springs" and "AI winters" among the history of the method has led to ignorance of research findings from years 1970 to 2000 and reinvention of concepts known from over four decades.

Decision-making Problem

The decision-making problem occurs when an individual or a group of people develop an idea of the desired state. This state often differs from the current situation, which requires certain actions to be undertaken. The aim is to prepare this set of activities, which will change the current situation to the target state in the short or long term. This difference between current and aimed state does not represent a decision-making problem, it appears when the goal can be reached by many means and ways. The decision-maker is then required to examine a set of possibilities to take the right course of action. The frequent negligence is not to investigate multiple possibilities but go straight away to action after inventing the first solution, whereas in almost all situations there is more than one option. A systemic approach is then highly advised and it will prevent the rush of being satisfied with the first idea. It is proven that a systemic approach provides better quality solutions in most cases. The decision-making problem can be then characterized by two main factors (Grünig and Kühn, 2005):

- A difference between the current state and the target state.
- At least two options for action to achieve the target.

The decision-making problem was widely recognized by both academics and practitioners, who proposed techniques including methods, models, algorithms and software tools (Zhang et al., 2015). The classification of different decision-making methodologies was undertaken by Zachary in his publication from 1986 (Zachary, 1986). According to his insight, we may distinguish the following decision-making techniques:

- Process models
- Choice models
- Information control
- Analysis and reasoning techniques
- Representation aids
- Human judgment amplifying/refining techniques

Most of these techniques include computational models with different emphasis on specificity like data mining, probabilistic modeling, data warehouse, goal programming, evidential reasoning, case-based reasoning, graphic user interface, heuristic judgments. The systemic solution of the decision-making problem may also include the integration of two or more techniques. AI finds its roots in heuristic methods and therefore in Zachary's taxonomy, it can be classified as Human judgment amplifying/refining technique (Zachary, 1986). Although Zachary's opinion on heuristic methods is not overly flattering, the change that they have faced over the years made them fairly popular and appreciated.

The decision is undertaken to reach the desired state, which differs from the current one. Although this problem may be approached from many perspectives: purely intuitively, without closer investigation of the problem, through described procedures taken from own or others experience, by taking a solution based on the expert knowledge or even choosing at random. All of these methods can be applied in different scenarios, but when it comes to the consistency of the outcome only systemic approaches give satisfying and predictable results (Sulich, Zema, et al., 2020). The rationality in decision making rises a question on layers of philosophy, logic and probabilistic theories. We, as people, tend to make rash decisions and act under the influence of the environment we are living in (Sulich, Rutkowska, et al., 2020).

Artificial Neural Networks

Work on Artificial Neural Networks has been motivated by the development of neuroscience. The discovery of the complexity of human brain functionality has triggered the change in conventional computer architecture. The conventional PC is based on linear operations, whereas the brain makes complex, nonlinear, and parallel computations every second. The main cell which is responsible for making this operation is a neuron and it is more efficient than any modern processor. When we consider basic everyday tasks like senses perception, the information processing takes brain approximately 100-200 ms, which is even beyond the capabilities of supercomputers. The other example may be taken from less cognitively evolved creatures than humans. Bats are using echolocation for perceiving the velocity and size of the object when flying in the dark. These complex computations are way more accurate than any of the available echo sonars, even though the bat's brain is a size of a plum (Haykin, 1994). In both cases, humans, as well as bats, were given this astonishing gift at birth. It does not grow that much in terms of the volume in the lifetime, but it builds up its structure and gains abilities through the experience it is exposed to. In the beginning, in the human body for the first two years of life, the brain is very flexible and has a high ability to the adaptation to the surrounding environment. This elasticity in adaptation is then crucial for the functioning neurons in the brain as information processors and so it is essential for the functioning of artificial neural networks. In general, neural networks are machines designed to mimic the cognitive process of a brain to solve a given task. The neural network is usually a computer system, which is designed to perform computations with the ability of self-adaptation through learning. This type of task with high intensity of interaction requires a special computer architecture with a lot of processing units called "neurons". Therefore we may quote the following definition of the neural network: A neural network is a massively parallel distributed processor made up of simple processing units that has a natural propensity for storing experiential knowledge and making it available for use (Haykin, 1994). The resemblance to the human brain has two layers:

- The learning process is based on acquiring experience from the environment;
- The main storage space of knowledge are neurons and synaptic weights between them.

The learning process modulates formulations between the neurons to adapt the model to solve the given task. This approach is already well established in theory and has enriched some successful applications in many diverse fields (Bernard and Samuel, 1985; Haykin, 1994). The neural network is also able to rebuild its topology by creating new synaptic connections, which is similar to the human brain in which neurons can die and create new connections as well. The main quality in terms of the utility of neural networks is the capability to adapt. The structure of synaptic connections can restructure and build new relations, which allows better adjustment to the surrounding environment. Minor changes in the environment can be easily incorporated into a neural network since the learning process is flexible and can be performed in real-time, which is especially valuable with nonstationary boundary conditions. Moreover, neural networks can transmit information from the cause to the effect (Marwala, 2015). The structure of the neural network determines the learning algorithm incorporated in it. Deciding on which system will be better in solving a given problem

than others, we need to consider aspects like computational limitations or calculation optimization. We may then consider the classification of artificial neural networks according to their architecture:

1. Single-Layer Feedforward Networks
   Neural networks can be organized in the form of layers. In the simplest architecture of the system, the inputs layer of source nodes is projecting directly onto the output layer. Described mapping is only one-sided. This type of neural network has been presented in Fig. 2.1, where we have four nodes on both sides: input and output. The described network is called a single-layer network because there is only one layer of output computation neurons. We do not count the input layer of source nodes, because no calculation is performed there.

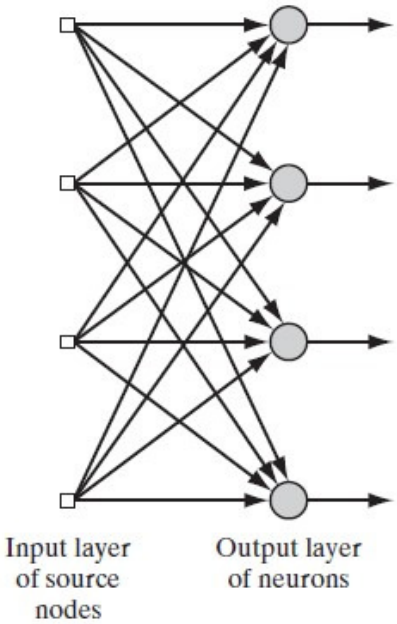

Fig 2. Feedforward network with a single layer of neurons. Source: (Haykin, 1994).

2. Multilayer Feedforward Networks
   The other type of architecture of the feedforward neural network is extended to have hidden layers of computational neurons. They are called "hidden" nodes because they are not exposed to any of the sides of the model: input nor output. The role that they play in the model is to modulate data between input and output to provide a better solution. By adding hidden layers to neural networks, the performance of the system is enhanced. In this type of architecture, the input layer sends a signal to the computation nodes in the second layer, then the second layer sends a signal to the third layer and the chain of information continues through all hidden neurons to the output layer. In the standard setup, the signal travels through all the layers respectively, without omitting any calculation nodes. The overall data transfer in a multilayer feedforward neural network from the input to output has been shown in Fig. 2.2. To shortly describe the illustrated neural network, we can use markup 10-4-2, which means that there are 10 source nodes, 4 nodes in the hidden layer and 2 output nodes.

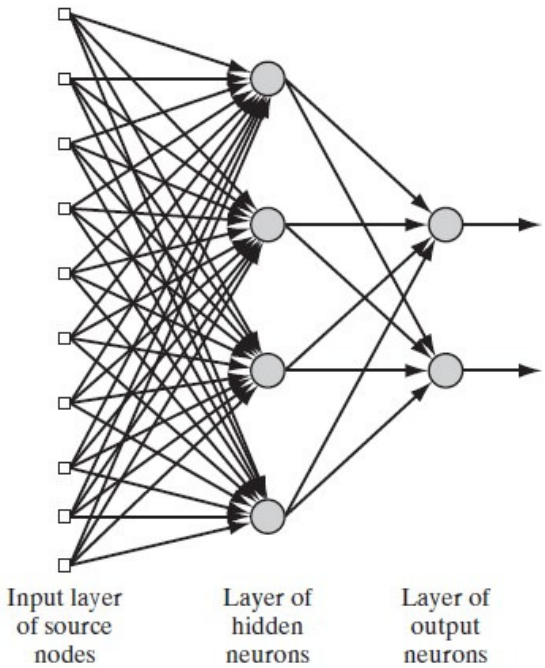

Fig 3. Fully connected feedforward network with one hidden layer and one output layer, Source: (Haykin, 1994).

3. Recurrent Networks

A recurrent neural network in diversity to feedforward neural networks includes an additional at least one feedback loop. The recurrent neural network presented in Fig. 2.3 includes one layer of neurons with each neuron feeding its output signal back to the inputs of all the other neurons. We can also distinguish self-feedback loops, where each of the output nodes provides the information back to its input. Furthermore, see that network architecture from Fig. 2.3 do not include any hidden neurons. If that was a case, a feedback connection can originate from the hidden nodes as well as from the output nodes. At any stage of the feedback loop, the neural network can be exposed to additional input if needed. This type of architecture is the most commonly utilized, because of better overall performance and ability to provide sufficient solutions despite data scarcity. This system model is especially valuable if we have little knowledge about the data source.

The Hopfield network is a specific type of Recurrent Network in which every neuron has corresponding unit-time delays as shown in Fig. 2 and 3. The number of feedback loops is equal to the number of neurons. On every loop, the time-delayed element is input back to the network and feeds every other neuron in the model, so that self-feedback will not occur (Haykin, 1994). The Hopfield network is initiated by setting up the values of the units to the desired start pattern. The feedback loop continues until reaching the convergence, which is indicated when any value cannot be changed in the updating phase.

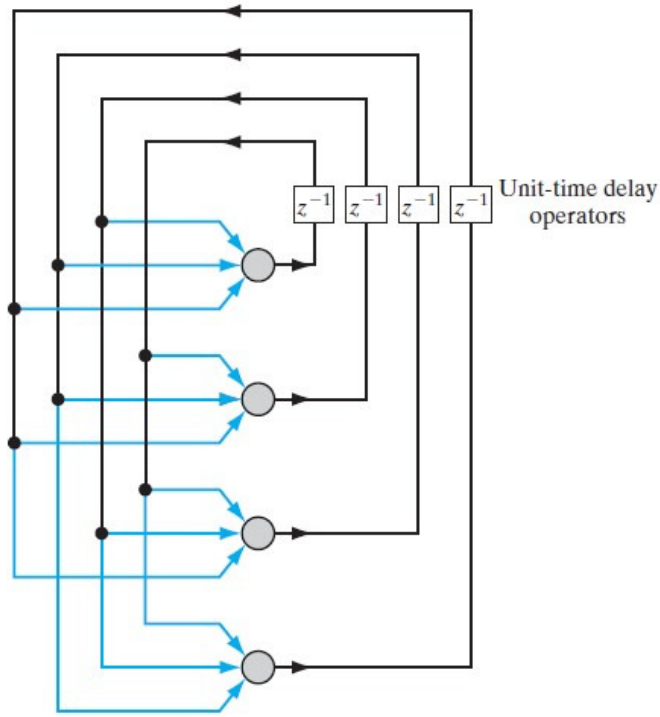

Fig 4. Recurrent network with no self-feedback loops and no hidden neurons, Source: (Haykin, 1994).

All of the presented neural network architectures may be used in the creation of the system, which will enhance the decision-making process. The most applicable one will be chosen according to the input data structure and the complexity of the solution we want to output. We also need to take into consideration available computational resources (Kwaśnicka et al., 1998).

Artificial Intelligence in Decision Making

The early idea of incorporation of Artificial Intelligence into decision making is the Expert System presented by Pomerol (1997). The basic functionality of this model is to process input information to diagnose the output. The strategy is to input the facts, which best describe the given situation and output the recommendation of action or assessment of the proposed solution. The best performance of the Expert System can be observed with controlling live parameters of the current process. According to input data, the system can assess the recent state and determine the action to undertake. The basic functionality of an expert system in comparison to the decision-making process has been shown in Fig. 5. Standard decision-making process consists of:

1. Diagnosis - a perception of a current state from the perspective of past and presence;
2. Choice of action - definition of multivalued function which describes the future states $\psi(S_i, A, E)$, where S_i is available current state, A is chosen action and E is an aftermath of action A;
3. Look Ahead - the prediction of the future state according to A - action, and E – aftermath;
4. Preferences - maximization of the desired outcome.

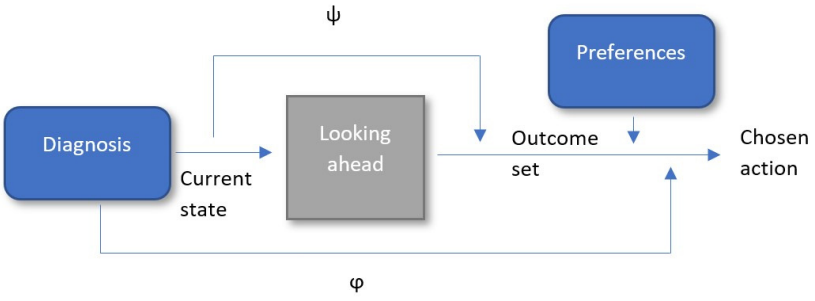

Fig 5. The simplified decision process. Source: (Pomerol, 1997).

Expert Systems exclude user interference in decision making and that is why some academics describe them as being objective. On the other hand, there is a question of reliability on the system and that is why most system development is spent on verification of the inserted knowledge base. The interpretation of function ϕ is a set of rules supported by the system. This set can be a discrete function or fuzzy boundary conditions.

Knowledge-Based Improvement

The Knowledge-Based Improvement model introduced by Robinson et al. (2014) is presented. The main motivation behind the creation of this system was a curiosity about the decision-making process and eagerness to improve it using operating systems. Since sophisticated models are not always the best approach, the creator of KBI emphasizes that it is not meant to be complex. Instead, the main goal was enabling the prediction of an outcome of alternative decision-making strategies. Although it seems like a knowledge-based system has very limited capabilities, the author states that the real complexity of human decision making is impossible to model and so the involvement of decision-makers is vital in the process. In such a case, the main objective is to identify improvements to the decision-making strategies employed.

The KBI model has been shown in Fig 6 and it consists of five stages:

1. Understanding the decision-making process - At this stage, the decision-making process is being investigated. The recognition of decision-making strategy components like decision variables, decision options, decision attributes, and attribute levels is undertaken. We may take for instance the malfunctioning machine in an assembly line, as a case in which the person responsible for making the decision needs to decide: when to repair the machine and to whom he needs to hand-over this task. The decision variable may consider two options: immediate repair of the machine or waiting until it will stop working at the end of the shift. In the recognition phase, we need to take into account time, which will be needed for the repair and the type of failure, which will be taken as a main factor for the decision function formulation.

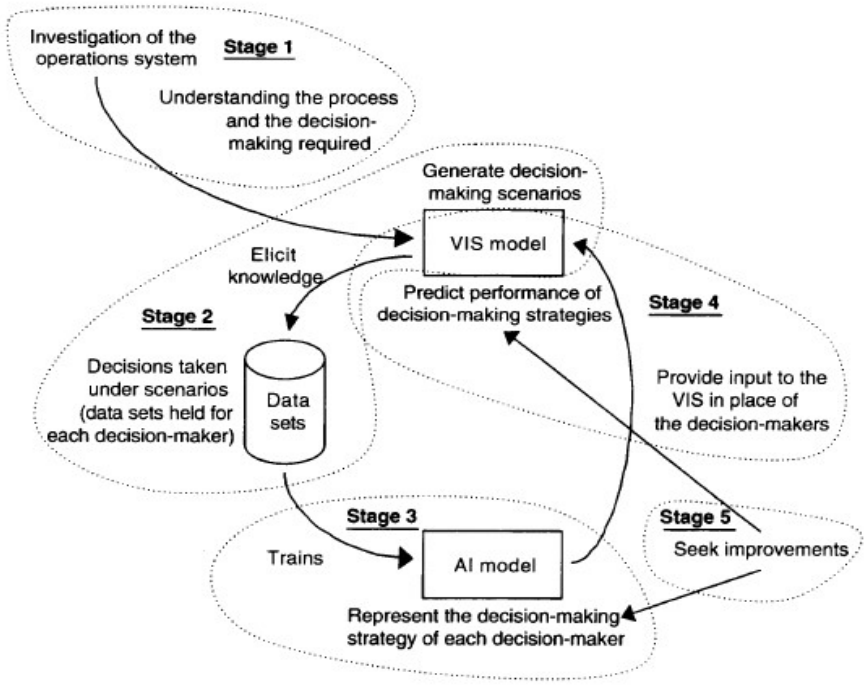

Fig 6. Knowledge-based improvement. Source: (Robinson et al., 2014)

To collect data from decision-makers we can make observations, but in many cases, it is very time consuming, because much time elapsed until the decision is reached. It is also difficult to note every significant decision-making factor solely based on observation, especially when most of them are changing in time. To solve this issue author of KBI proposes a Visual Interactive Simulation (VIS). In this case, the decision-maker is taking part in interactive simulation and being asked questions. The simulation ends with reaching a final decision by the user. The system then processes all collected data into decision variables $D_{i,j}$ and decision attribute A_i.

The decision-making process in KBI is represented with two-row vectors, where the first one represents a decision and the second one represents the attributes of the decision:

$$D_{i,j} = [d_1, d_2] \quad (1)$$

$$A_i = [a_1, a_2] \quad (2)$$

Where d - decision variables and - decision attributes. The relation between both of this vector can be described with the function:

$$D_{i,j} = f(A_i) \quad (3)$$

Where $f(A_i)$ is a decision-making strategy. Since this function is unknown, we need to proceed with steps 1-3 to determine it with the help of AI techniques. In this case, a set of collected example decisions will be needed.

2. Data collection - After establishing, which factors determine the decision-making process we may start the data collection stage. In this step essentially the system creator needs to create a matrix of data relevant for decision making. In each example, the data source should include the value of each decision option and attribute level.

3. Determining the decision-making strategies - At this stage, all data collected by VIS are processed into decision variables $D_{i,j,}$ and decision attributes A_i. These parameters are then used in the preparation of a decision-making strategy of individual decision-makers. We can create this model using the rule-based expert system or artificial neural networks. In most cases, an expert system is favored among the others because it can create decision trees, which represent the decision-making strategy and are more explanatory. In the decision, the tree system can assign priorities to each of the attributes according to the similarity to the data set with the correct decision. Since each decision tree represents one strategy there is a need for creating decision trees for each decision-maker.
4. Determining the consequences of the decision-making strategies - When all decision-making strategies are created for each decision-maker the next stage of KBI is to assess the results and choose the winning strategy. The simplest way to make such an assessment is to input expected results into Visual Interactive Simulation and compare it with a decision reached by the decisionmaker. Each time the decision is reached, decision attributes are passed to AI. Of course, the participation of best decision-makers is vital for the best performance of a system, since the winning strategy is chosen from those which participated in simulations. Any strategy reached this point can be improved and that is why we need to proceed to the last stage of KBI.
5. Seeking improvements - At this stage, only the best decision-making strategies are being considered in a search for optimization. There are two approaches to do that. We can create a discussion panel, which will aim to improve chosen strategies or we can make incremental changes by combining the best strategies. The alternative is to employ heuristic strategies with search algorithms. After optimizing the strategy, we need to verify it. We can do that by testing it in VIS.

There are clear benefits when using the KBI model. With the utility of VIS, we can collect data more efficiently. Moreover, we can control this input data at any stage of simulation. There is an ability to repeat the simulations with the same conditions, which is vital for verification purposes.

Conclusions

Most of the industry sectors depend on technology and computers in particular. In the USA we can hear that self-driving cars will lead to the unemployment of drivers. That may be the case in the future, but the labor market is constantly changing. In the past, there were thousands of people working on the connection of phone calls at the central office. Right now, it sounds almost ridiculous when we look at our smartphones. Fifty years ago, no-one would even think that people will be employed to write computer code and now millions of people are doing it and most of them are well off. The point here is that industry is constantly changing and we need to be aware that (Rudek and Heppner, 2020):

1. Even though some people may lose their job it is not happening overnight and there will be time to adjust to new conditions on the labor market;
2. Technology may take some of the jobs while creating new ones.

There is always a need to perceive emerging technology from different perspectives. Although some of the opinions sound very farfetched and alter reality it is good to exercise our trust. When we had our first sight on the internet most of the people didn’t know how to approach it from a legal standpoint. The United States Government decided at the time to let this technology to freely develop. Thanks to this decision we have internet everywhere and it has enabled economics to move to completely new directions. The main obstacle which may stand on the way of evolution of Artificial Intelligence is over-legislation.

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Smart' As A Problem-Solving Information And Communication Technology Innovation: Real-Life Understanding of The Term – A Pilot Survey

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Abstract

The term 'smart' has been used as a buzzword over the last decade. Its real-life understanding is shaped by citizens, enterprises, academics, public organizations, etc. This paper analyses the term 'smart' using the text-mining methodology with an iterative probabilistic model and provides a short as well as an intuitive definition based on the real-life understanding of the term. The term 'smart' is a subjective and multi-meaning concept. For most of the respondents, the term 'smart' perfectly fits with the words 'solution that is innovative and technological, an app'. There are rather limited linkages between the term 'smart' and 'Smart city'. The best fit provided variable containing words '(smart) urban planning and development'. Based on our research design and the discussion of the results, we propose a preliminary short definition of the term 'smart'. This research design can be used for more representative samples of the population. The paper aims to contribute to the debate about the real-life understanding of the 'smart' term. The citizens' understanding of the term 'smart' is important for the success of the 'Smart city' initiatives. With a better understanding of the term, researchers can adjust their socioeconomic surveys to ask better questions, while social and private entrepreneurs can implement problem-solving, innovative ICT ideas in the market and society.

Keywords: Citizens, Real-Life Understanding, Digital Economy, Smart, Definitions

Introduction

The term 'smart' is frequently used in scientific literature and citizen's everyday life (marketing campaigns, smart city, smart devices, etc.). Is there a reasonable real-life understanding of the term? The goal of this paper is to analyze the term 'smart' using the text-mining methodology with a probabilistic model and provide a short as well as an intuitive definition based on the real-life understanding of the term.

Literature dealing with 'smart' definitions are aimed mostly at the 'Smart city' concept (Albino et al. 2015). There is a multiplicity in definitions and frameworks dealing with 'smart' concepts. The most

popular Smart city frameworks are the Sharing cities (Boyko et al. 2017, Cohen and Munoz 2016, Hult and Bradley 2017) and the Sustainable cities (Ahvenniemi et al. 2017, Bibri and Krogstie 2017).

Frameworks should provide a real-life understanding of the term 'smart'. As suggested by D'Auria et al. (2018), when it comes to the term 'smart' and frameworks, it is necessary to analyze what activities agents do (innovation, learning, communication, etc.), then how they do them (organizational processes, devices, apps, computers, cars, etc.), and eventually who and with what or whom the activities are done (people, institutions, policies, etc.).

In the Smart city frameworks, we can find components or systems such as Smart economy, Smart mobility, Smart environment, Smart people, Smart factory, Smart Living, Smart Governance, Smart grids, Smart waste sorting and treatment, Smart spaces, housing and buildings, Smart devices, machines and things, Smart street lighting, Smart welfare and healthcare, Smart services, Smart government and governance, etc. Clearly, there is a common denominator of all these 'smart' terms and frameworks.

'Smart nation' is defined as: "*A smart nation applies digital technology and data to address strategic issues through a whole-of-government approach and in collaboration with citizens*." (Hoe 2016, p. 330). The adjective 'smart' in the term 'Smart grid' is about the application of ICT (smart meters) to end-users in order to monitor their consumption patterns. The adjective is not directly a characteristic of the grid itself (Kovacic and Giampietro 2015). The 'Smart (urban) mobility' definition is one of the most problematic and considered to be the vaguest of all 'smart' concepts. Working definitions are dealing with systems and technologies that generate data, information, knowledge, enhancing vehicles, infrastructure and deriving improvements for transport systems (Lyons 2016).

The term 'Smart factory' is considered to be the most extensive of the 'smart' terms. A systematic review of the literature found eight pillars of the term: decision making, cyber-physical systems, data handling, IT infrastructure, digital transformation, human-machine interaction, internet of things, cloud manufacturing and services (Osterrieder et al. 2019). 'Smart devices' or things and machines or the internet of things (IoT) are defined by their impact on individuals and society. They are considered to be social machines and provide new opportunities for humans and society (Smart et al. 2018).

We can define the term 'smart' or 'smartness' also in the context of devices and systems. "*Serious discussion of smart X needs to define what smart means in relation to IT-enabled devices and systems*." (Alter 2019, p. 2). Interacting dimensions of 'smartness' for systems, services and devices include 4 categories and 23 dimensions in total: (1) information processing, (2) internal regulation, (3) knowledge acquisition, and (4) action in the world. Considering different viewpoints (Vasauskaite et al. 2017) there are 4 pillars of 'smart': (1) smart system, (2) smart process, (3) implementation, and (4) orchestration.

Recent trends suggest an integrated 'organic' approach to the term 'smart'. 'Smart' frameworks have anatomy and spatial dimension. The approaches can be based on fuzzy logic and measured by key performance indicators. Furthermore, it means that 'smart' frameworks and concepts can be planned, managed and monitored (Koutra et al. 2019).

Technocratic and organic views are being integrated; however, recent frameworks forget the well-being and happiness of citizens. A definition suggested by Lara et al. (2016, p. 9) is based on social aspects: "*Smart city is a community that systematically promotes the overall wellbeing for all of its members, and flexible enough to proactively and sustainably become an increasingly better place to live, work and play.*"

What is the real-life understanding of the word 'smart'? To summarize current understanding, there is no commonly accepted short definition of the term 'smart' in the academic sector. In the business sector, the meaning of the term 'smart' is driven by the marketing departments that are offering 'smart' products and services. Positioning and branding play an important role. 'Smartness' is mostly a feature

of a product or a service in which ICT plays a major role; however, multiple meanings of the term are a feature of the business sector marketing strategies.

Definitions of the term 'smart' and 'Smart city' are normative. *"…connecting 'Smart' in 'Smart cities' to advanced ICT is the most constructive way forward. Thus, it is a normative choice to use the concept* instrumentally." (Höjer and Wangel 2015, p. 339). The synonym to the adjective 'smart' is 'intelligent'. It means that something or someone (a device, a system, a person, etc.) acts in an intelligent way.

'Smart' as an adjective means a lot of other things in both American and British dictionaries as well (fashionable, quick, clean, stylish, clever, effective, rude, etc.). As a result, the term 'smart' is an intended multi-meaning and subjective (normative) concept. That is why we applied the text-mining technique to basic open questions so that respondents can create their own definitions of the term 'smart'.

Materials and methods

We used a sample of students from social science studies at one university. The selection included a full sample of students from compulsory lectures (master and bachelor degree courses) from the academic year 2019/2020. The return rate was 100%; however, about 7% of responses were empty or incomplete. The total number of complete respondents is 180. The questionnaire was based on the concept of real-life understanding and Smart city linkages (Figure 1).

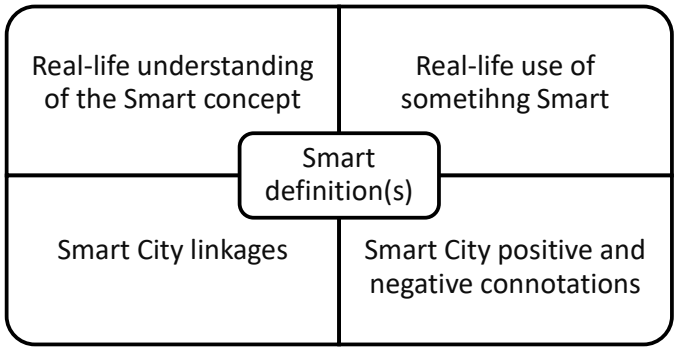

Figure 1: Concept of the survey

The Smart city linkages were added because the university is located in a Smart city and we want to test the relationship of the term 'smart' and 'Smart city' (Figure 1). The questionnaire was short and included only open questions. Respondents had about 20 minutes to complete the survey, there was no time pressure or other pressures as the submission was anonymous and voluntary.

1. How would you define the term 'smart'?
2. What does the word 'smart' mean to you in your daily life?
3. Do you personally use something that can be described as 'smart'? What is it or what purpose does it have?
4. In what context (areas) did you most often hear the term 'Smart city'?
5. What do you consider to be positive or negative in relation to the term 'Smart city'?

There is a selection bias toward the young population studying in a large city at a university. The representation bias is evident; however, this paper is considered to be rather a pilot survey. The goal is to test-drive a new iterative data-mining methodology and present the first results. The bias in data

processing is possible because data mining was performed by humans and not a software tool. Keywords were selected from the definitions and other answers.

We preferred manual data processing using two steps. One person selected the most used words that describes the respondents' views. In most questions, it was either an adjective, substantive, two-word or three-word phrases. In the second step, categories of the most used words were created. The threshold was 20 occurrences in one category and the rest of the words went to the category 'other'.

We created 5 definitions of the term 'smart' using the responses for the first question "How would you define the term Smart?". We then iteratively tested the relationship of each definition which had more words with factors derived from the rest of the questionnaire. The first definition is based on the words 'smart solution'. The second is based on the words 'smart solution, innovative, technological improvement'. The third definition is based on words in the second definition and the words 'something useful and effective'. The fourth definition is based on the words in the third definition and the words 'something that simplifies things' and to the fifth definition, we added all other meanings (Table 1).

Table 1: 'Smart' definitions – text mining summary

#	Q1: 'Smart' definition	Observations	Mean	*Smart$_i$ definitions*
1	('smart') solution	180	61 %	Definition #1
2	Innovative, technological improvement	180	23 %	Definition #2 (1+2)
3	Something useful, effective	180	18 %	Definition #3 (2+3)
4	Something that simplifies things	180	17 %	Definition #4 (3+4)
5	Other meanings	180	16 %	Definition #5 (4+5)
6	I do not know	180	5 %	

The regression uses logit probability modeling (Equation 1). It was used to test the concept (Figure 1) of the pilot survey. The key vision was to let the respondents shape their understanding of the term 'smart' using four dimensions (Figure 1). We considered for this pilot estimation only the two most pairwise correlated factors with the particular definition (in Table 1). In further research, we can use all of the factors at once. However, in this pilot research we used only a limited number of regressors to account for possible issues with statistical over-identification.

$$Smart_i \begin{cases} s_i^* = 1 \; if \; s_i = \left(X_{1i}\beta_1 + \varepsilon_{i_1}\right) > 0 \\ s_i^* = 0 \; if \; s_i \leq 0 \end{cases} \qquad (1)$$

The dependent variable $Smart_i$ (where i=1, 2, 3, 4 and 5) is estimated using the logic of the logit marginal effects procedure. The $X_1\beta_1$ is a vector of explanatory variables. Those are dummy variables based on frequencies in Tables 3-6. The ε_1 is a random-error term. The vector of parameters to be estimated is denoted β_1. All robust standard error coefficients are reported at 5% alfa.

The sample consists mostly of full-time bachelor degree students in their first year of studies at Jan Evangelista Purkyne University in Usti nad Labem, Czech Republic. There are more females (58%) which reflects the current trend in Czech universities. To add some variability, combined (distance) study (26%) and master's degree students (19%) were added (Table 2).

Table 2: Socioeconomic background of participants

Respondents	Observations	Mean
Master's program (MA/BS)	180	19%
Combined study (Yes/No)	180	26%
Years in the program (1-4)	180	1.41
Female (F/M)	180	58%

To sum up the rest of the survey, for most of the students the term 'smart' means something different in real life. It is something that simplifies things, it is a smart solution, it is also innovative, technological improvement, a smart device and for a fraction of the respondents, 'smart' means nothing special in their daily lives (Table 3).

Table 3: 'Smart' in real life (Variables)

Q2: Real-life meaning	Variable name	Observations	Mean
Simplifies things	RL Simplifying	180	28%
Smart solution	RL Solution	180	23%
Innovative, technological improvement	RL Innovative	180	21%
Smart device (phone, car, etc.)	RL Device	180	19%
Nothing special	RL Nothing	180	17%
Other meanings	RL Other	180	14%

To validate the understanding of the term, we asked about using something 'smart'. Most of the students use 'smart' devices (76%) like phones, car and other internet-connected devices. They use these devices for communication and it is represented by all kinds of mobile applications as well as ICT. About 14% of respondents do not consider themselves as users of something labeled 'smart' (Table 4).

Table 4: Use of something 'Smart'

Q3: Real-life usage	Variable name	Observations	Mean
Smart device (phone, car, etc.)	USE Device	180	76%
Mobile Apps and technologies	USE Apps	180	23%
Not a user of something 'Smart'	USE Nothing	180	14%
Other meanings	USE Other	180	4%

The third dimension adds links to the smart city concept. The words 'smart city' is for most of the students (45%) confusing and they don't know the context or meaning of it. The most popular dimension was transport and cars (16%), followed by innovations, technologies (16%) and in the last place was Spatial planning and development, environmental context and other meanings.

Table 5: 'Smart city' context

Q4: What is a Smart city?	Variable name	Observations	Mean
Don't know	SC Unaware	180	45%
Transport and cars	SC Transport	180	16%
Innovations, technologies	SC Innovation	180	14%
Spatial planning and development	SC Urban	180	11%
Environment	SC Environment	180	8%
Other meanings	SC Other	180	7%

The last question was about positive and negative connotations about the term 'Smart city' (Table 6). Mostly, the considerations were positive. For those who knew something about it (73%), they felt that Smart city facilitates something, which makes things faster and useful (32%), while they believed it indicated an improvement (24%). There were also negative considerations like dependency on technologies and other negative meanings which involved all kinds of costs (13%).

Table 6: Positive and negative 'Smart city' connotations

Q5: Smart city context	Variable name	Observations	Mean
Facilitation (faster, useful, etc.)	PN Facilitation	180	32%
Nothing, don't know	PN unaware	180	27%
Improvement	PN Improvement	180	24%
Dependency on technologies	PN Dependency	180	14%
Other negative meanings (costs)	PN Other costs	180	13%
Other positive meanings (benefits)	PN Other benefits	180	8%

Results

The iterative methodology shows some interesting dependencies. Statistically significant variables are in all four dimensions of our concept (Figure 1). In the first dimension (use of something 'smart' in real-life), the logit probability to define the term 'smart' is higher when we deal with devices, something innovative with other meanings. Those other meanings were mostly words like sustainable and ecologic. Other real-life meanings (making things simpler, smart solution, and nothing special) were not statistically significant.

In the second dimension (usage of something 'smart'), the situation is more complex. When it comes to narrow definitions (1st and 2nd), respondents were more likely not a user of something 'smart'. The higher probability to define something 'smart' is when using mobile applications. Other real-life use meanings were not statistically significant.

The linkages to 'Smart city' concepts and frameworks are quite surprising. Respondents are mostly unaware of what a 'Smart city' is when it comes to narrower 'smart' definitions. The only statistically significant variable is about urban development and spatial planning. Other smart city linkages (transportation, innovations, environment and other meanings) were not statistically significant.

Table 7: Logit probability - factors of 'smart' definitions

Logit Probability	Definition #1	Definition #2	Definition #3	Definition #4	Definition #5
RL Device	0.866	0.790	1.861**	1.754	
	(0.51)	(0.65)	(0.75)	(1.09)	
RL Other	0.981**				
	(0.50)				
RL Innovative		1.557***	1.587**	1.753	1.619
		(0.60)	(0.76)	(1.03)	(1.00)
RL Nothing		0.159			-0.827
		(0.60)			(0.59)
USE Device	-0.759	-1.165	-0.253	0.101	
	(0.57)	(0.80)	(0.96)	(0.92)	
USE Nothing	-3.020***	-3.591***	-1.658	-1.797	-0.651
	(0.77)	(1.00)	(1.07)	(1.06)	(0.59)
USE Apps		1.250**	0.772	0.921	1.657**
		(0.58)	(0.72)	(0.92)	(0.78)
SC Unaware	1.323***	1.762***		0.635	0.989
	(0.43)	(0.52)		(0.58)	(0.52)
SC Urban	1.469**	1.231	1.981	1.313	1.427
	(0.66)	(0.78)	(1.40)	(1.30)	(1.32)
SC Environment			0.439		

			(1.34)		
PN Facilitation	-1.110***		-1.493***		-1.269**
	(0.39)		(0.52)		(0.63)
PN Other costs	-0.094				
	(0.60)				
PN Improvement		0.910	0.414	0.324	0.921
		(0.61)	(0.64)	(0.72)	(0.87)
PN unaware		0.347		0.295	
		(0.49)		(0.58)	
Constant	0.894	0.746	1.629	1.032	1.535***
	(0.54)	(0.80)	(0.98)	(0.90)	(0.57)
Observations	180	180	180	180	180

In the last dimension, we explore the positive and negative connotations of the term 'Smart city'. Under the variable facilitation, we put together words like purpose, make something easier and simpler. This meaning reduced the probability of our definitions. Other variables dealing with 'Smart city' connotations (Dependency on technologies and other benefits) were not statistically significant.

Discussion and conclusion

The term 'smart' is a multi-meaning concept (Höjer and Wangel 2015). For most of them, the term 'smart' perfectly fits with the words 'solution that is innovative and technological, an app'. This meaning is based on innovations in information and communication technologies. There are rather limited linkages between the term 'smart' and smart city. The best fit provided variable containing words 'urban planning and development'. 'Smart city' frameworks solve urban planning and developmental problems.

The widest definition (number 5) offers a simple meaning to the term smart. The term 'smart' relates to the word 'application' (or App). Applications are based on hardware and software (ICT components) and have multiple uses. They are based on data, provide information and effectively contribute to the well-being of society. Apps are the output of processes' digitalization. They also utilize new ICT trends such as artificial intelligence and the internet of things.

This paper provided an experimental approach to untangle the meanings and definitions of the term 'smart'. To some extent, it seems we speak about innovations that involve ICT (Alter 2019) when we speak about 'smart' things, people, cities, etc. Our short definition based on the real-life understanding of the term is:

'Smart is a problem-solving and innovative solution based on ICT.'

ICT innovations and applications are fashionable which solve problems and tasks. They are faster than humans and can analyze data without getting tired. This makes them quick, stylish, clever, effective and sometimes rude because they are often without prejudice while they can replace humans. These technologies act in an intelligent way because they are made by humans (digitalized processes). Humans use ICT (systems, devices, solutions, etc.) that can collect data and intelligently interpret them to provide information and knowledge to solve problems.

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On the Experience of The Formation of Information Competence in The Framework of Continuing Professional Education

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Abstract

Immediacy of such a problem as information competence formation is due to the necessity of continuing improvement of pedagogical approaches, methods and technologies of educating specialists how to use information technologies in their professional activity to provide for their correspondence to the stable and outrunning level of society development. The article aims at the

formation of methodological approaches to the pedagogical process studying the use of information technologies in the framework of post-graduate continuing education taking into account the professional requirements and work specifics. The leading method of the problem study is the method of involved observation that enabled to make authentic comparison and analyze inquiries of 349 professionals attending the courses of continuing education.
The article shows that the applied pedagogical approaches and methods have to correspond to the modern level of information technologies and digital education development, characterized by qualitative changes in the technologies that process and transfer data and widely use the intellectual decision making systems. It states the results obtained in the practical implementation of the offered theoretical and methodological approaches to the process of health professionals' information competence formation. This results in the developed complex of methodological approaches to teaching information technologies at the general scientific, specific scientific and method and technological levels enabling the formation of health professionals' information competence. The article can be useful for teachers of the institutions involved in professionals' continuing education.

Keywords: Information Competence, Continuing Professional Education, Methodological Approaches, Health Professionals.

Introduction

Issue Urgency

Healthcare is currently one of the most significant and highly technological areas of human activity. It is stringent that specialists in any healthcare area (therapeutic, diagnostic, organizational, preventive and scientific) use information technologies in their activity.

Due to pressing social, economic and technological changes that occur at this time, health professionals are expected to constantly increase their level of information competence. The competence is a complex structure that unites learning criteria, psychological makers of the personality, potential capabilities, motivation, system of values, responsibility, and anticipation of action outcomes manifested when using digital technologies to solve practical tasks to provide population with medical aid, preserve and improve its quality of life.

Aggressive dynamics of environmental processes and phenomena, infomedia increased density, constant information update, and use of highly technological diagnostic and therapeutic equipment make continuous education in information technologies acquire particular importance for health professionals.

Scientific solution of any issue requires a distinct methodological regulation which is an important attribute of any conception determining its type, nature, the system of principles and methods of organization and building theoretical and practical activity. That is why developing a set of methodological approaches at the general scientific, specific scientific and methodology and technology levels of studying the way the information competence of health professionals is formed belongs to the pressing issues.

The current situation in the sphere of continuous professional education of health professionals

According to the Russian Ministry of Public Health Order 'On approval of the procedure and time for enhancing the professional knowledge and skills of healthcare providers and pharmacists using additional professional educational programs in educational and scientific institutions', it is the employer who determines whether professional retraining and pupillage is necessary after graduation of the university. However, they must be carried out at least once every 5 years during the entire labor activity.

The use of modern information technologies is one of the issues considered within the frames of the state additional professional training of doctors. The attendees belong to highly qualified professionals who use modern digital diagnostic and therapeutic equipment and software needed for proper functioning of medical institutions on a daily basis.

Peculiarities Of Teaching Information Technologies In The Courses Of Additional Professional Education Of Health Professionals

The educated health professionals represent various medical institutions that differ by a territorial attribute and department participation, size, equipment and specialization. A number of hours when informational support is studied is low. In a modern world, a competent specialist and a director must foresee how the situation can be developed, be aware that specific information must be obtained, know how to get the needed information selecting a proper source, be able to analyze, synthesize, use, transfer data using modern means of telecommunications and build it in its activity, and use it to solve practical and research tasks (Ovsyanitskaya L.Y., Yurasova E.V. (2015).

That is why it is necessary not only to cover the novelties of health maintenance hardware and software, changes in the legislation related to the informational support of medicine, features of automatized process of personal and confidential information but also to show the vector of medical informatics development.

Status of a problem

Health professionals are highly qualified people with a good professional and social status. They are capable of studying and are highly motivated to education: they study and participate in meetings, consultations and conferences on a daily basis. That is why they treat the process of education not as a new activity but as a continuing regular professional activity.

The educated health professionals represent various medical institutions from village hospitals to large federal centers. Thus, specific theoretical and methodological approaches to teach courses related to the use of informational technologies in medicine must be developed. The approaches should take into account the specific features related to the organizational, professional and psychological features of all health professionals who attend the courses.

Knowles (1984), Zmeev (2007), Chychuk, V. (2015) and others describe the features of methodological approaches that have to be used when working with adults. Sharlene Hesse-Biber (2015), Melanie Nind & Sarah Lewthwaite (2018), Clark, J., K.Laing, D.Leat,R,. Lofthouse, U. Thomas, L.Tiplady, and P. Woolner (2017), Knewstubb, B., and H. Nicholas (2017), Nilsa A. Bosque-Pérez P. Zion Klos Jo Ellen Force Lisette P. Waits Kate ClearyPaul Rhoades Sara M. Galbraith Amanda L. Bentley BrymerMichael O'Rourke Sanford D. Eigenbrode, Bryan Finegan J.D. Wulfhors tNicole Sibelet Joseph D. Holbrook (2016) discuss complex methodologies of teaching interdisciplinary disciplines at universities. Blumental & Glaser (2007), Masic, Pandza, Toromanovic (2011) reviewed the issue of teaching informational technologies to health professionals. Cartelli (2012), Ovsyanitskaya (2019) presented the results of modern technologies studies in digital literacy and medical competence.

Study Hypothesis

The authors solved the following tasks during the study: 1) select experimental and control groups of health professionals; 2) teach the experimental groups using the offered theoretical and methodological approaches; teach the control group using traditional methods; 3) compare the levels of information competence of health professionals in the experimental and control groups; 4) analyze the experimental results, estimate the effectiveness of health professionals' information competence formation.

Methodological Framework

Study Objectives

It is necessary to develop and implement the methodology of teaching the modules related to the usage of information technologies in medicine to form information competence of health professionals that will consider the age, module specificity and high educational level of doctors.

Theoretical and Empirical Methods

The authors used a complex of various complementary methods to check the hypothesis. These included theoretical (analysis of literature, regulatory, legislative, guidance, working documents and materials related to the study object; study and generalization of innovation pedagogical experience, analysis, and synthesis) and empirical methods (participant observation, summative and formative pedagogical assessment, questioning, testing, interview, conversation pieces and methods of mathematical statistics).

The authors used the authentic assessment to estimate how the material was studied. The assessment is used in practice-oriented education and estimates knowledge and practical skills of those who study in a classroom under the conditions that were close to the real life, both daily and professional.

Study Base

The Ural State Medical Academy of Additional Education and therapeutic institutions of Ekaterinburg, Zlatoust, Kurgan, Chelyabinsk, Magnitogorsk, Miass, Orenburg, Orsk, Tyumen formed the study base.

Stages of the study

The study had three stages.

During the first stage, the authors examined the specific features that have to be considered when teaching informational technologies in medicine and stated pedagogical conditions needed for successful achievement of the purpose.

The investigators developed the suggested theoretical and methodological approaches to health professionals' information competence and implemented them into the real pedagogical practice at the second stage.

The third stage generalized the results of the pedagogical experiment to produce information competence in health professionals using the traditional and suggested method and considering implementation of all substantiated pedagogical conditions.

Assessment Criteria

The authors assessed whether the education was effective based on the results obtained by health professionals when solving case problems that approached the real professional activity to the greatest possible extent. Tests reflecting various aspects of information competence were offered as well. The authors processed the results with the methods of mathematical statistics.

The course and description of the study

2.5.1. Uniar approach as the general scientific basis of research

By choosing the methodology that will be the general scientific basis of our study, the authors first and foremost examined the connection between informatics and medicine.
Medicine and informatics are sundered like the poles. They developed independently for thousands and decades of years, respectively. In the middle of the 20th century the sciences came into contact as

electronic means of data processing appeared. Joint developments occurred. However, there was no integration of these sciences.

Analysis of interrelation between medicine and informatics within the last decades showed that it is neither integrative (mutual penetration or union of any elements) nor transdisciplinary (joint trial or studying of either one subject, object, environment, or transfer of the study methods of one science to study another science in order to obtain the result). When informatics and medicine interact, one science helps the other one to reach a high qualitative level without interfering into the science that develops in parallel. A need in the development of subsequent technologies can initiate their development.

The authors introduced the term 'uniar' (unio (lat.) means union) denoting the principle of development for parallel sciences by joint solution of the occurring needs (Ovsyanitskaya, 2013). It results in the occurrence of qualitatively new technologies in every interacting science. Considering the uniar interaction between medicine and informatics and taking education as continuing professional activity of health professionals, the authors presumed that the approach to interaction between the teacher and healthcare professional must be uniar as well.

A uniar approach is a methodological approach that enables the interacting subjects of the pedagogical process to solve the occurring tasks. The main notion mentioned in the educational process when using the uniar approach is uniar interaction (communication between a teacher and a student aimed at the joint solving of occurring professional issues).

The basic method of educational process construction based on the uniar approach is the dialogue method. That is how the discussed issues became diversified and pressing. Moyles, J., S. Adams, and A. Musgrove (2002), Nind, M., D. Kilburn, and R. Wiles (2015) and Powell, E. (2005) discussed how to include the dialogue into the educational process.

Currently the situation changes so fast that to follow the points above, a teacher needs continuous knowledge of various aspects associated with the application of informational technologies in medicine. Health professionals attending the courses of post-graduation and continuous education for doctors form the only available source of reliable, pressing, diversified and adequate data.

Uniar interaction is a management process with an obligatory feedback. A teacher's task is to develop the educational process so that the data obtained during discussions or when doing home tasks associated with healthcare issues for their companies and institutions, public solution of cases could become the correcting module that makes a lesson pressing, useful and highly professional.

This approach is based on the elements of mutually profitable and interesting dialogue. It creates a climate of partnership in class enabling health professionals to improve their qualification in the sphere of information technologies and letting teachers be aware of the current needs of medicine in information technologies as well as modify and adapt the lesson for other groups.

2.5.2 Systemic and synergetic approach as the specific scientific basis of research

The specific and scientific methodology of our study includes the systemic and synergetic approach. The approach is a set of principles that determine the purpose and strategy of complex issue solution. This method takes an object (that has a problem) as a system, decomposes a complex problem into elements, and retains the elements as a whole. First, the synergetics appeared in studies of natural science. Then as the principles that manage the self-organization processes don't depend on the nature of the systems, the synergetics turned into a multidisciplinary approach within the frameworks of modern world view philosophical concepts. The system can never be taken separately from the environment which is also a complex system, in its turn. In synergetics, an emphasis is made on the conformity of interaction of elements when a single unity is formed (Bronwyn Hall, Kirsten Howard (2008).

According to the studies, the pedagogical system of continuing education of doctors is a functionally managed dynamic direct-feedback structure consisting of a set of subjects of the pedagogical process (teacher, health professionals and employees engaged in the organizational and methodological activity), contents, methods, forms, material resources and means of the pedagogical process. It was created to approve regular education of health professionals by statute.

To properly apply the methodology of synergetics when building health professionals information competence, the system of continuing education of doctors must correspond to the required criteria and represent an open, self-organizing and non-linear system.

An open system is a system that exchanges data, substance or energy with the environment. Continuing education of health professionals means that there is a constant exchange of data and knowledge between teachers, practitioners at the medical institutions where some classes are held, and attendees. When a conversation is managed based on the principles of synergetics, the obtained inconsistent data (facts, ideas, proposals bon during a conversation, personal and professional experience) can be turned into qualitative knowledge that can be implemented by attendees after the course.

Self-organization is a process or processes inside the system that enable its optimal functioning, self-restoration and self-change. It is typical of andragogical systems. Self-organization arises when there is an interaction between an accident and necessity. It is associated with the transition from instability to stability. Initially all attendees have different levels of theoretical and practical training in the sphere of informational technologies and a recognized necessity in generating a high level of information competence. Implementation of attendees' individual educational paths, change in the rate of group education if needed and use of individual means and methods.

Non-linear values are as follows: availability of alternative ways of development and possibility of their selection; ability to influence the rate of process development; irreversibility of the process after selection of a variant. The educational process is mostly optimized at the stage of its planning and design. However, a more freely format and lack of strict reference to training subject matter (as compared to secondary and higher education) allows a teacher to deviate from the selected plan and get an optimal decision considering the purpose set and pedagogical possibilities available. That is why professional training of a teacher (specializing in adragogy), intuition and additional lectures, multilevel study guides and control activities promote a reasonable change in the method, form and content of the lesson depending on the current need and initial training of attendees.

Optimization of the educational process means to study the required theoretical basis, solve pressing issues associated with the implementation of information technologies and getting practical skills needed for this group of attendees within a restricted interval.

Accidental replies and queries of attendees that arise during a conversation often seem important and interesting to everyone.

Adequate management of the educational process will lead to new knowledge and skills that could not be anticipated before.

Thus, use of the systemic and synergetic approach as a general scientific basis of the study enabled us to study the process of formation of health professionals' information competence by decomposing the systems, analyzing possible subsystems, their interrelation considering peculiar features attributable to the educational process of adult highly qualified people. Meanwhile, the basic attention was given to subsystems and their interrelation as parts of the whole i.e. the process of generating the information competence.

2.5.3. Cybernetic approach as the methodological and technological study basis of research

The cybernetic approach in our study forms its methodological and technological basis. As the system theory was cybernetic-based, the described methodological principles mostly reflect the cybernetic requirements. With the development of digital education, this approach acquires high prevalence (Ben Williamson (2015))

In cybernetic terms, the described system of advanced training as a whole is called 'a big system' i.e. it can be represented by a set of subsystems with constantly decreasing complexity. Cybernetic pedagogics treats the educational process from the point of view of management theory and on the basis of the systemic approach. Indeed, the educational process can be taken as a management process that has the managing (teacher) and managed (attendee) parties.

Considering the specific features of health professionals' continuing education environment, educational optimization is an algorithm of the teacher's actions related to the substantiation, implementation and control of qualitative educational decisions under specific conditions, and in the least necessary losses of time and efforts by attendees and teachers. A conscious need in motivated, responsible professionals with the system of values and capable of predicting their results when using digital equipment and technologies to provide for medical care of population can be considered as the basic control response.

Considering the formulated principles of cybernetics as related to the didactic systems (Mayer, 2013) we adapted the cybernetic sequence of management to the formation of information competence of health professionals.

First and foremost, the authors analyze the pedagogical system based on the systemic and synergetic approach. The target, component, comprehensive, deductive, subjective, and effective subsystems are selected and analyzed; their relations are assessed. Then the authors examine the management object (health professionals' activity), i.e. its basic knowledge, skills, experience, personality traits of the attendees associated with the age and digital equipment operation experience using the specialized initial testing or conversation. This is how gaps and achievements in the analyzed values were found.
Business Intelligence in MS Excel is an instrument analyzing the data of pedagogical monitoring. The use of data intellectual analysis provides for a multi-level processing of pedagogical monitoring data, reveals factors influencing the result and corrects the subsequent work of the educational institution i.e. produces pedagogical management.

Вырабатываем и реализовываем оптимальную стратегию (программу) управления:

Formalized visualized data promote scientific planning of not an abstract but a specific lesson for certain people anticipating possible difficulties in mastering the educational material or no need to study a topic in detail. The optimal strategy (program) of management is developed and implemented:

- a fixed program if a lesson is given according to a pre-defined plan with insignificant regulation;
- a flexible program which is adjusted to the changing conditions preserving the system targeting and expedience.

Joint use of cybernetic and systemic and synergetic approaches enable to achieve as follows: the cybernetic approach studies the interrelation between a subject and an object of management following the direct-feedback channels and enables to define the ways of influencing the objects. Meanwhile, synergetics examines the reasons for the system properties.

Results

Pedagogical conditions that promote the optimal achievement of the set objective

When conducting theoretical studies and pedagogical research, the authors set the pedagogical conditions that enabled to practically implement the theoretical approaches suggested above for every level. The list of pedagogical conditions that promote successful achievement of the set purpose, i.e. health professionals' information competence formation to the greatest extent, is as follows:

- to use the means and methods of education adapted to the andragogical environment;
- to organize lessons based on the principles of synergetics and uniar interrelation between a teacher and health professionals where their professional problems and requirements are discussed;
- to assign some material for self-learning;
- to look through some regulations covering how to treat the data;
- to use active methods of education (case-technologies, business games, context education);
- to use intellectual methods of data mining to reveal hidden regularities and generate recommendations on the introduction of dynamic corrections into the self-guided work, development of individual educational paths for health professionals based on the obtained recommendations.

The course and results of the experiment

The authors performed an experimental work that enabled mathematical substantiation of the revealed tendencies and checking the effectiveness of the integrity of the offered pedagogical methods to generate the information competence of health professionals within the framework of continuing professional education to confirm the effectiveness of the developed approaches.

The stated objective determined the type of the basic tasks solved during the exploratory work:

- to determine the level of health professionals' information competence before training and if the traditional method is used;
- to develop the programs that diagnose the formation of health professionals' information competence within the framework of continuous professional education considering the specifics of medicine;
- to select and argue representativeness of the sample and statistical criteria that evaluate the working results;
- to evaluate the significance and tendency of changes during training;
- to find the most significant factors influencing the process of health professionals' information competence formation.

Health professionals conditionally divided into two groups (control group (CG-172 people)) and experimental group (EG-177 people) participated in the experimental work.

At the first stage, a test was used to find the initial level of health professionals' information competence. Comparison of its levels showed that health professionals from the both groups had a similar level of information competence development.

The number of health professionals with a low level of information competence was 35.47% in the CG and 25.99% in the EG; mid-level – 64.53% in the CG and 74.01% in the EG; and there was no high level.

The obtained results showed that competence of health professionals in informational technologies was problematic. The conducted statistical estimation confirmed the significance of the obtained results and homogeneity of the initial experimental conditions.

The authors obtained the following results after health professionals completed the courses. The CG used traditional methods whereas the EG implemented the approaches described above. After the

training was completed, a number of health professionals with the mid-level of informational competency was 90.12% in the CG and 7.91% in the EG; high level – 9.88% in the CG and 92.09% in the EG; and there was no low level. Fig. 1 displays the results before and after the experiment.

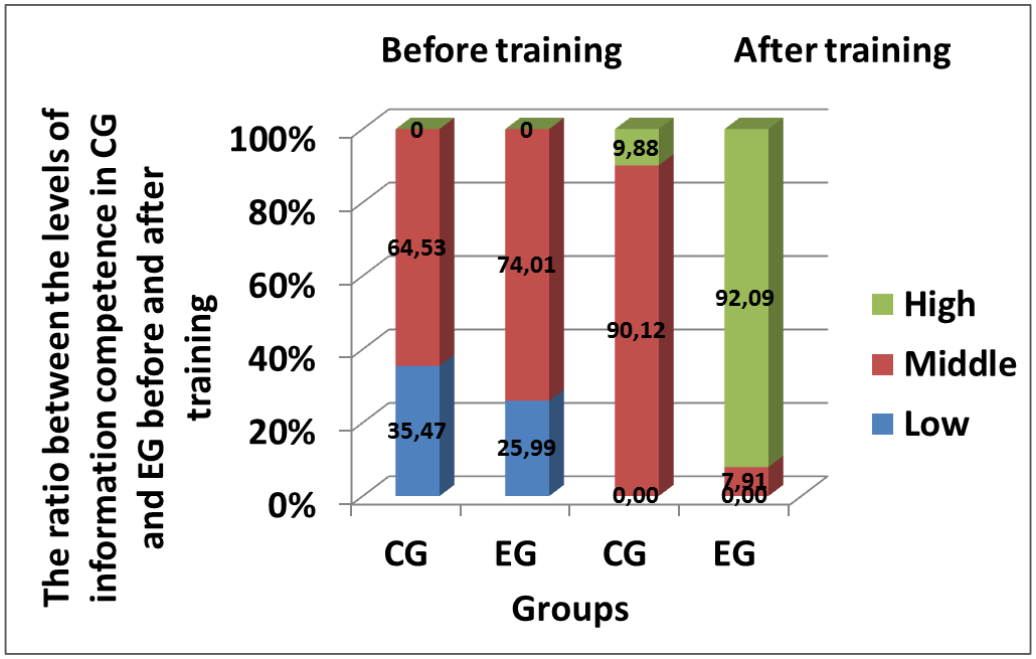

Fig. 1: The ratio between the levels of information competence in the CG and EG before and after the experiment

The results of tests, questionnaire, observation and conclusion based on the results of discussion by health professionals of the tasks that display a real situation associated with the use of information technologies to provide medical assistance to people were the primary entry data sources.

The experimental results show that implementation of the described theoretical approaches into the pedagogical practice was effective and confirm the rationale.

Discussions

Currently occurring social, economic and technological changes were the main conditions of formation of health professionals' information competence. High level of education and specific activity of doctors require specific methodological approaches to the building of the pedagogical process.

The experiment compared the level of formation between the two groups of health professionals. The study showed a significant growth of the controlled parameters in the experimental group as compared to the control group educated using the traditional method.

Conclusion

The integration of the uniar approach as the general scientific basis, systemic and synergetic approach as the specific and scientific basis and cybernetic approach as the methodical and technological basis for the method of health professionals' information competence formation suggested in the article enables to form the process of continuing education for health professionals in the sphere of informational technologies considering modern pedagogical requirements and trends of society development.

Recommendations

The testing results described in the article will be useful for teachers of medical universities and institutions involved in continuing education of health professionals.

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Let Seperate Your Food Before You Eat! : Using Normative Prompt To Reduce Food Waste Behaviour Among Lecturers

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Abstract

Food waste issue has become the focus of global attention including Indonesia. An impactful intervention need to start at University scope. This quasi-experimental study aims to reduce food waste among university lecturers. We used descriptive and injunctive norms together in prompt. Based on the behavioral change literature, it was hypothesized that normative prompt encourage consumer to reduce food waste compared to groups that are not given a normative prompt. As expected, normative prompt reduce food waste behavior among lecturers in intervention group. However, there was no significant difference of food waste statistically between intervention and control group. This study also contribute as a reuse way in food waste management hierarchy. Further limitations and implications are discussed.

Keywords: Behavioral change (intervention), Food waste, Prompt, Social Norm.

Introduction

Food waste issue has become the focus of global attention including Indonesia. Referring to the Food Sustainability Index data, Indonesia is the second largest contributor to food waste in the world (Economic Intelligence Unit, 2018). Every single person in Indonesia is predicted to produce food waste at least 300 kilograms each year. The phenomenon of food waste accumulation also causes various disadvantages in economic, social and environmental aspects (FAO, 2011). Given that humans still need food for life, food waste will not be zero. However, food waste can be prevented through interventions that can be started from small and routine activities such as at the university level.

Universitas Indonesia as a green campus in Indonesia (http://greenmetric.ui.ac.id/, 2019) is also important to pay attention to the food waste issue. As one of the UI Green Metric assessments, organic waste must be managed properly. Campus residents who daily carry out activities and produce waste can also play a role in this issue, including lecturers. Lecturers as part of the academic community have an important role in implementing sustainable development in the context of the university (Lozano et al., 2013). In addition, lecturers always having routine activity like training. By starting to intervene lecturers, we assume it can be a policy or movement.

Previous studies related to food waste behaviour found the external and internal factors that influence it. Russell et al (2017) found that negative emotions and habit became important predictors of the food waste behaviour. Other internal factors such as motivation (Neff, Spiker, & Truant, 2015; Schmidt, 2016), ideology (Narvanen, et al, 2018), perceptions and beliefs (Rowe et al., 2015; Painter et al., 2016; Whitehair et al., 2013) also correlated with the food waste behaviour. While the external factors found correlate with the food waste behaviour such as positive affections from the family (Porpino et al., 2016), cultural factors (Bozzola, Palu & Giorgi, 2017), food conditions (Iftitah, Sari, & Waryana , 2017; Kariyasa & Suryana, 2016; Nuraini, 2016) and social norms (Dorn & Stockli,

2018; Schmidt, 2016; Templeton, Stanton, & Zaki, 2016; Young et al., 2017). Based on these factors, we predict that the presence of social norms is the strongest factor in the food waste behaviour.

Some psychological interventions have been carried out by academics and practitioners, such as the use of social media (Gupta, 2016; Young, Russell, Robinson, & Barkemeyer, 2017), using nudge (Kallbekken & Saelen, 2013; Duursma, Vrenegoor & Kobus, 2016; Jagau & Vyrastekova, 2017), prompting (Chen & Jai, 2018; Stockli, Dorn, & Liecthi, 2018; Dorn & Stockli, 2018) and so on. However, the intervention technique by using prompt was assessed to have the greatest effect size among other intervention techniques to reduce food waste behavior (Stöckli, et al, 2018). Therefore, we hypothesize that using prompt of social norms (normative prompt) can reduce significanly the food waste behaviour.

Literature Review

Food Waste Behavior

Some previous literature has determined the definition of food waste behaviour itself. Aschemann-Witzel, et al (2015) defines the food waste behaviour closely related to behavior that is not responsible for the environment, the economy and the social consequences of food sustainability in the world. Furthermore, Qi and Roe (2017) explained that the behavior of food waste arises because of a cost margin formula that is expected. Expectations of these cost margins are combined from personal costs for food, internalizing the social costs of removing food and internalizing environmental costs from disposing of food. So the more food is thrown away, the more the individual will expect personal, social and environmental cost margins.

Social Norms

Cialdini and Goldstein (2004) emphasize that social norms are individual guidelines for behaving in a particular place or context. Cialdini and Goldstein (2004) mention social norms that are often commonly known, namely descriptive norms and injunctive norms. Descriptive norms are the norm that actually occurs in the majority of individuals in a community. Whereas the injunctive norm is the norm that should be carried out by the majority of individuals in the community. Activation of social norms can be effective when not only express descriptive norms but also contain injunctive norms (Nolan et al., 2008).

Normative Prompt

Prompts can be in the form of verbal or written messages delivered in a certain place that shows the targeted behavior. This message can be a reminder of the cause of the targeted behavior. Steg, Keizer, Buunk, and Rothengatter (2017) identify that prompt s the most effective strategy. Meanwhile, prompts are also popularly used because they are easy to implement, relatively low manufacturing costs, and can be considered the impact if applied correctly on a broader scale. Russell et al (2017) suggested that using prompt as a short-term intervention was able to prevent food waste behaviour. One study shows that giving prompt can reduce food waste behavior by 15% with simple printed words "All taste no waste - Eat what you don't and don't waste food" (Whitehair et al., 2013). The prompt technique in this study uses the main content that is communicating social norms. This technique refers to the intervention technique that has been carried out by Stockli, et al (2018).

Reseacrh Method

Sample, Design, and Procedure

Participants of this study were 35 lecturers from all faculty has attended the lecturer training in Universitas Indonesia training center. This training held for lecturer to raise their academic

competences. So there was no any related issue between training material and data collection for this study. This study employed a pre-test post-test between subject group design with one intervention (control group and intervention group). Data was collected only on weekdays (monday-Thursday). Conditions were counterbalanced across weekdays. All food menu between control and intervention group were controlled. To controll leftovers data from both group, we serve two basket bins in front of training room. During data collection, experimenters were present as covert observer. Then, after intervention has finished, we give all participants in both group a manipulation check, debriefing and souvenirs. Finally, only 33 participants has eligible for sociodemograpic data in intervention group (51,5% men, 57,6% master graduates, M_{age} = 33,24 years, SD_{age} = 7,332 years).

Intervention Material And Measurement

Normative prompt were placed only in intervention group. The message were in Bahasa Indonesia and were displayed on dining tables in front of training room. Prompt were made from acrilyc table tag landscape A4. Intervention group were added mini food bank. Mini food bank were made from container box with size 35,5 x 23,5 x 12 cm. Mini food bank were placed as one of option to reduce food waste behavior and as real action to create injunctive norms. Prompt contains two types of social norms (descriptive and injunctive norms). This is based on findings that combining two types of social norms is more effective than only invoking one norms type (e.g., Schultz et al., 2007). We also used gain message framing in descriptive norms (30% lecturers has joined to reduce food waste).

On the day of intervention, we collected food waste from everyday training collectively. Collective food waste were recorded by portable digital scale**.** This was decided because we felt difficulty to separate leftovers from each participants. This food waste measurment also based on findings that actual weighing can give us clear measurement of food waste behavior. Pre-test score recorded every Monday, and post-test recorded every Tuesday until Thursday on both group. Only morning snacking and lunch were not finished qualified as leftovers. Cleaning service attendant were instructed to ask for participants to throw away their leftovers in basket bins only in front of training room. This very useful for us to control participants leftovers during training.

Figure 1: Normative prompt and mini food bank design

Findings and Discussion

Findings

We tested the post-test data in both groups. By using the Mann Whitney test, it is known that p value is 0.275 (p> 0.05). The critical limit of this study was 0.05 or 95% confidence level. Then it can be concluded that there was no significant difference in food waste from the intervention group when compared to the control group.

Table 1: Statistical results of the Mann Whitney Test

	Food Waste
Mann-Whitney U	2,000
Z	-1,091
Asymp. Sig.	0,275

However, there was a decrease in the amount of food waste in the intervention group when compared to the control group. As is known that the first day intervention began on Tuesday and the food menu in the two groups was the same. So that the comparison of the weight of food waste is analyzed based on the day. In addition, the biggest difference in the amount of weight of food waste occurred on Thursday. Overall, it was found that food waste was lower in the intervention group compared to the control group of 3.69 kilograms or around 11.56%.

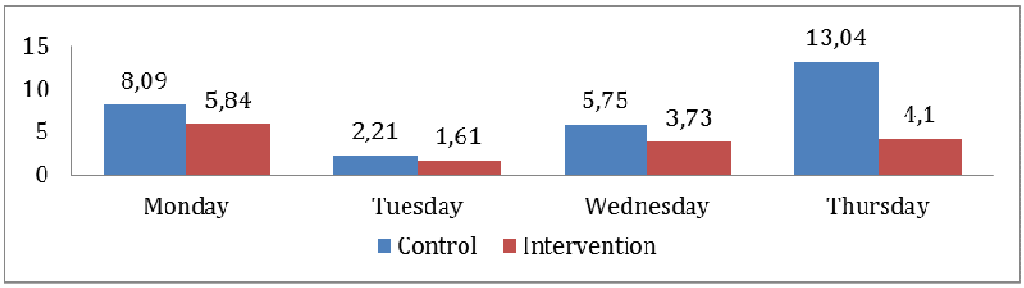

Figure 2: Percentage of food waste weight (kilograms)

Discussion

There are several theoretical implications that can be reported. First, the diction of "new 30% UI lecturers who try to reduce food waste" apparently supports the concept of approach-oriented gain message framing. That is able to encourage changes in individual behavior desired by the designer of the intervention (Shen & Dillard, 2009). Second, the combination of descriptive norms and injective norms at prompt has been able to increase the activation of social norms to reduce food waste behavior (Schultz et al, 2007; Stockli et al, 2018). Third, the normative diction used in the prompt confirms previous findings by Schultz, et al (2007) which states that norms are capable of being constructive in influencing a behavior.

The practical implications of this intervention study are also important to report. First, normative prompt use can be replicated in routine activities that have the potential to cause food waste. Second, the use of mini food banks as environmentally friendly containers also supports the zero-waste movement. Third, this intervention study also has implications for reuse stage food waste management (FAO, 2011). Fourth, the results of this intervention can also be extrapolated into a larger scope. In estimating extrapolation of UI lecturer training activities carried out around 15 times a year, normative prompt interventions and mini food banks can reduce food waste at least 73.5 kilograms and save at least 151.2 kilograms of whole food. Last, this study also has a domino effect, namely alleviating environmental issues and promoting food security. The food at a mini food bank was given directly to the janitors.

One important note in this study is the lack of statistical power. Based on statistical analysis using G*Power (Faul et al., 2007), it is known that there are only 6 data points which only produce an

effect size of 0.45 with power 0.11. Whereas previously we predicted this intervention study would produce an effect size of 0.80 with power 0.95. So that it can be concluded that the intervention study lost power of 0.80. When referring to the post-hoc G*Power statistical analysis that further research must be carried out at a site that is able to produce 37 data points in each group or around 74 data points to produce an effect size of 0.80 with power 0.95. Other choices in measurement can refer to previous research (Osbaldiston & Schott, 2012 ; Sebbane & Costa, 2018).

Conclusion

In implementing the intervention it is known that the normative prompt is able to reduce the behavior of food waste to the lecturer. This claim is supported by the results of the collective weighing of food waste which decreased to 11.56% in the intervention group. When compared to the control group, the addition of mini food banks in the intervention group was also able to save whole foods up to 7.63 kilograms. However, the statistical analysis using the Mann Whitney t-test showed that there were no significant differences between the two groups ($p > 0.05$). In other words, the hypothesis in this intervention study was not accepted or rejected.

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Modern Managers and Cultural Diversity in The Workplace

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Abstract

At present the area of studies devoted to modern managers is highly topical and particularly important in the context of their work with the culturally diverse workforce. The attitudes, qualities, and skills of managers working with multicultural teams have an impact on the style and way of employee management, employees' behaviour and cooperation in a team, their motivation, the quality of their performance, atmosphere at a workplace, and achieving organizational goals. The aim of the article, based on the analysis of the subject literature and the results of secondary research, is to determine the desirable characteristics of managers operating in culturally diverse work environment. The authors of the article focus on cultural differences stemming from employees' different nationalities.

Keywords: Managers, Managers' Qualities and Skills, Cultural Diversity, Multicultural Work Environment

Introduction

Managers - especially those who work in culturally diverse environment - play a vital role in modern management and the achievement of organizational goals. The challenges they face and responsibilities they shoulder result from the need to reconcile different ways in which employees from various – sometimes poles apart – cultures think and behave.

Modern managers working in multicultural environment and managing culturally diverse teams should be equipped with appropriate and up-to-date knowledge, relevant attitudes, qualities, skills and predispositions, which allow them to effectively operate in intercultural work environment, and should possess relevant experience which enables them to perform their managerial functions and roles in this environment.

In order to manage culturally diverse teams that work both in one location and in different geographical locations, managers need to be open-minded, flexible, culturally sensitive, and able to adapt quickly to diverse cultural backgrounds, so that they can positively motivate employees to take up new challenges and implement changes or innovative solutions together with other team members.

In the theoretical part the authors indicate which managerial qualities and skills are, in their opinion, particularly valuable in intercultural work environment and describe the managers' role in managing culturally diverse teams. The limitation of the article, of which the authors are fully aware, lies in a lack of their own empirical study investigating the issues discussed. Hence, the article is based on the analysis of secondary data and refers to the results of studies conducted by other researchers who reported their findings from the area investigated in this article.

Bearing in mind the above premises and the aim of the article, the following research question was formulated: What attitudes, qualities, and skills are particularly important for managers working in culturally diverse environment?

The Qualities and Skills Necessary for Managers Working with Intercultural Teams

Cultural diversity has been defined as "the representation, in one social system, of people with distinctly different group affiliations of cultural significance" (Cox, 1993). The authors of the article focus on cultural diversity of employees in terms of their nationality, which still poses a considerable challenge for many managers of multicultural teams.

The most important factor conductive to the achievement of the organizational goals is effective management (Mehri and Ramezan, 2016). The authors are convinced that the managers' attitudes, qualities, and skills greatly influence the efficiency of employee management in culturally diverse work environment.

As mentioned above, crucial challenges faced by managers working in culturally diverse environment are those which stem from employees' nationalities. Cultural differences in the context of national cultures were extensively studied by Geert Hofstede, his son, Gert Jan Hofstede, and Michael Minkow (2010).

Hofstede defined national culture as the collective programming of the mind that results from growing up in a particular country (Hofstede, 2007). His team described cultural differences in several dimensions: Power Distance Index (PDI)1, Individualism versus Collectivism (IDV)2, Masculinity versus Femininity (MAS)3, Uncertainty Avoidance Index (UAI)4, and Long Term Orientation versus Short Term Orientation (LTO)5, (Hofstede 2001; Hofstede, Hofstede, Minkow 2010). The next step in analysing cultural differences was made by Fons Trompenaars and Charles Hampden-Turner, who distinguished seven dimensions: universalism versus particularism, individualism versus communitarianism, specific versus diffuse, neutral versus emotional, achievement versus ascription, sequential time versus synchronous time, and internal direction versus outer direction (Trompenaars and Hampden-Turner 1998).

Although the subject literature discusses also other cultural dimensions that allow for the differentiation of national cultures, the four basic ones defined by G. Hofstede (PDI, IND, UAI, MAS) are sufficient to determine general cultural patterns which can be expected in given culture. In the context of the issues analysed in the article, this also refers to managers' attitudes, behaviours or values.

Managers working in culturally diverse environment should possess knowledge about different dimensions of culture and be familiar with their characteristics and implications for effective management in such environment. This knowledge, in the authors' opinion, is essential to understand and accept cultural diversity of members of multicultural teams.

Managers working with employees of different nationalities should be familiar with and take into account differences in their cultural and social background, as well as communication barriers and difficulties resulting from their cultural diversity. Therefore, they should be open, tolerant and able to quickly and flexibly adapt to different cultural realities. They should also be empathetic and sensitive, and, at the same time, possess strong personality and charisma to face challenges of working in multicultural environment.

International organizations employ people from all over the world. Such human diversity offers managers an opportunity to exploit employees' varied skills, knowledge and experience (Namiq 2018), thus they should know the members of their teams well in order to be able to fully capitalise on their potential.

An important aspect of managers' work in intercultural environment is their ability to identify values that are particularly important for employees from different cultures (Matić 2008). The employees' diverse value systems can influence the functioning of an organization in many ways, affecting e.g. the area of conflict management, change implementation, adaptation to the dynamically changing market, communication in teams, or engagement in the achievement of organizational goals.

It is worth noticing that modern employee management requires managers to be able to assure employees of their great value for the organization. Neglecting proper management in this area may cause various problems in the effective function of a team (Hasim and Hameed, 2012), particularly difficult to solve in face of cultural diversity of its members.

Managers working with multicultural teams should be familiar with and take into consideration the findings of scientific studies and analyses. "Hofstede (2001) and others (Ronen and Shenkar 1985; House, Hanges, Javidan, Dorfman and Gupta 2004) have found that different cultures reflect different values. Recently, researchers (Lenartowicz and Johnson 2002; Leung, Bhagat, Buchan, Erez and Gibson 2005, p. 368) have argued that, rather than determining whether or not culture makes a difference, we need to address ... how and when it makes a difference" (Hoffman, Frank, et.al, 2011, p. 1).

Modern managers who work in intercultural environment should also possess such qualities as: a high level of motivation, the ability to continuously broaden and update their knowledge, especially in the context of different cultures and markets, openness to change, the ability to overcome the employees' resistance in difficult situations, the ability to convince employees to implement innovative solutions, and the willingness to unceasingly search for new areas of their professional activity.

The manager should also be a well-educated, cultured person with impeccable manners and excellent communication skills, should act ethically at work and in relations with people, be highly motivated and ambitious, and be able to adapt to a whole range of situations and people (Petkovski 2012). Such qualities and skills are extremely advantageous in managing culturally diverse teams.

Other essential qualities of modern managers working with intercultural teams include their self-confidence, being success-oriented, assertiveness, resistance to stress, persistence, decisiveness, intelligence and courage. As far as highly desired skills of such managers are concerned, the ones worth mentioning embrace creativity, innovation, tact, diplomatic skills, and the ability to make quick decisions, all of which are particularly beneficial in managing culturally diverse teams.

"Along with roles and skills, a third means by which to understand managerial activities is that of mindsets. According to Gosling and Mintzberg (2003), managers have five mindsets or perspectives each linked to a key management task and applied in an integrated manner (a) managing self: the reflective mindset, (b) managing organization: the analytic mindset, (c) managing context: the worldly mindset, (d) managing relationships: the collaborative mindset, and (e) managing change: the action mindset" (Laud, Arevalo, et al., 2015, p. 7). Therefore, it should be noticed that in culturally diverse environment it is not only the managers' attitudes, qualities, and skills that matter but also their way of thinking about, for example, the working style of people from diverse cultures, the ways in which they communicate, express emotions, understand and solve problems, approach changes, or build interpersonal relations.

Managers who work in intercultural environment should be characterized by relevant interpersonal skills, extraversion, creativity, leadership, adaptive skills, awareness, and sensitivity, especially cultural sensitivity (Tewari and Sharma, 2011).

The authors of the article want to emphasize that, in their opinion, cultural awareness and sensitivity as well as the level of cultural intelligence of managers working in culturally diverse environment are also very important.

Summing up, modern managers' efficiency to a great extent depends on their qualities and skills. Therefore, it is crucial to recruit and train such managers whose skills make them effective in managing people and positively influence the development of an organization (Mehri and Ramezan, 2016).

Managers and cultural diversity in work environment

Contemporary organizations and their managers face a number of challenges. These include, first of all, globalisation, increasing competition, technological change, new organizational structures, changes in working styles and methods (Nasir 2017) and require effective employee management, especially in culturally diverse work environment.

Employee management in culturally diverse environment is not easy because the diverse workforce consists of individuals belonging to unique cultures who will have different characteristics, aspirations, and expectations (Cennamo and Gardner, 2008). Moreover, employees from different backgrounds have different needs and feel the urge to be respected in their workplace. Management needs to understand the need of these diverse groups of people so as to avoid employee tensions and conflicts (Hill, Stephens, et al., 2003).

The development of international businesses has resulted in a situation in which employee management in multicultural environment requires managers who are able to make right decisions quickly, to learn how to use new technologies, to communicate with their teams effectively, and to coordinate their performance and task realization (Dike, Odiwe, et al., 2015).

"21st century approach of HRM is to utilize the knowledge and expertise of people efficiently and effectively to meet organizational targets" (Wong and Snell, 2003, p. 217). Managers who possess the qualities and skills necessary to manage culturally diverse teams can effectively use the knowledge and experience of employees from different countries to achieve the organizational goals on the global market.

Contemporary organizations "require not only the management of production sources in the traditional sense but also, due to the employment of people from different cultures and beliefs, the management of these differences" (Tutar, Altinoz, et al., 2014, p. 345). A crucial role in managing culturally diverse teams is played by managers who should be open, understanding, respectful, tolerant and fully approve cultural diversity of their employees.

Managing a whole range of relationships, behaviours, cultures and values within culturally diverse teams has nowadays become a major challenge for many companies (Aslam, Aslam, et al., 2013). As far as management of culturally diverse teams is concerned, it can pose a challenge especially for those managers who do not have the qualities, skills, or experience required to work with such employees.

"The cultural diversity of a company influences how business news is conceived, compiled, delivered, received and interpreted. Diversity can therefore be seen as a way in which individuals are unique and different from each other" (Sumathi, Sethupathy, et al., 2018, p. 14).

It should be observed that modern managers must be adequately prepared to face the reality of the 21st century. They should develop their skills in order to be able to achieve organizational goals, especially when they manage culturally diverse teams (Dike, Odiwe, et al., 2015). They should be aware that employees' cultural diversity requires the implementation of new solutions in the area of management of multicultural teams, specifically the ones connected with effective communication and motivation.

"Nowadays, employers are more and more aware that employee engagement is very important for their individual performance, and consequently for company survival and growth" (Rasca 2017, p. 478). In intercultural work environment it is mangers who are responsible for employees' motivation and engagement. Their ability to motivate and engage their subordinates, therefore, plays a key role in building effective teams.

Managers who are effective in managing culturally diverse teams can expect positive outcomes of their work. These positive outcomes, stemming directly from the fact that employees come from diverse cultures, include different ways of thinking, different experiences and the ability to analyse problems from different perspectives (Martin, 2014). Moreover, knowledge possessed by culturally diverse employees can be extremely useful for an organization, as they can provide managers with reliable information on their native culture regarding the area of relationships with employees and customers. Information about the culture of a given country can also help to mitigate culture shock (Martin 2014).

Undeniably, cultural differences can be the source of various problems in the area of relationships between employees and between employees and managers. Therefore, it is vital that managers understand cultural differences between employees of different nationalities and create such working conditions that enable them to contribute to the effective functioning of an organization (Leng and Yazdanifard 2014).

Employees' diverse cultural values can lead to conflict, misunderstanding, poor performance, poor efficiency and quality of work, or not achieving organizational goals, and thus lead to individual, team and organizational inefficiency (Narkhede 2011). Bearing this in mind, managers should positively influence employees' attitudes and behaviour, their motivation to work, and the way in which they build relationships with other team members (Teagarden and Glinow 1997).

"Becoming a successful manager is actually developing a capacity to understand the nature of results and achievements and their linkage within corresponding systems of values. This implies that the management is not and cannot be neutral when it comes to values and results" (Petkovski 2012, p. 92). That is why values and results should be of particular interest to managers of multicultural teams. Especially in culturally diverse work environment, the values appreciated by multicultural teams and the results obtained by them should be clear and comprehensible, accepted and meaningful in every manager's work.

The authors of the article are convinced that in the culturally diverse workplace managers' attitudes, qualities, and skills are of great importance, as they influence the effectiveness of their management of multicultural teams. Their efficiency in optimising the positive outcome of culturally diverse employees' work also depends on managers' attitudes, qualities, and skills.

Methodology

As far as research methodology is concerned, the study consists of the following steps. First, the authors provide the analysis of the abundant subject literature devoted to modern managers and challenges they face while working in multicultural environment. Even the most recent publications still refer to the ground-breaking studies conducted by Geert Hofstede, his son Gert Jan Hofstede, Michael Minkow, Fons Trompenaars, and Charles Hampden-Turner on cultural dimensions that influence the attitudes, behaviours, and values of managers from different cultures.

Next, the authors present the results of their query directed at obtaining information on these attitudes, qualities, and skills of modern managers which are important in working in multicultural environment in the context of different national cultures.

As it was mentioned in the Introduction, the authors are aware of the limitation of the article resulting from a lack of their own study of the analysed issues, so in the next step they refer to the results of secondary studies on various aspects related to managers and their work in culturally diverse work environment (including the perception of managers from different countries in the context of trust, the attitudes of managers related to the dimensions of their own cultures or their attitude to foreign workers).

Managers in face of cultural differences – the results of selected studies in the area

Modern managers should realise that today it is no longer language that is the most important competence of employees working in culturally diverse environment but their knowledge, predispositions, attitudes, qualities, and skill which facilitate cooperation in multicultural teams.

In this section the authors refer to studies investigating the ways in which managers are perceived in different cultures in the context of such elements as trust, cooperation, attitudes directly connected with one's cultural background, or the way in which managers appraise employees of other nationalities, i.e. their attitude towards employees from other cultures.

Information on the ways in which managers are perceived can be found in the Harris Research study, conducted among 1500 respondents, which took into account European managers. It revealed mental differences and attitudes of employees of different nationalities towards each other (Kuc and Żemigała 2010, p. 79). The results indicate that one's culture influences the perception of managers of different nationalities. Italian managers enjoy the poorest opinion: as many as 28% of the respondents considered them the least trustworthy members of multicultural teams. 25% of the respondents declared that they cooperate best with German managers (61% of those 25% were the Dutch employees), 17% preferred working with French managers, and 10% - with British managers.

The results of these surveys can be referred to the dimensions of national cultures defined by Hofstede. For example, the Italians, who were at the bottom of the list in the above mentioned Harris Research study, come from national culture which is characterized by high power distance, average uncertainty avoidance, high individualism, and high level of masculinity. Not surprisingly, Italian managers display attitudes and behaviours in line with the dimensions described in the context of their national culture.

Likewise, the Germans, whose culture, according to Hofstede's classification, is characterized by low power distance, low uncertainty avoidance, medium individualism, and high masculinity, also display attitudes and behaviours which are consistent with this characteristic.

With reference to the results of studies conducted by Geert Hofstede (2001) in IBM's branches and subsidiaries all over the world, it is worth noting that managers from countries with high power distance (e.g. Malaysia, Guatemala, Arab countries) more frequently seek the approval of their superiors than managers from other countries. Conversations between representatives of masculine cultures are highly competitive, as is the case with the Italians mentioned earlier. This is not true about representatives of feminine cultures (e.g. the Swedes, the Norwegians or the Dutch), where empathetic attitudes and the search for compromise are expected. Managers from societies with high uncertainty avoidance (e.g. Greece, Portugal) often base their activities on rules and procedures, which makes them feel less comfortable in uncertain situations. However, managers from cultures with low uncertainty avoidance function better when the rules of e.g. negotiations are unclear or changeable (Lewicki, Saunders, et al., 2005).

The results of the survey conducted among 160 Polish managers concerning their attitude towards foreign employees are also interesting (Wachowiak 2008, p. 99). The study demonstrated that the managers who participated in it thought highly of employees from well-developed European countries but had a low opinion of those from Central and Eastern Europe, South America, and Australia. The survey contained questions from the area of their knowledge, experience, and physical and demographic features directly resulting from their cultural background, as well as their appearance, behaviour, and working style. The respondents were asked to list their employees' negative features, and their answers included: unpunctuality and failure to meet deadlines (96% of respondents), talking too fast, using open gestures, expressive facial expressions (96% of the respondents), and an unclear, not very open manner of speaking (98% of the respondents). The results of this study clearly demonstrate different attitudes of Polish managers towards employees from various cultures.

The results of other studies conducted in China among American and Chinese managers in joint-venture companies, reveal a negative perception of American managers by Chinese managers. The United States is a country with a high level of individuality, and this very feature of American managers was badly assessed by their Chinese co-workers, who highly valued collectivism (Walsh, Wang, et al., 1999).

The studies mentioned above are only several examples of a great number of studies in this area. However, they are enough to conclude that managers working in culturally diverse environment are perceived differently by culturally diverse employees and this perception depends on managers' nationality, country of origin, attitudes, behaviours, qualities, and skills. Similarly, managers from different cultures display attitudes characteristic of their national cultures and have different attitudes towards foreign employees.

In the authors' opinion, managers working in the culturally diverse workplace should definitely possess intercultural competences reflected in their ability to adapt to such environment and in their openness and sensitivity to other cultures.

Discussion

The aim of this article was to determine the characteristics of managers working in culturally diverse environment, especially in the context of different nationalities of their employees. The analysis of the subject literature and the results of selected secondary studies allowed for determining, a relatively universal - in the authors' opinion – inventory of attitudes, qualities, skills that are important for the effective functioning of managers in the culturally diverse workplace.

The analysis of the subject literature and the results of the studies referred to in the article lead to the conclusion that managers working in culturally diverse environment possess various attitudes, working styles, qualities, and skills which depend on their country of origin. They also have different attitudes towards workers from different countries and cultures. Therefore, the authors believe that such managers should, first of all, be open and flexible towards employees from different cultures and be able to adapt quickly to culturally diverse work environment.

Referring to the study conducted in China among American and Chinese managers (Walsh, Wang, Xin 1999), it is worth noticing that a culture clash often takes place in culturally diverse environment. The results of the study revealed a clash between the individualism of American managers and the collective working style of Chinese managers. American managers' lack of openness, flexibility, and willingness to change resulted in their negative perception by Chinese co-workers.

Moreover, managers' attitudes and behaviour towards employees from various countries should be characterised by tolerance and respect. They should possess extensive knowledge regarding cultural differences and cultural awareness necessary to effectively manage employees of different nationalities.

Conclusions

Managers motivated to actively contribute to the achievement of organizational goals are one of the key factors in managing employees in culturally diverse work environment. In order to unlock their employees' potential, managers should pay particular attention to work environment and support their employees, especially those working in multicultural teams, in which tact, tolerance and acceptance of cultural differences are essential.

Firstly, managers working in culturally diverse environment should know their employees, know which countries they come from, and how culturally different they are from other team members. They should try to understand and accept their cultures and possess a high level of cultural intelligence, which includes the ability to engage effectively in relationships in diverse cultural environment.

Secondly, being a manager in culturally diverse work environment requires the acquisition of interdisciplinary knowledge, especially in the field of cultural differences and the ability to constantly learn about the employees' cultures in order to use their potential effectively.

Thirdly, effective management of employees from different cultural backgrounds also requires managers to be able to adapt the rules and procedures to their employees' specific culture and the country of origin. Managers should be able to modify their management styles, attitudes and solutions and adapt them to their culturally diverse employees.

On the basis of the subject literature and the results of studies referred to in this article, the authors main recommendation is to provide managers with cultural training, which should enhance their development, attitudes, qualities, and skills allowing them to function more effectively in culturally diverse work environment and to improve their management of employees of various nationalities and cultures.

Notes

1 The power distance is defined as the level of acceptance of inequality in the distribution of power, expressed by those less powerful, e.g. employees or members of an institution or organisation, in relation to their superiors or persons who are higher in hierarchy. Societies characterised by low power distance (e.g. Ireland, Switzerland, Norway, the United Kingdom) believe that inequalities between people should be reduced, whereas societies with high power distance (e.g. Croatia, Spain, Italy) are characterized by large inequalities between people (Hofstede 2007).

2 Individualism versus Collectivism is a dimension that determines to what extent society focuses on a group or an individual. Collective societies (e.g. Greece, Portugal, Spain) place human relations and belonging to a group above the achievement of an individual's goal. They teach to think in the "we" category. Individualistic societies (e.g. the Netherlands, Belgium, Denmark, Germany) put the achievement of an individual's goal above that of human relationships. They teach to think in terms of the "I" category (Hofstede 2007).

3 Masculinity and femininity are associated with the existence of the predominance of male or female characteristics in given society. Feminine cultures (e.g. Sweden, Portugal, Finland, Greece) are characterized by delicacy and protectiveness and consider care for and protection of others to be a fundamental value. On the other hand, masculine cultures (e.g. Austria, Switzerland, Germany, Belgium) appreciate and promote the following characteristics: activity, aggressiveness, competition, and value material success and progress most (Hofstede 2007).

4 The degree of uncertainty avoidance is an indicator of society's sensitivity to change, new and unknown situations, or innovations. Countries with a low degree of uncertainty avoidance include Denmark, Sweden, the United Kingdom, and Ireland, while those with a high degree of uncertainty avoidance: Greece, Belgium, Spain, and France.

5 Long-term cultures (e.g. China, Singapore, Vietnam) value modesty, economising, long-term planning, and thinking ahead. Short-term cultures (Philippines, Thailand, Malaysia) are characterised by strong commitment to stability and balance in society and pressure on consumption and instant results.

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Trends Shaping Modern Intermodal Transport in Poland On The Example of Selected Organizations Providing Car And Rail Transport Services

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Abstract

Scientific purpose of the article is to present current state of intermodal transport market in Poland. Later, based on studies, the authors define and describe main development trends that have contributed to this state: European Union's transport policy, development of so called: New Silk Road, attitude of companies that are present on the market. The authors note that the awareness of the factors that have shaped the development of the industry is important because allows to properly shape further pro-development policies.

Keywords: Modality, Road and Rail Transport, Trends on Market.

Introduction

Contemporary rail and road intermodal transport is developing on the background of such phenomena as globalization, growing customers' expectations and increased risk (Brzeziński, 2017). Conditions for running operations on intermodal basics are invariably shaped by volatility and unpredictability, which phenomena were described more than a decade ago by P. F. Drucker as environment turbulence (Lane, Down, 2010) Despite this fact, the market of intermodal road and rail transport services in Poland is currently well developed.

The aim of the article is to define and describe main trends that have contributed to the current state of intermodal transport market in Poland. The results of research carried out at the example of enterprises involved in the provision of intermodal transport services, ensured authors that the operations of companies that are present on the market, has been one of primary factors.

Method adopted for the purposes of empirical part was case study. While making usage of this tool, the researcher may use several sources of data: interviews, observation, documents, analysis etc. (Bennett, 2015). Authors refer mainly to the results of observation and informal (targeted) interview with the representatives of the management forces of the selected entities. The introduction to the considerations is an approximation of the conceptual apparatus in the field of intermodal transport as well as description of modern state of road and rail intermodal transport market in Poland. This part was based on a bibliographic and theoretical query. The authors referred there, among others to scientific journalism on the subject of intermodal transport and to reports prepared by the Office of Rail Transportation. Selection

of this entity's studies results from the fact that it is subordinate to the Minister of Transport, the superior authority regulating issues related to carrying out rail transport activities in Poland (OECD, 2016).

Rail intermodal Transport Market in Poland

Among the terminology of intermodal transport, in addition to the concept of multimodal transport, the term - combined transport is also used (ECMT, 1998). Interchangeable use of these three terms is often visible in journalism, as well as documents or reports (Garrett, 2014). There are many official definitions of the intermodal transport in the literature, but the best concepts are described in the glossary of Combined transport terminology published in 1993 by the European Conference of Ministers of Transport: ECMT (Mindur, 2002). It follows that, in its assumptions, intermodal transport has the useage of one and the same loading unit on the entire transport route, in changing, at least two modes of transport. „Between the points of origin and destination the load unit is neither loaded nor unloaded. Load units will usually be martime containers, continental containers, swap bodies and semi- trailers of various sizes" (Kreutzberger, 2008). M. Hoeks stresses that in the case of intermodal transport, the entire transport process is organized on the basis of a contract signed between the customer and the service contractor: „the carriage is based on a single contract concluded by a carrier […] endowing him with a carrier's liabilities" (Hoeks, 2010)**.** In case of intermodal transport, there may be combinations of various branches' means of transport. In case of intermodal rail and road transport on the main path a mean of road transport (e.g. truck with/or without semi-trailer) along with the load placed in it, uses the rail transport service (Mindur, Gąsior, 2003).

In Poland, described type of transport is developing dynamically. According to the newest report developed by the Office of Rail Transportation, in 2019 already, intermodal rail and road transport reached the level of 17 million tons of cargo, which in comparison with 2017 means a jump of over 15%. Office of Rail Transportation calculated that the mass of loads in intermodal transport increased by 2.3 million tons. This is an excellent result because the increase in the whole mass of goods transported by rail in 2018 was 4 percent. It shows out that intermodal transport is growing much faster than the rest of the market (Urząd Transportu Kolejowego, 2019).

Already noticeable increase in tonnage being transported in an intermodal way was, among others, the effect of a gradual increase in the number of carriers who offer this type of services (Kadłubek, 2016). The amount of intermodal licensed rail transport operators in Poland have changed significantly. Increase in the number of carriers, up to nowadays is shown in figure 1. Currently, PKP Cargo still remains the main player on the market, with a share in transport, according to transport performance, at the level of 52,3%. However, the company's share in described market has been decreasing for a long time (e.g. in 2012 it was as much as 64.7%), what is accompanied by the increasing role of other market leaders. The trend of increasing market shares of smaller entities in Poland is illustrated e.g. by the case of a company Captrain Polska, which in 2019 reached a share of 12.5 percent in the transport work performed. This is a good result compared to 2017, when the company had only 7.3 percent of total share (www.utk.gov.pl).

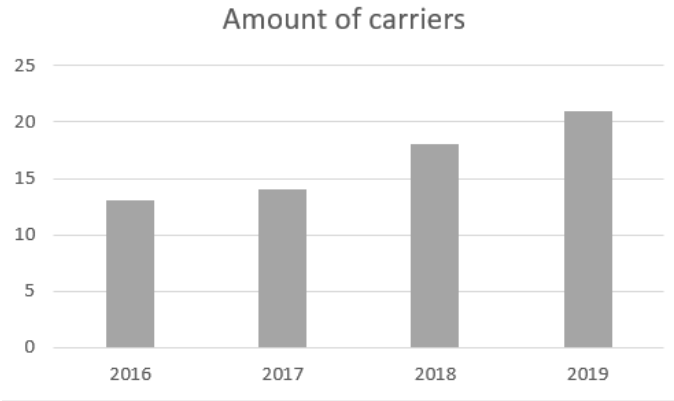

Figure 1: Change in the number of intermodal carriers in the last four years (data from the Office of Rail Transportation)

DB Cargo ranks third among the largest operators from the point of view of transport performance (≈10.2%). PCC International and LTE have also a significant share- in total, it exceeds 13%. It should be noted that the intermodal transport market in Poland is generally divided between the four carriers mentioned above. The percentage market share of individual companies is shown in Figure 2.

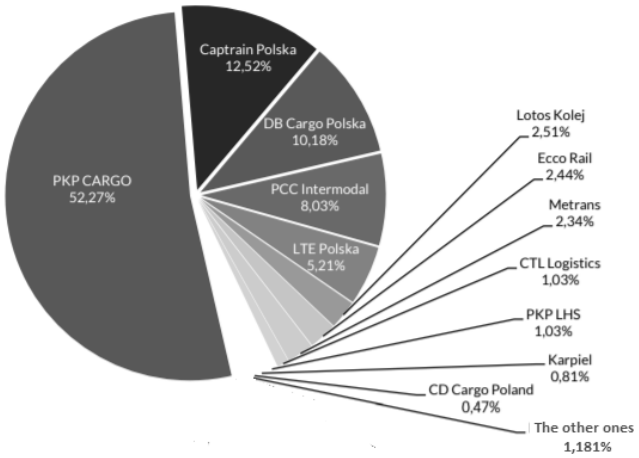

Figure 2: Current share of carriers in intermodal transport according to transport performance (Urząd Transportu Kolejowego, 2019)

In Polish intermodal transport containers are mainly transported. Their share in the total number of units in 2019 was 96.3%. Mostly transported were 20- and 40- foot units, which respectively constituted 47.8 and 43.8 per cent of the total number. The share of other containers was as follows: 25-foot - 0.2%, 30- foot - 1.6%, 35- foot - 0.5% and eventually 45-foot - 2.3%. Car trailers and semi- trailers accounted for 1.5% of the units being used, and swap car bodies 0.6% (Urząd Transportu Kolejowego, 2019).

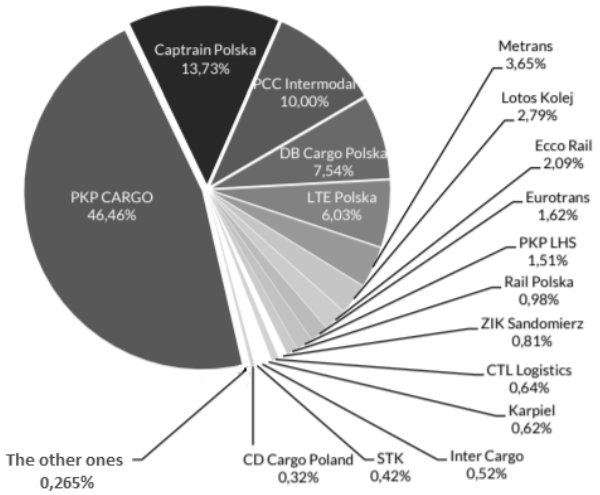

Figure 3: The share of carriers in intermodal transport by transport weight in 2019 (Urząd Transportu Kolejowego, Warszawa 2019)

In relation to the transported mass of intermodal containers (on the background of the total mass of rail transported tonnage), it amounted in 2019 almost 4.7 million tons and was higher compared to the previous year by 1.4 percentage point. The leader in this category is, similarly to transport performance, PKP Cargo with the result of ≈ 46.5%. However, it should be noted again that six years earlier the share of this company achieved a much higher level, significantly exceeding 60%. Captrain Polska is in second place (13.73%), while PCC Intermodal is third with one- tenth of the market share. The share of intermodal transport carriers according to the transported weight is illustrated in Figure 3.

Method

Research problems relate to the attributes of the subject of the study, their changes, conditions in which they occur, the relationships between the features of objects, the significance of variables and their interactivity, their joint or individual interaction. In the literature on the methodology of conducting scientific research, the research problem is interpreted as a question (Walliman, 2001). Obtaining answers to them (through in-depth studies and research) serves to exhaust the state of ignorance in a given issue. "A research problem is as much as a certain question [...] that the study is to answer" (Łobocki, 2007). For the need of this article, research problem was articulated in the form of a decisive interpellation: what are the main trends that have shaped the development of intermodal transport market in Poland? The anticipated answer to the question contained in the research problem, formulated with a significant degree of - satellites that orbit at an altitude of ca. 20180 km above the earth's surface, and conviction of the researcher about its veracity, is the research hypothesis. The authors' response to the observed research problem was the thesis that the development of intermodal transport in Poland have been due to the impact of three basic factors: the European Union's Transport Policy, development of so called: New Silk Road as well as appropriate orientation of companies operating on the market. Verifying the hypothesis formulated in this way was the main aim of the undertaken cognitive effort.

In order to verify the thesis, the authors used, inter alia, a case study of two companies. The method chosen for the purposes of case study's creation was an observation and informal (targeted) interview with the representatives of the management forces of selected entities. The research on a sample of managers was inspired by the work of W. Lyon, G. Lumpkin and G. Dess, who recommend as

extraordinary useful three methods to study issues related to management practice. One of them is so-called: managerial perception, consisting in verification of theses based on consultations with managers. Thanks to managerial perception, the material for in-depth analysis is obtained through personal or questionnaire interviews from people who know best about issues related to the topic (Lyon, Lumpkin, Dess, 2000). In preparing practical part of the work, the authors also looked through selected companies' materials and reports developed e.g. for the purpose of internal reporting.

Accepted criteria for selecting enterprises for research was the desire to select units that are characterized by high operational dynamics on the intermodal transport market. The first selected entity: Laude Smart Intermodal (for the sake of brevity referred later to as: x) is an example of an organization using innovations. Among other things, it introduced and patented 20- feet containers that have universal adhibition. Their important advantage is that, in one direction one can load loose goods on them, and then palletized ones back in the door-to-door and just in time system which should be understood as a management philosophy or toolbox of techniques, that is based on performing a significant improvement in operating efficiency through reduced inventory levels, lead times and overheads (Kee-hung Lai, Cheng, 2009). Thanks to the use of such containers, empty runs are significantly reduced: economic analysis carried out later shows that even if the containers return in an empty state to the operator, such transport is still competitive compared to the road transport. The second company: PCC Intermodal (marked: y) has a high growth dynamics on the intermodal transport market. It has been operating for over 12 years in the intermodal sector. Currently owns an established position on the market also its prospects for further development seem promising. This is mainly because of its own intermodal terminal, where every year the number of serviced trains from China increases. This terminal has a chance to become the main intermodal "crossdocking" centre for Western Europe.

Transport companies' operations as a trend loading to the development of modern intermodal market in Poland

A Company X- Laude International

Surveyed unit is among the fastest growing intermodal rail and road transport companies on the market. The company's main scope of activity is intermodal rail transport abroad. It launches regular connections between Poland and the East. In addition to regularity, these connections are characterized by the delivery of shipments in the "door to door" and "just in time" options. The company is implementing a unique project that involves the use of an innovative container for transport, which allows palletized products to be transported one way and dedicated products, in the other. The company also provides an innovative service in the form of delivery container weighing up to 28 tons to the final recipient, who does not have its own railway siding. The company has specialized in the transport of steel coils by an innovative method of coil transporting. It takes place in specialized 20- foot HTCOIL containers (figure 4). Transport in innovative containers allows to eliminate packaging costs and protect transported coils. The biggest advantage of the container, in comparison with the wagons for transporting steel coils is a fact that after unloading the containers can be loaded on the way back along with other goods. In contrast, traditional wagons usually return empty, which significantly increases costs of transport. The tare weight of the container is about 3 tons, and the maximum total weight closes in 33 tons.

Figure 4: Container 20' HTCOIL (corporate website)

The company, in order to meet the expectations of customers also designed and patented another, innovative container: type HTSYP. Thanks to its usage, costs in the field of packaging, handling and dumps are reduced during loading operations. The biggest innovation of this container is the possibility of spilling the goods through the rear "flap door". None other of the wagons available on the market for bulk cargo is used for the transport of palletized loads. On the contrary, the container of a company being described has a standard door opening wide, which enables efficient unloading. The container has a capacity of 43m^3, while the standard one has only 32m^3. The permissible total weight is 33 tons, with the container tare that is equal to 3 tons. The goods can be loaded into through the loading hatches on the top, e.g. from the so-called: sleeve, without removing the roof. As part of a comprehensive service, in the case of transporting the entire train composition, the company provides the substitution of a truck (type: Reach Stacker) with a lift, for transhipping containers onto a car trailer and then transporting them to the final unloading site (http://www.laude.pl/index.php).

Table 1: Categories of railway lines in Poland (with operational parameters) on which carriers' trains may travel. Own elaboration based on: (Towpik, 2009); (Wojciechowski et. al., 2009)

Lines' category	Radius of arcs	Transport load T [mln t brutto/year]	Maximum speed of freight trains v_{max} [km/h]
Magistral	≥ 1200 m	T ≥ 25	$80 < v_{max} \leq 129$
First class	≥ 1200 m	10 ≤ T < 25	$60 < v_{max} \leq 80$
Second class	≥ 600 m	3 ≤ T < 10	$50 < v_{max} \leq 69$
Of local significance	≥ 300 m	T < 3	$v_{max} \leq 50$

The company has a fleet of 120 (including 30 own) four-axle wagons. These wagons are designed for a maximum speed of 120 km/h and the permissible total weight is 90 tons, with a length of 13.5 meters. The tare of wagons being used is 17 tons, which means that two 20-foot HTSYP containers with their maximum load can be loaded on one wagon. Then the total weight of the loaded wagon will be equal to 83 tons, which is within the maximum load range on most Polish railway lines, which is 21.5 tonnes per axle. The types of lines constituting the Polish railroad system on which the wagons of the described carrier can travel are listed in Table 1.

Comparative analysis of transporting bulk cargo in HTSYP containers made by x company.

In order to carry out comparative analysis for transport carried out by the company in question as well as for traditional road transport, cost data collected from the market was used. For the purposes of calculations, average rates were adopted. Cost analysis was made with the assumption that only the delivery prices affect the profitability of the service. It was also assumed that both the sender and recipient of the shipment have a terminal/rail siding that can be used within a 20km radius of the place of loading and unloading. In the cost table (table 2), are included separately: the costs of transport and costs of delivery and drop off together with loading and unloading of the parcel. The presented analysis does not include: fixed costs of the company, costs of personnel, average costs of rolling stock maintenance (unforeseen repairs, insurance, etc.). This assumption is correct because each company bears similar maintenance costs. Three routes were selected for the analysis, described later.

Table 2: Cost statement for intermodal rail transport and road transport (own elaboration)

Intermodal rail transport								
Track	Distance [km]	Train weight [tn]	Cost of transort [pln]	Cost of delivery and drop off [PLN]	Cost of loading and unloading [PLN]	Total price [PLN]	Price for 1 km [PLN]	Price for 1 ton of cargo [PLN]
Krakow-Katowice	94	800	7135	12400	9920	29455	313	15,56
		2600	11235	12400	9920	33555	357	17,78
Krakow-Medyka	244	800	13585	12400	9920	35905	147	19
		2600	23175	12400	9920	45495	186	24,10
Krakow-Terespol	435	800	27175	12400	9920	49495	114	26,20
		2600	46320	12400	9920	68640	157	36,4
Road transport								
Track	Distance	Cost for transporting 26 tons to destination and back	Cost for transporting 1887 tons to destination and back				Price for 1 km [PLN]	Price for 1 ton of cargo [PLN]
Krakow-Katowice	94	564	41172				438	21,82
Krakow-Medyka	244	1464	106872				438	56,64
Krakow-Terespol	435	2610	190530				438	101

It has been assumed that the maximum load of the intermodal train will be 2600 kilograms gross, because such a load is acceptable on most railway lines. Goods that are assumed to be transported is grain. 1m^3 of grain weights an average 700 kg. Given that the HTSYP container has a capacity of 43m^3, one can load about 30 tons of grain into it. So if we put 2 containers with a gross load of 33 tonnes each on a 40-foot wagon, our wagon will weigh 83 gross tonnes, because its tare is equal to 17 tonnes. Therefore, we can form train of 31 wagons. The above table includes the costs of transporting the loaded and empty storage. There is not always a return load (trains often return empty), so it will be objective to include the cost of returning the train.

In order to get the total price for comprehensive intermodal service, it is necessary to add up the price for transporting up to 800 tons and up to 2600 tons. In relation to road transport, for the comparison to be meaningful, the return of empty trucks to the loading place was also taken into account. This is in accordance with the principle that the price of service includes kilometres travelled in both directions. For the needs of calculations it is accepted that the average price on the market for transporting by dump truck in the full/empty combination is 3 PLN. For the road transport service, a universal dump truck with a permissible total weight of 40 tons was selected, with the vehicle's tare equal to 14 tons, which translates to the opportunity of loading 26 tons of grain.

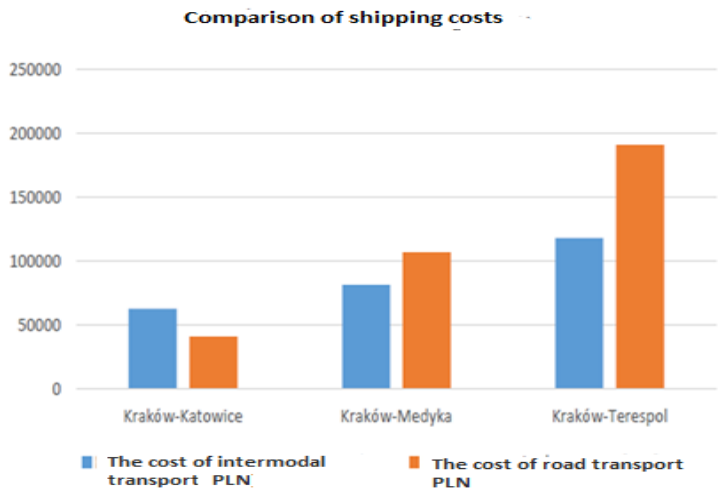

Figure 5: Comparison of shipping costs (own elaboration)

It means that 73 dump trucks should be fully loaded with 1887 tonnes in order to perform the same transport work as if using one train. The table includes cost of transporting one dump truck and the total price for transporting 1887 tons forward and back for each of individual routes. In addition, the price of 1 ton was calculated for both intermodal rail and road transport.

Comparing comprehensive rail and road transport on the first short route from Krakow to Katowice, it is clearly seen that rail and road option is more expensive than road transport alone (figure 5). Although one can point out, that if we counted the external costs generated by road transport and we loaded onto the return train (e.g. palletized loads), the price would be comparable. What's more, flexibility speaks for intermodal transport, because the train can be formed and sent faster than hiring 73 dump trucks in a short period of time.

Train transport of merchandise 1887 tons: 33555 pln + 29455 pln = 63 010 pln.

Rail transport price for transporting 1 ton of goods: 63010 pln/ 1887 tons = 33,38 pln.

Road transport of 1887 tons of goods: 94km * 438 pln = 41172 pln.

Road transport price for transporting 1 ton of goods: 41172 pln/1887 ton = 21,82 pln.

Comparing rail and road transport on an average distance (from Krakow to Medyka – 244 kilometres), one can observe that intermodal rail transport looks attractive from the price point of view in comparison to road transport. It is needed to pay PLN 81400 for the whole train composition, while for road transport: PLN 106872. It means that combined, rail and road transport is cheaper by 24%.

Comparison of transport costs on the longest, Krakow - Terespol route, confirms the theory that intermodal transport is the most cost-effective over the longest distances. For intermodal rail and road service the client will pay only 118135 PLN, while for road transport has to pay as much as 190530 PLN. It means that intermodal transport compared to the road one is cheaper by PLN 72395 (as much as 37% in percentage terms). It is worth adding that in road transport, in terms of weight, the price exceeded PLN 100 per ton, thus exceeding the value of the merchandise itself.

Currently, there can be heard an opinion, that on the transport market in Poland, intermodal road and rail transport is profitable only over the longest transport distances. Thanks to the innovative solutions in the organization of intermodal processes introduced by the considered company, this transport becomes attractive not only on long, but also on medium distances. This is confirmed by the comparative analysis being carried out previously. Intermodal rail and road transport performed by company x over a section of 244 km is cheaper by as much as 24% in comparison to road transport alone. Containers implemented by the company in question have brought new quality and new opportunities in intermodal transportation processes.

Company Y (PCC Intermodal) - Analysis and Assessment of The Company's Strategy

Company under considerations is an intermodal transport operator. It exists in Poland since the beginning of the new millennium, when it launched first regular intermodal rail connection from Brzeg Dolny to the coast. Then in 2007 the company launched another regular connection between the terminal in Brzeg Dolny and the sea terminals in Gdańsk and Gdynia. A year later, a connection between Brzeg Dolny, Szczecin and Frankfurt an der Oder has been launched (http://www.pccintermodal.pl/).

Compared to the other intermodal operators on the market, company Y stands out by offering a well-developed network of regular and punctual intermodal connections. Nowadays the company offers a regular intermodal connection (takes place 6 times a week) from Poland to Rotterdam. In addition, it has a regular 5 times a week connection from Hamburg to Poland, 4 times a week from Duisburg to Poland and 3 times from Poland to Brest. However, the largest number of connections in the weekly statement is launched from polish ports to Kutno, Brzeg, Gliwice and Kolbusow. In total, the company launches 400 regular intermodal trains in a month and carries out 200 container returns from its terminals per day. It should be emphasized that the company does not have its own rolling stock. Uses the services of external carriers.

When analysing company's Y strategy at the time of its presence in Poland, it should be stated that the construction and equipment of 5 terminals together with the creation of a network of regular connections is impressive. This is particularly significant if one consider the high level of capital absorption and the long payback time from investments that characterize intermodal transport. Probably, the above mentioned successes are primarily influenced by the fact that Y is a subsidiary of the parental holding company, which is present in 17 countries and employs more than 3,000 employees. Therefore, it can afford a long-term return on expenditure without significant impact on current financial liquidity. The best example is the implementation of terminal construction in Kutno. While planning this investment in the last decade, the company was convinced that it would be a strategic terminal because would become a gateway for daily intermodal connections in the Baltic and Adriatic corridor as well as in the East-West corridor. The terminal was officially opened in 2011, and in 2014 decision to expand it was undertaken. From the terminal in 2016, the first train to China, to Chengdu, was launched. The train arrived on place in 11 days, covering 9,800 km and delivering 41 forty-foot containers. This connection was launched in cooperation with company that previously acquired 13.94% of the shares in Y. Key terminal in Kutno was chosen by investors from China because it gives the possibility of spreading throughout entire Europe goods imported by rail. Currently it is considered to be the starting station of the New Silk Road. If the increase in rail transport to China continues in the future, this terminal will be re-expanded.

Another Trends Affecting Development of Modern Intermodal Transport in Poland

In addition to the operators' proper actions, a very important trend that has shaped the Polish intermodal transport market was a support from EU funds. Millions of PLN have been allocated for the development of intermodal transport from, so called, new perspective of the European Union for the years 2014-2020.

The European Union's Transport Policy is strongly focused on the growth of intermodal transport. One of its main assumptions is that by 2030, 30% of road freight transport, at distances greater than 300 km, would be transferred to other means of transport, e.g. rail or water transport. By 2050 it should be over 50% of this types of transport. European support have been provided to selected carriers and intermodal operators in response to requests from companies applying for them. All of these funds have been used to finance construction and equipment of logistics centres, intermodal terminals and the purchase of transport units used in intermodal transport. In connection with the aforementioned EU perspective and announcements of the government it is planned that by the 2023 the modernization of the most important railway routes will be completed.

Next, significant factor supporting the growth of intermodal transport in Poland is the development of, so called: the New Silk Road (NSR), which runs through the territory of Poland. The main assumption of this initiative is to create new, alternative rail-road routes from China to Europe. As S.A. Kashmeri points out: "China is building a twenty-first-century version of the Silk Road in which high speed trains […] will replace the long caravans of ancient times that trudged across Eurasia to barter and exchange goods" (Kashmeri, 2019) . China's economic policy is determined by five-year plans approved at the meetings of the Communist Party of China. In the plan for 2016-2020, one of the main assumptions is to reduce social inequality between the eastern and western part of the country. This eastern one is at a much higher economic level. The economic plan has assumed a number of infrastructural investments and the creation of new communication routes on the western wall, so from these regions there can be a systematic increase in exports and imports to Asian and European Union countries.

Already, around 50 countries declare their participation in the NSR (Nazarko et.al., 2016). This is also a great opportunity for Poland to increase the level of exports to China. The first train to Europe from the Asian country entered Poland in 2005. However, the dynamic development of these transport has occurred in the last 2-3 years. Poland plays an important role in NSR as a logistics centre for European countries. The company's Y container terminal in Kutno is particularly important in this case. Rail transport is definitely cheaper than air transport (about 3 times) and much faster than the sea one (Grohman, 2016). Transport processes by rail from China to Europe takes about 14 days, and by ship about 35 days, which makes the first option attractive to many customers. However, the price is three times higher compared to sea transport. Rates vary because some Chinese provinces subsidize rail exports to Europe as a result of the economic program mentioned previously. The rail route from China is through Kazakhstan, Russia and Belarus. Trains reach Malaszewicze, Łodz, Kutno and Pruszkow after 12-14 days. The advantage of rail transport over sea and air options is, without doubt better service for Chinese factories far away from ports and airports. There are currently 8 regular connections from China to Poland. From Zhengzhou or Chengdu provinces, trains run several times a week. Every now and then new directions are also tested ("Transport kolejowy do Chin", 2016)**.**

Conclusion

In the literature it is emphasized that intermodal rail and road transport is widely considered to be far more ecological than the road transport itself (Grohman, 2016). Therefore one can enjoy the fact that the market of intermodal car and rail transport in Poland is growing more and more dynamically. There have been a steady increase in the number of operators since 2015. The volume and weight of merchandise transported is also gradually increasing. In addition, several dozen intermodal terminals are active in Poland.

In addition to the market description, main factors that have led to the current state of intermodal transport in Poland have been listed in the article. Authors noted, that progress was mainly done due to the European Union Perspective for 2014-2020. In addition to the European Transport Policy, the creation of the NSR should be also mentioned. Companies operating on the Polish market has also significantly contributed to the progress. The results of research carried out in the example enterprises confirmed that

companies involved in the provision of intermodal transport services are already introducing innovative solutions (HTSYP container from company X) or shape their strategy in terms of significantly expanding networks of intermodal connections (company Y).

Awareness of the factors that have shaped the development of the industry is important, because allows to properly shape further pro-development policy. For example, it seems that it is worth providing broader support to enterprises operating in the industry (e.g. of a fiscal nature), so that they can continue to undertake valuable activities. At the same time, however, the authors are aware, that the undertaken topic do not fully exhaust the issues related to the determinants of the development of intermodal rail transport in Poland. However, it can be a good starting point and inspiration for further studies and research. The impact of factors other than those considered in the work, such as the role of governmental bodies can be the area of further exploration.

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The large German Companies Effect on the Lean Employment of Hungarian SME's

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Abstract

Aim: Recession and green thinking force manufacturers to reduce their losses. SME's successfully use lean to increase efficiency and performance. Despite the wide variety of literature, practical application is not widespread. The question arose: can the successful German lean method also be employed by Hungarian SME's? The purpose is to review international literature and to compare them with the lean knowledge of Hungarian SME's. It explores the impact of lean on the German parent company and the Hungarian SME, while conducts an asset research. *Methodology:* The literature review is followed by statistical and empirical elements to discover the relationship between the Hungarian and German markets. Hungarian SME's (processing and tourism industry) are the subjects of the primary research. Out of the potential 9683 SME's, 1315 were contacted online or personally, from the 223 questionnaire responses, 158 (12%) were filtered. The results obtained were supported by qualitative interviews. *Findings:* The results show that even though Hungarian SME's use lean elements, they are not lean businesses. It must be noted that this is not done consciously and a deeper analysis is required. The performance of supplier companies has a positive impact on the widespread of lean. Exploring lean practical knowledge is relevant from a scientific and practical point of view: it supports executives in the implementation of lean in order to maintain and develop their positions. In addition, it also shows the application of lean and achievement of efficiency. Furthermore the research suggests that lean could be the answer to labor shortage.

Keywords: SME's, Lean, Management

Introduction

Global recession and green-thinking affect manufacturers in reduction of their losses. The SME sector plays a significant role in the economy in the EU, as well as in Germany and Hungary. Lean manufacturing has been successfully used to increase efficiency and performance. It raises the question whether the lean method of German parent companies can be applied to Hungarian SMEs. According to this paper, with the right adaptations, it can.

In the last decade, Hungary has focused on improving efficiency along the lean, especially at foreign companies with German parent companies, and thus optimizing processes. Studies show that, despite the wide variety of specialist literature, practical application is not widespread.

The purpose of this publication is to review the literature and to compare it with the lean knowledge of Hungarian SME's, as well as to explore the use of lean in the German parent companies and in the Hungarian SME's. The lean device is conducting awareness research. The study attempts to draw attention to the fact that the situation of Hungarian SME's have become problematic in areas that could be a source of their competitiveness.

Literature Review

The Small Business Act for Europe (SBA) is the EU's flagship policy initiative. Hungary lags behind the EU average in most SBA areas. *Szerb* has attributed the weakness of the SME sector to the generally low level of corporate competitiveness. The weakest link analysis often shows significant shortcomings, even in the best performing companies. There is a critical gap in innovation, supply and networking. *(Szerb et al, 2016)* In the GEI study Hungary lagged far behind in Central Europe in terms

of opportunities, ability to start a business, product innovation and venture capital. The average value added of Hungarian SME's is less than half of the EU average *(Sasvári, 2014)* The development of the neighboring countries has led to the fact that by 2017 Hungarian competitiveness has become the driving force of the V4 countries. Competitiveness problems include aging, lack of language skills, SME operating conditions, corporate innovation capacities and the VAT rate. *(Molnár-Udvardi, 2016)* SME's with outstanding competitiveness can be found only in an island-like manner - especially in the areas on the Vienna-Budapest axis. Out of 15 competitive "Hungarian" SMEs, five are foreign subsidiaries, typically belonging to German multinationals. *(Szerb, 2010.)* European trends expect the growing importance of medium-sized companies in small open economies like Hungary. *(Kovács et al, 2017)*

Walton, author of the Deloitte & Touche study, pointed out the increasing vulnerability in terms of global competitiveness of the 100 Eastern European production companies that had been surveyed. Production companies must meet the key factors of production strategy, speed and flexibility. Companies are currently compensating for the lack of skills with the lower costs of cheap labor. Accession to the European Union tends to mean a significant risk for countries with low-cost production capacities. "As labor becomes more mobile and living standards rise, EU integration means the erosion of Central Europe as a low-cost geographical area," stated by *Walton*.

Several government programs have been launched to catalyze this process, but none have produced breakthrough results. According to *Koloszár and Pankotay*, the management tools used in the Hungarian SME sector are tight, which also affects the competitiveness of enterprises. *(Koloszár-Pankotay, 2017)*

Lean thinking is considered the gold standard for modern production management, but there are also skeptics in the field of SME's. An analysis of 425 Indian SMEs showed that lean thinking has a positive impact on operational performance *(Yadav et al, 2019)*. Competitiveness is influenced by young people who are becoming entrepreneurs, the use of new methods (lean), but also the effective use of intellectual capital *(Pankotay, 2013, 2018)*. *Szóka (2014)* notes that process thinking, production cycles and production processes must be simplified, standardized and shortened, and strategic orientation must not be overlooked. *Hines et al. (2008)* highlight organizational and cultural factors such as commitment, strategy and fit, and leadership. *Chong et al. (2013)* emphasize that cultural change is the primary aspect of the sustainable realization of lean. The importance of culture and knowledge have been emphasized by *Aboelmaged (2011), Maleyeff et al (2012), Bamber et al (2014), Tanik and Sen (2012), Albliwi et al (2014), Shokri et al (2016) and Sayer, Williems (2012).*

Hammer et al (2004) emphasized the priority of intellectual capital, while *Pankotay (2017)* emphasized the assessment of education and knowledge. *According to Achanga (2006), Dora et al. (2013), Arul-Arumugam (2015) (Koloszár 2018),* the focus should be on the people and learning process, while *Clarke et al (2006)* believes that the willingness of SMEs to learn is the key.

In 2011, *Spann et al* saw SME's becoming more competitive in a lean approach to technology and management. They identified the need for regular training for SME's. *(Spann et al 2011.) Ulewich-Kuceba (2016)* emphasized the learning process from the other side: lack of knowledge induces resistance. In addition to presenting national culture and good practices, *Netland (2016)* highlights the involvement of external experts in the SME sector. Organizational culture and behavior are key factors in TQM, LM or LSS, and the boundaries overlap. *((Antony et al(2014) Standon et al (2014) Bamber et al (2014) Dora and Gellynck (2015) Shokri et al (2014))*

Netland (2012) states that despite the various success factors of the 30 companies surveyed, they are struggling to achieve lean production. *Bhamu and Singh Sangwan (2014)* discuss different definitions and contents of reports. *Azlina Mohd Salleh, et al (2012)*, by definition, discuss the combination of LM and TQM as an integrated approach not yet discovered by the Malaysian automotive industry.

Hernandez-Matias, J., et al (2019), in a survey of lean managers of Spanish production units of international companies, describes the sequence of lean implementation. He points out that management, employee and operational performance are closely linked by the lean culture. *Belhadi et al (2017)* discuss 5 important barriers to SME lean deployment and how to overcome them. Value Analysis can help SME'S to improve their efficiency and market position. Value Analysis is a

development methodology that examines the cost-function relationship. The aim is to reduce costs and to improve functions in order to ensure customer satisfaction in the fields of quality and efficiency. It is a challenge to interpret this cost-function relationship and risk management from the perspective of sustainable development *(Szóka, 2017)*.

Methodology / Approach

Firstly the literature review had been carried out to be supported by the Hungarian and German market relations with statistical and empirical elements.

Finally, for the SME lean knowledge survey – along with the EU standards -, small and medium-sized enterprises in the manufacturing and tourism industries had been used for the primary data collection. The questionnaire was developed by pre-validation and use of relevant literature. Professional questions focused on the degree of the use of lean methods and the identification of the lean tools which are already in use. Out of the potential 9683 SME's, 1315 were contacted either online or in person, and after 223 responses, 158 (12%) were filtered. The results obtained were supported by qualitative interviews in order to identify trends and patterns of thinking.

Findings

The strong economic relations between Hungary and Germany were further strengthened after the economic recession, which is well represented by the economic indicators of the two countries. *(Table 1.)*

As an emerging science, lean still has a vast array of knowledge that is expanding almost on a daily basis. This is supported by the heterogeneous use of technical terms in the processed literature and the results of the survey: the lean elements, in some cases, are used consciously or unconsciously by Hungarian SME's, but we cannot talk about lean businesses. Lean is not an independent initiative, a business customer insists on implementing lean as their development program. The performance of supplier companies has a positive impact on the spread of the lean application. The success of the foreign parent company and the subsidiary is not based on the different national cultures, it is rather the outcome of the harmonization and application of the core cultures of the mother and subsidiary company. Culture, trust and relationship capital are the cornerstones of cross-border work organization today. *(Figure 1.)*

The relevant literature emphasizes the importance of lean in the human and cultural dimension of learning, which was also confirmed by the survey. Comparison of tools and methods is not relevant due to the cultural differences, but it may provide a point of reference.

Practical Consequences

It had been found that even though the lean elements could be used unconsciously, they are still being applied. However, the results require deeper analysis.

The research on the lean knowledge of Hungarian SME's highlights the impact of German parent companies on Hungarian SME's. Exploring lean practical knowledge in Hungarian SME's is also relevant from both a scientific and a practical point of view: it enables executives and leaders to understand the importance of lean and helps them in the implementation of lean in their businesses in order to maintain and develop their supplier position. The paper also demonstrates the applicability of lean elements to skeptics of SME lean use.

The survey confirms Benner's statements: Hungary is a success story for the German industry due to the cheaper labor. In addition, the employees in Hungary are well-educated, trade unions have little rights and logistics connections are highly developed. The government provides them with a number of tax advantages *(T Benner)*, and since Hungary is a member of the European Union, it has access to the common market. German economic operators have the largest capital stock in Hungary.

The vast majority of Hungarian SME's were unable to take advantage of the new opportunities of EU accession, on the contrary: the pressure exerted by foreign companies and imports increased

competition and made it difficult for companies to develop further. Lean could mean the solutions, which was also supported by the survey.

Lean awareness has shown that SME's are particularly vulnerable to sudden and drastic changes in the external environment. Companies that are unable to radically alter their business strategy in a rapidly changing environment will be left out from the competition and permanently excluded from the market. *(Fischer et al, 2004.)*

Originality

The study supports theoretical literature from a practical point of view. It recognizes the findings in the processed literature on human value, culture, learning, and behavior. The survey confirms or refutes the awareness of each lean element. It helps to understand the lean thinking of Hungarian SME's and its impact on performance.

It also highlights core philosophy of lean and the difference in unity across parent and subsidiary companies. It draws the attention to the "two-speed Hungarian SME's": a developing, foreign-based and/or supplying company and a lagging domestic servicing enterprise. This, in one way or another, affects the whole economy. In the future, lean thinking could be the answer to the problem of labor shortage.

Table 1: Lean Knowlege

Notion	**Knowledge of responders in %****
Toyota/ lean philosophy	60,5%
Kazein	45,9%
5S's	79,5%
Pulling workflow	35,1%
Continuous flow	42,4%
Kanban	18,8%
Value Stream Mapping	21,1%
Problem solving	85,4%
Reward systems for lean mfg.	74,2%
Visual factory	69,2%
Standardization	62,2%
Just in Time	63,2%
Work balancing	44,1%
Productionline Development	44,7%
Jidoka	30,3%

Source: own research 2017

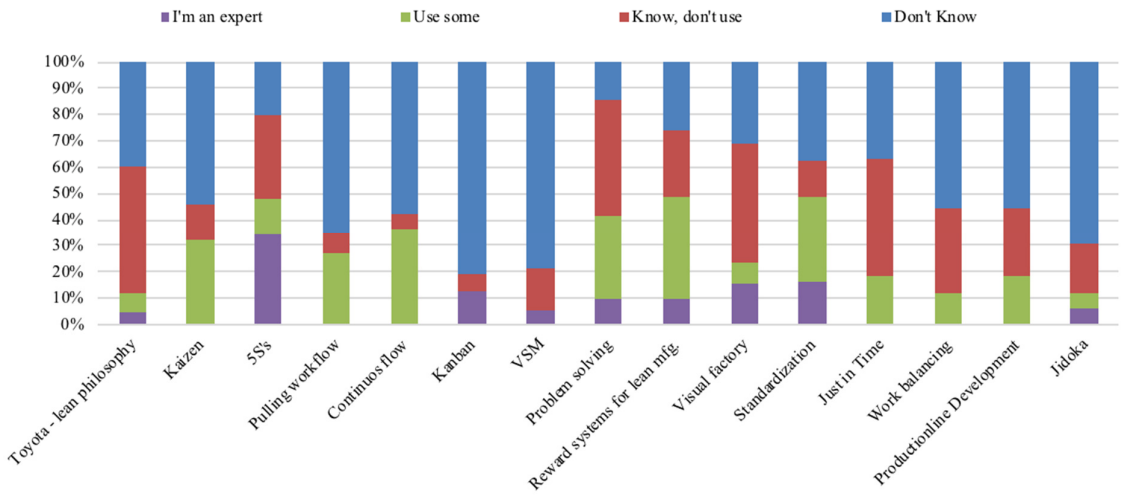

Figure 1: SME's Knowlede /Use of lean manufacturing -2017
Source: own research 2017

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Evaluation of Motivation and Remuneration in the Czech Corporate Environment Based on Factor Analysis

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Abstract

This paper aims to define the motivational preferences of employees at large concerns in the Czech Republic. The paper presents the results of empirical research at the level of employee motivation. The research was conducted at the end of 2018. Four hundred and forty-four companies were addressed. A questionnaire was distributed to companies in the manufacturing industry. The methods of data processing used were statistical mathematical methods, specifically the Chi-squared test and factor analysis. The study demonstrates that the possibility of career education and the transparency of remuneration have a large effect on the motivation of employees in the Czech environment; these results are subsequently compared with extensive theoretical research. The findings made by this study may be used as a tool to increase employee motivation, which has a direct influence on both employee performance and the performance of the company as a whole.

Keywords: employee motivation, the role of salary in remuneration, motivation theory, benefits, employee performance

Jel Classification: J24, L19, L25, M54.

Introduction

A highly competitive environment influences the success of a company, though this success is dependent on many factors that the company cannot influence. First and foremost, these are macro-economic and micro-economic factors that, taken together, we may call external factors. These include the political situation, the legislation, public opinion, the media and so on. Secondly, factors that the company influences itself have an effect on the success of the company, such as the standard of human capital, organisation within the company, the company's subject of business, its technological maturity, etc. In spite of the fact that the market is currently changing, and a new form of industry – Industry 4.0 – emerging, the human factor is indisputably the most important factor in any business. Although the new age will be characterised by robotisation and automation, many employers cannot imagine that robots will replace the human factor in their company (PWC, 2019). The principal role of personnel managers will, therefore, be not merely to find qualified staff, but first and foremost to motivate them appropriately and keep them at the company. And this is a process that is continually living, changing and developing, and one that is greatly influenced by the composition of the workers on the labour market. In global business, human resource management is considered a tool that helps the development and growth of both the company and the market as a whole (Gottwald et al., 2017).

Staff motivation and stabilisation has an interdisciplinary nature, since it is the result of the combination of a number of academic fields. Its thematic focus falls within the area of micro-economics, though it is also part of the theory of companies and company management. It also makes use of knowledge of the psychology of Man, and in particular applied psychology. It goes without saying that it also touches on macro-economics in the area of unemployment (during high levels of staff fluctuation due to inadequate motivation) and the creation of GDP (an adequate wage level guarantees staff the satisfaction of their needs by means of purchases). A productive working environment helps in attaining the goals of the company, for which reason motivation is an essential part of human resource management (Burma, 2014; Javorčíková, 2017).

The term motivation indicates the internal incentives for each individual to do something that leads to the satisfaction of his or her needs. Motivation expresses an internal stimulus for a particular behaviour (Zafar et al., 2014), and can also be defined as an endeavour to achieve a certain goal (Richman, 2015), while the authors Eshun and Duah (2011) describe motivation as the willingness to take efforts to achieve organisational goals, which is conditional to the ability to satisfy the particular needs of the individual.

Theoretical Background

The first theoretical approaches to the motivation of employees date back to the nineteenth century. A number of theories of job motivation have been defined, from classical theories to contemporary modern approaches that see the worker as a scientific model. One of the first theories concerning worker motivation is the instrumentality theory which is based exclusively on external control and entirely neglects other human needs. It also gives no consideration to the influence of the informal relationships created among the staff of the organisation. In contrast, Maslow's hierarchy of needs, evidently the most famous theory of motivation, does consider human needs. This theory states that as soon as a worker achieves the satisfaction of his or her needs at a given level, he or she moves a level higher. The highest need is the need for self-actualisation (Armstrong and Taylor, 2015).

Modern theories of motivation see the worker as a scientific model. Approaches of this kind include the theory of goal setting created by Locke and Latham. This theory states that the performance of a worker increases with growing goals. A great many authors have followed up from this theory, which has been used in many studies (e.g. Erez and Judge, 2001; Erez and Isen, 2002; Landy and Conte, 2010). Motivation as a process is based on two basic types of motivation – internal and external.

When studying motivation, it is also important to consider two other areas – worker performance and remuneration. Worker performance is influenced by the size of the remuneration he or she is entitled to, and this in turn influences his or her motivation. Worker motivation and satisfaction is then reflected in the worker's performance. These three terms are, for this reason, extremely closely related and cannot be seen in isolation. The dependency between working performance and motivation is undeniable (Cherian and Jacob, 2013; Khan, 2012); motivation is not, nevertheless, the only factor to influence working performance. Each company tries to be successful and competitive, for which reason a motivational strategy must be defined at each company. An integral part of this is a motivational programme that elaborates a specific system of work with people and contains specific rules, measures and procedures (Němečková, 2015).

When we consider worker stability, we must not neglect worker satisfaction, high-quality staff leadership and management, a feeling of fairness, an open approach to staff, career growth, the variability of work, the corporate culture, and transparency. Great attention is devoted to staff motivation in companies in developed market economies. Companies use the services of external firms that help with the appropriate configuration of motivational strategies, or employ experts in this area in-house. Reducing the costs associated with a high level of employee fluctuation connected with dissatisfied staff can be achieved by effective motivation, which is not, of course, focused on dissatisfied members of staff who want to leave the company, but on future members of staff (Němečková, 2015).

Staff motivation and remuneration is a key process at any company, as its functioning is always dependent on the human factor. The current situation on the labour market in the Czech Republic is imbalanced, since there are a large number of job vacancies and a lack of qualified staff. Companies are, for this reason, trying to offer new staff members benefits and advantages of many various kinds and a talent war is gradually beginning to break out (Businessinfo, 2019).

For a company to be attractive to employees on the labour market, it cannot neglect their needs. These needs change both over time and in dependence on change to hierarchical position within the company. Remunerations are generally divided into material and non-material rewards. The first are made up of monetary rewards, while the second are comprised of value rewards. This set of rewards has a

considerable influence of whether a staff member will seek a new job or not. Czech Business (2019) writes that monetary rewards resolve merely the basic needs of a company's employees. Overall staff satisfaction and motivation is, of course, also comprised of another two pillars. The second pillar is comprised of the company culture, while the third pillar is the work itself. Only a good balance between all three pillars leads to staff satisfaction. Research into employee satisfaction conducted by Gallup in 2017 indicates that the second and third of these components contribute as much as 87 % to a higher level of commitment among employees and their growing productivity, and a consequent increase in company productivity of as much as 30 % and an increase in company profit of 20 %. The management of employee satisfaction and commitment has been moving to the level of an improved employee experience in the last two years in the Czech Republic under the influence of "design thinking" (Czech Business, 2019).

Many studies demonstrate that motivated staff are more orientated towards independence, are more responsible and are typified by greater engagement in the company (e.g. Ryan and Deci, 2000; Thomas, 2002; Kuvaas and Dysvik, 2009; Vansteenkiste et al., 2007). Many managers presume that a material system is the best possible employee motivation. While it is a key element in keeping employees at the company, mere financial reward does not, as has been stated above, suffice to ensure the complete satisfaction of employees. An acceptable level may be achieved by managing employee motivation by means of financial reward alone, though truly excellent results cannot be achieved in this way (Mura et al., 2017; Strachová et al., 2018).

Motivation also differs by gender. Women and men build their careers differently, and education, profession and the selection of work are limited by stereotypes and social standards (Knapcova and Kucharcikova, 2015). Environment, tradition and society also have a significant influence on employee motivation. In their study, Ližbětinová and Hitka (2019) point to the difference in worker motivation in the Czech and Chinese environments. The employees of Czech companies are more demanding in obtaining the desired level of motivation, while Chinese employees are less demanding in all key areas – the atmosphere at the workplace, team leadership, pay conditions and the approach taken to employees. Preconditions for this difference can be found in the differing level of economic maturity (Poór et al., 2018) and the approach taken to workers.

Employee motivation, their performance and, consequently, the performance of the company are increased by the education of employees. In their study, Jones et al. (2009) point to the fact that training and the development of skills have a positive relationship with job satisfaction, which is subsequently interconnected with employee performance. Training can be considered a tool both to keep employees at the company and to increase competitiveness on the market (Kauffman, 2010; Khan, 2012). Open communication at the company also contributes towards greater employee motivation. This relates particularly to adequate communication in the assignment of tasks, feedback, communication regarding remuneration, and the strengthening of formal and informal relationships at the workplace (Abolade, 2015). Where there is inadequate communication, employees are not capable of meeting their tasks properly and the company does not achieve its goals, while inadequate communication within a working team reduces its performance. All these factors contribute towards weakening the corporate identity and, most importantly, reduce the performance of employees and their satisfaction and motivation (Rudd and Mills, 2015; Syallow et al., 2017; Robbins et al., 2010).

Methodology

This paper aims to find key indicators in group factors in the area of motivation for the top management of large concerns in the manufacturing industry in the Czech Republic. Motivation is a key area in the remuneration of employees as it makes it possible to retain employees at the company, to increase their productivity, and to ensure growth in the performance of the company and the management itself. The paper further aims to identify important latent variables that influence motivation in a company's top management as a select group of employees. Empirical data for the research was obtained by means of a structured questionnaire survey. Necessary conditions to the selection of companies were the number of employees, which had to be higher than 250 in order for them to count as large concerns, and the company's principal subject of business being the manufacturing industry according to CZ NACE

classification in category C. Only financially healthy companies, i.e. those not categorised as bankrupt or insolvent, were included in the research. The appearance of such bankrupt or insolvent companies in the research could lead to significant distortion of the results, since their remunerations could be purposefully reduced. A total of 444 companies were selected for the research.

The data obtained was evaluated by the program IBM SPSS Statistics. The mathematical and statistical dependence of selected variables was assessed by the use of the Chi-squared test and factor analysis. The primary function of factor analysis is the reduction of variables. Reduction can be performed only under the condition of the mutual dependencies of variables and the given dependencies being the result of the action of a certain smaller number of unmeasurable quantities in the background, known as factors. Numerical results or visualisation by means of a scree plot can be used for the evaluation of factor analysis. Such a scree plot depicts the scatters of all factors. The curve is a falling curve and the limit determining the appropriate number of factors is found where there is the largest fall in the scatter between two factors (Cattell, 2012).

The essence of factor analysis lies in the selection of correlation and partial correlation coefficients. The aim is to uncover the correlation structure of the group of manifest variables on the basis of a lower number of latent variables that cannot be measured. Two tests are used to assess suitability (Tarnanidis et al., 2015; Conti et al., 2014):

- The Kaiser-Meyer-Olkin Test (KMO) – the determinant is its coefficient located within an interval of <0;1>. The closer the value is to the number 1, the more suitable the given group of variables is for the use of this analysis.
- Bartlett's Test of Sphericity – the basis is the definition and testing of the null hypothesis that the correlation matrix of variables is unitary, and therefore that the variables are not mutually correlated.

Results and Discussion

The theoretical part of this academic research focused on the remuneration of employees and their motivation. These two areas are extremely closely interconnected, and remuneration is of key importance to the motivation of employees. The variability of remuneration of top management is higher than it is among other employees, since the nature of their work is also more variable. Since the top management is critical to any company, emphasis must be placed on its motivation and, thereby, its increased loyalty to the company. This paper focuses, then, on determination of the factors that influence the motivation of this select group of employees.

The following factors were defined by factor analysis:

- X_1 – the fixed amount of the gross monthly salary of the employee
- X_2 – the development of personal skills and knowledge
- X_3 – the fairness of remunerations
- X_4 – the variability of work
- X_5 – the transparency of remuneration
- X_6 – the communication of remuneration

The chosen variables can be interpreted as a preliminary result, since this research also has its statistical limits that are later described in the article. The barriers to the research and the possibilities for subsequent future research are also defined.

The KMO test is used for the purposes of factor analysis; its value should not be lower than 0.5, while the resultant value of this test falls within an interval of <0;1>. In addition to the KMO test, Bartlett's Test of Sphericity was also used to assess suitability. A KMO test value of 0.594 was recorded for the selected variables and the research conducted, while the significance of Bartlett's Test of Sphericity was 0.000. The hypothesis of the sphericity of the correlation matrix (or the fact that this is not a unitary

matrix) can be rejected thanks to this result. The chosen methodology would, therefore, seem to be appropriate for the assessment of the data obtained.

The total scatter of performance indicators is defined according to values that represent the scatter explained by the individual factors. The results presented demonstrate that only two factors attained the minimum required limit, which is the number 1. The factor analysis performed therefore extracted two factors that explain the differences of all the individual cases at a level of almost 52 %. The main result of factor analysis is a rotated matrix showing the strength of the individual variables. The Varimax method is used for rotation, and was also used in this case. The selected factors are defined as follows:

$$I1 = 0.769\ X_2 + 0.648\ X_3 + 0.722\ X_4 + 0.546\ X_6 \quad (1)$$
$$I2 = 0.849\ X_1 + 0.4358\ X_3 + 0.486\ X_5 \quad (2)$$

The indices determine important factors that affect the motivation of top managers and contribute to the greater loyalty of these employees and the performance of companies and management itself.

Table 1: Extraction of variability into new factors

	Initial Eigenvalues			**Extraction Sums of Squared Loading**			**Rotation Sums of Squared Loadings**		
Components	Total	% of VAR	% of Cumulative	Total	% of VAR	% of Cumulative	Total	% of VAR	% of Cumulative
1	2.017	33.621	33.621	2.017	33.621	33.621	1.908	31.801	31.801
2	1.096	18.272	51.893	1.096	18.272	51.893	1.206	20.092	51.893
3	0.956	15.925	67.818						
4	0.831	13.842	81.661						
5	0.701	11.682	93.342						
6	0.399	6.658	100						

Source: The authors

The first two components contribute most to explaining the variability of the original factors (variables). The first of these explains 33.62 % of the variability and the second 18.27 %. Both these factors together then explain 51.89 % of the variability of the original model. The number of factors is selected according to its value, which determines variability. This value should be higher than 1. It is clear from Table 1 that the value of the third factor is extremely close to 1 and could, therefore, be theoretically included among the group of factors explaining the variability of the model as a whole. This factor was not, however, included for reason of the improved interpretation of the results, since the overall variability would increase by just 15.92 %.

Visualisation of the results by means of a scree plot also serves for the assessment of the suitable number of factors. The number of factors at which an “elbow” occurs should be chosen. A visualisation of the results is given in Figure 1.

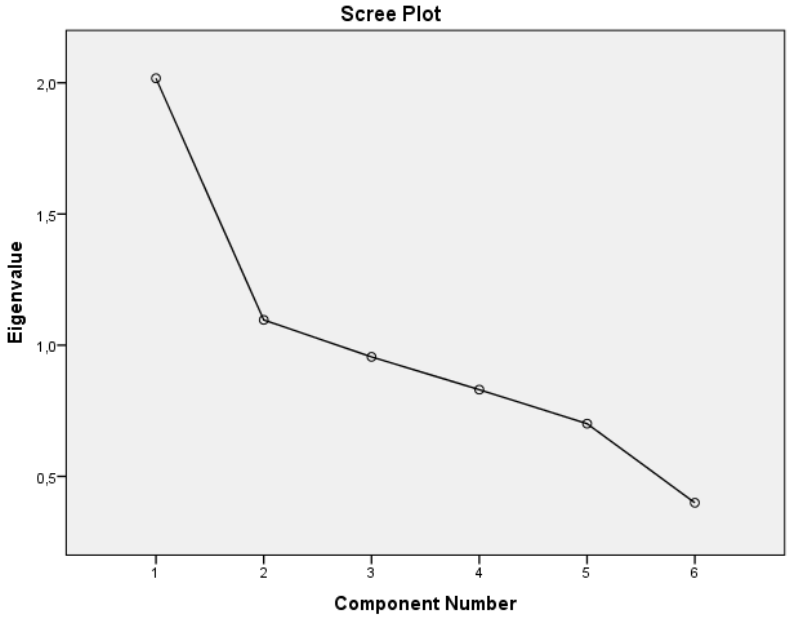

Figure 1: Scree plot of the number of factors. Source: processing by the authors in the program IBM SPSS Statistics

Comparison of the results of the empirical research performed with the theoretical research confirmed that the employees at the Czech concerns addressed see the possibility of further education and career development as a tool for increased motivation (factor X_2). These results are also confirmed by the research by Jones et al. (2009), Kauffman (2010) and Khan (2012). The research confirmed that the openness of communication and transparency of remuneration is also a motivational factor, and this was defined as factors X_5 and X_6; this motivational factor is supported in the theoretical research by the works by the authors Abolade (2015) and Syallow et al. (2017). Factors such as the fairness of wages, their fixed amount and the variability of work are, however, also important factors for employees in the Czech Republic.

The indices created may serve company owners in particular. The limit to this research is the engagement of a low percentage of the managers addressed, for which reason these results cannot be applied across the board for all concerns. Future research could focus on various forms of benefits and specific remunerations for top management and their relationship to the increased motivation of these employees.

Conclusions

At a time of ever-increasing company competitiveness, and with the coming digitalisation in the form of Industry 4.0., it is now more essential than ever to assure and satisfy the needs of one's employees by means of their motivation and a wide range of benefits. Financial valuation in the form of a salary is no longer entirely sufficient, though it remains a strong motivational factor (Mura et al., 2017; Strachová et al., 2018). Economic development and the situation on the labour market are forcing companies to come up with new forms of remuneration in order to assure the loyalty of employees, who are an increasingly important production factor in the company (Gottwald et al., 2017; Zameer et al., 2014). As the study by Hitka et al. (2017) states, motivational factors in the Czech Republic are comparable with those in the business environment in Slovakia and Hungary. The paper presented here points to six important factors that increase the motivation of employees in the Czech Republic, and thereby contribute to their greater satisfaction and, subsequently, performance.

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Motivational-Emotional Aspect of Training and Personality Development for Students with Special Abilities

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Abstract

Key factors of successful activity in the modern world are the learning, innovation and cooperation. Identification of abilities in the early age is necessary for further development and success of human activity in the future. The aim of the study is to highlight the results of the empirical study aimed at motivational factors that influence the identification and formation of the personality of pupils with special abilities. To study motivation of pupils, questionnaires and methods were used of personality diagnostics on motivation to success of T. Elers. The Questionarie of creative behavior KANE of S. Popek was applied for the study of pupil's creativity level and the peculiarities of their cognitive and characterological spheres. In the theory of multiple intelligences was indicated that success depends on the extent to which the person is using intelligence, and the goal of the school should be to develop the intellect and help the young person to achieve a professional and unprofessional goals that corresponds to a specific spectrum of intellects.

Keywords: Immanent Motivation, Emotional-Motivational Training, Spiritual and Moral Training

Introduction

Creativity, which is a fundamental characteristic of human nature, can be manifested in any activity, attitude to work, etc. There is a direct relationship between the development of creativity and the acquisition of competence as the ability of a person to perform a certain type of activity, which is expressed through knowledge, skills and other personal qualities. Creativity, as an expression of the health of the person, makes more interesting all the activities in which a person is involved. Formation of a creative person is preparation for self-development, management of one's own life, perfection in the chosen branch, self-realization, creation of one's own personality. Key factors for successful activity in the modern world are the learning, innovation and collaboration.

The purpose of the study is to highlight the results of the empirical study aimed at motivational factors that influence the identification and formation of the personality of pupils with special abilities.

Objectives for the goal of the study:

1. To reveal the informative characteristics of identifying abilities and the dynamics of their formation in pupils with special abilities.

2. To analyze the motivational factors influencing the formation of the student's personality with special abilities.

3. To reveal methods of revealing motivational dispositions of the person, which were developed in certain conditions of social environment.

Research Methods

The problems of creating appropriate systems of motivational-emotional programs for students with special abilities have been studied by a large number of scientists (A. Aubert, S. Molina, T. Shubert, A. Vidu, 2017; R. Kershner, 2016; L. Simpson, Y. Bui, 2017; A. Mez, L. Puigvert, R. Flecha, 2011).

The connection between intellectual and non-intellectual features in the structure of abilities drew attention D. Renzulli (1977). His model of abilities shows the interaction between the three main groups of personality characteristics, in particular creative ones. D. Renzulli (1977) assumes that human abilities develop through the interaction of the triad: intellectual abilities, creative abilities and motivation, which is integrated through the person and the environment of human life. It is about the cognitive and motivational spheres of the individual that were developed in a particular social environment.

S.Popek (2004) believes that the theoretical basis for the development of creative abilities is the interactive theory of abilities, which takes into account the appearance and influence on the human abilities of several equal spheres of the personality of man. The general model of abilities should take into account the interaction of the genotype with the environment. but within these factors, on the one hand, different spheres of personality that determine (intellectual, creative and special) abilities on the boundary of the genetic environment.

G. Gardner (2004) built the theory of multiple intelligences by distinguishing linguistic, logical and mathematical (as a set of logical, mathematical, and also scientific abilities), spatial (as the ability to create a mental model of the spatial world and the ability to maneuver and operate with such a model) musical, interpersonal (as the ability to understand other people, motivation of actions), physical-kinesthetic and intrapersonal (as a relative introverted ability, the ability to formulate an exact and actual model of oneself and ability to efficiently operate this model in real life) intellects. G. G. Gardner (2004) interprets intelligence as the only ability that helps in any problem situation. In particular, bodily-kinesthetic intelligence is the ability to solve problems or simulate the effects of using the whole body or its parts. As G. Gardner notes (2004) success depends on the extent to which the person is using intelligence, and the goal of the school should be to develop the intellect and help the young person to achieve a professional and non-professional goal that corresponds to a specific spectrum of intellect. In the theory of multiple intelligences, the biological origin of each skill is taken into account in solving problems.

To study the motivation of students, questionnaires and methods of personality diagnostics were used to motivate T. Ehlers' success (Practical Psychodiagnostics, Methods and Tests, 1998). To study the level of creativity of students and the peculiarities of their cognitive and characterological spheres, the Pitalnik of the creative behavior of KANE S. Popek (2004) was used.

Results

We attracted teachers working with teaching young people with special needs. We selected teachers from more than 30 educational schools from different countries of Eastern Europe. Ultimately, we wanted to establish whether teachers use non-standard teaching methods or only traditional ones (Figure 1).

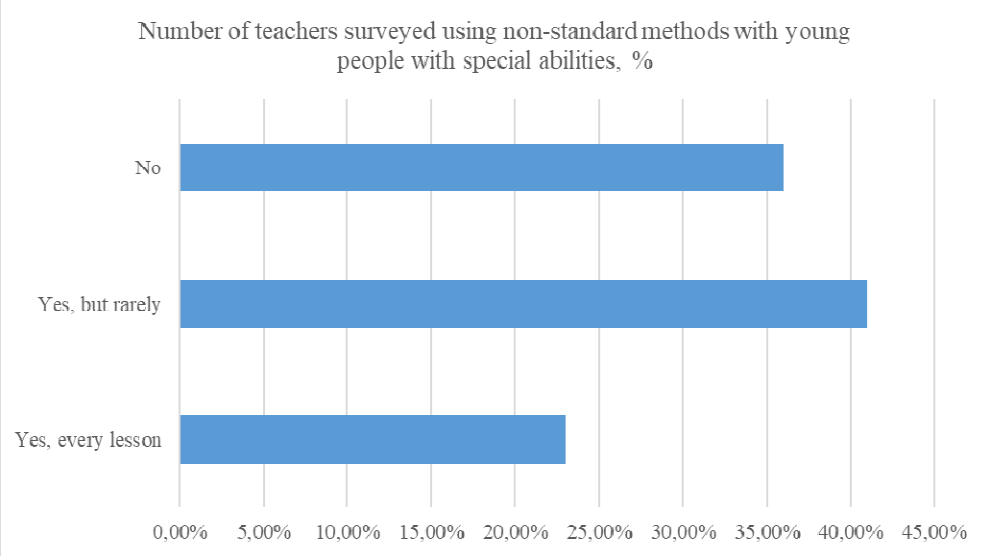

Fig 1: A survey of leading teachers in Eastern Europe on the use of non-standard methods of teaching the pupils with special abilities (created by authors)

Identifying one of the types of intelligence (abilities) at an early age is necessary for its further development and success of human activity in the future. The modern school is more oriented towards the development of logical and linguistic intelligence. According to G. Gardner (2004), this may inhibit the development of other intellectuals, in particular bodily-kinesthetic, which is often important for the development of personality, especially for achievements in sports. The goal of the school is to help young people achieve their chosen life goal, which is appropriate to their range of abilities and educational needs. The search for and implementation of non-standard teaching methods for the development of students in order to identify and develop individual enrollments are the following phases:

• information, which consists in the selection or creation of organizational forms for implementation in practice and search-creative training schemes, forecasting of the results of activity;

• motivational, which means to form a creative and supportive learning environment;

• strategic, aimed at introducing innovative teaching methodologies into practice. In this phase, the teacher's readiness for creative activity and the search for ways to implement the planned learning outcomes and personality development are required the ability to reorient in the course of the activity;

• diagnostic, in which the analysis of the learning outcomes and the planning of the system of appropriate pedagogical influences is carried out in order to correct the educational activities.

Development is the result of the genotype - environmental interaction (Aleksandrov, 2004), and factors hereditary and environment are interrelated. The group influences all its participants,

normalizes educational, cognitive standards. Creativity is impossible if there is no definite (creative) environment (Druzhinin, 2007). The thrust to creativity begins in a group of people - real or potential associates (followers). For children with special abilities there are two models of behavior in a group, namely:

• be like everyone; then there is a danger of losing their creative potential;

• develop in accordance with their capabilities, that is, as a creative personality.

In the first case, the adaptive ways of developing the creative individual are possible on the condition of solving the problem associated with the adaptation, which means to find the appropriate favorable environment. Creative people are non-conformist, and personal standards are more important to them than group standards.

Young people need to be able to anticipate changes and adapt to them on the personal and social levels, creative activity helps to adapt to the changes in modern life to increasing they spiritual and moral training. Every person has an individual set of interests, therefore the presence or absence of an incentive for their development and implementation is decisive. The definitions of abilities relate to individual psychological peculiarities, which are subjective conditions for the successful implementation of a certain type of activity and peculiar qualities (a combination of certain features, characteristics, peculiarities) which allow to reach a certain level of creative activity.

The development of creativity can take place by this way: on the basis of general giftedness, under the influence of social microenvironment, imitation and training, a system of motives and personal qualities is formed (non-conformism, independence, and motivation for self-actualization). Then it is ambitious and stubborn, enduring and principled, creative people are indifferent to the critique of young people.

In the motivational-emotional sphere, the activity of the teacher is aimed at helping students open their own creative abilities, increasing their self-esteem and overcoming obstacles that complicate activity, and develop optimistic approaches to problem solving (Vişan, 2017).

Immanently motivated person brings joy to the very activity, while a person motivated by the need for achievements is satisfied with the results of this activity. Voltage and nervous experiences, increased mental activity accompany the process of studying at school. The lessons of physical culture and sport are a way of relieving stress, gaining callous emotions and motivating to study and train, gain social qualities and form a personality.

Human creativity in the chosen industry can be motivated in many ways. Different stages of the individual development of the creator will require different motivational factors. External motivation associated with a reward or its expectations may be a stimulus to the activity of a particular type. Subsequently, along with the pleasure received through the performance of creative activity, personal motivation appears. Then the value of external awards and praises diminishes. This phenomenon T. Amabaill (1996) calls motivational synergy. The motivation and emotional training of creativity is offered for the formation and development of the student's motivational and emotional-volitional fields (endurance, readiness for risk, non-conformism, will, ability to overcome obstacles). Trainings of creativity are the way to stimulate, support and develop special abilities of the person to perform a certain type of activities. One of the basic features of creative thinking is an active approach. The need to demonstrate their own preferences does not, in the majority, contribute to creativity, and the need to achieve a higher level of mastery and professionalism in the chosen industry will contribute to this. The need for excellence is close to the so-called "hubristic" motivation as an attempt to confirm and enhance the importance of one's own person (Tokarz, 2007). The purpose of the motivational-emotional type of the training of creativity is the development of motivational dispositions. They are needed to form, if necessary, the ability to stimulate the motivation process

(for example, interest, initiated creative activity, the desire to successfully perform a certain type of activity, the desire to win).

Examples of training tasks:

Exercise "Auction of motives". Exercise is needed, first of all, to determine the rating of factors that support activity or an obstacle to active activity.

The teacher invites students to write what encourages them to perform a certain type of activity, preparation for something, the desire to improve the result, the desire for success and victory, that is, the motives of their activity. The following options were obtained:

1) interesting because pupils learn something new, get new knowledge, interesting information;

2) an attempt to prove that it is possible to overcome difficulties, to win the competition, the desire to be useful to society, that is, social motivation;

3) demonstration of its significance, the desire to take a worthy place in the classroom, in a team, that is, positional motives (hubristic motivation);

4) the desire to be interesting for peers, to develop and improve, to succeed, to win, that is, the motives of own growth, improvement;

5) awareness that certain achievements at a young age are welfare and recognition in the future, high-paying work;

6) need to work, parents and trainers require high results, ashamed before teacher, coach, that is, narrow educational motives;

7) fear of being threatened to be mocked, fear of criticism, fear of losing;

8) excessive motivation as a consequence of a lack of time and external pressure;

9) fear of risk, fear of a new one;

10) reluctance to identify their own activity, generate their own ideas or lack thereof;

11) the continuous desire to criticize the achievements and behavior of others without their own achievements and constructive suggestions;

12) learning and achieving something in life does not make sense, do not need.

The teacher holds an auction at the lesson where pupils can buy training motives. The auction consists of two parts. At first, purchases of motives-stimulators of creative activity are carried out, and then - inhibitors (obstacles) of creativity. The "buy" motives the teacher stimulates in various ways (given the situation moments, conditions, features of the class, teams, proposals, etc.). Conducting a didactic game sets the teacher with certain requirements, namely: emotional maturity and personal creativity.

Students give out a certain number of "conditional units" to participate in the auction, for which a motive can be obtained. It is clear that the corresponding motive will be received by someone who will pay more for him. After the "sale" of motive-stimulants go to the second part of the auction, there is a "sale" of motives-inhibitors. The meaning of their acquisition is the finding the stimulant

content in the motive-inhibitor, one can get the same number of "conditional units" as previously expended. While the buying a motive-inhibitor, they need explanations, for example, the activity because of fear does not justify the hopes you have on your victory in the competitions forming the ability to overcome oneself, overcome their weaknesses, which will help to achieve success. The winners of the auction are determined by the final amount of each of the participants, which the teacher can reward at his discretion.

The result of the auction, in particular, is the discovery and research of the motives that dominate the students, on the basis of which it is possible to make correction if necessary. The motives that have a direct impact on the development of special abilities of the child are desirable. To do this, among other things, you need a corresponding social order for the results of work and the belief that high qualifications and a high standard of living - things are interconnected. Significantly influence the process of forming the motives of the dominant set-ups in society, that is, what society is guided by, parents, mentors, what is the position of teachers and trainers.

• Exercise "Overcoming the stressful situation". Discussion of difficult situations that arise or may arise during training, conflicts with teachers, mentors, classmates, parents at home. The conflict situation, ways of overcoming it are analyzed. Students are encouraged to submit suggestions on ways to remove internal tension or poor health. To do this, you can use the method of brainstorming.

• Exercise "Ability to listen". Exercise to develop the ability to listen to the arguments of others, the ability to conduct a dialogue with mentors and peers. Several students together choose an object or phenomenon, describe their characteristics, the principle and result of action, the possibility of application, not naming the object itself or phenomenon. The rest of the students should disclose them by description and explanation.

• Exercise "Naive Questions". One of the students plays the role of a naive person who does not understand the simplest tasks, and in this regard puts unexpected but logical questions that must relate to problems that are, at first glance, obvious.

A series of such "naive" questions makes it possible to obtain two effects, namely: firstly, it becomes clear how some of our beliefs and positions are somewhat obvious, and therefore can be changed if necessary; and secondly, it turns out that our solutions are built on non-verbalized knowledge, and therefore so little can be changed if we adhere to standard and ill-informed statements and assertions.

In the motivational-emotional sphere, the activity of the teacher is aimed at helping students open their own creativity, increasing their self-esteem and overcoming those obstacles. which complicate activity in any activity, development of optimistic approaches to problem solving.

Discussion

Studies have shown that after completing the tasks of motivational-emotional training, the number of students with moderately high and very high levels of motivation increased and the number of pupils with low and moderate levels decreased accordingly (as shown in Figure 2).

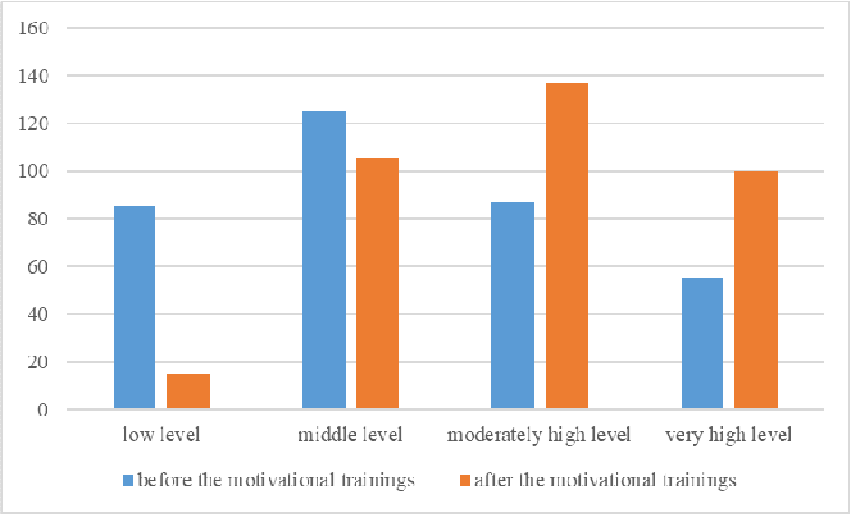

Fig. 2: A survey of leading teachers in Eastern Europe on the use of non-standard methods with teaching the pupils with special abilities (created by authors)

For the same functional readiness for the competition wins the one who has the best emotional and psychological readiness. Sometimes in sports the winner is not the one who has a higher level of training, but the crash of psychological readiness for the competition is better motivated. Although too much motivation can become an obstacle to creativity lead to burnout before the start of the competition, start.

Studies have shown that teachers, mentors with greater pleasure work with students with a higher level of intelligence, but not creative, than with a relatively lower level of intelligence, but creative and active, at their same level of achievement. The teacher must adhere to psychological and pedagogical principles in his creative methodological work, which relate to the conditions of the development of the individual, to take into account the various aspects of the learning environment.

Conclusions

Every person is born with certain instincts, has certain abilities that need to be identified, stimulated and developed in context of spiritual and moral training. It is a guarantee of successful activity in the future. It is important to identify the abilities of the child in preschool and early school age, in order not to lose them. Knowledge of laws that have an impact on the processes of change can be an instrument for improving the innovation in education. General knowledge of this type helps to understand what different forms of change differ, their course and what will be pedagogical and social consequences.

The psychological state of a person, his mood for success, his motivation, the confrontation with external pressure, and the ability to overcome stressful situations are important for successful study and achievement of good results in studying and sports. The goal of the school is to help young people to achieve their chosen life goal, which is appropriate to their range of abilities and educational needs.

For the formation and development of the pupil's motivational and emotional-volitional fields (endurance, willingness to risk, non-conformism, freedom, ability to overcome obstacles), motivational-emotional training of creativity is offered. The teacher must adhere to the psychological and pedagogical principles in his creative methodological work, taking into account the various aspects of the learning environment. For a successful study and the achievement of good results in

education and sport, the psychological state of a person, his or her determination to succeed, the confrontation with external pressure, and the ability to overcome stressful situations are important.

Human creativity in the chosen field can be motivated in many ways. Every person has an individual set of interests, therefore the presence or absence of an incentive for their development and implementation is decisive. Different stages of the individual development of the creator will require different motivational factors. External motivation associated with a reward or its expectations may be an impetus for the activity of a particular type. Subsequently, along with the pleasure received through the performance of creative activity, personal motivation appears. Then the value of external awards and praises diminishes. The objective of the school is to help young people to achieve their chosen life goal, which is appropriate to their range of abilities and educational needs. Aubert A., Molina S., Shubert T., Vidu A. (2017). Learning and inclusivity via interactive groups in early childhood education and care in the Hope school. Spain. Learn. Cult. Soc. Interact. 13 90–103. 10.1016/j.lcsi.2017.03.002

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Road Signs Evaluation and Improvement of Effectiveness Using Mobile-Eyetracking Method - Conteptual Framework

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Abstract

According to World Health Organization, motor vehicle accidents on raods cause more than 1.2 million deaths worldwide. This isseriousproblem,whch requires serious concern. One of main primary sources on causes of road accidents may be police reports of road accidents. According to them, one of important primary factors may be connected with road signs readibility and ease of understanding. To improve that author proposes use of eyetracking technique,whichmay helptounderstand how drivers see and perceive road signs. This may lead to better ways of informing drivers on roads. Inthis paperpreliminary research has been done for future research.

Keywords Safety on Roads, Eyetracking, Road Signs Effectiveness

Introduction

According to World Health Organization, motor vehicle accidents on raods cause more than 1.2 million deaths worldwide (World Health Organization, 2015) This isseriousproblem,whch requires serious concern. One of main primary sources on causes of road accidents may be police reports of road accidents. According to them, one of important primary factors may be connected with road signs readibility and ease of understanding.

The quality of ways how road sign inform drivers how to drive may influence traffic, and futher its safety. City of London, drove research that phas proven that anything which facilitates consistency and predictability would result in smoother traffic flow. However, this seems to be very often not take into consideration. The same report indicated that drivers in central London feel particularly strongly that existing signage is inadequate and does not help them to navigate. A sample roadsigns that make it difficult to understand has been shown on Fig.1. This has a detrimental impact on consistency because people who are having difficulty finding their way will often be travelling more slowly. Respectively, a large number of traffic signs can result in the same problem [Smoothing… 9]

Fig. 1: Sample road signs overuse

Therefore it is essential that, when installing traffic signs, road authorities should make sure that the signage provides a service readible and useful information to the user and does not gerenate unnecessary confusion. This means first and foremost, avoiding an 'over-population' of traffic signs which, apart from confusing users, is also an ineffective use of public resources.

This may be confirmed by police reports. Which place among most frequent traffic colision sources such factors as Eyesight problems, physical problems, slow driver reaction, fatigue, weather, inattention, road conditions, poor driver judgement.

Table1: Main sources of traffic collisions in police reports

Police	Male drivers			Female drivers		
	Younger	Middle age	Older	Younger	Middle age	Older
Other driver (third party)	3.90	6.49	3.90	2.60	3.90	2.60
Unfamiliar with road (layout, route)	1.30	2.60	2.60	3.90	0.00	6.49
Drugs or alcohol	80.52	74.03	45.45	63.64	70.13	29.87
General driving ability (skills)	6.49	2.60	9.09	7.79	9.09	10.39
Excessive speed	80.52	72.73	32.47	72.73	59.74	24.68
Inexperience	61.04	3.90	2.60	62.34	6.49	7.79
Dangerous driving (peer pressure, showing off)	31.17	9.09	5.19	11.69	1.30	2.60
Distraction (phone, friends, kids, outside)	68.83	55.84	19.48	88.31	67.53	22.08
Driver error (poor judgement)	14.29	11.69	36.36	15.58	22.08	40.26
Road conditions (road layout, road hazard)	20.78	28.57	20.78	28.57	29.87	28.57
Inattention (concentration)	15.58	20.78	25.97	20.78	27.27	15.58
Careless, reckless or in a hurry	12.99	11.69	9.09	15.58	11.69	9.09
Vehicle defects (mechanical failure)	22.08	16.88	12.99	14.29	14.29	9.09
Weather	25.97	29.87	23.38	20.78	31.17	28.57
Overconfidence	7.79	3.90	1.30	1.30	3.90	0.00
Failed to look properly (poor observations)	6.49	9.09	10.39	5.19	5.19	11.69
Traffic	2.60	2.60	2.60	3.90	1.30	3.90
Fatigue	12.99	32.47	19.48	15.58	28.57	19.48
Driving too slow for conditions or slow vehicle	0.00	0.00	0.00	0.00	0.00	3.90
Slow driver reaction	0.00	0.00	20.78	0.00	2.60	22.08
Medical condition (physical impairment, medication)	10.39	35.06	77.92	10.39	23.38	67.53
Poor visibility	5.19	5.19	9.09	6.49	7.79	16.88
Eyesight (uncorrected or defective)	0.00	7.79	57.14	0.00	6.49	53.25
Dazzling light (headlights or sunlight)	1.30	5.19	2.60	0.00	5.19	2.60
Nervous or uncertain (hesitation, confusion, lack of confidence)	0.00	1.30	11.69	2.60	9.09	15.58

The influence of most of them may be reduced through effective road signs system, which would be helpful not only in good driving conditions.

Dr. Rune Elvik, "General overview on Road Safety", 1999, has interpreted these basic requirements. They reflect the main goal of road safety, whichmay be measured by reducing road accidents rates. It should be interpreted as a sequence of all 4 basic requirements that must be met, in a cascading flow, in order for the road sign to be effective. This may be presented ason Fig.2

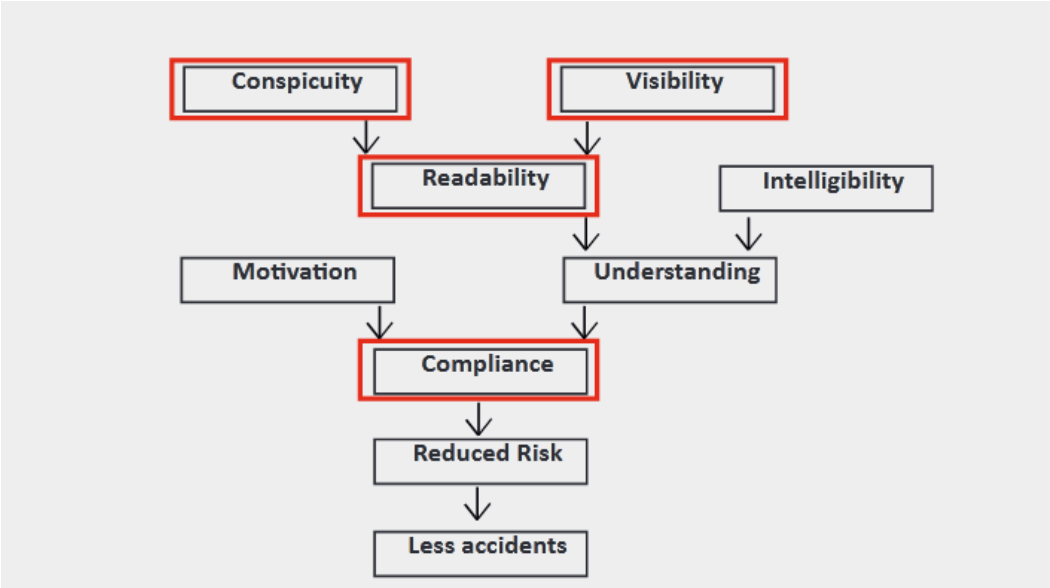

Fig. 2: Cascading flow of sources for effective road sign compliance

Eyetracking method

Modern technologygave researchers chance to observe what people look at. This was enabled due to human eye properties, which require people to point the yellow spot at an object that one want to see clearly. Equipement that allows tracking tese movements are Eyetrackers. Usually they use infrared radiation, which allows to determine what is currently being watched by the respondent. Very often it is used to track what is viewed on a websites as the monitor screens have a fixed position in space, and therefore are relatively easy to process data collected during the eye movement study. However, Eyetracking technique advances allowed to build portable devices, which maily are used inmarketing research. Both of them collect data very quickly (usually determined 25 in simple and static research and up to 500 times per second in a precise and dynamic ones). The result data determine the location in space that personunder research looks at, so they are very difficult to understand. Therefore, it became necessary to create methods for imaging the collected results so that they were readible and possible to be interpreted ina simple way by people. [Manhartsberger, M.; Zellhofer, N. (2005)]. Currently, inEyetracking, the most common and used techniques are: Hetamaps and Gaze-plot charts. Additionally, these methods are often accompanied by Think Aloud method, in which beside of eye movements, researchers note all statements and thoughts said by participants.

Heatmaps

Heat maps (heatmaps) were created as the application of the imaging technique known from cartography - where the height is imaged using colors. Originally, the red color on the maps was determined high altitudes, yellow - medium and green smallest. This scale has been adopted - and in the heatmap technique, the points of his focus are applied to the image viewed by the respondent. It is assumed that in the image viewed the areas in which the view was the most concentrated are illustrated in red, those which on average attract attention are shown in yellow, those that have only a minimal focus - they are illustrated in green. Areas that were not directly watched are left with the original filling. The respondents' attention may be calculated differently in this technique - the measures used are most often used [Bojko A.. (2009), O. Špakov, D. Miniotas (2007)] They may illustrate the number of times that a given area has attracted the subjects' eyesight, the time that the area was directly watched. In addition, the shape of the heatmap is influenced by the factors that shape the way of calculating the area of attention - the most important of which is the radius around the central point, which is affected by vision Sample heatmap is presented on Fig. 3 [Świerczyńska-Kaczor, U.; Wachowicz, J. (2012)]

Fig. 3. Sample Heatmap

Gaze plots

Gaze plots allow you to track the movement of the focus point for a given person. They are an illustration of observation that people do not look continuously. The movements of the eyeballs are of rapid nature - they move quickly from point to point, in which points the conscious reception of the image takes place. These points are called saccades, and paths are between them - transits. The gaze-plot charts illustrate both saccades and transitions. [Salvucci, D.D., Goldberg, J.H. (2000)] The first ones are depicted as circles whose radius is directly proportional to the time of focusing attention (thus allowing to differentiate the significance of observed points). The second one illustrates the path of eyeballs movement between the saccades. [Räihä KJ., et al. (2005), Sav Shrestha; Kelsi Lenz (2007)] In addition, numbers are placed on the sacraments indicating the order in which the given point was observed. An exemplary gaze-plot chart is illustrated on Fig. 4 [Świerczyńska-Kaczor, U.; Wachowicz, J. (2012)]

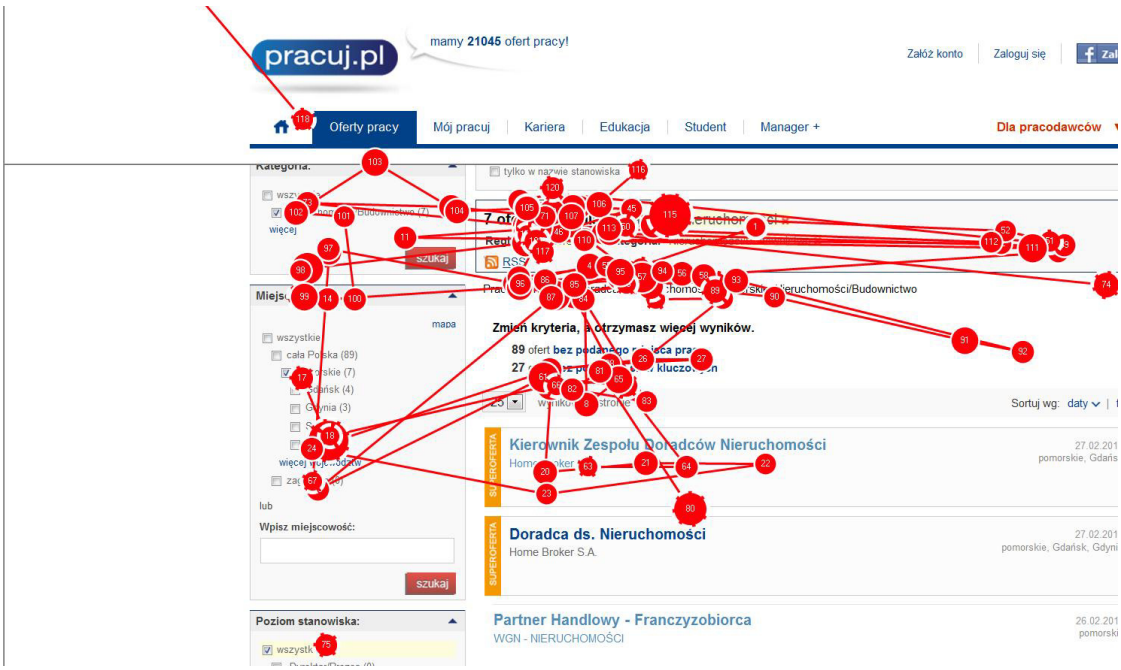

Fig. 4: Sample Gazeplot

The Research Framework

Use of modern mobile eyetracking technology allowing observation of eye movements may help understand how drivers perceive road signs which factors are crucial for effective understanding information necessary for a safe trip. This would require research done with mobile eyetracker hardware with dedicated software allowing readible presentation of obtained data, preferably in a form of heatmaps, which show which parts of visible area were mostly observed or as gazeplots which illustrate eye movements of a person under research. Such data should be colleted in different conditions (day/night, good/poor visibility, a lot of/moderate sign density etc.) as well as preferably for different drivers (e.g. men/women, young/elderly).

Conclusion

Safety on roads is one of points of interest in European Union. One of influencing factors is quality of road signs and its understandibility and ease of perception by drivers. Presented research concept is tryig to find answers in this important field with a concept of use of modern mobile eyetracking toolset.

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Plant Protection Products in Romania. Case Study Brăila County

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Abstract

To reduce the losses caused by diseases and pests, weeds and other plant pathogens, in addition to the agro-technical measures used, pesticides are widely used in agricultural production both preventive and curative. The paper proposes an analysis of the quantities of plant protection products, at the country level as well as at the level of Brăila county, between 2012-2018. To carry out the work, official statistical data were analysed and processed. The results of the researches highlighted the fact that by withdrawing from the market of several plant protection products and by approving some plant protection products that are used in much lower concentrations, the consumption of these products decreased slightly in recent years.

Keywords: Agriculture, Agricultural Technologies, Plant Protection Products

Introduction

The challenges generated by the global increase in the demand for food, mainly due to the demographic evolution of the last years, have required that at global level the traditional agriculture to be gradually replaced by an intensive agriculture, in which, through efficient agricultural technologies, the plants shall be provided with the optimum water requirement, nutrients, light, heat, density - space for nutrition, protection against diseases and pests, factors with direct impact on production (Stanciu, 2017). This production system has brought many economic benefits to agriculture, but in the longer term it can create imbalances in the environment. Production of agricultural crops is particularly sensitive to the weather conditions prevailing at key times of the year, as well as to the attack of diseases and pests, which imposes plant protection procedures against weeds and pests. (ICPA, 2019) According to Braicoop cooperative specialists, about one third of the potential crop is destroyed by harmful organisms, so plant protection is an important technological link that can help increase agricultural production and improve crop quality (http://braicoop.ro). For example, in lower temperatures in spring, the growth rate of maize plants is slowing down, which may favour the attack of pests, especially the maize leaf weevil *Tanymecus dilaticollis* which can

completely destroy the crops. Research conducted at NARDI Fundulea in this regard, under field and laboratory conditions, highlighted the need for maize seed treatment to combat this pest (http://www.incda-fundulea.ro/anale/82/82.22.pdf). Also, spring-summer droughts and heat waves can cause significant production losses, and weed development and pest attacks can increase in size, making harvesting difficult and reducing crop quality (Stanciu, 2018). Therefore, the meteorological and hydrological conditions play an important role in the level of crop production, the plants need a number of favourable growth factors and actions to reduce pests. For the reasons presented above the control of weeds, diseases and pests, by applying treatments with plant protection products is necessary for the cultivation of plants (Stoica (Dinca) et al, 2017). Applying plant protection procedures against harmful organisms is a major component of GAP, guidelines for Good Agricultural Practices. According to the Report on the Implementation of Directive 2009/128/EC, the use of pesticides has been steadily increasing in Europe since 1996, although there has been much discussion about the sustainability of agriculture and despite the introduction of pesticides that can be used in small doses, average use has not decreased significantly in recent years. The total volume of annual sales of pesticides at European level amounted to 400,000 tons in 2015, the vast majority of them being used in agricultural production. (http://www.europarl.europa.eu). The use of these products, which must be officially approved and officially recommended or authorized by the competent national authorities for the purpose of effective and safe control of the harmful agents for human health and environment, must be done in compliance with the good agricultural practices which stipulate among others that they must not exceed the authorized doses or to be applied in such a way as to lead to a minimum residue quantity (ICPA, 2019). According to the Association of the Plant Protection Industry of Romania (AIPROM), during the last 60 years' pesticides have become less toxic and persistent in the environment, but much more efficient (Stoica (Dinca) et al, 2017). Under these conditions farmers can apply to the crops lower doses of pesticides having similar protective effects. Pesticides currently used in agriculture are less toxic and have greater safety in use. (https://www.aiprom.ro).

Materials and Methods

In order to carry out the work, the quantities of pesticides used as plant protection products at the national level and in Braila county were analysed, between 2012-2018. In this respect, official statistical data from Tempo online, the database of the National Institute of Statistics (NIS) in Romania, were taken and processed. The results obtained were analysed, graphically represented and interpreted, the conclusions being correlated with the information from the specialized literature. Scientific papers were used to obtain bibliographic information, from the databases Clarivate Analytics and Google Academic, respectively the collection of legislative documents available at the level of the European Commission, the Directorate-General for Agriculture and Rural Development.

Results and Discussions

Pesticides are used as a control measure when other agricultural production strategies cannot reduce the population of pests below an acceptable threshold, are too expensive, time consuming, or when quality or yield effects are unacceptable to the farmer. Pesticides are products for plant protection against pests and diseases that contain at least one active substance. Pesticides are classified, depending on the effects and the pests controlled, in herbicides, insecticides, fungicides, acaricides, nematicides, molluscocides, ratacids and with mixed action, insecto-funcicides. (Https://chemicalsinourlife.echa.europa.eu/ro/chemicals- in-agriculture). The main effects of the application of pesticides are the positive influence on the growth rate of the plants, the conservation of useful components from the plants, the stripping or preventing the growth of unwanted plants (ECHA, 2018). At the national level, herbicide-treated crops hold the highest share in the application of plant protection chemicals. During the analysed period we can see a slight decrease of the herbicide-treated surfaces from 49% in 2012, to 41% in 2018. The surface treated with fungicides, from 27% in 2012 increased to 30% in 2018, and the surface treated with insecticides increased from 27% in 2012 to 29% in 2018 (Figure no. 1).

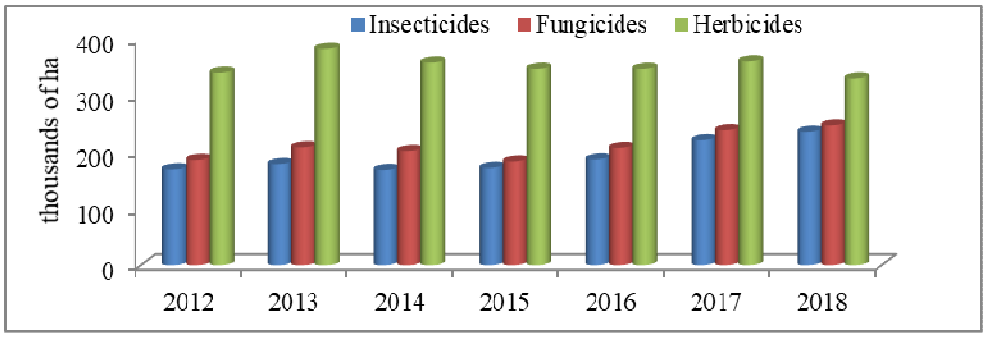

Figure 1 : Agricultural surfaces treated with pesticides at national level
Source: Authors, processing data from NIS -Tempo online 2020

Regarding the weight of the application of the different classes of pesticides, the herbicides are used in the greatest quantities for the protection of the plants, being followed by fungicides and insecticides. According to the data presented by NIS (2019), we can see a slight decrease from 3.678 tons of active substance, in 2012 to 2.739 tons in the year 2018. The quantity of fungicides used decreased slightly in 2018 and the quantities of insecticides used had an oscillating evolution during the analysed period, with a slight decrease in 2018. This decrease is due, on the one hand, to the approval of products that it is used in smaller doses, but probably also the increase of the ecologically certified areas from 182,706 ha in 2010 to 326,259 ha in 2018 (https://www.madr.ro/agricultura-ecologica/) (Figure no. 2)

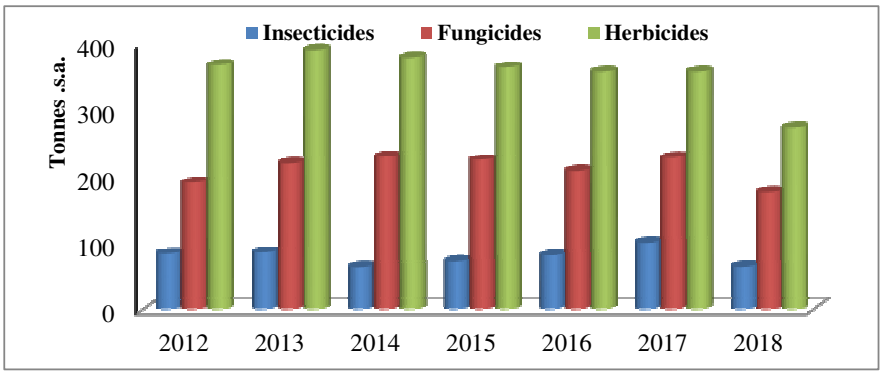

Figure 2: Pesticides used at national level
Source: Authors, processing data from NIS -Tempo online 2020

Herbicide treatments applied to agricultural crops at national level, expressed in tons of active substance (s.a.), show significant differences at the level of the 4 macro-regions of development, depending on the analysed period and the weight of the agricultural surfaces related to them. Thus, a significant reduction of the herbicide doses used in Macro-region I, from 991,672 kg s.a. in 2012, at 460,571 kg s.a. in 2018 and in Macro-region III from 582,036 kg s.a. in 2012 to 399,790 kg s.a. in 2018, while in Macro-region II the quantity increased from 1,055,838 kg s.a. in 2012 at 1,118,639 kg s.a. in the year 2018 (Figure 3).

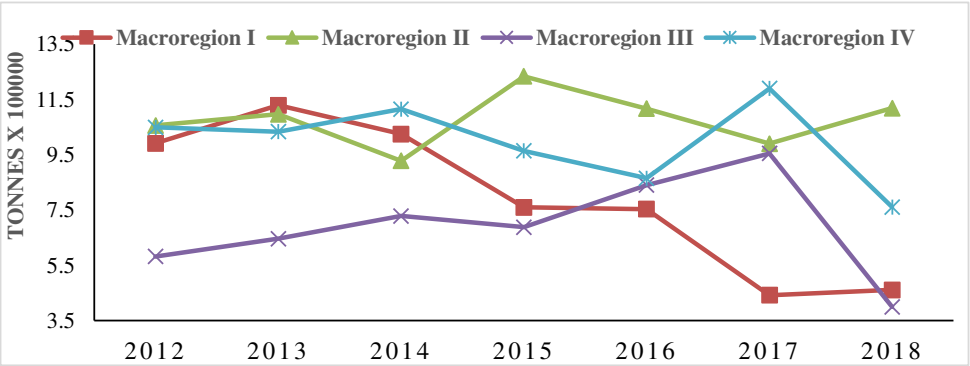

Figure 3: Herbicides used nationally, by years and by macro-regions of development
Source: Authors, processing data from NIS Tempo online 2020

Fungicides are plant protection products used for both curative and preventive purposes to combat plant diseases. The quantity of fungicides used nationally, by years and by macro-regions is shown in Figure 4.

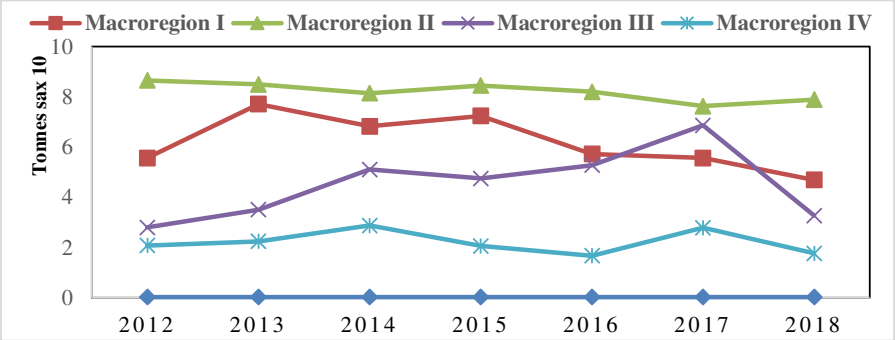

Figure 4: Fungicides used in the period 2012-2018 on Macro-regions of development
Source: Authors based on NIS tempo online data 2020

Insecticides are chemicals used against pests both in seed and in vegetation or in stored crops. Figure 5 shows the quantity of insecticides, expressed in kg of active substance, used at national level on macro-regions of development.

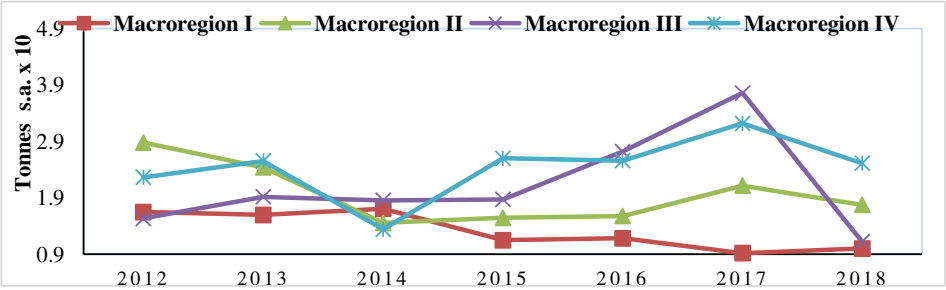

Figure 5: Insecticides applied to agricultural crops, on macro-regions of development
Source: Authors, processing data from NIS tempo online 2020

During the analysed period, the largest quantities of herbicides and fungicides were used in the Macro-region II located in the east and south-east of Romania, the area in which there are also the largest land areas used in agricultural production. (Figure no. 6).

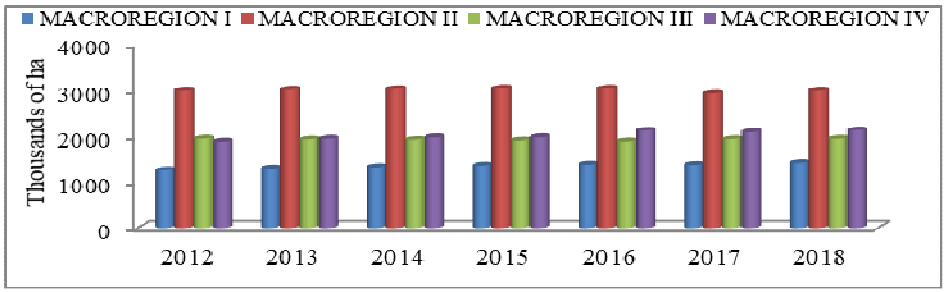

Figure 6: Agricultural area for crops, by macro -regions

Source: Authors, processing data from NIS tempo online 2020

Brăila County is part of the South-East region of Macro-region II of development. Analysing the quantities of pesticides used in the county it can be seen that herbicides were used mainly, followed by fungicides and insecticides. The data shown graphically in figure 6 show an increase in the quantities of herbicides and fungicides, and in the insecticides we can see a decrease from 10 tons s.a. in 2012 at 7 tons s.a. in 2018. This variation in the quantities of herbicides, fungicides and insecticides is due to the crop structures set up at the farm level, as well as the decrease of the labour force engaged in the agriculture of the county (Stanciu et al., 2017) (Figure 7)

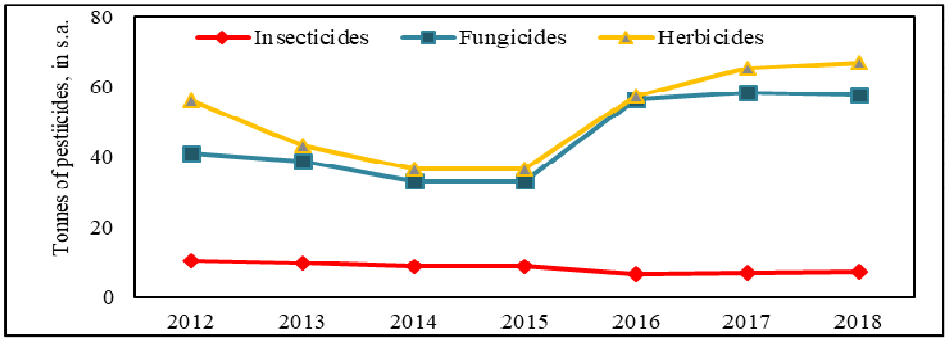

Figure 7: Pesticides used in Braila county

Source: Authors, processing data from NIS tempo online 2020

The quantity of herbicides used in Brăila county during the analysed period is lower compared to Vrancea and Galaţi counties, but at the county level there was a slight increase in 2018 compared to 2012 (Fig.8).

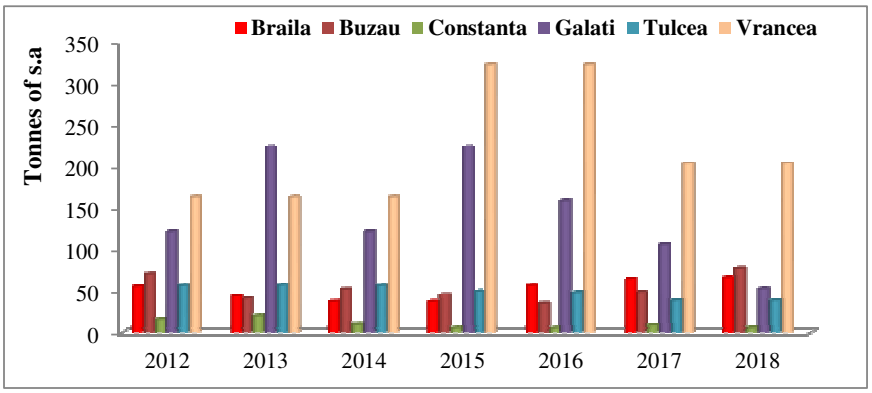

Figure 8: Herbicides used in the South East Region, by counties

Source: Authors, processing data from NIS tempo online 2020

The analysis of the quantities of fungicides used in the counties of the South-Eastern Region of Romania revealed that Braila county has a moderate consumption compared to the other counties of the region. (Fig. 9)

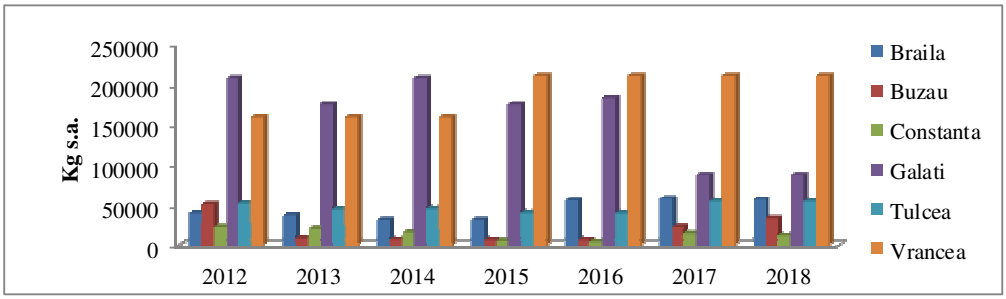

Figure 9: Fungicides used in the counties of the South East Region
Source: Authors, processing data from NIS tempo online 2020

The quantities of insecticides used in the counties of the South-East Region are presented in Figure no 10. From the analysis of the data presented the county of Braila was in an average position, compared to the other counties.

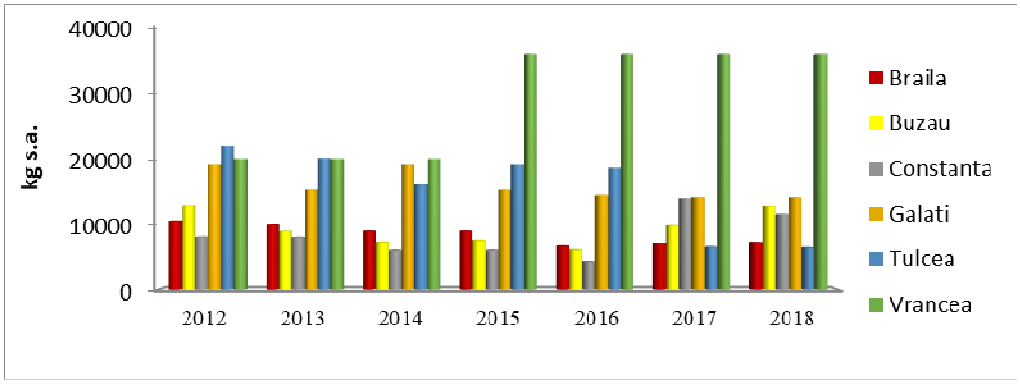

Figure 10: Insecticides used in the counties of the South East Region
Source: Authors, processing data from NIS tempo online 2020

Compared to the Macro-region of which it belongs, the most used pesticides in Braila County in 2018 were fungicides, about 44% of the total, followed by herbicides 34% of the total and insecticides 22% of the total. (Fig. 11)

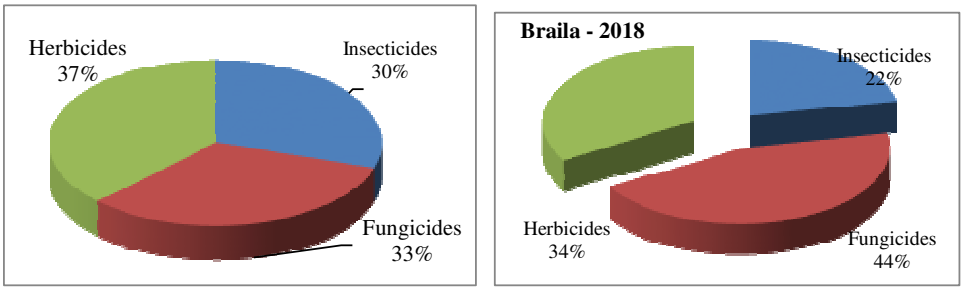

a) b)

Figure 11: Pesticides used in the Macro-Region II (a) and in Braila County (b) in 2018
Source: Authors, processing data from NIS tempo online 2020

In table no 1 the quantities of pesticides applied in Brăila County, by main categories, in kg of active substance applied per ha over a period of 7 years were calculated. The result showed that, with regard to herbicides, this quantity has increased in recent years. It may be a consequence of the fact that the availability of agricultural labour force is declining, and farmers are increasingly resorting to herbicides to keep the land clean of weeds. (Stanciu et al., 2017) Regarding the quantities of insecticides and fungicides, they showed a slight decrease that may be the result of the approval of some plant protection products that are used in increasingly smaller doses (Table 1).

Table 1: Pesticides used in Braila County agricultural production (kg/ha)

Pesticides (kg/ha)	2012	2013	2014	2015	2016	2017	2018
Herbicides	0.4746	0.3698	0.3648	0.3610	0.4059	0.4557	0.4876
Insecticides	0.085	0.085	0.085	0.085	0.084	0.081	0.081
Fungicides	0.3230	0.3243	0.3242	0.3242	0.3199	0.3135	0.3174

Source: Authors, processing data from NIS tempo online 2020

Conclusions

In the context generated by the growth of the global population and the necessity to increase the food need, the use of plant protection products is an essential factor for obtaining rich crops (Nicula and Stanciu, 2019). At national level, herbicide-treated crops have the highest weight in the application of plant protection products, followed by fungicide-treated crops and then by insecticide-treated crops. In the period 2012-2018 there was a decrease of the surfaces on which the herbicides were applied but the surfaces treated with fungicides and insecticides increased slightly during this period. Regarding the quantities of plant protection products used, herbicides are used in the greatest quantities followed by fungicides and insecticides. In the seven years analysed in all three categories of plant protection products, there is a slight decrease in the quantities used at national level, which means that the quantity applied per ha has decreased. In Braila county, as in the whole country, herbicides and fungicides are the most used pesticides. The data shown graphically indicate an increase in the quantities of herbicides and fungicides, while in the insecticides there is a slight decrease. Comparison of the quantities of active substance applied per hectare, in these seven years, showed that herbicides are used in larger quantity, while insecticides and fungicides have decreased the doses applied. Compared to the other counties of Macro-region II, Braila county has a moderate total pesticide consumption. This variation of the quantities of herbicides, fungicides and insecticides consumed is due to the structures of crops set up at the farm level, the pressure of pests, diseases and weeds during the vegetation period, as well as the reduction of the workforce in agriculture. Also, the decrease of the quantities of fungicides and insecticides consumed, the decrease of the quantities of active substance per ha are a consequence of the approval of the products that use lower doses, as well as the actions undertaken through the national policies in the field of agriculture.

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The Analysis of The High-Tech Enterprises' Efficiency by The Modified Production Function

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Abstract

High-tech enterprises, possessing advanced technologies, are able to play a strategic role in ensuring the long-term, sustainable development of the national economy. This role is determined by the contribution of scientific, technical, production and personnel potentials of high-tech enterprises. A distinctive feature of these enterprises is the dominance of research activities and the related need for regular updating of used production factors. The effectiveness of high-tech enterprises depends largely on the quality of the intellectual resources used. The paper presents the results of an analysis of the effectiveness of two Russian high-tech enterprises using a modified production function. Cognitive capacity is calculated as the efficiency of using intellectual resources. As well as this, an interpretation of the results is also given. The proposed modified function can be used in practical activities to support the adoption of managerial decisions on the strategic development of industrial enterprises and increase their economic efficiency.

Introduction

In the modern economy, the place of an intellectual product rises in the hierarchy of social values, and high technologies and high rates of technological renewal of industrial production are highlighted (Innovative Development: Economics, Intellectual Resources, Knowledge Management, 2013; Gokhberg et al, 2018; Bukhvalov, 2016). As a result, long-term economic development is determined by the quality of intellectual resources and the developed information infrastructure available to high-tech enterprises (Frolov, Shirov and Gusev, 2018). The intellectual and information resources convergence leads to the new type of production factors emergence, i.e. the cognitive ones. By which we mean the totality of knowledge, abilities, and skills embodied in an economic entity that ensure the growth of employee productivity in creating an intellectual product that is in demand by the market.

The analytical dependencies used at the enterprise level do not fully reflect the efficiency of using cognitive production factors. On the one hand, traditional approaches to assessing the effectiveness of the production factors make it possible to take into account all possible effects, and on the other hand, the assumptions that underlie economic and mathematical models are constantly criticized. There is a need to develop a modified production function and model the effectiveness of high-tech enterprises using open data as an example. The aim of this work is an empirical analysis of cognitive production factors dependence and high-tech enterprises performance.

The structure of the article is as follows:

- Part 1 provides an overview of the main approaches using the economic-mathematical mechanism of a production factor (or PF);
- Part 2 proposes a model of a modified production factor;
- Part 3 focuses on modeling performance based on available data;
- Part 4 presents the results and conclusions.

Theoretical Review

Economic growth research has repeatedly attracted the attention of scientists (Bhagwati, 2006; Zamulin and Sonin, 2019; Mamonov and Pestova, 2015; Acemglou et al., 2018, Makarov and Varshavsky, 2012). In theories of economic growth, two major stages can be distinguished during the second half of the 20th century and the first two decades of the 21st century:

- Theories of economic growth, taking into account scientific and technological progress (1950 - 1960 of the 20th century);

- Theories of economic growth taking into account human capital (from 1980 to the present).

The most famous model of exogenous growth is the Solow R. model (Solow, 1957), which is based on investments in fixed assets and a corresponding increase in capital capacities per employee until a stationary state is reached. Labor productivity in this model is explained, first of all, by the capital-labor ratio per employee. A modification of this theory allows one to take into account 'technological progress', providing comparable rates of steady-state economic growth with the speed of technological progress.

Despite the relative simplicity of the Solow R. model (Solow, 1957), it allows one to explain many phenomena. Therefore, the model explains why developing countries are growing faster than developed ones. Considering that they have a small stock of capital capacities, but a large amount of labor, these capacities give a greater return, with little resources being spent on replenishing them. However, as capacities accumulate, the return on them decreases, and more and more resources are spent on maintaining them, i.e. the economy is growing at a declining rate.

To describe the growth in developed countries, Solow R. introduced a parameter of technological progress, which, multiplying the capabilities of the labor force, allows you to get away from the problem of a diminishing marginal product; and continuing to invest in new capital capacities. The main limitation of the Solow R. model relates to exogenously given parameters. Economic growth in his model occurs on its own.

The key idea of the second generation theories is that the skills and technologies created in one industry are transferred to others and that the return on investment in technological development ceases to be diminishing for the economy as a whole. An illustration of this idea is presented in the work of Nordhaus W. (1997).

Among endogenous growth models, Ramcey F. (1928), Cass D. (1965), Koopmans T. (1965), Diamond P. (1965), Romer P. (1990), Aghion F. (2015), Howitt P. (1992) models can be distinguished, Acemglou D. et al. (2016). Some of these models consider economic growth at the country level, i.e. are macroeconomic.

The works of Romer P. (1990), Aghion F. (2015), Acemglou D. (2016) explore the sources of growth at the enterprise level. Let us consider them in more detail.

The Romer P. model is the basis of the economic growth study at the company level, the so-called A-model. The production function in it is defined by the $Y = AK$ formula, where output is equal to productivity multiplied by the stock of capital capacities. Such a function does not have the property of a decreasing marginal product, therefore, investments create new capacities at a constant speed,

and while this speed is higher than the rate of disposal of the capital, output will increase. The higher the savings rate in such a model, the higher the growth rate. This result creates in the Romer P. model (1990) endogenous growth, depending on the players' decision, and which is not given exogenously. Although the A-model explores endogenous growth, it is implausible both in terms of its premises and in terms of conclusions, representing only a conceptual illustration of overcoming the trap of a diminishing marginal product.

However, avoiding the problem of a diminishing marginal product, Romer P. encountered the problem of non-competitive technologies (or the free-rider problem). Technologies act as a public good, which, in addition to non-competitiveness, also has non-exclusivity, i.e. a consumer cannot be forced to refuse to consume a given good. The merit of Romer P. can be considered as the fact that in his model he made technology temporarily excluded, since there is a monopoly on the use of technological developments. Conceptually, the model is formulated as follows: each period, the enterprise makes a decision on investments in physical capital and in Research and development (or R&D), taking into account the current level of technology. investments in capital give the enterprise greater production capabilities that are limited by the marginal product. Investments in Research and development give certain opportunities not only to the enterprise, but also to have a positive external effect, i.e. an increase of total in technology level in economy for the next period. Everything repeats during the periodt_1, enterprises make decisions on investments again, but already taking into account the greater technological capabilities. The general level of technology no longer has the property of a diminishing marginal product. Thus, enterprises receive steady economic growth.

The formal scheme of the model is as follows. Along with labor, not one type of capital, as in the standard model, but a whole set of intermediate capital factors is involved in production. The production function is as follows:

$$y = \left(\int_0^A x_i^{\alpha}\, di\right) l^{1-\alpha} \tag{1.1}$$

x_i – amount of intermediate factor $i \in [0, A]$
A – a parameter denoting the number of different capital factors is determined in equilibrium by the amount of total capital k

Capital factors are produced by different monopoly enterprises, and in order to produce x_i of factor i, need to bear the costs $\frac{1}{2}(1 + x_i^2)$. If the A parameter is responsible for the variety of production factors and the number of factors are optimally selected, then$A = (2 - \alpha)k$, $x_i = \bar{x} = \sqrt{\frac{\alpha}{2-\alpha}}$ for each $i \in [0, A]$. In equilibrium, the volume of production is:

$$y = (2 - \alpha)k\bar{x}^{\alpha} l^{1-\alpha} \tag{1.2}$$

α – parameter of a production function an exogenously given constant
$\bar{x}$, l – the costs of each capital factor and the total volume of labor are fully determined
α

By producing a new industrial product, an enterprise not only earns profit, but also promotes technological progress. The main merit of Romer P. was not so much his own theory as the fact that it served as a kind of impetus to a significant number of studies on this topic and renewed the interest of economists and researchers in the factors of economic growth at the enterprise level. Among the followers of Romer P., the most interesting models are Aghion F. - Howitt P. and Acemglou D. We shall consider them briefly. Therefore, in the theory of Aghion-Howitt, technological progress occurs due to the replacement of old goods with new ones. Each enterprise, developing a new technology, not only raises the overall technological level, but also crowds out companies producing obsolete products from the market. Since the basis of this model is based on the ideas of Schumpeter J. (1995) like 'creative destruction', seeing this, the authors called this model Schumpeterian.

The Aghion-Howitt model also attempts to combine cycle and growth theories. Researchers noticed that the presence of innovations strongly depends on the country's position relative to the technological border, i.e. from the world technological level. In a country that is close to the technological frontier, new technologies have to be invented. Developing countries have an advantage, i.e. they can import technology, greatly increasing their productivity. For economic policy, these results are significant.

First, the theory postulates the importance of antitrust law. Monopolies are harmful not only because they produce low-quality goods and sell them at inflated prices, they just have no incentive to innovate, because there is no market loss threat.

Secondly, the theory emphasizes the importance of education quality. The imitation of existing technologies and the invention of fundamentally new ones require a different level of education. In the first case, secondary and applied engineering education is important, in the second, fundamental science plays a much larger role.

Thirdly, the theory focuses on the macroeconomic policies stabilization for sustainable economic growth. In economic studies, it is customary to distinguish between the rates of long-term growth and short-term fluctuations, which stabilization policy is aimed at smoothing. Prior to the Aghion-Howitt model, it was believed that long-term growth is provided by the growth of economy production capabilities due to technological progress and the accumulation of capital capacities, and fluctuations around the trend are caused by short-term shocks and do not affect long-term growth. Aggregate demand shocks of can be offset by stabilization economic policy, i.e. a drop in aggregate demand can be stopped by expanding demand from the state or lowering the interest rate in the framework of monetary policy.

Aghion has shown that cyclical fluctuations are detrimental to long-term growth, as technological progress requires investments in Research and development, which are formed either from earned profit, or from borrowed funds. In the event of a recession, the profits of enterprises are reduced; their own funds are not enough. With well-functioning financial markets, you can use borrowed capital. With poorly functioning markets, this source becomes inaccessible. As a result, investments in Research and Development (R&D) are falling; technological progress and economic growth are slowing. An important feature is that in the event of an economic boom, the opposite effect is not observed: enterprises are in no hurry to invest in Research and Development due to temporarily high profits.

Thus, the recession suppresses technological progress, and the economic boom does not stimulate it, therefore, the economy volatility is a deterrent to its economic growth.

An important consequence of the economic growth theory by Romer P. was the study of scientific and technological progress at the enterprise level. In this sense, it is necessary to note the work of Acemglou D. Having examined the data on American enterprises for the period from 1982 to 1997, he concluded that the share of the costs of Research and Development in the total costs of the enterprise is not determined by its size. Acemglou D. identified the key mechanism for the emergence of innovation or ‘selection effect’. Small enterprises are less likely to survive than larger ones, but if they survive, they grow faster, ensuring permanent replacement in the list of leading enterprises. At the same time, the selection process changes enterprises, but not their distribution by scale in the industry and this indicator remains stable.

A current theories review has shown that economic growth is more based on endogenous factors. Productivity gains come from investments in Research and Development; continuous improvement of the product and production technology is distributed throughout the economy, creating the prerequisites for long-term sustainable development.

Modified Production Function

From the point of view of system analysis, high-tech enterprises are characterized by a heterogeneous structure, non-linearity of characteristics, asymmetric distribution of parameters and multi-loop interactions. The solutions leading to the optimal control of the production system are found in the study of empirical laws by constructing the appropriate mathematical models. Production functions (PF) are used as a useful tool that allows you to carry out analytical calculations, determine the efficiency of resource use and the appropriateness of their additional involvement in production, predict the volume of output and monitor the feasibility of investment projects.

Currently, the production functions are divided into classes depending on the characteristics of production relations and the tools used. Micro and macroeconomic PFs are distinguished as theoretical and applied, optimization and equilibrium, statistical and dynamic, deterministic and stochastic ones.

In the economy of production, traditionally used PF type $Y = F(K, L)$, characterizing the relationship between the maximum possible output and the amount of applied resources of accumulated labor in the form of production assets (capital) K, and real labor L.

To model the results of the activities of an individual enterprise, a two-factor multiplicative function of the form is often used $y = a_0 x_1 x_2$, where x_1, x_2 – are parameters of PF. This PF is known as the Cobb-Douglas function. The Cobb-Douglas PF was widely used due to its structural simplicity. Analysis of PF showed that four concepts of PF could be distinguished (table 1):

Table 1: Basic concepts of production function

#	PF CONCEPT	AUTHORS	CONTENTS
1	Probabilistic	Demidenko E.Z. (1989)	PF is considered as the mathematical expectation of a random value of output for given resources
2	Majority (optimization)	Granberg A.G. (2004)	PF expresses the maximum possible output for a given amount of resources
3	Probabilistic majority	Gladyshevsky A.I. (1977)	PF used to obtain the probable upper limit of output
4	Deterministic	Kleiner G.B. (2000) Makarov V.A. (2007)	Rigid functional relationships between model variables are investigated as arguments to PF.

Thus, the PF structure allows solving the following problems:

- Effectiveness determination of resources use and the feasibility of their additional involvement;
- Substantiation of the formation and improvement of scientific and technical groundwork;
- Capital and labor ratio optimization;
- Management decisions on the production development.

However, in modern conditions, the concept of labor is significantly differentiated not only in the aspect of accumulated and current, but also in the aspect of simple and complex. Considering the

cognitive factors of production as a production resource, the concept of 'intelligence' will be interpreted by us as the ability of human thinking to transform perception into knowledge, to analyze a priori knowledge in the process of their development. We will understand the capitalization of mental abilities as the use of knowledge, labor skills, and professional experience of corporate personnel for the purposes of production activities.

Thus, capitalization means the transformation of an individual human resource into a corporate means of achieving the production activity goal. In this regard, the value PF is determined not so much by the personal potential of knowledge, skills and experience of employees as by the value of the results of its use, crystallized in the products of the entire corporation. From this, the need for a commodity form of these abilities becomes clear, i.e. this form ensures the transformation of the intellectual abilities of a human resource into a corporate means of achieving commercial goals; the prevalence of these funds leads to their further transformation into necessary production conditions.

The productive power of cognition lies in its ability to turn the initial form of knowledge into information, then into the active form of knowledge, then into expedient activity. Consequently, the modern value of human capital lies in its cognitive nature, i.e. the ability to transform information into knowledge, knowledge into productive activity and activity into a marketable product. Cognitive activity transforms knowledge from a resource into a means of production by imparting new meaning and content to information by linking it to a commercial goal, i.e. establishing teleological certainty. The above considerations allow us to reveal the cognitive basis of modern production activity, which includes the unity of knowledge, experience and creativity.

For the production process, the cognitive nature of personnel makes it possible to carry out high-tech productive activities. In the form of expedient activity (i.e. production activity), cognition becomes a necessary condition for obtaining a result, i.e. from a resource it is transformed into a production factor. The cognitive factor becomes an element of the production process. Its quantitative side determines the necessary level of mental abilities of human capital, which correspond to the needs of a particular production.

In the production field, 'cognition' is a single concept of knowledge and methods of their industrial application. The concept of knowledge, which, under the influence of cognitive production processes, grows constantly and is verified by practice. Obviously, the production process in its constancy and innovative development contains an equally constant process of cognitive growth. This process is a constant change in the quantity and quality of 'cognitions', i.e. solidly mastered and fixed by labor activity knowledge and skills necessary for continuous development and improvement of modern and future production processes.

The necessary level of 'cognitions' saturation of human capital will be called the cognitive capacity of the production process. Cognitiveness becomes a factor not only because of the causality and because of conditionality of its relationship to production. The main sign of its attribution to factors is its transformation into a measure of cognitiveness, i.e. the unity of the qualitative and quantitative sides of this production means. The qualitative side of cognition is cognitive polymorphism, expressed in the form of experience, knowledge, creativity, which in different proportions are conditions for the practical application of this resource to technology, organization, and production management.

Given that classic PFs do not take cognitive factors of production into account, their modification is necessary. Based on the production function, Solow R. developed a modified production function, which is used to analyze the performance effectiveness of two high-tech enterprises with positive and negative profit dynamics. Data for modeling were taken from open sources. The modeling period is 8 years from 2011 to 2018.

Developed modified production function including cognitive production factors (1.3):

$$Y = AK^{\alpha} L^{\beta} Cog^{\tau} e^{\gamma(t-t_0)} \quad (1.3)$$

Y – output volume;
K – capital;
L – labor;
Cog – cognitive factors of production;
$A, \alpha, \beta, \tau, \gamma$ – model parameters;
t - time

Figures 1 and 2 show the results of modeling a modified production function for enterprises A and B.

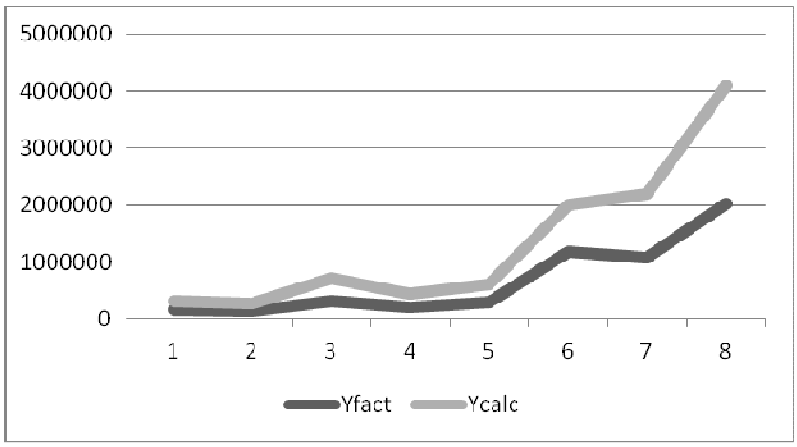

Fig. 1: Production function including cognitive factors of production for a high-tech enterprise A

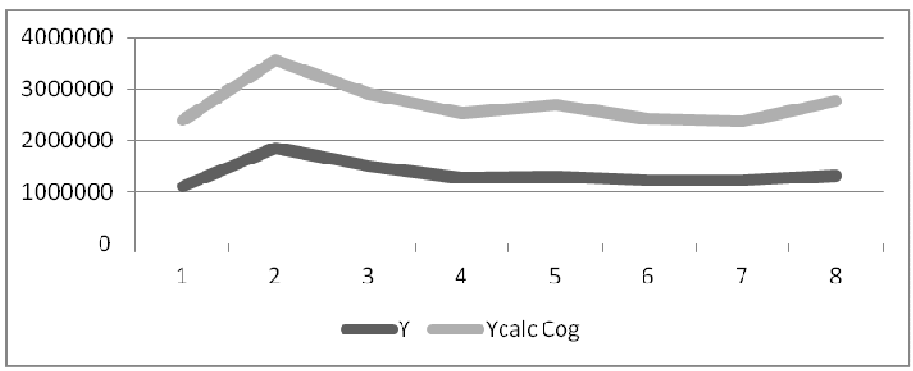

Fig. 2: Production function including cognitive factors of production for a high-tech enterprise B

In both cases, the slope of the curve becomes sharper. This indicates that enterprises could earn more with the available resources and technologies. However, this does not happen in the analyzed period. The Solow model also allows the study of consumption and accumulation rates. Manufactured products can be used either for consumption $C(t)$, or on investments in expansion of production. Then the share of income spent on investments will be:

$$Y(t) = C(t) + I(t); Y(t) = (s + q)Y(t) \quad (1.4)$$

s – share of investment income from traditional factors of production;
q - share of investment income from cognitive factors of production.

Given that the capital wears out over time, we assume that the depreciation rate (the share of capital lost per unit time interval) $\sigma \in (0,1)$ is constant.

Then gross investment over a period of time Δt will be equal to the sum of depreciation expenses and net capital gains from traditional and cognitive factors of production:

$$I(t) = \delta K(t) + \Delta K \tag{1.5}$$

whence

$$I(t) = \Delta(s + q)Y(t) \tag{1.6}$$

If divided (1.6) by L

Given the homogeneity of the production function, we shall get:

$$\frac{1}{L}\frac{\partial K}{\partial t} + \frac{1}{L}\frac{\partial Cug}{\partial t} + \delta\left(\frac{K}{L} + \frac{Cug}{L}\right) = (s + q)\frac{1}{L}F(K, Cog, 1) = \tag{1.7}$$

$$= (s + q)F\left(\frac{K}{L}, \frac{Cog}{L}, 1\right) = (s + q)f(\eta, \omega)$$

Quantities η, ω – represent factor performance.

Calculations based on real data have shown that for the studied enterprises, consumption norms exceed the norms of investment accumulation (figures 3,4).

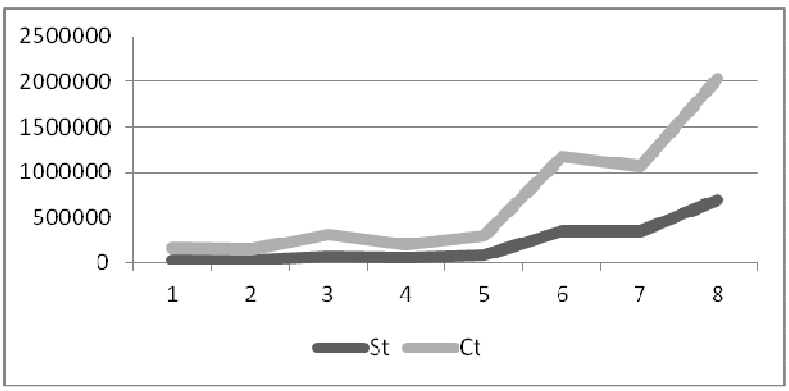

Fig. 3: Accumulation and consumption rates for a high-tech enterprise A

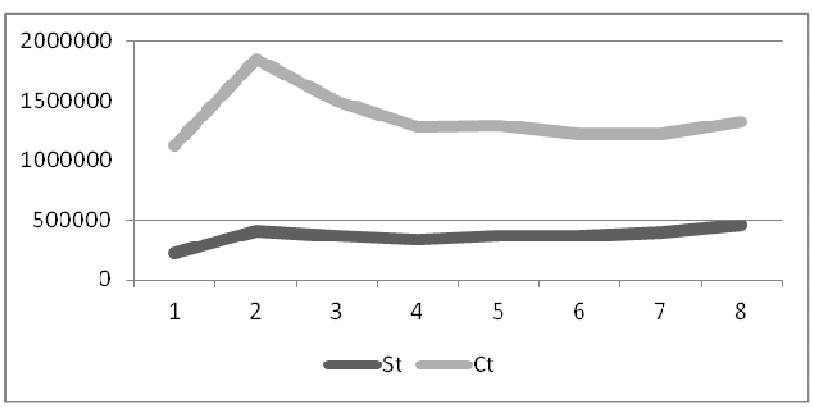

Fig. 4: Accumulation and consumption rates for a high-tech enterprise

Such a situation may lead to a further decrease in efficiency, since untimely updating of existing funds will not allow producing competitive products and relying on super-profits in the form of intellectual rent.

The production function also allows you to analyze the relationship between cognitive factors and make informed decisions on the development of measures aimed at improving the efficiency of the information use and intellectual resources. We use the indicator of cognitive capacity, which reflects the contribution of information and intellectual resources to traditional factors of production.

For an enterprise A, the following data were received (table 2). Figures 5-7 show the relationship of cognitive factor of production with traditional factors of production and with output based on the calculation of the cognitive capacity coefficient.

Table 2: The relationship of cognitive factor of production with output and traditional factors of production.

Year	Cog/L	Cog/K	Cog/Y
2011	0,018883	0,00201	0,006881
2012	0,014568	0,001401	0,006371
2013	0,01	0,001584	0,004353
2014	0,039178	0,000876	0,028334
2015	0,034287	0,000679	0,022999
2016	0,025853	0,001037	0,00827
2017	0,071815	0,004568	0,037879
2018	0,027057	0,00238	0,010878

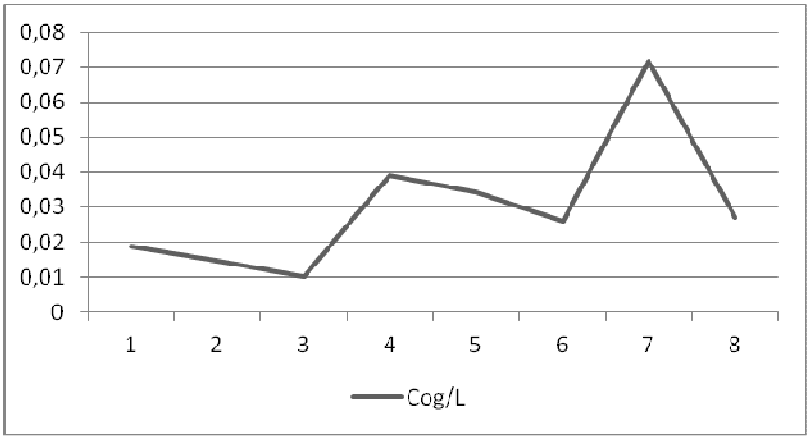

Fig. 5: Cognitive labor capacity for a high-tech enterprise A

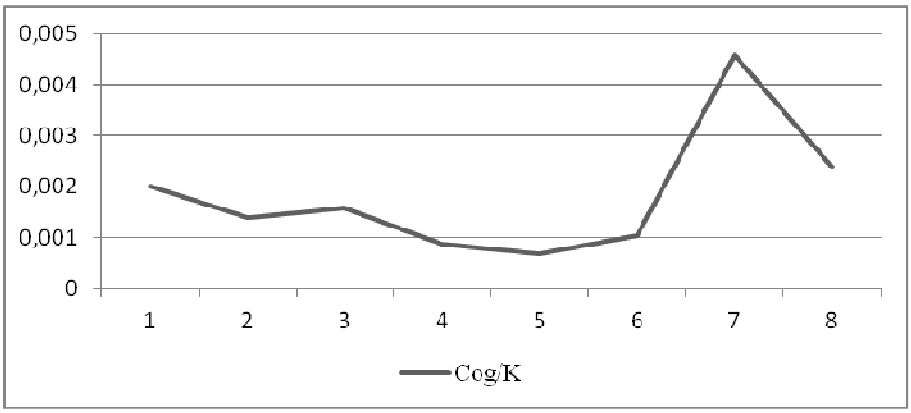

Fig. 6: Cognitive capital capacity for a high-tech enterprise A

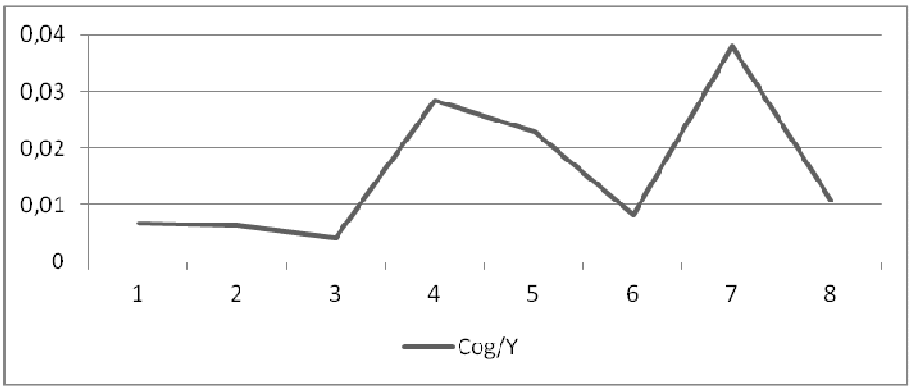

Fig. 7: Cognitive output capacity for a high-tech enterprise A

The data obtained indicate insufficient use of available information and intellectual resources, despite the fact that the enterprise is a high-tech and research activity is the main activity.

For a enterprise B the following data were received (see table 3). Figures 8-10 show the relationship of cognitive factor of production with traditional factors of production and with the output based on the calculation of the cognitive capacity coefficient.

Table 3: The relationship of cognitive factor of production with traditional factors of production and output

Year	Cog/L	Cog/K	Cog/Y
2011	0,005682	0,001518	0,001078
2012	0,010741	0,002523	0,001236
2013	0,025578	0,005512	0,003807
2014	0,007238	0,001617	0,001314
2015	0,007694	0,001744	0,001414
2016	0,008309	0,001961	0,001692
2017	0,008147	0,001925	0,001719
2018	0,045331	0,008485	0,008855

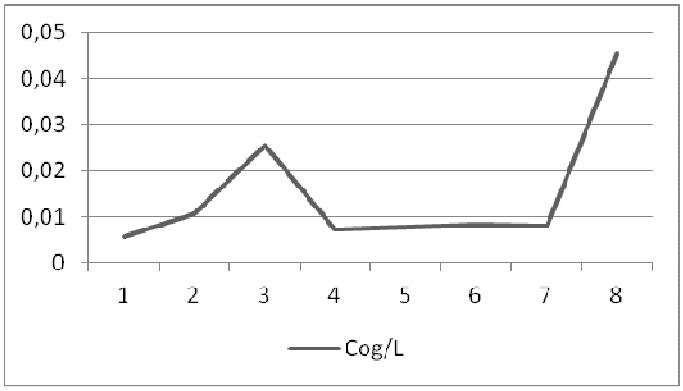

Fig. 8: Cognitive capacity for an enterprise B

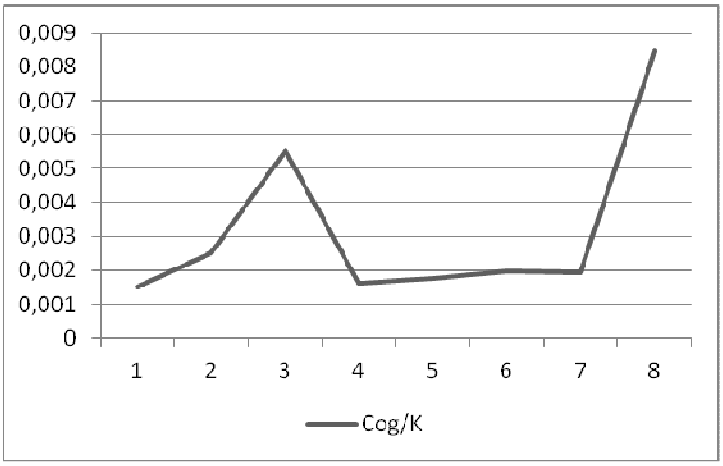

Fig. 9: Cognitive capital capacity for an enterprise B

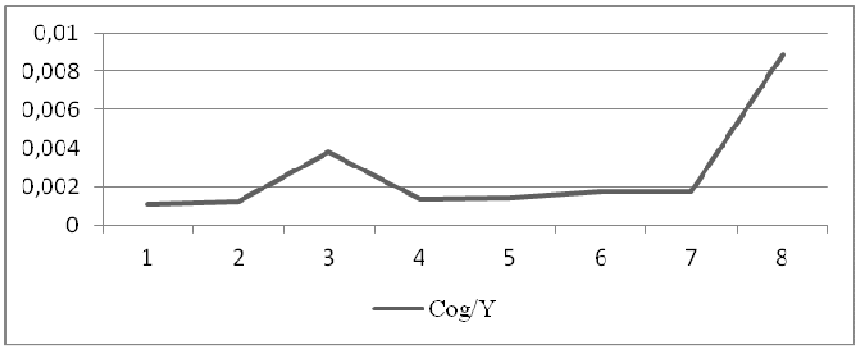

Fig. 10: Enterprise cognitive output capacity B

The graphs presented show that for the cognitive capacity coefficient of the enterprise B is higher, and despite the negative dynamics of profit, it is used more efficiently than in activities of an enterprise B.

Conclusion

Thus, the modeling of the production function taking into account the cognitive production factor (or CPF) revealed the problems analyzed high-tech enterprises inefficiency, which are related to the excess of consumption norms compared to the norms of accumulation and investment in production resources, both information-intellectual and material. Using the cognitive capacity coefficient allowed us to analyze the relationship of CPF with traditional factors of production, as well as to determine the contribution of CPF in the total output. The data obtained allowed us to conclude that an enterprise with positive dynamics of profit does not use the available CPFs efficiently enough, while an enterprise with negative dynamics of profit is vice versa.

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The Financial Model of a Comprehensive Assessment for Industrial Enterprises

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Abstract

To eliminate potential financial risks and determine the level of financial sustainability of an enterprise, prediction models are used. The development of digital technologies creates a platform for managing risk and improving the competitiveness of companies. The method of fuzzy sets in addition to taking into account the specifics of the enterprise is focused on Russianreality and gives more accurate results. The developed software for predicting financial distress is simple and easy to use. It is notable for its visibility of the results, the ability to change the number and significance of the indicators involved in the assessment, the ability to take into account the analysis period and the industry specialization of enterprises.

Keywords: Modelling, Analysis Of Financial Distress, Financial Risk, Fuzzy Set Theory, Program Model

Introduction

The manufacturing sector has undergone significant changes in terms of scale, complexity and technology over the past decades. Increased competition, growing uncertainty of the business environment, a variety of goals of economic entities and market participants increase the level of risks that can lead to the risk of effective development of industrial enterprises. Planning and forecasting will allow the manufacturer to gain visibility and control over all aspects of the activity. The development of digital technologies creates a platform for managing risk and improving the competitiveness of companies. To eliminate potential financial risks and determine the level of the financial health of an enterprise, forecasting models of bankruptcy are used, perceived as systems of timely warning of impending problems. Their task is to assess the financial condition of the company based on the selected financial indicators or other characteristics of the company or the environment in which they operate (Svabova, 2016). Accurate prediction of a bankruptcy of companies in various industries causes great concern of investors and creditors since it is possible to reduce the risk of creditors (Lee, 2013). Analysis of the most important financial indicators makes it possible to evaluate the results of the financial activity of an enterprise, it becomes possible to competently, scientifically-based management of business processes that ensure the achievement of the planned strategic goals (Foster, 1986).

Literature Review

For a comprehensive assessment of the financial condition of the enterprise and the probability of bankruptcy risk, a number of models are used, including the method developed in 1968 by E. Altman

(1968), the models by J. Connant and M. Golder (2014), U. Beaver (1966), and Taffler (1984), J. Fulmer (1984), Zmijewski (1984), Horrigan (1996), and others. Russian scientists are also involved in developing methods and criteria for analyzing financial condition: I. Ya. Lukasevich (2013), M. A. Fedotov (2018), R. S. Saifullin, G. G. Kadykov, O. P. Zaytseva, L. V. Dontsova (2008), and others.

Theoretical Part

In the course of the study, a comparative analysis was carried out and a test of the adequacy of the common models of comprehensive assessment of the financial condition based on the reporting data of a number of industrial enterprises. Of the eleven models considered, an adequate assessment of the current financial condition of the company was obtained only with the use of six: the five-factor original and improved Altman models, the Connan and Golder, Tafler, Springgate models, the O. Zaitsev six-factor model and the rating method for assessing the financial condition of the company R.S. Sayfulin and G.G. Kadykov (Table 1).

Table 1: Test results for bankruptcy prediction models

Indicator	2014	2015	2016
Two-factor Z – model Z = – 0,3877 – 1,0736 K1 + 0,0579 K2			
Value Z	–1,119	–1,304	–1,980
Probability of bankruptcy	less than 50%	less than 50%	less than 50%
Four-factor bankruptcy risk assessment model R = 8,38 K1+1,0 K2+0,054 K3+0,63 K4			
Value R	0,8025	-5,0759	1,7687
Probability of bankruptcy	minimal	maximal	minimal
Five-factor Z – E. Altman model Z = 1,2 X1 + 1,4 X2 + 3,3 X3 + 0,6 X4 + 1,0 X5 – original			
Value Z	2,51	–1,8	–0,44
Probability of bankruptcy	low	high	high
Five-factor Z – E. Altman model – refined Z = 0,717 X1 + 0,847X2 + 3,107X3 + 0,420 X4 + 0,998X5			
Value Z	4,29	– 2,71	– 2,44
Probability of bankruptcy	low	high	high
Four-factor model of R-invoice R = 8,38 K1 + K2 + 0,054 K3 + 0,63 K4			
Value R	–0,167	–2,414	0,206
Probability of bankruptcy	minimal	high	medium
Credit-men method N = 25 R1 + 25 R2 + 10 R3 + 20 R4 + 20 R5			
Value N	185,8466	93,2452	138,992
Probability of bankruptcy	low	high	low
Solvency indicator of J. Conan and M. Golder Z = – 0,16X1 – 0,22 X2 + 0,87X3 + 0,1X4 – 0,24X5			
Value Z	– 0,08	0,263	0,284
Probability of bankruptcy	50%	90%	90%
Four-factor model of Taffler Z = 0,53 K1 + 0,13 K2 + 0,18 K3 + 0,16 K4			
Value Z	0,613634	0,14987	0,18732

Probability of bankruptcy	low	high	high
Six-factor model of Zaitseva K = 0,25 K1 + 0,1 K12+ 0,2 K3 + 0,25 K4 + 0,1 K5 + 0,1 K6			
Value K	2,103166	1,43927	77,3856
Probability of bankruptcy	low	low	extremely high
Method of rating the financial condition of the company of R.S. Saifullin and G.G. Kadykova R = 2 K1 + 0,1 K2 + 0,08 K3 + 0,45 K4 + K5			
Value R	0,133867	-7,1268	0,54791
Probability of bankruptcy	high	extremely high	high

The high probability of error when using the remaining models may be due to the fact that they do not take into account the possibility of a negative value of the equity capital of the enterprise, due to retained loss from the activities of the enterprise. In the models of Tafler and Fulmer, in order to obtain a negative value of the Z indicator, which indicates the company's proximity to bankruptcy, it is necessary to have very high losses from the funds raised, therefore the results of the assessment on this model are close to reality.

Studies by a number of authors: D. Olson (2012), S. Balcaen (2006), H. A. Alaka (2018) also indicate inconsistency of the results obtained using these discriminant models. Thus, the studied models have several disadvantages:

1. Some indicators cannot be determined on the basis of published financial statements only.

2. The values of the weights in some models are not balanced, reflect not all aspects of the financial and economic activities of the enterprise.

3. There is no consideration of industry specifics and, accordingly, differentiation of threshold values of integral indicators.

4. Models based on the methods of linear progression and multidimensional discriminant analysis only state the current financial condition and are deprived of the possibility of its dynamic prediction.

With all the advantages of the models of E. Altman, J. Connant, M. Golder, U. Biver, G. Springgate and D. Fulmer, it should be noted that they are based on the study of the behaviour of firms in the conditions of economic development of Western countries. Building such models for the Russian economy is problematic, firstly, because of the imperfection of the regulatory framework for the bankruptcy of Russian enterprises; secondly, due to the lack of consideration of many factors affecting the financial sustainability of enterprises. In addition, along with the professionalism and intuition of an analyst who studies the economy of an enterprise, the quality of financial reporting documents and the degree of the information content of the statistical data and coefficients on which the models rely play a significant role. Many of the Western models are applicable only for wealthy enterprises and cause different, often opposite, opinions about the possibility of their application in specific country conditions (Peres, 2016; Jones, 2017; Deakin, 1972).

Foreign and domestic scientists are actively developing methods for assessing the financial condition and bankruptcy risk using neural networks (Odom, 1990; Anandarajan, 2001; Alfaro, 2008), using a hybrid approach based on precedents and genetic algorithms (Back, 1996; Ahn, 2009), based on the integration of decision tree classification and logistic regression (Chen, 2011; Cho, 2010), as well as using the apparatus of the theory of fuzzy sets (Chaudhuri, 2011; Mamdani, 1974; Zadeh, 1983) . The main difference between the theory of fuzzy sets is that this theory determines the belonging of some elements to the set not in binary values, as in the classical theory, but allows the gradation of the degree to which the element belongs to the set. This process is implemented using membership functions (Zadeh, 1965). The method for solving the problem of comprehensive assessment of the

financial condition of an enterprise and the related task of assessing bankruptcy risk on the basis of a fuzzy-multiple approach was described by A.O. Nedosekin (2017).

Comparing the effectiveness of neural network tools with methods of fuzzy logic and discriminant analysis showed that the neural network model cannot select any indicators that the analyst considers necessary, which is acceptable for models based on fuzzy logic. The use of models based on fuzzy logic is also supported by the fact that when analyzing the financial condition of an enterprise, a situation may arise when some explanatory indicators included in the discriminant model can be very low for a particular enterprise compared to their "normal" values, while others, on the contrary, are too high, which is also unacceptable. However, the combination of these indicators may indicate a stable financial condition of the enterprise, since it is the calculation of one integrated indicator based on all input factors at the same time. The solution of this issue can be accomplished by forming a base of decision-making rules when assessing the financial condition of enterprises, achieved using models built on the basis of fuzzy logic methods (Abdoulaeva, 2015). If we compare the values of the financial condition obtained with the help of a point estimate and the value of the financial condition obtained using fuzzy sets, we can conclude that the second method gives a more accurate estimate, because takes into account the specifics of the enterprise. In addition to taking into account the specifics of the enterprise, this method is focused on Russianreality and gives more accurate results than other methods.

Practical part

The method of solving the problem of comprehensive assessment of the financial condition of an enterprise and the associated task of assessing bankruptcy risk based on a fuzzy-multiple approach is used in the "Master of Finance: Analysis and Planning" program model developed by the Voronov and Maksimov consulting group. The program is implemented in the form of a template for Microsoft Excel, which includes a sheet with tables of initial data and results and about a dozen sheets of charts. As one of the branches of the Alt-Finance program, it has much in common with it. The main differences are a tidier design, many more options, however, the latter also turns out to be drawbacks - the program is easy to get lost. Among the shortcomings of this software, it can also be noted that the spreadsheet is not the most successful medium for developing large applications; working in this format with the results of the analysis is not very convenient. But the authors of the Master of Finance managed to get rid of many potential problems and make their template look like a real program (Abdoulaeva, 2015).

For a comprehensive analysis of the financial condition of the company during the study was developed software based on fuzzy logic. Based on the calculated financial indicators from the financial statements for the period, selected by a group of experts so that they best characterize the enterprise, at the same time form a complete set, a conclusion is made about the financial condition and risk of bankruptcy.

The number and names of indicators depend on the selected area. In the proposed version of the program uses six factors. However, you can specify their significance on a scale from 0 to 10. For example, a coefficient with a significance of 3 will be three times more significant than with a significance of 1. A coefficient with a significance of 0 will not be taken into account in further calculations.

To create a calculation, it is necessary that all fields for indicators be filled in and at least one indicator has a significance not equal to 0.

Information about the selected indicator is displayed in graphic or digital form. In digital form, a table of the boundaries of the membership functions for the selected coefficient will be presented. The graph shows the graph of the membership function.

If the entered parameters do not satisfy any conditions, the program will report this. The report displayed on the basis of the entered indicators contains a calculation table, a textual and graphical representation of the state of the enterprise.

In the main window of the program, you can also select the area for which the complex indicator of financial condition will be calculated.

Each region has its own coefficients, the number and membership functions of which can be changed. The presented model allows taking into account no more than 10 indicators.

When creating a new area, a window will open in which you must enter the name of the area and the number of coefficients. In the fields on the right side should be entered the names of the coefficients. Next, you should specify the boundaries of the subsets of states for each coefficient or the so-called T-numbers for the values of the linguistic variable, by setting which experts can take into account the industry sector and other qualitative parameters of the enterprise (for example, hidden or explicit options, image, reputation, enterprise personnel, etc.).

Using the developed software product, an assessment of the financial condition of a number of industrial enterprises was carried out. Comparison of the values of the complex indicators of financial condition obtained using common models with the results of calculations of a program using fuzzy sets led to the following conclusion: the developed model, takes into account the specifics of the enterprise and allows you to qualitatively assess the risk of bankruptcy of the enterprise.

Findings

Thus, the advantages of the proposed software product are simplicity and ease of operation, visibility of the calculation results, the ability to change the number and significance of the indicators involved in the assessment, take into account the period of analysis and industry specialization of enterprises. The developed program offers a solution to a fairly generalized problem. However, it has the flexibility to customize to the needs of the user, taking into account the specifics of the enterprise and the ability to solve new goals and objectives of the analysis. It is planned to establish the interaction of this program with other common software products, such as Microsoft Excel or 1C Enterprise, 1C Accounting, as well as to create the ability to integrate the report into Microsoft Word, which will increase the practical significance of the program.

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The Size Premium on Warsaw Stock Exchange – Sumbeta Approach

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Abstract

The problem of the size premium for small capitalization listed on Warsaw Stock Exchange is the main subject of this paper. We find that abnormal returns from small capitalization stocks are not properly explained by standard CAPM approach. The main thesis is that for small capitalization stocks it takes more time to reflect current information in their prices. Therefore, the additional explanatory variable is return realized in the preceding periods. The results are statistically valid, and the additional variable helps to explain the realized return. The importance of this result is that the size premium defined as the increase of beta coefficient should be applied to majority of Polish public and non-public enterprises.

Keywords: CAPM, small capitalization companies, beta coefficient, Warsaw Stock Exchange

Introduction

One of the leading models used to estimate the expected rate of return on investment in shares is the CAPM (capital asset pricing model) model. This is a one-factor model in which the size of the expected rate of return depends on the changes taking place on the capital market. The choice of the explanatory variable indicates that the investor examines exposure to market risk, and his investment portfolio might be well diversified.

The exposure to market risk can be related with financial features of companies, e.g., the size of debt, the operating leverage, the cost structure. In the paper, the financial parameter which explains the size of the beta parameter is the company's capitalization. It is assumed that the lower capitalization of the company means greater exposure to market risk. The following example can explain the impact of the required rate of return on the company's capitalization. Two companies with the same amount of expected cash flows have different standards of performance required by owners. A higher discount rate of expected cash flows will determine smaller goodwill. This means that companies which activities are riskier should be smaller and vice versa. The higher business risk for small businesses will require a beta adjustment - a measure of financial risk in the CAPM model. Pioneering research on the effect of small companies and how to include it in the CAPM model was carried out by RW Banz in 1981 [Banz, 1981, pp. 3-18] and the effect itself was observed in many markets [Arzac, 2008, p. 52]. The introduction of company capitalization could possibly improve the results obtained while using the CAPM model, as there is a reasonable suspicion that the beta coefficient for small companies are underestimated. The company's capitalization can be a good approximation of the influence of factors omitted in the calculation of the "classical" CAPM as well as compensate for the error of parameter estimation [cf. Berk, 1995, pp. 275-286]. The aim of this article is to estimate the premium for the size of companies listed on the Warsaw Stock Exchange. The main research problem is to determine the premium of small companies' exposure to changes in market risk.

There are several possible explanations of small capitalization. The increased risk of small business operations may be due to the low liquidity of shares, the higher risk of breaching the contractual condition and another way of organizing the market of trading in shares of small companies. Besides,

the size of the company is correlated with the difference (spread) between the buy and sell offers in the order book [see Ibbotson, Kaplan, Peterson 1997, p. 105]. The rate at which new information is included in the share price may depend on the size of the spread. Shares of high spread companies may reflect future information slower because an investor will decide whether to buy or sell a stock if the impact of the new information on the valuation exceeds the transaction costs. For this reason, shares of companies with a high spread will most likely show a positive autocorrelation of monthly returns in the portfolio [Mech 1993, 307 - 344].

The effect of small companies may result from the fact that not all shares of companies can be listed at the same time. The problem does not seem to be so important when one takes into account the monthly rates of return [Pratt, Grabowski, 2014, p. 227]. Ultimately, the delay in reflecting new information in share prices may be due to a limited number of analysts valuing the company. The speed at which further information is included in the price increases with the number of analysts performing stock analysis [see Brennan, Jagadeesh, Swaminathan 1993, pp. 799-824].

Description of the Research Model

In the literature describing the problem, determining the required rate of return of small-capitalization companies, the importance of the impact of low turnover on sensitivity to market changes is emphasized. One of the proposals to solve this problem was to use annual (instead of monthly) rates of return in determining the beta parameter [Kothari, Shanken, Sloan 1995, pp. 185 - 224]. It was assumed that within one year, most of the information that may affect the listing of the company's shares would be taken into account. An attempt to determine the required rate of return in this approach is limited for Polish companies, due to the small number of annual returns for companies listed on the Warsaw Stock Exchange.

Another way to make adjustments related to a low turnover on the securities market is to determine the exposure to market risk in two consecutive periods. This procedure was proposed by E. Dimson [Dimson 1979, pp. 197-226; Dimson 1983, pp. 753-783]. E. Fama adopted this solution, and K. French [Fama, French 1992, pp. 427-466], and the research results were developed and commercialized thanks to [Ibbotson, Kaplan, Peterson 1997, pp. 104-112]. This approach assumes that the estimation of the regression equation coefficients for the rates of return on the market and shares for the next two months:

$$R_t - R_{ft} = \propto + \beta\left(R_{mt} - R_{ft}\right) + \beta_{-1}\left(R_{mt-1} - R_{ft-1}\right) + u_t. \quad (1)$$

Where:
R_t- rate of return on shares in period t,
R_{tf}- the risk-free rate in period t,
R_{mt}- rate of return on the market portfolio in period t,

Most financial services publish β data calculated based on two weeks or monthly rates of return. The β coefficient better describes large companies (due to their higher share in market capitalization), and the factors of a small capitalization company will need to be adjusted for two reasons: the size and estimator's accuracy. The adjusted measure of the exposure of shares to market changes is SUMβ. This is the sum of the directional coefficients from equation 1.

$$SUM\beta = \beta + \beta_{-1} \quad (2)$$

The β factor measures the periodic correlation between return on shares and profits on the market portfolio. The portion of the performance obtained in the current period that reflects the correlation of rates of return represents the rate of return on the market portfolio in the previous period are additive, which allows the entry shown in Equation 2.

In studies conducted on the NYSE / AMEX / Nasdaq market [Ibbotson, Kaplan, Peterson 1997, pp. 104-112], the size of the coefficients increases as the size of the company decreases. Therefore, the

share of the coefficient in SUMβ change with the size of the company. The article presents the calculation of the SUMβ for companies listed on the Warsaw Stock Exchange.

The beta coefficient is commonly used in finance to determine the cost of capital. The basic model, that uses this factor is the CAPM model. This model does not exclude the use of modifications to the adopted beta coefficient [Feldman, 2005, p. 70]. The beta is also used as a risk measure. The full information beta can be used to determine the sector's risk premium [Pratt, Grabowski, 2014, p. 181].

Description of the Research Sample

The survey covered companies listed on the Warsaw Stock Exchange. The analysis covered the period from January 2002 to December 2017. The companies listed on the Warsaw Stock Exchange were divided into deciles with respect of their capitalization. For the analysis, companies listed on alternative market (i.e. New Connect) market were excluded. The average monthly rates of return of companies listed in the first and last deciles were calculated. The rate of return in decile is the weighted average capitalization of individual companies. The choice of the period was determined by the relative stabilization on the capital market at that time. The capitalization limits for each decile have changed over time. The minimum value of the lower limit for the first decile observed in February 2002 amounted to PLN 593 million, and the maximum value for the lower limit of this decile was observed in June 2007 and amounted to PLN 5,077 million. The capital of the companies gathered in the first decile ranged between 86.55% and 67.05% of the capitalization of the main trading floor. The special focus is put on the decile 9 because the results for the result of the decile 10 were inconclusive. For that reason, it was omitted further in the analysis.

In the analyzed period, for the data from the ninth decile, the maximum and minimum values of its upper limit were at the level of 217 million and 6 million, respectively. The size of companies in the ninth (last representative) decile did not change significantly. The capital of companies gathered in the ninth decile represented barely a maximum of 0.74% and a minimum of 0.07% of the capitalization of the main trading floor.

Figure 1 shows the change in the lower limit of companies in the first decile and the change in the upper limit in 10 deciles in the analyzed period.

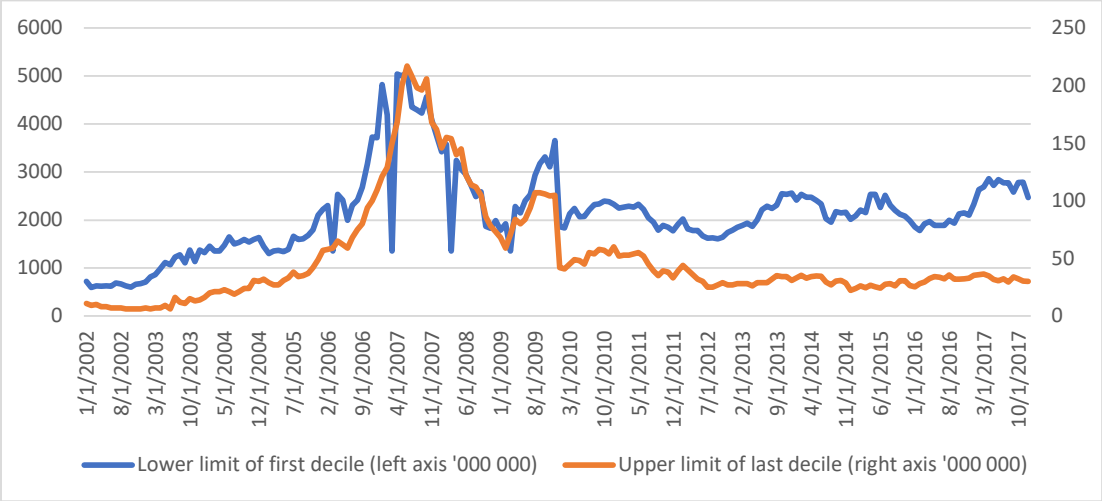

Figure 1: The limits of the first and ninth deciles for companies listed on the Warsaw Stock Exchange in the years 2002 2017, Source: own study

In decile 9, in the period under review, the companies generated a monthly arithmetic average rate of return of 0.36% based on logarithmic monthly rates of return with a standard deviation of 5.27%. Similarly, to the arithmetic average of the rates of return and the standard deviation for the WIG index, the values were 0.39% and 2.72%, respectively.

Research method and the result of the analysis

The reflection of company size on the rate of return was analyzed as follows. Beta coefficients were calculated for companies in the first and ninth deciles following equation 1. Then, using the factors and SUMβ were calculated. The power of explaining the rate of return, taking into account market risk exposure for companies in the 9th decile increased.

Table 1: Strength of explaining the model dl for β and SUMβ coefficients for companies from decile 9

	β	SUMβ
Adjusted R^2	0,2095	0,2283
Standard deviation of an estimate	0,1249	0,2533
Number of observations	191	190

Source: own study

For the companies from the first decile, the adjusted R^2 for the model taking into account β was 0.9632, and for the model taking into account SUMβ was 0.9635. Thus, the introduction of an additional variable in the first decile did not significantly improve the regression estimates.

Table 2 presents the quantities and SUMβ together with data describing the level of significance of regression estimates for companies in deciles 1 and 9.

Table 2: The size of the coefficients β, β_{-1} and SUMβ for companies from decile 1 and 9 listed in the years 2002 – 2017

	Decile 1	Decile 9
β	1,0415***	0,8927***
β_{-1}	-0,0238	0,2964**
$SUM\beta$	1,0177	1,1890

The numbers in brackets denote t-statistics. (***), (**), (*) reflect the 1%, 5%, 10% level of significance respectively.
Source: own study

This means that in calculating the betas for entities the size of companies from Decile 9 (the maximum value of the range is PLN 217 million), a beta factor of 1.1890 should be used. The coefficient value is underestimated by 0.2963, or 33%!

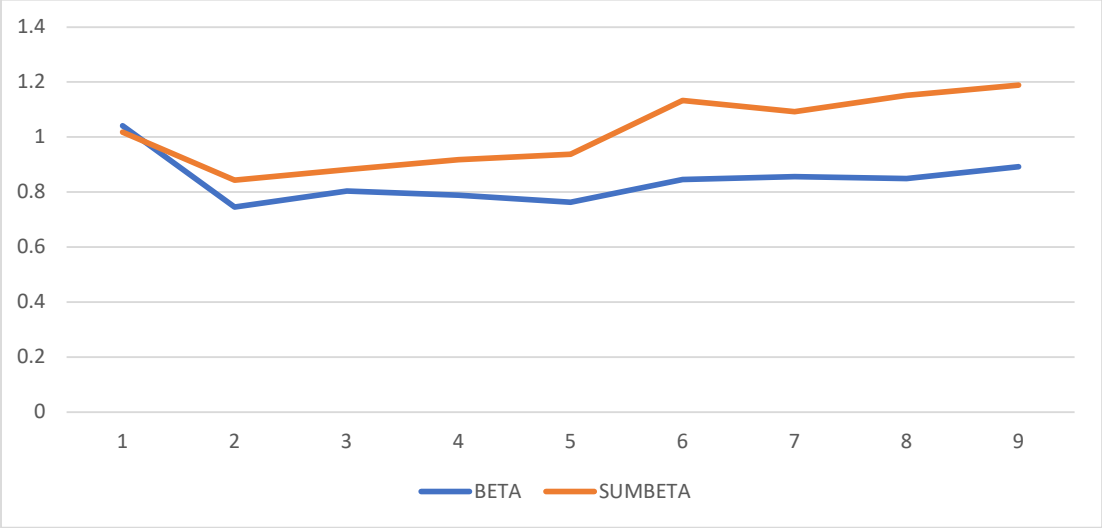

Figure 2: Comparison of beta and sumbeta for 9 deciles

Source: own study

The figure above presents the beta coefficient determined as in CAPM without taking into account the possibility of autocorrelation, and the sumbeta coefficient resulting from the use of multiple regression. The aggregated returns in decile 10 provides no statically valid regression results. Nevertheless, the study shows that for 9 out of 10 deciles, as the capitalization of entities decreases, the sumbeta coefficient increases. This can be explained by the occurrence of the autocorrelation of rates of return, which would indicate market inefficiency because information shaping the value of the entity would be included in the valuation slower in case of objects with lower capitalization than in case of objects which shares are highly liquid. Another argument for usage of the sumbeta coefficient instead of beta may be the increase in the standard deviation of rates of returns as the companies' capitalization decrease (from 2,88% in first decile to 5,27% in ninth decile). The following differences between the rates of return from the examined deciles were observed:

Table 3: The differences in the standard deviations of return in deciles

Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10
2,88%	2,68%	3,10%	3,29%	3,40%	4,01%	4,02%	4,35%	5,27%	7,15%

Source: own study

The trend of the standard deviations of the rates of return presented above corresponds to the sumbeta levels calculated for individual deciles, which may mean that the sumbeta coefficient better reflects the risk of small companies than the CAPM-related beta coefficient. This would indicate that the smaller companies are "overactive" to signals from the market.

Conclusions

The study observed the occurrence of significant differences between the sumbeta coefficients and the beta coefficients, which increase inversely to the capitalization.

Changes in the size of the companies forming deciles were significant in the analyzed period. Thus, the results can only be interpreted on the assumption that investors' expectations for the companies in the

decile (relative size of companies) are the same. The result of the analysis is a premium for companies with lower capitalization. The size of the premium is indirectly dependent on the size of the sumbetas coefficient. In contrast, the premium does not correspond with the rates of returns generated in particular deciles, but rather with the standard deviations of these rates of returns as a measure of risk.

In similar studies conducted on the US market, the size of premium was calculated based on very long time-series. As the data series describing small companies on the Polish market will extend (especially those listed on the New Connect market), they will allow for a confirmation of results achieved so far and enable the analysis of the volatility of the size premium over time. The next step in the small capitalization effect is to identify factors that determine the premium value.

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Women's Health in Precarious Work: A Review of Existing and Conceptual Framework for Future Research

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Abstract

The growth of interest in research on women employment in the last two decades is largely due to the spread of modern information technologies (the Internet, artificial intelligence, software, etc.), which led to large-scale changes in the labour market, providing women with additional opportunities for precarious work, but, at the same time, increased the requirements for the professional level of labour market participants. In addition, the large-scale changes and dynamism of the modern economy leave their imprint on the institution of family and marriage, the role of women and men in the family is increasingly blurred, women take on the responsibility of providing the family on an equal footing with men. Competition in the labour market leads to an increase in the number of employees working on a temporary basis, under flexible conditions of employment, which is often associated with a decrease in their income level and the emergence of health problems. The article is based on an analysis of Russian and foreign authors publications included in one of the bases: Web of Science, Google Scholar, RINC, which discuss issues of precarious work, and its impact on the physical and psychosocial health of women. The reasons for the negative impact of precarious work on women's health are analyzed. The results of the analysis show the state of scientific knowledge of the context of the impact of non-standard forms of employment on women's health.

Keywords: Precarious Employment, Female Employment, Flexible Employment, Distance Employment, Employment and Health of The Woman

Introduction

Employment instability and non-standard forms of employment are a social determinant that affect the health of the employee, his family and society as a whole. The intensification of the popularity of research on precarious work is caused by three main trends: the surge in “flexible employment” and the changing demand for labour, as well as the transformation of working conditions since the mid-1970s; increased interest in social aspects of health, including working conditions; introduction and development of new information technologies and systems.

Despite the growing interest in the problem of precarious work, not a large number of domestic studies are devoted to the gender aspects of the impact of precarious forms of employment on the health of workers (Kislicyna, 2015; Pesha, 2018; Pinchuk, 2018; Shal`, 2007). Russian researchers are more concerned about the transformation of the labour market as a result of the global and active spread of precarious forms of employment, as well as the insecurity of youth and rural residents in these new conditions (Cygankova & Telyatnikova, 2012; Gimpel`son & Kapelyushnikov, 2006; Kolot, 2013; Kotlyarov, 2015; Shkaratan, et all, 2015).

The term “precarious work” has been widely used for decades in various sciences and disciplines: sociology, economics, political sciences, and the media (Kalleberg, 2009; Rodgers & Rodgers, 1989; Tonkikh, et all, 2019). Over the past decade, interest in precarious work in research has increased (Vankevich, & Zajceva, 2015; Kamarova, 2015; Benach, et all 2016; Campbell, 2016; McDowell, et all, 2009). For example, a search for the key definition of “precarious work and women's health” at Google Scholar shows that between 4,560 works and 19,000 between 2001 and 2010 were published between 1970 and 1980. From 2011 to 2015, 17,500 articles appeared, and from 2019 to February 20,

2020, 16,900 new scientific articles and books have already been published.

The ongoing transformation of labour relations has led to an abundance of terms characterizing non-standard forms of employment: “precarious work”, “flexible employment”, “temporary employment”, “part-time employment”, “self-employment”, “home employment”, “distance employment”, “informal” employment ”,“ random employment ”(Benach, et all 2016; Campbell, 2016; McDowell, et all, 2009; Benach at all, 2014; and others).

The purpose of this paper is to analyze the problems of researching non-standard forms of female employment, to review the reasons highlighted by the authors for the negative impact of non-standard forms of employment on women's health, and also to highlight the main methodological issues of future studies.

Analysis method - content analysis of publications on the impact of non-standard forms of employment on women's health in Google Scholar, WoS, E-library.

The analysis is based on the most cited publications of the authors (according to Google Scholar, WoS, E-library) on the impact of non-standard forms of employment on women's health, published from 1991 to 2019. Articles and other kinds of scientific publications were selected by title, keywords and annotations of the definitions “precarious work, women”, “precarious employment and women's health”, “flexible women's employment”, “remote women's employment” (teleworking and gender). For the most part, publications in scientific databases intersect with each other. The sampling totaled 120 publications, with minimal citation for Russian-language publications - 6, for foreign ones - 30 (the difference in the selection criteria for citation is explained by the relatively small and only growing interest in the research problems in Russian publications, and the corresponding number of citations for publication). And also, relevant publications over the past two years - 2018-2019. When analyzing the RSCI base, priority was given to publications in peer-reviewed journals; nevertheless, works that met the search criteria published in collections of scientific papers, including those based on the results of conferences, and dissertation research were also added to the review. All descriptive works after analysis were excluded from the sample. The paper provides links to the most cited publications.

It should be noted that the entire sample body of work on non-standard female employment and its impact on women's health has several characteristics:

- Most of the publications reflect the results of empirical studies, which were carried out mainly with the help of interrogation techniques and refinement of statistics. This phenomenon emphasizes the importance of using along with methods that provide a subjective assessment of objective data and deepening research with a detailed understanding of various aspects of precarious female employment, their explanation and prediction of development trends at the local, regional, national and global levels.

- The dominant part of the research was carried out in Europe and the USA, in Russia, research is mostly concentrated on regional aspects and a small part of them, regarding foreign studies reflected in publications, deals with the impact of non-standard forms of employment on women's health.

- The most cited are works that reveal non-standard forms of employment and their impact on the labour market, the interaction of workers and employers, on the health of workers and on the institution of parenthood from an empirical point of view, work based on long-term and massive ones in terms of a sample population. Most of the popular studies include a deep methodological study of the existing scientific base on precarious work.

Research Directions on The Negative Impact of Precarious Forms of Employment on Women's Health

As a part of research in this direction, questions of legal and psychological safety of flexible and non-standard forms of employment, advantages and disadvantages, the effectiveness of these forms of employment for the economy of the family and the state are raised (Clarke, et all, 2007; Gerasimova,

E et all, 2017; Pyataya chast, 2015; Tonkix & Kamarova, 2015; Zlobin, 2011). For example, some researchers express concern about the physical and psychological health of women who are precariously employed in the economy (Amable, 2006; Ferrie, et all, 1995; Gerasimova, et all, 2017; Huws, et all, 2015; Virtanen, et all, 2005 ;). Empirical studies in various countries show that precarious work can lead to adverse health effects, including the development of low self-esteem, musculoskeletal diseases, injuries and mental health problems, family disorder, problems with raising children, smoking, alcohol abuse, anesthesia (Amable, 2006; Benach & Muntaner, 2007; Ferrie, et all, 1995; Huws, et all, 2015; Kim, et all, 2012; Virtanen, et all, 2005). Most studies supporting the hypothesis of the harmful health effects of precarious work are the result of studies of unsecured employment and temporary employment. Of course, not all non-standard forms of employment negatively affect women's health, in particular, temporary jobs can serve as a transition to permanent employment, and distance employment brings women satisfaction due to the availability of free time.

Researchers of the influence of non-standard forms of labour relations and forms of employment identify a number of reasons for their negative impact on women's health. Benach J., Muntaner C. (2007) (Benach & Muntaner, 2007, p. 276), who study temporary employment and work under fixed-term employment contracts, identify the following reasons for the negative impact of non-standard forms of employment on women's health:

- Non-standard forms of employment (flexible) have much in common with unemployment. Workers are offered low-skilled, low-income labour.

- non-standard forms of employment can be as adverse to health as unemployment;

- there is a mismatch between the level of work safety that a person experiences and the level at which he expects;

- transfer to a non-standard form of employment due to the closure of enterprises, insecurity in work leads to violations of self-esteem, chronic stress;

- temporary work associated with the implementation of heavy, tiring work, with repeated movements;

- temporary and intermittent work does not give an idea of the working environment, have less autonomy in work and are subject to closer monitoring.

These reasons, for the most part, are also noted by other researchers: Letourneux, (1998), Amable et al., (2006), Quinlan et al. (2001), Virtanen et al. (2005) (Amable et al., 2006; Letourneux, 1998; Quinlan et al., 2001; Virtanen et al., 2005). Lucı´a Artazcoz et al. (2005), based on a study of 8,400 people employed in Spain, confirmed that health problems are more likely to occur in women than in men with flexible employment patterns; dissatisfaction with work is greatest among women employed in low-skilled manual labour under flexible employment conditions; temporary contracts are positively associated with poor psychological health, regardless of gender. In this study, flexible employment was understood as: conclusion of a fixed-term contract, fixed-term temporary contract with an unlimited period and work without a contract.

Furthermore, because of these multiple forms of gender-based discrimination, women are more likely to accept precarious work that is precarious, unsafe, dangerous, and low paid (Huws, et all, 2015, p. 778; 65). One of the reasons for the negative impact of precarious work on women's health is also the inequality of the rights of precarious workers and permanent workers and the lack of social protection (Amable, 2006; Bloom, et all, 2012). The lack of training in the workplace is also indicated by researchers as one of the reasons for the negative impact of precarious work on health (Benach, 2016).

Orpen S. (1993) in his empirical study showed that although perceived flexible employment is associated with anxiety and depression among all employees, these mental health indicators do not differ between employees in the workplace who are objectively protected or unsafe. Thus, a feeling of insecurity in work is not always associated with objective conditions reflected in labour or other forms

of contractual relations (Walby, 1997).

Most studies confirm the negative impact of precarious work on the psychological health of workers (both sexes) (Orpen, 1993; Walby, 1997); part of the research focuses on the effects of precarious work on physical health (De Witte, 1999; Huws, 2015; Sverke, et all, 2002). Analysis of the studies revealed a lack in the depth of study of the topic of the direct impact of various non-standard forms of employment on women's health, since both women and men were present in the sample. In this regard, subsequent studies, in our opinion, should be carried out using conceptual models, which will include analysis of indicators of macroeconomic processes, welfare factors of the country and various regions, the development of non-standard forms of employment in various fields, followed by their correlation with an empirical study on women's health.

Results

Traditional employment covered all types and fields of activity in the World during the first industrial revolution, but already in the 20th century, the strengthening of state regulation of labor and the impact of political transformations on world labor markets, as well as technological changes led to the emergence of precarious work, which is widely distributed in economically developed countries and begins to spread in countries with developing economies. In addition, the development of “flexible employment” was facilitated by the fact that in the late 1970s “flexible production” was considered as a positive and necessary innovation to ensure sustainable economic growth. The need for “flexibility” was proposed for technical systems, schedules and salaries in the workplace, and “flexibility” was even recognized as a positive personality trait of the employee. In the last 20 years, with the advent of new technologies, new flexible forms of employment have appeared. A number of key areas can be distinguished in the studies, the dynamics of publications on which is presented in Figure 1. There are no publications on the selected issues until 1991 in the Web of Science (English-language works) E-Library (publications in Russian). The data reflect a growing interest in research issues and the main focus of scientists.

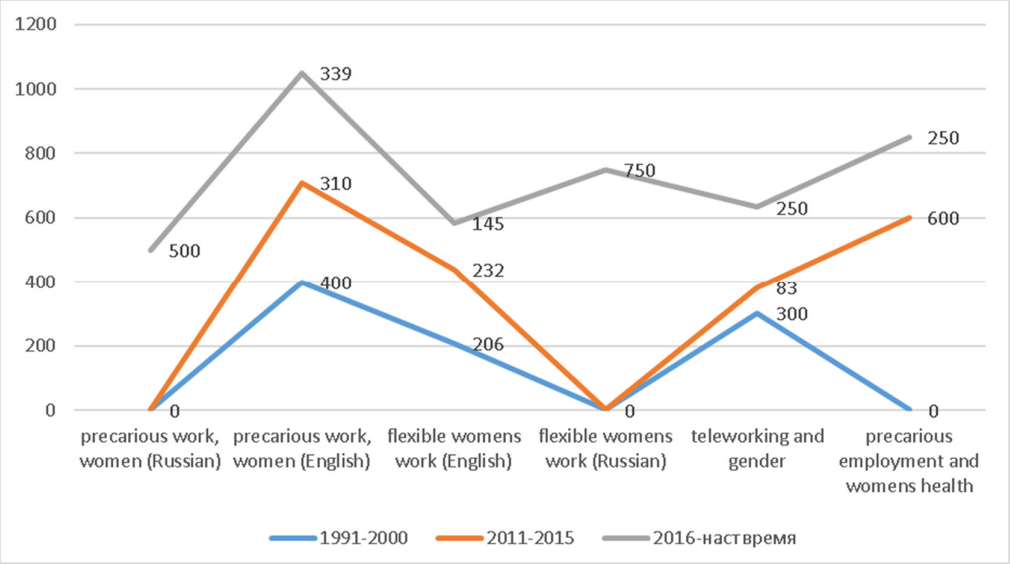

Figure 1: Dynamics of publications in the areas of research of non-standard forms of employment and their impact on women's health (% of the average annual indicators of the previous period, according to the Web of Science, E-Library)

Among the most cited studies on research, Kalleberg, A. L., 2009 (1634 citations) can be distinguished; Quinlan, M., et al., 2001 (694 citations); Benach, J., et al., 2007 (292 citations); Artazcoz, L., et al., 2005 (185 citations); Shkaratan, O.I. et al., 2015 (64 citations). The problems under study are devoted to the work of a wide range of researchers; of the most cited Russian-language publications, we can

distinguish the works of Aivazova S. G., 1998 (273 citations); Temkinoi A.A., 2002 (134 citations); Romanovsky N.V., 2000 (80 citations); Yarskaya V.N. and Yarskaya-Smirnova E.R., 2002 (56 citations) [2, 18, 19, 24] The most cited works in English on the topic of female employment: Sainsbury, D. (Ed.)., 1999 (2003); Kalleberg, A. L., & Leicht, K. T., 1991 (1236); Goldberg, P., 1968 (1,176 citations), England, P., 2017 (1,038 citations); Ridgeway, C. L., 1997 (946 citations); Bailey, D. E., & Kurland, N. B., 2002 (909 citations); Mandel, H., & Semyonov, M., 2006 (445 citations).

An analysis of the areas of research on issues of female employment showed that the largest number of published works have economic problems (about 20%), about 10% of the work in the field of sociology, psychology and management, at the same time, a fairly large number of studies are carried out by the authors within the framework of such sciences. like economic geography, demography, medicine and education.

Given the previously presented trends in research on the issues of precarious female employment, we present the following methodological principles for developing a conceptual framework for future research:

1. Consideration of non-standard female employment, taking into account all the components of this phenomenon: woman's employment in the family and domestic work, woman's activity in the economy and her competitiveness with respect to men; physical and socio-psychological health and well-being of women and marital and parental relationships.

2. The study of modern trends in the field of precarious female employment: the impact of innovative and modern information technologies on the position of women in the labour market, their entrepreneurial activity and family roles.

3. Reliance on the definition of flexible employment as including two aspects: the use of labour by the employer using non-standard forms and conditions of employment (flexible working hours, temporary, seasonal work, etc.); self-employment, as well as types of employment that allow a greater degree of freedom of action, decision making and choice of tools, place and time for the implementation of these decisions.

4. The use of an interdisciplinary and multidisciplinary approach to research on issues related to the effectiveness and impact of non-standard forms of employment on women, their health and economic and social satisfaction, their microsocium, as well as global processes in demography, economics and politics will allow us to more deeply study current trends in the field of employment of women.

5. Consideration of non-standard female employment issues from "private to general" and from "general to private" to confirm / refute research forecasts.

6. Consideration of issues of non-standard female employment is inseparable from male employment, in order to trace the correlation and general trends in relations in the labour market and employment.

7. The construction of a conceptual model for the study of modern aspects of female employment based on an analysis of the demand and supply of women's jobs and labour force, the distribution of female jobs by field of activity and form of employment, contribution to corporate / family outcomes and mobility.

Based on the analysis of studies for the period 1991-2019, the author proposes a conceptual model of the study of female employment, which demonstrates the influence of factors on the opportunities and prospects of women in the economic and social sphere, as well as the risks of modern transformation (Figure 1).

All changes in employment from a gender perspective are closely interconnected and research in this area, as we see it, should be carried out with a multidimensional analysis. So, if we study the issues of distance women's employment, it is necessary to trace the trends in distance employment in general,

the role of the female part of the population in them, the factors that contribute to its distribution (after all, all the factors from Figure 1 affect the distribution of distance employment), what are the prospects distance employment and what it can lead to, and what are the risks of its spread.

Environmental factors, economic and social policies have a significant impact on the employment and health status of modern women. In the conceptual model, the author formulated key risks caused by these factors - from forced informal employment of women to lower fertility and changes in parental functions. At the same time, we assume that there are opportunities for economies and politicians of states and companies that allow women to avoid the risks associated with precarious work in the future.

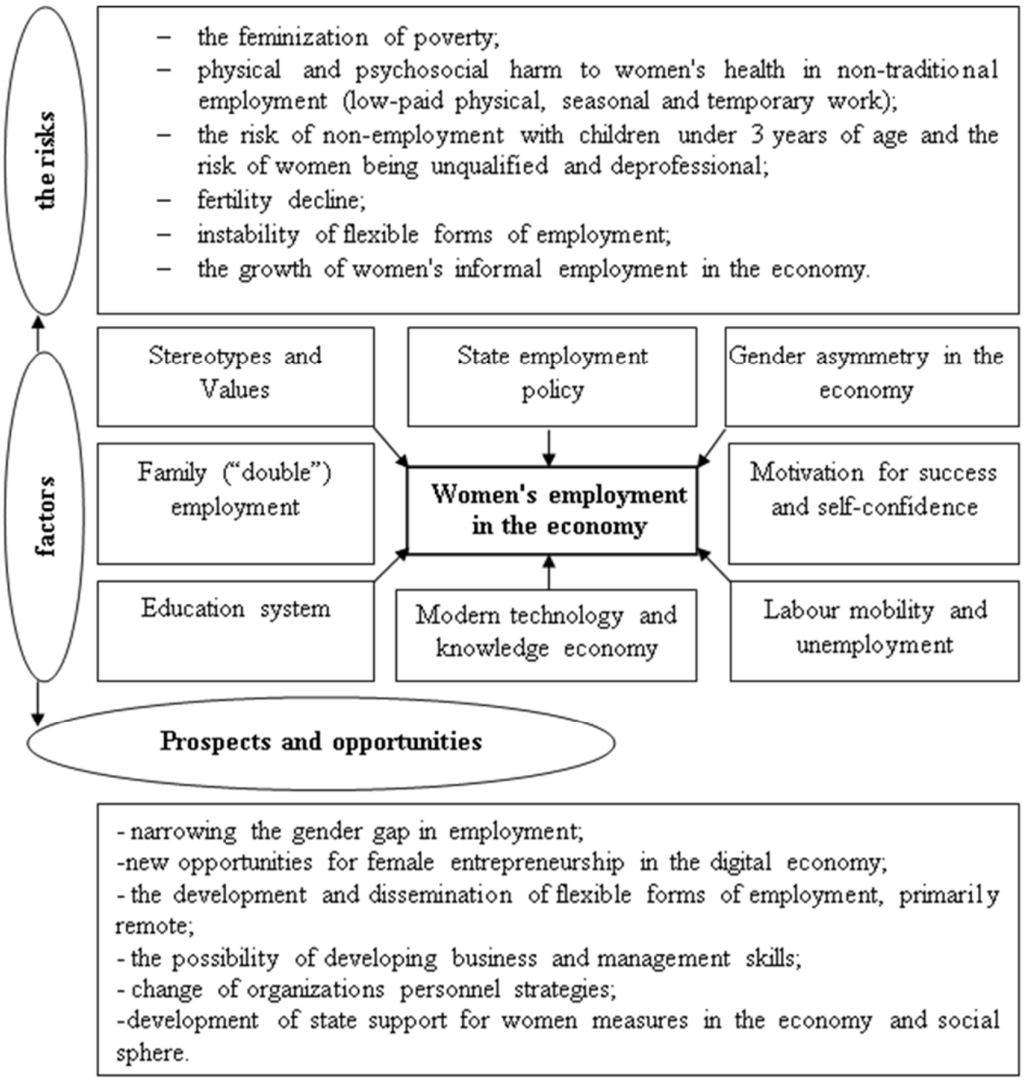

Fig. 1: Conceptual model of research on female employment

Conclusion

Women's employment and precarious work is a relatively new area of interdisciplinary research. But, in the era of large-scale digitalization of the economy, in the era of the economy of knowledge and innovation, and the growing number of precariously employed people in the countries, there is an

intensification of the interest of scientists in the world in protecting the health of workers, families and society, prone to these trends.

In the work, we presented the circle of the most exciting researchers on the issues of precarious work and its impact on women's health, reflected in scientific publications from 1991 to 2019, described key points and research results, as well as directions for future in-depth study.

Conclusions regarding the study of the problems of the influence of non-standard forms of employment on women's health:

- the question of the influence of non-standard forms of employment on women's health requires a deeper empirical study. But it is clear that a number of forms of temporary contracts are associated with adverse health and psychosocial consequences, in the first place, this relates to low-paid physical seasonal and temporary work;

- the question requires a deeper study also in that the number of precariously employed in the economy is constantly growing and can lead to negative consequences not only for the health of working women themselves, but also for family health, parental and marital relations, and the health of nations. Knowing the possible consequences of precarious work on workers, it is possible to prevent the development of serious social problems;

- as questions for further research in this direction, we propose to consider the impact of distance employment of some employees of organizations on the achievement of team (group) labour results, its reflection on the behavior of professional communities, the transformation of the communicative space in conditions when a third of the world's population has switched to flexible forms employment;

- It would be interesting to analyze the reasons why women of working age prefer flexible forms of employment to traditional ones on a global scale. Research can be aimed at studying the influence of flexible forms of employment on the autonomy of labour organization and control, job satisfaction and labour productivity.

In this review and the conceptual model of the study, as its summary, we tried to take into account and combine interdisciplinary achievements in the study of precarious female employment, as well as its impact on women's health.

From the point of view of the gender passport and the formed social portrait of the country, Russia has a female face. The changes taking place in the field of female employment in our country relate to new opportunities and obstacles to their integration and adaptation to new living conditions. Focusing on the prospects and dynamics of technology development and the introduction of innovations, it is necessary to make a qualitative forecast and create conditions for reducing the gender gap in the national labour market. This is a global and serious task, which must be solved in a comprehensive manner, with the active role of strengthening state policy, modernizing the education system, diversifying employment at the enterprise level and softening the stereotypes of the population regarding “male” and “female” labour.

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Cultural Embeddedness of The Successor Commitment to The Family Business. Comparative Study of Poland And Indonesia

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Abstract

The purpose of this paper was to add to existing research by exploring the importance of external factors on successor's commitment into a family business. It was done by performing comparative analysis of the culturally distant countries: Indonesia and Poland. The empirical survey was carried out among potential successors of family businesses. The hypotheses were based on four types of successor's commitment: affective, normative, calculative and imperative. The survey revealed numerous clear differences in successor commitment between the cultures under study. In particular, Indonesian successors commitment is basically an affective one, as opposite to calculative commitment of successors in Poland. We found strong first-hand support for cultural embeddedness of FB succession. That brings us closer to understanding of the commitment mechanism in particular and succession efficiency in general. We also point at stimulating niches for further study.

Keywords: Family Business, Succession, Successor, Commitment

Introduction

Due to the confirmed significance of the next generation perspective for the effectiveness of succession of family business, the investigations of the successor-related factors have been numerous. And, quite many elements of the successor predispositions for the succession have already been identified. However, there is still a visible gap in our knowledge on the conditions that influence the successor's approach to the issue and on the external determinants of the willingness of the successor.

In order to gain deeper understanding of successor approach development within family business, the study is to identify factors that affect willingness of the successor to take over the family business. Cultural embeddedness of successor commitment is selected for detailed investigation. Commitment of a successor is influenced by cultural context is hypothesised. To verify the supposition, a detailed examination of four kinds of commitment identified by Sharma and Irving (2005) in comparative analysis of two culturally distant nations is performed. The research is based on an empirical investigation made among the potential successors of the family businesses.

The significance of the issues under study comes from the importance of family business in every economy and the delicate issue of succession as an important element of business development. The findings reduce the gap in our knowledge on the family business succession determinants with special reference to cultural embeddedness. Moreover, this study adds to general knowledge on business and signs into discussions on far-strategic planning in family business.

Successor-Related Factors – Hypothesis Development

The matter of succession has long been an area of interest in the family business literature (Bozer, Levin, and Santora, 2017; Evert et al., 2015). And, the perspective of next generation on taking over family business is quite popular in FB research (De Massis et al., 2016). Chrisman, Chua and Sharma (1998) identified as many as 30 desirable successor features. Venter, Boshoff and Maas (2005) pointed at three groups of main successor related factors:

- **the preparation level of the successor (or readiness**) – defined as an ability or competences of the successor – managerial skills, personality and business experiences;
- **the quality of the relationship between the incumbent and the successor** – it is not surprising the literature suggests that the harmony and consensus between the incumbent and the successor are both essential for succession;
- **the willingness of the successor to take over the business** – a family's commitment to the business refers to the extent to which family members desire the perpetuation of the business in the family; as far as the successor is concerned the commitment is also defined as successor's willingness to take over the business.

In search for the explanation of the successor commitment phenomenon Sharma and Irving (2005) have identified four types of motivation that can be the fundament of successor's approach to take over the FB and that put some light on the successor approach to the issue (ANCI model):

- AFFECTIVE – based on desire,
- NORMATIVE – based on obligation and tradition, and/or under pressure,
- CALCULATIVE – based on opportunity costs,
- IMPERATIVE – based on need/necessity.

Table 1 summarizes determinants of the successor commitment that have been recognized in the literature. One can identify an important niche in the understanding of the problems of succession: the knowledge on the mechanism of both operation and importance of culture as a determinant of successor approach to FB is highly unsatisfactory because there is hardly any research done on the issue. Paradoxically, cultural references are very often mentioned in the succession literature, but the issue is rarely studied thoroughly. In other words, culture is one of those elements that is scarcely carefully incorporated into the investigation of the issue.

Table 1: Determinants of successors' commitment

Individual aspects	
affective commitment may be influenced by personal factors such as age, gender, birth order, skills, trust, abilities, career perspectives;	Cabrera-Suárez, and Martín-Santana, 2012; Cadieux, 2007; Fox, Nilakant, and Hamilton, 1996; Pyromalis, and Vozikis, 2009; Sharma, and Irving, 2005.
affective commitment is based on family member's strong desire to contribute to their family business' success;	Sharma, and Irving, 2005; Karima, and Habib, 2012.
commitment depends on self-efficacy of a successor;	Agarwal, Kumar, and D'Souza, 2016.
Family and business-related factors (microenvironment)	
the will of the successor to take over the FB is proportional to the degree of responsibly exhibited by them;	de Pontet, Wrosch, and Gagne, 2007; Pyromalis, and Vozikis, 2009.
the relationship between the owner-manager and the successor is important for the willingness of the	Chaimahawong, and Sakulsriprasert, 2013; Chrisman, Chua, and Sharma, 1998;

successor to take over the business;	Goldberg, and Wooldridge, 1993; de Pontet, Wrosch, and Gagne, 2007.
commitment depends on potential benefits for the future successor as they weigh the benefits and costs of assuming the leadership of the family firm;	Agarwal, Kumar, D'Souza 2016; American Family Business Survey, 1997; Handler, 1994; Sharma et al, 2001.
the fit between the career interests of a successor and opportunities in the family firm is important in determining if the potential successor joins family business;	Bozer, Levin, and Santora, 2017; Zellweger, Sieger, and Halter, 2011.
the cultural patterns of the family (patriarchal, collaborative or conflicted) might be important for succession;	Dyer, 2009.
education of a leader is important as predecessor plays a vital role to prepare the potential successor;	Amran, and Ahmad, 2010; Richards, Kammerlander, and Zellweger, 2019.
Macroenvironment	
succession is a social and family process influenced by cultural circumstances;	Le-Breton-Miller, Miller, and Steier, 2004; Karima, and Habib, 2012; Ward, 2000.
cases of areas of culture manifestations in FB succession related with gender and birth order;	Barnes, 1988; Friedman, 1991; Wang, 2010.
competitive environments play a very important role in the process of family business succession;	Marceau, Aldrich, and Aldrich, 1991; Stavrou, 1999.
changes in macro or micro business environment can influence the succession process;	Chaimahawong, and Sakulsriprasert, 2013.
uncertainties and contingencies in the business environment affect the distribution of power and control within family business and this distribution, in turn, influences selection and replacement of successors;	Wang, 2010; Nordqvist et al, 2013; Stavrou, 1999; Venter, Boshoff, and Maas, 2005.
as FB professionalizes the issue of succession it is far less emotional;	Afghan, and Wiqar, 2007.

Source: own elaboration.

The extensive studies of the family businesses all over the world made it clear that family business operations are deeply rooted in cultural context. And, uniqueness of family business is based on solid networks between private and professional life, and the social structure is strongly reflected in business culture (Dyer, 2009; Sułkowski, 2013). However, a vast majority of the research on firm succession carried out so far are single-region studies (Nordqvist et al., 2013) and they relate to Anglo-Saxon countries (Van der Merwe, Venter, and Ellis 2009). Moreover, international perspective in empirical studies of the determinants of FB succession is still limited. The identified importance of cultural embeddedness provokes reservations about possible generalization across countries. In other words, it implies doubts if mechanisms identified in one country might work in other countries as well. Therefore, it seems reasonable to expand our geographical area of investigation and suggest a comparative study of culturally distant countries. Such an approach seems to offer an opportunity to enrich our understanding of cultural background of succession. It also follows Morck and Yeung's (2003) suggestion that FB in the formerly planned economies may have their specificity and that studies in developing countries might bring important insights. Asia Pacific region seems to be relevant here as it is dominated by family-controlled businesses (Globerman, Peng, and Shapiro 2011).

The literature survey provides a conceptually sound framework which helps to improve the understanding of successor development in family businesses in general. Accordingly, this examination is to add to existing research by exploring the importance of external factors on successor approach to the issue in different cultural context and provide insight into how culture influences the succession in family business. Further hypothesis derived from ANCI model by

Sharma and Irving (2005) is to answer questions regarding the importance of culture for the successor's commitment to family business. The operationalisation of culture is based on Hofstede's (1980) dichotomies.

Following the aim of the study the following hypothesis was put to examination:

H. Commitment of a successor towards a family business depends on cultural embeddedness.

H1. Affective commitment is stronger in a collectivist culture that in an individualistic one.

H2. Normative commitment is more important in collectivist cultures than in individualistic ones.

H2a. Normative commitment is weak in individualist cultures.

H3. In individualist societies successors are driven mostly by calculative commitment.

H3. There is no cultural impact on imperative commitment.

Research Methodology

The purpose of the research was to find out whether there were any differences in the commitment of potential successors to family businesses among cultures. We applied comparative analysis as a basic research method. There is a number of frameworks for comparative investigation of factors influencing entrepreneurial behaviour in diversify of regions (Bouncken et al, 2008; Ozarall, and Rivenburgh, 2016). Patrickson, and O'Brien, 2001; Stehle, and Erwee, 2005). In the study we followed those patterns to compare the two countries under study, considering cultural issues following Hofstede (1980). An interviewing technique was used to collect empirical data on successor commitment with the measuring instrument developed on the basis of questionnaire offered by Hewitt, van Rensburg, and Ukpere (2012). The research instrument consists of three parts: SECTION A – the questions related with biographical data on a respondent and SECTION C – the demographical data on family business – these sections are to bring data that allows us to compare groups of respondents and to build up a company profile. In SECTION B (Q15-Q33) is an attempt to gather data on potential successors' commitment in FB. Respondents rated their orientation on a 7-point Likert scale. The following items have been developed here:

15. How involved are you with the strategic decision making in the family business?

16. To what degree do you believe and support the goals of the family business?

17. To what degree do you support the following statement: "It's our business; that is what we do"?

18. To what degree do the goals of the family business align with your own personal goals?

19. How important is it to keep the business in the family?

20. How important is it to pass the family business on to the OLDEST SON?

21. How important is it to the FAMILY to continue to manage the family business the same way it has been done by the previous generation?

22. How important is it to YOU to continue to manage the family business the same way it has been done by the previous generation?

23. To what degree do you feel FORCED to work in the family business by your parents?

24. To what degree do you feel OBLIGED to work in the family business?

25. I will earn a higher income being employed in the family business than I will get anywhere else.

26. By being part of the family business I ensure my inheritance in the family estate.

27. By being part of the family business I get access to the family networks.

28. By being part of the family business I nurture my relationships with family members.

29. To what degree were you employed in careers other than those available in the family business?

30. To what degree did you want to follow in the footsteps of your family member(s) who is/are controlling the family business?

31. My skills are in high demand in businesses other than the family business.

32. I will be more successful outside the family business.

33. My best career option is to be employed in the family business.

In order to catch context-related factors that might be important for FB succession, two culturally distant countries have been selected for comparative analysis. The case of Poland is interesting if only because as an emerging economy it does not have much experience in transferring leadership in private businesses (Bhalla, Orglmeister, and Tong, 2016). Indonesian case is worth attention – among others – due to its cultural heterogeneity and dynamic socio-economic development. Following Hofstede Insights Indonesian culture is collectivist, with both power distance and seniority importance high. And, Poland's national culture is an individualist one, with both power distance and seniority importance low (Hofstede Insights, 2020).

The results of the survey

The Sample: Respondents

This survey focused on investigating the perspective of university students with regard to their involvement in FB succession. The empirical data were collected among the university students of management, economics and finances coming from the families that run their own family business. The students declared to be real or at least potential successors. The respondents were interviewed in October 2019 at the universities in Jakarta and Warsaw. Simple random sampling was used to identify the survey's respondents. The questionnaire was successfully administered to n=52 students in Jakarta and n=90 students in Warsaw.

The respondents were aged 19–26 with dominant age of 21 in both countries and of the balanced sex structure. The study findings show a significant involvement of students in family firm operations in Indonesia (67%), evidently more than in Poland (53%). However, in both cases roles played by respondents in FB have been ranging from simple duties of cleaning and office administration to supervision and managerial tasks. Second, almost 60% of Indonesian respondents are to take over the business compared to less than 30% in the case of Polish students. The latter is probably related with the differences in having the succession plan between the countries (see section 4.2.). Third, it is worth mentioning that the way the questionnaires were filled in suggests that potential successors in Indonesia knew much more about the family business than it was in the case of Polish students.

The Sample: Family Businesses

The characteristics of family businesses represented in the sample are summarised in Table 2. The vast majority of businesses in the sub-samples from both countries have been created by parents – fathers and/or mothers of the respondents. The age of these family firms ranges from start-ups of 1 to 3 years up to well established firms that are over 20 years old. The median age in both sub-groups is the same and is 10 years. The businesses represented in the sample are mostly micro and small in size measured by number of employed. However, in Indonesian sub-sample the median size is 10 compared to 4 in Poland. Nevertheless, being small in size the business might be potentially equally attractive to potential successors, in comparison to big business that are definitely more desirable by younger generation. The businesses in both samples operated in many sectors (from the largest): wholesale and retail trade; services, transport, construction, manufacturing, tourism and hospitality, agriculture. Slightly more than a half of FBs in both countries represented in the sample operate on local markets, the rest range national markets, with a few operating on global scale. Polish FBs derive their key competences on price (60%) and flexibility (40%) compared to Indonesian businesses that mostly choose quality and price (46% and 36% respectively).

As far as succession is concerned in both countries the firms are still managed by their founders – they have not passed any succession yet. Nevertheless, one can easily notice the visible differences in approach to succession between the two countries as the majority of Indonesian firms (92% – compared to 13% in Poland) have their succession plans, they have already pointed the successor (87% – compared to 40% in Poland) and have already initiated the succession process at least through the implementation of the initial stages (85%, compared with only 13% in Poland). What is more, the strategy building and the succession planning in Indonesian firms covered by the survey have been much more far-reaching and mature than in the case of Polish firms. It was found that in both cases major strategies in succession planning that favour multigenerational outlook were primarily family discussions, mentoring and early participation in the family businesses. Moreover, in Indonesia the successors have been usually pointed quite early, their education has been subordinated to succession plans, and the other children in the family have been prepared for other career paths. This is not the case in Poland as the majority of families do not make such regular arrangements.

Despite these differences the responses to our questionnaire were irrespective of industry of operation, age or size of a business.

Table 2: The family business in Poland and Indonesia, the survey sample, numbers, (%)

age of family business							
	1-5	6-10	11-15	16-20	21-25	26-30	31-
Indonesia	14	13	9	11	3	2	0
Poland	24	26	7	16	7	9	1
size of business (number of employed)							
	1-5	6-10	11-15	16-20	21-25	26-30	31-
Indonesia	14	16	10	2	1	2	7
Poland	46	26	7	2	2	2	5
scope of a market				**fb' priority**		**religion important**	
	local	national	global	family	business	yes	Christian/ Muslim
Indonesia	28	20	4	37	9	38	4/34
Poland	48	38	4	42	40	24	24/0
strategic competences*					**successions completed**		
	price	flexibility	innovativeness	quality	0	1	2-
Indonesia	18	8	5	24	44	6	2

Poland	54	36	4	2	76	11	3
succession plan			**successor specified**		**succession in progress**		
	yes	no	yes	1st child	yes		no
Indonesia	48	4	45	28	44		8
Poland	12	74	36	12	18		72

*Source: own survey; * multiple choice allowed.*

Successor's approach to the FB

The comparison of the sub-samples covered by the survey yields the following results. There are not many similarities as far as an approach to family business of students from Indonesia and from Poland is concerned. First, the identification of the younger generation with the FB (Q17) is moderate in both countries: 48% of Indonesian students and 50% of the Polish ones agreed that: "This is our business". Second, in both countries, students are moderately convinced that by being a part of FB they ensue themselves an inheritance in the family estate and get access to family networks (Q26: Indonesia 48% and Poland 44%; Q27: Indonesia 58% and Poland 52%). Third, 58% students from Indonesia and 59% students from Poland believe that their skills are in high demand in businesses other than the family business (Q31). Also, their belief that their best career option is to be employed in the family business is similarly moderate (Q33: 54% in Indonesia and 56% in Poland). As far as slight differences between the countries are concerned it appeared in the survey that both in Indonesia (10%) and Poland (17%) the younger generation is not so much involved in strategic decision making in FB, and in Indonesia the decision making is more concentrated in the hands of older generation. (Q15)

Comparison of the two groups of students brings quite a number of evident differences as far as successors commitment is concerned. The dissimilarities are summarized below.

1. Potential successors believe in and support the goals of the family business much stronger in Indonesia (90%) than in Poland (50%) (Q16).
2. For potential successors in Poland it is quite important (65%) to keep the business in the family, but in the case of the Indonesian successors it is extremely important (95%) (Q19).
3. For the successors in Indonesia the takeover of the company by the eldest son is rather important (56%), apparently more than in the case of Poland (32%) (Q20).
4. The Indonesian potential successors would like to continue to manage the family business the same way it was done by the previous generation more (58%) than in the case of the ones in Poland (29%) (Q22).
5. Higher share of potential successors in Poland (47%) than in Indonesia (23%) claim that the goals of the family business do not align with their own personal goals (Q18).
6. Indonesian potential successors were employed in careers other than those available in the family business to a lesser extent (46%) than successors in Poland (56%) (Q29).
7. Students in Poland believe that they will be more successful outside the family business (56%) and the Indonesian students are not so optimistic about that (40%) (Q32).
8. Correspondingly, the Indonesian students present moderate belief that they will earn higher income being employed in the family business than they will get anywhere else (46%) and the opinion has a rather small acceptance among the Polish students (32%) (Q25).
9. The Indonesian students feel forced to work in the family business by their parents (44%) and the Polish students can hardly feel any pressure (9%) (Q23).
10. Similarly, the Indonesian students usually feel the obligation to work in the family business (64%) and the Polish students typically feel free from this kind of obligation (12%) (Q24).
11. The Indonesian students believe strongly that by being part of the family business they nurture their relationships with family members (73%) compared to moderate approach of the Polish students (53%) (Q28).
12. In Indonesia, the potential successors attach much more attention (60%) than in Poland (26%) to the family to continue to manage the FB the same way it was done by the previous generations (Q21).

13. Indonesian students would like to follow in the footsteps of their family member(s) who is/are controlling the family business to a higher extent (54%) than in the case of the Polish students (41%) (Q30).

The observable differences between Indonesia (as a collectivist culture) and Poland (as an individualist culture) regarding the potential successors approach to family business suggests that the main hypothesis of this paper might be true. In other words, the reported survey supports the premises that H: "commitment of a successor towards a family business depends on cultural embeddedness".

As far as the power of affective commitment is concerned, the results show that the Indonesian students are much more emotionally involved in the FB than the Polish students. That would advocate the statement H1: "Affective commitment is stronger in a collectivist culture that in an individualistic one". What is more, the tradition and social norms seem to be much more important for the Indonesian students for their approach to family business than for students from Poland. That would support the hypothesis: H2: "Normative commitment is more important in collectivist cultures than in individualistic ones" and H2a: "Normative commitment is weak in individualist cultures". For the students from Poland the calculative commitment seems to be more important than for the Indonesian students. That would go along with the H3: "In individualist societies successors are driven mostly by calculative commitment".

Discussion

In general, the results of the study go along with the previous knowledge on the importance of cultural embeddedness for the family business operations, succession planning included. In particular, the significance of the study is that it sanctions the legitimacy of comparative analysis of the topic. The empirical results confirm that culture determinants are important factors to successor commitment to the family business. Also, the researchers have not seen any empirical work which goes so deeply into successors' commitment nor its importance for the succession efficiency. What is more, the study shows the rationality of successor commitment understanding following the ANCI model. Moreover, a long list of identified important differences between the two subsamples from distant cultures is a substantial input into our understanding of succession mechanism.

The imperative commitment has been weakly presented in data on both sub-samples. It may come from the specificity of the respondents, i.e the students who are working on their future professional paths and are aware of the importance of education, and for them the FB takeover does not have to mean a necessity. One can also suppose that the method used in the research is not efficient as far as imperative commitment is concerned – a field study and qualitative research among actual successors seems to be more reasonable here. Thus, further research is necessary to learn more about the importance of culture and other external factors for successor's commitment to family business.

The wider scope of research survey seems to be justified to verify quantitative strengths of the relation between culture and commitment. We still operate in the area of suppositions that definitely need verification.

Conclusions

The comparative analysis of potential successors in Poland and Indonesia gave strong premises that justify our hypothesis. The evident differences between successors' commitment in Indonesia and Poland point at the specificity of the commitment depending on culture. However, study has not provided enough information on the activities of potential successors in relation to possible succession, and the real outcome of the succession process remains unknown. Moreover, the information in not enough to explain all the dissimilarities between the two sub-groups surveyed. What is more, as a special "by-product" of the survey quite meaningful suppositions on succession

planning in two countries under study emerged. That is why further study is necessary to explain the observed differences and root them deeply in cultural environment.

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Kitsch in Management: Characteristic Forms, Carriers and Propagators

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Abstract

Motivation to deal with the problem of managerial kitsch was the natural consequence of our previous research about crossing the borders of art and management. Our own – both practical and theoretical – experience in the fields of art and management was the main argument for combining these areas with benefits to the science and practice of management. This approach in management literature is rare and fragmentary; we try to establish the main routes for the future research. The delicate edging and features of art lead to the phenomenon of kitsch as something opposite to art or. Applying the well-developed theory of aesthetical kitsch into management area was vital for understanding the real nature of the phenomenon of kitsch in management. The research methodology bases on a qualitative review of the literature; the methodological approach bases on interdisciplinary and multi-paradigm approach taking into account the publications from areas of art (aesthetics theories) and management (organisational kitsch). The main research questions were: 1) is there any set of factors/features constituting the management kitsch and 2) what type/types of organisational roles are main for kitsch transfer? After the broad review of the literature, a synthetic description of management kitsch forms (one best way claim, simplification, grandiosity, organisational cynicism functional stupidity, bullshit jobs, seeming management) and the main carriers and propagators of organisational kitsch (management gurus, narcissistic managers, mendacious CEOs and owners) were described and the management kitsch was defined. Management kitsch should be defined and reduced for quality improvement of organizational life.

Keywords: Kitsch in Management, Kitsch in Aesthetics, Critical Management Studies

Introduction: Taste and Disgust, Aesthetic Theory of Organization

It is not an easy task to define the concept of kitsch. We may find many definitions of it, but each one leaves us with the feeling of insufficiency. Kitsch is easier to feel than to describe. By transferring the theory of kitsch from the field of aesthetics to the field of management, depending on the definition of kitsch, we get a kind of scale which we may put an aesthetic assessment of the manager's activity on: from the artist/virtuoso management to kitsch-method-producer imitating management (Szostak and Sułkowski, 2020). Since each assessment is the basis of improvement, the field of Critical Management Studies (CMS) opens itself as a theoretical canvas for the collision of aesthetics with management.

A positive change – as the basis of the CMS – is the purpose of constructive criticism: diagnosis, leading to therapy. This approach involves the use of humanistic management methods, within which nine pragmatic and methodological objectives (characteristic of the CMS cultural trend) can be distinguished (Alvesson and Willmott, 2003): 1) creating organizational cultures based on real intra-organizational democracy; 2) removing all forms of violence from the organizational culture by: rejecting false consciousness, reflectiveness, creating meaning (managing sense making),

humanization and moral and ethical sensitivity; 3) improving the social position of disadvantaged groups through the use of emancipation methods such as: empowerment, parities, political correctness; 4) implementing an emancipatory culture both at the level of relationships between organizations, within the organization and between employees; 5) rejection of the functionalist paradigm and instrumental reason in cultural interpretations; 6) developing qualitative, interpretative and engaged methods of researching organizational cultures; 7) the transformation of professionalism and technocratism of the academic community and management practitioners into critical methodological pluralism; 8) creating a reflective and critical organizational culture that will guide the development of organizations, society and people towards an increase in humanization; 9) developing humanistic management projects by radicalizing methods. Referring critically – in the spirit of the theory of art – to some of the above-mentioned CMS goals, one could say that they are unreal, or in themselves they are closer to kitsch than the immanent values of real artistic activity. The basic argument on the ground of aesthetics is that democratization – by its statistical nature – means lowering the bar to a level accepted by the majority, and this isn't associated with high quality. We can even find some of these goals to move towards kitsch methodically. Nevertheless, CMS is vital approach in our study.

The second half of the 20th century broadly transposed the phenomenon of kitsch scientifically from the field of art to other areas of life. Kitsch in management can be considered in two ways: literal and metaphorical. Literal reasoning is based on "bad taste" – question of a taste, i.e. the ability to recognize good from evil (Herbert, 1968; Eco, 1989); "golden recipes" of the management gurus, rhetoric of some of the guidebooks on management and leadership, shallow management concepts (like Maslow's pyramid of needs). In turn, the metaphorical understanding of kitsch is "any management", that is: non-creative and flattering low motives, deprived of mission – senseless and pointless, founded on the cynicism of organizational managers (Selznick, 1948), present in scientific area as Bullshit Management, BSM (Sułkowski, 2019). Using aesthetic optics, we can talk also about "taste and disgust in management": in some actions of managers we can find universal values, while in others – quite the opposite. In this theoretical framework – art-kitsch and taste-disgust – we'll be moving in this work.

Methodology and Theoretical Framework

The research methodology was based on a qualitative review of the literature taken from databases: EBSCO, Google Scholar, JSTOR and Scopus. The methodological approach based on interdisciplinary and multi-paradigm approach taking into account the publications from areas of art (aesthetics theories) and management (organisational kitsch). The main research questions were: 1) is there any set of factors/features that constitutes the kitsch in management and 2) what type/types of organisational roles are main for kitsch transfer? An additional goal was to define the kitsch phenomenon in management.

Literature Review

Analysis of the kitsch phenomenon in art is necessary to transpose the kitsch concept into management, that's why the literature review is divided on two groups: aesthetics and management. Both areas are firstly described separately to prepare the base for drawing the conclusions of the research.

Kitsch in Aesthetics

Although the kitsch phenomenon has always existed in art, it was named only at the end of the 19th century and it is only from this period that the development of its theory dates. This development of theory went hand in hand with the practical intensification of kitsch in the art of the 19th and 20th centuries, when the emphasis was placed on satisfying mass taste through mass (cheap and fast) production (Greenberg, 1985; Calinescu, 1987); it was a way to increase the material profits of artists who – putting aside the issue of loyalty to the ideals of art – focused on producing artefacts that found crowds of recipients, and thus enabling easier earning of livelihood. Kitsch, as a consequence of commodification, expresses problems inherent to high capitalism. If art becomes an extension of daily life it loses itself; it becomes a commodity among commodities, kitsch (Rosenberg, 1959: 267). Although kitsch was defined in of the second half of the 19th century in the Munich painting school, the phenomenon of kitsch is associated with human artistic creativity from its very beginning. The birth of the word "kitsch" shouldn't be equated with the birth of the phenomenon it describes. This thesis

results from the fact that kitsch lies on the opposite – to purely artistic creativity – pole of scale. Therefore, every creator, consciously or unconsciously, moves between these poles of ideal states.

Dictionary definitions of kitsch focus mainly on the meaning of a kitsch artefact instead of a kitsch phenomenon as a whole. The kitsch artefact means "something that appeals to popular or lowbrow taste and is often of poor quality (Merriam Webster, 2019), considered by many people to be ugly, without style, or false but enjoyed by other people, often because it's funny" (Cambridge Dictionary, 2019b). Synonymous words are: crap, debris, detritus, down-cycle, dross, effluent, influent, jetsam, jumble, junk, recycle, refuse, rubble, scrap, spoil, tat, upcycle, upcycling, waste product. Kitsch common features are: fundamentality, secondary nature, exaggeration, hysteria. The most popular themes of aesthetical kitsch are: patriotism, religion, erotism and politics. Starting from this point, we can conclude that kitsch likes primal instincts, which need primal fulfilment also. Kitsch answers for eternal need of emotion. From word "kitsch" there is close to the word "putty", which refers to filling the gaps with easily adhering mass. It can be said that the essence of kitsch is "special quality, which evokes emotions in a sure and easy way, effective in human creations, with stereotypical features". Because it isn't an easy task to define what kitsch is, that's why contemporary aesthetics theoreticians prefer the overview method of the kitsch artefact's features (Banach, 1968: 24, 34-38).

Adorno perceived kitsch in terms of the "culture industry", where the art is controlled and formulated by the needs of the market and given to a passive population which accepts it — what is marketed is art that is non-challenging and formally incoherent, but which serves its purpose of giving the audience leisure and something to watch. It helps to serve the oppression of the population by capitalism by distracting them from their alienation. Contrarily, art is supposed to be subjective, challenging, and oriented against the oppressiveness of the power structure. Kitsch is parody of catharsis, and a parody of aesthetic consciousness (Adorno, 2002). An important contribution to the kitsch definition process was adding ethics into the discourse: kitsch wants to act on the base of beauty (more "prettiness" than real beauty), not – like an art – on the base of the truth. Kitsch arises as a result of giving up the truth for the sake of prettiness. Kitsch isn't a bad art; kitsch is an evil in art – it creates its own reference system. On the base of this approach, there is no possibility to use a previous-mentioned scale where on one side there is an art and on other side there is kitsch; art and kitsch can be perceived as the separate levels (Broch, 1969a).

Aesthetical theory created a concept of kitschification, which means the phenomenon of departing in the work from artistic values in favour of the features belonging to kitsch. Kitschification, as an aesthetic defence against reality, "normalizes" the painful episodes in history, neutralizing that history, trivializing that history, commercializing that history, and exploiting that history in such cases as Nazi history transformed into a consumable commodity (Saltzman, 2001: 55). It consists, instead, in a sentimentalised unreflective emotional appeal that manipulates emotions, distorts perceptions, reduces rationality and understanding, and avoids or suppresses unpleasant or disturbing aspects of reality (Kulka, 1996). On sufficient scale, and with a sufficient permeation of societal sectors, kitsch not only disables people's capacity for aesthetic judgment, but also for political and moral judgement (Solomon, 1997). Kitsch is predominantly figurative, drawing on the conventions of 19th-century romanticism or socialist realism rather than abstract or cubist styles. One of its most characteristics traits is its use of the most conventional, standard, well-tried, and tested representational canons (Kulka, 1996: 29), rather than esoteric, idiosyncratic, original or innovative styles, since it must achieve an unchallenging, and effortless identifiability. Kitsch is aesthetically conservative and stylistically reactionary. It is universally accessible and easily understood. It is explicit and one-dimensional, lacking ambiguity, uncertainty or hidden meanings, and, by allowing for only one interpretation, is fundamental and dogmatic. It is pre-digested and pre-packaged "art" for the spectator, sparing effort and providing a short cut to pleasure without having to deal with the interpretive difficulty of genuine art; kitsch is mechanical and operates by formula. Kitsch is vicarious experience and faked sensations; it changes according to style, but remains always the same. Kitsch is the epitome of all that is spurious in the life of our times; it pretends to demand nothing of its consumers except their money (Greenberg, 1985: 25).

Kitsch origins are located in romanticism, in debased form emphasising dramatic effects, pathos and sentimentality (Broch, 1969b), a hackneyed form of romanticism (Calinescu, 1987: 240). Some researchers dispute its modern origins: poor aesthetic taste of classical-period Roman merchants – the universal access to and proliferation of kitsch were only made possible by the economic conditions and

mass culture of modern industrialism. The individual in a money economy becomes a mere cog in an enormous organization of things and powers which tear from his hands all progress, spirituality and value. Acquisition becomes one of the central motives of modern capitalist society, resulting in a sensory numbing from mass production (Greenberg, 1985). Money, while serving to measure the relative value of objects, relegates human activity to an alienated margin; cultural objects increasingly evolve into an interconnected enclosed world that has increasingly fewer points at which the subjective soul can interpose its will and feelings; this trend is supported by a certain autonomous mobility on the part of the objects; both material and intellectual objects today move independently, without personal representatives or transport; objects and people have become separated from one another. In this manner, economic modes of interaction replace socially embedded ones, transforming every facet of life to fit into the logic of market exchange through commodification.

Based on the theory of "aesthetic situation" by Maria Gołaszewska (1984, Szostak, 2020; Szostak and Sułkowski, 2020), we can present the problem of the kitsch experience by showing its opposition to the aesthetic experience. To distinguish it from an artwork, we will call the kitsch product as "kitsch artefact", whereas the kitsch creator as "kitsch producer/manufacturer". The synthesis of the discussed phenomena is presented in the Table 1.

Table 1: The Kitsch Experience vs the Aesthetic Experience

Element	Aesthetic Experience	Kitsch Experience
Creator/Producer	focus on universal values	focus on mass recipient
	creative reliability	duplication, copying
	opened for criticism and discussion	closed for criticism and discussion
Work/Artefact	it has an advantage over the receiver	it is dominated by receiver's (patriotic, religious, sexual, political) desires and needs
	it extends the recipient's existence	confirms the recipient's habits
	coherence	pretentiousness
	it fills the future based on the past	it fills the present
Receiver/Recipient	submission to a work of art	willingness to interfere with an artefact
	exclusivity	egalitarianism, mass scale
	willingness to consider the work from all sides/dimensions	choosing items to consider from the recipient's desires
	share of thought, awareness and will	avoidance of thought, consciousness and will (lack of reason, gullibility, irrationality)
	deep emotions, feelings	shallow and fleeting experience, sentimentalism
	internal contemplation	external experience
	need of loneliness	need of community
World of Values	dominant: truth	dominant: beauty (prettiness) and pleasure
Real World	source of creative inspiration	source of impulses to satisfy

Source: Authors' own elaboration.

Creator of artwork – being reliable in his creativity – focuses on universal values and is open for criticism and discussion about his work. Kitsch producer – copying own or other's ideas and patterns – focuses on mass recipient avoiding criticism. One motivation of the kitsch producer is to make something appear more valuable than it actually is. Kitsch is essentially deceptive – an artistic imposter, camouflaged as art: the whole concept of kitsch clearly centres around questions as imitation, forgery, counterfeit, and what we may call the aesthetics of deception or self-deception; it is a specifically

aesthetic form of lying (Calinescu, 1987: 229). Unreflective and uncritical, kitsch lends itself easily to the injection of propaganda and groupthink. It is confused with entertainment, attractiveness or fame, camouflages personal flaws, and is used to ingratiate. As dogma it is used to distract from important underlying realities, particularly those of contradiction and conflict, producing compliance and maintaining the status quo.

A work of art is coherent, it has an advantage over the receiver and – filling the future based on the past – it extends the recipient's current existence. Kitsch artefact is most often dominated by receiver's patriotic, religious, sexual and political desires and needs; it likes to confirm recipient's habits, to fill the present only shining with its pretentiousness. Artwork receiver is submissive to contemplated work, which gives him exclusivity and willingness to consider the work from all sides/spectrums; he needs to use his thought, awareness alone and will to contemplate deep emotions and feelings internally. The kitsch artefact lacks basic criteria of aesthetic values: unity, balance or harmony comprised of an inner logic of structure and style; complexity, multidimensionality, repleteness, combinations of heterogeneous forms, and elaboration of structures and detail; and intensity as vitality, forcefulness and vividness of presentation. The kitsch artefact also lacks the artistic value of creative and innovative contribution to the history of art – that is, opening new possibilities and suggesting solutions to topical artistic problems (Kulka, 1996), presenting an 'original' concept. It doesn't enrich our associations relating to the objects or themes, but rather is parasitic in nature since it doesn't create a beauty of its own. Essentially, kitsch artefacts lack provenance – they are disconnected from the original from which they are derived and lack considerations of sociohistorical context that in part add to their complexity but also their meaning.

Kitsch consumer wants to interfere with kitsch artefact by feeling egalitarianism of mass scale; he chooses items to consider from the recipient's desires avoiding his own thought, consciousness and will keeping his attention on external, fleeting and sentimental experiences preferably in the community of people in the same situation. Kitsch is easily understood by the consumer, doesn't question socio-political reality or vested interests, requires no great intellectual effort, reinforces our prejudices, avoids unpleasant conflicts, and promises a happy ending. We embrace images, popular actors, actresses, and musicians who, above and beyond their talents, have been given charismatic status despite – or perhaps because of – certain flaws in their character or theatrical skills. The appeal of kitsch to consumers resides not in the kitsch producer, its provenance, its contribution to the development of the arts, or even its social status. Kitsch is purchased as an end in itself because it satisfies an immediate desire and doesn't disturb our basic sentiments and beliefs. It also aims at universal rather than individual emotions, playing on the most common/lowest, denominator (Samier, 2008: 8-9). It is stirring but empty, serving primarily as a distraction. Kitsch, unlike art, doesn't accept the nature of things in the light of their critical or revelatory attributes, but to the extent which they cover and protect, relieve and console (Gregotti, 1969: 276). Kitsch mustn't question the basic metaphysical and moral assumptions of human existence the meaningfulness of our endeavours, the accepted moral code, and the meaning of life as such (Kulka, 1996: 97). It omits conflict producing the kitsch-man (Broch, 1969a).

Considering the world of values, in aesthetic experience we find domination of truth, but in kitsch experience – domination of prettiness and pleasure for the kitsch consumer. It can be said, that ethics is a distinguisher of kitsch. Real world is a source of creative inspiration in aesthetic experience, but a source of impulses to satisfy in experience of kitsch.

The development of the theory of kitsch phenomenon in aesthetics has been creatively adopted by management theory. The essence of the kitsch remains still the same: trivializing phenomena and reality, building appearances and moving away from the truth. As in aesthetics, kitsch in management is a departure from the truth. Management literature avoids answering the question of what organizational kitsch is; it focuses mainly on the description of its phenomenon. Trying to reach management area from the widest level, we collect kitsch manifestation in society, politics, religion, public administration, and education – finding management as the main denominator of all above levels.

Kitsch in Human Activities

McDonaldised (kitschified) society consists in four principles (Ritzer, 1996): 1) efficiency (the fastest way to satisfy a need); 2) calculability (an emphasis on the quantitative aspects of products, thereby

simplifying them); 3) predictability (the universal standardisation of products and services resulting in utter routinisation of thought and action); 4) control (the technological substitution of the non-human for the human). The primary purpose of kitsch socially and politically is in creating and perpetuating ideology and power structures: kitsch becomes totalitarian kitsch when it is a state policy, an approved way of understanding reality – dangerous not to admire it, more dangerous still to view it with irony. In this ideological context, kitsch takes on the status of dogma (Sabonis-Chafee, 1999: 365). Even in non-totalitarian contexts, kitsch has affected public policy. Public arts policy was used in the USA by liberals in the 1950s and 1960s to recruit art to support individuality, freedom and the superiority of the American way of life (Howard, 2004: 297). Similarly, the public art policy of Detroit that resulted in 'easily assimilated' imitative works posing as art. The new public 'art' was accepted as unproblematic by the citizens of Detroit since it lacked the provocative character of art, kitsch having substituted 'user friendly' installations that are unnoticeable elements of the urban environment aimed at covering, protecting, relieving and consoling (Hall, 1989: 328-329). The purpose of the policy was to beautify and ornament rather than challenge; if art becomes an extension of daily life it loses itself; it becomes a commodity among commodities (Rosenberg, 1959: 267). The preference for kitsch – exhibited by totalitarian regimes and, through extension, by authoritarian, top-down management styles – is that they can ingratiate themselves inexpensively with their subjects, and, unlike art, kitsch lends itself easily to the injection of propaganda (Greenberg, 1985: 30).

Kitsch can be found in all types of political systems. Socialist realism not only sanctioned but imposed kitsch, creating a "perfect world" of extravagant and socialist-realist theme parks, spectacular military parades, organised rallies, and gala atmosphere of party congresses. Capitalism requires kitsch exemplified in advertising using class distinctions and status symbols to create artificial needs and illusions to foster the ideology of the consumer society (Freidin, 2000: 134-135). Examples are buildings that imitate objects of desire: McDonald's stands masquerading as hamburgers or gas stations as mushrooms, houses imitating the style of ancient Greece, and buildings in gambling resorts modelled on the Taj Mahal or the great pyramid of Cheops (Kulka, 1996: 104-105). Despite the fact that politicians are often bearers of ideals and ideologies, political kitsch is like box-office attractions in the field of entertainment. Political symbols – being often manifestation of kitsch – allow to serve a mobilising function in totalitarian regimes. Political kitsch symbols: 1) are easily understood; 2) call for an unreflective emotional response; 3) handle core values of a political regime or ideological system as a closed, harmonious entity endowed with beauty to make them more effective and 4) link truth and beauty leading to a stylisation capturing mythical patterns (Friedländer, 1990: 203).

Religion, as a manifestation of the spiritual life of man, is also not free from the kitsch phenomenon. Benoit Mathot (2015), based on the philosophical and aesthetic concepts of Hermann Broch, Milan Kundera and Slavoj Žižek, shows kitsch's specific manifestations. Kitsch points to a blind path towards the external manifestations of the sacraments or liturgical rituals, which – without understanding their meaning based on the truths of faith – they are a blanket of empty gestures that lead to nothing (Pawek, 1969).

Kitsch is also an effect of globalisation: another mass product of Western industrialism, it has gone on a triumphal tour of the world, crowding out and defacing native cultures in one colonial country after another, becoming the first universal culture (Greenberg, 1985: 26). This process also describes the kitschified version of public administration, the New Public Management (NPM), a private-sector-style managerial ideology for the public sector adopted in the 1980s internationally (regardless of its lack of relevance in many jurisdictions). The NPM subjects public organisations to market concepts and forces that both theoretically and practically have been criticised and deemed highly problematic if not a failure (Samier, 2008: 7-8).

In a consumer society predicated upon instant gratification – expectations of success without hard work or without facing resistance and conflict – educational administration is transformed into a practice that comforts and reassures its audience. Leadership and policy kitsch's preferential characteristics as providing psychological comfort, reinforcing mythologies, predictability, and creating a sense of history, culture and reality that constitutes the 'beautiful lie'. It is the same underlying principles that are at the heart of the corporatisation and commercialisation of education, which has led to the transfer of authority from faculty to administration, conflict between Senates and Boards of Governors that erodes collegial governance, and a community of scholars based primarily on the vagaries of the

intellectual market (Lugg, 1999). Educational administration analogues are the leadership books that provide easy guidelines for becoming an effective leader, the many claims of leadership for all (reducing the qualifications to a mediocre level achievable by anyone), and superficial professional workshops that reduce complex moral theory to simplified rules. Intellectual kitsch – just as kitsch religion provides spirituality without the requirement of orthodox belief and action (Klinghoffer, 1996: 259) – kitsch administration gleans only the most superficial aspects of social reality. Organisationally it produces a total or comprehensive kitschification. Such principles pervade many teaching approaches aimed at making learning entertaining and effortless, including many of the learning organisation models promising a painless and conflict-free path to organisational improvement. The teaching of educational politics substituting anecdotes and war stories for political theory and analysis produces a course lacking foundational theory and rigorous examination of empirical studies. Without a scholarly foundation even the more insightful and penetrating use of war stories as a complex and sophisticated form of narrative, phenomenological and hermeneutic source is lost – it requires no knowledge, understanding, critique nor analysis.

Kitsch in Management

Looking for sources of kitsch in management, we can consider the growing pace of life and conducting business as one of the most important factors. A fast pace of functioning requires quick decisions; managers have less and less time for relevant analyses, hence the search for universal and simple rules is becoming a natural solution. These rules – often far from the "truth" – act as a remedy for problems and fill the features of kitsch. Analysis of kitsch in area of management created many own optics/metaphors of kitsch, f.eg.: Kitsch as Eternal Return, Kitsch as Human-Centred, Kitsch as Mass Sentiment or Kitsch as Defence Mechanism (Linstead, 2002: 662). Because management concerns various types of organizations – from small teams to entire societies – so descriptions of the kitsch phenomenon in management to date are rather selective and treat selected topics analytically.

Bullshit is unavoidable whenever circumstances require someone to talk without knowing what he is talking about: businessmen, politicians, PR specialists and consultants, forced to talk about any topic, can produce bullshit. Bullshit undoubtedly constitutes the concepts of many management gurus, promoted through their consultancy work and by offering the philosopher's stone of business, the frequent purpose of which is flattering the managers' egos. Sources of the expansion of Bullshit Management (BSM) include attempts to comment on every issue, attempts to dominate the discourse, repeating the same fashionable concepts, and lack of criticism in the scientific discourse (Sułkowski, 2019). BSM can draw on CMS theory by drawing on the definition of BSM as regular and instrumental manipulation of recipients using communication and social actions. But BSM should be exposed both within the theoretical discourse and in managerial practice. This is part of the revealing of false consciousness and symbolic violence that conceal the structures of power (Waring, 1998). Ways of resistance against managerial bullshit are: demystification and resistance that could be described as weapons of the weak (Scott, 2008).

We can distinguishes between two types of kitsch: 1) common kitsch that tends toward universality, and 2) uplifting kitsch which is rooted, symbol-centred, and emotionally linked to the values of a specific group – much like decontextualized leadership training programmes (Friedländer, 1990: 203). Contrived and inauthentic kitsch is found in organisational practices like creating mascots and company songs through executive decision rather than emerging naturally from the culture. Kitsch sanitises socio-political reality: kitsch excludes everything from its purview which is essentially unacceptable in human existence; a categorical agreement with being is a world in which shit is denied and everyone acts as though it didn't exist; it dilutes meaning (Kundera, 1990).

We need to mention here the bureaucracy also. Bureaucrats follow laws and rules without much thinking if these make sense or not. Followers willingly let their leaders do the thinking for them. Employees habitually avoid negative thinking and look on the bright side. People adapt to norms and expectations of others. They often jump on new fashions and fall for seductively formulated solutions. In each of these cases, people are thinking – but only in the most narrow and circumscribed ways. People are often competent, intelligent and clever within these established limits (Alvesson, 2018).

Results of the Research

We can distinguish two results of our research, which answer the basic initial questions. The first result are characteristic forms kitsch in management. The second result are carriers and propagators of organisational kitsch. Finally, the management kitsch definition is established.

Discussion and Interpretation of Results

This part is divided on three groups: 1) description of characteristic forms of kitsch in management; 2) description of carriers and propagators of organisational kitsch; and 3) definition of management kitsch.

Characteristic Forms of Kitsch in Management

There are characteristic forms of kitsch in management such as: 1) one best way claim; 2) simplification; 3) grandiosity; 4) organisational cynicism; 5) functional stupidity; 6) bullshit jobs; 7) seeming management.

Management belongs to social disciplines because the object of analysis are organizations created by people who, knowing the results of the research, adjust their behaviour reflectively; it means that the research subject itself is constantly changing. The ability to influence the directions of these changes is a powerful ideological tool that allows to manipulate the society. That is why there is a subtle and hidden pressure to conduct some research directions and limit others. In management, there are less frequent threads of rationalization of ownership and management, instrumental treatment of human resources, manipulative aspects of marketing, total organization or symbolic violence (Bourdieu, 1985: 93-94; Sułkowski, 2003). On the other hand, research areas and publications legitimizing the existing social order are exposed and financed. We can observe two trends that significantly limit the possibilities of communication consensus. On the one hand, we are dealing with an increase in the capacity and ambiguity of basic concepts, and on the other, with a growing terminology specialization in management sub-disciplines. Many basic management terms are ambiguous and resemble a "family of words". This is the case with organization, enterprise as well as management, structure, strategy or organizational culture. At the same time, management has its own specialized terminology within each sub-discipline. The language of reflection is increasingly condensed and less transparent, and thus the discourse is encapsulated. An additional language problem is the abundant use of terms from other disciplines and from life, which is a jumble of difficult rhetoric and phraseology. Fractal, learning, intelligent, vibrating, virtual and organic organizations are useful metaphors that are, however, difficult to define. Management, hiding behind the smoky curtain of jargon, is becoming more and more hermetic and instead of demanding openness of communication, we are dealing with the closure of small circles of specialists within our own sub-disciplines (Andreski, 2002: 66). On the other hand, we have "management shamans" who, rejecting the theoretical achievements of the discipline, use simple and colloquial language categories, which allows them to attract crowds of followers; they found their place and publicity with simple diagnosis for all organisational problems perfectly.

The problem arising in connection with the increase in the importance and popularity of management is confrontation with the values of post-industrial society. The area of management is increasingly dominated by the rules of the "mass intellectual goods" market. The demand for "recipes for market success" has been created. Management gurus, consulting companies and managers promote management ideas and works aimed at achieving the highest possible sales rate. Therefore, commercial criteria are beginning to prevail over cognitive values. This doesn't mean that outstanding managers or advisers don't create management achievements, but only that it loses its scientific character by becoming an area of mass culture (scientific truth gives way to superficial "prettiness"). When analysing the problem of the management idea commercialization, it's worth paying attention to the popularization issue. Dissemination of science is a process of bringing complex theories and discoveries to researchers so that they become accessible to society (Kozłowski, 2003: 18). In management, the sphere of creation and popularization of science are completely mixed. The mass goods market has created conditions in which the "production" of overly simplified ideas is a substitute for real discourse. And yet scientific cognition isn't egalitarian, so by definition the results of scientific work are of an academic/specialist nature, and only later should they be simplified and popularized. Meanwhile, in managing the standard is the creation of science as "mass theoretical products", which

are the intellectual equivalent of fast food, which by their simplicity and obviousness are to appeal to all interested parties (researchers, students, managers). It is no wonder that the problem of producing scientific banality corrupts the reputation of management. Critics point out the terminology based on colloquial terms and the lack of in-depth research, which creates room for "management shamans" (Micklethwait and Wooldridge, 2000a: 19-20). This leads to the sad conclusion for the academic community that management is at the stage of epistemological development comparable to tribal medicine, while at the stage of social development it is approaching show business. Management serves as an example of science, which too strong connection with the market and commercial categories can lead to cognitive pathologies (Amsterdamski, 1994). Simplification, as a way of social standardisation can be seen in many types of fiction organisations: communist organisations of youth, totalitarian organisations or artificial West-capitalist organisations always happy and ready to action while singing their company's hymn (Kostera, 1997).

Grandiosity refers to delusions of grandeur, characteristic of individuals with severe disturbances regarding their own qualities and significance. It can be observed in obsessions of dictators and other leaders constructing monuments to commemorate themselves or to leave a lasting legacy. Grandiosity is linked the narcissism of our times and a generalized craving to enhance self-esteem. The appeal of grandiosity and the social pressures to enact it create significant obstacles for management learning. Topics and methods signalling something glamorous and narcissistically satisfying attain great currency, uncritically seducing students into naïve acceptance of superficial and dubious knowledge (Alvesson and Gabriel, 2015). The ethos of grandiosity is one of the factors that has led to a fundamental re-evaluation of the functions and nature of management in today's organizations. Instead of a preoccupation with efficient production and rational administration, management is seen as increasingly seeking to bewitch the consumer with the magical, the fantastic and the alluring (Ritzer, 1999). Narcissistic individuals seeking to enhance their self-image easily embrace an employing organization's glamorous image and allure as a means of supporting and nurturing their self-identities. Today's organizations, imbued as they are with an ethos of grandiosity, are very liable to be led by narcissistic leaders. They can easily inspire their followers with their visions and can turn around moribund organizations and groups. The ethos of grandiosity brings organizations much closer to their consumers (Gabriel, 2005). Far from being outsiders to the world of organizations, consumers are being drawn into each organization's corporate fantasy, invited not only to purchase goods and services but a wide range of glamorized images, signs and symbols (Alvesson and Gabriel, 2015). The inflation of grandiosity labels is common: groups have become teams, groups with senior managers become "executive teams" or "top teams"; rationalization is "business process engineering" and management training takes the form of "executive development programmes". A whole new vocabulary of buzzwords and euphemisms has emerged, fuelled by the activities of management gurus and disseminated through MBA programmes, where simple tasks are elevated to heroic status and mundane calculations are turned into glamorous undertakings (Collins, 2000; Jackson, 2001). Grandiosity involves representing or loading phenomena in a way that makes them appear to be as attractive and extraordinary as possible, without being perceived as obviously fake. Issues of substance are marginalised.

Stupidity is often associated with low intelligence, but in a social context there is no clear link between people's IQ and their actual thinking and action. Clever people may do stupid things: in private life and at work, where social forces may be in operation. Functional stupidity involves narrow thinking, where established frameworks are accepted uncritically. Most workplaces seek to encourage and cultivate critical thinking, reflection and 'out of the box' ideas, yet they often remain better at doing the opposite. Managers and subordinates follow organisational and professional templates and cultures without paying much attention to assumptions and beliefs. In the kitsch context, the main aspects of functional stupidity are: 1) an absence of reflexivity: stop asking questions about the assumptions; rules/routines/norms are seen as completely natural; 2) not seeking cause or a good reason: stop asking 'why'; a rule is a rule and it must be followed, even if no one is clear why it exists; 3) lack of substantive reasoning: stop asking about the wider consequences of actions (Alvesson, 2018).

The Cynics – back to fourth century Greece – very openly questioned the existence of government and religious institutions. Cynicism was revived as a school of thought and propagated the idea of mockery of convention and tradition and prevailing beliefs and modes of behaviour. Organizational cynicism emerged as the new paradigm of employer-employee relations. A significant percentage of employees

are highly cynical about their organizations. Organizational cynicism arises when employees lack confidence in their organization and feel that the organization cannot be trusted. Definitions of organizational cynicism are associated with emotions such as disillusionment and anger. Organizational cynicism is divided into five distinct structures: 1) personal cynicism, 2) societal cynicism, 3) cynicism towards change, 4) work cynicism, 5) employee cynicism. Organizational cynicism comprises of three distinct dimensions: 1) cognitive cynicism, 2) affective cynicism, 3) behavioural cynicism (Durrah and al, 2019).

Bullshit job is a task (workplace, profession) whose disappearance wouldn't cause any noticeable change in the environment and would be accepted with indifference of the employee. There are five types of bullshit jobs: 1) making someone (client, boss) feel important: assistants, porters, elevator operators; 2) absolute solicitation of the interests of their principals: lobbyists, corporate lawyers, telemarketers, PR/marketing specialists; 3) solving problems that could be avoided with better organization: programmers with difficulty improving prematurely sold software, people accepting complaints; 4) generating documents, procedures and rituals instead of the real, needed action: performance managers, creators of magazines distributed among the company's employees, authors of intranet blogs; 5) managing people who do not need management or setting additional responsibilities that don't make sense but take time: medium level managers, leadership specialists (Graeber, 2019).

When a manager has no goals/plans for the future of the organisation, and the organisation is running with its own speed and direction, we can speak about the seeming management. Kitsch manager tries to keep his top position artificially, on the surface only. Seeming management connected with narcissistic personality of the manager can be very dangerous situation for the organisation, creating delusion situations (Sismondo, 2018).

Carriers and Propagators of Organisational Kitsch

Based on the phenomena presented in the review of the literature, we can distinguish three types of management process participants, which can be called as carriers and propagators of organisational kitsch or just as management kitschists: 1. management gurus; 2. narcissistic managers, 3. mendacious CEOs and owners. Guru is a concept derived from Sanskrit and signifies "a spiritual master who gives advices" (Cambridge Dictionary, 2019a), but in science the emphasis should be placed not on trusting the guru but on critical cognitive reflection. Guru is a role that means a distortion of both cognitive and practical management trends (Pinnington, 2001). One can ask the question, where did the role of the guru come from, which unfortunately is becoming more and more widespread in "home-grown" management. The reasons are varied and are rooted in both the subject of the discipline and its social environment (Andreski, 2002). Management, as a discipline, is extremely susceptible to the occurrence of the guru phenomenon for several reasons: 1) it concerns – in the vast majority – organizations focused on financial profit, so guru's "prescriptions" are an easy investment with a potentially high rate of return in a short time; if ready and simple solutions are applied, the profits will begin to flow in a wide stream; 2) concerns a phenomenon occurring commonly: everyone manages something and struggles with problems in the managed area, so simple solutions come with great interest; 3) verifying the guru's theses isn't easy: it is enough for the guru to have above-average wealth, which justifies his role and theories he proposes; in this case, scientific justifications aren't required. The guru role in the comparison to social roles of scholars in management is shown in

Table 2.

Table 2: Social roles of scholars in management

Social Role	Researcher	Teacher	Practice	Guru
Subject of Study	organization as an object of scientific cognition (finding out the truth)	organization as a place of social knowledge transmission	organization as a subject to change	organization as an object of intuitive cognition and changes
Approach to the Achievements of Discipline	building on management achievements (theorizing)	popularizing management achievements	adaptation of the pragmatic methodology of discipline	declaration of rejection of achievements
Seeking Confidence	pursuit of high probability	striving to pass the canon of probable knowledge	operating in conditions of uncertainty	suggesting certainty
Concentration Cognition vs Action	concentration on cognition	concentration on communication	focus on activities	focus on activities
Professional Ethos	scientist and researcher	academic teacher	consultant	shaman and prophet
Perfect Auditorium	the scientific community	students	employees, managers and clients	followers – businessmen

Source: Authors' own elaboration.

Management guides are popular on the publishing market and in cyberspace, whose authors are "management gurus" focusing more on self-marketing than on the transmission of reliable knowledge. They break with the tradition of real masters of management (Drucker, Kotler, Ansoff), who combined popularization with reliable theory skilfully. On the other hand, however, an advisory sector has emerged between the business sectors and other organizations and business schools, which makes little use of academic output and research, which deepens the gap between management theory and practice. The concepts promoted in consulting are – for marketing purposes – presented in an uncritical way, which in the long run reduces the authority of management sciences. F.eg., a non-reflective approach to reengineering, value management and organizational culture, and unsuccessful attempts to apply these concepts have aroused the distrust of many managers and have distanced them from the research community. Multiplying management guru concepts that pretend to be a philosopher's stone for managers are usually not of a scientific nature. They are characterized by tautological construction, excessive simplification of complexity, inability to verify, in which they resemble concepts of pseudoscience such as astrology (Wilson, 2000). Management gurus often exploit utopian motives by referring to the vision of an ideal organization leading to perfect social order (Reedy, 2002: 175-176); as an example we can use Senge's concept of "learning organization" described as the basis for a "knowledge-oriented society" (Senge, 1993). The management guru focuses on the process of intuitive

cognition that is supposed to cause changes (Peters, 1994). Managerial culture is based on authorities that are socially produced and reflect the structures of power. Some influential management representatives occupy the position of gurus instead of reflective and critical researchers. Gurus are therefore "heroes" and the most important promoters of oppressive culture and managerial ideology. Gurus "producing" the most widespread guides and simple and "practical" management concepts focus on a clear, "contagious" idea combined with effective marketing. Gurus are read because their concepts "seduce", so: 1) they don't require deeper reflection, 2) they are simple in understanding and remembering, 3) they have an element of "shocking" news, 4) they are lectured in a simple, non-academic language. Contrary to appearances, the gurus aren't rebels destroying existing power structures, but on the contrary they support them. They play the role of "cultural industry" in management. They create media interest in management concepts and structures, sanctioning the obvious and natural nature of this order. They bother their minds with peculiar "memes" of contagious concepts, at the same time postponing reflection on fundamental issues for organizations such as power and justice. Gurus try to "program the minds" of managers in accordance with the interests of those in power (Micklethwait and Wooldridge, 2000b: 9). The "cultural industry" of the guru is supported by mass advertising, PR and scientific marketing activities that lead to building the position of "idols" for managers. Gurus are treated in a special way in management, because their publications are of a popular nature and don't meet scientific rigors, and therefore they are relatively rarely criticized by the scientific community. It is also worth noting that because relationships with practice, the consultancy sector are an inherent feature of management understood as a practical scientific discipline, writing for practitioners and managers is a value in itself. Some management gurus from the past (Drucker, Kotler, Ansoff) also popularized research results and created valuable scientific achievements, sometimes constituting the foundations for entire sub-disciplines of management. Concluding this area, we can say, that there is a need of translation of science but in understandable way for untrained readers, otherwise this field will be (still) filled naturally by management kitschists.

The second group of carriers and propagators of organizational kitsch are narcissistic managers who build self-centred and professional-centred constructs in management practice. Putting the truth/merits of processes aside, they focus on the superficiality of actions and creating their own role in the organization. In this case, the organization becomes a means to build and fuel its own myth, not a tool to achieve business goals. The myth of Narcissus is permanently present in the history of mankind, because it opposes the phenomenon of self-worship, which is an immanent feature of human nature. The problem begins when narcissism becomes a significant or dominant personality trait. The need for narcissistic confirmation is not a new phenomenon, nor does it necessarily lead to grandiose delusions, disproportionate emphasis on image and presentation or constant craving for recognition, approval and praise. What is new is the generalized culture of narcissism (Lasch, 1980) which suffuses late-capitalism's where people become obsessed with trying to build a positive self-image, often through consumption of objects, experiences and brands. The effects of narcissistic attitudes on managers can be many: from deteriorating organizational efficiency, through demotivating employees, to creating fiction and artificial reality that can put the organization's vigilance and credibility to sleep.

The third group of carriers and propagators of organizational kitsch consists of mendacious CEOs and owners who – pretending to create and implement a mission in the organization – focus exclusively on revenue and profit maximisation. It can be said that efficiency (profitability) is a natural goal of any organization, but in this case we emphasize the element of false mission building, which is a fraud, giving up the truth (the basic feature of art) in favour of pretending to be external "prettiness" (the basic feature of kitsch). The presence of professional ethics can be here an important factor of distinction (Callahan, 1988).

Definition of Management Kitsch

After analysing the phenomenon of kitsch in aesthetics and based on the concept of an aesthetic situation (Gołaszewska, 1984), which concept is deformed by the kitsch-practitioners stripping off an element of universal values, kitsch in management – according to us – can be defined as "behaviours/manifestations/activities/attitudes in the organization deviating from an universal value of truth (understand as intended action) in favour of appearances and external forms".

Conclusions, Limitations and Perspectives

Kitsch in aesthetics – in relation to art – is clearly perceived negatively; even literally as an evil (Broch, 1969a). Kitsch in management is commonly perceived much less negatively, more mildly because the argument about the basic financial goal of business (profitability) acts as a justification for all (even unethical) methods of operation. BSM – on the flow of CMS – acts against kitsch in management. On the base of this research, it can be concluded that well developed aesthetical theory of kitsch can be used for understanding and developing of the kitsch phenomenon in management. Management kitsch features, kitsch carriers and propagators in organisations need to be clearly defined and possibly reduced for better effects and quality of organizational life.

Limitations of the research are as follows: 1) the matter of art is ephemeral and the matter of management is very real; not all kitsch features in aesthetics are applicable in the field of management; 2) as in the case of aesthetics, one shouldn't moralise over kitsch in management nor validate it; the kitsch phenomenon was, is and will be always; it should be studied and understood to the widest extent possible – assessing kitsch can affect the reliability of tests; 3) positive effects of kitsch in management can be found (e.g. creating myths around newly created businesses to facilitate market access) – although they are not long-term (life verifies all myths) and shouldn't be recommended as intentional methods of action.

Perspectives of the research are as follows: 1) deep studies in aesthetics as a possibility to next comparisons and conclusions in management; 2) development of kitsch in aesthetics as predictions for kitsch in management; 3) constant mix of kitsch and art gives the eternal perspective for the area of management kitsch studies.

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Aspects of Sustainable Development of Digital Enterprises Based on the Balance of Interests of Stakeholders

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Abstract

The article analyzes the impact of digitalization on the relationship between an enterprise and its stakeholders. The analysis of transformations in the economic mechanisms of the enterprise due to digitalization and the conditions for the emergence of new economic entities - digital enterprises. The stakeholders of the enterprise are analyzed and the directions of their influence on the activity and sustainable functioning of the enterprise are shown. The impact of digitalization on the relationship between stakeholder groups and the enterprise is evaluated. An approach to the analysis of the relationship between stakeholder groups and the enterprise is proposed. It is shown that digitalization has a bi-directional effect on the relationship between stakeholder groups and enterprises, while the negative actions of stakeholders in relation to the enterprise can be successfully compensated.

Keywords: Digital Enterprise, Sustainable Development, Stakeholders

Introduction

Today, new digital technologies, innovative business models penetrate into all spheres of the economic life of society and begin to influence the economy and contribute to the formation of qualitative structural changes in it (Plotnikov, 2018). Digital technologies are acquiring a decisive role in the economic development of many countries of the world. A single digital economic space, formed in the global space, contributes to economic growth and labor productivity, creating innovative jobs and digital assets, expanding the opportunities and rights of citizens, improving access to global markets and increasing the competitiveness of micro, small and medium enterprises, improving the quality of public services (Pirogova, Makarevich, Ilina, Ulanov, 2019).

The contribution of the digital sector, namely the production and trade of IT equipment, digital services and services, software and digital products development, and telecommunications to the Russian economy is relatively small in comparison with the economies of developed countries. So, in 2018, the share of the digital sector in the Russian economy amounted to 3% of GDP. At the same time, in most developed countries, the size of the digital sector averages 6–7% of GDP, for example: in France – 5,7%, in Germany – 6,3%, in the UK – 7,1%, in the USA - 7,4%, Sweden – 8,6%. At the same time, in many other indicators related to digitalization, Russia practically does not lag behind developed countries (Aleksandrov, Fedorova, 2019).

In order to develop the digital economy in Russia, a number of measures are being implemented. So, for example, the decree “On the Strategy for the Development of the Information Society in the Russian Federation for 2017-2030” defines a program of measures to develop the economy in Russia for the coming years. In 2017, an order was issued by the Chairman of the Government on the approval of the Digital Economy of the Russian Federation program (Ananyin, Zimin, Gimranov, Lugachev, Skripkin, 2019), in which the main objectives are to create conditions for the development of high-tech industries and increase the competitiveness of national economy sectors and strengthen it on the world market.

The introduction of new digital technologies, of course, has an impact on the development of enterprises, making it possible to make cardinal improvements at all stages of its production cycle (Rappaport, 1986). Digitalization allows to reduce production costs, optimize supply management, which contributes to a faster response to any new consumer needs, including in real time (Stern, Stewart, Chew, 1995). Customers have a feedback system with the manufacturer, consumer properties and the safety of goods and services are significantly improved due to the digital component, the contribution of which to the cost can reach up to half its value (Plotnikov, Pirogova, 2018).

The development of the digital economy leads to the emergence of new phenomena. More and more often in economic practice the term "digital enterprise" or "digital organization" sounds. The term "digital enterprise" was first proposed in 1996 in the book Being Digital by the director of MIT Media Lab Nicholas Negroponte, but it was possible to transfer to the practical implementation of the idea of a digital enterprise quite recently thanks to the development of appropriate technologies (Makovkina, Semeykina, 2016).

Digitalization and The Concept of Digital Enterprise

Various attempts are currently being made to define the term "digital enterprise". So at McKinsey they believe that an enterprise is digital if it is undergoing cultural digital transformations. Accenture claims the digital enterprise offers the opportunity for new operating models and business processes, connected product platforms, analytics, and teamwork to increase productivity. In the works of V. Ananyin (Ananyin, Zimin, Gimranov, Lugachev, Skripkin, 2019) it is proposed to call the "digital organization" the one in which the assets of computer capital are the most volatile complementary asset. In general, the authors adhere to the following definition of "Digital Enterprise" - a company that uses information technology (IT) as a competitive advantage in all areas of its activity: production, business processes, marketing and customer interaction.

According to most researchers, we are currently witnessing the Digital Transformation of traditional enterprises into enterprises with "digital thinking". A product or service created by a digital enterprise also becomes digital. The main features of a digital enterprise (Gurkov, 2011):

- most of the most important processes of relationships with customers, suppliers and employees are digital and supported by digital technologies;
- main business processes or logically interconnected business tasks, are implemented using digital networks;
- key assets (intellectual property, core competencies, financial assets and personnel) are managed digitally;
- business response to environmental changes is accelerated and enhanced through digital communications, which allows you to adjust the work in time and space (business can be conducted outside traditional geographical boundaries).
- not only the conditions but also the fundamental foundations of the enterprise are subject to change
- for a digital enterprise, information becomes one type of resource or raw material.
- digital technologies enhance the depth of penetration and impact of information on all areas of activity and relations of the enterprise.
- digital enterprises are becoming more flexible with expanding reconfiguration capabilities.
- focus on resource conservation: resource conservation, environmental conservation, energy saving, labor saving and capital saving.
- expanding the use of new materials or materials with new properties (including nanomaterials) that have predefined properties necessary for the final product, taking into account adaptation to additive technologies.

The positive and negative aspects of the impact of digitalization on the activities of enterprises are presented in table 1 (Gurkov, Avraamova, 2011).

Table 1: The positive and negative aspects of the impact of digitalization on the activities of enterprises

The positive impact of digitalization on the activities of service enterprises	The negative impact of digitalization on the activities of service enterprises
- decrease in the role of intermediaries, since digitalization enables enterprises in the service sector to independently promote and advertise their services.	- exclusion of government participation in the development of the digital economy
- reduction of costs for searching and processing information, reduction of transaction costs, promotion costs, etc.	- reduction in the share of investments, both in fixed assets and in the development of the hardware base of digitalization in enterprises
- optimization and acceleration of business processes of enterprises	- increased costs due to low investment attractiveness and the introduction of digitalization tools in enterprises
- reduction of time for promotion and implementation of new products and services, market adaptation	- low qualifications of personnel capable of effectively implementing and using digitalization tools
- increasing the flexibility and responsiveness of marketing strategies of enterprises	- inadequate security and the risk of digital fraud

Using digitalization tools, enterprises also change their behavior model, i.e. their organizational structure, mission and goals are changing, and the speed of these changes is so great that the current level of development of the digitalization infrastructure does not keep pace with the changing economy (Gurkov, Avraamova, 2011).

Digital enterprise stakeholders and their classification

Digitalization significantly affects the relationship with the organization's stakeholders. The stakeholder approach, being one of the leading areas of management over the past 30 years, suggests that the company should build relationships with its surrounding parties taking into account their interests, namely, create for them some values that may lie in the material, financial, social and other spheres. Currently, the stakeholder approach has spread not only in the field of pure management, which includes the classic works of I. Ansoff, E. Freeman, but also more modern studies, for example, I. Ivashkovskaya, which proposes the concept of managing the value of the company based on the interests of stakeholders, as well as the work of B. Kleiner and I. Gurkov, where relations with stakeholders are put at the heart of the mechanism for ensuring the sustainability of the enterprise (Ivashkovskaya, 2012, Gurkov, 2011, Freeman, 1984).

In accordance with the classification of J. Harrison and C. John, all stakeholders can be divided into three large groups: a wide environment, an operational environment, and an internal environment (Harrison, John, 1998).

Depending on the level of environment, the influence of the enterprise changes. The enterprise has the least influence on the wide environment, at the same time, this environment sets the context and changes in the conditions of existence and development of the enterprise. The wide circle includes sociocultural forces (society), technological changes (technologies), global economic forces (economics and economic trends), and global political and legal forces (politics) (Pirogova, Plotnikov, 2019).

The enterprise has a more significant influence on stakeholders in the operating environment. They, in turn, also have a significant impact on the enterprise. This includes suppliers, competitors, buyers, financial intermediaries, public authorities and the administration, as well as trade unions, activist groups, and local communities. The classification of stakeholders in accordance with their goals and objectives is presented in table 2 (Ivashkovskaya, 2012).

Table 2: Classification of stakeholders in accordance with their goals and objectives

Stakeholders:	Objectives:	Goals:	Expenses:	Win:
Owner	self-realization	Getting maximum profit, functioning and business development	Time, mental and other efforts, risks	Entrepreneur's rent
Investors	Provide financial flows for the development of projects	Profit from the sale of the final product	Risks, including loan defaults	Income
Customers & Buyers	Grow into a regular customer	Get a quality product at an affordable cost	The price of a product or service	The quality of the product or service
Supplier	Sales	Regular payment of orders	Quality of supply of goods or services	The price of the supply of goods or services
Staff	Performance of professional duties	Decent pay	Working hours, efforts, moral discomfort	Material and moral reward
State	Create the most correct relationship	Timely taxes paid	The cost of balancing the satisfaction of interests of all groups of stakeholders	Benefits of various stakeholders from the activities of the enterprise
Supervisor	Coordinates activities throughout the project life cycle, leads the team	Revenue generation and business operations	Working hours, efforts, moral discomfort	Material remuneration or a share of the company's income

The internal environment of the enterprise is the owners, board of directors, managers and employees. The internal environment has the greatest impact on the functioning and development of the enterprise and vice versa. In addition, various stakeholders can influence other stakeholders in the internal environment.

In the works of I. Gurkov (Gurkov, 2011), the crucial point is that the enterprise interacts with the labor, capital, finance, material resources, goods, as well as information and information solutions markets not directly, but indirectly, through specific entities that are actually stakeholders. Depending on whether these stakeholders have competitors, what is the level of completeness of information that is used when interacting with a particular stakeholder, the level of dependence of the enterprise on the stakeholder: all this determines the strength of its influence, as well as the value that the enterprise generates in the process its activities in the interests of a stakeholder.

In accordance with the approach of I. Gurkov (Gurkov, 2011), he classifies all stakeholders into 4 categories: key players, sleeping monsters, hostages, random companions. Key players or key stakeholders are stakeholders whose relationships are built on the basis of minimizing the level of acceptable solutions for the enterprise. The enterprise, on the contrary, holds hostages in a black body and can impose decisions on them at the lower limit of acceptability. For casual companions, the company does not try.

Transforming Digital Enterprise Stakeholder Relations

Currently, in the era of the development of digitalization, relations between stakeholders of a digital enterprise are undergoing a profound transformation (Greiner, 1972). This transformation is associated with the following factors:

1. Increasing the speed of transmission and dissemination of information, as well as reducing barriers to the distribution of confidential information, increasing information openness (what previously could be hidden or concealed, now it becomes almost impossible to hide).
2. The appearance of information or digital doubles, which are digital copies of processes, phenomena of objects, including enterprises. In fact, you can learn a lot about the enterprise from information networks.
3. The introduction of digital standards for transaction processing and technological processes in all areas of the enterprise, crowding out a person (employee) from the field of routine, simple, often repeated operations by information robotic systems.
4. A multiple increase in the amount of information collected, processed and stored about interactions with stakeholders (the transition to the so-called multidimensional big data), which reduces the risk of operational decisions.

The factors listed above can significantly affect the relationship of a digital enterprise with stakeholders and, as a result, require a change in the way they work with them.

In some cases, digitalization can lead to a change in the type of markets. For example, a buyer's market may turn into a seller's. And then the enterprise will lose the ability to impose a pricing policy on suppliers. The opposite is the case - the seller's market can turn into the buyer's market, where he determines the level of prices for products depending on their quality, functionality and level of support.

To analyze the sustainable development of an enterprise, it is necessary to determine what aspects of its functioning and existence can be affected by digitalization in relations with stakeholders. In our opinion, the following aspects can be distinguished:

1. Raising the awareness of stakeholders and strengthening the so-called "negotiating power", as a result of which the boundaries of acceptability of current decisions are shifted and, as a result, the potential profit for the enterprise is reduced.
2. Reducing the lifetime of the competitive advantage, which allows the company to extract additional rents. As a result, a decrease in the time for obtaining additional income and a reduction in the period of high growth rates of the enterprise value, and a decrease in investment efficiency.
3. Transformation (changing the requirements for a set of key competencies of stakeholders). First of all, it is necessary to note the employees and managers of the digital enterprise, who, competing with informational robotic systems, are forced to demonstrate new competencies, namely the ability to create innovations.

Digitalization Crises and Ways to Overcome Them

Directions for overcoming the indicated features of the functioning of digital enterprises and their interaction with stakeholders should be based on the understanding that, in principle, there are no insurmountable contradictions between the interests of stakeholders. If they existed, then in the end the enterprise would become unstable and collapse, which contradicts, first of all, the observed trends in the economic situation.

The next important aspect of crisis management is the understanding that digitalization is an expansion of opportunities not only for stakeholders, but also for the enterprise itself (Ivashkovskaya, 2009).
Let us consider in more detail, using the example of several stakeholders, how the interaction between them and the enterprise is changing in the context of digitalization.

Workers want to maximize their remuneration while minimizing effort. As a result, this leads to an increase in unit costs on the one hand, and a minimization of competencies, while minimizing efforts. On the other hand, digitalization, which allows automating some routine processes of personnel activities, leads on the one hand to increase competencies (the employee must solve tasks of a higher level), and on the other hand, allows to save money by reducing the excessive number of lower-level

staff and increasing higher salaries qualifications. Thus, digitalization compensates and even blocks the negative trends in the influence of the interests of workers on the activities of the enterprise.

Consumers are forcing the company to improve quality and reduce price. Improving the quality is due to the growth of the competencies of the enterprise, which leads to an increase in unit costs, and subsequently, to a loss of profitability of financial stability. Digitalization, accelerating the exchange of information, expands the consumer's ability to find the perfect combination of price and quality of the required product, on the other hand, it also allows the company to more flexibly and accurately meet consumer needs through the use of an individual approach, a system of discounts, personal offers, as well as optimizing its assortment based on the conditions of maximizing income for a given volume of sales or other gross indicators.

A similar analysis can be performed for all pairs of group of stakeholders - the enterprise. Based on this, strategic matrices can be built that allow one to evaluate where the enterprise will be moved in the coordinates of "price - quality" and "unit costs - competencies".

Conclusion

An analysis of the interaction of the enterprise with stakeholders in terms of digitalization showed that the introduction of digitalization in most cases can successfully compensate for the benefits of stakeholders. The winnings in the current situation are received by enterprises that earlier manage to transform into digital ones, which will allow them to compensate for the negative interests of stakeholders much faster, as well as offset the costs of introducing digital solutions into operational and strategic activities.

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The Media Exposure, Environmental Performance, And Companies' Characteristics on Carbon Emission Disclosure in Indonesia

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Abstract

This paper is aiming to analyze the influence of media exposure, environmental performance, type of industry, company size, profitability, and leverage on carbon emission disclosure. The dependent variable in this research is carbon emission disclosure that was measured by scoring a checklist of carbon emission disclosure. The independent variables are media exposure, environmental performance, type of industry, company size, profitability, and leverage. This research used secondary data with the population of all non-financial sector public companies that joined PROPER from 2014 – 2017. The 21 samples of companies were selected by using purposive sampling technique. This research used multiple linear regression using Eviews 10. The results proved that media exposure, type of industry, and profitability have positive and significant influence on carbon emission disclosure, whereas environmental performance, company size, and leverage have no influence on carbon emission disclosure. This research contributes to the development of green accounting in Indonesia and expects that related parties can develop a better evaluation and planning in increasing carbon emission disclosure of companies in Indonesia.

Keywords: Carbon Emission Disclosure, Media Exposure, Environmental Performance, Type of Industry, Company Size, Profitability, Leverage.

Introduction

The global warming caused by greenhouse gas emissions (GHG) has been a politics and business issue which has become more important in many countries (Bae, Lee, & Psaron, 2013) facing a lot of challenges resulting from this matter. One of the countries is Indonesia. According to *World Resources Institute* (2016), Indonesia was the sixth largest emitter of carbon emissions which released up to 1.98 million tonnes of CO_2 emissions every year based on its 2016 report. In 2017, Indonesia contributed 5,3% to the total global GHG in which Indonesia's GHG per capita reached 10,5 tCO_2e/cap compared with the average of G20 countries with 8,3 tCO_2e/cap (Climate Transparency, 2017).

Indonesia had ratified the Kyoto Protocol on December 3rd, 2004 by the enactment of Law No. 17 Year 2004 to participate in the efforts to reduce global GHG emissions. As a follow-up action, the president issued Presidential Decree No. 61 Year 2011 which stated Indonesia's National Action Plan for Reducing GHG (RAN-GRK). In 2015, Indonesian government submitted its post-2020 climate pledge

known as Nationally Determined Contributions (NDCs) to the United Nations. In its NDCs, Indonesian government promised to reduce the GHG emissions by 29% up to 41% in 2030. This pledge has been implemented in the national development plan 2015-2019 by determining several climate mitigation and adaptation targets, such as moratorium for new forest concessions and peatlands, peatland restoration, renewable energy mix targets, social forestry, and degraded forest land rehabilitation (Chrysolite, Juliane, Chitra, & Ge, 2017).

In the Indonesian National Action Plan for Reducing GHG (RAN-GRK), it was revealed that the industry sectors were the largest GHG emitters. The industry sectors or businesses undeniably had the biggest potential to increase the economy growth and became the development priorities in various provinces in Indonesia; however, the activities of the industries had the potential to release GHG emissions and contributed to global warming and climate change (Utama, 2014). Therefore, the related companies must support the measures to reduce GHG emissions and cope with the global warning effects as their corporate social responsibility efforts known as *carbon emission disclosure*.

The main objective of applying carbon emission disclosure is to reduce carbon emission produced by the industries as a part of the agreement within the Kyoto Protocol. Through the disclosure, each company can measure the amount of carbon emissions it produces, create a strategy to reduce it, record the results, and report them to the company's stakeholders (Dwijayanti, 2011). Carbon emission disclosure is a type of climate change disclosure covering the GHG emissions intensity and energy use, corporate governance, and strategy in relation to dealing with climate change (Cotter & Najah 2012). Carbon emission disclosure is also a form of contribution from the related parties to environmental changes, particularly global warming (Akhiroh & Kiswanto, 2016).

To measure the implementation of carbon emission disclosure, a non-profit organization based in England, called CDP, has issued a Carbon Disclosure Project (CDP) in the forms of information request sheets or questionnaires which have been submitted to the companies which need to be measured. CDP has functioned as the spearhead for the implementation of global disclosure system which has been useful for investors, corporations, cities, states, and regions to control their environmental effects. The CDP questionnaires was adopted and developed into a carbon emission disclosure checklist with 18 indicators by Bae et al. (2013) who used them to measure carbon emission disclosure in Australian companies.

In Indonesia, the carbon emission disclosure is still a voluntary act. A voluntary disclosure is a provision of information voluntarily by a company beyond the mandatory requirements which exceeds the minimum requirements of the existing stock exchange regulations (Nuswandari, 2009). Thus, companies have considerable discretion as to the amount of information they want to disclose. This creates variations of carbon emission disclosure stated in the companies' annual reports, and the carbon emission disclosure has been rarely implemented by companies involved in economic activities. The voluntary disclosure will urge the companies to consider the costs and benefits of the disclosure. For companies emitting GHG, the carbon emission disclosure can be advantageous to obtain legitimacy from the stakeholders and to avoid serious repercussions such as increased operating costs, reduced demands, reputational risk, legal proceedings, fines, and penalties (Berthelot & Robert, 2011).

In the discussion on carbon emission disclosure, there are some factors which can influence the extent of the disclosure. Several previous studies revealed the determinants of the carbon emission disclosure, including carbon emission levels, the size of the firms, the type of industry, profitability, growth opportunities, legal systems, environmental performance, financial market pressure, economic pressure, and other factors (Bae et al., 2103; Luo, Tang, & Lan, 2013; Jannah & Muid, 2014; Kalu, Buang, & Aliagha, 2016). Factors such as media exposure, environmental performance, and the company's characteristics measured by its type of industry, its size, and its profitability are still interesting to be studied as an attempt to reconcile the conflicting results found among the researchers in the area.

Media exposure is one of the factors that can influence the coverage size of carbon emission disclosure. The rapid advancement in information and technology has encouraged media to be a crucial part in carbon emission disclosure. This media exposure compels the companies to publish its activities related

to the protection of the environment to obtain positive responses from their stakeholders (Jannah & Muid, 2014). Companies which have more online media coverage from external parties tend to disclose their GHG emissions voluntarily because those companies have become more motivated in making a social and environmental disclosure (Majid & Ghozali, 2015). On the other hand, some researchers are of the opinion that the media presence does not always give the motivation for the companies to perform carbon emission disclosure in their annual reports (Pratiwi & Sari, 2016). In this case, companies have lacked explorations on the media visibility which is directly associated with the level of carbon emission disclosure due to the excessive anxiety or fear about the environmental control or retribution they will face if the information was disclosed openly in media, especially for the companies which cannot control the environment optimally (Cahya, 2017).

Within the environmental management issue, the environmental performance becomes the determinant of the carbon emission disclosure. The environmental performance of a company is the result of environmental management as an attempt to push the company to manage the environment. The Indonesian Ministry of Environment and Forestry has put some efforts to promote the management of the environment through the Program for Pollution Control, Evaluation, and Rating (PROPER) which has been in effect since 1994. The objective of this environmental performance rating (PROPER) is to encourage the company to comply with the laws and regulations by means of giving reputation incentives and disincentives and by compelling the practice of cleaner production. It is expected that the increase in the companies' environmental performances can encourage the disclosure of environmental issues such as the carbon emission disclosure.

Most of the publicly listed companies in Indonesia which have high environmental performance tend to encourage the companies to disclose the GHG emissions so that the public can give full supports (Prafitri & Zulaikha, 2016). However, companies with high PROPER ratings have indirectly represented the companies' commitment to cope with the climate change, and this has lowered the companies' motivation to disclose their carbon emissions voluntarily (Jannah & Muid, 2014). Conversely, companies with low PROPER ratings incline to make efforts to obtain the public trust through their voluntary GHG emission disclosure (Majid & Ghozali, 2015).

In the implementation of the companies' carbon emission disclosure, the characteristics of the companies' can encourage the extent of the coverage and the companies' motivation level in implementing the carbon emission disclosure. The characteristics of the companies can be measured from the type of industry, the company size, their profitability, and leverage. The type of industry can be grouped into high profile industry and low profile industry which can be differentiated from the intensity of their operational activities which can affect the environment. The high profile industry type is more intensive in producing emissions which bring negative effects on the environment, whereas the low profile industry includes companies which are not intensive in producing emissions (Bae et al., 2013). The high profile companies whose operational activities can bring negative effects on the environment have the tendency to disclose more corporate social responsibility (CSR) information than the low profile companies (Wang, Song, & Yao, 2013).

Bae et al. (2013) conducted a research on 100 Australian largest companies showed that the type of industry which is more intensive in producing emission will disclose carbon emissions more extensively. Companies in energy sector, transportation, materials and utilities which are more intensive in producing carbon emissions tend to disclose information related to environmental aspects compared with companies which do not produce carbon emissions intensively like the companies in financial sector (Jannah & Muid, 2014). In contrast to the statement above, Cahya (2017) is of the opinion that companies producing carbon emission intensively do not fully disclose their carbon emissions because the disclosure is still voluntary and this makes the companies incline to disclose their corporate social responsibility from other perspectives.

Subsequently, one of the characteristics of companies is their size. Large companies will actively involve in voluntary carbon emission disclosure because they have a lot of resources to prepare comprehensive disclosure (Bae et al., 2013). On the contrary, small companies tend to avoid this voluntary carbon emission disclosure because the quality of their human resources is not sufficient for

implementing the disclosure, not to mention their lack of other resources (Majid & Ghozali, 2015). Larger companies are more transparent in disclosing the carbon emissions information, so that they can maintain their environmental legitimacy (Gonzáles-Gonzáles & Zamora-Ramírez, 2016). Kalu et al. (2016) conducted a research on Malaysian listed companies, and the results showed that the more awareness and education the public has on carbon emissions, the higher the public consideration will be on the corporates' contribution towards the carbon emission threats. Consequently, the public will give more social pressure on companies which motivates them to increase their participation in carbon mitigation through voluntary carbon emission disclosure. Contrary to the previous statement, the results of Cahya's research (2017) on Indonesian *sharia* companies showed that the company size does not influence the extent of *sharia* social responsibility to disclose carbon emissions because large *sharia* companies still have not taken into considerations the positive effects of disclosing information for their companies, particularly the carbon emission disclosure.

In developing countries, financial resources play more significant roles in making decisions related to the companies' carbon emission disclosure (Luo et al., 2013). A company's profitability level is its financial resource which can indicate the company's performance to take some measures to reduce emissions and disclose the measures in its annual report. Companies with high profitability show that they can react well to the environmental pressure effectively, and they are willing to solve problems promptly (Jannah & Muid, 2014). Conversely, profitability does not correspond with the carbon emission disclosure which is caused by irrelevant benefits and disclosure costs. When a company discloses its carbon emissions, but the disclosure creates problems for the stakeholders in understanding it, the disclosure gives little contributions to the company (Irwhantoko & Basuki, 2016). Companies with high profitability do not need to extend the scope of the disclosure related to their environment because they are afraid that the disclosure can disrupt the information about the company's financial achievement (Prafitri & Zulaikha, 2016).

Leverage is another characteristic of a company. A higher leverage level in a company can increase the creditors influence in exerting pressure on the company. The higher the leverage level in a company is, the greater the creditors' expectation will be on the company's performance (Roberts, 1992). This shows that the credibility of GHG emissions has a directly proportional relationship with the company's leverage level (Rankin, Windsor, & Wahyuni, 2011). On the other hand, a higher liability level of a company than the company's debt and expenses can place restrictions on its carbon emission disclosure. A high leverage level reduces the tendency for the company to conduct social and environmental disclosure (Jannah & Muid, 2014). A company with high leverage level will be very careful in reducing and disclosing expenses related to carbon emission prevention action (Luo et al., 2013). The higher the leverage level is, the more obvious it will be that the companies tend to settle their liabilities rather than making disclosures which can result in an increase in the company's expenses (Majid & Ghozali, 2015).

Based on the reviews of previous research, it is found that there are some conflicting results from the previous studies. These different results motivate this present study which attempts to examine the relations between media exposure, environmental performance, and the characteristics of a company (e.g. the type of industry, the company size, profitability, and leverage) and carbon emission disclosure to obtain empirical evidence for this study.

Through development and testing of models, this present study can yield certain contributions. First, this study provides new empirical evidence for the relations between variables such as media exposure, environmental performance, and the characteristics of the company (e.g. the type of industry, the company size, profitability, and leverage) and carbon emission disclosure. Second, this present study can contribute to the development of green accounting, particularly its application in Indonesia. Third, this present study can enrich the existing empirical research on carbon emission disclosure which is still rare in Indonesia.

Literature Review

The Influence of Media Exposure on Carbon Emission Disclosure

Based on the legitimacy theory, media has a role in increasing pressures which come from public demand on the companies. Media exposure has a major role in the efforts to encourage companies to publish their activities, especially those related with environmental aspects. When the media publish the information related to the companies' activities which involve the environment, the information will become one of the considerations taken by the public in making pressure to the companies to legitimize their activities by disclosing their carbon emissions.

Based on the stakeholder theory, media plays a role in compelling the companies to fulfill various social contracts with various stakeholders of the companies. Media exposure on the companies' carbon emission policies encourages the companies to make necessary measures related to the environment. These measures to preserve the environment can help the companies obtain supports from various parties.

The high intensity of media attention on a company can increase the company's motivation to disclose information. The more intense the media attention on the company's environmental policy is, the more extensive the carbon emission disclosure will be. This is in line with the results of research by Jannah & Muid (2014) and Kusumah, Manurung, Oktari, & Husnatarina (2016) showing that media exposure has positive influence on the carbon emission disclosure. Thus, it can be assumed that media exposure can affect the carbon emission disclosure positively.

The influence of Environmental Performance on Carbon Emission Disclosure

The legitimacy theory asserts that to obtain public legitimacy, the companies must conduct environmental preservation which can create harmony between the environment and the company. The companies' efforts to bring this harmony are the results of their environmental preservation measures which can be reflected on their environmental performances. With a good environmental performance, a company can disclose more extensive carbon emission information as its attempt to create harmony between the environment and the company.

A company with high level of environmental performance can disclose the information on its carbon emissions to obtain legitimacy from the public in the surrounding areas. Thus, companies use carbon emission disclosure as one of the means to obtain public legitimacy. In this case, the better the environmental performance of a company is, the better the company's carbon emission disclosure will be. This is in line with the results of a research by Prafitri & Zulaikha (2016) and Dawkins & Fraas (2011). Prafitri & Zulaikha (2016) did a research on 298 listed companies in Indonesia and revealed that higher environmental performances can motivate the companies to disclose their GHG emissions including carbon emission disclosure. Similarly, Dawkins & Fraas (2011) who studied companies within S&P 500 also showed that environmental performances influence climate change disclosure positively. Accordingly, it can be assumed that environmental performances have positive influence on carbon emission disclosure.

The Influence of Type of Industry on Carbon Emission Disclosure

Corresponding to the legitimacy theory, companies operating in industries which intensively produce carbon emissions can receive greater demands from the public. The public demand that the companies make adjustments to their environmental management as the companies' activities which can potentially affect the environment becomes higher. With this demand, the companies can take some measures to restore the environment by decreasing their carbon emissions and publishing their carbon emission disclosure.

Business activities of a company involve various stakeholders. Each stakeholder will consider whether or not a support will be given to those business activities. Naturally, a company's business activities influence the provision of the stakeholders' interests. Each activity must yield value added to the stakeholders. When a company conducts business activities which have impacts on the decrease in the environment quality, the stakeholders can consider the measures taken by the company to restore the quality of the environment. Hence, companies which are active in producing carbon emissions will publish their carbon emissions disclosure more extensively to obtain the supports from the stakeholders who become more active in assessing the company.

The more intensive a company's contribution towards the increase of carbon emissions is, the more extensive its carbon emission disclosure will be. This is similar with the results of research by Bae et al. (2013), Jannah & Muid (2014), and Pratiwi & Sari (2016). Bae et al. (2013) which showed that the type of industry which produces carbon emissions intensively will disclose their carbon emissions extensively. Similarly, Jannah & Muid (2014) showed that the type of industry has positive influence on carbon emission disclosure, and they are significant for carbon emission disclosure. A similar result was also found by Pratiwi & Sari (2016) who studied non-industrial companies which are listed in Indonesian Stock Exchange. Therefore, it can be assumed that there is a positive correlation between the type of industry and carbon emission disclosure.

The Influence of Companies' Size on Carbon Emission Disclosure

The legitimacy theory and the stakeholder theory show that companies which have great resources can receive public attention and high demands for each of their business activities which are conducted to fulfil the interests of the stakeholders involved in those companies. Subsequently, companies with great resources are demanded to do extra measures to restore the environment.

The company size can influence its ability to report its carbon emission disclosure with its resources. It is in line with the fact that the size of the company's resources can affect its ability to conduct activities to mitigate carbon emissions. With great resources, a company can be more unimpeded in disclosing the mitigation activities. Studies done by Bae et al. (2013), Jannah & Muid (2014), Majid & Ghozali (2015), Gonzáles-Gonzáles & Zamora-Ramírez (2016), Kalu et al. (2016), and Hermawan, Aisyah, Gunardi, & Putri (2018) showed that the company size has positive effects on carbon emission disclosure. Thus, it can be assumed that the company size affects its carbon emission disclosure positively.

The Influence of Profitability on Carbon Emission Disclosure

Profitability reflects the ability of a company to fulfil the interests of its stakeholders from the financial aspect. A high level of profitability indicates that a company is able to give value added to its shareholders and creditors. Based on the legitimacy theory and stakeholder theory, a company must be able to satisfy the public demands related to the environment and to other social contracts. With a high profitability, a company is demanded to be capable of implementing the necessary measures to reduce the carbon emissions, in addition to increasing the wealth of the shareholders and fulfilling various social contracts with the stakeholders. Profitability can boost the company's ability in increasing its carbon emission disclosure.

Studies on the relation between profitability and carbon emission disclosure have been conducted by, among others, Bae et al. (2013), Luo et al. (2013), Gonzáles-Gonzáles & Zamora-Ramírez (2016), all of which show that profitability has positive and significant influence on carbon emission disclosure. The better the company performance in making a profit is, the better the company's contribution in reducing the carbon emissions will be, including in making carbon emission disclosure. Accordingly, it can be assumed that profitability affects carbon emission disclosure positively.

The Influence of Leverage on Carbon Emission Disclosure

Based on the stakeholder theory, the management will increase value creation to minimize losses suffered by the stakeholders. In this case, the stakeholders who become the center of attention from the management are the ones who provide debt financing to the company. To minimize the losses suffered by these stakeholders, the company will put more efforts into reducing any disclosure which can worsen the company's image. If the company's image becomes worse in the public eye, the company will weigh the disclosures which are considered as ineffective in increasing the company's image. Moreover, a high leverage level reduces the company's ability to publish its non-financial disclosure.

A high leverage level can motivate the company to limit the level of carbon emission disclosure to the public. A company with high leverage will prioritize the policy related to the fulfilment of the company's liabilities rather than its efforts to reduce its carbon emissions. This puts a restriction on the company's carbon emission disclosure. The results of studies by Jannah & Muid (2014), Luo et al. (2013), and Majid & Ghozali (2015) share the same opinion that the leverage level has a negative effect on carbon emission disclosure. Therefore, it can be assumed that leverage affects the carbon emission disclosure negatively.

Methodology

In this present study, the research objects focused on the level of carbon emission disclosure published in the annual reports or sustainability reports of listed companies in non-financial sectors which had joined PROPER over a four-year period from 2014 to 2017. These companies became the objects of research because the non-financial sector is closely related to the environmental issues, and the companies in this sector contribute to the increase in carbon emissions. The scope of this present study is constrained by variables influencing carbon emission disclosure, namely media exposure, environmental performance, type of industry, company size, profitability, and leverage.

This present study is a quantitative research using multiple linear regression to analyze secondary data. To assess carbon emission disclosure, the secondary data were obtained from the companies' annual reports uploaded to official website of Jakarta Stock Exchange (JSX) and other additional reports taken from the official websites of the companies.

All the listed companies in non-financial sector which had joined PROPER during 2014 – 2017 became the research population of this present study. The samples were taken by using purposive sampling technique in which the samples were taken based on certain considerations or certain criteria. The criteria used in taking the samples were as follows: 1) A listed company in non-financial sector which had joined PROPER from 2014 – 2017; 2) A listed company in non-financial sector which had published its financial reports and annual reports consecutively from 2014 – 2017; 3) A listed company in non-financial sector which has disclosed its carbon emissions implicitly and explicitly (covering at least one policy or one disclosure item which was related to carbon emissions or greenhouse gas emissions) in various published documents, such as annual reports, sustainability reports, and financial reports from 2014 – 2017; 4) A listed company in non-financial sector which had made positive profits from 2014 – 2017.

The Dependent Variables ini this research is Carbon emission disclosure, used the checklist scoring to operationalizing it. The scoring which is developed by Bae et al. (2013) based on the information request sheets distributed by CDP (Carbon Disclosure Project). The calculation of carbon emission disclosure index in this present study was conducted by following these steps (Jannah & Muid, 2014): 1) Give a score to each disclosure item by using a dichotomous scale; 2) Each disclosure item in a report was worth 1 point and vice versa; 3) the total score for each disclosure item (carbon emission disclosure by a company) was calculated using this formula:

$$CED = \frac{\sum di}{M} \; x \; 100\%$$

Notes:

CED = Carbon Emission Disclosure
$\sum di$= Total of the entire score 1 obtained by the company
M = Total items for maximum disclosure (18 items)

The Independent Variables in this study are Media Exposure; Enviromental Performance; Type of Industry; Company Size; Profitability; and Leverage. Media Exposure was calculated by using a dummy variable in which score 1 was given to a company which had had positive and negative news coverage from external parties or from internal parties with regard to the company's efforts in dealing with carbon emissions. The news coverage here was referred to the online media coverage. However, score 0 was given to companies which has received no publication on any types of media from external parties concerning the company's efforts in handling its carbon emissions.

In the operational description, the environmental performance was measured by using the ranking scores as stated in Program for Pollution Control, Evaluation, and Rating (PROPER). The PROPER rating puts the companies in gold rank, green rank, blue rank, red rank, and black rank. In this present study, each rank was given a score from 5 to 1 respectively. The table below illustrates the ranking scores for environmental performance based on PROPER ranking.

Table 1: PROPER Ranking of Environmental Performance Variables

Color	Ranking Scores	Notes
Gold	5	Excellent
Green	4	Very Good
Blue	3	Good
Red	2	Poor
Black	1	Very Poor

Source: proper.menlh.go.id

The type of industry was measured by using the ranking scores based on the ranking of three industrial sectors which had been the biggest contributors to carbon emissions in Indonesia as revealed by the Indonesian Ministry of Industry (2013). Each listed company was classified into one of the sectors, and they were given score 3 to 1 respectively. The table below shows the ranking score for the three sectors which constitute the type of industry variable.

Table 2: The Ranking for Carbon Emission Contributors in Indonesia

Sector	Ranking Score
Energy Sector: Mining and Energy Industry.	3
Industrial Processes and Product Use (IPPU) Sector: cement industry, steel, pulp and paper, textile, electronic and electrical appliances, petrochemicals, ceramics, food and beverage.	2
Agriculture, Forestry, and Other Land Use (AFOLU) Sector: Agro-industry, plantation, livestock, forestry, property, real estate, building construction, pharmaceutical and cosmetic.	1

Source: the Indonesian Ministry of Industry

The company size was measured by using the natural logarithm of total assets.

SIZE = Ln(Total Assets)

The level of profitability in this present study was measured by using ROA formula as stated in Gitman & Zutter (2013, p. 81):

$$ROA = \frac{Earnings\ available\ for\ common\ stockholders}{Total\ Assets}$$

This ROA formula had also been used in several previous studies, such as Bae et al. (2013), Jannah & Muid (2014), and Pratiwi & Sari (2016).

The leverage was measured by using the *debt to assets ratio* formula:

$$Debt\ to\ Asset\ Ratio = \frac{Total\ Debt}{Total\ Assets}$$

This formula had also been used in Jannah & Muid (2014).

The multiple linear regression analysis was done to measure the degree of influence from the factors which affected the carbon emission disclosure (CED). The multiple linear regression model was conveyed in the following equation:

$$\mathbf{CED} = \propto_o + \boldsymbol{\beta_1}\mathbf{MEDIA} + \boldsymbol{\beta_2}\mathbf{PROPER} + \boldsymbol{\beta_3}\mathbf{TIPE} + \boldsymbol{\beta_4}\mathbf{SIZE} + \boldsymbol{\beta_5}\mathbf{ROA} + \boldsymbol{\beta_6}\mathbf{LEV} + \boldsymbol{e}$$

Notes:
CED = Carbon Emission Disclosure
α = Constant
$\beta_1 - \beta_6$ = Regression Coefficient
MEDIA = Media Exposure
PROPER = Rating to Measure Environmental Performance
TIPE = Type of Industry
SIZE = Size of the company
ROA = Return on Total Assets
LEV = Leverage (Debt to Asset Ratio)
e = Error

Results and Discussion

Seventy-four (74) companies from non-financial sector became the research population in this present study. From the population, 21 companies were selected as the samples by using purposive sampling technique with several criteria. Thus, the total number of observations were 84 observation from a period of four years from 2014 – 2017.

The Results of Hypothesis Testing

After all the data were assessed using the classical assumption test and regression model evaluation, the next step was to test the multiple linear regression model on Eviews 10. The significant t-test results can be seen in Table 3 below.

Table 3: Results of Statistical Tests

Variables	t-statistic	Prob.
Constant	-0,948501	0,3459
MEDIA	3,240314	0,0018
EP	1,466138	0,1468
TYPE	3,054248	0,0031
SIZE	0,749745	0,4558
ROA	2,689701	0,0088
LEV	0,523496	0,6022
F-Statistic	12,18502	
Prob(F-Statistic)	0,00000	
R-squared	0,565167	
Adjusted R-squared	0,518785	

Source: Output Eviews 10

The results of multiple linear regression and significant t-test for each independent variable are explained briefly as follows:

1. First Hypothesis
The table above shows that *media exposure* (MEDIA) has positive and significant influence on carbon emission disclosure. This can be seen from t-value of 3,240314 > 1,992 t_{tabel} with p-value below 0,05, which is at 0,0018. Since it can be concluded that media exposure has positive and significant influence on carbon emission disclosure, The hypothesis which is stating that media exposure has positive influence on carbon emission disclosure is accepted.
2. Second Hypothesis
The environmental performance variable has p-value of 0,1468 which is higher than 0,05, and the t-value stands positively at 1,466138. This means the environmental performance variable has no significant influence on carbon emission disclosure. Thus, The hypothesis which is stating that environmental performance has positive influence on carbon emission disclosure is not accepted.
3. Third Hypothesis
The type of industry variable has positive and significant influence on carbon emission disclosure. This can be seen from t-value of 3,054248 which is higher than t_{tabel} of 1,992, and p-value stands at 0,0031. Therefore, the third hypothesis stating that type of industry variable has positive and significant influence on carbon emission disclosure is accepted.
4. Fourth Hypothesis
The company size variable does not affect carbon emission disclosure. This can be seen from t-value of 0,749745 which is lower than t_{tabel}, of 1,992 with *p-value* of 0,4558. This proves that the company size has no positive and significant influence on carbon emission disclosure. Consequently, H_4 stating that the company size has positive influence on carbon emission disclosure is not accepted.
5. Fifth Hypothesis
The profitability variable measured by ROA shows positive influence on carbon emission disclosure. This is because p-value of 0,0088 stands below 0,05 with t-value of 2,689701 > 1,992 t_{tabel}. Therefore, the fifth hypothesis stating that profitability has positive influence on carbon emission disclosure is accepted.
6. Sixth Hypothesis
The leverage variable measured by DAR has no significant influence on carbon emission disclosure. This variable has p-value of 0,6022 with positive t-value of 0,523496. As a result, the six hypothesis stating that the leverage variable has negative influence on carbon emission disclosure is not accepted.

7. Based on the test results above, the regression model equation in this present study shows that the independent variables simultaneously have significant influence on the dependent variables. This is proven from the probability F-value which is below the significant level of 0,05.
8. Coefficient of Determination
Based on the table above, the coefficient of determination value can be seen from *adjusted r-square* value of 0,518785 (51,88%). This value means that the independent variables used in the multiple linear regression model has 51,88% influence in explaining the dependent variables. The percentage is more than 50%; thus, it can be indicated that the independent variables in this present study have strong relations with the companies' carbon emission disclosure. In other words, these independent variables has high level of ability to explain factors which can influence carbon emission disclosure.

Discussion

The Influence of Media Exposure on Carbon Emission Disclosure

Media exposure (MEDIA) has positive and significant influence on carbon emission disclosure. This can be seen from t-value of 3,240314 > 1,992 t_{tabel} with p-value of 0,0018 which is below 0,05. Thus, it can be concluded that media exposure has positive and significant influence on carbon emission disclosure. Accordingly, the first hypothesis stating that media exposure has positive influence on carbon emission disclosure is accepted.

This result is in line with those of Jannah & Muid (2014) and Majid & Ghozali (2015) which showed a positive relation between media exposure and carbon emission disclosure. Jannah & Muid (2014) studied non-financial companies listed in Jakarta Stock Exchange from 2010 – 2012. During that period, it is found that media can motivate the companies to disclose their carbon emissions. However, this results are in contradiction to those of Pratiwi & Sari (2016) in which media exposure does not always motivate the companies to publish their carbon emission disclosure in their annual reports.

Companies which have continuous coverage from external media tend to publish carbon emission disclosure more extensively. For example, PT Bukit Asam (Persero), Tbk is one of the state-owned enterprises (SOEs) which often receives media coverage with regard to the company's policy in reducing carbon emissions. During the period of research (2014 – 2017), PT Bukit Asam (Persero), Tbk always received news coverage from external media related to its carbon emissions. Because of this considerable media exposure, PT Bukit Asam (Persero), Tbk published extensive carbon emission disclosure which covered 94,44% (17 items) from the total of 18 disclosure items. PT Bukit Asam (Persero), Tbk published a comprehensive carbon emission disclosure in its sustainability report which started from the company's experience in implementing carbon emission disclosure to its development and the results of its efforts to mitigate its carbon emissions.

The directly proportional relationship between media exposure and carbon emission disclosure was also proven from the companies which did not get media exposure during the research period. For example, PT Asahimas Flat Glass, Tbk which did not receive media exposure from 2014 – 2017 published only 22,22% to 22,78% from the total of 18 carbon emission disclosure items. The extent of carbon emission disclosure published by PT Asahimas Flat Glass, Tbk was not as extensive as those published by companies which constantly received media exposure. In other words, the less frequent the companies receive media exposure, the more restricted their carbon emission disclosure will be.

The results of this present study are in line with the legitimacy theory and the stakeholder theory which are applied in this present study. For example, PT Astra Agro Lestari, Tbk was one of the companies which received news coverage from external media regarding its policy in reducing the carbon emission level. As a crude palm oil (CPO) producer, PT Astra Agro Lestari, Tbk published 77,78% to 83,3% of its carbon emission disclosure in its efforts to obtain public legitimacy amid negative issues attacking palm oil producing companies. Not only did PT Astra Agro Lestari, Tbk contribute in the efforts to reduce carbon emissions nationally, but it also gained supports from its stakeholders in running its business activities.

The rapid advancement of information and technology has encouraged companies to be more active in responding to the media exposure. Various media have also become more active in criticizing the policies and issues striking the companies. By doing this, media can motivate the companies to extend its carbon emission disclosure in order to build and maintain their images in public who have become more aware of the companies' activities. It seems that the more frequent media exposure to a company is, the more extensive its carbon emission disclosure will be. Based on the theories, statistic test results, and facts, it can be concluded that media exposure has positive and significant influence on carbon emission disclosure. Hence, the fourth hypothesis is accepted.

The Influence of Environmental Performance on Carbon Emission Disclosure

The environmental performance variable has p-value of 0,1468 which is higher than 0,05, and it has a positive t-value of 1,466138. This means the environmental performance variable has no significant influence on carbon emission disclosure. For this reason, H_2 stating that environmental performance has positive influence on carbon emission disclosure is not accepted.

This result is conflicting with that of Prafitri & Zulaikha (2016) who are of the opinion that environmental performance has positive influence on greenhouse gas emissions (including the carbon emissions). The research by Prafitri & Zulaikha (2016) shows that the disclosure has been in line with the companies' commitment on the environment to obtain legitimacy and supports from their stakeholders.

On the other hand, the test results in this present study confirm some previous studies such as Jannah & Muid (2014), Majid & Ghozali (2015), Akhiroh & Kiswanto (2016), and Cahya (2017). Furthermore, the publication of high PROPER rating has indirectly represented the companies' commitment to cope with climate change problems (Jannah & Muid, 2014); thus, the increase in PROPER rating does not correspond with the companies' motivation to publish their carbon emission disclosure.

In this present study, there are some reasons (or facts) why the environmental performance has no influence on carbon emission disclosure. First, companies with high PROPER rating lack the motivation to publish carbon emission disclosure. They are more motivated to disclose their other environmental responsibilities in their annual reports. For example, PT Indofood CBP Sukses Makmur, Tbk received green PROPER rating in 2016, but its carbon emission disclosure only reached 22,22%. In its annual report, PT Indofood CBP Sukses Makmur, Tbk was more inclined to disclose its social responsibilities within the farmers' social welfare and the environment domain rather than to disclose its carbon emissions. With high PROPER rating, the company's motivation to extend its carbon emission disclosure was still less than expected although the company itself has been promoting the efforts to create alternative energy conversion which was environmentally friendly in which the program implied an effort to reduce the company's carbon emissions.

Second, although companies already have good environmental performance, they still lack the motivation to disclose their carbon emissions because they think they have fulfilled some of the rating criteria in PROPER. In green rating criteria, the companies think that if they can fulfil the air pollution and clean production aspects in PROPER, these two aspects can be considered as the alternatives in their efforts to reduce their carbon emissions. In the air pollution aspect, the companies which have air pollution emissions below 50% of the air pollution control standards have met one of the criteria in green PROPER rating. Within the clean production aspect, the green rating criteria include the application and conversion of efficient and environmentally friendly energy. Consequently, companies with green PROPER rating feel that it is unnecessary for them to extend carbon emission disclosure because the companies have already passed the evaluation criteria concerning air pollution and clean production which are two important aspects in carbon emission disclosure. Statistically, the environmental performance variable with other independent variables can simultaneouly have significant influence on carbon emission disclosure (the dependent variable) as revealed in the significant F-test value of this present study. For example, PT Indofood Sukses Makmur, Tbk has a green PROPER rating, and this company is aware that it does not belong to the type of industry which

is more intensive in producing carbon emissions; therefore, PT Indofood Sukses Makmur, Tbk becomes less motivated in publishing its carbon emission disclosure. Based on the statistic test results and facts found in this presen study, it can be concluded that the second hypothesis is not accepted. In other words, this present study states that the environmental performace has no significant influence on carbon emission disclosure.

The influence of Type of Industry on Carbon Emission Disclosure

The type of industry variable has positive and significant influence on carbon emission disclosure. This can be seen from t-value of 3,054248 which is higher than t_{tabel} of 1,992, and p-value stands at 0,0031. Therefore, H_3 stating that the type of industry variable has positive and significant influence on carbon emission disclosure is accepted

The observation in this present study applies to the three sectors of industry which include carbon emission contributors from the Ministry of Industry, and it is in line with previous studies by Bae et al. (2013), Jannah & Muid (2014), and Pratiwi & Sari (2016) In general, these three previous studies are of the opinion that the type of industry which intensively produces carbon emission tend to publish the carbon emission disclosure more extensively.

The results of this present study show a positive and significant relation between type of industry and carbon emission disclosure. Out of eight companies in energy sector, three companies had scored more than 90% of the total carbon emission disclosure items. They are PT Indocement Tunggal Prakarsa, Tbk, PT Bukit Asam (Persero), Tbk, and PT Semen Indonesia, Tbk, all of which operate in mineral mining industry which contributes rather enormously to the carbon emission increase in Indonesia. However, the three companies had made some efforts to mitigate carbon emissions by applying various policies and reporting the progress of their efforts publicly through their sustainability reports uploaded in their official websites. This confirms the legitimacy theory and the stakeholder theory in which companies must focus not only on the financial aspects, but also on the environmental aspects, particularly in the environment where the companies conduct their business activities.

The more intensive the companies produce carbon emissions, the bigger their efforts in publishing carbon emission disclosure will be. This has been done by PT Semen Indonesia, Tbk. In order to reach the target of reducing its carbon emissions, PT Semen Indonesia, Tbk. has done a lot of things, such as cooperating with Japanese companies in developing an environmentally friendly technology, implementing a pollution prevention program, environmental conversion, greenhouse program, and using biomass fuel in its plant in Tuban. All of the programs and their progress have been reported in a comprehensive carbon emission disclosure covering every segment of the company. This carbon emission disclosure of PT Semen Indonesia, Tbk is published in its annual report and sustainability report.

On the other hand, companies which are not intensive in producing carbon emission only reveal a small number of items from the total carbon emission disclosure items. For example, PT Kalbe Farma, Tbk operating in pharmaceutical industry did not publish carbon emission disclosure extensively although the company had been aware of the on-going climate change and carbon emission issues. Nevertheless, PT Kalbe Farma, Tbk only revealed its general strategies on reducing carbon emissions. Therefore, based on the statistic test results and described facts, it can be concluded that the third hypothesis stating that the type of industry has positive and significant influence on carbon emission disclosure is accepted.

The Influence of the Company Size on Carbon Emission Disclosure

The company size variable does not affect carbon emission disclosure. This can be seen from t-value of 0,749745 which is lower than t_{tabel}, of 1,992 with *p-value* of 0,4558. This proves that the company size has no positive and significant influence on carbon emission disclosure. Consequently, H_4 stating that the company size has positive influence on carbon emission disclosure is not accepted.

The results of this present study are not in line with several previous studies such as Jannah & Muid (2014), Majid & Ghozali (2015), Bae et al. (2013), Luo et al. (2013), Kalu et al. (2016), and Gonzáles-Gonzáles & Zamora-Ramírez (2016), all of which state that company size has a directly proportional relationship and significant relationship with carbon emission disclosure. Jannah & Muid (2014) are of the opinion that company size has positive and significant influence on carbon emission disclosure. Majid & Ghozali (2015) further explained that big companies are confident in publishing carbon emission disclosure because they have the necessary human resources which are highly capable in publishing the disclosure.

Based on the statistic test results, the direction of the relationship between company size and carbon emission disclosure is the same with that of H_4. However, the influence between company size and carbon emission disclosure is not significant yet. One of the reasons for this phenomenon is the presence of big companies which have not published their carbon emission disclosure optimally. For example, PT Indofood Sukses Makmur, Tbk which had a total asset of Rp 91.381.526.000.000,- in 2015 revealed only 22,2% (4 items) from the total of 18 carbon emission disclosure items. This implied that the company's resources have not been used optimally to decrease carbon emissions. The extent of the company's resources is reflected on the company's total asset value which has been obtained from various contracts made to increase the fixed assets. However, the fixed assets have been used to develop plantation crops which are valuable for PT Indofood Sukses Makmur, Tbk to increase the abilities of its business segments.

PT Indofood Sukses Makmur, Tbk also puts a lot of efforts to mitigate the risks of global warming and climate change which can endanger its business segments. The company's mitigation acts include maintaining the inventory level of raw materials, building good partnership with the suppliers, establishing contingency plans to anticipate disaster, and ensuring the provision of sufficient insurance protection against financial losses. However, these mitigation measures have less impact on extensive carbon emission disclosure because the mitigation efforts have not been focused on the measures which can potentially reduce the company's carbon emissions. Big companies with great resources have not been aware of the importance of reducing carbon emissions with more focused and continuous action. Consequently, the company size as reflected in its resources has no influence on the extent of carbon emission disclosure published by the company.

In addition to the policies implemented by a company, the characteristics of the company also influence the company size which has no influence on carbon emission disclosure. This present study also showed that actually several big companies are not the largest carbon emitters. This is because the company's characteristics such as type of industry and company size simultaneouly have significant influence on carbon emission disclosure. For example, PT Indofood Sukses Makmur, Tbk is a big company with big total assets. Nevertheless, the company does not belong to the type of industry which produces the largest carbon emissions. Because of this, the company feels unnecessary to publish extensive carbon emission disclosure. Thus, the company's total assets can be used for a more strategic policy.

To extend its carbon emission disclosure, a company must have a higher awareness of reducing carbon emissions by using the company's available resources which have not been focused on implementing carbon emission policy comprehensively. Because carbon emission disclosure is still voluntary, most of the companies still focus on their financial performance. In fact, carbon emission disclosure not only contributes to the environment, but it can also be published as value added statement which is not included in the financial statements as stated in the Indonesia Financial Accounting Standard or PSAK No.1 (Ikatan Akuntan Indonesia, 2009).

In this present study, although the direction of the relationship between the company size and carbon emission disclosure is the same with that of Hypothesis No. 4, the facts that happened in the sample companies make the influence is still insignificant. Thus, it can be concluded in this present study that the company size variable does not affect carbon emission disclosure.

The Influence of Profitability on Carbon Emission Disclosure

The profitability variable measured by ROA shows positive influence on carbon emission disclosure. This is because p-value of 0,0088 stands below 0,05 with t-value of 2,689701 > 1,992 t_{tabel}. Therefore, H_5 stating that profitability has positive influence on carbon emission disclosure is accepted. The results of this present study confirm the results of previous studies by Bae et al. (2013), Gonzáles-Gonzáles & Zamora-Ramírez (2016), and Cahya (2017). These studies showed that the increase on profitability will encourage the company to publish a more extensive carbon emission disclosure. On the other hand, some other previous studies such as Pratiwi dan Sari (2016) and Irwhantoko & Basuki (2016) showed different results. Both studies show that the increase in profitability has no significant influence on carbon emission disclosure. In other words, profitability does not affect the extent of carbon emission disclosure.

This present study used ROA to demonstrate how a company with a good profitability can publish carbon emission disclosure optimally. For example, PT Unilever Indonesia, Tbk had ROA of 41,50% in 2014, and its carbon emission disclosure reached 83,33% or 15 disclosure items (from the total of 18 carbon emission disclosure items). By directly proportional relationship similar to that of PT Unilever Indonesia, Tbk, the carbon emission disclosure of PT Asahimas Flat Glass, Tbk experienced reduction and became less extensive because its ROA value decreased drastically to 0,62% in 2017. Smaller ROA values encourage the decrease in carbon emission disclosure.

Companies with high ROA value can implement many policies which can reduce carbon emissions. This effort can bring many benefits which can increase the reputation of the company. One of the companies which has already been aware of the benefits of carbon emission disclosure is PT Semen Indonesia, Tbk which has been using carbon emission disclosure as a strategy of energy transformation. This energy transformation is implemented by using rice husk and cocopeat biomass as an alternative fuel which creates energy as the source of efficiency for the company by obtaining certified emission reduction (CER). By using alternative energy, the company has shown its commitment in managing energy, reducing carbon emissions, and increasing economic value.

Companies with high profitability tend to be active in disclosing their carbon emissions. By disclosing their carbon emissions, the companies hope they will receive positive viewpoints from their stakeholders, and these viewpoints are expected to be able to support their financial performance which had already been reported to public. Companies with high profitability can make use of this profitability to implement beneficial policies outside the financial aspect. It is expected that carbon emission disclosure can bring relevant benefits for the companies' reputation because by disclosing their carbon emissions the companies can receive public trust which can support the companies' operational activities which eventually can increase the companies' images.

The considerable cost for carbon emission disclosure corresponds with the benefits which are received by the companies from their carbon emission disclosure. The companies can focus on their social responsibilities for the environment, social, culture, and economy aspects. The companies' ability to make profits can influence the extent of their carbon emission disclosure. The higher a company's profitability is, the higher the company's awareness is in disclosing its carbon emissions which can support the results of its financial performance. Based on the statistic test results and facts found in the present study, it can be concluded that profitability has a positive and significance influence on carbon emission disclosure.

The Influence of Leverage on Carbon Emission Disclosure

The leverage variable measured by DAR has no significant influence on carbon emission disclosure. This variable has p-value of 0,6022 with positive t-value of 0,523496. As a result, H_6 stating that the leverage variable has negative influence on carbon emission disclosure is not accepted.

The results of this present study are different from those of the previous studies. For example, Jannah & Muid (2014) are of the opinion that leverage has a negative and significant influence on carbon emission disclosure. Companies with high debt financing tend to restrict its carbon emission disclosure and focus on settling the liabilities to the creditors or other financiers.

The direction of the relationship between leverage and carbon emission disclosure shows a different direction from that of the formulated hypothesis. There are facts demonstrating how leverage has positive but insignificant influence on carbon emission disclosure. For example, PT Unilever Indonesia, Tbk had a high leverage level of 71,91% in 2016, but the company's carbon emission disclosure was valued only at 77,78%. Although PT Unilever Indonesia, Tbk is aware that it should pay close attention to its expenses and discard any costs which do not add value to the consumers, the company still publishes its carbon emission disclosure extensively. Furthermore, the company still pays attention to non-financial aspects which also influence the company's good reputation. This implies that the company intends to fulfil various social contracts even though it has high leverage. However, the reduction of the company's carbon emission has not been directed optimally. This supports the claim that leverage has a positive relationship with carbon emission disclosure although it is not significant yet. Another example of companies with high leverage and restricted carbon emission disclosure is PT Indofood Sukses Makmur, Tbk which had leverage of 53,30% in 2015, but the company's carbon emission disclosure was valued only at 22,22%.

Moreover, the leverage level during the period of research tends to be high because of several factors, one of which is the increase in long-term liability. This happened with PT Phapros, Tbk whose DAR was increased from 29,57% to 40,35% in 2017. The surge was caused by an increase in liability value of 81,67% from 2016 which was mainly caused by the increase in long-term liability from Rp 215.020.000.000,- in 2016 to Rp 289.820.000.000,- or 287,47% increase in 2017. Furthermore, medium term-notes revenues which were realized in 2017 also contributed to the increase along with an increase in long-term bank loans to Rp 9.320.000.000,- or 19,59% which were used to fund investments. The increase in leverage level was also triggered by an increase in the current value of post-employment benefits which rose 20,14% from 2016 and reached Rp 80.510.000.000,-. The considerable increase in liability value did not correspond with the increase in total asset value which only rose 33,13% from 2016. Moreover, the increase in liability value also was not intended for purposes outside the company's carbon emission policies.

Similar things also happened to PT Semen Baturaja, Tbk which experienced an increase in leverage from 9,76% in 2015 to 28,56% in 2016. This surge was caused by retention receivables which reached 1030%. The retention receivables were incurred from the purchase of machinery equipment from Tianjin Cement Industry Design and Research Institute, the retention of civil construction work Phase I on DDK Joint Operation, and the retention of civil construction work Phase II plus mechanical and electrical installation from Waskita. All of the retention receivables were intended for the Construction Project of Baturaja II Plant.

The increase or the decrease of leverage is caused by funding which is used to support various company's interests in increasing the company's operations. The companies tend not to apply an optimum strategy to attract the stakeholders' attention (Ghozali & Chariri, 2007). This encourages the companies to lower their intention to publish their carbon emission disclosure. This is why leverage level does not influence the extent of the companies' carbon emission disclosure. Based on the statistic test results and facts found in this present study, it can be concluded that leverage has no significant influence on carbon emission disclosure.

Conclusion

Based on the discussion above, it can be concluded that there are three independent variables which have influenced and have the same direction of relationships with the research hypotheses. The variables are as follows: Media exposure which was measured by dummy variables to see how news coverage from external media can influence the companies' carbon emission disclosure. The results

show that media exposure has positive and significant influence on carbon emission disclosure. In other words, the more frequent news coverage from external media concerning the companies' policy on carbon emission is, the more extensive their carbon emission disclosure will be. Type of industry was measured by using the scoring based on the sector division of carbon emission contributors from the Ministry of Industry. The more intensive an industry is in producing carbon emissions, the more extensive its carbon emission disclosure will be. The results showed that type of industry has positive and significant influence on carbon emission disclosure. Profitability was measured by the companies' *Return on Asset* (ROA) values. The results showed that the company's profitability has positive and significant influence on carbon emission disclosure. Companies with good profitability will publish their carbon emission disclosure decently. The disclosure of carbon emission will become the center of attention from the companies because they are starting to realize the benefits they will have from carbon emission disclosure.

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Is the context of R&D narrative contingent on R&D expenses or R&D intensity? Evidence from European biopharmaceutical companies

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Abstract

Biopharmaceutical industry encompasses R&D-intensive companies which invest huge amounts in basic and clinical studies. Since most of R&D expenditures are expensed as incurred and the time needed to develop new medicines is long biopharmaceutical companies may generate negative financial results for years. Therefore, investors appreciate non-financial information on R&D activities which is more informative. It should be emphasized that this paper contributes to the literature by applying qualitative and quantitative approaches to investigate relations between particular words and establish the contextual meaning of the analyzed texts extracted from 65 annual reports of European biopharmaceutical firms. The study analyses how R&D narratives differed in various groups of biopharmaceutical firms in terms of a discussion context. It also examines whether the way how firms depicted their business within the R&D context was dependent on R&D expenses or R&D intensity levels. The results of the study proves that the companies which disclosed strategic aspects of their R&D activities had higher R&D expenses levels and higher R&D expense growths than the companies with operational R&D narrative context. Moreover, the group that disclosed intensively on R&D accounting policy statistically differed in terms of R&D expenses growth from the group disclosing on R&D operational aspects. The empirical evidence did not supported the conjecture that R&D intensity level might have affected R&D narrative context. The advantage of this study is that it applies an international context on the European level. However, there are also certain limitations, therefore, future research can upgrade and broaden the analyses.

Keywords: Biopharmaceutical Companies, R&D Expenses, R&D Intensity, R&D Narrative, Textual Analysis.

Introduction

The business activity of biopharmaceutical companies is affected by quickly changing technologies, need for highly skilled employees as well as intensive efforts directed at effective managing R&D expenses, launching new products and attaining marketing approvals issued by regulatory authorities. Interestingly, R&D budget managers more and more often face a problem of delivering better R&D performance with limited budgets. Whereas new products in order to gain reimbursement have to indicate a significant improvement of treatment effectiveness over the existing therapies (Deloitte, 2015).

The sector-specific conditions, various business models adopted by biopharmaceutical companies as well as long life cycles of R&D project cause that a decision on what should be disclosed becomes challenging even for experienced managers.

Investors, who attentively observe activities of high-technology companies in terms of financial and non-financial performance, expect periodic reports reflecting the actual situation of an entity. In turn, managers are on the horns of dilemmas regarding the framework of voluntary disclosures in the context of proprietary costs and possible benefits (Dye, 1985; Verrecchia, 1983). Cheng (2004) claims that R&D activities seemed to be a source of agency problems between insiders and outsiders. Aboody and Lev (2000) share that position and argue that R&D activities are significant drivers of

the information asymmetry which cause that investors can react more sturdily to the disclosure of insider trades in R&D companies than in non-R&D companies. Therefore, many researchers perceive voluntary narrative disclosure as a mechanism which aims at a reduction of the information asymmetry and agency conflicts (Jensen and Meckling, 1976; Patelli and Prencipe, 2007; Nekhili et al, 2015). It should be emphasized that disclosures made by high-technology companies refer to broader aspects, including substantial risks from openness to external organizations. In order to win the support of external parties or to obtain an access to external knowledge sources, companies may be impelled to share knowledge with other institutions.

The main objective of this study is to examine whether the way how biopharmaceutical companies depicted their business within R&D context was dependent on R&D expenses or R&D intensity. The paper contributes to the literature in applying qualitative and quantitative approaches to establish the contextual meaning of the analyzed paragraphs extracted from corporate annual reports.

This paper is organized in the following way. Firstly, it revises the empirical studies in terms of R&D narrative disclosures. Secondly, the paper introduces the research question. Thirdly it presents the research sample and elaborates on research methods. Finally, it provides the empirical evidence on contextual analysis, cluster analysis and comparisons between the identified subsamples based on content characters of the annual reports in terms of R&D expenses and R&D intensity levels.

Literature Review

Biopharmaceutical companies spend a lot of time and huge sums on its basic research and clinical trials. They expect in return effects that will contribute to a major breakthrough in a treatment of incurable diseases. Therefore, a topic of communicating R&D outcomes may be interesting not only from the viewpoint investors but also society or competitors. That is why a matter of R&D disclosures is thought-provoking in the context of proprietary costs. An issue of proprietary costs results from "disclosing information which may be used by competitors and other parties in a way which is harmful for the reporting company" whereas a lack of these costs may stimulate companies „to voluntarily disclose relevant information to the market in order to reduce information asymmetry and, consequently the cost of capital" (Prencipe, 2004). There is always a trade-off between disclosing more or disclosing less, since more disclosures decrease the cost of capital but also reduce the manager's profits from inside trading (Baiman and Verrecchia, 1996). These trade-offs may be considered as partial-disclosure equilibria, which are contingent on the information to be disclosed, the level of regulatory related costs, and the probability that a competitor will enter the product market (Wagenhofer, 1990; Cohen, 2002).

There are also several studies which refers to the nature of disclosures within R&D activities, the approaches of managers or analysts to R&D disclosures, the factors shaping R&D disclosures and the impacts of R&D disclosures on cost of equity, information asymmetry, analysts' forecasts. Entwistle (1999) interviewed analysts and executives in order to obtain an insight into disclosures of R&D intensive companies. The interview delved into the types of information the companies disclosed to communicate how they created value through mobilizing R&D expenditures. The executives were also asked about their anxiety for disclosing proprietary or bad news on R&D information, the methods of monitoring the effectiveness of R&D disclosures and overall R&D disclosure philosophy labelled as "conservative", "aggressive" or "mid-range". Moreover, Entwistle (1999) inquired the executives and analysts to identify the potential benefits from effective R&D disclosure management and to express their opinion on deferring vs. expensing development expenditures. The last part of that examination, based on a content analysis of annual reports of 113 Canadian stock-listed companies, evidenced that the ratio of R&D expenditures to total operating expenses and a listing status explained the amount of R&D disclosures provided by the high-tech companies.

In turn, Ding et al (2004) examined disclosure practices in French and Canadian high-technology companies based on 186 annual reports. They found a significant positive correlation between R&D disclosures and R&D intensity of Canadian entities. Moreover, Ding et al (2004) remarked that Canadian companies were more eager to disclose non-financial information and prospects concerning

the level of R&D expenses than their French counterparts which provided more financial and accounting information in a traditional way.

Another interesting study was carried out by Jones (2007), who examined 119 R&D intensive companies searching for their voluntary disclosures from the annual reports and the sources beyond financial reporting such as direct disclosures to financial analysts mainly in the form of conference calls. Jones (2007) focused on three types R&D information, including R&D spending, R&D projects in progress and development-stage R&D. She developed three research questions concerning: the types of information disclosed by managers of R&D intensive companies, the conditions under which managers of R&D intensive companies made voluntary disclosures, the relations between the level of voluntary disclosures on R&D activities and analysts' forecasts. Following research results she came to several interesting conclusions. Firstly, companies disclosed more R&D information when their financial statements were less informative about a market value. Secondly, no evidence suggested that companies with a higher level of information asymmetry disclosed more. Thirdly, the relation between R&D expenditures and R&D disclosures was positive but not significant, whereas the relation between analysts' forecast accuracy at the beginning of the year and the level of R&D disclosures during the year was negative.

Cheng and Zhao (2019) provided the empirical evidence that the number of textual R&D disclosures was negatively correlated with the profitability of the firm. They explained that companies with less profitability were more likely to publish more textual R&D disclosures to divert or confuse investors whereas companies with better profitability were not eager to publish too many textual R&D disclosures because there is no need to distract investors. Likewise, the study of Merkley (2014) concerned the extent of R&D narratives in annual reports and its relation to earnings performance. The results of that study evidenced that earnings performance was negatively associated with the quantity of R&D disclosures. The reason why companies disclosed more when their earnings performance was lower was not that managers used disclosures to put a positive spin on performance information, but it was rather a respond to investors' information needs. Consistently with the previous research (Jensen and Meckling, 1976; Patelli and Prencipe, 2007) the study of Merkley (2014) supported the statement that voluntary narrative disclosures aim at reduction of information asymmetry.

Most of the abovementioned findings relate to different conditions and various, though narrow, research samples including high-technology firms. Therefore, the results should not be generalized, nevertheless, they may constitute a point of reference for the research studies.

Research Question

The growing interest of non-financial narrative role in communicating topical issues to stakeholders and the empirical evidence on determinants and effects of R&D disclosures have become a motivation to take a closer look at annual reports of biopharmaceutical companies. Consequently the following research question was developed:

RQ: *Is the context of R&D narratives contingent on R&D expenses and R&D intensity?*

The empirical research studies linking R&D disclosure with R&D expenses and intensity levels have concerned mainly the extent of narrative so far. Napoli (2013) assumed that firms made more R&D disclosures when their earnings were less informative. That assumption was consistent with the earlier evidence provided by Entwistle (1999) who found that companies with higher levels of R&D expenses were more likely to provide additional disclosures. Likewise Gu and Li (2003) proved that companies made greater disclosures of innovation whilst increasing the rate of R&D expenses. Moreover they evidenced that disclosures of innovation were positively associated with the firm's R&D intensity. Positive association between R&D intensity and R&D disclosures was indicated in many studies, including: Entwistle (1999); Ding et al (2004); Nekhili et al (2012), Merkley (2014) and Mazzi et al (2019). However, R&D expenses and intensity levels have not been combined with R&D disclosure context so far. In order fill the research gap the empirical study whether the context of R&D narratives was dependent on R&D expenses and intensity levels was carried out.

Research Sample and Methods

Since this examination is motivated by the predetermined research question relevant texts for the purpose to answer it were collected. The study was based on annual reports of European biopharmaceutical companies listed in the 2500 world top companies R&D ranking (2014). The population was composed of 77 European entities, dominated by British (14) and Swiss (10) companies. The final research sample included 65 companies, since 12 entities were excluded due to a lack of access to annual reports.

The procedure applied in this study was divided into three stages.

First of all, annual reports of the selected companies were carefully examined in order to search for separate sections or paragraphs discussing R&D activities. It was clear to identify separate sections, since they were often placed on a content page. However, there were cases when R&D information was not easily noticeable. Guthrie et al (2004) point out that while analyzing the content of annual reports paragraphs' exploration seems to be more appropriate in drawing inferences from narrative statements than exploration of separate sentences or words since it enables to establish the appropriate context of the statement. Therefore, when a lack of clear separate R&D sections was identified, the overall text was decomposed into meaningful paragraphs, including the terms: „research and development", „R&D" or „research & development" which were essential to recognize and understand the meaning of R&D activities and their contextual linkages. The extracts from annual reports created an aggregated document covering narratives concerning all companies. Such document was ready to be mined, therefore it was inserted into a text mining tool (i.e. KH Coder). The applied procedure was to examine concomitance of words within the same paragraph. In order to examine the relations between particular words Jaccard's coefficient of similarity was computed. The said measure is a ratio of the number of elements in the intersection set divided by the size of the union set. In this case Jaccard's coefficient of similarity showed how frequently did two particular words occur in the same paragraph in relation to total occurrence of those words in the examined narrative.

The second stage of this study aimed at examining how the analyzed entities merged into clusters in terms of similarity of how they told the story about R&D activities. Therefore, vectors consisting of the number of Top 100 most common words were created for each company. Then agglomerative hierarchical clustering approach was applied and Euclidean distances between particular objects were established. In order to determine how particular objects merged, Ward's method was used. Ward's method does not use cluster distances to link objects (Ferreira and Hitchcock, 2009). Instead, it takes into consideration a classical sum of squares criterion and generates groups that minimize within-group dispersion. In other words, this method joins at each stage of an agglomerative procedure those cluster pairs whose fusion minimizes an increase in a total within-group error sum of squares (Rasmussen, 1992). This technique represents a mixed approach which enables processing qualitative data through clustering. Such an approach allows to manage a complexity of qualitative data while still maintaining its richness (Macia, 2015). The vertical axis displays linkage distances, whereas the horizontal axis presents observations. The tree diagram illustrates a way how clusters are created. In this procedure each object O_i (i = 1,2,…49) is considered to be a single element cluster (G_i) in the beginning. Then the Euclidean distances between all pairwise clusters are computed. If we assume that clusters G_p and G_q merge into a new cluster Gr where $Gr = G_p \cup G_q$, the next step is to specify a dissimilarity between Gr and all other objects (Oi) or clusters (Gi). The Lance-Williams dissimilarity update formula allows to establish the abovementioned distance (Murtagh and Contreras, 2012).

$$d_{ir} = \alpha_p d_{pi} + \alpha_q d_{qi} + \beta d_{pq} + \gamma \left| d_{pi} + d_{qi} \right|$$

Following Ward's method parameters: α_p, α_q, β and γ are computed as follows:

$$\alpha_p = \frac{n_p + n_i}{n_p + n_i + n_q} \qquad \alpha_q = \frac{n_q + n_i}{n_q + n_i + n_p} \qquad \beta = \frac{-n_i}{n_i + n_p + n_q} \quad \gamma = 0$$

Based on the cluster analysis and the qualitative examination of R&D narrative disclosures three subsamples with regard to their discussion character were specified.

The third stage of the research procedure consisted in checking whether the subsamples came from different populations in terms of R&D expenses level and consequently whether they significantly differed between each other. Therefore, a null hypothesis was posed that the subsamples came from populations with the same distribution. Since the ANOVA has restrictive assumptions concerning the distributions of the samples which in fact have not been met for this dataset rank-based nonparametric Kruskal-Wallis H test was applied. It is an omnibus test checking whether the mean ranks of the groups are the same. In case of the rejection of null hypotheses of the Kruskal-Wallis H tests for independent variables multiple pairwise comparisons looking for stochastic dominance or median differences between particular subsamples were planned to be carried out.

For this purpose, a post hoc Dunn's test is applied which uses the following statistic: $d = \frac{|\bar{R}_i - \bar{R}_j|}{\sigma}$,

where mean rank for the j-th sample equals $\bar{R}_j = \frac{R_j}{n_j}$

and the standard error equals $\sigma = \sqrt{\frac{n(n+1)}{12}\left(\frac{1}{n_i} + \frac{1}{n_j}\right)}$

Dunn's d-test statistic approximates the exact rank-sum test statistics by using the mean rankings of the outcome in each sample from the preceding Kruskal–Wallis test R¯_j=R_j/n_j where Rj is the sum of ranks, and nj is a size of the sample for the j-th group) and basing inference on the differences in mean ranks in each group (Dinno, 2015).

Empirical Evidence of the study

Results of Contextual Analysis

As a result of the first stage of the research procedure the co-occurrence network was developed (Fig. 1). It exemplifies 200 relations between 100 most common words and sheds the lights on the most important linkages to show explicitly the thematic modules.

The sizes of the circles exemplify numbers of particular words which appeared in the analyzed text, hence the bigger circles show more frequent words. It should be explained that although the content analysis is based on 100 most common words the said co-occurrence network does not illustrate all of them, since 24 words did not create strong linkages with the other 76 words. In order to show more words on the network Jaccard's coefficient should be decreased, what would lead to more linkages appear on the network, as well.

Based on contextual relations exemplified in fig. 1, five main modules discussed in the R&D narrative parts of annual reports were singled out.

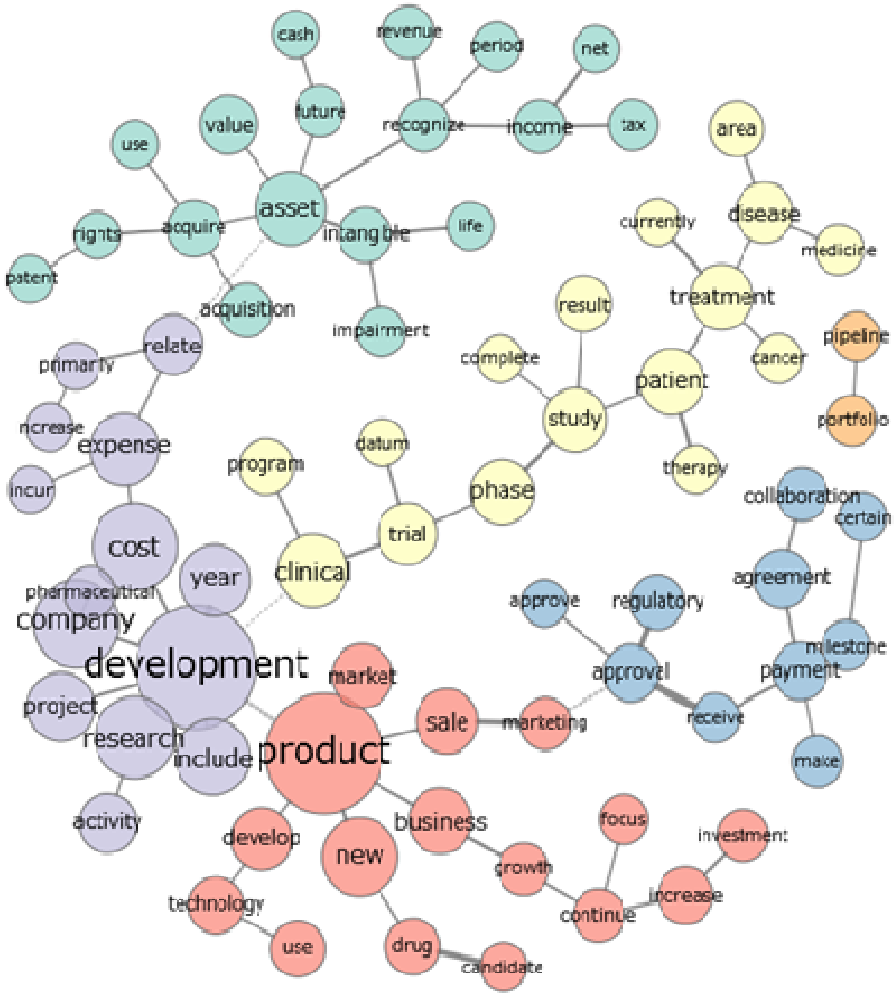

Fig. 1: Contextual analysis based on exploration of paragraphs: 200 relations between 100 most common words (n=65)

Source: Own presentation

The first module (a yellow graph) concerned a topic of 'CLINICAL STUDIES' and was composed of the following phrases: clinical programs, clinical trial phases, clinical trial data, study result, patient therapies, cancer treatment, disease area, disease medicine. There were 12 nouns included in the module - 'CLINICAL STUDIES' - which precisely indicated a discussion framework.

The second module (a purple graph) referred to 'PROJECT DEVELOPMENT' and covered the following phrases: research activity, pharmaceutical company development, development cost and development in time dimension, as for example 2-year development. Likewise, here nouns are the most frequent words which combine with verbs, adjectives and adverbs.

The third module (a red graph) discussed on 'NEW PRODUCTS" and reflected the following phrases: new product market, technology use, new drug candidate, sale marketing, business growth and investment increase. This module shows how many issues have arisen around new product development. They entailed not only product-related aspects but also technology applied, R&D investments as well as a final phase associated with sale marketing.

The next module (a blue graph) focused on 'EXTERNAL ENVIRONMENT' and drawn an attention to the following phrases: collaboration agreement, milestone payment, regulatory approval. These issues are pivotal for continuity of business activities in biopharma industry.

The last module (a turquoise graph) referred to R&D accounting policy. The debate oscillated around the topics related with value, acquisition and impairment of intangible assets, acquisition of patent rights, future cash, recognition of revenues and income tax.

Results of Cluster Analysis

The second stage of the study focused on examining how the analyzed entities merged into clusters in terms of similarity of how they told the story about R&D activities. The dendrogram presented on fig. 2 visualizes the results of the hierarchical clustering approach. It presents how two individual entities merged together or with an existing clusters consisting of more than one observation. A visual inspection of the tree diagram allowed to identify five various groups separated through cutting off four linkages. The groups were not equinumerous. Another point is that the dendrogram clearly shows two agglomerations which had quite long distance from each other. The adopted approach allowed to distinguish five clusters which differed in terms of narrative context in the R&D area.

The first cluster covered four companies which came from the European Anglosphere[1]. The textual analysis indicated that the main discussion in this group oscillated around R&D accounting policy, product and development. The first feature distinguished this cluster from the other groups specified in this study. The R&D paragraphs provided a lot of information about intangibles and their structure, amortization and impairment. It should be noted that intangibles account for a significant part of assets in biopharmaceutical companies. They are classified into indefinite-lived (in-process R&D) and definite-lived intangibles (such as licenses, customer relationships, tradenames, developed technology etc.) for which weighted average life is established. In their narratives companies informed about reclassification of in-process R&D into to definite-lived intangibles or capitalization of expenses as a result of reaching market approvals.

The next area of interest was related with R&D expenses. The companies disclosed amounts and changes in the levels of R&D expenses as compared to the previous years. They reported on the structure of R&D expenses as well. Another issue debated in the annual reports was the recognition of R&D expenses in the financial statement following the assumed R&D accounting policy. It is expected that managers should form judgments with respect to the commercial status of products in determining whether development expenditures meet the criteria for immediate expense or capitalization.

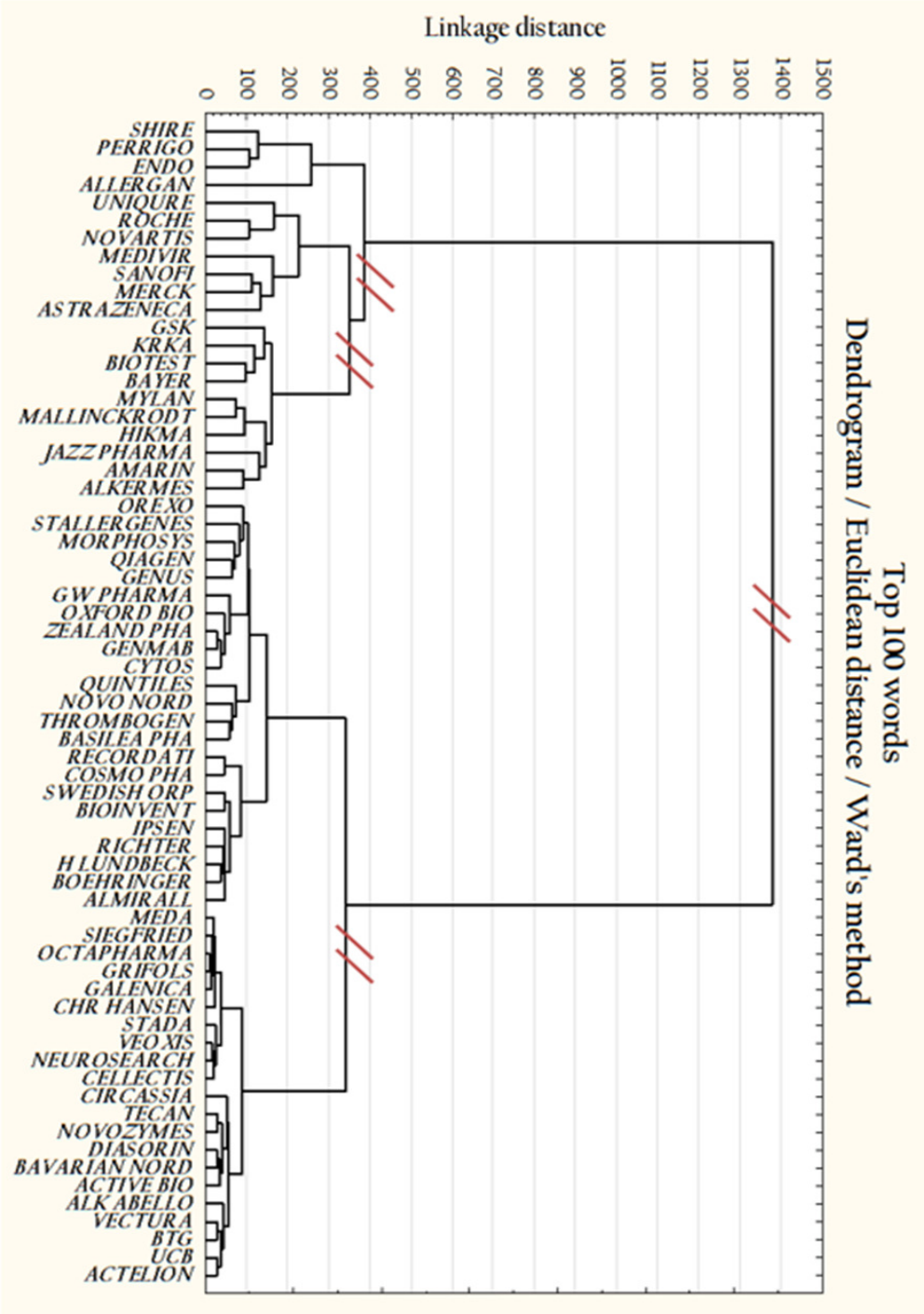

Fig. 2: Cluster analysis (n=65)

Source: Own presentation

The biopharmaceutical companies included in the first cluster also readily discussed on acquisitions in which they sought incremental development of growth opportunities. Through acquisitions of other entities companies may not only expand their knowledge with new technologies but also increase their efforts to develop generic products with complex formulations.

The textual analysis reflected topics which appeared frequently in the R&D narratives of the first cluster. However, it is interesting to make an insight into the notions which did not appear or were rarely used. As compared to the second cluster, the companies from the first one did not discuss about medicines, diseases, therapies or patients at all or almost at all. The strategic issues of innovation and patents were also rarely disclosed. Concluding, the first cluster provided mainly mandatory disclosures related with R&D accounting policy imposed by regulators.

The second cluster was composed of seven companies[2]. A careful analysis proved that these companies intensively discussed on diseases and other contextual aspects such as patients, treatments, clinical phases or product development in their R&D narratives. In that way they made a contribution about how they pursued the mission by communicating a sense of intended directions of the whole organization and providing tangible effects of clinical trials, treatments or therapies. Such an approach is consistent with stakeholder and legitimacy theories. Stakeholder theory underlines existence various groups of interests and assumes that stakeholders have a right to know what happens in an organization (normative branch of the theory) and their needs should not be disdained (positive branch of the theory) (Deegan, 2000). In this context managers are required to contemplate the frameworks of voluntary narrative disclosure. Legitimacy theory is based on an assumption that organizations act in a manner which is consistent with "socially constructed system of norms, values, beliefs and definitions" adopted by society (Suchman, 1995). Following this theory a quality of voluntary disclosure are to be adjusted to the expectations of society, whereas narratives should legitimize business activities, efforts and performance in a comprehensive and readable way.

The companies of the second cluster stressed an importance of potential beneficiaries stating that they should be treated equivalently with shareholders. In that context the companies were searching for persons most likely to benefit from their treatments. Moreover, they examined efficacy of drug candidates in particular groups of patients and reported about the results in R&D narratives. Personalized medicine development capability is presently of growing interest in biopharmaceutical industry. It refers to identification of groups of patients with unique genetic profiles and recognition of certain biologic characteristics or biomarkers that have the potential to be more efficient and effective in treatment procedure (Haruya and Kano, 2015).

The companies also precisely described the activities' areas and specified the range of diseases they were aiming at with various treatments and therapies as well. They strengthened the importance of new technologies and a role of effective collaboration with strategic research partners. The interesting but difficult part of disclosure in this cluster concerned the results of clinical studies. The companies reported on outcomes achieved in various phases of clinical trials.

The third cluster consisted of ten companies of which six entities were from the European Anglosphere, whereas the other from continental Europe[3]. The companies included in the third cluster focused on presenting their strategic priorities related with new product development. They mentioned about that in the context of product differentiation within a product pipeline, business or operating models, product licensing or acquisition.

The majority of companies in the third cluster disclosed information on sales performance. They reported about the changes in sales volumes and factors affecting thereof. Some organizations provided detailed information on sales in segments across the various markets all over the world. Another issue discussed broadly concerned the achievement of marketing approvals which was a key step in strengthening and broadening product portfolios. It should be noted that business activities of biopharmaceutical companies are subject to extensive regulations by various institutions such as FDA, EMA and other regulatory authorities which impose several requirements on manufacturing, labelling, packaging, storage, advertising, promotion, sale, distribution and R&D activities. Due to

these requirements product development, marketing approval and commercialization processes are very often expensive and time-consuming.

The fourth cluster was the most numerous one and consisted of twenty three objects of which fifteen came from the Western Europe and Scandinavia[4]. The cluster included also four companies from the European Anglosphere and the same number from Central and Southern Europe. The discussion included in the annual report of these companies oscillated around product development, cost and research and had operational context. It should be noted that the topic of research was quite intensively debated in terms of research alliances stimulating new research projects, active involvement in clinical trials and partnerships with researchers, patient organizations and research centers.

The last cluster covered twenty one objects of which nine came from the Western Europe and the same number from Scandinavia[5]. There were also three companies from the European Anglosphere and one from Central and Southern Europe. The R&D narratives in this cluster had definitely operational character since they referred mainly to financial effects of activities carried out in the reported period. The companies rarely discussed on patients, therapies, clinical studies or collaboration with external partners in the R&D context which may be explained by their less strategic orientation due to the lower R&D expenses as compared to the other clusters.

Dependence of R&D narratives' context on R&D expenses and R&D intensity

Both the results of the cluster analysis and the qualitative examination of R&D narrative disclosures enabled to distinguish three subsamples differing with regard to content characters of the annual reports. It should be emphasized that the content of the examined annual reports referred to R&D accounting policy context (cluster 1), R&D strategic context (clusters 2-3) and R&D operational context (cluster 4-5). Such a division was consistent with the agglomerative hierarchical clustering approach which results were demonstrated on dendrogram (Fig. 2). In this case only two linkages were cut following the established character of R&D narrative.

The procedure applied in this stage of the research study consisted in checking whether the abovementioned subsamples came from different populations in terms of R&D expenses level and consequently whether they significantly differed between each other (Table 1).

Table 1: Analysis of R&D expenses mean ranks across the subsamples

Group no	Description	Obs. no	Mean ranks		
			R&D expenses (t-1)[1]	R&D expenses (t)[2]	R&D expenses growth (t/t-1)
1	R&D accounting policy context	4	45,0	46,75	52,25
2	R&D strategic context	17	41,9	44,12	42,65
3	R&D operational context	44	28,5	27,45	27,52
Kruskal-Wallis test			H(2,N=65) =7,96 p = 0,019	H(2,N=65) =11,78 p = 0,003	H(2,N=65) =12,26 p = 0,000
[1] 2013, [2] 2014					

Source: Own presentation.

The results of Kruskal-Wallis H test for independent variables related with R&D expenses indicated that there existed statistically significant difference (at 0.05 or 0.01 levels) in each median variable among the three subsamples which differed in terms of R&D narrative context. Due to the rejection of all null hypotheses of the Kruskal-Wallis H tests for independent variables multiple pairwise comparisons looking for stochastic dominance or median differences between particular subsamples were carried out.

The results of post hoc test evidenced that there were significant differences (at 0.05 level) between groups 2 and 3 (strategic versus operational R&D narrative) in terms of R&D expenses levels as well as R&D expenses growth in (t) and (t-1) analyzed periods (Table 2).

Table 2: Dunn's post hoc test

Pairwise comparisons	***std err***	***x-crit***	**R&D expenses (t-1)**		**R&D expenses (t)**		**R&D expenses growth**	
			d-stat	***sig***	***d-stat***	***sig***	***d-stat***	***sig***
Groups 1-2	10,51	25,15	0,29	no	0,25	no	0,91	no
Groups 1-3	9,87	23,64	1,68	no	1,95	no	**2,50**	**yes**
Groups 2-3	5,40	12,93	**2,50**	**yes**	**3,09**	**yes**	**2,80**	**yes**
k=3, d-crit = 2,39, α=0.05								

Source: Own presentation.

The conclusion is that companies which disclosed more strategically on their R&D activities had higher R&D expenses levels and growths than companies with operational R&D narrative context. Moreover, the group which reported intensively on R&D accounting policy differed with statistical relevance from the group reporting on R&D operational aspects in terms of R&D expenses growth. In this case companies which orientated on R&D accounting policy discussion had higher R&D expenses growths over the years of 2013 and 2014 than companies reporting on operational aspects.

Similar analysis was carried out in reference to R&D intensity which is measured as a ratio of R&D expenses to sales revenues (Table 3).

Table 3: Analysis of R&D intensity mean ranks across the subsamples

Group no	**Description**	**Obs. no**	**Mean ranks**	
			R&D intensity (t-1)	**R&D intensity (t)**
1	R&D accounting policy context	4	17,00	19,75
2	R&D strategic context	17	27,59	27,65
3	R&D operational context	44 (*42)	36,55	34,93
Kruskal-Wallis test			H(2,N=65)=5,80 p = 0,055	H(2,N=63)=3,82 p = 0,148
*Two companies were excluded in (t) due to a zero level of sales revenues				

Source: Own presentation.

In this case Kruskal-Wallis H test allowed to accept the null hypothesis that the subsamples came from populations with the same distribution with reference to independent variables. It means that mean ranks of the groups were the same. Therefore, there was no reason to proceed with post hoc Dunn's test. Concluding, it was proved that the subsamples did not differed statistically significant between each other in terms of R&D intensity levels.

Conclusion

It should be noticed that despite the growing significance of R&D information knowledge on how companies disclose R&D related information is limited (Merkley, 2014). Although R&D narratives often constitute an important part of annual reports of high-technology companies, in fact, they may be difficult to capture. The reason is that, with minor exceptions, R&D narratives are not well distinguished as separate sections of annual reports.

The research question developed in this study referred to relationships between the content of R&D narratives, R&D expenses and R&D intensity. In order to obtain an answer whether R&D narrative

context was related with R&D expenses or R&D intensity a non-parametric Kruskal-Wallis test was applied for searching a difference between medians and post hoc Dunn's test for pairwise multiple comparisons. The results of the study proved that the companies which disclosed strategic aspects of their R&D activities had higher R&D expenses levels and higher R&D expense growths than the companies with operational R&D narrative context. Moreover, the group that disclosed intensively on R&D accounting policy statistically differed in terms of R&D expenses growth from the group disclosing on R&D operational aspects. The empirical evidence did not supported the conjecture that intensity level may affect the R&D narrative context.

This paper contributed to the existing body of literature by applying a qualitative approach to establish the contextual meaning of the analyzed R&D paragraphs extracted from corporate annual reports. Moreover, an in-depth text analysis allowed to create of a co-occurrence network which exemplified the relations between the words in the examined text. The advantage of this study is that it applies an international context on the European level. However, there are also certain limitations, therefore, future research can upgrade and broaden the analyses. Firstly, the study focuses on biopharmaceutical companies only which was an intended limitation due to idiosyncrasy of R&D activities. The concentration on a specific sector of high-tech companies due to relative uniqueness of their R&D activities facilitates to some extent formulation of final inferences. Secondly, the study refers to R&D disclosures provided in annual reports and ignores R&D information revealed voluntary through other media such as corporate websites or press releases. Finally, a separation of R&D content from the annual report when it is not clearly distinguished in text depends on a researcher's approach and may raise a questions concerning objectivity.

Concluding, future research may search for an answer how to improve R&D disclosures transparency while balancing stakeholder needs with the protection of sensitive R&D information at the same time.

Acknowledgment

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Endnotes

[1] Shire, Perrigo, Endo International, Allergan
[2] Uniqure, Roche, Novartis, Medivir, Sanofi-Avensis, Merck, AstraZeneca
[3] GlaxoSmithKline, KRKA, Biotest, Bayer, Mylan, Mallinckrodt, Hikma Pharmaceuticals, Jazz Pharmaceuticals, Amarin, Alkermes
[4] Orexo, Stallegenes, Morphosys, Qiagen, Genus, GW Pharmaceuticals, Oxford Biomedica, Zealand Pharma, Genmab, Cytos Biotechnology, Quintiles, Novo Nordisk, Thrombogenics, Basilea Pharmaceutica, Recordati, Cosmo Pharmaceuticals, Swedish Orphan Biovitrum, Bioinvent International, Ipsen, Richter Gedeon, H Lundbeck, Boehringer Ingelheim, Almirall
[5] Meda, Siegfried, Octapharma, Grifols, Galenica, Chr. Hansen, Stada Arzneimittel, Veloxis Pharmaceuticals, Neurosearch, Cellectis, Circassia, Tecan, Novozymes, Diasorin, Bavarian Nordic, Active Biotech, Alk Abello, Vectura, BTG, UCB, Actelion

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Evaluation of The Operating Effectiveness of National Healthcare Systems

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Abstract

Motivation behind conducted research was the analysis of significant international society problem, which is the effectiveness of Europe's national healthcare systems actions. To estimate this effectiveness quality, traditional analysis based on adequate indexes and measures with Data Envelopment Analysis were used. Evaluation has been performed according to objective and subjective data. It was shown that comprehensive view of the problem, which is given by DEA, is a significant amplification of fragmentary analysis performed by index analysis.

Keywords: DEA, Effectiveness, Healthcare Systems.

Introduction

The main objective of this research is to present an evaluation of the quality of national healthcare systems. For this purpose, three fundamental dimensions were analysed: praxeological (the effectiveness of therapies and treatment procedures), personal (individual health state satisfaction observed in general population), and economic (effectiveness expressed as a quotient of the product volume – in this case, the general health state – against total per-capita cost of the service rendered. Multidimensional assessment of health security systems is similar to WHO (2018) quality definition which is: "Quality health services across the world should be: Effective: providing evidence-based health care services to those who need them. Safe: avoiding harm to people for whom the care is intended. People-centred: providing care that responds to individual preferences, needs and values. In order to realize the benefits of quality health care, health services must be timely, equitable, integrated and efficient". Recently, public health state is analyzed depending on variety of environmental factors. Samut and Cafri (2016), besides DEA analysis method, investigated dependency of health status of population and Education expenditure in tertiary and incomes also. Dhaoui (2019) analyzed national health status according to Literacy rate, which is HDI component, and urban population percentage. Aside from the unidimensional analysis of the above, the last part of this paper presents a comprehensive analysis of effectiveness of selected national healthcare systems based on the DEA method (*Data Envelopment Analysis*). Most studies evaluating hospital efficiency have performed an efficiency analysis, using DEA. Mobley and Magnussen (1998), Retzlaff-Roberts et al. (2004) and Spinks and Hollingsworth (2009), are among such studies. Retzlaff-Roberts et al. compared health care results in OECD countries by DEA. For the national healthcare systems performance assessment as inputs were used: Number of beds, MRI – Magnetic Resonance Imaging, Physicians, Expenditure, Social environment inputs (School expectancy, Gini of income distribution, Tobacco). For the Health status outputs: Infant mortality and Life expectancy. Or (2001) measured population health status by the premature mortality counted by PYL.

Analytical evaluations were conducted for a selection of 20 European countries, divided into four groups. The first group, labelled as Postcom, included selected representatives of the Visegrad Group (Poland, Hungary, Slovakia, and Czech Republic) accompanied by several other countries of the former Eastern Bloc, namely: Latvia, Lithuania, Estonia and Slovenia. The second group included countries of the so-called Old Europe: France, Spain, Germany, Portugal, Great Britain, and Italy – labelled as Old EU. The third group included Nordic states typically associated with high level of social welfare: Denmark, Finland and Sweden. The last group was that of small and affluent countries of the Western Europe: the Netherlands, Austria and Switzerland. Data on the remaining countries of the European geographic area was not adequate enough to allow for their inclusion in the study.

Theoretical Framework

"The most fundamental problem in determining the 'satisfactory level of healthcare services' and the requirements of the strategic decision-making process within the analysed sector depends a lot on the environment. Modern healthcare systems operate in an unstable environment resulting from the following social transition factors (Walshe and Smith 2006):

- Demographic changes (ageing societies),
- Fast pace of technological innovations,
- Changing (more demanding) expectations of patients and society,
- Increased costs as a consequence of previous factors.

In addition, the problem's complexity is further enhanced by the scarcity of budget support for the operation of healthcare institutions, evident particularly in the post-communist states. In effect, the effectiveness of national healthcare systems will be strongly influenced by the quality of solutions offered by the respective governments, particularly by their accord with the principles of economic effectiveness, operational efficiency, and social justice (Fukuyama 2005).

In a strictly economic approach, the state of human health is perceived both in terms of capital goods (or, more specifically, an element of human capital that may affect their economic welfare) and consumer goods (with potential to directly affect their well-being). For the majority of global human population, health remains one of the most fundamental constituents and determinants of a happy life." (Biernacki 2017).

The responsibility for maintaining a satisfactory level of public health rests with public healthcare service systems. In accordance with WHO recommendations, the primary purpose of activities conducted by these systems is to 'promote, restore and/or maintain health'. After H. Laframboise (1973), M. Lalonde (1974), general condition of public health is determined by the following: genes, environment, life style, and public health system organization. Badura (1995) provides evaluations of the relative impact of the above factors, measured by mortality rates related to various health conditions. For example, in the group of cardiovascular conditions, mortality rates attributed to each of the factors were as follows: 25% (biology), 9% (environment), 54% (life style) and 12% (healthcare); for cancer, the findings were: 29%, 24%, 37% and 10%, respectively. While the above estimations are based on statistical data from the 1990ies, the fact of the matter remains: public health is affected by the organization and the effectiveness of the public healthcare system; and this impact, while not decisive, is fairly significant. Khaew et al. (2008) showed strong dependency between lifestyle and mortality by analyzing healthcare data of a group over twenty thousand English citizens, men and women. Colpani and others (2018) by analyzing health data of sick women received similar results.

The main task faced by health economics is to determine whether public healthcare services on offer are effective in improving the general state of public health in entire populations. Apart from the attribute of effectiveness, the services are also examined from the viewpoint of social justice, to ensure that distribution of general public health benefits across various segments of population is fairly equal.

The Praxeological Dimension – The Effectiveness of Treatment

The effectiveness of treatment is best measured by outcome indices, i.e. measures regarded as the best approximations of quality evaluation. Two separate measures were selected for this purpose, namely: EHCI and HLY.

The Euro Health Consumer Index (EHCI), a measure calculated and reported annually by Health Consumer Powerhouse since 2004, was used for assessing the effectiveness of national healthcare systems in Europe. The idea of the measurement is to assess the efficiency of healthcare service provision from a patient's viewpoint. In 2012, the assessment included five categories: 1. Patient's rights and information, 2. Waiting time for treatment, 3. Effects of treatment, 4. Scope and range of the provided services, and 5. Pharmaceuticals. There were a few or even a dozen or so subcategories distinguished in each category. For instance, the 'effects of treatment' category included the following subcategories: 3.1. Real mortality caused by heart failure, 3.2. Infant mortality, 3.3. Number of deaths caused by neoplastic disease in relation to the associated incidence rates, 3.4. Potential years of life lost, 3.5. MRSA infections, 3.6. Suicide rate decrease index, 3.7. Percentage of diabetic patients with high diagnosed levels of glycated haemoglobin HbA1c[1].

Average values of the EHCI index in analysed groups of countries are presented in Fig. 2.

It may be worth noting that all the groups under examination displayed a marked increase of the EHCI index over the period under study, suggesting a noticeable improvement of effectiveness in the operation of national healthcare systems. In addition, and over the entire period under examination, national healthcare systems of post-communist countries received markedly lower scores from patients compared to those in the remaining groups of countries.

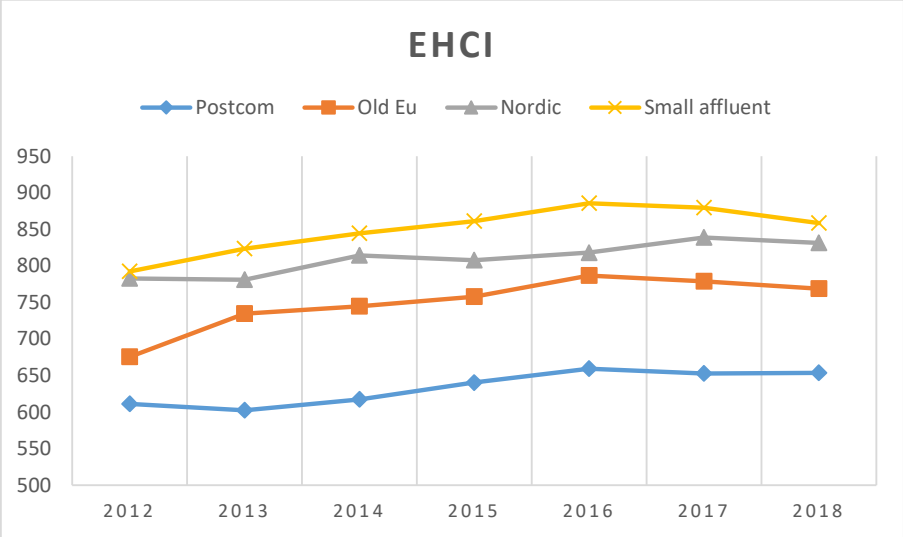

Fig. 2: Average values of the EHCI index in analysed groups of countries
Source: Own research using online data published by the healthpowerhouse

Human well-being is, to a large extent, a function of good health. Moreover, health condition largely determines human performance at work and in education-related tasks. One of the most adequate measures of health condition is the healthy life years index (HLY). To a certain degree of simplification, it may be observed that – while the life expectancy index measures life longevity – the HLY index can be seen as a gauge of life quality (Jagger 2008). Therefore, the authors decided to employ the HLY as a measure of general health condition in societies under study. Table 1 provides an overview of HLY scores and dynamics indices obtained in the study.

Table 1: Healthy life years in absolute value at birth

Group of countries	2006	2009	2012	2015	2017	2017/2006
Post-communist	55.89	57.59	58.25	57.41	58.41	1.045
Old EU	62.43	61.54	62.68	62.79	64.48	1.033
Nordic	62.62	63.22	62.23	63.58	62.67	1.001
Small affluent	62.88	61.72	63.55	58.83	57.87	0.920

Source: own research using Eurostat data.

General health condition in large and affluent countries of Europe, including the Nordic group of social welfare countries, is ostensibly superior to that observed in the remaining countries of the analysed sample. It must be noted, however, that the most pronounced dynamics of HLY growth was observed among the least affluent countries of Europe (Postcom). This trend can be attributed to the radical lifestyle improvements brought about by systemic transformations and to mass popularisation of modern methods of prevention against civilizational diseases (cardiovascular and neoplastic).

Effectiveness of treatment is strongly correlated with the total expense assigned in support of the national healthcare system (Leigh, Jencks and Smeeding 2011). Figs. 3 and 4 present the respective ratios of EHCI and HLY to national health costs for each of the analysed group of countries, to serve as gauges of the systems' effectiveness. For our purpose, national healthcare costs (total expenditure volumes) were backdated by 2 years in relation to their corresponding EHCI and HLY values.

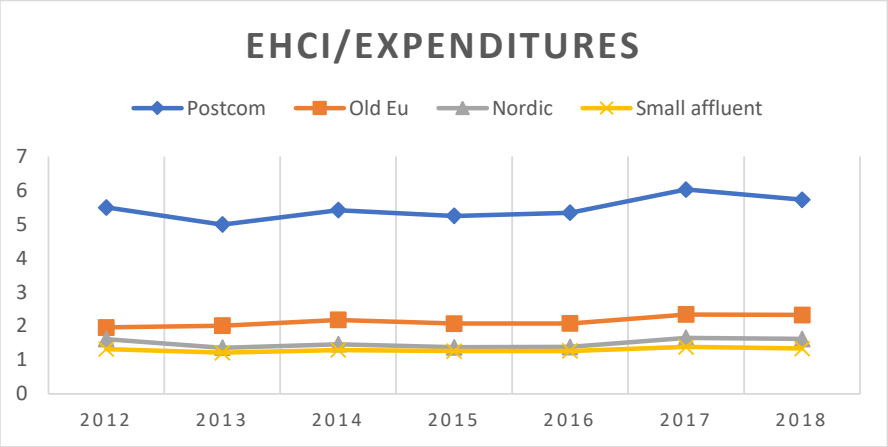

Fig. 3: The effectiveness of national healthcare systems – EHCI/cost

Source: own research using online data published by the OECD and the Eurostat.

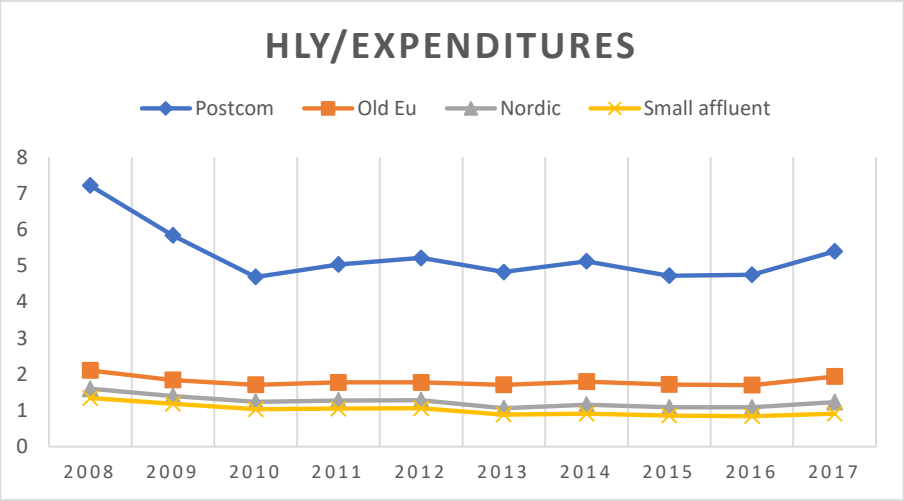

Fig. 4: The effectiveness of national healthcare systems – HLY/cost

Source: own research using online data published by the OECD and the Eurostat.

The observed prominence of effectiveness values for the Postcom group attests to a decidedly lower level of financing received by their national systems in relation to the levels registered in other European countries. This effect is produced by the markedly lower share of GDP directed to healthcare services in this group of countries. For a detailed analysis of national healthcare systems' effectiveness, see section four below.

Fig. 5 presents total per capita cost of national healthcare services in the analysed groups of countries. It must be remembered that per capita values registered in Postcom countries are significantly lower compared to the other groups.

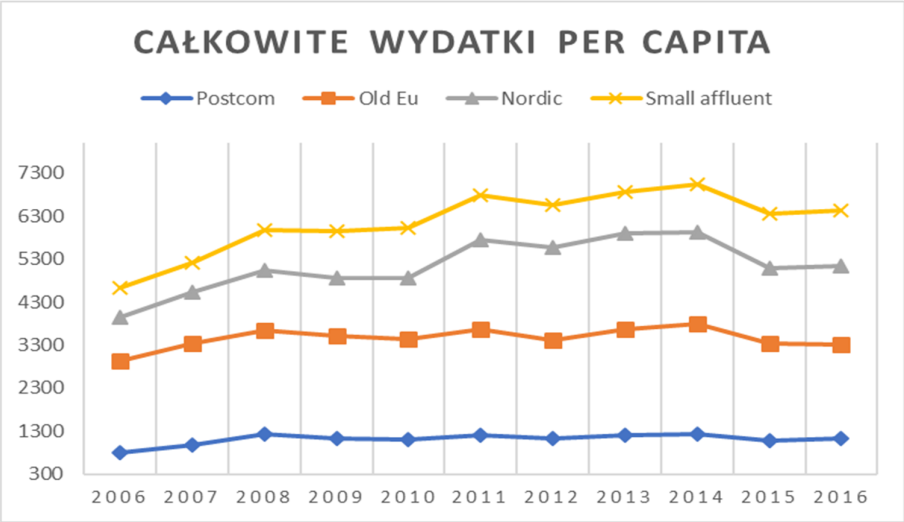

Fig. 5: Total per capita cost of national healthcare services in $ PPP

Source: own research using online data published by the OECD.

The Personal Dimension

To evaluate the effectiveness of resource utilization by national healthcare systems, the findings related to improvement of social health (measured by EHCI and HLY) should be examined against those

related to equity in social distribution of health (i.e. in general health condition) (Morris, Devlin and Parkin 2007). This aspect of social justice has long been emphasised in the British NHS (National Health Service). According to some experts in health economy (Williams and Cookson 2000), equity of health has to be distinguished from equity in access to healthcare protection, as excessive focus on health protection may result in poor representation of other effective methods of health improvement, such as disease prevention and propagation of healthy lifestyle choices. For the above reasons, this study employed a measure of general health condition – an analogue of the abridged Sen's social welfare function (1973) $\mu \cdot (1 - G)$, where μ represents average subjective state of health, and G – the Gini coefficient of the distribution of public self-perceived health.

The problem of equity and justice in relation to health is associated with the principle of inequality decrease in the distribution of health across populations. The Gini coefficient served to evaluate the degrees of inequality in our study. Since 2009, the Eurostat has published annual updates of *Self-Perceived Health* surveys, measured on a scale from 1 to 5. Based on these records, Fig. 6 presents subjective distribution in public self-perception of health, and Fig. 7 – values representing inequality in public distribution of subjective health for the analysed groups of countries.

The largest distance of inequality in the distribution of public self-perceived health between analysed groups was observed at the onset of the period under study (i.e. in the year 2009) and amounted to 6 percentage points; at the end of the analysed period (i.e. in the year 2018), it was reduced to 4 percentage points. This represents a clearly positive trend, particularly in the light of the relatively constant inequality in the distribution of income in Europe (between 0.303 – 0.31, according to the Eurostat).

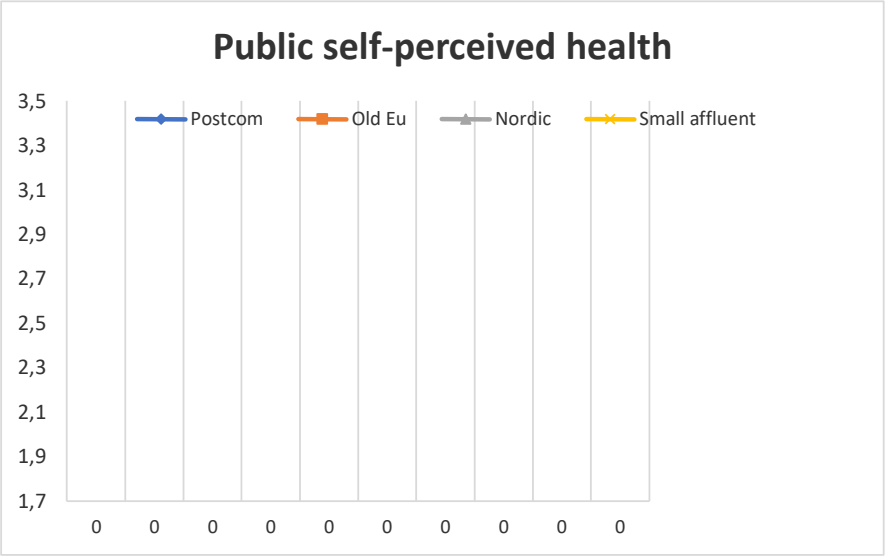

Fig. 6: Public self-perceived health

Source: own research using online data published by the Eurostat.

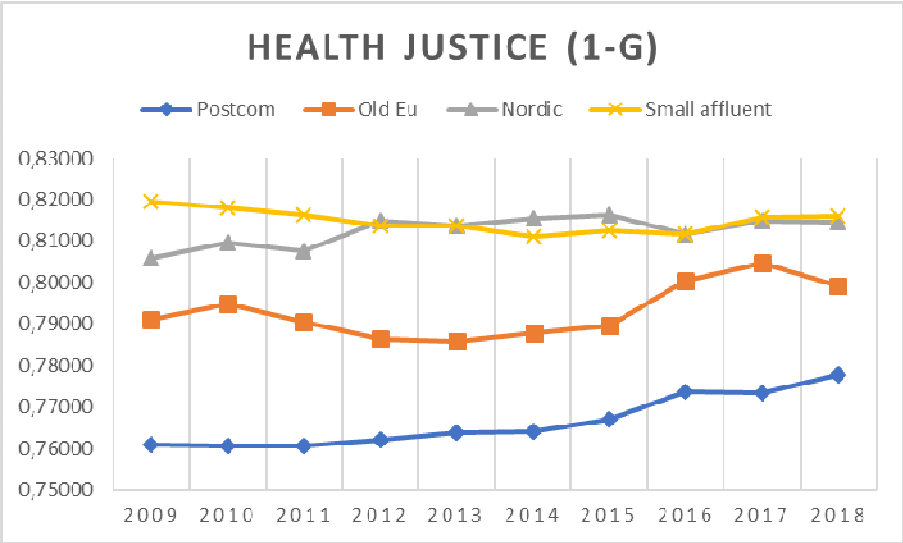

Fig. 7: Inequality in public distribution of subjective health
Source: own research using online data published by the Eurostat.

Similarly to the procedure described in the earlier section, the final stage of the process involved analytical evaluations of healthcare systems' effectiveness, measured as a quotient of public self-perceived health divided by total expenditure volumes (backdated by 2 years), as presented on Fig. 8.

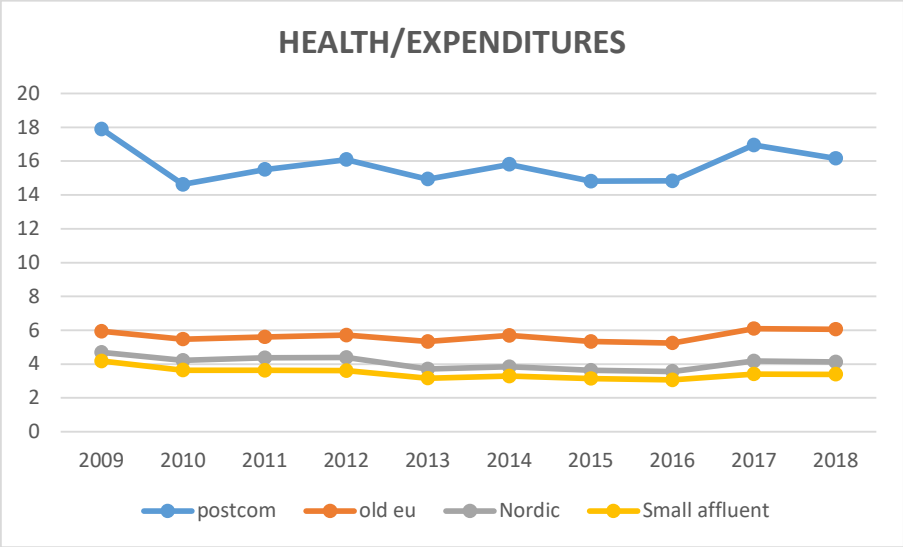

Fig. 8: The health/expenditures quotient
Source: own research using online data published by the OECD and the Eurostat.

The economic dimension – total effectiveness of national healthcare systems

As already noted in an earlier section, total expenditures assigned to national healthcare systems are strongly correlated with effectiveness of treatment measured on national levels by the EHCI index. This observation raises a question whether such cost can also be related to general health condition (as measured by the HLY index) or to public self-perceived health (expressed by $\mu \cdot (1 - G)$). This question

is particularly important in the light of the fact that evaluation of national healthcare systems is commonly examined on the basis of relations between these measures (EHCI, HLY and μ·(1 – G)) and the aforementioned total expenditures (cf. Figs. 3, 4 and 8).

Another question arising in association with the above dilemma is whether public expenditures in support of national health systems affect the aforementioned measures in an immediate fashion or is this effect delayed in time? And to what extent, if the latter holds true? Studies of professional literature have yet to provide a satisfactory answer to this question (Or 2001). This study aimed to tackle both questions by means of an analytical evaluation of correlations between the collected data segments[2]. For this purpose, the authors analysed Pearson's linear correlation coefficients between total expenditures and each of the data segments (EHCI, HLY and μ·(1 – G)), both for the same period and for periods representing a delay of one, two, and three years, respectively. The procedure also involved segmentation of total expenditures in two segments, representing two principal sources of healthcare funding, namely: private and public expenses. This step was designed to improve the depth of subject analyses.

This part of the study revealed that the findings had been of comparable quality, suggesting that the strength of correlations between the respective values had been largely unrelated to changes in the calculation of correlation coefficients (immediate vs. delayed)[3]. Based on this observation, the authors gained a greater degree of freedom in selecting a suitable approach to the task at hand. One other question remains: are the coefficient values significantly departing from zero values. Or in other words: are the correlations strong enough? Ultimately, the authors decided to adopt values representing expenses in private and public dimension, with a delay of two years in relation to the respective EHCI, HLY and μ·(1 – G) values, in line with the course of action previously adopted for the construction of effectiveness measures of national healthcare systems presented on Figs. 3, 4 and 8. Due to gaps in data, this level of delay offered the broadest available period of analytical evaluation[4]. Values of the resulting Pearson's linear value coefficient are presented in Tab. 2. In addition, a KPSS test was performed to test stationarity of EHCI, HLY, μ·(1-G) and of the private and public expense time series and the result is that all these time series are level-stationary on significance level equal to 0.05.

Table 2: Coefficients of correlation between private/public expenses taken with a delay of two years and the respective values of EHCI, HLY and μ·(1 – G)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
r(w_priv,EHCI)	0.652	x	x	0.519	0.663	0.611	0.658	0.643	0.597	0.614
r(w_publ,EHCI)	0.915	x	x	0.853	0.907	0.845	0.842	0.825	0.843	0.853
r(w_priv,HLY)	**0.360**	0.387	0.394	0.491	**0.127**	**0.116**	**0.155**	**0.065**	**0.032**	x
r(w_publ,HLY)	0.562	0.544	0.475	0.510	**0.299**	0.402	0.492	0.384	**0.267**	x
r(w_priv,μ·(1-G))	**0.369**	**0.357**	**0.307**	**0.219**	**0.213**	**0.163**	**0.233**	**0.162**	**0.301**	**0.243**
r(w_publ,μ·(1-G))	0.456	0.442	0.386	0.389	0.428	0.423	0.446	0.418	0.528	0.479

*Note: x – missing data, **bold** – statistically insignificant coefficients (at a significance level of 0.1).*
Source: own calculations, based on collected data.

It may be useful to note that all the correlations are positive, in line with economic intuition and suggestive of a trend that values of EHCI, HLY and μ·(1 – G) increase significantly with increases of expenditures from both sources. This seems to satisfy the precondition for further analyses of effectiveness of national healthcare systems conducted on the basis of the DEA method. It must be emphasised, though, that in some cases the values of coefficients are statistically insignificantly different from zero. This applies in particular to correlations between private expenditures and HLY and μ·(1 – G), respectively. In view of their values being insignificantly different from zero, coefficients of correlations between private expenditures and HLY for the years 2016-2017, the authors decided to remove the category of HLY from further examination[5]. In addition, due to the unavailability of EHCI index data for the years 2010-2011, the initial period of effectiveness analyses was reduced

to include the years 2012-2018 only (cf. Fig. 2). In the earlier sections, the effectiveness of national healthcare systems was analysed in relation to total levels of health expenditure (i.e. without division into those funded from private and public sources) and separately for each of the selected measures of EHCI, HLY and $\mu \cdot (1 - G)$. In this context, it may be valuable to examine the total effectiveness of all the studied systems in relation to each of the statistically significant categories. As already mentioned, the category of HLY had ultimately been rejected as practically unrelated to the level of private health expenditures.

For the task at hand, an output-oriented BCC model in the envelopment form was employed (Banker, Charnes and Cooper 1984), representative of the DEA methodology. DEA models are classic examples of input-output models, therefore our method required proper attribution of input and output roles among each of the studied categories. In line with earlier observations, the group of inputs will be represented by public and private health expenses, while outputs will be populated by the respective EHCI and $\mu \cdot (1 - G)$ values.

The analytical evaluations were based on a model construed on the assumption of variable returns to scale, to allow for analyses of national systems of varied scale and on varied stages of development. With the adoption of an output-oriented model, main analytical focus was placed on the examination of potential for increases in the values of EHCI and $\mu \cdot (1 - G)$ at a predetermined volume of both types of expenditures (taken with a two-year delay). If such potential exists, it would mean that the effectiveness of the associated national system is not yet fully realized. The degree of ineffectiveness will then be expressed un our measure by a value in excess of 1, calculated from the above model. When the value of the measure equals 1, the associated system is deemed as fully effective.

Table 3 presents values of our measure of effectiveness over the period under study (the years 2012-2018). In order to retain proper correspondence with the previous segments of the study, the results were aggregated to represent each of the four groups of countries. Geometric mean was selected for the purpose, due to the multiplicative and ratiometric character of the utilized measure.

Table 3: Average measures of effectiveness of national healthcare systems for each of the four studied groups of countries

	2012	2013	2014	2015	2016	2017	2018
Postcom	1.0252	1.0229	1.0193	1.0324	1.0203	1.0235	1.0243
Old EU	1.1200	1.0568	1.0578	1.0729	1.0492	1.0430	1.0346
Nordic	1.0235	1.0188	1.0110	1.0213	1.0231	1.0206	1.0103
Small affluent	1.0502	1.0305	1.0381	1.0370	1.0347	1.0279	1.0244

Source: own calculations, based on collected data.

Analytical findings suggest that, over the studied period, the most effective national healthcare systems were those in the Nordic group of countries, which may come as no surprise given their renowned status of social welfare states. Post-communist countries came as second in terms of their system's effectiveness, and even placed on the top of the ranking in the year 2016. However, in the authors' opinion, the reasons behind their 'good score' are quite distinct, as the group is characterised by the lowest level of total healthcare expenditures (cf. Fig. 5), while at the same time retaining the highest level of effectiveness, measured separately for each of the studied categories (cf. Figs. 3, 4 and 8). This means that the high effectiveness in this group may be attributed to the fact that – at such low funding – higher values of both EHCI and $\mu \cdot (1 - G)$ taken with two-year delay are quite simply unachievable.

The third position on the effectiveness ranking is occupied by 'small and affluent' countries, with average effectiveness scores improving significantly over the analysed period and remaining – in authors' opinion – on a relatively high level. Even in the most adverse period (that is: in the year 2012), values of both the EHCI and $\mu \cdot (1 - G)$ may potentially be improved by not more than 5%, at a predetermined level of public and private healthcare expenditures recorded for the year 2010[6].

The last place on the ranking is occupied by countries of the Old EU, but also in this case notable improvements can be observed over the analysed period. It must be noted, however, that this score is quite distinct from the one determined on the basis of separate evaluations of EHCI, HLY and μ·(1 – G) indices (cf. Figs. 3, 4 and 8), where Old EU placed second, right behind the Postcom group. This means that analytical evaluations of joint effectiveness of a national healthcare system produced on the basis of all significant categories may provide results quite diverse from those produced separately for each category, in line with the approach presented in previous sections of this study. Regardless of our selection of the second-degree delay between inputs and outputs, decided on the grounds of separate analyses of correlation, it leaves us with the still unresolved question on the aptitude of our decision, this time in the context of the findings. Would our procedure yield significantly different results if the inputs were delayed in relation to outputs by a different degree or with no delay whatsoever?

To address this question, the last part of the study was devoted to analytical evaluation of the results' susceptibility to the degree of delay between expenditures and the values of EHCI and μ·(1 – G). Results of this part of our inquiry are presented in Tab. 4.

Table 4: Values of effectiveness measures for analysed groups of countries, in relation to the degree of delay between inputs and outputs of the model employed in the study

	2012a	**2012b**	**2012c**	**2012d**		**2015a**	**2015b**	**2015c**	**2015d**
Postcom	1.0164	1.0207	1.0252	1.0195	Postcom	1.0204	**1.0195**	1.0324	**1.0346**
Old EU	**1.1102**	1.1153	1.1200	**1.1223**	Old EU	1.0742	1.0724	1.0729	1.0772
Nordic	1.0257	1.0257	1.0235	1.0253	Nordic	1.0214	1.0210	1.0213	1.0223
Small affluent	1.0511	1.0506	1.0502	1.0512	Small affluent	1.0374	1.0374	1.0370	1.0373
	2013a	2013b	2013c	2013d		2016a	2016b	2016c	2016d
Postcom	**1.0212**	1.0229	1.0229	**1.0468**	Postcom	**1.0177**	1.0221	1.0203	**1.0296**
Old EU	**1.0450**	1.0517	**1.0568**	**1.0614**	Old EU	1.0493	1.0491	1.0492	1.0488
Nordic	1.0170	1.0191	1.0188	1.0170	Nordic	1.0234	1.0232	1.0231	1.0233
Small affluent	1.0313	1.0311	1.0305	1.0300	Small affluent	1.0360	1.0360	1.0347	1.0325
	2014a	2014b	2014c	2014d	Note 1: Letters a, b, c, d are used to represent models with: no delay, and delays of the first, second and third degree, respectively.				
Postcom	1.0147	1.0164	1.0193	1.0201					
Old EU	1.0525	1.0535	1.0578	1.0623					
Nordic	1.0094	1.0093	1.0110	1.0113	Note 2: **Bolded** values represent measure values in the distance of less than 0.01. Comparisons were made in rows, i.e. between models.				
Small affluent	1.0398	1.0373	1.0381	1.0387					

Source: own calculations, based on collected data.

First of all, it must be noted that, due to the already noted gaps in source data, the period of effective analysis was narrowed down to the years 2012-2016. It is evident that average values of measures within each group only sporadically display variance of more than 0.01 when the only differing value is the degree of delay between the model's inputs and outputs[7]. The case in question is evidenced by values for the Postcom group (years: 2013 and 2015-2016) for Old EU (years: 2012-2013). Furthermore, differences of more than 0.01 do not apply to all four of the analysed groups, but are only observed for two or (in one case) three groups.

To sum up, the adoption of the second degree delay between inputs and outputs does not seem to impose any significant impact upon the results, at least in these authors' opinion and with a few exceptions. In closing, it may be useful to note that the significant gaps in source data, as already

mentioned, had the effect of ruling out the prospect of broader analyses of both the initial correlations and the resulting susceptibility of results to degrees of delay in excess of the three-year margin.

Conclusions

On the basis of the available data provided by the EUROSTAT and POWERHOUSE in relation to general health condition of European societies and data related to national levels of healthcare expenses (OECD) it can be observed that European countries, just like the majority of countries on a global level, seem to fall in line with the trend where increases in health expenditures correlate with increased satisfaction from the service (as evidenced by EHCI values presented on Fig. 2, by per-capita expenditures – Fig. 5, and by public self-perceived health – Figs. 6 and 7). This leads us to the observation that the increase in spending does not necessarily produce a comparable improvement in perceived health, as measured by the HLY index. This is, without doubt, evidence of the M. Lalonde's (1974) effect, where public self-perception of health is believed to be mostly affected by lifestyle, environment, and genetic predisposition, with national healthcare system regarded as the least important factor in this context. It is also worth noting that the post-communist countries, characterised by the drastically lowest level of healthcare spending, display the highest dynamics of HLY growth, in consequence of their rapid transformation, increased awareness and lifestyle improvements, accompanied by effective prevention of modern civilizational diseases (cardiovascular and neoplastic). While this group also displays the most pronounced disparities in public self-perception of health, the present trend shows significant improvement in this respect.

Joint effectiveness of national healthcare systems in the European countries included in this study is of a fairly high level. The least pronounced effects in this context can be observed among representatives of the Old EU, but their effectiveness has also showed a steady increase over the studied period. It must be remembered, however, that the reasons for the increased effectiveness observed in the Postcom group are quite different from those observed in other groups, as the Postcom countries are characterised by a radically lower level of healthcare spending. At such low levels, higher values of both the EHCI and of the self-perceived health adjusted by differences in health as measured by $\mu \cdot (1 - G)$ are quite simply unachievable. For this reason, national health systems of the Postcom group were deemed as effective at their present level of healthcare expenditures.

Future research should conduct national healthcare systems performance analysis depending on manner of funding and its amount. Additionally, it is planned to investigate the impact of environmental factors on quality, work of healthcare system (it's effectiveness) and its productivity. The time of a worldwide pandemic has shown that for public healthcare condition we are responsible personally.

[1] See: https://healthpowerhouse.com/ (accessed on: 12.01.2020).
[2] That is: not in general, but in relation to the specific empirical study discussed in this paper.
[3] Results of this part of the study are available upon request.
[4] These include missing data for the volumes of private and public expenses in the years 2017-2018, EHCI values for the years 2010-2011, and HLY values for the year 2018.
[5] It may also be useful to note that the HLY category was found to be insignificantly correlated with public expenses in the years 2013 and 2017, respectively. In addition, due to missing data, calculations of correlations and effectiveness for the year 2018 could not be performed.
[6] This can be seen as evidence of clear interpretation of this measure, and a source of information of supplementary value for analyses of economic effectiveness.
[7] The threshold value 0.01 was set in an arbitrary fashion. In these author's subjective opinion, and with the given set of values, differences in the range of 0.01 and below can be regarded as negligible, particularly in view of the fact that the employed measures of effectiveness represent *average* values for the studied groups of countries.

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Industry 4.0 Technologies: A Tool for Overcoming Contradictions of Socio-Economic Development or a Source of New Threats?

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Abstract

The article analyzes the key technologies of Industry 4.0, as well as their role in resolving the contradictions of socio-economic development. An integral indicator of the density of implementation of Industry 4.0 technologies is proposed for ranking the studied countries of the world. The ranking results indicate that the world's economies are differentiated by the level of implementation of Industry 4.0 technologies. This carries the risk of further strengthening the multipolarity of the global economy and increasing inequality. It is proved that the further development of Industry 4.0 may cause the appearance of new environmental restrictions and the emergence of cyber threats. Research methods: methods of logical and theoretical research (analysis, synthesis, comparison, generalization), methods of systematization, method of calculating an integral indicator based on the analysis of the standard deviation from the maximum values in each group of indicators.

Keywords: Industry 4.0, socio-economic development, contradictions, demographic problems, multipolarity of the global economy

Introduction

Each new stage of scientific and technological progress leads to a change in the paradigm of social development and the emergence of new contradictions of a socio-economic nature. Thus, the first industrial revolution caused a complete technological replacement of machines and equipment, the second industrial revolution led to the mass introduction of technologies based on the production and use of electricity, the third industrial revolution was based on automated technologies that provided almost complete replacement of industrial equipment. Industrial revolutions also caused significant changes in the structure of society, rapid urbanization of the population, growth in labor productivity, global change and re-profiling of labor resources and, as a result, an increase in the living standards of the population.

The next stage in the development of the world economy was the fourth industrial revolution or Industry 4.0, associated with the emergence of digital control systems, as well as the increased integration of "cyberphysical systems" in production processes.

These technologies probably have a great potential that can solve numerous problems of socio-economic development at the current stage. However, according to Klaus Schwab, the President of the World Economic Forum, "the problems associated with the fourth industrial revolution coincide with the rapid emergence of new environmental restrictions, the strengthening of the multipolarity of the international order and the growth of inequality» (Schwab, 2018). This allows us to make an assumption about the possible negative consequences of the impact of Industry 4.0 technologies on the global economic system.

Thus, the study of the nature of the impact of Industry 4.0 technologies on the world economy is currently becoming particularly relevant.

Methodology

The research hypothesis is based on the assumption that the development of Industry 4.0 is a natural stage in the evolution of the world economy in response to the existing contradictions of socio-economic development associated with global demographic changes (population aging and urbanization), as well as with a decrease in economic stability due to a slowdown in labor productivity and inefficient use of resources. The existing potential of Industry 4.0 technologies, on the one hand, makes them a tool for overcoming these contradictions, and on the other hand, it can cause the emergence of new environmental restrictions, the strengthening of the multipolarity of the global economy and the growth of inequality, as well as the emergence of cyber threats.

Schmidt and Cohen (2013) introduced the concept of the "digital age", which is associated with the active development and implementation of information and communication technologies (ICTs), covering a variety of software and hardware and related processes. Boyd and Crawford (2012) note that digitalization is changing the way people interact with each other and with their natural environment. Zuboff (2015) points to the transformation of the corporate landscape under the influence of new technologies.

Initially, the concept of Industry 4.0 (I40) appeared in Germany as a national strategic initiative of the government (European Commission, 2017). This concept was aimed at advancing digital manufacturing by increasing digitalization and interconnection of products, services, value chains and business models. The concept was designed for 10-15 years (starting in 2010). In the future, this concept was taken as the basis for implementing digital transformation in various countries of the world. The concept of Industry 4.0 is based on the use of information and communication technologies for intelligent networking of machines and processes that ensure the needs of industry through flexible production convertible factory (modular building production lines to improve performance), customer-oriented solutions (convergence of consumers and producers), optimized logistics, use of data and resource-efficient circular economy (Davies, N. And Schwab K., 2018, Haberer, S. et al., 2017). The success of implementing the new industrial Industry 4.0 will be based on the flexibility and sensitivity of national economic institutions to the upcoming transformations, which will require widespread changes in the legal regimes for the use of new components of the industry (Gokhberg et al., 2017).

Issues of digital security and information protection, as well as the creation of powerful technological bases for the development of components of new technologies are reflected in the works Smit et al. (2016).

Researchers have different assessments of the impact of new technologies on the socio-economic system and its security. Some scientists see the positive potential of information and communication technologies in solving problems of socio-economic development of society (Gijzen, 2013, Hampton et al., 2013). Others emphasize the growing vulnerability of the system and the possibility of information, economic and social threats (Helbing, 2012, Karpunina et al., 2019).

Research methods: methods of logical and theoretical research (analysis, synthesis, comparison, generalization), methods of systematization, method of calculating an integral indicator based on the analysis of the standard deviation from the maximum values in each group of indicators.

Results

Contradictions of socio-economic development as a condition for the development of Industry 4.0.

1) Global demographic changes, which consist of a process of continuous population aging, especially in developed countries, as well as continuing urbanization.

Thus, the share of the world population over 60 years of age from the total population is (in%): 1950-8%, 2000-10%, 2050 (according to forecasts) - 21% (PwC, 2017a). If we analyze the ratio of the old population (65 years or more) to the population of 15-64 years, we can see the trend of population aging. If the global average was 0.113% in 2005, it was 0.137% in 2018, meaning that the global aging trend is not so disastrous. However, an analysis of the dynamics of this indicator by country shows a more negative picture (table 1).

Table 1: Assessment of population ageing through estimation of changes in the ratio of dependents in the old age (65 years and older) to the population of 15-64 years (OECD Data, 2019)

Country	Old age dependency ratio (65 and over/15-64)		Assessment of population ageing through assessment of changes in the dependency ratio in old age (65 years and older/15-64)
	2005	2018	
Japan	0,305	0,472	0,167
Finland	0,239	0,347	0,108
Czech Republic	0,199	0,3	0,101
Netherlands	0,21	0,292	0,082
Portugal	0,259	0,336	0,077
Canada	0,181	0,257	0,076
Denmark	0,228	0,304	0,076
Korea	0,125	0,196	0,071
France	0,251	0,319	0,068
Greece	0,276	0,344	0,068
Poland	0,188	0,255	0,067
United States	0,185	0,245	0,06
European Union (28 countries)	0,248	0,307	0,059
OECD - Total	0,207	0,264	0,057
Italy	0,297	0,354	0,057
Sweden	0,264	0,318	0,054
China	0,106	0,157	0,051
Germany	0,284	0,33	0,046
Australia	0,193	0,239	0,046
United Kingdom	0,241	0,287	0,046

Austria	0,239	0,281	0,042
Switzerland	0,234	0,276	0,042
Norway	0,224	0,262	0,038
Brazil	0,098	0,133	0,035
Belgium	0,262	0,293	0,031
Turkey	0,102	0,127	0,025
World	**0,113**	**0,137**	**0,024**
Russia	0,194	0,218	0,024
Mexico	0,089	0,109	0,02
India	0,076	0,093	0,017

This problem is most relevant for Japan (an increase in the aging rate by 0.167%), Finland, the Czech Republic, and the Netherlands. The population is aging at an accelerated rate in the countries that are leaders in terms of national economies – the United States, China, Germany, and the United Kingdom. The aging population of developed countries significantly affects the global economy, creating prerequisites for the active introduction of new technologies and modernization of production processes.

The dynamics of the indicator "the share of the world's urban population in the total population, %" helps to characterize the process of urbanization: in 2010, the value of this indicator was 50%, by 2050 it is expected to increase to 72% (PwC, 2017a). The process of urbanization leads to an increase in current market segments, as many companies not only expand the geography of their market presence due to the emergence of large infrastructure projects, but also form new market segments.

2) The reduction of labor productivity in industrial production and the presence of fragmented demand for its products requires the modernization of production, including through the introduction of high-tech innovative innovations.

Let's analyze labor productivity and its dynamics, and use the GDP per employed person indicator from 1978 to 2018 (in US dollars, in constant prices in 2015) (OECD Data, 2019). We will select countries at random in order to maximize coverage of highly developed countries and a number of developing countries (table 2).

Table 2: Dynamics of labor productivity based on the analysis of GDP per employed person from 1978 to 2018 (in US dollars, in constant prices in 2015) (created by the authors, source: OECD Data, 2019)

Country	GDP per person employed Dollars USD, constant prices, 2015 PPPs					
	1978	1988	1998	2008	2018	GDP growth per employed person for 2018 to 1978 as a percentage
China	1 445,6	2 803,2	6 030,9	14 836,3	31 021,8	2 046,0
Korea	14 605,1	27 141,2	43 603,6	65 013,5	78 609,5	438,2
Turkey	30 565,4	39 036,9	48 672,6	67 076,5	79 884,9	161,4
Finland	45 040,6	59 926,9	79 935,6	95 044,3	95 313,9	111,6
Sweden	51 138,0	60 223,9	76 902,9	93 270,7	100 965,5	97,4

Japan	41 194,5	58 573,7	66 795,7	74 694,7	77 073,5	87,1
United Kingdom	49 332,4	61 832,4	74 165,1	86 603,6	89 848,6	82,1
Norway	64 920,5	77 848,2	102 239,3	113 335,9	117 552,9	81,1
United States	69 506,0	78 523,8	94 226,8	110 676,0	123 570,7	77,8
Austria	58 974,2	72 729,7	89 536,9	102 066,7	102 891,0	74,5
Denmark	58 544,3	68 664,6	83 617,6	91 611,4	101 493,7	73,4
Portugal	39 158,5	47 285,2	56 878,0	64 017,9	67 644,0	72,7
Belgium	67 157,9	82 081,5	96 577,1	108 381,0	113 583,7	69,1
France	61 557,2	74 903,9	87 059,7	96 177,8	101 715,7	65,2
Australia	58 815,8	65 992,7	79 199,8	86 853,0	93 993,5	59,8
Germany	61 961,8	68 874,7	81 292,2	89 065,8	92 354,4	49,1
Netherlands	67 791,9	74 030,8	83 686,6	94 323,9	98 154,6	44,8
Canada	63 246,8	67 414,3	75 107,6	82 903,7	89 074,5	40,8
Italy	65 528,5	81 390,7	95 407,6	94 926,8	91 765,0	40,0
Switzerland	85 045,3	89 148,8	97 436,0	108 836,2	111 479,4	31,1

According to the authors, the table data shows that the largest growth in labor productivity over the past 40 years was observed in China (20 times growth), South Korea (4.4 times growth), Turkey (1.6 times growth), Finland (1.1 times growth), as well as in Sweden, Japan, United Kingdom, Norway and the United States. The lowest growth in labor productivity is typical for Germany, Netherlands, Canada, Italy, and Switzerland. In addition, it can be argued that the US economy has the highest labor productivity (123 thousand us dollars per employed person) and Norway (117 thousand US dollars). China has the lowest indicator (31 thousand US dollars).

We will conduct an additional analysis of this trend and divide the GDP per employed person indicator into ten-year cycles (OECD Stat, 2019) (table 3).

Table 3: Dynamics of GDP per employed person in term of ten-year cycles (created by the authors, OECD Data, 2019)

Country	GDP growth per employed person from 1978 to 1988 as a percentage	GDP growth per employed person from 1988 to 1998 as a percentage	GDP growth per employed person from 1998 to 2008 as a percentage	GDP growth per employed person from 2008 to 2018 as a percentage	Change in the dynamics of GDP growth per employed person for the period 2018 to 2008 and for the period 1988 to 1978, % growth
China	93,9	115,1	146,0	109,1	15,2
Canada	6,6	11,4	10,4	7,4	0,9
United States	13,0	20,0	17,5	11,7	-1,3
Switzerland	4,8	9,3	11,7	2,4	-2,4
Australia	12,2	20,0	9,7	8,2	-4,0
Netherlands	9,2	13,0	12,7	4,1	-5,1

Denmark	17,3	21,8	9,6	10,8	-6,5
Germany	11,2	18,0	9,6	3,7	-7,5
Turkey	27,7	24,7	37,8	19,1	-8,6
Sweden	17,8	27,7	21,3	8,2	-9,5
Portugal	20,8	20,3	12,6	5,7	-15,1
France	21,7	16,2	10,5	5,8	-15,9
Norway	19,9	31,3	10,9	3,7	-16,2
Belgium	22,2	17,7	12,2	4,8	-17,4
United Kingdom	25,3	19,9	16,8	3,7	-21,6
Austria	23,3	23,1	14,0	0,8	-22,5
Italy	24,2	17,2	-0,5	-3,3	-27,5
Finland	33,1	33,4	18,9	0,3	-32,8
Japan	42,2	14,0	11,8	3,2	-39,0
Korea	85,8	60,7	49,1	20,9	-64,9

This approach confirms the conclusion that productivity is declining in most countries, with the exception of China and Canada. The decade of maximum productivity growth in most of the analyzed countries is observed from 1988 to 1998, and the lowest efficiency was in the last decade from 2008 to 2018. Germany allowed labor productivity to fall from 18% of GDP growth per employed person in the growth decade (1988-1998) to 3.7% in the decade of weak labor productivity (2008-2018). In the US, productivity declined from 20% to 11.7% of GDP growth per employed person, in the UK-from 20% to 3.7 %, in Sweden-from 27.7% to 8.2%, in Norway - from 31.3% to 3.7%, in Finland - from 33.4% to 0.3%, in South Korea - from 61% to 21%, in Canada-from 11.4% to 7.4%.

Industry 4.0 technologies and their role in resolving the contradictions of socio-economic development.

Industry 4.0 is represented by the following key technologies: Internet of things technologies; 3D printing technologies; artificial intelligence interfaces; cloud computing technologies; mobile devices; virtual and augmented reality technologies; location technologies; big data analysis technologies; distributed registry technologies-blockchain; quantum computing technologies; detection and authentication tools; smart sensors; drones, etc. (PwC, 2018).

The above-mentioned technologies of Industry 4.0 ensure the transformation of production due to the following technological trends: network integration, intellectualization and flexible automation of the technological process (Haberer et al., 2017). At the same time, network integration technologically provides communication between individual network nodes or production facilities, as well as facilitates access to information. Intellectualization helps to automatically track the occurrence of specified events and provides prompt provision of information for decision-making, and flexible automation, in turn, includes response mechanisms in the production process - automation and remote control of the technological process. In turn, the transformation of production processes using Industry 4.0 technologies leads to the restoration of positive trends of stable productivity growth in the world economy and should help to solve old problems of economic security – resource scarcity, population aging, reducing the overall efficiency of economies and reducing the human resources potential of many developed countries (table 5).

Table 5: Key technologies of Industry 4.0 and their role in resolving contradictions of socio-economic development (created by the authors)

Key Industry 4.0 technologies	Applications of Industry 4.0	The role of technology in resolving the contradictions of socio-economic development
Blockchain is a distributed database system that uses algorithms to reliably record transactions without the ability to replace or edit them	* Identification and access control • P2P transactions •Supply chain management • Smart contracts • Traceability and permanence of information • Secure login asset / property rights	According to experts, the introduction of blockchain in the financial industry can reduce losses associated with fraud by $ 15-20 billion per year (Santander, 2015). According to Bain & Company, blockchain can effectively reduce the size of the trade Finance deficit and lead to an increase in global trade by $1.1 trillion. Mass adoption of blockchain technology can increase exports of the Asia-Pacific region by $ 257 billion per year (World Economic Forum, 2018).
Drones are flying or water-based devices and vehicles piloted remotely	• Validation of insurance claims • Infrastructure Test •Cargo delivery • Intelligent management of construction sites in other industrial facilities •Forestry • Check the condition of the equipment	Analysts at IDC expect global spending on solutions in the field of robotics and unmanned aerial vehicles to reach $ 115.7 billion next year. This is 17.6% more than in the current year. For 2022, analysts forecast a figure of 210.3 billion dollars, corresponding to an average annual growth of 20.2%. The cost structure is dominated by robotics. It will cost 103.4 billion dollars next year (IDC, 2019). Research and markets analysts predict that by 2025, the market for unmanned aerial vehicles will grow to $ 51.85 billion, which is significantly more than in 2016 ($11.45 billion) (Research and markets, 2020). Tractica predicts that global revenue from services provided by unmanned aerial vehicles will grow from $ 337.6 million in 2017 to $22.7 billion by 2026 (Tractica, 2019). According to PwC calculations, the global market for business services using unmanned devices exceeds $ 127 billion. PwC highlights promising sectors: infrastructure, where the market for using unmanned devices is estimated at $ 45.2 billion; agriculture, where the potential for using drones is $ 32.4 billion; transport ($13 billion); security services ($10 billion); media and entertainment ($8.8 billion); insurance ($6.8 billion); telecommunications ($6.3 billion); mining ($4.4 billion). The market for unmanned aerial vehicles, including helicopters, could grow to $615 billion by 2040 (PwC, 2017b)
Three-dimensional printing is a method of creating three-dimensional objects in	• Health and smart medical devices • Production tools and parts • Prototyping • Optimization of the supply chain	Research by the McKinsey Global Institute shows that by 2025, the volume of three-dimensional printing can bring up to 550 billion dollars a year. Approximately $ 6 billion was accumulated by three-dimensional printing in 2017. This figure is projected to increase to $ 11 billion in 2020 (McKinsey Global Institute,

layers based on a digital model by applying material sequentially and using plastic, glass, and wood	• Customization of goods • Remote Production	2013). ING employees believe that after 40 years, 50% of the products produced will be created using 3D printers (ING, 2018).
Virtual reality is a computer simulation of a three-dimensional image or a full-fledged environment in a given and controlled space, with which the user can actually interact to provide an immersive effect	• Virtual jobs • Manufacturing / product development • Design and construction • Education / training • Entertainment • Health • Merchandising	According to Goldman Sachs, there are about 230 million consoles and 150 million computer players in the world. The total sales of VR/AR is 1.5 trillion US dollars. by 2025, 315 million users are projected with sales of 35 billion dollars. In 2018, the AR market was $ 11.1 billion, and the VR market is estimated at $ 7.9 billion. By 2020, 100 million customers will make online purchases using AR technologies (VC, 2016).
Augmented reality is an overlay of graphics / audio for a more detailed introduction to a task or product	• Virtual exhibition •Education •Travel and tourism •Game industry • Print and Advertising •Retail •Marketing	
The Internet of things (IoT) is a network of devices equipped with sensors, software, and network hardware that can collect and exchange data over the Internet	• Tracking the movement of goods and materials • Monitoring of assets • Remote data collection • Self-Service • Remote services • Obtaining market data real-time • Flexible pricing models	The total amount of global investment in the Internet of things will be $ 1.4 trillion by 2021. By 2020, the number of devices connected to IoT in the world will reach 21 billion units. A combined annual growth rate (CAGR) of 19.6% over 2020-2025 is needed for the market to grow from US $ 14.5 billion in 2020 to us $ 35.5 billion by 2025 (Marketsand, 2020b).
Artificial intelligence is software algorithms that implement visual	• Trading system • Risk management and combating fraud real-time • Automated virtual assistants	The use of artificial intelligence can provide additional growth of the world economy by 16 trillion dollars by 2030, or lead to an increase in total GDP by 16% compared to today's level. This represents about 1.2 percent of additional GDP growth per year (PwC, 2017b).

perception, decision-making, and so on.	• Underwriting of loans and insurance	The growth of automation through the introduction of AI will reduce about 75 million jobs by 2025, while new technologies and AI will drive the creation of new jobs to 133 million over the same period. Up to 60 percent of professions may be automated or robotic in the future. 375 million workers, or 14 percent of the world's workforce, will have to change their profession, and most workers will have to adapt to working together with robots and AI (McKinsey Global Institute, 2018).
	• Data analysis and advanced analytics	
	• Merchandising	
	Marketing and sales analysis of network traffic, analyze the quality of customer service, and in order to network automation	
	Autonomous vehicles, mobile communications there between	
	Personalization of service based on the history of purchases of financial services, and other intelligent services	
	Enhanced control and automatic correction of the production processes, analysis of supply chain optimization and production, the product optimization, predictive analytics	
Robots are devices or virtual agents that autonomously or according to instructions automate, improve, or support human actions	•Production	Robots will complete 42% of current work tasks by 2022, and 52% of current work tasks by 2025. More than half of current employees will either have to change jobs or go through a global digital reforging, but at the same time, at least half of today's professions will remain by 2022 (McKinsey Global Institute, 2018). Automation will affect 1.2 billion people with a total salary of 14.6 trillion dollars. The introduction of Robo-cars will bring $ 3.1 trillion annually to the global economy by reducing the number of accidents and reducing CO2 emissions. by 2050, the market for self-driving cars will generate $ 7 trillion annually (WSJ, 2018).
	• Harmful production	
	• Hospitality and Tourism	
	•Services sector	
	• Automation predictable operations	
	•Data management	
Cloud computing is a model for providing convenient on-demand network access to a shared pool of configurable computing resources (for example, data networks,	Cloud technologies in the educational process	Markets and Markets forecast that the global cloud database and database as a service (DBaaS) market size will grow from us $ 12.0 billion in 2020 to us $ 24.8 billion by 2025, with a combined annual growth rate (CAGR) of 15.7% over the forecast period (Marketsand, 2020a). The growing demand for processing requests with low latency is one of the main factors driving the growth of the market.
	Cloud technologies in the process of implementing blockchain technologies	
	Cloud-based technologies in medicine and banking business	

servers)		
Big data refers to structured and unstructured data of huge volumes and significant diversity that horizontally scalable software tools efficiently process	Transport telematics has been used by automakers for many years, but now a more sophisticated method of data collection is being lobbied that makes full use of Big Data.	According to expert estimates, by 2019, the turnover of the connected car market will reach $ 130 billion (Marketsand, 2020d).
	The implementation of Big Data technologies in the medical field allows doctors to study the disease more carefully and choose an effective course of treatment for a specific case. Understanding user requests and targeting is one of the largest and most widely publicized areas of Big Data tools. Big Data helps you analyze customer habits in order to better understand customer needs in the future.Data analysis is also used to improve a number of aspects of the life of cities and countries. For example, by knowing exactly how and when to use Big Data technologies, you can optimize transport flows.	According to MarketsandMarkets, the global size of the big data market will grow from us $ 138.9 billion in 2020 to us $ 229.4 billion by 2025, with a combined annual growth rate (CAGR) of 10.6% over the forecast period (Marketsand, 2020c).
	The introduction of Big Data tools helps to increase the transparency of industrial processes and implement "predictive production", which allows you to more accurately predict the demand for products and, accordingly, plan the use of resources.	Frost & Sullivan estimates that in 2021, the total global market for big data Analytics will increase by more than 2.5 times compared to 2016, to $ 67.2 billion, with an annual growth rate (CAGR) of 35.9% (Tadviser, 2019).

The data in the table shows that most expert companies predict a significant economic contribution of Industry 4.0 to the global economy, which should provide solutions to major problems, including reduced productivity and a lack of qualified and young personnel.

Comparative analysis of the implementation of Industry 4.0 technologies in countries around the world

Let's analyze the level of technology implementation of Industry 4.0 in 14 countries with different levels of digital and economic development: Australia, Denmark, USA, Netherlands, Germany, Sweden, France, Portugal, Belgium, UK, Canada, Italy, Japan and China. The choice of countries is justified by the possibility of maximum coverage of data in open sources in the context of implemented technologies.

To determine the country's rating by the level of implementation of the described Industry 4.0 technologies we propose to introduce an integral indicator of the density of implementation of Industry 4.0 technologies – D_{ti} (Density of Technology Imlementation).

The calculation of this indicator is based on comparing and ranking countries for each indicator with a conditional reference country that has the best results for all the indicators being compared. This approach corresponds to the practice of market competition, where each country strives to "look better than its competitor in all indicators of this type of activity" (Karpunina, 2011). The rating value for each analyzed country is determined by a summary calculation of integral (generalizing) indicators. An integral indicator of the density of implementation of Industry 4.0 technologies, calculated by the formula:

$$D_{ti}=\sqrt{\sum_1^i (1-xi)^2},$$

xi – standardized indicators for the implementation of Industry 4.0 technologies (where $xi=X_i / X_{max}$), $i = 1 \ldots .10$.

As initial indicators, we suggest taking:

X_1 - number of IOT devices per 100 inhabitants (units)

X_2 - number of installed industrial robots per 10,000 manufacturing workers (units)

X_3 - the share of high-tech and medium-tech products (as a % of total manufacturing output) in 2019 (based on the OECD technology intensity classification)

X_4 - the composite index of the penetration of artificial intelligence

X_5 - gross expenditure on research and development, % of GDP

X_6 - GDP/unit of energy use

X_7 - share of high-tech and medium-tech manufacturers in total, %

X_8 - number of samples contained in industrial design applications submitted to a given national or regional office (per billion PPP $ of GDP)

X_9 - computer software expenditures, % of GDP

X_{10} - high-tech exports minus re-exports (% of total trade).

The values of the baseline indicators for the analyzed countries are presented in table 6.

Table 6: Initial indicators for calculating the integral indicator of the density of implementation of Industry 4.0 technologies (compiled by the authors, HAI (2019), WIPO (2019))

Country	Internet of things devices per 100 inhabitants in 2017	Number of installed industrial robots per 10,000 employees in manufacturing industry, 2016	High-tech and medium-high-tech output as a percentage of total manufactures output, in 2019 years, %	Composite AI Index Scores, 2015-2018	Gross expenditure on R&D, % GDP	GDP /unit of energy use	High- & medium-high-tech manufactures, %	Industrial designs by origin/bn PPP$ GDP	Computer software spending, % GDP	High-technology exports minus re-exports (% of total trade)
China	6,20	68	59,4	32,56	2,1	6,6	0,5	26,3	0,4	27,90
Australia	7,90	83	35,5	23,3	1,9	8,5	0,3	2,3	0,3	1,70
Belgium	15,60	184	47,4	21,69	2,6	8,5	0,4	2,4	0,7	8,10
Canada	11,60	145	49,8	27,45	1,7	5,5	0,4	0,5	0,7	4,90
Denmark	32,70	211	55,2	20,17	3,1	15,6	0,4	6,8	0,6	5,20
France	17,60	132	58,9	27,55	2,2	10,3	0,5	6,3	0,6	12,80
Germany	22,40	309	73,8	30,44	3	11,6	0,6	14,5	0,6	11,50
Italy	10,20	185	48,6	20,99	1,4	13,5	0,4	16,6	0,6	5,30
Japan	8,20	303	70,5	17,83	3,2	11,2	0,5	4,5	0,3	12,10
Netherlands	24,70	153	38,8	26,91	2	10,9	0,3	3,8	0,6	11,20
Portugal	16,20	58	32,7	17,27	1,3	12,3	0,3	7,2	0,6	2,70
Sweden	21,90	223	58,6	22,1	3,4	9,7	0,5	4,1	0,6	7,30
United Kingdom	13,00	71	52,8	26,83	1,7	14,7	0,4	7,9	0,7	9,00
United States	24,90	189	66,8	57	2,8	8,1	0,5	1,2	1,1	5,80
Maximum value of each indicator in the group	**32,7**	**309**	**73,8**	**57**	**3,4**	**15,6**	**0,6**	**26,3**	**1,1**	**27,90**

Standardized indicators are found by dividing the values of each of the given initial indicators by the maximum number of this indicator for the countries under study (table 7).

Table 7: Calculation of the integral indicator of the density of implementation of Industry 4.0 technologies (compiled by the authors)

Country	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	Integrated indicator of the level of density of implementation of Industry 4.0 technologies
China	0,657	0,608	0,038	0,184	0,146	0,333	0,028	0,000	0,405	0,000	2,399
Australia	0,575	0,535	0,269	0,350	0,195	0,207	0,250	0,833	0,529	0,882	4,624
Belgium	0,273	0,164	0,128	0,384	0,055	0,207	0,111	0,826	0,132	0,504	2,784
Canada	0,416	0,282	0,106	0,269	0,250	0,419	0,111	0,962	0,132	0,680	3,627
Denmark	0,000	0,101	0,064	0,417	0,008	0,000	0,111	0,550	0,207	0,662	2,119
France	0,213	0,328	0,041	0,267	0,125	0,115	0,028	0,578	0,207	0,293	2,195
Germany	0,099	0,000	0,000	0,217	0,014	0,066	0,000	0,201	0,207	0,346	1,149
Italy	0,473	0,161	0,117	0,399	0,346	0,018	0,111	0,136	0,207	0,656	2,624
Japan	0,561	0,000	0,002	0,472	0,003	0,080	0,028	0,687	0,529	0,321	2,683
Netherlands	0,060	0,255	0,225	0,279	0,170	0,091	0,250	0,732	0,207	0,358	2,625
Portugal	0,255	0,660	0,310	0,486	0,381	0,045	0,250	0,527	0,207	0,816	3,937
Sweden	0,109	0,077	0,042	0,375	0,000	0,143	0,028	0,713	0,207	0,545	2,239
United Kingdom	0,363	0,593	0,081	0,280	0,250	0,003	0,111	0,489	0,132	0,459	2,762
United States	0,057	0,151	0,009	0,000	0,031	0,231	0,028	0,911	0,000	0,627	2,045

The calculations make it possible to distinguish two groups of countries depending on the density of implementation of Industry 4.0 technologies (table 8).

Table 8: ranking of countries according to the value of the integrated indicator of the density of implementation of Industry 4.0 technologies (compiled by the authors)

Country	Integrated indicator of the level of density of implementation of Industry 4.0 technologies	Rank by level of the integrated indicator of the level of density of implementation of Industry 4.0 technologies	The country is a leader or outsider in terms of the density of implementation of Industry 4.0 technologies
Germany	1,149	1	leader
United States	2,045	2	leader
Denmark	2,119	3	leader
France	2,195	4	leader
Sweden	2,239	5	leader
China	2,399	6	leader
Italy	2,624	7	outsider
Netherlands	2,625	8	outsider
Japan	2,683	9	outsider
United Kingdom	2,762	10	outsider
Belgium	2,784	11	outsider
Canada	3,627	12	outsider
Portugal	3,937	13	outsider
Australia	4,624	14	outsider

Thus, the leaders in the implementation of Industry 4.0 technologies are: Germany, United States, Denmark, France, Sweden, China (the value of the D_{ti} indicator is in the range of 1-2.5). Italy, Netherlands, Japan, United Kingdom, Belgium, Canada, Portugal, Australia are outsiders (the value of the D_{ti} indicator is in the range of 2.5-5).

Conclusions

The results of the study allow us to conclude that the level of development, penetration and use of Industry 4.0 technologies in the analyzed countries is significantly differentiated. This probably carries a certain risk of further dividing the economic world by the rate of economic development and economic well-being. For example, a study by the McKinsey Global Institute and WEF points to the emergence of a significant gap between countries and companies that are actively developing new technologies and countries and companies that are outsiders who remain aloof from new technological trends. The leaders are projected to have a combined cash flow growth of 122% over 5-7 years, while the outsiders will have a more modest growth rate of 10% (Weforum, 2019).

The available data highlight the growing multipolarity of the global economy: the centers of economic leadership are shifting from developed countries to the developing world. Thus, according to economists ' forecasts, up to 66% of the middle class and 59% of their consumption will be concentrated in Asian countries by 2030 (an increase of more than 2 times the volume of 2009). This process will consist in accelerated growth of the GNP of the developing E7 countries (China, India, Brazil, Russia, Indonesia, Mexico, Turkey) over the economic growth of the developed G7 countries. So, in 2015, the GDP of the G7 countries was $ 34 trillion, the GDP of the E7 countries was $19

trillion, according to forecasts by 2050, the GDP of the G7 countries will be $ 69 trillion, and the GDP of the E7 countries will grow to $ 138 trillion (that is, GDP growth (2050 to 2015) will be 7.26 (while in developed countries 2.03) (PwC, 2017a).

Another risk for the development of Industry 4.0 technologies may be the emergence of new environmental restrictions due to the increased burden on the industrial sector of the world economy. ICT estimates that for every 1% increase in global GDP, CO2 emissions will increase by about 0.5%, and resource intensity by 0.4% (GeSI, 2015). Current business practices will contribute to a global gap of 8 billion tons between supply and demand for natural resources by 2030, resulting in a loss of $ 4.5 trillion in economic growth by 2030 (Accenture, 2015). In addition, research by the Global Footprint Network indicates a shortage of available resources, and also shows that today the level of global consumption exceeds the available resources by 1.7 times (Footprint Network, 2018). The solution to this problem requires the development of new cyclical business models, their acceptance by customers and the impact on the environment of the digital technology itself.

The introduction of Industry 4.0 technologies also leads to the emergence of cyber risks and the updating of digital security issues due to the growth in the number of new devices connected to the Internet (in 2018, there were about 50 billion of them) (McKinsey Global Institute, 2018).

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Epidemic Threats and their Impact on the Economic Security of the State

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Abstract

The threat of viral epidemics is a factor of economic security of the state. Its manifestation damages the life and health of the population, as well as the normal functioning of the economic system. The authors reveal the dialectical nature of the impact of epidemic threats on the economic security of the state. They prove that the destructive impact of the epidemic threat is manifested in the form of economic damage at all levels of the economic system (a decrease in economic activity of economic entities, a reduction in the volume of markets, a fall in real GDP). The authors note that there is also a creative impact of epidemic threats, which is manifested in the growth of incomes of enterprises specializing in medical products, as well as the development of new digital forms of economic activity that contribute to improving the economic security of the state. The authors proposed a formula for calculating the amount of reduction in the economic security of the state as a result of the introduction of quarantine measures. The formula can be adapted to calculate the value of a country's GDP loss over the entire period of the epidemic. The authors proposed the directions of state policy that can increase the level of economic security of the state in the face of the threat of epidemics (preventive, reactive and proactive), as well as measures for their implementation.

Keywords: Economic Security of The State, Epidemic Threat, Economic Damage, Digital Technologies

Introduction

In modern conditions, the countries of the world face new challenges that focus their interest on issues of economic security and search for mechanisms to strengthen and improve it.

Digitalization and increasing the technological efficiency of production processes, as well as the penetration of information and communication technologies into the daily life of people shift the emphasis towards preventing, first of all, anthropogenic threats and risks to economic security.

Nevertheless, with a certain regularity, real threats of a natural nature arise in the world, they cause significant damage to humanity. One of these threats is viral epidemics, which damage the health of the population, increase mortality, and have economic consequences that undermine the security of states: a reduction in GDP, an increase in unemployment, an increase in the cost of social programs, and so on.

For example, the World Bank estimated the total economic damage from the Spanish flu pandemic during world war I (1918-1919) at 6.6% of world GDP. The economic consequences of SARS in 2002-2003 were reflected in a slowdown in economic growth from 11.1% to 9.1%. At the same time, direct damage to Asian countries was estimated at $12-18 billion, while indirect damage to the world economy amounted to $30-100 billion (The Bell, 2020).

Research on the economic consequences of the largest viral epidemics in world history shows that epidemics can also have a positive impact on the economic security of a state, for example, lead to an increase in per capita income or the development of new forms of economic activity (Brainerd and Siegler, 2003; Qiu et al., 2018). What is the dialectic of the relationship between the epidemic threat and the economic security of the state? Can modern digital technologies correct the impact of epidemic threats on the state of economic security of states? Our research is dedicated to finding answers to these questions.

Methodology

Research hypothesis. In the modern world, countries face new challenges and threats that reduce their level of economic security. The epidemic threat is one of the security threats that determine the development of the global economic system. Its impact on the economic security of the state is dialectical: on the one hand, the economic consequences of the epidemic threat have a destructive effect on the economic system, reducing the level of economic security of states; on the other hand, the emergence of an epidemic threat contributes to the development of new digital forms of economic activity, which are both a source of future sustainable development and a permanent tool for ensuring economic security.

The basis for the hypothesis is researches that reveal the essence of economic security of the state. According to Huber et al. (2010) economic security reflects the readiness of the economic system to ensure decent living conditions and personal development, socio-economic stability, and the implementation of the military and political potential of society and the country to eliminate internal and external threats.

The complexity and dynamism of economic security is determined by a variety of economic, social, financial, and political processes (Kesternich and Schnitzer (2010); Bordo et al. (2009); Busse and Hefeker (2006); Schwimmer (1995); Sercu (1980); Wilson (1979)).

Researchers define economic security as a factor of national security that provides resources and dynamic balance of other components of the economic system to eliminate poverty, hunger, social and economic inequality between individuals and between regions of the country (Rehm and Schlesinger (2013); Quadrini (2011); Ausloos and Miskiewicz (2010); Besten den (2007); Estrada (2000)).

Economic security includes many aspects, such as income security, housing security, health security, and so on. Guaranteed income is one of the most important aspects of people's lives. All basic necessities and commodities in a market economy have a monetary or price value, and people's perception of their own economic insecurity depends largely on their purchasing power. Maintaining a certain level of income is a critical security issue for human well being (Yang, 2014).

A complete list of indicators of economic security of the state includes more than 150 indicators, including GDP; share of investment in fixed capital; the share of defense spending; the share of expenditures on science; the share of innovative products in total volume of industrial production; the proportion of persons with cash incomes below the subsistence level in the whole population; the

decile coefficient of income differentiation of the population; the unemployment rate; foreign debt and other (Grigoryeva et al., 2017).

Violation of the normal functioning conditions of the economy is associated with the emergence of natural threats (when threats arise from the natural environment) and anthropogenic threats (when threats provoked by human activity), which are reflected in the form of lowering the threshold values of indicators of economic security.

Threats of a natural nature, including ecosystem parameters, are least affected by the economic security system, and are usually unpredictable and extensive (Fay, 2011). Conditions and factors that are fraught with danger may arise either by themselves or under the influence of certain circumstances. A common feature of threats and dangers is their destructive nature and negative impact on the subsystems of the state.

In the Global Risks Report 2019, the global risks are primarily man-made (the trade conflict between the US and China; US corporate debt problems; a large-scale crisis in emerging markets; a prolonged economic downturn in China; a devastating jump in oil prices; territorial disputes in the South China or East China sea; cyber attacks and data integrity problems; a military confrontation on the Korean Peninsula; the UK's exit from Brexit; the Italian banking crisis). However, the emergence at the end of 2019 in China, a new form of viral infection "coronavirus", which led to a world-class epidemic, actualizes the significance of threats of a natural nature for modern society (The Economist Intelligence Unit, 2019).

A number of studies are devoted to the study of the economic consequences of the world's largest epidemics. According to most of them, the spread of infectious diseases is considered one of the main global economic threats. Analysis shows that most economic losses are usually caused not by the disease itself, but by consumer responses, labor shortages, and cascading failures in the economic and financial sectors.

Researchers focus primarily on the negative consequences of epidemics in the form of increased costs for the health system associated with medical treatment of infected people and the control of disease outbreaks. Epidemics reduce the efficiency of the labor process, destroying labor productivity. Measures related to the introduction of quarantine during epidemics, as well as psychological instability of the population caused by fear of infection, lead to social distancing and disrupt the normal functioning of the economy (Bloom et al., 2018). The decline in trade, the decline in tourism, and the decline in foreign direct investment are also seen as negative economic consequences of epidemics (Fan et al., 2016).

However, a number of alternative studies also focus on the positive impact of epidemics on the socio-economic development of society (Brainerd and Siegler, 2003; Qiu et al., 2018). This allows us to make an assumption about the dialectical nature of the impact of epidemic threats on the economic security of the state. The study uses a qualitative approach to case studies, including a literature review, document analysis, and in-depth interview results. It relied on a wide range of data sources, including books, journal articles, government documents, policy reports, and conference proceedings. The method of economic and mathematical modeling was used to develop a formula that estimates the amount of reduction in the economic security of the state as a result of the introduction of quarantine measures. The dialectical method, the method of induction and deduction, and the systematic approach were used to form conclusions and conclusions.

Results

Let's turn to research on the economic side of epidemics and note that their consequences are distributed unevenly throughout the economy. For example, pharmaceutical companies that produce vaccines, antibiotics, or other products needed to respond to virus outbreaks are potential beneficiaries. So, according to RoboForex, Alpha Pro Tech's shares have always responded to outbreaks of various epidemics: in 2003, during the epidemic caused by the SARS-CoV virus, the company's share price increased by 300%; in 2009, the swine flu outbreak triggered a 700% increase in the share price; in 2014, the Ebola epidemic provided a 500% increase in the share price%

(RoboForex, 2020). Another example is the behavior of Roche Holding Ltd., the manufacturer of the drug Tamiflu, which sold $ 388 million worth of Tamiflu stocks during the swine flu outbreak (previously produced for the US and UK to fight avian flu) (Mercola, 2009). However, the pharmaceutical company Roche was not the only one that received large revenues during the epidemic. Thus, GlaxoSmithKline Plc. earned $ 364 million during this period, Sanofi-Aventis – $ 382 million, and Baxter International Inc. - $ 123 million (Kaushik, 2009).

At the same time, insurance companies face unexpected costs, at least in the short term. Epidemic risks are difficult to predict and even harder to insure. For example, in early 2020, Singapore company NTUC Income offered customers whose trips are affected by the new coronavirus outbreak the flexibility to cancel their travel insurance plans to any destination and receive a full refund of premiums. Japanese insurance company Tokio Marine said that holders of Tokio Marine life insurance policies can receive $ 5,000-limited to the first 50 submissions - if they have contracted the virus to help them "get through difficult times» (Straitstimes, 2020).

Inequality also affects different groups of the population: vulnerable segments of the population are most vulnerable to the impact of epidemics, because they have fewer opportunities for quality health care and fewer savings to protect them from financial disaster.

In general, the amount of economic damage caused by an epidemic threat consists of the cost of medicines, doctor calls, hospitalization and treatment of complications; and the loss of working days. The economic consequences of epidemics for employees are a decrease in income for the period of disability, an increase in medical expenses (doctor's consultations, purchase of medicines, hospital treatment), and an increase in the risk of losing their jobs. Indeed, falling productivity in poor health reduces earnings, and in response, people start working less, preferring leisure, which reduces the supply of labor. Skipping work due to illness entails direct costs of paying for sick leave and indirect costs due to reduced productivity during the employee's absence. For example, in the UK in 1994, productivity losses due to absence from work due to illness were estimated at more than 15.8 billion euros, while sickness payments in 1993 amounted to about 30.6 billion euros in Germany and 15.8 billion euros in the Netherlands (EFILWC, 1997). The occurrence of health problems in employees has many negative consequences for the companies in which they work: the quality and productivity of labor decreases, there is a failure to fulfill obligations, and, as a result, a decline in production, a reduction in profits, and a decrease in competitiveness.

Over the past thirty years, the number of epidemic threats of an infectious nature has increased significantly. The World Bank estimates that the annual global cost of moderate to severe pandemics is approximately $ 570 billion, or 0.7% of global income (Candeias and Morhard, 2018).

Let's analyze the consequences of epidemic threats and their impact on the economic security of the state (table 1).

Table 1: Economic consequences of modern world epidemics and their impact on the economic security of the state (compiled by the authors)

Epidemic threat	Negative economic consequences	Associated positive economic consequences
An epidemic caused by the H1N1 virus in 1918-1920 ("Spanish")	On average, the decline in real GDP per capita compared to the previous peak in 1918 (and sometimes in 1919 or 1920) was 6.6% (for the 24 countries with data, the average decline in real consumer spending per capita was similar to the decline in real GDP per capita). A significant decline in GDP was recorded in Canada and South Africa (by 24%) and in Italy (by 22%). From 1918 to 1921, there was a drop in GDP per capita and consumer spending by 12% and 14%, respectively (Barro and Ursua, 2009). In Spain, real consumer spending per capita fell during the epidemic. In the period 1918-1920, 11 countries experienced a stock market crash. The weakest markets during this period include Italy (minus 69%); Denmark (minus 57%); Switzerland (minus 54%); Japan (minus 52%); France and Spain (minus 46%).	The decline in the working population due to the virus caused a marked increase in per capita real income in the manufacturing sector in the United States in the 1920s (Brainerd and Siegler, 2003): the decline in the supply of manufacturing workers caused by flu-related deaths had the initial effect of reducing the supply of manufacturing labor, as well as increasing the marginal product of labor and capital per worker, and thus increasing real wages. Businesses that specialize in medical products had an increase in revenue (Garrett, 2007). The World Health Organization appeared.
SARS (2002–2003)	In 2003, business and leisure travelers sharply reduced flights. Revenue for Asia-Pacific carriers fell by $6 billion, while North American airlines lost another $ 1 billion. The tourism industry has also suffered a crushing defeat. Net income for Park Place Entertainment, owner of Caesar's Palace in Las Vegas and other gambling and hotel complexes, fell more than 50 percent in the second quarter of 2003 compared to the previous year (Reuters, 2013). By may 2003, Singapore Airlines had reduced capacity by 71 percent and placed 6,600 employees on unpaid leave. Tourism in Singapore has fallen	The epidemic triggered the rapid development of China's nascent E-commerce, mobile telephony and Internet sectors (Ghosh, 2016)[1]. Chinese suppliers have invested more in online marketing on the Alibaba platform. in 2003, Alibaba's business grew by 50% and generated daily revenue of 10 million yuan. More than half of the 1.4 million suppliers on the B2B platform saw strong sales growth (Digital Commerce 360, 2020). Taobao was also launched in 2003, and within two years, the platform surpassed eBay to become the number one C2C market in China.

[1] Bobby Ghosh (2016) China's internet got a strange and lasting boost from the SARS epidemic // https://qz.com/662110/chinas-internet-got-a-strange-and-lasting-boost-from-the-sars-epidemic/

	by 70 percent, and the country's GDP has reached $ 400 million. The global macroeconomic impact of SARS is estimated at 30-100 billion US dollars or about 3-10 million US dollars per case (Smith, 2006). An outbreak of SARS in 2003 resulted in losses of us $ 12.3-28.4 billion and an estimated 1% decrease in GDP in China and 0.5% in Southeast Asia (MacKellar, 2007).	
H7N9 virus (avian flu) epidemic in China in 2005, 2013	The direct medical cost of hospitalizing a patient with H7N9 was estimated at 71,060 yuan, which is more than an annual income for a person in a rich province of China (Huo and Chen, 2016). In April 2013, the H7N9 avian flu epidemic caused the price index for meat and poultry and their products to drop to 101.5 on an annual basis. China's poultry industry has suffered losses of more than 40 billion yuan (Huang et al., 2015). However, the economic impact in the global community was insignificant.	Creation of a system of state prevention of human infection with avian flu, operational optimization of the poultry industry, promotion of a healthy lifestyle and improvement of food culture (Ali et al., 2015). Global production and trade have demonstrated the potential for rapid recovery from severe outbreaks, which were mainly confined to East and South-East Asia (McLeod et al., 2005).
Swine flu epidemic of 2009	The 2009 swine flu epidemic was not significant for the macroeconomics of most countries, with the exception of Mexico. However, there were significant risks of depression. Perhaps 20-30% in the US, due to the global financial crisis of 2008, the potential for a flu pandemic increases the chances of depression, especially given that the strain disproportionately affects people of primary working age (Barro and Ursua, 2009). Overall, estimates of economic losses in the affected countries range from 0.5% to 1.5% of GDP (The Economist, 2014).	Investors have profited from the epidemic: sales of vaccines and drugs to fight swine flu in 2009 increased sales of some pharmaceutical companies. By the beginning of 2010, when the moderate epidemic ended, Sanofi-Aventis had a net profit of $ 10.1 billion, up 11 percent from a year earlier. The epidemic has benefited telecommunications companies, e-Commerce companies, home entertainment, and even utilities. The epidemic forced currency traders to rush to safe havens, which caused the dollar to rise (Reuters, 2013).
Ebola outbreak in West Africa (2014-2016)	The short-term (2014) impact on output is about 2.1 p. p. of GDP in Guinea (reduced growth from 4.5% to 2.4%); 3.4 p.p. of GDP in Liberia (reduced growth from 5.9% to 2.5%); and 3.3 p. p. of GDP in Sierra Leone (reduced growth from 11.3% to 8.0%). In 2014-2016, the damage	The increase in the level of food security in Liberia. In the health sector, there has been a shift from private providers back to public ones. Incentives have been created for the development of medical products for the treatment of diseases that affect the poor and have little market appeal

	amounted to $53 billion, taking into account the increase in unemployment, the cost of social programs and damage to public health (The Economist, 2014). There was a 41% drop in tourist visits to the country, and the Bank of Korea lowered its benchmark interest rate to a record low.	(World Health Organization, 2015). The foundations have been laid for well-functioning health systems that integrate public health and primary health care. Funding mechanisms needed to build rapid response capacity to outbreaks and humanitarian emergencies have been established. In Liberia, mobile communications were widely used for data collection (World Bank, 2015).

As can be seen from the above table, on the one hand, as a result of the impact of epidemic threats, the economic activity of most economic entities decreased, the volume of markets decreased, and there was a drop in real GDP per capita in many countries and regions that were both hotbeds of infection and affected by epidemics as a result of global population displacement.

We believe that to determine the amount of reduction in the economic security of the state as a result of the impact of epidemic threats, we can use the formula for GDP losses of a specific country (developed by the authors):

$\mathrm{GDPlos} = (\mathrm{GDP} * \mathrm{Dd} * \mathrm{Pq})/(\mathrm{Dw} * \mathrm{Pe})$, where

GDP – the volume of the country's GDP in current prices (according to official data of the Federal State Statistics Agency); D_d - the number of disability days; P_q - the number of people under quarantine (in the country); D_w – the number of work days per year; P_e – the number of employed people (in the country).

We will demonstrate the use of this formula for calculating the reduction of economic security in Russia as a result of the spread of the COVID-19 coronavirus pandemic.

Compliance with a two-week quarantine for persons arriving from abroad and those in contact with them was the first measure implemented by the Government of the Russian Federation to prevent the spread of coronavirus in Russia. These persons are on official sick leave.

We will calculate the amount of GDP that will be lost in 2020 due to the introduction of quarantine.

We will use the following indicators for the calculation:

1) The number of disability days (D_d):14 days
2) The number of people under quarantine (in the country) (P_q): 3.317 million people (data as of 01.04.2020 (M24, 2020)
3) Total number of disability days: $D_d * P_q$ =14*3,317 = 46.438 million days (46438 thousand days)
4) The number of work days per year (D_w): 248 days
5) The number of employed people (in the country) (P_e): 71576,9 thousand people (the average value for 2019, according to Gks (2019))
6) GDP: 110046,1 billion rubles (in current prices, according to Gks (2019))
7) The Minimum wage in 2020: 12130 rubles.

Calculate the amount of GDP lost due to the people being quarantined using the formula:

$$\mathrm{GDPlos} = (\mathrm{GDP} * \mathrm{Dd} * \mathrm{Pq}) / (\mathrm{Dw} * \mathrm{Pe}) = (110046{,}1 * 46438)/(248 * 71576{,}9)$$
$$= 287{,}9 \text{ billion rubles}$$

Thus, Russia's GDP will not receive about 287.9 billion rubles or 0.26% of GDP only due to quarantine measures (due to loss of working time).

We are confident that the proposed formula can be used to assess the reduction in economic security due to the introduction of quarantine measures not only for those arriving from abroad, but also for all categories of workers in the case of quarantine throughout the country.

On the other hand, the typical economic consequences of many epidemics were: 1) the growth of revenues of enterprises specializing in medical products; 2) the growth and rapid development of telecommunications companies, Internet Commerce companies, and home entertainment companies.

The growth of enterprises in these sectors largely compensated for the decline in GDP in many countries of the world due to epidemics and led to an increase in economic security indicators. For example, restrictions related to the epidemic threat of SARS in China have contributed to the development of the country's e-Commerce sector (primarily through the rapid growth of Alibaba), digital mobile telephony and the Internet. The epidemic has also triggered a rise in text messaging, which has boosted business for cellular companies such as China mobile. It also contributed to the development of three Chinese Internet portals Sina, Sohu and NetEase, through revenue-sharing agreements with the telecommunications company (Ghosh, 2016). Broadband Internet access has also received a huge boost, due to the need of the people under quarantine for communication, information and entertainment.

Thus, the emergence and development of new digital forms of economic activity is both the result of the impact of epidemic risk on the economic system and the source of its future sustainable development, as well as a permanent tool for ensuring economic security: 1) the economic effect of digitalization is significantly higher than that of autonomous technologies (cumulative effect, accumulation of intangible capital); 2) the economic effect of digitalization indicates a return to scale (the economic effect increases with the growth of the level of digitalization development); 3) economic growth and job creation depend on the level of technological development of the country (Katz, 2015; Katz and Koutroumpis, 2012).

The identified consequences of the impact of epidemic threats can become a starting point for determining the policy directions for ensuring economic security of the state: 1) preventive - minimizing the likelihood of new epidemic threats; 2) reactive – in the form of minimizing the consequences of economic damage; 3) proactive - creating conditions for improving the stable and safe functioning of the economic system based on the development of digital technologies.

The tool for implementing the preventive direction is to strengthen health institutions and develop the health services sector to protect countries from serious health shocks that can significantly affect human capital and hinder economic growth. The reactive approach is implemented in the event of a direct epidemic threat to limit the spread of the virus and its negative consequences (organizational, medical, social, technological, and economic measures). However, managing the epidemic threat is complicated by a number of factors. Diseases can be rapidly transmitted both within and between countries, so a timely response to initial outbreaks is essential. The epidemiological potential is enhanced by globalization and increased by climate change and urbanization: climate change expands the habitats of various common disease vectors; urbanization contributes to the transmission of infectious diseases in the context of close interaction of urban populations. The proactive direction includes a number of technological solutions that can help minimize the burden of epidemics: the use of online services, phones and other digital transactions is especially valuable, including in case of emergencies. For example, in 2015, the "Big data" project was launched to support States in the field of emergency telecommunications. The project facilitated the timely exchange of information on human mobility, including cross-border movement, and the spatial and temporal distribution of people in order to combat the Ebola epidemic (ITU, 2015). Aid agencies can track the geographical spread of viruses and save time in responding to an outbreak by turning processed and anonymized

official data into a dynamic map. Another proactive direction of economic security policy is the development of digital platforms and services to form the basis of the national economic system, ensuring uninterrupted operation and provision of goods and services in the event of an epidemic threat.

Conclusions/Recommendations

As a result of the research, the following conclusions were obtained. First, the place of epidemic threats in the system of economic security of the state has been established. Second, the dialectical nature of the impact of epidemic threats on the economic security of the state is revealed. On the one hand, epidemic threats have a destructive effect on the economic system, causing it economic damage and reducing the level of economic security of the state. The formula for calculating the reduction of economic security of the state as a result of the introduction of quarantine measures is proposed in the article. It can be adapted to calculate the country's GDP loss over the entire period of the epidemic. On the other hand, the accompanying results of epidemic threats are the intensive development of the sphere of medical goods and services, as well as the emergence of new digital forms of economic activity, which compensated for the decline in GDP in many countries of the world due to epidemics and led to an increase in economic security indicators. Third, the policy directions for ensuring the economic security of the state are defined: preventive (minimizing the likelihood of new epidemic threats); reactive (minimizing the consequences of economic damage); proactive (creating conditions for stable and safe functioning of the economic system based on the development of digital technologies).

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Social Risks of Digital Transformation

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Abstract

The authors analyzed various approaches to the disclosure of the concept of "digital transformation", presented the author's vision. The process of digital transformation is divided into three stages, depending on the dominant digital technology. The authors proved that each stage of digital transformation is associated with a certain set of social risks. It is proved that at the stage of spreading the Internet, there are risks of developing information, knowledge inequality and inequality in opportunities. The stage of intensive digital consumption provokes the risk of degradation of human relations, along with an increase in human vulnerability in front of digital environment. The stage of development of automation and robotization leads to the emergence of socio-economic risks due to the deepening of negative aspects of the psycho-emotional picture of human existence.

Keywords: Digital Transformation, Social Risks, Inequality, Automation, Internet

Introduction

The process of digital transformation has become an objective reality. For more than half a century social and economic conditions of human life have been changing under the influence of information and digital technologies. There are 3.9 billion people in the world who use the Internet, which is 51.2% of the world's population (ITU, 2018). People have the opportunity to participate in economic, political, social and technological processes thanks to new technologies.

However, many of the economic and technological benefits of digital transformation are accompanied by the emergence of new risks that threaten the well-being of modern society. Thus, digital inequality, which demonstrates differences between countries and within them in access to basic telecommunications infrastructure, cannot but affect the emergence of social risks associated with inequality in the realization of human opportunities. The result of the development of the Internet and Internet platforms is, on the one hand, the formation of production networks and the creation of conditions for the rapid satisfaction of consumer demand. On the other hand, there is likely to be a new social risk associated with the growing vulnerability of society under the influence

of the network. Thus, it is currently relevant to study social risks that have a negative impact on human well-being.

Methodology

Research hypothesis: Each stage of digital transformation is associated with a certain set of challenges and risks for modern society. The Internet distribution stage is associated with the risk of developing information, knowledge and opportunity inequality. At the stage of intensive digital consumption, there is a risk of degradation of human relations and increasing human vulnerability in front of digital environment. The processes of technological improvement of the quality of decision-making and automation of routine operations are accompanied by the emergence of economic risks and the deepening of negative aspects of the psycho-emotional picture of human existence.

In this research, we use the term "digital transformation". To identify it, we analyzed the work of Fitzgerald et al. (2013), McDonald and Rowsell-Jones (2012), which determined that digital transformation goes beyond simply digitizing resources and leads to the creation of value and revenue from digital assets. Collin et al. (2015), Gimpel and Roglinger (2015), Kane et al. (2015) Kane et al. (2015) emphasize that digitization usually reflects the simple conversion of analog information to digital, whereas the term "digital transformation" is a broader concept that affects politics, business, and social issues. In Stolterman and Fors (2004), digital transformation is concerned with the changes that digital technology causes and how it affects all aspects of human life.

Thus, in the current study, we will understand digital transformation as a process of changing social and economic conditions of human life, caused by the emergence of new opportunities and risks as a result of the development of digital technologies.

The basis for the research hypothesis was the discussion article "Social and economic impact of digital transformation on the economy" by Katz, in which the author divides the entire process of digital transformation into three waves, depending on the nature of the technologies being implemented (Katz, 2017). Similar stages in the process of digital transformation are found in the research of other scientists. Thus, Sologubova (2017) justifies that the process of digital transformation is implemented in stages: the first stage is associated with the birth of the digital economy, as well as legal regulation that promotes the development of "digital"; the second stage-the transition to the digital economy - is implemented through the formation of skills necessary for the introduction and use of digital technologies; the third stage forms effective institutions for digital development.

Alekseenko and Ilin (2018), Kulikova (2018), and Shmelev (2018) also emphasize the expediency of highlighting three stages of digital transformation: the first stage is associated with the automation of existing business processes and technologies, the second-with the global spread of the Internet and mobile communications to all spheres of public life, the third-modern-with the spread of digital currencies and distributed ledger technologies in the world economy.

There are several alternative views on the economic impact of digital transformation. Some researchers emphasize the positive impact of digital technologies on the economy: for example, Clarke (2008) cited evidence that firms in the manufacturing sector that have broadband Internet access produce 6% more foreign sales than others (Katz, 2017). The positive effect of broadband on job creation in the manufacturing sector was identified by Crandall et al. (2007). На рост выручки в результате расширенного охвата рынка указали Varian et al. (2002), Gillett et al. (2006), и Jonscher and Tyler (1982), Atkinson et al. (2009) pointed to revenue growth as a result of expanded market coverage and linked the economic benefits of digitalization to reducing trade distortions and stimulating demand for local ICT infrastructure services.

Other scientists noted the negative impact of digital transformation on the economic sphere: reduced employment as a result of the replacement of capital and labor in certain industries (Thompson and Garbacz, 2011); loss of revenue from Internet disruption due to natural disasters, cybercrime,

technological failures, or a politically motivated outage (West, 2016); reduction of jobs as a result of automation (Frey and Osborne, 2013); slowdown in economic growth in many countries, including mature economies (Ark et al., 2016; Summers, 2015), the decline in factor productivity (Gilbert et al., 2016).

However, the process of digital transformation is accompanied by the emergence of a whole range of social risks, some of which are reflected in research Katz (2012), De Los Rios (2010), Popper (1992), Molchan et al. (2019), Salikov et al. (2019).

It is the social risks of digital transformation that are of particular research interest and will be discussed in this article.

To conduct the research, we used observation, comparison, analysis and synthesis methods, logical, dialectical, graphical, and system methods.

The research is based on reports and forecasts from the OECD, ITU Statistics, Fincert of the Bank of Russia (2019), the Federal State Statistics Service of the Russian Federation (2019), McKinsey Global Institute (2017), the International Bank for Reconstruction and Development, and the World Bank (2016).

Results

Let's analyze the stages of digital transformation and the corresponding key social challenges and risks to support our hypothesis (Fig. 1).

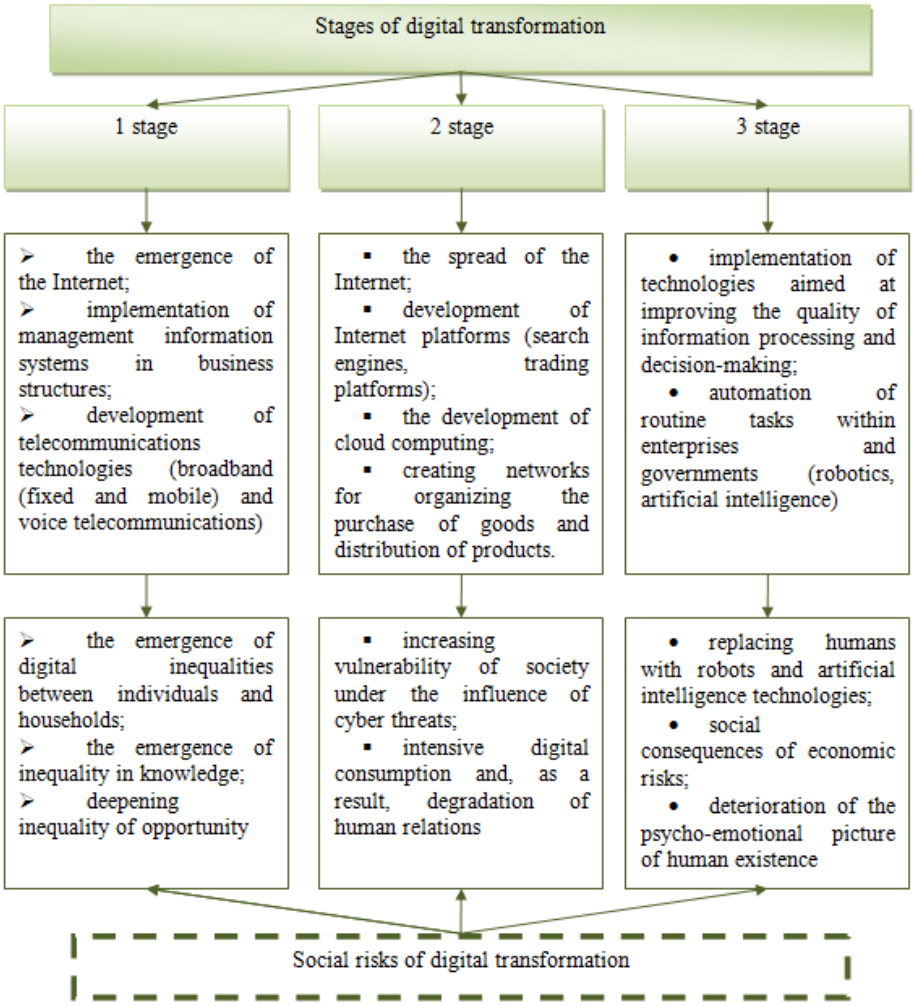

Fig. 1: Relationship between the stages of digital transformation and social challenges and risks (created by authors)

According to the logic of Katz (2017), Sologubova (2017), Alekseenko and Ilyin (2018), Kulikova (2018), and Shmelev (2018), the digital transformation process can be divided into three stages.

The first stage of digital transformation is associated with the emergence of the Internet and the introduction of mature technologies, including management information systems aimed at automating data processing and used for monitoring and reporting business results, as well as telecommunications technologies that allow remote access to information (broadband (fixed and mobile) and voice telecommunications) (Katz, 2017). At this stage, scalability restrictions were relaxed, and conditions for further business expansion, meeting additional final demand and increasing the need for labor, and faster growth rates in traditional sectors of the economy were created (Atkinson et al., 2009; Varian et al., 2002; Gillett et al., 2006; Jonscher and Tyler, 1982). The implemented technologies had a prolonged result. They were developed and started to be implemented starting from 1960, and only by 2015 the maximum penetration of mobile telephony and the use of personal computers in households was achieved, and in 2016 the maximum implementation of fixed broadband in the world was achieved. However, some developing countries and regions of the world (for example, the African region) are still at this stage of digital transformation (TAdvisor , 2019).

This stage of digital transformation is associated with the emergence of so-called "digital inequalities", that is, gaps between individuals, households, businesses and geographical areas at various socio-economic levels, both in terms of their access to digital technologies, and in terms of their use of the Internet for professional and personal purposes (OECD, 2001).

Digital inequality results from differences in the availability of computers (or alternative access via mobile phones) and the Internet.

The universal telecommunications services indicator "number of access lines per 100 inhabitants" is used to assess digital inequality at the international level. According to the International telecommunication Union (ITU), at the end of 2018, 3.9 billion people, or 51.2% of the world's population, access the Internet. ITU estimates that 53.6 percent of the world's population, or 4.1 billion people, will be using the Internet by the end of 2019 (ITU Statistics, 2018).

Indeed, the degree of Internet penetration in the world has grown rapidly, however, it still remains uneven in the context of macro-geographical regions of the United Nations (Fig. 2).

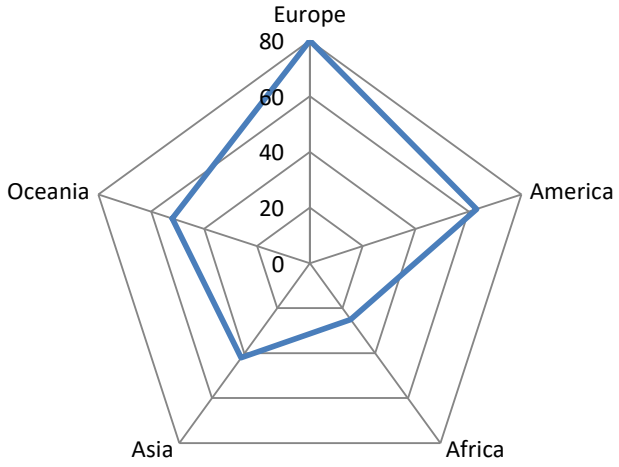

Fig. 2: Internet penetration Rate in macrogeographic regions of the world, in 2018, in % (compiled by the authors according to ITU data (2018))

For example, in Africa, only 2.1% of the region's population used this service in 2005, while in 2018, 24.4% of the population had access to the Internet. However, compared to developed regions, African countries lag far behind in terms of Internet access. For example, in 2018 in Europe, 79.6% of the population had access to the Internet (TAdvisor, 2019). In general, in the developed world, the share of people using the Internet has increased to 80.9% (in 2005, it was 51.3%), and in the developing world, this share is 45.3% (it was 7.7%). Note that the majority of the world's inhabitants have technological access to the Internet: 96% of people live in the mobile cellular area, and 83% of families in developed countries and 36% in developing countries have computers.

Significant digital disparities in access to personal computers and the Internet exist within countries and regions. Thus, according to the Federal state statistics service of the Russian Federation, the digital inequality between the regions of the Russian Federation in terms of the use of personal computers by households in 2014 was 1.96 and increased to 2.02 times by 2018. Digital inequality in terms of household Internet access increased from 1.3 times in 2014 to 1.6 times in 2018. The gap between the regions of the Russian Federation in terms of broadband access to the Internet for households is 1.9 times in 2018 (3.3 times in 2014) (Gks, 2019).

Income, level of education, size and type of household, age, gender, racial and linguistic origin, and location (for example, Internet access is more accessible in cities than in rural areas) are factors that determine the availability of computers and Internet access (Novak and Hoffman, 2000; Wilhelm, and Thierer, 2000). The population with a higher income level has greater access to a personal computer and the Internet, despite the fact that there is also a positive trend in access growth in lower-income groups. We can see this pattern on the example of differentiation of Russian regions. Regions of the Russian Federation, which traditionally have high incomes and a high level of socio-economic development, have the highest rates of Internet access: in the Yamalo-Nenets Autonomous district, 96.3% of the population have access to the Internet, in the Khanty-Mansi Autonomous district-Yugra-88.9%, in the Republic of Tuva-87.4%, in Saint Petersburg-84.7% (Gks, 2019). In addition, people with higher levels of education have more motivation and opportunities to access and use ICT at home and in the workplace (OECD, 2001). Thus, a significant social risk of this stage of digital transformation is digital inequality in access to a personal computer and the Internet.

The existing digital inequality can lead to the emergence of social risks of the next level-inequality in knowledge and opportunities (Stiakakis et al., 2010). Howard et al. (2001), Rogers (1995), Hargittai (2002) in their research emphasize that people who have access to the Internet and have computer skills find information easier and faster, as well as have a greater willingness to use the network to expand knowledge, obtain education and develop their own potential.

At the same time, Sologubova (2017) notes that in this case, there is an inequality in the amount of knowledge mastered, as well as a gap in their interpretation, which determines the level of human capital development. For example, users from the leading countries in terms of digitalization (the United States, Canada, and European countries) have a higher number of materials indexed by the google search engine, and a higher share of publications among all scientific journals published in the world (IBRD and World bank, 2016). In addition, researchers note an increase in the average income of households with broadband access (De Los Rios, 2010), as well as a strengthening of social division (Katz and Callorda, 2014).

The second stage of digital transformation is associated with the intensive development of the Internet and its corresponding platforms (search engines, marketplaces), as well as the spread of cloud computing. These technologies began to be implemented in the 90 years of the XX century, but tangible results were achieved only by 2015. For example, the launch of the social network Facebook occurred in 2005, and only by 2015, the regular access of the OECD population to the network reached 48.05% (Katz, 2017).

The intensive development of technologies of the second stage of digital transformation causes new social risks in the form of increasing human vulnerability in front of digital environment. In particular, at the individual level, information about personal data is increasingly leaked from state and municipal information systems. According to InfoWatch analysts, in 2019, the number of registered leaks from commercial companies and government organizations increased by about 10% compared to 2018. The total number of compromised user data records (personal data and payment information) exceeded 14 billion, which is almost double the figure of the previous year. In Russia, the number of leaks has increased by more than 40% over the year, and the number of compromised records has increased by about six times to about 170 million. The share of intentional violations has increased significantly in the world – about 2/3 of all leaks were committed intentionally (about 40 of internal leaks%) (InfoWatch, 2019).

Bank card holders become the target of cyber espionage, which brings them both direct financial losses and a whole range of negative emotional experiences. New technologies, information systems used by enterprises, high-tech user behavior, as well as electronic public administration systems create prerequisites for increasing the degree of human vulnerability and their economic activity (Karpunina et al., 2019b). For example, a serious risk for a person is cybercrime using virtual wallets, virtual exchanges, selling business packages, sites that are duplicates with fraudulent details, SMS fraud, attacks on systems that are massively used in daily life (the Internet of things). Thus, according to Fincert Bank of Russia in 2018, the volume of all unauthorized transactions made using payment cards issued on the territory of the Russian Federation amounted to 1384.7 million rubles, which is

44% higher than in the same period of 2017 (961.3 million rubles). The number of such operations for 2018 was 416,933 units, which is an increase of 31.4% over the same indicator for 2017 (317,178) (FinCERT Banka Rossii, 2019). Note that the average amount of one unauthorized transaction in 2018 increased by 9.6% and amounted to 3.32 thousand rubles against 3.03 thousand rubles in 2017.

In addition, a specific social risk is Internet addiction (its officially recognized symptoms are abstinence, compulsiveness, denial, tolerance), which is associated with "electronic network non-freedom". It contributes to reducing working hours and reducing labor productivity, loss of professional characteristics, and waste of time (Karpunina et al., 2019a). Research shows that 25% of Internet addicts form Internet addiction within 6 months after starting using the Internet, 58%-within the next 6 months, and 17% — after a year (Chou et al., 2005). According to Katz (2012), this form of social risk and intensive digital consumption lead to the degradation of human relationships. The author points out that users become unable to develop personal qualities, communication, self-identification and expand the field of knowledge due to excessive use of the network. As a result, they miss opportunities for future professional growth.

Scientists attribute the beginning of the third stage of digital transformation to 2010. They associate it with the introduction of technologies aimed at improving the quality of information processing and decision-making, as well as further automation of routine tasks and widespread robotization (Katz, 2017). Changes in the nature of the labor process due to automation and robotization, as well as shifts in the labor organization system, the emergence of new forms of employment create prerequisites for the emergence of new types of social risks.

On the one hand, currently about a quarter of the world's production is subject to robotics, it is expected that by 2021 the total number of installed industrial robots will double to about 630 thousand (for comparison, in 2009, only 60 thousand devices were produced, i.e. 10 times less) (World Robotics, 2016). This growth, according to experts, will be accompanied by a further reduction in the cost of automated devices, as well as an increase in the use of "inexpensive" robots (over the past 5 years, their cost has decreased by 17%).

On the other hand, one of the new social risks may be the growing trend of increasing robotization in developed and developing countries, which will lead to the forced release of significant labor resources. In this sense, robotics and automation carry the risk of a global restructuring of the labor landscape and the displacement of man by the machine (Salikov et al., 2019). So, McKinsey analysts studied more than 2,000 tasks performed by people from 800 different professions, and they concluded that almost half of the work can be automated using current technologies (while employers spent 15 trillion us dollars on it). However, only about 5% of these professions can be fully automated using existing technologies, and another 60% of professions can be automated by at least a third. According to analysts, the processes that use monotonous physical labor, as well as data collection and processing, will suffer the most. McKinsey experts estimate that 81% of the time that employees spend on physical labor can be transferred to robots; and automation of data processing and data collection will give employees 69% and 64% of free time, respectively (McKinsey Global Institute, 2017).

This type of social risk can be associated with increased unemployment, a decrease in the overall income, reducing aggregate demand and slowing productivity growth and a decline in overall welfare of the society. These adverse economic consequences can be accompanied by an increase in emotional experiences, fear of future job loss, loss of social status and personal degradation (Molchan et al., 2019).

In addition, the use of new technologies significantly changes the nature of work, creates prerequisites for increasing temporary or part-time employment in the labor structure, as well as the development of the so-called "precariat", that is, the practice of truncating rights and social security packages. This can also be considered as a risk situation in term of social well-being.

There are problems of emotional, psychological and behavioral nature against the background of increasing disunity in society as a result of virtualization, they threaten the well-being of society,

Popper (1992) describes the emerging situation through the concept of "open society", in which people almost never meet face to face, are completely isolated and communicate with each other through letters and electronic communication. People do not have enough live communication, attention, understanding and empathy, as a result of which new psychoemotional disorders such as nomophobia (fear of being left without a smartphone) or phantom phobia syndrome (when it seems that the phone rings or a message has arrived), as well as fears of loneliness and meaninglessness of existence are increasingly appearing. In addition, the process of meeting human needs for goods and services is changing: thanks to advanced digital technologies, it becomes extremely simple and fast. In turn, the acceleration of the process of emergence of new needs leads to a reduction in the time of satisfaction with the process of consumption, the syndrome of" frustration" begins to develop in people. It triggers transformations in the mechanism of demand formation and increases the risks of psycho-emotional experiences and depression.

Conclusions/Recommendations

The authors proved that social risks differ depending on the stage of digital transformation. The authors concluded that there are three stages of digital transformation: the first is associated with the emergence of the Internet, the introduction of management information systems in business structures, and the development of telecommunications technologies. At this stage, the following types of social risks can usually be identified: risks associated with the emergence of digital inequalities between individuals and households, inequality in knowledge and inequality in the realization of individual opportunities. The second stage of digital transformation is determined by the spread of the Internet, the development of Internet platforms and cloud computing. In turn, intensive digital consumption causes an increase in the vulnerability of society under the influence of cyber threats to the information environment and leads to the main social risk - the degradation of human relations. The third stage of digital transformation is characterized by the introduction of technologies aimed at improving the quality of information processing and decision-making, as well as further automation of routine tasks and widespread robotics. There is a change in the labor landscape due to automation and robotization, as well as shifts in the labor organization system. This leads to the emergence of new types of social risks – the risk of human displacement by robots and artificial intelligence technologies, the risk of future job loss, loss of social status and personal degradation, as well as the risk of deterioration of the psycho-emotional picture of human existence.

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Digitalization and Employment Problems of Modern Youth

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Abstract

The purpose of the research is to identify problems of youth employment and employment, as well as to study the advantages and risks of the digital environment for youth employment. The authors analyze the dynamics of youth employment in the global space and systematize the problems of their employment (the dilemma between employment and education; low motivation for development and employment due to high status and income ambitions; employers' distrust of hiring young professionals, the choice in favor of employees with work experience; gaps in social policy to support young unemployed). The authors reveal changes in the labor market that occur as a result of digitalization (the formation of new forms of labor, cooperation and exchange; growth in the quality of labor resources and changes in employee requirements; structural shifts in professions and competencies; automation and robotization of work and displacement of people). The authors propose a "B-R" matrix that reflects the benefits and risks of digitalization for youth employment. It is concluded that digitalization can overcome many existing problems of youth employment, expands opportunities for realizing the ability of young people to adapt to more flexible forms of work and training, but without motivation for development and employment of modern youth, all options for adaptation to the changing labor market become impossible.

Keywords: digitalization, youth, employment, unemployment, labor market

Introduction

Young people are an independent socio-demographic group with specific age characteristics and qualities that distinguish them in the social structure of society. Common characteristics of young people include their low social status and a high level of uncertainty about their professional future and their desired level of well-being. Indeed, young people face problems of age discrimination, underestimation of professional qualities and distrust from employers when they enter the labor market. Thus, the level of youth unemployment according to the International Organization for Economic Cooperation and Development in 2019 amounted to 11.17 % of the working population, in addition, international organizations note an increase in the share of economically inactive youth

(located outside the labor market-NEET (Not in Empoyment, Education or Training)) (OECD, 2020b, 2020c).

At the same time, young people have a high level of adaptability to changing conditions, as well as mobility and development potential, which can give stability to the economic system during its transformations. The current stage of transformation is associated with intensive digitalization, which causes critical changes in the labor market and requirements for professional qualities of employees. What are the challenges of digitalization for young people? How much does the digital environment contribute to solving youth employment problems? What are the risks of digitalization for young workers? The study of these issues is currently particularly relevant.

Methodology

Research hypothesis .Existing problems of youth employment are finding new solutions in term of digitalization. Young people as carriers of professional skills and competencies, on the one hand, will contribute to increasing social mobility, smoothing social inequality, as well as facilitating the adaptation of the labor market to new digital conditions. On the other hand, digitalization brings new challenges for young people (the need for continuous self-education, the growth of digital skills, the presence of internal motivation for development, self-organization), which can become factors that constrain the process of youth entering the labor market.

The theoretical basis of the research is formed by the works of:

- Elhorst (2003), Nataraj et al. (2012), Zubok and Chuprov (2012), Hohlova and Hohlov (2017), Korchagina (2019), describing the situation of youth in the labor market and the problems of youth unemployment;

- Frey and Osborne (2013), Sizova and Husyainov (2017), Snell and Bohlander (2012), Sorokina (2012), Bonin et al. (2015), Dengler and Matthes (2015), reflecting changes in the labor market in terms of digitalization;

- Zudina (2019), Gbadamosia et al. (2015), Lewis and Heyes (2017), reflecting the author's vision of the challenges of digitalization for young people.

Digitalization as an objective process of modern reality is based on the transformation of information into digital form, it leads to a radical change in production processes, the structure of life and social relations. In terms of digitalization, companies “compete through people”, their success is increasingly dependent on human capital and on the effectiveness of talent management (Snell and Bohlander, 2012).

Frey and Osborne (2013) note that in the process of digitalization, a high-tech (information and network) environment is formed, many types of work are carried out using a personal computer, mobile devices and applications, which themselves become the subject and/or means of work.

The development of digital platforms will reorganize the labor market and transform employment mechanisms (Kenney and Zysman, 2016).

The Federal Ministry of labor and Social Affairs of Germany (2017) presented a new model of labor and employment “Work 4.0”, which is being intensively developed in countries with advanced economies at the moment.

Sizova and Husyainov (2017) prove that the main features of "Work 4.0" are new requirements for employee training that apply to all professional groups without exception. In terms of technological change, there is a demand for a workforce with high skill requirements, the so-called “skill-based technological change” (Spitz, 2004).

In addition, there is a blurring of the classical labor organization and the usual employment patterns, while jobs that are not tied to one place and time are created (BMAS, 2013). Strebkov and Shevchuk (2009), Sorokina (2012) explore the specifics of new forms of remote work, outsourcing, and self-employment on the Internet.

In this study, we will refer to youth as a socio-demographic group that is distinguished based on a combination of age characteristics (from 16 to 25 years), features of social status and certain socio-psychological qualities: 1) transitivity of the situation (the development of new social roles (employee, student, citizen, family man)) and a high level of mobility and adaptability (young people are subject to internal changes that are characterized by emotional awareness and flexibility, self-control and regulation, stability and the ability of the individual to maintain concentration, as well as perseverance in the process of overcoming obstacles (Di Fabio and Kenny, 2015); 2) low personal wealth and low social status (Korchagina, 2019); 3) active search for their place in life and prospects in professional and career terms (young people began to consider job search and career formation in terms of global labor mobility, competition among graduates for specific jobs (Michael, 2014)).

The logic and concept of the research is presented in the figure 1.

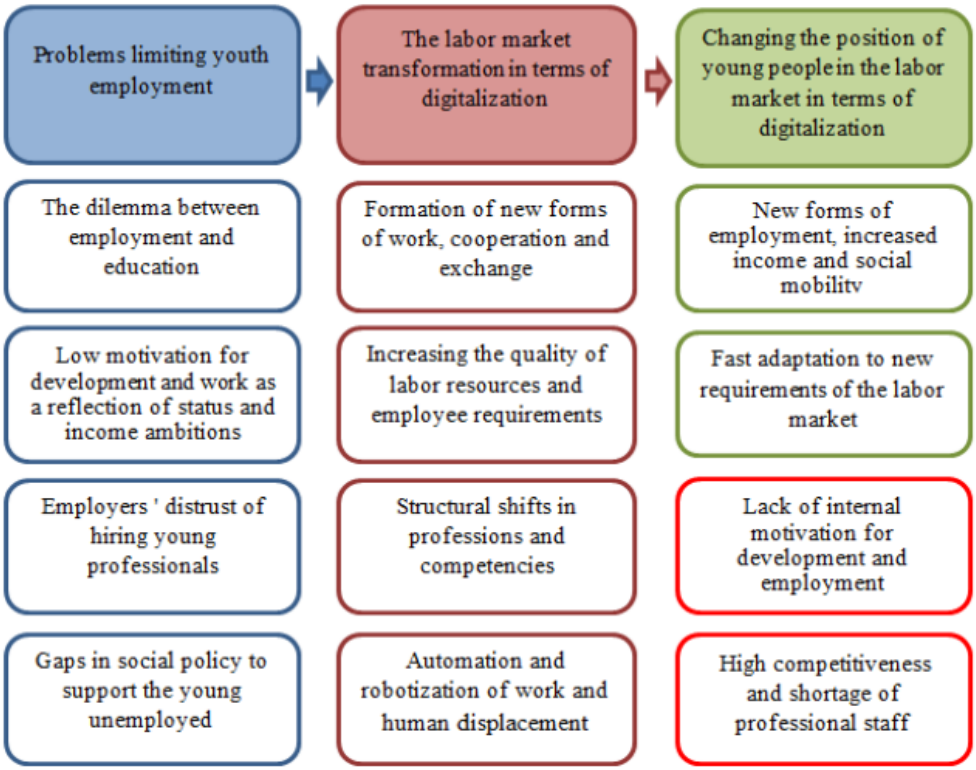

Fig. 1: Concept of research on the impact of digitalization on youth employment (compiled by the authors)

Research methods: methods of logical and theoretical research (analysis, synthesis, comparison, generalization), methods of systematization, system method, graphic method.

Information base of the research: materials of international reports of OECD (2020), McKinsey Global Institute (2017), Euromonitor International (2012), European Commission et al. (2014), Deloitte (2015), IMD (2019), as well as materials of international conferences and monographs.

Results

Problems Limiting Youth Employment

According to the International Organization for Economic Cooperation (OECD), the world youth unemployment rate in 2019 was 11.17 % of the working population (youth unemployment is the number of unemployed people aged 15-24 years, expressed as a percentage of the total labor force) (OECD, 2020c)).

The value of the index varies depending on the general level of socio-economic development of the country, implemented social policy, income levels, political instability, unemployment of the working population, as well as a number of other factors. The top 5 countries with the best indicators of youth unemployment in 2019 include Japan, the Czech Republic, Germany, Israel, and the Netherlands. The countries with the worst indicators are South Africa, Greece, Spain, Italy, and Turkey (figure 2).

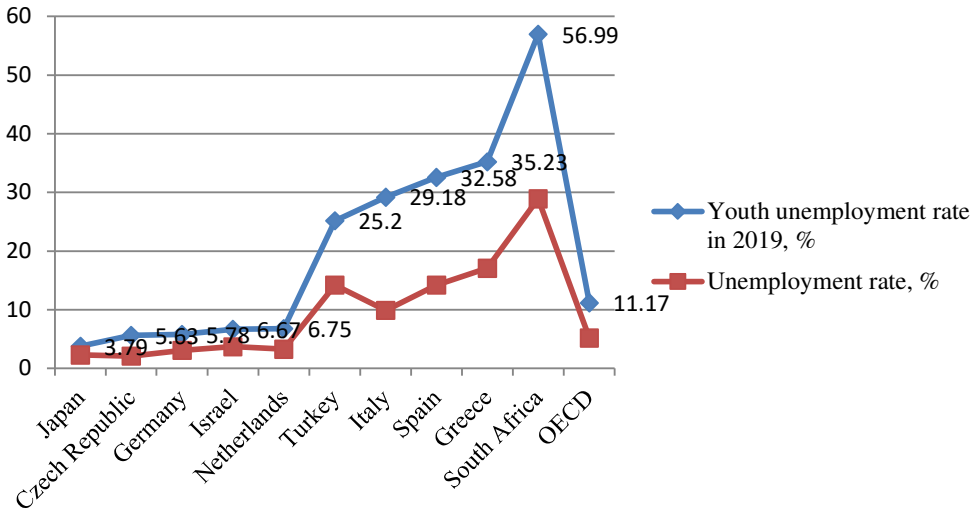

Fig. 2: Youth unemployment rate in 2019, % (% of the total labor force aged 15-24) (compiled by the authors according to the OECD, 2020a)

This anomalous gap between South Africa and all other countries can probably be explained by the largest share of the world's young population - more than 70% of the region's population is under the age of 30. In terms of median age (average age distribution), Niger had the youngest population in 2011 at 15.4 years, followed by Uganda (15.7 years) and Mali (16.2 years) (Euromonitor International, 2012).

Of course, youth unemployment is a multi-factor process, which is caused by internal contradictions of young people, imperfections of the labor market, as well as the implemented state policy. Let's note some problems that limit the employment of young people:

1) The dilemma between employment and education. Young employees often seek higher education and find out their career direction. Young people benefit from remaining in education and training because they continue to invest in their human capital, which can lead to better jobs, higher wages and higher productivity (European Training Foundation, 2015). Conversely, young people who find themselves without education and training at an early age are "vulnerable" because they face disadvantages in the labour market at the initial stage, as well as throughout their working life, because lack of or low qualifications significantly hamper their employment and career development (European Commission et al., 2014). In addition, the needs of the labor market may change during the course of education, which creates the problem of re-profiling or professional retraining.

2) Low motivation for development and employment due to high status and income ambitions.

The main motivating factor for youth employment is the quality of the offered employment, i.e. the ratio of the employment regime, the level of income received and career prospects. On the one hand, young people between the ages of 16 and 24 are usually not highly qualified, so they can apply for jobs that do not require professional skills. These types of jobs can't offer high earnings. For example, in 2017, the daily earnings of employed youth in developing countries were less than 3 US dollars. Of course, this amount of income does not encourage young people to actively join the workforce. On the other hand, initial entry into the labor market a priori can not guarantee a high level of remuneration and, as a rule, it is a necessary step for career advancement in the future. In addition, many young people are attracted to underemployment in the informal economy, which does not require high qualifications, as well as self-employment (Korchagina, 2019). Elder notes that there is a category of young people who consider job search a futile effort. Young people do not believe in the existence of a suitable job for themselves (in the desired professional field, with the desired characteristics of work, as well as in their knowledge and qualifications that meet the requirements of employers (Elder, 2009). In addition, in recent years, there has been an increase in the share of economically inactive youth (youth who are not engaged in employment, education or training and are outside the labor market - NEET (Not in Employment, Education or Training), especially in such countries as Turkey, Italy, South Africa, Argentina, Colombia, Brazil. Young people who do not have a job, education, or training are at risk of becoming socially isolated – people with incomes below the poverty line and lack the skills to improve their economic situation (OECD, 2020b).

3) Employers ' distrust of hiring young professionals, choosing employees with work experience. This is primarily due to the low level of competitiveness of young professionals in the labor market, their lack of professional skills and experience. The employer will incur additional financial investments in the professional training of young professionals, adapting them to the specifics of their activities, as well as certain risks in the future in the case of hiring young professionals without initial work experience. For example, the South Korean Government sends unemployed youth to train in manufacturing companies in order to solve this problem. This helps to eliminate the mismatch of jobs between businesses and job seekers. As a result, applicants get "work experience", as well as opportunities to plan their career path and develop productivity through experience before actual employment (Deloitte, 2015).

4) Gaps in social policy to support the young unemployed. In many European countries, conditions are too favorable for the unemployed, including young people. The ratio of the minimum wage of a young professional to the amount of unemployment benefits often pushes young people to choose the labor exchange. For example, Belgium uses various social policy mechanisms to regulate youth unemployment: the right to receive unemployment benefits or social benefits; an employee's social contribution; requirements for finding or having a job to receive unemployment benefits or social benefits; employment assistance, advice or employment; conditional income tax credit, benefits or “make work pay” schemes. But at the same time, social policy tools include sanctions and reducing the duration of unemployment benefits. The combination of such support and incentive measures is assessed as a good incentive for young people to take measures to find work, in contrast to other European countries (Deloitte, 2015).

The transformation of the labour market in terms of digitalization.

The introduction of digital technologies into production processes and people's daily lives has triggered corresponding transformations of the labor market and social reality.

1) Formation of new forms of work, cooperation and exchange:

- digitalization is transforming the labor market and employment mechanisms (Kenney and Zysman, 2016);

- there is a new model of work and employment "Work 4.0", which is derived from the concept of Industry 4.0 implemented in developed countries of the world (Federal Ministry of Labour and Social Affairs of Germany, 2017);

- work is becoming autonomous and mobile, Gig Economy is developing, and freelance and project work is dominating the labor market (for example, in Germany, about 30 % of employees regularly work outside the office, 12 % of employees and 4% of workers perform work tasks several times a week outside of official working hours) (BMAS, 2015);

- atypical forms of work are developing (remote work, outsourcing and self-employment on the Internet) (Strebkov and Shevchuk, 2009), remote work increases the degree of social mobility of a person, helps to equalize their life chances, reduces social inequality; employee productivity no longer depends on their location (a Gallup study showed that in 2018 alone, the number of remote workers increased from 39% to 44%) (Pravkina, 2012);

- temporary employment, part-time employment, temporary loan work, multi-party employment, and dependent self-employment are becoming more common (Sorokina, 2012);

- digital technologies allow you to divide the workflow into smaller operations within the global digital production, and work tasks become more fragmented (Kergroach , 2017).

2) Increasing the quality of labor resources and changing employee requirements:
- companies are more profitable to "hire by necessity", so competition for talent is growing;
- the professional profile of a modern employee includes professional competencies, system, creative and soft-skills, ability to abstract, fast processing and selection of information, as well as digital literacy;
- identification of future leaders, their retention and adequate development, succession planning and management of the personnel reserve become the most important for organizations.

3) Structural shifts in professions and competencies:

- the professional structure has changed in many countries, the process of creating new jobs has been divided into high-and low-skilled groups, and jobs requiring average skills and performing routine operations are being eliminated first (Goos et al., 2009; Autor and Dorn, 2013).

- new jobs require new skills and competencies: the availability of digital skills and lifelong learning become the basic conditions for a successful employee (Frey and Osborne, 2013); self-organization, management, teamwork, or communication are increasingly important;

- new types of jobs are being created: digitalization and big data are driving demand for employees with analytical skills and cybersecurity specialists (according to CEB forecasts, by 2030 the market will need 298,600 specialists in machine learning and predictive Analytics, and 351,500 engineers in the field of cybersecurity), as well as specialists in the field of artificial intelligence (by 2030, the supply will be 108,600 people) (Astera, 2017).

4) Automation and robotization of work and human displacement:

- the relationship between technology and labor is twofold: on the one hand, technological changes increase labor productivity, promote economic growth and create new jobs both at individual enterprises and at the macroeconomic level (Keynes, 1930), on the other hand, in many industries and professions, new technologies have already replaced human labor, which has led to the release of workers in different sectors of the economy and regions (Kergroach, 2017);

- the development of machine learning, robotics and artificial intelligence will inevitably contribute to the automation of production and change the structure of labor demand (Brynjolfsson and McAffee, 2011);

- robotics and automation carry the risk of a global reshaping of the labor landscape: McKinsey analysts concluded that almost half of the work that employers spent 15 trillion dollars on can be automated using current technologies, while only about 5% of these professions can be fully automated using existing technologies, and another 60% of professions can be automated by at least a third (Salikov et al., 2019);

- McKinsey experts estimate that 81% of the time that employees spend on physical labor can be transferred to robots; and automation of data processing will give employees 69% of their free time, data collection-64% of the time (McKinsey Global Institute, 2017).

Changing the Position of Young People in The Labor Market in Terms of Digitalization

Dynamics of the indicator "youth unemployment rate total, % of youth labour force" shows that in a time of increased digitalization 2015-2019 most of the studied countries, Japan, Czech Republic, Germany, Israel, Netherlands, Greece, Spain, Italy - have significantly improved their performance in 1,1-2,2 times, and only in Turkey and South Africa in 2019 relative to 2015 was increased by 1.4 and 1.1 times respectively. In general, there is a decrease in the unemployment rate among young people in OECD countries, which can probably be a consequence of the ongoing digitalization (Figure 3).

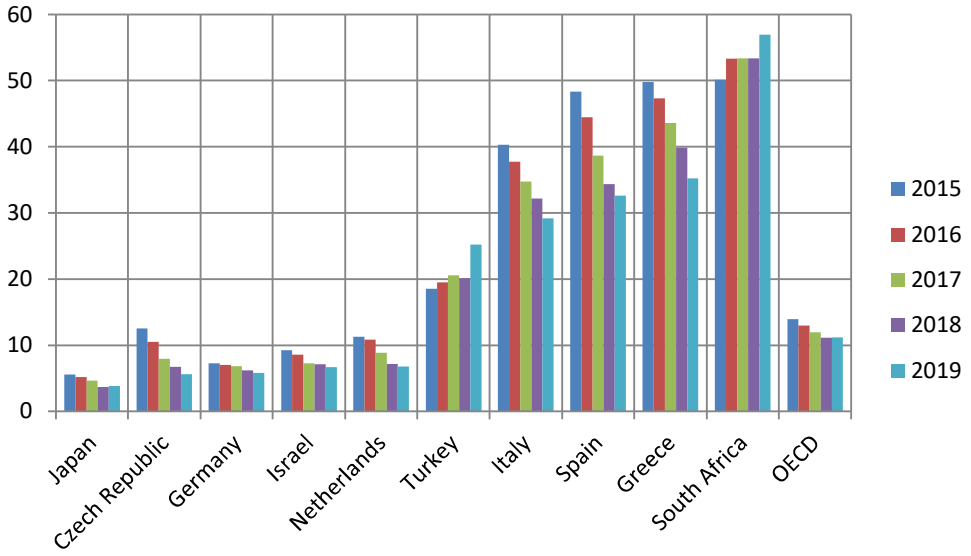

Fig. 3: Dynamics of the youth unemployment rate total, % of youth labor force, 2015-2019 (compiled by the authors according to OECD, 2020c)

It can be assumed that significant achievements in the field of digital development in most of the countries studied allowed them to create conditions for improving the situation with youth unemployment. For example, according to IMD data (2019) Germany has strengthened its leadership in scientific concentration, training and education, and the introduction of digital technologies by its citizens (adaptive settings). Israel is a key regional player in the field of digital competitiveness, the country topped the ranking in areas such as talent development (a sub-factor of training and education) and R&D intensity (scientific concentration). The Netherlands has demonstrated high levels of readiness for the future (in terms of it integration, business flexibility and adaptive installations) (IMD, 2019)

Let's reflect the impact of digitalization on youth employment in the form of a matrix of "B-R" (benefits and risks) (table 1).

Table 1: Matrix "B-R": benefits and risks of digitalization for youth employment (compiled by the authors)

Manifestations of digitalization / Problems of youth employment	Formation of new forms of work, cooperation and exchange	Increasing the quality of labor resources and changing employee requirements	Structural shifts in professions and competencies	Automation and robotization of work and human displacement
The dilemma between employment and education	**B:** ability to combine work and study; possibility of employment with incomplete education	**B:** opportunity for continuous learning, self-improvement and development of professional skills during working life	**B:** youth flexibility and rapid adaptation to changes in the labor market	**B:** availability of digital skills, as well as opportunities to develop soft-skills and analytical skills that allow to enter the segments of the labor market that are not subject to automation
	R: low incentive to get an education in case of employment without a diploma	**R:** inability to find employment due to high competitiveness and shortage of professional staff	**R:** non-compliance of the chosen education profile with the needs of the labor market	**R:** lagging in the speed of response to changes in the labor market, displacement from the labor market
Low motivation for development and employment due to high status and income ambitions.	**B:** choosing a new form of employment that meets the requirements of young people (freelance, self-employment, outsourcing, etc.)	**B:** low probability of finding your own niche in the set parameters "scope of work-amount of income" with the existing level of professional competence	**B:** it is unlikely that the profile and professional competence of young people will meet the new requirements of the labor market	**B:** low probability of staying in the labor market with the existing level of professional competence
	R: lack of internal motivation for development makes new forms of work ineffective	**R:** it is impossible to improve the quality of the labor resource without internal motivation for self development and improvement of professional competencies	**R:** it is impossible to respond adequately to structural changes in the labor market without internal motivation for self development and improvement of professional competencies	**R:** it is impossible to resist displacement from the labor market due to automation without internal motivation for self-development, improvement of professional competencies and digital skills
Employers' distrust of hiring young	**B:** new forms of employment (on-demand work,	**B:** the chance of employment in conditions of equal	**B:** rapid response to structural changes will	**B:** the acquisition of soft- skills that meet the

professionals, choosing employees with work experience	self-employment, outsourcing, etc.) allow you to smooth out the problem of distrust of employers and find a job	competition with experienced employees increases if professional skills are continuously improved	allow to acquire the necessary professional profile and increase your chances of employment	requirements of the labor market will allow to become in-demand specialists and save your workplace during automation
	R: high competition for talent reduces the chances of young professionals finding employment	**R:** it is impossible to develop professional skills of a young specialist in the case of low internal motivation, employment opportunities are minimized	**R:** slow response and poor adaptation to new conditions will not allow a young specialist to find a job in the desired profile	**R:** the advantages of automation and robotics, as well as cost reduction, do not allow the employer to make a choice in favor of young professionals
Gaps in social policy to support the young unemployed	**B:** guaranteed support from the state during the testing of a new form of employment	**B:** guaranteed support from the state during the period of training and professional retraining	**B:** guaranteed support from the state during the period of professional retraining	**B:** guaranteed support from the state in case of labor release due to automation and robotization
	R: excessive incentives for unemployment benefits reduce the motivation for employment in new forms	**R:** excessive incentives for unemployment benefits reduce motivation for training and retraining	**R:** excessive incentives for unemployment benefits reduce the motivation for professional retraining	**R:** excessive incentives for unemployment benefits reduce the motivation for self-improvement, development of soft and digital skills

These tables allow you to draw the following conclusions:

- digitalization helps to overcome many existing problems of youth employment, expands opportunities for realizing the ability of young people to adapt to more flexible forms of work and training, and promotes broader self-government in the field of employment and social integration;

- professional work and its results become exclusively a zone of personal motivation and responsibility for each young person under the influence of digitalization, without motivation for development and employment, all options for adaptation to the changing labor market become impossible;

- self-efficacy is associated with status and income ambitions, the level of education of young people and their confidence that they can achieve more through effort are the strongest predictors of new forms of employment available in the conditions of digitalization;

- young people who have information and digital communication resources for new forms of work (remote) have a “value”, since remote work increases the degree of social mobility of a person, helps to equalize their life chances, and reduces social inequality (Sheler, 1994).

Conclusions

The authors obtained the following conclusions. First, we analyzed the dynamics of youth employment in the world and systematized the problems that restrict their employment: the dilemma between employment and education; low motivation for development and employment due to high status and income ambitions; employers ' distrust of hiring young professionals, the choice in favor of employees with work experience; gaps in social policy to support young unemployed. Second, we have revealed the changes in the labor market that occur as a result of digitalization: the formation of new forms of labor, cooperation and exchange; the growth of the quality of labor resources and changing requirements for employees; structural shifts in professions and competencies; automation and robotization of work and the displacement of people. Third, we analyzed the impact of digitalization on youth employment, and proposed a "B-R" matrix that reflects the benefits and risks of digitalization for youth employment.

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Tools for Developing the Company's Labor Potential in Terms of Digitalization

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Abstract

The purpose of the study is to determine the objective risks of digitalization for each of the components of the company's labor potential (psycho-physiological, qualification, and socio-personal), as well as to develop tools for developing labor potential based on risk management. The authors showed how digitalization transforms the labor landscape and reduces the effectiveness of traditional tools for developing the company's labor potential. The researchers systematized the risks of digitalization, which are most likely to hinder the development of psycho-physiological, qualification and socio-personal components of the company's labor potential. The authors proposed a model of development of labor potential of the company in terms of digitalization, based on system approach (input of the model - risks of digitalization for psycho-physiological, skill and social and personal potential; management impact/operation - a set of the most effective tools to reduce risks; output of the model - the efficiency of development of labor potential of the company).

Keywords: Labor Potential, Company, Digitalization, Non-Standard Employment, Economy Of Joint Consumption, Automation

Introduction

One of the most responsible and significant aspects of a modern company is its work with personnel, which includes the management of labor potential. This is due to the increasing role of human capital in production activities as the main resource of the digital economy.

The developed labor potential becomes a source of increasing production efficiency and product quality in the conditions of digitalization (Chowdhury and Mukherjee, 2015). Solving the issues of continuous development of human capital, increasing the professionalism of employees, creating motivational mechanisms largely determine the company's competitiveness and the possibility of its sustainable development in the long term. However, the introduction of artificial intelligence,

cognitive computing and robotics technologies is radically changing the entire labor landscape and provoking changes in the structure and forms of employment, professions and organization of labor activity (Brynjolfsson and McAfee, 2011).

Modern companies in the process of developing their own labor potential face the challenges of designing new jobs, finding the optimal combination of automation and the use of human skills, as well as numerous risks that threaten the loss of competitiveness and traditional social values.

Methodology

Labor potential has the character of a strategic resource for the company's development and growth of its competitiveness. Digitalization is a factor that transforms the labor landscape and reduces the effectiveness of traditional tools for developing the company's labor potential. Improving the efficiency of the company's labor potential development is possible by using a system approach to managing digitalization risks, which become the starting points for choosing new tools for developing the company's labor potential.

Issues of managing the company's labor potential are reflected in the works of Sudakova (2014), Odegov et al. (1991), Torrington et al. (2008), Joshi (2013), Chowdhury and Mukherjee (2015).

The specifics of the transformation of the labor market and labor relations under the influence of digitalization are shown in the research by Brynjolfsson and McAfee (2011), Schwartz et al. (2013, 2016, 2017), Gimpelson and Kapelyuchnokov (2006), Kassi and Lehdonvirta (2018), Blochina and Blochin (2016), Titov (2008), Schatsky and Schwartz (2015), Stevens (2016), Knowles-Cutler and Lewis (2016), Huber (2017), Bostman and Rogers (2010), Heinrichs (2013), Allen and Berg (2014), Kathan et al. (2016), Erickson et al. (2012), Lacan and Parguel (2017).

In the present study under the labor potential of the company means a set of potential capabilities of workers in the framework of the activities of a particular company over time, taking into account their qualitative and quantitative characteristics (total size of the labor force, their age structure, educational level, opportunities for optimal use in industry, vocational qualification and territorial aspects) (Odegov et al., 1991).

The state of the company's labor potential is determined by a variety of factors, including location, sphere of activity, culture of development, specifics of relationships in the workforce, and traditions (Sudakova, 2014). The task of the company's management system is to form its labor potential (based on the qualitative, temporal, spatial, and quantitative characteristics of employees) as a strategic resource that determines its competitiveness in the long term (Joshi, 2013).

The authors identify the structural components of the company's labor potential to achieve the goals of this study:1) psycho-physiological potential, that is, the aptitudes and abilities of employees, their state of health, type of nervous system, the quality of their performance and endurance; 2) qualification potential as a reflection of the volume, depth and diversity of general and special knowledge, as well as professional skills that determine the ability of employees to work with a given content and level of complexity; 3) socio-personal potential, including the level of civic awareness and social maturity, the degree of employee recognition of the established labor standards, its value orientations and the needs of self-realization of employees in the labor process. This structuring of labor potential is necessary to improve the efficiency of its development and the effectiveness of the company's management as a whole. It allows us to present the company's labor potential as an integral characteristic of the aggregate ability to work (in its qualitative and quantitative terms), which determines the ability of both individual and collective employees to participate in socially useful activities (Odegov et al., 1991).

In this study, the company's labor potential (LP) is represented as a function of the quantitative (X) and qualitative (P, Q, S) characteristics of labor resources, taking into account the specific organizational, technical and socio-economic reality:

LP = f (X, P, Q, S), where

X - the number of labor resources, the size of the working time fund of one employee, as well as the coefficients of use and intensity of working time; P – qualitative indicators of the company's psycho-physiological potential (loss of working time due to diseases and injuries; frequency and severity of diseases per 100 employees, etc.); Q - quality indicators of the company's qualification potential (average category of workers; product quality; costs for professional development, etc.); S – qualitative indicators of the company's socio-personal potential (relationships between employees; losses from conflicts; job satisfaction; staff constancy coefficient, etc.).

The company's labor potential changes over time due to scientific and technological progress, digitalization, and transformation of working conditions (Torrington et al., 2008). Therefore, the more complex multi-level structure of the company's labor potential, which has its own socio-economic specifics, will also be subject to changes.

Research methods: methods of logical and theoretical studies (analysis, synthesis, comparison, generalization) was used to identify risks of digitalization for of the labor potential of the company, the graphical method was used to demonstrate the dynamics of the index of online employment, systematic method applied in the analysis of the risks of digitalization affecting employment potential, system approach applied to form a model of the development of labor potential of the company in terms of digitalization.

Results

1. Digitalization is changing the future workforce and forcing many companies to rethink how they design jobs, organize work, and plan for future growth (Schwartz et al., 2017). What trends in digitalization most strongly transform the labor market and conditions for the development of the labor potential of companies?

First, the formation of an open talent economy as a trend, as well as the development of non-standard forms of employment (Schwartz et al., 2016).

Non-standard employment is considered as an employment relationship that deviates from the standard model of full, regulated and open employment for a single employer for a long time based on one or more of the following criteria: length of working hours, payment terms, duration of the employment relationship, location of the workplace, social security, and so on (Gimpelson and Kapelyushnikov, 2006). The most common forms of non-standard employment are: temporary contracts, temporary agency work, self-employment, part-time work.

Temporary contracts have grown significantly in many European countries since the late 1970s, with periods of strong growth in individual countries concentrated in different decades until the 2008 recession. In the EU as a whole, the level of temporary employment (the number of temporary workers as a percentage of total employment) was 14.5% in 2006, 14.6% in 2007, and in the post-recession period, its maximum value of 14.2% was recorded in 2016 (Eurofound, 2018).

Since the early 1980s, self-employment, which was in long-term decline, has slowly gone up in some States. Between 2006 and 2016, the number of self-employed workers fell by almost 0.5 million. In total, the decline was 1.8 million people in Greece, Spain, Croatia, Italy, Portugal and Romania, due to a decline in agricultural employment. The largest absolute increases were observed in the UK (750,000) and the Netherlands (320,000). The level of self-employment in the EU-28 in 2017 for those who have employees (employers) is about 4.5%, and for those who do not have (their own employees) - about 10% (Eurofound, 2018).

Temporary agency work appeared in most European countries in the late 1990s and grew quite rapidly (according to the European survey of working conditions (EWCS), temporary agency work is the most unreliable of contract forms), but never accounted for more than 3% of all employment (CIETT, 2015), and it is currently about 1.9%. In 2015, the highest rate was in the UK (3.8%), the

Netherlands (3.0%) and France (2.1%); the lowest rate was 0.1% in Greece (World Employment Confederation, 2017).

New forms of non-standard employment (employee sharing; exchange work; temporary management; casual work; ICT-based mobile work; voucher-based work; portfolio work; mass employment; co-employment) are associated with digitalization (Eurofound, 2015). The economic efficiency of work mediated by digital platforms is becoming obvious, previously potential exchanges of low economic value relative to the transaction cost were not economically feasible (Eurofound, 2018). The Online Labour Index (OLI) is one of the indicators that measure the supply and demand of online employment in different countries and professions, as well as tracking the number of projects and tasks on different platforms in real time (Kässi and Lehdonvirta, 2018).

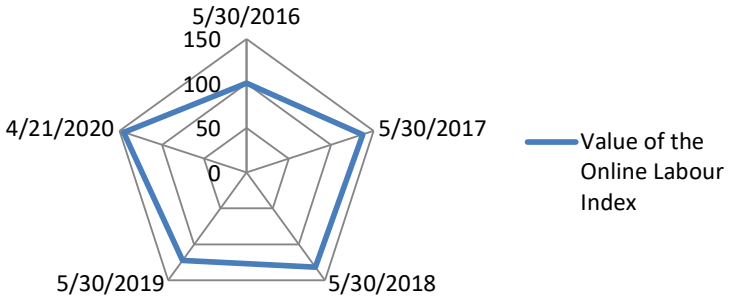

Fig. 1: Dynamics of the Online Labour Index in the world (compiled by the authors according to Ilabour, 2020).

The dynamics of the index shows how the use of the online workforce changes over time in different countries and professions. The index is normalized so that 100 index points on the y axis represent the average daily number of new projects in May 2016. Depending on the value of the Online Labour Index, Asia is the leading region in the world where online employment in 2020 is distributed as follows: 45.1% software development and technology, 32.7% creative and multimedia, 9% sales and marketing support, 6% writing and translation, 5.3% clerical and data entry, 1.8% professional services. The European region follows next, where the distribution of online employment by sector has an almost identical structure. North America is ranked third in the world, Africa is fourth, South America is fifth, and Oceania is sixth (Ilabour, 2020).

The emergence of new forms of non-standard employment is one of the most complex changes in the field of human capital: there is a transition from hiring and managing full-time employees to an expanded workforce (supplemented by technology and groups of people). This radical transition changes the usual ideas about the nature of work, staff training, workforce selection and workplace design.

If we consider non-standard labor relations through the interests of their participants, we can distinguish two groups of risks that are important for managing the company's labor potential. First, on the part of the employee, non-standard labor relations are realized in obtaining a temporary, part-time or informal workplace. This carries risks of losing social security guarantees and career prospects, increases employee insecurity, and creates problems with occupational safety and health (a combination of poor induction, training and supervision, communication failures, and work disruptions) (ILO, 2016). At the same time, a high level of employment is provided, which helps to reduce unemployment. Second, non-standard labor relations give employers flexibility in employment, which reduces labor costs, increases competitiveness, and opens up opportunities to reduce standard jobs and create new ones with already non-standard working conditions. However, on the other hand, this contributes to an increase in the share of non-standard employees, which

eliminates incentives to invest in human capital, and also negatively affects the labor motivation of employees (Blokhina and Blokhin, 2016). The effect of such negative factors can probably lead to a decrease in the quality of products and, consequently, loss of competitiveness (Titov, 2008).

In general, new forms of employment may be insecure due to weak contractual rights or market forces. By definition, temporary contracts are expected to have a limited duration, with low or even zero termination costs for the employer. The security of self-employment, usually in very small companies and with limited financial resources to deal with shocks, depends directly on the demand for services provided, so such work is highly susceptible to market fluctuations (Eurofound , 2018).

Second, the growing power of robotics and labor-saving technologies to restructure jobs (Schatsky and Schwartz, 2015).

Progress in technologies aimed at improving skills and saving labor is associated with the development of ICT, automation (artificial intelligence and machine learning technologies), new service networks, organization and management. The emergence of such labor-saving and skilled technologies changes the nature of work. Lower prices for investment goods encourage the employer to replace labor with capital, that is, to use labor-saving technologies that increase productivity and reduce labor costs. For example, according to the International Federation of Robotics, orders for industrial robots increased fivefold between 2001 and 2017, and this trend is projected to accelerate even further (IFR, 2019) when combined with a growth of the share of national income attributable to capital (OECD, 2019). The use of labor-saving technologies affects the share of national income that workers receive and the composition of the labor force (United Nations, 2020). On the one hand, technological progress can lead to the loss of some jobs due to automation and increase income inequality, and, on the other hand, it displaces low-skilled workers, creates demand for new jobs, especially for highly skilled workers, and contributes to the polarization of jobs (Salikov et al., 2019).

Automation can have a positive impact on both productivity and employee engagement and customer value. For example, Amazon effectively uses automation during the holiday seasons to quickly scale warehousing and shipping, reducing employee training time and maintaining its reputation (Stevens, 2016). At the same time, the rapid introduction of robotics and labor-saving technologies creates conditions when companies do not have time to repurpose employees and reorganize new jobs.

The results of a study by the University of Oxford and the Net job database show that while tasks are automated, the human attributes and skills (empathy, communication, persuasion, personal service, problem solving, and strategic decision-making) that determine the work process become more important (Knowles-Cutler and Lewis, 2016). Therefore, the company's strategic goal is to rebuild workplaces and rethink the necessary human skills in order to combine the capabilities of cognitive systems and robots and human abilities.

Third, the development of a shared consumption economy based on the collective use of goods and services (Schwartz et al., 2016).

Huber (2017) described sharing as a situation where at least two community members engage in direct interaction and use the same units of material goods or services to perform practices. In contrast to the traditional model, the economy of shared consumption has a fundamentally new way of creating and capturing value: the idea of sharing is realized through access to resources, rather than through their acquisition and consumption. This allows to effectively save resources while reducing consumption, preserve the environment, reduce transaction costs for consumers, and adapt products for users (Botsman and Rogers, 2010; Heinrichs, 2013; Allen and Berg, 2014; Kathan et al., 2016). The shared consumption model is most applicable in industries with access to distributed technologies and other forms of distributed fixed capital (for example, in the automobile transport industry), as well as where the design process can be separated from physical production. Companies like Airbnb and Uber are implementing the idea of a sharing economy. They actively attract freelance workers as a regular, manageable part of their workforce. The other part of employees are involved remotely and temporarily. Some companies prefer to pay for purchase orders instead of wages (Schwartz et al., 2016). Overall, the shared consumption economy is growing exponentially:

according to PwC's forecast, the revenue of companies in the shared consumption economy will increase 22 times by 2025 and reach 335 billion us dollars (PwC, 2015). According to the World Bank, China is the world's leading economy of shared consumption: in 2018, its volume was estimated at more than 230 billion US dollars, or 1.67% of the country's GDP. It is expected that by 2020 the share of the economy of shared consumption will be 10% of GDP, and by 2025 — 20% (Daxueconsulting, 2017).

The development of the economy of shared consumption causes a number of risks for the management of the company's labor potential. Some risks arise from employees and are associated with uncertainty about the future, instability of employment conditions and wages, as well as the distribution of benefits. For the company, the clear advantages of the sharing model (flexibility, reduced costs and tax charges) are accompanied in practice by problems related to hiring the best employees at the best price regardless of the type of employment relationship, consistent management of mixed labor resources, ensuring productivity growth, as well as ensuring accurate information about time, labor procurement, planning and management of personnel contingents (Brynjolfsson and McAfee, 2011). Companies are facing new and much more sophisticated competition for talent, especially as unemployment in some markets is falling and voluntary turnover is increasing (Erickson et al., 2012), as well as a problem of trust (Lacan and Parguel, 2017). To sum up, we will reflect the impact of digitalization on the development of the company's labor potential in the form of systematization of risks (table 1).

Table 1: Risks of digitalization for the development of the company's labor potential (compiled by the authors)

The trend of digitalization	Component of labour potential	Risks for employees	Risks for the company
1. Formation of an open talent economy, development of non-standard forms of employment.	Psycho-physiological potential	• Risk of disability due to health problems and stress • The risk of job loss and prospects of development • Risk of loss of social security guarantees	• Reduced incentives to invest in human capital • Reduction of labor motivation of employees • Reduced product quality • Reduced competitiveness
2. The growing power of robotics and cognitive computing for the restructuring of jobs.	Qualification potential	• Risk of job loss • Underestimation of human skills • Lack of opportunities for re-profiling and obtaining new positions	• Risk of inefficient re-profiling and reorganisation around automation • Risk of inadequate release of human resources • The risk of reducing the competitiveness
3. Development of the economy of sharing and cooperation.	Socio-personal potential	• Risk of loss of socialization • Lack of prospects for career growth and professional self-realization	• Risk of separation of the work team and its loss • Reducing the involvement of employees in achieving the company's success and productivity • Loss of high-potential employees • Elimination of corporate culture • The risk of reducing the competitiveness

2. A system approach to the development of the company's labor potential in terms of digitalization.

Let's build a model for the development of the company's labor potential in terms of digitalization based on a system approach. The system approach allows us to present development as a management process, i.e. a set of input, direct operation, and output (Fig. 2).

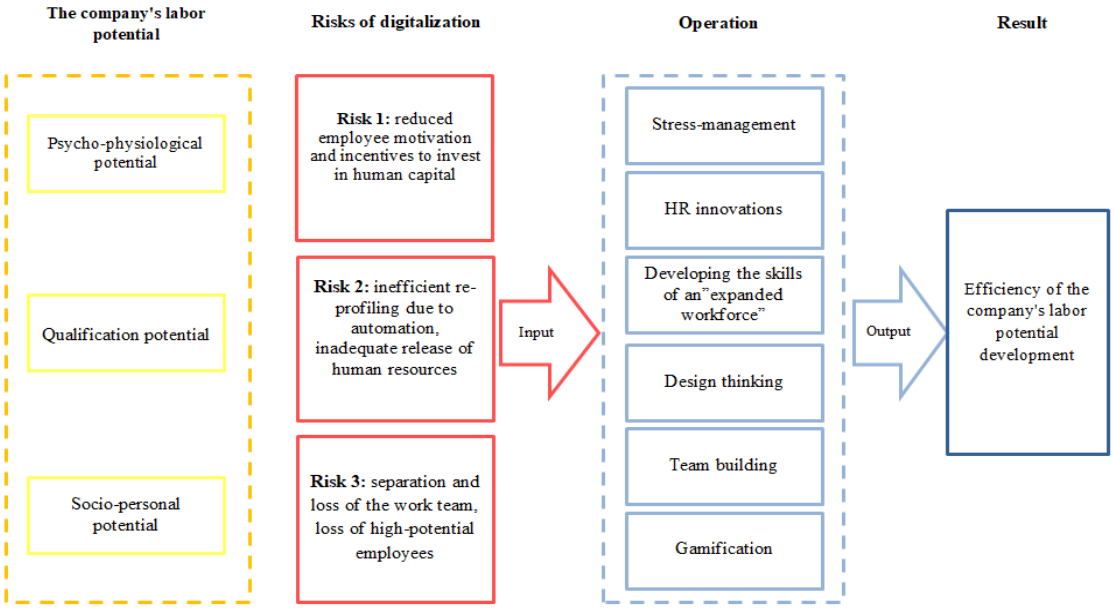

Fig. 2. Model of applying a system approach to the development of the company's labor potential in terms of digitalization (compiled by the authors)

In accordance with the authors' proposed component structure of the company's labor potential, the risks of digitalization were systematized. In the proposed model, they form the input conditions: a decrease in employee labor motivation and a decrease in incentives to invest in human capital (as a risk to the psycho-physiological component of the company's labor potential); inefficient re-profiling due to automation and inappropriate release of a person (risk to qualification potential) and separation/loss of the workforce and loss of high-potential employees (risk to socio-personal potential). Representing the development of labor potential as a management process requires defining the content of the impact operation in order to adapt to internal and external conditions that are undergoing changes. In our case the operation is identified with a set of the most effective risk leveling tools: 1) stress management, HR innovations; 2) development of skills of "extended workforce", design thinking; 3) team building, gamification.

Let's look at the specifics of the proposed tools.

1) Stress management and HR innovations are aimed at creating a favorable psychological situation for employees to adapt to new working conditions, reducing stress due to the risk of job loss and employee vulnerability in the future, as well as creating motivation to work. Organizational measures aimed at managing stress include changing the organizational climate and providing appropriate assistance to staff in the framework of special programs for stress monitoring, identifying possible negative consequences and implementing prevention measures, as well as mitigating or reducing the effects of stressors. The CDC estimates that depression is worth about 200 million lost work days in the United States, meaning about $ 17 billion to $ 44 billion in lost productivity (Forbes, 2017). For example, Unilever, which employs 172,000 people, has a global health initiative

for all employees, regardless of their form of employment, which includes a comprehensive program specifically designed for mental health. The company conducts mental health training for managers and senior managers, internal campaigns to raise awareness of mental illness, and regular seminars for employees on sleep, mindfulness, and exercise to improve psychological well-being (Huffpost, 2016). Employers ' concerns about hiring remote workers boil down to whether they will be able to do the job without supervision or will be out of control when they are needed. HR innovations help organize a remote workforce. For example, specialized applications such as Trello and Slack help organize remote workgroups, and hardware such as interactive displays ensures that teams can interact even if they are not all in the same place (Avocor, 2019). Productivity platforms allow to integrate applications that employees already use directly into the workflow and meet the unique business needs of a particular company.

2) The development of "extended workforce" skills and design thinking are aimed at maintaining regular demand for human resources in an automated environment, creating a new employee's qualification base for the digital economy. In the new environment, we need to rethink the limits of applying basic human skills, such as creative and ethical thinking, and the non-essential tasks that machines can manage. Research by Deloitte in the UK shows that the future workforce will need "a balance of technical skills and more general skills, such as problem-solving skills, creativity, social skills and emotional intelligence" (Knowles-Cutler and Lewis, 2017). Therefore, it is important for the company to evaluate the potential of robotics, cognitive technologies and artificial intelligence technologies for future development and establish critical human skills for the future workforce (analytical thinking, problem solving, creativity, project management, listening and ethical decision-making, communication, leadership, culture) as an investment object. In addition, an important aspect of the development of the company's qualification potential is the use of the possibility of selecting the ' best of the best' through remote recruitment (Avocor, 2019). Companies can hire people from anywhere in the world, thereby improving their competitive position.

Design thinking is a design methodology that is applied when rethinking a complex problem with human interests in mind, when creating a variety of ideas during brainstorming sessions, and when taking a practical approach to prototyping and testing. One of the main advantages of design thinking is that knowledge gained at later stages can have feedback from earlier stages. Specialists get new ideas in an endless cycle, develop new ways to create a product and its possible use, and develop a deep understanding of consumers (Rikke and Yu Siang, 2020). Design thinking by describing and documenting actual work, as well as analyzing tools, people, and work-related information, helps understand where tasks can be outsourced, and where human empathy can be further enhanced (Davenport and Kirby, 2016).

3) Team building and gamification are effective practical tools for building a company's socio-personal potential. A corporate team is a microsocium that is subject to constant changes and lives through different periods of life. Even if employees work remotely or part-time, they have channels to influence the life and work of the company. While remote work usually has a reputation for being unsocial, virtual connections can be established with people around the world. Although a virtual workplace is a place to work, a company can maintain friendly relationships, increasing employee satisfaction and, in turn, productivity. It is important to pay attention to maintaining healthy social relationships between employees and improving the effectiveness of team interaction during critical periods of the company's life, such as automation and workplace reorganization. In practice, the method of team building can be based on the principle of team building by M. Belbin - non-ideal people can form ideal teams. This perfection is achieved through a balanced approach to analyzing the weak and strong traits of each team member, which allows you to combine team members in such a way as to form a perfect team in terms of stability and productivity.

The gamification method, in our opinion, is ideal for maintaining a comfortable atmosphere in the company, strengthening corporate spirit, socialization, and increasing motivation, including for personal growth. Many large companies successfully create cloud platforms for corporate portal with integrated game mechanics that allow employees (regardless of their form of employment) to get involved in tasks. You can make your employees ' work more cohesive and productive by using gamification mechanics (coins, personal ratings, team ratings, prize shop, achievements, missions,

and quests). For example, the company Yota is using the game battle of the Republic against the Dark side to work on the implementation of the sales plan. The Track2Win service used the principle of car racing to gamify work in the office. Corporate Fitbit turns employee Wellness into a game by collecting statistics on daily physical activity (number of steps, distance traveled) and employee sleep quality.

The practical application of this set of tools will ensure the effectiveness of the company's labor potential development by optimizing quantitative and qualitative indicators $LP_1 = f(X_1, P_1, Q_1, S_1)$.

We suggest evaluating the effectiveness of the company's labor potential development (E_d) by applying a systematic method using the formula:

$E_d = E_{ey} / V_m$, where

E_{ey} – economic effect for the year;

V_m – the amount of money spent on the operation, that is, the implementation of management measures.

Conclusions

First, the authors analyzed the company's labor potential in terms of its structural components – psychophysiological, qualification, and socio-personal potential. Second, the authors identified the impact of key trends of digitalization (the formation of an open talent economy as a trend and the development of non-standard forms of employment; the growing power of robotics and labor-saving technologies for job restructuring; development of the economy of joint consumption based on the collective use of goods and services) on the conditions for the development of the labor potential of companies, as a result, the risks of digitalization for a specific structural component of the company's labor potential were systematized. Third, the article offers the author's model of applying a system approach to the development of the company's labor potential in terms of digitalization: the input conditions form the risks of digitalization for the psycho-physiological, qualification, and socio-personal potential; management impact / operation includes a set of the most effective tools for leveling risks; the output is achieved by the effectiveness of the development of the company's labor potential.

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Education, Civic Culture, and Electoral Law and Practice (The study was funded by the Russian Foundation for Basic Research and the region of Penza № 18-411-580003 / 18 p_a)

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Abstract

The article considers the importance of education in enhancing the political and legal culture of citizens, and increasing electoral activity. For decades, both the school and higher education systems and the electoral system in the United States have evolved towards the consistent implementation of the principle of equal rights regardless of gender, race, nationality, religion, age, or disability. In this regard, not only voter education during the election campaign, but also general civic education is of great importance. The article examines the "Bill of Voter Rights" fixed at the level of state law, analyzes education programs in the field of voting in the Russian Federation both at the federal and regional levels. The need for more active, open and widespread involvement of local youth in various forms of political participation, as well as the possibility of using the American model of the "Bill of Voter Rights" at the level of federal law is noted.

Keywords: Elections, Education, Civic Culture, Legal Culture, Electoral Legislation and Practice

Elections are the central institution of modern democratic governments, which provides for the formation of the state mechanism, at least its highest representative structures, the legitimization of state power and its decisions, the relationship between political power and civil society, and contributes to establishing a certain level of political socialization of individuals.

However, one of the most precarious trends is the complete formalization of the electoral process, which can lead to the political alienation of voters (potential and actually participating in the vote) from the results of the people's will. The growth of absenteeism and political apathy is dangerous both for civil society (due to the loss of control over state power and leverage over it in order to ensure the interests and protection of the rights of civil society entities), and for state power (poor relationship with the population, and a lower level of legitimation and activity). Another negative tendency in the development of election practice in the modern world is an increase in manipulation of various social groupings, various methods and technologies of information pressure and even programming of voters.

At the same time, the education system plays a crucial role in "producing" active citizens that share considerable political and legal culture. In this case, not only cognitive learning that helps to "consume" the concepts effectively is important, but also value learning that forms value and normative things necessary for politically active and responsible citizens.

Electoral law has traditionally been given a significant place in the system of constitutional and legal regulation in the United States (Nikolaev, 2018). A number of laws directly provide for specific education programs to enhance the legal culture of citizens in the context of education. Thus, the Uniformed and Overseas Citizens Absentee Voting Act (UOCAVA) of 1986 (PL 99-410) provides for the right of such persons to register for elections and vote by mail, as well as launching a program of assistance to military personnel under the US Department of Defense.

The Help America Vote Act of 2002 (P.L. 107–252)) was the result of a sharp social and political response to the mixed results of the 2000 presidential election, in which George W. Bush won after complicated recounting procedures had been performed and massive disputes had been litigated in the court. The law not only established unified standards for the electoral process, providing for the creation of a voter registration database in each state, and requiring the submission of a driver's license or voter's social insurance certificate for inspection at first registration, but also provided for voters to be informed about the places of voting, as well as providing the required amount of voting machines and election forms and materials required.

The importance of the education system for the development of electoral culture is not limited to an aspect that includes the preparation of ordinary voters or members of election commissions for responsible participation in elections.

The education system ensures the formation of basic values and principles of a developed civil society: maintenance of dialogue, legal competition, but not confrontation and, in particular, tolerance, and recognition of the equal rights of all citizens regardless of gender, race, national and social background, language, religious and political beliefs, health status and age (Nikolaev, Pavlova, 2016). Ensuring the constitutional principle of equality for decades has become one of the main trends in the development of the American education system (Nikolaev, Pavlova, 2018).

An important element of the legal framework for elections was the adoption of the "Bill of Voter Rights" by state constitutions, created in the same way as the Bill of Rights (the first ten amendments to the US Constitution). So, the California Election Code contains chapter 5 "Voter Bill of Rights", which includes the following rights:

(a) All voters, pursuant to the California Constitution and this code, shall be citizens of the United States. There shall be a Voter Bill of Rights for voters, available to the public, which shall convey all of the following to voters:

(1) (A) You have the right to cast a ballot if you are a valid registered voter.

(B) A valid registered voter means a United States citizen who is a resident in this state, who is at least 18 years of age and not in prison or on parole for conviction of a felony, and who is registered to vote at his or her current residence address.

(2) You have the right to cast a provisional ballot if your name is not listed on the voting rolls.

(3) You have the right to cast a ballot if you are present and in line at the polling place before the close of the polls.

(4) You have the right to cast a secret ballot free from intimidation.

(5) (A) You have the right to receive a new ballot if, before casting your ballot, you believe you made a mistake.

(B) If at any time before you finally cast your ballot, you feel you have made a mistake, you have the right to exchange the spoiled ballot for a new ballot. Vote by mail voters may also request and receive a new ballot if they return their spoiled ballot to an elections official before the closing of the polls.

(6) You have the right to receive assistance in casting your ballot, if you are unable to vote without assistance.

(7) You have the right to return a completed vote by mail ballot to any precinct in the county.

(8) You have the right to election materials in another language, if there are sufficient residents in your precinct to warrant production.

(9) (A) You have the right to ask questions about election procedures and observe the election process.

(B) You have the right to ask questions of the precinct board and elections officials regarding election procedures and to receive an answer or be directed to the appropriate official for an answer. However, if persistent questioning disrupts the execution of their duties, the precinct board or elections officials may discontinue responding to questions.

(10) You have the right to report any illegal or fraudulent activity to a local elections official or to the Secretary of State's office.

(b) Beneath the Voter Bill of Rights there shall be listed a toll-free telephone number to call if a person has been denied a voting right or to report election fraud or misconduct.

(c) The Secretary of State may do both of the following:

(1) Develop regulations to implement and clarify the Voter Bill of Rights set forth in subdivision (a).

(2) Revise the wording of the Voter Bill of Rights as necessary to ensure the use of clear and concise language free from technical terms.

(d) The Voter Bill of Rights set forth in subdivisions (a) and (b) shall be made available to the public before each election and on election day, at a minimum, as follows:

(1) The Voter Bill of Rights shall be printed in the state voter information guide, pursuant to Section 9084, in a minimum of 12-point type. Subparagraph (B) of paragraph (1) of subdivision (a), subparagraph (B) of paragraph (5) of subdivision (a), and subparagraph (B) of paragraph (9) of subdivision (a) may be printed in a smaller point type than the rest of the Voter Bill of Rights.

(2) Posters or other printed materials containing the Voter Bill of Rights shall be included in precinct supplies pursuant to Section 14105. (Elections Code of the State of California, 2018)

Despite the consolidation of basic electoral rights, the polarization of both the political establishment and the electorate as a whole has become a dangerous trend in US elections. A similar situation is likely to be typical for the general election in the USA in 2020. The bipartisan system in the United States, which has long served as a factor and means stabilizing the political system, is increasingly becoming a source of its polarization and even radicalization.

The low level of political and electoral culture of citizens, and a significant dependence on the media propaganda machine in terms of determining political preferences play an unenviable role in this process. For example, Thus, a study by the Pew Research Center points to an obvious separation of information sources for voters of the Democratic and Republican parties. So, of those who receive news primarily from Fox News, 93 percent are Republican supporters. In contrast, voters who draw information from media such as the MSNBC (an American cable television channel that provides NBC News coverage as well as its own reporting and political commentary on current events), the New York Times, National Public Radio (NPR), and Cable News Network (CNN) (95, 91, 87, and 79 percent, respectively) identify themselves as supporters of the US Democratic Party (Grieco, 2020). More than 65 percent of Republican supporters trust Fox News, while 67 percent of Democrats have confidence in CNN's information. All this not only shows "media polarization" due to the deep separation in the sources of information and the degree of trust in them, but also raises the question of a divided nation. (Jurkowitz, Mitchell, Shearer, Walker, 2020)

Although the Russian political agenda does not currently show such fierceness of the competing parties in terms of elections, it remembers the experience of the 1990s, when, in conditions of extreme polarization of the population and lack of knowledge and experience in the new competitive electoral system, manipulation of voters' minds and the radicalization of the election campaign reached their climax. The election campaign did not represent a positive program for the implementation of state policy, but only "counter-propaganda", the main task of which was to blacken and remove a competing candidate from the ballot, even at the expense of unethical and controversial methods of struggle.

The current stability of the political situation should not be misleading, since external factors of destabilization (the COVID 19 pandemic or the global economic crisis) can significantly aggravate internal contradictions in the face of a decline in the standard of living of the population.

The most important guarantee of a critical but responsible attitude of voters to the existing political situation and rational electoral behavior is the high level of political and legal culture of citizens, provided by an effective education system. The number of voters participating in the referendum in the Russian Federation as of January 1, 2020 amounted to 108 648 120 people (outside the territory of Russia the number is 1 903 406), and the number of voters in the region of Penza is 1 064 393. (CEC of the Russian Federation, 2020)

On November 30, 1994, in accordance with the decree of the President of the Russian Federation of November 1, 1994, the Central Election Commission of Russia established the Russian Center for Training in Electoral Technologies under the Central Election Commission of the Russian Federation in order to organize, coordinate and ensure work on improving the legal culture of voters (referendum participants) , training election and referendum organizers, other participants in the election and referendum processes in the Russian Federation. The Center organizes and coordinates the training of all categories of participants in the electoral process in the Russian Federation, is engaged in publishing and analytical activities aimed at improving and developing electoral technologies. The center is focused on cooperation with state authorities, education, social and political organizations, including youth organizations.

From November 1, 2019 to March 20, 2020, the Central Election Commission of the Russian Federation together with the Ministry of Education of the Russian Federation, the federal state institution "Russian Center for Training in Electoral Technologies under the Central Election Commission of the Russian Federation", election commissions of the entities of the Russian Federation, state authorities of the entities of the Russian Federation, carrying out public administration in the field of education organized the All-Russian Olympiad for schoolchildren on issues of suffrage and the electoral process.

Every year, the Russian Center for Training in Electoral Technologies under the Central Election Commission of the Russian Federation develops an action plan. So in 2019, 1,937.6 thousand rubles were allocated for the events aiming to improve the legal culture of voters; 13 514.7 thousand rubles were allocated for training personnel of election commissions and other participants in the election process in the Russian Federation. For comparison, in 2020, 12 951.8 thousand rubles were scheduled for the training of election organizers and other participants in the election process, 6 576.2 thousand rubles for improving the legal culture of voters. There is no doubt that there is a positive shift in the cost of educating voters.

The center organizes online YouTube classes on topical issues of the electoral law and the electoral process with broadcast on the channel "Just about the elections". So, in 2019, lectures were held by the associate professor at the Department of political science and political management at the Institute for Social Sciences, the candidate of political sciences M.Yu. Pavlyutenkova (PR in the public sector); the associate professor at the Department of political science and political philosophy at the Diplomatic academy of the Russian Ministry of Foreign Affairs, the candidate of philosophical sciences A.V. Borisov (Public opinion surveys in the activities of election commissions); by the associate professor at the Department of administrative law and process at Kutafin Moscow State Law, candidate of legal sciences M.M. Polyakova (Combating corruption in the election commissions of the entities of the Russian Federation); by the professor at the Department of the Russian language and literature theory at Moscow State Linguistic University, candidate of philological sciences I. V. Kosmarskaya (Linguistic difficulties in the language of documents).

The Center also offers webinars for members of election commissions in preparation for the Single Voting Day, training programs for observers at polling stations, training for the first time elected chairmen and secretaries of election commissions of the entities of the Russian Federation, classes

on topical issues of election law and the electoral process for federal state civil servants of the Central Office election commission of Russia, employees of the Federal Center for Informatization, the Russian Training Center in electoral technologies under the Central Election Commission of the Russian Federation.

The activities of specialized bodies and organizations in the regions of the country are even more significant for educating voters on matters of suffrage and the process. So, by the Resolution of the Penza Region Election Commission of January 24, 2020, No. 87 / 561-6, the 2020 annual activity plan to improve the legal culture of voters was approved. In particular, this year events are planned for all categories of voters. The local election commissions, educational institutions, universities, city and district libraries, culture houses will hold training events, quizzes, and competitions to improve the legal culture among young voters living in cities and regions of the region of Penza. The Legislative Assembly of the region of Penza, the Youth Parliament under the Legislative Assembly of the region of Penza, the Ministry of Education of the region of Penza, the Ministry of Culture and Tourism of the region of Penza, Penza Regional Library named after M.Y. Lermontov will hold joint events to improve the legal culture of young and voters voters-to be. They plan to hold events for people with disabilities (the contest on electoral topics among voters with disabilities "Long live, the country!"; the conference "Electoral Rights of Persons with Disabilities"); for high school students (the regional Olympiad for 10th and 11th formers on the basics of the electoral law and the electoral process; training lectures, excursions; electoral law quests for 9 to 11th graders).

Particular attention is paid to the political and legal education of young people. Currently, more than 250 thousand young people aged 18 to 30 live in the region of Penza. Such an direction is necessary for the formation of a civic habit of active participation in election events, the formation of a steady interest in political life, the development of one's own political position, a broad political outlook and sufficiently deep and solid knowledge in the political and legal areas. All of the mentioned above will ensure not only the intensification of youth participation in political processes in general and in the electoral process, in particular, but will also give greater stability during "whispering" campaigns and radicalization of the media.

Specialized youth bodies play an important role in involving young people in the daily political life of the region. So, the Youth Parliament under the Legislative Assembly of the region of Penza is a collegial deliberative body and operates on a voluntary basis. Its activities are based on the principles of legality, voluntariness, equality, transparency, free discussion regarding the intended and adopted decisions. The main objectives of the Youth Parliament are:

1) participation in the preparation and discussion of draft regulatory legal acts;
2) providing young people with true information about the activities of public authorities and local authorities of the region of Penza;
3) submitting proposals for consideration by state authorities and local authorities;
4) the promotion of social, legal, educational, cultural, moral, patriotic and physical development of youth.

The parliament is made up of 36 deputies each time after the election of the Legislative Assembly of the Penza region of the appropriate convocation for the term of its powers by delegating candidates to the Legislative Assembly of citizens of the Russian Federation aged 16 to 30 years old, permanently residing in the region of Penza. Each deputy of the Legislative Assembly delegates one deputy to the Youth Parliament taking into account recommendations of youth public associations, public associations of working youth, student self-government bodies, trade union organizations of students, student councils, youth advisory bodies established under the representative bodies of municipal districts and urban districts of the region of Penza. It is important to note the importance of the activities of the youth parliament as a communication link between public authorities, on the one hand, and youth organizations, both pupils and students associations, on the other. At the same time, in order to ensure a more open, competitive and effective activity of this body, the role of youth organizations in the formation of the Youth Parliament should be increased by allocating quotas for the corresponding representation.

Another important body is the Penza Region Youth Government, which acts as an advisory body to the Penza Region Government, training political and managerial personnel, involving the region's youth in the implementation of the most important agendas of state policy.

The main objectives of the Youth Government of the region of Penza are the following:

1) the work of the departments of the youth government of the region of Penza ;
2) discussions and proposals on social and economic issues of the region;
3) representation of socially significant interests of young citizens when solving issues of social and economic development;
4) attracting young citizens to participate in the formation and implementation of the social and economic policy of the region.

The framework of the Youth Government is built in the same way as that of the Government of the region of Penza. It consists of the chairman, vice-chair people, heads of the departments of the Youth Government, as well as other assistants to the listed persons who are part of the staff and working groups. The role of the Youth Parliament in the formation of the Youth Government of the Penza Region should be strengthened, which will increase the transparency, competitiveness and democratic character of this structure.

Finally, the Penza Region Youth Electoral Commission is a specialized body in terms of political and legal education of young voters in the region. It acts as a permanent advisory body to the Electoral Commission of the region of Penza.

The youth commission regularly monitors and analyzes the electoral activity of youth (visits to voting places in the region of Penza, their participation in elections as candidates; their participation in election commissions at all levels as members of the commission with the right of decisive and deliberative vote). The commission develops recommendations on behalf of the Penza Region Election Commission, prepares proposals and is directly involved in the implementation of measures to improve the legal and political culture of young voters. The Commission provides assistance to the Penza Region Election Commission on the implementation of activities related to the training of personnel; carries out interaction of youth and youth public associations with the Electoral Commission of the region of Penza on issues of improving the legal and political culture of youth; organizes and participates in conferences, round tables and other events; exercises other powers on behalf of the Election Commission of the region of Penza.

In particular, in 2020, the Youth Election Commission aims to interact with the Ministry of Culture and Tourism of the region of Penza, the Youth Parliament under the Legislative Assembly of the region of Penza, the Youth Government and other youth organizations of the region of Penza to improve the legal culture of young people. The commission will organize the work of volunteer youth groups to help the territorial and district election commissions, interacting with older voters and people with disabilities for the Single Voting Day; will participate in meetings of the Electoral Commission of the region of Penza and meetings with representatives of territorial bodies of federal executive bodies in the region of Penza , state authorities, territorial election commissions of the region of Penza and other organizations. The Commission will organize and conduct seminars, meetings, round tables on improving the legal culture of voters, conduct training lectures. It will also conduct electoral quests for 9th to 11th graders in the city of Penza; will participate and conduct regional Olympiads for 10th and 11th graders on the basics of electoral law and the electoral process; prepare information on the work of the Youth Electoral Commission and post it on the website of the Electoral Commission of the region of Penza and on the official Vkontakte page.

It is not for nothing that the official data of the Penza region Election Commission and the VTsIOM exit poll data show the highest percentage of turnout for the 18-34 age group (69.5 and 65.6 percent, respectively, with average figures of 67.5 and 63.7 percent).

Thus, significant prerequisites have been created for an effective education system in the field of electoral law in Russia. Appropriate resources are used at all levels of the Russian education system: secondary and higher education, as well as continuing education. Of special importance are specialized programs implemented under the auspices of the Central Election Commission of Russia and the election commissions of the constituent entities. The development of active forms of youth political participation is especially significant in the regions. This allows to adapt the activities of public authorities directly to the needs and interests of the youth environment of a particular region. Despite the existence of various organizational forms of youth participation in the life of the region (Youth Parliament, Youth Government, Youth Election Commission), elitization and secrecy of such interaction should be avoided. To this end, it seems appropriate to expand the participation of various youth organizations and youth groups in nominating their representatives to such youth political bodies and organizations.

In addition, in order to increase the political and legal culture of voters, it seems possible to use the American model of the “bill of voters' rights”, in particular, to consolidate a separate chapter containing a list of basic electoral rights and freedoms of citizens in specialized legislation (Federal Law "On Basic Guarantees of Electoral Rights and the right to participate in the referendum of citizens of the Russian Federation")

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The Students Research Work Organization as A Forward-Looking Pedagogical Method in Conditions of Transition to Industry 4.0

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Abstract

Revolutionary transformations in industry and the informatization of society, the rapid development of science, the introduction of high technologies in production, technological and service processes entail the need to improve the quality of education of young professionals in the IT sphere. The purpose of the article is to describe the algorithm for preparing and organizing the research work of students, the interdisciplinary integration of the subjects being studied and the research activity of students. The algorithm includes innovative ways of organizing the educational process, the possibility of using new educational technologies for the preparation of popular IT-specialists, focused on the creation of high-tech products. The article presents the algorithm developed by the authors for organizing the research work of students of IT specialties, taking into account promising pedagogical approaches. The algorithm orients future graduates to a phased preparation for innovation, continuous self-education and self-development, taking into account the changing market needs, opportunities and limitations of specific industrial enterprises, IT-companies. The model of organization of research work with students can be used by leaders of research work and teachers of professionally-oriented disciplines of higher educational institutions. The main directions for further research may be issues related to the approbation of the algorithm in practice, amending its structure and content according to the results of practical implementation.

Keywords*:* higher education, integration of education, educational technologies, algorithm, research work, Industry 4.0.

Introduction

In the last decade, we have seen the change of technological structures, the so-called fourth industrial revolution, which is marked by the merger of technology and the blurring of boundaries between the manufacturing, biological and digital spheres. Integration of such elements as big data, machine learning, artificial intelligence, robotics, additive technologies, virtual and augmented reality, industrial Internet of things, cloud computing, cybersecurity, protection of information in industrial networks in an integrated system will develop the concept of “Industry 4.0” and reach a new level of economic efficiency of production. The modern world is changing, the advantages in the international arena will be enjoyed by countries that actively invest in the development of high technologies. The economy needs to expand its competitive potential by increasing its advantages in science, education and information technologies (Kurnitskaya, 2018).

Analyzing the changes produced by the fourth industrial revolution, it can be argued that the labor market is also transforming. The production will require workers of a new type, with other qualification characteristics, organizational and social skills and abilities that are able to independently obtain and integrate knowledge from various fields that have an opportunity for the creation of innovative science-intensive products.

All the above mentioned significantly changes the requirements both for the content of training future graduates of higher educational institutions, and for organizing this training.

Research work is becoming one of the significant activities of university students, providing continuous improvement of the teaching and upbringing process and helps training a highly qualified specialist, a creatively active person who is able not only to acquire knowledge independently but also to generate new ones, to offer and develop innovative ideas, implement cost-effective projects.

Students research work acts as a mandatory form of students independent work in the framework of the curriculum, studying the content of the basic professional educational program and is conducted in 5-7 semesters.

The objectives of the research work in accordance with the requirements for bachelor's mastery (competence) are:

- intellectual development of future bachelors;
- preparation of future bachelors for independent research work;
- development and increase of motivation for professional activity;
- consolidation and deepening of theoretical knowledge, when studying disciplines, and the skills of using modern information technologies and software, including domestic production, in solving problems of professional activity;
- learning to manage your time, build and implement a self-development path based on the principles of lifelong learning;
- formation of new competitive ideas in the framework of innovative activity and their implementation in projects.

The main objectives of the students research activities:

- familiarization with the basics of research;
- formation of skills to justify the relevance of the chosen topic; independent setting of the research work goals; the definition of the tasks range within the stated goal; the choice of the best ways to solve them, based on existing legal norms, available resources and limitations;
- development of practical skills in search, critical analysis and information synthesis with the use of a systematic approach for solving the tasks;
- deepening the search skills of literary sources with the involvement of modern information technologies;
- expansion of knowledge gained in the study of fundamental and special disciplines, development of practical skills in the use of methods of mathematical analysis and modeling, theoretical and experimental research in professional activities;
- formation of skills to choose the necessary research methods, based on the tasks of the specific study;
- gaining experience in developing algorithms and programs suitable for practical application;
- formation of skills in processing results, analyzing and processing them in the form of reports, scientific articles and reports at the scientific and practical conferences.

Consequently, the students research work provides for the systematization, consolidation, expansion of theoretical and practical knowledge in a certain area of training and their use in solving specific scientific, production, economic, organizational and managerial tasks. Research work should be carried out by the student on an actual topic, have a sufficient theoretical level, be of an investigative nature (Sabinina, 2018).

Based on the scientific papers we studied and personal experience, the main problems were formulated:

a) the selection of actual practical-oriented research topics, corresponding to the beeing formed competencies and the specifics of the training area;

b) lack of knowledge at the required level of students' knowledge, skills and research skills;

c) low internal motivation of students, formal attitude to research activity, disinterest in the proposed topic;

d) absence of classroom hours, high workload of teachers, inability to sufficiently acquaint students with the research directions of the department; methods of research work; requirements for the design of a scientific article and other scientific and research documentation;

e) insufficient level of scientific and methodological competence of teaching staff.

Thereby, the aim of our research is to develop an algorithm for the research work preparation and organization, taking into account the revolutionary transformations taking place in the industry and

society, and including the possibilities of applying new educational technologies for the highly-demanded highly skilled IT specialists training focused on the science-intensive products creation.

Therefore, the question of developing an algorithm for the research preparation and organization using the new educational technologies is relevant.

Literature Review

The considering problematic is not new. Throughout the entire existence of engineering education, many teachers and researchers paid great attention to the problems of organizing the research work of students during their studies at the university.

Taking into account the current requirements for a graduate of higher education, the introduction of digitalization into the social sphere, including education (Shchurov and Vaulin, 2018; Scardamalia and Bereiter, 2014; Block, 2018), the latest technological achievements and challenges of "Industry 4.0", the tasks of effective organization of research work are relevant and require a new approach in their decision.

In the modern pedagogical literature much attention is paid to the students of higher educational institutions research work (Houseal, Abd-El-Khalick and Destefano, 2014; Avargil, Spektor-Levy and Zion, 2017; Scardamalia and Bereiter, 2014; Ary, Jacobs, Sorensen and Walker, 2018), its relevance is noted, but a number of problems of the preparation and organization of the research work are also indicated.

The research work of students is considered to be an obligatory and integral part of the training of specialists in the South Ural State University and is one of the priority tasks of the educational institution, which are solved on the basis of the unity of the educational and research processes (Dobichina, 2017; Prokhorova. and Ovsyanitskaya, 2015).

Various aspects and issues of improving the quality of research work are described in detail in the work (Shein and Tsai, 2015; Pickering, Grignon and Steven, 2014; Demchenko, 2015; Pochestnev and Kuzmicheva, 2016). Often scientists focus on individual problems, so there is a need for an integrated approach to overcoming the identified shortcomings in the preparation and organization of students research work (SRW). Such an approach can be realized only if innovative methods of organizing the educational process are used and new educational technologies are taken into account.

Particular attention should be paid to the work (Shadchin, 2012; Astanina, Shestak and Chmyhov, 2012; Nuzhnova, 2012), which describes the formation of new significant for modern life qualities: perseverance, professional mobility, thanks to the participation of students in research work. It is proved in the works that the acquired knowledge and skills lay the foundation for the future research activities of the future specialist, form the ability to independently obtain the necessary knowledge. The implementation of research work requires a change in the format of the pedagogical interaction of the teacher and the student. In the work (Proshkin, Glushak and Mazur, 2018) the results of the introduction of new pedagogical approaches to the organization of SRWS are given.

Modern education implies the availability of its receipt through the introduction of MOOC. The current situation and prospects for the development of MOOC are given in (Penalvo, Francisco and Fidalgo-Blanco, 2018; Karnouskos, 2017; Watted and Barak, 2018; Larionova, Brown and Bystrova, 2018). We agree with the authors of the articles; however, these papers do not pay attention to conducting NIRS among students using the distance method of students. Therefore, we have developed a technology that allows you to combine the advantages of the MOOC form with the mandatory research part.
In our studies, we relied on the work (Martyushev, Sinogina and Sheremetyeva, 2014; Karabalina, Yesengulova and Kulbayeva, 2018), which analyzed in detail the importance of organizing independent work of students. We are in solidarity with the authors of these works, but we believe

that any independent work should include elements of the research part. Our developed technology allows you to combine independent work with the scientific work of students.

Materials and Methods

The main materials for the proposed study were numerous scientific and pedagogical publications on the problems of research in Russian and English languages, normative and program-methodological documentation and the authors' own research and teaching experience. During the preparation of the article, general methods of analysis, synthesis, induction and analogy were applied.

Experimental base of the research was the South Ural State University (SUSU) and the university educational portal “Electronic SUSU” based on the Moodle environment. The educational site “Electronic SUSU” is a joint development of the Department of Global Network Technologies and the Institute of Open and distance learning, the structural units of the South Ural State University. As a part of the study, four electronic courses were created on the educational portal “Electronic SUSU”.

The result of the work has been the developed author's technology of preparing and organizing the research work of students.

The algorithm of preparation and organization of the research work of students

We have developed an algorithm for the research preparation and organization. The created algorithm can be used by heads of scientific works of the higher educational institutions students as a step-by-step guide.

The first stage. The determination of the students research work contents and the formation of a base for research directions and topics.

The content of research is determined by the graduating department on the basis of the list of scientific topics of the department; grants implemented at the department; works performed by the department in the framework of contracts with educational institutions, research teams, industrial enterprises, companies; priority directions of research in the field of digital industry, covered in scientific, scientific and practical conferences of the department, higher school, university; in-depth study of separate sections of specialized disciplines.

The second stage. The students acquaintance with the directions of scientific researches of the department.

On the portal “Electronic SUSU” an electronic course “Directions of the Information Technologies in Economics department research” is created, to which all the students of the department are connected. In the course, students have the opportunity to get acquainted with the topics of this department research work with the help of video lectures, presentation materials, published scientific articles of the staff of the department, selection of links to thematic Internet resources. The presented materials allow the student to consciously approach the choice of the topic of future research, proceeding from their own interests. This approach takes into account the propensities and preferences of the student, forms interest and internal motivation for research activities (Shadchin, 2012).

The third stage. The statement of the problem and the choice of the research topic. Formulation of goals and objectives of research. Development of a working hypothesis.

The students independently or with the participation of the scientific adviser chooses the topic of their future research, discusses the essence of the forthcoming work.

The fourth stage. The acquaintance with the scientific research methods.

The following the results of the list on the distribution of students for research and the signing of a calendar plan, the supervisor connects students to the electronic course “BF17-18-Methods SRW” on the portal “Electronic SUSU”. By analogy with the second stage of the algorithm, students have the opportunity to get acquainted with the methods of primary information search on the problem of research, selection, processing and critical analysis of the information received, methods of system analysis and mathematical modeling, theoretical and experimental research using video overviews, presentation materials, practical works with examples of the use of scientific research methods (including those studied in disciplines at senior courses). Also on the resource is a compilation of links of thematically suitable courses on the leading foreign and domestic MOOC-platforms (Coursera, EdX, Khan Academy, Open Education, Universarium, Lectory, Stepic, etc.).

Due to the presence of mobile versions in most MOOC platforms, the student has the opportunity to study “anytime and anywhere” on the model 24/7 (Dobichina, 2017). At the same time, the acquired knowledge and skills lay the foundation for further research activities of the future specialist, form the ability to independently obtain the necessary knowledge and readiness for professional mobility.

The fifth stage. The studying of the literary sources and the selection of Internet resources on the problems of scientific research.

The student independently (the scientific adviser provides consulting support) searches, studies, selects and analyzes the literature sources (textbooks, monographs, theses, scientific articles) on the problems of scientific research, performs a selection of Internet information resources. Search should be carried out including using domestic and foreign abstract and full-text electronic databases, access to which provides the university. Particular attention is paid to literature published over the past 5 years. The study of sources ends with the preparation of an analytical review, which highlights the state and degree of study of the problem posed in the work, its relevance, articulates unresolved problems of interest for further research, suggests ways of solving the tasks posed.

The sixth stage. The correction of the research plan. The collection of the factual material. Evaluation of the reliability of the collected data, their sufficiency for completing the research work.

Based on the analytical review and methodological guidelines on the SRW organization, the student clarifies the problem (topic), the content of the research, the working hypothesis. The student develops a methodology for data collection and collects factual material for research work, assesses the reliability of the collected data, their sufficiency for completing the research work.

The seventh stage. The discussion and the selection of the scientific research methods to solve the tasks, based on existing legal norms, available resources and limitations. The processing of the actual material. The testing the working hypothesis.

Based on the goals, objectives and expected result of the study, the student chooses the method of processing the actual material, negotiates the chosen method with the supervisor. Selects software environments for data analysis (calculation), performs a comparative analysis of their characteristics, justifies the choice of a particular software product. Processes the collected material. Analyzes the received data. Checks and corrects the working hypothesis. Formulates preliminary conclusions on the work done.

It should be noted that at stages 5-7 of the algorithm, emphasis is placed on the independent work of the student. At these stages, the supervisor acts as a moderator, consultant in educational and research activities. The search for arguments to solve the problem posed, the application of previously acquired knowledge in solving practical problems, stimulate the students to be ready for constant replenishment and deepening of knowledge, search and development of new methods for processing (calculating) data, technical means for processing the results of the study. Synthesis of obtained theoretical knowledge and practical skills and skills contributes to the formation of special research

skills, the development of critical thinking, the gradual transition from training to self-education (Prokhorova and Ovsyanitskaya, 2015).

The eighth stage. The preparation of the research report. The presentation of the results of the work done. The formulation of conclusions and proposals on the results of the study.

The student presents the results of the self-completed work in the form of a report on research, drawn up in accordance with the requirements of the state standard. Formulating the general conclusions on the results of the study. Preparing a report and presentation for the public presentation of the results of work, makes proposals for further research on selected issues.

During the defense and discussion of their work, students learn to logically, unequivocally, concisely expound their thoughts, competently and correctly discuss, defend their point of view (Demchenko, 2015).

The ninth stage. The preparation of reports for scientific and practical conferences, the writing of the scientific articles.

The research work does not always end with the ninth stage. Students can complete the results of the independent research work in the form of completed scientific works (articles, reports) and use them for presentation in annual exhibition events organized by the department, higher school, university, conferences of various levels, for publication in collections of scientific papers students and graduate students.

The tenth stage. The checking of the reporting documentation for the amount of borrowing.

In order to exclude non-independent execution of scientific research and formal approach to writing a report, scientific article and other scientific works, appropriation of other people's ideas, results, fragments or whole work without indicating the source of borrowing, the student's report documentation is checked in the special system. The eleventh stage. The completing of the base of scientific research directions and topics according to the results of the SRW (return to stage 1).

Results

In connection with the revolutionary changes in industry and the informatization of society, the rapid development of science, the introduction of science-intensive technologies in production, technological and servicing processes, there is a need to improve the quality of education of young professionals in the IT field. Before the teacher of the higher school there are new tasks and problems that can be solved only when addressing to active methods of teaching and modern educational technologies. The result of the research is the algorithm developed by the authors for organizing the research work of IT specialties students, which is a complex solution of the problems presented in the introduction and taking into account perspective pedagogical approaches. The presented algorithm directs future graduates to stage-by-stage preparation for innovative activity, constant self-education and self-development, taking into account changing market requirements, opportunities and limitations of specific industrial enterprises, IT companies.

The authors of the article believe that the described algorithm solves the problems of preparation and organization of scientific activity of higher educational institutions students, announced in the introduction. It should be noted that the proposed algorithm assumes that the university has a distance learning site. The above model can be used both by the heads of research work of students and by teachers of professionally-oriented disciplines of higher educational institutions, which is the practical significance of the research performed.
The main directions for further research in this area may be issues related to approbation of the algorithm in practice, introduction of changes in its structure and content based on the results of practical implementation.

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The Special Section "Pricing and Price Policy of The Companies'" Budget Planning Price Management System

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Annotation

In modern conditions of instability characterized by the rise of competition, differentiation of profitability, depending on the belonging to the industry, and the decline of investment attractiveness, there is a need for market actors to combine methods and tools of cost management at various stages of the organizing process: production, raw material supply, and implementation. The goal of all transformations is to increase balance and stability. The main tool for achieving system budgets, which are based on the classical pricing rules for a perfect market structure. It should be noted that the ideal model of the market process in the greater degree of artificial, entirely dependent on the scope and methods of cost accounting, external factors. Currently, the role of social relations, which is an important feature of competition and the administrative system of prices. So, the theory of value and prices can only be based based on a particular ethical system. Currently, issues of diversification and competitiveness of industries, and defines the required institutional changes in the economy associated with the increase of its competitiveness. On the other hand, in the framework of institutional solutions developed routines, the implementation of which will ensure the creation of sustainable, structurally balanced industry base on the basis of the system of cost accounting. All of this requires business entities to develop a strategic model of the formation and management of gross, marginal and average cost organization in the long term. The paper systematizes the main theoretical and methodological approaches in the field of cost management of the organization in modern conditions taking into account the sectorial SPE-civic and strategic development of the organization.

Keywords: Cost, Price, Segment of The Economy, Competition, The Conditions of Profit Maximization, Managerial Accounting.

INTRODUCTION

Pricing rules, as we know, are different in a variety of market structures. Market structure is the environment in which market competition occurs. There are many market structures, but pricing rules are based on ideal structures. Ideal types of market structures that are presented in table one. For a market of perfect competition, the pricing rule looks like this:

$$P=AR=MR=MC \quad (1),$$

Where, the price is equal to the average revenue is equal to the marginal revenue is equal to the marginal cost;

P-price;
MC-Marginal costs;
AR-marginal revenue.
The authors use ideal market models for price modeling and forecasting.
Table 1-Market structures and their characteristics[1]

[1] McConnell. Economy. - Moscow: Delo, 1992

Characteristics of the market structure	Perfect competition	Monopolistic competition	Oligopoly	Monopoly
Number of enterprises on the market	Infinite set	Plenty	Several	One
Barriers to entry into the industry	no	Few	significant	blocked
The presence of non-price competition	no	Significant	There are	No
Type of products sold	standardized	Individualized within very narrow boundaries	And those and others	Unique goods

For other market structures, the pricing rule (maximizing profits) explain the following:
MC=MR (2),

Where the flat marginal cost marginal revenue.

For the purposes of marginal cost pricing is important to the family costs. Marginal costs of gross and cross variables at their point of minimum defining the optimal output that maximizes profit. The next most important indicator-rum in pricing is the index of A. Lerner (1969), which determines the rationality of the pricing:

$$L = \frac{P - MC}{P} = -\frac{1}{\varepsilon_P}, \qquad (3)$$

Where L is the Lerner index, it can vary from minus infinity to plus infinity. However, if L<0 then this is the perfect competition market, or polyposis. In this case, to control prices is impossible; if L→1 then this is a market of imperfect competition with price controls;
Ed - demand elasticity price;
P-price;
MC-marginal costs.

The process of making financial decisions is directly linked to budgeting, a key element of the system of financial planning and cost control in management accounting. Budgeting relates to the planning processes. Budgets are the key tool of management accounting and control. The primary budget in the system of forecasting of financial results is the sales budget. The financial information provided in the sales budget, forecast of price, production volumes, and projected revenues can be further used to predict the value of the company's net profit allocated for payment dividen-ing and implementing investment decisions based on the strategy self-financing activities of the company. This budget is closely linked to the budget cost (budget cost of production budget and distribution costs).

The establishment of an adequate level of prices requires forecasting of profitability, in particular:
gross margin, defined as the ratio of gross profit to revenue from sales, calculated excluding excise taxes and value added tax;

Gross profitability of expenditures, defined as the ratio of gross profit to cost of goods sold (works, services);

return on sales, defined as the ratio of net profit to revenue from sales, calculated excluding excise taxes and value added tax;
Profitability ratio, defined as the ratio of profit from sales to the amount of cost of goods sold (works, services), commercial and management costs related to the sale of goods (works, services);

the profitability of commercial and management costs, defined as the ratio of gross profit to commercial and management costs related to the sale of goods (works, services);
Return on assets, defined as the ratio of profit from sales to the current market value of assets (non-current and current) used directly or indirectly in the analyzed transaction. In the absence of the necessary information about the current market a hundred -, the physical volumes of assets return on assets may be determined based on data of accounting (financial) statements.

The cost is the sum of current costs of production and sales. Costs are the money spent by the organization to purchase resources at market prices. Comparing these two categories, we can say that they are homogeneous, but the first "cost" is a broader concept. Determine the cost of goods is the desire as accurately as possible, preferably 100% to assess all the expenses of the organization. Cost accounting does not allow achieving such precision, but with their help, it is possible to use rules to maximize profits for different market structures, the definition of bringing to pass the optimal price and assessing the level of competition. Cost is a from-total net expense for acquisition of objects of labor and means of labor for the implementation of the company's operations. The cost is an economic category that characterizes the amount of resources consumed now[Prikhodko S. E. 2016.].

Cost (overhead) is the most important economic category. All management decisions are made based on cost analysis. For example, to start or to close business, buying, selling organizations (enterprises), the definition of the strategy of personnel management, marketing strategy and many other questions require careful analysis of costs. Are the following external environment factors influencing the unit cost of production: the demographic component; the changing age of the population and fluctuations in fertility; change in ethnic ratio; the political, technological and legal component; public impact; technological innovation and standards; the business cycle and other?

Cost control involves the use of instruments in the form of a developed budgeting system, involving the effective use of resources and control mapping execute strategic objectives in the development of budgets, organization of their implementation, monitoring and results analysis.

The role of the cost of the company in the formation of solutions is that the price level allows determining the estimated amount of revenue from sales, and as a result, the planned volume of production. That is especially important in the preparation of the sales budget of the company, which is the starting point of the entire budgeting system in the company [Skornyakova I. V. 2018].

STATEMENT OF THE PROBLEM

The costs they must be properly classified and taken into account to correctly account for. Many authors suggest different classifications of costs depending on methods and accounting purposes. For example, the authors identify the following classification, as shown in table 2.

Table 2: Classification of costs [Glukhova I. M., Kushnerova O. N. 2015]

Purpose: calculation of the cost of production, analysis of the cost of inventory and profit received	Goal: decision making and planning	Goal: control and regulation
* Costs at the beginning of the period and at the end of the period; * direct and indirect; • basic and applied; * production and recurring costs; * single-element and complex; * current and one-time	* Constants and variables; • accepted and not taken into account in evaluations; • non-refundable costs; * imputed costs; * marginal and incremental; * Planned and unplanned.	Regulated; unregulated

There are many options for organizing expenses of the organization, but in this case, we are interested in the pricing process (table 2). We will focus on the classification of the costs, reflected table 2. In the

process of pricing often, allocate main technical parameter. It is this property of goods, and bought at a specified price (the Approach A. K. Lancaster). For example, the fat content of milk, the quantity of enzymes in cosmetic cream, the magnitude of the shear crank, etc. Those costs that create the main technical parameter, referred to as primary, others patch.

The next item in table 2 (direct and indirect costs) shows, if the costs can be directly, economically, and directly attributed to the product, that is direct costs, if the costs cannot economically and directly attributed if you write off the product you are creating, this is an indirect cost. The division of costs into direct and indirect is carried out in the accounting organizations in Russia since 2006; the Organization itself carries out the classification based on technological rationality. Direct costs have two main largest group: direct labor costs (PTZ) and direct material costs (DMC). Direct labor costs (PTZ) include all costs of operation of forces that can be directly and economically to carry on a certain kind of ready-products. Wages of machine operators and other workers engaged in the direct manufacturing of products. However, with the associated production and maintenance workers, managers and craftsmen, and support staff. The cost of their labor should also be included in the composition of production costs. However, these costs are labor and cost cannot be directly attributed to a specific form of finished products, they are treated as an indirect (indirect) labor costs. Indirect labor costs, like indirect material costs are considered as part of overhead costs. The division of labor costs into direct and indirect largely depend on specific situations. If the company produces one product, the monthly wages of not only production workers, but wages of management personnel can be classified as direct costs.

Direct material costs are costs of raw materials and basic materials. Basic materials are materials that become part of finished products, their cost directly and economically, without extra costs apply to a certain product. The magnitude of direct material costs can be calculated by multiplying the number of materials that can be definitely attributed to a specific product, the unit price of materials. Virtually all the norms of consumption of resources are called direct costs. This division of resources is conditional, personalized for each organization. The classification is based on the technological possibilities of production.

The following item classification. Fixed costs (FC) do not depend on production volumes and provide fixed costs, such as salaries of top management, the costs of buildings, structures, and Variable (VC) costs are almost directly proportional to depend on the volume of production, these include the costs of raw materials, wages of production workers, and other similar costs.

The main production costs are the costs of the company that are directly attributable to the production process (operating activities) of the company. Legal regulation of accounting and reporting in relation to the formed-term production cost per unit and total issue volume is based about the Ministry of Finance.

For accounting and generalization of information on availability and movement of finished products produced by an "output (works, services)". Account "output (works, services)" is intended to summarize the information about released products, delivered to Ketchikan works and services rendered during the reporting period, and identifying deviations of the actual cost of production of these products, works, and services from normative (planned) costs.

The next step in cost accounting is to sell products. In this case, there are two groups of costs that form the cost of the product:

-cost of sales;
-cost of goods remaining in the warehouse.

The organization's desire to reduce the volume of goods remaining unsold is directly related to the basic principles and methods of work of the companies based on commercial profit. To prevent the formation of excessively large amounts of production costs of companies seek to accurately determine the potential and real volume of effective demand of your target audience and choose the pricing method that is appropriate for a particular market segment. An additional competitive advantage in this

case, the own company working on a contract basis. As the system of contractual relations in institutional Economics provides the implementation of the planned volume of production in full.

Indirect (overhead) costs are the costs of the company in the emerging service process the production process of the company.

To summarize the information on costs resulting from the organization of the mechanism for the implementation and promotion of goods on the market use the account "selling Expenses". This account displays the costs of the following activities:

Organization of the system of warehousing goods;
Packing and packaging of goods in the warehouse;
Loading unloading works;
Commissions paid to marketing and other intermediary organizations;
The cost of advertising.

The financial aspect of the classification costs of the company, the formation of production unit cost of the product and total costs of the organization, accounting and analysis of actual cost of sales is realized through the development of the following management systems:

Cost control in the centers of formation costs;
Managing profit centers of formation of profit;
Inventory management, particularly inventory;
Inventory management, in particular the volume of work in progress;
Inventory management, in particular finished products in the warehouse.

It unit variable cost per unit of output are increased in a factor analysis in the formulation of flexible budget.

Gross fixed costs do not change when you change the volume of production of goods, but when calculating the per unit becomes variable (AFC).

Example. The determination of the proportion of fixed and variable costs in total costs, using method "mini-Maxi", the original data are presented in table 3.

Table 3: Source data on total costs and the company's production

The volume of production, Q	Grand Total cost, TC.
10	1000
12	1120
13	1230
15	1350
18	1400
20	1480
22	1500
25	1580
27	1670
29	1900

When determining specific variable costs, use the "mini-Maxi" method»:

$$AVC = \frac{TC_{max} - TC_{min}}{Q_{max} - Q_{min}} \quad (4)$$

$$AVC = \frac{1900-100}{29-10} = 47\text{т. р} \quad (5)$$

$$FC = TC_{max} - Q_{max} * AVC \quad (6)$$

$$FC = 1900 - 29 * 47 = 530\text{т. р.} \quad (7)$$

Thus, the company's gross cost formula will be written as follows:

$$TC = AVC * Q + FC \quad (8)$$

When structuring costs and determining production volumes, it is necessary to conduct a break-even analysis and an analysis of costs per unit of product, an analysis of assortment and quality.

The cost structure (variable and fixed costs) is particularly important when forming a flexible company budget. A flexible budget is a company's budget that is based on the company's gross cost function. The economic essence of a flexible budget is to determine the deviations of actual costs from planned costs when the volume of output changes. When organizing the planning system in the company, determining production volumes, costs are a key condition for the rational use of production factors and ensuring the normative value of profitability.

When developing resource expenditure standards, the following indicators are introduced:

norms of consumption of raw materials used in the production of goods, determined on the basis of developments in the field of R & d;
Norms of labor costs, determination of expenses for its payment in accordance with the system of remuneration in the company;
Norms of indirect costs of labor and materials, expressed as General production costs.
Consider a hypothetical example. Initial data on the company's planned costs for the production of 500 units of goods and actual costs for the production of 550 units of products, table 4.

Table 4: Initial data on actual costs and output volumes: planned output volume and actual output volume, RUB

Cost items	**Cost structure**	
	500 unit	**550 unit**
Variable costs:		
Raw	7000	7800
Semi-finished products (bushings)	1000	1100
Wages of production workers	1500	1700
Payment for electricity and water consumption (variable part)	2000	2100
Constant flow:		
Salary of management personnel	3000	3400
Lease payment	1800	2000
Payment for electricity and water consumption (permanent part)	1200	1300
Total production costs	17500	19400

If you find a deviation of actual costs from the planned amount of costs from the source data, you will get an incorrect version of determining the deviation in the volumes of actual and planned costs, depending on the volume of output. Therefore, we calculate the unit costs per unit of planned output, table 5.

Table 5: Unit costs per unit of planned output, RUB

Cost items	**Cost structure**		
	500 unit	VC	550 unit
Raw	7000	14	7700
Semi-finished products (bushings)	1000	2	1100
Wages of production workers	1500	3	1650
Payment for electricity and water consumption (variable part)	2000	4	2200
Salary of management personnel	3000	const	3000
Lease payment	1800	const	1800
Payment for electricity and water consumption (permanent part)	1200	const	1200
Total production costs	17500		18650

As you can see from table 5, the increase in costs in value terms for the actual volume of sales is 1,150 rubles, or 6.57%. The result of planning the volume of production costs of the company are indicators:

Planned expenditure in absolute terms for output;
The cost per unit of output (ATC);

The volume of costs per unit of commodity production.

Accounting and analysis of the company's cost structure is an important factor in making effective management decisions. For example, in diversified industries with a wide range of both raw material suppliers and consumer groups, there is often a question of accepting or rejecting an offer to supply components, parts, and components of the product. In the search for additional competitive advantages, minimizing production costs while maintaining the achieved level of quality is a strategic goal of planning and developing the company in the long term. In this case, it is necessary to structure all the company's production costs for pricing purposes. As we can see, the production cost of a single product with a production volume of 500 units of the product has developed at the level of 21.7 rubles. Let us assume that we received an offer from a partner company to supply this product at the sale price of 19 rubles per piece. We justify the economic efficiency of accepting (rejecting) this offer using the category of gross expenses of the enterprise and margin income, table 6.

Table 6: Justification of the economic efficiency of the offer

Cost groups	Input cost			
	Total costs for own production	Total costs associated with purchasing components from an external company	Unit costs for own production	Unit costs with the purchase of components from an external company
The cost of purchasing a component part	0	9500		19
Main materials	650	0	1.3	0
Labor costs of production workers	5500	0	11	0
Overhead (variable part)	2000	0	4	0
Overhead (permanent part)	2700	2700	5.4	5.4
Total costs	10850	12200	21.7	24.4
Deviation		+1350		+2.7

As we can see, buying a product from a third-party partner company is a non-effective management decision for us. Since the structure of the company's production costs implies a large share of fixed costs in the total production costs of the company, namely 24.88%. An acceptable variant of the price level of the component is at a level not higher than 16.3 rubles per unit, which is located as a difference of 19-2. 7=16.3 rubles per unit.

The main cost-oriented pricing models include:
Method of pricing based on variable costs;
Method of pricing based on full costs;
Return on sales method;
return on assets method.

Whatever method you choose, the final price for each method is the same, and there is a different distribution of costs and profits. Consider the mechanism for setting the sales price using a pricing model based on the unit cost calculation using the variable cost category. The formula for determining the company's profit when using the variable cost model has the following form:

Profit = (P – ATC) * Q - TC (9)
Where, Profit-profit;
P-product price;
AVC-specific variable costs;
Q - Volume of production;
TC-total costs;
r-profitability of a unit of production;
VC-variable costs.
In this case, the formula for the price of a product using the variable cost method has the form:
P =VC* (1+A))

Unit costs with the purchase of components from an external company

$$AVC = \frac{FC+Prfit}{VC} \quad (10)$$

According to the structure of the parameters of the formula for finding the price based on the method of accounting for transferred costs, it can be noted that the determination of the cost of a unit of goods is based on the summation of specific variable costs. While the value of specific fixed costs is applied

to the entire volume of product output and is included in the profit category. Thus forming a measure of the company's margin profit and margin income.

Let's consider the mechanism for setting the sales price using the pricing model based on calculating the cost of a unit of production based on full costs.

P = ATC (1+Rtotal) (11)
Where, ATC = AVC + AFC;
AVC-specific variable costs;
AFC-specific fixed costs.
In sum, variable and fixed costs per unit of production are the total cost per unit of production or the cost per unit of production.

LITERATURE REVIEW

Theoretical and methodological prerequisites for the emergence and development of current theories of value have served as the scientific works of the largest researchers of the theory of value, such as W. petty, D. Ricardo, A. Smith, J. B. Say, John. St. Mill, K. Marx, V. Lenin, Macconnel, C., Brue S., A. A. Cournot, W. Pareto, W. S. Jevons, A. Marshall, K. Menger, O. Boehm - Bawerk, F. von Wieser, L. Walras, J. B. Clark, K. Vexilla, John. Hicks, M. I. Tugan-Baranovsky, A. N. Bogatko. Subsequently, the main provisions of the classical school of monetary theory, to appear in theoretical concepts of Russian and foreign scientists studying the issues of formation and transformation of co-temporary theories of value, theories of value management in the post-industrial economy: E. K. Vasilyeva, N. And. Vedernikova, A. L. Dmitriev, T. G. Evdokimov-ing, V. E. Esipova, I. A. Jeltkovo, S. A. Kotlyarova, A. D. Krikunova, G. A. Mahovikova, E. E. Pavlova, S. V. Pereverzeva, N. Yu. Puzyna, M. S. Abryutina, Kapelyushnikov R., There Bulava V. L., V. M. the Galperina, Elster J.,North D., Davis L., Eggertsson T., John. Com-Mons, Stigler J., Williamson, O. E. Clay, George. Itwell, M. Milgate, And P. Newman.

CONCLUSION

In modern market conditions, characterized by different degree of competitor-Noah wrestling depending on the belonging to the industry, and the decline of investment attractiveness, there is a need of constituent entities of national economy of various legal organizational forms in the combination of methods and tools of cost management in your organization at different stages of the life cycle: production, raw material supply, marketing and retail network. It should be noted that the level of competition is completely dependent on scale, pricing methods, types of market structure, the category of goods. So, now enhanced status of social relations, which is an important feature of competition and the price system. So the theory of value and prices can only be based on the basis of a particular ethical system. Currently, issues of diversification and competitiveness of industries, and defines the required institutional changes in the economy associated with the increase of its competitiveness.
On the other hand, in the framework of institutional decisions are designed the information platform for cost accounting, the implementation of which will ensure the creation of sustainable, structurally-balanced industry. All this requires the economic entities of strategic formation models for the formation and management gross expenditure in the long term.

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The Problem of Youth Unemployment and Entrepreneurship

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Abstract
The study is devoted to the problem of youth unemployment and entrepreneurship. The study has revealed an increase in unemployment in low- and middle-income countries, which is a driver of business development, including youth entrepreneurship. It is facilitated by government projects that are less popular in high-income countries than assistance in job creation and job search. The problem of unemployment in low-and middle-income countries is solved by the shifting of priorities from reducing unemployment to increasing employment. The high level of unemployment among young people prevails in the developed countries with a high share of industrial production in GDP. This is due to the need to get an excellent education and qualifications for tech-intensive sectors of the economy. Limited educational opportunities in low- and middle-income countries are not an obstacle to self-employment and entrepreneurship.
The exceptional position of the problem of youth unemployment and entrepreneurship in modern world order is associated with consistent high values of indicators of poverty rate dynamics of working youth, which depends on gender characteristics. High unemployment is observed among young people, both men and women, but employment among young men is significantly higher.

Keywords: Entrepreneurship, Youth, Unemployment, Poverty, Employment, Growth Rates.

Introduction

For a holistic analysis of youth unemployment and entrepreneurship in the current world order, we will explain their essence. From the point of view of ontology, unemployment is perceived by our consciousness as an abstract availability of people of working age in the economy who have no job, but fit for it and looking for it. The concept of employment is close to the functional characteristics of

a person and links the specific activities of people with satisfaction of their personal and social needs through earnings received and labor income.

Therefore, unemployment is understood as absence of a permanent job, and employment is a purposeful activity of a person focused on obtaining a stable and high income. Thus, an increase in the level of employment is more associated with self-employment and entrepreneurship, and a decrease in the unemployment rate is associated with government measures to promote job creation and help to find a job.

Giving the concept of unemployment and entrepreneurship the attribute "youth" does not change their essence, but only highlights the gender area of the problem.

The immediacy of the problem of youth unemployment and entrepreneurship in modern world order is related to a peculiar position of young people in the structure of the poverty rate among working people, and in accordance with the sustainable development goals (SDG) of the International Labour Organization (ILO). The SDG indicator shows the poverty rate of working people living below $US 1.90 at purchasing power parity.

As a result of the study of the predicted 2000-2022 data dynamics according to Human Development Reports, ILO has revealed an almost synchronous positive decrease in the poverty rate among the working population in the world, whereas high values of the poverty rate among working youth hold true.

At the same time, withdrawal of the youth from the "poverty structure" among working people often leads to an increase in unemployment. On the one hand, this is due to interruptions in work caused by the search for a new source of income, and on the other hand, the transition to alternative income in the form of receiving state unemployment benefits.

Consequently, the growth rate of unemployment among young people is an invariant of the entrepreneurial activity indicator, as it generates incentives for employment and self-employment. The results of the assessment of unemployment growth rates among young people have allowed us to form a conditional hierarchy of countries (table 1), that makes it possible to distinguish by: high median indicators and variance:

Pakistan (Me = 38.5%; σ^2 = 2310.1), Thailand (Me = 15.4%, σ^2 = 582.0) and Luxembourg (Me = 8.1%, σ^2 = 516.1);

low variance:

Swaziland (Kingdom) (σ^2 = 0.3, Me = 0.2%), China (σ^2 = 3.3, Me = 1.0%,) and Oman (σ^2 =3.7, Me = 1.1%).

Table 1: Hierarchy of countries by growth rates of "Me>0" youth unemployment (% aged 15-24), 2011-2017

Country	**Median, Me>0**	**Variance 6^2**
Pakistan	38.5	2310.1
Thailand	15.4	582.0
Luxembourg	8.1	516.1
Burkina Faso	6.7	15.1
Trinidad and Tobago	6.3	334.1
Mongolia	5.9	873.1
Palestine, state	5.4	57.3
Dominican Republic	5.4	298.8
Brazil	5.2	316.6
Jordan	5.2	38.8
Rwanda	4.9	357.5
Argentina	4.9	58.0

Country	**Median, Me>0**	**Variance 6^2**
Italy	4.6	105.8
Paraguay	4.5	96.4
Turkey	4.1	68.7
Kyrgyzstan	4.0	113.6
Bangladesh	3.9	59.3
Bahamas	3.8	103.6
Bahrain	3.8	44.9
Iran (Islamic Republic)	3.6	66.8
Maldives	3.1	25.9
Austria	2.9	38.3
Iraq	2.9	137.5
Honduras	2.8	222.7
Uruguay	2.8	77.9
Peru	2.7	181.0
Lesotho	2.6	65.4
Algeria	2.3	203.5
Morocco	2.3	28.4
Panama	2.2	157.8
Sierra Leone	2.2	14.2
Nepal	2.0	154.5
Cuba	2.0	113.8
Brunei Darussalam	1.9	53.7
Korea (Republic)	1.9	26.4
Barbados	1.7	61.0
Guatemala	1.7	468.9
Bosnia and Herzegovina	1.4	50.0
Sudan	1.4	4.1
Costa Rica	1.4	36.4
Indonesia	1.3	69.2
Suriname	1.3	121.0
El Salvador	1.2	98.5
Afghanistan	1.1	11.7
Oman	1.1	3.7
Armenia	1.0	121.3
Bhutan	1.0	272.3
Mali	1.0	2458.8
China	1.0	3.3
India	1.0	8.0
Haiti	0.8	26.3
France	0.8	15.1
Fiji	0.8	52.7
Saint Lucia	0.8	72.7
Namibia	0.7	162.0
Saudi Arabia	0.3	66.1
Swaziland (Kingdom)	0.2	0.3
Russian Federation	-1.8	66.1

Source: calculated using the data from Human Development Reports. ILO (International Labour Organization) (2018a). ILOSTAT database. www.ilo.org/ilostat (Accessed 13 April 2018).

The distinctive characteristics of these countries (according to the IMF) are: Pakistan – the population density is 258.45 people/km^2, GDP per capita – 5084 US dollars, HDI – 0.562 (average); Thailand – the population density is 130.5 people/km^2, GDP per capita is 7187 US dollars, HDI – 0.755 (high);

Luxembourg – the population density is 233.7 people/km^2, GDP per capita is 125364 US dollars, HDI – 0.904 (very high).

Thus, high median indices of youth unemployment growth rates are associated with high population density. Swaziland (Kingdom) – the population density is 68.4 people/km^2, GDP per capita is 3400 US dollars, HDI – 0.588 (average). China – the population density is 146.3 people/km^2, GDP per capita is 9380 US dollars, HDI – 752 (high). Oman – the population density is 12.3 people/km^2, GDP per capita is 45168 US dollars, HDI – 0.821 (very high).

Low variance in youth unemployment growth rates is determined by the high ratio of population density to GDP per capita.

Thus, the basic conditions for emergence and development of entrepreneurship in modern world order are quite simple and easy to evaluate. At the same time, in order to fully understand the possibilities of overcoming unemployment and developing entrepreneurship among young people, it is necessary to evaluate, in addition to density, the ratio of population density to GDP per capita, such indicators as: dynamics of the share of young people without education, work or professional training; self-employment; private indicators of employment and unemployment – employment ratio, total employment in industry, employment rate, the percentage of employees working more than 48 hours a week, etc.

The UN defines "youth" as people between the ages of 15 and 24. The definition appeared in the context of preparations for the International Year of Youth (1985) and was approved by the UN General Assembly in resolution 36/28 of 1981 (A/36/215). In the UN General Assembly Resolution (A/RES/70/1) "Transforming our world: the 2030 Agenda for Sustainable Development" of 25 September 2015, the interests of young people are taken into account in all goals and objectives.

Today, there are 1.2 billion young people aged 15 to 24 – 16% of the world population. For youth, the problems of unemployment, underemployment and low quality jobs remain unresolved. Young people are three times more likely to be unemployed than adults (in 2017, the youth unemployment rate in the world was 13%). Many young people are employed in low-paid, unstable or unofficial jobs.

The problem of youth unemployment. The ILO highlights youth unemployment as a global problem. More than 64 million unemployed young people worldwide and 145 million young workers live in poverty.

The ILO's multilateral approach to reducing youth unemployment rate is based on (O'Higgins, 2017(a)): economic policy of youth employment; possibility of getting education, training and skills, and transition from school to work; labour market policy; youth entrepreneurship and self-employment; and the right of young people to work.

It should be emphasized that one of the reasons for the development of the youth labour market is aggregate demand. A long period of youth unemployment is connected with a recession in the economy, and a decline in GDP leads to an increase in youth unemployment (Matsumoto, Hengge and Islam, 2012), (O'Higgins, 2012), (Choudhry, Marelli and Signorelli, 2012).

The implementation of the discretionary countercyclical fiscal policy (fiscal expansion based on an increase in public investment spending) in most OECD countries during the 2008 recession reduced the growth of youth unemployment (Gechert, 2015). Countercyclical fiscal policy is a tool for reducing youth unemployment during recessions. Under certain conditions, measures that increase budget deficit (or reduce budget surplus) can mitigate the negative impact of insufficient aggregate demand for labour of both youth and adults, restraining any reduction in employment and growth of unemployment (O'Higgins, 2017(b)).

Over the past century, there has been a gradual transition of young people from agriculture to industry, and especially into the service sector. Currently, the agricultural sector accounts for more than half of youth employment in low- and middle-income countries (LMICs). Low indicators of labour productivity in the economy contribute to the growth of youth employment. For LMICs agriculture is the dominant sector in terms of GDP formation and employment share (Loayza and

Raddatz, 2010). The growth in agricultural production has a positive effect on the reduction of unemployment among young people and their employment (O'Higgins, 2017(a)).

The review by the economist of the data preparation and analysis department of the ILO Statistics Department Rosina Gammarano on the problem of labour market access for youth around the world, based on global estimates for youth labour market indicators (Gammarano, 2019) showed that in 2018 21% of the world's youth were not employed and did not study. The future situation of youth labour market depends heavily on their initial experience, including how quickly and how well they can access labour market, as well as skills and competencies acquired through education and training. If you look at the proportion of young people who are not employed, do not study or are not taught separately for women and men, you find a striking gender picture – in 2018, more than 30% of all young women in the world were not involved in employment, education, or training, compared to 13% of young men.

Young women are more than twice as likely as young men to become unemployed and not to get an education. While 44% of young men in the world were employed in 2018, only 29% of young women had jobs. Similarly, 43% of young men got an education or training exclusively self-employed, compared to 40% of young women.

The situation is particularly alarming in the Arab States, where 29% of all youth in the region did not work, study or train in 2018, as compared to 23% in the Asia-Pacific Region and Africa, 19% in North and South Americas, 14% in Europe and Central Asia. The gender gap in the labour market is most impressive in the Arab States, where in 2018 45% of young women did not have work, education or training (compared to 15% of young men), in the Asia-Pacific Region 35% of young women did not have work, education or training (compared to 12% of young men).

In 2018, 37% of all young people in the world were employed, as compared to 64% of adults. In addition, 58% of all youth were outside the workforce, as compared to only 33% of all adults. These two facts are not surprising, since many young people are expected to get an education while staying out of the labour force. However, the analyses of the unemployment rate and the overall level of unemployment and potential labour force of youth and adults are very eloquent: in both cases, the percentage of youth approaches threefold the level of the adult population. While the adult unemployment rate in 2018 was 4%, the youth unemployment rate was 12%, and although the overall level of unemployment and potential labour force among adults was 7%, the corresponding rate among young people was 20%.

Recognizing the urgency of the problem of youth unemployment, the ILO has committed itself to significantly reduce it by 2020 as part of the SDG programme goals.

Assistance in job creation for young people. The SDG ILO goal is to reduce youth unemployment in the context of ensuring a sustainable, comprehensive economic development through productive and effective employment and decent work for all.

In modern world order, the common practice of promoting youth employment is to subsidize wages. Youth wage subsidy programmes, including cost reduction for youth recruitment firms, have become the backbone of the active labour market programmes/policy (ALMP) in high-income countries (HICs), especially since the beginning of the global recession. ALMPs are less common in LMICs, where they focus more on teaching of skills and promoting entrepreneurship.

ALMPs are state-funded programmes aimed at improving prospects of the participants. They include the following elements (O'Higgins, 2017(a)):

1) employment services and job search assistance (ESJSA). This is usually done by public employment services, which act as an intermediary between firms and job seekers;

2) subsidized employment takes two main forms:

- public employment projects (programmes) (PEPs), such as infrastructure construction, community service, etc.;

- assistance in job creation in private business through wage subsidies for young people;

3) training young people in professional skills at work or outside work.

Particular provisions of ALMP offer a series of support measures that cover more than one of the elements outlined above. Consequently, ALMP participants receive a combination of support forms, such as ESJSA combined with a wage subsidy from a private employer, on condition that the employer provides training.

The main rationale for introducing a wage subsidy is that it will increase employment for target groups, reduce labour costs and, as a result, increase the demand for labour resources. At the same time, two ALMP factors can lead to an integration effect after the end of the subsidy period due to the fact that: the subsidized pay period can act as a screening device, providing direct information about the performance of a young person; subsidized wages help to form skills through "training in practice" (Heckman, Lochner and Cossa, 2002), (Kluve, Puerto, Robalino, Romero, Rother, Stoterau and Weidenkaff, 2016).

Self-employment and entrepreneurship. In the context of a decrease in world trade growth rates and an increase in global competition, the development of self-employment and entrepreneurship is becoming a key element of the strategy for promoting youth employment in LMICs.

The increase in self-employment reflects "latent" unemployment, when it acts as a temporary alternative to unemployment (Tatomir, 2015). Self-employment may also indicate that people are employed part-time, for example, in the case of people who receive a certain income from formal work but want to work extra hours to increase their income. The increase in self-employment reflects long-term demographic trends, technological development, or institutional changes that encourage people to create independent firms.

The prevalence of self-employment is closely related to income level per capita in the country. In LMICs, the vast majority of the economically active population is self-employed, concentrated in sectors such as construction, agriculture, and street trading (Gindling and Newhouse, 2014). Most self-employed people in LMICs work in sectors of the economy with low productivity and income, and as a result, many of the self-employed and their families remain poor.

The self-employed in HICs also have few rights to paid sick leave, leave, maternity leave or parental leave, or compensation for dismissal. Within the EU, self-employed workers tend to work longer hours and have lower earnings as compared to full-time workers (D'Arcy and Gardiner, 2014).

Self-employment is not always a favourable employment status for young people. Self-employment promotion is not necessarily an effective mechanism for increasing social mobility or reducing poverty. In many cases, self-employment can be seen as the only way to generate income in economically depressed areas.

So, self-employment becomes a survival mechanism both on the part of a person and his family. Self-employment among young people is often rooted in the family where parents or other family members are self-employed. Self-employment is less advantageous than permanent employment. Instead of receiving a constant guaranteed income in the formal sector, many career paths of young people are stuck in a cycle between self-employment and unpaid family work, which in itself is considered a much more negative phenomenon (O'Higgins, 2017(a)).

Method and Results

To assess the possibilities of reducing unemployment and developing entrepreneurship among young people in modern world order, we apply the methods of descriptive statistics, including processing of empirical data, their systematization, visual representation in the form of graphs and tables, and their quantitative description by means of basic statistical indicators. Using descriptive statistics, we estimate the data set by statistical indicators – median and variance.

To identify the "stimulus-response" in relation to "unemployment-entrepreneurship", we apply statistical and cluster analysis. Statistical analysis will serve as a method of collecting, studying and presenting large amounts of data on properties (Lazar, Feng and Hochheiser, 2017) and data relationships (Schofield, 1993), correlation relationships of spatial and time series of indicators, which will allow us, while maintaining the research methodology, to create an analytical platform for applying cluster analysis. Cluster analysis will make it possible to justify the significance of the reasons for changes in money supply (monetary aggregate), to identify the main schemes of their

grouping, to formulate hypotheses (Adolfsson, Ackerman and Brownstein, 2019), (Favero and Belfiore, 2019).

Analysis

A multi-faceted review of literature on youth unemployment and entrepreneurship in modern world order allows us to conclude that young people who are not involved in the current structure of economic activities are forced to create new forms of gaining income, both legal and illegal. Within the framework of legal forms of income generation, the choice of young people is limited to entrepreneurial activity – entrepreneurship.

In view of the fact that there are many regulatory restrictions on entrepreneurial activity in the world, and the subject of the study is the analysis of the dynamics of youth entrepreneurship in the world, the presence of Russia as a certain regulatory benchmark is necessary, even if it is not included in the hierarchy of countries in terms of growth in youth unemployment. Relatively stable

median values of youth unemployment growth rates (Me = -1.8%, $\sigma^2 = 66.1$)

allow Russia to be included into the study as a determinant of youth unemployment and entrepreneurship in modern world order.

Relative to Russia, Pakistan and Thailand show high median rates and variance in youth unemployment. Pakistan is a developing agro-industrial country, and agriculture is the basis of the economy. The main crops are wheat, sugar cane, cotton and rice, which together make up more than 75% of the total value of exported crops. Pakistan's largest food crop is wheat, which in 2017 was produced more than in Africa and almost as much as throughout South America.

Thailand is an agro-industrial country too. The share of agriculture in GDP is more than 10%, it employs a third of the working-age population of Thailand.

Despite the fact that Pakistan and Thailand are agro-industrial countries, and according to the ILO SDG concept, the development of low-productive sectors of the economy (agriculture) in LMICs will significantly reduce the unemployment rate among young people, in reality we see the opposite effect.

In the structure of the hierarchy of countries by growth rates of youth unemployment (see table 1), one should single out a high level of youth unemployment in developed countries with a high share of industrial production in GDP such as Austria, Italy, Luxembourg and France. First of all, this is due to the need to get an excellent education and, secondly, to off-the-books employment, when young people do not seek to register their income, usually realizing their potentials in the service sector.

Limited educational opportunities in most LMICs are not an obstacle to self-employment and entrepreneurship, for example, in countries such as Armenia, Afghanistan, Bangladesh, India, Iraq, Mali, Namibia, Pakistan, Sudan, Trinidad and Tobago, Turkey.

The problem of the high proportion of young people without education, work or training is gradually taking hold in Europe. This is a critical problem, since the highly developed European labour market cannot "digest" the excess supply of unskilled labour. There are significant negative median values of the growth rates of youth self-employment in Luxembourg, Greece, Croatia, Poland, Serbia, Iceland, Belgium, Malta, Italy, Portugal, etc.

Let us analyze the growth rates of employment and unemployment indicators in Russia (table 2).

Table 2: Clusters of the growth rates of employment and unemployment indicators in Russia, 2010-2018

Cluster		Squared Euclidean distance
Proportion of adult population with higher education	Employment rate, men	24.240
	Total employment in industry	43.215
	Youth employment rate	82.672
	Level of employment	106.859
	Percentage of employees working more than 48 hours a week	537.914
	Unemployment rate	593.918
	Non-fatal industrial injuries per 100,000 employees	728.196
Level of employment	Population employment	2.675
	Employment rate, women	11.180
	Total employment in agriculture	89.115
Employment rate, men	Employment-to-population ratio, men	3.270
Total employment in industry	Employment-to-population ratio, women	2.706
Total employment in industry	Total number of people engaged in services	9.821
Total number of people engaged in services	Average number of actual hours worked per week per employed person	3.146
Unemployment rate	Unemployment rate, women	20.897
	Unemployment rate, men	32.527
	Youth unemployment rate	491.689
Youth employment rate	Youth employment rate, men	1.426
Youth employment rate	Youth employment rate, women	5.961
Youth unemployment rate	Youth unemployment rate, men	6.462
Youth unemployment rate	Youth unemployment rate, women	32.235
Non-fatal industrial injuries per 100,000 employees	Lost days on occupational injury	79.294
Non-fatal industrial injuries per 100,000 employees	Fatal industrial injuries per 100,000 employees	302.640

Note: Hierarchical cluster analysis – the average distance between clusters, squared Euclidean distance.

Source: calculated in "SPSS Statistics" according to the Russian Federation. ILOSTAT Country Profiles. https://www.ilo.org (Accessed 01 November 2019).

The analysis has revealed significant clusters:

1) adults with higher education, mostly men, are employed in industry;

2) opportunities to increase the employment rate mainly among women are related to agriculture;

3) high unemployment rate among adult men;

4) high youth unemployment among women.

5) loss of basic income is caused by non-fatal industrial injuries (lost days on occupational injury).

The resulting clusters allow us to highlight the gender component of the problem of Russian unemployment and entrepreneurship. High unemployment is observed among young people, both men and women, but employment among young men is significantly higher. At the same time, we notice low unemployment of the adult population "25+" among men, high employment among women.

The current economic situation in Russia indicates a significant enhancement of the role of entrepreneurship as a strategic resource that can provide an increase in national welfare (Smirnov, Talanova, Zakharova, Dulina, Getskina and Huraskina, 2018), (Smirnov, Semenov, Kadyshev, Zakharova and Perfilova, 2019), (Smirnov, Zakharova, Talanova, Dulina, Gubanova and Getskina, 2019).

The study results in complementary proposals and measures to improve youth unemployment situation:

- formation of social capital as a special economic environment and state institutions that increase the associative activity of functioning of entrepreneurship factors;

- the solution to the problem of population urbanization lies in the synchronization of small business management processes and the development of the urban economy;

- formation of industrial capital as part of financial capital will contribute to the development of the small and medium-sized enterprises sector;

- development of the mechanism of industrial cooperation and social stabilization, typical for the Russian craft of the past, will maintain a favourable institutional climate for corporate business, etc.

Conclusion

The immediacy of the problem of youth unemployment and entrepreneurship in modern world order is related to a peculiar position of young people in the structure of the poverty rate among working people. The dynamics of the poverty rate among working people in the world shows persistently high values among young people. This negative phenomenon is compounded by a high percentage of young people in the low-income group.

Unemployment growth in LMICs encourages the development of entrepreneurship, including youth entrepreneurship. This is facilitated by PEPs less popular in HICs than ESJSA measures. For example, the shift in emphasis on entrepreneurship in Russia (a country of LMICs) is linked not only with raw materials-based economic structure, unable to respond to ESJSA government measures, but also with well-developed PEPs implemented within the framework of National projects. Thanks to PEPs, Russia demonstrates significant and stable dynamics in reducing the growth rate of youth unemployment.

Generally, in LMICs the solution to the problem of unemployment as a lack of permanent work for the population is carried out by changing priorities towards employment, where personal interests dominate – stable income generation. At the same time, an increase in income is associated with self-employment and entrepreneurship.

In HICs unemployment growth leads to significant problems in the economy caused by additional costs for implementing ESJSA government measures. High youth unemployment rate is prevalent in HICs with a high share of industrial production in GDP. First of all, this is due to the need to obtain an excellent education and qualifications for tech-intensive sectors of the economy. Limited educational opportunities in LMICs are not an obstacle to self-employment and entrepreneurship.

The study has revealed a long period of high median values of growth rates for the proportion of young people without education, work or training, not only in underdeveloped countries, but in developing countries as well. The importance of the problem of employment and unemployment also depends on gender characteristics. High unemployment is observed among young people, both men and women, but employment among young men is significantly higher. In general, the growth of youth unemployment can reflect their decision to continue education.

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Mediating Effect of Organizational Culture on The Relationship Between Social Media Marketing Agents and SMEs Performance In UAE

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Abstract

Social media marketing is a phenomenon which has become an important aspect of the marketing mix and revolutionize the way companies interact with their customers. It is a new field of research and literature quick scan revealed that not many studies exist on social media marketing on SMEs in UAE. Quantitative methodology was employed in this research and 350 questionnaires were distributed to the target respondents and 245 were used for the analysis in this research work. SPSS and Smart-PLS were employed in data analysis. The findings indicate that email and twitter have negative effect on organisational culture while Facebook and WhatsApp showed positive effect. However, only the effect of twitter shows significant effect ($\beta = -.606$, $t = 17.49$, $p = .000$) while the remaining variables did not show any significant effect. Altogether, the four social media tools explained about 36 percent change in organisational culture. In addition, the effect of the four's social media tools and SMEs performance indicated that Facebook have negative effect on SMEs performance even though the effect is not statistically significant. The most influential determinant of SMEs performance is shown to be organisational culture ($\beta = .922$, $t = 40.70$, $p = .00$), this is followed by WhatsApp which returned a significant effect ($\beta = .193$, $t = 5.306$, $p = .000$), overall, email, Facebook, twitter, WhatsApp and organisational culture collectively explain about 77 percent variation in SME performance.

Keywords: Social Media, Organizational culture, SMEs, UAE.

Introduction

Over the past few years, social media has gained an enviable position in the life of many people and it has become a topic for discussion across different sections of our society and has gained widespread acceptance in today's busy life. The freedom and the level of interaction one can have in the various social media platforms have also influenced the way business is carried out these days. One can safely assume that in many organisations different platforms of social media has been playing a very important role in business development and better performance (Ahmad *et al.,* 2019). There has been a fundamental shift in the strategy of conducting business amongst the ever-evolving business community all over the world and the people who have not yet got into the bandwagon are forced to come on board due to the rapid spread and acceptance of social media among the general public and the consumers in particular. As social media has become a part of consumers' everyday life a lot of organizations have started exploring the positive qualities of the internet and have now shifted their attention to e-commerce and online trading (Daou et al., 2018).

One of the many advantages of social media is that it allows an organization to communicate closer to its target audience while it enhances the organization to increase its brand visibility (Gilbert, 2017). "Many organizations active on the social networking scene have direct links from their corporate websites to their social networking sites like Facebook, LinkedIn, Instagram, YouTube and Twitter, and use these social media sites to promote brands and support the creation of brand communities" (Prasad et al., 2019).

The advancements of the internet technologies in recent years have made new systems available to business of social media is one of the examples of such as online communities evolved with the advent of internet technologies. The general availability of the internet has allowed individuals to use social media, from email to Twitter and Facebook, and to interact without the need for physical meetings (Negoiţă *et al.* 2018). Web 2.0 applications have facilitated this, Web 2.0 is a new advancement, which has transferred the internet to a social environment by introducing social media, where individuals can interact and generate content online.

In today's business "environment, social media has become a new marketing tool that is available to all businesses, that instantly develops relationships with potential customers. Traditionally, large companies had the power of reaching their markets through the colossal advertising budget, which small companies found it difficult to fight the stiff competition from these large companies (Leung et al., 2019). Social Media, today, is among the 'best opportunities available' to a brand for connecting with prospective consumers. Social media is the medium to socialize (Ahmad *et al.,* 2018). These new media win the trust of consumers by connecting with them at a deeper level. Social media marketing is the new mantra for several brands since early last year. Marketers are taking note of many different social media opportunities and beginning to implement new social initiatives at a higher rate than ever before. Social media marketing and the businesses that utilize it have become more sophisticated. One cannot afford to have any presence on the social channels if the competitor is making waves with its products and services (Khasawneh, 2017).

Decisions of purchases are normally inspired by the persons who the customers trust and familiar with. Furthermore, several shoppers who shop online encourage to read and get familiar with the thoughts of expert bloggers before finalizing their buying choice to decrease the possibility of purchasing a bad product. Internet-based social groups, dynamically nurtured by Electronic business companies, permit customers to share their familiarities by rating reviews, writing reviews, and talking between trusting affiliates. They drive the number of visitors to shopping" sites and turn out to be an opening point for Web customers. Electronic commerce companies have captured data on the social contact among customers in their websites, with the possible objective of leveraging and understanding the social effect in customers' buying decision process to increase purchaser's attention and ultimately upsurge their sales (Kumar *et al.,* 2020).

Using e-commerce, the "decision-maker trying to concern costs and revenues at the same time, and seeking to follow all the means that lead to the improvement that serves as an goal sought by most of the companies that will contribute to the help the administration in the process of planning and sales policy-making of the company and facilitate the process control of those costs and help the administration in making sound decisions that relate to the marketing activity and being significantly effect on the company's sales and the level of profits (Fahad *et al.,* 2019).

Social media are online platforms that facilitate global collaboration and sharing amongst users. New social media applications in e-commerce appear on a daily basis and result in enormous shocks to the ecosystem of individuals and businesses. One of the most significant trends in the past decades is the growing use of the Internet and communication technologies (ICT). Internet and associated technologies have a major impact on the way organizations conduct business (Hollensen et al., 2017). Internet technologies provide new opportunities for companies to compete in the global market and play a major role in the world's economy. Even though the significance of several studies in the field of online business, the area of this kind of study requires more studies to be done (Taiminen, 2016). SMEs according to the State of Small and Medium Enterprises in Dubai is any company that fits the

thresholds of turnover" and headcount of an employee**,** as suited to the sector that lies into (services, trading and manufacturing). Figure 1 below represents Dubai SMEs' definition of SMEs.

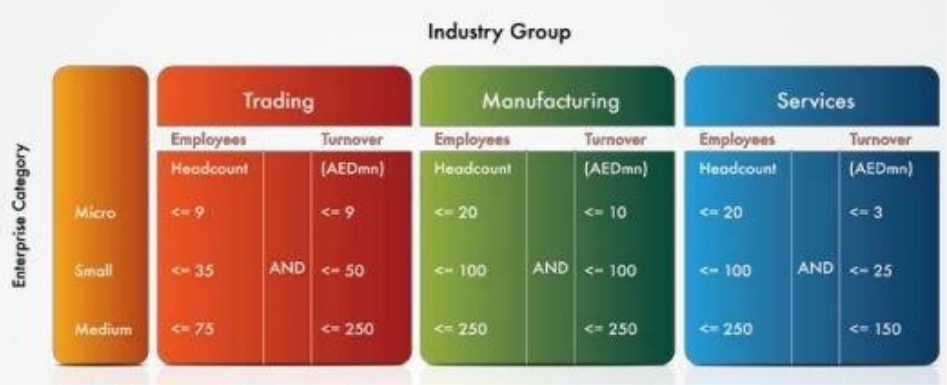

Figure 1: SMEs definition according to Dubai SMEs by the sectors and businesses' size
(Source: www.sme.uae, 2015)

Today, they are around 95% of the businesses and the reason for 90% of employment in the UAE. The report indicated that in Abu Dhabi for example, SMEs represent 74% of firms' total number. Moreover, in a similar report conducted by Dubai Small and Medium Enterprises, 95% firms in Dubai were considered SMEs (Nuseir, 2018). The majority of them are operating in trading sector estimated by 57% while 7% and 35% respectively are operating in manufacturing and services sectors. In addition, the report also stated that the contribution of SMEs to Dubai's GPD% and the total employment by 42% (Atienza, 2019). These findings confirmed by another report conducted by Emirates NBD in 2014. Those reports provide us with clear picture for the significant role of SMEs to UAE' growing economy and its main function to provide business and work opportunities for investors and job seekers which in turns shall grant a maintainable source for investments reaching to the region.

A study conducted by Alaa (2016) revealed that 58% of SME managers stated that they are planning to invest in social networks marketing due to the potentials and full benefits abound in the sector. These online business opportunities are available in the UAE business sector. Example of this businesses are the textiles industries, the electrical and electronics, the capital market and many other sectors. SMEs' top three priorities in digital marketing are increasing the use of social media.

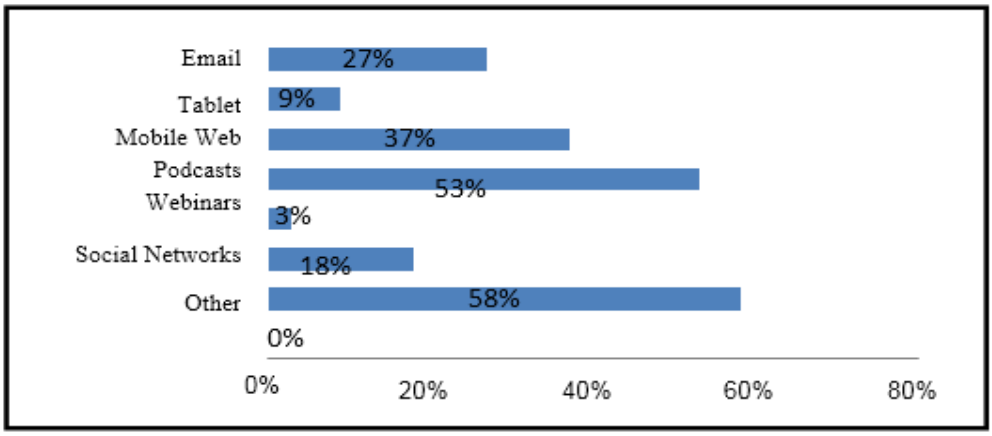

Figure 2: Future Digital Marketing Channel SMEs looking to invest in U.A.E (Alaa, 2016)

Similar a study conducted by Cader and Al Tenaiji (2013), they found that the primary purposes for social media marketing utilization by companies in UAE were as follows: to advertising; improve awareness of the brand: feedback on services or products; directing to the company web site; promotional offers and low-price reach of customers and gathering of market intelligence. Furthermore, they stated that Facebook, YouTube, Twitter, Flicker, Linked in and My Space were probably the famous sites used for marketing activities.

This study will discuss how Small and Medium Enterprises (SME) can leverage social media to penetrate their markets, reach their customers and develop relationships in a personal and direct manner that can catapult their brand and raise their awareness as successfully as any large business. The study also discloses the influence of social media on consumers' online buying decisions.

Methodology

The study employed a quantitative approach to achieve the research objective. The use of quantitative methods provides a concrete manifestation of the findings in an actual setting (Basias et al., 2018). In the same light, the use of this type of research allows the researcher to measure the parameters held in the objectives of this research paper (Brannen, 2017). Using survey research strategy and a convenience sampling technique, a total of 350 questionnaires were self-distributed to the target respondents which were employees of the SMEs in UAE (Quinlan et al., 2019). A total of 245 questionnaires were used for the analysis. The sample size was calculated to guarantee a sufficient number of respondents. Thus, the following formula has been used to estimate the population sample size (Queirós et al., 2017):

Where:

n = Required sample size (minimum size)
t = Confidence level at 95% (standard value of 1.96)
p = Estimated fractional population
m = Margin of error at 5% (standard value of 0.05)

The number of respondents in each subgroup was calculated based upon the collected data from the 263 respondents. Similarly, the questionnaire constituted of two sections A and B. Section A sought information about the respondents' socio-demographic data while section B contained questions with respect to the research constructs. The question format in the section B was designed in a Likert-scale format in a scale of 1 (strongly disagree) to 5 (Strongly agreed). Table 1 presents the factors, number of measurement items, scale and sources for each of the constructs used in the study. The data analysis was conducted using SPSS and AMOS software.

Result and Findings

Measurement Model Assessment

Figure 3 below shows the measurement model for SMEs performance. The model consist of six constructs measured in reflective-reflective mode (Hair, Ringle, & Sarstedt, 2011). The six constructs are linked with one-headed arrows which indicate causal effect among them. Being a reflective-reflective model, the assessment of the measurement model involves testing the validity of the model, the indicator loadings, Average Variance Extracted (AVE, composite reliability and discriminant validity needs to be computed (Hair, Ringle, & Sarstedt, 2011). The main purpose of assessing measurement model is to test for construct validity. According to Hair, et al (2017) construct validity is the degree to which the indicators of a latent construct represent it.

Construct validity is assessed through testing the convergent and discriminant validity. The convergent validity measures the extent of correlation among the indicators of a latent construct. On the other

hand, discriminant validity test the degree of uniqueness of a construct relative to other constructs in the research model (Henseler et al., 2015).

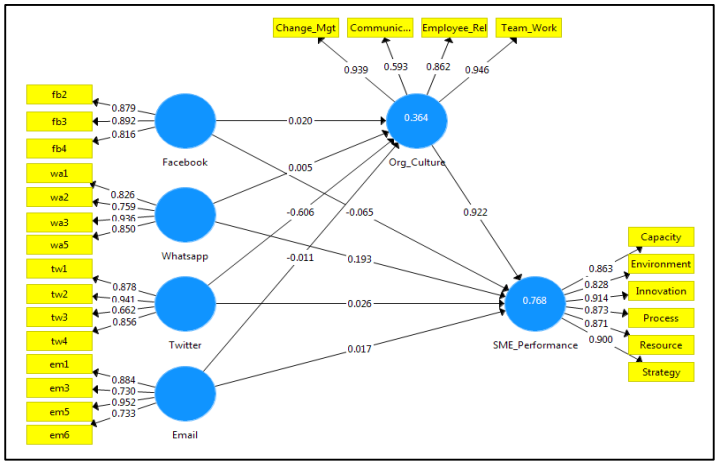

Figure 3: Measurement model for SMEs Performance

Convergent validity

Hair, et al (2014) defined convergent validity as the extent to which the indicators of a latent construct correlate. Hair, et al. (2011) recommended the use of indicator loading and AVE as criteria for judging convergent validity.

Indicator Reliability

Indicator reliability measures the absolute importance of individual measurement items in defining the latent construct. It shows the relationship between the latent construct and the measurement items (Hair, et al., 2014). A factor loading of .70 is considered sufficient (Becker et al., 2012) although Hair, et al. (2014) pointed that values less than .70 are also acceptable provided that the AVE is achieved.

Average variance extracted (AVE)

The second criteria for establishing convergent validity is the AVE. It is defined as the overall mean value of the squared loadings of the indicators of a latent construct (Hair, et al., 2014). According to Fornell and Larcker (1981) the AVE measures the amount of variance a latent construct explained from its measurement items in relation to the amount explained by measurement error. Hair et al. (2014) recommended that AVE should be .50 and above which indicates that at least more than half of the variance in the indicator is explained by the construct.

Composite reliability (CR) measures the internal consistency of the measurement model. Hair, et al. (2014) described it as the degree of inter-correlations among indicators of a latent construct. The recommended value is .70. However, Hair et al. (2011) pointed that .60 is equally acceptable especially in exploratory research.

Table 1 shows the outer loading of the indicators, AVE and composite reliability of the measurement model. All the parameters meet the recommended thresholds for model's convergent validity. Specifically, the outer loadings ranges from .593 to .946 and they are all statistically significant. Similarly, the AVEs reported values within the acceptable threshold of .50. The composite reliability values also reported values within acceptable benchmark of .70. The CR values range from low of .898 to a high of .952This indicate that construct validity is achieved.

Table 1: Construct validity

Construct		Outer Loading	T Statistics	P Values	AVE	CR
SMEs Performance	Capacity	0.863	67.880	0.000	.766	.952
	Environment	0.828	37.001	0.000		
	Innovation	0.914	102.431	0.000		
	Process	0.873	57.519	0.000		
	Resource	0.871	110.761	0.000		
	Strategy	0.900	100.182	0.000		
	Environment	0.828	37.001	0.000		
Org_Culture	Change_Mgt	0.939	102.359	0.000	.717	.908
	Communication	0.593	9.726	0.000		
	Employee_Rel	0.862	77.850	0.000		
	Team_Work	0.946	163.846	0.000		
Email	em1	0.884	3.416	0.001	.689	.898
	em3	0.730	2.902	0.004		
	em5	0.952	3.441	0.001		
	em6	0.733	2.705	0.007		
Facebook	fb2	0.879	3.170	0.002	.745	.898
	fb3	0.892	4.814	0.000		
	fb4	0.816	3.606	0.000		
Twitter	tw1	0.878	53.693	0.000	.707	.905
	tw2	0.941	91.559	0.000		
	tw3	0.662	14.005	0.000		
	tw4	0.856	89.001	0.000		
WhatsApp	wa1	0.826	15.384	0.000	.714	.908
	wa2	0.759	18.186	0.000		
	wa3	0.936	38.655	0.000		
	wa5	0.850	28.544	0.000		

Discriminant Validity

Discriminant validity as defined earlier measures the uniqueness of latent construct with respect to other constructs in the model. Discriminant validity is assessed using the Hetrotrait-Monotrait (HTMT) criterion. Henseler, et al. (2015) recommended it as the most conservative measure of discriminant validity. The criterion is to compare the calculated result with a value of .85 and .90 in such a way that any value in the table above the recommended threshold implies that discriminant validity is not achieved. Table 2 show the result of the HTMT test. The correlation matrix indicates that no value exceeds the recommended benchmark of .85 and .90. This implies that discriminant validity is achieved.

Table 2: Discriminant validity

	Email	Facebook	Org_Culture	SME_Performance	Twitter	Whatsapp
Email						
Facebook	0.047					
Org_Culture	0.070	0.103				
SME_Performance	0.068	0.040	0.741			
Twitter	0.145	0.053	0.609	0.437		
Whatsapp	0.137	0.052	0.322	0.215	0.605	

Structural Model Evaluation

After assessing the measurement model, next stage is to evaluate the research framework. The structural model is evaluated using collinearity assessment, test of significance of path coefficients determination of r-square and effect sizes (Hair, et al., 2014). Figure 4 shows the structural model extracted from the PLS software.

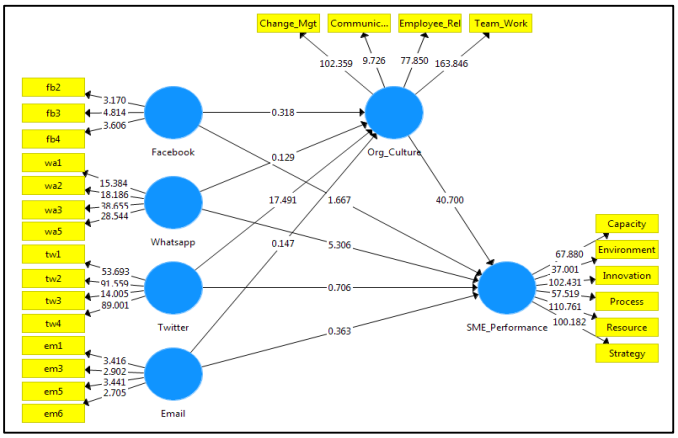

Figure 4: Structural model evaluation

Path Coefficient and R^2

The path coefficient is the estimate of the hypothesized relationships among the model's constructs. According to Hair, Black, Babin and Anderson (2010), the path coefficient ranges from +1 to -1 where values tending towards 1 indicate stronger relationship. Apart from magnitude of the path coefficient, it is equally important for the estimates to be statistically significant.

R^2 is considered the overall measure of model performance. It is an indicator of the combined effects of all the independent variables in explaining the variation in the dependent variable in a model. Hair, et al. (2014) provided a threshold for interpreting the R^2 value where R^2 of .75, .50 and .25 are considered to be of substantial, moderate and weak effect respectively. However, in behavioural research, consumer satisfaction studies and other related areas in management and social science fields, R^2 value of .20 are considered of high effect (Hair et al., 2014). Table 4.11 presents the path coefficients for the relationships among the six constructs in the model. All the reported path coefficients are positive which indicates that the variables in the model are positively related. The R^2 value is also reported.

Table .3 shows the path coefficients of the relationship among the constructs in the model. The table shows that email and twitter have negative effect on organisational culture while facebook and whatsapp showed positive effect. However, only the effect of twitter shows significant effect (β = -

.606, t = 17.49, p = .000) while the remaining variables did not show any significant effect. Altogether, the four social media tools explained about 36 percent change in organisational culture.

In addition, the effect of the fours social media tools and SMEs performance indicated that facebook have negative effect on SMEs performance even though the effect is not statistically significant. The most influential determinant of SMEs performance is shown to be organisational culture (β = .922, t = 40.70, p = .00). This is followed by whatsapp which returned a significant effect (β = .193, t = 5.306, p = .000). Overall, email, facebook, twitter, whatsapp and organisational culture collectively explain about 77 percent variation in SME performance.

Table 3: Path coefficients and R-square

	Path coefficients	T Statistics	P Values	R^2
Email -> Org_Culture	-0.011	0.147	0.883	.364
Facebook -> Org_Culture	0.020	0.318	0.751	
Twitter -> Org_Culture	-0.606	17.491	0.000	
Whatsapp -> Org_Culture	0.005	0.129	0.897	
Email -> SME_Performance	0.017	0.363	0.717	.768
Facebook -> SME_Performance	-0.065	1.667	0.096	
Twitter -> SME_Performance	0.026	0.706	0.480	
Whatsapp -> SME_Performance	0.193	5.306	0.000	
Org_Culture -> SME_Performance	0.922	40.700	0.000	

Effect Size (f^2)

The effect size measures the relative importance of individual construct or variable in the overall performance of the model (Hair, et al., 2014). It indicates the change in R^2 resulted from the removal of one of the independent variables in a model. The Cohen (1992) guideline is used to assess the relative importance of an exogenous construct where f^2 values of .02, .15 and .35 are considered small, medium and large respectively. Table 4 shows the effect sizes of the exogenous constructs in the model. The result shows that twitter has large effect size on R^2 in the relationship between twitter and organisational culture while it has no effect on R^2 in the relationship between twitter and SME performance. On the other hand facebook has a marginal small effect on R^2 in the relationship between facebook and organisational culture. In the relationship between organisational culture and SMEs performance, OC showed a very large effect on R^2, thus indicative of its importance in explaining the variation in SMEs performance.

Table 4: effect sizes of the constructs

	Org_Culture	SME_Performance
Email	0.000	0.001
Facebook	0.001	0.018
Twitter	0.453	0.002
Whatsapp	0.000	0.127
Org_Culture		2.332

The analyses conducted provided answers to the research questions as well as help to achieve the research objectives. It also provides empirical evidence that validate the research conceptual framework.

Conclusions

The successful implementation of social media marketing tools depends on its impact on the SMEs performance in UAE. Based on the survey data, the researcher has concluded that organizational culture has a significant influence on the relationship between social media marketing tools and SMEs performance in UAE. This study has addressed a significant gap in the literature pertaining to the social media marketing tools and performance of SMEs in UAE. This was done by formulating and examining a research model linking the multidimensional social media marketing tools and organizational culture as a mediating relationship between social media marketing tools and SMEs performance. The results of this study indicated that organizational culture has a mediating effect on the relationship between social media marketing tools and performance of SAMEs in UAE.

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Ambivalent Understanding of Nepotism in Small and Medium Family Business

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Abstract

Research background: Nepotism is one of the forms of favouritism occurring at people's workplace. This is the reason why it creates a problem for managers in charge of organizations, ethicists, and psychologists. Although nepotism as such is in principle negatively assessed, the employment of family members, especially in family businesses, is often considered natural and it can benefit the organization if certain conditions have been met.Purpose of the article: The goal of the article is to analyse the perception of nepotism occurrence in Polish small and medium family businesses, as well as to identify nepotism related factors, both beneficial and unfavorable ones. Methods: A qualitative study aiming at enhancing the knowledge concerning nepotism range in family businesses in Poland, followed by a quantitative study, performed to verify the information obtained in the qualitative study and to compare the nepotism perception of employees in family businesses and employees in other organizations. Findings and Value added: In Poland there is noticeable paucity of empirical research concerning the nepotism phenomenon. As a result of the studies which have been carried out, identification and stratification of positive and negative factors connected with nepotism in family businesses will be possible.

Keywords: Nepotism, Family Business, Recruitment Process

Introduction

Nepotism is one of the forms of favouritism occurring at people's workplace (Riggio and Saggi 2015, p. 19). Although it is in principle negatively assessed, the employment of family members, especially in family businesses, is often considered natural and it can benefit the organization if certain conditions have been met (Bellow, 2003, pp. 50-79).

At the same time, there is a clear lack of empirical research on the phenomenon of nepotism in Poland (Sroka and Vveinhardt 2018, pp. 31-45; Ignatowski et al., 2020, pp. 15-19; Vveinhardt and Sroka 2020, pp. 11-18). Therefore, the authors of the article decided that its objective will be to examine the opinions of business owners and employees on the phenomenon of nepotism in small and medium-sized family businesses. The implementation of the goal is possible through a research program that is based on a mixed method. In the first stage, qualitative research was conducted in the form of individual interviews with several entrepreneurs running family businesses. Their main goal

was to deepen the knowledge of nepotism in family businesses in Poland. In the second stage, a quantitative study was carried out to verify the information received in the qualitative study.

The result of the research will be the identification and stratification of positive and negative factors related to nepotism in family businesses. This will allow not only to gain in-depth knowledge of this phenomenon, but also to determine the direction of further research. In addition, the research results and their analysis will have practical value. They can be used by the owners of small and medium-sized family businesses when making rational decisions related to the employment of family members.

Nepotism in family businesses – literature review

Enterprises belonging to the family and managed by its members are the most common form of running a business and constitute an extremely valuable element of the economy that significantly affects the stability of economic development. Analyzing the essence of their functioning and development, it is noticed that they constitute an interesting example of relations between a family having a dominant influence on running the business and a company as well as a type of relationship with society and the economy that constitute a significant context for running a business. The functioning of a family enterprise is based on two logics - an emotional one based on the need to care for relatives and a business one based on economic rationality (Sułkowski et al., 2018, pp. 225-270). Undoubtedly, family enterprises have a number of features that distinguish them from other entities and decide on their specificity (Hoy, 2014, pp. 620-628). One of them is the issue of nepotism.

Nepotism in family businesses is a natural phenomenon, morally justified by the family ownership of the company's assets. At the same time, its impact on family businesses is one of the least studied and researched areas. In the case of family enterprises, the use of nepotistic practices is not always criticized, although it may cause huge problems for their functioning and succession (Sugundan et al., 2018, pp. 764-765).

Nepotism is not a homogeneous phenomenon. It covers a wide range of family relationships that connect with professional relationships. I-Pang Fu, referring to the works of Padgett and Morris (2005), talks about two forms of nepotism: "cross-generational nepotism" and "paired employees". Cross-generational nepotism refers to the employment of family members who come from the first two or earlier generations. Such a situation is often encountered in family businesses. The nepotism called "paired employees" raises greater controversy. The term refers to a dual career and relationship between husband and wife in the office. Controversies are associated with situations when married couples apply to work in the same workplace. The aforementioned Padgett and Morris question anti-nepotistic policy. They believe that married couples can better balance work and link family responsibilities when they become significant actors in the workplace (Fu, 2015, p.1).

Bearing in mind the nepotistic practices of family businesses, it should be noted that they may discredit some family members and support others. Applying nepotistic practices, families use their control to employ family members, which allows them to sustain family involvement in the company over time and for generations. Nepotistic practices in family businesses can be seen in two ways. Peter Jaskiewicz, Klaus Uhlenbruck, David B. Balkin and T. Reay (Jaskiewicz et al., 2013, pp. 121-139) talk about "reciprocal nepotism" and "entitlement nepotism".

The first of them, reciprocal nepotism, takes into account family conditions and interdependencies, relationships within the family, cultural norms as well as competences and obligations of people employed in relation to other family members.

The entitlement nepotism does not take into account the family ties and determinants, it may ignore the potential benefits resulting from them. Employment is based on family ties, but does not take into account the competences of the candidates. When it is deeply embedded in practice, it can be dangerous and even detrimental to the functioning of the business. Persons appointed for high

positions do not always feel obliged to achieve the results expected by the family and the reasons for their employment may be based on altruistic considerations (Jaskiewicz et al., 2013, pp. 121-139). Where nepotism, which does not take into account family conditions and is based on a simple intergenerational management transfer, is practiced in family businesses, the results achieved earlier are reduced and the employees' confidence in the management in the family's possession is lower (Keles et al., 2011, pp. 11-14).

The level of nepotism in family businesses is influenced by the requirements faced by company managers. The lower they are, the level of nepotism is higher. The managing director, who is derived from the family, is most often employed in small companies with low RandD expenditures and high expenditures on promotion and advertising (Lin and Hu, 2007, p. 1349).

The employment of a nepotistic candidate, if he is properly qualified, can be positively evaluated by his superiors. In addition, the employment of competent and properly prepared family members translates into an increase in the scope of family power in the organization and higher employee loyalty (Popczyk, 2017, p. 49; Ewing, 1965, p. 27).

Professional family businesses face a serious dilemma when there are no innovative and qualified people among the closest family members. In such a situation, they may look for a qualified manager outside the family circle (Miller et al., 2015, p. 35). There is also a second option for family businesses, namely postponing succession in time and making every effort to educate a successor who will acquire the necessary qualifications to run the family business (Liu et al., 2015, pp. 419-435).

An important factor related to nepotism in employment, which can positively affect the functioning of family businesses is the specificity of the relationship between family members. Mutual social connections of such candidates are higher than in the case of people from outside the family, which promotes the construction of the company's social capital that can be used for better knowledge management in the organization, which translates into strengthening competitive advantages (Jaskiewicz et al., 2013, pp. 128-130).

The family, having the power in the company, has a sense of self-worthiness that it brings to the organization, which translates into motivating its members to work for the development of the organization. Members of the family employed as a manager will place material benefits on the second plane, and the first one will be occupied by social, emotional and ethical security (Popczyk, 2017, p. 49). In the case of family members, flexible employment contracts are often used, where the provision of such services often goes beyond the formal responsibilities of the manager. The leader of the family does not need to be monitored so much (Lin and Hu, 2007, p. 1350). Persons employed on the basis of family connections are characterized by a higher level of loyalty and involvement in the organization. Growing up in a family running a business, they are often adapted from their youth to fulfill the future roles of managers, which naturally creates a team of highly competent and educated people who are an important social resource of the organization (Gibb Dyer, 2006, p.262).

When they are positively evaluated by the environment, they also manage to gain greater trust and involvement from other members of the organization (Padgett et al., 2014, p. 284, Ewing, 1965, p. 37). It can contribute to the formation of so-called communal organizations with a more holistic attitude of employees (Padgett et al., 2014, p. 285). This will rearrange into positive social capital of the organization (Sułkowski and Chmielecki, 2017, pp. 23-24). The high level of trust in families has also contributed to the development of small and medium-sized family businesses in Poland (Marjański et al. 2019, pp. 280-304).

If the family has large control over the company, this situation may result in limiting the manager's freedom of action. If the manager comes from the family, the probability of conflicts with the owners of the company is reduced (Lin and Hu, 2007, pp. 1359-60). In the case of limited ability to monitor by business owners, the risk resulting from the so-called "agency" phenomenon, where an external

manager with full access to information acts as an agent in relation to the owners is lower (Popczyk, 2017, p. 51).

The issue of employment and the functioning of a family business also applies to the lower level of employees. Companies that use specialized employee selection and have clear salary criteria achieve better results than those that did not implement such practices. The introduction of professional practices (referred to as high-performance work systems) in family businesses leads to disciplining unfair relatives and increases the involvement of other employees (Stewart and Hitt, 2012, p. 62).

Nepotism in family businesses is associated with a number of factors that are unfavorable to the organization. If employees from lower levels know that promotion decisions are not directly dependent on work performance, then they have less motivation to work and tend to be less inclined towards loyal life in the company. As a consequence, there is a loss of talented employees. All this reduces the value of the company (Bertrand and Schoar, 2006, pp. 78-79).

Managers employed according to nepotic practices usually have lower competencies. This leads to a reduction in the company's investment due to their lower qualifications. Which in the long run can lead to loss of competitiveness (Parise and Leone 2018, pp. 15-22).

Other disadvantages of nepotism include the perception of a person employed in this way. The subordinates, regardless of their competences, will perceive them as less competent and inferior (Padgett and Morris, 2005, p. 36). Some researchers claim that such people are stigmatized by the environment (Padgett et al., 2014, pp. 285-287). The subordinates of a person employed as a result of family connections experience lower job satisfaction and willingness to get involved in the organization as well as lower motivation (Padgett and Morris, 2005, pp. 39-42, Padgett et al., 2014, p. 283; Padgett et al., 2019, pp. 110-117; Abdalla et al ., 1998, p. 569; Pearce, 2015, pp. 41-44; Ignatowski et al., 2020, pp. 15-19). Nepotism can cause jealousy and bad emotions among employees (Padgett et al., 2014, pp. 285-287; Ewing, 1965, p. 37). Their trust in the organization is decreasing (Keles et al., 2011, p. 13), which weakens its social capital (Chmielecki and Sułkowski, 2018, pp. 99-103). The willingness of employees to leave the company also increases (Padgett et al., 2014, p. 283), and also, if information about nepotism practices gets into the environment, the willingness to hire outsiders decreases (Ewing, 1965, p. 37) . Such employees also note that they are treated worse than family members (Uygur , Ã‡aÄŸatay, 2015, p.144). The negative perception of nepotism is higher when employees are managed in an authoritarian manner (Ugurluoglu et al., 2018, pp. 165-176). At the same time, such a superior has less chance of getting support from his subordinates (Padgett et al., 2014, p. 286). All of the above negative factors weaken the social capital of the organization, contributing to the weakening of the organization's competitiveness (Sułkowski, 2017pp. 155-171).

The large role of nepotism in recruitment processes results in less employee involvement in raising their qualifications (Ponzo and Scoppa, 2010, p. 17). However, we meet studies that show that as the importance of nepotism in the functioning of the organization increases, the willingness to invest in social capital decreases as well as the willingness to improve qualifications in educational processes decreases (Perez-Alvarez and Strulik, 2018, pp. 26-27). This negative effect is strengthened in the case of educational processes of family members of the company's owner. Research conducted on students in Turkey showed a strong correlation between being a child of a parent running their own business, and weaker results in learning, smaller willingness to graduate, and less entrepreneurship (Gevrek and Gevrek, 2008, pp. 26-29). Only in the case of free professions, a reverse tendency was observed, in which parents performing a free profession had a positive impact on their children's learning outcomes, and also transferred skills and professional competences (Aina and Nicoletti, 2014, pp. 24-25). The problem may also have a broader perspective. If nepotism becomes widespread in a given country, the described negative phenomena may affect the entire economy, which, as in the case of Russia, will result in a "brain drain" from that country (Safina, 2015, pp. 631-634). This will result in a decrease in the competitiveness of the entire economy, and thus also of enterprises operating within it.

Research Methodology

The main objective of the study was to analyse employee opinions on the phenomenon of nepotism in small and medium-sized family businesses and to compare them with the opinions of other organizations' employees. The following specific objectives have been formulated for the purposes of the study:

- to determine the understanding of the phenomenon of nepotism by owners who manage the family businesses,
- to determine the scale of the phenomenon of nepotism,
- assessment of the phenomenon of nepotism both by entrepreneurs and employees,
- assessment of the impact of nepotism (both positive and negative) on the functioning of the family businesses.

On the basis of the research objectives mentioned above, the following research hypotheses were formulated. The first two relate to the very understanding of nepotism. By definition, it takes place when there are family connections between the beneficiary of nepotism and the person applies this practice. In the absence of such links, there is a similar phenomenon called cronyism (Keles et al., 2011, pp. 9-16, Arasli, and Tumer, 2008, pp. 1237-1250, Jaskiewicz et al., 2013, pp. 121-139)). Therefore, it is important to check if the respondents notice this difference. Hence, the first two hypotheses are as follows:

H1. Nepotism is properly understood by family entrepreneurs
H2. Nepotism is properly understood by employees in family businesses

It is equally important to determine the scale of the phenomenon of nepotism. Previous studies indicate that it is a common phenomenon (Sroka and Vveinhardt 2018, pp. 31-45; Ignatowski et al., 2020, pp. 15-19; Vveinhardt and Sroka 2020, pp. 11-18). At the same time, it seems that it is more frequent in family businesses, which results directly from their specifics, hence two further research hypotheses sound as follows.

H3. Nepotism is a common phenomenon in family businesses
H4. Nepotism is a significantly more frequent phenomenon in family businesses than in others

For the analysis of the phenomenon of nepotism, its assessment by both the employed as well as the owners themselves, is important. The analysis of the literature allows us to state that the former assess it negatively, the owners of companies - positively. At the same time, the competences and skills of the employed person influence the assessment of nepotism. Based on the above knowledge, two further research hypotheses were put forward.

H5. Nepotism is positively evaluated by family entrepreneurs
H6. Nepotism is negatively assessed by employees in family businesses

In the course of literature studies, the influence of nepotism on a number of factors related to the functioning of the company was identified. The next two hypotheses aim to verify the collected information and evaluate this impact based on research carried out on the same research sample. They sound as follows:

H7. Nepotism in family businesses has a negative impact on:
- o satisfaction,
- o motivation to work,
- o involvement,
- o trust in the organization,
- o willingness to work in the organization.

H8. Nepotism in family businesses, if it is related to the relevant competences of the manager employed due to the family connections, has a positive impact on:

- reducing the scale of conflict at the owner-manager level,
- employee engagement,
- employee motivation,
- employee satisfaction.

To verify the above research hypotheses, the study included both qualitative and quantitative methods. As part of the quality method, an in-depth individual interview was used. Its main goal was to identify the manifestations and effects of nepotism in the surveyed companies. Interviews were conducted between February 2019 and September 2019 with 19 owners of small and medium family enterprises. The selection of the qualitative approach at this stage of the research made it possible to reach specific cases and gave an opportunity to understand the specifics of the surveyed enterprises (Toften and Hammervoll 2010, pp. 108-121). Individual in-depth interviews were based on a repeatable research scenario, which gave the opportunity to ask respondents additional questions, thanks to which it was possible to refine the research issues. Prior to the research, the interview scenario was consulted with external experts dealing with family enterprises. Two experts came from the academic community, and one from a non-governmental organization dealing with family entrepreneurship. Interviews were recorded, then transcribed and subjected to qualitative analysis.

The selection of respondents was purposeful. The survey was targeted to owners of small and medium-sized enterprises, who considered their company as a family business and meeting the conditions resulting from the adopted definition of a family business treated as an economic entity based on family ties and dependencies, which seeks to sustainably maintain a decisive influence on family business through participation in the future. in ownership, management and responsibility with the intention of transferring it to the next generation.

In this study, it was intended to identify the understanding of the phenomenon of nepotism by owners of small and medium-sized family enterprises, to determine the importance of nepotism and to assess the impact of nepotism on the functioning of the enterprise.

In the second stage of the study, a quantitative survey was carried out in the form of an auditory survey. The survey is aimed at verifying information received in the interviews with entrepreneurs and learning the phenomenon of nepotism from the employees' perspective. The survey involved both employees in family businesses and employees in other organizations, which made it possible to compare opinions on nepotism among employees of various organizations and the frequency of this phenomenon. Comparative analyses were conducted using standard statistical inference methods, including significance tests for mean values and structure indicators.

The survey study was conducted using a group of 510 respondents, employed by Polish firms and service companies, and at the same time enrolled in an extramural programme at a prestigious Polish university. The surveyed group are all business faculty students, familiar with the principles of nepotism occurring in the employment procedure. In the course of their studies, they participate in lectures devoted to the issues of professional ethics and problems faced by family businesses. Thus, they have a fully formed image of how family businesses function in society. Consequently, they have sufficient background needed to be able to address the survey questions competently. Let it be noted that similar studies concerning nepotism, involving groups of student participants, have already been carried out by Padgett, Padgett and Morris (Padgett *et al.*, 2014, p. 287; Padgett & Morris, 2005, p. 36). The structure of respondents is presented in the table 1:

Table 1: Respondent structure

Characteristics	Percentage of valid answers
Gender	
Female	64.3%
Male	35.7%
Age	
Below 19 y.o.	1.0%
20-29 y.o.	56.6%
30-39 y.o.	28.1%
40-49 y.o.	11.7%
Above 50 y.o.	2.6%
Labour market situation	
Working in a family business	10.1%
Running one's own business	4.2%
Working in a private enterprise	41.6%
Working in a state or local government institution	29.4%
Not working	14.7%
Net income of the household	
Below 2700 PLN	16.1%
2701-5000 PLN	36.1%
5001-9000 PLN	25.5%
9001-15 000 PLN	17.5%
More than 15 000 PLN	4.8%

Source: authors' own calculations

A questionnaire with four compound main questions basic and five metrics-type questions was used for the study. All questions, except one, were closed, complex measurement scales were used.

Results of Qualitative Research

The research confirmed that the owners of the interviewed companies were mostly reluctant to approach the issue of nepotism. This resulted from the sensitivity of the issue as well as the dual impact of family and enterprise systems, which always causes the need to reveal sensitive information related to family members. The respondents pointed out that one of the factors related to the family-owned enterprise is the retention of key information among family members involved in running a business.

The study showed that the understanding of the phenomenon of nepotism was differently understood. 14 entrepreneurs surveyed were able to determine the nature of this phenomenon. It was pointed out that it was a favour of family members in the casting of positions regardless of their competences. However, 5 subjects were unable to identify the phenomenon of nepotism that may occur in a family business. Only after explaining the essence of the phenomenon of nepotism during the interview they were able to refer them to the realities of functioning of one's own company.

In the opinion of all respondents, employing family members in an enterprise is a completely natural phenomenon and is related to the family character of the subject and cannot be described as nepotism. It was pointed out that it is an inalienable right of the owner family and that the family is the basis of the family business.

Thus understood, nepotism has a positive impact on the functioning and long-term development of a family enterprise. The construction of the family social capital allowing for the competitive advantage of the company was indicated as positive. It was emphasized that the family social capital allows for a high level of trust and standards in internal relations in the enterprise as well as external relations with the environment. The respondents also noticed a positive impact on the high level of flexibility and undertaking joint actions by family members during the period of downturn.

It was also pointed out that nepotism could have negative effects if family members would be privileged without taking into consideration their competence. Five respondents indicated that such a situation took place in their company. It was also pointed out that emotional ties with family members employed in the enterprise, in the case of conflict situations, sometimes make it difficult to make rational decisions that take care of the company's interest. This fact was indicated by 11 respondents.

Most of the respondents indicated that nepotism understood as the use of social capital in the enterprise has a positive impact on the functioning of the entity by building trust, identity, reputation and commitment. These types of activities also allow to create a succession plan. On the other hand, 7 respondents also pointed to the possibility of negative effects of nepotism, nepotistic practices in the selection and treatment of human resources in the enterprise were given as an example. Managers are aware of this issue.

As it can be seen from the study, the influence of factors resulting from the family nature of the surveyed entities causes that the approach to the issue of nepotism must take into account both positive factors and threats. The mere employment of family members cannot be treated as a manifestation of nepotism because this situation results from the very nature of the family firm. The involvement of family members in family business activities increases the company's chances for its development and business continuity.

Results of Quantitative Research

In the following report presenting the results of the quantitative survey the responses of employees in family businesses (study group) are compared with the responses of employees in other organizations (in private non-family enterprises, in a state or local government institution), treated as comparative group.

The first question used in the study examined the degree of understanding of nepotism by the respondents. It consisted of five statements, in which five situations related to nepotism in employment were described. Two of them concerned the employment of a family by ordinary managers, not family-related with the company, and three situations when the relationship is between the owner and the person employed. The results show (Table 2) that the above all respondents considered the situation in which the manager hired a relative for a managerial position as nepotism (more than 63% of the respondents both from the group of employees in family businesses and in other organizations were rather in agreement or strongly agreed with the naming this nepotism). About 50% of respondents agreed that the remaining of the listed in Table 2. situations are the forms of nepotism. Most respondents did not agree (strongly or rather disagree) that employment by the owner of a person related to him / her on a regular position should be treated as nepotism (about 56%). Although the cumulated shares of employees in family businesses who rather agree or strongly agree are bigger than these shares of employees in other organizations, significance tests for structure indicators show no statistical significance of differences between them. An important reason for this insignificance is the small sample size of study group (51 units).

Table 2: Defining nepotism by the respondents

In your opinion, is the phenomenon mentioned below nepotism?					
		Strongly disagree	**Rather disagree**	**Rather agree**	**Strongly agree**
Employment by the recruiting manager of a person related to him / her on a managerial position	A B	9.8% 14.3%	23.5% 22.7%	21.6% 29.4%	45.1% 33.6%
Employment by the recruiting manager of a person related to him / her on a regular position	A B	13.7% 16.2%	35.3% 33.9%	31.4% 35.3%	19.6% 14.5%
Help of any company employee in employment for a person related to him in this company	A B	12.0% 16.4%	34.0% 38.4%	36.0% 35.0%	18.0% 10,2%
Employment by the owner of a person related to him / her on a managerial position	A B	17,6% 20.4%	29.4% 26.6%	21.4% 30.0%	31.4% 22.9%
Employment by the owner of a person related to him / her on a regular position	A B	17,6% 24.4%	39,2% 33.7%	25.5% 28.1%	17.6% 13.8%

A – employees in family businesses (study group); B – employees in other organizations (comparative group)
Source: authors' own calculations

The purpose of the next question was to assess the occurrence of the frequency of nepotism in employment and other areas of the organization's functioning. This question consisted of eight items in which respondents assessed the frequency of occurrence of the above phenomena using the five-point scale. The first part of the question was about the phenomenon of nepotistic employment. As a reference point, one situation was also given to present cronyism (employing a friend for a managerial position). The phenomenon of nepotism is more common when employing people for ordinary positions (Table 3). At the same time, in the case of the cast of managerial positions, nepotism was more often indicated (47,1% of respondents from study group and 42,9% respondents from comparative group meet this situation often or very often) than in the case of cronyism (37,2% in study group and 38,2% in comparative group). .

Table 3: Frequency of occurring nepotism in recruitment

How often in your career do you meet the following						
		Never	Sporadically	Rarely	Often	Very often
Employment for a managerial position of a person related to the business owner or a recruiting manager	A B	9.8% 14.0%	15.7% 21.6%	27.5% 21.6%	31.4% 29.7%	15.7% 13.2%
Employment for a regular position of a person related to the business owner or a recruiting manager	A B	8.0% 6.5%	16.0% 20.8%	28.0% 22.5%	32.0% 33.4%	16,0% 16.9%
Employment for a regular position of a person related somebody in the company	A B	9.8% 12.7%	21.6% 21.2%	27.5% 29.9%	27.5% 27.4%	13.7% 8.8%
Employment for a managerial position of a friend of the business owner or a recruiting manager	A B	3.9% 12.1%	17.6% 22.6%	41.2% 27.1%	23.5% 31.4%	13.7% 6.8%

Questionnaire scale description: 1 –never; 2 – sporadically (1-2 during all professional career); 3 – rarely (a few times in a year); 4 - often (1-2 times in a month); 5 very often – common phenomenon

A – employees in family businesses (study group); B – employees in other organizations (comparative group)Source: authors' own calculations

As with the previous question, the small sample size makes it difficult to carry out significance tests for the structure indicator (all differences between structure indicators for study and comparative groups, as well as between indicators for manifestations of nepotism and cronyism seem to be statistically insignificant). In connection with this limitation a synthetic measure of the frequency of nepotism in recruitment was calculated based on average scale values. The synthetic measure takes values from 1 to 5 (according to the scale adopted in the survey questionnaire), where 1 means that the respondent has never met any of these 4 situations and 5 means that every situation encountered very often. In the studied group the average value was equal to 3.23 (for 50 units) while in the comparative group 3.09 (for 350 units). Significance test for means indicates that the difference between average values of frequency of nepotism in recruitment is insignificant. This does not allow a positive verification of the hypothesis that nepotism in recruitment is a significantly more frequent phenomenon in family businesses than in others.

In the second part of the question assessing the frequency of nepotism, the respondents were asked about other nepotistic situations that may occur in the organization (Table 4). In this case, the most common form of nepotism was a better treatment of a related person and its milder assessment. 52.9% and 62,7% of respondents from study group indicated it as a frequent and very frequent phenomenon respectively (47.1% and 46.3% of respondents from comparative group). Promoting relatives and paying them a higher salary was much less common, although it was still a frequent phenomenon.. The percentages of respondents from the study group who often or very often met all nepotistic situations listed in Table 4 were higher than in the comparative group. Despite this, all differences between the structure indicators are statistically insignificant. As in the case of frequency of occurring nepotism in recruitment analysis, a synthetic measure of the frequency of the situations listed in Table 4 was calculated. Unfortunately, as before, the difference between the average values of these measures in the study group (3.19) and comparative group (3.01) turned out to be statistically insignificant.

Table 4: Frequency of occurrence of nepotism in other selected areas of the organization's functioning

How often do you meet with the following phenomena in your professional career?						
		Never	Sporadically	Rarely	Often	Very often
Promoting a person related to the business owner or that person's (direct or indirect) supervisor	A B	19.6% 14.3%	13.7% 21.6%	21.6% 28.0%	33.3% 25.8%	11.8% 10.4%
Paying higher salary to a person related to the business owner or that person's (direct or indirect) supervisor	A B	21.5% 23.0%	17.6% 20.8%	19.6% 27.2%	25.5% 22.2%	13.7% 6.7%
Better treatment of a person related to the business owner or that person's (direct or indirect) supervisor	A B	9.8% 10.9%	13.7% 17.4%	23.5% 24.6%	35.3% 33.9%	17.6% 13.2%
Milder assessment of a person related to the business owner or that person's (direct or indirect) supervisor	A B	13.7% 10.1%	9.8% 18.5%	13.7%% 25.2%	43.1% 35.9%	19.6% 10.4%

A – employees in family businesses (study group); B – employees in other organizations (comparative group)
Source: authors' own calculations

The results of significance tests both for structure indicators and average values of synthetic measures of the frequency of nepotistic situations do not allow a positive verification of the hypothesis that nepotism a significantly more frequent phenomenon in family businesses than in others.

In the next question, the authors examined the evaluation of nepotistic phenomena among respondents. There is a noticeable difference in the perception of these situations depending on the type of organization (Table 5). In the case of employees in family businesses, i.e. those who are most affected by nepotism, the employment by the recruiting manager of a person related to him on a managerial position was rated negatively (as unacceptable or improper) by 84.3% of respondents (study group), whereas only 69,6% of respondents from comparative group rated it negatively (the difference between these structure indicators is statistically significant, p-value=0.015). Other manifestations of nepotism were negatively assessed by higher percentage of respondents from study group but those differences between structure indicators were statistically insignificant. Employment by the owner of a person related to him on a regular position got the mildest assessment in both groups of respondents, more than 3/2 considered such a situation as neutral, appropriate or desired.

Table 5: Assessment of situations related to nepotistic employment in companies

How do you assess the following situations in the company?						
		Unacceptable	Improper	Neutral	Appropriate	Desired
Employment by the recruiting manager of a person related to him on a managerial position	A B	25.5% 20.3%	58.8% 49.3%	9.8% 24.8%	3.9% 5.1%	2.0% 0.6%
Employment by the recruiting manager of a person related to him on a regular position	A B	7.8% 8.4%	35.3% 28.7%	41.2% 47.5%	15.7% 14.6%	0.0% 0.8%
Employment by the recruiting manager of his friend on a managerial position	A B	25.5% 17.7%	45.1% 43.8%	21.6% 31.5%	5.9% 5.6%	2.0% 1.4%
Employment by the owner of a person related to him on a managerial position	A B	12.0% 14.1%	44.0% 33.2%	22.0% 33.2%	18.0% 15.5%	4.0% 3.9%
Employment by the owner of a person related to him on a regular position	A B	2.0% 7.9%	31.4% 23.1%	35,3% 42.5%	29.4% 22.8%	2,0% 3.7%
Employment by the owner of his friend on a managerial position	A B	10.0% 12.7%	46.0% 34.6%	28.0% 36.1%	14.0% 13.5%	2.0% 3.1%

A – employees in family businesses (study group); B – employees in other organizations (comparative group)

Source: authors' own calculations

In addition to employment, respondents also assessed other nepotistic situations in the organization (promotion, higher salary, better treatment and a milder assessment). Each of these situations was negatively rated by 74-84% of respondents (Table 6). There are very small differences between the evaluations of employees in family businesses and in other organizations. In the case of paying the better salary there was no significant difference between a friend and a relative noticed.

Table 6: Assessment of selected situations related to nepotistic activities

How do you asses the following situations?						
		Unacceptable	Improper	Neutral	Appropriate	Desired
Promoting a person related to the owner of the business	A B	28.0% 29.3%	50.0% 49.3%	12.0% 12.7%	4.0% 7.6%	6.0% 1.1%
Paying higher salary to a person related to the owner of the business	A B	49.0% 45.6%	33,3% 33.0%	7.8%% 15.5%	3.9% 4.5%	5.9% 1.4%
Paying higher salary to a manager's friend (direct or indirect)	A B	52.9% 42.4%	21.6% 37.6%	15.7% 13.3%	5.9% 5.4%	3,9% 1.4%
Better treatment of a person related to the owner of the business	A B	42.0% 33.8%	42.0% 44.2%	14.0% 15.2%	0.0% 4.2%	2.0% 2.5%
Milder assessment of a person related to the owner of the business	A B	36.0% 30.4%	42.0% 47.6%	18.0% 15.8%	4.0% 5.1%	0.0% 1.1%

A – employees in family businesses (study group); B – employees in other organizations (comparative group)
Source: authors' own calculations

In the last question, the authors asked the respondents about the influence of nepotistic phenomena on the functioning of the organization. The first part of the question referred to phenomena that have a negative impact. On the basis of literature analysis, the areas influenced by nepotism were identified. These are: motivation, job satisfaction, commitment to work, trust in it and willingness to be employed there. The highest percent of respondents who indicated negative impact on the discussed phenomena was recorded for motivation to work in the family business – 74,5% of respondents in study group (Table 7). More than half of respondents agreed with the statement that motivation to work, job satisfaction, commitment to work and trust are reduced when direct manager is employed due to family relation with the owners of the company. Similarly, more than half of respondents would not start working in the company in which it is preferable to employ family members in managerial positions. Only in the case of reduced motivation to work the percentage of employees in family businesses who agree with the statement was significantly higher than the percentage of employees in other organizations (p-value=0.021 in the significance test for structure indicators).

Table 7: Negative impact of nepotism on the functioning of a family business

Do you agree with the following statements?					
		Strongly disagree	Rather disagree	Rather agree	Strongly agree
Direct supervisor employed due to family relation with the owners of the company reduces motivation to work in the family business	A B	3.9% 10.1%	21.6% 30.1%	54.9% 39.6%	19,6% 20.2%
Direct supervisor employed due to family relation with the owners of the company reduces job satisfaction in the family business	A B	9.8% 7.9%	29.4% 37.6%	45.1%% 42.1%	15.7% 12.4%
Direct supervisor employed due to family relation with the owners of the company reduces the commitment to work in the family business	A B	9,8% 10.4%	27.5% 36.5%	43.1% 40.2%	19.6% 12.9%

Direct supervisor employed due to family relation reduces the trust in the family business	A B	11,8% 10.7%	37,3% 38.0%	37,3% 36.9%	13,7% 14.4%
If I knew that in a given family company it is preferable to employ family members in managerial positions, I would not start working in this company	A B	7.8% 10,5%	35.3% 30.7	33.3% 33.8%	23.5% 25.0%

A – employees in family businesses (study group); B – employees in other organizations (comparative group)
Source: authors' own calculations

As it was pointed out in the literature that if a candidate in the family has appropriate competences, nepotism can have a positive impact on the organization, in the second part of the fourth question respondents were asked about the benefits that may arise in the case of positive nepotism. Based on the analysis of the literature, the following phenomena have been selected which may result from it: increased employee engagement, increased satisfaction and motivation, and reduced risk of conflict with owners. In the case of each of these factors, the majority of respondents (51-61%) agreed that the above-mentioned positive phenomena occur (Table 8). Moreover, in every cases the percentage of respondents from study group who do not agree with the statements was higher than in comparative group. This outcome could suggests that positive assessment of nepotistic phenomena depends on the respondent's workplace, since the employees of family businesses in the sample were the least likely to point to such phenomena as positive. Unfortunately, the differences between structure indicators were not statistically significant..

Table 8: Positive influence of nepotism on the functioning of a family business

Do you agree with the following statements?					
		Strongly disagree	Rather disagree	Rather agree	Strongly agree
Direct supervisor, being a member of the owner's family, possessing the required competences to work in his position, increases the commitment of other employees	A B	7,8% 7.0%	39.2% 33.5%	31.4% 42.3%	19.6% 17.2%
Direct supervisor, being a member of the owner's family, possessing the required competences to work in his position, increases the satisfaction of the work of other employees	A B	7,8% 6.8%	41.2% 36.1%	35.3% 42.8%	15.7% 14.4%
Direct supervisor, being a member of the owner's family, possessing the required competences to work in his position, increases motivation for the work of other employees	A B	13.7% 6.5%	33.3% 31.8%	37.3% 45.9%	15.7% 15.8%
Direct supervisor, being a member of the owner's family, possessing the required competences to work in his position, reduces the risk of conflicts with the owners of the company	A B	17.6% 11.0%	31.4% 29.6%	31.4% 42.0%	19.6% 17.5%

A – employees in family businesses (study group); B – employees in other organizations (comparative group)
Source: authors' own calculations

Discussion

After the research, both qualitative and quantitative, the authors come to the following conclusions. The first two hypotheses (H1 and H2) related to the definition of nepotism have been partially confirmed. In qualitative research, most respondents were able to accurately define what nepotism is. However, five entrepreneurs had a problem with it. At the same time, it was noticed that proper

definition of nepotism depends on the type of enterprise and the place of its occurrence in the company's organizational structure. The lower the person responsible for nepotism is in the organizational structure of the company, regardless of whether he was the employer or the employed, the more rarely nepotistic phenomena were considered as such. At the same time, nepotistic situations related to employment in family businesses are less often called nepotism than in ordinary enterprises. This suggests that some respondents, due to being the owner of the company, give permission to do so. Quantitative research shows that the vast majority of respondents (including employees of family businesses and running their own business) correctly understand the concept of nepotism.

The third hypothesis (H3) was also confirmed. Nepotism is a common phenomenon in family businesses. The vast majority of respondents employed in family businesses encountered this phenomenon often and very often. The results of comparison of responses of employees in family businesses and in other organizations do not allow to confirm the second hypothesis that the nepotism is more frequent in family businesses than the others was not confirmed. Quantitative research has shown a slight, more frequent occurrence of nepotism in family businesses, compared to non-family companies. At the same time, the level of nepotism in the public sector was similar to that of family businesses.

The hypothesis about a positive assessment of nepotism by family entrepreneurs (H5) has not been confirmed. Although, the results of qualitative research suggested that the employment of family members in the enterprise is a completely natural phenomenon and has a positive impact on the functioning and long-term development of the family enterprise and the construction of family social capital, and allows to obtain a high level of trust and standards in internal and external relations, still such situations have been assessed negatively three times more often. So despite the fact that the evaluation of nepotistic phenomena in employment issued by entrepreneurs running their own business was milder in comparison with employees of family and non-family enterprises, negative evaluations of this form of recruitment were still predominant. In the case of other nepotistic situations, most entrepreneurs rated them negatively, and the differences in assessments with other groups were small.

The sixth hypothesis (H6) indicating a negative assessment of the indicated nepotistic phenomena by the employees has been fully confirmed. The vast majority of respondents assessed all cases of nepotism as inappropriate or unacceptable in the organization. In the case of employment of relatives in a family, there is a clear difference in assessments between those working in family businesses and entrepreneurs running their own business. But even they assessed these phenomena negatively more often.

The seventh hypothesis (H7) indicating the negative impact of nepotism on: satisfaction, motivation and commitment of employees, as well as trust in the organization and willingness to work there was also confirmed. Over half of the respondents indicated that nepotism has a negative impact on the above-mentioned factors. Also in a qualitative study in interviews, entrepreneurs indicated that if family members would be privileged without taking into consideration their competences, their impact on the functioning of the organization is negative. Thus, research results obtained were similar to those of other researchers (Padgett and Morris, 2005, pp. 39-42, Padgett et al., 2014, p. 283, Abdalla et al., 1998, p. 569, Keles et al. 2011, p. 13, Ewing, 1965, p. 37).

At the same time, the eighth hypothesis (H8), which says of the positive influence of nepotism on subordinates, has not been fully confirmed. On the one hand, employees in family businesses were divided in these assessments in half, which means an ambiguous assessment of this situation. On the other hand, two-thirds of the surveyed entrepreneurs conducting their own business agreed with the above statements. At the same time, in qualitative research, nepotism was indicated as a natural tool used to effectively manage family businesses. Perhaps a large discrepancy in the assessment of the impact of nepotism results from the phenomena of stigmatization of nepotism described by Padgett

and Morris (Padgett et al., 2014, pp. 285-287). Therefore, a study dedicated to this problem would be needed to get a clear assessment of this hypothesis.

Conclusions

Nepotism means favouritism of family members in their employment, promotion and remuneration at the workplace. Research on nepotism began only in the mid-1960s (Ewing, 1965, pp. 22-160). It does not change the fact that it was always practiced, as long as the business and service activities are carried out by people. Its occurrence, not only in family businesses, is confirmed by research carried out in this study. Low job satisfaction, reduced level of trust, commitment and motivation to work are mentioned among the negative effects of nepotism. This is clearly reflected in this research. In order to better understand the phenomenon of nepotism, further research should take into account the cultural context and the customs prevailing in the society in which the company exists and wants to develop. One cannot overlook such conditions as the economic situation and standards existing in organizations, also state legislation. Therefore, the phenomenon of nepotism will never be homogeneous and depends on the context of its occurrence. In addition, despite the negative effects that adversely affect the development of any organization, nepotism is widely practiced in family businesses, which is reflected in the conducted research. In this context, attention should be paid to two things. First of all, there is still a lack of satisfactory research on the values of nepotism. It is also not possible to say in advance that they have incomparably less importance compared to negative impacts. Let us remind that enterprises managed by the family are a widespread form of running a business and have a positive impact on the stable development of the economy. It should therefore be postulated to pay more attention to research on the phenomenon of nepotism in these companies. The conclusions can be used not only for the functioning of family businesses, but also for all sectors of the economy.

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Video-Based Waste Sorting's Literacy to Increase Waste Sorting Behavior of "XYZ" University's Students

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Abstract

Waste sorting behavior among "XYZ" University's students has the urgency to be intervened. Results of the baseline study showed that students were not sorting waste properly. It caused the waste management to be ineffective. Using the theory of planned behavior as the theoretical framework, the author found that perceived behavioral control (PBC) was the significant predictor of waste sorting behavior. The author designed an intervention using a video, containing information (knowledge) about waste sorting, which was expected to increase student PBCs and encourage them to perform waste sorting behavior. It was contructed based on social influence theory and social modelling. The hypothesis was waste sorting literacy through video can improve waste sorting behavior of the student. The author used an experimental (between-subject) design and divided the participants into two groups (waste sorting literacy vs. control group) using randomization. Participants were undergraduate students from various faculties which recruited by spreading posters and prospective participants registered through an online application. Waste sorting behavior was measured by observing whether participants sorted or not sorted their waste during the intervention. The results showed that video-based waste sorting's literacy significantly increased the accuracy of the waste sorting behavior of organic waste, but not with inorganic waste. Based on this finding, video-based waste sorting interventions can be adapted to increase waste sorting behavior in university context.

Keywords: behavior, intervention, students, waste-sorting

Introduction

"XYZ" University is a state university in Indonesia which has been implementing waste sorting program. In contrast, the survey result showed that their students, as the biggest population in campus, still sorted waste incorrectly. This matter would influence Green Matrix index of "XYZ" University and also caused waste management program in "XYZ" University became ineffective. It was because the cleaning service staff should sort out the waste which mixed from the trash bin. It would add work load for the them even though it was not necessary as if civitas academia would have sorted their waste correctly. It is clear that waste sorting behavior among students at "XYZ" University has the urgency to be intervened. This research is an intervention research developed based on the results of a baseline study. The aim of the intervention is to demonstrate that video-based literacy program can increase waste sorting behavior of "XYZ" University's students.

The baseline study consists of qualitative and quantitative method (Cresswell, 2009). Its purpose was to explore issues about waste sorting which are relevant for "XYZ" students. The qualitative method was conducted through interview toward students, cleaning service staffs and others staffs related waste management in "XYZ" University. The data was coded into categories related factor influencing waste sorting behavior among students. The quantitative method was conducted by surveys using questionaires relating waste sorting behavior of students and their knowledge about waste management at "XYZ" University.

Results of the baseline study showed that "XYZ" University students were not sorting waste properly. The qualitative study also found that factor influencing student to sort their waste were varies, such as knowledge about benefit and availability waste sorting program, knowledge about how to separate waste correctly, availability of time and opportunity to sorting waste, and also availability of waste sorting facilities. Support this finding, the quantitative study showed that most of participants did not know about waste sorting program. Furthermore, using the theory of planned behavior as the theoretical framework (Gadiraju, 2016; Stoeva & Alriksson, 2017; Zhang, Zhang, Yu, & Ren, 2016), the author found that perceived behavioral control (PBC) was the significant predictor of waste sorting behavior. PBC itself was individuals' perceived ability to perform such of a behavior (Ajzen, 2014). The higher individual's PBC to perform waste sorting behavior, the higher individual's intention to do waste sorting framework (Gadiraju, 2016; Stoeva & Alriksson, 2017; Zhang et al., 2016). When individual's intention to perform a behavior increase, the probability of the behavior to be performed would be increase as well (Ajzen, 2014). Besides, PBC to do waste sorting, also correlated with knowledge how to sort waste, benefit of behavior[2] and knowledge of availability waste management program (Kirakozian, 2015).

Based on those findings from the qualitative and quantitative study, the author designed an intervention to increase knowledge that "XYZ" University had waste sorting program, its benefit and also knowledge how to sort the waste. Video was chosen as media intervention in this study. It was seen as cheap, effective as media champaign, and easy to Access (Chung, 2015). It was also found to be effective increasing knowledge about environmental issues (Lalmuanpuii, Zagade, Mohite & Shinde, 2015; Pearson, Dorrian, & Litch, 2011). Furthermore, when people know what to do to reduce enviromental risk, it could increase their PBC to perform it. Beside PBC, video was found effective to increase people's intention to do something reducing environmental threat such as global warming (Kurisu, Kimura & Hanaki, 2019). Those finding gave consideration to the author to use video as intervention tool to increase knowlege about the benefit and how to sort waste, also knowlege of availability of the waste sorting program in "XYZ" University. It was expected that by increasing student's knowledge, it would increase their PBC's to sort the waste and encourage them to perform waste sorting behavior. The video was constructed based on social influence theory (Baumeister & Finkel, 2011) and social modeling (Bandura, 1977), which was found as effective technique to promote pro-environmental behavior (Varotto & Spagnolli, 2017). The hypothesis of this intervention study were:

H1: the organic sorting behavior of the intervention group (with video literacy) will significantly higher than the control group.

H2: the inorganic sorting behavior of the intervention group (with video literacy) will significantly higher than the control group.

H3: the waste sorting behavior of the intervention group (with video literacy) will significantly higher than the control group.

Method

For the intervention study, the author used an experimental (between-subject) design. Participants were divided into two groups (waste sorting literacy vs. control group) using randomization (Field, 2009). Participants were undergraduate students from various faculties. Participant's recruitment was done by spreading posters a week prior the intervention study and prospective participants registered through an online application.

A total of 51 participant became participant of this study, but only 29 participant (14 students in intervention group and 15 students in control group) were valid to be analyzed due to measurement's criteria.

Materials

There were two videos used in the experimental study. The first video was waste sorting literacy which gave information related waste sorting program in "XYZ" University, its benefits, and how to sort waste correctly. The content was given by students and social models who was responsible for the waste management in "XYZ" University and also by models who has authority in "XYZ" University.

The second video did not related to waste sorting behavior and was given to the control group. The video was washing hand literacy at "XYZ" University.

Procedures

There was deception in this intervention study. At the online registration form, the author told that this study was about pro-environmental behavior and they were expected to give review about the video they were going to watch. There was no information explaining that the study was intent to measure their waste sorting behavior. Its purpose was to let the participant showed their waste sorting behavior as natural as posible.

The intervention study conducted on April 13, 2019 at "XYZ" University, from 9.30 am until 11.30 am. All participants, which registered and confirmed that they were willing to be participant of this intervention study, were divided into two groups (waste sorting literacy vs. control group) using randomization. Each group was in different room with similar condition and was given the same procedures. They were accompany by three facilitators who helped the author conducted the study. Before entering the room, all participants were given snack.

After the participants came in the room, the facilitator gave introduction and gave deception of the study. All participants were given informed consent form and approval sheet for being participant. After it was filled and signed, they were asked to watch the video. Each of participants was asked to answer several question about the video. It was used to be a manipulation check for the author to know whether participant watch the video or not. Then the participants were asked to gather in short discussion and were given permission to eat their snack. The discussion was held for half an hour and asked the participants what they thought about the video as feedback, aligning with the deception of this study, which told the participant that their feedback about the video was useful for the author. After discussion, one of the facilitator closed the study, while the others observed their waste behavior. The authors also provide several bins with categories label on each bins (figure 1) so the waste behavior could be measured. The participant then could leave the room. All participants were given transport fee for came and being participant of this study. Debriefing was given 3 weeks after the intervention study by email to each participants. All participants were given information about the aims of the study that this study was not to get their feedback about the video, but to see whether waste sorting video's effect to their waste sorting behavior.

Fig. 1: Trash Bin with Different Waste Categories (inorganic and organic waste)

Fig. 2: Organic Waste (banana leaves)

Fig. 3: Inorganic waste (Plastic wrapping)

Measurement

Waste sorting behavior was measured by observing whether participants sorted or not sorted their waste based on its categories after they watched the video. The waste sorting behavior is classified by counting the waste of the snack given in the study by its categories: organic/banana leaves of a snack (figure 2) and inorganic waste/plastic wrapping (figure 3). Each snack item was given a code or mark for each participant, so it could be easily categorized whether each participant put their waste in the right bin. If a participant correctly sorted his/her waste in to the right bin, his/her behavior will be coded as 1, or 0 if the participant put it incorrectly. If the waste sorting behavior of the participants could not be observed during the intervention study, the data would be coded as missing data.

Data Analysis

A total of 29 participant were observed for their waste sorting behavior and were analyzed using non-parametric test, Fisher's Exact test (Field, 2009; Kim, 2017; Tomczak & Tomczak, 2014).

Result

A total of 29 participants were being analyzed for their waste sorting behavior. The author only counted the snack's waste whose mark could be detected come from different participant. Manipulation check also showed that all participant in each group watched the video.

The statistic descriptive of waste sorting behavior is showed by table 1. The data was tested using Fisher's exact statistical test (for categorical data).

Table 1: Waste Sorting Behavior's Statistic Decriptive of Participant

No	Waste	Intervention Group		Waste's Observed Amount	Control Group		Waste's Observed Amount
		Correct	Incorrect		Correct	Incorrect	
1	Organic waste (banana leaves)	93%	7%	14	45%	55%	11
2	Inorganic waste (Plastic wrapping)	100%	0%	14	92%	8%	13

H1: the organic waste sorting behavior of the intervention group (with video literacy) will significantly higher than the control group.

The Fisher's exact statistical test shows that H1 was supported by the data. It means the participants which were given waste sorting literacy more likely to sort their organic waste correctly than participants in the control group (df = 1, n = 25), $p < 0.05$, $V = 0.52$.

Effect size for Fisher's exact analysis method (2x2 table) can be seen from *phi* value or odds ratio (Kim, 2017; Tomczak & Tomczak, 2014). The Fisher's exact test for H1 showed the value of phi, $\Phi = 0.52$ and the odds ratio = 15.6. For the degree of freedom (df = 1), the value of $\Phi = 0.52$ is categorized as large effect (Kim, 2017). In addition, the odds ratio also shows that the possibility of participants sorting organic waste compared to not sorting out is 15.6 times higher if they are given a waste sorting literacy intervention compared to the control group.

H2: the inorganic sorting behavior of the intervention group (with video literacy) will significantly higher than the control group.

Hypothesis test results for inorganic waste showed that the hypothesis (H2) was not supported by data (df=1, n =27), p>0 .05, V=0.20. By this finding, the author answered that the sorting behavior of the intervention group (with video literacy) will significantly higher than the control group (H3) was partially supported by the data. It means video-based waste sorting's literacy significantly increased organic waste sorting behavior, but not with inorganic waste.

Discussion

The results of the intervention showed that video-based waste sorting's literacy significantly increased organic waste sorting ratio accuracy, but not with inorganic waste. It could be explained by several reasons. First, the information about the waste sorting program at the University of "XYZ" and the importance of separating organic waste from inorganic waste were only given to those who watched waste sorting literacy's video (intervention group). There was also information about the journey of the waste in "XYZ" University from the trash bin until it was recycled or became compost (for organic waste). It might give vicarious experience to the participant to know the real benefit of waste sorting, that their action to separate their waste would not be useless. The video also gave information how to sort their waste based on its categories. Those reasons might made video literacy significantly increase organic waste sorting behavior in the intervention group compared to the control group.

The author also conducted interview to several participant in the intervention group. They stated that kind of information change their attitude toward waste sorting behavior to be more positive. It

supported social learning theory (Bandura, 1977) which stated that when the observer could feel the outcome of the observed behavior, the observer could perceive themselves could perform such a behavior to get similar outcome. This study gave new finding to the literature that video not only could increase individual's PBC and intention to performed waste sorting behavior, but also increase the probability of the behavior to be performed. Besides, the organic waste used in this intervention was banana leaves, which might easily distinguished and categorized as organic waste by the participants.

However, the video literacy did not significantly increase inorganic waste sorting behavior, and this might caused by several factors. First, there is the possibility that participants already recognize and know to sort inorganic waste (plastic wrapping). It might also show the possibility that knowledge and PBC scores are already high, although the author could not provide data to support this statement. When knowledge related to inorganic waste is high, literacy is no longer able to increase their PBC, so it does not significantly increase inorganic waste sorting behavior of the participant (ceiling effect). But, because of the absence of pre-post tests related to knowledge in participants, the authors were unable to ascertain whether there was a ceiling effect in this intervention study or not. This can be suggestion for future research to conduct pre-posttest without give hint to the participant about the aims of the study (e.g. used filler question).

Furthermore, there were another finding from the interview conducted two weeks after the intervention study. While their attitudes were change positively toward waste sorting and they have higher intention to separate their waste, but if the facilities were not available, the behavior would not be performed. For examples, two of the students in the intervention group stated that they usually want to sort their waste. But they tend to not perform sorting waste behavior, simply because they found it was hard to find trash bin with several categories. This supported previous research which stated that availability of the facilities might became a gap that inhibit the intention to manifest into real behavior (Zhang et al., 2016). It also happened when they have no time to sorting the waste. Inconvenience factor, such as availability of time and chance, could influence someone whether they would sort their waste or not (Gadiraju, 2016). Personal values, such as individual's habit relating waste sorting, could become another factor which could encourage or inhibit the intention became a behavior. Unfortunately, those factors (inconvenience factor and personal values) were not variable of the study. Also, the interview was not part of this study and was only done by the author to help explaining the result of the study. Nevertheless, future research can add such of variables (inconvenience factor and personal values) to be investigated its correlation with waste sorting behavior.

This intervention study also had limitations. First, the sample size was small (less than 30 participants). Second, the author did not conduct pre-posttest related knowledge and waste sorting behavior of the participants during the study. For future research, the researcher could use filler questions to avoid participant knowing the aim of the study and then collect the pre-posttest data. Another limitation was all participant were undergraduate student in "XYZ" University. The result cannot easily be generalized into another population which have different criteria. But, in the "XYZ" University context, this study still valid because undergraduate student was the biggest population in the campus. This video can be environmental campaign to encourage waste sorting behavior for their students.

The author also realized that behaviour change could not be happened instantly by one-time intervention. There should be integrated system from many factors to make a behaviour sustain, from the availability of the facilities, good waste management system and clear regulation, socialization of the waste sorting program and education to all civitas academia in the campus. However, video-based waste sorting literacy has been shown to partially improve the waste sorting behavior of University "XYZ" students. Hence, this intervention can be adapted to increase waste sorting behaviour in university context, especially in Indonesia.

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Principles of Forestry Digitalization in Russia

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Abstract

The article discusses the implementation of digital technologies in the forestry sector of Russia. The results of a study of the state forest management system at the level of Russian regions for the application of digital technologies are presented. It has been established that the digitalization and implementation of ICTin forestry is hampered by the lack of national information systems and digital platforms and a unified approach to standardization of processes, forms of collection, storage and transmission of complete and relevant information on forest resources and forest areas. The need for digital technologies in the forestry business is growing, and the most demanded are mobile applications, online services, cloud services and distance learning technologies. To support forestry entrepreneurship, it is necessary to create a mobile application «Personal account of the tenant» with the characteristics of the leased forest plot, forest resource (timber stock, species composition, productivity, etc.) and economic characteristics (rental payments, expected income, rental period). Digitalization of the Russian forest complex should be carried out on the basis of standardization; reliability; unification; distribution of information; openness; information security.

Keywords: Management, Digital Technology, Forestry

Introduction

Digital technology is a set of methods and tools used to collect, store, process and disseminate information. Modern digital technologies today determine the level of technological development of industries and industries, regions and countries. Accelerated implementation of digital technologies in the economy and social sphere is an important goal that is being successfully implemented only in very few countries. The development of the digital economy is one of the priority areas for countries that are economic leaders, including the USA, Great Britain, Germany, Japan, etc. While in the developed countries the main goal of introducing digital technologies is to improve the quality of information, digitalization is oriented in developing regions with economies in transition on economic development and stabilization of individual business processes (Limani Y. et al., 2018).

Despite the existing cross-country differences, the need for the use of information and communication technologies both at the level of government and in business management is beyond doubt.

A huge number of enterprises use digital tachology, such as electronic data exchange, blockchain and big data to increase productivity, process efficiency, increase the amount of information. The technology of «digital doubles », combining the industrial Internet of things and digital modeling, is actively implemented in developed countries at all stages of the product life cycle - from development to operation (Huang S. et al., 2020; Kitain L. 2018).

Digital technologies increase the speed of information exchange, increase the flexibility of business processes and increase the efficiency and reliability of business networks.

The importance of the transition to digital technologies, designated as «Industry 4.0» in developed countries, is emphasized in the writings of researchers who consider various models of digital transformation of business processes, factors that determine the success of their application and problems (Laudante E. 2017; Schröder C. 2016).

Среди них готовность бизнеса и общества к цифровой трансформации, наличие развитых информационных технологий и спрос на них со стороны стейкхолдеров (Arvidsson, V. et al., 2018; Elia G. et al., 2020).

Russia is actively introducing digital technologies in industries and sectors of the economy. Managers of Russian enterprises have mastered basic digital technologies, in some cases they have automated and restructured business processes to advanced digital technologies.

Today, 83% of Russian organizations already use broadband Internet, 63% - have mastered the technology of electronic data exchange (Polyanin A. et al., 2019).

To assess the development of digitalization at the country level, the ICT Development Index is used, which is a combined indicator characterizing achievements in terms of the development of information and communication technologies. According to the index of the development of information and communication technologies, in 2017 Russia ranked 45th in the world.

At the same time, the demand for digital technologies in Russia from the side of state management and entrepreneurship is characterized by positive dynamics. Progress in the field of big data analysis, cloud computing has created a demand for innovation, both in management and in business. Today, 83% of Russian organizations already use broadband Internet, 63% - have mastered the technology of electronic data exchange (Morkovina S.S. et al., 2019).

However, the digitalization of sectors of the Russian economy is uneven. In some industries (mechanical engineering, chemical industry), the cost intensity of digitalization is similar to that in the United States. However, in such large sectors of the Russian GDP as trade and the forest sector, significantly lower digitalization costs are observed (Abdrakhmanova G.I. et al., 2019). Despite the uneven distribution of digital technologies in industries and complexes, the Russian forest complex, like no other, now feels the need for digitalization (Morkovina S.S. et al., 2016). In recent years, the interests of the Russian forest sector are related to the intensification of forestry, which is impossible without reliance on new information technologies (Nordberg M. et al., 2013; Petrov A.P. et al., 2019).

Methods

In the course of the study, an integrated approach to the study of the use of ICT in the Russian forest complex was implemented. As scientific methods, methods of content analysis, detailing, and a comparative approach were used. Sources of information were: federal and regional information resources, monitoring data from print and electronic business and specialized publications, analytical reviews. The application of analytical, logical research methods has made it possible to develop recommendations aimed at creating a unified digital platform to provide state power with information in forest management.

Results and Discussion

The forestry sector of the Russian Federation is significantly inferior to the world forest powers in digitalizing forest management processes, the reason for this is the lack of strategic documents and digital transformation programs. In the countries of Europe and America (USA, Canada, Great Britain, Serbia, Finland, Belarus) there is a stable legislation and there are a large number of developments related to the implementation of ICT, in particular, there are strategies for informatization of the forest industry.

Most countries use ICTs for forest inventory, monitoring and mapping of forest lands, and accounting and tracking of wood. Sustainable Internet in European countries and developed technical means have provided a breakthrough in the field of digitalization of forestry. In this case, the most popular ICTs are in forest inventory processes, which use modern GIS and RSE technologies, as well as various applications for automating the processes of mapping and maintaining forest resource databases.

At the same time, ICT in forestry can solve a significant number of problems and ensure a qualitative improvement in a number of processes (Figure 1).

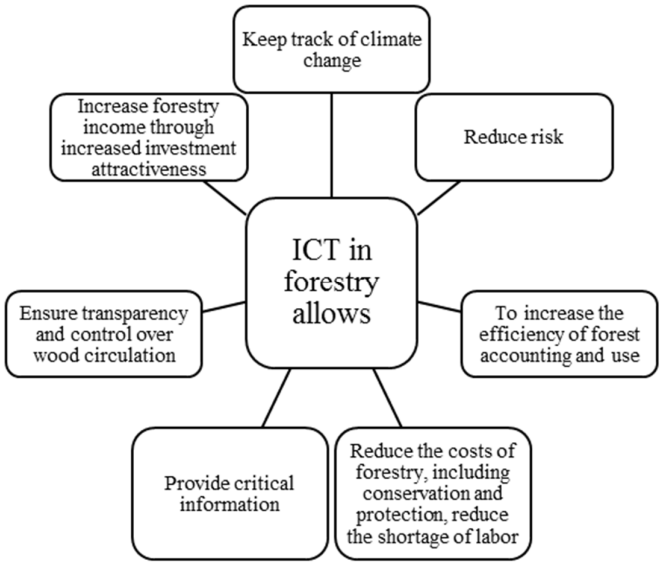

Fig .1: ICT Opportunities in Forestry

In all countries, at the level of departments (departments and services) of forest management, structural units have been formed responsible for the implementation of ICT. By analogy with European countries, a state policy in the field of forestry informatization should be developed in the Russian Federation.

According to the results of a study of the sites of state forest management at the level of Russian regions, it was determined that ICT implementation processes are haphazard, and informatization as a whole is fragmented, with one third of all state forest management bodies of the regions having dedicated websites (Figure 2).

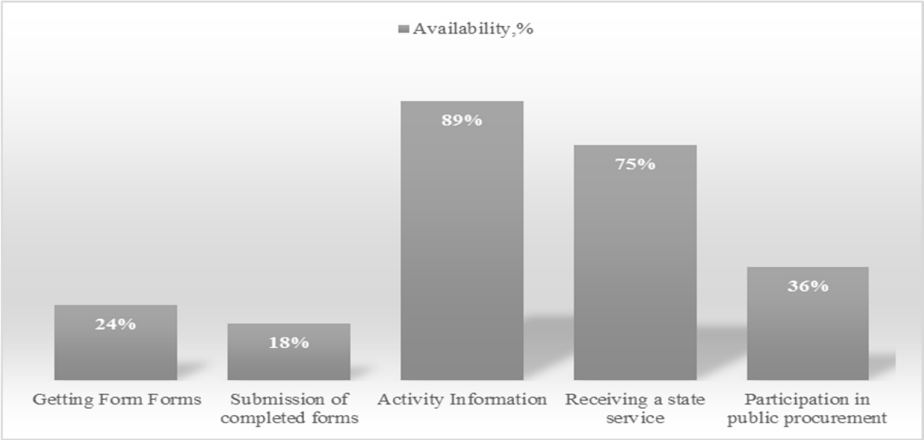

Fig. 2: Capabilities of existing websites of state forest administration authorities of the regions of the Russian Federation

The largest amount of information presented on the websites of state forest management bodies of the regions of the Russian Federation relates to the organization of activities.

There is little information for individuals and public organizations, and feedback is not effectively organized.

The following factors impede the digitalization and implementation of ICT in forestry, as well as the digitalization of state forest management processes:

– lack of a unified approach to standardization of processes, forms and formats for collecting, storing and transmitting complete and relevant information on forest resources and forest plots;

– a high level of deficit in the industry labor market for specialists who are able to work effectively with innovative digital technologies;

– lack of a regulatory framework and practice of interagency cooperation at the regional level;

– incomplete data on cadastral registration of all forest plots;

– lack of national information systems and digital platforms that provide forest users and regional bodies of state forest management with a set of spatial data and cartographic materials containing up-to-date information on the state of use of Russian forests.

The main use of forests in Russia is lease under the terms of the contract and as a result of the auction. At the same time, the most profitable type of forest use is logging (Table 1).

The use of ICT in entrepreneurial activity is increasing, and studies have shown that the most popular are digital solutions for forest users - the Internet, mobile applications, online services, cloud services and distance learning technologies. We performed an analysis of the demand for ICT among entrepreneurs operating in the forestry sector (Morkovina S.S. et al., 2019).

The channel for transmitting and storing information with the maximum coverage of entrepreneurs is corporate mail: more than 50% of entrepreneurs use it. Also, systems for automating the operation of the enterprise are quite in demand.

Table 1: Dynamics of forest use (forest use) in the Russian Federation

Indicators	Year end value							
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Number of lease agreements for timber harvesting (pcs.)	10217	10481	11811	13735	15098	15112	11965	13379
Forest area for timber harvesting (thousand ha)	155680	166983	177377	175798	173896	167448	166557	166986
The number of lease agreements for hunting (thousand ha)	888	939	1022	1132	1347	1492	1553	1595
The area of forest land for hunting (thousand ha)	33725	33506	37086	54248	44182	49876	55357	53883
Number of lease agreements for recreational activities (pcs.)	9834	12028	13237	13359	13804	14 295	14753	15050
Forest area for recreational activities (thousand ha)	83	49	37	36	35	33	76	34,1

The use of communication channels to receive forms and provide completed forms is the least developed ICT. The number of entrepreneurs using cloud services as a means of storing and transmitting information has grown significantly (Figure 3).

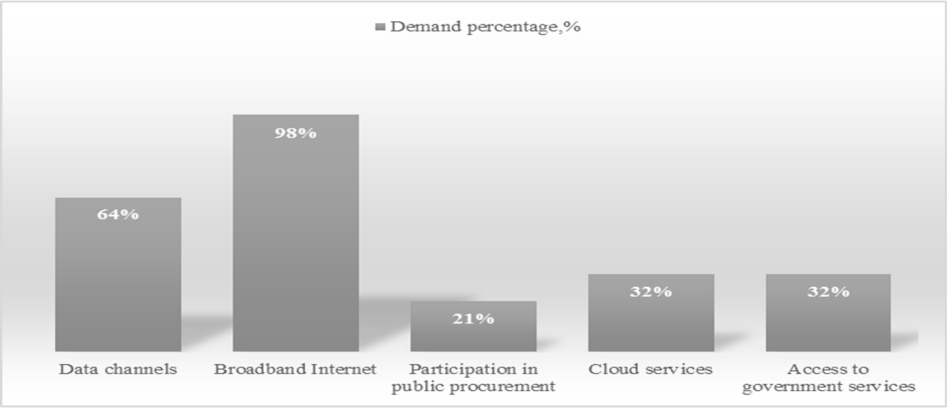

Fig. 3: Уровень востребованности ИКТ технологий у бизнеса, %

The vast majority of entrepreneurs (98%) use the Internet to conduct business. At the same time, entrepreneurs noted the need to create specialized mobile applications for the forest business. Training employees to use digital technology, according to entrepreneurs, is necessary.

As a conclusion, we note that forestry needs the creation and implementation at all levels from forestries to the federal level of a single industry digital platform in which all data on forestry will be accumulated and systematized.

In this digital platform, it is advisable to create a service « Personal account of the tenant», which will reflect the full information:

– characteristics of the leased forest plot and its location on the map;

– characteristic of the forest resource (timber stock, species composition, productivity, etc.);

– economic characteristics (rental payments, expected income, rental period, etc.).

All this will make it possible to efficiently manage forests and ensure the investment attractiveness of forestry through visualization of entrepreneurial activity.

When creating a digital platform and its mobile applications, both general and particular rules imposed in such objects must be taken into account. The general principles in our opinion are:

– standardization - the establishment of standard forms and data sets for individual events in forestry life, processes and interfaces of information systems, common standards and reference books to achieve orderliness, and the possibility of analytical processing, modeling and visualization of industry information, as well as technical and information compatibility of components of information systems;

– reliability - ensuring uninterrupted access in real time and remotely (without access to the information and communication network «Internet») to a single database of primary documents;

– unification - the establishment of common approaches to the development of technical and software solutions for information systems in the forest industry, common standards for the exchange of information, common unique sets of rules and processes that determine the interaction between users on different sides of ITP;

– distribution - the use of distributed information systems and resources, components of information and computing infrastructure, including a distributed cloud platform that allows you to store, protect, process and deliver data from / to all ITP users in the Russian Federation, at a high data transfer rate with minimal delays, as well as offline (without access to the Internet);

– openness - the availability of data established by law from primary documents on the forest industry to citizens, representatives of business entities and other interested parties in open access on the geoinformation portal in the Internet information and telecommunication network;

– legal significance - the exchange of primary documents between authorized persons and organizations should be based on the principles of building a distributed platform using the existing infrastructure of electronic document management operators, including those widely used by state organizations and business entities in the Russian Federation. At the same time, for ITP participants who do not use the specified infrastructure, the implementation of the corresponding functionality as part of ITP is provided;

– information security - ensuring the security of information, data and supporting infrastructure from accidental or intentional influences of a natural or artificial nature, including the use of information protection technologies using Russian cryptographic standards and Russian technologies to ensure the integrity, confidentiality, authentication and accessibility of transmitted information and its processing processes.

Conclusions and Recommendations

An analysis of the current state of informatization in the sphere of state forest management in Russia indicates that in the forest sector there is still no comprehensive approach to create a unified information system of state forest management bodies at all levels. There are many gaps in the regulatory system.

The forestry sector of the Russian Federation is significantly inferior to the world forestry countries in the field of ICT, which determines the need to accelerate the transition to digital technologies that are most in demand at the level of state forest management and the forest business. By analogy with European countries, a state policy should be developed in the field of forestry informatization, as well as the creation of a digital forestry platform.

Measures to digitalize forestry in Russia must be carried out in order to:

– a technological breakthrough in forestry and the achievement of a significant increase in the productivity of forest users through modern digital technologies, robotics, the use of artificial intelligence, big date and blockchain;

– transformation of state forest management processes and ensuring the effectiveness of decisions based on a single information space that ensures the completeness and consistency of information;

– digitalization of the forest sector in Russia and the creation of a single industry digital platform will contribute to the achievement of the following results;

– improving the quality of control and supervision of the forest business;

– unification and standardization of documents and rules for the organization of forest use;

– transparency of the results of work in forestry;

– lower costs for the production of forest products;

– increasing the efficiency of activities, including through the growth of labor productivity;

– reducing the time taken for managerial decisions, including due to the relevance of the information;

– increasing openness of information and increasing activity of the population and citizens in forest management processes.

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Qualimetric Assessment of Digitalization Vectors on A Regional Level: a Case of The Russian Federation

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Abstract

In modern conditions of Russia, the implementation of federal projects of the national program «Digital Economy of the Russian Federation» is especially relevant. Particular attention in the scientific community is paid to discussing the modern concept of the "digital economy" and the practice of developing regional digitalization processes. The paper provides a critical analysis of foreign and domestic approaches to assessing the level of development of the digital economy. The possibility of their application in the conditions of modern Russia at the regional level is investigated. The authors have proposed an approach to building the digitalization index of the Russian regions, which allows a comprehensive assessment of the digital economy development level in regions. This tool is especially relevant as a tool for analyzing the implementation of the digitalization strategy for the constituent entities of the Russian Federation in the framework of federal projects as a part of the national program «Digital Economy of the Russian Federation».

Keywords: Digital Economy, Digitalization Strategy, Subject Of The Russian Federation, Digitalization Index.

Introduction

The relevance of the research problem is due to the fact that the regional authorities in Russia today do not have tools to adequately assess the implementation of regional projects in the framework of federal projects of the national program "Digital Economy of the Russian Federation". Therefore, monitoring progress in the field of digital development of regions, as well as a comparative analysis of problematic issues in the implementation of the strategy of the constituent entities of the Russian Federation, is not yet possible.

In the course of data processing and analysis, a complex of economic research methods was used, united by a systematic approach to studying the digitalization problem, analytical, economic-statistical, abstract-logical, comparative methods were used.

The work states the existence of objectively existing problems that, on the one hand, impede the process of implementing tools for managing the process of implementing the digitalization strategy of the constituent entities of the Russian Federation within the framework of federal projects of the national program "Digital Economy of the Russian Federation", and, on the other hand, determine the relevance of research on the development of methodologies and tools to adequately assess the implementation of regional projects, and focused on their practical usefulness. Developed within the framework of the integrated (integral) approach that has prevailed over the past few years, methods, procedures and tools are not yet sufficiently clearly systematized, often contradictory, and in some

cases (this primarily relates to comprehensive diagnostics of progress in the field of digital development of the regions of the Russian Federation) very unsuitable for use in practice.

The interest of the research lies in the formation and scientific substantiation of theoretical, methodological and practical directions for the development of a mechanism for assessing the digitalization process in Russian regions, which allows for comprehensive monitoring and assessment of the level of development of the digital economy at the regional level.

The research results are in improving the process of managing the implementation of the digitalization strategy of the constituent entities of the Russian Federation in the framework of federal projects of the national program "Digital Economy of the Russian Federation".

Methodology

The main goal of the study is to develop an approach to building the digitalization index of the Russian regions, which allows a comprehensive assessment of digital economy development level in regions. This tool should contribute to the comprehensive monitoring and evaluation of the level of development of the digital economy at the regional level, as well as the analysis of the implementation of the digitalization strategy of the constituent entities of the Russian Federation within the framework of federal projects of the national program "Digital Economy of the Russian Federation".

To achieve this goal, the possibilities of applying a new system of indicators (rating) of the National Index of the Development of the Digital Economy of the Regions of the Russian Federation were investigated. The rating implies a balanced assessment of the development of digital transformation in the regional and sectoral aspects. The formation and selection of indicators takes into account state requirements established in regulatory legal acts governing digitalization processes in the Russian Federation, as well as taking into account the analysis of requirements and expectations from the business environment and citizens of the Russian Federation.

Literature Review

In the course of the work, the scientific works of domestic and foreign authors on the study of the problems of the digital economy were studied. Here are some definitions of the digital economy that are used in the scientific and professional communities:

- The economy is based on digital technologies, but we understand this to a greater extent as the implementation of business operations in markets based on the Internet and the World Wide Web by British Computer Society (2013).
- Use of digital technologies to change a business model of Banu Dawood Gani and Fernando (2018).
- Integration of digital technologies into everyday life by the digitization of everything that can be digitized – defined by Ochs and Riemann (2018).
- Is the process of converting information into a digital (bits - 0,1) format (i.e., readable by computers). This allows any information to be stored, processed, and transmitted easily by using a network of computers. Gupta (2019).
- The integration of digital technologies into everyday life. Digitalization also means the process of making digital everything that can be digitized and the process of converting information into digital format by Croon Fors (2013).

Obviously, the diversity of opinions presented on the essence of the digital economy gives rise to different versions of its description.

We agree with the opinion of L. Gokhberg (2019) that the digital economy is the creation, dissemination and use of digital technologies and related products and services - Gokhberg (2019).

The question of the relationship between digital and conventional activities remains open, and it also requires specifying the types of digital technologies by Polozikhina (2018).

In Russia, the term "digital economy" is defined in the "Strategy for the Development of the Information Society in the Russian Federation for 2017 - 2030." as “an economic activity in which the key factor of production is digital data, the processing of large volumes and the use of analysis results which, compared with traditional forms of management, can significantly increase the efficiency of various types of production, technologies, equipment, storage, sale, delivery of goods and services " in Decree About the Strategy for the Development of the Information Society (2017). At the same time, the specification of the directions of measurement and evaluation of the digital economy is not given.

Following Polozikhina (2018), we believe that the digital economy is segments of the market where added value is created using digital (information) technologies.

Thus, by the digital economy (digitalization) we mean a level of implementation of digital technologies at which they become a key factor in production and significantly increase the efficiency of various fields of economic activity and the quality of life of people. At the same time, a digital space is being formed in which, thanks to the accelerated progress of telecommunication technologies, a new basis is being formed for the development of the economic and social sphere by Antipina (2018) and Demura (2019). The digital economy is turning from a strategic priority for the state into reality for business, municipal organizations and the population of Russia. Decree of the President of the Russian Federation of May 7, 2018 No. 204 (2018) and the National Program “Digital Economy” define key areas for the development of the information society (2019).

Today, there is an urgent need to develop a new system of indicators (rating) of the National Index of Development of the Digital Economy of the Regions of the Russian Federation, which would take into account the initially existing “digital inequality” of the Russian regions and allow tracking the development dynamics of specific regions taking into account the specifics of their functioning.

Analysis

Today, the digital economy is turning from a strategic priority for states into a reality for business, municipalities and the public. At the same time, the current formation (change, concretization) of digitalization requirements must be taken as an opportunity to transform (specify) the tools taking into account new challenges and requirements that are formed at successive phases of the development of digital transformation (the principle of flexibility in building the Rating).

Decree of the President of the Russian Federation dated May 7, 2018 No. 204 and the national program “Digital Economy of the Russian Federation”, approved by the Presidium of the Presidential Council for Strategic Development and National Projects dated December 24, 2018 No. 16, set a new vector for the development of the information society.

To ensure the continuity of state policy and the “soft” transition of the stage of building the information society to the stage of formation of the digital economy, it is necessary to develop a new system of indicators for the National Index of the Development of the Digital Economy of the Russian Federation (hereinafter - the Rating). Continued use of the monitoring and rating tool will provide a timely assessment of the pace of regional digital development, and will provide an opportunity for flexible development management of the constituent entities of the Russian Federation. Information society building in Russia was executed in accordance with National program “Information society (2011-2020)”. Stages were as follows: digital technologies to legal bodies – by 2015 and trend towards fully electronical government with elements of infrastructure and cyber-security investments.

The peculiarity of regional rating and its difference from the all-Russian (country) rating is that initially the subjects of the Russian Federation are in unequal conditions from the point of view of

forming the potential for the development of digitalization in them. Therefore, the final rating should take into account the initially existing “digital inequality”, but it is advisable to lay the basis for its calculation methodology on the principle of assessing the development dynamics of a particular region taking into account its specific functioning features. Therefore, before the full-fledged use of the Rating as a monitoring and management tool, it is necessary to evaluate the starting positions of the regions, that is, measure their current state and development dynamics.

At the same time, when constructing the Rating, it is advisable to take into account the following three interrelated premises:

- the uniqueness of the region, including its industry structure;
- degree of mobility of the digital environment;
- maturity stage of digital technology.

The uniqueness of the region is connected with the fact that each region has a different level of development of the basic institutions necessary for launching digital transformation processes (infrastructure, human resources, etc. - the basis for the formation of the first index component).

The degree of mobility of the digital environment. The development of digitalization is largely determined by the degree of penetration of existing “end-to-end” digital technologies into the internal operations of a particular industry. Consequently, the ability to get the effects of digitalization varies across industries. At the same time, the trajectory of the socio-economic development of the region is largely determined by the existing sectoral structure, which should be perceived as an important variable in the rating process of the constituent entities of the Russian Federation. It is necessary to take into account not only the possibility of an integrated assessment, but also the qualitative and quantitative characteristics of the digital transformation of the economies and social spheres of the constituent entities of the Russian Federation by tracks, industries and fields of activity - tracks (the basis for the formation of the second index component).

It should be borne in mind that various industries have different digitalization potentials because the third-wave digital technologies, including artificial intelligence, big data analysis and storage, distributed registries, the Internet of things and other end-to-end technologies, have an impact on industry development opportunities in varying degrees and form fundamentally different prospects for creating added value.

At the same time, the degree of mobility of the digital environment also determines the level of activity of the main participants in the region's digitalization processes.

The maturity stage of digital technologies influences the intensity and efficiency of development of industries and fields of activity. New digital technologies dynamically penetrate the country's economy and thereby have a significant impact on the development of its infrastructure. These trends are becoming a key element in international economic competition; therefore, control and stimulation of these processes at the state level is becoming particularly relevant. The increasing use of modern information and communication technologies is becoming a prerequisite for the emergence and development of new effective management technologies and entrepreneurial practices.

Accounting for all three components will ensure the implementation of a systematic approach to assessing the development of digitalization of regions from a position of ensuring integrity, which will allow:

- monitor the conditions of system development over time;
- evaluate the evolution of the passed stages of development;
- prevent the occurrence of imbalances in digital transformation (balanced development of the system);
- set the vectors of managerial decision making at the regional level.

To increase the effectiveness of public administration and make informed management decisions, it is advisable to provide for a channel of social diffusion, the possibility of feedback, reflecting the degree of public reaction to digital transformation, including at the regional level. Thus, the index can carry not only an information-analytical function, but also be an interactive tool through which the main participants in the process of digital transformation of the region can influence the adjustment of state policy, including reform, in this area through their direct involvement in evaluating effectiveness (basis for the formation of the third index component).

Results

In the proposed methodology for determining the index, three upper-level index components are identified that are focused on key areas of the digitalization process in a particular region. Together, they form a common framework model for this process.

The first index component is "Perception of the processes of digital transformation of the subject of the Russian Federation. It is built in a regional context on the basis of taking into account the public opinion of citizens of the Russian Federation regarding state and regional digitalization programs. The information basis for this index component is the data of special sociological studies, the uniqueness of which is a feedback tool, due to which further adjustment of state policy is possible. Assessment of population satisfaction with digitalization processes is based on three components: trust, motivation and expectations, which allows maintaining parity between economic, political and social aspects when implementing state policy in the field of regional digitalization.

The second index component, "Factors for the development of regional digitalization," reflects the willingness and ability to transform the digital environment of the region. These factors are, in our opinion: the availability of appropriate human capital, innovative and investment potential of the environment, the level of development of information systems in state authorities, the level of development of information and communication culture, the willingness of subjects of the digitalization process to use domestic software. It demonstrates the degree of digitalization of the priority directions of the region's development (urban economy, industry, public administration, healthcare, transport, education, agriculture). When forming the index, we took into account important methodological aspects: the mandatory inclusion in its composition of indicators reflecting the degree of achievement of goals in the framework of the Digital Economy of the Russian Federation program; the implementation of the continuity between the previous assessment of the level of development of the information society in the constituent entities of the Russian Federation. For analysis, data from official authorities are used. Within the framework of this index, two subindexes are identified:

1. Readiness of the digital environment - at the level of the region's economy (macro indicators). They are considered in three sections: the readiness of the digital environment for the population, for business and for government.
2. Readiness of the digital environment - at the industry level (meso-indicators). These are target indicators of relevant sectors of the economy, which are enshrined in federal and regional projects as defining the development of regional entities.

The third component index characterizes the final effects of the digital transformation of the economy and social sphere of the region - for the population, business, government and key sectors of the economy.

The third index component "Effects of digital transformation for the economy and social sphere of the region" reflects the final effects of digital transformation for the economy and social sphere of the region (along the tracks) for the population, business, government and key industries identified in the second index component.

Currently, the main effects of digitalization are associated with the fact that the introduction of new ICTs allows to improve technological processes and improve product quality, optimize organization

in various fields of activity, and finally contribute to improving people's health and quality of life (Polozikhina, 2018).

Conclusion

Thus, the proposed methodology for determining the index allows you to carry out several areas of analysis: individual analysis of the selected index components; comparative analysis of regions; as well as analysis of the impact of digitalization by industry and by target groups. This analysis will be useful for developing policies in the field of digitalization in the region, as well as for analyzing the impact of digitalization by industry and by target groups, taking into account the specifics of their functioning.

When constructing the Rating, it is taken into account that the set of indicators and indicators of the digital development of the regions reflects the interests and involvement of all the main subjects of the digitalization process of the constituent entities of the Russian Federation, including aspects of the involvement of representatives of the business community and citizens of the Russian Federation outside the regulatory sphere. At the same time, the formation and selection of indicators takes place not only taking into account state requirements for the digital transformation process established in the main regulatory (regulatory legal) acts regulating the digitalization processes in the Russian Federation, but also based on an analysis of the requirements and expectations of business representatives community and citizens of the Russian Federation.

The proposed index allows for several areas of analysis, such as a comparative analysis between regions, an individual analysis of the selected index components, which is useful for developing policies in the field of digitalization in the region, as well as an analysis of the impact of digitalization by industry and by target groups.

The limitation of the proposed index at present is comparability with previous years, since many indicators have been calculated in Russian statistics with the introduction of the National Digital Economy Program.

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Factors Determining the Inflow of Foreign Direct Investment to Developing Economies – A Case Study of Poland

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Abstract

This study contains an analysis of the main determinants of the inflow of foreign direct investment to Poland between 2010-2017. The first section outlines the theoretical framework of the problem at hand, while the second part contains the results of own research whose scope covered identification of motives for FDI location in Poland. The aim of the study is to pinpoint the most important motives for locating FDI in Poland between 2010 and 2017, in a both national and regional perspective. This study focused on determining the cause-and-effect relationship between the scale of inflow of foreign direct investment (response variable) and selected macroeconomic parameters of the economy (explanatory variables). In the search for significant relationships between the inflow of capital in the form of FDI to particular regions and the factors determining that inflow, a regression model was used. The choice of explanatory variables in the model was dictated by an attempt to include the most frequently researched determinants of foreign direct investment. The dependent (response) variable, which represents the level of inflow of foreign direct investments to Poland between 2010-2017, was expressed by the number of active foreign-invested enterprises in a given year. Meanwhile, the independent (explanatory) variables are indicators that illustrate the most important determinants for the location of foreign direct investment in Poland. The following variables were assumed as explanatory: market size, labor costs, and the quality and availability of labor. A regression model was used in the search for significant relationships between the inflow of capital in the form of FDI to particular regions and the factors determining that inflow. The research was conducted for 16 Polish provinces (voivodeships) in the period between 2010 to 2017. The time range of the analysis was entirely conditioned by the availability of statistical data in the GUS database (Statistics Poland, Local Date Bank). The obtained estimation results did not provide grounds for rejecting the research hypotheses. The proposed regression model indicates that the main factors that encourage foreign investors to invest in Poland were the search for an absorptive market and an efficient workforce.

Keywords: Foreign Direct Investment; Investment Location; FDI In Poland; Statistical Analysis.

JEL Classification: F21; F23; F62; R15.

Introduction

International capital flows are one of the most important forms of relationships between entities in the modern global economy. From among the different forms of capital transfer conducted on an international scale, foreign direct investment (FDI) deserves special attention, having for years remained the largest external source of financing for developing economies. The lack of internal accumulation of capital in many developing countries forces them to seek various sources of financing for their economy, with foreign direct investment playing here a particularly important role according to E. Frejtag-Mika (2009, p. 165). Modern technology, knowledge and investing in people have grown to become important, if not crucial, factors of long-term business development and therefore of a country's economic growth. Investments aimed at boosting these aspects of corporate value growth largely determine such companies' domestic competitive advantage. The connections and cooperation of domestic companies with enterprises with foreign capital are not without

significance here. It is precisely their expansion that is believed, among others, to fill the gap of capital shortage, transfer of modern technologies, knowledge and skills, or diffusion of modern organizational solutions. FDI is most often associated with the influx of innovative technologies and modern solutions, breaking the barrier to the development of lagging economies. FDI also creates jobs directly related to the area of the investment and its surroundings, which may in turn trigger permanent changes in the social and economic structure of regions and therefore national economies at large.

Foreign direct investment is a widely discussed topic within economic literature (Skawińska 2018). It is generally believed that the advantages that FDI brings to the standard of living and prospects for economic growth of the host country, largely outweigh its disadvantages (Janicki and Wunnava, 2004, p. 505; Bobenič Hintošová, Bruothová, Kubíková, and Ručinský, 2018, p. 223). In the global economy, most FDI is located in highly developed countries (World Investment Report. Investment and New Industrial Policies, 2018). However, for several years there has been an increase in the inflow of FDI to developing and transforming countries, among them Poland, which has become one of the largest recipients of foreign capital from among the countries of Central and Eastern Europe (Czech, 2016, p. 36; Cieślik, 2018, p. 33-34; Jirasavetakul and Rahman, 2018; Wyrwa, 2018). By embracing the influx of foreign direct investment in the late 1980s and early 1990s, the economies of Central and Eastern European countries have managed to better lure foreign investors to this region. Over the past twenty-five years, Poland has seen a significant increase in FDI inflows, being currently one of the most important recipients of foreign capital from among the new EU member states. Poland has been relatively successful at confronting the global financial crises of the last decade - recording one of the highest economic growth rates in the EU, one of the lowest unemployment rates in the EU, and all this while avoiding "major financial turbulence" (SpotData, 2018, p. 3). In addition, Poland is the only country in the EU to not have been affected by the de-industrialization process which took place in 2007-2017. In that time, the percentage of persons employed in the industrial sector rose in Poland by 0.1 p.p. (according to Eurostat data, it stood at 24% in 2017, compared to 23.9% in 2006) - Poland was thus the only EU country in which an increased share of industry in employment was reported (SpotData, 2018, p. 7). Industrial enterprises operating in Poland benefited primarily from the development of supply chains by West European manufacturers, especially German. This is clearly reflected, among others, in Germany's increased share in Polish exports (from 25% on the eve of the financial crisis to around 28% at present). In some sectors, the entire Central European region serves as the EU-15's manufacturing base (SpotData, 2018, p. 7).

The favorable conditions for doing business in Poland, also highlighted by the *Strategy for Responsible Development* (Ministerstwo Funduszy i Polityki Regionalnej, 2017), are reflected in the opinions of reputable international centers. Last year the World Bank published its *Doing Business 2019* report, where Poland was among the countries with the best business conditions. Poland's relatively stable rank in this report is a sign that the reforms introduced in the last decade have been effective. The dynamic change of Poland's economy over the years has given rise to entirely new conditions for economic development, also in the context of the inflow of foreign capital. An important element of FDI analysis is identifying the motives guiding foreign investors in the choice of a location to inject capital. This is especially important because it allows assessing the level of development of a country's economy. A review of research studies on factors determining the size of involvement of international enterprises in Poland shows that economic determinants play a key role in the process of choosing Poland as a place to locate capital in the form of direct investment. Among these, market and resource motives have been of major significance (Wilson, 1990, p. 29; Tatoglu and Glaiser, 1998, p. 214; Karaszewski, 2001, p. 274, 280; Johanson, 2006, p. 17; Bitzenis, 2007, pp. 83-111; Gorynia, Nowak, Trąpczyński and Wolniak, 2015, p. 94; Shukurov, 2016, p. 87). While market motives have remained equally relevant over time, there has been quite a noticeable evolution in the area of resources. In the initial period, their cost advantages dominated, i.e. efficiency determinants (mainly labor costs), but soon, quality determinants (qualifications, skills of employees, etc.) would gain increasing importance (Jaworek and Karaszewski, 2018, p. 45).

The changing nature of the size and structure of FDI over time justifies efforts, both theoretical and empirical, to clarify the determinants of these changes. This study builds on previous research

exploring the determinants of international enterprises' activity in Poland. The first section outlines the theoretical framework of the problem at hand, while the second part contains the results of own research whose scope covered identification of motives for FDI location in Poland. The aim of the study is to pinpoint the most important motives for locating FDI in Poland between 2010 and 2017, in a both national and regional perspective. To achieve that goal, the following research hypotheses have been set out:

Hypothesis 1: The number of international enterprises is positively correlated with the size of the Polish market.

Hypothesis 2: Lower labor costs lead to an increase in the number of international enterprises in Poland.

Hypothesis 3: Higher quality and availability of workforce contribute to an increase in the number of international enterprises in Poland.

The article attempts to answer the question whether Poland is still perceived as a country whose main asset is low operating costs, including low labor costs (as was the case in the 1990s), or perhaps resource factors, including high qualifications of the workforce, are now of more importance to investors. The article presents the results of own research whose objective was to identify the motives for locating FDI in Poland. The assessment of the determinants was based on the results of the causal relationship between the scale of FDI inflow (response variable) and selected macroeconomic parameters of the economy (explanatory variables).

Research Methodology

Assuming that direct investors are driven by identical motives in the location of FDI, both in relation to individual Polish provinces and the country as a whole (Heller and Warżała, 2005, p. 797), the strength of correlation between the inflow of capital in the form of FDI to particular regions and the conditions of its location in Poland was examined. To test this assumption, a regression analysis was performed which enables – through the development of econometric models – the determination of the influence of individual explanatory variables on the dependent variable. The research was conducted in 16 Polish provinces (*voivodeships*) in the period between 2010 and 2017. The time range of the analysis was entirely conditioned by the availability of statistical data in the GUS database (Statistics Poland, Local Date Bank).

The aim of the study was to determine the factors that influenced the volume of FDI inflow to Poland between 2010-2017. To this end, simple- and multiple-regression models were used. An important part of the model-building process was its verification. The developed models were tested substantively and statistically. Substantive verification was based on the assessment of signs (characters) standing by the structural parameters of individual variables. This evaluation was to check the compatibility of signs with the expected correlation between an independent variable and an explanatory variable resulting from economic theory. Statistical verification, meanwhile, consisted of assessing the quality of the model using appropriate parameters and statistical tests. A statistical correlation between the level of inflow of foreign direct investments to Poland and the investors' motives between 2010-2017 was examined using regression analysis. Regression coefficients were estimated using a traditional method of least squares, the significance of which was determined by Student's t-test, while the significance of all variables in the model was estimated by variance analysis, i.e. the F-test. The coefficient of determination (R^2) was assumed as a measure of the regression model fit.

The choice of explanatory variables in the model was dictated by the attempt to include the most frequently researched determinants of foreign direct investment. The dependent (response) (y) variable, representing the level of inflow of foreign direct investment to Poland between 2010-2017, was expressed by the number of active foreign-invested enterprises in a given year. Meanwhile, the independent (explanatory) (x) variables are indicators that illustrate the most important determinants

for the location of foreign direct investment in Poland. The following variables were assumed as explanatory: market size, labor costs, and the quality and availability of labor.

Empirical studies employ several different measures to determine the size of the market, although these are most commonly GDP and GDP per capita. Some researchers also try to obtain the value of this variable by referring to the size of the population of a studied area (Resmini, 2000; Wei, 2000; Habib and Żurawicki, 2002; Johnson, 2006). As noted by A. Chakrabarti (2001, p. 98), GDP and GDP per capita show two different aspects of market size. While absolute GDP reflects the total size of the population, GDP per capita represents the level of income and the related quality of demand (the higher GDP per capita, the greater should be domestic demand for more advanced goods and better quality) (Johnson, 2006, p. 17). Thus, GDP per capita reflects not only the level of income, but also the quality of demand in the sense of increased demand for more advanced and higher-quality goods (Wawrzyniak, 2010, p. 92). A. Chakrabarti (2001) additionally points out that the variable representing the size of the host market appears almost in all empirical studies related to FDI determinants.

In this study, market size was reflected in the value of GDP at current prices, and its absorptivity – in the population, GDP per capita, and the gross household income per capita. A larger host market enables the simultaneous operation of a larger number of business entities (both domestic and foreign), thereby achieving economies of scale and increasing the likelihood of breaking even in terms of investment costs. In view of the above, a positive impact of the size of a host market on FDI is anticipated (Zhang, 2001; Erdal and Tatoglu, 2002; Janicki and Wunnava, 2004; Buch, Kleinert, Lipponer and Toubal, 2005; Clausing and Dorobantu, 2005; Kirkpatrick, Parker and Zhang 2006; Bellak, Leibrecht and Riedl 2008).

However, in relation to the variable reflecting labor costs, a negative impact on FDI is expected (Carstensen and Toubal, 2004; Janicki and Wunnava, 2004; Bellak, Leibrecht and Riedl, 2008). Higher labor costs mean a decrease in the profitability of a potential investment and therefore discourage FDI. A higher unit labor cost means a higher marginal cost, and consequently, a lower FDI inflow (Bellak, Leibrecht and Stehrer, 2008). Having said that, empirical studies reach markedly varied conclusions. They indicate both the existence of negative and positive correlations, but also the lack of a statistically significant influence of labor costs on FDI (cf. e.g. research overview presented in: Chakrabarti, 2001; Zhang, 2001; Hilber and Voicu, 2006; Wawrzyniak, 2010). Labor costs are the most controversial of all potential FDI determinants. This is because, although in theoretical approaches there is agreement on the importance of cheap labor in attracting transnational corporations, a large disparity is nevertheless observed in empirical research findings – some argue that higher labor costs in a host country reduce the size of FDI (Bellak, Leibrecht and Riedl, 2008; Sakali, 2013), others suggest a lack of correlation whatsoever, while still others find there is a positive correlation (Bénassy-Quéré, Fontagné and Lahrèche-Révil, 2005; Boudier-Bensebaa, 2005).

In the study, labor costs were expressed by the average monthly gross wage and labor productivity per employee, and a positive relationship was established between FDI inflow and labor costs.

Another factor taken into account in the analyses is the quality of the workforce. When high, workforce quality not only leads to increased production, but also enables the implementation of activities that use advanced technologies. This is particularly important for capital-intensive FDI, targeted at a qualified workforce. Therefore, areas marked by higher workforce quality should expect higher inflows of FDI compared to those where the quality of the workforce is low. In the study, the number of students per 10,000 residents in a region was used as the measure of workforce quality. The availability of qualified employees can significantly increase competitiveness of a host country in the international market, which is pivotal in attracting foreign direct investment (Quazi, 2007, p. 60). Given that the majority of empirical studies support the concept that higher workforce quality attracts FDI, a positive impact is anticipated.

Having said that, availability of labor force is an FDI determinant that is relatively rarely considered in empirical research. To measure it, the unemployment rate is used. However, there is no agreement in the literature on the direction of the influence of this variable on FDI. On the one hand, higher

unemployment means easier access to manpower resources, making employees value their current employment more and being more willing to work for lower wages (Billington, 1999, pp. 66-67). On the other hand, high unemployment may lead to an erosion of skills (Billington, 1999, p. 67), be a symptom of labor market rigidity for international enterprises (e.g. related to minimum wages or low spatial mobility) (Boudier-Bensebaa, 2005, p. 615), or signal the existence of less competitive conditions and a lower quality of life (Hilber and Voicu, 2006, pp. 13-14; Wawrzyniak, 2017, p. 58). In the study, the unemployment rate was to reflect the availability of the workforce. Despite the previously indicated disagreement in the literature with regard to the direction of the influence of this variable on FDI, it was assumed that a lower unemployment rate attracts FDI. Therefore, a negative impact is anticipated.

A set of indicators was compiled on the basis of available data for the years 2010-2017, using the ranks denoting:

x1 – GDP (market-related),
x2 – population (market-related),
x3 – GDP per capita (market-related),
x4 – nominal gross household income per capita (market-related),
x5 – unemployment rate (resource-related),
x6 – average monthly gross wage (resource-related),
x7 – number of students per 10,000 residents in a region (resource-related),
x8 – labor productivity per one employee (resource-related).

Explanatory variables (x1–x8) were selected in line with the guidelines on the substantive relationship, multidimensionality, accessibility and reliability of data.

The calculations were made using the statistics software suite PQStat v.1.6.6.202. Test probability at $p < 0.05$ was considered as significant, while test probability at $p < 0.01$ was considered as highly significant.

Results and Discussion: Determinants of the take-up and location of foreign direct investment – Research Findings

In this section, the results of empirical research obtained using the linear regression model are discussed. These results are included in the annex. The modeling procedure consisted of three stages. In the first stage, the degree of correlation of explanatory variables (x1–x8) with the explained variable (y), and of the explanatory variables (x1–x8) with each other, were assessed. This assessment was performed by estimating the R^2 and tolerability coefficients. The R^2 coefficient indicates the percentage of variability of a given independent variable translated by the remaining independent variables. The closer the R^2 coefficient is to 1, the more strongly a variable is correlated with the other independent variables, which indicates its redundancy. The tolerance ratio expresses the percentage of variability of a given independent variable not translated by the remaining independent variables. The closer this coefficient is to 0, the stronger a variable is correlated with the other independent variables, which indicates its redundancy.

In the second stage, the correlation was estimated using a linear regression model:

$$y = a + bx + [e]$$

where:
y – dependent variable,
x – independent variable (predictor),
a – intercept term (Y-intercept coefficient),
b – slope coefficient (directional),
e – standard error of the estimate.

The number of simple linear regression equations is determined by the number of adopted motives for the location of direct foreign investment in Poland. As a result of the estimation of regression coefficients, the following equations were obtained:

$$y = 1.4393 + 0.8307x1 + [2.5898]$$
$$y = 1.65 + 0.8059x2 + [2.754]$$
$$y = 0.8325 + 0.9008x3 + [1.9942]$$
$$y = 0.8269 + 0.9037x4 + [2.0068]$$
$$y = 14.5643 - 0.7134x5 + [3.2593]$$
$$y = 1.7929 + 0.7891x6 + [2.8574]$$
$$y = 3.425 + 0.5971x7 + [3.7314]$$
$$y = 1.5643 + 0.816x8 + [2.689]$$

In these regression equations, the number of active foreign-invested enterprises in a given year (y) depends in a statistically significant way ($p<0.01$) on all analyzed predictors. Among these variables, there are both stimulants and destimulants. For x5, which is the unemployment rate, this impact is negative, i.e. it is a destimulant, because a higher level of unemployment indicates a lower value of the share capital at the disposal of foreign-invested companies. However, attention should be paid to the previously indicated disagreement in the literature with regard to the direction of the influence of this variable on FDI. Higher unemployment facilitates access to labor force resources, but it can also lead to a decrease in skills, indicate labor market rigidity, or signal a lower quality of life. As far as other predictors are concerned, the regression coefficients were found to be positive, i.e. higher values triggered an increase in the number of foreign-invested enterprises (Table 1).

In the third stage, the obtained results were further explored by conducting a multidimensional regression analysis. To determine the strength and direction of the influence of selected factors affecting the level of inflow of foreign direct investment to Poland between 2010-2017, a multiple regression equation was constructed with all explanatory variables (x) that showed a statistically significant relationship with the explained variable (y) and their combinations (the best-subset method). The estimated model is as follows:

$$y = -2.3846 - 0.6529x1 + 1.0971x2 + 0.3447x3 + 0.0212x4 + 0.0959x5 - 0.035x6 + 0.0067x7 + 0.4024x8 + [1.4452]$$

The obtained results in the form of the value of coefficients describing the number of active foreign-invested enterprises in a given year are shown in Table 2.

The parameters in the estimated multidimensional Model I are logical and consistent with previous studies and theory. The model's coefficient of determination was R = 0.9537, (95%), R^2 = 0.9096, whereas the adjusted factor was at R^2 = 0.9026 (90%). These values indicate good agreement, as more than 90% of *y*'s variation was explained by the explaining variables. The model as a whole is highly statistically significant ($F = 129.55$, $p<0.0001$), with the standard error of the estimate at 1.4452. Noteworthy, however, is the fact that tolerance values are low, which means a high redundancy of predictors in terms of their mutual correlation. Given the standardized values of the regression coefficients, the following should be considered the main factors of FDI inflow to Poland: GDP, population, GDP per capita, labor productivity per one employee. The first factor has a negative directional coefficient, i.e. a region's higher rank in terms of GDP leads to a decline in the number of foreign-invested enterprises. The sign of estimating this parameter is opposite to that anticipated. The other three predictors have positive directional coefficients, i.e. a higher rank in terms of population, GDP per capita, labor productivity per one employee leads to an increase in the number of foreign-invested enterprises.

The most relevant description of the relationship between the level of inflow of foreign direct investment and the determinants of its location in Poland was adopted for multiple regression models with the highest determination coefficient.

Model II with four explanatory variables is expressed as follows:

$$y = -0.8587 - 0.3847x1 + 0.8154x2 + 0.2506x3 + 0.4194x8 + [1.4391]$$

Model II (four-dimensional) was found to be highly significant (F = 260.55 p<0.0001), with the standard error of the estimate at 1.4391. The coefficient R = 0.9523, R^2 = 0.9069, whereas the adjusted coefficient of determination is R^2 = 0.9034 (Table 3). The research reveals that a region's GDP value is not an important factor in this model, which is why the predictor was removed from the model.

Model III with three explanatory variables is expressed as follows:

$$y = -0.7597 + 0.4637x2 + 0.221x3 + 0.4044x8 + [1.4549]$$

Model III (three-dimensional) was found to be highly significant (F = 338.80 p<0.0001), with the standard error of the estimate at 1.4549. The coefficient R = 0.9508, R^2 = 0.9039, whereas the corrected coefficient of determination is R^2 = 0.9013 (Table 4). All three predictors in this model are highly significant (p<0.0001). The calculated value of the determination coefficient (R^2) showed good agreement between the model and the empirical data. Predictor tolerances are already higher here than in Model II which contains four predictors.

Conclusions

The purpose of this study was to examine the determinants of FDI in Poland between 2010 and 2017 using to this end the linear regression model. The obtained estimation results did not provide grounds for rejecting the research hypotheses. The proposed regression model indicates that the main factors that encourage foreign investors to invest in Poland were the search for an absorptive market and an efficient workforce. The adopted multiple regression model is interpreted as follows: the inflow of foreign direct investment to Poland between 2010-2017 is positively influenced by the market's absorbency measured by population and GDP per capita, and labor costs expressed by labor productivity per employee. The direction of the impact in both variables is as anticipated, i.e. these factors may lead to an increased inflow of FDI to Poland. However, the conducted analysis is not exhaustive, and in order to formulate detailed conclusions, it is necessary to conduct in-depth research that goes beyond the model adopted in this study.

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Annex

Table 1: Results of estimation and parameters of one-dimensional regression models describing the number of foreign-invested enterprises

	Coefficients (b)	Standard Error SE (b)	-95% CI Confidence Interval	+95% CI Confidence Interval	t-Student	p-value	Standardized Coefficients (beta)	Standard Error SE (beta)	R	R-squared	Adjusted R-squared
intercept term (a)	1.4393	0.5133	0.422	2.4565	2.80	0.0060			0.8307	0.69	0.6872
x1	0.8307	0.0531	0.7255	0.9359	15.65	<0.0001	0.8307	0.0531			
intercept term (a)	1.65	0.5459	0.5682	2.7318	3.02	0.0031			0.8059	0.6494	0.6463
x2	0.8059	0.0565	0.694	0.9178	14.27	<0.0001	0.8059	0.0565			
intercept term (a)	0.8352	0.3947	0.053	1.6173	2.12	0.0366			0.9034	0.8162	0.8145
x3	0.9008	0.0408	0.82	0.9816	22.10	<0.0001	0.9034	0.0409			
intercept term (a)	0.8269	0.3979	0.0382	1.6155	2.08	0.0401			0.9021	0.8139	0.8122
x4	0.9037	0.0412	0.822	0.9853	21.93	<0.0001	0.9021	0.0411			
intercept term (a)	14.5643	0.646	13.284	15.8446	22.54	<0.0001			0.7134	0.5090	0.5045
x5	-0.7134	0.0668	-0.8458	-0.581	-10.68	<0.0001	-0.7134	0.0668			
intercept term (a)	1.7929	0.5664	0.6705	2.9152	3.17	0.0020			0.7891	0.6226	0.6192
x6	0.7891	0.0586	0.673	0.9051	13.47	<0.0001	0.7891	0.0586			
intercept term (a)	3.425	0.7396	1.9593	4.8907	4.63	<0.0001			0.5971	0.3565	0.3506
x7	0.5971	0.0765	0.4455	0.7486	7.81	<0.0001	0.5971	0.0765			
intercept term (a)	1.5643	0.533	0.508	2.6205	2.93	0.0041			0.816	0.6658	0.6628
x8	0.816	0.0551	0.7067	0.9252	14.80	<0.0001	0.816	0.0551			

Source: based on own calculations.

Table 2: Coefficients in model I of multidimensional regression describing the number of foreign-invested enterprises

	Coefficients (b)	Standard Error SE (b)	-95% CI Confidence Interval	+95% CI Confidence Interval	t-Student	p-value	Standardized Coefficients (beta)	Standard Error SE (beta)	Tolerance	R^2
intercept term (a)	-2.3846	1.0842	-4.5348	-0.2344	-2.20	0.0301				
x1	-0.6529	0.2708	-1.1899	-0.1159	-2.41	0.0177	-0.6529	0.2708	0.0120	0.988
x2	1.0971	0.2725	0.5566	1.6376	4.02	0.0001	1.0971	0.2725	0.0118	0.9882
x3	0.3447	0.1475	0.0521	0.6372	2.34	0.0214	0.3457	0.1479	0.0401	0.9599
x4	0.0212	0.1265	-0.2296	0.272	0.17	0.8671	0.0212	0.1262	0.0551	0.9449
x5	0.0959	0.0653	-0.0336	0.2254	1.47	0.1451	0.0959	0.0653	0.2058	0.7942
x6	-0.035	0.076	-0.1856	0.1157	-0.46	0.6462	-0.035	0.076	0.1521	0.8479
x7	0.0067	0.0559	-0.1041	0.1176	0.12	0.9043	0.0067	0.0559	0.2808	0.7192
x8	0.4024	0.0936	0.2169	0.588	4.30	<0.0001	0.4024	0.0936	0.1003	0.8997

Source: based on own calculations.

Table 3: Coefficients in model II of multidimensional regression describing the number of foreign-invested enterprises

	Coefficients (b)	Standard Error SE (b)	-95% CI Confidence Interval	+95% CI Confidence Interval	t-Student	p-value	Standardized Coefficients (beta)	Standard Error SE (beta)	Tolerance	R^2
intercept term (a)	-0.8587	0.3336	-1.52	-0.1974	-2.57	0.0114				
x1	-0.3847	0.2092	-0.7993	0.0299	-1.84	0.0686	-0.3847	0.2092	0.0199	0.9801
x2	0.8154	0.1968	0.4253	1.2055	4.14	0.0001	0.8154	0.1968	0.0225	0.9775
x3	0.2506	0.0901	0.0721	0.4291	2.78	0.0064	0.2513	0.0903	0.1066	0.8934
x8	0.4194	0.0724	0.276	0.5629	5.80	<0.0001	0.4194	0.0724	0.1661	0.8339

Source: based on own calculations.

Table 4: Coefficients in model III of multidimensional regression describing the number of foreign-invested enterprises

	Coefficients (b)	Standard Error SE (b)	-95% CI Confidence Interval	+95% CI Confidence Interval	t-Student	p-value	Standardized Coefficients (beta)	Standard Error SE (beta)	Tolerance	R^2
intercept term (a)	-0.7597	0.3328	-1.4194	-0.1	-2.2826	0.0244				
x2	0.4637	0.047	0.3706	0.5568	9.8709	<0.0001	0.4637	0.0470	0.4030	0.5970
x3	0.221	0.0896	0.0434	0.3986	2.467	0.0152	0.2217	0.0899	0.1102	0.8898
x8	0.4044	0.0727	0.2603	0.5485	5.5629	<0.0001	0.4044	0.0727	0.1683	0.8317

Source: based on own calculations.

Financial Reporting for Financial Instruments in Individual Investors' Decisions

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Abstract

The observed development of financial markets and growing importance of financial instruments entail increasing investors' interest in relevant financial information. Consequently, in the current economic situation, the significance of financial reporting and financial instruments in individual investors' decisions is an interesting research problem. In this regard, the purpose of this paper is to assess the use of financial reporting for financial instruments by individual investors in their decision-making processes. The following research methods have been applied to achieve the assumed research goal: descriptive, comparative, subject literature analysis and survey among individual investors. The paper starts with an introduction to financial reporting and informative needs of investors. It is followed by a discussion concerning the results of own study. The final part of the paper contains the conclusions. These indicate that in individual investors' opinion financial reporting is an important source of information on financial instruments. However, a number of issues have been identified regarding the current solutions in this scope.

Keywords: Financial Reporting, Financial Statements, Financial Instrument, Individual Investor

Introduction

In current times of intensive growth on financial markets, business entities are more and more interested in financial instruments. The risk is indispensable in this kind of investments (Kurek, 2011). There is a large spectrum of identifiable types of risk related with investing in financial instruments. The basic ones include the risk of non-performance, market risk (interest rate, currency, prices), liquidity risk, political risk, inflation risk and management risk (Wasilewska, 2004). That is why proper risk judgment of financial instruments is an important issue in the investors' decision-making processes. Therefore, a wide interest in information on financial instruments from this group is identified. However, the way entities prepare relevant information, as well as the scope and form of their presentation, complicate the correct assessment of this risk and limits their decision-making usefulness (Koonce, et al. 2005).

The problem of informative needs of investors in their investment processes has been the subject of analyses for a long time. The first studies in that field were conducted in the 1970s by Slovic (1972), who focused on investors' behaviours concerning data processing and selection of investment strategies. A pioneer study in the field of general informative needs of individual investors was conducted by Baker and Haslem (1973). Investment decisions made by individual investors are determined by a number of various conditions. The major importance in this regard is attributed to economic factors. But there are also non-economic issues that count, including willingness to take risk, emotions, tradition, financial culture, knowledge and experience (Bielawska, Kordela, 2014, p. 30). In such conditions, individual investors need various information for the purposes of their decisions (Beyer et al., 2010). However, considering the specificity of financial instruments, a number of difficulties occur concerning the presentation of adequate financial information adjusted to the investors' expectations (Koonce et al.

2005). In this regard, this paper aims at evaluating the significance of financial reporting for financial instruments in individual investors' decisions. For the purposes of the assumed goal, the following research methods have been used: descriptive, comparative, subject literature review, analysis of results of third party research and analysis of results of own survey.

Literature Review

Financial reporting is currently deemed a major source of information used in investment processes. It gives investors access to a lot of information allowing to determine the property and financial situation of the company, as well as to financial results of business entities operating on financial markets (Toma et al., 2015). In the recent years, financial reporting rules have undergone significant transformations. It was mainly influenced by popularisation of the International Accounting Standards (IAS) and International Financial Reporting Standards (IFRS). The observed changes focus financial reporting on providing information consistent with the informative needs of the users, especially investors. This underlines the importance shareholder-based orientation in international regulation of accounting (Devalle, et al., 2010). It is reflected in the conceptual assumptions of the IAS/IFRS, which define the goal of financial reporting as providing financial information regarding the entity, that is useful for investors, lenders and other creditors in their decision-making processes (Kobiela-Pionnier, 2013). In this connection, the introduction of the IAS/IFRS had a major effect on the operation of financial markets, as well as on the decision-making processes of investors (Onali et al., 2017).

The findings of the recent analyses confirm that individual investors use financial reporting information in their decisions (Lerman, 2018). Additionally, the research concerning this group of investors in Poland indicated that financial report is considered as an important source of information (Pawłowski, 2018; Błażyńska, 2015; Adamczyk, 2014). However, the observed changes in financial reporting, that mainly result in an increase in the amount of disclosed information, method of presentation and degree of complexity cause that individual investors encounter difficulties in proper analysis and interpretation of such information (Kelton, Murthy, 2016). These problems are also seen in accounting for financial instruments. Investors indicate incompatibility of prepared financial information regarding financial instruments with their informative needs. Due to the specificity of financial instruments, including derivatives, the difficulties identified in this area mainly concern their recognition and valuation, as well as presentation of relevant information (Garstecki, 2014). The introduction of the rules of measurement of financial instruments based on fair value has long been a subject of controversy. On one hand, it is emphasised that due to the character of the instruments and informative needs of investors, using fair value is reasonable. But in certain situations using this parameter may affect reliability of financial reports, and also limit their usefulness in decision-making processes (Kunz, 2015). It is noteworthy that investors are critical of combinations of valuation of financial instruments in financial reporting. They react negatively to opacity of the information in this regard (Ballas, 2012). Another area of serious difficulties are disclosures on the risk exposure from financial instruments. Simultaneously investors consider this kind information essential in their decisions. That is why they require more relevant and transparency information that allows to evaluate the character and the extent of risks, and also the importance of the financial instruments to the firm's financial position. (Adznan, Nelson, 2014). The identified expectations in this regard concern both qualitative and quantitative disclosures of different types of risks of financial instruments, especially credit risk, liquidity risk and market risk (Malaquias, Lemes, 2013). Despite the significance of information concerning risk exposure for investors, certain issues have been identified regarding the current solutions in this field (Nadia, Rosa, 2014). The outcomes of the research indicate that some companies only partially complied with the regulations in this field, omitting other requirements (Othman, Ameer, 2009). Moreover, IAS/IFRS disclosure practices in this regard differ in particular countries. The main reason behind that is varied scope of enforcement and interpretation of international regulations (Adznan, Nelson, 2014). In view of this, the role of

financial reporting for financial instruments in individual investors' decisions is an important and complicated research problem.

Research - Results

For the purposes of this paper, the findings of an own survey, conducted on the author's demand in 2015 by the Individual Investors Association, have been used. It encompassed 408 individual investors from Poland. The research tool was an electronic survey questionnaire, published on the website of the association.

Individual investors participating in the survey have been categorised as natural persons investing their savings in various assets (Dziawgo, 2004). The assumed definition made it both a large and varied group. It is noticeable e.g. in the area of education, age, investment experience, capital owned and knowledge. Therefore, survey participants have been characterised in terms of selected features. Figure 1 presents the respondents' division according to the field of education.

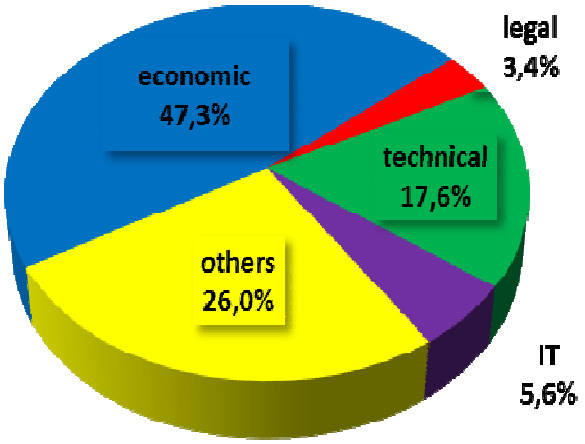

Fig. 1: Respondents division in terms of education (%)

Source: own work

When analysing the outcomes, it is noticeable that the majority of survey participants had economic education (47.3%). A relatively high number of investors had technical background (17.6%). The rest of the surveyed group was quite varied in this aspect. It is worth pointing out that persons with IT education (5.7%) and legal education (3.4%) were smaller groups.

Another feature that differentiates individual investors is investment experience. Based on this criterion, and with reference to considerations included the subject literature, survey participants have been divided into three categories (Dziawgo, 2016):

- investors with small experience, up to 3 years,
- investors with medium experience, 3 to 10 years,
- investors with high experience, more than 10 years.

This division is illustrated in Figure 2.

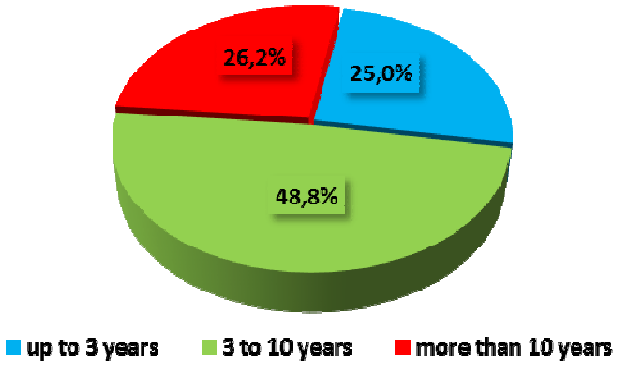

Fig. 2: Respondents division in terms of investment experience (%)

Source: own work

The major group, constituting almost half of the respondents, were investors with medium experience, from 3 to 10 year (48.8%). Participants with small experience - up to 3 years and high experience - longer than 10 years appeared as a minority (25.0% and 26.2%, respectively).

The basic assumption of the survey was to determine the degree of usage of financial reporting for financial instruments in individual investors' decisions. The analysis of the problem started with a check whether survey participants consider involvement of the entities in financial instruments in their decisions. The replies are presented in Figure 3.

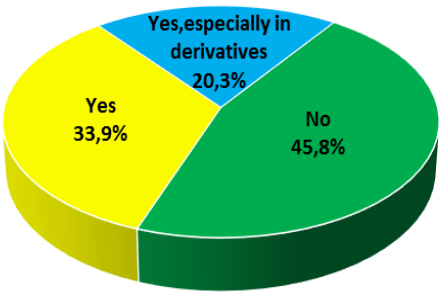

Fig. 3: Percentage of answers to the question: "Do you consider involvement in financial instruments while making decisions on buying assets of a given business entity?" (%)

Source: own work

The analysis of the findings brings to a conclusion that the majority of survey participants considered entities' involvement in financial instruments in their investment processes (54.2%). Additionally, it has been determined that some of them paid particular attention to derivatives (20.3%). The rest of the respondents claimed that they were not interested in such information (45.8%). In the following part of the survey, participants indicated the sources of their information concerning financial instruments used by business entities. Respective data are presented in Figure 4.

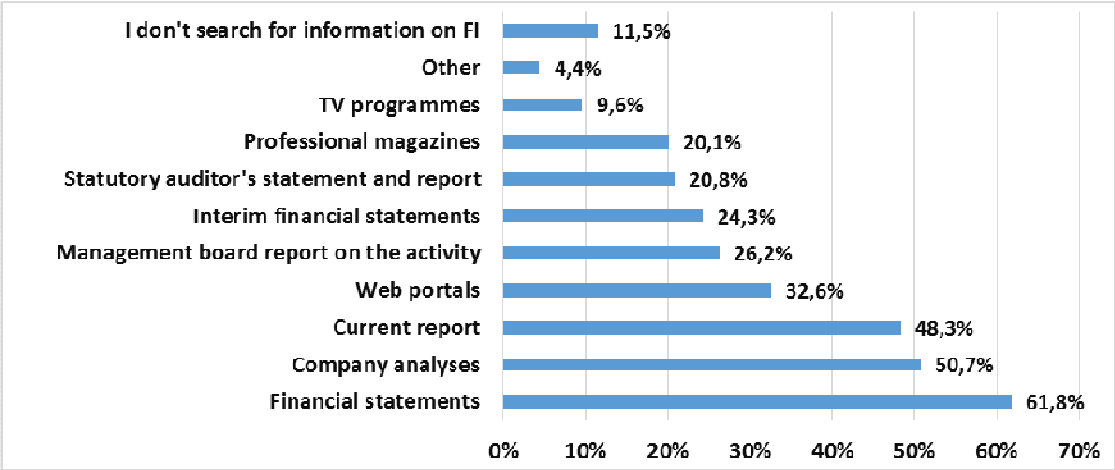

Fig. 4: Percentage of answers to the question: "Where do you find information regarding financial instruments used by companies?" (%)

* FI means financial instruments.

** Respondents could choose more than one answer to this question. The total number of indications was 1266.

Source: own work

Based on the findings presented above, it has been determined that yearly financial statements was the major source of information regarding business entities' involvement in financial instruments for individual investors (61.8%). Furthermore, the respondents indicated special significance of company analyses (50.7%), current reports (48.3%) and web portals (32.6%). It needs to be pointed out that some survey participants indicated other financial reporting tools as well. These included management board report on the activity (26.2%), interim financial statements (24.3%) and statutory auditor's statement and report (20.8%). Additionally, there was a group of investors who did not search for information in the discussed field (11.5%) .

Another analysed issue concerned the degree of usage of financial reporting for financial instruments by individual investors in their investment decisions. Survey participants evaluated such information, using the scale from 1 to 5. As a rule, higher grades indicated greater significance. Additionally, it has been agreed that grade 1 meant irrelevance of a given source of information, while grade 5 meant its relevance. Results are presented in Figure 5.

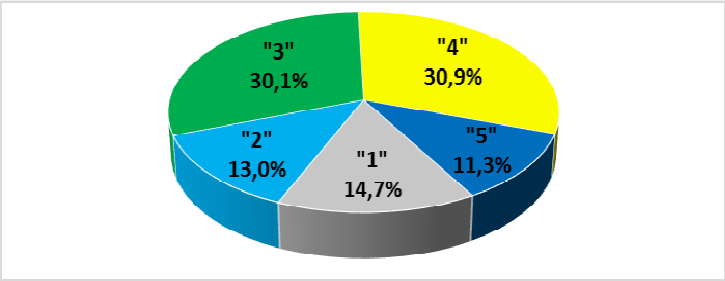

Fig. 5: Percentage of answers to the question: "Please specify the degree of usage of reporting information on financial instruments in your decisions, use the scale from 1 to 5 (1 - irrelevant source of information, 5 - relevant source of information)." (%)

Source: own work

Based on the results, it has been concluded that for a large group of survey participants reporting data on financial instruments was a significant source of information (grade "4" or "5", 42.2%). A relatively smaller group of investors admitted that such information was not useful at all (grade "1", 14.7%) or hardly relevant (grade "2", 13.0%). These answers were given by 27.7% of respondents. The remaining group of survey participants indicated medium relevance (grade "3") of this type of disclosed information (30.1%).

At the following stage, individual investors' use of individual financial reporting elements in search for information on financial instruments was analysed. The findings are presented in Figure 6.

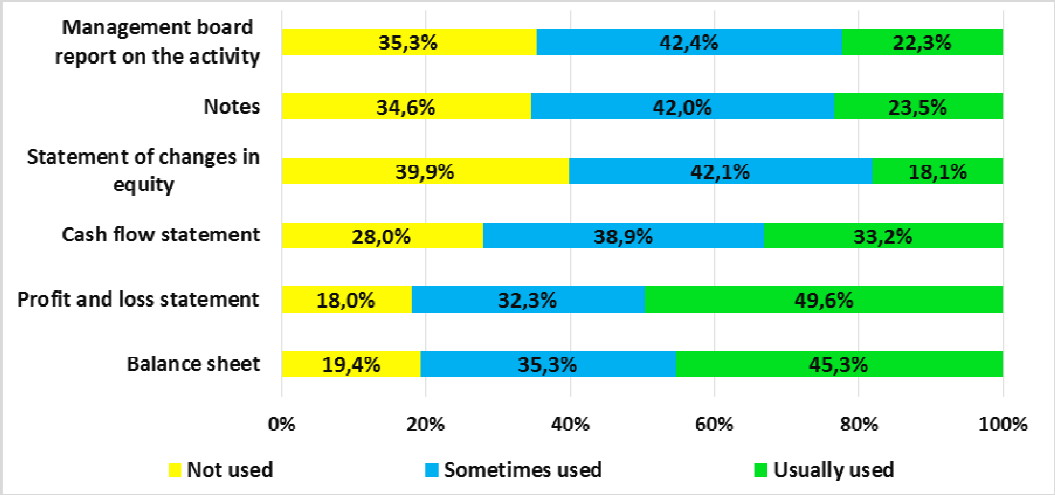

Fig. 6: Percentage of answers to the question: "Which elements of financial statements do you use while searching information on financial instruments in your investment decisions? Specify the extent." (%)

Source: own work

Based on the survey results it has been concluded that investors usually support their decisions with the profit and loss account (49.6%), balance sheet (45.3%) and cash flow statement (33.2%). Answers indicating irrelevance of these reports in the analysed aspect occurred less frequently. Other types of reports were apparently less significant for the respondents. Most often, survey participants admitted that they sometimes used these sources of information, i.e. management board report on the activity (42.4%), notes (42.0%) and statement of changes in equity (42.0%). Additionally, there were quite a lot of answers indicating that these information is not used in the decision-making processes at all.

The following part of the study aimed at determining the reasons behind the fact that individual investors do not perceive reporting data on financial instruments as a relevant source of information in their decision-making processes. For this purpose, the respondents who previously admitted irrelevance of financial reporting in this field (ratings 1 to 3), were asked to explain the grounds of their opinion. The findings are presented in Figure 7.

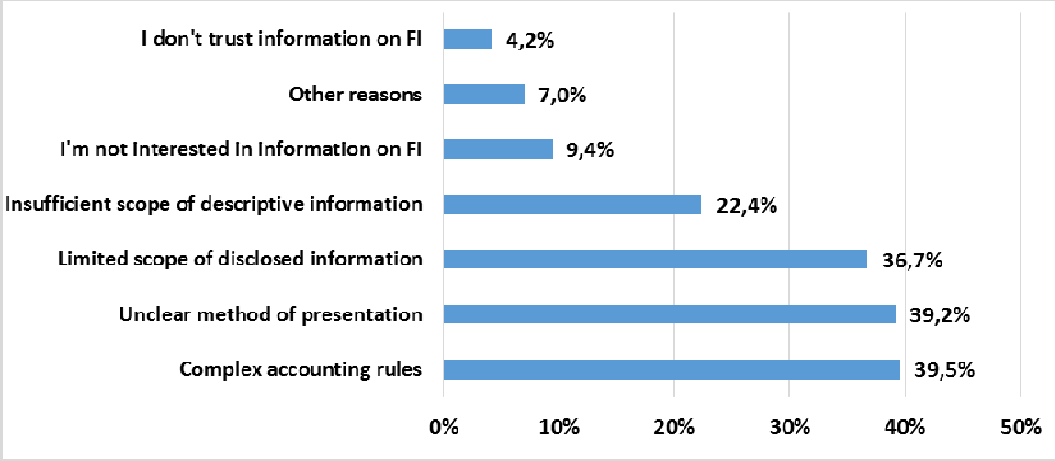

Fig. 7: Percentage of answers to the question: "If you find reporting information on financial instruments irrelevant in the decision-making processes, please explain the reasons." (%)

* Respondents could choose more than one answer to this question. The total number of indications was 453.
** The letters IF in the figure indicate financial instruments.
*** A small group of respondents selected the answer "Other reasons", without specifying any details.
Source: own work

After the analysis of the findings, certain basic issues concerning reporting information on financial instruments can be identified. These claims relate to two problematic aspects. The first concerns the shape of financial reporting rules, that in investors' opinion is too complex (39.5%) and does not guarantee a clear way of presentation of relevant information (39.2%). It affects the possibility of proper understanding and practical use in investment processes. Other repeating claims concerned the scope of disclosure related to financial instruments. In the respondents' opinion, it is not only excessively limited (36.7%), but also descriptive information is insufficient (22.4%). The identified informative restrictions confirm the incompatibility of the portfolio of presented information with the investors' needs.

Conclusions

In general, on the grounds of the literature review and the analysis of the outcomes of own study, a number of conclusions have been formulated concerning the relevance of financial reporting for financial instruments in individual investors' decisions. It is noteworthy that this study was limited. It was conducted on a purposive sample of individual investors from Poland, therefore the obtained results and the conclusions drawn concern only the surveyed group. Therefore, they cannot be generalized to their entire population. However, they have theoretical and practical cognitive value.

One of the fundamental insights is that for surveyed investors, yearly financial statements was the most frequently used source of information on business entities' involvement in financial instruments (62%). Additionally, a large group of them emphasised that it was a significant source of information in investment processes (42%). After the analysis of the use of individual financial report elements in the considered aspect, it has been concluded that investors most frequently used the information included in the profit and loss statement (82%), balance sheet (81%) and cash flow statement (72%). Despite the interest in this type of reporting information, a number of claims appeared pertaining the current financial reporting rules. These issues mainly concerned complex accounting rules (40%), lack of transparency in the methods of presentation (39%) and limited scope of disclosed information (37%). To sum up, it has to be mentioned that the analysed findings of the research contain a lot of various opinions concerning the rules of financial reporting in terms of financial instruments, expressed by the basic group of users of financial information, i.e. individual investors. Therefore, these remarks and recommendations undoubtedly form an interesting and important material that is worth being considered in the context of further work on improve solutions in the field of accounting for financial instruments. The importance of this issue and many reservations of respondents indicate the need for further study in this scope. One of the basic further directions of future research should include determining of detailed information requirements of individual investors in the analysed aspects. Another interesting area of research would concern assessment of the significance financial reporting for financial instruments in the opinion of institutional investors.

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The Importance of Cultural Intelligence In International Human Resource Management - A Pilot Study

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Abstract

At present cultural intelligence is a topical issue of great significance. It is widely discussed in subject literature, especially in the context of international business and management of multicultural teams. The special role and importance of cultural intelligence stems, first of all, from the fact that it affects the ability to notice, understand and accept attitudes, behaviours, norms, principles and values of representatives of other cultures. Cultural intelligence (CQ) understood as a set of skills and qualities necessary to effectively function in culturally diverse environment, plays a vital role in international human resource management. The pilot study (individual in-depth interviews) discussed in the article was conducted in international companies.

Keywords: cultural intelligence (CQ), International Human Resource Management, intercultural teams, multicultural environment.

Introduction

Operating on an international scale necessarily implies operating in multicultural environment - with reference to both employees and clients - which creates an opportunity to exploit the potential of culturally diverse employees and managers, their competences and experience, to implement new solutions, to take up new international challenges, and to improve the competitiveness of the company on the basis of effective ways of human resource management. The ability to effectively cooperate in different cultures has, therefore, become crucial in today's global business world.

Cultural intelligence (CQ) is nowadays of growing interest to researchers, which, to a great extent, results from globalization and a subsequent marked increase of intercultural interactions. Therefore, in order to function effectively in the international arena, managers and employees must possess cultural awareness and display sensitivity in intercultural contacts.

Cultural intelligence, i.e. the ability to adapt effectively to diverse cultural contexts enables employees and managers not only to quickly adapt to culturally diverse work environment, but also to act more efficiently and to achieve the organizational goals on the international market.

The theoretical part of the article explains the concept of cultural intelligence and its significance, defines international human resource management, and discusses the role of cultural intelligence in multicultural work environment.

The qualitative study whose results are reported in this article (6 individual in-depth interviews) was a pilot study and serves as an introduction to the more extensive study the author is planning to conduct in the future on the role of cultural intelligence in international human resource management among employees of international companies in Poland, the Czech Republic and Spain.

The aim of the article is to demonstrate the significance of cultural intelligence in international human resource management. Considering this aim and the above premises, the following research question was formulated: Are employees of international companies familiar with and do they understand the concept of cultural intelligence and are they able to determine the impact of cultural intelligence on various areas of human resource management?

Cultural Intelligence (CQ) – Definitions and Meaning

Cultural intelligence first appeared in articles and study reports at the beginning of the 21st century (Earley, 2002; Earley and Ang, 2003; Earley and Peterson, 2004; Thomas and Inkson, 2004; Earley and Mosakowski, 2004; Ang, Dyne, Koh, andNg, 2004; Earley, Ang, and Tan, 2006; Earley and Mosakowski, 2007; Ang, Van Dyne and Rockstuhl, 2015).

Cultural Intelligence or Cultural Quotient (CQ) is a relatively new concept (Brancu, Munteanu, et al., 2016; Engle, Nehrt, 2012), and subject literature provides its numerous definitions, whose brief outline is presented below.

Earley and Ang (2003) define cultural intelligence as a multidimensional construct that includes the individual's ability to function effectively in culturally diverse contexts. Piwowarczyk describes cultural intelligence as "a specific form of intelligence, connected with the ability to properly understand situations characterised by cultural diversity and to reason and behave adequately in such situations" (Piwowarczyk, 2016, p. 5).

Creque and Gooden define CQ as "an individual's cognition or knowledge that influences his perception to a cultural environment or state and which leads to how he behaves in that environment" (2011, p.143), while according to Khodadady and Ghahari, it is "the ability to interact effectively in multiple cultures" (2012, p. 22).

Engle and Nehrt (2012) define cultural intelligence as the person's ability to effectively engage in relationships in different cultural contexts. Brancu and Munteanu emphasise that "cultural intelligence (CQ) is a concept which explains why certain individuals can adapt to different cultural contexts more efficiently than others" (Brancu, Munteanu, et al., 2016, p. 336).

Cultural Intelligence (CQ) is also interpreted as the ability of managers, employees and other persons involved in intercultural interactions to act efficiently in the globalized world (Fang, Schei, et al., 2018). According to other authors, cultural intelligence refers to the individual's ability to recognize foreign cultural contexts, and then effectively function in culturally diverse environment (Shepherd, Willis-Esqueda, et al., 2019).

Another approach to cultural intelligence treats it as a feature which helps the individual to adapt to foreign cultural contexts, i.e. different cultural environment marked by different ways of doing things, different values and norms (Piwowarczyk, 2016). As Ang and Van Dyne observe, cultural intelligence is the individual's ability to function effectively in situations characterized by cultural diversity (Ang and Van Dyne, 2008).

Subject literature offers also other interpretations of cultural intelligence. "Peterson (2004) defined cultural intelligence as the aptitude to use skills and abilities appropriately in a crosscultural environment" (Brancu, Munteanu, et al., 2016, p. 337). For him, this kind of intelligence is: "the ability to engage in a set of behaviours that uses skills (i.e. language or interpersonal skills) and qualities (e.g. tolerance for ambiguity, flexibility) that are tuned appropriately to the culture-based values and attitudes of the people with whom one interacts" (Peterson, 2004, p.89). Moon sees CQ as "an organization's capability to function and manage effectively in culturally diverse environments" (Moon, 2010, p.458).

Emphasizing the need to understand how an individual adapts to new, unfamiliar social environment, cultural intelligence is defined as the individual's ability to successfully adapt to new cultural contexts (Lovvorn and Chen, 2011).

Recapitulating the above considerations on the definitions of cultural intelligence, it should be noticed that this term is used with reference to the individual's ability to successfully adapt to new and unfamiliar cultural contexts and to effortlessly and effectively function in situations characterised by cultural diversity (Nunes, Felix, et al., 2017). Therefore, cultural intelligence is particularly important in international human resource management, i.e. in managing multicultural teams.

Cultural intelligence comprises four distinct but interconnected components: metacognitive, cognitive, motivational, and behavioural (Ang, Van Dyne, et al., 2006; Ang, Van Dyne and Rockstuhl, 2015; Brancu, Munteanu, et al., 2016). Researchers and authors of publications devoted to cultural intelligence observe that these components shape the individuals' ability to learn about other cultures, their ability to learn how to learn about other cultures, their willingness to interact with other cultures, and their ability to modify their behaviour to behave appropriately and efficiently when faced with representatives of other cultures.

The metacognitive component (Metacognitive CQ) is defined as the individuals' mental capacity to acquire and evaluate their own cultural knowledge. It refers to one's awareness and monitoring of the cognitive process which takes place during interactions with representatives of other cultures with reference to one's own and their culture and cultural identity (Simpson, 2017). Metacognitive CQ means that managers and employees of multinational companies should acquire cultural knowledge not only about their own culture and cultural identity but also about the culture and cultural identity of their co-workers in order to better understand their relationships and the causes of possible failures. "People with high metacognitive CQ are able to question cultural assumptions, to adjust their mental models in intercultural situations. They are aware of others' cultural preferences before and during interactions" (Brancu, Munteanu, et al., 2016).

The cognitive component (Cognitive CQ) is connected with the individual's general knowledge of cultures and their differences (Simpson, 2017). It refers to the knowledge of norms, practices and rules present in various cultures, which are acquired through learning and personal experience. Individuals with high cognitive CQ know and understand a wide range of economic, legal and social aspects of different cultures (Nunes, Felix, et al., 2017). They are familiar with and accept cultural models, possess and understand information about values, norms, and traditions specific to the cultures with which they interact (Brancu, Munteanu, et al., 2016).

The motivational component (Motivational CQ) refers to intrinsic motivation of an individual who makes an effort to effectively function in culturally diverse contexts (Simpson, 2017). It is the ability to direct one's attention and energy to act successfully in face of cultural diversity. Motivational CQ is an important element of cultural intelligence, especially in the field of adaptive behaviours in intercultural environment.

The behavioural component (Behavioural CQ) is based on the individual's ability to respond appropriately - verbally and non-verbally – while interacting with representatives of other cultures (Simpson, 2017). Individuals with high behavioural CQ can communicate and react to a given situation appropriately. Therefore, if an organization is to overcome challenges posed by intercultural exchanges in the global business operations, culturally intelligent behaviour of its managers and employees is of vital importance (Solomon and Steyn, 2017).

Managers and employees must possess all four components of cultural intelligence if they want to achieve its high level, as all four of them are indispensable in successful development of intercultural relationships in international work environment, in achieving teamwork goals and organizational objectives, and in communicating with clients from different cultures and co-workers from outside the organizational structures.

"Cultural Intelligence (Bailey, 2004) is a basis for comprehending and learning the cognitive, motivational, and behavioural components of effective intercultural adaptation" (Mukherjia, Jainb, et al., 2016, p. 9). Moreover, "CQ allows an individual to appreciate the diversity of experiences to formulate rapid, accurate, and situationally sensitive responses to emerging issues" (Lovvorn and Chen Jiun-Shiu, 2011, p. 277). Managers and employees with a high level of cultural intelligence are able to adapt their behaviours, thinking and communication strategies to culturally diverse clients, which can contribute to better performance of teams and the whole company (Hartini, Fakhrorazi, et al., 2019).

It should be noticed here that, as a result of globalisation and the expansion of businesses to international markets, the role and importance of cultural intelligence as an essential skill in modern management is definitely growing (Day, 2017).

Summing up, cultural intelligence is a set of skills that are indispensable to successful international human resource management and to employees' effective functioning in multicultural teams.

International Human Resource Management - Managing Intercultural Teams

Looking for new ways of expansion and development, contemporary organizations increasingly expand their business activity to international markets. In order to improve their competitive position on the global market, they apply various strategies in building their competitive advantage (Tiwarai, 2013).

Both theoreticians and practitioners have been emphasizing the role of changes in the modern world and their impact on the functioning of business organizations for years. Effective human resource management, which adequately responds to the contemporary challenges, also those faced by international organizations, is essential if companies are to become and remain competitive on the market (Lima, 2016).

In today's business world, the internationalisation of the company's activity is becoming a decisive factor in its future expansion and development. However, internationalisation requires introducing numerous changes in the way it functions, especially in the area of human resource management (Đorđević, 2016).

Strategic international human resource management is nowadays a challenge for many companies which develop their business activity on the global scale (Alharthey, 2018). Therefore, both business theoreticians and practitioners emphasise the vital role played by human resources in the achievement of organizational strategies and objectives.

International resource management is a concept widely discussed in academic studies and publications, most of which are devoted to the direction of changes in the functioning of contemporary organizations (Knap-Stefaniuk and Karna, 2017).

International human resource management is defined in many ways. One of the shortest definitions is given by R. Boxall, who points out that international human resource management refers to the ways of managing employees in a situation where an enterprise conducts its business activity on an international scale (Beardwell and Holden 2001).

International human resource management is defined as "the human resource management issues and problems arising from the internationalization of business, and the human resource management strategies, policies and practices which a firm pursues in response to the internationalization of business" (Scullion, 1995, p. 352).

Gomes believes that the IHRM is the process of acquiring, allocating and effective using of human resources in international business (Gomes, 2012).

Human resource management in enterprises conducting business activity on an international scale differs from human resource management in enterprises which operate on a national scale. The differences include a greater number of tasks faced by human resource departments, especially in the area of preparing managers and employees sent to work abroad and in the area of building personal, team and organizational relationships in international work environment. They are also connected with coordinating employees' transfer within the structures of the company in the international dimension (Zając, 2012, pp. 44-45). It is worth mentioning here that the complexity of processes and tasks faced by human resource personnel working in international companies to a great extent stems from cultural diversity of their employees.

International human resource management is based on the same techniques of recruiting, motivating, training, and promoting employees as national human resource management, the difference being determined by cultural factors (cultures and languages used within the organization), geographical expansion of the company, and characteristic features of the home country (Dowling, Festing, et al., 2008). International human resource management focuses primarily on the formulation and implementation of strategies based on planning, recruitment and selection, training and development, remuneration, appraisal and long-term career management of employees in the context of international human resources.

International companies often adapt their human resource management solutions to practices implemented in various countries (Tiwari, 2013). In the author's opinion, human resource management in international companies which recruit employees from diverse cultures must take into account a range of various solutions adequate to given cultures and recognised by employees of given nationalities.

International human resource management should focus on achieving organizational goals and performing tasks in such a way that enables employees and managers to follow a global way of thinking while implementing the company's strategy. Therefore, successful cooperation between members of multicultural teams and the ability to influence the attitudes and behaviour of employees from different countries are among key challenges in contemporary management (Story, Barbuto, et al., 2014).

In the author's opinion, human resource management is an extremely important aspect of contemporary international organizations. The implementation of effective solutions related to human resource management is a crucial condition of the company's success (Agarwal and Saif Al Qouyatahi, 2017). However, many managers find managing multicultural employees, both within teams and within the whole organization, a demanding task (Devine, Baum, et al., 2009).

"The international organizations can use culturally sensitive and adaptive HRM practices for creating competitive advantage in overseas operations" (Tiwari, 2013). International teams are commonplace today and are part of the global operations of contemporary companies. In order to achieve organizational objectives and successfully implement its strategy, the organization must be pro-active and involved (Drach-Zahavy, 2011).

"To improve the effectiveness of employees in cross-cultural interactions, global organizations should focus their efforts on hiring the right people, matching them with the right managers and providing the right training to them" (Day, 2017, p. 11). Employees and managers should possess a high level of cultural intelligence in order to successfully function in international, i.e. culturally diverse work environment. Organizations, on their part, should organise training aimed at increasing employees' cultural competence in order to develop their cultural awareness and sensitivity, which are crucial factors in working in intercultural teams.

Summing up, human resource management in the globalised, international business context is a great challenge today (Agarwal and Saif Al Qouyatahi, 2017). In the author's opinion, it is a challenge for both managers and employees. Moreover, even though the concept of international human resource management is defined in many different ways, all definitions share certain elements which shape the

activities undertaken by mangers of culturally diverse employees. One of them is the multicultural structure of teams, which makes it necessary to develop employees' awareness of cultural differences with reference to teams and whole organizations.

Globalisation, technological progress, and changes in contemporary work environment create new challenges for management (Grabara, Cehlar, et al., 2019). Undoubtedly, cultural intelligence (IQ) is such a challenge in international human resource management, in which managers and employees work at the intersection of diverse cultures.

It should be emphasised that managers who operate in international environment must possess the qualities and skills which allow them for successful functioning in multicultural environment and facilitate efficient and effective management of culturally diverse teams (Karna and Knap-Stefaniuk, 2018). Cultural intelligence is indispensable for effective management of culturally diverse employees.

Cultural Intelligence and Its Importance in Multicultural Environment

Constant and dynamic changes taking place in today's global world, which affect the operation of organizations, especially those international ones, create such work environment in which managers and employees interact with people with various cultural backgrounds on a day-to-day basis (Rand, Cultural Intelligence, 2015).

Globalisation and international expansion of organizations have a significant impact on their intercultural interactions and commercial contacts, which makes it necessary for their employees to acquire knowledge about different cultures and to develop competences essential for their effective functioning in intercultural work environment. The success of modern managers responsible for international operations depends on their cultural intelligence (Sozbilir and Yesil, 2016)

Cultural diversity and intercultural dialogue are highly topical and widely discussed issues. Cultural diversity covers a wide range of phenomena, including symbols, heroes, rituals, values and practices (Albu, 2015). Therefore, employees and managers working in international companies, i.e. in multicultural work environment, should possess adequate knowledge about the cultures of their co-workers.

Positive aspects of cultural diversity among team members include the exchange of knowledge and experience between them, which can lead to better results and the achievement of objectives (Mukherjia, Jainb, et al., 2016, p. 9). However, if cultural diversity is to bring positive results, managers of multicultural teams must possess a high level of intercultural competence, manifested in their ability to adapt to culturally diverse work environment, in their openness and sensitivity to other cultures, and in their ability to negotiate and apply management tools suitable to multicultural environment and to build and manage international teams.

"Intercultural competence includes attitude, knowledge, interpretation and relating skills, discovery and interaction, as well as critical cultural awareness" (Byram, 1998, in: Gonçalves , 2014, p. 34). Intercultural competence also covers such treatment of people coming from other cultures that is not offensive or contemptuous.

Intercultural competence is defined as the individuals' ability to notice, understand and accept differences in their own cultures and those of other countries, and to respond adequately to differences through appropriate behaviour and communication (Gonçalves 2014). This competence also includes their systems of values and the ability to communicate effectively across cultures (Dimitrova and Chakarova, 2015).

International human resource management should be based on good practices and be part of strategies built around specific competencies of a given organization, which are key to achieving its competitive advantage on the global market (Edwards and Kuruvilla, 2005). Nowadays it is cultural

competence – with a particular role of cultural intelligence discussed in the article – that is considered to be the most important of these competences.

It is worth mentioning that, although it seems obvious that cultural intelligence is so crucial, especially in the context of the international activity of contemporary enterprises, so far certain aspects of the significant role it plays in contemporary companies have not been fully acknowledged (Stening, 2006).

Cultural intelligence understood as the ability to quickly adapt to and effectively act in diverse cultural environments (Piwowarczyk 2016) is essential for employees' and managers' functioning in multicultural environment and aiming at achieving the goals of their teams and the company. In the organizational context, cultural intelligence is simply the ability to deal effectively with cultural differences within an organization (Hu, Wu, et al., 2019).

The success of international companies to a great extent depends on cultural intelligence (CQ) of its employees who interact with people from other cultures (Ang, Van Dyne and Rockstuhl, 2015). Managers' cultural intelligence is particularly important, as it enables them to effectively operate in culturally diverse contexts, helps them to understand the norms, principles and values recognised in different cultures, and facilitates their understanding of different cultural principles in terms of working style, team leadership, communication and interactions with employees. Cultural intelligence exerts a significant impact on intercultural adaptation, the quality of performance, trust and cooperation in teams, team performance, and global leadership skills necessary to operate in international environment (Engle and Nehrt, 2012).

Moreover, cultural intelligence affects the relationships between employees and managers sent to foreign branches of their companies and their local co-workers, facilitates the resolution of intercultural arguments and ethical dilemmas, supports preparation of effective training courses and development programs for employees working in various cultural environment, enables the formation of effective intercultural teams and cooperation of their members, the development of managers' global thinking, and their ability to do business and build relationships with foreign clients (Stening, 2006, pp. 76-77).

Cultural intelligence of managers working in international organizations should help them develop openness and tolerance of cultural diversity within their teams. Managers should be more flexible and able to apply appropriate management styles and communication patterns in relation to different cultures. Their cultural intelligence should facilitate the implementation of activities that bring together culturally diverse employees.

Theoretical and practical knowledge of managing cultural diversity and first-hand experience in working with multicultural teams are essential for managers who want to support the operations of their companies on the global market (Agarwal and Saif Al Qouyatahi, 2017).

"Demonstrating culturally intelligent behaviour is therefore vital if individuals and organizations are to overcome the challenges presented by cross-cultural exchanges" (Solomon and Steyn, 2017), and that is why practitioners and theoreticians continue their efforts to identify and define individual characteristics that facilitate the individuals' successful functioning in different cultural contexts, especially as members of multicultural teams (Engle and Nehrt, 2012).

It is worth emphasising that "in order to function effectively, individuals need to be socially apt in deciding on the most appropriate behaviour suitable in a cross-cultural interaction" (Hartini, Fakhrorazi, et al., 2019, p. 217).

It is cultural intelligence (CQ) that allows managers and employees to function successfully in international environment, to deal with various - sometimes difficult - intercultural situations, and to anticipate and respond to the needs and expectations of culturally diverse employees and clients (Sozbilir and Yesil, 2016).

From the point of view of a manager who manages a multicultural team, it is important to create such work environment in which employees from various cultures can openly express their opinions, suggest solutions, and analyse problems from the perspective of their different knowledge and cultural experiences.

The crucial role of training courses organized by multinational companies for their managers and employees in the area of cultural sensitivity and awareness must be mentioned here. Such courses should aim at shaping attitudes and behaviours that lead to the acceptance of cultural diversity and the development of cultural intelligence of all employees. An international, multicultural, friendly workplace is the one in which all employees are accepted and treated equally, regardless of their cultural background.

Methodology

The pilot study, which was a qualitative one, was based on an interview method. The technique used in it was an individual in-depth interview, based on an interview scenario with open questions developed by the author.

The criterion for recruiting respondents was their employment in international companies and membership in international teams (in which at least 2 members were of different nationalities). The study was conducted in Kraków in 2020 among 6 persons (without dividing them into employees and managers) working in 4 international companies from the IT sector and 2 international branches of companies that operate as shared services centres in the area of accounting, payroll, and human resources).

Not all the respondents agreed to have their interviews recorded on a voice recorder, that is why the answers to the interview questions of 3 of them were handwritten by the author. The empirical material collected during all 6 interviews was transcribed, coded and categorised, and its quantitative analysis was also conducted.

All the respondents participating in the interviews were Polish, aged between 25 and 42 (4 women and 2 men), who worked as: Senior Developer, Product Manager, Event Marketing Specialist, Team Leader, Business Development Manager, HR Business Services Specialist.

The aim of the interviews was to obtain information whether the respondents are familiar with and understand the concept of cultural intelligence, whether, in their opinion, CQ has an impact on international human resource management in the organizations in which they are employed, and whether they are able to indicate those areas in which they believe CQ is important in human resource management. The author also wanted to discover whether and why, in the respondents' opinion, CQ is important for employees who work in international organisations and for managers who manage international teams, and whether they have ever taken part in training courses devoted to working in culturally diverse environment.

Cultural intelligence – the results of the pilot study

The pilot study consisted of 6 individual in-depth interviews, and can be treated as a preliminary step to the further study the author is planning to conduct in Poland, the Czech Republic and Spain among employees of international companies.

The respondents who took part in the pilot study were people working in international environment (4 international companies operating in the IT sector and 2 international branches of companies that operate as shared services centres in the area of accounting, payroll, and human resources).

The questions the respondents answered during the interviews included the following aspects: how do they understand the term "cultural intelligence"?, does CQ exert, in their opinion, an impact on international human resource management in the organizations in which they work?, is cultural

intelligence important for members of teams consisting of people of different nationalities?, is it important for managers of international teams in their organizations and why?, have they participated in training courses devoted to working in multicultural teams?.

The respondents included 4 women aged between 25 and 42 and 2 men aged between 28 and 35. All of them worked in international companies and were members of intercultural teams consisting of employees of at least 2 nationalities.

Due to the qualitative nature of the empirical material, the respondents' answers concerning their understanding of the concept of cultural intelligence, are presented below literally, as quotations of their answers. Respondent 1 (female, aged 25) - "cultural intelligence is the ability to understand and accept diversity; it is about cultural diversity; it is about accepting employees from other cultures, even if we are very different". Respondent 2 (female, aged 29 old) - "in my opinion, cultural intelligence is simply the ability to accept that people come from diverse cultures and are different in terms of behaviour, communication, how they work, what values they adhere to, even how they dress, what they consider important or irrelevant". Respondent 3 (female, aged 35) - "I think it's sensitivity to other cultures and the ability to work well with people from other cultures; cultural intelligence is the ability to accept cultural differences, e.g. in a team when there are people of various nationalities". Respondent 4 (female, aged 42) - "cultural intelligence is the ability to feel comfortably in environment where diverse cultures meet and also the ability to perceive people from other cultures in a positive way". Respondent 5 (male, aged 28) - "it is the ability to accept culturally diverse people. Understanding that people from other cultures think differently, work differently, behave differently in various situations". Respondent 6 (male, aged 35) - "cultural intelligence is the ability to communicate easily with people from other cultures, it is the ability to understand cultural differences and to cooperate easily in diverse environment where there are people from different cultures".

All respondents agreed that cultural intelligence plays a vital role in international human resource management, which is evident in the different dimensions of employee management in their organisations. During the interviews, the respondents indicated the areas in which, according to them, cultural intelligence is particularly important. These were: recruitment and selection - 4 respondents; appraisal interviews - 5 respondents; employee training and development - 4 respondents; talent management - 4 respondents; motivating and engaging employees - 6 respondents; conflict resolution - 5 respondents; the ability to respond to emotions of people of other nationalities - 6 respondents; building positive relationships between employees - 5 respondents; and the quality of team work (how fast teams work and achieve organizational objectives) - 5 respondents.

All respondents participating in the study emphasised that cultural intelligence is particularly significant in international work environment, for both employees who work in international teams (6 respondents) and for managers who manage such teams (6 respondents).

As far as international team members were concerned, the respondents were of the opinion that cultural intelligence greatly affects effective cooperation between people from various cultures (6 respondents), an effective way of building relationships in a team (5 respondents), effective communication (6 respondents), the ability to share knowledge (4 respondents), and the ability to resolve conflict together (5 respondents).

As far as managers were concerned, the respondents were convinced that cultural intelligence allows them, first of all, to manage people of various nationalities and cultures in a more conscious and sensitive way (6 respondents) and to adapt human management solutions to employees' diverse needs and expectations (5 respondents). Four respondents had participated in training courses addressing such issues as cultural diversity of the teams in which they worked or positive and negative aspects of working in multicultural teams. Participation in these courses undoubtedly increased their knowledge of cultural intelligence. Two respondents had not participated in any training related to working in culturally diverse teams.

Summing up, the pilot study revealed that all respondents were familiar with and understood the concept of cultural intelligence. They also notice an obvious link between cultural intelligence (for both employees and managers) and various areas of human resource management in international companies where they worked.

Discussion

It is worth repeating here that the study whose results are reported in this article was a pilot study, with small sample of 6 respondents, intended to serve as an introduction to a further, more extensive study (which will be conducted among employees of international companies in Poland, the Czech Republic and Spain). Individual in-depth interviews yielded the following results. All six respondents were familiar with and understood the concept of cultural intelligence and were able to explain and describe it. In their opinion, CQ plays a vital role in international human resource management and influences various areas of human resource management, such as: recruitment and selection, appraisal interviews, planning employee training and development, talent management, motivating and engaging employees, conflict resolution, the ability to respond to emotions of people of other nationalities, building positive relationships between employees, and the quality of team work (how fast teams work and achieve organizational objectives).

The study also revealed that, in the respondents' opinion, CQ is important both for employees and managers who work in international environment. They believe that cultural intelligence allows managers to manage people of diverse nationalities in a more conscious and sensitive way, as well as to adapt human management solutions to culturally diverse employees. The interviews provided information concerning the respondents' knowledge about and their preparation for working in intercultural teams (4 respondents had previously taken part in training courses devoted to, among others, issues related to working in a culturally diverse team).

The results of the pilot study provided the answer to the research question: Are employees of international companies familiar with and do they understand the concept of cultural intelligence and are they able to determine the impact of cultural intelligence on various areas of human resource management?

As a follow-up of the pilot study, the author is planning to conduct - in the near future - individual in-depth interviews with employees of international companies in Poland, the Czech Republic and Spain who work in culturally diverse teams (whose members are of at least 2 nationalities). The study will cover much larger sample than the one described in the article and will investigate the way in which respondents understand the concept of cultural intelligence, and its role and importance in international human resource management, but this time from the perspective of employees of different nationalities.

Conclusions

On the basis of subject literature review and individual in-depth interviews (the pilot study), the author of the article demonstrates the importance of cultural intelligence in international human resource management. Her further study investigating cultural intelligence in a wider context (separately among employees and managers of various nationalities) will be conducted on a much bigger scale among respondents from three countries.

The constantly growing role of international cooperation makes it necessary for managers and employees of international companies to pay a lot of attention to managing cultural diversity, i.e. understanding and accepting diverse ways of thinking, working style or problem solving.

The ability to successfully interact with representatives of various cultures has become a key feature of the global business world today. In order to effectively function in international work environment and manage human resources on an international scale, employees and managers must possess and develop cultural intelligence.

Cultural intelligence, especially in international human resource management, in which managers and employees work at the intersection of different cultures, helps them to notice, understand and accept behaviours, working style, communication, norms, and values adopted in various cultures. Cultural intelligence ensures faster adaptation to and smooth functioning in culturally diverse work environment, facilitates communication, and fosters positive relationships with clients, co-workers and members of other teams. It plays an important role in the process of recruitment and selection of employees from various cultures, during appraisal interviews, in planning employee training and development, in motivating employees, in resolving conflict and – last but absolutely not least – in building positive relationships.

Managers and employees with a high level of cultural intelligence understand what and why is accepted in different cultures, are able to work together with representatives of other cultures to achieve organizational goals, and to share their knowledge and experience.

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Creative Clusters in The Russian Economy: Operating Practices and Development Directions

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Abstract

The article presents directions of creative clusters' development in Russia and prospects of their creation and activity. The authors pay special attention to improving methodological approaches to definition and characterization of «creative clusters». Authors also formulate issues of infrastructure support for creative clusters development, directions of improvement of methodical approaches and criteria for evaluating effectiveness of russian creative clusters.

Keywords: Creative Industries, Clustering, Creative Cluster, Intellectual Creative Products.

Introduction

The primary task of any state is to maintain competitiveness. Destabilizing factors of the modern economy encourage economic actors to seek new forms of economic activity to support it, including the concept of cluster development, which is implemented by the state in the framework of innovative economic policy. In modern economy clusters can serve as the most effective form of integration of financial and intellectual capital, providing the necessary competitive advantages. This is emphasized by various researchers.

Thus, M. Porter in the book «Competitive strategy: methods for analyzing industries and competitors» (2011) defined clusters as «geographically concentrated groups of interconnected companies, service providers, specialized suppliers, companies in related industries, and organizations associated with their activities (universities, trade associations, and standardization agencies) that compete in a number of areas, but work together».

In a research study «Classification of trade and local industries in the US economy. Panorama of the European cluster» (2016) mentioned that the corresponding division of the European Commission (EnterpriseDirectorate-General) refers to a cluster as «a group of independent companies and related organizations that: first, compete and cooperate; second, are geographically concentrated in one or more regions; third, specialize in specific areas of activity and are linked by common skills and technologies; fourth, are traditional or based on knowledge; fifth, may have a management body, or may not have one».

It is interesting to define Ketels K., who focuses on a geographically specific region and their interconnectedness with certain interdependencies to provide goods/services. Because the cluster components are geographically close, they can benefit from several positive externalities related to the specifics of their location. These positive effects may include: access to specific human resources and suppliers; transfer of knowledge; new knowledge gained as a result of close cooperation with specialized suppliers and consumers. Therefore, a cluster that exists within these rules is a specially organized space that allows large firms, small businesses, suppliers (equipment, components, specialized services), infrastructure facilities, research centers, universities, and other organizations to develop successfully. At the same time, it is important that the cluster achieves primarily a synergistic effect, since the participation of competing enterprises becomes mutually beneficial.

From the point of view of our research, the works of G. Mensch listed in the research named «Synthesis of cluster strategy on the basis of system-integration theory» (2019) related to the analysis of economic dynamics are of great importance. On the basis of a huge empirical material in the field of technological innovation at the industrial stage of development of society, G. Mensch established the cyclical and uneven innovation process, completed the formation of powerful clusters of basic innovations at the stage of depression (i.e., when the economy is characterized by the greatest susceptibility to innovation). Therefore, clusters themselves contribute to the launch of another large cycle of economic conditions, and due to depression, the search for survival opportunities is stimulated, whereas they can be provided by the innovation process (this phenomenon has been called the «trigger effect of depression»).

In economic science, a whole theory of clusters has been developed and widely developed, which is understood as a group of organizations that are related to each other (including companies, research and other organizations), localized by geographical principle, mutually cooperated, which contributes to the growth of the cluster's competitiveness as a whole.

The concept of creating creative clusters was first proposed in 2000 by urban development specialist CH. Landry in the work «Creative city». The researcher, in particular, mentioned the prospects of «combining the creative resources of people and communities to form an economically and socially prosperous urban environment», emphasizing the positive consequences of such integration. The terminological designation of creative clusters was first formulated by S. Evans, curator of the UNESCO program «Creative cities»; in particular, it was noted that «... a creative cluster is a community of creative-oriented entrepreneurs who interact in a closed territory». One of the main tasks of forming a creative cluster is to establish partnerships between creative enterprises that are part of it.

This problem is highlighted by the fact that in the last 10-20 years the formation of creative clusters has become an important part of state policy in the field of regional development in many countries of the world. The integrating nature of the cluster approach as a tool for regional development lies in the possibility of complex problem solving.

Further, these problems will be considered from the point of view of the experience of implementing cluster initiatives in various countries with an emphasis on the development of cluster structures in Russia. This study is carried out in the conditions of imperfection of the legal framework, insufficient domestic practice of implementing the cluster approach and lack of understanding by the majority of the population of the importance and prospects of the cluster system. To date, it is impossible to talk about the full functioning of the Russian cluster system. In order to solve the main problems that hinder the creation and slow down the development of creative clusters in Russia, the following tasks are set:

1. Consider theoretical component of creative clusters, its structure, identify characteristic features, and determine the range of stakeholders.
2. Analyze foreign experience in the development of creative clusters, identifying its advantages and disadvantages.
3. Analyze the foreign practice of the system of creative clusters and identify opportunities for introducing the most successful elements of foreign experience into Russian practice.
4. Consider the process of managing a cluster system in Russia.

As the main approach for the study, a system approach was chosen, which is based on the consideration of the object as an integral complex of interrelated elements.

Authors used the following general scientific methods in the research process: tools of deductive and inductive analysis, which allowed combining the conclusions of individual authors and formulating their vision of the problem, and the method of analysis.

The method of expert survey was also used in the research process. One of the authors worked as an expert of Working group of the results' of intellectual activity commercialization together with the InterMedia News Agency (Moscow, Russia, 2017-2018). This working group was created in April 2017 in the Council of Intellectual property in Russian Federation as part of Council's initiative to prepare a draft law on culture. The study is supported by the results obtained by CCI working group: «Preliminary results of a comprehensive study of creative industries» and «Basic block diagram of the sphere of culture» (2018).

Method

Turning to the initial stages of cluster' development abroad, it should be noted that the history of cluster development in Europe and North America began more than 70 years ago. In the second half of the XX century, according a research study by Abashkin L., Artemov S., Alenkina E., Gokhberg L. (2017), the economies of many countries on these continents faced the problem of decline existing industrial clusters on their territories. In large cities, there is a need for new jobs, sources of replenishment of city budgets, points of growth of the city economy. In order to solve this problem, the former industrial territories were reorganized into creative spaces; this is how art centers, concert and exhibition halls replaced the production facilities.

During their existence, creative clusters have accumulated vast experience in «revitalizing» (transforming, updating) industrial territories, creating infrastructure, regulating business processes, etc. Creative clusters are usually located on territory of former industrial zones or abandoned buildings; the latter stimulates innovative activity, transforms the districts and cities in which they are located. Examples of successful creative clusters abroad are Hollywood (USA), Truman's brewery (UK), Zollverein (Germany), and others; there is a significant variety of creative clusters; they can be classified by scale, by areas of activity (cinema, fashion, fine art, design, architecture, etc.), and other grounds. The activity of creative clusters is supported by the fact that currently European cluster development programs are integrated into national policies and have the following characteristics:

- most cluster development programs are priority for the state;
- programs are necessarily coordinated with the tasks of other programs, which allows the most efficient use of financial resources;
- the importance of internationalization;
- program operators are actively developing individual clusters;
- the quality of cluster management is of particular importance at present;
- monitoring and evaluation are complex, but necessary;
- the importance of cluster policy is important not only for the region, but also for the country as a whole;
- innovation development and cluster development programs are linked;
- the program strategy takes into account the development of newly formed clusters, and support for Mature clusters.

The «Strategy for innovative development of the Russian Federation for the period up to 2020» also focuses on the need to support cluster initiatives. Analysis of the number and nature of creative clusters in Russia has shown that they are mainly located (and this is natural) in large cities, centers of Federal districts and cities with millions of people according a document named «Methodological recommendations for the implementation of cluster policy in the subjects of the Russian Federation» (2008). Antonova A. (2015) mentioned that the first creative cluster was formed in 2006; since that

time, «ARTPLAY» (its specialization is architecture), «Flacon» design factory, «The Factory», «ARMA», «Vinzavod» (cluster profile – photography and fine art), «Garage», «ART Strelka» cultural center, etc. have been formed and successfully operate in Moscow; in St. Petersburg there are «The Floors», «The Weavers», «Contour Family», «Museum of street art», «More Place», «Artmuza», «Taiga», «Erarta», «Pushkinskaya 10», «Lumiere hall», «Golitsyn loft», «Mansion on the Palace Embankment». In Yaroslavl, Krasnoyarsk, Novosibirsk, Yekaterinburg, Ulyanovsk, Ufa, Kazan, Kostroma, Ivanovo, Vladivostok and Rostov-on-don there are also appear more and more creative clusters every year.

According to existing statistics, creative companies currently make a significant contribution to the Russian economy. Over the past few years, their share in GDP has been more than 5%. In addition, according to data provided in UN Reports, 7.3% of Russian population is employed in production of creative products according to Abashkin L., Artemov S., Alenkina E., Gokhberg L. (2017). However, creative and cultural industries are underestimated as full-fledged priorities for regional development, including as an object of cluster policy: while KIBS, creative and cultural industries operate in 16 industries (production of films, videos and television programs, publishing of sound recordings and music; performing arts activities; distribution of films, videos and television programs; provision of services in the field of marketing, design and publishing; distribution and e-Commerce; provision of financial services; insurance services; production of designer clothing), the number of industries with cluster initiatives is 0.2.

It seems that a characteristic feature of Russian clusters, which include creative organizations, is the order of their creation and management: clusters are created on the initiative of individuals and entrepreneurs («from bottom to up») and operate without receiving support from the state. All the more important is the work that is currently being carried out to combine existing clusters. For example, Sofia Trotsenko, Dean of the Ranepa school of design and founder of the Vinzavod creative cluster support Foundation (Moscow), announced the creation of the Union of creative clusters in November 2019. It includes «Winery», «Bottle», «ARTPLAY», «The Factory». The reasons for this Association are the situation that has developed around creative industries and creative clusters: growing interest on the part of municipal authorities and the government; unresolved issues related to the General terminology, standards for the creation and operation of creative clusters and management issues. Issues of support for creative companies are increasingly being discussed at the regional and municipal level (largely due to such «private» initiatives).

The provisions of Russian legislation, however, do not contribute to new projects in the field of development of creative clusters, since they do not contain even the minimum necessary definitions. Only the concept of «innovation cluster» is highlighted as «... a cluster in the so-called «new sectors», such as information technology, biotechnology, new materials, as well as in the service sectors related to the implementation of creative activities (for example, cinematography)». Thus, in the legal field, creative clusters were assigned to the service sector, and the categories «innovative clusters» and «creative clusters» were equated to each other. However, the following indisputable position is noteworthy: the results of innovation activities of an innovation cluster may lie in technological, product, marketing, and other areas; results of innovation activities of creative clusters contain creative products related to the activities of creative industries.

In this regard, the authors of the article suggest introducing a new concept into scientific circulation – «results of intellectual creative activity», since the results of this nature are the actual result of the activity of creative clusters. This is a significant difference between them and other innovation clusters/organizations that also produce a «creative product», but the result of their activity is not creative products in the narrow sense (products of creative industries), but creative products as a result of creative activity in the broad sense, new products, technologies or management innovations. Organizations of this type can be part of a creative cluster to provide its infrastructure, but its core must be the companies that produce the creative product. According to the authors, the list of possible results of intellectual creative activity should include: musical works, works of drama, fine art, architecture and landscape design, literary works, movies and TV series, clothing design, phonograms, web design, news releases, talk shows, reality shows, objects of decorative and applied art, objects of photography,

journalism, etc. In this way, results of intellectual creative activity will be in the legal field of copyright and related rights legislation.

The issue of classification of industries of enterprises included in the creative cluster is also significant. The identified problem is based on the absence of a generally accepted classification as a whole: both the types of activities of clusters related to creative sector of economy, and the list of creative industries whose representatives can be combined into a creative cluster. There is no single Federal law defining the concept of «creative industries» in Russian Federation at the moment.

According to the WIPO classification, creative industries are defined as «the economic sector that creates products based on creativity and cultural resources» and combine music, visual and performing arts, film, fashion, crafts, literature and publishing, advertising, design, architectural design, the Internet and multimedia.

Kutsenko E., Abashkin V., Buderkina E. (2018) mentioned that referring to the experience of foreign countries: in the United States, the creative industries are divided into six branches: 1) museums and collections; 2) performing arts; 3) visual arts and photography; 4) film, radio and TV; 5) design and publishing; 6) art schools and services.

In the UK, the following classification of creative industries is accepted: advertising, architecture, art and Antiques, craft, design, fashion, film and video, music, performances, publishing, TV and radio, computer games and video; however, many researchers consider it erroneous to include IT, software, sports, and computer games in the creative industries according to Voitova L. M., Vasilieva Yu. S., Smirnova V. R. (2019).

Results

Practical application and implementation results of intellectual activity by creative clusters is possible when developing appropriate legal support that will solve a number of problems that arise in the process of creating and commercializing intellectual property. It is important to create a favorable climate in this area - creating conditions and an atmosphere conducive to the generation of new ideas, the manifestation of initiatives on the part of creative people and their implementation.

It seems that it is necessary to highlight the problem of produce the results of intellectual creative activity. When the results of intellectual creative activity not be created within the cluster, there can be no reason to define the cluster in the «creative» terminology.

The second distinctive feature of creative cluster should be the list of subjects that make up it. These can be: a) organizations (the «core of the creative cluster») that result in the creation or replication of the results of intellectual creative activity: record labels, film studios, production centers, publishing houses, galleries, concert venues, museums related to the theme of the creative cluster, theaters and theater studios, craft workshops, workshops of artists and sculptors, photo studios, circus studios, exhibition centers, radio and television centers, dance and choreographic studios, architectural bureaus and design studios, fashion houses, writers, actors, recording studios, etc.; b) providing organizations: bookstores, publishing houses, antique stores, libraries, cinemas, ticket offices, points and shops for the rental and sale of intellectual asset, museum and exhibition facilities, printing houses, fashion industry enterprises, examination of art objects, auctions of art objects, organizations of wholesale and retail trade in discs, albums, etc.; c) infrastructure objects that are not related to creative industries: catering enterprises; trade; musical instrument stores; construction and repair organizations; enterprises that provide Internet services, security, hairdressers, beauty salons, etc. It is necessary to observe certain proportions of these types of organizations' structure in cluster.

There are certain tools, well-developed methods and experience to measure cluster initiatives, (projects, activities, programs). However, there are certain difficulties in measuring the cluster. Statistical agencies do not collect or publish any data about clusters, clusters cannot be measured, evaluated, or compared based on publicly available statistics.

A cluster is measured primarily by macroeconomic parameters that allow us to assess its scale, weight, and significance for the regional and national economy. Examples of such parameters:

- the cluster's contribution to the gross regional product (in monetary terms and as a percentage of GRP);
- cluster contribution to the region's industrial production (for industrial clusters);
- the cluster's contribution to the export of the country and region, the cluster's position in the national and global markets;
- the cluster's contribution to the region's innovative products;
- employment in the cluster.

Cluster measurement is the subject of cluster mapping. At the same time, macroeconomic parameters are supplemented by a number of microeconomic ones (cluster enterprises, regional infrastructure). It is important to measure clusters in order to assess their current and future significance for the region's and country's economy. Cluster programs and projects are measured using the program-target approach. Examples of parameters: goals, expected results and indicators of their achievement; performers and deadlines; budgets and sources of funding.

Abashkin L., Artemov S., Alenkina E., Gokhberg L. (2017) mentioned that in Russia, following the example of European countries, specialists of the Higher school of Economics have also created a Cluster Observatory, but the mechanism for evaluating and monitoring cluster activities has not yet been set up. The publicly available information provided by the Observatory does not meet the requirements of stakeholders, and there is no direct access to cluster data. Research on clusters is carried out by various organizations, such as the Russian venture company (hereinafter referred to as RVC), the Russian Bank for support of small and medium-sized businesses, the Association of innovative regions of Russia (hereinafter referred to as AIRR), and others.

There is no aggregated information about cluster’s development in the open access. Enterprises participating in clusters analyze their own economic activities for tax reporting and internal purposes, some of the statistical data for clusters are provided by cluster development centers, but the information is collected in different time periods and according to different indicators. The Russian Cluster Observatory provides the most comprehensive and complete information on cluster pilot programs. However, this is not enough to make a conclusion about the dynamics of cluster development and their impact on the country's economy.

With regard to the introduction of creative clusters in Russia, we can say that the fundamental task is to develop a legal framework for creating and regulating activities of the above-mentioned associations, which is possible through the creation of a package of draft legal acts. In addition to preparing draft laws and draft by-laws, the fundamental task is to create and plan public management decisions for the implementation of cluster policy.

Thus, the authors propose to solve the methodological problems of creative clusters’ functioning as follows:

- to develop and approve a list of creative industries;
- to develop a methodology of creativity - interpretation of the concept, approaches to the study of creative industries, indicators, which will be studied by the industry (e.g., such as employment in the cultural sector, enterprises in culture sphere, export and import of products and services of creative industries, the spending on culture, etc.), classification of creative industries;
- to introduce the category «results of intellectual creative activity» into scientific circulation;
- to identify the distinctive features of creative clusters (first, note that the product creative cluster have to classified as an «intellectual creative activity results»; second, the list of subjects (the «core», providing and infrastructure organizations) in its composition);

– to fix the legal status of creative clusters, their main activities, rights and obligations of subjects, and the procedure for supervising their activities.

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Development of Small Business in Conditions of Innovative Economic Development

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Abstract

In today's world economy, innovation is seen as the main factor of competitiveness and sustainable economic development. In developed countries, small enterprises make significant contributions to the innovative development of national economies by leveraging their competitive advantages in the flexibility and responsiveness of decision-making. The article focuses on the role of small business in sustainable development. The article considers the possibilities of development of small business in the period of innovative economic development. The foreign experience of economic policy with regard to small business was studied, key problems and risks associated with the development of small innovative enterprises were identified and recommendations were made to improve the system of state support for small and medium business, taking into account the peculiarities of its development in the current environment.

Keywords: Small Business; Innovations, Competitive Advantages, State Support.

Introduction

Small business is the most important element of the market economy, without which the state cannot develop harmoniously. Small business largely determines the economic growth rate, structure and quality of the gross national product. According to the UN, in general, small and medium-sized enterprises in the world employ almost 50% of the labour population and produce 33-60% of the national product.

The development of small businesses creates prerequisites for accelerated economic growth, promotes diversification and saturation of local markets, while at the same time compensating for the costs of market economy (unemployment, market fluctuations, crisis phenomena).

Small entrepreneurship has great potential for optimizing the way the economy and society as a whole develop. The characteristic feature of a small enterprise is the high intensity of use of all kinds of resources and constant striving to optimize their quantity, to provide their most rational proportions for these conditions. Small businesses make a significant contribution to innovative production because they are the most mobile and can react quickly to revolutionary innovations in the economy and society.

Role of small business in sustainable development

Theories about the role of small business in the economy began to be developed in the 1900s. J. Schumpeter (1908) saw small firms as a place for gathering innovations and changes included in the economic system. In the 1980s, when the demand for mass industrial products based on fourth wave technologies saturated, the emphasis shifted from mass production to - individualized. These factors have strengthened the small business sector, making it more flexible and responsive to changing conditions and consumer demands. The opinion about the decisive contribution of small business to the development of the economy is becoming more widespread nowadays, in the era of another technological revolution. For example, in the book by Schumpeter J. (1908) mentioned that the concept of "Think Small First" is common in the European Union, which implies the creation of the most favorable environment for the functioning of small businesses.

Z.Ax and D.Odrech (1988) argue that small enterprises contribute significantly to technological development, providing about half of the most important innovations of the 20th century. A. Cooper (1964) in his article "R&D is more effective in small companies" concluded that small enterprises had spent considerably less time and money on the development of a particular product because of the higher ability of technical staff, their greater interest in the cost of the project and their more effective communication and coordination. W. Baumol (1972) believes that breakthroughs are achieved by small enterprises and suggests that large enterprises, because of their inherent organizational structure, will tend to specialize in improving innovations, while small enterprises will tend to specialize in revolutionary breakthrough innovations.

G. Aldrich and E. Auster believe that small and large enterprises can benefit from mutually beneficial cooperation, which will accordingly have a positive impact on economic development. The benefit of small enterprises is to access the missing resources through close links with large enterprises (through franchising, long-term contracts, mergers and acquisitions). D. Birch (1987) points out that the most successful companies start as small firms, and many of them remain small. The following conclusions were drawn from the Dun and Bradstreet credit ratings database for December 31, 1969, 1972, 1974 and 1976. 1. On average, about 60% of all jobs in the US were created by firms with 20 or less employees, while large companies (over 500 employees) created less than 15% of all jobs. 2. After more than 4 years in the market, the company's ability to create jobs was significantly reduced.

The British scientist D. Storey in his book "Entrepreneurship and New Firm", as opposed to D. Burch, argued that large enterprises create most of the new jobs and are responsible for the elimination of most jobs. Most small firms have low growth rates and are liquidated a few years after their establishment. D. Story believes that the contribution of small business to job creation is not supported by facts, and therefore questions the desire of politicians to put small business in a more favorable environment. In the book "Basic information about the small business sector" (1994). D. Story concluded that it was the fast-growing firms that made up a small proportion of all small businesses that contributed significantly to job creation, which brought him closer to D. Birch's conclusion about the role of gazelles. In the same study (conducted in 1989-1992). D. Storey (1993) showed that small firms in the USA and England create new jobs faster than larger firms, although their contribution is not as high as he originally estimated. Moreover, small enterprises were more reliable in job creation and less exposed to macroeconomic conditions, regardless of the stage of business cycles in the economy. However, the wages and additional benefits for workers in small enterprises were lower compared to those in large ones.

D. Henrekson's (1999) study "Institutional Effects on the Evolution of the Size Distribution of Firms" ("Institutional Effects on the Evolution of the Size Distribution of Firms") provides a statistical analysis of the evolution of Swedish firms from the late 1960s to the early 1990s and the evolution of the number of employees in firms of different sizes since 1984. Since the late 1960s, the relative importance of medium-sized firms (10-199) has gradually declined. This trend can be seen in the economy as a whole, in the private sector and in manufacturing. The reduction in the number of medium-sized firms is due to the fact that the Swedish tax and pension system, credit market regulation, labour legislation, and a high degree of monopolization of the service sector do not

contribute to the development of small and medium-sized businesses. Henrexon and Davis have shown that, in Sweden, large firms tend to increase their share of the economy at least until the mid-1980s. In contrast to Henrexon and Davis, Loveman and Sengenberger (1991) argue that "there is a general trend towards small organisational forms" in the 19 six largest OECD member states, which first became prominent in the US in the 1970s and then with a slight delay in other major economies.

I. Kitov's paper describes the evolution of the size distribution of US firms from 1992 to 2002. Two approaches were used in estimating firm size: sales volume and number of employees. In the period under review, the share of medium-sized firms decreased and the share of large firms increased, as well as the return on labour in small and medium-sized firms decreased and grew in large firms. Individual industries show significant differences in the evolution of firm size distribution. The author proposes to take these trends into account when choosing industries and firm sizes for long-term investments. For the first time, K. Motokhashi (2016) conducted an extensive analysis of the innovation activity of an entire population of Japanese firms using the interrelationship between the Census and Enterprise Census and the IIP Patent Database. The results of this study showed that the innovation activity measured by patenting positively correlated with the performance of enterprises. Moreover, there is a strong correlation between patenting and survival for large firms and a strong correlation between patenting and growth for small firms. The results of a study by K. Motokhashi on the example of Japanese enterprises show that small companies face greater risks associated with patenting. Therefore, the state should provide support to small businesses for technology commercialization.

Opportunities for small business development in the period of innovative economic development

During the technological revolution, small businesses have unique opportunities to get innovative rents from the commercialization of basic innovations, recouping the costs of scientific research in emerging industries. Apple's success in delivering growth opportunities during the technological revolution is exemplified by its innovative personal computer and operating system solutions, as well as by the undervaluation of the PC market by large businesses. In other words, small business is already innovative by its nature, it turns into a key factor of transformation changes in the economy.

Small entrepreneurship provides mobility and dynamism to the economic system as a whole, promotes rapid commercialization of research and development results, as well as adaptation to changing conditions in all spheres of activity, which has a significant impact on the accelerated pace of innovative development.

Modern information technologies provide small businesses with access to new activities and increase the share of small businesses in the global market for goods and services.

In addition, information technologies create conditions for reducing production costs (Internet technologies significantly reduce the cost of processes in marketing, advertising, logistics, consulting, registration, organization of contacts with partners) and allow small businesses to increase their competitiveness.

All this indicates in favor of small business, which is becoming an important factor and enabler of dynamic business development.

Subjects of domestic small business in Russia have the most qualified staff. The share of specialists with higher education at small enterprises in 2018 amounted to 34.2% of the average number of employees, although the all-Russian level for manufacturing companies fluctuates within 20.8%. In organizations with 50 to 100 employees, the share of innovative products in the total volume of goods shipped is 16.3%, while the average figure for domestic companies does not exceed 12%.

Small companies are also leading in terms of innovative products and services. While for small businesses in 2018 the output per employee in the production sector ranges from 72.1 thousand to 115.1 thousand rubles, and for services - from 39.9 thousand to 49.2 thousand rubles, for large companies -36.9 - 51.8 thousand rubles and 0.65 thousand - 0.94 thousand rubles, respectively.

Incapacity of products manufactured by small enterprises in Russia is 3 times higher than that of large organizations, and the cost of innovation per employee at small enterprises in 2018 amounted to 64.5 thousand rubles / person, and in organizations of large businesses - 17.4 thousand rubles / person.

At the same time, according to official data, only 6.2% of the total number of organizations are engaged in the introduction of innovations in the country in 2018, while in industry it is no more than 10%. Costs of innovation do not exceed 1.5% of the value of industrial products, while in the EU countries this figure is much higher.

First place in the ranking of world leaders in the field of innovative development is occupied by Switzerland, followed by Sweden, the United States of America (USA), the Netherlands and the United Kingdom; such data are given in the Global Innovation Index (GII) 2019 report, which also indicates that India, South Africa, Chile, Israel and Singapore have emerged as leaders in their regions, while China, Viet Nam and Rwanda have emerged as leaders in their respective income grouped country categories.

Methodology

In the process of research the following methods were used: methods of historical, logical-structural and system analysis, tools of inductive and deductive analysis, which allowed to combine the conclusions of individual authors and formulate them into a single problem. A comparative analysis of small and large enterprises provides insight into the role of small business in innovation and its contribution to the world economy. Using expert survey methods and content analysis, the survey identified the main problems and risks of small innovative enterprises development in Russia. Involvement of specialists in the field of innovation activity and employees of professional Russian small business associations in the survey made it possible to focus on the emerging difficulties in the field of interaction between government and business in the framework of development of application and implementation of innovative technologies in the business environment. As a result, a three-stage analysis of small business development was carried out: the possibilities of small business development and the level of innovative development of the economy were investigated; the problems and risks of small business were investigated, and the essential role of small business in the innovative development of society and economy was defined. The methods used allowed us to draw further conclusions about the impact of small business on Russia's economic development.

Problems and Risks Associated with The Development of Small Innovative Enterprises

Small innovative companies are one of the most effective tools to successfully bring scientific developments to the market. But small enterprises face the following challenges in attempting to create innovative products:

1) the problem of recruiting and retaining qualified staff;
2) the problem of insufficient resources for large-scale research;
3) the problem of lack of resources to introduce an innovative product to the market;
4) lack of advantages of "group research" conducted by engineers who develop new products;
5) the problem of fierce competition with large enterprises even if innovative products successfully enter the market.

The peculiarities of creation and operation of small innovative companies in Russia create a number of specific risks that require assessment, accounting and management. Even at the stage of selecting an innovative development for subsequent implementation from the existing pool of ideas, there is a deferred risk of lack of market demand for the product of small innovative companies after its launch into industrial production, partially informalized relations with the "parent" institution, which negatively affects the prospect of attracting investors. In addition, the risks associated with the licensing of small innovative companies can be regarded as legislative, as the long term of the license directly affects the success of the project.

It should be noted that up to the present day remains relevant conclusions made by G. Aldrich and E. Auster (1986) that the age and size of the enterprise affect changes in the structure of organizational populations... Small and new organizations face the threat of novelty and small size. This threat is manifested, first of all, in the lack of trust of market participants due to their ignorance, in recognition and tolerance of established brands.

For Russian small production enterprises, the problem of survival is topical: only three out of one hundred small enterprises have been operating for more than three years. Among the reasons for such statistics are management errors. Many managerial mistakes at the early stage of development of small production enterprises are related to the wrong choice of business model.

The difficulties of small enterprises arise at the stage of transition to industrial output. It is difficult for small enterprises to combine the cheapness of new products with its active advertising promotion and development of service network. In the event of financial difficulties, many small businesses have to be taken over by large corporations.

The main problem of Russia's lag in the innovation sphere is related to low demand from business for new technologies and innovative products. Russia is developing a catch-up development model, which is unacceptable for a technological revolution.

Current activities of small innovative companies also carry risks, primarily related to resource constraints. Often functions on realization of the basic and providing business processes of the small innovative companies are assigned to the scientific experts who are not professionals in the field of commercial activity. The implementation of this risk is associated with a decrease in the quality of these processes and can lead to negative consequences, primarily affecting the commercial success of the project.

Results

The analysis of small business development shows that it should be oriented to the markets of technological mode, as it is a supplier of components produced with the use of new technologies for mature industries. In order to secure a place in the technological landscape, small enterprises have to intensify their research and development. The share of small enterprises in federal support of research and development is also growing (up to 16.4%).

The Russian Federation has a multi-channel system of state support for small business that includes all the main types of support: financial, property, information and consulting, and personnel. The main measures of state support to innovative SMEs include:

1) R&D funding under the programmes of the Foundation for the Promotion of Small Innovative Enterprises;
2) financing the creation and development of infrastructure to support innovative SMEs (engineering centers, shared use and innovation technology clusters);
3) subsidizing part of the SME costs:
4) tax and customs privileges for residents of the Skolkovo Innovation Centre;
5) opportunity to establish small businesses under universities

But the current state support measures for SMEs in Russia have significant shortcomings.

First of all, Russia has not developed a systematic concept of state support for small business, instead of which separate measures and declarative strategies are taken.

Second, state support to small businesses is mainly directed at mass small and medium-sized enterprises, with unreasonably little attention paid to promoting the innovation activity of small businesses.

Thirdly, state support ignores the trends in small business development.

The Government has taken legislative measures to expand the access of small businesses to state and municipal purchases (the quota of small businesses has been increased to 15%, the initial price of a contract has been increased to 20 million rubles) and to purchases by state companies (the quota of small businesses is 10%). Also, measures have been developed to ease the administrative burden - a ban on scheduled control and supervision measures for three years in respect of small businesses, which, based on the results of the previous three years, did not reveal any significant violations of the RF legislation.

However, despite all efforts on the part of the government, the share of Russian small businesses in GDP is more than twice as low as in developed countries. Small and medium-sized Russian businesses lag behind the European Union, not only from the leading EU countries (Germany, France, and the UK), but also from the average level of all EU countries. The small business sector in the Russian Federation has concentrated its activities in trade and services.

At the same time, the contribution of small businesses to the Russian economy is much greater than that of medium-sized enterprises: the share of small businesses in employment was 22.6% and 24.4% in the turnover of enterprises in 2018, while the share of medium-sized businesses was 3.8% and 4.8%, respectively.

Conclusions

The analysis of the dynamics of small and medium business in the domestic economy shows that its development is non-monotonous. Over the period 1997-2018, a significant variation in the share of small business (and a less significant variation in the share of medium business) in employment, turnover and investment in fixed capital in Russia was found. The share of small enterprises in employment has a pronounced upward trend: from 12% in 1997 to 22.6% in 2018. The share of small enterprises in the turnover of all organizations decreases in 2008-2014 and increases to 24.4% in 2018. The share of small enterprises in fixed capital investments is most subject to variation. Reduction periods in 1997-2000, 2009, 2011 are followed by growth periods in 2001-2008, 2010, 2012-2018.

At the same time, the technological multiplicity of the Russian economy should be taken into account. Russia must simultaneously address the challenges of catching-up and forward-looking development. In the latter case, through direct public funding. Innovation clusters and technology platforms can make a significant contribution to the cooperation of small and large businesses, educational and scientific institutions. The state orientation of large enterprises in these sectors towards the purchase of innovative small business products is important to expand the opportunities for this business in testing promising areas of technological development.

For Russia, it is necessary to develop a state innovation policy to modernize industries and industries that use technologies from previous years, and to create and develop industries with a new technological mode.

For this purpose it is necessary to apply a strategy of advanced commercialization of scientific discoveries and technologies, combining the development of its own research and development sector and adaptation of foreign developments.

To implement the strategy of innovation breakthrough in Russia, it is necessary to develop an effective system of state support and development of small business that takes into account the specifics of its development.

Therefore, for the successful commercialization of fundamentally new technologies, it is necessary to provide priority state support to small innovative enterprises in the following areas:

1) support for independent small enterprises created by talented scientists and innovative entrepreneurs;
2) assistance to large Russian enterprises in creating their own small organizational forms engaged in innovation activities;
3) development of venture financing in the country.

The state should also promote the widest possible cooperation between small and large businesses, educational and scientific institutions through the mechanism of territorial innovation clusters and technological platforms.

Thus, small innovative entrepreneurs need to be supported as they are able to generate better innovations, which makes a significant contribution to the innovative development of the economy. It seems expedient for the government to stimulate demand for innovative products of small enterprises through the expansion of state procurement programs and state guarantees for the purchase of high-tech products by large private businesses.

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E-Business as A Component of Information Economy: Evolution and Future Challenges

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Abstract

Modern development of e-business is considered from the point of view of it as a component of information economy. Theoretical background of Internet sphere concepts definitions is investigated. The development of the Internet is considered by the authors at three levels. Levels of e-economic activity are listed too. The main goals of online business creation are analyzed. The article contains statistics on the level of electronic environment development in Ukraine. It is stressed that UAnet or Internet segment in Ukrainian is among the most common language segments on the Internet. Websites in Ukrainian make up a significant part of the global network. At the same time, among the most popular Ukrainian websites, there are only few sites which main language is Ukrainian. The authors pay attention to consideration of cloud services development. They note that the Internet provides opportunities for the development of activities that have traditionally been perceived as offline, in particular the educational field. The material of the article confirms the great potential of Ukrainian developments in the Internet environment. Examples of successful technological solutions of domestic developers are listed. The authors state that electronic environment greatly facilitates the work of businesses with potential consumers and creates opportunities for easier entry into the market for new players. The authors draw conclusions that the evolution of e-business in Ukraine has already passed a number of stages, but is still in a stage of growth. This market is ready for radical innovations.

Keywords: Electronic Business, Internet, Information Economy, Online Presence for A Company, E-Commerce, Distance Learning At University, International Electronic Trading.

Introduction

Now in the information economy, where knowledge is the most important resource, there is an active process of convergence and integration of communications and technologies in IT (Bilan et al, 2019) the full impact of information technologies on economic activity (most employees of companies operating on the principles of information economy, are IT specialists (System Administrator, SMM Manager, Internet Marketer, Content Manager, Online Consultant, SEO Specialist, Web Developer, Web Programmer, etc.), and products that are manufactured by these companies are mainly information products and services)). The active incorporation of revolutionary new technologies along with the transformation of the current system of international relations characterize the formation of the global information society at the beginning of the 21st century (Fyliuk et al., 2019). The changes in modern society are focused more on the sustainable economic growth. When reviewing the transmission from an agrarian economy towards industrial, knowledge society, organizational knowledge, intellectual

capital acquires greater importance and approval that they are some of the most valuable resources for sustainable economic future (Mikalauskiene et al., 2019). The society required new information system that would clarify the previously unexplained and intangible processes. The growing interest in the e-business and commerce coincided with the creation of information economy, movement towards the "Industry 4.0" (Krykavskyy et al., 2019). In particular, in economic activity such tendencies act as a technological platform for concepts of "digital economy", "electronic activity", "network economy".

Recent advances in technologies, fast global competition, and the increasing demand on the side of customers are forcing organizations to re-examine how they can exploit the benefits of information technology capabilities to gain competitive advantage. E-business is becoming one of the fastest growing fields in today's economy. Most scholars anf entrepreneurs predict that it would continue to expand faster and faster. Internet business is a great instrument that can assist in obtaining different competitive advantages over their rivals and improving their capabilities to compete with large firms at the world markets (Hu, 2019).

In the conditions of rapid development of modern information technologies and their use in all spheres of economic activity the approaches to solving problems of any socioeconomic processes are changing radically. These processes lead to the transformation of the marketing principles and functions and directly of the role of commerce. Each technology cycle is characterized by the existence of technological revolution and leading sectors of the economy (Osmyatchenko et al., 2019). Change of technological cycles leads to the transformation of the theory of marketing and its practical application. Particularly, approaches to business management changed due to the application of information technologies. Online business becomes leading. There is a significant development gap between different countries, which is the lack of harmonized relationship between the level of digital technology development and the time taken for introducing digital technologies into business sphere for example (Afonasova, 2019).

E-business has gained worldwide development. For example, every fifth European business make e-sales. The level of development of the modern Internet environment is demonstrated by the following data: users of the social network Instagram for a minute like about 2.5 million posts. On Twitter they send 9.7 thousand tweets in a minute. Users of YouTube hosting add 400 hours of new video in a minute. People registered in Facebook share more than 216,000 photos in just one minute. Snapchat users can watch 6 million videos in one minute online. Nearly 570,000 new images are uploaded to GIF services, 830,000 new documents are uploaded to Dropbox every day. Siri (cloud-based personal assistant and iOS-adapted question-and-answer system) manages to answer 100,000 questions in just one minute (E-commerce, 2020).

An increase of the e-business share in GDP can become an economic growth driver in every country. For example, BRICS countries today pay great attention to the development of e-commerce and plan to strengthen cooperation in this area (Revinova, 2019). For the company, the feasibility of doing business on the Internet is determined by the ability to work around the clock any day of the week, no geographical restrictions for work place, minimizing costs (including initial business investments), opportunities for business globalization, equality of access to the market for all businesses, facilitating marketing communications with customers (including interactive communication with them), increasing the speed of call ment operations within the business, reducing the risk associated with the human factor, reduced time-to-market product, no need to pay customs taxes related to electronic payments and others. Consumers also benefit from a number of benefits by using the Internet as a platform to buy goods, including 24/7 availability of business information, confidential receipt of goods and services from companies, purchase of goods and services at lower prices than at physical points of sale, availability of rare goods and services from foreign markets, unlimited opportunities for communication with representatives of companies, providing access to the purchase of goods and ordering services for people with disabilities, convenience for comparing competitive offers (saving time and financial resources).

The levels of development of the Internet approach within the enterprise can be defined in three levels:

- the first level (only the presence of the company on the Internet (presence of a web page, e-mail box, advertising on the Internet));
- second level (interaction with suppliers and consumers based on the use of the Internet);
- third level (transformation of business processes, when the main part of the action is carried out with the help of Internet technologies).

Developing people's interest towards starting a business plays a vital role in Ukraine in which, for a very long time, private property and free initiative were almost completely suppressed. Electronic technologies give opportunities for young people without huge starting finance capital to lounch their private acttvity in a market (entrepreneurship phenomenon) (Vargas-Hernández, 2013).

The increase of entrepreneurial activities is a major issue on which the sustainability of future growth depends (Belás et al., 2017).

Many businesses, at one stage or another of their development, believe that it is important to expand their presence in the eyes of the target consumer with the wide range of tools the Internet can offer. Nowadays, there is a belief that every company that wants to be successful in its customer acquisition activities should have at least a minimal presence on the Internet (having a business site, periodically launching online advertising, a company page on social networks (at least one), etc.). Separate services allow businesses to provide information about themselves to consumers, to deal with reviews (because experts estimate that consumers are about 1.7 times more likely to respond to companies who respond to reviews than those who ignore them). This service, for example, is a Google My Business service that enables businesses to present themselves on Google pages, including Search and Maps. Company representatives have opportunity to respond to customer reviews, post photos using this service.

Literature Review

With the spread of internet usage, electronic business has gained huge attention in the academic literature. Theoretical and methodological basis of the sphere of electronic business is developed in the works of a small number of Ukrainian scientists (Polivanov et al., 2018), (Malitska et al., 2018), (Zaitseva et al., 2015), (Sytnik et al., 2016), (Bashynska et al., 2019). Among the foreign scientists who have been involved in various issues of the development of e-business, can be called (Apăvăloaie, 2014; Yaser, 2013; Maureen et al., 2016; Dimitrios et al., 2014; Pilinkiene et al,, 2013; Delina et al., 2015; Roudposhti et al., 2018; Samašonok et al., 2016; Pabedinskaitė A. et al., 2012) and others. Due to its volatility, the amount of thorough and up-to-date research in the field of e-business is very small. Some aspects of e-commerce development and online projects are noteworthy and determine the relevance of this study.

Zorayda Ruth B. Andam from Philippines is of the opinion that e-coomerce encompasses wide array of the types of electronic businesses. Therefore, this author believes that online business is a component of e-commerce. In addition, the scientist notes that the definition of e-commerce is comprehensive to some extent and becomes really revolutionary phenomenon in modern business (Zorayda, 2003). Rajneesh Shahjee from India agrees with the previous scientist's view that e-business is a component of e-commerce (Rajneesh, 2016). Sahal M. Sheikh and Mehmet Basti from Turkey claim that all definitions of e-commerce can be devided in two groups – concrete and narrow. They think that narrow defntions are very simple (Basti et al., 2015). Chaffey (2009) explained e-commerce as the the exchange of electronic information between business and its external stakeholders. Harsono A. from Indonesia regards e-business as an ancillary link to e-commerce, consider it like a new link for improving physical business (Harsono, 2011). Poong et al (2006) suggest that e-commerce should be viewed from different angles according to the point of view of specialists of different specialization.

Since there is no kinship point of view in determining the relation of concepts, the authors of this article propose the idea of structuring the relations of these concepts for clarity.

Polivanov et al (2018) believe that online business covers the fields of information law, electronic money, technical and software, internet marketing, information management, online logistics, online insurance, tourism, online banking and online trading. Malitska et al (2018) consider e-business at the third level of e-commerce functioning and define it as the development and implementation of new forms of interaction between market participants. Also, it is a new way of exchanging information.

Maureen et al (2016) defined electronic business as the conduct of commerce in goods and services, with the assistance of telecommunication and telecommunication-based tools such as the Internet. E-commerce they identify as a sub component in e-business. In the research study by Yaser (2013) electronic acivity is comprised of three levels such as infrastructure, services, products and structures.

In most scientific studies, the Internet is defined as an additional channel for the effective pursuit of economic activity of various directions. Internet businesse is often identified with e-commerce, often without differentiating between these concepts of the information economy.

We agree with (Sytnik et al., 2016) that the development of online activity is influenced by a variety of factors and objective circumstances. This development is individual for each country. Therefore, it is advisable to identify trends in Internet business development in Ukraine separately from other countries. Scientists of the work (Pilinkiene, 2013) claim that electronic business improves business processes through the automation

economy such as: efficiency of public governance (Bilan et al., 2019c); macroeconomic stability (Vasilyeva et al., 2019; Lyulyov et al., 2017; Melnyk et al., 2018); country's brand (Bilan et al., 2019b); efficiency of the financial system (Vasylieva et al., 2014; Kuzmenko et al., 2014; Vasylyeva et al., 2014; Leonov et al., 2017, 2014; Vasilyeva et al., 2016; Bilan et al., 2018b; 2019a); level of shadow economy and development of creative industry (Levchenko et al., 2019; Kostyuchenko et al., 2018; Bilan et al., 2019e; 2019g; Leonov et al., 2019); information system (Bilan et al., 2019h).

Analysis of various studies shows that is a lack of investigations analyzing whether positiv electronic business impact leads to the stable competittive advantages on the market. and optimisation of usual business process.

The authors in the papers (Yevdokimov et al., 2018; Chygryn et al., 2018; Lyulyov et al., 2019; Vasylieva et al., 2019; Abaas et al., 2018; Lyeonov et al., 2019; Cebula et al., 2018; Lyulyov et al., 2015; Bilan et al., 2018a) proved that information economy boost the sustainable development and e-commerce should develop considering the green aspects (Cebula et al., 2015; Chigrin et al., 2014; Bilan et al., 2019f; GrenÄÃkovÃ et al., 2019; Shevchenko et al., 2016).

At the same time the group of the authors allocated the range of determinants which restrict the developing of e-commerce and information.

Methodology

The research methods are formed by an analysis of the scientific and business literature. The authors use quantitative method. The questionnaire was used to identify the attitude of the research participants towards ythe sphere of electronic business and advantages that it gives to entrepreneurs. Statistical analysis methods were used to process the obtained research data: commonly exploited applications worldwide, usinf of Internet by Ukrainian enterprises, volume of cloud serivises with forecast, leading e-commerce product categories purchased by shoppers in Ukraine, popularity of various sources in the Internet among Ukrainians. Statistical data analysis was carried out using Excel version 2010.

Results

The basic goals of a company transition to the Internet environment may be different. In addition, under the current conditions of rapid development of Internet technologies, the company from the very beginning of its existence can be represented exclusively in the virtual environment. It has become

commonplace, for example, for shops to sell their products without having their own warehouses, using the services of third-party carriers, placing their own storefronts on the Internet, etc. All key processes of a business are performed remotely without binding to the physical locations of goods.

Supported by that development such us invention of mobile phone and internet, caused a faster exchange of information (Amelia, 2014). Internet business is made possible by the development and continuous improvement of search engines. According to the statistics of 2019, Internet browsers have become the second most popular application in the world (Fig. 1). The market of developed countries is in its maturity phase, and the competition among eCommerce players is extremely high and cost-intensive. Marketplaces like Amazon and AliExpress are flourishing, while many stand-alone retailers struggle to find their USP as brand and store loyalty are decreasing and cart abandonment rate in the industry is at 75%. Increasing brand engagement can be achieved through community building (e.g., ASOS Marketplace), loyalty programs, and a seamless mobile and desktop user experience.

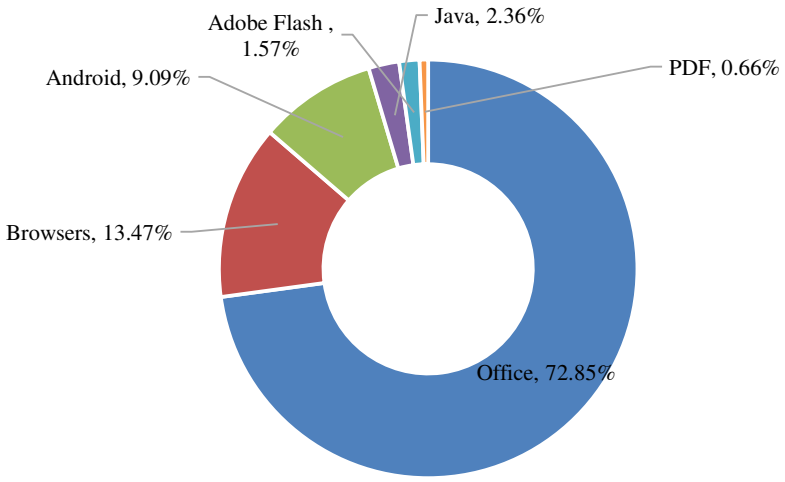

Fig. 1: Most commonly exploited applications worldwide as of 3rd quarter 2019 (formed with the use of (Statista, 2019))

The main goals of organizing an online presence for a company include:

- information support of existing non-electronic business with the purpose of creating another advertising and information channel, facilitating communication with partners, forming a positive image of a company that uses modern technologies. For example, creating a corporate site. This approach is typical for the B2B industrial market;
- organizing the sale of goods and services of an existing non-e-business through the Internet in order to use the Internet for advertising and product marketing (the so-called "new retail" was proposed by the founder of Alibaba Group, Jack Ma in 2016). For example, creating an online website with the possibility of ordering products online (such as Ukrainian Epicenter supermarket chain with their website 27.ua or the bookstore chain "Bookstore E" with the book-ye.com book ordering website. Or other example of the resource f.ua, which grew from a small kiosk to one of the most visited online stores in Ukraine;
- creation of a company that sells products exclusively on the Internet for the purpose of realization in the electronic environment of a complete business cycle of activity. That is, such a business is completely remotely implemented, including payment settlements, dealing with customer reviews and claims, consulting). Nowadays, there are more and more examples of companies entering the market within the framework of such rules of operation. On the Ukrainian market, one of the first online stores was Rozetka. In addition, examples of businesses created for this purpose include the Ukrainian online photobank Depositphotos, which mediates between photo authors and their buyers;

- business with advertising goals when creating an online resource with a segmented audience to further sell its contacts to advertisers. Site contains content of interest to the target audience in order to attract the maximum number of users (for example, if the resource is visited by at least 1 000 unique Internet users) with further search and attract advertisers who are willing to pay for contact with the audience of this site. This method of monetization is typical for many information resources, resources that provide free services, such as Ukrainian online site with publications “Na chasi”, which tells about business and entrepreneurship.

There are examples of companies in Ukraine that have expanded their presence to physical stores from the online model. For example, in contrast to Bookstore E, the bookstore Yakaboo, which started its business with an online store, also opened offline store in 2019.

Quite often e-commerce is identified with e-business, although e-business is the most generic concept. It includes any form of interaction between market actors by means of digital technologies: exchange of inform□tion; conducting m□rk□ting r□s□□rch; □st□blishing cont□cts, for □x□mpl□, b□tw□□n pot□nti□l custom□rs □nd suppli□rs; pr□- and after-sales support, such as providing detailed information on products and services, answering customer qu□ri□s, □tc .; s□l□ of goods □nd s□rvic□s; □l□ctronic p□ym□nt, in p□rticul□r using □l□ctronic p□ym□nt syst□ms; product distribution, including d□liv□ry management and tracking for physical products, direct delivery of products that can be distributed electronic□lly; □bility to org□niz□ virtu□l □nt□rpris□s (□ group of individu□l prof□ssion□ls or □v□n ind□p□nd□nt comp□ni□s for joint busin□ss □ctiviti□s); impl□m□nt□tion of busin□ss proc□ss□s jointly m□n□g□d by comp□ny □nd its tr□ding p□rtn□rs; m□n□g□m□nt of information flows within an enterprise. Online sales are in the sphere of e-commerce, and the customer acquisition and retention process already cover e-business as a whole. It is not enough for a successful sales person to have a website. It also needs to attract the attention of potential consumers. For example, if companysells home appliances online, then collectively it is an e-business, because when a visitor sees it, the first thing that catches his eye is the design of the site and the navigation that helps him find what he needs. The information provided must eliminate any doubt of the site visitor to turn it into a buyer. So far, no cash transactions have been made. It’s not e-commerce yet, it’s e-business. And only after the purchase we say that a company and a consumer have established relationships in the field of e-commerce. Levels of e-economic activity are listed in Fig. 2.

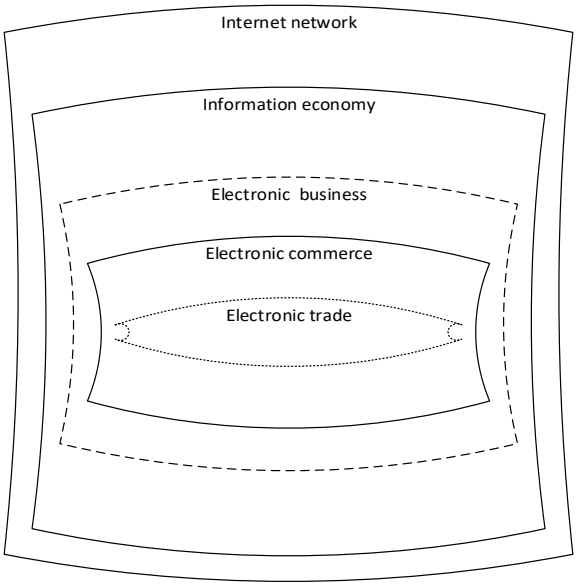

Fig. 2: Constituents of the electronic sphere in their relationship (formed using (Steblina, 2019))

E-commerce changes every year, both in terms of technology and business approach. In particular, multichannel marketing (making the most of all available customer acquisition channels), niche specialization, e-commerce festivals (Double 11 in China, Cyber Monday in the US, etc.) is gaining increasing popularity. The issue of business ethics in conducting economic activity in the electronic environment is of particular relevance today too (Kiss L. B., 2019).

The electronic environment in Ukraine is developing at a slow pace, but domestic entrepreneurs are trying to keep up with the neighboring countries in this field. The first Ukrainian site was launched in 1997 (UAnet, 2020). Currently, the UAnet or Internet segment in Ukrainian is among the 30 most common language segments on the Internet. Websites in Ukrainian make up about 0.2% of the global network (Davidaviciene, 2019). At the same time, among the 25 most popular Ukrainian websites, there are only 4 sites which main language is Ukrainian. Among Ukrainian enterprises that used the Internet, in 2017, the largest number used it for sending and receiving emails (Fig. 3a), and enterprises using social media mostly used social networks (Fig. 3b).

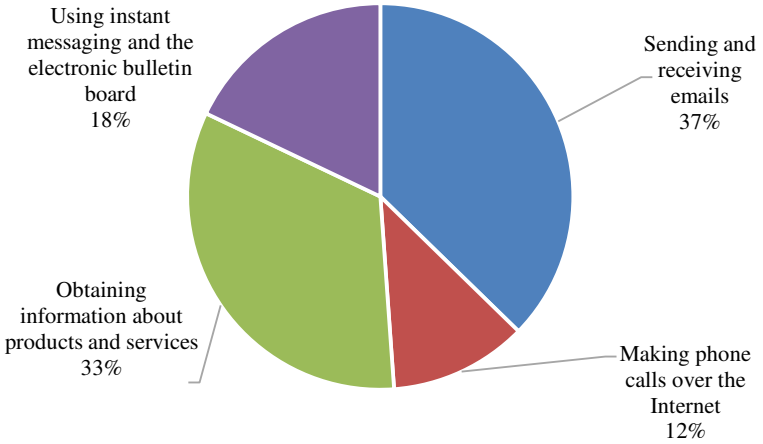

Fig. 3a: Using of the Internet by Ukrainian enterprises in 2017 (developed by using data from (Statistical Yearbook, 2018))

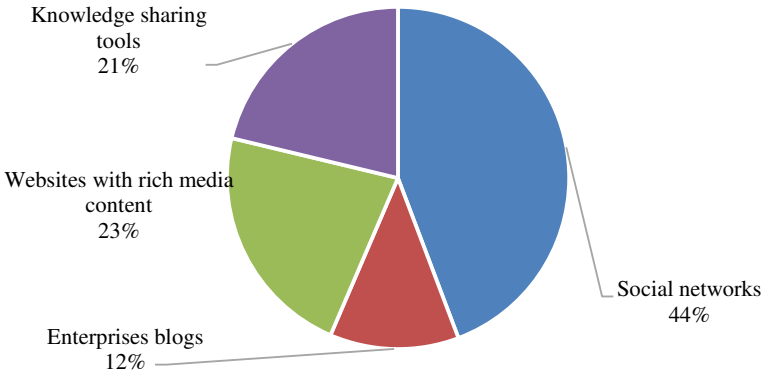

Fig. 3b: Using of social media by Ukrainian companies in 2017 (developed by using data from (Statistical Yearbook, 2018))

Social media becomes an integral part of life that helps reach modern generations of consumers. Results of scientific studies indicate that usage of social networks is effective for the formation of image of employer. This is important because there are clear links between workplace attractiveness, usage of social network and image of an employer (Most popular sites, 2019).

In 2019, trends are changing, including the popularity of cloud services and their use in business processes. According to the data, the volume of the cloud services market is growing rapidly (Fig. 4). So, we can conclude that the Ukrainian Internet has the potential for development, but there are still a lot of steps to be taken to become a leader in the global space of the Internet.

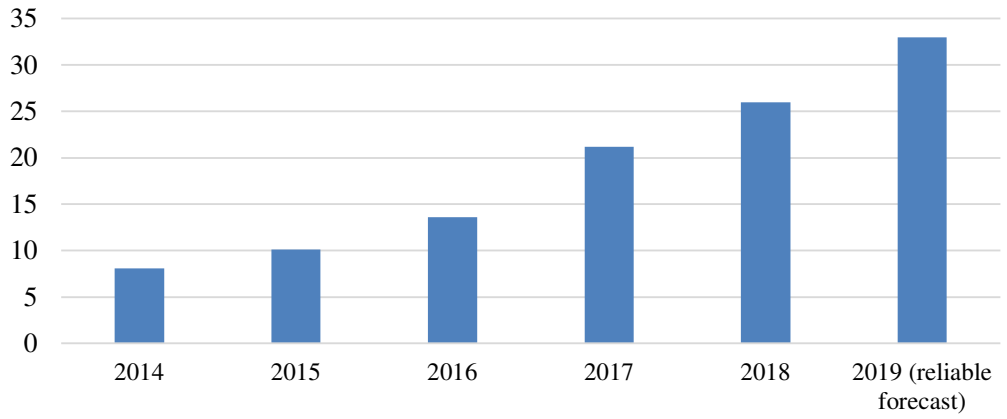

Fig. 4: Volume of the cloud services market in Ukraine, million dollars USA (built using data from (Agieiev, 2019), (Dainovskyi, 2019))

Overall, 2019 proved to be a success for the global internet startup market (according to statistics, among the IT sectors most invested in 2019 were electronic financial services, e-commerce, data analytics and SaaS). The Ukrainian startup Grammarly also stood out, attracting $ 90 million (Ukraine B2C, 2019).

In addition to Grammarly, Ukraine has already implemented a number of successful Internet startups, including:

Preply. Despite the fact that the competition in the educational projects market is high, this online tutor search service, launched in 2013, is developing successfully. Initially, it was intended as a service for learning English, but in the process of trial and error the creators changed its concept several times. It is now an online marketplace where you can find a tutor in 24 languages.

Restream. A streaming service that allows users to stream video content across multiple platforms and social networks (including the most popular video channels such as Facebook, YouTube, Twitch, Mixer, LinkedIn). The main service of it is cloud online broadcasting, which allows the author to broadcast videos to various streaming video sites.

PatentBot. Digital assistant for online trademark registration. This service checks name of a new trademark. If name is free, it helps to draw up necessary documentation. It helps to save up to 80% of the time, as well as paying lawyers.

Na'Vi (full name – Natus Vincere, which translates from Latin as “Born to Win”). Ukrainian multi-game eSports organization. The development of technologies, such as streaming services, gives the opportunity for mass viewing of competitions with greater involvement of sponsors, investments.

Prom.ua. Ukrainian marketplace, on the platform of which entrepreneurs have the opportunity to create online stores and / or place their products in the general catalog, to receive SEO promotion services, to advertise their products within the internal budget of ProSale.

Jooble. A search engine that aggregates job postings from job boards, newspapers, corporate career pages, and recruitment agencies. The search engine starts the site search by entering the city and job title. Filters allow you to sort your ads by city, date, salary, and company name. The ad search algorithm considers hundreds of parameters and selects relevant vacancies for user. By clicking on an ad, user is redirected to a relevant company page where he/she can find employer contacts and submit a resume.

TicketForEvent. An online service that enables event organizer to automate registration and questionnaire of visitors on their website, accept payment from their clients and secure them with electronic tickets / badges. The service is focused on various events by type and scale: exhibitions, conferences, forums, trainings, seminars, cultural and entertainment events.

Hubbub. An online platform that is a social network where people communicate by recording and exchanging short voicemails “bubs”.

Address.ua is a real estate portal. The site contains a complete and reliable database of homes for sale and rent. The ads go through a rigid system of control before posting on this resource.

Ukrainian startups in the field of electronic business are not inferior to European and American and have a chance to succeed and conquer the market, but their distinctive feature is that they are often implemented outside the home country of their developers, due to a number of circumstances. Despite the fact that e-business is thriving industry in Ukraine there is lack of favorable environment, expertise, mentoring, government and business support. Ukraine has strong human resources that understand future needs and what the consumer needs. However, a common problem for domestic startups is that they do not have alternative development options, that is, if a particular startup is not interesting to the audience it is aimed at when entering the market, it is necessary to have alternative ways of using it in advance. That is, most issues arise at the stage of commercialization of startups, which should be noted in the future developments.

A special place in the market of Ukraine is occupied by online stores, which now became popular not only for the purchase of goods, such as electronics, household appliances, clothing, cosmetics, but also food, baby goods, home goods and so on. Market leaders by number of visits include such projects as Rozetka, Allo, Citrus, Comfy, Make UP, Foxtrot, 27.ua, kasta.ua, f.ua, Moyo, Eldorado, Intertop. At the same time, it is natural that projects that place clothes, shoes, cosmetics, jewelry in the catalogs (Bonprix, kasta.ua, Leboutique, Make UP, zolotoyvek.ua) are leading by number of visits. The rapid development of information communication technologies has expanded the possibilities for marketing communication (Sabaitytė, 2019). In order to increase electronic business competitiveness and carry out effective marketing activities, it has therefore become important to acquire knowledge about e-consumers and to identify their preferences in purchase. Most popular categories of goods that were interested and purchased in Ukraine are shown in Fig. 5.

In general, visually buying preferences in Ukraine are similar to a triangle. The triangle shows the trend of increasing purchases in certain categories. According to this approach, if purchases in the fashion category have already reached an important maximum, and for sales growth is not projected, then significant sales growth can be expected in sales of travel services online, goods for children, furniture.In 2019, trends are shifting in favor of the increasing popularity of shopping for atypical categories in Ukranian e-market. For example, the Ukrainian medicines search and delivery service Liki24.com.

In fact, this service is not an online pharmacy. It is like a mediator between drugstore and consumer. Also, every consumer has the opportunity to order the service “I'll take it myself”. This is a good aggregator for finding the right medication.

If in 2018 the Ukrainian e-commerce market grew by 30%, showing the second growth rate in Europe, in 2019, the e-commerce market grew by 17% to UAH 76 billion. At the same time, the size of the average check of one purchase decreased by 7-10%, and the cost of delivery increased and is 5-15% of the cost of goods. However, online commerce shows faster development than regular retail (Educational institutions, 2019).

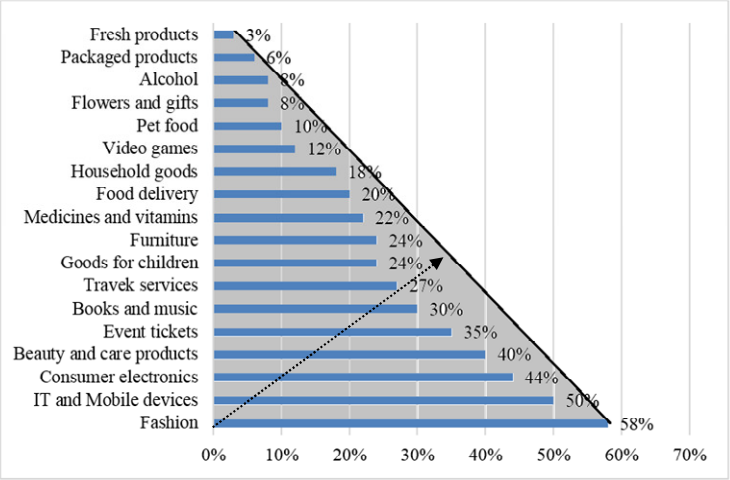

Fig. 5: Triangle of leading e-commerce product categories purchased by shoppers from Ukraine in 2018 (formed using data from (The e-commerce market, 2018)

Note: does not add to 100% due to multiple answers possible

In Ukraine, the Internet provides opportunities for the development of traditionally offline organizations such as, for example, a university. A system of distance learning is becoming more and more popular. Distance learning has already been introduced by such universities in Ukraine as the Ternopil Ivan Puliui National Technical University, Odesa National Academy of Food Technologies, Khmelnytskyi National University, State Fiscal Service University of Ukraine and others (Sumy State University, 2018). Sumy State University e-learning information system is provided by a complex of the software and information environments: automated distance learning system, Examiner open online course platform, blended learning platform, open educational resources, electronic catalog, institutional repository. The system includes online studio providing two-way audio and video communication for lecturer and student, recording and online broadcasting of training videos (Statista, 2019).

Thanks to international electronic trading platforms more and more opportunities for establishing own business for entrepreneurs in Ukraine are opened. This type of activity is especially popular for individuals as purchases in foreign online stores with the subsequent delivery of goods to end consumers. Plenty of sites such as next.co.uk, sportsdirect.com, decathlon.co.uk, hm.com, mountainwarehouse.com, lidl.de, carters.com, amazon.com, 6pm.com, calvinklein.com, zara.com provide favorable conditions for cooperation and periodic promotional offers in the case of wholesale purchases of goods. The popularity of browsing websites for reviewing goods at online stores is one of the main components in the sources used by Ukrainians on the Internet (Fig. 6).

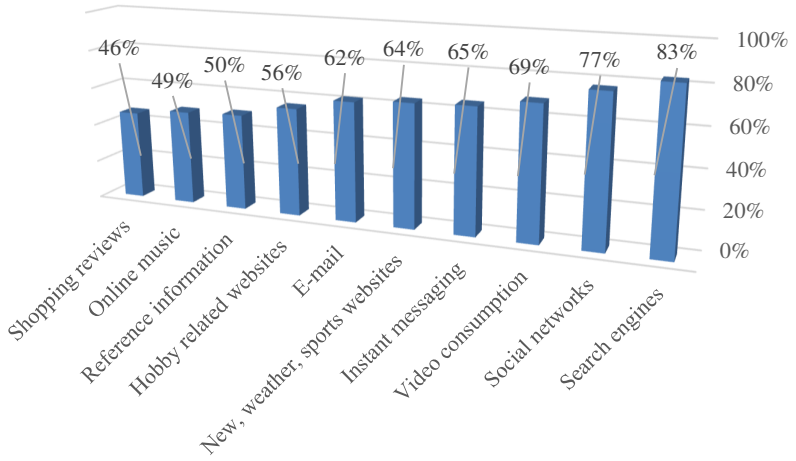

Fig. 6: Popularity of various sources in the Internet among Ukrainians in 2018 (formed using data from (The e-commerce market, 2018)

We can conclude that the worldwide accessibility to the Internet is one of the defining phenomena of the present times reshaping the world as we know it (Kirichenko, 2017).

Conclusions

The evolution of e-business in Ukraine has already passed a number of stages, but is still in a stage of growth. The Ukrainian market is ready for radical innovations in this field. Most Ukrainian companies are "scouting" according to the classification of innovation behavior types by Miles and Snow. They try to follow trends and changes in the market to use them to improve own business.

We understand that internet technology is no longer an extension of the business, it became the main driving force of change. Modern companies operating in various sectors change their way of doing business to take advantage of the power of the internet technologies. We conclude that electronic businesses are built due to a rapid distribution of information. There is also a premise for the continuous change that, by its nature, requires constant improvement and innovation.

With regard to future trends in e-business, an analysis of a number of scientific and practical sources shows that trends in e-business will continue to intensify. Social shopping will grow at a rapid pace. Significant technological and marketing changes are expected in the B2B e-commerce sector. Consumer electronic personalization will be a common thing. In terms of radical innovation, innovations in mobile sales will be a real revolution. Voice commercialization will become a common utility.

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Internationalisation and Competing – Evidence from The Polish Road Freight Market

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Abstract

Globalization influences the development of enterprises, regions and national economies. It also affects transportation markets. The air and maritime transport enable and accelerate the development of trade on a global scale. In EU, road transport plays a significant role in international trade and is responsible for ¾ of transported goods. The competition between European road carriers is strong. Polish enterprises are an important element of that process. It should be noted that the road freight transport is dominated by SME sector. In Poland, the structure is similar (although the majority are micro and small enterprises). The possibility of servicing on foreign markets, the necessity to compete with foreign competitors, the opportunity to develop intellectual resources may improve carrier's competing abilities. The purpose of that article is to indicate the role of internationalisation in competitiveness in road transport companies, to reveal the change in the perception of that role and to test if employment level has influence on perception of the role of internationalisation in shaping competitiveness of road carriers. The study was conducted in 2013 and in 2019. The respondents evaluated 6 factors that determine the internationalization process of Polish road carriers. In statistical analysis, measures of location and variability were used. To test the significance of differences between the groups (one from 2013 and the second from 2019), the Mann Whitney's U test was used. Research results prove that internationalization is important in shaping competitiveness of road carriers. Moreover, time and size of employment had an influence on research results.

Keywords: Freight Transport Market, Competitiveness, Internationalisation, SME.

Introduction

Global changes have been taking place in both spheres of production and consumption. This evolution is based on socioeconomic changes. The complementary nature of transport, whose main task is to serve the needs of the economy, determines the significant relationships between them. Development of the global economy strengthens the role of transport as an instrument used for boosting trade (Janelle and Beuthe 1997).

Internationalisation is a less advanced globalisation process. In a discussion on defining the concepts and interrelations between them (Scholte, 2002), both processes have a positive effect on economic growth. Internationalisation of technology and the development of international trade are very important elements of globalisation (Marginean, 2015; Cieślik et al., 2019; Szczepaniak, 2019). They are boosted by processes of liberalisation and economic integration. These are factors that have a considerable impact on the development of international transport services (Hertz, 1992).

Marine and air transport provide significant support to globalisation processes and trade transactions on a global scale (Rodrigue, 2007). The needs of trade in EU countries are served mainly by road freight and, to a lesser extent, by rail freight. The domination of road freight companies is determined by its competitive advantages compared to other transport branches (rail or inland waterway transport). This competitive edge can be regarded from several perspectives: technical and technological innovations, human capital or the organisation structure and management methods (see: Wang et al., 2011; Zygmunt, 2019; Świadek et al., 2019; Jakimowicz and Rzeczkowski, 2019a, 2019b; Mačerinskienė and Survilaitė, 2019).

The importance of road freight in serving transport needs in the EU makes it the main branch of transport. However, the conditions of orders acquisitions can be regarded as demanding. One of the causes is the road freight sector fragmentation in most EU countries. The decisive factor in effective competition of entities is the ability to find competition instruments in different segments of the service market, i.e. in serving the following needs (Rucińska, 2015): the native country logistics with the competition of resident carriers, domestic logistics in competition with foreign entities, foreign trade of domestic manufacturers with resident carriers, foreign trade with foreign competitors, regarding freight in foreign markets (including cabotage).

Road carriers participate in international competition processes in the domestic and foreign markets. The export of services is regarded as an opportunity for developing competitive potential (see Smallbone et al. 1998; Thrassou and Vrontis 2008). It also confirms the internationalisation of activities. It seems significant to determine the importance of internationalisation in developing the competitiveness of road carriers, which determines the objective of this study. The internationalisation process is determined by six factors (variables) referring to the market environment in which Polish road carriers operate. However, they reflect the conditions in which carriers from the Visegrád Group countries and the countries along the eastern border of the EU operate. These factors were evaluated by respondents. The study was conducted using two independent study samples in 2013 and 2019. A comparative analysis was performed whose aim was to show the change in perception of the importance of internationalisation in the development of competitiveness.

Literature Review

The main attributes of competitiveness of transport services include contents of service, time of transport, reliability, capabilities and availabilities (Žvirblis, 2003). Specific features of road freight have shaped the freight structure in the EU. The advantages of road freight in the competition between forms of movements on roads include high flexibility, service availability, door-to-door direct delivery, a relatively short time to taking up the order and completing its execution. In air, marine or rail transport, it is necessary to use road freight as a link between the employer, forwarder, cargo administrator, and the principal transport operator (rail, air, marine carrier). It is a feature of road freight that it does not need to use other branches. It enables reducing the time of delivery and helps to maintain the cargo safety (without the need for extra handling). These elements confirm the high competitiveness of road freight in the inter-branch competition.

Competitors include entities with various amounts and quality of material, financial, and human resources. Most of transport companies in Europe are SMEs. Different from large multinational enterprises, they need to create and sustain competitive advantage (Ho et al. 2016). The qualified and skilled staff is one of the most important factors in international development in small companies (Nemkova et al., 2012). Competitiveness of hauliers is an effect mainly of advertisements and promotion (creating the image of a socially responsible entrepreneur, who cares about the environment and provides high-quality services). Development of the service offer, taking into account the current needs of customers, developing customised and niche services, preferably with added value (Mallard and Glaister, 2008).

The share of road freight in cargo freight in the first decade of the 20th century was stable and amounted to approx. 70% (COM (2014) 222). This trend is not changing despite attempts at reducing road transports role to in-and-out transport. These actions are caused by the need to prevent degradation of the environment and global warming. At the level of the EU transport polity, several solutions are being implemented that favour ecologisation and decarbonisation of transport, mainly road freight (see: Jänicke et al. 1993; Jacyna et al. 2014; COM (2011) 144).

Liberalisation and development of international trade and access to new markets as a result of economic integration increases the demand for transport services. At the same time, they set different conditions of competing for orders for cargo freight. These conditions should be regarded as

demanding in the case of road freight companies. Participants in the competitive struggle include domestic and foreign entities with different levels of human and capital resources. SMEs have to face great challenges in increasing global competition. Their weakness, often lack of sufficient resources and capabilities, makes their internationalisation process more challenging (Genc, et al., 2019). The differentiation of needs, increasing expectations regarding the service quality, competition from global logistics operators - all of this necessitates some changes in the existing market strategies (Haung et al. 2019).

Internationalisation in transport activities can be regarded from a dual perspective. Studies analyse both the sources (factors) and the process of internationalisation (Fletcher, 2001). Internationalisation of companies, including small and family enterprises, can also be considered from the perspectives of (Lin, 2012):

1. pace – determined as time needed to achieve a set goal,

2. scope – the geographic area of activities; it shows the number of countries where the activities are conducted,

3. rhythm – defined as the process regularity or the time during which new branches (companies) are established.

Operating in foreign markets confirms active internationalisation – foreign expansion (Gorynia, 2000). Competing with foreign entities in the domestic market is referred to as passive internationalisation – without service provision in foreign markets. One of the forms of internationalisation of transport companies can be domestically-located service exports (providing transport services domestically on orders from foreign customers) (Andersen et al., 2000).

Economic integration was undoubtedly an impulse in the development of transport companies in the EU. Langesth et al. (2016) identified the technological factors which enabled quicker, more effective transport between trade partners. In the context of the EU law, a road freight company can be regarded as international when it conducts economic activities in international cargo transport (Dz.U.2019.0.2140). An entrepreneur is obliged to obtain a licence so that it can provide services in international markets, including in third-country markets. Offering services in foreign and global markets (outside the domestic market) is a manifestation of business internationalisation. According to Kandasaami (1998), an enterprise can be regarded as international when it operates in the global market from the start, without operating previously in the domestic market.

The freight structure in EU countries is dominated by road freight, which meets approx. 75% of the transport needs. Regardless of what kind of measure is adopted (cargo tonnage, tonne-kilometres), the freight carried by Polish road carriers makes them important actors in the EU market (see Fig. 1). Together with operators from Germany, France and Spain, they are responsible for nearly half of the freight transport.

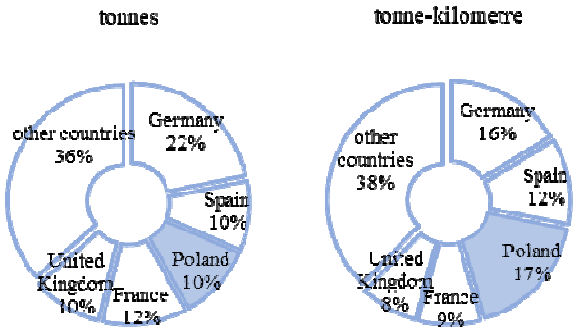

Fig. 1: Structure of road transport of goods in the EU in 2017

Source: the author's calculations based on EUROSTAT data (https://ec.europa.eu).

The majority of road carriers in Poland are SMEs, employing under 250 people. The sector structure in the EU is similar (European Commission 2014). Moreover, micro- (up to 9 employees) and small (up to 25 employees) enterprises account for approx. 80% of the sector in Poland. Some of them are family enterprises. As in other sectors of the economy, they have limited human and financial resources at their disposal (Laufs and Schwens, 2014). The considerable share of Polish carriers in the EU transport market is proof of their effective competition in foreign markets, cross-trade services (cargo is transported between two countries by an independent carrier), cabotage (transport between two places in one country by vehicles registered in a different country) and serving the intra-community trade.

To compete for orders in international markets, company management has to be aware of the needs of potential customers and effective competition instruments. Polish carriers seem to meet those criteria. The service prices seem to be one of the major criteria in the competition. It is noteworthy that the growing cost of transport activities in EU countries did not worsen their competitive position considerably. One can cautiously assume that their well-established position is also a consequence of quality-oriented competitive factors.

Research Questions

The aim of this study is to identify the factors that affect the competitive position of road freight enterprises in international activities. An attempt was made to answer the following questions:

1. Does the internationalisation affect the competitiveness of road carriers?

2. Does the perception of the role of internationalisation in shaping road carrier's competitiveness change?

3. Does the employment level influence the perception of the role of the internationalisation in competing?

Research Design and Methodology

Internationalisation provides opportunities for creating and developing private labels, especially by access to new (intellectual, material, etc.) resources, information (conditions and instruments of competition) and knowledge on how foreign markets operate. The service provided in international trade is an important element of transport internationalisation in the context of entering new markets

on orders from domestic customers or executing orders from foreign enterprises which can trade with distant countries.

The analysis of internationalisation of transport activities took into account six factors (variables). They were determined on a basis of literature and preliminary interviews with entrepreneurs. They included: a) competition in the domestic market, b) competition in foreign markets, c) activities of big international companies, d) benchmarking, e) cabotage markets, f) personnel quality (qualifications and education). It seems that these are the areas in which road carriers should follow cautious strategies. It is beyond doubt that conducting international activities allows acquiring and developing intellectual capital, which applies especially to senior staff. Therefore, it can bring tangible commercial effects.

The internationalisation factors were evaluated by respondents. A 6-grade scale was used to evaluate their importance in affecting the competitiveness of road carriers (1 – completely unimportant; 6 – of great importance). The factors that were given $\bar{x} \geq 4.00$ were regarded as those of considerable importance to competitiveness. The statistical analysis used measures of position and variation. The significance of differences between groups was checked by the U Mann Whitney non-parametric test, as not all the variables met the criterion of matching the normal distribution and because they did not meet the criterion of the equinumerosity of comparable groups (Ključnikov et al., 2019).

The study was conducted in two stages (in two independent test samples). The first study stage was performed in 2013 (the first study sample). The data were acquired by an interview with a survey questionnaire using telephone and personal interviews conducted by the author. The study was conducted on a sample of 134 road carriers in the Voivodship of Warmia and Mazury, Poland. Owners or managers of the companies were the respondents. The second study stage was performed in 2019 (the second study sample). The study employed an electronic questionnaire prepared using Google's Form tool. The survey was sent to the owners, managers or to staff members responsible for transport in transport companies. Not all of the respondents were able to use this tool. The problems reported included difficulty accessing the questionnaire and answering the questions. Part of the questionnaires were completed with the author's support. Ultimately, 73 properly completed forms were obtained.

The respondents are entities registered in the Voivodship of Warmia and Mazury, Poland, which operated in international markets and represented the SME sector. The study samples reflect the entity-based structure of the road freight sector in Poland. The entities employed up to 25 people. In 2013, approx. 70% of respondents represented the micro-enterprise sector, with up to nine employees per enterprise. There were 56% of the enterprises representing this sector in the study sample in 2019, while 44% of the enterprises employed 10-25 people.

Research Results

The factor with the highest score in terms of its importance to the competitiveness of road freight companies was personnel quality (see fig. 2). The qualifications, education and skills of the personnel affected the development of the competition potential of enterprises in international markets. Access to (and operating in) cabotage markets was also regarded as an important element in competitiveness development. The personnel quality and cabotage markets received the highest score in both of the analysis periods, i.e. in 2013 and 2019.

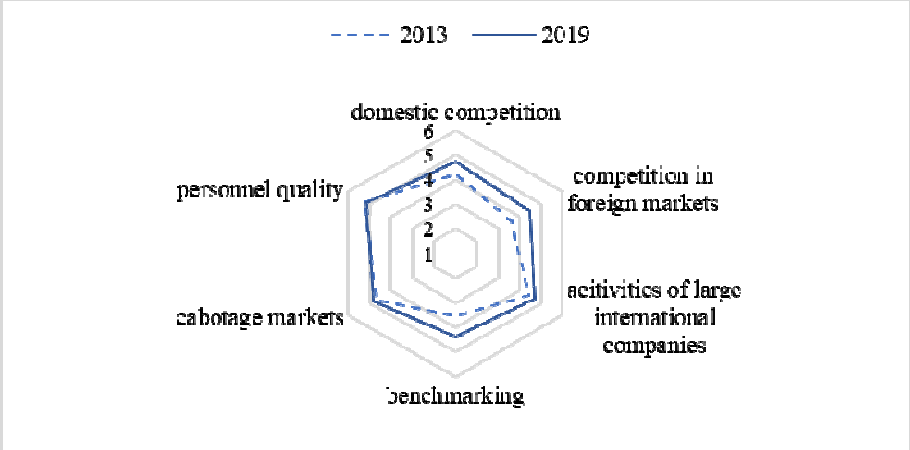

Fig. 2: Mean scores for the competitiveness factors in 2013 and 2019

Source: based on the findings of the author's studies.

Table 1 shows descriptive statistics for the competitiveness factors in individual years. The shaded fields show the factors which – in the respondents' opinion – affected the possibility of competing for orders. Competition in foreign markets (61% of grades below 4) and benchmarking (42% of grades below 4) were ranked as not affecting competitiveness in the first study sample. Their importance grew in the respondents' opinions in the second study sample (2019). It is noteworthy that all the proposed factors were regarded as important for competitiveness in the second analysis period.

Table 1: Descriptive statistics

Variable	Mean ($\bar{x}$)	Median (Me)	Variance	Standard deviation (SD)	Minimum	Maximum	Range (R)	Coefficient of variation (V) (%)
2013 (n=134, 95% of the confidence interval for the mean)								
Domestic competition	4.24	5	0.995	0.998	2	6	4	20
Competition in foreign markets	3.61	3	1.472	1.213	1	6	5	40
Activities of large international companies	4.40	4	0.784	0.885	3	6	3	22
Benchmarking	3.55	4	0.851	0.922	2	5	3	23
Cabotage markets	4.72	5	0.987	0.993	3	6	3	20
Personnel quality	5.22	6	1.168	1.081	3	6	3	18
2019 (n=73, 95% of the confidence interval for the mean)								
Domestic competition	4.73	5	0.785	0.886	3	6	3	18
Competition in foreign markets	4.45	5	1.890	1.375	1	6	5	27
Activities of large international companies	4.70	5	1.130	1.063	1	6	5	21
Benchmarking	4.36	5	1.038	1.019	2	6	4	20
Cabotage markets	4.82	5	1.037	1.018	2	6	4	20
Personnel quality	5.14	5	0.713	0.855	2	6	4	17

Source: based on the findings of the author's studies.

The descriptive statistics revealed the non-homogeneity of the study samples. The competition processes in foreign markets resulted in the highest score variation (V=40%, R=5) in the first sample. A similar situation was observed in the second group (V=27%, R=5). With a high score variability, this factor was regarded as important in competing by the majority of the respondents (73% gave scores of 4 and more). The highest consistency was observed in the respondents' scores given for the personnel quality both in 2013 (V=18%, R=3) and in 2019 (V=17%, R=4).

An analysis of assessment of factors affecting the competitiveness was performed with the U Mann Whitney test. This analysis revealed groups of homogeneous and non-homogeneous scores based on the central tendency measure (median – Me). The zero hypothesis was formulated (H_0), according to which the grouping variable (study year) did not affect the internationalisation factors assessment, and an alternative one (H_1), according to which the grouping variable (study year) affects the internationalisation factors assessment, at the assumed level of significance of α=0.05. Due to the positive verification of H_0 it was possible to regard the groups as homogeneous. Its rejection was tantamount to adopting H_1, which confirmed the effect of the grouping variable on an assessment of the internationalisation factors (statistically significant differences in scores). Table 2 presents the test results.

Table 2: Results of the U Mann-Whitney test analysis (grouping variable: study year)

Variable	U Mann-Whitney test	W Wilcoxon test	Z	Asymptotic (two-sided) significance
Domestic competition	3708.000	12753.000	-3.080	.002
Competition in foreign markets	3138.000	12183.000	-4.459	.000
Activities of large international companies	3963.000	13008.000	-2.371	.018
Benchmarking	2768.000	11813.000	-5.394	.000
Cabotage markets	4587.000	13632.000	-.769	.442
Personnel quality	4228.000	6929.000	-1.752	.080

Source: based on the findings of the author's studies.

Domestic competition received significantly higher scores from the second respondent group (2019). Similarly, the conditions of competition in foreign markets, activities of large international companies and benchmarking were regarded as more important for competitiveness in 2019 compared to the scores given by the respondents in 2013. These factors determined a significant difference in scores given to the factors affecting competitiveness, which shows that the H_0 hypothesis must be rejected and the alternative hypothesis H_1 accepted. It is noteworthy that the rank of competing in foreign markets changed. This factor was not a significant factor affecting competitiveness in the first study group (Me=3 in 2013). It was regarded as an important element in competing for customers' orders in the second sample (Me=5 in 2019.

Cabotage markets and personnel quality determined groups of homogeneous scores. The H_0 indicates that there are no significant differences in perceiving these factors as affecting competitiveness – they were equally important regardless of the study year. Importantly, cabotage and personnel quality also received the highest scores in both study samples (in 2013 and 2019).

The statistical analysis was expanded, taking into account the employment level. It was an attempt at determining whether scores given by respondents employing the same number of people differ statistically during the two periods of analysis (2013 and 2019). The test results are presented in Table 3.

Table 3: Results of the U Mann-Whitney test taking into account the employment level (grouping variable: study year)

Variables	U Mann-Whitney test	W Wilcoxon test	Z	Asymptotic (two-sided) significance
Employment level **1-9** people				
Domestic competition	384.000	735.000	-2.038	.042
Competition in foreign markets	410.000	761.000	-1.641	.101
Activities of big international companies	451.000	802.000	-1.099	.272
Benchmarking	308.000	659.000	-3.039	.002
Cabotage markets	493.000	844.000	-.534	.593
Personnel quality	409.000	1270.000	-1.756	.079
Employment level **10-25** people				
Domestic competition	1282.000	7168.000	-2.383	.017
Competition in foreign markets	932.000	6818.000	-4.167	.000
Activities of big international companies	1299.000	7185.000	-2.259	.024
Benchmarking	936.000	6822.000	-4.108	.000
Cabotage markets	1614.000	7500.000	-.592	.554
Personnel quality	1464.000	1992.000	-1.420	.156

Source: based on the findings of the author's studies.

Groups of micro-enterprises (employing up to 10 people) can be regarded as homogeneous in perceiving the importance of the competitiveness factors. The H_0 should be accepted, according to which there are no significant differences in perceiving these factors – the study year did not have a significant impact on the scores given for these factors. Benchmarking was an exception and it was not a significant factor affecting competitiveness in 2013. According to the respondents in 2019, this factor increases the market attractiveness of the enterprises.

The respondents employing 10-25 people (small enterprises) should be characterised as non-homogeneous groups. The competition processes in the domestic market, competition in foreign markets, activities of large international companies and benchmarking formed groups of significantly different scores (H_0 was rejected and H_1 accepted). Significantly higher importance of these factors was observed in the study conducted in 2019. Scores for cabotage markets and personnel quality confirmed the group homogeneity. H_0 was accepted – the study year did not change the perception of their importance in affecting competitiveness.

Conclusions and Discussion

In the respondents' opinion, internationalisation affects the competitiveness. This was confirmed by the mean scores for the factors under analysis ($\bar{x}$=4.29 in 2013, $\bar{x}$ =4.70 in 2019). Most of factors are regarded as important in shaping competitiveness. The study year affected the perception of the importance of internationalisation. In second sample (2019), internationalisation is ranked at higher level which means its growing significance in international competing. The increase in the demand for road freight and the geographical expansion, resulting from the international trade development observed during the period between 2013 and 2019, was probably the source of these changes. Benchmarking was a factor whose increase in significance should be regarded as desirable. It was not significant as a factor affecting the competitive potential development in the first study sample (2013). On the other hand, according to 82% of the respondents in 2019, the possibility of copying operation strategies of large transport operators can have tangible effects on the activities of Polish enterprises.

The employment structure in the respondent enterprises provides information on their diversity. No significant differences were observed in the way different factors were perceived in the group of micro-enterprises. Benchmarking was an exception, which is a desirable trend. Most factors were regarded as significantly more important in affecting competitiveness in the group of small enterprises (employing 10-25 people) (i.e. domestic and foreign competition, activities of large international companies and benchmarking). The importance of cabotage markets and the personnel quality seems interesting against this context. These factors were equally important as factors affecting competitiveness.

In conclusion, one can say that smaller groups of enterprises are less diverse in terms of their answers, as opposed to those with a larger number of employees. There is a question of whether those opinions would be even more diverse in enterprises employing more than 25 people. This indicates the need for studies on the effect of internationalisation on the competitiveness of road carriers. Larger enterprises have better resources and – usually – a larger potential for competitiveness, although the response structure might be different than in the current study.

Internationalisation should be regarded as a development opportunity. It is an obvious threat to Polish road carriers (SME sector, with small capital) that they have to compete against larger entities in the domestic market and abroad. It is important that the respondents are aware of increasing internationalisation of transport activities and, in consequence, of the need to adapt to the market requirements. The study results have shown that the importance of competition in foreign markets is growing. It is probably caused by an increase in the costs of transport activities in Poland, increasing costs of access to roads in the EU and the growth of competitors from such countries as Lithuania and countries of the Visegrád Group. They can decrease the price-related competitiveness of Polish carriers and accelerate the development of quality-related competition factors. Equally importantly, there are changes in the legal environment concerning transport activities observed in foreign markets (German and French, among others). These changes are referred to as the new mobility package. One of the main reservations raised with respect to the package, which affects the competitiveness of carriers from Central and Eastern Europe, is an increase in the operating costs (the minimum wage in a country, the need to provide hotel accommodation for a driver after a 6-day work week, etc.) They are regarded as detrimental to free competition and are an instrument of protection of resident carriers. The need to adapt to the changes in the way transport activities are conducted in international markets is the basis for further functioning in foreign markets. These changes have their source in internationalisation of transport activities.

Study limitations

The ability to compete and development opportunities for road carriers depends on such factors as the level of internationalisation of their activities and income diversification. These, in turn, depend on the enterprise size. Taking larger enterprises into consideration in the study will provide important information. The entity-related structure of the respondents is similar to the sector structure in Poland. Moreover, the study was conducted in one of the poorest voivodships of Poland and one of the poorer regions of the EU, which prevents generalisation of the results. It would also be valuable to expand the study scope geographically. A change in the study area could be important with respect to a change of the enterprise structure. In voivodships with better linear (with priority axes of the TEN-T network) and point infrastructure (large warehouse areas, container terminals, including bimodal ones). All these limitations will be taken into consideration in the future (extending the research area and including larger entities).

The study results provide a platform for considerations on the importance of internationalisation and globalisation processes on transport markets. They should be continued in an interdisciplinary setting (including the legal environment). It is also noteworthy that studies of the road freight service supply are less developed than those concerning demand (which usually take into account the expectations, needs and satisfaction of customers).

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Human Resources Management Practices and Future Plans of Ukrainian Employees Working in Poland: Empirical Study

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Abstract

Purpose: The aim of the study is to investigate the association between human resource management practices and future plans of Ukrainian employees working in Poland. **Design/methodology/approach:** This paper applies a quantitative methodology. The study is based on questionnaires conducted in Ukraine and filled in by 441 people who had worked and continue work in Poland. **Findings:** The results demonstrate that there is a significant relationship between HRM practices, especially in the area of training and development as well as compensation and rewards, applied in the case of employees from Ukraine, and their future plans. **Practical implications:** The findings of this study should be beneficial for HRM specialists and managers in Poland who hire employees from Ukraine and would like to retain them longer, as they confirm the importance of certain practices and facilitate their efficient selection. **Originality/value**: This research is valuable in terms of recognising the relationship between the application of certain human resources management practices in Polish enterprises and the fact whether employees from Ukraine intend to stay for a longer period of time or permanently, as it pertains to the employment in Poland.

Keywords: Human Resources Management Practices, Ukrainian Employees, Poland, Migration, Future Plans

Introduction

The issue of labour migration has been the topic of many discussions for years now, also between academics. The reason is that it now a common aspect of labour markets all over the world. In Poland, this situation is rather quite specific, as Poles travelling to other countries (especially Great Britain and Germany) in search of work since the accession of Poland to the European Union has been rather commonplace, but foreigners started coming to Poland for the same reason relatively recently. Ukrainians represent the most numerous groups, which offers significant support for the Polish labour market. Currently, there are 665,600 employees from Ukraine who work legally and pay social insurance contributions (Błaszczak 2020), and if we also take into consideration those who work in Poland illegally, the number increases to over 2 million (ZPP, ISBNews 2018). Employees from Ukraine are not only extremely valuable for Polish organisations for economic reasons, but they also have a significant capacity for assimilation due to the similarity of cultures (Gadomska-Lila, Moskalenko, 2019), way of thinking and language. However, incentives offered by other countries, especially Germany, the Czech Republic or Hungary, which provide legal and administrative tools as well as attractive employment and working conditions, encourage some Ukrainians to leave Poland. It is estimated that 60% of employees from Ukraine are considering work in another country, particularly Germany (EWL 2018). Moreover, a better social and economic situation of Ukraine and forecasted increase of real earnings encourage some of them to think about coming back to their home country. Therefore, the outflow of Ukrainians from the Polish labour market has become an actual risk, which may be a source of numerous problems for many employers, and slow down the Polish economy in the long term. For this reason, there is a need for incentive actions addressed to this particular group of employees to retain them in Poland longer or permanently. Many actions

which could potentially increase the attractiveness of Poland as a country for Ukrainians to work and live in require an intervention at the central level – simplifying and shortening the application procedures connected with obtaining residence and employment permits, creating a migration policy which would be consistent with social policy, health protection and education, etc. However, some of the actions encouraging to take up employment in Poland may be introduced by employers. Human resources management practices may prove critical. It is necessary to ask whether there are any dependencies between human resources management practices employed by Polish enterprises towards employees from Ukraine and their future career plans. In order to answer this question, the Authors conducted quantitative research among Ukrainians who worked/work in Poland. The results offer some contribution to the understanding of the relations between human resources management practices of Polish enterprises employing Ukrainians and their plans as to their future stay and work in Poland.

Theoretical Framework

Migration of Employees from Ukraine

Dynamic globalisation and integration processes result in barriers being removed from labour markets and migrations becoming commonplace. There are many reasons for this situation – educational, religious or political (Kawczyńska-Butrym, 2009), nonetheless economic reasons remain crucial (Kuciński, 2004). People migrate in search or better conditions of life, but also looking for security and shelter from military conflicts, persecution or natural disasters (Walaszak, 2003). People emigrating from Ukraine have similar reasons. Low salaries, massive corruption and the conflict with Russia force more and more Ukrainians to emigrate (Malynovska, 2018). Estimates of the total number of Ukrainian labour migrants simultaneously working abroad would probably amount to 3 million (Libanova, 2019). Ukraine is indeed one of the biggest donors of cheap labor for the EU and Russia (Molodikova, Yudina, 2016). The major recipient countries of Ukrainian labour force are the Russian Federation (43.2%), Poland (14.3%), Italy (13.2%) and the Czech Republic (12.9%) (Drbohlav, Jaroszewicz, 2016). Historically, one of the first destinations attracting part of the broader migration outflow from Ukraine in the mid-1990s towards West-European countries was Greece (Nikolova, 2013). Flows of labour migration are also directed to Hungary (Çağlar, Gereöffy, 2008), Portugal (Fonseca, Pereira, 2016) or Spain (Stanek, Hosnedlová, Brey, 2016). Recently, Poland has become the most popular destination for Ukrainians, who choose it primarily for economic reasons (Koshulko, 2016); however, it should be stressed that non-economic factors have gained more importance in recent years, especially for the youngest generation (Rovenchak, 2012; Blyznyuk, 2017). Economic migration of Ukrainians is very profitable for the Polish economy. Changes in the Polish labour market – decreasing working-age population, reduced retirement age, low unemployment rate and dynamic development of enterprises actively searching for employees, cause Ukrainians to be perceived as a valuable asset for Polish enterprises. Geographical and cultural proximity of both countries and the perception of Poland as a geographically, politically and socially attractive country are also conducive to this situation. Employing Ukrainians allows for the gap in labour supply to be filled in and ensures continuity of economic activity. Thus, employers are faced with the challenge of creating new solutions to acquire and retain employees from Ukraine, especially, since migration legislation and entry procedures are becoming more liberal in other European countries, which only adds to the competition in terms of attracting this group of employees. The German market seems to be posing a particular threat, as it became more open to economic immigrants from outside the European Union. Thus, employers should become active participants in the "fight" for this group of employees and initiate actions and implement HRM practices encouraging them to work in Poland in the long term or even stay permanently.

Importance of HRM Practices

Human resources practices exert a significant impact on results of organisations (Becker, Gerhart, 1996) as well as the conduct and attitudes of employees (Choudhury, Mishra, 2010). They establish and maintain organisational efficiency (Enz, Sigaw, 2000) and are of utmost importance in terms of attracting employees and retaining them in the organisation, and then developing their knowledge and skills (Choudhury, Mishra, 2010). Practices related to remuneration, trainings, employee participation or flexitime motivate employees to use their knowledge, skills and talents for the benefit of the

organisation (Evans, Davis, 2005). It increases job satisfaction, performance and decreases employee rotation, which, in turn, improves the results of the enterprise (Delery, Shaw, 2001). These dependencies were confirmed empirically in terms of job satisfaction and engagement (Alzyoud, 2018; Gong, Law, Chang, Xin, 2009), civil behaviour (Sun, Aryee, Law, 2007) or quitting work (Nam, Lee, 2017). Choosing the HRM practice becomes especially significant in developing countries (Miah, Bird, 2007) due to specific characteristics of the political, economic, social and cultural environment (Napier, Vu, 1998; Budhwar, Sparrow, 2002). Therefore, the choice of HRM practices made by Polish enterprises employing foreigners, including Ukrainians, is crucial, as they may be an effective solution for retaining them longer.

The article allows for deeper understanding of how HRM practices are used in Polish organisations with employees from Ukraine. It tests the relationship between HRM practices and future plans of this group of employees. This study presents implications based on significant dependencies between certain HRM practices and decisions of Ukrainians regarding their future professional careers and staying in Poland longer or permanently. The main hypothesis, verified in the course of the empirical research, assumed that HRM practices are positively related to future plans of Ukrainian employees.

Method of Study

Research Sample

Human resources management practices, attitudes and behaviours, future plans as well as values and barriers are the subject of the research project focused on Ukrainian employees, conducted by the Authors from February to December 2018. It consists of two parts – the quantitative research carried out in Ukraine among people who worked and continue to work in Poland, and the qualitative research carried out in Poland among employers and other entities involved in actions pertaining to the employment of Ukrainians, e.g. employment agencies, labour offices, trade unions, e.g. the Association of Ukrainians in Poland. The article presents the results of the quantitative research carried out in Ukraine with the PAPI method (Paper and Pencil Interview). A total of 441 respondents were surveyed. The majority were male, aged 25-34, with higher education, working in Poland for approximately 2 years, primarily as unskilled or semi-skilled manual workers in various industries, mostly in construction or catering. The detailed parameters of the research sample are presented in Table 1.

Table 1: Characteristics of the research sample

Sex					
Male			Female		
222 (51%)			219 (49%)		
Age					
Up to 25	25-34	35-44	45-54	55 and over	
118 (27%)	181 (41%)	107 (24%)	32 (7%)	3 (1%)	
Working period in Poland					
Up to 1 year	Over 1 year	Over 2 years	Over 3 years	Over 4 years	5 and over
12 (3%)	153 (35%)	127 (29%)	60 (14%)	51 (11%)	38 (8%)
Type of work performed in Poland					
Manager of one or more subordinates (non-managers)	Vocationally trained craftsperson, technician, IT-specialist, nurse, artist or	Unskilled or semi-skilled manual worker	Academically trained professional or equivalent (but not a manager of people)	Generally trained office worker or secretary	Manager of one or more managers

	equivalent				
13 (3%)	86 (20%)	217 (49%)	71 (16%)	32 (7%)	22 (5%)

Industry						
House-building	House-keeping	Agriculture	Gastronomy	Logistics	IT	Inne
85 (19%)	26 (6%)	53 (12%)	65 (15%)	39 (8%)	21 (5%)	152 (35%)

Source: Own study.

Research Instruments

The quantitative research was carried out with the use of a questionnaire, prepared by the Authors of this project. The questionnaire consisted in five sections: 1. Human resources management practices, 2. Attitudes and behaviours, 3. Future plans, 4. Values, and 5. Respondents' particulars. With respect to HR, the respondents were asked to provide their opinion on statements describing certain practices and evaluate them on the five-point Likert scale, where 1 means "no" and 5 means "yes". An identical scale was used for future plans. However, in the case of attitudes and behaviours, 1 meant "very low" and 5 – "very high". The values had the scale from 1 **"**of very little or no importance" to 5 – "of utmost importance". The measures were developed for the purpose of this research. They were analysed in terms of reliability with the Cronbach's α, whose value above 0.7 confirmed the reliability recommended for exploratory research projects (Templeton, Lewis & Snyder, 2002).

Results Presentation

In order to verify the research hypotheses, we conducted statistical inference based on the regressions analysis. Stepwise regression was used as the basis for selecting key variables for the model. Then, we constructed three independent regression models. The analyses we conducted are presented in Table 2.

Table 2: Regression analysis summary

	Intention to have a professional career in Poland (N=441)	Intention to stay in Poland longer (at least a few years) (N=441)	Intention to stay in Poland permanently (N=441)
financing education, including foreign language courses	0.287 (0.046)		
offers of work creating the possibility of learning and personal development	0.494 (0.021)		
clearly defined work assignments		0.204 (0.030)	
significantly higher remuneration than in Ukraine		0.521 (0.580)	
fair assessment of performed work (not favouring Poles)		0.384 (0.036)	
respecting employees' rights, e.g. breaks at work, OSH protection, leave entitlement		0.186 (0.024)	0.195 (0.029)
opportunities to be promoted to positions with increased pay and/or responsibility within the company		0.076 (0.025)	0.224 (0.028)

opportunities to develop at work			0.398 (0.041)
participation in trainings			0.197 (0.026)
clearly defined career paths			0.203 (0.034)
(Constant)	0.096 (0.083)	-2.559 (0.265)	-4.294 (0.229)
R^2	0.608	0.693	0.853
Standard error of estimate	0.705	0.558	0.568
Model analysis of variance	F= 338.36	F= 164.72	F= 362.59

p<0,001; standardised errors are provided in brackets under unstandardised coefficients.

Source: Own study.

The models confirm that the practices exert significant impact on future plans of employees from Ukraine and their decision whether to stay in Poland longer or permanently and whether to continue their career in Poland. The first model for "Professional Career in Poland" did not only prove to be well adjusted and reliable, but it also explains as much as 60% of result variances. The main predicates for this model are financing education, including foreign language courses, offers of work creating the possibility of learning and personal development. Essentially, it may be stated that the higher the engagement of employers in developing competences of employees from Ukraine in financial and organizational terms, the more often such employees declare their intention to develop their professional careers in Poland. The second model, pertaining to the factor of "Intention to Stay in Poland Longer", also offers effective measures of adjustment and reliability. It explains almost 70% of variances of results, and its main predicates are HR practices connected with clearly defined work assignments and fair assessment of performed work (not favouring Poles), respecting employees' rights, e.g. breaks at work, OSH protection, leave entitlement, as well as the opportunities to be promoted to positions with increased pay and/or responsibility within the enterprise. Nonetheless, the strongest predicate is remuneration, in particular, the fact that Ukrainians earn more in Poland than in Ukraine. Thus, it may be stated that the application of the aforementioned HR practices exerts a positive effect on the intention to stay in Poland longer (at least few years).

The third model is also characterised by effective measures of adjustment and reliability and explains over 80% of variances of results, confirming that the following HR practices are of importance for Ukrainians considering permanent stay in Poland: respecting employees' rights and creating opportunities for promotion. Moreover, it offers development, organising training courses, clearly determined career paths. The results of the regression analysis show that the hypothesis concerning the relation between HR practices and decisions of Ukrainians to stay longer or permanently and develop their professional career in Poland was confirmed.

Discussion

The objective of the article was to research and explain the relations between human resources management practices and future professional plans of Ukrainians employed in Poland. The key issue was to find practices crucially important for the decision regarding their future career and staying in Poland longer or even permanently.

The research shows that employees from Ukraine find training and development practices especially important. It is because they connect the decisions to develop their career in Poland with the opportunity to develop their competences. What is also important in this respect, is the offer of work which creates opportunities for learning, furthering personal development and provides financial support for education, including learning foreign languages. These findings correspond to findings of Jasniewska and Tomaszuk (2019) regarding Ukrainians, and show that the learning ability and high qualifications (comparable to the competence of Polish employees) are the strengths of Ukrainians,

who intend to continue their development working in Poland. Kupczyk and Przemyślańska-Włosek (2017) concluded that such HR practices increase efficiency and satisfaction with working in Poland among Ukrainians. It is valuable that Ukrainians want to develop their language competences, learn Polish and that they appreciate the engagement of employers who provide financial support to this end. It is an investment which they will not be able to rely on in other countries, which shows that Ukrainians consider Poland to be a valuable area of employment and that they have long-term plans connected with it.

Another important group of HR practices identified in the research is connected with compensation and rewards. The amount of offered remuneration is of particular importance in this case. Thus, it confirms the findings of such authors as Bilan, (2017) or Inshyn and Moskalenko (2018), who point that one of the primary reasons for Ukrainians is economic migration, which results from differences between wages in Ukraine and potential remuneration in the country of destination. In fact, the findings presented in the article show that the decisions whether to stay in Poland longer and develop the career significantly depends on the amount of remuneration. At the same time, the respondents stated (85% answered "yes", 10% "rather yes") that they earn much more than in Ukraine. However, it raises a question whether the amount of remuneration received in Poland is satisfactory, because it helps employees to care for their families by transferring money to Ukraine, or because it allows them to have dignified life in Poland, at a level higher than in Ukraine, or because it offers them the opportunity to bring their family to Poland. In this context, the issue of cultural proximity becomes significant – the similarity between Ukrainian and Polish cultures, languages and customs. This proximity may be conducive to Ukrainian employees staying in Poland longer or even permanently.

Practices pertaining to compensation and rewards include such significant predicates as opportunities to be promoted to positions with increased pay and/or responsibility within the enterprise. It suggests that employers should also pay attention to organisational structures and the opportunities to plan the career path as well as the principles and transparency of promotion. The decision to stay in Poland longer is connected with the fact that employees' rights are respected, the performed work is assessed fairly, without favouring Polish employees, and Ukrainians are offered opportunities for development. Training participation is also very important in this case. However, the research which was carried out shows that even though these practices are significantly connected with the decision on future professional plans of Ukrainian employees, they are implemented in a limited scope in Polish enterprises. Respondents pointed to this shortage in their answers, as 39% of them stated that there are no opportunities for development in their work, only 19% admitted that they participated in training courses and less than 15% declared that their career paths were clearly defined. It suggests that more employers should pay attention to this particular group of practices, especially because the research of Blyznyuk (2017) shows that they are of significant importance to younger generations of Ukrainians, who tend to emigrate most often.

Conclusion

The difficult situation in the labour markets of many developed countries forces them to search for solutions aimed at attracting employees from outside the European Union, which includes Ukraine. It means that Poland, which is currently the most common economic destination of Ukrainians, may soon lose its importance. Simplifying procedures of employing emigrants, offering higher remuneration or creating attractive employment conditions constitute incentives used by such countries as Germany and the Czech Republic to compete for employees from Ukraine. Therefore, despite geographical and cultural proximity, common history, similar languages, lifestyles or attitudes to life constitute important advantages of working in Poland, it is necessary to take certain measures to encourage Ukrainian employees to stay in Poland longer or even permanently. It refers to legal and administrative actions taken at the central level as well as human resources management actions taken by enterprises which employ Ukrainians. The research confirmed the impact of HR practices on future professional plans of Ukrainian employees. The findings suggest that some practices, especially in terms of training and development, and compensation and rewards, are of utmost importance to Ukrainians considering their future professional careers and longer or permanent residence in Poland. They proved especially important among the numerous practices assessed by respondents (43 practices). The findings suggest that HR departments, HR specialists and managers play an important role in the process of developing and implementing HR practices.

Therefore, it offers practical implications of the research on the selection of practices which exert positive impact on performance and satisfaction of Ukrainian employees as well as the decision pertaining to their future career in Poland.

Thanks to the findings pertaining to Ukrainians employed with Polish enterprises, the article offers contribution to the understanding of the preferences of this particular group of employees regarding human resources management practices, which will allow employers to take more appropriate choices as to tools in this area. Since the decision to take up/continue employment in a given country is affected by organisational, institutional and cultural factors, the knowledge offered by this research may also be conducive to integrating actions in certain areas. It presents the synergy of action taken by employers and institutions responsible for such areas as healthcare, educational offer or social security, which, considering the beneficial cultural context, may allow Ukrainians to move their lives to Poland for a few or several years, or even permanently.

Limitations and Future Research

One of the limitations of the research is connected with the essence of questionnaire surveys and their static nature, thus these issues should be further validated using a longitudinal data set. Another limitation is focusing on one national group. Ukrainians are of special importance to the Authors, since they constitute the biggest group of employees from abroad in Poland and their high level of assimilation capacity is an advantage for employers. Bearing in mind the fact that employees from Belarus, Moldova or Kazakhstan and, more recently, from India, Nepal, Bangladesh or Philippines are pursuing permits to work in Poland, it becomes more important to recognise human resources management practices dedicated to employees from these cultures.

As it pertains to employees from Ukraine, another interesting area of research may also be to diagnose human resources management practices in enterprises operating in Ukraine, and then compare the scope of such practices in Polish and Ukrainian entities.

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Patient Safety Management in The Face of E-health Development

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Abstract

The development of information and communication technologies creates opportunities to support innovation in the health services sector in the sphere of eHealth services and tools. The implementation of digital technologies in the sphere of health affects the safety of patients. The question about the possibilities of using eHealth services and tools in supporting patient safety management becomes a key issue. The aim of the article is to present the essence of patient safety and the objectives, benefits and areas of eHealth application in the process of patient safety management.

Keywords: E-health, Patient Safety Management, Health Care, Digital Health Interventions.

Introduction

The basic assumption of the article is the issue of ensuring patient safety in the era of progressive development of digital health. With the advancement of information and communication technologies, the possibilities of supporting the development of innovation in the medical services sector are expanding. Real benefits resulting from the implementation of digital technologies in the processes of providing health services, strengthening the role of the patient, involvement of patients and the community in health-related activities are recognised. The institutions of the European Union point out that thanks to the significant use of digital innovations it is possible to promote health, prevent and combat illnesses, help meet patients' needs and facilitate equal access to high quality care for citizens, and therefore recommend the implementation of priority actions in three main areas such as: citizens' secure access to and sharing of health data across borders; better data to advance research, disease prevention and personalised health and care and digital tools for citizen empowerment and person-centred care (Commission to the European Parliament, 2018).

Progress of digital technologies contributes to the dynamic development of eHealth, including services and tools for mobile health (mHealth) and telemedicine. According to Eurostat data, in 2019 already 55% of individuals aged 16 to 74 (citizens of 28 EU countries) used the Internet to search for health-related information (injury, disease, nutrition, improving health, etc. within the last three months before the survey) (Eurostat, 2020).

Digital innovations used in the health sphere can be a source of benefits in increasing the availability of health services, improving communication between participants of the health care system, providing high quality health services that significantly influence the patient safety. At the same time digital technologies can generate safety risks, especially in the area of data management, quality and reliability of the data collected and provided to patients. The key challenge for health care systems is to ensure health safety, including safe data management in the field of digital health interventions. This applies both to the recipients of health services (current and potential patients), health care providers (in the institutional dimension and at the level of employees) as well as national and local decision makers responsible for the functioning of the health system and organisations related to the information sphere.

Research Approach

The starting point in the research process was the assumption that the use of eHealth services and tools is important for the management of patient safety. The author tried to answer the following key questions:

1. what is the essence and what factors determine the management of patient safety,
2. what functions are the tools and services of eHealth in the health care system,
3. how and in what areas digital health interventions can support patient safety management.

The main aim of the article is to present the essence and determinants of patient safety and to identify the possibilities of using eHealth tools and services (digital health interventions) in the process of patient safety management. The article is conceptual and based on the analysis of literature as well as documents. The following research methods were used: a) study of literature - review and in-depth analysis of literature in the field of management, related to the patient safety management and digital health, and b) analysis of documents - review and in-depth analysis of international strategic documents on health policy, reports and legal acts.

The Essence and Determinants of Patient Safety Management

The issue of safety in the field of health is multidimensional. The complexity of the problem stems from the very definition of health, which is considered as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 2020). In a broader sense health means a "dynamic state of physical, mental, social and spiritual well-being" (Chuengsatiansup, 2003). In the considerations of the essence of health safety, the specific features of health services are important, in particular their professional character, which is usually a source of disproportions in the knowledge resources, occurring in the relations between a medical worker (a professional) and a patient (not possessing specialist knowledge). The main features of health services include: intangibility and lack of guarantee of the effectiveness of the health service, psychological complexity of the process (stress accompanying patients), constant interaction between the doctor and the patient, professional knowledge of the service provider, which enables professional performance of the service and implies the need for good communication between the doctor and the patient to build trust (Bukowska-Piestrzynska, 2009).

The concept of safety in the area of health is associated with such issues as safe health care, health safety, patient safety and concerns both the system level (health care system and society), as well as the patient's level (relations between the individual patient and the organisation providing health services).

Safety is an indispensable and desirable feature of health services. According the World Health Organisation (WHO, 2018a), a good health system should deliver quality services to all people, when and where they need them. Ensuring security is the domain of the state that is responsible for shaping such a health care system that will provide good health services to citizens. In this context, health safety is the process of continuous efforts of the state and individuals to meet their health needs and manifests itself in the certainty of action of government administration bodies, local government administration and subordinate services in the field of protection of life and health (Paplicki, (2016). These activities should lead to achieving health safety, i.e. a state guaranteeing no threats that may cause a deterioration or loss of citizens' health (Ameljańczyk and Ameljańczyk, 2012). In the general dimension health safety concerns the formal and organisational determinants of the health care system and is related to the activities of decision-makers (at the national and local level) and health care providers responsible for shaping and efficient functioning of the health system. According to B. Bober (2016), the level of health safety is determined by the health care system (including public hospitals) and is closely related to the availability of health services.

The concept of patient safety is closely related to health safety. Patient safety, as a feature of health care systems, means the discipline of the health care sector, based on the use of scientific methods of

maintaining safety in order to create a trustworthy system of providing health services and reduce the incidence of adverse events and minimise their consequences, as well as to increase the chance of returning to normal after the occurrence of these events (Patient safety, 2017). A sense of safety may be subjective and result from personal experience, awareness of rights, knowledge of the principles of the functioning of the health care system and the availability of health services, as well as from the experience of other patients. In the individual dimension "patient safety means freedom, for a patient, from unnecessary harm or potential harm associated with health care" (The Council of the European Union, 2009).

Patient safety is also defined as a set of activities including "the avoidance, prevention and amelioration of adverse outcomes or injuries stemming from the process of health care" (Vincent, 2011). These activities apply to all participants in the health system, including policy makers, health service providers, medical staff and other stakeholders, and require cooperation within formal and informal networks. From the perspective of health service providers, safety is determined by the operating conditions (formal and organisational conditions, resources, infrastructure and competences) and responsibility for the consequences of adverse events.

It is recognised that safety is a dynamic property of the health care system; therefore improving patient safety means organisational continuous learning and knowledge transfer at the system level, resulting in a need to change the approach to setting organisational procedures and taking into account the specificity of processes, divisions, professions and levels (Wiig and Lindøe, 2009). Patient safety, as an indispensable determinant of the delivery of high-quality health care, concerns three basic elements of the system, such as: structure (resources, organisation of the health care system, safety culture, availability of knowledge, transfer of knowledge, trainings), process (activity of health care providers) and outcomes (adverse events and injuries, consequences of clinical activities by providers) (Jha et al, 2010).

Most developed countries have the following elements in their strategies for improving patient safety (Stroetmann et al, 2007):

1. a "just" or "fair" culture, conducive to reporting and questioning - incident reporting and analysis systems at local and national level;
2. an in-depth analysis process to identify and assess the causes of incidents and aggregated incident reviews;
3. a process that ensures the implementation of activities and demonstration of adequate improvement of patient safety and quality of care;
4. effective information exchange processes at various levels - national, organisational and clinical - for learning and improvement;
5. redefinition of compensation systems and their impact on culture and achievements in the field of patient safety.

R.M. Wachter indicates that improving security requires a multi-dimensional approach and identifies five main areas of relevant activities and initiatives such as: regulation, error reporting systems; information technology; the malpractice system and other vehicles for accountability and work force and training issues (Wachter, 2004).

The process of patient safety management aimed at permanently maintaining the designated security state has a multistage and complex nature. The organisation of safe processes for the provision of health services requires action both at the systemic level as well as at the institutional level. A comprehensive approach is essential in this process, including coherent actions related to the establishment of the following components: safety definition (the expected, target result of safety management), safety model (a description of the way in which organisation functions and accidents happen), safety management model (background assumptions adopted in the organisation to manage and improve safety, elements necessary for the management and improvement of patient safety) and safety management system (a set of systematic organisational processes necessary to manage the organisation to ensure and develop security, that aim to provide a structured management approach to

control the risk in operations and increase the organisation's ability to function safely) (Macchi et al, 2011).

It is indicated that four areas are important for effective implementation of patient safety practices, such as: safety culture, team work and leadership commitment, structural organisational features, external factors (financial and performance incentives, patient safety regulations), availability of implementation and management tools (training resources, internal organisational incentives) (Taylor et al, 2011). Patient safety management should be comprehensive and consistent with the overall management system. Safety management, treated as an integral part of good management in general, should be based on the model: Plan, Do, Check, Act, under which the following activities are undertaken (HSE, 2013):

- planning - defining and communicating acceptable performance and resources needed;
- doing - determining the risk profile, identifying and assessing of risks, controls/record identifying and process safety knowledge maintaining, organising activities and implementing the plan;
- checking - performance measurement - implementing and managing of control measures, investigating the causes of accidents, incidents or potentially accidental events;
- acting - performance reviewing, taking actions based on lessons learned, including inspection and audit reports.

Summing up, it should be emphasised that patient safety management is a complex, multifaceted process involving many different stakeholders of the health care system, which requires constant striving to ensure and maintain a state in which patients feel safe in the area of health. This process means a set of integrated activities consisting in planning (identifying threats and their conditions, setting safety and regulatory standards, procedures for reaching this state), organising (providing human, financial, material and information resources), stimulating to operate safely (creating and maintaining safety culture by training, promoting, motivating), controlling and improving (system for monitoring and processing of adverse events, measurement, analysis and evaluation of the achieved level of safety). These activities must be coherent and integrated at all health care system levels and take into account determinants of health policy, social needs, demographic changes and technological progress, as well as internal conditions and the specificity of the operation of entities providing health services.

Ehealth In the Health Care System - The Essence, Tools and Goals

The concept of eHealth is defined in many ways, indicating, in a different perspective, the scope of activities (services), tools or functions. In broad terms, according to the definition of the World Health Organization, eHealth is “the cost-effective and secure use of information communication technologies (ICT) in support of health and health related fields, including health-care services, health surveillance, health literature, and health education, knowledge and research” (WHO, 2016a). The European Commission (2012) defines eHealth as “the use of ICT in health products, services and processes combined with organisational change in health care systems and new skills, in order to improve health of citizens, efficiency and productivity in health care delivery, and the economic and social value of health. EHealth covers the interaction between patients and health-service providers, institution-to-institution transmission of data, or peer-to-peer communication between patients and/or health professionals”.

In recent years, the concept of digital health has been promoted. WHO (2019) indicates that digital health or the use of digital technologies for health is rooted in eHealth and means a term that includes eHealth and mHealth as its subset. The European Commission (2019) use the concept digital health and care that means “tools and services that use information and communication technologies (ICTs) to improve prevention, diagnosis, treatment, monitoring and management of health and lifestyle”.
In addition, the concept of digital health interventions has been introduced. According WHO (2019) a digital health intervention is “a discrete functionality of digital technology that is applied to achieve health objectives”. Digital health interventions (DHI) may include activities such as: promoting

healthy behaviours, providing remote access to effective treatment methods, enabling patients to access information on their health status, improving results in people with chronic diseases, exchanging experiences with other patients, changing perceptions and cognitions around health, assessing and monitoring specified health states or health behaviours, titration of medication, improved communication between patients and health care professionals, explaining health priorities and making treatment decisions consistent with them (Murray et al, 2016). It is indicated that digital health interventions are conducted in four main areas such as (WHO, 2018b):

1. interventions for clients - potential or current users of health services, including health promoting activities and caregivers of clients,
2. interventions for health care providers - health care providers are members of the health workforce who deliver health services,
3. interventions for health system or resource managers - managers involved in the administration and supervision of public health care systems, including activities related to supply chain management, health financing, human resources management,
4. interventions for data services - cross-sectional functions, related to supporting a wide range of data management activities (collection, use and exchange of data).

Digital health interventions defined also as "the use of information and communication technology (ICT) as a tool to improve health systems and services" include mobile health (mHealth) and electronic health (eHealth) (Wilson et al, 2014). Mobile health (mHealth) is a dynamically developing field that can contribute to the transformation of health care and increase its quality and efficiency, and means medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices and including applications such as lifestyle and wellbeing apps that may connect to medical devices or sensors (e.g. bracelets or watches) as well as personal guidance systems, health information and medication reminders provided by SMS and wirelessly provided telemedicine (European Commission, 2004). MHealth is expected to play a significant role in changing health care towards a patient-centred and value-based delivery model, improving work-place productivity, increasing patient engagement and patient safety, better coordinating care, and facilitating payments (Deloitte, 2015).

The concept of telemedicine (telehealth) is also connected with eHealth. Telemedicine is defined as "the delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities" (WHO, 2010). It is emphasised that telehealth can contribute to improving (speeding up, reducing costs) equal patient access to high quality, cost-effective health services wherever they are, as well as increasing the uniformity of practice (higher quality of care) and providing universal health coverage, especially for vulnerable groups and ageing populations (WHO, 2016a).

It is also pointed out that the benefits of using eHealth (including mHealth and telehealth) services are multifaceted and relate to system performance levels. The main categories of benefits include (Reijonsaari, et al, 2005):

- quality of care: improved clinical data collection and analysis at organisational and national level, portability of patient information across health care network, improved patient-provider communication and more accurate and accessible patient records,
- cost: improved triage to reduce unnecessary office and emergency department visits, improved home care to reduce nursing home and hospital care, more robust disease management,
- efficiency: productivity of physicians increases, reduced paper flow and less telephone calls, faster processing of administrative transactions, automated scheduling and prescription refills.

However, there are a number of barriers that are not conducive to wider use of eHealth, in particular such as: lack of awareness and trust in eHealth solutions among patients, citizens and health professionals; lack of interoperability between eHealth solutions; limited evidence on a large scale regarding the cost-effectiveness of eHealth tools and services; lack of legal clarity for mobile applications for health and well-being and lack of transparency regarding the use of data collected by such applications; inadequate or fragmented legal frameworks, including the lack of reimbursement schemes for eHealth services; high start-up costs associated with the setting up of eHealth systems; regional differences in access to ICT services and limited access in deprived areas (European Commission, 2012).

The aspects mentioned above make the implementation of eHealth a difficult challenge at the system and executive level. EHealth means organisational (structural, procedural) and infrastructural changes, especially in the sphere of methods and communication tools that force the acquisition of new skills, thus generating the needs of interdisciplinary development.

An important challenge is the cross-sectoral cooperation and creation of well-functioning networks of relations between the participants of the health system (policy makers, organisations conducting health-related activities, medical staff and patients: potential and currently declaring needs in the area of health services and their families or friends) and sectors of services supporting eHealth (organisations responsible for information networks, etc.). According to G. Eysenbach (2001), eHealth is an area at the crossroads of medical informatics, public health and business, referring to health services and information provided or improved using the Internet and related technologies, and therefore in a broader sense it is not only technical development, but also state of mind, way of thinking, attitudes and commitment to networking, global thinking, to improve health care at the local, regional and global levels by means of information and communication technology.

In conclusion, it should be noted that eHealth can be considered a dynamic socio-cultural phenomenon meaning the development and implementation of digital technologies in the broader sphere of health and applies at various levels of the care system (macro, meso and micro) and in various dimensions of action relating to different stages of the service delivery process, supporting not only the treatment, but also prevention, health education and management activities (planning, organising, coordinating and monitoring health care).

The Use of Ehealth In the Management of Patient Safety - A Review of Scope and Functionality

Digital health interventions cover a wide range of services and tools that can be used at different stages of the patient safety management process. It is expected, that digital solutions should contribute to clinical decision support, more efficient use of health care resources, better targeted and integrated and safer health care, in particular regarding the exchange of information between health care professionals, reducing the number of avoidable errors and adverse events, and improving coordination and continuity of care and better adherence to treatment (European Union, 2017).

WHO (2016b) emphasises that key gaps in patient safety in any health care system include communication and teamwork, ordering and interpreting diagnostic tests, data management, transition between care levels, and completeness of patient records. EHealth can contribute to the reduction of these gaps by providing decision support for prescriptions and test orders, improving documentation and communication for transfer between providers, tracking and sharing the results of diagnostic tests and improving data monitoring and analysis (WHO, 2016b).

The core of digital health interventions is information transfer, which can ensure effective communication and interaction between participants in the health care system. In particular mHealth enables multidirectional communication, which can be implemented in the following types (WHO, 2016a):

- communication between individuals and health services - health call centres, health care telephone helplines, emergency toll-free telephone services;
- communication between health services and individuals - treatment adherence, reminder to attend appointments, community mobilisation, health promotion campaigns;
- consultation between health care professionals (mobile telehealth);
- intersectoral communication in emergencies - emergency management systems;
- health monitoring and surveillance - health surveys, surveillance, patient monitoring;
- access to information and education for health care professionals - access to information, resources, databases and tools, clinical decision support systems, electronic patient information, m-learning (access to online educational resources using mobile).

The benefits of implementing digital health interventions affect both the patients themselves and those providing health services, and may include effects such as: improvement of results, reduction of unwarranted variation, reduction of preventable harm, improvement of the appropriateness of health care, better patient centeredness, increased possibilities for monitoring and quality improvement (Shaw et al, 2017). The main functions of digital health interventions include (Shaw et al, 2017):

- electronic patient portals - providing patients with secure access to their health information and helping consumers to become active participants in decision-making about their health care;
- electronic patient reminders (mobile technologies) - delivering reminders to a large proportion of the patient population group; promoting successful outcomes by generating personalised communication between health care professionals and patients and impact on clinical workflow;
- information-sharing at discharge - critical to continuity of care and promotion of patient safety and promoting timeliness of preparation and transmission of patient information to primary care providers;
- computerised provider order entry including electronic prescribing - improving organisational efficiency and prescribing safety (in the field of compliance with medication guidelines);
- clinical decision-support systems - matching patient-specific characteristics to the database; creating personalised predictions for the assessment of disease status, diagnosis, appropriate treatment options and other clinical decisions; generating reminders and alerts for the patient when a deviation from the recommended care is detected and positive impact on patient safety, especially in terms of accessibility, clinical evaluation, data integration, compliance with guidelines, indicated care, organisational performance, patient outcomes, resource use and safety prescription.

Fundamental to the provision of safe, knowledge-based health care is appropriate collection analysis and feedback of health information, robust process and system design for clinical care and supports, risk management in all governance processes, and monitoring and activities based on real data connected with organisation performance and identified needs of the community (Stroetmann et al, 2007). In addition, it is pointed out that the key to effectively managing for health and safety are the following aspects: leadership and management (including relevant business processes); trained, qualified workforce; an environment in which people are trusted and involved (HSE, 2013).

WHO (2016c) indicates that digital interventions to involve patients in safer primary care fall into three broad categories such as: educating patients and health care providers for safer health care, obtaining retrospective or real-time feedback and engaging in improvement systems or services. Specific activities as part of strategies to increase patient engagement in safer primary care recommended by WHO (2016c) relate to:

- educating health care providers to involve patients, both at the organisational and individual level; including patient engagement and safety in educational curricula at undergraduate and postgraduate level and developing a learning culture, rather than a blaming culture;
- supporting patients to become actively involved - encouraging patients to report on safety incidents, near misses and safety concerns; actively promoting patient feedback systems; giving feedback to patients on follow-up actions taken about the issues they raised; considering legislation that supports patients and their families to engage in issues relevant for their safety

and providing patients with appropriate, accurate and up-to-date information about treatment and safety issues in a user-friendly language and format;

- broadening the ways in which patients are involved - exploring alternative ways of communicating with patients, such as telephone, e-mail and online video calls; putting in place systems to facilitate patient access to their health records; involving patient advocates, where appropriate, to support the engagement of patients at the direct care, organisational and policy level; supporting the work of patient-led voluntary associations and considering campaigns aimed at raising public awareness about the need for and benefits from the strengthened engagement of patients and their relatives in patient safety in primary care;
- recognising the importance of communities - adapting engagement strategies to the local social and cultural context and recognising that patients are part of social groups, families and communities and that these broader networks can be a positive force for change;
- providing an enabling and supportive environment - encourage and facilitate interaction among health care professionals, and engagement with patients and families; promoting open disclosure about safety incidents to patients; linking patient feedback systems to organisational systems for learning and improvement, similar to staff-initiated incident reports; providing information and support for self-care such as counselling, peer-support groups and coaching; designating and supporting patient safety champions or advocates, where appropriate, to help facilitate patient engagement and setting up mechanisms for patient engagement at the systems level.

In conclusion, it should be emphasised that the variety of digital solutions, including eHealth services and tools, creates a wide range of possibilities for supporting management processes in the areas of safety and quality of health care in particular. EHealth supports decision-making and controlling processes in the management sphere regarding the organisation and delivery of health services, as well as clinical decision, is a source and tool for data transfer, and enables measurement and monitoring of safety in the health care system, thus reducing errors and risk of occurrence adverse events. As a communication and education tool for patients and staff, eHealth supports the development of the idea of patient involvement and empowerment of patients in the health care system, which contributes to patient safety in a qualitative context related to accessibility, better communication, and information exchange processes.

Conclusions

The dynamic development of digital technologies creates opportunities for improving the health care system, in particular in ensuring patient safety. According to the World Health Organization (2016c), electronic tools will be crucial for improving safety, especially in the area of activities such as: the use of electronic health records for more accurate and complete patient records; timely and reliable sharing of health data; supporting the diagnosis, monitoring and management of diseases and conditions; effecting behaviour change and reduction of health risk, and empowering and engaging patients and families in their own care, support in organising communication between professionals in a way that reduces errors and improves coordination, reduction of unnecessary consultations and hospitalisations, improvement of access to knowledge about health conditions and management of them both for specialists and patients.

The implementation of digital solutions can be a source of threats, especially in terms of access to health data, the diversity of Electronic Medical Records, the lack of technical interoperability and access to digital health services (Commission to the European Parliament, 2018). The use of eHealth tools means the necessity of creating a convenient, coherent at the national and international level framework to ensure the safe functioning of health care systems. Key to the safety of patients is the shaping of data management systems, consistent knowledge management both in terms of personalised data and general health information. The necessity of efficient knowledge management concerns both the institutional and system level (in local and national dimensions) and also requires taking into account the international context. The condition for the effective and safe use of digital technologies in health services is cooperation in the international dimension. As the European Commission points out, the concerns related to electronic data exchange primarily regard the risk of breaching privacy, the cyber security threat and the quality and reliability of data, therefore the

following actions should be prioritised: the development of EU-wide standards for data quality, reliability and cybersecurity, EU-wide standardisation of electronic health records and better interoperability through open exchange formats (Commission to the European Parliament, 2018).

EHealth services and tools are widely used in various activities in the process of patient safety management, however, they require coherent, complex interaction at all levels of the health care system (macro, meso and micro) and intersectoral cooperation, in particular with organisations dealing in research and development of digital innovations, implementation of digital technologies and ensuring data security. Effective patient safety management is possible thanks to the involvement of all participants in the health care system. EHealth is a challenge for health care providers, managers and staff, and requires constant learning, readiness for change, and the responsible use of digital solutions. In addition, the potential of eHealth, digital health interventions can be used with the active participation of patients in developing health awareness, their involvement in communication and education processes.

To support the practical, operational dimension of the provision of health services, it is important to present examples of activities, eHealth projects and to promote good practices in the field of patient safety management. The article is valuable for identifying, systematising and highlighting the importance of digital solutions in improving the patient safety management process and is the starting point for more in-depth research.

Acknowledgement

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Determinants of Horse Industry Network Management

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Abstract

The aim of the article is to indicate the main factors affecting the creation and management of networks in horse industry. The network approach is currently one of the main models for the implementation of economic and social activities. This approach is also visible in the area of the horse industry, whose author's model is the basis of the presented analyzes. The article focuses on the main determinants of the creation and management of network systems, such as: the specificity of the main good and the process of its creation, relations that create entities that are a participant of the system and the specificity of the entities themselves. The article was based on the analysis of literature and documents as well as participant observations, and as a result of empirical research conducted by the author since 2002.

Keywords: Horse industry, business networks, horses business relations, horse business management

Introduction

For ages horses accompanied humans in performing different duties. First, as an animal that was hunted - and therefore a source of meat and other post-slaughter products, then as a means of transport and tractive force. Over the course of history, the horse has been a companion to struggle and competition, as well as an element of recreation and the development of other forms of activity such as, for example: hippotherapy. Today, Horses are mainly business which reaches far beyond farming and trade. In many countries the horse industry is a field of economy which creates possibilities for development of different type entities. The most important and the most difficult task of contemporary equine business is to provide horses and clients with the desired characteristics (resulting from the desired use profile), at a specific time and place, at acceptable costs. In order to be able to offer a suitable horse to the client, at least a few years earlier, the breeder must make the right choice, and then the owner of the animal must properly manage his farming and work, while engaging properly selected entities and resources that create a specific network of relationships.

The aim of the article is to indicate the main factors affecting the creation and management of networks in the horse industry. The article was based on the analysis of literature and documents as well as participant observations, as a result of empirical research conducted by the author since 2002.

Network Approach

The dynamics of business activity makes it difficult to indicate the perfect form for running modern business. Internationalization, globalization, regionalization as well as the impact of competition and consumers are the reasons why the necessity of change and flexibility have become indispensable elements of the struggle of economic entities for survival and development. Changes on the market and technological progress strengthen the conviction that it is necessary to create specific systems that will achieve the intended goals. the business exchange to a large extent takes place in business relationships, which in different ways are connected to each other and form network-like structures (Laage-Hellman et al, 2018) (Håkansson et al, 2009). In the literature related to the analysis of agri-food markets, the authors point out that today's supply chains and networks are becoming the

dominant form of cooperation (Bijman et al, 2006). However, among the functioning of economic systems it is extremely difficult to set clear boundaries and indicate membership in networks or chains. This is all the more difficult since there has been a shift from a concrete and specific understanding of the network as a set of mutually intersecting threads combined into one understanding of a more abstract, or defining the network as a set of points in the communication structure (Blanc, 1995). The essence of the contemporary network approach is the overall relationship of the company with the environment, which form a network of connections (Ratajczak-Mrozek, 2009), based on the theory of graphs (Beineke and Wilson, 2005) and general system theory, created by von Bertalanffy (1950). This theory demonstrates the need to integrate the social and natural sciences and prefers a network approach based on the interaction of the components that make up the system (von Bertalanffy, 1950). Especially that such interconnected elements, functioning as a whole, are able to generate numerous synergistic effects.

The basics of the methodology of network thought were proposed by Gomez, Probst and Ulrich (Zimniewicz, 1999). Their concept is based on the following elements: parts and whole, network, openness, complexity, order, control and regulation, development. A special area of research is formed by business networks, which constitute a set of long-term formal and informal relationships that exist between two or more entities. The essence of the network approach is based on the idea of exchange and mutual trust, which are the basis of the system's flexibility and the increase of competitive advantage (Łapicka, 2009). The basic parameters of the efficiency of the supply network include: the ability to react quickly, optimize the use of resources and increase flexibility (Kearney, 1999). According to Krawczyk (2011), networks are a form of organization in which at least two legally autonomous and formally independent entities accept and accept the obligation to comply with specific, relatively stable relations that limit their freedom of market activities, but do not introduce hierarchical relationships. Christopher (2000), identifies the network as a network of related and interdependent organizations that work on the basis of mutual cooperation jointly control and streamline material flows and information from suppliers to end users. In 1990, Powell (1990) published the article "Neither market nor hierarchy: Network forms of organization", in which he presents the network as an element of the linear system of the market - hierarchy. He states that forms of activity identified primarily as a system of transactions, and attributed to either market or hierarchical relations, may also take another indirect form. Their diversity, apart from goals and strategy, are influenced by: context and social structure, relations (including interdependence), community of interests, reputation, management systems, power structure, interactions and other hard to measure factors. A ‘network organization’ is usually conceived as an organization that is quick and flexible in adapting to changes in its environment (Vega-Redondo, 2013). Networking is thought to facilitate the development of personal and professional opportunities (Baker, 2000) (Wolff et al, 2008) and contribute to organizational functioning by supporting greater organizational communication and access to resources (Forret et al, 2001) (Gibson et al, 2014).

In network forms, allocation sources are not located in individual entities, but in the relations they create. Networked enterprises are marked by heterogeneous inter-organizational processes and interdependencies (El-Sawy and Pereira, 2013) (Palo and Tähtinen, 2013), where value creation and capture is not a mere result of a dyadic relationship between provider and consumer, but value is created and captured by a collective effort of the involved network (Solaimani, 2018). Their main goal is to create opportunities for partners to better adapt to changing conditions and opportunities to share benefits and costs.

Horse Breeding

The basic factor determining a specific approach to the horse industry is the horse and his relationship with man. Because of the man's relationship to the horse created over the long history of both species, the horse obtained a position unmatched by any other animal. Its versatility and usefulness for a human being is not irrelevant. Although its role has changed over the centuries, it remains an important subject of interest. Changes in the ways horses are used significantly affect the farming processes, forcing its operators to adapt to market requirements, thus increasing flexibility.

While in the rearing processes changes can be made relatively in short periods of time, changes in the breeding area require a long time - counted in years.

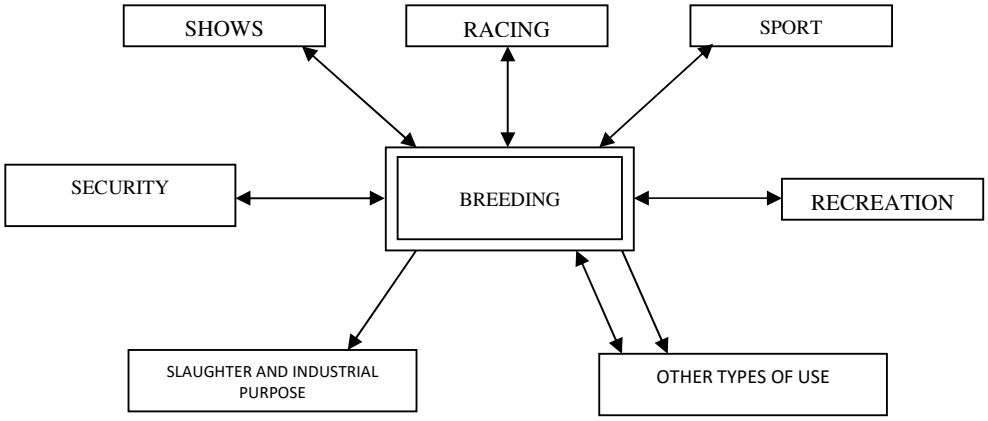

Figure 1: Flows of horses between breeding and other types of use

By animal breeding, the most commonly understood is a set of zootechnical treatments aiming at the genetic improvement or preservation of the characteristics of hereditary animals (Szulc, 2005). It is the central area of horse business. Its quality and specialization are the main determinants of the possibilities of other areas. Farm animals come from farms, which through the rearing process, realized for the needs of particular types of activity, gain value and become the object of desire and satisfy the needs of customers. Consequently, the flow of goods (and services) from the farm to individual entities forming the area of use created due to various types of horse use (Fig.1). The main elements of this area are: sport, races, recreation, fate and industrial use, shows, security system, other types of use, which form the core of the horse industry. Flows carried out between individual areas often have the nature of feedback. Especially in relation to races, sports, recreation and shows in the use processes, the best individuals are selected, which are then returned to the breeding system. They form the basis of individual (species) progress aimed at strengthening the most desirable traits in the next generations.

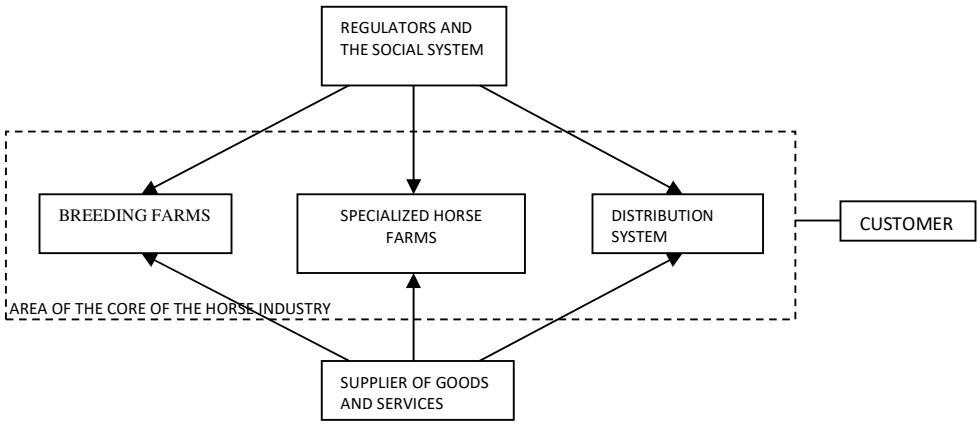

Figure 2: The core of a horse business - subject groups

Based on the empirical studies, it can be concluded that the time of shaping individual breeding activity in the desired direction is 10-20 years, while the time of obtaining outstanding individuals can not be estimated. Although it is possible to identify certain trends on the market as to the

characteristics desired in horses, which will be the future object of use, this is not an easy thing. Offering products (horses) in accordance with the current fashion is possible only if you manage to hit the expectations of potential customers, long before they appear. The breeding process consists of a number of elements, which include, above all: feeding, nurturing, breeding, rearing youngsters, mortar to perform certain functions and work, selection of the future breeding material (because of bravery, productivity at work, type, construction, viability, fertility), group or individual selection of individuals for reproduction, formation of bloodlines, breeding (Pruski et al, 2006). Breeding activity is based on individual decisions of individual breeders. However, they are largely undertaken on the basis of signalers flowing from the area of use, as well as the area of entities conditioning the proper functioning of the horse business. These flows create a multidimensional network of multiplicative relations. A specific role is played here by properly created state policy and the system of regulation of national and international organizations (Fig. 2).

An important element is also the selection of appropriate entities that will cooperate in order to obtain a specific horse, consistent with the requirements of customers, providing various types of goods and services. These include: veterinarians, research centers, copulation centers, veterinary clinics and hospitals, veterinary laboratories, carriers, breeding material banks, stallions and other breeders, as well as suppliers and service providers typical of horse farms.

Breeding activity is a long-term process. It starts with individual and genetic selection depending on the future destination of the animal. This selection is based on the knowledge and many years of experience and intuition of the breeder. In the analysis of the time needed to create a horse with the desired traits, it is necessary to take into account the period of pregnancy and the time needed to obtain an age allowing for the entry into specific types of activities in the area of breeding and imprinting. From the point of view of economics, pregnancy is the basic manufacturing process - as a result of which an output good for further processing processes is obtained. Depending on the breed, it lasts from 270 to 370 days, most often it is 335 days.

During the rearing process, the horse gains the behavior and skills that allow effective cooperation with the human being. Between the second and fourth years of life, depending on the breed, individual individuals participate in bravery trials. Their aim is to determine the suitability for particular types of future use and further improvement of breeding. Around 6-7 years old, young horses start their professional career. Depending on the breed, horses cease to grow between 4-7 years of age, therefore it is assumed that the 7-year-old horse is already a fully developed individual (Beown and Powell-Smith, 1984). From that moment on, they become working horses - performing target tasks. The average lifespan of a horse is 25-30 years, depending on the physical and mental condition between 20 and 30 years pass to the so-called "retirement". This means a gradual withdrawal from use. Often, during this period, they change their place of residence to centers for "retired" horses, distant from urban centers, where they live their days spending time in pastures. These processes are further complicated by the fact that mistakes made in them cannot be reversed. You can make attempts to neutralize them, however, it is a costly and time-consuming element, and without a guarantee of success. Errors made affect the lower usability of horses for the targeted tasks and reduce the safety and comfort of cooperation with people, which is reflected in the reduction in their value.

Horse Farming

The main type of entity performing tasks in the use of horses in the horse industry is the horses farm. By farm for horses, in accordance with applicable EU regulations (Act on the system of identification, 2004)(Commission Regulation (EC) No 911, 2004), should be understood as: a farm or an agricultural enterprise, a training center, stable or room or other place where equidae are habitually kept, kept or bred. At the same time, the farm is the seat of the herd understood as any buildings, farms, pastures or open spaces in which a given herd or flock of different animals resides, and the animals are kept breeding and breeding. In order for an economic entity to be able to function efficiently and effectively, it is necessary to have adequate resources (land, capital and labor), proper location, and above all, there are needed customers whose needs can be satisfied.

The choice of appropriate human resources determines the quality of the processes implemented. Especially people who have contact with horses in their work should have special qualifications and predispositions. The physiological conditions of horses make feeding systems a particular area of concern. Horses are animals with a very sensitive digestive system and to keep them healthy, special attention should be paid to both the selection and the feeding process itself. Any sudden changes in this area affect the deterioration of health and can even lead to the death of an animal. Also, the extremely delicate psyche of these animals creates the need for great care of the staff, and its violations affect the digestive and immune system.

In today's world, in order to achieve an adequate level of meeting objectives, it is necessary to undertake cooperation with various entities. Their proper selection greatly influences the obtained results. Therefore, they must create a system that functions efficiently both in relation to the environment and properly organized internally. An important element is the selection of cooperating companies who can provide the right quality and quantity of goods and services to be delivered. To the group of suppliers of goods and services, which are necessary to ensure frequent and regular implementation, to ensure the proper functioning of the horse farm should be primarily: feed, linings, supplements, care and services: veterinary, blacksmith, accounting, administrative, waste disposal and related with manure removal. Among the goods and services, supplies of which should be organized and implemented on a regular basis, however with less frequency, include cleaning and disinfection agents, farm equipment, household items and tools, equestrian equipment, clothing, clothing for pharmaceuticals, care tools, components for maintenance of green areas, as well as services: transport, IT, organizational, financial-insurance, marketing, education, rehabilitation, consulting, storage. For supplies of low frequency, however, those without which the functioning of horse farms is impossible include the supply of machinery and equipment: agricultural, farm, training, and the supply of training equipment, elements of small architecture, substrates, means of transport and handling, as well as construction services and renovation, hotel and catering, medical, publishing, liquidation service of animals dead or killed out of necessity.

An equally important element as the quality and reliability of deliveries that are an important factor of trust is the ability to influence the product or service being the subject of the transaction. The specificity of usage diversity, adaptation to particular individuals, as well as the requirements of clients force a far-reaching individualization. Therefore, an important group of cooperators are craftsmen as well as micro and small enterprises, showing a high degree of flexibility and individual approach. For many owners and users of horses, the possibility of establishing personal relationships is also important. It is worth mentioning that in many cases the horse is treated not only as a pet (like a dog or a cat), but also as an important member of the family. There is often a far-reaching anthropomorphisation of horses. Therefore, also influencing its well-being by creating personal relationships with people around it is an important element of the horse's business relationship system.

Horse Industry as A Network of Entities

The term horse industry should be understood as any form of activity directly or indirectly related to horses. The basic areas of horse business are created by its core and core environment. The core elements of the horse business are: breeding and breeding, equestrian, horse racing, recreation, agritourism, hippotherapy, use in security systems, production and processing, and other specific types of use. On the other hand, the environment of the horse business is a system of activity of various types of entities conditioning the proper functioning of the horse industry (Fig.3) (Wncewicz-Bosy, 2012).

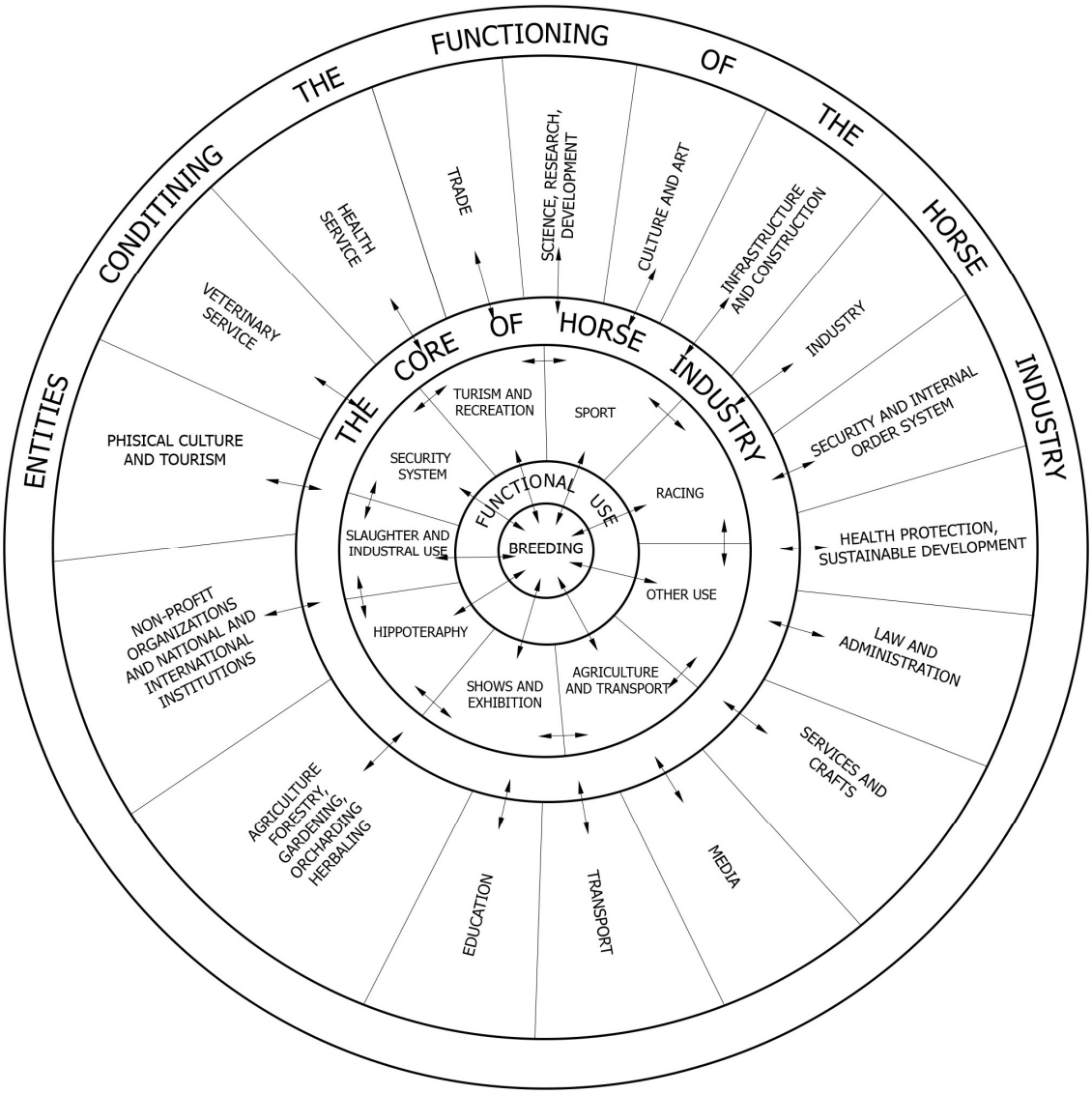

Figure 3: Horse Industry

The basic elements characterizing the compounds created within the equestrian industry include: caring for the safety of people in contact with horses, trust, primacy of quality, appropriate adaptation to the destination and the needs, knowledge and skills of customers. Therefore, the relationships established in this area are of a long-term nature, especially due to the acquired knowledge about the partner, thanks to which the cooperation offer can be better adapted. However, such cooperation does not mean being bound by forever and exclusivity. Each of the entities participating in this system is looking for solutions that are able to bring it closer to success on the market.

All entities participating in the system of the horse industry create a specific network of links based on cooperation and putting the well-being of horses above other values. They are also subject to the influence of the social system which, through its opinion-forming and law-making powers, influences both directly and indirectly their shape. This unique attitude of society to horses will make the horses always have a special place in them, regardless of the fate of individual economies. Nowadays it is also reflected in the possibilities of creating jobs, because "horses give work".

On the basis of the conducted research, it can be concluded that the horse industry integrates the activities of a very large number of entities. Apart from trust and concern for quality, emotions and personal relations that result from them are an important element. The separation of groups of entities due to their market functions allows to distinguish:

- regulators - including international organizations, state institutions, national organizations and the social system,
- breeding farms - operating in the field of breeding, including genetic and individual selection, and rearing, whose purpose is to provide horses which, as a result of further actions, will be of interest to consumers, will be brought to the market,
- specialized horse farms - being organizational units specializing in farming activities and work system with horses, which contribute to obtaining the desired characteristics by the clients,
- specialized entities forming a distribution system - a group of entities providing services, as a result of which clients obtain certain intangible assets (eg: knowledge, skills, artistic or sports experience) or goods (eg horses, post-mortem products),
- customers - the group of these entities includes primarily: owners, owners, spectators, riders, drivers and consumers of physical goods (eg: horse meat),
- suppliers of goods and services - constituting the largest group of entities conditioning the relevant efficiency and effectiveness of the industry system.

The horse industry is an economic area in which the importance of craft activity is very large. Saddlers, saddlers, tailors, shoemakers, purse-makers, blacksmiths and many other craftsmen, condition its efficient and effective functioning, and create opportunities to meet the needs of consumers at the appropriate level. In this area, the Make-to-order (MTO) and the provision of services (Service-to-Order) are also special. These systems, as indicated by Łebkowski and Klimek (2012), are related to the implementation of non-standard orders, for an individual recipient, and the order is implemented as part of a client consultation, the requirements of which are variable and unpredictable.

From the economy's standpoint, the shape of created network can be defined, among other things, based on expenses of particular entities. Due to a large variety in the area of the horse's usability purpose, the systems of expenses connected to them are different in every case. However, for research and identification purposes, we may attempt to apply aggregates, which will allow identification of their main flows within the horse industry. In building this model, a concept proposed by Hanley Centre (Report of Research, 2004) was used, where the foundation is identifying the supply chain of the horse business. The analysis of expenses flow in the entire horse industry makes it possible to build a model of a network of entities, including: consumers, expenses on final goods and services (final consumption) and suppliers of the first, second, third and fourth order. The direction of the expenses flow (financial flow) are opposite to the direction of goods and services flow. However, they are interrelated with a system of numerous interdependencies and feedback. The suppliers of the first order, located closest to the consumers, are the direct suppliers of goods and services, which are the objects of final consumption. Their offer is based on their operations, which require expenses on purchases and supply of goods and services provided by suppliers of the second order. The suppliers of the second order bear expenses on the suppliers of the third order, who provide goods and services essential for their functioning and creating offer for the entities making up the group of suppliers of the first order. The suppliers of the fourth order are mainly entities delivering raw material and entities connected to neutralization or disposal of waste. Efficiency and effectiveness of functioning of the particular entities influences the quality of the entire system, within which numerous correlation structures are created.

The human factor is of particular importance in the horse industry. Starting from the breeder himself by the staff as well as clients and cooperators, to the social system affecting both the hippie culture and the social perception of particular types of use. Appropriate knowledge, experience skills and constant improvement of competences are necessary in this area. In many cases, they decide not only about the quality and extent of the objectives, but also about the health and life of the participants in

the system. Often, there are also arrangements based on cooperation in one sphere and competing in another. The specificity of the horse industry means that in practice entities that compete on the market if they have the opportunity to cooperate in an area not covered by the competition system, are more willing to take it with competitors than with foreign entities. Knowledge about the partner, his strong weaknesses, is the basis for creating relationships, especially trust.

Conclusions

The horse industry is an economic subsystem whose participants form a network of both a structural, organizational and relational nature, for which the good of the horse is the overriding principle. The main factors affecting the creation and management of networks in the horse industry are:

1. a horse as an entity (object and subject) of activity, the specificity of which is associated with its intended use, the history of relationships with humans, the process of breeding, and anthropomorphisation;
2. breeding and rearing, which as processes of creating (producing) a good which is a horse with desirable traits, are long-lasting and require specific conditions of implementation and cooperation with specialized entities;
3. the specificity and diversity of suppliers of goods and services delivering specific goods, which are often highly individualized, and also created in cooperation with users;
4. diversity of types of use that increases the level of individualization and generates the development of the craft sphere;
5. the multiplicity of regulatory institutions and stakeholders related to particular types of use and supporting activities;
6. dependence on changes in consumers' needs, trends and fashions;
7. specific relations related to the system of values presented by system participants.

Research shows the importance of the horse industry as an economic subsystem creating conditions for the economic and social development of a large number of diverse entities; creating business and social networks covering the sphere of local, regional, international and global activity. Therefore, research should be continued both as part of the business management system and the national economy management system.

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Organization of Steel Rope Forwarding Process for Mining Shaft Hoists

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Abstract

Appropriate organization of the forwarding process is one of the basic elements of effective management of the operation of enterprises obtaining resources on the international market. The contemporary process approach and the resulting process management create opportunities for observing and analyzing processes and their key components. The use of mapping tools to get a picture of the processes being implemented can be an important tool for effective management of operations. For the processes of obtaining unique products such as steel ropes for mining shaft hoists, the conditions created by the forwarding process significantly affect the operating capabilities of the hoisting device. Therefore, from the point of view of process management, the basic element of management is its proper recognition. Therefore, the purpose of the article is to identify the organization of the steel rope shipping process for the needs of mining shaft hoists.

Keywords: Process management, steal ropes, freight forwarding process, steal ropes and wire industry.

Introduction

Process management is a natural and comprehensive management approach to business creation, creating the prerequisites for a highly efficient, agile, innovative and adaptable organization that far exceeds the reachable by traditional management approaches (Smith, 2003). Contemporary organizations are continually under competitive pressures and forced to improve their business models and business processes (Škrinjar, et al, 2007). Zairi defines a process as an approach for converting inputs into outputs (Weske, 2007). It is the way in which all the resources of an organization are used in a reliable, repeatable and consistent way to achieve its goals (Vugec et al, 2019). A business process is a coordinated chain of activities intended to produce a business result or a repeating cycle that reaches a business goal (Pourshahid, 2008). In other words, managing a business means managing its processes (McCormack and Johnson, 2001). As Harmon (2014) noted, all contemporary organizational structures, to a greater or lesser extent, emphasize the importance of business processes (Ranđelović et al, 2018). Thereby confirming that business process management is becoming an important part of organizations' operations (Lahajnar and Rožanec, 2016). Jeston and Nelis (2014) define BPM as achieving goals of an organization through management, improvement, and control of essential business processes. According to Weske (2007) business process management includes concepts, methods, and techniques to support the design, administration, configuration, enactment, and analysis of business processes.

The implementation of the process approach results in significant transformations within organizations. It should be assumed that the use of process maps, modeled in generally accepted standards such as BPMN, is just the beginning. Along with the increase of the process maturity of the organization (von Schel et al, 2015), further areas of its activity will be transformed (Stępniak, 2018).

However, before any improvement actions are taken, it is extremely important to properly recognize the process itself.

Identifying individual process elements is the starting point for further research, especially in the context of effectiveness and reliability analysis. And above all, it is the basis for proper process management as well as its development and improvement. Therefore, it has been assumed that effective and efficient process management is conditioned by its proper recognition. Therefore, the purpose of the article is to identify the organization of the steel rope shipping process for the needs of mining shaft hoists. This process is one of the most important elements of the steel rope industry system in the sphere dedicated to the use of ropes in mining. Its proper organization not only affects efficiency, but is an important element affecting the safety of exploitation of hoisting shafts.

Research Approach

In addition to the case study, as well as analysis of literature and documents as well as organizational and formal-legal conditions, research methods were used that included observations, and in particular participatory observations, which create the possibility of recognizing the process "from within". For imaging the observed process components, mapping methods have proved to be particularly useful, allowing to obtain a graphic image of the process. The article uses iGRAFX software to present process maps in BPMN standard. The final stage of the research procedure is the formulation of conclusions and recommendations

Freight Forwarding

The freight forwarding industry is an integral part of global commerce, since in transporting cargos, intermediaries play a vital role in the supply chain process (Pope and Thomchick, 1985). International freight forwarder is defined as an international trade specialist who can provide a variety of functions to facilitate the movement of cross-border shipments (Murphy et al, 1992). The freight forwarders offer transportation and information relations between hubs, plants, and suppliers (Richter and Stiller, 2018). A freight forwarding company generates its profit from the difference between the price that the customer is obliged to pay for the request execution and the costs of request fulfillment. These costs result either from the fulfillment by own transportation capacity, or from the external processing of orders in consequence of involving a subcontractor (Krajewska and Kopfer, 2006).

At a basic level, the forwarder advises clients on the best rates, routings, and modes of transporting goods to or from any area in the world (Custom Brokers, 2002). The forwarder must examine the carrier's total service offering. If intermodal services are needed, the carrier must be able to support the shipper's total requirements in a cost-effective manner. Today, freight forwarder plays an important role in the total supply chain process. Freight forwarders are able to offer the customer a multitude of services, which can save the shipper money in the long run. In the future, new technologies will enable the forwarder to make better decisions and to ensure efficient 'on time' delivery (Turner and Savitskie, 2008). Freight forwarders are concerned with forwarding and handling freight from importers or exporters who are their clients. They store cargo, secure its transport to its destination via air, sea or road, negotiate costs, prepare documentation, secure insurance, take care of port charges, and may even do customs clearance. I.e. freight forwarders handle the freight of their clients. For this reason, they are often also called cargo or freight agents (Bryant, 2015).

The classic forwarders are transformed 'into numerous and more complex activities as well as the function of logistics forwarding' unifying often all fields in the unique logistics service. They can be carriers, providers of special services such as "door to door", "just in time" or "outsourcing", can be included in transport and logistics supply chain, and have a significant part in determining of cargo flows (Jugović et al, 2016). Fourth-party logistics provider, abbreviated 4PL, lead logistics provider,

or 4th Party Logistics provider (Stanković et al, 2018), are consulting firms offering logistics consulting, transportation and supply chain management services.

There is also the need for new competencies from cross-functional areas (Thai and Yeo, 2012). Forwarding and logistic service specialists work in freight forwarding and logistics companies (TimCom, 2016). They are familiar with freight costs, port charges, fees, best modes and cost of transportation, documentation and so on (Bryant, 2015). In this connection modern forwarding service is to meet the following basic requirements (Kucheruk and Bozhok, 2016):

- services are to be based on a transport expedition contract concluded between the forwarder and shipper to implement a comprehensive service as to organizing shipments from the supplier to the consumer;
- services provided for hauling of goods in the scales of international traffic should comply with the rules of international treaties and agreements made between the countries participating in transportation;
- implementation of forwarding services, execution of transportation and other transport documents should be realized according to existing rules of cargo transportation on the appropriate mode of transport, and as for the carriage of direct combined routes
- subject to the rules of cargo transportation by all forms of transport which are included in delivery of goods (Bozhok, 2015)];
- providers should take into account the interests of consumers of freight services, progressive experience of freight supply and cargo traffic services and meet the requirements of an integrated approach, accuracy and timeliness of performance, safety and environmental performance, staff ethics, aesthetics conditions and in formativeness (Brady, 2001).

On the international market, freight forwarders provide significant support to sellers in fulfilling their obligations under the Vienna Convention on the International Sale of Goods (Final Act, 1980). Therefore, in the field of forwarding in international trade, typical activities include (Rymarczyk, 2017):

- Advice provided to clients in terms of transport conditions and costs, determining the best route, tariffs and transport regulations;
- Specific preparation of cargo displacement in the relationship requested by the client;
- Selection of carriers, transhippers and other subcontractors;
- Concluding transport contracts with the owners of transport;
- Formation of collective shipments and organization and protection of proper packaging for the transport and handling of goods;
- Concluding contracts for storage, appraisal and cargo control;
- Declaring goods for customs clearance and completing all formalities related to it;
- Preparation and completion of transport and commercial documents;
- Checking the condition of the parcel on delivery from means of transport and possible preparation of damage reports;
- Settlement of shipping costs related to shipments.

The service quality in forwarding is a significant determinant of demand (Šimková and Kone, 2013). In the competitive environment, it is an important tool for customer retention and also it has effects on the performance and economic results of the organization. When the company have a satisfied customer, it indicates competitive advantage and if company have a dissatisfied customer it creates a bad experience which results in affecting the attitude of the customers. There are various factors like reliability, transit time, over-supply, short supply and damaged, market considerations, carrier considerations, product characteristics which impacts spot and forward freight rates (Meixell and Norbis, 2008).

The Industry of Steel Ropes and Wires

The industry of steel ropes and wires dates back to 3000 BC, when plant fibers or slaughter products (tendons, skins) were used to create ropes. The history of the wire rope production beginning with its innovation by Oberbergrat Wilhelm August Julius Albert in 1834 (Feyrer, 2007), a royal engineer from the mining districts of Hanover (Haw, 2020). Due to the high axial strength and stiffness with flexibility in bending, steel wire ropes have been used extensively in many engineering application fields, such as elevators, mine hoisting, highway guardrail systems, energy absorber apparatuses, and so on (Xu et al, 2014). Wire Rope is made up of steel wires, generally braided in a helix (spiral) forming units known as strands. Generally speaking, the constituent steel wires are helically wrapped around core wires to form strands and likewise, several strands are helically wrapped around other strands or core materials to make a singular steel wire rope. The strands in the wire rope can vary in accordance with specific and desired properties (Steel Wire Rope, 2020).

Steel Wire Rope market maintains the average annual growth rate of 3.12% from USD 10024 million in 2013 to USD 10991 million in 2016 and hoping to reach USD 11888 million by 2021 (Steel Wire Rope, 2020). North America is witnessed to have the vast opportunities to lead the market shares due to increase in the mining sector revenue shares and also increasing innovative developments. Following North America, Asia Pacific is ranked second in leading the market shares. The rise in constructional buildings due to rapid increase in population is strengthening the demand of the market. Europe is anticipated to grow at a higher rate owing to increased adoption of these ropes in industrial sectors. With largest GDP in Europe, Germany is the largest consumption place, with a consumption market share nearly 25.5% in 2017. Following Germany, UK and France are the also important market with share of 13.3% and 13.5% (Global Steel Wire Rope, 2020). Products in the group of steel ropes and wires include: ropes and wire strands, construction wires, telecommunications cables, springs, stainless and colored wires (made of several types of metals). Product groups can be distinguished here: electricity permeable wires - animal control systems, cargo control system, plastic engineering, joining - binder metal alloys, liquid mineral transport system, heavy metals, sanitary and hydroponic installations, textile industry, equipment for extraction equipment (equipment, other products), natural and synthetic fiber ropes, products for packaging, securing and fixing. Ropes and wires are sold all over the world to a very wide group of customers on various markets, including: energy, oil and gas production and processing, mining (deep-well shaft, surface casting), railways and railways, civil engineering (elevators, road safety barriers), vertical transport (cranes, elevators), commercial and war shipping, shipbuilding, fishing, telecommunications, agriculture and horticulture, woodworking, and product security (including packaging).

Due to the progressing globalization and internationalization in the world economy system, at the turn of the 20th and 21st centuries there was a change in the rope production system. The regional producers that have dominated so far have been replaced by international concerns. It is a derivative of, among others, changes in the extraction system resulting from their economic analysis and depletion of mineral resources, as well as technological progress, which forced producers to develop a sphere of research and development activity, which entails significant investments (the need to incur more and more expenses). According to Global Steel Wire Rope Market 2019 Report key global manufactures in 2019 are: Wireco World Group, Tokyo Rope, Kiswire, Jiangsu Langshan, Guizhou Wire Rope, Fasten Group, Usha Martin, Bekaert, Xinri Hengli, Bridon, Juli Sling, Jiangsu Shenwang, Shinko, Xianyang Bamco, Dsr, Jiangsu Safety, Gustav Wolf, Ansteel Wire Rope, Youngheung, Pfeifer, Teufelberger, Hubei Fuxing, Redaelli, Haggie, Diepa, Brugg (Global Steel Wire Rope, 2020).

The specificity of the steel ropes and wires industry makes it necessary to establish numerous forms of cooperation, both with organizations related through the value chain and the logistics chain of individual entities, but also with companies that are links in the supply chain. This applies especially to connections with forwarding companies and scientific and research units. The latter create the possibility of gaining a competitive advantage due to wailing on new products and new applications of existing products. New production systems, methods and technologies are also extremely

important elements in this field. In order for products manufactured by this industry to be used, it is necessary to carry out numerous tests, trials and approvals related to strength and safety. It is also necessary to constantly check the technical condition of the products used during their operation.

Conditions for The Steel Rope Forwarding Process for Quick Mining Hoist

Mining shaft hoist is a set of equipment in the shaft, used to transport spoil, material and people in mining plants along vertical roads and inclination above 45°, in which the basic elements are: shaft, shaft tower, hoisting machine with a system of ropes moving the vessel hoists over guides and reloading equipment in the underground and on the surface of the mine. Mining shaft hoists is used for: people ride, spoil drawing, transport of materials and equipment, auxiliary transport. Issues related to ropes in mining shaft hoists are regulated by numerous national and international regulations and standards, among others: ISO 16124:2015, ISO 16839:2013, ISO 17893:2004, ISO 2232:1990, ISO 2408:2017, ISO 2532:1974, ISO 3108:2017, ISO 4101:1983, ISO 4345:1988, ISO 4346:1977, ISO 7800:2012, ISO 7989-1:2006, ISO 7989-2:2007, ISO 8793:1986, ISO 9649:2016, ISO/DIS 2232.

When deciding to buy a rope for a specific hoisting device, you should choose the right manufacturer. Each manufacturer has its own design and technological solutions created in cooperation with scientific and research institutions (entities). They are covered by a patent system. The construction of each rope is an individual element. Since the choice of rope design for a given device depends mainly on the design of the device and the conditions in which the rope works, the general principles of rope selection include:

- Determining the purpose of the rope.
- Indication of the quality of the wires used to make the rope.
- Determining the technology of implementation.
- Determining the operating rules.
- Identifying the most optimal rope parameters for a given device.
- The right choice of rope construction for its operating conditions.
- Compliance with occupational safety standards / conditions.
- Determination of external factors and the degree of their impact on rope operation.
- The right choice of rope construction for its exploitation conditions.
- Determining the determinants of the forwarding process.

This creates a product with individual features dedicated to the specific needs of the customer. This affects the organization of the forwarding process, as it requires appropriate organization of transport tailored to the product, and all the dates associated with it are a derivative of the production process and the agreed arrangements in the contract. Many elements accompanying the organization of the forwarding process result from the arrangements made at the stage of production control. Starting from the product parameters, through its transport and handling packaging, conditions of transport and handling, to the process of taking over the goods by the recipient.

Forwarding Process

It is customary in the steel rope and wire industry to organize the forwarding process on the manufacturer's side. The steel rope forwarding process for mining shaft hoists can be divided into four phases: pre-trade, contract conclusion, production and transport, settlement and closing of the process.

It should be noted that setting forwarding conditions begins at the stage of order construction. Due to the specificity of the product, it is necessary to properly compose the entire process, as a result of which the desired product will be delivered to the buyer.

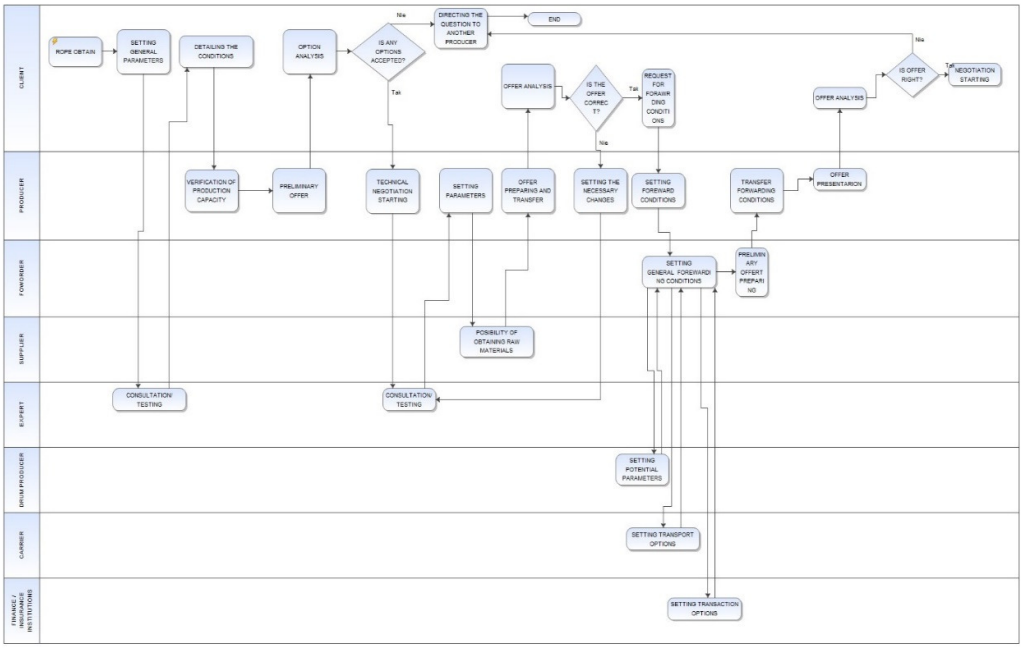

Figure 1: Pre-trade phase [own elaboration]

In the pre-transaction phase (fig.1), customers recognize the possibility of obtaining the appropriate rope. They are in talks with producers, trying to obtain the best technical solution for themselves. Technical arrangements in the product sphere are accompanied by preliminary arrangements in relation to delivery conditions. Recognition of formal, legal and financial conditions for the production process and forwarding process has a special place.

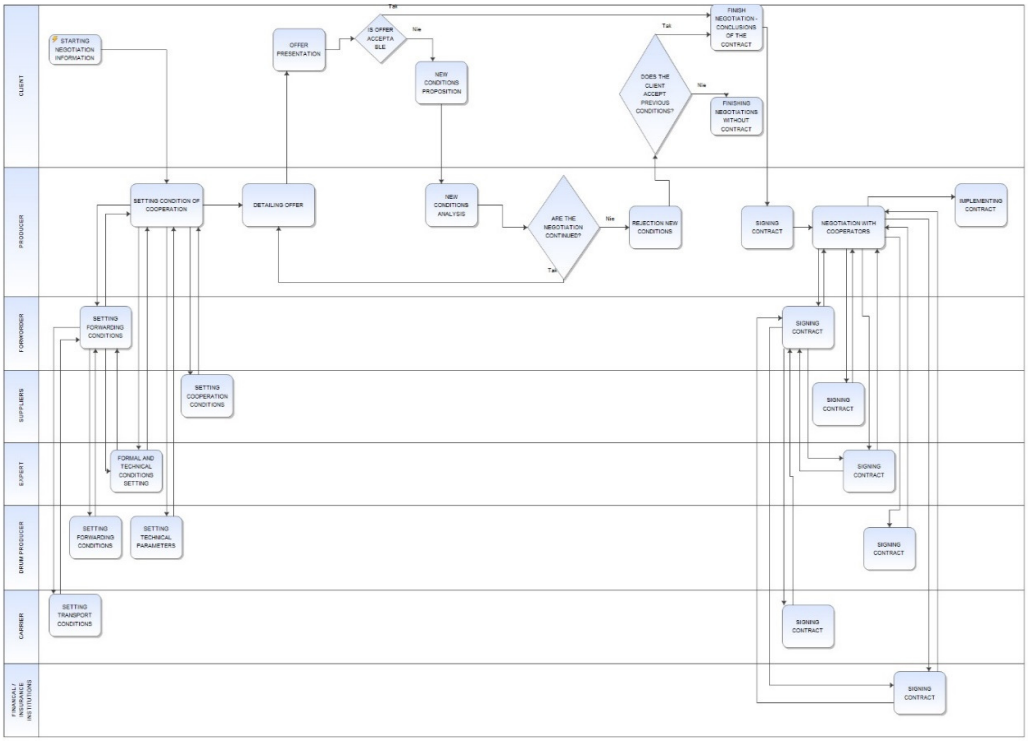

Figure 2: Contract conclusion phase [own elaboration]

The second phase is the conclusion of the contract (fig.2). Transaction details will be agreed during negotiations. The contract clauses include, among others, issues regarding delivery terms and deadlines, related costs and the division of transport responsibilities and risk. Due to the product specificity and customs in the industry, INCOTERMS DDP (Delivered Duty Paid) is accepted as the delivery terms. This means a maximum of obligations on the part of the seller who is obliged to deliver the goods on the means of transport to the buyer's disposal at a specific destination, to bear the associated costs and risks. In addition, the seller is required to perform customs clearance on import. The seller bears almost all responsibility during the transport process. It covers the cost of transport and assumes the risk of delivering the goods to the agreed address. The seller also prepares goods for unloading, fulfills export and import obligations and settles all customs fees. The risk is transferred from the seller to the buyer when the goods are in the indicated place and are ready for unloading.

In this phase, the proper forwarding process is initiated after receiving the right information from the seller regarding: production data, units and production volume, product description, price and cost information, sales date, payment deadline, special customer requirements, packaging information and product security conditions in transport. Based on the information received, agreements are concluded and contracts concluded with subcontractors from the TSL market. In this phase, there is, inter alia, the choice of a carrier, booking of loading space for a specific route and on means of transport meeting the requirements related to a given load.

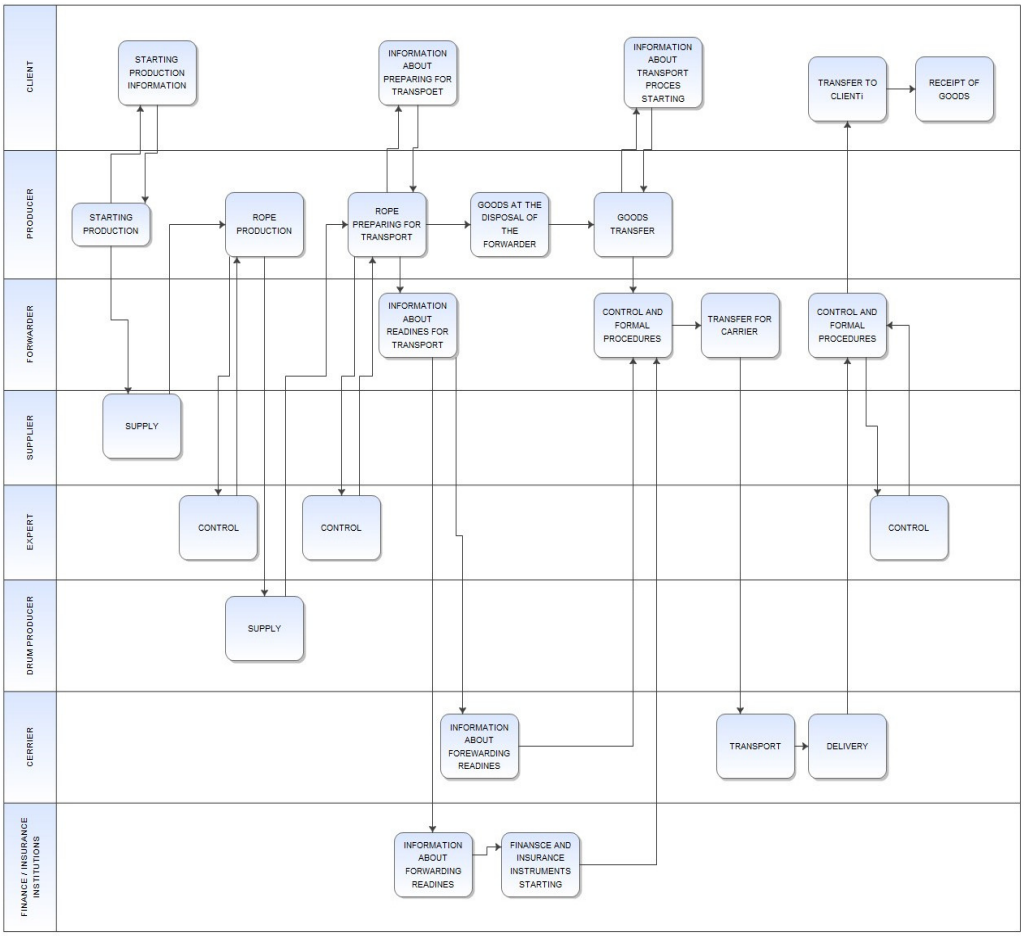

Figure 3: Production and transport phase [own elaboration]

The third phase is the implementation of the contract covering production and transport (fig.3). After determining the rope parameters obtained as a result of production, the transport packaging and the transport, storage and operational protection are adjusted. In addition to the rope production itself, it is necessary to order the manufacture of a drum for transporting the rope at this time, order appropriate preservatives and determine the method and entity that will secure it. Ordering appropriate handling equipment for loading, unloading, moving and securing the drum and rope and other substances during transport. For the determined dimensions of loading units, the means of transport, routes and conditions of transport (including the size of transported loads) are determined. For mining shaft hoists in the European area, for ropes up to 1000m, drums with a diameter of 3.5 m are most often used. The whole set - drum and rope - weighs about 16 tons. Drums with a diameter of 5 m are used for ropes over 1000 m to 1300. The whole set is about 20 tons.

Information related to the booking of means of transport is sent to the factory and is confirmed by subcontractors. Then all product instructions are collected and attached to the documents sent. The next step is to notify the customer about the delivery. In this phase, accounting documents (e.g. invoices) and all documents necessary for sending are also created. The factory sends all documents (including standards and shipping instructions) necessary for loading and transporting. It is necessary to obtain appropriate transport permits and preparation for shipment of finished products, after receiving confirmations and relevant documents from recipients and after they and the forwarder confirm their compliance with previous specifications.

Relocation of products to the customer begins preparation of products for shipment at the factory, notification of relevant entities about readiness to start transport processes and delivery of products to the point specified in the contract. For industry, steel ropes and wires forwarding process it is strictly dependent on the ordered product by the customer. It is therefore necessary to care for an appropriate level of customer service. Technical product standards impose the need to apply appropriate technical and administrative-economic solutions. An important element is the submission of customs declarations and controls, as well as the launch of fiscal instruments (financial and insurance)It is necessary to check the rope packaging for any transport damage. Record any such damage on the delivery note. When loading and unloading, take appropriate measures to avoid damage to the rope. In particular, take care not to damage the rope with the forks of the lift truck. This transportation operation should be performed in such a way as to completely avoid any possible of contact of between the wire rope and loading equipment (Steel Wire Rope, 2020). This phase ends with the delivery of the product to the final recipient.

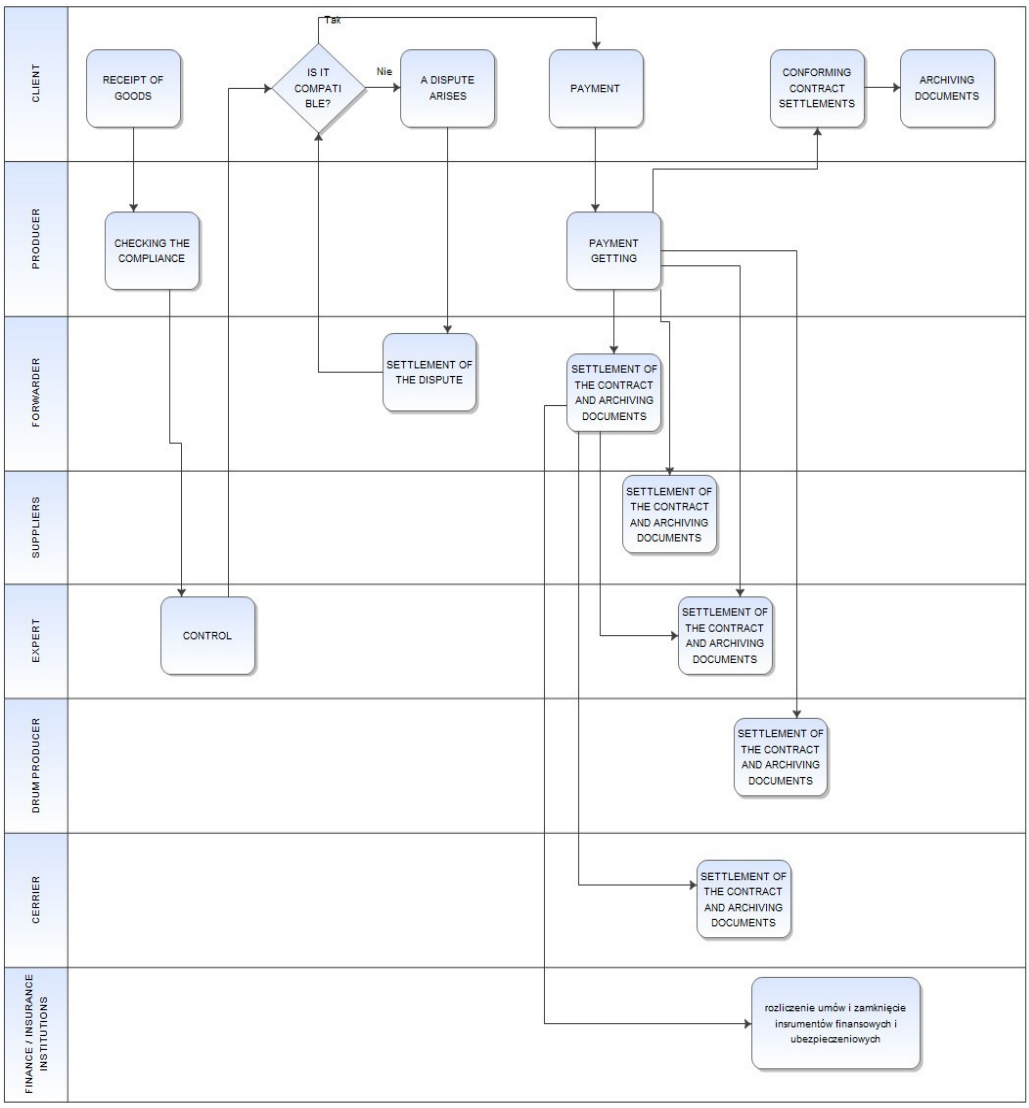

Figure 4: Settlement and closing of the process phase [own elaboration]

The last phase is the settlement and closing of the transaction, which de facto means the completion of the forwarding process (fig.4). After delivery of the goods to the final recipient, the condition of the delivered product is checked and its compliance with the concluded contract is determined. After conducting appropriate checks and confirming that the transaction participants have fulfilled their obligations, payment for the delivered goods is made. The next stage is settlements with individual subcontractors, including making appropriate financial flows and closing financial and insurance instruments. Archiving documents ends this phase.

Conclusions and Recommendations

Proper organization of the forwarding process is an important element of effective process management. However, for this to be possible, it is necessary to properly identify the individual elements that make up this process. By using process mapping tools, you can get the right picture of the area under study.

Due to the nature of the product, this forwarding process begins at the stage of negotiating the order (order) of the product. Because products for the needs of mining shaft hoists are a unique element and their production is carried out under individual orders, it is necessary for each product to have an individual approach to the forwarding process. Also, due to the size of the loading units and their individual nature, an individual approach to the organization of the forwarding process is necessary for each order.

The steel rope forwarding process is a significant organizational challenge resulting from the product specificity as well as from the variety of entities involved. For its effectiveness, proper coordination of activities and creation of an appropriate information flow system is of great importance. For the quality of implemented flows and the results obtained, the knowledge and experience of the entities involved in this process are important, and expert knowledge - represented in particular by experts is a decisive factor in the effectiveness of conducted activities. Cooperation of specialists from various industries is a necessary factor influencing the success of concluded contracts. The ability to resolve disputes and act under stress are important features of freight forwarders. Just like space-time coordination.
Due to their specificity (the scope of the tasks being carried out and the need to coordinate many multidirectional flows), these processes are becoming more and more often the subject of 4PL's implementation, especially in relation to transactions on the international market.

The forwarding process involves a wide variety of entities that create a specific business network involving numerous research, control and regulatory institutions. Therefore, it seems right to conclude that research into the network of entities integrated through this process should be continued. At the same time, taking into account the importance of safety, quality and reliability for the operation of ropes in mine shafts, the view seems to be right about the need to continue research also towards the analysis of the reliability of management processes associated with reliability in the technical context and their interaction.

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Avatar as The Modern Solution of Support the Customer Service in Public Services Management – Project Case Study

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Abstract

The paper present the basic issues and results of the realization the international project developing a method of providing public services and developing customer service standards tailored to the needs of people with special needs. The main goal of the project is to improve the functioning of local government units by developing and implementing an innovative model support for people with special needs. Regarding the very early stage of the project realization, in this paper only its first stage will be presented. It is based on the pilotage research made with the purpose to clarify the research questionnaire and prepare it for the final examination.

Keywords: avatar, customer service, public services management, case study, project

Introduction

Over the past several decades, we have seen a slowdown in demographic development in Poland. Forecasts indicate that in the next 10 years the number and share in the population of people aged 60+ will increase. This age will include many groups of people born in the baby boomers of the late 1950s and early 1960s. In turn, the age of late old age will include relatively few groups of people born during World War II. Therefore, Polish society is currently facing challenges arising from dynamic changes in the demographic structure of the population. One of the priorities of public policy implemented in Poland is the comprehensive development of social policy towards the elderly, the sick and the disabled in order to create and meet the special needs of this community in the future.

An increase in the number of people with special needs, an aging of population or social migrations are facts that are confirmed by numerous studies and statistical data. Older people, both as a social and demographic group, do not constitute a homogeneous community. The elderly population is distinguished from other social groups by four basic features:

1) feminization,
2) singularization,
3) decrease in income,
4) deterioration of health.

Age in itself is not a key factor affecting a person's old age. Senior has his own individual ideas about aging. The experience of aging raises an important aspect and justifies why we should refrain from generalizing when we talk about seniors. Personality, life history and experiences cause individual reactions of the aging organism and various diseases, and society's attitude and social relations are often integrated into the experience of aging. Aging is a process consisting of various elements. It includes objective facts such as: age of the person, functional skills or diagnosed diseases. In addition to these features, aging is a highly subjective experience in the perception of the disease and its syndromes or subjective feelings about functional and cognitive abilities.

There is a wide range of variables that affect aging and people experiencing aging. Successful aging is not only life without diseases, but also requires subjective satisfaction with life, participation in social life, good cognitive skills and mental resources.

The implementation of the project (details in acknowledgment), on the basis of which an avatar is to be created to support the service of older clients in offices, will facilitate access for people with special needs to services offered by offices, which will contribute to increasing satisfaction with the quality of life of the elderly and those weakened by diseases use of these public services.

The article presents the main motives for undertaking the subject of the project and preliminary data collected in the pilot study, which are to contribute to show the scale of the phenomenon of the problem examined in the project, as well as to recognizing the correctness of the motivation for changes planned in public units in the area of public services and customer service standards.

Literature Review

Every developing organization must invest in innovation, creative problem solving and the use of increasingly new technologies. Constant changes in the environment require flexible actions, developmental dynamics, the ability to take risks and meeting the needs of service recipients[1]. Such activities should also be undertaken in the area of customer service in public services management.

Public administration, as an integral part of the public sector, carries out important activities for the functioning of the state, and thus also the society. There is therefore a need to constantly improve the level and scope of services in this sector through effective customer service[2].

The role of public administration is to provide every citizen with a minimum amount of livelihood thanks to the basket of goods and services provided to him (public goods and services). Public administration bodies include: state authorities (including government administration, parliament) and self-government authorities at all levels (including local government, executive, supervisory and constitutive bodies)[3]. Public services provided by public administration are classified as follows[4]:

- basic private services (goods) are services (goods) consumed individually, delivered to the least-paid members of society;
- public exclusionary services, financed exclusively from public funds, are measurable through outcomes for society;
- publicly available public services, collectively consumed, for all or most of the society, totally or partially paid;
- basic public services, collectively consumed, widely available. The great diversity in the classification of public services in administration means that their significant significance in the economies of many countries is noticed.

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The basic problem of modern administration is to ensure efficient and effective implementation of public services rendered[5]. The public services sector must adapt to new conditions; the role of a public administration employee in shaping the quality of services provided is increasing[6]. A high-quality public service is a determinant of effective management of an administrative facility. The most important entity in the relation donor - recipient of public service is a citizen, the applicant entitled to obtain the necessary high quality services[7]. Quality from the point of view of the recipient is what he needs, expects, requires, taking into account the duration of the service. A public administration employee must be aware that the client in the organization is currently in the spotlight. His opinions and assessments are a clear indication for the public authority for further functioning. The satisfaction of the stakeholder with the public service is related to the correct assessment issued to the employee, and hence also the assessment of the public organization. Thus, customer service in public services management is focused on meeting the following requirements[8]:

- customer orientation that ultimately assesses the quality of the service provided;
- continuous improvement, deepening knowledge, innovation in problem solving, using the opportunities provided by the organization's employees;
- employee development and commitment, is associated with an organizational culture based on trust and the transfer of full competence to employees; management based on processes and facts, consisting in the efficient use of used resources, obtaining the desired results, information management, which should be true, complete, reliable, professional;
- leadership and consistency of goals, leaders at all levels of the public organization are responsible for its development, promotion of values, its mission and vision;
- development of partnership, mutually beneficial relations between partners cause full integration both in generating knowledge, implementing plans and public goals, while applying generally accepted principles of conduct;
- public responsibility, ethical approach and conduct of employees, meeting the expectations of clients, employers, society;
- results orientation, where perfection depends on the ability to balance and satisfy the interests of groups, people in whose interest it is the functioning of a public organization.

The concept of customer service means many interrelated activities that determine customer satisfaction when purchasing a product (service), which is the last act of the process that usually begins with the order and ends with the delivery of the product to the customer[9].

Customer service is a set of activities to meet customer expectations, specific standards of services rendered or even as a customer-oriented corporate management philosophy. What's more, this process is an information system that consists of a specific concept of relationship management, service standards set, decisions made and methods of contact with the client[10].

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Maintaining the right quality of customer service requires above all a continuous improvement of communication between the parties[11], which allows to present certain values, meet expectations and build trust.

Methodology of the Research

In connection with the implementation of the international scientific project "Innovative assistance model avatar for the carer of the elderly", a pilot survey was conducted at the beginning of 2020.

The survey questionnaire consisted of a main part comprising 23 questions and a metric with 4 questions. The main questions of the survey concerned two main areas. The first was related to the assessment of respondents in the operation and service of applicants at public administration offices. The second area concerned the expectations and requirements of clients regarding their service at public administration offices. The respondents' habits were also examined here, mainly in relation to computer skills and functioning on the Internet.

The pilot purpose was to verify the correctness (elimination of defects) of the assumed research procedure: selection of the examined people and the research tool used (survey). It was not used to verify hypotheses, but to provide information enabling the construction of a good research plan.

The study was qualitative (questionnaire test) and was carried out in the form of a meeting of people from a deliberately selected sample with the number N = 20. The pilot survey was carried out using the conventional method (verification, among others, whether the examined persons correctly understand all of the questions asked? Is the instruction attached to the survey clear for the examined persons? Are there any missing answers in the survey?), Supplemented with cognitive interview (suggestions for changes) / supplementing the scope and type of questions, analysis of the target group of respondents).

The research sample, due to the subject matter, was mostly elderly: 45% between 56 and 65 years old, 35% over 65 years old and the remaining 20% under 55 years old. 65% of the research sample were women and 35% men. 60% of respondents had higher education, 20% vocational, 15% secondary and 5% primary. 45% of the respondents are retired, 40% are working, 10% are pensioners and 5% are unemployed. The sample size ensured statistical significance of the results.

Research Results

Statistical analysis showed that all study participants have ever used public administration offices, but most of them (85%) used the services of a city, municipality or district office. The remaining part used the services of the poviat eldership. In most cases (50%), the respondents handle official matters several times a year (50%) or once every few years (25%). 10% of respondents could not accurately determine the frequency, while 5% of respondents admitted that they use several times a month, once a month or once a year. 10% of respondents had a problem determining the frequency of using public administration offices. In addition, 40% of respondents said they had been in charge of official affairs in the last six months to three years, 20% two months ago, 15% each month or last month, and 5% last week.

Then the respondents were asked about the type of matters they usually handle in public administration offices. It was a multiple choice question. 40% of respondents said that they handle matters related to waste management, location of landfills in the Department of Environmental Protection and replace the old ID card or produce an ID card in the Department of Civil Affairs. 20% of the respondents take care of matters related to social assistance - allowances and other benefits in the Municipal or Municipal Social Assistance Center; tax matters - tax payment, tax discontinuation etc. In the Tax Department and exchange of the registration certificate, production of the proof - vehicle registration / deregistration of the vehicle in the Communication Department. 15% of those surveyed deal with registration issues

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- permanent check-in, check-out, etc. In the Department of Civil Affairs; cases related to the issue of death and birth records, changes in civil status files in the Civil Registry Office and matters related to obtaining water and legal permits at the Department of Environmental Protection. 10% of the respondents arrange exchange of driving licenses, obtaining a driving license at the Department of Communication and obtaining maps for agricultural subsidies, obtaining information on spatial development plans, etc. at the Department of Geodesy and Cartography. 5% of respondents arrange obtaining building permits at the Faculty of Architecture and Construction. None of the surveyed group indicated dealing with job search or obtaining unemployment benefits at the Labor Office or registering a company at the Economic Development Department.

Participants of the study were also asked about the way in which they most often contact the authorities. It was possible to mark two answers. The respondents indicated that they most often contact personally (90%), by phone (25%) and by mail (5%). There was no indication regarding electronic contact and via the PUAP platform.

The respondents of the survey were also asked if they were satisfied with the manner of service in offices and here 100% of respondents said that they were rather satisfied. The respondents were also asked whether information on the location of individual cells / rooms of employees responsible for a given scope of tasks is legible. 95% of respondents said yes and 5% that rather not.

Another question concerned the service of applicants by office staff. The respondents positively responded to the statements that (1) information provided by the employees of the Office is understandable (100%); (2) information provided by the Office's employees is sufficient to settle the matter (95%); (3) employees of the Office always address clients culturally (95%); (4) the Office's employees are always happy to assist in completing documents (90%).

The next question was about determining what help or information the clients usually need when dealing with official matters. It was a multiple choice question. 70% of respondents indicated that they need information in which room they can do their business and information that prints are needed to settle the matter. 50% of respondents indicated that they need information on how to fill out forms to handle a given case. 40% of respondents indicated that they need information on the amount of fees in connection with settling a given case and how long the procedure will take. 25% of respondents indicated that they need information from where they can get printed matter to deal with a given case, and 15% indicated that they need information about where they can pay.

The respondents were also asked about how long they usually wait to settle the official matter (time spent in the office). 45% of respondents said they expected from 30 minutes to an hour; 40% that from 15 to 30 minutes; 10% for 1 to 3 hours and 5% for a maximum of 15 minutes.

When asked about the reason for the problems with reaching the right employee in the office (multiple choice question), 60% of respondents indicated incorrect oral information obtained from another employee of the Office; 50% of respondents indicated the employee's absence from work; 25% of respondents indicated incorrect data provided on the Office's website.

The survey also raised the issue of difficulties encountered when dealing with official matters (multiple choice). 40% of respondents said that they did not face any difficulties; 35% were asked to contact at another time; 25% were directed to the wrong person; 10% received incorrect information and 10% did not find an employee in the indicated room.

The respondents were asked (open question) what changes they would make regarding the office's operation. 30% of respondents answered this question. They suggested: (1) increasing the number of employees in the most sensitive departments such as the Communication Department; (2) more intuitive arrangement of the rooms of employees responsible for given cases; (3) better customer focus; (4) additional information on procedures and documentation; (5) increase in the number of employees; extended office hours; (6) shortening of certain cases and limiting the number of documents.

In the second part of the survey, regarding the improvement of official work, the respondents were to answer the question whether elderly people in the Office should be given special care. 90% of respondents said yes.

The respondents also answered the question of what problems in the offices most often face the elderly (multiple choice question). 75% of the respondents indicated the difficulty in reading on the information board in which room a given case was handled (illegible board, letters too small); 60% indicated the difficulty in completing the form; 55% indicated the difficulty in reading the form - letters are too small; 40% difficulty in understanding information obtained from officials (information spoken too quickly, too quietly) and the need to wait in queue to obtain information; 35% indicated the reluctance of officials to repeat the same information several times to an elderly person; 25% of the respondents indicated difficulty in moving around the Office due to mobility restrictions.

In relation to previous questions, the question was asked whether the respondents see the need to hire an employee whose main task would be to provide information to the Office's clients. 80% of respondents rated this idea positively and 20% negatively.

If the office hired such an employee, the respondents had to determine what information they should provide to applicants (multiple choice question). 85% of respondents thought that this would be information about which room a particular case can be dealt with and what documents are needed to settle a specific case; 55% of respondents indicated information on where to obtain documents to handle a specific case; 50% indicated a discussion of the procedure in place to deal with a particular matter; 45% of respondents indicated information on how to complete the documents necessary to settle a specific matter; 40% of respondents would like to know what additional actions should be taken to settle the matter; 25% of respondents believe that an employee should be able to call a given employee in a situation where a client of the Office cannot go to an employee due to various restrictions, and should also provide information about the Office's working time, especially on pre-Christmas days, long weekends, etc. ; 15% of respondents indicated that they should be able to read a given procedure and 10% that they should inform if the employee responsible for dealing with a given matter is present at work.

Respondents were also asked to specify the characteristics of the official who inspires their greatest confidence. Respondents indicated that it would be a woman (75%), wearing glasses (65%), short (45%), brunette (60%), elderly (60%), dressed in formal attire (85%) and with low tone vote (65%).

The third part of the survey was to determine the respondents' habits in the area of computer literacy. 65% of respondents use a computer on a daily basis, and use the Internet as much. These respondents declare average level (25%), high (20%) and average (15%) Internet skills. Only 5% rated their level of competence in this area as high.

In addition, people using the computer and the Internet use Skype or Messenger instant messengers to a small extent (35%); have their profile on social networking sites like Facebook (35%); use the websites of offices to search for necessary information (60%); use the application on a mobile phone (35%); and shop online (55%).

The last question concerned the possibility of introducing an application for clients to the office, which would contain all the forms together with information on how to complete them and where to submit them to settle a specific matter. 70% of respondents said that they would use such an application.

Summary and Discussion

The structure of the survey questionnaire requires a clear division of questions into three parts, as it was done, as this will help direct the respondents to the desired course of thinking, while suggesting to them how they should relate to individual questions: (1) The three-part division of the survey clearly separates questions about issues essential (1-part: the current state of affairs and how it is perceived by the respondents - this will allow to diagnose what brings applicants to the Offices and to what extent

assistance solutions should be sought for the implemented project, 2-part: what are the expectations of the applicants - answers to in this part, the questions in the right survey will create an image of the avatar's functionality, this is another part of the study used to diagnose the preferences of applicants in terms of the possibility of offering them assistance in the offices, 3-part: who thinks so - inform respondents that after knowing their habits and metric characteristics will allow targeting the developed solutions to specific social groups and adjusting them to the requirements of selected groups of clients as well as possible; (2) The division of questions in the survey results in a more favorable, subconscious perception of the fact that respondents complete the survey. The analyzed survey is quite long and complex, which translates into a possible reluctance to participate in such an extensive survey. The division into parts aims at creating the apparent satisfaction of the respondents from completing their individual stages. In a proper study, this will be important because the return of 100% completed surveys must be at a level ensuring sample representativeness.

Bearing in mind that the avatar originated from the functionalities specified in the actual study, carried out using the analyzed survey, is to support the elderly (60+) and those weakened by diseases, the study should cover exactly those people who will be able to use it. We are talking about people with some kind of social dysfunction and digital exclusion who are clumsy in dealing with official matters. The research sample should be focused on them, eliminating others who do not have such dysfunctions (which does not mean that if these people will be able to use the avatar they will not do it). Nevertheless, the elderly or those weakened by diseases or disabilities who are doing well in the age of digitization or have the support of other people (relatives, friends) should be excluded from the research sample, because their participation will not allow reliable results from the study.

Therefore, the first part of the survey questionnaire is the record, which allows to eliminate from the actual sample all persons who do not feel the need for support in dealing with official matters. Questions eliminating these questions include: (1) Age (analysis of pilot statistical data shows that the younger the better they are at dealing with official matters because they actively use the computer and the Internet and do not need to use additional supporting tools). (2) Computer and internet skills (analysis shows that people with competence in this area do not feel the need for support from the Office in dealing with matters). (3) The survey should be supplemented with a question about the independence of applicants in dealing with official matters. People with the support of relatives will not have problems with settling matters in the Offices. Therefore, respondents declaring active help from relatives in dealing with matters may ask if they would decide to become more independent if they had the opportunity to use the assistance of an avatar.

Other metric questions are: regarding gender, subject to a greater share of women due to demographic conditions, i.e. a higher percentage of women in the age group 60+; education - the proportion of persons with higher education should be proportionally reduced, who in the discussed age group use computers and the Internet more often, are more independent and, as a consequence, do not seek advanced help in dealing with official matters; status - referring to the avatar's orientation to help the elderly and debilitated diseases in most cases due to age, the answers can be accumulated on pensioners.

It can be also added to the record questions to diagnose the more sophisticated requirements that an avatar should meet (e.g. support for the visually impaired by using headphones and loud audio information, deaf people could use the option of displaying textual information).

Considering the above analysis and preliminary recommendations, in summary, after correcting the questionnaire, you can proceed to the actual study, and consider conducting this study using the Face-to-Face (F2F) direct questionnaire interview technique. It enables direct contact with the respondent. Thanks to this, the survey is completed on the basis of dialogue, and the respondent has the opportunity to ask questions, dispel doubts, which in the study of the elderly and those weakened by diseases may be of key importance.

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Employee Pension Plans as Retirement Saving Form

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Abstract

The forecasts referring to the effectiveness of the system introduced by the law act in 1999 show that the retirement pensions paid in the future from the obligatory part of the system will be low and they will significantly decrease the life level of the pensioners. The forecasted low level of the effectiveness of the new pension system leads to a bigger interest in solutions which can partially reduce the poverty level of the future pensioners. This article is devoted to a new pension saving form, that is Employee Pension Plans (EPP). The goal of this paper is the attempt to answer the question whether the proposed form of saving can have a crucial influence on the pension amount of an average Polish citizen. The simulations of the potential pension benefits gained thanks to the suggested form of collecting capital will be analyzed in this article. Methodology: elaboration of the simulations and forecasts of the future pensions amount from the Employee Pension Plans by application of quantitative methods. Practical application: the presentation of forecasted effectiveness of EPP Social implications: improving the awareness of Polish society as far as Employee Pension Plans are concerned and their influence on the level of future retirement pension.

Keywords: pension system, savings, pillar 3

Kody JEL: J18, J26, G17

Introduction

The unfavorable demographic situation in Poland causes that we should look with bigger and bigger fear at Polish pension system efficiency. In recent years we can observe the decreasing number of births simultaneously with a growing average lifespan. These rates significantly influence the level of the retirement pension paid from the obligatory part of the retirement system, and in this way they determine its efficiency. Taking into account the demographic processes, at the same time we can state that the level of a retirement pension will decrease for the significant part of the Polish in the perspective of the coming several dozen of years. Currently the replacement rate, that is the rate of the last pre-retirement earnings to the first retirement pension, equals about 50%. In coming years, it is predicted that the rate will drop to about 20-30% (Chorkowy 2018).

Because of the lower and lower level of pensions from the base part of the pension system, saving in the auxiliary system part initiated by an employer or a future pensioner is the effective way of ensuring a higher life standard (Pieńkowska-Kamieniecka 2015).

Polish government made an effort to meet the above mentioned necessity by introducing a new form of saving for the retirement that is Employee Pension Plans (EPP) by the law act of October 5, 2018.

The aim of this paper is to present the potential effectiveness of the new common way of saving. Will the saving method significantly influence the level of the future retirement pension? Will it lead to a more decent life of an average Polish citizen in the old age?

The article discusses the demographic situation in Poland, as one of the main reasons of the inefficiency of the pension system and it presents simulations of various saving possibilities of EPP.

Demographic situation in Poland

The analysis of the demographic situation in Poland, presented in the context of its influence on the pension system efficiency, has been based on two indexes:

- the live birth rate.
- the average lifespan.

In 2017 in Poland the live birth rate was at the level of 402 thousand of children, what constitutes the growth in comparison to 2016 of about 20 thousand. Simultaneously, it has to be noticed that it has been the highest live births level since 2010. Unfortunately, this positive situation in 2017 is not continued in the following year. In the first half of 2018 193 thousand of live births were registered, what constitutes a fall of over 6000 comparing to the analogue period of the previous year. It will be reflected in the fall of birth rate of about 0.3 points to the level 10.1‰. At the same time, it has to be noticed that the level of the rate will be practically half the amount of the level in 1983 (the year of the last "baby boom" in Poland) when 723 thousand babies were born and the birth rate was at the level of 19,7‰) (http://stat.gov.pl)

The total fertility rate plays a crucial role in the presented study. The optimum value of the rate which ensures the replacement of generations equals 2.10 – 2.15. It means that for every 100 of women in age 15 – 49 years there are 210 – 215 born children. From the nineties of the 20th century in Poland the value of the rate is shaped much lower than 2 (in 2017 the total fertility rate in Poland equaled 1.45), what means that the number of births does not ensure the simple replacement of generations, and as a consequence it has a negative impact on the Polish pension system.

The second very important aspect of demographic changes in Poland, which has the influence on the situation of future pensioners, is the average lifespan for persons at the age equal to the age of retiring of the insured person. The average further lifespan is a statistic value, which defines the average period which passes from getting the right to retire to the death of the insured. It helps to set the probable period of the insured person at the retirement and to evenly divide the accrued means. The retirement pension granted in accordance with new rules equals the amount which is the result of the division of the basis of pension calculation by the average further lifespan of the future pensioner (Kochanowska 2017). An average further lifespan in Poland shows a growing tendency. The age category of 60 years1 noted the growing lifespan in years 1999-2018 of 36.2 months and reached the level of 262.2 months. The changes of the number and structure of population according to age are the result of changes in the demographic processes. At the half of 2018 the number of Polish population equals 38.4 million including 8 million of persons beyond the retirement age (men in the age of 65 or older, women in the age of 60 and older). It has to be noticed, that the share of the above mentioned age group in the general population in years 1990- 2017 increased by 8 percentage points, that is from 12.8% in 1990 to 20.8 % in 2017. Unfortunately, the growth of the older people number was accompanied by the drop of pre-productive number of people (0-17 years old). In 1990 the percentage of the above said group in Poland was at the level of about 29.6 %, whereas at the end of 2017 it equaled only 18%.

Summing up the above deliberation it has to be stated that Poland contends with a very serious problem of the unfavorable demographic situation. A low, not ensuring the replacement of generations, total fertility rate and a simultaneous growth of the percentage of people beyond the retirement age puts a big question mark to the future efficiency of Polish pension system. Therefore, the need of the individual additional saving in the period of professional activity for the future retirement pension appears.

[1] The analysis of the average lifespan was limited only to age 60 category. It results from the fact that in Employee Capital Plan it is the age when it is possible to start paying out means (despite the extraordinary situations mentioned in the law act).

Employee Pension Plans – the goal and the functioning rules

The law regulations referring to Employee Pension Plans were introduced by the Act on Employee Pension Plans of October 4, 2018 (Law gazette no. 2215 of 28.11.2018). According to the above stated Act the first employees can save money in EPP since the half of 2019 and everything is introduced in the following stages:

- from July 1, 2019 for subjects employing at least 250 persons,
- from January 1, 2020 for subjects employing at least 50 persons,
- from July 20, 2020 for subjects employing at least 20 persons,
- from January 1, 2021 for all other subjects and employees of public finances sector.
  The savings accrued within EPP are financed from three sources:
- participants' payments,
- employing subjects' payments,
- state subsidies.

The basic payment financed by the EPP participant equals 2% of the salary. In case when the employed salary is lower than 1.2 of the minimum salary multiplication factor, the participant is allowed to place an application to lower the contribution up to 0.5 %. Despite the basic contribution the employee can declare additional payment of max 2% of the salary.

The employing subject pays the basic contribution of 1.5 % of the salary. Besides, it has the possibility to declare additional contribution of 2.5 % of the salary.

The subsidiaries from the state budget are the third saving component of EPP. Each program participant once receives the so-called welcome payment equal 250 PLN.[2]. Additionally, in a calendar year on the account of participation in the EPP each participant will receive an annual bonus to EPP in the amount of 240 PLN[3].

The above amount will be financed from the Work Fund.

The process of investing in Employee Pension Plans is based on the funds of the defined date. The funds, also known as life cycle funds, are the instrument the aim of which is to facilitate long-term investing in order to accumulate and multiply the capital for the retirement. The characteristic feature of such financial instruments is defining their destination date. Simultaneously, the person managing the fund has the precise knowledge of the investment horizon duration and can adapt the portfolio risk of a given fund (Świder 2018). The investment strategy of EPP will take into account the necessity to limit the investment risk level according to the EPP participant age. In accordance with the article 40, point 1 of the Act the shares of the share part and of the indebted part in the value of the defined date fund assets will be following (The Act on Employee Capital Plans, art. 40 point. 1)

- starting from the first day of the fund creation till the day of starting 20 years to the defined date of the retirement date, the part of a share part must be in the scope of 60-80% of fund assets value, whereas the part of the indebted part must be from 20 to 40% of the fund assets value;

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[2] The participant, who signs the agreement on running the EPP and for at least 3 full months is the EPP participant, and if for these months the basic payments financed by the participant are made, will be entitled to receive the „Welcome payment"

[3] The EPP participant will be entitled to receive the annual bonus if the amount of basic payments and additional payments financed by the employer and the participant in a given calendar year is equal at least to the amount of basic payments due from the amount constituting 6 times the minimum salary binding in a given year, or in case of persons whose salaries do not exceed the amount of 1.2 of minimum salary, at least 25% of the amount of basic payments due from the amount constituting 6 times the minimum salary binding in a given year.

- in the period of 20 to 10 years before the defined date, the part of the share part must be within 40-70% of fund assets value, whereas the part of the indebted part must be from 30 to 60% of the fund assets value;
- in the period of 10 to 5 years before the defined date, the part of the share part must be within 25-50% of fund assets value, whereas the part of the indebted part must be from 50 to 70% of the fund assets value;
- in the period of 5 years before the defined date, the part of the share part must be within 10-30% of fund assets value, whereas the part of the indebted part must be from 70 to 90% of the fund assets value;
- starting from the year when the fund reaches its defined date, the part of the share part must be max 15% of fund assets value, whereas the part of the indebted part must be not lower than 85% of the fund assets value.

For the management of defined date fund assets the investment funds company, the PTE Polish Retirement Company, the employee retirement company or the insurance company can take remuneration in the amount not higher than 0.5% of net assets value. Besides, the body managing the means can take remuneration for the achieved investment result. The level of this remuneration cannot be higher than 0.1% of net assets value and can be taken provided that the positive return margin is reached for a given year, and the achievements of the return margin in a given year are higher than the reference margin (The Act on Employee Capital Plans, art. 49 point. 1 and 2).

Participation in Employee Pension Plans is voluntary. The EPP participant can resign from making payments to EPP on the basis of a written declaration submitted to the employing subject. The resignation can be done once for the period of 4 years. If it is not prolonged by the employee, starting from April 1, the employing subject resumes payments for the EPP participant (The Act on Employee Capital Plans, art. 23 points: 1, 2 and 6).

The payments of the collected savings are possible from the age of 60 years of life, regardless retiring, or being professionally active. After reaching age 60 the participant is allowed to pay out 25% of the collected means, and the rest 75% divide into at least 120 monthly rates. The EPP participant has the possibility of paying out all means, in this case the tax has to be paid from the capital gains for the part exceeding 25% of all means. Besides, in accordance with article 100 point 1 of the Act the EPP participant after reaching age 60, can apply for the payment of the means saved in his EPP account in the form of so-called marriage benefit. In this case the following conditions have to be met: (The Act on Employee Capital Plans, art. 100 point. 2).

- the participant's spouse reached age 60,
- the participant's spouse has the agreement with the same financial institution,
- the spouses mutually declare that they want to benefit from marriage benefit payment.

The EPP participant has the possibility to pay out the means before reaching age 60 in the case of accidents defined by the Act:

- up to 25 % of the collected means in case of a serious illness of the EPP participant, a spouse or a child without the necessity of repayment
- up to 100% of the collected means in case of buying a house or a flat on loan. This possibility will be available for persons younger than 45 years. Besides the means paid out in this way have to be repaid within maximum period of 20 years.

The influence of Employees Capital Plans on the amount of future retirement pensions

Will the new method of saving for the retirement in the form of Employee Pension Plans have a significant influence on the amount of the retirement pension of the average Polish citizen? Will Employee Pension Plans be a "remedy" for the lowering replacement rate of the last salary by a pension? Or will it be the next (after Open Pension Fund) common way of saving money for the old age, but without a greater influence on the efficiency of the Polish pension system? These are only

some questions which arise in the discussions referring to EPP - a new form of saving for the old age. This elaboration makes an attempt to estimate the forecasted amount of retirement pension from Employee Pension Plans. The simulations were performed in four variants:

Variant 1 – joining EPP at age 26, the remuneration amount – an average remuneration in the national economy;

Variant 2 - joining EPP at age 45, the remuneration amount – an average remuneration in the national economy;

Variant 3 - joining EPP at age 26, the remuneration amount – 1.2 of minimum remuneration for work;

Variant 4 - joining EPP at age 45, the remuneration amount – 1.2 of minimum remuneration for work;

The following assumptions were made while elaborating the benefit payments simulations from EPP:

1. Yearly return rate from capital – 3% - monthly capitalization,
2. Increase of salaries – linear trend models were estimated:
    a. Model of an average salary in the national economy:
    $$y=1505,12 + 143,73 \times t;\ R^2=0,99 \quad (1)$$
    b. Model of minimum salary for work:
    $$y=380,67 + 81,89 \times t;\ R^2=0,97 \quad (2)$$
3. Payment for management 0,5% + 0,1% for positive return rate from capital higher than reference rate.

Detailed simulations in particular variants are shown in tables 1-4.

Table 1: – variant 1

Predicted amount of 25% of capital paid at once						
Employer / Employee	1.50%	2%	2.50%	3%	3.50%	4%
2%	40303.44	45752.14	51200.85	56649.55	62098.26	67546.96
2.50%	45752.14	51200.85	56649.55	62098.26	67546.96	72995.67
3%	51200.85	56649.55	62098.26	67546.96	72995.67	78444.37
3.50%	56649.55	62098.26	67546.96	72995.67	78444.37	83893.08
4%	62098.26	67546.96	72995.67	78444.37	83893.08	89341.78
Predicted payment amount paid out in 120 rates						
Employer / Employee	1.50%	2%	2.50%	3%	3.50%	4%
2%	1007.59	1143.80	1280.02	1416.24	1552.46	1688.67
2.50%	1143.80	1280.02	1416.24	1552.46	1688.67	1824.89
3%	1280.02	1416.24	1552.46	1688.67	1824.89	1961.11
3.50%	1416.24	1552.46	1688.67	1824.89	1961.11	2097.33
4%	1552.46	1688.67	1824.89	1961.11	2097.33	2233.54

Source: Own elaboration

Table 2: Payment from EPP – variant 2

Predicted amount of 25% of capital paid at once						
Employer / Employee	1.50%	2%	2.50%	3%	3.50%	4%
2%	12354.06	13972.85	15591.64	17210.44	18829.23	20448.02
2.50%	13972.85	15591.64	17210.44	18829.23	20448.02	22066.82
3%	15591.64	17210.44	18829.23	20448.02	22066.82	23685.61
3.50%	17210.44	18829.23	20448.02	22066.82	23685.61	25304.40
4%	18829.23	20448.02	22066.82	23685.61	25304.40	26923.20
Predicted payment amount paid out in 120 rates						
Employer / Employee	1.50%	2%	2.50%	3%	3.50%	4%
2%	308.85	349.32	389.79	430.26	470.73	511.20
2.50%	349.32	389.79	430.26	470.73	511.20	551.67
3%	389.79	430.26	470.73	511.20	551.67	592.14
3.50%	430.26	470.73	511.20	551.67	592.14	632.61
4%	470.73	511.20	551.67	592.14	632.61	673.08

Source: Own elaboration

Table 3: Payment from EPP – variant 3

Predicted amount of 25% of capital paid at once						
Employer / Employee	1.50%	2%	2.50%	3%	3.50%	4%
2%	24985.02	28245.38	31505.74	34766.10	38026.47	41286.83
2.50%	28245.38	31505.74	34766.10	38026.47	41286.83	44547.19
3%	31505.74	34766.10	38026.47	41286.83	44547.19	47807.55
3.50%	34766.10	38026.47	41286.83	44547.19	47807.55	51067.91
4%	38026.47	41286.83	44547.19	47807.55	51067.91	54328.27
Predicted payment amount paid out in 120 rates						
Employer / Employee	1.50%	2%	2.50%	3%	3.50%	4%
2%	624.63	706.13	787.64	869.15	950.66	1032.17
2.50%	706.13	787.64	869.15	950.66	1032.17	1113.68
3%	787.64	869.15	950.66	1032.17	1113.68	1195.19
3.50%	869.15	950.66	1032.17	1113.68	1195.19	1276.70
4%	950.66	1032.17	1113.68	1195.19	1276.70	1358.21

Source: Own elaboration

Table 4: Payment from EPP – variant 4

Predicted amount of 25% of capital paid at once						
Employer / Employee	1.50%	2%	2.50%	3%	3.50%	4%
2%	7624.23	8567.33	9510.43	10453.54	11396.64	12339.74
2.50%	8567.33	9510.43	10453.54	11396.64	12339.74	13282.85
3%	9510.43	10453.54	11396.64	12339.74	13282.85	14225.95
3.50%	10453.54	11396.64	12339.74	13282.85	14225.95	15169.06
4%	11396.64	12339.74	13282.85	14225.95	15169.06	16112.16
Predicted payment amount paid out in 120 rates						
Employer / Employee	1.50%	2%	2.50%	3%	3.50%	4%
2%	190.61	214.18	237.76	261.34	284.92	308.49
2.50%	214.18	237.76	261.34	284.92	308.49	332.07
3%	237.76	261.34	284.92	308.49	332.07	355.65
3.50%	261.34	284.92	308.49	332.07	355.65	379.23
4%	284.92	308.49	332.07	355.65	379.23	402.80

Source: Own elaboration

The analysis of the above simulations shows that the age of joining the program plays the key role in EPP. Reaching the average salary in the national economy and paying the minimum contribution amount (3.5% - 2% employee + 1.5% employer) at age 60 it will be possible to pay out at once (25 % of capital) over 40 thousand PLN and to get a monthly amount 1 thousand PLN for 10 years period. In case of paying the highest contribution the single amount to be paid will be over 89 thousand PLN, and a monthly amount to be paid per 120 months will equal about 2.20 PLN. For comparison a person earning an average salary in economy, who starts the participation in the system at age 45, provided paying the lowest contributions, will receive the single amount 12.3 thousand PLN and a monthly amount about 300,00 PLN for 10 years. In case of highest contributions (totally 8%) the EPP benefit will equal 26.9 thousand PLN and a monthly amount 670,00 PLN for 10 years.

It has to be emphasized that a monthly benefit, received by the person joining the EPP at age 26 will be equal 10.7 % of the last pre-retirement remuneration in case of minimum contribution, whereas in case of maximum contribution about 23.7%. For persons joining the system at age 45 the amounts will equal appropriately 4.6 % and 10%.

In case of remuneration at the level 1.2 of minimal salary the benefits from EPP will be significantly lower. Persons joining the system at age 26 and paying the lowest contributions at age 60 will receive a single amount about 25 thousand PLN and for 120 months about 600,00 PLN monthly benefit. In case of the highest contribution (8% of remuneration) they could get a single amount of almost 55 thousand PLN and about 1350,00 PLN a monthly benefit for 10 years. For a person joining the system at age 45 and paying the contribution of 3.5 % the single benefit will equal 7.6 thousand PLN, and a monthly benefit 190,00 PLN for 10 years. In case of maximum contribution these values will be appropriately 16 thousand PLN and 400,00 PLN.

The monthly benefits will equal 10.7 % of the last remuneration for persons earning 1.2 of minimum remuneration and joining the EPP system at age 26, with contribution at the level 3.5% and 23.2% of the last remuneration with contribution 8%. Whereas the monthly benefits for joining the EPP at age 45 the benefit will equal 4.8% of the last remuneration with minimum contribution, and 10% with maximum contribution.

Summary

The presented forecasts allow to state that Employee Pension Plans constitute a solution which can contribute to lowering the discrepancy between the level of the last pre-retirement remuneration and the retirement pension level. The above simulations show that the influence of EPP on the level of retirement pensions will not be significant and largely it will depend on the age of joining the system. Besides, with a great probability it has to be assumed that a greater part of systems participants will pay the minimal contributions. Similarly, the situation will develop in case of employers, for which the responsibility of co-financing the EPP contribution will constitute an additional financial charge. It will mean, as it is shown in the above simulations, a low level of benefits from EPP after participant reaches age 60.

These negative previsions show that in order to avoid poverty risk coming truth in the group of older people additional retirement means have to be collected during professional activity (Kowalczyk-Rólczyńska 2017). In case of additional pension insurance, a proper economic knowledge of financial markets and investment funds, and also the knowledge of retirement systems is an indispensable condition. Without the awareness of the principles of pension system functioning and the level of pensions ensured within a base system, it is hard to expect from particular individuals the initiative in the scope of necessity of additional pension insurance (Grzebieniak, Pieńkowska-Kamieniecka, Przybytniowski 2016).

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Managing Thinking History Through Historical Thinking Learning Model (Mpbh)

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Abstract

Critical thinking in the study of history is a necessity that must be mastered by history students so that they know the latest issues that can be drawn to historical events based on historical evidence. However, critical thinking in history learning is not as easy as imagined, because students still think that historical learning only accepts historical information without criticizing the source and still imagining it. The purpose of this study is to analyze the effectiveness of historical learning models to improve the student learning outcomes. Empirical data was obtained from 57 students who participated in a local history course which was divided into two classes, each A 29 regular classes and 28 regular B classes students collected through open and closed questionnaires, observation on tests and limited tests. Class A 29 using the MPBH model and class B using another model. A Collecting the data uses the techniques of tests and documentation. The effectiveness of MPBH was analyzed through t-test. The findings of this study, that MPBH is effective enough to achieve learning objectives and competencies in local history courses, so that MPBH is effectively used. Furthermore, MPBH effectiveness testing must be extended to a broader scale and different subject.

Keywords: Organizing, thinking history, Historical Thinking Learning Model, and Indonesia.

Introduction

History is not an inheritance but learning about human activities in achieving ideas in space and time. Studying the thought of history, and history is recognized as teaching the past, but life is not for the past, but rather acquires the meaning to be a dialogue with the present that is needed to design the future.

Learning history in the future emphasizes the analysis of sources and asks students to create and be critical of knowledge in learning history (Henderson, 2019). Historical thinking trains students to think critically, to understand, that learning history must be based on sources about a series of causal links that take place in continuity and change (Pratt, 2019). Efforts to support historical thinking by many history instructors by creating historical learning models.

Critical thinking is discussed in the curriculum in Indonesia, but the implementation of learning history is still far from expectations. The results of the study provide information: lack of interest in reading, *copy-paste* assignments from the internet, memorizing material, and teaching methods lectures (Retnosari P, Mustansyir, Nugroho H W, 2019).

Learning models to help students in the learning process and historical thinking has been widely implemented (Putri H, Zafri Z, Ofianto O, 2019). The results of the study with the theme of historical thinking have been conducted by other researcher (Aman, 2012) and (Ofianto O, Basry W, 2015). Safe Research found an evaluation model of historical learning, while Ofianto succeeded in developing *learning continue*s in history learning. Safe and Ofianto Research Results are more likely to find judgments in historical education, but do not criticize the contents of the historical material being taught. The identification of the problem above encourages research with a focus on how to develop the Historical Thinking Learning Model.

The critical history of learning through MPBH encourages students to understand the past, dismantle parts of historical stories, and find their meaning to practice developing students' thinking skills. MPBH is an alternative to linking contemporary social problems with selected historical problems, being critical of sources and building students' creativity to find solutions. Studying history with current problems illustrates that history can develop thoughts that emphasize scientific principles. The problem in the field is students consider history lessons to be memorized. Students assume that learning history is boring, so it needs a learning model that invites students to be active and think critically to improve the learning outcomes, one of which is MPBH. The purpose of this study is to analyze the effectiveness of historical learning models to improve the student learning outcomes

Literature Review

Historical a term to explain the negotiations of thought, which are reflected in human activities in achieving their life goals and moving continuously across the time dimension. Human activities in moving time bonds are arranged in chronological order and space. The historical subject material is taught as an academic activity to understand the soul of a change.

MPBH is based on a philosophy of constructivism education that begins with the cognitivism of the ideas of Piaget and Vygotsky. Cognitive describes that learning is an activity of assimilation and accommodation of controlled external activities. Constructivism prepares students to solve problems while building knowledge. In line with Piaget's view, Vigotsky argues that this form of social constructivism places great emphasis on cooperative or collaborative learning. The learning process occurs due to relationships with various elements. The view of constructivism about knowledge does not come suddenly but is built by the individual, when interpreting and interpreting his world (environment). Implicitly, the sentence implies that learning not only examines the subject but connects with social issues that occur to solve problems so that they can investigate the future.

Historical thinking is a concept of the way's historians think and apply it to the present world (Yuta Miki, Tomoko Kojiri, Kazuhisa Seta, 2015). Historical thinking is a type of thinking that studies history and applies it to the modern world. Think of history or historical thinking is Considered as the ability to reflect, synthesize, and construct understandings of history based on evidence (Cintia Salinas, M. E. Bellow, H.L. Liaw, 2011). The opinions of other states think historically. For this study we will focus on related but distinct elements; historical empathy and the construction of historical accounts (Thomas Fallace, A.D. Biscaal, Jenneifer Perry, 2007). Historical thinking requires linking two opposing views: first, the way of thinking so far is a legacy cannot be excluded, and secondly, if it does not try to ignore the relics, it must use presentism, which is the past seen in the present lens. This view implies that history is always actual (Wineburg, 2006). Thinking history requires participation in learning, which is linked to personal experience, observation, and n self-reflection. Practicing historical thinking requires learning models. Conceptually, the research model of learning is made of historical thinking. Historical Thinking Learning Model is a synthesis of the problem-based learning model (PBL) (H Nugraheny, S S Edie, Sutikno, 2019) with the model issues centered history` (Ferguson, 1996). Model Steps Issue Centered History:

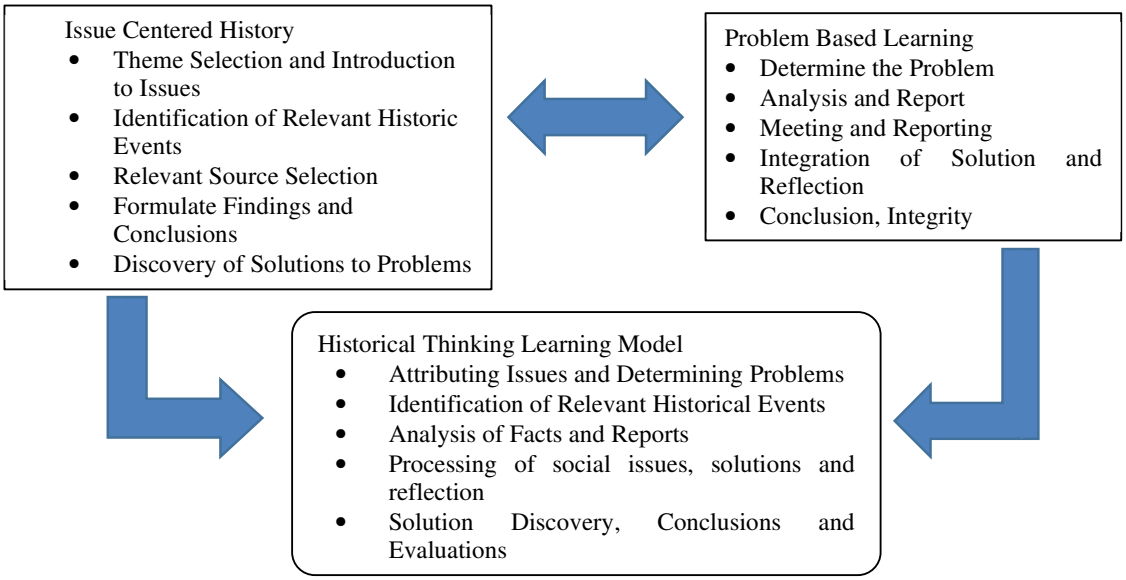

Figure 1: Adaptive MPBH of Problem-based Learning The

The advantages of PBL are more focused on the problem being examined. PBL tends to explore contemporary problems by ignoring problems that are not related to the problem being examined. Students can build their knowledge. Encourage students to be able to think in a scientific setting. The shortcomings of PBL for use in learning history are too focused on the problem being made a topic so closing contact associates with similar problems in past events. Implementation of historical learning in solving problems can use problem-solving methods as a group or individually.

Achievement of student assessments at the stage is *Problem Statement* carried out with technical, interpretative, and emancipatory instruments. The instrument of technical questions to find out the competencies of students by using question words, where and when they occur. *Interpretative instruments* concern about why and how. Emancipatory instruments are aimed at issues about the effect of power on what happens and how people interpret and explain what happened and ask why something should happen.

The analysis phase uses instruments to analyze problems and relate them to history. *Verification* involves students to look for current information about land cases and historical sources. *Interpretation* provides examples of past comparison with contemporary or contemporary phenomena. *Generalization*. In finding solutions, students can find solutions in solving problems using technical instruments, interpretations, and emancipation.

Methodology

This research is a combination of research to build a product that is considered effective following standards (Ofianto O, Suhartono S, 2016). The subject's overall research was 57 students participating in local history courses in Faculty of Teacher Training, Lambung Mangkurat University consisting of two classes. The control class was named regular class A with a total of 29 students, while the experimental class was regular class B with 28 students. The subject of this research development resembles the model developed by (Dick W, Lou C, James O.C, 2008).

Table 1: Pre-test and Post-test Control Group Design (Quasi-Experimental)

Class	Pre-test	Treatment	Post-test
Experiment	O_1	X	O_2
Control	O_1	-	O_2

The test question used is an essay test with a validity test using an expert validity test with Cohen's Kappa coefficient of 0.590. Pretest and posttest were conducted to obtain research data. To find out the effectiveness of the model of historical thinking learning, the analyst conducted a t-test (Sugiyono, 2015).

The steps of developing historical thinking models, namely: (1) preliminary research, (2) planning of model development, (3) validation, evaluation, and revision of the model includes a) expert studies, b) one-on-one trials, c) testing try small groups, d) limited testing and e) Implementation of the model.

Results and Discussion

The study began by examining 10 thesis students of the History Study Program, Faculty of Teacher Training and Education, Lambung Mangkurat University. The component of the historical method for heuristics has a score of 2.80 which means that the heuristic ability of students is close enough. Critical scores reach 2.85, their ability to criticize is close to adequate. The interpretation of the score of 2.83 also informs that its interpretation ability is close to adequate. Likewise, the average value of historiography is 2.80, this score also informs, that the ability of historiography is close to enough.

This phenomenon illustrates, that students are still considered to need to develop learning models for historical methods courses so that historical education competencies are achieved. Problems about the history learning process, especially local history courses tend to memorize, central lecturers, while problem-solving skills are lacking, do not track sources, arithmetic in critical thinking, stutter in discussions, so as not to foster a collaborative atmosphere, this study develops learning models of historical thinking (Anis, 2019).

At the initial development level, the researcher models the previous situation with the idealized state based on the learning objectives. Continue to determine the characteristics of students and learning resources available. At level 2 so that the objectives are achieved, the existing sub-competencies are broken down into several themes in the hope of achieving sub-competencies. At the level 2 stage, the researcher developed 4 themes included in the learning model. The themes, among others, analyze the notion of history and historical science, historical sources and their depository institutions, oral sources, oral traditions and interview methods, as well as criticism and interpretation.

In level 3, the researcher draws up a learning plan for the historical thinking model concerning levels 1 and 2. The learning approach is used by using the historical thinking model. Allocation of time needed in the learning process for four meetings (1 month), with details of one face-to-face meeting and 3 meetings that are devoted to solving problems and connecting links with current phenomena through group discussion activities. The activity of solving problems and connecting with contemporary phenomena begins with throwing problems that must be solved by each group collaboratively. The first and second discussion activities will be concluded with plenary activities. So that students are always active and reactive in the learning process, at the beginning of the meeting a pre-test is held and at the end of the study ahead *Posttest is*. In the last level or the fourth stage, problems were arranged and built into the 5 questions pre-test and post-test essay questions but not included in the lesson plan.

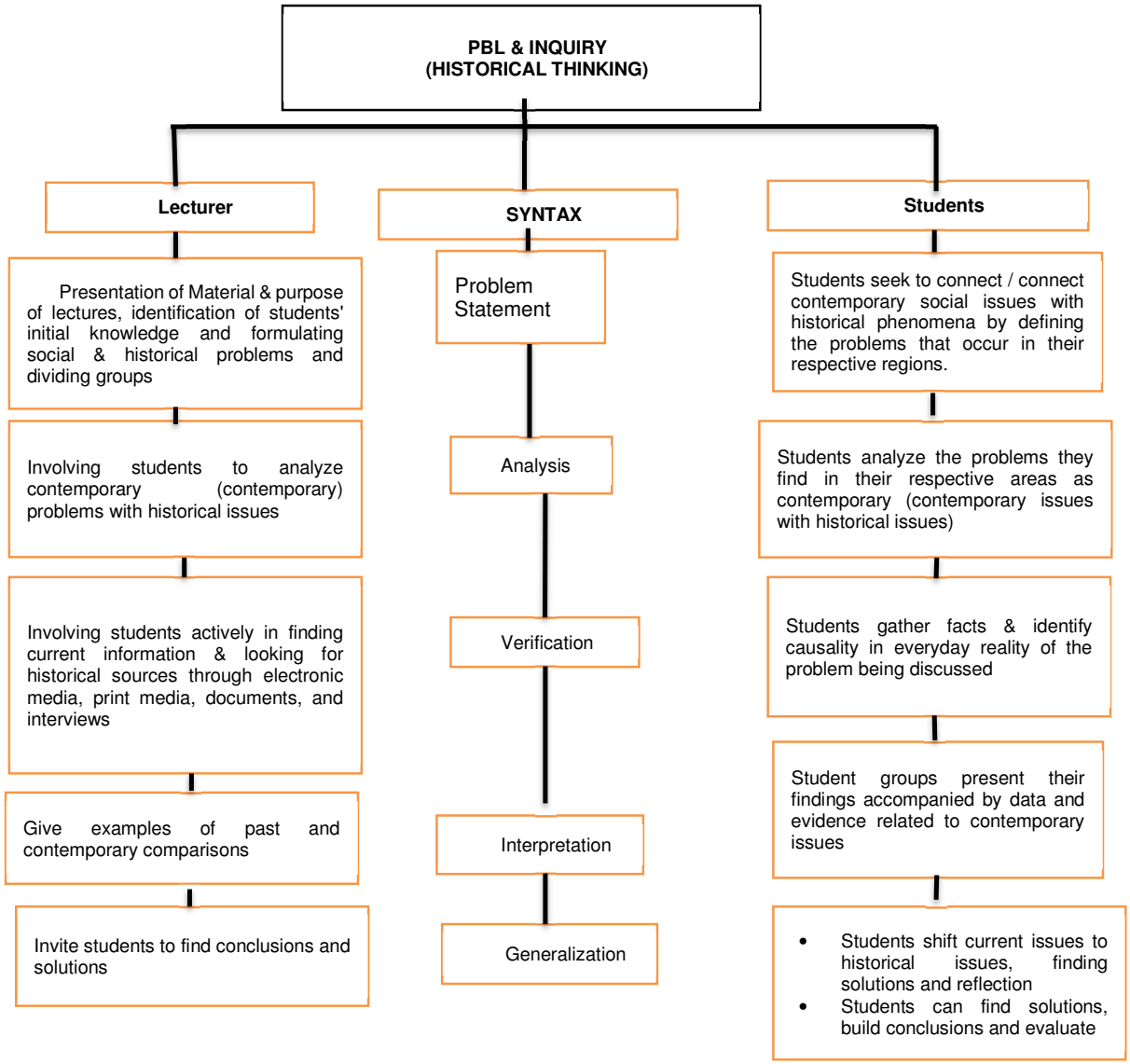

Figure 2: Syntax of Historical Thinking Learning Model (MPBH)
Source: (Anis, 2019)

MPBH suggests a link between historical issues and contemporary social phenomena (Anis, 2019).The process of lecturing the historical method with the MPBH approach is harmonized with the learning plan that is prepared and agreed upon between lecturers, and students who take the history method lecture. After completing the lecture process evaluation is held to determine the success of the activity with *Pretest* and *Posttest*. During the discussion, activities take place an assessment of the process As is usual activity *pretest* written with essay questions, in essence, to find out the discourse of the subject that must be mastered by students, while at the end of the theme the implemented *posttest is* with the intent of knowing an increase in mastery of the subject matter in the theme that was discussed. The process of lecturing the historical method with the MPBH approach is supplemented by learning media,

as follows: 1) Written sources: documents, archives, and newspapers, 2) Historical evidence: stories, photos, pictures and videos, 3) Guides and method modules history, 4) Historical Thinking Worksheet.

The history method module is a summary of lecture material that will be taught to students of MPBH participants so that the learning process takes place more effectively. The historical thinking worksheet was adopted from that suggested by *The Benchmarks of Historical Thinking Project* (Peck, 2008). The proposed MPBH development product is a synthesis of the learning model *Problem-Based Learning* (PBL)with Historical Thinking. The product of the Development of Historical Thinking Model was reviewed by five experts to look for weaknesses and weaknesses to be revised.

The five experts sought an agreement with the use of Cohen Kappa and ICCS. Cohen Kappa is used to seek agreement between historians (Sgh) and historical education experts (Stn). The agreement between Sgh and Stn using Cohen Kappa (R Aloud, T Recount, 2017). With Cohen's Kappa coefficient of 0.590. This means that there is enough agreement Sgh as a historian and (Stn) as an expert on history education on the model of historical thinking. The significance value is 0.018. Because the significance value is smaller than the significance level used by 5% (0.018 <0.05), it means that the initial hypothesis was rejected and concluded that there was a significant agreement between expert 1 and expert 2 at the 5% significance level.

For 3 experts with different expertise, namely IPS, Technology, Education and Language Education experts, researchers used *Intra Coefficient Correlation (ICC)* (Landers, 2016).The ICC results among US Educational Technology experts, M language linguists, and IPS B Education experts had an ICC score of 0.741, with a significance of 0.000 <0.05. This means that there is an agreement between experts, at α 0.05. In general, this media is appropriate to be used.

Evaluation Results *in One to One*

the evaluation was *One to one* carried out to obtain information on the interests and comments of three students about the development of MPBH. Three students consisted of two female students and a student. One student with a *grade point average* moderate (GPA), another who is above medium and one student with a moderate IP. Each was given a guide to the MPBH model to be examined and studied.

Students need reading material related to the material being studied. Students feel the need to know and practice the historical significance of primary and secondary sources (verification). Students still doubt that current reality can be contacted with historical phenomena. They also admitted that MPBH could develop its thinking based on methods so that it was not fixated on formal history books and one-way historical views.

The highest value is 60, the average or *Mean* is 32.33. results *Posttest* shows the lowest value is 40 and the highest value is 87.50, the mean or mean is 70, 13. In addition to the *Pretest-Posttest* and *tests* in the small test lecture activities with the Historical Thinking Model, observations are also conducted, conducted by two young lecturers as observers.

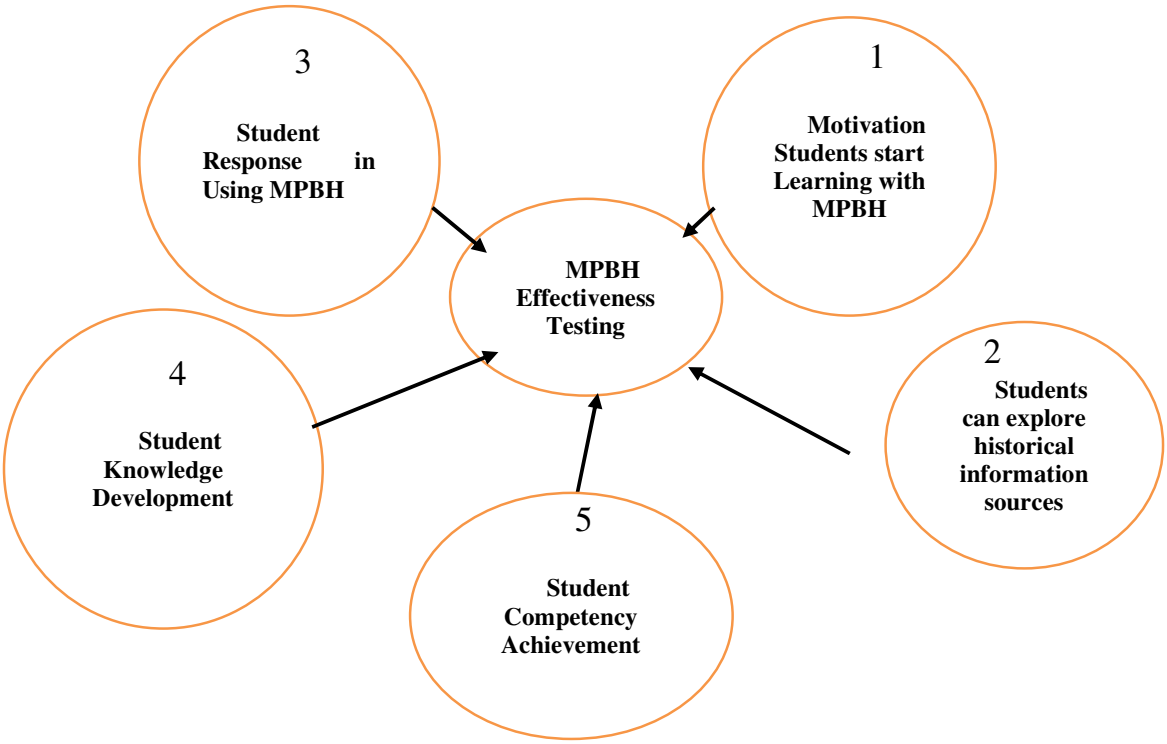

Figure 3: MPBH Effectiveness Test Results

Results of the study by interviewing the one-two one evaluation and small group evaluation, students expressed and felt an interesting learning atmosphere and made them want to always think historically through MPB. On completing the history worksheets, students have difficulty in finding sources of archives containing historical information and historical phenomena. This is because they have never previously visited the regional and provincial archives.

The response of students in using MPBH based on the results of the questionnaire during 4 meetings of their interest in experiencing an increase. Descriptively proven, that the student responsible for the whole group was 68.54 with the lowest value being 50 and the highest was 79. The median value was 69. Asymp value. The Sig of the Chi-Square statistic (df = 2) is 0,000 <a. 005 thus rejects Ho and accepts Ha. These results provide information, there are differences in student responses from meeting 1 to meeting 3 there was an increase. These results indicate that students' interest in MPBH courses in local history courses is increasing. The development of students' knowledge of the posttest score from the first meeting was 60 maximum values, the second meeting the minimum value was 69.21 and the maximum value was 72.72, while the 3rd meeting the minimum value was 75.44 and the maximum value was 78.44. It means that from the first meeting to the third meeting had increased. The information also indicates that the competency of students in local history courses has increased.

After a limited test in the following year, the MPBH was implemented in the even semester of 30 November 2019. The subject chosen was related to how the Banjar people saw, interpreted, and then adapted to their environment so that it gave birth to the river culture which became the name of the city of Banjarmasin.

Class begins with a pretest, terminated. *The posttest* number of participants in the lecture was 45 students divided into 6 groups with group members consisting of 6 to 7 people. Lectures with subjects on rivers, small river *(handil*), and very small river (*saka*) are considered interesting and contextual by

student's college participants. This is indicated by the questions they raise, and the responses to the questions. The atmosphere in implementing *Posttest* and Posttest is very orderly.

This shows that the MPBH model can be carried out in the real test class with the result of increasing students' competence in learning historical methods, seen from the value *Mean Pretest* (54.02)> *Posttest* (75.24). The historical method module they already have. They have obtained information and historical facts about local history. The facts about the local history that they know are the raw materials for making proposals as a final bill from the participants of the history method courses following the problems, they like to know the difference between a certain value and the average value of the group of participants conducted a t-test. T-test results show that MPBH in the comparison class influences learning historical methods. This is demonstrated by an analysis of the pre-test and post-test results <0.05.

The implementation of MPBH for the Historical Method course has been tested in the Historical Education Study Program of the FKIP University of Lambung Mangkurat. MPBH in the history method course was tested on a limited test of three with each theme on local history, namely the issue of land that had been laid out during the reign of the Sultanate of Banjar (Sultan Adam's Law), river culture and fashion dynamics always actual and close to memory participants are considered enough. The drawback is the deepening of material outside the classroom must be done and remain controlled.

Other obstacles, students are still accustomed to being passive participants in lectures, not preparing themselves for college, and lack of reading, so it is rather difficult to express their ideas, critical and less able to connect current issues with historical issues. The atmosphere becomes liquid when the problem of the subject of localization and close to their memory and environment can be picked, so they feel close to the problem under discussion. Seeing this phenomenon, the MPBH which has been more refined seems to be able to use the effectiveness of this model better.

Research on the development of MPBH after it is carried out there are still limitations that include: Trial of the MPBH model for local history courses History is only applied to students of the Historical Education Study Program Faculty of Teacher Training and Education Lambung Mangkurat University in the sixth semester implemented at the end of November 2019 in the even semester 2015 in the same course with different students. Different characteristics of students as the subjects in this study are different. Through the results of small tests, limited tests and the implementation of the model, researchers assume, that MPBH can be used or applied to other students in the class. Do different study programs students, different faculties and different universities. It can be applied to new research is needed.

Before the implementation of small and large trials, the development of MPBH has not carried out simulations, but observers and students were only given a general explanation of this model. In addition to a small test and three limited tests, MPBH is also implemented in the Historical Method course in different classes so it needs to be developed and expanded with several related subjects. If the development of MPBH is used it is recommended for courses totaling 3 SKS. The effectiveness of the development of MPBH evaluation results is not compared to other approaches. Research that also uses PBL states that the PBL Model (in this case used at MPBH) can increase student activity and social skills (Dewi S, Sumarmi, Amirudin A, 2016).

The inquiry activities in MPBH are also called "inventions". Inquiry in MPBH requires students to find their own learning experiences and look for answers to the questions posed. An inquiry is a way of presenting lessons that allow students to find information with or without the help of the teacher. This involves students in the mental process of discovering the concepts taught themselves. Learning by using inquiry can improve students' knowledge and build their own learning experiences (Sumantri, Mulyana, Johar Permana, 2001).

Historical thinking is a continuous activity, in which there are activities in reading, writing, linking material to one another. Besides historical thinking in the form of analyzing the material obtained such as how to compare one historical event with another, why historical events occur, how their impact,

and how historical events can help for life today and be able to interpret events. By thinking historically students will always filter every information they get (Yulia Sofiani, Oka Agus Kurniawan Shavab, 2018). These skills require students to be able to hear, read historical narratives, and be able to explain why something happened.

Historical thinking 'has a central role in the theory and practice of historical education. At the very least, history educators must work with historical thinking models if they are to formulate potential developments in student progress through the school history curriculum, test these developments empirically, and form teaching experiences to maximize those developments (Seixas, 2017). Historical thinking skills are related to mastery of several document assignments and discuss the implications for future research (Merkt, Werner, and Wagner, 2017).

Conclusion

The MPBH model has proven to be effective in improving student learning outcomes and able to make students think more critically. The MPBH model is the right solution to use in overcoming monotonous and uninteresting historical learning. Through this model, students are required to think more creatively so that learning outcomes can improve. The next recommendation is to apply this learning model more in class and in more subjects.

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Predictive Analysis of the Effeciency of Equipment of a Machine-Building Enterprise

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Abstract

There is a recent trend in analytics which has burst into our world – it is a predictive analytics. The article is devoted to the tasks and results of the predictive analysis of the efficiency of the equipment of an industrial enterprise.

Keywords: predictive analytics in production, performance analysis of equipment, Overall Equipment Effectiveness, Key Performance Indicators, TEERo operator, TEERa automatic control.

Introduction

At the present time, we would like to talk about this today, there appeared a recent trend in analytics - predictive analytics. The central essence of predictive analytics is the task of determining the predictor or several predictors (parameters or entities that affect the predicted event). Based on the selected predictors, a predictive analytics model is formed with the help of which events in the future are predicted with a certain degree of probability. What are the questions that the predictive analytics answers in the production? In this article we would like to highlight the prediction of the technical condition of the equipment. Thus the following problems are solved [1-5]:

- stops in the operation of equipment are prevented by switching to equipment repair according to the state;
- the technical condition of the equipment is evaluated in real time;
- causes of equipment failures are identified;
- alerts about approaching failures are received.

Methods

OEE and Downtime Management

OEE (Overall Equipment Effectiveness) is an approach to monitoring and managing the life cycle of funds. It was proposed in the late sixties of the last century by the Japanese Nakajima (Seiichi Nakajima), but began to be used outside of Japan only in the late eighties.

The essence of the approach is to collectively analyze the metrics that characterize various aspects of the equipment operation, including downtime, speed reduction and quality loss [4].

Its structure already contains the analysis technique, which consists in a consistent immersion in the problem areas, whether it is a non-optimal organization of the equipment operation, its low productivity or the spoilage of the product [5, 6]. As a result of the analysis, the reason for the decrease in efficiency is revealed, on which it is necessary to focus attention.

OEE allows you to identify the losses and causes of inefficiencies. As a result, not only failures due to breakdowns are identified, but also losses due to inefficient equipment configuration, a decrease in the performance of its operation, or the expectation of receipt of materials. Ultimately, OEE allows you to see what the impact of the current performance of a particular piece of equipment on the performance of the whole production [7].

The availability of reliable results of measuring the productivity of funds allows you to make weighted decisions about capital investments, providing a faster return on investment [8]. Based on the OEE data, it is concluded whether it is possible to improve performance on existing equipment or whether its capabilities are actually exhausted and new equipment is needed to increase performance.

Calculation of OEE Indicators

To analyze the efficiency of the equipment, a KPI (Key Performance Indicators) system was developed. But before you start to consider them, you need to agree on terminology. As already mentioned, OEE is an approach to monitoring the operation of equipment [9-12]. At the same time, very often OEE refers to the coefficient itself, which characterizes the operation of the equipment. In order to avoid confusion, we will continue to talk about OEE when it comes to the approach, and the "OEE indicator" in the second case.

Essentially, the OEE is the ratio of fully productive operating time (ideal production time) to the planned operating time. Taking into account the loss of productivity and quality, this coefficient can be calculated by the formula 1.

$$\text{OEE} = \text{Accessibility} \times \text{Productivity} \times \text{Quality} \qquad (1)$$

Where: Accessibility = Working time / Planned time
Productivity = Produced products / (Perfect speed × Working time)
Quality = Quality products / Produced products.

It is easy to see that by substituting the multipliers in formula 1 and making the abbreviations, you can get the OEE equal to the ratio of the volume of produced quality products to the planned time multiplied by the ideal speed. Thus, it can also be defined as the ratio of the volume of produced quality products to the ideal volume that could be produced if the equipment worked during the planned time at the maximum (ideal) speed.

These calculations are given in order to clarify the meaning of this indicator.
Despite the fact that to calculate the OEE indicator you can do without information on working time and products, these quantities must be recorded.

They are needed, because besides the OEE indicator itself we are also interested in the whole triple of factors of formula 1: accessibility, productivity and quality. What for? For analysis.

The fact is that monitoring the OEE value is like a starting point.

Finding that the value of OEE is different from the target (for example, it fell compared to the previous period), you can see what affected this decline.

Analyzing the values of each of the three coefficients and comparing them, for example, with the values for the previous periods, we gradually localize the reason for the loss of efficiency. If the problem lies in the quality or speed of the equipment, this is a signal for the relevant services. If the problem lies in the area of availability, we can make a deeper analysis of the causes, which we will consider a little later, when we talk about managing equipment downtime.

Of course, the KPI set for performance evaluation is not limited to the four indicators described [13, 14]. They are the most common and in the future are detailed to the required level. Other important indicators will be considered below.

Experience of World Manufacturers

According to research, the best world producers reach the level of the production process with OEE values above 85%. The values of the main indicators, if this value is achieved, are given in Table 1. These data are relevant for continuous production. For discrete manufacturing, the same OEE is 80%.

Table 1: value of OEE indicators of the best world producers

Indicator	Meaning
Availability	90.0%
Productivity	95.0%
Quality of service	99.9%
OEE	85,4%

It should be noted that for many enterprises the value of the quality index exceeds that indicated in Table 1. However, according to the mentioned studies, the average value of the OEE indicator for producers does not exceed 60%. This fact points to the potential for optimizing production in terms of performance and availability.

What the value of OEE should be compared with

As already mentioned, the analysis of OEE indicators is the starting point for solving problems of loss of effectiveness. One of the most common approaches to monitoring is comparing the OEE indicator with a certain target value. If the difference becomes tangible, then it is necessary to look for the causes. There is a reasonable question, what it is necessary to compare with. The above indicators of world producers are good in terms of strategic goals, but for operational management it is better to use indicators that reflect the specifics of your production.

In this capacity, you can use the indicators obtained at your enterprise. For the current production status, the OEE value can be calculated, which will be compared in the future to assess the improvements made. Also, the values can be calculated for individual production lines, and then the best of them can become the target value for all other lines.

This will identify the problem areas of each of the lines and try to find and eliminate the cause.

In the same way, one can compare work at the present time with the same period in the past, which is important for industries with a strong seasonal component. In addition, it is possible to compare the performance of different shifts that work with the same equipment.

The challenges that must be addressed

One of the main objectives of OEE is to reduce the six most significant causes of loss of effectiveness (Six Big Losses) listed in Table 2.

Table 2: sixe big losses

Cause	Category	Comment
1	2	3
Loss	Loss due to downtime	There is some freedom in attributing to breakdowns, or to mini-stops

continuation of the table 2

1	2	3
Setting	Loss due to downtime	Includes changing and reconfiguration of tools
Mini-stop	Loss of speed	Usually includes stops for a time less than, for example, five minutes
Speed reduction	Loss of speed	Anything that does not allow the process to run at the highest possible speed
Spoilage at start-up	Loss of quality	Spoilage arising from warm-up, start-up and other early stages of production
Spoilage in production	Loss of quality	Spoilage arising from normal production work

Equipment Downtime Management

The meaning of downtime management (DTM - Downtime Management) is a deeper analysis of the reasons for stopping the operation of equipment. In fact, the task of managing downtime is to find the time intervals when the equipment did not work at all or worked at a reduced speed or quality, and classify these gaps according to the time model and the cause tree. After classification, time intervals are aggregated for each category. As a result, statistical indicators are obtained, which are used in the calculation of KPI.

Let us consider in more detail the time model and the tree of causes.

Figure shows an example of a time model.

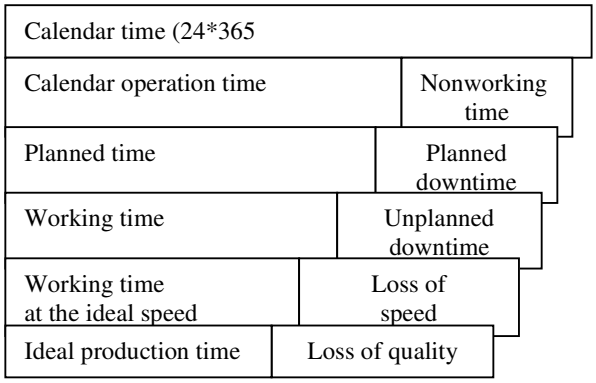

Fif. Time model

It contains a set of time categories according to which down time and losses can be broken up into disjoint groups. It also contains the time categories that are used in calculating the KPI. The reduced time model is not fixed; it can be expanded with additional categories.

The causes tree is a detailed description of the categories of time and allows you to classify the reasons for downtime. For example, for an unplanned shutdown, you can specify that it can be caused by manual equipment stoppage, expectation of receipt of materials or breakdown. In turn, manual shutdown of equipment can be caused by reconfiguration, adjustment, etc. As a result of such consistent detailing, the cause tree is constructed.

In the future, downtime will be divided into groups according to the nodes of the tree and can be analyzed. More information about the cause tree will be given when describing the SIMATIC IT OEE / DTM configuration.

As we have seen, OEE and downtime management are close tasks and complement each other. Because of their similarity, they are often viewed in pairs, and the systems that solve these tasks are called OEE / DTM systems.

Results

Place of OEE / DTM systems in the Enterprise Information Environment

Based on the tasks to be performed, the OEE / DTM systems are MES-class systems. MES uses data obtained from various control systems existing in the enterprise (SCADA systems, controllers, etc.). Also, MES imports data from adjacent systems (LIMS, etc.) and upper (ERP) levels. As a result, a single information space for operational management is created, in which separate tasks are functioning. Each of them consumes the available data and provides new information, which in turn can be used by someone else. This is how the OEE / DTM system integrated into this space uses data from lower-level systems and calculates various KPIs that reflect the operation of the equipment. Moreover, the values of these KPIs enter the general information environment and may be of interest not only to OEE / DTM users, but also to other MES users. Also, these data can be exported to ERP and other systems, with the interface of interaction with them provided by means of MES, rather than OEE / DTM.

Of course, in order to obtain up-to-date data on the efficiency of the equipment, it is necessary to have advanced low-level monitoring systems that supply real-time information about the operation of the equipment. However, even with incomplete equipment, it is possible to obtain reliable data on efficiency, combining the data of available systems with the results of manual input.

The information environment allows you to simultaneously see performance indicators together with other performance indicators of production. On the operation of the equipment, reports can be generated, access to which is carried out within the same environment.

You can also send reports by e-mail. Thus, access to data is greatly facilitated and the culture of their use is changing. After the implementation of the system, you do not need to wait for the report to be prepared manually, just once you have configured the distribution system, receive a report, for example, in the morning of each day.

It is also possible to set up automatic distribution of reports when certain events occur, for example, when the efficiency falls below a specified level.

Note that when using the common information infrastructure, the resulting complexity of the system decreases, since the interaction of each component with each one is replaced by the interaction of all components with a single environment.

Automated control system for the machinery park of a machine-building enterprise

Automated control system of the machine tool fleet of the machine-building enterprise calculates and archives the following data:

- coefficient of planned time Cpt;

coefficient of available time Cat;

- coefficient of useful time Cut;
- coefficient of quality unplanned operations Cquo;
- the coefficient of poor quality unplanned operations of Cpquo;
- total equipment efficiency based on input of OEE operator data;
- absolute effective equipment performance based on data input of the TEERo operator;
- absolute effective equipment performance based on TEERa automatic control.

1. Cpt is the coefficient of the planned time.

$$Cpt = St / Ct \quad (2)$$

where: Ct is the calendar time;
St is the scheduled time.
Ct per day = 24 hours; Ct per week = 7 days; Ct per month = 28 ÷ 31 day; Ct = 3 months; Ct per year = 4 quarters;

$$St = Ct - \text{Unplanned time (Ut)}. \quad (3)$$

Unplanned times include the following machine status periods:

- holidays;
- weekends;
- changes;
- formal meetings;
- lunches;
- officially allotted time for inspection, maintenance and servicing of the machine;
- officially allocated time for testing new technology;
- officially allotted time for working out a new program;
- other official regulated activities;
- non-working time.

2. Cat is the coefficient of available time.

$$Cat = At / St \quad (4)$$

where: St is the scheduled time;
At is the available time.

$$At = St - \text{Loss of availability} \quad (5)$$

The loss of availability includes the following machine status periods:

- unplanned operator absenteeism (illness, shirking, etc.);
- equipment breakdown and repair;
- absence of a task to fulfill;
- lack of material;
- lack of tools;
- absence of a crane;
- lack of ancillary equipment.

3. Cut is coefficient of useful time.

$$Cut = Ut / At \quad (6)$$

where: At is available time;
Ut is useful time.

$$Ut = At - \text{Loss of non-core operations} \quad (7)$$

The loss of non-core operations includes the following machine status periods:

- tool layout at the beginning of the shift;
- cleaning tools and the working place at the end of the shift;
- obtaining and installing tools, devices;
- removal / returning of tools and devices;
- installation and removal of parts from the machine;
- changeover of the machine to a new part;
- control of the part on the machine by the technical process;
- personal needs.

4. Cquo is the coefficient of quality unplanned operations.

$$Cquo = STt / Ut \quad (8)$$

where: Ut is useful time;
STt is the standard time.

$$STt = Ut - \text{Qualitative unplanned operations} \quad (9)$$

The quality unplanned operations include the following machine status periods:

- replacement / sharpening of a worn tool;
- adjustment of equipment during the operation;
- equipment management (changing its operating modes).

5. Cpquo is the coefficient of poor-quality unplanned operations.

$$Cpquo = Nto / STt \quad (10)$$

where: STt is the standard time;
NTo is a net time based on the input of operator data.

$$NTo = STt - \text{own poor-quality unplanned operations} - \text{other poor-quality unplanned operations} \quad (11)$$

The following status-periods of the machine are related to own poor-quality unplanned operations:

- correcting the spoilage of this machine.

Other unfavorable unplanned operations include the following machine status periods:

- correcting the spoilage of another machine.

6. OEE is the overall efficiency of the equipment based on operator input.

$$OEE = Cat \times Cut \times Cquo \times Kno \quad (12)$$

where: Cat is coefficient of available time;
Cut is coefficient of useful time;

Cquo is the coefficient of quality unplanned operations;
Cpquo is the coefficient of poor-quality unplanned operations.

7. TEERo is the absolute effective performance of equipment based on operator input.

$$TEERo = Cpt \times Cat \times Cut \times Cquo \times Cpquo \quad (13)$$

where: Cpt is coefficient of planned time;
Cat is the coefficient of available time;
Cut is the coefficient of useful time; Cquo is the coefficient of quality unplanned operations;
Cpquo is the coefficient of poor-quality unplanned operations;
or

$$TEERo = NTo / Ct \quad (14)$$

where: Ct is calendar time;
NTo is the net time based on the input of the operator data.

8. TEERa is absolute effective productivity of the equipment on the basis of the automatic control.

$$TEERa = NTa / Ct \quad (15)$$

where: Ct is the calendar time;
NTa is a net time based on automatic control.

Conclusion

Predictive analytics based on the use of modern software products effectively solve problems and give excellent results, which in turn makes it possible:

- to reduce equipment downtime;
- to reduce equipment repair costs;
- to reduce the number of unplanned repairs;
- to monitor violations;
- to improve efficiency in the management of the machine building enterprise.

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Aspects Related to Production Competitiveness in The Latvian Aquaculture Sector

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Abstract

In the world, the aquaculture sector is evaluated as highly productive, competitive and environmentally friendly sector with the potential to be developed as an alternative source of fish resources using the basis of inland water resources. The economic breakthrough in the EU and Latvia is related to development of aquaculture sector, where competitive production is one of conditions for economic recovery. The aim of the research is to evaluate and facilitate the production competitiveness of the Latvian aquaculture sector. On the basis of the available data and chosen indicators, the analysis includes and reflects the most important aspects of the Latvian aquaculture sector related to production competitiveness, with particular focus on production in micro and small enterprises. In addition, it provides an insight into the measures to be further implemented, in order to facilitate production competitiveness. The information reflected in the research can be useful in establishment, planning and implementation of the common policy of the aquaculture sector.

Keywords: Aquaculture, Enterprises, Financial Analysis, Latvia, Production Competitiveness.

Introduction

The Latvian aquaculture sector mostly deals with fish and crayfish breeding for commercial sales, where the breeding of aquaculture products takes place not only in open land ponds, but also in natural water flow basins and recirculation systems. In 2018, 766 ponds with the total area of 5.19 thousand ha, 1279 pools with total capacity of 15.74 thousand m3 and 37 recirculation systems with capacity of 5.73 thousand m^3 were used to breed fish and crayfish. The total amount of fish and crayfish sold in 2018 was 829.70 tons with the total market value 2.17 million EUR (Central Statistical Bureau, 2020). The greatest part of the aquaculture products (~85%) has been acquired from the open land ponds, whereas the rest products (~15%) – from the natural water flow basins and recirculation systems. In the local conditions, the open land ponds are mainly suitable for breeding carp-like fish; consequently, carps (60%) dominated in the composition of the products available in the market. The range of the products included also other fish – trout, sturgeon, tench, pike, crucian carp, zanders etc. 87 companies were engaged in farming fish and crayfish in 2018; they employed 340 people with the average net remuneration of 516 EUR (Central Statistical Bureau, 2020). Since 2005, the number of companies has increased 3 times, which largely can be explained by the entry of Latvia into the EU in 2004 and availability of support provided by the financial instruments to develop aquaculture.

Pollution of the environment, inimical spawning conditions and intensive fishing as well as a range of various other factors have negative influence on the condition of fish stock world-wide, resulting in increase in the significance of the aquaculture sector. There is a possibility to develop aquaculture as an alternative source of fish, where the basis of inland water fish resources offers broad opportunities of supplementing the fish stock much sought for on the market, simultaneously contributing also to the development of industrial and recreational fishing, processing and fishing tourism. The water resources in the territory of Latvia available for aquaculture are evaluated as qualitative and sufficient to ensure performance and development of the respective business (Agriculture Ministry, 2014). The economic breakthrough in the EU and Latvia is related to development of aquaculture sector (Agriculture Ministry, 2013), which at the global level is evaluated as a highly productive, competitive and environmentally friendly sector (Agriculture Ministry, 2014). One of the objectives

of the Common Fisheries Policy is to contribute to environmentally sustainable, resource efficient, innovative, competitive and knowledge-based aquaculture that can be facilitated by the development of the competitiveness and viability of micro, small and medium-sized enterprises (European Parliament and Council, 2014)**Error! Reference source not found.**. The development of the aquaculture sector depends on production competitiveness, which has become one of the key goals of development of countries, sectors and enterprises.

Research aim – to evaluate and contribute to the production competitiveness of the Latvian aquaculture sector. To reach the aim, the following work tasks were put forward: 1) to select the most important indicators to describe the aspects related to production competitiveness; 2) to evaluate production competitiveness of micro and small enterprises, at the same time providing proposals for improvement of production process.

The novelty of the research – account of the most important aspects in the Latvian aquaculture sector related to production competitiveness, with particular focus on production in micro and small enterprises. It offers a comprehensive insight into the competitiveness of aquaculture enterprises, which is reflected on the grounds of use of the fixed assets and labour involved in their production process. The research also provides an insight into the measures to be implemented further, in order to facilitate production competitiveness. The reflected information may be used in decision making in order to establish, implement and plan the common policy of the aquaculture sector.

There were used quantitative research methods in the research. The author mostly applied analysis and synthesis methods in development of conclusions and proposals. Microsoft Excel, Microsoft PowerPoint and IrfanView program were used in processing and analysis of the research results.

Materials and Methods

Production is a process of creating products intended for selling in the market. At the level of an enterprise, it includes decision making on the choice of products to be produced, technology to be applied in production, required production factors, market strategy, etc. Production factors in the classical economic production theory are the resources required for manufacturing products or provision of services: land, capital, labour and entrepreneurial abilities.

Capital plays a crucial role in ensuring production process, in the context of production resources it is understood as real capital – fixed assets and working capital, required for production. Productivity of fixed assets determines the level of technological development of an enterprise, which in turn influences the production competitiveness and development potential of the enterprise.

The composition of fixed assets in the aquaculture sector includes land and pond areas, fish and fish fry breeding shops and sheds, pools, recirculation systems, tractors, specialized computer hardware for fish breeding, oxygen cylinders, etc.

Production competitiveness in the Latvian aquaculture sector was evaluated by availability, capacity, utilization intensity and efficiency of fixed assets, as well as productivity of labour (Fig. 1).

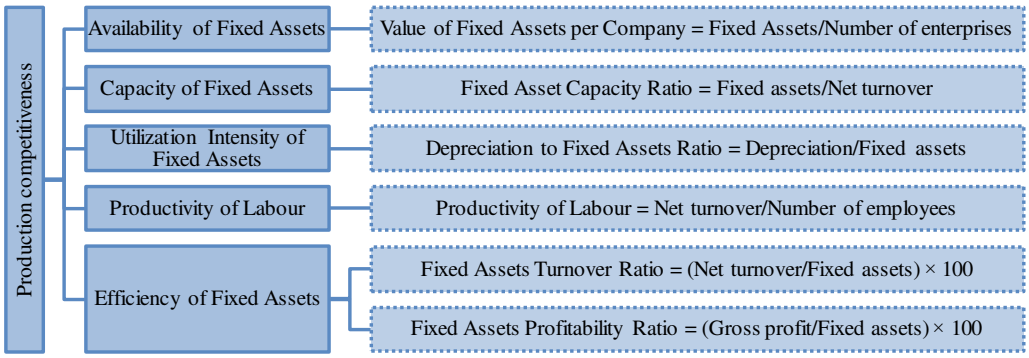

Fig. 1: Indicators for Evaluation of Production Competitiveness (created by the author **according to Springate, 1978; Porter, 1990; Rurāne, 2001**)

The analysis of fixed assets availability will deal with evaluation of how many fixed assets are in the management of the enterprise. The analysis of fixed assets capacity will enable an assessment of the capital intensity in the enterprises (Rurāne, 2001). The analysis of fixed asset utilization intensity will allow reflecting the intensity of fixed assets involved in production process of enterprises, and will provide an opportunity to judge about the level of technical provision of the enterprises (Rurāne, 2001). The analysis of productivity of labour will allow evaluating the utilization efficiency of the labour attracted by the enterprises (Porter, 1990). In the framework of fixed asset efficiency analysis, the benefit obtained by the companies from the fixed assets involved in the production process will be reflected by assessing the return and profitability of fixed assets (Springate, 1978). To evaluate production competitiveness in general there were selected 6 indicators: Value of Fixed Assets per Company, Fixed Asset Capacity Ratio, Depreciation to Fixed Assets Ratio, Productivity of Labour, Fixed Assets Turnover Ratio and Fixed Assets Profitability Ratio. The evaluation embraced the period from 2005-2018. Considering confidentiality of data, the research does not comprise the information about the small enterprises in the period of 2006-2008 and 2011. The research also includes no evaluation of medium-sized enterprises, as the data about these enterprises are available for 2005 only, and the data for 2006-2008 and 2011 are confidential.

Results and Discussion

Production competitiveness of micro and small enterprises in the Latvian aquaculture sector was viewed according to availability, capacity, utilization intensity and efficiency of fixed assets, as well as productivity of labour, in general analysing 6 indicators (Fig. 2).

In 2005-2018, on average 0.21 million EUR of fixed assets per company were available for production needs of the aquaculture enterprises (Fig. 2a). In terms of capital, the small enterprises were the richest enterprises within this period; on average 1.47 million EUR of fixed assets per company were available for their production needs. In turn, 11 times less fixed assets were available to micro enterprises – on average 0.14 million EUR of fixed assets per company. Both the small and micro enterprises carried out restoration of fixed assets, which can largely be explained by the support of Financial Instrument for Fisheries Guidance, European Fisheries Fund and European Maritime and Fisheries Fund provided for purchase and restoration of production capital.

All in all the Latvian aquaculture sector can be evaluated as fixed asset intensive sector (Fixed Asset Capacity Ratio – 4.26), where production requires significant capital investments (Fig. 2b). Both the micro and small enterprises were fixed asset intensive – no considerable differences were observed between these groups of enterprises. Since 2005, the capacity of fixed assets in the aquaculture sector has increased per 49% suggesting that more and more fixed assets are involved in production process.

The wear intensity of fixed assets involved in production process of the Latvian aquaculture sector cannot be evaluated as high (Depreciation to Fixed Assets Ratio – 0.002), suggesting that there are regular investments into the restoration of fixed assets (Fig. 2c). Higher wear intensity of fixed assets

was observed in micro enterprises, in turn, it was lower in the small enterprises. Since 2005, the wear intensity of fixed assets in the Latvian aquaculture sector has risen, suggesting that the fixed assets available for production needs of the aquaculture enterprises are used more intensively, and they physically wear out and technically grow obsolete faster.

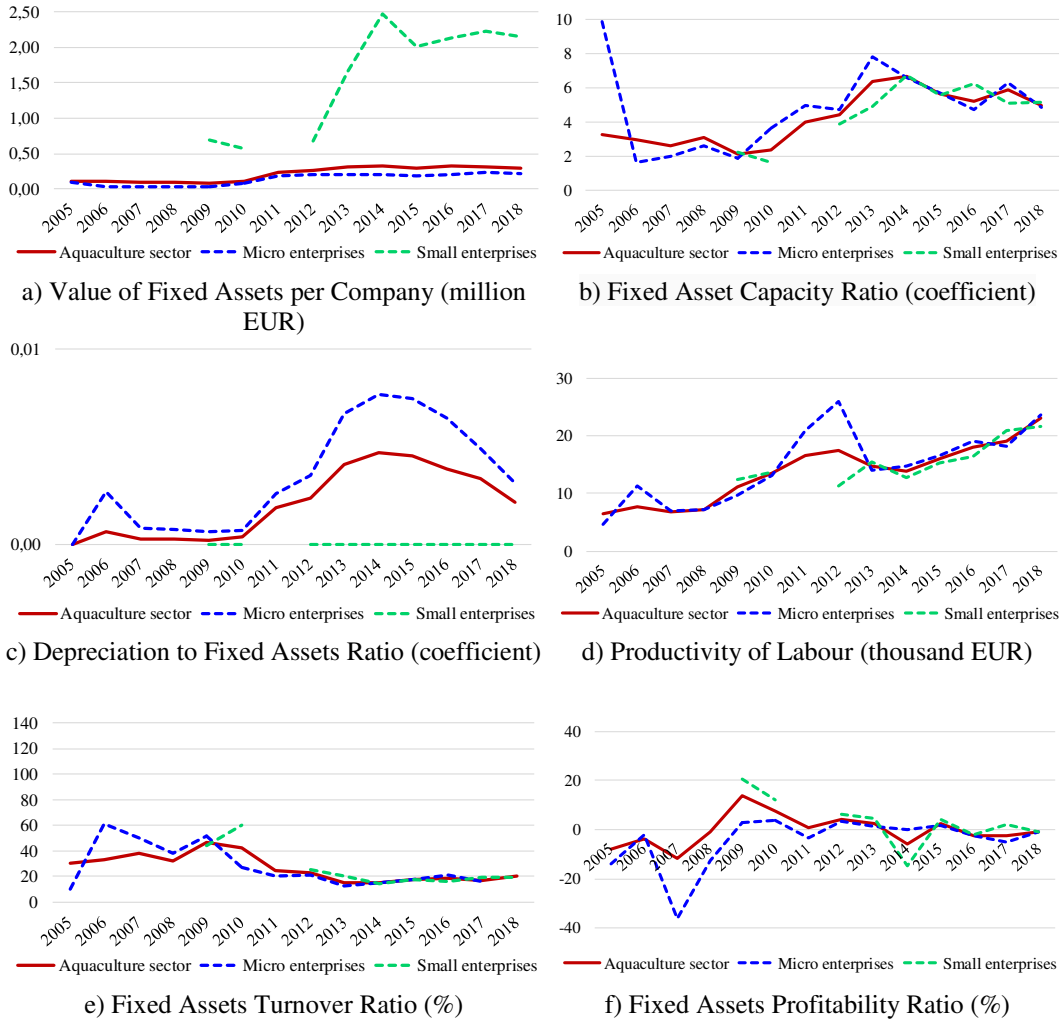

a) Value of Fixed Assets per Company (million EUR)

b) Fixed Asset Capacity Ratio (coefficient)

c) Depreciation to Fixed Assets Ratio (coefficient)

d) Productivity of Labour (thousand EUR)

e) Fixed Assets Turnover Ratio (%)

f) Fixed Assets Profitability Ratio (%)

Fig. 2. Indicators describing the production competitiveness of Latvian aquaculture sector from 2005 until 2018 (EUR, coefficient, %) (calculated and created by the author according to Central Statistical Bureau, 2020)

The productivity of labour in the Latvian aquaculture sector can be evaluated as low (on average 13.72 thousand EUR per employee in 2005-2018), which can be explained by lack of knowledge and experience in the field of aquaculture (Fig. 2d). In this period, the highest productivity of labour was observed in small enterprises exceeding the average indicator in the sector by 8%. Since 2005, the productivity of labour in the Latvian aquaculture sector has improved 4 times, reaching 23.04 thousand EUR per employee in 2018. The micro enterprises experienced the most rapid increase of this indicator.

Fixed assets turnover ratio in the Latvian aquaculture sector was influenced by the resources involved in the production process – the more profitable the fixed assets and knowledgeable the labour were

involved in the production process the greater return was achieved (Fig. 2e). In 2005 - 2018, the fixed assets turnover ratio the Latvian aquaculture sector constituted 26.87%, which has reduced by 33% since 2005. In the aquaculture sector, the greatest return from the fixed assets involved in the production process was achieved by the small enterprises (Fixed Assets Turnover Ratio – 36%), and smaller return – by micro enterprises (Fixed Assets Turnover Ratio – 27%).

Between 2005 and 2018, the fixed assets available to the Latvian aquaculture sector have been insufficiently profitable, whereof the negative profitability of fixed assets suggests (except for 2009 - 2013 and 2015) (Fig. 2f). In this period, the small enterprises operating in the aquaculture sector were more financially profitable. Although the profitability of fixed assets in the Latvian aquaculture sector has improved by 89% since 2005, it still cannot be evaluated as sufficient (the Fixed Assets Profitability Ratio was -0.88% in 2018).

To improve the management of fixed assets and the efficiency of their use, as well as to enhance the efficiency of the labour, aquaculture companies must use not only productive (innovative) fixed assets and knowledge-based labour in the production process, but must also have the capacity of fixed assets and number of employees which is fully utilized for production purposes (neither too little nor too much). It is also important to provide for timely and proportionate investments in renewal of fixed assets through regular fixed asset restoration and disposal of obsolete and unused fixed assets. To improve labour productivity it is recommended to promote the increase in knowledge and qualification of the high-level employees, simultaneously introducing various measures to induce workers, improving the working conditions and working environment as well as work organization.

Conclusions

The economic breakthrough in the EU and Latvia is related to development of aquaculture sector, where the competitiveness has become one of the key objectives for development of countries, sectors and enterprises. The production competitiveness in the Latvian aquaculture sector was evaluated from several aspects, with particular focus on production in micro and small enterprises. The indicators applied in the process of evaluation enabled to understand the most important aspects related to production competitiveness and the measures to be implemented further in order to contribute to the development of the Latvian aquaculture sector.

The Latvian aquaculture sector can be described as fixed asset intensive sector, where the production of products requires considerable capital investments. The wear intensity of fixed assets involved in production process was not high, showing that there are consistent investments made to ensure the technical level, which was largely facilitated by the availability of support from the EU funds and financial instruments. The production resources involved in production process are not used rationally and efficiently enough. Although the Latvian aquaculture sector has a good level of technical supply, the production capacities are not fully used. Productivity of labour in this sector is still low, which can be explained by the lack of knowledge and experience in the aquaculture field. The resources involved in production process did not provide sufficient return and profitability. Currently, the production of the Latvian aquaculture sector is not competitive enough, besides, in all the groups of enterprises. The production competitiveness in the Latvian aquaculture sector can be facilitated by using productive fixed assets and knowledge-based labour in the production process, as well as ensuring optimal and rational involvement thereof in the production process, simultaneously envisaging proportionate investments in provision of the technical level.

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E-Banking Accessibility: The Social and Financial Exclusion of People with Visual Disability

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Abstract

1.3 billion people have vision impairment, 70 per cent of which, live in developing countries, such as Egypt, which has a population of over 98 million. Banks' websites and ATMs are not accessible, and staff has negligible expertise to deal with visually impaired customers. Accordingly, this research investigates the challenges that face people with visual disability, and the reasons behind preventing them from opening bank accounts independently, and thus jeopardizing their privacy. The study also identifies the main variables that affect e-banking accessibility together with the mediating and moderating factors. Then, the research develops an accessible prototype e-banking system. A survey strategy is used, where questionnaires are used for surveying people with visual disability. Data collected is statistically analysed using structured equation modelling. Focus groups are also used to obtain group feelings and perceptions. Semi-structured interviews are conducted to get a deeper understanding pf the perspective of decision makers in banks and governmental representatives. Data collected is interpretively analysed in order to know more about the governmental rules, laws and projects that are established for people with visual disability. It also utilises the experiment method on evaluating the developed and proposed e-banking system in order to gain reliable results. Based on the statistical and interpretive analysis together with the reviewed literature, derived conclusion and recommendations are made to decision makers at banks and governmental representatives.

Keywords – E-banking, accessibility, visual disability, financial inclusion, digital divide, assistive technologies.

Introduction

People with visual disabilities find many difficulties to perform the most common daily tasks. In such scenarios, technology, far from providing always a solution, sometimes raises the existing barriers. Several reasons and challenges exist, where the main issues refer to a lack of standards with respect to accessible information and communication technology (ICT) interfaces and the wide diversity of requirements brought by the wide variety of special needs of potential users. One important challenge faced by visually impaired people is how to preserve their privacy and security in their daily lives. Sighted people are able to monitor their surroundings to protect themselves from privacy threats. For example, when using a mobile device in public, sighted people can hide sight lines between the screen and nosy bystanders. When sharing a photo online, they can not view to make sure that it does not include private content before sharing it (Tilse et al., 2007; Venkatesh and Sykes, 2013).

Approximately 1.3 billion people live with some form of vision impairment. The concentration of people living with either moderate or severe vision impairment is higher in developing countries than in developed countries. Internet users in Egypt were reported by the Egyptian ministry of Communication and Information Technology to be over 37 million users (Hussien, and Abd El-Aziz, 2019; Hussien, and Abd El Aziz, 2017; Raja, 2015; Abood et al., 2015). E-banking is rapidly growing, where bank customers are adopting electronic transaction systems in developing countries in general and in Egypt in particular (Llanto, 2015; Poushter, 2016). People with visual disability cannot open a

bank account or have an online banking because of the Egyptian banking regulations (Abd El Aziz, et al., 2018; Wentz, et al. 2017; Abd El Aziz, 2012); as they mainly depend on family, friends or third parties to manage their bank account. Although Automatic Teller Machines (ATMs) has a great potential, people with visual disability in Egypt face many challenges in using ATMs, checking balance, handling bank cards, and making online purchases.

Research problem

Being able to manage one's money is an essential component of independence and an essential day-to-day task. For people with visual disability, managing finances is very relevant to maintaining independent living (Tilse et al., 2007). Although the different banking services are used nowadays for several types of payments, it is considered as an inaccessible solution for people with visual disability. Without accessible banking solutions, many people will be excluded from vital services. Privacy might also be adversely affected. For example, users might have to depend on third parties, such as a spouse, children, and friends—or, in some instances, complete strangers—to deal with banking services such as buying any product using a credit card or an inaccessible ATM; which could expose them to greater security risks.

Despite the existence of technology in Egypt, where almost all banks have launched their websites, and provided e-services via ATMs, payment cards, and even phone banking. Yet, many banks' websites and ATMs are not accessible, and staff has negligible training or expertise to deal with customers with visual disability. ATMs are also not equipped with the required technology to be used by people with visual disability. Most Egyptian banks reject dealing with people with visual disability, making them financially excluded, and jeopardizing their privacy. A number of researchers have tackled this digital divide, but Egyptian people with visual disability have received insignificant attention regarding this matter.

Research Aim

In order to reach all potential customers, banks should offer banking services to people with visual disability that accommodate their accessibility needs. Banking services may be accessible to the broad range of users, by being inclusively designed, where users' human attributes, skills, competencies, and functional capacities are considered when designing any banking services. Yet, challenges that face people with visual disability in e-banking, remain unexplored (Okonji and Ogwezzy 2018).

Accordingly, the aim of this research is to investigate the spectrum of challenges that face people with visual disability when dealing with Egyptian banks, and the reasons behind preventing people with visual disability from opening bank accounts independently. The study also seeks to identify the main variables that affect e-banking accessibility together with the mediating and moderating factors. Finally, the research seeks to develop an accessible prototype e-banking system.

Research Questions

The overall aim of this study can be achieved by answering the research questions below:

1. What are the key challenges facing people with visual disability in the banking industry?
2. What are the main dimensions that affect e-banking accessibility with respect to people with visual disability?
3. What are the mediating and moderating factors affecting e-banking accessibility?

Literature review

The World Health Organization (WHO) has classified disability into three key definitions that are often used interchangeably but have different meanings: Impairment, Disability and Handicap. 'Impairment' refers to an abnormality in the anatomy, anatomical, physiological, or psychological function. On the other hand, 'Disability' refers to any limitation of an individual's ability to perform an activity in a normal manner. Finally, 'Handicap' refers to a shortcoming for a person due to an impairment or a disability that hinders him/her from fulfilling of a normal role on an equal level with a peer group due to physical and social barriers **(Lang, 2007).**

Visual Disability

Disabilities are divided into Mobility Impairment, Cognitive, Hearing, Speech, and Visual Impairment. Visual impairment refers to an impairment in vision that, even with correction, affects the educational performance. It ranges from low vision impairment to total blindness (Zitkus, et al., 2016). The International Classification of Diseases classifies four levels of visual functions which are: normal vision, moderate visual impairment, severe visual impairment, and blindness. People with moderate and severe visual impairment are classified as low vision people. The last classification is blindness, which is the focus of this research together with the perception of people with visual disability towards banking accessibility.

The WHO (2018) estimates that with regards to distance vision, 188.5 million people have mild vision impairment, 217 million have moderate to severe vision impairment, and 36 million people are blind, with around 90% living in low-income settings (WHO, 2018). They can be divided into: inability to see images clearly and distinctly, loss of visual field, inability to detect small changes in brightness, color blindness, and sensitivity to light (Ahmed, et al., 2017).

Due to the negligible attention paid to people with visual disability, there is no accurate or updated statistics of the number of people with visual disability in Egypt. According to the Egyptian State Information Service (2017), the number of people with disabilities in Egypt is around about 10.7 per cent of the total population (SIS, 2017). In Egypt there is lack of awareness about the visually disabled people and how to deal with them. Many parents of visually disabled people might deal with a low vision person as a blind person due to lack of awareness. Not to mention the lack of computer-based courses in schools which facilitate the educational process for people with visual disability (Marshall, et al. 2009).

Electronic banking accessibility

Internet accessibility standards are mainly provided by the World Wide Web Consortium (2008) - an international organization that provides a range of recommendations to ensures websites' accessibility to users with disabilities (Wentz et al., 2015). The World Wide Web Consortium (W3C) guidelines address the needs of people with disabilities and usability with assistive technologies (Raja et al., 2015; Caldwell et al. 2008). For people with visual disability, accessibility is improved by including options of adjustable fonts, keyboard navigation options, images' description, structured text suitable to screen readers; and captions for images, in order to maintain a consistent design.

In many western and industrialized countries, there are ethical and commercial justifications for creation of business websites accessible to users with disabilities. In such countries, a range of drivers are promoting the inclusion of persons with disabilities to accessible financial services.

Automatic Teller Machine Accessibility

In Australia, Canada, Turkey, the USA, and the UK many banks have deployed talking ATMs (Ulldemolins et al., 2012). The talking ATMs provide audible instructions enabling visually impaired persons to independently use the machine (RNIB, 2012). All audible information is delivered privately through a standard headphone jack on the face of the machine or a separately attached telephone handset. Information is delivered to the customer either through pre-recorded sound files or via text-to-speech program. In the USA, a final ruling on ATM accessibility standards was notified by the American Department of Justice under the Americans with Disability Act. The standards specified by the ruling included the provision of voice guidance systems, braille signs on ATM keys, and input controls for people with visual disability users. All ATM owners are complying with these guidelines when constructing or altering ATMs. Similarly, the Australian Bankers' Association and the Indian Banks' Association adopted ATM accessibility standards extensively covering issues of technology and physical accessibility especially for customers with disabilities (Gupta, 2014). Conversely, in many developing countries, business organizations have yet to comply with the W3C guidelines and many people with disabilities continue to grapple with internet access (Chigona et al., 2009; Venkatesh and Sykes, 2013).

The Belgium BNP Pariba's case

The BNP Pariba bank developed "An Accessible Bank for All" program for customers with a disability to carry out their banking transactions in a user-friendly way possible. Some accessibility features are included in the software running on their ATM's. They are mainly useful for people with visual disability. The voice assisted withdrawal has been available for all users of the BNP Pariba's ATM's since 2010. This feature is activated when plugging in a standard 3, 5-inch earphone into the jacket of the ATM after which the screen is switched off and the dialog is started up through the ear phones.

The interaction with the machine goes through the numeric keypad, with tactile indications on the buttons: 5dot on 5, circle on "OK", cross on "Cancel" and vertical bar on "Modify". BNP Paribas Fortis was the first bank in Belgium to offer this feature, in the meantime a second bank, Belhus, has an equivalent service.

Problems that face people with visual disability in banking

People with visual disability are marginalized with regards to accessing e-banking (Gallagher et al., 2012). Tackling this is important; as they are restricted from making electronic payments, their participation in society is limited. Moreover, they have to pay extra costs due to the additional administrative charges posed by the central bank for physical cash deposits and cash withdrawals. These benefits could not be gained by people with visual disability; as they do not have same access to technology-enhanced platforms for financial transactions (Warren, 2007; Wentz et al., 2018).

Mobile Payment

Mobile phones have transformed telephony profoundly. They are equipped with functionalities which exceed telephony needs, and which inspire the development of value-added mobile services, the use of mobile phones as access devices, and mobile commerce in general. The number of mobile phones in use far exceeds any other technical devices that could be used to market, sell, produce, or deliver products and services to consumers. These developments open beneficial opportunities to merchants and service providers.

Purchased products and services have to be paid for. Initially, fixed-line telephony billing systems were modified to charge mobile telephony. Later, mobile telephony billing systems were introduced, and used also to charge various mobile services when such services emerged. Yet, payments based on billing systems have several limitations. These include comparatively high payment transaction fees, merchant and service provider complaints about unfair revenue sharing, and the necessity to provision services to billing systems (Peirce and O'Mahony, 1999, Tewari and O'Mahony, 2003). In some areas, such as the European Union, credited payment services to third parties require a (limited) credit institution license. The lack of suitable payment instruments has for a long time been regarded as a factor that hampers the development of mobile commerce.

Mobile payments are payments for goods, services, and bills with a mobile device (such as a mobile phone, smart-phone, or personal digital assistant (PDA)) by taking advantage of wireless and other communication technologies. Mobile devices can be used in a variety of payment scenarios, such as payment for digital content (e.g., ring tones, logos, news, music, or games), tickets, parking fees and transport fares, or to access electronic payment services to pay bills and invoices (Dahlberg, et al, 2008). Payments for physical goods are also possible, both at vending and ticketing machines, and at manned point-of-sale (POS) terminals.

A mobile payment is carried out with a mobile payment instrument such a mobile credit card or a mobile wallet. In addition to pure mobile payment instruments, most electronic and many physical payment instruments have been mobilized. Furthermore, mobile payments, as all other payments, fall broadly into two categories: payments for daily purchases, and payments of bills (credited payments). For purchases, mobile payments complement or compete with cash, checks, credit cards, and debit cards. For bills, mobile payments typically provide access to account-based payment instruments such as money transfers, Internet banking payments, direct debit assignments, or electronic invoice acceptance (MUNOZ-LEIVA et al., 2017).

In the early 2000s, mobile payment services became a hot topic and remained so even after the burst of the Internet hype. Hundreds of mobile payment services, including access to electronic payments

and Internet banking, were introduced all over the world. Strikingly many of these efforts failed. For example, most, if not all, of the dozens of mobile payment services available in EU countries and listed in the ePSO database in 2002 (Carat, 2002) have been discontinued. To facilitate the development of better mobile payment services, it is important to understand the lessons of this history by learning what previous studies have discovered about mobile payments and about the mobile payment services markets, as well as what issues have remained unanswered.

Assistive Technologies for Financial Inclusion

The Technology Related Assistance to Individuals with Disabilities Act of 1988 described an assistive technology device as "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities." The purpose of assistive technologies is to support people with disabilities to carry out daily activities including using computers, mobiles and the web that they would otherwise find impossible or difficult to do. Examples of these technologies for people with visual disability are: screen readers, refreshable braille displays, optical character recognition software, speech recognition software and talking browsers. Assistive technology is used to assist people with visual disability to access computers, internet, and information technology (Suwannee, 2013).

When designing an electronic banking channel, designers should ensure that the e-banking channel can be accessed by everyone whatever his disability. In the banking sector, the people with visual disability customers can use computer screen readers to access the internet banking websites. Also, they can use mobile screen readers to access mobile banking applications. ICT-enabled banking can be made accessible and inclusive of users with varying needs and preferences. Some effective practices from the report are shared below (G3ict 2015):

- ATMs can be equipped with voice output, touch screen navigation, Braille and tactile lettering, audio and visual feedback and cues, and graphic icons for navigation can benefit persons with varying disabilities, as well as individuals with low literacy and language limitations.
- Accessible internet banking through websites and web portals allow persons with disabilities and others to operate their finances when a physical visit to a Bank branch is difficult.
- Financial institutions can offer multiple ways to contact customer service including email, IVR systems, SMS, telephone relay, and video conferencing.

Screen Readers

A screen reader is a piece of software which interrogates the contents of the screen on a computer and turns the contents into a non-visual form. This can be presented in synthetic speech using speakers, or braille using braille displays devices, or both. It allows blind users to hear what sighted users see on their computer monitors (Edwards and Launikonis, 2008). With respect to using the internet, screen readers parse the HTML of each page visited and read aloud what is presented on the page (Mankoff et al, 2005). Screen readers do much more than read web pages; they can be used with any software running on the computer. Therefore, they must be keyboard-compatible with that software.

Optical characters recognition software (OCR)

This software converts any scanned paper using desktop scanner which is scanned as a picture into electronic document. Therefore, people with visual disability can read and edit it either through the OCR software itself or convert it into any accessible document format such as Microsoft word document file (.doc/docx file). Moreover, this converted file can be printed in Braille form (BHATIA, 2014).

This software allows people with visual disability to access books or any printed documents without a need for sited person to read it to them. Unfortunately, most OCR software does not support recognition of the Arabic papers, except one software produced by Sakha Company, which support the Arabic language but unfortunately its recognition accuracy is very low and it is discontinued. Examples of OCR software are Kurzweil 1000 by Kurzweil Educational Systems Company and Read iris software by I.R.I.S. Company (Bhatia, 2014).

Research Methodology

The research methodology refers to all the techniques that are used to conduct the research, collect the required data for the research, and answer the research questions. This section will discuss the way to achieve the research aim through using the research strategy. The research approach will also be discussed together with the research methods used to collect data.

This research is mainly conducted to identify the challenges that face Egyptian people with visual disability in the banking sector, and the main dimensions that affect e-banking accessibility together with the mediating and moderating factors with regards to people with visual disability. The research also seeks to develop an accessible prototype e-banking system.

A survey strategy is a systematic strategy for gathering, analyzing data from the target population about their opinion on something. In this research this strategy will be used, where a simple random sample will be selected to represent the research population, which are people with visual disability in Egypt. This strategy is considered suitable because it enables fast data collection and finding significance answers easily (Punch, 2003; Creswell, 2012).

The research uses the mixed methods approach, where both quantitative and qualitative methods are used; in order to benefit from the strengths of both approaches (Johnson, et al. 2007; Sekaran & BOUGIE, 2016; Onwuegbuzie and Leech, 2004). This is clear because a qualitative research helps in gaining deeper and detailed understanding of the problem. On the other hand, a quantitative research allows generalisation of conclusions and flexibility in the treatment of data. Suitable methods for addressing the research questions include: structured questionnaire, semi- structured interviews, focus groups and experimentation.

Structured questionnaires are considered suitable for surveying a relatively large number of people who are visually impaired, and collecting data which can be statistically analyzed (Creswell, 2002) using structured equation modelling. Focus groups are also useful to obtain detailed information about the group feelings, perceptions and opinions. On the other hand, semi-structured interviews are appropriate for the research; as they allow a deeper knowledge about the perspective of decision makers in Egyptian banks and governmental representatives. Data collected can be interpretively analyzed in order to know more about the governmental rules, laws and projects that established for people with visual disability will be conducted (Sekaran and Bougie, 2016; Jackson and Bazeley, 2019).

Although, literature reveals that testing users via experiments on evaluating web accessibility is very expensive and time consuming; experiments are considered the most successful method to detect accessibility problems (Mankoff, 2005; Jay et al, 2008; Brajnik et al, 2010). Accordingly, the underlying research utilizes the experiment method on evaluating the developed and proposed e-banking system in order to gain reliable results. Finally, based on the statistical and interpretive analysis together with the reviewed literature, derived conclusion and recommendations are made regarding e-banking accessibility.

The research variables

Efficiency

Regarding E-Banking, users believe that using this service will result in changing the nature of banking, navigation patterns, number of site visits, and number of transactions executed (Dwivedi, et al. 2017; Bhatiasevi, 2016; Martins, et al., 2014; Zhou et al., 2010). Furthermore, based on UTAUT, both Bhatiasevi (2016) and Zhou et al. (2010) concluded that Efficiency significantly influences the continuous use of E-Banking.

Ease of Use

Users feel connected to technologies that are convenient and simple to use (Alalwan, et al., 2017; Ozturk, et al., 2016; Shareef, et al., 2017). The easy accessibility of a technology tends to motivate users, making them highly inclined to adopt the technology (Dwivedi, et al., 2017; Oliveira et al., 2014; PIKKARAINEN et al., 2004). Thus, when updating a given technological service automatically, users should not experience difficulty or complexity in using the technology; otherwise, their usage will plummet significantly (Yu, 2012, Liebana-Cabanillas, et al., 2017; Yiu, et al., 2007).

Facilitating conditions (FC)

FC is "the degree to which an individual believes that an organisational and technical infrastructure exists to support the use of the system" (Venkatesh et al., 2003). A number of studies have indicated the positive influence of FC on the level of usage among users (e.g. (Dwivedi, et al., 2017A; Dwivedi, et al., 2017B; Rana, et al., 2016; Shaikh and Karjaluoto, 2015; Yu, 2012; Zhou et al., 2010). The capacity to log in to personal accounts, the ability to transfer money from one account to another, and a high level of compatibility support the use of M-Banking (Shaikh and Karjaluoto, 2015).

Price value (PV)

PV is defined as "the consumers' cognitive trade-off between the perceived benefits of the applications and the monetary cost for using them" (Venkatesh et al., 2012). During the course of using a technological service, users tend to compare the prices they paid for the technology and the discounts they might get from the continuous use of the technology (Alalwan, Dwivedi, et al., 2014; Al-Sukkar, 2005; Baabdullah, 2018; Laukkanen and Lauronen, 2005). Thus, they will tend to increase their level of usage when they are rewarded by discounts (Laukkanen and Lauronen, 2005). However, in the context of Internet banking and M-Banking, consumers will radically become reluctant to continue using a technology when the providers of the service increase its prices (Njenga and Ndlovu, 2012). In such circumstances, the users of the technology tend to switch their usage to a competing service (SCHIERHOLZ and Laukkanen, 2007; Raleting and Nel, 2011).

As indicated by Alalwan et al. (2017), when the PV level is higher, customers become more enthusiastic about continuing to use a technology. It should be ensured that the benefits derived from the technology use are greater than the monetary costs paid by the customers for continuing to use the technology (Lee, et al., 2012). Accordingly, users who are unable to pay the required money for continuing the use of upgraded technology (such as M-Banking) fail to show interest in continued use.

Reliability

Customers feel highly motivated to adopt and use systems that can provide the maximum reliability (Peters, et al., 2016; Upadhyay and Jahanyan, 2016). In the case of E-Banking, the benefits that the customers will get by using the facility will help them to grow interested in it, and thus the propensity to use the technology will increase due to the sensitivity of using online financial services (Zhou, 2011). This sensitivity demands the highest degrees of reliability in the provided technology.

Security/Privacy

Security and privacy in the context of e-banking defined as "a potential loss due to fraud or a hacker compromising the security of an online bank user" (Lee, 2009; Liao, et al., 2011). Financial transactions using IT devices are a great threat to customers as criminal acts can be done quickly without any physical interaction (Cheung and Lee, 2006). As a result, most of the customers are reluctant to adopt e-banking services due to its security and privacy concerns (Lee, 2009; Lee and Turban, 2001; Yousafzai et al., 2009; Poon, 2007). Today, a number of banking services are offered through the Internet and smart devices, thus customers are highly concerned about security issues more seriously. Privacy/security issues have proven barriers hence, customers keep on eye what kind of data is collected, for what purpose, how long these data is stored, and for what purpose their data is processed (Yoon and Steege, 2013).

Drawing on the various studies in literature, the issue of security and privacy were found to be the most important determinant factor which obstruct customer adoption of Internet banking (Koskosas, 2011; Yoon and Steege, 2013). Moreover, information privacy and security issues were identified as serious limiting factors on the adoption and use of e-banking applications (Khalfan and Alshawaf, 2004). Accordingly, the security and privacy widely considered as the most important factor which hinders the acceptance of Internet banking among banking customers.

E-banking Accessibility

According to Barnes and Vidgen (2002) accessibility is concerned with how to access and interact with a system, whether it is easy to navigate, the design is appropriate, and how a user focuses the design principles to improve the website accessibility. The purpose of aesthetic design is to create an

accessible e-banking system (Ahmad and Al-Zu'bi, 2011; Alam and Yasin, 2010; Shergill and Chen, 2005). Under website accessibility/usability Yoon and Steege (2013) includes perceived usefulness (PU) and perceived ease of use (PEU) as factors that positively influence customer's perception towards e-banking. In literature, accessibility has been found and perceived to be the significant factor in determining customer interaction in e-banking (Casalo et al., 2008; Hasbullah et al., 2016; Shergill and Chen, 2005; Yoon and Steege, 2013).

Moderators: Demographics and Technology Literacy

There is quite a number of factors used as a moderator to study user acceptance of the technology. For instance; Sun and Zhang (2006) classified moderators into three groups such as organizational, technological and individual factors in which age and gender lay in the third group and suggested, research on moderating factors add great value. Prior studies have suggested that gender plays an important role in explaining behavioral intention in information system research (Sun and Zhang, 2006; Tarhini, et al., 2014; Venkatesh et al., 2003). For customer acceptance or rejection choice in the Internet and mobile banking gender and age significantly influenced the decision in Finland (Laukkanen, 2016). Moreover, the study of Yousafzai and Yani-de-Soriano (2012) revealed technology readiness, age and gender moderate the attitude intention among Internet banking users in the UK. In this study we used technology Literacy, age and gender as moderators in customer's usage determinant factors.

Research Framework and Hypotheses

This section presents the research framework as well as the research hypotheses developed from the model. Figure 1 depicts the e-banking accessibility framework adopted in the Egyptian context. The framework consists of nine variables. Efficiency, Ease of Use, Facilitating Conditions, Price, and Reliability are five constructs that are considered as the main dimensions affecting e-banking accessibility in Egypt, and they are mediated by Security, and moderated by Technology Literacy and User’s Demographics. Thus, the research hypotheses could be developed as follows:

H1: There is a significant impact of the Research Variables on E-banking Accessibility

H2: There is a significant impact of the Research Variables on Security

H3: There is a significant impact of Security on E-banking Accessibility

H4: Security mediates the relationship between Research variables and E-banking Accessibility

H5: Technology Literacy moderates the relationship between Research variables and E-banking Accessibility

H5: User’s Demographics moderates the relationship between Research variables and E-banking Accessibility

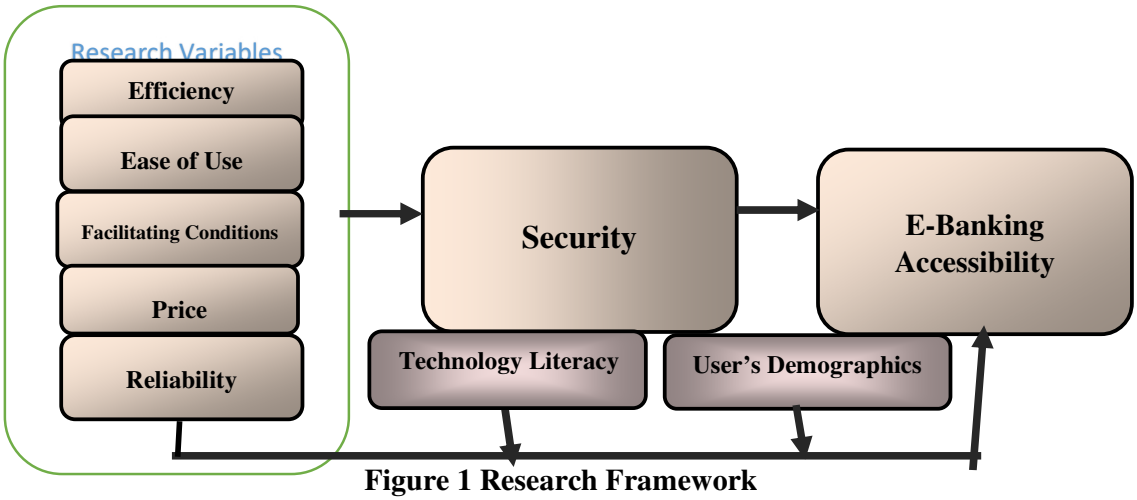

Figure 1 Research Framework

Conclusion

People with visual disability have been facing many challenges in a variety of industries. The banking sector in particular has been posing many challenges to those with visual impairment. This research investigates the challenges thry face people and the reasons behind preventing them from opening bank accounts independently, which invades their privacy. The study also identifies the main constructs that affect e-banking accessibility together with the mediating and moderating factors. Then, the research develops an accessible prototype e-banking system.

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Appendix

- Do you have a bank account?
- Do you have e-banking account?
- Do you use e-banking services?
- How long have you been using e-banking?
- How frequently do you use e-banking?
- When do you most frequently use e-banking?
- The website is clearly structured and traceable
- The website does not contain too many pop-ups and banner advertisements
- The website is graphically appealing and attractive
- The website menu design is easy to understand
- The website is easy to use, login, and navigate
- The website functions properly
- I think that learning to use Internet banking would be easy for me
- I think that interaction with Internet banking would be clear and understandable
- I think that using Internet banking does not require a lot of mental effort
- I think that doing what I want via Internet banking would be easy
- It is easy for me to become skillful at using Internet banking service
- I find Internet banking easy to use
- Learning to use Internet banking is easy for me
- My interaction with Internet banking is clear and understandable
- It is easy for me to remember how to perform task with Internet banking

- It is easy to get Internet banking to do what I want it to do
- Overall, I think that using Internet banking would be easy
- I trust that transaction conducted through Internet banking is secure and private
- I trust payments made through Internet banking channel will be processed securely
- I believe my personal information on Internet banking will be kept confidential
- I have the resources necessary to use Internet banking.
- I have the knowledge necessary to use Internet banking.
- Internet banking is not compatible with other systems I use.
- My living environment supports me to use internet banking.
- My working environment supports me to use Internet banking.
- Using Internet banking is compatible with my life.
- Help is available when I get problem in using Internet banking.
- The website is always available
- The website performance is satisfactory
- The website information is accurate
- The website information content is well organized and easy to understand
- The website presents its security certificate and policy explicitly.
- The website keeps my credit card information secure.
- The website does not share personal information with other sites.
- The website gives me confidence when doing e-banking transactions.
- It protects information about my Web-shopping behavior.
- It does not share my personal information with other sites.
- This site protects information about my credit card
- The website makes it easy to find what I need.
- The website offers banking products at a low cost.
- The website provides a variety of packages and offers that suits my needs.
- The website makes it easy to find what I need.
- It makes it easy to get anywhere on the site.
- It enables me to complete a transaction quickly.
- Information at this site is well organized.
- It loads its pages fast.
- The website is simple to use.
- The website enables me to get on to it quickly.
- The website is well organized.
- Internet banking services are reasonably priced.
- Internet banking is good value for the money.
- At the current price, Internet banking provides good value.
- I think Internet banking services are expensive to use.
- I think Internet banking enabled handsets are expensive.
- I think the subscription fee to use Internet banking is expensive for me.
- I believe my Internet banking transaction information will not be lost during an online session.
- I believe my Internet banking transaction information will only reach the target bank account.
- I feel comfortable using devices to conduct Internet banking operations.
- I am comfortable in conducting Internet banking operations.

The Efficiency of Financing The Health System. Romania in The European Context

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Abstract

Access to healthcare is important for everyone and the existing economic national status influences this aspect. A high standard in this area is essential and large variations in the quality of the sector are increasingly visible within many countries. As medical care becomes more complex, expenditures continue to grow leading to the knowledge's necessity about the health sector's impact and importance in the state's economy. The analysis of the public health system's efficiency financing consisted of evaluating the different aspects of population health and the degree of this sector's financing, during different periods of time, aspects that are influenced by the degree of performance of the hospital units, which depends on the technology used or human resources available. Romania is analyzed in the European context, due the need of comparison in order to form an overview of the financing health services efficiency. The financing of the health sector influences the health status of the population, which is why we will analyze the degree of efficiency of the financing of health services in Romania, in the context of the EU. The actuality of the theme and the global interest for the problem of financing the health sector, are the premises of a complex analysis, and the main objective of the present paper is to quantify the degree of efficiency of the financing of the health sector in Romania, in a European context, using Data Envelopment Analysis (DEA) and Euro Health Consumer Index (EHCI).

Key words: Economy, Financing, Health, Efficiency

JEL Classification: A10, H51, I15

Introduction

Health is seen as a robust predictor of economic growth because the economic development of any nation is closely linked to the health status of its population. For this reason, financing in the field of healthcare have an important role in ensuring efficient services within this system, an aspect reflected in the people's health status. The population's health status is largely determined by the economy of the country; therefore rich countries tend to have significantly better health outcomes than poor or developing ones. In the current period, this observation is critical, given that globalization has been implicated in generating economic convergence within and between some countries. To understand the existing changes in the health status of the population it is necessary to understand the reason for their origin, respectively the recent changes in the global economy. In the last decades, the problems existing in the health status of the population at a global level have generated an increasing interest in approaching this segment, to discover the factors that contribute to the deterioration of health. The literature published on this topic has produced important informative research on a set of problems and determinants in this regard, but the reality shows that the current state of health cannot be a prosperous one in the conditions of a precarious economy.

Financing healthcare is a major concern for all countries, including developed countries, given that population health requires a solid financial base, and spending on these services is constantly increasing. This fears strict current affairs in the present economic context, as more and more states are facing difficulties in financial support of this sector. The economic status determines, in most cases, the degree of financing of the health services, an aspect that is reflected in the efficiency degree of the health institutions and, thus, in the health status of the population. To determine the degree of efficiency of the health services there are several calculation methods and different indicators, to identify the segment in which a state has a low level of it. The use of efficiency indicators within hospital units can lead to a wide range of activities for it to grow. However, the national decision-makers need to focus on the areas and on the factors that need improvement, such as no hospital beds or programs for the prevention of certain conditions, given that each hospital unit and country has different needs, which requires the identification of priorities according to the needs of the population.

Research Methodology

The research methodology used to achieve the objectives includes qualitative and quantitative research; qualitative research offered the possibility of a deep understanding of the subject of the research and, in this way, the chance of a complex explanation of it, through methods such as the analysis and synthesis of the specialized literature, which ensures the formation of a faithful image on the studied phenomena. The qualitative dimension used supported the analysis of the state of the knowledge, as well as the argumentation of the importance of the financing and the efficiency of the financing of the health sector. We selected the specialized literature according to content, with emphasis on the efficiency of financing the health sector. Thus, in the end, a number of 62 cases were analyzed. After identifying and analyzing the conceptual framework based on the specialized literature and the existing studies in this regard, we determined the efficiency of the financing of the health sector by carrying out a quantitative analysis. The quantitative part of the research methodology is based on the grouping method, the comparison method, the indicator method, the data analysis methods using statistical techniques such as graphs and tables, the efficiency analysis method-Data Envelopment Analysis (DEA) and Euro Health Consumer Index (EHCI), in order to capture and analyze Romania's position within the European Union, from this point of view. The data needed for the quantitative analysis are available on official websites, respectively www.healthpowerhouse.com, www.ec.europa.eu.

Literature Review

Field (1993) defines an efficiently funded health system as a result of all the state's economic resources invested in health care, institutions and research, with positive results on life expectancy, premature mortality rate, decreased incidence of illness and prevention of related problems of health. (Field, M., 1993, p. 10). Roemer (1991) defines efficient health systems as "the combination of resources, organization, financing, and management that culminated in the delivery of health services to the population." (Roemer, M., 1991, p. 31). Lassey et al. (1997) define the effective financing of a health care system as "the association of the financing mechanisms with the medical care provided in specialized institutions, the support of the state of health, information systems, organizational structures, human resources and management structures that support the provision of health services to all categories of patients." (Lassey, M., et al., 1997, p. 3). The specialized literature presents other studies on this topic, such as Pavelescu (2013), Murgea (2016), Mihalache et al., (2018), Mihalache et al., (2019).

The literature in the field presents other research on this topic, namely Arrow (1963), Anderson and Poullier (1999), Getzen (2000), Berger and Messer (2002), Alfonso and Aubyn (2005), Bokhari et al. (2007), Kulkarni (2016). Analyzing the efficiency of health systems in terms of public spending for health, an important contribution was made by Rivera (2010), who identified a positive correlation between public spending for the health sector and self-assessment of health, arguing that investments in health prevention are less expensive and more important than the costs of treating the diseases and have an important role in the self-assessed health condition. (Rivera, B., 2010, pp. 1313 - 1319).

The analysis of the measurement of the efficiency of the health system is influenced, according to Naylor et al. (2002) of two problems, respectively: (1) the health of the population of a country is not only affected by the expenses for the health services, but also by a multitude of other factors such as the social, economic and natural environment; therefore, external influences to the health system must be taken into account to correctly estimate the efficiency of the financing of the health system; among these external factors, (2) education has been widely recognized as an important factor, after funding, which influences the health status. (Naylor, D., et al., 2002, pp. 13-34). Thus, to measure the degree of efficiency of the financing of the sanitary sector, different methods can be used; Data Envelopment Analysis (DEA) is a non-parametric model that allows the measurement of efficiency and which uses mathematical programming in rendering the efficiency boundary. Charnes et al. (1978) define DEA as "a mathematical programming model of data observation that provides a new way to obtain empirical estimates of extreme relationships, such as production functions and/or surfaces of efficient production possibilities, which represent the stone of fundamental of the modern economy." (Charnes, A., et al., 1978, pp. 429 - 444). According to a research conducted by Hollingsworth and Peacock (2008), in 2003, there were 188 studies using the DEA model to evaluate the effectiveness of healthcare, the first study to be published in 1983. (Hollingsworth, B. & Peacock, S., 2008, p. 83). Among the authors who have used the DEA method to measure the efficiency of financing the health sector, we can mention Giuffrida and Gravelle (2001), Hollingsworth and Wildman (2003), Retzlaff-Roberts et al. (2004), Lauer et al. (2004), Afonso and Aubyn (2005), Ferrier et al., (2006), Hollingsworth, (2008), Nițoi (2009), Caballer-Tarazona et al. (2010), Nedelea et al., (2010), Roman and Suciu (2012), Popescu et al. (2014).

In order to measure the efficiency of the financing of health services and the efficiency of the health system in general, the Euro Health Consumer Index (EHCI), present in the report published by the Health Consumer Powerhouse, can be used, which is an index which compares the efficiency of the systems. of health. The aim of the study was to select a limited number of indicators in a certain number of evaluation domains that, in combination, can present the degree of efficiency of the health systems in the analyzed states. The criteria according to which the indicators were selected, according to Björnberg (2017), are relevance, scientific validity, and feasibility. Since 2004, the Health Consumer Powerhouse (HCP) publishes a wide range of comparative analyses on the efficiency of healthcare in different countries, with the help of the Euro Health Consumer Index (EHCI); the most representative publication in this regard is the annual Euro Health Consumer Index (EHCI) report. In January 2008, the Border Center for Public Health Policy and HCP released the first report, "Euro-Canada Consumer Health Index"; new editions were published in 2009 and 2010. (Eisen, B. & Björnberg, A., 2010, pp. 1 - 48); in this type of report, we mention: Euro Health Consumer Index, launched in July 2008; a new edition was published in 2016, and another edition, in 2017. (Björnberg, A. & Uhlir, M., 2008, pp. 1-61). Euro Health Consumer Index Diabetes launched in September 2008; a new edition was published in 2014. (Garrofé, C., et al., 2014, pp. 1 - 71). Among the publications that used the Euro Health Consumer Index (EHCI), in order to analyze the efficiency of the financing of the health sector, we mention Clarke et al. (2003), McCabe et al. (2005), Baggott and Forster (2008), Gonçalves (2011).

The Importance of The Efficiency of The Financing of The Health Sector

An efficient health system is directly proportional to the development of health policies and funding, aspects that lead to the quality of the medical services offered, an idea supported by Green and Matthias (1997): "first, health services must focus on components such as policy development, financing, provision of services, and regulation of the type and quality of services, conditions for the (health) system to become effective." (Green, A. & Matthias, A., 1997, p. 13). Blank and Burau (2007) argue, in the second edition of the book "Comparative Health Policy", that the efficiency of a health system comes from the financing and management of resources. Matcha (2003) defines an effective health system as "any combination of those components identified by a company, which facilitates the efficient provision of medical services to its members." (Matcha, D., 2003, p. 4).

Among the authors who have studied the importance of financing health services, from 1970 to 1990, are Kleiman (1974), Newhouse (1977, 1978), Culyer and Jonsson (1986), Donaldson and Dunlop (1986), Parkin et al. (1987), Culyer (1989), Milne and Molana (1991), Getzen and Poullier (1991), Gerdtham and Jonsson (1991), Hitiris and Posnett (1992), who demonstrated the existence of a positive correlation between the efficiency of public spending and health and population health, in most OECD countries; thus, increased financing of this sector supports the general state of better health of the population. More recent research has also focused on evaluating the link between public spending on health, population health and GDP growth, respectively Murthy and Ukpolo (1994), who analyzed the influence of health spending. per capita, in the USA, in the years 1960 - 1987, on the health status of the population; the results of the study show that an increased volume of health expenditure per capita leads to a better overall health (Murthy, V. & Ukpolo, V., 1994, pp. 797-802); Hansen and King (1996), considering that there is a strong correlation between GDP and health care expenditures, shows that within the 20 OECD countries analyzed, the higher the GDP, the higher the expenditures for health services; it can be considered that the state allocates a larger volume of financial resources to this sector and, on the other hand, the population may allow a closer investigation of the health status. (Hansen, P. & King, A., 1996, pp. 127 - 137). Gruen and Howarth (2005) consider that the financial resources allocated to the health sector are essential for safe health services, because "the resources are needed for a qualitative production process, and the costs measure the value of the services offered." (Gruen, R. & Howarth, A., 2005, p. 34). Starting from Roemer's theory (1977), according to which each country has a certain type of health care system that is the result of its history, economic development, and ideologies, it can be stated that the efficiency of the financing of this sector is closely linked, besides other aspects, of the economic state. Also, Audretsch et al., (2015), Goldberg (2016) argue the importance of financing the health sector within the Bismarck economic model; Paolucci (2011), Del Vecchio et al., (2014) talk about this in the Beveridge model; Shishkin et al (2014), Arentz et al (2012), Knickman and Kovner (2015) support the importance of financial resources in economic models of financing the health system such as the private health insurance model and the Semashko model.

The efficiency of financing the health sector based on the DEA model (Data Envelopment Analysis)

In order to carry out this study, a sample of 28 countries was selected, the member countries of the U.E. The model focuses on an area of national interest, respectively health. The data subjected to quantitative research were taken from sites such as Eurostat, OECD - Organization for Economic Cooperation and Development, all data being accessed at the end of 2019. The role of this model is to identify for the decision-making units taken into account, the scores of efficiency to form the boundary of efficiency. The applied model is oriented in the calculation of the efficiency score on the input variables, respectively and on the basis of the variable scale returns (VRS), thus being able to observe those changes of values of the inputs that could take place, the results of the variables of output type not changing it. The use and description of the DEA model was achieved using the notations and approach used by Crețan (2015).

In order to carry out the study, we chose a number of 3 health efficiency indicators, respectively (1) infant mortality; (2) life expectancy; (3) the number of hospital beds, indicators that we correlated with the budgetary expenditures in the health sector (% of GDP). The period subject to the analysis is focused on the years 2016 and 2017. The study used, as the first working instrument, a statistical analysis that has the role of allowing each indicator to be highlighted using four parameters: maximum, minimum, standard deviation and value average. The second working tool in the research is represented by the non-parametric Data Envelopment Analysis (DEA). The variables used, as input (resource type variable) and output (result type variables) in the two analyzes, are shown in the following table:

Table 1: The variables used

Input	Output
Budgetary expenditure in the health sector (% of GDP), (noted I1)	Infant mortality rate (1000 babies), (noted O1)
Number of hospital beds, (noted I2)	Life expectancy, (notat O2)

Table 2: Glossary of data used in the DEA model

Indicators	Unit	Data source
Budgetary expenditure in the health sector	% of GDP	Eurostat
Number of hospital beds	Number of hospital beds	Eurostat
Infant mortality rate	% 1000 born	Eurostat
Life expectancy	Years	Eurostat

Source: author

Correlating the usefulness of the indicators chosen for research purposes with the availability of data from official sources, we presented the results in the following table:

Table 3: Descriptive analysis of the health sector (2016)

Indicators	Minimum	Maximum	Standard deviation	Average
I1	1,90	8,50	1,80	6,28
I2	12,81	674.830,00	163.667,94	119.902,94
O1	73,70	81,90	2,78	78,45
O2	2,40	10,10	1,97	4,34

Source: author

Table 4: Descriptive analysis of the health sector (2017)

Indicators	Minimum	Maximum	Standard deviation	Average
I1	1,80	8,20	1,81	6,12
I2	2.990,00	670.443,00	163.267,51	122.446,79
O1	74,40	82,50	2,62	79,15
O2	1,60	9,00	1,73	3,95

Source: author

From the analyzed data, it is observed that the year 2016 stands by its values above those of 2017. In this case, Romania is well above the average in terms of infant mortality rate, I hold the maximum at this indicator in both years; thus, in 2016, Romania registered an average of 6.9 ‰ of infant mortality and 7.1 ‰ in 2017. Also, in 2016, our country registered a no. of 134,572 hospital beds, compared to 408,245 hospital beds in France, 664,364 in Germany or 252,029 in Poland. As regards life expectancy, in 2017 it is 75.3 years, compared with 82.7 years in France or 82.5 years in Spain. These aspects are a consequence of the poor financing of the health sector, given that Romania allocates to this sector an amount lower than the average of the studied countries; in 2016, our country allocates 5% of GDP to the health sector, while Germany allocates 11.3%, Sweden and France 11%, the Netherlands 10.5%; In 2017, Romania's financing for the health sector remains below the EU average, allocating 5.2% of GDP, respectively $ 442.37 per capita expenditure for health, compared to Luxembourg, which, although allocating a percentage of this sector 6.2% of GDP, this equates to $ 6,236.00 per capita health expenditure, or Sweden which allocates 10.9%, respectively $ 5,600.10 per capita.

Analysis of the health sector's efficiency. The efficiency model of the health field is composed of two input variables: budgetary expenditures in the health sector (% of GDP) and the number of hospital beds, and as output variables are used: infant mortality rate and life expectancy. It can be seen (Table 16) that there are the same number and the same effective countries in both years, namely: Belgium, Czech Republic, Germany, Ireland, France, the Netherlands, Slovakia, and Finland. Given the average value in both years found in the range [0.64- 0.66], the most inefficient countries that depart considerably from the efficiency frontier are Romania, Bulgaria. The minimum efficiency score belongs to Romania in both 2016 and 2017, 0.31 respectively 0.29.

Table 5: DEA results on efficiency score

Countries	2016	2017
Belgium	1,00	1,00
Bulgaria	0,37	0,34
Czech Republic	0,40	0,39
Denmark	1,00	1,00
Germany	1,00	1,00
Estonia	0,36	0,34
Ireland	0,85	0,82
Greece	0,42	0,44
Spain	0,71	0,59
France	1,00	1,00
Croatia	0,78	0,68
Italy	0,85	0,82
Cyprus	0,35	0,38
Latvia	0,85	0,64
Lithuania	0,44	0,39
Luxembourg	1,00	1,00
Hungary	0,41	0,39
Malta	0,44	0,44
Netherlands	1,00	1,00
Austria	1,00	1,00
Poland	0,42	0,42
Portugal	0,35	0,44
Romania	0,31	0,29
Slovenia	0,44	0,42
Slovakia	0,41	0,39
Finland	1,00	1,00
Sweden	0,78	0,78
United Kingdom	0,78	0,78
Maximum	1,00	1,00
Minimum	0,31	0,29
Average	0,66	0,64
Standard deviation	0,28	0,28
Efficient country	8	8

Source: author

The analysis of this sector shows the same efficient countries in both 2016 and 2017, namely Belgium, Denmark, Germany, France, Luxembourg, the Netherlands, Austria, and Finland, which also allocates the highest percentage of GDP to health. In 2016, Belgium allocated health 10.4% of GDP, Denmark 10.4%, Germany 11.3%, Austria 10.4%, France 11.0%; the least efficient country is Romania, which allocated to health a percentage of GDP of 5% in 2016, and in 2017 a percentage of

5.2%. The analysis shows a low efficiency for 2016 in countries such as Bulgaria, Estonia, Cyprus, Portugal and for 2017 in Bulgaria, Estonia, Cyprus; it is difficult to increase the efficiency of the financing of this sector, which is why the situation, from year to year, remains approximately constant in most states that are inefficient from this point of view.

Thus, the developed countries, which allocate a higher percentage of the GDP to the healthcare sector, maintain their high efficiency of these services. However, it is necessary to consider the fact that countries such as Spain, Sweden, the United Kingdom, Ireland, maybe effective on a particular segment of health services, such as life expectancy in Spain, Sweden, infant mortality in the United Kingdom, Ireland, however, may be less effective in terms of the number of hospital beds (Ireland 12,169 hospital beds in 2016, Sweden 23,885 hospital beds in 2016) or the frequency of certain types of conditions. It is difficult for a state to be effective in all segments of health services, but increased funding can influence these aspects.

The efficiency of financing the health sector based on the EHCI index (Euro Health Consumer Index)

The EHCI (Euro Health Consumer Index) is the most complex way of calculating the efficiency of the health sectors, including the efficiency of their financing. EHCI 2017 consists of 6 components, respectively: (1) patients' rights and information, maximum score 125; (2) waiting time, maximum score 225; (3) system results, maximum score 300; (4) coverage with basic services, maximum score 125; (5) prevention, maximum score 125; (6) pharmaceutical products, maximum score 100. To calculate the degree of financing efficiency, the average of one component or the average of the 6 sub-components can be correlated with the percentage of GDP allocated to the health sector or with expenditure per capita for health.

In terms of patient rights and information, the maximum score, respectively 125, was reached by the Netherlands (Figure 1), meaning that it enjoys the highest degree of efficiency in this segment; In this regard, Romania is among the last places, with 71 points, followed by Bulgaria, with 67 points, and Greece, with only 58 points. Slovakia has the highest efficiency in terms of waiting time, respectively 225 points; Romania has a low degree of efficiency in this regard, registering 113 points, as well as Spain and Sweden. The highest degree of efficiency regarding the results of the health system is occupied by Finland, with 289 points out of 300; Romania is in the last place, with 122 points.

The maximum score, respectively 125, for coverage with basic health services of the population, is found in the Netherlands and Sweden; within this category, Romania shares the last place with Greece, with only 52 points. In terms of prevention, the United Kingdom and Ireland are equally efficient, respectively 113 out of 125; Romania is in the last place with 48 points. The most effective grade for pharmaceutical products is found in the Netherlands and Denmark, with 89 out of 100 points; Romania is last, with 33 points, before Bulgaria with 39 points; the degree of efficiency calculated based on the EHCI index, correlated with the percentage allocated from the GDP for the EU member countries, in 2017.

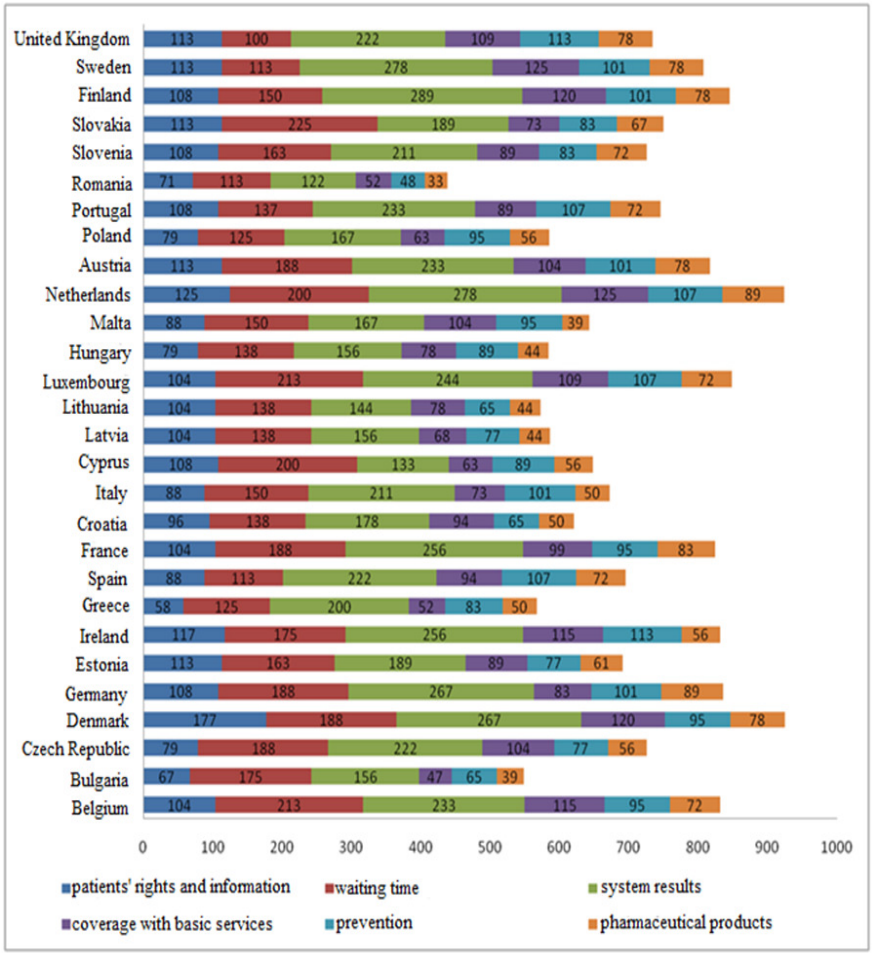

Figure 1: Values of the efficiency of the health services, the year 2017

Source: author, based on data available at EHCI (2018), https://healthpowerhouse.com/media/EHCI-2018/EHCI-2018-report.pdf

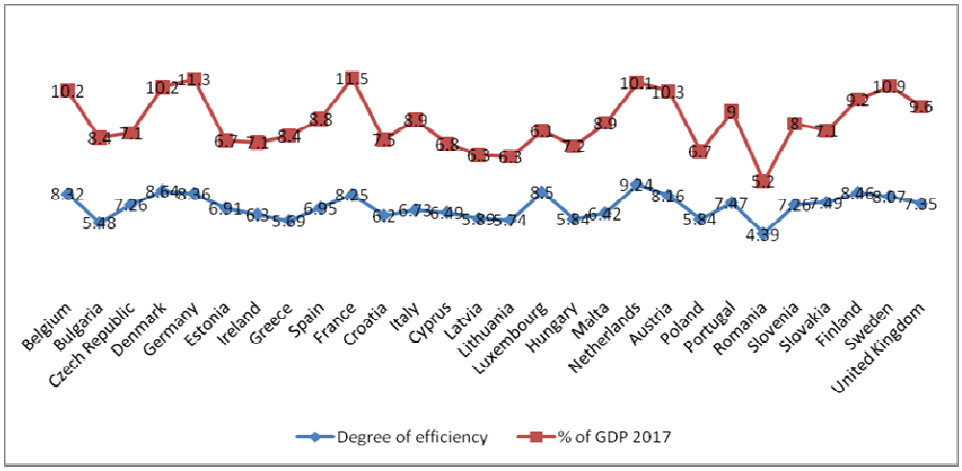

Figure 2: The degree of efficiency calculated based on the EHCI index, correlated with the percentage allocated from GDP for the EU member states, in 2017

Source: author, based on data available at EHCI (2018), https://healthpowerhouse.com/media/EHCI-2018/EHCI-2018-report.pdf

It may be noticeable that the degree of efficiency of health systems in the member states of the U.E. largely depends on the degree of financing (Figure 2). Belgium allocates 10.2% of GDP to the healthcare sector and has an efficiency rating of 8.32%, Germany allocates 11.3% of GDP to health care and has an efficiency rating of 8.64%. Romania has the lowest level of efficiency of 4.39%, as well as the lowest percentage of GDP allocated to this sector, 5.2%. The highest level of efficiency is found in the Netherlands, respectively 9.24%, a country that allocates 10.1% of GDP to health; although France allocates a higher percentage of GDP to the health sector (11.5%), it represents 4,026.15 USD per capita of health, compared to the Netherlands, which allocates a lower percentage of GDP (10.1%), but this means $4,746.01 per capita spent on health. This applies to the state of Luxembourg, which, although allocating 6.1% of GDP to the health sector, this means $6,236.00 per capita spending on health.

Results & Discussion

The efficiency of the financing of the health sector is a problem, as well as addressed, so difficult to solve. It is known that well managed financial resources can lead to an increased degree of efficiency of the health sector, but at present, most states are facing difficulties in ensuring a solid basis of health services. The costs of this system are rising at a rapid pace, which is a problem even for developed countries.

Within the analysis of the efficiency degree using the Data Envelopment Analysis (DEA) method, having as variable budgetary expenditures in the health sector (% of GDP), number of beds in hospitals, infant mortality rate, and life expectancy, Romania is the last place, with the lowest degree of efficiency, both in 2016 and in 2017. This means a low percentage of GDP allocated to health care (5% in 2016 and 5.2% in 2017), an increased infant mortality rate (6.9% in 2016 and 7.1% in 2017), low number of beds in hospitals according to population needs and low life expectancy compared to the rest of EU member states Within the analysis of the efficiency degree using the Euro Health Consumer Index (EHCI) method, a method that can provide a degree of efficiency in the general model of health services, taking into account a comprehensive number of indicators, Romania is still on the last place, with a total score of 549 points. This score represents a total of the scores obtained on the 6 categories considered by this index, respectively the patients' rights and information (maximum score: 125, score obtained by Romania: 71), waiting time (maximum score: 225, Romania: 113), system results (maximum score: 300, Romania: 122), coverage with basic services

(maximum score: 125, Romania: 52), prevention (maximum score: 124, Romania: 48), pharmaceuticals (maximum score: 100, Romania: 33).

It is difficult for a state that allocates one of the lowest percentages of GDP to the healthcare sector, such as Romania, to be able to have an increased degree of efficiency of these services. It is obvious, from the analysis carried out, that the financial resources influence the degree of efficiency of the health sector. not always influenced by the degree of efficiency of the health sector, which, in turn, is not always influenced by the financial resources; thus, the health status of the population may also depend on hereditary factors or factors such as living environment, working environment, vices, food, etc. Also, the efficiency of the health sector can be influenced by the behavior of the medical professionals or the lack of interest of the decision-makers. În acest sens, România se confruntă cu o lipsă acută de personal medical, în special după aderarea la Uniunea Europeană, atunci când cadrele medicale au migrat într-un număr foarte mare.

Conclusions

For the concretization of the right to health care in equity, quality and accessibility, the choice of the financing system, as well as the reimbursement and payment mechanisms bring important determinants, such as (1) the collection of financial resources, (2) the transparency and efficiency management of the available resources, (3) establishing the health of the population as a priority, (4) developing prevention programs for certain diseases, etc. Thus, financial mechanisms are required to promote cost-effective healthcare. It is necessary that the financing of the health system be effective through the capacity of managing the existing funds, so as to ensure the coverage of the requests of patients, the increase of the safety and quality of the care process, the acquisition of progressive technologies, the diminution of the existing disparities in accessing these services.

For greater efficiency, the financing modalities existing in health services should be adapted according to the country in which they operate. Each health system has its own advantages and disadvantages, as well as changes according to the needs of the population. In this sense, in order to determine the degree of efficiency of health services, there are several calculation methods and different indicators, in order to identify the segment in which a state has a low level of it. The use of efficiency indicators within hospital units can lead to a wide range of activities for it to grow. However, it is important that the national decision makers focus on the areas and on the factors that need improvement, such as no. of beds in hospitals or programs for the prevention of certain diseases, considering that each hospital unit and each country have different needs, which requires the identification of priorities according to the needs of the population; for example, there are states such as Spain, Sweden, the United Kingdom, Ireland, which may be effective on a particular segment of health services such as life expectancy in Spain, Sweden, infant mortality in the United Kingdom, Ireland, but may be more less effective in terms of the number of hospital beds or the frequency of certain diseases.

According to the efficiency's analysis of the health sector's financing, Romania ranks the last places, meaning that the low percentage of the GDP allocated to this system influences the infant mortality rate, the existing number of beds in hospitals, the life expectancy, the patients' rights and the information, the coverage of the population with services, basic healthcare, waiting time, prevention, range of pharmaceuticals, as well as health system outcomes. These aspects are influenced by the available financial resources, but also by other factors, which represent a limitation of the present study. Also, the limits of this study are also given by the fact that there are certain ways of calculating the efficiency of the financing of the health sector, in which certain indicators are used; In this respect, it depends on the correctness of each hospital unit to report the indicators correctly.

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Technology Acceptance Influence on Performance of Manufacturing Organizations

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Abstract

The paper concerns the topic of technology acceptance among manufacturing organizations. Those organizations seem to be especially relying on technology and it is a factor, which differentiate them from others. The approaches to technology acceptance analysis are presented. Based on that, it is assumed that technology acceptance influences the organizational performance of manufacturing organizations. Empirical study based on 264 organization is performed in order to verify this assumption and identify whether this relation is stronger for manufacturing organizations.

Keywords: Management, Technology Acceptance, Manufacturing Organizations.

Introduction

In a nowadays competitive world, innovative use of technology has become a key survival factor in manufacturing industry. New technologies have enabled industries to increase their performances, efficiency and due to its advantages are able to create better and transparent relationships with customers. Contemporary organizations are obliged to create new technologies to satisfy customer needs and serve customers better.

The success of a new technology depends, among other, on how well it is accepted by its intended users (Davis, 1989; DeLone & McLean, 2003). Many technologies face the problem of low adoption rate, despite the benefits. An understanding of what makes people accept or reject a new technology can help speed up the adoption rate (Sitorus et al., 2016).

A company oriented on its development should perceive its success in the need to transform its production capacity, switch from manual operations to increasingly organized and automated ones. The success of implementation of new technologies depends on many different, often unexplored, factors that ultimately determine the degree of acceptance by intended users (employees of the manufacturing company) (Davis, 1989).

Within Industry 4.0, many connected systems are entering production to optimize the processes. Fully connected smart production becomes a system that exposes company employees to direct contact. The result of this direct contact of an employee with a new technology (information system) is attitudes and behaviors that accept or reject the technology. Rejection by the user is not an isolated problem, as it often happens that the introduced system does not achieve the success it was intended, irrespective of how technically valuable the future product is.

The continuous development of the technologies that surround economy at the same time poses a threat to established business models, but when they are properly used, it brings the opportunity for

dynamic development in new directions. This is the basis for diversifying operations, optimizing production, reducing resources used and responding more flexibly to the needs of customers (Paska, 2019). International companies are trying to shape the evolution of technological applications to their own advantage. Therefore, the effect of advanced and dynamic technologies, whose acceptance by poorer users depends on many factors - including such as technology availability, safety and quality – seems to become critical at many levels.

The experience of many manufacturing organizations is proof that many technologies face problems during and after their implementation (adoption) in organization life, despite the overt benefits of its future use. As it was pointed out by the Austrian economist Joseph Schumpeter, innovation in the form of production technology appears to be a significant change in the function of production, consisting in a different than previously combined production factors occurring in a discontinuous way (Nahotko, 2019)

Therefore, it is important to understand whether the acceptance or rejection of technology really influences the performance of the manufacturing organization as a whole.

The aim of this paper is to analyze the existing approaches to the measurement and understanding of technology acceptance and to present the results of the pilot study, verifying that the level of technology acceptance positively influences the organizational performance, and confirm that proper use of technology is important for ensuring the efficient performance of manufacturing companies.

Technology Acceptance Models

The literature review in the field of research related to the acceptance and adoption of new technology by intended users of manufacturing companies is connected to the analysis of various technology acceptance models (). The field of research related to technology acceptance had a great literature coverage at the turn of the XX century. The most important contributions seems to consist of: Theory of Reasoned Action (Ajzen & Fishbein, 1980) Theory of Planned Behavior (Ajzen, 2012), Technology Acceptance Model (Davis, 1989), Personal Characteristic of Innovating (Hölzle et al., 2011)Task-Technology Fit (Goodhue & Thompson, 1995), Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003), and others that will be subtly described in table 1.

The described theoretical models take the form of a tool and attempt to explain the use of different technologies in different countries. As a result of the empirical research performed to verify them, some were confirmed while others gave conflicting results. Moreover, these theories have been developed over the years and resulted from the extension of each other (Venkatesh et al., 2016).

It is worth emphasizing at this point that all the theories regarding the acceptance of technology collected and presented here are designed to measure the degree of acceptance and satisfaction of individuals in relation to any technology or information system, but from different points of view, depending on the design and determinants that present their structure.

Table 1: The overview of the technology acceptance models

Source	Name of Model		Constructs
M. Fishbein, I.Ajzen	TRA	Theory of Reasoned Action	Attitude, subjective norms, perceptions
I.Ajzen	TPB	Theory of Planned Behaviour	Attitude, subjective norms, perceived behavioural control
S.Taylor, P.Todd	DTPB	The Decomposed Theory of Planned Behaviour	Relative advantage, complexity, compatibility, normative influence,

			efficacy, facilitating conditions, Attitude, subjective norms, perceived behavioural control
F.Davis	TAM	Technology Acceptance Model	Perceived usefulness,perceived ease of use, attitude
E.M.Rogers	DOI	Diffusion of Innovation Theory	Innovation features, innovators characteristics
A.Bandura	SCT	Social Cognitive Theory	Personal factors, environmental influences
H.Triandis	MPCU	Model of PC Utilization	Affect, individual beliefs, social factors, habit, facilitating conditions, complexity, long-term consequences
F.Davis, Bagozzi	MM	Motivational Model	Intrinsic motivation, perceived benefits, external pressure
V.Venkatesh	UTAUT	The Unified Theory of Acceptance and Use of Technology	Performance expectancy, effort expectancy, social influence, facilitating conditions
V.Venkatesh	UTAUT2	The Unified Theory of Acceptance and Use of Technology 2	Performance expectancy, effort expectancy, social influence, facilitating conditions, habit, hedonic motivation, price value

Theory of Reasoned Action (TRA)

During review of the literature related with current subject in an attempt to understand the factors influencing the decision and maintaining the acceptance of new technologies by intended users, one that cannot be ignored is important theory proposed by M. Fischbein and I. Ajzen. This theory is Theory Of Reasoned Action. These two scientists dealt with socioligical and psychological research, which aimed to study the users' behavior in the use of IT(Kuo et al., 2015).

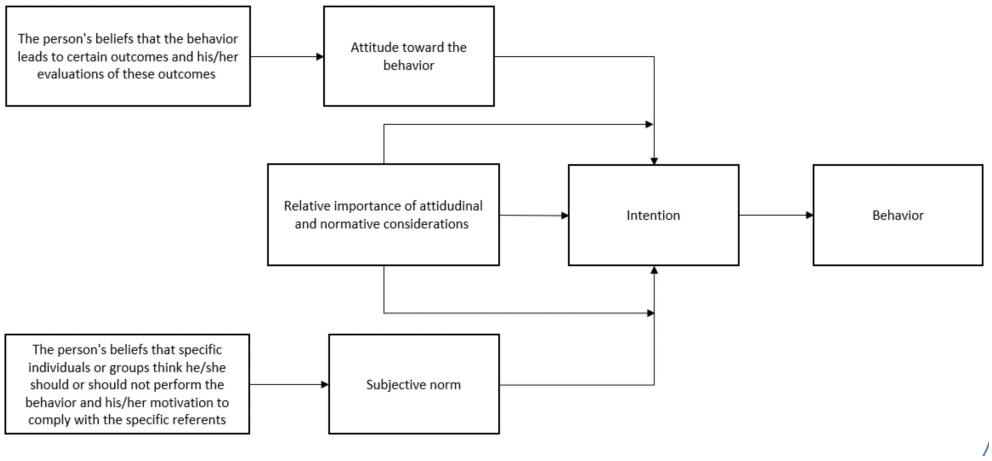

Fig 1. Theory of reasoned action

Source: Ajzen & Fishbein (1980)

This theory became one of the most basic theories of human behavior. Is the result of a research program that began in the late 1950s on the Persuasion Models of Psychology. TRA is considered to

be one of the earliest technology acceptance theories. In that period was the beginning of studying the individuals' behavior through the impact of attitude.

They explained their theoretical model, whose task is to translate human behaviors, with the help of the main cognitive elements, which also include unfavorable or favorite of person's feeling for a behavior, social norms and social influence, intentions and individual decision to do or do not do a behavior. Their aim was to develop a theory that could predict, explain, and influence human behavior (Ajzen & Fishbein, 1980).

Theory of Planned Behavior (TPB)

In the following years of scientific research, Ajzen expanded TRA, thus introducing Theory of Planned Behavior. This model in relation to TRA was expanded with a new construct, which was Perceived Behavioral Control (PBC) as a new variable is added to extend TRA model. Basically, PBC is determined by the availability of resources, opportunities and skills, as well as the perceived significance of those resources, opportunities and skills to achieve outcomes (White et al., 2015). Such an extensive form of the model allows it to be successfully applied in understanding individual acceptance and usage of technologies.

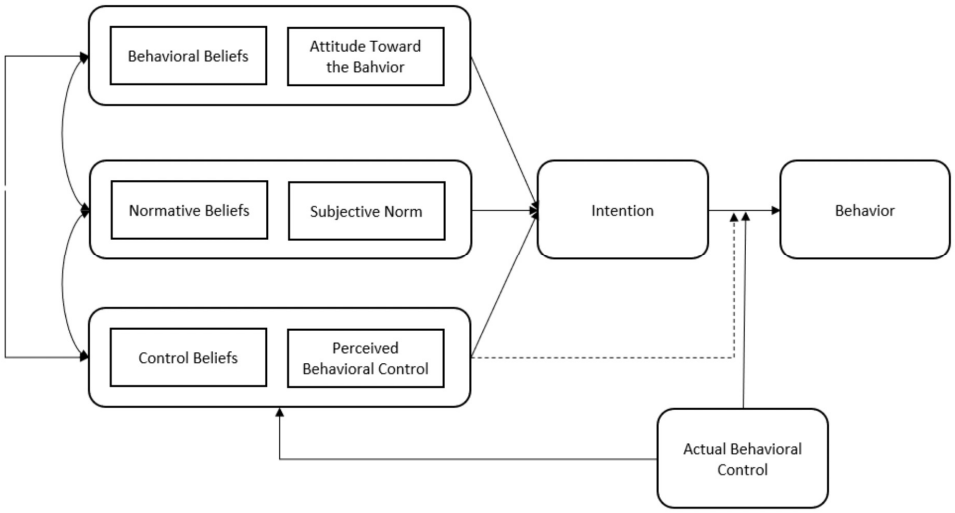

Fig 2. Theory of planned behavior

Source: White et al. (2015)

Technology Acceptance Model (TAM)

The theoretical roots of TAM can be found in the expectancy-value model and the theory of reasoned action. Technology Acceptance Model (TAM) was introduced by Davis (1989).TAM explaining the user behavior towards technology or system having been implemented by institutions (Turan et al., 2015).This has been pointed out and maintained in Davis's assertion that there are two fundamental factors that are responsible and determine user acceptance. These two key factors are perceived ease of use and perceived of usefulness (Fathema et al., 1989). Perceived of usefulness (PU) is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance", and perceived ease of use (PEOU) defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989).TAM posits that the attitude of

an individual to using a particular system is the most important factor that will influence their adoption and utilization of such a system.(Usoro et al., 2010).

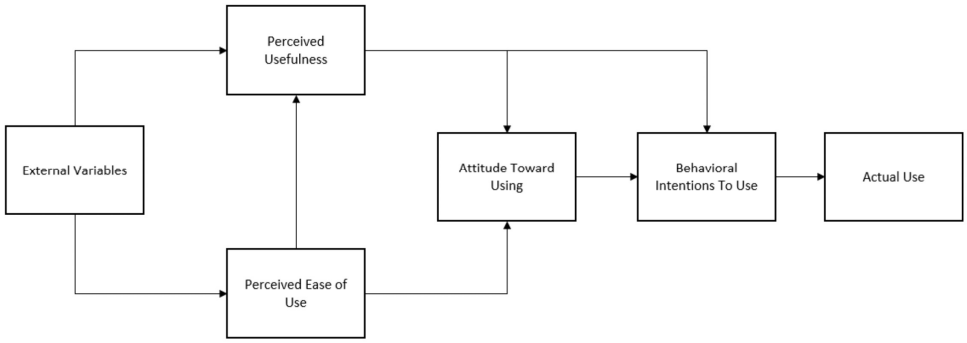

Fig 3. Technology Acceptance Model (TAM)

Source: Davis (1989)

Technology Acceptance Model (TAM) aim at understanding better why users accept or reject a given technology, and how user acceptance can be improved through technology design (Ammenwerth, 2019). User acceptance is often a pivotal factor in the success or failure of a new information system (Davis, 1993). The goal of the Technology Acceptance Model is to understand better why users accept or reject a given technology, and how user acceptance can be improved through technology design. TAM was developed by Fred D. Davis in the late 1980s (Davis, 2016).

During last last thirty-five years have been a lot of models developed that are widely used based on TAM however, TAM seems to be the most common theory among the plurality of studies of various information systems to study user behavior in terms of technology acceptance.

The basic premise of the Technology Acceptance Model is that the more accepting users are of new systems, the more they are willing to make changes in their practices and use their time and effort to actually start using the system.

Motivational Model (MM)

As Davis and Bagozzi emphasized using the Motivational Model, the use of the system depends on two types of motivation: intrinsic and extrinsic (Davis et al., 1992). The extrinsic motivation is defined as the perception that users will want to perform an activity because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself, such as improved job performance. The intrinsic motivation is defined as the perception that users will want to perform an activity for no apparent reinforcement other than the process of performing the activity.

Technology Acceptance and Organizational Performance

Organizational performance is considered as one of the most important measures of benefits, which organization is gaining from various factors (Bieńkowska, 2015). The modern functioning of the manufacturing organizations has no doubt that without automated production processes their measurable economic results would not be possible. That automation based on the real use of technology that has achieved agreement in the acceptance of the technology process paves the way for economic success. The role of technology is gaining momentum and importance with each month of industrial life. The chemical, pharmaceutical, aviation, and automotive industries are only one part

of the progressing innovation markets, in which the number of products offered increases, without the implemented technology this effect would not have been achieved. The importance of the acceptance of a given technology is undoubtedly the clearest in the sense of the development, efficiency, and performance of the organization. The technological infrastructure challenges not only in the dimension of dynamics development and maintaining the growth of broadly understood productions, but also gains importance in the field of human resources. Therefore, it becomes more important and becomes a challenge for society through cooperation with technology. That is why the role of the technology acceptance process has great importance for scientists and people associated with practical management in various businesses of industries. Therefore, presented content can be considered that acceptance of technology should be equated to success only when technologies are implemented and already in actual used.

As it was pointed by Cascio and Montealegre (2016), the rapid advances and the increased reliance on technology brings the very important and significant question, how it is changing work, which is highly salient for scholars of organizational psychology and organizational behavior. The role of technology acceptance in shaping organizational performance is discussed in the literature, however it is usually connected to the information technologies – specific type of technologies used in organizations. Researches conducted by Aral and Weil (2007) provides evidence of a general relationship between IT and organizational performance, as well enhance knowledge of the specific factors driving these general results. Their conclusion demonstrate that different IT assets are associated with different types of performance benefits for firms that are generally consistent with their strategic goals. Despite the fact that scholars are still struggling in order to create and to specify the underlying mechanisms linking IT to the financial performance of organizations, particular case studies indicate that effective and efficient use of IT is a key factor in differentiating successful firms from their less successful counterparts. It has become a widely held belief that technology is fundamental to a firm's survival and growth. (Bharadwaj, 2000). Results in this field of researches are consistent with the notion that IT contributes to a firm's future performance potential (Bharadwaj et al., 1999), highlighting the importance of IT-enabled organizational change (Bresnahan et al., 2002). Scientists and practitioners are interested in the relationship that exists between investments in technology and the effect of organizational performance. The conducted study posits that the driver of IT impact is not the investment in the technology, but it is related to acceptance of technology and actual usage of the technology, which may be a key variable in explaining the impact of technology on organizational performance (Devaraj & Kohli, 2003).

The role of IT is also valid for manufacturing organizations, especially in the context of other technologies use. The current picture of technology appears as a network of interconnected equipment, tools, and production machinery. Integrated with each other through a network of sensors and detectors, they take the form of cyber-physical systems that are gaining popularity. The dimension of the digital era is responsible for integrating robotization with existing human activities, which as a result has changed significantly and allows to exceed the current event horizon on production lines. (Wang et al., 2015). The use of appropriate technologies by users supports the growing level of computerization, which more and more corresponds to the future user potential. This increase aims to meet production requirements. Production systems have the features of intelligence, which is characterized by flexibility, efficient use of resources (optimization), ergonomics in the broadly understood application and the ability to integrate the client and business partner in the process of creating added value (Waibel et al., 2017).

Moreover, the use of any technology is a result of its acceptance, and in effect, focuses on acquiring new knowledge, new components, and new kind of systems that will become responsible for creating more competitive products in manufacturing companies and in the provision of services. Those are designed to broadly optimize related processes (Torkkeli & Tuominen, 2002).

The use of technology is associated with innovation. The technology allows for efficient operations of manufacturing processes. Research conducted in the field of innovative technologies is associated with an increase in the efficiency of the organization. The conducted study estimates the impact of product innovation on initial market share, and the results show that the product's advantage relative

to competing products has the strongest market share impact (Robinson, 1990). Undoubtedly, manufacturing companies that use properly selected technology for their needs, which is generally accepted by its users, has a high degree of technological competence. A higher level of technological competence for each organization has a chance to be more innovative than companies with a low level of competence. Using new technologies increases not only technical competence but generally has an influence on production flexibility. As a result of the efficiency and performance of the organization grow. Greater efficiency means greater opportunities, and thanks to these competencies the company can become a pioneer in the market thanks to the development of new innovative products that can be produced at lower costs in a shorter time. These are advances that the use of technology for manufacturing plants gives (Malerba & Marengo, 1995).

The fourth industrial revolution within production technologies, in particular cases, as an effect of the positive acceptance technology process, presents itself as new performance opportunities. The previous conventional production lines consisted of one line, which was adapted to usually one type of product. Usually there was an open-loop conveyor belt with input and output ends and the machines run along the line. In most cases, there's no communication between the machines in the production line.

As practitioners from the world of business indicate, which is also supported by scientists, the nearest future of manufacturing companies aims to implement the concept of smart factories under a roof whose key role will be played by technology, robots and industrial machines.In a factory near the future, in a smart factory, the role of man will be greatly changed (Brettel et al., 2014). The operator of new technologies, in the thresholds of an intelligent factory, works directly with the technology, which consists of machines, and these are a system of interaction of software, mechanics, pneumatics, electronics and hydraulics. The new role of man in the era of new production technology is limited to the role of monitoring the working status of production lines. The operator's activity from the manual routines performed in practice begins to encounter a different scope of other duties. The key qualities on which the desirable features of modern manufacturing process technologies are based are: speed, proper detail, readability, specificity, repeatability, reliability, efficiency, effectiveness as well as the form and structure of communication that allows for more efficient adaptation and integration of man with the machine (Paska, 2019), which furthermore contributes to the organizational performance. Based on those considerations, the following hypothesis can be formulated:

H1: The technology acceptance has a positive influence on organizational performance of manufacturing companies.

Research Methodology and Results

The survey was conducted in order to verify the proposed hypothesis. The main survey was preceded by the pilot survey conducted in the fourth quarter of 2019 among the group of 25 managers (acting as competent judges). According to obtained results, some ambiguous questions were rewritten and it was established that proposed questions are understood by respondents as it was intended by researchers (which is a prerequisite for establishing a questionnaire as a valid measurement method (Czakon, 2019)). The main research was conducted in December 2019, among 263 organizations located in Poland, which was the only condition limiting the sample (organizations were surveyed regardless of size, industry or type of business etc.), using CAWI method. For the purpose of this study, the sample was limited to the manufacturing companies (128 responses). Sample characteristics are presented in Table 2.

Table 2: Research sample overview

Organization size	local organization
Micro (below 10 people)	12
Small (11-50 people)	37
Medium (51-250 people)	42
Large (above 250 people)	37
Total	128

Variables Overview

The hypothesis verification was based on three key variables: technology acceptance, organizational performance and source of revenue (see table 3).

Technology acceptance was measured based on a single item variable (as this study is treated as the pilot one) on the 5-points' Liktert scale.

Organizational performance was measured based on Balances Scorecard concept (Kaplan & Norton, 1996), being the framework that allows to draw together multiple measures aimed at financial performance, internal business processes, customer perspectives, and innovation and learning. Within these 4 perspectives, ensuring consistency between the strategic objectives and the projects implemented by the organization, 8 measures of the organizational performance were indicated. They were rated on the 5-points' Likert scale (from well below expectations to well above expectations with the middle point: as expected).

Source of revenue was measured as a single item variable, based on the information whether the main source of revenue of the company is connected to manufacturing, trade or services.

Table 3: Variables overview

No.	Variable	No. of items	M	SD
1	Technology acceptance	1	3,56	0,97
2	Organizational performance	10	3,40	0,74

Research Results and Discussion

In order to verify the proposed hypothesis, the correlation and regression analysis was performed. The correlation analysis using r-Pearson coefficient was performed and revealed that there is strong and statistically significant relation between technology acceptance and organizational performance of manufacturing companies ($r = 0{,}473$, $p < 0{,}001$, $N = 126$). Since the correlation analysis does not allow to conclude on the cause-effect relation between the variables, as the second step, the regression analysis was performed. The statistically significant model was obtained ($F(1,124) = 35{,}807$, $p < 0{,}001$). The fit of the model was sufficient considering that only technology acceptance was tested in order to confirm the cause-effect nature of the verified relation ($R2 = 0{,}224$, which means that technology acceptance variance describes 22,4% of the organizational performance variance, which is a very high value for single variable regression). Therefore, the obtained results allow to accept the hypothesis H1 stating that: The technology acceptance has a positive influence on organizational performance of manufacturing companies.

In order to further confirm that the issue of technology acceptance is especially important for manufacturing companies, the regression analysis with moderator was performed. The main source of revenue of the company was set as a moderator (manufacturing company or trade / service company).

Table 4: Regression analysis with moderator – results

Model description	R^2	Delta R^2	Moderator coeff.	Standard error	t Stat	P Value
Technology acceptance, Source of revenue, Moderator *dependent v.: organizational performance*	0,171	0,014	0,095	0,044	2,131	0,034**

The obtained results are presented in table 4. The statistically significant (F(3,257)=17,695, p < 0,001) and fitted (R2 = 0,171) model was obtained. The results show that the source of revenue is a statistically significant moderator of the analyzed relation. Hence, the influence of technology acceptance of organizational performance is stronger among manufacturing companies then among trade or service ones.

Therefore, the obtained results allow to confirm that technology acceptance is a significant factor influencing performance of the organization. Moreover, what was assumed based on the literature review, manufacturing organizations are among those, which are more susceptible for such influence. It can be concluded that manufacturing organizations should pay extra attention on shaping the acceptance of technology used by their employees in order to gain benefits from such use and boost their performance.

Conclusions

The performed theoretical and empirical analysis allowed to fulfill the assumed aim of the paper. The existing approaches to the analysis of technology acceptance were described and discussed. Then, the empirical pilot study was performed verifying that the level of technology acceptance positively influences the organizational performance. The performed empirical study also confirmed that technology acceptance influence on organizational performance is stronger among manufacturing companies, thus it can be assumed that it is a factor especially needed to ensuring the efficient performance of manufacturing companies.

It is worth noting that performed research has the character of the pilot one. The sample of manufacturing companies was not sufficiently large but it was enough to form first conclusions and verify, whether the assumed relation is truly stronger in manufacturing companies than in trade or service ones. Therefore, the established conclusions allow to declare the acceptance of technology in manufacturing companies as a valid field of research. The analysis of the existing models of technology acceptance also revealed that there is a need to indicate factors influencing technology acceptance in such companies, which are specifically dependent of their manufacturing technologies and because of that, especially exposed to the consequences of acceptance and rejection of them by employees.

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Prediction of Grades in a Course on basis of Performance in the Prerequisite Course using Association Rule Mining

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Abstract

The data mining, which is also known as knowledge discovery in databases, is successfully used to extract valid, previously unknown, understandable, useful, and actionable information from large structured and unstructured databases. The data mining has got importance for supporting the crucial business decisions, disease diagnostics, or predictions what may happen in future. In this paper, we present the application of *Apriori* algorithm of data mining to mine associate rules among the marks scored by students in prerequisite and successor mathematics courses in an engineering degree program. The analysis of rules reveals that students who scored better marks in the prerequisite courses will 100% confident, maintain their performance same in the successor courses. The mined rules also revealed that association rule mining could be used effectively for predicting the grades and also adapting the teaching methodologies to teach mathematics course.

Keywords: Educational Data Mining, Association Rules, Confidence, Support.

Introduction

The most important targets of any educational system are to furnish students with the knowledge and skills required to switch into successful professions within a specified period. How effectively global educational systems meet this goal is a major determinant of both economic and social progress.

In Baker, R.S. (2014) mentioned that in recent years, increasing attention to Artificial Intelligence (AI) inspired the development of data mining and analytics in the pedagogical domain. Data mining is the method to obtain additional characteristics and models from a large data set. Data mining uses the methods of machine learning, statistics, and database systems. It is mentioned by Fayyad, U. et al (1996) that data mining is a field of knowledge discovery in databases (KDD), which is the area of detecting the individual and hypothetically advantageous information from large amounts of data set. The data mining concentrating in the educational area is called as Educational Data Mining (EDM). EDM refers to the techniques, tools, and research designs utilized to obtain information from educational records, typically online logs, and examination results, and then analyses this information to formulate conclusions. In Berland, M. et al (2014) mentioned that the EDM is theory-oriented and focuses on the connection to pedagogical theory. In Papamitsiou, Z. and Economides, A. A., (2014) mentioned that presently, little empirical evidence exists to support a theoretical framework able to gain wide acceptance in the scientific community. Given that in the real world there is a great diversity of different learning contexts, they determine the analytical approaches utilized by EDM. Therefore, how EDM can be beneficial in real educational practices, as demonstrated in the research, could be crucial.

The website International Educational Data Mining Society (2011) mentioned that Educational Data Mining is an emerging field, concerned with rising procedures for discovering the exclusive and

progressively large-scale data attained from educational surroundings, and uses those methods to better understand students and the settings in which they learn. Koedinger K. et al (2008) states that EDM permits users to extract knowledge from student data. This experience can be used in different ways such as to substantiate and assess an educational system, enhance the quality of T& L processes, and lay the groundwork for a more effective learning process.

EDM can present universities with a clear picture of specific hindrances to student learning. For example, students can fail in advanced subjects because they did not learn the basic information from the prerequisite subjects. Using data mining (DM) techniques to analyze student information can help identify possible reasons for student failures. Data mining delivers many procedures for data analysis. The enormous quantity of information presently in student databases surpasses the human capability to evaluate and obtain the most useful information without help from computerized analysis procedures. Knowledge discovery (KD) is the process of nontrivial extraction of implicit, unknown, and potentially useful information from a large database. Data mining has been used in KDD to discover patterns with respect to a user's needs. The pattern definition is an expression in language that describes a subset of data. An example of a KDD pattern definition was use by Agrawal, R. (1993).

The section 2 presents association rule mining, in section 3 we present the data and methods, and discussion of results is presented in section 5. We conclude our work in section 6.

Association Rule Mining

The association rule mining was introduced by Agrawal, R. (1993) in 1993 in an international conference on Management of Data and since then it has received a notable attention of the researcher in every domain of life. The association rule mining is one of the mostly used machine learning algorithm for hidden patterns discovery in large database. Association rule mining, in brief, employs the use of machine learning models to analyze data for hidden patterns or co-occurrences in a database. It identifies frequently occurring *if-then* associations that are called association rules An association rule is composed of two parts; an antecedent (if) and a consequent (then) and are written as "*antecedent → consequent*". The antecedent is an itemset in the database and the consequent is an itemset in the database that occurs in combination with the antecedent.

We need to reproduce here to the terms from Lustgarten J. L. et al (2008) used to understand the association rule mining.

Itemset – a set of one or more items i.e. {Butter, Bread, Milk} in a transaction database.

K-itemset – an itemset which contains K items. For example, {Butter, Bread, Milk} is a 3-itemset.
Support (denoted by 's') – is frequency or occurrence of an itemset X. It is one of the measure of interestingness that tells about the usefulness and certainty of a rule. A 5% support means total 5% of transactions in database follow the rule.

Frequent itemset –an itemset X is frequent if support of X is no less than a minimum support threshold.
Confidence (denoted by 'c') – conditional probability that a transaction having X also contains Y.
Strong rule – an association rule having support greater than or equal to the user-specified minimum support threshold and confidence greater than or equal to a user-specified minimum confidence threshold.

An association rule *butter → bread* is presented in Figure 1.

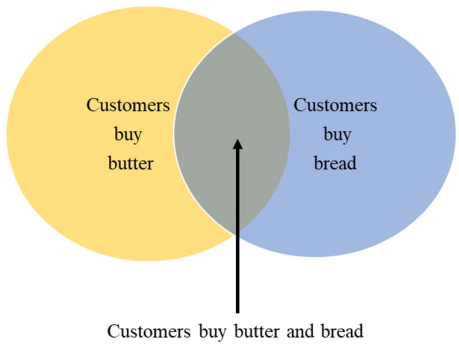

Figure 1: Butter → Bread association rule

This direct applicability to business problems together with their inherent understandability (even for non-data mining experts) made association rules a popular mining method. Moreover, it became clear that association rules are not restricted to dependency analysis in the context of retail applications, but are successfully applicable to a wide range of business problems.

To predict grades in a course on the basis of performance in the prerequisite course(s), we used the *Apriori* algorithm described in Markus H. (2005), which is a quite favorite algorithm for frequent itemset mining and identification of association rules over transactional databases. It proceeds by identifying the frequent individual items in the database and extending them to larger and larger itemsets as long as those itemsets appear sufficiently often in the given database. The frequent itemsets determined by *Apriori* algorithm can be used to determine association rules which highlight general trends in the dataset. We present here an example having few transactions in the database as shown in Table 1.

Table 1: Example transactions database

Transaction ID	**Items bought**
T100	{A, B, D, K}
T200	{A, B, C, D, E}
T300	{A, B, C, E}
T400	{A, B, D}

Let minim support is 60% and minimum confidence is 80%.

Step 1: Scan the database for 1-itemsets candidates and frequent 1-itemsets.

1-itemsets candidates (C-1)

Itemset	Support (%)
{A}	100
{B}	100
~~{C}~~	~~50~~
{D}	75
~~{E}~~	~~50~~
~~{K}~~	~~25~~

Frequent 1-itemsets (L-1)

Itemset	Support (%)
{A}	100
{B}	100
{D}	75

Step 2: Scan the database for 2-itemsets candidates and frequent 2-itemsets.

2-itemsets candidates (C-2)

Itemset	Support (%)
{A, B}	100
{A, D}	75
{B, D}	75

Frequent 2-itemsets (L-2)

Itemset	Support (%)
{A, B}	100
{A, D}	75
{B, D}	75

Step 3: Scan the database for 3-itemsets candidates and frequent 3-itemsets.

3-itemsets candidates (C-3)

Itemset	Support (%)
{A, B, D}	75

Frequent 3-itemsets (L-3)

Itemset	Support (%)
{A, B, D}	75

Step 4: Extract all strong association rules from the database.

Frequent Itemsets	Support (%)
{A}	100
{B}	100
{D}	75
{A, B}	100
{A, D}	75
{B, D}	75
{A, B, D}	75

Candidate Rules	Confidence (%)
A → B	100
B → A	100
~~A → D~~	~~75~~
D → A	100
~~B → D~~	~~75~~
D → B	100
~~A, B → D~~	~~75~~
A, D → B	100
B, D → A	100
~~A → B, D~~	~~75~~
~~B → A, D~~	~~75~~
D → A, B	100

The strong association rules that satisfy the minimum support (60%) and confidence (80%) thresholds are given in Table 2.

Table 2: Strong association rules

Candidate rule	Support (%)	Confidence (%)
A → B	100	100
B → A	100	100
D → A	75	100
D → B	75	100
A, D → B	75	100
B, D → A	75	100
D → A, B	75	100

Data and Methods

1.1 Data Collection

The data consists of the total marks (0 – 100) scored by the forty-four students who passed the second course in Calculus (SC) and Differential Equations (DE) course of an engineering degree program taught by the same instructor in two consecutive semester of fifteen weeks. The course Preliminary Calculus is a prerequisite of the Differential Equations course. The sample marks data is presented in Table 3.

Table 3: Sample dataset

S. No.	Marks scored by students	
	2nd Course in Calculus	Differential Equations
1	63.7	76.3
2	68.5	70.5
3	76.2	81.3
4	62.8	81.5
5	63.0	62.8
6	66.3	76.5
7	76.8	91.3
8	81.9	76.5
9	76.1	70.3
10	54.2	63.0

Data Cleaning

There are a number of data cleaning techniques in the literature such as fill missing values, binning, regression, and clustering – some are mentioned in Kiron, D. et al (2012). We did not use any algorithm or technique to handle the missing values in the marks dataset. The data of the students who passed Calculus course in preceding semester but did not pass the DE course in the successor semester was not included in this study. The students who did not registered course taught by the same instructors in the two consecutive semesters was also not included in finding the association rules.

In educational systems, assessment is a predictable component as it has a wide impact on learning. The student's performance in a course is also based on teaching methodology, faculty behavior towards the student, and faculty tone and communication style in the classroom. These factors influence participation of the student in a class. If different faculty will teach the course, the student's association in class will be affected and hence it results in the performance of the students' grades in the class. The value of the data in this study is that one faculty taught the prerequisite as well as the successor courses to the same students. This ruled out the earlier mentioned side effects of two courses taught by two different faculty.

Data Discretization

The *Apriori* algorithm works on nominal attributes that requires o discretize any numerical data in the datasets. Discretization is a typically preprocessing step for machine learning algorithms that transformed continuous-valued feature to discrete one as mentioned in Lustgarten J. L. et al (2008). Cios K. J. et al (2007) states that the goal of discretization is to reduce the number of possible values a continuous attribute takes by partitioning them into a number of intervals. The marks scored by students in two courses in this study are numerical and we have converted that to a nominal data consisting of ten categories use MS Excel. The categories and their corresponding range is given in Table 4.

Table 4: Numerical to nominal – range and category

Sr. No.	Marks Range	Category
1	90 < Marks <= 100	C-10
2	80 < Marks <= 90	C-9
3	70 < Marks <= 80	C-8
4	60 < Marks <= 70	C-7
5	50 < Marks <= 60	C-6
6	40 < Marks <= 50	C-5
7	30 < Marks <= 40	C-4
8	20 < Marks <= 31	C-3
9	10 < Marks <= 20	C-2
10	0 < Marks <= 10	C-1

The scored marks of the students in two courses transformed into categorical data, a sample, is given in Table 5. Now, scored marks have been made to be eligible for applying mining association rule since association rule mining support nominal data only in Weka.

Table 5: Scored marks transformed to Nominal Data

Marks Numerical Data		**Marks as Nominal Data**	
2nd Course in Calculus	**Differential Equations**	**2nd Course in Calculus**	**Differential Equations**
63.7	76.3	C-7	C-8
68.5	70.5	C-7	C-8
76.2	81.3	C-8	C-9
62.8	81.5	C-7	C-9
63.0	62.8	C-7	C-7
66.3	76.5	C-7	C-8
76.8	91.3	C-8	C-10
81.9	76.5	C-9	C-8
76.1	70.3	C-8	C-8
54.2	63.0	C-6	C-7

Results and Discussion

Apriori algorithm was applied on the dataset using a publically available free data mining tool developed at Waikato University and available at Weka (2019). The Weka tool allows users to apply most of the data mining algorithms on a given dataset. The summary of categories of performance of students in two courses produced by Weka is presented in Figure 2 (a) and Figure 2 (b).

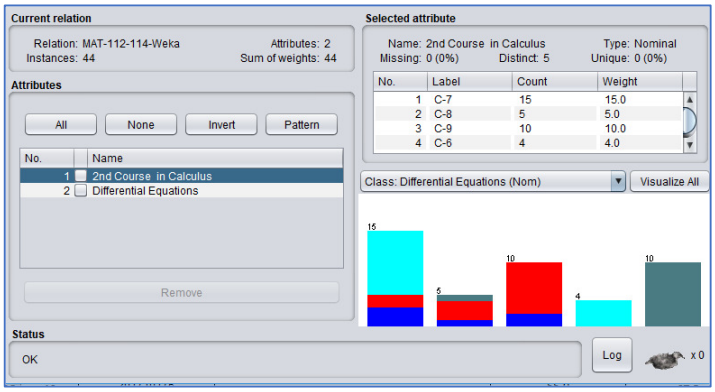

Figure 2 (a): Summary of 2nd Course in Calculus data

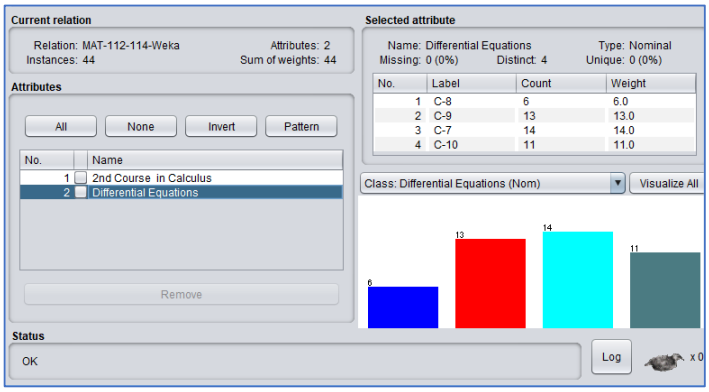

Figure 2 (b): Summary of Differential Equations data

The Weka generated set of association rules with the minimum confidence of 70% and minimum support of 20% are given below.

Number of cycles performed to mine the association rules = 18
Generated sets of large itemsets are given below.
Size of set of large 1-itemsets = 9
Size of set of large 2-itemsets = 4

The strong rules of interest selected from the association rules mined with different combination of supports and confidences are presented in Table 6.

Table 6: Strong association rules mined

Rule No.	Antecedent – 2nd Course in Calculus	Consequent – Differential Equations	Confidence (%)
1	C-10	C-10	100
2	C-6	C-7	100
3	C-9	C-9	80

The analysis of rules reveals that students who scored marks in the range of 80 < marks <= 90 and 90 < marks <= 100 in the prerequisite course will, 100% confident, maintain their performance same in the successor course i.e. Differential Equation.

There is only one strong rule that reveals that we are 80% confident that students who scored marks in the range of 50 < marks <= 60 in the prerequisite course i.e. 2nd Course in Calculus can improve their performance in the successor course. i.e. Differential Equation.

The analysis of the data disclosed that there are only two students (2/44*100 = 4.5%) whose performance was lowered in the successor course as compared to the performance in prerequisite course, but it was not mined as strong rule.

Conclusion

Apriori algorithm proved to be successful in finding the hidden association among prerequisite and successor courses in mathematics to predict grades. The association rules generated in this study were later verified by the expert instructors involved in teaching the related course. The study can further be extended for finding association rules among the related courses in given baccalaureate program in any discipline.

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Mistakes Made by Executives and HR Managers in Personnel Selection Interviews and Options for Avoiding Them

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Abstract

Executives and HR managers face many challenges today, such as demographic change, shortage of skilled workers, development of the diversity of the staff, pressure to expect service quality, increase in mental stress, etc. Personnel selection is one of the most critical issues for a company because it is an investment in human capital, which can be a decisive competitive advantage for an organization. For many companies and industries, it is becoming increasingly difficult to find suitable staff, since applicants tend to be interested in large corporations or attractive brands. Furthermore, tasks in our society are becoming increasingly complex and demanding, which means that the requirement profiles are becoming more and more specific. This makes the search and selection of suitable employees more important. Few companies can afford to make wrong decisions in the personnel selection process despite their good economic success. This scientific paper describes and discusses, based on the methodology of a qualitative research via problem-centered interviews as well as a literature review, on the one hand, the mistakes that executives and/or HR managers can make during the personnel selection interviews, on the other hand, what the consequences are and what options exist to avoid these mistakes.

Keywords: Competitive Advantages, Human Resource Management, Organizational Management

Introduction

Personnel selection is one of the most critical issues for a company, because it is an investment in human capital, which can be a decisive competitive advantage. For many companies and industries, it is becoming increasingly difficult to find suitable staff, since applicants tend to be interested in large corporations or attractive brands. Furthermore, tasks in our society are becoming increasingly complex and demanding, which means that the requirement profiles are becoming more and more specific (Krings, 2017, p. 1). The current demographic development also confirms that in many industries it is very difficult to get skilled workers. This makes the search and selection of suitable employees more important. Few companies can afford to make wrong decisions in the personnel selection process despite economically good success (Lorenz & Rohrschneider, 2015, p. 1). Due to the increasing size and complexity of many companies, personnel policy measures are no longer used only for personnel administration, but also take on an important coordination function. In order to coordinate the actions of the individual employees in a company accordingly and to ensure a consistent company policy, binding criteria for personnel selection, group-oriented forms of personnel deployment and personnel management based on target values are used (Holtbrügge, 2015, p. 4).

The aim of this scientific article is, on the one hand, to describe the mistakes that executives and/or HR managers can make during the personnel selection interviews, on the other hand, what the consequences are and what options exist to avoid these mistakes. The chosen methodology is the qualitative approach of the problem-centered interviews as well as a literature review, including the current knowledge on the respective subject. Through the openness and flexibility of this method, the discovery of unknown facts is made possible, higher information content is generated and the viewpoint of the interviewees is centered. The data collection will be conducted by guided and problem-centered interviews. The basis for the preparation of the interview guide and the related questions are the information and current knowledge base from the literature on this subject. The interview guide consists of an introduction and a main part. The introduction serves to briefly outline the meaningfulness and

usefulness of the survey. In the main section, questions are asked about possible mistakes made by executives and HR managers in personnel selection interviews and options for avoiding them. When conducting the interviews, it has been tried to ask open questions where possible and appropriate in order to gain as much information as possible from the interviewee and not lead him or her in a specific direction (Mayring, 2016, pp. 67-68). The problem-centered interview selects a linguistic approach to determine his or her position on the basis of subjective meanings. It's tried to establish a situation of trust between the individual parties. Although the interview partners are directed by the guideline through certain questions, they react openly and without any specific answer possibilities. This approach has the advantages of being able to check the general understanding of the interviewees, as well as the disclosure of subjective opinions and the discussion of concrete terms of the interview situation (Mayring 2016, pp. 68-69). The areas of application for the problem-centered interview are mainly within theory-based research, since it integrates the aspects of the primary problem analysis into the interview. It is particularly suitable if in principle a lot is already known about the research field. The standardization through the interview guide facilitates the comparability of the conducted interviews and thus also the subsequent evaluation (Mayring, 2016, pp. 70-71).

The evaluation method is based on the summary approach of the qualitative content analysis according to Mayring. The entire material is screened without any specific preliminary considerations and the respective recordings of the interviews are transcribed. In a further step all utterances, which do not change the content, are removed, since the main interest is aimed only at the content-based information (Mayring, 2016, pp. 115-116). A comprehensive content analysis is used for the data evaluation. The aim is to reduce the material to its essential contents and to create a manageable basic form. Written statements will be structured in order to subsequently draw conclusions for the research. For this purpose, the obtained information will be divided into categories. The category system should not be very detailed. Afterwards the results will be discussed and put into context with the relevant literature. The category system can be reworked and adapted after carrying out the pre-study (Mayring, 2016, pp. 115-116).

Personnel Selection

In the age of a shortage of skilled workers, recruitment and personnel selection are the pillars of an active personnel strategy that aims to increase the inflow of human capital. The job market does not allow waiting and experiments, but requires systematic actions to increase the base rate and hit rate. Personnel selection is a key success factor in the value chain in order to minimize wrong decisions in personnel deployment. Mismanagement is associated with considerable follow-up costs in connection with fluctuation, new advertisements, personnel development, low motivation for work and performance deficits (Treier, 2019, p. 122). Personnel selection refers to the assignment of applicants to positions in an organization through recruitment and the use of selection techniques, which are based on a requirement analysis and serve to find the most suitable applicant for the respective position (Kauffeld, 2014, p. 100). The basis of personnel selection and personnel development is the identification and promotion of job-specific suitability of the employees (Holtbrügge, 2015, p. 10). The so-called suitability diagnosis is an essential part of the selection of personnel, with the help of which it can be checked whether and to what extent an applicant is suitable for a specific job. It is more likely to be suitable for a specific position, the better it is able to cope with the respective requirements due to its requirements. Accordingly, the correspondence between the desired professional position and the requirements of the applicant is analyzed (Schuler & Höft, 2007).

The design of the personnel selection process plays an essential role for the efficient procurement of employees. The prerequisite for this is an exact recording and creation of the requirement profile or job description. In general, different ways of procurement, different evaluation principles of the application documents as well as several selection procedures are available. From these, the respective company can design the best recruitment process for its purposes (Lindner & Lohmann, 2012, pp. 5-6).

Personnel marketing has become more professional in recent years in terms of channel breadth (e.g. use of social media) and the use of IT, but with the risk of falling prey to the maximization principle in order to counteract the impending scarce need for personnel. At this point, an increase in candidates is

often no added value if this is accompanied by a decrease in the fit and the administration costs skyrocket. The progress in the selection of personnel is sobering, because personnel managers use comparatively few psychological tests and continue to rely on their intuition based on non-standardized interviews and application documents in decision-making processes (Treier, 2019, p. 123).

At the initiative of the professional association of German psychologists, for example, DIN 33430 ("Requirements for procedures and their use in job-related suitability assessments") was adopted in 2002, which describes requirements for personnel selection. The background to this decision was the low forecast validity of many personnel selection procedures. The standard specifies that only those processes are used that can be demonstrated to be related to the requirements. Furthermore, all aspects of the implementation and evaluation of the procedures as well as the interpretation of the results should be defined and documented in advance. The process of personnel suitability assessment must be documented in such a way that the result can be understood. The aim is to increase the quality of the selection of applicants and to provide verifiable proof of their legality (Hornke & Winterfeld, 2004; Kersting & Püttner, 2006). DIN 33430 unlocks the standards that are already common in Great Britain and the Netherlands. However, it is not mandatory, but only serves as a recommendation (Lorenz & Rohrschneider, 2015, p. 4). A targeted selection of personnel starts with an open and honest self-assessment of the company, the environment and the task. Success can only be achieved by fitting the person and position (Lorenz & Rohrschneider, 2015, p. 5).

The process of personnel selection is divided into different stages. Figure 1 shows the ideal typical process of recruiting new employees. For reasons of clarity and taking into account the question to be dealt with in this scientific article, only the phase of the selection process should be described in more detail.

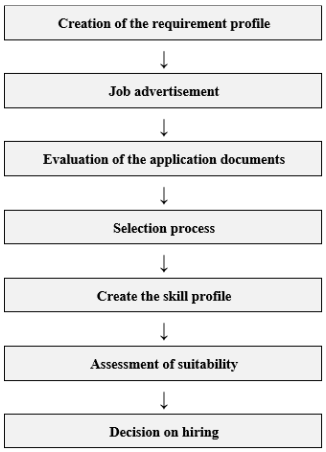

Fig. 1: Process overview of personnel selection

To check the quality of the personnel selection process, an evaluation using a cost and benefit analysis should be carried out. This serves the specific determination of the financial income of a personnel selection process (Kauffeld, 2014, p. 100). After reviewing the documents or pre-selecting potential candidates by telephone, there is direct interaction between applicants and those responsible for the company. The company usually specifies the process with which it wants to check the suitability of the candidate. Interviews are usually conducted so that the company can get an idea of the applicant. If necessary, these can be supplemented with tests and self-assessment by applicants through questionnaires (Lindner & Lohmann, 2012, p. 64).

Various procedures can be used to make the personnel selection decision. These include the assessment center or the structured assessment of the application documents. The leading decision-making instrument is usually the personal interview (Welk, 2015, p. 64). Personnel selection interviews are also referred to as job interviews. Depending on the company and the position to be filled, the respective

framework conditions for a personnel selection interview can vary. As a rule, representatives of management, personnel management and the immediate supervisor (e.g. department head) take part in these discussions. Personnel selection interviews are used to fill new positions and/or management positions in the company (Welk, 2015, p. 63). The aim of personnel selection interviews is that on the one hand the respective company can get a general picture of the applicant, on the other hand it can check the written documents and find out the expectations of the applicant. In addition, the potential performance of the applicant should be estimated. In turn, the applicant can get a more precise picture of the company and the relevant area of work in a personnel selection interview and assess development opportunities. Successful personnel selection interviews require detailed preparation from both sides (Lindner & Lohmann, 2012, pp. 64-65). The next chapter deals with the common mistakes in personnel selection interviews and their causes more in detail.

Recruitment goes hand in hand with personnel selection to increase the hit rate. That is why more and more companies are not only investing in recruiting, but also in selection procedures that allow a candidate's future work performance to be validly assessed. The call for future work performance is determined by the job's requirement profile. Because only when it is known what requirements a particular workplace places on an employee will you be able to identify and select a suitable employee (Treier, 2019, p. 130).

In aviation for example, professional selection of personnel has been practiced successfully for more than fifty years. From joining the company, i.e. the beginning of pilot training, to being promoted to captain after ten to fifteen years, 97% of the candidates are still on board at Lufthansa. This is no coincidence, because large airlines use procedures that meet the special requirements of this professional group when choosing their future pilots. By systematically ensuring a high degree of accuracy between future personnel on the one hand and job requirements and corporate culture on the other, the airlines have been able to minimize problems and risks for decades. People have different talents, which are very different for them. Such dispositions lead to people developing an affinity for certain activities. Everyone knows from his own experience that he prefers to take care of things and topics with a high affinity – this is where you are most likely to become a professional. Companies must therefore find out where the individual talents of their applicants lie in order to select a suitable candidate and use them according to their strengths. Personnel selection procedures and potential analyzes serve to identify these personally strong investments, but also any weaknesses (Hinsch & Olthoff, 2019, p. 91).

Mistakes in Personnel Selection Interviews

The consideration of mistakes and their causes in the course of personnel selection interviews is essential, since the selection of personnel or personnel search requires costs that vary with the type of position to be filled and the number of applications. Basically, all investments are sensible, through which a new competent employee can be won. Costs are not justifiable that arise from failure to achieve goals and new search activities over and over until the respective position is successfully filled (Lorenz & Rohrschneider, 2015, pp. 2-3). To find out whether someone fits into a company, a department or a team, it is necessary to find out what drives the applicant. Therefore, a company needs employees with knowledge of human nature and the ability to empathize an interview (List, 2013, pp. 26-27).

Research shows that judgments about other people are made in the first seconds of getting to know each other. So after this short time there is already a relatively firm opinion about another person. This poses certain dangers in the personnel selection interview, since the entire further perception is channeled. After a subjective opinion has been formed in the first seconds of an encounter, it is further confirmed unconsciously. If the first impression was positive, the subjective filters result in all positive subsequent impressions being perceived particularly clearly and evaluated as confirmation of the first impression. Negative follow-up impressions are accordingly assessed as low or not perceived correctly (Lorenz & Rohrschneider, 2015, pp. 109-110). Figure 2 shows the causes of observation and assessment mistakes in the course of personnel selection interviews that can be made by managers and/or personnel.

Causes of observation and assessment mistakes

Intra-personal influences	Interpersonal influences	Situational influences	Assessment procedures
Selective perception	Sympathy and antipathy	Influences in the situation	Inadequate exercise
Prejudices	Primacy effect	Influences outside the situation	Not exactly defined criteria
Status error	Recency effect		
Personal value structure	Halo effect		
Assessment type	Order effect		
egoism			

Fig. 2: Causes of observation and assessment mistakes

Intra-Personal Influences

Selective perception is the selection of information by the interviewer according to his personal situation. The applicant's objective assessment suffers as a result, as does prejudice or status errors, in which academic titles convey their suitability. A shift in the personal structure of values can, for example, set the bar for the applicant's performance unattainably high (Lindner & Lohmann, 2012, p. 65).

Interpersonal Influences

The effects of sympathy and antipathy must be analyzed just as critically as so-called primacy or recency effects. This means the comparatively high attribution of weights of first and last impressions, which may influence the other effects. The sequence effect is the phenomenon in which applicants are judged better or worse, depending on the quality of the representation of previous or subsequent applicants (Lindner & Lohmann, 2012, p. 65). The effect of sympathy and antipathy means that applicants who appear likeable are rated better than those who convey a rather unappealing picture. This can quickly lead to the competencies of an applicant who immediately makes a sympathetic impression being completely overestimated or that of an applicant who seems rather unappealing to be devalued. This is one of the main sources of error in recruitment interviews. Furthermore, it must be taken into account that the feeling of sympathy is ultimately subjective (Lorenz & Rohrschneider, 2015, p. 112).

Situational Influences

Situational influences include, for example, the room temperature or a possible unpunctuality of the applicant, which may have a lasting impact on the course of the conversation (Lindner & Lohmann, 2012, p. 66). Other situational influences that make it difficult to make general statements about the personnel selection interview are e.g. the level of awareness between the two interviewees, the situation on the job market, the age or the age difference of the interview partners, the differences in level of education and social origin, as well as gender (Neuberger, 2015, p. 24).

Assessment Procedures

Due to inadequate training or familiarity of the interviewer with the conversation situation, the procedure as such can lead to distortions. In addition, the assessment criteria cannot be clear or at least inconsistent between the interviewers (Lindner & Lohmann, 2012, p. 66).

Other Sources of Mistakes

If the interview is conducted using closed questions, this reduces the information about the applicant and the presentation of complex content suffers. Too fast staffing can lead to incorrect staffing if it is not adequately checked whether the right employee has been found for the right job at the right time, which is also associated with additional avoidable costs (Welk, 2015, p. 64).

In many industrial companies, personnel selection primarily takes place via resumes and personal interviews. The assessment is based on past performance. In the foreground are also professional job requirements. Process and interpersonal skills of applicants are rarely systematically determined. Therefore, their evaluation is all too often done from the gut. It is therefore not surprising that, according to a study by Intersearch Executive Consultants, inadequate management skills, inadequate leadership skills, inadequate social skills and inadequate adaptability are the most common reasons for unplanned new appointments. For this reason, larger companies in particular rely on assessment centers when hiring new employees, with the help of which they systematically pay attention to the non-technical skills and abilities of their applicants (Hinsch & Olthoff, 2019, pp. 91-92).

Consequences and Options to Avoid Mistakes

Mistakes in personnel selection interviews can mean that the qualifications required for certain tasks are not available with enough employees or that managers are only selected based on their professional qualifications and not on the basis of their leadership skills. A possible consequence would be that skills shortages of individual employees have to be compensated by other team members over a longer period of time. Hiring an unsuitable applicant may result in the applicant leaving the company after a relatively short time. The employer cannot continue the employment relationship during or after the probationary period, or the employee ends the employment relationship himself due to excessive or insufficient demands. High fluctuation rates or early fluctuation can mean considerable costs for companies if the employee concerned has to be released and compensated and new transaction costs for advertising, search and selection of new candidates. As a rule, these costs increase with the economic importance of the position in the company (Weuster, 2004, pp. 5-6).

The most common mistakes of judgment arise from making intuitive judgments. The evaluation therefore takes place at the same time as the observation, which, however, has not yet been completed at this point in time. It is therefore advisable to divide the assessment process into three phases (observing, describing, evaluating). In the first phase, only what can be observed and described is included in the assessment (concrete behavior and no generalizations). In this phase, your own judgment is deliberately put at the back. In the second phase, what is observed is put into words and recorded in a neutral manner. This also includes the continuous documentation of the conversation. You should therefore take as many notes as possible throughout the interview. The evaluation takes place in the third phase. Here, the notes from the selection interview are systematically evaluated in advance. The quality of a decision increases when it takes place in a dialogical process. In this context, it makes sense to conduct several interviews with changing interview partners with the applicant. The evaluation is then carried out in a large group. The combination of different perspectives can significantly improve the quality of the decision-making process and reduce the fluctuation in this part of the company (Krings, 2017, p. 66).

The creation of an in-house guide for personnel selection interviews enables the different applicants to be compared objectively. The following content structures the process (Welk, 2015, pp. 64-65).

1.) Greeting: e.g. brief description of the course of the conversation and an introductory round
2.) Description of previous professional development
3.) Information about the current position and competencies/tasks
4.) Information about the future position and area of responsibility
5.) Questions about the company
6.) Questions from the applicant
7.) Questions from the company

8.) Clarification of the general conditions
9.) Conclusion of the conversation
10.) Farewell

An essential point for avoiding mistakes in personnel selection interviews is appropriate preparation by the interviewer. In some cases, the selection of personnel requires special content and time-based process management in order to best meet the needs of the applicant and the interests of the company. The first step is to clarify who should take part in the conversation (or conversations) on the part of the company. It is important to ensure that all decision-makers involved also take part in all discussions (typical combination: line manager and HR specialist). The positions of the company interview participants make it clear to an applicant how he perceives the importance of his person or the respective position. For this reason, the next superior manager should also take part in the personnel selection interview or at least briefly meet the applicant. Furthermore, a conversation with the current job holder and future colleagues, as well as a job visit can be taken into account and scheduled. The preparation of a personnel selection interview includes the development of a question guide as well as the preparation of information materials with which the job and the respective company are to be explained in more detail to the applicants. The documents can also be made available to applicants as a printout or information brochure (Weuster, 2004, pp. 179-180).

The best way to reduce perception distortions and assessment errors is to prepare personnel selection interviews in writing. The interview guide already mentioned secures your own conversation behavior and ensures that all necessary information is requested. It also ensures that all applicants are faced with the same questions (Lorenz & Rohrschneider, 2015, p. 113). By selecting the questions in the personnel selection interview, it can be determined and controlled how much information is obtained and how well it is suitable to arrive at an assessment of the applicant. The decisive success criterion is the "how" of a question. Closed questions that can be answered with “yes” or “no” should be avoided as much as possible due to their low information value. Unanswered questions generate a higher information content and usually begin with a "W" (what, who, when, where, why, etc.). This form of question requires a comprehensive and complete answer and the taking of your own position. The necessary information about an applicant and his or her suitability for the position to be filled can only be learned through suitable questions. Before carrying out the personnel selection interview, the interviewer should consider which types of questions are used and which should be avoided for reasons of fairness. It must be checked whether, for example, provocative questions from the respective applicant are appropriate for the position in question. If the position requires a discussion of difficult conversation situations and conversation partners in everyday work, it can be useful to include such a short phase in the interview. At the beginning of the recruitment interview, you should work with open questions to gain as much information as possible. In the following course of the conversation, the type of questions can then vary or be changed as soon as comprehensive information about a certain aspect has already been obtained. In order to achieve effective results, some rules should be considered in the interviewer's conversational behavior. This includes, for example, giving the conversation partner time to think, listening carefully and asking questions in the event of ambiguities or identified contradictions (Lorenz & Rohrschneider, 2015, pp. 114-116). For the planning, implementation and evaluation of personnel selection interviews, essential legal bases must also be observed. The storage and use of data may only take place after prior notification of the applicant and his given consent. The use must be purposeful. The purpose must have been made known to the person and consent must be given (Krause, 2017, pp. 92-93).

Conclusions & summary

Personnel selection is one of the most critical issues for a company and represents a decisive competitive advantage (Krings, 2017, p. 1). The current demographic development confirms that it is very difficult to find skilled workers in many industries, which makes the search and selection of suitable employees more important. Very few companies can afford to make wrong decisions in the personnel selection process (Lorenz & Rohrschneider, 2015, p. 1).

Aptitude diagnostics form an essential part of personnel selection, with the help of which it can be checked whether and to what extent an applicant is suitable for a specific job (Schuler & Höft, 2007). Targeted personnel selection starts with an open and honest self-assessment of the company, the environment and the task (Lorenz & Rohrschneider, 2015, p. 5). The leading decision-making instrument for personnel selection decisions is usually personal interview (Welk, 2015, p. 64).

The consideration of mistakes and their causes in the course of personnel selection interviews is essential, since the selection of personnel or the search for personnel requires costs that vary with the type of position to be filled and the number of applications (Lorenz & Rohrschneider, 2015, pp. 2- 3). The most common errors of judgment arise from making intuitive judgments. It is therefore advisable to divide the assessment process into three phases (observing, describing, evaluating) (Krings, 2017, p. 66). The creation of guidelines for personnel selection interviews enables the different applicants to be compared objectively (Welk, 2015, pp. 64-65). An essential point for avoiding mistakes in personnel selection interviews is appropriate preparation by the interviewer. In some cases, the selection of personnel requires special content and time-based process management in order to best meet the needs of the applicant and the interests of the company (Weuster, 2004, pp. 179-180). By selecting the questions in the personnel selection interview, it can be determined and controlled how much information is obtained and how well it is suitable to arrive at an assessment of the applicant (Lorenz & Rohrschneider, 2015, pp. 114-116). For the planning, implementation and evaluation of personnel selection interviews, essential legal principles must also be observed (Krause, 2017, pp. 92-93).

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Pasado Y Presente Del Proceso Migratorio En Venezuela

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Resumen

A lo largo de la historia del siglo XX, Venezuela fue considerada una nación de puertas abiertas al mundo, los factores de atracción estaban anclados a un nivel de vida estable y al desarrollo de sus fuerzas productivas. Entrado al siglo XXI, la situación se revierte, el país presenta un patrón migratorio completamente distinto, más de cuatro millones de personas han emigrado, según cifras de la ACNUR (2019). En este sentido, el objetivo de esta investigación es caracterizar el proceso migratorio venezolano, haciendo énfasis en su dinámica más reciente, abordando el problema desde una óptica descriptiva y documental. Los resultados develan que se ha venido configurando el mayor movimiento migratorio en la historia reciente del continente americano, y cuyo efecto ha provocado un desequilibrio en la región. Entre las causas más relevantes de este éxodo destacan factores de carácter económico y social, como la caída vertiginosa del Producto Interno Bruto (PIB), el proceso hiperinflacionario que ha erosionado el poder adquisitivo de la moneda nacional, la inseguridad jurídica y personal, entre otras razones. Lo anterior, ha derivado una crisis humanitaria de grandes dimensiones que exige una respuesta inmediata a la población.

Palabras clave: Inmigración, emigración, crisis, Venezuela.

Introducción

La migración es un proceso demográfico complejo relacionado con múltiples aspectos económicos, sociales y políticos que inciden en la vida cotidiana de las personas, por un mundo, políticas y gobiernos cada día más cambiantes. El fenómeno se compone de la salida de un individuo (emigración) de una comunidad, estado o país (lugar de origen) por un tiempo determinado y la llegada de este al nuevo territorio (inmigración) o lugar de destino. La historia de la humanidad ha permitido recopilar diversos hechos migratorios, pues desde que la especie humana existe, hay indicios de migración. Las personas han tenido que desplazarse de un lugar a otro en búsqueda de alimentos, abrigo, vestimenta o producto de grandes catástrofes naturales o sociales.

A medida que la sociedad fue avanzando, con el desarrollo de los medios de comunicación y transporte (automóviles, ferrocarriles, aviones, barcos, entre otros), este proceso demográfico tuvo mayor auge, haciendo posible la migración masiva de personas, en una escala global nunca antes vista. Se trata de migraciones de tipo socioeconómico, estimuladas por un proceso de desigualdad creciente entre los países desarrollados y subdesarrollados, y acentuados, en especial en este último caso, por deficiente gestión de los gobiernos.

De esta manera, la migración ha contribuido en mejorar las condiciones de vida de las personas tanto en los países de origen como en los de destino. No obstante, no todos los movimientos migratorios se producen en circunstancias favorables. En los últimos años, de acuerdo a la Organización Internacional para las Migraciones (OIM, 2018), se ha registrado un aumento de las migraciones y los

desplazamientos provocados por conflictos, persecuciones, situaciones de degradación y cambio ambiental, y por una acusada falta de oportunidades y seguridad humana.

De acuerdo a la Organización Internacional del Trabajo (OIT, 2015) existen alrededor de 232 millones de migrantes en el mundo, sin embargo, los datos que ofrece la OIM (2018) aseguran que la cifra alcanza los 244 millones de personas, de los cuales el 65% son trabajadores. Cifra que devela la cantidad significativa de personas que dejaron de pertenecer a la fuerza de trabajo de sus naciones para hacer vida productiva en otras tierras, por lo que son individuos en edad activa (que incluye a jóvenes) y muchos de ellos, de condición calificada. Situación que preocupa a dicha institución y a otros organismos internacionales que han tratado el tema para delinear políticas de migración de alcance mundial.

Para el caso de Venezuela, que ha sido caracterizada como una nación de puertas abiertas a los flujos poblacionales interesados en las actividades económicas, en la actualidad se presenta un patrón migratorio completamente distinto, pues se han registrado emigraciones masivas, en especial de población joven y calificada de acuerdo a De la Vega y Vargas (2017), devenidas por problemas con la alimentación, realización personal, inseguridad, escasez de medicamentos, bajos salarios, corrupción, entre otros inconvenientes, que demandan la atención inmediata del gobierno, que no ha querido otorgar el reconocimiento tácito de la diáspora que se está presentando. Bajo estas consideraciones, este trabajo compone una caracterización del proceso migratorio venezolano, haciendo énfasis en su dinámica más reciente, abordando el problema desde una metódica descriptiva - documental.

América Latina Ante El Desafío De La Migración

La migración en América Latina, dada su vinculación al viejo mundo, desde los períodos de la colonia, la independencia y hasta mediados del siglo XIX y parte del XX, ha sido activa, la región recibió inmigrantes de ultramar cuya presencia aún es notoria en varios países. Aruj (2008) expone que 55 millones de europeos aproximadamente se movilizaron a tierras americanas y actuó como válvula de escape, posibilitando la organización o reorganización de los estados europeos. La región fue también escenario del arribo de personas procedentes de otras subregiones del viejo continente según las Naciones Unidas (2006), como de poblaciones africanas salidas del sistema de esclavitud vigente hasta el siglo XIX, de asiáticos, principalmente chinos y japoneses y, en menor escala, de inmigrantes de otras regiones, tales como el Medio Oriente; dejando huellas profundas en la cultura y sociedad latinoamericana.

Posteriormente, la recuperación económica y social del continente europeo, el mantenimiento de vínculos con las antiguas metrópolis y el establecimiento de estrechas relaciones políticas, comerciales y económicas con los Estados Unidos, se conjugaron con las grandes transformaciones mundiales de la economía y provocaron que América Latina y el Caribe se convirtieran en fuente de emigración (Naciones Unidas, 2006). También se tienen los desplazamientos poblacionales generados por la crisis económica de 1930, y los conflictos políticos, económicos y sociales de algunos países latinoamericanos, que desencadenaron una migración entre países fronterizos de América y hacia territorio europeo u otras partes del mundo desde la década de 1960 (España, Italia, Francia, Portugal, Países Bajos, Reino Unido, Japón, Australia, Israel y Canadá)

De igual manera, se tienen las migraciones producidas en las últimas dos décadas del siglo XX hasta la actualidad, que según algunas estimaciones ha movilizado en todo el mundo a más de 150 millones de personas que actualmente no residen en su país de origen. Estadísticas conservadoras del Centro Latinoamericano y Caribeño de Demografía (CELADE) - División de Población de la Comisión Económica para América Latina y el Caribe (CEPAL) permiten sostener que el número de migrantes latinoamericanos y caribeños ha aumentado sensiblemente, pasando de más de 21 millones de personas a inicios del año 2000 a casi 25 millones de personas hacia finales del mismo año (Naciones Unidas 2006). Si se compara esta cifra con los 232 millones de migrantes que reporta la Organización Internacional del Trabajo (OIT, 2015), se obtiene una proporción superior al 10% de los migrantes internacionales del mundo.

Cabe destacar, que América Latina experimenta desde hace décadas, pérdidas de población altamente calificada, cuyo retorno se hace imposible consolidarse (Martínez y Orrego, 2016), a pesar de que varios países han propuesto medidas para establecer vínculos con sus comunidades de emigrados y apoyar redes científicas asociadas a las diásporas (De la Vega y Vargas 2017). Motivo de particular preocupación es la situación de las economías más pequeñas, que suelen verse afectadas por la emigración de sus profesionales hacia países desarrollados en búsqueda de salarios altos, mejores condiciones laborales y posibilidades de desarrollarse profesionalmente de acuerdo a Rosales, Nigenda, Galárraga y Ruiz (2010).

Muñoz (2016) al cotejar información sobre emigrados latinoamericanos (cerca del 4% de la población regional, según una estimación mínima), observa que el número más cuantioso de emigrantes corresponde a México, seguido del conjunto de los países de la Comunidad del Caribe y Colombia, que exceden holgadamente el millón de personas en cada caso. Otros nueve países de América Latina superan el medio millón y sólo uno cuenta con menos de 100.000 personas. Estas cifras acusan una considerable presencia de latinoamericanos y caribeños fuera de sus países de nacimiento.

Inicios De La Migración En Venezuela

Venezuela ha sido caracterizada en su historia migratoria como un país de puertas abiertas a los flujos poblacionales, interesados en las actividades económicas nacionales (Álvarez de Flores, 2007). En la población actual está presente una variedad étnica producto de la constante mezcla de nacionalidades, que lleva en la sangre y en los apellidos la marca indeleble de los antepasados inmigrantes (Taylhardat, 2003).

El cacao y el café durante el período colonial (siglo XIX) marcan el inicio de la presencia de migrantes en el país, compuesta principalmente por comerciantes españoles, canarios y alemanes (Muñoz, 2016). Las exportaciones de estos productos de creciente demanda en el mercado mundial, representaban el pilar de la economía venezolana, alcanzando el 92% para el año 1920 según Álvarez de Flores (2007). En el siglo XX, Venezuela continuó siendo un lugar de destino atractivo para los migrantes europeos, por su estabilidad económica y política. Situación que se extendió durante los años de la Segunda Guerra Mundial y la posguerra.

De acuerdo a Massey, Arango, Hugo, Kouaouci, Pellegrino y Taylor (1998), la década del cincuenta y los primeros años de la década del sesenta, Venezuela se convirtió en un importante punto de atracción para unos 335.000 inmigrantes, de los cuales el 70% era de Europa del Sur (Italia, España y Portugal) y el 30% restante de países de la región sudamericana y de otras nacionalidades. Parte de esto se debe a que, durante la dictadura de Marcos Pérez Jiménez, se minimizaron los requisitos para el ingreso al país. Álvarez de Flores (2007) señala que luego del derrocamiento de Pérez Jiménez, la Junta de Gobierno decide no otorgar nuevos permisos a los inmigrantes que querían radicarse, salvo cónyuges, hijos o padres ya residenciados, lo que explicaría el saldo negativo de inmigración que se registra en 1963.

El Petróleo Como Factor De Atracción En La Migración

Con el llamado “boom petrolero”, que contempló un alza progresiva de los precios del petróleo a partir de los años 70, se acentuó la prosperidad económica de Venezuela, trayendo consigo un aumento de la inmigración de personas provenientes de países fronterizos, disminuyendo los arribos masivos de europeos. En este momento de la historia, se instalaron particularmente colombianos, atraídos por las grandes oportunidades generadas por el petróleo y ante la posibilidad de adquirir mayores ingresos, en comparación con su país de origen (Álvarez de Flores, 2007; Muñoz, 2016).

Durante la misma época de bonanza que experimentaba la nación, que requería mano de obra en los diferentes sectores de la economía, aunada a la crisis política y el asentamiento de dictaduras militares en Chile, Argentina, Uruguay y Bolivia, estimularon la migración de recursos humanos calificados hacia Venezuela (Pellegrino,1989). Tal panorama se mantuvo constante hasta los años 1982-1983, cuando se produjo una baja de los precios del petróleo en el mercado internacional,

acompañado de la reducción de los volúmenes de exportación, que pone de manifiesto un cuadro de real crisis en Venezuela que se venía presenciando desde el año 1979 (Álvarez de Flores, 2007). Estas dificultades obligan al ejecutivo nacional (Luis Herrera Campins) a tomar decisiones importantes en materia económica.

Posteriormente, el endeudamiento externo, tanto público como privado, así como las crecientes sumas destinadas al servicio de la deuda, comprometieron seriamente la capacidad de inversión y gasto del Estado venezolano (Torrealba, 1987). Para 1989, el presidente Carlos Andrés Pérez, inició la aplicación de un programa de ajuste para la estabilización de la moneda y de la economía nacional, denominado "El Paquete", que luego provocó el rechazo de los sectores menos favorecidos, generándose sucesos de violencia los días 27 y 28 de febrero, conocido como "El Caracazo".

Por todo ello, Freitez (2011) afirma que durante los años ochenta y noventa Venezuela da un giro en sus pautas migratorias, pues la crisis tuvo efectos desalentadores sobre los movimientos migratorios provenientes del exterior, que además contribuyó a procesos de retorno de los extranjeros que habitaban en el país y a la emigración de venezolanos, quienes reaccionaron frente a ese contexto de recesión económica, descomposición social y deterioro institucional. En el mismo orden de ideas, Baraldi y Gainza (2013) exponen que durante este tiempo eran habituales los retenes, las redadas y las deportaciones de los migrantes sin documentos; incluso los migrantes irregulares, sin importar su nacionalidad, eran deportados a la frontera colombiana.

El Nuevo Milenio Y Los Nacientes Problemas Migratorios

Al iniciar el nuevo milenio, los factores de atracción de inmigrantes intrarregionales empezaron a disminuir y de acuerdo con cifras del censo del año 2011, los extranjeros alcanzaron el 4,2% (1.156.578) del total de la población en Venezuela, estimada en poco más de 27.227.000 personas (INE, 2014). Siendo la principal colectividad de extranjeros la formada por los provenientes de Colombia, Perú, Ecuador, Brasil y Cuba. Escenario diferente al de la década de los ochenta, donde representaban un 7,4% de la población total (Muñoz, 2016).

Instalado y direccionando las riendas del país, Hugo Rafael Chávez Frías, se pudo elevar los niveles de bienestar de la población más vulnerable gracias a los altos precios del petróleo, particularmente entre 2003 y 2009 (Freitez, 2011). Sin embargo, no se tienen evidencias de la recuperación del país como atractivo para los migrantes internacionales. Por el contrario, se registra un incremento apreciable de nacidos en Venezuela residentes en el exterior, que pasó de 378 a 521 mil personas, durante 2005-2010 según Freitez (2011) con apoyo de estadísticas de la División de Población de Naciones Unidas y del Banco Mundial.

A partir del año 2013, con la llegada al poder de Nicolás Maduro Moros como presidente de la República, se ha acentuado en el país, una situación caracterizada por la polarización política, donde además se evidencian altos niveles de inseguridad, la caída de los precios del petróleo, altos niveles de inflación, caída de las reservas internacionales, mayor control de precios, devaluación del bolívar, cierre técnico de numerosas empresas, escasez de productos básicos, entre otros inconvenientes provenientes de su proyecto político-económico (Gutiérrez, Romero, Díaz y Sulbarán, 2017), que mantienen hoy en día a Venezuela con las expectativas más bajas de crecimiento en la región (Romero, Hernández, Gutiérrez y Portillo, 2017).

La situación del país actualmente se debate en una profunda crisis económica y social que se devela a través de sus principales indicadores económicos, que describen su comportamiento según cifras del Banco Central de Venezuela (BCV) y organismos internacionales como el Fondo Monetario Internacional (FMI), pues la tasa de inflación anualizada al cierre del año 2015 se ubicó en un 180,9%; el Producto Interno Bruto (PIB) experimentó un 5,7% de decrecimiento; y el índice de escasez alcanzó más del 20% (cifra correspondiente al año 2013, última fecha de publicación de este indicador). Cabe destacar, que el BCV y otras instituciones del Estado no han publicado cifras oficiales de la situación socioeconómica del país

Por lo que el informe "Perspectivas Económicas Globales" del FMI estimó la inflación de Venezuela para el año 2017 en 1.133,0% y para el cierre del año 2018 la ubica en 2529,6%; esto debido al financiamiento monetario de profundos déficits fiscales y la pérdida de confianza en la moneda nacional. Asimismo, este informe aseveró que la crisis económica del país se profundizó con la contracción del PIB real en 12% para 2017 y predijo una caída del 6% para el 2018. Este último indicador se acercó al 5% que previó la CEPAL para el cierre del mismo año (FMI, 2017).

A mediados del año 2019, el BCV publicó algunas cifras de la situación económica del país luego de varios años de silencio. Los principales datos revelan que la economía venezolana se contrajo en 26,8% en el primer trimestre de 2019 en comparación con el mismo período del 2018; demostrando una recesión económica (contracción del PIB) que se mantiene desde el primer trimestre de 2013. Además, la entidad indicó que la inflación acumulada para el primer trimestre de 2019 fue de 4.679,5% y que la producción petrolera continuaba en caída. Estos nuevos datos oficiales revelan el descalabro de la economía nacional que se suma a la crisis política e institucional.

Cabe señalar, que este panorama económico alarmante ha incidido en la precaria situación social de la población, reseñada por el estudio realizado por la Universidad Católica Andrés Bello (UCAB), Universidad Central de Venezuela (UCV) y Universidad Simón Bolívar (USB), denominado ENCOVI (Encuesta sobre Condiciones de Vida); el cual muestra la pobreza multidimensional de la población, que consiste en un promedio ponderado de privaciones que tienen los hogares o algunos de sus integrantes en cuanto a vivienda, servicios, estándar de vida, educación, trabajo y protección social.

De esta manera, el porcentaje de hogares pobres fue de un 41% para el año 2015, mientras que para el 2016 este indicador subió a 46%. Para el 2017 el estudio registró 48% hogares en pobreza y para el 2018 este indicador alcanzó la dramática cifra de 51% (Encovi, 2018). La justificación de este escenario en materia de pobreza se corresponde al acelerado incremento de los precios que lleva a la pérdida de capacidad de compra; según el mismo estudio el 89% de los hogares venezolanos no tienen suficientes ingresos para comprar alimentos.

Tal situación económica y social, aunada al descontento político, han provocado una serie de emigraciones nunca antes vista (Muñoz, 2016; Castillo y Reguant, 2017). En cuestión de pocas décadas, Venezuela pasó de ser un país receptor a emisor de migrantes, debido a las condiciones políticas, económicas y sociales presentes en el país (Padilla, Torres y Michelena, 2015), desencadenando un escenario cargado de expectativas de crecimiento personal, económico y hasta profesional en la población.

Censos de otros países e informes de organizaciones internacionales muestran según Freitez (2011) que la diáspora hasta 2010 era de 521.620 personas y que los principales lugares de destino en ese momento eran Estados Unidos, España, Colombia, Portugal, República Dominicana, Ecuador, Canadá, Chile, Italia, Reino Unido, Aruba, Alemania, México y Francia. En referencia a esto, De la Vega (2014), señala que para 2013 más de 1.200.000 venezolanos (4,3% de la población total) habían dejado el país. Muñoz (2016) agrega que la diáspora venezolana se ha dirigido en los últimos años a Estados Unidos, España, Colombia y Ecuador, de forma notable.

Es preciso señalar siguiendo a Azócar (2018), que la crisis económica y política del país, ha llevado a visualizar en el extranjero una ruta segura para conseguir recursos económicos en monedas con mayor fortaleza adquisitiva. Este autor con apoyo de estadísticas de organizaciones no gubernamentales en Venezuela, muestra que, en el año 2016, más de 378.500 venezolanos entraron a Colombia legalmente para estabilizar su situación migratoria. Para el 2017, se tiene un registro de 153.000 venezolanos que se quedaron más tiempo del que les permite la tarjeta de turista (90 días), por lo cual están viviendo bajo la figura de estatus ilegal. Asimismo, Azócar (2018) afirma que durante el año 2017 y parte del 2018, 750.000 venezolanos cruzaban la frontera a diario bajo condición emigratoria, pero del 20% al 30% de este grupo poblacional, utilizaron la ruta por Colombia para seguir su camino hacia Ecuador, Perú y Chile.

Por su parte, el Servicio de Análisis de Entorno PERFIL 21, Consultores 21 (2017) expone que en promedio 1,97 personas han emigrado por núcleo familiar, por lo que la diáspora se elevó a 4.091.717 personas para el año 2017. Esta cifra también es manejada por ENCOVI (2017), quien habla de una emigración que asciende a 3 o 4 millones de venezolanos en el extranjero para la misma fecha, que representaría del 10 al 12% de la población total. El estudio además asegura que el 80% de la emigración desde Venezuela ha salido básicamente durante los años 2016 y 2017, teniendo como lugar de destino países como Colombia, Perú, Chile, Estados Unidos, Panamá, Ecuador, Argentina, entre otros.

Estadísticas de la Oficina del Alto Comisionado de las Naciones Unidas para los Refugiados, ACNUR, demuestran que para el año 2019 la diáspora ha superado los 4 millones de emigrantes, pues en el año 2018 salieron un número importante de personas. Estas cifras alarmantes resaltan la necesidad urgente de apoyar a las comunidades de acogida en los países receptores. Cabe resaltar, que los países latinoamericanos han recibido a la mayoría de los venezolanos migrantes; Colombia acoge alrededor de 1,3 millones, seguido de Perú con 768.000, Chile 288.000, Ecuador 263.000, Argentina 130.000, Brasil 168.000, países como México, Panamá, Estados Unidos y Costa Rica también albergan un gran número de migrantes (ACNUR, 2019).

Por su parte, El Fondo de las Naciones Unidas para la Infancia, UNICEF muestra una preocupación por los informes sobre casos de xenofobia, discriminación y violencia contra niños y familias venezolanas en las comunidades de acogida. Los asociados humanitarios de este organismo proyectan que hasta 4,9 millones de personas se encuentran en el extranjero por factores como la violencia, inseguridad y amenazas, así como la falta de alimentos, medicinas y servicios esenciales (Naciones Unidas, 2019). Representando el éxodo más grande en la historia reciente de la región.

No obstante, a pesar de las diferencias presentadas en cuanto a los totales de la emigración, por no tener acceso a fuentes estadísticas oficiales que permitan realizar alguna aproximación precisa (Freitez, 2015), lo verdaderamente preocupante es que la mayoría de estos venezolanos en el extranjero es considerado como capital humano calificado y en edad productiva (Padilla *et al.,* 2015; Vargas, 2016; Mazuera, Albornoz, Morffe, Ramírez y Carreño, 2019), lo que representa una pérdida dramática de capital intelectual y social. Es importante aclarar, que el capital humano involucra conocimientos, experiencias, habilidades y destrezas, por lo que la pérdida de este es significativa para la sociedad y su desarrollo; aún más si se trata de personal joven y calificado; esta última connotación es definida por el Sistema Económico Latinoamericano y del Caribe, SELA (2009) como aquella persona que ha logrado una educación correspondiente al tercer nivel (universitaria) y que nació en un país distinto al de residencia.

Ante esta situación que cada día se agudiza, la ACNUR (2018), alienta a los Estados del mundo a garantizar que los venezolanos tengan acceso a los territorios y a los procedimientos de determinación de la condición de refugiado, ya que se ha producido un aumento de 2.000% en el número de venezolanos que han solicitado el reconocimiento de condición de refugiado en todo el mundo desde 2014, principalmente en países de América Latina y aunque más de 94.000 nacionales lograron acceder a los procedimientos de determinación de la condición de refugiado en 2017, otros con necesidad de protección optan por diversas alternativas de residencia legal, que otorgan el derecho al trabajo, acceso a la salud y la educación.

Sin embargo, ACNUR ratifica que cientos de miles de venezolanos permanecen sin documentación o permiso para residir legalmente en países de acogida, situación que los expone a la explotación, la trata de personas, la violencia, el abuso sexual, la discriminación y la xenofobia. Este organismo pide a los países tener mayor sensibilización en atención a un complejo contexto político y socioeconómico que vive Venezuela en estos momentos de su historia.

Consideraciones Finales

La migración venezolana sufre una transición, pues pasa de ser un país receptor durante buena parte del siglo XX, a uno emisor, desde comienzo del siglo XXI, destacando dentro de este último proceso, la pérdida de su capital humano, población económicamente activa, con alto nivel de calificación y

experiencia, con formación a nivel de pre y posgrado, empresarios e incluso, migración de retorno de aquellos que eligieron a esta nación para desarrollar su proyecto de vida y que hoy se devuelven a sus países de origen.

Hasta el año 2019 se registra una migración masiva de venezolanos, que tiene detrás la desesperación y altos niveles de estrés por lo que sucede en el país, seguido de la violencia e inseguridad, poco poder adquisitivo, inflación, desempleo, escasez de alimentos y medicamentos básicos, sumándose a ello la crisis política e institucional; que denotan la falta de condiciones mínimas de vida, que violan los derechos humanos y se considera un crimen de lesa humanidad, que cataloga a la migración como forzada.

El panorama expuesto, muestra los rasgos de una crisis humanitaria de gran relevancia, pues Venezuela está hipotecando su desarrollo con este fenómeno social que exige acciones urgentes para aliviar el sufrimiento de quienes huyen del país y el impacto de este fenómeno en los países receptores. Cabe resaltar, que a corto plazo no se evidencia cambios que se materialicen en la aplicación de políticas públicas, programas o instrumentos de carácter público orientados a revertir la intención de emigración de la población venezolana.

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Analysis of Psychophysical Predispositions of Persons Performing Tasks of Security Control Operators

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Abstract

An airport is a specific place that requires employees performing tasks related to air operations to possess specific skills and specialist knowledge. However, the knowledge and practice learned are not the only factors conditioning the correct performance of official duties, and thus the safety of flight operations. This relationship is particularly noticeable during the security check of persons and luggage carried out by the airport manager. These tasks are performed by security control operators, who also have an entry on the list of qualified security guards. This work shows that in addition to the professional qualifications necessary to perform the abovementioned profession, the psychophysical predisposition of such a person is also very important. The paper presents the results of research carried out using a specialized tool which is the Polipsychograph. The research was attended by people who perform the tasks of a security control operator on a daily basis. These are people with many years of experience in performing security checks and having all the required training and certificates entitling them to this work. Notwithstanding the foregoing, the study also involved totally outsiders, working in a completely different nature and not taking part in the process of controlling people and luggage. These two professional groups were then subjected to a comparative analysis to identify the characteristics of people working in airport security.

Keywords: airport, security control, psychophysical predispositions

Introduction

Screening of people and baggage at the airport is one of the necessary requirements for using public transport by air. This obligation is a kind of ailment for a passenger who, when choosing an air transport, is sometimes forced to submit to very restrictive requirements specified in national and EU regulations regarding civil aviation security. This inspection is carried out using specialized equipment, whose effectiveness often determines the quality of the inspection. Advanced technical devices not only support human work, but also significantly affect airport capacity. It should be noted that the main purpose of the security check is to prevent prohibited items and prohibited substances from being carried on board aircraft. The catalog of these things was quite precisely defined in the EU 1998/2015. These include:

- pistols, firearms and other devices that fire projectiles - devices that are capable or appear capable of being used to cause serious injury by firing a projectile,
- stunning devices - devices designed specifically for stunning or immobilizing,
- objects with a sharp point or sharp edge - objects with a sharp point or sharp edge that can be used to cause serious injury,
- working tools - tools suitable for use to cause serious injury or threat to aircraft safety,
- blunt tools - items that can be used to cause serious injury when used to hit,

- explosive materials and devices, and incendiary substances and devices - explosive materials and devices and incendiary substances and devices that are capable of or appear capable of being used to cause serious injury or threat to aircraft security.

The catalog of these items, however, is not listed in the Regulation in an enumerative manner, allowing the safety control operator (SCO) to assess whether a given object or substance may pose a threat to an air operation being carried out at a given time. Thus, the safety and security of passengers using this form of transport depends on the training and skills of SCO.

Security control is performed by security control operators - people with specific training dedicated to carrying out tasks consisting in screening luggage and controlling people entering the airport's protected areas. These skills are confirmed by the state certificate issued by the Civil Aviation Authority.

Therefore, the Security Control Operator, in addition to formal powers, also has specialist theoretical knowledge allowing it to analyze situations that may occur at the security checkpoint and to make a decision based on applicable legal regulations and the so-called Heuristics. Heuristics play an increasingly important role in the way people work. It involves the use of practical rules of conduct based on experience and the use of simplified methods of assessing the situation, allowing to save time and resources used to solve unstructured problems.

Formal and legal powers to perform security checks are not the only factors conditioning obtaining the required effectiveness of tasks performed by the security check operator. In addition to theoretical knowledge, the attitude of the employee to his duties, his experience and level of training are also very important. The topic of effectiveness of security controls in the context of employee selection was presented in detail in [Skorupski, Uchroński, 2016].

Nevertheless, an important argument deciding about the selection of candidates for the security control operator are their psychophysical predispositions. this topic, which is very sensitive from a social point of view, is bypassed in the literature, inclining mainly towards the assessment of the work of active security control operators who are already performing their duties. This article is an attempt to examine the psychophysical predispositions of both active SCOs and potential candidates for SCO who have no experience in civil aviation security. This approach may allow for so-called pre-selection of candidates for pkb, selecting from among them only those who have the best prognosis in the scope of possessed abilities of analyzing the x-ray image and considering potential problems.

During security checks on persons and luggage, SCO is exposed to a number of external stimuli related to passenger service. Access control, preparation of the passenger for control, conversations are just a few of the many factors that significantly affect the way and effectiveness of security checks performed.

Especially in the studied area, the functioning of the Nideffer model can be observed, which divided human attention into four types: narrow, wide, internal and external. This model illustrates how a person functions when performing his duties. The predisposition areas listed above, in turn, significantly affect the psychophysical predisposition of employees performing tasks in the field of security control and the effectiveness of this control.

In order to examine the dependence of psychophysical predispositions of employees performing SCO tasks on the effectiveness of their control, tests were carried out with the participation of SCO actively working at security checkpoints. A specialized device was used for testing, which was designed to test people in the field of correct operation in an environment exposed to strong stress and time pressure. This device is a Polipsychograph.

Current state of research

Review of the literature dedicated to the control of safety of people at airports indicates the existence of several important research trends:

1. Analysis of criteria for evaluation of screening systems. The following are usually considered in this regard: the throughput of a security screening checkpoint, passenger comfort and efficiency in detection of prohibited items. This paper addresses the last issue.

2. Analysis of factors affecting the effectiveness of a security screening checkpoint. They are most often considered in qualitative terms. Our paper adds quantitative analysis to this research.

3. The use of various research methods to analyse the issue.

4. Taking into account the uncertainty of information in the analysis of a security screening system. It makes it necessary to select a proper research methodology. In this paper we use a fuzzy inference system since the authors consider it to be adequate to the nature of the problem.

Criteria for Evaluating A Security Screening System

Analyses of throughput at a security screening checkpoint often appear in the literature. The article written by Hainen et al. (2013) presents an analysis of factors that influence the time period spent by a passenger at a security screening checkpoint. Kirschenbaum (2013) proposed a different approach to this problem; i.e. he analysed a passenger's individual characteristics that have an influence on throughput at a security screening checkpoint. Attempts are also made to produce alternative solutions that would combine all kinds of passenger and baggage screening (Yildiz et al., 2008). A review of such new methods can be found in (Leone & Liu, 2011). One of the more interesting methods is the one whereby a risk level is dynamically assigned to a passenger (Nikolaev et al., 2012; Nie et al., 2012). Wieneke and Koch (2009) proposed a method which involves automatic tracking and the classification of passengers passing through an airport by using many chemical sensors. This method allows one to locate threats and quickly notify security screeners. Statistical studies on the time that passengers have to wait at a security screening checkpoint are presented in Barros & Tomber (2007).

The comfort and satisfaction of a passenger who is subjected to security screening at a security screening checkpoint was studied by Alards-Tomalin et al. (2014). Their research showed that the type of activities that security screeners undertake has a great impact on the subjective perception of security in aviation. It is mandatory for all passengers to be screened by the WTMDs that are analysed in that paper. Gkritza et al. (2006) have analysed the impact of the type and intensity of the taken control actions on the subjective satisfaction of the passenger. It also depends on the level of awareness of hazards present in aviation as well as on cultural or religious background (Rusiłowicz, 2011). Also, the need to draw on the experience of other disciplines, e.g. medicine (Wetter, 2013), is emphasised.

Factors Affecting the Effectiveness of a Security Screening System

As Yoo & Choi's (2006) studies show, the human factor is of greatest importance as far as the effectiveness of screening at a security screening checkpoint is concerned. However, technical equipment, i.e. its efficiency and proper operation, are also very important. These aspects were tested in our paper in terms of their influence on the effectiveness in detecting prohibited items. They are important because they constitute an expensive element of an airport security system, and additionally, they are not always used effectively (Stewart & Mueller, 2014; Gerstenfeld & Berger, 2011). This is because it is easy to justify the costs of developing infrastructure related to security, but it is much more difficult to quantitatively determine the actual effect of such investments

(Stewart, 2010). Increasingly important role in security screening (also with the use of WTMD) is played by computer systems. So it is becoming increasingly important to raise questions regarding their resistance to external, unlawful interference with their structure. This matter has been discussed in the work by Wolf et al. (2014), which indicates the need to intensify the works to better protect against cyber-attacks. In general the problem of trusting the applied support equipment is analysed in greater detail in (Kirschenbaum et al., 2012).

Research Methodology

As for methodology, the process of passenger screening at an airport was analysed by using different methods; for example, Concho & Ramirez-Marquez (2012) proposed that a multi-objective evolutionary approach should be used. The effectiveness of screening as well as its cost and throughput at a security screening checkpoint were the criteria that they took into account. In (Akgun et al., 2010) an interesting model was presented in which the vulnerability of critical infrastructure, which also includes airports, to terrorist attacks was examined. The proposed approach was called FIVAM (Fuzzy Integrated Vulnerability Assessment Model). It is based on the theory of fuzzy sets and is focused on searching for gaps hidden in the system, resulting from its internal functional relationships. In turn, in (Liou et al., 2011) it was proposed to use the rough sets based on dominance to examine the service systems at airports. The basis of the developed model is formed by a set of decision rules in the form of "if ... then ...” statements. Similar rules but in the form of fuzzy conditional sentences are used in this article. Oliva, Panzieri & Setola (2011) carried out studies in the area of analysing the security of critical infrastructures by using fuzzy set methods.

Research tool – Polipsychograph

The tests were carried out using a system designed to design and carry out psychological tasks testing human mental, cognitive and motor skills in connection with the assessment of his professional capabilities or diagnosis of possible deficits of various origins. This system is used to measure psychological and psychophysiological variables of the examined unit. Tested abilities are recognized in the context of accompanying reactions and physiological processes manifested by skin-galvanic reaction, depth and frequency of breathing, pulse frequency - which allows additional interpretation of the obtained data. In both cases, apart from a ready set of test and rehabilitation tasks, it is possible to design your own test or rehabilitation tasks (due to their content, form, display rhythm, etc.). Thanks to this, it is possible to individualize the diagnostic or rehabilitation process. Therefore, the device can also be used to test research hypotheses in scientific research in the field of psychophysiology.

The system consists of three basic elements. They are:

- Computer (portable or desktop).
- Control program.
- Psychophysiological State Meter..

In the system, the computer performs the functions of programming and controlling both the diagnostic and therapeutic process. Its software enables flexible selection of test tools depending on the sphere studied and is open. This means that they can be gradually extended with new applications or existing ones can be modified. Picture 1 presents the device visualization.

Fig. 1: Illustrative image of the Polipsychograph. Source: own.

5 SCOs were tested - experienced people who have been working directly for pkb for at least several years, carrying out tasks related to the security control of persons and luggage. This work requires them to have certain skills that enable them to fulfill their basic duty, which is to ensure the safety of air operations. One of these skills that is required of SCO is, therefore, the divisibility of attention that NIdeffer illustrated in the manner specified in Table No. 1.

Table 1: Divide the attention according to Nideffer. Source: Nideffer, 1994.

		The direction of concentration	
		external	internal
Area of concentration	wide	**wide external** Used in the quick assessment of the situation, e.g. where the threat is located.	**Wide inner** Used in the analysis of current work and its planning. e.g. analyzing why an object was not detected**.**
	Narrow	**Narrow inner** Focus only on one or two external matters**.**	**external narrow** Used when visualizing future activities and controlling emotions, e.g. controlling stress levels

When analyzing an overexposed image, in many situations there is a change in concentration (switching attention) from one to the other. According to Nideffer, concentration control means control over both its direction and scope. When SCO has problems, e.g. of a personal nature, it means that he is using the wrong way to concentrate in a given situation.

Effective concentration means using the right kind in a given situation. SCOs lose focus when they pay attention to the wrong object during an inspection. The relationship between the scope of attention and the degree of concentration is shown in the chart below (Unesthal, 1988).

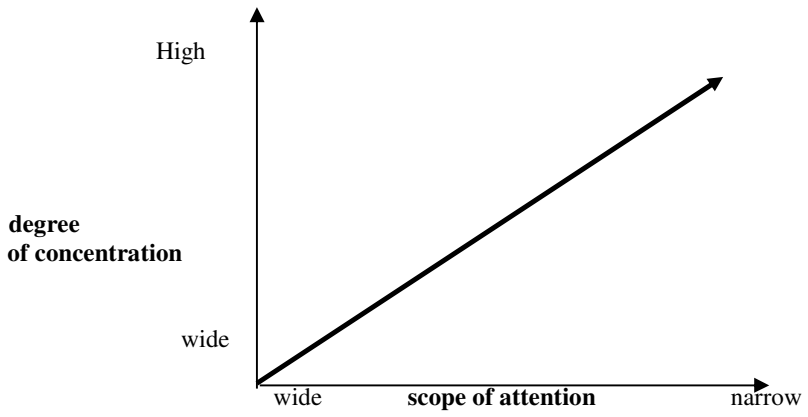

Fig. 1: The relationship between the scope of attention and the degree of concentration is shown in the chart below

Research

Tests with the participation of SCO, were to determine the level of concentration required for the implementation of tasks by SCO on the one hand and indicate the necessary psychophysical predisposition of employees, and on the other to determine the relationship between the results of tests carried out and the level of achievable effectiveness of baggage security check. The effectiveness of security controls of individual people participating in the tests will in turn be verified on the basis of the HMC (Heimann Management Console), where the results of all SCOs are verified. Based on this tool verifying the quality of SCO work based on the virtual projection of images of prohibited items (TIP – treat images projection) displayed in real time on the screen of the monitor supporting the RTG device [Uchroński 2019], the people responsible for the quality of the airport security control carried out, gain knowledge in the field of skills, and thus the effectiveness of operators during their work.

Tests were carried out in the following areas verifying behavioral impact on respondents:

- addition test (three tests with varying degrees of difficulty),
- numbers test (consisting of searching on a matrix of numbers indicated by the system),
- complex coordination test (consisting in selecting the correct result of adding two displayed digits as soon as possible),
- simple coordination test (consisting of verification of motor coordination by pressing the key assigned to the number displayed on the monitor screen),
- line test (based on determining the number of lines displayed on the monitor), literal memorisation test (based on memorizing a string and restoring them from memory).

These tests, with the exception of the line test, required SCO to work on time, which simulated the real working conditions of SCO operating under continuous time pressure and the associated stress. The line test, in turn, provided information about SCO in the field of perception skills in space. This is an extremely valuable ability, because the main task of SCO is to analyze the image of x-rayed luggage. The efficiency of SCO's work also depends on this skill.

The topic of SCO predisposition testing (or SCO candidates) is often overlooked in the recruitment or training of security personnel. Attention is paid here mainly to the physical characteristics (fitness) of the candidate and possible skills to distinguish colors as a necessary element conditioning the possibility of analyzing x-rayed luggage. Both in practice and in literature there is a lack of a method for pre-selecting candidates for SCO, which would forecast the achievement of the required effectiveness of baggage screening. This action would allow for a precise selection of the staff responsible for airport security in the field in question, on the other hand, for delegating employees duties in accordance with their capabilities resulting from their psychophysical limitations.

This proposal proposes a method for assessing both SCO and SCO candidates.

Table 2 summarizes the results of tests carried out with the participation of security control operators.

Table 2: List of test results carried out with the participation of security control operators. Source: own study

	SCO 1	**SCO 2**	**SCO 3**	**SCO 4**	**SCO 5**
Test 1	30,36	13,53	17,15	13,92	12,30
Test 2	12,04	16,34	14,78	15,33	8,99
Test 3	19,96	20,13	22,93	18,05	15,65
Test 4	54,41	36,59	57,30	35,43	59,25
Test 5	59,86	59,95	59,96	59,93	59,96
Test 6	36,93	47,85	45,49	43,76	37,21
Test 7	59,80	59,91	59,93	59,89	59,95
Test 8	101,60	159,30	177,09	203,31	124,43
average	46,87	51,70	56,83	56,20	47,22

As we can see, the biggest differences in the time necessary to perform a given test are visible during test 4 and test 8. Test 4 (number test) required spatial perception skills from employees. They were supposed to find on the matrix of numbers the number indicated by the test program.

Analyzing the results presented in Table 2, 2 people coped with this task best, achieving a time almost twice as fast as the other SCOs (SCO 2 and SCO 4). On this basis, it can be concluded that these people (SCO 2 and SCO 4) stand out from the others by their spatial analysis ability, thus they will work more efficiently in pkb by analyzing the content of x-rayed luggage. Other people (SCO 1, SCO 3, SCO 5) also performed the test correctly but they already needed about 40% more time to perform this test.

The graphic representation of the results of these tests is shown in Fig. 2

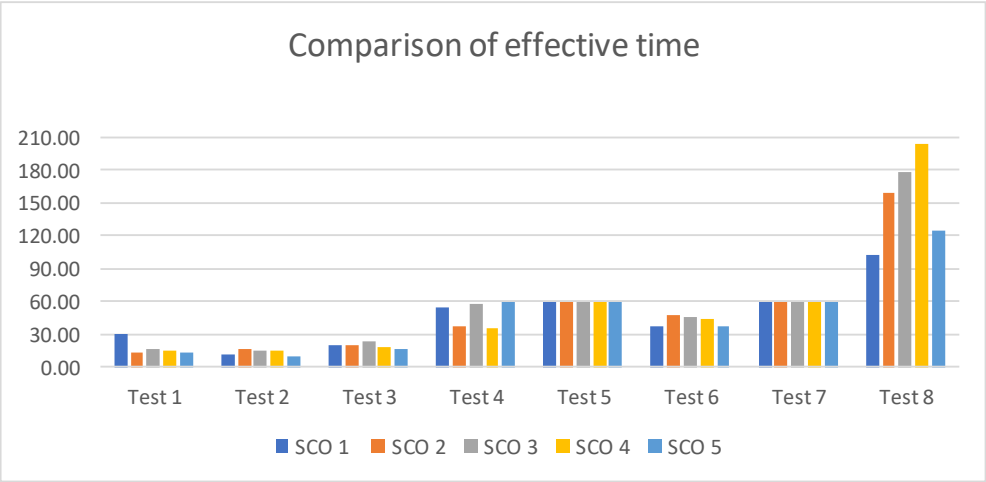

Fig. 2: Graphic representation of test results. Source: own study..

Equally significant differences can be observed by analyzing the results of test No. 8. Here, the operators had to demonstrate the ability to remember a literal. Their task was to memorize a sequence of numbers and then, from memory, to map their order as displayed on the device's monitor. During this test, SCO 1 and SCO 4 deserved distinction, who completed this task in the shortest possible time. This test, in turn, showed the impact on the security control process of the ability to remember the image presented on the pp monitor. This is an extremely valuable and useful skill in the case of manual control of luggage, when the SCO physically searches luggage, which as a result of its analysis have a reasonable suspicion that it contains an object or prohibited substance. On the other hand, memory trained in this way allows you to quickly remember the numerous procedures and order of tasks performed by SCO. This, in turn, minimizes the risk of making wrong decisions and committing an error resulting in a decrease in the effectiveness of air operations control.

Correct answer to test tasks

However, in order to be able to reliably assess the quality of tests carried out by SCO, in the context of their actual predispositions, it is necessary to relate the results of the time needed to complete the tests to their correctness. These relationships are presented in Tab. No. 3. Incorrect answers can be seen when performing tasks in the case of 4 tests, while in test No. 1 only one employee marked the wrong answer, which can be statistically treated as a margin of error. A similar situation occurs in the case of test No. 3. Both of the above mentioned tests concerned the summation of numbers displayed on the PP monitor. In the second case, employee No. 3 was mistaken twice, which may suggest a negative impact of stress on the correctness of the answers given, and thus on the number of errors that the employee may make while performing official duties at security checkpoints.

Tab. 3: Correctness of tests performed. Source: own study.

	SCO 1	SCO 2	SCO 3	SCO 4	SCO 5
Test No. 1 [max 5]	4	5	5	5	5
Test No. 3 [max 10]	10	10	8	10	10
Test No. 6 [max 9]	7	7	9	9	8
Test No. 8 [max 14]	4	11	10	11	11

Particularly noteworthy are the results of test No. 6 (line test) and Test No. 8 (literal memorization test). As we can see in Tab No. 3, these tests gave the most difficulties to the test participants. Only two respondents (SCO 3 and 4) provided correct answers to all tasks specified in test No. 6. However, he completed the test the fastest (SCO 1 and 5), with 9 out of 9 possible points, they achieved 7 and 8 points, which, given the nature and duration of the tests, is satisfactory.

Test No. 8 required SCO to demonstrate the ability to retrieve from memory the sequence of numbers indicated by the system. This test was to show the impact of short-term memory functioning on the process of detecting prohibited articles. As can be seen in Table 3, 4 SCO's (SCO 2,3,4,5) approached the maximum number of points possible to obtain. SCO No. 1 achieved the lowest number of points, which can be interpreted as uncertainty in operation in practice as a result of improperly fixed material. Graphic representation of the results of the tests is shown in Figure 3.

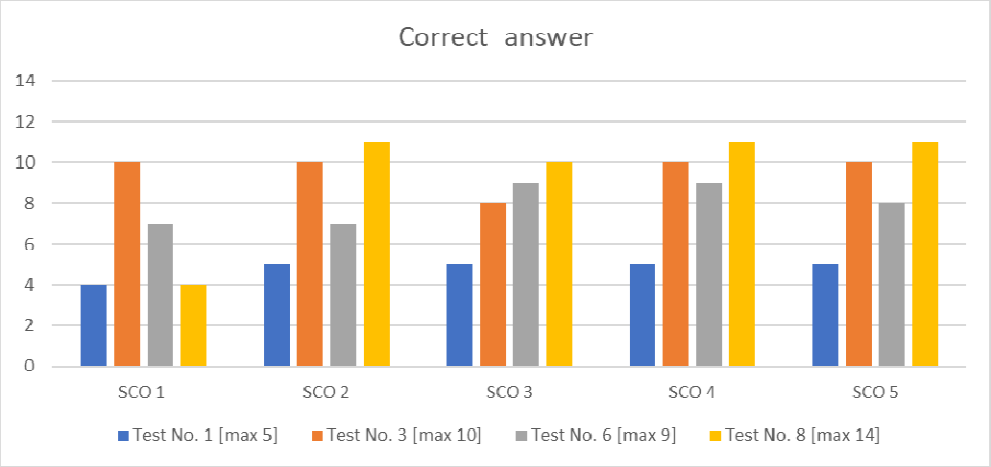

Fig. 3: Graphic representation of the results of the tests carried out.

It should be noted that SCO took part in the test with at least several years of experience and has extensive substantive and practical knowledge.

Effectiveness of detection of prohibited articles

The results of their work are verifiable in a dedicated HMC system that provides supervisors with a daily knowledge of the level of detection efficiency. On this basis, we can assess the existence of dependence of tests carried out using the Polipsychograph and the predispositions of the examined

people on the effectiveness of detecting prohibited items hidden in the luggage of passengers. Table 4 presents the results of this assessment provided by the HMC system.

Tab. 4: Results of the assessment provided by the HMC system. Source: own study.

Screener	Pd	Pfa
SCO 1	0,87	0,03
SCO 2	0,90	0,01
SCO 3	0,79	0,02
SCO 4	0,81	0,06
SCO 5	0,91	0,01

Analyzing the data, it can be seen that among the subjects deserved distinction two SCO (SCO 2, SCO 5) who achieve the highest detection rate (PD) with the lowest error rate indicator (PFA). These relationships are presented in Figure 4.

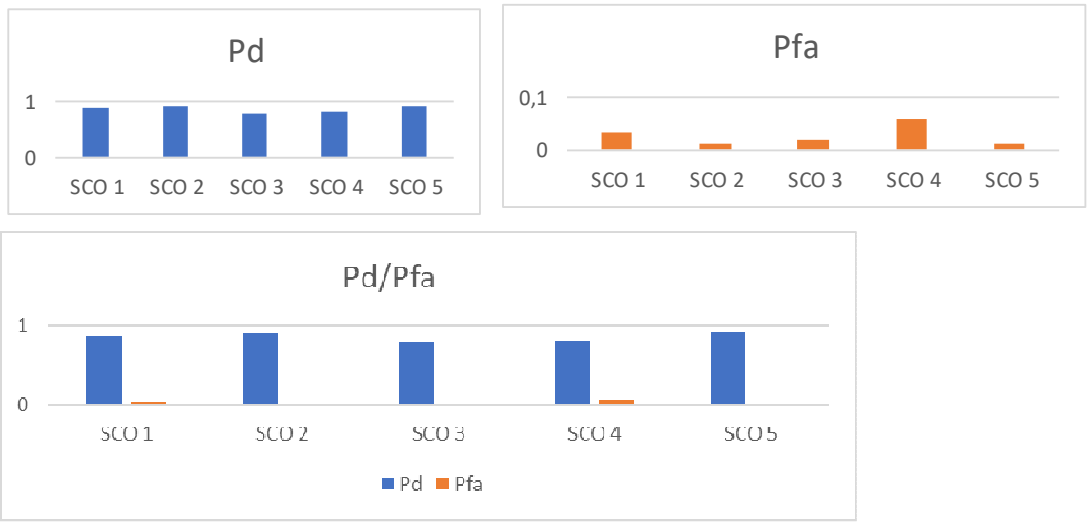

Fig. 4: Dependence of the detection of prohibited articles on the indicator of the amount of misinterpretation of the image. Source: own study.

Analyzing the results of tests carried out using the Polipsychograph and comparing them with the real results of the effectiveness of SCO in detecting prohibited articles, we can conclude that the psychophysical predisposition of persons performing tasks related to security control is one of the key elements determining the opportunity to work in this profession.

The research showed precisely that the respondents are characterized by very similar psychophysical abilities. It is justified because all these people, as working on the basis of legal regulations regarding the protection of persons and property, and having the so-called entry on the list of qualified security guards (in accordance with the Act on the protection of persons and property), undergo a series of psychological and physical examinations, based on which they receive the right to have at work all types of direct coercion measures.

Security guards undergo detailed medical examinations that include the following:

1. general examination of the state of health, including assessment of the hearing organ and balance, the circulatory system, the musculoskeletal system and the nervous system;

2. specialized tests:

- ophthalmic, in the field of eye assessment, in accordance with the regulations issued on the basis of art. 15 paragraph 7 of the Act of 21 May 1999 on weapons and ammunition (Journal of Laws of 2012, item 576 and of 2013, item 829),

- psychiatric, in the field of mental disorders referred to in the Act of 19 August 1994 on the protection of mental health (Journal of Laws of 2011 No. 231, item 1375), as well as disease states and disorders of psychological functioning specified in provisions issued based on art. 15 paragraph 9 of the Act of May 21, 1999 on Weapons and Ammunition;

3. other specialist examinations and auxiliary examinations, if a physician authorized to conduct a medical examination, hereinafter referred to as an "authorized physician", finds that they are necessary for the correct assessment of the health condition of the person applying for an entry or who has an entry on the list of qualified physical protection workers .

In addition, each employee undergoes at least every 3 years detailed psychological examinations including:

1. Rating:

- intellectual skills,

- personality, including functioning in difficult situations,

- level of social and emotional maturity;

2. other psychological tests, if a psychologist authorized to conduct a psychological examination, hereinafter referred to as an "authorized psychologist", finds that they are necessary for a proper assessment of the psychological functioning of the person applying for an entry or who has an entry on the list of qualified physical protection workers.

(source: Regulation of the Minister of Health of 19 December 2013 on medical and psychological examinations of persons applying for an entry or having an entry on the list of qualified physical protection workers).

Comparison of SCO and Civilian Employee Test Results

Our research has also shown that, in addition to common predispositions to perform a specific profession, directional and specialist training and practice are very important. These trainings allow you to train the senses that are most used at work. To confirm this thesis, five people unrelated to civil aviation security were tested on the Polipsychograph, and their tasks mainly include ground handling of aircraft. The results of these tests are shown in Table 5.

Tab. 5: Test results of persons who do not carry out security control tasks. Source: own study.

	effective time 1	effective time 2	effective time 3	effective time 4	effective time 5
Test 1	20,21	17,23	18,44	18,06	17,79
Test 2	15,90	17,52	15,15	11,35	18,13
Test 3	30,29	19,38	21,67	26,65	42,06
Test 4	92,33	48,91	44,74	54,87	60,99
Test 5	59,84	60,02	59,97	59,96	60,00
Test 6	44,80	49,40	57,74	45,06	83,04
Test 7	59,86	59,93	59,98	59,88	59,92
Test 8	212,69	232,03	253,68	152,18	256,19

Based on the data from Tab. 5, we can conclude that there is a large discrepancy in the time-movement coordination of people who perform SCO tasks and those whose work does not consist in analyzing an x-ray image using an X-ray device. In particular, these relationships can be observed during activities that require the involvement of at least several areas of perception.

The biggest differences can be observed in the examined area by comparing the results of tests No. 4,6,8 where correct movement coordination with simultaneous time pressure and the need for mental analysis of the given area were important. In addition, test No. 8 showed how important for SCO's work is spatial perception, allowing for proper image analysis. Fig. 5 graphically illustrates the abovementioned depending on:

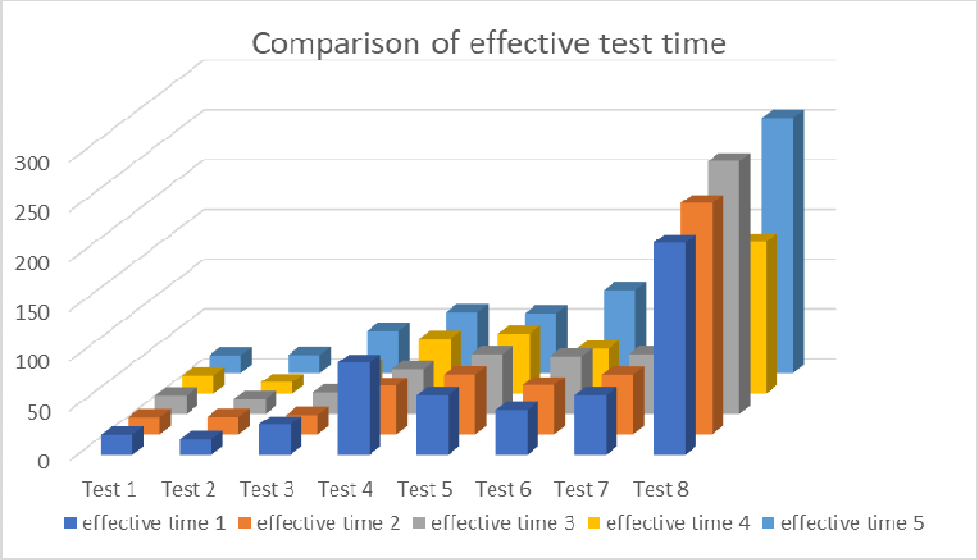

Source: own study.

Fig. 5: Results of tests of persons not carrying out tasks related to security control.

The research also confirmed that, in addition to the natural skills possessed by SCO and those acquired during training with the use of specialized equipment, non-substantive elements

significantly affecting the way and quality of SCO's work are very important. These elements, described in detail in [Skorupski, Uchroński], are also the attitude of the employee to the tasks he performs. This attitude, associated with employee motivation, determines the existence of so-called human factor, which is still the main reason for the occurrence of broadly understood inconveniences and errors that are an indicator of the quality of work performed and assessment of the operation of the airport security system.

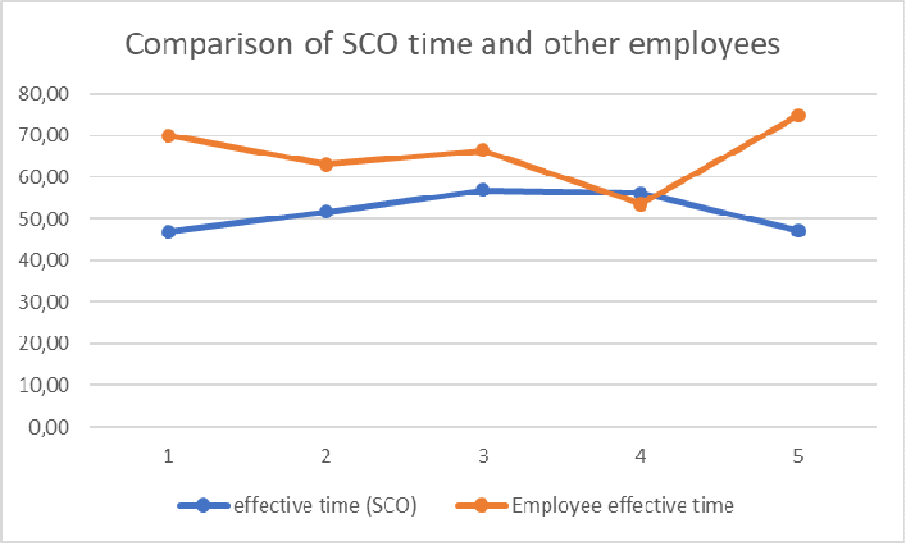

Source: Own study.

Fig. 6: Comparison of time to complete tests carried out by SCO and other employees.

Fig. 6 shows the results of comparing the effective time of tests performed by both SCO and other employees. As we can see, SCO's testing time is on average about 36% shorter than the same tests performed by random people. It should also be noted that all persons participating in the test had not previously faced the same or even similar psychophysical predisposition test, and their selection was completely random.

Therefore, during the tests, not only the time of completing the test tasks was compared, but also the level of errors made by both SCO and other people not related to this profession. The test results are presented in Fig. 7.

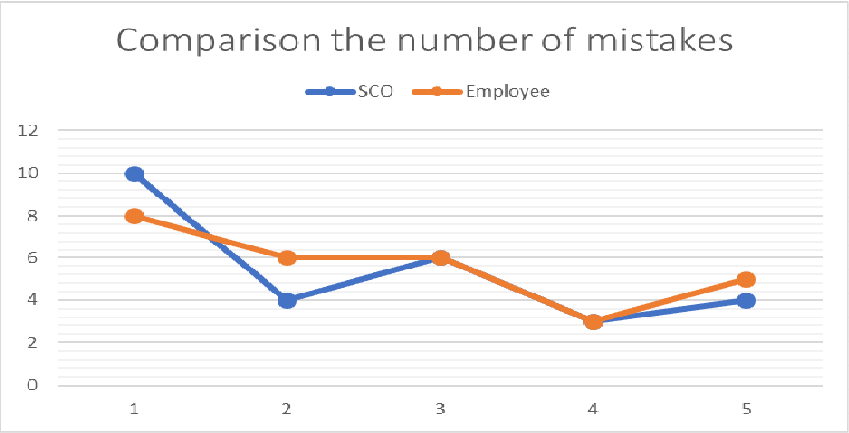

Fig. 7: Comparison of the number of errors made during tests by SCO and other employees. Source: own study.

As we can observe, only in one case the test results are more favorable for an employee not related to security control. In other cases, the unit number of errors made by SCO is definitely smaller or the same as the number of errors made by other employees. The average difference between one professional group and the other in this respect is slightly more than 3% in favor of SCO. This chart, in addition to the presentation of the SCO skills themselves in solving imposed tasks, also shows the impact of external factors on the quality of work done and their resistance to stress caused by time pressure and awareness of the assessment they are subjected to. This issue is extremely important from the point of view of civil aviation security, has been described in detail in [Uchroński, 2019].

Not without significance for the results of the tests carried out is the fact that security control operators additionally undergo detailed medical examinations that allow them to determine their psychophysical predisposition to perform the tasks specified in the Act on the protection of persons and property. It is a kind of pre-selection of candidates for security officers, i.e. people who use the broadly understood means of direct coercion in carrying out their tasks.

Summary

Resistance to stress and the ability to think analytically and to properly assess a given situation are therefore necessary for making the right decisions that often determine the health or life of protected people. Such processes occur during security checks on persons and luggage. The scope of the work touches a completely new area for the authors in the field of psychology. This is the psychology of work, which plays an increasingly important role in the work of people performing tasks for specific professional groups. SCO's work is undoubtedly one of those vulnerable professions where proper selection of staff and understanding by superiors of the mental, social or sociological processes occurring among subordinate employees can determine airport security, and thus air operations. Nevertheless, it is worth considering the obvious conclusions of the research. The main starting point for the conducted research was the inability to prepare people for the tests. The test results have clearly shown that with virtually the same number of errors made by both professional groups, SCOs are able to work by more than a third faster and more efficiently compared to other professional groups for which there is no requirement to carry out detailed verification of their predispositions. Of course, this is not a rule, because among such people there are certainly people who meet the profile compatible with the appropriate security guard, but from the point of view of airport security and its capacity, it is necessary that only such employees entrust the duties of a security control operator.

Paragraphs are 10 pt fonts. Paragraphs are separated by a separate line. The whole document should be arranged in 1 Column

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Include figures and tables within the body of your paper. **DO NOT** design your figures using Microsoft word in bits and pieces. This will cause the figure to be distorted during formatting and production. You have to use a drawing tool and import the figure to word.

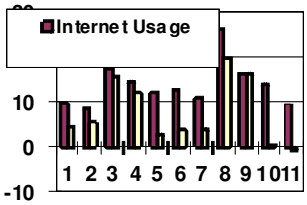

Fig. 1: Internet Usage & E-government access

Table 1: table title here

Factor	Per country	Per continent
Internet Usage		
E-government		

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Development of Production and Logistics Systems in The Context of Globalization

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Abstract

The global logistics infrastructure and the transport services market are developing in the context of international integration processes. The impact of these processes on freight traffic is associated with nations' desire to better integrate in production by building cross-border production networks and manifests in the creation of integrated transport and logistics systems. The global logistics management system aims to respond in real time to market changes, make decisions about business and inventory risks, reduce distributors' costs, soften the supply chain and make the market reaction more flexible. Numerous economic ties between countries stimulate mutual interest in creating an effective integrated production and logistics infrastructure with standardized elements. The processes of international economic integration have become one of the most important factors in the transformation of the global logistics system. Thus, in the context of globalization, the production and logistics infrastructure and logistics services market directly affect the level of economic development of countries, defining conditions of entrepreneurship development. The modern, hypercompetitive market of logistics services is entered by new players, suggesting that existing companies undergo transformation and develop innovative business models, which at the current stage is impossible without the use of advanced digital technologies.

Keywords: Logistics, Globalization, Regional Macrologistic Systems, Digital Technologies.

Introduction

The relevance of studying the development of production and logistics systems in the context of globalization is determined by the fact that the globalization of international economic relations presents new requirements for production and logistics infrastructure efficiency. The global logistics infrastructure and the transport services market are developing in the context of international integration processes. The impact of these processes on freight traffic is associated with nations' desire to better integrate in production by building cross-border production networks and manifests in the

creation of integrated transport and logistics systems (Polyanin et al., 2018; Pirogova et al., 2019; Plotnikov et al., 2019; Pollitt, 1999; Vertakova et al., 2019).

The global logistics management system aims to respond in real time to market changes, make decisions about business and inventory risks, reduce distributors' costs, soften the supply chain and make the market reaction more flexible. Numerous economic ties between countries stimulate mutual interest in creating an effective integrated production and logistics infrastructure with standardized elements. The processes of international economic integration have become one of the most important factors in the transformation of the global logistics system (Volkova et al., 2019).

The object of this study is the process of logistic globalization. The subject of the study is a set of factors for the development of production and logistics systems in the context of globalization. The purpose of this article is to analyze the features of the development of production and logistics systems in the context of globalization. Research objectives are formulated as studying the concept of a global logistics system, its role and importance; studying the features of the formation of regional macro-logistic systems; considering the use of digital technology in global logistics systems.

The concept of a global logistics system, its role and importance

Studies into the impact of globalization on today's market of logistics services reveal that in order to provide an advantage on the market today, a vendor must take into account the following factors while providing delivery services: timely service; environmentally friendly service; special terms; emerging technologies; corporate social responsibility; costs; quality of services; flexible schedules (Volkova and Plotnikov, 2016). Modern research identifies five key factors in the globalization of logistics operations: economic growth, reliance on the supply chain, regionalization of the market, technological progress, and deregulation of the economy. These factors are the driving forces that encourage firms to enter the global logistics services market (Volkova et. al., 2019).

Simultaneously, the desire for a company to expand its international operations is its desire to grow and survive in a competitive environment (Plotnikov et al., 2018). All these factors possess the properties of a driving force, and at the same time, there are the following motives for the behavior of companies: seeking economic growth and increased profits; good return on assets, optimization of financial costs; need to develop new markets to support growth; regionalization that brings about the reduction of trade duties, eased trade restrictions, common standards for transport documentation and common freight systems; striving for greater customer satisfaction; increasing the efficiency of companies by deregulating the sphere of finance and transport.

In the development of logistics, the modern stage is described as the stage of logistic globalization (Gedik and Turğut, 2017; Hayaloğlu , 2015; Majercak, 2020; Shumin and Hua, 2017). Studies show that the transition to the globalized economy means a new era in the development of capitalism which causes the expansion of commodity movement and creates demand for logistics services. The concept of "globalization" has two aspects. On the one hand, globalization is an objective process, the content of which is the growing interconnection and interdependence of national economies based on global markets for goods, services, labor and capital. On the other hand, globalization is an invisible force-majeure that imperatively nudges entities entering the global economic space to comply with established general technological, economic, legal, socio-political relations, norms and requirements.

The globalization of the development of logistics systems is also directly affected by the internationalization of economic activity (Vertakova and Plotnikov, 2019). Globalization is an entirely new level of internationalization of world economic relations, marked by tight competition and at the same time close collaboration. Global logistics can be defined as a phenomenon related to the strategy and tactics of building sustainable macro-systems linking business entities around the world on the basis of divided labor, partnership and cooperation in the form of treaties, agreements, masterplans maintained at the international level.

In the context of globalization, logistics is also an important means of reducing the costs of all types of resources, both in the production sphere and in the sphere of goods circulation. It thus becomes a means of making greater profits and ensuring that businesses remain competitive. Thus, the economic essence

of global logistics is to implement the goals and strategies of the entities of the logistics services market in which their interests manifest. The technological essence of global logistics is to reduce the operational costs of working time, shorten the production cycle as well as cut delivery times and, of course, material costs. The scientific and technical essence of global logistics lies in the fact that it is implemented based on information management technologies in the areas of production and goods circulation by optimizing information flows, as well as providing timely, complete and reliable information to customers (Desyatirikova et al., 2017; Dubovik et al., 2018; Polyanin et al., 2017). The socio-political essential feature of global logistics is manifested in the improvement of services, the elimination of customs, tariffs, taxes and other barriers to the movement of goods, services, capital and labor.

Having considered the essential features of logistics activity in the macroeconomic sphere, we can conclude that the essential basis of global logistics determines the globalization of relations between international participants whose economic activity is the subject of logistics management. The essence of global logistics as a special type of activity, in our opinion, is to ensure the optimal use of all resources of national economies and transnational companies interacting in a single global market space and increase their efficiency through the creation and use of international macro-logistic systems and centers, transport and telecommunication infrastructure, favorable international legal, customs and tax regulation of logistics flows.

Thus, the geographical expansion of the scope of logistics activities is associated with several external factors. The determining ones among them are growth in global volumes of commodity distribution; expansion of IT technologies and communications; regionalization; deregulation of the sphere of international relations; concentration of efforts and interaction of political actors at the global level. The most important internal factor in the globalization of logistics consists in the essence of the object of its activity, which is service. Logistic service can, on the one hand, provide profit to the supplier, on the other hand, it can reduce customers' costs for all types of business processes integrated into the supply chain.

Globalization creates new customer expectations and requirements for the logistics of all components of the reproduction process from sources of raw materials to end consumers, explained by increased volatility of crucial factors that affect the efficiency of their operations and services. The globalization of the world economy creates competition in commodity markets. Customers producing goods compete for the buyer and offer various benefits. For example, previously the buyer could change the loading order with a 10-day notice, but now almost half of the sellers let customers change loading orders a day before shipment or even later. Thus, operating conditions for providers are becoming more complicated.

In connection with the development of new forms of online trade, logistics companies feel the need to integrate their processes and systems both vertically and horizontally, improve coordination, and increase the level of mutual trust. Customers' expectations become an important factor impacting the global market of logistics services, forcing providers to increase the level of logistics services from 3PL (integrated logistics outsourcing) to 4PL (integrated logistics outsourcing) and 5PL ('virtual' logistics). Thus, the system of business relations in logistics contains contradictions that give rise to changes in all of its areas, turning logistics into a globalized structure.

We can distinguish the following main trends affecting the development of logistics systems in the context of globalization:

1. Forming demand. Demand for any product is significantly increased due to increased mobility, unhindered movement of goods and services and access to better logistics infrastructure. The expanded trade and logistics infrastructure mean that customers and users can be served anytime, anywhere, thus helping increase the company's sales.
2. Reducing the cost of doing business. Enhanced logistics infrastructure helps keep business value low, as transporting products from one place to another becomes virtually uninterrupted due to improvements in port, rail network, road and civil aviation infrastructure. All this is

undeniably important, because delays over long distances not only increase the trading cycle, but also worsen the quality of some goods and lead to lower prices in the markets.

3. Connecting customers around the world. Many countries, whose industry has many potentially effective areas, such as electronics, mechanical engineering, microchip design, automotive components, etc., can only contribute to world markets if they improve their trade logistics infrastructure and network systems. Otherwise, the business opportunities of these countries may get trampled by competitors from other countries with a more developed logistics infrastructure.
4. Fast economic growth. In the development of any country, economic growth plays a vital role, and today this is largely due to the expansion of trade and logistics infrastructure, which creates demand in the economic system for various products. Improving the logistics infrastructure not only contributes to the growth of the state economy, but also helps state enterprises achieve sustainable high performance in international markets by expanding the process of trade supplies.
5. Timely provision of critical supplies. An efficient logistics system in international trading operations helps companies deliver products to their international customers on time. Due to the complex functionality of the logistics system and the long distance between two countries, the problem of security, care and shipping times often causes nightmares for suppliers, especially in the case of perishable and expensive products and goods with expiration dates. Examples include newspapers, flowers, and seafood.
6. Bridging the gap between supply and demand. This phenomenon is one of the main problems that any company faces in international markets at all levels - from finding raw materials to work in progress and distributing it among consumers. Thus, better transportation of goods and timely delivery of products help fill the gap between the demand and supply of a product. Improved communication using road, rail, runways and the sea helps companies efficiently allocate their resources.

Thus, the concept of 'global logistics system' can be defined as follows: this is a new stage in the development of logistics activities that meets the imperative challenges of globalization to increase the efficiency of the reproduction process (production, distribution, exchange and consumption) through the creation and development of global interstate transport and logistics, distribution and other macro-logistic systems.

Features of the formation of regional macro-logical systems

The macro-system of logistics in the broad sense is a socio-economic system, the subjects of which are united by the common interests of optimizing economic flows in order to minimize costs and expenses. At present, building management of economic systems based on a macro-logistics approach is gaining popularity, since any system has a certain degree of entropy in the areas of management, technological process, service, information and finance, all of which is significantly decreased thanks to an integrated management system. Macro-logistics system is a structural and compositional integrity, united by common strategic goals and objectives, functioning in the market of transport and logistics services for the supply (development, overhaul) and promotion (repair and maintenance) of the finished product (road) to users based on the logistics concept. At the same time, the road transport sector is expanding to the boundaries of economic research, forming into a complex logistics system with a multilayer flow process.

The theoretical basis for constructing such a macro-logistic system is provided by the reproductive approach to production resources. Moreover, the logistic approach to the activation of reproduction processes allows for the intensive development of system links. Characteristic features of such an organization are self-development stemming from the cyclical nature of the reproduction process and adaptability to changes. Emphasis in the development of this system is made on qualitative parameters. Thus, the boundaries of the regional macro-logistic system depend on the state and degree of development of the transport and logistics services market and are determined by the cycle of

reproduction of roads and the economic cycle of their operation. It should be noted that the division into cycles is rather arbitrary and is designed to separate the production and technological processes of the road sector from the scope of circulation of its products.

During operation, the state of the road is constantly changing both technically (the state of the roadway, roadsides, artificial structures, etc.) and in the economic sense (dynamics of traffic volumes, freight and passenger traffic, composition of traffic flow, etc.). As a result, periodic fluctuations and changes in transport and operational indicators occur within the regional organizational and economic cycle of road operation. Of importance are the changes that occur during the operation of roads while providing road support for the transportation process, aimed at creating the necessary conditions to satisfy the need of all sectors of the national economy in road transportation of goods and passengers with minimal time and resources. Having extrapolated the traditional stages of capital movement in the sphere of circulation to a logistic facility that is a highway, we can state the presence of traditional functional forms and stages of circulating assets turnover:

- monetary – flow processes of acquiring material, technical and labor resources – as part of the scope of circulation;
- production – flow processes of construction and installation works on the road – reproduction;
- commodity (sale of finished products) – flow processes of road operation – another part of the scope of circulation.

At the end of the generalized flow process, the money received from the operation of roads is returned to the budget in the form of tax revenues, acquiring its original cash form. At the same time, the most specific and important flow process of the sphere of circulation is the implementation of transportation process on roads, ensuring the involvement of not only finished products of the road sector, but also products of other industries in the national economy. The model of a regional macro-logistic system is represented as a set of functionally interconnected blocks out of which logistic flow processes are synthesized. This representation allows for providing improved organization of stream processes of reproduction and circulation at all levels (micro-, meso-, macro-) in the road sector.

Logistics has many directions (e.g. procurement, production, marketing, etc.), and considering each of them significantly changes the content of the functions implemented during the construction, reconstruction, overhaul, repair and maintenance of roads. The logistics object also changes depending on the key positions of consideration, operating interests within the scope of marketing, management, financing, and technological processes. At the regional macro-level, the main thing is to correctly formulate the goals of logistics optimization, assessing the needs for their implementation, without being limited to solving problems of material and technical support and transportation of goods.

The results of the regional macro-logistic system are evaluated from the standpoint of integrity as final industry results. Hence, the concept of the result for logistic systems of different levels and scales will be transformed depending on the complexity of their internal structure. The goals of the macro-logistic system are assessed based on whether planned strategic goals of regional programs for the development of the transport complex have been achieved and whether major operational processes (reconstruction, major repairs of roads) have been optimized. Setting strategic goals is associated with decisions with long-lasting consequences; cancelling or correcting these decisions would entail additional costs and losses in the national economy.

Most current configurations of regional transport and logistics systems no longer meet modern requirements. In the traditional scheme of regional transport and logistics systems, there is mainly a direct interaction of each demand point with the source of goods flow serving it (Fig. 1).

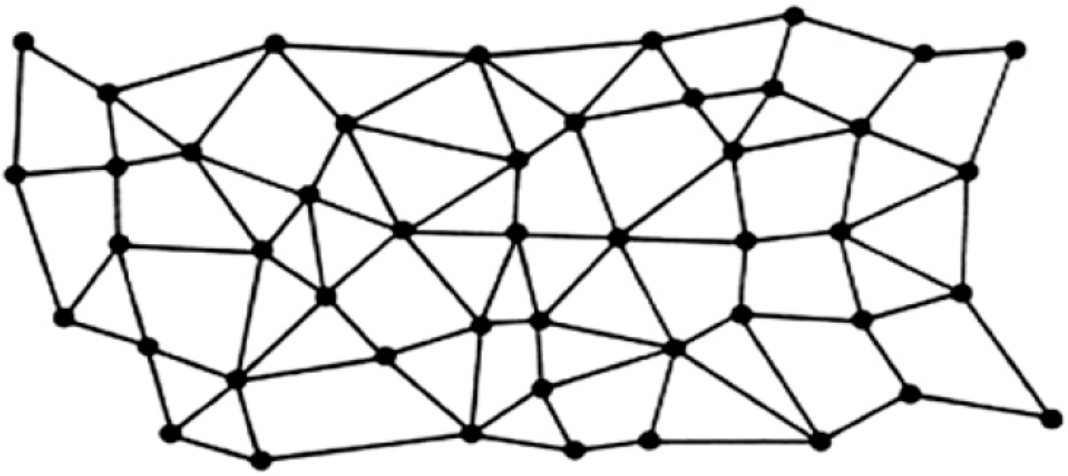

Figure 1: Scheme of the raster structure of regional transport and logistics systems

Given that the logistics network consists of many links interrelated by both main and associated flows, separate supporting network nodes can be built in order to project an intermediate structure between supply and demand. As a result, the demand of nodes at different levels of regional transport and logistics systems is supplied by the source through auxiliary structures. Moreover, at the axial level of the regional transport and logistics systems, a scale effect is realized, as measured by the discount coefficient of the total transport costs within the system.

In contrast to the already widespread scheme of a star-shaped regional transport and logistics system, which has one or two central support nodes or 'hubs', the optimal configuration looks as follows (Fig. 2). In this scheme, one can distinguish 'hubs' – central support nodes and 'spokes' – regional points of departure/destination. Support nodes with connecting arcs represent the regional transport and logistics system and are defined as the axial level; the rest of the system refers to the level of the spokes. With respect to any departure/destination route, an element of the axial level (a hub or an axial arc) is present, in contrast to the raster structure, where any pair of system nodes is connected directly.

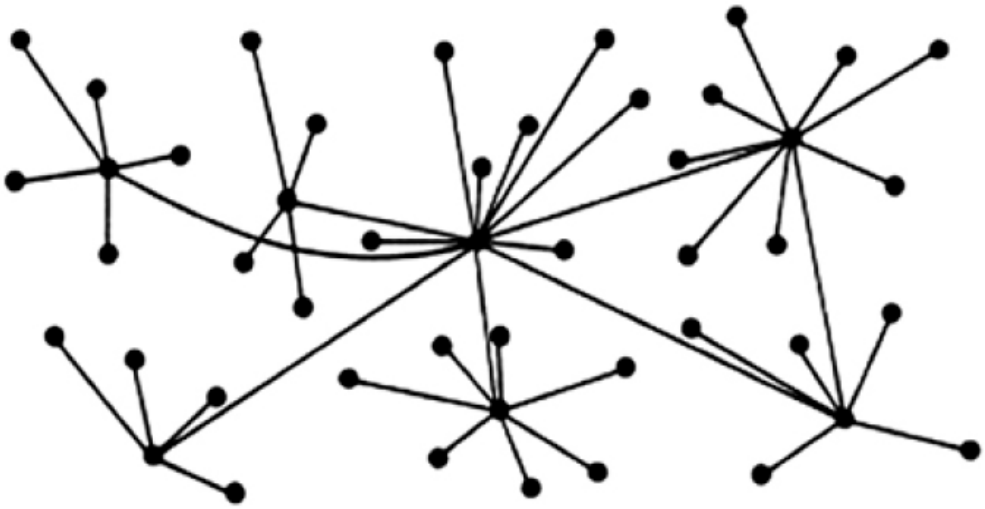

Figure 2: Scheme of the satellite-like regional transport and logistics system

Organizational actions in system objects, united by shared target results, give rise to flows and the need to optimize the processes occurring in them, which is a function of logistics. In variant study of ways to achieve the strategic goals of the macro-level, economic indicators are formed that determine the need for various types of resources. This is the origin of the logistics flow. The ongoing rationale for investing in construction forms the primary information and financial flows, which are still abstract but begin their directed movement towards the consumer. Progressing through the levels of the regional macro-logistic system, information becomes detailed, gets used as input by various software products, processed and output as valuable data for users. Financial flows from the results of preliminary calculations of efficiency are expressed as cash settlements between subjects of industrial relations. The material flow is formed much later, only when implementing specific project decisions necessary to achieve the goals of the macro level.

In the macro-environment, abstract flows without a material basis (informational, financial flows) are primary, which makes it possible to make economically sound organizational and production decisions in the future. Subsequently, these flows must be structured into two components, one of which is transformed into a material flow, acquiring material form, while the second one continues its movement, carrying out its substantial support during the construction, reconstruction, and overhaul of highways.

After putting the finished object into operation, the material flow ceases to exist in the original form of original material resources, becoming the material basis of the structural parts of the road, thereby continuing its functioning in the form of a finished product at the time when it is brought it to users (the stage of road operation). Let us limit this period to the time when it becomes necessary to increase the throughput and carrying capacity of the road. It should be noted that at the same time, relatively small manifestations form within the material flow which function during maintenance and repair of roads, and it is impractical to consider them at the macro level.

Here, the role of financial and information flows increases again. Road tolls and other payments and deductions established by law form the road fund, creating the basis for implementing strategic goals of the macro level. Information flows, functioning both in the environment of the road economy and in its external environment, synthesize certain information products (road measuring stations, GPSS, etc.) that help optimize the movement of transport and logistics flows on roads and reduce costs for other sectors of the economy.

Thus, two kinds of flows exist in the regional macro-logistic system (abstract and material), which is its distinctive feature and should be considered when organizing logistics systems at other levels. Optimization of the development of industries in the national economy is inextricably linked with a focused and comprehensive presentation of flow processes in the road sector, which is possible only under the condition of organizational, technological, economic and informational unity. The increased importance of aggregate results should be taken into account when solving large-scale tasks at the macro level. With the functioning of the macro-logistic system, it is possible to improve many interconnections that are based on mutual dependence and necessary interaction of various organizational structures in the performance of the logistics process.

The Use of Digital Technology in Global Logistics Systems

Innovation and adaptation of advanced technologies are key elements in the process of developing global logistics systems. Modern technologies used in the management of physical flows in the supply chain can be divided into two groups depending on the estimated time of their adoption (Table 1). Technologies that will be used in global logistics systems in the next five years belong to the first group, and those that will be used in the more distant future form the second group.

Table 1: Technology Trends in Global Logistics

	Relevant within <5 years	Relevant in > 5 years
Technological trends are presented according to their importance for the logistics services industry from the most important (potentially destructive) to gradual improvements.	Robotics and automation. Internet of things. Cloud logistics. Big data analysis. Augmented Reality. Inexpensive sensor solutions.	Self-driving vehicles. Electric cars. Artificial Intelligence. 3D printing. Unmanned aerial vehicles. Blockchain. Next-generation wireless connectivity. Bionic boost. Computer vision.

Technologies listed in the Table 1, are used in logistics and supply chain management for servicing material flows in the physical world (i.e. as part of the supply system, production, intelligent warehouses, spare parts management, distribution to end consumers, autonomous logistics and transport) and to improve processes in the virtual world (i.e. integrated planning, analytics or ensuring the visibility of the goods throughout the supply chain).

Digital transformation, especially in the field of transport and logistics, helps the company remain competitive in a market that is constantly growing with the development of technology. Obviously, the widespread adoption of digital technologies in the field of transport and logistics is occurring as reliable new platforms solve problems associated with insufficient use of assets, increase supply chain efficiency, improve supply and demand balance, and improve overall connectivity and visibility. Thanks to improved operational connectivity and visibility between previously isolated systems, parties can easily connect to each other throughout the supply chain. With rapid advances in technologies such as artificial intelligence, biometrics, automation and GPS, a well-coordinated orderly work is expected in the global logistics industry. Below are some technological trends that can revolutionize the logistics industry:

1. Electric cars. Electric vehicles are energy efficient, economical and have lower maintenance costs compared to internal combustion engines. There are three main ways in which electric cars can enter the logistics industry: traditional manufacturers will either produce them themselves, or invest in batteries for them, or they will invest in startups that produce such electric cars.

2. Increasing digitization. New digital technologies in logistics help customers track their deliveries in real time and help optimize logistics operations. Moving from the age-old method of tracking orders on paper to a digital platform will leave less room for errors. For example, delivery based on mobile apps has made booking more convenient, reducing human intervention. In the future, robotic process automation may be used to implement full automation in logistics. The current workforce entering the market is technically savvy, which contributes to the growth of digitization in logistics. In addition, digitally accumulated data helps accelerate the implementation of actions related to customer needs, optimal routes, fuel consumption and turnaround time.

3. Blockchain technology and the Internet of Things (Plotnikov and Kuznetsova, 2018). Customers today are interested in ensuring that the supply chain process is transparent because they want to track the load in real time. Blockchain technology and the Internet of things are

capable of providing end-to-end cargo visibility. This will increase accountability and transparency in the supply chain process. Blockchain will help improve security, reduce fraud, facilitate seamless transactions, increase accuracy and ensure accurate data recording. The Internet of Things will create a connected environment that will have end-to-end visibility, optimal warehouse management and efficient fleet management using digitally connected devices. These devices can help you track routes, maintain schedules, monitor vehicle usage and reduce vehicle downtime. IoT systems using visual and acoustic fuel-powered sensors and GPS will help intelligent vehicles. The Internet of Things can also be used to predict the delivery time of each batch and for preventative maintenance to help avoid breakdowns.

4. Computer vision for classifying technology. Computer vision is an advanced algorithm by which a computer can see the real world based on the data that was entered it. This allows the computer to make decisions just like people would. In logistics, if the cargo is damaged during transit, the customer must accept it if it is within acceptable limits. However, if it is not within acceptable limits, the goods must go through a predefined process. This is due to the large number of decision-making gaps, since approval is required at several levels. Computer vision can be used to more effectively classify cargo damage. Labeled data can be entered into the computer, based on which it can tell whether the damage is within acceptable limits or not. This eliminates the need for consumers to obtain multiple permissions from different parties and speeds up the delivery process.

The use of advanced digital technologies in global logistics activities will be efficient if the following factors are considered: strategic vision of the entire global logistics network according to the system strategy, which is important for raising awareness of market changes; establishing open and direct links between the components of the global logistics network, as well as integrated planning and forecasting; focusing production at specific points serving a geographically expanded market; intensively using digital communication technologies in logistics, which minimizes reliance of companies on geographical location as a key factor in forming their business network; involving the human factor, which is important for teamwork and senior management throughout the process of changing global logistics associated with the decentralization of operations; reverse logistics, where digital technologies can significantly improve the management methods of reverse logistics companies, because information processes that occur after the product is consumed become more accurate and allow for controlling these physical flows; knowledge sharing and dissemination.

Conclusion

Thus, in the context of globalization, the production and logistics infrastructure and logistics services market directly affect the level of economic development of countries, defining conditions of entrepreneurship development. It is advisable to study how traditional logistics becomes globalized, bearing in mind that globalization of the sphere of logistics services is the result of the imperative impact of the objective irresistible force of globalization of the world economy. For sustainable development of territories, their transport and logistics should be seamlessly integrated and unified, and for this it is necessary to manage the development and functioning of the transport and logistics infrastructure as a macro-regional logistics system covering adjacent regions of the country.

The modern, hypercompetitive market of logistics services is entered by new players, suggesting that existing companies undergo transformation and develop innovative business models, which at the current stage is impossible without the use of advanced digital technologies. Today, logistics service providers are not limited to the implementation of one business model and simultaneously use different models, i.e. the real world of global logistics flows is thus complemented (and not replaced) with a virtual world in which advanced technologies provide customers with higher value logistics services.

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Digital Technologies in the Public Procurement System (Case of Russia)

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Abstract

One of the key trends of the 21st century is the digitization of the economy. This trend is fundamentally changing many areas of the economy and society. It is transforming the Public Procurement System (PPS). The aim of the study is to explore the possibilities of increasing the effectiveness of PPS by digital methods. The subject of study is the digitization of Russia's PPS. The objectives are as follows: to consider the features of electronic document management in the field of public procurement; to study the essence and features of a unified information system in the field of public procurement; to analyze current trends in the development of digital technologies used in the implementation of public procurement. Research methods include the study of relevant legislation and literature, institutional and system analysis, comparison, and other. The analysis showed that the improvement of PPS and digitization are put forward as key priorities of the state economic policy. This is true both for Russia and for other countries of the world. Digitization of PPS necessitates the creation of a new institutional form of the public procurement market, the formation of a "smart" procurement economy. The study is based on Russian experience and identifies the main directions of PPS modernization by way of its digitization. The results of the study may be in demand in other countries, as well as internationally.

Keywords: Public Procurement System, Digital Technologies, State Economic Policy, Russian Economy.

Introduction

Digitization is a global modern trend (Andriole, 2005; Parker et al., 2016; Schwab, 2016; Volkova et al., 2019; Wellisz, 2016; and others). The creation of new innovative digital technologies and their diffusion radically change the economy and society (Dubovik et al., 2018; Edler and Fagerberg, 2017; Gawer and Cusumano, 2014; Negroponte, 1999; Plotnikov and Vertakova, 2015; Polyanin et al., 2017; Teece, 2018; and others). The main advantages of digitization are saving time and financial resources, as well as an increase in the level of coordination and quality of processes. In this regard, in many countries of the world state programs for the digitization of the economy and public administration are adopted. Moreover, the implementation of these programs in different countries of the world has institutional features. There is also the specificity of digitization of individual areas and processes.

In this article, the subject of study is the digitization of the Public Procurement System (PPS) of Russia. The aim of the study is to explore the possibilities of increasing the effectiveness of PPS with digital means and methods. The importance of studying this issue is determined by two circumstances, as described below.

- Firstly, a significant part of the national income is redistributed through PPS. According to official data, the share of public procurement is about 25% of Russia's GDP. Given the purchases of state-owned companies and corporations, this value is estimated to reach 40% of Russia's GDP. Some of these funds are spent inefficiently. The introduction of digital methods will improve the efficiency of procurement and the national economy (Plotnikov et al., 2018).
- Secondly, digital technologies are scalable. PPS problems exist in many countries. Effective methods of digitization of this system, developed on the example of Russia, can be used in other countries. They can also be used in commercial procurement systems and in international practice.

Materials & Methods

The study is based on the materials of the Russian economy. This allows us to give its results a specific character. As a theoretical and methodological basis of the research, the authors' developments were used, both from Russia (Desyatirikova et al., 2017; Fedotova et al., 2019; Ivanov et al., 2019; Polyanin et al., 2018; Vertakova et al., 2019; and other) and from other countries (Falco and Kleinhans, 2018; Shrivastava et al., 2016; Tambe and Hitt, 2014; Todoruţ and Tselentis, 2018; Zuehlke, 2010; and other). The presented results are a substantially supplemented and revised version of the materials published earlier in Russian in the book "Digital transformation of the economy and cluster development" (Volkova, Nikitin, Plotnikov, 2019).

The study considered the institutional specifics of Russia. It is governed by the provisions of Russia's Federal Law No. 44-FZ "On the Contract System in the Sphere of Procurement of Goods, Work, and Services to Ensure State and Municipal Needs" (further referred to as Law No. 44-FZ). Procedures for the application of this Law were considered taking into account the digitization of the Russian economic policy (Strategy for the Development of the Information Society in the Russian Federation for 2017-2030, Federal Project "Normative Regulation of the Digital Environment", National Program "Digital Economy of the Russian Federation", Decree of the President of the Russian Federation No. 204 "On National Goals and Strategic Objectives of the Development of the Russian Federation for the Period up to 2024", draft Federal Law "On Experimental Legal Regimes in the Field of Digital Innovations in the Russian Federation", Federal Law No. 63-FZ "On Electronic Signature" and others).

For research methods of institutional, system, comparative, historical, economic and technological, managerial, economic, legal, retrospective analysis are used.

Results & Discussion

The introduction of digital technologies in the PPS can solve several problems existing in this area. Advanced information technologies for data analysis and market modelling can play a decisive role in the process of improving the scope of public procurement as an integral part of the national economy.

Electronic Document Management

Electronic document management is a set of processes for working with documentation carried out in electronic form. The concept of electronic public procurement is to translate into the format of electronic standards the procedures established by law. Electronic document management in the Russia's PPS is regulated by Law No. 44-FZ. As is stated in it, "it is allowed to exchange electronic documents stipulated by the legislation of the Russian Federation and other regulatory legal acts on the contract system in procurement between participants in the contract system in the field of procurement, including the submission of applications for participation in determining the supplier."

In procurement, applications for participation in determining the supplier, final proposals and documents sent in the form of electronic documents must be signed with an enhanced electronic signature and submitted using the Unified Information System (UIS). In Law No. 44-FZ, the term "enhanced qualified electronic signature" is used; the abbreviation "enhanced electronic signature" is also given there. These concepts are defined in Federal Law No. 63-FZ "On Electronic Signature." Both types of electronic signatures are created by cryptographic transformation of the document, confirming authorship and the absence of changes after signing.

As stipulated by Law No. 44-FZ, the UIS, when interacting with other information systems, ensures the use of an enhanced unqualified electronic signature for signing electronic documents provided for

by this Law. Strengthened electronic signature keys, as well as certificates of electronic signature verification keys intended for use for the purposes of the Law, are created and issued by certification centers that have received due accreditation. In cases stipulated by international treaties of the Russian Federation, the indicated keys of enhanced electronic signature and certificates of keys to verify electronic signatures must be created and issued by certification centers created in accordance with the law of a foreign state.

In accordance with Russia's Law on electronic signature, information in electronic form, signed by a qualified electronic signature, is recognized as an electronic document, equivalent to a paper document signed with a handwritten signature, and can be used in any legal relationship. However, information in electronic form, signed with a simple electronic signature or an unqualified electronic signature, is equivalent to a paper document signed with a handwritten signature, only in cases established by federal laws, normative legal acts adopted in accordance with them or an agreement between participants in electronic interaction.

If federal law or other authority requires that a document must be stamped, an electronic document signed with a strengthened electronic signature and recognized as an equivalent paper document signed with a handwritten signature, is recognized as an equivalent document on paper signed by handwritten signature and stamped. In terms of establishing requirements for certificates of electronic signature verification keys and enhanced electronic signature keys, approval is also required from the Federal Security Service of the Russian Federation.

Unified Information System

The UIS is a specialized website where all the information and necessary documents related to public procurement are collected. In accordance with Law No. 44-FZ, the UIS provides for the formation, processing, storage and provision of data (including automated) to participants in the contract system; monitoring compliance with the law in procurement planning and implementation; filing applications for the determination of the supplier in the form of electronic documents. Moreover, all information contained in the UIS is publicly available and is provided free of charge and is also posted on the UIS official website.

Problems in the official site of public procurement continue to manifest today, even though the UIS was conceived and financed from the federal budget to resolve these exact problems. Among them, the following:

1. Lack of integration of budget and procurement processes, which can be overcome at the technological level through the interaction of information systems for managing budget planning of authorities with the official website. Because budget and procurement processes at the technological level are fragmented, it is difficult to assess the effectiveness of procurement procedures in terms of the degree to which planned procurements are implemented and goals are achieved.
2. Lack of integration of the procurement process with the implementation of State Programs. The technical requirements for the creation of the UIS and the development of the Procurement Management subsystem do not provide for interaction with information systems for managing state programs.
3. The search capabilities of the UIS are severely limited. For the UIS, the problem of an inconvenient procurement information search service continues to be significant, as the smart search service on the official website has not been implemented.
4. Lack of analytical capabilities in the UIS. The system creates significant difficulties for those who are searching for concluded contracts. It is not possible either to search for a contract by its number. It is not possible to collect aggregated statistics on the examination of the results of the contract.

The functionality of the UIS as of 2018 was monitored, and the results that some of the functions available in the public part were inoperable. Areas in which the lack of analytical data is most detrimental are as follows: general data on purchases of the customer and its subordinate organizations; analytical data needed to calculate the initial (maximum) prices of state (municipal) contracts;

analytical data necessary to select a method for determining the supplier; analytical data on the results of the execution of state (municipal) contracts. The issue of the loss of statistical tools for monitoring procurement information is closely related to issues related to the functioning of the UIS. After the abolition of key statistical forms, only fragmentary restoration of procurement information is possible.

Information Technology Used in the PPS

Public procurement is one of the factors in the growth of the national economy, playing an important role in the development of small businesses and their participation in the economic evolution of the country, and influencing the economic development of its regions. However, structural shifts occurring in the world economy as well as growing prominence of the innovation and informational factors dictate the emergence of future governments, which, in turn, determines fundamental changes in the state regulation system, the infrastructure of information systems, including in the field of public procurement for state and municipal needs.

The introduction of e-commerce in public procurement not only eliminates corruption risks, but also helps to increase the availability of procurement for a wide range of small and medium-sized businesses. Digitization of the economy presupposes the launch of a large-scale economic development program for a new technological generation (Volkova et. al., 2019). It should be noted that advanced IT-technologies for data analysis and market modeling can play a decisive role in improving the scope of public procurement as an integral part of the economy of our country.

The implementation of the digital agenda involves using information and communication technologies, new business processes and digital models, along with creating digital assets. The directions of development of the digital economy within the framework of national policy include digital transformation of economic sectors and cross-industry transformation, digital transformation of goods and services markets.

The process of digitization of the procurement system has been completed. Until the end of 2017, the only electronic procedure in the contract system was the electronic auction. The rest of the procedures: tenders (and their varieties), quotation requests, requests for proposals and purchases from a single supplier remained paper-based, and as of 2018, their share as part of the procurement of goods, works, services of certain types of legal entities (state corporations, corporate customers in which the government is a stakeholder, resource supplying organizations) was significant.

Transferral of purchases into electronic format is a worldwide trend that is characteristic not only of the Russian state procurement system. For example, the European Union Procurement Directives are part of the Europe 2020 strategy and provide for the full digitization of procurement by the end of 2019. In connection with that the legislation of the member states is subject to unification, and public procurement is expected to become formalized and fully digitized.

The PPS is an important part of the information and telecommunication infrastructure of the public sector economy, a significant component of e-government, and therefore dependent on information technology and development factors of software and hardware, the theory of intelligent systems. An intelligent system is a software system, a set of interacting with each other elementary structures and processes, capable of solving tasks that were traditionally performed by a person, but integrated into a whole by performing the function of intelligent processing and belonging to a specific subject area.

Extensively using simplified procedures to provide services is a measure that allows achieving elimination of bureaucratic restrictions and increasing the efficiency of meeting public needs. This measure is ensured by the comprehensive digitization of the contract system in public procurement. Of importance are creating customer-oriented management systems, selecting the most promising ideas and best development practices, establishing a feedback system, and reviewing and analyzing feedback.

Main Measures for Developing PPS

The following measures are advisable as conducive to the digitization of the contract system:

1. To create based on the UIS, a system of statistical indicators of state and municipal procurement accessible to all interested parties. Users should be able to create databases at their discretion using filters (i. e. selecting conditions.

2. To create an analytical subsystem of the UIS or make it openly accessible. To use the capabilities of UIS to implement support for a single technological cycle of procurement activities.
3. To ensure the integration of budgetary and procurement processes, which can be achieved through the interaction of information systems for managing budgetary planning with the procurement system. To ensure the integration of the procurement process with the implementation of state procurement programs embedded in government programs.
4. To expand the search capabilities of the UIS based on the technologies of intelligent information retrieval. To exclude the possibility of placing distorted information passed from the procurement management subsystem to the UIS.
5. To ensure the continuity of procurement supporting documents not only by the technical means of the official website (subsequently the UIS), but also by the legal regulation of the procedure and form for the preparation of such documents. To update, according to the goals and principles of the PPS, the normative legal acts regulating the functioning of the official site, as well as the requirements for its technological and linguistic means.

Today, attention is increasingly paid not only to the transparency of the supplier selection, but also to the efficiency of the procurement process itself. To date, a significant level of transparency of procurement procedures has been achieved in comparison with the now-obsoleted law on placing orders, but the efficiency and ease of implementation of the procedures remain substandard. Due to duplicate processes, customers must carry out most actions twice: first on paper, and then entering the same information into the unified information system and on various electronic platforms, usually in an unstructured form.

Thus, the procurement process, on the one hand, has become transparent and digitized; on the other hand, this result has been achieved by increasing the bureaucratic burden carried by state and municipal employees. One of the most important tasks today is to simplify procedures for customers and suppliers, structure information in information systems, and, therefore, increase the efficiency of the entire contract system.

Conclusion

The topic of digitizing the procurement process is very relevant. It is through the digitization of procurement that many existing problems are addressed in the contract system not only in Russia (the example of which was considered), but also in other countries. The procurement system is constantly evolving and modernizing; however, the improvement of the system inevitably leads to its complexity, which causes unintentional errors. Digitization is designed to prevent these violations. It is necessary to solve pressing problems and develop initiatives conducive to the effective implementation of digital technologies in procurement at the federal, regional and municipal levels.

Federal Law 44-FZ contains the basic principles of organizing public procurement, including the principle of openness and transparency, providing free and gratuitous access to information about the contract system in the field of procurement. Along with this, there is a principle of procurement efficiency. Achieving these principles in modern conditions requires the digitization of the Public Procurement System. The main results and directions of digitization are considered by the authors in the article. For further successful development in this area, modernization of state regulation of the digital transformation of the economy is required.

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Use of Data Mining to Optimize the Selection of Scenarios for Accepting Planned Decisions in Russian Companies

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Abstract

The authors offer a methodology for developing a model of dependence of key company performance indicators – sales profit and unit costs on different factors, which operate in competitive environment, as exemplified by a modern Russian company, and for determining the nature of correlations and the degree of factor influence with the use of Data Mining methods. The methodology is based on studying correlations between key factor features by means of pair correlation linear coefficient analysis based on statistical evaluation of input information on the Russian company performance indicators. The use of methods of Data Mining correlation and regression analysis, which take into consideration the factors of external and internal environment of the company, allows deriving a universal established model for calculation of sales profit and unit costs for the purpose of using it for development of scenarios for accepting planned decisions in the company.

Keywords: methods of Data Mining; correlation analysis; regression analysis; planned solutions; environmental factors; regression coefficient; factor features.

Introduction

We have previously examined the role of cost information in managing a business. However, only cost information is not enough (Kaverina, Terenteva and Ivanova, 2019). Problems concerning optimization of selection of scenarios for accepting planned decisions can be solved in different ways (Xu et al., 2005). We offer our solution based on Data Mining technology. A concept of templates (patterns) underlies the modern Data Mining (discovery-driven data mining) technology, which reflect fragments of manifold relations in bulk data. The templates are patterns of data samples, which may be compactly expressed in an intelligible form. The templates are searched for through the use of dedicated methods (Russel and Klassen, 2020, p. 25). Data Mining methods allow to determine the existence, force of correlation between features under study by calculating indicators of correlation between the pair correlation linear coefficient, the partial correlation coefficients, the total multiple correlation coefficient, the determination and allow to determine, how the effective feature changes at the average with the change of factor features.

Methodology for optimization of selection of scenarios for accepting planned decisions

To solve the problem concerning optimization of selection of scenarios for accepting planned decisions in Russian companies, a methodology is offered for developing a model of dependence of key company performance indicators – sales profit and unit costs on different factors, which operate in competitive environment. Analytical study of the mechanism of dependence between the features is expressed as follows: y=f (x(1), x(2)…..x(n))

The purpose of the study is to reveal the nature of correlation and the degree of influence of arguments *x(1), x(2),…….x(n)* (factor features) on function *y* (effective feature).

Problem solving through the use of the Data Mining method includes the following stages:
1. Economical problem definition and the purpose of solving thereof. 2. Statistical evaluation (processing) of input information. 3. Deriving an equation of correlation between effective and factor features. 4. Interpretation of the equation derived.

Based on this method a model of dependence of the estimated values of sales profit and unit costs on different factors is built. Based on input data of the Russian company for 3 years from 2017 to 2019, through the use of Data Mining methods it is necessary to give an economical appraisal of the existing relation between changes in sales profit and unit costs values and environmental factors, and to determine through the use of derived analytic expressions (correlation equations) the estimated values of sales profit and unit costs for the company. Further, to make statistical evaluation of input information through the use of the Data Mining statistical package. The most basic requirement with regard to the factor features – they should be the key ones for the company operations (tables 1, 2). First of all it should be noted that the groupings under study are homogenous. Unit costs and profit for all periods are calculated with the use of the common methodology (Zakharenkova and Igotti, 2018, p. 48).

Table 1: model 1 – input values

Periods	Unit costs, (C), USD	Factor features			
		g	h	v	t
2017	0.86	0.53	-0.32	0.24	0.47
Q 1	0.87	0.06	-0.03	0.09	0.13
Q 2	0.85	0.07	-0.07	0.11	0.15
Q 3	0.84	0.13	-0.15	0	0.12
Q 4	0.87	0.27	-0.07	0.04	0.07
2018	0.93	0.43	0.09	-0.21	0.32
Q 1	0.94	0.13	0.04	0	0.11
Q 2	0.90	0.17	0	-0.17	0.20
Q 3	0.90	0.08	0.02	0	0
Q 4	0.92	0.05	0.03	-0.04	0.01
2019	0.56	0.50	-0.45	0.15	0.41
Q 1	0.69	0.21	-0.09	0	0.21
Q 2	0.55	0.02	-0.21	0	0.08
Q 3	0.51	0.09	-0.13	0.15	0.07
Q 4	0.53	0.18	-0.02	0	0.05

Where: C – unit costs value (effective feature), USD.; g – changes in expenditures connected with raw and other materials, fuel, power (changes in wholesale prices, changes in the consumption rate per unit, materials substitution), USD.; h – assortment shifts (changes in the output assortment or relative changes in the quantity of each product description in the total output), USD; v – changes in grade and quality of raw and other materials, USD; t – changes in the prime cost of particular types of products (changes in prices based on sales forecasts, material type substitution), USD; g, h, v, t – factor features.

Table 2: model 2 - input values

Periods	Sales profit (S(p)), thous. USD	Factor features						
		x	z	c	l	m	q	n
2017	2,427.1	27.729	5.216	0.914	5.111	3.065	0.121	14.229
Q 1	533.9	3.717	2.396	0.115	1.665	1.012	0.012	2.099
Q 2	509.7	7.969	0.149	0.500	1.987	0.617	0.055	2.433
Q 3	631.1	6.616	0.992	0	0.945	0.314	0	3.201
Q 4	752.4	9.427	1.679	0.299	0.514	1.122	0.054	5.996
2018	1,418.0	25.614	-14.604	0.629	4.401	2.914	0.219	12.624
Q 1	418.0	4.712	-3.264	0	0.965	0	0.015	4.019
Q 2	118.0	6.395	-5.448	0.219	2.486	0.730	0	5.619
Q 3	258.0	5.588	-2.424	0	0.214	0.512	0.098	0.668
Q 4	624.0	8.919	-3.468	0.410	0.736	1.672	0.106	2.318
2019	2,304.0	31.853	-19.910	0	6.882	4.287	0.158	16.444
Q 1	571.0	5.604	-4.512	0	1.654	0.694	0	3.208
Q 2	552.0	7.828	-8.485	0	3.293	1.295	0.069	4.914
Q 3	497.0	9.168	-5.168	0	1.108	2.205	0.052	6.868
Q 4	684.0	9.253	-1.745	0	0.827	0.093	0.037	1.454

Where: S(p) – sales profit (effective feature), thous. USD; x – changes in wholesale prices for the products sold, thous. USD; z – changes in prices and rates for materials (changes in contract delivery terms for the target period), thous. USD; c – organizational violations (production process violation; breach of contract by suppliers, etc.), thous. USD; l – changes in the output, thous. USD; m – changes in the product composition (changes in the output assortment; relative changes in the quantity of each product description in the total output), thous. USD; q - changes in the average level of operational costs per unit, thous. USD; n – changes in the cost structure, thous. USD; x, z, c, l, m, q, n – factor features.

Correlations between the factor features have been studied based on the analysis of the pair correlation linear coefficients introduced in tables 3 and 4. The pair correlation linear coefficients are verified for significance by t-criterion, which has Student's distribution with k=n-2 degrees of freedom at the prescribed significance level of a=0.05 or 0.1. The calculated value of t-criterion is compared with the tabular one. If t-calculated is more than t-tabular, the pair correlation linear coefficient is significant (Sokolov and Sagitov, 2016, p. 187).

Table 3: model 1 - pair correlation linear coefficient matrix

Variables	g	c	h	v	t
g	1				
c	-0.174	1			
h	-0.098	0.394	1		
v	-0.173	-0.108	-0.322	1	
t	0.417	-0.363	-0.045	-0.093	1

The multiple correlation coefficient significance is verified through Fisher and Snedecor statistics of F-criterion with the selected level of a significance (0.05 or 0.1), the number of degrees of freedom for bigger variance m-1 and the number of degrees of freedom for smaller variance m-n, that is F(tabular)=(a, m-1, m-n). The calculated value of F-criterion is compared with the tabular one. If it is more, multiple correlation and determination coefficients are significant (Russel and Klassen, 2020, p. 233).

Based on the statistical evaluation of the input information, it has been found that it presents a roughly homogeneous, normally distributed grouping. Following the correlation analysis, the problem defined above reduced to finding multiple dependence C=f(g, h, v, t) and dependence S(p)=f(x, z, c, l, m, q, n).

Following the comparative analysis, the following linear dependences have been selected as per the models under study:

$$C=a_{(0)}+a_{(1)}g+a_{(2)}h+a_{(3)}v+a_{(4)}t \quad (1)$$
$$S(p)=a_{(0)}+a_{(1)}x+a_{(2)}z=a_{(3)}c+a_{(4)}l+a_{(5)}m+a_{(6)}q+a_{(7)}n \quad (2)$$

With linear dependences (1) and (2), regression coefficients a(1), a(2), …. a(n) demonstrate a medium degree of impact of each factor on the effective feature with fixed positions of other factors. The intercept term of the regression equation $a_{(0)}$ has no economic value, therefore, it is not interpreted economically. It only points to the origin of those intervals of ordinates, which have already been given particular value (Sokolov and Sagitov, 2016, p. 245).

Table 4: model 2 - pair correlation linear coefficient matrix

Variables	x	z	c	l	m	q	n	S(p)
x	1							
z	-0.103	1						
c	0.354	0.314	1					
l	-0.150	-0.118	0.103	1				
m	0.453	0.040	0.194	0.240	1			
q	0.360	0.437	0.172	0.236	0.208	1		
n	0.136	0.064	0.211	0.414	0.459	0.445	1	
S(p)	0.445	-0.418	-0.034	-0.052	0.198	-0.222	0.070	1

Tables 5 and 6 contain regression coefficient values for the data bases under study. According to the above-mentioned information, linear equations as per the models will take shape as follows:

$$C=0.868+0.012g+0.099h-0.02v-0.096t \quad (3)$$
$$S(p)=252.2+56.391x-20.027z-76.180c-6.329l+0.273m-142.601q+6.934n \quad (4)$$

Sign "+" at factors means that the growth of their values results in the growth of the unit costs *(C)* or the sales profit *(S(p))* values. Sign "-" demonstrates reduction of the resulting values.

Table 5: model 1 - regression coefficient

Intercept term $a_{(0)}$	$a_{(1)}$	$a_{(2)}$	$a_{(3)}$	$a_{(4)}$
0.868	0.012	0.099	-0.002	-0.096

Table 6: model 2 - regression coefficient

Intercept term $a_{(0)}$	$a_{(1)}$	$a_{(2)}$	$a_{(3)}$	$a_{(4)}$	$a_{(5)}$	$a_{(6)}$	$a_{(7)}$
252.2	56.391	-20.027	-76.180	-6.329	0.273	-142.601	6.934

Thereafter, based on the selected model, a project of cost value per 1 USD of the output and the sales profit value are determined (table 7).

The calculations made show that the deviation result as per model (3) is within the range from -0.06 USD to +0.05 USD. The deviation value is insignificant. The target value of the unit costs for 2019 coincides with the calculated one (0.56 USD), which confirms reliability of the developed model. This indicator is influenced most significantly by the assortment shift and changes in the prime cost of particular types of products. The influence of changes in wholesale prices, grade and quality is less noticeable. The deviation value as per model (4) is within the range from -9.7 thous. USD to +7.7 thous. USD. The target value of the sales profit for 2019 calculated as per the model (2,301.6 thous. USD.) is 2.4 thous. USD less than the calculated one (2,304.0 thous. USD). Subject to a significant period of study (3 years), the deviation value is insignificant, therefore, such model is reliable and can be used for calculation of the target sales profit value.

Table 7: calculation results as per the models

Periods	Unit costs, (C), USD		Deviation (+,-)	Sales profit (S(p)), thous. USD		Deviation (+,-)
	as per calculation	as per the model		as per calculation	as per the model	
2017	0.86	0.80	-0.06	2,427.1	2,432.0	+4.9
Q 1	0.87	0.85	-0.02	533.9	534.6	+0.7
Q 2	0.85	0.85	-	509.7	508.2	-1.5
Q 3	0.84	0.84	-	631.1	633.4	+2.3
Q 4	0.87	0.86	-0.01	752.4	755.8	+3.4
2018	0.93	0.92	-0.01	1,418.0	1,420.7	+2.7
Q 1	0.94	0.92	-0.02	418.0	416.2	-1.8
Q 2	0.90	0.91	+0.01	118.0	118.7	+0.7
Q 3	0.90	0.95	+0.05	258.0	259.8	+1.8
Q 4	0.92	0.93	+0.01	624.0	626.0	+2.0
2019	0.56	0.56	-	2,304.0	2,301.6	-2.4
Q 1	0.69	0.69	-	571.0	578.7	+7.7
Q 2	0.55	0.56	+0.01	552.0	555.1	+3.1
Q 3	0.51	0.54	+0.03	497.0	493.5	-3.5
Q 4	0.53	0.58	+0.05	684.0	674.3	-9.7

Conclusion

Therefore, based on the undertaken studies, we may confirm that the above-mentioned factors as per models (3) and (4) determine to a significant extent the level of unit costs and the value of profit on sales of the company products. Accordingly, the presented models, developed with the use of Data Mining methods, are reliable and can be recommended for development of scenarios of the company performance targets in the future.

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Risk Management in The Digital Transformation

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Abstract

Today, in some countries more, in others - less effective in the process of development of the digital ecological environment, digital transformation, representing the introduction and use of modern digital technology in the field of material and non-material production in order to increase productivity and competitiveness. The main objective of the development of the digital economy in Russia - the creation and development of the digital environment - infrastructure, which in the future should bring material production to the next level and provide a solution to the problems of the international competitiveness of domestic production and the national security of Russia. And on top of the main objective -increasing quality of life. Between the formation of the country's digital economy and increase the welfare of the population there is a direct relationship: no welfare is difficult to achieve the formation of a real digital economy, and without increasing prosperity becomes virtual. The aim of this work is to reveal the urgency and complexity of the problem of risk management is a digital transformation. The processes of digitalization and automation provide great opportunities for development. At the same time they are accompanied by certain risks.The article deals with issues related to the development of new risk assessment methods and their impact on business processes in the formation and development of the digital economy. article applied scientific methods of research: empirical methods, historical and theoretical (literature analysis), systems analysis, computational and constructive, vertical and horizontal analysis, and use of economic and statistical methods and other approaches.

Keywords: Digital Transformation, Digital Ecological Environment, The Contribution to GDP Growth, Prospects of Development Barriers, Risk Management, Fragmentograms

Introduction

The proliferation of digital technologies for a long period determines the trajectory of development of economy and society and have often led to fundamental changes in people's lives. Formation of the digital economy - a priority for most countries - economic leaders, including the US, UK, Germany, Japan, etc. As a rule, they are characterized by a long period of implementation of the "Agenda for Digital Development" and priority succession -. From building a base of information and communication infrastructure to form a coordinated policy in this area, and programs to support the widespread introduction of digital technologies.

The idea of "new public management (management)" and the "New Economic Policy" is well known in Russia. Our task does not include a full review of the theoretical literature, we only note that it is quite extensive and diverse study problems (work Servryukovoy LV, AV Obolon. OV Sivintsevoy VL Tambovtseva, and other).

In this study we restrict ourselves to the key provisions of which have a significant impact on the strategy and approaches to digitization. Since the beginning of the new century, issues of digitization of the economy being actively discussed in scientific and popular publications, she devoted to seminars and conferences. In the last years the band released a series of studies on the introduction of digital technologies in various fields, and have been published numerous books, monographs and textbooks. The problem of the digitalization of the economy developed in the works of Russian and foreign scientists and economists, as the Berbers AB, (AB 2017 Berbers). Hulin VG Chernov GV (Hulin VG Chernov GV 2018). New Age is not brought to the subject of new ideas at the same time focusing on academics addressing urgent and concrete problems. Structural and logical models to ensure the economic and fiscal security that can be implemented using digital technology are reflected in the works Tkacheva TY Afanasyeva LV, et al. (Afanasyeva, LV, Tkachev TY 2015). However, in terms of unpredictability of the processes occurring in the Russian economy become of particular interest as macroeconomic research, presented in the works of LS Belousova and other Russian economists (Tsiklauri VY 2017). taking place in the Russian economy become of particular interest as macroeconomic research, presented in the works of LS Belousova and other Russian economists (Tsiklauri VY 2017). taking place in the Russian economy become of particular interest as macroeconomic research, presented in the works of LS Belousova and other Russian economists (Tsiklauri VY 2017).

Results and Discussion

By the digital economy includes activities in which, unlike traditional forms of management, production efficiency, the use of technology, equipment performance, storage, sale, delivery of goods and services is significantly increased due to the handling of large volumes of data and use the results of their analysis Currently, there are dozens of definitions of the digital economy. Synthesizing important to them, we distinguish two approaches to the interpretation of the study categories.

First, narrower, in which the digital economy - an economy based on the production of digital goods and services. This includes areas of activity in which the process of production of goods or services is carried out on a digital basis (the traditional products and services that have been converted into electronic digital form).

Second, advanced approach - is an economic unit in which goods and services are produced with the predominant use of digital technologies, and the data in digital form is a key factor of production and services. Quantitative criterion here can serve the following: more than half of the added value in the company (industry) and in the whole national economy is created using digital technology: big data; unmanned artificial intelligence technology; Distributed system registry; quantum technologies; new production technologies; Internet industry; robotics and sensing; virtual and augmented reality, wireless communications [2].

More specifically, the digital economy will be defined as the economic activity with the production of information goods (IT) and services, information and communication technologies (ICT) (digital economy - the first level), as well as activities related to the production of goods and services, predominantly or completely produced based on digital technology, carrying out economic entities, the business model which is based on digital products or services (the second and third levels) (Fig. 1).

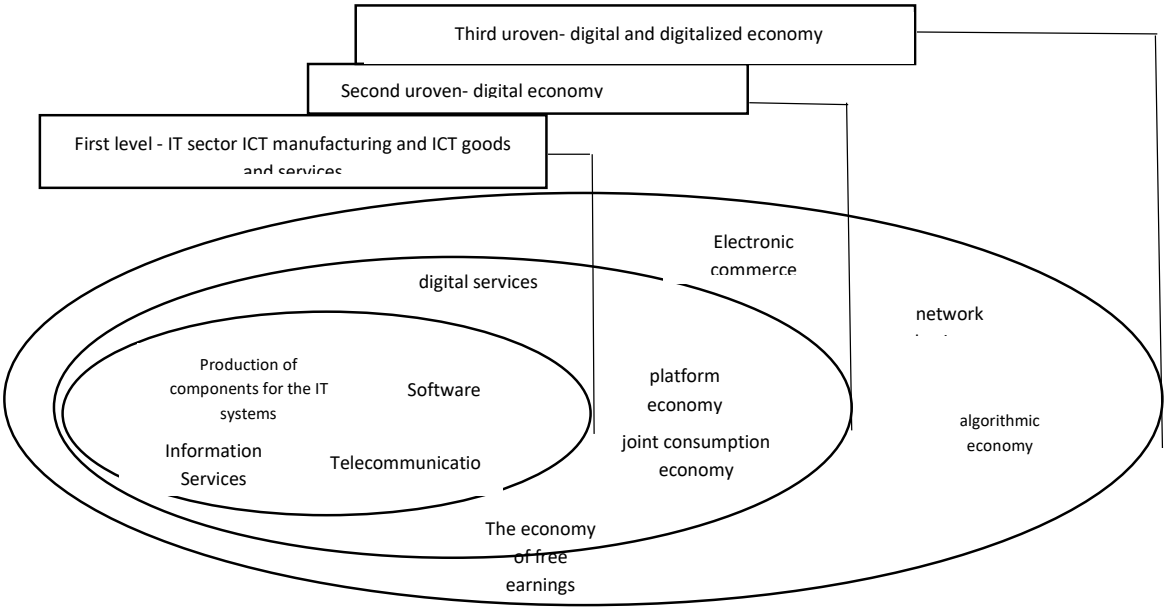

Fig.1 : levels and components of the digital economy

At the present stage of the world economy is entering a new phase of digital development, which is characterized by including the active transformation of institutions and governance mechanisms. Today, Russia is one of the leaders of the digital economy - its share is about 3.9% of GDP, which is 2-3 times lower than that of the leading countries.

The European Commission has published the level of development of the digital economy in which Russia lags behind in the development of the Euro Union and the United States. The share of digital technologies in the GDP of Russia holds 4.1% (Figure 4), while the US GDP - 10.9%, China - 10%, the EU - 8.2%.

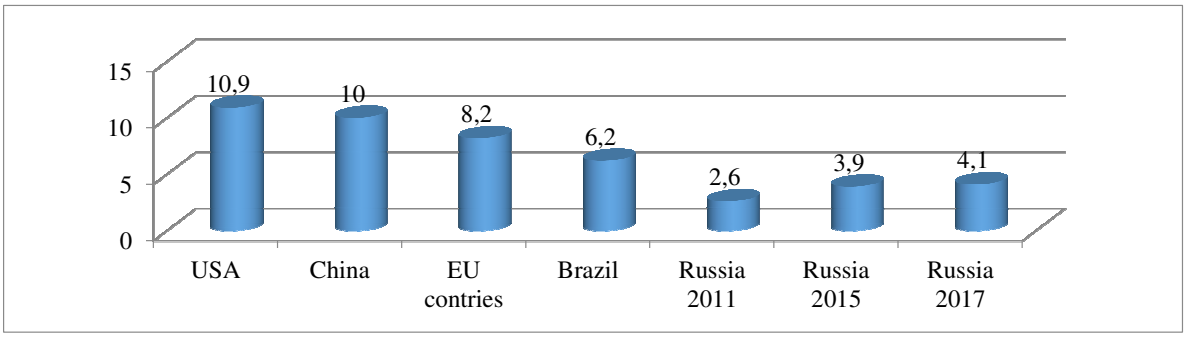

Fig.2 : The share of digital technologies in the country's GDP in 2017.

However, even now visible and a number of positive trends, so that the volume of the digital economy has grown steadily in recent years. In the period 2011-2015, the digital economy, had 24% of the total growth of Russia's GDP. [7] Our country has a great potential and prospects of further development: according to the expert group Digital McKinsey, digitalization of the Russian economy

can increase the country's GDP in 2025 to 4,1-8,9 trillion rubles, amounting to 19-34% of the total increase in GDP.

The digital economy will have an increasing and decisive impact on economic growth [3-5]. You can use the approach of Huawei for evidence linking digitalization and economic well-being, which experts offer to evaluate the effect of different digital aggregated indices on key macroeconomic indicators [6]. Comparing the ICT development index and per capita GDP (. Figure 3) confirms the hypothesis: in developed countries with a high level of ICT implementation impact of digital technology on the scale of the economy and economic growth is significantly higher.

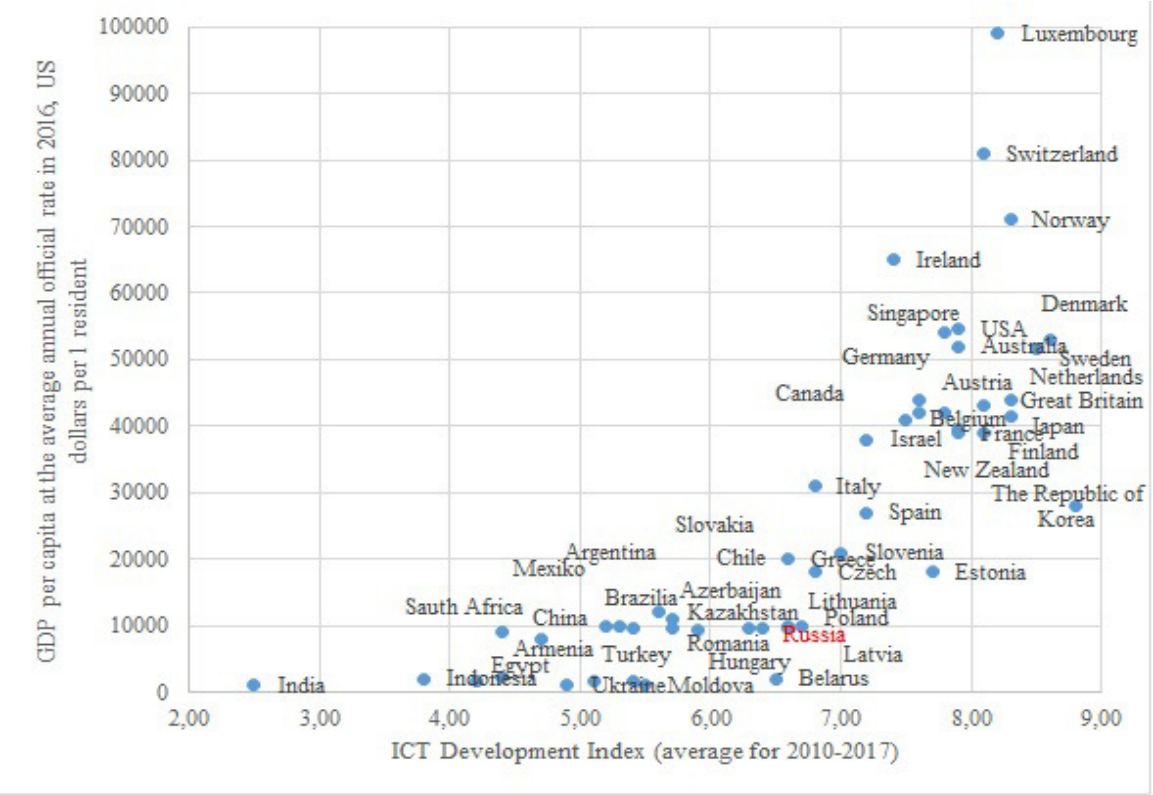

Fig.3: Comparison of the ICT development index and per capita GDP

The experience of leading countries shows that it is due to:

- increasing the efficiency research and product development (development process accelerates innovation with rapid prototyping, automated analysis, etc...);
- optimization of manufacturing and logistics operations;
- more efficient use of resources ("smart" IT systems help to optimize the consumption of raw materials, spare parts and reduce losses) [8].

Another factor influencing the growth of GDP by digitalization, is to increase the impact of the production and nonproduction assets. For example, the introduction of Internet of Things (IoT) enables companies to achieve greater output of finished products, reduce downtime of equipment and vehicles, to optimize capacity utilization, reduce repair costs.

Another factor: the digitalization of industries leads to changes in the demand for factors of production and goods and services produced. Change model of value-added, reduced the influence of intermediaries. The importance of individual approach to demand generation through the creation of

unique digital services and flexible digital companies interact with customers. Demand outstripping growth rates of companies and individuals in the digital services that accompany the use and operation of [9-11]

One of the main conditions for the implementation of large-scale government investment in the deployment of digital technology is to assess the contribution of the relevant events in the economic growth in terms of cost-effectiveness.

Regardless of the scenario of economic development require guarantees sufficient return on such investments to support the feasibility of their implementation.

The introduction of digital technology - one of the key drivers of economic growth. The cost structure of sectors of the Russian economy products and services of the ICT sector is already a significant share. In some industries (machine-building, chemical industry), the intensity of the costs of ICT products conform to the US level, and in science, education, public health, the financial sector and the transport sector even exceeds it. However, in such a large proportion of Russia's GDP in sectors such as trade and timber industry complex, and in some service sectors are observed significantly lower values of intensity of ICT costs. In engineering, in recent years the level of ICT expenditures (relative to the release) is about 8%, which is comparable to the costs of the transport sector. In general, the intensity of the products the cost of ICT in Russia lags behind the US level (2.46% vs. 3.08%). To a large extent the backlog of individual segments of the Russian economy on the level of digitalization is related to low levels of investment in the digital infrastructure (software, electronic component base and others.), Which in Russia (1.46% of GDP) is far behind the US level (2.80 % GDP). In terms of sanctions more expensive imported technology is slowly replaced with domestic, constraining the pace of upgrading the digital infrastructure. that in Russia (1.46% of GDP) is far behind the US level (2.80% of GDP). In terms of sanctions more expensive imported technology is slowly replaced with domestic, constraining the pace of upgrading the digital infrastructure. that in Russia (1.46% of GDP) is far behind the US level (2.80% of GDP). In terms of sanctions more expensive imported technology is slowly replaced with domestic, constraining the pace of upgrading the digital infrastructure.

Digitalization of industry leads to a change in demand for the factors of production. Under the influence of digital technologies and the associated new business models transform not only individual sector, but the whole structure of the economy and the cross-industry interactions. Calculations ISSEK the HSE show that in the baseline scenario with moderately favorable macroeconomic and institutional conditions (primarily faster growth of investment activity in all sectors of the Russian economy and maximize the effect of scientific and technological development), digitalization can significantly improve factor productivity as the industries and the service sector

The core of the development of the digital economy is the information industry. To ensure the digitization of other sectors, it needs to grow faster than the growth of the economy as a whole, and in 2030 may reach 4.6% of GDP (in 2017, it is estimated that - 3.6%).

Fig. 4 presents estimates of digitalization contribution to value added growth of individual sectors of the economy. To a large extent the growth will be associated with an increase in production efficiency. Process automation and robotics, accompanied by a radical renewal of fixed assets, will result in a reduction of the share of labor factor contribution to economic growth, while the growth of capital contribution in almost all sectors of the economy. The development of digital infrastructure in the first place can affect the increase in the rate of growth of the financial sector, the transport and construction sectors. Estimates show that the digitization of a positive impact on the efficiency of the manufacturing industries (the most - the chemical industry and mechanical engineering).

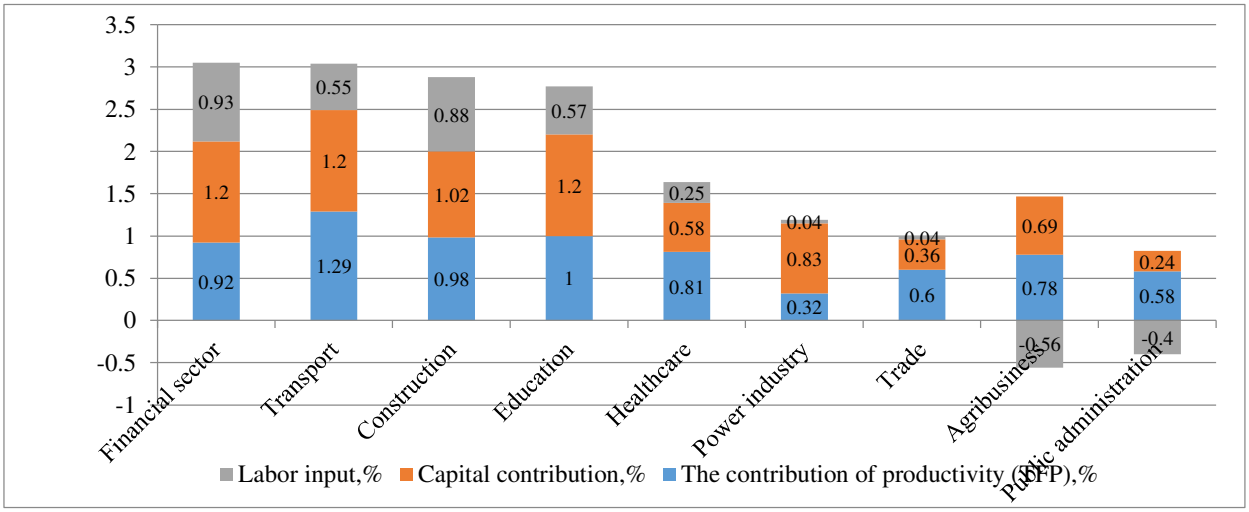

Fig.4: The average annual value of the additional contribution of the growth factors in the value-added sectors of the economy as a result of digitalization in the period 2019-2030 gg.

, Subject to the necessary levels of investment digitalization will be a key factor in economic growth. By 2030, GDP growth will be more than half related to digitization and provided not only by the development of information industry, but also by increasing the efficiency and competitiveness of other sectors of the economy. So, in general, for the period from 2017 to 2030 the contribution of the information industry in the GDP growth of almost 4% and the digitalization of the sectors of the economy - about 30%.

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Presidential Decree of May 7, 2018 № 204 "On the national objectives and strategic goals of the development of the Russian Federation for the period till 2024" set the tasks to be carried out to the government in the implementation of the national program "The digital economy of the Russian Federation."

Of the main tasks of the Russian program of the digital economy in the emerging global digital space should be highlighted:

- providing technological leadership;
- formation of a qualitatively new structure of economic assets;
- digitization of material production, services in general, the entire socio-economic, political and social life of society;
- forming digital principles economic resources;
- the formation of the domestic business community and civil public trust in the CE and the digital environment through attractiveness of institutional and regulatory frameworks and the work of state bodies, in particular structures such as multi-functional centers;
improving the welfare of the population;
- security and sovereignty of the national space CE;
- ensure the effective participation of the country in all the processes of formation of a global ecosystem of CE and global digital space, in particular, it provides for the establishment of at least 50

smart cities based on information and communication technologies (ICT) and the system of "electronic official," which should reduce the level of bureaucracy and allow go to state bodies to digital media instead of paper. The processes of digitalization and automation provide great opportunities for development. At the same time they are accompanied by certain risks. Since MK Chernyak and MM Czerniakow, in his work "Innovation risks of the digital economy" have developed a classification of risks inherent in the digital economy (Fig. 5) (MK Tcherniakov 2018).

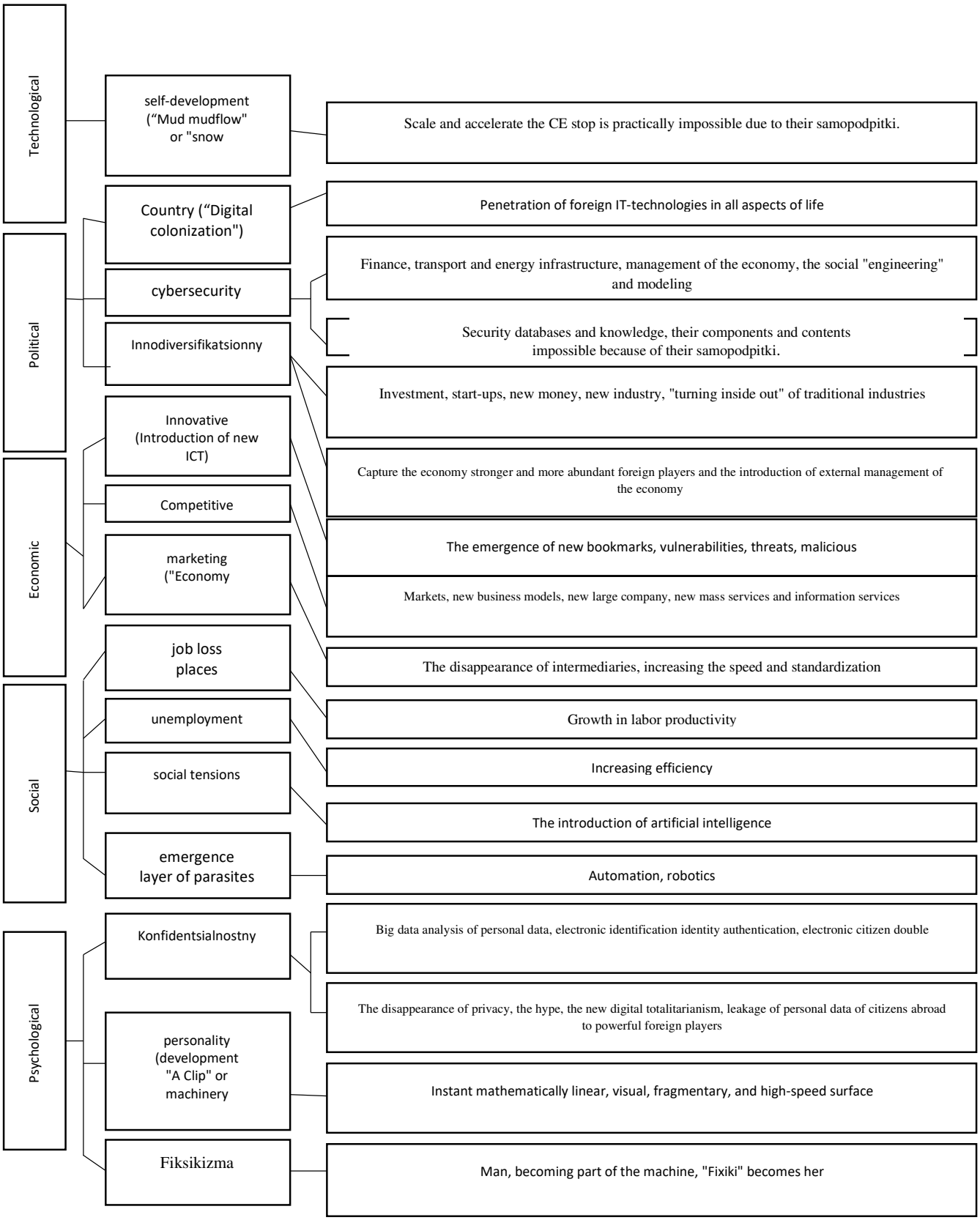

Fig.5: Classification of risks inherent in the digital economy

Risks are associated primarily with the advent of a large amount of new information and communication technologies (ICT), which are characterized by new types of vulnerabilities (vulnerability). In 99% of cases leads to the vulnerability threats.

In early 2017, a report by Global Risks Report on the global risks that pose the greatest threat to mankind for the next ten years. This fact clearly demonstrates the importance of developing new techniques, risk assessment and prevention methods at all stages of development of socio-economic systems. In addition, approaches are being developed to minimize risks should be based not only on traditional methods of preventing accidental events, but also to apply the latest advances in the study of flow processes, the theory of fuzzy sets, IT-technologies, etc.

Some of them dwell in more detail, let's start with the traditional. To select a risk management method, you first need to carry out identification, assess the likelihood and consequences of each type of risk. Only this will work out a system of measures that prevent, prevent or reduce possible damage. Usually isolated and used in practice several groups of risk management methods (exposure to risk):

1) risk aversion;
2) Dissipation (distribution);
3) hold (with subsequent risk reduction);
4) transfer risks;
5) compensation.
As an example shown organizational management risks (Table 1)

Table 1: Organizational and management risks

Kinds organizational and managerial their risk	evaluation probably STI risk	evaluation level loss	Methods of risk reduction				
			Evasion the risk	dissipation (distribution)	retention (followed by decrease risk)	Transfer of Risk	Compensation
Availability and warranty perform planagrafika performance works	low	Central	Monthly development budget plan enterprise.	Creating a matrix organizational structure	project management IPMA standards and PMBok planning schedule in the environment: ▪ Spider expert, ▪ Primavera project, ▪ microsoft project	duplication, kvorumirovanie, verification and validation phases of the project	High-precision design and business process implementation in SADT - technology (ARIS, UML, IDEF4 technologies)
Interest all participants performing planagrafika	low	Central	Duty and sense of purpose all participants perform business process scenario in strict accordance with passport workplace and process technology	Duty all participants to improve the business process scenario in strict compliance with the passport workplace and process technology	High motivation for the results achieved in the work and discipline	The motivation of the participants the project is aimed at receiving end result, not short-term profits. tough budget financial planning.	Organization of competitions and Brigade responsibility the company
Opportunity duplication organizational disruptions	low	low	The use of dual-channel enterprise management systems	A complete and comprehensive scheduling of business processes	duplication, reservation, aggregation and controlling of current administrative actions	duplication, kvorumirovanie, verification and validation stages of the	Statistical collect all information and database collection

				through the dispatch center		project team economic security	data in the analytical center
Availability kvalifitsirovannog about management staff (certification managers)	low	low	Invitation to the position of Chief Engineer of the leading specialist in the textile industry Karpov VP	System training on their own training base businesses and educational establishments of the Russian Federation	Opposition and acceptance measures for reduce the level staff turnover	Full collection of statistical information about each KPIs party business process through a global info-rmatsionnuyu network	preparation forward Group managers leading Russian universities.
Relationship with local authorities authorities	low	low	Local authorities are granted tax and customs preferences	Funding and sponsorship of local-level events	Additional financial support local budget Local events and festivals	establishment friendly relations with republican authorities authorities	Establishing pre-govornyh the Legal iCal agreements on cooperation and mutual responsibility

It is necessary to take into account the rapid development of the digital economy. With the use of innovative technologies, new communication channels, telecommunications began to change the concept of modern business: from the technological support of business processes for the provision of information services. It is because of this there is a continuous transformation of technologies and management practices. Opening perspectives create a wide field for the growth of new risks that can not be quantified, characterized by a lack of reliable information on the links between the causes of the risks and adverse consequences. The presence of hypothetical risks that hardly calculated and analyzed, as scientific knowledge in the field available. Proceeding from the above it can be stated Prof. AN Bryntsev in their work in order to minimize risks in the digital economy offers use fragmentograms method. Recall that under the fragmentograms be understood matrix relationships problematic conditions and situations (or risks), a decision which substantially modifies the original settings, because it reveals not only the level has an impact on a particular element of the system, but also helps to establish links between actors involved in the process under consideration, namely, the relationship between their behavior and its consequences. This ultimately helps to evaluate the interaction of the elements of the matrix. Accordingly, for each type of activity to build their fragmentograms, tailored. Solution to the problem of passage of fragments is reduced to search the priority issues, eliminating that significantly improves the predictability of developments in this area, as well as removed or significantly weaken other risks. This may be a root cause analysis, which are located at the bottom of the tree of the current reality, etc. (17)

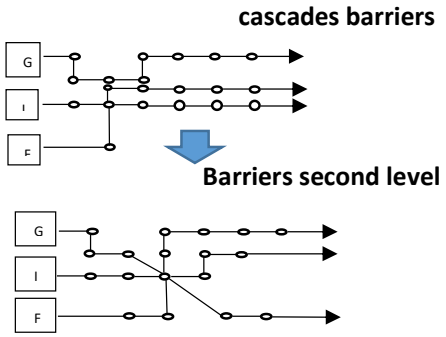

Where G- material flow, information flow I-, F- cash flow,- Ki - moiety in the stream

Thus, the main objective is to move the barriers to cascade from the second level barriers (Figure 6), i.e. reduction of uncertainty in the formation of business processes. This in turn leads to higher probability of occurrence of a scheduled event, thereby enhancing the stability of the system.

Conclusion

To summarize, it should be noted that Russia will need a lot of time to build in the key sectors of the digital economy and competitive enterprises. The first step in this direction - a large-scale application of IT technologies, taking into account the risks involved and the search for methods to minimize them.

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Mechanisms Contributing to The Development of Eco-Innovations: The Case of Moderate Innovators

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Abstract

The aim of the study is to obtain new knowledge about mechanisms contributing to the development of product eco-innovations by companies-suppliers of environmentally sound technologies in countries classified as moderate innovators. The research uses qualitative methods and it is based on multiple case-study analysis. The research results reveal that eco-innovations are developed thanks to feedback loops between companies' knowledge, technical expertise and market information (obtained from customers and competitors). The importance of these elements of the mechanism contributing to the development of eco-innovations differ, however, between types of enterprises in the countries studied (i.e. companies-suppliers of finished products and the companies supplying the products components). Component product providers place greater emphasis on tracking their competitors' moves and analysing their products, while final product suppliers focus more on customer needs and their actions to great extent depend on the exclusive expertise and experience of their executives.

Keywords: Eco-Innovation, Environmentally Sound Technologies, Product Innovation

Introduction

The activities of companies in the 21st century focus, among others, on two trends in which opportunities for development are perceived. Firstly, it is the pursuit of new knowledge and innovation (Liczmańska-Kopcewicz, Wisniewska, 2019). Secondly, it is a tendency for sustainable business development (Azzone, Noci, 1996; Bansal, Roth, 2000; Bilan, Mishchuk, Pylypchuk, 2017). For these and other reasons, companies have begun to consider both aspects - innovation and ecology (Cleff, Rennings, 1999).

The present study attempts to build on the research findings related to drivers of eco-innovations. Although important contributions to the knowledge on eco-innovations drivers have been made, there is still a research gap concerning mechanisms contributing to the development of eco-innovative products, especially in companies from countries classified as moderate innovators (European Commission, 2015, p. 10). Most of the previous literature focuses on identifying and listing eco-innovation drivers using quantitative research methods and examples of innovation leaders. Only a few present actual processes that led eco-innovations development in the companies. This paper seeks to fill this gap in the study by focusing on innovative companies-suppliers of environmentally sound technologies. It aims to discover and describe mechanisms contributing to the development of product eco-innovations using the example of companies-suppliers of environmentally sound technologies from countries classified as moderate innovators by focusing on selected case studies and addressing the following research questions:

1. What are the mechanisms contributing to the development of product eco-innovations?
2. How the mechanisms contributing to the development of product eco-innovations differ among the companies-suppliers of environmental technologies, depending on the type of technology?

This paper contributes to existing body of knowledge in several ways: it presents sector specific mechanisms contributing to the development of product eco-innovations; apart from listing the drivers of eco-innovation it describes in detail the processes that led to their development; it

concludes with the identification of model according to which product eco-innovations are developed.

The article proceeds as follows. First, the theoretical framework concerning eco-innovation and their drivers is presented. The next part of the paper is focused on research method, sample selection justification and research limitations. It is followed by the main section of the paper that presents empirical evidence of the mechanisms contributing to the development of product eco-innovations. The article ends with conclusions presenting main research findings.

Theoretical Framework: Eco-Innovations and Their Drivers

Previous studies on eco-innovations in the environmental technology sector concern, among others, the definition of the phenomenon (James, 1997; Rennings, 2000; Kemp, Pearson, 2007; Kanerva, Arundel, Kemp, 2009), its characteristics (Horbach, 2013; Díaz-García, González-Moreno, Sáez-Martínez, 2015; Díaz Lopez, Montalvo, 2015), categorizing according to the type of environmental impact (Horbach, Rammer, Rennings, 2012), diversity (Carrillo-Hermosilla, Del Río, Könnölä, 2010), drivers and determinants (Horbach, 2008; Demirel, Kesidou, 2012; Cai, Zhou, 2014; Marinescu, Ciocoiu, Cicea, 2015; Ryszko, 2017), development (Pujari, Wright, Peattie, 2003; Morand, 2008; Rashid et al., 2015), diffusion (Kemp, Volpi, 2008; Bossle, de Barcellos, Vieira, 2015) and the connection with enterprises performance (Pereira, Vence, 2012; Cheng, Yang, Sheu, 2014; Przychodzen, Przychodzen, 2015; Majerník et al., 2019).

Most of the research focused on the development and diffusion of eco-innovation is based on quantitative analysis covering all types of eco-innovative solutions (e.g. product, process, organisational, marketing) in different industries of a given country or region (Del Val Segarra-Oña, Peiró-Signes, 2013; Cuerva, Triguero-Cano, Córcoles, 2013; Frondel, Horbach, Rennings, 2008; Demirel, Kesidou, 2012; Becker, Englmann, 2005; Theyel, 2000). Much less research has focused on a particular type of innovation in the specific industry (Türpitz, 2003; Kivimaa, 2007). Comparative analyzes of countries, regions or industries are also encountered relatively rarely (Triguero, Moreno-Mondéjar, Davia, 2013).

Past research related to the topic of this article concerns mainly determinants of eco-innovation development. Two main perspectives can be applied while categorizing drivers of eco-innovations. On the one hand, environmental economics literature usually emphasizes the main role of regulation in eco-innovation development (Brunnermeier, Cohen, 2003; Rennings, 2000; Oltra, 2008; Triguero, Moreno-Mondéjar, Davia, 2013; Li, 2014). On the other, innovation literature focuses on the importance of other, non-regulatory, determinants of eco-innovations, mainly supply-side factors (for example firm specific factors, such as organizational capabilities, R&D activities, firm size) (Hart, 1995; Demirel, Kesidou, 2012; Ryszko, 2016) and demand-side factors (like societal requirements, consumer's attitude, CSR, competition) (Díaz-García, González-Moreno, Sáez-Martínez, 2015; Rehfeld, Rennings, Ziegler, 2007; Kammerer, 2009). In practice, eco-innovation is usually driven by a mixture of all factors mentioned above (Horbach, 2008; Belin, Horbach, Oltra, 2009; Cuerva, Triguero-Cano, Córcoles, 2013; Oltra, 2008; Cleff, Rennings, 1999; Rennings, 2000; Del Val Segarra-Oña, Peiró-Signes, 2013; Zuzek, 2015; Horbach, Rammer, Rennings, 2012) and it is difficult to assess, which of these factors are the most important in the development of eco-innovations. Empirical research provides various points of view on this topic. However, the trend is to conduct relevant analysis with regards to geographical region and the type of eco-innovation in order to perform relevant assessment of the importance of eco-innovation drivers (Oltra, 2008). Such approach is used in this study in order to research mechanisms contributing to the development of eco-innovations.

Research Method

The article is based on a multiple case-study approach. The detailed research procedure has been developed based on the approach proposed by Robert Yin (2014) and consisted of the following research steps: planning, design, preparation, data collection, data analysis and reporting. In the

process of data analysis, the following three techniques have been used: explanation building, chronological sequences and cross-case synthesis (Yin, 2014, pp. 147-168). The specific cases were selected using purposeful selection along with the principles of theoretical sampling and taking into account their suitability in terms of data availability, which will allow to answer research questions (Glaser, Strauss, 2006, pp. 45-78; Flick, 2011, pp. 63-64). One of the main criteria while selecting the research sample was companies' success in the development and market implementation of product eco-innovations. The time boundaries of the multiple case study have been set by the life cycle of each company.

In order to facilitate the elaboration of a detailed research plan and to identify the most valuable information from the viewpoint of the study, a brief pilot case study was conducted in May 2014 in a company from northern Italy. The company was excluded from the research sample. The results allowed to define appropriate data sources, develop preliminary interview scripts and prepare a plan of effective cooperation with companies.

Two countries have been selected for the purpose of this research - Poland and Italy. In 2015, when the research sample was selected, these countries were ranked in the Innovation Union Scoreboard, respectively, at the 2nd position, with the overall score 42 and at the 18th position, with a score of 95. Italy seems to be an appropriate point of reference for Poland for several reasons. Firstly, it is a country situated in the same group as Poland in terms of innovativeness - according to the Innovation Union Scoreboard is a group of so-called moderate innovators (European Commission, 2015, p. 10). Secondly, it is a country that according to the general rate of eco-innovation can be classified as a representative of the EU average, as it is located right next to the average value for all Member States of the European Union (Eco-Innovation Observatory, 2014b). Thirdly, on the basis of the general indicators from Eco-Innovation Scoreboard it can be concluded that Poland and Italy have similar eco-innovation activity structures, since all discussed indicators are relative to each other in the same proportion in both countries (i.e. in Italy these indicators are about twice as high as in Poland) (Table 1). This should facilitate comparative analysis.

The condition of the proportionality structure of eco-innovation indicators is also met by Sweden (all three indicators are about three times higher than in Poland). Nevertheless, it is a country with the most developed innovation system (belongs to the group of innovation leaders), representing one of the highest eco-innovation need awareness across the European Union (European Commission, 2015, p. 10; Eco-Innovation Observatory, 2014b). A detailed analysis of all the Member States, and the gap between indicators of eco-innovativeness in these countries and Poland is presented in Table 1.

Table 1: Eco-innovation indicators and the distance (relationship) between indicators of individual countries and Poland

	Indicator			**The distance between the indicators of the EU countries with regards to Poland (the rate for Poland = 100)**		
	Overall Scoreboard	**Eco-innovation outputs**	**Socio-economic outcomes**	**Overall Scoreboard**	**Eco-innovation outputs**	**Socio-economic outcomes**
UE28	100	100	100	238	185	303
Austria	106	158	64	252	293	194
Belgium	101	79	113	240	146	342
Bulgaria	38	46	22	90	85	67
Croatia	57	99	10	136	183	30
Cyprus	43	68	9	102	126	27

Czech Republic	71	22	70	169	41	212
Denmark	129	184	79	307	341	239
Estonia	72	67	51	171	124	155
Finland	138	164	127	329	304	385
France	108	71	129	257	131	391
Germany	132	164	136	314	304	412
Greece	66	127	22	157	235	67
Hungary	61	47	60	145	87	182
Ireland	95	94	28	226	174	85
Italy	95	115	77	226	213	233
Latvia	52	101	14	124	187	42
Lithuania	66	110	24	157	204	73
Luxemburg	109	121	60	260	224	182
Malta	67	43	86	160	80	261
The Netherlands	91	78	87	217	144	264
Poland	42	54	33	100	100	100
Portugal	79	69	44	188	128	133
Romania	63	82	37	150	152	112
Slovakia	47	26	18	112	48	55
Slovenia	74	99	45	176	183	136
Spain	110	125	117	262	231	355
Sweden	138	176	105	329	326	318
Great Britain	122	61	143	290	113	433

Source: Own elaboration based on Eco-Innovation Observatory 2014a, 2014b.

An additional argument to the comparative analysis of Poland and Italy is the existence of a similar structure of both economies. Both countries are dominated by micro-enterprises and small enterprises (ISTAT, 2014; GUS, 2014).

Preliminary selection of Italian companies has been made using reports and rankings of the most eco-innovative companies developed for the largest trade fair in the environmental technology sector in Italy – *Ecomondo* in Rimini 2014 (67 companies met relevance criteria). The Polish companies have been selected from a sample of 63 winners of five editions of GreenEvo - Green Technology Accelerator initiative run by the Ministry of the Environment in 2010-2014 which was aimed at selecting the best Polish environmental technologies and supporting their international transfer.

The collection of data took place in the period of December 2013 - June 2015. A variety of data collection methods have been used to capture information from various sources and built a large database of information in accordance with data triangulation principles (Table 2).

Table 2: Data sources used in the multiple case study research

Data source	Source description	Geosynthetics	Polyurethanes	Recyclers	Biomessers
Documentation	Notes	21 pages	3 pages	24 pages	18 pages
	Information brochures	16 pages	12 pages	26 pages	22 pages
	General business documentation	14 pages	64 pages	45 pages	6 pages
	E-mails	13	5	12	6
	Materials from websites	Company Website (8 tabs)	Company Website (19 tabs – available until the end of September 2015); new website of the company (4 tabs)	Company Website (16 tabs) - youtube.com channel	Company Website (6 tabs) - youtube.com channel

				- company profile on Facebook	- company profile on Facebook
	Articles in the trade press		6 pages		
Archival records	Files relating to the structure of employment	9 pages			
	Extracts from databases	26 pages		36 pages	
	Registers of organizations		647 pages		370 pages
Interviews	In-depth interviews	279min 51s	123min 17s	117min 1 s	175min 6s
	Focused interviews	11 pages		13 pages	
Direct observation	Observation of production workers at work	2 visits		1 visit	1 visit
	Observation of the production process	2 visits		1 visit	1 visit
	Observing the work of research and development employees	1 visit	1 visit	1 visit	1 visit
Photos	Pictures taken during the observation and company visits	38 photos	2 photos	3 photos	14 photos
	Photos provided by the company	4 photos	46 photos	21 photos	31 photos
Video materials	Videos provided by the company		2 videos	61 videos	14 videos

Source: Own elaboration.

Case study research method has several limitations. However, this analysis has planned for reducing these potential problems. To reduce internal validity problem explanation building and time-series analysis have been applied in the phase of data analysis (Yin, 2014, pp. 47-48). External validity has been ensured by applying analytic generalization (Yin, 2014, p. 48). In order to mitigate reliability problem, a research protocol and database were developed. To increase the construct validity, the research planning and data collection stages benefited from multiple sources of evidence, chain of evidence and key informants' opinions on the case study plan and the draft research report (Yin, 2014, pp. 46-47).

Case Evidence: Mechanisms Contributing to The Development of Eco-Innovations

Analysed companies are innovators and pioneers among environmental technology providers and can be classified as "first to the market" according to Ansoff and Stewart (Ansoff, Stewart, 1967). These companies are actively engaged in research and development, increase their employment over the years (which is at a similar level in all analysed companies), invest in both infrastructure and staff development, and constantly seek new markets. Table 3 presents basic information on the companies selected for the multiple case study analysis. In the selected sample there are two companies manufacturing environmental protection machinery, which can be used directly by users and treated as part of larger production lines (Recyclers, Biomassers). The other two companies are engaged in developing wide-ranging products that are mostly purchased by companies or persons as part of other

installations or products (Geosynthetics, Polyurethanes). Such sample selection allows to make comparisons in following two dimensions:

- between companies from different countries (Poland-Italy);
- within companies representing similar type of technology in two different countries (machines [Poland] - machines [Italy], components [Poland] - components [Italy]).

Table 3: Multiple case study analysis – sample characteristics

Case name*	Eco-innovation	Form of business organisation	Year of establishment	Number of employees (in 2013)	Turnover (in 2013)
Geosynthetics (Italy)	Geotextiles	Joint stock company	1945**	45	16 092 552 EUR
Polyurethanes (Poland)	Chemical substances used to improve energy efficiency in the building industry	Limited partnership	1995	45	10 166 068 EUR
Recyclers (Italy)	Machinery for the recovery of non-ferrous metals	Limited liability company	1980	50	9 664 340 EUR
Biomassers (Poland)	Equipment for processing biomass for energy applications	General partnership	1991	21	862 610 EUR

** Case names are not company names. The data for research has been anonymized.*
***The company was established in 1704. In 1942 because of World War II the business was closed for three years. The company resumed its business in 1945.*
Source: Own elaboration.

Mechanisms contributing to the development of product eco-innovations by companies-suppliers of environmentally sound technologies vary depending on the technology type, the age of organization, and the country of origin. In general, companies producing innovative component solutions look more closely at the market situation, than companies offering the final product. The difference can be seen particularly looking at their relations with competitors and customers. Companies developing innovative components focus on a detailed analysis of the actions taken by competitors and research products they offer. Moreover, more experienced enterprises that operate longer on the market look at competitors' product offers not only in terms of technology (analysis of technical data sheets, examining the quality of the raw materials used in the production process, specifying the suppliers of raw materials, examining samples of products) but also their financial results (cost analysis and balance sheets analysis). The fundamental difference between these types of companies in Poland and Italy is the lower maturity of the former. The Polish company was established in the 1990s, when the political system along with the economic situation in the country changed and private enterprises flourished. The Italian company can be seen as a mature business with very long traditions, roots dating back to 1704 and a continued activity since 1945. Analysis of managerial decisions taken in both companies, their turnover and employment structure allow to conclude that the processes of dealing with competitors are very similar, and the differences described above result from shorter market experience of Polish company.

Component manufacturers in both countries also have a similar approach to their customers. They constantly build their customer relationship advantage. Both companies are willing to pursue personalized orders. For the Italian company it is a priority to meet the individual needs of each client. The Polish company is more willing to adapt production to entire customer groups, preferably strategic customers.

The importance of competition is marginal for companies that aim to produce and sell final products. These companies rely primarily on the knowledge and experience of their executives and their own research and development activities to develop new solutions. They use knowledge from the supply side of the market mainly to verify a company's position. However, the demand side of the market plays an important role for these companies. Both product lines, Polish and Italian, were created and developed in the initial period inspired by customer needs and were willing to offer various product improvements for individual clients. Later, the Italian company abandoned the offering of personalized products. Nevertheless, it never stopped its constant contact with customers, and continued with extensive customer service at all stages of the transaction and comprehensive after-sales support. In the case of Polish company knowledge of customers preferences and expectations directly affects the decisions of the shareholders on trying products developments and improvements. Information from customers often directly translates into machine production, and relationships with them are maintained for a long time. Figure 1 presents main activities of companies-suppliers of environmentally sound technologies aiming to produce and sell products-components or final products.

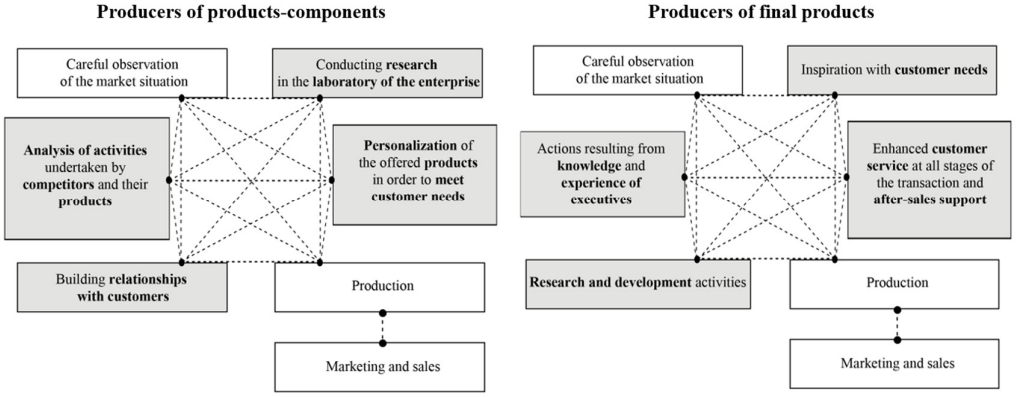

Figure 1: Main activities of companies-suppliers of environmentally sound technologies aiming to produce and sell products-components or final products

Source: Own elaboration.

The development of eco-innovative products was possible thanks to various companies' resources including in particular unique characteristics of the organization and organizational knowledge, which is a combination of general knowledge, skills, abilities and motivation along with values and economic efficiency of its exploration, development and utilization (Dosi, Faillo, Marengo, 2008, pp. 1165-1166). Based on the research results, it can be confirmed that key competences and dynamic business capabilities are important for creating eco-innovative products, especially by market pioneers. However, it is not possible to clearly identify and enumerate these characteristics in each case because they constitute tacit knowledge. Often even company owners were not able to describe them in detail, but the observation of the company allows to confirm their existence and importance. The research in each case have revealed, however, the existence of numerous sources of organizational knowledge that underlie key competences and dynamic capabilities. Companies engaged in the production of innovative machines focus on the accumulation and multiplication of knowledge in the company, mainly through research and development, cooperation of their employees (mainly those with professional skills, less often with technical), recruiting qualified staff (after college) and collecting information from customers. Companies - component suppliers in the knowledge acquisition process are more based on cooperation with outside actors (i.e. universities, research institutes) and their environment. They perform consultation with specialists or fellow

professors, participate in conferences, seminars, exhibitions and fairs, and study of various thematic expertise. All companies emphasized the importance of two key groups of scientific knowledge - technical knowledge and business knowledge in the process of product innovations development. Technical knowledge included important for each company area of science, while business knowledge was understood as a general knowledge about the market and entities operating on it, price, finance, effective decision-making, communication, management, customer service, problem solving, interdisciplinary knowledge. Figure 2 presents a detailed list of knowledge sources underlining key competences and dynamic capabilities of the companies from the sample.

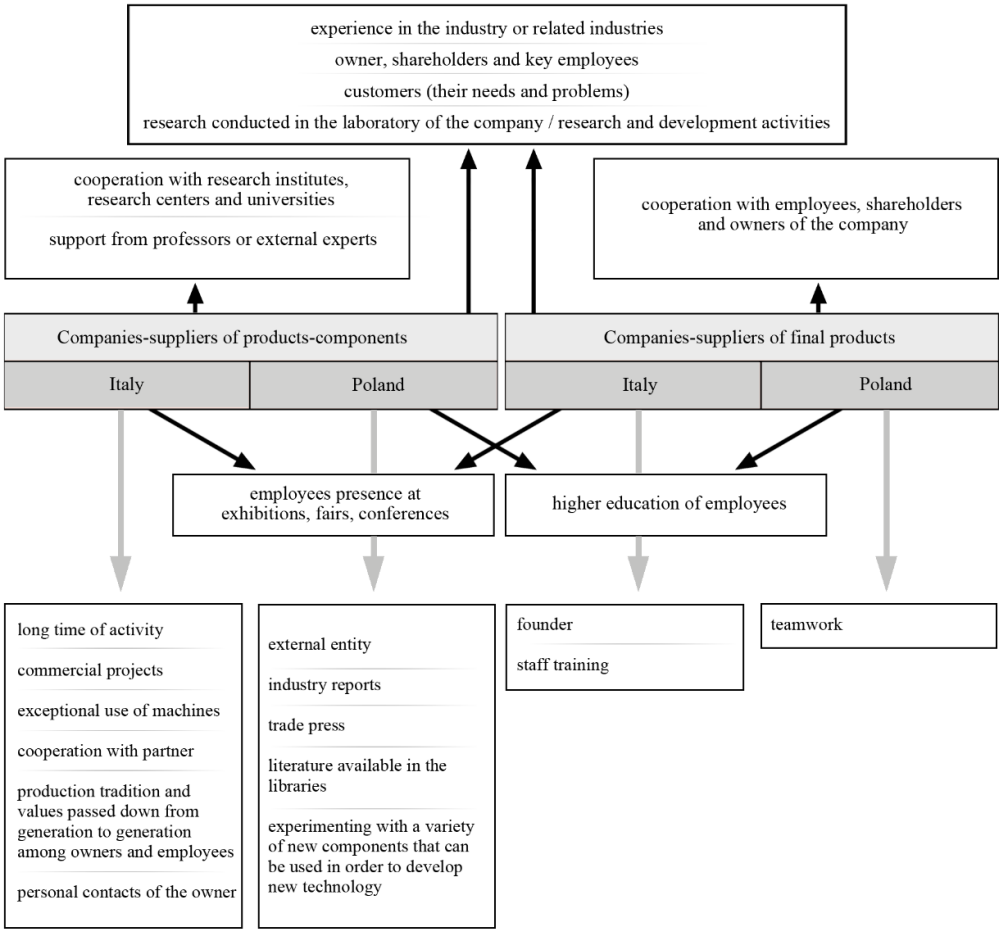

Figure 2: Sources of knowledge essential for the development of product innovations by companies-suppliers of environmentally sound technologies

Source: Own elaboration based on multiple case study analysis.

Companies-suppliers of environmentally sound technologies develop product eco-innovations according to a similar mechanism that can be explained using the interactive model of the innovation process described in the literature by Rothwell and Zegveld (1985, p. 50). The specifics of this process were slightly different in the analysed cases, but it is clear that eco-innovative products were the result of various companies' actions, acquired information and feedback loops between the technological capabilities of the company and the signals coming from its environment. This mechanism applies to both: radical and incremental innovations developed in companies over the years. Most often, the companies started with radical innovations and continued with creating products that were the evolutionary development of previously developed solutions. The exception to

this rule is the case of a company offering briquetting machines whose breakthrough product on a global scale was developed at a later stage of activity. Nevertheless, the majority of product eco-innovations created by companies-suppliers of environmentally sound technologies is incremental innovation.

Conclusions

The paper examined mechanisms contributing to the development of product eco-innovations by companies-suppliers of environmentally sound technologies. The multiple case study analysis reveals that it can described be using an interactive model defined in the literature by Rothwell and Zegveld (1985). It consists of a series of feedback loops between the technological possibilities of the company and the signals coming from the environment. Different stages of product eco-innovation development process differ, however, between types of enterprises in the countries studied (i.e. companies-suppliers of finished products and the companies supplying the products components). Component product providers place greater emphasis on tracking their competitors' moves and analysing their products, while final product suppliers focus more on customer needs and their actions to great extent depend on the exclusive expertise and experience of their executives. Nevertheless, in all analysed companies representing countries classified as moderate innovators feedback loops between knowledge, technical expertise and market information (obtained from customers and competitors) are key process in the development of eco-innovations.

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Analysis of Relationships Between Museums and Stakeholders - A Quantitative Approach

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Abstract

Simple recognition of the stakeholders' importance is a competitive advantage for a museum. Based on studies and researches issued in the last years, applying the principles of stakeholders' theory will maximize the benefits offered by them.This paper aims to study the museums' relationships with their stakeholders and the implications of their involvement in museum management. The results of a questionnaire filled in by 100 respondents from three major segments (management team, specialized staff and administrative staff) from targeted museums were evaluated by statistical methods: testing the answers' coherence and consistency by the cronbach's alpha coefficient and the analysis of four hyphoteses by chi-square, pearson's r and spearman correlation coefficients, using spss software.

Keywords: Stakeholders, Museums, Management, Statistical Methods, Correlation Coefficients

Introduction

One of the main development factors of a country is the investment in culture, largely due to the satisfaction offered to citizens who participate in such activities. When we refer to the subcategory proposed to our analysis, the museums, the international practice shows us that the majority is governed by public, central or local authorities. The public financing of museums is frequently criticized, due to the discrepancy between the economical performance, the value of the assets and the value perceived by citizens (Milone & Pizzi, 2019).

If traditionally the value of a museum is given by the assets it houses, from the economic point of view the success of a museum is measured in the profit margin. But even the value of the assets is perceived differently according to the context factors which influence their activities.

Today, museums are perceived as management institutions, but Milone & Pizzi (2019) show that their impact in society cannot be quantified only economically, because a huge part of their economical performances are tied to intangible elements (the impact in the community, reputation, localization, as well as partnerships with other entities). The real reduction in the contribution of public subsidies to museums in recent years has led to the need to invest the available resources more efficiently and to diversify the sources of funding.

According to Moreno-Mendoza & Santana-Talavera (2019) an efficient method to counteract the effects of income reduction, especially public subsidies, is a serious analysis of the museum's relations with its stakeholders, but also the perception of the museum's personnel regarding the involvement of the external stakeholders in the institution's activity.

Theoretical background

The role of museums is evolving rapidly in contemporary society. In the context of changing the visitors' needs, both social and recreational, and taking into account the technological advance, Arinze (1999) argues that museums must constantly re-evaluate their programs and improve their offer in order to be effective, relevant and to correspond to the community's demands. That is why more and more

efforts are being made to reflect the objectives and mission of the institution in the values of the community of which it is part. According to Bitsos, Tomas, Magaha & Samuelson (2019) these changes makes the specialized personnel to take a multidisciplinary approach and constantly engage in consultations with the community. Thus, the museums capacity to adapt their mission to the changing needs of the community represents, as Green (2006) admits, the key by which they ensure for a long time their performance and existence, as trustworthy cultural institutions and with prospects for the future.

According to the researchers in management, a second important element in this equation is the need to increase the attention on stakeholders, especially the external ones and their commitment to the institution in the most diverse contexts. If the activity of the internal stakeholders is easily recognizable in the planning and decision-making processes, regarding the external stakeholders, Lehtinen, Aaltonen & Rajala (2019) think that it might be crucial for the organization's performance and for surviving on a long term. All recent research on the involvement of external stakeholders advocates the benefits of their involvement.

Stakeholder theory generally deals with how partnerships with various categories of stakeholders should be managed and how to co-opt them in the decision-making process (Parmar, Freeman, Harrison, Wicks, Purnell & De Colle, 2010). The one who gave the stakeholder theory and conceptualized is, without a doubt, Freeman (1984), but an adaptation of the theory for museums was suggested by Legget (2006): individuals or organizations that have an interest or influence in the museum's ability to achieve its goals.

From Freeman to this day, a whole specialized literature has been developed on stakeholders, and on the benefits of partnerships with them, but the weak point of this literature is precisely that the debate is focused on identifying stakeholders and specific characteristics, rather than testing the implementation of the stakeholder theory, the quantification of results in the management performance of the institution and of the effective impact on the organization, such as access to resources or competitive advantages.

Even if there is a lack of strategic thinking regarding the competitive advantage offered by stakeholders, Kotler & Kotler (1998) have been showing for two decades that museums have become more and more aware of the importance of stakeholder groups (public, private or non-profit) with an active interest in museum practices and policies.

The study proposed by this research was part of a larger project (ILIE, 2019) based on museum research, on the stakeholders theory, researches and studies issued in the last decades in the field of museum organizations. A questionnaire with 20 items with Liquert scale answers and 4 segmentation items was filled by internal stakeholders of a museum (staff). The target audience was represented by museum employees from Romania: management, specialized and administrative personnel and the main purpose was to identify the perception of respondents about museum relations with stakeholders (internal and external). The main research instrument was a questionnaire, that was sent to the majority of the museums and public collections from Romania and it was filled in by 100 persons of the major 3 segments: management, specialized and administrative. The questionnaire was sent to the participants through e-mail enclosed with a letter of intent and a privacy statement.

The Distribution Of Results And Preliminary Conclusions

Regarding the distribution of the respondents, they are employed in local museums (33%), regional (36%) and national (31%) which give a good balance, a favourable representation within the study with almost equal segmentation of interest groups.

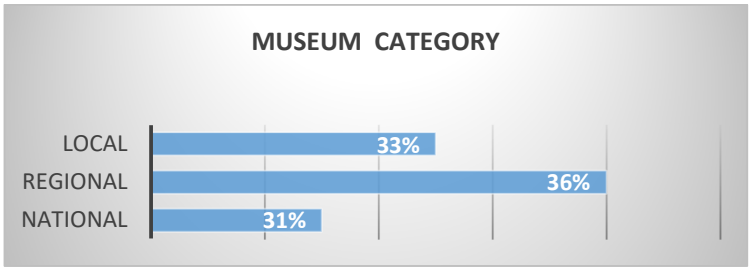

CHART 1

National museums are generally governed by the Ministry of Culture, regional ones by the county councils and local ones by town halls or entities and private persons (usually owners).

Regarding the type of financing (CHART 2) the public funding is the majority (53%), mixed (31%) and private (15%) – usually being private collections of local importance.

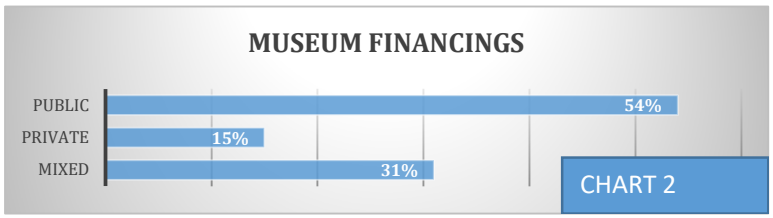

CHART 2

The results confirm the division of the museums participating in the study by the degree of importance. 15% belonging to the private area are most likely of local importance, belong and managed by founders – private persons and legal persons, monasteries, churches, various associations.

The respondents' structure is very close to a museum's internal structure: management (35%), specialized (51%) and administrative (14%) personnel. The share of specialized personnel (curators, conservators, researches, restorers) is gratifying, because this is the first segment to be actively involved in designing the museum's programmes and services.

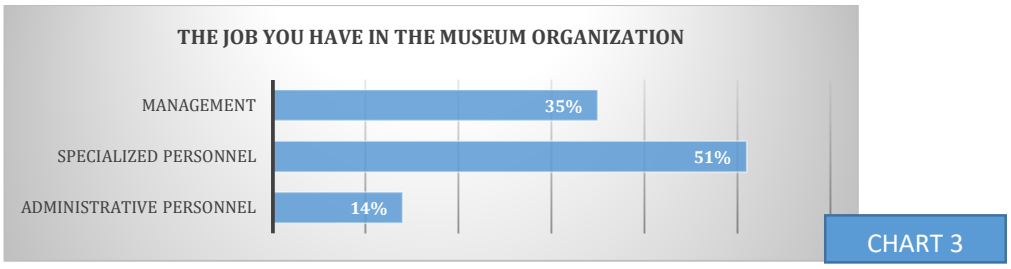

CHART 3

Regarding the accumulated service of the position we can see that the museum organization is generally a stable environment with an emphasis on personal development and with possibilities of advancement according to the professional accumulated service: over 3 years (76%), between 1-3 years (20%) and under 1 year (4%).

To exploit both, statistical methods and for a profound analysis of the study' results, four working hypotheses have been established:

HYPOTHESIS I: the function in the museum influences the opinion about the benefits brought by involving the external stakeholders in improving the activity;

HYPOTHESIS II: the accumulated service in the museum influences the perception about the benefits brought by involving the external stakeholders in improving the activity;

HYPOTHESIS III: the museum's importance influences the perception about the benefits brought by involving the external stakeholders in improving the activity;

HYPOTHESIS IV: the museum's type of financing influences the opinion about the benefits brought by involving the external stakeholders in improving the activity.

Instrumentation/ Methods of Statistical Analysis

The results were evaluated by statistical methods: testing the answers' coherence and consistency by the Cronbach's Alpha coefficient and the analysis of four hyphoteses by the Alpfa Chi-square, Pearson's R and Spearman correlation coefficients. The most appropriate technical way to perform these analyzes is the SPSS software

Cronbach's Alpha Analysis

Cronbach's Alpha Analysis is the best way to measure the internal consistency of a questionnaire when we have several items that use a Likert scale (the model: Strongly disagree to Strongly agree).

Cronbach's Alpha was run on a sample of 100 people who provided answers to the items in the questionnaire. The result shows a coefficient of **0.883**, indicating a high internal consistency of responses for the chosen scale.

Table 1: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.883	.883	20

In the table that shows the total statistic of the items used in the questionnaire the last column represents Cronbach's Alpha value if one of the items was to be erased. Removing any item, except for 3 of them would give a lower score. That is why the items should not be erased, but rather better studied (the whole table can be studied from the appendix).

Table 2: Statistics – the 3 items that needs to be better studied

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
The financing of the museum corresponds only to current needs, with insufficient funds for development	**72.09**	**123.816**	**.057**	**.294**	**.891**
A bigger share of own revenues (taxes, sales, sponsorship, branding) is the key to the sustainable development of museums	**71.86**	**121.464**	**.176**	**.227**	**.887**
Involving people outside the institution in museum management is beneficial for improving the work	**72.57**	**121.629**	**.137**	**.263**	**.889**

The **Chi-square** test is used to determine if there is a significant difference between the expected frequency and the observed frequency in the study at one or more categories. The use of the Chi-square test implies devising two hypotheses: the negative hypothesis that shows that there is no significant difference between the expected and observed frequency, while the alternative hypothesis states that they are different. The significance level, when we are sure that the difference is not due to a chance, is set to 0.05.

The **Pearson's R** coefficient is a useful descriptor of the linear association of two variables and provides access to two key properties: magnitude and direction. When the result is close to 0 there are no correlations, but when it gets closer to -1 or +1 it shows a strong correlation, negative or positive between the variables.

The **Spearman** correlation coefficient indicates the direction of the association between the independent variable and the dependent variable. If the dependent variable has the tendency to increase when the independent variable increases then the Spearman correlation coefficient is positive, otherwise the coefficient is positive. A coefficient close to **0** indicates that there is no tendency for the dependent variable to increase or decrease when the independent variable increases.

Data analysis. Results and Debates

We used the SPSS software to analize the collected data. For each one of the four hypothesis we have created a contingency table which reflects the distribution of responses on each correlation based on the chosen hypothesis.

The distribution of responses corresponding to the first hypothesis implies the creation of a double entry contingency table which allows the observed frequencies classification (Table 3).

Table 3: contingency table associated with the first hypothesis

		Involving people outside the institution in museum management is beneficial for improving the work					Total
		Total disagreement	Disagreement	No agreement, no disagreement	Agreement	Total agreement	
The job you have in the museum organization	management	5	2	13	9	6	35
	Specialized personnel	2	9	13	19	8	51
	Administrative personnel	1	1	7	5	0	14
Total		8	12	33	33	14	100

In the first table we can see that less than half (47%) of respondents agree with the benefits brought by the involvement of external stakeholders in the museum's activities. The most reluctant are: the management and administrative personnel, while the specialized personnel is the most receptive (over 50% agree).

Testing the first hypothesis with SPSS is shown in Tables 4 and 5.

Table 4: Testing the first hypothesis with chi-square test

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.049[a]	8	**.199**
Likelihood Ratio	12.993	8	.112
Linear-by-Linear Association	.000	1	.992
N of Valid Cases	100		

a. 9 cells (60.0%) have expected count less than 5. The minimum expected count is 1.12.

In this case, the value of asymptotic significance (0.199) is higher than the significance level (0.05) and the Pearson Chi-Square value (11.049) is less than the chi-square value found in the Chi-Square distribution table by degrees of freedom (15.51) in the context of 8 degrees of freedom. The null hypothesis is accepted and we can say that there is no association between the independent (the function in the museum) and the dependent (the benefits brought by involving the external stakeholders in improving the activity) variable.

Table 5: the first hypothesis tested with Pearson`s R si Spearman methods

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-.001	.096	-.009	.993[c]
Ordinal by Ordinal	Spearman Correlation	-.009	.097	-.092	.927[c]
N of Valid Cases		100			

Table 6: contingency table associated with the second hypothesis

		Involving people outside the institution in museum management is beneficial for improving the work					Total
		Total disagreement	Disagreement	No agreement, no disagreement	Agreement	Total agreement	
Accumulated service of the position	Less the 1 year	3	1	0	0	0	4
	Between 1-3 years	2	2	9	7	0	20
	Over 3 years	3	9	24	26	14	76
Total		8	12	33	33	14	100

The results of testing the first hypotheses are also validated by the Pearson's R and Spearman correlation coefficients because their values (-0.001 and -0,009) are negative, but close to 0 which shows a lack of correlation between the independent (the function in the museum) and the dependent (the benefits brought by involving the external stakeholders in improving the activity) variable.

The distribution of responses corresponding to the second hypothesis involves creating a new dual-entry contingency table, which allows the classification of the observed frequencies (Table 6).

We can see that less than half of respondents (47%) believe in the benefits brought by the involvement of foreign stakeholders: those with accumulated service of under a year 4/4 disagree, between 1 and 3 years are open to the involvement of those outside the organization (16/20) and those over 3 years, a little over 50% believe in such partnership (40/76).

Testing the second hypothesis with SPSS is shown in Tables 7 and 8.

Table 7: Testing the second hypothesis with **chi-square test**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	32.775[a]	8	.000
Likelihood Ratio	24.434	8	.002
Linear-by-Linear Association	14.240	1	.000
N of Valid Cases	100		

In this case, the value of the asymptotic significance (0.000) is inferior to the significance level (0.05) and the Pearson Chi-Square value (32.775) is higher than the chi-square value found in the Chi-Square distribution table by degrees of freedom (15.51) in the context of 8 degrees of freedom. The hypothesis is accepted and thus we can say that there is an association between the independent (the accumulated service in the museum) and the dependent (the benefits brought by involving the external stakeholders in improving the activity) variable.

Table 8: the second hypothesis tested with **Pearson`s R si Spearman methods**

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	.379	.096	4.058	.000[c]
Ordinal by Ordinal	Spearman Correlation	.295	.091	3.062	.003[c]
N of Valid Cases		100			

The results of testing the second hypothesis are also validated by the Pearson's R and Spearman correlation coefficients because their values (+0.379 and +0,295) are positive which shows a strong correlation between the independent (the accumulated service in the museum) and the dependent (the benefits brought by involving the external stakeholders in improving the activity) variable.

The distribution of responses corresponding to the third hypothesis involves creating a new double entry contingency table, which allows the classification of the observed frequencies (Table 9).

Table 9: contingency table associated with the third hypothesis

		Involving people outside the institution in museum management is beneficial for improving the work					Total
		Total disagreement	Disagreement	No agreement, no disagreement	Agreement	Total agreement	
Museum category	local	3	2	13	14	1	33
	regional	3	7	9	13	4	36
	national	2	3	11	6	9	31
Total		8	12	33	33	14	100

In this case, we see similar shares on all segments. No category exceeds 50% of positive responses. We draw the conclusion of a feeling of reluctance.

Table 10: Testing the third hypothesis with **chi-square test**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.881[a]	8	.061
Likelihood Ratio	15.282	8	.054
Linear-by-Linear Association	1.183	1	.277
N of Valid Cases	100		

The value of asymptotic significance (0.061) is higher than the significance level (0.05) and the Pearson Chi-Square value (14.881) is inferior to the chi-square value found in the Chi-Square distribution table by degrees of freedom (15.51) in the context of 8 degrees of freedom. The assumed hypothesis is null and thus, we can say that there is no association between the independent (the museum's importance)

and the dependent (the benefits brought by involving the external stakeholders in improving the activity) variable.

Table 11: the third hypothesis tested with **Pearson`s R si Spearman methods**

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	.109	.096	1.089	.279[c]
Ordinal by Ordinal	Spearman Correlation	.101	.099	1.003	.318[c]
N of Valid Cases		100			

The results of testing the third hypothesis are also validated by the Pearson's R and Spearman correlation coefficients because their values (+0.109 and +0.101) are positive, but close to 0, which shows a lack of correlation between the independent (the museum's importance) and the dependent (the benefits brought by involving the external stakeholders in improving the activity) variable.

The distribution of responses corresponding to the fourth hypothesis involves creating a new double entry contingency table, which allows the classification of the observed frequencies (Table 12).

Table 12: contingency table associated with the fourth hypothesis

		Involving people outside the institution in museum management is beneficial for improving the work					**Total**
		Total disagreement	**Disagreement**	**No agreement, no disagreement**	**Agreement**	**Total agreement**	
Tip of museum financings	**Public**	5	7	15	22	5	54
	Private	2	2	6	2	3	15
	Mixt	1	3	12	9	6	31
Total		8	12	33	33	14	100

If public and mixed-funded museums have a share of at least 50% of positive responses to the perception of the benefits of external stakeholders regarding the private segment, only 30% perceive positively, 37% are indifferent, 33% disagree. In order to understand these results we have to be aware that most of the private museums are of local importance. The partnerships with private entities are influenced especially by the museum's location and visibility. Thus, small museums or from rural areas incur difficulties in generating partnerships with persons or entities outside the museum. It is a big time consuming activity and it is impracticable for small museums which also have little personnel.

Table 13: Testing the fourth hypothesis with chi-square test

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.476[a]	8	.486
Likelihood Ratio	8.104	8	.423
Linear-by-Linear Association	.751	1	.386
N of Valid Cases	100		

In this case the values of asymptotic significance (0.486) is higher than the significance level (0.05) and the Pearson Chi-Square value (7.476) is inferior to the chi-square value in the Chi-Square distribution table by degrees of freedom (15.51) in the context of 8 degrees of freedom. The assumed hypothesis is null and thus, we can say that there is no association between the independent (the

museum's type of financing) and the dependent (the benefits brought by involving the external stakeholders in improving the activity) variable.

Table14: the fourth hypothesis tested with **Pearson`s R si Spearman methods**

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	.087	.094	.865	.389[c]
Ordinal by Ordinal	Spearman Correlation	.057	.098	.564	.574[c]
N of Valid Cases		100			

The results of testing the fourth hypothesis are also validated by the Pearson's R and Spearman correlation coefficients because their values (+0.087 and +0.057) are positive, but close to 0, which shows a lack of correlation between the independent (the museum's type of financing) and the dependent (the benefits brought by involving the external stakeholders in improving the activity) variable.

Conclusions

Most of the stakeholders are aware of their potential role in obtaining competitive advantages for the museum, in bringing more value for the community. They are also a good resource for identifying new sources of information, experience, finance. Community stakeholders (various community centers, commercial organizations, NGOs, associations) can play an important role in experience exchange regarding the partnerships with stakeholders and through the input of innovative ideas.

Even if there is a lack of strategic thinking regarding the competitive advantage offered by stakeholders, we can tell for sure that in the last two decades that museums have become more and more aware of the importance of stakeholder groups (public, private or non-profit) and the benefits of their involvement.

The results of the study led by Ilie (2019) and the testing of the four working hypotheses proposed by the present work represents a mirror of the perception of the main actors in museums, regarding the involvement of external stakeholders in the management and activity of the institution. We could see that 47% of the respondents considered the involvement of the stakeholders as a beneficial one, 33% are indifferent and 20% disagree. From the point of view of specialization the most receptive are the specialized personnel, and from the point of view of seniority only those with work experience over 3 years exceed 50% of positive answers. We also learned that if the category of the museum does not change the general perception about the benefits brought by the involvement of external stakeholders, the answers of the 3 types (local, regional and national) are positive in a proportion of almost 50%, the type of financing is a factor that shows us greater diversity. The staff from museums financed exclusively from public or mixed funds is aware of the benefits brought by the involvement of stakeholders in proportion of over 50%, while those in the private sector, look reluctantly-33% agree, 33% indifferent and 21% manifesting disagreement.

The limitation of our study is the short number of respondents and short period of analysis. Future research could fill this gap by extending the period of analysis and the number of respondents. Further more, te adoption of qualitative methods in order to understand the perception of the museum factors about the relationship with stakeholders (internal and external) will represent a useful tool to understand it.

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Appendix

Table 15: Cronbach's Alpha - Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
In the museum's relations with the institutions that finance its activities, it has autonomy over managed funds?	72.11	115.193	.438	.421	.879
The relationship between the museum and the authorities (central and local) is based on the satisfaction of the interests of both parties	72.11	113.482	.569	.592	.875
The financing of the museum corresponds only to current needs, with insufficient funds for development	**72.09**	**123.816**	**.057**	**.294**	**.891**
The museum manages to attract new sponsors each year	72.72	109.542	.588	.707	.874

The museum institution builds constructive ties with its sponsors through joint partnerships and projects that meet the mutual needs	72.43	108.742	.601	.724	.874
A bigger share of own revenues (taxes, sales, sponsorship, branding) is the key to the sustainable development of museums	**71.86**	**121.464**	**.176**	**.227**	**.887**
The notoriety of the museum depends on the social impact it has in the community	71.56	119.775	.369	.475	.881
The museum's work generates added value over the long term within the community	71.59	115.110	.540	.628	.876
The museum is an active partner of key community organizations (central or local)	71.91	112.765	.661	.613	.873
The development strategy of the museum is in line with the development strategy of the community it belongs to	72.12	112.707	.677	.676	.872
Museum employees are involved in decision-making processes	72.53	113.324	.541	.517	.876
Museum employees are involved in training activities in order to develop the necessary skills in their functions.	72.58	115.998	.411	.393	.880
The museum has partnerships with associations like `the friends of the museum`, who support the institution in its cultural, aristic, educational and recreational activities	72.33	107.665	.643	.628	.872
The rethinking of the museum's activities to improve the museum-public relationship is also based on the results of studying the behavior of visitors (current and potential)	72.04	110.823	.627	.553	.873
Besides the traditional functions: research, conservation, valorisation of heritage and education, more and more attention is paid to the recreation function is adequately covered at local and national level.	72.05	109.946	.695	.577	.871

The museum's activity is adequately publicized at local and national level.	72.31	108.648	.774	.764	.868
The museum allocates resources to promote its heritage, in order to attract foreign visitors.	72.50	109.923	.690	.648	.871
Active partnerships with other profile institutions, local, national or even international are essential for the museum	71.60	119.892	.359	.486	.881
Studying current and potential visitor behavior is required at least once a year	71.62	120.588	.310	.515	.882
Involving people outside the institution in museum management is beneficial for improving the work	**72.57**	**121.629**	**.137**	**.263**	**.889**

The State Management of Agriculture in The Transition to Innovative Reproduction

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Abstract

The article proposes the author's conceptual model of state management of agricultural development in the context of the transition to innovative reproduction. This model involves the use of the basic socio-economic law of development, aimed at increasing the share of useful cost-results and reducing the share of useless, harmful, loss of cost-results in the budget structure of social working time and free time at all levels of management.

Keywords: Agriculture, Public Administration, Conceptual Model Of Public Administration Of Agricultural Development

Introduction

The public administration is a system of interaction between the state apparatus and all participants in social production in the process of performing objective socio-economic functions aimed at ensuring a stable state and developing productive forces, consumer forces, production and superstructural relations.

The conceptual model of state management of agricultural development

In the context of the transition to an innovative method of production, the goals and content of the activities of the state apparatus undergo significant changes. The sphere of agriculture, to which the activity of the state should be directed, is no exception. In this regard, public administration in the agricultural sector is designed to provide a qualitatively new level of solving problems: food security; providing the country's population with affordable organically pure domestic food products; providing appropriate raw materials for industry; cardinal improvement of the ecology of arable and other lands, water basins and forests.

We propose the author's conceptual model of state management of agricultural development [1; 3; 4; 5; 6] in terms of innovative reproduction, consisting of 9 blocks interconnected vertically and horizontally.

Table 1: The conceptual model of state management of agricultural development in the transition to innovative reproduction

1. The innovative scientific base, an adequate theory, a system-holistic methodology, a truly humane innovative ideology and a socio-economic policy for the development of agriculture, the resettlement system, infrastructure, comfortable living conditions and livelihoods, taking into account the universal and	2. A system of objective goals, principles, criteria, stages, tasks, objective indicators of assessing vital functions at the economic level, aimed at increasing the share of useful cost-results and reducing the share of useless, harmful, loss of cost-results in the budget structure of social working time and free time , calculated in	3. The system of innovative reproduction of personnel of all categories - fundamental education, a rational worldview based on an interdisciplinary methodology, general and professional training, creativity, social, spiritual, moral, scientific, technological, environmental culture, aimed at increasing the share of useful

socio-economic laws of development humanity and society in nature, calculated in kW/h and other units of the dimension of physical quantities.	kW/h, taking into account the action of the basic socio-economic and other universal and socio-economic laws of nature and society.	cost-results and reducing the share useless, harmful, loss of cost-results in the budget structure of social working and free time.
4. The legal, information, and managerial support for the processes of innovative reproduction, taking into account the universal and socio-economic laws of human-society development in nature, aimed at increasing the share of useful cost-results and reducing the share of useless, harmful, loss of cost-results in the budget structure of a social worker time and free time by level of management.	5. The widespread introduction of breakthrough technologies of a new generation based on the use of new physical, socio-economic and other principles in materials, energy systems, production, management, information, legal and other technologies, aimed at increasing the share of useful cost-results and reducing the share of useless ones, harmful, loss of cost-results in the budget structure of social working and free time.	6. The widespread use of new physical and other principles in the organization of labor and everyday life of every person during working and free time, aimed at increasing the share of useful cost-results and reducing the share of useless, harmful, loss of cost-results, calculated in kW/h.
7. The innovative system for the development of strategic, tactical, operational development of agriculture, aimed at constantly increasing the share of useful cost-results and reducing the share of useless, harmful, loss of cost-results in the budget structure of social working time and free time of each person and society (in kW/h), based on universal monitoring of the new generation, using new physical, etc. principles, artificial and socio-economic intelligence by levels of management.	8. The innovative system of preliminary and complete accounting, control, analysis, amendments to the personal and aggregate strategic, tactical and operational activities of the employed and free population, aimed at increasing the share of useful cost-results and reducing the share of useless, harmful, loss of cost-results in the structure of their budget social working time and free time by level of management, measured in kW/h.	9. The innovative system of constant comparison of personal and aggregate strategic, tactical, operational actions with real results obtained in kW/h and other units of the physical quantity dimension, reflecting qualimetrically actual fulfillment and non-fulfillment of the time-bound activities and whose fault at each level of management.

This matrix makes it possible to obtain a three-dimensional, non-linear, three-dimensional socio-economic model that objectively reflects any actually dynamic process of social reproduction in real time and serves as the basis for an adequate imitation of socio-economic processes.

The main socio-economic law of development passes through the entire conceptual model, aimed at increasing the share of useful cost-results and reducing the share of useless, harmful, loss of cost-results in the budget structure of social working and free time at all levels of management, measured in kW/h.

In the future, this model can and should be presented in the form of a state standard-regulation for the development of rational (objective) forecasts, programs, plans.

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Evaluation of The Imperatives of Eco-Innovation in A Global Context

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Abstract

Environmental pollution and the depletion of natural resources have led governments to attach increasing importance to eco-innovation. We had to change the way we think about resource use. That is why the concept of a modern circular economy model was created, which enables economic growth while optimizing resource consumption. The article presents the definition of the concept of eco-innovation and circular economy. It also presents the management of European Union projects aimed at implementing a circular economy and eco-innovative solutions worldwide.

Keywords: Eco-Innovation, Circular Economy, Management

Introduction

The need to take measures to protect the environment and the risk of shortages of raw materials have made it necessary to pursue the objectives of sustainable economic development. To achieve this, eco-innovative measures are necessary. The introduction of a circular economy is helping to achieve this. It is designed to change the existing linear model based on the production - consumption - throw away to a loop model where waste, if any, becomes a raw material. The aim of this paper is to present the evaluation of the imperatives of eco-innovation in a global context.

The conceptualization of eco-innovation

In recent years, eco-innovation has becomes increasingly important. This is because the environment is increasingly polluted and opportunities are being sought for sustainable economic development that will contribute to growth without causing damage to the ecosystem. Taking into account the conclusions of analytical work and strategic documents of the OECD, EIO, EC can be defined as an innovation that improves the efficiency of the use of natural resources in the economy, reduces the negative impact of human activity on the environment or strengthens the economy's resistance to environmental pressures (Szpor, Śniegocki 2012, p. 3).

Eco-innovations are aimed at developing new products and processes that significantly reduce negative environmental impacts. They have to be considered from three perspectives:

- individual organisations and enterprises in the production and service sectors,
- spatial layouts (communes, cities, provinces, regions of different sizes, up to a global scale),
- consumers (individual and institutional) (Białoń (ed.) 2010, p. 25).

The definitions of eco-innovation treat the prefix “eco” as a characteristic describing an environmental advantage. Therefore, eco-innovations are considered to be innovations consisting of new processes, techniques, practices, systems and products that avoid or reduce the burden on the

environment (Ziółkowski 2008, p.3). It follows that eco-innovations are those innovations that consciously seek to reduce the environmental burden (Woźniak, Ziółkowski, 2006, p. 21, 37). They are therefore a combination of innovation (innovation, creativity, change) with environmental sensitivity and environmental awareness of the organisation. "Eco" added before the term innovation does not distort its character. The preparation and implementation of eco-innovations of different nature (product, process, technological) is still aimed at building a competitive advantage and is of an effective nature. It is important that eco-innovation is designed to help build a competitive advantage for businesses. The expected effect of the implementation of eco-innovation is an increase in environmental effectiveness, which means directly, e.g. reduction of energy intensity of production and indirectly an increase in the economic competitiveness of the enterprise (Woźniak, Ziółkowski, 2006, p. 21, 37).

Circular Economy

Price volatility, dwindling resources of raw materials and the risk of scarcity have led the world of business and politics to change their thinking about resource and energy use (Ellen McArthur Foundation 2015, p. 2). Despite the growing degradation of the environment, global economies operate on the basis of a traditional, linear model of activity. It is characterised by a strategy based on a diagram from the raw materials from which the products are made to the consumption and disposal of waste. This model does not take into account the environmental burdens generated by production and consumption processes and the natural limits of economic growth associated with the depletion of non-renewable resources, such as mineral resources or fossil fuels (Pichlak, Kruczek 2017, p. 22). This led to attention being paid to the modern model of the circular economy (CE). The essence of a circular economy is a maneuverable (non-linear) flow of materials with the simultaneous use of natural resources at the lowest possible environmental cost. The introduction of a circular economy leads to the achievement of social and economic benefits and ultimately to the construction of a system in which the economy, the environment and society are coordinated in terms of achieving sustainable development objectives (Xuan et al., 2011, Seroka-Stolka, Ociepa-Kubicka 2019). Return material flow means closing material flow loops by taking various measures, e.g. repair, reuse, recovery or recycling of materials or products, so that they can be used as inputs in subsequent production processes (Romero, Molina 2012). Closing the material flow loop is due to the design of value-added products as long as possible, thus eliminating excessive waste generation and emissions (Hobson, Lynch 2016, pp. 15-25).

There are many definitions of a circular economy. According to a report by the Ellen McArthur Foundation, "the circular economy is an industrial system that is intentionally renewable and self-healing" (Ellen McArthur Foundation 2013, p. 7). In economic terms, it is a "spiral-loop economy that minimises the flow of materials, energy and environmental degradation, without limiting economic growth or technical and social progress" (Lieder, Rashid 2016, p. 37).

A circular economy is characterised by significant transformations in the production and consumption chains, as well as the redesign of industrial systems. The basis of circular economy is to optimise the use of resources according to the 3R principle (reduce, recycle, reuse) (Xuan et al., 2011; Lieder, Rashid 2016). CE is based on a modern product concept, more efficient production and value recovery using materials. This allows a circular economy to be embedded in the sub-discipline of industrial ecology (Anderson 2007, pp. 133-140). The concept of a circular economy is currently becoming the direction of the main stream of structural changes thanks to environmental protection initiatives developed and more and more often implemented in many economies (among others in the European Union countries, the USA, China and Japan) (Hobson, Lynch 2016).

Managing the diffusion of the concept of a circular economy depends on the political, cultural and social system. In China, CE relies on the integration of closed material flow loops and industrial symbiosis into its development strategy (Hobson, Lynch 2016). Part of the CE management concept, implemented in Korea and Japan, aims to increase consumer responsibility in the use of materials and

products (Winians et al., 2017, s. 825-833). In the European Union, however, circular economy management is based on efficient waste management (Lieder, Rashid 2016).

Circular economy in European Union projects

The management of the implementation of a circular economy in the European Union countries is based on strategic projects whose task is to financially support the implementation of eco-innovative projects. One of these is Europe 2020, the EU's strategy for smart, sustainable and inclusive growth.

A very important programme is GEKON - Generator of Ecological Concepts, which is a joint initiative of the National Centre for Research and Development (NCBR) and the National Fund for Environmental Protection and Water Management (NFEP&WM). The programme co-finances scientific research, development and implementation work in the area of innovative pro-ecological technologies (http://program-gecon.pl).

European Commission's main programme "Roadmap to a Resource Efficient Europe", assumes the priority of implementing the circular economy concept to improve security of supply through better product design, sustainable management of natural resources, increased reuse, recycling and substitution of raw materials and saving resources (European Commission 2011, p. 2).

Eco-innovations are also supported by the GreenEvo project - Green Technology Accelerator. This is a project of the Ministry of the Environment, which was prepared with a view to international transfer of proven domestic environmental technologies to foreign markets (http://greenevo.gov.pl).

The largest funding for research and innovation activities for the period 2014-2020 comes from "Horizon 2020", The EU Framework Programme for Research and Innovation. The programme brings together three existing European funding initiatives for scientific development: The Seventh Framework Programme for Research and Technological Development (FP7), the European Institute of Innovation and Technology (EIT) and innovation support instruments available under the Competitiveness and Innovation Framework Programme (CIP). Eco-innovation activities will be supported under the sectoral programme "Industrial Leadership" sub-action: "Access to finance" and "Innovation in SMEs" (Janik 2014, p. 453).

The HORYZONT 2020 programme offers a new financing instrument - the Fast Track to Innovation (FTI). It is dedicated to innovations that have high potential to be implemented on the market and have a chance for success (Janik 2014, p. 453).

The European Commission allocated EUR 46.62 billion out of over 77 billion of the Horizon 2020 budget. Of the total amount spent, Poland gained almost EUR 475 million (1.12% of the budget for EU countries) and is a leader among the countries of Central and Eastern Europe, but it is still a modest result compared to the European leaders - Germany, Great Britain, France, Spain and Italy. The analysis concerns 702 competitions evaluated by the EC in the scope of signed grant agreements for the implementation of projects before 5 June 2019 (https://www.kpk.gov.pl/przeanalizuj-horyzont-2020-nowe-interaktywne-narzedzie-do-statystyk-na-stronie-kpk-pb-ue).

Important sources of funding for eco-innovation are the structural funds spent within the framework of the Intelligent Development Operational Programme (OP-IR), the Infrastructure and Environment Operational Programme (OP-I&E) and 16 Regional Operational Programmes (ROP). The Intelligent Development Operational Programme assumes support for scientific research and development works leading to innovations in environmental technologies, low carbon technologies and enabling rational management of resources. The Operational Programme Infrastructure and Environment (OP IE) also provides for financial support for eco-innovation. Eco-innovative activities will also be supported by 16 Regional Operational Programmes. These programmes will constitute a significant source of funding for the activities of SMEs, with a strong emphasis on innovative projects, including research and development (Janik 2014, p.454).

The LIFE Programme will finance eco-innovation through a sub-programme for the environment (policy area Environment and Resource Efficiency - Innovative solutions for better implementation of environmental policy and integration of environmental objectives into other sectors) and a sub-programme for climate change (policy area Climate Change Mitigation and Adaptation - Enhancing Adaptability to Climate Change) (Regulation (EU) No 1293/2013 of the European Parliament and of the Council of 11 December 2013 on the establishment of a Programme for the Environment and Climate Action (LIFE) and repealing Regulation (EC) No 614/2007 (OJ EU, L 347/185 of 20.12.2013).

In 2015. The European Commission has published "Closing the loop - An EU Action Plan for the Circular Economy", which aims to move towards a sustainable, low-carbon, resource-efficient and competitive European Union economy. The main actions presented in the plan are:

- introducing environmental standards for secondary raw materials in order to facilitate their identification and increase their market potential,
- supporting circular economic activities relating to recycling, product durability, biodegradability and reducing the presence of substances hazardous to plastics,
- take action to reduce food waste, including reducing losses in the production and supply chain, improving expiry date labelling and developing tools to achieve sustainability, i.e. halving food waste by 2030,
- improving production processes, including the inclusion of guidance on best practice in waste and resource efficiency in industrial sectors in reference documents,
- measures for the re-use of water, including a legislative proposal on minimum requirements for the re-use of waste water,
- establishing minimum requirements for Extended Producer Responsibility (European Commission 2015).

These projects aim to meet the main challenges of reducing demand for primary raw materials and energy. They also aim to remove barriers to the development of new markets, improve resource efficiency, especially in the secondary use of materials, and promote new business models to reduce energy consumption and greenhouse gas emissions (Lieder, Rashid 2016).

In 2018, EU Member States adopted legislation to make the Community a world leader in waste management and recycling. Recycling of municipal waste is to be carried out:

- 55% by 2025.
- 60% by 2030.
- 65% by 2035.

In addition, stricter rules for the calculation of the recycling rate will contribute to better monitoring of the real progress of the circular economy. On the other hand, based on the existing obligation to collect glass, paper and cardboard, metals and plastics separately, the new provisions on separate collection will contribute to better use and quality of secondary raw materials: hazardous household waste will have to be collected separately by 2022, bio-waste by 2023 and by 2025 - textile materials. In a circular economy, landfilling should not take place because it can cause water, air and soil pollution. By 2035 the amount of municipal waste to be landfilled is to be reduced to a maximum of 10% of the total amount of municipal waste generated (European Commission 2018).

In the last 20 years, EU Member States have improved their waste management performance. In 1995, an average of 64% of municipal waste was landfilled in the EU, in 2000 this figure fell to 55% and the average recycling rate was 25%. In 2016, only 24% of waste was already landfilled in the EU as a whole and the recycling rate increased to 46%. However, there are still problems and differences between EU countries. In 2016, ten EU Member States landfilled more than 50% of waste and six incinerated a minimum of 40% (Table 1).

Table 1: Municipal waste: Situation in individual European Union countries

Country	Generated municipal waste (kg per capita). Data from 2005.	Generated municipal waste (kg per capita). Data from 2016.	Share of recycling and composting. Data from 2016.	Share of landfilled waste. Data from 2016.
EU 28	515	482	47%	25%
Denmark	736	777	48%	1%
Malta	623	647	8%	92%
Cyprus	688	640	19%	81%
Germany	565	626	66%	1%
Luxembourg	672	614	48%	17%
Ireland	731	567	42%	22%
Austria	575	564	59%	3%
The Netherlands	599	520	53%	1%
France	529	510	42%	22%
Finland	478	504	42%	3%
Greece	442	497	17%	82%
Italy	546	497	51%	28%
United Kingdom	581	482 (2014)	45%	28%
Portugal	452	453 (2014)	30%	49%
Slovenia	494	449 (2015)	58%	24%
Lithuania	387	444	50%	31%
Spain	588	443	30%	57%
Sweden	477	443	49%	1%
Belgium	482	420	54%	1%
Latvia	320	410	28%	72%
Bulgaria	588	404	32%	64%
Croatia	336	403	21%	78%
Hungary	461	379	35%	51%
Estonia	433	376	32%	12%
Slovakia	273	348	23%	66%
Czech Republic	289	339	34%	50%
Poland	319	307	44%	37%
Romania	383	261	15%	80%
		Together with other waste disposal methods (such as incineration) this gives a total of 100%.		

Source: https://ec.europa.eu/eurostat/statistics-explained/index.php/Municipal_waste_statistics, https://www.europarl.europa.eu/news/en/headlines/society/20180328STO00751/eu-waste-management-infographic-with-facts-and-figures

Eco-innovation in a Global Context

An important impetus to the development of a circular economy is the challenge for the members of the United Nations to achieve the Sustainable Development Goals (SDGs) under the UN Agenda 2030. 5 of the 17 objectives concern development based on the reuse of raw materials, which is characteristic of the circular economy (https://sustainabledevelopment.un.org/sdg7).

UN members are required to implement the Sustainability Targets, based on national priorities and implementation strategies and the results achieved by the adopted indicators for each target.

Eco-innovation has the potential to lead to significant economic opportunities. But investors need a clear and credible price signal and long-term targets now to make the appropriate investment decisions for a greener future. Even with such a price, the costs of some innovations may be very high initially, and government will have to share the risk of new technologies with the private sector in some circumstances. A number of other measures are already being employed by countries to support environment-related research and development (R&D) (https://www.oecd.org/env/consumption-innovation/42957785.pdf).

The concepts of eco-innovation are increasingly adopted by industry and policy makers as a way to facilitate more radical and system-wide improvement in production processes and products and in corporate environmental performance. Eco-innovation can be understood in terms of its target, mechanism and impact. The primary focus of sustainable manufacturing and eco-innovation tends to be on technological advances for the modification and re-design of products or processes, as in conventional innovation. However, some advanced industry players have adopted complementary organisational or institutional changes such as new business models or alternative modes of provision, for example, offering product-service solutions rather than sale of physical products (https://www.oecd.org/innovation/inno/43423689.pdf).

OECD Project on Sustainable Manufacturing and Eco-innovation Advisory Expert Group recommended:

Sustainable manufacturing indicators:

- Develop a toolbox or manual to help manufacturing companies use existing indicator sets to improve their environmental performance by providing guidance and general recommendations on the use, terminology, standard processes and methodologies of indicators.
- Standardise methodologies for material flow analysis at the micro level (i.e. at the corporate or product level), as this is considered as one of the most effective tools for improving energy and resource efficiency.

  Global eco-innovation platform:
- Collect interesting examples of different levels of eco-innovation from around the world and conduct an in-depth study on processes that help achieve eco-innovation in order to draw lessons for practitioners and policy makers.
- Collect good examples of policies that promote eco-innovation and conduct an in-depth study on how they function. This can be followed by the identification of result-oriented, dynamic new-generation innovation policies that encourage industry to lead ecoinnovation efforts (https://www.oecd.org/innovation/inno/43423689.pdf).

A major problem of eco-innovation is the problem of world agriculture. The world's population has always faced food shortages. This has resulted in industrialisation, i.e. intensification, concentration and specialisation of agricultural production. However, the foundations for the success of such agriculture were laid by the use of non-renewable natural resources, which are becoming increasingly scarce. The environmental impact is loss of fertile soils, water and air pollution and loss of biodiversity. It has also resulted in social inequalities and reduced the quality of food products. Despite overproduction, the industrial model of agriculture has not solved the problem of world hunger. That's why there are now attempts to replace it. The main challenge for the coming decades is therefore to increase food supply while reducing pressure on the environment. These challenges can be presented as balancing demand and sales, ensuring the sustainability of the desired food supply, eradicating hunger, enhancing the climate and preserving biodiversity and ecosystem services while feeding the world. A fundamental transformation of agriculture is needed - moving away from the status quo towards sustainable production through environmentally sound farming practices. The transformation of agriculture is part of the so-called great transformation from the industrial era to a fundamentally new era of sustainability in all dimensions of civilization development (Buttel,

Magdoff, Foster 2000, p. 833-834). There is also a need to fundamentally change the system of agriculture based on the inputs of synthetics into an agriculture based on the properties of nature - the circulation of energy and nutrients, reintegrating agricultural and animal production. Farmers are not only supposed to maximize yields, but also to take care of the complex system of food circulation between plants, soil and soil microorganisms (Roberts 2008, p. 249). The rationale for sustainable agriculture is as follows:

- industrial agriculture is losing its spell,
- growing awareness of the limitations of the global ecosystem (biosphere),
- the growing importance of non-food goods (multifunctionality),
- to question the progress formula to date,
- food quality - health, quality of life,
- the need to increase productivity (Zegar 2012, p. 11).

The new economy must therefore take account of externalities, define the social and ethical framework necessary for sustainability and lead to economic decisions that respect fundamental natural rights.

Organic farming is also a very important issue in the problems of eco-innovation in agriculture (Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91) . The area of organic farming is growing all over the world and Poland is also among the countries with the highest growth of organic agricultural land. This trend will continue to grow in the future. Although organic farming is developing dynamically on all continents, the demand for organic food is mainly concentrated on Europe and North America. This means that organic products are transported over long distances, mainly by road and air, which significantly increases the carbon footprint of organic food production. The market for organic products is developing mainly in highly developed countries, as the prices of organic products are clearly higher than those of conventional production. In the long term, organic farming will remain a source of food supply for a larger but still limited proportion of consumers, as most of them will still be primarily price driven in their choice.

Environmental issues are a very important issue for global economies. Immediate eco-innovation measures are needed to halt climate change. Ambitious plans are therefore needed to help fulfil this task. Biomass is important in achieving climate protection and circular economy objectives. Biomass incineration is the best way to use organic agricultural and industrial waste. Biomass can be an excellent source of energy. It can be used in electricity production and for heating and transport as a biofuel.

Biomass is the oldest and most widely used renewable energy source today. It is all organic matter existing on Earth, all substances of plant or animal origin that are biodegradable. These are residues from agricultural production, forestry residues, industrial and municipal waste (Commission Regulation (EU) No 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty). It is the third most valuable natural energy source. The advantages of biomass include products made during combustion that are safer for the environment than those made from fossil fuels, because e.g. the content of harmful elements is lower. Biomass sources are distributed fairly homogeneously, reducing the need for transport. Biomass has a theoretically more favourable carbon dioxide balance than fossil fuels by absorbing part of it in the process of photosynthesis. In practice, however, the carbon balance is much less favourable than the research results due to emissions from biomass production and transport.

Biofuels, on the other hand, are fuels created from biomass processing (Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC) . They are renewable energy sources as opposed to fossil fuels. The advantage of biofuels is that the energy bound inside the biomass can be stored infinitely long without any risks. Another advantage is the reduced dependence on oil. The disadvantage is that the production and

combustion of biofuel, according to research, has a worse energy and environmental balance than the combustion of fossil fuels. This is related to the environmental degradation associated with the growing acreage of crops and high consumption of fertilizers. It is also disadvantageous to increase the cultivated area by grubbing up tropical forests. Both biofuels and biomass have their great advantages, but they must be well managed.

Currently, the economy is based on fossil fuels such as gas, oil and coal. With biomass, we can create a bioeconomy that is independent of fossil resources. The bioeconomy is a pro-ecological economy that uses biomass as well as solar and wind energy. Biomass can be used in many industries, such as paper and construction. It is also the basis for food. It can replace oil in the plastics, chemical and pharmaceutical industries. It is also used to produce heat. The use of biomass can complement other renewable energy sources, such as wind power plants, which are dependent on weather conditions. Biomass burning, on the other hand, can support countries such as Poland, where energy production is mainly fossil fuel-based, which will help transform the economy into a more eco-innovative one (http://biomasa.org.pl).

Unlike fossil fuels, biomass is a renewable energy source. The plants grow continuously, so access to them is very easy. However, it is important to remember to use biomass in a sustainable way, because although it is renewable, the amount of biomass is not unlimited.

The eco-innovation solution in a circular economy is to use municipal waste that can be used as secondary raw materials in production. The role of economic clusters, in which waste from one company is used by another in production, should also be strengthened. Emphasis should also be placed on the extended responsibility of companies, which would have to collect and manage the same waste as it produces itself, thus increasing the availability of raw materials for producers.

A form of implementation of a circular economy may also be the possibility of replacing ownership by other forms of using the products. In this case, the entrepreneur will make the products available to other entities and provide services within their scope. Rental, digitisation and sharing can also contribute to reducing waste. Repairing and improving products can also be a better way to manage waste, which will contribute to extending their life. Eco-innovative measures applied in the circular economy are a key element in building an economy that is designed to achieve sustainable development objectives.

Summary

Eco-innovative actions are necessary to achieve sustainable economic development objectives. To achieve this, a circular economy is needed that eliminates the concept of end-of-life, since the materials used to manufacture the product at the end of its life can be reused. Its advantages include independence of economic growth from limited resources, the possibility of regenerating the ecosystem, optimization of resource use, reduction of pollution emissions and development of new technologies and innovation. Therefore, there is a need to manage eco-innovation in such a way that a strategy for the development of a circular economy is introduced on the widest possible scale. This paper present strategic directions which can be used to implement eco-innovation solutions in global economy.

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Issues of Forming the Accounting and Analytical System of The Organization's Own Capital

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Abstract

Relevance. In the context of survival of the majority of companies on the market today, the accounting and analytical aspects of the formation and effectiveness of the equity of organizations are crucial in the process of making financial, economic and organizational management decisions. Research objective: forming the accounting and analytical system of the organization's own capital. Research methods: As a research toolkit, universal methods of cognition were used, such as dynamic, comparative, logical, functional, inductive and deductive, as well as specific research methods - analysis and synthesis, modeling, concretization and abstracting, grouping and others.Achieved results and significance of the research: the accounting and analytical system of equity of an economic entity and its subsystem are characterized; on the basis of the research, the concept of the accounting and analytical system of equity was developed, its elements are shown, their brief description is given.

Keywords: Own Capital, Accounting and Analytical System, Equity, Accounting, Analysis, Audit.

Introduction

Today, Russian enterprises operate in crisis conditions, exacerbated by the ongoing sanctions policies of foreign partners. Established economic relationships strongly require enterprises to use highly efficient management technologies that contribute to maintaining financial stability and solvency of economic entities, thereby ensuring their economic security. And management decisions of both tactical and strategic nature should undoubtedly be based on reliable operational information in the necessary analytical sections, formed by the accounting and analytical system of an economic entity.

The first developments of the accounting and analytical system in the economic scientific community appeared in the 90s of the last century, and since then research in this area has continued. Nevertheless, despite the many developments in this area, the issues of creating an optimal

accounting and analytical system of economic entities under conditions of uncertainty have not lost their relevance and are only becoming more severe.

Today in economic literature the accounting and analytical system of enterprises as a whole has been studied quite widely, however, the development in the field of its formation in individual areas of accounting and analytical work is clearly not enough.

The basis of this study is the formation of the accounting and analytical system of the organization's own capital, which is the potential, without which the functioning of any economic entity is impossible.

Literature Review

The research showed that in economic literature there is no single concept of accounting and analytical system as such. The views of the authors vary. So, if Thagapso M.B. (Thagapso, 2015), for example, understands this as the coverage of data processed by the accounting and analytical system, then another researcher Ivanov E.A. (Ivanov, 2014) under the accounting and analytical system sees the functions, techniques and methods of processing information of the accounting and analytical system. Gudzinsky A. D. described that as an integrated system of methods for accounting and analytical support of management through the implementation of specific internally systemic and system-wide functions "(Kchatyan, 2017).

The authors' point of view also differs as to whether the accounting and analytical system is an independent information structure, or it can be considered as a part (element) of the general accounting system of the enterprise.

The accounting and analytical system is understood as a complex of interconnected functional subsystems (elements) that provide continuous collection, systematization, processing and subsequent evaluation of information generated by accounting for analyzing the performance of an economic entity and audit, confirming the accuracy of the information provided by its accounting system for making appropriate managerial decisions (Alimov, 2009).

Opinions of authors-economists specializing in accounting and analytical and financial sciences - also sometimes differ significantly with regard to the formulation of the concept of organization's capital.

In the works of foreign researchers, capital (equity) is identified as net assets, which was the basis for the interpretation of capital in the Conceptual Framework of IFRS. Thus, J. Betge defines capital as the difference between the assets and liabilities of organization (Betge, 2000).

In the works of Scherr J.F. (Scherr, 1993) the concept of enterprise capital is formulated as the net asset value of an economic entity, i.e., the difference between the value of its assets and liabilities. Anthony R. and Rhys J. give a similar definition of the organization's capital, identifying it with the concept of net assets (Anthony, 1993).

To a greater or lesser extent, modern domestic and foreign researchers also adhere to the understanding of the essence of enterprise capital as the residual value of assets minus (covering) total liabilities.

Official definitions of equity reveal the conceptual framework of financial reporting (IFRS Conceptual Framework, 2018): "Equity is the residual share in the assets of an organization after deducting all of its liabilities", this is nothing more than the difference between total assets and total liabilities. From this, it follows, that the value of equity has a value equal to the value of net assets.

Thus, determination of equity is possible only by calculation based on a comparison of all economic resources (total assets), reduced by the amount of debt owed by the owners of the organization for

contributions to the authorized capital, and total liabilities, reduced by the amount of income for future periods.

Based on understanding of the international concept of equity, it should be noted that the provisions of Russian regulatory documents provide for a similar vision, and the procedure for calculating equity in accordance with the Order of the Ministry of Finance of the Russian Federation requires its calculation as the difference between the assets taken into account in net assets and liabilities, taken into account net assets (Order of the Ministry of Finance of the Russian Federation dated August 28, 2014 No. 84n "On approval of the procedure of net asset value". When calculating the net assets of the organization according to the balance sheet, we can conclude that their value is equal to the sum of the outcome of section III "Capital and reserves" and the indicator "deferred income" (section IV of the balance sheet "Short-term liabilities", line 1530).

It is worth noting that, based on the requirements of fundamental approaches to the disclosure of financial statements in the balance sheet, the items of assets and liabilities should, first of all, be separated on a temporary basis (less than 12 months and more than 12 months since the reporting date). It follows that a certain part of the amount of "deferred income", which will be reflected in the composition of the income of the related reporting periods more than 12 months after the reporting date, should be shown as of the reporting date in the section "Long-term liabilities". Whereas the sum of deferred income, which will be recognized as income next to the reporting date of the reporting period, should be reflected in the "Short-term liabilities" section on line 1530. This will allow to get more realistic reflection of the financial condition of the organization in the balance sheet at the reporting date, but this circumstance will not affect the calculation of net assets.

The traditional disclosure of the elements of capital and liabilities in the balance sheet gives a general idea of the expense of which financial resources the organization makes the necessary investments in assets.

Materials and Method

In the course of the research, normative acts and regulations on accounting and reporting, as well as the works of domestic and foreign scientists on a given topic, were critically comprehended. As research tools, universal methods of cognition were used, such as dynamic, comparative, logical, functional, inductive and deductive, as well as specific research methods - analysis and synthesis, modeling, concretization and abstraction, grouping and others.

Results

Accounting and analytical and evaluative issues of the formation and efficiency of use of equity are crucial in the process of making financial, economic and organizational managerial decisions (Plaskova, 2019).

Equity is the most important essential part of economic entity functioning, due to the fact that it is the main source of property formation of the latter, that is, this is the potential without which the functioning of the enterprise is impossible, as well as its further development. The financial well-being of an economic entity, its solvency and financial condition, therefore, economic security, depend on the state of its own capital, therefore, the study of the accounting and analytical system of the company's own capital is of indisputable importance today.

We present the accounting and analytical system of the economic entity's own capital as one of the components of its management system that combines accounting and analytical operations related to the formation and use of its own capital. Based on reliable credentials, the system provides ample opportunities in terms of timely and comprehensive analysis of the efficiency of use (including factor analysis) of the organization's equity.

It is advisable to start the organization of the accounting and analytical system of own capital with the development of its basic concept (Fig. 1).

The main component in the accounting and analytical system of equity formation is precisely the accounting subsystem, the basis of which is the primary information accumulated by all types of accounting carried out at the enterprise - financial, managerial, tax. The primary information carriers are unified or independently developed primary documents at the enterprise.

The accounting subsystem provides the collection, accumulation, classification and generalization of the necessary information for analysis and audit of the formation and effectiveness of the use of equity of an economic entity.

Exactly based on primary documents, synthetic and analytical accounting of the equity of an economic entity is carried out. In the future, all the data of synthetic and analytical accounting are summarized in its registers, that forms a consolidated accounting of equity, which, in turn, is the information basis for the formation of enterprise reporting, which, on the one hand, acts outgoing in the accounting subsystem, and on the other hand, incoming information in the analytical subsystem of the enterprise (Vandina, 2015).

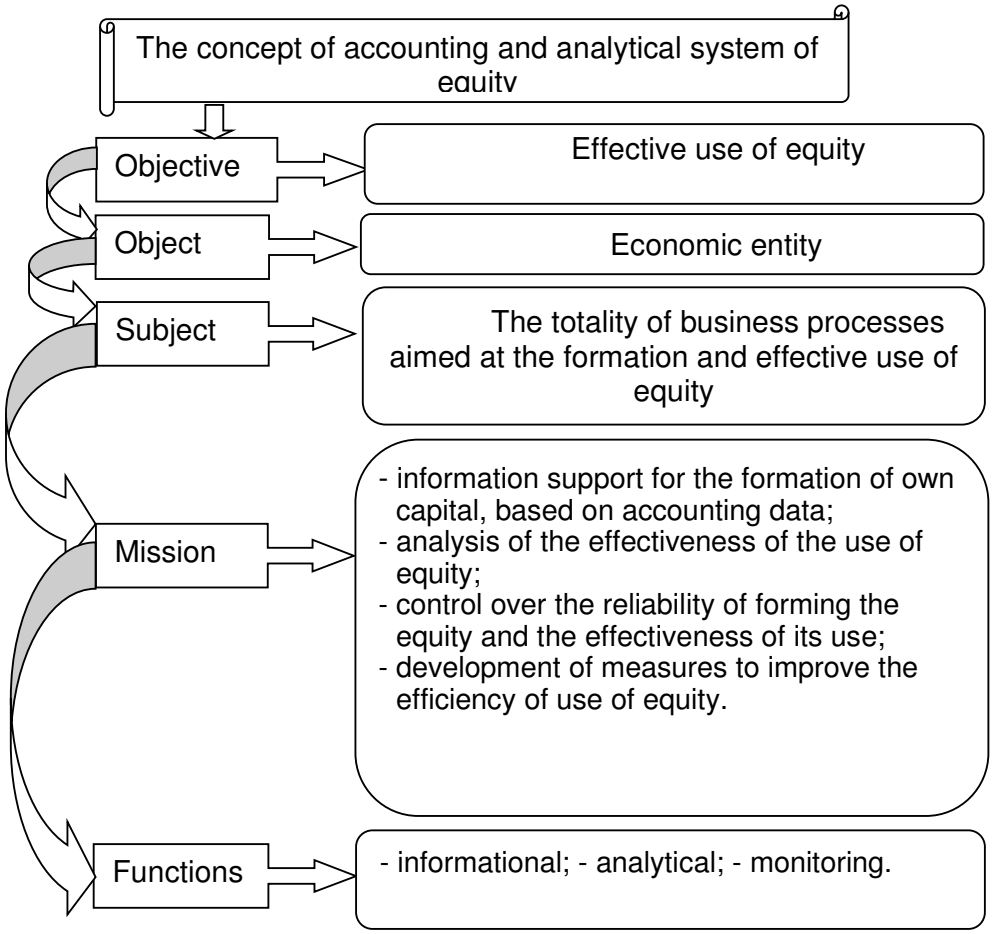

Fig. 1: The concept of accounting and analytical system of equity of the enterprise
(Compiled by the authors)

All elements of the accounting and analytical system for the formation and use of equity (Fig. 2) have different goals, objectives, objects, methods and are intended for different users of information.

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The accounting subsystem provides the collection, accumulation, classification and generalization of the necessary information for analysis and audit of the formation and effectiveness of the use of equity of an economic entity (Fedotova et al., 2018).

Exactly based on primary documents, synthetic and analytical accounting of the equity of an economic entity is carried out. In the future, all the data of synthetic and analytical accounting are summarized in its registers, that forms a consolidated accounting of equity, which, in turn, is the information basis for the formation of enterprise reporting, which, on the one hand, acts outgoing in the accounting subsystem, and on the other hand, incoming information in the analytical subsystem of the enterprise (Vandina, 2015).

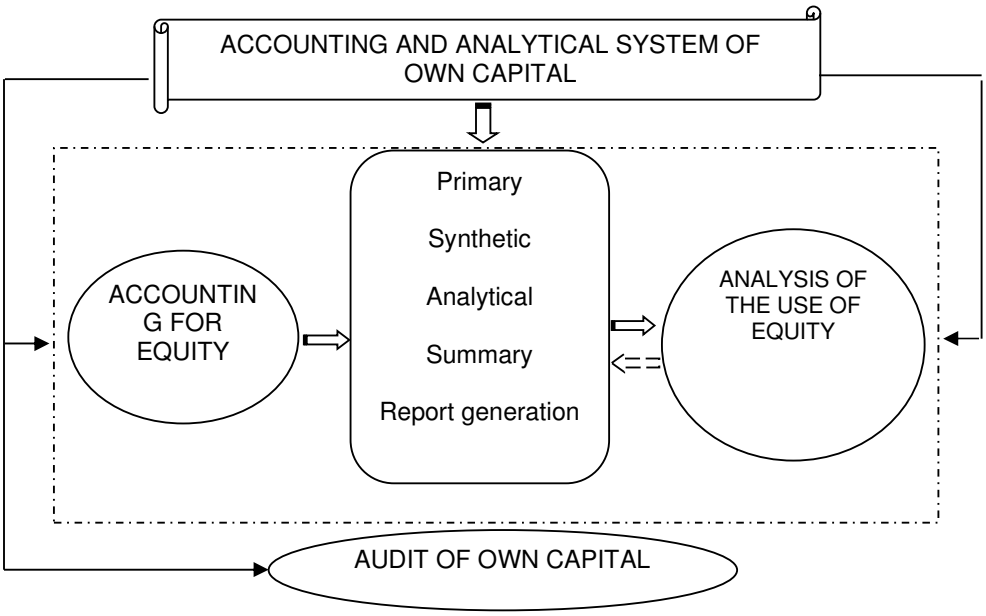

Fig. 2: Elements of the accounting and analytical system for forming the equity of economic entities*

(Compiled by the authors)

The analytical subsystem of the accounting and analytical system of equity is designed to determine the level of efficiency of its use, due to the fact that equity is the basis of any economic entity A sufficient amount of the company's own capital provides it with financial stability, a certain margin of financial strength necessary to ensure its economic security, as investors are more willing to invest their funds in those enterprises where the share of equity is quite high. Therefore, the economic entity is obliged to conduct an analysis of the efficiency of using its own capital, following which managerial decisions are made to maintain the amount of equity at a sufficient level and, if necessary, take measures to increase it (Butkova, 2018).

The audit of equity in the accounting and analytical system performs a control function, since during the audit, the legitimacy of the formation and change in the value of equity, as well as the accuracy of the reporting of all operations related to the formation and use of the equity of the enterprise, is checked (Bexultanov et al., 2018).

Moreover, at present, enterprises need to pay close attention to the organization and constant implementation of internal control over the formation and use of their own capital due to the fact that a quality audit allows not only to avoid errors in the formation of equity, to eliminate its inefficient use, but also to level out the differences of the economic entity with its shareholders.

Conclusion

Optimally built accounting and analytical system of equity opens up real opportunities in terms of optimizing and increasing the efficiency of using the equity of an economic entity. Today, it is the main and most reliable information source of the management system, which enables to minimize the risk of uncertainty when making management decisions. At the same time, the unity, interconnection and interdependence of all the components of subsystems of the accounting and analytical system allows not only to make the necessary tactical decisions timely, but also to develop strategies for the development of the organization for the future.

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Extending Sustainable Business Model Archetypes with a Stakeholder Value Creation Perspective

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Abstract

This conceptual paper aims to extend sustainable business model archetypes developed by Bocken et al (2014) by incorporating a stakeholder value creation perspective suggested by Freudenreich et al (2019) and holistic sustainability orientation recommend by Elkington (1998). Among eight archetypes, only two sustainable business models, adopting a stewardship and developing scale up solutions, embrace a triple bottom line approach and aim at creating value with and for a wide range of stakeholders. In addition, meeting the needs of shareholders is a common characteristic of all almost all archetypes, excluding repurposing for society/environment. Sustainable business models focusing on material-energy efficiency, renewable energy sources and sustainable production-consumption engage with value delivery network actors to create value. In line with triple bottom line approach, only four of the archetypes integrate economic, environmental, and social benefits for sustainable development.

Keywords: Sustainable business models, triple bottom line approach, stakeholder theory, value creation

Introduction

Corporations around the world are trying to meet a new demand; integrating sustainability principles to their key strategies, decisions, and operations to achieve sustainable development. According to the WCED (1987: 43), sustainable development is the "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". In other words, organizations are being called upon to take responsibility for their operations' impacts on the natural environment and society, and thus, apply sustainability principles to the ways in which they conduct their businesses. Triple bottom line approach emphasizes the integration and reconciliation of environmental, social and economic concerns into business decisions Elkington (1998). It is also argued that stakeholder orientation is a precondition for sustainability (Zink, 2005). Firms should not only create value for a wide range of stakeholders but also support stakeholders to actively participate in the value creation process of the sustainability-oriented business models (Freudenreich et al., 2019). Therefore, this conceptual paper aims to extend sustainable business model archetypes developed by Bocken et al (2014) by incorporating a stakeholder value creation perspective suggested by Freudenreich et al (2019) and holistic sustainability orientation recommend by Elkington (1998).

Corporate Sustainability from a Stakeholder Perspective

Bowen, known as the Father of corporate social responsibility (CSR), provided the initial definition as "the obligations of businessmen to pursue those policies, to make those decisions, or to follow those lines of action which are desirable in terms of the objectives and values of our society" (1953: 6). CSR definitions proliferated during the 1970s and began to include a stakeholder approach (Carroll, 1999). As one of the most notable contributors of the period, Johnson (1971: 50) stated that "a socially responsible firm is one whose managerial staff balances a multiplicity of interests. Instead of striving only for larger profits for its stockholders, a responsible enterprise also considers

employees, suppliers, dealers, local communities, and the nation". In the 1990s, the CSR concept transitioned significantly to stakeholder theory as an alternative theme (Carroll, 1999). Although corporate social responsibility (CSR) and CS both aim to balance economic goals with social and environmental responsibilities, and have similar conceptualizations, they differ depending on the nature of the relationships among sustainability dimensions (Montiel, 2008). CS concept embraces a triple bottom line approach and argues that the economic, social, and environmental dimensions are interconnected, complementary (Bansal, 2005; Branco and Rodrigues, 2006; Dyllick and Hockerts, 2002; Elkington, 1998), whereas CSR treats social responsibility and economic performance as independent factors (Montiel, 2008). CS describes a nested system that recognizes that the economy is part of society, which in turn is part of the larger ecological system. Triple bottom line conceptualization of CS argues that to achieve sustainable development, environmental integrity, economic prosperity, and social equity principles must be integrated (Elkington, 1998). As a result, organizations must apply all these principles to their products, policies, and practices to achieve sustainable development at corporate level (Bansal, 2005). Regarding CS, there is no commonly agreed definition (Rego, Cunha, and Polónia, 2017; Montiel and Delgado-Ceballos, 2014) and measurement in the literature (Montiel and Delgado-Ceballos, 2014). From a business level perspective, each organization should choose its own specific ambition and approach regarding corporate sustainability (CS) depending on organizational aims and strategies and operating situations (Van Marrewijk, 2003).

Stakeholder theory is one of the main theories used in the literature to explain CS strategies and behaviors (Montiel and Delgado-Ceballos, 2014). Stakeholder theory embraces a managerial perspective and articulates two important issues; understanding the shared sense of the value the firm creates and the responsibilities of the firm has to stakeholders (Freeman, 1994). The word stakeholder first appeared in the management literature in an international memorandum at the Stanford Research Institute (Freeman, 1984). Freeman (1984) initiated a broader discussion in his book Strategic Management as a Stakeholder Approach. Freeman (1984: 5) defines a stakeholder as "any group or individual who can affect or is affected by the achievement of the firm's objectives". Market stakeholders, also called primary, engage in economic transactions with the firm, including shareholders, creditors, employees, suppliers, wholesalers, distributors, and customers (Zu, 2009). On the contrary, non-market stakeholders do not engage in direct economic exchange with the firm, including communities, public, governments, media, activist groups, business support groups (Zu, 2009). Firms should meet the needs of all stakeholders without compromising their ability to meet the needs of future stakeholders (Dyllick and Hockerts, 2002). However, different stakeholder groups often have distinct set of expectations, needs, interests and objectives that often conflict with each other (Neville and Menguc 2006; Polonsky, 1995; Sen et al., 2006). For example, occupational health and safety or employment equity and distinction are important issues of concern to employee stakeholder group, whereas product safety and truth in advertising are of concern for all corporations in managing their relations with customers. Incorporating corporate sustainability requires firms to develop a broader range of stakeholder relationships and meet these conflicting demands (Amini and Bienstock 2014; Clarkson, 1995; Dyllick and Hockerts, 2002; Mitchell et al., 2010). However, given the limited organizational resources, it is clear that not all stakeholder issues can be addressed (Maignan and Ferrell, 2005). Companies need to first identify the relevant stakeholder groups, then determine the stake and importance of each group, and then discuss how well their expectations/needs are met and finally modify corporate policies and priorities accordingly (Freeman, 1984). For instance, economically sustainable companies target shareholders and creditors, ecologically sustainable companies focus on the environment, and socially sustainable companies add value to the communities within which they operate. It is also argued that sustainability problems can be solved only together with stakeholders (Freudenreich et al., 2019).

Sustainable Business Models from a Stakeholder Perspective

Sustainable business models (SBMs) do not only incorporate a triple bottom line approach but also consider a wider set of stakeholders (Bocken, at al. 2014). By SBMs, firms can create competitive advantage, capture economic value for itself, and deliver social and environmental benefits (Boons and Lüdeke-Freund, 2013; Lüdeke-Freund, 2010). Bocken et al (2014) propose three SBM types (technological, social, and organizational) based on the innovation-focused categorization of Boons and Lüdeke-Freund (2013) (see Table X). Technological innovation oriented SBMs focus on maximizing material productivity and energy efficiency (MMPEE) (e.g., lean manufacturing and de-materialisation), creating value from waste (CVW) (e.g., industrial symbiosis and cradle-2-cradle), and substituting non-renewable resources and current production systems with renewables and natural processes (SRNP) (e.g., solar and wind-power based energy production). Socially SBMs emphasize delivering functionality rather than ownership of products (DFO) (e.g., rental, lease and shared products-car sharing, maintenance contracts and extended warranties and pay-per-use services), engaging with all stakeholders to develop and sustain long-term health and well-being of their value networks (ASR) (e.g., upstream and downstream stewardship) and encouraging sufficiency by promoting sustainable consumption (ES) (e.g., second-hand markets and frugal business models) . SBMs with an organizational innovation focus are more about delivering of social (RSE) (e.g., social enterprises) and environmental benefits rather than economic profit and providing sustainable solutions at a large scale (DSCS) (e.g., franchising, and collaborative business models). Freudenreich et al (2019) argue that the concept and analysis of value creation through sustainable business models need to be expanded regarding different types of value created with and for different stakeholders. It is also claimed that sustainable business model archetypes developed by Bocken et al (2014) lacks stakeholders' contributions to value creation processes. This conveys the need for extending the current model. Table 1 presents an extended framework by integrating value creation process with and for stakeholders and main sustainability benefits provided. Among eight archetypes, only two sustainable business models, ASR and DSS, aim at creating value with and for a wide range of stakeholders by providing benefits related to all dimensions of sustainability. In addition, meeting the needs of shareholders is a common characteristic of all archetypes, excluding RSE model. Regarding value co-creation approach, beside ASR and DSS archetypes, RSE model creates value with a wide range of stakeholders. In addition, MMPEE, SRNP and ES sustainable business models engage with value delivery network actors to create value. In line with CS triple bottom line approach, only four archetypes, DFO, ASR, ES and DSUS, integrate economic, environmental, and social benefits for sustainable development.

Table 1: The Extended Sustainable Business Model Archetypes

SBM Archetype	DSS	RSE	ES	ASR
Definition	Deliver sustainable business model solutions at a large scale to maximise benefits for society and the environment.	Prioritize delivery of social and environmental benefits rather than economic profit through close integration between the firm and local communities and other stakeholder groups.	Offer solutions that actively seek to reduce consumption and production.	Engage proactively with all stakeholders to ensure their long-term health and well-being.
Sustainability Benefit Examples	***Economic***: generate revenue from a variable (e.g., franchising or licensing) or fixed fee (e.g., mergers and acquisitions) paid for scaling up a solution. ***Environmental***: contribute environmental sustainability on a global level . ***Social:*** support local, small and innovative business to go to scale through, such as, franchising, licensing and collaborative models, and change consumption patterns.	***Environmental***: regenerate flora and fauna, offer societal benefits at a low environmental cost. ***Social:*** deliver nutrition, health and education to low-income markets, while being embedded in community and employment rich.	***Economic:*** increase profitability (premium pricing), customer loyalty, and market share from provision of better products (longer lasting, durable). ***Environmental***: reduce resource consumption and environmental impact through using less product (longer lasting, durable goods) and reusing products across generations (second-hand goods). ***Social:*** provide higher quality, longer lasting, durable, less energy consuming products, support a more sustainable lifestyle, provide products and services to low-income markets by eliminating superfluous or over complex functionality and features.	***Economic***: generate revenue and brand value from premium pricing of certificated products. ***Environmental***: protect environmental resource and bio-diversity and minimize chemical fertilizers and water consumption. ***Social:*** offer energy efficient and environmentally friendly products and ensure long-term health and well-being of stakeholders.
Value created with stakeholders	All	All	Suppliers Retailers Customers	All
Value created for stakeholders	All	Employee Communities General public	Shareholders Customers General public	All

SBM Archetype	DFO	SRNP	CVW	MMPEE
Definition	Provide services that satisfy users' needs without having to own physical products.	Reduce environmental impacts and increase business resilience by addressing resource constraints ' limits to growth' associated with non-renewable resources and current production systems	Eliminate waste by turning waste streams into useful and valuable input to other production and making better use of under-utilized capacity.	Do more with fewer resources, generating less waste, emissions, and pollution.
Sustainability Benefit Examples	Economic: generate revenue from the ownership of assets and service for upgrading and repairing. Environmental: reduce resource consumption through enhanced product longevity and durability and reuse of materials. Social: educate consumers to shift away from ownership and enable access to previously not affordable products by paying for the use of the service not for ownership of the products.	Economic: generate revenue through new nature-inspired innovations in products and services. Environmental: reduce use of non-renewable resources, emissions associated with burning fossil fuels, and synthetic waste to landfill.	Economic: reduce costs through reusing material and turning waste into value. Environmental: reduce footprint, waste and virgin materials use.	Economic: reduce costs, generate price reductions and profits through maximized material productivity and resource efficiency. Environmental: reduce resource consumption, waste and supply chain emissions through product and production process redesign.
Value created with stakeholders		Suppliers Retailers Wholesalers Distributors		Suppliers Retailers Wholesalers Distributors
Value created for stakeholders	Shareholders Customers	Shareholders	Shareholders	Shareholders

Source: Adapted from Bocken, at al. 2014

Conclusion

This conceptual paper demonstrate that only limited number of sustainable business model types incorporate a triple bottom line approach and consider a wide range of stakeholder interests, namely ASR and DSS. However, business strategies, policies and practices need to create economic, social and environmental value with and for a wide range of stakeholders to achieve sustainability. Drawing on the sustainable business model framework of Bocken et al (2004), future studies can reveal how companies integrate different stakeholder issues in value creation and delivery process in developing sustainable solutions. In addition, management of stakeholder relationship is a promising research venue (Freudenreich et al., 2019).

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The Use of Multivariate Comparative Analysis to Assess the Financial Condition of a Company

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Abstract

Motivation: Many methodological problems are associated with measuring and assessment of the company's financial standing. Various methods have been developed to assess the current and future financial standing of enterprises. Their usefulness requires development and verification based on the example of a specific enterprise. The evaluation of one of these methods is the subject of this article.
Aim: The major research objective of the study is to propose a synthetic method of assessing the condition of a company and verify its correctness based on data referring to a deliberately selected listed company. **Results:** This article shows that a synthetic measure constructed on the basis of selected financial indicators allows for a comprehensive assessment of the company's financial condition in dynamic terms. The constructed synthetic measure can also be used for a comparative analysis of the financial condition of companies over a given period of time.

Keywords: Financial Condition, Complex Phenomenon, Synthetic Measure, Zero Unitarization Method (ZUM)

JEL: C32, C51, C53

Introduction

The assessment of the company's financial condition is a crucial instrument of company management. It should be used by the company's management to make short and long-term decisions in the field of corporate finance, including the control of the course of economic processes relative to the assumptions adopted (Bień, 2008, p. 81). Financial analysis makes it possible to assess the company's financial standing, its liquidity, threat of bankruptcy and the perception of the company's condition and potential by investors and contractors. The basic instruments of financial analysis are liquidity, debt, operational efficiency and profitability ratios. The above groups of indicators, allowing the assessment of the picture of the effects of a company's activities recorded in its financial statements (*i.e.*, balance sheet, profit and loss account, cash flow statement) can be used to construct various methods and models for assessing the company's financial condition (Altman, 1968; Altman *et al.*, 1977; Hadasik, 1998; Sharma, 2001; Nam & Jinn, 2000; Kitkowski 2013; Yang & Dimitrov, 2017; Chatterjee, 2018; Haider, Ou & Pettit, 2019). These models and methods are generally based on both microeconomic data derived from the entity's financial statements and macroeconomic data describing processes in the economy (Acosta-González, Fernández-Rodríguez & Ganga, 2019; Fernández-Gámez *et al.*, 2019).

The financial situation of an enterprise is essentially a complex phenomenon, *i.e.*, a multidimensional construct described by many different characteristics. Complex phenomena are the subject of multidimensional comparative analysis (MCA) research, also referred to statistical comparative analysis (SCA) or multidimensional statistical analysis (MSA).

As Kukuła (2000, p. 7) reports, complex phenomena are those phenomena that described by at least two characteristics that can have different titers and different orders of magnitude. Multidimensional methods are used to analyse this type of phenomena, which are commonly used by researchers in many fields, such as, for instance, economic sciences, tourism, medicine, demography (Kukuła, 2000, p. 22-32).

The company's financial condition seen as a multidimensional construct is a typical example of a complex phenomenon. This means that in order to properly and reliably assess it, many aspects of the entity's functioning must be taken into account. The subject literature emphasizes that there are many methods for assessing the economic and financial situation of a company. These methods include, among others, discriminant analysis, logit or probit analysis, artificial neural networks, survival analysis (Łapińska *et al.*, 2018; Zdunek-Rosa & Huterska, 2018; Hasanaj & Kuqi, 2019). In this context, a properly constructed synthetic measure can also be a useful tool for analysing and assessing a company's financial condition.

This article presents a method of assessing the financial condition of a company using a synthetic measure. This measure is based on a multidimensional assessment that uses key financial indicators that reflect areas of analysis such as profitability, debt, liquidity, and efficiency.

The major objective of the work is to propose a synthetic method of assessing the condition of the company and verify its correctness on based on data characterising a deliberately selected listed company.

Materials and methods

Index analysis and one of the methods of multivariate comparative analysis (MCA) were applied in this article to assess the financial condition of a selected company and a synthetic measure was constructed.

In order to illustrate the essence of the synthetic measure constructed by the authors, the financial indicators describing the financial situation of one of the largest Polish companies operating in the chemical industry - CIECH S.A. were used. This company was selected for analysis deliberately, since in recent years it has been marked by significant fluctuations in its financial situation, which was reflected also in stock market listings and assessments of brokerage house analysts. The company's financial data covering the period from the second quarter of 2008 to the third quarter of 2019 (a total of 46 quarterly data) was used. The data comes from the website www.biznesradar.pl.

The construction of the synthetic measure of the financial condition assessment basically consists of three stages (Marcinkowska, 2007, p. 586):

1. selection of assessment criteria and partial measures,
2. bringing partial measures to comparable quantities,
3. synthetic measure design.

The synthetic meter construction procedure is determined by many factors. It depends on the nature of diagnostic variables (*i.e.*, variables selected for evaluation of the phenomenon under study - in the case under study – the ratios), the scale of their measurement, standardization procedure, weight system and formula for aggregating these variables (Panek, 2009). If diagnostic variables are expressed in different units of measure and/or have different numerical ranges, then they should be transformed to obtain variables without titles and unified as to the range of values they can take. The subject literature (Panek, 2009; Walesiak, 2014) points to numerous methods of normalizing diagnostic variables.

One of these methods is the zeroed unitarisation method, which allows normalization of diagnostic variables based on trait range testing. This method meets all the postulates for standardization procedures for diagnostic variables (Kukuła, 2000, p. 81). Variable values obtained as a result of its application are contained in the range [0;1].

Depending on the nature of the diagnostic variable, standardization is done using the following formulas:

a) for stimulants, *i.e.*, diagnostic variables whose increase in value causes an increase in the assessment of a complex phenomenon:

$$z_{ij} = \frac{x_{ij} - \min_i x_{ij}}{\max_i x_{ij} - \min_i x_{ij}}, \quad [1]$$

b) for destimulants, *i.e.*, diagnostic variables whose increase in value causes a decrease in the assessment of a complex phenomenon:

$$z_{ij} = \frac{\max_i x_{ij} - x_{ij}}{\max_i x_{ij} - \min_i x_{ij}}, \quad [2]$$

c) for nominatives, *i.e.*, diagnostic variables that have a specific value, which is most favourable, from the point of view of assessing a complex phenomenon, called the nominal value:

$$z_{ij} = \begin{cases} \frac{x_{ij} - \min_i x_{ij}}{c_{0j} - \min_i x_{ij}} & dla\ x_{ij} < c_{0j} \\ 1 & dla\ x_{ij} = c_{0j} \\ \frac{\max_i x_{ij} - x_{ij}}{\max_i x_{ij} - c_{0j}} & dla\ x_{ij} > c_{0j} \end{cases} \quad [3]$$

The following relationships occur for nominative features:

$$z_{ij} = 1 \Leftrightarrow x_{ij} = c_{0j} \quad [4]$$

and

$$z_{ij} = 0 \Leftrightarrow x_{ij} = \min_i x_{ij} \ \text{ lub } \ x_{ij} = \max_i x_{ij}\ , \quad [5]$$

where:
z_{ij} – the normalized diagnostic variable *i* for the object *j* taking the value from the range [0;1],
x_{ij} – value of the characteristic *i* in the *j*-th object,
$min_i\ x_{ij}$ – the lowest value of the characteristic *i* from among the objects contained in the set [1, 2,…, *j*],
$max_i\ x_{ij}$ – the highest value of the characteristic *i* from among the objects contained in the set [1, 2,…, *j*],
c_{0j} – nominal value of the characteristic in the *j*-th object.

The next stage is the construction of a synthetic measure based on the following formula:

$$Q_i = \frac{1}{k}\sum_{j=1}^{k} z_{ij}\ , \quad [6]$$

This formula assumes the same meaning of all diagnostic characteristics describing the complex phenomenon studied (weights are the same for all diagnostic characteristics).
The procedure presented above was used to construct a synthetic measure for assessing the company's financial condition.

The results of Research

Fifteen financial indicators, which characterize four basic areas of the company's activity, i.e., liquidity, debt, profitability and efficiency of operations, were adopted to examine the economic situation of the company selected deliberately. These indicators make up a set of potential diagnostic variables. Table 1 shows the list of diagnostic variables along with the determination of their nature, i.e., the impact of the assessment of the company's financial standing.

Table 1: Potential diagnostic variables

Category of indicators	Indicator	Nature of diagnostic variable
Profitability	ROE	stimulant
	ROA	stimulant
	Operating profit margin	stimulant
	Net profit margin	stimulant
Debts	General debt	destimulant
	Equity debt	destimulant
	Long-term debt	destimulant
	Sustainability of the financing structure	stimulant
Liquidity	2nd degree of coverage	stimulant
	Cash liquidity	neutral variable (0.2 *)
	Fast liquidity	neutral variable (1.0*)
	Current liquidity	neutral variable (1.2-2.0*)
Efficiency of operations	Cycle of receivables	destimulant
	Cycle of payables	stimulant
	Inventory cycle	destimulant

**means the nominal value (or range of nominal values) of a diagnostic variable, i.e., the value (range of values) of a variable for which the level of the complex phenomenon is the highest.*
Source: own study.

Potential diagnostic variables were analysed for the degree of differentiation and correlation between individual variables. In order to assess the degree of variation in the variables, the coefficient of variation and the relative amplitude of fluctuations were calculated (Kukuła, 2000, p. 49). All of the financial indicators proposed were used to construct the synthetic measure. After determining the nature of individual diagnostic variables (see Table 1), their values were normalized by the zero unitarization method (ZUM), which also allows the unification of the nature of the variables, i.e., allows the conversion of the destimulant and neutral variable into stimulants (Kukuła, 2000, p. 92). In the last stage of the construction of the synthetic variable, aggregation of normalized variables for individual quarters of the analysed period was made.

Figure 1 presents the change in the financial condition of the audited company in dynamic terms, which is described by a synthetic measure. The synthetic measure values are normalized in the range [0; 1]. The closer the value of this variable to unity, the better the company's financial condition.

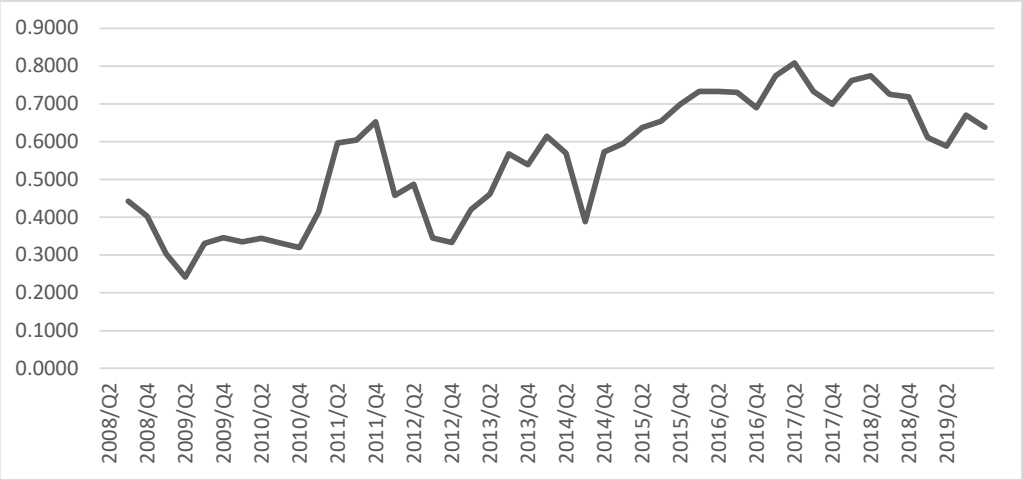

Figure 1: Values of the synthetic measure of the financial condition for the CIECH SA company in the period from the second quarter of 2008 to the third quarter of 2019
Source: own study.

In the period examined, the synthetic measure took values in the range [0.241; 0.809]. The CIECH SA company had the worst financial situation in the second quarter of 2009, and the best – in the second quarter of 2017. Therefore, the results obtained show significant fluctuations when it comes to assessing the financial standing of the company under study. The assessment of the financial condition of the examined company in the analysed period using the proposed synthetic measure shows a high degree of convergence with the assessments made by brokerage houses and the company's market valuations, reflected in stock market listings.

Conclusions

The study presents the use of one of the methods of multivariate comparative analysis, i.e., the construction of a synthetic measure to assess the financial condition of an enterprise. This method – based on the ratio analysis – allows a comprehensive assessment of various aspects of the business entity's operations, i.e., financial liquidity, debt, profitability and efficiency of operations. In this article, the synthetic measure was constructed to assess the financial condition and was verified based on the data of a deliberately selected listed company. In this way, the company was assessed following a dynamic approach, which allows observing the development of the complex phenomenon (here its financial condition) over time. The synthetic measure can also be used for a comparative analysis of the financial condition of many enterprises over a given period of time (CIECH).

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Analysis of Internal Environment of Organization for Determining the Practical Orientation of Applied Research and Development Within the Framework of Innovative Activities

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Abstract

Relevance. Today, innovation plays an important role not only as a catalyst for the global progress of mankind, but also as an additional opportunity for commercial organizations to strengthen their position in markets of any level. This is a complex, long and resource-intensive process, which involves taking into account the maximum number of both external and internal conditions that, one way or another, can affect its results. For the implementation of commercially effective innovative projects in the field of production and organizational processes at the stage of development of an innovative project, the analysis of the internal environment of the organization plays a decisive role. **Research objective:** choosing the most appropriate method for analyzing the internal environment, which is necessary for the transition from the stage of basic research to applied development in the implementation of innovative projects. **Methods:** The main research tool used in the work is a system analysis, which enables building a system of economic analysis of innovation based on the work of Russian and foreign scientists. **Results achieved:** proposed by various authors critical analysis of the possibilities of using the methods was carried out. **Practical significance and applicability of the results**: the methodology for analyzing the internal environment of the organization is adapted for innovative activities and recommended for use at the stage of transition to applied research.

Keywords: Internal Environment Analysis, Investment Project, Innovation, Research And Development.

Introduction

Innovative activities are always associated with a high degree of risk and uncertainty (Mukhtarova et al., 2017; Ziyadin et al., 2019; Korableva et al., 2017; 2018; Bisultanova Korableva et al., 2018). Before conducting applied research and development, it is necessary to set a whole vector for the development of innovations. At the stage of fundamental research and development, research areas and the possibility of introducing one or another innovation are determined. For this purpose, it is

necessary to analyze the conditions in which innovations will be implemented. First of all, this contributes to the analysis of external environment in order to find opportunities to increase the effectiveness of the organization through the adoption of a particular innovative decision, identify the associated risks and threats, as well as an analysis of internal business conditions to identify opportunities for implementing an innovative project within the organization. Analysis of the results of basic research is a key element of the analysis of internal business conditions.

Materials and Methods

To select the most suitable methodology for analyzing the internal environment necessary for the transition from the stage of basic research to applied research, the scientific works of Russian and foreign economists were studied. As a part of the study, the analysis of possibilities of using the methods proposed by the authors was made; conclusions on the adaptation of the proposed methods to innovative activities were generalized and systematized.

Results

Internal environment analysis is necessary to identify the key places in the organizational and production processes, which merit special attention. For this purpose, you should use methods of comprehensive analysis of the organizational and technical level of the organization, which is based on "three groups of analytical indicators: the level of equipment and technology; organizational level of production; indicators of management analysis" (Lysenko 2010).

As an internal analysis applicable to all types of innovations, the organization's potential and resource availability should be examined to assess the feasibility and possibility of implementing innovations of a particular type. In this regard, the analysis of the organizational-technical, techno-economic levels and other production conditions enables determining the organization's capabilities for introducing innovations of a certain type.

The analysis of the organizational-technical level plays a crucial role for the implementation of process and organizational innovations aimed at modernizing internal production and organizational processes.

It is important to pay attention to the fact that for innovative activities the analysis of the organizational and technical level in dynamics almost does not matter, since the dynamic and normative analysis of indicators explores the current deviation from basic and normative indicators, while innovative activities deal with exclusively new or modernized technological and organizational processes. For this reason, the results of non-fulfillment of the plan or deviations from last year's indicators have a weak connection with innovative activitiy and relates to management activities. As part of the choice of the direction of applied research, the study of dynamic performance indicators of production processes allows us to identify stagnant processes, where the size of the reserve for improving efficiency is not determined.

Nevertheless, the classical indicators of the organizational and technical level analysis at the stage of determining the direction of applied research are either not used, or are used with a reservation and modification.

A.D. Sheremet identified 3 main groups of indicators that reflect the technical level of production (Sheremet, 2017):

- Indicators of the level of tools used (capital-labor ratio, technical equipment, energy-labor ratio, mechanization and automation of production processes, etc.);

- Quality indicators (degree of perfection) of the applied equipment and technology (progressiveness of technological processes, equipment of workplaces with technically advanced

tools and devices, the proportion of detail operations processed by group methods, quality, reliability, and durability of products) (Muzychenko, 2008);

- Implementation and development of new progressive machinery and technology (the number of measures to be implemented taking into account the economic efficiency of implemented organizational and technical processes).

These indicators of the technical level of production are related to technical equipment and are considered, for the most part, by narrow specialists. And the insufficient size of any of these groups, reflecting the technical level of production, indicates the need for modernization of production processes.

To make a decision on the implementation of process innovations, it is necessary to study current scientific-technical and technological levels of production, linked to the economic efficiency assessment.

In our opinion, to assess the scientific-technical level of production, we should use the groups of indicators presented in the work of S.I. Kuznetsov "Improving the analysis of the organizational-technical level of production at enterprises of various forms of ownership", among which the following indicators are highlighted:

- Indicators of availability and condition of the main equipment;
- Indicators of mechanization and automation of labor;
- Indicators of technical capacity of labor (Kuznetsov, 2009).

We support the point of view of N. Bazhenov that “the need for modernization of production is reflected in indicators of mechanization and automation, as well as technical capacity of labor. Moreover, “the higher the proportion of progressive and automatic equipment, the higher the level of quality of products (services)” (Bazhenov, 2011).

Thus, the following coefficients should be used to assess the organizational and technical level of the organization.

The coefficient of work mechanization in the classic sense shows the share of products produced in a mechanized way, in the total volume of production represented by formula (1):

$$C_{WM} = \frac{Goods\ produced\ in\ a\ mechanized\ way}{Total\ volume\ of\ goods\ produced} \quad (1)$$

Where

C_{WM} – the coefficient of work mechanization.

It is important to note that in complex production processes in which manual or mechanized labor is used at different stages of the production cycle, the volume of produced goods must be adjusted by multiplying by the share of mechanized production processes in one production cycle.

The coefficient of labor mechanization characterizes the share of working time spent on mechanized work in the total amount of working time spent on production and is determined by the formula (2) (Kuznetsov, 2009):

$$C_{LM} = \frac{Working\ time\ to\ produce\ products\ in\ a\ mechanized\ way}{Working\ time\ to\ produce\ the\ entire\ volume\ of\ products} \quad (2)$$

Where C_{LM} – the coefficient of labor mechanization.

The coefficient of mechanization on labor intensity, reflecting the ratio of the coefficient of mechanization of labor to the coefficient of mechanization of work (Kuznetsov, 2009), is calculated by the formula (3):

$$C_{Mli} = \frac{C_{LM}}{C_{WM}} \tag{3}$$

Where C_{Mli} – the coefficient of mechanization on labor intensity.

In our opinion, the coefficient of labor mechanization for making a decision on the use of innovations in the production process should consider the costs of using mechanized and other labor. Thus, to determine the economic feasibility of the production process at a certain level of mechanization of work, it is necessary to use the coefficient of costs of mechanized work, determined on the basis of formula (4):

$$C_{MWC} = \frac{Costs\ of\ mechanized\ production}{Total\ production\ costs} \tag{4}$$

Where C_{MWC} – the coefficient of the cost of mechanized works

The level of work mechanization in the future can significantly affect the economic efficiency of the organization, therefore, it is necessary to determine the degree of change in the current level of mechanization of work. In this case, we need to calculate the level of costs for the production of one unit in a mechanized way. To do this, use the coefficient of work mechanization specified in the formula (1). By dividing the costs of producing the entire volume of production, in one way or another, by the entire volume of output, we can determine the costs of producing a unit of production. Thus, due to the ratio of the expenditure rate for mechanized work and the cost ratio, the economic efficiency of production is determined in a mechanized way (5).

$$E_{MW} = \frac{\frac{Costs\ of\ mechanized\ production}{Goods\ produced\ in\ a\ mechanized\ way}}{\frac{Total\ production\ costs}{Total\ volume\ of\ goods\ produced}} = \frac{C_{MWC}}{C_{WM}} \tag{5}$$

Where E_{MW} – economic efficiency of mechanized work.

The lower the indicator of the economic efficiency of mechanized work, the more effectively mechanized labor is used. If the indicator of economic efficiency of mechanized work is more than 1, the mechanization of production processes is inefficient and requires modernization and implementation of innovations. A coefficient of economic efficiency tending to zero indicates insufficient mechanization of production processes. Thus, with a decrease in the indicator under study, the coefficient of work mechanization should tend to 1. Low coefficients of mechanization of work and the economic efficiency of mechanized work indicate a low technical level of production processes and the need for their modernization.

This technique can be used to evaluate the effectiveness of any part of the processes of independence from the main activity of the organization.

With regard to technical equipment, the classic indicator of capital-labor ratio, determined by the ratio of the fixed assets value to the number of production workers, is calculated by the following formula (6):

$$CLR = \frac{Fixed\ assets\ value}{Number\ of\ production\ workers} \tag{6}$$

Where CLR – capital-labor ratio

This indicator also characterizes the technical equipment of the organization and the automation of production processes. However, this does not always indicate the efficiency of using fixed assets, since fixed assets having a higher level of automation also have a higher cost, despite the fact that the number of staff of such fixed assets is significantly reduced, and the qualification requirements are growing. For this reason, to determine the need for the introduction of modernization from an economic point of view, it is recommended to use the capital-labor ratio on wages.

$$CLR_W = \frac{Production\ fixed\ assets\ value}{\text{ФОТ}_{\text{пп}}} \quad (7)$$

Where CLR_W – capital-labor ratio on wages;

WF_{PP} – wage fund for production personnel.

In this case, the main condition for the modernization of technical conditions is that the growth rate of the fixed assets value and the wage fund for production personnel should be greater than 1, while the growth rate of the production fixed assets value should be higher than the growth rate of the wage fund for production personnel.

$$GR_{production\ fixed\ assets\ value} > GR_{WFpp} > 1 \quad (8)$$

When deciding on the implementation of technological innovations, the technological level of production is also extremely important, since on average, 25-40% of the cost of products depends on the level of production.

According to D.V. Lysenko, to analyze the technology of production processes the following indicators are used (Lysenko 2010):

- The share of technological advanced processes;
- Flow rate;
- The coefficient of technological equipment of production
- The share of products manufactured by advanced technological methods, and the share of work performed by advanced technology;
- The share of machine time in the technological complexity;
- Indicators of technological discipline;
- Unification and standardization ratios.

The level of automation of production processes is also important in assessing the technological level, since "the use of modern technologies allows us to increase the consumer properties of products (the quality of services provided), and also reduces current production costs".

To identify the potential opportunities for innovations in the technology of the production process, it is necessary to identify the level of automation. For this, necessary to analyze each stage of the production process, regardless of whether the production process is performed sequentially or in parallel. This analysis is carried out similarly to the scientific-technical level of production, only when determining the coefficient of mechanized work, the share of mechanized production stages in the whole production cycle is estimated:

$$C_{WM_{PC}} = \frac{\text{Products produced in a mechanized way}}{\text{Total volume of goods produced}} \quad (9)$$

Where $C_{\mathrm{WM_{PC}}}$ – coefficient of work mechanization of production cycle.

When choosing the direction of studying the organizational system and developing organizational innovations, the commercial effectiveness of the current organizational system should be investigated.

One of the indicators characterizing the complexity of production processes in the organization's activity is the indicator of the skills of performers, which shows the degree of proximity of the average level of all employees to the highest level. More qualified personnel are capable of the most active implementation of innovations, therefore, the qualification coefficient of production personnel, determined by formula (10), can reflect the organization's readiness for technological innovation:

$$R_{PQ} = \frac{\sum_{i=1}^{i'}(ip_i)}{i'N} \quad (10)$$

Where K_{PQ} – performers qualification rate;

p_i – the number of workers of the i-th category;

i' – the highest category of this production sector;

N – the total number of workers in the manufacturing sector (Korshunov, 2006).

Moreover, a higher qualification of workers leads to a higher level of wages. And, despite the fact that decisions to change the organizational and managerial structure and issues of labor organization are more managerial in nature, such changes should have a positive economic effect. Therefore, to determine the economic efficiency of the organizational system, the basis should be laid on the indicator of salary return. Salary return indicator is determined by the formula (11):

$$SR = \frac{\text{Sales revenue}}{\text{WF}}, \quad (11)$$

Where SR – the indicator of salary return.

Separately, to determine the effectiveness of management, the coefficient of management efficiency is used, determined by the formula (12):

$$\mathrm{C}_{ME} = \frac{\text{Sales revenue}}{\text{Management costs}}, \quad (12)$$

Where C_{ME} – the coefficient of management efficiency [43].

Also, to assess the organizational level, a manageability coefficient is applied, which reflects the actual degree of workload of the 1st manager in comparison with the normative level. This coefficient is calculated by the formula (13):

$$C_M = 1/m \sum_{i=1}^{n} \frac{r_{a_i}}{r_{n_i}} \quad (13)$$

Where C_M – the manageability coefficient;

m – the number levels of control;

r_{a_i} and r_{n_i} – actual and normative numbers of employees per 1 i-th head (Lysenko, 2010)

In our opinion, the calculation of the above coefficients helps to make decisions about the need to modernize the organization of labor. To do this, there are four stages:

1. Assessment of the coefficient of manageability:

- C_M = 1: the number of managers corresponds to the normative value: organizational work is organized rationally;

- C_M < 1: the number of management personnel is insufficient in the current organizational system;
- C_M > 1: management resources are used irrationally.

However, if the controllability coefficient deviates from 1, it is important to evaluate the management efficiency, since when maintaining or increasing the management efficiency, it is necessary to revise the regulatory management system itself.

2. Analysis of the dynamics of the coefficient of management efficiency:
- C_{ME} decreases: managerial model is ineffective;
- C_{ME} grows: management costs are used effectively.
3. Analysis of the dynamics of the coefficient of qualification of performers:

- R_{PQ} decreases: the level of preparedness of performers decreases, which can lead to a deterioration in the quality of products and the impossibility of timely targeted measures to establish production;

- R_{PQ} grows: the level of competence of production personnel is growing, which leads to an increase in the innovative potential of the organization.

4. Assessment of the dynamics of the salary return indicator:

– SR decreases: the organizational system is inneficient and requires the adoption of certain measures;
– SR grows: staff efficiency is growing.

Based on the above assessments, it is possible to draw certain conclusions and make a decision about the need of implementing organizational innovations. Typical decision-making options for organizational innovations are presented in table 1.

Table 1: Options for decisions on the implementation of organizational innovation in the analysis of the organizational level

Coefficient of manageability	Management efficiency coefficient	Performer qualification coefficient	Salary return	Conclusions on the modernization of the organizational structure
<1, =1, >1	↑	↑	↑	The organizational system works efficiently: the staff is ready for research and the implementation of technological innovations; adjustment of the regulatory indicator of controllability is required.
<1, =1, >1	↓	↓	↓	The organizational system is ineffective in all components and have to be changed.
<1, =1	↓	↑	↑	In the current management structure,

				management costs should be reduced.
>1	↓	↑	↑	The management team is hypertrophied and needs to be restructured; the production staff works efficiently.
<1, =1, >1	↑	↓	↑	The organizational structure is built efficiently, however, the lack of qualified personnel leads to the inability to implement technological innovations and for this purpose measures for improving the qualifications of employees should be taken.
<1, =1, >1	↑	↑	↓	The organization of the management system is effective, but the work of the staff is oversaturated with qualified, highly paid personnel: if the current economic effect is negative in the long term, this situation can provide a positive effect with the competent use of labor resources due to long-term technological development
>1	↓	↓	↑	The administrative apparatus is used irrationally and requires restructuring. Despite the positive short-term effect of the use of labor resources, in the long term, an excess of executive staff and a lack of qualified personnel will lead to a decrease in the production and innovation activities of the organization
<1, =1	↓	↓	↑	An exceptional case when the lack of manageability does not lead to a decrease in the efficiency of labor resources. However, such a scenario is possible only in the short run. In the long run, this situation will lead to a decrease in the organization's production and innovation activity.
>1	↓	↑	↓	Unreasonably high level of manageability and increase in the qualification of production personnel reduce the efficiency of the workforce: management must be restructured, and the work of production staff must be rationalized
=1	↓	↑	↓	High management costs with the normal use of managerial resources leads to a decrease in the effectiveness of the entire organizational system, including an excess of qualified personnel at this

				stage.
<1	↓	↑	↓	The lack of manageability, leading to a decrease in the effectiveness of the entire organizational system, within which managerial resources should be increased with a systematic decrease in the level of skills of performers
<1, =1, >1	↑	↓	↓	With well-managed management costs, the use of production personnel is extremely inefficient: a decrease in the qualifications of personnel while reducing salary return indicates the need for a complete change in the structure of the organization of production and the construction of a management system in accordance with its requirements.

Conclusion

Internal environment analysis of the organization plays a decisive role at the stage of developing an innovative project in the field of production and organizational processes and enables determining the organization's capabilities for introducing innovations of one type or another. For innovative economic analysis, classical methods of economic analysis should be applied, but they should be adjusted considering the features of innovative activities.

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Labor Protection as The Basis for Reducing Occupational Injuries and Increasing Labor Productivity

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Abstract

Modern tasks of increasing the competitiveness of the national economy, ensuring the country's economic security, and moving the economy to a new level of technological development actualize the issues of improving the labor protection system and its development in the framework of modern world trends. Work-related traumatism and occupational diseases result in loss of working time, personnel problems, and significantly reduce labor productivity. In the article, the authors use statistical data, analytical and law enforcement materials of the Federal service for Labor and Employment to consider the types of job-related accidents, to analyze the causes and conditions of traumatism and mortality. The authors conclude that it is necessary to focus on the problems of developing the system of preventing work-relayed traumatism and occupational diseases, forming the interest of the parties of social and labor relations in meeting the requirements of regulatory documents on labor protection, carrying out activities aimed at improving working conditions, protecting the life and health of employees. The transition from the remuneration model of occupational safety and health management and payments for harmful working conditions to a modern system of occupational risk management will make it possible to implement preventive approaches to preserving the employees' health in the workplace, to reduce financial losses of businesses associated with unfavorable working conditions, to increase labor productivity and production efficiency in general.

Keywords: Occupational Safety, Employee, Employer, Occupational Traumatism, Occupational Diseases

Introduction

The labor protection system creates the foundation for developing and implementing the set of measures to create conditions for maximum security of employees' life and health. At the present stage, its improvement is particularly relevant due to increasing globalization and innovative modernization of production in all countries of the world, which is accompanied not only by new

technological opportunities, but by an increase in threats and risks to the life of people in various fields of work as well.

Work-related traumatism and occupational diseases result in loss of working time, personnel problems, and significantly reduce labor productivity. These are negative socio-economic, financial and material consequences not only for a particular organization, but for the country as a whole as well. For the global economy, losses from accidents and occupational diseases are estimated at 4% of GDP, for European countries and the United States - 3% of GDP. 2.78 million people die every year as a result of occupational accidents or workrelated illnesses (Work for a brighter future – Global Commission on the Future of Work International labor Office – Geneva: ILO, 2019). Prevention of occupational traumatism, prevention of occupational diseases, improvement of the labor protection system and its legal basis are the most important social and economic tasks not only in Russia, but internationally as well. Implementation of employees' right for labor protection is impossible without a well-functioning system of state control (supervision), as well as trade union control over labor protection.

The issues of developing and further improving labor protection are the subject of ILO annual reports dedicated to the World labor protection day, which indicates the importance and relevance of the problem and the need to take into account the latest trends in the development of international standards on labor protection. Ensuring safe working conditions and expanding social protection are identified as the main priorities and areas of cooperation between the ILO and various countries. «All workers, regardless of their contractual arrangement or employment status, must equally enjoy adequate labor protection to ensure humane working conditions for everyone...It is time for safety and health at work to be recognized as a fundamental principle and right at work." Global Commission on the Future of Work International Labour Office notes in its annual report (Work for a brighter future, 2019, p. 38-39).

The relevance of the topic is proved by the fact that the Russian Federation actively ratifies the ILO conventions on occupational safety and health issues: the ILO Convention № 187 "On Principles that Promote Safety and Health at Work", ILO Convention № 174 "On Preventing Major Industrial Accidents", ILO Convention № 176 "On Safety and Health at Work in Mines", ILO Convention № 167 "On Safety and Health at Work in Construction", etc.

In December 2017, the Russian Federation Ministry of Labor and Social Protection and the International Social Security Association (ISSA) signed the Memorandum of Understanding and Cooperation to promote the concept of "zero accident" (Vision Zero). The concept is a qualitatively new approach to the organization of prevention, combining three areas - safety, occupational health and well-being of employees at all levels of production.

Currently, a new holistic concept of ensuring healthy and safe working conditions is being developed, and attention is being paid to the experience of a number of countries in adopting and implementing comprehensive laws on safety, environmental protection, labor protection, hygiene and the production environment.

The national security strategy of the Russian Federation, approved by Presidential Decree № 683 dated 31.12.2015, aims at increasing the competitiveness of the national economy, at ensuring the country's economic security, and at moving the economy to a new level of technological development. All these tasks are closely related to improving the labor protection system. The General agreement between the All-Russian associations of trade unions, the All-Russian employers' associations and the Government of the Russian Federation for 2018 - 2020 focuses on ensuring the safety of employees' life and health in the course of their labour activity as one of the national priorities in order to preserve the human capital, which should be supported, including by improving the legislative and other regulatory framework, taking into account foreign and international legal regulation of labor protection.

Methodological Framework

The object of the study is social relations that develop in the field of labor protection, while implementing the measures aimed at improving the safety of employees' labour activity, preserving their life and health.
The research is based on an interdisciplinary approach. The methodological basis of the research is made by general scientific and specific scientific methods of cognition. The methodological instrumentarium is chosen taking into account the specific goals of the work.

The dialectical-materialistic method of cognition enables to study the system of labor protection in its development, in interdependency of all its individual manifestations and in interaction with related phenomena, to justify the advantages and disadvantages of various approaches to solving the issues of its improvement.

The paper uses the following methods of formal logic: description, comparison, classification, analysis and synthesis, etc. The research techniques include analyzing the causes and conditions for traumatism, employees' mortality, types of accidents, and their classification. The work also used specific scientific methods of cognition: comparative-legal, formal-legal, statistical, structural-functional method for substantiating the main directions of improving the legal and organizational basis of the labor protection system in modern production.

Discussions

Great attention has always been paid to Issues of labor protection. PhD theses, monographs, and scientific articles by Russian and foreign authors are devoted to considering various aspects of labor protection: A. Mikhailov (2013), E. Kryazhev (1997), A. Neverova (2014), S. Saidakhmedov (2009), O. Kuznetsova (2015), A. Petrov (2015, 2016), A. Khabibullina (2015), R. Meshechkina, N. Zholobov (2016), M. Buyanova (2016), Martina Gogolova (2015), Sergey S. Kudryavtsev, Pavel V. Yemelin, Natalya K. Yemelina (2018), Maureen F. Dollard, Daniel Y. Neser (2013), Veikko Rouhiainen (2018), Ioannis Anyfantis, Georgios Boustras, Alexandros Karageorgiou (2018). The problems of developing the labor protection management system taking into account modern international trends in this area are revealed in the works of G. Z.Feinburg (2016), E. A. Kuznetsova (2017), S. N. Kudryashova (2015). The authors share the position of individual scientists, debate with some of them and draw their own conclusions based on other scientists' opinion.

The work "The Development of Higher Education in Occupational Health and Safety in Estonia and Selected EU Countries" by authors Karin Reinhold, Virve Siirak, Piia Tint (2014) presents the experience of educational institutions in foreign countries on the organization of training in the field of occupational safety and its inclusion as a mandatory discipline in the curricula of all specialties (both technical and socio-economic); this experience is interesting for further studying.

Results

The concept of "zero accident" was developed by the International Social Security Association and launched in Singapore on the 4th of September 2017 at the XXI World Congress on occupational safety and health. For the first time in Russia, an ample debatable about the "Zero Accident" program developed in the framework of the panel discussion "Zero Accident Concept", to what extent international experience is applicable in Russia" at the All-Russian labor protection week, which was held from April, 10 to April, 14, 2017. Speaking at the 10th European regional meeting of the International labour organization (ILO) in Istanbul (Republic of Turkey) in October 2017, the Russian Minister of labour and social protection Maxim Topilin noted that Russia shared the principles of the concept of "zero" traumatism promoted by the International social security organization. In this regard, in 2018 the state program "Employment promotion" was supplemented with a new subprogram - "Safe labor". The purpose of the subprogram is to create conditions to form the culture of safe work and to increase the effectiveness of measures aimed at preserving the life and health of employees in the course of their work.

The subprogram is implemented in the following areas: developing and implementing the precautionary model of labor protection management; modernizing tools for state labor protection management; stimulating employers to improve working conditions in the workplace.
In 2019, the Ministry of labor and social protection of the Russian Federation developed the methodology for organizing internal control (self-control) of compliance with labor legislation, the methodology for remote training on labor protection, and methodological documents for employers in order to identify hazards, to assess occupational risks and to reduce their level based on the best world practices for the most traumatic types of economic activities. In addition, the concept of conducting a public awareness campaign aimed at promoting occupational safety and health of employees was developed.

Official statistics from the Federal service for labor and employment make it possible to draw the conclusion about the trend of reducing the level of general traumatism (About the results of 2019 in labor protection: Russian Ministry of Labour).

During 11 months of 2019, there were 4,078 accidents with severe consequences, which is 9% lower than in the same period of 2018 (4,479 cases). Figure 1 reflects the overall positive trend in traumatism decrease over the 5 years from 2015 to 2019.

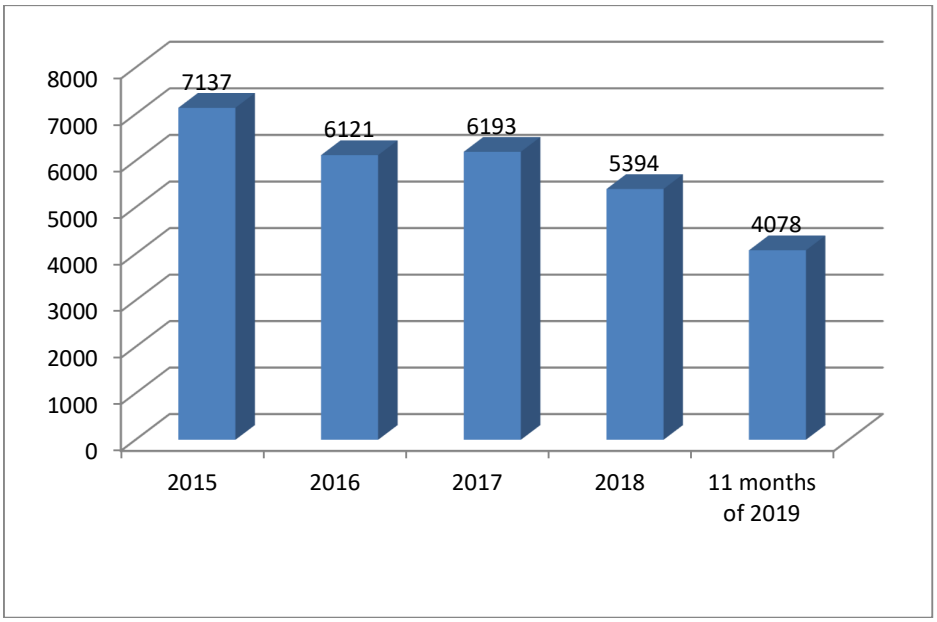

Fig. 1: Dynamics of accidents with severe consequences for 2015-2019.

In 2019 a decrease in the number of deaths in the workplace is noted as well: during 11 months of 2019, the number of workers died is 12% less than in the same period of 2018 (1,018 and 1,158 people, respectively). However, the number of deaths traditionally remains the highest in construction, manufacturing, transport, agriculture and extraction of mineral resources.

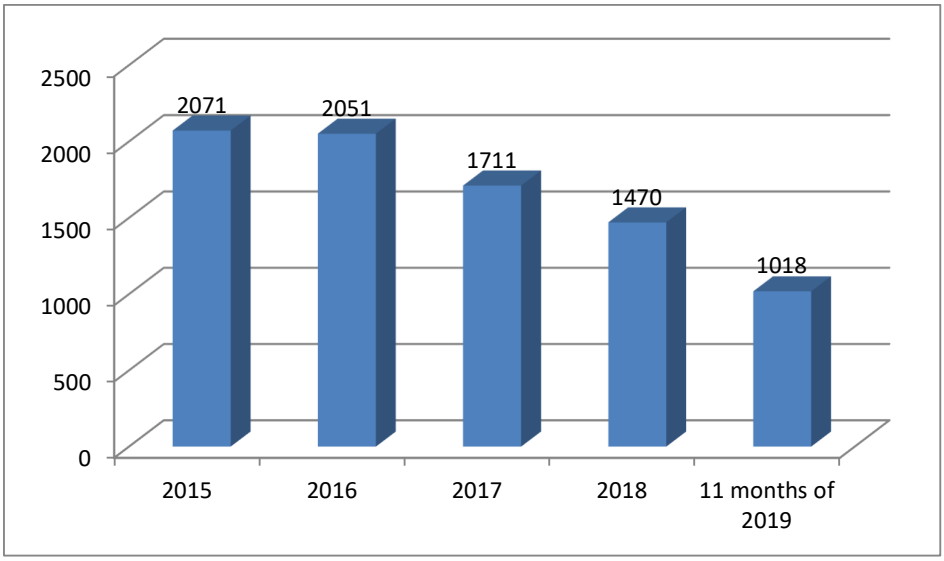

Fig. 2: The number of fatalities in the workplace

When it comes to agriculture, official statistics on the number of casualties in the workplace allow us to compare agriculture with traditionally traumatic activities such as construction, transport and communications, as well as manufacturing.

The largest number of injuries and accidents, including fatal ones, falls on the livestock industry, crop production, maintenance and repair of equipment. At the same time, high-risk professions include those of an animal breeder, a tractor driver, a shepherd, a driver, a utility worker, a fitter, a milkmaid (Galyanov I. V., Koshechkin Yu. V., Studennikova N. S., Barabanova S. V., 2016).

The analysis of the typology of industrial accidents with severe consequences that occurred in the 1st half of 2019 in organizations of the Russian Federation shows that almost every fourth accident (25%) occurred as a result of a victim falling from a height or as a result of the impact of moving, flying, rotating objects, parts, machines and mechanisms (27%); 15% – falling on an even surface of the same level, 11% – as a result of falling, breakdown, collapsing of objects, materials; 8% – as a result of traffic accidents (Operational data for 2019. Federal Service for Labor and Employment).

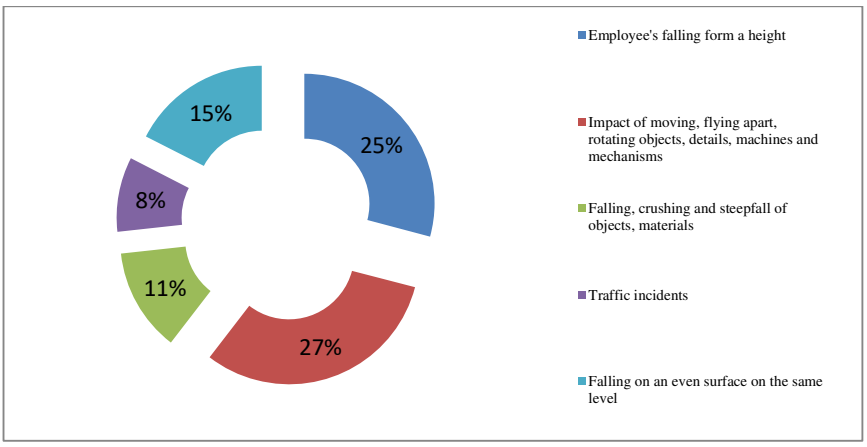

Fig. 3: Types of workplace accidents with severe consequences that occurred in the 1st half of 2019

Among the main causes of accidents at workplace are: design deficiencies and insufficient reliability of machines, mechanisms, equipment, operation of faulty machines, mechanisms, equipment, violation of the technological process, violation of safety requirements when operating vehicles, road traffic offense, non-use of personal protective equipment by the employee, finding the victim in the state of intoxication by alcohol, drugs and other toxic substances. At this, a significant number of injuries are caused by unsatisfactory organization of work performance.

It should be noted that the reporting forms of the state labor inspectorate take into account only the types and causes of accidents with severe consequences, fatalities, and group accidents, a significant number of accidents remains unexplored. It seems appropriate to improve the system for analyzing and generalizing the information about accidents at workplace, their causes in the context of economic sectors and occupation of affected workers.

The documents of inspections performed by the Federal service for Labor and Employment form the idea of the most typical violations and shortcomings in the field of labor protection in agricultural production organizations. Thus, in accordance with article 217 of the Russian Federation Labor Code to ensure compliance with labour protection requirements, ensuring control over their implementation every employer, engaged in production activities where the number of employees exceeds 50 persons, shall organize a labour protection service or open the post of a specialist on labour protection, having the necessary training or experience in this area. However, some employers do not comply with this provision.

A large block of violations is traditionally associated with non-compliance with the requirements for training and employees' knowledge assessment. Agricultural organizations do not observe the established deadlines for training and testing of knowledge of labor protection requirements, not all managers and specialists, including mid-level executives who are directly responsible for the safety of workers, pass training and testing for labor protection. It is noted (Aleshin S., 2013) that the persons responsible for the state and organization of work on labor protection are not familiar with their specific official duties (functions) on labor protection. In some organizations, there are no commissions to check the knowledge of labor protection requirements; instructions, training on labor protection, on-the-job training, and checking labor protection knowledge are not carried out in accordance with the established procedure, as a result of which employees are suspended from work at the request of the labor Inspectorate (Report of the State Labor Inspectorate in the Chuvash Republic, 2017). One of the problems is the formalism when carrying out instruction on labor protection. Organizations do not develop instructions on labor protection for all types of work or professions, or they are not reviewed in a timely manner due to the emergence of new legal acts on labor protection. In some organizations, there are no programs for conducting introductory training and training on labor protection in the workplace. Logbooks of occupational safety instructions are filled in untimely.

According to item 19 of the Rules on labor protection in agriculture, approved by the order of the Ministry of labor and social protection of the Russian Federation dated 25.02.2016 № 76n, works that are associated with increased danger and are performed in places of constant action of harmful, dangerous production factors must be performed through work-permits to executing works of increased danger. The work permit must be issued by officials authorized by the employer, in accordance with the recommended model, which is provided for in the Appendix to the Rules. The list of employees' professions and types of work that are subject to heightened labor protection requirements is approved by the local regulatory act of the employer. At the same time, some organizations do not approve the lists of high-risk jobs, and work-permits for performing such works are not always issued in a timely and correct manner.

"Rules on labor protection while operating electrical installations" are enacted by the Order of the Ministry of Labor and Social Protection of the Russian Federation dated 24. 07. 2013 № 328n. Reports and analytical materials of inspections performed by the state labor Inspectorate indicate that organizations commit gross violations of labor protection rules and regulations when operating electrical installations. For example, testing of ground loops and insulation of electrical wiring is not

always carried out in a timely manner; electric welding transformers are often operated without protective barriers of current-carrying parts and protective earthing, metal structures of buildings, pipelines of the heating system and grounding buses are used as a reverse welding cable. In production capacities, in workshops, power electric equipment cabinets and other electrical switchgear are not under lock and key, on the doors there are no warning labels (signs) about the danger of electric shock and dispatching names (Aleshin S., 2013).

The procedure for authorizing the personnel to service the electrical equipment, including electric welding transformers and accumulator plants is violated. So, cases of operating the equipment for cold metal working (lathe machines, drilling, sharpening, etc. machines), the woodworking equipment without serviceable protective protections of cutting zones are revealed. It is noted that most drilling machines do not have a spindle returning mechanism, devices for secure fixing the processed products. Sharpening machines often do not have hand arm rests, and abrasive wheels do not pass the test for mechanical strength.

In a number of organizations, equipment for gas-flame metals treatment (welding and cutting) is operated with defective or unverified by state checkup pressure gauges of reducing gears, with faulty and not securely fixed gas flexible pipes; technical inspections and tests of portable acetylene generators, torches, burners, and gas pressure regulators are not carried out. Safety requirements are not met at workplaces on engine driven currents and other storage devices for example, dump pits are not always equipped with safety grates, storage hoppers are not covered with solid or grille flooring, and open pits of bucket carriers and inclined conveyors do not have protection covers. As a result of such violations, employees suffer serious injuries, including fatal ones.

One of the problems is providing employees with high-quality and certified special clothing, special shoes and other personal protective equipment. Article 212 of the Russian Federation Labour Code using equipment for personal and collective protection of employees that passed compulsory certification or declaration of conformity as prescribed by the law, purchasing and outgiving special-purpose clothing, footwear and other means of individual protection, washing and decontaminants are related to the employer's responsibilities. Typical violations are: no calculation of the need in such equipment, unsatisfactory record of their outgiving and returns by employees, violation of the terms for testing and checking their proper functioning; failure to replace or repair special-purpose clothing and other personal protective equipment collapsed before the end of the term for their using for reasons beyond the control of employees.

Given these considerations, it is possible to draw the following conclusions and to formulate separate directions for improving labor protection.

1. A human-oriented agenda requires an equally urgent – and additional - attention to the broad role of technology in promoting decent work (p. 43).
In the past few years, there has been a growing demand from manufacturing organizations for so-called "smart technologies"in Russia. New programs and technological developments are used in different industries, however their implementation is not sufficient and they are expensive. Developments in digital technologies in the field of labor protection cover several areas: documentation design, complex coordination of various operations, automation of management processes, and others. Thus, the "Production Control" program, which is an integrated system for ensuring work safety, is in demand. The program is aimed at prevention and control of processes related to the requirements of labor protection, industrial safety and environmental protection. It is used to identify risks, to keep records of all incidents, and to build global analytics in terms of security measures effectiveness. Such a development as "a smart helmet" monitors the employee's health indicators, the temperature in the work area, the content of harmful impurities in the air or the concentration of explosive gases. If a worker is in danger, a high degree of emergency or deviation from the norm is detected, the module instantly communicates with a single cloud platform and transmits information. "Digital" training is used to train workers in various safety skills.

Technologies can free workers from hard work, exhausting routines and dangers, and reduce work stress and potential traumatism. However, technologically driven production processes can make labor unnecessary, eventually removing workers and inhibiting their development. The Global Commission on the future of work aptly notes in its annual report that "automation can reduce worker control and autonomy, as well as the richness of work content, resulting in a potential deskilling and decline in worker satisfaction" (Work for a brighter future, 2019, p. 43). The approach to artificial intelligence should be based on the principle of " human-in-command", which ensures that the final decisions that affect the organization of work are made not by algorithms, but by people.

2. One of the most important ways to prevent occupational traumatism is to improve the efficiency of the occupational safety management system.

In order to maintain the existing positive trends in the field of labor protection, the Russian Ministry of Labor has been implementing a program-targeted method of labor protection management since 2015, which develops a risk-oriented approach to the social insurance system for occupational accidents and occupational diseases and control and supervision activities in the field of labor protection.

The "Safe work" subprogram is aimed at developing and implementing a preventive model of labor protection management with simultaneous formation of Incident and Injury Free culture.

To ensure a unified approach, the "Model state program of a Russian Federation subject for improving working conditions and labour safety" has been developed and recommended for use. Currently, programs to improve working conditions and labour safety have been enacted in all subjects of the Russian Federation. The program activities include improving the regional regulatory framework for labor protection, improving the competence of employees and employers in the field of labor protection, and developing mechanisms for employers ' material interest in improving labor conditions and safety. Businesses in developed and many developing countries treat expenditures on labor protection as an investment, while in Russia they are perceived as costs that will never pay off and will not return. Taking into account how much the organization loses when there is a high level of employees' traumatism (compensation for material damage, re-organization of production, investigation of accidents, additional payments to victims, hiring and training a new employee), it is much easier and more strategically correct to conduct preventive measures in the field of labor protection.

In addition, since 2014, the transition from the system of workplaces certification to the system of special assessment of working conditions has been made. In contrast to the certification, which described the actual values of working conditions, the new procedure represents a comprehensive scope of work to assess working conditions in the workplace, which addresses issues of labor protection, social security of employees and planning the organization's expenses aimed at improving the created conditions.

3. A significant number of accidents are related not only to the technical conditions of work, but to unsafe behavior of people in the workplace as well. In this regard, it is necessary to pay attention to forming high production practices among employees, unconditional compliance with labor safety requirements and an intolerant attitude to any deviations from labor protection requirements.

4. Analysis of international and Russian legal acts in the field of labor protection makes it possible to conclude that Russian legislation generally complies with international norms and standards in the field of labor protection. Further development of the Russian legislation on labor protection is connected with transition to the system of accident and occupational diseases prevention in the workplace.

It seems appropriate to improve the concept of labour protection, embodied in article 209 of the Russian Federation Labor Code, by adding and defining it as "system of *safety provision*, preserving the life and health of employees in the course of work activities, which includes legal, socio-economic, organizational-technical, sanitary-hygienic, medical-preventive, *psycho-physiological*, rehabilitation and other activities".

Russia is interested in the experience of organizing labor protection in the Federal Republic of Germany. There are several parts in the German labor protection system: technical labor protection, social labor protection, medical labor protection, etc. (Buyanova, 2016). This approach contributes to a more orderly and clears organization of the labor protection system. The US experience in strengthening the legal responsibility of employers for violations of labor protection requirements can be used to improve Russian legislation (Khabibullina, 2015).

It is necessary to draw attention to the need for the Russian Federation to ratify International labour organization conventions № 129 "On labour inspection in agriculture", № 184 "On safety and occupational hygiene in agriculture", and № 161 "On occupational hygiene services".

Conclusion and Recommendations

Thus, modern tasks of labor protection system development require not only responding to violations, accidents at work, but focusing on the problems of developing the system for preventing occupational injuries and occupational diseases as well, on forming the interest in the parties of social and labor relations in meeting the requirements of normative documents on labor protection, carrying out measures aimed at improving working conditions, protecting the life and health of employees. The transition from a remuneration model of occupational safety and health management and payments for harmful working conditions to a modern system of occupational risk management will make it possible to implement preventive approaches to preserving the employees' health in the workplace, to reduce financial losses of businesses associated with unfavorable working conditions.

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New Directions of Financial Statement Fraud Detection Methods

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Abstract

The purpose of the paper was to present new developments in the area of financial statement fraud detection techniques. The paper analyzes new tools and data sources and shows research gaps that are not yet covered with the research. The novelty factor in the article is the presentation of these gaps.

Keywords: financial fraud detection, data mining, NLP

JEL classification: G30, G39, C38

Introduction

The stability of the financial system depends on multiple factors. One of them is the fairness of the stock market game and the resulting investors' confidence in investing in this market. Enron and Worldcom scandals showed the weaknesses of the external financial statements audit and the need to strengthen the supervision systems concerning corporate fraud. As a result, almost all countries all over the world introduced new regulations on how public corporations are to comply with the law. New regulations imposed on companies also required new supervision tools and controls performed by the commissions responsible for the stock market oversight. This paper attempts to observe recent developments in artificial intelligence applied to the prediction of corporate fraud.

State of the art

One of the first and well-known fraud-detection models was developed by M. Beneish (1999) and it predicts earnings manipulation of publicly traded companies based on several financial ratios calculated from the balance sheet and income statement data. Many analysts and information agencies use this model until today, however, many researchers developed his idea into more sophisticated systems with much better prediction accuracy. Table 1 shows the most relevant publications which followed the Beneish paper.

Table 1: Previous research results

Data	Accuracy	Recall	Algorithm	Source
Financial ratios	71.7	68.4	ANN	Green, Choi (1997)
Financial ratios	54.5	20	Logistic regression	Calderon, Green (1994)
Financial ratios	47.6	63	Logistic regression	Green, Calderon (1995)
Financial ratios	71.25	72.52	ANN	Green, Choi (1997)
Financial ratios	83.54	81.08	Logistic regression	Bell, Carcello (2000)

Data	Accuracy	Recall	Algorithm	Source
Financial ratios	71.5	64	Logistic regression	Persons (1995) (preceding year)
Financial ratios	66.51	61.81	logistic regression	Persons (1995) (current year)
Financial ratios	52	51.54	LDA	Fanning, Cogger (1998)
Financial ratios	50	50	QDA	Fanning, Cogger (1998)
Financial ratios	50	50	LOGIT	Fanning, Cogger (1998)
Financial ratios	62.50	66	ANN	Fanning, Cogger (1998)
Financial ratios	59.8	67.8	Logistic regression	Summers, Sweeney (1998)
Insider trading factors	57.8	62.7	Logistic regression	Summers, Sweeney (1998)
Financial ratios, insider trading factors	66.7	72.2	Logistic regression	Summers, Sweeney (1998)
Financial ratios	69.72	81.03	ANN	Feroz et al (2000)
Financial ratios	48.13	75.96	Logistic regression	Feroz et al (2000)
Financial ratios	84.21	84.21	Logistic regression	Spathis (2002)
Financial ratios	87.75	86.29	UTADIS	Spathis et al (2002)
Financial ratios	81.37	81.23	Logistic regression	Spathis et al (2002)
Financial ratios	84.03	83.86	Discriminant analysis	Spathis et al. (2002)
Financial ratios	79	5	Logistic regression	Lin et al (2003)
Financial ratios	76	35	FNN	Lin et al (2003)
Financial ratios	53.8	21.7	Discriminant analysis	Kaminski et al. (2004)
Financial ratios	67	81.3	Three-phase cutting plane	Dikmen, Küçükkocaoğlu (2010)
Financial ratios	89.5*	54.2*	unweighted probit	Beneish (1999)
Financial ratios	64.41	65.59	logistic regression	Dechow et al (2011)
Financial ratios	73.6	75	decision trees,	Kirkos et al (2007)
Financial ratios	80	82.5	Neural network	Kirkos et al. (2007)
Financial ratios	90.3	91.7	Bayesian Belief Network	Kirkos et al. (2007)
Financial ratios	95	63	Genetic algorithms	Hoogs et al. (2007)
Financial ratios	63.4	62.9	Linear regression	Humphreys et al. (2011)
Financial ratios	67.3	69.3	Naïve Bayes	Humphreys et al. (2011)
Financial ratios	65.8	71.3	SVM	Humphreys et al (2011)
Financial ratios	67.3	68	C4.5 (decision tree)	Humphreys et al (2011)
Financial ratios	67.3	66.3	Jrip	Humphreys et al. (2011)
Financial ratios	60.4	61.4	Latent Words Language	Humphreys et al. (2011)
Financial ratios	38.46	45.16	Computational Model for Financial	Glancy (2011)

Data	Accuracy	Recall	Algorithm	Source
			Reporting Fraud Detection	
Financial ratios	78.36	80.21	Multilayer feed-forward neural network	Ravisakan et al. (2011)
Financial ratios	70.41	55.43	SVM	Ravisakan et al. (2011)
Financial ratios	94.14	95.09	Gaussian Processes	Ravisakan et al. (2011)
Financial ratios	93.00	91.46	Group Method of Data Handling	Ravisakan et al. (2011)
Financial ratios	66.86	63.32	Linear Regression	Ravisakan et al. (2011)
Financial ratios	98.09	98.09	Probabilistic neural network	Ravisakan et al. (2011)
Financial ratios	71.37	61.96	CDA	Ravisakan et al. (2011)
Financial ratios	72.38	72.40	CART	Ravisakan et al. (2011)
Financial ratios	77.14	80.93	Exhaustive pruning NN	Ravisakan et al. (2011)
Financial ratios	74.1	51.2	K2	Kotsiantiset et al. (2006)
Financial ratios	91.2	85.2	C4.5	Kotsiantiset et al. (2006)
Financial ratios	79.7	56.1	3NN	Kotsiantiset et al. (2006)
Financial ratios	73.4	36.6	RBF	Kotsiantiset et al. (2006)
Financial ratios	86.8	65.7	RIPPER	Kotsiantiset et al. (2006)
Financial ratios	75.3	36.6	LR	Kotsiantiset et al. (2006)
Financial ratios	78.66	48.8	SMO	Kotsiantiset et al. (2006)
Financial ratios	95.1	90.2	Stacking	Kotsiantiset et al. (2006)
Financial ratios	92.1	80.5	Voting	Kotsiantiset et al. (2006)
Financial ratios	91.2	85.2	BestCV	Kotsiantiset et al. (2006)
Financial ratios	93.3	85.4	Grading	Kotsiantiset et al. (2006)
Financial ratios	NA	98.39	CART	Bai et al. (2008)
Financial ratios	NA	95.97	Linear Regression	Bai et al. (2008)
Financial ratios and non-financial variables	n.a.	n.a.	logistic regression	Brazel et al. (2005)
Financial ratios	90.4	80	SVM	Cecchini et al. (2010a)
Onthology	75.41	76.53	NLP text recognition	Cecchini et al. (2010b)
Analyst calls+Financial variables	89.03	24.69	logistic regression	Larcker and Zakolyukina (2012)
Financial+non-financial variables	89.02	n.a.	UTADIS	Gaganis (2009)
Financial+non-financial variables	80.49	n.a.	MHDIS	Gaganis (2009)
Financial+non-financial variables	78.05	n.a.	KNN	Gaganis (2009)
Financial+non-financial variables	78.05	n.a.	PNN	Gaganis (2009)
Financial+non-financial variables	78.05	n.a.	ANN	Gaganis (2009)
Financial+non-financial variables	82.93	n.a.	SVM RBF	Gaganis (2009)

Data	Accuracy	Recall	Algorithm	Source
Financial+non-financial variables	75.61	n.a.	SVM Polynominal	Gaganis (2009)
Financial+non-financial variables	84.15	n.a.	SVM Linear	Gaganis (2009)
Financial+non-financial variables	84.10	n.a.	DA	Gaganis (2009)
Financial+non-financial variables	78.00	n.a.	LR	Gaganis (2009)
Management report	82.95	80.71	logistic regression	Purda and Skillicom (2015)
Traits extracted from oral speech	n.a.	n.a.	logistic regression	Hobson et al. (2012)
Traits extracted from financial social media+financial variables+management reports	80	83.04	SVM	Dong et al. (2018)

**We chose the most popular version of the Beneish model with the proportion of costs for errors 40:1 and unweighted probit, ** Another version of the Beneish model estimated with a Weighted Exogenous Sampling Maximum Likelihood with the proportion of costs for errors 40:1.*

The results of the research provide the relatively good performance of the models. Still, in most cases, there was room for improvement, especially that in some of the older papers, the performance measures were based on cross-validation or substitution of the known data to the model instead of the separate validation sample. It is difficult to determine which model estimation method proved to be the most efficient because this depended on the size of the data sample and how extreme were the analyzed samples. For instance, Beneish research concentrated on the most significant financial scandals of the XX century, whereas Dechow's model was trained on an extensive sample, which included all US public companies which manipulated their financial statements. A variety of performance results for the same method also suggest that the selection of the method depends on the specific data sample (size, period, the scope of data). In the table, one can see that researchers successfully implemented various data mining and AI methods. Still, a dominating model was logistic regression because it produces a linear, easy to use and interpret formula for fraud prediction. Nevertheless, one of the most efficient classifiers was artificial neural networks, which proved their usefulness on the validation sample.

Extending the Financial Statement Data Model

The analysis of the literature from recent years shows that new publications explore new ideas concerning:

* extending the data sources used for the training of the model (not only financial statement data),

* implement new models of data classification and new methods of data extraction.

The first development is new sources of data used in fraud recognition. Table 2 shows that newer publications use nonfinancial statements and nonfinancial information conveyed in financial reports as well as the data from outside of the company, which is coming from analyst calls, discussion forums, investor portals, and psychological tools measuring the market sentiment and the CEO's personality.

Table 2: Corporate Fraud Detection developments

Development	Example of research
Numerical financial data	Cecchini et al. (2010a)
Linguistic analysis of financial texts	Cecchini et al. (2010b)
Financial ratios	Beneish (1999), Dechow et al (2011)
Non-financial variables from financial statements	Yuan et al. (2016)
Linguistic analysis of analyst calls	Larcker and Zakolyukina (2012)
Linguistic analysis of management report	Purda and Skillicorn (2015)
Traits extracted from oral speech (from analyst calls)	Hobson et al. (2012)
Linguistic analysis extracted from social media (investor forums)	Dong et al. (2018)
Risk factors taken from questionnaire research	Lenard et al. (2006)
Linguistic analysis of employees emails	Holton (2009)
Context-based features	Abbasi et al. (2012)
The employment history of the CEOs	Ericson et al. (2006)
CEO personality analysis	Johnson et al. (2011)

source: own compilation based on Dong et al. (2018), Amani F. and Fadlala A. (2017) and Table 1.

As can be seen from Table 1 and Table 2, the development of fraud detection models went in the direction of non-linear models and various sources of data that go far beyond financial statements. Information provided by multiple data sources is non-linear and context-dependent and quite possibly, the multi-dimensional functions describing the probability of fraud can have multiple extrema. Nonfinancial information which proved to be useful in fraud detection included:

- CEO's turnover (Dechow et al. (1996)),
- Big 4 Auditor (Fanning and Cogger (1998)),
- Audit fee higher than the average in the industry (Hribar, Kravet, Wilson (2011)),
- The remuneration package for directors (Armostrong, Jagonizer, Larcker (2010)),
- Market returns (Dechow et al. (2011)),
- The CEO duality (Feng et al. (2011)),
- Time of CEO employment (Erickson et al. (2006)),
- Religion (Koerber, Neck (2006)),
- Analysts call information (Hobson et al. (2012)),
- Age of a company (Erickson et al. (2006)),
- M&A activity (Erickson et al. (2006)),
- Percentage of outside directors (Armstrong et al. (2010)),
- Number of institutional investors (Armstrong et al. (2010)),
- Various economic predictors which in a quantitive or descriptive way characterize a company (Hribar et al. (2011)),
- Number of board meetings (Erickson et al. (2006)),
- Percentage of a "core" CEO salary in the total CEO remuneration (Feng et al. (2011)),
- Whether the company is below or above the analyst's expectations (Perols and Lougee (2011)),
- Number of business sectors in which a company operates (Hribar et al. (2011)),
- Auditor's opinion was in any way different from the standard version (Hribar et al. (2011)),
- Initial Public Offering (Hribar et al. (2011)),
- High risk of the court case (Hribar et al. (2011), Perols (2011)),

- Linguistic analysis features based on the contents of analyst calls (Larcker et al. (2012)),
- Linguistic analysis features based on the contents of management reports (Purda and Silikorn (2015)),
- Traits extracted from oral speech (Hobson et al. (2012)),
- Traits extracted from social media (Dong et al. (2018)),
- Corporate Governance implementation (Mahesarani, Chariri (2016)).

The second development in financial statement fraud detection is the implementation of the automatic personality perception tools and generally extensive use of natural language recognition tools (for opinions, emotions, sentiment). Automatic personality perception is an essential topic in psycho-linguistics and focuses on determining a person's personality from the text and oral interviews. The most famous personality measures system used in automatic feature detection is the Big Five system, which follows the binary values for extraversion, neuroticism, agreeableness, conscientiousness and openness. On top of personality recognition researchers extract emotions from oral interviews and video files, parse any written documents or internet websites in search for opinions, emotions and sentiment. Table 3 shows the most popular existing tools.

Table 3: Popular tools used for feature extraction from different types of data

Type of contents	Name	Commercial or free	Selected functionalities
NLP, Sentiment analysis	LIWC (API: Receptiviti)	commercial	Extracts certain words or phrases from texts which are meaningful for psychological features; it contains dictionaries of such words for many languages. This software sets standards for NLP and sentiment analysis.
NLP, Sentiment analysis	RIOT Lite/RIOT Scan	free, open-source	Extracts certain words or phrases from texts which are meaningful for psychological features, but it does not come with a dictionary
NLP, Sentiment analysis	TAPA	free	Extracts certain words or phrases from texts which are meaningful for psychological features, allows adding weights to words. Allows for using their own dictionaries and character norms.
NLP, Sentiment analysis	FreeLing	free	Divides text into tokens, performs morphological analysis of texts, parts of speech tagging, rule-based dependency parsing
NLP, Sentiment analysis	SenticNet	free, open-source	Extract certain words and phrases from the given text and categorizes emotions conveyed in them in terms of four affective dimensions (Pleasantness, Attention, Sensitivity, and Aptitude) and polarity is floating number between -1 and +1 (where -1 is extreme negativity and +1 is extreme positivity)
NLP, Sentiment analysis	Python: NLTK	free, open-source	It offers easy interfaces to more than 50 linguistic resources, allows for word classification, tokenization, finding a stem of a word, parts of speech tagging, parsing of texts, semantic reasoning, wrappers for industrial-strength NLP libraries.

Type of contents	Name	Commercial or free	Selected functionalities
NLP, Sentiment analysis	Java: Stanford CoreNLP	free	Offers parts of speech tagging, named entity recognizer (labels sequences of words in the text which are the names of things), text parsing, sentiment analysis, pattern learning, open information extraction tools
NLP, Sentiment analysis	Cython: SpaCy	free, open-source	Allows division of the text into tokens, recognition of named entities (labels sequences of words in a text which are the names of things), dependency parsing (creation of the grammatical sentence structure and relationships between "head" words and words which modify these heads), sentiment analysis
NLP, Sentiment analysis	Gensim	free, open-source	Topic modeling (classifies texts into topic clusters), indexes texts, finds similarities, prediction of the next word based on previous words, transforming words into vectors
NLP, topic modeling	Meaning Extraction Helper	free	Creates datasets for semantic analysis, processes customized content-coding schemes, word frequency analysis, topic modeling
NLP	IBM Watson	commercial	Detects emotional tones
NLP	Vader-Tots	free	Tokenizes text, sentiment analysis
NLP	Contextualizer	free	Extracts words that surround selected keywords or phrases, the user specifies words meaning positive or negative emotions and the software extracts them.
NLP for conversational data	ConverSplitter Plus	free	Splits apart transcribed files by each speaker, detects speaker tags and removes timestamps and other useless marks.
NLP, Sentiment analysis	Bitext	commercial	Sentiment analysis of texts
NLP, Sentiment analysis	MoodPatrol	commercial	Recognizes emotions and sentiment in texts
NLP, Sentiment analysis	Synesketch	free, open-source	Textural emotion recognition and maps emotions into images
NLP, Sentiment analysis	Tone API	commercial	Analyzes the emotional tone of a text.
NLP, Sentiment analysis	Repustate API	commercial	Emotions detection, social media sentiment analysis
audio, video, text for emotions and sentiment	Mixed Emotions	free, open-source	Estimating arousal, valence, big5 personality traits, emotion detection, and sentiment detection of texts.

Type of contents	Name	Commercial or free	Selected functionalities
speech analysis	PRAAT	free, open-source	Emotional state identification (feature extraction)
speech and video recognition and processing	OpenSMILE	free, open-source	Emotional state identification (feature extraction)
speech recognition and processing	OpenEAR (C++ code)	free, open-source	Emotional state identification (feature extraction)
speech recognition and processing	MIR Toolbox	free, open-source	Emotional state identification (feature extraction)
speech recognition and processing	Psysound	free, open-source	Emotional state identification (feature extraction)
speech recognition and processing	Marsyas (Music Analysis, Retrieval, and Synthesis for Audio Signals)	free, open-source	Emotional state identification (feature extraction)
speech recognition and processing	Vokaturi	free version and commercial version	Emotion recognition from speech
human body audio recognition	GoodVibrations	commercial	Emotion recognition from speech, heartbeat rate, lungs, other organs
facial expressions and speech	Affectiva	commercial	Facial and physical expressions recognition for emotions and intensity (heart rate), speech analysis
facial expressions	FlowingSoftware	free	Facial and physical expressions recognition for emotions and intensity
facial expressions	Cyflogic	free academic use	Facial and physical expressions recognition for emotions and intensity
facial expressions	CERT (The Computer Expression Recognition Toolbox (CERT))	free academic use	Facial and physical expressions recognition for emotions and intensity
facial expressions	Face++	commercial	Facial and physical expressions recognition for emotions and intensity, it can read postures
facial expressions	EmoVu	free	Facial and physical expressions recognition for emotions and intensity
facial expressions	Face (Microsoft Azure)	commercial	Facial and physical expressions recognition for emotions and intensity
facial expressions	Emotient	commercial	Facial and physical expressions recognition for emotions and intensity
facial expressions	Kairos	commercial	Facial and physical expressions recognition for emotions

Type of contents	Name	Commercial or free	Selected functionalities
facial expressions	Project Oxford	commercial but one can request it for free	Facial recognition of eight core emotional states – anger, contempt, fear, disgust, happiness, neutral, sadness or surprise
facial expressions	Face Reader (Noldus)	commercial	Facial and physical expressions recognition for emotions and intensity, eye tracking, physiology data
facial expressions	SightCorp	commercial	Facial and physical expressions recognition for emotions
facial expressions	SkyBiometry	commercial	Facial and physical expressions recognition for emotions
facial expressions	Imotions	commercial	Facial expressions, eye tracking, electrodermal activity, EEG, EMG, ECG
biometric detection	CrowdEmotion	commercial (startup)	Biometric detection, recognition of emotions
facial expressions	FacioMetrics	commercial	Facial and physical expressions recognition for emotions
facial expressions and semantic text analysis	AlchemyAPI	commercial	Facial and physical expressions recognition for emotions, analysis of texts for emotions and sentiment
facial expressions and text recognition	Vision API	commercial	Detects emotions from facial expressions and texts
facial expressions, pose and joint detection	Nviso	commercial	Facial and physical expressions recognition for emotions
wrist movements	PredPsych	free, open-source (R toolbox)	Wrist velocity, wrist height, grip aperture, physical expression of emotions

As can be seen in Table 3, there exist nowadays multiple libraries and programs which are capable of detecting emotions (lying) and personality types. One of the popular tools is the Linguistic Inquiry and Word Count (LIWC) software. LIWC was created based on text extraction and the vectors with word counts. Creators of the LIWC used this data for machine learning where the output vectors were the results of paper personality tests run on research objects. Another popular tool is the Sentic net, which is a knowledge base that contains over 100.000 natural language semantics, sentics and polarities which allow determination of 4 affective emotions: pleasantness, attention, sensitivity, and aptitude.

OpenSMILE is the acronym of open-source software for automatic extraction of features from audio signals and for classification of speech and music signals. OpenSMILE is capable of recognition of emotions, age, gender, personality. A similar tool is Praat but it has fewer functionalities than OpenSMILE.

FACS, Face++, Noldus, EmoVu, Affectiviti and CERT, are capable of recognizing facial expressions and can recognize different prototypical facial expressions. Face++ can also read body movements and postures.

Synesketch, NLTK, CoreNLP, Cython and SpaCy are used for natural language processing of text. They allow: tokenization, parts-of-speech tagging, dependency parsing, lemmatization, sentence boundary detection, named entity recognition, entity linking, similarity analysis, text classification,

rule-based matching, training and serialization. Gensim is a similar tool but with a narrower scope of functionalities and concentrates on topic modeling and document similarity analysis.

Freeling is a primary language processing suite for such purposes as tokenizing, morphological analyzers, lemmatizing, PoS tagging, chunking, etc. is a need for most NL applications such as Machine Translation, Summarization, Dialogue systems, etc.

Receptiviti API is used to analyze texts, tweets, emails, chats, surveys and voice data to provide insights into various aspects of people's personal lives, such as personality, emotion, tone and relationships.

Repustate API is used for sentiment analysis in the text. This API is based on linguistic theory and review cues based on POS tagging, lemmatization, prior polarity and negations.

Researchers also analyze linguistic styles (Newman et al. (Newman et al. 2003)) of how the directors communicate and the amount of information revealed to the media (Buller, Burgoon(Buller and Burgoon 1996)). Since social media use a specific language, researchers create dedicated dictionaries which should measure emotions in posts on social media (Loughran, McDonald (Loughran and Mcdonald 2011)). Social media and media informational contents include not only emotions and opinions, but also more direct information used in fraud prediction such as:

- The number of breaking news (Pak and Zhou (2014)),
- The number of messages on investor forums (Dong et al. (2018)),
- The number of comments to messages on investor forums (Dong et al. (2018)),
- Social connections of the CEOs modeled with graph databases (Kiedrowicz et al. (2018)).

As can be seen from table 4, new research that uses described new techniques of information extraction and new data sources seem to improve the efficiency of fraud detection.

Table 4: Fraud detection accuracy when financial data is supported by nonfinancial and social media information

Data type	Accuracy	Recall	Method	Source
Analysts calls	89.21	n.a.	logistic regression	Larcker and Zakolyukina (2012)
Management reports	82.95	93.57	logistic regression	Purda and Skillicom (2015)
Management reports	67.3	65.3	C4.5 (decision tree)	Humpherys et al. (2011)
Management reports	60.4	59.4	LWL	Humpherys et al. (2011)
Management reports	67.3	66.3	Jrip	Humpherys et al. (2011)
Management reports	67.3	69.3	Naive Bayes	Humpherys et al. (2011)
Management reports	65.8	71.3	SVM	Humpherys et al. (2011)
Analysts calls	n.a.	n.a.	logistic regression	Hobson et al. (2012)
Financial social media	80	83.04	SVM	Dong et al. (2016)
Financial social media	66.17	79.96	NN	Dong et al. (2016)
Financial social media	52.38	49.18	DT	Dong et al. (2016)

Data type	Accuracy	Recall	Method	Source
Financial social media	52.38	49.18	LR	Dong et al. (2016)

Conclusions and Recommendations

Figure 1 shows a summary of the financial fraud development methods. Detection techniques initially used financial and numerical data, mostly financial ratios and the most popular models, such as probit and logit functions. The first step of their evolution was increasing interest in nonfinancial variables from financial statements, basic data mining techniques and interest in the CEO's narcism. In the next step, researchers learned how to deal with unstructured data, extracted traits from speech and documents and used more sophisticated artificial intelligence techniques. Recently, one can see in the literature increasing interest in social media contents and extensive use of natural language processing. As to the future, if one looks at recent trends, there seems to be a gap in the research for a better understanding and measurement of the CEO personality traits, video recognition and other developments of affective computing.

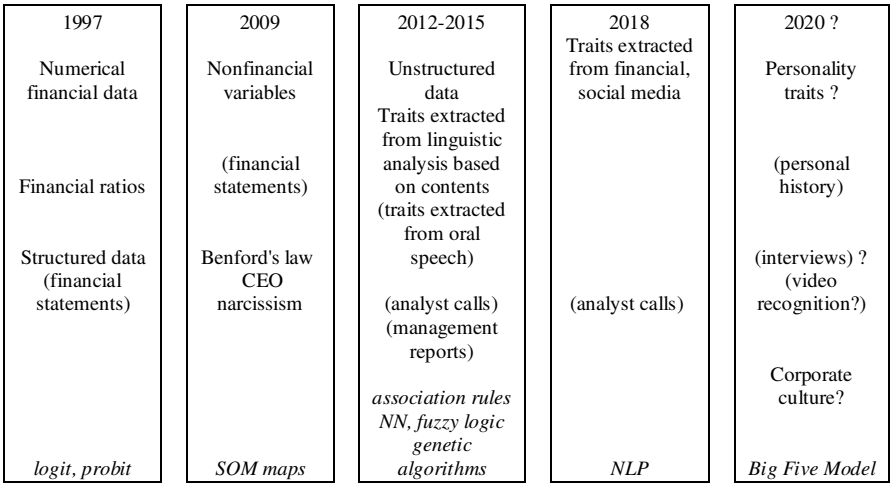

Figure 1: Development of corporate fraud detection models and algorithms

Recent developments in presented software tools suggest that in the future one may expect a better usage of video materials which can be tracked for physical signals of lying (facial expressions, physical symptoms of lying – heartbeat, breathing, blood pressure, wrist movements, perspiration, body posture) and better penetration of the internet resources for sentiment analysis. We also expect an improvement in the number of personality traits and emotions which can be detected so researchers can identify not only narcissuses but also psychopaths, excessive ambitions, tendency to manipulate other people, the criminal mind, arrogance, sycophants, lawbreakers, ease of rationalization (popular attributes of conscious fraudsters). It also seems that the recent developments in financial and non-financial reporting and the increasing trend for standardization of these reports will enable the researchers to use this new data in the prediction process.

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The Measure of Enterprise Development Defined by The Use of IT Systems Supporting Logistic Management: A Comparison of Poland And Germany

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Abstract

The motivation for undertaking the research was to prove an influence of various tools of logistic management on the enterprise development. Authors of the paper specified tools of logistic management as IT systems more and more often used by different enterprises. To indicate the impact of IT systems (in particular ERP, CRM and SCM systems) on enterprise development there were compared 10 economic branches on the grounds of the use of these systems. The aim of the research was to determine, in what trade the IT systems are applied to the highest extend and how does it impact the enterprise development. Additionally, there was analysed and compared the use of IT systems by enterprises functioning in particular industries of the Polish and German economy. In the research there were conducted analysis based on the methods of multidimensional benchmarking. The measure of development based on the application of systems fostering logistic management by enterprises of different industries was calculated and the concentration analysis by the means of HH index was conducted. The results of the research were presented in form of Tables.

Keywords: Development, IT Systems, Logistic Management

Introduction

The successive activity of enterprises depends on the effective management. The management is more and more connected with logistics, that makes it possible to organize flows of goods, people or information in every area in our life. There are many solution the leaders of a company may use to improve an enterprise prosperity, but the choice of appropriate tools is not an easy way. However, the use of IT systems supporting logistic management seems to be rational nowadays because of still growing amount of information the enterprises should gather and process. The IT systems can definitely foster the enterprise management, but the aim of the paper is to check, how the use of IT systems, especially ERP (Enterprise Recourse Planning), CRM (Customer Relationship Management), SCM (Supply Chain Management) systems affect the enterprise development.

The authors considered this area of research very actual and interesting. The comparison of industries in reference to the use of systems supporting logistic management enables to consider some special needs or demands of particular enterprises in order to improve their activity. The comparison of a whole industry, but in different economic conditions (in Poland and i Germany) makes the problem more complex and interesting, that can bring a new light on the analysed area. Namely, the use of IT solutions supporting logistic management affects the enterprise development at different levels in different economic conditions. According to the research data, the impact of ERP, CRM and SCM systems applied in various organizations is doubtless high, and leads to more skilful and effective management, thereby to more successive prosperity of enterprises, irrespective of some economic determinants. In the research there were used the methods of the multidimensional comparison analysis which enables to calculate the measure of enterprise development and a distance of an industry from the estimated pattern.

In the paper the authors tried to indicate how the application of systems supporting logistic management influence enterprises' development functioning in different sections of Polish and

German economy. To achieve this aim of research some methods of numerical taxonomy were used, and in particular the methods of linear ordering of objects. The analysis was conducted on the basis of statistical data available for years 2009 and 2017 from Central Statistical Office (GUS for Poland) and Statistical Office (Statistisches Bundesamt for Germany). The aim of the study was to determine the similarities and differences in terms of the grade of application of IT systems, as ERP, CRM and SCM in the enterprises of various trades in Poland and Germany.

Research Questions

In order to conduct the research the following research questions were stated:

- Does the application of IT systems effect the enterprise development?
- To what extent different industries apply IT systems supporting logistic management?
- Which of the analysed industries are characterized by the highest measure of development in reference to application of ERP, CRM and SCM systems?

To answer in detail the questions above, and some further questions, that may result from the research, the study might to be extended in time. There is a basis for further discussions in this area.

Literature Review

Modern enterprises need to use information gathering and processing technologies to be able to operate in global supply chains. Information technologies (IT), enabling the flow of information, play an important role in the business and financial results of the enterprise. IT makes the supply chain more reliable, load-resistant and at the same time efficient (Tseng et al. 2011). Enterprises have many solutions to choose from. Firstly, they can implement those that enable conducting a customer-oriented strategy - CRM (Jelonek 2006, 2015, Pozza et al. 2018, Sulaiman et al. 2014). CRM as an IT system enables the implementation of CRM strategies. Customer records, grouping of contacts with clients, project management and other possibilities of this system enable an individual approach to the client.

Secondly, enterprises can choose the solutions that enable global exchange of information between partners in the supply chain - ERP (Mesjasz-Lech 2015, Hendricks et al. 2007, Kot et al. 2015). ERP systems support both specialized production functions as well as quality management, repairs, service and creation of management reports. Characteristic for ERP is the generation of comprehensive financial analyzes for the needs of management. ERP systems combine various processes in an enterprise and its supply chain through one logical database. However, despite the fact that most of the major ERP systems contain a CRM module, in practice the use of separate CRM systems is observed in many organizations (Haddara and Constantini 2017).

Thirdly, enterprises can use SCM systems, often called complementary to ERP (Lo et al. 2008), because the ERP system integrates information within one application, and individual applications of the SCM system use it as a source of current data. There are two types of SCM systems: internal regarding supply, production and distribution, and external enabling integration of the enterprise with its suppliers and customers. Thanks to the SCM system, enterprises can more flexibly and effectively influence their suppliers and clients, including them in executive or planning processes (Su and Yang 2010).

The research presented in the article is based on the use of the above-mentioned systems in Polish and German enterprises of various trades.

Research Design and Methodology

A deep cognition of both simple and complex economic phenomena influencing an enterprises' prosperity in different trades is possible only by means of a thorough multidimensional analysis, by which some statistical methods are used. The units' research according to the complex phenomena

(those, which are described by many variables) does not bring the possibility of direct confirmation, which of these test units shows the highest level of the complex phenomenon. It is, therefore necessary the use of some methods from the field of statistical multidimensional analysis, specifying – some methods of benchmarking, that allow to explain such issues as following:

- an evaluation of differences among researched units in terms of complex phenomenon,
- an ordination of researched units in terms of level of complex phenomenon.

In the statistical analysis there are significant these definitions:

- an object (the statistical unit being researched),
- variable (the specification describing population of objects and having for every single object some defined value),
- measurement of variables (the assignment of numbers for every object in such a way, that these numbers reflect relations among objects).

By the use of methods of multidimensional statistical analysis there is necessary to know how the variables can be divided according to the specific features they can poses. There are distinguished stimulants (variables having higher values, which are desired from the perspective of general character of researched phenomenon), destimulants (variables having higher values, which are not desired from the perspective of general character of researched phenomenon) and nominants (variables having deviations from normal level, which are not desired from the perspective of general character of researched phenomenon).

Linear ordering methods constituting the basis of multidimensional benchmarking are widely used especially by the evaluation of objects variety according to the achieved level of economic development. The application of these methods enables, i.a.:

- hierarchy of objects in multidimensional fields of features. The hierarchy because of its special character cannot be measured directly,
- extraction of objects which characters are similar in terms of analysed features,
- designation of development pattern for researched objects'
- indication of the most informative features and evaluation of impact of essential variables on the level of economic growth.

The aim of grouping methods is, in turn, to separate out of sets similar in terms of some elements. It is done not only to designate the function value of particular criterion, but also to find such a displacement among groups, which may influence value improvement of criterion function. Multidimensional benchmarking enables to study a complex phenomenon specified by few variables, which constitutes development potential of enterprises functioning in different economic sections. The development potential is defined by means of economic indicators. It has been researched the variable vector, as following:

$$X = [X_1 \dots X_m],$$

by which *m* means number of variables. By the application of multidimensional benchmarking methods there should be extracted variables defined by the same units of measurement with similar orders of magnitude, and that is why it is recommended to normalize the variables in order to standardize both - measurement units of variables and orders of magnitude of variables. An often used way to normalize variables is the standardisation conducted according to the scheme:

$$z_{ij} - \frac{x_{ij} - \bar{x}_j}{S_j}, (i - 1, 2, \dots, n; j - 1, 2, \dots, m)$$

wherein particular symbols mean:

n – the number of objects

z_{ij} – standardized variable value X*j* for i-th object,

$\bar{x}_j$ - arithmetic average of a variable X*j*,

S_j – standard deviation of a variable X*j*.

The term that enables the comparison of objects relative to each other, from the view of complex phenomenon, is the similarity defined as the fact, that objects are the more similar, the more similar are the variable values defining particular complex phenomenon. The similarity perceived in this way is measured in the multidimensional benchmarking by means of the distance between objects, that assigns one value to the two objects. It is therefore necessary to denominate the Euclidean distances of particular objects in relation to the reference object according to the scheme:

$$d_{i0} = \sqrt{\sum_{j=1}^{m}(z_{ij} - z_{0j})^2} \qquad \text{(i=1, …, n)}$$

wherein,

$$z_{0j} = \begin{cases} \max_i z_{ij} & \textit{for stimulants} \\ \min_i z_{ij} & \textit{for destimulants} \end{cases}$$

It was established, that the influence level of all variables on the analysed phenomenon is the same. There was estimated the measure of development for each object according to the scheme:

$$m_i = 1 - \frac{d_{i0}}{d_o} \qquad \text{(i=1, …, n),}$$

wherein d0 means distance between pattern and anti-pattern of development defined by the scheme:

$$d_0 = \sqrt{\sum_{j=1}^{m}(z_{ij} - z_{_0j})^2} \qquad (i = 1, \ldots, n)$$

wherein:

$$z_{_0j} = \begin{cases} \min_i z_{ij} & \textit{for stimulants} \\ \max_i z_{ij} & \textit{for destimulants} \end{cases}$$

For the measure of development defined in this way, which values are in the range [0,1], it is accepted, that the higher its value , the higher the level of researched phenomenon.

For studies in this paper there was estimated the synthetic measurement aimed to analyse the concentration of logistic management potential influencing the development of enterprises functioning in different economic branches. Economic studies should be based on numerical recognition of concentration strength understood as a grade of irregular distribution of values of variables features for particular units of researched statistical population. In aim to research the concentration strength there was applied the Herfindahl-Hirschman Index (HHI), which values are in range (1/n; 1), and the higher its value, the stronger concentration. The Herfindahl-Hirschman Index was estimated according to the scheme:

$$H = \sum_{i=1}^{n} z_i^2$$

wherein z_i means the value share of the researched feature of i-th object in the total sum of values of the studied phenomenon for all analysed *n* units.

Results

The unit of the economy is a section. Economic sections differ, i.a. in the grade of the use of various IT systems supporting logistic management in particular enterprises. It is, therefore necessary to evaluate the intensity of application of IT systems in various industries. As a tool of this evaluation there were used the methods of multidimensional data analysis. In the aim to evaluate the potential of IT systems as factors influencing enterprise development in various economic sections in a context of logistic management, there was used the method of linear ordering from the field of multidimensional benchmarking. It was established, that the IT systems potential may be determined by the synthetic variable, which comprises the use of various software types – ERP, CRM and SCM. In the research there were analysed ten key economic sections, as following: Industrial processing (C Section), Production and supply of electricity, gas and steam, water supply. Sewage and waste management (D and E Section), Construction (F Section), Trade and Repair (G Section), Transport and Storage (H Section), Accommodation and Catering (I Section), Information and Communication (J Section), Real Estate Market Service (L Section), Science and Technology (M Section), Administration and Support Activities (N Section). Furthermore, the economic sections listed above were compared in two European Union countries – Poland and Germany, and for the researched the data from Polish and German statistical office for the years 2017 and 2009 were analysed. It was assumed, that the grade of the IT systems constitutes the basis of logistic management development of enterprises in particular industry. The determination of synthetic variable has enabled to create a ranking of industries in terms of the intensity of the IT systems application. In the research the following variables were distinguished:

X_1 – the share of enterprises of particular industry using ERP systems in order to transfer information between different departments of an enterprise (eg. accounting, marketing, production),
X_2 – the share of enterprises of particular industry using CRM systems in order to manage customer information that enable to collect and store customer information, and to provide access to these information for various enterprise departments,
X_3 – the share of enterprises of particular industry using CRM systems in order to manage customer information that enable to analyse customer information for marketing aims (e.g. pricing, promotion management, choice of distribution channels)
X_4 – the share of enterprises of particular industry using SCM systems in the area of electronic exchange of information on supply chain management with suppliers or recipients.

The all variables are characterized as stimulants. These variables create the potential of enterprises of particular industry. The results of the linear ordering were depicted together for all four variables groups – the application of three different IT systems: ERP, CRM, SCM in Poland for the year 2009 (Table 1.), and for the year 2017 (Table 2.), in Germany for the year 2009 (Table 3.), and for the year 20017 (Table 4.). All the Tables 1. – 4. present the ranking of industries (from above there are placed the industries having the highest measure of development value). This way of results depiction enables to compare, how high was the level of ERP, CRM and SCM systems application by enterprises in particular industries.

Table 1: The results of linear ordering – the distance of objects from the development pattern and the measure of development for IT systems (ERP, CRM, SCM) potential in Poland in the year 2009

Industry/Economic Section	The distance of objects from the pattern	Measure of development
Information and Communication - J	0.620938	0.986024
Trade and Repair - G	2.693774	0.939370
Production and supply of electricity, gas and steam, water supply. Sewage and waste management – D; E	3.786250	0.914781
Science and Technology - M	4.187435	0.905751
Industrial processing - C	4.302620	0.903159
Transport and Storage - H	4.609612	0.896249
Administration and Support Activities - N	5.143177	0.884240
Real Estate Market Service - L	6.031202	0.864252
Accommodation and Catering - I	6.225903	0.859870
Construction - F	6.368566	0.856659

Source: own compilation

The enterprises of the Information and Communication Industry, that use IT systems (ERP, CRM, SCM) present the best conditions for the enterprise development potential in the context of applied IT systems supporting logistic management. In the other industries the development conditions are also good, what is confirmed by the high value of the measure of development index. In the case of Poland, in both analysed years 2009 and 2017 (Tables 1. and 2.), the best economic section, in terms of the application of IT systems supporting the logistic management in enterprises, was the Information and Communication Industry (J Section), what, in reference to its activity specification based on the application of various IT solutions, seems to be obvious.

Table 2: The results of linear ordering – the distance of objects from the development pattern and the measure of development for IT systems (ERP, CRM, SCM) potential in Poland in the year 2017

Industry/Economic Section	The distance of objects from the pattern	Measure of development
Information and Communication - J	0	1
Trade and Repair - G	3.540649494	0.930355964
Industrial processing - C	4.310378517	0.915215511
Administration and Support Activities - N	4.474036010	0.911996393
Production and supply of electricity, gas and steam, water supply. Sewage and waste management – D; E	4.557612487	0.910352457
Science and Technology - M	4.987700823	0.901892685
Transport and Storage - H	5.600680813	0.889835462
Real Estate Market Service - L	6.002094444	0.881939717
Accommodation and Catering - I	6.287688223	0.876322131
Construction - F	6.631460859	0.869560175

Source: own compilation

It is worth noticing, that in the year 2017 the Information and Communication Industry achieved the result of 1, what indicates, that this economic section may constitute a pattern to follow for enterprises of other industries, taking into consideration the enterprises development as a result of the given IT systems use. Invariably for two analysed years – 2009 and 2017 on the second place in the ranking is the G Section – Trade and Repair Industry. By the other economic sections it is to observe,

that there are slight fluctuations in terms of ranking places occupied by them. In both analysed years – 2009 and 2017 the last three places are taken by Real Estate Market Service – L, Accommodation and Catering – I, Construction – F. It should be stated, that despite of the ranking of the best (in reference to the measure of development perceived from the perspective of IT systems application supporting logistic management in enterprises) industries, all researched economic sections are characterized by the very high value of the measure of development, and their Euclidean distances relative to the pattern is very small. Taking into consideration the results of the research it should be added, that there are definitely some areas in the enterprises of industries placed lower in the ranking, that need to be improved.

A bit different looks the situation in the case of Germany in the researched years 2009 and 2017 (Tables 3. and 4.). There are to observe greater fluctuations by the placing of industries ranking of the best developing economic sections in reference to the use of IT systems supporting logistic management in enterprises.

Table 3: The results of linear ordering – the distance of objects from the development pattern and the measure of development for IT systems (ERP, CRM, SCM) potential in Germany in the year 2009

Industry/Economic Section	The distance of objects from the pattern	Measure of development
Production and supply of electricity, gas and steam, water supply. Sewage and waste management – D; E	2.302680	0.946580
Trade and Repair - G	2.721688	0.936859
Information and Communication - J	2.948839	0.931589
Industrial processing - C	4.043305	0.906199
Real Estate Market Service - L	4.911742	0.886052
Administration and Support Activities - N	5.239075	0.878458
Science and Technology - M	5.462872	0.873266
Transport and Storage - H	5.852989	0.864216
Construction - F	5.862623	0.863992
Accommodation and Catering - I	6.218069	0.855746

Source: own compilation

While in the analysed year 2009 (Table 3.) the economic sections D and E (Production and supply of electricity, gas and steam, water supply. Sewage and waste management) indicated the best result in relation to the measure of development calculated in the research, they felt on the 4th place in the industry ranking in the year 2017. In the year 2009 only third place of the Information and Communication Industry (J Section) which activity is based on the use of different ICT solutions, can be also considered unusual. The last three places were taken by the economic sections, as following: Transport and Storage – H, Construction – F, Accommodation and Catering – I. Similar to Poland all analysed industries in German economy indicated the high value of the measure of development, but despite of that there are still some issues by the application of IT systems supporting logistic management in German enterprises to improve.

The linear ordering methods used in the research enabled not only to indicate the best industries, but also to determine their similarity to the pattern the enterprises should follow to succeed. The analysis, in reference to the application ERP, CRM i SCM systems supporting logistic management in enterprises, allows to compare to what extent the application of these systems may influence both - the enterprises development of the given industry, and the decision-making concerning some future activities fostering enterprise development.

Table 4: The results of linear ordering – the distance of objects from the development pattern and the measure of development for IT systems (ERP, CRM, SCM) potential in Germany in the year 2017

Industry/Economic Section	The distance of objects from the pattern	Measure of development
Trade and Repair - G	1.393940	0.965825
Information and Communication - J	1.481566	0.963677
Industrial processing - C	2..692511	0.933989
Production and supply of electricity, gas and steam, water supply. Sewage and waste management – D; E	2.972921	0.927114
Real Estate Market Service - L	4.376903	0.892693
Science and Technology - M	4.722806	0.884213
Administration and Support Activities - N	5.015551	0.877036
Transport and Storage - H	5.142960	0.873912
Construction - F	5.569970	0.863443
Accommodation and Catering - I	6.107582	0.850263

Source: own compilation

The potential of logistic management tools based on the application of ERP, CRM i SCM systems constitutes an internal element of enterprises structure leading to their development. Considering separately the variables creating the potential of logistic management, there are concentration indices (HHI) presented in Tables 5. and 6. worth noticing.

Table 5: Herfindahl-Hirschman Indices for the use of IT systems potential in Poland in the years 2009 and 2017

Variable	HHI in 2017	HHI in 2009
The application of ERP systems	0.231	0.307
The application of CRM systems in order to manage customer information that enable to collect and store customer information, and to provide access to these information for various enterprise departments	0.213	0.256
The application of CRM systems in order to manage customer information that enable to analyse customer information for marketing aims (e.g. pricing, promotion management, choice of distribution channels)	0.245	0.296
The application of SCM systems in the area of electronic exchange of information on supply chain management with suppliers or recipients	0.256	0.329

Source: own compilation

In the concentration analysis there was researched the grade of the use of ERP, CRM, SCM systems in enterprises of particular industries in Poland and Germany. The high concentration is to observe by all analysed features in both analysed years 2009 and 2017. The highest values of the HH Indexes in this variable group appeared in the number of enterprises using SCM systems. The presented research data showed also, that in the year 2017 in comparison to the year 2009 the concentration inequality in reference to the grade of the application of all analysed IT systems has decreased. It means, that the enterprises functioning in various industries are becoming more and more eager to use many tools supporting logistic management, which are IT systems.

Table 6: Herfindahl-Hirschman Indices for the use of IT systems potential in Germany in the years 2009 and 2017

Variable	HHI In 2017	HHI in 2009
The application of ERP systems	0.119	0.139
The application of CRM systems in order to manage customer information that enable to collect and store customer information, and to provide access to these information for various enterprise departments	0.107	0.107
The application of CRM systems in order to manage customer information that enable to analyse customer information for marketing aims (e.g. pricing, promotion management, choice of distribution channels)	0.120	0.114
The application of SCM systems in the area of electronic exchange of information on supply chain management with suppliers or recipients	0.116	0.194

Source: own compilation

In the case of German enterprises in comparison to Polish enterprises it is to observe a lower level of concentration for all features and both years 2009 and 2017 analysed in the research. The highest values of the HH Index in this variables group appeared in the number of enterprises using CRM systems enabling to analyse customer information for marketing aims (e.g. pricing, promotion management, choice of distribution channels). The concentration analysis indicates not significant irregularity among researched variables in different economic sections in Germany. It means, that enterprises of various industries in German economy use many tools supporting logistic management, which are IT systems, to much higher extent in comparison to Polish enterprises.

Discussion

The research paper confirmed, that logistic management has a huge impact on the enterprise development. In the study the logistic management is defined as the grade of the application of IT systems supporting management. In the research the attention was paid to the IT system as: ERP systems, enabling the planning of all issues connected with all – production, distribution, or marketing; CRM systems providing some special power for an enterprise by collecting, storing and processing customer information; and finally SCM systems organizing flows of various types inside and outside an enterprise. The measure of development calculated by the means of the variables described as the use of particular system indicated, that all analysed industries present high values, and the distance from the estimated pattern is small. It may be stated, that the use of ERP, CRM, SCM systems influence the enterprise development.

The comparison of research results from two economies – Poland and Germany – allowed to draw several conclusions. Namely, the Polish and German industries are applying IT systems supporting logistic management to a similar extent. Despite of some economic differences between these two analysed countries, especially when we look few years in the past – the year 2009 – the measure of development presents similar values. It means, that the application of ERP, CRM and SCM systems not only support the enterprise activity, but also influences enterprise development.

There are many fields in enterprises, where the IT systems listed above may be applicated. Their highest impact is definitely seen by the organization of production (extremely precious are here the ERP systems that control the remain recourses of an enterprise and determine the future resources) and distribution of products (the SCM IT systems enable to plan almost all logistic processes; the supply chains can hardly be managed without these systems). In other areas of a business organization very helpful are definitely the CRM systems leading to better connection with end consumers. The CRM systems applicated in order not only to gather, store and process some

customer information, but also to analyze these information in reference to better sales records. The CRM systems play also an important role in different departments of an enterprises, as i.e. Accounting or a Customer service. The results of the research presented in the paper show the consciousness of enterprises by the use of IT systems supporting logistic management. During following years the application of all analyzed systems has increased in all enterprises regardless the industry, type, model or different economic conditions of activity. The prosperity of enterprises is seen by the prism of overwhelming digitalization of data that are nowadays the highest value of an enterprise.

Study limitations

The study reflects one of many possible analyzes of enterprises development by the means of use of logistic management tools. Another approach that may be used in further research is the use of other tools supporting management of an enterprise and leading to its development. The problem is in lacking of macro data for whole industries. For the multidimensional benchmarking data must be compatible according to time and variables feature. The particular enterprises using some effective instruments of logistic management cannot create a pattern for other organizations. Another step in the development of the problem may be the comparison of industries of totally different economies, with different business conditions e.g. in terms of the location or financing. It is worth checking, what are the measure of development values (development understood as the use of logistic management tools) in the industries or particular enterprises functioning on the hard business areas.

Conclusion

The issue discussed in the paper, namely enterprise development due to logistic management is very complex. In addition the problem in reference to different economies – to Poland and Germany- is more complicated in terms of the lack of examples in science literature according to the use of logistic management tools in different business conditions. The range of logistic management tools is very wide, so the choice of some appropriate instruments supporting enterprise functioning is not easy. The use of IT solutions fostering logistic management of enterprises is more and more often chosen, because of the standing access to the information exchange we have nowadays by means of desktop or mobile devices. Despite of this fact, the digitalized data are much easier to process, and the systems as ERP, CRM, SCM definitely facilitate the organization activity. The methods of multidimensional comparison analysis used in the research were aimed to answer i.e. how the use of IT systems supporting logistic management affects the enterprise development. The measure of development of enterprises using ERP, CRM, SCM systems indicated very high values, which confirms that there is strong impact to observe by all of the industries analysed. Moreover the Euclidean distances from the estimated pattern to follow by all enterprises in order to succeed is very small. It is wart noticing, that the values of HH Index meaning concentration of the use of particular IT system analysed, are also high. The high value of the measure of development and the HH Index are compatible, which indicates, that the higher grade of ERP, CRM, SCM systems application, the higher is the measure of development value. The attention should be also paid to the fact, that the use of the given IT systems in Polish and German industries are similar. From all the data presented in the research it is concluded, that the enterprise development highly depend on the application of IT systems fostering logistic management.

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Mobile Devices in Organization Need or Whim – Case Study from University of Information Technology and Management in Rzeszow

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Abstract

Organizations are very different now compared to the last three or five years. New mobile technologies are changing business models, strategies and trends in organizations. Mobile technologies resulted in many challenges not only for organization and employees but also for end customers. The main goal of this article is examining the technological maturity of the end customers - in this case students of the University of Information Technology and Management in Rzeszow (UITM), Poland. To answer the research questions three steps were taken. At the beginning a literature review was carried out. Then the global statistics on mobile solutions (devices and applications) were analysed to discover technology trends. At the end the text-based survey was conducted among 640 persons representing 25 countries. The research results allow to draw a conclusion that the rapid development of mobile devices and mobile applications is forcing organizations to create new strategies - to implement new technologies. The research also led to discover that end customers of the UITM are technologically and mentally ready for using mobile technologies.The results presented in this article are a part of two-years research project: The adoption of a mobile solution in the context of university education. The project was financed by statutory grant from University of Information Technology and Management in Rzeszow, Poland.

Keywords: Mobile Devices, Mobile Technologies, Mobile Applications.

Introduction

The society of the 21st century is the society of mobile devices. In times of mobile technology domination, the quality of corporate applications often determines the choice of a specific offer: bank, store, office or training. New technologies have changed, change and will change strategy of nowadays organizations.

First part of the article presents literature review with current knowledge on the subject of interest.

Introducing mobile devices in business organizations require considering the technological trends, therefore second part of the article familiarized author with statistical data with current trends in area of mobile devices, mobile Internet and mobile applications. The following rankings have been considered: Statista, RFBenchmark, Teachthought, eMarketer or the Polish Internet Research Report.

Fast-growing organizations know the value of employee training. It is obvious that mobile training saves employees time and employers time and money. Mobile learning is not only used in the formal university education but also in education in the workplace. The last part of this paper discusses the problem of acceptance of mobile devices in the context of the University of Information Technology and Management, private university in Poland. The empirical analysis of questionnaire led to answer the questions: Are end customers mentally and technically prepared for mobile learning? The prepared Questionnaire can be used at universities and educational institutions of all profiles. The analysis of the research answers will allow university authorities and managers in organizations to discover if end customers are ready to implement mobile learning.

Literature Review

The general overview of the field of interest will help us not only to summarize and evaluate the research area goal but also familiarize us with present-day solutions of mobile learning used at universities worldwide.

Mobile devices are part of our daily life, this resulted in many new technologies for organizations such as: Bring You Own Device (BYOD) - Bring Your Own Device according Kearney is (2012) "the strategy that allows employees, business partners and other users to use a personally selected and purchased client device to execute enterprise applications and access data", or Mobile Device Management (MDM) solution which helps organizations to deploy, monitor and manage all the mobile devices in their organization. Deyan calculated that 78.48% of organizations in the US had BYOD activities in 2018.

One of the successful tools in many business segments today are Augmented Reality (AR) and Virtual Reality (VR). Slusarczyk et al (2019) mentioned: "Virtual reality offers human recourse (HR) employees a new way to provide an interesting experience for candidates and employees through basic HR processes—hiring, adapting, training, organizing work. Interactivity, which is at the heart of AR/VR, allows not only assessing the competences and skills of a candidate or company employee, but also identifying his strengths and weaknesses".

It seems that organisations need to work on a mobile technology to meet the need and demand of their business partners current employees and also to encourage potential employees.

Of course, implementing mobile devices in an organization has many challenges. One of the challenges will be examined in this article – end customer technological maturity. Customers' and employees' response to mobile technologies depends on how open they are to new technological solutions. What approach do they have to mobile applications? Are they ready to improve their qualifications using mobile applications?

Research conducted in the team of Jorge De-la-Calleja (2020) from the Polytechnic Puebla, Mexico show that Mobile Learning System have 82.4% acceptance by users. Several surveys of student's attitudes towards m-learning have been conducted but further studies are needed to better understand the reality of developing countries.

Mobile learning is not only used in the formal education but also is used in informal education in the workplace or in museum institutions. Language teachers have especially been interested in using these devices as a means of providing learning opportunities.

The researchers from Taiwan in article "Review of trends from mobile learning studies: A meta-analysis" (2012) indicate that 86% of the analyzed studies show positive results for mobile learning. The study in this article confirms this trend - 65.3% students at the University of Information Technology and Management in Rzeszow reported wanting lecturers to integrate mobile applications into courses.

In article of Crompton, Burke (2018) we can read: "higher education faculty are encouraged to consider the opportunity to expand their learning possibilities beyond the classroom with mobile learning".

The Technological Trends

Does the dynamically growing market of mobile devices have a chance to change the way of doing business? How mobile devices market look like today?

To answer this question, we will consider mobile technology trends in three training/educational areas:

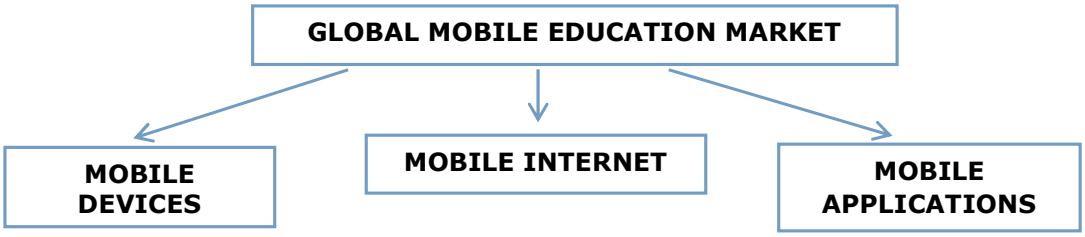

The global mobile education market is growing dynamically, and according to forecasts, this trend should continue. In 2020, it will reach $ 37,800,000, according to a study by statista.com, (18.10.2019).

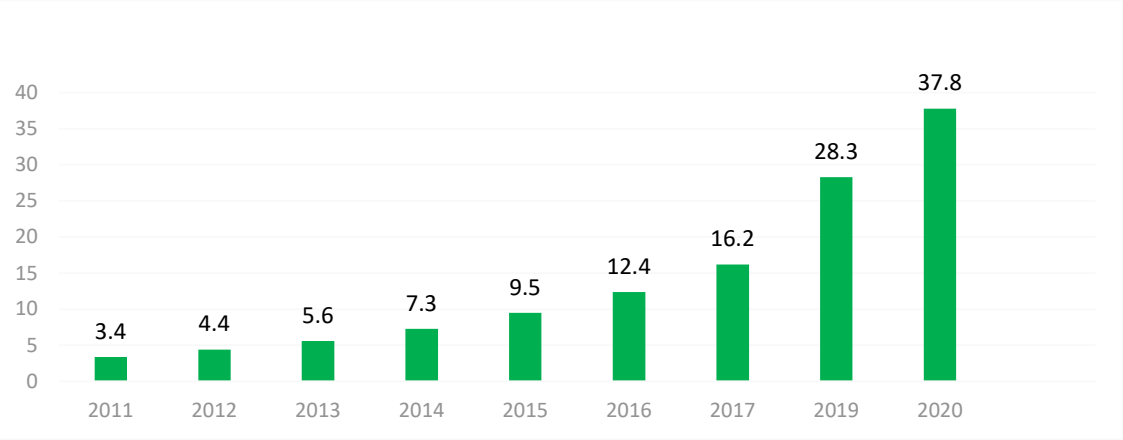

Fig. 1: The global mobile education market in 2011-2020 (in millions of dollars)

Which applications are the most popular among owners of mobile devices?

It is not surprising that the most popular are games that make up almost 25% of all downloads. But, remarkably, educational materials are already in third place among the most downloaded applications in the Apple App Store (Figure 2, www.statista.com (18.08.2018)). This information indicates that mobile device users not only want, but use mobile education.

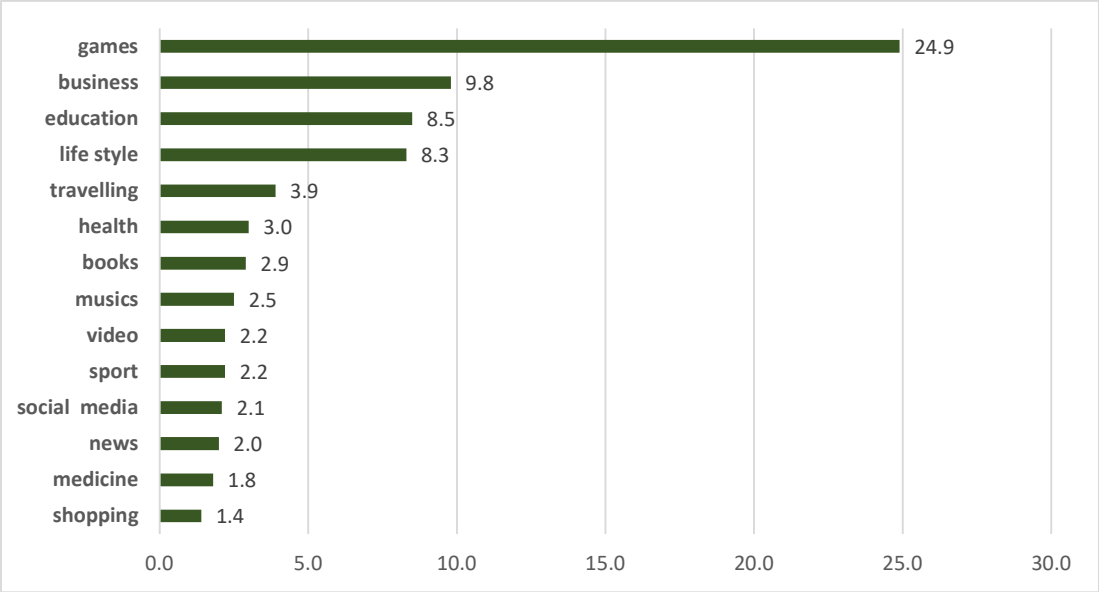

Fig. 2: Selected popular applications in the Apple App Store in May 2018 (number of downloads in percent)

What Polish statistics show? Are we technically prepared for mobile learning? To answer this question, we have to analyse access to three tools necessary for m-learning, these include: mobile devices, mobile Internet and mobile applications.

How popular are **mobile devices** in Poland? According to the eMarketer report in 2015, 7,400,000 people used the tablet. According to forecasts, by 2020 this number is to increase to almost 10,000,000, i.e. more than a quarter of our society will have tablets (emarketer.com, 05/10/2019).

Mobile Internet is required to use mobile applications. In the ranking of mobile Internet speed and quality of mobile operators in Poland, according to RFBenchmark, two networks were at the forefront: T-Mobile and Orange. Based on 26,127 measurements among mobile Internet users, it can be seen that the best average data upload speed is 11.94 Mb/s (TMobile). On the other hand, Orange services with 30 Mb/s rank first in terms of data download speed. These parameters are sufficient for working with mobile applications. They will allow for video conferencing or downloading large files.

How popular are educational websites? According to PBI reports: On average, almost 19,000,000 Internet users visit education-related websites once a month, of which 13,900,000 use a computer, and 11,600,000 million mobile devices. In August 2017, educational services were in sixth place in terms of the most-visited thematic categories with over 16,000,000 users (Educational websites, Polish Internet Research Report, pbi.org.pl).

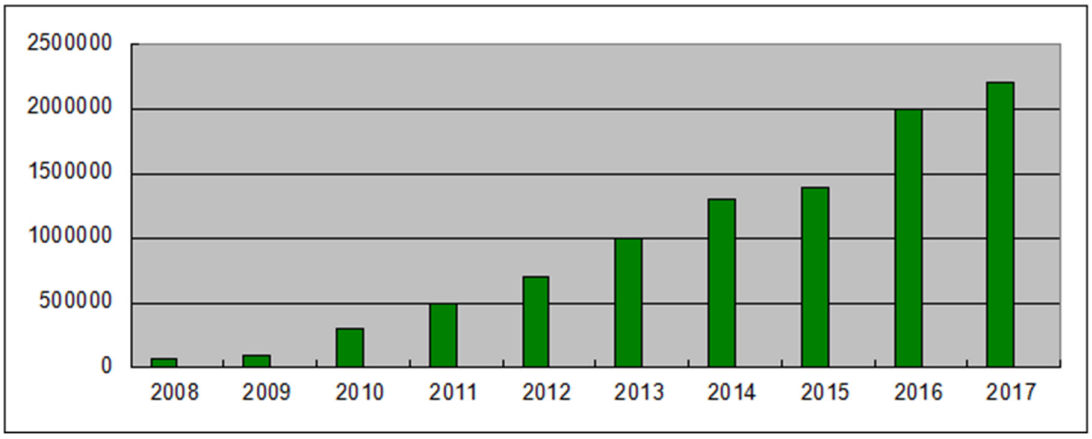

Fig. 3: Number of applications available in the Apple App Store in 2008-2017 (www.statista.com)

The Apple App Store was launched in July 2008, and already in April 2009 recorded 1,000,000 application downloads. According to analyses by the Statista.com team, it is estimated that in 2022, iPad users worldwide will download approximately 2,600,000 applications from the Apple App Store.

According to the Educational App Store, there are currently 500,000 **educational applications** on the market. An undoubted drawback is the lack of Polish language versions of educational applications.

The Figures 1-3 leave no doubt that the market related to mobile devices and mobile applications is developing dynamically and Poland is not lagging behind in this field.

Every academic teacher faces a difficult decision: "Do I want to enrich classes with materials using mobile devices?". The analysis is the basis for conducting a survey that sheds light on: How do students at Polish universities use mobile devices? Are they open to mobile learning?

Interesting data have been collected by Eurostat (2019), concerning Internet and Information and Communication Technologies (ICT) use among students from Poland and the European Union (EU). The level of digital skills is high: 89% of Polish students have basic or above basic overall digital skills, whereas 87% overall in the EU. Only 38% of Polish students use Internet resources for any educational activity (59% in EU). Also, learning from online courses is not popular (7% of users). The reason may be low student awareness of good quality online courses in one's native language. The second reason could also be the lack of e-learning infrastructure at some universities.

Acceptance of mobile devices in the context of UITM

Research Methodology

The research population consists of students from UITM - 5,157 students from 25 countries. Almost 12.5% (640) of the overall student population participated in the research. Is the research sample representative? To verify it we checked two attributes: gender and level of education. Figures 4 and 5 provide graphical representations of the answers.

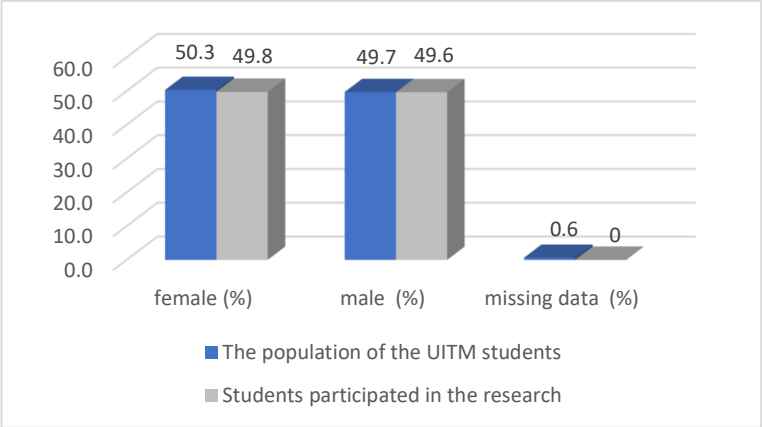

Fig 4: Gender of UITM student population versus research sample

As shown, 50.3% of UITM students are female, while 49.5% of our research sample were female, a difference of only 0.8%. The male population differs by just 0.1%. Thus, our sample is almost identical to the population of interest. During recruitment were entered into the database 0.6% missing data, but we assume it does not influence the research results.

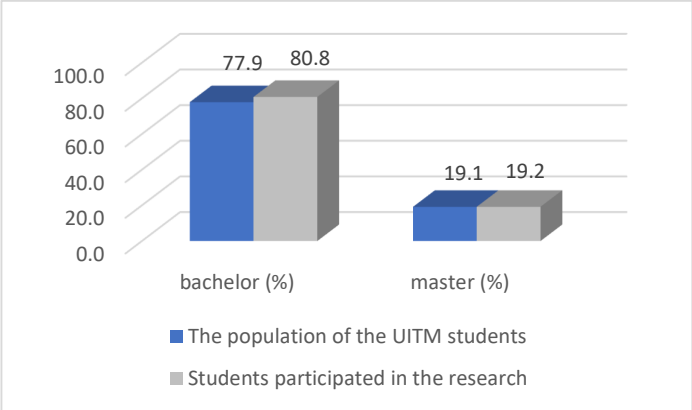

Fig. 5: Level of education of UITM students versus research sample

While 77.9% of UITM students' study at the bachelor's level, 80.8% of our participants did so, to give a nonsignificant difference of 0.1%.

As shown, our sample has characteristics of the whole population in the specified attributes of gender and level of study. Our sample is representative, and we can generalize our study results to the whole population of UITM students.

All students participated voluntarily in the survey and all data were collected anonymously. Research participants represent 11 fields of study provided by University, with 69.9% of all participants and the majority of the overall University student body studying in the five fields of Management, Computer Graphics, Information Technology, Aviation Management, and International Management.

The 29 questions of survey grouped into three sections. The first section comprised personal information on age, field of study, year of study, gender, sex, and country of origin. The second section asked about the specifications of mobile devices owned by students and how they use mobile tools.

The final section asked about attitudes towards current and, more importantly, future use of mobile devices in education.

The survey was designed by experts – educators form UITM. The data were collected from students in a class and the instructor was one of the researchers.

The Statistical Package for the Social Sciences – IBM SPSS Statistics 25 (SPSS) - was used to compute all data. All survey variables were provided in a nominal scale; thus, before applying computer analysis, we coded all data, and text-based answers were transformed to numbers. The questionnaire analysis was based on the descriptive statistics.

Results

A total of 640 students, including 322 (50.3%) female and 318 (49.7%) male students, participated in the study.

At the beginning of our study we checked if students owned **mobile devices**. The survey indicates that 99.7% of participants own a mobile device, including 100% women who participated in the study. We suspect that non-admission of ownership of mobile devices was a student joke. Nevertheless, we found these answers statistically significant.

The largest percentage of respondents in the study were students from Poland studying in the home country, so it is not surprising they have an unlimited or 10 GB Internet package. The foreign students' situation is slightly worse. For example, almost 35% of students from Kazakhstan do not have access to **mobile Internet**. Also, students from Ukraine have an unlimited Internet package less frequently than their Polish colleagues. This does not mean that students do not use the Internet and mobile applications; they often use the university's Wi-Fi network.

In the open question, students were asked about the most frequently used **educational mobile applications** related to their field of study, to which 45% of the students responded that there were educational applications related to their field of study but unfortunately did not provide any particular names. Students mainly use an application to manage their learning process - muczelnia (20%). In addition, because of the university's high level of internationalization, the apps for learning foreign languages were among the most frequently mentioned (9,6%). A mobile application for the Khan Academy website containing teaching materials for a wide range of school subjects were used by 11,5% of students. The findings showed that students use mobile devices to support learning despite m-learning not being formally included in the curriculum.

In total, 65.3% of students reported wanting lecturers to integrate mobile applications into courses. 58.1% believe that mobile education will help them gain better scores. 53.8% declared that they learn faster thanks to mobile devices. 23.6% claim that educational applications will help them be more focused and involved during study. These data demonstrate that students' attitudes towards m-learning are positive. Interestingly, however, 73.4% of students do not want to completely abolish direct (face-to-face) relationship with colleagues.

The results of our study demonstrate the technological maturity of end consumers of mobile education – in this case, students at the private University in Europe. They also indicated that mobile learning is a promising pedagogical technology to be implemented in modern organization.

Conclusion

Successful deploying of mobile technologies is not a matter of accident, but depends on users' acceptance of the technology.

This article presents the dynamic development of mobile devices and their application. It seems, after the analysis development of the educational application market in the light of polish reality, that a reasonable option is supporting traditional methods of teaching by mobile technologies.

The survey questionnaire checking students' attitudes towards mobile learning was design is in line with good practices taken from researches from: Ankara University, Turkey, Liverpool John Moores University, England, Queensland University of Technology, Australia or University of Winchester, England. The survey questionnaire will be published - in December 2020 – on completion of research project: The adoption of a mobile solution in the context of university education on the web page of UITM. The survey questionnaire can be used in practice by other educational institutions that are wondering if their end customers are ready for mobile learning. The research led us to discover that the mobile learning system holds wide acceptance, satisfaction, and applicability from UITM students' perspectives. Applying mobile learning tools in the curriculum will help students gain new competences and skills to adapt to the expectations of future

Author leave for future studies analysis of teachers' technological maturity and approach to teaching with mobile devices, asking primarily into whether teachers are familiar with new mobile devices and applications. The question arises: How to encourage students and educators to gain new skills and competences? The challenges are also necessity to create educational applications tailored to the needs of particular field of study or translating already existing into polish language.

65.3% students of University of Information Technology and Management in Rzeszow reported wanting lecturers to integrate mobile applications into courses what encourages author to analyze the results obtained in particular subjects by students who use mobile education applications and to compare such scores with students who have traditional lessons. This study is not without limitations. The Statistical Package for the Social Sciences – IBM SPSS Statistics 25 (SPSS) - was used to compute all data. It is true that the functionality of this package has not been fully used. Only basic statistics were made, which allowed author to visualize some characteristics and trends - what was the author's intention. However, the software used during the research provides a solid background for extending analyzes and interesting data visualization, which will be use in the next article.

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Measuring an Amount of Money Laundering: A Case from Ukraine

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Abstract

Despite the importance of combating money laundering and terrorist financing, there is still no single methodology for determining the extent amount of money laundering, based on the statistical information provided by the public financial monitoring authorities, since a large part of these financial flows is still outside the official statistics. The aim of the study is to develop methodological bases for determining the amount of money laundering through the real sector of economy, state and local budgets, and the segment of financial intermediaries. While determining the amount of money laundering, authors also have taken into account the level of shadow economy and indicators of quality and efficiency of state regulation of the national economy. The amount of money laundering in the country was determined using the Minkowski metric. The information base for the paper was data from the State Audit Service of Ukraine and the State Financial Monitoring Service of Ukraine. The paper presents the results of an empirical analysis concerning measurement of money laundering in Ukraine, which showed that the lowest level of money laundering was recorded in 2007; during 2008-2009 there was a slightly increase in the amount of money laundering as a result of the activation of destructive processes both in the global financial system and in the national economy; 2010-2013 can be considered a period of post-crisis stabilization and, accordingly, a slight fluctuation in the amount of money laundering, while the intensification of the military-political conflict in Ukraine again intensified the increasing of money laundering with the highest level in 2014. Thus, the correspondence of the trend of volatility of the calculated amount of money laundering to the real political and economic processes in Ukraine confirms the adequacy of the developed approach to its estimation. The methodological approach made it possible to comprehensively evaluate both implicit and explicit flows of money laundering and create an effective information base for evaluating the effectiveness of anti-money laundering instruments in the context of ensuring economic security in the country. Further scientific research requires the forecast the amount of money laundering in Ukraine. The results of the research can be useful for governments in order to adequately respond to destabilizing factors in the national economy.

Keywords: Money Laundering, Minkowski Metric, Economic Security, Financial Monitoring.

Introduction

The financial and economic security of the state is ensured by introducing an effective early diagnosis system, enhancing supervision of systemically important banks, improving macro-prudential banking regulation through the introduction of a countercyclical capital buffer, and strengthening measures in anti-money laundering and terrorism financing (S. Kozmenko and Vasyl'yeva (2008), Sofjan (2018), Stankevičienė et al (2014), Vasylyeva et al (2014), Lewandowski (2016). Money laundering is not only a criminal act, but also an ever-present threat to the stable development of the financial market and the corporate sector as a whole (Pilipenko et al (2019)). Leonov et al (2014) justify that institutional investors as subjects of initial financial monitoring in the area of preventing and counteracting the money legalization (laundering) or terrorist financing, should be advisable to improve the system of regulation and supervision of these institutions for the protection the consumers' rights of financial services. However, the scale of money laundering in the country are determined not only by the transparency of economic relations in the country, but also the level of social security and the political stability in the country (Bilan et al (2019), Bilan (2019), Kozmenko and Kuzmenko (2013), Lyeonov and Liuta (2016), Stukalo et al (2018). According to the United Nations Office on Drugs and Crime, the global money laundering amounted at 2.7% of world GDP in 2009, while by the beginning of 2019 this figure has almost doubled to about 5% of world GDP (2.0 trillion USD, which is, for example, equivalent to the annual GDP of countries such as Italy, Brazil, or Canada). This rapid growth in money laundering clearly confirms the dynamically increasing threat to economic security in both national and global contexts (Zarutska (2018)). That is why finding new tools to prevent money laundering is a key task of national and international oversight bodies. The need to develop anti-money laundering regulatory measures urges the development of methods for determining the amount of money laundered, which would take into account both actual data and implicit components of this process.

Literature Review

Vasilyeva et al (2013) and Gospodarchuk and Suchkova (2019) recon that the money laundering is one of the drivers of appearance of internal and external imbalances in the financial sector. Similar opinion is shared by other scholars (Vasilyeva et al (2016)), who substantiate the following negative factors affecting the banking system development: significant number of bank liabilities generated in foreign currency, imbalance between the terms of investment and borrowing, high level of credit risk, insufficient capitalization of banks and using financial services for money laundering. Buriak et al (2015) empirically identify how expansion of money laundering processes increase fragility of systemically important banks and financial system as a whole. According to Aryani and Hussainey (2017), Deaconu et al (2016), Evana et al (2019), the riskiness of the bank's activities and the financial institution's tendency to use its services for legalization of funds correlates with the quality of the financial reporting.

Assessing the volume of criminal income legalization requires a thorough study of the causes of its occurrence and the mechanisms of its formation. Thus, the analysis of such a source of the legalization of criminal income as narcotics trade and the evaluation of the further mechanisms of the legalization of funds received from this type of activity were carried out in the works of Alasmari (2012, 2013). Particular attention should be paid to money supply and inflation which is also related to impacting factors such as money laundering. The two factors money supply and inflation are a particular characteristic of Ukraine and systematically lead to destructive consequences in the economy. The study of this problem was carried out in the works of Sasongko and Huruta (2018). An equally important factor in expanding the process of criminal income legalization in Ukraine is the dollarization of the economy. This phenomenon was investigated in the works of Kaminskyi and Versal (2018).

The main forms and tools of illegal financial transactions are tax evasion or avoidance and withdrawal financial resources abroad (Bilan et al (2018), Bilan et al (2019), Budzyńska (2016), Dobrovič et al (2018),

Grytsenko et al (2010), Pilipenko et al (2019). According to Muljavka and Reznik (2013) one of the key actions to anti-money laundering should be the expansion of the tax police authority and its institutional restructuring into a large-scale law enforcement body that would combat economic and corruption crime. Other scientists (Masri et al (2019)) have justified that international tax practices are a form of international tax avoidance in order to lower tax liabilities and to conceal the source of illegally obtained funds.

Considerable attention to the development of methodological approaches to determining the risk of money laundering is reflected in the work of such scholars as Dmytrov et al (2011, 2014, 2017), Boyko and Roienko (2014), Kostyuchenko et al (2018), Levchenko et al (2019), Berzin et al (2018). An innovative solution for analyzing predisposition to commit illegal activities in the financial services markets involves taking into account public trust in financial institutions, which is determined based on a combination of regulatory rules and the behavior of economic agents (their feelings, emotions and other subjective characteristics) (Bilan et al (2019), Brychko et al (2019)).

Today's drivers of global economic development are innovative technologies that not only dramatically change the architecture of the financial system, but also create completely new approaches to managing and executing business processes based on Big Data, robotics, artificial intelligence, the Internet thing and more (Karaoulanis (2018)). The Internet and digital devices are a driver of economic growth (Afonasova et al (2019), Nathan et al (2019)). At the same time Industry 4.0 has created an environment conducive to illegal criminal proceeds (Bilan et al (2019)).The paper of Gasparėnienė et al (2017) was aimed to define the concept of a digital shadow economy and identify its determinants and channels. Knezevic (2018) conducted a research on an impact of blockchain technology platform on the financial sector through cryptocurrency, and an impact on activity of money laundering.

The use of cryptocurrency and other digital currencies as innovative financial instruments is another topical trend of money laundering through IT technologies. In particular, Mabunda (2018) justifies that the emergence and rapid spread of cryptocurrency in the world leads to the improvement of money laundering schemes through the Internet, since the peculiarities of circulation of virtual money allow for uncontrolled transactions within different countries. Stokes (2012) conducted a money laundering risk analysis of two virtual currencies: Linden Dollar, a global currency in the Second Life interactive online environment, and Bitcoin, an experimental virtual currency that allows transferring value using peer-to-peer technology. The study found that these virtual currencies are in demand among criminals in the field of money laundering, but they are not suitable for large-scale laundering. Šimonová, Čentéš, & Beleš, 2019 continued a study on the peculiarities of using innovative forms of money for money laundering. They focus on the existing problems in the field of regulation of the electronic money market and the mechanism for countering the illegal circulation of these assets for money laundering.

The rapid development of information technology has led to the emergence of cyber-attacks, which is one of the threats in the functioning of the anti-money laundering system. The study of this issue is reflected in the works of such scientists as (Filipkowski (2008), Horne (2014), Mirea et al (2011), Piller and Zaccariotto (2009), Şcheau and Pop Zaharie (2017), Sekgwathe and Talib, 2012)). In turn Stiawan et al (2017) review various cyber-attack techniques and penetration test methodologies to assist security service personnel in relevant security assessments on their network systems. Simultaneously (Federici, 2007) notes that the use of various data mining methods in modern conditions can be useful for understanding the links between people and suspicious operations in order to track money laundering and terrorist financing activities.

Many scientists studied the use of electronic payment systems and online banking for money launderings, namely Merenkova (2008), More et al (2015), Trautman (2013), Tropina (2014).

However, the latest technologies are used both for money laundering and for counteracting this process. Thus, Plaksiy et al (2018) study the possibilities and benefits of applying Big Data for financial investigation data analysis. The visualization of ML/CFT typologies with the use of graphs is being

considered as a result of the study. Leonov et al (2019) engage in the active use of the latest information processing methods, succeeding in the prototyping of information system for monitoring banking transactions.

In scientific works of Kordík and Kurilovská (2017) special attention is devoted to the study of mechanisms of counteraction to money laundering. However Klochko et al (2016) justify the need to bring in criminal liability for offenses in banking activities, which allows to protect the interests of consumers of financial services and increase the level of confidence in the national financial system. Subeh and Boiko (2017) have proposed innovative methodological approach to estimate the effectiveness of regulatory authorities using a queueing system. Kadhim et al (2019) confirmed the necessity for banks' stress testing as one of the primary steps to counteract money laundering.

The most commonly used approach for determining the amount of money laundering is The Walker Gravity Model (Walker (1995)). Walker's model for money laundering assumes that the share of proceeds from unlawful activity generated in one country and sent to another country depends on both the mass and 'attractiveness' of the second country, and the distance between the two countries. It was revised and re-estimated for the Netherlands by Walker and Unger (2009, 2013) by using the distance between the countries in the attractiveness factor, instead of its square.

Given the need for a comprehensive assessment of the volume of criminal income legalization, it is advisable to analyze the existing econometric approaches to the evaluation of economic phenomena and processes. Thus, the approach to the integrated assessment of social security is reflected in the work of Zavora and Chepurny (2014). The work of Formánek (2019) deals with a complex spatio-temporal regression model. The team of researchers, namely Rungsrisawat et al (2019) use the ARDL technique to explore the nexus between crime, socio-economic strains, and economic growth. In turn, in the works of Bivainis and Skačkauskienė (2009), an approach is proposed to solve the problem of assessing the evolution of indicators over time. In addition, data mining and artificial intelligence can serve as a methodological tool for determining the amount of money laundering (Dahooei et al (2018), Kuziak (2016), Slapikaite and Tamosiuniene (2017), Vasilyeva et al (2019), Njegovanovic (2018).

Methodology and Results

A methodology has been developed for determining the amount of money laundered based on the use of mathematical modeling in economics. It involves determining the actual losses from money laundering schemes, as well as calculating an adjusting factor to take into account both explicit and implicit money laundering flows.

First, actual losses from money laundering schemes are assessed. In different countries, this amount can be specified based on the data from the relevant anti-money laundering agencies and government statistics agencies. In Ukraine, this indicator is based on the data from the State Audit Service of Ukraine and the State Financial Monitoring Service of Ukraine. Thus, the operating results of the State Audit Service allow determining two indicators: the amount of money laundered through the state budget and local budgets. In its turn, the data from the State Financial Monitoring Service are used to assess the amount of money laundered through the real sector of the economy and financial intermediaries. The mathematical formalization of this stage is based on the additive convolution of these three indicators.

For the practical implementation of first stage of methodology, we will use Table 1 to formalize the dynamics of the amount of money laundered through the state budget, the amount of money laundered through local budgets and the amount of money laundered through the real sector of the economy and financial intermediaries for 2007-2018.

Table 1: Data for assessing the real volume of money laundered

Year	Amount of money laundered through the real sector of the economy and financial intermediaries	Amount of money laundered through the state budget	Amount of money laundered through local budgets
2007	9,745,614	488,524.77	554,184.40
2008	12,349,333	1,219,706.32	515,381.68
2009	11,365,557	1,308,422.72	992,598.71
2010	14,945,389	7,323,744.68	1,001,618.04
2011	22,702,164	1,109,218.08	1,228,780.89
2012	29,203,021	1,099,530.16	524,724.02
2013	4,482,439	737,850.92	936,838.66
2014	3,961,062	1,546,713.31	567,682.87
2015	1,113,910	819,552.20	730,796.59
2016	11,336,889	709,139.87	511,510.85
2017	928,802,849	608,922.82	510,658.76
2018	124,346,271	623,651.51	470,314.24

Based on the data in Table 1, it is possible to conclude that no consistent patterns were observed regarding the mechanisms for applying money laundering schemes during 2007-2018. Thus, 2017 and 2018 were the most critical years for the real and financial sectors of the economy in terms of the amount of money laundered, when the value of the indicator under study exceeded the average annual indicator by almost 44 times. In turn, when studying public finances, we note that the largest amount of financial resources was laundered through the state budget in 2010 and 2014. The period from 2009 to 2011 demonstrated the peak of money laundering through local budgets. This indicates that criminals use various money laundering schemes and try to increase the amount of money laundered every year.

Second, it is necessary to calculate the adjustment index, which will increase the actual amount of money laundered based on the amounts of laundered money that were not potentially revealed by state regulatory authorities. The following seven indicators are proposed to be selected as components of this index.

The level of the shadow economy. Accounting for this indicator is due to the need to formalize sources of income, which in the future will require laundering. The shadow economy creates monetary resources that are used by criminals either to commit other illegal actions or develop various money laundering schemes.

The corruption control index is currently the most significant disincentive indicator in terms of money laundering for Ukraine. This indicator can be used as an argument that the government is joining private interests and, accordingly, receives illegal income in the form of profit by business entities and in the form of bribes. Thus, taking this indicator into account is mandatory when forming the index for adjusting the amount of money laundered towards its decrease.

Government performance index. The rationale behind this index is that the high quality of public services and the independence of public services from political pressure extremely impedes the money laundering processes. Thus, the competent and highly effective performance by the ministries and departments of Ukraine of the functions assigned to them makes it impossible for the criminals to generate illegal income and use a significant number of schemes (for example, with state property, securities, etc.). Leonov et al (2014) substantiate a systemically important role in determining the effective and fair rate of government bonds' yield to prevent the legalization of illicit income and the withdrawal of funds abroad.

The above index is supplemented by the regulatory quality index. Its use is conditioned by the need to take into account the level of implementation by the ministries and departments of Ukraine of the state policy and adopted provisions. Considering the fact that anti-money laundering activities are based on fulfilling the requirements of international organizations implemented in the laws of Ukraine (FATF, MONEYVAL, etc.), the effectiveness of law enforcement in Ukraine directly affects the level of money laundering.

Political stability and absence of violence/terrorism. This indicator is used due to the need to take into account political instability. This indicator is especially significant for Ukraine since the power shift takes place every five years, and therefore, first, government officials are involved or directly carry out the money laundering because they hold power for a short period, and second, it is much easier for criminals to hide illegal incomes in conditions of constant changes and instability.

The rule of law index directly reflects the probability of crime and the general level of public confidence in the judiciary. Thus, this indicator reflects a certain component of the general indicator of the propensity (desire) of economic entities to accumulate illegal income followed by its subsequent laundering.

The results of the publicity and accountability index are interesting in terms of the openness of companies and freedom of the media. Thus, the first characteristic of this index describes the likelihood of attracting a company to the shadow sector of the economy, and the second opportunity for the media to honestly covering and carrying out objective journalistic investigations related to the activities of public officials, etc.

Thus, it is fair to point out that the corruption control index, the government performance index, the regulatory quality index, the political stability and absence of violence/terrorism index, the rule of law index and the publicity and accountability index are indicators that more or less describe certain manifestations of corruption. For Ukraine, corruption and the shadow economy are the main sources that stimulate money laundering. Corruption allows criminals to escape punishment and unimpededly implement all money laundering schemes.

As for the mathematical formalization of calculating the index for adjusting the total amount of money laundered, we note that it must be presented as an exponent of the Minkowski parametric metric of naturally normalized indicators.

This stage is complex, and there is a need for its step-by-step description:

The first step involves the formation of an information base for the index adjusting the actual amount of money laundered, represented by the dynamics of seven time series: the level of the shadow economy, corruption control, government performance, political stability and absence of violence/terrorism, regulation quality, the rule of law, transparency and accountability (Table 2).

Table Error! No text of specified style in document.**: Data on the index for adjusting the real amount of money laundered**

Year	Corruption control	Government performance	Political stability and absence of violence/terrorism	Regulation quality	Rule of law	Transparency and accountability	Shadow economy
2007	-0.80	-0.67	0.17	-0.43	-0.73	0.06	28.00
2008	-0.84	-0.72	0.04	-0.53	-0.68	0.09	34.00
2009	-1.04	-0.83	-0.30	-0.57	-0.76	0.06	39.00
2010	-1.03	-0.78	0.01	-0.52	-0.81	-0.08	38.00
2011	-1.05	-0.82	-0.07	-0.60	-0.82	-0.13	34.00

2012	-1.08	-0.58	-0.09	-0.60	-0.78	-0.28	34.00
2013	-1.13	-0.65	-0.78	-0.62	-0.80	-0.32	36.00
2014	-0.99	-0.41	-2.02	-0.63	-0.79	-0.14	43.00
2015	-0.98	-0.52	-1.96	-0.59	-0.81	-0.09	40.00
2016	-0.81	-0.57	-1.86	-0.43	-0.77	0.00	35.00
2017	-0.78	-0.46	-1.87	-0.32	-0.71	0.01	32.00
2018	-0.87	-0.42	-1.83	-0.22	-0.72	-0.01	30.00

Based on the data given in Table 2, it is fair to note the following patterns:

– during 2007-2018, all the indices studied were negative; exceptions were the political stability and absence of violence/terrorism index in 2007-2008 and the publicity and accountability index in 2007-2009 and 2016-2017;

– during the years 2007-2018, with the exception of the publicity and accountability index, the average of all indices was less than -0.5 units;

– the most negative values of the indices studied were traced with respect to the corruption control index (mean -0.95, lowest in 2013 equaled -1.13) and political stability and absence of violence/terrorism index (mean -0.88, lowest in 2014 was -2.02).

This indicates the existence of a favorable environment in Ukraine for the money laundering and, accordingly, the need to adjust the actual amount of money laundered to obtain relatively real data.

Continuing the practical implementation of the methodology for determining the amount of money laundered in the context of the formation of the adjustment index, we proceed to the second step. Thus, it is necessary to normalize the indicators of the information base of the adjustment index using the natural method for incentives and the Savage normalization for disincentives (Levchenko et al (2019)).

For incentives (corruption control indices, government performance, political stability and absence of violence/terrorism, regulation quality, rule of law, publicity, and accountability), we apply natural normalization:

$$n_{it} = \frac{f_{it} - \min\limits_{t} f_{it}}{\max\limits_{t} f_{it} - \min\limits_{t} f_{it}} \tag{1}$$

where f_{it} – the actual value of the i-th indicator-component of the adjustment index for the t-th year;

n_{it} – the naturally normalized value of the i-th indicator-component of the adjustment index for the t-th year;

$\min\limits_{t} f_{it}$ – the minimum possible value of the i-th indicator-component of the adjustment index over the studied time range;

$\max\limits_{t} f_{it}$ – the maximum possible value of the i-th indicator-component of the adjustment index over the studied time range.

For the disincentive (level of the shadow economy), we apply the Savage normalization formula:

$$n_{it} = \frac{\max\limits_{t} f_{ti} - f_{ti}}{\max\limits_{t} f_{ti} - \min\limits_{t} f_{ti}} \tag{2}$$

The calculations made based on formulas (1) and (2) are summarized in Table 3.

Table 1: Normalized values of indicators of the index for adjusting the amount of money laundered

Year	Corruption control	Government performance	Political stability and absence of violence/terrorism	Regulation quality	Rule of law	Transparency and accountability	Shadow economy
2007	0.96	0.40	1.00	0.48	0.67	0.93	1.00
2008	0.84	0.28	0.94	0.23	1.00	1.00	0.60
2009	0.27	0.00	0.78	0.14	0.44	0.92	0.27
2010	0.30	0.12	0.93	0.28	0.08	0.57	0.33
2011	0.23	0.02	0.89	0.06	0.00	0.45	0.60
2012	0.16	0.60	0.88	0.08	0.26	0.09	0.60
2013	0.00	0.45	0.57	0.01	0.10	0.00	0.47
2014	0.40	1.00	0.00	0.00	0.20	0.43	0.00
2015	0.44	0.74	0.03	0.08	0.04	0.56	0.20
2016	0.91	0.62	0.07	0.49	0.38	0.78	0.53
2017	1.00	0.89	0.07	0.75	0.78	0.81	0.73
2018	0.74	1.00	0.09	1.00	0.73	0.74	0.87

The third step is aimed at determining the weighting coefficients of priority of indicators for assessing the index for adjusting the amount of money laundered. Since an assumption is made that the considered indicators are of equal priority, the corresponding onew_i (the weight coefficient of the i-th indicator-component of the adjustment index) takes the value of 1/7. At the same time, it is fair to say that the goal of developing this methodology is the formation of universal principles, i.e. the use of such economic and mathematical tools that will allow adapting to changes in the internal and external environment. Therefore, given the changing economic and political situation in Ukraine, or the application of the proposed methodology to another country, this step may be transformed and the weighting coefficients of the i-th indicator-component of the adjustment index may take different values. Weighting is usually based on an expert method.

The fourth step involves intermediate calculations, namely the calculation of the Minkowski parametric metric in the context of indicators of the information base of the index for adjusting the actual amount of money laundered.

At the final fifth stage, the adjustment index is directly calculated – the exponent of the Minkowski parametric metric in terms of indicators of the information base of the index for adjusting the actual amount of money laundered (formula 3).

$$I_{kt} = exp(M_{mt}) = exp\left(1 - \sqrt{w_i \cdot \sum_{i=1}^{7}(1 - n_t)^2}\right) exp\left(1 - \sqrt{w_i \cdot \sum_{i=1}^{7}\left(1 - \frac{f_{it} - \min_t f_{it}}{\max_t f_{it} - \min_t f_{it}}\right.}\right. \quad (3)$$

where I_{kt} – index of adjustment of the actual amount of money laundered.

The results of calculations according to formula (3) are presented in Table 4 (column 2).

Table 4: Dynamics of Minkowski metric and index for adjusting the actual amount of money laundered

Year	Minkowski metric	Index for adjusting the actual amount of money laundered
2007	0.67	1.960275006
2008	0.57	1.766179903
2009	0.33	1.385018664
2010	0.32	1.372054102
2011	0.25	1.289611991
2012	0.32	1.372237918
2013	0.19	1.213107852
2014	0.21	1.237898848
2015	0.25	1.284987375
2016	0.48	1.610586896
2017	0.60	1.830284811
2018	0.61	1.844962014

At the third stage of development of the methodology for determining the amount of money laundering, the estimated amount of money laundering is determined by applying a multiplicative model of adjusting the actual amount to the corresponding adjustment index:

$$ML_t = (RL_t + SL_t + LL_t) \cdot I_{kt} \quad (4)$$

where ML_t – estimated (real) amount of money laundering for the t-th year;

RL_t – the amount of money laundered through the real sector of the economy and financial intermediaries;

SL_t – the amount of money laundering through the state budget;

LL_t – the amount of money laundering through the regional budgets.

I_{kt} – the index of adjustment of the actual amount of money laundering for the k-th year.

The results of the calculation of the amount of money laundering are presented in the figure 1. At the same time, in order to understand the real scale of the money laundering in Ukraine, the share of the calculated (actual) amount of money laundering in GDP has been determined.

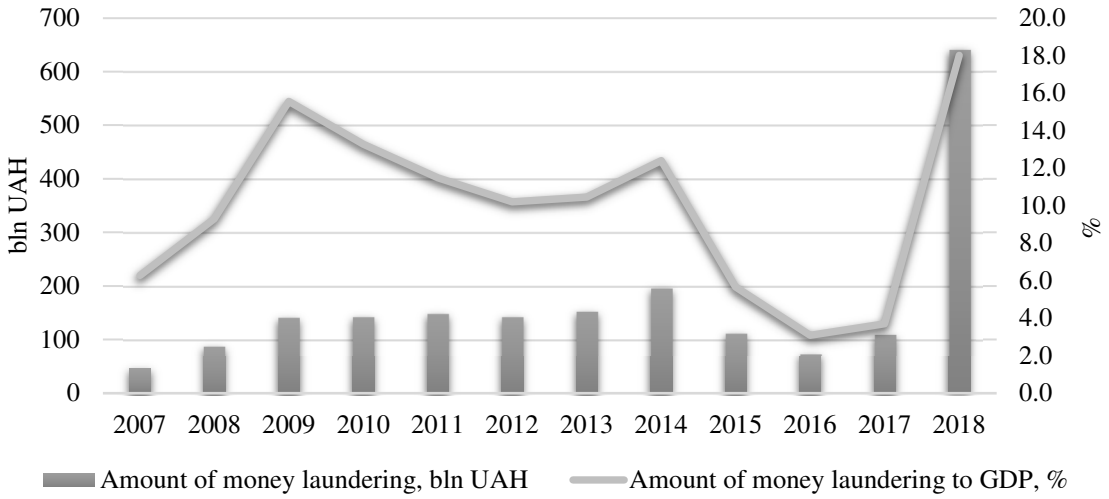

Fig. 1: Dynamics of money laundering in Ukraine during 2007-2018 years

The results of the empirical investigation showed that the lowest level of money laundering was recorded in 2007. During 2008-2009 there was a slightly increase in the amount of money laundering as a result of the activation of destructive processes both in the global financial system and in the national economy. 2010-2013 can be considered a period of post-crisis stabilization and, accordingly, a slight fluctuation for money laundering, while the intensification of the military-political conflict in Ukraine again intensified the increasing of money laundering with the highest level in 2014. The anomalous value of money laundering in Ukraine in 2018 is due to the disclosure of a large-scale scheme for laundering illicit funds in the amount of 1.5 billion USA dollars.

Conclusions

Combating the money laundering and terrorism financing is a major challenge for national and international supervisory and regulatory authorities to ensure sustainable economic development and security. It is advisable to use foreign experience of countries that also have a bank-centered model of financial market to combat the legalization of criminal income. According to Kozmenko et al (2011) point out that Ukraine repeats the path of financial development of Germany.

Summing up the above calculations, it is fair to say that the amount of money laundering during 2007-2018 was cyclical, with periods of decline in 2012, 2015, and 2016, as well as 2019. Anomalous value of the amount of money laundering in 2018, the average growth rate of this indicator for the period under review will be 20%. This indicates an intensive increase in the volume of criminal proceeds legalization, even after significant periods of its decline. Thus, the correspondence of the trend of volatility of the calculated amount of money laundering to the real political and economic processes in Ukraine confirms the adequacy of the developed approach to its estimation. The methodological approach made it possible to comprehensively evaluate both implicit and explicit flows of money laundering and create an effective information base for evaluating the effectiveness of anti-money laundering instruments in the context of ensuring economic security in the country. The development of methodological support for measuring an amount of money laundering, in fact, serves as an informational basis for sound management for agencies engaged in state regulation, control and supervision – in identifying the risk of money laundering and developing measures to minimize or neutralize it through information systems; during the formation of the macroprudential policy of the state, in developing strategic plans for the development of the country.

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Impact of Highly Qualified Personnel's Migration on Economic and Innovative Development

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Abstract

Liberalization and rationalization are the *main factors* that favor the modification of migration processes and the growth of relevant migration indicators. Factors that determine the global migration movement can also be attributed to the expansion and acquisition of a mass of technologies that aim at reducing the sense of distance, which allow you to quickly and quickly change locations of stay, without changing the conditions and principles of work, contact audiences, etc. It is in this context that *the focus* of research on migration processes in general, and those areas where small changes in which, can potentially have a significant impact on the economic situation and further development, including innovation, becomes relevant. *The hypothesis* of investigation is the migration of highly skilled personnel exerts a set of influences on the economic and innovative development of the recipient country and the donor country. Applied analytical *methods*, comparative analysis, classification, allow to achieve the aim. The authors grouped the main indicators of the migration processes impact on the countries of departure (donor countries) and those leaving (recipient countries) in terms of economic and innovation component. The analysis presents *the results* in qualitative and quantitative terms. The IT market is analyzed, indicators of its development are given, and major trends are identified, including in comparison with the world ones. The peculiarities of migration processes of specialists in this field are described. As *implications*, it is proposed to include the migration of highly skilled workforce in the assessment indicators Country Innovation Index.

Keywords: Migration, Innovative Development, Economic Development, IT, Highly Qualified Personnel.

Introduction

long with the powerful development of information technology and innovative processes, humanity is increasingly focused on the constant search for ways to improve their lives. The processes of globalization and internationalization cause a change in the vector of international activity and cooperation, where they open a wider space for the movement of labor between regions, countries and continents. Thus, labor mobility makes the analysis relevant of a wide range of economic, socio-demographic, political and technological changes in the recent period.

With the processes of deepening of innovative development and economic transformation, more and more formation of life of society in general, and of each individual in particular, becomes evident, which becomes tangible in work processes, private life, public and spiritual sphere, etc (Ginevičius et al., 2018).

Along with the powerful development of information technology and innovative processes, humanity is increasingly focused on the constant search for ways to improve their lives. Thus, liberalization and

rationalization are the main factors that favor the modification of migration processes and the growth of relevant migration indicators. Factors that determine the global migration movement can also be attributed to the expansion and acquisition of a mass of technologies that aim at reducing the sense of distance, which allow you to quickly and quickly change locations of stay, without changing the conditions and principles of work, contact audiences, etc (Čajka et al., 2018).

The aim of the article is to investigate the main factors and directions of influence that carry out the migration processes of highly skilled specialists on the countries economic and innovative development (the example of the IT industry). According to the aim of this article it was suggested to explore the latest research in the field, which is presented by the Literature Review.

In order to study global processes, the structure of the migrant's distribution is presented in accordance with the total population in percentage terms by continents. The factors that influence the increasing trend of increasing the number of highly skilled labor migrants from Ukraine are analyzed. The authors analyzed ranking of Ukraine, that characterize it`s state of socio-economic development, which causes an increase in the migration activity of highly qualified personnel in particular. It is determined that Global Innovation Index, Ease of doing business index, Sustainable Society Index (Human, Economic, Environmental Wellbeing), The Global Peace Index, Index of Economic Freedom, Index of Happiness are the main indicators that shape the above factors. Thus, in the course of the study these indicators were analyzed, and the Ukraine place was determined according to them in the overall rating. It was Compared the Global Innovation Index of Ukraine with other countries that are recipient countries for Ukrainian IT professionals, and it was analyzed the structure of the Summary Innovation Index, which is formed annually for European countries.

The prospect of further research may be quantitative determination of the migration processes influence on the state of countries economic and innovative development, forecasting and economic-mathematical modeling of changes in the country's economic development in changing or maintaining migration trends, factor analysis of the impact of highly qualified personnel migration on economic development.

Literature Review

It is in this context that the focus of research on migration processes in general, and in particular those areas where small changes in which, can potentially have a significant impact on the economic situation and further development, including innovation, becomes relevant (Filipishyna et al., 2018).

Particularly noteworthy is the type of migration that is encouraging from the point of view of the host countries, since they are making some efforts to promote, simplify procedures and encourage migration (Piekutowska et al., 2018). This type of migration includes the migration of highly skilled labor. These cadres shape the potential of countries for further economic and innovation development, as they often have higher education, special skills and professional skills in their field (Churilova et al., 2019). The sphere, which is closely connected with the innovative development and gives the basis for the economic development of the country, declares it on the territory of the world space is the sphere of Information technologies. The highly qualified personnel employed in this field is one of the driving forces for the future development (Belas et al., 2018). At the same time, the innovation growth is related form the level of creative development which proved by the authors in the paper (Bilan et al., 2019e).

With this in mind, it is relevant to study migration issues among highly qualified IT industry professionals in the case of Ukraine and the corresponding impact on the country's economy, in detailing the aspects of the relationship of this particular type of migration with economic indicators and innovation potential.

The main indicators which influence macroeconomic stability, the marketing factors of the country's competitive advantages are allocated in the papers (Lyulov et al., 2018; Ivanová et al., 2018; Bilan et al., 2019c; 2019f); the role and influence of economic freedom on macroeconomic stability were

analyzed by the scientists in the paper (Yevdokimov et al., 2018). The authors in the paper (Vasilyeva et al., 2019; Djalilov et al., 2015) proved that dynamics of bifurcation transformations in the transition economy influenced on the temp of the innovation development.

The analysis of the impact of innovative enterprises activity on ensuring the indicators of state development is analyzed in the work of Zakharkina et al. (2018), Kondratiuk-Nierodzińska (2016).

Prediction of the most obvious indicators of loss of intellectual capacity of the country on the basis of analysis of socio-economic impact of intellectual potential of young people on economic and human development is made in the papers (Pryima et al., 2018; Mishchuk et al., 2019; Koceva, 2019; Lyeonov et al., 2016; GrenÄÃkovÃ et al., 2019; Petrushenko et al., 2014; Shvindina, 2019).

The importance of values of young employees, researches on labor migration are laid down in the papers of Titko et al., (2020), Romanska (2017), Zholkver (2019), Garden (2019).

Besides, the range of the scientists (Bilan et al., 2019d) analysed the level of trust among business and government as an indicator which influenced on the economic and innovation development of the country.

The role of highly qualified personnel in forming relationships with stakeholders as part of economic and social development is examined in the papers (Syhyda, 2013; Bilan et al., 2018; 2019b; Abaas et al., 2018). The migration of highly skilled personnel exerts a set of influences on the economic and innovative development of the recipient country and the donor country.

Methods

It was applied analytical methods that were showed by graphical method of trend analysis and descriptive approach. Also, it was used comparative analysis, structural analysis of classification features, allow to achieve the aim of research migration impact on different areas of country management.

The database of the article was formed by studies of leading world scientists, official and statistical information of national and international organizations, such as Ministry of Finance of Ukraine, the World Bank, Department of Economic and Social Affairs of United Nations, the World Intellectual Property Organization (WIPO, a specialized agency of the United Nations) and Cornell University, INSEAD.

Also the methodical approach in this study is based on an analysis of results interviewing directly IT specialists and IT companies that was taken by the all-Ukrainian forum www.dou.ua (DOU: The community of programmers, 2019).

Results

With the advent of the 21st century, the international environment has been radically changing in which states act as key players in the modern paradigm of the common market, according to which the international economy is not a direct interaction of the national government with other national governments, but an economic (not political) interaction between the regional economic communities (Barnz V. and Lebedur L., 2003).

Thus, a new approach to international internationalization becomes a relevant issue for consideration by politicians, scientists and practitioners. Globalization processes necessitate the study and modification of approaches to the role and place of civil society institutions in the field of regulation of labor processes and employment of the population, infrastructure development of national and regional labor markets (Yevdokimov et al., 2018; Lyulyov et al., 2017). Hence, employment processes cause a steady increase in global migration rates and reallocation of the labor force in both global and national and regional labor markets (Garden et al., 2019). The main factors that currently

affect rethinking of approaches to migration processes are the scientific and technological progress, world market, the constant change of market specialization, changes in the structure of social and labor potential, as well as geopolitical and geocultural processes (Bilan Yu et al., 2019b).

There are many kinds and forms of migrations. In studying the conditions that encourage people to leave their country. In addition, the establishment of classification has a great influence theoretical school, according to the principles which the scientist makes their hypothesis.

Migration processes in its essence are subject to classification on a large number of factors.

The generally recognized classification of migration is the distribution by qualitative feature, namely, migration originates from the country under consideration or into it, immigration and emigration accordingly are distinguished. In most cases, migration is divided into internal and external on the grounds of crossing the state border. In addition, there is a breakdown by kinds and type of migration by such features as: distance, duration, nature of the organization, purpose, reasons, scale, etc. Steven Castles, director of the Oxford University Refugee Study Center, among the total number of migrants distinguish such group as highly skilled business migrants (Stephen Castles, 2008). These are high-level managers, administrators, specialists, technicians and those who move within the internal labor markets of multinational corporations and organizations, or those who are seeking employment through international labor markets. This group of migrants is in demand in most countries, which leads to offers for special programs of the type "Highly skilled and business migrants" (Kasianova, 2016).

Thus, comparing highly skilled labor in migration processes with other types, it should be emphasized that this group has certain special characteristics, namely:

– these migrants are in most cases highly educated and focused on lifelong learning;
– in most cases, migrants aim to leave the donor country forever without plans to return;
– migrants are in demand both in the donor and recipient countries;
– this type of migrant fully comply with migration laws and are responsible citizens;
– they often migrate with their families;
– this type of migration is due to particular reasons where people seek not only higher wages but also in a common vision of a better standard of living and security.

It is impossible to consider individual types of migration and their impact on the economy and innovation without understanding the overall structure of migration processes. Thus, according World Migration Report 2020 of International Organization for Migration the number of international migrants globally in 2019: 272 million (3.5% of the world's population) and 74 per cent of all international migrants were of working age (20–64 years) (Khadria et al., 2020).

Considering the number of migrants in recent years according to the division into parts of the world (Fig. 1) provided by the United Nations Department of Economic and Social Affairs, we can say that on average, every 10th European is a migrant, and Ukraine is not an exception (United Nations, 2020).

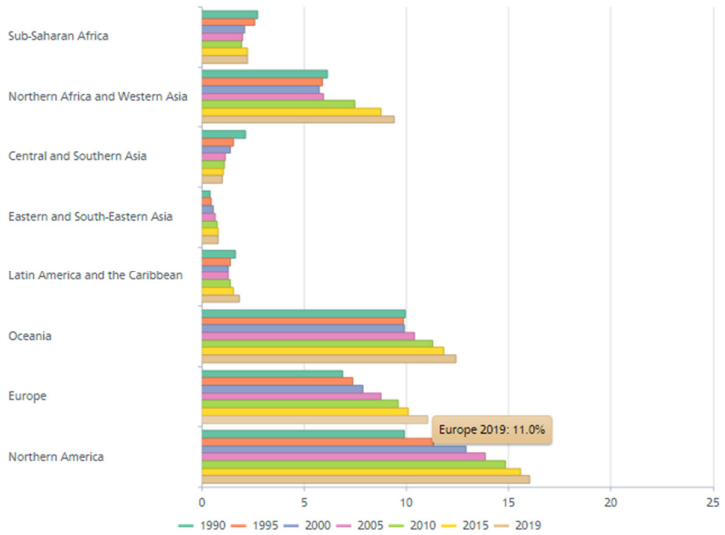

Fig. 1: International migrants as a percentage of total population by major area of destination
Source: United Nations, 2020

Ukraine is the largest European country in terms of area, so any changes in the absolute values of migration indicators in Ukraine are immediately reflected in the analysis of all European countries (Pimonenko et al., 2018). Despite the fact that an indicator of the number of migrating Ukrainians tends to decline (Fig. 2), according to the Department of Economic and Social Affairs Population of United Nations Ukraine is among the world's Top 20 countries, whose population migrates. For example, in 2019, the number of such citizens of Ukraine was 5.9 million. It is interesting to note that along with Ukraine in this list are such countries as the United Kingdom, Germany, the USA, Poland, Italy, for which Ukraine is a donor of labor migrants (United Nations, 2020).

So, in 2019 Ukraine ranked 8th in absolute terms of migrant donor countries (Fig. 2). But if you analyze this graph in more detail, it should be said that most of the countries that precede Ukraine are much larger in area and population (India, Mexico, China, Russia, Pakistan), Bangladesh, smaller in area but overall population is still more than the population of Ukraine (more than three times), only Syria is smaller than Ukraine in terms of area and population.

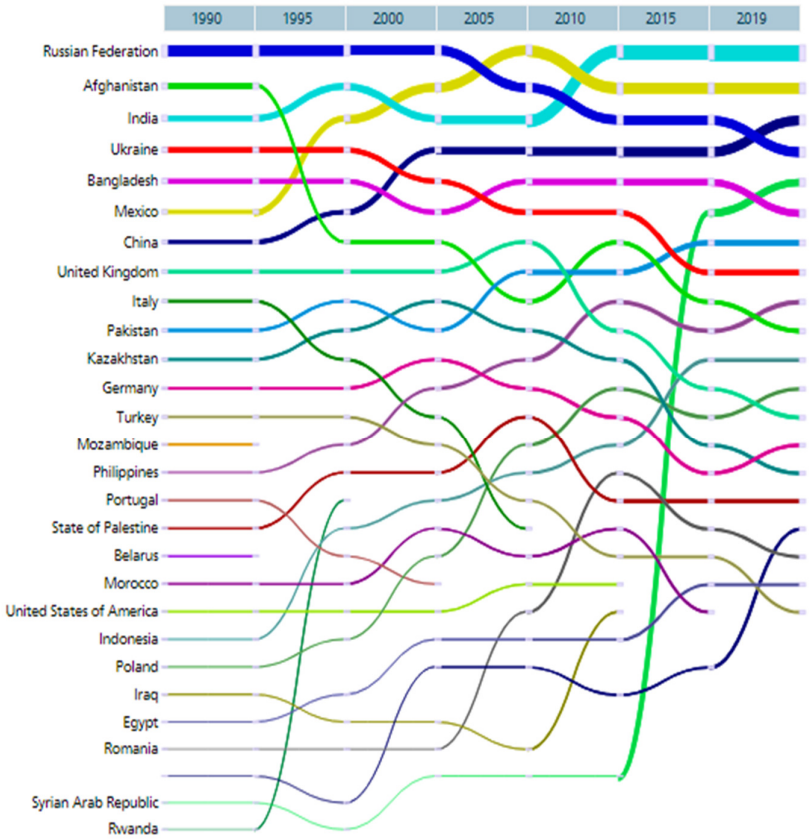

Fig. 2: Twenty countries or areas of origin with the largest diaspora populations (millions)
Source: United Nations, 2020.

But it is obvious that such a rapid jump in the number of emigrants is due to the difficult geopolitical situation and aggravation of the military conflict. Therefore, it can be argued that among the countries whose population size and area are approximately equal in indices, Ukraine occupies a leading position as a migrant donor country. The current situation actualizes the issue of migration research in Ukraine: cause and effect, alternative opportunities and threats, which carries outflow of population from the territory of Ukraine (Vdovtsova, 2019; Bilan et al., 2011; Nur-Al-Ahad et al., 2019). The current situation actualizes the issue of migration research in Ukraine: causes and effects, alternative opportunities and threats, which outflow of population from the territory of Ukraine is fraught with (Naghshpour et al., 2019).

To study the impact of migration on the country's economic growth, let us research the IT industry, which is one of its driving forces.

IT industry today is very attractive for young people, the reason is primarily high income, because most contracts are funded by the investments outside the state. Also, the industry is characterized by a constant change and improvement of technology, knowledge, skills of its employees, and their compliance with international standards and requirements (Nemanja et al., 2019). On the one hand, this progressiveness is a positive factor for Ukraine in general, as it contributes to the development of innovation in the country, as well as reaching level of developed countries in the field of intellectual labor potential. Experienced IT industry personnel play the part in attracting foreign investments, creating companies and opening branches with internationally raised capital in Ukraine.

The ranking of the 10 largest IT enterprises in Ukraine by number of employees is shown in Table 1.

Table 1: top 10 largest IT companies in Ukraine (as of July 2019)

Place in rating	The company name	Cities where the company's offices are located	Specialists in Ukraine, number of people	Increase in six months (January 2019 - July 2019)	Technicians, number of people
1	EPAM	Kyiv, Kharkiv, Lviv, Dnipro, Vinnytsia	7500	+900	6700
2	SoftServe	Kyiv, Kharkiv, Lviv, Dnipro, Exactly, Chernivtsi, Ivano-Frankivsk	7082	+749	5780
3	GlobalLogic	Kiev, Kharkiv, Lviv, Mykolaiv	4363	+214	4071
4	Luxoft	Kiev, Dnipro, Odessa	3670	-250	3598
5	Cycle	Kiev, Kharkiv, Lviv, Dnipro, Odessa, Vinnytsia	2867	+4	2506
6	NIX	Kharkiv	2004	+301	1794
7	Infopulse	Kyiv, Kharkiv, Lviv, Odessa, Vinnytsia, Zhytomyr, Chernihiv	1900	+49	1681
8	Intellias	Kyiv, Kharkiv, Lviv, Odessa, Ivano-Frankivsk	1521	+301	1233
9	DataArt	Kiev, Kharkiv, Lviv, Dnipro, Odessa, Kherson	1474	+173	1278
10	ZONE3000	Kharkiv, Lviv, Dnipro	1450	+150	392

Source: DOU: The programming community, 2019

Market size of the IT industry is an important economic indicator. It shows how much information technology is developed in the country compared to other countries. Thus, proof of the development of the IT market is a positive trend in absolute and relative terms of the total number of technicians engaged in major IT –companies of Ukraine (Fig. 3).

Fig. 3: Market growth and number of IT specialists in Ukraine (2015-2020)
Source: N-iX, 2019

Despite the significant growth of the IT industry in Ukraine, the level of migration among representatives of the IT professions continues to increase. Thus, according to Julia Ruda, 2018 nearly every other representative of the profession thinks about leaving abroad. Destination countries include Poland, Germany, and the United States. The proportion of people considering returning is extremely low and is less than 5%.

Experienced and highly qualified personnel who have knowledge, experience and skills at the level of specialists of developed countries can leave the country and migrate to other countries where the standard of living is higher (Fig. 4).

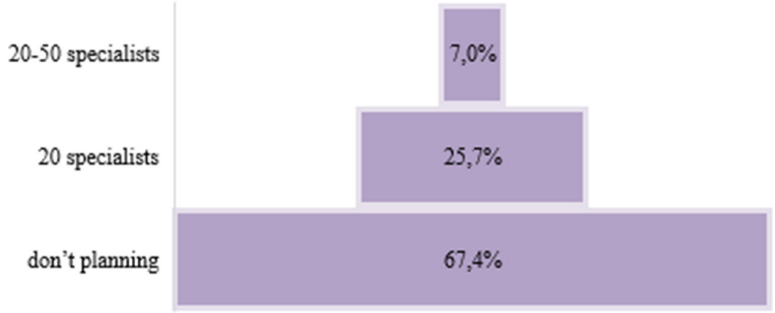

Fig. 4: Plans for relocation of specialists outside Ukraine in the largest 50 IT companies in Ukraine

Source: developed on DOU: The community of programmers, 2018

Ukraine's current internal IT market is growing much faster than in other countries. In 2016, overall growth was 22% (while developed markets in the world are growing no more than 5% per year) 3, in 2017 - 27% 4. Today, the IT industry accounts for over 3% of Ukraine's GDP (US $ 5 billion), along with the agrarian sector (US $ 17 billion) and metallurgy (US $ 14.3 billion) (Karpenko, 2018).

In the ranking of the level of spending on the IT sector and depending of economic development on this level, the state ranks one of the last places among the countries with the IT sector ($ 32.2 GDP per capita, according to 2015 data). The development of the domestic IT market shows one-sided trends (Rollnik-Sadowska et al., 2018). The low level of IT consumption in Ukraine is at the same time the consequence and the cause of the low level of well-being of citizens (it is the raw material and not the technological basis of the economy that causes the lagging behind developed countries) (Garden et al., 2019; Zakharkina et al., 2018). Domestic IT market is US $ 1.1 billion - against US $ 3 billion in India and US $ 7.1 billion in the UK. And it is not about the production of hardware or the creation of packaged software, but only one segment - outsourcing.

In the IT services export market, Ukraine is now 5 times more modest than Poland ($ 3.2 billion versus $ 16.3 billion). If you look at the overall IT market of Ukraine, it grows across all three segments: the hardware market; packaged software market; services market (Ivanová et al., 2018).

The all-Ukrainian forum www.dou.ua (DOU: The community of programmers, 2018) constantly conducts research into the market of IT-specialists, most often by interviewing directly specialists in this field and companies representing the industry. Yes, a survey was conducted among IT professionals who moved abroad and were willing to share their experiences of moving and living in another country. The study surveyed IT professionals who migrated to countries such as Poland, Germany, the United States, the Netherlands, the United Kingdom, and Canada, and analyzed the situation separately. To include other countries in the analysis, they were combined into regions: Western Europe (including Scandinavia and the British Isles), Central Europe (including the former Yugoslavia), the Baltic States and the former USSR. There were also responses from Asia, Australia, New Zealand, South America and Africa, but too few to analyze even at the regional level, so these responses are only included in the sample as a whole.

Thus, according to the results of the study, the following results were obtained regarding the country to which the interviewed IT specialists migrated (Fig. 5).

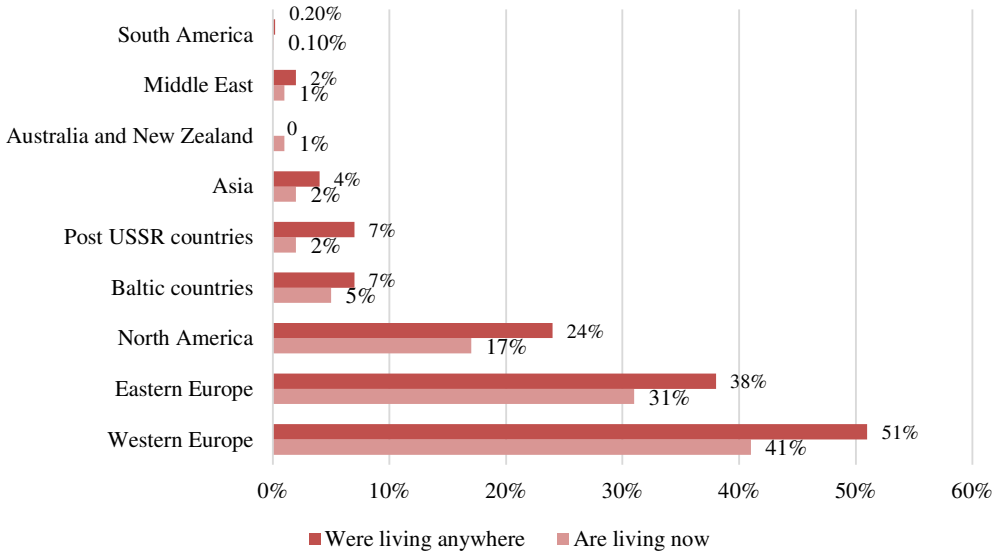

Fig. 5: Distribution structure of regions of the countries to which the Ukrainian IT specialists migrate

Source: developed on DOU: The community of programmers, 2018.

It is safe to say that most of the migrants from Ukraine who are employed in this field are highly qualified IT specialists , that is, at the time of departure they already have experience working directly on the industry profile, which is shown in Figure 6.

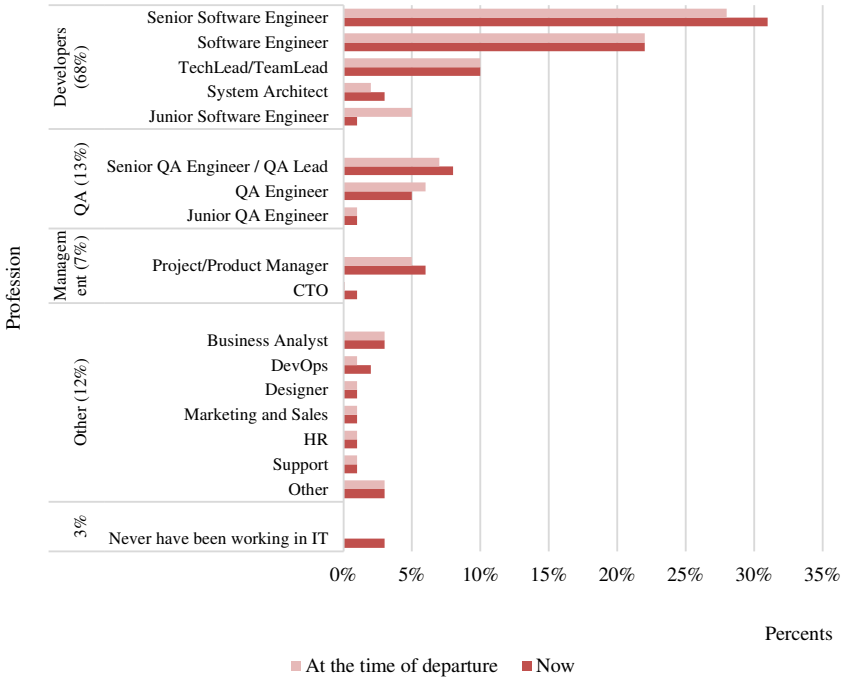

Fig. 6: Results of the interviewing IT professionals who migrated regarding professional orientation at the time of departure and at the time of the survey

Source: developed on DOU: The community of programmers, 2018

The age of the departed is an almost perfect histogram with a peak of 31.5 years now and 29 years at the time of departure (Fig. 7).

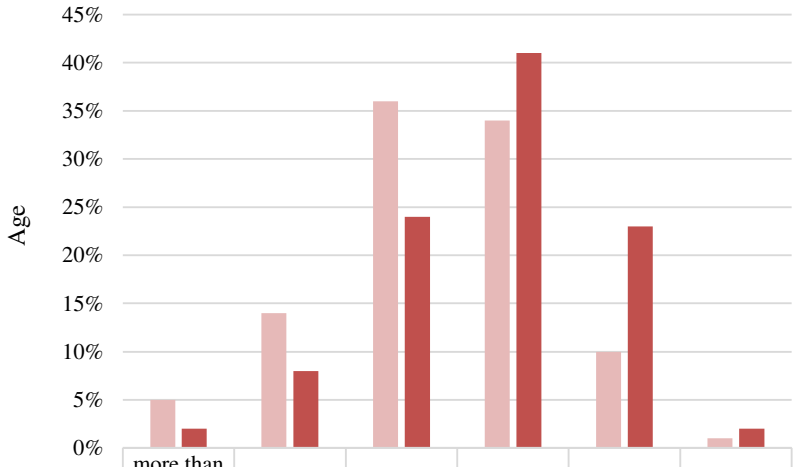

	more than 40	36-40	31-35	26-30	21-25	up to 21
Now	5%	14%	36%	34%	10%	1%
At the time of departure	2%	8%	24%	41%	23%	2%

Fig. 7: Distribution of age structure of migrant IT professionals according to the survey
Source: developed on DOU: The community of programmers, 2018.

Another factor that must be considered analyzing migration trends of highly qualified specialists from Ukraine IT industry is that they do not go alone, but with their families (more than 40%), which respectively increased the total number of migrants (Dmytrów et al., 2019). This fact also indicates that these professionals do not transfer money into the home country, do not pay taxes, which means they in no way take part in the formation of GDP as a result of their departure. Also, family migration reduces the likelihood of their return to the country from which they migrated in the future (Limosani et al., 2017).

The main feature that distinguishes representatives of the IT sector from other migrant workers is financial capacity (Titko et al., 2020). Among the first reasons for the departure of specialists are not income, but the quality of living environment (education, health care) (Domina et al., 2018), the prospects for company development, as well as access to another culture, the opportunity to learn about other countries (Fig. 9).

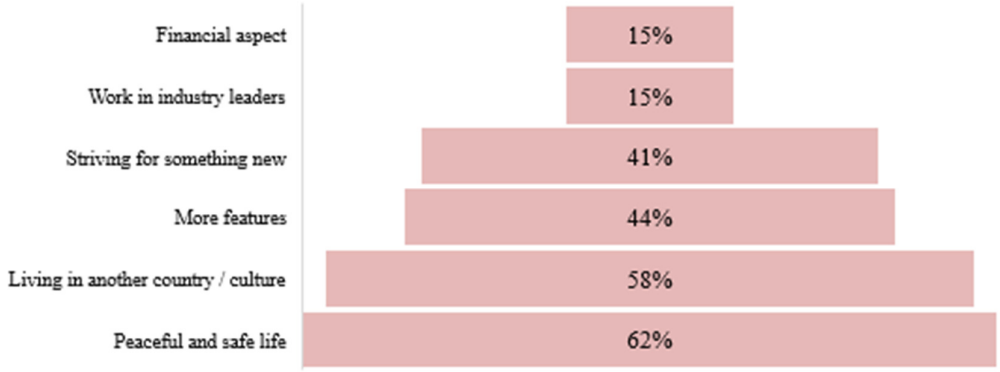

Fig. 8: Reasons for IT professionals to move

Source: developed on DOU: The community of programmers, 2018.

The living environment consists of many indicators that complement each other and form a holistic picture of living standards. The most significant of these indicators are the Global Innovation Index, Ease of doing business index, Sustainable Society Index (Human, Economic, Environmental Wellbeing), The Global Peace Index, Economic Freedom Index, Happiness Index (Fig. 9).

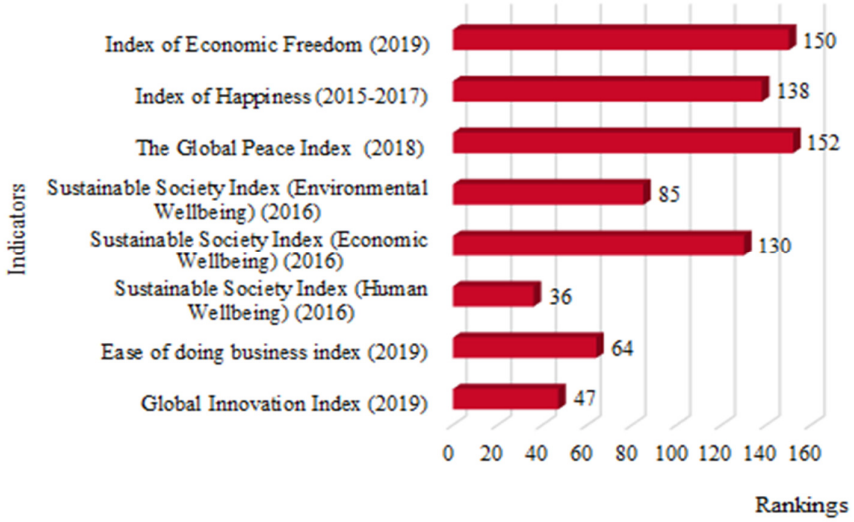

Fig. 9: Ukraine in the international indices in 2016-2019 (Ivanová E et al., 2019)

Thus, according to (Global Innovation Index, 2019) the Global Innovation Index, Ukraine ranked 47th in 2019, while in 2018, 2017 and 2016, the figure was 43, 50, 56, which indicates an overall positive trend. However, the countries visited by Ukrainian specialists have a much higher position in the Global Innovation Index ranking:

1) 2019: Poland – 39, United States of America – 3, Germany – 9;
2) 2018: Poland – 39, United States of America – 6, Germany – 9;
3) 2017: Poland – 38, United States of America – 4, Germany – 9;
4) 2016: Poland – 39, United States of America – 3, Germany – 10.

The ease of doing business rankings based on the average of each economy's ease of doing business scores for the 10 topics included in the aggregate ranking. For the economies for which the data cover two cities, scores are a population-weighted average for the two cities. A positive change indicates an improvement in the score between 2016/17 and 2017/18 (and therefore an improvement in the overall business environment as measured by Doing Business), while a negative change indicates a deterioration and a 0.00 indicates no change in the score (Koceva, 2019). In 2018, Ukraine ranked 71st (ranking = 68.25, change +0.94), in 2019 – 64 (ranking = 70,2, change +1,95). At the same time Poland ranked 40th (ranking = 76.9, change - 0.5), Germany - 22 (ranking = 79.3, change +0.4), USA – 6 (ranking = 83.6, change +0.4).

By the Economic Freedom Index, based on the calculation of 12 factors that characterize the rule of law (property rights, judicial efficiency and government integrity); the level of government intervention (tax burden, government spending and fiscal health); the effectiveness of regulation (business freedom, freedom of work and monetary freedom); openness of the market (freedom of trade, freedom of investment and financial freedom) Ukraine ranked 147th in 2019 and 150th in 2018, respectively, among 186 countries for which this indicator is calculated (with only 180 fully rated). This indicates that it is difficult for professionals to achieve company success through government policy, the imperfection of the judiciary, the legal system, etc.

The corresponding tendency is characteristic of Ukraine according to the majority of the analyzed indicators, which confirms the fact of dissatisfaction with the quality of life by highly qualified specialists of the IT sector.

In the general context of migration processes, it can be said that increasing labor mobility contributes to the economic development of the world, because it enables more efficient allocation of labor and economic resources (Koceva, 2019). But in fact, the economic effects of international migration may differ from theoretical expectations, due to a number of factors for both donor and host countries (Mikhaylova et al., 2019).

The migration of highly skilled professionals is one of the key factors in the redistribution of goods. Information and people are key resources for value creation. Studies conducted on the impact of migration on the performance of the economy (Koceva, 2019; Titko et al., 2020, Balkytė et al., 2011; Mishchuk et al., 2019; Kondratiuk-Nierodzińska, 2016; Lyulyov O. et al., 2018) allow us to understand the relationship between migration processes and economic development. However, a number of issues need further investigation (Bombiak, 2019). Namely, the impact of large-scale migration on the economic growth of the donor country and the recipient country. In order to understand this issue, it is advisable to identify the positive and negative aspects of the migration processes of highly qualified personnel for donor and recipient countries. The study will be carried out on the example of information technology.

From the perspective of the donor country. The outflow of highly skilled IT professionals in the country has one of the consequences a slowdown in the development or recession of science-based and high-tech areas, which in its turn has global implications that go beyond the individual sectors of the country's economy (Palienko et al., 2018). Consider the mechanism of this process. Migration of top IT professionals abroad (and there is no doubt that a significant proportion of those leaving the IT industry in donor country belong to this category, given the prospect of competing in highly competitive markets), leads to reduced competition in the domestic market. On the one hand, it contributes to the reduction of unemployment in the industry and promotes the recruitment of new specialists, which is a positive indicator (Kačerová, 2016). However, on the other hand, it reduces the level of competition among the best professionals in the industry. That is, there is a phenomenon where the attractiveness of the industry is increasing for newcomers, but there is a shortage of personnel among high-level professionals. The consequence is a reduction in the potential of the industry as a whole. In its turn, the decline in the industry's potential is reflected in the performance of the companies that form the industry and their market positioning. This can be traced at the structural changes (Serebryakova et al., 2018). The share of outsourced IT companies (to a large extent, supporting the activities of powerful international IT companies) and niche companies is

growing. In addition, a significant portion of the industry's output is export-oriented, which also has two aspects: a positive one – foreign currency flows into the country's economy - and a negative one - an industry product aimed at developing high value-added industries overseas rather than domestically (Karabasevic D., 2018). The activity of freelancers is also characterized by these aspects. This affects the state of science-based and high-tech sectors of the country's economy, which are gradually losing competitiveness (Ministry of Finance of Ukraine, 2020). As a result, at the macroeconomic level, import of science-based and high-tech products increases and their export decreases. The next link in the chain reaction is the relocation of investment resources to less science-based industries, and as a result to the production of lower value-added products. The minimization of high-tech cost component in the business model guides business structures (enterprises) along the trajectory of movement from process to primary industries (Tommaso, 2018, 2019). The global consequences of migration of highly skilled workers is a decrease in the share of high value-added industries and an increase in exports of raw materials, as a result, the country's economy functions as a raw-material and forms a typical economic model of a "third world country" (Djoemadi Faizal Rochmad, Setiawan M., Noermijati N., Irawanto D. W., 2019; Papp et al., 2019).

However, flow of foreign currency earnings from emigrants (to relatives and family) into the country is considered as a positive effect of large-scale migration, despite their considerable volume, these funds are directed mainly to consumption and do not solve the problems caused by labor migration.

Consider the importance of migration processes among the economically active population for the donor country. In terms of economic development, one of the benefits of labor migration is the infusion of currency (Afanasiev et al., 2019).

For example, according to various estimates, such revenues in Ukraine are from $ 1 to $ 5 billion every year. According to the Ministry of Finance of Ukraine, 2020, in 2016 private money transfers amounted to $ 7.5 billion or 7.9% of GDP, of which 20% came through informal channels, in 2017 $ 9.3 billion came to Ukraine (6% of GDP), in 2018 it was up to $ 11.1 billion. In 2019 – 8.7 billion dollars (6% of GDP), of which almost 50% arrived through informal channels. In 2016, most transfers were made from Poland, Russia, the USA (Fig. 10), but in 2019 the situation was changing towards an increase in receipts from the Czech Republic, Italy and a decrease in foreign currency inflows from the USA and Russia.

Accordingly, these receipts help to improve the competitiveness of the country's economy, but only in the context of individual industry markets (Golovchanskaya et al., 2018). Particularly it can be applied to the production of goods and the provision of services, the need for which migrant workers themselves declare in the implementation of migratory capital funds (Šanda et al., 2018). In Ukraine, these are mainly basic necessities, health care services, education, transport and more. In recent years, the real estate market (secondary and primary) has become quite significant in this regard, where migrant workers not only implement the acquired capital but also invest into extensive development of other related industries (Chocholatá et al., 2018). Matthias Benz and Robert Kirchner (Zholkver, 2019) state that their families' money is spent, in particular, on consumption (31.7%), construction or purchase of housing (19.4%), health treatment (8.7%), health treatment of children (6.9 %). Thus, according to the expert, Ukrainian labor migrants, although working abroad, still contribute to the growth of domestic consumption, which benefits the domestic economy , but do not significantly increase the investment aimed at the production of goods with high added value, and consequently, do not solve the problems caused by labor migration.

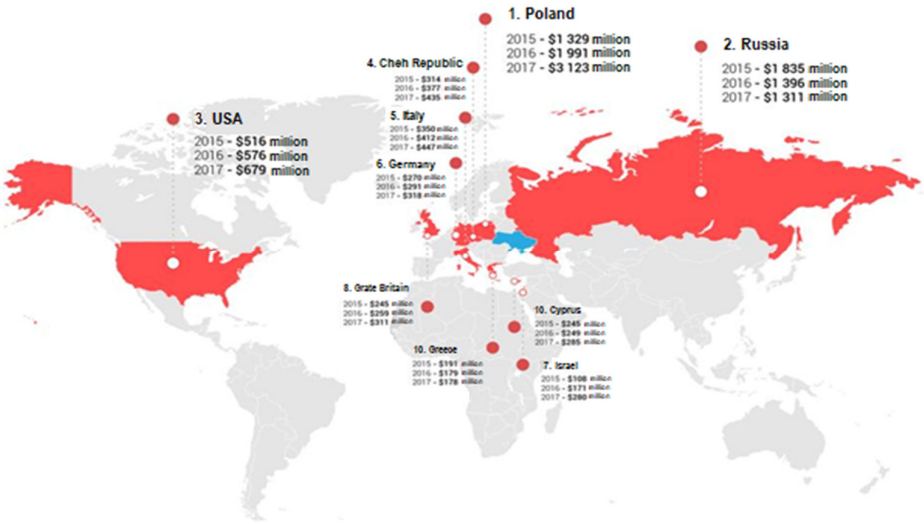

Fig. 10: Amounts of receipts into Ukraine from other countries in 2015-2017
Source: developed on RBC-Ukraine, 2018

From the position of the recipient country. The benefit of the recipient country is to obtain cheaper and highly skilled workers, who increase the overall technological level and competition in the industry, contributing to the intensification of its development processes and increasing its competitiveness on the international market (Dimian et al., 2018). Even if there is no discrimination in the wages of local specialists and immigrants, which sometimes takes place, national economy savings origin from no need to invest in the education of visiting professionals, since these costs are already borne by their country of origin.

Mass immigration of highly skilled workers may cause temporary increase in unemployment in the relevant industries for local professionals, but further development of the industry counteracts this effect, making it temporary (Hovhannisyan et al., 2018).

Thus, decrease in the unemployment rate is observed in Poland (7.1% in June 2017 compared to 8.3% in December 2016), which indicates that the country has passed the main stage of instability associated with mass immigration (in the case of Poland both highly skilled and low skilled). Migration is one of the key reasons that has led to Poland's economic success in recent years. The country's economy is booming. As a result, the GDP of the Republic of Poland shows a steady upward trend (2.8% in 2016 and 3.9% in II quarter of 2017 compared to previous periods) (Romanska, 2017).

The consequences of migration of this category of specialists for the recipient country's economy are contrary to those of the donor country and are: increasing the share of production and exports of high value-added goods, increasing the level of competitiveness of the economy, and the growth of GDP and other macroeconomic indicators (Formánek, 2019). Thus, as a result of the migration of highly skilled personnel, the gap in the level of economic and social development between the recipient country and the donor country is widening (Podra et al., 2020).

If we consider the impact of migration processes not globally, but separately on different groups of countries, on different industries and spheres of a particular country, it turns out that there are both positive and negative consequences (Table 2).

Table 2: the impact of labor migration of highly skilled staff on donor countries and on recipient countries (SWOT analysis)

Sphere	Advantages	Disadvantages	Opportunities for the future	Threats to the future
Impact of migration on the donor country				
Economics and Finance	Receipt of hard currency (freely convertible currency) into the country. Reducing the pressure of excess work force in the local labor market and, accordingly, social tensions in the country	Decrease in receipts to national GDP, decrease in tax revenue, due to non-payment of taxes by those who have previously worked and are now migrated	Accelerating of technology exchange, increasing of business opportunities, and export facilities for producers, as migrants abroad generate demand for national goods in the host country	Activation of inflationary processes through transfers of funds. Growth in labor remittances of migrant workers can lead to a decrease in output for export
Human capital	Free training of new professional skills of the workforce for the exporting country, familiarity with advanced work organization, etc.	A "brain leak", of qualified, initiative personnel	Reducing unemployment. Improving the quality of human capital in the future (for those who want to migrate)	Load on the social system of the country. Shortage of workers in certain specialties in the labor market
The educational industry	Acquiring new knowledge and skills of migrants returning to their homeland	Human capital outflow. Deterioration of the quality of human capital	Increasing motivation for education or skills for those who wish to migrate in the future	Shortage of entrants due to the departure of children together with their parents - highly qualified specialists
Social Aspect (Family Relationships)	Improving the well-being of poor working-class families	Deepening social inequalities through increased funding for families receiving money transfers from abroad	Changing roles in migrant families. Reducing the burden on local authorities and social institutions that take care of citizens' lives	The weakening of family ties through distance, and the inability to constantly communicate effectively. Destruction of families
Innovative development	Investing to innovative industries by creating joint ventures with foreign founders	Staff insufficiency / absence to generate innovation.	Using the gained experience for develop innovative activities	The loss of knowledge-intensive and high-tech industries competitiveness
Other areas	Increased productivity among remaining citizens	The number of economically active population is decreasing	Development of services for potential migrants	The elderly population is growing, and the number of young people is decreasing
Impact of migration on the host country				
Economics and Finance	Reduction of production costs. Foreign workers, by creating additional demand for goods and services, stimulate production growth and additional employment	Rising unemployment through additional competition in the labor market	Increasing the competitiveness of domestic products and the competitive position of the whole country	Overload of production facilities. Increasing competition of specialists in the domestic market; rising unemployment
Human capital	The intellectual capital receipt	The reorientation of specialists to less skilled work (temporary phenomenon)	Increasing the country's intellectual potential, including due to rising competition in the labor market	The own cadres substitution to foreign ones, population migration abroad
The educational industry	Reducing the cost for training specialists	There is no direct negative float	Increase in the practical training level by growth the industries capacity, increasing the number of practice bases	No direct threat was detected
Social Aspect (Family Relationships)	Increasing cultural diversity	Increasing the burden on local authorities, social institutions and migration service	Openness of the country. Following the globalization trends as a factor of the improving the image in the international labor market	The well-being deterioration of professionals families who have lost competitive labor to migrants in the labor market

Sphere	Advantages	Disadvantages	Opportunities for the future	Threats to the future
Innovative development	Involvement of highly qualified professionals in the process of innovation through increased competition in the labor market	There is no direct negative float	Improving personnel potential as a catalyst of the country innovative development	Information leakage. Loss in competition of international markets due to the experienced professionals return to their country
Other areas	Import of skilled work force saves on the cost of education and vocational training Improving demographic situation in the country, slowing down the overall pace of population aging	Social tensions in society. discrimination against migrant workers	Establishment of intercultural relations; internationalization of the population. Increasing demand for the social needs of migrants - the development of other social institutions, religions	Conflicts on racial, national, regional grounds, rise in crime and other negative phenomena

Source: Own research

As we see, the migration of highly skilled IT workforce can cause significant changes in the assessment of many functioning countries (Sriviboon, C., 2020). Taking into consideration this conclusion, it is advisable to analyze and group the areas potentially affected by the international migration processes of IT professionals (Table 3).

Table 3: alternative consequences for the donor country of migrants in the IT industry (high skilled workforce)

Feature of migration processes among IT specialists	Benefits for the donor country	Disadvantages for the donor country	Opportunities for the donor country	Threats to the donor country
Migration of IT specialists by section	Increase of opportunities of career growth for the specialists of lower qualification. Increase in foreign currency earnings	Reducing the development of high value-added industries. Reducing the real consumption of supporting industries for the IT industry	Increasing demand for educational services for IT professionals	Decrease of real investments, decrease of development of other industries
Migration with family	Increasing vacancies in the domestic labor market not only in the IT sector but also in others where family members were employed	Lack of currency receipts	Establishing close community relations with national diasporas in other countries	Changing the social structure of the country, reducing the number of able-bodied population and children, adolescents
The relocate is temporary	Training of domestic specialists; increasing and disseminating international experience	Reduction of revenues from temporary taxation at the time of temporary migration	Increasing the country's innovation potential; increasing opportunities for international cooperation	Disparities in the requirements for the qualification of IT specialists in the future. Dissatisfaction with specialists returning to the country. Temporary relocation may be followed by migration without return.

Source: Own research

Therefore, migration processes are one of the important factors that are taken into consideration when examining the economic situation and development of countries (Prokop et al., 2019). But at the same time, the migration of highly skilled IT professionals can have an impact on the formation and development of country innovation (Afonasova et al., 2019). To date, this indicator is not included in a number of issues that are taken into account when analyzing the innovative development of European countries by the European Commission. According to the European Innovation Scoreboard 2019 (European Innovation Scoreboard, 2020), in the 2018 summary Ukraine innovation index is 0.311. Summary innovation index is formed on the basics and analysis of indicators Human resources, Attractive research systems, Innovation-friendly environment, Finance and Support, Firm investments, Innovators, Linkages, Intellectual assets, Employment impacts, Sales impacts. Each of

these indicators is formed accordingly based on the analysis of specific data. Thus, accordingly the indicator Human resources is formed on the basis of New doctorate graduates, population with tertiary education, lifelong learning. But these figures only take into account the actual increase, but do not consider the amount of population with tertiary education and lifelong learning population leaving the country with almost no intention of returning. Thus, when considering the migration of highly qualified staff, having higher education degree and lifelong learning aspirations, this indicator can dramatically change the value of Human resources and Summary innovation index. For the donor country, this may have an impact towards reducing the summary innovation index. At the same time, for the host country, considering the migration processes of highly qualified personnel, in particular the IT industry, can dramatically increase the summary innovation index.

Conclusions

In order to study global processes, the structure of the migrant's distribution in accordance with the total population in percentage terms by continents is presented. According to data from the Department of Economic and Social Affairs Population of United Nations Ukraine is ranked 8th among the countries with the largest number of migrants in the world.

In general, it has been found that the IT market of Ukraine is showing unilateral trends, and that despite the strong development of the industry in Ukraine, it is several times more modest than in some developed countries such as the UK, USA, Poland, and even developing countries (India). In view of this is formed a stable judgment that the migration rates of Ukrainian IT professionals continue to increase.

In most cases, the regions where Ukrainian IT professionals migrate are Western and Central Europe, North America and a small number in the Baltic States. An analysis of the age structure showed that these are mostly young people (21-35 years old). The main factors behind which highly skilled IT workers migrate are not income but quality of living (education, healthcare), company development prospects, as well as access to another culture, opportunity to learn about other countries.

Based on an analysis of several world rankings by indices characterizing quality of life, economic, political, social, etc. (Global Innovation Index, Ease of doing business index, Sustainable Society Index, The Global Peace Index, Index of Economic Freedom, Index of Happiness) it is determined that Ukraine does not occupy key positions in the rankings, which clearly demonstrates its competitiveness in comparison with the leading countries in terms of social, economic development, standard of living and quality of life.

Comparing the Global Innovation Index of Ukraine with other countries that are recipient countries for Ukrainian IT professionals, and analyzing the structure of the Summary Innovation Index, which is formed annually for European countries, it is proposed to include the migration of highly skilled workforce in the evaluation indicators, as taking into account the turnover of specialists and can reflect significant changes in assessing a country's innovation and economic development.

The study grouped the main indicators of the impact of migration processes on donor and recipient countries in terms of economic and innovation component. It is determined that, despite the number of benefits (including financial benefits), for the donor country, labor migration of highly skilled workers reduces the share of high value-added industries and growth of raw material exports, as a result, the country's economy functions as a raw material and forms a typical economic model of the country "of the third world". The effects of the migration of this specialists category on the economy of the recipient country are opposite and consist in increasing the share of production and export of goods with high added value, increasing the level of the economy competitiveness and the GDP growth and other macroeconomic indicators.

Thus, it is determined that as a result of the migration of highly qualified personnel, the gap in the level of economic and social development between the recipient country and the donor country is widening.

According to the aim of the article main factors of migration of highly qualified specialists influencing the economic and innovative development of countries were identified. So, the study found that the hypothesis was correct and the migration of highly skilled personnel influences the economic and innovative development of both the recipient country and the donor country.

The findings allow allocating the directions for further research as follows: quantitative determination of the migration processes influence on the state of countries economic and innovative development, forecasting and economic-mathematical modeling of changes in the country's economic development in changing or maintaining migration trends, factor analysis of the impact of highly qualified personnel migration on economic development.

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The Problem of The Growing Similarity of The Level of Disposable Income in The Countries of The Visegrad Group

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Abstract

The article deals with the issue of the growing similarity of the level of disposable income in the Czech Republic, Poland, Slovakia and Hungary in the years 1996-2017. The studied countries have been associated within the Visegrad Group. At the beginning of the 1990s, these countries underwent a series of economic reforms necessary to transform from central planned to market economies. This made it possible to record systematic socio-economic development since the mid-1990s, which also translated into an increase in the level of disposable income of households. This process continues to this day. In the period under review two key events should be noted: the accession of the Visegrad Group countries to the European Union and the occurrence of the global financial crisis. The events had a significant impact on the growth of disposable income per capita in the period 2004-2008 and a slowdown in the years 2009-2012. The main objective of the study is to analyze changes in disposable income per capita in the Visegrad Group countries in the period 1996-2017 and to identify the convergence process of the level of disposable income. The implementation of the goal allowed to state that the level of disposable income in the examined countries was becoming more similar, which is undoubtedly the result of their mutual economic cooperation, globalization processes taking place and the countries belonging to the EU structures.

Keywords: Disposable Income, Convergence, Households, Visegrad Group.

Introduction

At the beginning of the 90s, the countries of Central and Eastern Europe began their political transformation. In 1991, the Czech Republic, Hungary, Poland and Slovakia formed the Visegrad Group, whose goal was to strengthen political and economic cooperation. As a result of the transformation, these countries have undergone a series of economic reforms that allowed the transition from a centrally planned to a market economy. The institutional and economic reforms led to systematic socio-economic development (Kurowska-Pysz et al. 2018; Łapińska 2013, 2016; Simionescu et al., 2018), which in turn had an impact on the increase in disposable income of households (Jankiewicz, 2018a, Saman, 2018). In 2004, the countries of the Visegrad Group joined the structures of the EU. Membership in the EU has undoubtedly resulted in the further development of selected countries in the institutional, economic and social dimensions (see Formanek, 2019; Simionescu et al. 2017, 2018; Bednář & Halásková, 2018; Balcerzak & Pietrzak, 2016; 2017). The similarity of many economic and social processes in the case of the Visegrad Group countries and countries belonging to the EU is indicated in the literature (see Kuc, 2015; 2017a; 2017b; Hadaś-Dyduch, 2016; 2017; 2018; Hadaś-Dyduch et al., 2019, Stanišić et al. 2018; Meyer & Meyer, 2019; Kuc-Czarnecka et al., 2020)

The subject of the article concerns the issue of changes in the disposable income per capita in the Visegrad Group countries and their growing similarities over the years. The literature on the subject most often considers the problem of economic convergence related to GDP (Wójcik, 2017; Kravčáková & Kotulič, 2015). Verifying the hypothesis of economic convergence for a group of countries means identifying long-term trends in the development of their level of GDP per capita and other economic categories, including the level of disposable income. In addition, consideration of the

problem of economic convergence makes it possible to answer the important question whether in the long run countries with lower levels of economic development are able to catch up with richer ones. The issues of absolute and conditional β-convergence, σ-convergence, club convergence and stochastic convergence were raised in the works of Baumol (1986), Barro & Sala-i-Martin (1995), Mankiw et al. (1992); Sala-I-Martin (1996a, 1996b), Kuc (2015, 2017a, 2017b).

In the literature the differences in the level of GDP per capita and productivity between EU countries are highlighted, where disproportions between new members and countries that joined the community before 2004 are pointed out (see Cheba, 2015; Cheba & Szopik-Depczyńska, 2017; Szopik-Depczyńska et al. , 2017; 2018a; 2018b). It is emphasized that the countries of Central and Eastern Europe are characterized by a significantly lower level of GDP per capita, and thus also a lower level of many macroeconomic and social indicators (Jermolajeva et al., 2017). However, since the Visegrad countries have joined the EU, they could have been described as a group of countries forming a convergence club, where the process of economic convergence takes place both within the club and throughout the EU. The systematic increase in the level of GDP per capita translates into an increase in the level of disposable income in households and a change in the structure of their expenditure (Gavurova et al. 2018; Głodowska, 2017; Jankiewicz, 2018a; 2018c; 2019). These changes are associated with the quick modernisation of these economies, in particular with institutional changes (see Balcerzak & Pietrzak, 2016; Balcerzak, 2020), an increase in the level of innovation, which triggers TFP growth (Jakimowicz & Rzeczkowski, 2019a; Jakimowicz & Rzeczkowski, 2019b; 2019b; Kijek & Matras-Bolibok, 2019; Roszko-Wójtowicz et al., 2019; Zygmunt, 2019), an increase in economic relations related to the belonging of these countries to international structures, or the increase in financial integration and their engagement in foreign trade (see Stverkova et al. 2018; Skare & Porada-Rochoń, 2019a, 2019b). An important factor is also the improvement of the labor market of the surveyed countries (see Georgescu & Herman, 2019; Bieszk-Stolorz & Dmytrów, 2019; Dmytrów & Bieszk-Stolorz, 2019; Tatarczak & Boichuk, 2018), which is a factor supporting the enrichment of households.

The aim of the article is to analyze changes in the level of disposable income per capita in the Visegrad Group countries in 1996-2017. The choice of such a long time of analysis made it possible to consider the variability of disposable income in three periods. The first ones concerns the years 1996-2004, where the Czech Republic, Hungary, Poland and Slovakia, after successful reforms related to the transformation and stabilization of the economy, carried out further system changes aimed at adapting economies to the possibilities of functioning within the EU. The second period concerns the years 2005-2008, in which the countries noted dynamic development related to functioning in the EU structures. The last period concerns the years 2009-2017, which includes the occurrence of the global financial crisis and the slower progress of the economies to economic equilibrium.

The level of disposable income indicates the wealth of the household and is the main factor shaping the structure of consumer spending (see Jankiewicz, 2018a, Shaw et al., 2017). In the article, the author puts forward a research hypothesis saying that there was a process of convergence of disposable income per capita in the countries under investigation. The verification of the hypothesis is an important contribution in the discussion on the issue of the similarity of the structure of household consumption, which changes along with the globalization process (see Hadaś-Dyduch, 2017, 2018; Swinnen, 2017) and as a result of duplication of international consumption patterns (see Salvati et al., 2018).

Methodology

The study concerns the analysis of changes in the level of disposable income per capita in the Visegrad Group countries, while the focus will be on the ongoing process of growing income similarity. Therefore, an attempt will be made to establish absolute β-convergence for disposable income. The concept of absolute β-convergence are presented in the works of Baumol (1986), Barro & Sala-i-Martin (1991, 1992, 1995), Sala-i-Martin (1996a, 1996b). Confirmation of the occurrence of

absolute β-convergence proves that in the long run all the studied countries will strive for the same level of disposable income per capita. Within a certain time, this income will be achieved on a common path of sustainable growth.

If the convergence process occurs, there should be a negative correlation between the disposable income growth rate per capita and its initial level. The absolute β-convergence hypothesis is tested by estimating the following model

$$Y^* = \beta_0 + \beta_1 \ln Y_0 + \varepsilon \quad , \qquad (1)$$

$$Y^* = \frac{1}{T} \ln\left(\frac{Y_1}{Y_0}\right), \qquad (2)$$

where Y_0, Y_1 are the values of the disposable income per capita in the initial and final periods, β_0, β_1 are structural parameters of the model, T is the number of periods studied, ε is a random component.

Obtaining a statistically significant parameter β_1 with a negative assessment confirms the hypothesis about absolute β-convergence for the examined group of countries. Otherwise, the hypothesis should be rejected. The value of the assessment of the parameter β_1 informs about how much of the distance between the average initial income for all countries and the value of income at steady state has been covered during the T years. The higher the absolute value of β_1, the faster the countries converge to equilibrium.

For panel data a dynamic panel model is used to verify absolute β-convergence (Baltagi, 1995):

$$\ln\left(\frac{Y_{it}}{Y_{it-1}}\right) = \beta_0 + \beta_1 \ln Y_{it-1} + \eta_i + \nu_i + \varepsilon_{it}, \quad (3)$$

$$\ln Y_{it} = \beta_0 + (1 + \beta_1) \ln Y_{it-1} + \eta_i + \nu_i + \varepsilon_{it}, \qquad (4)$$

$$\ln Y_{it} = \beta_0 + \gamma \ln Y_{it-1} + \eta_i + \nu_i + \varepsilon_{it}, \qquad (5)$$

$$\gamma = (1 + \beta_1), \qquad (6)$$

where: Y_{it} gives the values of the disposable income process per capita, $\beta_0, \beta_1, \gamma_1$ are parameters of the model, t is time variable, i is index for the country, η_i gives individual effects of a panel model; ν_i are time effects, $\varepsilon_{it}$are disturbances.

The UMM system estimator is most often used to estimate the parameters of a dynamic panel model (Blundell & Bond 1998). The two-step estimation process is a development of the UMM estimator for equations in the first differences (Arellano & Bond, 1991). In the case of using the panel model, obtaining a statistically significant parameter γ with an assessment less than one confirms the hypothesis of absolute β-convergence. The average annual convergence rate is given by the formula

$$b = -\ln(\gamma) \qquad (7)$$

and the time it takes to move halfway between the average level of initial income and equilibrium income by formula (see Barro & Sala-i-Martin, 1995)

$$c = \frac{-\ln(2)}{\ln(\gamma)}. \qquad (8)$$

Analysis of changes in the level of disposable income

The empirical study focused on the level of disposable income per capita in the Visegrad Group in the years 1996-2017. The data were obtained from the Eurostat database. Table 1 presents the level of disposable income per capita in the years 1996, 2004, 2009 and 2017 and its percentage changes in the periods 1996-2004, 2004-2009, 2009-2017. Initial analysis of the data in Table 1 indicates a systematic increase in disposable income, both before joining the EU in 2004 and after accession. In 1996, the highest level of disposable income per capita was obtained in the Czech Republic (2,871.23 Euro). In Hungary and Poland the initial disposable income per capita was at a similar level (2,286.16 and 2,344.45 Euro, respectively), and in Slovakia at the lowest level (1,986.85 Euro).

Table 1. Disposable income in the Visegrad countries
(Source: own work based on Eurostat data)

Countries of EU	Dispisable income p.c.				Percentage change			
	1996	2004	2009	2017	1996-2004	2004-2009	2009-2017	1996-2017
Czech Republic	2871,23	5056,72	7941,08	9380,72	76,12%	57,04%	18,13%	226,71%
Hungary	2286,16	4962,47	5480,92	7127,9	117,07%	10,45%	30,05%	211,78%
Poland	2354,45	3607,46	5240,6	7326,82	53,22%	45,27%	39,81%	211,19%
Slovakia	1986,85	3868,67	7527,5	9328,57	94,71%	94,58%	23,93%	369,52%
all countries (average)	7982,55	11446,5	13519,4	15575,3	43,39%	18,11%	15,21%	95,12%
"old" countries (average)	11339,3	15531,5	17423	19544,9	36,97%	12,18%	12,18%	72,36%

In the years 1996–2004, as a result of system reforms carried out in the early 90s and actions aimed at institutional preparation of economies for accession to the EU, the level of disposable income has grown very dynamically. In the case of Hungary, it more than doubled (117.07%). Slovakia, the Czech Republic and Poland also recorded high disposable income growth rates at 94.71%, 76.12% and 53.22% respectively (see Table 1). As a result of such a strong upward trend, disposable income per capita for Poland and Slovakia in 2004 amounted to 3607.46 and 3868.67 Euro, respectively. In the case of the Czech Republic and Hungary, disposable income of households was at a higher level compared to Poland and Slovakia in 2004, respectively 5,056.72 and 4,962.47 Euro.

The year 2004 was crucial for the countries of the Visegrad Group due to their accession to the structures of the EU. The membership resulted in a significant increase in the level of their disposable income, which in 2009 amounted to 7941.08, 5,480.92, 5,460.60 and 7,527.50 Euro respectively for the Czech Republic, Hungary, Poland and Slovakia. Slovakia recorded the highest increase in disposable income per capita at 94.58%. The increase in disposable income for Czech Republic and Poland was at a comparable level of 57.04% and 45.27%, respectively. It is important to emphasize the very low increase in disposable income in Hungary in 2004-2009 at the level of 10.45%. Hungary was undergoing an economic crisis during this period and. As a result of reforms, the Hungarian economy entered the recovery phase only after 2012.

It should be emphasized that, despite the global financial crisis in 2008-2009, the level of disposable income of households for the Visegrad Group countries again significantly increased in the years 2009-2017. As a result, in 2017 the Czech Republic and Slovakia had the highest level of disposable income, 938.72 and 9328.57 Euro, respectively. In the case of Hungary and Poland, disposable

income was at a lower level in 2017 and amounted to 7,127.90 and 7,326.82 Euro, respectively. It should be emphasized that in the period 2009-2017 the growth rate was lower than in the years preceding 2009. The growth rate of disposable income per capita amounted to 18.13%, 30.05%, 39,81% and 23.93%, respectively for the Czech Republic, Hungary, Poland and Slovakia. One of the main arguments justifying this situation is the fact that the studied countries were at the time under the influence of the global financial crisis, which significantly affected the global economic slowdown.

Summing up the analysis, it should be emphasized that in the period 1996-2017 there was a systematic increase in the level of disposable income in the examined countries, respectively for the Czech Republic, Hungary, Poland and Slovakia 226.71%, 211.78%, 211.19% and 369.52 (Table 1). The analysis confirms the diversity in the level of development of the economies of the Visegrad Group countries. The Czech Republic and Slovakia achieved a similar level of disposable income in 2009 and 2017, in spite of the fact that the countries were characterized by significant differences in the level of socio-economic development in favor of the Czech Republic. The economic development of Hungary and Poland went completely different, which also achieved a similar level of disposable income in 2012.

It should be emphasized, however, that despite differences, there is still a high similarity of the economies of the Visegrad Group countries and in social, economic and institutional conditions for their development. In addition, the presented analysis clearly indicates that the largest increase in disposable income for the countries studied was recorded in the period 1996-2004, after which, in the subsequent periods 2004-2009 and 2009-2017, the speed of growth decreased. This means that for the Visegrad Group countries a convergence of disposable income may occur, which was expressed in the research hypothesis set out in the article.

In the first stage, the Pearson's linear correlation value between the logarithmic rate of increase in disposable income in the period (t-1, t) and the value of disposable income in the year (t-1) was determined. The significant correlation value obtained at the level of -0.36 indicates the potential convergence of disposable income in the countries. In order to verify the research hypothesis, the parameters of the dynamic panel model were estimated, where the model specification was expressed using equation 5.

Table 2. The result of the estimation of the dynamic panel model (Source: own estimation)

Parameters	Parameters Estimated	p-value
γ	0,94	≈0,00
α_1	0,49	≈0,00
Statistical test	The value of the statistical test	p-value
AR(1)	-4,05	≈0,00
AR(2)	-1,38	0,16

The obtained estimation results are presented in Table 2. Parameter γ turned out to be statistically significant. The obtained assessment of the parameter γ lower than one allows the verification of the research hypothesis presented in the article about the convergence process of disposable income per capita. The average annual convergence rate for a group of selected countries is 5.24%, and the time it takes to move halfway between the average level of initial income and steady state level of income is 13.22 years. The statistical properties of a random component of the model were also examined. In the case of autocorrelation properties of increments of random component, a negative, statistically significant first order autocorrelation and statistically insignificant second order autocorrelation were obtained. This demonstrates the choice of the UMM was statistically justified (see Baltagi, 1995).

Conclusions

The article deals with the issues related to the development of the level of disposable income per capita in the years 1996-2017 in the Visegrad Group countries. The aim of the study was to identify the trends of disposable income and to determine the process of its convergence. For each of the countries, a dynamic increase in disposable income per capita was established. Permanent growth over the years was mainly due to the reforms carried out in the political system, the accession of countries to the EU, which lead to the systematic increase in the level of socio-economic development (see Simionescu et al., 2017; 2018). It can be stated that selected countries are becoming more and more economically similar to the so-called old EU, including the main determinants of welfare such as investment outlays (see Rogalska et al., 2017; Wigren & Wilhelmsson, 2007, Tvaronavičius and Tvaronavičiene, 2008), level of innovation (see Mejlgaard et al., 2018), or the development of the digital economy (see Balcerzak, Pietrzak, 2017; Azzouz et al., 2018). Therefore, with the increase in the level of socio-economic development of the Visegrad Group countries, including institutional and structural changes in these economies, a further upward trend in the level of disposable income per capita should be expected.

Realization of the goal of the article allowed to verify the research hypothesis on the convergence of disposable income per capita for the examined group of countries. This means that long-term trends in the level of disposable income have been established, according to which selected countries will strive for the same level of disposable income. The target income level should be achieved on a common path of sustainable growth. It should be emphasized that the established average annual convergence rate and the time needed to reach halfway to a steady state level of income may change over time. The identification of the disposable income process for the Visegrad Group countries indicates that even in crisis situations and in the event of structural changes in economies, they should aim at a similar steady state.

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Electronic Banking Services for Micro and Small Enterprises in Poland

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Abstract

The theoretical part of the article presents general knowledge about electronic banking services and the importance of ICT networks for the development of this field of economy. Premises causing the dissemination and development of the offer of electronic banking services for micro and small enterprises were also presented. The practical part of this study presents the results of research conducted among owners and managers of micro and small enterprises in the Silesia region covering such aspects as: the degree of using electronic banking services, the most common forms of using electronic banking services, the most important electronic banking services from the point of view of micro and small enterprises, determinants of the use of electronic banking services and threats resulting from the use of electronic banking services. Conclusions and proposals for further research complete the study.

Keywords: Electronic Banking Services, Micro Enterprises, Small Enterprises, Poland.

Introduction

Using banking services in a classic way is out of the question. ICT networks allow convenient, simple, fast and above all cheap use of banking services by enterprises and individual clients. Computer and telecommunications networks enable the execution of a transfer order or checking the account balance from anywhere. This solution allows enterprises freedom of account operations, while banks have the ability to control their operations and ongoing contact with clients (Badawi et all, 2017); (Grzywacz, 2016).

The popularization of electronic banking services determines the access of enterprises to particular telecommunications services. These services can be implemented through such media as: traditional telephony, mobile telephony, fax-modem services, ISDN, leased lines, packet data transmission, WAN, MAN and LAN. The development of ICT techniques and technologies can now be regarded as an accelerator of all business processes. Observing the dynamic development of the banking services market and integrated IT systems dedicated to business organizations, there is a convergence of banking areas with the areas of corporate finance (Liao and Tow Cheung, 2016).

The modern banking system is one of the more active areas of occurrence of various financial innovations. Innovation in financial service, both for companies and individual recipients, can be considered search and selection of various methods and forms of payment that meet the needs of customers. As a result of increased competition among banks, the quality of their services is improving. It is primarily the banks that are currently deciding on the basic choice of distribution channels for their products and services, but customers should not be depreciated in this respect (Kocisova et all, 2018).

In recent years, significant progress has been made in Poland in the field of IT applications in banking. It is well known that banks have a large number of settlement operations. The fast and error-free service of these operations can be performed only with the use of appropriate IT systems. A number of banking activities are significantly accelerated due to instant access to information stored in databases (Kaczmarek, 2016).

An important problem in the field of banking financial services is the concern about the security of funds accumulated on the account. In Poland, there is still a lack of confidence in the electronic transmission of data. This is primarily due to the lack of sufficient public awareness in this regard. This is particularly evident in the areas of electronic payments. There is a perception that there is still a lack of sufficiently secure electronic transaction channels.

The noticeable process of decreasing the number of operations carried out in banks by micro and small enterprises in the classical way for electronic operations is very dynamic. For this purpose, less time-consuming, more efficient and safer information technologies are used. This applies to the entire range of electronic services offered by banks to individual and business clients. The market for these services is expanding to include the following forms of activity:

- preparation of technical and information infrastructure,
- information services provided electronically,
- commercial and banking operations carried out using electronic devices (Gąsiorowski and Podsiedlik, 2015); (Omariba et all, 2012); (Sławek, 2017); (Sravanthi, 2016).

The methods of conducting banking operations have a significant impact on the development of micro and small enterprises. Therefore, it is important to improve this area through the use of modern technologies and IT techniques. However, the use of IT infrastructure in micro and small enterprises is associated with organizational changes that should be carried out in them and with incurring some financial expenses. However, as a result of such transformation, the efficiency of financial management is increased and the level of company profits increases. This is one of the most important conditions that determines the functioning of micro and small enterprises on the market (Laith Talal Khrais, 2013).

Banks strive to modernize the banking systems existing in their branches. This possibility is largely guaranteed by legal regulations and market realities. Banks provide their clients with the option of carrying out banking operations electronically. This process is conditioned by:

- an increase in the number of documents in the banking sector,
- high costs of traditional banking services,
- introducing new banking services,
- competition between banks,
- changes in legislation affecting the dissemination of an electronic document in business transactions,
- increased threat of criminal activity.

Considering the above premises, it should be assumed that electronic banking services are an indispensable tool in micro and small enterprises. Therefore, it becomes important to organize the individual stages in the processes of selection, design and implementation of electronic banking services in these enterprises (Ranisavljevic and Jovic, 2016); (Liébana-Cabanillas et all, 2013); (Nso, 2018); (Khan, 2017).

Research Methodology

The survey using the questionnaire was conducted from January 7 to January 21, 2020. The respondents were the owners and managers of micro and small enterprises in the Silesia region. The selection of the research group was intentional. 146 business entities took part in the study. After checking the correctness, completeness and logic of the answers given, 128 questionnaires were classified for further analysis. The condition of participation in the research was consent to anonymous completion of the questionnaire. The survey contained 1 single-choice question and 4 multiple-choice questions.

The test results are summarized in the tables. The tables are based on the relationship (1), illustrating the frequency of answering y-type responses (y = a, b, ...) within the question x (x = 1, 2, 3, ..., 7, 8).

$$k_{x,y} = \frac{\sum e_{x,y}}{\sum E_x} \cdot 100 \ [\%] \ , \qquad (1)$$

wherein:

$\sum e_{x,y}$ - the number of y-type answers (y = a, b, ...) given under question x,

$\sum E_x$ - total number of answers given under question x

The aim of the research was:

- determining the degree of use of electronic banking services by micro and small enterprises;
- obtaining knowledge about the most common forms of using electronic banking services in micro and small enterprises;
- isolating key (most relevant) electronic banking services for micro and small enterprises;
- diagnosing the determinants of using electronic banking services in micro and small enterprises;
- learning the opinions of respondents about the risks arising from the use of electronic banking services.

Presentation and Discussion of Research Results

The first survey question concerned the use of electronic banking services in micro and small enterprises and the business profile of the enterprise. In the surveyed group of business entities, 100% of respondents use such services in various degrees and forms. Regarding the profile of the company's activities - 55% respondents indicate a commercial activity, 35% for service activities and 10% on production. The research results for this survey question are shown in Figure 1. This part of the research is not surprising and its results were predictable. Nowadays, it is difficult to imagine the functioning of any enterprise without access to an ICT network. It should only be noted that in family businesses, transferring competences related to IT activities to the younger generation is a common phenomenon. This is due to the fact that people born in the nineties and later are much better educated in the field of computer science. This information was obtained during a direct survey interview on a sample of 24% of the surveyed population.

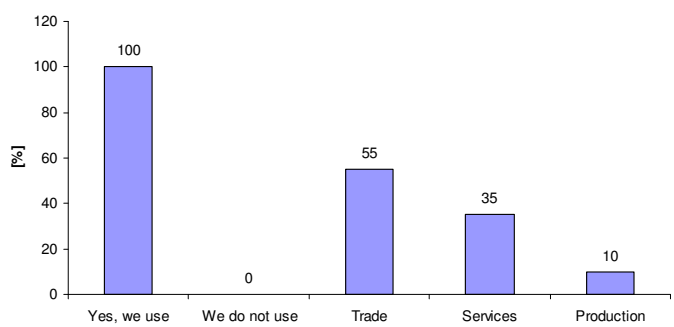

Fig. 1: Degree of use of electronic banking service and business profile

Source: Own research

The second survey question concerned the form of using electronic banking services by micro and small enterprises. The research results for this survey question are shown in Figure 2. As can be seen, the vast majority of respondents (96%) indicate the use of banking services via websites and payment cards (51%). Telephony comes next (28%). The questionnaire did not specify whether it is landline or GSM, but we can assume that this applies to services provided through smartphones. ATMs were indicated by 15% of respondents, which indicates a trend aimed at limiting cash transactions. A very small percentage of respondents (5%) pointed to stationary bank branches, which means that it is not possible to completely eliminate bank branches, as there are activities and procedures that require a personal visit to the bank.

The third survey question concerned the identification of key (most significant) banking services for micro and small enterprises. The research results for this survey question are presented in Table 1. The most important services for micro and small enterprises surveyed indicated the current PLN account (100%), domestic transfers (95%) as well as information about accounts (90%) and credit cards (70%). A small percentage of respondents indicated such services as: foreign currency loan, foreign currency deposit and foreign currency account. This state of affairs is most likely due to the fact that the majority of respondents conduct their activities only with contractors from Poland, providing services and goods to the local market. Another reason for such indications may be the attractive offer of banks in the field of conversion into universally acceptable currencies of the world, which does not require the freezing of funds on company accounts.

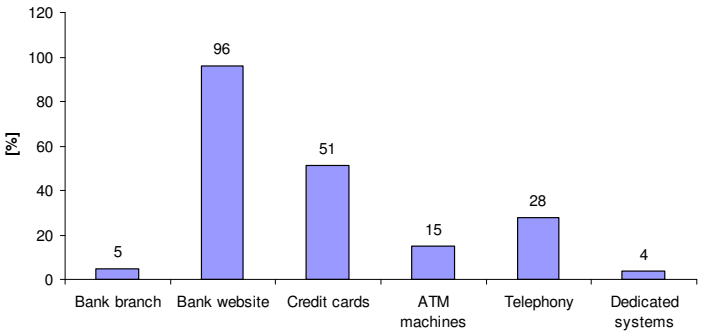

Fig. 2: The form of using electronic banking services

Source: Own research

Table 1: Key banking services for micro and small enterprises

Answers	Indications [%]
Current PLN account	100
Domestic transfers	95
Account informations	90
Credit cards	70
PLN loans	35
Foreign transfers	21
Investment account	12
Currency account	8
Currency deposit	5
Foreign currency plan	4

Source: Own research

Another survey question referred to the determinants of the use of electronic banking services by micro and small enterprises. The research results for this survey question are presented in Table 2. The respondents indicated as the most important determinants: Reduction of time-consuming, direct contacts with the bank branch (92%), more effective management of funds on the account (85%) and reduction of the number of paper documents (75%). Less important for the respondents from the point of view of the activities of micro and small enterprises were: improved security of cash

disposition, faster access to financial information and access to new banking products (14%). It should be presumed that such indications result from the real needs of micro and small enterprises operating on the local market and the proper adjustment of banks' offer to the needs of entrepreneurs.

The last survey question concerned the threats to development of electronic banking services. The research results for this survey question are presented in Figure 3. The majority of respondents (98%) point to the threat arising from broadly understood electronic crime. In this aspect, the research results should be treated optimistically, taking into account the awareness of entrepreneurs about the possibility of cyber attacks and attempts to phishing login data in electronic banking systems. Relatively many indications (56%) were at the expense of telecommunications services. It should be assumed that this is due to the belief in the high costs of these services outside the country (especially in countries outside the European Union) and the presumption of entrepreneurs with a significant financial burden for telecommunications services. This aspect requires a separate approach and research, which in the author's opinion should constitute a more comprehensive study. A small percentage of respondents pointed to the costs of system implementation and maintenance (32% and 15%, respectively), which is also confirmed by taking into account previous responses regarding the use of dedicated systems.

Table 2: Determinants of the use of electronic banking services in micro and small enterprises

Answers	Indications [%]
Limiting time-consuming, direct contacts with the bank branch	92
More efficient account management	85
Reducing the number of paper documents	78
Acceleration of payment transactions and cash flow	21
Access to new banking products	14
Faster access to financial information	12
Improving the safety of cash management	10

Source: Own research

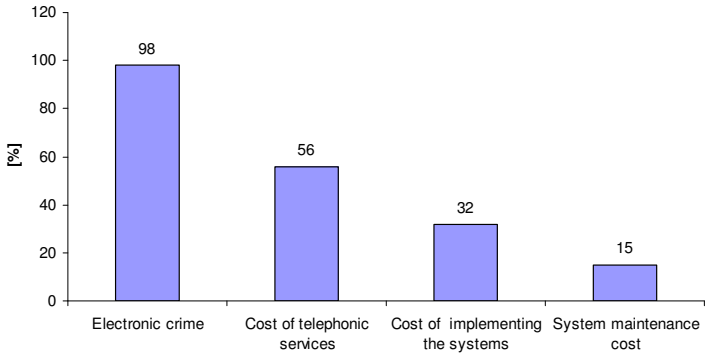

Fig. 3: Threats to the development of electronic banking services

Source: Own research

Conclusions

Electronic banking services set new directions in the development of commercial techniques and processes, and these are very important aspects from the point of view of the activities of micro

and small enterprises. Through IT networks it is possible to carry out most of the financial operations related to the means of payment stored on the account. This is confirmed by studies in which 100% of micro and small enterprises indicate that they use such services. Equally important are the possibilities of obtaining information on the state of cash and operations carried out now and in the past. This is possible by checking the course of all transactions carried out after referring to the account history. Thus, it becomes possible to automatically load defined accounts, create all types of reports, select information and print selected documents. Data sorting is done according to selected and given criteria, for example transfer amount, posting date, etc. Thanks to this, possible mistakes that could arise during the preparation of orders are kept to a minimum. This is indicated by research. The surveyed group of micro and small enterprises indicated that the key services are: account information (90%), domestic transfers (95%) and the current zloty account (100%). Planning and managing finances is also easier. As a result, by obtaining full and timely information, you can control the cash flow of your bank account to a much greater extent. Account management can also be carried out from outside the country via ICT networks. However, this is not the most important issue for micro and small enterprises. Only 8% of respondents indicate a currency account as significant from the point of view of their business activity. 21% of respondents declare their willingness to use foreign transfers. Most likely it depends on a group of contractors in which foreign entities constitute a much smaller percentage than domestic economic entities.

In the organizational and economic aspect, the conducted research and analysis provide grounds for stating that the importance and relevance of the issues raised is undeniable. Electronic banking services allow for a high level of information flow, which gives flexible and quick access to accounts. This is reflected in the research carried out. In the surveyed group of enterprises, as determinants of the use of electronic banking services, 92% point to the reduction of time-consuming and direct contacts with the bank branch and 85% to more efficient management of funds accumulated on bank accounts. The respondents' indication of faster access to information at the level of 12% is most likely due to the fact that electronic access to the account should assume that the service is satisfactory.

The use of electronic banking services carries real threats, such as: computer piracy, hacking into IT systems and the possibility of unauthorized interception of information. Therefore, institutions providing telecommunications services and enterprises using extensive computer systems for their operations are forced to incur costs on security systems. Nevertheless, these costs may turn out to be disproportionately low in relation to the losses resulting from the above mentioned activities. Existing advanced technologies and techniques are not perfect, because no information can be sufficiently protected and is vulnerable to being taken over by unauthorized persons. The optimal solution is the simultaneous use of the latest security systems as well as proper management and organization. This is confirmed by studies in which 98% of respondents indicate electronic crime as a threat to the development of electronic banking services and 56% the cost of telecommunications services, taking into account, among others, the costs of security incurred to protect transferred data in ICT networks.

Users of electronic banking services must be sure that the incoming data is correct in formal and logical terms. It is also important to encode transmitted and stored data. There is a special need in the electronic payment systems for standardizing procedures, because only then it is possible to make payments both nationwide and international. Telecommunications infrastructure adequate to the needs of enterprises has an impact on the functioning of these systems.

The preliminary (exploratory) research and analysis carried out do not close the topic. It seems reasonable to repeat the survey in which the Likert scale will be used. This would make it possible to determine the model of the examined set of enterprises taking into account the predilection relating to the area of electronic banking services. This, in turn, would allow the identification of key selection factors, development, restrictions and risks associated with the use of electronic banking services.

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Desired Competences of University Graduates According to Employers

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Abstract

Global markets, general computerization and digitalization, as well as technological development often force to redefine competencies of current employees. At present, employees are functioning in a very dynamic, diverse and multicultural environment. The changing expectations of employers and market requirements result in the need to continuously develop and enhance competencies. Therefore, it is important for employees to develop competencies, which are desirable on the job market, to be able to work in the numerous professions of the future. This publication presents categories and types of competences, as well as trends in the development and changes of competencies of employees. Possibilities of improving competencies have been indicated. Challenges faced by the higher education system as well as relevant expectations towards graduates of higher schools have been defined. An assessment of the demand amongst entrepreneurs for selected competencies of employees (creativity, entrepreneurship, teamwork, communicativeness) has been carried out in the light of the conducted research in selected European Union countries.

Keywords: Competencies, Job Market, Creativity, Entrepreneurship, Teamwork, Communicativeness

Introduction

The job market is undergoing an intensive transformation. The future of work and professional competencies of the future are often discussed during global debates and on economic forums. Heads of corporations, political leaders, intellectuals and journalists continue to discuss the challenges to be faced by the job market in the nearest future. One of the most significant transformations is the changing character of work. New technologies allow to work at any place and any time. The conditions of work are also changing.

Thus, the transforming environment forces new competencies amongst employees. Today, young people often have different competencies than their older colleagues and are driven by different values. The younger generation of future employees comprises people who function in the digital world and combine the virtual worlds with the real one. They regularly use social media, which, to a large extent, serve to replace reading the press, communicate with others or expand knowledge. They are open to changes, they easily adapt to new situations, and they value independence, which is often related with mobile work. On the other hand, employers note openness to change, the will to improve and develop, as well as creativity and critical-thinking abilities. According to forecasts, innovativeness, inventiveness and creativity are the competencies, which will be most desirable and sought by employers in the foreseeable future.

Employment in the knowledge economy is characterized by increasing demand for more highly skilled workers (Ishak, Eze, Ling 2010, Triki, Zouaoui 2011). Shaping the future character of work will depend on the development of digitalization and robotization. It is estimated that as much as 40% of jobs in Poland, and over one half in the world, are threatened by automation (Gumtree 2017

Report). It is also emphasized that the development of new media as well as the growing number of data open a new era, which allows modeling the social systems on a huge scale, where we will have to learn to think and act in an entrepreneurial manner (Future Work Skills 2020). It is estimated that even 30% of skills, which are valued by today's employer, will change in the coming years.

Thanks to the development of new technologies more people will find jobs in new professions. This, in turn, results in the need to continuously gain knowledge and change the approach to learning. Modern technologies make work easier and simplify processes, however they will not replace the human. Therefore, it is important to constantly develop competencies of future employees, which are desired by employers. The purpose of this publication is presenting the expectations and the assessment of entrepreneurs of the selected desirable competencies of graduates of higher schools - the future employees.

Concept and categories of Competencies

According to various researchers, businesses involved in the global area need to have certain competencies, capabilities and skills that are important. These competencies can be the fundamental building blocks of competitive advantage. Sanchez, Heene, and Thomas define competence as the ability to create, gain access to and co-ordinate tangible and non-tangible assets (Kuppusamy 2008). Source literature provides numerous definitions of "competencies".

Usually competencies are divided into professional competencies and personal competencies, referred to as behavioural (Armstrong 2004).

Professional competencies are defined in reference to the given job position. They are directly related with execution of tasks, for example technical abilities, knowledge of the industry. They are defined as "hard" competencies. Hard competencies are developed along with obtaining professional experience. They may also be improved through formal methods, such as university courses or training. Personal competencies refer to behaviours and are related with personal characteristics of managers, which are contributed to the fulfilled professional roles. Personal competencies are defined as „soft" competencies. Soft competencies of managers, as opposed to hard competencies, are not easy to improve. This usually requires a change of behaviour. In business processes, hard competencies of the management still play an important role. They facilitate, amongst others, development of products, implementation of new solutions, or building authority. From the perspective of the last few decades, requirements concerning hard competencies may be deemed as constant. Whereas the significance of soft competencies is growing. These competencies contribute to effective execution of the company's strategy where not only the abilities of single persons are used but also the synergy of the entire team (Jędrzejczyk 2013).

Both hard and soft competencies may be developed and improved. In particular, soft competencies may dominate in many workplaces. Recruiters and professional advisors admit that hard competencies often decide about getting the job, but soft competencies may cause losing it. According to some, hard competencies may soon be replace by machines. This particularly refers to routine repeatable tasks, based on algorithms.

According to Rostkowski, competencies mean all attributes of employees (knowledge, skills, experience, abilities, ambitions, values, style of operation), the possession, development and use of which contributes to executing the strategy of the employer (Rostkowski 2004).

In turn, F. Delamare Le Deist and J. Winterton (Delamare Le Deist, Winterton 2005, see Oleksyn 2006,) divide competencies into four categories:

- cognitive – ability to learn, understand and remember. Related to openness, curiosity and cognitive passion;
- functional – abilities allowing effective performance of the given profession or working at the given position;

- social – refer to relations with other people (ability to cooperate, initiate and maintain contacts, execution of common goals, ability to solve conflicts);
- metacompetencies – ability to learn and reflect, combined with ability to cope in conditions of risk and uncertainty.

The proposed typology of competencies was defined as a holistic competence model.

At present, there is a visible trend of a wider understanding of the term "competencies". Its semantic scope is successively becoming close to the semantic scope of the term "human capital. Pursuant to this understanding, competencies of employees comprise the following elements (Oleksyn 2011):

- abilities and aptitudes, important in the given job, as well as internal motivations;
- education and knowledge;
- experience and practical skills;
- attitudes and behaviours expected by the employer;
- formal authorizations to act on behalf of the organization – managing certain affairs, decision-making, signing contracts and incurring liabilities, external representation;
- psychophysical attributes important in the given job (creativity, entrepreneurship, courage, strength, physical fitness, good health).

To date, no model set of competencies has been distinguished in spite of numerous experimental research conducted in this area by many science & research centres (Jędrzejczyk 2013, Case Di Leonardi, Hagler, Marshall, Stobinski, Welsh 2020). Most important competencies, which are frequently distinguished on lists of competencies prepared by various researchers in this field – both in individual and organizational terms include (Jędrzejczyk 2013, see Oleksyn 2006):

- knowledge;
- experience and skills;
- creativity and innovativeness;
- independence;
- accountability;
- entrepreneurship;
- business orientation;
- professionalism;
- decision-making ability;
- efficiency and effectiveness;
- communicativeness;
- ability to cooperate;
- ethical behaviour;
- intelligence;
- personal culture and work culture;
- assertiveness.

Therefore, the conducted analysis of the concept of "competencies" indicates the following trends (Jędrzejczyk 2013):

1. The concept of competencies is most often defined as a combination of the employee's knowledge, experience and skills, along with possessed intellectual skills and adopted attitudes, which are aimed at effective execution of the enterprise's strategic goals.
2. A growing number of authors indicate that defining competencies as knowledge, skills and abilities is not sufficient, because competencies are then treated too narrowly. Apart from these components, other elements are also important, including: values pursued by employees (honesty, loyalty), styles of operation (e.g. perfectionism), ambition (e.g. self-motivation, self-development), personal characteristics (e.g. empathy).

3. Competencies are deemed to include any and all aptitudes, which allow executing professional tasks on an appropriate level.

Improvement of management competencies in enterprises

In today's conditions, professional management of competencies became a necessity in basically every enterprise. Competencies of individual employees may more and more often decide about the enterprise's success or failure.

The success of a company depends on the development of its staff, take the great importance the proper education, which is the basis for the subsequent improvement of skills (Ślusarczyk, Herbuś 2014).

Therefore, a necessary condition for the effective functioning of the current enterprise is continuous improvement and adaptation to current market changes (Żukowskis, Pypłacz, Sasak 2015).

The fast technological progress, reducing the human role in the process of manufacturing goods, advanced IT technologies and the dynamics of development force a change in the approach to work, as well as the need to redefine roles in organizations. Skills, qualifications and competencies of older employees are no longer sufficient. In the era of evolution of professions, there will always be need for improvement and obtaining new competencies so as not to reduce own attractiveness on the job market.

Both in management theory and in practice more and more attention is paid to human resources, in particular to soft competencies of employees. This is related with issues such as: staff development, training, and education. These activities are connected with the development of the human potential in organizations, complementing knowledge, as well as improvement of skills and qualifications useful in professional work. This development will also contribute to broaden cognitive horizons of employees, improve innovativeness and entrepreneurship.

Improvement of management competencies means a process of developing existing, or obtaining new qualifications, skills, attitudes, knowledge and experiences, expected by superiors. The effects of this process should be expressed through the level of executed business tasks (McCauley, Velsor 2004).

Competencies may be obtained and improved using various methods. Most often, three principal sources of improving competencies are indicated (Jędrzejczyk 2013):

- experiences obtained during work;
- information and guidelines received from other members of the organization;
- formal methods of improvement (training, workshops, and management courses).

However, learning in educational institutions is important because employees obtain knowledge, later applied during work, in various schools and at various educational levels. This is the basis of further development in organizations, where they will later work. In regard to some employees, companies support their further education during employment. Most often this refers to university and post-graduate studies, as well as complementing vocational education (Oleksyn 2011).

Intercultural competences and intercultural dialogue request an international co-operation in education (Suciu, Pompili Pagliari, Neagu Trocmaer, Donolo 2013). Today, learning should not stop upon collecting a diploma. College studies expand horizons, inspire, and equip with knowledge required at the start of employment. However, it is difficult to define even one industry sector where possessed knowledge does not have to be updated or where one does not need to keep up with the trends. Learning does not end with the completion of the last year of studies. It can be said that this is only the beginning. In order to perform best work in a changing environment, we should set for continuous learning. It is worth to consider courses and training that raises qualifications.

Soft competencies, developed already at the early education stage, may help graduates to be distinguished amongst other candidates in the future and get the dream job. One of the multicultural activities in terms of improvement of competencies already in college may include student exchange programs such as Erasmus, which support the development of competencies of Europeans; or engagement in various social undertakings which require cooperation with others. New skills must be obtained in an ongoing manner. Knowledge may be gained from commercial companies during training or so-called learning crowd (Internet communities and mobile learning courses).

En employee must have competencies, which are valuable for the enterprise, so that it is interested in engaging the employee and paying him for competencies used in accordance with the company's interests. In case of particularly valuable competences, it will be in the company's interest to undertake numerous legal activities (e.g. a non-competition agreement), as well as non-legal (e.g. increasing the tangible satisfaction from work) to keep the employees with valuable competencies. (Juchnowicz 2014).

Currently, all professions to appear in the coming future cannot be foreseen, so it is worth to be creative.

Challenges and expectations towards graduates of higher schools

Modern universities are functioning not only as centers of research and teaching, but also as institutions, whose mission is to prepare the future cadre of the economy, through professional and comprehensive process of teaching students (Kurowska-Pysz 2014). Universities are forcing a huge challenge associated with intense adjustment of educational program to labor market requirements. It means that educational program should lay emphasis on the development of specified competencies of future employees (Smoląg, Kot, Oane-Marinescu 2015).

The challenges faced by higher education require the academic staff to notice and accept the expectations of the job market for graduates of higher schools. The most important task of today's higher schools is to prepare students to (Report O1 2016):

- accept responsibility for own development;
- make decisions concerning professional career;
- shape creative thinking and activity;
- improve interpersonal skills;
- develop the spirit of entrepreneurship.

All this leads to a change of the roles and requirements addressed to academic teachers, who often become advisors in the development of their students, and moderators of the process of obtaining competencies. This situation causes changes in the learning process, introducing new and more effective methods. Therefore, practical teaching methods are increasingly important especially in the context of developing competencies.

More and more often employers are looking for employees with strictly defined competencies. They indicate low practical skills and insufficient adjustment of young employees to work, in particular in terms of possessed competencies. Therefore, it is important to take action already at the stage of education at school or university. This may include activities aiming at equipping graduates of universities with higher level of transversal competencies, since improvement of the quality and adequacy of learning programs in the area of practical and transversal competencies constitutes an important element in many documents of the European Union. Employers and job market institutions should be included in the process of preparing and executing learning programs and taking account of practical experience in the plans of class programs, which should be prepared in account of foreseeing or shaping the future career paths (Guide for implementation 2018).

It is important to raise the level of employability of graduates, amongst others through development of skills related with entrepreneurship. Apart from ensuring education and skills related with the

future profession, schools must improve "general" and "key" skills of students, which are not necessarily related with defined professions, but allow graduates to find a job and move around the job market (e.g. communicativeness, entrepreneurship, ability to learn, as well as ability to work in a team etc.) (Guide for implementation 2018).

Activities should be carried out to support equipping young people with transversal skills by way of improving active cooperation between higher education institutions and partners from outside of the school in order to adjust to current and future needs of the job market (Guide for implementation 2018).

The task of higher schools and academic teachers is constant adjustment of their teaching methods to fulfil the requirements of the modern world, and teaching new competencies, desirable on the job market.

Assessment of the demand for selected transversal competencies in the light of conducted research

Employers indicate that students and graduates are not prepared to function on the job market because their knowledge and skills are not in line with the demand on the market (Reimers, Kanter 2014; OECD 2017). This maladjustment results, on the one hand, with an increasing unemployment rate and, on the other hand, inability to find properly qualified employees (Leceta, Renda, Könnölä, Simonelli 2017).

The conducted research was initiated by an attempt to explain identified signals from entrepreneurs concerning the combination of the needs reported by the job market and methods of educating future young employees in higher schools. The research concerned the entrepreneurs' view on transversal competencies of graduates of higher schools in four countries of the European Union, and it was one of the elements of a project carried out by one of the authors of this publication.

The main goal of the research was an analysis of the demand for selected transversal competencies amongst entrepreneurs in the selected European Union countries. In particular, this covered the assessment of the demand for competencies such as: entrepreneurship, creativity, communicativeness, teamwork. Therefore, the subject of the studies covered four competencies, selected during consultations with experts, deemed as particularly desirable in graduates of higher schools, who enter the job market (Report 02 2016).

The research population comprised enterprises with any legal form, in any industry branch, and of any size, operating in the following European countries: Poland, Slovakia, Slovenia and Finland. In total, 135 enterprises participated in the study.

Research was conducted in the form of an indirect poll, as a survey. A survey questionnaire was applied, prepared in a Google form. The survey included 24 closed questions and 1 open question, along with a data sheet. A five-step grading scale was used to assess the demand for transversal competencies. The following scale was adopted (Report 02 2016):

1 – competence not needed
2 – competence needed very rarely (incidentally)
3 – competence needed but rarely used
4 – competence needed and frequently used
5 – competence very much needed and systematically used

The division of enterprises participating in the research is presented in figure 1.

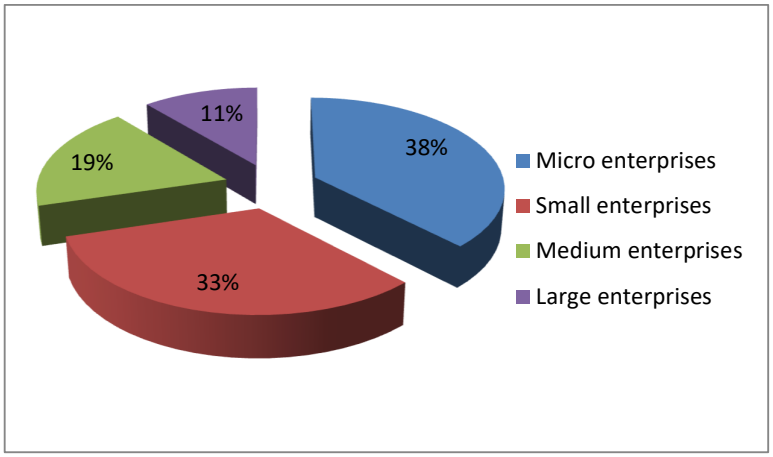

Fig. 1 : Percentage share of enterprises participating in the research

Source: own elaboration

The following definitions of individual competencies were adopted for the purpose of the research (Report 02 2016):

Entrepreneurship: a set of knowledge, skills and attitudes allowing to adapt to change, identify new opportunities of development and their critical evaluation, foresee and create new innovative solutions, take rational risk as well as implement and realize ideas.

Creativity: a set of knowledge, skills and attitudes connected with the practical application of creative thinking in order to come up with original and useful solutions to problems and to develop new concepts or new links with already existing ideas and concepts.

Communicativeness: a set of knowledge, skills and attitudes relating to a reliable transfer of information and establishment and maintenance of appropriate interpersonal relations which are the foundation of effective professional activity, clear and comprehensible expression and interpretation of ideas, thoughts, feelings, facts and opinions in speaking and writing, understanding non-verbal messages, listening to and respecting other people's opinions, being able to negotiate, make public appearances and self-presentations.

Teamwork: a set of knowledge, skills and attitudes allowing to work in a way that is based on activity and commitment to tasks carried out by a group as well as on aspiration to achieve a mutual aim, provide work-improving solutions, adopt joint responsibility for task completion, effectively exchange knowledge and experience, receive feedback, work together on solving problems and support each other in task execution.
Conducting expert research led to distinguishing attributes which form relevant competencies. Specification of these attributes is presented in table 1.

Table 1: Analysed transversal competencies and their characteristics

Transversal competence	Attributes forming the defined competencies
Entrepreneurship	– ability to initiate and accept changes, – ability to perceive and critically evaluate entrepreneurial opportunities, – ability to plan creative solutions, – ability to create and implement new, creative solutions, – ability to take rational risk,

	– ability to translate ideas into specific activities.
Creativity	– ability to use creative thinking techniques, – ability to create original and useful solutions to problems, – ability to create new concepts or new connections between existing ideas or concepts.
Teamwork	– ability to be actively involved in tasks, – ability to build friendly atmosphere and positive relationships, – ability to solve conflicts in a group, – ability to motivate others to act, – ability to encourage others to reach a common goal, – ability to respect norms and rules of a group as well as their tasks and ideas, – ability to effectively transfer information.
Communicativeness	– ability to transfer information in an effective and reliable way, – ability to establish and sustain good interpersonal relationships, – ability to express concepts, thoughts, opinions in speaking and writing in a clear and comprehensible way, – ability to interpret non-verbal messages, – ability to listen and respect opinions of others, – ability to negotiate, – ability to express and defend one's own opinion, – Ability to speak in public and give self-presentations.

Source: own elaboration based on (Report 02 2016)

In the opinion of surveyed entrepreneurs, the key transversal competence is "entrepreneurship" – this competence received the largest number of indications as strongly demanded and used often or systematically. The lowest level of indications was reported in regard to "communicativeness". Creativity and teamwork had similar results (figure 2). Average results for individual abilities - defined within the scope of the 4 transversal competencies – are as follows: entrepreneurship: 4.32, creativity: 4.19, teamwork: 4.2, communicativeness: 4.03 (Report 02 2016).

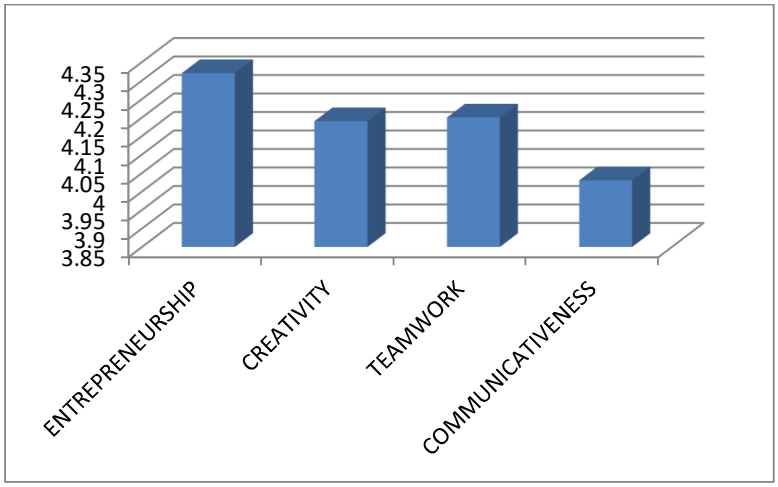

Fig. 2: Aggregate results of research concerning individual transversal competencies (average grades for individual abilities – within the scope of indicated transversal competencies)

Source: own elaboration based on (Report 02 2016)

Within the scope of the assessment of entrepreneurship, assessed as highly demanded and systematically used (grade 5) was the "ability to bear the consequences of own decisions" (57.8%) as well as the ability to create and implement new creative solutions (54.1%). Assessment of the competence "Entrepreneurship" – presented by the average value of results of particular competences is as follows: rate 5: 49.3% of answers, rate 4: 35.8% of answers, rate 3: 12.4% of answers, rate 2: 2.2% of answers, rate 1: 0.3% of answers. In the view of nearly half of the respondents competence "entrepreneurship" was rated as very important. In addition, there was a high proportion of assessments "4" - allows to define this competence as desired by employers and expected among graduates entering the labour market. In the "creativity" area, a quite varied level of grading particular abilities may be observed. According to respondents, the most needed competence was the "ability to create usable problem solutions" (59.3% of indications). In the view of nearly half of the respondents competence "creativity" has been assessed as very important. This competence also received high ratings percentage "4". The level of demand for this competence should therefore be assessed as high (rate 5: 45% of answers, rate 4: 33.6% of answers). In "teamwork", almost all abilities were assessed as equally needed. The "ability to share knowledge and experience" received most results (48.1%) as a highly needed and systematically used competence (grade 5). The ability to motivate others to take action and the ability to initiate and maintain proper interpersonal relations each received 46.7%. Nearly 80% of respondents rated the high demand for the competence of "team work", giving it a rating of "5" or "4". This allows defining this competence as desired by employers and expected among graduates entering the labour market. In the communicativeness area, grades of individual abilities were quite varied. Respondents indicated that the ability of effective and reliable delivery of information was the most needed competence (55.6% of indications). The ability to read body language and the ability of public speaking and auto-presentation received lowest grades. Among the analyzed competence – area "communication" received the lowest score in the assessment of entrepreneurs' demand. It does not change the fact that in the opinion of the employers 'communication' to is the most needed and important competence among employees (Report 02 2016, Szwajkowska, Przybyłek 2017).

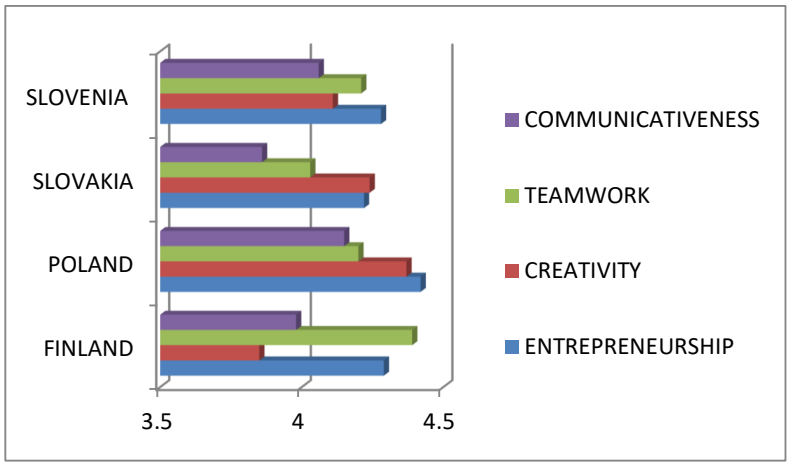

Fig. 3: Aggregate results for individual competencies – obtained in individual countries participating in the research

Source: own elaboration based on (Report 02 2016)

Comparing obtained results of research in individual countries in should be noted that in Finland the most appreciated competence is teamwork (4.39) and entrepreneurship (4.29) - fig.3. Entrepreneurs from Finland - subsequently - pointed to the competence of the "communication" (score of 3.98), the last place went competence "creativity" with a score of 3.85. In Poland the highest score of the demand received competence "entrepreneurship" with a score of 4.42. The next position got competence "creativity" (score of 4.37). Polish entrepreneurs - subsequently - pointed to the

competence of “teamwork” (score of 4.2), the last place went competence “communication” with a score of 4.15. In Slovakia the highest score of the demand received competence “creativity” with a score of 4.24. The next position got competence “entrepreneurship” (score of 4.22). Businesses from Slovakia - subsequently - pointed to the competence of “teamwork” (score of 4.03), the last place went competence “communication” with a score of 3.86. In Slovenia the highest score of the request received competence “entrepreneurship” with a score of 4.28. The next position got competences “teamwork” (score of 4.21). Businessmen from Slovenia - subsequently - pointed to the competence of “creativity” (score of 4.11), the last place went competence “communication” with a score of 4.06 (Szwajkowska, Przybyłek 2017).

Contemporary enterprises operate faster, are more flexible and geographically dispersed. Dynamic work, multitasking and daily challenges require creative and critical thinking. Entrepreneurship and initiative are also of significant importance. Therefore, entrepreneurship is often linked with creativity. It is connected with effective thinking and action, readiness to make decision independently, including business decisions, and ability to act in a rational manner and achieve a measurable result in the form of profit. An entrepreneurial person does not act passively and in a routine manner, but organizes the work in a creative and innovative manner. Creativity in turn, as a resource, which is unique, valuable and difficult to imitate, may distinguish the enterprise on the market. Such activities are driven by teams, which may be the key element of the enterprise’s strategy. Constituting flexible forms of work organization, they are characterized by substantial knowledge, innovative manner of thinking, and seeking unconventional solutions.

A modern employee operates in a very dynamic and diverse environment, which often combines not only numerous personalities but also cultures, especially in international structures. Therefore, the ability to cooperate and communicate effectively is so important. A company, which functions well, should be built on cooperation and transparent internal communication rules.

One of the challenges of international cooperation of enterprises is working in multicultural teams, often virtual teams working asynchronously. Cultural diversity contributes to the growth of creativity and innovativeness of team members, improvement in communication, work satisfaction, and creates an atmosphere favorable to achieving above-average team results since it enables access to persons, who represent various environments and contact networks, models of thinking and perception, and knowledge. Therefore, team diversity, understood as a combination of varied abilities and experiences, helps to work out better and more innovative solutions due to combining different skills, competencies and points of view.

Hence, research results confirm that the combination of these four tested competencies seems to be the appropriate set of attributes of a potential employee in demand on the job market.

Conclusion

Competencies of employees constitute the most valuable capital at the disposal of the enterprise. Today, personal processes aim not only at attracting, assessing and planning the development of employees, but mainly at adjusting their competencies to the company’s needs and using them in accordance with these needs. The competence-based approach to human resources management is essential nowadays, and this results from both internal needs (clients, activities of competition) and external needs (motivating employees effectively, including motivating to develop).

Competence management systems introduce an innovative manner of perceiving the human being (with their skills, knowledge, personality) as a factor, thanks to which the company may achieve an actual competitive edge.

In the changing world, the requirements of the job market are also changing, and completely different attributes and skills become desirable. Professional experience and education are no longer enough to be a fully-fledged participant of the job market. These must be accompanied by soft competencies, the role of which is growing along with the progress of globalization of processes. Companies engage

employees with well development soft skills, because they are more effective at work, in particular in interactions with people. Therefore, employers expect that the person entering the job market will have basic soft competencies along proper education. Many entrepreneurs sees personal and interpersonal competencies as the basic criterion, while academic and intellectual preparation comes second. In the future, the role of soft competencies will increase, and they should supplement knowledge obtained in colleges, to allow them to adjust to working in a multicultural, dynamically changing professional environment diversified in terms of age and country.

The job market is globalizing at an increasing pace, work is executed in multinational multicultural teams. Therefore, more and more enterprises bet on employees with communicativeness, creativity, entrepreneurship or ability to work in a team. Soon, some professions will disappear from the market, and others will be transformed or changed. There will be many new professions. Hence, we should be aware of the need to continuously raise and update our competencies, as well as of the fact that in the future employees will combine many professions. Future employees should know how to prepare for these changes and what competencies will turn out to be mostly demanded by employers in the nearest future. Higher schools should prepare students to changes occurring faster than ever before, and to obtain competencies in professions which will be created in the future so as to meet future social challenges.

A challenge for the future is therefore to find a way to shape the competencies of the future in a flexible educational system. This may be achieved through a change in the future teaching system, where schools would constitute institutions serving to train and develop competencies demanded on the job market.

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How Does Stakeholder Pressure Affect Strategic Environmental Types. The Evidence from Polish Companies

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Abstract

The paper includes an empirical analysis of the relationship between environmental strategic types and the stakeholder pressure. The stakeholder theory posits that the stakeholder pressure is one of the most powerful determinants affecting the implementation of environmental issues into corporate strategies and provide enterprises with the motivation to adopt advanced corporate environmental strategies. The study was conducted among Polish companies operating in three industries. The results of the study confirm a positive impact of the stakeholder pressure on the advancing environmental strategic types. Moreover, the results show a stronger pressure of stakeholders on the proactive environmental strategic type, than on the reactive strategic environmental type. Surprisingly, the regulatory pressure has positive and significantly the strongest effect on the proactive environmental strategic type. However, the internal stakeholder pressure has a stronger effect on the proactive environmental strategic type than the external stakeholder pressure.

Keywords: Environmental Strategies, Stakeholder Pressure, Strategic Management.

Introduction

Nowadays, the environmental issues are of growing interest for enterprises. For this reason, companies should take into consideration various persons and interest groups – stakeholders who are interested in the environmental protection and who exert certain manners of influence. The literature emphasizes that stakeholders interested in pro-ecological activities exert a pressure on companies to take environmental actions and adopt more environmentally friendly strategies (Garcés-Ayerbe et al., 2012). In particular, that pressure emerges against enterprises that are a nuisance to the environment. Therefore, enterprises design their environmental strategies in an attempt to respond to environmental demands of those groups of stakeholders whose needs are perceived as the most essential (Henriques and Sadorsky 1999; Buysse and Verbeke 2003; Sharma and Henriques 2005).

The aim of the paper is to assess the impact of the external and internal stakeholder pressure on the continuum of strategic environmental types - from reactive to proactive strategic environmental types. Additionally, the study examines the relationship between the total power of the stakeholder pressure on strategic environmental types.

Corporate Environmental Strategic Types

The literature presents two main leading approaches to the classification of environmental strategies: the non-progressive and progressive approach. The non-progressive approach classifies companies' strategic environmental responses using tools such as a matrix formed by axes that measures the degree of application of different variables. This approach contemplates a strategic analysis of companies' environmental behavior based on different orthogonal dimensions, not always related to the degree of the environmental effort (Garcés-Ayerbe, et al., 2016). The progressive approach (continual) to strategic response patterns presents environmental strategies that ranges from reactive to proactive (Sarkis et al. 2010, Abreu et. al. 2013) or from laggard to eco-innovative strategies (Garcés-Ayerbe, et al., 2016). The progressive approach provides a continuum of strategic possibilities and capabilities of companies to change their strategic responses to stakeholders: first to regulatory then to non-governmental stakeholders (Garcés-Ayerbe et al., 2016). The progressive approach of the strategic classification is dominant among scholars (Hunt and Auster, 1990; Henriques and Sadorsky 1999;

Buysse and Verbeke, 2003; Murillo-Luna et al. 2008, 2011). The criteria identifying the strategic environmental types are mostly based on the degree of commitment to the natural environment (Henriques and Sadorsky (1999), advancing environmental practices Buysse and Verbeke (2003), and strategic possibilities (Murillo-Luna et al. 2008). The classifications of strategic environmental types are presented in Table 1. Although, the presented classifications of stakeholders do not fully present what the literature explores, it can be concluded that there are some slight differences between the presented progressive classifications of companies' responses to environmental issues. Nevertheless, the dominant at first strategic attitude of securing the compliance with the law is gradually extended with voluntary „beyond regulation" activities for the environmental protection, as a sign of legal regulation anticipation and meeting regulatory requirements. The progressive strategic approach to environmental issues is typical for the strategy evolution perspective, in line with the adaptation cycle, and the reaction to the problems of adaptation cycle are different types of enterprises environmental strategies. Furthermore, companies can choose the areas of involvement in the different decision areas that is why, a company's environmental strategy may differ depending on width and depth dimensions of a company' activity.

Table 1: Environmental strategic types classifications

Authors	Environmental strategic types classifications
progressive environmental strategic types classifications	
Hunt, Auster (1990)	Beginner – fire fighter – concerned citizen – pragmatist – proactivist
Winsemius, Guntram (1992)	Reactive – receptive – constructive – proactive
Roome (1992)	Non-compliance – compliance – compliance plus – commercial and environmental excellence – leading edge
Henriques and Sadorsky (1999)	Reactive – defensive – accommodative – proactive
Buysse, Verbeke (2003)	Reactive strategy – pollution prevention – environmental leadership
Murillo-Luna et al. (2008)	Passive – attention to legislation – attention to stakeholders – total environmental quality
Peiro-Signes et al. (2012)	Low-environmental proactivity – medium environmental – high-environmental proactivity
Albertini (2014)	Newly concerned – compliance – opportunistic – proactive
non-progressive environmental strategic types classifications	
Steger (1993)	Offensive – innovative – indifferent – defensive
Vastag et al. (1996)	Reactive – proactive – strategic – crisis preventive
Klassen and Angell (1998)	Reactive posture – opportunistic posture – proactive posture – compliance posture
Winn and Angell (2000)	Deliberate reactive – unrealized – emergent active – deliberate proactive
Carmona-Moreno et al. (2004)	Experienced – hopeful – indifferent – incipient
Lee and Rhee (2007)	Reactive – focused – opportunistic – proactive
de Abreu (2011)	Defender – reactor – sleeper – innovator

Source: Garcés-Ayerbe, C., Scarpellini, S., Valero-Gil, J., & Rivera-Torres, P. (2016). Proactive environmental strategy development: from laggard to eco-innovative firms. Journal of Organizational Change Management, 29(7), 1118-1134.

Stakeholder Pressure and Stakeholder Groups

According to Freeman definition, "a stakeholder is any group or person (actor) who is influenced or may influence the achievement of the organization's goals" (Freeman 1984, Freeman, Moutchnik, 2013). Freeman and Liedtka (1991) consider an organization as the system of primary stakeholder groups

which survival and success depend on the capacity to create value for these stakeholders by satisfying their demands and expectations.

The literature proposes various taxonomies to classify the stakeholders that can exert pressure on organizations to adopt environmentally friendly behaviors (such as greening strategies). Stakeholders can be classified according to their location in relation to the enterprise - *internal and external stakeholders.* External stakeholders include competitors, suppliers, customers, consumers, media, environmental organizations, local communities, and internal ones include management, shareholders/owners and employees (Freeman, 2010). External stakeholders, unlike internal stakeholders, do not have control of critical organizational resources (Sharma and Henriques, 2005), but "they have the capacity to regulate or mobilize the organization's environmental practices" (Freeman, 1984). A number of external stakeholder groups exist, including customers (clients), government regulators, shareholders, and society in general represented by non-governmental organizations.

Clarkson (1995) distinguishes between *primary stakeholders*, without whose participation and support the organization cannot survive (e.g. customers, suppliers, regulators), and *secondary stakeholders*, which affect and are affected by the organization but are not engaged in transactions with it and are not essential for its survival (e.g. media, non-governmental organizations) (Clarkson, 1995).
Following the stakeholder theory, Henriques and Sadorsky (1999) differentiate four groups that demand enterprises to protect the natural environment: *regulatory stakeholders* (governments, trade associations, informal networks, competitors), *organizational stakeholders* (suppliers, clients, employees, shareholders), *community stakeholders* (community groups, environmental organizations, other potential lobbies), and the media. This classification of stakeholders includes the changing of the strategic response to the stakeholders: first to regulatory then to non-governmental stakeholders. Buysse and Verbeke (2003) proposed an alternative classification: *regulatory stakeholders* (national and regional governments, local public agencies), *external primary stakeholders* (domestic and international customers, domestic, and international suppliers), *internal primary stakeholders* (employees, shareholders, financial institutions), and *secondary stakeholders* (domestic and international rivals, international agreements, non-governmental organizations). Darnall et al. (2010) introduce the classification as follows: *primary stakeholders* - external (value chain participants i.e. commercial buyers, household consumers, suppliers), *primary stakeholders*- internal (management and non-management employees), and *secondary stakeholders* as societal stakeholders (environmental and community organizations, labor units, industry associations), and *environmental regulators* (governments).

A special type of stakeholders distinguished by Fineman and Clark (1996) are stakeholders demonstrating the mission to protect the planet, which include national and local pressure groups. It is worth explaining that there are some differences between the traditional concepts of real stakeholder and pressure groups and regulators, as indicated by Fassin (Fassin 2009).

Opposite to these stakeholder classifications, Sharma and Henriques (2005) argue for a classification in context of how stakeholders affect organizations' strategies. on the basis of the resource interdependences between the organization and its stakeholders. Scholars argue that enterprises do not react differently to different groups of stakeholders, but when they perceive pressure on environmental matters from one of them, they begin to perceive pressure from the others. Thus, the proactiveness of the environmental strategy does not depend on the origin of the pressure but on its intensity (e.g., Murillo Luna et al. 2008; Rueda-Manzanares et al. 2008; Sarkis et al. 2010; Gonzalez-Benito et al. 2010; Sprengel and Busch 2011; Garces-Ayerbe et al. 2012).

Enterprises trying to satisfy different expectations and goals of various interest groups and persons should consider the influence (pressure strength) of stakeholders in developing their environmental strategies. Enterprise relations with stakeholders may occur in three forms:

- strength (stakeholder power),
- legitimization (stakeholder legitimization),
- persistance (stakeholder demands urgency) (Mitchell et al., 1997).

The stakeholder power is based on the enterprise dependence on shareholders. The basis of the legitimization are the assumptions of the legal norms system, but also of the system of values and beliefs regarding environmental problems. The urgency relates to the time in which stakeholder claims require a response. Following the theoretical base of the stakeholder theory, Mitchell et al. (1997) indicate that green stakeholders have often been classified by importance, determination by power, legitimacy and urgency (i.e., Harvey and Schaefer, 2001; Fernandez-Gago and Nieto-Antolın, 2004; or Eesley and Lenox, 2006). Furthermore, Abreu et. al. (2009) distinguish three categories of environmental pressure: the pressure from environmental legislation, from environmental impacts and from the stakeholder environmental demands (Abreu et. al. 2009).

Conceptual Framework

As the result of stakeholder pressure from various interest groups, enterprises adopt more advanced environmental strategies. Academics claim that the stakeholder pressure has a positive influence on the adoption of proactive environmental strategies (Henriques and Sadorsky 1999; Buysse and Verbeke 2003; Garcés- Ayerbe et al. 2012). The scholars argue that "the greater the perceived pressure from a stakeholder group, the greater the strategic environmental proactivity response to environmental issues" (Garcés-Ayerbe, et al., 2012). Authors point out the importance of the pressure of stakeholders to change the strategic environmental response types from passive to proactive (Murillo-Luna et al. 2008). The approach to the stakeholder pressure presented by Murillo-Luna et al. (2008) is more consistent with the main purpose of this paper because it is mainly interested in the total effect of the power of stakeholders pressure on adopting of environmental strategic types. However, there is no consensus about the influence of the external and internal stakeholder pressure on strategic environmental types. What is more, the previous research studies were conducted in developed countries (e.g. USA, Canada), but it is still a gap how each stakeholder pressure influence the companies from the East European Union countries.

Based on arguments from the past research, the following hypotheses are proposed:

H1: The total effect of stakeholder pressure is stronger on the proactive environmental strategic type in comparison to environmental strategies with lower level of adaptation
H2: The effect of external stakeholder pressure is stronger on the proactive environmental strategic type in comparison to environmental strategies with lower level of adaptation
H3: The effect of internal stakeholder pressure is stronger on the proactive environmental strategic type in comparison to environmental strategies with lower level of adaptation
The research framework is presented in Figure 1.

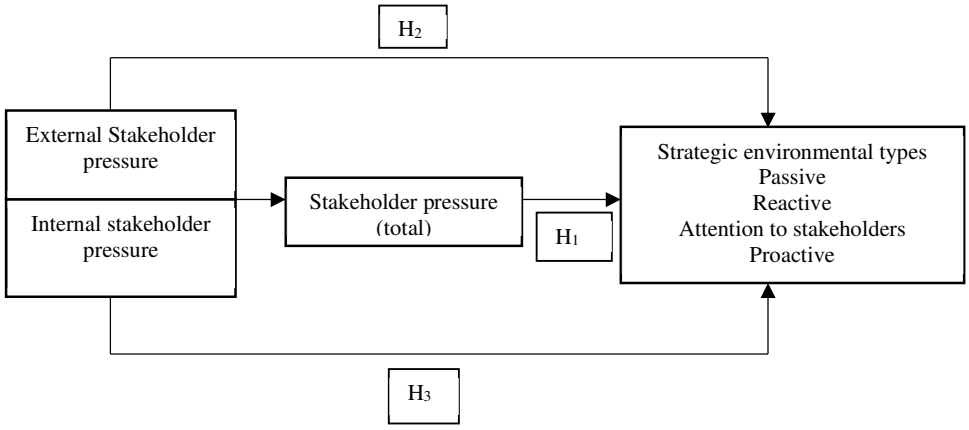

Fig. 1: Conceptual framework

Methodology

The research was conducted among companies operating in three industries: food (40%), fuel and energy (36%), and chemical (24%). These industries were chosen from a few reasons. The industry, still remains, the main anthropogenic source of environmental pollution. The included industries in population sample have the most significant impact on the natural environment. Moreover, within the same sectors or industries, it can be observed the effect of isomorphic pressure (Murillo-Luna et al., 2011). The identification of various industries allows us to differentiate the impact of the stakeholder pressure. A questionnaire survey was e-mailed to 800 firms. The questionnaire contained an instruction how it should be completed. We received 192 questionnaires, but in 12 of them answers were missed. The final sample consisted of 180 companies, and the survey response rate was 24%. The questionnaire survey was fulfilled by management staff responsible for the environmental management, or production management. The general size characteristics of the firms in the sample include both small-enterprises – from 10 to 49 employees – (13%), medium-sized enterprises – from 50 to 249 employees – (35%), as well as large firms with more than 250 employees (52%).

To identify strategic environmental types, the proposition of Murillo-Luna et al. (2008) was used in the research study. This validated tool presents four types of environmental response patterns: passive response (organizations which pay little attention or make little effort to environmental issues), attention to legislation response (organizations which adopt environmental practices which are only compliance with the environmental law), attention to stakeholders response (organizations, which dedicate the necessary time and resources to environmental protection in order to comply with legislation, and attend to the environmental pressures from other stakeholders), total environmental quality response (organizations with total effort to environmental issues in all dimensions of company's activity) (Murillo-Luna's et al. 2008). The environmental strategy in the above approach is a set of environmental activities, that are incrementally undertaken as various resources emerge and gain strategic features. Each pattern of the environmental strategy is a special configuration of environmental goals and allocations of internal resources adopted to the requirements of the environment.

However, the above instrument has been modified by adding new names of the environmental strategic types as follows: passive, reactive, attention to stakeholders and proactive environmental types. Additionally, using Henriques and Sadorsky's (1999) description of environmental strategic types, two items were added. The first item, expressing the level of the environmental support of top management to environmental issues, the second one, the frequency of corporate environmental reporting. The enriched instrument identifies environmental strategic types on the continuum: from the least advanced, to the most advanced environmental strategic types. The most advanced environmental strategic type - proactive - involves stakeholder management and top management support for environmental issues, investment in environmental research development, the adoption of preventing and correcting pollution measures, environmental staff training and the allocation of environmental responsibilities, and corporate reporting to environmental issues.

The four descriptions of environmental strategic types (passive, reactive, attention to stakeholder and proactive) were included in the questionnaire. Respondents were asked to choose the most appropriate description of the environmental strategy if at least four of the attributes of each description were suitable for their companies.

To measure the power of the influence of ten stakeholder groups, the 5 point Likert scale was used (1- " lack of pressure" to 5 -"very high pressure") (Boone, 2012). Stakeholders were divided into external and internal groups by the criterion of stakeholders' location in the company as follows: external stakeholder groups (regulators, competitors, suppliers, clients, NGOs, media, consumers) and internal (top management, shareholders, employees) stakeholders. (Freeman, 2010).

In order to evaluate the statistical significance of the differentiation of the stakeholder pressure in enterprise groups identified by the criterion of environmental strategy types, a one-way analysis of variance (One Way-ANOVA) was used. Kendall's tau correlations were used to assess the correlations

between stakeholder groups and environmental strategy types (variables were coded in the increasing order of their advancement).

Due to the fact that the measurement of the dependent variable in the variance analysis is made in the interval scale, variables describing the pressure of individual stakeholder groups (external and internal stakeholders – interval dependent variables) were aggregated.

Testing the assumptions of the dependent variable distribution normality and the assumptions of the variance homogeneity revealed that the requirements of the variance homogeneity in groups (Levene's test for two variables: for "total stakeholder pressure" was 4.87, $p<0.05$, for "internal stakeholder pressure" was 14.90, $p<0.05$). In the case there are different variances in groups, it is possible to use Welch's t-test to evaluate the equality of means.

Results

The results of the self-classification by enterprises, indicate that 37% of Polish companies chose a reactive environmental strategy, 35 % of companies chose a strategy of "attention to the stakeholders" and 28% of companies recognized a proactive environmental strategy. No company was identified that declared the passive environmental strategy. As the result, the sample consisted of three groups of companies with different environmental strategies. Table 2 shows the results of the analysis of variance relating to the impact of stakeholder pressure on environmental strategic types.

The results of the variance analysis and the obtained level of test probability (at the significance level $\alpha = 0.05$) indicate the lack of the justification for rejecting hypotheses referring to the equality of means in the distinguished subgroups. The hypothesis on a significant differentiation of the effect of the total stakeholder pressure (F Welch-38.46 $p<0.05$), the external stakeholder pressure (F Welch-23.41 $p<0.05$) and the internal stakeholder pressure (F Welch-43.00 $p<0.05$) on environmental strategy types in examined enterprises can be adopted.

In the next step, post-hoc tests were made in order to evaluate which environmental strategy types differ in terms of the effect of the stakeholder pressure. The obtained post-hoc test results reveal significant differences between the effect of the stakeholder pressure on enterprise environmental strategies, except for two strategy types: proactive and attention to stakeholders environmental strategies.

The stakeholder pressure increases as the environmental strategy type advances. The strength of both external and internal stakeholder pressure as well as of the total pressure, exerted on enterprises that adopted the proactive type of the environmental strategy is at the highest level in comparison to enterprises with the reactive and attention to stakeholders environmental strategies (Table 2). The hypothesis H1 was confirmed. However, the effect of the external and internal stakeholder pressure as well as the total pressure on environmental strategy types does not statistically significantly differ between the proactive and attention to stakeholders environmental strategy types. Despite this, the results suggest that environmental strategies of enterprises with a lower adaptation level are less responsive to the pressure exerted by stakeholders (Tables 3-5). Hypotheses H2 and H3 were confirmed.

In the next step, the correlation analysis was conducted, which suggested that strong and statistically significant pressure was exerted by regulators (0.78; $p<0.001$) on the proactive type of the environmental strategy. In addition, moderate correlations were obtained for the effect of the pressure exerted by management (0.48; $p<0.001$) and shareholders / owners (0.40; $p<0.001$) on the proactive type of the environmental strategy. The obtained results indicate that the more advanced environmental strategy type, the stronger the pressure exerted by stakeholders (Table 6).

Table 2: Stakeholder pressure and environmental strategic types: the analysis of variance between group

	$\bar{x}$	sd	Strategic environmental types						F	p	F Welch	P Welch
			Reactive		Attention to stakeholders		Proactive					
			$\bar{x}$	sd	$\bar{x}$	sd	$\bar{x}$	sd				
Total effect of stakeholder pressure	3.144	0.981	2.48	0.74	3.19	0.74	3.47	0.47	34.02	0.000	38.46	0.000
Internal stakeholder pressure	3.010	0.793	2.47	0.94	3.38	0.91	3.72	0.49	37.01	0.000	43.00	0.000
External stakeholder pressure	2.952	0.823	2.49	0.80	3.10	0.72	3.36	0.59	22.24	0.000	23.41	0.000

Source: own elaboration

Table 3: Stakeholder pressure (total) and environmental strategic types: The results of RIR Tukey test- post hoc tests for pairwise comparisons

Environmental strategic types	{1} M=2,84	{2} M=3,19	{3} M=3,47
Reactive {1}		**0.0000**	**0.0000**
Attention to stakeholders {2}	**0.0000**		0.0723
Proactive {3}	**0.0000**	0.0723	

Source: own elaboration

Table 4: External stakeholder pressure and environmental strategic types: The results of RIR Tukey test- post hoc tests for pairwise comparisons

Environmental strategic types	{1} M=2,48	{2} M=3,10	{3} M=3,36
Reactive {1}		**0.0000**	**0.0000**
Attention to stakeholders {2}	**0.0000**		0.1658
Proactive {3}	**0.0000**	0.1658	

Source: own elaboration

Table 5: Internal stakeholder pressure and environmental strategic types: The results of RIR Tukey test- post hoc tests for pairwise comparisons

Environmental strategic types	{1} M=2,46	{2} M=3,38	{3} M=3,72
Reactive {1}		**0.0000**	**0.0000**
Attention to stakeholders {2}	**0.0000**		0.0698
Proactive {3}	**0.0000**	0.0698	

Source: own elaboration

Discussion and Conclusions

This research explores the relationship between the external and internal stakeholder pressure and the total impact of the stakeholder pressure on environmental strategic types. There is a positive relation between the pressure exerted by (external and internal) stakeholders on the proactive environmental strategic type. The stakeholder pressure increases in line with changes in strategic response of the enterprise from reactive to proactive and the pressure strength is not homogeneous.

Obtained results are consistent with academics who claim that the stakeholder pressure has a positive influence on the adoption of proactive environmental strategies (Henriques and Sadorsky 1999). What is more, scholars argue that the stakeholder pressure not only positively but also linearly influences environmental strategies on their continuum (Fineman, Clarke, 1996; Murillo-Luna et al. 2008). As expected, our results are supported by Buysse and Verbeke (2003) that more proactive environmental strategies are associated with a deeper coverage of stakeholders.

Our results confirm that the pressure of regulators is the most important external pressure what is consistent with former studies (Freeman, 1984; Backer, 2007; Zhu and Sarkis, 2007; Sarkis et al., 2010).

Surprisingly, results revealed that pressure exerted by regulators has the strongest effect on the proactive environmental strategic type, which is not consistent with the previous studies. Buysse and Verbeke (2003) argue that the environmental leadership (proactive environmental strategy) is not related to a growing importance of environmental regulations, thereby suggesting a role for voluntary cooperation between enterprises and the government. These results also differ from what was found by Murillo-Luna et al. (2008) and Garce´s- Ayerbe et al. (2012) that organizations with reactive environmental strategies are under more pressure from regulators than organizations with proactive environmental strategies (Murillo-Luna et al. 2008; Garce´s- Ayerbe et al. 2012). These differences can be explained by the specificities of the Polish regulatory context, related to bureaucracy, high level of social legitimacy, and issue legitimation among industries. From this reason, it can be expected that restrict regulations may more threaten proactive environmental companies than it is expected. Regulatory pressure can also hurt a company's public image which is also crucial for companies with proactive strategic types.

Our results indicate that, among internal stakeholders, top managers play a vital role in perceiving the stakeholder demand for environmental protection what is fully consistent with other studies (Henriques and Sadorsky, 1999; Sharma, 2000; Sharma and Henriques, 2005). The degree of proactivity is greater when managers perceive more stakeholder pressure in high polluting companies (Garce´s- Ayerbe et al. 2012). Managerial interpretations are crucial, since they ultimately determine the importance of stakeholders and are the most powerful determinant among internal shareholders to adopt the most advanced environmental strategies (Sarkis et al., 2010). Henriques and Sadorsky (1999) state that managerial perceptions of the importance of the stakeholder pressures were associated with a more proactive strategic type (Henriques and Sadorsky, 1999).

Regulatory bodies and government (Freeman, 1984) are the most obvious external stakeholders when it comes to environmental issues and are typically associated with coercive pressures (Zhu and Sarkis, 2007). Some of these pressures may come in the form of voluntary initiatives for matters such as pollution prevention. Companies may also adopt proactive environmental strategies as one means to preempt regulatory threats. Implementation of proactive environmental strategies may also build informal relationships and accrue political capital (Darnall et al., 2010).

To conclude, the pressure of stakeholders is a source of the adaptation of activities related to the environmental protection demands and forces changes in the strategic responses of enterprises. External and internal stakeholders may significantly affect the proactive approach to strategic management of enterprises. However, companies' strategies may also differ because of specific context related to demands from stakeholders. From this reason, our results require further investigation especially according to the relation between PES and regulatory pressure. It may exist other mediation or moderation variables which influence the obtained results.

Table 6: Correlation between strategic environmental types (SET) and groups of stakeholder pressure. Tau Kendall correlations

	SET	Regulators	Competitors	Suppliers	Clients	NGOs	Media	Consumers	Top management	Shareholders	Employees
SET	1.00										
Regulators	**0.78 *****	1.00									
Competitors	**0.33 *****	0.25***	1.00								
Suppliers	0.11*	0.12***	0.54***	1.00							
Clients	0.19***	0.19***	0.49***	0.44***	1.00						
NGOs	0.20***	0.24***	0.33***	0.44***	0.33***	1.00					
Media	0.18***	0.11*	0.29***	0.37***	0.25***	0.51***	1.00				
Consumers	0,02	-0.02	0.37***	0.34***	0.46***	0.30***	0.23***	1.00			
Top management	**0.48 *****	**0.41*****	0.29***	0.16*	0.39***	0.25***	0.18***	0.12*	1.00		
Shareholders	**0.40 *****	0.35***	0.20***	0.18***	0.38***	0.34***	0.25***	0.10*	0.57*	1.00	
Employees	0.24***	0.27***	0.21***	0.42***	0.28***	0.56***	0.32***	0.29***	0.19***	0.45***	1.00

*p<0.05; **p<0.01; ***p<0.001. ST Strategic environmental types (1 reactive, 2-attention to stakeholders, 3- proactive)

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Appendix

Survey items for strategic environmental types

Passive environmental strategic type

- Environmental objectives are currently not pursued in our company.
- Our company has difficulties with financing environmental protection and hardly dedicates time to deal with problems of the natural environment.
- Our company does not currently use technical or organizational instruments to protect the environment.
- Our company does not plan to implement environmental certificates i.e. ISO 14001, EMAS within the next 3 years.
- Our company does not have any person who is responsible for solving environmental problems.
- Top management does not support and is not involved in environmental issues in our company.
- Our company does not report environmental issues.

Reactive environmental strategic type

- Environmental objectives of our company are limited to compliance with legislation on environmental matters.
- Our company devotes time and financial resources necessary on environmental protection not only to comply with legislation on the environment.
- Environmental instruments used in our company do not bring any positive changes in the production and work methods and/or the modification of the organizational structure.
- Environmental instruments (measures) adopted by our company are not certified according to ISO 14001 or EMAS standards.
- Environmental problems are solved by external professionals and/or by a person from our company who is not directly responsible for environmental issues in our company.
- Our the top management selectively supports and engages in environmental activities only in the required range.
- The company prepares reports irregularly, if necessary.

Attention to stakeholder strategic type

- Environmental objectives of our company are not just limited to compliance with legislation on the environment, but also to attend to the environmental requirements of customers, suppliers and other stakeholders.
- Our company devotes time and financial resources to environmental protection to comply with legislation and in order to response to the environmental pressures from stakeholders.
- Environmental instruments (measures) implemented by our company have required improvement of the production, and work methods and/or the organizational structure.
- Some of the environmental instruments (measures) adopted by our company are certified or are in the process of obtaining a certificate (e.g. ISO 14001, EMAS or other).
- The company regularly solves environmental problems with the participation of external professionals specialized in environmental matters or has a qualified person(s) from our company who is responsible for environmental issues and take care of environmental issues.
- Out top management partially supports and engages in environmental activities to meet the requirements of stakeholders.
- Our company regularly reports to external stakeholders on environmental issues, but we report irregularly to internal stakeholders on environmental issues.

Proactive environmental strategic type

- Environmental objectives of our company are among the priority to meet the environmental requirements of all interested stakeholders.
- Our company allocates a significant part of the budget for environmental protection that goes beyond complying with legislation, and in order to respond to pressures from different stakeholders.
- Environmental instruments (measures) used in our company bring improvement in the production process, organizational structure and working methods.
- The implemented environmental instruments in the company are supported by certificates obtained by the company (ISO 14001 or EMAS, or others).
- Responsibility for environmental issues is delegated to one or several people (team) dealing with environmental issues in the company.
- Our top management fully supports environmental initiatives and is involved in any new environmental activities.
- The company regularly/cyclically reports to external and internal stakeholders.

TEI Modelling of the Interpretation of Islamic Holy Book: Tafsīr al-Ṭabarī Case

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Abstract

The corpus of *Tafsīr al-Ṭabarī* is considered as one of the high regard Islamic corpora. The importance of this corpus is revealed in the deep interpretation (*Tafsīr*) of the Holy Quran. This corpus is characterized by an important and rich knowledge that is often used by different researchers and Islamic individual communities. Indeed, the normalization of *Tafsīr al-Ṭabarī* corpus can improve information retrieval and text analysis to achieve advanced results. In this context, we aim to develop and experiment a standardized Arabic version of *Tafsīr al-Ṭabarī* with XML based standard: Text Encoding Initiative (TEI). To achieve this, we start with proposing an encoding model based on TEI and adapted for the *Tafsīr* text structure. Then, we elaborate and experiment an automatic encoding module to generate the standardized version of *Tafsīr al-Ṭabarī* based on our model. The obtained results are encouraging despite some problems related to some exceptional cases.

Keywords: Quran interpretation, Arabic *Tafsīr* corpus, TEI normalization.

Introduction

Religious manuscripts have been processed as important corpora in human literature. These corpora have been so far the subject of many academic researches and projects especially in Artificial Intelligence and Natural Language Processing. It is the case of many Islamic corpora. In fact, one of the advantages of applying NLP tasks on the Islamic text is the implementation of intelligent systems, which can allow information retrieval and text analyzing. In addition, it can assist all societies to build knowledge about the text of the Holy Quran and the *hadith* (or Prophetic tradition). The normalization of the Arabic Islamic corpora can support NLP applications to achieve advanced results. Since on the one hand, the standardization of the text will support the compatibility and the interchangeability between NLP applications; on the other hand, this conception can improve the automatic processing of the Arabic Islamic corpora. It considers mainly the corpora that contain a rich and complex text format, and a deep analysis of knowledge of important subjects such as *Tafsīr* (interpretation) of the Holy Quran like the famous corpus of *Tafsīr al-Ṭabarī.*

Although, according to our knowledge, no study has solely focused on the corpus of *Tafsīr al-Ṭabarī* from the standardization perspectives. The standardization (normalization) of this category of manuscript could lead to a new presentation of the text based upon a descriptive and detailed structural and semantic annotation. However, the representation of such corpora poses a serious structuring and text unification problems. This is mainly related to the amount of the knowledge and the details that exists in this manuscript which rise the complexity of the identification of the multiple types and categories of the text and the annotation of each part properly.

Our main objective is the normalization of the Arabic *Tafsīr al-Ṭabarī* corpus, which requires the selection of a standard for encoding all parts of the text. To reach that, we based on Text Encoding Initiative (TEI) guidelines (http://www.tei-c.org/). Indeed, the TEI guidelines present conventions of usable coding in several domains and can be applied to any sort of text (Burnard et al., 2016). To realize the standardization of *Tafsīr al-Ṭabarī*, we start with a study on the NLP processing of the Arabic Islamic manuscripts in general and the *Tafsīr* corpus in specific. Then, we elaborate on a TEI

customized model that maintains the *Tafsīr al-Ṭabarī* structure. Moreover, to realize the normalization process of *Tafsīr al-Ṭabarī*, we implement an automatic encoding module to generate a standardized version of the corpus.

In the present paper, Section 2 introduces a state of art on the processing of Islamic religious corpora and an overview on the *Tafsīr al-Ṭabarī* corpus. Second 3 presents the proposed *Tafsīr al-Ṭabarī* TEI modelling that contains, first, an overview on the TEI elements selection then, second, the proposed TEI model. Section 4 introduces our module to generate the *Tafsīr al-Ṭabarī* standardized version. This section is followed by an evaluation step. In the end, we close our paper with a conclusion and some perspectives.

State of the Art

Since the early stages of the NLP field, the processing of religious corpora was the topic of multiple studies and projects. This was also the case of Islamic corpora which concentrated mostly on the processing of the text of the Holy Quran, the *hadith* and the *Tafsīr* in Arabic language.

In this section, we present, in the first part, some of the realized works that focused on the processing of Arabic Islamic manuscripts. In the second part, we focus on a study of the Arabic *Tafsīr al-Ṭabarī* corpus regarding the characteristics and the structure of the text.

The processing of the Arabic Religious Islamic manuscript

The religious texts are a type of scripts related to religious education and traditions. They characterized with a spiritual aspiration and provides religious commandments (Elster, 2003). Through many fields of researches interpreted religious text, there are several studies focused on Islamic manuscripts in the Arabic language such as (Seddik et al., 2015; Azmi et al., 2014). Many of these projects adopted NLP fields such as ontology modelling, text annotation, linguistic analyzing, and information retrieval to experiment with several intelligent processing. Though, the majority of NLP processing on Islamic scripts and corpuses has largely focused on the ontology modelling, especially for the Holy Quran script. In this context, we present as follow some of these works.

The authors in (Seddik et al., 2015) focused on compiling a large Arabic corpus of the Holy Quran, annotated with anaphoric relation and anaphoric information, providing multi-dimensional feature vector rich with most of the basic anaphoric information needed in statistical anaphora resolution systems. The authors proposed a large and valuable language resource for researchers who are investigating in anaphora resolution systems like investigating and analyzing the Quran script. The established resource offered the accessibility to a combination of the basic features of two of the large and rich corpuses; Quranic Arabic Corpus (QAC) and QurAna corpus.

In (Basir et al., 2018), the researchers focused on the fact that determining the fields of a keyword searched in the Quran can convert to be a guide to improve the knowledge in a certain domain. The authors adopted this idea and proposed that the keyword searched in the Quranic ontology can be applied for extracting the relevant fields. The researchers developed the domain ontology in TopBraid Composer with the medical and economic topics mentioned in the Quran. The process continued with running the queries to depict the appropriate role of ontology. Then, it proposed certain recommendation for the proposed Quranic ontology to attaining semantic search from all domains and the result by searching from *ayah* (Quranic verse) to domain, or domain to *ayah*.

According to (Saad et al., 2009), The authors proposed an approach to create an ontology from Islamic knowledge including the holy Quran. The presented approach allows the automatic generation of ontology instances concentrating on the concepts of the Quran and based on the traditional Information Extraction Systems, and Natural Language Processing and Text Mining techniques. In order to obtain the ontology instances, the researchers proposed the relative grammar and the extraction rule.

The authors in (Menacer et al., 2014) presented a systematic approach allowing the structuring and the organizing of the prominent *Tafsīr* books of the Holy Quran into a digital portfolio or ePortfolio. The proposed digital ePortfolio can offer the possibility of building and exchange digital and interactive content in the topic of the *Tafsīr*, the Quran, and the relative Islamic issues. This study has as an objective to propose a methodical approach for establishing, structuring and developing an ePortfolio for *Tafsīr* books. The project started with the ePortfolio development of Al Asfahani *Tafsīr* book.

The researchers in (Aman et al., 2017) presented a review of different ontology-oriented approaches for building specific ontologies for Islamic knowledge domain. The researchers mainly focused on a review of ontology development approaches for Islamic knowledge domain. The objective was to realize a comparative study between the approaches of manual ontology creation and the semi-automatic ontology learning approaches in the Islamic knowledge domain. Then, this study focused on identifying the main problems and challenging tasks in ontology development and shortcomings of existing approaches in the Islamic knowledge domain.

The ontology modelling provides more relevant and semantic resources which present an important factor in the Information Retrieval field. The realized studies have produced several ontologies for Islamic knowledge based on different NLP methods and technologies. However, ontology development has faced a lot of problems as time and resource consuming. Besides, several ontologies still partial regarding the richness and value of the knowledge figured in such Islamic scripts.

In the following section, we present an overview on one of the major necessary Islamic corpuses for the interpretation (*Tafsīr*) of the Holy Quran through the well-known corpus of *Tafsīr al-Ṭabarī*.

Overview on Tafsīr al-Ṭabarī

The corpus of *Tafsīr al-Ṭabarī* is one from the most important and high regard to Sunni Islamic corpora. This corpus is being written between 838 AD and 923 AD by the Persian scholar *Muhammad ibn Jarir al-Ṭabarī*. He is a scholar, historian and exegete of the Quran who composed all his works in Arabic language (Abu Zaho, 1984). His most influential and well-known works are his Quranic interpretation known as *Tafsīr al-Ṭabarī* and his historical chronicle *Tarikh al-Rusul wa al-Muluk* (History of the Prophets and Kings), often referred to *Tarikh al-Ṭabarī* (Abu Zaho, 1984).

Tafsīr al-Ṭabarī corpus is the earliest major running interpretation of the Quran to have survived in its original form. Like his history, Al-Ṭabarī is notable for its comprehensiveness and citation of multiple, often conflicting sources. Al-Ṭabarī has relied on narratives of the Islamic prophet Muhammad, including narrations and comments of *sahabah* and *tabi'in*. *Hadiths* are selected based on their authenticity (Brown, 2009; Abu Zaho, 1984). The following example of Fig. 1 illustrates the statement of the *hadith* number 6505 cited in the *Tafsīr* of *Surat al-Baqarah*, from the *ayah* 286.

القول في تأويل قوله تعالى: لَهَا مَا كَسَبَتْ وَعَلَيْهَا مَا اكْتَسَبَتْ.
قال أبو جعفر: يعني بقوله جل ثناؤه: " لها " للنفس التي أخبر أنه لا يكلفها إلا وسعها. يقول: لكل نفس ما اجترحت وعملت من خير " وعليها "، يعني: وعلى كل نفس " ما اكتسبت "، ما عملت من شر، كما:
6505 - حدثنا بشر قال، حدثنا يزيد قال، حدثنا سعيد، عن قتادة قوله: " لا يكلف الله نفسا إلا وسعها لها ما كسبت "، أي: من خير " وعليها ما اكتسبت "، أي: من شر - أو قال: من سوء.

To say in the interpretation of God says: "laha ma kasabat waealayha ma aktasabat.": It has what earned and it has what gained.
Abu Jaafar said: he means by saying most of his praise: "her" for the same, which he told that it does not cost only its power. Says: For every soul what I was hurt and worked of the good "and it", means: and on all the same "what I gained", what worked from evil, as:
6505 –Bachar reported that, Yazeed said that, Saide told them, about Qatada saying: "God does not cost a soul only what it has earned," ie: the good "and what has gained", that is: from evil - or said: bad.

Fig. 1: Extraction from *Tafsīr* of *Surat al-Baqarah*, *ayah* 286, *hadith* number 6505.

Al-Ṭabarī focused on the preface of the *Tafsīr* to give general facts about the Quran, including its superiority to any other text, what *Tafsīr* and *Tawil* are, the seven *qira'at* (readings), companions who commented on the Quran and the naming of the *Surah*. Al-Ṭabarī adopted the methodology of establishing the corpus, starting with the explanation of the meaning of the *ayat* (Quranic verses) based on other *ayat* and *hadiths*, and by the words of the *sahaba* and *Tabi'ins* and then he continues by citing the view that prominent for him (Brown, 2009; Abu Zaho, 1984).

Modelling of Tafsīr al-Ṭabarī with TEI

An XML version of the corpus of *Tafsīr al-Ṭabarī* can make the processing of the information more flexible and easier for the different application. Besides, the XML representation of the fundamental features and hierarchical schema of the corpus can help us to avoid the redundancy and time-consuming processing. Therefore, we choose to develop a TEI representation of *Tafsīr al-Ṭabarī*. In fact, this standard support XML annotation and provides the main XML structure that respect the granularity of the structure of the document divisions. Besides, it recommends various modules and allows the encoding of multiple data categories without losing the specification and the typologies of the components such as the named entities, the quotations and other types of text that can be found in the *Tafsīr al-Ṭabarī* (Sperberg-McQueen, et al., 2019; Burnard et al., 1996).

This section starts with an overview on the range of the elements that can be employed in the encoding process. Then, as a second subsection, we introduce our proposed TEI model.

Selected TEI elements

From the TEI classes and modules, we can select many elements that can be adapted to the text specification and provide a conceptual and semantic representation of the text of *Tafsīr al-Ṭabarī* in an appropriate way. We present first a summary of the TEI elements allowing the encoding of the text structure. Table 1 illustrates this category of elements.

Table 1 : TEI elements for the text structure

Element	Description
<text>	This element contains any kind of distinct text, whether unitary or composite.
<body>	The element <body> means the text body. This element contains the whole body of a single unitary text without the front or the back section.
	The element means the text division which contains a subdivision of the front, the body, or the back of the text.
<head>	The element <head> represents the heading and contains any type of heading, like the title of a section, or the heading of a list, etc.
<p>	The element <p> marks the paragraphs of the text.

To support the text structure, the TEI guidelines recommend a set of flexible elements that contains the sections and the passages of the text (Sperberg-McQueen, et al., 2019). It starts with <text> elements that can have any type of text and includes the <body> element. This element contains purely a single text unit. Then, the <body> element encloses all the divisions and the subdivisions of the text inside elements. The <head> element is essentially used as a type of heading for the division elements. Then, the <p> element indicates mainly a part of the text as a paragraph.

The TEI guidelines propose a module of quotation encoding. We selected from this module a set of elements that can harmonize with the specification of the text of *Tafsīr al-Ṭabarī*. Table 2 illustrates this group of elements.

Table 2: TEI elements for quotation encoding.

Element	Description
<q>	The element <q> refers to "quoted". This element contains a distinguished part of text which is surrounded using quotation marks or a similar method. It is not limited to direct speech or thought, technical terms or jargon, authorial distance, quotations from outside the corpus, and passages.
<quote>	The element <quote> means the quotation. It contains a passage attributed by the author to refer to an external text.
<said>	The element <said> refers to the speech or the thought. This element indicates passages thought or spoken, explicitly or implicitly indicated in the source , directly or indirectly reported and by real persons or imaginary characters.

The quotation can be indicated in a printed source by changes in typography, by special punctuation marks (single or double or angled quotes, dashes, etc.) and by layout (indented paragraphs, etc.), or it may not be explicitly represented at all. The <q>, <quote> and <said> elements can represent the quotation and maintains it specificity (Sperberg-McQueen, et al., 2019).

Regarding the corpus of *Tafsīr al-Ṭabarī*, the text contains a different kind of named entities (for example the information related with the persons, places and dates). Indeed, The TEI guidelines suggest a module of named entities encoding, which allows us to encode these sequences of text. Table 3 illustrate these elements.

Table 3: TEI elements for named entity encoding.

Element	Description
<persName>	The element <persName> refers to a personal name. It contains a part of the name like the proper noun or the proper noun phrase referring to a person.
<name>	The element <name> is for Name or proper noun. This element contains a proper noun or noun phrase.
<placeName>	The element <placeName> contains an absolute or relative place name.
<date>	The element <date> refers to a date entity in any format.

The module of named entities encoding in TEI guidelines offers many elements that may be used for the encoding of these entities (Sperberg-McQueen, et al., 2019). From the list of these elements, the <persName> element presents a part or all the phrase that indicate a proper name of a person. The <placeName> element allows the encoding of any information that defines a place name. Also, the <date> element which can contain information about a date.

The last selection of elements that we focused on is related to the representation of the poetic verses and the distinctive segments of text that have a contextual specificity comparing with the rest of the text. Table 4 highlights some of these components in TEI encoding.

Table 4: TEI elements for poetry and segments encoding.

Element	Description
<l>	The element <l> refers to a verse line. It contains a single or incomplete line of verse.
<lg>	The element <lg> means line group. This element contains one or more verse lines functioning as a formal unit, like a stanza, verse paragraph, etc.
<seg>	The element <seg> defines an arbitrary segment. The <seg> element may be used to mark any segments of the text of interest for processing.
<s>	The element <s> signifies s-unit. It contains a sentence like division of a text. The <s> element may be used to mark orthographic sentences, or any other segmentation in the text. For a segmentation which is partial or recursive, the element <seg> should be used instead.

The TEI guidelines offer various elements to encode a special part of the text like the poetry (Sperberg-McQueen, et al., 2019). The element <l> can hold one line of verse. The element <lg> represent a group of <l> elements as a group poetic paragraph. The TEI presents also different elements to highlight the specific segments in the text like <seg> element an <s> element.

From this collection of TEI elements, we attempt to create a TEI model for the corpus of *Tafsīr al-Ṭabarī*. The next subsection presents this model.

Proposed TEI Model

In order to annotate the different parts of the text of *Tafsīr al-Ṭabarī*, we base first on the norm TEI to represent the *Tafsīr* corpus from the body of the document to the different segments in the text. Fig. 2 shows an extraction from the TEI model that we prepared for the TEI encoding of the corpus of *Tafsīr al-Ṭabarī*. For most of the corpus, *Tafsīr al-Ṭabarī* maintains one regular structure that supports the interpretation presentation and the Ṭabarī opinion statement about each *ayah* and the related justification or argumentation with the associated *hadiths* and the poetic expressions. Moreover, the text contains the suggestions of reading methodology and the author analyses.

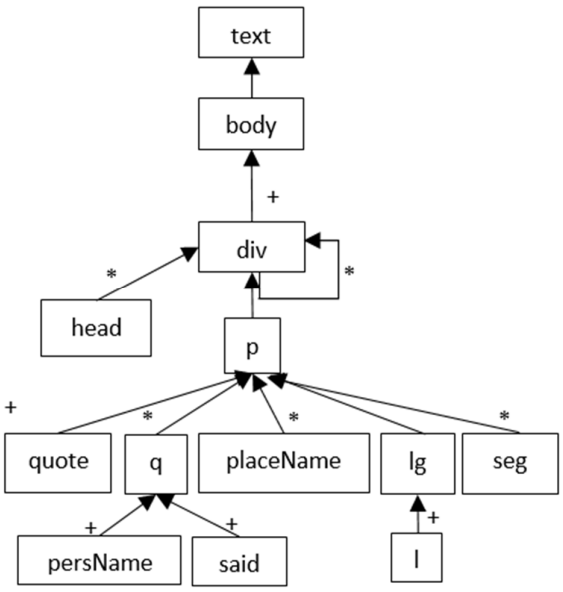

Fig. 2: Extraction from TEI encoding model for the corpus of *Tafsīr al-Ṭabarī*

To represent this structure, we employed the TEI elements that allow the annotation of those parts in the text. This modelling begins by separate the different divisions where each one illustrates the

interpretation of one *Surah* from the Quran. This division is presented as element that englobes all the elements and text inside it. This upper element have an attribute "xml:id" to give the *Surah* number as a direct identification. In fact, this element include first a <head> element to represent the name of the *Surah* or the heading used by Ṭabarī for announcing the new upper section. Second, this division contains a sequence of subdivisions where each one presents the Ṭabarī interpretation of each *ayah* or a part of *ayah*. These subdivisions are presented in a sequence of elements under the main division. Similarly, each element of these includes an "xml:id" attribute and a <head> element to present also the heading in the text. In this level, a <p> element is used to englobe all the text of the subdivision. The <p> element can contain the *ayaht* in <quote> elements. The following TEI code illustrates an example of using , <head>, <p> and <quote> elements in of the *Surah Al-Ma'idah*, *ayah* 1, Part 1, from the corpus of *Tafsīr al-Ṭabarī*:

```
<div xml:id="S5" xml:lang="ar">
<head>سورة المائدة</head>
<div xml:id="S5.A1">
<head>1 آية</head>
<div xml:id="S5.A1.P1">
<p>
الْقَوْلُ فِي تَأْوِيلِ قَوْلِهِ جَلَّ ثَنَاؤُهُ
<quote type ="Quranic_Text">
1 يَاأَيُّهَا الَّذِينَ آمَنُوا أَوْفُوا بِالْعُقُودِ سورة المائدة آية </quote> ، قال
<persName role="authorName">
أبو جعفر محمد بن جرير
</persName> رحمه الله
يعني جل ثناؤه بقوله
<quote type ="Quranic_Text">
1 يَاأَيُّهَا الَّذِينَ آمَنُوا سورة المائدة آية
</quote>
يا أيها الذين أقروا بوحدانية الله وأذعنوا لله بالعبودة، وسلموا له الألوهة، وصدقوا رسوله محمدا صَلَّى اللهُ عَلَيْهِ وَسَلَّمَ فِي نبوته، وفيما جاءهم به من عند ربهم من شرائع دينه،
<quote type ="Quranic_Text">
1 أَوْفُوا بِالْعُقُودِ سورة المائدة آية
</quote> …
</p>
</div> … </div> …
</div>
```

If the text contains *hadiths*, the <p> element can contain each *hadith* respectively under a <q> element that contains the relatives *Isnad* and *Matn*. The *Isnad* contains the list of narrators who transmitted the *Matn* as a citation. The <q> element contains a <persName> element for the name of each narrator. Then, it includes a <said> element to present the *Matn* of the *hadith*. Besides, the <q> element can have an "xml:id" attribute to contain the *hadith* number (Maraoui, et al., 2017). The following TEI code illustrates an example of using <q>, <said>, <persName> in the encoding of *hadith* number 10002 from the corpus of *Tafsīr al-Ṭabarī*:

```
<p> …
ذِكْرُ مَنْ قَالَ مَعْنَى الْعُقُودِ الْعُهُودُ
<q xml:id = "HT10002"> حَدَّثَنِي
<persName role = "sheikh">
الْمُثَنَّى </persName> ، قَالَ ثنا
<persName role = "rawi">
عَبْدُ اللَّهِ بْنُ صَالِحٍ </persName>
، قَالَ ثني
<persName role = "rawi">
مُعَاوِيَةُ بْنُ صَالِحٍ </persName> ، عَنْ
<persName role = "rawi">
عَلِيِّ بْنِ أَبِي طَلْحَةَ </persName> عَنِ
<persName role = "sahabi">
ابْنِ عَبَّاسٍ</persName> ، قَوْلَهُ
<said>
<quote type ="Quranic_Text">
1 أَوْفُوا بِالْعُقُودِ سورة المائدة آية
```

```
</quote>
يَعْنِي بِالْعُهُودِ
</said>
</q> … </p>
```

The text can be also poetic lines. These expressions can be encoded with <lg> element that englobes all the poetic lines under an <l> element for each line. The following example illustrates one bloc of poetic lines in the text:

```
<lg>
   <l>أتى العُجم والآفاق منه قصائد</l>
   <l>بقين بقاء الوحي فِي الحجر الأصم</l>
</lg>
```

In addition, the corpus can contain other text like an alternative reading as a segment inside the subdivision. This part of the text can be represented by <seg> elements. Moreover, the text can contain some named entities such as a place name which can be represented in the <placeName> element. The following example indicates the using of <seg> and <placeName> elements to annotate similarly an alternative reading and a place name:

```
<q xml:id="HT10088"> حَدَّثَنَا
<persName role ="sheikh">
ابْنُ حُمَيْدٍ </persName>
<persName role ="Sheikh">
، قَالَ ثنا<persName> وَابْنُ وَكِيعٍ </persName>
<persName role ="Rawi">
، عَنْ<persName> جَرِيرٌ </persName>
<persName role ="Rawi">
، أَنَّهُ قَرَأَ<persName> الأَعْمَشِ </persName>
<said who="p1">
<seg type ="alternative_reading">
وَلَا يُجْرِمَنَّكُمْ
</seg>
يُجْرِمُنِي ، مُرْتَفِعَةَ الْيَاءِ مِنْ أَجْرَمْتُهُ أُجْرِمُهُ، وَهُوَ
</said>
</q> … <placeName> الصَّفَا </placeName>
```

To attain the standardization of *Tafsīr al-Ṭabarī* corpus with the proposed TEI model, we developed a module for an automatic corpus encoding with TEI presented in the following section.

Implementation phase

The normalization of the corpus of *Tafsīr al-Ṭabarī* requires a consecutive phase starting from the text identification and segmentation and arriving at the actual encoding and annotation. Therefore, we implemented a module to apply the required processing. Then, we experimented our module to generate an Arabic normalized version of *Tafsīr al-Ṭabarī*.

The present section is divided into two parts. First, we introduce our developed module for the encoding of *Tafsīr al-Ṭabarī*. Second, we present the module evaluation phase.

Development of a module for the normalization of Tafsīr al-Ṭabarī

To create a normalized Arabic version of *Tafsīr al-Ṭabarī* based on TEI, we need two phases of processing. The first phase is a preprocessing step. This step is required to prepare the text for the XML encoding. The first part of the preprocessing step is the annotation of the text to define the typologies of each part in the text that needed to be highlighted in the encoding process. We based on a pre-annotated version which highlights the segments of the text. The second part of the preprocessing is to complete some required annotation to prevent some complications related to process optimization. The second phase of processing is the XML encoding. To realize the normalized version, we developed a module to generate automatically the TEI encoding. This encoding procedure follows our TEI model for the corpus of *Tafsīr al-Ṭabarī*. The implementation is based on different software and tools. In fact, we use Oxygen XML Editor to manipulate and experiment the TEI output XML files. Besides, we use JAVA language and the JDOM Library to develop the TEI encoding module that generates the normalized version of *Tafsīr al-Ṭabarī*. In addition, to simplify the accessibility to the different encoded parts in the normalized versions of *Tafsīr al-Ṭabarī*, we developed a relative interface. Fig. 3 illustrates the *Tafsīr al-Ṭabarī* consultation interface.

Fig. 3: *Tafsīr al-Ṭabarī* consultation interface

The developed interface allows access to the different encoded fragments respecting *Tafsīr al-Ṭabarī* structure. In fact, it allows the user to point on any specific encoded level in the hierarchy of the corpus. Also, it provides the user with the actual position of the consulted fragment of text such as the position of a specific *hadith* inside the interpretation of the relative part of *ayah*.

Evaluation and Discussion

To evaluate our TEI encoding module, we based on the text of the corpus of *Tafsīr al-Ṭabarī*. This corpus allows us to generate a TEI encoding of the *Tafsīr* of 114 *Surah* in the Holy Quran including 35751 *hadith* inside the *Tafsīr al-Ṭabarī*. In fact, the developed module starts with identifying and separating the chapters in the corpus where each chapter contains the *Tafsīr* of one *Surah.* Then, the module separates the subdivisions inside every chapter that contains the *Tafsīr* of each *ayah* of the relative *Surah.* In the same time, the module creates a folder for each *Surah* and performs the equivalent encoding process. After that, it saves the generated TEI encoding in XML files under the folder of the relative *Surah*. We calculate the quality of this module with three measures: precision, recall and F-measure. Table 5 illustrates the obtained values of the used measures.

Table 5: Summary table of the obtained results.

Evaluated corpus	Precision	Recall	F-measure
Tafsīr al-Ṭabarī corpus (114 *Surah*, 35751 *hadith*)	0.97	0.97	0.97

Table 5 shows that the precision and recall have the same amount equal to 0.97. As well, the result of the F-measure is 0.97. In view of that, the obtained results are encouraging. The module succeeded to generate a correct TEI encoding of *Tafsīr al-Ṭabarī* corpus while respecting the corresponding model. However, 1079 *hadith* which make 3% of the text is incorrectly encoded. In most cases, the incorrectness is related to some irregularity in the structure of *hadith* and some exceptional cases in the text. In the one hand, we perceive this irregularity in the context of some segments of the text especially in the citation of some *hadiths* like *hadith* number 14535. Fig. 4 shows this example of *hadith*.

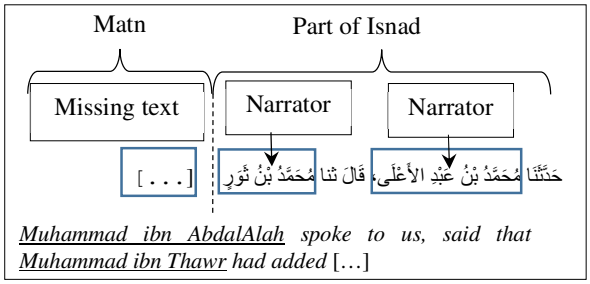

Fig. 4: Exception in *hadith* number 14535.

Indeed, *hadith* number 14535 contains only a part of the Isnad with no Matn but an implicit reference to the Matn part. Furthermore, the editors in (Al-Tabari, M., 2010) mentioned that a part of the Isnad of this *hadith* was missed during the text copying phase. In the other hand, these errors are related to a wrong detection of the information related to some ambiguous parts like a missing or misplaced annotation from the pre-annotation phase.

Conclusion and Perspectives

In this work, to attain our main objective, we used TEI guidelines to elaborate an adapted module customized for *Tafsīr* structure. To achieve that, first, we started with a study of *Tafsīr al-Ṭabarī* structure. Second, we identified the data categories from the TEI standard registers, which harmonized with the *Tafsīr* corpus specification. After that, we developed an NLP module for the automatic processing of the encoding of *Tafsīr al-Ṭabarī* following the TEI model. The elaborated module allowed us to generate a normalized version of the *Tafsīr al-Ṭabarī* corpus with TEI format, which can be used in other levels of analyses and NLP applications.

As perspectives, we want to improve our model by incorporating other specifications for deeper encoding of the fundamental fragments of the corpus. Furthermore, we want to experiment the encoding of other *Tafsīr* corpora to create a normalized database for *Tafsīr* of the Holy Quran.

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The Influence of Non-Monetary Inflation Factors on the Origin of Inflation in Russia

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Abstract

The moment of occurrence and development of inflation is important in the development of the economy of each country. After inflation in the country, it will never be possible to completely get rid of it. Once this process has developed in the country, the state is only able to restrain inflation, limiting its growth. The main issue for the economy of each country remains the search for tools to reduce inflation. To date, there is no universal approach to solving this issue. Each country has its own historical, unique features that affect the further development of the entire economy. Therefore, the search for tools to overcome inflation should begin with an analysis of the causes of its occurrence.

Keywords: Non-Monetary Factors, Inflation, Interest Rate, State Policy

Introduction

For several centuries, such an economic phenomenon as inflation remains a complex problem requiring an integrated approach to its solution. The inflation crisis has an impact not only on professional participants in the economy, but also on all sectors of society to a greater or lesser extent. That is why inflation is a socio-economic phenomenon (Abiad, 2005). A negative impact on production has a rapid price growth rate. Inflation reduces the flow of investment in the economy, lowers production activity, which leads to a decrease in both real and nominal wages, and a decrease in tax revenues to the state budget. An effective solution to this problem requires a combination of fiscal and monetary policies, taking into account inflation factors (Adler, 2002).

Literature Review

In economic theory, there are different points of view on the inflation process. Followers of Marxist theory pay particular attention to the impact of inflation in the redistribution of national income. Followers of Fisher focus on the impact of inflation in the field of price regulation (Taylor, 2001). This view is one of the most common opinions among the population, since many people identify inflation with rising prices (Arias, 2019). The followers of the monetarist theory explain inflation by processes in the sphere of money circulation. Inflation is a multifactorial phenomenon, its consideration only from the point of view of price level, money supply is a rather simplified approach (Baumeister, 2015). In our opinion, it is necessary to analyze the groups of factors affecting the inflationary process. The first mention of inflation and an

explanation of the sharp rise in prices in the 16th century was made by professors of the University of Salamon D. S. and Aspilquet M.N. (Saks, 1996). The rapid price increase was caused by the influx of precious metals from America to Europe, which increased the money supply in circulation and led to their depreciation (Hatami-Marbini, 2017).

Theoretical Background

There are two types of inflation factors: monetary and non-monetary. Monetary factors have a significant impact on the money supply in circulation. The monetary factors include:

1) State budget deficit and domestic debt growth;
2) Credit expansion of banks;
3) Poor tax policy;
4) Dollarization.

Non-monetary inflation factors have a significant impact on the development of inflation. Non-monetary factors include:

1) High resource intensity of production;
2) Monopolization;
3) The presence of shadow sectors of the economy;
4) Dependence of prices in the domestic market on external;
5) Import inflation.

Experts put forward an interesting point of view: if inflation in Russia is caused by non-monetary factors, it is possible to increase the money supply without provoking inflation. The following arguments are presented: the Russian economy has insufficient capacity utilization (75-80%) and low monetization. Based on data on money supply and GDP, we calculate the level of monetization of the Russian economy (Table 1).

Table 1: level of monetization of the Russian economy for 2008-2018

Year	The level of monetization of the economy,%
2008	31,4
2009	39,3
2010	43,2
2011	40,1
2012	39,8
2013	42,6
2014	39,9
2015	42,3
2016	44,7
2017	46,0
2018	48,4

Source: own calculations based on http://www.gks.ru/wps/wcm/connect/rosstat_main (contact date 11.01.2020)

After analyzing the data, we can draw the following conclusions: every year there is an increase in the money supply in circulation, but the level of monetization of the economy remains low. The level of monetization does not have stable growth. Therefore, the proposal to issue additional cash is applicable.

The influence of monetary and non-monetary inflation factors is significant; one phenomenon is generated by another. They cannot be separated from each other. Inflation is a multifactorial process caused by the integration of monetary and non-monetary factors. Consider the relationship of these factors with an example. An unjustified increase in nominal wages entails an increase in household cash incomes, which in turn affects the depreciation of the national currency, in the future this entails a state budget deficit, and the latter is one of the monetary factors. Consider the opposite situation when monetary factors affect non-monetary. The money issue gives rise to the increase in the velocity of money, therefore, the equality in equation of the quantity theory of money PT=MV, derived by Irving Fisher, is violated, which causes an increase of the monetary mass in circulation, which affects the volume of production, generating a trade deficit, which is a non-monetary factor of inflation.

As the factors influence each other, can change from one form to another, and to combat inflation have in the same way. We believe that inflation caused by monetary factors should influence non-monetary methods, and the inflation caused by non-monetary factors can be influenced by monetary methods. For example, to fight inflation caused by monetary factors (excess emissions) will be more effective non-monetary (increase in production). It is possible to allocate two approaches to overcome inflation: monetarist and Keynesian. Neither of their approaches is not a universal solution, abandoning it in favor of another, as the choice of approach depends on the historical conditions for the functioning of the whole economy and causes inflation (Kosov, 2016). The essence of monetary policy is that Central Bank changes the quantity of money in circulation that allows you to apply interest rate which affects investment and income. The mechanism of influence of monetary circulation on the interest rate as follows: increase of money in circulation reduces the interest rate, and decrease of money in circulation increases it. The opposite approach of overcoming of inflation is the Keynesian. Its main objective is the preservation of aggregate demand. One of the methods of regulating aggregate demand is income policy (non-monetary factor of inflation, when the ill-conceived use of government). This policy involves control over the growth of wages and prices. Non-monetary methods of regulation include actions aimed at addressing structural imbalances in production, to increase production efficiency (Ricardo, 1995).

The primary role of monetary stabilization gains stimulates economic growth. Special importance is attached to fiscal policy, is able to regulate aggregate demand and aggregate supply. These methods should be applied with caution, as an ill-conceived policy of economic growth could lead to another bout of inflation, to escalate it due to the excessive increase in demand and the money supply in circulation. In practice, the most preferred methods of influence are monetary because they are aimed directly at the object of regulation and gives the result faster than non-monetary. Keynesian methods are used relatively rarely because their theory is that the increase in the mass of money in circulation leads to a decrease in interest rates, which promotes investment, employment and production. The majority of developing countries this mechanism does not apply due to the fact that the increase in money supply in circulation in their country leads to lower interest rates, and to higher prices. Also the application of this theory prevents hidden unemployment, which is common in developing countries. Was formulated two approaches to the problem:

- the exclusive use of monetary methods (Akhmadeev, 2018);
- active state regulation in combination with non-monetary methods (Sigarev, 2018).

Monetary policy, in spite of its prevalence, has both positive and negative consequences. Let us consider the example of Latin America in the 80-ies. The policy was carried out according to the recommendations of the IMF with different degrees of hardness recommendations this program was conducted in Latin America:

- reducing the budget deficit by reducing government contributions for social programs;
- tight monetary policy, limiting the issue;
- the devaluation of the national currency;

- liberalisation of economic activities;
- approval of limits on the growth of wages.

The most striking examples of the application of these principles to combat inflation became Chile since 1983 and Bolivia since 1985. The use of the above elements of "shock therapy" allowed to slow down the rate of "galloping" inflation, in Chile from 27.3% to 19.9% for the period 1983-1984, in Bolivia this indicator looks even more attractive. From 11749.6% to 276.3% for the period 1985-1986 (Kong, 2017; Ekimova, 2016). The negative consequence was a decrease in per capita GDP, a decrease in real wages, a decline in those employed in production. Monetarist politics did not lead to a prosperous economy, as evidenced by the above facts (Korableva, 2019). Regarding Chile, it cannot be said that inflation was overcome solely due to monetarism, since monetary methods were applied in a complex with non-monetary methods, namely, fixing the exchange rate of the national currency.

Discussion

Among the supporters of non-monetary factors as a prerequisite for the development of inflation in Russia (Popov, 1993). He believes that, in the period of the 90s, Russia had its own special non-monetary factors that are characteristic only for it: the outflow of foreign exchange and material resources from the country, a high degree of monopolization of the economy, etc. Afanasyev and Vite (1995) believe that inflation in Russia "is supported by prevailing wage indexation. Pulling fuel and raw materials prices to the world level". To explain the changes in consumer prices, Batinti and Congleton (2018) analyzed the events of 1993-1994. and came to the conclusion that the change in the money supply was only 30-31%, non-monetary factors, namely the change in wages, fuel and energy prices, occupied a more substantial share. Anikin (1992) adheres to this point of view; he believes that Russian inflation is caused by problems in the sphere of social production, and not monetary circulation. The problem is that the structure of domestic prices is significantly different from world prices. This price structure does not correspond to a single, global, market rate of a floating national currency (Illarionov. 1995). According to Dorofeyev (2018) in the early years of the 1990 the M3 monetary aggregate increased 186.8 times, consumer prices - 105.7 times, wholesale prices - 1863.1 times. According to the author, the above data indicate that the reason for inflation lies in non-monetary factors, since they had a greater impact, and monetary factors accounted for only 20% of the total factors (Aksenova, 2014; Kosov, 2017).

Conclusion

After a comprehensive analysis of the various approaches to inflation, we can conclude that inflation in Russia is mostly due to non-monetary factors. However, this does not mean that monetary factors do not affect the development of inflation. Inflation is a multifactorial process, the effect of each factor is affected, but to varying degrees. In our opinion, the primary goal is to identify the primary sources of inflation. This is necessary to reduce the level of inflation. The choice of model to fight inflation unique to each country. On the one hand, emerging countries have similar economic, socio-political properties. The rigid methods of the IMF program is reasonable, this is due to insufficient development of the market mechanism in the economic system of each country (Woo, 2003).

From this point of view, the Russian economy should adhere to these rules. On the other hand, there is a perception that the IMF model was developed in the interests of developed countries (Shtefan, 2017), but is focused on the underdeveloped countries and former colonies, consequently, this model is not applicable in Russia, as the country has a large production potential than other countries that adhere to this policy. This statement cannot be refuted, because the success of anti-inflationary models of the IMF in most cases was achieved in countries with high production potential. The level of monetization of the Russian economy is at a low level, which creates an artificial shortage of money. It is possible to carry out additional emission

of money, because inflation in Russia is caused by non-monetary factors will not affect the increase in the rate of inflation, and will allow you to fill the shortage of money, consequently, investments that will increase economic growth.

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Transport Sector and Environmental Impact: Spatial Analysis of Greenhouse Gas Emissions in Poland

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Abstract

A spatial inventory of greenhouse gas (GHG) emissions includes many categories of human activity. The aim of this study was to analyze, in high resolution, the spatial distribution of transport sector emissions. Statistical data to the lowest level (provinces, districts, and municipalities) were used to make a GHG spatial inventory for Poland, as a case study. Vector maps of GHG emission sources in the transport sector and algorithms to disaggregate activity data to the level of road segments were created. Using mathematical models, the emissions of carbon dioxide, methane, nitrous oxide, and other GHGs, as well as total emissions in CO_2-equivalent, at the level of road segments, were calculated for passenger cars, buses, lorries, and special cars. Gridded data, with 30 arc seconds resolution, were assessed to combine with inventory data in other categories of human activity. Vector maps conserve information regarding the administrative authorities of corresponding road segments, which enabled the spatial inventory results to be connected to municipalities and other units by taking into account administrative boundaries. The results were compared with EDGAR gridded data and correlations between the two datasets was investigated.

Keywords: Transport Sector, Environmental Impact, GHG Emissions, Spatial Analysis, High Resolution.

Introduction

Reducing greenhouse gas (GHG) emissions to prevent current and future climate change is the most important challenge facing humanity (Le Quéré et al, 2015). Therefore, effective tools are needed to provide inventories of GHG emissions and absorptions. Some international institutions, such as the United Nations Framework Convention on Climate Change (UNFCCC), the International Energy Agency (IEA), and the Carbon Dioxide Information Analysis Center (CDIAC), collect national inventory data on GHG emissions for many categories of human activity. Such national inventory reports (NIRs) play an important role in verifying compliance with emission obligations, predicting future emissions under different climate change scenarios, and establishing new international agreements. Nevertheless, decision makers and scientists need to know more about emission processes, and especially about their spatial patterns. Data presented in such a way link emissions to the territory where they appear (Olivier et al, 2005; Oda & Maksyutov, 2011; Boychuk & Bun, 2014), which is also important as input data for global circulation and transport models.

Traditionally, a regular grid is used to present spatial data for GHG emissions. Emissions in each grid cell are calculated on the basis of national/regional emission data and some complicated disaggregation algorithms using additional proxy data. The intensity of night-time lights, sensed remotely by satellites, is an effective example of such proxy data (Oda and Maksyutov, 2011). The advantage of such an approach is its potential to estimate GHG emissions for the whole globe, regular updated on monthly/yearly basis. But this technique covers only emissions from fossil fuel combustion processes (point as well as non-point emission sources), and mainly emissions of carbon dioxide (CO_2).

The grid cell size and resolution of the proxy data determine the resolution of the resulting spatial data for GHG emissions. Since higher resolution data better reflect the territorial specifics of emission processes, scientists have invested a lot of effort into reducing grid cell size (Hutchins et al., 2017), decreasing it from 1° latitude/longitude for global fossil-fuel CO_2 emissions (Andres et al, 1996), to 0.25° (Rayner et al, 2010), and to 1 km for global data on CO_2 emissions from fossil fuels, using point

source data and remote sensing data reporting night-time light intensity as a proxy (Oda & Maksyutov, 2011). Nevertheless, gridded emissions approaches do not take administrative boundaries fully into account, because a grid cell is often ascribed to an administrative unit (province, district, municipality) according to the largest part of the cell area located in the unit. This drawback can be avoided by using vector maps and analyzing GHG emissions at the level of point-, line-, and area-type (polygon) emission sources (Gurney et al, 2009; Bun et al, 2019).

Due to its consumption of fossil fuels, the transport sector has important mitigation potential in reducing GHG emissions. The share of GHG emissions from the transport sector is considerable in many countries (for example, 34% of total CO_2 emissions in the US). Included in the national emissions of this sector are emissions from road and off-road transportation, domestic aviation, railways, and domestic shipping. Estimation of GHG emissions in the transport sector may constitute a part of gridded data (for example, global gridded data with 0.1° longitude/latitude resolution (Janssens-Maenhout et al, 2019; Crippa et al, 2018), US data with 1 km resolution (Gurney et al, 2009) and datasets for part of Europe (Denier van der Gon et al, 2017)) or form a subject of separate research (Cao et al, 2017, Boychuk et al, 2012; Cong et al, 2018; Mendoza et al, 2019; Palsson & Johansson, 2016; Puliafito et al, 2015; Smit & Ntziachristos, 2014; Wassan et al, 2019)).

In this study spatial analysis was performed for GHG emissions from railways, road and off-road transportation in Poland with different types of vehicles, such as passenger cars, buses, lorries, and special cars (tractors, bulldozers, cranes, forklifts, fire engines, ambulances, etc.). Road segments are presented as line-type emission sources. Activity data, at the level of separate emission sources, were calculated using statistical data, some proxy data, and algorithms for disaggregation of the data to source level. These algorithms differ depending on category of vehicle. Since the spatial data retain information regarding the administrative assignment of road segments, GHG emissions can be analyzed at any administrative level, up to municipality, by taking into account administrative boundaries.

Methodology and Input Data

The geoinformation technology for GHG spatial analysis in the transport sector (Fig. 1) proposed here is based on an approach described in Bun et al (2019) and Hamal (2009), where emission sources are classified into point-, line-, and area-types, depending on their emission intensity and physical size, as compared to the territory under investigation. The results of previous studies of GHG emissions in the Polish transport sector (Jacyna et al, 2015; Dzikuć et al, 2017; Boychuk et al, 2012; Valakh et al, 2015) were also taken into account in this study.

The highest share of GHG emissions in the Polish transport sector is contributed by road and off-road transportation (15% of total energy sector GHG emissions). Railways in Poland are mainly electrified, so the share of their emissions is not so high (0.11% of total energy sector emissions). Because of the relatively small size and compact shape of Poland, the use of civil aviation for domestic transport is not efficient (the share of GHG emissions from domestic aviation is only 0.03% of the energy sector emissions). The share of emissions from domestic shipping in Poland is very small (only 0.0004% of the energy sector emissions), because of its relatively small rivers and comparatively short coastline. Therefore, the last two categories of emission sources were omitted from the current research, as well as emissions from the use of bunker fuels for international transportation (due to the regional scale of this research).

The digital maps of emission sources for road and railway transport were created using OpenStreetMap (Jokar Arsanjani et al, 2015) and road maps of Poland using categories. If needed, the roads or railways were additionally split into segments based on administrative boundaries to retain their administrative assignment. Such road segments were considered as separate elementary objects in the analysis. Road category was used as one of the proxies for the disaggregation algorithms in order to calculate the activity data for various categories of vehicles in the transport sector using statistical data on fossil fuel combustion.

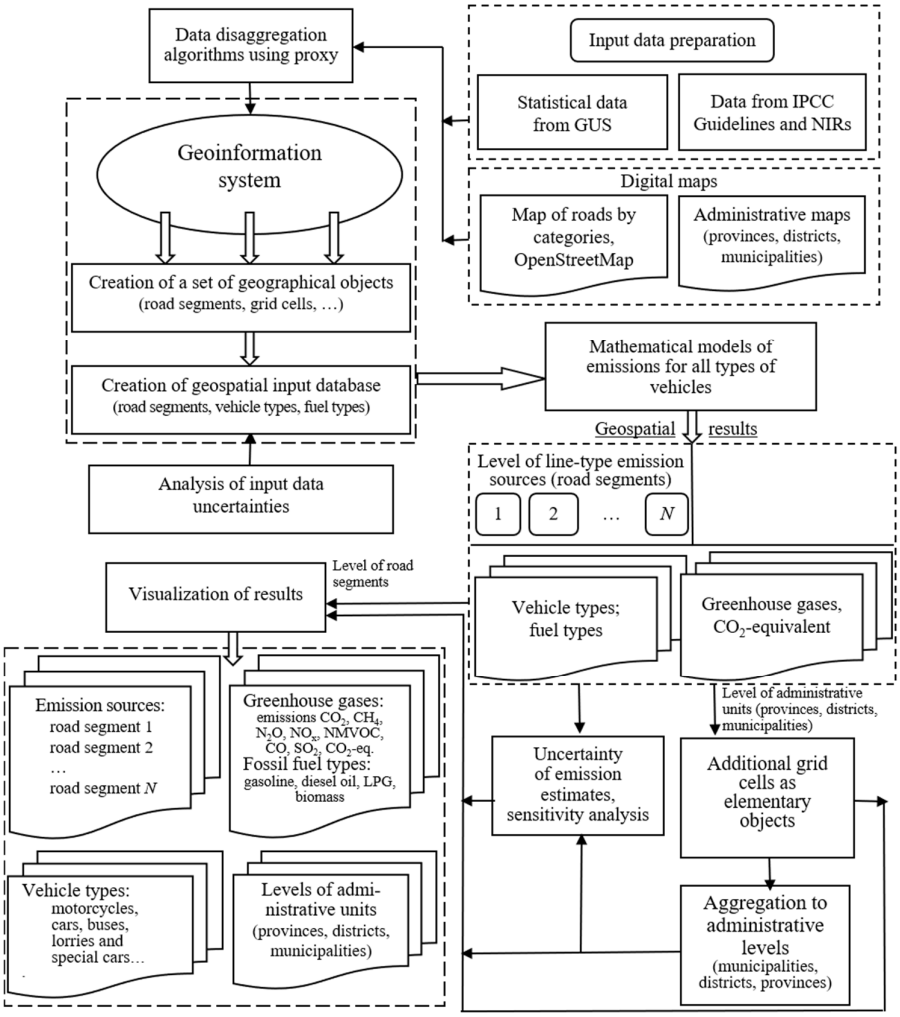

Fig. 1: Structure of geoinformation technology for spatial analysis of greenhouse gas emissions in the transport sector

To calculate GHG emissions, the following road categories were taken into account: national, provincial, district, or community roads; and the following road types: highway, express route, dual carriageway, express carriageway, dual carriageway for heavy traffic up to 11.5 t per axle, single carriageway for heavy traffic up to 11.5 t per axle, dual carriageway for heavy traffic up to 10 t per axle, single carriageway for heavy traffic up to 10 t per axle, dual carriageway up to 8 t per axle, single carriageway up to 8 t per axle, dual carriageway, single carriageway, other road with paved surface, dirt road, or city road. The following types of vehicles were analyzed: motorcycles, cars, buses, lorries and special cars. Traffic intensity factors established by experts for these vehicle types were used (per 1 km of the road of specified type) (Valakh et al, 2015). On this basis the amounts of gasoline, diesel, and liquefied petroleum gas (LPG) used by different types of vehicles on each segment of the roads were calculated. Emissions of CO_2, methane (CH_4), nitrous oxide (N_2O), and other GHGs from burning gasoline, diesel, and LPG, were estimated, separately for all types of vehicle and in each segment of the road, using the main principles of the IPCC Guidelines (IPCC, 2006), according to which the emission is a product of the activity data and the emission factors. The total emissions of all GHGs were calculated using the global warming potentials of each GHG.

To obtain activity data at the level of the road segments, algorithms were developed to disaggregate the available statistical data at the lowest administrative level possible (municipalities, districts, and provinces). For example, the data on vehicle numbers by type, the amount of fossil fuel used and other proxies, and the emission coefficients for each type of vehicle were taken from the Local Data Bank (BDL, 2019), the Central Statistical Office (Poland) (GUS, 2019), and Poland's National Inventory Report (NIR, 2012). The errors and uncertainties of the calculated emissions, and 95% confidence intervals were estimated at the final stage using Monte-Carlo method, and symmetric distributions of the investigated parameters (IPCC, 2001; Ometto et al, 2015; Oda et al, 2019). Such an estimation was applied to the separate road segments as well as to the aggregated results for the administrative units, such as municipalities, districts, or provinces of Poland. Since information about the administrative assignment of each road segment is retained in the geospatial database, it provided us with the ability to calculate emissions for whole administrative units (even for small ones such as municipalities) without any of the loss of accuracy found in the traditional approach of gridded emission data.

Results

Road Segment Level

Using the database of road segments created as line-type GHG emission sources in Poland (312,679 km^2) and the algorithms for fossil fuel data disaggregation, a geospatial database of input data for the spatial analysis of GHG emissions was established. The GHG emissions from each road segment were calculated using appropriate mathematical models, that is the emissions of CO_2, CH_4, N_2O, and other GHGs, as well as the total emissions in CO_2-equivalents, were estimated. Following Bun et al. (2019) these results are termed GESAPU (Geoinformation technologies, spatio-temporal approaches, and full carbon account for improving the accuracy of GHG inventories) data in this research. As an example, Fig. 2 illustrates the intensity of GHG total emissions in the transport sector in the provinces of Silesia and Lesser Poland. This region consists of the highly industrialized agglomeration of Katowice and Krakow, which contains a high density road network, as well as very clean mountain territory with a limited road network. The highest bin in Fig. 2 represents the roads with an emission intensity more than 1,600 $t_{CO2\text{-}eq}$/km (such as the A4 highway). The results of such a spatial inventory can be presented separately for each vehicle category, as well as separately for different fossil fuel types, or for different GHGs.

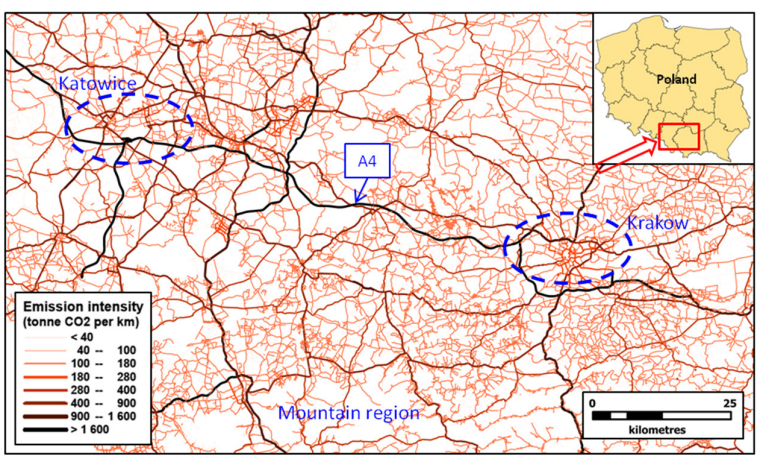

Fig. 2: Intensity of total GHG emissions in the road transport sector by road segments: fragment of line-type sources of emissions in Silesia and Lesser Poland provinces (t/km^2, CO_2-equivalent, 2010)

The results of the GHG spatial analysis at the level of road segments can be sampled to any grid, to be compared with known gridded GHG emission data. A grid was used as a vector map, where each grid cell was a polygon. Additionally, where necessary, grid cells were split by administrative boundaries

into separate objects of the vector map. The cells of such a grid retained the administrative assignments of each road segment. Grid size was not so important, because the resolution of the maps from OpenStreetMap was higher than the grid sizes used recently to produce gridded GHG emissions data (1 km, 500 m etc.).

As an example, Fig. 3 illustrates total GHG emissions from the road transport sector in Poland and the Poznań agglomeration at 30 arc seconds grid size scale. These data include GHG emissions from all categories of vehicles. The grid size was chosen to be comparable with well known global GHG emission data based on night-time light intensity (Oda & Maksyutov, 2011). At the latitude of Poland, the cells cover approximately 1 km in latitude, and approximately 0.5 km in longitude. The cell with the highest annual emission intensity is located in Warsaw (6.978 $t_{CO2\text{-}eq}$/cell). The same results are presented in Fig. 4 for the Warsaw agglomeration, using the prism-map for better visualization of the results. This 3D presentation illustrates a non-uniform distribution of emission sources and the differences in magnitudes of their emissions. Major highways and agglomeration road networks cause emissions higher than 1 $kt_{CO2\text{-}eq}/km^2$.

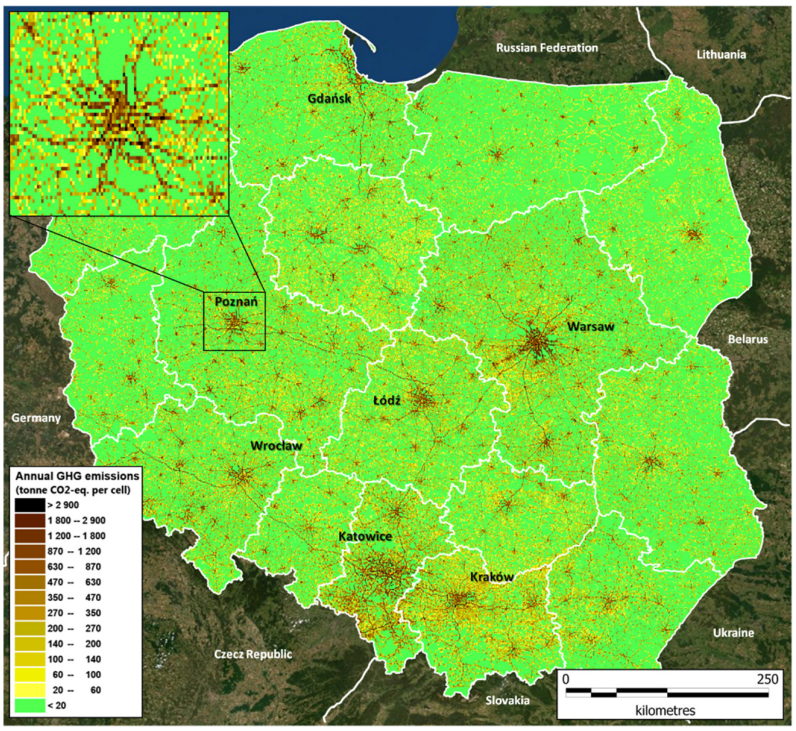

Fig. 3: Total GHG emissions from the road transport sector in Poland and the Poznań agglomeration (all categories of vehicles, CO_2-equivalent, t/cell, 30 arc seconds grid size, 2010)

Municipality and province level

As the information regarding the administrative assignment of each road segment is retained, and line objects of vector maps are split by administrative boundaries, GHG emissions could be calculated at the level of any administrative unit (such as municipality, district, or province) without any loss of accuracy. As shown in Fig. 5, total GHG emissions from road transport in Poland at the level of municipality are distributed extremely unevenly (there are 2,478 municipalities in Poland; gmina in Polish). In 2010, as expected, the highest total GHG emissions from road transport were found in the big cities like Warsaw (1,104,152 $t_{CO2\text{-}eq}$), Krakow (418,649 $t_{CO2\text{-}eq}$), and Łódź (373,480 $t_{CO2\text{-}eq}$), while the lowest was from Kleszczele town in Podlaskie province (723 $t_{CO2\text{-}eq}$). But if the intensity of GHG

emissions from road transport is considered, the highest intensity occurred in Piastów, the smallest municipality in Poland, but located near Warsaw (2,429 $t_{CO2\text{-}eq}/km^2$). The lowest intensity of GHG emissions from road transport was recorded in the mountain municipality of Cisna in Subcarpathian province (16.7 $t_{CO2\text{-}eq}/km^2$).

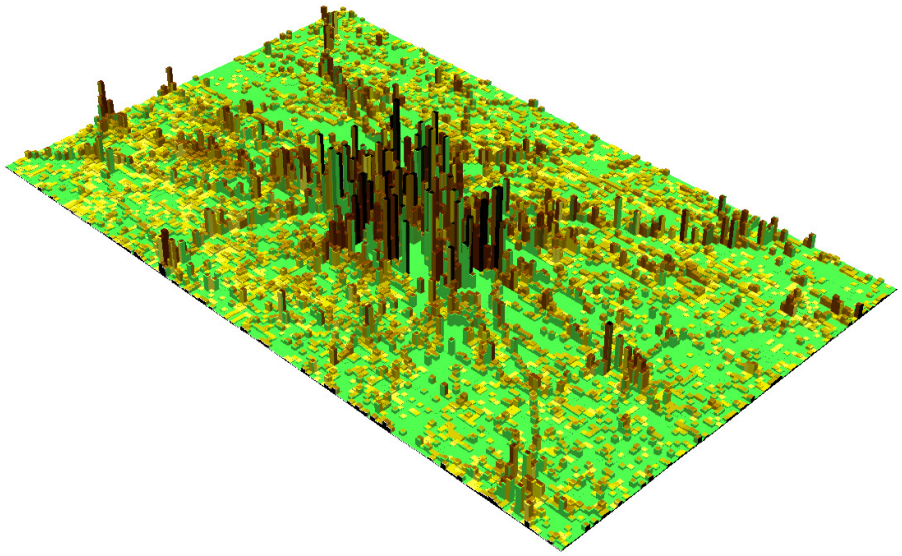

Fig. 4: Prism-map of GHG emission intensity from road transport in the Warsaw region (CO_2-equivalent, t/cell, 30 arc seconds grid size, 2010)

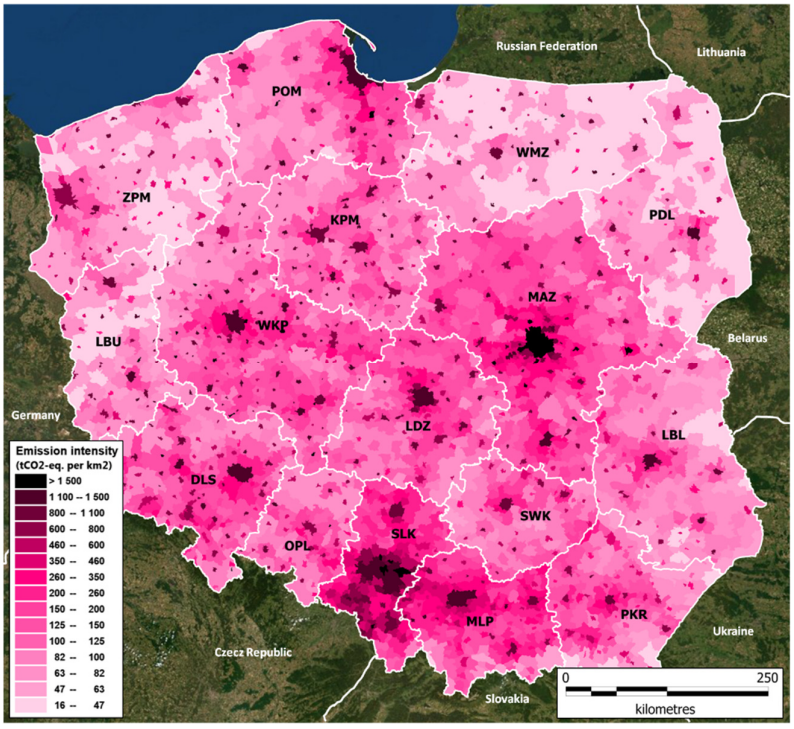

Fig. 5: Total GHG emissions from road transport in Poland at municipality level (CO_2-equivalent, t/km^2, 2010)

There are 16 provinces in Poland (voivodeship in Polish). In 2010 the total GHG emissions from the transport sector (Fig. 6) were highest in Masovian province, containing the capital Warsaw (MAZ; 7,740 kt_{CO2-eq}), the most industrialized Silesian province (SLK; 5,259 kt_{CO2-eq}), and Greater Poland province (WKP; 4,926 kt_{CO2-eq}), while the lowest total GHG emissions were from Opole province (OPL; 1,265 kt_{CO2-eq}). Considering emission intensity, the first three places were as follows: Silesian province (427.8 t_{CO2-eq}/km^2), Lesser Poland province (251.9 t_{CO2-eq}/km^2), and Masovian province (218.5 t_{CO2-eq}/km^2), but the lowest emission intensity occurred in Podlaskie province (67.0 t_{CO2-eq}/km^2).

As we can see from Fig. 6, total GHG emissions caused by passenger cars dominated in all provinces (70.3% – 76.4%), with the highest share in Opole province. The share of total GHG emissions from lorries was not as high (18.1% – 23.9%), but slightly higher than the share of emissions from special cars (2.9% – 4.4%). Due to the electrified railways, the share of GHG emissions from this category of transportation was low in all provinces (0.4% – 1.3% of total emissions in the transport sector by province). Within the fossil fuel types, the highest GHG emissions were caused by diesel, with shares ranging from 58.0% of total GHG emissions in the transport sector of Łódź province to 70.1% in the province of Pomerania. GHG emissions from gasoline were lower, with contributions ranging from 22.8% in Pomeranian province to 31.8% in Opole province, and the share of emissions from LPG ranged from 6.7% in West Pomeranian province to 14.9% in Łódź province.

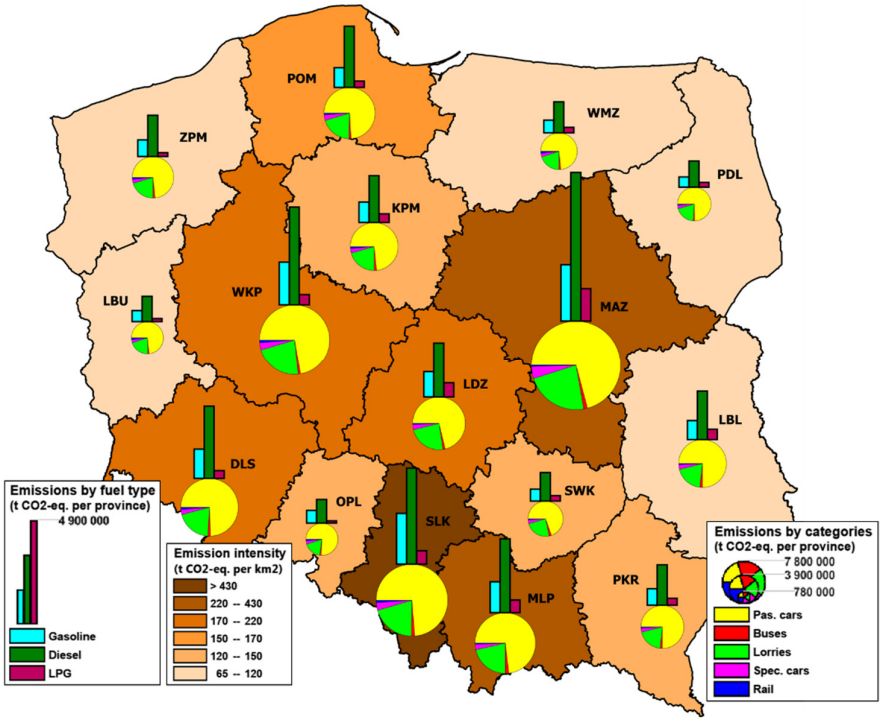

Fig. 6: Total GHG emissions from the transport sector by province, vehicle type, and fossil fuel type (Poland, tCO_2-equivalent, 2010)

Discussion and conclusions

The spatial analysis of GHG emissions from the Polish transport sector demonstrated considerable unevenness, in particular we could see very high emissions in the industrialized provinces with high densities of both population and road networks (such as Silesian and Masovian provinces), and low emissions in the mountainous and strongly forested regions, with low road densities (such as Opole, Lubusz, Podlaskie, and Holy Cross provinces). Such unevenness is typical for many categories of

human activity (Bun et al, 2019), therefore a positive feature of spatial analysis is the ability to identify regions and road network nodes that need more attention from local authorities.

National inventories of GHG emissions play an important role at international scale, but they cannot be used for local analyses. However, spatial data on GHG emissions at high resolutions are needed for modelling local dispersion of emitted gases, and for comparison of atmospheric concentrations of these gases with recorded measurements. In this study spatial data on transport sector GHG emissions were compared with EDGAR global gridded data (the Emission Database for Global Atmospheric Research; Janssens-Maenhout et al, 2019) with a resolution of 0.1° latitude/longitude (for Poland the grid size is 7.1 km in longitude and 11.1 km in latitude). Only the cells that fully cover Polish territory were taken into account. Then the high resolution data from this study at the level of road segments were sampled and aggregated to the EDGAR grid.

The results of the comparison for total GHG emissions in the transport sector in 2010 (Fig. 7a) demonstrate a good correspondence between the two datasets (light green bin). The EDGAR data depict higher emissions in pixels that cover major highways, while the data described here identify higher emissions from the transport sector in large agglomerations. When comparing GHG total emissions in the transport sector within Poland (4,014 pixels of EDGAR grid), we noted the following results: GESAPU high resolution dataset – 46,666 $kt_{CO2\text{-}eq}$; EDGAR gridded dataset – 48,398 $kt_{CO2\text{-}eq}$; NIR (NIR, 2012) – 48,024 $kt_{CO2\text{-}eq}$. In the main, this was a good correspondence if the following factors are taken into account: this comparison did not include pixels crossed by the Polish border (which are quite large pixels), the NIR data also contain emissions from additional sources such as civil aviation, navigation, and pipeline transport. The scatter plot in Fig. 7b illustrates the correlation between this study and EDGAR datasets for GHG total emissions in the Polish transport sector, with coefficient R = 0.848.

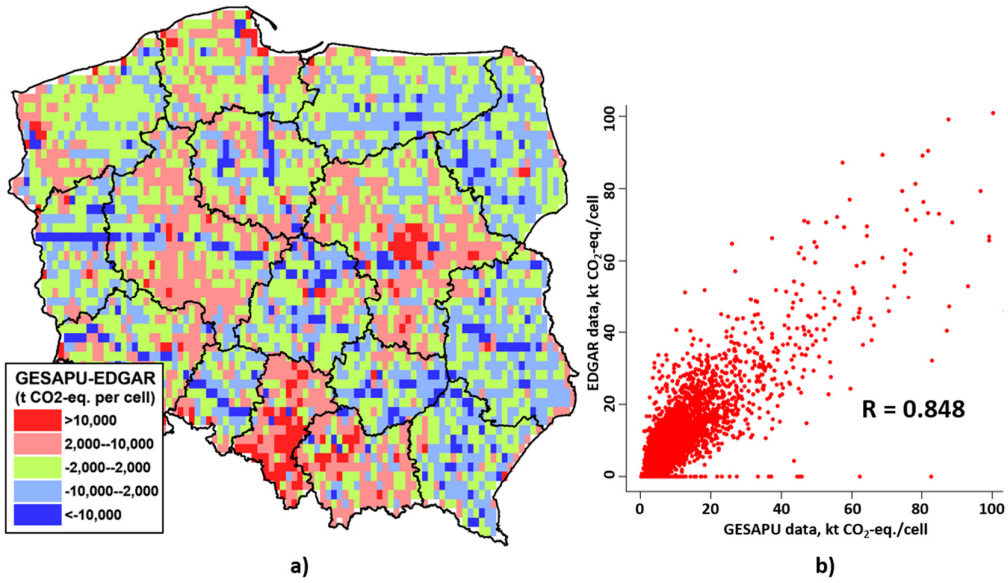

Fig. 7: Comparison of this study and EDGAR data for the transport sector in Poland: absolute difference (a), scatter plot and correlation (b) (GHG total emissions, CO_2-equivalent, GESAPU data aggregated to 0.1° grid, 2010)

The approach described here performs the spatial analysis of GHG emissions in the transport sector by describing road segments as linear emission sources. Therefore, unlike gridded data approaches, GHG emissions are calculated directly at the level of road segments. This make it possible to retain information on the administrative assignment of such segments and further, if necessary, to aggregate the inventory data to the level of even the smallest administrative units without losing accuracy. The results of this study made it possible to depict the real state of emission processes from small territories

or transport nodes. In addition, such data could be presented for all categories of vehicles and for all types of fuel.

For the spatial analysis of GHG emissions, vector maps of roads were used in this research, which has a positive effect on reducing uncertainty in the results, because such maps are much more accurate than their gridded representations for modeling road transport emission processes. This methodology minimized uncertainty regarding the location of GHG emission sources and reduced the overall uncertainty of the spatial inventory results. Of course, operating with vector maps required additional effort to build a map of emission sources and to form a georeferenced database of input data. However, as a result of analysis based on these maps, we gained additional knowledge in the form of GHG emission distributions for each category of transport and for each type of fuel. Data presented in such a form are important for both decision makers and scientists.

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Emigración De Estudiantes Universitarios Venezolanos. ¿Hacia Dónde Van?

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Resumen

Venezuela en estos momentos de su historia presenta un patrón migratorio nunca antes registrado, los datos sobre emigración han ido incrementándose en los últimos años. La situación de crisis por problemas económicos, políticos y sociales ha sido el detonante de esta diáspora indetenible. Bajo estas consideraciones, este trabajo tiene el objetivo de determinar las intenciones de emigración de estudiantes universitarios venezolanos, destacando hacia dónde piensan dirigirse al concretar esta decisión. La metodología utilizada fue de carácter descriptivo, con un diseño de investigación de campo; empleándose la encuesta como técnica para la recolección de datos, mediante el uso de un cuestionario que contó con 25 ítems, aplicado a una muestra de 423 estudiantes de las diferentes carreras y núcleos de la Universidad del Zulia para el año 2018. Los resultados develan que el 85,7% de los universitarios tiene la intención de emigrar, prefiriendo establecerse en Chile (33,9%) una gran cantidad, el resto tiene en la mira Colombia (16,1%), Argentina (11,3%), Estados Unidos (10,8%), entre otros países. Se concluye que, se está frente a una pérdida significativa de población joven, en preparación y perteneciente a la población económicamente activa, incidiendo negativamente en el proceso de desarrollo de la nación.

Palabras clave: Emigrantes, Estudiantes, Lugar De Destino, Crisis.

Introducción

La migración es parte de los procesos demográficos que junto a la natalidad y mortalidad introduce cambios en el tamaño, composición y distribución de la población. Este fenómeno está relacionado según De la Vega y Vargas (2017) con el movimiento o desplazamiento espacial de las personas, que tiene vigencia desde que la especie humana existe, ya que el hombre tuvo la necesidad de salir de su lugar de origen en búsqueda de alimentos, vestimenta o vivienda para él y sus afectos. Además, las grandes catástrofes naturales, pérdida de cosechas, guerras y hechos sociales como persecuciones raciales o ideológicas, han promovido el movimiento migratorio.

A medida que la sociedad fue avanzando, el hombre tuvo que migrar con la intención de encontrar mayores oportunidades de trabajo que le permitieran mejorar la calidad de vida de su familia. Con los avances tecnológicos en el marco de la globalización, este proceso demográfico tuvo mayor auge; los sistemas de comunicación y transporte representaron una nueva era que facilitaron consolidar el proceso, tratándose de migraciones incitadas por problemas sociales, económicos y políticos, dado un proceso de desigualdad creciente entre los países desarrollados y subdesarrollados y acentuados, en especial, por malas gestiones de algunos gobiernos.

En el caso de Venezuela, que en muchos años de su historia fue un país receptor de migrantes o de puertas abiertas al mundo, actualmente presenta un patrón migratorio completamente distinto, nunca antes visto en la historia. Esta situación a criterio a Freitez (2013), De la Vega (2014), Muñoz (2016) y Castillo y Reguant (2017) se debe a problemas relacionados con la sobrevivencia cotidiana, las oportunidades de desarrollo personal y profesional, la conflictividad política y los problemas relacionados con la falta de seguridad en su sentido más amplio, generando gran incertidumbre respecto al futuro, que han alentado la decisión de emigrar, teniendo como lugar de destino países como Colombia, Perú, Chile, Estados Unidos, Panamá, Ecuador, Argentina, entre otros.

Bajo estas consideraciones, la presente investigación tiene el objetivo de determinar las intenciones de migración de estudiantes universitarios venezolanos, haciendo énfasis en los factores que promueven esta decisión y los posibles lugares de destino al que piensan migrar. Cabe señalar, que este grupo poblacional está próximo a egresar de sus carreras como profesionales para aportar todos los conocimientos adquiridos, habilidades y destrezas en las diferentes actividades económicas del país, con expectativas de construir un futuro estable, por lo que es alarmante abandonen la nación en búsqueda de oportunidades.

La metodología utilizada es descriptiva, con un diseño de investigación de campo, empleándose para la recolección de datos un cuestionario de 25 ítems, aplicado en el año 2018 a una muestra de 423 estudiantes de diferentes carreras y núcleos de la Universidad del Zulia; casa de estudio centenaria, con mayor matrícula estudiantil de Venezuela; ubicada en el municipio Maracaibo, estado Zulia.

Migración: Proceso Demográfico Indetenible

Valente (2012) señala que la migración es un derecho ejercido por los individuos con la perspectiva de mejorar su situación o enfrentar circunstancias adversas, que puede producir cambios ligeros o hasta radicalmente bruscos en estas personas. Asimismo, indica que todo sujeto está expuesto a migrar en algún momento de su vida y aunque puede que esto no ocurra, existe siempre una expectativa latente de migración susceptible en cualquier lapso de tiempo.

Por su parte, el Centro Latinoamericano y Caribeño de Demografía (CELADE, 1997) expone que la migración es un fenómeno social indisoluble del cambio de la población que está determinado por la estructura social y económica de una región o país, que a la vez, repercute sobre dichas estructuras, pues es un hecho potencial que trasciende en la vida de las personas, dado que existe un traslado de residencia que exige el cruce de alguna delimitación administrativa o geográfica. De allí que, son desplazamientos de grupos humanos que los alejan de sus residencias habituales.

En el mismo orden, León (2015) y Vargas (2016) definen a la migración como el cambio de residencia de un lugar llamado “origen” hacia otro llamado “destino”, con un carácter casi permanente, el cual es motivado por razones económicas, sociales y/o políticas. De esta manera, el fenómeno se compone de la salida de un individuo (emigración) de una comunidad, estado o país (lugar de origen) por un tiempo determinado y la llegada de éste al nuevo territorio (inmigración) o lugar de destino.

Cabe destacar, que en la migración tiene características como: edad, sexo, estado civil y aspectos educativos. Al respecto, Rodríguez y Busso (2009) alegan que la mayor parte de los migrantes suele ser población joven, con mayor presencia de hombres; esto puede ser explicado debido a que la etapa de la juventud se caracteriza por decisiones y eventos cruciales como la inserción universitaria, ingreso al mercado de trabajo, nupcialidad, aventura, poco temor al riesgo, experimentación, entre otras características que promueven la migración. La supremacía del género masculino podría expresarse en el temor que las mujeres tienen ante los cambios, de allí que los hombres siguen representando la proporción más elevada de migrantes según la OIT (2015). No obstante, Martínez y Orrego (2016) afirman que la mayoría de los países de América Latina y el Caribe presenta un perfil de emigrantes feminizado en los últimos años.

Por otro lado, Valente (2012) expone que el estado civil es otro elemento que se introduce como variable explicativa de la migración, pues los solteros o matrimonios de reciente formación son los que tienen mayor disposición para probar suerte en un lugar diferente, mientras que los trabajadores casados y con niños tienen menor propensión a migrar por razones como los altos costos de traslado, mayor arraigo al medio, así como obstáculos psicológicos de otra naturaleza.

En cuanto a las características educativas, Rodríguez y Busso (2009) sostienen que la decisión de migrar se eleva con la educación, debido a que la escolaridad brinda información y habilita el desplazamiento, abre opciones de vida, ofrece más probabilidades de moverse bajo la modalidad de contratación previa, convenio, beca, intercambios y se vincula positivamente con los ingresos y la capacidad de solventar los costos de una mudanza.

La historia de la humanidad ha permitido recopilar diversos hechos migratorios en el mundo, pues desde que la especie humana existe, hay indicios de migración. Estos diversos desplazamientos de masa poblacional espontáneos o forzados vividos a lo largo de los años, tienen como causantes principales factores culturales, económicos, geográficos y políticos.

De acuerdo a la Organización Internacional del Trabajo (OIT, 2015) existen alrededor de 232 millones de migrantes en el mundo, de los cuales 150 millones son trabajadores, que representan el 65% del total. Esta cifra devela la cantidad significativa de personas que dejaron de pertenecer a la fuerza de trabajo de sus naciones para hacer vida productiva en otras tierras, por lo que son individuos en edad activa (que incluye a jóvenes) y muchos de ellos de condición calificada; situación que preocupa a dicha institución y a otros organismos internacionales que han tratado el tema para delinear políticas de migración de alcance mundial.

Por su parte, la Organización Internacional para las Migraciones, OIM (2018) indica que la cifra alcanza los 244 millones de personas, por lo que nunca antes había ocupado una posición tan prominente como problema público. Cada vez más gobiernos y políticos, así como gran parte de la opinión pública de todo el mundo, consideran que la migración es una variable política relevante, debido a la importancia que reviste para el desarrollo y la prosperidad económica de los países.

Venezuela Ante El Desafío De La Migración

En Venezuela se ha presentado una historia migratoria de puertas abiertas a los flujos poblacionales interesados en las actividades económicas nacionales (Álvarez de Flores, 2007), por lo que en la actual población está presente, una variedad étnica producto de la constante mezcla de nacionalidades, que lleva en la sangre y en los apellidos la marca indeleble de los antepasados inmigrantes (Taylhardat, 2003).

El cacao y el café durante el período colonial (siglo XIX) marcan el inicio de la presencia de migrantes en el país, compuesta principalmente por comerciantes españoles, canarios y alemanes (Muñoz, 2016). Las exportaciones de estos productos de creciente demanda en el mercado mundial, representaban el pilar de la economía venezolana, alcanzando el 92% para el año 1920 según Álvarez de Flores (2007). En el siglo XX, Venezuela continuó siendo un lugar de destino atractivo para los migrantes europeos, por su estabilidad económica y política. Situación que se extendió durante los años de la Segunda Guerra Mundial y la posguerra.

Al iniciar el nuevo milenio, los factores de atracción de inmigrantes intrarregionales empezaron a disminuir y de acuerdo con cifras del censo del año 2011, los extranjeros alcanzaron el 4,2% (1.156.578) del total de la población en Venezuela, estimada en poco más de 27.227.000 personas (INE, 2014). Siendo la principal colectividad de extranjeros la formada por los provenientes de Colombia, Perú, Ecuador, Brasil y Cuba. Escenario diferente al de décadas anteriores.

A partir del año 2013, con la llegada al poder de Nicolás Maduro Moros como presidente de la República, se ha tornado en el país una situación caracterizada por la polarización política, donde además se evidencian altos niveles de inseguridad, la caída de los precios del petróleo, altos niveles

de inflación, caída de las reservas internacionales, mayor control de precios, devaluación del bolívar, cierre técnico de numerosas empresas, escasez de productos básicos, entre otros inconvenientes provenientes de su proyecto político-económico (Gutiérrez, Romero, Díaz y Sulbarán, 2017), que mantienen hoy en día a Venezuela con las expectativas más bajas de crecimiento en la región (Romero, Hernández, Gutiérrez y Portillo, 2017), aunado al descontento político, que han provocado una serie de emigraciones nunca antes registradas (Mazuera, Albornoz, Morffe, Ramírez y Carreño, 2019).

De esta manera, el Servicio de Análisis de Entorno PERFIL 21, Consultores 21 (2017) expone que en promedio 1,97 personas han emigrado por núcleo familiar, por lo que la diáspora venezolana se acerca a 4.091.717 personas. Esta cifra también es manejada por ENCOVI (2017), quien habla de una emigración que asciende a 3 o 4 millones de venezolanos en el extranjero, que representaría del 10 al 12% de la población total. El estudio además asegura que el 80% de la emigración reciente desde Venezuela ha salido básicamente durante los años 2016 y 2017, teniendo como lugar de destino países como Colombia, Perú, Chile, Estados Unidos, Panamá, Ecuador, Argentina, entre otros.

Es preciso señalar siguiendo a Azócar (2018), que la crisis económica y política del país, ha llevado a visualizar en el extranjero una ruta segura para conseguir recursos económicos en monedas con mayor fortaleza adquisitiva. Este autor con apoyo de estadísticas de organizaciones no gubernamentales en Venezuela, muestra que en el año 2016, más de 378.500 venezolanos entraron a Colombia legalmente para estabilizar su situación migratoria. Para el 2017, se tiene un registro de 153.000 venezolanos que se han quedado más tiempo del que les permite la tarjeta de turista (90 días), por lo cual están viviendo bajo la figura de estatus ilegal.

Asimismo, Azócar (2018) afirma que hay un estimado de 750.000 venezolanos que cruzaron la frontera bajo condición emigratoria, pero del 20% al 30% de este grupo poblacional, utilizaron la ruta por Colombia para seguir su camino hacia Ecuador y Chile. Situación que cada día se agudiza y llama la atención de la Oficina del Alto Comisionado de las Naciones Unidas para los Refugiados, ACNUR (2018), ratificando que cientos de miles de venezolanos permanecen sin documentación o permiso para residir legalmente en países de acogida, exponiéndolos a la explotación, la trata de personas, la violencia, el abuso sexual, la discriminación y la xenofobia. Este organismo pide a los países tener mayor sensibilización en atención a un complejo contexto político y socioeconómico que vive Venezuela en estos momentos de su historia.

Cabe destacar, que el escenario de las migraciones también ha tocado al ámbito universitario nacional, ya que se está en presencia de una deserción estudiantil considerable y preocupante desde la óptica de las casas de estudios. Al respecto, La Universidad de Los Andes, declaró que en esa institución se observa al menos dos tipos de deserción: el retiro total y el ausentismo. Reportan que entre 2012 y 2016 hubo un incremento del 100% de estudiantes que retiraron sus documentos de la universidad, mientras que en 2017 el número de retiros se ha multiplicado por cinco o por seis (LUZ Agencia de Noticias, 2017).

De igual modo, la Universidad Metropolitana de Caracas detalló que iniciaron a finales del año 2017 el período académico con 8% menos de estudiantes que debían continuar sus estudios. Una encuesta realizada por esta misma universidad, dejó saber que la mayoría de sus estudiantes había decidido emigrar con familiares hacia otros lugares. En el caso de universidades de la región zuliana, también se presentan altos índices de ausentismo que ha causado preocupación a sus autoridades (LUZ Agencia de Noticias, 2017).

En la Universidad del Zulia (LUZ), específicamente, la deserción se dejó sentir en las distintas facultades durante el reinicio de las actividades académicas y administrativas en septiembre de 2017. Decanos han reportado algunas cifras de la deserción y mencionan que las causas de esta pueden ser atribuidas a las protestas registradas en el país, la migración, la crisis en materia de infraestructura y servicios estudiantiles de la universidad, la situación económica familiar y hasta la seguridad

personal. No obstante, la deserción no sólo es de estudiantes, sino también de profesores, personal administrativo y obrero (LUZ Agencia de Noticias, 2017).

La Vicerrectora Académica de LUZ, Dra. Judith Aular de Durán, declaró ante medios de la región que la deserción de estudiantes en LUZ para el año 2018 supera el 40%, por lo que exhorta al gobierno nacional a tomar cartas en el asunto (El Nacional Web, 2018). Esta situación que se ha ido generalizando en otras casas de estudios, demanda una seria discusión, reflexión y atención de las autoridades gubernamentales, pues está en juego la generación de relevo del país, que está saliendo de la nación en búsqueda de mejores oportunidades sociales y económicas.

Emigración De Estudiantes Universitarios Venezolanos

Es preciso aclarar siguiendo a León (2015) que la decisión de emigrar es básicamente de carácter individual, ya que, en última instancia, quien se desplaza es el sujeto, sin embargo, este tiene detrás todo la conexión y situación de la familia de la que es difícil desprenderse, por lo que la decisión muchas veces se convierte en familiar. El autor además precisa que el migrante no siempre expresa un acto completamente voluntario, pues en la mayoría de los casos, en los lugares de origen existen fuerzas expulsoras que presionan la voluntad de las personas para tomar la decisión de emigrar hacia destinos que actúan como focos de atracción porque ofrecen mayores oportunidades o simplemente se presentan como las únicas alternativas posibles.

Bajo estas consideraciones, se preguntó a los estudiantes si han pensado residenciarse en otro país y el 85,7% indicó que sí tiene la intención; mientras que un porcentaje muy bajo (14,3%) rechazó esta posibilidad. Tal situación causa preocupación dado los altos niveles de emigración registrados en los últimos años por organismos internacionales, Consultores 21 (2017) y Encovi (2017), pues esta problemática no ha recibido un reconocimiento oficial y desde las instituciones públicas poca atención se ha brindado (Freitez, 2015).

Consultores 21 (2017), registra una diáspora de 4.091.717 venezolanos hasta el año 2017. Encovi (2017) para el mismo año, habla de una emigración que asciende de 3 a 4 millones, que representaría del 10 al 12% de la población total. Por lo que este gran número de estudiantes universitarios (85,7% población en estudio) pasaría a formar parte de las personas que deciden irse a otros países; situación que Azocar (2018) ya viene advirtiendo, por lo que se estima que un 30% de la población está realizando las gestiones para emigrar.

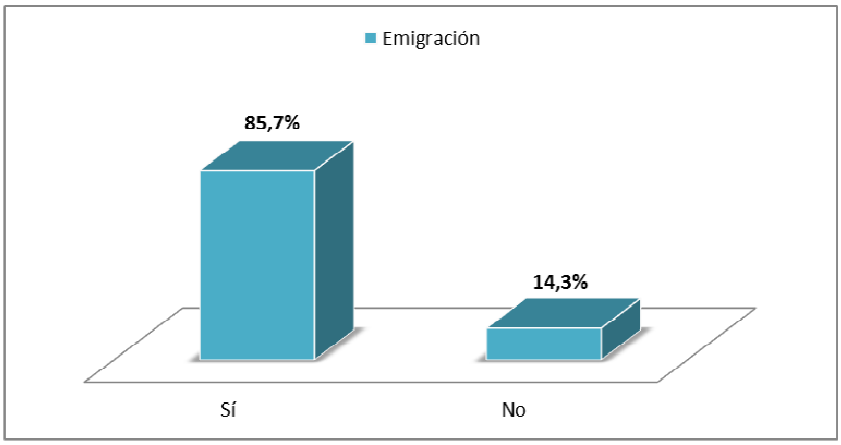

Gráfico 1LUZ: Estudiantes universitarios según intenciones de emigrar

Fuente: Elaboración propia a partir de la encuesta (2018).

Cabe destacar, que del total de estudiantes que piensa establecerse en otro país, el 95,2% tiene entre 17 y 24 años, el 3,8% posee entre 25 y 44 años y el resto (1,1%) pertenece a la población con 45 años y más, evidenciándose un grupo etario muy joven con intenciones de migrar. Ante este panorama, Rodríguez y Busso (2009) afirman que la mayor parte de los migrantes suele ser población joven, pues la etapa de la juventud se caracteriza por decisiones y eventos relevantes como la inserción universitaria, ingreso al mercado de trabajo, nupcialidad, menor aversión al riesgo y mayor interés en experimentar, que promueven o facilitan la migración. Muchos de estos estudiantes apenas inician su carrera universitaria o están a punto de culminarla para incorporarse como profesionales en el mercado de trabajo, pero quizás sientan que sus sueños no son posibles bajo las condiciones que presenta el país, prefiriendo salir de Venezuela.

Con respecto al sexo del grupo de estudiantes que posee intenciones de emigrar, la mayor parte está comprendida por mujeres (58,6%), observándose un liderazgo del sexo femenino frente a este proceso que según Rodríguez y Busso (2009) tiene mayor presencia masculina. No obstante, Martínez y Orrego (2016) afirman que la mayoría de los países de América Latina y el Caribe, presenta un perfil de emigrantes feminizado en los últimos años, dado que han tomado la iniciativa de formarse profesionalmente e incorporarse a la fuerza productiva. Estos mismos autores manifiestan que la composición por sexo de la migración venezolana muestra un predominio de mujeres. Esta característica puede estar asociada a la actividad que buscan realizar en el lugar de destino, donde los factores educativos y laborales tienen un peso importante.

De la misma manera, del total de universitarios con intenciones de migrar, la mayor parte (92,5%) está conformada por solteros, condición que les permite mayor facilidad para desplazarse y probar suerte en otras tierras, debido a la disposición de adaptabilidad a condiciones nuevas de trabajo y menor arraigo al miedo (Rodríguez y Busso, 2009).

En relación a la Población Económicamente Activa (PEA) del grupo total de estudiantes, el 78,2% de los ocupados tiene expectativas de migrar. Lo mismo ocurre en el caso de los desocupados (91,8%) y la población inactiva (90,1%). Esta situación puede presentarse debido a que la población estudiantil observa un mercado de trabajo nacional con una remuneración que no garantiza un sustento para mantener una vida y un ejercicio de la profesión digno, optando por irse al exterior y captar ingresos en divisas. Según Romero, Hernández y Bracho (2015), la pérdida del poder adquisitivo se ha venido acentuando por los altos índices inflacionarios, que han convertido en simbólicos los ingresos por actividad económica, sumergiendo a la población en una espiral de pobreza alarmante que ronda el 87% de acuerdo a Encovi (2017).

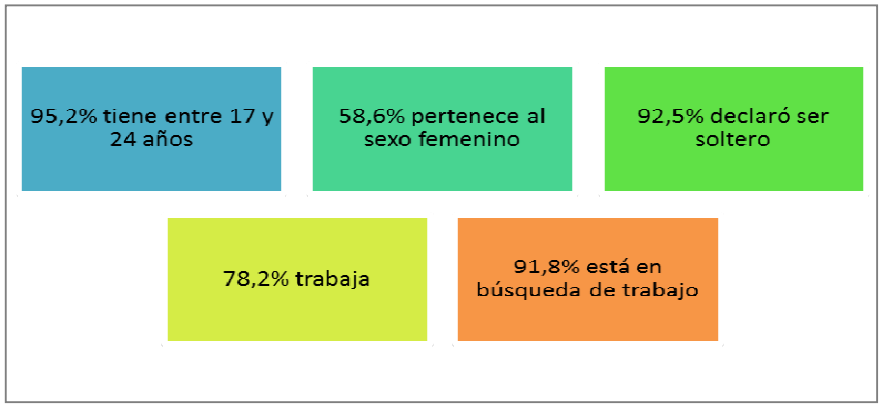

Gráfico 2 LUZ: Migración de estudiantes universitarios

Fuente: Elaboración propia a partir de la encuesta (2018).

Con respecto a los factores que están detrás de esta decisión de emigrar, los estudiantes en atención a un listado de problemas que integra necesidades básicas insatisfechas, problemas de seguridad, contrariedades en la universidad, en el sistema de salud, factores económicos generales, en el ámbito laboral y factores políticos; indicaron que los más significativos son la alimentación (41,9%) y realización personal (35,2%), seguido de los atracos (36,1%) y la violencia (25,9%), así como el deterioro de la infraestructura universitaria (42,5%) y la falta de personal en la casa de estudios de educación superior (33,90%).

Igualmente, se encuentran como factores determinantes la escasez de medicamentos (45,4%) y las malas condiciones de los centros de salud (32,8%); respectivamente los estudiantes destacaron la escasez de bienes y servicios (34,4%) y la inflación (37,4%). En cuanto a problemas en el ámbito laboral, sobresalen los bajos salarios (46,8%) y las pocas oportunidades de encontrar empleo (20, 4%). Por último, como factores políticos motivantes de la migración, los estudiantes seleccionaron la corrupción (44,6%) y el modelo político implementado (30,4%)

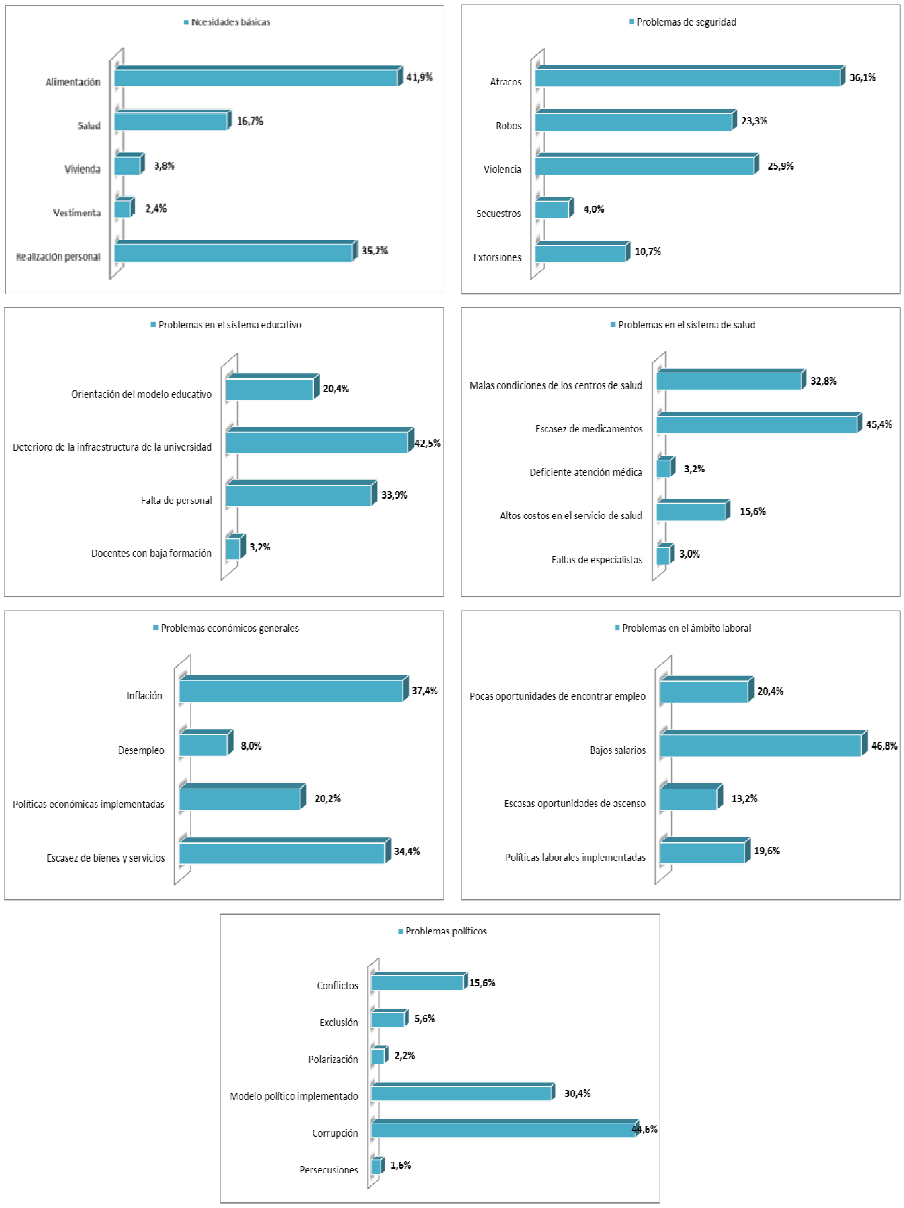

Gráfico 3 LUZ: Factores que promueven la migración de estudiantes universitarios

Fuente: Elaboración propia a partir de la encuesta (2018).

Todos estos factores son el reflejo de un panorama dramático para Venezuela, pues se está en presencia de una crisis generalizada en términos de alimentación, seguridad, salud, economía, educación, entre otros inconvenientes que hacen que los jóvenes universitarios busquen mayores oportunidades y mejores condiciones de vida en otros países.

¿Hacia Dónde Van Los Estudiantes Universitarios?

En atención al lugar de destino, los estudiantes prefieren establecerse en Chile (33,9%), que de acuerdo a ACNUR (2018) es un país que ha dispuesto de buena recepción para los migrantes, sin embargo, a mediados de abril de 2018, decretó algunas políticas para frenar el proceso migratorio de venezolanos, solicitando una visa para poder ingresar a este territorio.

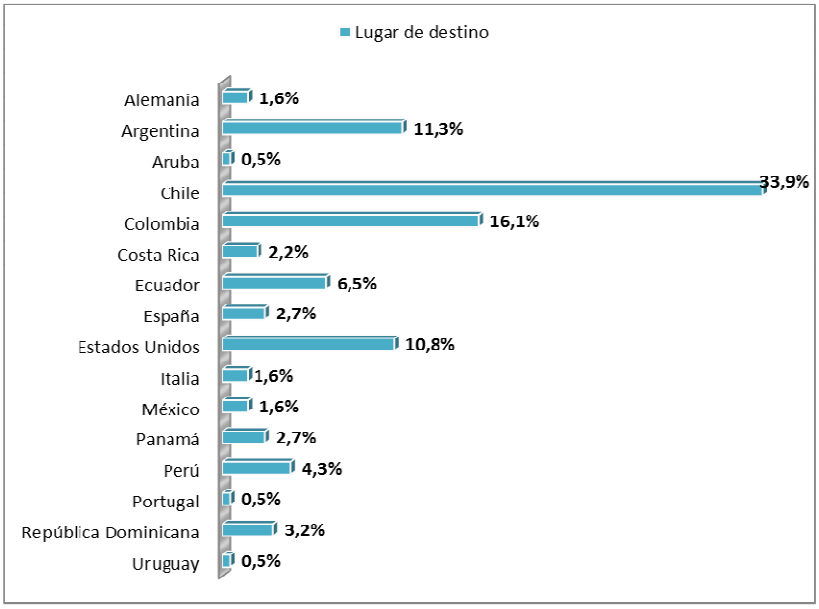

Gráfico 4 LUZ: Estudiantes universitarios según posible lugar de destino

Fuente: Elaboración propia a partir de la encuesta (2018).

Otro lugar de destino preferido por la población universitaria es Colombia (16,1%), país que ya cuenta con una gran cantidad de venezolanos; de hecho, un 30,4% de los estudiantes manifestó que sus familiares se encuentran radicados en esa nación, por lo que es más fácil establecer conexión y de acuerdo a su cercanía fronteriza, es un viaje que apenas tarda hora por carretera. También tienen previsto migrar a Argentina (11,3%), Estados Unidos (10,8%), entre otros países.

Por último, la encuesta evidencia que, de la población con propensión a migrar, el 61,8% consolidaría el proceso demográfico sin compañía alguna y el 38,2% está planificando viajar con la familia. Esta decisión de emigrar sin acompañamiento posiblemente se deba a los altos costos que demanda el fenómeno, además el grupo que predomina es joven y está libre de compromisos matrimoniales, condición que les permite asumir mayores riesgos y experimentar nuevas

experiencias. Situación que no ocurre con las personas de mayor edad, casadas y con familia, donde el miedo y otros factores se hacen presentes.

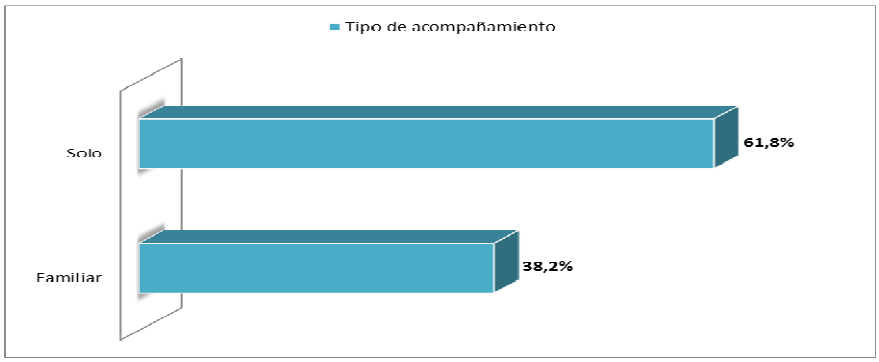

Gráfico 5 LUZ: Estudiantes universitarios con intenciones de migrar según tipo de acompañamiento

Fuente: Elaboración propia a partir de la encuesta (2018).

También ocurre que, al migrar sin compañía, pueden establecerse sin mayor responsabilidad, encontrar empleo, ahorrar y crear condiciones para recibir en el futuro al resto de la familia con mayor seguridad y estabilidad. Es importante mencionar, que autores como Freitez (2011), Muñoz (2016), Castillo y Reguant, (2017), De La Vega y Vargas (2017), Azócar (2018), entre otros, han insistido sobre un cambio de modelo político para Venezuela, ya que el proyecto político bolivariano encabezado por Hugo Chávez y continuado desde 2013 por Nicolás Maduro, ha fracasado, generando una diáspora incalculable. Sencillamente, ha recrudecido la situación del país hasta sumergirla en una espiral de crisis permanente, manifestada en la pauperización de los empleos o la falta de ellos, la carencia de productos básicos, la inflación, la delincuencia, decadencia de los sistemas de educación y salud y corrupción, entre otros problemas.

Conclusiones

Como aspectos concluyentes se tiene un número significativo de estudiantes universitarios jóvenes con intenciones de abandonar el país. Este grupo que ha declarado asumir este reto está representado de manera predominante por el sexo femenino, connotando un liderazgo de la mujer en este proceso demográfico que hipotéticamente se esperaría correspondiera a los hombres.

Igualmente, se evidencia que la gran parte de las personas que desea emigrar está compuesta por solteros, condición que les ofrece mayor facilidad para desplazarse. Y de acuerdo a la actividad que realizan en la actualidad, tanto la población activa como inactiva manifiestan la intención de salir de Venezuela. Por lo que se está en frente de una pérdida de capital humano en formación invalorable, que incidiría negativamente en el desarrollo del país.

Estas intenciones se derivan en esencia por problemas económicos, sociales y políticos concurrentes en el país, que no están permitiendo cubrir la mayoría de las necesidades de la pirámide de Maslow, primordiales para cualquier grupo humano; pues la alimentación, la realización personal, atracos, violencia generalizada, deterioro de la infraestructura universitaria y falta de personal en la casa de estudios, están siendo los factores trascendentales para la migración de estudiantes. A esto se suma la escasez de medicamentos, las malas condiciones de los centros de salud, la inflación, escasez de bienes y servicios, los bajos salarios y la corrupción.

Este panorama dramático con el que la población tiene que lidiar día a día, devela la falta de condiciones mínimas de vida, que violan los derechos humanos, que demanda la atención inmediata del gobierno y un cambio de políticas que mejoren las condiciones internas para contrarrestar la emigración.

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Human Resources and Intellectual Capital for A Company– Role, Goals, Perspectives

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Abstract

Sustainable development represents a process of continuous and permanent improvement, learning and perfecting and the introduction of sustainable development policies into a society or company guarantees the creation of sustainable (not only immediate) value and consequently long-term benefits. In the age of knowledge, each organization is constantly changing. The success of the organization depends on how the crises that occur during this period are managed. An important factor in managing these crises is the intellectual capital. During the process of assimilating the intellectual capital, a transformation of the individual's identity is also realized. Identity transformation is an important social process that employs dissonance, attributions and divides the role of expectations. In this paper we want to highlight the concept of intellectual capital, which is it role into organizations and societies and which are the benefits for institutional health.

Keywords: People, Intellectual Capital, Society, Sustainable Development

Introduction

In this moment the concept of sustainable development is widely used in almost all areas and it’s necessary to be applied in order to satisfy the basic material needs, in order to provide the resources for optimizing the quality of life in terms of health and education.

Sustainable development represents a complex process whose metrics involve a system of common indicators, but which also differs from country to country.

The human resource is considered to be the most important, the only one able to attract, combine and use the other resources necessary for a company, to achieve the proposed objectives.

Human capital has developed as a concept in the economy, where it is regarded in particular as "estimating a person's ability to generate income through work" (Di Bartolo, 1999).
The notion of intellectual capital appeared in the business world in the 1990s, and at the center is the information that gives rise to intellectual capital.

In the present paper, I aimed to describe what sustainable development means for a multinational automotive company in Romania, the city of Braila having the code CAEN 2931 Manufacture of electrical and electronic equipment for cars and for motor vehicles / section C where a significant number of people work where they come from both rural and urban areas and how the intellectual capital influences the health of the institution, but also of the society in which they live.

Material and Method

The AK model developed by Paul Romer and Sergio Rebelo studies the effects of accumulation of knowledge. The phenomenon considered endogenous is that, using new technologies, the economy accumulates experiences and knowledge which, in turn, favors the introduction of new technologies, generating growth.

Starting from the Cobb-Douglas formula, with neutral technical progress, the production function is written:

$Y(t)=K^{\alpha}(t)[A(t), L(t)]^{1-\alpha}$

Where:

K= capital;
L = work;
A = technical progress.
The model assumes that technical progress is the result of learning through practice, being a function of capital growth.

$A(t) = BB^{\emptyset}(t)$, B>0, Ø>0

Where:

B= coefficient of growth of K factor
The growth rate of the population is constant, the rate of economies is exogenous.
δ – depreciation of capital
And we have:
s(t) = I(t) and s(t) = sY(t) – saving rate;
K(t) = I(t) – δK(t) = capital rate;
For Ø = 1 și n = 0 – growth is self-sustaining
By substitutions, we obtain:

$Y(t) = K^{\alpha}(t)[BK^{\emptyset}(t)L(t)]^{1-\alpha}$

The engine of endogenous growth is the stock of technological knowledge. Technological knowledge and physical capital are the accumulating factor; The accumulation of knowledge is realized inside the company through the process of learning through practice: the more it is produced, the more the technological knowledge develops, which will allow to increase the efficiency of the production in the following periods for quantities of invariable factors of production.

The assessment of intellectual capital can be considered a good starting point for a more efficient management, in order to increase the competitiveness, but it can also provide a reporting tool.

For the multinational company with CAEN CODE 2931 Manufacture of electrical and electronic equipment for vehicles and for motor vehicles / C-section in the city of Brăila, the concept of intellectual

capital plays a very important role because, at the moment, it is focused on technology, each factory belonging to this company, not only from the city of Braila, but from all the countries where there are work points, it is equipped with the latest generation working / technological machines, which work on the basis of a software, in which the engineer introduces the information so that the operators can process the raw material from which the finished product results.

Finally, the finished product is sold to the customer, of course according to valid contracts in which prices and conditions are agreed by mutual agreement.

At present, everything related to the supply, production and sale of a product cannot be achieved without the help of the technology set up and directed by the person / employee.

The person / employee to be able and authorized to use the working machines correctly must first be trained. The more people trained in this regard, the better the production goes; in other words, the role of the intellectual capital is to ensure the health of the institution of which it is a part and for which it works and, of course, to ensure the sustainable development of the organization, later of the society.
As a statistic at the local factory level, we can say that:

- 40% of the employees are people who have completed high school and a college, which means they have a computer, technical knowledge and a foreign language.
- 60% being assigned to studies belonging to the vocational schools, but following the training offered by the factory where they work they are authorized to use the production equipment at a certain level and in different ways, depending on the locations where they were positioned.

As a result, over time it has been observed that many companies have higher incomes because they have employees with higher intellectual capital, which is why more and more companies, both large and small, want to recruit in their own personal team with a high level of qualification and education, which can respond to the future demands and requirements of the economy and society.

Critical success factor for all types of organizations intellectual capital, is based, first of all, the evolution of education and studies.

It is the ability of employees to innovate in thousands of ways to improve the efficiency of a factory. It is the electronic network that carries information at light speed through a company, so that the answer is faster and faster than the rivals. It is the collaboration between a company. and its clients, their strong connection, which brings the client back again and again. It is the power of the collective mind.

The importance of investing in intellectual capital is the first step towards economic stability, even in these times of economic crisis.

The intellectual capital, through its forms, determines the performance of the organization, and the relationship between the intellectual capital and the performance of the organization leads to the establishment of a new trajectory in the evolution of the career, based on the acquisition of a portfolio as complete as possible. The evolution of the professional career must be part of a knowledge map within the organization. This map is very valuable for the organization, because it includes the knowledge networks that are created between the employees, as well as the way in which they are organized around the production.
In the current economy, more and more managers are fighting to effects of the financial crisis, trying to find all kinds of solutions to increase the value of the company, and the importance of intellectual capital and its components are very important and even vital for some companies. This new era of technologies, new inventions and innovation has a great impact on the strategies, objectives and goals of many

companies, which is why many researchers in the economic field regard intellectual capital as a sure source of growth in business value.

Most of the times, intellectual capital is considered a hidden wealth of companies, which, despite not being presented in its financial statements, offers an added value for the company. In today's economy, intellectual capital seems to be one of the safest things to prevent the effects of the current economic crisis, but also for the sustainable development of the economic entity. For this reason, more and more companies tend to invest more and more in intellectual capital, because they represent the engine of successful business.

Results and Discussions

Sustainable development has also a profound impact on many businesses, their operations and their supply chains.

The complex and interdependent nature of environmental problems will cause businesses to go beyond simply complying with environmental regulations to develop innovative responses to environmental challenges.

Companies that act according to the principles of sustainable development often obtain high performances (even in the short and medium term) compared to the other companies due to a better control of the different categories of risks to which they are exposed.

In the global civilization, the new economies that are based on innovations have as a priority the technological development that leads to a high level of competitiveness and to human development and the proven fact is that technological progress is essential for human progress.

Digital innovations open up new perspectives and "break the boundaries" of how people can use technologies to expand knowledge, stimulating growth and development.

New technologies are diffused, both between different countries and within them.
A rational starting point in examining the notion of intellectual capital is the analysis of the organization made from the perspective of resources. Viewed from this perspective, any organization or firm presents itself as a system consisting of a set of resources mobilized within a given structure.

Technological innovations can improve human potential and abilities, in other words they are a source of ensuring human development.

The financial advantages for companies obtained from investing in people, mainly in their education and training, are already proven and known. This investment has a high rate of recovery, respectively benefits in the form of increased labor productivity, professional skills development, innovation capacity, increased mobility of workers. However, many organizations still see employee education and training programs as a cost and not as an investment.

To clearly define the concept of intellectual capital, the following statements are defining:

- intellectual capital is the sum of all the people in an organization know, giving it competitive advantages on the market;
- intellectual capital is recognized as a value in most organizations, but also the key to the success of that organization
- Intellectual capital represents the intellectual material that has been formalized, captured and valued to produce even more valuable assets. He is given by those knowledge that can be transformed into values.

The most important factors for sustainable development within an organization or company are: structural capital and human capital.

Structural capital refers to ownership of information systems, distribution networks, supply chains.

Human capital, which includes human resources, as well as customers and suppliers - is made up of educational capital (skills acquired by individuals in the school education process, but also outside it) and biological capital (physical abilities of individuals, most often synthesized by the state of health).

Types of indicators used to measure intellectual capital:

- Leadership;
- Motivation;
- The ability to execute delegated tasks;
- Networking;
- Number of Employees;
- Age in the company;
- Stability in the position;
- Number of managers;
- Number of women managers;
- Percentage of managers with higher education;
- Average age of employees;
- Average duration of training programs (hours / employee);
- The average cost of training programs (hours / employee);
- IT knowledge.

Conclusions

In order to realize the potential of some businesses, it is very important to attract and retain the right combination of people who have collective expertise and have access to information networks. All the more so given the rapidity of many of the technological advances and the potential profits for private sector organizations, which exploit the first new market opportunities.

In the age of knowledge, each organization is constantly changing. The success of the organization depends on how the crises that occur during this period are managed. An important factor in managing these crises is the intellectual capital. During the process of assimilating the intellectual capital, a transformation of the individual's identity is also realized. Identity transformation is an important social process that employs dissonance, attributions and divides the role of expectations.

It is very important to understand the true value of intellectual capital and to invest in it, because it provides companies with a much greater well-being than similar companies, but they do not invest in this type of resource. The current economy is based on these ways of developing the company, because they are reliable methods not only to keep the company afloat but even to develop it.

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Smart Predictive Maintenance Using Industry 4.0 Principles: An Analysis in A Manufacturing Industry

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Abstract

This work describes a case study carried out in a manufacturing company that intends to apply some concepts of Industry 4.0 in a maintenance pilot machine. To achieve this, maintenance machine problems were analyzed, and afterward, an action plan was proposed to start adopting predictive maintenance with the help of sensors connected to an information system. Thus, a new way of working was achieved, creating a smarter and more competitive maintenance field with the application of Industry 4.0, which in turn, represents more value to the company.

Keywords: Industry 4.0; Predictive Maintenance; Sensors; Integrated Information System.

Introduction

Globalization contributes to attending the growing world's demand for capital and consumer goods — ensuring, at the same time, a sustainable evolution in different fields.

Market requirements such as efficiency, flexibility, adaptability, stability, and sustainability are increasing. This fact justifies the need for companies to adopt new approaches supported by Information and Communication Technologies (ICTs) to deal with such challenges. Today, ICTs have an important role in the context of organizations, generally used to create and define new business models (Brettel, Friederichsen, Keller, & Rosenberg, 2014). However, while some organizational fields have been taking advantage of the integration of ICTs for a long time, the maintenance field has only recently started to use ICTs to automate their processes. Maintenance planning is an important management activity in making production more efficient, increasing the availability of equipment and, consequently, improving product quality (Upasani, Bakshi, Pandhare, & Lad, 2017). For that, correct information at the right place and time is a critical factor in supporting decision-making and promoting new opportunities in the maintenance field (Kans & Ingwald, 2016). In this context, new models related to maintenance activities in companies are emerging, to ensure the success of operations and reduction of costs. Although several types of maintenance can be applied, the literature suggests that condition-based maintenance (predictive maintenance) is one of the best for reducing costs and eliminating production stops. It should be noted that this type of maintenance could be improved through the use of smart technologies (Ferreiro, Konde, Fernández, & Prado, 2016).

Additionally, and considering the current technological context, some studies in the literature already indicate that predictive maintenance will be predominant in the industry's future — where machines will be connected, resembling a collaborative community. However, this situation requires the use of advanced prediction tools. This is so that data can be systematically processed into information, which explains uncertainties and supports more informed decisions (Lee, Kao, & Yang, 2014).

This paper describes part of a work carried out in an industrial company that intends to increase the availability of machines (press), and at the same time reduce maintenance costs. To improve the maintenance press process, reduce costs and generate a higher availability, it is necessary to: (i) gather and organize information; (ii) analyze more common problems; (iii) discover what type of solutions can solve said problems; and (iv) plan the implementation of the solution.

The remaining content of this paper is organized as follows: a brief theoretical background of the topics addressed in this work is provided in section 2; namely, maintenance, industry 4.0 (I4.0) and their possible connection. Section 3 presents the practical case, specifically a preliminary study to implement smart predictive maintenance. Finally, some conclusions about the study and proposals for future work are presented in section 4.

Theoretical Background

Concept and types of maintenance Subjects or Participants

Maintenance is the set of all activities that are applied to restore machines to the specified condition of operation or to prevent the machine from breaking down, for them to remain in a functional state (Pintelon & Gelders, 1992). It represents a critical shop floor activity since it guarantees good performance of the production process and the final product's quality (Sipsas, Alexopoulos, Xanthakis, & Chryssolouris, 2016).

Depending on the circumstances and characteristics of each industry, different maintenance processes can be used. However, there is no consensus among the different authors regarding the classification of maintenance types. Due to the divergence of classifications, the one used by the European standard will be considered in this work (NP EN 13306, 2007). According to the European norm, maintenance can be curative or preventive. Preventive maintenance can still be further divided into systematic maintenance or conditional maintenance (or predictive maintenance). Table 1 compiles the main characteristics of these three types of maintenance.

Table 1: Types of maintenances and their main characteristics (Blischke & Murthy, 2003) (Hashemian, 2011).

Type	Curative	Systematic preventive	Conditional preventive (Predictive)
Characterization	An **unplanned** maintenance executed when a malfunction occurs or when equipment performs below expected performance indexes	A **planned** maintenance that consists of actions to increase the functional life of equipment or a system and tries to prevent its failure Maintenance without any previous control of the state of the equipment, assuming that it fails in a relatively predictable way	A **planned** maintenance that consists of actions to increase the functional life of equipment or a system and also tries to prevent its failure; however, in this case it is performed according to the condition of the equipment

Costs	There is a reduced continuous and unnecessary maintenance cost. However, when a component eventually fails, it can damage other system components or the entire machine, which can make it more expensive	Usually history-based, which is not the most adequate. Consequently, preventive maintenance is sometimes carried out more often than necessary, which entails unnecessary high maintenance costs	Costs are better adjusted to the needs of the equipment – better investment
Advantages	Does not require previous work or money, because it only acts upon a machine's failure	Works to prevent problems in advanced	Uses objective evidence of a fault or failure condition, in order to reduce costs, minimize the risk of catastrophic failures and maximize system availability
Disadvantages	Sometimes implies having long and unexpected downtimes, which can affect production — big risk	Sometimes leads to unnecessary wastes of money	Requires an integrated, real time or online approach to data collection, analysis and interpretation, using wireless sensors and analysis in order to work in an effective manner

Industry 4.0 and its main technological components

Currently, in industrialized countries, the demand for industrial value creation and development is shaped by the development of the fourth phase of industrialization, called Industry 4.0 (Stock & Seliger, 2016).

The first three industrial revolutions were the result of mechanization and electricity, as well as computers and automation, with I4.0 being the result of cyber-physical systems (CPS) (Lukac, 2015).

Industry 4.0 is a name given to the current trend of automation and data exchange in the manufacturing environment, which includes different technological components, such as cyber-physical systems (CPS), Internet of Things (IoT), cloud computing, big data analytics, and cognitive computing, among others.

I4.0 is characterized by digitalization process, enabling automation and data exchange between different systems without human intervention (Vijaykumar, Saravanakumar, & Balamurugan, 2015) (Wan et al., 2016) (Obitko, V., & Jirkovský, 2015) (Lu, 2017) (Gruber, 2013). I4.0 contemplates a new era of intelligence, with a decentralized production, focused on continuous communication between people, machines, and products (Albers, Gladysz, Pinner, Butenko, & Stürmlinger, 2016).

IoT notably represents a key technological component in I4.0, since it uses equipment with sensing and identification processes, along with communication and network capabilities (Xu, He, & Li, 2014); connecting humans and machines and integrating knowledge between and within organizations (Thames & Schaefer, 2016).

Microprocessors and artificial intelligence technology transformed machines, making them intelligent in the sense that they not only have the ability to compute, communicate and control, but also have autonomy and can connect with others (Wang, Wan, Li, & Zhang, 2016).

Many other important technologies are at the core of the infrastructure required for IoT, which includes sensors, circuits, actuators, controllers and Radio Frequency Identification (RFID). For example, RFID consists of a method of automatic identification through radio signals, retrieving and storing data remotely (Trappey, Trappey, Hareesh, Chuang, & Sun, 2016). The use of sensors in data collection will play a decisive role in developing industrial services, with particular relevance in the maintenance field (Albers et al., 2016).

The cloud is another important technological key solution for I4.0, in so far as it allows for a great storage capacity when gathering large amounts of data, enabling advanced analyses. Cloud computing technologies allow organizations to collect and analyze a large amount of data using sensors, converting data into useful information. It is also helping companies improve customer relationships, track tools, deliver products faster, and reduce costs (Yang, Shen, & Wang, 2016).

Other important technological components for I4.0 are related to big data analytics and data mining, which applies intelligent techniques to extract data patterns, helping to plan better, following real previous data and their interceptions (Bubeník & Horák, 2014). The overall goal of the data mining process is to extract information from a data set and transform it into an understandable structure for further use. Two factors that may emerge from the use of data mining are productivity and transparency since with the support of the big data analysis and the subsequent advantages in coordination, there is work optimization of the machines and resources — generally, resulting in optimized processes and productivity growth (Wang et al., 2016).

With the automation of some operations, there is also a reduction in the daily tasks that workers need to do. On the other hand, the support of big data for analysis, software with efficient tools and more friendly interfaces, allows for an easy way to run diagnostics and correct maintenance (Wang et al., 2016).

For all this be possible, intelligent hardware and software are needed, including ways to control intelligent machine parts, large data analysis software, and embedded information systems (Wang et al., 2016).

Industry 4.0 In Preventive Maintenance

Nowadays, industrial maintenance will also be a revolutionary area. Data and information in the right place at the right time are critical factors for new management, with new opportunities available in the maintenance field (Kans & Ingwald, 2016).

Efficient preventive maintenance is important to ensure the reliability of the systems, helping in reducing unplanned downtime and avoiding defects (Hashemian, 2011).

In the practices, maintenance is usually done less often than necessary, which makes it ineffective and several breakdowns continue to occur, i.e., unplanned breaks (Upasani et al., 2017). Because of this, failures and long periods of inactivity happen, resulting in large repair costs, misuse of resources, production delays, and operating costs.

The use of proper technologies makes the existence of smarter systems possible, which makes the anticipation of problems and more intelligent production processes possible (Kans & Ingwald, 2016).

It is important to mention that Industry 4.0's principles are characterized by providing different individual assets with intelligence, which can always evolve into a more intelligent operation, through the application of sensors. Researchers are working on ways to make the most intelligent assets, in the case of maintenance, for example, monitoring the conditions, forecast, and diagnostics, as well as artificial intelligence, to obtain more information about the components and therefore allowing a more precise maintenance plan (Upasani et al., 2017).

Other important components in reaching smart preventive maintenance are Information Systems (IS). Smart preventive maintenance includes the concept of electronic maintenance, to optimize the maintenance in a process that involves data acquisition, data processing, and decisions based on the resulting information.

Several types of IS allow to centralize and collect data from different physical resources connected, making information available to different users in terminals such as PCs, tablets or mobile phones (Pintzos, Rentzos, Papakostas, & Chryssolouris, 2014).

Practical Case: A Study to Implement Smart Predictive Maintenance

Objectives and problem contextualization

The present project is related to a maintenance plan of a critical machine, integrated into a manufacturing company. Maintenance represents a high cost for the company, and additionally, the machine chosen for the pilot study (press machine) has a very important function, since it produces many different essential components that integrate into the final product marketed by the company. Thus, the main goal of this project is to plan a proper maintenance strategy for this machine to (i) reduce maintenance costs and (ii) increase availability of the work, avoiding delays in planned production.

The company was working with curative and preventive maintenance. So, there was no maintenance based on the real condition of the machine, i.e., predictive maintenance.

Therefore, to reduce the cost of maintenance for these critical machines, while reducing unexpected breaks, and production and financial impacts, a project was created to analyze and perceive the causes and how to solve them in a better way. Work was organized into four steps: (i) get information related with maintenance occurrences and costs; (ii) analyze the most common problems and their impact on the company; (iii) present the best solution to solve the identified problems; and finally, (iv) define how the solution could be implemented.

Problem Analysis

To understand the reasons behind higher costs, the kind of maintenance that was applied and how to improve it in an intelligent way, it is important to know the most common reasons why the machine stopped. As such, the first step was to analyze every cost and maintenance report in the last years, to know which parts of the machine encounters problems more regularly and which problems required a higher cost and time to solve.

After analyzing the information (figures 1 and 2), it became evident that most of the problems and costs came from issues with one specific component of the press machine – the press tools. Of all the machine's parts, press tools are the most crucial, because they are what shapes the material and pieces cannot be made without them. It is also an expensive component.

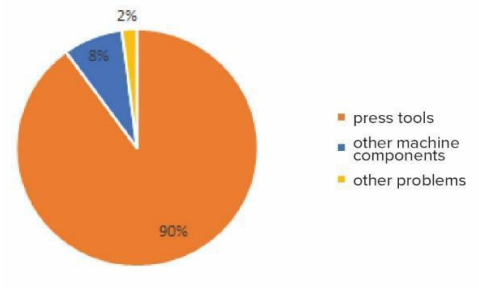

Fig. 1: Costs distribution of maintenance

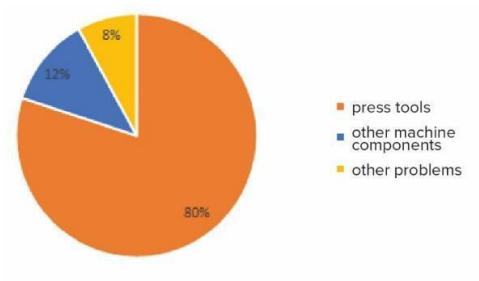

Fig. 2: Time distribution of maintenance

Additionally, the OEE (Overall Equipment Efficiency) report was consulted. OEE is an indicator of the overall equipment's efficiency, which takes into account the availability, efficiency, and quality of the machine. Therefore, it is useful for companies to have knowledge of the effective work of their machines and where the greatest losses of efficiency come from. In this case, using the OEE reports, it was concluded that 5% of OEE losses are related to press tools maintenance; therefore, improving the maintenance of the press tools can improve the OEE as well.

The second step of the analysis was in understanding what type of maintenance had been applied and the most common causes of press tool damage.

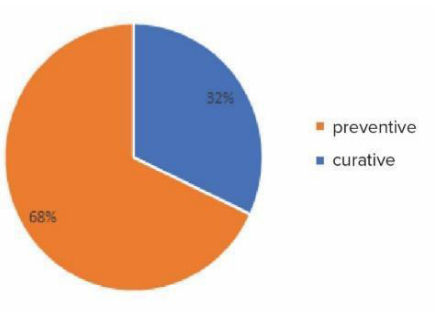

Fig. 3: Time/ Type of maintenance

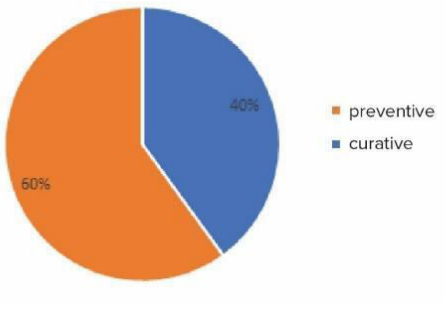

Fig. 4: Costs/Type of maintenance

Figures 3 and 4 depict the analysis of the most used maintenance types, in terms of cost and time consumed, when it comes to the maintenance of the most critical machines, i.e., press tool. Both factors (time and cost) indicate that in the majority of cases, the press tool has more curative maintenance than preventive maintenance. It is important to point out that this solution is not beneficial to the company, because when curative maintenance is more dominant, it means that the company has less control over the process, leading to more breakdowns and consequently to unplanned production stops.

A good maintenance plan should work to avoid the problems more than to solve them, i.e., more preventive maintenance than curative ones. It will reduce unplanned downtimes and the costs of solving a machine's problems later on, which are often more expensive or even result in the purchase of a new tool.

To determine the problems and complete the information, a more in-depth data collection was carried out. Data was gathered through both systems and paper reports. Data on all types of maintenance and damages for this press tool machine was collected and several meetings with maintenance technicians and press machine operators were done. As a result, a list of the most common root problems was

identified: burr, waste material/scrap; bad cuts in the separations of pieces; a broken part of the press tool, and mistake or delay in a change process of a press tool.

It became evident that all problems were the result of a lack of adequate maintenance since it could all be avoided with a more periodic intervention (periodic preventive maintenance) and ideally, the effective work of the press tools would be taken into consideration; which required a more efficient and evolved maintenance – such as predictive maintenance.

Proposed Solution: Plan smart predictive maintenance using the I4.0 concept.

The preventive maintenance carried out by the company was developed based on the machine's problem history. How much time it took for the tool to have problems was taken into consideration and actions were planned to avoid such an outcome. Despite this type of maintenance being better than a curative one, it is important to consider the real effort and effective wear, to predict the problems more efficiently and in real-time. As such, the next step was having a way to predict the right time to do maintenance and how it would work daily; considering the wear of the press tools, this prediction would probably be based on the number of strokes. Doing maintenance based on this makes it possible to measure the effective work in real-time and not just based on past events, which allows for the use of such knowledge when determining what to do and the most common type of problems. With this, it is possible to adjust the maintenance to what is necessary, instead of dealing with defects and excesses, leading to more effective and optimized performance and reducing downtime and unnecessary costs.

This makes it possible to lubricate, arrange or replace the necessary components of the press tools and clean accumulated scrap or burr, promptly; which, as previously mentioned, was a significant source of the problems.

For this to happen reasonably, it is essential to use two technological supports: (i) sensors to count the number of strokes, and (ii) an information system to support the information flow, for example, an enterprise information system (ERP) to collect data and notify the maintenance team in real-time.

Number of strokes through sensors in the predictive maintenance applying I4.0 concept

Regarding the change in the maintenance method, threshold values must be defined and each time the required number of strokes for maintenance (on average) is met, the system will notify the maintenance team.

Initially, to define the number of strokes needed to perform maintenance it was considering the historical maintenance. Over time the number of stokes will be adjusted. For example, if a module needs monthly maintenance, and it is known that, for that module, 15000 strokes occur on average within a month, this will be the number of strokes needed to perform the predictive maintenance. Over time, as knowledge increases, the number of strokes required to perform maintenance will be continuously adjusted and improved upon (see Figure 5).

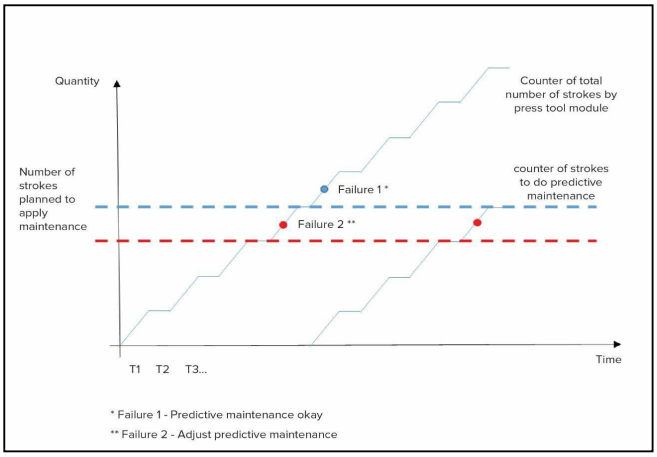

Fig. 5: The continuous process of stroke number adjustment.

Information system to support the information flow in the predictive maintenance applying I4.0 concept

Practically speaking, each press tool will be identified and sensors will count the number of strokes for each. The data captured by the sensors will be used for: (i) counting the number of press tool strokes/process reference, which will be used when defining the threshold (for example, every 15000 strokes triggers a notification to the maintenance team, then restarts the count); and, (ii) counting the number of strokes/process reference during the lifetime of press tool (relevant information to be analyzed later).

To implement a smart predictive maintenance solution, it is necessary to consider an information system that receives the data from the sensors and sends notifications to the maintenance team when the programmed threshold is reached. Additionally, the IS should allow for the visualization of the relevant information at any time and by any authorized user.

It should be mentioned that this type of solution for predictive maintenance, makes it possible to collect certain information that, because of its nature, is often not perceived or not easily accessible to operators.

Additionally, the integration of a mobile solution in the system can improve the working process. In this project, a mobility solution was planned, focusing on the needs of the maintenance technicians to work on the shop floor. It enables the maintenance technicians to receive notifications at any time or place within the company and also to have access to all the information they need about the equipment; for example, the planned maintenance actions for each press tool or to automatically request the material for a maintenance intervention. With this additional feature, it is expected that maintenance will further improve productivity and efficiency while reducing the loss of time when consulting information systems and notifications.

With the system and the installation of sensors connected to an information system, maintenance smartly advances in a revolutionary way (I4.0) and becomes a more productive and valuable field.

Conclusions and future work

Predictive maintenance increases the gains and new challenges, insofar as it contributes to the reduction of costs and production stops. This fact motivates a maintenance expert to investigate new ways to carry out the maintenance process and make use of opportunities related to ICTs that could not be exploited before.

This work presented a study that was performed to implement better preventive maintenance – predictive maintenance – on a specific press machine, to reduce the downtime for repairs, and consequently the maintenance costs. For this, and to guarantee the information about the state of the machine in real-time, the study considered the application of a smarter way of working with predictive maintenance, using I4.0's principles, more specifically sensors connected with a proper information system.

The study about the implementation process defined for this press machine can be replicated in any other type of machine, changing the type of information that needs to be controlled for maintenance (this case being the number of strokes), representing thus one possible future work. In the future, it would also be interesting to extend the present process of analysis to include other relevant parameters that help to verify the state of the press machine. However, this extension can lead to another interesting area of knowledge – data mining –, which applies techniques to discover useful relationships between data; representing an important technological component for the growth of I4.0's solutions.

Acknowledgment

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Management and Quality Control of Grain Seed. Research on The Influence of Storage Conditions

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Abstract

The efficiency of the control of harmful organisms of the batch of grain cereal seeds is an essential component in the effort to maintain unaltered the quality of the stored seed lots, in terms of physical integrity, especially their longevity, by maintaining germination indices at the optimum level, for as long as possible. The primary purpose of the research was to identify and describe the specific pests and their grouping, depending on the specific types of attack, as well as estimating potential damage in the event of an uncontrolled attack. The second component of the research was to monitor the possible ways of infestation with the identified harmful organisms of storage as well as the specific way in which they can be controlled so as not to produce irreversible damage to the consignments of stored grain cereal seed. The paper proposes concrete control schemes that harmoniously combine physicochemical methods and biological methods to prevent and combat pest infestation during storage. Modern theories of protection against harmful organisms are based on the economic threshold of harm (PED), which can be defined by the level of losses caused by the harmful organisms, the cost / benefit ratio and the expenditure of resources for protection actions.

Keywords: Harmful Organisms, Seed Lots, Integrated Control, Storage, Physical Methods.

Jel Code: Q1, L1, L66

Introduction

The seasonal character of the vegetable agricultural production requires its preservation / conservation for a variable period of time, depending on the needs of the consumption requirements.

Wheat production is an important factor in ensuring Romania's food security. Wheat cultivation is a very old practice in Romania. Research conducted by Stanciu (2017) showed that wheat production obtained in the last period of Romanian agriculture was not directly influenced by the government's

investments in irrigation systems or by the additional quantities of chemical fertilizers. Government and private measures could increase the volume of wheat production, and Romania could be a major exporter worldwide.

Bacanu (Serban) et. al, (2018) analysed of the agricultural area allocated to wheat and the seed production in Romania, Braila County. Using the data of the Territorial Inspectorate for the Quality of Seeds, the main wheat seeds used by the Braila farmers were presented and described. The results of the study showed that the most common varieties of wheat seeds in the agriculture of Braila County are indigenous, better suited to the local conditions of cultivation, to high temperatures and to a lower level of rainfall, which are in fact cultivated on the widest agricultural areas.

Seed conservation has as its main objective the prevention of possible quantitative and qualitative losses by maintaining and / or improving the specific physiological and cultivation characteristics (Ion, 2010). The study proposed by Stanciu (2017) analysed the concentration of investments in storage facilities in Romania, using the Gini Struck index. The results showed that there has been significant progress at national level in terms of seed storage capacity. However, in Romania the storage facilities are characterized by a low technological level and by the prevalence of the chop type installations, which do not offer good storage conditions, quantitative and qualitative losses for the local farmers and the premature sale of the production.

Regardless of the proposed objectives, the seed conservation technology is based on the fact that the seed is a living organism whose basic vital functions are not completely interrupted in the hemibiosis state (Bâlteanu, 2003). One of the coordinates of the judicious management of the quantitative and qualitative losses during the storage of the seeds intended for consumption/sowing is their defence by the effect of the harmful organisms specific to the storage. The harmful organisms specific to the storage of seeds of straw grains are constituted mainly by insects and rodents. Most species of insect pests belong to the group of beetles, like wheat mackerel (*Sitophilus granarius*), rice mackerel (*Sitophilus oryzae*), Surinam beetle (*Oryzaephilus surinamensis*), Mauritanian beetle (*Tenebrioides mauritanusus latilusus, latilusophilus*) etc, or lepidoptera: cereal moth (*Sitrotoga cerealella*), wheat moth (*Nemapogon granellus*) or dried fruit moth (*Plodia interpunctella*). Major problems, during storage can be generated by rodents: the gray rat (*Rattus norvegicus*), the black rat (*Rattus rattus*) and the common mouse (*Mus musculus*).

In order to prevent the attack of these harmful organisms, a series of preventive measures are required, which aim to prevent the pests from entering the storage spaces, as well as curative measures aimed at the rigorous control of the potentially harmful organisms, applied according to the treatment approved by the National Phytosanitary Authority (Ministry of Agriculture and Rural Development MARD, 2018).

Materials and Methods

The experimental part of the work was carried out within the Agrosem Tecuci Complex, whose warehouses are exclusively intended for the storage and keeping of seeds for sowing, from most agricultural and horticultural species, for the storage of wheat seeds, respectively, within the operator SC Păunul AN SNC SA, specialized for the storage and keeping of barley seeds.

Given the fact that the two mentioned deposits are authorized by State Institute for Testing and Registration of Varieties, Regional Centre Galați (ITCSMS) for the activity of processing and marketing of seeds, within them, only the certified seeds, produced by authorized economic operators for the production of the seeds, have a minimum degree of infestation with organisms. harmful, the integrated control of the harmful organisms being realized by preventive - curative methods approved by NPA, for the disinsection of the spaces of storage of seeds using an approved product, combined with the preventive treatments, respectively, with the technique of lowering the temperature of storage to the maximum 5ºC, in order to minimize the propagation rate of pests, which gave remarkable results.

The laboratory part of the work was carried out within the ITCSMS Galați laboratory, accredited for sampling the seed lots and carrying out quality tests specific to the official certification of seeds and planting material.

Post-harvest technological flow – storage

The access of seeds to the storage areas (temporary or permanent) authorized by the official territorial authorities is allowed when it has a guaranteed provenance, and once entered the deposit the seed goes through a minimal flow, which must start with the quantitative and qualitative reception of the seeds, after that the seed is managed in the appropriate space for temporary storage, depending on the species, variety, category and provenance (MARD, 2018).

Source: Author, personal contributions

Fig. 1: Deposits of seeds packed in Galati county

In accordance with the provisions of the regulations specific to the seeds, the storage of seeds for straw grains for sowing is applicable to the seeds, which come from a crop that has been the subject of official control in the field and has been declared admitted, by the inspectors of the official authority, on the basis of the document of field inspection, with the decision "permitted seed culture" (MARD, 2010). At harvest, the seed mass is not homogeneous but contains, along with the seeds of the base species, a series of impurities formed from seeds of other crop plants, weed seeds, residues of the basic crop (grain fragments), microorganisms (bacteria, fungi) on the surface of the seeds, in shells or inside the seeds, live insects, plant residues (fragments of stems, leaves, inflorescences), mineral impurities (soil, sand, dust, etc.). The seed mass is formed, mostly, from living organisms (seeds and microorganisms), having a vital activity of greater or lesser intensity, depending on the conditions of storage ensured, which interact both with each other and with the environment, with which they are in - an unstable ecological balance, the characteristics of the seed mass constituting the result of the specific properties of its components. Given that the vast majority of harmful organisms are transmitted through seed and soil, and through their action can cause serious damage, sometimes even by compromising the culture, complex prevention and control measures are required, starting with the proper preparation of storage spaces. The choice of seed storage systems for grain crops depends on the state of the crop, the climatic conditions, the duration for which it is necessary to maintain the viability and vigour of the seeds, humidity, their value, being able to opt for: keeping the seeds in different ways: dry state, cool state, or in a state of no air with the help chemical substances.

Fig. 2: Warehouse for cereals and seed Galati County
Source: Author, own contributions

These systems that can be approached singly or can be combined, depending on the objective proposed, the handiest example being the one in which the seeds are kept in the dry state. The quality of a crop, as well as of other products obtained from the processing, crucially depends on maintaining optimum humidity and air temperature, being absolutely necessary, a regulation of the humidity of the seeds and the temperature of the air in the warehouses, because according to these indices the duration of seed retention also varies.

The germination capacity of cereal seeds can be maintained throughout the year only in cases where the seed moisture has not exceeded 13-14%. Permanent monitoring of the evolution of the temperature and humidity of the seed mass, the appearance of the odour of mould and possibly the pests, represents an essential constant of the overgrowth of the seed lots, the results of the determinations being recorded in the record of the respective seed lot. Analysis were made in laboratory of

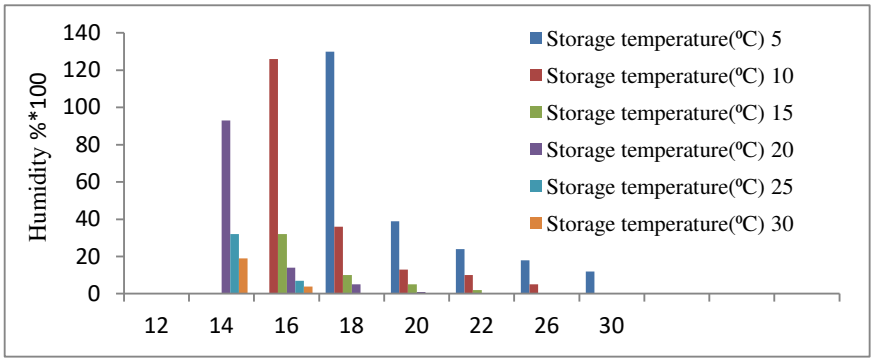

Fig. 3: Humidity variation depending on the storage temperature
Source. Authors based on ITCSMS, 2019

Comparing the data from two successive observations gives an image of the evolution of the conditions in the seed mass, which, correlated with that of the temperature of the storage air, allows suitable measurements to be done.

Storage conditions for cereals depending on the type of deposit - cereal storage is performed frequently with individual silos with a capacity ranging from 10 to 200 tons, equipped with loading and unloading equipment. A silo count has an underside, which allows the air to circulate freely. Preservation of cereals during the early days imposes an active aeration system, adapted to the characteristics of the respective storage area, composed of channels located at the floor level. Deposited in bulk constructions vertically or horizontally, the cereals are arranged in a layer dependent on the

humidity. Deposits with active aeration allow the formation of a layer of 2.5 m thickness for a humidity of 14-15%, as long as the spaces are provided with special installations, a thickness of 1.5 m is allowed. **Keeping seeds in the dry state** - drying the seeds up to a humidity, below the critical one and keeping them, in the usual conditions of the environment, packed or unpackaged, in spaces that provide maximum protection against changes in humidity, temperature and other factors that prevents the deterioration of their physiological qualities (Agrimedia, 2012).

The vast majority of registered economic operators for seed production, processing and marketing, use this system with good results. The system does not require warehouses or silos with special installations, does not require supervision that is very attentive or expensive maintenance works and allows the packaging and storage of seeds in packages of different types and sizes. Even when stored for 2-3 years, the seeds of most species maintain their physiological properties at optimal values, except for those with a higher fat content.

Cool seed storage - This is the method that can be considered as an alternative to dry storage systems, which responds best to the pest control requirements. The seeds have a temperature-dependent activity rate and the lower it is below the optimum level for each species, the slower the rate until, at certain negative temperatures, some species (harmful organisms, microorganisms) die. The seeds slow down their life cycle, especially the respiration process, so that at 0-5^{0}C temperatures its effects become of no importance for storage (Ion, 2010). The seeds of dry straw grains can be cooled without affecting their germination, but if their moisture is high, the negative temperatures cause them to lose their germination, the process being influenced by the humidity and the degree of maturity of the seeds, by the temperature at which they are cooled, by the rate of decrease of the temperature, by the duration of maintaining at the respective temperature, by the temperature alternations, etc. In practice, keeping seeds at exaggerated negative temperatures is useless and, if made artificially, it is uneconomical both during the production phase and subsequently, during maintaining the temperature because at removing dry seeds from cold storage tanks wetting them should be avoided, through the condensation that can take place in a humid and warm atmosphere, thus being necessary, the thermal accommodation of the seeds, in a warm and dry space, in tight containers, or their energetic ventilation.

Harmful Organisms Specific to Storage of Seed Lots of Straw Grains. General Context

After the technological conditioning process has been carried out, the raw materials collected in warehouses or silos can be:

- Contaminated with mold:
- Field mold, own mold, which contaminates cereals before harvesting *(Altenaria, Fusarium, Clodosporium);*
- Storage mold, which develops in storage spaces *(Aspergillius, Penicillium, Rhizopus);*
- Mold originated during the alteration process *(Populospora, Sardinia, Fusa-rium graminaruum).*
- Infestated with adults and larvae of beetles *(Tenebrioides mauritanicus L., Cryptolestes sp.),* or other insects *(Tenebrioides mauritanicus, Cryptolestes ferrugineus, Ephestia elutella, acarieni).*

In these infestations, the seeds can have the germ destroyed, although the percentage of direct weight loss is very low. Some pests feed only on the endosperm, others attack only the embryo, and the third category attacks all the anatomical parts of the cereal seeds (Jadaneant, Pop and Calin, 2008). Periodic control of the stored products is necessary, as there is a permanent danger of infestation with the most frequent pests in storage, which are insects. The losses caused by rodents are also recorded at significant values. Each rat can consume approximately 9 kg of cereals annually, and 10 times as much grain becomes unfit for human nutrition (NIS, 2015). Damage caused by harmful factors leads to consumption of products, pollution of the mass of products with products of insect metabolism,

increase of temperature and humidity and creation of favourable conditions for the development of microorganisms.

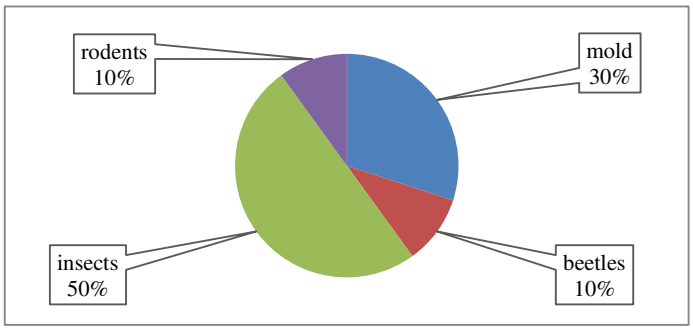

Fig. 4: The weight of infestation while depositing

Source: Author, own contributions

Protection of stored agricultural products

The concept of integrated protection of seed lots subjected to storage is based on food safety management systems, according to Regulation (EC) no. 852/2004 of the European Parliament and of the Council of 29 April 2004 on food hygiene and integrates the requirements of modern technologies, in a set of methods and means of combating, based on the natural factors for regulating the population density of harmful organisms, which should not to exceed the Economic Damage Threshold (PED) (MARD, 2018).

The problem of protection of stored products has become very current in agriculture, a large quantity of agricultural products being stored without ensuring the necessary conditions for storage. In many cases, prophylactic measures of disinsection are not performed. The problem of infestation of stored products is old, the overall losses are very high. Numerous specialized studies illustrate the economic role of infestations in the conservation process of plant products and, in particular, cereals. Pest infestation is among the biotic factors that most influence the quality of the stored products. An important aspect is to identify the degree of infestation of the seed mass, prior to preliminary storage, based on samples taken directly from the gross mass of seeds harvested, by the direct observation method (in the visible form, live adults or their larvae are observed, as well as the damaged seeds) or by other procedures that determine the hidden forms of the pests or the cases of infection with different pathogens. Seeds in which pests live have been found (eggs, larvae, chrysalis, visible and latent adults) are considered to be affected by pests and cannot be passed to the next processing / storage stage, until the most appropriate measures are taken for pest control, given that the specific regulations and standards in force do not admit live pests or their larvae in the seed material.

Determination of the economic damage threshold (PED). Modern theories of protection against harmful organisms are based on the economic threshold of damage (PED), which can be defined by the level of losses caused by harmful organisms, the cost / benefit ratio and the resource costs for protection actions. The level of losses may vary, as the cost and benefit of some actions will depend on the actual situation and circumstances (Boboc, 2006). This is essential, taking into account the variability of opportunities and constraints between keeping products in agricultural holdings, processing companies and large warehouses with sophisticated storage conditions of control capabilities. In simple terms, PED is an indicator that helps manufacturers determine if the number of pests is large enough to justify the application of the control measures. Rather, PED is the number of harmful organisms per unit of measurement (m2, kilogram, trap, etc.), which, being unchecked, will in the near future increase and exceed the economic level of damage. In reality, this is the balance between the costs of plant protection and the economic losses caused by harmful organisms. The economic threshold for pests and insects in seed lots to be stored is close to zero, when certified seed lots come from controlled and admitted seed crops, free of living harmful organisms and without signs of infestation. In cases where the PED is

higher than zero and the quality standards require product reconditioning, the cost of pest control works in the storage areas is quite high, due, first of all, to the high prices for the chemical preparations used, to equip them with the necessary equipment, to train the specialists in carrying out the corresponding works and approvals. (Alecu et al, 1997). Prophylactic measures are the most important elements of the system of integrated protection of the stored products and include the operations that are carried out in the empty warehouses, before the introduction of the products (cleaning the deposits, disinfecting them by chemical means, etc.) and have as a basic principle of preventing the penetration of pests into the storage space, the development of a system of monitoring the ways by which they can have access inside the warehouses:

Preventive - curative measures The inspectors of the National Phytosanitary Authority (NPA-ANF) recommend the disinsection of the cereal storage spaces, observing several stages: the hygiene and the clearing of the storage spaces, the sealing of the storage spaces in order to increase the efficiency of the solutions, the treatment solutions, by spraying, with long-acting insecticides. The basic objective of cleaning the rooms and hygiene measures were to eliminate the outbreaks of pests, to prevent the spread of pests from outbreaks established in other places, to limit the extension of the populations of pests, maintenance and cleaning at the workplace. The harvesting machines, air conditioning systems, packaging, as well as means of transport are also cleaned.

Results

Thus, the health status of the seed lots (SS) was evaluated, determinations of humidity (U%), germination capacity (G%) and the presence of live pests (SS) were carried out, by standardized laboratory methods, standardized according to SR EN ISO/IEC 17025: 2000. The preparation of the storage areas related to the keeping of the seed lots certified by the Gloss and the barley of autumn Nectaria, was realized, by treating them with a product approved for disinsection and deratization. The evolution of the health status of Glosa wheat seed batches, stored experimentally in the laboratory of the State Institute for Testing and Registration of Varieties, Regional Centre ITCSMS Galați (figure 5).

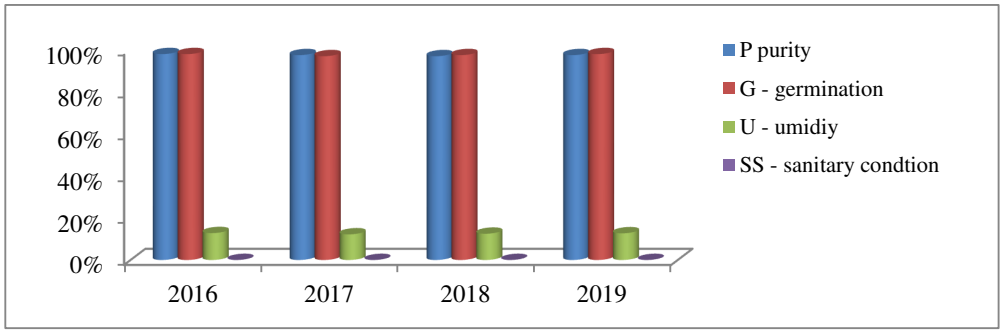

Figure 5: Evolution of the health status of Glosa wheat seed (2016-2019)
Source: ITCSMS (2019)

In order for the experimental results to be repeatable, with practical and scientific value, the researches were carried out according to specific techniques and methodologies, described in the specific standards mentioned, as well as in the operational procedures and instructions of the Quality Manual. The evolution of the health status of the Nectaria barley seed lots, experimentally deposited in the Galati ITCSMS laboratory is shown in Figure 6

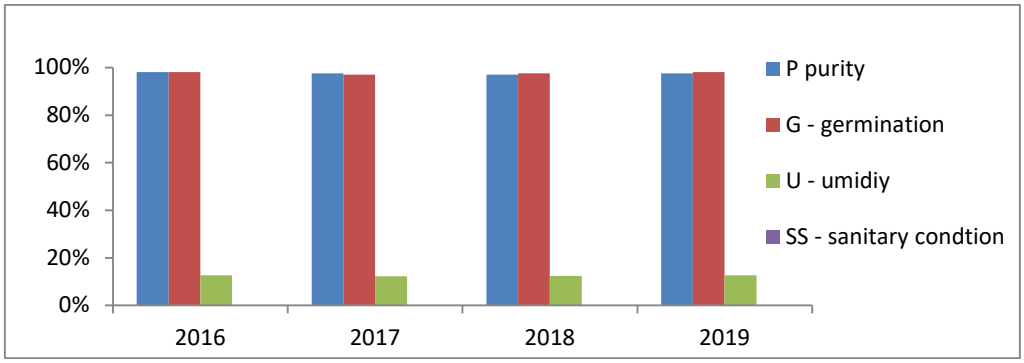

Figure 6: The evolution of Nectaria barley seed (2016-2019)
Source: ITCSMS Galati data - health quality indices of stored seed lots (2020)

From the analyses carried out it was observed that the indices of humidity (U%), germination (G%) and health status (SS%) (presence of living pests), purity (P%) of the batches of seed certified in the end, analysed, in view of the official certification, had corresponding values. The determination of the presence, in the analysis samples, of the living pests, emphasized that during the four years of storage, the presence of the harmful organisms of the deposit was kept to zero, so the indications of respective quality and the sanitary status had corresponding values. According to the principles of integrated pest control organisms, the method of maintaining the storage temperature, at the level of 5^0C, was used to minimize the propagation rate of pests.

Conclusions

The research on the integrated control of the damaging organisms from the lots of stored grain seeds, was carried out within the mentioned authorized warehouses, finding that the lots of Glosa wheat and Nectaria autumn barley seeds were conditioned and stored according to the specific seed technologies for straw grain for seeding. Pest control of stored grain seed lots has developed as a practical necessity, in order to biologically substantiate the steady increase in agricultural yields, as well as to avoid the risks related to seed trading. Research on the integrated control of harmful organisms from the lots of stored grain seeds, at the level of the two authorized economic operators for seed processing, has revealed "zero" PED values as an indicator of the presence of living harmful organisms in the stored seed lots, in all years of storage. The economic pest threshold for insects in seed lots for storage is close to zero, when certified seed lots come from controlled and admitted seed crops, free of living harmful organisms and without signs of infestation.

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The Development of Socially Oriented Non-Profit Organizations in Russia: The Meso-Level and Micro-Level Analysis

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Abstract

The purpose of the study is to consider the features of the development of socially oriented non-profit organizations at the regional level and to determine the main directions of support and development of socially oriented non-profit organizations in the Russian Federation. The researchers paid special attention to the problems of legislation and legal support for the activities of non-profit organizations. The main conclusions of this study are based on the key theoretical principles and practical directions of the activities of socially oriented non-profit organizations (establishing, functioning, development). The authors analyzed the activities of one of the largest and most efficient regional socially oriented non-profit organizations. The researchers carried out the SWOT analysis to study the methods of state support for regional non-profit organizations and the effectiveness of cooperation with the philanthropic sector. Based on the study, the authors proposed the ways of development of the non-profit sector and socially oriented non-profit organizations.

Keywords: Non-profit sector, non-profit organizations, socially oriented non-profit organizations, social sphere

Introduction

In the modern conditions of globalization and growing external influence, it is extremely important to develop the national economy, social sphere and well-being of citizens. Special attention should be paid to social problems. The social sphere is negatively affected by the policy aimed at raising the retirement age, the weakening healthcare system and the economic situation.

In 2010, there appeared a concept of non-profit organizations and Russian law started to regulate the actions of such entities. Such organizations include civil society institutions and deal with the social problems. They are not involved in political activities and are not state-owned. Employees of non-profit organizations are fully interested in the development of various areas of the Russian economy and contribute to the efficient work of the company.

In 2010 socially oriented non-profit organizations were treated as a specific type of corporations, which was an important stage in the process of development and structuring of such entities. The socially oriented non-profit organizations perform specific economic functions to strengthen the

economy, to stabilize the situation and to increase the financial literacy of the population. To achieve the goals, the socially oriented non-profit organizations also:

- create new jobs;

- even incomes of various social groups;

- contribute to improving the quality of social services provided to the population.

Social functions include not only providing social services, but also:

- drawing public attention to acute issues so that the citizens could contribute to the process of solving the urgent problems;

- developing the civil society as a whole;

- contributing to the development of the social sector by means of providing high-quality services, taking innovative approaches and working conscientiously;

- contributing to the development of charity and volunteer activities;

- contributing to the development and augmentation of the regional natural resources and human capital, helping citizens to attain self-realization.

The most popular non-profit organizations include public organizations, autonomous non-profit organizations and non-profit foundations (Kovalenko, 2019).

According to the Ministry of Justice of the Russian Federation, in April 2018, there were 455,617 organizations in total. According to the Russian Statistics Agency, in 2014 there were 132,087 socially oriented non-profit organizations in the Russian Federation. The data provided by Rosstat (Russian Federal State Statistics Service) in 2016, are presented in Figure 1.

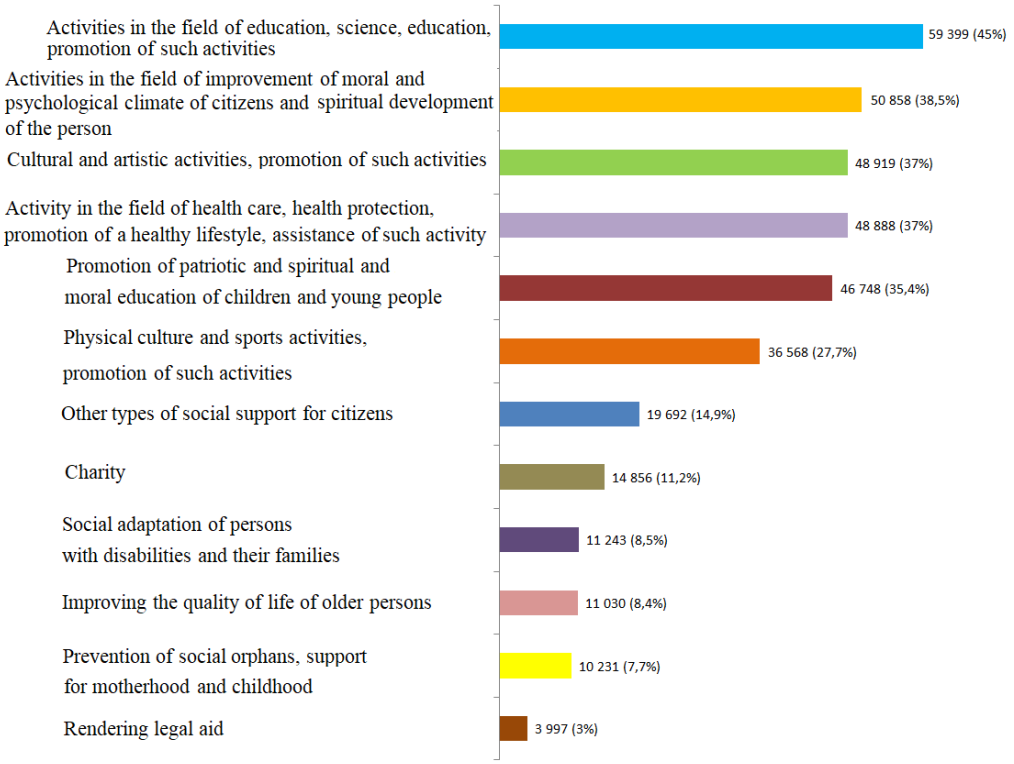

Figure 1: The number of socially oriented non-profit organizations performing major activities in the Russian Federation (percentage of the total number of organizations).

Thus, today the vast majority of non-profit organizations (approximately two-thirds of all the registered companies) are socially oriented.

Methods

The purpose of this study is to find the ways, methods and tools aimed at improving the work of regional socially oriented non-profit organizations. The study was conducted at two levels. First of all, the authors analyzed the specifics of the area and the sector the socially oriented non-profit organizations are involved in. The researchers determined which organizations should be supported by the government at the federal, regional and municipal levels. Secondly, the authors conducted the research at the level of the socially oriented organization to identify which problems this type of organization has to deal with and to determine the ways to solve these problems.

A great contribution to the development of the issue under study was made by Russian and foreign authors, such as L.I. Jacobson, I.V. Mersiyanova, R. Kramer.

The methodological basis of the study is related to the analysis of the legislative framework and regulatory documents alongside with the comprehensive and systematic analysis of data on the development of the nonprofit sector. The authors applied such general scientific methods and cognitive techniques as a statistical analysis, complex and situational approaches, and generalization. The empirical study is based on the method of web content analysis (the analysis of the information posted on the organization's official websites on the Internet). Within the framework of the first part of the study, the authors formulated some hypotheses, which allowed them to conclude if it was necessary to make some changes in the activities of socially oriented non-profit organizations in the field of economic development of the region:

- the most famous socially oriented non-profit organizations getting state financial support are most involved in practical actions;

- the successful projects of socially oriented non-profit organizations contribute to the development of the social sphere of the region as a whole and improve the quality of social services provided to the population;

- executive bodies of state power provide financial support in the form of grants to the most open and transparent socially oriented non-profit organizations.

To implement the second stage of the study, the authors analyzed the activities of an autonomous non-profit organization, which is one of the largest in the region (Kolesnichenko and Radyukova, 2018), since 2014 it has successfully provided social services and improved living conditions for single elderly people.

To identify the specifics of the organization under study, a SWOT analysis was carried out. A SWOT analysis is related to a situational analysis. Within the framework of this analysis the emphasis is made on the enterprise under study, while the competitive environment and the sector itself serve as the "background" of the study. In general, the authors focused on the "matrix of the SWOT analysis".

Results and Discussion

Let us focus on the general development trends of socially oriented non-profit organizations in 2012-2019. In March 2012, the President of the Russian Federation announced that there was a need to promote public-private partnership in the social sphere. At the same time, it was crucial to provide socially oriented non-profit organizations with financial support from the federal budget and grant systems. Since 2017, there has been a rapid increase in the number of socially oriented non-profit organizations in the subjects of the Russian Federation. Some of the social welfare services are provided by socially oriented non-profit organizations on the basis of an outsourcing agreement. So, the activities of socially oriented non-profit organizations are controlled by the government, which results in the efficient work and high-quality services. It is important to note that due to the external

and internal competition and specific criteria for evaluating the effectiveness of activities, the work efficiency increased and the social sector attracted additional funding.

In 2018, socially oriented non-profit organizations became fundamental for the stable and confident development of the state. According to the statistics, there was a growth in the number of socially oriented non-profit organizations involved in the social sphere. As for the finances, they used their own resources and the money they received thanks to the grant systems, partnerships and crowdfunding projects.

According to the analysis of the activities of the regional socially oriented non-profit organizations, at the end of October 2018 there were 171 registered organizations (98 of those companies were registered in 2018). There were more and more registered organizations. The authors focused on the main characteristics of the non-profit sector and came to the following conclusions.

1. Socially oriented non-profit organizations have deficient legal framework. There are no clear mechanisms for granting privileges to socially oriented non-profit organizations that provide socially useful services.

2. The competitive conditions are not equal for socially oriented non-profit organizations and small and medium-sized businesses. This implies that non-profit organizations do not have the opportunity to obtain debt financing, soft loans etc. In addition, socially oriented non-profit organizations cannot receive property support on a gratuitous (preferential) basis if they receive compensation for social services they render; and regional socially oriented non-profit organizations do not have preferences in public contracting.

3. Poor public awareness of the activities of socially oriented non-profit organizations. There are specific problems related to offline and online work. The information on socially oriented non-profit organizations needs to be available on the Internet so that the companies could be promoted and developed in the future. Thanks to the Internet, it is possible to implement projects and meet like-minded people. However, it takes much time to create and maintain a social networking community and a website of the organization. Many socially oriented non-profit organizations, especially in the regions, hardly use PR promotion tools (Kulkova, 2017).

4. Disunity of the non-profit sector. Some representatives of the socially oriented non-profit organizations claim that there is an “unhealthy competition” in the non-profit sector. There are no established intra-sectoral contacts, organizations rarely interact to exchange their positive experiences to develop the civil sector and solve corresponding social problems.

5. The low level of professionalism of non-profit sector workers is also a great problem. In the commercial sector candidates compete against one another to attain a position, the most qualified personnel are selected, and the employees are paid according to their merits. The situation in the civil sector is different. It mostly employs enthusiasts ready to work for a small salary, or unprofessional volunteers who need additional training. Therefore, in socially oriented non-profit organizations there is always a shortage of experienced personnel in the field of management, office work, marketing, etc. (Zavgorodnyaya, 2018)

6. "Philanthropic hunger" which implies lack of resources needed to carry out certain activities. There is an ongoing process of searching for additional sources of funding. State organizations and socially oriented non-profit organizations providing social services have to meet the same requirements, despite a critical difference in funding and available resources.

Let us analyze the results of the SWOT-analysis of one of the regional socially oriented non-profit organizations. The results of the analysis are presented in Table 1.

Table 1: results of the SWOT-analysis of the activities of the socially oriented non-profit organization

Strengths: Highly qualified personnel; Years the created experience; High uniqueness of the organization; Partner support; Recognition and trust in the organization use of the mechanism of crowd funding; Support from volunteer units; Continuous work on the extension of the partner network.	**Weaknesses:** Specifics of activity; Continuous dependence on external funding
Opportunities: Receiving grant support; Implementation of new system projects; Participation in grant competitions; Involvement of new partners; Holding charitable actions; Continuing staff development; Development of cooperation within the framework of corporate charity.	**Threats:** Macroeconomic instability, Economic recession

As soon as the authors analyzed the strong and weak points of the organization, as well as potential threats and opportunities, they tried to establish links between them.

The results of the SWOT analysis show that the unique competitive advantages of a socially oriented non-profit organization make it possible to maintain and expand the list of competitive advantages in the market in the current macroeconomic situation.

A socially oriented non-profit organization pays special attention to the development of the project format of work, constantly looks for new ways and directions, tries to use accessible information technologies and be in line with the main trends.

Recommendations

One of the latest Federal Laws was adopted to support socially oriented non-profit organizations, to simplify their work system and to make it more convenient both for non-profit organizations themselves and for beneficiaries (Romodina, 2018). Federal Law of December 5, 2017, No. 392 provides for amendments to improve the system of independent expert analysis of the quality of services rendered by socially oriented non-profit organizations. In accordance with the system, an independent expert analysis of the quality of services should also be carried out by the federal medical and social assessment departments. The federal, regional and municipal Public Chambers are responsible for forming public councils to conduct an independent expert analysis. Public service employees (representatives of state and local self-government bodies) working in the sphere where an independent expert analysis is to be carried out, as well as the employees of the organizations involved in this sphere, are not entitled to be members of such public councils. (Kovaleva, Tcukarev and Shibaeva, 2016).

Such a mechanism is convenient for all participants and, above all, is aimed at improving the quality of services provided. Public Chambers also receive an additional privilege - their authority is strengthened and they act as a mediator between the state and the civil society.

To be promoted in the network, socially oriented non-profit organizations need to hire a new employee, which is also problematic due to insufficient financial resources. Volunteers can provide partial or substantial assistance.

The government is responsible for eliminating the above-mentioned problems. Property support can also be provided to socially oriented non-profit organizations. It implies that such organizations are entitled to possess and (or) use on a long-term basis the state property of the region free from any

right or claim of a third party (with the exception of property rights of non-profit organizations). Such property should be used for its intended purpose only. Non-profit organizations rendering socially useful services are provided with property support for at least two years.

Information support may also be provided. In order to implement state policy aimed at supporting regional socially oriented non-profit organizations, the regional administration creates and maintains a website to provide necessary information.

Consultative support is offered to socially oriented non-profit organizations by regional government authorities. They publish methodological materials for socially oriented non-profit organizations. Such materials deal with the issues of interaction with regional government authorities and the activities performed by socially oriented non-profit organizations regulated by the law. The methodological materials should also provide information on how to arrange thematic seminars and hold scientific and practical conferences on the interaction between regional authorities and socially oriented non-profit organizations etc. Two online resources (the Information Portal of Socially Oriented Nonprofit Organizations and the site called "Nonprofit Organizations of the Region") provide consultative support and systemize legislative and methodological information useful to regional nonprofit organizations. On these sites, interested parties can read the sector news, look through a calendar of events, post information on the activities of their organization, find out useful information on competitions, grants and legislative aspects (Zhdanov and Danilov, 2018).

Socially oriented non-profit organizations cannot do without financial resources. Subsidies are the main and most effective form of financial support.

The authors offered some draft recommendations for specific non-profit organizations.

1. Active participation in grant competitions at the regional and federal levels.

It is necessary to regularly monitor the sites that systematize information on current contests the organization can take part in.

2. Interaction with volunteer centers and building a team of permanent volunteers. The implementation of many projects and the activities of the organization depend on the help of volunteers (mainly students of universities and colleges). However, students find it difficult to combine their voluntary work on a regular basis with their studies at the university. The older people also provide some assistance but cannot participate in every event, since their priorities are related to their families, work and personal affairs. If a team is created, the work is coordinated. It should also be noted that experienced volunteers helping the organization, contribute a lot to the effective work. They do not need much time to undergo training courses. Volunteer work connected with the leisure activities helps people to get closer, trust each other and make their communication more open.

3. Studying the mechanisms of work in the field of corporate charity. This is one of the most important directions aimed at the development of the charitable sphere and the promotion of socially oriented non-profit organizations. It is characteristic of large cities and industrial regions (for example, the regions where natural resources are extracted). It implies different ways of interaction and support. However, nowadays this direction is not very popular since it demands a lot of time and effort.

4. The development of social networks of the organization. The direction has always been very popular. The information on the organization's activities is provided and crowdfunding projects are promoted. Increasing audience engagement will help to expand the affiliate network and promote the organization. In this case, it is necessary to focus on priorities as time is limited. There are several ways to gradually improve the work in this area:

- writing posts and content-plans in advance;

- attracting volunteers who can provide information support;

- regular e-mail distribution of projects;

- budgeting for advertising in social networks;

- attracting more followers (real users) in all social networks;

- creating interesting sections to post materials apart from news information.

Conclusions

The modern political strategy of the Russian Federation tends to be social since it is aimed at improving the quality of life and well-being of every citizen.

Since 2012, the government has put a lot of efforts into the formation and development of the "third sector" of economy represented by non-profit organizations.

In the course of time, socially oriented non-profit organizations proved to be trustworthy and reliable market participants. A new type of organization is aimed at creating healthy competition in the sphere of social services, improving the quality of social services and introducing innovations.

Currently, socially oriented nonprofit organizations successfully perform their functions and are involved in almost every sector of economy. Creating healthy competition in the service market and giving beneficiaries an opportunity to make their own choice, socially oriented nonprofit organizations help to improve the quality of services, create new jobs and promote volunteering in our country.

Socially oriented non-profit organizations perform their functions successfully and get the resources they need thanks to the support provided by business structures, wealthy and middle-class citizens and the volunteer sector.

Socially oriented non-profit organizations play an important role and are treated seriously at all state levels.

Taking into account the general tendency to support socially oriented non-profit organizations at the federal and regional levels, the authors claim that in the future the social sector is likely to be promoted and perform its functions successfully in our country.

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The Determining Factors for Establishing the Structure of Agricultural Crops in Small Farms in Romania

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Abstract

The crop structure of a farm designates its field of activity and, in the case of developing a strategy, it is a component of it, influencing in many aspects the results that will be obtained. Due to its complexity, determined by the multitude of components, the relationships between it and the impact it generates on the economy of agricultural holdings, the culture structure has a special decision charge. In this context, the structure can be viewed as a combination of options, of ways in which the unit is to function. It is absolutely necessary for the process of establishing a culture structure to take into account the relationships of biological, technological and economic nature, whose contents can lead to either a complex structure of production (diversification) or the imposition of narrowing the profile of the production activity (specialization). The following indicators are followed in research: structure of cultures (2015-2018); cultivated area (2015-2018) and total production, prices and total revenues (2015-2018). The conclusion of the research is that choosing an optimal crop structure, it starts from the soil and climate conditions that characterize the agricultural unit, following on one hand, putting them into value, and on the other hand satisfying the requirements of the plants towards these factors, which influences the level of production. Extensive and intensive agriculture determines the organization of different production structures, with particularities that influence the economic results on the farm level.

Practicing culture structure is a natural consequence of the plant biology, especially population’s need for food (population growth and product demand).

Keywords: Agriculture, Culture Structure, Culture Share.

Introduction

The rural development of Romania experienced a complex evolution after the change of the political regime in 1990, being influenced by the national policies regarding the field of land funds and the retrocession by the former owners. The fragmentation of agricultural lands, due to the wrong system of reallocation of the Romanian farmers' lands, affected the performance of the national agricultural production and favored the sale of the Romanian land to foreign investors (Iancu and Stanciu, 2017).

Direct payment schemes to be granted as support mechanisms for agricultural producers, are the following in Romania: Single payment scheme on the agricultural area; Transitional national aid - ANT; Redistributive payment; Payment for climate-friendly agricultural practices; Payment for young farmers; Coupled support scheme; Simplified scheme for small farmers. Payment schemes should be revealed in the impact study.

Since, in general, crops have varied production cycles and that environmental factors know a certain distribution over time, some of the crops, respectively, the varieties, "catch" better conditions. For example, given that, in certain areas, rainfall is concentrated during May-June and early July, early varieties of maize give better results than late ones, which, although having higher efficiency, are affected by drought at the end of the period, production per hectare being decreased (Stanciu, 2017a, b).

The same can be done in the case of field vegetables, in order to counteract the negative effects of late spring frosts and mists that come too early in the fall. In principle, the determination of the production structure of the agricultural holding must take into account the criteria of the technical and economic optimum (Florea et al, 2019). In connection with the transition to the market economy, it is deeply necessary to investigate the economic efficiency of the production and to introduce corrections in the modification of the specialization of enterprises. Schin, Virlanuta and Stanciu (2017), showed that the association of agricultural producers, in various forms, can be a solution for the improvement of technological flows for the agricultural feedstock production, for the processing and selling of food products. As far as agricultural associations from Romania are concerned, there are significant discrepancies between counties and between the crop and animal production sectors. At a national level, there is a moderate concentration degree of producer organisations.

This is done through structural changes in the production process, as well as in the potential of resources for which large investments are usually required. The selection of crops must be made according to the profitability ensured by selling the products that depend on the level of the resources of the companies. Selecting the most profitable crops and determining the profit obtained by combining them is a relatively slow process and a specific research problem.

An analysis of the structure of the main agricultural crops in Romania (table 1), in 2018 compared to the year 2014, shows that:

- grains decreased by 4.14%, from 5,484 thousand ha in 2014 to 5257.20 thousand ha in 2018;
- legumes registered an increase of 170.59% in 2018 compared to the year 2014, especially due to the increase of the cultivated areas with pea beans, an increase with 233.89% in 2018 compared to the year 2014;
- oilseed plants registered an increase with 18.40%, influenced by the growth with 92.25% in the culture of rapeseed.

Regarding the share of the crop groups from the total cultivated area it can be observed the following:

- cereals registered a decrease in share, from 66.44% in 2014 to 62.09% in 2018, decrease influenced by the share decrease of the areas cultivated with maize from 32.66% to 28.82%;
- legumes registered an increase in share, from 0.60% in 2014 to 1.58% in 2018, influenced by the share increase of cultivated areas with peas from 0.44% to 1.42%;
- the oilseed plants registered an increase of the share, from 18.57% in 2014 to 21.44% in 2018, growth influenced by the increase of the surfaces of all crops. (table 1).

Table 1: Share of the main crops from the total agricultural area in Romania (2014 – 2018)

Culture groups / Culture	**years**		**(+/-) compared to 2014 (%)**	**% (compared to the total cultivated area)**	
	2014	**2018**		**2014**	**2018**
Total cultivated area (Thousands of ha), of which:	**8254.40**	**8466.70**	**2.57**		**100.00**
• Grains	**5484.00**	**5257.2**	**- 4.14**	**66.44**	**62.09**
- Wheat	2100.30	2116.2	0.76	25.44	24.99

- Rye	9.00	10.30	14.44	0.11	0.12
- Barley	421.00	423.50	0.59	5.10	5.00
- Oats	165.10	161.5	-2.18	2.00	1.91
- Maize	2696.20	2439.8	-9.51	32.66	28.82
● Legumes	**49.30**	**133.4**	**170.59**	**0.60**	**1.58**
- Peas beans	36.00	120.2	233.89	0.44	1.42
- Beans	12.90	11.4	-11.63	0.16	0.13
● Oilseed plants	**1532.90**	**1815.0**	**18.40**	**18.57**	**21.44**
- Sunflower	1022.00	1007.0	-1.47	12.38	11.89
- Soy	176.30	169.4	-3.91	2.14	2.00
- Rapeseeds	329.10	632.7	92.25	3.99	7.47
● Beetroot	**21.90**	**25.7**	**17.35**	**0.27**	**0.30**
● Tobacco plant	**0.50**	**0.9**	**80.00**	**0.01**	**0.01**

Source: *data processed according to the Statistical Yearbook of Romania 2014 and 2018.*

Analysing the data presented in Table 2 it is noted that, regarding the structure of the main agricultural crops in Galati County, in 2018 the evolution was different from the evolution to the national level, thus:

- cereals showed a decrease of 16.82%, from 283,976 ha in 2014 to 269,848 ha in 2018;
- legumes registered an increase of 446,47% in 2018 compared to 2014, being influenced by the growth of the cultivated areas with peas with 798.09%;
- oilseed plants showed an increase of 14,43%, growth influenced by the increase with 6,39% of the sunflower culture.

Table 2: Share of main crops from the total agricultural area in Galati County (2014 – 2018)

Culture groups / Culture	Years		(+/-)comp. to 2014%	% compared to total agr. area 2014	%compared to total cultivated area 2018
	2014	2018			
Total cultivated area, ha	**283,976**	**269,848**	**- 4.98**		
● Grains	**190,589**	**158,524**	**-16.82**	**67.11**	**58.75**
- Wheat and rye	54,882	44,555	-18.82	19.33	16.51
- Maize	112,674	96,914	-13.99	39.68	35.91
● Leguminous	**1,829**	**9,995**	**446.47**	**0.64**	**3.7**
- Peas beas	1,048	9,412	798.09	0.37	3.49
- Beans	751	583	-22.37	0.26	0.22
● Oilseed plants	**68,828**	**78,760**	**14.43**	**24.24**	**29.19**
- Sunflower	49,918	53,108	6.39	17.58	19.68
● Potatoes - total	**1,436**	**1,047**	**-27.09**	**0.51**	**0.39**
● Vegetables - total	**11,540**	**10,331**	**-10.48**	**4.06**	**3.83**

Source: *data processed according to the Reports of Statistical Office of Galati County,*

Regarding the share of the crop groups from the total cultivated area, in Galati County, it can be observed that:

- grains have decreased in share, from 67,11% in 2014 to 58,75% in 2018, being influenced by the decrease of the share of the wheat cultivated areas from 19,33% to 16,15%;

- leguminous showed an increase of the share, from 0,64% in 2014 to 3,70% in 2018 influenced by the increase of the peas cultivated area from 0,37% to 3,49%;
- oilseed plants registered an increase of the share, from 24,24% in 2014 to 29,19% in 2019.

Considering the structure of the main crops in the total agricultural area used in Galati County, it is required an analysis of it viewed in a rational rotation, recommended for the South Eastern part of Romania (table 3).

Table 3: The share of main crops from the total agricultural area within a rational rotation, in the plain area

Culture groups/Culture	Crop system	
	Irrigated (%)	Not irrigated (%)
Maize	33 - 35	25 - 27
Wheat	10 - 12	12 - 16
Barley	6 - 8	11 - 14
Grains - total	**49 - 55**	**48 - 57**
Soybean	8 - 9	5 - 7
Sunflower	5 - 6	8 - 10
Oilseed plants - total	**13 - 15**	**13 - 17**
Beetroot	4 - 5	3 - 4
Other plants for industrialization - total	**4-5**	**3-4**
Fodder plants	**14-15**	**15-18**

Source: *CEEX PROJECT no, 732 " The technical-economic and management practical guide - Vegetable production"*

From the data presented in Table 2 and Table 3, the following conclusions can be formulated:

In Galati County:

- the share of cereals in the crop structure represented 67,11% in 2014 and 58,75% in 2018, which shows a structure above the recommended share;
- the share of leguminous plants in crop structure represented 0,64% in 2014 and 3,70% in the 2018;
- the share of oilseed plants in crop structure represented 24,24% in 2014 and 29,19% in 2018, a structure above the recommended share.

Case study on PFA PECHEANU CORNEL

The Authorized Physical Person (PFA) is the form of organization of the economic activity performed by an entrepreneur in Romania equivalent to a self-employed individual in UK or USA.

The Authorized Physical Person (PFA) PECHEANU CORNEL was founded in 2006 and operates on the basis of the Romanian commercial law, with headquarters in Namoloasa village, Galaţi County, having an agricultural area of 908,69 ha in 2018, located on the territory of the same locality. The area of arable land owned and used by PFA PECHEANU CORNEL between 2015-2018 has shown a structure of crops presented in table 4 in which it is noticed that cultures of wheat, barley, maize and sunflower are predominant. The land is leased from the rightful owners, based on lease agreements, according to Law no. 16/1994.

The land area currently used has low agricultural potential, the area being disadvantaged due to specific natural conditions, as provided by the National Rural Development Plan 2014-2020, allowing moderate agricultural productions.

The agricultural holding has no possibilities to irrigate the crops, even if in that area has been conducted, before 1989, a project for an irrigation system, abandoned in 1991. From the data presented in table 4 it is noticed that the land area of the agricultural holding, all arable land, has increased during the years 2016, 2017 and 2018, towards the year 2015, with 199.74ha, 223.94 ha and 62.84ha, reaching from 422.17ha in 2015 to 908.69ha in 2018.

Table 4: Crop structure for PFA PECHEANU CORNEL, between 2015 and 2018

Nr. crt.	Culture	2015	2016	2017	2018	Average	(+/-) Towards 2015 (%)
		Area (ha)					
1	Wheat	103.42	305.21	299.15	236.36	236.04	128.54
2	Spring barley	80.44	78.04	195.28	270.42	156.05	236.18
3	Barley (autumn)	-	-	-	38.50	9.63	-
4	Oat	-	31.00	237.16	98.67	91.71	-
5	Maize	54.75	17.91	41.11	30.20	35.99	-44.84
6	Sunflower	56.35	71.05	53.60	128.10	77.28	127.33
7	Soybean	2.70	-	-	-	0.68	-
8	Rapeseed	-	37.56	-	-	9.39	-
9	Fodder plants	44.14	60.84	5	50.70	40.17	14.86
10	Peas beans	-	-	4	-	1.00	-
11	Sorghum	-	20.30	10.55	28.36	14.80	-
12	Uncultivated land	80.37	-	-	27.38	26.94	-65.93
TOTAL		**422.17**	**621.91**	**845.85**	**908.69**	**699.66**	**115.24**

Source: *data processed according to PFA PECHEANU CORNEL's records.*

The analysis highlights the fact that, during the period 2015-2018, the culture structure has modified, in the sense that certain crops (soybean, rapeseed, peas) are no longer cultivated, but new crops appeared (barley, oats, sorghum). Surface increases are recorded for the autumn wheat crops, maize, sunflower and fodder plants (between 236% for barley and 14,87% for fodder plants). Considering that in the structure of crops a predominant place is occupied by cereals, it can be concluded that the farm is a "cereal type" farm. The following indicators are followed in research: Structure of cultures (2015-2018); The cultivated area, 2015-2018; Total production, prices and total revenues 2015-2018.

The results for the economic activity of agricultural holding PFA PECHEANU CORNEL are presented in tables 5, 6, 7 and 8. The total amount of the obtained products has increased from one year to another as a result of the increase of the cultivated area, but the average production per hectare depended on the climatic conditions.

Table 5: Total production, prices and total income, on crops, realized by PFA PECHEANU CORNEL in 2015

Culture	Area (ha)	Average production (kg/ha)	Quantity (tons)	Average price (RON/ha)	Total revenue (thousand RON)	Income (RON/ha)
Wheat	103.42	1232	127.41	0.57	72.63	702.24
Wheat straw	103.42	369	38.16	0.18	6.87	66.42
Barley	80.44	1134	91.22	0.51	46.52	578.34
Barley straw	80.44	340	27.35	0.18	4.92	61.20
Maize	54.75	876	47.96	0.65	31.17	569.4
Sunflower	56.35	436	24.57	0.8	19.65	348.8

Soybean	2.7	654	1.77	0.8	1.41	523.2
Fodder plants	44.14	3682	162.52	0.2	32.5	736.4
Uncultivatedland	80.37	-	-	-	-	-
TOTAL	**422.17**	**-**	**-**	**-**	**215.67**	**510.87**

Source: *data processed according to PFA PECHEANU CORNEL's records.*

Table 6 : Total production, prices and total income, on crops, realized by PFA PECHEANU CORNEL in 2016

Culture	**Area (Ha)**	**Average production (kg/ha)**	**Quantity (tons)**	**Price environment (Euro/kg)**	**Total revenue (thousand RON)**	**Income (RON/ha)**
Wheat	305.21	1578	481.62	0.6	288.97	946.80
Wheat straw	305.21	473	144.36	0.2	28.87	94.60
Barley	78.04	1145	143.98	0.5	44.68	572.50
Barley straw	78.04	343	26.77	0.2	5.35	68.60
Oat	31	946	29.33	0.4	17.60	567.60
Oat straw	31	283	8.77	0.2	1.75	56.60
Maize	17.91	3120	55.88	0.65	36.32	569.4
Sunflower	71.05	1246	88.53	1	88.53	1246.00
Rapeseed	37.56	1127	42.33	0.7	29.63	788.90
Fodder plants	60.84	5682	345.69	0.3	103.71	1704.60
Sorghum	20.3	893	18.13	0.5	9.06	446.50
TOTAL	**621.91**	-	-	-	**654.48**	**1052.37**

Source: *data processed according to PFA PECHEANU CORNEL's records.*

In 2015, due to drought, yields obtained have been far below the average of the years 2015-2018, and the total income has been influenced by the average sales price, which has been above the average price for the years 2015-2018. In 2016, by comparison to the year 2017, the total income realized by the farm were with 48,54% higher, due to the influence of the average productions as well as the average selling price.

Table 7: Total production, prices and total income, on crops, realized by PFA PECHEANU CORNEL in 2017

Culture	**Area (Ha)**	**Average production (kg/ha)**	**Quantity (tons)**	**Average price (RON/ha)**	**Total revenue (thousand RON)**	**Income (RON/ha)**
Wheat	299.15	1765	528.00	0.45	237.60	794.25
Wheat straw	299.15	529.5	158.40	0.2	31.68	105.90
Barley	195.28	1478	288.62	0.35	101.02	517.30
Barley straw	195.28	443.4	86.59	0.2	17.32	88.68
Oat	237.16	1145	271.55	0.5	135.77	572.50
Oat straw	237.16	343.5	81.46	0.2	16.29	68.70
Maize	41.11	2784	114.45	0.4	45.78	1113.60
Sunflower	53.6	1134	60.78	0.8	48.63	907.20

Fodder plants	5	7342	36.71	0.4	14.68	2936.80
Peas	4	854	3.42	0.8	2.73	683.20
Peas (haulm)	4	213.5	0.85	0.1	0.09	21.35
Sorghum	10.55	935	9.86	0.6	5.92	561.00
TOTAL	**845.85**	**-**	**-**	**-**	**657.51**	**777.34**

Source: *data processed according to PFA PECHEANU CORNEL's records.*

For some crops, the income per hectare had a significant increase, as it is the case of the sunflower crop, where the income increased by 257.22%, compared to the year 2015 and the case of fodder plants, which increased by 131.47% towards the year 2015. In 2017 compared to the year 2018, the total income registered a decrease by 26.13%, as a result of the change of the crop structure, of the sale prices and of the lower yields compared to the year 2018. In 2018, compared to the year 2017, the total income on the farm increased by 37.75%, as a result of the increase of the used area, but also as an effect of changing the structure of crops, the average selling price and the higher yields.

Table 8: Total production, prices and total income, on crops, realized by PFA PECHEANU CORNEL in 2018

Culture	**Area (ha)**	**Average production (kg/ha)**	**Quantity (tons)**	**Average price (RON / ha)**	**Total revenue (thousands lei)**	**Income (RON / ha)**
Wheat	236.36	1869	441.76	0.55	242.97	1027.95
Wheat straw	236.36	560.7	132.53	0.25	33.13	140.18
Barley (spring)	270.42	1327	358.85	0.4	143.54	530.80
Barley straw	270.42	398.1	107.65	0.25	26.91	99.53
Barley (autumn)	38.5	1156	44.51	0.5	22.25	578.00
Barley straw	38.5	346.8	13.35	0.25	3.34	86.70
Oat	98.67	1138	112.29	0.5	56.14	569.00
Oat straw	98.67	318.64	31.44	0.25	7.86	79.66
Maize	30.2	2938	88.73	0.5	44.36	1469.00
Sunflower	128.1	1259	161.28	1.1	177.41	1384.90
Fodder plants	50.7	7987	404.94	0.5	202.47	3993.50
Sorghum	28.36	895	25.38	0.5	12.69	447.50
Uncultivated land	27.38	-	-	-	-	-
TOTAL	**908.69**	**-**	**-**	**-**	**973.08**	**1070.86**

Source: *data processed according to PFA PECHEANU CORNEL records*

Conclusions

The structure of cultures, which has a very important role in how it is manifested and in terms of the results it generates, is influenced by natural, economic, technical and technological factors, etc. Taking into account this role, it is necessary to choose and to optimally proportion the different cultures that enter the structure and, implicitly, in the production system.

An optimal culture structure must satisfy several demands in a simultaneous relationship:

- to offer products that, from a quantitative and qualitative point of view, respond to the demand, highlight and protect the natural conditions and other factors of production;

- to allow the organization of culture rotation and to ensure maximum profit for the entrepreneur.

As a result, the option for one structure of cultures or another structure of cultures is a complex process, which is required to be grounded considering both technical and economic knowledge and appropriate methods.

It is rightly appreciated that these conditions manifest themselves as major restrictions, which almost certainly limits the choice of structure, also with a restrictive role intervenes the market of the respective products.

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Safety Performance – Node Comparison in Polish Railways Aspect

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Abstract

Article shows comparison of different transport modes safety performance. On basis of which conclusion that railways are the safest mass land transport mode. Additionally one can obtain information about safety performance of polish railway market. 2018 was the safest year, however there are still areas for improvement. On of the most significant risk factors are the involvement of third untheorized personnel and railway crossing users, which generate nearly ¾ of all accidents. Keeping in mind high risk level for the whole market it must be stated that the risk level for passengers is one the lowest in EU member states. One of key factors may be different approach towards qualification of suicides and fatalities in area of unauthorized persons between different member states. Form the human and organizational factors scope - SPAD's seem to be the most crucial elements to be taken care of regarding safety of polish railways.

Keywords: Safety performance, safety monitoring, safety, railways, safety management system, risk management

Safety Performance Regarding Different Transport Modes

Prologue

Safety has always been a key feature of transport especially regarding passenger services and transport of hazardous goods. It is one of the most significant values in railway transport due to its very structured approach and highly organized manner. Railway transports large amount of goods which inflicts operating with heavy vehicles where a slight error can cause catastrophic consequences. The second most important factor in making railways such a safe mean of transport is the human factor – the devotion to railways of people who are involved in it, and high level of competencies required for nearly every post which is involved in operational services. In summary, available historical data on fatal railway accidents shows a solid gradual improvement in railway safety over the past three decades, which has slowed down since the late 1990s. This "softening" of the trend is observable when analysing both absolute and relative figures of fatal train collisions and derailments in Europe. [1]

Due to this aspect, while organizing railway transport there is a high demand for specialized engineers who can aid the safety matters of railway transport not only on the operational level but mainly on the management level. Proper data analysis and giving precise conclusions and safety targets are at stake. Thus, there are a lot of courses dedicated to safety engineering, based on experiences from other branches of technical science and transport modes. They implement such elements of the art like: proactive safety management, risk analysis, accident investigations etc. These courses are provided at a different level of individuals education, from technical college-like level, through dedicated specializations during bachelors and masters studies, up to postgraduate studies and doctorate theses. It seems that the role of well-trained safety engineers will greatly increase in the railway sectors in the following years.

As it is well described in aviation literature, a proper safety-related data analysis is crucial for improving safety. Extracting knowledge from the mistakes made is the minimum requirement for preventing them in future – a cornerstone of safety culture. As one can see from the higher number of railway accidents[i] for analysis last year it seems that also railway companies see the full potential in this area and the grey area of reporting seems to be decreasing.

As it was stated at the beginning, there are some differences between transport modes:

- ✔ Level of organization – in general companies in maritime, aviation and railway are far more structurally organized and larger per company then in road transport, the other aspect is that they usually derive from national operators where road transport seems to be more open and competitive,
- ✔ Level of administrator regulation – there are regulatory bodies in every industry but mostly one can find them outside of road transport, from the aspect of access to the market (licence and safety certificate in railways for the level of company, authorisation of placing in service for technical assets, and competency management for safety-related posts etc.). Other aspects of regulatory supervision and aid of transport are investigation bodies, where throughout Europe one can find them outside of road transport mainly in aviation and railways,
- ✔ A natural approach to internal regulation form organizational culture approach from companies – aviation is built on procedures for nearly every aspect of transport, railways also have a strong internal regulations backbone for operation, lately (from around 2004) also going into the direction of management systems for safety and maintenance.
- ✔ Access for non-professional operators to the transport infrastructure is the only one with open access for "amateur" operators (drivers) to the same infrastructure that professionals operate, with slight resemblance in maritime (but significant differences in size of vessels). In aviation small airplanes, usually operated by nonprofessional pilots, can operate to a certain flight level and in railways there are only professional drivers.
- ✔ All of these differences and far more, like the level of the safety culture of transport users will eventually have its influence on safety performance.

Safety performance regarding different transport modes

European Union's Agency for Railways (EUAR or the Agency) started to compare safety performance between different transport modes a couple of years ago. The most up to date comparison are shown in Figure1 [1]. As one can see from it, aviation is still the safest mode of transport regarding the number of fatalities and travel distance, while the railways remain the safest land transport mode.

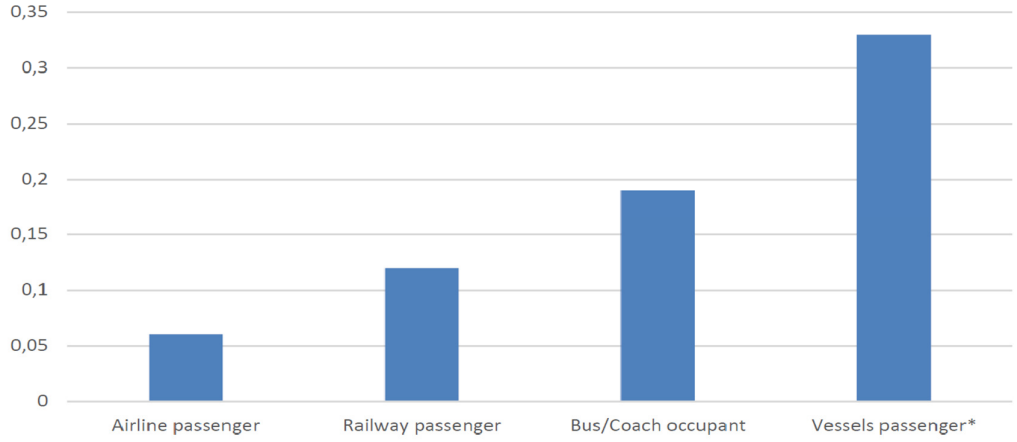

Figure4 :Fatalities per billion passenger kilometres for different modes of transport in the EU (2010-2014)[ii] [1]

In the following analysis authors focused on road and railway transports as they are the most common and very accessible for passengers, especially regarding distances up to 500 km. General Safety performance values for each transport modes are given in Table 1.

Table 1 General safety performance data for road transport and railways

Transport mode (data for 2016)	**Number of accidents / incidents**	**Number of fatalities / seriously injured / injured**	**Economic cost (2014 & 2015)**
Road transport	33,664 / 406,622	3,026 /12,109/40,766	PLN 48.2 bln - 2015[8]
Railways	581 / 837	169 / 94 / -	EUR 153.9 mln -2014

One can clearly see that the difference in data is staggering and favouring railways, even having in mind the difference in a number of million passenger-km done by each mode (in 2016[9] - 292 for railways and 390 for road transport). Regarding land transport in Poland, the authors compared number of fatalities with the operational work in railway and in road transport, the comparison is shown in Table 2.

Table 2 : Comparison of safety performance in land transport (number of fatalities and operational work) [iii]

Accident measure for **freight transport**	Accident measure for **passenger transport**	*year **2016***
0,010	0,157	***Road transport***
0,006	0,015	***Railways***

Another interesting field of comparison is a number of fatalities and distance covered by road and railway vehicles. Figure 2 shows the average of fatalities regarding operational work in road transport. Poland's system is unfortunately the last one, with nearly 18 people killed on roads per one billion vehicle-km.

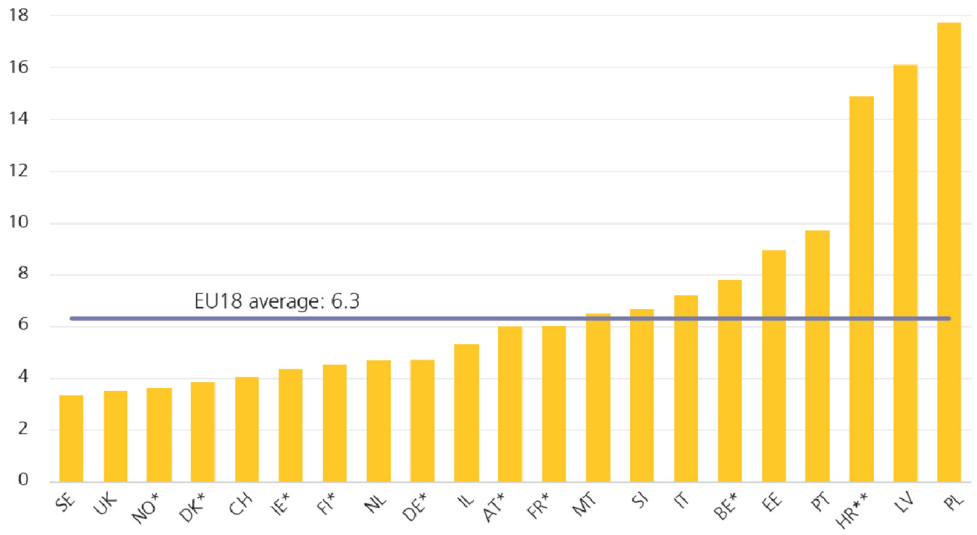

Figure 5 : Road deaths per billion vehicle-km[iv] **[6]**

Figure 3 shows the appropriate measure for railways and one can clearly see that there is a significant reduction in number of fatalities per train-km. These can be treated as equal to vehicle km despite the

fact that trains usually consist of multiple vehicles. Even at the EU level, there is a nearly 21-time reduction in the average number of fatalities. Also, the same applies to Poland – 15 times higher for road transport.

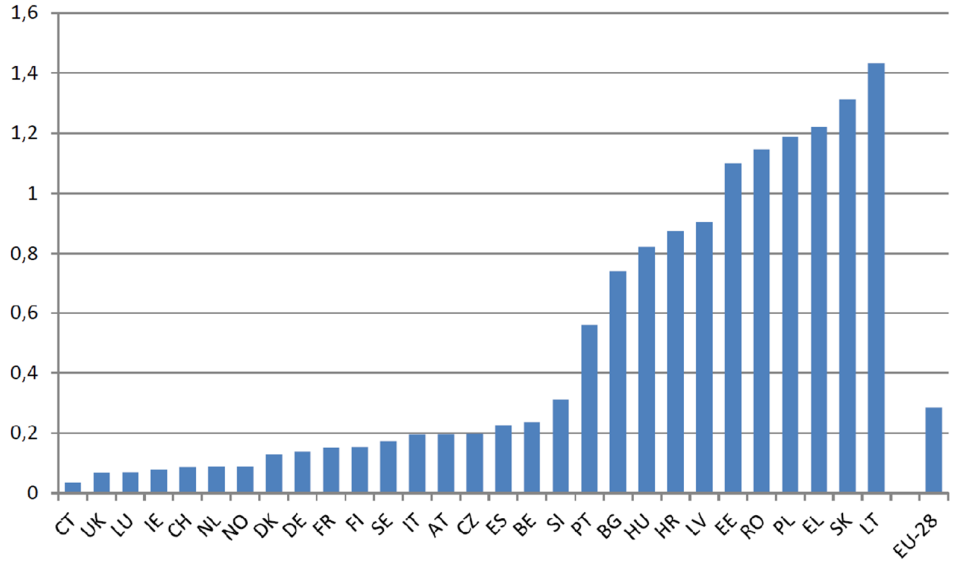

Figure 6 : Railway fatalities per million train-km (2010-2014) [1]

Other interesting aspects of safety performance are external costs of transport which were studied by prof. A. Merkisz-Guranowska team and described in [7]. The summary is given in Table 3, and it also clearly states that rail transport is the best choice for mass land transportation.

Table 3: Comparison of external costs of transport modes [7]

[euro/1000 tkm]	Road transport	Railways	Inland shipping	Short sea shipping
Accidents	5.44	1.46	0	0
Noise level	2.14	3.45	0	0
Pollution emission	7.85	3.80	3	2
Greenhouse gas emissions	0.79	0.50	irrelevant	irrelevant
Infrastructure	2.45	2.90	1	< 1
Congestion costs	5.45	0.24	irrelevant	irrelevant
Summary:	**24.12**	**12.35**	around **4.0**	around **3.0**

Railway safety performance in Poland for 2018

This paragraph is based on the most relevant data for Polish railway market which are published in the latest report of Polish national safety authority – the President of Office of Rail Transport - [97]. First of all, authors focused on a primary measure for safety performance which is the number of accidents[v] to operational work for the whole railway market.

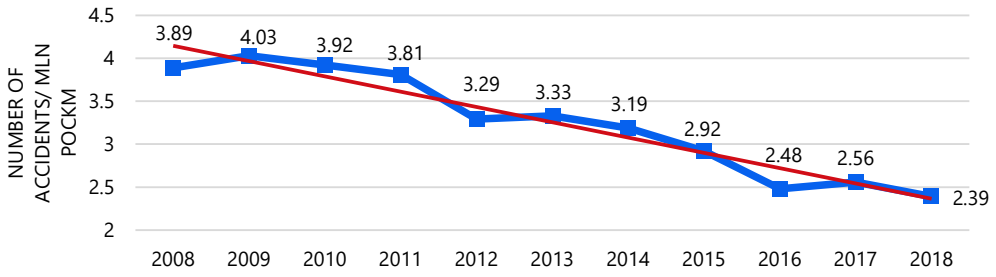

Figure 7: Value of accidents measure

2018 was the safest year since the measure is being calculated with the rate of accidents on railway lines of 2,39. That was despite increase in operational work in the market.

When analysing the accident rate, it should be pointed out that for the improvement of safety it is necessary to cooperate with all parties, both those operating the railway traffic and providing products and services for this market. The periods of disturbing the railway system during investment works and the still high level of influence of third parties on the railway have a negative impact on the level of safety. In 2018, the President of UTK carried out activities aimed at raising the awareness of both railway market entities, service and goods suppliers, but above all, people crossing the tracks in a hazardous or even unlawful manner. This was done through participation in social campaigns, organizing meetings of the Task Force on monitoring the safety level of the railway sector in Poland, promoting a safety culture, as well as stimulating railway market participants to implement solutions, often innovative, improving the level of safety in rail transport. One of the actions taken is the safety improvement program on level crossings.

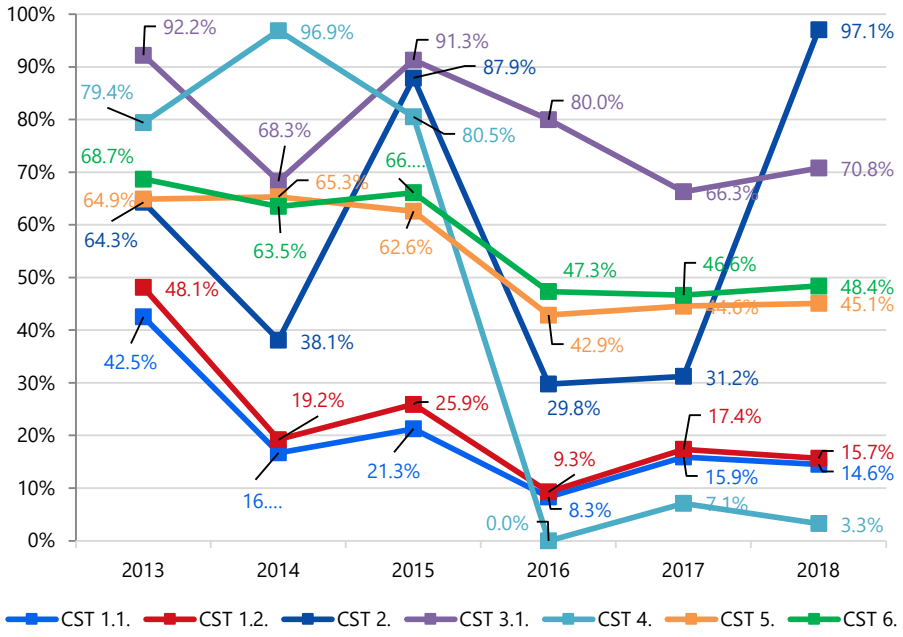

Figure 8: Common Safety Targets achieved for Poland in 2013-2018

Another important aspect of safety performance are Common Safety Targets calculated in six different categories. These values are then compared to National Reference Values which are also calculated according to European regulation for each member state. These evaluated NRV levels for Poland in

respect of CST values in years 2013-2018 are shown below – Figure 8. As one can see there is a general acceptable level of all CST values, which is a desirable tendency. Unfortunately, risk towards employees is nearly at maximum acceptable level, it's mainly due to high level of infrastructure investments on the market and high level of outsourcing conducted during ground works.

As for specific values that were calculated in 2018, they are shown in Table 4. As it was said before CST 2 and 3.1 are addressed on the basis of SMS's (Safety Management System) of specific companies. CST 5 and 6 require proper attention as well.

Table 4 : Achieved CST values in 2018[3]

Common Safety Targets (CST)		NRV for Poland	CST value for Poland	NRV level
NRV risk to passengers (x 10^{-9})				
CST 1.1.	Fatalities and weighted serious injuries (FWSI) among passengers per billion train kilometres of passenger trains	116,1	16,918	14,6%
CST 1.2.	Fatalities and weighted serious injuries (FWSI) among passengers per billion passenger kilometres	0,849	0,133	15,7%
NRV risk to employees (x 10^{-9})				
CST 2.	Fatalities and weighted serious injuries (FWSI) among employees per billion train kilometres	17,2	16,7	97,1%
NRV risk to level crossing users (x 10^{-9})				
CST 3.1.	Fatalities and weighted serious injuries (FWSI) among level crossing users per billion train kilometres	277	196,064	70,8%
CST 3.2.	Fatalities and weighted serious injuries (FWSI) among passengers per billion passenger kilometres (km) multiplied by the number of level crossings	n.a.	-	-
NRV risk to others (x 10^{-9})				
CST 4.	Fatalities and seriously injured (FWSI) among other people in one billion train kilometres	11,6	0,379	3,3%
NRV risk to unauthorized persons (x 10^{-9})				
CST 5.	Fatalities and seriously injured (FWSI) among unauthorized persons in one billion train kilometres	1210	545,799	45,1%
NRV societal risk (x 10^{-9})				
CST 6.	Fatalities and seriously injured (FWSI) among all people per billion train kilometres	1590	769,493	48,4%

Another positive aspect that was identified in 2018 is the regular growth in a number of incidents per year since 2013. Of course, it is intended to have as low as a possible number of railway accidents unfortunately in the past a significant number of accidents that should have been qualified as incidents were hidden in internal categories of railway undertakings and infrastructure managers. Due to consistent "zero tolerance" policy of the President of Office of Rail Transport since 2013 and putting emphasis on effective implementation of Safety Management Systems railway, actors began to understand that there is no point in hiding incidents, even if there were less investigation and analysis to be done. The companies encouraged by the President of UTK began to implement safety culture policy and their SMS and gradually began to see the benefit of conducting an analysis of all unwanted accidents in their systems. Finally, in 2016 the number of incidents exceeded the number of accidents, which seems to be a natural course of things regarding their significance – least accidents with highest

consequences and most accidents with least consequences. As the companies need to investigate all of those accidents and incidents the most likely outcome is a continuous improvement in safety as one the main goals of each SMS is to prevent accidents and incidents from happening. It seems that the values stabilised at around 1200 incidents per year – Figure 9.

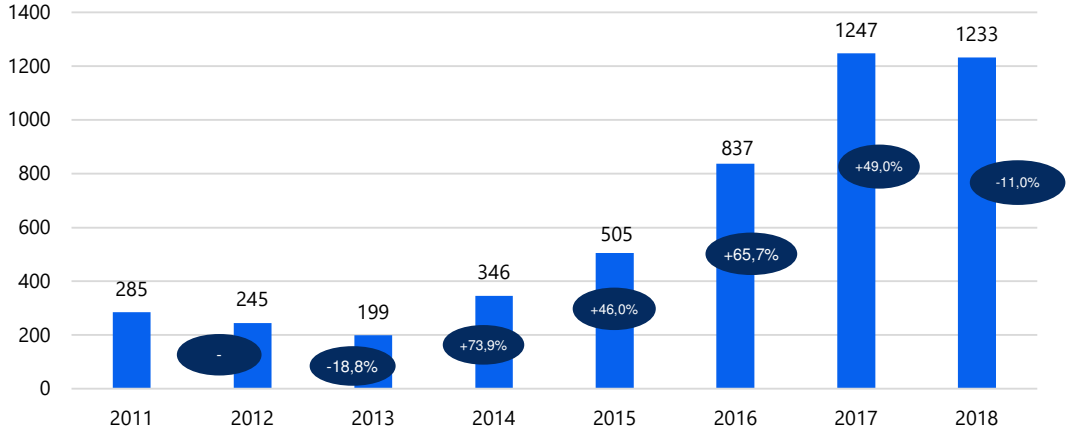

Figure 9: Number of incidents on railway lines in years 2011-2018

There were also other activities of the President of UTK that influenced safety performance i.e. supervision activities. The way was performed in 2013 shifted towards a systematic approach with stronger enforcement actions taken afterward. The other element was a change in approach towards efficiency so that each year there were more activities conducted. In 2016 there was a change in legislation and the President of UTK became responsible for supervision of railway commission (which is responsible for the investigation of every accident and incident). This resulted in additional growth due to the new scope of activities.

The other outcome of consequent supervision was the decrease in a number of found non-compliances. It seems that the railway companies began to understand the point of having their own Safety Management Systems so that they took action and did not wait for a control of a supervision body.

Analysing the change in the noncompliance indicator compared to 2017, one can notice its significant increase in the area of railway sidings. In 2018, it increased by 2.59 points, which is almost 57% difference. Based on further analyses, the President of UTK decided to include railway sidings in additional supervisory activities in the audit plan for the coming years.

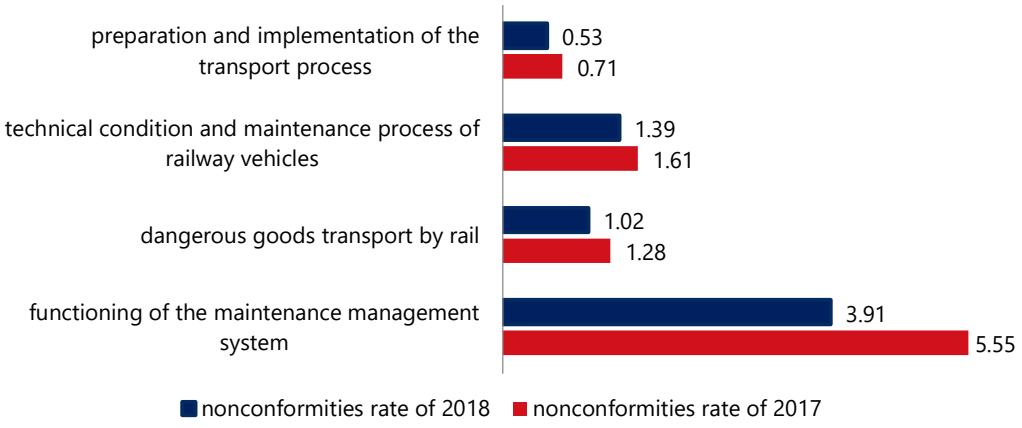

Figure 10 : Areas with the largest decrease in the noncompliance's rate in 2018

The largest decrease in the noncompliance rate in 2018 compared to the previous year was recorded for the following thematic areas:

• functioning of the maintenance management system (-1.64);
• the process of transporting dangerous goods by rail (- 0.26);
• technical condition and maintenance process of railway vehicles (-0,22);
• preparation and implementation of the transport process (- 0.18).
Which also seems to be the benefit of proper understanding of companies the requirements that are set out for their management systems.

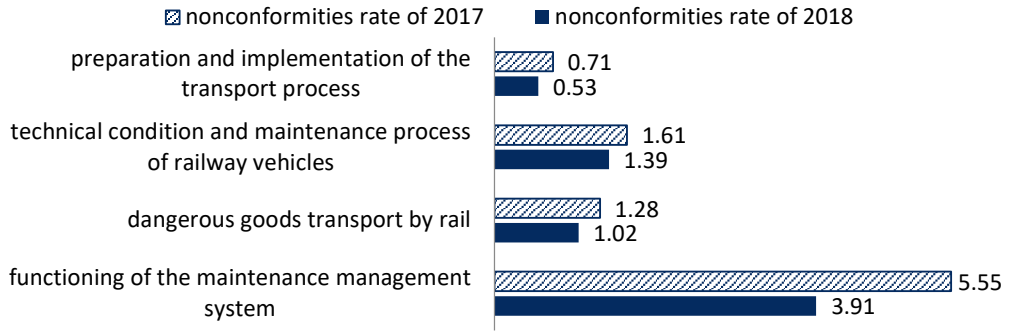

Figure 11 : Areas with the largest decrease in the noncompliance's rate in 2018

There are also general studies conducted regarding railways safety, one of them focused on the decomposition of primary causes of accidents and incidents. The study was started by Eng. D R. Wachnik during his studies and then was continued by Eng. D K. Chruzik. The latest data come from 2012 are described in [4] and shown on Figure 8. Unfortunately, more than two-thirds of railway accidents have their origin outside of the railway system – it concerns "unauthorized persons on railway tracks" and "level crossing users" which in most cases do not comply with legal restrictions and eventually not only break the law but also cause damage to the railway system.

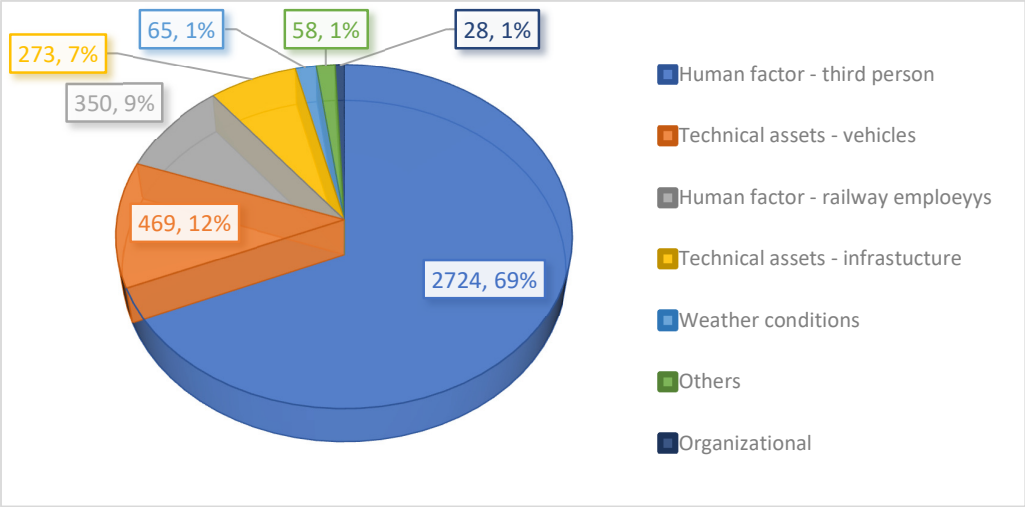

Figure 12 : Structure of the railway accidents (number of accidents, the percentage) due to their primary reason for covering the period 2009-2012[4]

Unfortunately those studies seem to be up to date still in 2018 as nearly 80% of accidents are caused by persons from outside of the railway system.

As these two subjects unauthorized persons and level crossing user's behaviour is a remaining safety issue also the President of UTK addresses these subjects with supervision activities. These activities were described in detail in [5]. The main approach is to point out any illegal crossing to the infrastructure managers, provide technical controls on level crossing but mostly act on soft aspects like education of the youth during campaign "Railway ABC" which is dedicated towards preschools in places with the highest number of accidents on railway crossings.

Another aspect of the above-mentioned activities is encouraging infrastructure managers to upgrade their level crossing towards a B category (automatic system with barriers) which has lowest number of accidents measure, except man-operated A category. It may seem that A category is a way to go, but one must keep in mind that this measure strongly relies on the number of level crossings, and having in mind the cost of operation of A – level crossing and the possible influence of human factor, the B – level crossing seems to be the optimal choice.

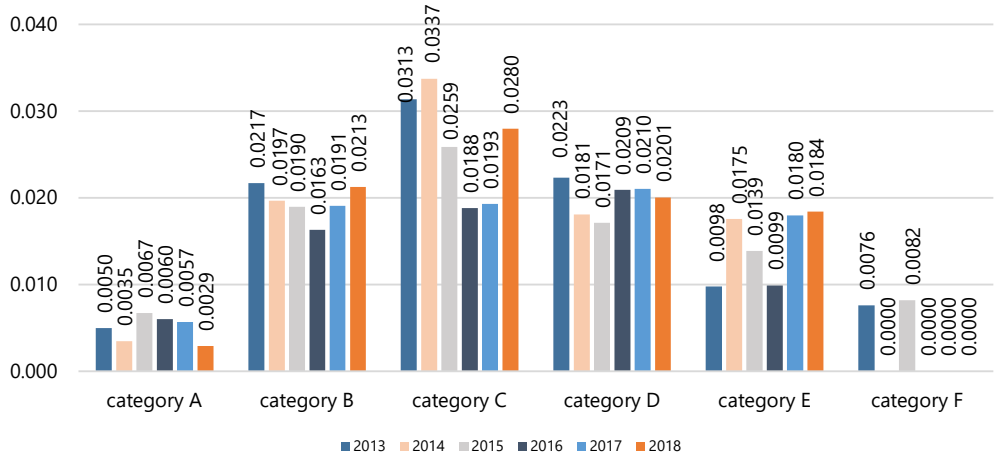

Figure 13 : Accidents measure on railway crossings in years 2013-2018

The last-mentioned aspect is the impact of a human factor on railway accidents, it is most significant regarding SPAD's[vi]. Figure 14 shows the number of SPAD, regardless their qualification in the last 5 years. There has been a large increase in the number of accidents since 2014, which continued in 2018.

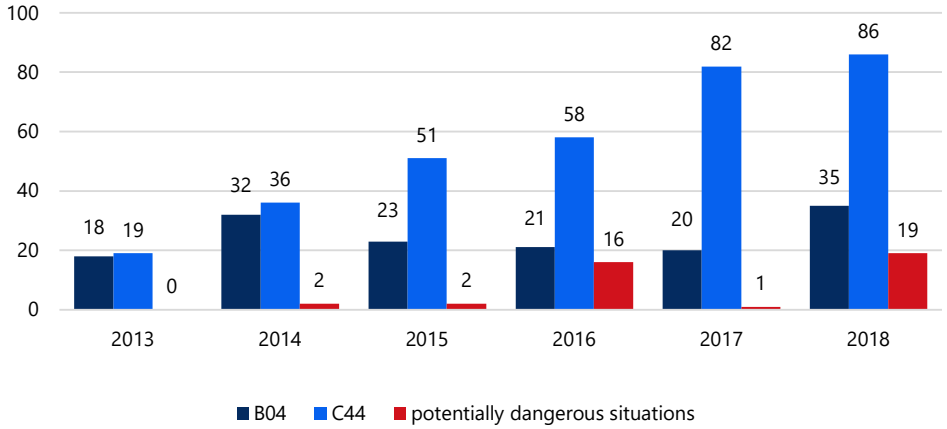

Figure 14: Number of SPAD's in years 2013-2018

Figure 16 shows the possible and real outcome of a SPAD, in this specific case a train driver of a freight train missed a STOP sign and entered an occupied track on which the passenger train was already running. It was impossible to avoid the collision and the passenger train was nearly entirely derailed – fortunately, no one was killed or seriously injured. It was one of a couple of similar accidents in 2017 and it clearly shows that even the slightest mistake regarding train operation can result in a catastrophe. This subject needs to be properly analysed as for now it seems that the corrective measures that are applied are ineffective. It is possible that a proper analysis of human factor involvement is a necessity.

Figure 16 : Example of outcome after a SPAD [10]

Accident risk is expressed as the number of outcomes per exposure. Considering all railway fatalities (excluding suicides), the fatality risk per million train-kilometres in the 2011-2015 period was 0.27 fatalities per million train-kilometres in the EU Member States. The figure for 2015 alone is lower at 0.23 fatalities per million train-kilometres. Values of risk vary greatly between Member States, with a more than 30-fold difference between Member State safety outcomes. The distribution of Member States' accident risk, expressed as the fatality risk per million train-kilometres over the 5 years from 2011 to 2015, is shown in Figure 17.

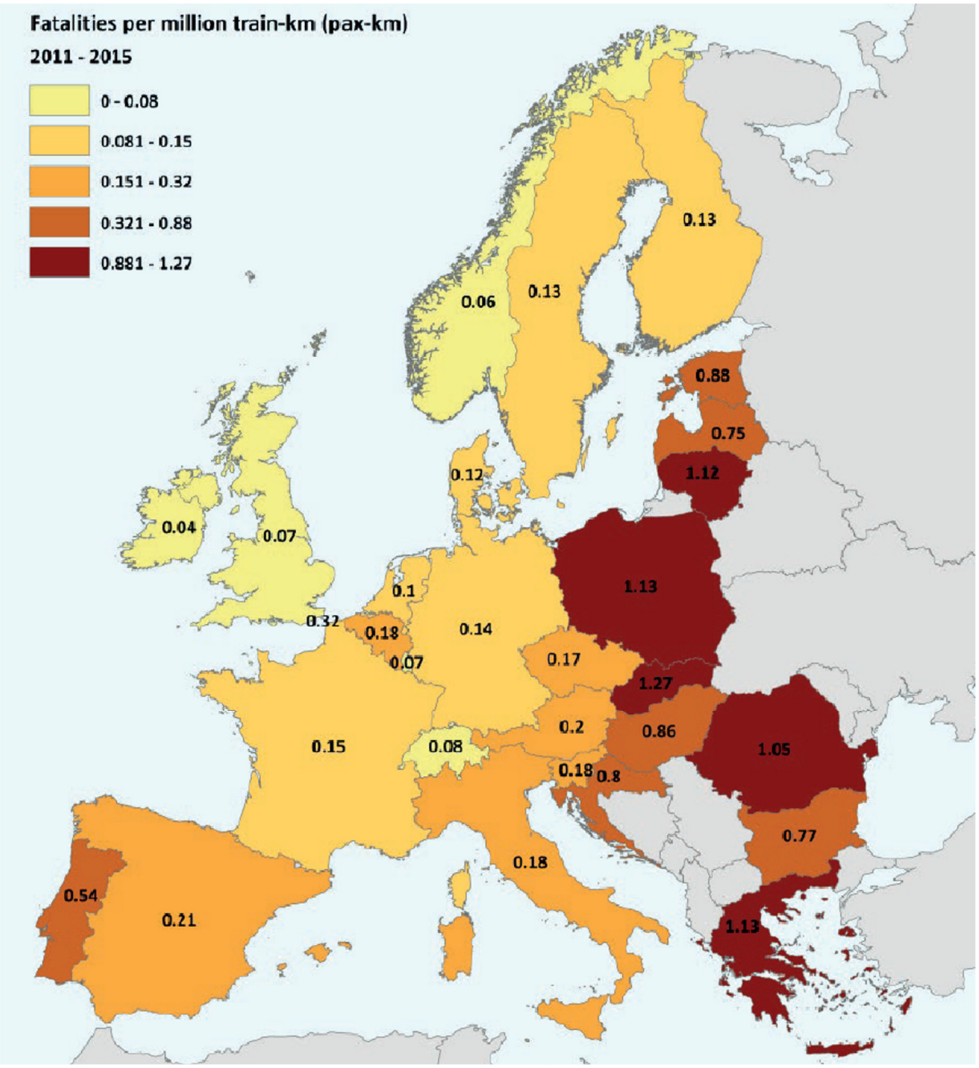

Figure 17: Railway accident fatality risk on EU railways: fatalities per million train-kilometres (2011-2015)

Personal risk for railway passengers can be expressed in terms of passenger fatalities per passenger-kilometre. For the EU-28 over the 5 years from 2011 to 2015 and 2015 alone, the fatality risk range was between 0 and 0.085 fatalities per 100 billion passenger-kilometres respectively. Figure 18 maps the passenger fatality risk over the 5 years from 2011 to 2015 by Member State.

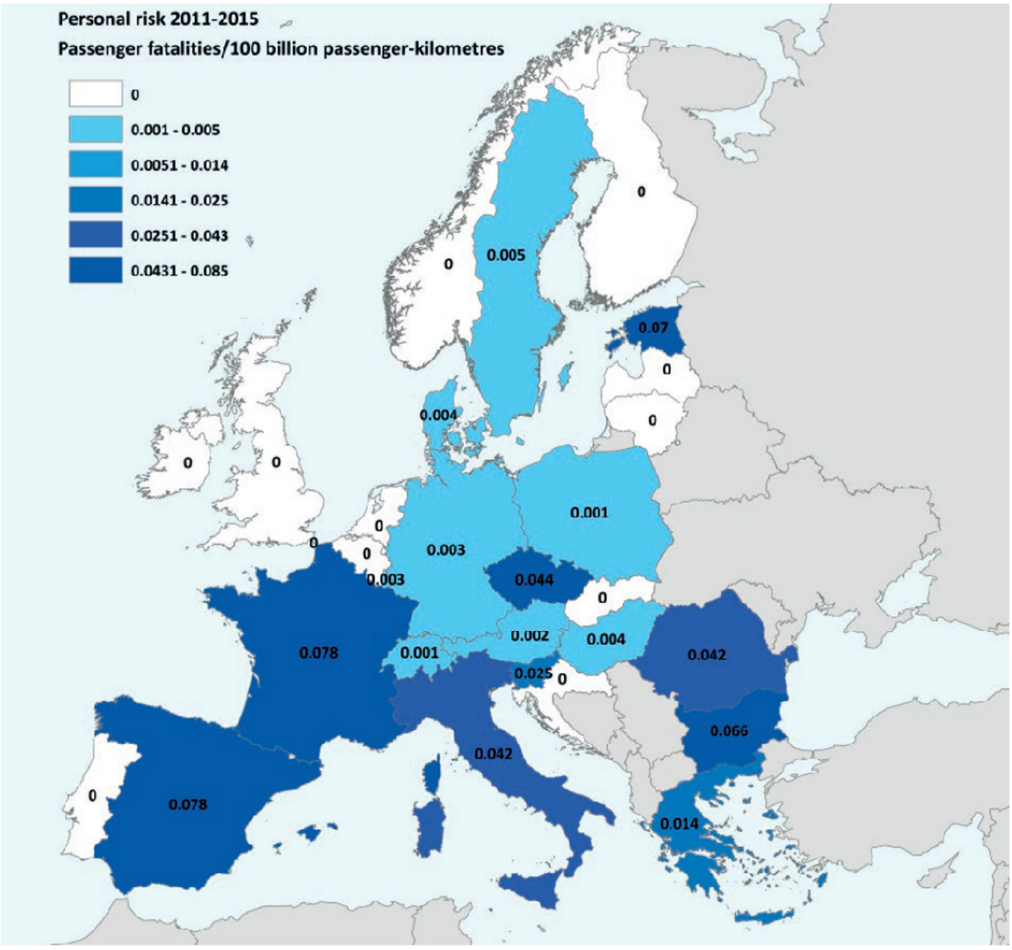

Figure 18 : Map of personal risk on railways: passenger fatalities per 100 billion passenger-kilometres (EU-28, Norway and Switzerland; 2011-2015)

A positive point that can be taken from Figure 19 is the fall in the numbers of unauthorised persons being killed. In the past 5 years there has been a reduction from 804 (2011) to 591 (2015), a fall of 26 %. Whether or not they are 'railway caused', these accidents are a source of appalling personal tragedy, including the impact on railway staff, along with significant delays and unnecessary costs for the rail system as a whole.

In recent years we have considered the use of different methods to normalise suicide fatality statistics, for example by using the correlation with national overall suicide rates, the availability of the railway to the public expressed by total train-kilometres or traffic density. Figure 12b on the following page shows the comparative analyses of suicides/million train-kilometres for 2015, the three 5-year means for 2015-2011, 2014-2010 and 2013-2009 and the 10-year mean for 2015-2006.

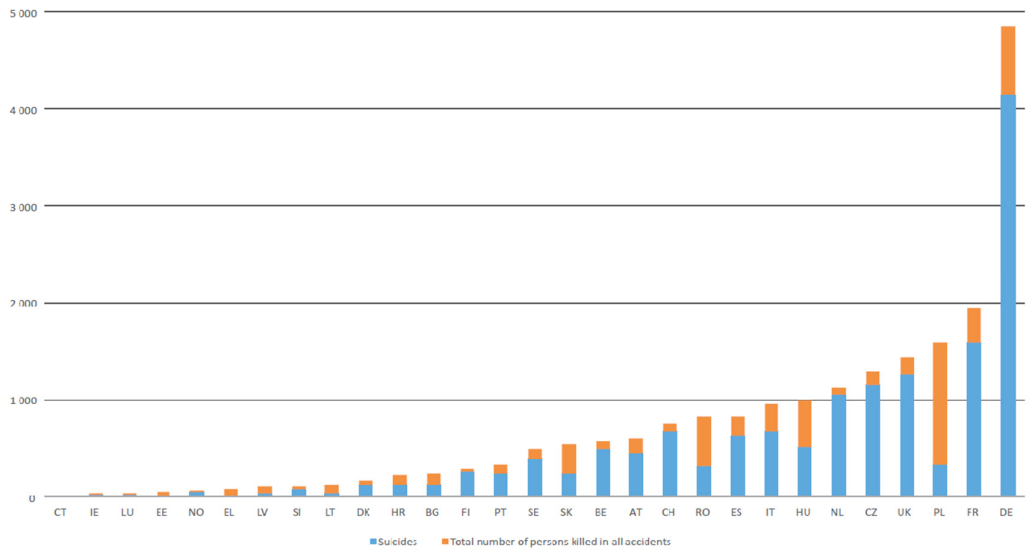

Figure 19: All railway fatalities and suicide fatalities on railways (EU-28, Norway and Switzerland; 2011-2015)

Summary

In comparison, railways are the safest mode of land transport, not only regarding pure safety performance indicators but also considering external costs to society and a member state.

As for Polish railways, the year 2018 was the safest since 2008 even despite the growth of the railway market.

There are still elements that need to be taken care of, such as continuous improvement of safety culture so that there can be a consistency in safety statistics and improvement of total safety performance. Another significant element is the analysis of human factor with the involvement of professionals in the area of human performance, since it seems that current corrective activities are insufficient.

Authors would like to summarise this short paragraph concerning railway safety performance that, undoubtedly railways are the mass transport mode to choose, as far as the safety of travel is concerned.

Bibiography

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[i] Railway events in this article are understood as serious accidents, accidents, and incidents under the Polish national law.
[ii] Source of data: Passenger kilometre data taken from the EU transport in figures (Statistical Pocketbook 2014, DG MOVE 2014, European Commission). Airline passenger fatalities over EU-28 territory by any operators (Annual Safety Review 2014, EASA), Bus/occupant fatalities estimated from available data in CARE database (European Commission), Vessels passenger fatalities as reported by EU and EFTA MS as per Directive 2009/18/EC for years 2011-2014 (EMSA, 2016)
[iii] Measure was calculated on data from [2][3] and data from Central Statistical Office of Poland (www.stat.gov.pl)
[iv] Average for the latest three years for which both the road deaths and the estimated data on distance travelled are available. 2013-2015 (HR, LV, SE, CH), 2012-2014 (AT, SE, DK, FI, FR, IE, NL, PT, UK, IL, NO), 2011-2013 (BE, PL), 2014-2015 (MT). *Provisional figures for road deaths in 2015. **Road deaths per billion vehicle-km travelled by cars only.
[v] Accident is considered a railway event which results in negative measurable consequences regarding people, environment or generally expressed in cost (above 3,000 euro).
[vi] Signal Passed at Hazard (SPAD) means any occasion when any part of a train proceeds beyond its authorized movement and travels beyond the hazard point. Hazard point is a point at which the train will be in a hazard of an accident (collision, level-crossing accident, accident to a person caused by rolling stock in motion or derailment). It is usually defined in the specifications of the Train Protection System.

Public Procurement Performance: Criteria and Indicators for Ukraine

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Abstract

Transparent and efficient public procurement is the basis of financial security, economic growth and social stability in the country. The main purpose of the article is to analyze the performance indicators of public procurement in Ukraine and determine the ways of their improvement. The authors used the method of generalization and systematization (to identify three groups of factors affecting public procurement efficiency), expert survey (to set the limits of indicators and determine the level of customer satisfaction with the choice of winning suppliers through an electronic system ProZorro), statistical analysis (to calculate indicators) and other methods. The effectiveness of public procurement affects the quality of public services and is based on three main factors: accessibility of the public procurement market; quality of organization of procurement activity and quality of performance of the contract. The authors proposed 12 criteria of public procurement performance and substantiated the methodology for their evaluation. An analysis of public procurement performance in Ukraine showed that during 2016-2019, the level of public procurement performance was consistently low, namely the high proportion of unsuccessful procurement, the low level of competition, the increase in the share of contracts being cancelled and contracts to reduce procurement volumes due to lack of financing. The study identified the main problems faced by customers in the procurement activity.

Keywords: public procurement, KPI, transparency, contract performance

JEL Classification: H57, M 48

Introduction

The legislation of Ukraine contains the principles of public procurement, the main ones are to ensure their maximum cost-effectiveness, the impartiality of evaluation and transparency. Public procurement will be able to meet established principles using key criteria and methods for evaluating In Ukraine, for example, this is a problem for the government (Tkachenko, 2016). In 2018, the Ministry of Economic Development and Trade of Ukraine (regulator in the field of public procurement) presented an annual report, which mentioned the efficiency of the procurement area. As positive indicators, the Ministry showed the dynamics of growth in the number and cost of completed purchases, the number

of participants and customers in the ProZorro system. Low levels of competition and a significant proportion of direct contracts without competitive procurement were noted as negative indicators (over 72%). This requires preventive control and further automation of the procurement process (Ministry of Economic Development and Trade of Ukraine Report, 2019). At the same time, the Accounting Chamber of Ukraine, in its conclusions from the analysis of the Ministry's report, noted that the indicators presented in the Ministry's Report do not characterize the efficiency of public procurement (Accounting Chamber Report, 2019). Lack of public procurement performance criteria and methodology for performance evaluation does not allow for an objective assessment. That is why the conclusions of the Accounting Chamber (the body of financial and budgetary control established by the Verkhovna Rada of Ukraine) and the Ministry for Development of Economy, Trade and Agricuture of Ukraine (the authorized body that regulates and implements public procurement policy) differ significantly in the results of the evaluation of public procurement effectiveness in Ukraine.

Literature Review

Public procurement is part of public spending that can ensure the sound management of public finances while performing various functions of the state, aimed at ensuring the sustainable welfare of the population. The economic effect of public procurement is the result of the impact of the Government's strategic objectives on health, education, the environment, and social protection (Tkachenko, 2016). In Ukraine, about 20% of public spending is spent on public procurement (17% on the use of goods and services and 3% on capital expenditures).

Public procurement in research is linked to the impact on the economic growth of the country. Kukhta P. & Piontkivska I. (2015) believe that public spending is not the only determinant of economic growth and cited Sweden as an example, where declining public spending has led to economic growth through high levels of government efficiency, regulatory quality and control of corruption.

According to the calculations of the multiplier of public spending, Dehtyar N., Boyarko I., Deineka O. (2013) identified two cluster groups in studies of the impact of public spending on economic growth in the EU and Ukraine: Group I - the countries with a positive impact of public spending on economic growth (Greece (1.850), United Kingdom (1.819), France (1.751); Group II - the countries with lack of effect of public spending on economic growth (Luxembourg (0.518), Malta (0.862) and Ireland (0.872)).

Piontkivska I. (2016) noted that significant budget savings can be achieved through public spending reform on a “do more, spend less” principle, and identified expenditures where the greatest savings can be achieved, including increasing public procurement transparency.

According to the World Bank report, Ukraine is in the top twenty in terms of government spending and in the last quarter in the quality of government. That is why researchers justify the need to reduce government spending (Dubrovsky, 2018).

The European Commission, as the supreme executive body of the European Union, links the role of public procurement to the quality of public services, the high level of which depends on the efficiency of procurement, as reflected in the European Commission's Procurement Strategy «Making Public Procurement work in and for Europe» (2017). The European public procurement performance experience is based on the OECD / SIGMA methodology of the Organization for Economic Cooperation and Development, the World Bank (Methodology for Assessing Procurement Systems), the European Bank for Reconstruction and Development (EBRD). For evaluation of efficiency, the expert evaluation is applied in three directions: 1) national legislation in the field of public procurement; 2) public procurement practices; 3) verification and facilities of legal protection. Overall rating is determined by the level of compliance: very high compliance (above 90%); high compliance (76-90%); average compliance rate (60-75%); low compliance (50-59%); very low compliance (below 50%).

Bhagat G. (2017) proved the need for optimization the efficiency of procurement. Costantino N., Dotoli M., Falagario M. & Sciancalepore F. (2012) argue for the importance of such public procurement

characteristics as competition, prescribed procedures, and transparency. Patrucco A., Luzzini D. & Ronchi S. (2016) suggested cost, quality, time, compliance, innovation and sustainability as indicators of public procurement performance. The authors of the study argue that public procurement performance will be ensured when the procurement function is recognized as strategic in government. Rizzo I. (2013) relates public procurement effectiveness to the level of corruption, competition and speed of the procurement process. Panda P., Sahu G. & Gupta P. (2010) believe that digitizing all stages of public procurement can ensure their effectiveness. Janke F. & Packova M. (2016) noted that electronic reverse auctions have become popular as a public procurement mechanism, and they are the ones that provide efficiency through competition and the ability to reduce the price during rounds. Milosavljevic M., Dobrota M. & Milanovic N. (2018) consider that the biggest problem with evaluating public procurement performance is the definition of criteria that are prone to systematic error and numerous omissions.

Tas B. (2012, 2017) conducted empirical research and substantiated the impact of the optimal number of bidders on the procurement price of different types of products. Chever L. & Moore J. (2013) compared standard open auctions and open auctions with a supplementary negotiation phase and non-formalized procedures. Decarolis F. (2018) also explored types of auction formats and factors limiting the scope for strategic bidder defaults. Nunes A. & Velame I. (2016) analyzed indicators of cost-effectiveness and time efficiency in public procurement. Thus, in today's scientific environment, an understanding of the importance of transparent and efficient public procurement has emerged as it is capable of providing financial security (Khovrak & Petchenko, 2015; Finogenova et al. 2018; Tsintsadze et al., 2019), economic growth (Dehtyar, et al., 2013; Kaigorodova et al., 2018), development of social responsibility (Kaigorodova et al, 2017; Khoma et. al., 2018; Koziuk et. al., 2019; Trynchuk et. al., 2019; Trunina & Khovrak, 2019; Glonti et. al., 2020) and reduce the risks (Merlo et. al., 2013; Achkasova, 2017; Klapkiv et al., 2017; Pyrkova et al., 2018; Aroshidze, et al., 2019).. This is important for both public and commercial procurement (Wozniak, 2018), (Zimon et al., 2019).

Hypotheses

The effectiveness of public procurement affects the quality of public services and is based on three main factors: accessibility of the public procurement market; quality of organization of procurement activity and quality of performance of the contract.

Methodology and Data

In worldwide practice, key performance indicators (KPIs) are widely used as a tool to measure goals. The KPI formulation process is reflected in ISO 9001: 2015, which defines performance as the degree of achievement of planned results (the ability to navigate results) and efficiency - the ratio between the results achieved and the resources expended.

First of all, it is necessary to separate cost savings, performance and cost-effectiveness (fig. 1), since in the scientific literature these concepts are the same. But this is not correct.

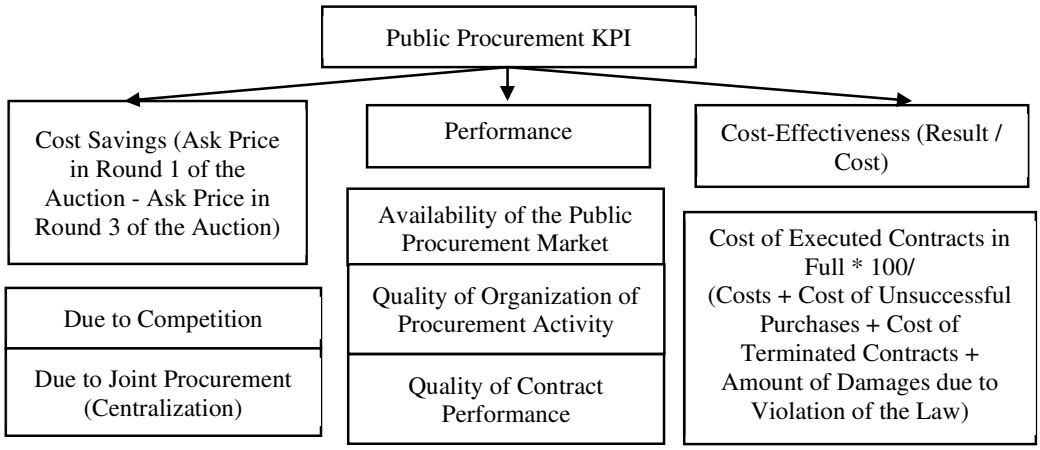

Fig. 1: KPI for measuring public procurement

Thus, performance indicators are the accessibility of the public procurement market; organization of procurement activities and performance of the contract. In order to determine what factors lead to procurement performance, the categories were divided into quantifiable subcategories. As a result, we obtained 12 criteria, the method of calculation of which is described in table 1.

Table 1: Criteria and methodology for evaluating public procurement performance

№	Criteria	Calculation formula	Justification of the criterion
The accessibility of the public procurement market			
1	The proportion of procurement participants to all economic entities in the country, %	The number of entities of the large, medium, small, microenterprises in Ukraine participating in procurement for the year * 100 / The number of entities of the large, medium, small and microenterprises in Ukraine per year.	It is an indicator of the level of awareness, interest and confidence of the business in the field of public procurement. It affects the level of competition in competitive procurement procedures and the amount of cost savings due to the competition factor.
2	Percentage of participants-subjects of medium, small and micro-enterprises in public procurement, %	The number of entities of the medium, small, microenterprises in Ukraine that are involved in the procurement for the year * 100 / The number of entities of the large, medium, small, microenterprises in Ukraine that are involved in the procurement during the year.	Indicates the availability of small and medium-sized businesses in the field of public procurement.
Quality of organization of procurement activity			
3	Share of unsuccessful purchases by quantity, %	(The number of cancelled procurements annually for the year + The number of procurements that did not occur in the year) * 100 / The number of announced procedures per year.	Negatively affects the performance of public procurement of the organization (institution, enterprise).

4	The share of unsuccessful purchases by value, %	(Estimated cost of cancelled purchases for the year + Estimated cost of purchases that have not occurred in a year) * 100 / Estimated cost of announced procedures for the year.	Reduces the economic efficiency of public procurement of an organization (institution, enterprise).
5	Percentage of unsuccessful competitive boundary* procurement procedures by quantity, %	The number of competitive boundary procedures completed per year * 100 / The number of competitive boundary procedures announced per year.	Negatively affects the efficiency of the auction as a mechanism of public procurement.
6	Percentage of unsuccessful competitive boundary procurement procedures by value, %	(Expected cost of cancelled competitive boundary procedures for the year + Expected cost of competitive boundary procedures that did not occur in the year) * 100 / Expected cost of competitive boundary procedures announced for the year.	Reduces the economic efficiency of the auction as a mechanism for public procurement.
7	Percentage of non-competitive boundary procurement procedures,%	(Estimated cost of the negotiated procedure for the year + Estimated cost of the negotiated procedure for the urgent need for the year) * 100 / Estimated cost of competitive boundary procedures for the year.	There is a risk of a negative effect - collusion and rising prices. One of the indicators for the implementation of the Sustainable Development Strategy "Ukraine 2020" is the limit of the share of non-competitive purchases in the total volume of procurement not more than 30% (Decree of the President of Ukraine «On Sustainable Development Strategy« Ukraine - 2020» of 12.01.2015 No. 5/2015).
8	The average number of participants in competitive boundary procurement procedures	The number of tenderers participating in competitive boundary procedures (lots) / The number of competitive boundary procedures.	A high level (4 or more participants) ensures the effectiveness of the auction mechanism in procurement.
9	The proportion of purchases in which the winner is selected only by price criterion, %	The number of competitive procedures and lots with non-price selection criteria for the winner per year * 100 / The number of competitive procedures and lots per year.	Allows choosing an economically advantageous offer from suppliers on the principle of "better quality at a lower price".
Quality of contract performance			
10	Share of terminated contracts by quantity, %	The number of contracts terminated per year * 100 / The number of current contracts per year.	Affects the degree of satisfaction of public and state needs.
11	Share of terminated contracts by value, %	Cost of terminated contracts for the year * 100 / Cost of current contracts for the year.	Affects the cost-effectiveness of public procurement.

12	Share of current contracts with changes in price and volume of purchase, %	The number of current contracts that changed the price and volume of purchase for the year * 100 / The number of original current contracts.	Affects the effectiveness of the public procurement financing mechanism.

Public procurement performance is measured at two levels:
1 – national (1-12);
2 – customer (3-12).

Table 2 shows the results of the analysis of public procurement performance criteria at the national level. Public procurement performance assessments required the establishment of indicators by each criterion, which was identified through the involvement of experts.

The Ukrainian ProZorro system is considered the best reform in Ukraine and transparent at all stages of public procurement. The main achievements of the system are:

- A significant reduction in transaction costs by replacing paper purchases with electronic ones;
- Access to open data through the Public Procurement Analytics module, which enables effective control over the spending of taxpayers' funds;
- Introduction of automatic indicators of a violation of the law in the field of public procurement for the implementation of public financial control;
- The professionalisation of the public procurement field started due to the gradual rejection of the tender committee.

The main problems of purchasing activity are:

- The orientation of the customers not on the result of improving the quality of public services, but on the use of budget funds and compliance of the procurement procedure with the law;
- The main indicator of public procurement effectiveness is the cost savings, the value of which is calculated as the difference between the expected value of the tender and the lowest bidder's bid price, which is unjustified in complex procurement (construction work). Procurement with contracts terminated was made with a saving of 1.4 billion UAH, which is 4.4% of the total cost savings;

Table 2: Public Procurement Performance Indicators in Ukraine

Criteria	2016	2017	2018	2019	Indicator
The proportion of procurement participants to all economic entities in the country, %	3,53	7,07	8,05	-	≥ 10%
Percentage of participants-subjects of medium, small and micro-enterprises in public procurement, %	-	-	-	96,5	≥ 50%
Share of unsuccessful purchases by quantity, %	23,7	14,7	13,2	9,4	≤ 10%
The share of unsuccessful purchases by value, %	34,9	30,3	33,2	32,9	≤ 10%
Percentage of unsuccessful competitive boundary* procurement procedures by quantity, %	52,6	47,6	50,5	43,6	≤ 10%
Percentage of unsuccessful competitive boundary procurement procedures by value, %	49,8	39,1	44,1	43,2	≤ 10%
Percentage of non-competitive boundary procurement procedures,%	18,8	16,1	14,7	15,2	≤ 10%
The average number of participants in competitive boundary procurement procedures	2,86	2,68	2,67	2,76	≥ 4
The proportion of purchases in which the winner is selected only by price criterion, %	-	-	-	0,8	≥ 10%
Share of terminated contracts by quantity, %	5,0	7,0	7,0	7,0	≤ 10%
Share of terminated contracts by value, %	9,0	12,0	5,0	14,0	≤ 10%

Share of current contracts with changes in price and volume of purchase, %	15,0	31,0	20,0	44,0	≤ 10%

** according to the Law on Public Procurement, boundary procurement procedures are purchases of goods and services with an expected value of 200 thousand UAH (approximately 7 thousand EUR), works - 1 million UAH (approximately 36 thousand EUR). The share of unsuccessful purchases (criteria 3, 4) include canceled procurements and purchases that have not taken place and does not include terminated contracts (criteria 10, 11).*

- Low competition and a high proportion of unsuccessful purchases. The Public Procurement Law of Ukraine establishes a boundary procurement requirement for a minimum number of participants (at least two), otherwise, the tender is cancelled. Given the low level of competition, the participants informally agree to simulate the tender to obtain a contract that is not in competition. In such circumstances, both the players and their tender prices are known;

- Customer dissatisfaction with the performance of contracts by the winning tenderers.

The results of the study showed that in general public procurement in Ukraine is ineffective.

The focus of public procurement reform solely on the fight against corruption has led to ineffective control of public procurement by public financial control authorities over the identification of unjustified needs, inflated purchase prices, unjustified rejection of the bidder's best offer for formal reasons, rejection of bidding. This was the result of the imperfection of national legislation. According to the results of an electronic survey of procurement participants on the impact of corruption, it turned out that more than 24.2% of respondents have experienced corruption in procurement, but noted that corruption has decreased; 89% of respondents experienced dumping by competitors (ProZorro, 2020).

We conducted interviews with customers who were trained in the Public Procurement Program at the Kyiv National University of Trade and Economics during September-October 2019. The questionnaire contained two questions: 1. How do you assess the level of satisfaction with the choice of the winning suppliers through an electronic system at the stage of contract performance? 2. What is the main reason for dissatisfaction with the winning suppliers?). 65 interviewees from 33 bidding organizations participated in the interview. According to the research, more than 60% of customers are dissatisfied with suppliers (Fig. 2).

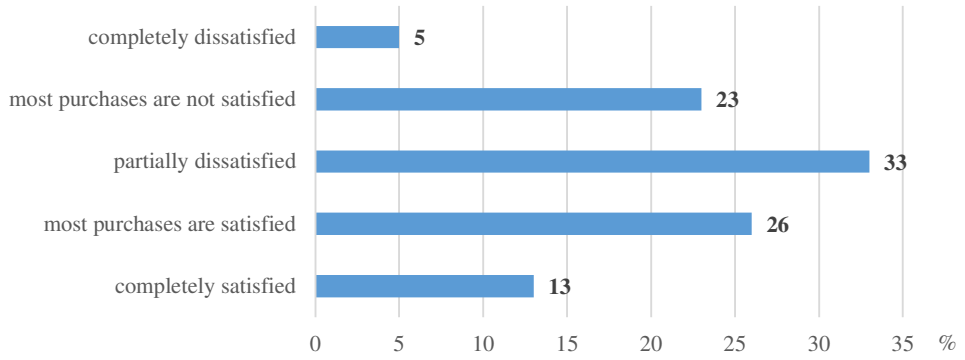

Fig. 2: Distribution of respondents' answers regarding the degree of customer satisfaction with the choice of winning suppliers through an electronic system ProZorro, %

Customers note the fact that bidders are dumping at the auction, knowing that they will not be able to fulfil the terms of the contract. That is why the scheme of making amendments to the signed agreements is quite common in Ukraine. So, after signing the contract with the supplier-winner received a certificate from the Chamber of Commerce and Industry of the actual price requires the customer to make a change to the contract. This is most often done by raising the price per unit and reducing the number of goods. Under these conditions, the contract value does not change. These circumstances force the customer to agree to change the conditions because the customer does not want to start a new tender procedure. Therefore, the effectiveness of public procurement should focus more on the quality of contract performance.

Results and conclusion

The results of the study show that the criteria for the effectiveness of public procurement, the measurement of which is available in the module of analytics of the electronic system ProZorro (2020), are the proportion of procurement participants to all economic entities in the country; share of unsuccessful purchases; share of non-competitive purchases; the average number of participants in the tender; share of contested purchases in favour of the complainant; share of terminated contracts; share of current contracts with changes in the price and volume of purchase.

An analysis of public procurement performance in Ukraine showed that during 2016-2019, the level of public procurement performance was consistently low, namely the high proportion of unsuccessful procurement, the low level of competition, the increase in the share of contracts being cancelled and contracts to reduce procurement volumes due to lack of financing.

Discussion

Increasing the efficiency of public procurement will enable new procurement methods, such as electronic catalogue procurement, joint (centralized) procurement, and the implementation of a life-cycle costing criterion. Also, it is important to use the voluntary certification of reliable suppliers to confirm the level of qualification (including financial and economic status) can significantly improve the quality of contract performance. Priority objectives of regulatory policy should be the adoption of appropriate regulations on the use of "green" procurement, the development of functional and "green" specifications and life cycle cost calculator.

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Photovoltaics as A Tool for Managing Household Finances

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Abstract

This article attempts to assess alternative ways of investing financial surplus by households. One way to increase household income is to invest surpluses in photovoltaic cells. The methods of assessment of investment projects showed a higher profitability of such investment in relation to financial instruments with low risk and income. Despite the positive results of the investment analysis of the project, one should remember about the limitations in this type of surplus investment by the household, which is also presented in this study.

Keywords: photovoltaic installation, household, finance, investments.

Introduction

Currently, in Poland and throughout Europe, we are dealing with the phenomenon of low interest rates. Historically, they are at the lowest level in almost 30 years. On the one hand, this means a relatively low cost of capital for borrowers, on the other, very low income from low-risk financial instruments. The exceptional stability of interest rates in Poland should also be emphasized, as the main rates of the central bank have not changed for 5 years. This tendency will probably continue for many years. This article attempts to assess alternative ways of investing financial surpluses by households in the context of low interest rates on financial market instruments such as bank deposits, bonds and low risk funds. Nominal income from such investments is at most 3 percent, and it should be taken into account that this negligible income is still taxed at a rate of 19 percent, which further aggravates their low attractiveness. The increase in inflation in 2019 caused a further decline in real rates to negative values. A way that can increase household income is to invest their surpluses in photovoltaic micro installations, the profitability of which is presented in this study.

Household as An Entity of The Financial Market

The household sector is heterogeneous, which then leads to different divisions and classifications of households, and to problems in comparative analysis (Hoffmeyer-Zlotnik, Warner 2009, p. 1-26). Not only in Poland but also in the world, scientists are trying to emphasize the importance of household finances (Campbell 2006, p. 1553–1604).

Household finances cover the most numerous group of market stakeholders. Based on the assumption that, according to the classification of the European Central Bank as well as the National Bank of Poland, households are divided into: private individuals, individual entrepreneurs and individual farmers, household finances can also be classified according to this scheme as: personal finances, finances of individual entrepreneurs and individual farmers. Household finance as a scientific subdiscipline includes the study of theoretical phenomena and relationships. It should be noted, however, that it has broad practical application in economic reality. The subject of interest in household finances is extremely extensive, as it relates to: savings, investing, credit, spending (consumption), insurance, taxes, income, pensions, wealth, etc. (Świecka, Musiał 2016, p. 823).

The household is an active participant in the market. The market in economics is understood as an institution enabling transactions between producers and consumers. The market can be divided, taking into account the household, among others into the labor market, goods and services and the financial market (Podolec, Ulman, Wałęga 2008, p. 15-16).

Some households have a surplus of free cash and often decide to invest them hoping for greater profit. Such transactions are carried out on the financial market and are concluded between capital providers and borrowers.

In literature, the financial market is defined in a broad and narrow sense. In a broader sense, the structure of the financial market includes not only money-related activities, their flow but also economic activities based on money trading. In the narrower sense, the financial market contains decisions related to cash, whose task is to protect the value of money held or its increase in future periods. Financial markets enable the creation over time of investment and consumption structures in economic entities and increase the efficiency of resource use in the economy. Financial markets enable investors to diversify the portfolio of assets held, thus limiting the risk of investment, they also provide financial information about business entities in the form of financial statements, especially for listed companies. (Szrama 2010, p. 8-9).

Modern financial markets are very complex, consisting of many different entities issuing and purchasing financial instruments and brokers of trading, as well as modern technical means enabling transactions. Financial markets can be classified according to various criteria, three classifications are of primary importance. The financial goods market can be divided into: money and capital. The first of them lasts only for one year, the market's entity are securities and deposits. In turn, the capital market is based on making long-term transactions such as the purchase of shares or bonds. Households can participate in both markets, primarily as entities depositing financial surpluses. The amount of assets collected in the form of financial instruments by a household is influenced by factors such as (Świecka 2008, p. 28):

– financial tradition and culture,
– level of financial market development,
– at least average propensity to save.

The amount of savings depends on the profitability and efficiency of the household. Namely, this relationship consists in dividing the obtained income into current consumption and savings goals. Increasing monetary resources for consumption causes a decrease in savings and vice versa. In income management, therefore, a so-called "golden mean" should be found that allows shaping the balance between the expenditure and saving sphere of the household. Saving can be voluntary or forced. Voluntary saving consists in voluntary resignation from spending income for consumption purposes. On the other hand, forced saving consists in allocating part of your income to repay e.g. a bank loan (Bywalec 2009, p. 163).

There are six types of saving strategies. The first strategy is a low risk strategy. Households with savings in the form of bonds use this type of strategy. This strategy is used by households with the following socioeconomic and demographic characteristics (Anioła, Gałaś 2013 p. 1-11):

– households of pensioners,
– households whose place of residence is a city,
– educated members of the household are medium or higher,
– households with health problems or disabilities,
– farms with average or higher income.

Another austerity strategy is the so-called conservative strategy. Over half of households in Poland using this strategy, investing all their savings in the form of PLN deposits. Households using this type of strategy are characterized by a lack of cash savings. The conservative type of strategy is characterized by a low saving rate. This strategy is used by households in which:

– members are middle and older,
– farms embedded both in the city and in the countryside,
– households with an average level of income.

The third type of strategy is extremely passive. About 25% of households in Poland use this type of strategy. Households have 100% of their savings in cash. The passive savings strategy is characterized by a very low savings rate. Households using a passive saving strategy use loans and borrowings, however, the value of their debt does not exceed their monthly income. Farms of this type show that they have difficulty making ends meet. This strategy is used by middle-aged households who live in the countryside and are often run by widowers. The fourth type is an extremely conservative strategy. It is used by households that invest their savings in bank deposits and in cash. This strategy is characterized by an average saving rate. Households using this type of strategy are characterized by income stability and thus have no problems with making ends meet. Only one in four households using this strategy must use loans. The extremely conservative strategy is used by households in which members of households are older and middle-aged, the location of households is both the city and the village and the income is obtained from hired work.

The next strategy is a diversification strategy. This type of strategy is used by the smallest number of households, only 0.4%. The type of saving is characterized by a variety of forms of saving and the lowest saving rate. Households using a diversification strategy very rarely use loans. Nevertheless, if they already contract them, the value of this debt is high, usually exceeding their annual income. This strategy is used by households with the following socioeconomic and demographic characteristics:

- low age of household members,
- farms where the head of the family is a man,
- households located in large cities,
- households with minor health problems,
- household members have a secondary or higher education,
- income is earned from hired work or from running your own business.

The last sixth saving strategy is aggressive. About 1.6% of households that are not afraid to take risks use this type of strategy. Farms using this strategy show the highest level of debt exceeding their annual income. This strategy is used by households in which (Anioła, Gałaś 2012 p. 1-11):

- low age of household members,
- high level of education of household members,
- households whose members are single,
- earned income is higher than average,
- households have a low level of disability.

In households, the conservative strategy is the most important and extremely passive based on saving in the form of bank deposits and / or cash. In Poland, households most often use banking services, placing their money in the form of deposits secured by the Bank Guarantee Fund. In contrast, in countries such as the USA, Great Britain, a significant proportion of household funds is allocated to pension funds (Czapiński, Panek 2014 p. 87-92).

In 2018 in Poland, there was an increase in real average monthly total disposable income per person - by 4.3% (in 2017 an increase of 6.3%). This applied to all socioeconomic groups of households, except for households of farmers, in which income in nominal terms remained almost at the same level as in 2017, and in real terms fell by 1.5%. The highest real increase in income was recorded in households of retirees (by 4.4%) and employed persons (by 4.2%). The real decrease in disposable income in the group of farmers' households was mainly due to the real decrease in income from an individual farm compared to 2017 (by 5.3%). The highest share of income from the main source of income was recorded in the households of pensioners (82.7%), and the lowest in the households of farmers (66.6%) (www.stat.gov.pl).

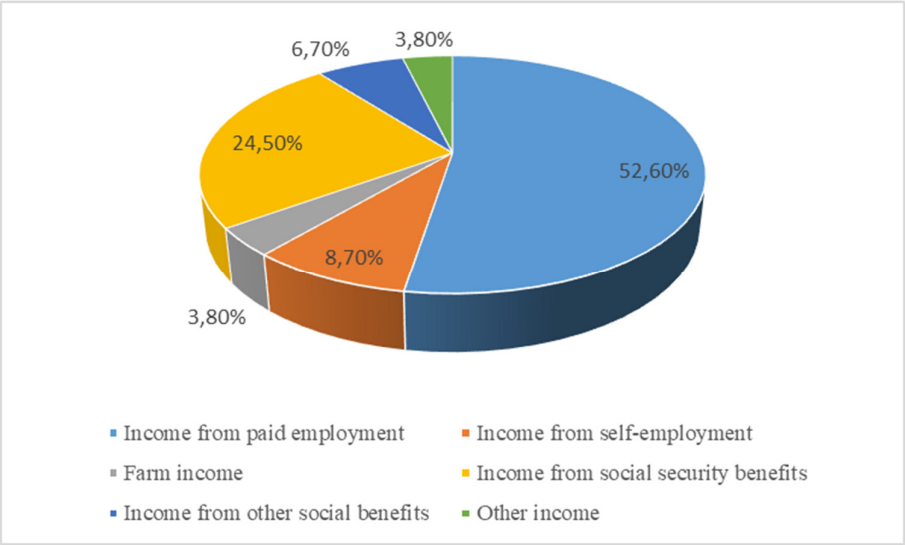

Fig. 1: Structure of average monthly disposable income per capita in households in total in 2018

Source: own study based on www stat.gov.pl.

The average net assets of a household in Poland amounted to 60.6 thousand euros accounted for approx. 58% of the median net assets of a household in the euro area (104.1 thousand euros), the vast majority of households own the main residence (79.2%) and motor vehicles (65.8%). Much less often, respondents declared valuable items (29.4%), other real estate (24.3%) or business property (20.4%) as components of their property. Financial assets have 90.8% of households, with bank deposits being the most popular form of raising funds (84.9% of households), although the average value of assets accumulated in this form is relatively small (about EUR 3 thousand) (www.nbp.pl).

Development of photovoltaic installations in Poland

The solar sector in the country is developing very dynamically, in 2019. increased to 1300 MW, which means a dozen or so growth in recent years. Despite such a large increase in installed power from solar farms, this technology still has great potential for development, especially when compared with other available energy sources. Most investments operate in the Podkarpackie, Śląskie and Kujawsko-Pomorskie voivodeships.

Photovoltaic panels operate on the principle of a photovoltaic effect, for which light is needed, so even on cloudy days photovoltaic works well with electricity production. However, the highest efficiency is achieved in sunny weather, which we have relatively many in Poland, which translates into an average energy yield of 950 kWh per year from one kilowatt solar cell power (about 6 m2). To cover the annual average electricity demand of an average Polish family, it is enough to cover 18m2 of roof with photovoltaic panels. According to the Central Statistical Office, the average energy consumption per person in Poland in 2018 ranged from 824.3 kWh to 904.5 kWh. (www.stat.gov.pl). The small solar plant consists of photovoltaic panels, inverter, cabling and assembly system. The cost of devices is the largest component of the installation price. Comparing these costs to the price of other devices in the home or business, such as central heating furnaces, heat pumps, home sewage treatment plants or interior furnishings, the expenditure on photovoltaic installations is not at all greater. Branded devices that make up the solar power plant have a long warranty. It is at least 10 years for panels and 5 years for inverters. The service life of the devices is also very long, for good solar modules it can reach up to 30 years. In addition, the expense associated with the launch of solar micro-installations begins to pay off immediately, resulting in a significant reduction in electricity bills.

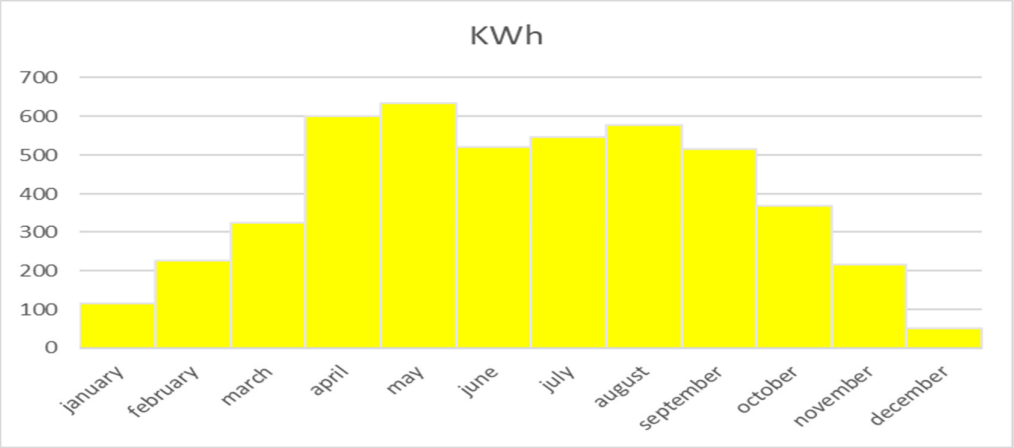

Fig. 2: Production of energy from the 4.32 Wp - 4701 kWh installation

Source: own research.

The legislator, wanting to encourage the installation of photovoltaics, allowed the storage of surplus energy in the network in the summer and collection them in the winter months in order to compensate for slightly worse results of electricity production in the winter. Thanks to this, we can balance our energy demand with production from solar farms throughout the year and reduce electricity bills to subscriptions and fixed fees. Figure 2 shows the distribution of energy production from 4,32 kW installations. Three years of research indicate that the distribution of energy production varies from month to month, however, annual production is very similar. The solar installation on the roof or ground is practically maintenance-free. Branded solar inverters themselves inform about faults, therefore there is no need for continuous personal monitoring of the installation status. Inverters connected to the internet can send information about the failure directly to the service technician so that in the event of a failure he can react quickly and resume the production of free energy. The legislator imposed on power plants an obligation to connect microinstallations with a capacity of up to 40 kW. He also ordered the operator to cover related costs, such as replacing the meter with bidirectional. The requirements for devices and installers are strictly defined in the Act and after their fulfillment and submission of complete documentation, the energy operator has 30 days to connect microinstallations. Prosumer's introduction of energy into the grid is also beneficial for operators for several reasons. They can sell energy from a photovoltaic installation to their nearest customer saving on transfer from a remote power plant. Poland must also comply with international obligations regarding the share of renewable energy in total electricity production. It is also worth paying attention to the fact that the greatest demand for electricity, which is in the summer, occurs during the period of the highest productivity of photovoltaic installations, which will relieve conventional power plants overloaded during this period and reduce the possible need to import electricity.

Cost-Effectiveness of A Photovoltaic Installation

The cost of investing in a photovoltaic system is related to the total power of photovoltaic cells and the place where the installation will be built. Small photovoltaic installations, up to 10 kW, are located on the roofs of buildings. Systems with power above 10 kW are usually mounted on the ground with the help of support structures. Expenses related to the preparation of the installation project are incurred first and represent a small percentage of the entire investment (Fig. 3). As a rule, however, especially for the smallest installations, the project is carried out for free by the contractor, but probably its cost is included in the total cost of installation.

Over 2/3 of expenditure is the purchase of devices with all electrical equipment. The inverter, ensuring the change of the parameters of the current flowing from the panels to those required for home receivers (alternating, 230 V, 50 Hz), costs several thousand zlotys, while other small accessories such as

mounting constructions, cables and assembly - another several thousand. The average unit costs for small installations below 10 kW, assumed on the roofs of buildings, are in the range from 4000 to 5000 PLN / kWp (EUR 930 to 1370). Roof installations are cheaper due to a lower VAT rate of 8% against 23% for ground installations. The total power of electric receivers, together with household appliances and lighting (without electric heating), may exceed 30 kW. Building an installation that satisfies at least half of this power will be expensive and will take up a lot of space. At the same time, it is rare that most of them operate simultaneously, so it is recommended that the peak power of the solar installation for a single-family house should not exceed 5 kW. A system with this power will occupy approx. 33 m2 of roof.

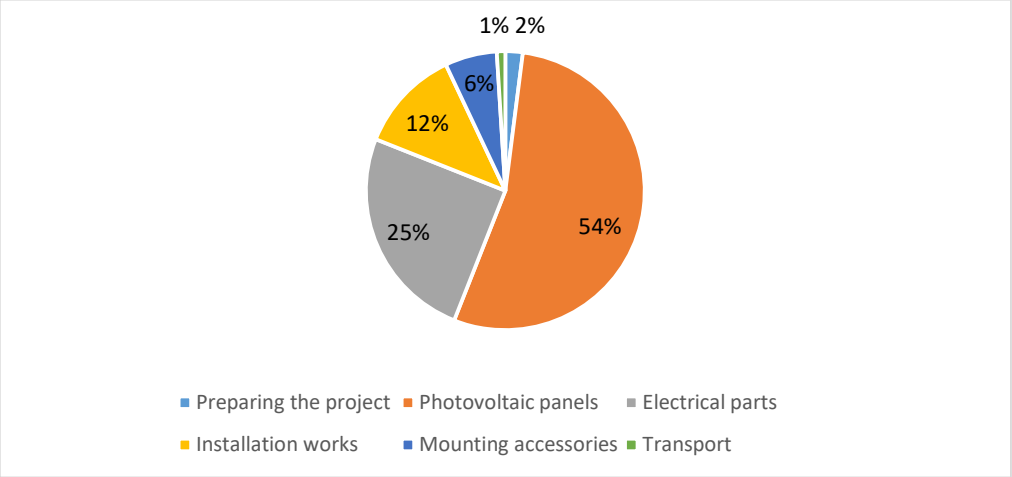

Fig. 3: Expenses related to the solar system

Source: own research.

In the analyzed photovoltaic investment, implemented in the Częstochowa poviat, 16 Sharp panels with 270 Wp capacity were installed. Total installation has a power of 4.32 kWp. The installation includes a 4 kW FRONIUS single phase inverter. The unit cost of the installation was 4.4 thousand. PLN/kWp, the total value of investment outlays is 19 thousand PLN (EUR 4420). Thanks to the 4.32 kW photovoltaic installation, savings with the highest efficiency of the system is PLN 1,800 per year. The final value of the project was omitted in the calculations due to its negligible value. Investment flows also include expenditure on repairing the installation in the middle of the investment's operation. According to producers, the life span of photovoltaic cells is estimated at 30 years and this was the life span of the project used in the analysis. It is worth adding that many products available on the market have a warranty of 25 years, at least 80% of the output power obtained from photovoltaic cells.

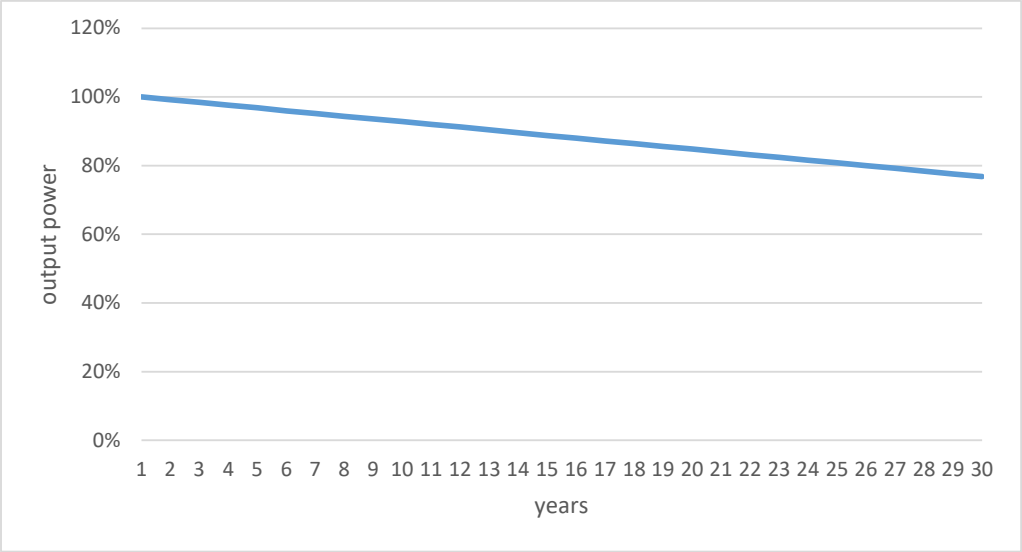

Fig. 4: Example relationship between the output power of a solar panel and the length of service life in years

Source: own research.

Figure 4 shows an example of the dependence of the photovoltaic panel output power on its years of use. As you can see, the decrease in power over time is a linear (decreasing) function. This is also the way the system efficiency was adopted in further analysis. From the observations and tests of the photovoltaic installation carried out over the last 3 years, it was not found that such a large decrease in power could improve the efficiency of the installation.

Table 1 presents the results of research on the profitability of solar farms. The discount rate was adopted as the average interest rate on 12-month deposits from five banks that offered the best terms according to the banks' offers at the end of 2017. The net present value (NPV) of the investment is positive, which means that it is more beneficial to implement such an investment than, for example, investing cash in a bank deposit bearing an interest rate of 2%. Internal rate of return (IRR) indicates the profitability of the project in the amount of 7.54 percent, however, one should remember about the limitations of this method, because it assumes reinvesting surpluses according to the obtained rate of return, which in this case will not be possible. The payback periods of the investment under consideration are long and amount to 11 years and almost 14 years for the discounted version of this method.

Table 1: Solar plant profitability test

Year	**2017**	**2018**	**2019**	**2020**		**2044**	**2045**	**2046**	**2047**
Investment outlays	-19000								
Savings		1800	1785,6	1771,2		1425,6	1411,2	1396,8	1382,4
Cash flow	-19000	1800	1785,6	1771,2		1425,6	1411,2	1396,8	1382,4
Discounting factor for discount rate = 2%	1	0,9804	0,9612	0,9423		0,5859	0,5744	0,5631	0,5521
Discounted cash flow	-19000	1764,71	1716,26	1669,04		835,20	810,56	786,56	763,18
NPV	15953,35								
IRR	7,54%								
Return period	11	years	0	months					
Discounted return period	13	years	7	months					

Source: own research.

Table 2 shows the situation in which capital expenditure is 60 percent. financed from subsidies. The value of co-financing was adopted conservatively, as it is usually at a much higher level. In this case,

all indicators improve, but even the payback periods, which have not previously had satisfactory values, reach very favorable ceilings close to the length of frequently established bank deposits or other financial investments.

Table 2: Study of the profitability of a photovoltaic installation co-financed from public funds in the amount of 60%

Lata	0	1	2	3	…	27	28	29	30
Year	**2017**	**2018**	**2019**	**2020**		**2044**	**2045**	**2046**	**2047**
Investment outlays	-7600								
Savings		1800	1785,6	1771,2		1425,6	1411,2	1396,8	1382,4
Cash flow	-7600	1800	1785,6	1771,2		1425,6	1411,2	1396,8	1382,4
Discounting factor for discount rate = 2%	1	0,9804	0,9612	0,9423		0,5859	0,5744	0,5631	0,5521
Discounted cash flow	-7600	1764,71	1716,26	1669,04		835,20	810,56	786,56	763,18
NPV	27353,35								
IRR	22,48%								
Return period	4	years	3	months					
Discounted return period	4	years	6	months					

Source: own research.

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The analysis of these two investment options indicates that in the case of obtaining a subsidy for investments from public funds, the superiority of solar photovoltaic installations against financial investments is indisputable. However, in the absence of such a subsidy, making a photovoltaic investment is no longer so obvious, despite positive financial indicators mainly due to payback periods. This means that the funds will be tied up for a very long period without the possibility of early withdrawal, as practically all financial investments allow.

In order to broaden the research covering investment analysis, surveys were conducted in 2019. The study covered residents of small towns with single-family houses. The research was carried out in two voivodships: Śląskie and Łódzkie. The research shows:

- 94 percent of surveyed households are willing to make a solar investment.
- Usually, the minimum expected return period was 4-5 years.
- Older people are less willing (over 60 years) to undertake such investments, they also expect a shorter payback period.
- All respondents pointed to the need for co-financing from such programs by government programs.
- Only 8% of respondents indicated the possibility of carrying out such an investment without public aid.
- 43 per cent of respondents indicated the possibility of using investments in a solar installation as a way to increase household income.
- 13 per cent of respondents indicated the possibility of using solar investments instead of investing in bank deposits. Such a low result is probably the effect of limited cash resources in Polish households.

Research also carried out among persons who already have such installations. Their implementation allowed to draw the following conclusions:

- The majority are satisfied with having such an installation.
- Respondents point to an increase in electricity consumption at the expense of other energy sources.
- If there were government programs, they would be willing to expand their installations, reducing the consumption of conventional energy sources.
- The biggest limitation in the expansion of renewable energy is the inability to store it and the need to settle accounts with energy suppliers.

Summing up financial analyzes and surveys, it should be stated that photovoltaic investments can be implemented on a large scale if two conditions are met. The first is the support of government programs for this type of investment and the second is the possession of free financial resources by the household.

Summary

The activities of the European Union aimed at increasing the share of energy from renewable sources in the market, and at the same time the uncertainty associated with the exploitation and supply of non-renewable raw materials (coal, gas) point to the great development potential of the solar cell market. Households having a privileged position in this market due to legal regulations may take advantage of the possibilities of increasing their income by constructing such a backyard installation. Undertaking such an investment will depend on the propensity for risk of persons creating a household, however, as research has shown, such an investment will be profitable. Of course, remember about the restrictions of this type of investing surplus by the household. The main disadvantage of this way of using the surplus is the size of investments, which in principle in the case of financial instruments are not limited by a minimum amount, while in the case of a solar installation such investment is at least several thousand zlotys. In addition, exit from financial investments is possible at any time, and in the case of solar investments it is impossible. The advantage is greater income from financial investments, which can be even greater thanks to the use of public funds. Obtaining funding at least 60 percent total expenditure, significantly improves the profitability of investments and minimizes the risk of building the installation. The popularity of photovoltaic investments, and through them the improvement of environmental protection can be achieved not only by financial support from the government or the European Union, but also by raising awareness of the investment possibilities of this type of projects. As indicated in surveys, this awareness in society is small and should be improved by information programs.

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Global Debt: Problem Assessment and Some Strategic Development Aspects

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Abstract

The article analyses the most characteristic trends in the functioning of the world and national economies amid increasing global and sovereign debt dependence. The authors study a number of issues related to the global debt growth: the reasons for it and its manifestation forms, the impact on the economy of certain countries, possible options for resolving sovereign debts. Focus is made on the role of regional interstate associations in reducing risks and threats of debt dependence. The assessment of the economic regionalization policy potential in strengthening the stability of the global economic system is given using the EAEU as an example.

Keywords: Global debt, sovereign debt, regional economic unions, instability.

Introduction

The global debt problem is now impeding the development of the world economy. Large global debt increases the risks for global financial stability and creates limitations for economic growth. Global debt is increasing dangerously amid growing macroeconomic and financial instability, dependence on short-term market expectations, worsening growth prospects in the global economy in the absence of incentives for aggregate demand and stable positive dynamics of its main components, such as manufacturing investment, export, domestic consumption, government spending.

Uncontrolled increase in debt obligations leads to a decrease in the sovereign credit rating, political and economic dependence of borrowing countries on creditor countries. The need to direct more and more funds to pay the external debt diverts resources from key national sustainable development projects and destabilizes the

financial situation in countries. Modern strategies for balanced economic development of states should be aimed at maintaining external debt at a safe level. Amid significant increase in external debt and reducing possibilities for its refinancing, the government debt management policy aimed at timely servicing of public debt at the lowest cost through the optimal selection of debt methods and tools, which does not allow sovereign liquidity or solvency crises, becomes of primary importance. Understanding the nature and development processes of modern debt imbalances, the dependence between fundamental factors, the level and structure of the debt burden, is important to ensure macroeconomic and corporate financial stability, and an efficient economic policy.

The objective of the article is to study the impact of global debt on the state of the world and national economies, analyze the relationship between macroeconomic development and the debt burden level, identify possible development areas for the global economy and individual countries that are able to solve debt problems.

The academic value of this paper consists in stating the problem to find radical solutions for reforming national economies, taking into account the problem of increasing global debt and formulating some proposals in this area. In particular, it becomes necessary to clarify the possibilities of building a balanced regional economy, which allows on a mutually beneficial basis to fully utilize the production factors of individual states and reduce systemic risks caused by debt dependence.
The practical importance of this study is that the research results can be used to justify and implement foreign and domestic debt policy strategies at the macro- and micro levels, as well as in selecting principles and mechanisms for debt financing of the Eurasian Economic Union member states.

Materials and Method

The main provisions of the article are based on the application of modern scientific methodology, presented by the concepts of debt analysis by J. Stiglitz, B. Bernanke, S. Gesell, C. Kennedy and others. Debt problems are studied in the article together with the reproduction of the existing capital structure in the global economy and national economies. The logical approach to considering the evolution of debt relations in a global context, the analysis of quantitative indicators of debt, together with an analysis of the qualitative characteristics of the economic development of certain groups of countries, made it possible to substantiate the challenges of monetary and debt stimulation of the economy.

The debt problems were studied in several interrelated areas: analysis of the sources and features of the global debt structure, identifying the specifics of the national debt level, principles and methods of debt settlement through economic regionalization processes. To analyze the scale and pace of change in global debt, the indicators of international monetary and financial organizations were used: the International Monetary Fund, the World Bank, the Bank for International Settlements,

UNCTAD, the World Economic Forum, as well as statistics from the Eurasian Economic Union and the Bank of Russia.

Results

The modern economy is characterized by an increase in the debt burden. The dynamic development and liberalization of the international financial market has increased the level of dependence of different countries on external financing sources. The potential of the international financial market today can meet almost any need. The diversified assortment and cost of international financing sources, convenient and simple fundraising schemes are attractive. Opportunities of the international financial market, as a source of financial revenues, are widely used by government agencies, financial and non-financial private companies, and international financial organizations.

External and internal financing expands financial opportunities to support national economies. Almost all countries across the world implement debt mechanisms in the course of market reforms. Injecting cash and loans into the national economy encourages economic growth, the spread of financial innovations, and increased concentration of financial markets. In the course of history, debt instruments have proved to be effective in stimulating economic development. Future cash flows, being the result of earning investments through today's debt financing, provide revenue growth and debt repayment opportunities. With the efficient spending of borrowed resources on projects with a high multiplier effect, economic growth accelerates, priority investment objects are implemented, and socio-economic problems are solved. At the same time, monetary and debt stimulation does not always promote investment growth. It all depends on preference levels in terms of liquidity, marginal efficiency of capital, and propensity to consume. If the financial resources of external origin are used inefficiently, debt obligations increase, which leads to extra budget expenditures, reduction of government spending, pressure on the national currency exchange rate and tension in the monetary sphere. Then external debt burden becomes a threat to the sustainability of national economies.
An array of problems is connected with the tension in the global debt market. The growth of global debt affects the international and domestic liquidity of individual markets, causing significant, sometimes sudden, capital flows that expose national markets and create risks to economic and financial stability. Unsustainable household debt and the excessive borrowing of financial institutions in the United States became the reasons for the 2008 global financial crisis. Exceeding the reasonable limits of the sovereign external debt compared to GDP drags countries into debt traps, when a decrease in credit rating due to poor indicators of sovereign or corporate debt increases the external debt service expense and requires more and more borrowings.

Global debt is a serious problem for many countries today. Most national economies, both developed and developing, now have debt some features. Sovereign debts are classified as key systemic risks of the global and national

financial systems. Global debt has grown more than 13 times since the 80s, and over the past decade – by almost 50% reaching a record-breaking $250 trillion in 1Q 2019, which corresponds to 320% of global GDP. In 50 countries of the world, public debt exceeds 70% of GDP, and in 15 countries public debt is above 100% of GDP. Traditionally, advanced economies have accumulated the largest debt. In total, they account for more than half of all loans – about $177 trillion. The United States has been leading in the "debt" race for years. The total debt of the United States today exceeds the country's output, and by 2023 it will reach 117% of GDP. A significant increase in external debt is also observed in China, where the indicator already exceeds 300% of GDP. Argentina and Japan markets are facing similar problems (Fig 1).

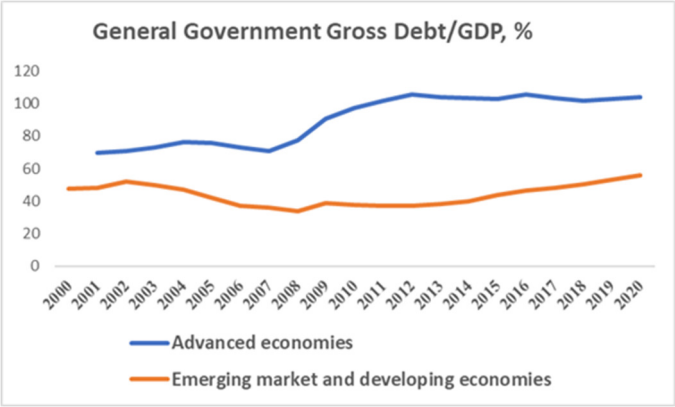

Fig. 1: Dynamics of the "public debt/GDP" ratio by groups of countries, in %

One of the reasons for the significant growth of the global debt today has been the large-scale state support of the private sector during the 2008 crisis. Direct state support of financial institutions only during the crisis amounted to $1.6 trillion. The situation is also aggravated by the ultra-low interest rates set by central banks in different countries and lower requirements for creditors.

Over the past decade, the nonfinancial sector is making an increasing contribution to the growth of global debt. The total amount of non-financial debt in countries with systemically important financial sectors as of the end of 2017 equaled more than 250 percent of their total GDP. 2/3 of Chinese debt is corporate debt, represented mainly by state companies. The debt of Chinese companies exceeds 40% of the corporate debt of emerging economies. It is increasingly difficult for the global economy to cope with such huge and poorly managed debt. Under these conditions, the risk of potential defaults, recessions, increases sharply. In 2018, 18 thousand companies went bankrupt in China, while defaults on bonds were five times higher than in 2015.

Discussion

International monetary and financial institutions and national governments are coordinating their efforts to reduce the vulnerability of global and national economies connected with the growing debt, but agree that there can be no universal solution in this sphere. Measures to improve debt management are being developed aimed at increasing the transparency and acceptability of sovereign debt as well as easing the debt burden of poor states. Funding sources are being searched for in order to implement the Sustainable Development Goals (SDG) program in the developing countries, which is expected to require at least $2 trillion per year annually, including through the use of concessional lending schemes and the global SDG fund.

It is proposed that one of the ways to release the developing countries from debt traps, to support the effective mobilization of domestic resources, it to strengthen regional monetary cooperation between developing countries for refinancing, expand intra-regional trade and develop intra-regional value chains, as well as encourage full-scale development of regional payment systems and domestic clearing unions. Quite positive effects of the European Economic Union's monetary policy during the European debt crisis give reason to consider interstate economic regionalization as one of the central strategic formats for the debt development of the world economic system. Let us analyze the potential of regional economic cooperation of developing countries in the context of solving the global debt problem taking the Eurasian Economic Union (EAEU) as an example.

The principles of the EAEU allow creating conditions for mitigating debt contradictions and preventing the transformation of borrowed capital from a long-term financing tool designed to unleash the future growth potential into a potentially risky financial asset. The EAEU is implementing a coordinated macroeconomic policy, which includes the development and realization of joint actions by member states in order to achieve a balanced development of the economies of member states, to ensure their resistance to external influences based on the integration potential of the Union and the competitive advantages of each member state, as well as their effective interaction. Specific quantitative values of macroeconomic indicators showing the sustainability of the economic development in member states were specified (Table 1) for these purposes. These include the size of the annual deficit of the consolidated budget in the general government sector, the debt in the general government sector, and the inflation rate. Considering that the state budget affects investment attractiveness, motivates capital outflows/inflows, it can be assumed that this system of indicators contributes to the optimization and debt burden of the EAEU member states.

Table 1: Macroeconomic indicators of the EAEU sustainable economic development

Indicator	Quantitative value, not higher than
Annual consolidated budget deficit of general government sector	3% of GDP
Debt of general government sector	50% of GDP
Inflation level	5 percentage points of minimum inflation in member states

A high share of foreign currency liabilities in the public debt structure aggravates the problem of the debt dependence of the EAEU member states on external factors. In the EAEU in general, as of October 1, 2019, external debt amounts to $1.2 billion. Its annual increase equaled 0.2%. The external debt of Armenia over the past year has grown by 7.6%, Belarus – by 1.3%, Kyrgyzstan – by 3.0%, Russia – by 1.0%. In Kazakhstan, external debt over this period decreased by 2.2%. The ratio of external debt and GDP is 36.1% on average in the EAEU. The dynamics of this indicator varies across the EAEU member states (Table 2). In Armenia, Belarus and Kyrgyzstan, the debt of government bodies prevails, while in Kazakhstan debt on direct investments (intercompany lending) and in Russia debt of other sectors prevail. All EAEU member states share a common trend of declining debt to external creditors and growing external debt in relation to GDP.

Table 2: Dynamics of the external debt/GDP indicator in the EAEU member states, %

Country	**Years**							
	2012	2013	2014	2015	2016	2017	2018	2019
Armenia	38,1	36,5	35,3	43,7	51,5	53,4	52,8	87,9
Belarus	23,9	22,5	22,5	32,6	41,5	42,1	40,6	64,0
Kyrgyz-stan	11,7	12,2	14,1	17,5	19,2	19,7	19,4	89,7
Kazakh-stan	48,6	45,4	48,6	57,1	58,9	59,7	57,4	101,1
Russia	9,1	9,8	10,8	11,4	11,9	12,0	11,6	28,6

All EAEU member states have adopted public debt management strategies sharing a common target – debt burden optimization, but by different means of implementation, taking into account the heterogeneity in the macroeconomic development of the regional association participants, the level of integration into the world economy, mutual trade volumes, etc.

The Republic of Armenia defines 4 target indicators for public debt management:

1) the average maturity of a state debt is 8-11 years,
2) the share of treasury securities with a maturity next year in the total volume of treasury securities (at the end of the year) – no more than 20%,
3) the share of fixed rate debt in the total debt is not less than 80%,
4) the share of domestic debt in the total debt is at least 20%.

The Republic of Belarus established that
1) procurement of unrelated state loans shall be carried out solely to repay the state debt and replenish gold and foreign currency reserves as well as it shall not exceed half of the annual need for repaying the state debt;
2) payments for servicing the state debt shall be made at the expense of the republican budget;
3) the ratio of public debt to GDP shall not exceed 45 percent.

The Republic of Kazakhstan has introduced the following restrictions to maintain the state, quasi-public and external debt of the country at a safe level:
1) public debt in 2020 should not exceed 27% of GDP, including the governmental debt – 25% of GDP;
2) external debt in the medium term should not exceed 100% of GDP;
3) the upper limit of public debt and the debt of the quasi-public sector shall total no more than 60% of GDP, excluding the mutual obligations of state-controlled organizations and the obligations of controlled non-resident organizations.

The Kyrgyz Republic has recommended that the present value of government debt to GDP, taking into account the remittances of labor migrants, shall not exceed 56% in 2020.

The debt policy of the Russian Federation identifies the following main areas:
1) achieving the optimal ratio of duration and yield of sovereign debt obligations;
2) restoration and increase of credit ratings;
3) the development of reasonable guidelines for the level of credit risk and the improvement of the system for monitoring the risks of external borrowings for corporate borrowers;
4) stimulation of the Russian territorial entities and municipalities to conduct a responsible debt policy;
5) increasing the adaptability of the mechanism for providing state guarantees to the needs of economic growth and diversification of its structure;
6) to ensure that the ratio of public debt to gross domestic product is not higher than 20%.

The security of sovereign debt in the EAEU is also supported by the fiscal policy of member states through control of current expenditures, limiting the budget deficit indicator, and the creation of sovereign wealth funds (in Russia and Kazakhstan). The budget rule in Armenia and Belarus establishes a “debt anchor”, which includes three thresholds for the public debt level – 40%, 50% and 60% and 45%. Kyrgyzstan has started planning to use the “debt anchor” at 70%. Kazakhstan dos not have such “anchor”, however, there is a limit for the costs of paying off and servicing the government debt in the amount of 15% of the republican budget revenues. In the Russian Federation, due to a relatively low rate of public debt, debt ratio standards have not been defined. Such stabilization mechanisms of a budgetary nature, while preventing the excessive growth of government spending and

smoothing out the negative external impact on the budget system of an unfavorable political and economic global environment, have a positive effect on the size of the debt overhang.
To a certain extent, the problems of external debt in the EAEU states are connected with the state of their balance of payments and low adequacy of international reserves. In the EAEU, only Kazakhstan and Russia have a positive trade balance. Only Russia has high coverage of external debt with international reserves (112.1%). In other EAEU member states, this indicator ranges from 18.3% to 26.4%. Although in recent years, all EAEU member states, except Kazakhstan, have observed a positive trend in the dynamics of the international reserves and external debt ratio.

Regional cooperation within the EAEU creates the conditions for flexible debt management, achieving a balance between financial needs and obligations. The EAEU common market is a growth factor for all the member states. The expansion of mutual trade within the Union reduces pressure on the EAEU member states in industrialized countries and allows using relative advantages of national economies amid the most favored nation treatment. If the global economy today is characterized by negative expectations of imbalances in world trade due to trade protectionism escalation, then in the EAEU, the volume of mutual trade is gradually increasing. Following the results of 2019 (January-November), the growth of mutual trade amounted to 0.2%. In 2018, the export of Armenia and Kyrgyzstan to the EAEU member states increased faster than with other countries, and Belarus saw outperforming growth rates of imports from the EAEU member states. As a result, trade costs are reduced, revenues from external deliveries are increased, negative external influence is slowed down and currency risks are reduced, since national currencies are increasingly used for settlements. The share of the dollar in the mutual settlements of the EAEU member states in 2018 amounted to 19.2%, the euro – 6.8%, and the Russian ruble – 72.7%. The stability of the EAEU member states financial income can be achieved thanks to the EAEU internal market, which is extremely important for timely repayment of external and internal state debt in full.

Conclusion

It is quite real that strategies for interstate regional development may start dominating the debt economy today. Studying the functioning and prospects of the EAEU leads to the conclusion that regional economic policy has a higher level of harmonization and provides more visible growth conditions for each member state and, therefore, a solution to the sovereign debt problem, than global or national financial regulation.

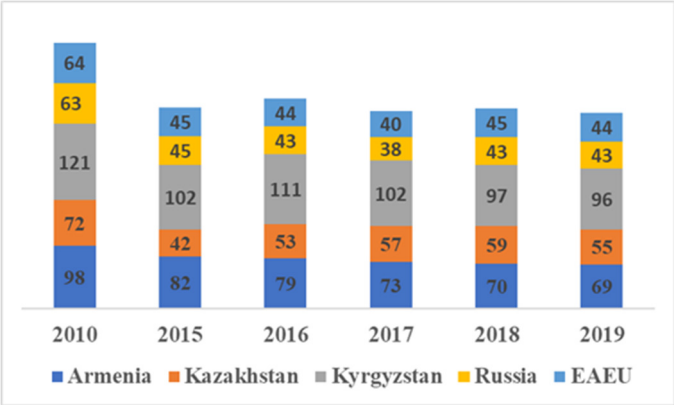

Fig. 2: Positions of the EAEU member states in the WEF Global Competitiveness Index

The macroeconomic situation in the EAEU member states has improved over the recent years, the volatility of key macroeconomic indicators has decreased, their position in the world economy is strengthening, which is demonstrated by the dynamics of the global competitiveness indices of the World Economic Forum (WEF) (Fig 2). The EAEU national markets are becoming increasingly attractive for investors. Thus, 90% of Western companies with many years of experience in Russia are confident in the future growth of the Russian market, especially in such sectors as medicine, pharmaceuticals, engineering, energy, construction and consider it strategically important for themselves in the future. More than 2/3 of Kazakh business representatives are optimistic about the prospects for the development of the country's economy and are confident in the corporate income growth. The further rise of the EAEU national markets will allow not only to cope with debt problems, but also to increase credit and investment ratings, will become a new stage in their progressive economic development.

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The Importance of Tokenization for The Development of The Art Investment Market

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Abstract

With the financial markets facing high volatility, crises and declining confidence in recent years, alternative forms of wealth creation have been attracting more interest. The art market is the largest segment of the alternative investment market. One of the reasons for investing in this class of assets is the ability to diversify investment portfolio and to ensure protection against inflation. However, there is a number of factors such as low liquidity, having to invest substantial amounts and the lack of international exchange standards which hamper investments to be carried out the art market. Today, devising modern models of investments based on innovative technological solutions is becoming one of the priorities for this market. Drawing on the blockchain technology, tokenization, as a new model, allows for the issuing of tokens. A digital token certifies that a fractional ownership of the work of art, and has been purchased while enabling one to trade the token on the cryptocurrency exchanges.
As its primary goal, the paper attempts to find the answer to the question whether the process of tokenization can play a part in the development of the art market. The indirect goal is to identify the factors constraining investment in this asset class For these two objectives the following theses were put forward: (i) there are numerous factors on the art investment market which hinder its growth; (ii) by removing significant barriers, tokenization of artworks can contribute to the development of the art investment market.

Keywords: blockchain, alternative investments, tokenization, works of art.

Introduction

The analysis of the history of the art market reveals that works of art have been enjoying unwavering demand among collectors and investors. On the one hand, artworks represent a long-term investment while on the other allowing one to achieve non-financial goals and follow his or her passion. Additionally, seeing the issue from the investor's perspective, works of art provide an opportunity for portfolio diversification, they protect against inflation and show low correlation with the financial market. Investments in works of art are part of the alternative investments making up the largest segment of this market.

In 2018 the art market was worth USD 67.4 billion, which is 6% more than the year before (The Art Market Report, 2019). Still, the analyses show that there exist plenty of barriers which affect adversely the art market and hence constrain its development. The most important of these barriers are low liquidity of investments, having to provide substantial funds, low transparency and geographical limitations on access to the market. According to the entities operating at the art market, a pressing priority is to search for models capable of removing these barriers and making investments in this asset class more appealing. The solution to the issues cited may be found in bringing the innovative blockchain technology into the art market. The application of a digital ledger that is decentralized and distributed combined with smart contracts made issuing digital tokens possible, a process referred to as tokenization. Tokenization of artworks is a new investment model which allows one to purchase a fraction of an artwork as security tokens and then to trade them on the cryptocurrency exchanges.

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factors constraining investment in this asset class. For these two objectives the following theses were put forward: (i) there are numerous factors on the art investment market which hinder its growth; (ii) by removing significant barriers, tokenization of art works can contribute to the development of the art investment market.

The first section of the paper presents the concept of alternative investments and examines the art market globally. Next, the concept of digital tokens and their types are defined, and the tokenization process is outlined. Further on, the paper identifies the barriers hampering the development of the market in question, and shows how tokenization contributes to making investments more appealing. The paper goes on to show how the removal of the factors indicated can impact the chances for using the model and what are the risks involved in its functioning. To this end, a review of the literature and references was conducted. The number of available publications on tokenization of artworks is understandably very small given that it is a new phenomenon on the financial markets. The paper was written drawing on the analysis carried out based on the latest reports on the global art market and internet portals of entities operating on the art market.

The concept and features of alternative investments

The largest segment of the alternative investment market is the art market, where the objects of trade range from paintings to sculptures, graphics, posters, porcelain, antiques and applied arts, with the artwork price not being dominated by the supply/demand ratio (Cichorska, 2015, p. 71). Alternative investments could be defined as those which do not fall into one of the conventional equity/income/cash categories. "Alternative investments include private equity or venture capital, hedge funds, managed futures, art and antiques, commodities, and derivatives contracts" (Chen, 2019). However, what is still being disputed is what is the clear dividing line between the traditional and alternative investments. How this dividing line is being drawn is directly related to the investor's knowledge and experience regarding the allocation of assets on the financial markets (Borowski, 2012).

Alternative investments are also defined as physical assets having no links to the financial market. With this approach, alternative investments could be seen as investments in physically existing assets, whose rate of return is not correlated with the financial market and which are comprised of: real estate, precious stones and metals, works of art, wine, whisky, luxury goods (e.g. yachts, watches), raw materials and commodities, ornamental materials of natural origin (e.g. amber), collections (e.g. stamps, coins, pens, furniture), comics, national memorabilia (Banasik, 2016, p. 110-113).

Alternative investments are a wide range of products of which the following features should be examined (Aspadarec, 2013):

- low correlation with conventional financial investments such as stocks,
- potentially relatively low liquidity,
- potential difficulty in determining the current market value for assets concerned,
- potentially limited data on risk and rates of return,
- potentially necessary analyses before investing,
- potentially high cost of opening and closing down an investment.

As Chen (2019) stresses, alternative investments tend to show a low correlation with the investments in the conventional asset classes. This feature makes them a suitable tool for diversifying portfolio. They may also generate higher rates of return than a strictly traditional portfolio (Manning 2019). Some authors, meanwhile, emphasize that the alternative investment market grows only in times of economic crisis while in times of economic growth they fail to be an attractive form for wealth creation (Weber, 2011). Investing in fixed assets such as gold, works of art, raw material and property also provides effective protection against inflation. This may also be a feature which makes investing in this asset class appealing.

Another fact worth mentioning is that artworks as part of the segment of alternative investments fall into the subcategory of emotional investments. Borowski (2016, p. 9) describes emotional investments as those for which profit is no longer the key determinant of making the investment since the primary factors taken into consideration are of noneconomic nature – emotions, sentiment or sensorial experience. For the participants of this market, the crucial factors considered when making an investment decision, include such elements as beauty, rareness, origin, nature or the very fact of being able to commune with the particular object.

The Art Investment Market

In 2017 the global art market worth was USD 63.7 billion, an increase of 12% compared to 2016, while the number of transactions itself grew by 8%. The year 2018 saw the sales at USD 67.4 billion, which is 6% more than in 2017. 84% of those sales was centered around the three markets: the USA (44% of sales by value); the UK (21%) and China (19%) (The Art Market Report, 2019). 70% of the global auction sale (between July 2018 and July 2019) was carried out at the following three auction houses: Sotheby's (32.9%) Christie's (25.4%), Phillips (11.9%), (The Contemporary Art Market, 2019, p. 19). Dealer sales in 2018 reached an estimated USD 35.9 billion, up 7% year-on-year. What is significant here is that the global value of online art sale amounted to USD 6 billion in 2018 and was up 11% compared to 2017 (The Art Market Report, 2019).

The studies show that in 2018 works of art whose value exceeded a million dollars accounted for 61% of all sales at the auction market, with 28% accounting for artworks worth more than USD 10 million. Artworks sold for less than a thousand dollars accounted for merely 0.3% (The Art Market Report, 2019). Chart 1 shows the value of sales according to price ranges.

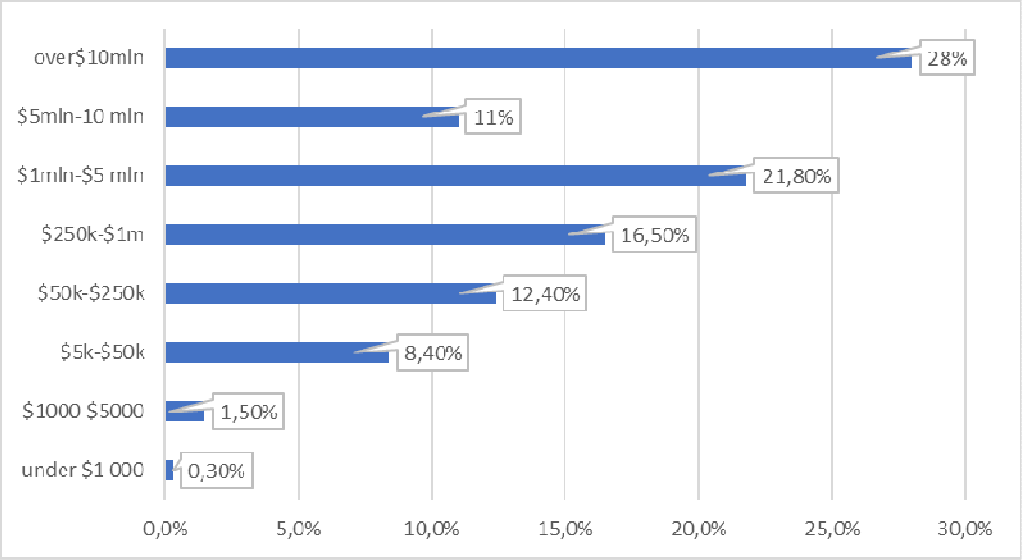

Chart 1: The value of artworks sold on the global market according to price ranges (2018)
Source: self-reported data based on The Art Market Report, (2019, p.157).

For the art market, significant findings come from the Deloitte study carried out on a sample of 322 entities operating on the market. Published in 2019, the report shows that in 2008-2018 the value of sales conducted at auction houses increased by 4.6% annually. CAGR (*Compound Annual Growth Rate*) for Top 100 artists was at 8% in relation to 3% for S&P500. In 2018 52% of people owning artworks reported that in purchasing those assets they were strongly motivated by gaining the possibility to diversify their investment portfolios (Art&Finance Report, 2019). Table1 presents CAGR levels for individual art categories for the five, ten and fifteen-year terms.

Table 1: CAGR level for individual art categories (2013-2018)

Art category	5-year CAGR	10-year CAGR	15-year CAGR
European Old Masters	-2.82%	-1.63%	2.38%
Global Impressionist Art	-3.92%	-0.48%	1.33%
Global Modern Art	2.87%	2.10%	4.15%
Global Post War Art	7.92%	6.69%	7.81%
Global Contemporary	5.70%	4.58%	7.12%
Fine Chinese Paintings and Calligraphy	-5.06%	7.45%	9.31%

Source: self-reported data based on Art&Finance Report (2019, p.135).

That the interest in investing on the art market has been on a rise is clearly evidenced by the growth of assets of the funds engaged in art investments. In principle, art funds are private investment funds whose purpose is to generate profit by purchasing and selling works of art. They are run by professional firm managing art investments or counseling firms which receive fees for management and participates in the fund's profit. The funds investing in art differ in terms of their total amount, duration, investment orientation, strategies and portfolio limitations. Artemundi Global Fund, in business from 2010 to 2015, is one example among financially successful funds. The fund raised USD 211 million from investors. The average purchase price of an artwork stood at over USD 800 thousand. The Fund's investments were tailored to the five-year time horizon, with the average annual rate of return at 17.07%. Tiroche DeLeon Collection Art Vantage registered in Gibraltar is yet another example of the fund, whose portfolio is built on art. As the founders of the Fund say, "Classical portfolio theory recommends an allocation of 3-10% to art; the fund offers an opportunity to investors from around the world to diversify their portfolios while remaining the only fully private fund built on the decisions made by one private collector". Upon opening subscription (2017), the Fund required a minimum investment of USD 500 thousand, other costs-annual management fee at 2% and performance fee at 20% (http://www.tirochedeleon.com/about/investors/). The Fine Art runs several funds, which invest into art. Other funds operating in this way include Fine Art Invest Fund based in Switzerland (https://privateartinvestor.com/category/art-finance/art-funds-art-finance/) or German Artfonds21 (http://artfonds-21.com/).

The Art&Finance Report (2019) draws attention to the factors which the art market participants (broken down into art professionals, collectors and wealth managers) view as having an adverse impact on the reputation of the art market. 75% collectors reported that the lacking transparency is one of the most serious threats to the market's reputation. It is a sharp increase compared to 2017 (62%). The same view is shared by 75% of art professionals and 77% of wealth managers. Chart 2 presents selected factors indicated by the entities operating on the art market.

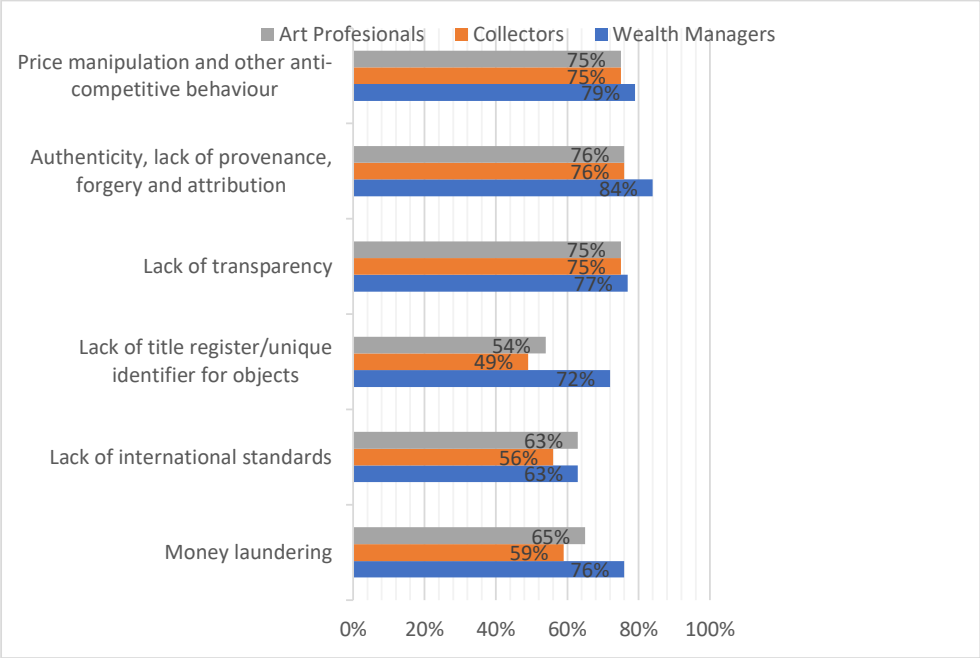

Chart 2: The most threatening/damaging issues to the reputation of the art market (in %)

Source: self-reported data based on Art&Finance, (2019, p. 206).

As the result of the lack of uniform regulations in Europe the market for art-backed credits is poorly developed unlike that operating in the USA, where its global worth ranges from USD 21 to 24 billion. In Europe, only 32% of banks declares that they will focus on this form of securing credit in the upcoming year, in relation to 80% of the financial institutions in the USA (Art&Finance Report, 2019).

A considerable problem, perceived as particularly harmful, is the fact that the art market is being used for money laundering. In this respect, significant changes regarding the EU Member States were put in place in connection with the V AML Directive on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing. Under the Directive regulations, entities are indicated which are involved in providing currency exchange services between virtual currency and fiat currency, as well as providers of virtual currency accounts who in the past were not required under the EU law to report suspicious transactions (Directive EU 2018/843 of 30 May 2018).

Another issue worth emphasizing is the opinion voiced by the participants of the art market that the implementation of an innovative technology may affect significantly the most vital aspects involved in art investments, such as (Art&Finance, 2019, *key facts*, p. 16):

- improving provenance and traceability,
- creating more transparency,
- improving authenticity,
- imformation and educating,
- improving valuation.

The last ten years have seen the wealth of people owning at least one million dollars double. People's growing wealth witnessed globally may become a driving force for today's art market, already turning into a great opportunity. It is estimated that the value of artworks in the collections owned by UHNWI (Ultra high-net-worth individuals defined as people having a net-worth of at least USD 30 million) amounts to USD1.74 billion, and is expected to go up to USD 2.13 billion in 2023. Although

the forecasts of growth are optimistic, currently the art market has grown in nominal terms by merely 9%. Lacking credibility and transparency have been identified as the key obstacles to its expansion. In order to capitalize on this opportunity, the legal barriers which discourage potential investors should be removed (Art&Finance Report, 2019).

Moreover, the authors of the report (Art&Finance Report, 2019) argue that development of technologies, including that of blockchain, may affect considerably a number of aspects involved in the functioning of the art investment market. Building on the findings produced by the analysis of the studies included in the report, the conclusion to be drawn is that what now becomes one of the market's priority is having to create new investment models based on innovative technological solutions. A promising innovation in this context is the already mentioned blockchain, which allows for solving the important problems plaguing the art market in relation to the lacking transparency for buyers and sellers, transaction security, and the possibility to verify the authenticity of an artwork and that of its origin.

Tokenization of works of art

The blockchain technology entails five key advantages (Schueffel, 2019):

- it makes transactions more transparent to all the parties involved,
- it offers better traceability of transactions,
- it is safer than the conventional methods used for recording transactions,
- improving transaction effectiveness and speed,
- reducing transaction cost.

Bringing the blockchain technology into the world of finance has also positive implications. First of all, this is a situation where the number of intermediaries is being constantly reduced. Furthermore, a blockchain allows for reducing the transaction time. Another advantage is that various asset classes can be offered on the global market. In practical terms, everybody with the Internet access can, in accordance with current law, take up an investment opportunity just emerging, regardless of their current place of stay. Additionally, investment projects can raise interests among a greater number of investors as their offer will be able to reach new segments of investors. It is important to emphasize that blockchain considerably limits the opportunities for market manipulation as every transaction is recorded in a very transparent way in real time, offering no possibility for any alterations later on, while the information about the transaction is made available at any time to all operators concerned, including the supervisory authorities (Schueffel, 2019).

Asset tokenization is a process of issuing digital tokens which is made possible thanks to the decentralized blockchain technology and smart contracts. A token is a transferable item of fixed assets which is not material having only a digital record. In the process of tokenization of assets we encounter the exchange of rights to individual items of wealth for a token. "A token represents an asset or utility that a company has and they usually give it away to their investors during a public sale called Initial Coin Offering (ICO). ICOs are basically crowd sales, the cryptocurrency version of crowdfunding" (Hiscox online art trade 2019).

Among the uses of tokenization there is Security Token Offering (STO). STO offers security tokens, which share the same characteristics as the regulated securities, being subject to legal regulations, and meet all the requirements in this respect. As such, it is a much more secure method of financing given that it requires that the asset tokens be issued in a blockchain network under the regulations on the prospectus. The holders of tokens can therefore own shares in tangible assets (Burke et al. 2019). Security tokens represent such assets as shares in underlying instruments, companies or revenue streams and rights to dividends or interests. In terms of their economic function, security tokens correspond to stocks, bonds or derivatives (*'*Types of tokens. The four mistakes beginner crypto-investors make').

In other words, STO is a digitalization of assets. This is a modern form used for raising capital through a public offering with the tokens sharing similar features to those found in cryptocurrencies. Unlike utility tokens, issued under ICO and not regulated at all, tokenization under STO is subject to legal regulations conditional on the provisions in place in the country concerned. Art will thus become an investment with greater liquidity when it is approved and becomes an object of trade just like securities. That is why security tokens, classified under law as securities, have to meet the relevant legal requirements. It is on account of the securities law, implemented as the method designed for investor protection, that the fractionalized sale of artworks allows numerous investors to trade tokens and co-create works of art (Fractionalized Art Ownership and Securities Law).

The process of artwork tokenization consists of several stages. Following the valuation, verification, confirmation of the authenticity of a given work of art, a bid is made at the investment portal. Before making their decision, investors have a chance to learn about the details of a particular artwork, its history, origin and creator. Next, relying on the blockchain technology, tokens are issued representing fractional ownership of the artwork. The owner issues tokens to be sold at the platform while the investors interested in purchasing the tokens can pay in acceptable fiat currency or cryptocurrency (https://www.maecenas.co/whats-maecenas/). The tokens can be exchanged at any time via cryptocurrency exchanges at which they are listed. The costs associated with storing and insuring the work of art, are paid by its holder (the entity that has the largest share in the ownership of a work of art). Table 2 shows the advantages arising from the tokenization of works of art both for investors and owners of a tokenized artwork.

Table 2: Advantages arising from artwork tokenization for investors and owners

Investors	Ownerships
Holding a fraction of an artwork	Raising capital from the fractional sale of an artwork.
No geographical limitations – greater access.	The chance of reaching a wider group of potential investors.
Low entry threshold/no need for high financial resources.	The chance of taking physical possession of an artwork (provided that one's share is over 50%).
High investment liquidity/the ability of trading tokens on cryptocurrency exchanges.	The ability to make works of art available to the public, e.g. in a museum.
No security and storage costs.	High transparency and transaction security.
The ability to verify the authenticity of an artwork/ high transaction transparency and security.	Satisfying emotional needs.

Source: Author's own study.

"Due to the growing interest in the art market in the last decade, one of the models that emerged on this market is fractional ownership. Fractional ownership of art has been tried and tested over the last 10 years with limited success, from the early European initiatives such as SplitArt and A&F Markets to the Chinese art exchanges that emerged between 2009 and 2011, and were subsequently shut down or consolidated by the Chinese government towards the end of 2011. The question whitch arises is could fractional ownership be a way of attracting new audiences to the art market?" (Art&Finance Report 2019, p. 146).

According to the study, the art market participants continue to take a skeptical attitude towards the fractional investment models. Only 19% of collectors and art professionals shows interest in this

investment form. In contrast, 33% of collectors and 38% of art professionals made the same comment about the traditional art funds. Nor do wealth managers show much confidence in the art tokenization model. Merely 10% of them considers recommending the fractional investment models to their clients. This situation, however, looks slightly different for investors in the age bracket of up to 35. According to the study carried out by ArtTactic, 46% of millennial art buyers would consider fractional ownership of art as a form of investment. For comparison purposes, 29% of buyers from the over 50-age bracket found the new model for investing in art interesting (Hiscox Online Art Trade Report 2019, p.26).

Maecenas is the first blockchain-based platform that allows anyone to buy, sell, and trade part ownership in masterpieces on a liquid exchange. It was on this platform that the first artwork tokenization took place. The year 2018 saw Andy Warhol's graphic sell for USD 5.6 million using the tokenization process. Over 800 individuals entered the auction buying tokens for USD 1.7 million, representing 31.5% of the artwork value ('Maecenas successfully tokenizes first multi-million dollar artwork on the blockchain'). The MeacenasArt token is currently listed on cryptocurrency exchanges, including, for example:

- CoinMarketCap (https://coinmarketcap.com/currencies/maecenas/),
- Etherscan (https://etherscan.io/token/0xfec0cf7fe078a500abf15f1284958f22049c2c7e),
- CoinGecko (https://www.coingecko.com/pl/waluty/maecenas).

One of the platforms created most recently is Artopolie, founded in 2019 offering works created by Pablo Picasso and Claude Monet. Any registered member of the platform can become a fractionalized owner of an artwork. Artopolie purchases a work of art and files an offer at the Securities and Exchange Commission (SEC). After the offer has been approved, Artopolie sells the fractional ownership of the artwork on its platform. 50 dollars will be sufficient to buy a fraction ownership (Artopolie, 2020).

Another example of a blockchain-based platform is Look Latereal, created in 2018. Anyone interested in investing in art through buying or selling part ownerships in artworks can access the platform. Through Look Lateral, one can authenticate and secure permanent collections, e.g. in museums, or artists can raise capital for their various art projects (https://www.looklateral.com/).

The Importance of Tokenization for The Art Market Development

Investing in artworks is considered as high risk. This risk arises from the specific features inherent to this class of assets and the market volatility caused by the ever changing trends. Given that these are long-term investments, predicting the future value of a particular artwork, is quite challenging, as is predicting how the buyers' taste will change and whether the artwork will still be in demand, say in several or a dozen of years. Moreover, considering that some artworks are exceptionally rare, putting a value on them might prove quite difficult. For this kind of investments, it is not infrequent that one needs specialist expertise or has to turn to advisory services. When taking physical possession of an artwork, investors must take into account additional costs relating to having to store, insure and secure the artifact. What investors find to be an extremely difficult problem is low liquidity of this asset class and having to make a substantial investment. This situation pertains not only to the physical purchase of works of art at auction houses or art galleries, but also to the participation in the art investment funds. Another problematic issue is that there are no uniform regulations governing the trade on the art market.

In summing up, one can identify the following barriers to the art market growth:

- low liquidity,
- high enter threshold,/substantial investments,
- the costs involved in storing and insuring artworks, fees to be paid to intermediaries (physical possession of the artwork) or fees and commissions paid to the investment funds,

- difficulty relating to confirming the authenticity of the work,
- geographical limitations/limited access to art,
- low transparency of the art market,
- no uniform laws,
- no institutional supervision over the art market.

As the analysis shows, there are many factors which affect adversely the art market growth in terms of investments. Using innovative technologies can contribute considerably to removing those barriers thus creating completely new investment possibilities. The tokenization of artworks, as a new investment model, could be the answer to the majority of the problems reported by the participants of the market.

Considering the issues addressed in the paper regarding the barriers identified here, as well as the participants' views as to how the technology may affect the art market and the benefits arising from tokenization, one may venture to conclude that the new model of artwork tokenization can alter significantly the rules according to which the art market operates. Some of the advantages arise from the potential offered by blockchain and are conducive to matters concerning the following:

- determining the authenticity of an artwork and its origin,
- transaction speed and transparency,
- transaction security,
- lowering transaction costs,
- global access to the art market (no geographical barriers).

What tokenization, or fractional investments, does is to lower the threshold for entering the art market, thus providing less wealthy investors with the chance of getting access to this market. Trading tokens is easier than trading a physical masterpiece, which in turn contributes immensely to improving the liquidity of the investments in these assets. In addition, holding a token does not entail additional costs such as those arising from the physical possession of a piece of art. Lower are also the costs arising from using intermediaries. For the auction houses, the commission charged amounts to 25% of the sales value, art galleries may set their commission as high as 50% while with tokenization the fee charged by the investment platform ranges from 1% to 8% (https://www.maecenas.co/whats-maecenas/). Hence the art tokenization model plays a part in removing the art market barriers indicated in the paper.

Conclusions

Adopting the blockchain technology is a slow process. It appears that the art world is watching closely the changes as they unfold, awaiting their verification. The area where Blockchain is likely to succeed is where it offers the possibility to register the title and trace the origin of artworks. Meanwhile, the participants of the art market seem cautious when it comes to the tokenization process. As a new investment model, tokenization cannot remove all the barriers which hamper the art market growth such as changing trends or difficulties in putting a value on the works of art. Still, tokenization can play a part in overcoming some key obstacles thereby making art investments more accessible.

Moreover, what certainly presents a serious threat to the art token trade is the overall situation at the cryptocurrency exchanges, where instability, volatility, potential hacking attacks can destabilize the market affecting adversely the investors' attitudes. Furthermore, implementing legal regulations centered around the STO, is one of the most vital determinants for a successful tokenization. Having appropriate legal provisions in palace will ensure investors' safety and increase the level of confidence while making art investments. Although security tokens feature similar characteristics to those of securities, the legal provisions and rules concerned with their issuing have not been implemented in every country. Many countries adjust their provisions to the changing market demands as well as to the development and application possibilities offered by Blockchain.

Nevertheless, there are countries where trading security tokens continues to be banned, e.g. China, South Korea, Ecuador, Algeria (The Ultimate Guide to STO 2019, p. 27).

In referring to the question raised in the Introduction, it is possible to conclude that the artwork tokenization contributes considerably to removing the barriers encountered at the art market, to reducing investment risk and thereby help the art investment market expand. However, when deciding to invest in fractional ownership, one should consider such factors as the overall situation at the cryptocurrency exchanges and the scope of the legal provisions regarding the issuing of security tokens.

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System for Financing of National Projects in Russia

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Abstract

National projects have become the main strategic instrument for stimulating the economic growth of the Russian economy and improving the level and quality of life of Russian citizens. Financing of national projects is based on a program-oriented approach and involves the allocation of 95% of funding from the federal budget, implies the use of new project mechanisms for the construction of capital objects in various sectors of the economy. In the study, the analysis was carried out on the basis of implementation plans and detailed schedules of national projects. Monitoring for 2019 revealed that the implementation of national projects was relatively effective – not all projects had a high indicator of control events, and in addition, it was often not possible to fully assess the effectiveness of spending the total amount of funding due to the lack of statistics. Based on the collected statistics, the study analyzed expenditures financed under national programs by component elements, which made it possible to develop recommendations on the use of economic growth drivers and structure the types of effects depending on the characteristics of the GDP structure – short-term (from the aggregate demand side), medium-term (from the supply side) and long-term (increasing factor productivity) macro-effects.

Keywords: The System for Financing, The State and Municipal Finance, National Projects, Program-Targeted Method of Funding

Introduction

A special Russian instrument as national projects is a key trend and a strategic instrument for stimulating economic growth in the Russian economy. The idea of national projects in Russia was born as a result of the search for the new strategic points of growth and development of the Russian economy that can not only provide the economy with a new breakthrough socio-economic level of development, but also improve the quality of life of Russian citizens, creating conditions and opportunities for self-realization and development of each Russian resident. National projects were developed during 2018 and currently include sectoral goals and objectives, the list of federal projects, the expected results of their implementation and the parameters of financial support in the context of sources of budget and non-budgetary sources of funding. To ensure the unity of the state strategic planning system the list of Federal projects are included in the sub-program elements of the relevant state programs of the Russian Federation. In 2019-2024, it is planned to allocate more than 25.7 trillion rubles for national projects, of which 29.1% are non-budgetary sources; 51% – means of the Federal budget of the Russian Federation and about 20% - means of regional budgets and state extra-budgetary funds. The main task of the national project financing system in the country is to develop new schemes and mechanisms for financing national projects that can optimally combine different conditions and sources of

financing, as well as attract significant resources to improve the quality and level of socio-economic development and life in the country.

Objectives of the Study

The broad objective of the study is to examine the system and methods of financing national projects, analyze the effect of their implementation on the Russian economy and think about the structure between different budget and extra-budgetary sources of financing national projects in various sectors of the economy in Russia.

Literature Review

Program-Targeted Approach to The System of National Projects Financing

A special Russian instrument as national projects based on the long-term socio-economic development plans of Russia, is an instrument for achieving its goals, and is oriented on a program-targeted approach. Preconditions for the introduction and use of program-targeted approaches to budgeting in the implementation of national projects in the framework of state programs began in Russia in the early twentieth century, long before the development of national projects themselves. During this time, the Government of Russia have rebuilt the system of planning and forecasting socio-economic indicators in the country, as well as the sectoral development of the economy, in order to fully assess the effectiveness of public expenditures from the budget in relation to the main parameters of economic development. However, the process of forming an integrated system for managing state and municipal finances at all levels of the state's budget system is still incomplete. A serious budget reform based on a program-targeted approach has been carried out, which has made it possible to build a budget process in Russia and link the achievement of efficiency between strategic goals, priority tasks of social and economic development and state programs, national and federal projects. National projects in the system of state and municipal finance have become a key mechanism that allows linking strategic and budget planning, increasing budget transparency at all levels of the country's budget system.

A special feature of national projects in Russia is the presence of a special management system that provides for accelerated decision-making management and the allocation of significant financial resources from the federal budget of the Russian Federation for their implementation.

Theoretical Review

The development of public finance management in RF in recent 10 years is due to the following trends:

- increasing the independence of the Executive authorities of the subjects of the Russia,
- reducing the dependence of the consolidated budgets of Russian regions on financial assistance from the federal budget of the Russian Federation,
- development of program-targeted methods of public finance management,
- improving the quality of regional and local financial management.

The transition to program-targeted methods of funding the state budget has been a general global trend in the past decades to improve the system of public finance management. The program budget in many countries of the world economy is the main mechanism for financing national projects in order to effectively spend funds on solving socio-economic problems of regional development.
The use of software instruments makes it possible to increase the flexibility of budget resources management in achieving strategic goals of economic development, helps to minimize costs and improve the efficiency of

providing all types of budget services. Within the framework of program and target planning, the financing of major national projects is implemented by developing a set of measures to equalize disparities in the socio-economic development of various territories and, as a result, to achieve the set goals and objectives laid down in national projects. Results-based management is considered an effective instrument for public finance when the process of its implementation takes place within the framework of changes in the system of public finance management, development of strategic planning, and reform of budget powers and functions of government authorities. All these changes have been taking place in the budget sphere in Russia since the 2000s. they have created a good platform for launching a system of financing national projects in Russia and, as a result, achieving strategic goals and objectives of socio-economic development.

Prerequisites for implementing the system of financing national projects based on the program-target method in the budget process factors:

- international reserves accumulated during the 2000s played a role, but were almost exhausted by 2014, and risks are increasing;
- spending in the 2000s increased significantly, but without linking to priorities, there was bargaining for resources and erosion of budget discipline;
- incentives to increase budget expenditures were maintained, and conditions were not created for improving the efficiency of budget expenditures;
- strategic planning was loosely linked to budget planning, and the structure and dynamics of expenditures were loosely linked to public policy goals;
- there was no assessment of the effect of public policy instruments (budget, tax, tariff, customs, regulatory regulation);
- planning of program and non-program expenditures, as well as capital and current expenditures) was not methodologically linked.

The main issue in the course of financing national projects based on the principles of program-targeted budgeting remains the qualitative improvement of the unified system of performance indicators and its subsequent integration into the budget process. Most countries that have implemented programmatic budgeting have difficulty using performance indicators correctly. These problems include the following issues:

- measuring the parameters of indicators based on their goals of national projects;
- obtaining the necessary volume of high-quality statistical data for their analysis;
- developing a system of indicators for accounting for data of individual activities.

As you know, the most common model worldwide (especially in the OECD countries, the USA, Canada, Australia, and UK) is the budgeting model (or «direct budgeting» model), which takes into account performance when budget funds are linked to either planned indicators or actual results. The application of this model implies a budget in the program format and specification of goals through indicators of expected results. Actual results are of key importance in the process of prioritizing the distribution of financial flows for the next year, but they do not affect the process of determining the amount of budget funds allocated.

In Russia, a demonstration model of program budgeting is practiced, which has the main reference point in the form of the final result. At the same time, the main feature of this model is the lack of connection between information about results and financing, since the indicators of final results are included in state budget documents only as information. Such information mainly contains data on planned and actual indicators and is necessary, first of all, to increase the accountability of state bodies and transparency of the budget process.

At the same time, it should be noted that when determining the sources of funding for national projects to achieve the strategic goals of economic development, not only public investments from the budget are attracted, but also private investments from extra-budgetary sources of funding, including funds of the population.

Methodology

For national projects, the following main focus has been identified for forming a system of their implementation and financing aimed at ensuring breakthrough results:

- defining national projects as a portfolio of priority projects;
- ensuring that expenditures for national projects are separated in the budget classification;
- transformation of state programs that affect the implementation of national projects (programs) into «pilot programs»;
- creating a single information resource that allows you to ensure that full information about the parameters of national projects is available, in accordance with the principle of single data entry.

At the stage of developing national projects, proposals should be formulated that are used in the performance assessment stage and include:

- proposals for a system of goals and objectives for the implementation of national projects with a methodology for calculating new proposed indicators, including determining the methodology for calculating indicators, justifying the possibility of using existing forms of federal statistical observation or the need to adjust these forms;
- proposals for target values of national project indicators, including justification of forecast values of indicators;
- proposals on the structure of the main activities in the framework of national projects and the expected results of their implementation;
- proposals for a system of measures a system of legal regulation measures aimed at achieving the goals of the implementation of national projects;
- proposals on the amount of financial support for the implementation of national projects, taking into account the maximum amount of financial support from the federal budget for the next financial year and planning period.

The transition from forecast targets for socio-economic development to national projects is a multi-stage process of forming proposals based on forecasts to justify national project options at the macro level, supplemented by proposals from regions containing integrated assessments of municipalities. In connection with these circumstances, possible contradictions are inevitable, but the search for solutions should be aimed at achieving agreed measures, decisions that indicate the relationship between the social and economic development targets and results of national projects.

The system of implementation of national projects and subsequent evaluation of their effectiveness includes the following stages at the macro level (Fig.1).

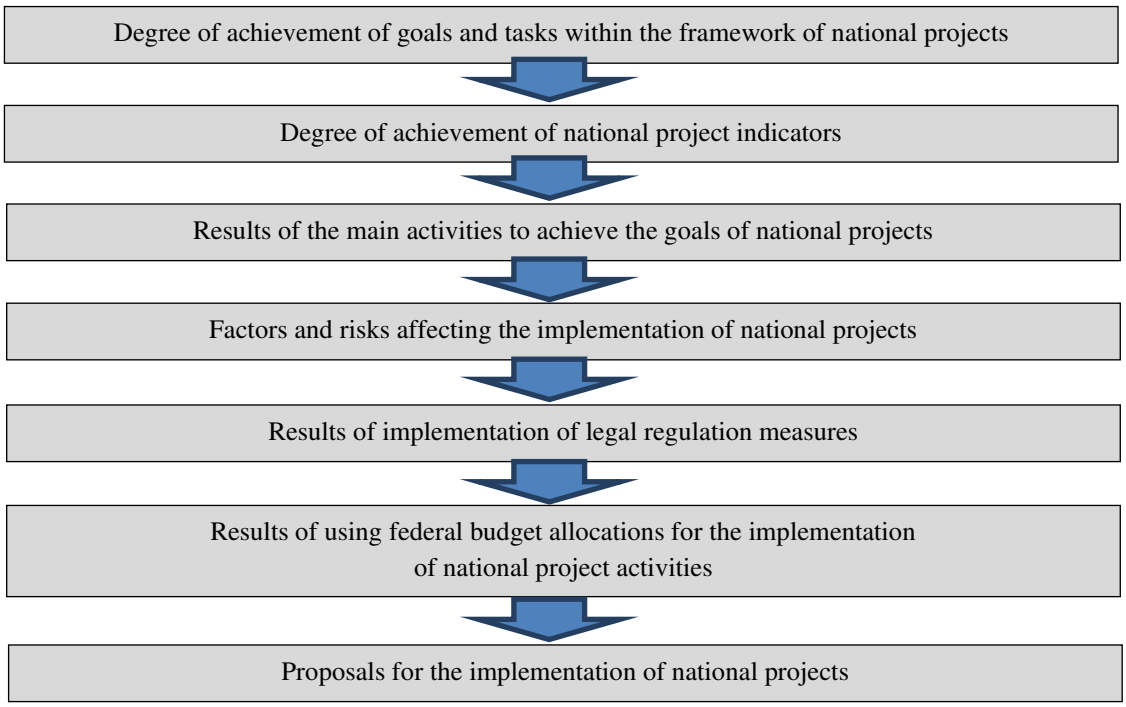

Fig.1: Stages of implementation and evaluation of the effectiveness of national projects

(source: compiled by the authors)

The main priorities for the development of public finance in the implementation of national projects on the principles of project management are:

- digitalization of tax administration and integration of all data sources into a single information space with subsequent automation of its analysis based on modern technologies for processing large data sets;
- strategic prioritization of financing of national projects (in the proportion of 95:5 – federal and regional budgets) that contribute to the transition of the economy to a qualitatively different pace of development and significantly improve the quality of life of the population;
- introduction of the «golden rule», according to which the expansion of the economy's potential and the financing of capital investments are carried out at the expense of a moderate increase in government borrowing based on the principles of long-term sustainability and balance of the country's budget;
- reorientation and prioritization of targeted inter-budget transfers in accordance with a differentiated approach to areas and measures of state support for different types of territories, taking into account the economic specialization of the Russian regions, the identified growth points and infrastructure constraints;
- setting targets for federal projects in the context of Russian regions, which will be reflected in agreements on providing financial support to regional budgets.

Implementation of results-based management principles at the regional level increasing the efficiency of public finances, and introducing modern budget technologies and tools into the budget process (starting with the development of revenue potential and ending with public debt management) have also become priorities for the socio-economic development of Russian regions. National projects should become a simple and effective tool for organizing both project and process activities of public administration

bodies, reflecting the relationship between the resources spent and the results obtained. The achievement of the established values of national project indicators at the regional level will be taken into account when compiling industry ratings of their performance, and in some cases – when evaluating the activities of governors and when financially encouraging regions through grants.

The involvement of regional public authorities in the implementation of national projects in the process of implementing the program principles of budgeting in the regions led to the formation of the following trends in the development of regional finance:

- implementation of budgeting in budget practice, which contributes to the coordination of strategic and tactical goals for the implementation of national projects;
- development of tools for improving the efficiency of budget expenditures by improving the quality of public services and completing the process of developing national projects for the balanced socio-economic development and improving the quality of life of citizens of the country;
- the main guidelines of national projects that have become tools for improving the quality of public finance management are the development of the social sphere, implementation of infrastructure projects, innovative development and modernization of the economy;
- state programs have an active impact on the economic development of certain territories (Crimea, the far East, Kaliningrad, the North Caucasus) and focus on financial support for projects aimed at solving systemic problems in these regions;
- improving the efficiency of public investment and procurement, and improving internal financial control and audit procedures.

Statistics and Data Analysis

In 2019-2024, it is planned to allocate more than 25.7 trillion rubles for national projects, of which 29.1% are non-budgetary sources; 51% – means of the federal budget of the Russian Federation and about 20% - means of regional budgets and state extra-budgetary funds.

National projects are financed on the basis of a decree of the Government of the Russian Federation. Average levels of co-financing for subsidies in the context of national projects, despite the threshold value of 95: 5, where 95% of co-financing is provided from the Federal budget, and 5% from regional and local budgets.

In fact, this minimum ratio is much lower and varies from 60: 40 to 82: 18 depending on the industry specifics of the national project (Fig.2).

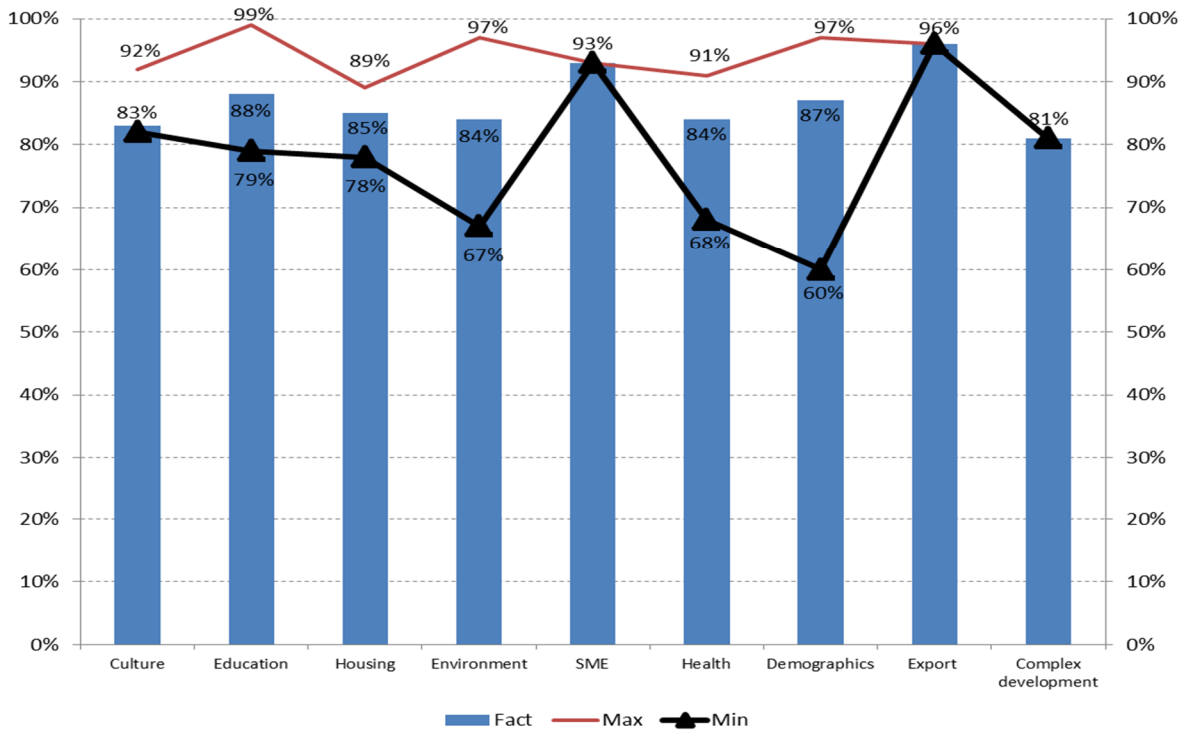

Fig.2: Average levels of co-financing for subsidies in the context of national projects

The main task of the national project financing system in the country is to develop new schemes and mechanisms for financing national projects that can optimally combine different conditions and sources of financing, as well as attract significant resources to improve the quality and level of socio-economic development and life in the country on the principles of public-private partnership and initiative budgeting.

Test of Hypotheses

A systematic approach to the consideration of national projects dictates the need to analyze the economic processes that determine their implementation. In this regard, the assessment of the macroeconomic effect of the implementation of national projects is carried out in close relationship with the indicators of socio-economic development of the Russian Federation and the structure of GDP. The methodology for assessing the macroeconomic effect of national projects is based on the methodology for calculating GDP by expenditure method. For this purpose, as part of the assessment of the macroeconomic effect of the implementation of national projects, a General assessment and classification of Federal budget expenditures by economic factors that form the macroeconomic effects of supply and demand in the economy is carried out. The factors that determine the expenditure items of GDP form the demand in the economy (expenditure on final consumption, investment in fixed capital, government expenditure and net exports). In General, from the point of view of the elements of GDP use, these expenditures mainly form the final consumption of households and public institutions. At the same time, a significant share of expenditures, according to the provisions of the national accounting system, can be classified as investment and will contribute to the growth of demand for investment goods and services and the accumulation of fixed capital in the economy.

Results

1. The process of forming an integrated system of state and municipal finance management in 2019 in Russia at all levels of the state budget system has not yet been completed. A serious budget reform has been carried out, which has made it possible to build a budget process and link the achievement of efficiency between strategic goals, priority tasks of social and economic development in Russia and state programs, national and federal projects. National projects in the system of state and municipal finance have become a key mechanism for linking strategic and budget planning and increasing budget transparency at all levels of the country's budget system.

2. The program budget and its tools are the main mechanism for increasing the socio-economic efficiency of state expenditures. Since 2014, the main tool for improving the efficiency of federal budget expenditures has been the use of a program-targeted method for managing budget resources within the framework of state programs, which ensures their concentration on priority areas of socio-economic development.

3. The use of software tools makes it possible to increase the flexibility of budget resources management in achieving strategic goals of economic development, helps to minimize costs and improve the efficiency of providing all types of budget services. In the future, national projects should become a simple and effective tool for organizing both project and process activities of state government, reflecting the relationship between the resources spent and the results obtained within the framework of national projects.

4. Trends in public finance in Russia include increasing the independence of the executive authorities of the Russian regions, reducing the dependence of the consolidated budgets of the Russian regions on financial assistance from the federal budget of the Russian Federation, developing program-oriented methods and improving the quality of public finance management.

5. The specifics of implementing national projects require the creation of a quality standard for public services. National projects should address issues aimed at improving the quality of life, improving the living environment, ensuring equal opportunities for education, medical care and health restoration, developing social activity and protecting socially vulnerable groups. At the same time, personnel issues should be resolved. Creating comfortable living conditions for the population, including transport accessibility, development of telecommunications, engineering, and social infrastructure, and preservation and improvement of the environment and cultural and historical landscape of the territories. All this will help to improve the quality of life of the population and ensure the inclusion of the population in civil society.

6. Despite a number of unresolved issues, such as the inability to fully select all budgeted funds for national projects at the federal level. At the regional level, when financing expenditure obligations in the proportion of 95: 5 and its deviations (Fig. 2), there is often not enough money for the implementation of activities on national projects due to the lack of new project mechanisms and often the lack of funds from municipalities for the development of design and estimate documentation, the conclusion of state expertise bodies for capital construction projects.

7. The implementation of national projects in Russia is carried out on the basis of implementation plans and detailed schedules for their implementation. For planning and forecasting socio-economic performance indicators of national projects, it is carried out on key points, which also include an annual report on the progress of implementation and evaluation of the effectiveness of national projects, a report of the responsible executive on the progress of implementation and a consolidated annual report.

8. According to the results of monitoring, the implementation of national projects for 2019 in Russia was relatively effective – not all national projects have a high indicator of the control events that occurred, in addition, there is no opportunity to assess the effectiveness of spending the total amount of funding for all national projects.

9. The macroeconomic performance of national programs in the medium term is determined by the volume and dynamics of investment expenditures in the structure of their financing, which form a contribution to the operating flow. The total contribution to the use of GDP in 2019 is estimated at 25.7

trillion rubles (including 5.7 trillion rubles – in human capital, 9.9 trillion rubles – in creating a comfortable living environment and 10.1 trillion rubles in creating conditions for economic growth in the country), which is approximately 30% of GDP. According to the estimates, the financing of national projects made a positive and neutral contribution to the GDP growth rate.

10. The positive contribution from the increase in financing of national projects is offset by the negative impact of their inflationary depreciation. At the same time, the implementation of national projects practically does not lead to additional inflationary pressure, even contributes to a certain slowdown in inflation. The analysis of expenditures financed under national programs by component elements allowed us to structure the types of effects depending on the characteristics of the GDP structure – short-term (from the aggregate demand side), medium-term (from the supply side) and long-term (increasing factor productivity) macroeconomic effects.

Discussion of Findings

In international practice, the assessment of the macro-effect of the implementation of program-target planning in the budget process was as follows:

a) analysis of the structural elements of each of the projects as part of in-depth public administration reforms (Great Britain, Australia, New Zealand);

b) within the framework of separate programs for partial modernization of the public administration system that do not affect its fundamental foundations (USA, Canada, Ireland, the Netherlands, Denmark, Sweden, France);

c) within the constraints of the initiatives to improve the system of public finance management (Norway, Germany, Switzerland).

Each of the described methods involves the use of a final tool or driver for regulating the impact on the national project management system. As indicated in the study, in order to increase macro-efficiency from the implementation of national project activities, it is necessary to activate new growth drivers. Any of the state approaches determines the analysis of expenditures financed within the framework of national projects by component elements and types of effects, depending on the characteristics of the GDP structure: short-term effect-formed from the aggregate demand in the economy (wages, interest expenses, depreciation, profit margin); medium-term effect-formed from the supply side (investments in fixed assets, net exports, expenditures of state administration bodies); the long-term effect is formed by the drivers of economic growth (investment, new jobs, labor productivity).
These findings are supported by results of current studies.

Recommendations

The study recommends include:

a) based on the results of the evaluation structural elements of national projects, state and regional authorities should formulate consolidated proposals for:
- a system of goals and objectives for the implementation of national projects with a methodology for calculating new proposed indicators, including determining the methodology for collecting statistical data and calculating indicators, as well as searching for alternative sources of statistics;
- target values of indicators of national projects, including justification of forecast values of indicators;
- structure of the main activities of national projects, their expected results of implementation;
- a system of legal regulation measures aimed at achieving the goals of implementing national projects;
- the amount of financial support for the implementation of national projects, taking into account the maximum amount of financial support from the federal budget in accordance with the federal law on the federal budget for the next financial year and planning period.

b) to increase the macro-efficiency of the implementation of national project activities, it is necessary to activate such growth drivers:
- in the short-term as creating new jobs, increasing the level of remuneration of the population,
- in the medium-term – attracting investment,
- in the long-term – increasing the innovation of infrastructure, social sphere and industry in the country.

In the future, national projects should become a simple and effective instrument for organizing both project and process activities of public authority, reflecting the relationship between the resources spent and the results obtained.

Conclusion

National projects are a key mechanism for strategic and budget planning and increasing budget transparency at all levels of the country's budget system. The process of forming an integrated system of national project management is based on a program-oriented approach and requires the creation of a quality standard for public services to improve the level and quality of life of Russian citizens. As a result of the implementation of national projects for 2019, a number of unresolved issues were identified, such as the inability to fully select all budgeted funds for national projects at the federal level, although at the regional level there is often not enough money for the implementation of activities due to the lack of new project mechanisms and lack of funds at the local level. According to the conducted estimates, the financing of national projects has made a positive and neutral contribution to the GDP growth rate, but not all national projects have a high indicator of the control events that occurred, in addition, it is not possible to assess the effectiveness of spending the total amount of funding for all national projects. In order to increase the macro-efficiency of implementing national project activities, it is necessary to activate such growth drivers in the short-term as creating new jobs, increasing the level of remuneration for the population, attracting investment in the medium-term, and increasing the innovation of infrastructure facilities in the long-term.

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Development of The Evaluation Tools of Budget Program Expenditure in The Russian Federation

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Abstract

The article is devoted to the methodology of evaluating the effectiveness of program budgets of the Russian Federation's expenditures and the substantiation of approaches to transform the existing methodology for assessing the effectiveness of state budgeting. There were described the existing tools of program budgeting in Russia and their evolution at the macro level, as well as the methods and approaches used to assess the effectiveness of government programs. Not only the author's interpretation of the term "efficiency of the state program" was given, but also the criteria of efficiency are proposed for evaluating state programs. The statistics on the effectiveness of the implementation of state programs in Russia by the integral indicator and on the cash execution of expenses from various sources were summarized. A set of measures is proposed to improve the methodology for assessing the effectiveness of state programs and approaches to managing program budget expenditures. Research also justified the proposal on increasing weight values for significance factors for measures and suggested indicators that have a direct impact on achieving the goal of the state program.

Keywords: Program Budgeting, State Program, State Program Effectiveness, Methodology For Evaluating Effectiveness.

JEL Classification: H11, H43, H50, H59

Introduction and Literature Review

The topicality of the research is determined by the need to develop a unified and understandable comprehensive, scientifically based methodology to measure the impact of program expenditure of the federal budget and other budgets of the budgetary system of the Russian Federation, which allows managing in the area of prioritization and rationale for funding state programs and projects. The concerns of ensuring the most cost-effective budget funds spending of at all levels of the budget system and increasing their impact on economic growth in Russia are associated with a set of unresolved issues that are related to theoretical and methodological basis for evaluating program budget expenditures in the context of the expansion of program budgeting tools.

Since the 2000s, there is a trend in the Russian Federation to accumulate simultaneously used program-targeted financing and management tools. The *federal targeted programs*, in which an attempt was made to ensure the balance between various resources (financial, human, material ones) to achieve the most important state goals and objectives as well as their connection with the priorities of socio-economic development, can be considered as first program budgeting tool at the federal level. Similar programs have been adopted at the territorial levels (*(regional target and municipal target programs*) for targeted financing of priority activities of territorial significance. Since 2005, *departmental target programs* have been included into the practice of budget funding of expenditures to finance sectoral areas and areas of government activity, covering specific profile functions and services of authorities. To enhance public investment and develop public infrastructure, another tool for program financing of budget expenditures, – the federal targeted investment program, has been introduced since 2010. It combined state investment projects related to the creation, reconstruction and modernization of capital construction projects at the expense of the federal budget. The need to

improve the RF citizens' standard of living, the quality of the existing social infrastructure, as well as the quality and accessibility of social services gave birth to a new program financing tool – *priority national projects*, included not only traditional elements of program planning (goals, objectives, events, deadlines), but also target indicators of their performance. So, since 2006, along with the federal targeted investment program, departmental target programs, numerous federal, regional and municipal programs, the following four priority national projects have appeared: "Education", "Health", "Development of the Agro-Industrial Complex", "Affordable and Comfortable Housing and Utilities for Citizens of the Russian Federation".

The development of program tools in the field of budget planning and financing did not stop there. Result-oriented budgeting received a further large-scale boost with the introduction of the program budget into the budget process, i.e. mandatory producing of part of budget expenditures in the format of state programs. So, since 2013, a program structure of expenditures has been introduced in Russia: first at the federal level, and from 2016-2017 – also at the level of constituent entities of the Russian Federation and municipalities. The main goal of introducing state programs was to increase the efficiency of budget expenditures in the context of a limited revenue base for budgets of all levels. The state (municipal) program financing would come both from budgetary funds and from extra-budgetary sources: bank loans, funds of public organizations, private investments, etc. However, the share of budgetary funds in the overall structure of financing sources of state (municipal) programs significantly exceeds the extra-budgetary component. A certain innovation in program management and financing of budget expenditures was the approval in the federal budget of five "pilot" state programs since 2018, for which project management mechanisms have been implemented. This tool, which in fact duplicated the previous ones, was aimed at overcoming the shortcomings of the existing system of functioning and implementation of state programs.

Finally, in 2019, 65 *federal projects* as part of 25 (of the 42 existing) state programs, were approved. These projects were combined according to national strategic development goals into *12 national projects*, as well as a Comprehensive Plan, including 7 federal projects implemented at the expense of the federal budget in as part of *the backbone infrastructure modernization and expansion program.* National projects have become the basic tool for achieving national development goals, as defined in Presidential Decree No.204 of May 7, 2018 and disclosed in the main areas of government activity until 2024. The integration of national projects in the program budgeting system was carried out in order to promote common actions of the state strategic planning and a unified state policy.

As can be seen from the review, program and project approaches, declared to be more effective in financing investment budget expenditures by state and municipal bodies, were each time clothed in new formats (tools), without fundamentally changing the very mechanisms of spending budgetary funds. The "long-livers" of the budgeting system remain federal target programs and national projects of the first wave, which have not been officially canceled and for which the required reports are regularly prepared (*Figure 1*).

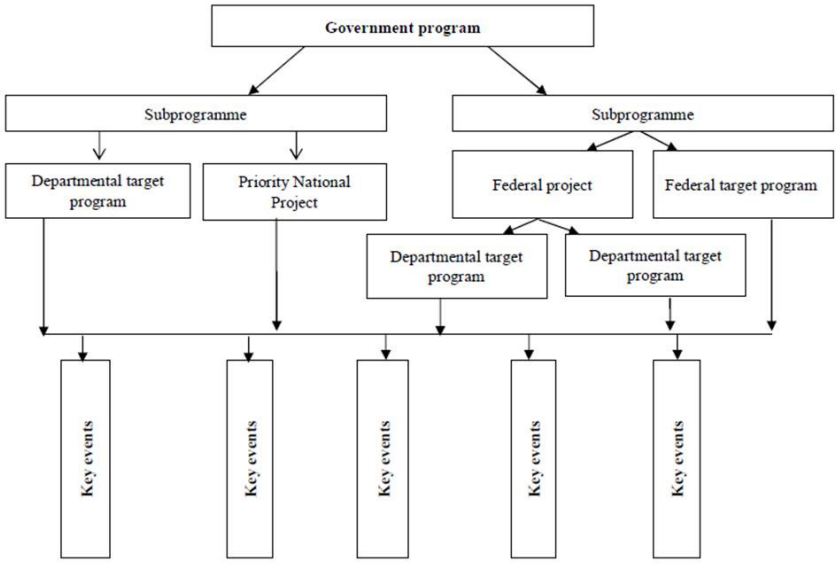

Fig. 1: Structure of the state program

Such a "program and project compote" in the absence of a systematic mechanism for financing the above-mentioned state budgeting formats makes it very difficult not only the execution of expenses for these formats, but also an objective assessment of their effectiveness. This creates a multiplicity of models and hierarchical branches of management: the implementation of national projects is managed according to one model, the main directions of government and state programs - according to another, federal target programs (FTP) - according to the third. This creates duplicate processes that are identical in tasks and not integrated into a single system, which distorts managerial motivation. Under these conditions, expectations of new changes are being formed, in connection with which the desire to deeply develop some kind of tool does not arise.

At the same time, a large number of different plans and road maps are in operation. Despite the correct vector of actions and transformations undertaken by public authorities in the field of reforming budget planning and financing, budget spending does not yet have a proper impact on indicators of the social and economic sector, and the evaluation of programmatic expenditure formats is not standardized up to the level of a unified methodology with a transparent algorithm and criteria. This requires the authorities to reload the existing mechanisms for implementing state programs and the projects being part of them, including change in the methodology for their evaluation.

Hypotheses

What has been achieved so far in the field of development of program budgeting in the Russian Federation and implementation of high-quality goal-setting when planning budget expenses. For example, government pilot programs set goals that meet the SMART method. However, they are failing to combine goals and resources on a systematic basis. As a result, there are situations that arise in practice, when funds are spent efficiently (internal efficiency is high), while they are not aimed at achieving the goals set in the state program (effectiveness is low). The multi-level system for the implementation of activities and the achievement of targets within the framework of the state program is diffused ("blurred"), inaccurate and has a number of substantive problems and shortcomings.

So, the evaluation of the effectiveness of the implementation of state programs is carried out by its responsible executives (ministries and departments) on the basis of independently established

indicators and the methodology for evaluating effectiveness developed by them, is subjective and does not allow to really assess the progress of the implementation of state programs. In addition, when assessing the effectiveness of state programs, the volume of increasing receivables from responsible executives, as well as the increase in the cost of construction in progress, in which budget funds are actually frozen, but which does not affect the growth of the economy, are not taken into account.

In this regard, a reload of approaches to assessing the effectiveness of state programs in Russia is required in the direction of unification of the evaluated performance criteria for all state programs and their structural elements, as well as weight values awarded to them. We also believe that an increase in weight values for significance factors for measures and indicators that have a direct impact on achieving the goal of the state program, and a decrease in weight values for coefficients for events and indicators of secondary importance, i.e. having an indirect effect on the achievement of the program targets, it will provide a more adequate assessment of the effectiveness of the implementation of government programs and their impact on economic growth and improving the life of the Russian population.

Methodology and Data

The methodology for assessing the performance of a state program from an economic point of view is an algorithm to evaluate whether budget funds for approved specific activities both in the process and as a result of the implementation of the state program are being spent in an efficient manner. Based on the review of economic literature, there are three main areas that unite the whole variety of approaches to assessing the effectiveness of government programs:

1. The method of cost-benefit analysis (CBA - cost benefit analysis), the founders of which are C. Weiss and M. Scriven. To apply this method, it is necessary to evaluate all the required costs and possible benefits from the implementation of government programs in monetary terms. However, it is usually difficult to evaluate the social effect in monetary terms in practice. A modification of this technique is the discounted cash flows method, which is used to assess the effectiveness of investment projects. V. Livshits, A. Shakhnazarov and S. Smolyak believe that, in calculating the benefits that will be obtained from the implementation of government programs, all deferred income are to be considered.
2. The cost-effectiveness analysis (CEA) differs from the above method in that it eliminates the need to calculate all socio-economic effects in monetary terms. As an indicator, it uses the amount of resources per unit of result. However, this approach too would have disadvantages. If, when applying the first method, the comparison of net present value is carried out with zero, and the profitability index – with unity, then in the CBA, cost benefit analysis, there is no normative value with which to compare the obtained efficiency indicator. Still, we can widely use this approach to select the most effective program from the many existing ones.
3. The method of integrated assessment - a variation of wCEA, weighted CEA, used by the World Bank and in foreign practice as a whole. The essence of this approach is that weights are assigned to each direction of the program. The social effect is its conditional expression through an aggregated indicator. In this case, weights are set for the goals and objectives of the program, planning, management and monitoring, effectiveness and performance, that is, those areas that determine the requirements for the program and allow you to objectively form an idea of its quality.

In the Russian Federation there is used the methodology for assessing the performance developed by the Ministry of Economic Development of the Russian Federation. It involves evaluating by the following directions:

1) the degree of conformity of the established and achieved targets and indicators of state programs;
2) analysis of the execution of control events of state programs;

3) analysis of the fulfillment of expenditure obligations of the Russian Federation related to the implementation of state programs;
4) an assessment of the activities of promoters in terms of the development and implementation of state programs.
5) calculation of the integral indicator for assessing the performance of the state program in quantitative terms.

Consider the assessment methodology in the direction of the analysis of compliance with established and achieved target indicators and indicators of the state program (table 1).

Table 1: Methodology for analyzing the compliance of established and achieved target indicators and indicators of state programs

Overall assessment of achievement of planned values of indicators	$OD_{п} = \frac{к_1 * \frac{\sum_{i=1}^{M} ОД_{пi}}{M} + к_2 * \frac{\sum_{j=1}^{N} ОД_{пj}}{N}}{к_1 + к_2}$
Overall assessment of the achievement of the planned value of the q-th target indicator of the state program level, which is not an indicator of the Decrees of the President of the Russian Federation	$ОД_{п_i} = \frac{к_3 * \frac{\sum_{i=1}^{L} ОД_{П(ГП)_q}}{L} + к_4 * \frac{\sum_{w=1}^{P} ОД_{П(ПП)_w}}{P}}{к_3 + к_4}$
A general assessment of the achievement of the planned value of the j-th target indicator of the state program (subprogram, federal target program), corresponding and ensuring the achievement of the Decrees of the President of the Russian Federation	$ОД_{п_j} = \frac{к_3' * \frac{\sum_{q=1}^{L} ОД_{П(ГП)_q}}{L} + к_4' * \frac{\sum_{w=1}^{P} ОД_{П(ПП)_w}}{P}}{к_3' + к_4'}$
A general assessment of the achievement of the planned value of the w-th target indicator of the subprogramme level (federal target program), corresponding and ensuring the achievement of the Decrees of the President of the Russian Federation	$ОД_{П(ПП)_w} = СД_w * СД_{Д_w}$
The degree of achievement of the planned value of the w-th target of the state program	for indicators whose desired development trend is an increase in the value: $СД_w = \frac{ЗП_{Ф_w}}{ЗП_{П_w}}$
	for indicators whose desired development trend is a decrease in the value: $СД_w = \frac{ЗП_{П_w}}{ЗП_{Ф_w}}$
The degree of dynamics of the values of the w-th target indicator of the state program	for indicators whose desired trend is an increase in values: $СД_{Д_w} = \frac{ЗП_{Ф_w}}{ЗП_{Ф_{предыдw}}}$
	for indicators whose desired trend is a decrease in values: $СД_{Д_w} = \frac{ЗП_{Ф_{предыдw}}}{ЗП_{Ф_w}}$

The next stage is the analysis of the execution of control events of state programs, the methodology of which is presented in table 2.

Table 2: Methodology for the analysis of the execution of control events of state programs

General assessment of the implementation of the main activities of state programs in the reporting year	$OP_{OM} = \frac{\kappa_5 \frac{\sum_{i=1}^{M} H_{KC_i}}{M} + \kappa_6 \frac{\sum_{j=1}^{N} H_{KC_j}}{N}}{\kappa_5 + \kappa_6}$
Assessment of the onset of the q-th control event provided for in the implementation plan for the main activities of the state program, the implementation of which provides for the allocation of budgetary allocations	$H_{KC_i} = \frac{\kappa_7 \frac{\sum_{q=1}^{L} H_{KC_{(ПР)q}}}{L} + \kappa_8 \frac{\sum_{w=1}^{P} H_{KC(ДПГ)_w}}{P}}{\kappa_7 + \kappa_8}$
Assessment of the onset of the j-th control event for the main activities of the state program, the implementation of which does not provide for the allocation of budgetary allocations	$H_{KC_j} = \frac{\kappa_7' \frac{\sum_{q=1}^{L} H_{KC_{(ПР)q}}}{L} + \kappa_8' \frac{\sum_{w=1}^{P} H_{KC(ДПГ)_w}}{P}}{\kappa_7' + \kappa_8'}$
Assessment of control events for key events	$H_{KC_{(ПР)q}} = \frac{KC_{ФПР_q}}{KC_{ППР_q}}$
Evaluation of the onset of the w-th control event provided for in the detailed plan for the implementation schedule and not included in the implementation plan for the main activities of the state program, the implementation of which provides for the allocation of budgetary allocations	$H_{KC_{(ДПГ)w}} = \frac{KC_{ФДПГ_w}}{KC_{ПДПГ_w}}$

An interpretation of all indicators is presented *in Appendix 1*.

Evaluation of cash execution of state programs is carried out according to the following formula:

$$K_{уи} = \frac{\sum_{i=1}^{N} \frac{Касса_{OM}}{СБР_{OM}}}{N} \quad (1)$$

Performance evaluation of a responsible executor:

$$ОЭД = \frac{\sum_{j=1}^{T} \frac{КР_{факт\,j}}{КР_{план\,j}}}{T} \quad (2)$$

And finally, the integral indicator is calculated according to the following formula:

$$ГП_{ОЭ} = \kappa_9 * ОД_n + \kappa_{10} * OP_{OM} + \kappa_{11} * K_{уи} + \kappa_{12} * ОЭД \quad (3)$$

The integral indicator provides an assessment of the effectiveness of the implementation of the state program in quantitative terms and is based on the degree of achievement of indicators (indicators) at the level of the state program as a whole, its subprograms and federal target programs, the effectiveness of the implementation of the main activities, the level of cash execution and the performance of the responsible executive. The highest weighted value is given to the coefficient of achieving the planned values of the indicators of the state program, subprograms and federal target programs (K9) – 40 percent, the smallest – to the coefficient of the level of use of budgetary allocations in the implementation of the state program (K11) – 10 percent (Appendix 1). This generally contradicts modern practice of evaluating the effectiveness of the implementation of state programs by the Ministry of Finance of the Russian Federation in terms of the use of federal budget funds, in which the key criterion remains the amount of cash execution of program budget expenditures.

However, in 2018, changes were made to the assessment of the integral indicator in terms of dividing the degree of achievement of indicators at the state program level as a whole and at the level of its constituent elements (subprograms and federal target programs) with the assignment of different weighting factors (previously it was estimated by one indicator and, accordingly, one weighting factor), which in our opinion should increase the objectivity of this indicator. Thus, the integrated performance assessment for each state program since 2018 is estimated as a weighted average of 5 indicators (weighting coefficient of achieving the planned values of indicators (indicators) of the state program - 0,7; weighting coefficient of achieving the planned values of indicators (indicators) of subprograms (federal target programs) - 0,1; weighting coefficient for evaluating the effectiveness of the implementation of the main activities - 0,1; weighting coefficient for the level of use of budgetary allocations - 0,05; weighting coefficient evaluating the performance of the responsible officer - 0,05). Thus, the weight of the assessment of achieving the planned values of program indicators in the aggregate was increased from 40 to 80 percent in the overall assessment of the effectiveness of the state program. This confirms the thesis that when assessing the effectiveness of state programs, a significant factor is the level of achievement of planned values of indicators of the state program, even in the case of the presentation of forecast (preliminary) data

A key aspect of the methodology used in assessing the effectiveness of state programs is the use of weighting coefficients for achieving one or another indicator of the methodology, both at intermediate stages of evaluation for each criterion being evaluated, and at the level of the integral indicator. At the same time, the same significance factors are graded in relation to the individual estimated indicators of the methodology (indicators and control events) for various structural elements of the state program (subprograms, target programs, etc.) according to the criterion of their compliance or non-compliance with the goals of the Decree of the President of the Russian Federation, as well as the implementation plan of measures . Moreover, the weight of the coefficient of significance of achieving the indicator or the implementation of the control event within the state program that is not related to the Presidential Decree is significantly higher than the weight of the same coefficient for the estimated indicator that is not related to the implementation of the Decree of the President of the Russian Federation. Since during the period of implementation of state programs since the approval of the methodology under consideration both the new decree of the President of the Russian Federation was adopted, so a significant number of other regulatory legal acts with a huge list of targets, often not comparable, this creates significant problems when assessing the effectiveness of state programs, makes the methodology too bulky and difficult to use. In addition, the exclusion from the evaluation of indicators for which the responsible executors did not provide the actual values of their performance leads to an overestimation of the effectiveness of state programs, does not stimulate the responsible executors to update the list of indicators.

In connection with the integration of federal projects into the structure of the state program, the following additional problems arise when using this approach: there are no indicators to assess the contribution of the federal project to achieving the goals of the state program, there is no direct relationship between the key targets (indicators) of federal projects and the corresponding state program.

Speaking about the effectiveness of financing and implementation of state programs, it should be noted that the evaluation of state programs is a tool that allows you to create a view of the progress of the programs being implemented and helps to obtain information for making budget decisions regarding their further implementation. At the same time, the cost-effectiveness of the state program implies the implementation of all the main activities to achieve the specified targets (indicators), taking into account the use of the approved budgetary allocations on the planned dates. From this it is clear that the effectiveness of the state program is directly related to the cost effectiveness of program budget expenses.

In modern financial science and budget legislation there is no consensus on what is meant by the cost effectiveness of budget expenditures. In the public sector, it must be borne in mind that the cost is the entire amount of budgetary funds allocated to achieve the goals and objectives of the budgetary policy of the authority. Moreover, the allocated resources are determined by the budget law and

should be justified and sufficient to achieve the goals and objectives of the state program. The results of budget spending are usually of socially significant nature and should reflect the achievement of goals. The extent to which goals are achieved can be different, i.e. it demonstrates the level of compliance of the actual result with the planned goals and objectives, which is characterized by the indicator of "effectiveness". However, in our opinion, the concept of "*efficiency of a state program (project)*" is a much wider and more comprehensive concept from the point of view of not just the final result of the use of budget funds, which, no doubt, is an extremely significant factor, but also from the standpoint of conformity and priorities of spending budget funds for strategic (national) development goals, as well as the impact of the results of such spending on specific indicators of society and the state of the economy.

In this regard, the concept of "*efficiency of a state program (project)*" should be understood as the maximum compliance of the results of the activities implemented in this program with the planned growth of socio-economic development indicators for a certain period and the final needs of the population (maximum achievement of the final target indicators of the program), while ensuring timely financing of these activities in the prescribed amount. At the same time, an assessment of the effectiveness of budget expenditures under the state program should express the ratio of the degree of achievement of socially significant results (effects) to the level of actual use of budget funds with the purpose not to minimize costs, but to maximize the beneficial effect (economic, social, budgetary)

Since the term "efficiency" evolves the precise definition of the criteria for evaluation, such benchmark indicators must be determined to evaluate the efficiency of the program and projected expenditure. These criteria must meet the following requirements:

1) a clear statement of the goals of the state program (project), focused on its final measurable result;
2) justifying calculations of the amount of budget funds spent for the implementation of each of the provided goals and objectives of the state program (project);
3) the absence of duplicate expenses during the implementation of one goal (task);
4) the presence of an estimated relationship between the amount of budget funds for the state program (project) and the expected results of their use in budget reporting forms;
5) comparability of socially significant indicators and performance indicators of the state program (project).

Conclusion and Discussion

A statistical evaluation of the effectiveness of the implementation of state programs in the Russian Federation was carried out on the basis of the approved range of distribution of state programs in the following efficiency categories: high degree of implementation efficiency, degree of implementation efficiency above the average level, degree of implementation efficiency below the average level, low degree of implementation efficiency. The results are presented in table 3. As can be seen from the table, the criteria for the degree of effectiveness of state programs from year to year are constantly changing due to the constant change in the list of indicators and weighting coefficients in the evaluation methodology. At the same time, there is a steady increase in percentage criteria for such categories of state programs implementation efficiency as a high degree of implementation efficiency and a degree of implementation efficiency above the average level. At the same time, in relation to percentage values for the efficiency categories of the implementation of state programs with a degree below the average level and a low degree of implementation efficiency since 2018. That is, after changing the composition of the evaluated indicators in the methodology and the weight values of the coefficients, a tendency of their significant mitigation.

Table 3: Performance criteria for the implementation of government programs in the Russian Federation in 2015-2018, in percent

The degree of effectiveness of the state program	2015	2016	2017	2018	2019
high	more 92,7	more 91,9	more 92,7	more 94,6	more 94,2
above average	77,6-91,4	83,5-87,9	88,4-92,3	85,3-94,5	90,1-94,1
below the average	73,2-76,9	76,5-81,8	82,8-87,2	57,6-85,2	56,8-90,0
low	45,5-63,0	56,8-74,8	78,4-80,8	less 57,5	less 56,8

The results of evaluating the effectiveness of the implementation of state programs in the Russian Federation by the integral indicator according to the methodology of the Ministry of Economic Development of Russia for 2015 - 2018 are presented in table 4.

Table 4: Evaluation of the effectiveness of the implementation of state programs in the Russian Federation in 2015 - 2018, number of state programs

The degree of effectiveness of the state program	2015	2016	2017	2018	2019 (preliminary estimate)
high	3	6	6	22	23
above average	16	12	12	13	7
below the average	5	13	12	4	12
low	8	6	6	1	0

Despite the tightening of percentage assessment criteria for the upper values of the presented range, and as a result, an increase in the number of state programs with a high degree of efficiency and a decrease with a low degree of efficiency, the impact of state programs on the rate of economic growth in Russia remains extremely low. This is evidenced by the unsatisfactory significance of the dynamics of real incomes of the population, the growth rate of the Russian economy, the mortality rate and so on.

Statistical observations of the implementation of federal and regional programs and national projects integrated in them in Russia demonstrate a significant decrease in their cash execution from year to year, failure to achieve a number of planned indicators or lack of real results when formally achieved. Given that the financing of state programs comes from various sources, the assessment of their financial support should be carried out not only from the federal budget, but also from the budgets of the constituent entities of the Russian Federation, budgets of state extra-budgetary funds, as well as from extra-budgetary sources (table 5).

Table 5: Evaluation of cash execution of government programs in the Russian Federation by resource sources in 2015-2018, in percent

Source of financial support for the state program	**2015**	**2016**	**2017**	**2018**
Total	85,7	104,7	101,2	113,5
Federal budget	99,6	98,6	101,7	103,9
Consolidated budgets of the subjects of the Russian Federation	90,0	90,8	93,2	63,5
State extrabudgetary funds	95,3	103,8	96,6	90,1
Extrabudgetary Sources	47,4	214,5	58,8	162,7

The data in table 5 demonstrate a steady increase in the level of cash execution of state programs from 2017 from the federal budget relative to planned values. In relation to the execution of state programs at the expense of the consolidated budgets of the subjects of the Russian Federation (territorial budgets) and funds from extrabudgetary sources, extremely unstable dynamics is observed. We believe that in assessing the overall effectiveness of the implementation of state programs, it is advisable to include an assessment of the fulfillment of expenditure obligations at the expense of all sources of financial support for all participants in state programs, taking into account the financing of budgets of the constituent entities of the Russian Federation and extrabudgetary sources.

Of course, the federal budget plays a decisive role in the effectiveness of the implementation of state programs. However, if we evaluate the cash execution of federal budget expenditures for the implementation of state programs (including expenses for the implementation of pilot state programs) in relation to the approved indicators of the consolidated budget list, then for the period from 2015-2019. there is a steady downward trend (Table 6).

Table 6: The level of cash execution of expenditures of the federal budget of the Russian Federation for the implementation of state programs regarding the indicators of the consolidated budget list, in%

at the end of the reporting period	2016	2017	2018	2019
% execution	98,3	96,8	95,6	94,1

Expenditures for the implementation of national projects (programs) and the Comprehensive plan were fulfilled by 91.4% of the consolidated list, which is 2.8 percentage points lower than the average level of execution of federal budget expenditures in 2019 (94.2%). At the same time, 7 out of 12 national projects were completed below the indicated level. As a result, the total amount of unfulfilled assignments for national projects (programs) and the Comprehensive Plan amounted to 149.8 billion rubles, or 8.6% of the total budget list at the end of 2019. (table 7).

Table 7: Implementation of state programs and national projects in Russia in 2019

State programs	*Execution of government programs, in%*			
	more than 100	*94,2 - 99,9*	*90,1 - 94,1*	*56,8- 90,0*
Number of state programs	1	22	7	12
Total (42)	***94,1***			
National projects	*Execution of national projects, in%*			
	100 and more	*93,1 - 99,1*	*90-93*	*Less than 90*
Number of national projects	0	7	1	4
Total (12)	***91,4***			

The reasons for the unsatisfactory implementation of program tools in the field of state budgeting were the lack of a systematic mechanism for their formation, fulfillment, and evaluation. In particular, a number of state programs are not balanced in terms of goals and objectives; the target dates for the implementation of activities in individual programs are constantly shifting. So, by the end of the approved term of the next state program, the level of its implementation often is so low that its implementation is delayed for the next planning period. Such situation does not lead to an increase in the effectiveness of budget financing in terms of targeted and efficient use of the federal budget and other budgets of the budget system of the Russian Federation, but it also discredits the very idea of program budgeting in Russian practice, reduces the degree of trust and interest in government projects on the part of business.

The problems of implementing program tools for financing public expenditures can be grouped in accordance with the root causes of their occurrence as follows:

1) increasing the types and forms of program-target management documents;
2) the blurred concept of the consumer of the state program results and the lack of feedback on the program implementation results;
3) combining program-specific management and budgeting based on results;
4) combining change management and process administration procedures;
5) the public administration system focused on control, but not results;
6) reduced manageability of state programs as a result of including federal projects in their structure;
7) the formation of a significant number of requests for changing the passports of national and federal projects, providing for the adjustment of indicators and results, the redistribution of their financial support;
8) inferiority of the procedure for a comprehensive assessment of the effectiveness of state programs.

The result of these problems created a paradoxical phenomenon: despite the low performance or non-performance of individual expenditures for state programs and federal projects that are part of them, the planned targets of individual indicators were met or exceeded. Moreover, a number of results of federal projects do not affect the achievement of any target indicator of national projects.

The inferiority of complex procedures evaluation of the effectiveness of state programs leads to the fact that the evaluation of the effectiveness and efficiency of the state program implementation is based primarily on the principle of "plan - fact" and is largely similar to monitoring the fulfillment of instructions from the management of the relevant control units. The following paradoxical situation can arise in a situation where the conditional customer of the results of the state program is the agency that administers it: Evaluation of the effectiveness of the direct results is actually based on the data of the responsible performer, who forms plans on its own and provides information on their implementation. As a result, in most cases, the existing system of monitoring the implementation of state programs does not lead to management actions that are adequate to the actual situation.

The problems of program budgeting identified in the course of the study confirm the thesis about the need to “reload” state programs as a management tool. Each specific state program should be considered as a tool for managing changes in the relevant field of activity. It must respond to urgent challenges based on the real needs of society, citizens and business.

To improve the efficiency of program budgeting in Russia at the state level, we propose the following strategic directions (vectors) for the development of a methodology for evaluating state programs and tools for managing them.

1. To ensure the manageability of the federal budget expenditure results, it is necessary to take an inventory of existing formats for planning and budget spending, to combine program and project tools with similar goals, objectives and performance indicators. This should significantly simplify the budget process for responsible performers of expenditure obligations and increase the level of cash fulfillment of expenses.
2. To obtain objective results of evaluating the effectiveness of program expenditures, it is necessary to fully match the target indicators of each federal project that is part of a specific state program with the profile orientation of the target indicators (indicators) of this program. At the same time, the content of the main measures for assessing the effectiveness of the state program should be fully consistent not only with the goals of its separate federal projects, but also with the goals of the state program as a whole.
3. To determine the *significant factor* for each main event of the state program and its constituent federal projects, which should be used to evaluate the performance of the main activities. For example, measures that lead to the achievement of strategic (national) development goals (for example, increasing life expectancy) and that have a direct impact on the achievement of the state

program goal should have a greater weight in the model for assessing its effectiveness compared to activities related to additional goals and having an indirect effect on the achievement of the final goal of the project (program).

4. To conduct a thorough decomposition of indicators of national projects at the territorial level, as well as federal projects that are part of them. I.e., the target indicators of the federal project of the corresponding state program should be adapted for each region individually, taking into account its territorial features, available resources, and living standards of the population. At the same time, it is necessary to take into account differences in the starting conditions of regions when implementing national projects assigned to them.

5. To carry out a gradual transition from monitoring the occurrence of control events under the state program to monitoring the immediate and intermediate results of the state program.

6. Given the high dependence of volumes of financing of state programs from the approved indicators of the summary budget list in approving the budget law, it is proposed to assess the impact of new funding on the change in the integral indicator of the efficiency of the state program when changing the indicators of the summary budget list. If the assessment shows a significant decrease in efficiency in terms of an integral indicator, a program adjustment is required in terms of its indicators and the volume of planned measures. Otherwise, an assessment of the effectiveness of the state program completion with the changed volumes of its financing will give a negative result.

7. To transform the methodology of evaluation of state programs and their component projects through the division of its efficiency into two components: "financial efficiency of the state program" as a separate indicator, the purpose of which will be a direct assessment of the management quality of financing state programs, and "socio-economic efficiency of the state program", which involves assessing the degree of impact of state program measures and the timeliness and completeness of their implementation on specific indicators of economic and social development and the degree of customer satisfaction of the services provided under the program. This measure will allow to focus on the high-quality results of measures in managing the implementation of the state program. The financial efficiency of the state program, calculated at the end of the reporting period, will allow identifying possible ways to optimize the volume and format of its financing, while not harming the quality component of the implementation process and achieving the goals of the program.

8. To review the measures of responsibility for failure to achieve the indicators of national projects, which are fixed in agreements between the federal center and the regions on obtaining subsidies for co-financing regional projects. According to the current regulatory documents, the subject of the Russian Federation, in case of failure to achieve the results of the national project, must return 10% of the financial equivalent of the lost effect to the federal budget. At the same time, the effect of financing may appear beyond the time limits set for achieving national project indicators. In this regard, a preliminary comprehensive and objective assessment of the reasons and factors of the failure to achieve the planned indicators is required, which should be enshrined in the grant agreement.

These recommendations are aimed at improving the effectiveness of program-oriented management, objectivity of approaches to assessing the effectiveness of state programs and their "reloading" from the side of a positive multiplier effect on economic growth and improving the life quality of the Russian population.

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Appendix 1

Interpretation of indicators of the methodology for assessing the effectiveness of a state program approved by the Ministry of Economic Development of the Russian Federation

$ОД_n$- a general assessment of the achievement of the planned values of the indicators of the state program, as well as subprograms and federal target programs;
$ОД_{ni}$- a general assessment of the achievement of the planned value of the i-th target indicator of the state program, as well as subprograms and federal target programs, which is not an indicator of Decrees of the President of the Russian Federation dated 05.05.2012 No. 596-606;
M - the number of target indicators of the state program (subprogram, federal target program), which are not indicators of Decrees of the President of the Russian Federation dated 05.05.2012 No. 596-606;
κ_1- significance coefficient for indicators of the state program (subprogram, federal target program), which are not indicators of Decrees of the President of the Russian Federation dated 05.05.2012 No. 596-606 (κ_1= 1);
$ОД_{nj}$ – a general assessment of the achievement of the planned value of the j-th target indicator of the state program (subprogram, federal target program), corresponding and ensuring the achievement of Decrees of the President of the Russian Federation of 05.05.2012 No. 596-606;
N – the number of target indicators of the state program (subprogram, federal target program), relevant and ensuring the achievement of Decrees of the President of the Russian Federation of 05.05.2012 No. 596-606;
κ_2 – significance coefficient for indicators of the state program (subprogram, federal target program), relevant and ensuring the achievement of the Decrees of the President of the Russian Federation of 05.05.2012 No. 596-606 (κ_2 = 1,2). In the absence of such indicators – ($\kappa_2 = 0$);
$ОД_{П(ГП)_q}$ – общая оценка достижения планового значения q-ого целевого показателя уровня государственной программы, не являющегося показателем Указов Президента РФ от 7.05.2012 г. №№ 596-606;
L – the number of target indicators of the state program level that are not indicators of the Decrees of the President of the Russian Federation dated 05.05.2012 No. 596-606;
κ_3 – significance coefficient for indicators of the level of the state program that are not indicators of Decrees of the President of the Russian Federation of 05.05.2012 No. 596-606 ($\kappa_3 = 1{,}5$);
$ОД_{П(ПП)_w}$ – general assessment of the achievement of the planned value of the w-th target indicator of the level of the subprogram (federal target program), which is not an indicator of Decrees of the President of the Russian Federation dated 05.05.2012 No. 596-606;
P – the number of target indicators for the level of the subprogram (federal target program), which are not indicators of the Decrees of the President of the Russian Federation dated 05.05.2012 No. 596-606;
κ_4 – significance coefficient for indicators of the level of the subprogramme (federal target program), which are not indicators of Decrees of the President of the Russian Federation dated May 7, 2012 No. 596-606 ($\kappa_4 = 1$);
$\kappa_3{}'$ – the coefficient of significance for indicators of the level of the state program, relevant and ensuring the achievement of Decrees of the President of the Russian Federation of 05.05.2012, No. 596-606. In the absence of such indicators - ($\kappa_3{}' = 0$);
$\kappa_4{}'$ – significance coefficient for indicators of the level of the subprogram (federal target program), relevant and ensuring the achievement of the Decrees of the President of the Russian Federation of 05.05.2012 No. 596-606. ($\kappa_4{}' = 1$) In the absence of such indicators - ($\kappa_4{}' = 0$);
$СД_w$ – degree of achievement of the planned value of the w-th target indicator of the state program (subprograms, federal target programs) in the reporting year;
$СД_{Д_w}$ – the degree of dynamics of the value of the w-th target indicator of the state program (subprograms, federal target programs);
$ЗП_{Ф_w}$ – the value of the w-th target indicator of the state program (subprograms, federal target programs), actually achieved at the end of the reporting period;

$ЗП_{П_w}$ – the planned value of the w-th target indicator of the state program (subprograms, federal target programs) for the reporting year;
$ЗП_{Ф_w}$ – the value of the w-th target indicator of the state program (subprograms, federal target programs), actually achieved at the end of the reporting period;
$ЗП_{Ф_{предыдw}}$ – the actual value of the w-th target indicator of the state program (subprograms, federal target programs) for the year preceding the reporting year;
OP_{OM} – general assessment of the implementation of the main activities of the state program in the reporting year;
H_{KC_i} – assessment of the occurrence of the i-th control event for the main activities of the state program, the implementation of which provides for the allocation of budgetary allocations;
M – the number of control events for the main activities of the state program, the implementation of which provides for the allocation of budgetary allocations;
κ_5 – coefficient of significance of control events for the main activities of the state program, the implementation of which provides for the allocation of budgetary allocations (κ_5=1). In the absence of such control events – ($\kappa_5 = 0$)
H_{KC_j} – assessment of the onset of the j-th control event for the main activities of the state program, the implementation of which does not provide for the allocation of budgetary allocations;
N – the number of control events for the main activities of the state program, the implementation of which does not provide for the allocation of budgetary allocations;
κ_6 – coefficient of significance of control events for the main activities of the state program, the implementation of which does not provide for the allocation of budgetary allocations (κ_6=1,2). In the absence of such control events – ($\kappa_6 = 0$);
$H_{KC_{(ПР)q}}$ – assessment of the onset of the q-th control event provided for in the implementation plan for the main activities of the state program, the implementation of which involves the allocation of budgetary allocations;
L – the number of control events provided for in the implementation plan for the main activities of the state program, the implementation of which involves the allocation of budgetary allocations;
κ_7 – the coefficient of significance of control events provided for in the implementation plan for the main activities of the state program, the implementation of which provides for the allocation of budgetary allocations ($\kappa_7 = 1{,}5$). In the absence of such control events - ($\kappa_7 = 0$);
$H_{KC(ДПГ)_w}$- assessment of the occurrence of the w-th control event provided for in the detailed plan for the implementation schedule and not included in the implementation plan for the main activities of the state program, the implementation of which provides for the allocation of budgetary allocations;
P – the number of control events provided for in the detailed plan for the implementation schedule and not included in the implementation plan for the main activities of the state program, the implementation of which provides for the allocation of budgetary allocations;
κ_8 – the coefficient of significance of control events provided for in the detailed plan for the implementation schedule and not included in the implementation plan for the main activities of the state program, the implementation of which provides for the allocation of budgetary allocations ($\kappa_8 = 1$). In the absence of such control events - ($\kappa_8 = 0$);
$H_{KC_{(ПР)q}}$ - assessment of the onset of the q-th control event provided for in the implementation plan for the main activities of the state program, the implementation of which involves the allocation of budgetary allocations;
L – the number of control events provided for in the implementation plan for the main activities of the state program, the implementation of which involves the allocation of budgetary allocations;
$\kappa_7{}'$ - the coefficient of significance of control events provided for in the implementation plan for the main activities of the state program, the implementation of which does not provide for the allocation of budgetary allocations;
$H_{KC(ДПГ)_w}$- assessment of the occurrence of the w-th control event provided for in the detailed plan for the implementation schedule and not included in the implementation plan for the main activities of the state program, the implementation of which provides for the allocation of budgetary allocations;

$\kappa_8{}'$ - the coefficient of significance of control events provided for in the detailed plan for the implementation schedule and not included in the implementation plan for the main activities of the state program, the implementation of which does not provide for the allocation of budgetary allocations ($\kappa_8{}' = 1$). In the absence of such control events - ($\kappa_8{}' = 0$)

$КС_{ФПР_q}$ – actual value for the q-th control event provided for in the plan for the implementation of the state program in the reporting year;

$КС_{ППР_q}$ - planned value for the q-th control event provided for in the plan for the implementation of the state program in the reporting year;

$КС_{ФДПГ_w}$ – the actual value for the w-th control event provided for in the detailed schedule of the implementation of the state program in the reporting year and not included in the plan for its implementation;

$КС_{ПДПГ_w}$ – planned value for the w-th control event provided only in the detailed schedule for the implementation of the state program in the reporting year and not included in the plan for its implementation;

$К_{уи}$ – level of use of budget allocations in the implementation of the state program;

$Касса_{ОМ}$ – cash expenses of the federal budget for the implementation of the main activities of the state program;

$СБР_{ОМ}$ – the amount of budget allocations for the implementation of the main activities of the state program according to the consolidated budget list;

$ОЭД$ – assessment of the performance of the executive of the state program in the reporting year;

$КР_{факт j}$ – actual value of the j-th criterion for assessing the performance of a responsible executor;

$КР_{план j}$ – planned value of the j-th criterion for evaluating the performance of the responsible executive;

T – number of evaluation criteria.

$ГП_{ОЭ}$ – integrated assessment of the effectiveness of the implementation of the state program;

κ_9 – weight coefficient of the overall assessment of the achievement of the planned values of the indicators of the state programs (subprograms and federal target programs) ($\kappa_9 = 0{,}4$);

$ОД_n$ - a general assessment of the achievement of the planned values of the indicators of the state program, as well as indicators of subprograms and federal target programs;

κ_{10} – weight coefficient of the overall assessment of the effectiveness of the implementation of the main activities of the state program in the reporting year ($\kappa_{10} = 0{,}3$);

$ОР_{ОМ}$ – general assessment of the effectiveness of the implementation of the main activities of the state program in the reporting year;

κ_{11} – weight coefficient of the use of budgetary appropriations in the implementation of the state program ($\kappa_{11} = 0{,}1$);

$К_{уи}$ – level of use of budget allocations in the implementation of the state program;

κ_{12} – weighting coefficient for evaluating the performance of the responsible executive of the state program in the reporting year ($\kappa_{12} = 0{,}2$).

Do Eco-Innovations Boost Entrepreneurship Development?

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Abstract

In an entrepreneurship development, not only the system, structure and strategy are of paramount importance, but also the entrepreneurial culture. Entrepreneurs all around the world have continuously helped improve the global economy. The paper is aimed to identify the relationships between countries performance in eco-innovations implementations and indicators of enterprises development in the EU-28 countries. Set of dependent variables includes indicators of business units' quantity (existing and new enterprises), indicators of financial potential of enterprises development (investment and capitalization parameters), indicators of added value, created in national economy and indicators of employment structure. Set of independent variables is presented by Eco-Innovation Index and its structural components that illustrate inputs, activities, outputs, socio-economic and resource efficiency outcomes of eco-innovation practices. Research period covers 2010-2016. Calculations are realized with using random-effects GLS regression in Stata software package and intended at testing the following hypotheses: 1) intensification of the process of eco-innovation implementation is associated with a decrease in the number of enterprises due to enhancing requirements for their competitiveness; 2) the effects of progress in implementing eco-innovation are reflected in increasing the country's investment attractiveness and increasing company capitalization; 3) eco-innovation reduces the share of value added created by the real sector of the national economy; 4) implementation of eco-innovation has a positive impact on employment in entrepreneurship; 5) the impact of eco-innovation on entrepreneurship development is differentiated depending on the country's overall level of eco-innovation progress.

Keywords: entrepreneurship, business, eco-innovations, employment, value added, capitalization, investment.

Introduction

Nowadays sustainability of development stands core position not only in research of economic, social and environmental issues on country level, but in the context of entrepreneurship development, including innovative activities and progress. On the one hand, growth in economic impact on environment determinates enhancing research & development efforts (Haseeb et al., 2019b) and vice versa intellectual resources development creates conditions for economic growth and innovations

implementation (Golovchanskaya et al., 2018). Traditionally entrepreneurship and start-ups are considered as drivers of innovative economic growth (Khan, 2018; Pomianek, 2018; Vidic, 2018). Bhandari (2019) illustrates that innovations lead to sustainability. Interconnection of business performance and corporate social responsibility is confirmed by scope of studies (Adámek, 2018; Mayorova, 2019; Manzoor et al., 2019; Cismas et al., 2019; Fadyeyeva, 2019; Szanto, 2019) while linkage of environmental responsibility and entrepreneurship development is not so obvious (Myroshnychenko et al., 2019). Thus, research purpose is to ground interrelationships of eco-innovations and entrepreneurship development.

Literature Review

Before clarification of certain relevant factors affecting entrepreneurial activity, it is necessary to underline core perspectives of indicators of entrepreneurial performance and systematize indicators of eco-innovations measurement.

Nowadays entrepreneurial performance is no more measured only with financial indicators like sales, profit or variation of ratio of returns, but by far more important triggers of business development become orientation on sustainable development issues: namely, implementation of innovations, environmental-friendly technologies and resources, adoption of corporate social responsibility concept, active participation in local community development etc.

Nevertheless, there are still a lot of empirical research results aiming at assessing of drivers and inhibitors of only economic perspective of entrepreneurial performance. Namely, Korcsmáros and Šimova (2018), Bilan et al. (2019a), Cepel et al. (2019), Lesáková, Ondrušová, Vinczeová (2019), Svabova and Durica (2019) in their research tried to identify important economic factors that influence SME business environment in Czech and the Slovak Republic. They found out that SMEs development highly depends on financial conditions and credit availability. In addition, Ahmad and Atniesha (2018) grounded key role of the volume and structure of SMEs financing at start-up stage of their development. In turn, Boiko and Samusevych (2017), Ślusarczyk (2018), Mukherjee (2018), Bilan et al. (2018b), Liu et al. (2019) and Andrejovska (2019) mentioned tax incentives and tax competition as key factors of business performance and entrepreneurial development. Rahmatiah, Wiroto, and Taan (2019) based on Indonesian case pointed out that favorable social conditions is one of the core prerequisites of youth entrepreneurship. Kasztelnik and Brown (2019), Bilan et al. (2019d), Vasylieva et al. (2019a) also argued that social factors matter for business performance.

There is also a group of scientists arguing that institutional framework and regulatory quality significantly matter for entrepreneurial development. Namely, Marikina (2018) found that effective regulatory conditions help to reach environmental sustainability in Balkan states. Bilan et al. (2019c) also found empirical evidences that institutional conditions have impact on social and economic sectors, and certainly entrepreneurial environment. Zajkowski and Domańska (2019) identified that regional Business Support Institutions influence creation of new business entities.

Plenty of scientists found empirical evidences that innovations, creativity and new technologies have positive impact on entrepreneurial development. Specifically, Carrillo (2019) proved that expansion of R&D expenditure positively affected country economic development and business competitiveness. While Karbowski (2019) revealed that cooperative and non-cooperative R&D strategies influence product innovation and business performance. Moreover, Potjanajaruwita and Girdwichai (2019), Bilan et al. (2019b) also mentioned that information technologies and creative innovations matter for business sustainable development. In turn, Drejeris and Oželienė (2019) empirically proved that technological perspective might be added to the set of traditional corporate sustainable development dimensions (economic, social, environmental and institutional). Kyrychenko et al. (2018), Zakharkina et al. (2018), Mikhaylova et al. (2019), Susanto, Abdullah, and Wardi (2019), Mekhum (2020) also proved that innovations are core trigger of entrepreneurial development. Crucial role of Industry 4.0 in ensuring of SMEs performance and sustainability is confirmed by Haseeb et al. (2019a).

Despite existence of plenty researches that proved significance of innovations for entrepreneurial development, there are also some empirical evidence of the opposite trend. Certainly, Taçoğlu, Ceylan and Kazançoğlu (2019) while analyzing determinants of textile industry development in Turkey pointed out that open-mindedness and employee qualification are the most influential factors of business development, while product design and product innovation have no significant impact on performance indicators. Meanwhile, Kaur and Mehta (2019) also did not observe significant gap of productivity, employment and output between high-tech and low-tech manufacturing industries.

Nevertheless, there are also set of researches aiming at clarification of ecological and environmental factors' effect on entrepreneurial development. Namely, Dabyltayeva and Rakhymzhan (2019) underline that active implementation of green economy concept in Kazakhstan allow achieving positive macroeconomic effects and ensure qualitative transformation of business environment. Meanwhile, Salam and Senasu (2019) aimed at constructing of business sustainable development measurement system that includes economic, social and environmental dimensions. They underlined such influential environmental determinants of entrepreneurial development as environment management system parameters, energy use and greenhouse gas emission, waste and wastewater management. Additionally, Akhtar (2019) and Pechancová et al. (2019) also revealed that active adoption of environmental management system has positive and significant impact on business competitiveness and company performance. Moreover, Sokolenko, Tiutiunyk, Leus (2017), Bilan et al. (2018a), Mentel et al. (2018), Yevdokimov et al. (2018), Vasylieva et al. (2019b), Lyeonov et al. (2019), Dwikuncoro and Ratajczak (2019), Pisar & Bilkova (2019) also support the idea that greenhouse gas emission, renewable and traditional energy consumption influence entrepreneurial sustainable development. Meanwhile, Chygryn et al. (2018) argued that emission of green bonds might positively influence business environmental performance.

Ślusarczyk (2011) proves that limitations of negative impact of industry on the environment as the part of EU protection policy lead to the reduction of business competitive advantages and might determinate slowdown of national economy. Pohludka, Stverkova, and Ślusarczyk (2018), Vaitkevicius et al. (2019) highlight an importance of sustainable business development through the implementation of enterprise resource planning system that has positive impact on company's financial performance. In addition to existent positive influence of internal business innovations (i.e. supply chain management) on the company's competitive advantages (Harsasi and Minrohayati, 2017) some extensions of its effects on the growth of social and environmental sustainability of enterprises were revealed by Kot, Haque and Kozlovski (2019).

In order to investigate eco-innovations influence of entrepreneurship development the following hypotheses have been put forward:

H1: eco-innovations implementation has an inverse relationship with the number of enterprises in economy;
H2: progress in eco-innovations lead to an increase of financial indicators of entrepreneurship development;
H3: eco-innovative development inhibits share of value added in real economy;
H4: eco-innovations have a positive relationship with employment in entrepreneurship;
H5: linkage of eco-innovations and entrepreneurship indicators depends on the general level of country's eco-innovation progress.

Research Methodology

The purpose of the study is to identify the relationship between the country's eco-innovation level and entrepreneurial development. Background of research is presented by Eco-Innovation Index, which was developed by European Commission for illustration of EU countries performance in eco-innovations implementation and achievement of sustainability progress. Such Index consists of 16 components characterizing different directions of ecological innovations both on state and enterprises levels that are aggregated into 5 groups. Thus, set of factor variables of current research is presented by following indicators:

– Eco-Innovation Index – general level of country's eco-innovation progress measured in reference to EU-average level, where higher value of index illustrates better country's position;
– Eco-innovation inputs: 1) Governments environmental and energy research and development appropriations and outlays, % of GDP (R&D appropriations); 2) Total research and development personnel and researchers, % of total employment (R&D personnel); 3) Total value of green early stage investments, USD/capita (Green investments);
– Eco-innovation activities: 1) Enterprises that introduced an innovation with environmental benefits obtained within the enterprise, % of total firms (Enterprise environmental benefits); 2) Enterprises that introduced an innovation with environmental benefits obtained by the end user, % of total firms (User environmental benefits); 3) ISO 14001 registered organizations, per mln population (ISO 14001);
– Eco-innovation outputs: 1) Eco-innovation related patents, per mln population (Patents); 2) Eco-innovation related academic publications, per mln population (Academic publications); 3) Eco-innovation related media coverage, per numbers of electronic media (Media coverage);
– Resource efficiency outcomes: 1) Material productivity, GDP/Domestic Material Consumption (Material); 2) Water productivity, GDP/Water Footprint (Water); 3) Energy productivity, GDP/gross inland energy consumption (Energy); GHG emissions intensity, CO2e/GDP (GHG emissions);
– Socio-economic outcomes: 1) Exports of products from eco-industries, % of total exports (Exports); 2) Employment in eco-industries and circular economy, % of total employment (Employment); 3) Revenue in eco-industries and circular economy, % of total revenue (Turnover).
Entrepreneurship development is presented by different dimensions:
– Business quantity indicators: 1) Population of active enterprises, number (Active); 2) New limited liability corporations, number (New business); 3) Density of new registrations per 1,000 people (Density);
– Added value indicators: 1) Value added in agriculture, % of GDP (Agriculture); 2) Value added in industry, % of GDP (Industry); 3) Value added in manufacturing, % of GDP (Manufacturing);
– Employment indicators: 1) Contributing family workers, % of total employment (Family workers); 2) Self-employed workers, % of total employment (Self-employed); 3) Wage and salaried workers, % of total employment (Employees);
– Financial indicators of entrepreneurship development: 1) Foreign direct investment net inflows, % of GDP (FDI); 2) Market capitalization of listed domestic companies, % of GDP (Market capitalization).
Country sample consists of 28 countries that are European Union members. Research period covers 2010-2016, based on statistical data from European Commission and World Bank databases. Empirical research is realized by panel data regression analysis in Stata software package. Application of the Breusch and Pagan Lagrangian multiplier test to the sample of statistics showed the presence of random effects, therefore random-effects GLS regression was chosen as the method of calculation.

Results

The overall impact of the change in the country's Eco-Innovation Index position on the dynamics of entrepreneurship development indicators is demonstrated by the results presented in Table 1.

Table 1: Results of Eco-Innovations Index impact on entrepreneurship development

Dependent variables		EU-28 countries	Eco-innovations leaders	Eco-innovations performers	Catching up eco-innovations
Business quantity indicators	Active	249.9290	-1063.4320	-240.5033	637.9369**
	New business	36.6871	-134.4999	-120.9689	83.0164**
	Density	0.0147	0.0061	-0.0253*	0.0327**
Added value	Agriculture	-0.0048***	0.0031	-0.0009	-0.0044

indicators	Industry	-0.0025	0.0449**	-0.0183	0.0008
	Manufacturing	0.0035	0.0167	-0.0214	0.0115
Employment indicators	Employees	0.0393***	-0.0155	0.0271**	0.0479***
	Self-employed	-0.0393***	0.0155	-0.0271**	-0.0479***
	Family workers	-0.0106***	0.0022	-0.0069	-0.0128***
Financial indicators of entrepreneurship development	FDI	0.0104	-2.6800***	-0.0922	0.1605
	Market capitalization	-0.0376	-2.9087***	-0.0984	-0.0704
Number of observations		196	35	70	91

*Note: *** – p<0.01; ** – p<0.05; * – p<0.1.*

The Eco-Innovation Index assessment methodology provides the classification of countries into three groups by eco-innovation activity level: eco-innovations leaders, eco-innovations performers and countries, catching up eco-innovations. Thus, in order to compare the intensity of the impact of eco-innovation on the parameters of entrepreneurial development at different stages of country's eco-innovation development, the relationships between the indicators was also evaluated in terms of different groups of countries.

The evaluation results show that the maximal impact eco-innovations have on the employment structure in the economy. Thus, the growth of the country's progress in the implementation of eco-innovation leads to an increase in the share of wage and salaried employees, at the same time having inverse relationship with the parameters of self-employed and family workers. Such relationships illustrate increase of opportunities for additional employment of workers as a result of eco-innovative economy development. On the other hand, the results show a decrease in the share of value added created by the real sector of the economy (agriculture), which is caused by a decrease in the level of use of resources in the eco-innovative approach to doing business. At the same time, there is no significant results of the impact of eco-innovations on quantitative and financial parameters of entrepreneurship development.

Calculations for countries with different levels of eco-innovation activity revealed the following patterns:

– eco-innovation leaders are characterized by the lack of significant impact of eco-innovation progress on quantitative indicators of entrepreneurship development, while the countries that are catching up eco-innovators show a strong positive effect in these terms. Eco-innovations performers have the weak relationship between eco-innovation and number of enterprises;
– changes in value added as a result of eco-innovation are only confirmed for eco-innovations leaders. Positive effect of value added in industry illustrates the results of production based on more efficient use of resources;
– the results of assessing the impact of eco-innovation on employment obtained for eco-innovation performers and countries catching up eco-innovations are similar to the trends found in estimating the total sample, while eco-innovation leaders do not show a statistically significant correlation between indicators, which may be the result of an already formed employment structure at earlier stages;
– the impact of eco-innovation on financial performance of business development has been confirmed only for eco-innovation leaders. The reversed identified impact may be the result of the transformation of the priorities of doing business from financial to non-financial indicators in the conditions of significant level of eco-innovation progress.

At the same time, the results of assessing the impact of separate components of the Eco-Innovation Index on business development are interesting. Table 2 shows the results of the impact of different dimensions areas and indicators of Eco-Innovation Index on quantitative parameters of business development and value added indicators. Thus, increase in eco-innovation inputs determinates the growth of new enterprises density both in general and through the channel of R&D personnel growth.

On the other hand, growth of green investments has an inverse impact on the number of active enterprises.

Growth of companies certified by ISO 14001 requirements stimulates an increase in quantity of new and existing enterprises, while expansion of environmental benefits achieved by enterprises for their own goals leads to the reduction in active enterprises quantity. Improvements in eco-innovation outputs does not determinate rise of business number, whereas resource efficiency and socio-economic outcomes indicators demonstrated positive significant relationships with new and existing business quantity in terms of influence of separate indicators. Thus, improving the country's performance in the direction of GHG emissions is a driving factor for the growth of active enterprises number in the economy, while water productivity has strong significant impact on the creation of new business units. At the same time material productivity is the factor inhibiting new enterprises creation in terms of their density. On the other hand, development of socio-economic outcomes forms a background for the rise of new business density.

The growth of eco-innovation inputs has no significant impact on value added in any of the studied economic sectors. Along with this, the share of value added in the industry is reducing due to the influence of environmental benefits, creates by enterprises for final user and share of value added in agriculture is mostly inhibited by intensification the process of ISO 14001 certifying.

Table 2: Results of eco-innovations impact on indicators of enterprises quantity and value added in economy

Independent variables	**Business quantity indicators**			**Added value indicators**		
	Active	New business	Density	Agriculture	Industry	Manufacturing
Eco-innovation inputs	-324.4775	23.4146	0.0142**	-0.0003	0.0067	-0.0002
R&D appropriations	206.5074	0.8447	-0.0009	-0.0012	0.0004	-0.0012
R&D personnel	-76.3143	30.1711	0.0068**	0.0004	0.0040	0.0013
Green investments	-245.5847**	-33.2114	0.0021	-0.0001	-0.0017	-0.0034
Eco-innovation activities	-133.2502	19.4925	0.0002	-0.0011	-0.0040	-0.0065
Enterprise environmental benefits	-631.5771**	14.5501	-0.0072	0.0006	-0.0074	-0.0068
User environmental benefits	-15.4807	3.7708	0.0022	-0.0000	-0.0059**	-0.0023
ISO 14001	330.3022*	58.3162	0.0107***	-0.0015**	-0.0035	-0.0004
Eco-innovation outputs	-30.6258	-6.1004	0.0013	-0.0004	-0.0042	-0.0017
Patents	194.8169	-92.6036*	0.0048	-0.0006	0.0015	-0.0014
Academic publications	94.5722	31.2489	0.0004	-0.0001	-0.0048***	-0.0009
Media coverage	3.2608	21.8089	0.0008	2.62E-06	-0.0028*	-0.0007
Resource efficiency	617.1582	189.5518*	0.0029	-0.0075***	-0.0231***	-0.0023

outcomes						
Material	-296.7009	21.1056	-0.0161***	-0.0009	0.0077	0.0127***
Water	166.1144	68.7513**	0.0043	-000011**	-0.0063***	-0.0039**
Energy	437.0433	-30.8656	0.0027	-0.0035***	-0.0208***	-0.0109**
GHG emissions	969.8946*	8.1694	0.0081	-0.0079***	-0.0337***	-0.0193**
Socio-economic outcomes	84.6665	3.6775	0.0073*	-0.0002	0.0068**	0.0056**
Exports	68.3611	-8.7588	0.0121***	-0.0003	0.0025	0.0003
Employment	76.7522	1.1748	0.0005	-0.0003	0.0039*	0.0031
Turnover	62.3854	13.6193	0.0024	-0.0001	0.0025	0.0046**

*Note: *** – p<0.01; ** – p<0.05; * – p<0.1.*

An impact of eco-innovations outputs on the value added in economy in presented with decrease of value added in agriculture in a result of academic publications and media coverage indicators. Most indicators of resource efficiency outcomes demonstrate strong inverse relationship with value added by real economy, except material productivity improvement that leads to the growth of manufacturing value added to GDP ratio. Identified direct linkage between socio-economic outcomes of eco-innovations and value added in industry and manufacturing represents the contribution of eco-innovative enterprises in real production growth.

Changes in employment structure and financial opportunities of business development under the influence of eco-innovations parameters are presented by the data of Table 3.

Table 3: Results of eco-innovations impact on indicators of employment structure and financial indicators of entrepreneurship development

Independent variables	**Employment indicators**			**Financial indicators**	
	Employees	Self-employed	Family workers	FDI	Market capitalization
Eco-innovations input	0.0051	-0.0051	-0.0005	-0.0454	-0.0232
R&D appropriations	0.0050	-0.0050	-0.0008	-0.0926**	0.0180
R&D personnel	0.0006	-0.0006	-0.0001	0.0207	0.0149
Green investments	0.0021	-0.0021	-0.0003	-0.0302	-0.0682***
Eco-innovation activities	0.0109***	-0.0109***	-0.0025*	-0.0673	0.0096
Enterprise environmental benefits	0.0068*	-0.0068*	-0.0024	0.0032	-0.0343
User environmental benefits	0.0059***	-0.0059***	-0.0022***	0.0022	-0.0359
ISO 14001	0.0101***	-0.0101***	-0.0033***	-0.0619**	0.0080
Eco-innovation outputs	0.0078***	-0.0078***	-0.0030***	-0.0249	-0.0455
Patents	0.0052*	-0.0052*	-0.0024**	-0.0221	-0.0221
Academic publications	-0.0024**	-0.0024**	-0.0011**	0.0149	-0.0529***
Media coverage	0.0031***	-0.0031***	-0.0013***	-0.0209	-0.0314**
Resource efficiency outcomes	0.0390***	-0.0390***	-0.0092***	-0.1067*	0.1393*
Material	0.0115***	-0.0115***	-0.0024*	0.1120***	0.1015***
Water	0.0024	-0.0024	-0.0004	0.0239	0.0102
Energy	0.0187***	-0.0187***	-0.0058***	0.0924	0.0405
GHG emissions	0.0327***	-0.0327***	-0.0071***	0.0041	0.0639
Socio-economic	0.0058**	-0.0058**	-0.0016**	0.0189	-0.0264

outcomes					
Exports	0.0016	-0.0016	-0.0007	0.1160***	-0.0045
Employment	0.0041***	-0.0041***	-0.0007	-0.0346	-0.0252
Turnover	0.0041***	-0.0041***	-0.0018***	-0.0382	-0.0105

*Note: *** – p<0.01; ** – p<0.05; * – p<0.1.*

The calculations showed that almost all indicators of the country's eco-innovative development are determinants of changes in employment structure, except eco-innovations inputs. Results obtained for the dimension of eco-innovation activity demonstrate significant positive impact of eco-innovations on the growth of the share of wage and salaried workers simultaneously with the reducing of the share of self-employed and family workers. Resource efficiency and socio-economic outcomes indicators are characterized by similar effects of employment structure changes to the previous results.

It should be noted that revealed connections between eco-innovations and business financial indicators are multidirectional in the scope of dimensions and indicators of eco-innovations. So stimulating effect of eco-innovations implementation on the growth of financial potential for enterprises is presented by socio-economic and resource efficiency outcomes, while eco-innovations inputs, activities and outputs have rather negative impact.

Conclusions

According to formulated research hypotheses calculations were divided into 5 sections, which illustrated effects of eco-innovations implementation in different dimensions of entrepreneurship development to check out the hypotheses of the research. Obtained results allowed confirming H4 and H5 completely. H3 is mostly confirmed at the level of separate eco-innovations dimensions, while revealed effects are not consistent for the countries in different eco-innovation progress. Results research aimed to test H1 and H2 did not allow drawing unambiguous conclusions about the direction and strength of existing linkage and should be completed by additional studies. In general, it can be summarized that eco-innovations have limited positive impact on business development in the context of employment growth, increasing the competitiveness of existing enterprises and a certain increase in the financial attractiveness of investments. It was found that in the early stages of eco-innovation progress of the country there is a more intense impact of eco-innovation on business development than in countries with a formed eco-innovation economy. In general, research shows that eco-innovation has a moderately stimulating effect on entrepreneurship development in terms of ensuring the growth of companies' number and employment. On the other hand, strong impact of eco-innovation on the financial performance of entrepreneurial development is not revealed. These results are of great practical importance in terms of improving the coordination of economic and environmental policies of countries.

Limitations and future directions of the study

Obtained results reflect relationships in the sample of countries from the European Union. To identify more general trends, the sample of the research have to be broadened by geography and level of economic development of countries. In the context of further research, the most promising area is to study the specifics of the relationship between eco-innovation outcomes and entrepreneurship development. The current study allowed suggesting that resource and economic outcomes might have the greatest potential to influence the financial performance of companies that should be realized with additional investigations.

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Green Brand for Sustainable Business: Bibliometric Analysis

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Abstract

Systematization of the scientific researches indicated the absence of unique and generally acknowledged term to define the essence of green brand of companies. Thus, absence of unique definition prevents the effective promotion of environmentally friendly activity and increases the level of distrust in society. In view of this, this study is aimed to provide the bibliometric analysis investigating the scientific research papers related to green branding issues in order to contribute to the theoretical development in this field and popularize green brands among the academic community and online users. The authors have formulated a hypothesis that green brands positioning is more effective than sustainable brands, eco-brands or sustainability brands for promoting green company policy. To develop formulated hypothesis, Google Trends analysis, Google Ngram Viewer overview, Scopus and VOSviewer bibliometric analyses were used. The current study involved data from 214 papers investigating the issues on green brands published from 2001 to 2019. The findings from VOSviewer identified 9 clusters of papers with 124 links where green brands were investigated from the different points of views. The obtained results have proved the formulated hypothesis. Moreover, it was justified green brands' web-search requests were the most popular when online users look for information to increase their awareness level on environmentally friendly issues. Furthermore, the authors found out the outstanding research interest to green brands was in 2017, while the USA was most of all interested in this issue. Finally, this study provided directions for future researches in order to popularize green brand positioning.

Keywords: bibliometric analysis, green brand, Scopus, VosViewer.

Introduction

It is a world tendency that companies increase the volume of green investments to investigate and implement the modern environmentally friendly methods of production and distribution as well as eco-programs and shares to position themselves as a green brand. Increasing the green consumer number indicates the necessity to consider the principles of sustainable development in the process of formulation of the marketing mix and transform sustainability into the marketing strategic instrument that intensifies the competitive advantages of the company. The different terms could be used to describe the environmentally friendly intentions of business activity.

Thus, the following terms such as «green brand», «sustainable brand», «sustainability brand», «eco-brand» are used by companies promoting themselves, Internet users looking for information on environmentally friendly topics and researchers investigating in this field. In view of this, it was noticed the increasing number of scientific publications in the field of green branding. The focus on green brand in the analyzed publications, allow formulating the hypothesis that for promoting green company policy green brand positioning is more effective than sustainable brands, eco-brands or sustainability brands. In accordance, the huge number of scientific papers on issues of green branding allows testing the formulated hypothesis by the methods of bibliometric analysis. Thus, this article is aimed to analyze the structure and dynamic of scientific publications in the field of green brands. It should be noted that nowadays Internet is the most powerful platform for satisfying many people's needs by searching any information, doing business, promoting brands etc. in turn, the web-research analysis makes it possible to identify the preferences of the potential clients, formulate the effective strategy to promote green brands taking into account the trend fluctuations. Using the modern tools of analysis on the base of the contemporary analytical database formulates the preconditions to win higher company positions in the search engines and, as a result, the companies have the opportunities to set their trends.

Literature Review

Using Google Ngram Viewer online tool (Ngram, 2020) it has been founded, that the scientific interest to green brand appeared after the 1860s which is associated with the machine production transition and distributive marketing development (Fig 1). Whereas, the term «sustainable brand» appeared after the 1980s while the political and academic communities became to take more attention to the issues of sustainable development.

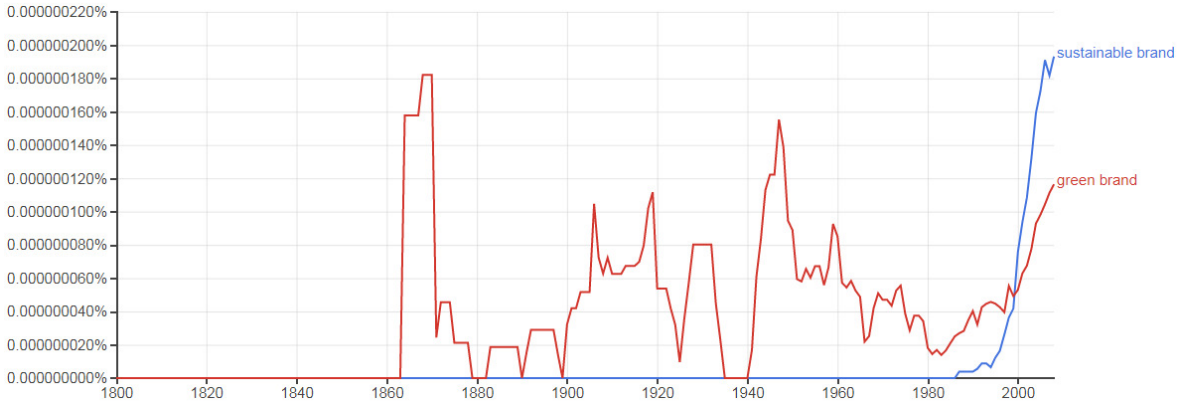

Fig. 1: The frequency of using sustainable and green brand in scientific papers to 2000 (Ngram, 2020)

The systematization of scientific sources indicates that the tools of Internet analytics have been growing in popularity as in the business, as in the academic community. In the scientific paper (DRAKE et al., 2012) the American scientists Michael S. Drake, Darren T. Roulstone и Jacob R. Thornock proposed to use Google Trends to investigate the factors influencing on the decision-making process by the potential investors. In turn, Choi H. and Varian H. in their work (CHOI et al., 2012) demonstrated how Search Engine data could be used to predict economic performance. Moreover, in the scientific paper (Kirichenko et al., 2013). The description of the modern Search Engines to investigate the dynamic pattern of the population's interest to some events in the society and in the government was presented. Zaharov V.P. emphasized on the linguistic mechanism of web-search request formulating (Zakharov, 2005). Furthermore, the authors of research (Klimchuk et al., 2014) investigated the popularity of project management theme in banking among Internet users by the means of online requests analysis. The research studies (Greco, 2018; GrenÄÃ-kovÃ¡ et al., 2019) were aimed to investigate the online analytical tools to analyze big data.

The studies in the field of green branding and sustainable development were included in the current paper (Mikalauskiene et al., 2019; Medani, 2019; Lušňáková et al., 2019; Kwilinski et al., 2019b; Kot et al., 2019). Thereby, the researches in the papers (Madden, 2012; Atkočiūnienė et al., 2019; Chygryn et al., 2018; Dabija et al., 2019; Derevianko, 2019) have analyzed how sustainable development and green image of companies related to macroeconomic stability and companies' performance. The authors emphasized that the more people are aware of sustainable development necessity, the more they concern about environmental problems and try to protect the environment. As a result, it influences economic stability increasing the economic growth of the country.

In the following papers (Purgat, 2018; Zhao et al.,2019; Yuri et al., 2018; Shevchenko et al., 2016; Roszko-Wójtowicz et al., 2019; Kiseľáková et al., 2019) the EU experience in providing the support of sustainable development and a new model of green brand popularization were investigated. In the frame of the mentioned papers, the authors considered the determinants of sustainable development and measured the average innovativeness change in green economy over time in the EU member states. In the scientific article (Bethlendi et al., 2019; Bilan et al., 2018; Kološta et al., 2019; Sotnyk et al., 2013; Haseeb et al., 2019) the authors investigated the relationship between brand management and economic stability, where the strong impact of brand management on company development has been found.

In view of this, in the paper (Kwilinski et al., 2019a) the marketing tools and innovative approaches to popularize green brands were proposed. The researches in their publication (Pechancová et al., 2019; Hasan et al., 2019; Csaba Fogarassy et al., 2018; Cebula et al., 2018; Bilan et al., 2018a; Onishi et al.,2018; Popkova et al., 2018; Sokolenko et al., 2017; Sotnyk et al., 2014) investigate the environmental management systems as effective tools to boost the development of companies' green brands. The analysis of green GDP of green activities in developing and developed countries was conducted in the researches (Stjepanović et al., 2019; Bilan et al., 2019; Lyulyov et al., 2017; Vasylieva et al., 2019b; Moskovicz et al., 2018; Vasilyeva et al., 2019a). The systematization of mentioned above scientific papers indicates that the issues on positioning green brands are investigated from a holistic perspective. In view of this, under the studying the following hypothesis was checked:

H1. Green brand is more effective for promoting green company policy positioning than sustainable brand, eco-brand or sustainability brand.

Methodology

In the frame of this paper, the most relevant data retrieval to look for the highlighted research questions was conducted into several steps. Firstly, based on the Scopus database (Scopus, 2020), a search request of publications including the following keywords such as «green brand», «sustainable brand», «eco-brand», «sustainability brand». As a result, the current study involved data from 214 papers published in 7 languages conducted from 2001 to 2019. The Scopus bibliometric analysis on the issue of the green brand was conducted from the view of the dynamic of publication activity and citations, considering the most interested researchers in this issue, related subject areas for green brands research as well as countries.

Furthermore, in the current article, the analysis of keywords popularity was conducted with Google Trends analytical tool (Google, 2019) which is a simple and convenient web-application to analyze the popularity and seasonality of web-search requests. It should be noted, that the results demonstrated the frequency of web-search request to the total number of research requests in the different world part and languages in order to estimate the impact of geographical features on the popularity of the web-search or the topic in general; to specify how optimize the content of the site to get more traffic; to monitor the popularity of the different goods, news in the Internet; to analyze the dynamic of web-search requests during the time period and detect the seasonal dependence, etc.

Thereafter, investigating the thematic scope of the chosen publications was conducted by VOSviewer bibliometric tool that allowed building a terminological map on the base of keywords co-occurrence in the names and abstracts of the scientific papers. It is worth to note that the results of VOSviewer

bibliometric analysis are visualized by a thematic map that is formulated with the clusters. Moreover, each cluster has its own color that shows which keywords are used in the same study. The distance between circles shows the frequency of using the keywords. It means the shorter distance is, the more frequently the keywords used in study. Furthermore, the more the size of circles, the more citations and co-occurrence keywords could be in the study. In turn, in the frame of this paper, the minimal number of co-occurrence key words was chosen three. As a result, for each of 45 words, the total strength of the co-occurrence links with the other key words was calculated.

Results

In purpose to investigate the most appropriate keywords for the companies providing environmentally friendly activity, the Google Trends analysis has been conducted. Thus, using this tool frequency of web-search requests of the following keywords such as «green brand», «sustainable brand», «eco-brand» were analyzed s from September 2016 to July 2019 (Fig 2)

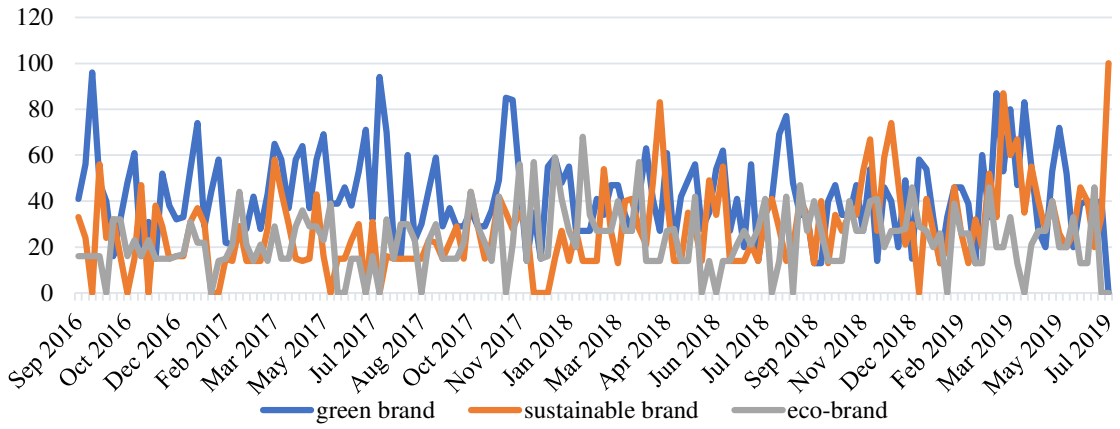

Fig. 2: The popularity dynamic of web-search requests in Google Engine from 2016 to 2019 (Google Trends, 2019)

The obtained results indicated that «green brand» (46 points) web-search requests were more popular than «sustainable brand» (26 points) or «eco-brand» (25 points). However, we could assume that the «green brand» web-search requests the Internet involved not only information on ecological issues, but design or color. In view of this, we concretized our parameters and analyzed the above-mentioned requests in the categories «Business and industry» as well as «Science». According to the results, we found out that the most popular web-search request in the category «Business and industry» were «sustainable brands», while in the category «Science» were «green brand» web-search requests. Thereby, relying on the empirical observation it was founded that the business sector and academic community had different definitions describing the environmentally friendly and responsible brands. In turn, these contradictions rise the complexities in the process of promoting environmentally friendly brands.

Systematization and summarization of scientific resources in the investigated field (Pham et al., 2019; Nemmiche et al., 2019: Mentel et al., 2018; Hitka et al., 2019; Danaj et al., 2018; Bilan et al., 2019c; Baldo, 2018.) indicated that the concept of green brands demands more attention while the academic community has taken more attention to researches in «green marketing». It should be noted that in the studies (Tresna et al., 2019; Bilan et al., 2019; Vaitkevicius et al., 2019) considered «green brands» to be some messengers to transfer information about unique and ecologically clean brand features that decrease the negative impacts on the environment. On the other hand, in the research papers (Yakubu et al., 2019; Sriyana, 2019; Skačkauskienė et al., 2019; Huang et al., 2014) «sustainable brands» described as the brands designed that increase the company income while developing social welfare

and preserve the environment providing green investments in their activities. According to Fig 3, it was found that green brand keywords most of all used in the articles on issues of green marketing and sustainability investigations.

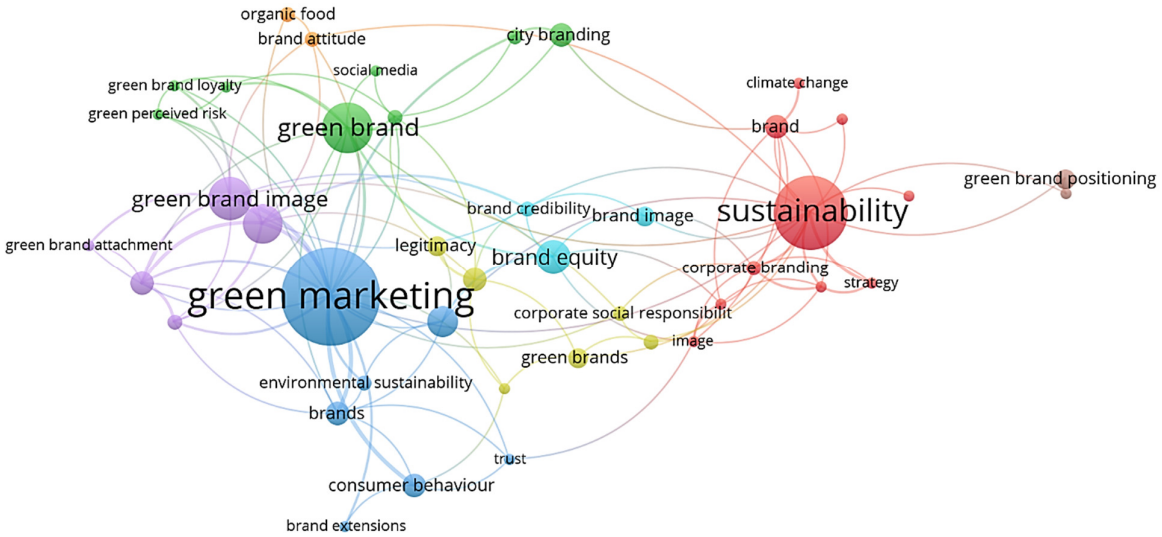

Fig. 3: Bibliometric coupling of the keywords in the investigated articles

2001-2019 (VOSviewer 2020)

In this paper, the thematic scope of investigating papers was conducted by the bibliometric tool VOSviewer allowing build the terminological map on the base of coupling keywords in the names and abstracts of the chosen articles. Having limited frequency of keywords to three items, it was detected 45 items gathered into 9 clusters, joined by 124 links (the total link strength was 178) that link keywords according to thematic proximity (Fig 3). This map visualizes the frequency of using the keywords (the size of circle), link strength (the closer, the more strength) and different conjunctions of keywords as inside clusters, as outside them. According to the developed map (Fig 3) the following circles consist of (in decreasing quantity of keywords): 1) brand credibility, brand equity, brand image, communications, corporate branding, identity, image, strategy; 2) brand extension, branding, brands, consumer behavior, environmental sustainability, green marketing and trust; 3) brand loyalty, green brand, green brand loyalty, green perceived risk, green perceived value, social media; 4) corporate social responsibility, green advertising, green brands, greenwashing, legitimacy, stakeholders; 5) green brand attachment, green brand equity, green brand image, green satisfaction, green trust; 6) brand, climate change, conjoint analysis; 7) green brand knowledge, green brand positioning, sustainability, sustainable brands: 8) city branding, green branding; 9) brand attitude, organic food.

Based on the Scopus analytical tool, it was founded that the publication activity in the field of green brand has a positive tendency (Fig 4). Furthermore, it has been established that the hugest share of publication on green brands were in the United States (17%), China (12%), India and Taiwan (10%), Australia (7%), South Korea (6%) as well as United Kingdom (5%).

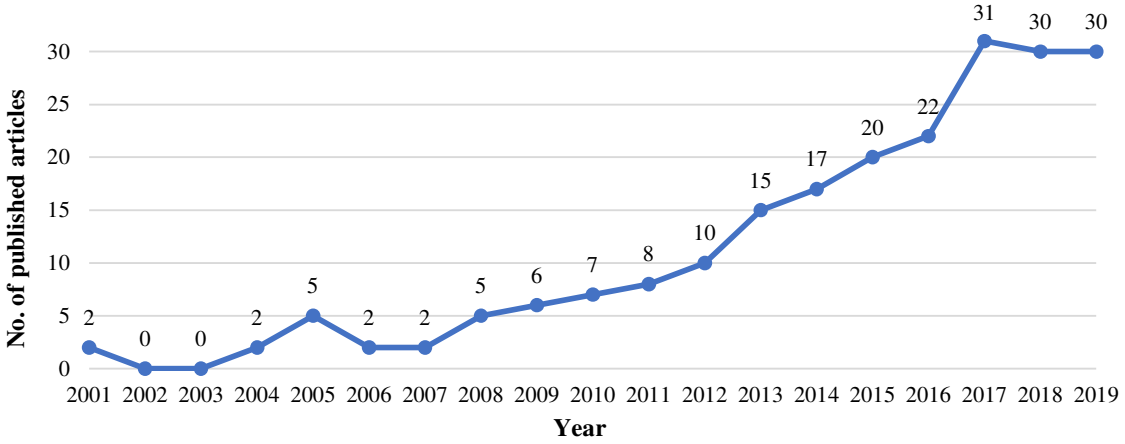

Fig. 4: The dynamic of published articles for 2001-2019 (Scopus, 2020)

Moreover, the citation level of the investigated articles increases every year. Studies on green brand become more popular and have higher value for society. In 2018 255 articles were published while it has been the highest explosive growth for analyzed period. According to the Fig 5, the boom in publishing activities was in 2010, when the first preparatory committee to 2012 United Nation Conference on Sustainable Development in Rio de Janeiro (RIO+20) took place. It should be noted that this conference was aimed to agree the political declarations on the getting the sustainable development goals as wake to collectively find the methods to solve the problems in the field of sustainable development such as decreasing of poverty in the world, promoting the development of social justice and reserving the environment etc. Furthermore, the most important issues were the development of green economy in order to achieve sustainable development goals and complete for the poverty among people as well as improve the global collaboration in the field of sustainable development. In turn, in 2015 Agenda for Sustainable Development was adopted which set 17 sustainable development goals. However, the agenda provided no methods and ways to achieve the formulated sustainable development goals. In the wake of this, the number of researchers investigating the directions and special tools to achieve the target goals has been increasing every year.

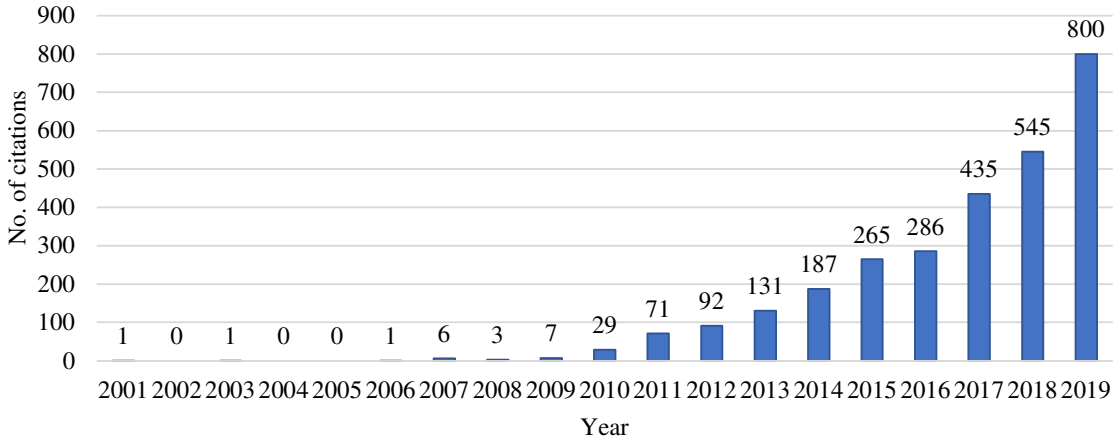

Fig. 5: The dynamic of citations of published articles for 2001-2019 (Scopus, 2020)

In the publications (Abaas et al., 2018, Akhtar, 2019) the authors indicated that to develop green brands and satisfy society's needs companies collaborated with professionals from different subject areas. In accordance with Fig 6 in the academy society green brands appeared to be a multidisciplinary issue and considered from the view of business, social science, economics, environmental science,

engineering, energy, agricultural, biological, computer sciences, psychology as well as art and humanities. Moreover, it has been found out that about 64% of analyzed study papers on green brands were investigated from business management and accounting perspectives (Zhuang Xiong, 2019; Haninun et al., 2018; Leonov et al., 2019; Csaba Fogarassy et al., 2018). Furthermore, the researchers in their studies (Armenia Androniceanu, 2019; Wroblowska, 2019; Vasilyeva et al., 2018a; Teletov et al., 2019) indicated that generation Z become more ecologically aware and concerned about the damaging environmental influences. Taking this into account, they trust just the environmentally friendly companies which aimed to reserve environment making income.

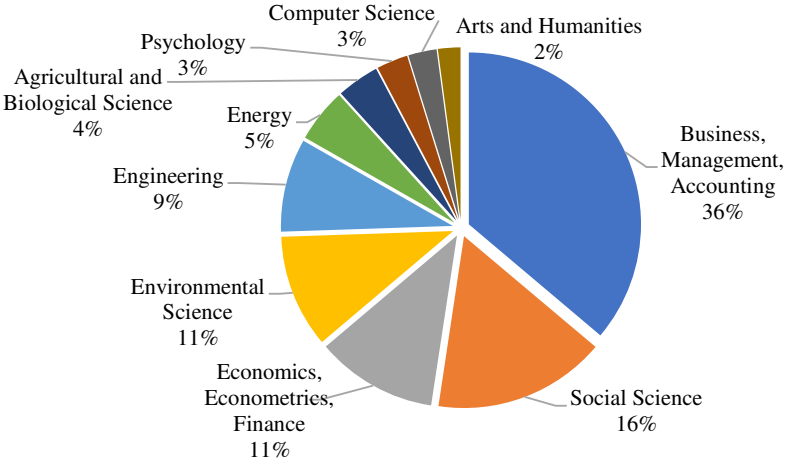

Fig. 6: The analyzed study articles by the research areas published from 2001 to 2019 (Scopus, 2020)

In the frame of this study, top-10 highly cited articles based on the total number of citations were considered in order to compare the impact of total citation per article with the field-weighted citation impact per article for the previous three years (Table 1). It should be noted that field-weighted citation impact allows estimating whether the article cited well compare to the similar ones. Furthermore, the value of field-weighted citation impact depends on the year of article publication, the type of article as well as the associated disciplines with considering article. According to Table 1, the ranks of the article by the total number and field-weighted citation ratio differed. While the most cited article titled "Pro-environmental products: Marketing influence on consumer purchase decision" by Pickett-Baker, J., Ozaki, R. had the total number of citations 386, its field-weighted citation ratio was 5.37. In turn, the article "The drivers of green brand equity: Green brand image, green satisfaction, and green trust" by Chen, Y.-S. which the total number of citations was 338 had higher field-weighted citation impact which was 11.45. In the wake of the above mentioned, it has been found out that the impact of investigated article total citations didn't mean that this article has the same impact level to set the directions for future investigations in the field of green brand providing.

Table 1: Impact of top-10 articles based on total number of citations and field-weight (Scopus, 2020)

Rank	Author(s)	Title	Citations	Field-weighted citation impact
1	Chen, Y.-S.	The drivers of green brand equity: Green brand image, green satisfaction, and green trust	338	11.45
2	Pickett-Baker, J., Ozaki, R.	Pro-environmental products: Marketing influence on consumer purchase decision	386	5.37
3	Namkung, Y., Jang, S.S.	Effects of restaurant green practices on brand equity formation: Do green practices really matter?	78	3.51
4	Huber, F., Vollhardt, K., Matthes, I., Vogel, J.	Brand misconduct: Consequences on consumer-brand relationships	72	2.50
5	Burmann, C., Jost-Benz, M., Riley, N.	Towards an identity-based brand equity model	101	2.03
6	Kam Fung so, K., King, C.	"When experience matters": Building and measuring hotel brand equity: The customers' perspective	81	1.35
7	Madupu, V., Cooley, D.O.	Antecedents and consequences of online brand community participation: A conceptual framework	78	1.31
8	Hartmann, P., Apaolaza Ibáñez, V.	Green value added	94	1.10
9	Hartmann, P., Apaolaza Ibáñez, V., Forcada Sainz, F.J.	Green branding effects on attitude: functional versus emotional positioning strategies	167	1.03
10	Phau, I., Ong, D.	An investigation of the effects of environmental claims in promotional messages for clothing brands	69	0.88

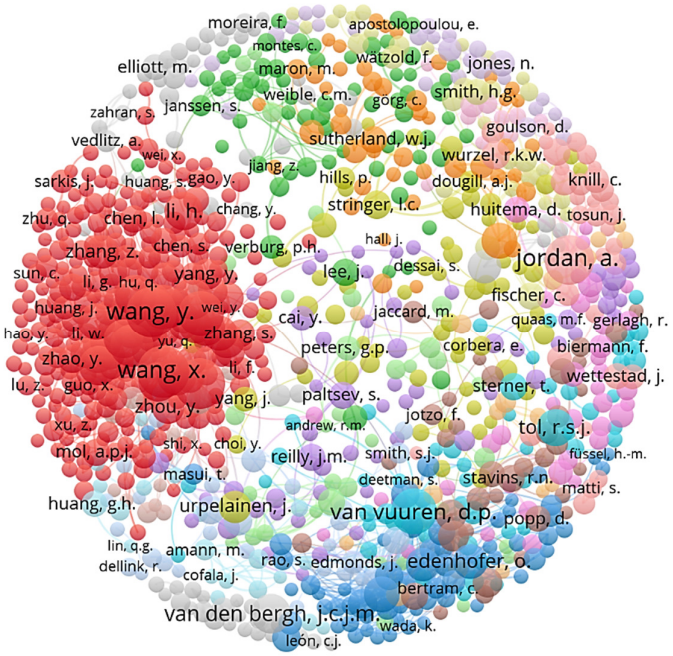

Fig. 7: The co-occurrence network of authors of the articles on the base extended set of keywords (VOSviewer, 2020)

Moreover, to formulate the network of authors who had strong impacts on the green policy investigation, we analyzed the publications based on the following keywords as "green marketing", "green policy", the environmental policy" as well as "green brand". As a result, based on 31083 publications from 2001 to 2019 the VOSviewer analytical analysis visualized the 41 clusters with 7098 links (the total link strength was 10656) among which the Chinese researchers had stronger link strengths. However, comparing the countries (Scopus, 2020) indicated that the biggest part of publications was conducted in the United States (Fig 8).

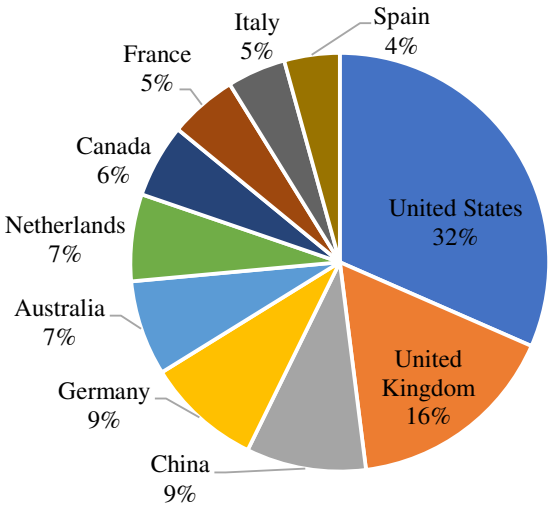

Fig. 8: The analyzed study articles by the countries published from 2001 to 2019 (Scopus, 2020)

Conclusions

The existence of the different definitions to describe the environmentally friendly aspects of companies' activities increases the level of misunderstanding among the consumers as well as the stakeholders. Moreover, the marketers could use «green brand», «sustainable brand», «eco-brand», «sustainability brand» to popularize and promote their brands. In the frame of this article, on the base of Scopus and VOSviewer analytical tools we made the bibliometric analysis of publications in the field of green brand in order to find out the structure and dynamics of publications on green brand development.

According to the obtained results on the base of the Scopus analytical tool, it has been found that the quantity of publication on green brand issues increased. In this study, 214 articles presented on the Scopus database from 2001 to 2019 were analyzed. Furthermore, the level of citation increased too, which means green brand issues became more important and relevant for society. In turn, in the frame of this article, it has been highlighted the more attention is taken to the issues of climate change, the more academic community is interested in investigating the green brands in their researches. It was found that the most active in view of publication activity in green brand issues were the USA, China and India. Moreover, we highlighted the most cited articles which indicate the directions to future investigation in the field of green branding.

The analysis of the thematic direction of investigated articles on the base of the VOSviewer analytical tool indicated 45 items gathered into nine clusters of research with 124 links where the total link strenghts was 178. In turn, it proved the formulated hypothesis that for promoting green company policy green brand positioning is more effective than sustainable brands, eco-brands or sustainability brands. More than, analysis of the web-search requests based on Google Trends tool emphasized that Internet users most of all used the keywords «green brand» to find any information on ecological issues.

Limitations of the Study

The obtained results of investigations proved that green brand positioning considered to be more popular in the scientific papers provided in the Scopus database. However, as this study covers only the publications based on the Scopus database, it is appropriate to extend the current study by analysing the publications from the Web of Science database in order to find the unique and generally acknowledged term to define the essence of the green brand of the companies.

Future Directions of The Research

According to the results of the VOSviewer and Scopus analyses investigating the articles from the Scopus database, we found out the most influencing articles in the field of green brand development that could be the basis for future investigations in the field of environmentally friendly brand positioning. The provided results in the frame of this study have practical importance and could be considered for future investigations. However, because of analyzing the articles published just on the Scopus database there is existent question “Is term “green” is the best to popularize the brand as environmentally friendly among the main stakeholders such as consumers, investors, partners, etc.?” In this way, this study could be used as direction for future bibliometric investigations in order to find out and popularize the unique and generally acknowledged term to define the essence of the green brand of the companies.

Acknowledgement

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New Public Management and Relationship with Business: Role of Financial Inclusion

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Abstract

Financial issues are one of the important factors influencing new public management and relations with stakeholders. The purpose of this study is identifying and formalization of hidden structural links between the level of financial inclusion and new public management in the context of a business environment. This was done through a two-step analysis of 22 World Bank indicators: G 20 Financial Inclusion Indicators (6), Worldwide Governance Indicators (6), Doing Business (10) for 93 countries with different levels of economic development in 2014. In the first phase, using the principal component method 9 most relevant indicators were selected, three in each group that participated in the next phase of the study. Financial Inclusion Indicators remained the following: Account, ATMs per 100,000 adults and POS terminals per 100,000; from the Worldwide Governance Indicators - Control of Corruption, Government Effectiveness and Rule of Law; from the Doing Business-Global group: Ease of doing business, Paying taxes and Resolving insolvency. In the second phase of the study, two systems of simultaneous structural equations were built. They help to identify the hidden links between financial inclusion and new public management in the context of a business environment. It has been found that financial inclusion of the population has a stronger statistically significant direct impact on the business environment than on new public management. As the level of financial inclusion of the population per unit of business environment increases, it will improve 7,234 times, while new public management will improve 0,470 times.

Keywords: Financial Inclusion, New Public Management, Business Environment, Public Administration.

Introduction

Financial inclusion is an important component of economic development and reducing the overall poverty level in the country, and can also be a means of preventing the phenomenon of social exclusion. The human right to use formal financial products and services should be a priority when the financial system is organizing. However, when it comes to financial inclusion, it cannot be limited to its relationship with the financial sector. In accordance with the key principles underlying the new public management concept defined in 1993 in one of the OECD publications (public functions are delegated to private entities under contractual agreements or based on partnerships; prompt and flexible response to the needs of customers and users of public services; maximum satisfaction of their requests; decentralization of management of finances, personnel, quality of work;

delegation of powers and responsibilities from the central to the lower levels of public administration; activities of local authorities and non-governmental organizations in the development and implementation of strategic goals of public policy; establishment through the system of evaluation of the results of personal responsibility for the quality of management; endowing the grassroots with authority to effectively make decisions and solve local problems; employees, increasing the responsibility of organizations for achieving results; functioning of state institutions in market conditions through competition, client choice through tendering, etc .; expanding their area of responsibility; widespread implementation of strategic planning and other innovations), the ability of the population to be active financial actors is encouraged and promotes the free development of the government sector and the business environment. These vectors of social life combine that the level of financial inclusion of the population, the level of implementation of the concept of new public management and assessment of the business environment. These categories are complex, so they are usually formed by the integrated assessment of the phenomenon under study. The nature of the management of the financial system is complex and heterogeneous. An inclusive financial system needs special encouragement in the use of financial services by all groups of society in the conditions of well-organized government and business environment.

Overview of Research Studies

To quantify the degree of financial inclusion of the population in the work of Cámara and Tuesta (2017) it is proposed to calculate an appropriate index, which will consist of those positions of financial activity of the population that are relevant to the particular situation. In general, the index of financial inclusion can be viewed from the standpoint of the following blocks: accessibility (possibility to have access to branches of banks and other financial institutions, ATMs, self-service terminals); usability (ability to freely manage personal accounts, savings, loans); obstacles (distance to the point of service, trust in financial institutions, operating expenses, workflow). As noted above, the category of financial inclusion of the population is complex and includes a number of other defining concepts such as the financial health of the society, the level of financial knowledge (financial literacy), financial behavior, transparency of financial data and activities of financial institutions, etc. Directly or indirectly, these aspects of determining financial inclusion of the population were discussed in the works. Luan and Tung (2019), Rungsrisawat and Pamornmast, C. (2019), Sadalia et al. (2019), Schönfeld et al (2018), Bolek et al (2018), Shkvarchuk and Slav'yuk (2019), Nguyen and Rozsa (2019), Bilan et al (2019), Gavurova et al (2019), Singh and Lall (2018), Alikariev and Poliakh, S. (2018), Ivanova et al (2017), Issa et al (2019).

A number of scientific works are also devoted to defining the connection of the concept of new public management with different segments of the economy. In particular, how the public services for the business environment could be effectively employed in the development environment of Industry 4.0 is presented in Ślusarczyk and Adnan (2019); on the activities of multinational corporations in the conditions of active implementation of different management concepts, including new public management, are discussed in the works of Ohunakin et al (2019), Li (2018), Kargol-Wasiluk and Wildowicz-Giegiel (2018), Korecko et al (2019), Farhshatova et al (2019).

There should be highlighted a series of scientific papers dedicated to the isolation of microeconomic and macroeconomic factors, which have a decisive influence on the formation of a quality business environment in terms of providing a sufficient regulatory framework and openness of activities of governing bodies across countries: Czech Republic - Smékalová et al, 2017) Egypt and others African Countries - Asaleye (2019), Wagdi and Hasaneen (2019), Bakari et al (2018), Serbia - Stevanovic et al (2017), Baltic Countries and Slovakia - Krajnakova et al (2018), Raišienė et al (2018), Korcsmáros and Shimova (2018), Poland - Gorączkowska (2018), Greece - Taliouris and Trihas (2017), Israel – Braw et al. (2018); USA - Kasztelnik and Gaines (2019), India - Chakr awal and Goyal (2018), Russia - Usenko et al (2017); Indonesia - Costini and Rahar (2019).

The activities of small and medium-sized enterprises also play a very important role in shaping an effective business environment. Correct risk management by entrepreneurs, the influence of credit risk during a crisis and sufficient funds for SMEs, technological factors - these and other factors form

the basis for the development of this segment of business. Various aspects of these issues are reflected in the following scientific papers: Belás et al (2018), Kozubikova and Kotaskova (2019), Belas et al (2019), Meresa and Haftu (2019).

Today, a legal framework has been formed in various countries around the world to regulate the management of sovereign and guaranteed sovereign debt and other obligations in order to promote financial stability. The set of measures undertaken by governments allows to regulate this process at the expense not only of direct government only, but also of involvement of the non-state sector (financial institutions, private sector) - Gružauskas and Grmanová (2018), Nastiti et al (2019), Zhussupova (2019) , Karintseva and Benetyte (2018), Bhowmik (2018), Urbina (2018), Mirzanti et al (2018).

Methodology and Data

The next step of the analysis is to formalize the links between financial inclusion, new public management and the business environment within the help of structural equation modeling. In the first stage, the most significant indicators in the study should be selected, grouped into three groups, reflecting the level of financial inclusion of the population, new public management and the business environment.

Principal Component Analysis, PCA is at the part of factor analysis. A more detailed description of the analysis can be found in the works of Harman (1976) Lawley and Maxwell (1971), Mulaik (1972), Morrison (1967) and others. Factor analysis is used to solve two main problems: reducing the number of variables (data reduction); defining the structure of relationships between variables, their classification.

The principal component method allows to identify a number of components (factors) that explains all the variance and correlations of the initial values. The selected components (their number can be both set individually and programmatically obtained) are ranked in descending order of the proportion of total variance explained by each component. It is generally accepted that those components that account for more than 70% of the total variance can be called the most influential among the entire sample. The principle of selecting is next – the first component is to choose exactly the direction in the space of initial variables, in which the set of objects (points) under study has the greatest variation (variance). Each subsequent component is calculated to have its direction parallel to the first component and to account for as much of the residual dispersion as possible. This process continues until all the components that determine 100% of the variance of the studied variables are found. In addition, it is possible to determine the required number of factors by using a scree plot, where, on the basis of the eigenvalues of factors, Cattell (1966) suggested to find a place on the graph when the velocity of decreasing eigenvalues, when looking at the graph from left to right, decreases significantly. Anything left on the right side of the checkpoint is called "debris" that does not have a significant effect on the result. After determining the optimal number of factors, it is necessary to analyze the eigenvalues of the factors - these are the variances that are allocated to each of the factors.

The next step of the analysis is to formalize the links between financial inclusion, new public management and the business environment whith the help of structural equation modeling. The first to develop this field in the world was Professor and Director of the Institute for Advanced Study in the Integrative Sciences, George Mason University, Virginia J. Warfield. In 1973, based on the foundations of discrete mathematics, the scientist developed a methodology for structural equation modeling that allows us to investigate a variety of complex systems based on the detection of hidden relationships between them. The first resonances of J. Warfield's scientific work, where he used the developed methodology, were devoted to the analysis of complex socio-economic systems of Warfield (1976). For a long time, this technique was closed to the general public, as it was considered very complicated, from the stage of input data formation, to the process of interpretation of the results. Later, when the necessary mathematical calculations were automated with the help of special software, the high cost of such products became a new obstacle to the popularization of this method

of modeling. Today, however, these problems have come to the fore and it is safe to say that the use of structural modeling is one of the most popular methods of scientific research in various fields of human life.

Among the main tasks for which modern scientists apply structural modeling are the following: causal modeling or path analysis (establishing between causal relationships, testing hypotheses of causality, determining explicit and latent (implicit variables); factor analysis (determining the structure of factor loadings and correlation relationships between factors); second-order factor analysis (this analysis is a modification of the previous one and allows you to build a correlation matrix between common factors); regression modes whether (the analysis of regression coefficients, provided that they can be fixed and equal to each other, is considered as a modified multivariate linear regression analysis); modeling of the correlation structure (testing the hypothesis that the correlation matrix has a certain form); modeling the structure of averages (simultaneous analysis of variances and covariates).

Thus, structural modeling reveals some hidden factors, the links between them, to some extent, explain the structure of the phenomenon under study.

From the point of view of mathematical representation of systems of structural equations, systems of independent (1) and interdependent (recursive, joint, simultaneous) (2) equations are distinguished.

$$\begin{cases} Y_1 = a_{11}x_1 + a_{12}x_2 + \ldots + a_{1n}x_n + \varepsilon_1 \\ Y_2 = a_{21}x_1 + a_{22}x_2 + \ldots + a_{2n}x_n + \varepsilon_2, \\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \\ Y_m = a_{m1}x_1 + a_{m2}x_2 + \ldots + a_{mn}x_n + \varepsilon_m. \end{cases} \quad (1)$$

$$\begin{cases} Y_1 = a_{11}x_1 + a_{12}x_2 + \ldots + a_{1n}x_n + \varepsilon_1 \\ Y_2 = b_{21}Y_1 + a_{21}x_1 + a_{22}x_2 + \ldots + a_{2n}x_n + \varepsilon_2, \\ Y_3 = b_{31}Y_1 + b_{32}Y_2 + a_{21}x_1 + a_{22}x_2 + \ldots + a_{2n}x_n + \varepsilon_2, \\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \\ Y_m = b_{m1}Y_1 + b_{m,m-1}Y_{m-1} + a_{m1}x_1 + a_{m2}x_2 + \ldots + a_{mn}x_n + \varepsilon_m. \end{cases} \quad (2)$$

The main difference between the presented systems of equations is the nature of the representation of variables. Unlike independent systems, where each equation of a system is actually a separate regression equation, in systems of interdependent equations, both dependent (Y_n) and independent variables (x_n) simultaneously play the role of each other in different equations. Therefore, each subsequent equation of this system cannot be considered without the previous one. It is the systems of simultaneous structural equations that have become most widespread in scientific research, as they allow us to detect the presence of those hidden relationships between the variables being studied.

Considering the basic terminology of the system of simultaneous structural equations, it should be noted that instead of dependent (Y_n) and independent (factor) (x_n) variables, it is customary to use such synonyms, respectively, as endogenous and exogenous variables. In fact, the number of endogenous variables depends on the number of equations in the system and depending on the specifics of the study, the variables can replace each other. Each endogenous and exogenous variables have the coefficients b_{ik} and a_{ij}, respectively. These are the structural coefficients of the model. In addition, in each equation of the system there is a residual value ε_j, while the free term is absent.

The process of modeling consists of a few steps. In the first step, it is necessary to present the structure of dependencies between explicit and latent variables using visual tools, usually graphically (path diagram). This is necessary in order to clearly understand the nature of the complexity of the model, which simplifies the process of entering the necessary parameters during the calculation in special software. In the second step, you must set all the required parameters for the calculation. In the next step, in the corresponding software module in which the structural equations are constructed, the obtained variances and covariations are automatically checked. If they meet all the requirements of the research process, then the program goes to the next step. In the fourth step, it is necessary to substitute the obtained structural coefficients of the model and the residuals into the general form of representation of the structural dependencies between the variables. In the fifth final stage, based on a set of different statistics, the quality of the model is evaluated and the adequacy of the results obtained. To evaluate the quality of the built models, there are three main indicators: maximum residue cosine, RMS index, graphical representation of the distribution of residues and reflector matrix.

The maximum cosine residual criterion indicates how well the iteration process has converged. If the value of this indicator is close to zero, it means the successful completion of the iteration process. The RMS index measures the quality of the model fit. Model fit is considered qualitative if the index is less than 0.05. If the index value exceeds 0.1, then the constructed model does not adequately describe the data. The reflector matrix is used to test the model for resistance to scaling the input measurement. A model is considered more stable if the values of the elements of a given matrix are close to each other.

We used indicators from the World Bank databases as input variables: G 20 Financial Inclusion Indicators (6), Worldwide Governance Indicators (6), Doing Business (10) for 93 countries with different levels of economic development in 2014 (this year's choice is explained the presence of complete statistical information). The input indicators and their symbols are presented in the Tab 1.

Tab 1: Input variables

№	Name of variable	Sense of variable	Legend
1	Account (% age 15+)	Denotes the percentage of respondents, ages 15+, who report having an account	x1
2	ATMs per 100,000 adults	Denotes the total number of ATMs for every 100,000 adults in the reporting country	x2
3	Branches per 100,000 adults	Denotes the number of branches of commercial banks for every 100,000 adults in the reporting country	x3
4	Deposit accounts per 1,000 adults	Denotes the total number of deposit accounts that are held by resident nonfinancial corporations	x4
5	POS terminals per 100,000 adults	Denotes the number of point of sale (POS) terminals per 100,000 adults.	x5
6	Outstanding loans per 1,000 adults	Denotes the total number of loan accounts that are obtained by resident nonfinancial corporations	x6
7	Control of Corruption	Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption	b1
8	Government Effectiveness	Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and	b2

		implementation, and the credibility of the government's commitment to such policies	
9	Political Stability and Absence of Violence/Terrorism	Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism	b3
10	Regulatory Quality	Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development	b4
11	Rule of Law	Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts	b5
12	Voice and Accountability	Voice and Accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their governmen	b6
13	Dealing with construction permits)	The score for dealing with construction permits is the simple average of the scores for each of the component indicators: the procedures, time, cost to deal with construction permits	a1
14	Enforcing contracts	The score for enforcing contracts is the simple average of the scores for each of the component indicators: the procedures, time and cost for resolving a commercial dispute through a local first-instance court	a2
15	Getting Credit total	The total score for getting credit is the sum of the strength of legal rights index and the depth of credit information index	a3
16	Getting electricity	The score for getting electricity is the simple average of the scores for each of the component indicators: the procedures, time, cost for a business to obtain a permanent electricity connection and supply for a standardized warehouse	a4
17	Global: Ease of doing business	The ease of doing business score is the simple average of the scores for each of the Doing Business topics: starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting minority investors, paying taxes, trading across borders, enforcing contracts and resolving insolvency	a5
18	Paying taxes	The score for paying taxes is the simple average of the scores for each of the component indicators, the payments, time and total tax and contribution rate for a company to comply with tax laws in an econom	a6
19	Protecting minority investors	The score for protecting minority investors benchmarks economies with respect to the regulatory best practice on the indicator set	a7
20	Resolving insolvency	The score for resolving insolvency is the simple average of the scores for each of the	a8

		component indicators: the recovery rate of insolvency proceedings involving domestic entities	
21	Starting a business	The score for starting a business is the simple average of the scores for each of the component indicators: the procedures, time and cost for an entrepreneur to start and formally operate a business, as well as the paid-in minimum capital requirement	a9
22	Trading across borders	Doing Business measures the time and cost associated with exporting and importing a standardized cargo of goods by sea transport	a10

Results and Discussion

As a result of the principal component method, 9 were selected from 22 inputs (three in each group). The number of selected factors and factor loadings for each indicator are presented in the Tab 2.

Tab 2: Factor loadings

Legend	**Factors**	
	Factor 1	Factor 2
x1	**-0,841**	
x2	**-0,834**	
x3	-0,661	
x4	**-0,729**	
x5	**-0,844**	
x6	0,348	
b1	**-0,959**	
b2	**-0,961**	
b3	**-0,835**	
b4	**-0,952**	
b5	**-0,984**	
b6	**-0,866**	
a1	-0,676	-0,178
a2	-0,622	0,351
a3	-0,659	-0,117
a4	-0,635	-0,521
a5	**-0,995**	-0,027
a6	**-0,737**	0,106
a7	-0,587	0,361
a8	**-0,733**	0,046
a9	-0,593	0,579
a10	-0,689	-0,478

In the first and second cases, for a group of financial inclusion indicators and new public management, based on the eigenvalues of factors (3.2, representing 54% of the aggregate variance, and 5.17, representing 86% of the aggregate variance, respectively), one factor is optimal. In the third case (a group of indicators describing the business environment), two factors are identified - a cumulative eigenvalue of which is 6.07, accounting for 60.7% of the total variance.

Given the values of the factor loadings of each indicator: Account (-0.841), ATMs per 100,000 adults (-0,834) and POS terminals per 100,000 adults (-0,844) remain for further analysis in the first group; from the second group - Control of Corruption (-0,959), Government Effectiveness (-0,961) and Rule of Law (-0,984); from the third group - Global: Ease of doing business (-0,995), Paying taxes (-0,737) and Resolving insolvency (-0,733).

For structural modeling, we introduce into the study three latent variables: to denote a group of indicators of financial inclusion of the population - FIN, for a group of indicators new public management - GOV, for a group of indicators that describe the business environment - BUS. Each of these latent variables includes the corresponding explicit metrics selected using the principal component method. We conduct a two-step study of the nature of the relationship between latent variables (Fig. 1).

The results obtained from structural modeling for both cases are presented in the following form (Tab 3)

Tab 3: The results of structural modeling for both cases

Case 1			
Direction of connection	Estimation parameter	t-statistics	p-level
FIN->GOV	0,905	8,552	0,000
FIN->BUS	-0,974	-0,545	0,586
GOV->BUS	9,065	5,112	0,000
Case 2			
FIN->GOV	0,470	3,780	0,000
FIN->BUS	7,234	6,813	0,000
BUS -> GOV	0,060	4,261	0,000

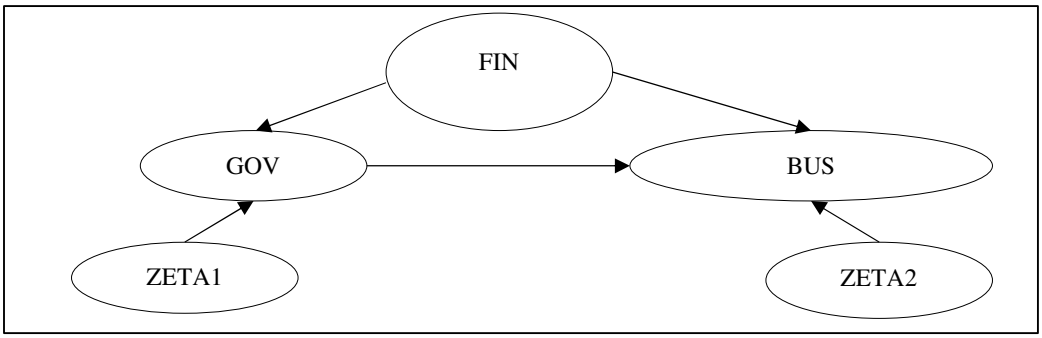

1 case

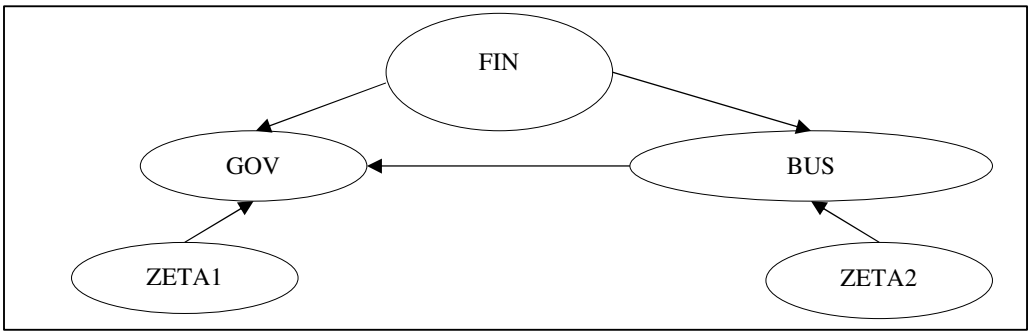

2 case

Fig 1: Regression dependencies between latent variables for two cases where ZETA1, ZETA2 are residual values

The systems of structural equations for both cases are as follows:

$$\begin{cases} BUS = -0{,}974FIN + 9{,}065GOV + 12{,}903 \\ GOV = 0{,}905FIN + 0{,}188 \end{cases} \tag{3}$$

$$\begin{cases} GOV = 0{,}470FIN + 0{,}060BUS + 0{,}086 \\ BUS = 7{,}234FIN + 28{,}386 \end{cases} \tag{4}$$

The adequacy of the constructed models can be estimated using the maximum cosine of residuals, RMS index (Tab 4)

Tab 4: Criteria for assessing the adequacy of models

	Case 1	Case 2
MAX Cos	1,190	0,000
RMS	0,054	0,044

As we can see, from the obtained values, in the second case, the value of the cosine maximum is zero. This means successful completion of the index iteration process. The RMS is less than 0.05, which indicates the high quality of the model fit.

The reflector matrices and the graphical representation of the residue distribution (Tab 5) also confirm the quality of the second model.

Tab 5: Reflector matrix and graphical representation of residue distribution for two cases

Case 1

	x1	x2	x5	b1	b2	b5	a5	a6
x1	-0,000	-0,099	7,172	0,005	-0,006	-0,002	-0,011	0,023
x2	-0,006	0,000	-5,422	0,003	0,001	0,002	-0,011	-0,022
x5	0,001	-0,012	-0,000	-0,000	0,000	-0,000	0,001	0,000
b1	17,507	34,398	59,277	0,000	0,060	-0,138	2,718	6,662
b2	-22,735	-34,769	-176,114	0,129	-0,000	0,120	-8,500	-11,111
b5	0,687	25,275	-180,204	-0,395	0,160	0,000	4,615	6,742
a5	0,363	-0,641	33,754	0,011	-0,006	0,012	-0,000	-0,849
a6	0,184	-0,030	4,783	0,008	0,003	0,006	-0,078	-0,000
a8	-0,390	-0,795	-7,662	-0,004	-0,008	-0,010	0,032	0,269

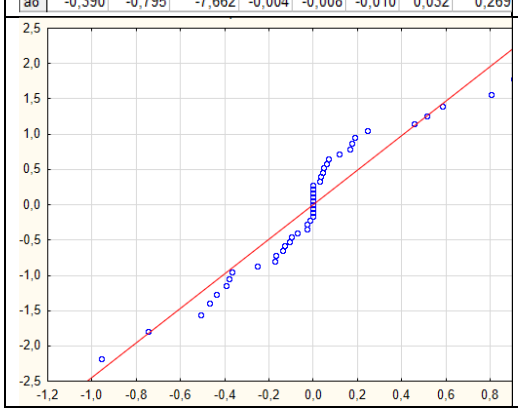

Case 2

	x1	x2	x5	b1	b2	b5	a5	a6
x1	-0,000	-0,099	7,172	0,005	-0,006	-0,002	-0,011	0,0
x2	-0,006	0,000	-5,422	0,003	0,001	0,002	-0,011	-0,0
x5	0,001	-0,012	-0,000	-0,000	0,000	-0,000	0,001	0,0
b1	17,507	34,398	59,295	0,000	0,060	-0,138	2,718	6,6
b2	-22,736	-34,771	-176,187	0,129	0,000	0,120	-8,501	-11,1
b5	0,687	25,276	-180,190	-0,395	0,160	0,000	4,615	6,7
a5	0,363	-0,641	33,752	0,011	-0,006	0,012	-0,000	-0,8
a6	0,184	-0,030	4,783	0,008	0,003	0,006	-0,078	-0,0
a8	-0,389	-0,795	-7,658	-0,004	-0,008	-0,010	0,032	0,2

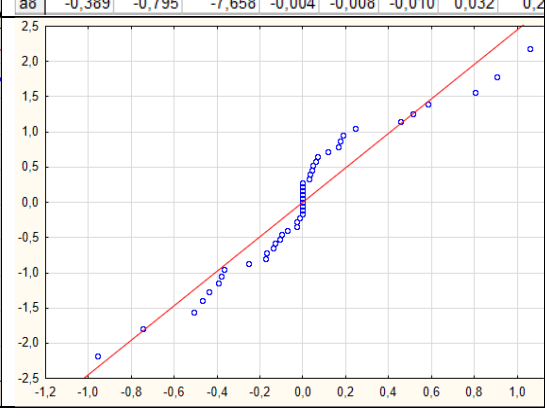

Thus, in view of the results obtained, it can be seen that financial inclusion of the population has a stronger statistically significant direct impact on the business environment than on new public management. As the level of financial inclusion of the population per unit of business environment increases, it will improve 7,234 times, while new public management will improve 0,470 times.

Conducting an analysis from the standpoint of identifying implicit functional relationships between groups of metrics, one should focus on exploring the interrelationships between explicit variables. In particular, it concerns checking the impact of the most significant variables characterizing the business environment and new public management on the level of financial inclusion. For this purpose it is necessary to determine the integral index of financial inclusion of the population.

Given the existing methods for deriving an integrated indicator based on several interrelated indicators, the following are the most popular ones:

- method of additive convolution of criteria;
- the method of multiplicative convolution of criteria;
- method of uniform optimality.

The first two methods are not included in the category of so-called universal, because their application has certain requirements. Yes, the method of additive convolution of criteria is used in cases where we are sure that all our studied indicators have a linear and additive effect on the system. In our study we cannot confidently accept this hypothesis, so we have to exclude the use of this method. With regard to the second method, the multiplicative convolution of criteria, the main assumption here is the following: the main convolution indicators should be relative values. As for the method of uniform optimality, there are no special requirements for its application. Given the specifics of our input indicators, we can use the latter two methods to obtain an integral indicator, however, given the popularity of use in the financial sector, let us focus on the latter.

Thus, the role of the dependent variable will be played by the Financial Inclusion Index (IFI), and the independent variables - Control of Corruption (b1), Government Effectiveness (b2), Rule of Law (b5), Global: Ease of doing business (a5) - variables having the highest values of factor loadings.

We obtain the following multivariate regression model:

$$IFI = 0{,}339 - 0{,}032b1 + 0{,}067b2 - 0{,}032b5 + 0{,}003a5 .$$

So, we have the following results:

- with the increase of the corruption assessment index in the country per unit financial inclusion of the population will decrease by 0,032, which indicates the negative impact of corruption on the financial involvement of the population;
- with increasing government efficiency per unit, financial inclusion of the population will increase by 0,067, which indicates a close positive relationship between government and the desire and willingness of the population to be active users of financial services;
- with the increase of the index of development of legislation in the country per unit financial inclusion of the population will decrease by 0,032, which indicates the negative impact of complex regulatory support on the general level of financial involvement of the population;
- with the increase of the global index of ease of doing business in the country per unit financial inclusion of the population will increase by 0,003, which indicates the positive impact of business on financial inclusion of the population.

Conclusion

Today, there is a clear understanding of the concept of "financial inclusion" as a prerequisite for sustained poverty reduction and economic growth. However, the relationship between financial

inclusion and the already traditional concept of sustainable new public management and the business environment development index has not yet been sufficiently studied and considered in a single context. This situation started to improve and became especially relevant in the post-crisis period, when research into these issues could help to understand the causes of negative financial and administrative structural changes. According to the purpose of this study, it was necessary to identify and formalize hidden structural links between the level of financial inclusion and new public management in the context of a business environment. This was done through a two-step analysis of 22 World Bank indicators: G 20 Financial Inclusion Indicators (6), Worldwide Governance Indicators (6), Doing Business (10) for 93 countries with different levels of economic development in 2014. In the first phase, using the principal component method The most relevant indicators were selected, three in each group that participated in the next phase of the study. Financial Inclusion Indicators remained the following: Account, ATMs per 100,000 adults and POS terminals per 100,000; from the Worldwide Governance Indicators - Control of Corruption, Government Effectiveness and Rule of Law; from the Doing Business-Global group: Ease of doing business, Paying taxes and Resolving insolvency. In the second phase of the study, two systems of simultaneous structural equations were built to identify the hidden links between financial inclusion and new public management in the context of a business environment. It has been found that financial inclusion of the population has a stronger statistically significant direct impact on the business environment than on new public management. As the level of financial inclusion of the population per unit of business environment increases, it will improve 7,234 times, while new public management will improve 0,470 times. The results obtained can form the basis for formulating recommendations to state and local government bodies in formulating management decisions in the area of financial involvement of the population.

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Public Policy Efficiency of Unshadowing Economic Activity of Businesses

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Abstract

In the context of increasing social and economic tensions, one of the reasons for the low level of economic development of both individual countries and the world as a whole, is the activation of economic entities and households towards concealing their income and shadowing their output. The aim of this study is to develop a methodological toolkit for evaluating the effectiveness of public policies to counteract the shadow economy. This paper empirically investigates the economic and social effects of implementing an effective policy of the de-shadowing economy. The developed approach assumes an assessment of the integral index of public policy effectiveness, which is based on the following components: regulatory efficiency, procedural efficiency, substantive efficiency and transactive efficiency. Based on the panel regression models, the most prioritized measures of the de-shadowing economy were identified (formation of a sufficient level of tax morality, reduction of corruption in state bodies, raising awareness of the main goals of economic reforms, etc.). The scientific contribution of the article consists in the fact that the current studies of the effectiveness of the policy of de-shadowing the economy are fragmentary and limited to studies of the effectiveness of its individual components. The established inter dependence can help to increase the effectiveness of measures to stimulate business entities to withdraw funds from the shadow and improving the performance of the official economic sector. Also, modern information technologies can counteract the emergence and help in subsequent monitoring of the shadow economy. Contemporary times are marked by the digital blood circulation of data, which makes the virtualization of the world, apart from globalization, a marker of the level of development of the economies of individual countries. Economy 4.0 with set of technical and technological solutions includes cloud data collection and computing, mobile technologies, analysis of large data sets (Big Data), social media in business and finally Block chain technology will reduce shadow economy.

Keywords: De-Shadowing of The Economy, Public Policy, Efficiency, Economic Development, Instruments, Economy 4.0

Introduction

Excessive state regulation of the economy, high level of corruption, low income of economic entities, excessive tax burden, low level of efficiency of the institutional environment in the country are leading to an increase in the size of the shadow economy worldwide. According to international experts, the level of shadow economy varies within 10-40% of GDP (for Advance Economies its value is 10-20% of GDP, in Emerging economies - 30-35 % of GDP, in CIS countries it exceeds 40%) and is a threat to the economic development of countries (Schneider and Buehn, 2017).

The annual increase in the size of the shadow economy leads to the formation at both national and international levels of institutional and regulatory policies to counteract the shadow economy. The current system of counteraction the shadow withdrawal of funds abroad has a three-tier structure: the national financial monitoring system (Financial Action Task Force on Money Laundering), The Committee of Experts on the Evaluation of Anti-Money Laundering Measures and the Financing of Terrorism (MONEYVAL), The Eurasian group on combating money laundering and financing of terrorism (EAG)); regional revenue shadowing system (Eastern and Southern Africa Anti-Money Laundering Group (ESAAMLG), The Caribbean Financial Action Task Force (CFATF), Latin America Anti-Money Laundering Group (GAFILAT), OUF Banking Supervision Group, Central African Republic Anti-Money Laundering Group (GABAK)); a supranational monitoring and control system.

These institutions have developed a wide range of initiatives to counteract the shadowing of revenues by lowering tax bases, investing funds through shell companies, attracting foreign loans with the subsequent bankruptcy of companies, overestimating or lowering the customs value of goods, etc. One of the main instruments for the de-shadowing of the economy in the EU countries is the Directive 2015/849 of the European Parliament and of the Council of 20 May 2015 on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing.

However, despite the considerable diversity of anti-money laundering organizations and the regulatory acts that they have developed, there is no methodological toolkit to form an effective strategy for unshadowing the economy. Thus, it becomes urgent to develop a methodology for assessing the effectiveness of public instruments to de-shadowing the national economy and determine their impact on the social and economic development of the country.

Literature Review

The theoretical and practical aspects of the functioning of the shadow economy, the methodological tools of its assessment and the mechanisms of minimizing the share of the shadow sector in the economy have been studied by many scientists. The international scientific community pays the greatest attention to the issues related to the functioning of the shadow economy, the identification of its causes and the factors that stimulate its spread. Thus, the development of individual theories of shadow economy and the study of the causes of the informal economy sector devoted to the work of such scientists as: Schneider (2017), Bhattacharyya (1999), Loayza (1996), Williams and Martinez (2014), Geertz (1978), Bilan et. al. (2019 a, g, f), Ginevicius et. al. (2018), Lubacha-Sember et. al. (2017), Rahimi (2016), AUgbaka et. al. (2019), Greco (2018).

A considerable amount of scientific work is devoted to the study of the determinants of the shadow economy growth. Thus, the works of Sookram et. al., (2009), Williams and Nadin (2012) investigate the shadowing of the economy in the context of its relation to the labor market in the country: inefficient labor relations, low wages, worsening working conditions becomes the reasons for shadow employment increase. The impact of economic development indicators on the level of shadow economy have been investigated by Miłek (2018), Omidi et. al. (2017), Shkolnyk et. al. (2018), Ślusarczyk and Haque (2019), Vasilyeva et. al. (2019a), Vasylyeva et. al. (2014), Yoshimori (2019), Zainol et. al. (2018). The impact of digitalization on the level of shadowing of the economy was investigated by Afonasova et. al. (2019), Bilan et. al. (2019b, d), Melnyk et. al. (2016, 2019), Zakharkina et. al. (2018), Nathan et. al. (2019), Petrushenko et. al. (2018), Kendiukhov and Tvaronavičienė (2017), Khusaini (2019), Leonov et. al. (2019).

The quality of functioning of the institutional component of public policy and confidence level in the government as a prerequisite for the growth of the share of the shadow economy are considered by Schneider (2017), Ipatov et. al. (2018). Thus, Schneider determines the low level of competence of official institutions, the quality of the regulatory framework, the level of bureaucracy, the quality of the judiciary, the compliance with the law by factors of shadowing the economy in the countries of Central and Eastern Europe. Bilan et. al. (2018), Chygrynet. al. (2018), Dobrovič et. al. (2018), Gashenko et. al. (2017), Ipatov and Grebeniuk (2018), Masri et. al. (2019), Mróz (2019), Tiutiunyk (2019), Vysochyna et. al. (2015) argued that countries where fiscal regulation of the economy is carried out on a democratic basis have a lower level of shadowing.

The most influential factors behind the increase in the level of shadowing are the level of fiscal burden. Krumplyte (2008), based on examples of foreign experience, shows that countries with high tax burden (52-55%) are more competitive and have a low shadow economy (Sweden, Denmark, Finland). Countries with relatively low tax rates (up to 20 percent) have a shadow economy over 60 percent of GDP (Georgia, Mexico). The impact of this factor is described by the Laffer curve, which shows that a relatively low tax burden determines low levels of the shadow economy while increasing the tax burden above an optimum level determines a high proportion of the shadow sector, which in turn reduces the amount of tax revenues to the state budget (Schneider, 2017).

In general, for industrial countries, the following factors influence on the level of the shadow economy (Al-Tkhayneh et. al., 2019; Boyko and Roienko, 2014; Brychko et. al., 2019; Dobrovič et. al., 2017; Gren et. al., 2019; Kostyuchenko et. al., 2018; Levchenko et. al., 2019; Marikina, 2018; Marková et. al., 2017; Musa et. al., 2018; Petrenko et. al., 2017; Skare et. al., 2019; Ślusarczyk and Grondys, 2019;): high level of tax burden and excessive social security contributions; increasing unemployment and limiting to the maximum number of working hours per week; excessive government regulation of the labor market, increasing the retirement age; frequency and intensity of regulation of the official sector of the economy. Countries with high level of shadow economy tend to show low level of willingness to pay taxes, low level of government tolerance, lack of respect and loyalty to NGOs, and are characterized by excessive corruption and commitment.

The theoretical aspects of public administration of the national economy have been investigated in the works of Sokolenkoet. al. (2017); Stanczyk-Hugiet and Maciejczyk (2019); Sukhonos and Makarenko (2017); Tiutiunyk (2018); Bercu et. al. (2019); Bilan et. al. (2019c, e); Brychko and Semenog (2018); Kasztelnik and Gaines (2019); Kolarova et. al. (2019); Koraus et. al. (2017); Kot et. al. (2019); Levchenko et. al. (2018) and others. In the process of developing measures to de-shadow the economy, the authors differently determine the tools to counteract the shadow withdrawal. Thus, some authors define financial policy as the basis for legalizing shadow income, while some authors define tax policy as the main instrument for the shadowing of the economy.

At the same time, there are currently no comprehensive studies on the development of tools for assessing the effectiveness of instruments of the de-shadowing national economy.

Material and Methods

On the basis of the generalization of existing approaches to determining the most effective instruments for the de-shading of the economy, we can conclude that there is a multiple nature. Such diversity of counteraction instruments testifies to the feasibility of applying an individual approach to the development of a policy of unshadowing economy. The authorities should determine the feasibility of applying a particular instrument of unshadowing the national economy and form an appropriate regulatory framework for their use, depending on the level of economic development of the country, the level of risk of shadowing of income, the most influential factors of shadowing that are specific to a particular country.

Considering the above mentioned, we propose to define the public policy of counteracting the shadow economy as a system of goals, tasks and measures that determine the volume and forms of

influence of the official sector of the economy on the channels of shadow withdrawal, aimed at reducing the share of informal financial transactions.

Assessment of the effectiveness of public policy is a very important element in the system of economic management and at the same time it is difficult from the point of view of implementation of the process. However, despite the presence of a large number of state institutions responsible for implementing the policy of unshadowing the economy, the efficiency of their work is rather poor. The reasons for this situation are the objective factors related to the significant influence of the external (international) environment on economic entities and subjective ones, among which corruption and bureaucracy in the country, low level of trust in the government, lack of historically formed principles and tax morals play an important role.

Effective implementation of the policy of de-shadowing the economy should include not only measures to identify the facts of income shadowing, but also measures aimed at raising the level of tax morality among the population, reducing the level of corruption in the bodies that are directly involved in the process of unshadowing the economy (tax authorities, public administration, control services, etc.).

In this context, understanding the goals and key objectives of economic reform, in particular tax one, is important. Awareness of the importance of taxes as key components of budget filling, the causes and consequences of changing the tax burden, are important tools to combat tax evasion.

One of the conditions for successful implementation of the policy of unshadowing the economy is to reduce the tax gaps - the difference between the sum of actual and potentially possible tax revenues. Taking into account the fact that tax payments are one of the main budget-forming elements, they also determine the ability of the state to fulfill its powers by financing economic, environmental and social activities. However, to date, the problem of effective planning of public expenditures is quite acute, due to the inability to finance certain items under the influence of the shadow economy and the emergence of income gaps. Thus, increasing the efficiency of measures to de-shade the economy will provide an opportunity for accurate planning and regulation of the budget process, targeted use of funds and full financing of planned budget items.

In the process of establishing a state policy to counteract the shadowing of an economy, the fact that a large part of illegal operations is carried out with the direct involvement or support of employees of state or local authorities is generally not taken into account. Thus, reducing the level of corruption in public institutions, increasing the transparency of their activity before the public, reducing the contradictions of the regulatory framework should be considered as one of the main components of the effective functioning of the economy.
Importance is gained in implementing in the executive authorities an effective approach in determining the priority areas of their activities. Quite often, the actual activity of public authorities in the sphere of the unshadowing of the economy does not correlate with those tasks, which are declared in the normative-legal acts of the respective direction.

We propose to evaluate the effectiveness of the policy of counteracting the shadow economy in the context of the following components: regulatory efficiency - as an indicator of the conformity of the results of implementation of state measures to the previously defined goals; procedural efficiency - the effectiveness of ways to achieve the intended result; substantive efficiency - the consistency of interests of the state and economic entities; transactive efficiency - efficiency of realization of auxiliary components in the sphere of counteraction of shadowing of economy.

Thus, the analysis allows to determine the main components of the evaluation of the effectiveness of the policy of the de-shadowing economy, the characteristics of which are shown in table 1.

Table 1: Indicators of effectiveness of the public policy of unshadowing the economy by main components

Effectiveness	Indicator	Characteristic
Regulatory efficiency	The rate of change in the ratio of tax revenues to GDP, the rate of change in the level of corruption	Characterizes the amount of non-receipt of tax payments by the appropriate level budget.
Procedural efficiency	Rate of change in the cost of financing measures to counteract the shadowing of the economy, the level of change in the effectiveness of the process of financial monitoring	It describes the ability of state and local authorities to use their powers to develop the official sector of the economy.
Transactive efficiency	The level of time spent on tax payments, the level of digitization of the economy	It reflects the efficiency of building the tax system in the country in accordance with the principles of openness and transparency based on the calculation of the index of development of e-government, openness of state data, budgetary transparency, etc.
Substantive efficiency	The tax progressiveness index, the tax burden, the rate of change in the level of awareness of the main goals of economic reforms, the rate of change in the level of tax morale	Characterizes the level of stability and fairness of the tax system in the country on the basis of the level of tax competitiveness, the quality of individual components of the tax system.

Evaluating the effectiveness of existing policy to counteract the shadowing of the economy requires the use of a large amount of information, which in the conditions of low data transparency, democratization of society can significantly complicate this process and reduce the reliability of the obtained results. At the same time, taking into account the fact that macroeconomic indicators are at the heart of the calculation of the vast majority of components, the application of this approach provides an opportunity for international comparison, comparisons at the national level, identification and use of best practices for the de-shadowing measures.

We propose to calculate the integral indicator of the effectiveness of the public policy to counteract the shadowing of the economy by the following formula:

$$IndiScore = \sum_{j=1}^{n} I_j = \sum_{j=1}^{n} \frac{x_i - \underline{x}}{\bar{x} - \underline{x}} \times 100 \quad (1)$$

where I_j – normalized values of the j-th component; x_i – the actual value of the i-th component; $\bar{x}$ and $\underline{x}$- the maximum and minimum values of the element.

Results

The results of the evaluation of policy efficiency of unshadowing economic activity of businesses in the context of the European Union and Ukraine, given in the Table 2, let us to determine the average level of public policy effectiveness. Thus, the average efficiency for the analyzed countries is 0.68 (Figure 1). For France, Lithuania, Bulgaria, Finland, Hungary, the effectiveness of public policy exceeds 0.75, while for some countries (Croatia, Latvia, Czech Republic) its value is much lower than the average. For Ukraine, as the only non-EU country, the indicator of the policy efficiency of the counteracting the shadow economy does not exceed 0.5.

Table 2: The results of the evaluation of policy efficiency of unshadowing economic activity of businesses

Country	Regulatory efficiency	Procedural efficiency	Substantive efficiency	Transactive efficiency	Integral efficiency
AUT	0.6580	0.7850	0.7125	0.6655	0.7052
BEL	0.5687	0.4568	0.6542	0.7455	0.6063
BUL	0.6987	0.8020	0.7447	0.7864	0.7579
HRV	0.4789	0.5497	0.5104	0.5390	0.5195
CYP	0.6970	0.8001	0.7429	0.7844	0.7561
CZE	0.5478	0.6288	0.5839	0.6165	0.5943
DNK	0.5987	0.6872	0.6381	0.6738	0.6495
EST	0.6398	0.7344	0.6819	0.7201	0.6941
FIN	0.6987	0.8020	0.7448	0.7864	0.7580
FRAU	0.7234	0.8304	0.7711	0.8142	0.7847
DEU	0.5987	0.6872	0.6381	0.6738	0.6495
GRC	0.6325	0.7260	0.6741	0.7118	0.6861
HUN	0.6978	0.8010	0.7438	0.7853	0.7570
IRL	0.5880	0.6749	0.6267	0.6617	0.6378
ITA	0.6133	0.7039	0.6536	0.6902	0.6653
LVA	0.5366	0.6159	0.5719	0.6039	0.5821
LTU	0.6979	0.8147	0.7985	0.8389	0.7875
LU	0.5697	0.6539	0.6072	0.6412	0.6180
MLT	0.6125	0.7030	0.6528	0.6893	0.6644
NLT	0.6355	0.7294	0.6773	0.7152	0.6894
POL	0.6707	0.6925	0.6425	0.7334	0.6848
PRT	0.6540	0.7507	0.6971	0.7361	0.7095
SVK	0.5478	0.6288	0.5839	0.6165	0.5943
SVN	0.5697	0.6539	0.6072	0.6412	0.6180
ESP	0.5987	0.6872	0.6381	0.6738	0.6495
SWE	0.6970	0.8001	0.7429	0.7844	0.7561
UKR	0.4218	0.4956	0.4826	0.5510	0.4878
GBR	0.5870	0.6478	0.5570	0.6657	0.6144

Analysis showed the lowest effectiveness of the regulatory component, which indicates that the actual results of the public policy did not correspond to the planned indicators. The reason for this situation may be, on the one hand, the imperfection of the planning procedures and, on the other, the inefficiency of the implementation of the planned measures. The most effective in terms of counteracting the shadowing of the economy is the transactive component (average efficiency index of 0.7), which is based on reducing the level of shadow activity of economic entities by digitizing the economy, increasing the transparency of financial transactions. Given the active use of digital technologies by the vast majority of economically developed countries, the use of online technologies

in the process of financial monitoring and control is a key to increasing transparency in the activities of both economic entities and public authorities.

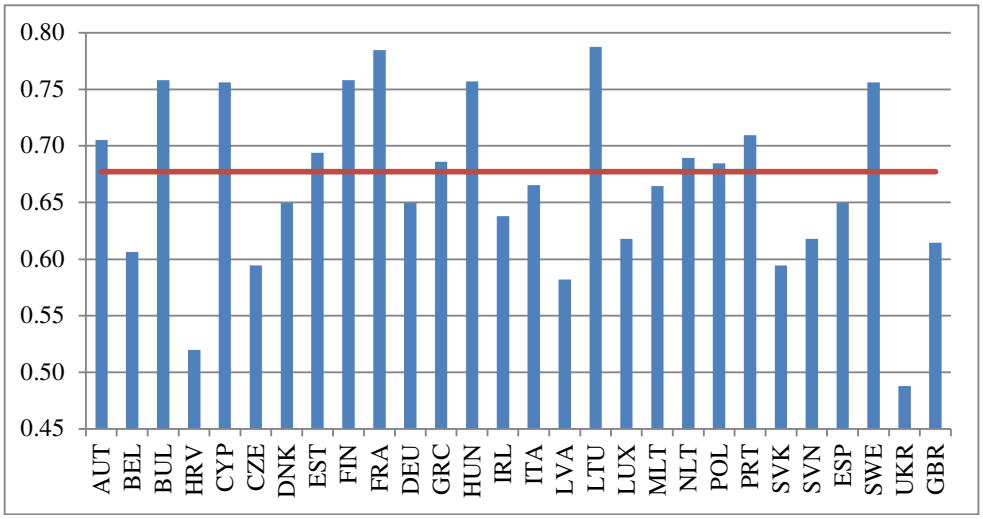

Figure 1: Effectiveness of public policy to counteract the shadow economy

Determination of the most priority, in terms of increasing the effectiveness of the policy of unshadowing the economy, indicators will be made in the context of components (regulatory and substantive), which have the least average. Taking into account the fact that the implementation of public policy is generally of a long-term nature, we will carry out a Fully Modified least squares regression using. The results of the calculations are shown in table 3.

Table 3: The funding of Fully Modified least squares regression for Ukraine

Variable	Coefficient	Std. Error	t-Statistic	Prob.
The ratio of tax revenues to GDP	0.02147	0.00324	0.47854	0.6578
The level of corruption	0.05354	0.00424	6.24786	0.0000
The tax progressiveness index	-0.01479	0.01257	-0.33678	0.3214
The level of tax burden	0.01478	0.03245	-5.15478	0.0001
The level of awareness of the main goals of economic reforms	-0.03595	0.00478	-6.14751	0.0000
the level of tax morale	-0.05945	0.02775	-4.69756	0.0000
R-squared		0.974564		
Adjusted R-squared		0.931475		
S.E. of regression		0.907014		
Long-run variance		1.365786		

The results of the analysis revealed a statistically significant correlation between the level of shadow economy and the level of corruption, the level of awareness of the main goals of public policy and the level of tax morale. In terms of the ratio of tax revenues to GDP and the tax progressiveness index, the probability is less than 5%, which indicates that there is no statistically significant correlation between the analyzed indicators. Thus, an increase of 1% of the tax burden leads to an increase in the level of shadowing of the economy by 1.48%, an increase in the level of corruption is accompanied by an increase in the shadowing by 5.3%, the level of awareness of the main goals of economic reforms to a reduction of the level of shadowing by 3.5%, and the level of tax morale up to 5.9%.

Conclusion

This study is aimed at analyzing the effectiveness of public policy to counteract the shadowing of the economy. The study was based on an analysis of four major groups of policy effectiveness components: normative, procedural, transactive and substantive. The results of the analysis made it possible to evaluate the effectiveness of state measures aimed at reducing the level of shadow economy and to identify the areas that have the most significant impact on them: the level of corruption, the level of awareness of the basic goals of economic reforms and the level of tax morality. The calculations conclude that in most EU countries the level of public policy effectiveness is average, while in Ukraine it is quite low. The calculations confirm the results of previous researchers (Levchenko, 2018; Dobrovič, 2018) on the low level of effectiveness of public policy to counteract the shadowing of the economy in countries with transitive economies and the average level in EU countries. The study substantiates the feasibility of improving the effectiveness of measures within the framework of regulatory effectiveness. The results of the study have implications for representatives of the scientific community as well as for public authorities in the world. First, they form the basis for further scientific research in the context of identifying priority actions to improve the effectiveness of public policy. Secondly, it is possible to predict the value of the level of shadowing of the economy due to changes in certain directions of public policy.

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Correlation Links of Innovations in Financial Services and Business Environment Development

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Abstract

The development of the financial sector is inextricably linked to the functioning of other sectors of the national economy and is interdependent with the parameters of the business environment. Stormy and dynamic changes create new challenges for running economic activity. Doing business must include processes aimed at improving the competitiveness of enterprises and ensuring economic growth. The purpose of the paper is to analyze the correlation between the spread of FinTech innovations and the parameters of business environment development, using Spearman's rank correlation methodology. To quantify the spread of technological innovation in the financial sector, it is proposed to use the Technological Financial Services Index (TFSI) – an integral indicator proposed by the authors. Twelve international indexes, such as Social Progress Index, Gini Index, Index of Economic Freedom, Global Competitiveness Index, Human Development Index and others, are used to evaluate the parameters of the business environment. The correlation analysis of the business environment parameters and the technological financial services index provided the following conclusions: 1) the highest level of correlation is between the technologization of financial services and the ICT development and digital readiness; 2) technological development is the main determinant of FinTech innovations, while the level of economic development does not have a decisive influence on the spread of FinTech innovations; 3) the parameters of the political and social environment strongly correlate with the technologization of financial services; 4) the lack of linkage to innovation in financial services is only specific to the environmental dimension of business environment.

Keywords: Business Environment, Fintech, Financial Services, Information Technologies, Correlation Analysis.

Introduction

The development of the financial sector is inextricably linked to the functioning of other sectors of the national economy and is interdependent with the parameters of the business environment. On the one hand, financial institutions, by acting as intermediaries, facilitate and accelerate commodity exchange, ensure the distribution of financial resources through stock market and credit market mechanisms.

The technological development of the financial sector has a positive impact on the efficiency of the business environment. FinTech innovations accelerate the payment process, simplify the process of obtaining loans, reduce transaction costs, which directly affects the business environment of enterprises and institutions of the real and public sectors.

On the other hand, the business environment can create barriers or, on the contrary, favorable conditions for the development of financial and technological innovations. For example, lack of information technology dissemination, lack of secure or high-quality access to computer networks will slow the implementation of FinTech innovations.

Thus, the purpose of the paper is to analyze the correlation between the spread of FinTech innovations and the parameters of business environment development, using Spearman's rank correlation methodology and the analysis of the field of correlation between the parameters of the business environment and the technologization of financial services.

Literature Review

In the financial sector, as in any other sector of the national economy, innovation is a way of ensuring the competitiveness and efficiency of a financial institution. The role of innovation in economic development, improving efficiency and profitability, ensuring sustainable development and competitiveness is confirmed by numerous scientific studies (Kirikkaleli and Ozun (2019), Goncharenko et al (2019), Sineviciene et al (2018), Zygmunt (2019), Khan (2018)). However, previously the financial sector, including the banking sector, could work effectively using traditional business models, but now the transition to a new technological mode – Industry 4.0 made it impossible to stay away from transformation processes (Brychko and Semenog (2018), Postelnicu and Câlea (2019), Pisar and Bilkova (2019)). At the present stage innovations are primarily related to the use of information technology, which includes the automation of production and general management, the use of cloud technologies, Big Data analysis, the use of artificial intelligence and automated decision-making systems (Beyi (2018), Afonasova et al (2019)).

The need for technological innovation in the financial services market has been driven by several key global market trends (Grencikova et al (2019)). As noted, the first trend is the digitization of all aspects of public life, industrial activity and services (Bilan, Đšuzmenko et al (2019)). The second trend is the decline in confidence in the banking sector, the destabilization of the banking system after the global financial crisis (Bilan, Y., Brychko et al (2019), (Buriak et al (2019), Brychko et al (2019), Vasilyeva et al (2013), Vasilyeva et al (2016)), and the efforts of financial services consumers to find alternative ways of investing and saving, and alternative sources of capital formation and lending (Bilan et al (2018), Buriak et al (2015), Gavurova et al.(2019), Kozmenko and Vasyl'yeva (2008), Leonov et al (2014), Leonov et al (2012),). The third trend is changes in consumer demand, the desire to receive 'everything at once', i.e. to have online access to services, quickly conduct financial transactions and so on (Grytsenko et al (2010), Lyeonov and Liuta (2016), Vasylieva and Chmutova (2015)).

The results of the diffusion of technological innovation in the financial sphere have several manifestations. First, the technological basis of conducting financial transactions has changed, the share of non-cash payments has increased, and online banking and mobile banking have developed (Basri (2018), Redda et al (2017)). In the real economy, such changes have contributed to the intensive development of e-commerce and promotion and marketing by social networks (Hu et al (2019), Roy et al (2017), Hendriyani and Raharja (2018), Khwaja et al (2019), Kunesova and Micik (2019), Zatonatska (2018)). Secondly, the digitalization in the financial sector has led to a change in the financial intermediation concept and in the emergence of peer-to-peer and crowdfunding platforms, FinTech startups. FinTech startups offer individual financial services, replacing traditional financial intermediaries (Drugov et al (2019), Njegovanović (2018)). Lack of venture funding has led to the development of crowdfunding platforms. Peer-to-peer platforms are an alternative source of lending to individuals and small businesses (Bilan, Rubanov et al (2019)). Therefore, the essential feature of the financial sector nowadays is the widespread adoption of information technology and its use both for financial services provision and organization of financial institutions' activity – process and organizational innovation (Big Data, electronic payment technologies, blockchain technology, online and mobile banking), and for changing financial services – product innovation (Giebe et al (2019), Veselovsky et al (2018), Knezevic (2018), Karaoulanis (2018)).

The processes of financial sector development are inextricably linked to the properties of the country's micro and macroeconomic environment and are influenced by general trends in the global financial market and regulatory policies in this field (Vasilyeva, T., Kuzmenko et al (2019), Djalilov et al (2015)). On the other hand, financial innovations also affect the business environment, creating both new opportunities and threats. Among the main risks of spreading FinTech innovations are limited control by the state, insufficient protection of the interests of consumers and investors, lack of effective risk management, employment problems as a result of reducing the need for staff of financial institutions, the possibility of data loss through cyberattacks are some of the main issues of using innovative financial and technological services at the present stage (Lyulyov and Shvindina (2017), Tkachenko et al (2019), Postelnicu and Câlea (2019), Milon et al (2018)). In addition, some technological innovations may be used in money laundering and other illegal activities as a result of lack of clear legislation and financial monitoring mechanisms (Bilan, Vasylieva et al (2019b), Kostyuchenko et al (2018), Leonov, Yarovenko et al (2019), Levchenko et al (2019)).

In addition, studies show that the level of financial and technological innovation implementation by banks and other financial institutions has significant differences in different countries and regions of the world. The interstate and interregional differences in investment and innovation activity and technological readiness to innovations by economic entities is confirmed by the scientific studies in particular (Bilan, Vasylieva et al (2019a), Koišová et al (2018), Wierzbicka (2018), Vashchenko et al (2018), Roszko-Wójtowicz and Białek (2019)). The higher innovation activity is common in the countries with higher levels of economic development, and vice versa (Kapidani and Luci (2019), Formánek (2019), Szarowská (2018)).

Thus, most studies on the diffusion of innovations in the financial sector consider them in relation to the overall state of the financial market, economic development, technological level and the scope of innovation (Li (2019), Skare and Porada-Rochoń (2019), Kohnová et al (2019)). At the same time, the interdependence of all components of the business environment, including the social, demographic, political, ecological and other dimensions, cannot be ignored. The specificity of modern innovative development is the penetration of technology in all spheres of society, including public administration and the social sphere (Ślusarczyk and Haque (2019), Kozubikova and Kotaskova (2019)). Several studies have substantiated the correlation between economic and social indicators (Vasilyeva et al (2018)). It therefore requires a deeper study of the correlation links between the different dimensions of the external business environment and innovation in the financial sector.

Methodology

The main methodological toolkit used in this study is the Spearman's rank correlation. Spearman's rank correlation is a non-parametric measure of statistical dependence between two variables, ranked in an increasing or decreasing order. Spearman's correlation coefficient determines the strength and the direction of monotonic relationship between two ranked variables, rather than the strength and direction of linear relationship, which is what Pearson's correlation determines.

The following are some of the methodological aspects of the application of correlation analysis in this study.

First of all, in order to carry out a correlation analysis between the indicators of business environment development and diffusion of FinTech innovations it is necessary to determine the list of quantitative parameters and to form the information base of the research. To quantify the two components between which the correlation is analyzed, it is proposed to use an index method that allows comparative analysis of indicators of different countries without further normalization and provides a generalized assessment of many indicators in a particular area (Alikariev and Poliakh (2018), Janoskova and Kral (2019), Kiseľáková et al (2018)). Therefore, it is necessary to select the appropriate index parameters to characterize all dimensions of the business environment and technological development of the financial sector.

To quantify the spread of technological innovation in the financial sector, it is proposed to use the Technological Financial Services Index (TFSI) – an integral indicator proposed by the authors. It is based on a linear model of calculating the level of technologization of financial services using the weighted sum method. Eight indicators, weighted by the appropriate weighting factor, are included in the index calculation. These indicators include the financial component expressed as the share of population with an account in a financial institution or mobile money provider (weight coefficient based on the the Fishburn formula – 0.04167), the technological component expressed as the share of the population using the Internet at least once a week (weight coefficient 0.04167) and six comprehensive indicators that include the share of population who use internet banking (weight coefficient 0.22222), the share of population conducting other financial transactions (securities transactions, insurance) via the Internet (weight coefficient 0.19444), the e-commerce share in total sales (weight coefficient 0.08333), the share of population who use electronic payments (automatic and online) (weight coefficient 0.15278), the share of population who use mobile phones to pay bills (weight coefficient 0.15278), the share of traditional loans substitution by alternative on-line financing, (crowdfunding and peer-to-peer) (weight coefficient 0.11111).

Moving on to the characteristics of a business environment, first, it is necessary to distinguish its constituent elements or parameters, and secondly, to identify indicators (indexes) by which these parameters can be evaluated and analyzed.

For the purpose of analysis, we will present the structure of the business environment by the degree of its influence on the activity of economic entities and the ability to control the factors of the business environment by the business entity. According to this division, the business environment can be distinguished to the internal (controlled) business environment, external controlled (direct impact) and external uncontrolled (indirect impact) business environment.

The internal business environment reflects the company's management system, including the international management system, technological level, cost, personnel, financial, investment and marketing policies. An external controlled environment encompasses the interaction of the enterprise with customers, suppliers, intermediaries, partners and competitors. At this level, there may be an interaction between the company and the FinTech segment. That is, the use of innovative financial services by enterprises is an example of their interaction with the external environment. The degree of use of FinTech in the activity of the enterprise will be determined primarily by the factors of the external uncontrolled environment.

The external uncontrolled business environment includes general economic development (economic dimension), politics and law (political dimension), social and cultural development (sociocultural dimension), development of science and technology (technological dimension), demographic situation (demographic dimension), environmental protection (ecological dimension). As indicators to evaluate the parameters of the business environment, we use the most famous international indexes, which are calculated by international organizations and experts. The characteristics of the indicators selected for analysis are presented in Table 1.

Table 1: Indexed parameters of external business environment

Index	Methodology	Source / developers
Social Progress Index	Twelve components in three categories: - Basic human needs (nutrition and basic medical care, water and sanitation, shelter, personal safety); - Foundations of wellbeing (access to basic knowledge, access to information and communications, health and wellness, environmental quality); - Opportunity (personal rights, personal freedom and choice, tolerance and inclusion, access to advanced education)	Social Progress Imperative

Human Development Index (HDI)	The HDI is the geometric mean of normalized indices for three dimensions of human development: - Health (assessed by life expectancy at birth); - Education (mean of years of schooling for adults aged 25 years and more and expected years of schooling for children of school entering age); - Standard of living (gross national income per capita)	United Nations Development Programme
Global Competitiveness Index (GCI)	The overall GCI includes three sub-indexes and their corresponding pillars: - Basic requirements sub-index (institutions, infrastructure, macroeconomic environment, health and primary education); - Efficiency enhancers sub-index (higher education and training, goods market efficiency, labor market efficiency, financial market development, technological readiness, market size); - Innovation and sophistication factors sub-index (business sophistication, innovation)	World Economic Forum
Index of Economic Freedom	The Index is based on 12 factors, grouped into four broad categories (pillars): - Rule of Law (property rights, government integrity, judicial effectiveness); - Government Size (government spending, tax burden, fiscal health); - Regulatory Efficiency (business freedom, labor freedom, monetary freedom); - Open Markets (trade freedom, investment freedom, financial freedom) (Miller et al. 2016)	The Wall Street Journal and the Heritage Foundation
Gini Index	Statistical measure of economic inequality, measuring income distribution among a population	Eurostat
Environmental Performance Index	The Index is based on 20 performance indicators in 9 policy categories: health impacts; air quality; water and sanitation; water resources; agriculture; forests; fisheries; biodiversity and habitat; climate and energy	Yale Center for Environmental Law and Policy; Center for International Earth Science Information Network; World Economic Forum
Ease of doing business	Ease of doing business ranking includes ten areas: starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting minority investors, paying taxes, trading across borders, enforcing contracts and resolving insolvency	World Bank Group
Democracy Index	The Index is based on five categories and 60 indicators within these categories: electoral process and pluralism; civil liberties; the functioning of government; political participation; and political culture	Economist Intelligence Unit
Corruption Perceptions Index (CPI)	The CPI is calculated using 13 different data sources from 12 different institutions that capture perceptions of corruption within the past two years	Transparency International
Digital Readiness Score	Includes 7 index groups: technology adoption, start-up, human capital, technology infrastructure, business and	Cisco Corporate Affairs

	government investment, ease of doing business, basic needs (Yoo et al. 2018)	
Digital Economy and Society Index (DESI)	DESI is composed of 5 principal dimensions, each divided in a set of sub-dimensions, which are in turn composed by individual indicators. The dimensions are: Connectivity, Digital Skills, Use of Internet, Integration of Digital Technology, Digital Public Services	European Commission
ICT Development Index (IDI)	The IDI is a composite index that combines 11 indicators. The Index divided into the following three sub-indices: ICT access sub-index; ICT use sub-index; ICT skills sub-index	International Telecommunication Union

Given the complex nature of most of the indices under consideration, they can be used to characterize multiple dimensions of the business environment. Taking into account the methodology of index calculation discussed in Table 1, Fig. 1 presents the proposed relationship between business environment measurements and the indices selected to characterize them. Note that straight lines are used to indicate the full correspondence of the indicator to the selected business environment parameter. The dotted line indicates the partial correspondence of the index to this dimension of the business environment.

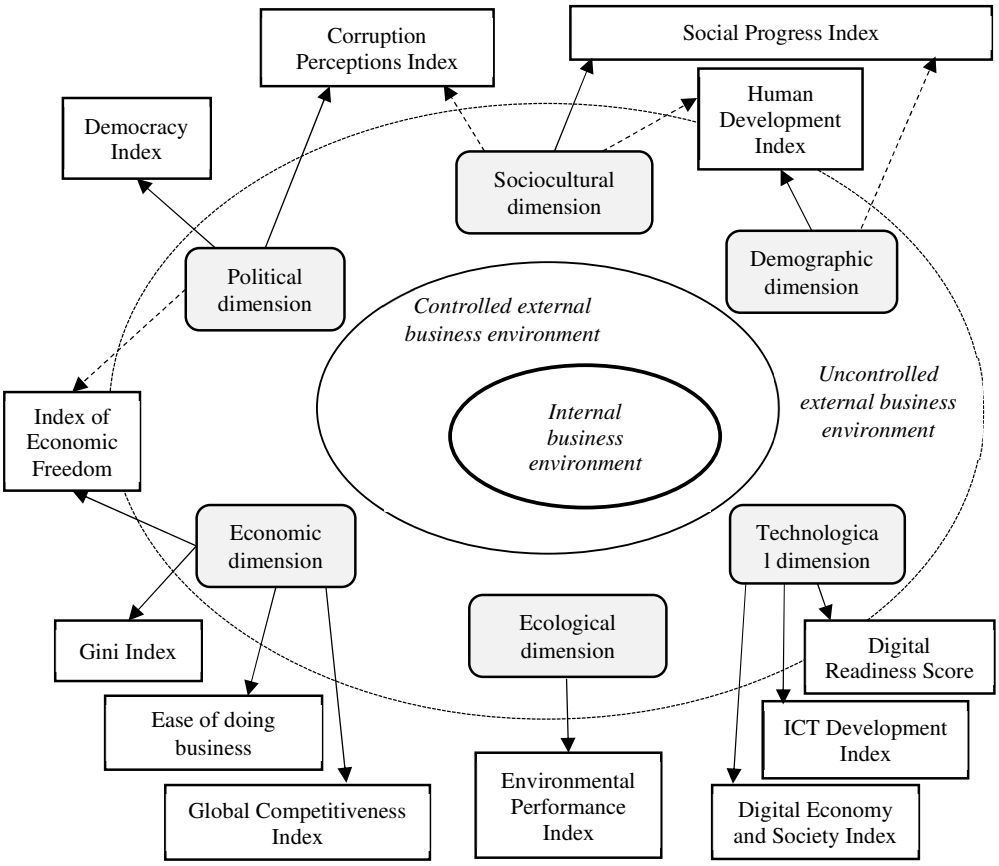

Fig. 1: Indicators of analysis of external business environment

Therefore, the following international indices and indicators are used to characterize business environment measurements:

- Economic dimension: Index of Economic Freedom, Gini Index, Ease of doing business, Global Competitiveness Index;
- Political dimension: Democracy Index, Corruption Perceptions Index, optional – Index of Economic Freedom;
- Sociocultural dimension: Social Progress Index, optional – Corruption Perceptions Index, Human Development Index;
- Demographic dimension: Human Development Index, optional – Social Progress Index;
- Technological dimension: Digital Readiness Score, ICT Development Index, Digital Economy and Society Index;
- Ecological dimension: Environmental Performance Index.

Results and Discussion

The practical implementation of the proposed approach to the analysis of the relationship between the level of technological financial services and the parameters of business environment development was carried out on the basis of statistics for 2016 for 28 countries in the European region: Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark , Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and UK.

The formation of such a sample of countries and the selection of the study period are due to the limited statistical data for calculating the technological financial services index. Accordingly, for the parameters of the business environment, the index values were also selected for the listed European countries for 2016. This will ensure the comparability of the data and the adequacy of the results. Thus, we analyze the correlation relationships between the technological financial services index and business environment parameters using Spearman's rank correlation methodology and the analysis of correlation fields of business environment parameters and the technological financial services index. The results of modeling correlation relationships based on the correlation fields are presented in Fig. 2-4.

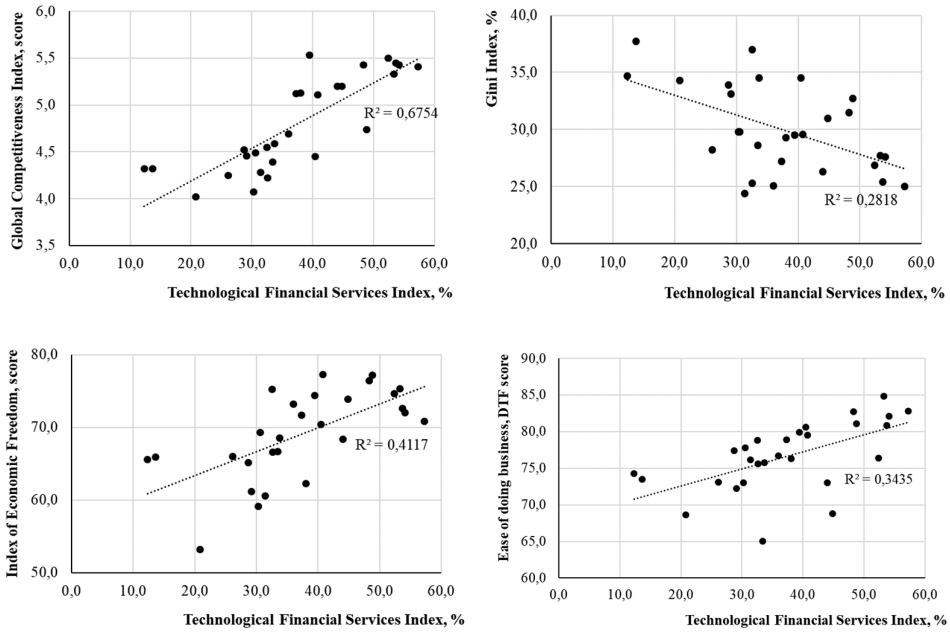

Fig. 2: Correlation fields of the Technological Financial Services Index and indicators of economic dimension of external business environment

As can be seen from Fig. 2 the relationship between the technological financial services and the economic dimension of the business environment cannot be described by linear dependence. While it is generally possible to find a direct link between the technologization of financial services and global competitiveness, economic freedom and ease of doing indices, and reversed relationship with the Gini index, the variance in the correlation of variables is quite wide. According to the results obtained by constructing the correlation field, the Gini coefficient has the lowest level of correlation with the level of technologization of financial services. It may indicate that innovations in the financial sector do not have a significant impact on the distribution of income between different segments of society, and vice versa.

Among the analyzed indicators of economic dimension of the business environment, the Global Competitiveness Index shows the highest level of correlation with the Technological Financial Services Index. According to the value of the coefficient of determination, the relationship between these variables is described by a linear function for 67% of cases. However, the higher correlation level of this pair of indices, compared to other indicators selected to characterize the economic dimension of the business environment, may be related to the complexity of the Global Competitiveness Index itself. The GCI it includes not only economic but also other components whose impact on the results of correlation analysis can be decisive.

Regarding the next set of indicators characterizing the technological and innovative dimension of the business environment, we can say that there is a clear relationship between the technological financial services and indices of digital readiness, ICT development, digital economy and society.

According to the formed correlation field (Fig. 3), all three analyzed indicators of technological development have a direct linear dependence with the indicator of technologization of financial services. The determination coefficient in all three cases ranges from 0.77 to 0.81, which means that the established dependency is valid in about 80% of the cases and shows a strong correlation of the variables.

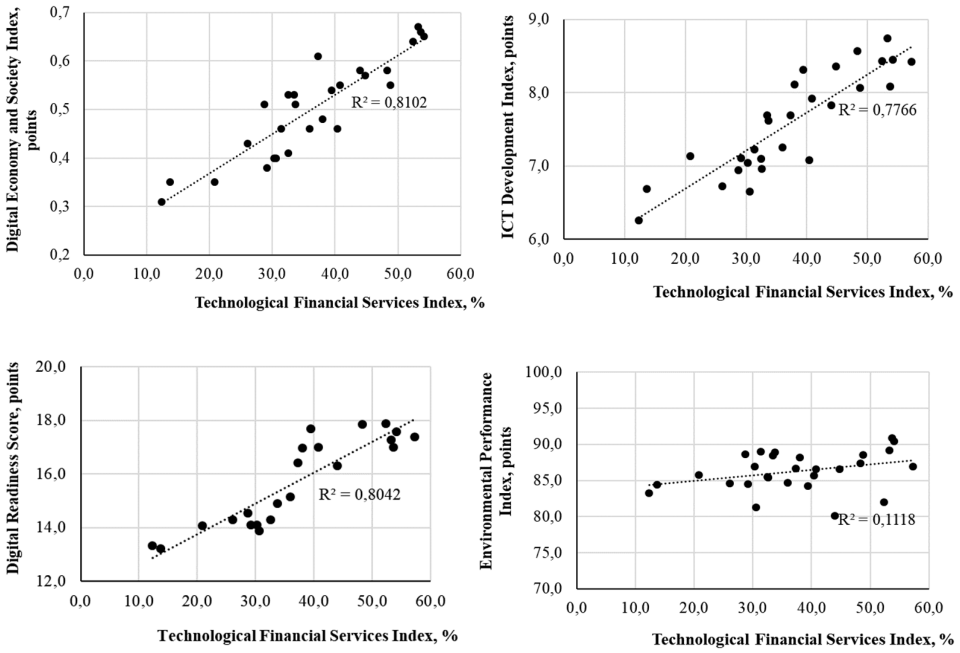

Fig. 3: Correlation fields of the TFSI and indicators of ecological and technological dimensions of external business environment

Regarding the environmental dimension indicator (Environmental Performance Index) it is not possible to detect its correlation with the technologization of financial services according to the correlation field.

The next group of indicators presented in Fig. 4 demonstrates the correlation between the technological financial services index and the indicators of social, political and demographic dimensions of the external business environment. First of all, it can be noted that all the indicators considered have a strong correlation with the technological financial services index. The strongest correlation link is traced between the TFSI and the Corruption Perceptions Index.

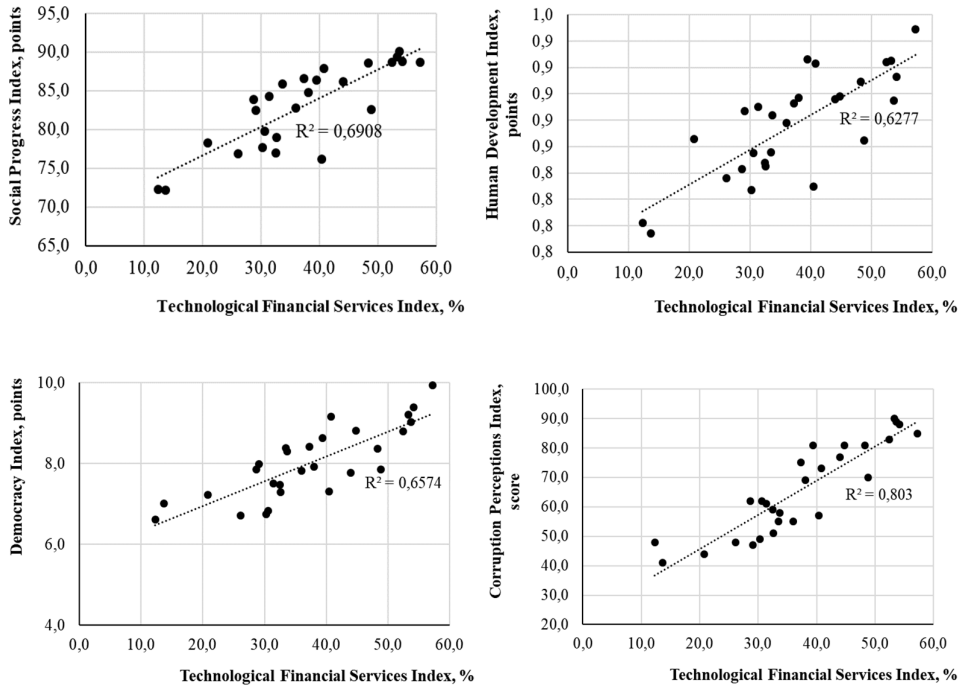

Fig. 4: Correlation fields of the TFSI and indicators of political, sociocultural and demographic dimensions of external business environment

The high level of linkage between the technologization of financial services and the level of corruption can be explained as follows: the lower the level of cash payments, the lower the shadow economy and the share of payments that goes uncontrolled outside the banking system. Thus, it can be assumed that the correlation between the studied indicators is more indicative of a positive impact of the technologization of financial services on the rate of the Corruption Perceptions Index than vice versa. It can also be noted that, as the previous findings have shown, there is a close direct relationship between the general level of digitization in the country and the digitization of the financial sector in particular, so a significant correlation between the index of technological financial services and the corruption perception index may be associated with a decrease in the level of corruption in all areas of society, including government agencies, through the digitization and automation of many services and processes in the public sector (when issuing permits, conducting inspections, etc.).

For an in-depth analysis of the linkage of technologization of financial services to business environment parameters, we calculate Spearman's rank correlation indicators and test their statistical significance according to p-value and Student's t test. The results of Spearman's rank correlation analysis are presented in Table 2.

Note that due to the complexity of the Global Competitiveness Index and its coverage of various dimensions of the business environment, including not only economic, but also social, demographic,

technological and others, the correlation coefficients were analyzed both for integral values of the GCI and its 12 pillars.

Table 2: Spearman's correlation analysis results

Variables in correlation with the TFSI	Spearman Rank Order Correlations	t(N-2)	p-value	Tightness and nature of the relationship	Statistical significance
Global Competitiveness Index	0,838604	7,849694	0,000000	Strong, direct	Significant
1st pillar. Institutions	0,887247	9,807368	0,000000	Very strong, direct	Significant
2nd pillar. Infrastructure	0,585112	3,679006	0,001074	Weak, direct	Significant
3rd pillar. Macroeconomic environment	0,586448	3,691797	0,001039	Weak, direct	Significant
4th pillar. Health and primary education	0,737101	5,561696	0,000008	Moderate, direct	Significant
5th pillar. Higher education and training	0,825623	7,461360	0,000000	Strong, direct	Significant
6th pillar. Goods market efficiency	0,849199	8,199785	0,000000	Strong, direct	Significant
7th pillar. Labor market efficiency	0,844670	8,046108	0,000000	Strong, direct	Significant
8th pillar. Financial market development	0,823594	7,404211	0,000000	Strong, direct	Significant
9th pillar. Technological readiness	0,829068	7,560495	0,000000	Strong, direct	Significant
10th pillar. Market size	0,065681	0,335636	0,739839	Absent	Not significant
11th pillar. Business sophistication	0,778872	6,332267	0,000001	Strong, direct	Significant
12th pillar. Innovation	0,817187	7,229432	0,000000	Strong, direct	Significant
Gini Index	-0,474131	-2,74586	0,010805	Weak, reversed	Significant
Ease of doing business	0,661193	4,493957	0,000128	Moderate, direct	Significant
Index of Economic Freedom	0,713191	5,187920	0,000020	Moderate, direct	Significant
Democracy Index	0,805692	6,935682	0,000000	Strong, direct	Significant
Corruption Perceptions Index	0,889742	9,939016	0,000000	Very strong, direct	Significant
Social Progress Index	0,819487	7,005179	0,000000	Strong, direct	Significant
Human Development Index	0,773946	6,231915	0,000001	Strong, direct	Significant
ICT Development Index	0,881073	9,498508	0,000000	Very strong, direct	Significant
Digital Economy and Society Index	0,892083	9,870978	0,000000	Very strong, direct	Significant
Digital Readiness Score	0,893533	8,899826	0,000000	Very strong, direct	Significant
Environmental Performance Index	0,368363	2,020360	0,053759	Absent	Not significant

Thus, the results of the analysis of the correlation field and the calculation of the Spearman correlation coefficients for the relationship between the business environment parameters and the technological financial services index revealed that there is a statistically significant correlation between the majority of the variables.

The lack of linkage to innovation in financial services is only specific to the environmental dimension (Environmental Performance Index) and the 10th pillar of the Global Competitiveness Index ("Market Size").

The lack of relevance to the environmental dimension is logical and understandable given the specifics of the variables chosen, since the FinTech innovations are a service industry and, most of all, automated online operations, so they do not require the use of natural resources.

In addition, the following conclusions were drawn from the study.

The highest level of correlation between the technologization of financial services and the ICT development and digital readiness is expected. The correlation was confirmed by three different indexes, calculated using slightly different methods and characterizing different aspects of technological innovation diffusion and its perception by society. However, all three indices showed virtually identical results both in modelling the correlation field and in calculating the Spearman correlation coefficients, and confirmed the existence of a very strong, direct, statistically significant correlation with the technological financial services index.

Economic environment parameters, such as the Economic Freedom Index, Ease of doing business and Gini Index, confirmed the existence of a statistically significant link with the Technological Financial Services Index. At the same time, the strength of this link is lower than the correlation of the TFSI and indicators of technological, political and sociocultural dimensions. Therefore, we can conclude that not financial or economic but technological development is the main determinant of FinTech innovations. The level of economic development does not have a decisive influence on the spread of FinTech innovations.

At the same time, it should be noted that due to limited statistical data, only the countries of the European region were included in the analyzed sample. These countries have at least an average level of financial and economic development, which ensures that they have the minimum necessary conditions for diffusion of FinTech innovations. In our opinion, this could have affected the results of the correlation analysis. It can be assumed that the diffusion of FinTech innovations requires a certain level of economic development, which, in the future, will not have a decisive influence over other factors. Insufficient level of economic development in other non-sampled countries can be a significant factor of the low level of technologization of financial services. This can be considered as a major drawback and limitation of the proposed model and the direction of further research.

The parameters of the political and social environment strongly correlate with the technologization of financial services. This is confirmed by the Spearman correlation coefficient values for the Corruption Perceptions Index (0.89); the 1st pillar of Global Competitiveness Index ("Institutions") (0.89); the Social Progress Index (0.82); Democracy Index (0.81). Therefore, important conditions for the development of FinTech innovations and technologization of financial services are the protection of intellectual property and investor rights, the legal regulation of economic relations, the stability of the political system, the independence of the judiciary etc. The factors that characterize human development, including access to information resources, educational attainment, protection of civil rights and freedoms, are also significant.

Conclusions

The correlation analysis of the business environment parameters and the technological financial services index provided the following conclusions:

- the highest level of correlation is between the technologization of financial services and the ICT development and digital readiness, which is confirmed by three different indexes - Digital Economy and Society Index, Digital Readiness Score, Environmental Performance Index;
- technological development is the main determinant of FinTech innovations, while the level of economic development does not have a decisive influence on the spread of FinTech innovations;
- the parameters of the political and social environment strongly correlate with the technologization of financial services;
- the lack of linkage to innovation in financial services is only specific to the environmental dimension of business environment.

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Meeting the Housing Needs of Seniors In the Poznań Agglomeration

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Abstract

The aim of the article was to recognize whether, within the framework of the conducted housing policies in the municipalities of the Poznań agglomeration, actions are taken to meet the housing needs of the seniors. To this end, provisions concerning housing policies were analysed in the strategic and development documents of the surveyed commune.The research shows that the communes' activities focus primarily on adapting the social infrastructure and the cultural offer for spending free time to the needs of the elderly, which is to counteract the social exclusion of the elderly in the commune. Senior housing policy in the analysed municipalities is insufficiently implemented.

Keywords: housing policy, senior housing, senior, elderly

Introduction

Poland is a country with an ageing society. The increasing proportion of seniors in the overall population structure, which has been observed for many years, can influence the adaptation of many areas of everyday life to the needs of older people.

One of the areas in which changes should be observed is the real estate market. The key activity of the state authorities in this respect seems to be the creation of the country's senior policy, including housing. The current national housing policy is subordinated to the creation of demand for the purchase of real estate mainly by young people, which in the long run may not necessarily have a positive impact on the proper development of the real estate market.

The issues of housing policy are discussed in national and world literature. One of the country's developed in these analyzed housing conditions in the context of the housing situation in Poland is Mieszkalnictwo w Polsce. Analiza wybranych obszarów polityki mieszkaniowej w Polsce prepared by Habitat for Humanity Poland. In the report analyzing the results of experts, solutions to the housing problems of Poles, paying attention to the condition of housing and problems related to the management of state resources. In addition, the results of public opinion polls and the opinions of local government authorities included in it. Case studies were also carried out for four cities in Poland, which analyzed how housing policy is conducted. Qualitative research results available for leading providers of housing services and housing. The conducted research concerns that the housing needs of Poles are not fully met. Housing goals do not cover all areas where deficits are defined, e.g. too few flats for the least affluent (Habitat for Humanity, 2015).

The housing situation in Poland is monitored by the state authorities through censuses of residents and apartments (once every four years), based on possible problems related to the description of housing conditions related to service (GUS, 2019a). In addition, Główny Urząd Statystyczny publishes once a year a study on housing relations in Poland.

Issues conducted in residential Poland have been conducted for a long time. The emerging solutions focus primarily on searching for housing needs, the main problems related to housing, related and managed development of housing services, as well as municipal problems in the field of housing

design - financial aspect (Cesarski, 2013; Groeger, 2016; Herbst, 2013; Kucharska- Stasiak, 2008; Lis, 2011; Muzioł-Węcławowicz, 2013; Rącka and Bieda, 2017; Trojanek, 2015). Issues related to meeting the housing needs of older people are rarely addressed (Kłobukowska, 2014; Rataj, Iwański and Bugajska, 2018; REAS, 2015; Zrałek, 2012).

In foreign literature, housing issues are also addressed. Many studies have been created in this field in various countries (Aalbers, 2004; Aalbers & Christophers, 2014; Allen and other, 2004; Anderson, 2004; Gibb, 2015; Hochstenbach, 2017; Lopez & Paredes, 2018; McKeea, Muirb & Moorec, 2017; Paris, Gray and Muir 2003; Pato and Pereira 2016; Yates, 2013).

The study aimed to identify whether, within the framework of local policies (in regional development strategies and long-term programs of municipal housing management), the communes' activities are aimed at meeting the housing needs of the seniors. The analysis was carried out on the basis of strategic-development documents of 17 communes of the Poznań county and the city of Poznań (the communes of the Poznań county together with Poznań constitute at the same time the area of the Poznań agglomeration), based on which it can be concluded whether the authorities of local government units take into account the housing needs of the oldest people in their communes when creating local policy. It is believed that the housing needs of older people are marginalized in the documents examined.

Assumptions of housing policy in Poland

The satisfaction of housing needs is considered to be one of the basic human needs (Kucharska-Stasiak, 2016; Dziworska, 2017). These needs belong to the group of subjective needs-striving for a certain comfort of life or social status (Tanaś et al. 2019, Trojanek 2013). Living is a special good. It plays a significant role and is essential in the life of every person. Unfortunately, not every household can guarantee its own housing needs (Główka, 2009).

However, the satisfaction of housing needs is not entirely achievable. Even in the event of an increase in income and a drop in apartment prices, the difference between potential and effective demand would never be equal to zero. As regards the price elasticity of demand, it should be pointed out that a change in the price of a residential property may result in a less than proportional change in demand. Most often, the flexibility index is less than unity. This is due to the lack of a substitute for the good that is the apartment (Trojanek, 2008).

The issue of the right to live was first raised by T. Toeplitz in the interwar period. The provisions of these considerations were first included in 1948 in the Universal Declaration of Human Rights (Lis, 2008; Tolwiński, 1975).

In Poland, the housing policy is shaped based on the provisions of the Constitution of the Republic of Poland . Indicate the provision of Article 75, point A, point A, B, C and D. 1 of the document indicated, reading as follows: "public authorities pursue policies to meet the housing needs of citizens, in particular, to combat homelessness, support the development of social housing and support citizens' efforts to obtain their own housing". Special attention shall be paid to the tenant of the housing stock. The authorities of the country were obliged to adopt a separate resolution, defining first of all the rights protecting tenants. This is due to the point. 2 of the indicated Constitution (Constitution of the Republic of Poland of 2 April 1997).

The housing policy conducted in Poland is a part of the social policy of the state, in which the mentioned constitutional postulates for action should be indicated . It is, therefore, the responsibility of the State to provide assistance to anyone who does not have housing needs met. As in other countries , Poland's housing policy is initiated by central authorities (Brenk, Chaczko and Pląsek, 2018; Cesarski, 2016; Lis, 2012; Lis, 2015; Muzioł-Więcławowicz, 2015).

Actions in the field of housing policy are to a large extent delegated to the level of communes, then districts, and are implemented in cooperation with social organisations or private entities.

As far as social housing is concerned, a commune is obliged to provide shelter, run and provide places in protected flats, direct to a social welfare home and pay for the stay of a commune resident in that home, set up and maintain a social welfare centre, run and provide places in social welfare homes and support centres of a commune-wide range and direct persons requiring care to tchem and to provide shelter to foreigners referred to in Article 53 paragraph 1 point 15 and Article 53s paragraph 2 point 4 of the Act of 13 June 2003 on foreigners, providing shelter to foreigners who have obtained a permit for a tolerated stay on the territory of the Republic of Poland (MRPiPS, 2020).

The Ministry of Funds and Regional Policy (responsible, among others, for the state's housing policy), within the framework of the conducted housing policy, which is the point of these considerations, has identified four areas of action, which include (MFiPR 2020): Narodowy Program Mieszkaniowy, housing aid, support for term modernization and renovation, housing cooperative.

Narodowy Program Mieszkaniowy is currently the most important and recent document, describing in a comprehensive way the specific objectives and activities of the authorities that create the country's housing policy. In Poland's housing policy, Narodowy Program Mieszkaniowy has included provisions taking into account the housing situation of seniors. So far, the state aid provided by the State has been social welfare homes and protected housing. Moreover, the housing situation of the elderly has not been addressed before in any strategic documents of the country. The elderly person's place in the housing market was rather marginalised.

It, therefore, seems important to pay attention to seniors in an ageing society. The indicated age group may report additional needs when choosing an apartment due to certain movement restrictions or health problems. Thus, there may be a need to provide different types of housing that will provide care at home.

In the housing policy, the term senior housing was cited for the first time. The concept is defined as a resource adapted spatially, environmentally and technically to the needs of seniors.

It is important from the point of view of the issues raised that attention should be paid to whether the implemented senior policy includes housing policy aspects. It turns out that the document addresses the issue of adaptation of the current housing to the demographic situation, possibilities, including financial possibilities and needs of the seniors. One of the instruments planned to be introduced is a reversed mortgage and a life annuity, which are intended to enable seniors to benefit from additional benefits paid under the ownership of the apartment transferred after death. At this point in time, work is underway on the appropriate shape of this instrument.

Currently, seniors can apply for a sheltered apartment within their own homes, where they benefit from a preferential rent. In addition, the first proposals are made to create housing estates dedicated to the elderly with appropriate infrastructure and services (MRPiPS, 2020).

One of the objectives of the senior policy is "to promote spatial architectural planning that is adapted to all (universal design) and takes into account the needs of different age groups (including the elderly)".

Among the submitted recommendations is indicated (MRPiPS, 2020):

- working with seniors and social organisations on the assessment of public places and buildings in terms of accessibility for elderly and preparing plans and proposals for changes that take into account the needs of seniors,

- raising awareness of the energy efficiency of senior's homes and buildings and the risk of energy poverty,

- public transport planning, taking into account the needs of elderly (location of stops, running hours, frequency of trips, transfers),

- introduction of measures to shorten the waiting period for service in public places (office, library),

- implementing universal design principles at every level,

- support for the construction of apartment complexes as well as for the change of existing ones, as specially adapted infrastructure and services for the elderly.

Strategic and development documents of voivodeship, county and commune should take into account the provisions of national regulations.

Demographic Diagnosis of The Poznań Agglomeration

The Poznań agglomeration consists of 17 communes of the Poznań county and the city of Poznań, which is the centre of the agglomeration. In the agglomeration, there are urban, urban-rural and rural municipalities. The first of these groups are the following local government units: Luboń and Puszczykowo, the urban-rural communes: Buk, Kostrzyn, Kórnik, Mosina, Murowana Goślina, Pobiedziska, Stęszew and Swarzędz, and the rural communes: Czerwonak, Dopiewo, Kleszczewo, Komorniki, Tarnowo Podgórne Rokietnica and Suchy Las (powiat.poznan.pl).

The Poznań agglomeration is characterized by high demographic potential. At the end of 2018, the Poznań agglomeration was inhabited by 926,746 people, of which 42.2% were from the Poznań district and the remaining 57.8% were residents of Poznań (GUS, 2020). According to the data for 2018 available at the end of 2019, the agglomeration was inhabited by 29.8% of the population of Greater Poland Voivodeship, while the natural growth was 2.7 persons per 1000 inhabitants, while for Greater Poland Voivodeship it was 1.0 persons per 1000 inhabitants and for Poland, in the same period, it was negative and amounted to -0.7 persons per 1000 inhabitants. The population density is, in turn, 338 persons/km2 in the Poznań agglomeration (for the Greater Poland Voivodeship 117 persons/km2, for Poland 123 persons/km2) (GUS 2019b).

It should be pointed out that in the case of Poznań and cities with a similar level of development (e.g. Wrocław, Kraków), which form agglomerations with neighbouring communes, characteristic phenomena are observed which are related to the movement of population within the agglomeration and changes in the age structure (Kayser, 2012).

In the Poznań agglomeration, the migration of people from the central city to the neighbouring communes is observed - a developing suburbanisation process. These movements concern mainly the place of residence of wealthy city dwellers of working age, who continue to benefit from the conditions of Poznań's close location and the city's well-educated offer such as commuting, children's education, studies and leisure activities (Kayser, 2012).

The fact of migration from Poznań, or in fact its direction, is confirmed by the results of the analysis conducted by J. Tanaś in 2014. As the author points out, people who in the years 1995-2010 moved out of Poznań, lived mainly in the Poznań district (1995 – 47.11% of the total migration to the Poznań district from Poznań, 2000 – 61,04%, 2005 – 67,40%, 2010 – 65,26%). The share of people moving out of Poznań to neighbouring communes in the analyzed period was on an upward trend. In turn, the migrants who registered in Poznań at the same time came mainly from the territory of Poland (not including Greater Poland Voivodeship and Poznań County). Their share in the years 1995 – 42.15%, 2000 – 42.85%, 2005 – 46.15%, 2010 – 43.72%. Only 20% on average of the new

registrations in Poznań in the same period concerned people coming from the Poznań district (Tanaś, 2014).

The main directions of migration of the inhabitants of Poznań to the district of Poznań should be indicated as Swarzędz, Luboń and Puszczykowo, Murowana Goślina and Pobiedziska and the communes: Swarzędz, Komorniki, Czerwonak, Dopiewo, Tarnowo Podgórne and Suchy Las as rural areas located closest to Poznań. The rarest people from Poznań moved to the municipalities of Buk and Stęszew (Tanaś, 2014).

Figure 1 presents the age structure according to economic age groups separately for Poznań county and Poznań at the end of 2018.

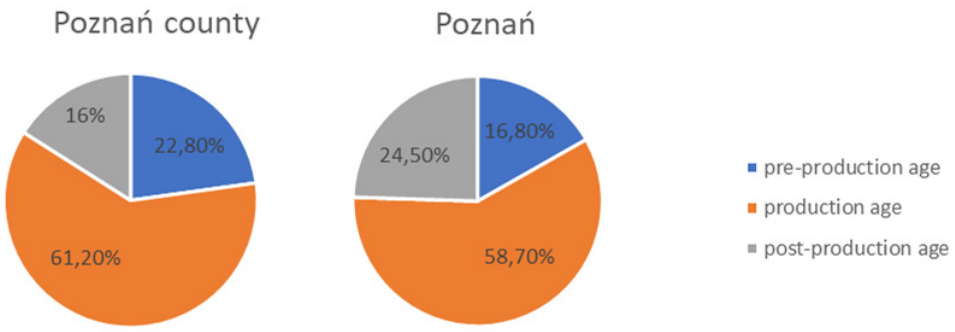

Fig. 1: Age structure of the population by economic age groups as a percentage of the population in Poznań and the communes of the Poznań count in 2018

Source: Own study based on GUS, 2020.

In Poznań, the share of people in the post-working age is higher than in the communes of the Poznań count. The age structure of the inhabitants of the communes located near Poznań is younger than that of Poznań - both the youngest inhabitants in pre-production age and those in production age. However, the share of elderly people in the total population of the Poznań count is high.

Figure 2 shows the share of people in the post-production age bracket in the communes of the Poznań district and in Poznań in the years 2008-2018.

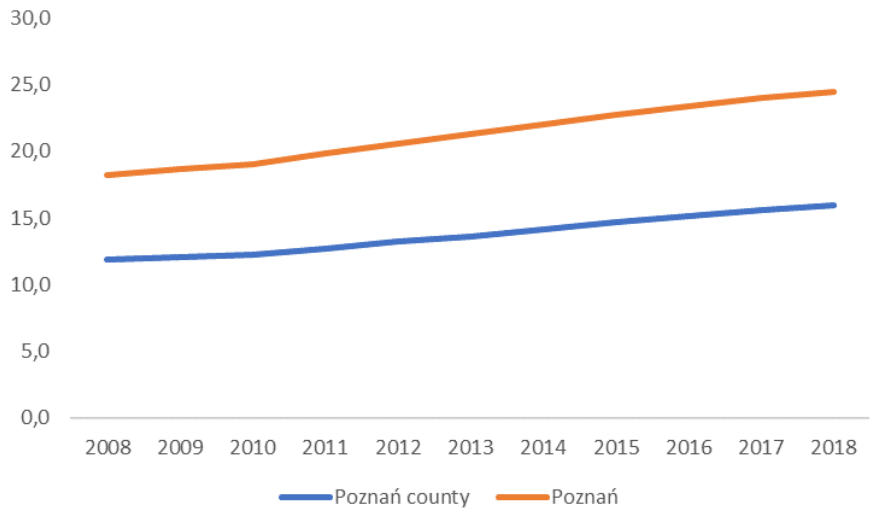

Fig. 1: Share of people at post-production age in communes of Poznań county and in Poznań in 2008-2018

Source: Own study based on GUS data (2020).

The share of people in the post-production age in 2008-2018 increased both in Poznań and in the communes of the Poznań count. However, the share of people of post-production age in the count of Poznań is lower than in Poznań. At the end of 2008, it was 11.9%, while at the end of 2018 it increased to 16%. In Poznań, the share of people at the beginning of the analysed period was already 18.2% and at the end of 2018 24.5%. Therefore, the process of population ageing concerns both the inhabitants of Poznań and the communes of the Poznań count.

Housing policy of municipalities in the Poznań Agglomeration – analysis of strategic and development documents

The subchapter presents the results of the analysis of strategic and development documents of the Poznań agglomeration communesr in the context of the conducted housing policy. Only the municipal development strategies valid for 2019 and long-term municipal housing programmes were examined (table 1). The review of the documents has been limited to records of actions taken by municipal authorities to ensure adequate housing conditions for the elderly. First of all, it was analysed whether the territorial self-government units' authorities take into account the housing needs of older people when setting the direction of development. In the context of the discussed issues, the following provisions on local housing policy are presented, taking into account the needs of the elderly.

Table 1: Records in the development strategies for gminas of the Poznań county taking into account the process of an ageing population

No.	Name of the local government unit	Name of the strategy of development and housing development programme	Record in the document
1.	Czerwonak	-*Strategia Rozwoju Gminy Czerwonak na*	-lack of infrastructure for the elderly (nursing homes for the elderly, palliative care facilities, temporary stay for the elderly related to

		lata 2012-2020 *-Wieloletni program gospodarowania mieszkaniowym zasobem Gminy Czerwonak w latach 2017 – 2021*	rehabilitation and care), - signalled willingness to broaden and improve the level of services provided for the elderly by developing a system of assistance for the elderly and increasing their accessibility to protected housing, - municipal programme of support and prevention of social marginalization of elderly people, - counteracting the isolation and social exclusion of seniors by developing and promoting the activities of the Senior Citizen's Club, systematic cooperation with Social Welfare Houses and Health Care Centres in neighbouring municipalities and promoting the value of the participation of seniors in social life, - building (launching) a Daily Residence and Rehabilitation House, - currently, there is no infrastructure such as a daycare home for seniors, - The vision of the commune indicates the creation of favourable living conditions for all inhabitants, - development of housing and support for municipalities in the construction of housing for people requiring social assistance
2.	Buk	- no current strategy available *-Wieloletni program gospodarowania mieszkaniowym zasobem Gminy Buk na lata 2014 – 2019*	- lack of records
3.	Dopiewo	*-Strategia rozwoju gminy Dopiewo na lata 2016-2025* *-Wieloletni program gospodarowania mieszkaniowym zasobem Gminy Dopiewo na lata 2016-2020*	- the general trend for people in the post-working age bracket in the commune is at the level of a steady growth of 100 people per year on average, however, the commune authorities assume the need to incur higher costs in the future related to social and caring functions for the group of seniors
4.	Kleszczewo	- no current documents available	-

5.	Komorniki	-*Strategia rozwoju gminy Komorniki 2013-2020* -*Program gospodarowania mieszkaniowym zasobem Gminy Komorniki na lata 2020 – 2024*	- willingness to organise a Day Care Home for the Elderly in Plewiska in an adapted facility after Herbapol
6.	Kostrzyn	-*Strategia rozwoju gminy Kostrzyn na lata 2015-2022* -*Wieloletni program gospodarowania mieszkaniowym zasobem Gminy Kostrzyn na lata 2016 -2020*	- the commune wants to be a friendly place to live for its residents, guaranteeing comfortable living, rest and recreation conditions (vision)
7.	Kórnik	-*Strategia rozwoju miasta i gminy Kórnik 2017-2025* -no available programme	- building a house for intergenerational integration
8.	Luboń	-*Strategia rozwoju miasta Luboń na lata 2019-2028* -no available programme	- the functioning of the day care centre
9.	Mosina	-*Strategia Rozwoju Gminy Mosina na lata 2014 do 2020+* -no available programme	- the social welfare infrastructure is planned to be expanded by providing in-patient day care for the elderly, disabled and lonely and by providing hot meals for those in need of support, - The Social Welfare Centre in Mosina carries out tasks in the field of feeding various groups of people, including the elderly, - the development of various forms of housing construction is planned
10.	Murowana Goślina	-*Strategia Rozwoju Miasta i Gminy Murowana Goślina na lata 2013-2020* -*Wieloletni program gospodarowania* *mieszkaniowym zasobem* *Gminy Murowana*	- drawing attention to the elderly in the editorial office of the commune vision: Brick Guesthouse attractive for residents: The competitiveness of the commune will be based on the offer of residence attractive for the existing residents as well as for those who intend to settle in the vicinity of Poznań. It is important that the offer of accommodation is competitive for young people, attractive for families, friendly for the elderly and disabled,

		Goślina na lata 2015 do 2020	- the creation and functioning of a day house for the elderly is planned (adaptation of the existing premises, elimination of architectural barriers), - the market offer of flats in terms of construction costs and housing prices must take into account the capabilities of different social groups with housing needs
11.	Pobiedziska	*-Strategia Rozwoju Miasta i Gminy Pobiedziska na lata 2012-2020* *-Wieloletni Program Gospodarowania Mieszkaniowym Zasobem Gminy* *Pobiedziska na lata 2017 – 2022*	- the development of social infrastructure, i.e. diversified social and health services for the elderly, is planned, - there is thought of increasing activities in the field of community support, institutional care, e.g. creation of a new nursing home, - Pobiedziska has the "Hospes Hospiti Sacer" Welfare House, which has 18 places for the elderly, including the disabled and chronically ill.
12.	Puszczykowo	*-Strategia Rozwoju Miasta Puszczykowo na lata 2010-2020* *-Wieloletni program gospodarowania mieszkaniowym zasobem gminy Miasta* *Puszczykowo w latach 2016 – 2020*	- lack of records
13.	Rokietnica	*-Strategia Rozwoju Gminu Rokietnica na lata 2014-2020* -no available programme	- there are plans to create infrastructure for the needs of disabled and elderly people (including rehabilitation facilities, occupational therapy workshops, day homes), - the housing policy is mainly geared towards young people (it is indicated in the document that the municipality is mainly settled by young people - the dependency ratio is favourable in comparison with other municipalities)
14.	Stęszew	*-Strategia Rozwoju Gminy Stęszew na lata 2016-2026* *-Wieloletni program gospodarowania mieszkaniowym zasobem gminy Stęszew na lata 2016-2020*	- it is planned to improve care for the elderly by creating day homes for seniors
15.	Suchy Las	*-Strategia rozwoju gminy Suchy Las na lata*	- undertaking activities aimed at improving housing management and developing various

		2013-2022 *-Programu gospodarowania mieszkaniowym zasobem Gminy Suchy Las na lata 2016-2020*	forms of housing construction in the municipality, - adaptation of the social housing base to social needs (the main idea behind this objective is to verify and adapt the existing housing stock to the needs of social housing)
16.	Swarzędz	*-Strategia rozwoju społeczno-gospodarczego gminy Swarzędz, Swarzędz 2020 (rok 2011)* *-Wieloletni Program Gospodarowania Mieszkaniowym Zasobem Gminy* *Swarzędz na lata 2020-2024*	- a system of assistance and support for the disabled, children and the elderly is planned (counteracting social exclusion) - the housing market in the municipality is considered by the authorities to be diverse (inhabited by different age groups)
17.	Tarnowo Podgórne	*-Strategia rozwoju gminy Tarnowo Podgórne, 2009* *-Wieloletni program gospodarowania mieszkaniowym zasobem Gminy Tarnowo Podgórne na lata 2016-2020*	- lack of records

Source: Authors' own calculations based on the development strategy for communes of Poznań county, 2020

The analysed strategies signal the problem of an ageing society. All the strategies under analysis note the problem of increasing the participation of seniors in the population structures from year to year, which is included in the strategic development goals.

The entries in the documents indicate that the hitherto influential population who decided to live in the areas of the analysed communes are mainly young and middle-aged people, who constitute the demographic development potential of the area. It should also be pointed out that the communes note that the most significant problems as a result of the ageing society will be observed in Poznań, from where young and middle-aged people migrate (purchase of a cheaper flat or construction of a detached house on the outskirts of Poznań).

When pointing out the main priorities for the development of communes, which take into account the needs of the elderly, some universal and at the same time, convergent areas of undertaken activities should be indicated. These include the objectives of activating the elderly and preventing social exclusion (providing medical and rehabilitation services, organising cultural activities for the elderly and the leisure sphere, setting up universities of the third age and senior citizens' circles, ensuring adequate public transport, and removing architectural barriers).

Records concerning the housing sphere in strategic documents appear much less frequently or are generalized. In the visions of these strategies, the authorities usually indicate that the area of their

municipalities is friendly to residents of different ages. The solutions included in the documents include the desire to increase the number of places for temporary stay of seniors in care facilities mainly offered by social assistance, to extend the offer of day homes for seniors, to increase access to protected and social housing, to eliminate architectural barriers to the public housing stock, and to develop various forms of housing construction.

The long-term housing programs drawn up by territorial self-government units' authorities contain, first of all, provisions concerning the guarantee of statutory tasks imposed on gminas - such as a plan of renovation of the gmina housing stock, plans to increase the available number of protected or social housing. None of the documents cited in this respect contained information concerning assistance to the elderly.

Activity in these areas will undoubtedly have an impact on ensuring an appropriate quality of life for the elderly in terms of guaranteed services. The analysis of the documents shows that housing policy for seniors exists, but is currently not a priority area. Municipalities focus on regulating land ownership, creating local plans. Instead, there is a lack of provisions in the strategies concerning the use of land for investment projects concerning strictly senior citizens' homes or the adaptation of existing housing for the needs of the elderly. Municipalities focus on and develop tasks in the field of social policy assurance.

When analysing the strategic and development document of the city of Poznań, it should be pointed out that in January 2017 it was updated (Strategia Rozwoju Miasta Poznania 2020+). The new provisions introduced in the document were influenced by the changes noticed in the macroeconomic environment of Poland, including Poznań. Five areas of global conditions determining the development of the city of Poznań were indicated. One of them was the phenomenon of an ageing society. This problem has and may continue to have an impact on the demographic and economic development of the city, which is noticed by the city authorities. It is assumed that the city will be increasingly inhabited by the elderly: well educated and entrepreneurial. They will be specialists in various industries and will sell or pass on their companies to their children. These people may report a higher quality of life requirements than existing seniors. They may also want to continue their professional career or train younger people (passing on the skills and experience gained so far).

Poznań is a city focused on meeting the housing needs of seniors. Residential investments have already been made here, which have been exclusively intended for the elderly. From the activities undertaken by the city authorities in the scope of satisfying the housing needs of the elderly, the cooperation of the city of Poznań with Towarzystwo Budownictwa Społecznego Sp. z o.o. should be indicated above all (PTBS). The program consisted of concluding contracts for participation in the costs of construction of flats in PTBS resources by the city in exchange for the delivery of a council flat by an elderly person to the city. The PTBS residential building and its premises have been technically and architecturally adapted to be inhabited by the elderly (elevators, thresholdless passages, handles, driveways, floors in different colours to allow orientation, proximity to greenery and public transport). The old building on Grabowa Street was revitalized, while a completely new one was built on Drewlańska Street.

Flats for seniors are also created thanks to the city's cooperation with the municipal company ZKZL. In its investment plans, the company has planned to allocate part of the flats from the ground floors of the buildings to the elderly or disabled people.

The provisions of the strategy and the initiative taken prove that the authorities of the city of Poznań are constantly monitoring the demographic situation of the city and trying to meet it by creating newer and newer initiatives. The housing policy of the city of Poznań, due to the importance of the city, is conducted on a much wider scale than in suburban gminas oriented in terms of development mainly towards young people undergoing the suburbanization process.

Conclusion

Everyone needs housing. The housing policy of the state has aimed at providing equal opportunities in access to housing for people in difficult financial situation. Setting housing policy goals should take into account the housing needs of people at risk of social exclusion. One of the groups of people who may need help from the state in the future in guaranteeing housing are the elderly.

The problem of population aging is now widespread, it also applies to Poznań, where the percentage of elderly people has recently been constantly increasing. Senior policy in the Poznań agglomeration is conducted in the field of social welfare, shaping services exclusively for seniors, organization of free time and adaptation of public buildings for the elderly and disabled. Social assistance is implemented through the functioning of social welfare homes, feeding the elderly or the functioning of daycare homes. However, in the majority of the surveyed gminas, no activities are undertaken in the area of investing in housing for seniors and these issues are not properly covered by strategic and developmental documents.

Perhaps during the period of creating strategic documents, interest in the housing situation of the elderly was not significant enough. In addition, mainly young people move to suburban communes, it is possible that up to now there was no need to guarantee housing for the elderly.

In Poznań, interest in the housing situation of seniors is greater. One of the most important initiatives implemented in the Poznań agglomeration is the City's cooperation with PTBS Sp. z o. o. and providing independent housing with preferential rent to seniors as part of the provision of communal housing.

Records in the development strategies of the Poznań agglomeration's communes, taking into account current and projected demographic changes and the awareness of the municipalities' authorities of the impact of population ageing on the further development of municipalities may lead to more and more recent initiatives in this area and directions of development. Cooperation between private entities and municipal authorities also seems to be crucial here, which may affect the level of housing needs of current and future seniors according to their expectations.

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Consumers Revealed Preferences In The Secondary Housing Market In Poznań

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Abstract

Many studies on buyers' characteristics and their housing market preferences are of a qualitative nature. Surveys are performed to classify the attributes of potential buyers, which are typically targeted. The study aims to evaluate the buyer's characteristics as well as the preferences reported on the secondary housing market in Poznań. To this end, information was collected on transactions concluded on the secondary market in Poznań in 2010-2016. Instead, the information contained in the land and mortgage registers (Section II-ownership and Section IV-mortgage) was used to assess the gender, the age of the buyers and the form of financing the buying of real estate. Additionally, the information was supplemented with Cadastare data and Google Street View. The analysis shows that the largest number of flats were purchased in Nowe Miasto and Grunwald. Among the buyers, young people up to 35 years old dominated (they constituted about 48% of the buyers). The area of 2/3 of the apartments ranged from 30 to 60 m², and 2/3 of the total were apartments located in buildings built in the traditional technology. What is essential, the majority of flats purchased with a loan (ca. 54%) constituted in the analysed period. The results obtained may serve as a basis for further consideration of the demographic conditions of demand on the Poznań housing market.

Keywords : Buyers' Preferences, The Housing Market, Revealed Vs Stated Preferences.

Introduction

The choices made by consumers on the market are the result of their preferences and budget constraints. Different motivations are at the basis of the final decisions, which determine a given a choice from the alternatives under consideration. Consumers' preferences are, to put it simply, their subjective assessments of the characteristics of the goods in question that form the basis of their choice at the time of purchase. Research on consumer preferences is necessary to determine what rationale the purchaser has when deciding to buy a given good (Gluszak & Marona, 2017; M. Trojanek, 2013).

Residential real estate is a specific property that is traded in a specific market. This is due to such characteristics of the property as high price to be paid for it, high strength, variety and stability in place (Galster, 1996). This makes the measurement of preferences in the real estate market complicated, and this is an essential issue because housing satisfies one of the basic life needs of a person (Jansen, Sylvia J.T., Coolen, & Goetgeluk, 2011). Since the 1950s, when Rossi (1955) began researching the motives of families in deciding to move, many publications on the factors determining choices in the housing market have been produced (Borth & Summers, 2018; Coulter, Van Ham, & Feijten, 2011).

Most of the research on the characteristics of buyers conducted in Poland, as well as their preferences concerning the residential market, is of a qualitative nature. Most often surveys are conducted, usually targeted, to identify the profile of a potential buyer. The authors draw attention to demographic features such as age, gender and income as determinants of preferences. Some people study housing preferences in relation to the family life cycle and housing mobility. Most of the research focuses on the characteristics of the apartments, such as cost, size and location.

The goal of the article is to identify the profile of buyers of housing (residential) properties and to investigate the preferences identified in the secondary market in Poznań. In order to achieve this objective, information on purchases entered into the secondary market in Poznań in 2010-2016 was gathered. Then, the information provided in the land and mortgage registers was used to determine the gender, age of the buyers and way of financing the purchase of the real estate. In addition, the database was supplemented with Cadastre data and Google Street View in order to obtain more detailed information about the apartments being purchased.

Literature Review

Methods For Examining Consumer Preferences

The problem of measuring preferences is the area of interest and research of scientists from many disciplines (de Koning, Filatova, & Bin, 2017; Jansen, Sylvia J.T. et al., 2011). Because of this interdisciplinarity, several different strategies and preference research models have arisen, from simple direct questions from respondents to sophisticated strategies that enable researchers to examine the reasons behind their choices. It can be assessed in many different ways what customers desire. Each approach is based on a set of limiting assumptions and thus serves a specific aim.

Classification of approaches to housing preference research can be done using several different schemes (Timmermans, Molin, & van Noortwijk, 1994). In principle, there are two broad approaches to preference survey - methods for analysing revealed preferences and methods for analysing stated preferences. The research on preferences revealed is based on actual market decisions of consumers (Tanaś, Trojanek, & Trojanek, 2019; R. Trojanek, 2013). The analysis of such preferences is primarily based on historical data. In turn, the stated preferences concern the market behaviour of consumers.

However, it should be remembered that both approaches have certain limitations. They are listed in Table 1.

Table 1: Potential limitations of methods of analysis of preferences revealed and stated

Preferences revealed	Stated preferences
1. Hard to distinguish individual interests from (market) constraints; 2. They are based on the belief that customers are always making rational decisions and are always looking for optimal solutions, which is unlikely; 3. The study may exclude major explanatory factors; 4. Many characteristics are associated which can lead to incorrect conclusions/indicators;	1. The approach may not be accurate because people may express transient expectations or beliefs in a real housing market that can not be realized; 2. The approach assumes that respondents may express their desires while being indifferent or may rely on specific conditions; 3. Factors such as social motivation, risk aversion, and reduction of cognitive dissonance may affect the result of this process.

Source: Jansen S. J.T i in. (red.), (2011) The Measurement and Analysis of Housing Preference and Choice, Springer, s. 20

Both methods have common assumptions:

1) first, they assume that the properties and their surroundings can be described in terms of a set of features (attributes);
2) Secondly, they assume that individuals or households derive usefulness from each attribute.

Different approaches offer different outcomes Therefore, the selection of a particular approach can not be based on the benefit of one method over another, but should be influenced by the sort of information which the researcher is interested in. Nevertheless, many economists share the view that by studying

the choices they make, much more can be learned about human interests than by listening to what they say (Bernheim, 2009). Molin and others (Molin, Oppewal, & Timmermans, 1996) claimed that individuals can disclose their desires only in the act of actual choice, as confirmed by the anthropologist M. Mead's assertion that "what people say, what they do and what they say they do, are completely different things".

Typically the micro-and macro-levels are concerned with variables examined in the housing preferences studies so far. The investigations had been focused on the preference stated and revealed in these studies. Ge and Hako (2006) studied the characteristics of residential preference trends, residential selection criteria and residential satisfaction, and their interrelationships, using questionnaire surveys of two Japanese cities. It turned out that the size of the apartment could predict residential satisfaction (Hwang & Albrecht, 1987), and could affect people's mobility (Diaz-Serrano & Stoyanova, 2010).

Other characteristics of housing preferences involved external environmental quality (Cellmer & Trojanek, 2019; Del Giudice et al., 2017; Kopsch, 2016; Naish, Tan, & Demirbilek, 2011; Szopińska & Krajewska, 2014; R. Trojanek & Huderek-Glapska, 2018; R. Trojanek, Tanas, Raslanas & Banaitis, 2017), green spaces (2016; McCord et al., 2014; Olbińska, 2018; R. Trojanek, Tanas, Raslanas & Banaitis, 2017) location (Kryvobokov & Wilhelmsson, 2007), security and town centre proximity, mass transit (Gadziński & Radzimski, 2016), office proximity, medical and educational facilities (Ceccato & Wilhelmsson, 2011; Wu, 2010). Besides, the preferences examined included factors such as a building's architectural style (Akalin et al., 2009; Stamps, 1999), security, comfort, and flat layout (Wang and Li, 2006; Wu, 2010). Factors such as safety function, expected resale value (Iqbal & Wilhelmsson, 2018), facilities were also examined.

Moreover, in turn, the analysed preferences included factors such as the architectural style of a building (Akalin et al., 2009; Stamps, 1999), safety, comfort, the layout of flat (Wang and Li, 2006; Wu, 2010). Such factors as the role of safety, the expected value of resale (Iqbal & Wilhelmsson, 2018; Renigier-Biłozor, Walacik, Źróbek, & d'Amato, 2018), facilities have also been studied, as well as the price of dwelling, location, distance from shops, schools (Turnbull, Zahirovic-Herbert, & Zheng, 2018; Wen, Zhang, & Zhang, 2014), and other premises, and the size of the house (Borth & Summers, 2018).

Overview of studies in the housing market preferences in Poland

The vast majority of studies of purchasers' preferences on the residential market in Poland carried out over the last few years are studies on local markets usually of the largest cities. The most frequently conducted surveys of preferences stated with the use of a survey questionnaire (Jancz, 2019). In many cases, it was a survey among young buyers, as the respondents were students. A summary of research conducted in recent years on preferences in the real housing market in Poland is presented in Table 2.

Table 2: Summary of studies on buyers' preferences in the housing market in Poland

N.	Author(s)	Spatial range	Details of the test
1.	(Gorzeń-Mitka & Grabiec, 2015)	Częstochowa	The survey conducted in Q2 2014 among 98 apartment buyers
2.	(Kempa, Krajewska, Palicki, & Rącka, 2015)	Poznań, Bydgoszcz, Toruń, Wrocław and Kalisz	The survey conducted at the turn of 2013/2014 among 623 students from 6 universities (preferences stated)
3	(Źróbek, Trojanek, Źróbek-	3 regions	The respondents assessed the performance of their residential environment (269 residents).

	Sokolnik, & Trojanek, 2015)		
4.	(Głuszak & Małkowska, 2017)	Cracow	Survey questionnaire among 153 students in 2015/2016; (tenant preferences survey)
5.	(Plebankiewicz & Biel, 2017)	Cracow	The survey conducted in 2017 among 154 people planning to buy a flat (stated preferences)
6.	Tanaś J., Trojanek R., Trojanek M., (2019)	Poznań	Survey of preferences of seniors who bought an apartment between 2010-2016 (preferences revealed)

Source: Author's own work.

Test Methodology and Data Sources

This research, as already described, aims to define the profile of buyers in the secondary housing market in Poznań and to explore their preferences. For this reason, data about transactions concluded on the secondary market in Poznań in 2010-2016 were collected from the Property Price and Value Database. Then, as a result of a time-consuming process of reviewing sections II and IV of the land and mortgage registers of the properties that were the subject of trading, the sex, the age of the buyers and the method of financing the property's purchase, among others, were decided. To get more accurate information about the apartments being bought, the database was supplemented with data from the Land and Building Register and using Google Street View. After the database was tidied up (which was necessary due to, e.g. incomplete information on some transactions or lack of the land and mortgage register number), 13779 real estate transactions were finally accepted for analysis. Their number in particular years are shown in Table 3.

Table 3: The number of transactions of residential properties in Poznań in 2010-2016

Year	Number of transactions covered
2010	1826
2011	1792
2012	1710
2013	1853
2014	1881
2015	2683
2016	2034
Total	**13779**

Source: Author's own work.

The developed database contained information on the dwellings being traded and their buyers. The apartments were described in terms of such features as the location by district, area of the premises, construction technology, age of the building, building height and transaction price. As far as buyers are concerned, information was obtained on their gender, age, and how to finance the purchase of property (credit or cash).

Results

Characteristics of purchasers of residential real estate

The purchasers of premises were divided into four primary groups (types), namely: marriages, women, men and others (this group includes, e.g. siblings). Figure 1 shows the share of particular types of purchasers in the total number of transactions in the whole analysed period, while Figure 2 shows the share of particular types of purchasers in particular years of analysis.

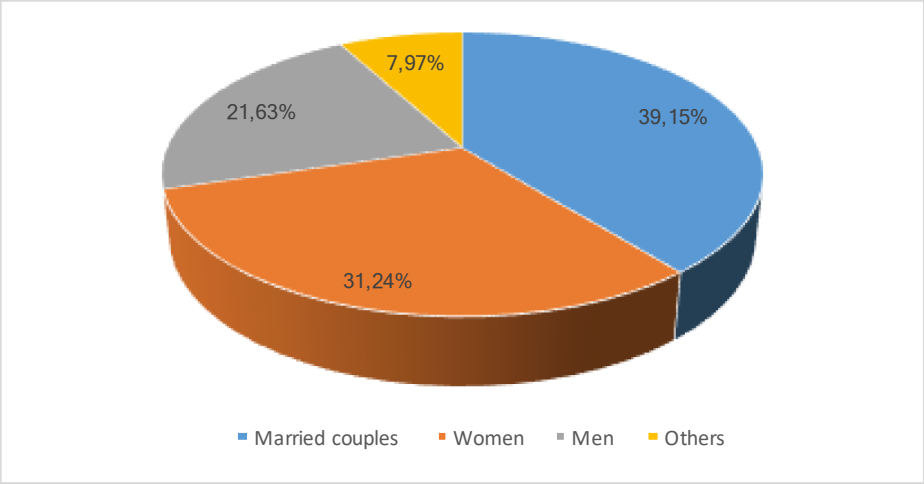

Figure 1: The structure of buyers according to the type in the years 2010-2016.
Source: Author's own work.

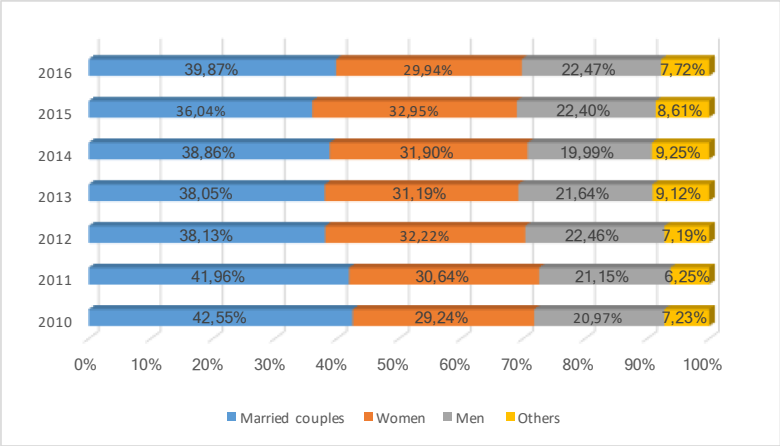

Figure 2: The structure of buyers by type in individual years covered by the analysis
Source: Author's own work.

The most significant number of flats in the analysed period was purchased by married couples (39.15%). On average, every third apartment was bought by a woman. Slightly less frequent buyers were men (21.63% of all transactions).

In particular, years covered by the analysis, one can observe slight fluctuations in the shares of particular types of purchasers in the total number of transactions in a given year.

When analysing the share of individual groups of purchasers in subsequent years, it can be seen that marriages dominated in the first two years, after which their share in the total number of transactions generally followed a downward trend (except for the last year of analysis). In turn, until 2015, the share of women has gradually increased (only in 2016 can we see a decrease of about 3 p.p.). In the group of men, on the other hand, it is difficult to indicate a specific trend.

First, the buyers' structure was evaluated according to their age. The buyers were split into groups of 10 years. In the case of marriages, the "average age of the partners" has been defined as the arithmetic mean of the age of the husband and wife. Figure 3 shows the proportion of particular age groups in the overall number of transactions.

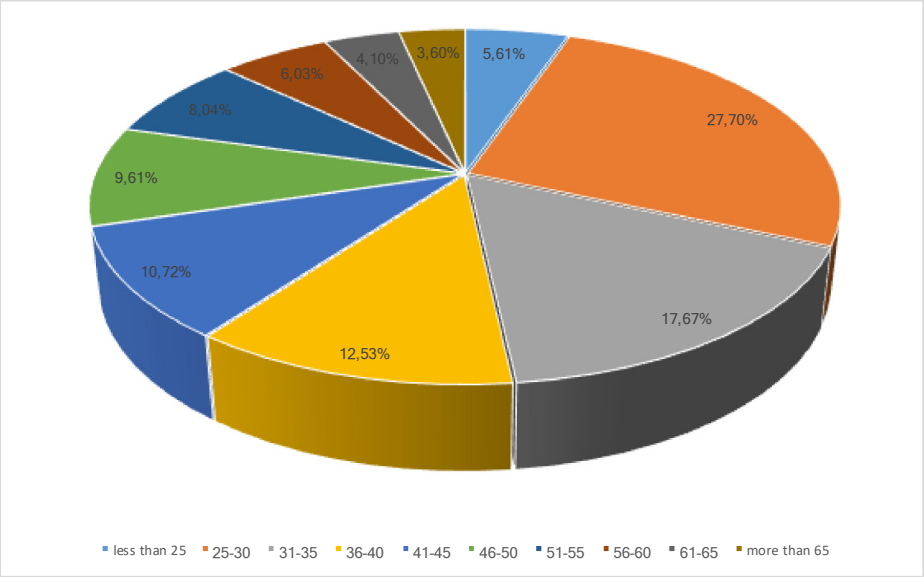

Figure 3: The structure of buyers according to age in the years 2010-2016.
Source: Author's own work.

The analysis of the age distribution of buyers indicates that most apartments were bought by people between 25 and 30 years old. The youngest buyers constituted about 5% of the buyers. It can be seen that the older the age range, the lower the share in the total number of transactions.

Among men purchasing apartments, the largest group were people aged 25-30, then 31-35. Among women, the proportion of subsequent age groups was slightly higher than that of men. In turn, among married couples, the share of individual age groups was more evenly distributed.

Interesting conclusions are provided by the analysis of the method of financing the purchase of a flat by young buyers on the secondary market (Figure 4).

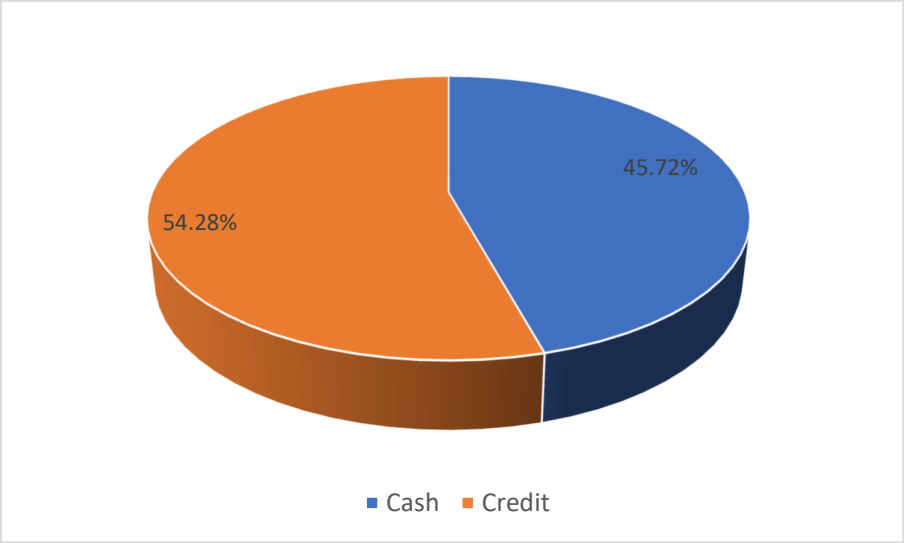

Figure 4: The method of financing a flat by buyers at the age of over 60 in the years 2010-2016.
Source: Author's own work.

In the entire analyzed period, slightly more than half of the purchased apartments were purchased with a loan (Figure 4). However, the analysis of transactions made in particular years shows that in general, the share of apartments purchased for cash has been growing year on year (except in 2016). The share of transactions with funds coming from credit in the 7 years covered by the analysis dropped by 16 p. p. Analysing the method of financing within particular groups of purchasers, it can be observed that married couples definitely most often purchased apartments with funds coming from credit. Among this group, over 55% of the apartments were purchased with the participation of an external financing source. Among men, transactions involving credit also dominated. In turn, the trend among women was the opposite - slightly more than half of the apartments were purchased for cash.

Purchaser Preferences In The Secondary Housing Market In Poznań

On the basis of the collected data, the preferences of the revealed purchasers of flats were analyzed taking into account: location of flats according to the districts of Poznań, area of purchased flats, construction technology, age of the building, building height and transaction price.

The data presented in Figure 5 may indicate preferences of particular groups of buyers for the districts of Poznań.

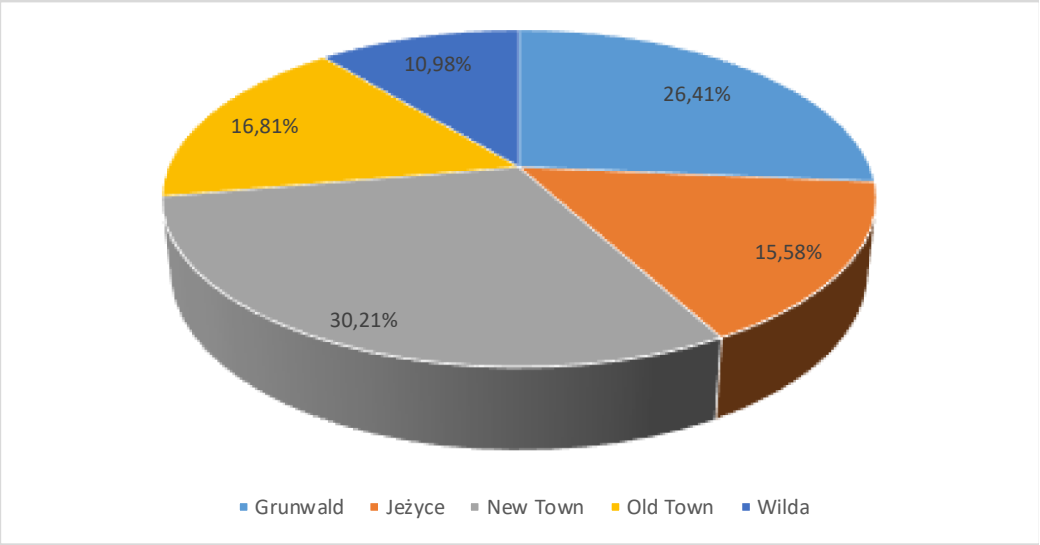

Figure 5: The percentage of flats bought by particular groups in the districts of Poznań in the years 2010-2016

Source: Author's own work.

Most apartments were purchased in the New Town district, then in Grunwald, and rarely in Wilda. In particular years, the share of transactions in the Old Town and the Wilda district was steadily growing, while in the remaining districts the values of these shares fluctuated, but generalised, a decline in interest in apartments in these areas can be observed. Women were more willing to buy apartments in the Grunwald and Wilda districts, while couples in the Old and New Town. The location in the Old Town was the least popular among men. In turn, Figure 6 shows the apartments purchased by area.

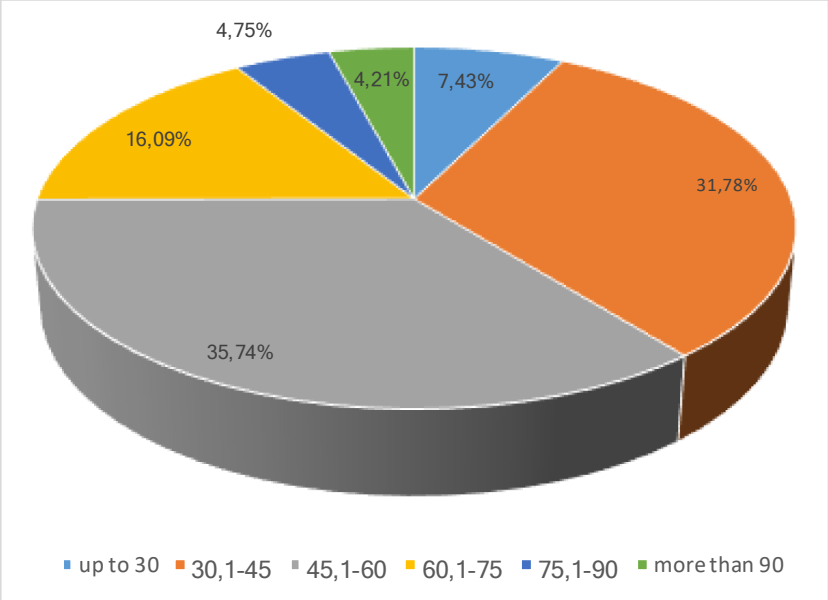

Figure 6: Flats purchased by buyers according to their floor space in the years 2010-2016.

Source: Author's own work.

Figure 6 shows that the most frequently purchased apartments were those of 45-60 m^2, followed by 60-75 m^2. The largest and smallest apartments were the least popular. Analysing the individual years, one can see that the share of the largest flats increased slightly, but still decreased - the smallest ones.

Figure 7 shows buyers' preferences for construction technology.

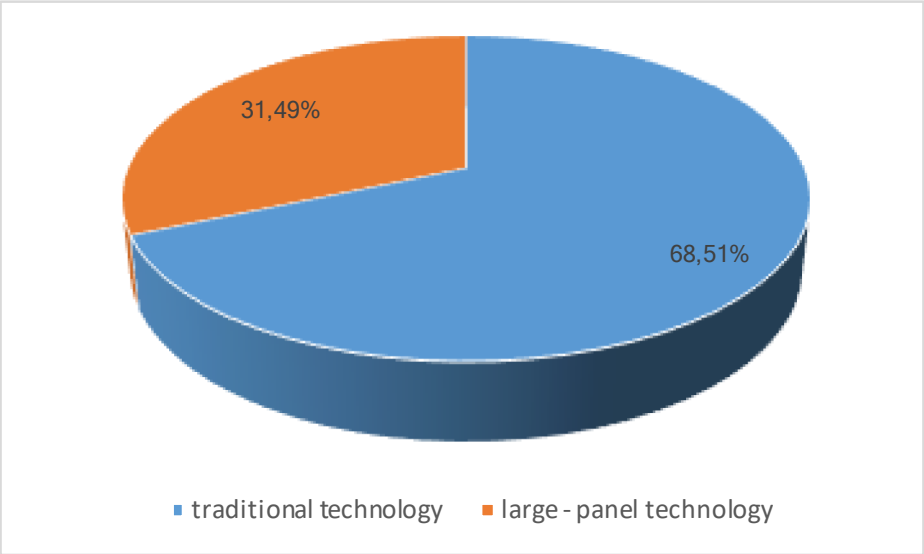

Figure 7: Flats purchased by buyers according to the construction technology in the years 2010-2016

Source: Author's own work.

Taking into account the construction technology - 2/3 of all transactions were apartments located in buildings constructed in the traditional technology. In particular years, the share of the purchased flats in traditional technology was increasing, while it was decreasing - in the large plate one.

The age of buildings in which flats were most often purchased was also analysed (Table 4).

Table 4: Flats purchased by buyers according to the age of building in the years 2010-2016

Type of buyer/ Age of building in years	Up to 25	25-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	More than 65	The average age of a building
Married Couples	37	40	38	39	39	40	40	38	37	28	39
Women	40	45	42	40	42	43	43	34	33	34	41
Men	45	42	44	42	46	40	47	45	41	46	43
Total	42	42	41	40	41	41	42	37	36	34	41

Source: Author's own work.

The average age of buildings in which the apartments purchased in Poznań at the aisles of the examined period were located was 47.3 years. The average age of buildings was the lowest for apartments purchased by married couples and the highest for men.

Figure 8 shows the preferences for the number of floors of buildings.

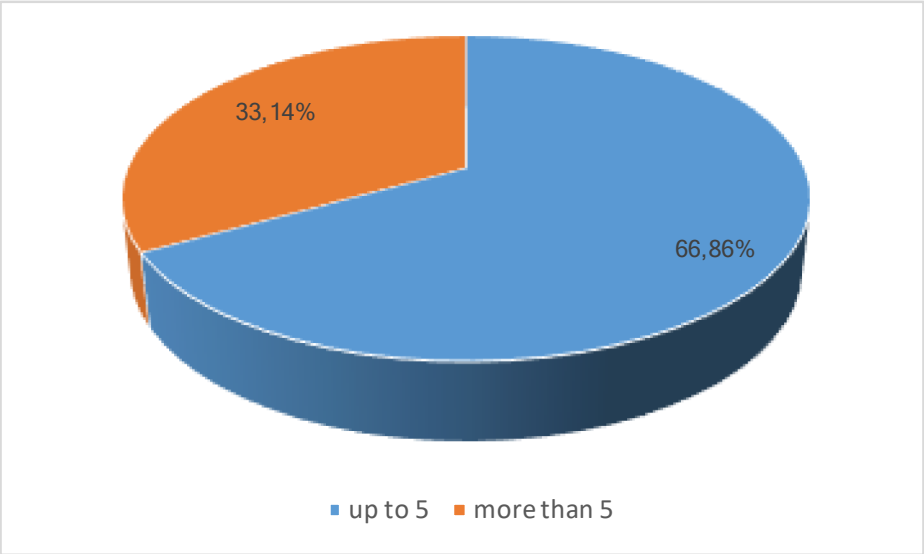

Figure 8: Flats purchased by senior buyers according to the number of floors in the years 2010-2016

Source: Author's own work.

Taking into account the height of the buildings, 2/3 of the purchased apartments were located in low buildings (up to 5 storeys). There were no significant discrepancies between the different groups of buyers on this issue.

Table 5 shows the average transaction price of the apartment being purchased and the average area depending on the group of buyers.

Table 5: Average prices of flats and its average floor space purchased by buyers in the years 2010-2016

Type of buyer	Average price (PLN)	Average area (m^2)
Married Couples	266 280, 23	53,05
Women	244 677,75	48,02
Men	255 481,17	50,92

Source: Author's own work.

Within buyers, it was married couples who on average bought apartments at the highest overall transaction price. This is presumably because it was it the group that bought apartments with a bigger area on average (about 53.05 m^2).

Conclusions

The purpose of this study was to determine the profile of buyers on the residential market in Poznań and their preferences. The analysis shows that in the years 2010 - 2016 in Poznań in the secondary market:

- ✓ Most flats were purchased by married couples (about 40%), followed by women (about 31%) and men (about 22%),
- ✓ The most flats were purchased in the New Town district (about 30%) and Grunwald (about 26%),

- ✓ Among the buyers, young people up to 35 years old dominated (they constituted about 48% of the buyers),
- ✓ The area of 2/3 of the flats ranged from 30 to 60 m²,
- ✓ 2/3 of the total were apartments located in buildings built in traditional technology,
- ✓ In the analysed period, the majority of flats were purchased with a loan (about 54%),
- ✓ the older the purchasers, the greater the proportion of flats purchased for cash.

The results of the revealed preferences survey are worth comparing with the survey of declared buyers' preferences conducted on the Poznań market (Strączkowski, 2010). Taking into account the preferred construction technology and height of buildings, the results are convergent. However, in terms of the area of flats purchased, age of buildings or location by district, the results obtained slightly differ. It should be noted, however, that the discrepancies indicated may be related to a different period covered by the analysis (preferences change over time), but certainly they also mainly result from the adopted research methods. In this study, the preferences revealed to the whole population were examined, whereas in the quoted studies the sample selection was non-random, purposeful and included interviews with 56 intermediaries, who expressed their opinions on the preferences of the whole population.

It should be borne in mind that the method of analysing preferences revealed has certain limitations. The choices made in the analyzed market may have resulted not only from the buyers' preferences alone but to a large extent they may have been due to financial constraints. The described conclusions have been prepared on the basis of data on completed transactions, derived from notarial deeds and supplemented with data from land and mortgage registers.

It should, therefore, be taken into account that the analysis may have omitted other essential factors which influenced the choice of purchasers and about which it was not possible to obtain information from the sources used in this study (e.g. standard of housing, accessibility of playgrounds for children, proximity of green areas or recreation places, etc.). The author sees a need to supplement the results obtained with the use of this method, e.g. by conducting a survey among people who bought a flat in the analysed period. Such a survey would allow getting to know the motives of the buyers when making such an important decision.

Undoubtedly, the results would also provide vital information for developers in terms of planning an appropriate residential offer, as well as other real estate market participants, such as valuers or real estate agents.

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Importance of Perpetual Usufruct Right in The Structure of Rights to Municipal Real Estate in Poland

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Abstract

The institution of perpetual usufruct in the Polish legal system was introduced in 1961, at a time when, according to the political system assumptions, the dominant form of ownership was state property. It was intended by the legislator to regulate ownership relations between the state and private sector entities, initially mainly in the field of housing. These regulations have been amended many times; hence the current legal regulations differ significantly from those introduced in 1961. The study aims to present the significance of this law in the management of municipal real estate in selected cities, as well as to indicate the consequences of the instability of legal regulations (here: another regulation of the transformation of the right of perpetual usufruct of land intended for housing purposes into the right of ownership of such land) in terms of the reduction of the commune's assets (real estate stock) and the reduction of budget revenues from annual fees, which in consequence will not be without influence on the financial situation of communes. The deliberations take into account the current legal status, refer to the literature on the subject and present the share of land given over for perpetual usufruct to natural persons and housing cooperatives in selected cities in Olsztyn. area and legal changes in the field of municipal land management in selected cities in Poland. The interviews show that the introduced changes in legal regulations will reduce the share of perpetual usufruct in the structure of legal forms of municipal land ownership. This is the result of transforming the right of perpetual usufruct by law into the ownership right.

Keywords: Perpetual Usufruct, Property Rights, Municipal Land.

Introduction

Perpetual usufruct was introduced into the Polish legal system in 1961 by the Act on land management in cities and housing estates (consolidated text in Journal of Laws of 1961, No. 22, item 159, as amended), at a time when, according to the political system assumptions, the dominant form of ownership was state property. Article 41 of the quoted Act stated that various temporary, long-term forms of management of state property existing at the date of its entry into force were replaced by the right of perpetual usufruct (Sejm Rzyczypospolitej Polskiej, 1961; Truszkiewicz, 2006). Besides, the right of perpetual usufruct guaranteed that real estate owned by the State Treasury could be used by non-state entities while remaining the property of the State. This law regulates the issues of development on other people's land, i.e. State Treasury (SP) land, and since 1990 also land owned by municipalities, and since 1999 also land owned by other local government units or their associations. The right of perpetual usufruct enables natural and legal persons to use real estate in public property for a long time (40 or 99 years) to satisfy various social purposes, primarily to carry out housing investments (Kokot, 2009). The current legal regulations of perpetual usufruct differ from those introduced in 1961 by the Act on land management in cities and housing estates (Sejm Rzyczypospolitej Polskiej, 1964). Although the political and political and political reasons for the introduction of this right have disappeared, the right of perpetual usufruct still plays an essential role in the system of property law, although the scope of this right has been limited

since 1997 due to the possibility of transformation, and since 2018 the right of perpetual usufruct of land developed for housing purposes is transformed from the "office" (land) into the ownership right (Article 1(1) of the Act of July 20, 2018, on transformation of the right of perpetual usufruct of land developed for housing purposes - Dz.U. 2018, item 1716).

The right of perpetual usufruct played an essential role in the processes of systemic changes concerning the functioning of the economy and the State, especially in the processes of the enfranchisement of state and municipal legal entities. The right of perpetual usufruct is a right in rem, derived from the Roman law of emphyteusis. The institution of a long-term lease is a form of ownership that is common not only in Europe, but also in the economies of other continents (Asia, North America, and Australia), although it is applied to a different extent and detailed regulations vary across countries and in time (Caesar, Donner, & Kopsch, 2019; Dale-Johnson, 2001; Foryś & Gaca, 2018; Gerber, Nahrath, & Hartmann, 2017; Giglio, Maggiori, & Stroebel, 2015; Głuszak, 2008; Irumba, 2015; Löhr, 2017; R. Trojanek, Tanas, & Trojanek, 2019; Tyvimaa, Gibler, & Zahirovic-Herbert, 2015).

Features of the right of perpetual usufruct

The right of perpetual usufruct is a right on somebody else's property (land owned by the State Treasury, local government units and their unions), giving the perpetual usufructuary (natural persons or legal persons) rights similar to the right of ownership. The right in question is, like the right of ownership, a transferable right (it means that it can be traded), a transferable right (it means that it can be contributed as an in-kind contribution to a company), and an inherited right (it means that it can be, for example, an object of donation or inheritance). However, there are differences between the right of ownership and the right of perpetual usufruct, which apply (M. Trojanek, Anholcer, Banaitis, & Trojanek, 2018):

- the duration of these rights. The right of perpetual usufruct is temporary, and the land is given away for 99 years. In specific situations where the commercial purpose does not require that the land be given up for 99 years, a shorter period may be allowed, but at least for 40 years,

- the properties of the buildings and structures on the ground. Buildings and other equipment erected on the land for perpetual usufruct are the property of the perpetual user,

- the possibility of extending this right. During the last five years before the expiry of the perpetual usufruct right reserved in the contract, the user may demand an extension of this right for a period from forty to ninety years. Refusal of extension is only acceptable for critical public interests (e.g. construction of sewage treatment plants),

- the method of accounting for buildings or other equipment erected on the ground. If the perpetual usufruct expires as a result of the expiry of the period established in the contract or as a result of termination of the contract before that period, the perpetual usufructuary is entitled to remuneration corresponding to the market value of the buildings and equipment as at the date of expiry of the perpetual usufruct right,

- the need to pay for the use of the land. The perpetual usufructuary pays the first fee (from 15% to 25%) of the real estate price and annual fees for the entire duration of the perpetual usufruct right (from 0.3% to 3% of the real estate price). The amount of the first fee and annual fees depends on the purpose for which the property has been let for perpetual usufruct as specified in the agreement. For example, the commissioning of land property for residential purposes requires the first fee of 15% and annual fees of 1%, whereas if the property is let for perpetual usufruct for commercial purposes, the fees are 25% and 3% of the property price respectively,

- rules of charging for the use of land. The annual perpetual usufruct fee may be updated no more frequently than once every three years, provided that there is a change in the value of the property,

- the possibility to terminate the contract before the expiry of the deadline set in the contract. An agreement for the perpetual usufruct of land may be terminated before the expiry of the deadline specified therein, if the perpetual usufructuary uses the land in a manner contrary to its purpose as specified in the agreement, in particular, if, contrary to the agreement, the buildings and equipment specified therein have not been erected,

- of the subject of the rotation. The right of perpetual usufruct is connected with the right of ownership of buildings of other facilities) located on the land given over for perpetual usufruct. The right of perpetual usufruct is transferable. The transfer of the right of perpetual usufruct of developed land transfers the ownership of the buildings to the buyer. This means that the right of perpetual usufruct cannot be traded separately from the ownership of the building erected on the land by the perpetual user.

Perpetual usufruct may be established only on land that is publicly owned, i.e. the State Treasury, local government units or their associations.

Municipal land under perpetual usufruct

Initially, the right of perpetual usufruct supported housing construction (single and multi-family), providing land on favourable terms. Overtime (since 1969), the subject matter of this right has been significantly extended (it could be established for housing and boarding house construction, craft workshops or small manufacturing plants).

Perpetual usufruct may be established only on land that is in public ownership (Treasury State and local government units or their associations). As of December 31 2018, the land use structure is presented in Figure 1.

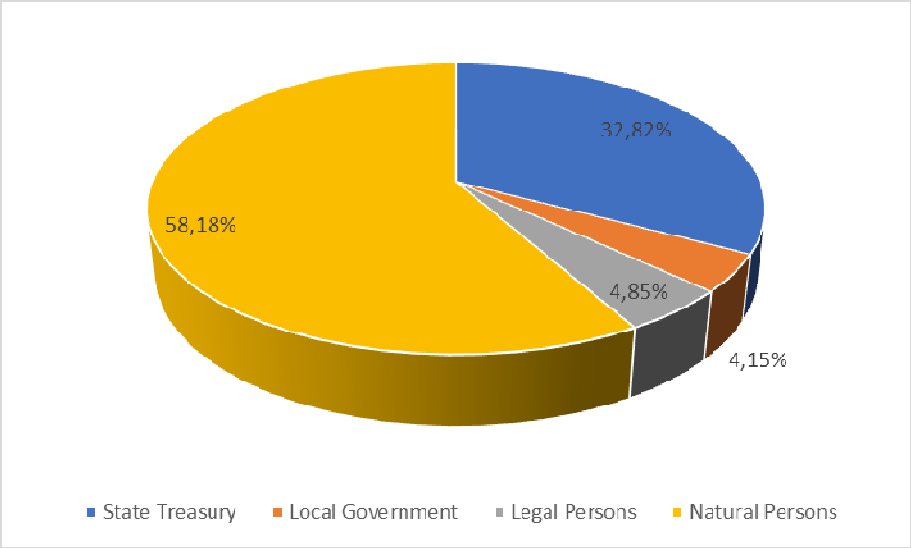

Figure 1: The land use structure in Poland in 2018

Source: Report on the condition of Treasury property as at 31.12.2018.

The perpetual usufruct of 485,965 ha of land owned by the State Treasury, which accounts for 4.85% of the total land of the State Treasury. The municipalities owned 1.041.386 hectares, of which 75.432 hectares were transferred for perpetual usufruct, which accounted for 7.24% of the land owned by the municipalities. Perpetual users of communal land are natural persons -21.810 ha (28.92%), housing cooperatives -10.487 ha (13.90 %), legal persons 4.220 ha (5.59 %), remaining persons – 38.915 ha (51.59 %).

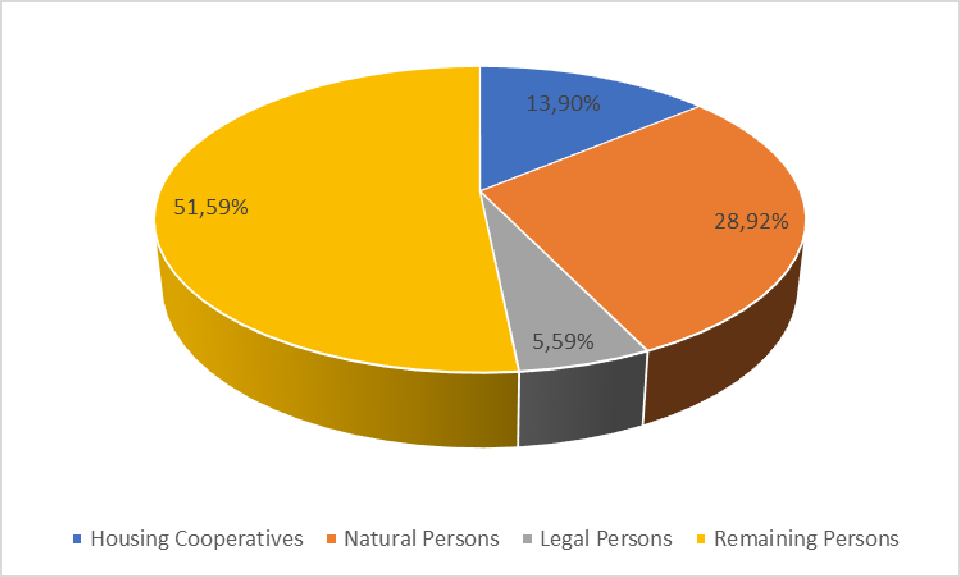

Figure 2 : The structure of perpetual users of communal land

Source: Own study based on the Local Database, www.stat.gov.pl

The share of land owned by powiats and voivodships in the total land under perpetual usufruct is small (about 154 ha is the land owned by powiats, and about 34 ha is the land owned by voivodships). Due to the changes introduced (since 1997) in legal regulations giving the possibility to transform the right of perpetual usufruct into ownership, the area of land under perpetual usufruct is decreasing. The scale of these changes is illustrated by the following data: in the years 2002-2003, there were 96,000 hectares of communal land under perpetual usufruct, while in 2017 (as of December 31, 2011) the area decreased by over 20,500 hectares. The share of land transferred to natural persons and housing cooperatives in the total land given over for perpetual in the capital cities of voivodships in Poland in figure 3.

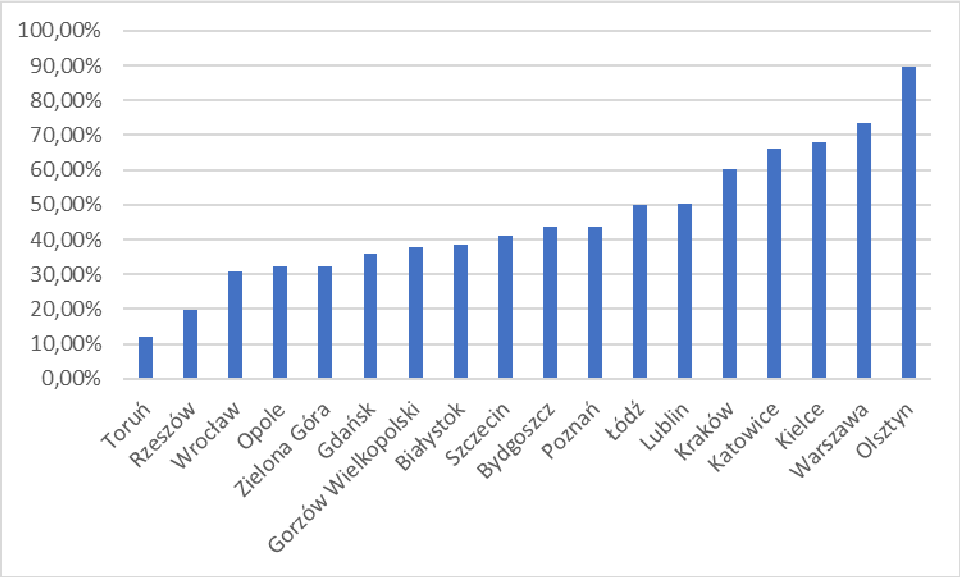

Figure 3 : The share of land transferred to natural persons and housing cooperatives in the total land given over for perpetual in the capital cities of voivodships in Poland

Source: Municipal land area according to legal forms of use, Central Office of Geodesy and Cartography, 2018

It is worth noting that the share of land transferred for perpetual usufruct to natural persons and housing cooperatives in the total land transferred for perpetual usufruct varies considerably in individual cities with county rights. There are cities in which this ratio is only 12% (Toruń) and 90% (Olsztyn).

Since 2002, the area of land under perpetual usufruct has significantly decreased. Due to subsequent amendments to the Acts governing the transformation of the right of perpetual usufruct of land developed for housing purposes (Act 2018), this process will intensify as, in accordance with the provisions of this Act, land put into use for housing purposes as of January 1, 2019, became by law the property of existing perpetual usufructuaries. This applies primarily to land given for perpetual usufruct to natural persons and housing cooperatives. It is estimated that, on a nationwide scale, the area of municipal land will decrease by more than 32 thousand hectares. The right of perpetual usufruct, due to its legal nature (features of this right), causes certain financial effects in real estate and income of both perpetual usufructuaries and public property owners. The principles of transforming the right of perpetual usufruct into the ownership right from financial consequences are primarily unfavourable for municipal budgets. The cities which lose the most are those who have given up a significant part of their land for residential purposes, and these properties have a high market value. The consequence of this transformation process is a reduction of assets (gminas cease to be landowners), and this fact influences the financial situation of individual cities (gminas). This applies in particular to cities with poviat rights, which is mainly due to the high share of land given over for perpetual usufruct in the budgets of these cities. The receipts from perpetual usufruct fees in the budgets of cities with poviat rights amount to over PLN 1 billion; they are characterised by small variability, although they show a systematic growth. The situation concerning the share of receipts from perpetual usufruct in particular cities varies. For example, in 2018 the following amounts were received by the cities' budgets: PLN 35 910 581 (Cracow); PLN 38 700 000 (Poznań); PLN 547 861 740 (Warsaw); PLN 6 761 363 (Częstochowa); PLN 622 220 (Chełm); PLN 13 826 552 (Białystok).

Conclusion

The right of perpetual usufruct governs the development of someone else's land (public property). The legislator intended to provide an accessible way of acquiring land primarily for housing purposes. Over time, the scope of purposes for which state land may be given away was extended. Thus, the law met specific social objectives. On the other hand, it gave the possibility to shape certain investments, contributed to the development of cities or gave the possibility to use real estate for specific developmental purposes.

In the period of political transformation, the right of perpetual usufruct played an essential role in the process of the enfranchisement of state and municipal legal entities. Therefore, the right of perpetual usufruct was not only an instrument to implement the state housing policy, but also to carry out public tasks.

However, from the very beginning of the introduction of the Act of 1961, it has been the subject of a multithreaded discussion, the provisions regulating this Act have been amended many times. The study presents the role of the right of perpetual usufruct as a form of management of land properties owned by municipalities (here: cities). It was pointed out that the last introduced change in the regulations will result in significant depletion of municipal land resources and property, and in consequence, will affect their financial condition. The scale of these changes in individual gminas (cities) will be differentiated depending on the amount of land held for perpetual usufruct by natural persons and housing cooperatives for perpetual usufruct, the value of this land and the annual fees paid for perpetual usufruct. The financial consequences of the introduced changes will result in a total loss of revenue from the annual fees. In return, the cities (municipalities) will receive revenue from the transformation fee (20 times the annual perpetual usufruct fees set at the level in force in 2018), which may result in potentially higher revenue if the transformation fee is paid once. The loss of revenue should be increased by the amounts resulting from the possibility to increase the annual fees due to the statutory possibility for municipalities to update these fees.

Communes, especially urban communes, will be deprived of permanent income. The legislator has not provided for any compensation for the lost income, which will have an impact on the financial standing of gminas. However, the solutions introduced are beneficial for perpetual usufructuaries, as by law, perpetual usufruct is transformed into ownership on preferential (non-market) terms.

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Omnichannel Strategy as A Green Marketing Tool

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Abstract

The current trends in green products promotion characterizes by the relevant necessity of implementation the omni-channel approach for unification customer experience across all marketing channels. The goal of the article is to investigate the structural and functional environment of the formation and development the marketing and omnichannel strategies, to search the opportunity for its implementation in green marketing strategies. The authors used the methods of bibliometric analysis for determining vectors of perspective development of marketing strategies and omnichannel theory as a tool for green goods and services promotion. The main hypothesis of investigation is the studying the increasing tendency on analyzing of marketing strategies by the scientists. In order to formulate the terminological basis of the implementation the omnichannel strategies in green marketing, a bibliometric analysis of the spread of the concept of "green marketing" and "omnichannel strategies" in scientific articles indexed by the Scopus science base was performed. These authors reviewed more than 1670 papers from Scopus base. The period for the analysis was chosen since 2000 till 2019. Used the Scopus screening tools showed that in 2006 the numbers of articles which focused on marketing strategies began to increase. On the international level the investigated area represented by the next countries: United States, United Kingdom, China, Australia, India etc. Using the VOS viewer program were identified 12 clusters of the scientific papers which investigated marketing strategies from the different points of views. In the paper justified that in the condition when the scale of green products supply and using are constantly increasing the traditional multichannel strategies can lead to confusion for customers about the products offer. In that case using the omnichannel strategies could optimize consumers engagement, meet high customer expectations, enable better service, provide actionable data integrated.

Keywords: Green Marketing, Customer, Marketing Channel, Brand, Omnichannel Strategy.

Introduction

Today there is a sustainable trend on markets toward to using of the different multi and cross channel approaches to communicate with buyers and consumers. But nowadays production development and market tendencies characterize by fundamental consumer's needs which determine to use omni-channel approach that provides a unified experience for the customer across all channels. The omni-channel strategy may be especially successful for the sphere of green products and services promotion. It will

be possible due to the new market requests in the condition of the dynamic convergence global marketplace in which customers are being provided with new quality of green goods from the different companies and industries.

Literature Review

Last tendencies characterized by the necessity of implementation more than one of the distribution channels for green products promotion. The marketing strategy must be increasingly complicated. Today more than 80% of customers demand to get an integrated shopping experience for the different channels they can use when buying from the one supplier [E-tailing Group].

Traditionally the marketing strategies analyzing from the different points of view. Thus, the scientists in the paper (Çera et al., 2019; Osama Ben Rajab, 2019; Lubis, A., 2018) investigated the social factors and their influence on marketing strategies. In the paper (Nikodemska-Wołowik et al., 2019; Shih & Yang, 2019) that the behavioral determinants and their trends are the key element in the enterprises marketing strategies. From another point of view the authors (Rallabandi Srinivasu, G.V.S.R. Anjaneyulu, 2019; Atta Mills et al., 2020) proved that development of the basic management functions improving quality in commercial and social institutions, and as a result the companies policy creates the environment for the customer behavior. In the papers (Dabyltayeva, N., Rakhymzhan, G. 2019; Pechancová et al., 2019; Aliyas et al., 2018; Yevdokimov et al., 2018; Bilan et al., 2018; Cebula et al., 2018; Sokolenko et al., 2017) the scientists investigate the environment management systems and their place in green economy development. Besides, Yevdokimova et al. (2018), Lyulyov et al. (2019), Vasylieva et al. (2019), Mentel et al. (2018), Lyeonov et al. (2019), Shvindina (2019), Serhii et al. (2014) and Aliyas et al. (2018) emphasized the role of sustainable development and social responsibility in modern marketing concepts. The place of innovations and the barriers on the way of increasing market competitiveness are analyzed by the scientists Szymańsk, E., Dziedzic, E., & Rutkowski, A. (2017), Bondar et al. (2015), Bilan et al. (2019c), Vasylieva et al (2014) and Hvolkova et al. (2019). Agota Giedrė Raišienė et al. (2019), Grenaakova et al. (2019), Myroshnychenko et al. (2019) and Malega et al. (2019) proved the influence of the changes in attitudes to stakeholder collaboration in the process of marketing policy creation and competitiveness. The linking between educational aspects and marketing categories are investigated in the papers of Dvorský (2019) and Adebayo et al. (2019). The marketing strategies provided on the level of national economy are analyzing by the scientists Lyulyov et al. (2018) and Raftowicz-Filipkiewicz (2014), Bilan et al. (2019). Mikołajczak (2019) emphasized that the factors, which strongly influence on promotion marketing strategies in NGOs'. They include initiatives and activities for several years, events in favor of external benefit takers, close commercial cooperation, lack of investments and constant financial sources, regular actions combined with flexible working time. At the same time, the Hossain et al. (2018), Němcová (2019), He Shuquan (2019, 2018) and Hadbaa, H., (2019) Vaitkevicius et al. (2019) Starostová et al. (2018) investigate the determinants which influencing on consumer behavior using the examples from their countries. In the researches provided by Arribas et al. (2019) and Hadbaa (2019) analyses the behavioral factors in the decision-making process. The scientists Vysochyna (2018) and Tiutiunyk (2019) was determined conflicting influence of different determinants of fiscal policy on dynamic of promotion of goods and services. The industry segment in the field of marketing instrument implementation was investigated by the authors Gavurova et al., (2018); Huamin (2019); Horváth, (2019). In the paper (Chygryn et al., 2018) justified that the principled of sustainable development have to implemented in management and marketing strategies. The papers (Bilan, 2019a, 2019b) are using the behavioral aspects and trust cycle for representing the level of synchronization the financial and commercial cycles. The author Njegovanović A., (2018) justified that the future of decision-making and choosing of future marketing strategy are linked to artificial intelligence and the necessity for implementation new knowledge.

The omnichannel marketing, first, characterized by multiplicity of information channels about the products and services. The first use of the term "channels multiplicity" was used in 2016 by Van Bruggen et Al., which was determined by increasing of using technology and information streams. According to Donald Carroll and Inés Guzmá (Carroll, 2015) omni-channel model can be created on the base of synchronized operating modeling where all the company's channels are having the same

rights and represent a single configuration and view to the consumers and the one corresponding way of doing business. In this model, companies change their points of view to the customer, identifying they specific and one unified features. It is open up a possibility for companies to respond in a permanent way to the customer's fast-moving evolving needs. Verhoef P., Kannan P.K., Inman J. (Verhoef, 2015) determined the omnichannel strategy as the synergetic simultaneous management of the multifarious existent channel and customer touchpoint, in the way then the customer experience and expectation across the channels of promotion and performance over channels is optimized.

Giovanni Vaia and Diletta Cerolini (Vaia, 2016) noted that the omnichannel strategies redefine a customer experience creating a synergy between consumer and brand. Concurrently the brand doesn't lose value but follow the needs of customer and communicate with him.

However, using the omnichannel strategies for green goods promotion is the relevant way how to engage green consumer and involve their to the processes of green consumption using the instruments of digital marketing.

Methodology

The main hypothesis of investigation is the studying the increasing tendency on analyzing of marketing strategies by the scientists. For this purpose were identifying the quantity tendency of the scientific papers which focused on the analyses of issues connected with omnichannel marketing strategies; the emphasizing the main subject areas under analyses of marketing strategies was done; clustering the papers on the main directions for investigations with purpose to identify the further options for analyses were provided.

For the analysis were chosen the following keywords: green marketing, omnichannel strategy, neuromarketing, digital marketing. The research process was divided on two steps. First, were determined the main clusters and their scale which were formed in the procedure. In the process were identified 12 clusters of the scientific papers. These are the clusters connected with the green marketing strategy, neuromarketing, consumer behavior. On the second stage was analyzed the cluster which include omnichannel category with the linked categories, such as, green marketing, environmental management, neuromarketing, consumer behavior etc. The time for analysis was chosen 2000-2019.

This study reviewed 3500 papers from Scopus. The analyze was done by providing the software of VOSviewer using the dates from the Scopus. The VOSviewer allowed to allocate and visualize the network of definitions which used and co-citation during the investigation of omnichannel strategies in green marketing. The provided analyses proved the statement about the perspectives of implementation omnichannel strategy for the green goods promotion using the instruments of digital marketing.

Results

In order to formulate the terminological basis of the implementation the omnichannel strategies in green marketing, a bibliometric analysis of the spread of the concept of "marketing strategy" and "omnichannel strategies" in scientific articles indexed by the Scopus science base was performed.

Using the Scopus analyzing tools were reviewed more than 1650 papers from the scientific Scopus base. The period for the analysis was chosen since 2000 till 2019. The Scopus screening tools showed that in 2006 the numbers of articles which focused on marketing strategies began to increase. In 2019 in comparison with 2000 the quantity of articles increased more approximately on 600 percent (figure 1).

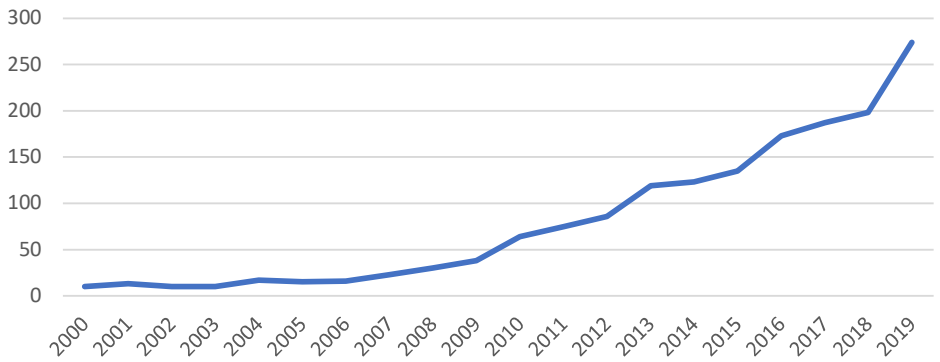

Fig. 1: The results of the publication trend analysis in the field of omnichannel strategies in marketing

Sources: created by the authors on the base of Scopus

On the international level the investigated area represented by the next countries: United States (4260 papers), United Kingdom (1336), China (1094), Australia (718), India (682), Taiwan (652), Canada (470), Spain (462), South Korea (437), Italy (414). The most quantity of academic researches concentrate in such academic institutions: Hong Kong Polytechnic University; Texas A&M University; Pennsylvania State University; Purdue University; Griffith University; Texas Tech University; University of Florida; Cornell University.

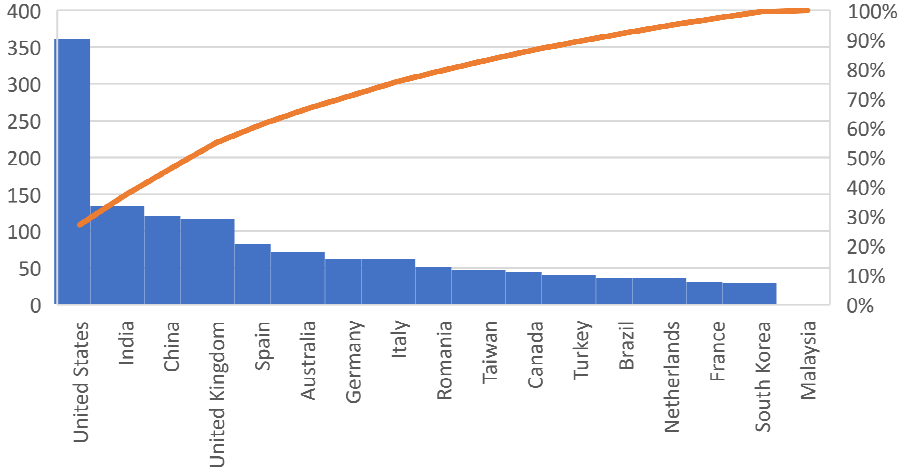

Fig. 2: International academic representation of the category "omnichannel marketing strategy"

Sources: created by the authors on the base of Scopus

The main subject areas (Figure 3) which connected with the marketing strategies are business, management and accounting, social science, computer science, economics, econometrics and finance, engineering, medicine etc.

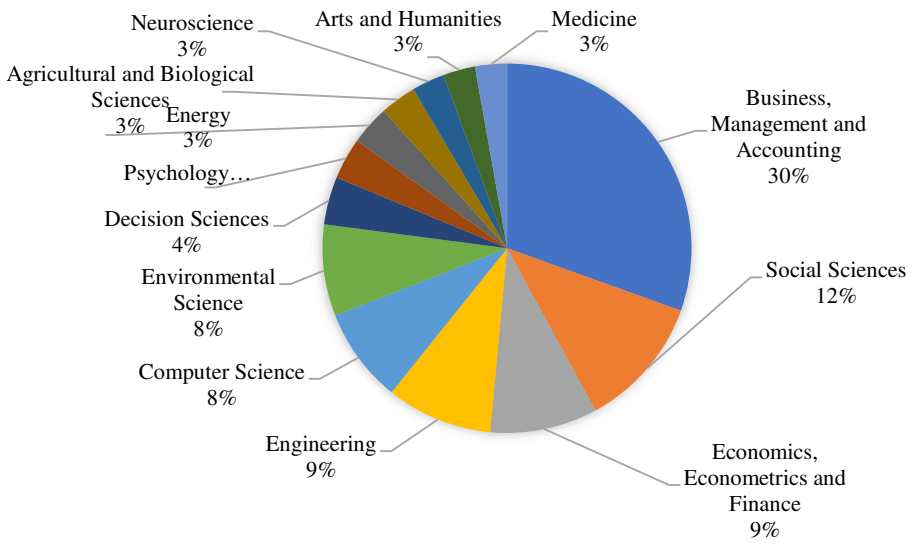

Fig. 3: The subject area in Scopus for analyzing the "omnichannel marketing strategy"
Sources: compiled by the authors using data from Scopus

It has to be noted that the percentage of the environmental science is 8%. It tells about low level of implementation the marketing strategies in the sphere of environmental economics, sustainable development and green production.

In the table 1 systemized the authors whose scientific interests relate to the omnichannel marketing. Considering the scientific trends (figure 1, 2, table 1) it has to be noted that the spreading of the omnichannel strategy connected first of all the digitalization the retail processes, neuromarketing and green marketing.

The citation analysis revealed the most authoritative researchers as well as the 12 clusters of research teams that had the greatest influence on the development of omnichannel theory (Figure 4). The big cluster includes the categories connected with the categories of omnichannel strategies and digital marketing, such as: big data, omnichannel management, omnichannel retailing, internet of things, customer experience, e-commerce, digitalization etc. Considerable cluster connected with the green marketing categories: environmental marketing, sustainable marketing, environmental concern, environmental attitude, green products, green consumer, green consumer behavior, willingness to pay, green marketing strategy, purchase intention, green supply chain, green brand image etc. The significant cluster chained with the neuromarketing and contain the next categories: marketing research, brain activity, circular economy etc. The "sustainability" cluster includes concepts: green marketing strategies, environmental management, green products etc. Determined interconnections tell about the huge possibilities for using the approaches and opportunities omnichannel strategies for promotion the green good and services.

Table 1: Bibliography of publication about omnichannel marketing

	Authors and title	Source	Year
1	Hossain, T.M.T., Akter, S., Kattiyapornpong, U., Dwivedi, Y. Reconceptualizing Integration Quality Dynamics for Omnichannel Marketing, (Hossain, 2020)	Industrial Marketing Management	2020
2	Orús, C., Gurrea, R., Ibáñez-Sánchez, S. The impact of consumers' positive online recommendations on the omnichannel webrooming experience, (Orús, 2019)	Spanish Journal of Marketing - ESIC	2019
3	Riantini, R.E. The Effect of Omni Channel Marketing on the Online Search Behavior of Jakarta Retail Consumers with Theory of Planned Behavior (TPB) Approach, (Riantini, 2019)	ICIMTech	2019
4	Tolliver-Walker, H. Smart printers embrace omnichannel marketing, (Tolliver-Walker, 2019)	Printing Impressions	2018
5	Berman, B., Thelen, S. Planning and implementing an effective omnichannel marketing program, (Berman, 2018)	International Journal of Retail and Distribution Management	2018
6	Henry, P. Omnichannel marketing: Integrated, coherent and consistent, (Henry, 2017)	FedCSIS	2017
7	Remhof, R., Candussi, T., Grisold, T. Grisold, T. It's more than paid, owned and earned towards an extended marketing model: 'OPENS', (Remhof, 2017)	ECSM 2017	2017
8	Taufique Hossain, T.M., Akter, S., Kattiyapornpong, U., Wamba, S.F. The Impact of Integration Quality on Customer Equity in Data Driven Omnichannel Services Marketing, (Taufique Hossain, 2016)	Procedia Computer Science	2016
9	Pophal, L. Multichannel vs. Omnichannel Marketing: Is there a difference, and what does it mean to you? (Pophal, 2015)	EContent	2015

Sources: created by the authors on the base of Scopus

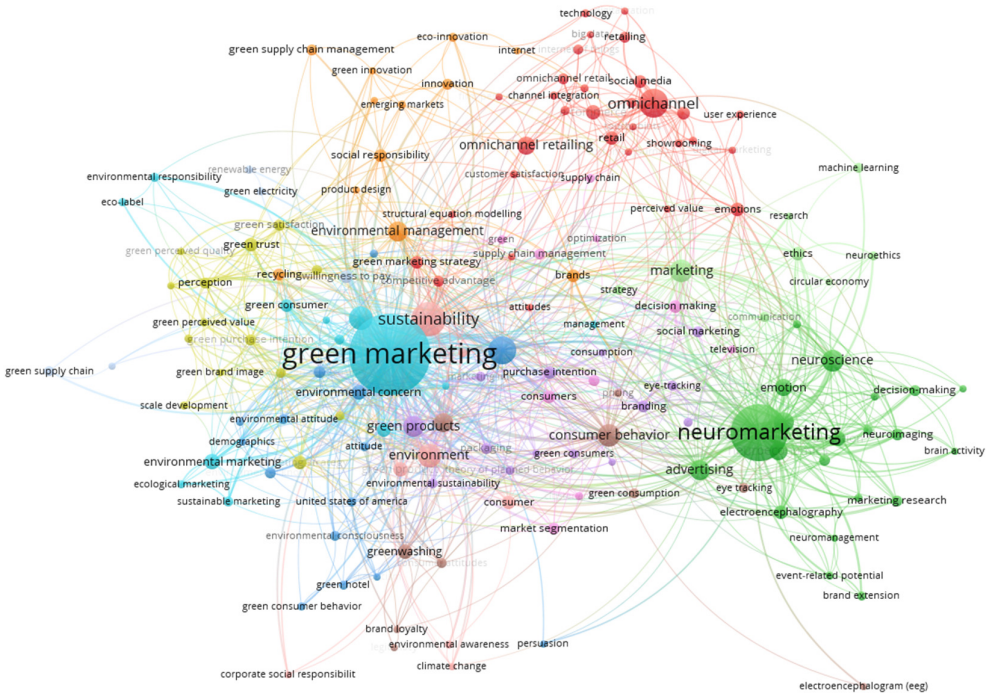

Fig. 4: The results of bibliometric analysis of structural and functional environment of formation and development of the omnichannel theory

Sources: compiled by the authors using the data from Scopus and VOSviewer tool

The figure 5 shows analyzed the cluster which include omnichannel category where also the linked categories are: green marketing, environmental management, neuromarketing, consumer behavior etc. The provided analyses proved the statement about the perspectives of implementation omnichannel strategy for the green goods promotion using the instruments of digital and neuro marketing.

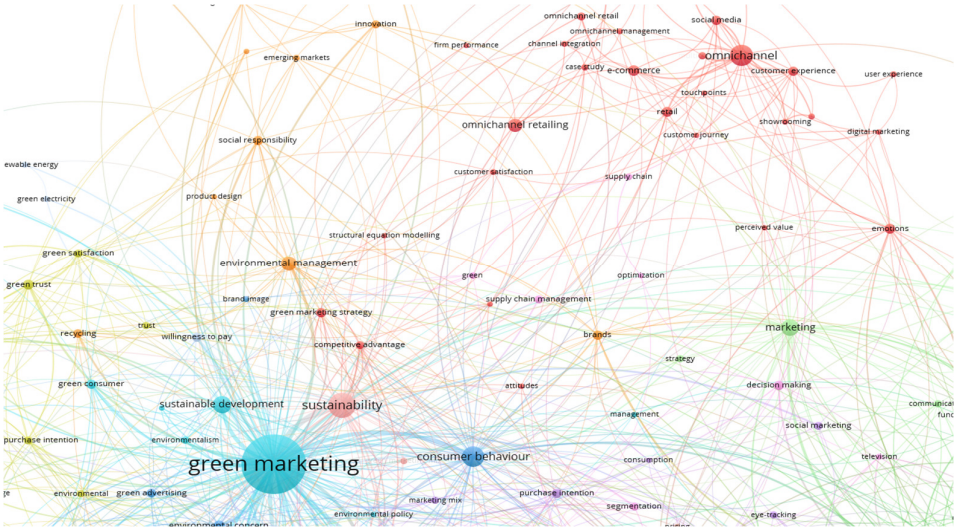

Fig. 5: The results of bibliometric analysis of structural and functional environment of formation and development of the omnichannel theory with close areas

Sources: compiled by the authors using the data from Scopus and VOSviewer tool.

Until recently most of the green companies focused their marketing strategies on green products, their quality and features. In that cases the main target is the promotion of a brand fostering. This general approach remains through the many years at campaign-level mentality and using corresponding basic marketing capabilities. For green products promotion the communication channels are conceived separately, and the environmental marketing strategies could be different according to the consumers used. But in the condition then the scale of green products supply and using are constantly increasing such strategies can lead to confusion for customers about the offer. At the same time nowadays the competition among green companies is high and the possibilities of choice for the customers are continuous multiplied.

The omnichannel strategies redefine a customer experience creating a synergy between consumer and brand. The brand doesn't lose value but follow the needs of customer and communicate with him.

In that case it is important to distinguish the features between multichannel and omnichannel marketing. The multichannel marketing proposes to use various channels with the identic messages that will be reaching as many consumers as possible for brand promotion. In the case of omnichannel marketing the channels can interact between each other when the brand is sending the messages to a consumer across the whole channels.

According to statistics (Omnichannel, 2019), customers who interacted with an omnichannel campaign using three or more channels had higher involvement than those who interacted with the single channel of promotion. In the comparison of the single-channel (where the rate is 5,4%), the omnichannel engagement rate - 18,96%.

Conclusion

The omnichannel strategy in green marketing today can bring the list of the benefits for companies, who provide green production. So, an omnichannel strategies allows businesses to cooperate with consumers through their required ways, increasing involvement and targeting communication. The companies can reach more wide audience because they can procure more consistent message across the whole marketing channels and provide a broad information for the customers. Such strategies make the marketing channels different for consumers and can improve communications for better engagement by the finding the necessary information for buying through a diversified field of channels. Beyond that, the customer-focused approach will be being provided for each consumer. In addition to, any mismatches between information form the store units and from on-line stores could create uncertainty over the process of buying and will turn aside the consumer from making a commitment. In that case multichannel systems equalize such customer expectations and allow companies to fulfill their obligations before the consumer. So, the omnichannel strategies allow companies to have an engagement in market communication processes and be responsible to consumer needs in a timely manner through different marketing channels. The interaction between such channels will give the opportunity for the consumer to finish the communication on one channel and seamless find it on another channel. In that case companies have more information about the customer service the and can use an optimized marketing channel. Integrated multi-channel channels can gather various marketing information and dates about consumers. Such dates help to provide continuous understanding about the customer journey, allowing companies to improve communication processes and identify their inefficiencies at a faster way. As a result, enhanced business practices could result to a higher customer satisfaction and loyalty.

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Managing the Image of An Educational Institution in The Social Media Era

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Abstract

This article presents the use of social media in marketing activities, which aim at creating a positive image of the organization. Social media play an increasingly important role in the contemporary marketing. The attributes of social media predestine them to be used in the process of image creation. They are used in practical areas. Therefore, it does not to be checked or proven that social media should be applied in image management, but rather if social media are used in a diligent and effective manner? Market economy principles apply not only to business organizations but also, increasingly, to other types of organizations, including educational institutions. Similarly to enterprises, educational institutions must also build a positive image of the organization, which will translate to good reputation in the long term. The main purpose of this article is assessing the scale of using social media in the process of managing (creating) the image of educational institutions. In the presented results of empirical studies, the analysed entity was limited to one type of educational institutions – secondary schools. The research has shown that all analyzed schools use social media and the school's website as tools to promote and build their image in the local community, which is undoubtedly a strength. However, low effectiveness of using these tools is the weak point.

Keywords: Image of The Organization, Social Media, Marketing Communication, Educational Institutions, Secondary Schools.

Introduction

The image of an organization is how the stakeholders see it, it is the depiction of the organization in the environment in which it operates (Alvesson, 1990; Chaturvedi and Gupta, 2014). The image may be deliberately and intentionally created by the organization. Image management is a process that requires developing a general concept and an action plan. The image concept should constitute an element of the overall marketing concept, strictly related with other elements.

Social media play an increasingly important role in the contemporary marketing (Kaushik, 2012). The attributes of social media predestine them to be used (in communication with stakeholders) in the process of image creation. Organizational practice demonstrates that they are used in practical areas. Numerous research proves that business organizations attach great importance to social media in conducted marketing activities, which aim at building the organization's image – for example, during a national survey covering 152 enterprises, the management responsible for using the Internet in marketing activities, or for initiating and maintaining the company's relations with customers using new technologies assessed the importance of such activities at 4.36 (the average grade) on a scale from 1 (small importance) to 5 (large importance) (Mazurek-Łopacińska and Sobocińska, 2017, p. 350). Therefore, it does not to be checked or proven that social media should be applied in image management, but rather if social media are used in a diligent and effective manner?

Market economy principles apply not only to business organizations but also, increasingly, to other types of organizations, including educational institutions. Similarly to enterprises, educational institutions must also maintain good relations with their stakeholders (Kazoleas et al., 2001). They have to build a positive image of the organization, which will translate to good reputation in the long term (Alves and Raposo, 2010; Ryńca and Radomska, 2018).

The article consists of two main parts. The first part presents a synthetic description of the process of managing the image of the organization. It describes the basic stages of the process, as well as the methods of creating the organization's image for various groups of stakeholders. The distinguished elements were referred to the process of managing the image of educational institutions. In addition, part one also presents the most important characteristics of social media, which predestine them to manage the image of organizations. Part two presents the results of own research. This article has been prepared for analytical and research purposes. It was drawn up based on an educational approach, with the use of source literature and results of empirical studies.

The main purpose of this article is assessing the scale of using social media in the process of managing (creating) the image of educational institutions. In the presented results of empirical studies, the analysed entity was limited to one type of educational institutions – secondary schools.

The Process of Managing the Organization's Image

The process of managing the organization's image is not an easy task, mainly due to substantial complexity of this phenomenon. The image may be may be different in various groups of the organization's environment. It does not have a static nature, because it changes along with the change of stakeholders' views and tastes. To a large extent, it is shaped regardless of the organization – the entity, to which it refers, and does not always reflect the reality. It may be shaped through quality of products and services, as well as promotional activities. Shaping the image is a long-term, continuous process, which requires a methodical approach (Massey, 2016). The process of managing the organization's image may be divided into the following stages (Schuler, 2004, Świeczak, 2017, p. 91):

1. Defining the goals of building the desirable image of the organization;
2. Defining the main stakeholders of the organization;
3. Analysing the present image of the organization;
4. Defining the determinants of the organization's image;
5. Selecting the instruments for creating the image and channels of communication with stakeholders;
6. Defining the team and persons responsible for executing image-related tasks;
7. Implementing and executing the image management strategy;
8. Supervision over results achieved.

The proposed stages in the image management process allow identifying areas – both in the organization's environment where it is essential to undertake actions to create, strengthen, or change the organization's image, and in the organization itself, where activities significantly affect the organization's image.

The image allows differentiating the organization from the comparison, in the organization-environment relation. An important role in shaping this relation is played by stakeholders, who may affect the organization, or are affected by its activity (Frandsen, 2017). Every organization has its groups of stakeholders, which may include various entities e.g. natural persons, communities, institutions, enterprises, public offices. Individual groups of stakeholders may have stronger or weaker relations with the given organization. The manner of creating the image depends on the power of this relation (Scott and Lane, 2000). Possible methods of creating the organization's image for various groups of stakeholders are presented in figure 1.

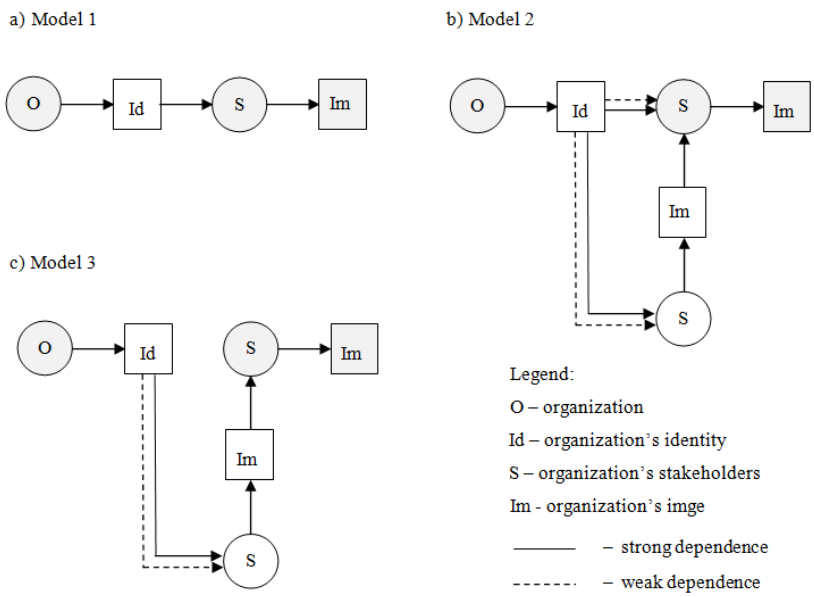

Fig. 1: Methods of creating the organization's image for various groups of stakeholders
Source: own elaboration

In the first model version, the organization's image, developed in the defined group of stakeholders, is created directly on the basis of the organization's identity. The organization has a potentially significant influence on the created image. In the second version, the organization's image is created not only on the basis of the organization's identity but also based on images of other groups of stakeholders, whereas the influencing power of individual factors depends on the power of relations between entities. In the third model version, the organization's image is created only on the basis of images of other groups of stakeholders. This is applied when the organization and stakeholders do not have direct relations. In such event the organization has no possibility to influence the image.

The Image Management Process of Educational Institutions

Execution of the process of managing the image of educational institutions, in particular managing the image of secondary schools is relatively easier than the analogical process carried out in business organizations. In case of educational institutions, the situation is relatively simple in the following stages of the management process:

Stage 1. It is easy to define the main goal of marketing activities – the main goal is to attracting candidates during recruitment.
Stage 2. It is easy to precisely define the most important groups of stakeholders – in the process of building a positive image of the organization, a very important role is played by proper definition of groups of stakeholders, in particular customers. The principal groups of stakeholders of secondary schools are presented in figure 2.
Stage 4. It is relatively easy to define the most important determinants of the image – for this purpose, in its on-going marketing activity the school should expose elements with the most importance for the student, such as: educational offer, teaching level, teaching staff, premises, technical facilities.
Stage 5. The task concerning the selection of tools for image creation is also relatively simple. The portfolio of methods should definitely include social media. There is no need to conduct own research to realize that all youth in a secondary school uses and is present in various social media on

a mass scale – they create own communities. In effect, it is relatively easy to define the profile of the customer – student.

Stage 6. It is relatively easy to define the persons engaged in image-related activities – they should include not only school principals, but also all teachers since they are in direct contact with the most important school stakeholders – the students.

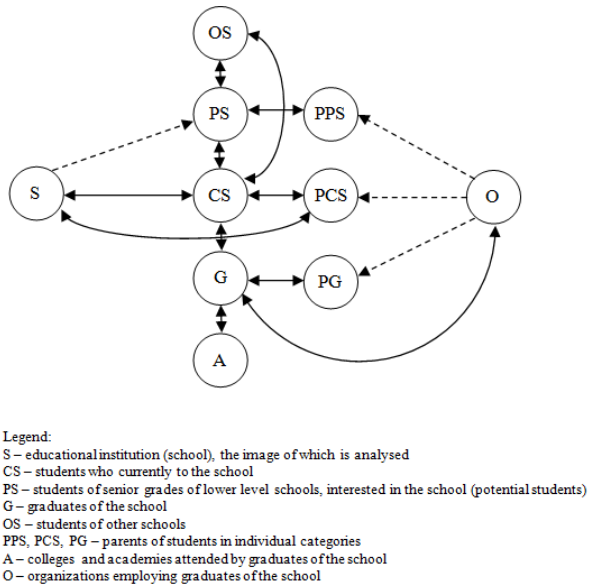

Fig. 2: Principal groups of stakeholders of the secondary school
Source: own elaboration

Schools have strongest connections with own students and their parents, whereas this is a direct dependency. This group of stakeholders may be influenced by the school to the largest extent – variant 'a' of the image creation model. In turn, the group of stakeholders, which receives the school's largest attention, are potential students – graduates of lower level schools. To continue operation, schools must attract these stakeholders. The image amongst this group of stakeholders is most important for the school and relations with this group are weak – variant 'b' of the image creation model. Schools should therefore pay special attention to stakeholders, with whom potential students have best contact. This means current students at the school, in particular from junior classes, who only last year attended the lower level school with the younger potential candidates. This means that schools should make their own students the image ambassadors, because such action may be most effective. However, other groups of stakeholders should not be completely ignored, because they may also influence the school's image and its reputation to a larger or smaller degree.

Although the process of managing the image of educational institutions, in particular secondary schools, is relatively easier than an analogical process carried out in business organizations, this does not mean that image management in these institutions is conducted effectively. The difficulty in managing the image of secondary schools results from a flat organizational structure. A school is managed by a principal, usually assisted by one or two deputies. Other employees are subject teachers and administration staff. The main burden on management is on the school principal, who must create appropriate organizational, personnel and economic conditions for effective and efficient performance of educational activities in the school (Komorowski, 2009, p. 10). Execution of these tasks requires a wide range of competencies - both conceptual, social as well as professional – in various management areas, mainly in regard to educational processes, human resources, finance and marketing, both at the strategic and operational level (Gawrecki, 2003, p. 120). Therefore, the role of

the school principal should be fulfilled by a top class manager. And here is the problem – such managers are completely not at interested in working in a school for financial reasons. A school will never offer salaries comparable with large companies. It is a general educational practice – in the Polish reality – to employ school teachers as principals. An advantage of this solution is a very good knowledge of the specificity of the managed organization, and a disadvantage is a lack of numerous management skills.

The competency gap of school principals usually covers also the area of image management, in particular with the use of new technologies. This issue is not easy to solve. Personnel restrictions pose a barrier. A school cannot afford to hire a marketing specialist, who would also be responsible for image management. The principal is often supported by teachers. However, this is usually an *ad hoc* support. In the area of image management with the use of social media, relevant tasks are usually outsourced to IT teachers. However, they also lack required competencies.

Execution of tasks related with using social media in the organization's practice requires defined competencies – both organizational and individual. Source literature mentions publications, where competencies of so-called social media specialists are defined (Moretti and Tuan, 2014; Cao and Poorani, 2015). This specialist should have the following competencies:

- Knowledge of various types of social media,
- Ability to effectively mover around social media, combined with content analysis,
- Ability to create multimedia communication,
- Ability to design campaigns in interactive media,
- Ability to generate traffic in social media,
- Ability to monitor undertaken activities,
- Ability to strengthen the image of the organization.

The above skills cover technical, media, communication, social, and marketing competencies. This is also reflected on the job market. Many organizations are seeking specialists in this area.

Knowledge of school principals on competencies desired in the image management area will surely contribute to reducing the competency gap and increasing the effectiveness of this process.

Why are Social Media Predestined to Manage the Organization's Image?

Social media comprise a developed set of communication tools, based on Internet applications and mobile technologies, which constitute a breakthrough in the area of interpersonal communication (Bingham and Conner, 2010, p. 6). The methods of communication between people have changed radically and, going beyond hitherto social communication, have transformed it into an interactive dialogue. The basic characteristics of social media, which differentiate them from traditional media, include (Heinonen, 2011; Laroche et al., 2012; Fill and Turnbull, 2016, p. 605):

- Large potential to trigger activity of users, which means that content published in the network about e.g. a particular organization are generated not only by this organization but also its stakeholders. This means that how the organization is perceived depends not only on the organization but also on its environment.
- Ability to direct the message to a wide group of recipients, as well as a narrow group of recipients, or a defined addressee.
- High speed of information transfer – social media constitute an environment where an immediate reaction of users is possible.
- A lot of types of social media, followed by substantial abilities to satisfy very different needs of users.

The specific ownership of social media translates to their usability. SM are increasingly used in organizations mainly for the purpose of marketing communication, both in relations with advertising

as well as connected with public relations (Mangold and Faulds, 2009). The effectiveness of using social media in marketing/ public relations activities depends on the adopted strategy of conducted marketing activities. There are several concepts of a marketing-mix, whereas the most popular and frequently use in business are the following concepts: 4P, 4C and 7P. It seems that the most predestined concept in the area of use of social media is the 4C formula, since it concentrates on the client's point of view and perspective, and not on the organization. Conducting activities consistent with the 4C formula requires (Kietzmann et al., 2011, pp. 241-251):

- Recognizing and understanding the mechanisms of social media functioning (cognise);
- Building a strategy on the application of social media in marketing communication – social media, which allow executing assumed goals should be selected (congruity);
- Defining the policy and rules of listening to the dialogue of customers in social media, and appointing responsible persons (curate);
- Monitoring information in social media about the given organization (chase).

Assessment of the Scale of Using Social Media in the Process of Managing (Creating) the Image by Educational Institutions – Research Results

Research Method

The main goal of the conducted empirical studies is to prepare a model approach to effective management of the image of educational institutions[i]. Three principal research questions are asked in relations to the main goal, in order to facilitate achieving this goal:

1. Is the potential of social media in the management of the image of educational institutions used in an effective manner?
2. What are the main reasons of ineffective use of social media in managing the image of educational institutions?
3. How to manage the image of educational institutions using social media, so that the process of creating the image was effective?

Responses to such questions were sought in a survey addressed to defined groups of respondents. Research was conducted in the years 2015-2019. In search for the answer to the research question in empirical studies, emphasis was placed on those elements of the process of shaping the image, which depend on the organization and which should be combined with the use of social media. Three sub-processes were analysed:

1. Building of organization's identity,
2. Communicating the organization's identity to stakeholders,
3. Obtaining feedback from stakeholders on the current image of the organization.

Within each sub-process, attempts were made to define and assess activities undertaken by analysed schools in the image building process with the use of social media.

This article presents results of research, which allowed obtaining a partial answer to the first research question. The main goal of this article is to assess the scale of use of social media in the process of managing (creating) the image of educational institutions. Educational institutions are divided into schools and educational facilities. Schools are in the definitive majority. Due to the substantial differentiation of types of schools (every educational level has its specificity) it was adopted that the subject of the research will cover secondary schools.

Empirical research was conducted on two principal research populations. The first population comprised employees of secondary schools (principals, vice-principals, teachers), and the second one – main stakeholders – students and their parents. Schools were located in Poland in the Łódzkie voivodeship. 201 employees participated in the research, including three principals, five vice-principals and one hundred and ninety three teachers from thirteen secondary schools, as well as 1465

students from these schools and 467 parents of students. Research was conducted in 13 schools – in schools where principals agreed to conduct this research. In every school the study population included both school staff as well as current students and their parents.

Research Results: Employee's Perspective

Currently schools undertake promotions in the local environment (96% of respondents). In their marketing activities, they use various methods and techniques. Most frequently used promotion methods include: so-called open doors (95% of respondents), the school's website (89% of respondents), participation in educational fairs (65% of respondents), information placed in social media (60% of respondents), local media i.e. press, television, radio (55% of respondents) – figure 3. Social media and traditional media are mainly used by schools to inform about their successes, executed projects and school events. Sharing photographs and films as well as discussion forums were stated as the most useful functions of social media, which the school may use in its promotional activities (70% and 52% of respondents, respectively). In the opinion of the staff, currently undertaken promotional activities are effective (95 % of respondents).

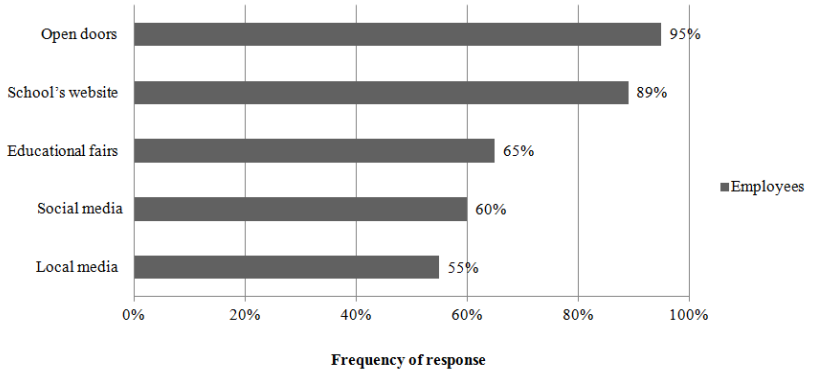

Fig. 3: Promotion methods used by schools according to employees' opinions
Source: own elaboration

All analyzed secondary schools are already using social media, but the level of this use varies. All schools have accounts on at least one social media portal, and most – on at least two social media portals. The post popular social media service amongst secondary schools is Facebook – all schools use it. You Tube is also very popular. Other social media such as Messenger, Instagram or Snapchat are used much less. It seems that schools still do not appreciate these applications, while they should. They have huge potential due to very big popularity amongst young people. In general, social media are seen as a good communication channel between the school and its stakeholders, in particular students and their parents (92% of respondents). The effectiveness of promotional activities carried out using social media is also deemed as high (87 % of respondents).

Research Results: Main Stakeholders' Perspective

The use of social media in the process of building the school's image is highly justified. At the moment, students have an almost unlimited access to the Internet (89% of respondents), which they mainly use in their natural environment – at home (95% of respondents) and in school (48% of respondents)[ii]. More or less, almost all students use social media – they have an account in at least one portal and use it daily (98% of respondents). Social media are most frequently used in the following areas:

- education – expanding knowledge required in school, expanding knowledge within one's own interests, hobbies, doing homework, preparing for tests, searching other information, learning via the Internet, e-learning courses, reading blogs;

- communication – using social media, using email, viewing forums and participating in discussions on forums, contacting friends;
- entertainment – listening to music, watching movies, playing games;
- e-shopping – using Internet stores.

Within the scope of activity in social media, many students also share their opinions on Internet forums and blogs, and comment on posted content (44% of respondents).

Students are already aware that schools started to compete for them (96% of respondents). Most information on a given school reaches its stakeholders mainly through the school's website (61% of respondents), open days (54% of respondents), social media (49% of respondents) as well as local media (32% of respondents). Whereas the most effective promotion methods applied by schools are recognized as: open doors (53% of respondents), the school's website (45% of respondents) an social media (22% of respondents).

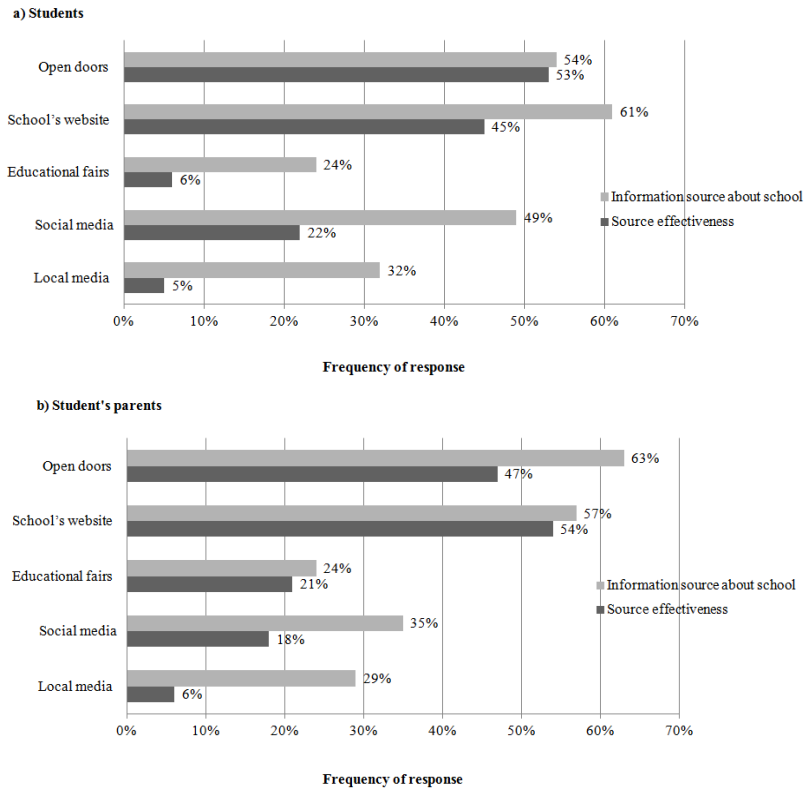

Fig. 4: Promotion methods used by schools according to main stakeholders' opinions
Source: own elaboration

The data presented allows for two principal conclusions: 1) digital communication tools are also included in the portfolio of methods of promotion applied by schools; 2) schools do not fully use the potential of applied methods, in particular digital tools. This mostly visible in the case of social media. Less than half of respondents who receive information about the school via social media see this as an effective form of promotion. In general, promotional activity of schools is positively assessed by their main stakeholders, meaning both students and their parents (82% and 70% of respondents, respectively). The above data should definitely be of interest to schools.

Discussion and Conclusions

All organizations must be aware that the Internet is currently the one media where promotional activities must be concentrated in the coming years. The significance of the Internet in promotional activities is continuously growing at the cost of traditional media. Traditional forms of advertising are more and more often replaced by more specialised and better addressed digital tools, which allow reaching selected groups of clients with more customized information in the form of an interactive multimedia dialogue. The following portals are most frequently used by organizations:

Facebook, Google+, LinkedIn, Twitter, YouTube, Instagram, Snapchat and blogs. Usability of social media in organizations is increasing systematically. This concerns all types of organizations, including educational institutions. This is confirmed by numerous publications e.g. examples of good practices in using social media in higher schools presented in: Lavrusik (2009), Rosmala and Rosmala (2012), Tess (2013). This phenomenon is treated as a trend, which started to be referred to as social media marketing.

In the client's market era, the need to care for the image becomes an axiom. This concerns not only businesses but also public and social organizations, including educational institutions. Caring for the image and building it consciously is becoming a general practice in schools. The image also forms a significant element of the school's strategy, shapes its diversity, distinguishes it amongst the competition, and is decisive in terms of how the school functions and how it is perceived in the local community. The image is one of the most important factors that decide about choosing a particular school.

The activity of stakeholders in social media may be divided into two types: 1) activity in the form of posted comments and opinions about the school, both positive and negative, which has direct effect on the school's image; and 2) activity in the form of expressing interest in content posted by school staff, as well as general topics related with the school, its educational offer and promotional activities, which directly affect the school's image. Both types of activity are significant for the school's functioning. Obtaining information about how stakeholders perceive the school allows conducting an evaluation of activities undertaken by the school and their future modifications. Whereas data concerning the interests of stakeholders give a wider picture and may be used in operational studies, e.g. to detect new trends in the environment.

All analyzed schools use social media and the school's website as tools to promote and build their image in the local community, which is undoubtedly a strength. However, low effectiveness of using these tools is the weak point. The current scale of using social media in schools may be surprising, taking into account the nature of this tool. Actually, for the first time in history organizations may use tools with huge potential, for which they do not have to pay, and which offer unlimited access – a condition to use these tools is access to the Internet. They may also be certain that this tool is used by stakeholders, especially when the main stakeholders are young people.

Discussed studies should be continued on a wider territorial scale. It would also be interesting to check whether the school's location (town/village) and size affect the applied communication tools and their effectiveness. Additionally, it would be interesting to conduct a comparative analysis of the studied phenomenon against analogical studies conducted in other countries. However, these activities would require new empirical studies and broad literature analyses. Due to the volume- and time-related limitations related with this article, this issue should be deemed as a limitation of presented study.

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[i] Research is conducted by a research team managed by Waldemar Jędrzejczyk, the author of this article. The principal study area concerns the issue of competences, both those currently desirable as well as prospective, referring to sectors, kinds and types of organizations, professional groups, and key positions in organizations. In the area of the organization's competences to create the image using social media, the main owner is Marta Konieczna-Kucharska.

[ii] This trend is also confirmed by studies conducted by other research centres and institutions e.g. the NASK national research institute: *Raport z badania. Nastolatki 3.0*, NASK, Warsaw 2017.

Development Factors of Polish Subsidiaries in The United States

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Abstract

The paper presents results of a firm-level survey carried out between 2016 and 2017 among Polish companies who made foreign direct investment in the United States. The purpose of this paper is to identify FDI development determinants among Polish enterprises in the US market as well as to find out about the discrepancies in their perception between representatives of different business sectors i.e. enterprises from traditional and new technologies industries. The results of the study indicate that regardless of the sector, Polish enterprises seek the determinants of development of their subsidiaries in the USA primarily in the internal factors, i.e. unique and sustainable ownership-specific advantages. The ownership advantages – together with external location factors such as the demand, the ease of doing business and the business environment – affect most the development of Polish direct investment companies in the USA. There were significant differences between the assessment made by traditional and new technologies enterprises in relation to resource factors, efficiency factors and the competition in the USA.

Keywords: Foreign Direct Investment, FDI, Development Determinants, Multinational Enterprises, MNES

Introduction

In the era of accelerated internationalization, involving capital abroad in the form of foreign direct investment (FDI) seems to be a natural way leading to an enterprise development. Foreign capital expansion, which until recently had been a privilege available only to corporations originating from highly developed countries, is now becoming a tool that is frequently used also by enterprises from developing countries and by the so-called latecomers in the global economy. While the former ones originate generally from moderate or low-income economies with still modest levels of internationalization, the latter ones represent countries already partially advanced on their way to win the "developed" status (Storper et al, 1998).

In spite of their current status, enterprises from both groups keep aiming at shaping their ways to gain their share of "business success" in international markets. Likewise, Polish companies are continuing to boldly follow this development path. According to the data published in the last World Investment Report (UNCTAD, 2019), by the end of 2018, Polish companies had invested abroad capital in the form of FDI with a value of $28,510 million, which is over 106 times more than at the end of 2000 ($268 million, nominal values). 1838 companies based in Poland held shares/stakes in 3941 entities abroad, which means an increase of almost 38% compared to 2010 (Statistics Poland, 2019). Despite an intensive growth in FDI outward stock, it must be clearly emphasized that most Polish subsidiaries have been located in European countries (NBP, 2018; Statistics Poland, 2019) – which means in a geographically and culturally similar environment. Among the non-European countries attracting Polish capital, the USA is a leading destination. Entering the US market – one of the most advanced and competitive economies in the world – may however be a major challenge for many companies, especially for latecomers in international business. This brings us to a fundamental and potentially interesting research question: what are the development determinants of Polish FDI in the USA?

The aim of the paper is to identify FDI development determinants among Polish enterprises in the US market as well as to find out about the discrepancies in their perception between representatives of different business sectors i.e. enterprises from traditional and new technologies industries.

Literature Review

The internationalization of economic activity is guided by various premises that lead enterprises to undertaking activities focused on foreign expansion. They originate in the enterprise but take into account a broad spectrum of both internal and external factors, which determine the potential, the position and probable chances of a company to succeed in the implementation of planned projects depending on the area of activity, a chosen direction of expansion, its form or the final destination of planned foreign activity (Kuzel, 2018). In this context, these initial internal internationalization premises (motives) are inextricably linked with the factors that encourage choosing a specific place for business development (location determinants). The right combination of these factors maximizes the chances of success in foreign expansion.

Conceptually, the described relation is best explained by the so-called OLI paradigm (Dunning, 1979; 1988). According to the OLI paradigm, three conditions must be satisfied if a company is to engage in overseas operations in the form of FDI: 1) the possession of unique and sustainable ownership-specific "O" advantages (in comparison with other firms in a given market), 2) the presence of superior market benefits (internalization "I" advantages) in exploring the above mentioned advantages directly rather than through an arm's length relationship, and 3) the existence of location "L" advantages in a host country (Dunning and Lundan, 2008). While the "O" advantages and the "I" advantages are firm-specific and represent mainly endogenous factors such as product differentiation ability, marketing, logistics and management skills, trademarks and brand names, access to raw materials, economies of scale, access to capital, technology, patents, etc., the "L" advantages are country-specific and refer to the host country factors exogenous to multinational enterprises (MNEs).

Translating that into the experience of Polish enterprises in the US market, it should first be pointed out that – as far as the authors are aware – there are no papers directly related to the issues discussed in this paper. Hence, to put our considerations into the context of the literature on the subject, the main focus has been on the review of the work on Polish FDI motives and FDI location determinants in the USA.

Quoting J.H. Duning's (2000; Dunning and Lundan, 2008), this basic division of FDI by their main motive of foreign expansion, four main types can be distinguished, i.e. market seeking, resource seeking, efficiency seeking, and strategic asset seeking investment. Research results have demonstrated that in the case of FDI undertaken by Polish enterprises, it is possible to demonstrate virtually all types of investment, although market seeking investment clearly is the dominant group (Götz, 2011; Gorynia et al, 2013; Jaworek, 2013; Kowalewski and Radło, 2014; Trąpczyński, 2015; Kuzel, 2017; Jaworek et al, 2018a). It seems that attributing Polish FDI mainly to market motives should be confirmed by the assessment of market-related factors as one of the most important factors for the operation of foreign subsidiaries in the United States. Therefore, the first hypothesis states that:

Hypothesis 1: Irrespective of an enterprise's business sector, i.e. enterprises from traditional or new technologies industries, market factors (especially those related to market demand) were the most important factors for Polish direct investors who had entered the US market.

It seems that the multitude of determinants not only justifies, but even requires analysing them in groups, so that they can be subjected to a more comprehensive assessment and comparison. In this paper has adopted the division proposed by J.H. Dunning (2006; Dunning and Lundan, 2008), who distinguishes between three broad groups of host country FDI determinants. The first group is made up of institutional and legal factors including for example taxation and trade policies. The next group constitutes economic determinants that can be divided into market, resource, efficiency and strategic asset-related investment. The last group is made up of business facilitation factors that lie within the competence of host countries (Jaworek et al, 2018b).

Analysing various papers on FDI location determinants in the USA, it can be seen that the majority of them consider economic factors to be the most important (table 1), and among them those related to the market, i.e. the extremely large US market, the search for new markets, and the need to be close to customers (Sokoya and Tillery, 1992) or in more general terms, the "market potential" (Ajami and Ricks, 1981; Friedman et al, 1992; Zitta and Powers, 2003; Ekanayake and Kornecki, 2011; Underwood, 2012). The factors identified in the group of economic determinants were also related to: the quality of the labour force along with the efforts by the local authorities to improve it (Axarloglou, 2004; 2005; Zitta and Powers, 2003; Ekanayake and Kornecki, 2011; Underwood, 2012), manufacturing wage rate and transportation infrastructure (Friedman et al, 1992), and minimizing transaction costs by the choice of site and investment size (Solocha et al, 1990). Factors from the other two groups – institutional and legal framework, and business facilitation (table 1) – appeared much less frequently in the quoted papers.

Table 1: Summary of literature on FDI location determinants in the United States

Determinants (groups)	Author(s) / year
Institutional and legal framework	Tallman, 1988; Chernotsky, 1991; Hines, Jr., 1996; Coughlin and Segev, 2000; Zitta and Powers, 2003; Wijeweera et al, 2007; Globerman and Shapiro, 2009; Ekanayake and Kornecki, 2011
Economic determinants (market, resource, efficiency, and strategic asset-related investment)	Ajami and Ricks, 1981; Chernotsky, 1987; Solocha et al,, 1990; Kogut and Chang, 1991; Sokoya and Tillery, 1992; Friedman et al, 1992; Grosse and Trevino, 1996; Ulgado, 1996; Coughlin and Segev, 2000; Zitta and Powers, 2003; Axarloglou, 2004; Axarloglou, 2005; Ekanayake and Kornecki, 2011; Underwood, 2012
Business facilitation	Head et al, 1995; Coughlin and Segev, 2000; Axarloglou, 2004; Halvorsen, 2012

Source: compiled by the authors.

In this text, the focus is on companies already present in the United States and on the recognition of their development determinants, referring to both internal factors of an enterprise, as well as location determinants. We also take into account the potential importance of enterprise diversity in terms of their resources as well as their perception of external factors. That is why the second research hypothesis takes the following form:

Hypothesis 2: The importance of FDI development determinants has varied depending on the business sector of analysed enterprises, i.e. enterprises from traditional and new technologies industries.

Methodology

The results presented in this paper come from a survey conducted between 2016 and 2017. It covered Polish enterprises which had undertaken direct investment in the United States. The database was created based on own insightful knowledge of the Polish Embassy in Washington and on public information. It contained a list of 82 Polish investors, who had created a total of 92 direct investment entities in the USA. 19 questionnaires were filled out correctly, which meant a return rate of 25%.

Taking into account the specific nature of the respondents, the results were not only presented in relation to the whole population, but also taking into account the singularities of the surveyed entities, splitting them into two groups, namely enterprises doing business in the area of new technologies and entities operating in traditional industries. The first group comprised entities doing business within two different sections: "Information and Communication" and "Professional, Scientific and Technical

activities". The second group included entities operating in the following sections: "Mining and Quarrying", "Industrial Processing" and "Wholesale and Retail Trade; Motor Vehicle Repair". The share of the respondents in each group was 63.2% and 36.8% respectively.

The questions in the research questionnaire regarding the individual factors' impact on the development of Polish direct investment companies in the USA were closed-ended questions. The respondents determined the impact of individual factors using a seven-point scale with a range from -3 to +3, where: -3 meant a strong negative impact, -2 – a negative impact, -1 – a slightly negative impact, 0 – no impact (neutral factor), +1 – a slightly positive impact, +2 – a positive impact, and +3 – a strong positive impact. The impact strength of individual variables was determined using a weighted arithmetic mean, hereinafter referred to as the impact indicator (i). The level of an index value determined the position of individual indicators in the value hierarchy.

Research Results

The respondents assessed a total of 40 potential development determinants, which were divided into two main groups. First of all, the determinants in the form their resources, the so-called internal factors – i.e. unique and sustainable ownership-specific advantages – and external location factors, i.e. country factors exogenous to the analysed enterprises. The first group of factors was assigned to four sets: production/services, marketing, organization and management as well as finance. Most of these factors were resources contributed by parent companies to their subsidiaries, including the factors falling under the category of the so-called ownership advantages related to non-classic production factors. The location factors were divided according to the J.H. Dunning's classification into three groups: institutional and legal framework, economic determinants and business facilitation (table 2).

Having analysed the results of the entire population, the factor that had the greatest impact on the development of the subsidiaries in the USA was market demand (1st place with an impact ratio i=2.44). Despite the fact that respondents ranked external factor of location as first, their indications reflected their tendency to see the determinants of their development within their own organization. Out of the 15 factors that positively influenced the development of direct investment enterprises in the USA, as many as 10 belonged to factors in the form of these companies' internal resources: leadership (2nd place, i=2.00), organization of production/service processes and product/service innovation (3rd place, i=1.88), applied technologies (4th place, i=1.88), organizational culture (6th place, i=1.74), management team competences (7th place, i=1.68), product quality, employee qualifications and management team commitment (9th place, i=1.50) as well as company financial capital (11th place, i=1.44). Factors related to the ease of doing business in the USA (5th place, i=1.79) and the business environment (8th place, i=1.65) were also ranked high. This proves that the development of subsidiaries is largely determined by the ownership advantages of the surveyed enterprises, including the possession of innovative products and services that, together with favourable location determinants, affect the success of an enterprise in foreign markets.

Analysing the responses in these two groups, it must be pointed out that the results differed slightly. The determinant related to the demand on the US market had the biggest and definitely the most positive impact on the development of Polish new technology enterprises (i=2.82). These companies also indicated that applied technologies had a strong positive impact on their development (2nd place, i=2.25). Among the 14 factors that positively influenced the development of enterprises from new technologies industries, there were as many as 10 determinants in the form of the internal potential of these enterprises, including product/service innovation (3rd place, i=2.09); organization of production processes and employee qualifications (4th place, i=2.00), leadership (6th place, i=1.83), product/service quality (7th place, i=1.82), organizational culture (8th place; i=1.67), management team commitment (9th place, i=1.64), management team competences (10th place, i=1.58), company image (12th, i=1.33) and company financial capital (13th place, i=1.30). These results may indicate that investments in the USA made by entities with specific high-quality products and services, which result from the application of the right technologies, the work of qualified employees and competent management of the discussed investments by a committed management teams. This, together with the

large size of the American market, the ease of doing business there (5th place, i=1.92) and a favourable business environment (7th place, i=1.82), impacts a company's success.

Companies from traditional industries also ranked high the impact of internal factors on the development of their enterprises in the USA. Among the 13 determinants exerting a strong positive or positive impact on that development, they indicated as many as 7 internal factors. Enterprises from this group ranked leadership first (i=2.29) as a factor with a strong positive impact. Three other factors, including market demand in the USA, management team competencies and organizational culture (i=1.86), ranked second. Similarly to the group of technologically advanced enterprises, respondents from traditional industries also recognized the positive impact of the organization of production processes (3rd place, i=1.71), product/service innovation (5th place, i=1.57) and applied technologies (6th place; i=1.50) on the development of their enterprises. In their opinion, a company's financial capital was also important (4th place, i=1.67). The enterprises stressed, similarly to the previous group, the importance of the factor related to the ease of doing business (5th place, i=1.57). It is worth mentioning that in contrast to the previous group of companies, the following external resource factors proved to be important for traditional enterprises: factors related to the ability to supply natural resources, materials and semi-finished products, energy resources (3rd place, i=1.71) and factors related to the ability to supply new technologies, management systems and other new intangible assets (6th place, i=1.50). It can be argued that apart from market determinants, these entities were also guided by resource motives when making those decisions. These companies ranked factors such as employee qualifications and product/service quality slightly lower than those from the new technologies industries attributing to them only a slightly positive impact on their development.

Other factors in both groups of enterprises were ranked lower, meaning that they had a slight positive impact, no impact at all or even a negative impact.

Table 2: Development determinants of Polish enterprises in the United States (survey results)

DEVELOPMENT DETERMINANTS	Enterprises					
	New technologies		Traditional industries		Total	
	Index	Pos.	Index	Pos.	Index	Pos.
A. FACTORS INSIDE AN ENTERPRISE						
I. PRODUCTION/SERVICES						
applied technologies	2.25	2	1.50	6	1.88	4
organization of production/service processes	2.00	4	1.71	3	1.89	3
product/service quality	1.82	7	1.00	10	1.50	9
product/service innovation	2.09	3	1.57	5	1.89	3
employee qualifications	2.00	4	0.71	13	1.50	9
employee attitudes	0.82	22	0.71	13	0.78	20
up-to-date equipment	1.09	17	1.14	9	1.11	14
II. MARKETING						
marketing activity	0.92	20	0.83	12	0.89	19
qualifications of employees employed in marketing	1.00	19	0.86	11	0.95	17
company image	1.33	12	1.14	9	1.26	13
III. ORGANIZATION AND MANAGEMENT						
management team competences	1.58	10	1.86	2	1.68	7
leadership	1.83	6	2.29	1	2.00	2
organization culture	1.67	8	1.86	2	1.74	6
management team commitment	1.64	9	1.29	8	1.50	9
IV. FINANCE						

company financial capital		1.30	13	1.67	4	1.44	11
finance team qualifications		0.45	26	0.14	20	0.33	27
B.FDI LOCATION DETERMINANTS							
I.AN INSTITUTIONAL AND LEGAL FRAMEWORK IN THE USA							
the tax system		0.33	29	-0.57	22	0.00	30
regulatory stability		0.75	23	1.29	8	0.95	17
customs policy		-0.25	34	-0.14	20	-0.21	33
labour law		-0.17	31	0.57	16	0.11	29
a business registration process		1.25	14	1.71	3	1.42	12
II. ECONOMIC DETERMINANTS							
market-related	US market demand	2.82	1	1.86	2	2.44	1
	competition in the USA	1.08	18	-0.71	23	0.56	25
	demand on foreign market(s)	1.83	6	0.60	15	1.47	10
	competition on foreign market(s)	1.17	15	-0.20	21	0.76	21
efficiency-related	labour costs	-0.25	34	-1.14	24	-0.58	34
	cost of natural resources, materials and semi-products, energy resources	-0.20	33	0.57	17	0.12	28
resources-related	availability of external capital (venture capital, private equity, business angels)	1.50	11	0.17	19	1.06	15
	credit and loan availability	-0.18	32	0.17	19	-0.06	31
	availability of staff with the right qualifications	1.08	18	0.57	16	0.89	19
	ability to supply natural resources, materials and semi-products, energy resources	0.00	30	1.71	3	0.75	22
	ability to supply new technologies, management systems and other new intangible assets	0.55	25	1.57	5	0.94	17
III. BUSINESS FACILITATION							
supplier network		0.40	28	1.14	9	0.71	23
customer network		1.10	16	0.71	13	0.94	18
network connections within clusters		0.60	24	0.67	14	0.63	24
business environment		1.82	7	1.33	7	1.65	8
trade union activity		0.00	30	-0.71	23	-0.28	33
ease of doing business		1.92	5	1.57	5	1.79	5
specialized marketing consulting		0.91	21	1.14	9	1.00	16
specialized financial consulting		0.45	27	0.29	18	0.39	26

Guidance notes: Pos. – factor position; i – impact indicator taking the value from -3 to 3.
Source: own study based on survey results.

Based on the analysis of the responses, it can be concluded that they were largely convergent. However, significant differences have emerged in relation to some factors. Two of them were the assessment of competition in the USA and other foreign markets. Traditional enterprises perceived these factors to be hampering or without any impact on their development (i=-0.71 and i=-0.20 respectively), while new technology entities treat competition as a development factor (i=1.08 and i=1.17 respectively). The philosophy of competition perception can explain such assessment. New technology entities often use competition to improve their standard of services and better reach their customers. Strong

competition forces them to grow constantly, means avoiding stagnation and often inspires them to take action.

Other significant differences were noted in the assessment of resource factors. For traditional entities, an important development factor was the ability to supply both classic production factors (i=1.71) as well as those related to new technologies, management systems and intangible assets (i=1.57). Surprising is the fact that new technologies enterprises rated these factors much lower (i=0.00 and i=0.55 respectively).

Another significant difference in the assessment of development factors was related to the availability of external capital (venture capital, private equity, business angels). Both new technologies and traditional enterprises recognized that it is a factor which impacts their development, but the impact was believed to be insignificant for the latter group. This fact can be explained by the very nature of this type of financing. As a rule, venture capital funds and business angels finance new technologies companies with an innovative product and the American market is considered to be one of the largest markets of high risk investors.

Ranking the market factor very high, i.e. a market demand in the USA, in both groups of enterprises, proves that the expectations of enterprises in regards to foreign expansion expressed in the motives that affect investor's decisions contribute the most to the development of their subsidiaries, and consequently the entire company. Therefore, there is no reason to reject the hypothesis which says that regardless of the enterprise type, the market factor related to market demand was the most important development determinant of Polish enterprises in the USA.

In addition, the differences in the assessment of resource factors, efficiency factors and the competition in the USA indicated by traditional and new technologies enterprises, demonstrate that there are grounds for accepting the hypothesis which says that the importance of FDI development determinants varied depending on the sector of the analysed companies, i.e. enterprises from traditional and new technologies industries.

Conclusions

The experience of Polish enterprises investing in the USA is intrinsically interesting as it describes latecomers in the global economy conquering one of the most demanding markets in the world. Apart from companies following the traditional path of internationalization, for which the USA are the next stage on their path towards international expansion, the paper focuses on enterprises from the sector of new technologies with relatively little experience in international business.

The results of the study indicate that regardless of the sector, Polish enterprises seek the determinants of development of their subsidiaries in the USA primarily in the internal factors, i.e. unique and sustainable ownership-specific advantages, such as for example leadership, product and service innovation or applied technologies. These ownership advantages – together with external location factors such as the demand in the USA (ranked as the major development determinant), the ease of doing business and the business environment – affect most the development of Polish FDI there.

The research results also found that there were the differences in the assessment of competition in the USA and in foreign markets. New technologies enterprises perceived these factors as stimulating, while traditional companies indicated that the factors had no impact or even inhibited their development. The differences were also noted in the assessment of resource factors. For traditional entities, the ability to supply both classic production factors as well as those related to new technologies, management systems and intangible assets was an important development factor. New technologies enterprises, however, rated these factors much lower. While classic production factors, such as natural resources, semi-finished products and energy resources, are not sought after by new technology companies, ranking low the ability to supply new technologies may come as a surprise. This can be explained by the surveyed enterprises' resources: without valuable intangible assets, having own technology or even an idea for a new product, undertaking operations in the USA seems to be an irrational step.

This study has contributed to the understanding of FDI development determinants among Polish enterprises in the US market. While no significant differences between the two groups were identified in relation to enterprise internal factors, there were some important differences in the assessment of FDI location determinants depending on the business sector analysed. The study has also presented the problem from the perspective of investors from Central and Eastern Europe, who have not received a lot of attention from empirical researchers in the past decades. Moreover, the study has focused on firm-level survey studies, which makes it unique and gives it a significant cognitive value making it an important contribution to the existing literature.

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Opportunities and Limitations of Energy Efficiency in Companies in The European Union

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Abstract

Achievement of energy efficiency is a major challenge due to the complexity and size of customers, including national, regional, and local authorities, households, and industry. The energy savings shown so far in individual countries are usually smaller than declared. The problem is aggravated by the continuous technological progress, social development, and population growth. The goal of energy saving remains in opposition to the growing demand for products and services. Therefore, EU energy efficiency regulations may not fully address the existing dilemmas for many market players, including primarily for private companies. On the one hand, the objective of those entities is to meet the needs of consumers, and on the other hand, they should focus on reducing energy consumption. Consequently, a research problem has been identified concerning the possibilities of increasing energy savings in companies and trade associations operating within the European Union. All raw data used for the study comes from a data set that was developed for consultation of the EED Directive by the European Commission. The purpose of study is indicate the attitude of companies operating in the European Union towards energy efficiency regulations.

Keywords: Energy Saving, Energy Efficiency, Business Operations

Introduction

Energy is an important resource for any developing economy and its low price and sufficient availability are even more important. In the light of climate and economic change, energy resources are becoming increasingly important, both globally and nationally, for economic growth, sustainable development, and social well-being. Energy is used by national and local authorities, households, and, most importantly, industry. The role of energy is particularly noticeable in manufacturing processes that can have a negative impact on the environment. External regulations and related environmental goals mean that reduction of energy consumption requires dynamic and effective corrective actions. Effective use of energy is therefore becoming one of the biggest economic and climate challenges.

Energy efficiency is also a strategic priority for the European Union's energy and climate policy. A proper energy policy is a prerequisite for sustainable development. Technological and demographic developments limit the available energy resources and force us to take measures to ensure energy security. Both the way energy is obtained and the way it is used are important. The area of production of goods and services requires a special focus on both energy sources and the level of its consumption due to the high level of energy consumption in the operations of production companies. Effective implementation of an energy efficiency policy is a major challenge for them. High investment costs, lack of experience, access to finance, and reluctance to change must be overcome. On the other hand, only some companies are required to carry out energy audits to verify their achievement of energy efficiency. Organizational and financial constraints effectively inhibit the level of energy savings in

companies therefore, formal and accessible solutions are needed to support and facilitate energy efficiency in manufacturing and service activities.

The effectiveness of available regulations in the field of energy saving in operations of businesses is a research problem of the article, where purpose is to identify and assess the attitudes of enterprises operating in the European Union towards regulations on achieving energy efficiency. The content of paper divided into sections. Section 1 describes the theoretical basis of the problem and identifies the EU documents that underpin the achievement of energy efficiency in the EU. Section 2 covers empirical research aimed to identify the attitudes of companies to energy efficiency regulations. Section 3 summarizes the results of the study and the conclusions drawn.

Theoretical framework of the problem

The concept of energy efficiency

As a result of economic growth, global energy consumption is growing out of proportion to the size of the population (Cruz-Lovera C. et al., 2017; Manzano-Agugliaro F. et al., 2015). According to a report by the International Energy Agency, global energy consumption increased by 92% between 1971 and 2014 (International Energy Agency, 2016). This results in a lower availability of energy for all types of consumers, including enterprises (Kumaraswamy S. and George S., 2019).

There are many definitions of and approaches to energy efficiency in the literature. Ganda F. and Ngwakwe C. (2014) believe that these technologies and strategies solve problems related to energy consumption and the associated costs and environmental impacts. Patterson M. (1996) supplements the fact that energy efficiency makes it possible to produce the same product or service with reduced energy consumption. Cui Q. et al. (2014) define this concept as a determination of performance based on a comparison of the energy input and output or as a comparison of the energy input to the energy production and expressing it in monetary value (Galvin R., 2014, Mikita M. et al., 2017). As defined by Erbach G. (2015), energy efficiency means the level of energy consumption for production purposes and is usually expressed, as a percentage, as the amount of mechanical energy produced by a given energy source. According to Salvia A. L. and Schneider L. L. (2019), "energy efficiency refers to a group of practices to improve the use of energy sources, reaching the same results - or even better ones - with lower energy consumption."

An improvement in energy efficiency consists primarily in reducing the resources needed for energy production and at the same time reducing carbon dioxide emissions. It is also related to the reduction of consumption of non-renewable energy sources and alleviation of energy poverty in the society (Ganda F. and Ngwakwe C.C., 2014).

Energy efficiency is an important part of the strategy for combating climate change and also serves to improve energy security and to optimize energy resources. It consists in using less energy to produce the same or improved product, service, or process (Science for Environment Policy, 2015; Allouhi A. et al., 2015). On the other hand, efficiency of energy sources enables production of an identical or better product or service using reduced energy resources (Dahlstrom K. and Ekins P., 2005).

The objective of energy efficiency is to generate benefits while saving energy by (Erbach G., 2015):

- off-peak energy use by different entities;
- use of renewable energy sources; and
- application of solutions that limit energy consumption.

Pursuit of energy efficiency should constitute the foundation for actions for sustainable development. Rational use of available energy sources and minimization of damage to people and the environment force maximum use of energy while minimizing its consumption (Kot and Ślusarczyk, 2013).

Improvement of energy efficiency leads to reduced environmental pollution and improved competitiveness of national economies.

Energy Efficiency Regulations

Improvement of energy efficiency is an important part of national and international environmental strategies, mainly involving reduction of greenhouse gas emissions. Effective achievement of environmental objectives requires the use of simple and understandable tools (Medina A. et al., 2016). Governments and non-governmental organizations (NGOs) focus on improving energy efficiency by improving access to renewable energy and combating climate change (Ürge-Vorsatz D. and Metz B., 2009). On the other hand, regulations on strategies to reduce energy consumption and carbon dioxide emissions adopted by European countries are based on an energy efficiency certificate that has been devised. The energy policy adopted in 2007 under the "Horizon 2020" program sets energy efficiency targets to be met by the end of 2020, including energy savings of 20% compared to 2005, an increase in the use of renewable energy of at least 20% of total energy consumption, and a 20% reduction in greenhouse gas emissions compared to 1990 (Energy Policy, 2018). The energy efficiency improvement target to be achieved by 2020 assumed 1.5% energy savings annually. In the period of 2007-2017, primary energy consumption decreased on average by over 2% per year (Peryt S. et al., 2019). The fastest rate of energy efficiency improvement was recorded in industry. Each member state set its own energy efficiency targets and had to take its own actions and put in place additional measures to achieve this objective.

Energy efficiency is important for environmental protection and is linked to the ETS Directive (2009/29/EC) on limits of greenhouse gas emission from electricity and industry. The need to comply with emission quotas set forth in external regulations may motivate companies for investments in energy efficiency, especially when they can significantly reduce pollution levels.

The Energy Efficiency Directive 2012/27/EU (EED) was also prepared in 2012 to promote energy efficiency within the European Union. Its objective is to support measures aimed to increase savings resulting from energy supply and consumption. According to the EU Directive, energy efficiency means the ratio of the level of service and production to the energy used. Saving energy, on the other hand, means a reduction of the energy consumption needed for the same production. The document contains both definitions and tools for the pursuit of energy efficiency by the various entities in the national economy.

Effectiveness of energy efficiency legislation makes it possible to reduce resource consumption by introducing specific laws. Penalties for high energy consumption stimulate innovation and introduction of new technologies to reduce energy consumption, as well as use of alternative energy sources. It has been shown that without external pressures, such as market forces or legislation, it is almost impossible to improve efficiency (Dahmus J. B., 2014). An important measure that results in an improvement of energy efficiency is stimulation and motivation of public and private entities with the aim to increase energy savings. Understanding and availability of regulatory solutions can also have a significant contribution to increasing energy savings in companies.

Empirical Analysis

Scope and subject matter of the study

In order to identify the attitudes of businesses towards regulations and laws pertaining to increase in energy savings, their opinions on the Energy Efficiency Directive (2012/27/EU) were examined. The study uses external primary data intended for the Public Consultation for the Review of Directive 2012/27/EU. The raw data was collected in an Excel file. The main objective of the study was to assess the views on the application of the energy efficiency concept in a group of companies operating within the European Union. Taking this into account, only a group of businesses and business associations was surveyed. Thus, a further study covered 172 research questionnaires. The structure of the research

sample was the following: 79% of industry and business associations and 21% of private companies. Slightly more than 26% of the respondents indicated that their main activity was located in Belgium, about 11% indicated Germany, 9% France, and about 5-6% of the respondents conducted their operations in Sweden, Spain, or Austria. Only two thirds of the surveyed entities declared that they dealt with energy issues. The study used basic inference methods, including response frequency distributions, p-value for the single-sided chi-square test investigating the significance of the differences between indication frequencies, and graphical methods.

Assessment of the possibilities to strive for energy efficiency in business operations

Among the surveyed respondents, there was generally no significant difference in the assessment of their countries' guidelines for properly defining the concept of energy efficiency of products and services: the group of respondents who indicated that the guidelines were sufficient in this respect and the group who were of a different opinion were the same and equal to 30%. The lack of clarity in this respect may result from the respondents' assessment of ongoing information campaigns or public initiatives that would concern clarification of the nature of public procurement of energy-efficient products and services. Nearly 75% of the respondents admitted that they did not encounter any activities in this area. Detailed information on the issues discussed above is presented in Figure 1.

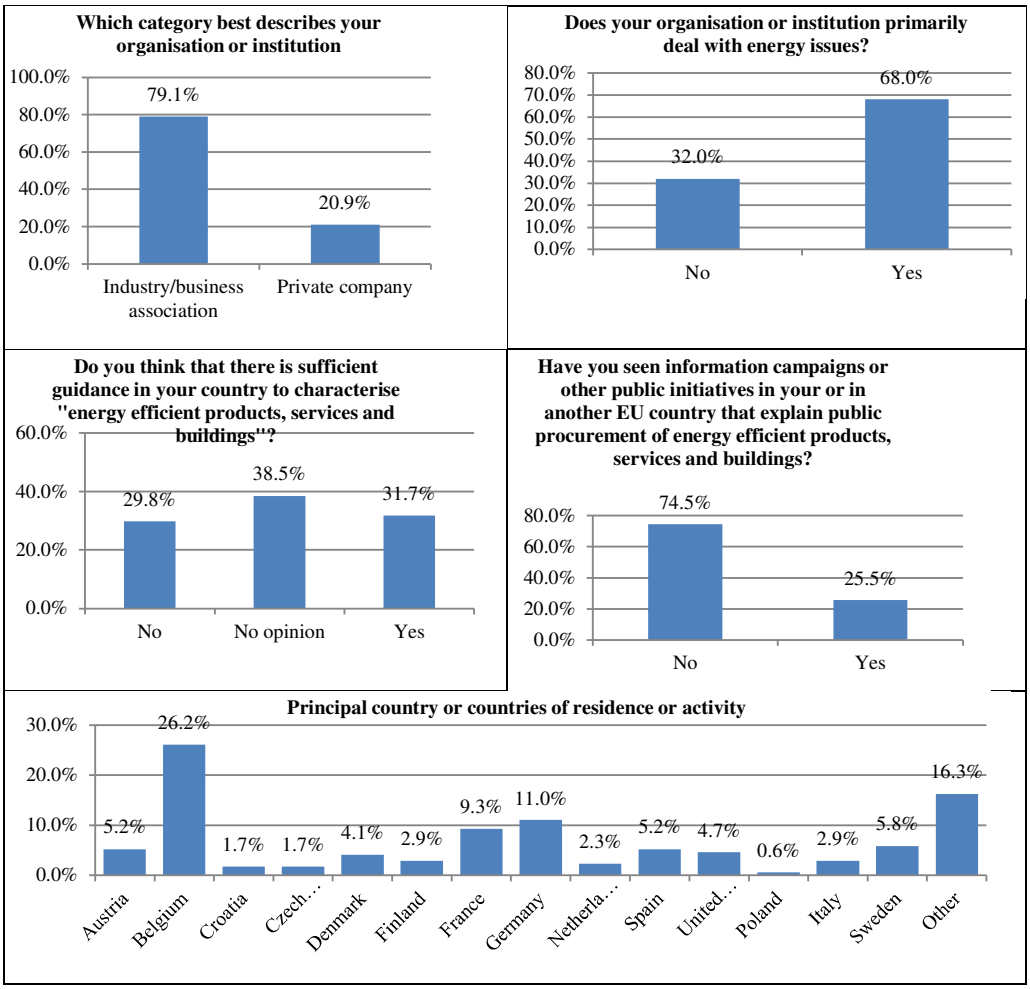

Fig. 1: General characteristics of the surveyed respondents.

Source: prepared by the authors.

At the same time, the results observed with regard to the low level of energy savings in the European Union show some barriers and challenges to the effective implementation of Article 7 of the Directive (Fig. 2). The most common challenges for companies are the selection or implementation of the right set of measures that will enable achieving 1.5% of annual energy savings (26% of the indications), the high degree of flexibility in applying the measures of the energy efficiency obligation scheme and alternative measures or the lack of sufficient knowledge and skills of the parties involved in implementing Article 7 (10% each), as well as the strong opposition from energy suppliers and distributors to the establishment of an energy efficiency obligation scheme, the lack of effective enforcement of the commitments made, the lack of the end-users awareness of energy efficiency obligation schemes or alternative measures, and the high administrative burden associated with introduction of such schemes (7-9% each).

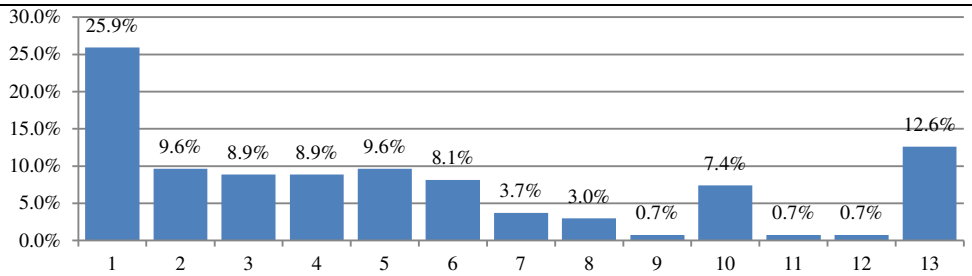

1. To select or introduce the right set of measures for achieving 1.5% energy savings (annually)
2. Too great flexibility to use a wide range of measures: energy efficiency obligation scheme and alternative measures
3. Strong opposition from energy suppliers and distributors to set up an energy efficiency obligation scheme
4. Lack of effective enforcement
5. Lack of sufficient knowledge and skills of involved parties
6. Lack of awareness (by the end-users) of the energy efficiency obligation schemes or alternative measures
7. Developing the calculation methodology in line with the requirements of Annex V
8. Ensuring sound and independent monitoring and verification of energy savings
9. Avoiding double counting
10. High administrative burden
11. Ensuring consistent application of the requirements with other energy efficiency legislation (e.g. building codes)
12. Limited timeframe (2014-2020) that makes it hard to attract investment for long term measures
13. Other

Figure 2: Challenges and barriers to achievement of energy efficiency by companies operating within the European Union

Source: prepared by the authors.

At the same time, more than 43% of the surveyed entities believed that the provisions of the EED on metering and billing are sufficient (less than 23% of the respondents expressed a different opinion) and almost 50% of the surveyed entities indicated that the requirement of frequent and individual billing should be dependent on the technical possibilities and the cost-efficiency of such undertaking, but only one in five respondents indicated that it would affect the potential for energy savings and consumer empowerment. Nevertheless, more than 80% of the respondents were of the opinion that there should be specific provisions to facilitate investments in specific areas of energy efficiency, with very frequent references to measures related to energy consumption by the industry (36%). In addition, a half of the respondents thought that solutions related public procurement of energy-efficient products and services should also apply to public authorities at the regional and local levels, but only 17% believed that the guidelines currently in force sufficiently define the very concept of "energy-efficiency of products, services."

The respondents also indicated that energy efficiency obligation schemes can bring some benefits (Fig. 3).

Inclusion in their operations of the principle of sustainable energy acquisition and consumption can translate into greater consumer awareness of the potential of energy efficiency (71%), development of

new financing models (56%), creation of a better business and administrative environment for future innovations in energy services (55%), lower bills for consumers (51%), possibility of aggregating several small investments into one larger one (46%), better relations between energy suppliers, distributors, and customers (35%), lower costs of energy generation and transmission (23%), and increased competition in the energy market (22%).

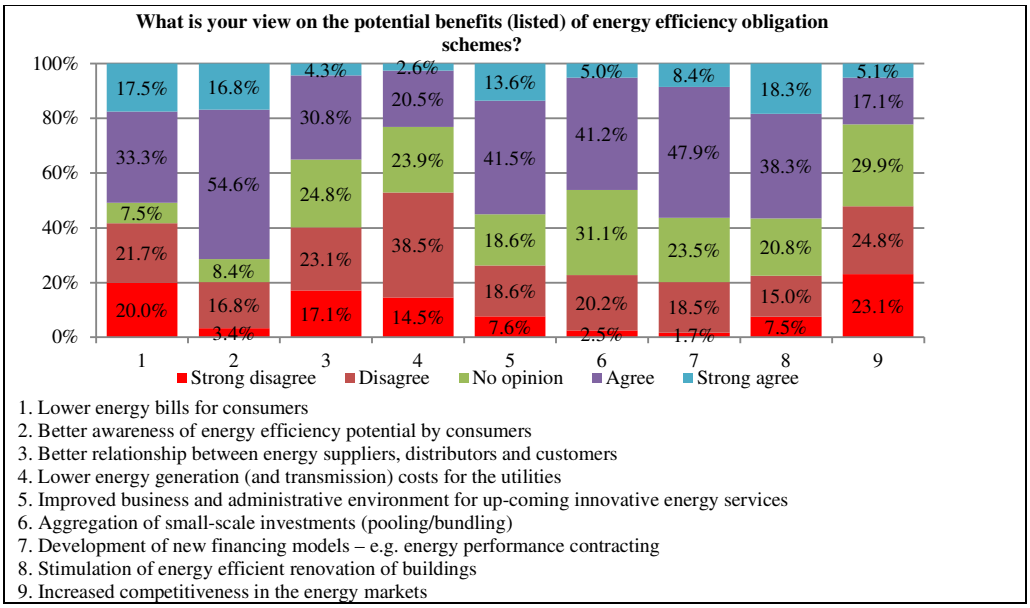

Figure 3: Benefits for companies from adaptation to the principle of energy efficiency

Source: prepared by the authors.

Study of Significant Differences Between Selected Groups

A detailed analysis of respondents' views on the energy efficiency issues discussed above indicates that these views are largely dependent on the views of the respondents as regards their countries' guidelines that enable proper description of energy-efficient products and services. Significant differences in this respect occur between industry and business associations and private companies, but this is mainly due to the fact that the opinions in this respect are much more often expressed by the surveyed associations than by private companies (see Table 1).

Table 1: Opinions about the level of guidelines for describing energy efficiency of products and services in particular groups of surveyed entities

	Industry	Private	p-value for a one-sided chi-square test investigating the significance of the differences between frequencies of indication
Insufficient	32.94%	15.79%	0.069752
I have no opinion	31.76%	68.42%	0.001493
sufficient	35.29%	15.79%	0.049327

Source: prepared by the authors.

In addition, those respondents who saw the information campaigns on energy efficiency more than twice as often indicated that the guidelines in their countries were sufficient in this respect and, on the other hand, those who did not see such campaigns more than four times as often indicated lack of sufficient guidelines on the energy efficiency of products (see Table 2). Both the supporters and the opponents of the opinion that there is a sufficient level of guidance for properly defining the energy efficiency of products and services, most often indicated as barriers and challenges to the effective

implementation of Article 7 the need to choose the right set of measures to achieve 1.5% annual energy savings (35% of the indications among the supporters and 24% among the opponents) and strong opposition from energy suppliers and distributors to the establishment of an energy efficiency obligation scheme (13% and 17% of the indications, respectively). Lack of sufficient knowledge and skills of the parties involved and the need to ensure reliable and independent monitoring and verification of energy savings (about 10% each) were indicated as other significant barriers by the supporters of the claim that the guidelines in the area of energy efficiency are sufficient. The other group of respondents, on the other hand, indicated that there was too much flexibility in applying the various measures of the energy efficiency obligation scheme and alternative measures (21% of the indications) or that there was a lack of effective enforcement of the adopted obligations (14%). Detailed information on the frequency of indications of particular barriers and the significance of the differences between the two discussed groups of respondents is presented in Table 2.

Table 2: Frequency of identification of selected barriers and challenges to effective implementation of Article 7 of the EED depending on the opinion concerning the sufficient level of the current energy efficiency guidelines

Barrier	Opinion on the level of the current guidelines in the area of energy efficiency		P-value for a one-sided chi-square test investigating the significance of the differences between frequencies of indication
	sufficient	insufficient	
To select or introduce the right set of measures for achieving 1.5% energy savings	35.48%	24.14%	0.168937
Too great flexibility to use a wide range of measures: energy efficiency obligation scheme and alternative measures	3.23%	20.69%	0.017613
Strong opposition from energy suppliers and distributors to set up an energy efficiency obligation scheme	12.90%	17.24%	0.319078
Lack of effective enforcement;	6.45%	13.79%	0.171754
Lack of sufficient knowledge and skills of involved parties	9.68%	0.00%	0.042828
Lack of awareness (by the end-users) of the energy efficiency obligation schemes or alternative measures	6.45%	0.00%	0.08208
Developing the calculation methodology in line with the requirements of Annex V	3.23%	10.34%	0.134641
Ensuring sound and independent monitoring and verification of energy savings	9.68%	0.00%	0.042828
Avoiding double counting	0.00%	0.00%	-
High administrative burden;	6.45%	6.90%	0.472477
Ensuring consistent application of the requirements with other energy efficiency legislation (e.g. building codes)	0.00%	3.45%	0.148559
Limited timeframe (2014-2020) that makes it hard to attract investment for long term measures	0.00%	0.00%	-
Other	6.45%	3.45%	0.296875

Source: prepared by the authors.

Respondents who were in favor of the statement that the existing guidelines in the area of energy efficiency were sufficient also indicated more frequently (p-value<0.0047) that the provisions of the EED on metering and billing are sufficient, but at the same time more frequently (p-value<0.0143) they were of the opinion that the requirement of individual metering and frequent billing should be made dependent on technical possibilities and cost-effectiveness in this area. Also, they significantly more frequently (p-value<0.0077) believed that the requirements of the EED concerning smart metering systems for electricity and natural gas and the feedback on their consumption, as well as common

minimum functionalities, such as those related to the frequency of updating of readings and their delivery directly to customers, would ensure a sufficient level of harmonization at the EU level. They also statistically more often (p-value<0,0072) believed that there was sufficient guidance and framework in place to properly understand the very concept of energy-efficient products and services. The respondents who had a negative view on the sufficient level of guidelines related to energy efficiency significantly more often (p-value<0.058) expressed the opinion that the sheer technical and/or economic possibility of being energy-efficient had a positive impact on potential energy savings and consumer empowerment. Also, they significantly more often (p-value<7.3E-05) agreed with the statements that measures related to public procurement of energy-efficient products and services should also become mandatory for public authorities at the regional and local levels. Detailed information on the above opinions of the supporters and opponents of the claim concerning sufficient scope of guidelines describing the energy efficiency of products and services is presented in Figure 4.

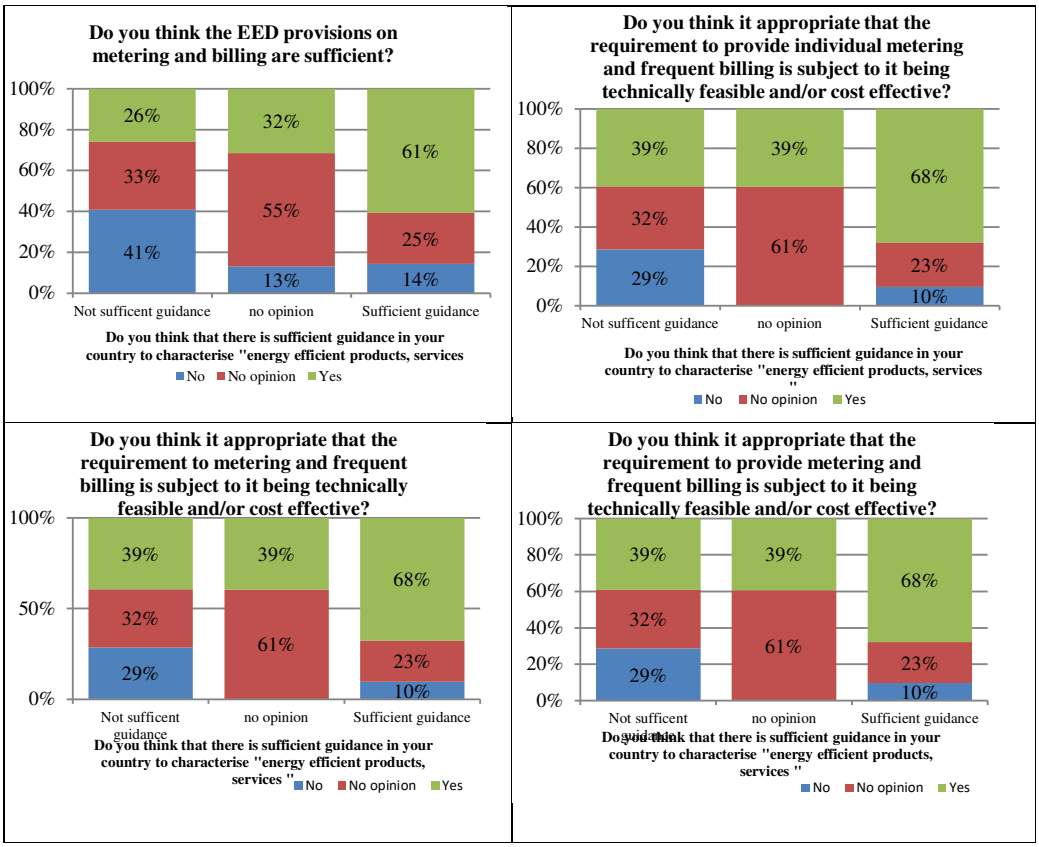

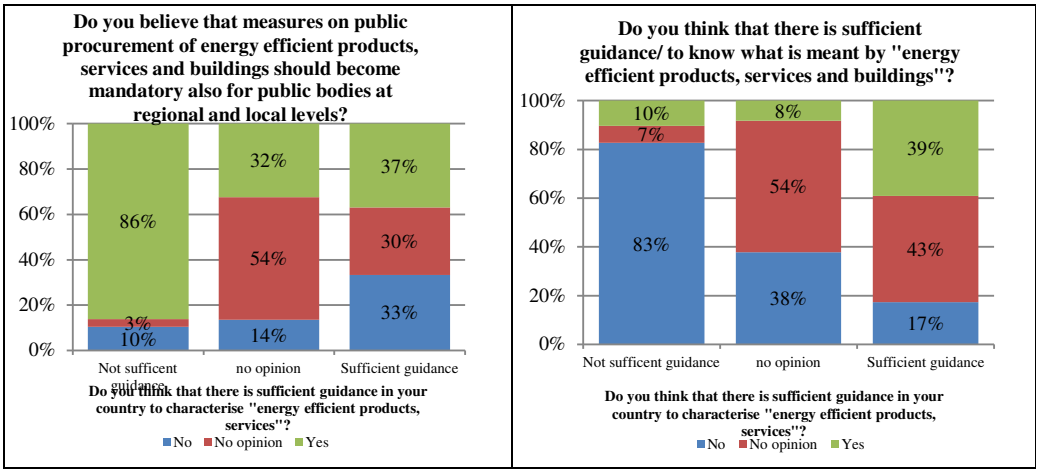

Fig. 4: Opinions concerning selected energy efficiency issues depending on the opinion on the level of guidelines enabling adequate description of the energy efficiency of products and services.

Source: prepared by the authors.

Both supporters and opponents of the claim of sufficient level of current energy efficiency guidelines are in principle the same supporters of the opinion that there should be specific detailed regulations to facilitate investments in specific areas of energy efficiency. In general, there are also no significant differences in the areas where such provisions should apply. Only in the case of the area related to improvement of the efficiency of household appliances and equipment, 35% of the respondents who believed that the current level of guidelines related to energy efficiency was sufficient were in favor of specific regulations in this area, compared to only 8% of those with the opposite view. Also, the first group of respondents significantly more often indicated the need to prepare detailed regulations facilitating investment in the urban and community infrastructure with respect to transport, energy recovery, heat recovery, and waste energy. Detailed information in this respect is presented in Table 3.

Table 3: Assessment of the importance of areas where there should be regulations to facilitate energy-efficient investments

Areas indicated	Opinion on the level of the current guidelines in the area of energy efficiency		p-value for a one-sided chi-square test investigating the significance of the differences between frequencies of indication
	sufficient	insufficient	
Building renovation	65.22%	73.08%	0.275673
Efficient appliances and equipment in households	34.78%	7.69%	0.009433
District heating and cooling network development	26.09%	15.38%	0.176788
Energy use by industries	30.43%	34.62%	0.377734
SMEs	21.74%	34.62%	0.159691
Companies	8.70%	23.08%	0.087029
City and community infrastructures in relation to transport, waste heat recovery, waste-to-energy	43.48%	11.54%	0.005747
Other	21.74%	38.46%	0.102481

Source: prepared by the authors.

As a potential benefit of the functioning of energy efficiency obligation schemes, those who considered that the current guidelines in their countries already allowed for a proper definition of the concept of energy-efficient products and services were significantly more likely to indicate lower energy bills for

consumers (p-value<8.55E-06), greater consumer awareness of the potential for energy efficiency (p<0.0467), the possibility of developing new financial models (p-value<0,0005), stimulating energy-efficient renovation of buildings (p-value<0,012), and increasing competitiveness in energy markets (p-value<0.0022) (cf. Fig. 5).

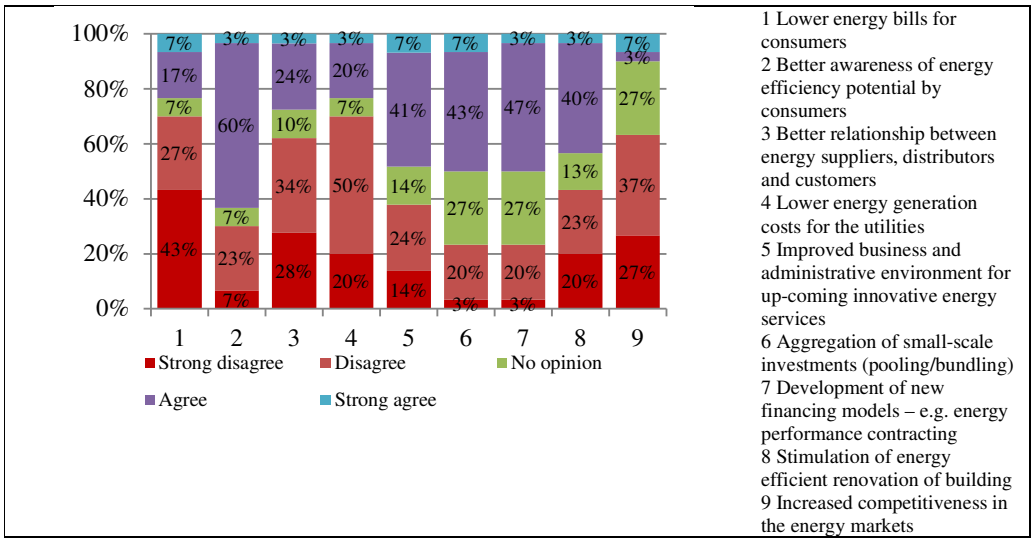

Fig. 5: Potential benefits of energy efficiency obligation schemes

Source: prepared by the authors.

Summary of the results

The most important conclusion of the study is that not all business entities are interested in energy efficiency in their operations. The analysis has shown a number of obstacles that may influence such a development of the studied problem. First of all, these entities lack a concrete set of measures and tools to enable the effective implementation of the energy efficiency concept in line with EU requirements; secondly, there are many gaps and misunderstandings in awareness and knowledge of the issue. On the part of companies, the need to introduce formal simplifications in the implementation of investments related to energy consumption in production and service provision processes is particularly evident. The biggest challenge is therefore to supplement the Directive with programs that will support the implementation of innovative energy saving solutions. At the same time, the surveyed entities hope that the regulations in force will primarily increase consumers' energy awareness and will allow them to optimize their energy consumption and thus improve their competitive position. The study also made it possible to identify some differences between the surveyed entities. Those entities that considered the current guidelines to be sufficient in the area of energy efficiency most often pointed to lack of sufficient knowledge and skills and lack of a robust system for monitoring and verifying energy savings as an important barrier. At the same time, they believed that the EED's metering and billing rules are sufficient, but the requirement for individual metering and billing should be made conditional on technical feasibility and cost-effectiveness. The other group, on the other hand, did not consider the current rules to be sufficient, mainly due to too much flexibility in the application of the various measures of the energy efficiency obligation scheme and alternative measures. Furthermore, such companies thought that the technical and/or economic feasibility of being energy efficient itself has a positive impact on potential energy savings and consumer empowerment.

Achievement of energy efficiency in companies is constrained by a number of considerations, including mainly lack of experience and skills. The provisions of the Energy Efficiency Directive are not sufficiently clear and understandable, while the proposed energy saving tools are not adapted to current possibilities of functioning in a competitive market. As a result, achievement of the planned energy

savings and reduction of energy consumption requires additional actions and forms of external support not only to companies but also to other market players.

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The Meaning of The Motivation in The Management Process Concerning Educational Institutions

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Abstract

All organizations strive to achieve and maintain the highest possible level of employees' motivation. It may be achieved by using of tangible or intangible motivation tools. Highly motivated employees bring many different benefits for the organization. School and other educational institutions are organizations where possibility to use financial motivation tools is considerably limited. It is then especially important for school leaders to understand motivational processes and factors important for their motivation and motivation of employees. High motivation of school managers results in job satisfaction and motivation of teachers. The motivation of teachers undoubtedly affects students' learning and performance which is the main aim of schools as organizations.

Keywords: Educational Leadership, Job, Motivation, Teachers, School.

Introduction

Job is defined in many scientific disciplines. This term comes from the Latin word "*labor"* which originally means "an effort". Generally speaking , the literature concludes that the job is a set of activities performed by a human in order to produce goods and services in return for remuneration. The meaning of work in human life is defined as a degree of general importance that the subjective experience of working has in the life of an individual, at any given time. These subjective experience is divided into three main groups. They include:

- The individual experiences as job – employees in this category are committed to performing their work only for the material benefits such as for example salary and other material benefits.
- A career – viewing work as a career causes that employees are willing to put their effort into work - related activities for future gain understood as prospects of taking higher positions in professional hierarchy.
- A calling – people feel job satisfaction and obtain a sense of fulfillment from performed activities, they do not see work as way of making money but way of doing something valuable (Bellah, Madsen, Sullivan, Swidler, & Tipton,1985; Parry, 2006; Wrzesniewski, McCauley, Rozin, & Schwartz, 1997).

Referring to work as a sphere of life in which employee spends a considerable part of his or her life, it can be concluded that working environment plays an important role in meeting specific human needs. According to Maslow's theory there are five types of needs that are arranged in a hierarchical order such as:

- **Physiological needs** – (i.e. our body craves food, clothing, warmth) this basic group of needs can be fulfilled by received fair remunerations for job.
- **Safety needs** – teachers seek to establish stability and consistency in chaotic world which can be achieved by a guarantee of permanent employment.

- **Love/belongingness needs** – these needs come into play if the psychological and safety needs are already satisfied. It can be understood as establishing positive relationships with supervisors and co-workers and a sense of belonging to workplace.
- **Esteem needs** – understood as the need of esteem and prestige. The needs of this level can be satisfied by public praises or giving an employee ambitious and responsible tasks to be performed.
- **Self – actualization needs** – it means to satisfy human ambitions, constantly striving for personal and professional development. The school can help to meet this needs by organizing courses/training which to enable learn new qualifications and skills (Griffin, 2012).

These needs are arranged from the most to the least pressing needs. Meeting the needs on the higher level (self – actualization needs) causes that a teacher sees the sense of his or her professional and private life. It is important to stress that motivational systems in organizations should take into account complexity of human needs and their importance to motivation in organizational context. It is especially important in education as schools are places with very specific social context important for specific motivation (Schunk, Meece, Pintrich, 2020). It is also important from more general point of view of education as a social change agent that can promote certain models of action, in that case certain ways of motivation that can be transferred from educational context to other social domains (Gonida, Lemos, 2019).

Job Motivation – General Information

According to Butkus and Green *motivation* is derived from the Latin word *"motivate"* which means to persuade to move and act to satisfy the needs. Kreitner and Kinicki also underline that word *motivation* comes from the Latin *"movere"* which means to move (Butkus, Green, 1999). Literature presents many definitions of motivation as a psychological phenomenon (several of them showed in Table no. 1). On the basis of literature review motivation is understood as a set of energetic forces that originate both within as well as beyond an individual's being, to initiate work – related behaviour, and to determine its form, direction, intensity and duration (Pinder, 1998). Motivation is understood as a behaviour focused on specific goals. Employee is motivated when she or he expects that his/her way of action will lead him/her to achieve the specific objectives and valuable prizes satisfying her/his needs. According to A. Pocztowski motivation is an internal process during which the employee (Zając, 2014) :

1. Realizes his/her unmet needs.
2. Recognizes the opportunities to meet the needs.
3. Undertakes the actions aimed at achieving particular goals.
4. Achieves a certain level of completed tasks, which then is evaluated.
5. Receives awards or punishments for his tasks, which meet or do not meet her/his needs.
6. Assesses the degree of meeting his/her needs which, in turn, leads to creating a new needs or to modifying existing.

The literature distinguishes two kinds of motivation which involves positive and negative motivation. Positive motivation means encouraging employees to do their work in the best possible manner as well as to improve their performance by receiving financial and non – financial rewards. In contrast, negative motivation means the act of forcing workers to work by using threats and punishments e.g. threat of loss a part of salary after performing improper tasks, risk of reprimand, a shift to less well-paid jobs or lower position at work.

The aim of positive and negative motivation is to inspire employees to work. However, these concepts differ in their approaches. The positive motivation concept assumes that rewards and other facilities are provided for workers better performance. Whereas negative motivation tries to induce the workers by cutting their wages and other facilities. This kind of motivation is based on concept that if employees fail in achieving the desired results, they should be punished.

Motivation to work may have a very diverse nature. Employee is motivated to work which meets her/his expectations or needs as well as gives him/her perspectives. On the other hand, a worker can be

motivated by salary, promotions or other praises. Motivation can be divided into two different types of motivation such as (McCullagh, 2005):

- **Intrinsic (internal) motivation** – is understood as an individual need of pride with something. A worker is intrinsically motivated when she/he seeks satisfaction of curiosity or personal challenge in the job instead of working to achieve external, mainly material rewards (Nduka, Obiekwe, 2016). An employee's engagement in tasks requires a sense of inner satisfaction or pleasure. According to Hackman and Oldham workers have strong internal motivation when they are aware of a responsibility for their job's outcomes, realize the meaning of work and they have knowledge about the actual results of job activities (Hackman & Oldham,1980). In educational contexts such kind of motivation is especially important as aims of educational organizations are specific and material situation of schools are generally difficult which makes material (external) motivation more difficult (Łuczyński, 2011).
- **Extrinsic (external) motivation** - it is an opposition of internal type of motivation. It necessitates the effort on activities for the sake of external rewards such as bigger salary or other material job benefits (Amabile, 1993). It is undoubtedly not a good method of motivation in educational organizations context.

Internal and external motivation has different effects on each other: individuals focus on intrinsic outcomes while others are centered on extrinsic or even both. According to Furnham et al. introverts are more extrinsically motivated while extraverts are more intrinsically motivated (Furnham, Forde, Ferrari, 1998). In order to increase employee motivation and satisfaction, the organization should concentrate on internal factors because only these factors contribute to productivity growth. At the same time, the organizations should not neglect external factors because it may lead to increased employees' dissatisfaction and result in counterproductive behaviours of employees.

It seems to be important from practical point of view that motivation is a complex phenomenon influenced by many different factors. It influences ways of understanding motivation and its definitions in literature that underline different aspects of motivational process, that can be seen in Table 1 below.

Table 1: Definitions of motivation in literature

Authors	Definition of motivation
S.P. Robbins	Motivation is defined as a willingness to exert high levels of effort toward organisational goals, conditioned by the effort's ability to satisfy some needs.
J.A.F. Stoner, Ch. Wankel	Motivation is understood as a something what arouses, steers and maintains human behaviour.
A.A. Huczynski, D.A. Buchanan	Motivation is defined as a decision making process through which the individual chooses desired outcomes and sets in motion a pattern of behaviours appropriate to acquiring them.
L. H. Haber	Motivation is defined as an action to perform on individual approach to worker, knowing his needs and expectations as well as creating good working conditions. These activities contribute to achieving the objective of the company.
J. Reykowski	Process of psychological regulation which determines human effort for achieving particular goals.

Source: own elaboration

Tangible employee motivation tools include all motivators that are given to workers in an intangible form but which can be converted to money (some of them are shown in the picture no.1). However, intangible motivation tools cannot be converted into cash but they have a substantial psychological value for employees.

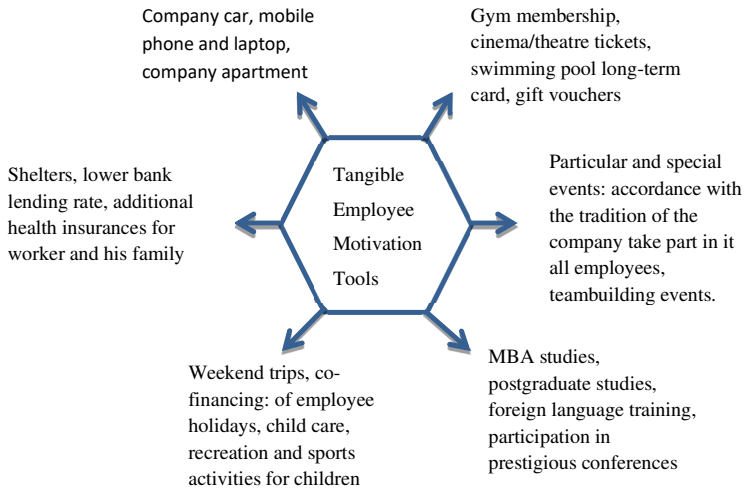

Figure 1: Tangible employee motivation tools

Source: own elaboration

Research conducted by Linder shows that different motivational factors affect workers performance. This factors are ranked in the following order: (1) interesting work, (2) good salary, (3) full appreciation of work done, (4) job security, (5) good working conditions, (6) promotions and growth in the organization, (8) feeling of being in on things, (9) personal loyalty to employees, (10) tactful discipline as well as (11) sympathetic help with personal problems (Linder, James, 1998).

Teacher's Motivation

Motivation is one of the most important factors increasing the efficiency and effectiveness of work (Yousaf, Latif, Aslam, Saddiqui, 2014). Teacher's motivation is understood as something 'what attracts individuals to teaching, how long they remain in their initial teacher education courses and subsequently the teaching profession, and the extent to which they engage with their courses and the teaching profession' (Sinclair, 2008). Motivation is a complex psychological process. Teachers have different needs which are determined by such factors as for example: their age, sex, life/job experience, social status, expectations, financial conditions etc. Teacher motivation is a key determinant for student motivation and teaching effectiveness in the classroom (Han, Yin, 2016; Hattie, 2012).

Teachers' motivation is affected by job satisfaction, reward system, training and development as well as work situational factors (Nyakundi, 2012). Schools and other educational institutions are places where possibility to use financial motivation tools is considerably limited. Teachers' salary consists of basic pay and remuneration for additional work as well as supplements: years of experience, class teacher's duties and other incentives (in other companies called the bonus).

The research conducted by B. Taradejna presented expectations motivating teachers to take up work at school. According to study which included about 260 respondents the most important factors which determined teachers to choose the teaching profession are: opportunities to pursue their passion at work as well as possibilities for personal and professional development (Taradejna, 2011). Also the opportunity to improve qualifications and professional development has enormous potential for teachers' everyday motivation. The school manager/leader may encourage teachers to constantly improve their professional qualifications through such activities as for example:

- Creating a good working ambience in the pedagogical council which help to identify teachers with their school as specific educational institution.
- Creating a convenient weekly lesson schedule for teachers that suits their individual needs.

- Co - financing some of the continuing professional development courses important for teachers in their professional career.
- Proposing attractive forms of increasing teachers' skills and qualifications within internal professional development schemes developed at the school level.

Penc distinguished several activities of the motivation process which can be used by school leaders or managers to motivate their teachers. One of them is formal recognition of different teachers' qualifications/needs/predispositions to adapt work to employee expectations (eg. during job interview) as well as maintaining good climate at work (Penc,1996). Friendly atmosphere at school means a good relationship between headmaster and all school workers, mutual respect as well as mutual kindness at the interpersonal level. A good social climate or atmosphere at work determines workers creativity and speed of response to changes in the workplace. It satisfies many important needs connected with work among which are: esteem needs, safety needs and affiliation needs. In addition, employees expect oral praises (individual or public) and professional support from their school headteacher (Watt, Richardson, Smith, 2017).

Working environment of school can strongly influence employees' professional motivation. It includes different aspects such as equal opportunities, equal rights and equal possibilities to act professionally within school as organization for all teachers. On material level, it also needs to build a healthy workplace, understood as using the modern equipment/tools/ergonomic furniture at work, lighting and functional design of classes, number of students in class, conditions in teachers' room, relationship with co – workers, responsibility and autonomy. Understanding complexity of factors contributing to motivation is one of most difficult aspects of building adequate competencies of school leaders.

Conclusions

Good school leadership needs different interpersonal competencies but those connected with motivation seem to be one of crucial for good school functioning. Understanding motivation and its functioning in organizational context is very important. Good school leaders know how to motivate by understanding complexity of this process.

Motivation specifies the reason why teachers decide to do their job with commitment as well as effort which employees put in the performance of their duties and how long they are willing to sustain their job (Han, Yin, 2016). Teacher motivation affects student performance while motivation is affected by job satisfaction, reward system, training and development as well as work situational factors (Nyakundi, 2012).

Teachers play a significant role in the learning process of students (Muhammad, Farrid, 2011). Building a school motivation system may guarantee its efficient functioning. School manager (headmaster) is expected to have such a style of managing the educational institution which influencing the workers' commitment and job satisfaction that contribute to high motivation in everyday work.

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Communication as The Determining Factor of Building School Communities in 21st Century

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Abstract

Communication skills seem to be crucial element of contemporary leadership skills, especially educational leadership. In traditional schools, communication was predominantly one-way, e.g. directed from teachers to students. Therefore, such schools were often dubbed schools of monologue. In contemporary schools, more and more communication is two-way or even multi-directional, which shows that all the participants of educational process are involved in the communication. It is one of the steps taken in order to build a school community. The issues discussed in this paper include communication and its impact on the creation of democratic school communities. The authors arrives at their final conclusions by means of discussing two aspects that are immanently related to communication, i.e. management styles and self-education.

Keywords: Communication, School Community, Democratic School, Management Style, Self-Education

Introduction

Before 1989, working in Polish schooling consisted mainly in student education and socialisation. These were, however, corrupted by the ideology of that time. The party imposed a default development pattern upon people so that they are formed by manipulated knowledge and, quite paradoxically, anti-social models of existence in society. In the time of transformation, schools functioned in very much the same way as they did in the socialist era, albeit without the shackles of total oppression. The tokens of liberty in education were: the demonopolisation of schooling, the decentralisation and autonomy of schools. A contemporary school keeps evolving, but the goal is not only to care about education, socialisation, and individual development, but also to initiate changes in the society. A starting point for such changes could be the creation of democratic schools. The reference to democracy here is not only to imply the system of the school itself, but also to characterise the attitude of people. A significant role in schools should be played by civic education on both theoretical and practical levels. The development of democratic attitudes should be started from the area of communication, as its impact on self-perception, outlook, and reality creation is immense. The principle of mature and responsible existence in society is self-development.

The aim of this article is to present communication as a determinant in the construction of school community. Communication is perceived as one of key factors or competencies of leadership in every organization (Mumby, Kuhn, 2018), but especially educational leadership or management in school context (Bush, 2011). It is undoubtedly very important aspect of school functioning as central educational skill (Raptou, Stamatis, Raptis, 2017). It is also a crucial competency of people working in schools as specific organizations (Morreale, & Pearson, 2008). Two aspects related to communication have been scrutinised: the management style and self-education. The reference to management style may suggest that this article is primarily related to those who manage schools, i.e. headmasters and teachers. What is more, if there is no self-education effort or conscious self-development, it is difficult to speak of a proper communication that could facilitate the creation of a

school community. This kind of communication is more of a pretence.

Attempts at defining communication

The discussion on communication should be started from a scrutiny of the term itself. The concept of communication appears and is discussed on a variety of fields, including sciences such as information technology or cybernetics, and reaching humanities and social studies, e.g. linguistics, psychology, sociology, management, or political science. Communication can have an external or internal form. The internal communication is oriented towards the surroundings. The internal communication – or autocommunication – is oriented towards one's inner self. The definitions of communication available in literature on the subject can be divided on the basis of how broad the definition is. In the narrower definition, communication is understood as a process of information exchange between two people (Griffin, 2002; Grzesiuk, Korpolewska, 1988). M.Filipiak makes a distinction between *communicating something*, *communicating with somebody*, and *communication* itself. Thus, "*communicating something* is a one-way flow (with the addressee listening to the speaker), *communicating with somebody* is a two-way flow (with both interlocutors conversing), and *communication* is a flow in general (with the information circulating in the system)" (Filipiak, 2004, p.13). The broader takes at the term emphasise other aspects of communication. For instance, Z. Nęcki defines communicating as "an exchange of verbal, vocal, and non-verbal signs (symbols) undertaken in a specific context aimed at reaching a higher level of communication" (Nęcki, 1996, p. 109). At the same time, J. Stewart claims that "interpersonal communication is the type or kind of communication that happens when the people involved talk and listen in ways that maximise the presence of the personal" (Stewart, 2000, p. 37). Then he proceeds to explain the definition, highlighting the significance of *people* and *contact*. People's characteristics are enumerated to distinguish them from other living creatures. These characteristics include: „1. **Uniqueness** – every human being is a special and irreplaceable part of a communication situation, 2. A person is more than a combination of observable, measurable elements. The immeasurable consists of *feelings*, *emotions*, or *soul*, 3. People can **choose**. Instead of reacting, we can respond. We cannot turn time back or move to another planet, but our future is never totally determined by our past, 4. People are **reflective**. We are aware of not only what is around us; we are also aware of our own consciousness, 5. People are **addressable**, which means one can talk *to* us or *with* us, not only *about* us, and we can reciprocate that" (Stewart, 2000, p. 44). By „type or kind of communication", Stewart means something that occurs between people, and not something one person does to another" (Stewart, 2000, p. 45). This shows that communication is relative and has influence on others.

Stewart's definition presented above is a starting point for the author's discussion, as it allows one to acknowledge the depth of communication processes and their significance, as well as provides the basis for a real community to exist. Thus, we arrive at the very etymology of the word *communication*, which was derived from "a Latin word *communis* ("common"), signifying an attempt to establish connectivity (community) with somebody" (Pilarczyk, 2002, p. 7)

Communication and Management Style

Every management style brings about a specific method of communication. The style of one's preference is decided by the traits of the managers, their personality, qualifications, and management skills (Żukowski, 1997). Both a manager and those who are managed have an impact on the effectiveness of the management style applied. A management style "is a complex set of relationships between the behaviour and personal traits of the manager, the characteristics of the team to manage, and the context in which the manager and the team work. (…) The management style applied is copied on all subordinate levels on the organisation hierarchy" (Penc, 2000, p.148). The management style is suggestive of the constellation of relationships in a given professional team.

There are many typologies of management style in the literature on the subject. The first scholar to scrutinise this issue was K. Lewin. He developed a classic management style typology, distinguishing between: 1) an autocratic leader, under whose management every employee has a manager-specified role in a defined field. The manager is the one controlling employees' activity. The manager single-

handedly defines goals for the organisation and does not base employee evaluation on objective criteria, 2) a democratic leader, who discusses the goals and the effectiveness of the team members with the team and takes into account objective factors for employee assessment, 3) a laissez-faire leader, whose approach is characterised by the freedom of actions, also those of the employees. The manager has a passive, friendly attitude towards the subordinates and avoids evaluating them (Teczke, 1988). In 1930s, R. Lippit and R. White conducted a significant study. The study analysed children's reactions to the three leadership styles: the autocratic, democratic, and laissez-faire leadership. The autocratic leader used commands to manage the group. A democratic leader allowed his group to talk and make decisions. The laissez-faire maximised the children's freedom of action and minimised the manager's impact on the group (Bielski, 2001). The results showed that in the autocratic model, the amount of work done by the kids was the highest, but the effort was virtually non-existent once the leader left. In the democratic model, the quality of the work was the highest and the intensity of work dropped just insignificantly in the absence of the leader. The laissez-faire model did not bring any positive results in any area (Bielski, 2001). Some scholars (e.g. F. Fiedler) prefer situational leadership and believe the effectiveness of each style is dependent on the acceptance of the subordinates the manager has, the nature of the tasks, and the extent of formal superiority the manager has (Bielski, 2001). The effectiveness of a given style is decided by the circumstances.

J. Penc described two management styles: classic management and new management. The former is characterised by rigid rules and extensive bureaucracy. The latter is about flexibility, support, and partnership (Penc, 2010). It is assumed that the classic management style is in correlation with a one-way model of communication. A certain kind of asymmetry can be observed in the one-way communication process: the speaker addresses the listener, there is no feedback, the speaker does not wait for the addressee's reaction after the command was uttered, the manager does not explain the "why" behind the decision (Frydrychowicz, 2009). The modern style is based on a two-way (interactive) or a three-way (relational) communication model. The characteristic features of interactive communication include: feedback, increased symmetry of the relationship between the manager and employee, and more frequent consideration given to employees' standpoint and vice versa. This creates the environment for the regulation and modification of behaviour and for the development of sensitivity to the person we are interacting with (Frydrychowicz, 2009). The three-way communication, also known as relational or transactional communication, consists mainly in concentrating on the subject of the communication, and not on the individuals and their behaviour. The communication between the speaker and the addressee is based on creating a common platform for understanding, constructing meanings together, developing a kind of closeness enhanced by the communication subject, establishing mutual respect for others' roles. This communication leads to being open in a cognitive and emotional way (Frydrychowicz, 2009).

From the management point of view, communication has an impact on the effectiveness and quality of the way the organisation functions. It creates the organisational culture – the personality of a given company or unit (Lis, 2007). Schools are organisations in which the management is an important field. The key roles are held by headmasters, teachers, and more and more often also parents and pupils. Communication is perceived as key competence important for good school management or leadership (Dorczak, 2019). The management style assumed brings about a specific communication style, and high-quality communication in the organisation helps in managing it, positively impacting the motivation, involvement, and integration of employees as well as their completion of tasks and goals (Frydrychowicz, 2009). Striving for perfection in communication may contribute to the development of a school and every human being.

Communication and (self-)education

The relational (three-way) communication described above requires adequate communication skills. Therefore, it is not easy to apply it in practice. In order to acquire the skills related to the highest communication level, it is essential that one is constantly focused on their own development. The question of self-education arises as the one of utmost importance. Considering the very concept of human life, one can conclude that people start undergoing education processes right after they are born. Later schools, starting from lower levels of nursery or kindergartens as places of socialization

help to develop communication skills and enable individual to develop themselves (Zakova, 2019). Until a young person is fully mature, they are hardly or not at all capable of being involved in any conscious self-education processes. Crucially enough, „the dominating, primary factor responsible for preparing the foundations for self-education" (Pacek, 1977, p. 14–19) is always education itself. The education process is conducted with the participation of two significant figures. While the educator manages pupils' activities and takes responsibility for them, the pupil is the focus of the educator's effort. Pupils' behaviour reflects the impact of educator's activities. Pupils' involvement in the education process can vary in degree and type (Sowiński, 2006). In this discussion, the author would like to address the role of the educator. In adult life, self-education processes are of primary importance. It is the "I" that decides whether the influences from the surroundings are internalised or not. What is more, in order to be able to direct somebody towards self-education, one should make an effort to develop themselves as well. F. W. Foerster claims that „one of the most important conditions for effective development of pupils' characters is self-development on the part of the educator, since the educator can only discover in pupils that which he can discover in himself. Therefore, the most important education method is the indirect one, i.e. the one which educates and reforms one's will is first applied to oneself and one's own reservations, and only after that to pupils" (Matwijów, 1994, p. 25). Self-education activities are most often undertaken in order to become a better person, not least morally. Before one can get to that point, however, a certain route must be taken. S. Pacek described self-education potential using a classification of initial behaviour. He distinguished between five levels: 1) egocentric, 2) unsteady, 3) spontaneously exploratory, 4) creative, and 5) harmonious.
The egocentric level is characterised by no developmental dynamism. Its sole orientation is towards one's needs. The attitude towards the world is on one hand conflict with the world, and on the other hand, dependence on it. The characteristics of the egocentric level include the lack of sensitivity, empathy, internal conflicts, and guilt. The unstable level is characterised by the instability of attitudes and preferences, the lack of a clear development path, internal conflicts that are solved very randomly, and emotional attachment to other people. The spontaneously exploratory level is distinguished by the presence of dynamisms oriented towards the internal: evaluation and self-evaluation. The instability is replaced by the sense of responsibility and a kind of existential anxiety is observed. On the creative level, one hierarchy of values and aims is developed to a large extent. Internal conflicts and tensions still appear, but self-consciousness is very well developed. Individuals are more autonomous and are oriented pro-socially. The are reflective regarding self-perfection. The last level, called harmonious, deals with dynamisms at the highest degree: authenticity, responsibility, self-consciousness, and autonomy. Reaching this level is very difficult but not impossible (Żurowska-Berkowicz, 2012). All these levels form a pyramid, in which the broadest and lowest egocentric level forms the base, and is followed by unstable, spontaneously exploratory, creative, and harmonious levels to form the triangle.

Self-education contributes to one's developmental changes. The development is directed from a basic level – psychological level, focused on needs and oriented towards specific goods and the associated lower values, and characterised by strong egocentrism, a taker's attitude, and entitledness – to the spiritual level, consisting in exploring higher values, experiencing them, and having a desire related to a given value. The characteristic feature of this level is transgression, the transcendence of the ego, the "objectivised attitude", i.e. orientation to the subject of cognition, love, relationships with other people (Węgrzecka, 2012). The effort to develop, the ability to reflect, and the awareness of the responsibility for one's word dissolve communication barriers. The most common communication obstacles as listed by M. Świeca are:

1) Judgement – criticism, abuse, predication, judgemental praise. Imposing one's on values upon the interlocutor, formulating solutions to the interlocutor's problems, applying one's own criteria to judge other people – this is all often frowned upon.
2) deciding for others – making others dependent on us and depriving them from the power to make decisions autonomously. This is manifested by ordering, threatening, and moralising. This can compromise understanding even despite the sincere willingness to help because the partner may feel they have limited control over their situation.
3) Premature interpretation of motives – guessing people's point before they verbalise it themselves. Teachers are likely to see the motive they are afraid of, and not the motive the

pupil is concealing – e.g. when a pupil is smiling in front of the teacher, he or she may feel nice, be afraid, be ashamed, and not necessarily sarcastic or ironic.

4) Perception filter – we see mainly that which we want to see and hear what we want to hear. Limited perception is a distorted one. The rejected information is that which may undermine our positive self-perception or contradict the data stored in our brains.
5) The contradiction between body language and words – the utterance conveys something different than the body.

Self-education pertains to the work on speaking consciously, and listening to others consciously, too. P. Thomson claimed there were six levels of listening. The first one is the "unconscious look" – it happens when somebody unreflectively drifts away. The listening does not occur as the listener is busy with his own thoughts unrelated to the subject of the conversation. The second level is automatic response, with no willingness to get involved in the conversation. The third level is listening half-heartedly, i.e. the listener remembers only the last utterance, kept busy by his inner dialogue. On the fourth level, the recipients begin to listen. They can answer the question that was asked. The two final levels consist in the deeper understanding and processing of the input received. The understanding on the fifth level allows one to explain the subject to a third party. On the sixth level, the person can teach others (Machaj, 2006). Such deep communication is vital in every context but especially in education as it can best help to develop such personalized communication (Kaur, Cui, Luu, 2019).

Conclusions

The foundation of the efficient functioning of all organisations is formed by the people who make them. Skilful communication with others based on respect and interest facilitates the exchange of ideas, experience, or knowledge and motivates people to be more involved in the work they do (Szczygieł, 2012). The Gospel of John reads this: *In the beginning was the Word, and the Word was with God, and the Word was God. The same was in the beginning with God. All things were made by him; and without him was not any thing made that was made. In him was life; and the life was the light of men (…)* (The Jerusalem Bible, 2006, p. 1475). The religious context of that passage aside, it is worth to analyse the "word" part. This *passus* of the Gospel Prologue shows the power of the word. The word is *the beginning, the cause of things, life and light*. The last two nouns especially highlight the positive aspect of words. Nevertheless, if that is so, words can be negative as well; they can be *death* and *darkness*. This shows that the power of words is serious enough to affect the mental and physical health of individuals.

The 21st century has brought about the democratisation of management which calls for teamwork in management on all organisation levels. The people at the top of the ladder should be close to what is happening right at the bottom, and the lower level employees should be familiar with the goal of the organisation, its mission, vision, and strategy (Koźmiński, Piotrowski, 1998). Because of this situation, the structures are flattened and deformalised, and all employees participate in the management of the unit. Each of the presented communication models has its advantages and drawbacks. All three communication types can virtually occur; yet most commonly there is a hierarchical order to them. In order to build a school community, relational communication reached and perfected through self-education seems to be the most adequate type. This allows people to reach the highest communication level – the synergic one, which is devoid of the primitive win/lose dichotomy.

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Management of Projects and Project Portfolios Co-Financed from The EU in Public Universities

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Abstract

EU projects play an important role in the development of public universities. Therefore, it is so important to ensure an appropriate level of management of these specific undertakings. Changes in the financing of project management costs co-financed from the European Union funds brought a new financial perspective, necessitated the search for new solutions in this area. The aim of the study was to assess the possibilities of managing EU projects and portfolios composed of these projects at public universities. For this purpose, methods of analysing literature sources were used and quantitative research was carried out using a questionnaire for EU project managers implemented in public universities in the previous and current financial perspective. In the course of the research, it was found that it is necessary to search for solutions combining the advantages of managing multiple projects simultaneously with the management of single EU projects at public universities

Keywords: Public Universities, Portfolio Management, Project Management.

Introduction

EU projects are a specific type of initiatives financed with the European Union funds available under multiannual financial perspectives. However, not only the source of origin distinguishes this group of projects, but also a strong concentration on guidelines for their implementation, including cost eligibility, information and promotion. Additionally, when these projects are implemented in public entities, such as universities, which also operate within a specific legal and financial framework, their management requires moving within a narrow range of acceptable activities. Therefore, it seems reasonable to look for solutions to improve the process of managing EU projects in public universities.

New financial perspective of the European Union for the years 2014-2020 brought many changes. In Poland, previous Operational Programs have been replaced by new ones, and universities have received a dedicated priority axis under the Operational Program Knowledge Education Development (OPKED), which replaced the Human Capital Operational Program (HCOP). In addition, significant funds can be obtained by universities as part of the Smart Growth Operational Program (SGOP), which replaced the Innovative Economy Operational Program (IEOP). There were also changes in the scope of financing costs, particularly unfavorable are changes in the scope of extending the catalogue of indirect costs and at the same time keeping their proportion unchanged. In the 2014-2020 perspective, both costs of remuneration and delegation of project management staff, as well as information and promotion costs can be financed only as indirect costs. Therefore, it is necessary to search for new solutions that will allow more efficient use of limited funds for project management. One of these solutions may be turning to portfolio management.

In order to achieve research goal defined in this way, an analysis of literature and results of own research were carried out. First part of the article presents a review of literature on project management and portfolio management. Next part presents methodology of own research and then analysis of results obtained. Last part includes a summary of research results and indicates directions of future activities in the field of managing EU projects at universities.

Projects and their role in HEI

Projects can be analysed from a static and dynamic point of view. Statically, project is a presentation of a description of implementation of a task (action, problem) with indicating its implementation within a specified time (Stabryła, 2006). It is presented usually as a preliminary document describing intentions and proposals for implementation of a specific task (Werewka, 2012). On the other hand, in dynamic terms, project is an organized sequence of many actions aimed at achieving a specific and measurable effect structured in time. It is addressed to specific group of recipients and requires involvement of limited human, material and financial resources (Bonikowska et al., 2006).

Project prepared in a form of description of the concept of implementing an action, requires involvement of specific resources in order to be implemented. Therefore, many projects remain only at the conceptual stage, and only certain projects are implemented. Main factor here are financial resources, involvement of which is an inseparable element of implementation of many projects. Each project has a clearly defined goal, which should be achieved within a specified time, within adopted budget and at an assumed quality level. In addition, projects are characterized by high level of complexity, autonomy (partial or complete independence) and uniqueness (Malinowski, 2013; Kopczyński, 2014).

Definitions and characteristics clearly indicate that projects require an adequate level of management (Mesjasz-Lech, 2015). Project management is a set of activities consisting of planning, organizing, directing and controlling focused on implementation of project objectives, enabling use of resources, both material and human, assigned to the project (Łada and Kozarkiewicz, 2005). Project management is a complex process (Padalkar and Gopinath 2016) requires consideration of aspects such as costs, time, quality, material resources, staff and communication, and risk. (Sanderson, 2012; Jun et al., 2011; Carr and Tah, 2001; Manikowski, 2013).

Projects co-financed by the European Union are an example of projects closely linked to various guidelines, both on the national and EU level. These projects are implemented as part of EU policies and are intended primarily to support socio-economic development of member states. In addition, these projects are characterized by significant resources necessary for their implementation and involvement of many participants (Domiter and Marciszewska, 2013).

On the other hand, portfolio of projects is a set of projects which implementation takes place at the same time and were particular projects are linked with the same source of financing, existence of a synergy effect or mutual balance (Martinsuo, 2013; Tonchia, 2018,). In the process of project portfolio management, projects for the portfolio are selected, method of their financing is determined, monitoring tools are chosen and implementation stages are design in a way to enable organization to achieve its goals (Kozarkiewicz, 2012, Kaiser et al., 2015, Killen et al., 2012).

Among various concepts aimed at increasing effectiveness of operations in the multiple-projects environment, the idea of creating a project management office is worth mentioning (Ko and Kim, 2019). This solution allows you to centralize all tasks directly related to project management in the organization. Thanks to this, it is possible to identify theoretical and practical knowledge and its subsequent use in particular projects contributing to increasing their efficiency (Unger et al., 2012, Jonas et al., 2012). It is also recommended to include project portfolio management in project management offices (Spałek, 2012). It should be emphasized that in many Polish public universities there are already project management offices (Chluska and Szczepaniak, 2017).

Review of the literature shows that there are not many publications on the relationship between the single-project management and project portfolio management (Martinsuo and Lehtonen, 2010). Therefore, it can be pointed out that there is a cognitive gap in the area of solutions combining elements of single-project management and portfolio management (Maceta and Berssaneti, 2019), especially at public universities.

Methodology of Research

Presented discussion has been based on the analysis of literature and results of quantitative research. First survey on project management was carried out among EU project managers implemented by public technical universities in Poland in the previous financial perspective of the European Union. Based on data from the SIMIK National Information System 07-13, 659 projects that were carried out by December 31, 2015 at public technical universities from the EU financial perspective for 2007-2013 were identified. These projects had to be implemented individually or as part of a consortium / partnership where the university was a leader. Population defined in this way formed a base for selecting respondents for the survey. Selection was deliberate and random. 20% of projects were drawn at each of 18 public technical universities. Systematic draw was adopted as a drawing scheme. The sample obtained is a result of choosing every k-th unit from the community (k=5). Survey was prepared online and posted on webankieta.pl platform. An invitation to complete the survey was sent to 132 EU project managers, of which 85 fully completed the survey, which resulted in a relatively high 65% rate of return.

However, the second survey was a preliminary study and was based on results of unstructured interviews with heads of units responsible for project management at public universities (Szczepaniak, 2017). Based on advantages and disadvantages of project portfolio management identified during the qualitative study, a survey questionnaire was developed and a survey was conducted among persons managing EU projects at public technical universities in the 2014-2020 financial perspective. This study was aimed at identifying factors determining transition from the level of individual project management to the level of project portfolio management at public universities. The survey was prepared in an online form and published on webankieta.pl platform. Selection of respondents was random, invitation to complete the survey was sent to 28 EU project managers at universities. These managers were identified based on project websites. 15 EU project managers responded to the invitation to complete the survey, which meant a rate of return of 53.6%. The article presents partial results of the study, which concerned rationale for portfolio management at universities. This research approach allowed to take advantage of rich experience of EU project managers from previous financial perspective and new challenges brought by the financial perspective for 2014-2020.

Research Findings and Discussion

Each project requires involvement of a team responsible for managing it. It is natural that in the case of complex projects, which are undoubtedly projects co-financed from EU funds, apart from the project manager, other people are appointed to the management team. Results of the study regarding size of EU project management teams are summarized in Table 1.

Table 1: Size of EU project management teams at public technical universities

Number of people appointed to the project management team	Number	Share (in %)
1	5	5,9
2-5	55	64,7
6-10	20	23,5
More than 10	5	5,9

Source: own study based on research, n=85.

In the case of examined projects, management teams most often consisted of two to five people (64.7% of responses). Only in 5 projects (5.9% of respondents) project management was focused exclusively in the hands of project manager. The same number of projects were managed by teams of more than ten people. For the remaining 23.5% of projects, project management teams consisted of six to ten people.

Project management process is multi-stage and multi-faceted. In the project you can manage all its components or only selected ones. Therefore, in the further part of survey, managers were asked whether indicated elements of the project were managed in their projects. The answers received are summarized in Table 2.

Table 2: Management of individual components of the project

Has the following aspects been managed in your project?	Yes		No		I do not know/ Hard to say	
	Number	Share (in %)	Number	Share (in %)	Number	Share (in %)
Quality	63	74,1	15	17,7	7	8,2
Costs	81	95,3	0	0,0	4	4,7
Time of implementation	79	92,9	4	4,7	2	2,4
Risk	48	56,5	25	29,4	12	14,1
Human resources	74	87,1	7	8,2	4	4,7
Communication	57	67,1	12	14,1	16	18,8

Source: own study based on research, n=85.

Vast majority of EU project managers (74.1% of respondents) indicated that quality was managed within their project. This is a very important issue primarily from the point of view of final beneficiaries who are interested in receiving the highest quality project products and results. High quality of results obtained is also an important element in creating the image of a university implementing the project.

Costs are another element of project, which are at the same one of main constraint in the implementation of each project. Answers given by respondents in the area of project cost management are generally not surprising. Over 95% of respondents indicated that costs were managed in their projects. Remaining 4.7% of managers surveyed could not answer this question unequivocally. Importantly, none of respondents indicated that they did not manage costs. Effective project cost management should ensure that costs are fully eligible.

Implementation of each EU project should take place in accordance with adopted schedule. Project implementation time is another main constraint of each project. Answers given by respondents clearly indicate that implementation time is managed within EU projects. Almost 93% of surveyed managers indicated that in their projects they managed implementation time. Only 4.7% of surveyed managers replied that they did not manage realization time in their projects. On the other hand, 2.4% of respondents had difficulty in providing a clear answer to this question. Effective time management in the project should ensure timely implementation of planned activities and achievement of intended specific effects in the grant agreement.

Implementation of each project involves a certain level of risk. The longer implementation time and the higher budget, the greater risks associated with successful completion of a project. Answers given by respondents indicate that majority of managers (56.5% of respondents) managed risk in their projects. 14.1% of managers had difficulty in answering this question. What is more, 29.4% of respondents said that risk was not managed in their projects. Lower percentage of risk managers in projects is not surprising. For example, in HCOP, part of application regarding risk of failure to achieve project assumptions was not filled in for projects with a value below PLN 2 million.

Human resources management is another important aspect of project management. Implementation of EU project is associated with management of personnel being part of management team but also of staff responsible for implementation of content-based tasks. In connection with this, project managers were asked if they managed human resources in their projects. Respondents' answers confirm important role of human resources in EU projects. 87.1% of respondents said that human resources

management played an important role in their projects. Only 8.2% of managers surveyed replied that they did not manage personnel in their projects. However, 4.7% were unable to provide an unequivocal answer to this question.

Management of human resources in the project is also associated with communication management. Among the surveyed managers, 67.1% indicated that in their project they managed communication. A lower percentage of EU projects in which communication was managed may result from specific communication paths at the university. Respondents asked to assess the correctness of the statement saying about official communication related to implementation of the project at the university pointed to its truthfulness. Their answers are summarized in Table 3.

Table 3: Assessment of correctness of the statement regarding communication related to the project

Communication related to the implementation of the project at the university takes place by business	Number	Share (in %)
I definitely agree	35	41,2
I rather agree	40	47,1
I have no opinion	4	4,7
I rather disagree	6	7,1
I strongly disagree	0	0,0

Source: own study based on research, n=85.

Results obtained indicate that majority of respondents – 47.1%, rather agree with this statement, and 41.2% of EU project managers strongly agree with this statement. Only 4.7% of respondents did not have an opinion on this issue, and 7.1% rather disagree with this statement. This confirms existence of a business route as part of project-related communication, which in some cases may limit possibilities of full communication management.

Presented research results regarding possibilities of managing EU projects have shown that:
- 74.1% of respondents said that they managed quality in their project,
- 95.3% of respondents said that they managed costs in their project,
- 92.9% of respondents said that they managed implementation time in their project,
- 56.5% of respondents said that they managed risk in their project,
- 87.1% of respondents said that they managed human resources in their project,
- 67.1% of respondents said that they managed communication in their project.

It was therefore confirmed that EU projects were managed at public technical universities. This statement allows to evaluate possibilities of managing EU project portfolios, understood as groups of EU projects implemented under a given Operational Program. The adoption of such a criterion for combining EU projects in a portfolio is justified by similar objectives and one source of financing. It also results from existence of common guidelines, manuals, guides and other documents dedicated to relevant Operational Programs.

During the second survey, one of questions asked to respondents concerned assessment of the issue whether project portfolios should be managed at the university. Results obtained are summarized in Table 4.

Table 4: Evaluation of a need to manage project portfolios at the university

Do you think portfolios of projects should be managed at the university?	Number	Share (in %)
Yes	12	80,0
No	3	20,0

Source: own study based on research, n=15.

Respondents' answers indicate that there is a need to manage project portfolios at public universities. The vast majority of EU project managers indicated that they should manage project portfolios at the university. In further part of the survey, the question was asked whether their project could be part of project portfolio at the university. Answers obtained are presented in Table 5.

Table 5: Evaluation of the possibility of including projects in the portfolio

Could your project be part of project portfolio at the university?	Number	Share (in %)
Yes	10	66,7
No	5	33,3

Source: own study based on research, n=15.

Among surveyed EU project managers, almost 67% stated that the project they were managing could represent part of project portfolio at the university. Obtained answers indicate that at most universities several projects are implemented under particular Operational Program, which is confirmed by analysis of ranking lists as part of competitions dedicated to universities in Poland. At the same time, it proves the need to search for new solutions in the field of managing EU projects in public universities.

Conclusion

In the management of a project that takes advantage of external financing under the European Union's structural funds, a strong emphasis is placed on efficient and effective use of funds within contracted time frame, taking into account objectives of allocated funds. Therefore, effective management plays an important role in the implementation of any EU project. It is to ensure that project objectives will be achieved in accordance with the budget and schedule, and products and results produced will be of adequate quality.

Process of managing EU projects begins when application for funding is prepared. Then, after receiving the funding, management processes are strongly intensified until the project is closed. After the end of implementation period, EU projects enter a sustainability period, within which management actions are also necessary.

Empirical studies carried out indicate that strong emphasis has been placed in public universities on ensuring an adequate level of management of EU projects. These activities are aimed at ensuring an appropriate level of product and project results quality within the time specified in the schedule and with full cost eligibility. To achieve these goals, additional efforts are required in human resources and communication management as well as in risk management. New financial perspective also means new challenges faced by public universities participating in the absorption of EU funds. Restrictions on financing management costs in projects, visible primarily in the Operational Program Knowledge Education Development, where these costs were included in indirect costs, lead to a situation in which it is necessary to search for new solutions in the scope of managing EU projects at universities.

These solutions should be developed in a direction of seeking opportunities to combine advantages of managing individual projects with benefits of portfolio management. Particularly important role should be played by project management cells at universities, which bring together qualified employees supporting administrative service process of such projects. However, each project should be managed by an independent manager. This solution will enable an individual approach in the implementation of each project while providing professional service by a team of employees involved in the implementation of many projects.

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Sustainable Quality of Life and Knowledge Management

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Abstract

The purpose of the article is to identify the factors which affect the quality of life in terms of knowledge management at the individual level. A literature review pointed to the existence of a research gap in this field. It has been assumed that the knowledge management context is understood as a desire to acquire knowledge in the field of addiction prevention as well as health and life, but also as a desire to obtain information on solutions to improve the quality of life. Conclusions were drawn on the basis of the results of a survey carried out among the residents of the Department of Housing Management - Social Housing Association called ZGM "TBS" in Czestochowa. The obtained data was subjected to statistical analysis, which included the use of logit analysis. The study allowed to identify statistically significant factors affecting the quality of life in the context of knowledge management.

Keywords: Knowledge Management, Sustainable Quality of Life, Municipal Housing Management.

Introduction

Knowledge in times of information society has become an indispensable resource of every organization. However, the ability to acquire, accumulate, process, generally speaking – to manage knowledge – is very important for every human being, in every field of his/her activity. In this context, it can be assumed that knowledge management affects the quality of life. This issue is particularly significant in terms of health and safety of both society and individuals.

The method of cognitive-critical analysis of the literature on the subject of quality of life and knowledge management was used to prepare the theoretical part. This allowed to indicate the research gap that can be identified between the studied areas, i.e. knowledge management at the individual level with regard to the quality of life. On the other hand, the conclusions presented in the empirical part were formulated on the basis of the survey results obtained from the residents of the Social Housing Association „TBS" in Czestochowa. The data obtained was further subjected to statistical analysis, in which logit analysis was used.

With reference to the issues thus adopted, the following conditions were defined for the identification of factors affecting sustainable quality of life in the context of knowledge management, namely:

- there is an increased need to broaden the knowledge of improving health and life, including addiction prevention,
- organization of regular meetings with residents contributes to raising awareness in the area of life quality,
- there is a growing interest in solutions to improve the quality of life.

On this basis, the main thesis was raised that knowledge management is of key importance for shaping the quality of life.

Quality of Life – A Review of Definitions

The quality of life of the population is the most important indicator of the efficiency and effectiveness of the economy, in the regions and local governments. In a single economic and social space, the most important goal of the state is to create and maintain conditions for the convergence of its regional levels (Kuznetsov, Rastova, Rastov, 2017). The quality of life of the population is determined by the achieved level of development of society, reflecting the level of realization of people's reasonable needs and the degree of satisfaction of their life plans in accordance with economic and social standards (Walczak and Tomczak, 2011). Therefore, the quality of life is one of the aspects of the concept of sustainable development, which is analyzed in three dimensions: economic, social and ecological. In economic terms, it relates to GDP growth that will ensure the right amount of goods and services. In social terms, it concerns the satisfaction of basic social needs, improving the quality of life and reducing unemployment. However, in ecological terms it refers to the improvement of the natural environment and the preservation of natural capital and protection of biodiversity (Zakrzewska, 2019).

Quality of life is a very complex concept that refers to many aspects of human life and depends on many individual and social factors, and the boundaries between individual approaches are fluid. This is an in¬terdisciplinary issue, so it is impossible to formulate a simple definition and uniform methodological criteria for its assessment (Kowalska and Szemik, 2016, Camarero, 2019). In research practice, the measurement of life quality is defined as multidimensional, requiring the combination of knowledge from various fields. Therefore, the subject matter related to it is of interest to many fields of science.

Quality of life is a result of the individual's attitude towards its own psychological and physical well-being, material existence, interpersonal relations possessed, possibilities of personal development and a sense of subjectivity (Walczak and Tomczak, 2011; Tetsuya et al, 2006 ; Padilla et al, 1983; Stempień, 2018). According to the World Health Organization, the individual's quality of life should be understood in the context of their perception of life situation, related to the cultural context and the system of values accepted by the society in which the individual lives, and in relation to life goals, expectations and interests (WHOQOL, 1993). According to E. Skrzypek, „the quality of a person's life is the sum of his/her efforts, struggles, the fight often taken against oneself, it is the ability to make right choices, it is also the ability to compromise, and above all it is the ability to make decisions and take their consequences with all responsibility. It is also quality perceived by the environment, manifested in how we live, how we dress, what we ride, how we eat, how we spend our free time, how we relate to other people, whether we are open to human problems" (Skrzypek, 2001). The quality of life includes all those elements of human life that are related to the fact of human existence, being someone and feeling various emotional states, resulting e.g. from having a family, colleagues and friends (Katana, 2016). It is an existential approach which focuses on distinguishing between two life orientations that can relate to the desire to live and the desire to own (Suchodolski, 1990). Quality of life can also be considered as a sense of accomplishment in connection with the implementation of development and life tasks (Kowalska and Szemik, 2016).

The quality of life defined in the category of needs is associated with the satisfaction of individual needs, including, among other things, the degree of satisfaction with family and professional life, neighborly relations, social relations, health status, the way of spending one's leisure time, education received, occupation and general standards affecting the quality of life within a given local community. R. Kolman defines the quality of life as a degree of satisfying material and

spiritual needs that translate into the standard of human life and society. According to him, the quality of life is the level of expectations satisfying the individual against the requirements of normality, as well as the predictability of life and actions in everyday situations (Kolman, 2000).

It is assumed that the quality of life is determined by two categories of factors, namely: objective conditions and subjective conditions of well-being. The first category includes economic and social conditions, while the second category includes the beliefs, feelings, desires and aspirations of the individual related to existential values (Trzebiatowski, 2011; Rapley, 2003; Sompolska-Rzechuła, 2013, Burkhart-Kriesel, 2017). Factors affecting the quality of human life include objective factors and subjective factors. Objective factors include, among others: the objective reality in which the individual lives, as well as the socio-economic and demographic structure of the population (Katana, 2016). Therefore, it will be an objective assessment of such indicators as, among others: life expectancy, crime rate, unemployment rate, amount of the gross domestic product, poverty rate, solarization rate, weekly number of hours (Chanda, 2015; David, 2017). However, subjective factors are primarily values and content understood as life satisfaction, expectations, aspirations, assessment of perspectives as well as perception of the past and adopted reference points. The following things are important here: a sense of community, a sense of security, perception of one's own financial situation, family relationships, a sense of justice, a hobby, a sense of class identity. The interaction of these factors affects the sense of life satisfaction (Sőrés and Pető, 2015).

Knowledge Management in The Context of Life Quality

The quality of life in subjective categories is interpreted through the prism of human moral and ideological problems, attitudes towards life, as well as preferred values (Sompolska-Rzechuła, 2013). In this view, knowledge as a resource, the desire to acquire knowledge and the ability to use it to preserve or improve the quality of life is a key factor according to the author. In the literature, knowledge and knowledge management relate primarily to organizations. This is understandable, because in today's information society knowledge is a valuable resource of dynamic nature that is a source of market competitiveness. Knowledge, however, can not only contribute to the development of any organization, but can also be a subjective factor in the quality of life of the individual. According to the author, many analogies can be found.

In the literature on the subject "knowledge is the ability to use data and information for a specific action" (Brdulak, 2005). Researchers of the problem of knowledge, noticing the difference but also the interdependence between the triad: data - information - knowledge, explain it using a model created by D. Tobin functioning under the name of the so-called knowledge hierarchy. The foundation is the data which, by linking together, creates information, whereas the information used in practice transforms into knowledge (Hey, 2012).

Knowledge at the individual level also includes skills and motivations. As in the company, the source of knowledge is man and the broadly understood human capital associated with him/her. An important factor, and also a soft component of intellectual capital, is the attitude towards knowledge. According to Skiba and Kwiatek, human attitudes towards knowledge are generally relatively persistent dispositions to assess and value it. In this definition, the object of attitude is knowledge. An important feature of this definition is the fact that attitude in this approach is a phenomenon rooted in the human psyche and the meaning assigned to specific components of a given attitude is an important issue (Skiba and Kwiatek, 2017).

Acquiring knowledge and activity level in this action is a kind of indicator of how valuable the attitude towards knowledge can be. It should be clearly emphasized here that two basic conditions must be met simultaneously in order to generate a true internal motivation that encourages

intellectual effort and knowledge acquisition, or a motivation that encourages the implementation of specific actions and adopting the right attitude towards knowledge. Firstly, the objectives of the action, the expected results, intentions and actions taken must present a specific value for the individual. Secondly, those particular goals should enable the achievement of measurable benefits or serve a specific need - they must therefore be assessed positively (Kwok and Gao, 2005). It is worth emphasizing at this point that regardless of whether the attitude towards knowledge and its acquisition is positive or negative, it has a fundamental impact on the quality of life.

Research Methodology and Procedures

To verify the adopted assumptions, a diagnostic survey using a survey technique was conducted among the residents of the Social Housing Association (abbreviated ZGM "TBS") in Czestochowa.

The study used a structured questionnaire that was created as a result of consultations of the appointed research team, which included five employees of the Faculty of Management of the Czestochowa University of Technology with the Management Board of ZGM TBS in Czestochowa. The prepared questionnaire form contained 22 main research problems related to various aspects of life quality in the city of Czestochowa.

The questionnaire was distributed via internal communication channels in August and September 2019 to the residents of six branches of ZGM TBS in Czestochowa. Due to the low rate of returned surveys, which was at the level of only 100 correctly completed forms, the study period was extended (the end of October - the beginning of November) and the direct interview method (PAPI) was used (For its correct course, it was determined that the sample size should be at the n=384 level, which was estimated on the basis of the sample size formula for a very large population, assuming that the confidence level 1-2 is 0.90 and the maximum error of estimate e = 5%). The final sample size was $n = 531$ of correct answers.

The starting point for statistical analysis was the econometric modeling instrumentation in the form of a multivariate ordered logit model (Kufel, 2007). The use of logit analysis was aimed at determining potential knowledge management factors affecting the quality of life of the residents of the ZGM TBS housing stock in Czestochowa. The estimated models included only zero - one variables coded on the basis of the subjects' answers (dependent variables). It has been assumed that the dependent variable (Y) defines the subject in the following way:

— $y_i = 1$, if i-th resident of the ZGM TBS housing stock declares willingness to acquire knowledge,
— $y_j = 0$, if j-th resident of the ZGM TBS stock is not interested in acquiring knowledge.

It should be emphasized that these variables were referred to four questions from the questionnaire, identified for the purposes of this scientific study as:

— $\boldsymbol{Y1}$ - interest in the knowledge of addiction prevention,
— $\boldsymbol{Y2}$ - interest in the knowledge regarding health and preventive medicine,
— $\boldsymbol{Y3}$ - interest in participating in educational meetings about improving the quality of life,
— $\boldsymbol{Y4}$ - solutions to improve quality.

The input set of independent variables (X) included variables characterizing the inhabitants of the ZGM TBS housing stock in Czestochowa. For the purposes of the study, the following were selected as explanatory variables: gender, age, level of education, marital status, and status in ZGM TBS. Variants of responses, together with the reference group, are given in Table 1.

Table 1: List of explanatory variables (own calculations)

Statistical data of the respondent		Independent variable	% Value	Reference group
Gender	Female	F	57%	
	Male	M	43%	*
Age	18-24 years old	A1824	4%	*
	25-39 years old	A2539	25%	
	40-59 years old	A4059	42%	
	60 years old and above	AP60	29%	
Education	Graduate	EG	31%	
	high school	EHS	36%	
	Professional	EP	25%	
	primary school	EPS	7%	*
Marital status	Single	S	15%	
	Married	MA	46%	*
	Widowed	W	16%	
	Divorced	D	11%	
	Separated	S	4%	
	Partnership	P	7%	
Status	Housing Association member	HA	39%	
	Tenant	T	61%	*

The research sample consists of 302 women and 229 men (reference group). The subjects (i.e. respondents) of the study were both members (39% of the surveyed population) and tenants themselves (61% of the surveyed population - reference group) of ZGM TBS in Czestochowa. The study mainly involved people over 40, of which 42% are people aged 40-59, while 29.4% are people over 60 years of age. The smallest group consists of young people, up to 24 years of age - 4%, who were selected as the so-called reference group. Taking into account the next category of variables, i.e. the level of education, the smallest share in the sample was recorded in the group of persons with elementary (primary) or lower secondary education - 7% (reference group). The most numerous group in this category was recorded among persons with secondary education (36%). Most of the people participating in the study were married - 46.6% (reference group), then single people (widowers / widows - 16%, bachelors / maidens - 15%, divorced people - 11%).

Research Results and Discussion

For the purposes of the study, eight logit models were estimated using the Gretl program, two for each of the considered explanatory variables (full logit model including all explanatory variables and a reduced logit model including only those variables that show significance features). The developed logit models were created based on the structure of answers to research questions defined as explained (i.e. dependent) variables. Table 2 presents the results of estimated models for the variable $Y1$.

Table 2 : Results of estimated logit models for the $Y1$ variable (own calculations)

Model 1					
	Coefficient	*Standard error*	*z*	*p value*	
Const	0.511452	0.473193	1.081	0.2798	Credibility ratio test 24.8 p = 0.02
F	0.319501	0.186900	1.709	0.0874*	
A2539	0.637881	0.442484	1.442	0.1494	
A4059	0.154310	0.433941	0.3556	0.7221	
AP60	−0.256241	0.455450	−0.5626	0.5737	
EG	−0.317853	0.234129	−1.358	0.1746	McFadden R-squared 0.0457
EHS	−0.485892	0.285805	−1.700	0.0891*	
EP	−0.242674	0.424163	−0.5721	0.5672	
S	−0.0752068	0.294374	−0.2555	0.7984	
D	0.289145	0.290645	0.9948	0.3198	The adjusted R-squared 0.007
W	0.255858	0.320463	0.7984	0.4246	
P	−0.700789	0.467489	−1.499	0.1339	
NZ	−0.731102	0.392756	−1.861	0.0627*	
HA	−0.284033	0.203803	−1.394	0.1634	
Model 2					
	Coefficient	*Standard error*	*z*	*p value*	Credibility ratio test 15.16 p=0.0017
const	0.397256	0.149371	2.660	0.0078***	
F	0.358045	0.181671	1.971	0.0487**	McFadden R-squared 0.0209
EHS	−0.383068	0.206546	−1.855	0.0636*	The adjusted R-squared 0.0099
NZ	−0.779200	0.352136	−2.213	0.0269**	

Explanation, significance level of parameters: *** $\alpha = 0{,}01$, ** $\alpha = 0{,}05$, * $\alpha = 0{,}1$

Looking at the obtained results (Table 2), it can be stated that age and status in the housing resources of ZGM TBS in Czestochowa are not statistically significant factors determining the desire to acquire knowledge of addiction prevention. In the case of data analysis in groups distinguished in terms of education, a statistical relationship can be observed in the case of EP (full and reduced model). Comparing this to the other groups, it can be stated that the probability of acquiring knowledge in the field of addiction prevention will be lower in this case. A similar situation (full model) is shaped for the variable F (gender) and NZ (informal relationships).

In the reduced model, these variables show a statistically greater relationship (level of significance $\alpha = 0{,}05$). Analysis of the obtained material showed that the inhabitants of the ZGM TBS housing stock in Czestochowa are most interested in acquiring knowledge of healthy lifestyle prophylaxis, in particular diet (52% of respondents). It should be emphasized here that both model 1 and 2 are characterized by the correctness of matching, as evidenced by the value of the likelihood ratio test (24.8 - p = 0.02 and 15.16 - p = 0.0017, respectively). On this basis, the null hypothesis of the total assessment irrelevance of the parameters of these models should be rejected.

However, taking into account the second of the analyzed variables - $Y2$, interest in the knowledge of health and preventive care (see Table 3), it should be observed that each of the selected groups

of explanatory variables has features of statistical significance. It can therefore be concluded that this factor plays a large role in improving the quality of life of the inhabitants of the ZGM TBS housing stock in Czestochowa. This is because these variables, as in the case of model 1 and 2, are characterized by the correctness of matching, which is also the basis for rejection of the null hypothesis.

Table 3 : Results of estimated logit models for the variable $Y2$ (own calculations)

Model 3					
	Coefficient	*Standard error*	*z*	*p value*	
Const	0.339954	0.475496	0.7149	0.4746	Credibility ratio test 37.6938 p=0.0003
F	0.491312	0.195455	2.514	0.0119**	
A2539	–0.402770	0.436052	–0.9237	0.3557	
A4059	–0.983984	0.438558	–2.244	0.0249**	
AP60	–0.921728	0.461100	–1.999	0.0456**	
EG	–0.456076	0.233991	–1.949	0.0513*	McFadden R-squared 0.053907
EHS	–0.644278	0.298678	–2.157	0.0310**	
EP	–0.516768	0.440537	–1.173	0.2408	
S	–0.454647	0.301297	–1.509	0.1313	
D	–0.322114	0.320136	–1.006	0.3143	The adjusted R-squared 0.0138
W	0.545222	0.319704	1.705	0.0881*	
P	1.04020	0.467862	2.223	0.0262**	
NZ	0.202325	0.411174	0.4921	0.6227	
HA	–0.377390	0.211028	–1.788	0.0737*	
Model 4					
	Coefficient	*Standard error*	*z*	*P value*	Credibility ratio test 28.381 p=0.0004
const	–0.264168	0.245153	–1.078	0.2812	
F	0.511439	0.192574	2.656	0.0079***	McFadden R-squared 0.040
EHS	–0.486629	0.222575	–2.186	0.0288**	The adjusted R-squared 0.0148
NZ	–0.644844	0.253665	–2.542	0.0110**	

Explanation, significance level of parameters: *** $\alpha = 0{,}01$, ** $\alpha = 0{,}05$, * $\alpha = 0{,}1$

Confirmation of the great interest in the knowledge of health and preventive care is the fact that the inhabitants of the ZGM TBS housing stock are mainly interested in acquiring knowledge in the field of hypertension, heart attack, stroke and therefore diseases that affect people over 40 years of age. In addition, questionnaire analysis showed that respondents were interested in the knowledge of physical activity and healthy eating, as well as ways to manage stress.

The results of the estimated models (models 5 and 6) are slightly different for the $Y3$ variable of interest in participating in educational meetings in the field of improving the quality of life (Table 4).

Table 4: Results of estimated logit models for the $Y3$ variable (own calculations)

Model 5					
	Coefficient	*Standard error*	*z*	*p value*	
const	−0.586423	0.518962	−1.130	0.2585	Credibility ratio test 34.1944 p=0.0011
F	−0.354934	0.206181	−1.721	0.0852*	
A2539	−0.453124	0.494337	−0.9166	0.3593	
A4059	−0.0992520	0.480215	−0.2067	0.8363	
AP60	−0.226351	0.502828	−0.4502	0.6526	
EG	0.0797071	0.260336	0.3062	0.7595	McFadden R-squared 0.0539
EHS	−0.0546446	0.314749	−0.1736	0.8622	
EP	0.474029	0.440659	1.076	0.2820	
S	−0.388549	0.350520	−1.108	0.2676	
D	0.882508	0.298647	2.955	0.0031***	The adjusted R-squared 0.0097
W	0.0885774	0.342275	0.2588	0.7958	
P	−0.958272	0.657891	−1.457	0.1452	
NZ	0.0775353	0.415431	0.1866	0.8519	
HA	−0.409196	0.228159	−1.793	0.0729*	
Model 6					
	Coefficient	*Standard error*	*z*	*P value*	Credibility ratio test 9.88793 p=0.0195
const	−0.613666	0.158594	−3.869	0.0001***	
F	−0.343590	0.194947	−1.762	0.0780*	McFadden R-squared 0.0155
D	0.0139934	0.308920	0.04530	0.9639	The adjusted R-squared 0.002
HA	−0.520753	0.209045	−2.491	0.0127**	

*Explanation, significance level of parameters: *** α=0,01, ** α=0,05, * α=0,1*

Analyzing the estimated models for the $Y3$ variable, it can be stated that:

- in the case of the full model (model 5): age and education did not prove to be a statistically significant factor determining the probability of occurrence of the examined factor (participation in educational meetings about improving the quality of life), a low significance level can be seen for the criteria of gender and status in the housing stock of ZGM TBS; a high level of significance can be observed for variable D, and therefore people who, due to the greater amount of time, will be happy to acquire knowledge during educational meetings,
- in the case of the reduced model (model 6): statistical significance was demonstrated by the variables F and HA, with higher probability of occurrence of the examined factor in persons from the point of view of status in the ZGM TBS housing resources.

In both models 5 and 6, the correct credibility of the model is clearly visible, therefore the null hypothesis should be rejected in favor of the H1 hypothesis. Delving into the respondents' preferences, the most desirable educational meeting is participation in workshops with a dietitian as well as a doctor. The respondents were also willing to meet with a lawyer and a psychologist.
In the next modeling (model 7), similarly to models 1 and 5, age did not show statistical significance. The status in the housing stock of ZGM TBS did not play a significant role either (as

in model 1). Statistical significance can be seen in the case of three groups of factors, i.e. gender and then education (EP) and marital status (D). It is these three variables that were analyzed in the reduced model (model 8). From the point of view of improving the quality of life, the highest probability of occurrence of the examined factor ($Y4$) can be seen in the case of gender (Table 5).

Table 5: Results of estimated logit models for the $Y4$ variable (own calculations)

Model 7					
	Coefficient	*Standard error*	*z*	*p value*	
const	−0.426568	0.466563	−0.9143	0.3606	Credibility ratio test 34.1944 p=0.0243
F	0.488256	0.182776	2.671	0.0076***	
A2539	0.272246	0.433535	0.6280	0.5300	
A4059	−0.228656	0.430791	−0.5308	0.5956	
AP60	−0.399044	0.453564	−0.8798	0.3790	
EG	0.287476	0.223871	1.284	0.1991	McFadden R-squared 0.0332
EHS	0.402918	0.278982	1.444	0.1487	
EP	0.932615	0.429983	2.169	0.0301**	
S	0.00637252	0.278545	0.02288	0.9817	
D	0.460734	0.287342	1.603	0.1088*	The adjusted R-squared -0.0042
W	0.546929	0.313219	1.746	0.0808	
P	0.626916	0.477459	1.313	0.1892	
NZ	−0.334131	0.390480	−0.8557	0.3922	
HA	0.0384028	0.196510	0.1954	0.8451	
Model 8					
	Coefficient	*Standard error*	*z*	*p value*	Credibility ratio test 12.7021 p=0.0053
const	−0.253758	0.137118	−1.851	0.0642*	
F	0.509014	0.175752	2.896	0.0038***	McFadden R-squared 0.0170
D	0.598202	0.349594	1.711	0.0871*	The adjusted R-squared 0.0062
HA	0.438543	0.285185	1.538	0.1241	

Explanation, significance level of parameters: *** $\alpha = 0{,}01$, ** $\alpha = 0{,}05$, * $\alpha = 0{,}1$

The analysis of the questionnaire explicitly shows that the residents of the ZGM TBS housing stock are interested in the installation of gas sensors, as well as video surveillance. In their opinion, these two factors mainly affect their safety and thus improve the quality of life. In addition, the respondents indicated that social campaigns such as: "Be safe, senior" or "Internet safety " (action directed at children) have an impact on improving this quality.

Conclusions

The objective of the study was to identify statistically significant factors affecting the quality of life in the context of knowledge management, the implementation of which required the use of logit modeling. The estimated logit models (full and reduced) showed that interest in the knowledge of addiction prevention, knowledge concerning health and preventive medicine, interest in participation in educational meetings about improving the quality of life as well as

learning solutions that improve quality have a significant impact on improving the quality of life in the ZGM TBS housing stock in Czestochowa. It should be emphasized that the relatively higher quality of the estimated models can be seen in the case of models 5 and 6. In these models the number of 'correct prediction' cases is 72.6%. This means that in the case of the $Y3$ variable, the prediction corresponds to the actual state to the greatest extent. In other models the following may be observed: model 1 - 64.3%, model 2 - 62%, model 3 - 68.5%, model 4 - 66.9%, model 7 - 59.3% and model 8 - 56.1 %. To sum up, the overall case classification turned out to be correct, which can be considered a satisfactory result. This means that most of the accepted explanatory variables have a statistically significant effect on the dependent variables found.

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Regulatory Aspects of Ensuring the Development of Competitive Biofuels Production in Ukraine

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Abstract

The purpose of the article is to determine the strategy of development and effective principles of regulation of biofuels production in Ukraine at the competitive level.

To systematize historical trends in the development of world and domestic energy, a dialectical method has been used. Using the monographic method, the priority principles of formation and mechanisms of regulation of energy policy and biofuels production are investigated. The forecasting method is used to formulate conceptual foundations of regulation and strategy for the development of competitive production of biofuels, and abstract-logical – for the theoretical generalization and formulation of conclusions. To ensure a solution to raised the problem, the well-known strategic planning tool – SWOT-analysis was used.

Based on the SWOT-analysis and the results of the study, a comprehensive mechanism for increasing the rate of industrial production of biofuels in Ukraine at a competitive level has been formed, containing the following priority regulatory measures: technology transfer and innovation; harmonization of the legal framework with the European Union; introduction of energy-saving and energy-efficient technologies; proper consulting and audit; attraction of highly skilled personnel; cluster approaches; provision of principles of nature conservation; development of foreign economic activity in the biofuels industry. The state regulatory strategy for the development of competitive biofuels production involves the comprehensive application of economic, legal and administrative regulatory methods.

For the first time, the principles of regulatory policy (consistency, flexibility, homeostaticity, synergy, competence) that are based on system-wide properties (system unity, development, complexity, compatibility, invariance, information unity) are developed in the field of stimulation of

production and consumption of biofuels. The direct process of their implementation in the fuel and energy complex of our country should be carried out on three main levels of management: macro-, meso- and micro-levels.

Adherence to the developed strategic principles of state regulatory policy will transfer the state to the energy saving type of economy and reduce energy intensity of production, increase the share of renewable energy resources in the national structure of energy consumption, ensure the formation of competitive production of biofuels in Ukraine, create favorable conditions for attracting to the agro-industrial complex external and internal investment inflows, the introduction of the latest innovative technologies and modern experience of effective work of the agricultural sector on the basis of diversification and clustering of production.

Keywords*:* Management, Fossil Fuel, Energy Dependence, Biofuels Industry, Competitiveness, SWOT-Analysis, Principles of Regulation, System Properties.

Introduction

The advanced countries of the world in the current economic environment are intensively developing rational ways of balancing their own structure of consumption of energy resources to ensure the independent functioning of the national economy by reducing the supply of imported energy. The complex of practical questions on significant reduction of energy consumption will be effectively solved only if the identified problem is clearly delineated in a structured system, localized on a territorial principle, comprehensive study of relationships with environmental factors, identified sources and causes of energy leakage. Constant exacerbations and conflicts at the state level in the supply of fossil energy are forcing the national economies of developed countries to constantly focus their research on shaping the competitiveness of biofuels. The development and implementation of diversified programs aimed at supporting domestic and international biofuels production seek to find effective and sustainable ways to overcome obstacles in bioenergy development, to create a balanced management system for scientific knowledge and research to promote innovation in this field. This process will lead to rational and efficient use of energy resources to sell produced products at national and world markets, as well as to stabilize the growth of demand for different types of biofuels, which should become a necessary component in the overall structure of needs of different categories of consumers.

The current conditions indicate that Ukraine has an irrational structure of energy resources use, so the problem of improving the management efficiency in energy consumption and reducing the energy consumption of produced products is quite relevant in theoretical and practical terms. The very volatile and unpredictable situation in the gas and natural gas markets and the possible negative changes in their further appreciation, as well as the need to dramatically improve the environmental status of cities and rural areas, require accelerated development of industrial production and consumption of biofuels, in particular for motor transport , agricultural machinery, housing and communal services, etc. Therefore, it is relevant to study and use the world experience in the development of the biofuels industry, as well as to put into practice state mechanisms of regulation and facilitate cooperation with developed countries in the field of development and implementation of highly efficient technologies of competitive production of biofuels in our country, bringing their technical and economic levels world standards.

The global demand for energy and related services to meet social, economic and human development, well-being and health is increasing. Energy is a central requirement in our daily lives to improve human development, leading to economic growth and productivity. Returning to renewable energy sources to help mitigate climate change is a great approach to sustainable development and meeting the energy needs of future generations [1]. Reducing energy demand and improving energy efficiency are two of the main goals sought in many national and international programs (such as EU 20-20-20 goals) in the transformation of energy systems [2].

Materials and Methods

Since the oil crisis of 1973, biofuels have been used extensively for many years to increase energy independence, reduce the cost of importing fossil fuels, and strengthen the agrarian sector of the economy [3]. Biofuels have the potential to change the transport and agricultural sectors of decarbonized societies. However, the stability of these fuels has been questioned in recent years due to the compromise of food against fuel, carbon accounting and land use [4].

However, the IEA estimates that bioenergy is one of the most effective and promising alternative energy destinations. The technologies for the production and use of bioenergy resources meet the requirements of the Paris Climate Agreement (COP 21) on environmental protection. The rapid and steady pace of development of the bioenergy industry over the last decades is due to a number of factors, the key ones being the widespread use of state programs to limit greenhouse gas emissions and environmental protection, reducing traditional energy resources while accompanying rising energy prices, improving the competitiveness of energy and energy. . The successful development of the biofuels industry abroad is driven by stable and diverse support from the state. Forms of support vary from country to country, but generally boil down to tax breaks and vacations; providing interest-free loans; setting a fixed tariff for green electricity; public financing of research and development works and pilot projects, etc. [5].

It should be noted that in the world, Ukraine is one of the most energy-intensive industries, so the competitiveness of production is directly dependent on the prices of fossil fuels, whose value is constantly increasing. The rise in prices over the last decade for fossil fuels has led to an increase in the competitiveness of renewable energy resources, in particular biofuels.

In agricultural enterprises, the cost of production is increasing annually, which is largely due to the constant appreciation of used energy materials produced from natural resources, such as fuel and lubricants, fertilizers, and natural gas. It is possible to reduce these resources at the expense of their alternative production from agricultural products, the technologies of which have been elaborated by world and national science, practically applied in many countries of the world and experimentally tested in Ukraine [6]. In spite of this, there is an extremely unsatisfactory rate of development of the biofuels market today, despite the adoption of a number of legislative acts aimed at solving this problem. The lack of consistency and consistency in the organizational and economic mechanisms for the development of the biofuel industry is conditioned by the lack of political will for their full implementation, as well as economic and political interests that have emerged in the energy market of Ukraine and other countries [7].

The wide range of urgent problems of pursuing a rigid state government policy in the field of bioenergy and the lack of incentive measures for biofuels producers have led to a slowdown in investment in the industry and the curtailment of the biofuels market in Ukraine in recent years. In order to create favorable investment climate for the development of bioenergy in Ukraine and to develop the market of biofuels, the state policy should be aimed at introducing an effective mechanism for supporting the production and use of biological fuels. The effectiveness of this mechanism is based on the optimal correlation between the administrative and market instruments of regulation of the bioenergy segment of the fuel and energy complex. The decisive role in shaping the state policy of bioenergy development in Ukraine belongs to the processes of development and adoption of legislation aimed at introducing tax, credit and price instruments, which will be more directed to the sphere of regulation of demand for biofuels [8].

The scarcity of its own energy sources compels the government to decide on increasing their imports. However, in the context of reducing fossil fuels in the world and the rapid increase in prices for them, solving energy problems through imports alone is not sufficient, which requires the introduction of effective regulatory instruments aimed at developing national biofuels. The current processes of European integration and the low level of consumption of renewable energy resources, in particular biofuels, in the structure of energy consumption requires the development of perfect regulatory principles and a coherent strategy for the sustainable development of national energy policy and

independence, which are now one of the weakest links in state regulation in Ukraine. [9].

The creation of a new environmentally friendly energy sector will facilitate the deployment of rational diversification processes for energy resources and the strengthening of Ukraine's energy and economic security. Along with the market mechanism of self-regulation, the state should also be the main regulating subject of a market economy. Especially versatile and purposeful should be the functions of public authorities in the context of economic reform, especially where the rights of private property are not clearly defined, as a result of which private owners lack the motivation to use their capital for the benefit of society as a whole, including the development of a sustainable energy sector. This is forcing the state regulatory bodies of Ukraine to pay greater attention to energy efficiency and energy conservation policies while respecting the environmentally friendly use of energy resources. Among the unresolved tasks of the state policy in the regulation of the fuel and energy complex is the urgent solution of the problem of reforming the national energy supply through the introduction of effective mechanisms of state regulation in accordance with world practice and EU requirements.

This process requires that, a set of priority measures will be implemented as soon as possible that will allow: to make the transition to competitive internal and external energy markets; to create an efficient internal infrastructure; introduce transparent market rules for energy activities; increase the level of financial discipline and responsibility and introduce mechanisms of insurance of non-payment risks for the used energy resources; to provide systematic control over pricing processes in the energy sector; introduce a system of mixed state and market regulation of the activities of energy market entities; to carry out systematic regulatory control over the activity of natural monopolies; increase the share of renewable energy resources in the national energy mix, giving priority to biofuels. The dynamic development of bioenergy requires a comprehensive optimization of this process, taking into account the needs of the energy and food sectors of the economy, as well as state regulation of export of biofuels.

The purpose of the research is to identify a strategy for the development and regulation of biofuels in Ukraine at the competitive level.

The conducted research is based on fundamental principles of economic theory, scientific developments of domestic and foreign scientists on the issues of state and market regulation of the development of competitive biofuel production, as well as the current legislative base of Ukraine. The study used general and specific scientific methods and techniques. In particular, a dialectical method was applied to systematize the historical trends of world and domestic energy development. Priority principles of formation and mechanisms of regulation of energy policy and biofuel production were investigated using the monographic method. The prediction method is used to formulate conceptual bases for regulation and strategy for the development of competitive biofuel production, and abstract-logical - for the implementation of theoretical generalization and formulation of conclusions. The well-known strategic planning tool - SWOT-analysis was used to solve the problem. The methodological underpinnings of SWOT analysis are a comprehensive assessment based on a matrix of interrelationships of the strengths and weaknesses of the industry, as well as a consideration of a range of factors of available opportunities and threats to the environment.

Results and Discussion

The system of urgent problems of rational use of energy resources under conditions of intensive increase of production of foodstuffs, improvement of their qualitative characteristics and formation of food security are among the priority tasks of the world economy. Today, however, an energy crisis that has swept almost the entire world has combined food and energy issues into an interconnected scenario for the continued sustainable development of the planet's future existence. Thus, an increasing number of countries are declaring their interest in accelerating the production of various types of energy from renewable energy sources, and the biofuels industry is now one of the fundamental positions in the economy of any energy-dependent country and in the development of

consumer services and materials markets.

Effective solution of the problem of energy supply is a key, paramount task of a sustainable, ie harmonious with nature and society, development of each state, implementation of its independent foreign policy, internal political and social stability, raising the economic and cultural standard of living of the population. As a consequence, the role of energy in solving sustainable development challenges is growing. The steady rise in world prices for traditional energy and energy produced in recent years has been exacerbated by the impact of the problem of energy supply on these factors, especially in countries with fragile economic status to which Ukraine belongs.

Changes in approaches to the formulation of states' energy policy are taking place in the world: the transition from the outdated model of functioning of the energy sector, dominated by large producers, fossil fuels, inefficient networks, imperfect competition in the markets of natural gas, electricity, coal - to a new model in which creates a competitive environment, equalizes opportunities for development and minimizes the dominance of one of the types of energy production or sources and / or routes of fuel supply. At the same time, it is preferable to increase energy efficiency and use of energy from renewable and alternative sources. This poses new economic and technological challenges for Ukraine, opens new opportunities for finding and implementing innovative developments in the field of fossil fuel production and transformation, transformation, supply and consumption, necessitating the formation of a new state energy policy [10].

The inevitable process of liberalization of prices for energy resources should take place in stages, but in the current unstable economic and political situation, our country is not immune to the trigger effect - a sharp increase in prices, which can lead to shock therapy for the whole economy. At the present stage of development, the disparity in prices for energy, industrial and agricultural products in Ukraine determines the prospect of introducing innovative technologies for the use of plant products. Industrial biofuel production process makes agricultural products analogous to industrial or energy. Given the rather strong potential of the scientific, technical and industrial base in the agricultural sector of Ukraine regarding the cultivation of agricultural biomass, the biofuel industry has a high level of economic efficiency, which gives every reason to allocate it to a separate branch of energy.

The Law of Ukraine “On Alternative Fuels” aims at supporting and developing the production of biofuels. In particular, in Art. 9 of this law states that the organizational and economic measure to increase production (production) and consumption of alternative fuels is to stimulate investment and the introduction of new technologies. The growth of investments aimed at the production of biofuels will be a decisive factor in adjusting the production process, the transition of agricultural enterprises to their consumption and the creation of an economic mechanism to regulate market relations in the field of alternative fuels [11]. Therefore, the regulation of the biofuels industry should be viewed through the prism of optimizing production, finding the most profitable areas of entrepreneurship and rational maneuvering of financial flows. In order to achieve sustainable biofuel production, it is necessary to develop an effective development strategy based on which the high economic efficiency of the bioenergy industry will be achieved and optimal ratios will be created in the domestic and foreign markets. However, the biofuel production process is currently under conditions that are not specific to global market trends and relationships. Regulatory decisions should be avoided in returning to the old framework of the planning and administrative system, with its almost comprehensive planning and tight regulation of the established limits. Addressing the problematic aspects of biofuel production will depend on the coordination of joint action, that is, on political and administrative consolidation in government.

Properly developed managerial strategic decisions on the implementation of energy conversion of biological raw materials contribute to the development of diversification processes in the production activities of the agro-industrial complex, ensure the entry into the market of production of new types of basic and by-products, reduce the negative impact on the environment at the regional and national levels, which results economic and financial condition of the agro-industrial industry and the country as a whole [12].

Therefore, in order to formulate an effective strategy for managing and regulating the processes of bioenergy conversion, a selection of appropriate effective analytical tools has been made, among which SWOT analysis is at the forefront. This kind of analysis is one of the necessary elements of scientific research to create sound prerequisites for the development of different levels of strategic and marketing plans, in particular for the formation of competitive biofuels production in Ukraine. The results of the SWOT analysis (Table 1) make it possible to objectively evaluate the internal forces and resource potential of the industry to realize the potential of the existing external capabilities and to confront the various threats that are constantly emerging in the changing market conditions. As a result of a comprehensive justification of the weaknesses, a system of internal deficiencies is identified that needs immediate elimination or minimization.

Table 1: Matrix of SWOT-analysis of strategy for development and regulation of biofuels production in Ukraine

Indicators of the matrix		Environment	
		Opportunities 1. Energy independence of agro-industrial complex and expansion of consumption of biofuels. 2. Inflow of internal and external investments and development of national production of biofuels. 3. Increasing employment and reducing the negative manifestations of seasonality of production.	**Threats** 1. Traditional energy subsidies and low biofuels consumption. 2. Lack of state support and legal nihilism in the field of bioenergy. 3. Increased competition and higher standards in biofuel production.
Internal environment	**Strengths** 1. Energy dependence and unregulated prices for traditional energy sources. 2. High biomass potential for biofuel production. 3. Reduction of waste accumulation and improvement of environmental situation.	Field of SO 1. Reduction of energy dependence and sustainable development of the agricultural sector of the country's economy. 2. Development of national production of biofuels on the basis of favorable investment climate. 3. Improvement of conditions of agricultural production and ecological situation in the country.	Field of ST 1. Development of the state program of development of biofuel production. 2. Stop the government's lobbying for traditional energy and adopt effective laws on the development of biofuels production. 3. Formation of ecologically clean production on the basis of development of competitive biofuel production.
	Weak sides 1. High energy intensity and cost of agricultural products and seasonality of production. 2. Low level of innovation and investment development. 3. Export of plant products for processing into different types of biofuels.	Field of WO 1. Bringing energy production indices of national production to the world level based on biofuel consumption. 2. Formation of competitive biofuel production on the basis of innovation and investment development. 3. Decrease of export of plant products abroad and increase of employment of the population in the country, especially in the agrarian sector of economy.	Field of WT 1. Low production of competitive agro-industrial products and rising unemployment. 2. Development of Ukraine as a raw material appendage of Europe. 3. Use of fertile lands of Ukraine for biomass cultivation and food security problems.

Source: created by the authors

Thus, at the intersection of the Sectors Strengths - Opportunities sectors, the most effective areas of strategic activity are formed, which provide the comparative advantages of the industry. As we can see, due to the considerable energy dependence of the Ukrainian economy on the import of traditional energy sources, it is strategically necessary to develop national production of biofuels based on the high economically viable biomass potential.

This process will ensure, first and foremost, the energy independence of the country's agro-industrial complex, expanding further the consumption of biofuels in other sectors of the national economy. Secondly, based on the creation of a favorable investment climate, there will be an inflow into the agricultural sector of domestic and foreign investment economies, which will allow the export of biofuels to the European energy market in the future. Thirdly, the formation of a competitive biofuel industry will help increase the employment rate of rural population and reduce the seasonality of agricultural production, as well as create real prerequisites for reducing waste accumulation and improving the environmental situation in the regions and in Ukraine as a whole.

An assessment of the Strengths - Threats sector indicates the feasibility or refusal of the further development of the area of activity or industry in question. The process of forming a competitive national biofuel production requires the development of a state support program to increase the pace of development of the biofuels industry, to end the government's lobbying of traditional energy in the form of subsidies and to minimize the problem of food security in Ukraine.

A study of the Weaknesses - Opportunities sector creates the prerequisites for identifying key challenges that need to be effectively addressed, as unfulfilled opportunities can translate into potential threats. As a result, the development of competitive biofuel production in Ukraine needs to be carried out on the basis of innovation and investment development, which will allow to reduce or stop the export of vegetable raw materials for processing to biofuels abroad and will provide a rational process of energy use with bringing the energy production indicators to the level of energy intensity. .

It also requires a thorough analysis of the Weaknesses - Threats sector, where emerging relationships create various risks that can halt the industry's development and lead to a loss of production and subsequently to bankruptcy. In this case, the main risks are related to the low level of production of competitive agro-industrial products, the further development of Ukraine as a raw material appendage of the European Union, the increasing risk of using fertile land of Ukraine for biomass production.

In the process of becoming biofuel production in market conditions, its financing should be made on the basis of internal and external resources. Internal resources include active savings of the owner, which are directed to the creation and development of the biofuel business; current receipts to support existing production and further depreciation. External resources include received funds from various financial institutions (banks, credit and investment companies), as well as funds that may come from business colleagues, stakeholders, sponsors, etc.

According to the Law of Ukraine “On the Principles of State Regulatory Policy in the Field of Economic Activity”, six basic principles of state regulatory policy have been established: 1) expediency; 2) adequacy; 3) efficiency; 4) balance; 5) predictability; 6) transparency and consideration of public opinion [13]. In order to form and develop competitive biofuel production in Ukraine, we are offered to use, in addition to the above-mentioned principles of state regulatory policy, principles based on system-wide properties (Table 2).

Table 2: Characterization of proposed regulatory principles and system-wide properties for competitive biofuel production

The essence of the proposed principles of regulation	The essence of system-wide properties
1. Funnels - the persistence of accounting policies used to compare reporting information. 2. Flexibility - the ability to change their directions in the process of business planning due to the emergence of unforeseen circumstances and adaptation to market requirements. 3. Homeostatic - the creation of economic and organizational mechanisms of self-regulation and stabilization in the production system, so that it is able to perform its functions in a stable manner within the tolerances and withstand dysfunctional influences. 4. Synergism - the use of several mutually agreed methods (strategies) has a greater effect than the sum of the effects of the isolated application of each method (strategy). 5. Competencies - the presence of special professional knowledge, skills and professional experience acquired as a result of professional training and professional activity.	1. System unity - is ensured by close links between technological processes of biofuel production (from the formation of raw materials to the sale of finished energy products to consumers); 2. Development - based on the expansion and improvement of the production of various types of biofuels and the formation of their competitive production in the long term in both the internal and external markets for energy. 3. Complexity - due to the integrated use of raw materials for the introduction of waste-free technologies in the production of biofuels. 4. Compatibility - is ensured by the joint operation of production systems on the basis of traditional energy carriers, biofuels analogues and their mixtures in different ratios. 5. Invariance - creation of universal or typical energy systems that provide a continuous process of increasing the share of biofuels consumption in the structure of national energy consumption. 6. Information unity - providing objective information on the economic, energy and socio-environmental characteristics of consumption of traditional and biological fuels.

Source: created by the authors

The direct implementation of these principles and system-wide properties in the fuel and energy complex of our country must be carried out at three main levels of management: macro-, meso- and micro-levels. At the macro level, it is necessary to ensure a system-wide change in national energy consumption, increasing the share of the use of renewable energy sources, in particular biofuels. On the mezzanine level, the consumption of biofuels is increased in the context of natural and economic regions, taking into account the regional structure of consumption of traditional energy sources (principles of behavioral economy). At the micro level there is a thorough analysis of the indices of local energy supply in each region and the possibilities of realizing economically feasible biofuel production potential.

Indirect stimulation of competitiveness in the field of biofuel production will be achieved on the basis of tax rebates on investments in the active part of fixed capital, reduction of the term of depreciation, introduction of tax incentives in financing scientific works of research institutes, insurance of risks and insurance of risks. An important role in the structural changes of the economy will be played by the introduction of the contract system, whose functions and methods in a market economy are gaining new meaning. Government institutions order the required products (services), at market prices. Instead, private capital may lease to the state factories, factories, equipment, research centers, etc.

One of the main directions of improvement of domestic biofuel production is a balanced process of its transfer to the path of intensification and innovation-investment development, ensuring optimization of acreage for the formation of raw materials base. By developing a sound and scientifically sound economic support system, the cost of producing biofuels can be reduced. The use of agricultural products for the production of biological energy will increase the consumption of

cheap renewable energy, thereby increasing national competitiveness.

Therefore, increasing the energy efficiency of the national economy requires that in the shortest possible time a set of priority measures will be implemented that will allow: to make the transition to competitive internal and external energy markets by forming an efficient internal infrastructure; to use transparent market rules of activity in the field of energy; increase the level of financial discipline and responsibility for ensuring timely calculations for the use of energy resources, as well as preventing barterization; introduce mechanisms of insurance of non-payment risks; ensure systematic control over pricing processes in the energy sector; introduce a system of mixed state and market regulation of the activity of the subjects of energy markets; apply systematic control over the activity of natural monopolies by the regulatory body; to increase the share of renewable energy sources in the national energy consumption structure, giving priority to biological fuels.

Conclusions

Thus, based on the conducted SWOT-analysis and the results of the research, a comprehensive mechanism for increasing the rate of industrial production of biofuels in Ukraine at a competitive level was formed, which contains the following priority regulatory measures: 1) technology transfer and innovation; 2) harmonization of the legal framework with the European Union; 3) implementation of energy saving and energy efficient technologies; 4) proper consulting and audit; 5) attracting highly qualified personnel; 6) cluster approaches; 7) ensuring the principles of nature protection; 8) development of foreign economic activity in the biofuel sector, etc. Adherence to the existing and developed strategic principles of the state regulatory policy will ensure intensive development and development of competitive biofuel production in Ukraine, create favorable conditions for attraction to the agro-industrial complex of external and internal investment revenues, introduction of the latest innovative technologies and modern economic activities production.

The strategy of state regulation of the development of competitive biofuel production in Ukraine envisages the process of complex application of the basic methods of regulation. The main economic will include: the cessation of subsidizing traditional energy sources; reduction of bank lending rates for producers and consumers of biofuels; exemption from taxation of part (at least 50%) of the profit received from the consumption of biofuels; introduction of innovations and attraction of investments). Legal methods will include: the adoption of an environmental tax on emissions of harmful substances from the consumption of traditional energy sources; creation of central and regional bodies of state executive power for production and consumption of biofuels; adopting a differentiated approach in increasing the addition of bioethanol and biodiesel to gasoline and diesel, giving priority to bioethanol. Administrative methods should ensure: the introduction of a state duty or limits on the export of bioenergy raw materials; development of European Union harmonized state standards and certification in the biofuels industry; licensing of consulting and auditing firms; adopting differentiated standards for production and consumption of biofuels in the context of regions and natural and economic areas of Ukraine.

The development of biofuel production is essential for the restructuring of the fuel and energy complex and the further integration of Ukraine into the EU. It is necessary to develop a set of measures for implementing economic policy in the field of bioenergy in order to achieve a radical revival in the implementation of innovations and to create effective incentives for spreading the innovative model of economic behavior of Ukrainian business. Increasing the rate of development of the bioenergy industry in our country makes it possible to comprehensively solve a number of energy, economic and environmental problems.

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Capital Investments into Fertility Increase of Agricultural Lands in The Conditions of Transformation Processes in Land Relations in Ukraine

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Abstract

This article provides the analysis of the actual state and level of agricultural lands use, presents the reasons of these lands degradation. It systemizes the factors creating obstacles for activating investments aimed to agricultural lands fertility restoring. Also, the article presents different capital investments of agricultural enterprises oriented to lands reclamation, such as drainage, irrigation, amelioration, creation of highly productive hayfields, pasturages etc. It is proposed to evaluate land resources of agricultural enterprises according to fair value that will contribute to better transparency and credibility of financial reporting. For this purpose it is necessary to elaborate the methodology of agricultural lands evaluation taking into account the indices of soils rating, crop yield in every region. It is justified that for increasing investments to restoring agricultural land potential fertility it is necessary to implement the corrective coefficients at the calculation of the land tax and the tax for group 4 of tax payers (former fixed agricultural tax). It is wise to calculate corrective coefficients on the base of agricultural soils grade rating in the beginning and in the end of reporting period that should be multiply on the normative monetary value of the region. The action of this index should be foreseen to the period of five years. It is defined that activation of investments to agricultural lands fertility preservation and improvement should be realized on the base of the state programme for land use and protection based on plots markets with the respect of the legislation and under the independent monitoring of agro-ecological characteristics, property rights, and economic activities. It is justified that the investments into agro-technical measures aimed to increasing fertility of agricultural lands should be based on the co-financing by agricultural enterprises, united territorial communities and the state budget.

Keywords*:* Agricultural Lands, Capital Investments, Restoring of Lands Fertility, Normative Monetary Evaluation of Land.

Introduction

In Ukraine 32, 5 million ha of lands are used for agricultural purposes, so almost 54% of the territory is tilled. It is one of the biggest indices in the worlds. There are more than 25 million of land users and owners. According to the FAO data, Ukraine is on the 9-th place in the world with its 32,5 million ha of agricultural surface behind India, Russian Federation, United States of America, China, Brasilia and Australia.

Being a production mean in the agriculture, the land has its specific peculiarities that differ it from other production means, namely, if other production means are results of a previous human work, the land is a gift of the nature, a product of its natural and historical development that lasted during many centuries. The land is reproduced by the work. It is a natural condition for human creative activity, it can't be substituted, and the productive process is impossible without it; it is limited in the space. But it doesn't mean that its capacities needed for agricultural production are exhausted; the use of the land as production mean is related to its constant location, in the same time other production means don't have this relation, land plots are not homogenous as for to their quality, that depends on the content of nutritive matters in the soil; they are not homogenous as for relief and other characteristics. It is an objective factor that should be taken into account by enterprises for planning their productive programmes; at a proper use the land is not exhausted, its quality doesn't degrade, but in difference with other production means created by work, it can be improved permanently. This peculiarity of the land is conditioned by such characteristic as its fertility that is the most important characteristic of the land and consists in its capacity to provide necessary nutritive matters to plants during their vegetation and development. In the conditions of market relations the land can be a commodity with a range of peculiarities that differs it from all other commodities.

Analysis of recent researches and publications

_The largest share in investments structure in the agriculture belongs to real investments, which are called placement of funds. It should be noted that placement of funds is an investment into fixed capital (fixed assets), including costs of new construction, expansion, reconstruction, technical re-equipment, updating of existing resource potential, purchase of machinery and equipment. Some researchers conflate placement of funds and real investments, but the latter are larger because they include investments into intangible assets and formation of inventories [1].

The main areas of funds placement in the agrarian sector are: construction of industrial and non-production facilities; purchase of equipment (agricultural machines, tractors), equipment and vehicles, planting of perennial plantations and their cultivation to the operational (fruitful) age; formation of main herd of productive and working animals; land improvement measures (without buildings).

By generalizing the approaches to the definition of investments, their versatility was established: investments as all kinds of property and intellectual values that are invested into objects of business and other activities [2]; investments as costs [3]; investments as incomes by J.M. Keynes [4, 5]; investments as a process, investment operations [6-8]; investments as long-term funds placement Y. Morozov [9]; investments as a use of savings [10].

The specificity of the agrarian sector economy influences the implementation of many economic and social phenomena and processes, including the investment activity of agricultural enterprises, among which it is advisable to distinguish the following: greater, than in other sectors duration of technological and financial cycles due to the objective properties of agriculture; close relationship of production processes in agriculture with natural processes; the high level of risks of investment in the agricultural sector is largely determined, in addition to the natural factor, by the instability of domestic agricultural markets; the strategic importance of the agriculture in the socio-economic development of rural areas and the country requires active government intervention in investment activities; the multiplier effect that arises not only in the economy but also in the social sphere as well

as in the environment; the specificity of the institutional environment is conditioned by the complexity of modern agriculture.

Under the investment activity of agricultural enterprises we understand the task oriented process of regulatory, organizational, economic and financial influence of an economic entity on the formation (not related to current consumption) and the transformation of resources from one form to another, which contributes to obtaining of additional profit, achievement of another economic, industrial or non-economic potential long-term effect, creation of conditions for extended reproduction.

The main resources of agricultural production essentially include: land resources (their surface and quality), climatic conditions, and availability of water resources. When characterizing the land resource as a production factor in the market conditions, it is necessary to take into account the fact that this resource becomes decisive in shaping the level of competitiveness of agricultural products. That is why it is necessary to study the issue of investing into the increasing of agricultural land fertility in today's economic conditions.

The land investment processes are studied in the works of Ukrainian scientists [11, 12], in particular, the scenarios of prolongation or withdrawal of the moratorium as an institutional prerequisite for ability or inability to use land assets as collateral for obtaining credit resources are analyzed, the issues of implementation of public-private partnership agreements for investments into the reproduction of agricultural lands are considered. However, in the context of the formation of the land market in the country, it seems necessary to form a systematic approach to the choice of priorities for attracting investments into the reproduction of agricultural lands.

Materials and methods

The purpose of the study is to summarize the peculiarities of the investment potential of lands belonging to agricultural enterprises and to justify the optimal ways of attracting investments into increasing the fertility of agricultural land in the conditions of transformation processes in land relations.

The study was based on the use of the following methods: balance method for the study of the nutrients balance dynamics of agricultural lands involved into production; statistical analysis for the study of the capital investments dynamics of agricultural enterprises and their share in the overall structure of agricultural enterprises' investment; calculation and constructive method for justifying sources of investment resources formation for restoration of agricultural lands fertility. The data of the State statistic service of Ukraine and the State Geocadastre of Ukraine, the results of researches of Ukrainian scientists and the author's own observations, obtained through the survey of agricultural producers were used as a database for this study.

Research Results

According to the results of scientists' researches, in terms of acidity, salinity, alkalinity, water logging, technogenic pollution, some of Ukrainian lands are in pre-crisis and sometimes in crisis condition with a tendency to deteriorate [13]. In addition to the above mentioned reasons, other degradation processes have spread to agricultural land.

It should be noted that the volumes mineral fertilizers application decreased from 148 kg / ha of active substance in 1986–1990 to 76–96 kg / ha in 2011–2015. Only 0.5 tons of manure are applied to 1 ha of arable land instead of 9.4 tons as it was in 1985, which led to the formation of a stable negative balance of humus, nitrogen, phosphorus and potassium in agro-ecosystems (Table 1).

Table 1: Dynamics of nutrients balance in the Ukrainian agriculture

Balance articles	Balance of nutrients, kg/ha of active substance			
	Nitrogen	Phosphorus	Potassium	Total (NPK)
1986–1990				
Intake	89,5	56,1	102,7	248,3
Removal	92,6	31,2	103,2	227,0
Balance	-3,1	24,9	-0,5	21,3
1996–2000				
Intake	26,0	10,4	15,3	51,7
Removal	56,5	18,2	53,7	128,4
Balance	-30,5	-7,8	-38,4	- 76,7
2001–2005				
Intake	21,8	5,9	8,7	36,4
Removal	70,1	24,7	76,7	171,5
Balance	-48,3	-18,8	-68,0	-135,1
2006–2010				
Intake	38,7	10,2	14,7	63,6
Removal	77,4	23,9	60,3	161,6
Balance	-38,7	-13,7	-45,6	-98,0
2011–2015				
Intake	65,0	13,1	18,1	96,2
Removal	85,0	25,4	33,2	143,7
Balance	-20,0	-12,3	-15,1	-47,5

Source: Done according to the data of the State Geocadastre of Ukraine.

Thus, today agricultural producers obtain high yields of agricultural crops mainly due to natural soil fertility, which can decline significantly in 5-10 years, since the average humus content in soils of Ukraine decreased from 3.64% in 1961 to 3.16% for today.

Obviously, the improvement of agricultural land can be carried out by both tenant farmer and by landlord, which must be conditioned by the lease contract. According to the Law of Ukraine "On Land Lease", if the tenant farmer is engaged in land improvement, he is reimbursed for the costs of such measures; if land improvement is done without the consent of the landlord, then such costs are not reimbursed to the tenant [14].

The capital investments of agricultural enterprises include works on a radical improvement of land (drainage, irrigation and other reclamation works, creation of high-yielding meadows, pastures, etc.). These may be capital expenditures of inventory nature: construction of water, anti-erosion, hydro-technical, anti-settlement and other structures (dams, canals, irrigation and drainage networks), cultural and technical measures for surface improvement of land for agricultural use of non-inventory nature (not connected with building) and terraced slopes. Technical works on agricultural lands that do not require drainage include: planning of land plots, clearing of land from forests, shrubs, stumps, boulders and stones, leveling of lands after cutting, cutting and cultivation of mounds, milling, plowing of virgin land and fallow lands that has not been carried out for more than 5 years, with tillage and rolling of these lands, cleaning of water reservoirs, etc. Reclamation works belong to building works (water management building). The following capital investments are allocated for irrigation of lands: creation of new irrigation systems, including for irrigation of hayfields and pastures, areas under rice and vegetables; for complex reconstruction of irrigation systems and restructuring of the collector-drainage network; land drainage (new drained lands, restoration and reconstruction of existing drained lands, including closed drainage; watering of pastures (new

pastures), reconstruction of water structures on existing pastures; construction of main agricultural water supply systems.

It is known that the Ministry of Agrarian Policy has foreseen the amount of 350 million UAH in the State Budget for 2018 under the budget program 2801170 "Financing of measures for protection, reproduction and increase of soil fertility". It is planned to use this amount for carrying out the following measures on the area of 500 thousand hectares: liming of acid soils - 350 thousand hectares; gypsum plastering of alkaline soils - 150 thousand hectares. It has been proved that neutralization of soil solution due to chemical reclamation, according to data of scientific institutions of the National academy of agrarian sciences of Ukraine, provides yield increase in terms of grains within 3–3,5 hundredweights / ha, or 1200–1400 UAH / ha. Thus, the Procedure of using the funds provided in the state budget for financing measures for protection, reproduction and increase of soil fertility in the amount of 350 million UAH from the state budget will be spent on liming - 245 million UAH, gypsuming of soils - 105 million UAH. It should be noted that for the first time in Ukraine the funds from the State budget have been allocated for the aforementioned agro-technical measures.

During the studied period, the area of liming of soils increased by 63.7%, gypsum in almost three times. However, the volumes of limestone flour and gypsum application remain minimal, which does not give reason to claim a positive effect from the implementation of the aforementioned agro-technical measures.

We believe that most land tenants (pais) have undertaken measures to increase the fertility of agricultural land, if there were long-term perspectives for their production activities. In current conditions, it is very difficult to finance independently such measures to increase the fertility of land, especially for small agricultural enterprises. It is established that during 2010-2018 years the volume of capital investments applied by enterprises of the agrarian corporate sector increased in 5.6 times and in 2018 this amount was 193090 thousand UAH. (Fig. 1). However, in the structure of capital investments of agricultural enterprises they make up less than 0.5%.

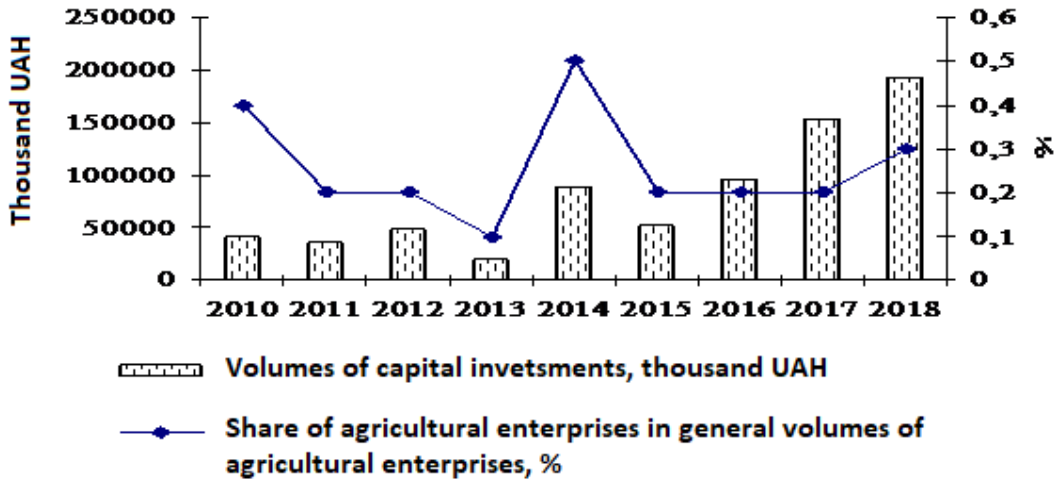

Fig. 1: Dynamics of the volumes of capital investments applied by enterprises of the agrarian corporate sector in increasing agricultural lands fertility (thousand UAH.) and their share in the total investments of agricultural enterprises

Source: Done according to the data of the State Statistics Service of Ukraine.

So, we can conclude that restoring the fertility of agricultural land is not a priority for investing economic entities in the field of agribusiness. According to the results of surveys of agricultural enterprises heads in Kyiv, Cherkasy, Kirovograd and Khmelnitsky regions (435 interviewed), the main factor of such situation is a high probability of agricultural lands owners or tenants change in

the conditions of introduction of the agricultural land market, this answer was received from 76% of respondents; 17% mentioned the probability of economic entity failure; the absence of incentive measures implemented by the State and the united territorial communities was indicated by 6%, and 1% of respondents indicated the absence of agricultural land quality monitoring systems.

It should be noted that land is the only component of agricultural capital that is not reported as an object of accounting and reporting. So, this situation makes it impossible to make appropriate calculations of the return on capital investments, as well as the accounting of capital investments aimed at increasing soil fertility, that have a direct impact on the change in the residual value of agricultural land as an asset of an economic entity. It is estimated that at the current level of market prices near $ 25 billion of such assets are not reflected. To be more precise, this figure is a $ 24.51 billion that presents a potential for growth of the national wealth of Ukraine [15].

If we consider the land capital in comparison with the main macroeconomic indicators, it is a fifth part of GDP and more than all gold value reserve of Ukraine, which at the beginning of 2019 was at the level of $ 20.8 billion. At the same time, unlike gold value reserves, that are more than a half formed by IMF loans, the land resources are Ukraine's own capital that ensures the country's income, its food security, and its competitiveness at external stocks and food markets.

It should be noted that at present time only about 3% of agricultural lands and rights to use them are evaluated and put on the balance of agricultural enterprises of all legal forms of economic activity, which is only $ 150 million. In order to identify the reasons of a low accounting discipline related to land and rights of their lease, we carried out a survey of farms accountants (109 people).

The following restraining factors of land value assessment were identified: problems of identification of land assets - 23% of respondents; lack of recommendations for self-assessment - 11%; high cost of the peer review procedure - 9%; lack of the state motivation and control - 26%; orientation to shadow business and unwillingness to evaluate these assets - 31%. So, today in Ukraine we can notice a low level of accounting of agricultural lands directly by producers (only $ 150 million in the financial statements) and in parallel its low reflection in the system of national accounts in the macroeconomic statistics.

The main problem in estimating the value of lands is the contradiction in the consideration of capital, national wealth in the International Financial Reporting Standards and in the system of property rights to them. This leads to the key problems of capitalization of Ukraine's land-based national wealth: accounting and evaluation procedures and a clear identification of property rights to assets; its concerns the rights to both physical and non-physical objects.

In 2018, an updated version of the Conceptual Framework for Financial Reporting has been published, according to which, since 2020, the International Financial Reporting Standards will treat assets as a set of rights and not only as physical objects. In addition, in 2019, International Financial Reporting Standard 16 "Lease" has come into force; it clearly recognizes that, at the date of the lease start, the tenant recognizes an asset for the right to use and a lease obligation (paragraph 22 of IFRS 16 "Lease"). In this regard, it is necessary to adapt the domestic accounting standards and the provisions of the Tax Code to the International Financial Reporting Standards.

It should be noted that according to the Law of Ukraine "On land evaluation" №1378-IV of 11.12.2003 (as amended), depending on the purpose and methods applied the assessment is divided into the following types: soil rating; economic evaluation of lands; monetary evaluation of land plots [16]. The economic evaluation is the basis of the regulatory monetary evaluation of agricultural lands, but its principles are outdated [17]. In the current context, such a method of assessment is expensive, since it must be carried out at the same time throughout the country and difficult, since there is no comprehensive data on the activities of agricultural enterprises.

We believe that it is advisable to develop a scientifically justified methodology for agricultural lands evaluation that should take into account soil rating indices, crop yields for each region. Yields will be

differentiated and translated into income for a specific type of farmland. The proposed approach will equalize the situation, and land with higher fertility rates will justly be more expensive.

The economic evaluation of agricultural lands is a natural extension of their qualitative assessment, and can be considered as a basis for conducting a comparative efficiency of agricultural lands use at an average level of economic intensity. It should be emphasized that the yield capacity is a complex productive, quantitative and qualitative indicator, its analysis will allow to generalize the impact of natural and climatic factors on the land use efficiency. Obviously, the land evaluation is becoming a necessary procedure today, since without information on its market value it is not possible to carry out properly operations related to land plots, in particular, to obtain a loan. AS for the land in Ukraine, the concept of "independent evaluation" is transformed into the concept of "expert monetary evaluation".

A new regulatory monetary evaluation (NME) for agricultural lands is currently being implemented in Ukraine. It should be noted that the information base for NMEs of such lands, including lands under farm buildings and yards, is information of the State Geocadastre (quantitative and qualitative characteristics of lands, soil rating, economic evaluation of lands), documents related to land management. However, this process is complicated since the last soils rating and the economic evaluation of lands were carried out in the 1980s. Therefore, without carrying out a new stage of soils survey, that will affect soils rating indices and, accordingly, the economic evaluation of lands, it is difficult to speak about the objectivity of NMEs, even in view of the new Methodology No. 831 “Methodology for regulatory monetary evaluation of agricultural lands”.

It is known that the regulatory monetary evaluation is intended to determine the amount of land tax and rent for lands of state and communal property (clause 289.1 of the Tax Code of Ukraine) [18]. However, the analysis of regulations shows that the use of the regulatory monetary evaluation is not the basis for the presentation of agricultural lands in the financial statements forms.

Today, a moratorium on the sale of agricultural lands is acting in Ukraine, so the market for such lands does not work, and therefore, the market prices for arable land are not formed. However, due to certain subjective circumstances, some individual farms of the corporate sector of the agrarian economy have to carry out the expert monetary evaluation of agricultural lands; to their opinion this evaluation is market-relevant. We believe there are several root causes for this: the need to reduce financial risks. The urgency of this issue in Ukraine is confirmed by the fact that during 2014-2016 years, nearly 600-700 thousand hectares of land changed their owners. Therefore, all these agreements will require a preliminary objective evaluation; the necessity of involving an appraiser in accounting re-evaluation of non-current assets and current biological assets (Article 7 of the Law of Ukraine “On evaluation of property, property rights and professional evaluation activity in Ukraine”) is provided by the law [19]; the requirement of commercial banks to provide an independent evaluation of property and property rights when drawing up a loan and a collateral agreement; equal distribution of capital structure in the process of merging are foreseen as well.

When assessing the market value of agricultural lands the following features should be taken into account: the need to maintain the fertility of the upper layer of agricultural land, it means soil, through the use of scientifically sound agricultural technology and respect of certain requirements to the methods of production (compliance with grazing standards, establishment of appropriate crop rotation systems, applying of an appropriate quantity of fertilizers, etc.), leaving of fallow lands, creating protective forest belts, etc.; a direct dependence of the structure of agricultural lands on physical and geographical characteristics of the area (geomorphological, soil, hydrological, climatic and other features); high risks of agricultural production due to natural factors and force majeure (droughts, floods, early winter frosts, snowstorms, epizootic diseases emergence, other natural disasters); a significant impact on the incomes from agricultural production of fluctuations in prices for agricultural products, fuel and lubricants, agricultural machinery; a seasonal nature of production and prices in the agricultural market; the lack of actual farmland turnover; the deficiency of significant investments in agricultural production; a low population density in areas distant from large industrial centers; a poorly developed infrastructure of the land resources market.

To assess land rights under the Ukrainian law, the comparative and profitable approaches are envisaged. So, the comparative approach (similar to sales) often can be used just to obtain information. Obtaining of an objective result is complicated due to the inaccessibility of market information, significant individual characteristics of plots and history of their use.

The method of comparing sales for analogue objects is practically undeveloped now, as the practice of its use is not yet available. However, the technology of applying this method to agricultural lands should not fundamentally differ from the technology of the market value assessment of other categories of land (land in cities, suburban areas) by the sales comparison method. Thus, when making adjustments, in addition to the elements of comparison, listed in the sales comparison method, such characteristics as soil type and its technological properties, soil credit score (differential land rent I), availability of reclamation facilities, structure of sowing areas, distance from sales markets, environmental status (differential land rent II) may be taken into account. Other factors, such as preferences of local people in production and consumption of certain types of agricultural products, etc. (surplus land rent) should be considered as well.

It should be noted that the domestic regulatory documents do not give the rules and requirements for the procedure of amendments introduction to the evaluation of agricultural lands in view of their specificity.

An income approach based on the capitalization of future cash flows from land use is the main one, which takes into account all the features of the agricultural area and real provisional future profits from its use.

The estimation of agricultural land by the methods of income approach can be carried out both on the basis of direct capitalization of rent payments for land, and with the help of capitalization of net operational income, which is formed as a result of agricultural production and is a land rent. We believe that the assessment of agricultural lands value and its reporting will provide: cost savings as it optimizes capital investments; increasing of the capitalization of agricultural enterprises, especially highly concentrated ones; formation of the information base, since it requires periodic professional evaluation and professional management of it; attracting of capital and investors. IPO's initial public offering as a fundraising tool is now somewhat obsolete, since private investors prefer to understand the real value of business, confirmed by independent consultants; increase in income, and in particular, by export of products. An independent evaluation uses market analysis and real-costs calculation to justify the objective level of agricultural prices and to optimize value-added tax (VAT). This tax is a significant part of the cash flow of agricultural enterprises in Ukraine because it remains at the disposal of the enterprise to finance capital investments under the legislation. During 2010-2018, the use of VAT as a source of investments for the development of agricultural enterprises is characterized by two stages: the first - 2010-2015: the taxation of volume of sales carried out by agricultural enterprises on the principle of "zero rate »; the second stage - 2016 - to date: the use of the mechanism of "quasi-accumulation" of VAT in relation to agricultural enterprises. It should be noted that during 2010-2015, the share of VAT in the structure of agricultural producers' revenue was from 8.1 to 13.4%. In year 2015, that was the last for the full functioning of the VAT-accumulation regime, the amount of VAT support increased to more than UAH 42 billion, which was aimed at enhancing the renewing of material and technical base of enterprises. However, in 2018 only UAH 4.2 billion were allocated for the development of the agrarian sector economy through the use of the mechanism of "quasi-accumulation" of VAT in the form of the direct state support, mainly for the development of the poultry industry.

Therefore, an independent evaluation can be used as a justification of costs volume for fiscal authorities, the size of VAT base as a whole; and for the optimization of top management remuneration. It is obvious that the increasing market capitalization (value) of a business is one of the key indicators of business efficiency, and serves the basis for cash remuneration of enterprise management; for the optimization of insurance payments, whose amount is calculated depending on the market value of agricultural assets; for the formation of reliable financial statements according to the International Financial Reporting Standards when attracting foreign investments. An international audit of such reporting requires a prior evaluation of main production means and other assets

(including biological current assets and agricultural lands) by an independent evaluator; and optimization of the amount of collateral whose market value requires an independent evaluation in all Ukrainian banks. To enter the foreign capital market, agricultural enterprises should prepare financial statements that will be understood by potential foreign investors. A fair presentation and disclosure of assets, liabilities and equity in financial statements done according to the International Financial Reporting Standards will enable interested users to form an informed view of the entity's performance during a particular reporting period and the effectiveness of its management's decisions.

We believe that it should be reasonable to carry out the evaluation of agricultural organization's land resources at fair value, as an amount of money sufficient to purchase an asset or to fulfill obligation of an agreement between informed, really interested, independent each from other parties. The evaluation of assets and liabilities at fair value will increase the transparency of financial statements and the reliability of information provided in them about the financial and economic activities of economic entity.

The use of the market value of land plot for preparing the information on the value of land resources of agricultural enterprises will allow increasing the reliability of financial statements. In addition, in the analysis of financial and economic activity of agricultural enterprises, a real evaluation of land resources will have a positive impact on the regulatory indicators of liquidity and financial sustainability, which is especially important in the conditions of financial crisis and growing need for investment.

An important way for formation of preconditions for intensification of investments in reproduction of potential fertility of agricultural lands requires the use of correction coefficients in the calculation of land tax and tax paid by the 4th group of tax payers (the former fixed agricultural tax). Obviously, the current mechanism for calculating the above taxes does not encourage the application of efforts for the improvement of the potential fertility of agricultural land. Conversely, managers of big agricultural enterprises have an economic interest in reducing fertility, as it will lead to a reduction of tax paid to united territorial community (UTC) budget and the value of rent to potential landlords.

We believe that for this purpose it is necessary to develop the system of coefficients correction in calculating the value of agricultural lands, which will be effective in determining the value of 1 hectare of agricultural lands that is the basis for calculating the tax of group 4. For their calculation it is necessary to carry out (once every 5 years) the agrochemical certification of the lands as a component of the agricultural census. It is advisable to base the calculation of the adjustment coefficient on the value of agricultural lands in the beginning and in the end of reporting period, and by multiplying it on the amount of the regulatory monetary assessment existing in the region, the value of the land, that will serve a basis for calculating land tax and leasing fees will be determined. It is advisable to anticipate the validity of this indicator for a five-year period.

At the same time, an unpaid amount of the land tax that had to be paid to united territorial communities' budget and the amount of leasing fees due to the use of the reduction coefficient, which is an evidence of improvement of soil quality (increased rating), should partially, indirectly compensate the cost spent for fertility reproduction of agricultural soils that are temporarily used by business entities. On the contrary, when the increasing coefficient is applied the value of money incomes to budget of the united territorial community increases.

The Budget Code of Ukraine provides for the distribution of funds from the environmental tax in the following ratio: 20% to the state budget and 80% to budgets of the local level, in particular 25% to the rural and city budgets and 55% - to regional budgets.

We believe that the creation of a special Fund for the economic encouraging of agricultural lands fertility increase is an important source of financing the restoration of farmland in addition to the environmental tax, rent payments for the use of natural resources. The sources of its pumping up can be penalties for violations of environmental legislation, as well as additional penalties for non-respect

of soil quality standards that should be developed by the institutions of the State Enterprise "Ukrderzhrodyushchy".

One of the positive changes at the legislative level that will contribute to the increase of soil fertility is the adoption by the Cabinet of Ministers of Ukraine of the Draft Resolution on Amendments to the Model of Land Lease Agreement [20]. This regulatory act provide a new mechanism of management of land use and protection, preservation and reproduction of soil fertility, namely: fixing in the lease agreement the indicators of quality characteristics of the soil in the moment of its transfer to the lease, compensation to landlord-owner of the losses in case of deterioration of soil quality in rented land plot or rendering it in an unusable condition for target purpose; setting the term of payment of the rent for the use of the land plot and strengthening of responsibility in case of its late payment (fine, penalty). However, this regulation does not specify the mechanism for reimbursement of the costs of agrochemical research. To our opinion, their value should be compensated evenly at the expense of the tenant and the lessor.

An important way to increase soil fertility is to fight against its acidity and salinization. The cost of implementing measures to protect, to reproduce and to increase the fertility of soils per hectare (according to the State Institute of Soil Conservation) is on average more than 1500 UAH / ha. Taking into account financial capacity of agricultural enterprises in carrying out these measures and their importance for restoring the fertility of lands, the amount for compensation of their costs is provided by the State Budget of Ukraine. The procedure for the use of funds is envisaged within 40-50%, namely: the foreseen amount for liming of soils is 700 UAH / ha; for gypsum is 700 UAH / ha. This ratio of the size and cost of these activities is optimal, because the main component of the cost of chemical reclamation is the cost of reclamation assests (within 200 UAH / t) and their transportation that is up to 75%, which requires large sums of money before the works.

To our opinion, agro-technical measures in Ukraine should be co-financed by agricultural enterprises, united territorial communities and the State budget under the State program "Financing measures for the protection, reproduction and increase of soil fertility" on a parity basis. Their implementation is mandatory. The quality control of the aforementioned agro-technical measures is entrusted to the environmental inspection.

An important factor that, although indirectly, but contributes to increasing the fertility of agricultural land, is the dissemination of knowledge about current resource-saving technologies. The necessity of training is due to the fact that agricultural professionals feel the need of scientific and advisory services, especially for farmers in order to learn how to restore the fertility of farmland.

Conclusions

It has been proved that activation of investment processes aimed to the reproduction of agricultural land fertility cannot be ensured independently by agricultural enterprise itself. This is due to the fact that farmers, due to their poor financial and economic condition, are not able to direct funds to soil protection measures. Unless immediate actions are taken, soil degradation processes can become irreversible. In view of this, a system of economic incentives to increase the fertility of farmland leased by business entities should be implemented at the State level, primarily through administrative levers and a valid tax system. Since the reproduction of farmland is nationwide, targeted programs should also be fully funded.

At the level of united territorial communities, it is advisable to develop appropriate programs for soil fertility reproduction and conservation. With the combined efforts of the State, united territorial communities, agricultural enterprises the process of reproduction and conservation of soil fertility can be ensured. After all, irresponsible intensive use of the land fund without effective measures to restore it as a productive resource and a renewable ecosystem of the environment has not yet been eradicated. That is why an effective mechanism that foresees the interest of producers in preserving the fertility of Ukrainian soils will ensure a positive result.

Thus, the formation of effective legal regulation of land relations and the implementation of effective tools to stimulate producers to expand the reproduction of land resources fertility will help to prevent soils erosion; to accumulate organic substances; to control the balance of humus and nutrients in the soil; to provide the implementation of directives on water protection, nitrate content in agricultural products and food, use of fertilizers, plant protection, etc.

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Financial and Economic Aspects of Formation of Biofuel Supply Chains to Ukraine

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Abstract

As discovered the tendency to increasing of biofuel production in 2007–2017 was more than doubled due to organizational support for the development of the bioenergy industry in Ukraine, introduction of new technologies and innovative approaches, and application of foreign experience. The prevailing use of gas or oil causes the energy dependence of the economy on the external energy market, which is affected by geopolitical changes. It is proved that the level of self-sufficiency of the Ukrainian economy with fuel and energy resources can be increased due to the use of biofuel, which is produced from biomass. It has been proved that the competitiveness of the biofuel supply chain is achieved by increasing the efficiency of actors functioning at each level, entering of new actors to the market, expanding the internal market and its individual segments. The development of small forms of agrarian business in the bioenergy sector is leading to the growth of the economy and in particular of the agricultural sector, creation of new jobs and expansion of the tax base. The value chains have been constructed and the pricing factors at the bioenergy market have been clarified. A methodological approach is proposed to determine the economic feasibility of directing agricultural products to different areas of industrial use, including their processing for biofuel. It has been found that in the process of forming the technological chain of production, marketing and final consumption of solid biofuels, the confirmation of quality (compliance with standards and certification of pellets), as well as the increase in added value by the manufacturer, play a crucial role. The viability of bioenergy resources production through the cumulative added value formed in the respective technological chains has been determined.

Keywords*:* Supply Chain, Biomass, Biofuel, Added Value, Producers-Assemblers.

Introduction

The Ukraine has sufficient economic and organizational conditions for the development of bioenergy, which are characterized by favorable natural and climatic factors, a strong potential of the agrarian sector, the excess of man power and other factors. At the same time, despite a high resource potential of biomass energy, today there is a high internal demand of energy, which is mainly satisfied by traditional fuels and significant import of energy resources. Thus, fossil resources: natural gas, coal and petroleum products are the most demanded in Ukraine today, they represent over 70% of domestic energy consumption. Biofuels make up only a tiny fraction of the country's overall energy balance.

The restraining factors for the development of the Ukrainian bio-energy market are explained by a number of circumstances, which are conditioned, first of all, to economic and geopolitical processes. Achieving the level of European countries in the production of biofuels requires the mobilization of actors working for the development of biofuel supply chain, increasing their efficiency and increasing the state support, intensifying the processes of attracting domestic and foreign investments in this industry. That is why, under the current conditions, researches devoted to the specificity of biofuel supply chains in Ukraine are important. They identified unresolved issues and allowed to substantiate the ways of their development in terms of added value creation, creation of new employments and solving the problem of import dependence on energy resources. In this research we pay a special attention to the production of biofuels, which will allow the state adapting flexibly to the influence of external factors on energy supply, that are conditioned by the technological development, changes in environmental and energy policy of the leading countries, and the implementation of sustainable development principles and competitiveness of operators in the agricultural sector.

Supply Chain Literature

The concept of "supply chain" is widespread in the scientific literature, and is most often considered through a set of participants (business operators), who bring products (services) to the consumer, logistics warehouses, wholesalers, retailers, other intermediaries and buyers. Therefore, the supply chain consists of all operators who directly or indirectly participate in meeting requirements and needs of potential and actual consumers of the goods [1, p.3]. In addition, some scientific sources point out that the supply chain is a set of three or more organizations that are directly linked to each other and move up and down the flow of goods, services, finances and information from sources of acquisition to end consumer [2].

We find in scientific literature three traditional stages of the supply chain in any production and sell process: procurement, production and distribution [3]. The supply chain can have different complexity level, it depends on participants number and diversity of business processes but in the chain we always see a central organization that manages the entire supply chain or influences its sustainability.

Some researches apply a wider approach, so they believe that the supply chain includes physical, informational, financial flows, as well as management knowledge and experience, aimed at meeting needs of end consumers of goods and services [4]. Thus, according to this definition, the supply chain encompasses processes that include a wide range of activities, including business processes for supply, production, transportation and sale of goods and services. In addition, they highlight an element of the supply chain, such as after-sales support. The integrated supply chain model can contain three interconnected flows: material flows (which include - purchase, transformation and distribution), information flows (electronic data exchange or formed links) and financial flows that include payment for delivered products and services to subcontractors, suppliers of goods and services, as well as payment by the consumer for purchased product to trade organizations [5]. It is obvious that physical distribution is an important part of supply chain, and information and financial components are just as important as physical flow. Nowadays, areas of activity related to increasing the level of consumer satisfaction, recycling of wastes and environmental protection are especially important in the concept of the supply chain. It should be noted that reverse logistics refers to programs or competencies aimed at moving products backwards in the supply chain (e.g. from consumer to manufacturer), and appropriate measures may include product return, recycling, waste disposal, recovery [6].

It should be noted that the supply chain according to the object approach is a set of organizations – manufacturing enterprises, logistics operators, processing enterprises, wholesale and retail organizations, which interact in material, financial and information flows, as well as in service flows from sources of raw materials to final consumer. At the same time, in the process approach, the supply chain is a set of flows and corresponding co-operative and coordination processes between different participants in the value chain to meet requirements of consumers in goods and services [7, 8].

Based on the above mentioned notion, we consider "supply chain" as a set of all activities and processes related to the flow of goods and information from the stage of production of raw materials to the final consumer of the product (service), and its purposeful development is carried out on the basis of organization, planning, control and regulation of commodity flow, in order to create added value and to meet in the best way needs of consumers. As for the value chain, it is first and foremost a combination of supply chains and demand chains, which is aimed to the transformation of raw materials as input through various value-adding processes and to selling of finished goods to consumers with maximum value at the lowest total cost.

The relevance of the study on the functioning of the supply chain of biofuels is confirmed by data from the World Bioenergy Association (WBA) that in 2017 the volume of energy supply from biomass was 55.6 EJ. Energy supplies have declined, however, accounting for up to 70% of total renewable energy [9]. The orientation of most countries in the world towards biofuel production is driven by the desire to implement sustainable development principles in agriculture [10]. It is believed that the production and use of bioenergy and biofuels may have a less negative impact on the environment than oil counterparts[11]. As a result, the world's leading countries have developed appropriate legislation and strategic programs to expand the biofuels industry. For example, in the US, the Energy Independence and Security Act, passed in 2007, to bring the country's annual biofuel production to 36 billion gallons by 2022[12]. Under these conditions, researchers emphasize the development of measures to avoid adverse effects on the food supply of the population, this law stipulates that 16 of the 36 billion gallons of biofuels must be produced from non-starch raw materials in 2022 [13,14]. For Ukraine, there is also debate about balancing food supply and biomass energy production, but today there is no rational use of crop residues and organic waste in the country. It should be noted that only 6% of total grain production is used for ethanol production [15] and for Ukraine this figure does not even reach 1%. In addition, the creation of a modern biofuel production facility in the country requires considerable investment, which cannot be considered as a rapid process, but studying the issues of functioning of the supply chains of biofuels and the directions of their expansion is extremely relevant for domestic practice. This is confirmed by the fact that biofuel production capacity worldwide is less than 1 billion gallons, but the industry will grow, requiring development of sustainable biomass and bioenergy supply chains, reducing production costs, reducing the environmental footprint and reducing the environmental footprint. obtaining social benefits [16,17,18].

It should be noted that until the last decade in Ukraine there were no systematic, coordinated scientific researches on the development of the bioenergy market, and only on February 28, 2007 the Targeted comprehensive program of scientific researches "Biomass as a fuel raw material" was approved, but the study of bioenergy production processes is widespread. , the raw material base of processing technologies, etc., and the features of functioning of the bioenergy supply chains remain unaddressed.

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Research Methodology

The purpose of the research is an assessment of the country's energy supply and determination of the share of biofuels production, typing of biofuel supply chains in Ukraine by key classification features and justification of proposals for enhancing their sustainability and competitiveness on the basis of increasing added value and creating new employments in the country.

The study was carried out on the basis of the fundamental provisions of the chain approach concept, developed by M. Porter [19], Gereffi, G [20], Morris, M. and R. Kaplinsky, [21,22]. The methodological approach of the study was based on the works of the above-mentioned scientists, as well as on analytical studies of national scientists, on the summarized opinions of experts and practitioners in the field of biofuel production. Scientific publications of leading world and national scientists in the field of formation and functioning of supply chains, data of statistical authorities related to production, processing, sale and consumption of biofuel in Ukraine were used for the study. Additional information on value chain initiatives in the production and sale of biofuels at the location of individual actors not registered by the State Committee of Statistics of Ukraine was obtained through a survey of chain participants, technical assistance projects, associations and international donor organizations acting in Ukraine. These collected data were used for the empirical studies devoted to peculiarities of supply chains functioning in the production of biofuels.

The study takes into account the integrated approach to the functioning of the biofuel supply chain, which takes into account the economic and organizational factors of stimulating the use of biomass for energy production at the macro and micro levels, in particular in the context of the economic and political interests of the country, eliminating contradictions in choosing the direction of biomass use , harmonization of economic interests in the technological chain between producers of bio raw materials and energy resources, taking into account the variability of use ystannya biomass-based size accumulative value added per unit of basic production resource. Methods of substantiating the economic feasibility of different corn supply chains for grain, which include the production of bio-raw materials, processing of biofuels, production of biogas from silage of corn, use as feed in the production of milk and pig meat, supply to the foreign market and sale on the domestic market provides for the calculation of cumulative value added, which will allow at the micro level to carry out economic activities more effectively, and at the macro level - to activate the functioning of nationals On the market of biogas and biofuels.

Research Results

The general tendency to decreasing capacity of the fuel and energy market in Ukraine as a whole and in almost all types of bioenergy resources, as for production, so for import was discovered. The exception is biofuels, where production and consumption volumes increased in 2.4 and 1.7 times respectively during 2007–2017, as a result of stepping up of its use (Table 1).

Table1: Dynamic of energy balance indices of Ukraine in thousand tonne of oil equivalent, (toe)

Energy resources	Production	Import	Export	Final consumption
2007				
Total of energy resources	84998	64975	7901	85955
Including bioenergy resources	59850	59709	2538	48007
where:				
- Coal and peat	38018	8899	2492	11772
- Raw petrol	4478	10361	4	21
- Petrol products		4976	4282	13761
- Natural gaz	15865	40449	3	35069
- Biofuel	1489		39	1145

2017				
Total of energy resources	58851	35261	1944	50086
Including bioenergy resources	34935	35257	1494	32155
where:				
- Coal and peat	13637	12993	567	5226
- Raw petrol	2208	1331	139	6
- Petrol products		9671	246	10060
- Natural gaz	15472	11262		14971
- Biofuel	3618		542	1892
2017 - 2007, %				
Total of energy resources	69,2	54,3	24,6	58,3
Total of bioenergy resources	58,4	59,0	58,9	67,0
Biofuel	2,4	×	13,9	1,7

Source: done by authors according to the data of the State service of Ukraine

The data provided in Table 1 indicate a tendency to increase the volume of biofuel production and waste, since in 2007 this indicator amounted to 1489 thousand tons, toe, and in 2017 - 3618 thousand tons, toe. This indicates that in Ukraine there is a growing dynamics of the bioenergy industry development, which is achieved due to technological development of biofuel production processes, introduction of innovative approaches and use of foreign experience. However, the capacity of the biofuels market remains low, which proves the lack of efficient instruments for state support of the biofuels industry.

The positive fact is that the production of wind and solar energy also tends to increase, so in 2017 the figure was 149 thousand tons, toe, and in 2007 it was only 4 thousand tons, toe. High green tariffs, availability of land and sufficient insulation in almost all regions of Ukraine, availability of infrastructure to connect SES to energy systems, and the most important, the support from the state and the business community are the main factors in the development of production of this energy.

It is also discovered that for the period from 2007 to 2017 the indicators of biofuels and waste also increased: the indices of primary energy supply in the form of biofuels and waste increased in 2017 to 3046 thousand tons, toe, in comparison of 1522 thousand tons, toe in 2011 and 1508 thousand tons in 2007.

As in any other market, the bioenergy market has a value chain - the allocation of market participants according to the stages of added value creation from primary raw materials to final consumers. The study found that a complete value chain has been formed in the bioenergy market, since all the links in the value chain are represented; in addition, different business models are presented in the market - from one unit to full vertical integration (from own raw materials to heat production for final consumers). It should be noted that in the formation of the supply chain of biofuel in the country, the model "manufacturer-dealer" is dominating.

The results of the analysis show that the majority of market participants (quantitatively) are engaged in the production of chips, pellets and briquettes, and deliver finished products directly to final consumers. At the same time, the study did not identify powerful biofuels traders in the domestic market that could dominate and act as powerful operators in the formation of the product offer.

It is defined that the majority of biofuel producers are moving up the value chain (trying to control access to raw materials, upstream), it can be supposed that additional resources are needed to move down the chain (to heat production). This proves the willingness of private capital to participate actively in the procurement and growing of raw materials.

The bioenergy market in Ukraine is young and under development; there are only a few powerful players in the market that specialize in one particular part of value chain. So there are few players in the market that are really focused on a particular value chain; most of them are working on multiple parts, or are actively expanding to other parts, some parts can be relatively recently created to define the strategy clearly. We believe that the lack of specialized players is a limiting factor for the future development of the biofuels industry, as companies specialized in certain segments play the role of drivers for the development of other relevant units, actively shape supply and stimulate consumer demand.

It has been defined that the supply chain of biofuels has a limited number and there are no procurement units for some types. Due to the opacity of the market, there is a limited number of companies in the domestic market that present themselves as feedstock for biofuel production.

The limiting factor in the effective functioning of the biofuel supply chain is the fact that today the chain part consisting of biomass heat producers is not shaped (small number of quantified players). Another limiting factor is the lack of clear rules of the game in this market segment and its expansion can be transformed into a market development strategy. The lack of market shape causes significant volumes of biofuel exports, which does not allow addressing fully the issue of value added generation from the functioning of the chain and the creation of additional jobs.

We will carry out the financial and economic calculations of added value in the formation of biofuel supply chain based on the use of maize grain as a raw material. It should be noted that this crop is a strategic food and feed crop and can also be used as a raw material in biofuel production. We have developed a methodological approach, calculating the economic feasibility of using a certain type of product for different purposes of production, but when using agricultural products for biofuel production it is necessary to take into account the levels of food security for certain types of products. We believe that the assessment of the economic potential of energetic crops wastes should be based on the calculation of the optimal amount of wastes for biofuels by individual types and should foresee the implementation of the restrictive criteria for the size of minimum sown areas and livestock for the effective provision of existing bio-raw material processing facilities.

In order to determine the added value in the production and sale of gain corn, we used the indicator of the actual area harvested in the farms of the corporate sector of the agrarian economy for 2018, which is reflected in the appropriate statistical form. In determining the volume of sales of grain corn in the domestic market and the level of purchase prices, as well as prices for milk, pigs (live weight), we used the data of the State Statistics Service of Ukraine, which are obtained on the basis of the state statistical observation according to the form №21-general (monthly) "Report on sales of agricultural products". We have used also the information on the volume of corn exports and the level of export prices based on data from the State Fiscal Service.

In determining the volume of milk production, it was we have supposed that agricultural enterprises grow the silage corn at a standard yield 500 centners / ha instead of grain corn. When doing calculations related to milk production and pig production, we used data from the State Statistics Service related to the level of feeds consumption per 1 quintal of milk and of pig growth, which are reflected in the form № 24 (annual) "Livestock Status".
The value of expenses (in the context of relevant articles) for the production of grain corn, silage corn, milk, and pig meat in live weight was formed on the basis of the Ukrainian State Statistics Service data, based on the form № 50-agriculture "Main economic indicators of agricultural enterprises for 2018 ", and partly on the results of the State statistical observation according the form № 2-farms “Main indicators of economic activity of farms and small agricultural enterprises for 2018".

The rate of manure yield per capita of pigs and cows, as well as the ratio of corn grain weight to by-products, the yield of pellets per weight unit of corn stalks was based on the normative values, which are reflected in the relevant reference literature. For the calculations related to the added value rate formation when processing silage into biogas we used the results of the study done by a leading expert in this field G. Geletukha [23]. The calculations related to the added value formation according to different options of gain corn supply chain formation are presented in Table 2.

Table 2: Calculation of added value at production and sale of grain corn in 2018, thousand UAH / ha of harvested area

Supply chain	Income amount	Expenses without consideration of salaries, depreciation, rental costs	Added value
Sales of maize at the domestic market and use of crop residues as organic fertilizer	28,7	12,2	16,5
Production of biogas from corn silage	76,8	40,0	36,8
Export of corn and production of pellets from stems	40,4	19,2	21,2
Production of corn for silage and use as feed in milk production	73,7	44,9	28,8
Production of corn for grain and use as feed in pig production	57,7	33,3	24,4
Production of corn for the domestic market and production of pellets from stems	39,9	20,4	19,5

Source: *Calculated by the authors*

The calculations provided in Table 2 show that the highest value added per 1 ha of sowing is obtained by growing corn on silage and using it as raw material in biogas production. The experts estimate that from one ton of corn silage from 200 to 400 m^3 of biogas can be obtained, and the yield of biogas from one ton of dry matter of corn stalks will be 420 m^3. The presence of maize repair forms allows the effective use of leaf stem for biogas, obtained by their processing (fermentation). It is known that this type of biofuel with a high efficiency can be transformed into other types of energy, in particular, when used as fuel for gas generators, the efficiency reaches up to 83%. As a result of biogas production in special bioreactors, so-called methane tanks, high quality organic fertilizers (biohumus) are obtained [24].

It is known that growing corn for biofuel production requires mineral fertilizers and plant protection products, so such growing technologies are particularly energy intensive and require cost optimization. Obviously, scientific selection of corn hybrids for the use of grains for biofuels, in order to adapt to the conditions of a particular region of the country, will reduce the cost of both starch and biofuels.

At the same time, the economic attractiveness of the use of corn for energy purposes threatens to reduce food and feed. That is why the EU adopted the Law on Renewable Energy Sources (EEG 2012) establishing the maximum share of corn mass in nutrient substrate for biogas plants 60%. Therefore, today, EU countries consider sugar beets as an alternative to corn [25]. We believe that the most efficient way to stimulate the construction of biogas complexes in agriculture in the country should be the introduction of graduation for a certain capacities and of "green" tariff for small bioenergy producers.

For example, in Germany in 2019, with a near-total abandonment of solid green tariffs, a guaranteed tariff of 0.214 Euros / kWh for 20 years applies to biogas stations with a capacity of less than 75 kW operating on animal husbandry wastes (but not less than 80%). For the larger producers, a long-term (10 years) low-interest lending is guaranteed, with subsidies for the ability to operate at the request of previously installed capacity.

In view of an important role of corn grain in feed base it is advisable to consider the economic feasibility of its alternative use in the production of pig and dairy cattle. It should be noted that since 1993 the number of cows in agricultural enterprises has stabilized and as of January 1, 2019 there were 467.9 thousand heads that is more in 1.3 thousand heads (0.3%) than the previous year. The lifestock of pigs in 01.01.2019 on pig farms was 3395.6 thousand heads, which is in 92 thousand heads (2.8%) more than in the corresponding period of the previous year. Therefore, it can be concluded that dairy farming and pig breeding at agricultural enterprises are in crisis situation.

It should be noted that the use of grain corn as a feed is also facilitated by the acceptable price ratio between milk, pig production and feeds where grain corn presents an important share. Thus, in 2018 the price ratio between milk and corn was 1: 1.6, estimated value providing extended reproduction was 1: 1.1, the price ration between pig production and grain corn was 1: 12.9, estimated value 1: 8. Thus, this ratio of corn, milk, and pig production prices indicates that there are prerequisites for the economic viability of using corn for milk and pig production in the condition of efficient state support. For this purpose, it is advisable to introduce the following instruments: to restore the special VAT tax regime for dairy farmers and pig producers; to develop and adopt the Law of Ukraine "On the National Program of Breeding in Livestock by 2030"; to provide targeted state support for cattle and pig breeders; to carry out the identification of farm animals; to improve the mechanism of interest rate compensation support by dividing them at the national and regional level by credits involved in the construction and reconstruction of livestock premises and the processing of livestock products; to improve the contractual base of integration relations in terms of partnership activities in the chain "production-processing-wholesale-sales"; to create preconditions for motivation of processors to establish long-term raw material zones by providing producers with preferential credits, leasing possibilities, including leasing of milk production equipment; assistance in land leasing under long-term lease and arrangement of tax holidays for the implementation of investment projects in cattle and pig production; to consider the possibility of support to livestock production through the establishment of government subsidies for the use of equivalent prices for livestock products, which would ensure an equal return on equal investment in productive capital.

It is established that one of the problems limiting the development of the biogas, solid and liquid biofuels market at the micro level is insufficient supply of biological raw materials for the production of heat and electricity. Such capacities are used mainly by agricultural and processing enterprises that have their own raw material base and by this way they solve the problem of utilization of by-products, in particular manure of farm animals, solid fuel wastes (sunflower husk).

Obviously, if a producer disposes of solid fuel waste, it incurs additional costs in form of environmental payments (the purchase of permits), their cost depends on the volume of such waste, and in form of payments for their loading and unloading at landfills.

Therefore, the following business models can be distinguished in the market:

1. Manufacturers-buyers. Companies providing services to owners of raw materials (mainly forestry) in harvesting timber or exporting primary logging waste. They are producers of biofuels, they have their own facilities for processing raw materials, production and storage of biofuels, but this model requires significant capitalization (equipment), scale (coverage of forestry) and transparency (the right to collect and to buy raw materials).
2. Full cycle energy service companies. Companies supplying heat to final consumers, mainly to territorial communities. These companies are producers of biofuels and have their own raw materials (such as planting energy plants). The model is based on vertical integration, which encompasses all added value along the entire value chain. An important issue in this model is the development of long-term partnerships with final consumers, capital investments in growing of raw materials and creation of transparent conditions for heat supply.
3. Biomass trade companies that cooperate with different biofuel producers (different types, different volumes, etc.); enter into long-term contracts for the supply of biofuels to heat producers or final consumers. The economic interest of this model is based on the difference between the time of purchase (production season) and the time of sale (heating season) and scale (wholesale and retail

sales). The strategic development of this model requires considerable working capital and establishing relationships (with producers and consumers of biofuels).

The limited price competitiveness and funding for relevant technologies and projects remain major challenges to increasing biofuels consumption. [26] We share the view of some researchers that existing subsidies to traditional energy sources and other distortions of market mechanisms make it difficult to address these challenges. A number of measures and incentives have been developed in Ukraine to expand the production and use of biofuels, but most of them are under implementation. In this situation, more efficient public policy and efficient legislation are needed to promote consumers' interest in using biofuels and to achieve their full environmental, economic and social benefits [27].

Thus, the Law of Ukraine "On Amendments to Certain Legislative Acts of Ukraine on Promoting the Production and Use of Biological Fuels", which stimulates the production of motor gasoline with bioethanol additives (reformulated gasoline), formally acted in 2007, excise tax on such fuels was reduced from 60 to 30 Euros / ton. Zero excise duty on fuel bioethanol produced in the country was set as well. However, because of a number of objective and subjective reasons, the preferences for biofuels suppliers have not been fully implemented.

In 2010, at the meeting of the EU Council of Ministers of energy, Ukraine was unanimously admitted to the EU's Energy Community, accordingly, the country committed itself to the implementation of European fuel rules and standards, including the use of biofuels. Accordingly, in 2012, the Ukrainian Parliament adopted the Law of Ukraine "On Amendments to Certain Laws of Ukraine on the Production and Use of Motor Fuels with the Content of Biocomponents". According to this Law, since January 1, 2014, a mandatory rate of bioethanol content of at least 5% in fuel produced and sold in the territory of Ukraine was introduced. And since 2016, the alcohol content should be at least 7%. However, in 2015 the Ukrainian Parliament abolished the aforementioned Law.

In 2013-2014, bioethanol production was practically ceased due to the introduction of excise duty on alternative motor fuels at the level of 99 EUR / ton by adopting the Law of Ukraine “On Amendments to the Tax Code of Ukraine (on taxation of alternative motor fuels and reducing the cost of fuel)”. According to leading scientists, for the dynamic development of bioethanol production it is necessary to abolish the requirements for licensing of bioethanol, the bill for its transportation, the excise duty on biodiesel, and to define the concept of bioethanol as a separate complex chemical product, and not as a subspecies of ethyl alcohol [28]. Due to political and economic instability, the country has stopped the development of production and use of alternative energy sources.

We believe that one of the factors that influenced the cessation of biofuel production and, consequently, the decline in rape production, that is the main energy crop, is the rise in world food prices. The IMF estimates that the increase in food prices by from 15 to 30% is the result of growing cereals for biofuel production. On the other hand, the ethanol production as a major substitute of automotive fuel, is able to curb rising of oil prices and to help to reduce inflation in major oil importing countries. Bank of America Merrill Lynch estimates that the cessation of biofuels production will lead to increase in oil and gasoline prices by 15% [29].

The "green" tariffs for electricity produced at enterprises from alternative energy sources (except blast furnace and coke oven gas, and using only hydroenergy produced by mini and small hydropower stations) have been and remain main incitement for the production of electricity from solid biofuels in Ukraine.

The coefficients of the “green” tariff for each type of electricity according to the date of commissioning of electricity objects into operation are set by the relevant Laws of Ukraine. On June 4, 2015, a new version of the Law on Green Tariffs № 2010-d was adopted, establishing the following:

for electricity from biomass and for biogas, the green tariff is determined taking into account the coefficients foreseen for facilities put into operation on 31.12.2014, namely is increased by 10% compared to the current one, which is 12.39 euro cents / kW hours;

at the green tariff, electricity is purchased in full, except the amount consumed for own needs of electricity entity producing electricity from alternative sources;

the "green" tariff is revised according to the euro exchange rate on a quarterly basis (once a quarter at the NBU average rate for 30 days preceding the last quarterly meeting of the National Commission for State Regulation of Energy and Utilities);

dependence on euro is valid until 2030, but does not concern objects put into service after 01.01.2025;

when using equipment of Ukrainian production, a “green” tariff is set at a premium of 5% (for 30% of “local component”) and 10% (for 50% of “local component”).

The additional factors contributing to the expansion of biofuels and the reduction of natural gas consumption since 2014, and influencing on the pricing of biofuels, were the increase in gas prices for households and utilities, the setting of administrative limits for gas consumption: reduction by 30% in industrial consumption, state institutions and housing enterprises, by 10% for the population. If in 2014 the price of gas provided at the consumption maximum 2500 m^3 per year was 0.7254 UAH per 1 m^3, then, starting from May 1, 2016, the price increased to 6,879 UAH per 1 m^3, from April 1, 2017 to November 1, 2018 the price of natural gas for needs of the population is set at 6.9595 UAH per 1 m^3, and from November 1, 2018 to December 31, 2019 the price of natural gas used by the population is set at 8.54892 UAH per 1 m^3 [30]. In the face of rising prices for fossil fuels, households and businesses are looking for alternative sources with a lower cost per unit of energy (Fig. 1).

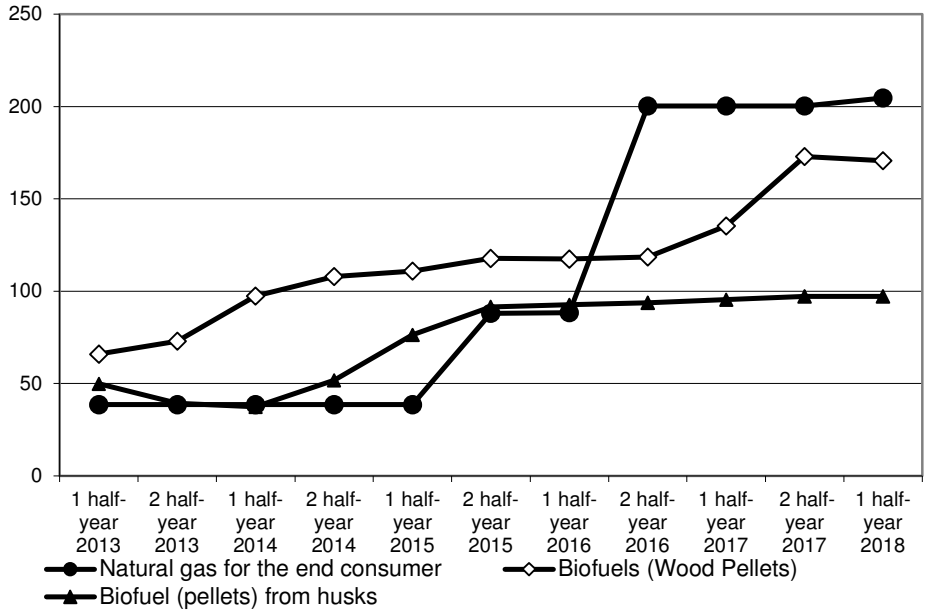

Fig. 1: Dynamics of unit cost of energy in fuel (energy source material) in Ukraine, UAH per 1 GJ without VAT

Source: done by the authors according to the data of the State service of Ukraine

It is revealed that one of the most important factors of the pricing process is the level of purchasing power of biofuel consumer. In the process of interaction with final users and building marketing communications system, the attention should be paid to the cost benefits they can receive. On the other hand, biofuel production volumes in the country cannot be increased immediately. This requires investment and time.

In a context of scarcity, under the influence of public policy and the increase in cost of traditional energy sources, prices for biofuels also rise, making processing all new types of biomass cost effective. Starting around 2016, when active participants in the biofuels market demonstrated the benefits of using vegetable waste, their producers are increasingly setting high prices for them. As a result, in 2016 prices of raw materials for the production of solid fuel pellets and briquettes increased by 10-15%, and doubled in 2017-2018. The distance at which producing companies have to collect straw and husks is also important. For example, the cost of 1 ton of straw at a delivery radius of 25 km is approximately 750 UAH. This price includes the entire cycle from collection of straw to shipment at warehouse.

The second factor influencing the pricing process for biofuels is the price of traditional energy source materials. Biofuel is a substitute product for traditional energy sources. Accordingly, the price level in the biofuel market correlates with changes in the oil, gas and coal markets. The more expensive are oil and coal, the more advantageous it is to burn biofuels. And vice versa.

However, the observation of biofuels markets over last 3-4 years shows that, at least in the short and medium term, this correlation works only upward. Thus, as a result of the oil and oil products price jump in August 2005, the market price of fuel pellets increased by 15-20%. When oil prices dropped again from $ 80 to $ 50 for a barrel, the biofuel prices continued to increase gradually. Obviously, this is due to government regulation on one hand, and with relative inelasticity of demand for biofuels on the other.
The State policy aimed at reducing of greenhouse gas emissions; in particular through the development of bioenergy, underpin such a rapid increase in demand for biofuels. Fuel pellets are one of the most technological sources of clean energy. However, FAO points out that the demand for biofuels is largely artificial. Manufacturers receive tax breaks and discounts, and there are standards for mandatory ethanol add when selling gasoline and biodiesel add when selling diesel.

The Ukrainian scientists have determined the economic parameters under which it is advisable to produce biofuels. The starting points for determining these parameters are the price level: for oil and fuel produced from it (diesel, gasoline, heating oil); on appropriate bio-raw materials; for by-products in the production of biofuels; as well as the level of costs for biofuel production, etc. [31]. Therefore, it is necessary to first determine the approximate production volumes, the indicative market prices for biofuels, clearly understand all stages from the production of biomass to its supply in the form of biofuels to final consumers, the list of necessary equipment, the number of staff, the distance of transportation of raw materials and finished products; to calculate on this base cost items at each stage of the supply chain. Obviously, the total cost determines the cost of 1 ton or 1 m^3 of biofuels. Further, using guidelines, the cost per unit of biofuels is translated into the price of heat energy unit, which allows comparing the efficiency of its production from different energy sources.

In order to identify the opportunities and threats of the biofuels market in Ukraine in more detail, as well as to identify its strengths and weaknesses, we will use a cross-matrix of SWOT analysis (Table 2).

Table 2: Matrix of SWOT analysis of biofuels market in Ukraine

	Opportunities (O)	Threats (T)
	- high level of interest; - development of domestic demand; - certification of products; - access to international export markets; - support of participants; - creation of clusters; - credit lines; - transfer of experience; - state support for development; - image creation; - production diversification; - investment growth; - introduction of modern technologies; - saving of natural energy resources and natural gas; - participation in international and domestic exhibitions;	- shortcomings in the legislation; - a strong lobby in the gas industry; - unstable quality of biofuels; - unstable political situation; - reorientation of biomass suppliers towards more profitable activities; - lack of financial resources; - increasing influence of natural factors; - insufficient awareness of the population; - demographic and social crisis of rural areas
Strengths (S)	SO- strategies	ST- strategies
- great biomass potential; - a lot of grain waste; - availability of wood; - high cost of traditional energy sources; - relatively low competition in the industry; - positive dynamics of the sector development; - "green" tariff; - favorable natural and climatic conditions; - high potential of cultivation of energy crops; - implementation of foreign experience in the construction and production of biogas complexes; - protection and maintenance of soil reproduction; - preservation of the ecology of the environment; - increasing employment and development of rural areas;	1. Creation of value chain for certain types of biofuels; 2. Involvement of existing consumers and companies that are currently supplying biofuels with the new timber supply chain; 3. Creating examples of real cooperation between farmers and industry. 4. Search for potential partners and financing opportunities; 5. Create clusters to bring together small and medium players in this market	1. Increasing the level of knowledge regarding the correct technology for production and storage of biomass 2. Stimulation of biofuel production; 3. Formation of marketing support for promotion of bioenergy products; 4. Involvement of regional / regional / local decision-makers at political level to promote energy sector promotion and protection activities. 5. Overcoming barriers and obstacles hindering the creation of innovative value chains 6. Combating the shadow timber market. 7. Establishment of a network of logistic centers and a regulated exchange for the sale of biofuels of different types with quality monitoring and guarantee of security of supply
Weak sides (W)	WO- strategies	WT- strategies
- imperfect institutional	1. Determining the best business	1. Development of new

support; - unsatisfactory financial condition; - significant biomass production is exported as raw material; - unstable supplies; - seasonal shortage of biomass; - high cost of logistics services; - low level of state support; - underdevelopment of the marketing system in agricultural enterprises; - lack of approved methods of checking the quality of delivered biofuels; - lack of developed infrastructure for storage and processing of agricultural biomass.	model and optimizing its functioning. 2. Marketing research on the introduction of new business in the field of bioenergy 3. Establishment of centers for training of professionals regarding the specificities of the sector and transfer of experience in the future; 4. Awareness raising on the potential benefits of biomass energy use both among farmers / agar enterprises and among potential consumers, companies that can expand their biofuel procurement and supply activities and communities 5. Wide dissemination of information to create a positive image among all stakeholders, potential players in the supply chain and members of the community.	technical capabilities to achieve the economic value of raw materials; 2. Exploring the possibility of using biomass to produce alternative products such as organic fertilizer, biocomposites, biofilters, compost, etc.

Source: Generalized by the authors.

It is obvious that the volatility of the external market for energy resources, the decline in traditional fuel stocks and other factors increase the risks of energy supply to the import-dependent countries, including. and Ukraine. On the other hand, favorable public policy, rising cost of traditional energy sources, except for the situation at the beginning of 2020, lead to higher prices for biofuels, and therefore cost-effective processing of all new types of biomass. In general, these trends lead to conditions for the expansion of production and consumption of different types of biofuels.

At the state level, setting up biofuel production and consumption in the country causes the manifestation of a synergistic effect, which is most characterized by economic, social and environmental factors (implementation of sustainable development principles in rural areas, creation of new jobs, creation of added value at each level of the supply chain, increased revenues budget at different levels - state, region, rural area; productive use of biomass, waste, etc.).

At the micro level - direct producers, the effect is manifested in the diversification of revenue generation, the development of a new line of business, which is additional and based on its own raw material base; gaining the benefits of consumers (agricultural producers), if they are producers and consumers, they receive tangible benefits from the use of biofuels.

Conclusions

It is established that for an efficient development of the bioenergy market in Ukraine a number of problems should be solved at both micro and macro levels. At the micro level the problem consists in low level of supply of bio-raw materials, in particular for available processing capacities into thermal and electric energy. This problem can be explained by a lack of balance of economic interests between agricultural producers of bio-raw materials and their processors. This problem can be solves by the establishment of commissions for reconciliation of economic interests between producers and processors of bio-raw materials, whose obligatory participants should be independent experts. The other mean of solving the problem is ensuring the equal profit per unit of area for agricultural producer compared to other types of products produced by him. At the macro level the problem consists in energy dependency and environmental problems at country and at world level that can be

solved by stimulating the development of alternative fuel markets by differentiating green tariffs depending on the country's economic conditions and the extent of fossil energy depletion.

Based on the calculations, the cumulative added value in different corn supply chains has been determined; they involve the production of biological raw materials, their processing into biofuel, use as feed in the production of milk and pig meat, supply to the foreign market and domestic sales, it takes into account partial return of nutrients to the soil when using stems of the plant as an organic fertilizer and digestate obtained as a result of biogas production per 1 ha of biological raw materials growing. It has been established that in process chain of production, marketing and final consumption of solid biofuels, the confirmation of quality (compliance with standards and certification of pellets) and the increase of added value by the manufacturer play a crucial role.

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The Maturity of Outsourcing Used Within Polish Enterprises - Research Results

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Abstract

The goal of the paper is to present research results concerning the maturity level of outsourcing used in Polish companies. The article begins with a brief presentation of outsourcing maturity criteria identified by the author that were used to create a research tool. Then, the methodology of the research and characterization of research sample is presented. Main part of the paper shows the results and conclusions that can be drawn based on the accumulated data, including the analysis of outsourcing maturity in enterprises of different size. The research results have enabled to draw two main conclusions. Firstly, the overall level of outsourcing maturity in Polish companies is low. This approach to outsourcing naturally limits not only its scope, but also potential benefits it could bring for the client. Secondly, the specificity of outsourcing maturity used in small companies should be noted. Somewhat chaotic, ad-hoc approach to outsourcing, proved by lowest outsourcing maturity levels among small companies, may result, among others, from the limited possibilities of resource access in comparison to bigger entities. This approach to outsourcing in Polish companies naturally limits not only its scope, but also the potential benefits it could bring for the client. Particularly, it indicates also that the vendor is treated rather as an outside company that provides resources, than a partner that could – to some extent – improve client`s overall efficiency and effectiveness (e.g. by process optimization or new business opportunities).

Keywords: Outsourcing, Maturity, Contract, Vendor.

Introduction

The fact, that outsourcing is one of the most frequently used methods of management in Polish companies (Lisiński *et al*., 2012; Kuczera, 2013), should come as no surprise; for it enables to achieve many various organizational benefits, such as increasing efficiency and effectiveness of processes, as well as new possibilities for establishing relations with environment (including customer and / or client). However, the modern way of approaching outsourcing not only as a method of cost optimization, but also as a tool that supports strategy implementation (Gay, Essinger, 2000; Power *et al*., 2010; Vitasek *et al*., 2013) and business model change (Drzewiecki, 2019) suggests that implementing outsourcing nowadays may be even more demanding than before. This perception of outsourcing requires a thorough analysis of its consequences, because implementing this method may result in significant changes in such vital areas, as: organizational structure, value creation an value delivery process, shape of organizational boundaries, and even organizational culture. This fact raises a question of the way Polish companies approach the problem of outsourcing implementation, which is reflected by the outsourcing maturity concept presented in the paper.

Therefore, the goal of the paper is to present the research results concerning level of outsourcing maturity used in Polish companies. The article begins with a brief presentation of the identified outsourcing maturity criteria that were used to design a research tool. Then, the methodology of research and characterization of research sample is presented. Main part of the paper shows the results and conclusions that can be drawn based on the accumulated data, including the thorough analysis of outsourcing maturity in enterprises of different size.

Outsourcing maturity criteria: framework and research tool

Based on thorough literature review, as well as author`s preliminary and pilot research, a framework of outsourcing maturity was created. It is based on four main areas, as shown in figure 1:

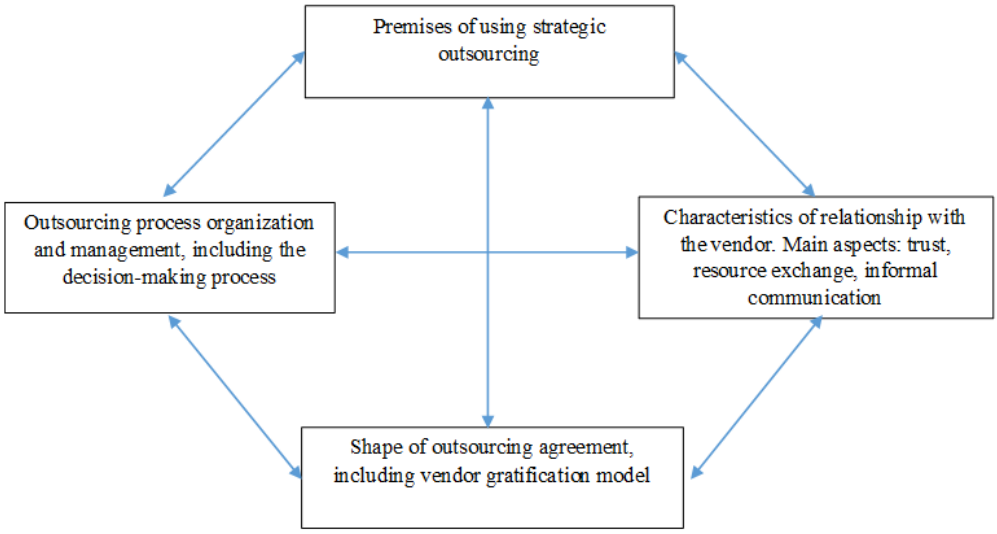

Figure: own work based on: (Drzewiecki, 2019, p.147).

Fig. 1: Outsourcing maturity framework used in the research

The first area of outsourcing maturity determinants stems from using the strategic outsourcing (Alexander, Young, 1996; Greaver, 1999). Most frequent approaches to this issue are: defining a specific set of outsourcing goals, alignment of strategy and outsourcing goals, identifying the level at which using outsourcing contributes to strategy implementation, or certain characteristics of outsourcing (Power *et al.*, 2010, p.25; Gay, Essinger, 2000, pp.39-45). Main problem with this approach to outsourcing maturity is that the company itself may not be conscious of its strategy, yet not even the strategic goals. Moreover, the links between outsourcing and the value it adds to the client`s products and / or services may be difficult to assess, especially in cases, where the value is created within a network, hence – when the process of value creation is somewhat vague and dispersed. Therefore, the strategic outsourcing perspective has to be supplemented by a second set of outsourcing maturity determinants, which encompasses the way outsourcing process is organized and managed.

An important aspect of outsourcing process is time and other resources spent for: gathering information and analytical activities, for it influences outsourcing efficiency. In first phase, the information should encompass: outsourcing goals, expected benefits, outsourcing risks and opportunity cost level (Bidwell, 2012). In second phase, the analytical activities should enable to make an optimal (or, rather, "satisficing" (Simon, 1972)) vendor choice. In this context, such outsourcing process characteristics, as the way the information about vendor is gathered, as well as the way its experience and quality of provided products and / or services is assessed, become crucial. When it comes to outsourcing process organization, one of the options is creating a team that would be responsible for the implementation of this method, as well as to use the assistance of consulting companies. Again, such organizational choices increase the level of resources needed to carry out the process, but, at the same time, allow to achieve many benefits, such as: lowering the risks of failure (e.g. by using different sources of information or gaining additional knowledge) or adding value to the service and / or final product (Power *et al.*, 2010, pp.43-44). Finally, vendor`s participation in outsourcing process may also be beneficial for the client, but it requires a certain level of trust between two sides of the outsourcing agreement (Vitasek *et al.*, 2013).

The organizational aspects of outsourcing described above impact both its efficiency and effectiveness. At the same time, they are not the only factors that influence the possibility of successful outsourcing. Hence, the third determinant of outsourcing maturity used in the research is the form of an outsourcing contract, with emphasis on: contract duration, metrics of assessing partner`s work and partner gratification model. The outsourcing contract duration not only indicates the frequency of transactions between client and vendor (Williamson, Ouchi, 1981; Williamson, 1998); it also influences the level of risk. Long term contract may be an incentive for a vendor to invest in streamlining the processes provided for the client (Vitasek *et al*., 2013). Another crucial aspect of outsourcing contract is the partner gratification model (Vitasek *et al*., 2013; Power *et al*., 2010), which should be strictly linked to the metrics of assessing level of services and / or products provided by the partner (e.g. in the form of SLA, SLI etc.). Both of these aspects of contract are going to influence not only the level of vendor`s motivation, but also the nature of relationship between parties, which is the premise for fourth and last set of outsourcing maturity determinants.

From the client`s perspective, the relationship is perceived here as one of the control mechanisms, usually described as *relational governance* (Dyer, Singh, 1998; Lee, Cavusgil, 2006) which enables the client to influence the vendor`s behaviour. Hence, the outsourcing relationship may be viewed at as a significant complement of the contract that includes – among others – the informal aspects of the cooperation (Goo, Nam, 2007; Poppo, Zenger, 2002). The importance of relationship in outsourcing stems mainly from the lack of possibility to specify a complete contract (one that would consider all the possible scenarios, which is the result of both decision-makers` bounded rationality and uncertainty (Hart 1988)) as well as the cost of partner change (Gulati, Sytch, 2007; Hansen, Rasmussen, 2013). Two main characteristics of outsourcing relationship crucial in this context are: trust and engagement (Babin *et al*., 2017; Child, 2001; Kern, Willcocks, 2000, p.329), since they enable, among others, to: lower transaction cost (mostly by reducing the uncertainty cost regarding outsourcing partner`s opportunistic behaviour), shorten and simplify the outsourcing process (e.g. the negotiation phase), reduce contract complexity, as well as to better understand partner`s goals and choices (Babar *et al*., 2007; McEvily *et al*., 2003).

Four areas of determinants identified during the research described above served as the foundation for a set of specific 18 criteria that would enable to assess outsourcing maturity (in the form of a research tool), along with corresponding variables, as shown in table 1:

Table 1: Brief description of outsourcing maturity criteria used in the research

No.	Criterion description	Substantiation of applying the criterion to measure outsourcing maturity level	Name of the corresponding variable	Variable Code
1	Using long term contract	Influences the durability of relationship, signifies possible strategic impact of outsourcing, as well as possibly higher level of trust	Long term contract	LT
2	Sharing benefit between client and vendor	Highly influences the level of vendor`s motivation and engagement, may signify the importance of the contract for both parties	Benefit sharing	BS
3	Sharing risk between parties	As above	Risk sharing	RS
4	Sharing human resources between client and the vendor	Requires to considerate functional strategies of client (here: the HR strategy), may influence the way this strategy is implemented. Indicates possible need for fit between client and vendor in such	HR sharing	HS

		areas, as organizational culture and communication (e.g. communication routines).		
5	Sharing physical resources between client and vendor	As above	Physical resources sharing	PS
6	Vendor`s participation in the investment needed to carry out outsourcing project	Requires to take into consideration functional strategies of outsourcing client as well as investment process. Increases vendor`s engagement in the relationship. Requires higher level of cooperation between parties (e.g. by making joint decisions concerning the investment).	Joint investments	SI
7	Analyzing possible outsourcing risk	Enables to better understand the outsourcing rationale, as well as to match outsourcing goals to client`s strategy. Increase in cost of outsourcing process. Influences contract formulation phase of outsourcing process.	Outsourcing risk analysis	OR
8	Analyzing level of opportunity cost	As above	Opportunity cost analysis	OC
9	Analyzing the quality level of products and / or services provided by vendor	May be crucial for using outsourcing as a strategy implementation tool (the issue of importance of provided services and / or goods for client`s value creation process). Influences the model of vendor gratification, hence – the contract shape. The results of the analysis may influence vendor`s image, and, as a consequence, level of trust between parties. Important for evaluating the metrics within an outsourcing contract.	Quality of products / services analysis	QP
10	Analyzing the level of vendor`s experience	As above	Vendor experience analysis	VE
11	Gathering information about the vendor from other companies (e.g. former / current client, business partners etc.)	Crucial in case of strategic outsourcing, influences the perceived risk of getting into the relationship. May influence: contract duration, vendor gratification model and metrics.	Gathering additional information about vendor	GI
12	Consulting vendor about the product and / or service requirements specified within the contract	May influence outsourcing effectiveness and efficiency (e.g. by utilizing vendor`s experience), and enable to better address client`s goals (strategy). Possibly shortens the outsourcing process, signifies	Vendor consultations about the requirements	VC

		the higher level of trust between the parties. Enables to specify the contract more precisely and adapt it to both parties` needs.		
13	Consulting vendor about outsourcing agreement draft	As above	Vendor consultations about agreement draft	VA
14	Creating the team responsible for negotiations with a vendor	As above	Creating a team to negotiate with a vendor	CT
15	Creating the team responsible for the project together with a vendor	As above	Creating a team with the vendor	CV
16	Organizing informal meetings with vendor`s employees	Enables to gather additional information from vendor, influences the efficiency of communication during outsourcing process, may result in changes within the contract (e.g. metrics)	Informal meetings with vendor	IM
17	Exchanging the information of strategic importance (e.g. strategic goals, plans) as well as information crucial for company`s results	Enables to match vendor`s strategy to client`s needs, may streamline the outsourcing process. Enables more precise description of requirements.	Exchanging strategic information	EI
18	Hiring consultant(s) during outsourcing process	May enable to improve both efficiency and effectiveness of outsourcing. Influences the shape of outsourcing contract, may be beneficial for contract specificity, enables to gain additional knowledge (e.g. about legal aspects of outsourcing) and to avoid some risks of not matching the contract to client`s needs and / or specifications.	Hiring consultant(s)	HC

Source: own work

Respondents were to assess the frequency of each of 18 solutions used during outsourcing project carried out in their company and described in table 1. During the assessment, 6-point Liker scale was used; the scale ranged from 0 (“never”) to 5 (“very frequently”).

Methodology of the research and characterization of research sample

The research tool was a survey questionnaire. Four channels of communication were used in order to initiate contact with the respondents: traditional mail, e-mail, direct contact and via telephone (using CATI). The research sample included 281 cases and was purposive. Alongside the criterion of outsourcing implementation, the research included only Polish enterprises (Drzewiecki, 2018, p.199).

The characteristics of the research sample in the cross-section of selected quality features (organizational and legal frame, scope of diversification, and business area) are presented in table 2:

Table 2: The characteristics of the research sample in the cross-section of selected features

Organizational and legal frame of business activity	Size of enterprise			Sum (%)
	Small	Medium	Big	
State owned enterprise	1	2	7	10 (3.6%)
Joint stock company	3	5	19	27 (9.6%)
Civil law partnership	21	50	13	84 (29.9%)
General partnership	12	9	4	25 (8.9%)
Limited partnership	0	0	1	1 (0.3%)
Limited liability company	22	20	24	66 (23.5%)
Business run by a natural person	44	23	1	68 (24.2%)
Sum	**103**	**109**	**69**	**281**
Area of business				
Activity only on domestic market	66	72	30	168 (59.8%)
Activity mostly on foreign markets	2	3	5	10 (3.6%)
Activity mostly on domestic market	35	34	34	103 (36.6%)
Degree of diversification				
Enterprise operating in one sector	53	52	21	126 (44.8%)
Enterprise operating in several related sectors	45	53	31	129 (45.9%)
Enterprise operating in several unrelated sectors	4	3	7	14 (5%)
Enterprise operating in a dozen or so sectors	1	1	10	12 (4.3%)

Source: (Drzewiecki, 2018, p.199-200).

Almost one third of the research sample were comprised of civil law partnerships, around one fourth – limited liability companies and businesses run by a natural person. Roughly every tenth of researched companies was organized in the form of a joint stock company; in total, share-holding companies equaled to one third of cases. Most of the subjects comprising the research sample (nearly 60%) operated the business only on a domestic (Polish) market. The degree of diversification of investigated subjects should be evaluated as low: more than 90% of enterprises operated its business either in one branch or at most few related branches (Drzewiecki, 2018, p.200).

Research Results

In order to evaluate the level of outsourcing maturity, average and median values were calculated for each of the 18 variables used in the research (see table 1). Table 3 presents these results (in the sample as well as according to company size):

Table 3: Outsourcing maturity: in the sample and according to company size

Variable code	Variable name	Sample data (n=281)		Data according to company size*					
				Small (n=103)		Medium (n=109)		Large (n=69)	
		Avg.	Med.	Avg.	Med.	Avg.	Med.	Avg.	Med.
LT	Long term contract	1,75	2	1,15	1	2,16	2	2,01	2
BS	Benefit sharing	0,96	1	0,79	1	1,00	1	1,16	1
RS	Risk sharing	1,06	1	1,02	1	1,05	1	1,16	1
HS	HR sharing	1,37	1	1,12	1	1,47	1	1,62	2
PS	Physical resources sharing	1,10	1	0,78	0	1,22	1	1,41	1
SI	Joint investments	1,16	1	0,74	0	1,42	2	1,41	1
OR	Outsourcing risk analysis	1,61	2	1,48	1	1,59	2	1,87	2
OC	Opportunity cost analysis	1,88	2	1,62	1	1,96	2	2,14	2
QP	Quality of products / services analysis	2,43	2	2,23	2	2,43	2	2,72	3
VE	Vendor experience analysis	2,17	2	1,75	1	2,37	3	2,48	3
GI	Gathering additional information about vendor	1,79	2	1,50	1	1,94	2	1,99	2
VC	Vendor consultations about the requirements	1,67	2	1,61	1	1,64	2	1,80	2
VA	Vendor consultations about agreement draft	1,20	1	0,87	0	1,35	1	1,45	1
CT	Creating a team to negotiate with a vendor	1,28	1	0,90	0	1,44	1	1,61	1
CV	Creating a team with the vendor	1,23	1	0,98	0	1,27	1	1,55	1
IM	Informal meetings with the vendor	1,06	1	0,97	1	1,08	1	1,17	1
EI	Exchanging strategic information	1,35	1	0,95	1	1,59	2	1,57	2
HC	Hiring consultant(s)	0,93	1	0,77	0	0,85	1	1,28	1

**Based on two criteria defined in EU regulations: employment size and annual turnover.*

Source: own work

Overall, research results in the sample confirmed **low level of outsourcing maturity used within researched companies** according to criteria taken into account and resulting from the framework described earlier. When it comes to vendor gratification model, Polish companies are not keen to share both risk and benefits with their outsourcing partners. Also, the average values for variables responsible for measuring the frequency of resource sharing (HS, PS and SI) were one of the lowest, in comparison to the rest of variables. Polish outsourcing clients prefer rather formal communication, which may signify that they rarely use various forms of informal relationships with vendor`s workers as one of the control mechanisms. Also, they very rarely decide to hire consultants, which may be the result of lack of financial resources (relevant especially for small companies). In case of only two variables (QP, quality of vendor`s products and / or services analysis, as well as VE - vendor experience analysis), the

average amount was higher than 2. Even though these activities seem obvious and can be found in virtually any outsourcing process framework, values between 2 and 2,5 still have to be assessed as low in this context.

The research results suggest that most of the Polish companies sooner or later encounter problems during outsourcing contract execution, which is going to negatively affect both outsourcing efficiency and effectiveness. Lack of organizational routines such as risk and profit sharing is neither going to encourage the vendor to be engaged in the relationship, nor to increase partner`s motivation. Low level of mature outsourcing solutions popularity suggests also a low level of trust in interorganizational relationships, which naturally increases transaction costs, and, again, negatively influences potential benefits of using this particular management method. Relatively low average values of variables responsible for measuring frequency of analytical activities carried out during outsourcing (2 to 2,5 on a scale of 5) indicate also somewhat chaotic approach to the way outsourcing should be managed and organized. This is especially relevant to small companies.

What also has to be noticed are the differences in outsourcing maturity levels between companies of different size. Statistically proven (by applying Kruskal-Wallis test which enabled to confirm specificity of small enterprises in this regard) differences between average values of variables shown in table 3 indicate, that the way outsourcing is approached and carried out is specific for small companies. This group of enterprises seems to experience some kind of "vicious circle" of outsourcing. They do not have access to the level of resources (mostly: time, financial, HR) that would enable them to carry out outsourcing process "the right way" (e.g. by putting more effort to analytical activities in order to reduce outsourcing failure risk). What is more, they are also not able afford to seek for help from consulting companies which could streamline the whole process. This results in a less controlled approach to outsourcing implementation and, as a consequence, negatively impacts not only *ex ante* risks, but also *ex post* results of cooperation with a vendor. Additional problems during the whole process generate more transaction cost, which influences overall level of company`s resources.

At this stage of the research, a correlation analysis was carried out in order to identify the relations between variables used to measure outsourcing maturity. Its results proved the existence of a number of statistically valid correlations between the 18 variables used in the research. Hence, an additional analysis was carried out, which would enable to aggregate the variables in order not only to inquire more about the nature of these relations, but also to clarify the research framework.

In the course of this analysis, the following statistical methods were used:

- factor analysis – to acquire the new set of aggregated variables and
- reliability analysis – to confirm the correct way the variables were aggregated.

In order to establish the number of aggregated variables (factors), two criteria were taken into consideration: levels of eigenvalues (over 1) and the criterion of Catell`s scree test (Catell, 1966). After identifying the number of factors, the Varimax method was used to rotate the variables, which enabled to match each of the 18 variables to one of the factors. Then, reliability analysis was carried out by calculating the α-Cronbach indexes for each of the identified factors. The results of this analysis are presented in table 4:

Table 4: Brief description of four aggregated variables for outsourcing maturity

Aggregated variable symbol	α-Cronbach index value	Variables constituting the aggregated variable	Aggregated variable characteristics
OM1	0,89	Benefit sharing (BS) Risk sharing (RS) HR sharing (HS) Physical resources sharing (PS) Joint investments (JI) Informal meetings with the vendor (IM) Exchanging strategic information and knowledge (EI)	Form of the contract, model of vendor gratification and information exchange between outsourcing partners
OM2	0,80	Long term contract (LT)	Contract duration
OM3	0,91	Outsourcing risk analysis (OR) Opportunity cost analysis (OC) Quality of products / services analysis (QP) Vendor experience analysis (VE)	Analytical activities that accompany the outsourcing process
OM4	0,91	Gathering additional information about vendor (AI) Vendor consultations about the requirements (VC) Vendor consultations about agreement draft (VA) Creating a team to negotiate with a vendor (CT) Creating a team with the vendor (CV) Hiring consultant(s) (HC)	Outsourcing process organization and management

Source: own work

The results of the factor analysis carried out for the 18 variables of outsourcing maturity enabled to identify four of the following aggregated variables. Table 5 presents the research results of outsourcing maturity using new set of four aggregated variables:

Table 5: Aggregated variables data: in the sample and according to enterprise size

Aggregated variable name [variable code]	Sample data (*N*=281)		Data according to company size					
			Small (*N*=103)		Medium (*N*=69)		Large (*N*=109)	
	Avg.	*Stand. dev.*	*Avg.*	*Stand. dev.*	*Avg.*	*Stand. dev.*	*Avg.*	*Stand. dev.*
Form of the contract, model of vendor gratification and information exchange between outsourcing partners [OM1]	1,15	0,93	0,91	0,78	1,26	0,81	1,36	1,21
Contract duration [OM2]	1,60	1,26	1,08	1,01	1,96	1,20	1,80	1,31

Analytical activities that accompany the outsourcing process [OM3]	2,02	1,27	1,77	1,40	2,09	1,08	2,30	1,28
Outsourcing process organization and management [OM4]	1,35	1,08	1,10	1,07	1,41	0,91	1,61	1,27

***Source**: own work*

The research results presented in table 5 have proven previous conclusions regarding outsourcing maturity. Now, the specificity of small companies in this context becomes even more visible. The lowest average values were observed for variable OM1 (contract form, gratification model), especially in case of small business entities. Also, when it comes to variable OM3 (regarding the analytical activities that accompany outsourcing process), its average value was lower than 2 only for small companies. Again, the research results presented in table 5 have proven that the size of an enterprise is positively correlated to the outsourcing maturity.

Summary

The research results have enabled to draw two main conclusions. First one is that the overall level of outsourcing maturity in Polish companies is low. This approach to outsourcing naturally limits not only its scope, but also the potential benefits it could bring for the client. Particularly, it indicates also that the vendor is treated rather as an outside company that provides resources, than a partner that could – to some extent – improve client`s overall efficiency and effectiveness (e.g. by process optimization or new business opportunities).

The second main conclusion that stems from the research is the specificity of outsourcing maturity used in small companies. As it was stated before, this somewhat chaotic, *ad-hoc* approach to outsourcing, proved by the lowest outsourcing maturity levels, may result, among others, from the limited possibilities of resource access in comparison to bigger entities. The above conclusions become particularly important in the light of the statistically verified relationship between the level of outsourcing maturity and its effectiveness. Indeed, small enterprises, characterized by the lowest level of outsourcing maturity, assessed outsourcing effectiveness as the lowest. The reasons for this state of affairs can stem from, among others, the differences in awareness of how to use this method, as well as managerial routines, processes and procedures, in entities of different size.

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Enhancing Quality and Management Engineering Laboratories for Undergraduate Programs in Higher Education

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Abstract

The effective and efficient laboratories' exposure plays an important role for producing market ready graduates of any engineering are science degree program. The main purpose of the labs, a short form used hereafter for laboratories, is to provide the opportunity to the students to practice the knowledge they gained in the classrooms and from their own understanding. This require for higher education institutions offering degree programs in engineering and science, particularly, to strive always to enhance the quality as well as proper management of the labs. This study presents the analysis of labs in a higher education institutions and suggest solutions; following those labs would have managed properly and students will benefit at maximum of the purpose of the labs.

Keywords: Traditional Managing, Responsibility Matrix, Labs Management Organizational Chart, Teaching/Laboratory Assistants

Introduction

The engineering professionals have always, as their professional responsibility, been endeavoring to harnessing and adapting the well-known fundamental resources; materials, energy, technology, and information that has been considered the creation of technology. The ultimate objective and goal of engineering education is to prepare students to apply engineering theories and laws to deal with the forces and materials of nature. The ABET (2020) defined outcomes for an engineering degree program that a student will have:

"1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies."

A careful analysis of the above listed ABET SOs reveals that labs are mandatory resources in a higher education institution offering engineering programs. For example, SO 6 requires a lab to develop a

student's skill to conduct appropriate experiments and SO 5 could also be achieved when students work in a team in labs.

This study was conducted to identify problems in managing engineering degree program supporting labs. The data and the information about style of managing the labs was collected from responsible personnel of engineering labs in three different higher education institutions. This data and style was analyzed to propose *to-do-things* to make labs more productive and provide inducing environment to achieve the student learning outcomes in an engineering degree program. The name of the institutions and personnel are not listed here rather we will use HEI-1, HEI-2, and HEI-3 to present of findings for three labs in different institutions.

Data Collection

Organization Structures

In this section we present the data collection methodology and management style in three labs. The management structure chart for HEI-1 is given in Figure 1. The institution HEI-1 is offering four different programs and there are more than fourteen different labs including computer, science, and engineering.

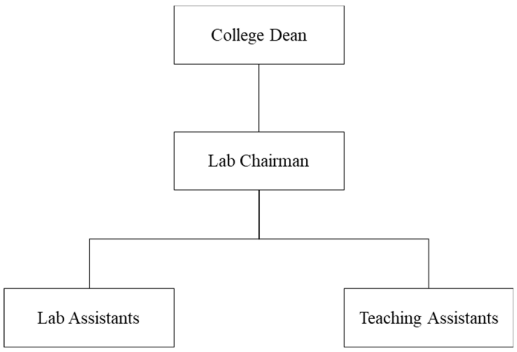

Figure 1: Management structure chart for HEI-1

The management structure chart to manage the labs in institution HEI-2 is given in Figure 2. The institution HEI-2 is offering four different programs and there are different labs including computer, science, and engineering.

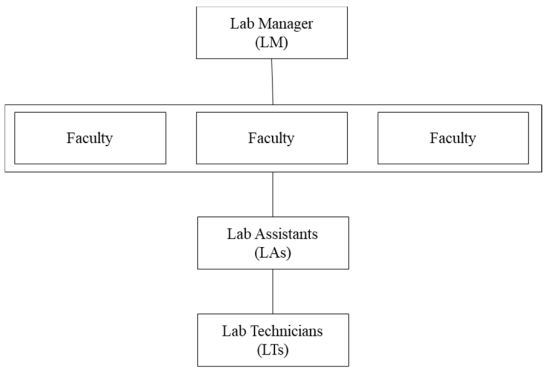

Figure 2: Management structure chart for HEI-2

The management structure chart to manage the labs in institution HEI-3 is given in Figure 3. The institution HEI-3 is offering different programs and there are more than thirteen different labs including computer, science, and engineering.

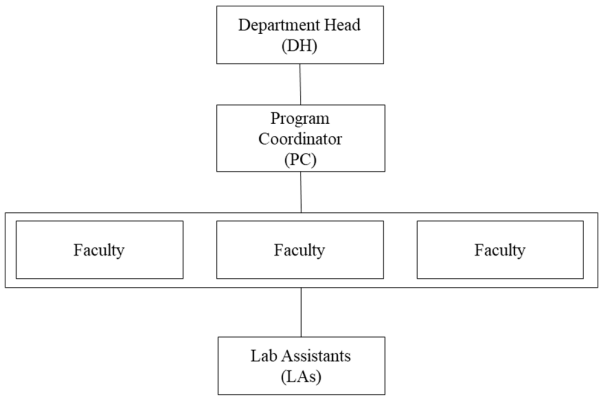

Figure 3: Management structure chart for HEI-3

Responsibility Matrices

The responsibility matrix to manage the labs for readiness for day-to-day effective conduct of the labs in institution HEI-1 is given in Table 1.

Table 1: Responsibility matrix in HEI-1(a tick is for the responsible personnel)
LAs – Lab Assistants, TAs – Teaching Assistants, LC – Lab Chairperson

Items	Dean	LC	LAs	TAs
Resolving issues in labs	✓	✓	✓	✓
Preparing labs for experiments	✓	✓	✓	✓
Maintaining and repairing equipment	✓	✓	✓	✓
Scheduling labs	✓	✓	✓	✓
Supervising labs	✓	✓	✓	✓

The responsibility matrix to manage the labs for readiness for day-to-day effective conduct of the labs in institution 2 (HEI-2) is given in Table 2.

Table 2: Responsibility matrix in HEI-2 (a tick is for the responsible personnel)

Items	LM	Faculty	LAs	LTs
Resolving issues in labs	✓	✓	✓	✓
Preparing labs for experiments		✓	✓	✓
Maintaining and repairing equipment	✓			✓
Scheduling labs	✓	✓	✓	
Supervising labs	✓	✓	✓	✓

The responsibility matrix to manage the labs for readiness for day-to-day effective conduct of the labs in HEI-3 is given in Table 3.

Table 3: Responsibility matrix in HEI-3 (a tick is for the responsible personnel)

Items	DH	PC	Faculty	LAs
Resolving issues in labs	✓	✓	✓	✓
Preparing labs for experiments			✓	✓
Maintaining and repairing equipment		✓	✓	✓
Scheduling labs	✓	✓		
Supervising labs	✓	✓	✓	✓

Questionnaire used for Data Collection

The important feature such as accuracy and systematic of data collection has always been critical to conducting scientific or social research as presented in Karim (2017). The data collection allows us to collect information that we want to collect about our study participants. The methods of data collection depend on the investigation and research types and may include documents review, observation, questioning, measuring, or a combination of different methods. The questionnaires, one of data collection tools, are designed to collect data from a group of people coming under the purview of the study. The questionnaire is designed to collect data from large. diverse and widely scattered groups of people. Therefore, it is a device for securing answers to questions by using a form which the respondent himself fills in. We have used a questionnaire to collect data form the those who have been involved in using or managing the labs in three institutions. The questionnaire form; 4 – 1 for (4 Yes), (3 Partially Yes), (2 Partially No) and 1 (No), used and ratings collected is given in Table 4. There were 10 TAs in three institutions and 47 faculty members who participated in the survey.

Table 4: Questionnaire Form for data collection

Questions	**Ratings**			
	4	**3**	**2**	**1**
1. Is the college supporting well in developing and improving the lab as whole?	10	20	20	50
2. Are the learning outcomes of each lab courses clearly defined and are they conducted according to the mentioned learning outcomes?	5	15	55	25
3. Are you happy with your department wise organizational structure for reporting the lab issues?	10	10	50	30
4. Are the responsibilities of each person involved in labs clearly defined?	50	20	20	10
5. As a student working in lab, are you satisfied with your learning outcome?	10	20	40	30
6. Are you happy working with the college as a lab assistant and TA?	3	3	1	3
7. Do you think the lab equipment are properly repaired and refreshed?	2	15	20	10

Data Analysis and Proposed Management Style

Data Analysis is the process of systematically applying statistical and/or logical techniques to describe and illustrate, condense and recap, and evaluate data. According to Shamoo (2003), various analytic procedures *"provide a way of drawing inductive inferences from data and distinguishing the signal (the phenomenon of interest) from the noise (statistical fluctuations) present in the data"*. In Table 5, we provide the analysis of data presented in Table 4.

Table 5: Data analysis and explanation of finding

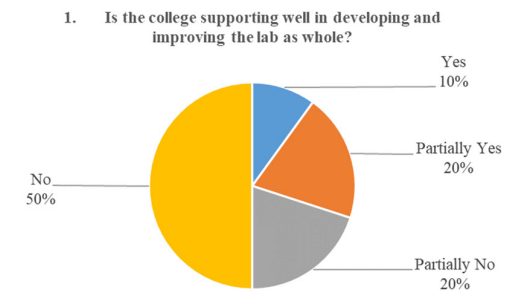	This question was asked to identify the level of support and importance given to the improvement of the labs in college. *The analysis of data shows that more than 70% are not satisfied with the support and importance provided by the responsible management personnel.*
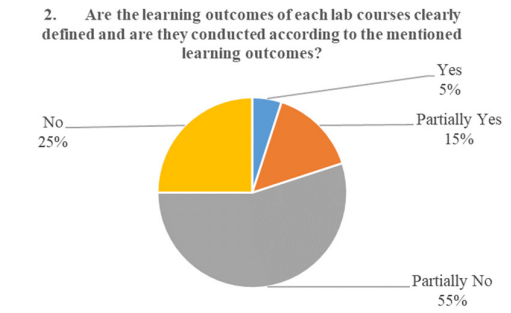	This question was asked to identify importance given to the conduct of labs during the preparation of the curriculum i.e. at the time of developing a syllabus. *The analysis of data shows that only 20% of the participants only are of the opinion that labs are not considered during the development of curriculum.*
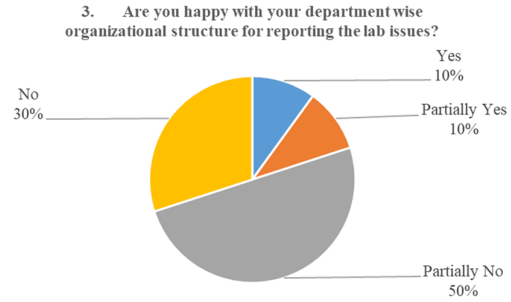	This question was framed to know the type of reporting and organizational structure of the lab managing personnel. It plays an important role to resolve lab issues occurs. *The analysis of data shows that only 20% of the participants only are of the opinion that reporting and organization structure of the lab managing personnel.* .
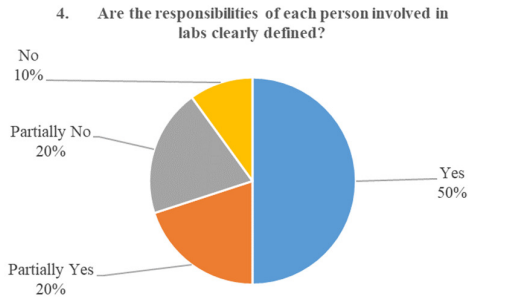	This question was asked to identify clarity in the job descriptions of those who are involved in managing the labs for effective contribution in an engineering degree program. *The analysis of the data presents that 70% rated it satisfactory that job roles were clearly defined for the employees involved in the lab management.*

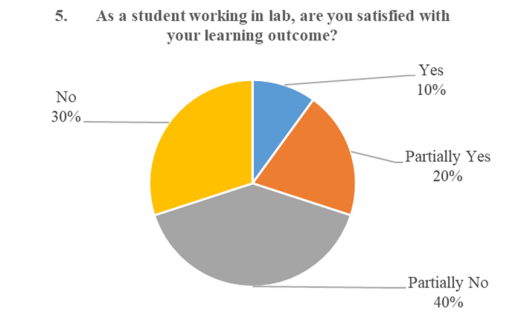	This question was asked from the students about their satisfaction with the labs readiness for meeting the student outcomes of a program. *The analysis of the data presents that only 30% rated it satisfactory that labs are properly maintained.*
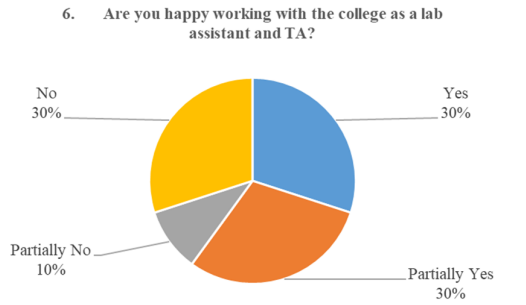	This question was asked from the TAs about their satisfaction with the working as managing the labs etc. *The analysis of the data presents that only 60% rated it satisfactory.*
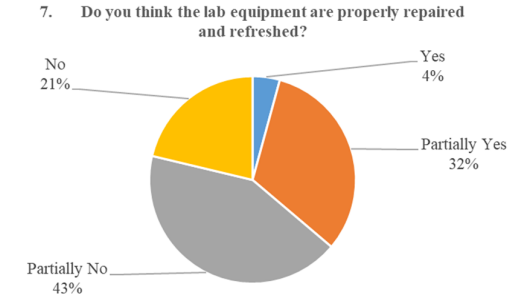	This question is actually asked from the faculty about their satisfaction with the timely procurement of the equipment. *The analysis of the data presents that only 36% rated it satisfactory*

We summarize the main issues identified after the analysis of the collected data as follows:

1. Lab courses are not distributed as per the qualification of the TAs.
2. The learning outcomes for the labs in lab-base courses are not stated.
3. The students' feedback for the faculty/TA is not satisfactory due to faulty or non-availability equipment in labs.
4. There is no properly specified process for financial decisions for replacement or repair of equipment.
5. There is no effective organizational structure for labs' maintenance.
6. There is no proper responsibility matrix present in the institutions for conducting the labs efficiently.

Recommendation for Effective Labs Management

The investigators of this study proposed an organizational structure as shown in Figure 4. The proposed structure will be useful for effective management of the labs for its contribution to meet the students' outcome positively.

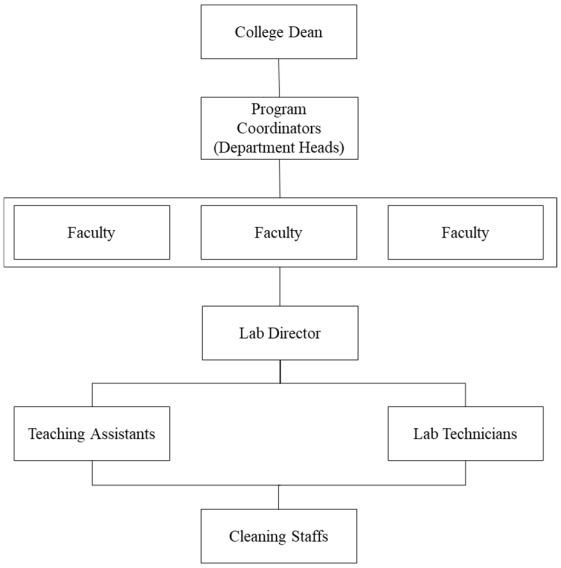

Figure 4: Proposed organizational structure

A Lab Director should be appointed as responsible for all labs in an engineering college. The Lab Director and Program Coordinators can decide the learning outcomes of labs and higher decisions regarding laboratories can be made by these personnel. The Lab Director should make sure that the syllabus for labs is proper and as per the requirement of an engineering degree program level. The Program Coordinators should be assigned for each department and they can discuss with their faculty about the experiments to be conducted and also about the learning outcomes of each experiment. Once the syllabus of lab is prepared properly, it should be passed on to the concerned lab assistants to go through it.

Before each semester starts, the Lab Technicians and Lab Assistants should make sure that all the equipment and component are properly working. A log should be maintained to mark the number of working and faulty equipment. The labs should be refreshed with new components in case of any faulty components are there.

Finance for this kind of purposes should be immediately available. For this purpose, reporting of faulty equipment should be done at least two weeks before a semester starts so that the management has enough time to get new one.

If this organizational structure is maintained properly, a lab can run smoothly without many issues.
A responsivity matrix has also been proposed as given in Table 6 *(LD – Lab Director, PC – Program Coordinator, FM – Faculty Member, LA – Lab Assistant, LT – Lab Technician, and CS – Cleaning Staff)*

Table 6: Proposed responsibility matrix

Items	**LD**	**PC**	**FM**	**LA**	**LT**	**CS**
Lab issues	✓	✓	✓	✓		
Lab preparation and running		✓	✓	✓	✓	
Equipment repairing and maintenance				✓	✓	
Lab timing and scheduling	✓	✓	✓			
Lab supervision			✓	✓	✓	
Cleaning labs						✓

The responsibilities of each personnel involved in using and managing labs should be clearly defined. The Lab Director, responsible for readiness of all labs, should be aware of important changes that happen in labs and also should be updated with the status of equipment and experiments conducted as well. The developments and operations of labs should be decided by him or should be prepared by LD to be presented to higher administration following the prescribed processes in the institutions.

Conclusion

We conducted an analysis of the labs management and maintenance in three institutions offering engineering degree program those include the practical as part of the curriculum. After the analysis and findings of the shortcomings in under investigation institutions we also proposed the organizational structure and responsibility matrix. We are confident that the proposed structure and matrix will help in achieving the outcomes of the labs.

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Methodology for Assessing the Investment Attractiveness of a Commercial Organization Using the Scenario Method

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Abstract

The article discusses the use of scenario analysis for the analysis of investment attractiveness. With the help of this analysis, a predictive assessment of the state of the organization is carried out with various variants of combinations of factors determining its activity. This method is also the most promising among the existing instruments of strategic economic analysis, since it allows providing the management of an economic entity with ready-made schemes of actions in case of changing conditions of its activity. Scenario analysis is used in decision making even without the support of modern software, purely on an intuitive level.

Keywords: Scenario Method, Investment Attractiveness, Inflation Rate, Economic Efficiency

Introduction

To ensure the competitiveness of Russian enterprises, both in foreign and domestic markets, great attention must be paid to investments. In order for the enterprise to be able to successfully respond to changes taking place in the country and in the world, it is necessary to introduce innovations, to fully utilize the full potential of the enterprise, both economic and technical. This requires significant investment. For this, both the company's own funds and borrowed capital can be used. In order to competently distribute the received funds, it is necessary to evaluate the investment attractiveness (Nandi S. et al., 2019; Laužikas M. et al., 2019; Shaitura S.V. et al., 2018.)

Due to the lack of a clear structure in the system of methods for assessing investment attractiveness, its effective practical application is difficult (Kaźmierczyk J. 2019.; Masood O. et al., 2019; Movchan I.B. et al.,2019; Benešová D. et al., 2019.)

If the analysis of investment attractiveness is carried out competently, then it can form the basis of effective interaction between the source of financing and its consumer.

(Ige O., 2019; Molchanov N.N. et al. 2017; Shatunova O. et al., 2019; Ivanova V. et al., 2019; Turen S. et al. 2019; Petrushina L.O. 2015.)

According to the authors, the identified shortcomings in the process of investment attractiveness can be offset by the use of scenario analysis.

In the system of methods of strategic economic analysis, we can distinguish traditional (statistical), economic-mathematical and special ones. Techniques demanded during the assessment of the investment attractiveness of the organization can be divided into quantitative and qualitative. Quantitative methods include those methods whose use is measurable, objective and unambiguous. While the qualitative ones will differ in subjectivity both in the interpretation of the results and in the nature of the performance.

The main part of the methods of economic analysis of investment attractiveness belongs to the first group, with the exception of heuristic methods (expert assessment methods, brainstorming) and most special (SWOT, PEST, SNW, portfolio, scenario, comparative).

One of the most comprehensive methods of analyzing investment attractiveness is scenario analysis. It is used for predictive assessment of the state of the organization in various combinations of factors that determine its activities. This method is also the most promising among the existing tools of strategic economic analysis, since it allows you to provide the management of an economic entity with ready-made action plans in the event of changes in the conditions of its activity. Scenario analysis is used when making decisions even without the support of modern software, purely on an intuitive level, when the responsible persons are faced with the question: "What happens if?". The possibilities of this method make it necessary to develop and Refine a single scheme for its implementation.
Methods

In the process of practical adaptation of the methodology of the scenario method of strategic economic analysis for assessing the investment attractiveness of a commercial organization, we developed the following step-by-step algorithm of actions:

1 step Organizational stage

2 step Defining predefined constraints

3 step Assessment of factor impact and risks

4 step Forecasting

5 step Adjustment of the organization's development strategy taking into account the forecasts made

6 step Assessment of the investment attractiveness of the organization.

Results and Discussion

We will perform a consistent implementation of the methodology for assessing the investment attractiveness of a commercial organization, based on the reports of Planeta LLC.

Stage 1-organizational. Organization of evaluation of investment attractiveness of a commercial organization through a scenario approach. At this stage, it is necessary to assign responsible persons for each of the elements of the algorithm, set intermediate and control deadlines for the implementation of tasks.

Step 2-define the specified restrictions. At this stage, it is necessary to find out the investment targets and analyze the financial and management reports of the organization to identify current trends in the development of activities. In the period 2020-2022, the market for machine-building products for

agriculture is projected to grow by 12-15 % annually. The market of machine-building products for agriculture has an inflationary model of development, in many respects its volume is determined by the level of set prices. Due to the lack of the organization's own funds, as well as the existing debt to pay long-term obligations, it is necessary to attract 4285714.28 euros of investment to Finance the expansion of the field of activity. Table 1 shows the expected indicators of an organization's investment attractiveness set by a potential investor.

Table 1: Indicators of investment attractiveness of the organization

Indicator	Value
Payback period, years	no more 5
Share of equity, %	no less 7,6

According to the received data, a number of main trends were identified in the activity of Planeta LLC. Planet LLC is located in the city of Voronezh, Russia. The company belongs to medium-sized enterprises with 82 employees. The subject of activity of Planet LLC is the wholesale and retail trade in agricultural machinery and other consumer goods.

1. Active investment activity – implementation of expanded reproduction, acquisition of more modern equipment, implementation of services in new areas of production of complex equipment for agriculture.

2. The financial condition of the organization is stable enough from the point of view of making a profit, but the company is insolvent and financially unstable. Financing activities primarily through long-term and short-term Bank loans, increasing the cost of servicing loans, a low share of equity, reduced liquidity, solvency, and financial stability.

3. Jump in profitability and business activity of the organization, mainly due to the growth of net profit.

Forecasting of changes in the value of the organization was performed from the moment of investment investments-in 2020 – until 2022.

Stage 3-factor impact and risk assessment. One of the indicators of an organization's investment attractiveness is the growth rate of its value. One of the key factors determining the value of a business is revenue. The second indicator of investment attractiveness, the payback period, is calculated on the basis of the derivative of the same indicator – the net profit received minus the planned current expenses after the project launch. Revenue is affected by a large number of factors.

The main performance indicators that form the organization's revenue are the number of customers and the average receipt. These parameters are affected by the following factors:

- rate of inflation;
- currency fluctuations (euros);
- number of market consumers;
- success in attracting new customers in the market;

The considered parameters are mainly determined by the external conditions of the organization's functioning. The impact of each of them on the organization's performance can be estimated, but to eliminate the consequences of the expected negative outcomes, it is necessary to create a program of measures to manage internal factors that primarily determine the level of investment attractiveness of the studied organization for a potential investor. One of the indicators of investment attractiveness in this study is the condition for increasing the cost of equity. The amount of equity can be determined through the leverage of the financial lever, the cost and cost levels, and the amount of current assets. Let's take as a basis for these indicators the DuPont investment attractiveness model.

The expression of the cost of equity through a number of interrelated factors allows you to minimize the set of factors that need to be taken into account in the subsequent calculation of scenarios for changes in the investment attractiveness of the organization. The matrix of possible outcomes of factor influence is presented below (table 2).

When constructing the matrix, the cost level, the level of conditional fixed costs, and the level of conditional variable costs are assumed to be equal to the values of the last studied period, i.e., 2018. The inflation rate refers to external factors with a high degree of uncertainty, so using correlation and regression analysis, we will build a forecast of the inflation rate for the period from 2020 to 2022, taking into account possible economic development options.

Table 2: Prediction of inflation based on correlation and regression analysis

the probability of failure of the Year	Actual Values, %	Forecast, %	
		Polynomial trend line	Trend line
2016	5,4		
2017	2,5		
2018	4,3		
2019 (forecast based on results 9 month)	5,5		
2020		10,08	4,95
2021		16,44	5,16
2022		24,85	5,37

Calculations show that if you use a polynomial trend line as the most reliable one ( ),that is, a fairly serious increase in inflation is predicted: in 2020 - 10.08%, in 2021-16.44% and in 2022 - 24.85%. If you use a linear one, there is a slight increase from 4.95% to 5.37%, but the approximation coefficient for a linear trend line is too low ( ),to use the obtained data in further calculations.

However, given the state policy aimed at reducing inflation, we propose to consider three outcome given the increase in inflation from the minimum determined by a linear trend line to the maximum defined by the polynomial trend lines. The second outcome is the arithmetic mean between the first and second.

Since there are only parameters of the first and second level of uncertainty among the considered factors, a fairly accurate matrix of a small format is formed. If there are factors of the third level of uncertainty, it is possible to include in the matrix the boundary and average values of the range of possible influence, which will allow you to create an optimistic, pessimistic and realistic development scenarios and, thus, limit the number of scenarios considered.

Table 3: Matrix of possible outcomes of factor influence for «Planet» LLC

Factor	№ outcome	2020 г.	2021 г.	2022 г.
Inflation rate, %	1	4,95	5,16	5,37
	2	7,51	10,79	15,11
	3	10,07	16,43	24,85
Cost level, %	1	87,9	87,9	87,9
Level of fixed costs, %	1	6,51	6,51	6,51
Level of conditionally variable costs, %	1	2,81	2,81	2,81
Early repayment of a loan, euro.	1	0	0	0
	2	4285714,28	4285714,28	4285714,28

Taking the outcomes of external factors as strictly set limits of activity, for each of the scenarios, you can choose a set of values of internal factors that the company will need to adhere to in order to maintain the necessary level of investment attractiveness. In addition, by automating calculations and setting possible values for each of the indicators, it is easy to deduce the number of optimal scenarios in their total number, which will determine the current level of investment attractiveness of the organization for a particular investor.

To determine the number of scenarios being developed, we use the basic combinatorics formula.

In this case, the group will be the number of all possible scenarios for the development of each specific factor. Thus, the total number of all possible scenarios for the development of the organization's activities, taking into account the factors considered, is 6 and is determined mainly by the number of possible options for the development of the inflationary influence factor, the timeliness of the investment project and the financial policy of the organization. Using the tools of budgeting, trend analysis, extrapolation, etc. we form a model of the organization's development, tied to different values of factor features.

Stage 4 - preparation of forecast scenarios. From the point of view of assessing investment attractiveness, as well as taking into account the interest of most investors in increasing the cost of equity, the calculations used a model developed by us that links the external and key internal parameters of the organization's activities, including such specific characteristics as the number of buyers, the average check, etc.

The initial data for using the scenario approach when evaluating the investment attractiveness of Planeta LLC are given in table 4.

The results of calculations for each of the 6 scenarios of revenue, net profit, total assets, average annual value of current assets and equity are disclosed in table 5.

Table 4: Initial data on Planet LLC for the period from 2016 to 2018, euro

Усл. Обозн.	Indicator	2016 г.	2017 г.	2018 г.
OA	Current assets	9317786	11955786	14881614
CA	The average annual value of current assets	-	10636786	13418700
TA	Total assets	10419557	13365129	16615757
TD	Borrowed capital	10115814	12983614	16001371
E	Equity	286300	422728,6	614371,4
TD/E	Leverage financial leverage	504,28	438,57	372,85
TI	Revenue	20343057	25910443	36447529
SI	Average check	142,85	185,71	271,42
P	Average number of buyers	142401	139518	134280
C1 abs	Cost price	17737429	22406343	32045043
C2 abs	Contingent costs	1625933	2117321	2674043
C3 abs	Conditionally variable costs	609767,1	793007,1	1020514
C1	Cost level	0,87	0,86	0,88
C2	Level of fixed costs	0,08	0,08	0,07
C3	Level of conditionally variable costs	0,03	0,03	0,03

Evaluating the investment attractiveness of a commercial organization using a scenario approach, if technical capabilities are available, allows you to take into account both changes related to internal factors of activity and possible risks associated with external factors. It is enough only to include the considered risks as part of the restrictions (table 5) that determine the business development for the forecast period.

The disadvantage of the proposed method is that it increases the complexity when a sufficiently large number of parameters are included in the calculation. For example, including an increase in the amount of investment due to higher exchange rates as a risk factor (some products and equipment are purchased abroad). This factor has only two possible outcomes in the forecast period: either the amount of investment is growing or not. However, this is enough to double the number of calculated scenarios from 6 to 12.

Stage 5-adjustment of the organization's development strategy taking into account the forecasts made. Taking into account the set restrictions and possible options for the development of factors, the number of neutral (not taking into account possible measures to minimize risks) scenarios corresponding to indicators of investment attractiveness is determined.

Since we selected the payback period and the share of equity as indicators of the organization's investment attractiveness (Table 1), we will consider the choice of a scenario based on these criteria, and we also need to estimate the amount of expected cash receipts from the selected project and calculate the discounted value of each stream that is expected.

Table 5: Calculation of the cost of equity of Planet LLC, taking into account the influence of factors, Euro

Indicator	Script number	Scenario description	2020 г.	2021 г.	2022 г.
TI	1,4	End inflation 1	38251681,29	38328221	38404760,9
	2,5	End inflation 2	39185649,14	40382950,4	41953839
	3,6	End inflation 3	40119617,14	42437679,9	45502917
NP	1,4	End inflation 1	742971	744457,714	745944,286
	2,5	End inflation 2	761111,7143	784367,143	814878,857
	3,6	End inflation 3	779252,4286	824276,571	883813,429
TA	1	End inflation 1, loan is not repaid	17358728,14	18103185,9	18849130,1
	2	End inflation 2, loan is not repaid	17376868,86	18161236	18976114,9
	3	End inflation 3, loan is not repaid	17395009,57	18219286,1	19103099,6
	4	End inflation 1, кредит погашается	13073013,86	13817471,6	14563415,9
	5	End inflation 2, кредит погашается	13091154,57	13875521,7	14690400,6
	6	End inflation 3, кредит погашается	13109295,29	13933571,9	14817385,3
TD	1	End inflation 1, loan is not repaid	16001371,43	16001371,4	16001371,4
	2	End inflation 2, loan is not repaid	16001371,43	16001371,4	16001371,4
	3	End inflation 3, loan is not repaid	16001371,43	16001371,4	16001371,4
	4	End inflation 1, the loan is repaid	11715657,14	11715657,1	11715657,1
	5	End inflation 2, the loan is repaid	11715657,14	11715657,1	11715657,1
	6	End inflation 3, the loan is repaid	11715657,14	11715657,1	11715657,1
E	1	End inflation 1, loan is not repaid	1357356,714	2101814,43	2847758,71
	2	End inflation 2, loan is not repaid	1375497,429	2159864,57	2974743,43
	3	End inflation 3, loan is not repaid	1393638,143	2217914,71	3101728,14
	4	End inflation 1, the loan is repaid	1357356,714	2101814,43	2847758,71
	5	End inflation 2, the loan is repaid	1375497,429	2159864,57	2974743,43
	6	End inflation 3, the loan is repaid	1393638,143	2217914,71	3101728,14

The value obtained during the calculation characterizes the amount of money brought to the moment of investment and the amount of income from investments. And now we can compare this amount with the size of the investment.

The forecast of the equity share is shown in table 6.

Table 6: Forecast of the share of equity in the property of Planet LLC, 2020-2022

Script number	Scenario description	Amount of equity, euro			Share of equity, 2020 г.	Share of equity, 2021 г	Share of equity, 2022 г
		2020 г.	2021 г.	2022 г.			
1	End inflation 1, loan is not repaid	1357356,714	2101814,43	2847758,71	0,08	0,12	0,15
2	End inflation 2, loan is not repaid	1375497,429	2159864,57	2974743,43	0,08	0,12	0,16
3	End inflation 3, loan is not repaid	1393638,143	2217914,71	3101728,14	0,08	0,12	0,16
4	End inflation 1, the loan is repaid	1357356,714	2101814,43	2847758,71	0,10	0,15	0,20
5	End inflation 2, the loan is repaid	1375497,429	2159864,57	2974743,43	0,11	0,16	0,20
6	End inflation 3, the loan is repaid	1393638,143	2217914,71	3101728,14	0,11	0,16	0,21

The payback period is usually understood as the number of years required to return the initial investment. This method is very actively used when we are talking about high-risk investments. Then the main criterion for decision-making is the speed with which the investment pays off. The calculation of the payback period, as well as the return on investment, is shown in table 7.

Table 7: Calculation of the payback period and return on investment of LLC Planet for 2020-2022

Script number	**Scenario description**	**NPV, евро**			**NCF, евро**	**Payback period, years**	**Return on investment**
		2020 г.	**2021 г.**	**2022 г.**			
1,4	End inflation 1	707928,571	673191,86	637610,57	2018731	2,12	0,16
2,5	End inflation 2	707928,571	638939,14	534296,29	1881164	2,28	0,15
3,6	End inflation 3	707928,571	608003,29	454200	1770131,85	2,42	0,14

The analysis made it possible to determine possible directions for strengthening the investment attractiveness of the organization, since, according to the preliminary assessment, only one of the 6 scenarios corresponds to the investor's expectations. Thus, the most optimal scenario for the selected criteria is scenario № 4. Let's choose it as a base for further risk assessment: the equity share of 20% is achieved with a minimum payback period of 2.12 years, in addition, the return on investment is maximum and is 16%.

Taking into account the possibility of unrecorded risks, the stage of strategic economic analysis based on the scenario method, involving the development of anti-crisis measures, is vital for the organization. Suggestions for improving the quality of an organization's asset management contribute to an increase in the number of optimal scenarios.

The management response matrix (Table 8) is a table that contains the main signal indicators that reflect the implementation of a particular scenario.

Table 8: Response matrix of the management of Planet LLC, euro

Script number	Scenario description	Total assets	Revenue	Net profit	Borrowed capital	Equity
1	End inflation 1, loan is not repaid	18849130,14	38404760,86	745944,28	16001371,4	2847758,7
2	End inflation 2, loan is not repaid	18976114,86	41953839	814878,85	16001371,4	2974743,4
3	End inflation 3, loan is not repaid	19103099,57	45502917	883813,42	16001371,4	3101728,1
4	End inflation 1, the loan is repaid	14563415,86	38404760,86	745944,28	11715657,1	2847758,7
5	End inflation 2, the loan is repaid	14690400,57	41953839	814878,85	11715657,1	2974743,4
6	End inflation 3, the loan is repaid	14817385,29	45502917	883813,42	11715657,1	3101728,1

However, it should be noted that neither the level of detail of the forecasts carried out nor the number of factors accepted for calculation provide an absolute guarantee that the development of the organization's activities will take place according to one of the considered scenarios. The response matrix serves only as a tool for orientation when drawing up current and medium-term plans and adjusting long-term plans of the organization, which allows reducing the number of considered alternatives taking into account already actual events, and clarifying forecast indicators.

Stage 6-assessment of investment attractiveness. During the analysis, it was determined that there are 6 scenarios for the development of the organization's activities, and this differentiation is due to the presence of a large number of possible outcomes for each period within the forecast of the factor effect of consumer price inflation on services. The revenue indicator is crucial in terms of determining the payback period of the project, as well as in calculating the cost of the business, as it participates in the formation of the company's market stability, its financial condition, and Fund return.

Conclusions and Recommendations

Thus, the scenario approach differs favorably from many existing tools by its universality, or rather, the proposed algorithm takes into account the need to adapt to the specifics of a particular organization's activity. The result of the implementation of the proposed algorithm is the percentage of probability of occurrence relevant for the subject of the scenario assessment for the development of financial and economic activity of object of investments, integrating the actual performance of different versions of the forecast of changes in main determinants of the business. The matrix of responses received as a result of the implementation of the model serves only as a tool of orientation in the preparation of the current and medium-term adjustment and long-term plans of the organization, allowing to reduce the number of alternatives given the fact, already coming events, Refine prognostic indicators. In addition, in the process of testing the method, a number of properties of factors included in the simulation model of the organization's activities were identified, which differently affect the number of calculated scenarios.

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Are the Millennial Banking Customers Willing to Use Digital Banking? A Case from Indonesia

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Abstract

This study aims to determine and analyze the factors that influence the intention of millennial banking customers to use digital banking services by involving conventional banking customers and Islamic banking customers. This research was conducted using a survey method through a questionnaire with a Likert scale of 5 categories in which all statements in the questionnaire were arranged according to the extended UTAUT (Unified Theory of Acceptance and Use of Technology) framework by adding innovativeness, trust, and security variables to adjust the context of the use of digital banking services. In addition, this study also used a dummy variable gender. This study involved 234 respondents consisting of conventional and Islamic banking customers aged 19-39 years and had never used digital banking services. The sampling technique used was non-probability sampling with the type of purposive sampling. Data collected through a questionnaire were then analyzed using multiple linear regressions. The result show that performance expectancy, innovativeness, trust and security provide significant effects on the intention of millennial banking customers to use digital banking. However, gender differences, effort expectancy, social influence and facilitating condition did not play salient role in affecting the millennial banking customers' intention to use digital baking

Keywords: Digital Banking, Millennial Banking Customers, UTAUT.

Introduction

The rapid technological advances in the Industrial Era 4.0 with the existence of Big Data, Artificial Intelligence (AI), the Internet of Things (IoT) have encouraged changes in people's behavior patterns in using financial services. This phenomenon has led to the emergence of new financial service providers who offer new innovations in financial services. According to the McKinsey and Company report compiled by Dietz, Khanna, Olanrewaju, and Rajgopal (2016), if banks do not mitigate fintech attacks, 10-40 percent of bank revenues will be at risk by 2025.

The banking industry is forced to improve and innovate to face the competition with others financial services. There are two responses that banks can do. First, digitizing services in order to provide faster, easier and cheaper services to customers. Second, integrating banking services with customers' daily lives (DBS, 2016). By doing and creating new products that are relevant to the market, as well as new experiences to customers, the bank will become a new disruptor. At present, service to banking customers in Indonesia is still product-oriented (product-centric mindset), so banks need to align strategies for providing customer-oriented financial services (customer-centered mindset).

Indonesia ranks second after Vietnam with 55 percent of non-digital consumers saying that they are willing to use digital banking services in the next 6 months. Meanwhile, according to the 2018 Oracle Financial Services Global Retail Banking Survey, banking customers have switched to digital services, where 67 percent of global customers have actively used digital platforms and frequently access their bank accounts digitally through mobile banking and etc (Pugh, 2018).

Therefore it is important to find out more about factors that influence the intention of banking customers to use digital banking services in Indonesia.

This study used the Unified Theory of Acceptance and Use of Technology (UTAUT) framework developed by Venkatesh et al. (2003) which is a model of technology acceptance and use which synthesizes various elements that exist in eight models of technology acceptance and use that have existed before. In addition, the study modified UTAUT by including innovativeness, trust and security variables to adjust to the context of the acceptance and use of digital banking services and also used a dummy variable in the form of customers' gender to determine whether gender differences affect the intention of millennial banking customers to use digital banking services. This study also involves banking customers in the millennial category, so that this research has a novelty and different from previous studies that have been conducted such as by Yu (2012), Tangkalayanan and Tubtiang (2015), Slade, Dwivedi, Piercy, and Williams (2015), Rahi, Ghani, and Ngah (2019), and Merhi, Hone, and Tarhini (2019).

This study aims to determine and analyze the factors that influence the intention of millennial banking customers to use digital banking services in Indonesia. In addition, this study also aims to determine and analyze the relationship and significance of the factors that influence the intention of millennial banking customers to use digital banking services in Indonesia. This research is expected to be able to contribute to the banking industry, both conventional banking and Islamic banking, by becoming a consideration in developing strategies to dealing with changes in people's behavior patterns in using financial services and in facing competition with other financial service providers. So that the financial industry is able to attract banking customers to use digital banking services. As for the regulator in this case the Financial Services Authority, is expected to be a material consideration in formulating appropriate policies for the banking industry in the face of competition with other financial service providers.

Millennial Banking Customers' Intention to Use Digital Banking

According to Tapscott (1998) millennial generation is referred to as digital generation born in 1976 - 2000. On the other hand, according to the Central Statistics Agency (BPS) 2018 millennial generation is the generation born between 1980 – 2000. In this study, the millennial generation referred to the Central Statistics Agency is the generation born between 1980 - 2000 who are currently aged 19 - 39 years. The main character of millennial generation is familiar with the digital world, so the banking industry is required to adapt to the needs of those who tend to want flexibility and speed (DBS, 2016).

The Oracle Global Retail Banking Survey 2018 states that 69 percent of customers want the entire financial lifecycle to be accessed digitally (Pugh, 2018). The research also outlines several things that encourage customers to switch to digital services, where high rates of return (interest) and customer experience are important considerations in customers financial decisions. Thus, it will be easy for customers to switch to alternative services that offer high returns (interest) and a better experience.

Bank is still the best option in terms of trust, but in the aspect of customer experience, the rate of return (interest) and benefits, the bank is inferior to other financial options. Digital banking enable prospective customers and/or bank customers to obtain information, conduct communications, registration, account opening, banking transactions and account closures, including obtaining other information and conducting transactions other than banking products, including financial advice (financial advisory), investment, electronic-based trading system transactions (e-commerce), and other needs of banking customers (Financial Services Authority, 2016). Therefore it is important to find out more about what factors influence the intention of millennial banking customers to use digital banking services in Indonesia.

This study used the UTAUT model developed by Venkatesh et al. (2003) to understand millennial banking customer's behavioral intention. The UTAUT model was developed to overcome limitations on models of acceptance and use of technology that had existed before, such as the theory of

reasoned action (TRA) developed by Fishbein and Ajzen (1975), technology acceptance model (TAM) by Davis (1989), theory of planned behavior (TPB) by Ajzen (1991), the innovation diffusion theory (IDT) by Rogers (2010) and the theory of perceived risk (TPR) by Featherman and Pavlou (2003). Vankatesh et al. (2003) propose a new model that unites various models of the acceptance and use of existing technology, the model is called the Unified Theory of Acceptance and Use of Technology (UTAUT).

The UTAUT model is a model of technology acceptance and use that synthesizes various elements that exist in eight models of technology acceptance and use that have existed before. The eight models are theory of reasoned action (TRA) developed by Fishbein and Ajzen (1975), technology acceptance model (TAM) by Davis (1989), motivation model (MM) by Davis, Bagozzi, and Warshaw (1992), theory of planned behavior (TPB) by Ajzen (1991), an integrated model of technology acceptance and planned behavior (TAM-TPB) by Taylor and Todd (1995), model of PC utilization (MPTU) by Thompson, Higgins and Howell (1991) , the innovation diffusion theory (IDT) by Rogers (2010), and social cognitive theory (SCT) by Bandura (1986).

According to Venkatesh et al. (2003), the UTAUT model proved to be more successful in predicting technology acceptance and use by 70 percent when compared to the eight previous models. So this study uses the UTAUT model developed by Venkatesh et al. (2003). The UTAUT model has four constructs namely performance expectancy, effort expectancy, social influence, and facilitating conditions. These four constructs succeed in predicting the use and acceptance of technology accurately (Venkatesh et al., 2013). So according to Venkatesh et al. (2003) this model is better compared to other models. In addition, this model has also been validated by being applied in various countries and in various contexts, such as internet technology, internet banking, mobile banking, e-government and others (Merhi et al., 2019).

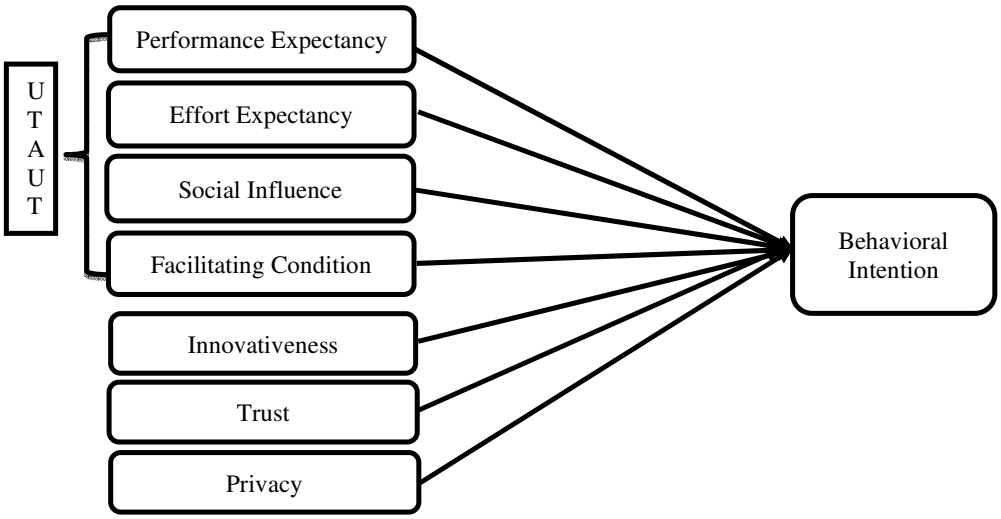

Figure 1: Research Model; Extended UTAUT with Innovativeness, Trust and Privacy

Source: Venkatesh (2003); Self-Developed

This research extends the UTAUT model by adding innovativeness, trust, and security variables in the construct model. The innovativeness variable was added to determine the extent to which banking customers are open to new experiences and try new technologies in this case digital banking services, as an expression of trends towards innovation and novelty (Slade et al., 2015). However according to Slade et al. (2015), innovation has not been incorporated into any technology acceptance model. Therefore, as a service that offers innovation in the form of new experiences by providing banking

services that are comprehensive, easy, accessible at any time and from anywhere and effective and efficient, in understanding the intentions of banking customers, innovation variables need to be added to the model.

Unlike acceptance of other technologies that simply use the UTAUT model, digital banking services are fraught with security risks, financial transactions that are confidential, involving personal information of customers and so forth. Therefore, the modification of the UTAUT model needs to be done by adding trust and security variables, thereby increasing the ability of the model to explain customers' intentions to use digital banking services.

Methodology

This research was conducted using a survey method through a questionnaire with a Likert scale of 5 categories, where 1 = Strongly Disagree, 2 = Disagree, 3 = Quite Agree, 4 = Agree, and 5 = Strongly Agree. The Likert scale is used to measure how strongly the respondent agrees and disagrees with the statement. The sampling technique used is non-probability sampling with the type of purposive sampling. According to Bentler and Chou (1987), the minimum number of samples needed is represented by the number of question items multiplied by five.

In this study, the construct used consisted of 8 variables, namely, performance expectancy (4 indicators), effort expectancy (4 indicators), social influence (4 indicators), facilitating conditions (4 indicators), behavioral intention (5 indicators) that adapted from Venkatesh, et.al (2003) and additional variables, namely, innovativeness (4 indicators), trust (4 indicators), security (4 indicators). In addition, this study also uses a dummy variable, namely gender of the customers to find out whether gender differences affect the intentions of banking customers in the millennial category to use digital banking services. Thus, in this study there were 33 indicators or statement items, in which 33 x 5 = 165 samples, the minimum number of samples in this study refers to Bentler and Chou (1987) is 165 samples. This study involved 234 respondents consisting of conventional banking customers and Islamic banking customers aged 19-39 years and had never used digital banking services. The respondents were spread in Java, Sulawesi, Sumatera, Kalimantan, and also Maluku Island as Indonesia's largest islands.

The data collected was analyzed using Statistical Package for Social Science for MacOS (SPSS for MacOS Version 23.0). Descriptive analysis used frequency and percentage to examine the profile of the respondents. Individual t-test, simultaneous F-test and multiple linear regressions were used in this study. The level of significance at probability level of 5% was used.

The mathematical equation used in this study is as follows (Gujarati and Porter, 2017):

$$\mathrm{BI} = \beta_0 + \beta_1\, D_\mathrm{Gender} + \beta_2\, \mathrm{PE} + \beta_3\, \mathrm{EE} + \beta_4\, \mathrm{SI} + \beta_5\, \mathrm{FC} + \beta_6\, \mathrm{IN} + \beta_7\, \mathrm{TR} + \beta_8\, \mathrm{SC} + \varepsilon \quad (1)$$

Where:

BI	: Millennial banking customers' behavioral intention to use Digital Banking
β_0	: Intercept
D_Gender	: Dummy variable for respondents gender
PE	: Performance Expectancy
EE	: Effort Expectancy
SI	: Social Influence
FC	: Facilitating Conditions
IN	: Innovativeness
TR	: Trust
SC	: Security
ε	: Error term

Results and Discussions

There were 234 respondents involved in this study, the completed questionnaires were received and consider valid for further statistical analyses. The sample composed of male (41.5 percent) and female (58.5 percent). In addition, the age distribution presents that most of the millennial banking customers in this research were aged from 19-29 with 69.7 percent. The participants were asked about their education level, about 73.9 percent have a bachelor degree. About 23.1 percent of the respondents were student and most of them are muslim with 97.9 percent. The respondent were also asked about their income per month, 33.3 percent were bellow IDR 1.5 Million and 30.8 percent were between IDR 2.5 – IDR 5 Million. Most of the respondents used conventional bank with 67.5 percent of them and the rest 32.5 percent were customers of Islamic Bank. The table 1 summarize the main results.

Table 1: Demographic Respondents

Variables	Category	Frequency	Percentage (%)
Gender	Male	97	41.5
	Female	137	58.5
Age	19-29	163	69.7
	30 – 39	71	30.3
Education Level	High school	42	17.9
	Bachelor degree	173	73.9
	Master or doctoral degree	19	8.1
Profession	Student	54	23.1
	Civil Servant	38	16.2
	Teacher/Lecturer	25	10.7
	BUMN Employee	2	0.9
	General Employee	32	13.7
	Entrepreneur	18	7.7
	Other	65	27.8
Religion	Muslim	229	97.9
	Protestant	4	1.7
	Hindu	1	0.4
Income per Month	< IDR 1.5 Million	78	33.3
	IDR 1.5 – IDR 2.5 Million	46	19.7
	IDR 2.5 – IDR 5 Million	72	30.8
	IDR 5 – IDR 10 Million	29	12.4
	> IDR 10 Million	9	3.8
Bank Used	Conventional Bank	158	67.5
	Islamic Bank	76	32.5

Source: Computed by Author (2020)

Multiple regression analysis was conducted to examine the relationship between adoption factor for online banking and consumer intention to use online banking. It is a constructive statistical technique that can be used to analyze the associations between a set of independent variables and a single dependent variable (Hair et al., 2005). The result of multiple regression analysis summarize in the table 2.

$$BI = 1.930 - 0.050\ D_Gender + 0.243\ PE - 0.130\ EE + 0.049\ SI - 0.067\ FC + 0.269\ IN + 0.160\ TR + 0.452\ SC + \varepsilon \quad (2)$$

The value of intercept is 1.930, it means that the average value of millennial banking customers' intention with gender female and if the performance expectancy, effort expectancy, social influence,

facilitating condition, innovativeness, trust and security are relatively low. Then, the value of β_1 = -0.050, the data shows that the intention of millennial males in adopting digital banking is 0.050

points lower than the females. The value of β_2 = 0.243, it means that every increasing in performance expectancy as much as one point will increase the millennial banking customers' intention amounts 0.243 point. The value of β_3 = -0.130, it means that every increasing in effort expectancy as much as one point will decrease the amounts of millennial banking customers' intention 0.130 point.

Table 2: Result of Multiple Regression Analysis

Independent Variables	Standardized Coefficient (β)	Std. Error	t-value	Sig.
Dummy Gender	-0.050	0.269	-1.457	0.147
Performance Expectancy	0.243	0.073	4.480	0.000
Effort Expectancy	-0.130	0.089	-1.927	0.055
Social Influence	0.049	0.050	1.103	0.271
Facilitating Condition	-0.067	0.082	-1.072	0.285
Innovativeness	0.269	0.068	4.871	0.000
Trust	0.160	0.078	2.537	0.012
Security	0.452	0.068	7.352	0.000
Intercept (β_0)	1.930			
F-Value	88.287			
R-Square	0.758			
Sample (n)	234			
Significant Level (α)	0.000			

Source: Computed by Author (2020)

The value of β_4 = 0.049, it means every increase in social influence as much as one point will increase the amounts of millennial banking customers' intention 0.049 point. The value of β_5 = -0.067, means every increase in facilitating condition as much as one point will decrease the amounts of millennial banking customers' intention 0.067 point. The value of β_6 = 0.269, means every increase in innovativeness as much as one point will decrease the amounts of millennial banking customers' intention 0.269 point. The value of β_7 = 0.160, means every increase in trust as much as one point will decrease the amounts of millennial banking customers' intention 0.160 point. The value of β_8 = 0.452, means every increase in security as much as one point will decrease the amounts of millennial banking customers' intention 0.452 point.

Simultaneously, based on significant level (α) shows that the p-value of α is 0,000 < 0.05. It could be concluded that independent variables which are performance expectancy, effort expectancy, social influence, facilitating condition, innovativeness, trust and security provide significant effects on dependent variable millennial banking customer's intention to use digital banking. All independent variables used can explain variation of their dependent variable as big as 75.8 percent which can be known from R-square value. Whereas, the remaining as big as 24.2 percent is explained by other variables outside the model.

Based on individual test of β_1, it is known that p-value = 0.147 > 0.05 then referring to hypothesis H0: $\beta_1 = 0$ and H1: $\beta_1 \neq 0$ is decided that H0 is accepted or in other words there is no significant differences in millennial banking customer's intention between male banking customers and female banking customers. The results of this study support research conducted by Afandi (2020), this study states that there is no significant difference in intention between millennial banking customers who are male and female to use Fintech Landing services.

The individual test of β_2 show that p-value = 0.000 > 0.05 then referring to hypothesis H0: $\beta_2 = 0$ and H1: $\beta_2 \neq 0$ is decided that H0 is rejected or in other words there is a significant effects of performance expectancy on millennial banking customer's intention to use digital baking.

Performance expectancy is a construct aimed at measuring the extent to which the use of technology will benefit users in carrying out certain activities (Venkatesh et al., 2012). Performance expectancy is the most powerful predictor of predicting user intentions in accepting and using technology (Venkatesh et al. 2003). In the context of digital banking services, including mobile banking (Yu, 2012), online banking and internet banking (Alalwan, Dwivedi, Rana, and Algharabat, 2018), mobile payment (Slade et al., 2015), payment bank (Gupta, Manrai, and Goel, 2019), performance expectancy is determined as a significant factor in customers' intention to accept and use the service.

The result of individual test of β_3 show that p-value = 0.055 > 0.05 then referring to hypothesis H0: $\beta_3 = 0$ and H1: $\beta_3 \neq 0$ is decided that H0 is accepted or in other words there is no significant effects of effort expectancy on millennial banking customer's intention to use digital baking. According to Venkatesh et al. (2003), effort expectancy is associated with the level of ease for users in using a technology. In other words, in the context of banking customers, effort expectancy is related to the level of customer convenience in using digital banking services. Therefore, this construct is related to the perceived ease of use in the technology acceptance model (TAM) developed by Davis (1989).
However, this study empirically found that there is no significant effects of effort expectancy on millennial banking customer's intention to use digital baking. The result in accordance with study conducted by Yu (2012). The reason is that mobile technology has advanced rapidly and the convergence of such technologies and financial services has evolved over time. As a result, consumers have rich experience using mobile phones, the internet and also already have experience with electronic banking services so they are familiar with digital banking.

The value of β_4 show that p-value = 0.271 > 0.05 then referring to hypothesis H0: $\beta_4 = 0$ and H1: $\beta_4 \neq 0$ is decided that H0 is accepted or in other words there is no significant effects of social influence on millennial banking customer's intention to use digital baking. Social influence is defined as the extent to which an individual views that important people around him believe that the individual must use existing technology (Venkatesh et al., 2003). In other words, information and confidence provided by people around the customer could influence the awareness and intention of banking customers to use digital banking services. The result of this study show that social influence does not significantly effect user intentions to use digital banking in accordance with research conducted by Alalwan et al. (2018a) and Mehri et al. (2019).

The individual test of β_5 shows that p-value = 0.285 > 0.05 then refers to hypothesis H0: $\beta_5 = 0$ and H1: $\beta_5 \neq 0$ decided that H0 is accepted or in other words there is no significant effects of facilitating condition on millennial banking customers' intention to use digital baking. According to Venkatesh et al. (2003), facilitating condition is defined as the condition of the availability of technical infrastructure that facilitates individuals in supporting the use of a technology. Facilitating conditions refer to customer perceptions about the resources and facilities available in receiving and using a technology (Vankatesh et al, 2012). However, the result of this study show that facilitating did not play a salient role in affecting the millennial banking customers' intention to use digital baking. This results are consistent with the work of Arenas, Peral, and Ramón (2015).

The result of individual test of β_6 shows that p-value = 0.000 < 0.05 then refers to hypothesis H0: $\beta_6 = 0$ and H1: $\beta_6 \neq 0$ decided that H0 is rejected or in other words there is a significant effects of innovativeness on millennial banking customers' intention to use digital baking. According to Hirschman (1980), innovativeness is defined as the extent to which banking customers are open to new experiences and trying new technologies in this case digital banking services, as an expression of trends towards innovation and novelty. The result of this study show that innovativeness play a salient role in affecting the millennial banking customers' intention to use digital baking. This results are consistent with the work of Slade et al. (2015) and Alalwan, Baabdullah, Rana, Tamilmani, and Dwivedi (2018).

The value of β_7 shows that p-value = 0.012 < 0.05 then refers to hypothesis H0: $\beta_7 = 0$ and H1: $\beta_7 \neq$

0 decided that H0 is rejected or in other words there is a significant effects of trust on millennial banking customers' intention to use digital baking. According to Giovanis et al. (2018), trust refers to the assumption or belief of a potential user that a service provider will fulfill its obligations. In the context of digital trust banking services is a vital variable in the acceptance and use of technology. Trust is needed to reduce the uncertainty of financial transactions so that banking customers are motivated to use digital banking services. This results are consistent with the work of Alalwan et al. (2018b), Oliveira et al. (2014), Merhi et al. (2019).

The individual test of β_8 shows that p-value = 0.000 < 0.05 then refers to hypothesis H0: $\beta_8 = 0$ and H1: $\beta_8 \neq 0$ decided that H0 is rejected or in other words there is a significant effects of security on millennial banking customers' intention to use digital baking. Feeling safe in conducting financial transactions digitally is important to minimize concerns about the use of technology in banking services (Salisbury, Pearson, Pearson, and Miller, 2001). The higher the level of security provided, the higher the user's intention to accept and use a technology. This results are consistent with the work of Merhi et al. (2019) and Oliveira et al. (2014)

Conclusion

The extended UTAUT with innovativeness, trust and security framework has ability to explain variation of the intention of millennial banking customers to use digital banking as big as 75.8 percent, whereas, the remaining as big as 24.2 percent is explained other variables outside the model. The result of this study also show that performance expectancy, innovativeness, trust and security provide significant effects on dependent variable millennial banking customers' intention to use digital banking. However, gender differences, effort expectancy, social influence and facilitating condition did not play salient role in affecting the millennial banking customers' intention to use digital baking. independent variables the performance expectancy, effort expectancy, social influence, facilitating condition, innovativeness, trust and security provide significant effects on dependent variable millennial banking customers' intention to use digital banking.

This study has several implications which could be reflection to the banking industry, both conventional banking and Islamic banking, by becoming consideration develops strategies to dealing with customers' behavior patterns in using financial services and in facing competition with other financial service providers such as fintech. So that the financial industry is able to attract millennial banking customers to use digital banking services. As for the regulator in this case the Financial Services Authority, is expected to be a consideration in formulating policies for the banking industry in the face of competition with other financial service providers. In addition, this research has limitations which the framework used in this research was first UTAUT1, therefore, on the future research is suggested to used UTAUT2 that developed by Venkatesh et al. (2012) and try other data analysis technique.

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Assessing Relation Between The Sukuk Market And Islamic Banks To Strengthen The Islamic Financial System: Evidence In Indonesia

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Abstract

If the company needs source of funding by staying compliant with Islamic law, the options available are taking financing in Islamic banks or by issuing sukuk. Both financial instruments are sources of Islamic funding th at are currently growing and being widely studied by researchers. Along with its development the question arises how the existence of Islamic banks whose main business is in the financing sector with the continued growth of sukuk issued by corporations. This study examines the relationship between these two Islamic funding instruments by examining the impact of the growth of corporate sukuk on the ratio of Islamic banking in Indonesia. This research uses secondary data of monthly time series sourced from the Indonesian Financial authority publication report. Testing data in this study uses quantitative methods with the Vector Auto Regression (VAR) model and the Granger Causality Test. This study also uses Impulse Response Function (IRF) and Variance Decomposition (VD) for further analysis. The results of this study indicate that the growth of the corporate sukuk market has a relationship with the ratio of Islamic banking. The increase in the volume of outstanding sukuk has a positive effect on Islamic bank CAR, but has a negative effect on Islamic bank FDR. While sukuk yield variables produce a positive relationship with Islamic bank FDR but have a negative relationship with Islamic bank CAR. So that the growth of corporate sukuk is relevant to be considered as an exogenous factor affecting the ratio of Islamic banking in Indonesia.

Keywords: Sukuk Growth, Islamic Bank, Ratio, Vector Auto Regression

Introduction

Capital Adequacy Ratio (CAR) is one of the main assessment components used by regulators as a buffer against credit risk faced by banks. Based on Bank Indonesia Regulation Number: 13/1 / PBI / 2011 and Regulation of the Financial Services Authority Number 4 /POJK.03/2016 Concerning the Rating of Commercial Banks, banks are required to conduct individual Bank Soundness assessments using a risk-based approach Bank Rating) with the scope of the assessment of factors: risk profile; Good Corporate Governance; earnings; and capital. According to Wibowo and Syaichu (2013) CAR can increase customer confidence in banks, as well as being the last reserve to protect banks against the risk of any risky productive assets. A high CAR value will provide the bank's ability to finance operational activities so that it can contribute to increasing profitability.

Based on research Nuviyanti and Anggono (2014) states that profitability ratios namely Return on Equity and Return on Assets are the two variables that significantly influence the CAR in commercial banks, then (Jaara *et al.*, 2017) found that bank size, leverage, loan loss reserve, net interest margin, and loan asset ratio have a significant influence on the CAR in banks. While the results of the study (Abusharba *et al.*, 2013); (Andhika and Suprayogi, 2017) show that profitability ratios (ROA and ROE), liquidity (FDR), and problematic financing (NPF) have a significant relationship with CAR at Islamic commercial banks (BUS) in Indonesia. Furthermore, the results of the study Almanaseer and AlSlehat (2016) show that Murabahah (Cost plus), Mudharaba (Profit sharing) and Bai Ajil (deferred sale) financing have an impact on the profitability of the Islamic banking sector.

Based on Sharia Banking Statistics reports issued by the Financial Services Authority of the Republic of Indonesia (OJK), it shows a positive trend in the development of Islamic banking CAR in Indonesia for the past 7 years. The increase in the value of the CAR ratio of Islamic banks indicates the performance of Indonesian Islamic banking which is also getting better. Growth can also be seen with an increase in the value of Islamic banking assets that continue to increase. Recorded in June 2019 Islamic banking assets in Indonesia amounted to IDR 499 trillion, the value is equivalent to 5.95% compared to the total assets of the Indonesian Islamic financial industry. With this value, it placed the Islamic banking in second place after the Islamic capital market sector which contributed 15.49% compared to the total Islamic financial assets in Indonesia. Sharia capital market assets include state sukuk, corporate sukuk and sharia mutual funds.

Indonesia's Islamic capital market sector has grown and developed in the last decade, especially corporate sukuk. Sukuk was first issued by Indosat in 2002, based on the report of OJK there is currently no 145 Sukuk circulating in the Indonesian market with a total value circulating RP30 trillion. In the future, corporate sukuk is projected to continue to grow in line with the government's seriousness through the policies contained in the 2019-2024 Sharia Economics Masterplan for Indonesia to support and encourage efforts to develop corporate sukuk as an alternative source of financing.

Sukuk can be an alternative source of funding for the government and corporation both for general financing and financing certain investment activities or projects (Huda and dkk, 2017). So that the Islamic financial industry provides 2 types of funding instruments that can be selected by companies / corporations in meeting the needs of providing funds, namely through financing in Islamic banking or through the issuance of sukuk. In a study conducted by Mimouni, et al., (2019) on banks and markets it was mentioned that the crisis had a bad impact on lending or in other words that the crisis had the side effect of increasing the potential risk to banks. But on the other hand Sukuk is not affected by the global crisis shocks. Even in some developing countries, after the 2008 global crisis financing through bonds has relatively increased faster than bank financing. Other research conducted by Smaoui, et al., (2017) states that the relationship between sukuk and Islamic bank financing is a substitute. Which means that sukuk growth will likely replace the existence of Islamic bank financing as an instrument providing funding in the Islamic financial system.

This is the basis for examining the impact of the growth of corporate sukuk on the CAR ratio level in Islamic banking in Indonesia. Does the growth of corporate sukuk have a negative or positive effect on the level of CAR in Islamic banking in Indonesia. In addition to capital, liquidity ratios are also calculated in this study taking into account that bank capital and liquidity are needed to maintain bank loans, with capital having a significant positive effect on loans after banks maintain sufficient liquid funds (Thornton and Tommaso, 2019). In addition, bank regulators have understood the importance of adequate liquidity funding and bank capital. Thus, they introduced regulations that obliged banks to maintain adequate liquidity and capital (Dahir *et al.*, 2019). It is hoped that the results of this study will be beneficial for regulators and related parties in determining the right policies to stimulate the growth of the sukuk market while at the same time minimizing the impact caused by the growth of these sukuk on Islamic banking.

Islamic Banking

According to Ayub (2007) and Abdul-Majid, Falahaty and Jusoh (2017) Islamic banking is different from conventional banks, especially in the prohibition of usury, interest-based transactions, gharar, prohibitions in Islamic Sharia, and other unethical practices and to participate in achieving the objectives of the Islamic Economy . Ascarya and Yumanita (2005) defines a Islamic Bank is a bank that conducts business activities based on Sharia principles, namely rules of agreement based on Islamic law between banks and other parties for depositing funds and / or financing business activities, or other activities that are declared in accordance with Sharia.

In its current and future business activities, Islamic banks have the potential to be exposed to risks along with the increase in risk exposures in line with the ever-increasing product and service

developments. So that in the end will affect the soundness of the bank. Through Bank Indonesia Regulation Number: 9/1 / PBI / 2007 Concerning the Rating System for Commercial Banks Based on Islamic Principles, regulators stipulate Islamic Commercial Banks are required to conduct an assessment of bank soundness, which includes the following factors: Capital; Asset quality; Profitability; Liquidity; Sensitivity to market risk, and Management.

Bank Capital

In a banking institution, every aspect of its activities is closely correlated with the availability of bank capital (Raluca, 2011). The provision of a minimum capital ratio is useful to reduce the possibility of failures and systemic risks that endanger liquidity, monetary policy, financial market stability and economic stability (Abou-El-Sood (2016); Nguyen, Gan and Li (2019); Baldwin, Alhalboni and Helmi (2019)) . In addition, bank capital is also an indicator to determine their ability to provide loans (Kick, Malinkovich and Merkl (2020); Dahir, et al., (2019)).

The Islamic Financial Services Board (IFSB) is an equivalent committee to the Basel committee for Islamic finance that is responsible for setting regulatory standards equivalent to Basel standards. Based on IFSB (2013) the total capital required for Institutions offering Islamic Financial Services (IIFS) is the amount of Tier 1 and Tier 2 capital. For Islamic banking, capital is influenced by bank size factors, bank deposit structure, bank competition, and deposit insurance (Smaoui, Salah and Diallo, 2019).

Bank Liquidity

Liquidity for the banking sector is related to solvency. Banks convert liquid liabilities (deposits) into loans. Liquidity shows the ability of banks to meet obligations, repay deposits, and represent the ability to repay their investment and loan portfolios. Banks are said to have an adequate level of liquidity when they can increase the funds needed by selling assets at reasonable prices (Jaara *et al.*, 2017).

According to Dabiri, et al., (2017) liquidity and profitability in the financial sector plays an important role, liquidity is needed to meet the obligations of its creditors. Thus, financial institutions need to maintain a large amount of their assets in cash to meet their short-term obligations. Liquidity ratios measure liquid assets available in banks relative to total assets. The higher the liquid assets, the lower the risk of illiquid. Unemployed liquidity is also undesirable because they produce very little or no return (Jalil and Biswas, 2018).

Sukuk

The word sukuk is a plural form for certificates (sakk) of ownership of certain assets given by the borrower to the lender as proof of ownership. Therefore, Sukuk is a debt instrument that requires the creation of assets owned proportionally by lenders and fund providers (Safari, Ariff and Mohamad, 2014). Sukuk differs from conventional bonds because sukuk represents an inseparable part of ownership of assets, usufructs, projects and services. Sukuk also shows the partnership relationship between the issuer and the investor in a business or joint venture project. Meanwhile, conventional bonds are debt obligations, which can be guaranteed with certain basic assets or without collateral in the form of a promise to pay. Thus, Sukuk holders have a part of the underlying assets in each sukuk transaction depending on the level of investment participation (Alam, et al., (2013); Zakaria, et al., (2012)).

In sukuk classification, Safari, Ariff and Mohamad, (2014) classifies sukuk by issuer into 3, namely:

1. Sukuk issued by the government in the category of risk free
2. Sukuk issued by SPC (Special Purpose Company)
3. Sukuk issued by private companies or institutions with a high risk category.

Table 1: Previous Research Relevant

Author	Year	Invention
Houcem Smaoui, Karim Mimouni & Akram Temimi	(2020)	The development of the sukuk market has a negative impact on the risk of bankruptcy in Islamic Banking, while the risk of Conventional Bank remains unchanged.
Houcem Smaoui, Hatem Ghouma	(2019)	The development of the sukuk market has an adverse effect on the capital of Islamic banks. Sukuk market development has stimulated competition between Islamic Bank, and encourages maintaining lower capital ratio.
Karim Mimouni, Houcem Smaoui, Akram Temimi, Moh'd Al-Azzam	(2019)	Sukuk issuance has a negative impact on bank performance as measured using NIM / NPM. Sukuk issuance is a substitute for the banking system. Sukuk has a negative impact on Islamic Bank's performance while Conventional Bank is not affected.
Houcem Smaoui, Karim Mimouni, & Akram Temimi	(2017)	Sukuk and Islamic bank financing are substitutes. A well-developed banking sector is a barrier to the development of Sukuk market.

Source: Processed from various sources

Reserch Method

This study uses time series secondary data from 2016 to 2019. Data sourced from OJK Report and from the Indonesia Bond Pricing Agency (IBPA) Report. The variables used in this study use the dependent variable in the form of Capital Adequacy Ratio and Financing to Deposit Ratio, while the independent variable uses corporate sukuk outstanding and corporate sukuk yields.

Table 2: Variable Description

Category	Variable Name	Symbol
Dependent	CAR	CAR
	FDR	FDR
Independent	Corporate Sukuk Outstanding	OUTS
	Corporate Sukuk Yield	YIELD

Data analysis uses the approach of Vector Auto Regression approach. The VAR model is a model for two or more time series in which each variable is modeled as a linear function of the past values of all variables, plus a disturbance that has zero means given all the past values of the observed variables (Wooldridge, 2013). The VAR model is used for data variables that are not stationary at the level but are stationary at first differences and no cointegration is found on the variables (Gujarati and Porter, 2009). The IRF approach is also used to assess the response of the dependent variable to shock by the independent variable. Meanwhile VD provides the proportion of movement in the dependent variable caused by shocks 'on the variable itself' compared to shocks with other variables (Mitsaliyandito, Arundina and Kasri, 2017).

Empirical Results

Augmented Dickey Fuller (ADF). If the t-statistic ADF value is smaller than the critical Mc Kinnon (1, 5, 10 percent), then H0 is rejected or in other words, the data is stationary. The test results are as follows:

Table 3: Results of Stationary Test

	Variable	Level		First Difference	
		ADF Value	Critical Value (5%)	ADF Value	Critical Value (5%)
CAR	CAR	-1.014681	-2.935001	-6.069738	-2.936942
	OUTS	-0.208209	-2.935001	-6.342352	-2.936942
	YIELD	-2.127815	-2.935001	-5.463968	-2.936942
FDR	FDR	-1.438943	-2.935001	-7.738082	-2.936942
	OUTS	-0.208209	-2.935001	-6.342352	-2.936942
	YIELD	-2.127815	-2.935001	-5.463968	-2.936942

Source: Data processed (2020)

Tables 3 show that the dependent variables CAR and FDR are not stationary at the level, but at the first difference level all variables have been stationary, so that further testing can be done that is determining the optimum lag length. The optimum lag value that can be used, namely from Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC). This research uses optimal lag determination by looking at the minimum value from the SIC. The test results are as follows:

Table 4: Results of Optimal Lag Determination

Lag	CAR		FDR	
	Value AIC	Value SC	Value AIC	Value SC
0	-5.446073	-5.314113	-7.227618	-7.095658
1	**-11.06596***	**-10.53812***	-12.52334	**-11.99550***
2	-10.84609	-9.922373	-12.39277	-11.46905
3	-10.59967	-9.280072	-12.28497	-10.96537
4	-10.69269	-8.977214	-12.50813	-10.79265
5	-10.57339	-8.462028	-12.39220	-10.28085
6	-11.04968	-8.542441	**-12.56982***	-10.06258

Source: Data processed (2020)

In table 4, the optimum lag length value of the two dependent variables is obtained in lag 1 which will be used to estimate VAR in the next step. Cointegration relationships between variables will also be the basis for determining the estimation model that will be used. If there is no cointegration model then the VAR model is more suitable for use (Afandi and Amin, 2019). The cointegration test results are as follows:

Table 5: Results of Cointegration Test

	Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value
CAR	None	0.229809	16.62759	29.79707
	At most 1	0.121633	6.182939	15.49471
	At most 2	0.024575	0.995291	3.841466
FDR	None	0.145771	11.05025	29.79707
	At most 1	0.082695	4.748009	15.49471
	At most 2	0.031866	1.295407	3.841466

Source: Data processed (2020)

Tables 5 show the trace statistic value is smaller than the critical value of 0.05 or that the two dependent variables have no cointegration relationship. Then the granger causality test stage has been carried out, with the results shown in the following table:

Table 6: Results of Granger Causality Test

	Null Hypothesis:	Obs.	F-Statistic	Prob.
CAR	LOGOUTS does not Granger Cause LOGCAR LOGCAR does not Granger Cause LOGOUTS	41	0.08828 3.76838	0.7680 0.0597
	LOGYIELD does not Granger Cause LOGCAR LOGCAR does not Granger Cause LOGYIELD	41	0.21667 0.10760	0.6442 0.7447
	LOGYIELD does not Granger Cause LOGOUTS LOGOUTS does not Granger Cause LOGYIELD	41	0.37259 0.23983	0.5452 0.6271
FDR	LOGOUTS does not Granger Cause LOGFDR LOGFDR does not Granger Cause LOGOUTS	41	0.82429 0.25232	0.3697 0.6183
	LOGYIELD does not Granger Cause LOGFDR LOGFDR does not Granger Cause LOGYIELD	41	0.52809 0.00339	0.4719 0.9539
	LOGYIELD does not Granger Cause LOGOUTS LOGOUTS does not Granger Cause LOGYIELD	41	0.37259 0.23983	0.5452 0.6271

Source: Data processed (2020)

Ho in the Granger causality test is that there is no causality relationship between the two variables tested. The criterion for starting Ho is if the F-Statistic value is greater than the critical value of 10%, or it can also be used the probability is smaller than the critical value of 0.05. The test results show, statistically the independent variables each do not significantly affect the two dependent variables or vice versa. Furthermore, the stability test results are shown in the following table:

Table 7: Results of VAR Stability Test

CAR		FDR	
Root	**Modulus**	**Root**	**Modulus**
0.975528	0.975528	0.983909	0.983909
0.810662 - 0.060417i	0.812910	0.817712 - 0.113771i	0.825589
0.810662 + 0.060417i	0.812910	0.817712 + 0.113771i	0.825589

Source: Data processed (2020)

The evaluation criteria in this stability test are modulus value smaller than 1 (one). Based on Table 7, it can be concluded that the model used in this study is valid. So that the analysis of the IRF and VD output used in this study is valid.

Results of VAR Estimation Test

This study uses significance with a 95% confidence value, that is the t-statistic value for the critical value of 5% which has a meaning that is, H0 is said to be rejected if the absolute value of t-statistic is greater than the t-ADF value, then the variable is declared to have a significant effect. The test results are as follows:

Table 8: Results of VAR Test for CAR

Variable	Coefficient	T- Statistics
CAR(-1)	0.950385	9.69464
OUTS(-1)	0.004259	0.10465
YIELD(-1)	-0.029428	-0.36838
C	0.201641	0.96342
R-squared	0.938518	
Adj. R-squared	0.933533	

Source: Data processed (2020)

The estimation results of the VAR model state that, if an increase in outstanding corporate sukuk has a positive effect on Islamic bank CAR by 0.004%. Meanwhile, if corporate sukuk yields rise, the CAR of Islamic banks will decrease by -0.029%. Adj. R-squared states that in this equation the CAR variable can be explained by the variable outstanding and corporate sukuk yield of 93.35%.

Table 9: Results of VAR Test for FDR

Variable	Coefficient	T- Statistics
FDR(-1)	0.793433	7.53752
OUTS(-1)	-0.019454	-1.32650
YIELD(-1)	0.047709	1.20992
C	0.855644	1.87854
R-squared	0.915331	
Adj. R-squared	0.908466	

Source: Data processed (2020)

The estimation results of the VAR model in Table 9 mean that, an increase in outstanding corporate sukuk negatively affects the FDR value of Islamic banks by -0.019%. Meanwhile, if the yield of corporate sukuk rises, FDR of Islamic banks will also increase by 0.048%. The FDR variable in the equation can be explained by the outstanding variable and corporate sukuk yield of 90.85% according to the value Adj. R-squared.

Results of Impulse Response Function Analysis

IRF analysis will explain the impact of a shock on one variable on another. The IRF analysis also functions to see how long the influence lasts. The horizontal axis is the period in months, while the vertical axis shows the response value in percentages.

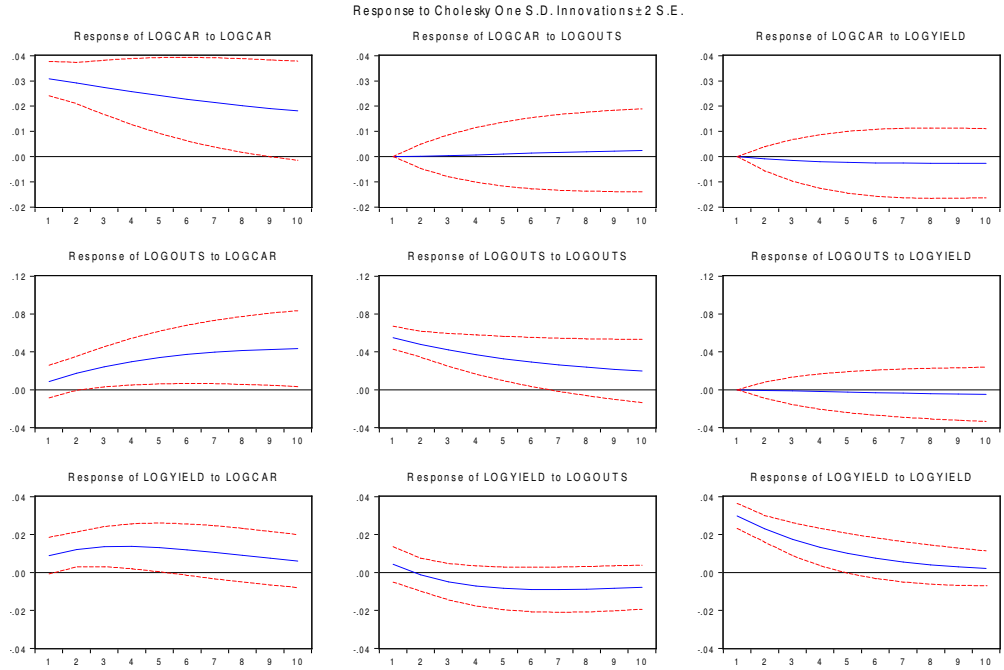

Source: Data processed (2020)

Picture 1: Results of IRF Output for CAR

The graph above shows the CAR's response to the shock of the Outstanding variable which showed a positive trend (+) for 4 months and then returned to its equilibrium point. Whereas CAR responds to the variable yield shock with a downward trend entering the 3rd period.

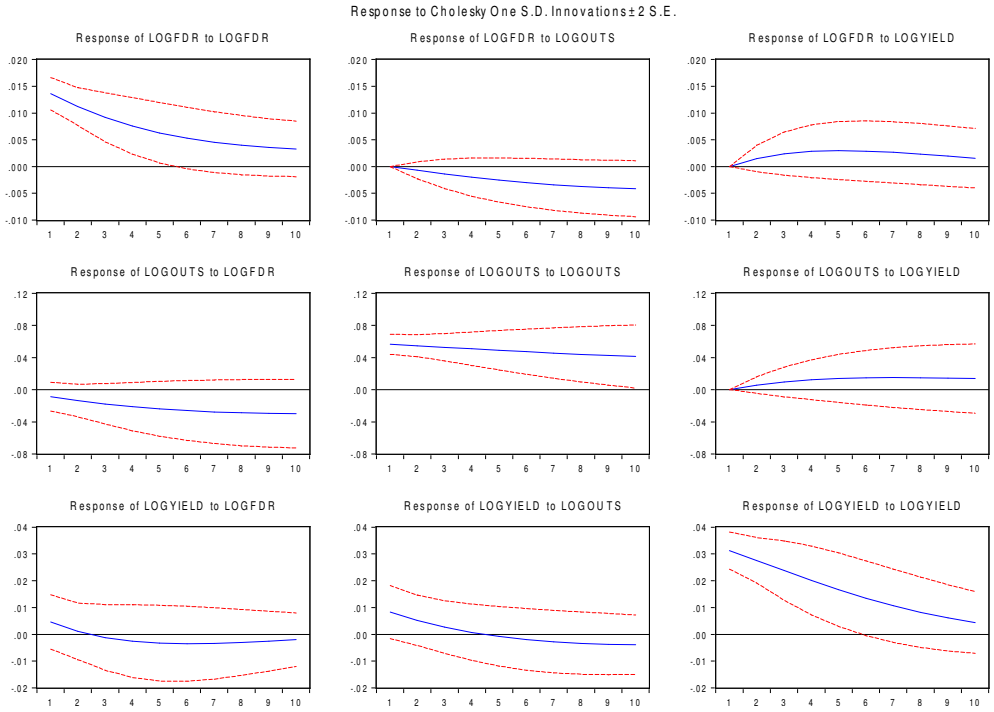

Source: Data processed (2020)

Picture 2: Results of IRF Output for FDR

The graph above shows the response of FDR to the shock variable Outstanding and yield. This means that when there is a shock on the outstanding sukuk or corporate sukuk yield, it will take around 3 months for the FDR to return to its equilibrium point.

Results of Analysis of Variance Decomposition

VD Analysis aims to measure the amount of contribution or composition of the influence of each independent variable on the dependent variable.

Table 10: Results of VD Output for CAR

Variance Decomposition of LOGCAR:				
Period	S.E.	LOGCAR	LOGOUTS	LOGYIELD
1	0.030851	100.0000	0.000000	0.000000
2	0.042417	99.95639	0.000662	0.042948
3	0.050505	99.87461	0.005139	0.120247
4	0.056713	99.76763	0.017281	0.215092
5	0.061695	99.64307	0.040284	0.316645
6	0.065805	99.50575	0.076166	0.418083
7	0.069264	99.35901	0.125702	0.515287
8	0.072221	99.20547	0.188578	0.605953
9	0.074783	99.04738	0.263646	0.688975
10	0.077029	98.88677	0.349204	0.764026

Source: Data processed (2020)

Table 11: Results of VD Output for FDR

Variance Decomposition of LOGFDR:				
Period	S.E.	LOGFDR	LOGOUTS	LOGYIELD
1	0.013603	100.0000	0.000000	0.000000
2	0.017685	99.13111	0.159222	0.709666
3	0.020119	97.44989	0.592604	1.957508
4	0.021777	95.28016	1.344768	3.375073
5	0.023004	92.87906	2.424055	4.696880
6	0.023972	90.42296	3.806824	5.770220
7	0.024775	88.01668	5.445929	6.537391
8	0.025471	85.71299	7.280214	7.006798
9	0.026094	83.53237	9.243170	7.224455
10	0.026669	81.47858	11.26993	7.251487

Source: Data processed (2020)

The results of the VD Analysis output show that the yield of the corparate sukuk is the more dominant variable contributing to fluctuations in CAR and FDR.

Effect of Sukuk on Islamic Bank Capital

A series of tests and analyzes have been carried out, and we have arrived at the results that the growth of corporate sukuk through an outstanding increase has a positive relationship with the capital of Islamic banks in Indonesia. The opposite result was shown by sukuk yield which had a negative impact on Islamic banks CAR, this result was also supported by previous research conducted by Smaoui, Mimouni and Temimi (2020). In the results of his research it was said that the development of the sukuk market had an adverse effect on the capital of Islamic banks, with the explanation that the development of the sukuk market would increase competition between Islamic banks by forcing them to increase their portfolio asset risk by reducing their capital ratios to the minimum level needed. This is their effort to get higher profit margins.

Effect of Sukuk on Islamic Bank Liquidity

Based on this research it turns out that the sukuk market growth represented by outstanding corporate sukuk turns out to have a negative impact on the FDR of Islamic banks in Indonesia. While sukuk yields have a positive relationship with FDR of Islamic banks. The results of a study conducted by Braima (2017) which states that the ratio of Financing to deposits shows the ability of banks to support the growth of their financing business with owned savings funds. This higher ratio means that there is less savings left to fund additional funding, implying lower liquidity.

Conclusion

Sukuk and Islamic banks are part of the Islamic financial system. For Islamic banks, financing is the main business source of income for the sustainability of the bank. Financing expansion undertaken by Islamic banks must continue to prioritize risk mitigation that may be faced. The results of this study indicate significant findings for the development of the Islamic financial market in Indonesia. The growth of the corporate sukuk market turns out to have an influence on the Islamic banking ratio. The increasing outstanding or high volume of corporate sukuk issuance turns out to have a positive relationship with the capital ratio of Islamic banks, but on the other hand it produces a negative relationship with the liquidity ratio of Islamic banks. Meanwhile, the improved performance of the corporate sukuk market, which was marked by an increase in sukuk yields, turned out to have a negative relationship with the capital of Islamic banks as well as having a positive impact on the

liquidity ratio of Islamic banks in Indonesia. This result can be a reference that should be considered as an exogenous factor that can influence the ratio of Islamic banking.

Our findings can illustrate that there is indeed a potential that Islamic sukuk growth and banking are not in line. There is a potential adverse relationship due to the growth of corporate sukuk towards Islamic banking ratio in Indonesia. This is important for the authorities and decision makers to formulate policies in strengthening the Islamic capital market and Islamic banking together with the aim of creating a strong Islamic financial system. The potential for further research is very open to digging deeper into why and how this can happen and projecting future conditions will be like what.

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State of Crowdfunding in Traditional Ventures: An Exploration of Latest Developments in Pakistan

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Abstract

Financing of SME's has been a centre of debate among the academia as well as policymakers for almost a century. In general, financing involves risks; however, the level of risk associated with mature firms is low compared to business start-ups. Therefore, to attract more investors, these start-ups have to pay higher bank rates than established firms. This research explores the importance of crowdfunding as a new form of financing for traditional ventures, and how it has become a unique and different type of financing compared to the traditional form of financing. This study describes different kinds and prototypes of crowdfunding that currently exists in society, and it illustrates the overall market scenario of crowdfunding in Pakistan. This article examined the Pakistani crowdfunding market with the mainstream market. The analysis highlights that awareness among the community about crowdfunding in Pakistan is getting popular and positive results are numerous. However, despite being a new concept, its market size is comparatively smaller than the venture capital market and the banking industry.

Keywords: Entrepreneurship, Crowdfunding, Financing, SMES, Venture Capital

Introduction

Policymakers and academia have been debating rigorously about entrepreneurial venture financing for over half of the past century (Bolton, 1981; Gray and Stanworth, 1991). Axiomatically, entrepreneurial ventures have encountered persistent difficulties in securing the monetary means that are obligatory for potential expansion and development. At the start of 20th century, different strategies were initiated by governments around the world to stimulate both the quality and the size of financing that was conveniently accessible for the small-scale entrepreneurial ventures (Silver et al., 2016; Ponikvar et al., 2017).

In the 1980s and 1990s, the ICT-sector start-ups exclusively enjoyed the easy availability of a large quality of venture capital compared to other sectors. After March 2000, the interest of venture capitalists drastically dropped in the start-ups and growing entrepreneurial firms in most of the industrialized countries due to the dot-com crash (Ponikvar et al., 2017). Over the past decade, a strong upswing has been experienced by the informal venture capital in form of business angels, whereas downsizing has been noticed in formal venture capital markets (Thompson et al., 2009).

The catalyst reason behind the increase in the popularity of informal venture capital is due to the strong dependency of the entrepreneurial ventures on financial institutions loans and overdrafts (Berger and Black, 2011; Hall, 2010). The only source of financing for the small-scale firms in Europe, Asia, and rest of the world are financial institutions. Due to the recent financial crisis, severe detrimental effects have been noticed especially at the time when these firms try to expand (Schizas et al., 2012). Therefore, an emerging concept in comparison to the traditional source of financing is evolved called crowdfunding. According to Asia Institute of Finance (2017) "Crowdfunding is expected to pick up pace in the near future as a critical source of alternative financing for micro, small and medium enterprises (SMEs)".

Keeping in mind the problem of entrepreneurial ventures that seek outside capital, it is the aim of this research to study the role and importance of crowdfunding and how it's become unique as well as different from traditional sources of financing. We presented the current status of crowdfunding market globally, which was more specific in Pakistan, and highlighted crowdfunding platforms areas of focus, revenue earning models, and key factors to develop a crowdfunding market. A brief comparative analysis of the Pakistan crowdfunding market was made with another mainstream market i.e. China. It also discusses two prominent platforms, their vision, objectives, and overall functions. The study concludes by presenting the future outlook of the crowdfunding market in Pakistan.

Role of Financing in Entrepreneurial Ventures

The role of the principal-agent theory reflects a theoretical understanding of departure at the point of conducting research on the financing of SMEs (Jensen and Meckling, 1976). The core hurdle for the SMEs looking for financing is the information asymmetric problem, which exist among financiers and entrepreneurs (Hall 2000; Hsu, 2004). Pragmatically, it is usually apparent that financers feel reluctant while investing at the nascent stages of financing due to the high level of risk related to the firm. Such levels of risk exist due to the lack of information sharing, and it is hard to accurately predict the firm's future market potential. To overcome the problem of moral hazards and information asymmetry, the financer's and entrepreneurs develop contracts and improve the frequency of interactions among each other (Shane and Stuart, 2002; Mason and Harrison, 2000).

Another important feature of financing in the SMEs is the pecking order theory or the pecking order framework (Myers and Majluf, 1984). This theory states that entrepreneurs tend to select that particular types of financing that empowers them to preserve the control. For example, financial institution loans are desired over private equity loans (de Jong et al., 2011; Howorth, 2001; Berggren et al., 2000). Control aversion is the basic concept of this theory, which means entrepreneur's speculate that they are losing their control to external factors (Sætre, 2003; Lindström and Olofsson, 2001). The primary factors were discussed using the pecking order theory, which determines an entrepreneur's financial behavior. According to this theory, "the entrepreneurs select to nurture more slowly- or not at all- to avoid the thinking that they are losing control" (Howorth, 2001).

The problem of information asymmetry becomes more severe at the initial phases of a firm's development due to the encountering perennial problems in access of outside financing. As a result, they lean more on alternative sources of capital (Table 1). Insider finance becomes the sole source of financing at current stage (Berger and Udell, 1998; Cassar, 2004). Insider finance includes the founder's own savings and other connected personnel, such as family, friends, and fools traditionally referred to as 3F (Cliff Ennico, 2002; Bygrave et al., 2003). Owner's personal saving includes property, credit cards, and homes, while finance from 3Fs includes gifts, loans, or firm equity ownership (Cliff Ennico, 2002).

Table 1: Sources of capital for entrepreneurial ventures

Origin	Explanation	Financing category
Owner	Owner's own savings	Equity
3F	Family, friends, and fools	Equity or short term debt
Business angels	Business angel invested in firm	Equity
Government allowance	Accept allowances and subsidies	Short-medium term grants
Factoring	Received cash through the selling of invoices	Short term debt
Financial institutions	Banks provided loan facility	Medium-long term debt
Purchase through hire and leasing	purchase assets through instalments	Medium-term deferred payment
Organizations credit card	On short term basis providing the cash credits facility	Short term debt
Suppliers	Purchasing the raw material on credit	Short term debt
Venture capital firms	Investment by the VC firms in a newly develop firm	Equity

Source: (Silver et al., 2016)

A Background and Overview of Crowdfunding

Crowdfunding started mass targeting in 2006 in the United Kingdom, 2007 in the United States, and in other markets after the global financial crisis in 2008, which included emerging and developing economies (Kirby and Worner, 2014). The global financial crisis caused a lot of damage to the confidence of the financial system, which included the banking sector and as a result, the crowdfunding industry got an opportunity to fill the gap. Since then, crowdfunding has shown accelerated growth in markets across the income range with high demand at both ends of the operation. The number of online platforms raised with a notable rate of 350% worldwide and currently, approximate 2,000 crowdfunding platforms is working online globally (Gałkiewicz and Gałkiewicz, 2018).

Crowdfunding typically describes a system of financing where small volumes of funds are raised from large numbers of individuals or legal entities to support businesses financially, specific projects, individual utilization, or other needs. It bypasses conventional financial mediators and uses online web-based platforms to connect founders with funders. Definitions of crowdfunding may vary, but they often include the following key points: (i) raising funds in small amounts, (ii) from individuals to many, and (iii) uses digital technology. The key out-of-line effect of crowdfunding is that the intermediation from long-established financial institutions is downsized to a minimum as funds are routed directly from funders to founders through a specified platform (Turner et al., 2010).

Crowdfunding is a fairly new concept but has grown substantially over the last few years, which witnessed a whopping growth (UNDP 2017). Just eight years ago, $880 million was reported as the crowdfunding market value in 2010, which depicted a pretty small market with a minimal growth rate. From 2013 to 2014, the industry increased by 167% and reached $16.2 billion. In 2015, the industry maintained at a high growth rate and raised funding that more than doubled, which amounted to $34.4 billion (UNDP 2017; Scott-Briggs Angela, 2016). The crowdfunding market raised a total of $48 billion in 2016, the Asian Pacific (APAC) market is expected to reach $42.39 billion by 2021, and Europe, the Middle East, and Africa (EMEA) are growing at Compound Annual Growth Rate (hereafter CAGR) of 14.70%. According to the Global Crowdfunding Market 2017-2021 report, the crowdfunding market is projected to grow at a CAGR of 17% between the period of 2017-2021, and the estimated value of the industry will be $90-96 billion by 2025 (technavio, 2016; Ali Mohsin, 2018).

The term crowdfunding has appeared as a facilitator for businesses of all kinds and shapes to receive funding by asking the crowd instead of specialized investors and financial institutions (Bouncken et al., 2015; Kleemann et al., 2008).

Crowdfunding Models

The different online crowdfunding platforms usually feature four main categories: donations, rewards, debts, and equity (Kirby and Worner, 2014). Funders commonly select the category that is aligned with their goals based on expected returns.

Table 2: Characteristics of different crowdfunding models

Crowdfunding Model	Business Model	Characteristics	Advantages	Disadvantages
Donation	Donation-based (Philanthropic)	Backers contribute without supposing any financial benefit.	Zero risk factor	Zero guarantees being given to the contributors about the interest deposit.
	Rewards-based	Two kinds of gifts received by the funders in form of thanks given or a sample of the product.	Level of risk is very minimum, but there is no guarantee for any monetary profit.	A small amount of gain is expected but did not obtain any security, and there is no check and balance system.
Investing	Equity-based	A number of shares received by the backers or collects a substantial amount of share from the profit.	It is expected that profit earned from the venture can be shared with the donors. There is a huge potential for monetary gain.	There is a chance of losing the invested capital. At the time of insolvency, the position of the equity holders becomes a subordinate to their creditors.
	Lending-based	Backers obtain a certificate of obligation that remunerates a static interest rate and pay the principal amount on a stated timetable.	Fixed rate of return is pre-decided among creditors and debtors. In the case of insolvency, the equity holders become senior to debt holders.	Subordinates might possibly become a senior creditor. The rate of failure in start-ups becomes higher, which reflects the risk of losing a portion of investment being done as an equity..
	Royalty-based	In comparison to other models, this one is not very popular. Backers obtain a portion in the form of unit trusts.	Profit earnings are limitless, but the rate of earning is pre-decided by the rate of interest.	There is a possibility that the invested amount could be lost. Even though the investment pays a lower amount of earnings than equity investment, that's why such loss of risk is parallel in comparison to an equity investment.

Source: The World Bank (2013).

Investment Stages and Crowdfunding

There are different models presented by different research scholars related to the investment stages of the venture capital and business angels, but the models presented by Tyebjee and Bruno (1984); Fried et al., (1994) and Paul et al., (2007) about investment stages are slightly different as shown in figure (1). According to them, the first stage is the deal origin, which is handled in crowdfunding for the projects that seek funding and use the crowdfunding platform for financial support. In order to attract the potential investors, deal origination is one of the important stages for the financiers, which keeps the equality among the projects, such as how to differentiate good projects from the bad ones.

Screening and due diligence are expected as one of the crucial stages in crowdfunding, because most of the projects that seek the funding are turned down due to the lack of potential. To overcome this issue, crowdfunding does not provide a true and accurate mechanism for this issue in the shape of clear and proper regulations.

In the contracting stage, the investor and investee are much clearer about the terms and conditions of the contract, because information about funding and rewards are clearly stated by the financiers without any negotiations.

Next, managing is considered one of the important stages where investors use their knowledge and networks by making their firms more value added (Politis, 2008). In crowdfunding, this stage does not exist in their true form, because when the founder has received the financial support from the backer then there is no proper interaction between each other.

Finally, in most of the contracts when the financiers will to exit, which is fairly well explained and limited in scope. Once, the financers receive a reward in shape of a product or a certain amount of money at a particular point of time, then contract automatically expires. However, the reward is one of the necessary elements in crowdfunding logic, therefore, some consideration must be given to the investors level of satisfaction by offering different kind of rewards (Silver et al., 2016).

To comprehend crowdfunding under the umbrella of the above investment process, it is evident that crowdfunding provides a very vivid mechanism for managing such stages in the investment process but not for all the stages.

Fig. 1: The Investment model for VC's investors

Source: Silver et al., (2016)

Method

This study is exclusively conceptual, in that it explains theoretical viewpoints that have the latent to highlights the latest developments in entrepreneurial ventures especially in crowdfunding in one of the emerging economy i.e. Pakistan. It is neither a quantitative nor a qualitative analysis or investigation of crowdfunding market; rather, it will establish a strong foundation in developing the crowdfunding market and assist the government in developing the sound policies and practices for this nascent yet emerging stream of investment. Due to the absences of qualitative and mixed-methods design and empirical analysis, it is expected that rigorous propositions and directional hypothesis will be tested by collecting empirical data, which will be grounded in part in the conceptual directions presented in this study.

Crowdfunding in Pakistan

Once Scott Belsky said, "It's not about ideas. It's about making ideas happen." Certainly, owning an idea is a big asset but developing it in a reality is what counts (Ebtihaj, 2017). Pakistan is low-income country but has a tremendous potential for initiating its own digital turnaround that is sustainable. One of the biggest strengths the country is blessed with is a pool of talented, energetic, and competent youth. As per the Higher Education Commission of Pakistan, each year 25k IT graduates become part of the practical world. The boom in IT and telecom sectors embrace digital technology as a powerful tool, which is not only limited to simple communication but sparked as a life-changing catalyst (Khan Rizwan, 2016). The confluence of several enablers, such as increasing internet/smartphone penetration and the snowballing usage of mobile technology for performing everyday functions is expected to digitize the financial services value chain which will cater to the unbanked population which has long been neglected by the financial institutions. In the same scenario, Pakistan, the 6th populous on face of map, is open for innovative penetration. Therefore, innovative technology and business process re-engineering have an opportunity to create solutions, fulfil gaps and succeed (Hussain, 2017).

The young and energetic entrepreneurs initiated new businesses with sparkling ideas but during nascent stages. As there is a high level of risk, entrepreneurs are struggling for the expansion of businesses, because sources of funding are limited. However, various initiatives are being taken by the industry giants, provincial, and federal governments to support young entrepreneurs in their designated area in terms of financial and technical help. Due to strict and vague regulations, it's become tough for the start-ups to grow and expand although governments and financial institutions especially State Bank of Pakistan have started interest-free karobar loan schemes to facilitate these start-ups. In this aspect, crowdfunding evolves as a catalyst that supplements government and financial institution efforts (Khan Rizwan, 2016). Due to the complex mechanisms of equity crowdfunding, reward-based crowdfunding has become popular among the small-scale investors. Two portals emerged as core engines for the entrepreneurs, for example, Kickstarter and Indiegogo, where they can showcase their prototype and unique ideas to compete for funds. The traditional sources of means, such as social media and cellular messages, are still used by most of the entrepreneurs to raise the necessary funding for their projects. Two renowned personalities, Abdul Sattar Edhi and Imran Khan, both adopted crowd-funding by using their personal charisma locally and internationally. Even though financial constraints were there, they acted and adopted more or less in ways acceptable to the state (Ahmad Naveed, 2017). Recently, the American stock index provider classified Pakistan as an emerging market, whereas Morgan Stanley Capital International (hereafter MSCI) announced it as the best performing market in Asia. This type of improvement did not happen overnight. It took a large span of time to bring a lasting change (Ebtihaj, 2017). According to AlliedCrowds statistics Pakistan ranked 22th among the list of crowdfunding in developing countries with an estimated annual sum of $5.4 million (Khan Rizwan, 2016).

Fundraising platforms in Pakistan

Pakistan is a country that has a young population, which two-thirds of its 207 million people are below 30 years old, who are inspired and motivated for change. According to UNDP, 23% of youth are willing to pursue their own businesses in Pakistan, but the prevailing landscape, the requirements, and the procedures hamper the implementation of ideas to materialize (Hussain, 2017). Table 3 shows the list of the top 8 crowdfunding platforms in Pakistan including two of them are honorary members, such as the Edhi Foundation and the Shaukat Khanum Cancer Hospital.

Table 3: Crowdfunding platforms in Pakistan

Name	Sector	Focus area	Nature of platform	Region	URL
Transparent Hands	Healthcare	Basic health facilities	Donation	Domestic/International	https://www.transparenthands.org/
Seedout	Micro-finance	Poverty alleviation	Donation	Domestic	https://www.seedout.org/
Pink Ribbon	Healthcare	Breast cancer	Donation	International	http://pinkribbon.org.pk/
Care Foundation	Education	School construction	Donation	Domestic	http://carepakistan.org/
Edhi Foundation	Social welfare	Facilitate needy, poor and homeless people	Donation	Domestic	https://edhi.org/
Shaukat Khanum Cancer Hospital	Health care	Cancer treatment	Donation	Domestic	https://shaukatkhanum.org.pk/
Door of awareness	Education	Facilitate students in schools.	Donation	Domestic	Nil
TCF Pakistan	Education	Development of student personalities through diverse competitions.	Donation	Domestic	https://www.tcf.org.pk/

Source: Ali Mohsin, (2018).

Seedout

Seedout is a crowdfunding platform that was initiated in 2013 in Pakistan. The vision for the platform is to raise funds from a large community to facilitate micro-entrepreneurs. The developer of Seedout argues that the core objective is to alleviate poverty, empower micro- entrepreneurs, uplift the living standards of the entrepreneurs and their families, furnish sustainable business, bring economic stability, and promote education. Entrepreneurs participating in Seedout belong to a low-income class. Seedout purely focusses on charitable based projects. Seedout hosts projects of diverse categories, such as clothing, entertainment, agriculture, food, health, housing, retail, manufacturing, services, transportation, and wholesale. The Seedout team evaluates potential micro-entrepreneur personal information before launching the proposed project for the funding goal. Once the team declares the venture satisfactory, then it develops an entrepreneur profile and launches the project. After that, Seedout asks the potential entrepreneur for a written description and photographs about the

project, which can be furnished if required by the potential contributor. For such activities, Seedout does not charge any fees from the entrepreneurs. Seedout collects contribution from the contributors via two streams, which are donating money to the entrepreneur's project directly or donating money to Seedout. Furthermore, there are three ways that entrepreneurs can collect the contributions, which are charities, *zakat*, and *sadaqah ("Zakat (Arabic) is the taxation of income and wealth of a Muslim, it is a form of obligatory alms-giving and the collected amount is paid to poor Muslims. It is the payment that is made annually under Islamic law on certain kinds of property and is used for charitable and religious purposes, one of the five pillars of Islam" [(Arshad Nadia, 2017)]. "Sadaqah or saddka (Arabic) is an Islamic term that means 'voluntary charity'. This concept encompasses any act of giving out the compassion, love, friendship (fraternity), religious duty or generosity" [(Arshad Nadia, 2017)]).*Donations to Seedout means that contributors assign the responsibility to Seedout to distribute the contributors pool of money where it deems best (Arshad Nadia, 2017; Seedout, 2015).

Once the project successfully achieves its target funding, Seedout provides the necessary training and mentoring sessions for the concerned entrepreneurs before handing over the desired amount. After the initiation of the business, Seedout waits for three months, and afterwards 1% of the donation is returned each month to Seedout. Seedout has an excellent project success rate that ranges from 70-80%. Currently, there are a total of 171 projects worth of $127,776 being floated on Seedout, which 18 are active projects and 153 projects are 100% funded by the contributors (Ahmad Naveed, 2017; Arshad Nadia, 2017). More detailed information about the way Seedout functions can be viewed from their respective website, which is available in Table 2.

Transparent Hands

Transparent Hands (hereafter THs), is a crowdfunding platform that started its operations in 2014 in Pakistan. The aim of the THs is to facilitate Pakistan's underprivileged community by paying the medical bills of patients' who undergo critical surgeries (TransparentHands, 2015). Using a four step process, THs facilitates the patients. In the first step, a contract is signed with the renowned hospitals in Pakistan. In the second step, the THs receive a list of the registered patients recommended by different hospitals, and then they send these patients to those contractual hospitals in-order to verify the patient, prepare a diagnosis report, and develop a medical bill with an estimated cost. After that, THs allocate a unique number to the concerned patient and upload their picture, case history, and other medical treatment information along with the requested amount for the donors through their crowdfunding platform. In the third step, potential donors evaluate the patient's medical credentials and fund the campaign by using a credit card or a bank transfer. In the final step, once the requested amount is raised successfully, THs stops the campaign and transfer the payment to the concerned hospital for the patient's treatment. In order to update all the donors, the recovered patients share their respective success stories along with the necessary documents via the THs web portal (Moin Rameeza, 2015).

From its inception till now, THs have financed more than 264 surgeries and spent $229,000. A total of 35 organizations support THs, and it has 12 medical partners and has organized 19 medical camps. THs recovers their development/service charges by deducting 15% from the total amount of each campaign (TransparentHands, 2015).

The team of the THs argue that it will continue to serve humanity by offering them the best healthcare across the country in addition to its plan to extend humanitarian services, which include human rights and education (Transparent Hands, 2015). More detailed information about the way Transparent Hands functions can be viewed on its website, which is available in Table 2.

A brief comparison between the Pakistani crowdfunding market with the Chinese mainstream market

As previously discussed, the Pakistani crowdfunding market is at the initial stages, and regulatory agencies are working overnight to develop clear and transparent regulations, so that the doors of opportunities will open for the outside investors and entrepreneurs to launch new start-ups and invest in unique and viable projects. In this part of the paper, we compare the Pakistani market with another developing market i.e., China. As per the market analysts, the Chinese crowdfunding market is flourishing phenomenally and witnessed the largest market growth in the world. Since 2007, after the emergences of crowdfunding in the United Kingdom, many would have never thought that China would become the largest market in 10 years. Peer-to-peer lending in China gained popularity in 2011, and the market size reached US $52.44 billion in 2015 (Zhang et al., 2016; Aveni and Jenik, 2017). After one year, the Chinese crowdfunding market far outperformed North America with a threshold of US $100 billion and a total crowdfunded loan volume that amounted to US 36.16 billion (Aveni and Jenik, 2017). The exceptional progress in the industry enriched the access of finance for the potential entrepreneurs and SME's. Figure 2 interprets the growth rate of crowdfunding in China. Furthermore, according to the World Bank report 2013, crowdfunding's potential for the developing world estimates that Chinese crowdfunding market will generate US $50 billion or 52% of the global total in crowdfunding by 2025 (Shira, 2017).

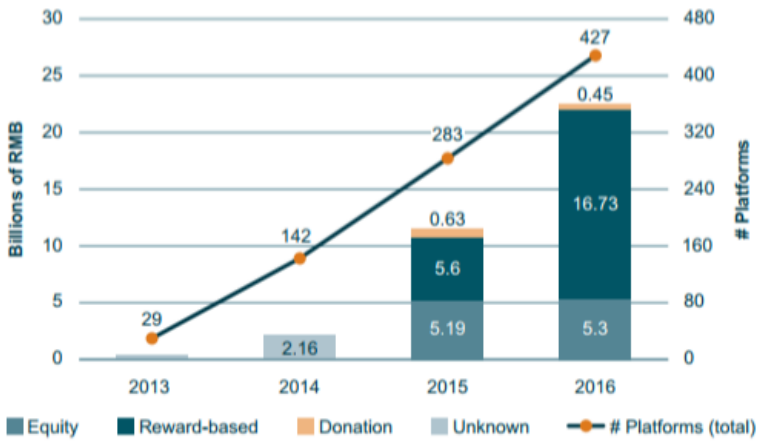

Fig. 2: The Chinese crowdfunding market

Source: (Aveni and Jenik, 2017).

There has been a surge in online crowdfunding platforms in recent years in the country. According to Premier Li Keqiang at a recent meeting of top leaders on education, science, and technology, "New ideas, such as crowdsourcing, will be promoted to bring more social forces into play" (Chinadaily, 2015). By the end of December 2017, the number of domestic crowdfunding platforms totalled 209, which covered 18 provinces and cities. The number of equity crowdfunding platforms were 71, the commodity crowdfunding platforms were 95, the donated crowdfunding platforms were 9, and another 34 were equity + reward multi-mode platforms. By the end of 2017, crowdfunding fund-raising amounted to 58.4 billion yuan (historical accumulated). In the year of 2017, crowdfunding fund-raising amounted to 22.02 billion yuan. The three leading platforms in 2017 were Kaishiba Crowdfunding, Jingdong Crowdfunding, and Taobao Crowdfunding. The amount of funds was 2.9 billion, 1.7 billion and 1.6 billion respectively. Some other crowdfunding platforms also had outstanding performances (JRZJ, 2018). Table 4 shows the list of top crowdfunding platforms in China.

Table 4: Crowdfunding platforms in China

Name	Sector	Focus area	Nature of platform	Region	URL
Taobao	Personalized products	Entertainment, books, videos, technology, design etc.	Reward	Domestic/ International	https://izhongchou.taobao.com/index.htm
JingDong (JD)	Smart hardware	Gaming laptops, personal transportation devices	Equity	Domestic/ International	https://.z.jd.com
Xiaomi	Everyday life commodities	Mobile phone, daily accessories, laptops, utensils etc.	Reward	Domestic/ International	https://youpin.mi.com
Demohour	Everyday life commodities	Mobile phone, daily accessories, laptops, utensils etc.	Reward	Domestic	www.demohour.com
Kaishiba	Personalized products	Hotel, agriculture, dining, entertainment	Multi-mode	Domestic	https://www.kaishiba.com/
Zhongchou	Personalized products	Donated, publication, entertainment, art etc.	Donation and reward	Domestic	www.zhongchou.com
Baidu	Private Equity	Game, big data, education, entertainment etc.	Equity	Domestic	www.8.baidu.com/rich
Tencent Succor	Education	Education, environment protection, health care etc.	Donation	Domestic	www.gongyi.qq.com
Jue.so	Art and Design	creatives, artists, filmmakers, designers	Reward	Domestic	http://www.jue.so/html/publish/20160901/
Tao Meng	Media	Video and movie	Reward	Domestic	www.tmeng.cn

Source: (JRZJ, 2018).

The industry has experienced tremendous growth especially in P2P lending and crowdfunding. Therefore, the governmental agencies adopted a wait-and-see strategy towards establishing regulations for this nascent industry. From 2007, the government agencies allowed P2P platforms and other online financial companies to execute their operations without setting any legal structure. The self-generated policies and ad-hoc oversight by the local authorities bring the problem of

inconsistencies in most of the platforms functioning in the different parts of the region, which resulted in failures and the emergence of scandals, which include the E'zubao Ponzi scheme. To overcome such inconsistencies, the regulative authorities tightened the policies more in 2015. Figure 3 defines the regulative policies milestone. Such regulative changes make the market more competitive and transparent for the entrepreneurs and investors. As a result, more than 3,000 P2P platforms wind up their businesses, and the number of P2P Platforms became 2,488 in 2016 (Aveni and Jenik, 2017).

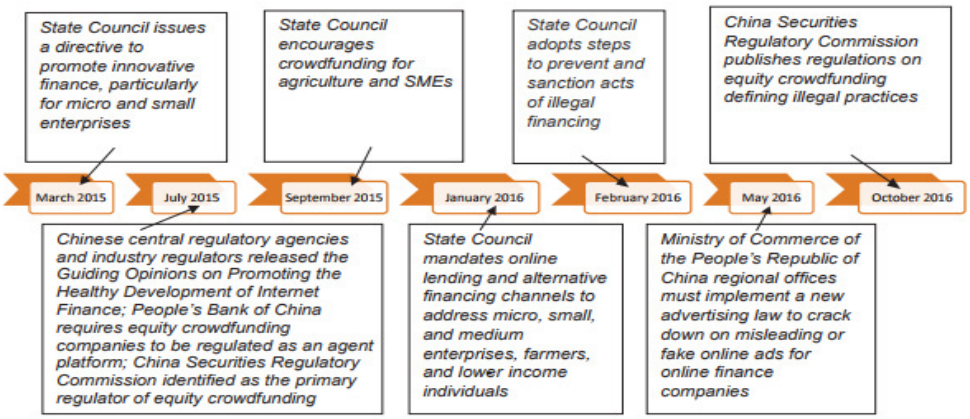

Fig. 3: Policy interventions by the state council

Source: (Aveni and Jenik, 2017)

The prevailing comparison in Table 5 will shed light on a few of the important aspects that will help the stakeholders, the government, and regulatory agencies in developing vivid policies for the crowdfunding market in Pakistan.

Table 5: Key differences and improvements b/w two countries

Area	Pakistan	China
The role of Government	Government agencies, such as SECP established incubators and accelerators with the collaboration of the provincial government and educational institutions (Quadri and Ayesha, 2014).	In 2015, the government took very decisive steps in the form of policy intervention and pilot drafts for P2P lending and the crowdfunding market. (Liang, 2015).
Supporting Talent	To encourage and support the young talent to acquire the entrepreneurial skills by creating avenues and platforms for the promotion and reinforcement of entrepreneurship in the country (JRZJ, 2018).	The Chinese government strongly fuelled the entrepreneurship activities inside the country by engaging e-commerce giants, such as Taobao, JD, and Xiaomi (Joffe, 2017).
Access to markets	The government should develop a centralized platform or directory that showcases Pakistan's potential markets to the outside investors. Such acts	To flourish the market further and bring momentum in equity crowdfunding, the regulative agencies should develop confidence and trust among

	will develop a high level of trust in the minds of outside investors (JRZJ, 2018).	investors and open new ways/channels for the potential financing of businesses at different stages of the start-up development cycle (Liang, 2015).
Education	Education can foster an ecosystem of entrepreneurship based on learning (World Bank, 2013). Pakistan spent nearly Rs 790 billion ($6.8 billion) on education in 2016, and the education budget has gone up by an average of 17.5% every year since 2010 (Ali and Naviwala, 2017).	China spent nearly 4 trillion yuan ($590 billion) on education in 2016, which was upto 7.57 percent from the year before. It was the 5th consecutive year that the country spent above 4 percent of GDP on education (Yan, 2017).
Women	To educate and develop the entrepreneurial skills among women, the provincial governments first step was to make a technology based incubator called Plan 9. Plan 9 developed a platforms called a capacity building platform to aspire women entrepreneurs, and it has trained 100 women over a period of six months with the aim to increase the female labour force participation rate (Qadeer 2017),	The Chinese government estimates that 55 percent of the country's internet firms were founded by women. Even if these figures are debatable, there is no doubt that China's start-up industry has brought about some of the most successful businesswomen in the world, such as Jean Liu and Hu Weiwei (Sieren 2017).

Key Factors That Facilitate the Development of Crowdfunding

The following are the key factors that help crowdfunding being embraced in developing countries.

1. The government should develop a clear and profound regulatory framework that leverages the transparency and improves the scale and speed of the technology, which will enhance the internet connectivity and clearly discuss different aspects of crowdfunding, start-up promotions, and investor protection (BR Research, 2017; World Bank, 2013).
2. To harness the demographic and technological trends by developing a profound mechanism where social media can integrate among the community, strong market players could adopt a penetration strategy and strong internet usage, which will also become a bridge for collaboration and cultural shifts (World Bank, 2013).
3. To facilitate capital formation, a strong regulated online marketplace is necessary where investor protection can be achieved by proper training and education (World Bank, 2013).
4. To create a promising channel for opportunity and oversight, it has become necessary for the entrepreneurs to collaborate and participate in different hubs and events, such as business plan competitions, education institutions, incubators, accelerators, and co-working spaces (World Bank, 2013).
5. The Country State Bank should bring changes in legislation to reduce the barriers for the entrepreneurs in access to finance, and such provisions will accelerate the business growth (Hussain, 2017).

6. Entrepreneurs should perform comprehensive research about crowdfunding before launching any projects and must adopt sound marketing techniques for project promotion (Khan Rizwan, 2016).
7. Local citizens are totally unaware of the role and importance of crowdfunding in the development of society. Digital and print media can play their role in educating the society about start-ups and crowdfunding.

The culture of trust will evolve as a result of the above factors, which are the core element for the funding of companies, projects, and causes mediated primarily through web-based interactions.

Conclusion

Crowdfunding is a unique concept that gives a method of integrating investors demand through financial support and the management of the risk, but it requires a definite share of magnanimity and social entrepreneurship commitment. To make this idea valid, there is a valid reason, where the internet more specifically has become a great source for connecting and engaging people that have unique and common interests on a worldwide basis.

This write-up is one of the first to address and assess the current trends of crowdfunding in Pakistan. We have analyzed the overall market based on suggestive evidence and a comparison with a mainstream market in China, which reflects the prevailing environment and procedures available for the entrepreneurs and contributors that motivate them to invest in the crowdfunding market. The current environment that exists in the country supports and convinces entrepreneurs to initiate a donation-based platform rather than other crowdfunding models.

The current market scenario strongly witnessed that soon reward based and equity-based crowdfunding platforms will start their operations once the government and regulatory agencies streamline the overall mechanisms of crowdfunding in a country that is hampering in the developmental process of crowdfunding. Even though market conditions are quite favourable but vague and complicated regulations make it tough for the local people to understand and invest inside in the crowdfunding market.

We are confident that a comparative study of the two markets will further shed light on the importance of crowdfunding especially in developing a strong and profound foundation inside in the country for P2P and the crowdfunding market. All crowdfunding platforms, especially Seedout and Transparent Hands, have been quite successful in promoting the crowdfunding concept as well as a donation base model and expanding the boundaries of their operations across the country.

In summary, this leads to the conclusion that the concept of crowdfunding is new and at such an initial stage's that there are a few numbers of platforms currently operating in Pakistan. However, the FinTech industry, which is booming drastically will popularize the concept of crowdfunding among the community and will change the financing scenario for the start-ups.

Limitations and Future Research Work

This research contributes to the eminent field of crowdfunding in one of the developing countries, such as Pakistan. However, there are few limitations that make room for further research. The most obvious one is that our sample size is very limited. We selected Pakistan, because it's a new market in crowdfunding industry. Secondly, the availability of literature is quite rare, and accessible information usually originates from the news, magazine reports, and discussions that occur during table talk. Thirdly, there is no proper research publication available about the crowdfunding market in Pakistan. Fourthly, the discussions and conclusions made here cannot be generalized, because the environment of the crowdfunding market varies from country to country.

Further interesting trends in market development can be explored through an in-depth analysis by conducting a qualitative and quantitative study. A comparison study is also possible between Pakistan and another developing country by analyzing the two markets through an (S.W.O.T) analysis.

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Considerations Regarding the Predictors of Financial Performance. The Case of Start-Ups Included in Business Accelerators Programs

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Abstract

The essential role of entrepreneurship for economic growth and prosperity determines a constant effort made by researchers and decision-makers in creating and developing suitable business structures to enhance its effects on the economy and society. In this respect, business accelerators, focused mainly on a critical mass of successful entrepreneurs, are able to stimulate and accelerate the development of a significant number of innovative, high growth projects, with a significant impact on the market. In this paper, using the results of a survey applied to a considerable number of start-ups around the world made available by Entrepreneurship Database Program (EDP), we analysed the association between the expected profit margin and the founder's age, and respectively, cumulative work experience. We found that expectations of reaching a certain profit margin are not strongly dependent on the age or work experience of start-up's founder. In line with other contribution in the field, we consider the aim of accelerated growth is not necessarily linked to the youth and limited experience of high growth-focused entrepreneurs.

Keywords: Entrepreneurs, Age, Work Experience, Profit Expectation

Introduction

Entrepreneurship has a key role in economic development, individual and social prosperity, and technological progress. Identifying those entrepreneurial determinants able to strengthen the support measures and to capitalize on the growth and profit ambitions are of great importance. Thus, incubators and accelerators are exceptional opportunities for young companies in order to transform ideas into successful start-ups, orienting energies to the market and avoiding the typical mistakes of the start.

In this paper, based on the results of a survey involving a large number of new ventures' entrepreneurs from all over the world, enrolled in various business accelerator programs we attempt

to identify the existence and intensity of a relationship between the entrepreneur's age and work experience, on one hand, and expected financial performance of the firm, on the other hand.

Firm's objectives and performance

Assessing business performance is an essential issue for researchers, entrepreneurs and managers. Currently, standard indicators used to measure business performance, such as profit, turnover, customer portfolio, return on investment, improvements in product quality, are preferred, as they also express how a business has hit or missed strategic pre-settled goals. Pérez and Canino (2009) confirms that the most endorsed indicators associated with performance in the literature are quantitative ones, describing in particular the business expansion and financial performance: the growth of the company / or turnover (31% of cases), followed by profitability indicators (over 18 % of cases), profit (14%,) or liquidity 7%.

However, in the early years of a business, surviving and gaining a market position are truly successful, when insufficient managerial experience and high costs are combined with instability and fierce competition. Thus, a widespread use of financial performance indicators can generate an incomplete picture of young firm performance (Hillman and Keim, 2001). These indicators do not take into account the efforts and achievements such as competition, entering new markets, reaching organizational goals - strengthening the team, retaining key personnel, etc. showing, rather, underperformance, crisis or insolvency circumstances, being unsuitable indicators to measure the success of start-ups (Herron and Robinson, 1993). A combination of objective and subjective techniques, quantitative information and individual perspectives on performance seems more appropriate (Naman and Slevin, 1993), (Zulkiffli and Perera, 2011). It could allow comparisons between firms in various contexts such as relative performance of industry, time horizon, culture or economic conditions, supplementing the understanding of entrepreneurial ambitions.

Age and work experience as predictors of entrepreneurial performance

There is a popular yet unproven concept that youths are more capable of generating revolutionary ideas, as they are more dynamic, open to novelty, less preoccupied by social obligations and responsibilities (family, savings, retirement etc). Several studies argue that young people often have unique advantages in approaching entrepreneurial activity: high level of optimism and confidence, willingness to assume risks and naturally inclined towards change and modernization (Koellinger, et al., 2007), (Haltiwanger, et al., 2013), (Hatos et al., 2015). Consequently, they could be interested in entrepreneurship because they perceive it as a challenging endeavour, different from common and boring jobs, specific to older generations (Badulescu et al, 2015).

However, the ability to discover opportunities is often best enhanced by experience, market knowledge, accumulation of resources, useful in influencing business success and resilience (Azoulay, et al., 2018). Experience and education are parts of human and social capital (Dodescu and Badulescu, 2010) and they can enhance the accumulation of financial capital (Gruber, et al., 2008), (Lafontaine and Shaw, 2014) being critical in high technology domains. Also, young people may be reluctantly treated by creditors (especially banks) when they apply for a loan (Andersen and Meisner Nielsen, 2012). In this case, there is the alternative of business angels, where a higher seniority of the firm's founder may be a disadvantage, as these investors are usually looking for extremely dynamic start-ups and they are less interested in medium- and long-term stability (Gompers, et al., 2010), (Badulescu, 2013).

Even if the age, skills' accumulation and the availability of adequate financial capital do not guarantee the entrepreneurial success, nor the risky decisions are inevitably successful. There is, rather, a complex and often unfavourable relationship between optimism and performance, between entrepreneurial over-confidence and business longevity (Koellinger, et al., 2007).

Research Methodology and Results

Our research is based on the data series made available by Entrepreneurship Database Program (EDP) housed at Emory University, which include application data collected from programs that opened applications in the 2013-2018 window. The main database contain data from 19,418 ventures whose founders applied through more than 280 different programs run by more than 90 different organizations (Entrepreneurship Database Program & Aspen Networks of Development Entrepreneurs (EDP), 2019).

We try to find the answers to several questions such as: Are younger (i.e. under 25) entrepreneurs more eager to set higher profit targets? Are entrepreneurs with a relevant work experience (i.e. 5-20 years) more cautious than younger ones? Is there a connection between the age, respectively the work experience of the firm's founder, and the setting up of a certain profit margin target?

In preparing the dataset we identified and removed several records considered extreme or implausible, or due to the impossibility of identifying the firm's year of establishment. Overall, of the total of 19418 records, 18743 valid ones were taken into account. We find a high percentage of for-profit entities (14886, i.e. up to 80% of the total), followed by the non-profit entities (11%), but also undecided (4%), others (6%) or unfilled responses. In terms of education, a large majority of founding entrepreneurs has tertiary education (around 75% of the total) followed by high school, associate and vocational (16%) and few (up to 1%) up to Middle school (including Pimary school, Less than 9, None) education. The rest (8%) are No answer (around 8%).

We were then interested in selecting only for-profit companies, leaving us (after removing 663 non-answers) with 14.223 records, i.e. over 77% of the total. In Table 1 we present the expected annual profit margins with regard to the founder's age and, respectively, work experience.

Table 1: The expected annual profit margins related to founder's age, respective, to work experience

Expected profit margin	Founder's age (years)				Founder's work experience (years)		
	16-25	26-45	46-65	>66	<=5	5-20	>20
0% - 10%	127	645	137	4	507	353	53
11% - 15%	170	856	164	21	657	485	69
16% - 20%	278	1508	303	21	1043	966	101
More than 20%	690	4003	813	44	2813	2453	284
None	881	3247	565	46	2705	1819	215
Grand Total	2146	10259	1982	136	7725	6076	722

Source: Own calculation based on dataset

In order to analyse the association between the expected profit margin and the founder's age, and respectively the founder's cumulative work experience, we converted the quantitative variables (founder's age /experience) into ordinal data. The expected profit margin was divided in 5 ordered ranks (0% - 10%, 11% - 15%, 16% - 20%, More than 20%, None), the founder's age was grouped into 4 ranks (16-25 years old, 26-45, 46-65, >65), and experience into 3 categories (up to 5 years of experience; 5-25 years' experience, and above 25 years' experience). No expected counts in either contingency table were below 5, allowing the use of Pearson's chi-squared test. The association was tested by means of chi-squared tests and Cramér's V statistics, based on interpretation suggested by Cohen (1988).

Regarding the relationship between the expected profit margin and the founder's age is was observed a very highly significant association ($p<0.001$, $\chi2=105.274$, df=12, N=14,523), even the effect size is weak (Cramér's V=0.049, $p<0.001$), below Cohen's suggested threshold of 0.058 for a 4x5 contingency table. In the case of the association between the expected profit margin and the founder's

cumulative work experience, similar results was obtained - a very highly significant association ($p<0.001$, $\chi2=63.499$, df=12, N=14,523), but a weak effect size (Cramér's V=0.047, $p<0.001$), below Cohen's suggested threshold of 0.071 for a 3x5 contingency table.

Thus, based on the analysed data, we can affirm that the expected profit margin is influenced by the age or work experience of the founder of the company (very significant results of the chi-square test). On the other hand, however, we found a weak association between the independent variables (age and experience, respectively) and the dependent ones (the anticipated profit margin). In other words, independent variables have a low predictive value.

Conclusions

Identifying those entrepreneurial determinants able to strengthen the support measures and to capitalize on the growth and profit ambitions are of great importance for economic growth, innovation, employment and for the decrease of regional disparities. In this paper we have considered two of these determinants - age and work experience and we attempt to find tried to see if they really count in targeting an expected level of profit. The results of the research show that, although they influence setting certain financial performance objectives, the entrepreneur's age and experience are not powerful predictors thereof. Moreover, we cannot say whether young and inexperienced entrepreneurs are more optimistic in setting ambitious aims, nor conversely whether age and experience lead to having more reserved goals. The impossibility to verify the actual achievement of the proposed targets, but also the lack of some qualitative information regarding the founder's work experience (relevance, type) could constitute as a serious limitation of our research. In future studies, we intend to expand the analysis of the determinants of entrepreneurial and high-growth ambitions by addressing the above-mentioned limitations.

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Government Regulation of Innovative Development of Russian in the Current Conditions

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Abstract

The paper concludes that the share of new knowledge embodied in technologies, equipment, personnel training, manufacturing organization in developed countries is about 70%-90% of GDP growth. Introduction of innovations has become a key factor of market competition giving progressive companies an opportunity to reach excess profits based on assignment of intellectual rent arisen by the monopoly usage of more advanced technologies. Nowadays, Russia faces a problem to form advanced engineering and manufacturing systems. At the same time, the Russian economy does not have an operating system of state stimulation of innovation development. The factors constraining the innovation-oriented development of Russia are revealed thus: expensive energy resources, inefficient taxation system, insufficient money supply, unused human capital, quality of administration. The necessary measures which ensure the transition to a balanced economy with sustainable growth of the main indicators of national production and consumption have been identified.

Keywords: Innovative Development, Innovation, State Policy, Innovative Activity.

Introduction

The transition to a balanced economy, ensuring a steady growth of the main indicators of national production and consumption, is possible only with development of high value-added manufacturing and high-tech industries. Innovation was the main factor that ensured economic progress at all times. At present, in all countries, posing themselves as highly developed countries, the contribution of innovation to GDP growth has an upward trend. In the EU, on average, the value of innovation factor reached half of all components providing GDP growth at the beginning of the 21st century. In Germany and Austria, it has recently reached 67%. At the same time, it was not the market, but targeted management efforts that ensured the West European (especially German) innovation effect.

The research purpose is to identify the factors affecting innovation development of the Russian economy and determining the directions for neutralizing their influence.

Research Material and Methods

During the research process, there were used the following research methods: universal methods of scientific cognition including the empirical and theoretical levels of scientific knowledge, analysis and synthesis, a systematic approach, and conceptual modeling. In addition, such methods of scientific research as dynamic and structural analysis, and the construction of logic circuits were used. The information and empirical part of the research was formed on the basis of data provided by

the Federal State Statistics Service; research results of the World Bank; analytical reviews published in periodicals, domestic and foreign literary sources, and materials of scientific research institutes.

The works of the following Russian and foreign scientists and economists are devoted to innovation issues and innovation activities: S.Yu. Glaziev (2010, 2014), V.V. Ivanter (2005), V.L. Inozemtsev (2000), Ch. Greenhalgh (2010), and G.M. Peter Swann (2009).

Practical significance of the research is concerned with developing recommendations that can be used to improve the process of strategic planning and current management of developing the national innovation system of Russia. The authors' theoretical ideas and research results are applicable to the activities of government bodies at various levels.

Research Results

Back in the 1960s, science in the West actually functioned independently of the economy sphere. With the exception of the military-industrial complex, it was not involved in the development of economic sectors. As the researches notes, during this period, state scientific policy had cultural features. Reorientation of scientific research for satisfying practical needs and economic challenges began in the West in the second half of the 1960s. Science has become defined as a factor of economic growth. In accordance with this approach, developments are primarily stimulated that are aimed at increasing the growth and competitiveness of products. Finally, in the late 1990s, science and technology policy was transformed into an innovative one in the West.

Unlike business, states consider R&D as a sector with long-term economic returns. Active support of renewable energy engineering programs illustrates this fact. The German 100,000 solar roof program implies state subsidies for research on solar energy in the amount of 0.51 billion Euros.

Special attention is paid to seed-stage financing of the development and implementation of innovations, which, as a rule, constitute up to 30% of the total project cost. In the West, the system of innovative incentives includes such traditional financing instruments as targeted subsidies, grants, mortgage lending, etc. A state innovation procurement practice builds confidence of product implementation and contributes to the success of its rapid introduction into production. This kind of procurement provides in the EU countries 16% of gross domestic product (Yakunin, 2008).

At the same time, there is a significant lag in the financing of scientific research in Russia compared to developed countries. In the 1990s, Russia's scientific policy was based on 'the Gaidar imperative' – 'Science will wait'. In terms of percentage of science expenditure in GDP, Russia is ranked in the upper thirties, along with Greece, New Zealand and Slovenia (Malinetskyi, 2015).

In addition, there is a 'technological lag'. The results of basic research are embodied in specific technologies in about half a century. Applied developments come to industry and change it in 15–20 years' time. This is clearly shown by innovations in the defense complex - on average, 10 years pass from the start of financing a new weapon project to supply it to an army.

It is necessary to pursue a reasonable industrial policy for solving these problems.

A policy of reduction of extraction and consumption of natural resources and energy to the level of the national industry needs should be put in place. At the same time, the right to extract oil and gas should be granted to companies on a competitive basis with payment to them per unit of extracted raw materials; the products themselves should belong to the state.

The prices of gasoline, fuel oil, gas, electricity and utility services at least should be halved due to the removal of adventitious costs, inefficient management and excessive taxes on domestic energy consumption. This would be the most important factor in raising the competitiveness of Russian industry and increasing the well-being of the population (Minakova, Bukreeva, Masalov, Galchenko and Kharlanova, 2019).

It is advisable to change the order of interaction of the state with mining companies: the right to extract oil, gas, etc. should be given to companies on a competitive basis with a fixed fee per unit of extracted raw materials. At the same time, the raw material remains under state ownership and must be sold at world prices without involving offshore companies and intermediaries.

The Russian tax system needs to be improved. First of all, it is necessary to modernize the income tax and value added tax.

The introduction of a progressive income tax is one of the main measures to improve the socio-economic situation in Russia. According to the calculations of the Institute of Social and Economic Studies of Population of the Russian Academy of Sciences, if Russia had an average European progressive tax scale, Russia's GDP would be 30-50% higher than in reality (Rusrand, 2017). The greater the income of the population, the greater the demand for goods will be thus ensuring GDP growth. At the same time, Keynes's Psychological Law of Consumption states 'when aggregate real income is increased, aggregate consumption is increased, but not by as much as income'. As a rule, these funds are transferred overseas for purchasing real estate, luxury goods such as yachts and football clubs, or simply deposited in foreign banks, which also does not contribute to the production and GDP growth in Russia.

In such conditions, the introduction of progressive taxation will increase the marginal propensity to consume in the Russian economy. The last one will ensure the growth of GDP, including industrial production.

The next measure is taxation. Enterprises allocated their income for investing in production development, R&D and development of new technologies should be exempted from taxation. Special attention should be paid to the value added tax (VAT).This tax burdens high-tech products with high added value and stimulates the development of resource-based industries.

In 2019, the standard VAT rate in Russia was raised to 20% (In accordance with Federal Law No. 303-FZ of 03August 2018) (Nalog, 2019). At the same time, the actual collection of VAT does not exceed 30% (Rusrand, 2017). According to some economists, it is advisable to establish a unified VAT rate equal to 8%; reduce the number of VAT exemptions; calculate VAT as a product of value added and tax rate; cancel the VAT refund for exporting raw materials; 50% of VAT reinvested regionally. The implementation of the proposed measures will improve business climate, significantly reduce the number of subsidized regions, increase the collection of VAT from 30% to 90% and give the budget an additional RUB 2.0-2.5 trillion (Rusrand, 2017).

The reasonability of the proposed measure is confirmed by the report 'U.S. corporate tax policy for the 21st century' of the Office of Tax Policy of the US Department of the Treasury.

The most important factor constraining the industrial innovation in Russia is the quality of labour forces. This is partly a consequence of the degradation of the Russian educational system. The Russian educational system is based on training of humanities scholars and middle-ranking managers. Training of specialists in natural science and technology is carried out only by state universities, the share of the experts in these fields is reducing, and as a result, the number of professional personnel capable of contributing to the development of the domestic industry is rapidly declining. According to the statistics of recipient countries, Russia's loss from 'brain drain' is evaluated by several million educated people, including 250 thousand scientists in advanced fields (Shevyakov and Kiruta, 2019).

Therefore, this problem can be solved by generating a demand for innovations from the real sector of the economy. In order to overcome scientific, technical and technological stagnation, our own R&D expenditures should be doubled. This task should be achieved by combining the growth of government allocations by pursuing appropriate scientific and technical policies with stimulating innovative activity of the private sector through tax incentives, infrastructure development and credit expansion. Russia should demonstrate at least a two-fold increase in scientific research budget financing.

Countries having experienced so-called economical miracles confirm the need for forced increase investments up to 35–45% of GDP. These investments will move the economy to a new technology stage. Thus, China's ten-fold increase in GDP from 1993 to 2016 was followed by an increase in investments by 28 times, money supply and bank credit on the manufacturing sector – by 19 and 15 times, respectively (Glaziev, 2018).

This implies the need to reorient monetary policy to the needs of economic development through the creation of a multi-channel mechanism for targeted credit emissions under the obligations of the state and enterprises to master advanced technologies and expand production.

Conclusion

Russia will not have a chance to join the list of global leaders without advanced technologies in economy. The ability of the national economy to update its technological base and upgrade the technical level of enterprises is a key factor for improving and realizing its competitive potential.

This implies the need of reorienting monetary and fiscal policy for the needs of economic development and incentives for enterprises introducing new technologies.

The economic development policy should review:

- the reduction of interest rates and the creation of mechanisms for refinancing of capital investment and innovation activities;
- the introduction of progressive income taxation, the modernization of the VAT system, tax exemption for enterprises investing business profit in manufacturing expansion, R&D implementation and introducing new technologies.

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Background and Directions of Transformation of the Current World Order

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Abstract

The paper reveals the results of the unipolar world order implemented since the 1990s of the XX century after the collapse of the USSR. The research determines the prerequisites for modernization of the current world order and highlights the centres of resistance of the American centrist model. First of all, it is China which over the past 15 years accumulated considerable resources and potential and developed its own tactics of influencing counterparties with the aim of building an allied network; then Latin America, Iran, North Korea and Russia. Russia has significant potential in certain areas. In particular, the territory of Russia is the most important factor to occupy leadership positions in the world. Natural resources are another criterion for determining the potential of a country. By this criterion, the position of Russia in the world is even higher; it is the most resource-rich actor for putting forward an independent new world alternative. Russia is most affected by socio-economic and political factors. But unlike geographic, these factors can be changed in a targeted way.

Keywords: unipolar world order, bipolar system of international relations, American centrist model, world alternative.

Introduction

Starting from 1991 to the present, the world economy remains unipolar. The result of a unipolar world was an increasing inequality between countries. So, from the moment of the collapse of the socialist system, income inequality, or the gap between the richest and poorest groups has been growing markedly. According to the report on human development of 2017, many African countries are balancing on the verge of mass starvation. In Guinea, one out of every five children under five years of age, and in Madagascar every third child is underweight. According to the report on human development 2013, in the fifteen-year period after the collapse of the USSR, the death toll in one thousand children increased in Zimbabwe by 38.2%, Swaziland by 49.1% and Botswana by 113.8%.

The quality and volume of educational services provided differ fundamentally in the regions of the world. About 800 million people over 15 years of age remain illiterate - 18% of the world's adult population. 76 countries of the modern world do not provide legal guarantees of free primary education.

The country gap in life expectancy is growing. It is twofold between Japan with the highest life expectancy and Afghanistan with one of the lowest rate of life expectancy (Golos, 2017). One of the

significant, producing a high level of conflict in the world of modern challenges is the growth of xenophobia. Back in the 1980s there was no such problem on a planetary scale. The average level of xenophobia in the world was less than 5% of respondents, indicating a fundamental undesirability for themselves to live next to immigrants. Currently, this share in the world's population is already about 28% (Golos, 2017).

Drug use as the most dangerous social vice in the world is in a growth trend. After the American invasion of Afghanistan, opium production increased by almost 2.5 times compared to the initial level (Sulakshin and Bagdasaryan, 2016).

This implies the relevance of the problem of the changing world order. A new world order will be opposed to a unipolar model of the world order. It seems important to analyze the possible alternatives to the existing model of the world order and to study the potential opportunities and Russia's place in it.

Research Material and Methods

The theory of a multipolar world was developed in the papers of Kissinger H. (2009, 2011), Brzezinski Zb. (2009), Waltz K.C. (1993, 2000), Huntington S. (1993, 1999), Kegley Ch.W. and Raymond G. (1994).

The research works of Bogaturov A.D. (2009, 2017), Sulakshin S.S. (2016), and Ponomareva E.G. (2016) cover the modern model of international relations. The purpose of the research is to study of the essential prerequisites and directions of transformation of the global economic model. The study is based on the methodology of the general theory of systems, and such methods for studying complex social objects as synthesis, comparison, system analysis, analogy, the construction of scientifically based hypotheses, etc.

Research results

The United States ensured a unipolar world order by maintaining overwhelming leadership in four key areas: military-technological, financial-economic, geopolitical, and information-ideological. The fundamental basis was the axiomatic nature of the statement about the exclusive position of the United States and its messianic role in the world. A distinctive feature of American foreign policy is its offensive and expansionist nature. Along with the expansionism of the United States, a 'complex of American superiority' developed, which increasingly resembled arrogance (Shakleina, 2002).

Almost all the presidents of the Cold War era supported the idea of 'American exclusivity' and the US special mission to spread their own ideals and values as the main ideological argument in the fight against the Soviet threat. In the 1990s of the 20th century American political scientists developed several clear doctrines of demonstrating and affirming the US dominant position in international relations. According to the concept of power hegemony (W. Wohlforth, C. Bell and Zb. Brzezinski), preference is given to the power tools to strengthen the leadership positions of the United States in the world. The ignoring interest of partners and closest allies by the US is allowed.

The consequence of such a policy of the United States was the growth of conflictogenity in the world. Despite a more than twofold reduction in militarized interstate disputes, the number of intrastate conflicts almost reached the level of the final phase of the Cold War, when the bipolar world order disappeared. There was no significant reduction in mortality as a result of military conflicts.

It happens amid the decline of influence of UN's legal principles on the world politics. The most important of them is a state sovereignty - the cornerstone of world politics since the middle of the XVII century.

The bipolar system of international relations was based on the military parity between the Soviet Union and the United States. When the Soviet Union collapsed, Russia as a sole successor state

retained the right to possess the Soviet arsenal of strategic nuclear weapons (including nuclear arsenals removed from the territory of Belarus, Kazakhstan, and Ukraine). Due to this, today we can talk about maintaining parity between Russia and the United States, but only in strategic weapons. A number of scientists call this situation residual bipolarity (Bolotin, 2001). The other seven countries (great Britain, France, China, India, Pakistan, Israel, and North Korea) have nuclear weapons, but their stocks allow only talking about the possibility of nuclear deterrence, but not parity with either the US or Russia (Minakova, Parkhomchuk, Golovin and Bukreeva, 2018).

After the dissolution of the USSR and the socialist camp with the subsequent collapse of the bipolar system of international relations, Russia's sphere of influence in the world began rapidly to reduce. The Soviet Union actively expanded the allied network around the world, primarily due to powerful ideological (communist and socialist alternative, political support), financial (credits, arms transfers, trade ties within the CMEA, etc.) and intangible (academic exchanges, cultural cooperation, etc.) resources and incentives. The USSR's 'soft power' could be estimated by the number of countries chosen the Soviet life model. According to the Soviet propaganda, these countries could are divided into socialist and socialist-oriented ones. As of 1985, they accounted for 37% of the territory, 40% of the population, and 22% of GDP (Bolotin, 2001). Nowadays, Russia's foreign presence is limited to curtain former Soviet republics (Belarus, Armenia, Azerbaijan, Kyrgyzstan, Tajikistan, Kazakhstan and Uzbekistan) and regions involved in conflicts (Transdniester, South Ossetia and Abkhazia). As for far-abroad countries, only Syria, Serbia and Venezuela are quite loyal to Russia influence. At the same time, the United States over the past 20 years has not only preserved, but also significantly increased its military presence in the world.

The current unipolarity model demonstrates curtain signs of coming global restructuring. First of all, it is increasing the resistance of some countries or groups of countries to rules, institutions and regulatory mechanisms within a unipolar world order.

In recent years Latin America has become another significant area of resistance to the American-centric model of the world order. Since 2010, four states of the Bolivarian alternative (Venezuela, Cuba, Nicaragua and Ecuador) have agreed to replace the US dollars with the virtual currency equivalent (the sucres) for trade payments among themselves. In 2010, after the adoption of the Customs Code, the stage of formation of the customs union of Mercosur's member countries was completed. The organization has started creating conditions for the transition to a new currency union, Argentina and Brazil have already managed to test a number of mutual trade settlements in a single currency. In addition, the Mercosur's countries have reduced their dependence on trade with the United States (an average of 18%), increasing intra-continental trade.

Being the traditional hotbeds of anti-Americanism Iran and North Korea have high-level resistance to American hegemony. A large potential for resistance to the established rules of world order is shown by such regional integration blocs as the Association of Southeast Asian Nations (ASEAN), the Shanghai Cooperation Organization (SCO) and organizations such the CIS operated in the post-Soviet space (CSTO and others). These organizations develop new alternative models of trade, economic and military-political relations among the member states.

Russia with a great potential in certain areas is a significant pole of resistance to US dominance. In particular, the territory of Russia is the most important factor to occupy leadership positions in the world. Natural resources are another criterion for determining the potential of a country. By this criterion, the position of Russia in the world is even higher. According to some courses, Russia possesses 22% of the world's total natural resources. The Russia's share in the world's supplies of natural resources is estimated by the following indicators: 12% oil, 32% gas, 11% coal, 31% potassium salts, 21% cobalt, 25% iron, 15% zinc, 10% lead, 33% nickel, 18.2% tungsten, 7.6% tin, 10.7% platinoids, 5.3% uranium, 8.2% antimony (Minakova, Parkhomchuk, Golovin and Bukreeva, 2018). The well-known American Internet resource 247 Wall Street calculated the financial value of the natural potentials of the countries. The calculated resources included: oil, natural gas, coal, wood, gold, silver, copper, uranium, iron ore and phosphates. The calculations were based on statistics from the US Geological Survey, the US Energy Information Administration, Bloomberg, and financial

visualizations. A dozen of the world's most resource-rich countries were identified (247wallst, 2012). With an indicator of 24.4% Russia (USD75.7 trillion) took an unconditional 1st place in this rating. The USA with an indicator of 14.5% is in the second position in the ranking. Thus, Russia beats America in a resource fight. Consequently, in order to maintain its dominant position, the United States must take steps that undermine Russia's resource capabilities. This is one of the main reasons for the increasing external pressure on Russia.

The resource potential makes Russia the most secured actor for developing an independent new world alternative. China, being the world's second-largest economy and the world's largest country in terms of population, ranks only sixth in terms of natural resources. In this regard, it is vulnerable to the prospect of a long-term resource competition with the United States. China's resource potential is 2 times less than the American one and 3.3 times less than the Russian one (247wallst, 2012). Hence, China's resource strategy may consist of either intercepting Russian resources or establishing an alliance with Russia. Weak Russia will lead China to the first scenario. Strong Russia will be obviously chosen as a strategic partner. The liberal model of the state currently prevents Russia from realizing its natural potentials. The preservation of this model in Russia is beneficial to its geopolitical opponents, especially to the USA.

China is the biggest threat to American hegemony. It has been making a major contribution to the growth of the world economy over the past few years.

In the last 15 years China has accumulated considerable resources and potential and developed its own tactics of influencing counterparties with the aim of building an allied network. Thus, it has managed to convert its increased economic opportunities into political influence in many African countries, Latin America, Mongolia, etc. The Chinese leadership does not allow American capital enter its strategic industries and major companies. Despite serious international pressure, China is not going to give up protectionist measures in the interests of national producers and the undervalued exchange rate of national currency - the renminbi (yuan). Moreover, the Chinese leadership openly promotes the decline of the US dollar in world trade in favor of other currencies and the revision of management rules and quoting in international financial institutions - the International Monetary Fund and the World Bank.

However, China alone will not succeed in overthrowing the United States from the podium of leadership. The chances of China are even less in the global struggle against the geopolitical power of the United States and its allies. A real challenge to the West can be thrown by the joint geopolitical powers of Russia and China. The calculations of the countries' potentials prove this fact.

One of the calculated comparative integral indices is the national combined power index. It uses data from the International futures (IFS) computer model as the basis for evaluating countries' potential. The model was developed by Barry B. Hughes, the Professor at the University of Denver, it is one of the most authoritative projects for predicting the future (Don, 2014). For calculating a country's power index, the following variables are taken into account: GDP, defense spending, population, and technology. According to the received trends, the center of geopolitical power is moving from the West to the East. By 2060, the United States will lose global leadership. They will be bypassed not only by China (this will happen in 2030), but also by India. Rapid breakthroughs in the ranking will be made by Indonesia - from 12th place to 4th and Pakistan-from 19th to 7th (OECD Economic Policy Papers, 2012). Russia will also reach the level of world leaders in terms of total power. In this situation, the model of the unipolar world can no longer be implemented. There will be a transition from a system of country hierarchy to a system of country equality and dialogue.

Conclusion

Thus, the globalization of the modern world does not mean the homogenization of countries' development indicators, but leads to the further delamination and inequality. The gap between the world leaders and the rest of the world in terms of indicators reflecting the dynamics of the standard

of living, the quality of life, scientific and technological progress, after the collapse of the Soviet Union, has significantly increased.

It is logical to assume that in the nearest time the struggle between the US and China will intensify, and the pressure on the Arab countries will be increase. The fight against the possible alternative will be conducted not by highly cost-effective strong arm tactics, but will be transformed into an information technology and ideological sphere. In the next 50 years, the convergence of large countries of the East (China, India) and some countries of the Middle East (Pakistan, Iran) is likely to occur, despite the fact that the contradictions between these countries are still quite strong. China and Turkey, apparently, will strengthen their presence and influence in the countries of Central Asia, and compete in this area with the Western countries.

In case of the turn away from of the liberal model, Russia with its potential can become one of the world leaders. It is highly likely that in the medium term, cooperation in the BRICS and SCO will be actualized, which will begin to gain more weight in the international arena, as well as other attempts will be made to create associations and unions of countries striving to build their policies independently of the United States.

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Position of Electromobility in the Mateusz Morawiecki's Government Policy vs Energy System and its Security

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Abstract

The Polish fuel sector within the hydrocarbon area is confined to mid- and downstream. The first of the two is losing support due to the decline of Poland's significance as a transit state for the Russian export. Given lack of upstream capacity, the position of the latter is also very weak. The excess supply of refinery services across the European continent reduces its development opportunities. The electrical power engineering alike, leaves much to be desired. The production area is dominated by entities more than half a century old. The over-exploited and useless power units are not replaced by any new ones featuring the power close to the withdrawn items. Majority of professional power plants are coal operated. The climate changes and the resulting restrictive UE policy in terms of greenhouse gases emission, including carbon dioxide, successfully contribute to the decarbonisation of the power production in the region. This process will cover also Poland. Awareness of the issue seems to emerge from the government's state of mind. The electromobility plan meets all the preconditions to become an element of support to the power transformation process in Poland. The car market is well developed and plays a significant role. Although used cars imported privately dominate in the streets, the share of new vehicles rises on a year to year basis. CO_2 emission-based restrictions and penalties imposed on the manufacturers lead to the eventual removal of traditional combustion engines driven cars. The rising number of PHEV and EV indicates not only the higher demand for electric power, an increase in its production in other words, but a complete remake of the distribution infrastructure as well. The problem is clear to see in big agglomeration suburbs inhabited by wealthy society. Microgeneration development seems to be the only hope here.

Introduction

The National Electromobility Development Plan (NEDP) was signed in February 2017[1)]. It was given the status of an agreement the signatories of which were the following government institutions: Ministry of Development, Ministry of Energy, Polish Development Fund, National Centre for Research and Development, National Fund for Environment Protection and Water Management and the representatives of the Association of Polish Cities. It was part of the concept entitled Strategy for Responsible Development[2)]. It is the vision of Mr Mateusz Morawiecki, then Minister of Development and Finance and presently Prime Minister, on the direction of activities granting the stable and fast rise of welfare of the Polish citizens and arriving at a competitive position in Europe.

The focus on Electromobility was not accidental. It contained a propaganda message which exposed the option for modernity and high-tech by the conservative government. The plan suggested a fast progress in the domain of advanced technologies meant as counter argument to the massive criticism linked to the resistance against decarbonisation project. Electromobility was to help Poland built a strong position on the emerging market; within the area where there was no need to catch up with the huge backlogs resulting from the Eastern Block heritage, etc. It created a field for economic competitiveness where Poland had the same position as its Western counterparts, hence the idea of making the said Plan into the flywheel of the country's subsequent development.

Methodological Assumptions

The logical connection between the electromobility and the energy sector transformation trends is very clear and does not call for any explanations unlike the issue of correlation between the progress of electromobility implementation and the transformations within the said economy sector. This combination gives way to both elements being created by one power centre. The said centre supervises the legislation work to present the legal grounds for motor industry segment development focusing on electric vehicles and, at the same time, does it in the event of the entities present in the domestic fuel and energy market and also controls it. The latter function results from it being the body representing the institution of the State, and at the same time, in the Polish circumstances – it appears as a shareholder – owner of major companies operating within this sector.

The basic research related question raised in connection with the analysed issue, concerns the taken measures and subsequently their cohesion. The reciprocal relations between the market and the PRE strategy targets implementation seem very interesting to be determined. The circumstances that remain to be explained is the role electromobility plays in the Polish energy transformation process.

Reaching out to the institutional analysis frequently referred to in social studies, but also very popular in political and economy studies, Polish fuel concerns and energy companies, passenger cars segment in the motor market as electromobility pioneer and also energy distribution infrastructure have become the focus of researchers. The latter of the enumerated elements can be deemed the progress measurement tool of the implemented processes.

The Energy Market in Poland

The daily demand for the oil and its products reaches nearly 700 000 bbl (Dudley, 2019). The dozen-percent rise that has occurred over the last five years explains the customs system sealing. Also, the recent Poland's economic growth does not remain unnoticed. Due to the abovementioned changes to the duel import system, its share in the demand sharp rise is difficult to determine.

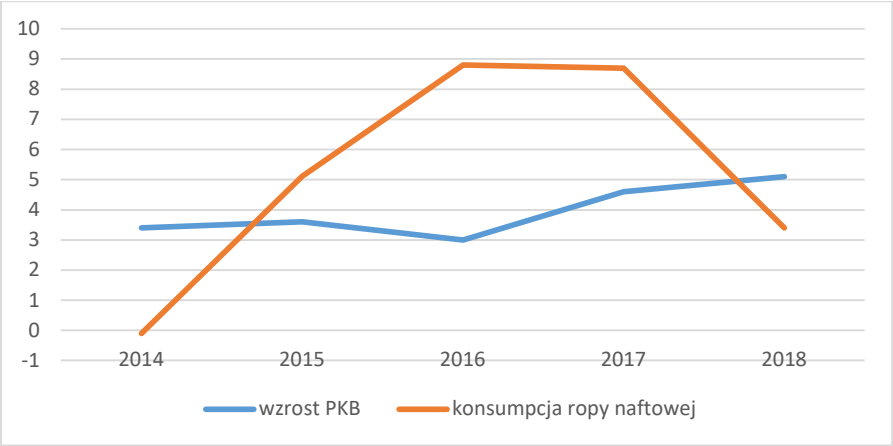

Fig. 1: GDP growth / crude oil consumption

Author's own survey based on BP and the Central Statistics Bureau

Oil is imported from the Russian Federation by the Friendship Pipeline. It is about 65% of raw material that Poland uses. It is supplemented by swap purchase from the Persian Gulf area. The imported oil is processed in local refineries whose output satisfies the national market on 100%. The domestic oil drilling oscillates around 1 % and is of little importance to the economy.

The situation of natural gas is quite to the contrary. The annual demand for this fuel reaches 20 bln m^3 and keeps rising (Dudley, 2019). This progress results from a growing number of households that turn to gas consumption due to pro-environmental administration decisions and an improvement of living standards as a consequence of the said economic development (see, Fig.1). Approximately 20% of natural gas is produced on site, 65% come from import contract concluded with Gazprom and transferred by a network of pipelines, and about a dozen percent comes to Poland on board ships in the LNG form. Among the suppliers, the US companies are the key ones followed by the ones from Canada and Qatar.

Over 80 % of the coal mined in the UE was from Poland which amounts to about 65 million tonnes. However, the demand for this raw material is much bigger; its consumption reaches 75 million tonnes. The difference is covered by import, mainly from Russia. This situation is determined by the peculiarity of Polish coal mines. High production cost and very deeply seated deposits are the main reasons for the quantity and activity limitation.

Polish Oil Concerns and Their Transformation

Two Polish major oil companies: Grupa Lotos S.A and PKN Orlen S.A. are of key importance at home. Both companies operate within mid- and downstream. The upstream operation run by the subsidiaries has a marginal significance for their business, their share in EBTIDA alike. The first of the two is smaller; it operates a modern refinery processing over 11mln bbl/y and a network of 495 petrol stations. It is based in Gdańsk and sells only in Poland. PKN Orlen operates in a number of countries. Its refineries are not as advanced as those owned by Lotos yet its total procession capacity is three times higher and arrives at 33,5 mln tonnes a year (ORLEN, 2018). Orlen owns 2 800 petrol stations, of which 1787 in Poland, 582 in Germany, 409 in the Czech Republic and 25 in Lithuania (ORLEN, 2018). Its capitalisation reaches USD 8 billion and is two-and-a-half times higher than that of Grupa Lotos S.A. (*Money.pl*, 2020) Both concerns have entered the fusion process. It is a political decision made by the major owner, the Polish State and is not rid of a propaganda aspect. Their key position in the sector results from their total wholesale market domination. Their joint share is over 80%. This situation reflects the legal regulations in place and the role the State has taken as a regulator of oil products turnover. The possessions of Grupa Lotos S.A. and PKN Orlen S.A. in wholesale theoretically guarantees their wellbeing in case a gradual retail reduction occurs due to the rise of interest in alternative fuels against the traditional combustion engine driven vehicles. Those concerns have been using concessions for power distribution over the area under their control. In 2014, PKN Orlen was granted the licence for their products marketing, thus becoming a supplier (Decision by the Energy Regulation Authority Chairman, 2014). They also adopted the role of a manufacturer owning a 2153MWt & 345MWe heating power plant. In September 2019, PKN Orlen announced their intention to acquire the Energa Group – energy producer and distributor to over 3 million consumers. In December 2019, Orlen placed a stock call to sell the shares of the acquired company (Sofuł, 2019). Having been focused on oil processing and petroleum-derived product sales for many years, the Concern is clearly diversifying their operations. Today, the electric power they produce, and market makes up 15 % of EBITDA (Lis, 2019). This trend of changes might be regarded as unambiguous and in line with the assumptions which have the electric energy the only fuel of the future. Statoil – Equinor are undergoing analogous transformation yet much more advanced in terms of the implemented stages. The correlation with the electromobility programme is very clear, yet the fusion with Grupa Lotos interferes with the transformation ideas.

The Motor Market – Passenger Car Segment

In early 2018, in Poland there were 23 million registered cars. Since the start of the decade, the growth dynamics has not changed much. It can be assumed that the market defined by the number of items in the passenger car segment has been expanding since 2015 at the pace of 3,8% y./y.

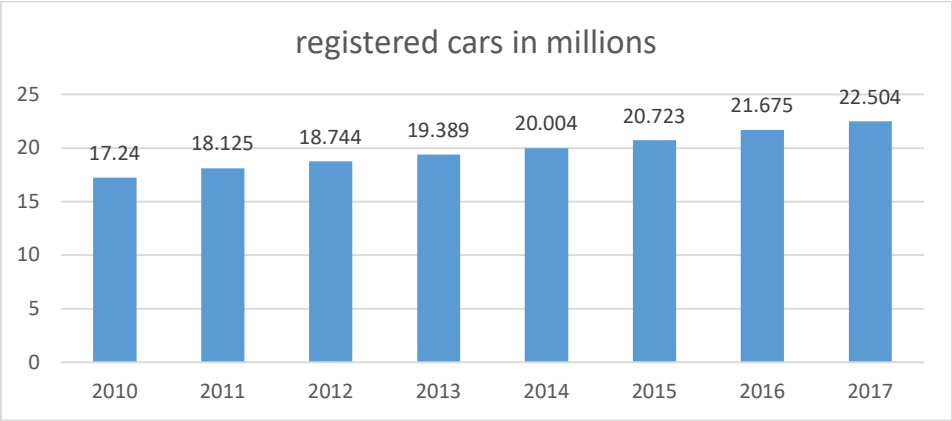

Fig. 2: The increase in car number in Poland since 2010.

The change is of both quantity and quality nature. The latter parameter concerns the car age and standard. A vital element of the discussed transformation is the replacement of old vehicles by newer generation cars.

In 2018, over 1.16 million cars were deregistered (CEPiK), while in the first quarter of 2019 – over 360 thousand (CEPiK). The number of cars that were allowed to drive the roads for the first time was 531 889 and 139 809 respectively, which seems to reflect the dynamics of the changes present in the passenger car age structure in Poland.

Also, in the event of car import, there is a clear element which can be described as the transition to the subsequent technological car generation. On one hand it is a natural process as a consequence of sometimes limited wear&tear, depreciation period and car durability, but also the technological advancement and associated changes to valid standards on the other. Very slowly, yet on a systematic basis, the percentage of imported cars younger than 4 years is growing (PZPM).

The Motor Market, Passenger Car Segment – Development Perspectives and Their Basic Determinants

The above mentioned short- and medium-term perspective of the generation change of cars in Poland along with the rising number of vehicles, is the factor stimulating the demand for liquid fuels. This will refer to petroleum and diesel oil in similar proportions. With time, however, it seems to be of more certainty that the demand will differ as to the choice in favour of petrol and the drop in diesel consumption. Both the pace and dynamics of the process will progress in relation to the extent of pro-environmental awareness among the society and the respective regulations. It is not difficult to notice in the said processes the effects of the changes occurring in the passenger car market and of the transformations started by the introduction of new types of drives. It is interesting to see the rising share of hybrid cars. The reports focus exclusively on the plug-in types (hereafter PHEV - Plug-in Hybrid Electric Vehicles / PK comm.), the y/y/ records display 29%. Trying to estimate the future demand for fuels, vehicles featuring the combustion-and-electric drive with no access to chargers (hereafter: HEV - Hybrid Electric Vehicles / PK comm.) will appear in significant numbers.

Their share in the secondary market is becoming more and more clear. In August 2019, in the most popular Internet motor announcements service, it reached 2%, in the event of new cars it was over 12%. If this trend is maintained, the quantity of passenger cars with compression ignition will be outnumbered by vehicles powered by engine petrol followed by LPG, CNG and possibly also ethanol-based fuels.

The preferences under the "Law on Electromobility and Alternative Fuels"[1] or the Order concerning supplements to electric cars do not seem to be able to change much. The scale of the planned supplements will only allow to be used in case of short-range small cars. It may merely serve as an additional stimulus to raise interest in electricity powered vehicles.

Analysing the factors influencing the domestic market, the cultural aspects should also be taken into consideration. The variable which must not be neglected is the attitude of the subsequent generations to owning a car (Hysa, 2016). The so-called Y-Generation forms a considerable barrier, i.e. persons born in 1980s and early 1990s. Analytical surveys of the HR areas indicate no manifestation of the said need (Stachowska, 2012).

The UE legislation and the changes trends makes the endogenic factor of market shaping, which is a result of Poland's membership in the UE structures. Almost all of the Union bodies, the European Commission including, have been very clearly manifesting their concern about the natural environment and the need to counteract the ongoing climatic changes. This is well reflected in the resolutions concerning the acceptable fumes emission standards. They determine the work in the motor industry, both in the design and construction sector and the fuel manufacturers as well. The trends of the ongoing transformations can be spotted as early as the applications for changes or replacement of the present regulations[2]. The base guidelines were specified already in April 2019 (European Commission).

The technological solutions are external elements affecting the market. Their availability on the target market determine the popularity of a given vehicle or model type. And this is the place where logistics issues are exposed followed by the so called environmental factor, such as CNG system presence will not be a supply advantage if in the nearest area of the potential customer there is no station to fill the tank with the "blue fuel", a garage or workshop specialising in particular repairs, etc.

CO_2 emission limitation as electromobility development stimulus

The conclusion of the Paris Agreement on greenhouse gases reduction, including CO_2 made the EU member states initiate actions to achieve the aim (Ministerstwo Aktywów Państwowych, 2017). An outline of new regulations likely to efficiently reduce the road transport emission was put forth already in 2017. Those propositions were included in the so called third package entitled "pure mobility". The European Parliament made a respective statement in October 2018. The member states negotiations were going on until January 2019. Their results were codified on 15th April 2019. The basic assumption of the then adopted order saw drop of the CO_2 emission into the atmosphere in 2030 by 37,5% for passenger cars and by 31% for trucks in relation to 2021. It is supposed to happen gradually so that the said reduction over the years 205-2029 would not be lower than 15%. The quoted values refer to the average size vehicle park by a given manufacturer.

Early 2021 was set as the moment of changes. Then the maximum CO_2 emission norm is supposed to be implemented on the level of 95 gr/km. Before this happens, the 1st January 2020 marks the implementation of the obligatory limit CO_2 95gr/km. It is by 35 gr more than the prospective amount in Euro 6 – 130 gr, which was deemed standard until the end of 2019. The very decisions cannot be regarded as novelty. Initial assumptions concerning the top levels were known already in 2014 (International Council on Clean Transportation, 2014).

[1] LAW on Electromobility and Alternative Fuels dated 11th January 2018, Journal 2018, item 317.

[2] F.ex. an application – EUROPEAN PARLIAMENT AND COUNCIL ORDER *altering the Order (CE) No. 715/2007 on homologation of engine cars type in relation to pollution emission from light passenger cars and vans (Euro 5 & Euro 6) and on the access to information concerning vehicle repair and maintenance,*
https://ec.europa.eu/transparency/regdoc/rep/1/2019/PL/COM-2019-208-F1-PL-MAIN-PART-1.PDF

Fig. 3 :Acceptable CO_2 emission for passenger cars and light vans

Year	gr/km
2021	95
2025	80,75
2030	59,37

Source: Author's own survey based on the EC data.

Failure to stick to the abovementioned standards is subject to financial penalties. Initially, they were of progressive nature: € 5 was paid for the first gram too much, € 15 for the next, €25 for the subsequent and finally € 95 for the further grams (European Commission). Since 2019, the latter rate has been compulsory. It refers to every registered car. In 2020, 95% cars will meet the standard: starting with 2021 - all new cars. The emission volume subject to calculation will be distributed over the entire manufacturer's fleet. This means a rise in price of many car models which for many concerns equals slump in income and lesser profit.

In practical terms, the standards planned for early 2021 will not be met by any model with the conventional combustion engine drive. This refers to both the spark ignition and compression ignition vehicles. See Fig. 1.

The reason is very prosaic. The main factor determining the CO_2 emission into the atmosphere is the burn of hydrocarbons. The volume of gas is directly proportional to the amount of consumed fuel and translates to the vehicle power (Adamski and Brzozowski, 2009).
This formula defines the situation:

$$P_s = \frac{P_t}{\vartheta \cdot \eta_m} + P_{acc}$$

Where:
P_t total power required on vehicle wheels [kW],
η_m– total efficiency of driveline,
v– engine power drop coefficient in non-specified working conditions,
P acc – power absorbed by additional accessories (i.e. air conditioning) [kW].

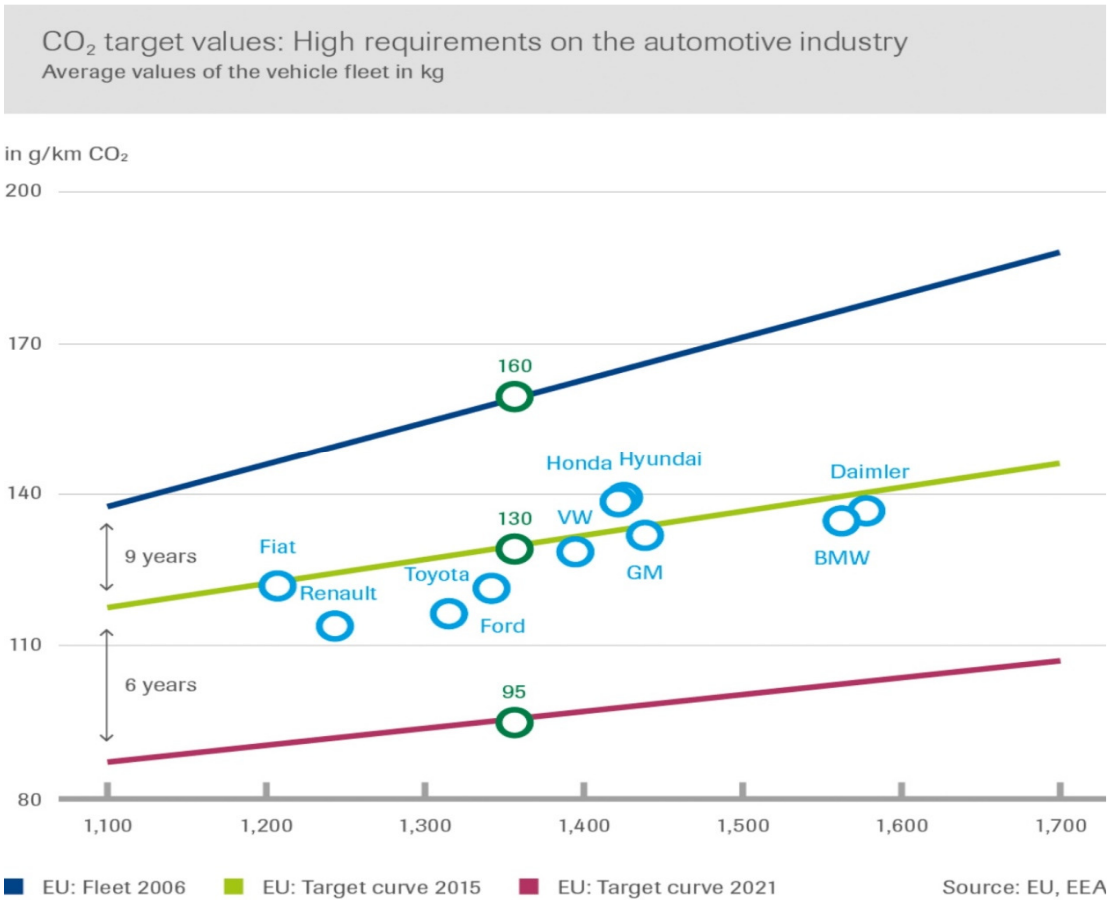

Fig. 4: Emission targets and average emissions for a particular manufacturer fleets in kg.

Source: Verband der Automobilindustrie (VDA).

Consumers do not seem to be interested in the purchase of significantly lower power vehicles and, what is more, it does not always solve the problem.

According to the calculations done by Intergovernmental Panel on Climate Change (IPCC) - 1 litre of combusted petrol generates 2370 g CO_2, while one litre of Diesel oil – 2650 g CO_2.

Thus (CI):

$$\frac{2370\ gr}{100\ km} \times Xl = 95\ {}^{gr}/_{km},$$

which means:

$$23{,}7\ {}^{gr}/_{km} \times Xl = 95\ {}^{gr}/_{km}$$

Hence:

$$X = \frac{95}{23{,}7}\ {}^{gr}/_{km} = 4{,}008\ l$$ – combustion is not likely to be in excess of 4 litres in the mixed cycle per 100 km,

the limit is supposed to be lower by 15% in 2025 against the 2021 level, which is in line with the 80,75 gr/km value:

$$X = \frac{80{,}75}{23{,}7}\ {}^{gr}/_{km} = 3{,}40$$, thus, combustion is not supposed to be in excess of 4 litres in the mixed cycle per 100 km,

and in 2030 is supposed to decrease by 37,5% in relation to 2021 i.e. down to about 59,37 gr/km:

$$X = \frac{59{,}37}{23{,}7}\ {}^{gr}/_{km} = 2{,}50$$

for compression ignition (CI) engines operated by diesel oil,

thus, in the CI case

$$\frac{2650\ gr}{100\ km} \times Xl = 95\ {}^{gr}/_{km},$$

which means:

$$26{,}5\ {}^{gr}/_{km} \times Xl = 95\ {}^{gr}/_{km}$$

Then:

$$X = \frac{95}{26{,}5}\ {}^{gr}/_{km} = 3{,}58\ l$$ – combustion uses 3,58 litres in the mixed cycle per 100 km,

in 2025 this value is going to drip down by 15%, i.e. 95 × 15% = 80,75 gr/km:

$$X = \frac{80{,}75}{26{,}5}\ {}^{gr}/_{km} = 3{,}04,$$

and in 2030 this value will decrease by 37,5%, i.e. 95 × 37,5% = 59,37:

$$X = \frac{59{,}37}{26{,}7}\ {}^{gr}/_{km} = 2{,}22$$

Technical data:
Engine: 1-cylindrer, fluid-cooled in thermosiphon system
Cylinder capacity: 500 cm^3
Power: 10 KM
Gearbox: 3-gear
Rear-wheel brakes
No Differential
Maximum speed: 80 km/h

Given today's technology and engineering opportunities, no exclusively hydrocarbon fuel operated vehicle is able to meet the said standards. Much sought by the customers car power and weight are the major obstacle. There exist vehicle prototypes powered by petrol which are able to meet the emission requirements. However, owing to the functionality issue, they were never implemented into mass production or hit the market. An example of such a car is the German Hanomag Komissbrot manufactured in 1920s, over 15 000 items of which appeared on the roads.

Fig. 5: Hanomag Komissbrot (Germany) – 1920s, CO_2 emission below 20 gr/km – 15 000 cars were manufactured

Source: autoexpert.pl.

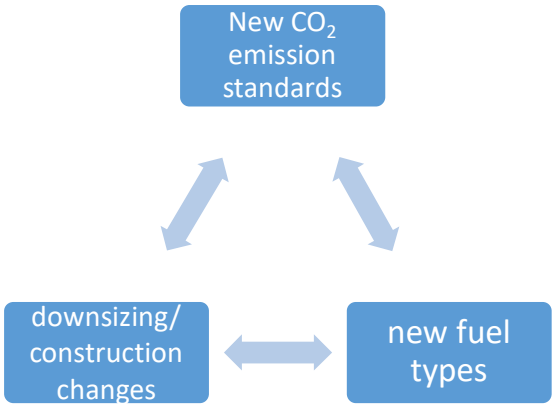

Fig. 6: Possible motor industry development trends changes triggered by the CO_2 emission levels restrictions

New legislation getting the car manufacturers to offer car models subjected to downsizing or the plug-in and electric vehicles builds up one of the possible scenarios of the situation development in the market. Its coming true is equal to the reduction, and on a longer run, even to total elimination of new combustion engine cars.

Fuel Alternative to Electromobility

Electromobility involving electric and plug-in hybrid vehicles seems to be the only predictable development path of the motor market.

Nevertheless, the principles of a scientific study have it that other potential solutions must be indicated. An alternative to the reduction of the drive units capacity might be new constructions. However, it does not seem possible that there are such ones present and waiting to be implemented for it is difficult to imagine that any concern having such a vehicle in place would waive the opportunity to present it to win the advantage over the competition and dominate the market. Information on designs and prototypes of vehicles featuring the well-known standards and consuming less than 4 litres of petrol or 3.5 litre of diesel have systematically been appearing for years. The procedure path from the Concept Car to the production onset is long and the scepticism concerning the final effects of such enterprises is well-grounded. It results from the so far experienced implementation cases and is reflected in lack of such vehicles on the market. If the restrictions concerning the construction of new type drive units seem to have negative forecast, then the possibility of changes to liquid fuel composition used for combustion engines must be seriously taken into consideration.

The definitions of fuels that have appeared so far and based on the legislative instruments[3] and tax regulations[4] contain gaps connecting the product with the system used for its production[5]. This, however, does not seem a solution for a longer perspective. This is the situation where a substance never before used for that purpose has not yet become a problem but is the matter of time. Given the popularity of the solutions applied in South America, adaptation of the more and more successful

[3] Np. Ustawa z dnia 11 stycznia 2018 r. o elektromobilności i paliwach alternatywnych, USTAWA z dnia 10 kwietnia 1997 r., Prawo energetyczne Dz. U. 1997 r. Nr 54, poz. 348, Dz.U.2018.0.1344, t.j. – Ustawa z dnia 25 sierpnia 2006 r. o biokomponentach i biopaliwach ciekłych.
[4] Dz. U. 2009 r. Nr 3, poz. 11, Ustawa z dnia 6 grudnia 2008 r. o podatku akcyzowym art. 89, ust. 14.
[5] Prawo energetyczne (D. U. z 2018 r., poz. 755, ze zm.) art. 3 ust.10e.

ethanol-based technologies, even in the USA, should be taken into consideration. CO_2 emission into the atmosphere in case of C_2H_5OH power is balanced by CO_2 absorbed by the plants used for alcohol production (Żółty and Stępień, 2016). It is also lower than the mined hydrocarbons derived engine petrol (Patyk and Kułakowska, 2013).

Fig. 7: Test results of lead-free petrol against petrol and ethanol blends

Petrol 95 Blended		Petrol 95 and ethanol (50 % vol.)	
860 rot./min	vol. 13,9 %	860 rot.min	13,6 % vol.
3000 rot/min	vol. 14,3 %	3000 rot.min	13,4 % vol.

Source: study by Patyk and Kułakowska (2013).

The difference is minor because lower combustion value triggers higher fuel consumption (Ambrozik and Łagrowski, 2014). As a result, the difference reaches about 2%. Nevertheless, which is worth repeated emphasising, owing to its biological origin, ethanol is treated as emission-free medium (Stelmasiak, 2014).

As fuel, it also has many other advantages, such as high culture work and strong independence of external temperature conditions which allows for operation in extreme cold external surrounding. A higher octane than in petrol is in favour of ethanol because it means resistance to uncontrolled spontaneous fuel combustion. It also has broader flammability limits and bigger flame velocity. It is characterised by greater evaporation heat which has some impact on the engine performance powered by it. As to the drawbacks, it features a greater ability to mix with water which is detriment to the device's durability. A more serious fault in this fuel is its lower vapour pressure than in engine petrol, and so the very combustion process. The high failure rate, shorter life and excess fuel consumption are drawbacks of all spark ignited engines. The list of potential difficulties the application of ethanol as energy medium poses must be expanded by the limited storage opportunities and flammability.

Service and Related Infrastructure Development Problems

The present stage of the electromobility development in Poland can be tagged as initial. It is due to the general regulations included in the abovementioned *Law on Electromobility and Alternative Fuels,* which makes the legislative basis for all activities within this area of the motor market[6]. The executive laws help here as the important completion and supplement, such as the Order by Minister of Energy on the technical requirements for charging stations[7] or the charging stations records[8]. The inherent feature of the creation period of the broadly meant mobility-related market is the relatively small number of RV and PHEV vehicles that hit the roads. On 12th December 2019 there were only 6672 such vehicles. The EV were in the majority - 4178, while PHEV – 2494 (PSPA, 2019). The public charging stations alike - 888, of which 624 – AC and 264 – DC (PSPA, 2019).

[6] Act on Electromobility…

[7] Dz. U. 2019 z dnia 15 lipca 2019 r. Poz. 1316,ROZPORZĄDZENIE MINISTRA ENERGII z dnia 26 czerwca 2019 rozporządzenie Ministra Energii z dnia 26 czerwca 2019 r. w sprawie wymagań technicznych dla stacji ładowania i punktów ładowania stanowiących element infrastruktury ładowania drogowego transportu publicznego.

[8] Dziennik Ustaw 2018 r., poz. 2514, Rozporządzenie Ministra Energii z dnia 10 grudnia 2018 r. w sprawie wzorów zgłoszeń dokonywanych do Ewidencji Infrastruktury Paliw Alternatywnych przez operatora ogólnodostępnej stacji ładowania oraz operatora stacji gazu ziemnego.

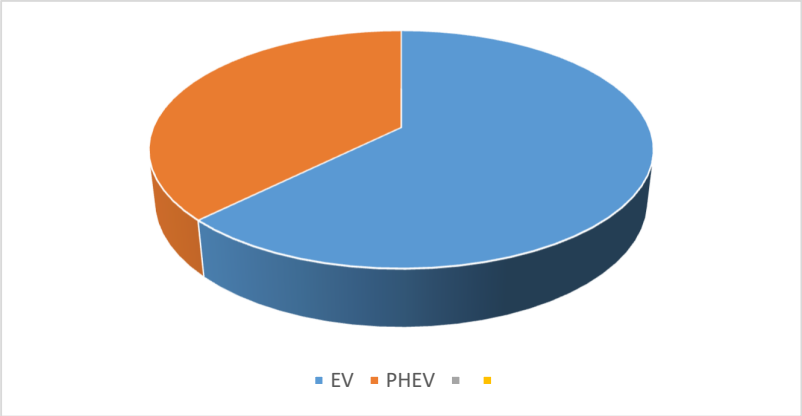

Fig. 23 : EV and PHEV registered in Poland on 12th December 2019

Source: Author's own survey on the basis of pspa.com.pl

The relatively small number of the entities is not here a problem, as they are going to appear, and taking into account the said dynamics of the motor market in Poland on the basis of the passenger car segment, the process will keep unfolding at a fast pace. The main challenge is not the very idea but its transfer into the planning sphere. One of the fundamental issues is the energy security.

Power Protection

According to the data concerning the preferences of electric car drivers, in the USA and Western Europe countries the absolute majority of such car owners charge their vehicles at home or at work; rarely at shopping centres (Muzi, 2018). It would be practical to assume having a standard in place which states in big city satellite towns, at 10:00 p.m. in nearly every household additional 3,7 kWh to 22 kWh power supply will be provided. This means multiplication of previous consumption by a few or a dozen times. In case of shopping centres those values are still bigger.

A small village of Chomęcice near Komorniki, 15 km away from Poznań city centre in central-west Poland was taken as an example. It is one of the wealthiest, most modern with most developed transport infrastructure regions in Poland. In nearly 400 houses there live 1234 residents[9]. Owing to its specific type and the wealth of the citizens, the number of cars registered in this area oscillates around 800 and the figure is significantly higher than average in Poland, i.e. 600 cars per 1000 (Eurostat, 2019). Had they been electric, half of the number would be charged at night with the use of minimum power of 3,7 kWh, energy consumption would have been 1,5 MW. The local transformers are able to secure one third of this figure. Their possible extension would not help much given the inadequate electric energy network systems.

The above described example may be applied to any locality in Poland. Contrasted to other places in terms of electric power infrastructure, it shows successful which is due to the region prosperity among others. In the national dimension, the existing condition can be considered as totally useless for any progress in terms of electromobility and the presence of this type of vehicles bigger number.

[9] Data by Urząd Gminy Komorniki

Conclusions

The electromobility programme in Poland finds its place in the area of political declarations. Its concept is based on the assumption this king of suggestion or proposition will convince the society to back up the government. The idea exposes its innovative elements and will give airs of the governing party contradicting the stereotypes of right-wing populists unable to think innovative.

From the marketing point of view, the programme was successful. The critical approach imposed on the opposition merely lack of objectiveness. The criticism traditionally used for this purpose putting forth the argument of limitations as the historic conditions' heritage did not work here. The electromobility area is a global challenge of the future. All the states are at more or less the same stage and the differences in implementation are acceptable.

The concept of electromobility development as the economy flywheel for the nearest future is perfectly composed with the characteristics of the Polish fuel sector. Featuring no downstream, doomed to import hydrocarbon-based fuels, it owes its economic existence only to the privileged legal position that ensures the advantage over the foreign competition. What is important and wroth pointing out, the greatest oil concern of Poland, the PKN Orlen has spotted niche businesses for them and started diversifying the income sources focusing on electric power production and marketing. Given the fuel stations network, correlating this activity with electromobility is only the matter of time.

In Polish circumstances, the electromobility development plan is greatly aided by the Polish motor market size and dynamics. The passenger car segment only, displays over 20 million vehicles, and there is a clear trend for upgrading and implementation of innovative solutions. Following this analysis, the only possible direction of changes is the alternate way of car powering, i.e. the introduction of electromobility.

The distribution infrastructure across the country still remains the prohibitive barrier to be overcome. Its characteristics prevent the electromobility programme to be implemented. It is due to the unsatisfactory electric power supply in terms of medium voltage line and transformers density. It is the electric power distributors who are responsible for the infrastructure improvement. They are companies with National Treasury share. They are among the richest economic entities in Poland and also play a significant political role. The scale of the investment required for the electromobility development is unacceptable for them. A potential solution, which is the microgeneration expansion, is against their welfare as this would mean the end of the centred electric energy system based on concessions, which make their existence happen. This situation makes the government programme confined to a plan incapable of being implemented.

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An Approach of Risk Analysis and The Potential Effects of The Occurrence of 2019-Ncov Coronavirus in Romania

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Abstract

From the perspectives of early warning and identification of risk, risk quantification and analysis, also as risk management, we propose recommendation, which include analysis of behavior citizen in panic, cooperation of the institutions in Romania. The 2019-nCoV coronavirus epidemic started in China's Wuhan city, which has spread throughout the country and subsequently, in a very short period of time, in several states, being viewed as a global contagion effect that causes great concern. As the virus gets closer to Romania, it becomes worrying and citizens are already panicking. Therefore, in this article we will analyze, according to public data, what is the current situation and how well Romania is prepared to manage the risks arising from the confirmation of COVID-19 in the country and how the behavior of citizens in a state of panic is influenced.

Keywords: Coronavirus, 2019-Ncov, Risk Management, Viable System Model, Romania;

Introduction

Mankind is nowadays situated at one of its thousands of key points which have left their footprint within history (either pandemics or wars, among other events resulting in mass deaths). This time, every grain of power on a global scale is focused on the occurrence of the novel coronavirus in Wuhan. Time and time again, there have been performed tests on the hypotheses assuming an influenza-related virus (even the 1918 Spanish flu), SARS coronavirus (Severe Acute Respiratory Syndrome) or MERS (Middle East Respiratory Syndrome) and the avian flu. Within one month from the occurrence of the first infection, the structure of the new strain has been discovered and named Wuhan or Coronavirus 2019-nCoV, after the city where it first made its mark. According to experts, respiratory disease in Wuhan is caused by a new type of coronavirus remotely related to SARS coronavirus (SARS-CoV). Aggressive human-to-human transmission has led to a large number of coronavirus infections leading to the deaths of over 1000 people in several countries. According to official World Health Organizations figures, there were 2,918 deaths out of a total of 81,109 confirmed cases worldwide. The majority were registered in China (2,718 out of 78,191). These figures indicate a mortality rate slightly above 3%.

In this paper we set out to analyze the first economic and social effects of the risk arising from the SARS-CoV- 2 viruses in Romania. We consider that the greatest impact on society in Romania is public panic, lack of medical
supplies, insufficient hospital beds and lack of medical staff. Through this research, we believe that we will contribute to the Romanian literature on the topic of risk management in the context of Coronavirus.

The work is structured on 3 important sections. The first section presents the most important problems that may arise in Romania after the pandemic has been confirmed. The second section presents the medical system in Romania and addresses the emergency department within a hospital from a cyber perspective. We propose a new approach to the viable system model **[1]** within the emergency department to build a clear picture of potential issues regarding the management of patients arriving at the emergency room. The main problem is how to manage waiting time when selecting patients according to the severity of the case. In addition, we also conducted a brief analysis on the situation of beds in hospitals in Romania compared to Italy, a country strongly affected by this pandemic. In the last section we discuss the risks generated by the pandemic in Romania and propose some solutions to reduce their impact throughout the society.

The specialized literature in this field was not very extensive. In view of the situation and urgency of this pandemic, the international academic community is looking for different possibilities to accelerate the development of the disease detection and the identification of an appropriate treatment. More and more academic and research organizations and institutions propose different solutions to help the above objective. For example, the Wellcome Trust collected over 100 signatures to provide access to a database of disease research findings. Thus, journals such as Springer, Taylor and Francis, Elsevier or the British Medical Journal provide important data and research in this area. **[2,3]**

The work paper deals with the incipient aspects of the appearance of Coronavirus in Romania. Due to the rapid advancement of the pandemic and research in the field will be faster, so that specialized literature will change daily.

Main Problems

The risk management of this potential occurrence of Coronavirus in Romania could poses many problems. The major potential impacts on society in Romania could be: public panic, lack of medical supplies and food, insufficient beds and medical staff. A confirmation of the coronavirus epidemic of the Romanian population could also have an impact on the functioning of economic units, such as banks.

The spread of the virus in as many countries in Europe close to Romania and confirmation of the occurrence of coronavirus in Italy has already caused panic among the population. Access to the Internet, to social networks such as Facebook and inter-national news, makes it easy to increase panic and the appearance of chaos in the behavior of citizens. With panic, the economic issues will become even larger in the short term. On an emotional basis, consumption may also rise, but only artificially. This could also lead to a penury in goods, which relies on popular perception of a certain danger. Among the causes, there could be miscommunication, media hype and individual subject knowledge. For example, because of the fear that this form of virus will be confirmed in Romania, people have started to buy as much food as flour, pasta, water, oil, gourd and canned food to prepare with supplies. Thus, a chaos has already been created that does nothing more than amplify the panic even more.

Figure 1: Photography of a supermarket in Romania
Source:https://www.mediafax.ro/social/cozi-in-supermarketurile-din-tara-romanii-si-au-facut-provizii-de-teama-coronavirusului-foto-si-video-18890921

Fear of a coronavirus epidemic in Romania has made it difficult for citizens to storm supermarkets to make food supplies and other necessary things in case isolation becomes necessary. Because of the fear of the coronavirus, and the locals from Borşa, Maramures County, they emptied the shelves of supermarkets. Some of them think about what's worse and make supplies for a few weeks. Others send packages for relatives established in Italy or another affected country. The panic created is self-stimulated by many news stories, some documented and others less documented. Another event that contributes to this behavior of Romanian citizens is also due to the fact that Italy is part of countries infected with coronavirus. A 71-year-old Italian citizen was in Romania on February 18-22, and now, having returned to the Italian town of Cattolica, he has been confirmed to be infected with this virus. This event together with the entry of Italy on the list of infected countries, generated another shock of fear in the population of Romania. **[4,5]**

The head of the Supervisory Board of the National Bank of Romania said that the situation may become worrying for the Romanian banks if they do not provide a working scenario in case of unforeseen events, such as coronavirus, regarding the continuity of the business. From an economic point of view, in the context of investors fearing that the epidemic with the new coronavirus will slow down the economy, European and Asian stock markets have been on a downward trend. The panic created among the citizens leads to as many purchases regarding non-perishable foods, hygiene and protection materials. People need to be aware that this exaggerated fear can lead to a lack of food and hygiene materials, and this is a potential danger to life, health and basic survival. The population must be rational at these times regarding the choices and decisions they make.

The Medical System in Romania

A difficult question, but relevant as it may be, is whether the medical system in Romania is ready for a possible coronavirus pandemic. Do the medical units in Romania have enough beds for an emergency patient boom? Do they have enough medical staff? Do the hospitals in Romania have an emergency system within a hospital that is ready to make an appropriate and timely triage on a large volume of patients coming to the emergency for fear of a possible coronavirus infection?

In the following, we will describe from the perspective of a viable system how an emergency room is organized within a hospital in Romania and how the triage is performed. In addition, we will analyze the situation of available beds in Romania compared to Italy. In addition, we will analyze the situation of available beds in Romania compared to Italy. According to some researchers that this virus has the

characteristics of a pneumonia, we will analyze how many deaths were in Romania due to this disease compared to Italy before the possible occurrence of this virus.

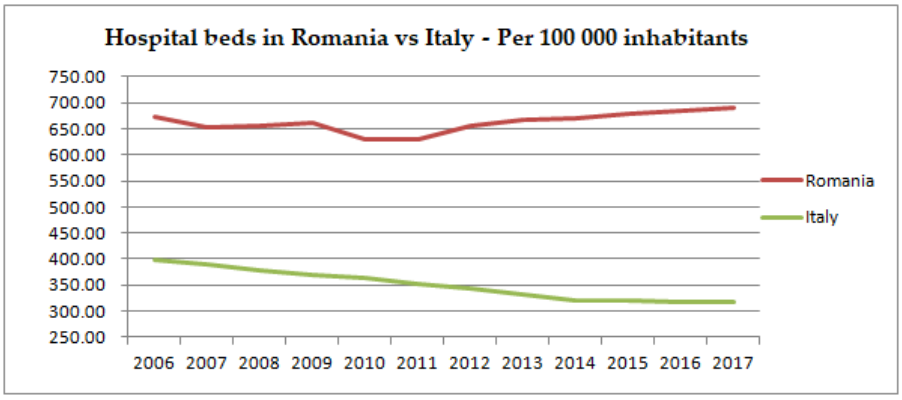

Figure 2: Hospital available beds in Romania compared to Italy

Source: Authors computation based on data available at 26.02.2020
https://ec.europa.eu/eurostat/tgm/table.do?tab=table&plugin=1&language=en&pcode=tps00046

According to the Eurostat, hospital beds provide information on health care capacities, i.e. on the maximum number of patients who can be treated by hospitals. Total hospital beds are all hospital beds which are regularly maintained and staffed and immediately available for the care of admitted patients; both occupied and unoccupied beds are covered. Hospitals are defined according to the classification of health care providers of the System of Health Accounts (SHA).

Table 1: The data of available beds

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Romania	674.13	653.87	656.92	662.01	628.49	631.03	659.60	667.31	671.15	679.12	683.99	689.21
Italy	399.30	390.64	379.10	369.34	364.35	351.73	342.16	331.17	321.09	319.55	317.21	318.07

Source: Author computation based on data available at 26.02.2020
https://ec.europa.eu/eurostat/tgm/table.do?tab=table&plugin=1&language=en&pcode=tps00046

Table 2 : The data of the death due to pneumonia

Year	2011	2012	2013	2014	2015	2016
Romania	30.75	34.75	31.8	32.56	38.45	36.45
Italy	13.01	13.91	13.24	12.89	15.98	14.35

Source: Authors computation based on data available at 26.02.2020
https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tps00128&plugin=1

According to the Eurostat, death rate of a population adjusted to a standard age distribution. As most causes of death vary significantly with people's age and sex, the use of standardized death rates improves comparability over time and between countries, as they aim at measuring death rates independently of different age structures of populations. The standardized death rates used here are calculated on the basis of a standard European population (defined by the World Health Organization). **[6,7]**

Although there are more beds in Romania than in Italy, the lack of beds and medical staff in the number of patients is already a known problem in Romania. In addition, as shown in Table 2, in Romania there is a higher death rate from pneumonia than in Italy, so from this point of view we can say that there is a possibility that the human body is not prepared for coronavirus. In addition, many Romanian citizens

rush to the hospital after experiencing cold symptoms or fever because of the fear of viral infection. The lack of beds and medical staff could be an important risk factor. According to the data updated so far, there are 380 confirmed cases and 12 people dead in the European Union (plus Great Britain, Iceland, Norway and Liechtenstein, Switzerland). The map presented by European Center of Disease Prevention and Control (ECDC) is updated in real time.

From the ECDC's point of view, things are as follows: At this point, the best way to reduce the spread of the virus is to quickly identify and test suspicious cases and to identify and monitor the people they came in contact with. In the past, systematic implementation of infection prevention and control measures has been effective, both for SARS-CoV (severe acute respiratory syndrome) and MERS-CoV ("Middle East respiratory syndrome", published in 2013 in Saudi Arabia).

An approach to the Viable System Model in the Emergency Medical System

The association between the mathematic and cybernetic models in order to modelling behaviour of subsystems. Associating mathematical and cybernetic systems, modelling the behaviour on subsystems can lead to the apparition of discrepancies between decision results adopted according with the delivered solutions and the existing expectations between the members of human society. Even though differences are present, the obtained results can be used in order to improve regulatory processes in order for the medical system to use an optimal allocation combination of resources and guarantee the satisfaction of all agents of human society. **[1,8]**

National protocol for the triage of patients in emergency hospitals structures from 25.03.2019 is based on ESI (Emergency Severity Index) triage scale, from 1 to 5, in order to facilitate the priority based on state of emergency. The second goal of this type of triage, by asking who should be seen first, beside taking into consideration what resources are required for the patients, but also sending them to the right place at the right time. Triage is done in a specially arranged area, having specific lay outs depending on the available space. Two parameters are taken into account, the moment when the patient entered in the facility and is seen by triage assistant and the moment when the patient is receiving the first medial consultation in the treatment areas.

The character of the limited resources regarding the emergency medical personnel requires the diagnosis of the emergency system for an optimal allocation of these resources. Thus, an approach to the Viable System Model (VSM) may highlight certain factors that would influence the viability of the entire emergency system.

Starting from the cybernetic conception of Norbert Winer, McCulloch and Ross Ashsby, Stafford Beer created the viable system model as a systemic tool for observing collective behavior at large systems. VSM allows a qualitative evaluation of the strategies used to operate with the complexity inherent in cybernetic systems, so that useful tools can be made in the organizational diagnosis but also in establishing optimal decisions. VSM is a means of observing the structural context in which different people engaged in an organization, enterprise or economic system evolve, showing how they interact and how to solve certain problems. Viable systems are capable of having a separate, autonomous existence, compared to other components of the enterprise. Stafford Beer, the parent of managerial cybernetics, laid the fundamental foundations of the viable system model starting from the way the human system works, considering it structured into different relatively autonomous systems, but capable of coordinating and working together to ensure the well-being of the whole organism. Thus, he defined 5 systems that form the basic structure of VSM. Starting from these theories, I will describe the viable system of the emergency admissions department within the Hospital of Bucharest.

Moreover, I will consider the 5 triage rooms to be the 5 basic systems of a viable system at this medical institution. The 5 codes associated with the triage are described in section 4 and represented in the diagram below.

System 1: includes everything intended to ensure the functioning of the entire system. In the case of my study, system 1 associates it with level 1 of the triage, the red code, in which the medical

intervention on the patient is immediate and does not allow waiting queues. A very large number of patients at this level, in a very short period of time, leads to a large allocation of existing staff.

System 2: In some situations, patients may arrive in the emergency room with a major risk of intervention. Thus, from the number of resources allocated to system 1, they can also be allocated here for medical interventions in case of need. Therefore, a conflict of resources is created. Resolving these conflicts is the task of system 2, providing stability to the model. At the level of this system, there must be already assigned personnel to do the correct sorting and to place them in yellow code corresponding to the level 2 of the sorting, and only if it is the major emergency in which the resuscitation is required to be allocated to system 1.

In case of following the investigations at system level 2 or if the patient associated with code 1 does not die and it is found that multiple personnel will be needed and that vital functions are affected, the emergency room associated with level 3 is allocated, green code. Thus, system 3 has the role of supervisor for system 1, optimizing the interactions, seeking to make an efficient allocation of personnel. This increase of efficiency in the functioning of a system is called synergy. This is a process by which the result of the functioning of the elements of system 1 (medical resources) together leads to greater results.

The patient who has stable vital functions and needs a single medical resource is included in the triage code 4, the blue code. Thus, in system 4 we will place the patients in this level of triage, after they have become stable, but still have to be monitored. System 4 will evaluate threats, opportunities and elaborate different reports on changes in vital signs. So, this system produces plans to ensure long-term viability.

The system 5 associated with the level 5 triage, white code, has the role to ensure that all patients included here improve their health quickly, without going to other interventions and worsening the health condition. System 5 must maintain its balance and function in a certain context without losing its cohesion.

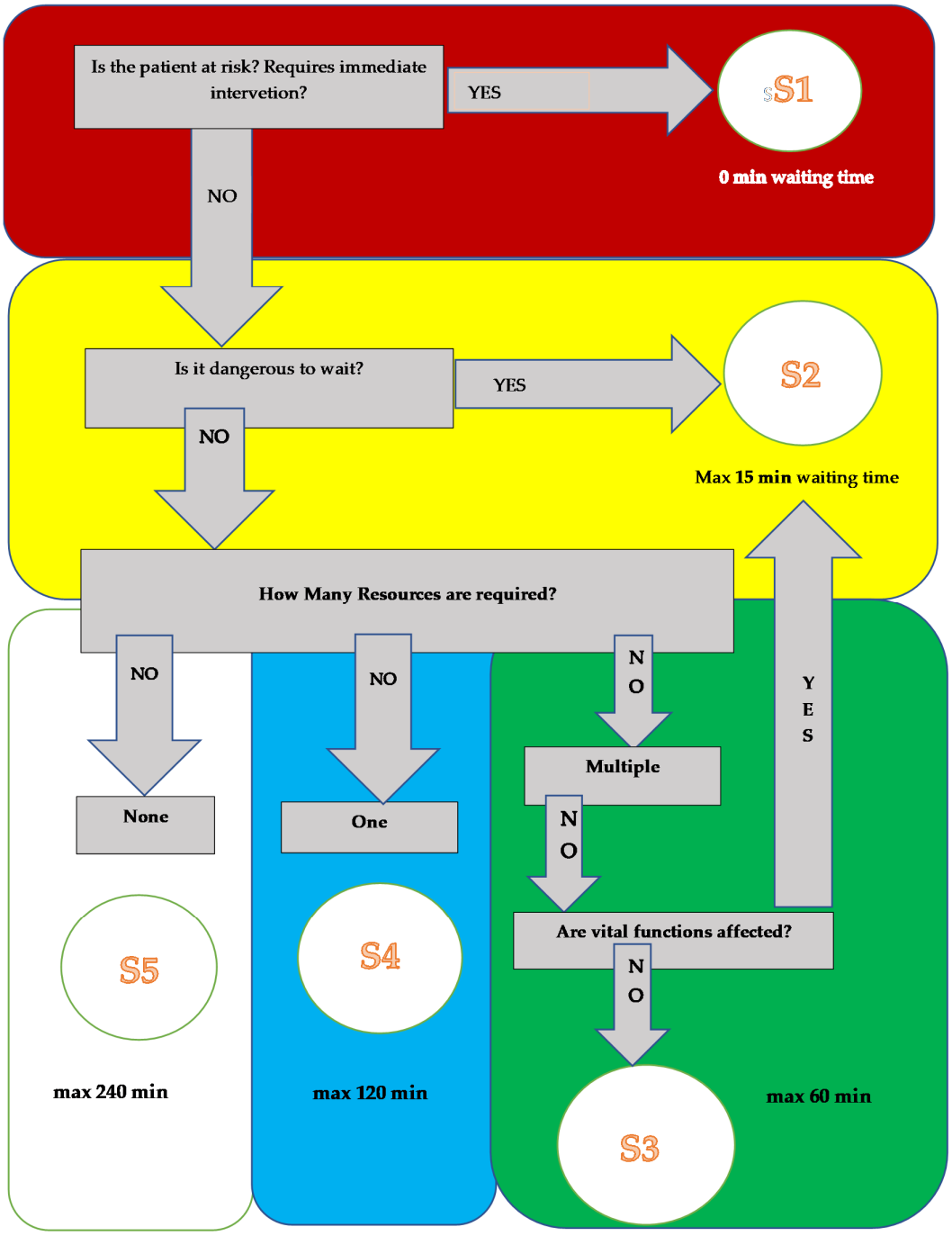

Figure 3: Viable System Model of the Emergency System Room. The diagram describes the VSM of an ideal emergency system

Source: Authors computation

Risk Management, Discussion and Recommendations

Most EU Member States have developed risk assessment methodologies, adopted in national law and already operational. These developments are taking place in the context where, starting with 2010, in order to improve the capacity of the Member States to respond through measures of prevention, preparation and intervention to the identified risks, the European Commission has initiated a process of creating a unique methodological framework for risk assessment. to enable the development of common European strategies and policies, based on comparable results at EU level. A common European framework aims at better management and distribution of resources, with the aim of preventing and managing effectively and efficiently the negative effects of disasters and other risks at European Union level. Several epidemics and pandemics that have emerged in recent centuries have their origin in China. In 1781-1782, a flu virus killed many people in China and other countries. The Asian crisis that broke out in 1957 killed over 1 million people. Then followed SARS, in 2002, and bird flu, in 2013. **[9,10,11]**

An important measurement for the prevention and control of the epidemic could be the analysis of the possible risks and their monitoring. Risk monitoring combined with knowledge based on the analysis of larger amounts of data and certain information, combined with artificial intelligence and data science could be a factor that would contribute to improving the reason and behavior of citizens. Due to the high rate of spread of an epidemic, a small amount of data is used and little research is needed to make quick decisions so that the spread of the contagion is prevented. From the point of view of risk management, several parties must be involved, as follows: medical resource, political departments, emergency departments, patient, coronavirus suspected patient, research institutions, citizen, media and inter-national community. They must create a complex network of interactions so that the best decisions are made. When it comes to a contagious disease, many people face panic. We recommend the use of medical personnel specialized in psychology and not only to intervene to promote an optimistic psychology.

Another important player that could help increase citizens' optimism is the government itself, or even the president. For example, it is to be appreciated that the president of Romania discusses with the citizens through press conferences and transmits that the level of mobilization remains high but calls for calm and correct information. All citizens must understand that it is the responsibility of each individual, not just the institutions, to cooperate, to fully respect the directions and advice of the authorities, in order to have a successful strategy in preventing and combating coronavirus infections.

Another recommendation is to continue to publish in a transparent and correct way the reports on citizens who were suspected of the virus but the test came out negative. The media should focus on such news, not on hyperbolizing fake and unrealistic news. To avoid limiting existing resources, authorities should impose in the case of a coronavirus infection, but perhaps before that, a department that will determine for each household the optimal consumption and their needs to accurately provide information regarding medicines, protective masks and food. Another recommendation is to equip several hospitals with the necessary equipment for testing people regarding the transmission and occurrence of this virus because at present there are only a few units throughout the country and every minute is precious in these conditions**.[12,13]**

In Romania, there was a great debate about how the authorities prepared to take security measures at airports in the case of passengers, Romanians and foreigners, who came from Italy, the European country most affected by coronavirus and where many live. Romanian. The question is what specific measures should the Romanian authorities take at airports in order to avoid contact between suspected / infected persons coming from Italy (for example) and other persons? It is up to the Member States to decide what measures to take and ECDC has no power over their decisions. Member States have different approaches to quarantine and the measures to be taken to prevent the spread of the virus, including for returnees or returning from an epicenter of infection. The control measures to be taken to minimize the subsequent transmission of the virus are based on the available information regarding the magnitude of this outbreak and the rate at which it spreads.

Unfortunately, just at the moment of designing this article, the first case of a citizen infected with COVID-19 was confirmed on the Romanian territory **[5]**. The Secretary of State and the Minister of Health officially declared the first case of a patient infected with coronavirus. The Secretary of State stated that the patient was in good condition, had no fever, cough, had no symptoms. Because he is positive, he will be transferred to the hospital and hospitalized. A crew from ISU Dolj, with a special insulated truck, are already departing from Craiova to take the person from their home and transport them to "Matei Balș" Hospital, from Bucharest. Under these conditions, the first and most critical step is restoring people's confidence because many people are and will be psychologically affected. So far, Romania has proven that it still has the situation under control, the state institutions act quickly and preventively every potential and existing case.

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Conclusions

In the next research, we will analyze how the behavior of citizens will change considering that the existence of this virus in a patient has been confirmed right now. We will see how the press and state institutions will react to this topic. In addition, we will analyze what will be the impact on industry, companies, banks and, implicitly, in the country's economy.

In this paper we analyzed how the installation of the Coronavirus pandemic would affect Romania from an economic, social and risk management point of view. It is clear that the deficiencies of the medical system together with the panic created by the media creates a negative effect on the way people react to the situation. The key points of such an event is calm and rational thinking. From an economic point of view, we expect the impact to be a negative one, because the pandemic is set up globally. Stock markets will be affected, industries will cease activity and lay off employees.

The economic behavior will be influenced by the behavior of all citizens, organizations and businesses and the decisions taken by each actor involved in the economic system. **[14]**

All of these will create an ideal framework, unfortunately, for the installation of a possible economic crisis. It all depends on how the pandemic will worsen or improve. Installing it in a country and its longer life span will have devastating effects both on the economic level and on human lives.

Taking preventive measures before confirming the coronavirus to a citizen of Romania, we can say that the institutions were prepared for this occurrence. We will see how things will evolve in the next paper. The state will evolve in a positive sense only by making rational decisions, increasing the optimism of the citizens and respecting the strict rules regarding the treatment of this pandemic.

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Data Mining Techniques in The Analysis of The Casual Factors Regarding Innovation in The Private Sector at The Level of Europe

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Abstract

The rapid pace of growth of data quantities and the need to make sense of the information chaos have made it possible to introduce a new concept that encompasses these two aspects. Living in a world where we can identify a wealth of data and information, the data mining technique is a useful tool for analyzing a large data set. In this article we have analyzed a data set in order to allow the observation of how innovation has different causal factors in the private sector. The analysis was carried out in several countries in Europe. The first step of the analysis was data processing and descriptive statistics. The next step was to analyze the main components to reduce the dimensionality of the analyzed data set. The third step of the analysis is the cluster technique in order to classify the variables into classes so as to ensure a minimum variability within the class and a maximum variability between classes. The last part of the analysis proposed in this article was the use of classification trees to see what characteristics influence an individual's decision to become an entrepreneur.

Keywords: Data Mining, Private Sector, R Studio, Opinion Influence, Big Data

Introduction

The present work was elaborated to apply the reduction of the dimensionality of a certain data set in order to allow the observation of the way in which the innovation in the private sector, at the level of Europe (by country), has different causal factors (direct or indirect) that allow it to grow and develop, or otherwise, to decrease. These can be: the share of the population with higher education, the share of foreign doctoral students, the share of companies that have high-speed internet access, public or private expenses with research, the share of companies offering training or innovating, the number of publications resulting from public sector collaboration and private, private sector investments in research and higher education.

The rapid pace of growth of data quantities and the need to make sense of the information chaos have made it possible to introduce a new concept that encompasses these two aspects. This is Big Data, the concept that refers to the exponential growth of structured and unstructured data.

Methodology

Big Data is any collection of datasets that are so big and complex that can no longer be processed using traditional means. Forrester analysts described the Big Data phenomenon as "the ability of a company to store, process and analyze all the data needed to function efficiently, make informed decisions, reduce risks and serve the needs of customers."

In 2001, analyst Doug Laney gave a definition of the concept of Big Data that included the three V's:

- volume (if in 2000, a regular computer would have 10 GB of storage space, now Facebook generates 500 terabytes of new data daily, a Boeing 737 generates 240 terabytes during a secure flight over the United States, etc.)
- velocity (user behavior can be reflected by accessing advertisements, various sites, and this happens quickly; online game systems host millions of competing users, each producing a lot of data every second);
- variety (Big Data does not only refer to numbers, character strings, login data, but also includes audio and video data, unstructured data from social media sites, 3D data, the latter making databases and traditional analytics tools to be unprepared; traditional databases were designed to operate on a single server, thus being expensive and finite as capacity in the Big Data context).

SAS specialists added two other dimensions, namely variability and complexity. The first term refers to the inconsistency of the data, and the second refers to the existence of multiple sources of data that make their correlation necessary. Thus, Big Data refers to any complex set of unstructured data, which can no longer be managed with the help of traditional databases, the difficulties of storing, analyzing, manipulating data, viewing and sharing.

The term Big Data is first mentioned in August 1999, when Steve Bryson at al. published the article "Visually exploring gigabyte data sets in real time" in "Communications of the ACM". One of the chapters of the paper is called "Big Data for scientific visualization"[**Error! Reference source not found.**].

In October 2003, Peter Lyman at al. of the Berkeley University publish the paper "How much information?". It tries to quantify the total of new and original information created annually in the world and kept in physical format (books, magazines, etc.), on DVDs and CDs or on magnetic disks. It is found that in 1999 around 1.5 exabytes of unique information were produced worldwide, that is to say about 250 megabytes produced by one person. [7]

R is software that works on the basis of a programming language, providing a variety of statistical analysis and data mining techniques. The popularity of this software has increased lately, due to the variety of facilities it offers in terms of analysis techniques. Thus, R encompasses linear and nonlinear models, classical statistical tests, time series analysis techniques, classification methods, clustering and so on. Through the packages that add functions to the program, the facilities are constantly increased.

Results and Discussions

The study of dimensionality reduction is based on a sample from 2017 consisting of indicators from 28 countries:

	A	B	C	D	E	F	G	H	I	J	K	L
1	cod	Country	I112	I123	I131	I211	I221	I223	I312	I322	I323	I333
2	BE	Belgium	45.7	41.80401558	23	0.74	1.73	34	45.1444	82.8389	0.07867	2.76273
3	BG	Bulgaria	32.8	6.281481481	10	0.21	0.57	8	14.7502	3.63444	0.01684	6.97138
4	CZ	Czech Rep	32.6	14.75876658	10	0.64	1.03	22	25.737	21.9825	0.02996	2.61842
5	DK	Denmark	45.3	33.40376295	31	0.97	1.89	28	39.9838	186.43	0.02666	8.02711
6	DE	Germany	30.5	9.123343527	12	0.94	2	29	49.0903	65.3235	0.11625	6.21725
7	EE	Estonia	41.2	11.96611366	12	0.61	0.66	13	15.034	15.1982	0.03587	3.80452
8	IE	Ireland	53.5	28.43691149	15	0.35	0.83	30	52.5187	41.047	0.00958	0.98145
9	ES	Spain	41	15.48320989	20	0.55	0.64	23	25.5234	23.1481	0.03362	3.0094
10	FR	France	44	40.0527643	9	0.78	1.43	20	41.6205	43.7731	0.03566	2.9104
11	HR	Croatia	32.8	3.927779538	6	0.46	0.38	22	30.8386	16.7038	0.03349	0.84326
12	IT	Italy	25.6	14.16213919	5	0.5	0.75	12	34.5953	24.5609	0.01188	6.4071
13	CY	Cyprus	56.2	14.3081761	3	0.27	0.17	22	31.1097	17.682	0.00153	3.19336
14	LV	Latvia	42.1	11.38528139	22	0.33	0.11	12	18.9673	0.50788	0.05174	1.77142
15	LT	Lithuania	54.9	4.603580563	21	0.55	0.3	10	24.0038	3.46193	0.09041	1.45858
16	LU	Luxembou	51.5	86.99472759	21	0.6	0.64	29	54.3491	39.9133	0.00729	12.6792
17	HU	Hungary	30.4	11.63457599	12	0.29	0.89	16	15.2232	33.9759	0.02917	0.92793
18	MT	Malta	34	54	12	0.23	0.39	23	30.7782	2.22017	0.00227	20.2664
19	NL	Netherlan	45.2	40.10094972	22	0.87	1.16	22	32.51	106.896	0.08277	3.64967
20	AT	Austria	39.7	28.262164	12	0.87	2.2	37	46.0554	84.9379	0.04638	7.06213
21	PL	Poland	43.5	1.957060472	11	0.32	0.63	12	11.3859	6.05786	0.01846	5.99264
22	PT	Portugal	35	25.63483736	25	0.64	0.61	23	37.8069	15.8587	0.0124	4.43033
23	RO	Romania	24.8	3.779271968	13	0.21	0.27	5	8.84043	4.85822	0.0328	0.81329
24	SI	Slovenia	43	9.652509653	16	0.49	1.51	27	33.1914	52.3208	0.04942	2.98634
25	SK	Slovakia	33.4	9.127990299	9	0.39	0.4	20	22.4371	9.58304	0.03669	1.09644
26	FI	Finland	40.7	21.14508117	26	0.91	1.81	34	37.264	92.7595	0.04686	4.43962

Figure 1: The table of the indicators from 28 countries

In the figure below, you can see, in detail, the name of each indicator considered in the paper:

	A	B
1	Indicator	Name
2	I112	Share of population with higher education (group 25 -34 years)
3	I123	The share of foreign doctoral students
4	I131	The share of companies that have high speed internet access
5	I211	Public expenditure on Research % GDP
6	I221	Private expenditure on research development
7	I223	Share of companies offering trainig (IT Competencies)
8	I312	Share of companies that have innovated (non-technological innovation)
9	I322	Number of publications resulting from public-private collaboration
10	I323	Private sector investments in research and higher education
11	I333	The number of designs (aesthetic appearance of a product) registered

Figure 2: Descriptions of the name of each indicator

In order to perform the analysis of the chosen data set, by applying the dimensionality reduction, the R Studio software was used. The first step in the analysis represented the creation of descriptive statistics. Thus, in the figure below, you can see the correlations between the data presented. As the blue increases in intensity, the stronger the correlation between the indicators. The empty squares in the figure

represent that the probability is greater than 0.05, that is there is a statistically insignificant coefficient between certain indicators. For example, the indicator I112 (weight of the population with higher education) has very strong correlations with all the indicators in the data set:

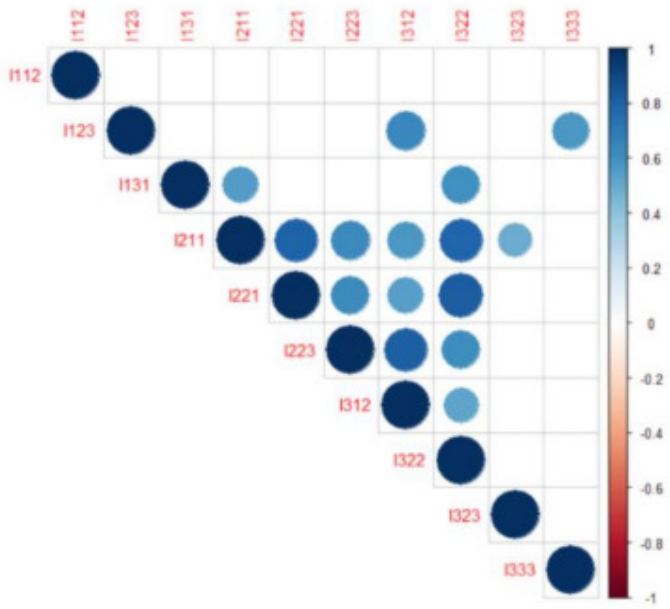

Figure 3: The correlation matrix between the indicators

In the correlation matrix of the figure below, we can say that there is a strong direct (positive) correlation between I211 (Public expenditure on Research% GDP) and I221 (Private expenditure on research development) of 0.80 and a strong correlation in the sense directly (positive) between I223 (Share of training companies) and I312 (Share of innovating companies) of 0.81. Further in the analysis, the correlation matrix was created using the chart. Correlation () function in the Performance Analytics package that allows the correlation chart type to be made.

The values above the main diagonal, in the figure below, represent the values of the correlation coefficients, and the stars represent the significance levels (three stars → significant correlation coefficient, with an associated probability of 0%, two stars → less significant correlation coefficient, a star → very low correlation coefficient). In the figure below, you can see the histograms related to the analyzed indicators, those inclined to the left (related to I123, I131, I211, I221, I322, I323, I333) have the most extreme values to the right, and the indicator I312 has a distribution inclined to the right, with several extreme values to the left. Last but not least, indicator I112 has a distribution close to the normal one.

The graphs below the main diagonal, in the figure below, represent scatter plots detailing the relationship between two quantitative variables. For example, the first scatter plot represents the relationship between indicator I112 (weight of population with higher education) and indicator I123 (weight of foreign doctoral students). Analyzing each scatter plot, we observe a general tendency of growth, more precisely the association between variables is positive. Also, you can see that there are countries (represented by circles) that are positioned above the average or very low, below the average. These countries represent the tools of the dataset.

The Correlation Matrix Chart graph also shows the intensity of the connections between the analyzed variables, so we can see in the 6th scatter plot a very strong connection (the dependency line is drawn

at a distance of about 45 degrees) between the indicator I131 (the share of companies that have high-speed Internet access) and I211 (public spending with% GDP research).

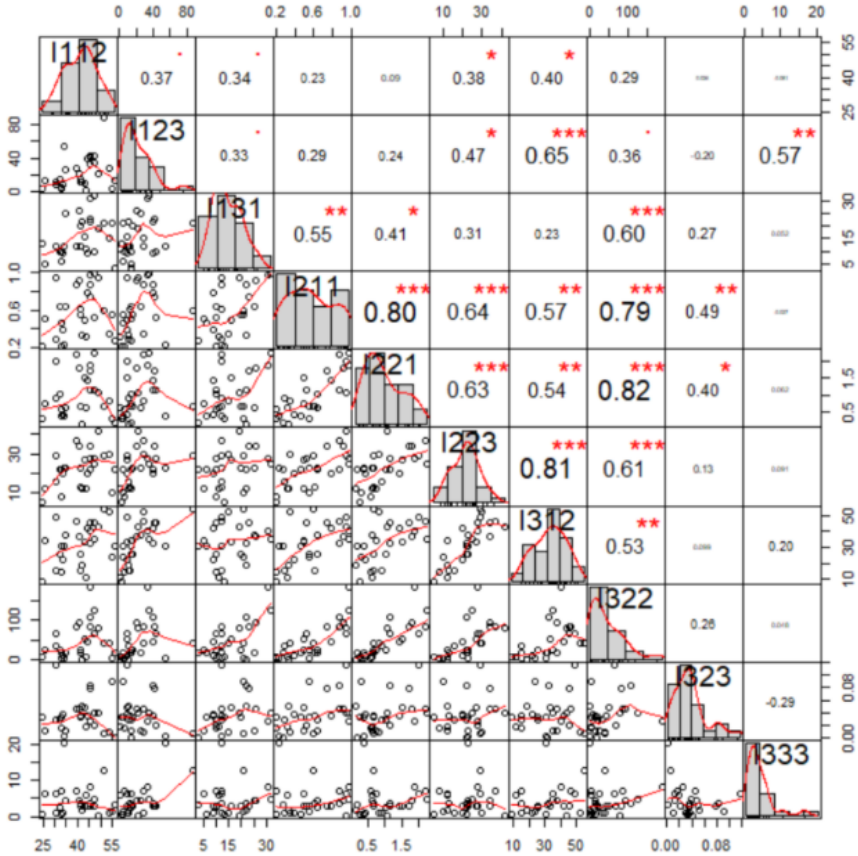

Figure 4: The correlation matrix chart

The second step in the analysis was represented by the analysis of the main components, because following the analysis of the correlation above, it was found that there is informational overlap. We will use the princomp () function to reduce dimensionality by approaching spectral decomposition.

Next, the eigenvalues of the correlation matrix were determined:

```
eigen() decomposition
$values
 [1] 4.5672943 1.8969684 1.0709738 0.9001628 0.5860366 0.3303287 0.2486787 0.1628657 0.1248762 0.1118149

$vectors
            [,1]        [,2]        [,3]        [,4]        [,5]        [,6]        [,7]        [,8]        [,9]       [,10]
 [1,] -0.2083605  0.13874573  0.778534294  0.110871894  0.122077712  0.52661728 -0.100837196  0.07024968  0.04562437 -0.09753892
 [2,] -0.2700002  0.51305446  0.006282385  0.135969494  0.214314983 -0.21364192  0.568916639 -0.11853011 -0.40100780 -0.23505591
 [3,] -0.2922331 -0.10310216  0.122977702  0.722314502 -0.109434822 -0.46437530 -0.250673589 -0.12433800  0.23201329 -0.08579201
 [4,] -0.4083575 -0.22472796 -0.124222040  0.006720359  0.003151212 -0.02167898  0.121451577  0.86351886 -0.04224717 -0.06771389
 [5,] -0.3860233 -0.19361196 -0.319923234 -0.109016952 -0.185336817  0.35461335  0.052443956 -0.31436583  0.21605676 -0.62522615
 [6,] -0.3858829  0.09746159  0.074011359 -0.408580828 -0.090425658 -0.25126638 -0.603906708 -0.09077635 -0.47235295 -0.04250973
 [7,] -0.3715200  0.22535099  0.079002820 -0.418872544  0.185471392 -0.25331837  0.117956382 -0.07252354  0.66287351  0.26897894
 [8,] -0.4076737 -0.11683742 -0.099357751  0.138850994 -0.388056762  0.28570891  0.216967289 -0.21911715 -0.19833971  0.65142627
 [9,] -0.1564888 -0.51906156 -0.057742189  0.040323865  0.782844987  0.03503573 -0.002676385 -0.21741955 -0.15749291  0.12235183
[10,] -0.0699748  0.52492735 -0.485812854  0.268800126  0.294651852  0.35355943 -0.400160752  0.11082130  0.09030170  0.13747289
```

Figure 5: Output of the eigenvalues of the correlation matrix

Then, we calculated the number of the main components that will have lambda greater than 1, complying with Kaiser's Criterion and observed the presence of three main components in the chosen data set, following the analysis of the variances representing the square elevation of the standard deviations of each main component.

```
> comp_principale
Call:
princomp(x = c2, cor = TRUE, scores = TRUE)

Standard deviations:
   Comp.1    Comp.2    Comp.3    Comp.4    Comp.5    Comp.6    Comp.7    Comp.8    Comp.9   Comp.10
2.1371229 1.3773048 1.0348787 0.9487691 0.7655302 0.5747423 0.4986770 0.4035662 0.3533782 0.3343873

 10  variables and  28 observations.
```

Figure 6: Output of the princomp () function

In the figure above, following the application of the princomp () function, the standard deviations of the main components were displayed, which shows the percentages of information taken by each new component created. It is also observed that the first three main components take the highest percentage of information from the data set.

Using the summary () function, the simple proportions and cumulative variance ratios of the main components resulted in R. This confirms that we will keep in the analysis, only the first three main components, the standard deviation of the first component is 2.1371229, of the second 1.3773048, and of the third 1.0348787, exceeding the value 1, according to the criterion. to Kaiser. It is also found that the first main component retained in the analysis accounts for 45.6% of the total information, the second holds only 18.9% of the total information, and the third holds only 10.7% of the total information.

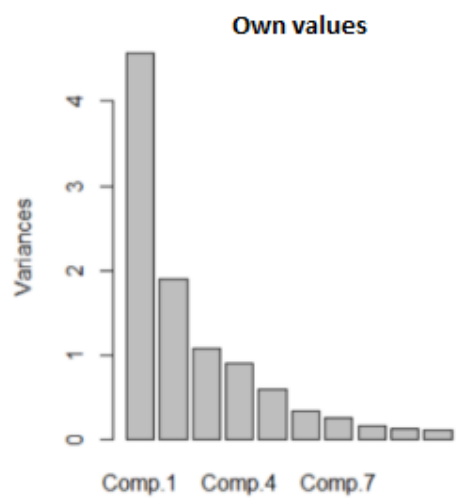

Figure 7: The variances of the main component

In the figure above, we can see graphically the three main components (Comp1., Comp.4 and Comp.7) that we will keep in the analysis, results based on the calculated values.

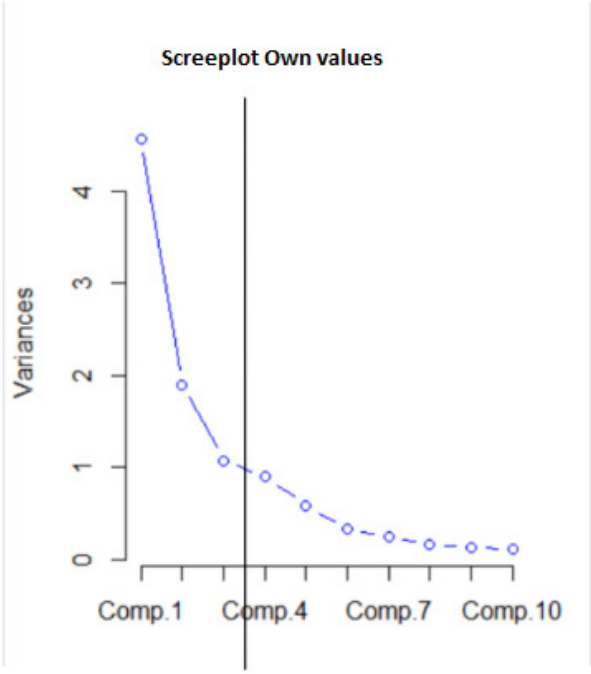

Figure 8: The screeplot of the main component

In order to determine the optimal number of main components that we should keep in the analysis, a line-type screeplot was developed. In the figure above, it is observed how the eigenvalues decrease, thus, the first variance passes to the value 4 (variance = 4.5672943), the second variance decreases to the value of approximately 2 (variance = 1.8969684), and the third component decreases to about 1 (variance = 1.0709738). Then, the slope changes and the values reach below 1, becoming insignificant in the analysis. Therefore, we will only analyze the first three main components in the analysis.

```
> coef

Loadings:
     Comp.1 Comp.2 Comp.3 Comp.4 Comp.5 Comp.6 Comp.7 Comp.8 Comp.9 Comp.10
I112 -0.208  0.139  0.779  0.111  0.122  0.527  0.101
I123 -0.270  0.513         0.136  0.214 -0.214 -0.569 -0.119 -0.401 -0.235
I131 -0.292 -0.103  0.123  0.722 -0.109 -0.464  0.251 -0.124  0.232
I211 -0.408 -0.225 -0.124                       -0.121  0.864
I221 -0.386 -0.194 -0.320 -0.109 -0.185  0.355        -0.314  0.216 -0.625
I223 -0.386               -0.409        -0.251  0.604        -0.472
I312 -0.372  0.225        -0.419  0.185 -0.253 -0.118         0.663  0.269
I322 -0.408 -0.117         0.139 -0.388  0.286 -0.217 -0.219 -0.198  0.651
I323 -0.156 -0.519               0.783               -0.217 -0.157  0.122
I333         0.525 -0.486  0.269  0.295  0.354  0.400  0.111         0.137

               Comp.1 Comp.2 Comp.3 Comp.4 Comp.5 Comp.6 Comp.7 Comp.8 Comp.9 Comp.10
SS loadings       1.0    1.0    1.0    1.0    1.0    1.0    1.0    1.0    1.0     1.0
Proportion Var    0.1    0.1    0.1    0.1    0.1    0.1    0.1    0.1    0.1     0.1
Cumulative Var    0.1    0.2    0.3    0.4    0.5    0.6    0.7    0.8    0.9     1.0
```

Figure 9: Output of the eigenvectors of the correlation matrix

In the figure above, one can observe the eigenvectors of the correlation matrix, more precisely the coefficients that are used in the construction of the main components.

```
> n<-cbind(c2, scoruri[,1:3])
> n
   I112      I123 I131 I211 I221 I223     I312        I322        I323      I333     Comp.1       Comp.2      Comp.3
1  45.7 41.804016   23 0.74 1.73   34 45.14440  82.8388567 0.078673975 2.7627327 -2.85102525 -0.634401855  0.31555726
2  32.8  6.281481   10 0.21 0.57    8 14.75016   3.6344402 0.016844894 6.9713815  3.11553737  0.302859053 -0.84768711
3  32.6 14.758767   10 0.64 1.03   22 25.73695  21.9825139 0.029960268 2.6184228  0.91129942 -0.506187354 -0.67563558
4  45.3 33.403763   31 0.97 1.89   28 39.98384 186.4295087 0.026662337 8.0271073 -3.83711507  0.013355223 -0.61955460
5  30.5  9.123344   12 0.94 2.00   29 49.09030  65.3234599 0.116249337 6.2172544 -2.08120593 -2.114371067 -1.98770172
6  41.2 11.966114   12 0.61 0.66   13 15.03398  15.1982151 0.035869824 3.8045195  1.65225901 -0.563160922  0.07336375
7  53.5 28.436911   15 0.35 0.83   30 52.51866  41.0470293 0.009575487 0.9814522 -0.57620391  1.171237046  2.02066548
8  41.0 15.483210   20 0.55 0.64   23 25.52341  23.1480988 0.033621318 3.0093984  0.61260192 -0.301440313  0.45848727
9  44.0 40.052764    9 0.78 1.43   20 41.62046  43.7731181 0.035655392 2.9104048 -0.79788350  0.277565466  0.08517536
10 32.8  3.927780    6 0.46 0.38   22 30.83859  16.7037769 0.033493860 0.8432611  1.81874555 -0.575280387 -0.05840775
11 25.6 14.162139    5 0.50 0.75   12 34.59531  24.5608912 0.011883829 6.4070989  1.87353267  0.524473734 -1.63864697
12 56.2 14.308176    3 0.27 0.17   22 31.10969  17.6820276 0.001530849 3.1933631  1.77410970  1.295891684  2.04821900
13 42.1 11.385281   22 0.33 0.11   12 18.96729   0.5078831 0.051741130 1.7714152  2.04582124 -0.751750762  0.99735289
14 54.9  4.603581   21 0.55 0.30   10 24.00380   3.4619350 0.090407165 1.4585808  1.08038145 -1.696791031  1.91892702
15 51.5 86.994728   21 0.60 0.64   29 54.34913  39.9133014 0.007286728 12.6791691 -2.08833915  4.078023623  0.54335941
16 30.4 11.634576   12 0.29 0.89   16 15.22325  33.9759432 0.029166999 0.9279319  2.08387865 -0.788589525 -0.54258579
17 34.0 54.000000   12 0.23 0.39   23 30.77816   2.2201747 0.002272594 20.2664417  1.13896332  4.097365638 -1.93057235
18 45.2 40.100950   22 0.87 1.16   22 32.50998 106.8959993 0.082767928 3.6496701 -2.00370535 -1.004548159  0.12978037
19 39.7 28.262164   12 0.87 2.20   37 46.05537  84.9379304 0.046379458 7.0621259 -2.63850921  0.006670333 -1.14524581
20 43.5  1.957060   11 0.32 0.63   12 11.38587   6.0578590 0.018459829 5.9926396  2.57059357  0.048408344  0.19102465
21 35.0 25.634837   25 0.64 0.61   23 37.80689  15.8586952 0.012396282 4.4303347  0.09168293  0.573626089 -0.06939830
22 24.8  3.779272   13 0.21 0.27    5  8.84043   4.8582224 0.032797101 0.8132872  3.72357883 -1.091332178 -0.75141307
23 43.0  9.652510   16 0.49 1.51   27 33.19138  52.3208157 0.049420034 2.9863413 -0.39525147 -0.791944558  0.14729716
24 33.4  9.127990    9 0.39 0.40   20 22.43714   9.5830418 0.036685072 1.0964387  2.09246283 -0.590783406 -0.01809398
25 40.7 21.145081   26 0.91 1.81   34 37.26398  92.7595098 0.046861256 4.4396204 -2.57170901 -0.840813744 -0.43290548
26 47.3 34.686098   32 0.98 2.26   25 35.10149 126.1798655 0.039532064 4.7113810 -3.37370109 -0.692396449 -0.16344944
27 47.2 42.949468   10 0.52 1.13   28 45.44738  67.2197642 0.020905360 3.0511216 -0.94315492  1.119532029  0.73258699
28 49.2 21.600103   19 0.95 1.08   42 43.25129  79.7854232 0.040209756 0.3950196 -2.42764460 -0.565216553  1.21950136
```

Figure 10: Output of the values of the components corresponding to each of the 29 countries

We can see, from the table above, the values of the components corresponding to each of the 28 countries, as well as the values of the indicators. For example, the value of component 1 for Germany (6th country in the dataset) is 1.65225901.

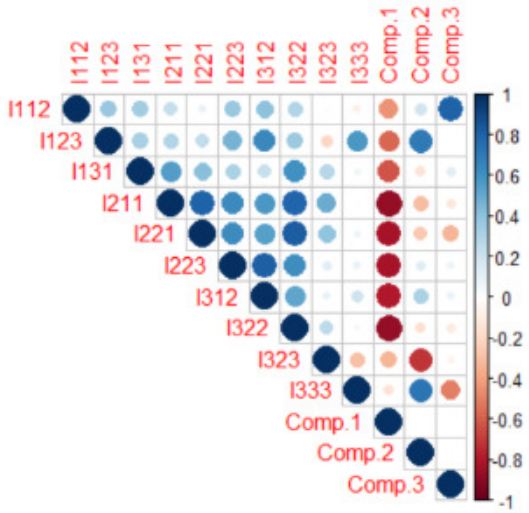

Figure 11: Correlation matrix

```
> matrice_corelatie<-rcorr(as.matrix(n))
> matrice_corelatie
        I112  I123  I131  I211  I221  I223  I312  I322  I323  I333 Comp.1 Comp.2 Comp.3
I112    1.00  0.37  0.34  0.23  0.09  0.38  0.40  0.29  0.03 -0.08  -0.45   0.19   0.81
I123    0.37  1.00  0.33  0.29  0.24  0.47  0.65  0.36 -0.20  0.57  -0.58   0.71   0.01
I131    0.34  0.33  1.00  0.55  0.41  0.31  0.23  0.60  0.27  0.05  -0.62  -0.14   0.13
I211    0.23  0.29  0.55  1.00  0.80  0.64  0.57  0.79  0.49 -0.03  -0.87  -0.31  -0.13
I221    0.09  0.24  0.41  0.80  1.00  0.63  0.54  0.82  0.40  0.06  -0.82  -0.27  -0.33
I223    0.38  0.47  0.31  0.64  0.63  1.00  0.81  0.61  0.13  0.09  -0.82   0.13   0.08
I312    0.40  0.65  0.23  0.57  0.54  0.81  1.00  0.53  0.10  0.20  -0.79   0.31   0.08
I322    0.29  0.36  0.60  0.79  0.82  0.61  0.53  1.00  0.26  0.05  -0.87  -0.16  -0.10
I323    0.03 -0.20  0.27  0.49  0.40  0.13  0.10  0.26  1.00 -0.29  -0.33  -0.71  -0.06
I333   -0.08  0.57  0.05 -0.03  0.06  0.09  0.20  0.05 -0.29  1.00  -0.15   0.72  -0.50
Comp.1 -0.45 -0.58 -0.62 -0.87 -0.82 -0.82 -0.79 -0.87 -0.33 -0.15   1.00   0.00   0.00
Comp.2  0.19  0.71 -0.14 -0.31 -0.27  0.13  0.31 -0.16 -0.71  0.72   0.00   1.00   0.00
Comp.3  0.81  0.01  0.13 -0.13 -0.33  0.08  0.08 -0.10 -0.06 -0.50   0.00   0.00   1.00

n= 28


P
       I112   I123   I131   I211   I221   I223   I312   I322   I323   I333   Comp.1 Comp.2 Comp.3
I112          0.0502 0.0730 0.2383 0.6476 0.0489 0.0334 0.1289 0.8970 0.6835 0.0176 0.3300 0.0000
I123   0.0502        0.0906 0.1328 0.2130 0.0119 0.0002 0.0568 0.2994 0.0015 0.0013 0.0000 0.9738
I131   0.0730 0.0906        0.0022 0.0290 0.1077 0.2442 0.0007 0.1610 0.7912 0.0004 0.4710 0.5187
I211   0.2383 0.1328 0.0022        0.0000 0.0003 0.0014 0.0000 0.0079 0.8915 0.0000 0.1090 0.5144
I221   0.6476 0.2130 0.0290 0.0000        0.0004 0.0030 0.0000 0.0351 0.7540 0.0000 0.1702 0.0853
I223   0.0489 0.0119 0.1077 0.0003 0.0004        0.0000 0.0005 0.5151 0.6469 0.0000 0.4959 0.6985
I312   0.0334 0.0002 0.2442 0.0014 0.0030 0.0000        0.0040 0.6168 0.3034 0.0000 0.1080 0.6792
I322   0.1289 0.0568 0.0007 0.0000 0.0000 0.0005 0.0040        0.1758 0.8090 0.0000 0.4133 0.6026
I323   0.8970 0.2994 0.1610 0.0079 0.0351 0.5151 0.6168 0.1758        0.1325 0.0820 0.0000 0.7626
I333   0.6835 0.0015 0.7912 0.8915 0.7540 0.6469 0.3034 0.8090 0.1325        0.4475 0.0000 0.0064
Comp.1 0.0176 0.0013 0.0004 0.0000 0.0000 0.0000 0.0000 0.0000 0.0820 0.4475        1.0000 1.0000
Comp.2 0.3300 0.0000 0.4710 0.1090 0.1702 0.4959 0.1080 0.4133 0.0000 0.0000 1.0000        1.0000
Comp.3 0.0000 0.9738 0.5187 0.5144 0.0853 0.6985 0.6792 0.6026 0.7626 0.0064 1.0000 1.0000
```

Figure 12: Output from R software

In the two figures above, we observe the correlation matrix between the main components and each indicator chosen in the analysis. Thus, Comp.3 presents a strong correlation of 0.81 with the indicator I112 (weight of the population with higher education), but in general the informational redundancy has decreased, as a very weak correlation

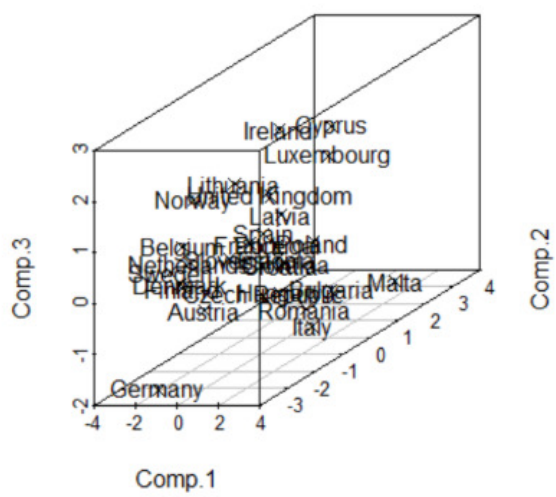

Figure 13: The three dimensional graph

In the three-dimensional graph resulting in R Studio, using the Scatterplot3d () command, you can see the 3 main components and the countries considered in the analysis. Thus, countries such as Finland, Belgium, Denmark, the Netherlands are grouped, more precisely, they are similar in information from the perspective of the 3 main components represented. Germany and Malta represent the outliers, and the majority of countries are grouped above the average of the third main component, with positive values predominating, with Germany, Austria, Romania and Italy below average.

The third step of the study was to perform a cluster analysis. First, the distances between countries were calculated using the Euclidean distance as a calculation method.

```
> d<-dist(scoruri[,1:3],method="euclidean")
> d
          1         2         3         4         5         6         7         8         9        10        11        12        13
2  6.1507288
3  3.8928125 2.3543200
4  1.5054556 6.9624157 4.7770817
5  2.8439291 5.8436954 3.6418211 3.0793283
6  4.5103550 1.9337810 1.0551147 5.5628890 4.5379515
7  3.3678685 4.7550479 3.5066306 4.3525847 5.3969676 3.4301847
8  3.4825286 2.8872054 1.1905361 4.5892539 4.0653609 1.1391684 2.4540657
9  2.2583514 4.0231499 2.0284004 3.1310350 3.4154204 2.5903974 2.1433415 1.5697384
10 4.6850939 1.7537844 1.0996374 5.7140298 4.6152570 0.2126696 3.6205872 1.3405041 2.7558501
11 5.2424569 1.4890622 1.7074970 5.8233400 4.7671059 2.0403166 4.4508516 2.5826445 3.1888856 1.9260365
12 5.3028316 3.3424264 3.3780637 6.3441122 6.5407956 2.7149544 2.3537782 2.5353139 3.3920020 2.8180052 3.7680169
13 4.9454749 2.3792156 2.0362543 6.1488793 5.2725362 1.0218676 3.4088219 1.5960179 3.1588315 1.0942284 2.9337566 2.3175389
14 4.3766910 3.9742438 2.8596994 5.7922587 5.0429908 2.2401484 3.3136401 2.0733320 3.2846016 2.3901507 4.2684234 3.0747561 1.6353819
15 4.7791775 6.5777815 5.6123766 4.5751629 6.6896990 5.9794284 3.5942168 5.1460655 4.0396399 6.1057901 5.7519820 4.9923313 6.3737048
16 5.0113331 1.5325360 1.2134230 5.9755507 4.6036927 0.7851799 4.1817719 1.8450249 3.1361320 0.5917979 1.7232906 3.3396539 1.5408493
17 6.5844309 4.4133622 4.7769653 6.5695711 6.9970298 5.0989940 5.2073321 5.0333047 4.7334435 5.0794414 3.6592853 4.9073871 5.7366425
18 0.9431184 5.3732115 3.0650141 2.2268860 2.3919539 3.6829446 3.2167139 2.7290058 1.7606281 3.8510799 4.5274958 4.8212360 4.1491269
19 1.6093732 5.7693432 3.6172777 1.3088361 2.3492840 4.4967109 3.9537720 3.6382160 2.2305209 4.6246085 4.5683790 5.5974561 5.2066192
20 5.4658658 1.2002629 1.9524173 6.4588697 5.5734820 1.1095943 3.8092866 2.0069035 3.3779217 1.0082061 2.0150013 2.3748204 1.2513216
21 3.2042243 3.1341257 1.4850225 4.0064984 3.9530574 1.9359916 2.2741104 1.1470663 0.9501965 2.0743317 2.3748570 2.7993804 2.5909918
22 6.6762736 1.5240578 2.8735087 7.6421079 6.0225032 2.2911978 5.5939048 3.4301553 4.7976434 2.0916395 2.6116438 4.1637972 2.4471143
23 2.4665677 3.8097542 1.5703346 3.6170422 3.0248098 2.0615788 2.7196203 1.1632722 1.1444751 2.2340637 3.1733161 3.5607151 2.5851588
24 4.9549268 1.5916982 1.3544979 5.9905452 4.8600602 0.4504519 3.7924976 1.5814036 3.0197345 0.2771041 1.9793739 2.8161216 1.0291833
25 0.8251181 5.8159094 3.5074550 1.5380816 2.0687999 4.2632506 3.7483862 3.3504240 2.1600085 4.4143910 4.8039563 5.4412893 4.8347861
26 0.7113373 6.6006765 4.3195182 0.9596196 2.6496135 5.0331955 4.0086754 4.0534262 2.7635985 5.1948294 5.5848405 5.9451428 5.5427617
27 2.6249128 4.4313885 2.8399041 3.3803727 4.3764438 3.1626262 1.3403256 2.1247759 1.0719857 3.3355893 3.7296882 3.0241556 3.5363511
28 1.0005762 5.9794389 3.8397364 2.3881958 3.5785543 4.2378354 2.6617603 3.1451263 2.1571041 4.4345216 5.2779317 4.6696077 4.4828609
          14        15        16        17        18        19        20        21        22        23        24        25        26
```

Figure 14: The Euclidian methods

It can be seen from the graph of Euclidean distances above that the distance between Germany (6) and Belgium (2) is 4.51. The Euclidean distance was calculated by taking into account the main scores.

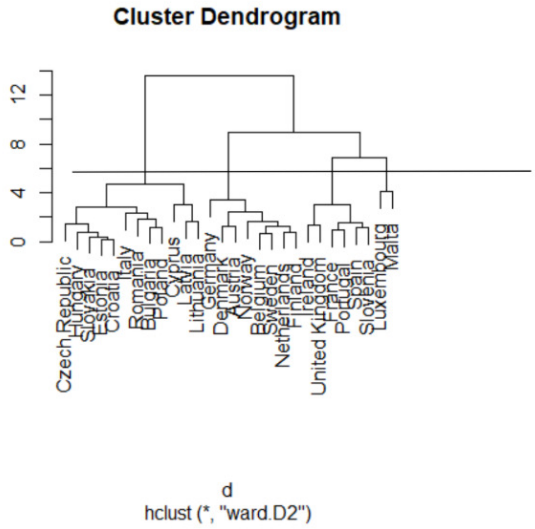

Figure 15: Ward method

In the figure above, the WARD distance was calculated, which is based on minimizing the increase in the sum of the squares of errors, after the groups are merged into one. By making a cut in the figure above, at the level of about 6, 3 clusters are obtained. The first cluster is made up of countries such as the Czech Republic, Hungary, Slovakia, Estonia, Croatia, Romania, Bulgaria, Poland, Cyprus, Lithuania.

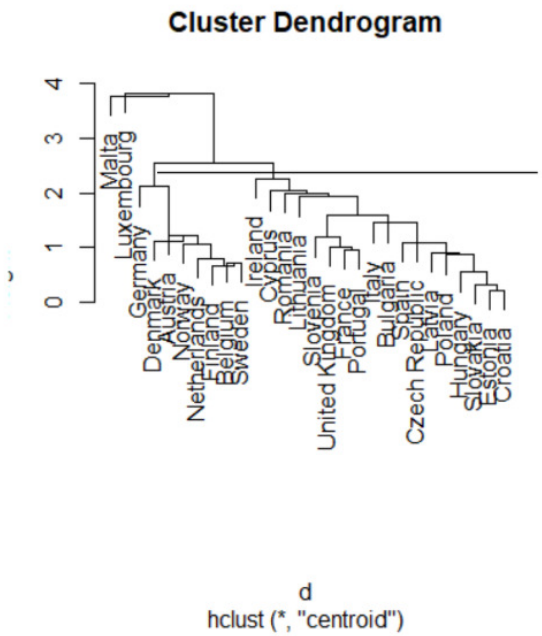

Figure 16: Centroid method

Using the centroid method, the Euclidean distances between the arithmetic averages of the components of the elements in the three groups were calculated, using the centroid of the clusters. After plotting a cut in the dendrogram, the distribution of the analyzed countries is observed in three clusters. Luxembourg and Malta are part of the first cluster, while the second cluster is made up of countries such as Germany, Denmark, Austria, Norway, the Netherlands, Finland, Belgium and Switzerland.

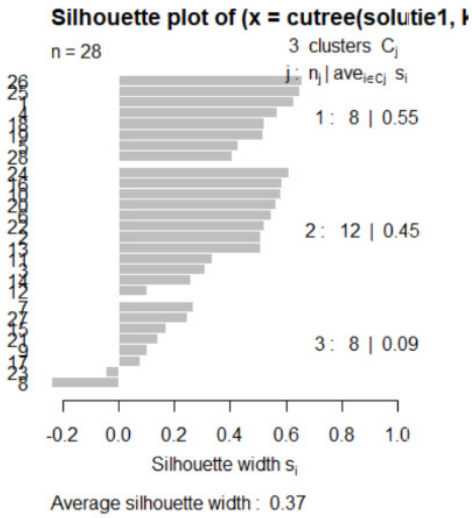

Figure 17: Silhouette plot for the Ward method

Analyzing the figure above, realized by the function silhouette (), for the Ward method, it can be observed that the highest average is in the case of the division of the countries into 3 classes. Most countries correctly distributed (the value of the silhouette coefficient approaching more than 1) are also in the case of the division into 3 classes, but two countries will remain correctly distributed, with the coefficient of silhouette less than 0.

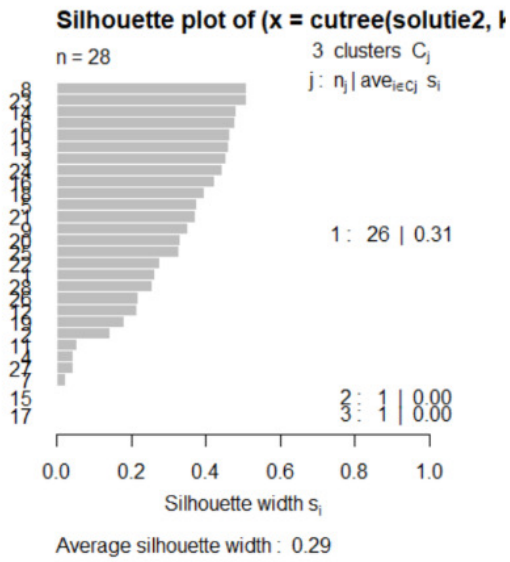

Figure 18: Silhouette plot for the Centroid method

Analyzing the figure above, realized by the function silhouette (), for the Centroid method, it can be observed that with the increase of the number of clusters, the coefficient of silhouette decreases, but it still remains positive, therefore, the countries are distributed correctly. Therefore, the division of countries into 3 clusters is recommended.

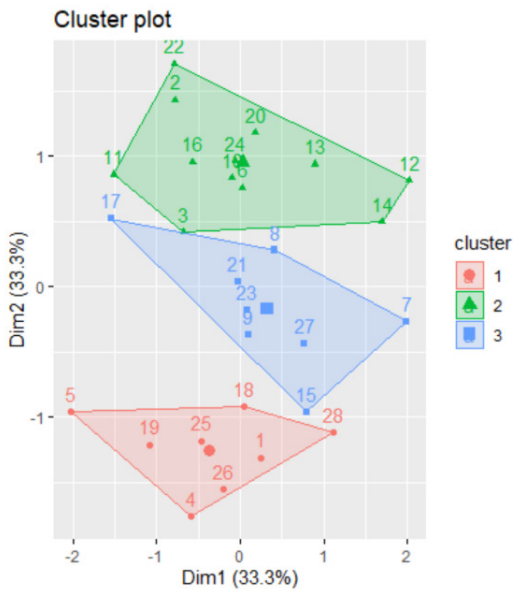

Figure 19: Cluster plot

From the figure above, realized in R Studio, it is observed even more clearly, the 3 clusters and the countries that form them, represented by numbers. Also, the border countries, such as: 12 (Italy), 7 (Estonia), 5 (Denmark), have small silhouette coefficients.

The use of classification trees in the analysis of the decision to become an entrepreneur

The purpose of the analysis is to see what are the characteristics that influence a person's decision to become an entrepreneur. The data set used has been downloaded from www.gemconsoltum.com and is presented as follows:

	setid	country	ctryalp	cat_gcr1	cat_gcr2	yrsurv	id	weight	weight_l	weight_a	gemwork	gemwork3
1	1150900027	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900027	0.7576617	NA	0.7576617	Full: full or part time (includes self-employment)	Work:F-T, I
2	1150900066	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900066	0.6778038	0.6740203	0.6778038	Part time only	Work:F-T, I
3	1150900086	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900086	0.6778038	0.6740203	0.6778038	Part time only	Work:F-T, I
4	1150900090	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900090	0.7486202	NA	0.7486202	Retired, disabled	Retired st
5	1150900096	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900096	0.8189806	0.8144091	0.8189806	Full: full or part time (includes self-employment)	Work:F-T, I
6	1150900115	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900115	1.2968244	1.2895856	1.2968244	Full: full or part time (includes self-employment)	Work:F-T, I
7	1150900145	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900145	0.9689959	0.9635870	0.9689959	Retired, disabled	Retired st
8	1150900163	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900163	1.0234998	1.0177866	1.0234998	Full: full or part time (includes self-employment)	Work:F-T, I
9	1150900194	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900194	0.9464582	0.9411751	0.9464582	Retired, disabled	Retired st
10	1150900224	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900224	1.0330074	1.0272411	1.0330074	Full: full or part time (includes self-employment)	Work:F-T, I
11	1150900306	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900306	1.2004057	1.1937050	1.2004057	Retired, disabled	Retired st
12	1150900312	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900312	1.0234998	1.0177866	1.0234998	Full: full or part time (includes self-employment)	Work:F-T, I
13	1150900314	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900314	1.2845408	1.2773705	1.2845408	Full: full or part time (includes self-employment)	Work:F-T, I
14	1150900356	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900356	1.2845408	1.2773705	1.2845408	Full: full or part time (includes self-employment)	Work:F-T, I
15	1150900360	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900360	1.0502063	NA	1.0502063	Retired, disabled	Retired st
16	1150900362	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900362	0.6778038	0.6740203	0.6778038	Full: full or part time (includes self-employment)	Work:F-T, I
17	1150900367	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900367	1.2845408	1.2773705	1.2845408	Retired, disabled	Retired st
18	1150900395	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900395	1.2845408	1.2773705	1.2845408	Retired, disabled	Retired st
19	1150900413	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900413	1.2971960	NA	1.2971960	Retired, disabled	Retired st
20	1150900470	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900470	0.8025263	0.7980466	0.8025263	Full: full or part time (includes self-employment)	Work:F-T, I
21	1150900498	United States	United States	Stage 3: innovation driven	Stage 3: innovation driven	2015	900498	1.1307355	1.1244237	1.1307355	Full: full or part time (includes self-employment)	Work:F-T, I

Figure 20: The table of the data set

From the total of 230 countries we chose for analysis the country of Germany because it has a higher number of records (3842), which will help us to obtain a greater accuracy of the results. For the analysis I will consider the following variables:

• bstart - represents the variable y by which an individual wants or does not want to open a business; depending on the following features;
• suskill - represents a variable by which the individual thinks he or she has competencies entrepreneurs to open the business;
• fearfail - represents the variable that registers the fear of failure, which prevents it individual to open a business;
• gender - represents the gender variable;
• gemwork3 - represents the occupational status and already has three levels;
• gemhhinc - represents the income category;
• knowent - binary variable - which indicates that the individual has acquaintances friends who have opened a business;
• gemeduc - a variable that represents the level of education of the individual;

From the total of 3842, following the data cleaning process, the following division was obtained:

```
> germany<-na.omit(germany)
> table(germany$bstart)

  No   Yes
2647   192
```

Figure 21: Output of R

Thus, at present we have a total of 2839 registrations, of which 2647 consider that they do not want to open a business, while 192 individuals want to open a business.

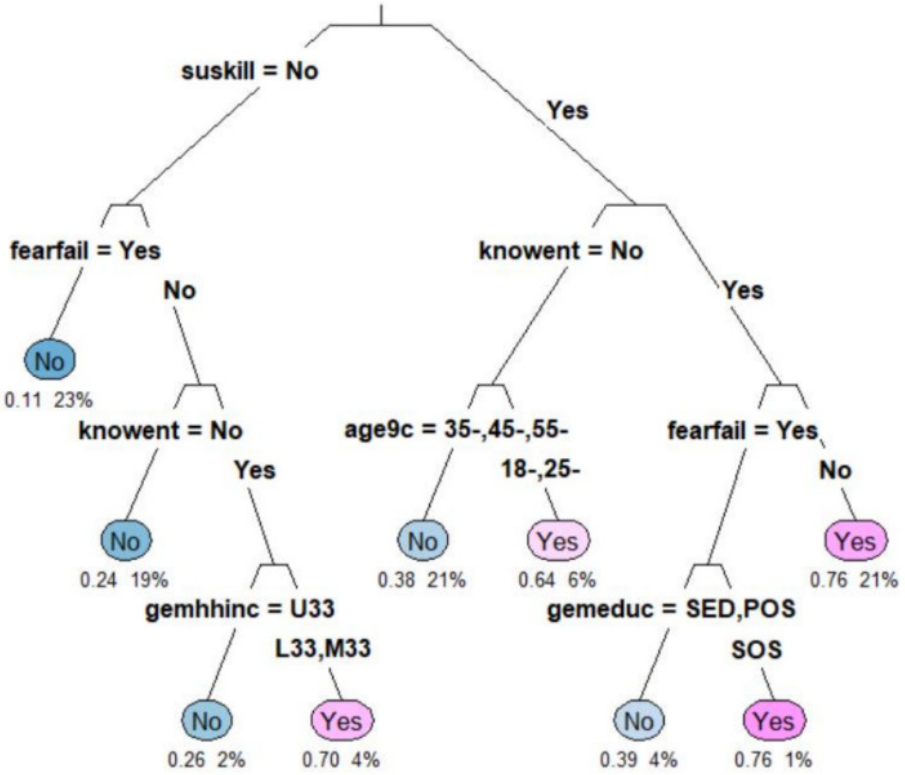

Figure 22: The classification tree

On each branch we see the variable used and the level it takes ("Yes" / "No"). Only the leaf nodes are labeled, and for "type" = 3 on each branch of the tree we see the variable used and the level it takes. For the numerical information it is observed that we used "extra" = 106 and the probability of class 2 ie the class "yes", that is the weight of the observations from the total sample from the initial node to the root node. It started from 0.11 as a probability of the "no" class, meaning a proportion of 23% of the respondents said they were not afraid of failure. The first variable used was "suskill" whereby the individual believes about having entrepreneurial skills to open the business. It is noticeable that on the left branch we have "No", ie only those who have the answer no have been selected, and the no tag is associated. The tree in the previous figure shows a pale pink leaf which shows us that we have a fairly low probability of 0.64, ie 6% as a risk of misclassification. For respondents who do not know close persons who have a business, it is found that those between 35 and 45 years old do not consider that they can open a business, whereas a percentage of 6% people consider that they can be entrepreneurs in the near future. I applied the "plum" function on the initial tree, using the minimum accepted value of the complexity parameter and obtained a new tree with the variable "suskill" in the first place in importance. Even if the "root" variable is not found on the tree, it appears in the tree with a probability of 60.4%.

The tree below was made using the training set. It is noticeable that we have a probability of 0.98 for individuals who consider that they do not have entrepreneurial skills to open a business.

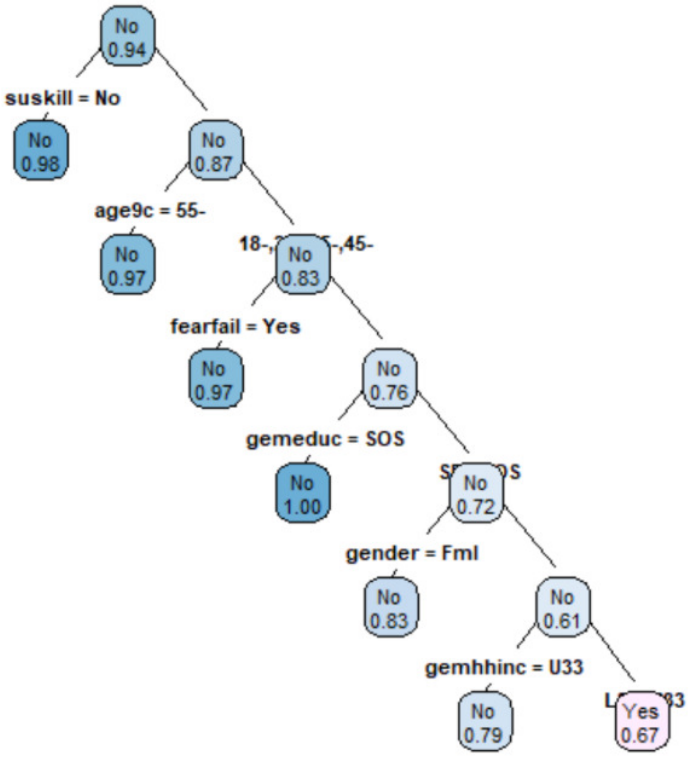

Figure 23: Training set method of the tree

Conclusions

This article demonstrates the usefulness of the analysis and analysis tools applied to the large datasets generated in the process of observing innovation in the private sector in Europe.

In the first part of the analysis I observed that there is a strong correlation between public spending on research and private spending on research and development. A strong positive correlation was also observed between the share of companies offering training and the share of companies that innovated.

From this first analysis, we observe that the more training offered by companies, the more performance of a company increases. An important correlation was also observed between the share of companies that have access to high-speed Internet and public spending on research. For a clearer analysis, the principal components analysis technique and the clustered technique were used to correctly group the countries considered in the analysis from the variable point of view taken into account.

The last part of the analysis was the evaluation of the characteristics that influence a person's decision to become an entrepreneur. The tree classification technique was used. Germany having the most records in the dataset, was the country for which we analyzed the proposed objective.

Future analyzes of this article are aimed at implementing data mining techniques by applying an online questionnaire to several countries in Europe to determine information about the behavior of individuals who want to be entrepreneurs and how to change this behavior at certain changes. For this purpose, correspondent analysis and conjoint analysis will be used.

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Risk Management Process as An Element of Oils Cake Commercialization by A Family Company from The Oil Industry in Poland (Case Study)

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Abstract

The implementation of a new investment is subject to uncertainty in many aspects. Therefore, not only should it be preceded by the analysis of internal and external factors that may affect it but also be based on the principles of risk management. The implementation of a product innovation is one of the undertakings, which are burdened with high risk. It mainly stems from the fact that making the decision about broadening the product portfolio most often aims at increasing the organization's profits. The present paper identifies and assesses risk factors related to the implementation of a new product based on a waste raw material on the food market. At the first stage of the research risk factors were identified through brainstorming within the areas of the organization's context, experience, market observations and professional literature. Next, each risk factor was assessed by the research participants according to the likelihood of occurrence and its potential effects of occurrence. The risk value was obtained through multiplying the abovementioned characteristics by each other. On the basis of the obtained results critical (unacceptable) risks were determined. Consequently, mitigation actions were proposed in reference to the unacceptable risks. These actions should contribute to reducing the importance of the threats to an acceptable level, and, thus, boost the project's chances to succeed.

Keywords: Risk, Risk Assessment, Product Innovation, Risk Assessment in The Food Industry, Oil Production Industry

Introduction

The process of diversifying production should be properly planned and realized in a controllable way. It is important to find an appropriate business reason and develop a strategy for actions, which should precede and shape the planning of operational activities. Success on new markets is accompanied by a high risk of failure; therefore, it is extremely significant to carry out a detailed analysis of all factors of varying impact on actions and to properly manage all major threats (Chauhan et al., 2018). The aim of the present research was to identify and assess the risk of implementing a product innovation in an enterprise from the oil production industry, as well as to plan actions related to unacceptable risks.

Risk Management

It is commonly believed that most actions are taken in the uncertain circumstances of changeability and unpredictability of the organization's context (Korombel, 2017). Moreover, it is also assumed that uncertainty is a type of a concrete risk (DSDM Consortium, 2010). The ISO 31000 standard defines risk as the effect of uncertainty on objectives and emphasizes the role of managing diverse risks (ISO 31000). On the other hand, within agile management risk is understood as an occurrence or a set of uncertain occurrences, which, if materialized, have a negative impact on achieving the planned

objectives. It is also important that risk related to the actions taken by the organization does not only generate threats, but also creates opportunities (Hopkin, 2018). Thus, not only does risk assessment support managerial decisions within mitigating risks but also helps to identify the strengths of the project. It is commonly assumed that risk is a combination of the likelihood of an expected event's occurrence (both negative and positive) and the scale of the potential impact on objectives (Hillson, 2009).

The conception of risk management was initiated by the insurance industry at the turn of 1940s and 1950s and was gradually adapted in other areas of management, which is confirmed by numerous publications from this period (Beck da Silva Etges and Cortimigila, 2019; Cagliano, Grimaldi and Rafele, 2014; Cole,Gine and Vickery, 2017; Hoseini, Hertogh and Bosch-Rekveldt, 2019; Shah, Etienne, Siadat and Vernadat, 2017). The core of risk management is the systematic, punctual and structured decision-making in uncertain circumstances, which consists in the identification of possible threats, as well as taking preventive and corrective actions. Therefore, risk management requires the elasticity of realized actions, adapting to the ongoing changes of structures, processes and knowledge level.

All these measures aim at minimizing negative effects of threats related to the actions taken by the organization (Aven, 2016). Managing risk in a project is commonly divided into six basic stages, including (1) risk management planning, (2) risk identification, (3) quality risk analysis, and (4) quantity risk analysis, (5) planning risk mitigation actions, (6) risk monitoring and controls (Hopkin, 2018; Hoseini, Hertogh and Bosch-Rekveldt, 2019). It is also reflected in the risk management model described in the ISO 31000 standard, which states that risk management should embrace determining the context, risk assessment (risk identification, analysis and evaluation) and risk treatment (ISO 31000). The risk assessment process should result in selecting a specific strategy for risk treatment mainly from the following options:

- avoidance – changing the conception of operation,
- transfer – delegating the realization of certain actions to external entities,
- mitigation – taking proper actions, which aim at reducing negative effects of the materialized risk,
- acceptance – accepting the existing risk and acting in uncertain circumstances (Crispim, Silva and Rego, 2019).

The complex and correct risk management in a project or an organization brings many tangible benefits. The most obvious of them include increasing the likelihood of achieving business objectives, improving the decision-making process, and boosting the efficiency of resource allocation. Consequently, risk management should be reflected in cost reduction, shorter time of implementing changes, bigger sense of control over subsequent stages of the project, and preparedness for the occurrence of potential threats (Aven, 2016; Hillson, 2009).

Risk Management in The Food Industry

The food product market undergoes constant evolutionary changes. Even the best-prepared and realized expense and price strategy stops bringing the expected results due to the decreasing role of price as a determinant of consumers' purchasing decision. Consumers' awareness and knowledge are incessantly growing, which is accompanied by the rising expectations towards food products reflected best in the cyclical consumption trends (GlobalFoodForums®, 2019; Giampietr et al., 2018). The crucial condition of gaining competitive advantage is innovativeness. However, it is mostly evolutionary (and not revolutionary), which means that the food market is full of similar products, differing in flavor, form of sales and packaging. The analysis of specific segments of the food industry seems to indicate that the oil production industry is an area resistant to revolutionary changes. The biggest changes within the production technology and new products in this industry could be witnessed in 1990s and now the room for changes within raw material usage is very limited (Boczor and Błażejczyk-Majka, 2018; Chauhan et al., 2018).

The domestic market of edible oils, especially the cold pressed ones, has shown a growing tendency for the last decade, which has triggered considerable interest of researchers. Relevant studies include the quality evaluation of raw materials and final products, as well as increasingly often of byproducts (OECD/FAO, 2016). During the process of cold pressing a significant amount of pomace, i.e. the remaining part of oily raw materials from which the proper oil has been extracted by means of mechanical methods, is created. Numerous studies indicate that oil production waste is a rich source of nutrients and can be successfully used in other branches of the food industry, e.g. in bakery and confectionary, without any threat to health (Coelho & Salas-Mellado, 2015).

Among the main advantages of the further use of pomace as byproducts we may point out the reduction of post-production waste treatment costs and the potential profit from selling press cakes as pomace flour. Sales of this product relates to entering new segments of the market and attracting new consumer groups. Such projects amount to an opportunity (and sometimes even a necessity) for small, family oil mills balancing on the verge of profitability (Bińczak, 2019).

Adapting production to the needs of the new undertaking does not have to be costly, yet, as any new project, entails some risk of failure. Therefore, it calls for the cluster analysis of all relevant factors and taking account of its results in the process of making managerial decisions.

Market risk in the food industry is mostly analyzed in the context of the assessment of the product's impact on consumers' mood and health. It is common to carry out the analysis of exposure to a given nutrient, its biological, chemical and physical safety, as well as to manage risk in the supply chain, i.e. from harvest to the final consumer's purchase (Wrzosek et al., 2017). The approach to risk in the food industry is regulated by law, including the Regulation (EC) no. 178/2002 of the European Parliament and Council of 28 January 2002, which establishes general principles and requirements of the food law, as well as creates the European Food Safety Authority (EFSA). The regulation also contains food safety procedures related to risk analysis that guarantees the minimization of chemical, physical and biological threats of products (Rozporządzenie 178/2002). However, it should be noted that complex risk management of introducing a new product onto the market has been conspicuously absent in research.

Proper Research

The analysis was focused on a family enterprise from the oil production industry, which operates in the Kujawy-Pomerania Voivodeship and specializes in natural edible oils (a statistical oil company in Poland). The company described is J.A.W Łącz Przetwórstwo Roślin Oleistych-Nasiennictwo Ltd. It is a family company in the oil industry producing natural vegetable oils since 1992. The organization has full control over the production process, from sowing plants to harvesting raw material, oil pressing and distribution. The company specializes in cold pressing of edible oils from flax, hemp, sunflower and rapeseed. In addition, it produces oil cake, deoiled meal and firewood briquettes. It is a member of various organizations for organic, traditional and regional food producers. The amount of oil production is: rapeseed oil about 100,000 l, linseed oil about 20,000 l, sunflower 12,000 l, hemp oil about 2,000 l. Production structure: approx. 34% oil and 66% oil cake (data for 2017). Its offer includes both pressed oils – linseed oil, sunflower oil, hemp oil – and refined rape oil. The oils are sold in containers from 250 ml in the case of pressed oils to 5 l in the case of refined rape and sunflower oils. The average annual production volume reaches 20.000 l of linseed oil, 12.000 l of sunflower oil, and approx. 2.000-4.000 l of hemp seed. The efficiency of production is 30%. So far pomace has been sold to local farmers for approx. 4,70-10,70 PLN (1,10-2,50 EUR), while the price of raw materials was approx. 7,00-25,60 PLN (1,65-6,00 EUR). The average price of the enterprise's products was approx. 34,10 PLN (8,00 EUR) for sunflower oil, approx. 64,00 PLN (15 EUR) for linseed oil, and approx. 170,00 PLN (40 EUR) for hemp oil. The oil mill is not dependent on suppliers – raw materials are mostly obtained from farms belonging to the owners of the mill. Retail sales prevail and are realized through phone orders and the Internet service. The enterprise cooperates with several shops located in the same voivodeship in addition to its own shop.

In light of the growing competition and limited technological capacity not allowing to enlarge the present production volume, the enterprise looks for new forms of activity, including the ones involving the rational use of treating byproducts that cannot be transferred to local farmers and breeders. The enterprise has already made the decision about broadening its product portfolio with pomace flours created in the process of milling press cakes, which are obtained in pressing oils. Moreover, the enterprise plans to continue the strategy of selling products in its online shop.

The aim of the present research was to identify and assess the risk of implementing a product innovation in an enterprise from the oil production industry, as well as to plan actions related to unacceptable risks.

Research Method

The research was carried out in two stages (Table 1). The first stage consisted in brainstorming in the group of 10 persons (top management, relevant employees and the present paper's authors). In this way the risk factors of commercializing a new product based on the oil production industry byproducts were identified. The process was founded on the determined context of the organization, its experience, market observations and relevant professional literature. Next (stage 2), the risks attached to each of the identified factors was estimated with the use of our own methodology prepared in accordance with the ISO 31000 standard. This stage aimed at determining risk gradation, indicating priorities in relation to mitigation actions and opportunities.

Table1: Research characteristics

	Stage I	Stage II
Objective	Risk factor identification	Risk estimation and assessment
Method	Brainstorming	Own methodology of risk estimation based on the ISO 31000:2018 standard
Tool	Survey	Survey

Source: own research

In the present study we calculated risk by multiplying the likelihood of a detected event's occurrence and the size of its impact on realizing the planned objectives (effect) by each other. Due to the fact that the ISO 31000 standard does not define a specific methodology of attaching value to risks, i.e. guidelines for risk criteria and their values, in the present study we used the matrix method for risk estimation with the use of the scale ranging from 1 to 4 (Table 2.).

Table 2: Risk estimation measures

Scale	Likelihood	Effect
1	low (0-30%)	insignificant
2	medium (31-60%)	medium
3	high (61-80%)	significant
4	very high (81-100%)	very significant

Source: own research

Risk levels for specific factors were calculated by multiplying Likelihood and Effect of the occurrence by each other (Table 3).

Table 3: Risk estimation matrix

EFFECT	very significant	4	8	12	16
	significant	3	6	9	12
	medium	2	4	6	8
	insignificant	1	2	3	4
		low	medium	high	very high
		likelihood			

Source: own research

Next, on the basis of the obtained value the risks were classified into one of the four groups – insignificant, acceptable, conditionally acceptable, and unacceptable (Table 4.).

Table 4: Classification of risks according to importance

Range	Risk level
1 - 4	low (insignificant)
5 - 8	medium (acceptable)
9 - 12	high (conditionally acceptable)
13 - 16	very high (unacceptable)

Source: own research

The statistical analysis of the results was carried out with the use of IBM SPPS Statistica. Basic statistical measures, including the average and standard deviation, were calculated.

Research Results

Risk Factor Identification

The basis for identifying main risk factors of expanding production and entering a new market segment was the SWOT analysis, which was used to determine and classify all internal and external factors with impact on the current and future situation of the organization taking account of the organization's market position and its micro- and macrocontext. While defining internal factors the following aspects were considered: groups of resources, i.e. personnel, financial resources, knowledge and infrastructure, sales, customer service, logistics, the applied technology, capacity for development, and business process realization tools.

The first stage resulted in the list of 20 risk factors referring to the market situation, the product's specificity and the enterprise's experience (Table 5).

Risk Estimation

The risk factors defined at the first stage of the research were then subjected to assessment in the context of the likelihood of occurrence and the impact scale. The estimation was carried out within the same team of 10 persons, who identified the factors. The discussed results amount to the average of values given by each research participant (Table 5).

Table 5: Risk factors for the process of implementing a product innovation

No.	Risk factor	Value of risk	Description of risk
Internal			
1.	Lack of experience in production not related to fats	6.0±1.4	acceptable
2.	Lack of technological facilities and expertise	6.0±1.2	acceptable
3.	Lack of financial resources for purchasing new equipment	6.0±1.2	acceptable
4.	Shortage of employees	6.0±1.2	acceptable
5.	Lack of room and proper conditions to store the raw material	6.0±1.3	acceptable
6.	Lack of room and proper conditions to store final products	6.0±1.4	acceptable
7.	Lack of financial resources to carry out the marketing campaign	16.0±0.0	unacceptable
8.	Insufficient profit in relation to the spending	12.0±1.5	conditionally acceptable
External			
9.	Poor recognizability of the brand	4.0±0.1	insignificant
10.	Lack of knowledge of the nutritional value of the raw material	16.0±0.0	unacceptable
11.	Lack of knowledge of the energy value of the raw material	16.0±0.0	unacceptable
12.	Lack of knowledge of the chemical and biological processes occurring in the raw material	16.0±0.0	unacceptable
13.	Lack of knowledge of the product's suitability for consumption	16.0±0.0	unacceptable
14.	Limited access to the raw material (seasonal access)	9.0±1.3	conditionally acceptable
15.	Limited number of consumers	16.0±0.0	unacceptable
16.	Limited demand for the product	9.0±1.9	conditionally acceptable
17.	Consumers' reluctance to waste raw materials	16.0±0.0	unacceptable
18.	Difficulty in selecting the price strategy	6.0±1.3	acceptable
19.	Lack of outlets	6.0±1.2	acceptable
20.	Growing competition	6.0±1.3	acceptable

Source: own research

Respondents displayed large consistency of estimation despite the fact that the assessment was carried out individually. Seven risks were identified as unacceptable, 3 – as conditionally acceptable, 9 – as acceptable, and 1 – as insignificant. The low level of consumers' and food producers' awareness of the nutritional values of pomace flours was considered the most important and dangerous factor for the project's success. The expected effect of it is reluctance to the designed product and the fear of lack of demand that would assure the return of the incurred costs and obtaining income at the assumed level. The factors related to the lack of the enterprise's knowledge and experience were considered important. For example, they included difficulty with estimating the expiry date of the product, the necessity to adjust production and employ new workers, which can be problematic when balancing on the verge of the existing production's profitability. The factors linked with the internal adaption of the enterprise to the new production technology were considered less significant due to the fact that it is relatively simple and the enterprise has some resources, as it sells press meal for fodder.

Mitigation Actions

In professional literature it is hard to find any information on the complex risk estimation in the food industry in the context of commercializing new products. It can stem from the interdisciplinary character of our research and the focus on the product itself (and not the accompanying factors). However, the necessity to carry out risk assessment in relation to product quality, including its safety and availability, is strongly emphasized in relevant papers. In order to minimize risk and increase the probability of the project's success the enterprise should launch cooperation with a research unit, which is able to conduct a complex research in the nutritional and energy value of press cakes as well as to assess their suitability for consumption and the dynamics of chemical and biological processes occurring during storage. This knowledge may become a major asset in advertising campaigns and will allow to reduce costs related to conducting research with the use of own resources, including employing new personnel. In addition to nutritional aspects the advertising campaigns should stress the environment-friendliness of using press cakes, as consumers increasingly often take it into account. Not only does the cooperation with a research unit boost credibility but also allows for presenting the product at conferences and finding its new applications.

The factors, which were considered crucial in the context of the project's success, mainly stem from the demand for the product at the insufficient level and, consequently, the relevant low income from sales. It seems that at initial stages the enterprise should focus on intensified marketing and advertising activity targeted on its existing clients. Making better use of the enterprise's website and social media accounts appears to be a highly efficient and cost-free tool in such a situation. These communication channels allow for the direct contact with the consumer, personalized messages and publications. In order to strengthen the message and credibility it is useful to invite a person, who is involved in research in nutrition, and an expert, whose studies focus on the use of waste in the food production, to join the advertising campaign. Once the product is established in the consumers' awareness and the number of rival products is bigger, the enterprise should reconsider the expense and price strategy based on the in-depth analysis.

It should be noted that the general risk related to the production and implementation of pomace flours can be automatically reduced by the changes on the food market and in the consumers' awareness. For the last several years we have observed a shift from the highly-processed food to natural products of high nutritional value. The demand for new gluten-free raw materials (as well as interest in them) has also been growing (GlobalFoodForums®, 2019). Moreover, the need to implement eco-friendly actions, e.g. rational waste treatment (in compliance with the zero-waste policy) and minimization of food waste, has been increasingly emphasized.

The abovementioned questions of designing and implementing innovation on the food market should not be discussed only in the context of maintaining the nutritional and health safety of the new product, as it is recommended to take into account all factors that have impact on the whole project from planning to commercializing and selling the product. The analysis of professional literature within the scope risk management in the food industry indicates two main trends. The first one relates directly to the risk of maintaining the food product's safety, including allergens, durability, vulnerability to microbiological, physical and chemical contamination, as well as the risk in the supply chain (Prakash et al., 2017; Kassie et al., 2014). The other trend is centered on the last phase of the project, i.e. the risk assessment of consumers' reluctance to accept the product, failing against the strong competition of substitute products, and the insufficiently long (in comparison with expectations) product life cycle (Białoskurski, 2018; Fuller, 2016). In addition, some papers touch upon the questions of risk management in projects linked with the implementation of new technologies and machinery, which engages the enterprise's resources and requires large spending (Arrenvalagan and Mohamed, 2016, Rezaee et al., .2018). In spite of different aims of applying risk assessment in the food industry projects they share the common (and analogical to the results obtained in the present study) notion that efficient risk management in new projects is necessary to achieve goals in an efficient and effective way. Moreover, it allows for taking actions in controlled circumstances throughout the whole period of realizing the new project, as well as for taking immediate corrective actions or timely preventive actions (Beck da Silva Etges and Cortimiglia, 2019).

Summary

The process of commercializing a product innovation in an organization is always burdened with a high risk of failure, which calls for in-depth assessment, analysis and management. In the case of the discussed enterprise the biggest threat seems to be the origin of the raw material, which can discourage consumers, the uncertainty of outlets, or the limited human and financial resources, which significantly hinder efficient and memorable advertising campaigns on the national scale. Broadening the product portfolio preceded by risk assessment allows for taking account of all potential difficulties at the stage of planning. It enables the enterprise to properly prepare and increases its chances to succeed. The research also depicts that risk assessment does not have to engage a team of interdisciplinary experts, as it can be founded on the knowledge and experience of employees and careful observations of the macro- and microcontext of the organization.

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Determinantes De Éxito Y Fracaso Presentes En Spin Off En Territorios De Baja Intensidad De I+D- Avance De Tesis Doctoral

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Resumen

La creación de empresas de alto contenido tecnológico por los propios emprendedores es uno de los principales mecanismos de transferencia tecnológica desde la universidad y los centros de investigación públicos a la industria. Es por ello, que está recibiendo un fuerte impulso con ayudas públicas y la eliminación de ciertas barreras legales en la nueva ley de universidades. Este trabajo tiene como objetivo analizar los determinantes de éxito y fracaso de empresas Spin Off en territorios de baja capacidad de I+D, mediante la evaluación de un instrumento de política pública de intervención, que permiten apoyar la supervivencia de estas unidades empresariales. Se presenta una revisión bibliográfica de los ejes temáticos de empresas de base tecnológica Spin off y los determinantes de éxito y fracaso de estas Spin off. El tipo de investigación que se empleará para desarrollar la investigación será Explicativa-Correlacional, teniendo en cuenta que la investigación va más allá de la descripción de las variables o del establecimiento de relaciones entre estas variables. Además, se espera conocer la relación o grado de asociación que exista entre entre tres, cuatro o más variables en el contexto particular a estudiar. Actualmente se da a conocer cómo será la estructura del desarrollo de la investigación asociadas al planteamiento del problema a resolver, objetivos, ejes temáticos de la investigación, diseño, método y técnicas a utilizar.

Palabras clave: Factores determinantes; Emprendimiento, Spin Off, transferencia de tecnología.

Abstract

The creation of companies with a high technological content by the entrepreneurs themselves is one of the main mechanisms for transferring technology from the university and public research centers to industry. For this reason, it is receiving a strong boost with public aid and the elimination of certain legal barriers in the new university law. This work aims to analyze the determinants of success and failure of Spin Off companies in territories with low R&D capacity, by evaluating a public policy instrument for intervention, which will help support the survival of these business units. . A bibliographic review of the thematic axes of spin-off technology-based companies and the determinants of success and failure of these spin-offs is presented.

The type of research that will be used to develop the research will be Explanatory-Correlational, bearing in mind that the research goes beyond the description of the variables or the establishment of relationships between these variables. Furthermore, it is expected to know the relationship or degree of association that exists between three, four or more variables in the particular context to be studied. Currently, the structure of the research development associated with the approach to the problem to be solved, objectives, thematic axes of the research, design, method and techniques to be used will be disclosed.

Introducción

Durante las últimas décadas, cada vez más investigaciones se han centrado en el emprendimiento como facilitador de la creación de valor social, especialmente en el contexto de las economías emergentes (Londres y Hart, 2004, 2010; Sinkovics et al., 2014). Los problemas relacionados con la creación de valor son evidentes en el contexto de las economías emergentes debido a la baja capacidad del estado para resolver los problemas socioeconómicos. Además, estas economías sufren debido a los desafíos relacionados con la escala, la coordinación y la sostenibilidad de la creación de valor socioeconómicol. En tal contexto, el papel del emprendimiento social para abordar estos problemas múltiples e interdependientes se vuelve vital para estimular el cambio social a través de la innovación (Peredo y McLean, 2006; Sinkovics et al., 2014; Weerawardena y Mort, 2006; Zahra et al., 2009). Debido a este potencial, el emprendimiento social se ha denominado como una nueva norma (Corbett, 2016), por lo que se considera que toda actividad empresarial tiene una dimensión social. Su enfoque disruptivo y no tradicional de la innovación social es un aspecto importante del emprendimiento social, según Nicholls & Pharoah (2008).

Para Fuster, Padilla-Meléndez, Lockett, & del-Águila-Obra (2019), la Teoría del Emprendimiento del Conocimiento es un trabajo que se ha utilizado ampliamente para estudiar la ubicación de la empresa, el emprendimiento estratégico, las tasas de inicio a nivel regional y la cooperación con universidades. En particular, Hellerstedt et al. (2014) demostraron cómo las características del entorno económico y político dentro de cada región influyen en la proporción de spin off consolidadadas, encontrando que el desbordamiento de conocimiento de las universidades y la I+D basadas en la empresa afectan considerablemente los indicadores de creación tanto para las empresas de alta tecnología como de conocimiento. Acs, Braunerhjelm, Audretsch, & Carlsson (2009) mencionan que la Teoría del Emprendimiento del Conocimiento se centran en el nivel de los individuos y su papel en la transferencia de conocimientos. El conocimiento no se relaciona "automáticamente" con otras organizaciones, sino que está sujeto a restricciones institucionales, geográficas y de costos (Almeida y Kogut, 1999; Feldman, 2003) conocido como filtro de conocimiento según Acs et al. (2009) . Esto se define como la brecha entre la inversión en nuevos conocimientos y su comercialización (Audretsch et al., 2014: 316), que conduce a una actividad innovadora y al crecimiento económico.

De nuevo Acs et al. (2009), menciona que las teorías contemporáneas del emprendimiento generalmente se centran en el reconocimiento de oportunidades y la decisión de explotarlas. Aunque la literatura sobre emprendimiento trata las oportunidades como exógenas, la teoría predominante del crecimiento económico sugiere que son endógenas y que el conocimiento creado de forma endógena da como resultado la difusión de conocimientos, lo que permite a los empresarios identificar y aprovechar oportunidades. En este sentido, y como resultado, los modelos de crecimiento endógeno no incorporan un elemento crucial en el proceso de crecimiento económico: la transmisión de “spillovers” de conocimiento a través del espíritu empresarial (Audretsch, 1995). Esto implica que el conocimiento en sí mismo es solo una condición necesaria para el ejercicio de una empresa exitosa en un modelo de crecimiento. Un enfoque interesante recientemente se centra en la asignación de recursos sociales gastados en I + D y espíritu empresarial.

Los países de América Latina y el Caribe (ALC) deben seguir en busca de los medios adecuados para atender a las necesidades básicas de sus poblaciones, con programas de nutrición y saneamiento, reducción de la pobreza, educación de calidad universal y modernización económica. Al mismo tiempo, deben aportar la contribución que les corresponda para hacer frente a los actuales desafíos mundiales. En este contexto, aún en el informe realizado por el Banco Interamericano de Desarrollo (2010), se establece la necesidad de aprovechar las oportunidades que ofrece el cambio tecnológico en una economía globalizada como condición imprescindible para cualquier economía emergente. El incremento en el volumen de recursos canalizados hacia la investigación y el desarrollo (I&D) y la innovación, proveniente de fuentes tanto públicas como privadas, denota que los formuladores de políticas públicas y los dirigentes del sector privado están tomando cada vez mayor conciencia de la importancia del conocimiento para el crecimiento de la productividad.

Incluso con desarrollos positivos como los que se han logrado, la situación general de la región, está caracterizada por una baja intensidad tecnológica y déficits severos en aspectos tales como capital humano, inversión en I&D tanto pública como privada, infraestructura tecnológica, coordinación entre instituciones y eficacia institucional, según Navarro, Crespi, & Zuñiga (2010); esta baja intensidad tecnológica de los sistemas económicos latinoamericanos es consecuencia directa de una estructura económica que depende, en su mayoría, de sectores en los cuales la intensidad tecnológica es también baja, como los relacionados con la extracción de recursos naturales. Allí se llega, sin embargo, a la conclusión de que la región registra más bien un "déficit de innovación", es decir, está caracterizada por una subinversión en tecnología, independientemente de cuál sea la estructura económica prevaleciente en cualquier país en particular. Dicha conclusión apunta a que las inversiones en innovación e I&D resultan decisivas para superar la brecha de productividad entre los países de América Latina y el Caribe y el resto del mundo.

Como lo manifiesta Merino Moreno & Villar Mártil (2007), se resalta el interés del análisis sobre el potencial innovador que se viene identificando en los procesos que posibilitan la transferencia de conocimiento a la sociedad a través de diferentes sistemas y canales cuya disposición y tratamiento varían según sus propósitos. Dentro de este argumento inicial toma cuerpo, como ejercicio tanto de transferencia de conocimiento como de indicador de innovación, la creación de nuevas empresas de base tecnológica, sobre todo de aquéllas que generan mayores expectativas de contribución al estado del bienestar, a saber, las que suponen y aportan un reto innovador basado en la aplicación de conocimiento tecnocientífico y en desarrollos tecnológicos, tanto desde la óptica de ser recurso y capacidad para la creación de valor económico, como desde su consideración para explicar la empresa actual a modo de organización basada en conocimiento para, en definitiva, crear innovación.

Es por ello, que surge la necesidad de esta investigación en conocer los determinantes del proceso de éxito y fracaso de las empresas de base tecnológica, siendo éstas un mecanismo de innovación, que contribuyen así a generar ecosistemas empresariales. La literatura reciente apunta a esto como un área de investigación emergente y prometedora en la que se están invirtiendo cada vez más en las universidades para facilitar el crecimiento económico. Esto se basa, parcialmente, en la idea de que un ecosistema universitario empresarial bien establecido o exitoso conduce automáticamente a la aparición de ecosistemas empresariales con beneficios subsiguientes para la región, según lo define Fuster et al.(2019).

Este artículo está estructurado de la siguiente manera, primero una introducción del problema que se pretende analizar a través de la revisión bibliográfica sobre las empresas de base tecnológica-EBT y sus determinantes de éxito y fracaso, nuestra contribución a través del desarrollo de los objetivos de la investigación y finalmente la metodología que se utilizará para alcanzar los resultados previstos.

Planteamiento del Problema

Para estudiar los factores de éxito y fracaso de las spin off de base tecnológica, City, Amara, City, Rherrad, & Laciak, n.d.), identifican, que existen dos conjuntos de factores que probablemente influyen en la decisión del emprendedores sobre su spin off: los factores de "nivel micro" y "nivel macro". El primer conjunto de estos factores está relacionado con los atributos de los investigadores y las características de sus proyectos de investigación y hallazgos tecnológicos. En cuanto a los determinantes del "nivel macro", la investigación ha demostrado que factores determinantes como los sistemas tecnológicos y las políticas universitarias influyen en la creación de spin-off universitarios.

Cualquiera que sea el nivel de análisis adoptado, se requieren dos condiciones para asegurar el éxito de la creación de spin-off: i) la capacidad empresarial, así como las habilidades técnicas para evaluar el potencial industrial de la tecnología (Roberts y Malone, 1996; Clarysse y Moray, 2004), y ii) el grado de apoyo que reciben los beneficios de sus organizaciones matrices según Roberts y Malone (1996); Steffensen et al. (1999).

Esta necesidad de estudiar estos factores se ve medida por la relevancia de la innovación para la competitividad empresarial y territorial, donde la regeneración de la oferta supone mejoras para el

usuario y, por tanto, genera exigencias sociales que se derivan hacia otros productos y servicios movilizando los esquemas de comercialización y atención al ciudadano. Es más, este enfoque innovador por su soporte en las tecnologías plantea decididamente un esquema de competencia territorial tanto a nivel internacional, donde las balanzas comerciales de tecnología se imponen como referencia de competitividad global, como intranacional, entre regiones, basados en el enfoque de los planes regionales de innovación (Myro y Fernández, 1996) citado por Merino Moreno & Villar Mártil (2007).

Bueno (2005) define que las empresas de base tecnológica y del conocimiento tecnocientífico juegan un papel clave como activo crítico y recurso valioso en la Sociedad y Economía del Conocimiento, requiere ser gobernado adecuadamente tanto desde la óptica de su creación, como de su desarrollo y posterior gestión. En este caso, cabe hacer referencia a las competencias asociadas a este gobierno del conocimiento organizativo basadas en dinámicas de vigilancia tecnológica, redes, comunidades de práctica, comunicación, capital intelectual, gestión de la información, retención del conocimiento, calidad, etc.

Por lo tanto, y para alcanzar los objetivos propuestos en la investigación se identifica que para el planteamiento del problema, la investigación se oriente a dar solución al enunciado ¿ Cuáles son los determinantes de éxito y fracaso de las empresas de base tecnológica Spin Off cuando operan en territorios de baja capacidad de I+D?, y que a su vez estaría apoyadas por unas preguntas secundarias: ¿Cuáles son los elementos determinantes presentes en las empresas de base tecnológica Spin Off asociadas al éxito o fracaso de su operación?, ¿Qué efectos están presentes entre los determinantes de éxito y fracaso de las Spin Off que redundan en su supervivencia?, ¿Cómo es la influencia del ecosistema de innovación sobre los determinantes de éxito y fracaso de las Spin Off? y ¿Cuál sería el comportamiento de las Spin Off durante un proceso de intervención?.

Objetivos

Objetivo General

Analizar los determinantes de éxito y fracaso de empresas Spin Off en territorios de baja capacidad de I+D, mediante la evaluación de un instrumento de política pública de intervención.

Objetivos especificos

Caracterizar los determinantes de éxito y fracaso de las Spin Off, que permiten definir el potencial de crecimiento y sostenibilidad en el mercado de la comercialización de conocimiento.
Determinar los efectos presentes entre los determinantes de éxito y fracaso de las Spin Off que definen su superviviencia.
Analizar la influencia del ecosistema de innovación en los determinantes de éxito y fracaso de las Spin Off.
Evaluar el instrumento de política pública de intervención de las Spin off.

Revisión de Literatura

Empresas de Base Tecnológica-EBT: spin off

Según lo que define Cocorullo (2017) las universidades ahora se consideran actores vitales en el proceso de transferencia de conocimiento, innovación y tecnología del sector académico al sector comercial / productivo. Si en el pasado las universidades cubrieron este rol otorgando patentes a personas externas, la situación ha cambiado fuertemente. En la actualidad, las instituciones académicas también están dedicadas a la creación y promoción de spin-offs y nuevas empresas, como instrumentos para responder a la presión social sobre la rendición de cuentas y el diálogo con la economía mediante el intercambio de resultados de investigación científica (Geiger 2006; Laredo 2007).

Un problema preliminar es la diferencia entre los términos "spin-offs" y "start-ups". En particular, la etiqueta "puesta en marcha" se puede aplicar a cualquier nueva forma de empresa innovadora en su etapa embrionaria. Una vez que el proyecto se lanzó y se separó de la universidad, se convirtió en una

entidad propia, por lo que se puede describir como "spin-off de investigación universitaria". Ser un spin-off podría considerarse como una condición genética que continúa a lo largo de la vida en el mercado empresarial y que podría mitigarse si el spin-off se hace más grande que la institución original.

En consecuencia, el término "spin off" se adoptó para describir una nueva forma de iniciativa empresarial que resulta de una fase previa de investigación académica y que ahora está separada de la institución original y se ha convertido en una entidad independiente en el negocio. El mundo, como instrumento de explotación de la investigación académica. (Lazzeri y Piccaluga 2012).

Para Cocorullo (2017) las empresas Spin Off derivadas de la investigación se definen como nuevas empresas creadas por una institución científica, instituto nacional de investigación, universidad, escuela técnica, institución o laboratorio de I + D público o privado para transferir y comercializar las invenciones resultantes de los esfuerzos de I + D de sus investigadores. La literatura divide entre diferentes tipos de empresas basadas en la investigación, diferenciándose de acuerdo a:

- El tipo de institución matriz de la que se derivan;
- La motivación del investigador;
- Los vínculos entre la institución matriz y el investigador;
- Los medios y fuentes de su financiación.
- Los modelos aplicados institucionalmente para su creación.

En lo que respecta al primero de los criterios de diferenciación de las spin off antes mencionadas, son dos tipos principales de empresas derivadas, es decir, derivaciones corporativas y spin-offs científicas. Las empresas spin-off corporativas son creadas por la empresa matriz con miras a comercializar ideas, tecnologías, productos o soluciones de proceso que no están dentro del área principal de su actividad, pero aún están consideradas comercializable y rentables. Se establecen las spin-offs científicas que comercializan las innovaciones provenientes de instituciones de investigación matriz.

Dependiendo del tipo de organización de investigación, las derivaciones científicas pueden dividirse en spin-offs académicas, las establecidas por investigadores universitarios,y las derivadas no académicos basados en la investigación, establecidos por el personal científico de organizaciones públicas de investigación, es decir, institutos de investigación o laboratorios públicos.

La definición introducida por Klofsten & Jones (2000) enfatiza cómo los spin off académicos se pueden identificar a través de cuatro aspectos que se describen a continuación: un nuevo negocio (entidad autónoma de la universidad, con su propia identidad legal); creado por la universidad (excluyendo así a todas las demás entidades o instituciones de investigación); para el uso de los resultados derivados de académicos (no solo todos los resultados patentables, sino también todos los conocimientos técnicos y científicos adquiridos durante la actividad académica); cuyo propósito es obtener una ganancia (para luego excluir todas las actividades sin fines de lucro).

Por su parte según Merino Moreno & Villar Mártil (2007), la denominación «Empresas de Base Tecnológica» es un término que se refiere a un nuevo tipo de empresas que refleja la transición al nuevo ciclo del sistema capitalista a nivel mundial. El contexto actual establece una serie de criterios que según el profesor Veciana favorecen la creación de nuevas empresas, a saber, «el cambio tecnológico, la sociedad del conocimiento, el sector servicios, el poder tractor de la gran empresa, el problema ecológico, la privatización de servicios públicos, el cambio de estructura demográfica, el cambio de valores de la sociedad, los movimientos migratorios y las políticas de fomento y ayuda a la creación de empresas y empleo».

El interés por esta tipología empresarial, según Camacho et al (1999), radica generalmente en los siguientes factores:

1.Potenciar el I+D regional como motor de la economía regional.
2.Mejorar las relaciones interinstitucionales en el sistema de I+D, especialmente en lo referente al marco de interacción universidad-empresa.

3.Promover la transferencia de tecnología como eje de competitividad y bienestar social, donde las PYMEs, aparte de las grandes empresas, ostentan un lugar clave en la estructura del tejido empresarial y, por tanto, requieren un lugar protagonista en la estrategia regional de innovación (Asheim y Isaksen, 2001).
4.Impulsar el autoempleo como alternativa atractiva de desarrollo profesional.

En definitiva, para Merino Moreno & Villar Mártil (2007), todo este planteamiento del perfil de la EBT se aglutina en la tabla 1, ante la carencia de una definición única, se define Empresa de Base Tecnológica - EBT (Spin Off) como aquella organización productora de bienes y servicios, basados en tecnología nueva o innovadora, comprometida con el diseño, desarrollo y producción de nuevos productos y/o procesos de fabricación innovadores, a través de la aplicación sistemática de conocimientos técnicos y científicos.

Tabla 1: Carácterísticas y consecuencias de Empresas de Base Tecnológica

Características	Consecuencias
Rápido crecimiento	Altas necesidades de capital
Muy enfocadas en innovación	Necesidad de apoyos comerciales
Gestionados por tecnólogos	Necesidad de ayuda gestora
Propiedad intelectual	Posibilidades de elevados márgenes

Fuente: Merino Moreno & Villar Mártil (2007). Pág.150.

Las EBTs se consideran proyectos empresariales donde su principal característica es «el I+D es el negocio» y no una partida presupuestaria. Su proliferación impacta decisivamente en aspectos socioeconómicos como son el empleo, la labor de transferencia tecnológica, el desarrollo regional, etc., haciendo llegar al mercado el conocimiento tecnocientífico.

No obstante, Merino Moreno & Villar Mártil (2007) al margen de estas características cabe hacer referencia a la consideración sobre la reflexión semántica del concepto de «éxito» evidenciando la entrada en un terreno complejo condicionado por el carácter subjetivo del individuo a la hora de considerar si ha logrado el éxito en su proceso de creación de empresa o por el contrario ha fracasado. Este enfoque trascendente podría delimitarse a través de ciertos aspectos básicos que, en su conjunto, enmarcarían de alguna forma el éxito, y por derivada negativa, el fracaso, a saber:

1.La supervivencia del proyecto empresarial. Es decir, se asocia el éxito con la sostenibilidad en el mercado deduciendo la presencia de un grado competitivo suficiente.
2. El crecimiento de la empresa. En este caso, el incremento de la dimensión empresarial mostraría la competitividad y potencial organizativo.
3. El aumento de cuota de mercado. Así, se podría vislumbrar el potencial de la oferta de valor de la empresa.
4. El cumplimiento de las expectativas. De esta forma, se ajustarían sobremanera los criterios de éxito dado que se incluye la percepción del individuo.

Determinantes de éxito y fracaso de spin off

Según City et al. (n.d.), estudios previos sobre cómo las universidades promueven la creación de spin-offs (Radosevich, 1995; Roberts y Malone, 1996; Carrayannis y otros, 1998; Steffensen y otros, 2000) intentan comprender y distinguir los principales problemas planteados por la creación de tales empresas en universidades. En su intento de abordar el fenómeno, esta revisión se ha centrado en las organizaciones matrices (Roberts, 1991a; Rogers, 1986; Steffensen et al., 1999; Smilor et al., 1990), y

en un conjunto complejo de factores como el capital de riesgo, el entorno económico, los activos complementarios y las redes sociales (Chiesa y Piccaluga, 2000; Segal, 1986; Steffensen et al., 1999). Estudios anteriores han prestado poca atención a los determinantes que influyen en la decisión del investigador de una spin off sobre sus resultados académicos y hallazgos.

En su tipología, Di Gregorio & Shane (2003) identifican dos conjuntos de factores que pueden influir en la decisión del investigador de crear una spin off sobre su investigación: factores de "nivel micro" y "nivel macro". El primer conjunto de estos factores está relacionado con los atributos de los investigadores (Levin y Stephen, 1991; Shane y Khurana, 2000; Roberts, 1991; Zuckeret al., 1998) y con las características de sus proyectos de investigación y hallazgos tecnológicos (Shane , 2001a). En cuanto a los determinantes del "nivel macro", la investigación ha demostrado que los determinantes como los sistemas tecnológicos (Shane, 2001b) y las políticas universitarias (Kenney, 1986; Goldfarb et al., 2001) influyen en la creación de spin-offs universitarias.

Cualquiera sea el nivel de análisis adoptado, se necesitan dos condiciones para asegurar el éxito de la creación de spin-offs: i) la capacidad empresarial y las habilidades técnicas para evaluar el potencial industrial de la tecnología (Roberts y Malone, 1996; Clarysse y Moray, 2004), y ii) el grado de apoyo que las empresas derivadas reciben de sus organizaciones matrices (Roberts & Malone, 1996).

En Colombia, como lo describe Vesga (n.d.) y con una mirada a los niveles macro, de las empresas y de los individuos permite identificar fortalezas y debilidades críticas para el desarrollo del capitalismo del emprendimiento y la innovación en nuestro país.

Para este autor en los tres niveles, Colombia presenta una situación destacada en términos de fuerza empresarial y potencial de desarrollo. Una acción decidida sobre puntos críticos en los niveles de las empresas y los individuos podría tener un impacto grande desde este punto de vista. Podría convertirse en el elemento que resolviera el cuello de botella del problema.

A la luz de lo anterior, algunos puntos relevantes para avanzar en el desarrollo del capitalismo emprendedor en el país serían los siguientes:

1. Capital de riesgo. Uno de los puntos centrales que bloquean el desarrollo de empresas nuevas es la ausencia de capital de riesgo. Un cuello de botella básico está en la ausencia de mecanismos de salida para los inversionistas y en la escasa cultura de evaluación de proyectos y valoración de empresas que tienen altos niveles de riesgo.

2. Redes. La construcción deliberada de redes de emprendedores es un paso necesario para el desarrollo de estos proyectos. Las capacidades competitivas de las empresas de innovación dependen en forma crítica de los activos intangibles relacionados con el conocimiento, los cuales requieren de la existencia de redes efectivas para poder desarrollarse.

3. Infraestructura. El desbloqueo de los sistemas de puertos y carreteras del país es esencial para el emprendimiento innovador. En términos de telecomunicaciones y tecnologías de información se ha avanzado en esta década, pero se requiere acelerar el paso.

4. Actores. Existe en Colombia una amplia gama de iniciativas y actores que están trabajando para que el país desarrolle una cultura empresarial más emprendedora y más innovadora.

5. Investigación. Es indispensable multiplicar los esfuerzos de investigación sobre los determinantes de las fuerzas que afectan el emprendimiento y la innovación en los tres diferentes niveles. Hay una concentración de esfuerzos en el tema macro y en las consideraciones de política pública, pero sabemos poco sobre los determinantes en los niveles de la empresa y el individuo.

En términos generales, los hallazgos de la investigación se han centrado en la revisión bibliográfica asociadas a spin off de orígen universitarios y se han aceptado como determinantes de las spin off.

Tipo De Investigación

El tipo de investigación a emplearse en la investigación es Explicativa-Correlacional, teniendo en cuenta que la investigación va más allá de la descripción de las variables o del establecimiento de relaciones entre estas variables; es decir, están dirigidos a responder por el comportamiento de esos determinantes en la supervivencia de estas empresas intensivas de conocimiento, es decir, en qué condiciones se manifiestan estas dos o más variables. Además, se espera conocer la relación o grado de asociación que exista entre entre tres, cuatro o más variables en el contexto en particular a estudiar.

En la primera etapa, asociado al cumplimiento del primer objetivo donde el estadío es Descriptivo, donde lo que se busca será una descripción completa de los determinantes de la innovación de éxito y fracaso que están presentes en las Spin off, teniendo en cuenta que se debe estudiar estas características que no se manifiestan tan evidentes en la realidad. Esta etapa se realizará la validación del instrumento de medición.

Para la segunda etapa, siendo el estadío Explicativo, se perseguirá explicar la relación de los efectos asociados a la acción de los determinantes de innovación en la supervivencia de las Spin off. En esta etapa se utilizará la herramienta de modelo de regresión logística multinivel para definir las relaciones.

Para la etapa tres, teniendo en cuenta que el estadío es Correlacional, se definirá establecer la relación de influencia de los ecosistemas de innovación que se encuentran alrededor de estas empresas spin off y su relación con los determinantes de innovación de éxito y fracaso.

Y finalmente para la etapa cuarta y definitiva, el estadío es Evaluativo, en el que se evaluarán los resultados del proceso de intervención de las spin off que permitan verificar los determinantes de innovación de éxito y fracaso presentes.

Método

El método a utilizarse en la investigación será el método Hipotético-Deductivo, donde el procedimiento permitirá hacer de la actividad una práctica científica. El método hipotético-deductivo tiene varios pasos esenciales: observación del fenómeno a estudiar, creación de una hipótesis para explicar dicho fenómeno, deducción de consecuencias o proposiciones más elementales que la propia hipótesis, y verificación o comprobación de la verdad de los enunciados deducidos comparándolos con la experiencia.

Diseño de Investigación

Con relación al diseño de la investigación y cómo se recogeran los datos, los objetivos especificos están enmarcados en un diseño de campo, transeccional, de evolución de grupo, univariable para cada uno de los objetivos del proyecto.

Hipótesis

Para la presente investigación y teniendo en cuenta que el diseño de la investigación es transeccional, las hipótesis son de investigación y se fundamentan en diferencia de grupos, correlacionales y causales, donde se recolectarán datos sobre categorías, contextos, variables y sus relaciones en los dos momentos desarrollados por el programa Probeta del Distrito de Barranquilla-Colombia para evaluar el cambio en éstas.

Las hipótesis se encuentran estrechamente relacionadas con algunos factores de éxito y fracaso de la innovación: el modelo de negocio, el tipo de producto o servicio que proporcionan a sus clientes, capacidad empresarial, habilidades técnicas para evaluar el potencial industrial de la tecnología, el

grado de apoyo que reciben de sus organizaciones matrices y su capacidad de adaptarse a los cambios continuos y mantener su capacidad de innovación. A continuación se relacionan:

H1: El éxito o fracaso de las Spin Off está relacionado con un ecosistema de innovación con alta intensidad de I+D.
H2: El efecto de las variables de innovación de éxito y fracaso en Spin Off es igual en las unidades de negocio en un tiempo inicial con aquellas participantes en el tiempo final.
H3: El modelo de negocio y las habilidades técnicas para evaluar el potencial industrial de la tecnología son los determinantes que definen el éxito o fracaso de las Spin Off en el entorno de innovación.
H4: El instrumento de política pública de intervención de las Spin off impacta en el comportamiento de los determinantes de innovación en la vida de estas empresas a lo largo del proceso.

Unidades de Estudio

Las unidades de estudio de esta investigación hacen parte del programa PROBETA, convocatoria en la que se invita a científicos, grupos de investigación y empresas de tecnología de la ciudad, pertenecientes a los sectores: salud, energía y medio ambiente, a presentar sus iniciativas. Esta población cuenta con 33 empresas dispuestas para ser el objeto de estudio de esta investigación.

Técnicas e Instrumentos de recolección de datos

Tabla 2: Técnicas de recolección de datos por objetivo específico

Objetivo específico	Evento	Técnica de recolección de datos	Instrumento
Caracterizar los determinantes de éxito y fracaso de innovación de las Spin Off.	Determinantes de éxito y fracaso de innovación Spin Off	Encuesta	Cuestionario
Determinar los efectos presentes entre los determinantes de de éxito y fracaso de las Spin Off que definen su superviviencia.	Determinantes de éxito y fracaso de innovación	Entrevistas estructuradas	Guía de entrevista Modelo de regresión logística multinivel
Analizar la influencia del ecosistema de innovación en los determinantes de éxito y fracaso de las Spin Off.	Ecosistema de innovación Determinantes de éxito y fracaso de innovación	Se trabaja con datos recogidos Revisión documental	Matriz de análisis Modelo de regresión logística binaria
Evaluar un instrumento de política pública de intervención de las Spin Off.	Determinantes de éxito y fracaso de innovación Spin Off	Técnica Sociométrica Entrevista estructurada	Guía de entrevista Evaluación Socioeconómica

Fuente: Propia

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Foreign Direct Investments and Foreign Trade: Substitutability or Complementarity? The Case of Ireland And Portugal

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Abstract

Since globalization became a worldwide phenomenon, a relationship between trade and foreign direct investments (FDI) has attracted economists' and policy-makers' attention. In the aftermath of the last financial crisis, this interest increased as both trade and foreign capital played a pivotal role in the rebalancing of countries' external positions. Despite widespread post-crisis deleveraging and adjustment processes, some euro area countries, including Ireland and Portugal, continue to have large negative net international investment positions, which are well below prudential thresholds. This paper explores, using ARDL models, the influence of the FDI liabilities on demand for exports and imports of goods and services for Ireland and Portugal. The results point to substitute relationships between trade and FDI in both of these countries.

Keywords: Trade Openness, Financial Openness, Foreign Direct Investments

Introduction

Traditionally, international trade and foreign direct investments are the main drivers of economic integration, which interact with each other. Membership in the European common market, adoption of a common currency the euro, and the EU policy aimed at liberalization of trade and capital flows with non-EU countries, enhanced the attractiveness of European countries as trade partners and recipients of foreign investments. Due to these institutional arrangements, as well as technological improvements in communication, information processing, and transportation, the European countries have significantly enlarged their economic openness. According to the UNCTAD data, the average of the EU trade openness, gauged as a sum of exports and imports to GDP, augmented from 50% in 1980 to 87% in 2018. A substantial growth was registered also in capital flows. The average stock of inward foreign direct investments accumulated in the EU economies increased from 5% do 54% of GDP (UNCTAD database).

Rich empirical evidence confirms the widespread benefits of higher economic openness, both in terms of trade and financial factor mobility, which contribute to higher competitiveness, productivity, and consumer's satisfaction (Grossman and Helpman 1991, De Mello 1999, Borenstein et al. 1998, Kose et al. 2006). Although positive effects of capital and trade flows are well documented, there is also rich literature proving that the extended exposition to foreign demand and external financing raises a concern about too much dependence on outward factors. The main drawback of high economic openness is, that it causes higher vulnerability of a domestic economy to international shocks (Rodrik 1997, Stiglitz 2002, Prasad et al. 2003, Shiller 2000). The last financial crisis revealed that countries which accumulated huge external imbalances suffered more from the global turmoil (Lane 2013, Kalantzis et al. 2014). Following a widespread post-crisis deleveraging and adjustment processes, a

number of current account imbalances have been corrected. However, some euro area countries, including Ireland and Portugal, continue to have large negative net international investment positions, below -100% of GDP**,** which is well below prudential thresholds set at -35% of GDP (Eurostat 2018, European Commission, 2018). As both trade and financial flows affect external balance, their role in restoring external equilibrium is essential. Taking into account that these two types of flows may interact with each other, it is worth examining the character of their interlinkages. The identification of the nature of the FDI-trade nexus may not only help to understand the rebalancing process of excessively indebted economies but also evaluate the effects of globalization.

In this paper, we provide the empirical research of the long-run relationship for export and import demand. Besides traditional determinants of the demand for exports, i.e. a foreign income and a relative price level, proxied by a real effective exchange, we add the stock of inward FDI as an explanatory variable. Similarly, the demand for imports is determined by conventional explanatory variables, i.e. domestic income, a real exchange rate, and FDI stock. The study is for two euro-zone economies, Ireland and Portugal, which were severely hit by the last financial crisis and still experience macroeconomic imbalances, in particular involving vulnerabilities from large stocks of net external liabilities.

The paper is organized as follows. In section 2, we review the theoretical issues relating to trade and its determinants, including more specifically, the role of FDI. In section 3, we describe the methodology and present the models for two countries. In section 4, we presents and discuss the empirical results. Conclusions are made in Section 5.

Trade and Foreign Direct Investments: Theoretical considerations and empirical evidence

The classical theory of trade is not useful in explaining the trade-FDI nexus, as it assumes that production factors are immobile between countries. According to the traditional models of trade, exports is determined by the opportunity costs of production and production possibilities frontier in each country. This, implies that country's pattern of comparative advantages is based on the domestic resources, which differ between countries, however, are not mobile internationally. Such approach constraints country's export capacity to domestic factor endowments. Also, a typical function for aggregate imports is based on the Marshallian demand function, where the volume of imports demanded by the domestic residents depends on the domestic income and the ratio of import price to domestic substitute price adjusted for the exchange rate (Feenstra and Taylor, 2014; Lichteinstein 2016).

The increasing openness of economies, as a result of regional integration and globalization processes, gave rise to examine the trade effects of international mobility of production factors. In a seminal paper published in 1957, Mundell showed that trade in goods and production factors movement are substitutes. According to Mundell (1957), the extent to which factor mobility would substitute for goods mobility depends on many factors, such as the relative size of the trading countries, the technologies employed, and restrictions on commodity and capital flows. For example, if barriers on production factors, like capital or labour, are imposed, their effects would be offset by an equivalent increase in imports of capital-intensive or labour-intensive goods, exposing those domestic producers to even more foreign competition. In other words, if capital or labour cannot enter the country, the commodities will. In a similar vein, if domestic policy-makers attempt to protect their market by placing a tariff on capital-intensive or labour-intensive imports, the effect would be higher prices and higher return rate of capital, that attract more foreign investors and more labour. Mundell's reasoning pointed that trade and production factors flows are substitutes, thus it is pointless to restrict the flows of goods, labour or capital.

In the 1980s. the New Trade Theories influenced by monopolistic competition, industrial organization and liberalization of goods and capital flows, shed new light on the relationship between trade and capital flows. Markusen (1984) and Helpman (1984) distinguished between horizontal and vertical foreign investments. The former focuses on the improvement of market access or market growth

prospects, which create a substitutional relationship with the trade. The latter is mainly based on the differences in factor endowments between countries and produces complementarity linkages with trade (Camarero and Tamarit, 2004). Thus, if the foreign investors' interest is generated by a market-seeking strategy, the FDI inflows substitute with the international trade (Anderson et al. 2019). In turn, if foreign investor aims at cost reduction and efficiency improvement, the FDI contribute to complementarity, rather than substitutability with trade. The vertical type of the FDI is often associated with international fragmentation of production and activities of multinational corporations. Countries increasingly involved in international production networks trade within industries, as well as within firms, i.e. they export and import different varieties or qualities of products of the same industry, as well as sell abroad semi-finished commodities, which undergo further processing (Borga and Caliandro, 2018).

Models and Methodology

To explore how foreign direct investments affect trade we analyze the long-run relationship using the following model for exports:

$$ln\, EX_t = \alpha_0 + \alpha_1\, ln\, FDI_t + \alpha_2\, ln\, GDP_t + \alpha_3\, ln\, RR_t + \varepsilon_t \qquad (1)$$

where EX denotes exports of goods and services, FDI is the stock of inward foreign direct investments, GDP is the world's gross domestic product, which stands for the foreign income, and RR is the real effective exchange rate. For all the variables given in constant US dollars, i.e. EX , FDI , and GDP, the base year is 2010. The real effective exchange rate is a nominal effective exchange rate index adjusted for relative movements in national price indicators. The index of the RR for the year 2010 equals 100.

Similarly, the model for imports is specified as follows:

$$ln\, IM_t = \alpha_0 + \alpha_1\, ln\, FDI_t + \alpha_2\, ln\, GDP_t + \alpha_3\, ln\, RR_t + \varepsilon_t \qquad (2)$$

where IM denotes imports of goods and services, GDP stands for the gross domestic product of the importing country. Both of these variables are measured in 2010 constant US dollars. The FDI and RR variables are defined as above. All the data, except the stock of the foreign direct investments, are collected from the World Bank WDI database. The FDI data derived from the UNCTAD database. The dataset covers yearly data over the period 1980-2018.

According to the theory, the signs of the FDI coefficients in equations (1) and (2) depend on the substitutability or complementarity existing between trade and FDI. A positive sign of α_1 is expected when the stock of FDI inflows and exports or imports are complements, whereas a negative sign appears when FDI and trade flows are substitutes. With respect to the GDP variable in the export model, the signs of α_2 should be positive, as the GDP stands for the world income which represents foreigners' demand for domestically exported goods. Considering the sign of the GDP variable in the model for imports, the theory also predicts a positive link between trade (real imports) and the real production, which stands for of the domestic income. The sign of the coefficients α_3 which relate real effective exchange rates to exports (in the export model) and imports (in the import model) should be, respectively, negative and positive. The negative α_3 in the model for exports implies that real exchange rate appreciation deteriorates country's price competitiveness, which results in lower exports. With respect to the model for import, appreciation of real exchange rate makes foreign commodities cheaper for domestic consumers, which should be reflected in higher imports.

In empirical economics considerable attention has been paid to testing for the existence of relationships in levels between variables. In the last years, two approaches have been mainly used: the two-step residual-based procedure (Engle and Granger, 1987) and the system-based reduced rank regression approach due to Johansen (1995). Recently, a new approach called "ARDL bounds testing approach to cointegration" has gained considerably in popularity among researchers. Philips (2018) has clearly

shown that for short time series the rate of type I error using the bounds test is very often far closer to the nominal level than that of the other two cointegration tests. Also Narayan (2005) found evidence that the small sample properties of the bounds testing approach are far superior to that of the other cointegration procedures.

To implement the bounds testing procedure (Pesaran et al., 2001), the long-run relations given in equations (1), (2) have been reformulated as an autoregressive distributed lag (ARDL) model that incorporates the short-run dynamic adjustment process as follows:

$$\Delta \ln Z_t = \beta_0 + \sum_{k=1}^{p_1} \beta_{1,k} \Delta \ln Z_{t-k} + \sum_{k=0}^{p_2} \beta_{2,k} \Delta \ln FDI_{t-k} + \sum_{k=0}^{p_3} \beta_{3,k} \Delta \ln GDP_{t-k} + \sum_{k=0}^{p_4} \beta_{4,k} \Delta \ln RR_{t-k} + \gamma_0 \ln Z_{t-1} + \gamma_1 \ln FDI_{t-1} + \gamma_2 \ln GDP_{t-1} + \gamma_3 \ln RR_{t-1} + \xi_t, \quad (3)$$

where Z denotes EX or IM, respectively.

In the first step, one has to ensure that none of the variables is above $I(1)$. In the presence of $I(2)$, the critical values computed by Pesaran et al. (2001) are not valid. To test unit roots in the time series Phillips–Perron (1988) test was used.

Table 1a: Unit root result (Ireland)

Variables	p-value for levels	p-value for differences
EX	0.8346	0.0004***
IM	0.6836	0.0318**
FDI_	0.5483	0.0000***
GDP_IM	0.6209	0.0022***
GDP_EX	0.2360	0.0001***
RR	0.4992	0.0000***

*Note: For level variables tests include a constant and a trend. The differenced variables tests include only a constant. Rejection of a unit root hypothesis is indicated with asterisks. *, ** and *** indicate, 0.1, 0.05 and 0.01 significance levels, respectively.*

Table 1b: Unit root result (Portugal)

Variables	p-value for levels	p-value for differences
EX	0.7988	0.0000***
FDI	0.9595	0.0000***
GDP_EX	0.2360	0.0001***
REER	0.8791	0.0002***

*Note: For level variables tests include a constant and a trend. The differenced variables tests include only a constant. Rejection of a unit root hypothesis is indicated with asterisks. *, ** and *** indicate, 0.1, 0.05 and 0.01 significance levels, respectively.*

Tables 1a, 1b show that none of the variables included in the models are beyond $I(1)$. Consequently, the results warrant performing the second step of the Pesaran procedure which is the F-test to identify the existence of the long-run (cointegration) relationships among the variables. For this, the null hypotheses of no cointegration, $H_0: \gamma_0 = \gamma_1 = \gamma_2 = \gamma_3 = 0$ in equation (3) - is tested vs. H_1: that at least one of coefficients differs from 0. The optimal lag structures are determined by the Akaike Information Criterion (AIC) using a maximum of 4 lags. The significance of the error-correction term

(EC) is then used as another criterion to determine the existence of the long-run relationship among the variables. For this, the t bounds test is performed. The long-run effects of the explanatory variables on the dependent variable are obtained by the estimates of γ that are normalized on γ_0. We check residual autocorrelation, heteroscedasticity and normality. We also investigate the stability of coefficients in the models using CUSUM tests. The results for Ireland and Portugal are displayed in tables 2a-2b and 3a-3b, respectively.

Table 2a: ARDL cointegration summary results with long-run regression coefficients for FDI, GDP and RR (Ireland)

Dependent variable		**EX**	**IM**
Order of ARDL		ARDL(1,1,0,3)	ARDL(3,3,0,0)
Bounds Test	**F - statistic p-value I(1)**	13.280*** p = 0.000	11.092*** p = 0.001
	t - statistic p-value I(1)	-5.651*** p = 0.001	-5.556*** p = 0.002
EC		-0.287*** (SE=0.051)	-0.531*** (SE= 0.096)
Independent variable	**FDI** **GDP** **RR**	-0.333***(p=0.000) 4.043*** (p = 0.000) -3.533*** (p = 0.000)	-0.120*** (p=0.009) 1.792*** (p = 0.000) -0.066 (p = 0.824)

*Note: AIC is used to select the order of ARDL lags for first-differenced variables. For example, (2, 1, 1, 3) indicates that 2 lags are selected for EX, or respectively, for IM, 1 lag for FDI, 1 lag for GDP, and 3 lags for RR. *, ** and *** indicate, 0.1, 0.05 and 0.01 significance levels, respectively.*

Table 2b: ARDL cointegration summary results with long-run regression coefficients for FDI, GDP and RR (Portugal)

Dependent variable		**EX**
Order of ARDL		ARDL(1,2,1,2)
Bounds Test	**F - statistic p-value I(1)**	12.219*** p = 0.000
	t - statistic p-value I(1)	-4.782*** p = 0.008
EC		-0.345*** (SE=0.072)
Independent variable	**FDI** **GDP** **REER**	-0.407***(p=0.001) 2.547*** (p = 0.000) 1.406*** (p = 0.000)

Note: AIC is used to select the order of ARDL lags for first-differenced variables. For example, (2, 1, 1, 3) indicates that 2 lags are selected for EX, 1 lag for FDI, 1 lag for GDP, and 3 lags for RR.
, ** and * indicate, 0.1, 0.05 and 0.01 significance levels, respectively.*

Table 3a: ARDL model diagnostics. Dependent variable: EX and IM, independent variables: FDI, GDP and RR (Ireland)

Dependent variable	EX	IM
$adj.R^2$	77.60%	77.18%
B-G test	F = 1.763 (p = 0.1724)	F = 1.474 (p = 0.2457)
Durbin's alternative test	F = 1.339 (p = 0.2868)	F = 1.028 (p = 0.4159)
B-P test	χ^2 = 1.28 (p = 0.2570)	χ^2 = 0.50 (p = 0.4814)
White test	χ^2 = 36.00 (p = 0.463)	χ^2 = 36.00 (p = 0.4215)
SK test residual normality	χ^2 = 3.54 (p = 0.4215)	χ^2 = 1.36 (p = 0.506)
RCM	ST (p > 0.1)	ST (p > 0.1)
OCM	ST (p > 0.1)	ST (p > 0.1)

*Note: *, ** and *** indicate, 0.1, 0.05 and 0.01 significance levels, respectively. The B-G test denotes Breusch-Godfrey LM test for higher-order serial correlation in the disturbance. Durbin's alternative test was used to test for serial correlation in the residuals (minimal p-value across 4 lags with the corresponding value of the test statistic is reported in the table). B-P test (Breusch-Pagan test) and White test were used to test residual heteroscedasticity. SK test denotes skewness and kurtosis test used to test residual normality. RCM and OCM stand for stability test of the coefficients in a time-series regression over time. The test statistic is constructed from the cumulative sum of either the recursive residuals (RCM) or the ordinary least-squares residuals (OCM). ST indicates that the estimated model parameters are stable, whereas NST suggests otherwise.*

Table 3b: ARDL model diagnostics. Dependent variable: EX, independent variables: FDI, GDP and RR (Portugal)

Dependent variable	EX
$adj.R^2$	80.61%
B-G test	F = 2.644 (p = 0.1165)
Durbin's alternative test	F = 1.924 (p = 0.1777)
B-P test	χ^2 = 0.30 (p = 0.5814)
White test	χ^2 = 37.00 (p = 0.4226)
SK test residual normality	χ^2 = 0.86 (p = 0.6506)
RCM	ST (p > 0.1)
OCM	ST (p > 0.1)

Note: as stated before in table 3a.

Findings and Discussion

Our results reveals that the stock of the FDI inflows significantly affects exports in both countries under the study. As concerns imports, the FDI turned out to be a statistically significant determinant of Irish imports, whereas for Portugal the import model provided unexpected results. The signs for the FDI in the estimated models are negative, which point to the substitutability between the stock of the FDI inflows and trade.

For Ireland, the coefficient on the FDI stock -0.333 in the export model suggests that a 1% increase in the stock of the inward FDI reduces exports by 0,33%. Similarly to the export case, the FDI coefficient in the model of Irish imports is also negative (-0.12), which implies that the stock of FDI inflows is a substitute to imports. Our outcomes also confirmed statistically significant long-run dependence of Irish exports on the foreign income and the real exchange rate. The estimated regression coefficients have the expected signs and magnitude. The estimated coefficient on income is 4.043, which suggests

that a 1% increase in the world income leads to more than 4% rise in the Irish exports. The elasticity of exports with respect to the real exchange rate, -3.533, indicates that a 1% increase in the exchange rate (appreciation) will result in export decline by 3.5%. This result inclines to consider so-called Dutch disease as an explanation of the substitutability between FDI inflows and exports. Dutch disease is a well-known economic phenomenon that refers to a loss of competitiveness when domestic currency appreciates as a result of capital inflows. In fact, the FDI capital which during the last two decades has been heavily invested in Ireland contributed to strengthening the domestic currency, which deteriorated Irish export competitiveness. As the real exchange rate is identified as a significant determinant of exports, we infer that the inward FDI may affect exports not only directly, but also indirectly, i.e. through the exchange rate channel. As concerns the import model, the results show that Ireland's GDP is a significant determinant of imports, whereas the coefficient on the real exchange rate turned out statistically insignificant.

In the case of Portugal the elasticities obtained from the estimated export model provide statistically significant results indicating the dependence of Portuguese exports on the inward FDI, the real exchange rate and income. The coefficient on the FDI -0.407 suggests that a 1% increase in the stock of the inward FDI reduces exports by 0,4%. This result, similarly to Ireland, indicates that the inward FDI substitutes exports. As concerns the income elasticity of exports, the obtained coefficient is of the expected sign. Its value 2.547 suggests that 1% increase in the world's GDP enhances Portuguese exports by more than 2.5%. The estimated coefficient on real exchange rate (1.406) is highly significant, however its positive sign is not in line with the theory. The interpretation of such estimate should take into account the fact of the euro adoption and prevailing trade relations with the EU countries, which may be determined to large extent by non-price factors, including quality and consumer's preferences of the product brand.

The obtained results also indicate that when the variables are out of long-run equilibrium, the economic forces, captured by the adjustment coefficients EC, push the model back to long-run equilibrium. For Ireland, in the model of exports the speed-of-adjustment coefficient EC -0.287 implies that nearly 29% of the disequilibrium error is corrected after each year. In the case of Portugal, the speed-of-adjustment coefficient EC is -0.345, that implies correction of more than 34.5% disequilibrium errors within a year. Concerning the EC coefficient estimated in the model of Ireland's import, it is negative and statistically significant. Its value of -0.531 indicates that change from the equilibrium level is corrected by 53% each year.

Comparing the results for the two economies under the study, we found that the world's GDP has stronger impact on exports in Ireland rather than in Portugal's economy. This finding is a natural consequence of the fact, that Ireland is much more oriented towards trade with the non-EU economies. The share of the extra-EU exports constitutes around 50% of total Ireland's exports, whereas for Portugal it is less than 25%. It is worth noting, that shortly after the introduction of the euro, the share of the EU as a trade partner in total Portuguese exports reached 81.4%, and the share in imports was 80% (Data: UNCTAD database).

The estimates for export models for both economies identified significant substitutability between the stock of the FDI inflows and exports, however the coefficient on the FDI revealed higher for Portugal. This relationship appeared to explain a much worse position of Portugal in the trade balance. For most of the period considered, Portugal registered high trade deficits, which significantly deteriorated its net international investment position. In contrast, Ireland performed foreign trade surpluses throughout most of the period considered. However, similarly to Portugal, its excessive deficits, registered on the financial account, resulted from the net incurrence of liabilities, both of debt and equity ones.

Conclusions

Our research sheds some light on the ongoing debate over the economic openness and the factors behind trade performance. The evidence presented in this paper focuses on two aspects of the economic openness: trade and capital flows in the form of foreign direct investments. Each of them affects country's external balance. Although trade, according to the balance of payment classification, is

included in the current account, and the FDI is a financial account's item, these two variables should not be treated separately, since they interact. Thus, we investigated the nature of the long-run relationship between exports, imports and the stock of the FDI inflows. Our research is carried for two euro-zone economies: Ireland and Portugal. Both of them have accumulated excessive negative net international investment positions, respectively, -165% and -106% of the GDP, that is much below the prudential thresholds set at -35% of the GDP. Thereby, Ireland, as well as Portugal, faces the challenge of external rebalancing. The identification of the nature of the trade-FDI relationship may help to understand the effects of their globalization.

The main conclusions that can be derived from our findings pointed to a substitutability between stocks of the FDI inflows and trade. The fact that the inward FDI is a substitute for exports reduces the attractiveness of this form of capital flows, that is commonly regarded as relatively stable and export-promoting. We are aware, that the relevant relationship between trade and FDI is not limited to the strict issue of whether they are substitutes or complements. In-depth analysis should cover other aspects of economic openness, including the presence of externalities and technology transfers, that are associated with trade and capital flows. Further research may also consider sectoral interlinkages between FDI flows and trade. Bearing in mind a dynamic nature of this relationship, related to bidirectional flows of trade and capital, as well as the increasing role of services in international transactions, it can be concluded that the empirical study in this area should be continued.

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Has Import-Income Elasticity changed in the aftermath of the global financial crisis? The evidence from Poland's economy

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Abstract

After a sharp collapse in 2009, the world trade rebounded in 2010, reaching its pre-crisis volume. Although the v-shaped recovery occurred relatively fast, in the subsequent years, trade growth has been sluggish. An analysis of the pre- and post-crisis evolution of trade-income elasticities sheds some light on the structural factors behind the recent trade slowdown. The aim of this study is to explore whether import demand elasticity has changed in Poland's economy in the wake of the last financial crisis. The findings show that the income elasticity of import demand in the period 1995q1-2008q3 is nearly double that of the post-crisis era (2008q4-2019q3). This induces a structural break in the import response to income changes and gives rise to an in-depth analysis of the supply-side factors behind the recent trade slowdown.

Keywords: trade slowdown, long-term import elasticity, import-income relationship, foreign trade

Introduction

Rich empirical literature confirms a key role of trade and financial integration in driving economic prosperity (e.g. Krugman, 1979; Grossman and Helpman, 1991; Frankel and Romer, 1999; Melitz and Ottaviano, 2008; Busse and Kröniger, 2012). It is also well evidenced, that a lot of growth, especially in emerging market economies, took place through the creation of export-oriented industries, import-intensive investments and participation in the global value chains (Escaith and Inomata, 2013; Goh, 2013). Besides emerging markets in Asia, Central and Eastern European economies intensively liberalized their economies and benefited from higher trade and capital openness. Their increasing economic openness resulted from the transition from a planned to a free-market economy in the 1990s, as well as a progressive integration with the Western European countries in the 2000s. Yet, a convergence process, with the European Union high-income countries, has not been fully accomplished, the new member states faced "a global trade plateaus" problem (Evenett and Fritz, 2016). In the post-crisis era, which characteristic features are weak economic growth and trade slowdown, keeping at catching-up requires new-thinking, especially if growth strategies relied on international relationships.

While the global trade slowdown is a recent phenomenon, the analysis of a long time period can shed light on structural changes that may have occurred in the trade-income relationship. Various studies, including Escaith et al. (2010), Ollivaud and Schwellnus (2015), Timmer et al. (2016), Constantinescu et al. (2020), identified that a long-term elasticity of the world trade to GDP tended to be higher before the Global Crisis of 2008 than in the recent times. A structural break in the relationship between international trade and income was found, for example, by Ito and Wakasugi (2015), Constantinescu et al. (2020), and in the ECB studies (2016). Despite a consensus on the weaker trade response to income changes in the post-crisis era, economists differ in terms of the value and the time of the exact breakdown of the import demand elasticity.

The aim of this study is to explore whether import demand elasticity has changed in Poland's economy in the wake of the last financial crisis. By applying the ARDL model, we compute long-term response

of imports to the GDP changes over the period 1995q1-2008q3, and 2008q4-2019q3, i.e. the period preceding and following the outbreak of global financial crisis. The identification of the structural breaks in the long-term relationship between Poland's imports and income not only helps to explain trade slowdown in Central Europe but also permits to rethink about growth strategy and adapts it to the new post-crisis environment.

The paper is organized as follows. In section 2, we present a definition of the trade elasticity and briefly discuss its theoretical framework. In section 3, we review the relevant empirical studies of import elasticities and summarize the estimates published in the recent literature. Section 4 describes the methodology and presents the models estimating a long-run income elasticity of imports for Poland's economy. In section 5, we interpret the results of the study and outline the directions for further research on the nature of contemporary international trade. Conclusions are in Section 6.

The Elasticity of Imports - Definition and Theoretical Framework

Trade elasticities are crucial components of import and export demand equations. They show how international trade, both its volume and direction, is affected by income and relative prices. The former is generally gauged by gross domestic product (GDP), and the latter is frequently measured by real exchange rates. The trade effects of income changes are reflected in income elasticity of exports (or imports), whereas the influence of price adjustments on trade is explained by price elasticities of exports (or imports). As our study concerns the income-import relationship, this section focuses on the theoretical background of the causality running from income to imports.

A typical model of imports includes domestic income as a key determinant of the domestic residents' demand for foreign goods. The expected sign of this interlinkage is positive, as imports are a part of the general domestic consumers' and producers' demand for both final and intermediate goods. As the vast majority of consumers and producers' needs are satisfied with domestic trade, simple use of the general consumption theory to explain international trade would lead to a mismatched interpretation of the economic performance. Thus, trade theory helps to consider the role of international frontiers in domestic agents' behaviors.

Three approaches can be used to explain the relationship between income and import demand. They refer to the classical trade theories, the Keynesian theory, and the new trade theory. According to the classical trade theories, import demand is derived from the optimal consumer behavior, and depends mainly on the relative prices of domestic and foreign goods (Feenstra and Taylor, 2014). In this approach, a fundamental feature of import demand is price elasticity, which results from a production factor endowment, its productivity, and comparative advantages established in a particular country. In the Keynesian framework, the relationship between trade and income is analyzed on the aggregate level, with the assumption that relative prices are rigid. Thus, import changes result from short-term income fluctuations and the average propensity to import. Keynesian approach is useful in explaining the role of international trade in cyclical fluctuations (Lichtenstein 2016). However, neither classical nor Keynesian models of trade account for imperfect competition and intra-industry trade. On the contrary, the new trade theory adopts these relevant, to the contemporary economies, factors. The assumptions of monopolistic competition and increasing returns to scale shed new light on the linkages between imports and income. Such an approach points to the additional reasons, for example, market structure, exchange-rate pass-through, international fragmentation of production processes, or consumer tastes and preferences, which influence trade elasticities.

Empirical Framework of Import Elasticities: A Recent Literature Review

Most recent empirical studies of trade elasticities point that the long-term income elasticity of imports declined in the wake of the last financial crisis. For example, Constantinescu et al. (2020) use an error correction model to assess whether the global trade slowdown is structural or cyclical. The authors estimate a relationship between trade and income in the past four decades. Statistical tests confirm that the income elasticities of trade in the 1990s. were significantly different from the estimates for the

1980s and the 2000s. The long-term trade elasticity of the 1990s nearly doubled that of the period 1970-1985 and 2001-2015. This finding suggests a structural break in the trade-income relationship.

Ito and Wakasugi (2015) estimated short and long-term import elasticities of the world trade and the Japanese economy. The authors distinguished two periods: 1988-2000 and 2001-2012. Their findings showed that in both periods, the long-term elasticity exceeded 1, however in the second period import response to income changes fell twice below the level of the first period. For the Japanese economy, the import elasticity revealed greater in the 2000s. than in the 1990s., however this difference was not so big, as for the world economy (table 1). According to the authors, the results for Japan suggest that structural changes in trade occurred after the 2000s. The findings published by Ollivaud and Schwellnus (2015) confirmed an inverted-U shape relationship between imports and income over the period 1970-2015. In the years 1986-2001, when the global trade was exceptionally high, the income import elasticity was estimated at 2.3, whereas in the years preceding and following this period, trade elasticity fell to 1.3 and 1.8, respectively. Escaith and Miroudot (2015) confirmed a steep increase in trade elasticity about the year 2000, and a steep fall thereafter. Nevertheless, when Ollivaud and Schwellnus (2015) computed global income elasticities excluding intra-eurozone trade, their results suggested that the decline in import response to income changes after the year 2000 was only slightly lower than in the 1990s. This suggests that trade slowdown resulted from cyclical, rather than structural factors.

Reviewing the recent empirical studies on trade elasticities, it should be noted, that some of them prove that the trade-income relationship depends on the level of countries' development. For instance, Bernhardt (2016) analyzed the income elasticities of imports for bilateral trade relationships among developing Asian and South American countries and two key Northern markets, i.e. the US and the eurozone. He received mixed results in terms of whether South-South trade presents higher income elasticities than South-North trade, however, his findings showed that South-South trade can be an alternative source of growth for developing countries, especially if an economic and trade slowdown persists in developed economies.

Table 1 summarizes the estimates of income elasticities of imports demand published in the recent relevant literature.

Table 1: Income elasticities of imports: a review of the recent studies

Author	Sample period	Long-term elasticity	Economy
Constantinescu et al. (2020)	1970-1985 1986-2000 2001-2015	1.1 2.2 1.6	World
Constantinescu et al. (2020)	1991q1-2000q4 2001q1-2015q4	2.85 1.41	World
Constantinescu et al. (2020)	1991q1-2000q4 2001q1-2007q4 2008q1-2015q4	2.85 2.51 1.02	World
Ito and Wakasugi (2015)	1998-2000 2001-2012	2.272 1,147	World
Ito and Wakasugi (2015	1998-2000 2001-2012	1.200 1.833	Japan
ECB (2014)	1981-2007 2011-2013	1.8 1.1	World
Ollivaud and Schwellnus (2015)	1970-1985 1986-2000 2001-2014	1.3 2.4 1.8	World
Ollivaud and Schwellnus (2015)	1970-1985 1986-2000 2001-2014	1.3 2.3 2.0	World except intra euro-zone trade

Source: own elaboration based on the literature review.

Model and Methodology

To examine the relationship between trade and income, we follow the standard literature methodology and use the Error Correction Model (ECM) representation of the first-order autoregressive distributed-lag model or ARDL (1,1) as presented in (Constantinescu et al., 2020). This specification is generally sufficient to ensure a white noise error term (see Irwin (2002); Escaith, Lindenberg, and Miroudot (2010)). In particular, we are interested in estimating the long-run income elasticity of trade (in short, the trade elasticity), which measures the long-run relationship between imports and income. We also estimate the speed of adjustment to the long-run equilibrium. Specifically, we run a regression of the form:

$$\Delta lnIM_t = \alpha + \beta \cdot \Delta lnX_t + \gamma \cdot lnIM_{t-1} + \delta \cdot lnX_{t-1} + \varepsilon_t \quad (1)$$

where Δ denotes first differences, IM_t is the import volume, and X_t is real GDP at time t, α is a constant, and ε_t is the error term (Phillips-Perron unit root tests indicate that both import volume and real GDP are I(1)). In this framework, the short-run trade elasticity is β, while the speed of adjustment to the long-run equilibrium is $-\gamma$. The long-run trade elasticity is given by $-\delta/\gamma$.

Residuals were found to be stationary by the bounds test (Pesaran et al., 2001). Moreover, the Breusch-Godfrey LM test accepts the null hypothesis that there is no serial correlation in the residuals of the linear regression. These results further justify the use of the ECM specification. We check also residual homoscedasticity and normality. The results are displayed in table 2.

Table 2: Results of Estimation Using Quarterly Data

*Note: (lev.) , (dif.) denotes results for levels and differences of the unit root test. White test were used to test residual homoscedasticity. SK test denotes skewness and kurtosis test used to test residual normality. And *, ** and *** indicate, 0.1, 0.05 and 0.01 significance levels, respectively.*
Source: own calculations.

		Regression 1 (1995q1-2008q3)		**Regression 2 (2008q4- 2019q3)**	
Phillips-Perron unit root test	**IM**	p=0.409 (lev.)	p=0.000 (dif.)	p=0.0633* (lev.)	p=0.000 (dif.)
	GDP	p=0.242 (lev.)	p=0.000 (dif.)	p=0.969 (lev.)	p=0.000 (dif.)
Bounds test		Yes***		Yes***	
Breusch-Godfrey LM		Yes*		Yes	
EC		**-0.197*** **		**-0.302*** **	
Long-run elasticity 95% Conf. Interval		**2.66*** (2.33; 2.99)**		**1.40*** (1.11; 1.70)**	
Adj. R^2		36%		75%	
White's test		3.68 (p=0.8155)		14.17 (p=0.2236)	
SK test for normality		p=0.6946		p=0.8952	

The data we used in our research comes from the Eurostat database. Import volume covers imports of goods and services, and is measured in euros deflated with the GDP deflator. Real aggregate income is given as chain-linked volumes (2010 index = 100) of Gross Value Added. All the data are seasonally and calendar adjusted.

Empirical Results

The elasticities obtained from the estimated import demand model for Poland are statistically significant. They show that in the period 1995q1-2008q3, long-term elasticity of imports was 2.66, and then, in the post-crisis period (2008q4 to 2019q3), it declined to 1.40. This finding is in line with the estimates of other authors who indicate that the world trade elasticity was above 2 in the 1990s., then decreased, but remained above 1 (see table 1). It must be taken into account that the studies differ in terms of the periods of analysis, thus they are not consistent in determining the date of the breakdown

in the trade-income relationship. Our results suggest that in Poland's economy a structural break in the import elasticity might occur in the wake of the last financial crisis.

Figure 1 illustrates the growth rates of Poland's GDP and imports in five sub-periods over the years 1992-2017. It is easily seen, that prior the crisis, the GDP growth in Poland was well below the growth rates of imports. This difference was particularly striking in the years 2005-2008, when the average growth of imports reached 23.7%, whereas the GDP was growing at the rate of around 5.2%. The data presented in figure 1 also shows, that after the global crisis of 2008, Poland's imports were raising less slowly than GDP. The slowdown in import demand was a natural consequence of the overall weakness in the aggregate output, however, as the difference between the growth rates of these two variables was much smaller than in the pre-crisis era, it suggests that cyclical factors may not fully explain why trade has become less responsive to GDP. This evidence implies that structural factors might play a role in the recent trade slowdown.

Our study also provides estimates of the speed of adjustment to the long-run equilibrium. The speed-of-adjustment coefficients EC -0.197 (for the period 1995-2008) and -0.302 (for the period following the crisis) imply that 19.7%, and respectively, 30.3% of the disequilibrium errors are corrected after each quarter.

Fig. 1: Poland's GDP and imports – average yearly growth rates

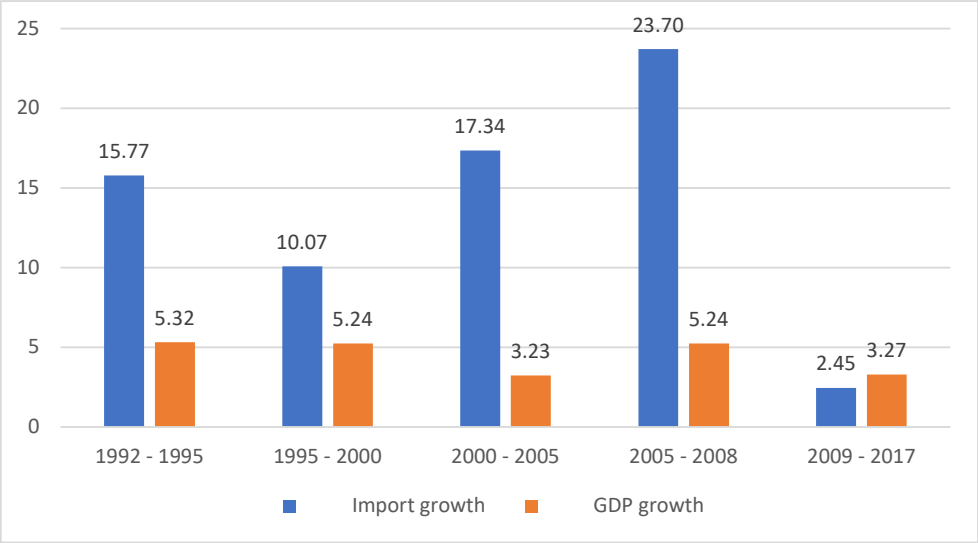

Source: Data from UNCTAD database.

A high import elasticity identified for Poland in the pre-crisis era results, to a large extent, from trade creation effects that emerged from the integration with the EU economies. However, in the long term, the incentives from functioning in a common market fade, so does the dynamics of trade growth. The additional reason for a lower trade elasticity in the post-crisis era was a slower pace of trade liberalization registered on a global scale. As a lot of countries, including the advanced European Union economies, resorted to protectionism after 2009, the changes in trade regime influenced both the volume and the composition of the foreign trade. The evidence of the global value chains confirms that a recourse to protectionism, especially so-called "behind-the-border restrictions", was associated with a decline in Poland's activity in the international network, both as a recipient and a supplier of intermediaries. As many firms seeking cost-cuts developed their supply chains and outsourced parts of their production to low-cost countries, e.g. the Eastern and Central European economies, their trade intensified. The OECD data on trade in value-added shows that share of foreign value-added embodied

in Poland's exports increased from 16.1% in 1996 to 32.4% in 2011, and declined to 26.6% in 2015 (OECD, TiVA). The slower pace of expansion of international production measured by a share of foreign value added in parts and accessories to total exports, implies weaker import's response to changes in GDP.

It is worth noting, that low income elasticity of imports may have implications for the growth prospects. As import elasticity is often related to the development of investments and international supply chains, a slower expansion of these trade drivers reduces the scope for productivity and technology spillover. On the other hand, if income growth exceeds the rate of import development, it helps to rebalance a current account. Moreover, less import-intensive production may result from gaining new comparative advantages and specialization of domestic producers in import substitutes. This does not imply the end of globalization, but rather moving to the up-stream levels of the global production chains.

Conclusions

Most of the recent empirical studies of import performance, by using state-of-the art econometric tools, e.g. cointegration techniques and error correction modeling, identify a substantial decline in income elasticity of trade. The weakness in the foreign trade relative to economic activity is observed on the global scale, and seems to be a syndrome of the post-crisis era. While economists agree on the decline in in the trade-to-GDP ratio, they differ as to the exact time of this breakdown.

This study examined whether income elasticity of imports has changed in Poland's economy in the aftermath of the last financial crisis. Our findings revealed a considerable difference in imports response to income changes in the years preceding (1995q1-2008q3), and following the crisis (2008q4-2019q3). The evidence of the reduced income elasticity of imports in the post-crisis era is in line with the estimates of other authors and suggests that trade slowdown might result from structural changes. As structural adjustments, on the contrary to cyclical factors, have a more lasting impact, their final effects will occur in the future. This opens an area for further research on the nature of the trade-income relationship and its influence on countries' macroeconomic performance.

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A Reality Check of Machine Learning Algorithms on Daily Bitcoin Prices

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Abstract

In this paper, we test the superior predictive ability of Machine Learning models in the Bitcoin market, while adjusting the results for data snooping. Our findings show that Machine Learning models inspired from five different types of classifiers are capable of generating above-random predictions for future price changes and, consequently, positive excess returns over the naïve buy and hold benchmark. However, when accounting for data snooping, the returns turn out to not be statistically and economically significant. Moreover, Machine Learning models underperform more simple and popular models derived from Technical Analysis, such as moving average cross-over rules. Even though the scope of the paper is limited, the evidence provided may be considered troublesome for investors considering applying ML-inspired trading models in cryptocurrency markets.

Keywords: Reality Check, Machine Learning, Artificial Intelligence, Bitcoin

Introduction

Analyzing the superior predictive ability of Machine Learning (ML) algorithms in financial markets is not a new research topic. Early evidence reported some success of ML-inspired models for predicting price movements on the stock and foreign exchange markets (Park and Irwin, 2007, review several relevant examples), but these were quickly criticized due to methodological limitations related to how the estimated performance measure was adjusted to trading costs, liquidity, risk, and data snooping. Because of this, ML algorithms were largely dismissed in applications related to forecasting financial asset prices, at least in the financial economics literature. However, the literature has regained its momentum due to the recent surge of new, alternative asset markets, such as cryptocurrencies, coupled with the recent advances in ML programming techniques that recorded great successes when applied to other important practical topics, such as speech and handwriting recognition (Hinton, Osindero and Teh, 2006), autonomous driving, or gameplay learning (Chen, 2016).

Many recently published papers discuss the predictability of cryptocurrency returns using ML-inspired models. For example, McNally, Roche and Caton (2018) implement Recurrent Neural Networks (RNN) and a Long Short Term Memory Network (LSTM) to achieve a classification accuracy of 52.78% for one-day-ahead price changes. Using intraday (hourly) data, Fischer, Krauss and Deinert (2019) employ the Logistic Regression and Random Forest approaches to construct statistical arbitrage portfolios that earn annualized out-of-sample returns of up to 29% (Sharpe Ratio 2.54), which is significantly higher compared to the -71% (Sharpe Ratio -1.46) obtained by an equal-weighted portfolio of 40 cryptocurrencies in the same time period. Chen, Li, Sun (2020) combine various ML learning techniques with different data structures and dimensional features to achieve price prediction accuracies of 66% and 67.2% on daily and 5-minute data, respectively. Other related papers also find that ML-inspired forecasting models consistently obtain above-random prediction accuracies and significantly positive excess returns in the cryptocurrency market.

This renewed interests for ML applications in financial markets and the positive evidence reported in the recent literature reignites an older question: do such algorithms really have superior predictive ability over financial asset prices (albeit in the cryptocurrency market), after adjusting the results to known methodological issues? Put differently, given alternative forecasting models that are easier to learn and cheaper to implement, is the significant investment into learning, developing and implementing ML-inspired prediction models worth the effort? Although recent papers try to control

for some of the known limitations, data snooping remains a problem that has not been properly addressed. This paper tries to fill in this gap by evaluating several prediction models inspired from ML using the Reality Check test of White (2000), on the specific case of the Bitcoin-US dollar market. Moreover, we test if ML models are capable to outperform classical prediction models, such as the ones inspired from Technical Analysis (TA), which have a long history and have been widely used in other financial markets (Park and Irwin, 2007).

The contribution that this paper makes is important from both practical and theoretical perspectives. From a practical perspective, we basically test if investing into learning, developing and implementing ML trading strategies in cryptocurrency markets is worth it; if not, investors would be better off with using much cheaper and easier-to-learn methods for forecasting cryptocurrency prices. From a theoretical perspective, our paper is related to the long-standing debate of market efficiency (Fama, 1970) and to the recent discussion on data snooping (see, e.g., Harvey, 2017). Our results evaluate if the overperformance recorded by ML forecasting models remains significant after controlling for data snooping, while also shedding some new light on the weak-form efficiency of the most popular cryptocurrency market, namely Bitcoin.

The remainder of the paper is organized as follows. Section 2 presents the data sample, defines the set of ML forecasting models, and presents the statistical tests used to evaluate them. Section 3 shows and comments on the results. Section 4 concludes.

Methodology

Data Sample

The data sample is collected from the Gemini Exchange via https://www.cryptodatadownload.com/ and consists of daily prices (Open, High, Low, and Close) and trading volumes for Bitcoin (BTC/USD) in the period April 28, 2013 – December 31, 2019. In total, 2439 observations are used. OHLCV data is needed in order to compute some of the selected technical Analysis indicators (discussed in Section 2.3) used as benchmarks in the statistical tests. It is also useful for tweaking the methodology in order to incorporate trading costs and market frictions associated with liquidity. However, for initializing the features needed by ML models at the beginning of this main sample, closing price data as far back as July 18, 2010 is additionally collected from Coin Metrics (https://coinmetrics.io/).

Machine Learning Models

The main goal of the paper is to test if ML models have superior predictive ability on the Bitcoin market. First, because of the general nature of ML algorithms, we frame the problem as a classification task. Specifically, we construct models that try to predict the future direction of price movements, up or down, and not the exact expected return. This is also useful from a practical perspective, because the predictions made by the various models can be associated to "signals", i.e. the suggested trading positions that investors should take in the market. An expected rise in prices would signal investors to buy the asset (a long position), while an expected decline would signal investors to sell (stay out of the market). In this latter case, short positions would also be possible, but would be conditioned by investor risk preferences and market limitations; we do not consider them in the current analysis.

Second, because we are not focusing on a particular type of ML algorithm, we select and define several alternatives, based on both classical and recently introduces concepts. The classifiers that we select are Support Vector Machines – SVM (Cortes and Vapnik, 1995), Logistic Regression, Random Forest (Ho, 1998), Wide and Deep Neural Networks – WDNN (Cheng et al., 2016), and Recurrent Neural Networks – RNN (Rumelhart, Hinton and Williams, 1986). The models are constructed and implemented in Python, with the help of the packages *Scikit-Learn*, *Keras*, and *TensorFlow*. For brevity, short descriptions for each model are listed in Table 1, while the reader is referred to Géron (2019) for further details regarding their overall characteristics and the specific ways they are implemented in Python.

Note that the risk of data snooping is considered when constructing the models (for example, we add several Dropout layers to the WDNN classifier) or implementing them. The actual implementation goes as follows. First, we use the daily closing prices (C_t) to compute the log-return series, $r_t = \ln(C_t/C_{t-1})$. Second, we construct a binary variable used in the ML classification tasks, this taking 1 if the next day's return is positive and 0 otherwise. The ML algorithms use this as the TARGET variable in the training phase, and tries to predict it in the testing phase. Third, we construct the set of features used by the ML classifiers to make predictions. Following similar approaches in the literature (e.g., Fischer, Krauss and Deinert, 2019), each day we compute the total return over the past m days, $R_{t-m,t} = \sum_{k=1}^{m} r_{t-m+1}$, in our case selecting m from $\{1,2,3,4,5,6,7,10,14,21,28,35,42,49,56,63\}$. Essentially, this choice implies that we try to predict future returns by using the price action in roughly the last 2 months. The resulting series are added to the FEATURES list.

Table 1: List of ML classification models

Classifier	Package	Implementation
SVM	sklearn	SGDClassifier(alpha=0.0001, average=False, class_weight=None, early_stopping=False, epsilon=0.1, eta0=0.0, fit_intercept=True, l1_ratio=0.15, learning_rate='optimal', loss='hinge', max_iter=1000, n_iter_no_change=5, n_jobs=None, penalty='l2', power_t=0.5, random_state=7, shuffle=True, tol=0.001, validation_fraction=0.1, verbose=0, warm_start=False)
Logistic Regression	sklearn	LogisticRegression(C=1.0, class_weight=None, dual=False, fit_intercept=True, intercept_scaling=1, l1_ratio=None, max_iter=1000, multi_class='auto', n_jobs=None, penalty='l2', random_state=None, solver='lbfgs', tol=0.0001, verbose=0, warm_start=False)
Random Forest	sklearn	RandomForestClassifier(bootstrap=True, ccp_alpha=0.0, class_weight=None, criterion='gini', max_depth=None, max_features='auto', max_leaf_nodes=None, max_samples=None, min_impurity_decrease=0.0, min_impurity_split=None, min_samples_leaf=1, min_samples_split=2, min_weight_fraction_leaf=0.0, n_estimators=5000, n_jobs=None, oob_score=False, random_state=7, verbose=0, warm_start=False)
WDNN	keras	Layer (type) Output Shape Param # Connected to input_1 (InputLayer) [(None, 34)] 0 dropout (Dropout) (None, 34) 0 input_1[0][0] dense (Dense) (None, 32) 1120 dropout[0][0] dropout_1 (Dropout) (None, 32) 0 dense[0][0] dense_1 (Dense) (None, 32) 1056 dropout_1[0][0] dropout_2 (Dropout) (None, 32) 0 dense_1[0][0] dense_2 (Dense) (None, 32) 1056 dropout_2[0][0] dropout_3 (Dropout) (None, 32) 0 dense_2[0][0] dense_3 (Dense) (None, 32) 1056 dropout_3[0][0] concatenate (Concatenate) (None, 66) 0 input_1[0][0] dense_3[0][0] dense_4 (Dense) (None, 1) 67 concatenate[0][0] Total params: 4,355 Trainable params: 4,355 Non-trainable params: 0
RNN	keras	Layer (type) Output Shape Param # simple_rnn (SimpleRNN) (None, None, 4) 36 simple_rnn_1 (SimpleRNN) (None, 4) 36 dense_5 (Dense) (None, 1) 5 Total params: 77 Trainable params: 77 Non-trainable params: 0

However, we consider that the return series are not enough to accurately forecast future price movements and other variables may also be important. We explicitly consider volatility, which we also incorporate using the standard deviation of returns over the past n days, selecting n from $\{7,14,21,28,35,42,49,56,63\}$. As a way to further incorporate the possible effect of higher

moments in the distribution of returns, such as asymmetries and thick tails, we also add the observed skewness of the return series over the same historical windows as for volatility. We end up with a set of 33 features, which we use to train the SVM, Logistic Regression, Random Forest and WDNN classifiers. Because the RNN classifier was developed to explicitly handle time-series data, we use a different set of only 4 features when training it, this consisting of the daily return, the squared return, the cubed return and the biquadrate return.

Finally, we implement the following procedure to fit our models and make predictions. Starting with April 21, 2013, we constitute a training set using all available observations in the extended sample prior to that day (July 18, 2010 – April 20, 2013). We train each model on the first 70% of days and then select the best one by measuring prediction errors on the remaining 30% of days. This cross-validation implementation tries to avoid the problem of fitting to the noise in the data. Early Stopping is also implemented; this stops training when the prediction error on the validation set starts to diverge from the one on the training set, implying that the models start to overfit the data. The resulting models are used to make one-day-ahead predictions using the feature set observed in the current day and the following 27 days. After 4 weeks, the models are retrained and the process is repeated until we reach the end of the sample. Note that this procedure assures that we conduct a true out-of-sample test. To test if the models are capable to predict returns several days ahead, we also record and evaluate the lagged predictions up to one week.

Evaluating the Performance of ML Forecasting Models

First, we are interested to test if the ML models are capable of providing non-random predictions above the naïve 50% threshold. For this, we analyze the prediction accuracy of each model using simple t-tests, both on the entire sample and on subsample of 1 year of data.

Second, we evaluate the superior predictive ability of ML models by using their predictions to simulate trading and compute, evaluate their empirical performance. In order to avoid look-ahead bias, we perform all trades on the Open price of the day following each prediction. Also, for simplicity, we do not consider trading fees. Further, in order to control for data snooping, we test the results using the Reality Check (RC) methodology proposed by White (2000). The RC evaluates the null hypothesis that the best performing prediction model in the set ("universe") is not capable to outperform a benchmark model. Here, we use the buy and hold strategy as the naïve benchmark and the simple average excess return over the benchmark as the performance measure for each model. The RC effectively evaluates the data-snooping-free statistical significance of the average excess return obtained by the best ML model, using the empirical distribution of excess returns constructed via bootstrap simulation. In our implementation of the RC, we use the stationary bootstrap of Politis and Romano (1994) with $B = 10{,}000$ iterations.

Third, we also evaluate if ML models are capable to outperform simpler alternatives, namely prediction models ("*technical trading rules*") derived from Technical Analysis (TA). For this test, we select three classes of TA models that are very popular among investors and have also been widely used in the relevant literature (see, e.g., Sullivan, Timmermann and White, 1999). Specifically, we employ moving average crossover rules and their extension, the MACD indicator; the RSI indicator; and the Stochastic Oscillator (%k). Colby (2002) provides a detailed description of each indicator, while our implementation is based on the work of Anghel (2015), which constructs prediction models by successively setting values to their various parameters, such as the lookback window (for which we also use a maximum of 143 days). The resulting universe of TA prediction models has 17,365 individual entities, out of which only 12,312 make trades and are considered. We use this together with the ML-inspired models in a second RC test to essentially evaluate which are better. The number of alternative TA models used may seem excessive, but is motivated by the need to reinforce the point on the dangers of data snooping. However, we also consider alternative universes. Overall, we run several robustness tests using smaller universes but the conclusions do not materially change, even though specific results do. For example, we report the results from a small set of 196 models based on the simple moving average cross-over rule.

Results

Predictive ability of ML models

The results of the predictive accuracy tests are reported in Table 2. We find that most ML models make non-random predictions, as shown by the statistical significant full-sample prediction accuracies. Even though the estimated accuracies vary for the different prediction models–the most successful is the Random Trees 4-d.a. model, with an overall accuracy of 54.49% (t=4.87), while the less successful is the SVM 6-d.a. models with an accuracy of 50.65% (t=0.70)–most models tend to obtain above-random results on the entire sample.

Table 2: Prediction Accuracy of ML trading strategies

No.	Classifier	Days Ahead	2013	2014	2015	2016	2017	2018	2019	*Full Sample*	
[1]	SVM	1	47.95%	50.96%	52.60%	46.72%	58.63%	48.77%	46.58%	***50.96%***	***[1.03]***
[2]		2	57.26%	47.40%	50.96%	57.10%	59.73%	47.40%	51.78%	***53.40%***	***[3.67]******
[3]		3	55.89%	49.32%	50.96%	59.02%	60.00%	49.32%	54.52%	***54.32%***	***[4.68]******
[4]		4	59.73%	49.86%	47.95%	57.92%	54.25%	48.49%	56.44%	***53.57%***	***[3.86]******
[5]		5	53.97%	44.38%	50.96%	54.64%	60.27%	50.68%	51.78%	***51.71%***	***[1.85]****
[6]		6	45.48%	51.23%	53.42%	47.27%	55.89%	49.32%	46.30%	***50.65%***	***[0.70]***
[7]		7	60.27%	47.12%	51.51%	56.56%	60.27%	49.04%	50.14%	***53.81%***	***[4.12]******
[8]	Logistic Regression	1	57.26%	50.68%	52.05%	54.10%	58.90%	47.40%	53.42%	***53.60%***	***[3.89]******
[9]		2	61.64%	49.59%	47.95%	55.74%	51.51%	49.59%	53.15%	***52.95%***	***[3.19]******
[10]		3	54.25%	47.12%	49.32%	55.74%	57.53%	50.68%	51.78%	***51.78%***	***[1.92]****
[11]		4	47.95%	50.96%	50.96%	47.27%	56.99%	53.70%	48.22%	***51.71%***	***[1.85]****
[12]		5	61.10%	45.21%	50.41%	56.01%	59.45%	44.93%	52.33%	***52.98%***	***[3.22]******
[13]		6	58.08%	50.68%	52.88%	55.19%	61.64%	47.12%	52.33%	***54.32%***	***[4.68]******
[14]		7	63.56%	49.32%	49.59%	56.28%	52.33%	49.86%	52.88%	***53.46%***	***[3.74]******
[15]	Random Forests	1	53.97%	46.58%	51.51%	55.46%	59.45%	49.59%	52.60%	***51.78%***	***[1.92]****
[16]		2	47.12%	51.23%	52.33%	48.09%	57.26%	52.60%	46.30%	***51.34%***	***[1.44]***
[17]		3	61.37%	46.58%	50.96%	56.01%	57.81%	48.49%	50.14%	***53.22%***	***[3.48]******
[18]		4	57.26%	50.14%	53.15%	56.83%	58.90%	49.04%	53.97%	***54.49%***	***[4.87]******
[19]		5	63.29%	45.21%	49.59%	55.74%	53.42%	48.22%	54.79%	***53.09%***	***[3.33]******
[20]		6	55.34%	45.21%	51.78%	56.56%	60.00%	52.05%	51.23%	***51.92%***	***[2.07]*****
[21]		7	46.03%	51.78%	54.79%	47.27%	55.89%	52.60%	45.48%	***51.27%***	***[1.37]***
[22]	WDNN	1	60.00%	45.75%	50.41%	56.56%	58.90%	46.85%	53.97%	***53.36%***	***[3.63]******
[23]		2	54.79%	52.88%	51.23%	54.64%	59.45%	50.96%	51.78%	***53.91%***	***[4.23]******
[24]		3	63.01%	46.03%	47.40%	58.47%	55.07%	47.67%	54.79%	***53.36%***	***[3.63]******
[25]		4	52.60%	46.03%	52.33%	55.46%	56.71%	53.15%	51.23%	***51.78%***	***[1.92]****
[26]		5	49.86%	49.32%	55.89%	46.99%	58.90%	52.60%	47.95%	***52.43%***	***[2.63]******
[27]		6	61.92%	46.58%	51.51%	58.20%	60.00%	50.68%	51.23%	***54.18%***	***[4.53]******
[28]		7	57.26%	51.23%	49.32%	52.46%	57.81%	50.96%	49.86%	***53.05%***	***[3.30]******
[29]	RNN	1	63.29%	46.30%	49.04%	56.28%	55.89%	47.40%	52.88%	***52.91%***	***[3.15]******
[30]		2	56.71%	45.48%	50.68%	57.10%	61.37%	49.59%	51.78%	***52.67%***	***[2.89]******
[31]		3	47.67%	49.04%	53.15%	47.27%	56.44%	49.86%	47.67%	***50.96%***	***[1.03]***
[32]		4	60.00%	45.75%	51.51%	56.56%	57.26%	47.95%	49.86%	***52.85%***	***[3.07]******
[33]		5	56.99%	50.41%	48.22%	55.19%	55.62%	50.68%	50.41%	***52.61%***	***[2.81]******
[34]		6	63.56%	46.58%	49.04%	57.92%	53.97%	48.22%	53.15%	***53.36%***	***[3.63]******
[35]		7	53.70%	44.93%	52.33%	54.37%	58.63%	52.88%	51.78%	***52.67%***	***[2.89]******
All Classifiers			***56.28% [4.45]*****	***48.19% [-1.25]***	***51.07% [0.61]***	***54.37% [2.40]*****	***57.60% [4.34]*****	***49.66% [-0.25]***	***51.27% [1.25]***	**52.76%**	**[5.14]*** **

*Note: t-statistics are reported in square parenthesis for full sample (year) prediction accuracies in excess of the random 0.5 threshold. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.*

On the other hand, the estimated accuracies do significantly change from one year to another. The multi-model one year average is highest in 2017 at 57.60% (t=4.34), while being lowest in 2014 at 48.19% (t=-1.25). Also, the various prediction models obtain widely different results on a year-by-year basis. The best yearly performance in our sample is obtain by the RNN 6-d.a. classifier in 2016 (61.56%), while the worst is obtain by the SVM 5-d.a. classifier in 2014 (44.38%).

Overall, the results support previous findings regarding the overall prediction accuracy of ML-inspired models, which range from 52% (McNally, Roche and Caton, 2018) to 66% (Chen, Li, Sun, 2020) on daily Bitcoin data, but also show that the this significantly varies in time and that ML-inspired prediction models can significantly underperform in some particular periods.

ML Performance When Adjusting for Data Snooping

The results of the RC tests conducted for the universe of ML models (Panel A), ML and moving average (MA) models (Panel B) and ML and TA models (Panel C) are reported in Table 3. For the entire sample and for each individual year in the sample, we report the prediction model that obtained the best performance, its average excess return compared to the buy and hold benchmark and the RC p-value that evaluates its significance while accounting for data snooping. Also, Figure 1 provides a visual representation of the location of the full-sample performance (excess return) obtained by the best ML model within the empirical distribution estimated via bootstrap simulation in two of the three RC tests.

Table 3: RC test results

Panel A. 35 ML Models				
Year	**Best Model**	**Average Daily Return**	**Annualized Return**	**RC p-value**
2013	ML classifier [13]	0.2589%	63.94%	0.8308
2014	ML classifier [23]	0.3598%	131.34%	0.1712
2015	ML classifier [26]	0.3179%	116.02%	0.1519
2016	ML classifier [10]	0.0501%	18.35%	0.9436
2017	ML classifier [30]	0.1357%	49.53%	0.9382
2018	ML classifier [16]	0.4863%	177.50%	0.1176
2019	ML classifier [24]	0.1527%	55.72%	0.7712
FULL SAMPLE	ML classifier [13]	0.0596%	21.76%	0.8527
Panel B. 35 ML & 196 MA Models				
Year	**Best Model**	**Average Daily Return**	**Annualized Return**	**RC p-value**
2013	MA(5,8)	0.3108%	76.76%	0.7881
2014	MA(2,8)	0.4060%	148.21%	0.1304
2015	ML classifier [26]	0.3179%	116.02%	0.1783
2016	ML classifier [10]	0.0501%	18.35%	0.9699
2017	ML classifier [30]	0.1357%	49.53%	0.9586
2018	ML classifier [16]	0.4863%	177.50%	0.1402
2019	MA(11,20)	0.1810%	66.06%	0.7093
FULL SAMPLE	MA(11,20)	0.1258%	45.91%	0.3389
Panel C. 35 ML & 12,312 TA Models				
Year	**Best Model**	**Average Daily Return**	**Annualized Return**	**RC p-value**
2013	RSI(2) > 26	0.5517%	136.26%	0.6559
2014	%K(22) > D(7)	0.4786%	174.70%	0.1987
2015	%K(2) > D(7)	0.3777%	137.87%	0.3413
2016	RSI(2) > 20	0.1042%	38.14%	0.9319
2017	RSI(8) > 42	0.1635%	59.68%	0.9898
2018	%K(2) ↗ 30 ‖ %K(2) > 80	0.7839%**	286.13%**	0.0256
2019	MACD(17,20) > S(5)	0.2059%	75.17%	0.8344
FULL SAMPLE	MA(11,20)	0.1258%	45.91%	0.6729

*Note: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.*

Several interesting results are worth noting. First, the best ML model (no. [13], representing the Logistic Regression 6-d.a. model, as recorded in Table 2) obtained an average annualized excess return of only 21.76% over the full sample. As can be seen in Figure 1, this almost falls within the left tail of the empirical distribution of excess returns. As a result, the RC p-value is 0.8527, implying that the results is not statistically and economically significantly. Similarly, we observe that the significant predictive ability of ML forecasting models enable them to earn positive excess returns each year in

our sample, but none of the estimated results are statistically and economically significant, as can be inferred from the RC p-value. The Random Forest 2-d.a. models comes closest to achieving superior performance, but even a 177.5% return in excess of the buy and hold in 2018 does not qualify as being significant at the 10% level after adjusting for data snooping. Overall, these results lead to the conclusion that ML-inspired trading models are not able to generate statistically and economically significance performance in the Bitcoin market. We note that the reported performance is actually overestimated by not accounting for fixed trading costs, which further reinforces this conclusion.

Second, the tests of the 35 ML vs. the 12,312 TA models (Panel C, Table 3) show that TA models outperform the ML models in every year, and also on the entire sample. In this latter case, the simple cross-over rule that buys Bitcoins when the 11-day moving average is above the 20-day moving average outperforms the best ML model in terms of average excess return by a factor of 2.1 to 1. Similar results are obtained for each year in the sample, culminating in 2018 with a version of the Stochastic Oscillator (%K) model earning 286.13% above the buy and hold benchmark, this being statistically and economically significant at the 5% level. Moreover, the results reported in Panel B show that simple moving average cross-over rules outperform ML models in 3 of the 7 investigated years. Overall, the findings show that ML forecasting models underperform even some basic and popular prediction models derived from technical analysis, which are much easier to learn, develop and apply by investors.

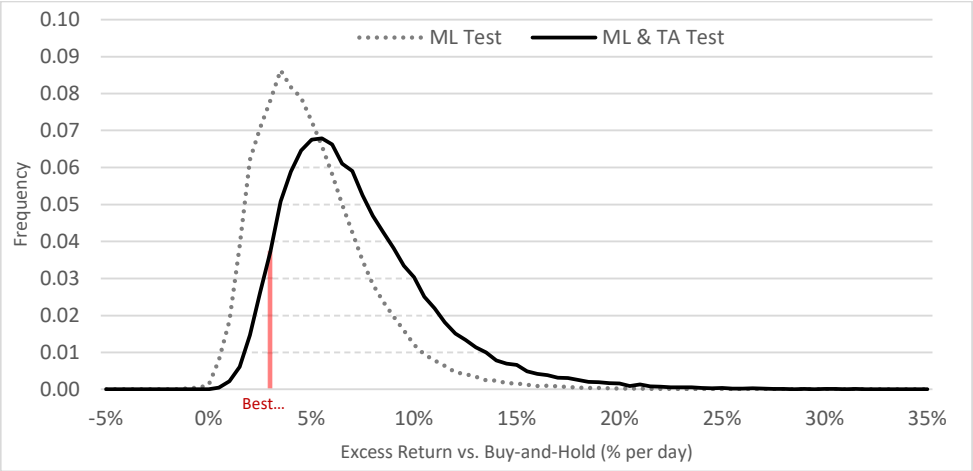

Figure 1: Empirical Distribution used to evaluate RC null hypothesis (full sample test)

Third, the statistical significant excess performance obtained by the TA prediction model in 2018 even after adjusting for data snooping may indicate that the Bitcoin market is not weak-form efficient. However, given that this is the only RC null rejection in our tests, and that the results were estimated without adjusting for trading costs, we restrain from drawing a definite conclusion in this regard solely based on the reported results. Further research is necessary to elaborate on this issue.

Conclusions

There is currently a significant expansion of the literature focusing on forecasting financial asset prices using Machine Learning algorithms, such as Artificial Neural Networks (ANNs), Genetic Programming, or other Machine Learning (Artificial Intelligence) algorithms. Although the recent literature more thoroughly controls for possible methodological issues, the important problem of data snooping remains significant. This paper evaluates the superior predictive ability of Machine Learning models on the Bitcoin market, while specifically adjusting the results for data snooping. Five types of Machine Learning classifiers are considered, namely Support Vector Machines, Logistic Regression, Random Forest, Wide and Deep Neural Networks, and Recurrent Neural Networks. The prediction results are then tested using the Reality Check proposed by White (2000).

Overall, we find that Machine Learning models are capable to generate above-random predictions for future price changes, this echoing similar results in the literature (e.g., McNally, Roche and Caton, 2018). However, the predictions do not generate statistically significant excess returns over the naïve buy and hold strategy, when accounting for data snooping. Moreover, Machine Learning models underperform more simple and popular models derived from Technical Analysis. The results imply that, at least when using daily price series, investing into learning, developing and implementing ML models is not worth the effort on the Bitcoin market, especially when other cheaper and better-performing alternatives exist.

The paper does however present some limitations that do not enable the generalization of this result. First, the hyper-parameters related to learning rates, optimization methods, number of layers (for neural networks) or other important ML setups were not optimized. Thus, there might still be a margin for developing ML models that would generate better results. As a counterpoint, other simple and popular Technical Analysis methods, such as Filters, Support and Resistance levels, and many more, were also excluded from the tests. Second, only daily trading data was considered, while intraday data may be important for this discussion. Similarly, besides historical trading data, other information regarding Bitcoin trading and the cryptocurrency market were not included. Finally, only Bitcoin prices were investigated. While this is the oldest and most recognized cryptocurrency, many other price series from this continuingly growing market remain to be investigated. All of these limitations can be addressed in future studies.

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Analyzing and Evaluating the Amount of Power Consumption Used by Current Power-Saving-Applications on Android Smartphones

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Abstract

This paper aims at analyzing and evaluating the consumption of energy of Android power saving applications however, the study has been done in a qualitative manner. The secondary analysis has been done by evaluating the past research papers and surveys that has been done to assess the perception of the users regarding the phone power from their battery. In addition, the study highlights an issue that the notifications regarding the power saving shown on the screen seems to exploit a lot of battery. Therefore, the study has been done to reflect the ways that could help the users to save the phone battery without using any power from the same battery in an efficient manner. The goal of the study was also to provide a simple insight into four main research questions. As to the research question about energy saving features that could aid in energy resistance includes the flight mode, do not interrupt, power off Wi-Fi and data connections. Furthermore, with regard to the research questions about the fact that power saving application consumes a lot of electricity, past studies clearly indicate that there is a lot of battery depletion due to several factors and these problems have become a major problem for smartphone users and manufacturers. The study offers a good insight into many ways that could be used to more effectively conserve smartphone energy.

Keywords: Android smartphones, Android applications, Power-saving, Battery.

Introduction and Background

Power management has been considered as one of the basic feature in the mobile phones however, mobile companies have been urged in introducing advanced power management features and different power interface and advanced configuration (Datta, Bonnet and Nikaein, 2012). Not only the computer engineers but the mobile phone application developers have been seen to show their interest in encouraging power saving features that must be advanced and must not incur power of the phone. Android version of phone holds the Linux Kernel and has put forward its power management systems including Google I/O (Zhuang, Kim and Singh, 2010). Moreover, it has been reported in the research that there are around 400,000 devices of Android who has activated the power management systems but for some of the individuals, these applications have become an issue. The developers of power management systems and applications have been seen to be very sophisticated thus the hardware components available in the applications have been seen to and consume a lot of battery power and also the storage of the mobile phones. High drain of power from the energy saving applications has become a major issue for the users thus they are having really bad experience. Moreover, there are some of the important components such as GPS, Wi-Fi and OLED which is consuming high energy level and power (Paek, Kim and Govindan, 2010). As per to another study and research, in the power saving applications there is a role of third party advertisements that aims at consuming around 30% of the total power consumed by application (Ravi et al., 2008). This is the reason that the persistent usage of the applications could increase the advertisements and automatically decrease the uprightness of the battery. Android aims at developing an aggressive policy and application for the power saving that includes wake locks and helps in conserving the battery life but this is not enough and sufficient for saving the battery. In addition, there are several

applications in the Google play store that provides the users to get facilitated with the power saving applications. In order to understand its consistency and power saving modes without wasting the power of phone, the researcher has done an in-depth analysis to check its operating principle. It has been explored that most of current power-saving-applications tends to control the features of a smartphone including Wi-Fi, 2G and 3G, brightness level, GPS as they have a significant impact in making the battery life prolong. In addition, the deep analysis also revealed that the use of power-saving modes is statically significant which also controls the features of smartphone. There are several mobile phones who have a pre-define control on saving the battery life. With the changing patterns of smartphone usage, the idea of dissipation of power has been seen to be varied (Ravi et al., 2008). In order to deal with the threats regarding the investigation of the research, it is clear that there are various aspects of android battery saving development which have identified major semantic bugs and syntactical errors. These errors play a major role in destroying the capability of the power saving applications in showing up their capability (Payet and Spoto, 2012).

In this contemporary world, the increase in the application developers have also showed an increase in uncovering various vulnerabilities. This is the reason that several developers have urged in developing the criteria to save the power. For this, the researchers and developers have done a research by performing every step statically and ensured that there could be an android application code that might help the users in ensuring high scalability and save the power of the mobile phones (Moran et al., 2015)(Arzt et al., 2013). At that time, the study remained incomplete because of severe obstructions in the specific Android features and the biggest hindrance in the completeness of analysis made the researcher dissatisfied in proposing a mode of power saving (Li et al., 2015)(Lu et al., 2012). One of the common barriers that have been confronted by Android is the lack of the main point of entry or the construction of call graph. these issues regarding the introduction of saving modes without compromising the battery of the mobile devices might be controlled if the handlers of Android and other mobile phones work more efficiently.

Not only is this there several other challenges carried by the mobile application that includes the support of Java programs. Java reflection statements helps in dealing with the dynamic code loading however, major support of Java application would be helpful in obtaining a hype on power saving solution (Moran et al., 2015). According to the recent survey and analysis, securing the mobile phone from viruses is the only way to use it for long term however, responses from multiple smartphone users indicated that downloading and using power saving applications caused an negative impact on their phones thus it is exploiting their battery usage adversely (Lu et al., 2012) (Payet and Spoto, 2012). The fact about using smartphone is that it is energy constrained and its life relies on limited use of battery supply (Li and Halfond, 2014). The researchers have been playing very well in showing up advanced battery technology that could help in saving the consumption of battery and helps in alleviating the limitations in using the phone. It is important to improve the capability of the developers to construct an energy saving methodology which could be used as an essential source of reducing effect of energy constraints (Hao et al., 2013).

Research Aim and Questions

The primary aim of this study is to give a unique idea regarding the battery saving without the consumption of any power from the battery. The study looks into following questions:

- Does power saving applications also consume a lot of power?
- What are the issues regarding current power management applications?
- What are some of the proposed ways that could help in saving power of the phone?
- What are some of the battery saving features that could help in improving battery resistance?

Related Work

In the present era, smartphone devices are taking the first place among other technology platforms as users now prefer them for different life purposes. In the past few years this trend has increased, and there has been a significant increase in the number of smartphone users. Smartphones are known to intake an unusual amount of electricity budget of the world due to the repeated charging of battery (Ahmad et al., 2016). Besides that, a report provided by Barry Flscher (Fischer, n.d.) the volume of energy it takes in charging iPhone 5 smartphones globally is equal to the accumulated power utilized by 54000 United States households for each year. Following this report, the power demanded by iPhone 5 each year is ranging from 3.5 to 4.9 kWh. Furthermore, the financial expense for charging an iPhone 5 per year is $0.41. Another approach through which the electricity budget can be minimized globally is through energy estimation.

Power models for mobile devices

The task of modeling consumption of power could be divided along two aspects (Kjærgaard and Blunck, 2012). Initial aspect is related to the approach through which measurements are collected for designing the framework. These calculations can be gathered through utilizing an internal battery interface or through external equipment. The second aspect is the sort of data through which the framework was built. Such a power framework can be planned from: computation of system usage, for instance processer data accessible from OS level, consumptions of power computation for each system call construct to OS and consumption of power computations each application program interface call constructed in a particular language of programming. Numerous research attempts have been managed on the gathering of power models for various hardware building elements of a cell phone device for assisting application developers for estimating energy needs of the mobile application.

Power Tutor (Zhang et al., 2010) utilizes data taken from voltage drop for determining the battery discharge rate to approximate the consumption of power. These frameworks are assembled and approved for single-core mobile processors. The calculations identified that application of the identical model for contemporary high-performance multi-core mobile devices would be somewhat incorrect. Moreover, the Wi-Fi model is unable to discriminate among the energy consumed while sending and receiving states producing not so precise results. Shye et al. (Shye, Scholbrock and Memik, 2009) provided a solution in which he used a background logger which was monitoring the resource usage by emphasizing various hardware elements of the cell phone device periodically. A linear regression framework was planned through accumulating present calculations with an external device, with, OS described statistics of battery operating voltage and logger information. Even though, the framework is developed for a sole core Central processing unit, and lower Central processing unit frequencies are not considered while planning the model of power whereas it is rather imprecise for the offloading utilize case. Powerprof (Kantardzie, 2005) also uses a smart battery to calculate the consumption of power at the length of time they take to run through a particular Application Program Interface (API) and such data is utilized for measuring the energy operation of application API calls. Utilizing genetic algorithms (Yoon, 2012), an energy usage profile is identified for every method call. This method is implacable solely when a smart battery applying that particular Application Program Interface is accessible, and it supposes that every time a way is called the similar quantity of power will be utilized, which is usually over-elaborated. AppScope (Jung et al., 2012) is an energy based on an Android mentoring system that utilizes power frameworks and usage facts or data for every hardware element. Linear regression power frameworks are built utilizing DevScope (Kim, Kong and Chung, 2012), and equipment resource utilization examining is taken by loading extra modules into the Linux kernel. For estimating the utilization data of each traces, application, and inter-process communication are examined, showing a significant overhead. Moreover, this equipment is not managing the multi-core processors. Figure.1 clearly illustrates that there are certain categories of applications which are more towards the consumption of battery in smart phones. However, those categories include Entertainment, lifestyle and productivity, travel and transportation, music and media applications, camera, utilities and other tools.

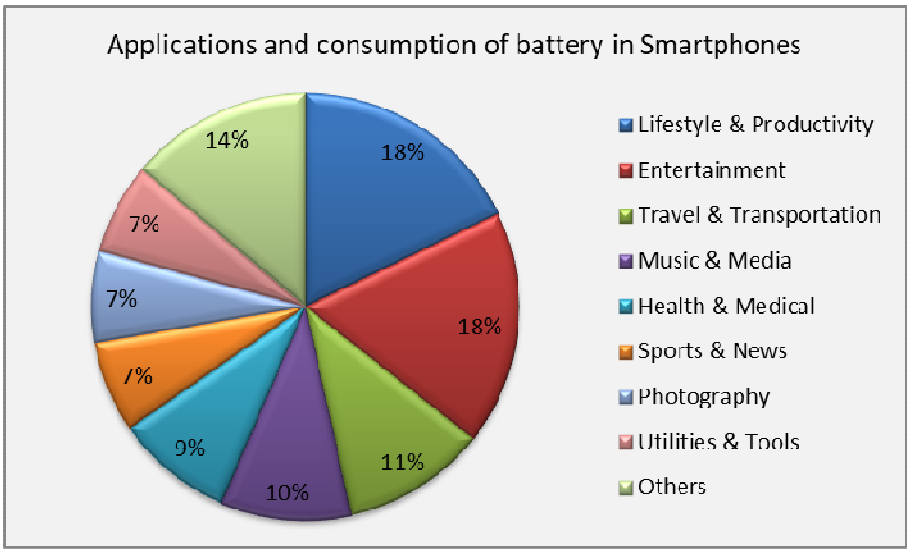

Fig. 1: Applications and consumption of battery in Smart phones (Kim, Kong and Chung, 2012)

Figure.2 points out the list of non-idle energy and their percentage of consumption of battery. Non-Idle energy refers to the power that is active or in-use however, the most common and active energy includes the power of Internet, UI and Camera that seems to consume a lot of battery.

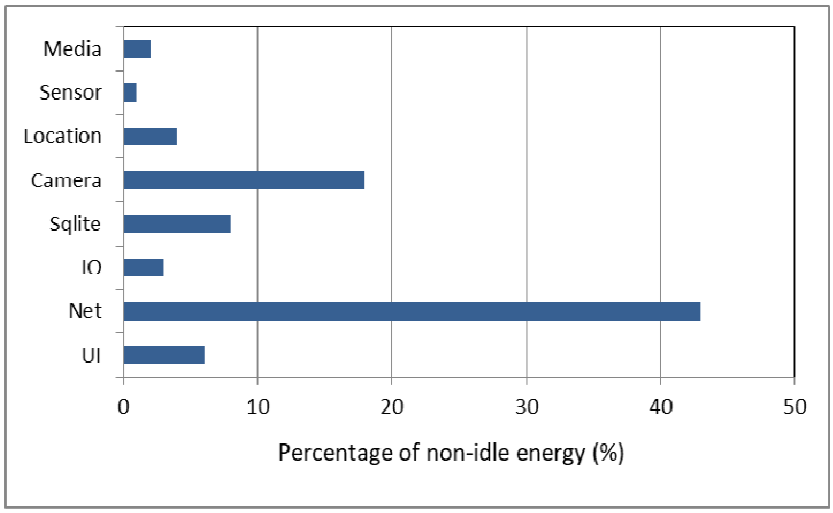

Fig. 1: Percentage of non-idle energy (%) (Kim, Kong and Chung, 2012)

Besides that, the method described in Kim et al. (Ali et al., 2016) provided an expanded online power approximation method for multi-core smartphones which are utilizing an external meter of power.

Present power models, as concluded in Table1 are lacking one or more than one attributes of present mobile hardware: they are outlined for single core Central Processing Units, disregarding the energy proportionality of Central Processing unit frequency scaling or it does not discriminate among the various energy states of network interface cards. Furthermore, specialized hardware and software

application program interfaces are needed for measuring the power consumption of the application of application program interface calls.

Table 1: Mobile device power models for energy efficient dynamic offloading at runtime (Ali et al., 2016).

Comparison of previous work related to power modeling.

	CPU		Display unit	Memory	Network
	Cores	Auto-scaling			Wi-Fi
CloneCloud (Chun et al., 2011)	On–Off model		x		On–Off model
MAUI (Cuervo et al., 2010)	Single-core tested				Simplified[a]
Power Tutor (Zhang et al., 2010)	Single-core	2 freq. supported	x		Simplified[a]
AppScope (Yoon et al., 2012)	Single-core	x	x		Simplified[a]
PowerProf (Kjrgaard and Blunck, 2012)	Single-core	Not mentioned			Simplified[a]
Online Estimation (Kim et al., 2012)	Dual-core	x	x		Simplified[a]
Into the Wild (Shye et al., 2009)	Single-core	2 freq. supported	x		Simplified[a]
Our work	Multi-core support	x	x	x	Detailed[b]

[a] Wi-Fi simplified model does not differentiate between Send and Receive states.
[b] Wi-Fi detailed model takes into account Send, Receive, Tail and Idle states.

This power model manages with all these restrictions. Moreover, it is proven for multi-core Central Processing Units, and all assisted frequencies are contemplated. In addition to that, Wi-Fi power framework precisely discriminates among various conditions of the wireless interface card. There is no need for specific software or hardware support, and there is no requirement of extra overhead in the analysis of various traces. This framework also observes the power consumption because of memory acquired to the application (RAM)

Previous Researches on Power Saving Modes and Applications

For extending the battery life of Android smartphones, developers have offered many applications which are accessible in the Google Play Apps store. Many such applications were analyzed at the time of the survey for understanding the power saving methods. They study how these applications increase efficiency of power saving, their principles and restrictions of operating that gather different ways in encouraging the improvements. It was identified that these energy saving applications have two different methods for managing the consumption of the energy of smartphones. The following sections are discussing the efficiency of energy consumption, operation and limitations of set Central Processing Unit for Root Users (Kang, Seo and Hong, 2011), Juice Defender (Pathak, Hu and Zhang, 2012), and Central Processing unit tuner (Pathak, Hu and Zhang, 2012). These applications are selected on the basis of their high user rating, positive feedback of the user and their popularity.

Increase in the efficiency of power saving

Many hardware elements such as GPS, Wi-Fi of tablets and smartphones take very extraordinary energy (Pathak, Hu and Zhang, 2012). Hence, energy can be saved by turning them off when they are not being utilized. Moreover, there are various characteristics like auto sync, frequency of recent notifications which uses the hardware and other connectivity. Reducing the rate at which notification occurs (mainly of Gmail, Facebook) also reduces the utilization of smartphone elements and extends the battery life. The listing is not comprehensive.

- Fastening command on Bluetooth, Wi-Fi, auto-sync, GPS, auto screen lock, airplane mode, USB, screen-always-on, mass storage, 2G, torch, 3G, 4G/Wimax (if available) and the cell phone data (APN).
- Fluctuate the brightness level of cell phone's display
- Vibration and volume management

- Screen alteration time value
- Development – night, peak, weekend.
- Timeout of setting Wi-Fi
- Getting a home screen with dark wallpaper for organic light-emitting diode (OLED) display.
- The stated three application utilizes all or a subset of these characteristic in their profiles of power saving.

Power saving Applications and its operations

It is essential to know the operating principle of the applications for investigating their restrictions. When the app is installed in a rooted smartphone and the root permissions are given then there are sliders which allow the management of the Central Processing Unit frequency done by hands (Rahmati, Qian and Zhong, 2007). After that Central Processing Unit administrator must be chosen. It manages how the frequencies of Central Processing unit are scaled among the utmost and minimum set frequencies. Mostly kernels considered as smartphones have 'performance' and 'on demand'. The moment central processing unit load gets to a threshold, on demand increases the frequency instantly and decreases the frequency when the load is on its minimum. Other present Central Processing Unit administrator is mentioned in (Rahmati, Qian and Zhong, 2007). A few of them have expert condition controlling attributes. The profiles design the application to set the Central Processing Unit frequency in certain situations. Furthermore, there is a "monitor with condition" which repeatedly monitors the situations set in profiles. If such a situation is true, then a particular profile is activated. For instance, the profile "Battery <" is place when battery level decreases below a provided level. The profile "Time" is activated for a specific time frame. Specific priority is given to all the profiles. If situations of many profiles are correct, then the priority of these profiles is inspected. The profile with the most priority is triggered. In the mobile saving applications, there are various profiles that aims at controlling over the smartphone features thus the developers must keep a deep focus on creating an application that could be able to be fully customized by the users which might be helpful in making a deep focus on saving high consumption of battery (Wood et al., 2008)

Exploring Battery Saving features

By exploring the battery saving features, it is clear that there is various ROM s that could be customized like the Lineage Operating system thus these applications help in setting the menu in a manner to optimize and conserve the consumption of battery efficiently. By toggling and pinning the options, the users could easily find and use them. For example, the best thing a user could do to save the power without compromising battery is switching off Wi-Fi and data connection when it is not needed. Moreover, there are several setups in the phone such as do not disturb option that is included for the purpose of power management. In addition, there are some of the smart applications such as IFTTT that helps the user to create their own rules to save the life of a battery efficiently (AndroidPIT, n.d.). There are several limitations regarding the previous researches such as:

- The survey done on analyzing the power saving modes have been statically gathered during the development of application and have not been customized as per the behavior of customers.
- The controlling part of the power saving application does not seem to be really intelligent thus the user must also focus on evolving around all the necessary steps.
- It is true that present mobile applications have been exploiting the battery and energy because of the display of adverts and other resources.
- This study focuses on a limited mindset of using the power saving applications or features without exploiting the mobile energy or power.
- The power consumption of the mobile for every user is different in each survey.

Conclusion and Future Work

This study has provided a review of the existing literature regarding the different solutions, techniques and tools that have been proposed by different authors in response to battery energy consumption problems of mobile applications for smart devices running on the Android OS. Based on the review of the literature, solutions presented by prior studies in relation to the approach reveal that the average estimations that the proposed tools/techniques provide tend to conflict the actual usage habits of device and the accuracy of the power consumption measurements and simulators remains an issue of debate. Therefore, while the techniques presented herein provide some potential solutions for reducing energy consumption by mobile applications on Android-based smart-devices, they are limited in their usage. This study has gone through various areas of interest in order to answer all research questions asked on the introduction section. The study also has explored the literature and related works around power saving applications, the available approaches that have either not added or added a negative effect on the area of saving energy on smartphones. The study was able to classify the different levels of power-usage among different smartphone resources. That has helped us later to sort the smartphone components in terms of their level of power consumption

Based on the findings, a significant share of power consumption in these smart devices is largely caused by applications that are installed on the devices. Depending on the applications' functionality, they entail activities such as data downloading, content display, and use of built-in-sensors such as GPS (Global Positioning System) related sensors. There are various components of mobile smart devices that facilitate the above activities including; GPS sensors, device' display, the CPU, and network interfaces among others. Consequently, activities/functions of different Android smartphone applications increase the energy consumption of any of the above-mentioned components. As a result, there has been a lot of effort in the study geared towards identifying and investigating the underlying potential for energy savings in relation to these smartphone applications at applications layer and OS layer levels.

In reference to the guidelines of the European Commission regarding energy efficiency, Huge improvements in energy efficiency are occurring across the European Union. Energy efficiency policies are delivering in terms of reducing consumption. Although much attention has been given to energy conservation, there are several issues that existing researchers need to devote more attention to. The European Union has successfully managed to decouple energy demand and economic growth. In short, this means reduction in energy use is not linked to a reduction in the economic or industrial activity (European Commission Directorate-General for Energy, 2017). The economy can now grow while energy is being saved. The primary motive for potential work is to stop following the statement that 'waste any power from the mobile battery under the premise of saving the same power from the same device. At the end, more efforts are required to recognize the core flaws in the battery savings that are being built and introduced in potential smartphones. Today we are seeing so-called 'energy intensity' 1 levels fall. This fall is due to several factors, including structural changes to the economy and advances in technology. But it is also a result of new national and European energy efficiency policies that have played a key role in reducing energy consumption across the bloc.

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Impacto Del Uso De Tecnologias Educativas En El Desarrollo De Habilidades Cognitivas En Estudiantes Universitarios Segun La Taxonomia De Bloom. Caso Universidad De Norte- Barranquilla (Colombia)

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Resumen

La presente propuesta de investigación es producto de la participación en el Laboratorio Pedagógico realizado en el Centro para la Excelencia Docente de la Universidad del Norte -CEDU-, tiene como objetivo analizar el impacto del uso de tecnologías educativas en el desarrollo de habilidades cognitivas según la taxonomía de Bloom, en estudiantes matriculados en el periodo Julio - diciembre de 2019 en los Programas académicos de Administración de Empresas y Negocios Internacionales de la Escuela de Negocios de la Universidad del Norte en Barranquilla. A partir de la correlación de Spearman, de la aplicación de una encuesta de percepción aplicada a una muestra de 180 estudiantes y de la realización de grupos focales de validación, se obtuvo que definitivamente las herramientas tecnológicas implementadas y guiadas, desarrollan unas en mayor proporción que otras, habilidades de recordar, comprender, aplicar, analizar y evaluar en los alumnos. La habilidad de crear toca reforzarla a través de trabajos que los lleven a ser más propositivos y creativos para que puedan lograr ser estudiantes integrales. La utilización del mapa mental ayudó a sintetizar ideas y resumir la información; Quizlet permitió identificar, comprender y evaluar los conceptos; con Kahoot, recibir retroalimentación inmediata y comprender la información de manera más sencilla y con los videos priorizar y señalar aspectos importantes de un tema, mejorar la comprensión y analizar fácilmente sus componentes.

Palabras clave*:* Tecnologías Educativas, Taxonomía de Bloom.

Abstract

This research proposal is result of participation in the Pedagogical Laboratory of Center for Teaching Excellence of the Universidad del Norte (CEDU, for its acronym in Spanish). The main objective of this is to analyze the impact of the use of technological tools in the development of cognitive skills according to Bloom's taxonomy, in students enrolled in the period July - December 2019 in the Academic Programs of Business Administration and International Business of the Business School of the Universidad del Norte in Barranquilla. Based on Spearman's correlation, the application of a perception survey applied to a sample of 180 students and the realization of focus groups of validation, it was obtained that the technological tools implemented and guided definitely develop some in a greater proportion than others, abilities to remember, understand, apply, analyze and evaluate in students. The ability to create must be reinforced through assignments that make them more proactive and creative so that they can become integral students. The use of the mind map helped synthesize ideas and summarize the information; Quizlet allowed to identify, understand and evaluate the concepts; with Kahoot, the student received immediate feedback and the student was able to understand information more easily, and with videos, prioritize and point out important aspects of a topic, improve understanding and easily analyze its components.

Keywords*:* Educational Technologies, Bloom Taxonomy.

Introducción

La integración de las Tecnologías de la Información y la Comunicación en la práctica educativa constituye una de las demandas que la sociedad plantea al mundo educativo (Saez,2012) y los profesionales de la enseñanza no podemos perpetuar los modos del siglo XX: las antiguas clases magistrales dejan indiferentes a los alumnos que experimentan la vida a través de las pantallas (De la Cuadra De Colmenares, 2016). Es claro que la presencia de las TIC en la formación universitaria favorece los procesos de enseñanza y aprendizaje a profesores y estudiantes, además de mantener un aprendizaje abierto, continuo y flexible (Garcés & Alcivar, 2016).

Dado lo anterior, la necesidad de incorporar la tecnología digital en los procesos de aprendizaje, han llevado a que las Universidades cada vez más estimulan a los docentes a la aplicación de innovaciones en el aula de clase, con el propósito de facilitar el aprendizaje de los estudiantes. Pero integrar exitosamente las tecnologías en los procesos de enseñanza- aprendizaje, se produce cuando los docentes centran su atención no tanto en el recurso tecnológico en sí, sino en las experiencias de aprendizaje que se diseñan y para las que las tecnologías resultan adecuadas (Marcelo, Yot & Mayor, 2015).

Aplicar TIC en la educación, exige que el docente domine su uso en los procesos de aprendizaje y que posea los conocimientos mínimos, que sea capaz de determinar la forma y el momento para integrarlos en la práctica docente de forma creativa, de tal manera que favorezcan el aprendizaje.

Hoy día los docentes se encuentran preocupados por encontrar herramientas que faciliten los procesos de enseñanza aprendizaje de sus alumnos y continuamente están diseñando nuevas maneras de cautivar su atención. Kirkwood & Price (2014), analizaron como la tecnología había sido incorporada a la práctica de enseñanza en el contexto universitario a partir de la revisión de una gama de artículos científicos que habían sido publicados entre el 2005 a 2010 y encontraron que en, al menos, el 50% de ellos, la tecnología había sido empleada sin modificarse el método de enseñanza. El uso de herramientas tecnológicas y el aprendizaje tienen una relación estrecha porque el aprendizaje debe estar coordinado con los avances y cambios en el uso de recursos (Quesada Chaves, 2.015).

Ahora bien, cobra importancia sustancial saber hasta qué punto la utilización de dichas tecnologías impactan el desarrollo de habilidades cognitivas y el proceso de aprendizaje. Muchos autores argumentan que las habilidades cognitivas de naturaleza compleja y abstracta como pensamiento crítico, resolución de problemas y capacidad de análisis, son potenciadas por las propias características de las TIC como herramientas de manejo de información y creación de conocimiento y que son crecientemente valoradas por la sociedad del conocimiento (Claro, 2010).

Marco Conceptual Y Teorico

Taxonomia De Bloom

Fue propuesta por el psicólogo educativo de la Universidad de Chicago Benjamín Bloom en 1956. Es un modelo cognitivo compuesto por seis etapas, que se centra en las habilidades de pensamiento que una persona debería tener (Bhargav, Akalwadi y Pujari, 2016). Dichas habilidades cognitivas son las destrezas que permiten al individuo adquirir y desarrollar pensamientos y conocimientos nuevos. Contempla tres dominios el cognitivo, el afectivo y el psicomotor, siendo el primero de ellos el más desarrollado. La versión original, estaba conformada por los siguientes niveles de aprendizaje: conocimiento, comprensión, aplicación, análisis síntesis y evaluación (Favieri, 2016).

En la década de los noventas, Anderson y Krathwohl, exalumnos de Bloom, realizaron una revisión y actualización de la Taxonomía, clasificándose en dos: las básicas o Habilidades de Pensamiento de Orden Inferior (HPOI) que facilitan la adquisición del conocimiento (Recordar, Comprender, Aplicar)

y las superiores o Habilidades de Pensamiento de Orden Superior –HPOS- (Analizar, Evaluar y Crear) que facilitan la calidad y la aplicación del mismo (Eduteka, 2011).

Los niveles son los siguientes:

a. **Recordar**: hace referencia a identificar y memorizar conocimientos o información anteriormente aprendida. No involucra ningún tipo de razonamiento sobre el contenido. Allí se observa y trae a la mente, un saber previo (lugares, fechas, símbolos, etc).

b. **Comprender**: capacidad de una persona para explicar, comparar la información recibida y de representar de otra manera este tipo de información, entendiendo y construyendo, además, el significado de los mensajes orales, escritos y gráficos a través de la interpretación, ejemplificación y clasificación.

c. **Aplicar**: consiste en seleccionar y usar métodos para resolver un problema o situaciones concretas; utilizar un procedimiento mediante la ejecución o implementación.

d. **Analizar:** es descomponer un problema en sus partes, determinar cómo ellas se relacionan entre sí y con una estructura o propósito general a través de la diferenciación, organización y atribución. Distinguir y relacionar hipótesis y evidencias de la información dada.

e. **Evaluar**: se refiere a la capacidad para interpretar, justificar y hacer juicios basados en criterios o estándares mediante el control y la crítica a un determinado tema.

f. **Crear**: corresponde a la habilidad para explicar, estimar y combinar diversas ideas en una sola. Es unir elementos para formar un todo coherente o funcional, reorganizar los elementos en un nuevo patrón o estructura a través de la generación, planificación o producción.

Es una poderosa herramienta para ayudar a desarrollar objetivos de aprendizaje, ya que los explica. Es jerárquica, porque para desarrollar las habilidades de orden superior debe haberse obtenido conocimientos y habilidades de orden inferior, tal como se muestra a continuación:

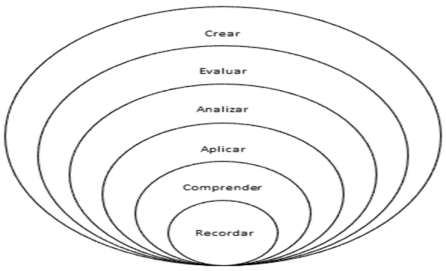

Figura 1: Taxonomía de Bloom- Fuente: Elaboración Propia.

- Antes de entender un concepto, debes recordarlo
- Para aplicar un concepto, debes entenderlo
- Para evaluar un proceso, debes haberlo analizado
- Para crear una conclusión, debes haber realizado una exhaustiva evaluación.

Lo anterior implica que, si un alumno desea alcanzar un nivel superior, será necesario que primero domine los niveles inferiores que le preceden. En este sentido, al comprender este proceso de aprendizaje se le facilitará al docente el empleo de las TIC en los procesos de enseñanza – aprendizaje (Torres, Segobia & Calderón, 2020). Por tanto, Cortés (2012) citando a Churches, invita a la reflexión respecto a qué tipo de herramientas tecnológicas, posibilitaran el desarrollo de las habilidades cognitivas requeridas por los estudiantes.

En la Taxonomía de Bloom enfocada al mundo digital (Churches, 2009), los verbos que indican las habilidades cognitivas describen muchas de las actividades, procesos y objetivos que se llevan a cabo en un salón de clase, en donde las TIC exigen habilidades cognitivas "digitales". Con este punto de vista, el profesor guía el aprendizaje construyendo sobre la base de recordar conocimiento y comprenderlo para llevarlos a usar y aplicar habilidades; a analizar y evaluar procesos, resultados y consecuencias y, a elaborar, crear e innovar (Eduteka, 2011b).

Dichos verbos (Churches 2009, Cortés 2012, Favieri 2016), orientan la labor del docente en cuanto a la formulación de objetivos de aprendizaje, contenidos, tecnologías educativas a usar y mecanismos de evaluación:

Recordar: reconocer, distinguir, jerarquizar, listar, describir, identificar, recuperar, denominar, localizar, encontrar.

Comprender: Interpretar, resumir, diferenciar, parafrasear, clasificar, comparar, explicar, ejemplificar.

Aplicar: Implementar, desempeñar, usar, ejecutar, utilizar.

Analizar: comparar, organizar, combinar, distinguir, delinear, desglosar, estructurar, integrar.

Evaluar: revisar, formular hipótesis, criticar, justificar, fundamentar, probar, validar, monitorear.

Crear: diseñar, construir, planear, producir, idear, trazar, elaborar.

Herramientas Tecnológicas

La aparición de las tecnologías educativas mediadas por TIC, hicieron posible el surgimiento de los "student response systems" o sistemas de respuesta del estudiante, que permiten tener en tiempo real información sobre el progreso en el aprendizaje. Los primeros dispositivos se empezaron a utilizar en los años setentas para la enseñanza de la Biología y la Química (Judson & Sawada, 2002).

Es importante tener en cuenta que se ha venido avanzando desde los clickers y keypads a mecanismos como kahoot, socrative, google forms, question press, entre otros, que son utilizadas por internet disponibles en páginas web, en las que se formulan preguntas y se despliegan opciones de respuesta. Las diferencias entre ellas radican en su mayor o menor proximidad a las dinámicas de juegos, en el grado de complejidad técnica o en las posibilidades de obtener resultados a posteriori (Pintor Holguín, et al 2015).

Según Kay and Lesage (2009), los principales beneficios de utilizar estos mecanismos en el aula, son los siguientes:

1. Se aumenta la atención y concentración del estudiante en clase a través de la competencia con otros compañeros, ante la resolución de los problemas o preguntas.

2. Se produce una mejora notable en el aprendizaje de los alumnos, cuando interactúan en la discusión sobre soluciones adecuadas.

3. Posibilita la obtención de una retroalimentación en tiempo real tanto para el profesor como para los estudiantes, sobre la calidad de la enseñanza y el aprendizaje obtenido.

A continuación, se presenta un breve esbozo de las herramientas utilizadas en la presente propuesta investigativa:

Plataforma Kahoot

Es una plataforma de aprendizaje on line, gratuita y de acceso libre en internet basada en juegos y pruebas divertidas, que permite realizar debates, encuestas, o cuestionarios con opciones de respuesta, de verdadero y falso, para que los estudiantes respondan en un tiempo establecido; mediante dispositivos electrónicos como ordenadores portátiles, tabletas, teléfonos móviles (smartphones) con conexión a internet. Pasado el tiempo establecido, el programa muestra las respuestas correctas y arroja los resultados por estudiante y el score con la puntuación final. Hace parte del aprendizaje móvil electrónico (M-learning) y de la Gamificación. Su gran propósito es que el alumno aprenda jugando dentro del aula, para que la experiencia de aprendizaje sea más amena y motivadora.

Existen tres características en la forma de operar de kahoot: la existencia de un reto para el estudiante debido a que debe contestar de forma correcta las preguntas que se le formulan tratando de vencer a sus jugadores, el despliegue de cierto grado de fantasía debido a la competencia que se suscita por el juego y la curiosidad por las imágenes y el audio que acompaña el problema o pregunta planteada y favorecen la motivación a través de la competición entre los alumnos (Wang, 2015).

Puede ser utilizada para hacer verificación de conocimientos previos o posteriores adquiridos, comprobaciones de lecturas (Pintor Holguín, op cit) y también como mecanismo de evaluación constante estilo quiz.

Las principales ventajas de su aplicación hacen referencia a su facilidad, funciona en cualquier dispositivo con conexión a internet, rapidez para el diseño de la prueba, flexibilidad ya que puede crearse en cualquier momento y lugar, permite obtener en tiempo real información sobre el progreso en el aprendizaje para detectar problemas de comprensión o las carencias en forma rápida (Fuentes, 2016), guarda los resultados de manera automática en la plataforma y se pueden descargar sin inconveniente para llevar un registro, genera participación activa de los estudiantes y sana competencia, es entretenida y genera diversión en clase y acorta la distancia entre el docente y el alumno (Salinas, 2004).

En cuanto a los inconvenientes, es que los caracteres de las preguntas y respuestas son limitados, y se puede dar una desconexión inmediata o dificultades en el acceso a la plataforma que limita la participación de los estudiantes (De Mingo López & Vidal Meliá, 2019).

Plataforma Videos Animados

Powtoon es una herramienta tecnológica diseñada para realizar videos interactivos, es semejante a presentaciones Power Point pero se puede añadir animaciones, voces, sonido, texto e imágenes. La ventaja adicional es que se puede exportar a Youtube y las plantillas son en su mayoría gratuitos, es fácil de usar y sencilla de entender. Es importante recalcar que es necesario tener conexión a internet, y en la versión gratuita solo se puede utilizar 5 minutos, la calidad es estándar por lo que la alta resolución no aplica, se pueden utilizar 11 estilos de letra y 38 canciones (Jancsó, 2.017).

Con relación al aprendizaje, los factores que más aporta el uso del video son: asimilación más sencilla y mejor comprensión de contenidos, que sí se utilizará un método tradicional de enseñanza (Quesada Chaves, op cit), permite ser eficiente, crear interés por aprender un tema y mejorar el rendimiento académico de los estudiantes (Yenchum & Chih-Hung, 2.018). Se ha demostrado que la comprensión de los temas se optimiza con los videos por el dinamismo y el menor tiempo que este requiere para la comprensión del conocimiento, desarrolla procesos cognitivos que tienen correlación con el trabajo colaborativo y el interés por la materia, y por consecuente con los resultados académicos (Hernandez, Rodriguez, Parra, & Velázquez, 2.014).

El diseño de vídeos Powtoon ayuda al entendimiento por el componente investigativo, de innovación y de síntesis; además, logra que el alumno preste mayor atención a las materias por ser animadas (Jancsó, op cit). Es una herramienta fundamental para el mejoramiento de la comunicación, y el trabajo

en grupo, ya que disminuye la ansiedad, y ayuda a la autoconfianza y determinación, importante para el desempeño académico. (Quintela del Río, 2018).

Finalmente, los estudiantes están dispuestos y motivados en usar nuevos recursos tecnológicos al momento de tener una clase, ya que se involucran con ideas y aportes del uso de diferentes softwares usados para elaborar videos (Quintela del Río, op cit). Entre los aspectos negativos de la creación de videos, se encuentran especialmente la coordinación de los grupos de trabajo, y de las herramientas limitadas que tiene Powtoon para que los videos no se vean planos y sin innovación.

Plataforma Mapas Mentales

Los mapas mentales son estrategias didácticas que permiten al estudiante recrear una imagen sobre un determinado contenido de forma sintética, que posteriormente puede utilizar para guiar el recuerdo apoyándose en proposiciones verbales (Alvarado Peña, 2.015). Se definen como "una estrategia didáctica para favorecer el aprendizaje de conceptos, los cuales serán asociados y conectados con otras situaciones, lo que permitirá un análisis, comprensión y reflexión de lo asimilado" (Roig Zamora & Araya Ramírez, 2.013).

De esta manera, se pueden definir a los mapas mentales como organizadores gráficos creados con el fin de exponer ideas, relacionar elementos y conceptos, sintetizar y comparar diferentes opiniones. Son elementos, técnicas o estrategias para transformar la información en conocimiento (Muñoz González, Peña, & Molina, 2010).

La diferencia con el mapa conceptual radica en su estructura y componentes, el mapa mental tiene la oportunidad de insertar videos, imágenes, colores, y darle dinamismo e innovación al conocimiento que se quiere exponer.

Con respecto a lo anterior, el uso de mapas mentales para organizar, comparar y sintetizar conceptos es muy comúnmente utilizada en el desarrollo de aprendizaje. Busca aclarar ideas, ampliar información y resolver problemas, facilita el aprendizaje y los procesos de toma de decisiones; el uso de la herramienta no plantea dificultades, lo único que hay que tener en cuenta en su aplicación, es el cambio de modelos de aprendizaje. (Caballero Hernández, 2006).

Otra habilidad desarrollada por el estudiante al emplear esta herramienta es el trabajo cooperativo, lo cual es útil para aprender y crear competencias (Muñoz González, Hinojosa Pareja, & Vega Gea, 2.016).

Como recomendación (Alvarado Peña, 2.015) afirma que para desarrollar habilidades cognitivas en los estudiantes, se implemente como estrategia el trabajo con mapas mentales y otros organizadores gráficos, ya que éstos brindan posibilidades tanto al estudiante como al docente, al facilitar la identificación de la manera como representan sus modelos mentales, permiten definir las ideas relevantes en un tópico o contexto planteado, y en consecuencia favorecen las capacidades de organización, de establecer prioridades, de clasificar, de categorizar la información, y en suma, mejorar sus niveles de comprensión del conocimiento.

Plataforma Quizlet

Quizlet es una herramienta diseñada para recordar conceptos, el uso es sencillo, el profesor debe tener un tema y conceptos claves claros. Utiliza dos mecanismos el primero es el aprendizaje interactivo. Una vez el docente escoge los conceptos y sus respectivas definiciones, el estudiante con un link puede acceder de manera inmediata. Este tiene diferentes formas de interactuar para aprender con la herramienta: aprender (selección de múltiple respuesta), fichas (tarjetas que muestran el concepto y luego la definición), escribir (muestra el concepto y el estudiante debe definirlo), ortografía (es una actividad de escritura) y probar (herramienta evaluativa).

El segundo mecanismo es el juego. Este tipo de juegos se divide en individual; combinar que es en parejas y el grupal que es live. El profesor abre esta opción y entrega un código de ingreso en

quizlet.live , luego el sistema agrupa a los estudiantes en equipos con nombres llamativos y empiezan las preguntas.

El juego de quizlet incluye el cooperativismo y la colaboración, debido a que solo a un alumno de todo el equipo, le llega la respuesta. Por tanto, todos deben estar atentos, en la pantalla se ven los resultados, si pierdes vuelves a comenzar. Es un excelente mecanismo para interactuar y aprender.

Metodología De La Investigación

La metodología de la investigación planteada es de tipo cuantitativo. Debido a que este tipo de investigación, presenta un orden rigoroso y su objetivo se centra en medir para comprobar hipótesis. Así mismo, se determinan unas variables de estudio y se plantea un proceso para probarlas y someterlas a mediciones por lo general de carácter estadísticas tal como lo sugieren Hernández, Fernández y Baptista, (2014). De acuerdo con sus postulados, también se puede establecer que el alcance de la investigación es correlacional, porque tiene como fin conocer el grado de asociación que puede existir entre dos o más variables teniendo en cuenta un contexto en particular, tal como se presenta en el estudio propuesto.

El proceso metodológico fue el siguiente: durante el primer semestre del 2019 se realizó una prueba piloto con el fin de identificar cuáles fueron las herramientas tecnológicas que mayor impacto tuvieron en el aprendizaje de acuerdo con la percepción de los alumnos, lo que sirvió de parámetro para continuar con la propuesta en el segundo semestre de 2019.

Posteriormente se determinaron las materias objeto de intervención, las cuales fueron Gestión del Talento Humano en el programa de Administración de Empresas y Negocios y Culturas Globales en el programa de Negocios Internacionales de la Escuela de Negocios. Se realizó la programación de las asignaturas mencionadas contemplando los temas, las herramientas tecnológicas utilizadas y los objetivos de aprendizaje por cada herramienta. Estos objetivos se plantearon de tal manera que se relacionarán con las habilidades cognitivas que se deseaban reforzar o desarrollar.

En tercer lugar, se diseñaron las guías de trabajo, los tutoriales del uso de las herramientas, se escogió el material de revisión y se crearon los mecanismos de evaluación que fueron parciales y rúbricas. Luego, se rediseñaron las encuestas y los test por herramienta con el fin de medir la percepción que los estudiantes tenían frente a cada tecnología educativa utilizada (Mapas mentales, Kahoot, quizlet y video animado) y su impacto en el desarrollo de sus habilidades cognitivas de acuerdo con la Taxonomía de Bloom.

El desarrollo de la propuesta consistió en aplicar el pretest por medio de la herramienta tecnológica quizlet, el cual pretendía verificar los conocimientos previos que el estudiante tenía del tema abordado durante las clases. Posteriormente, las docentes introdujeron los respectivos conceptos y subtemas y luego se aplicó nuevamente el quizlet como postest con el fin de verificar si hubo mejora frente a la primera aplicación. Por último, los estudiantes desarrollaron las guías de trabajo para asegurar su comprensión de la temática y pudieran elaborar los mapas mentales donde sintetizaron la información aprendida. Una vez realizadas las actividades descritas se procedió a la realización del parcial, en el cual se verificó los conceptos aprendidos por los estudiantes y que tanto ayudaron las herramientas tecnológicas aplicadas en su proceso de aprendizaje, alineadas con la taxonomía de Bloom. Una segunda medición se realizó con Kahoot como pretest y postest, y, por último, se solicitó la elaboración de un video animado que incorporó los conceptos aprendidos y su validación se efectuó con el segundo parcial.

Una vez aplicadas las tecnologías educativas escogidas por las docentes, se procedió a la aplicación de la encuesta diseñada por cada una de las herramientas, para medir la percepción de los estudiantes sobre el impacto de ellas en el desarrollo de habilidades cognitivas. La última técnica utilizada fueron los grupos focales, para validar y conocer a fondo y de manera directa, la apreciación de los estudiantes frente al proceso y las herramientas implementadas.

Los datos recolectados a través de los Pretest y Postest mencionados, los parciales y las actividades realizadas a lo largo del semestre académico, fueron digitalizados, organizados y analizados por medio de matrices y se incorporaron en la herramienta estadística SPSS versión 23, con el fin de establecer si existía una correlación entre el uso de las herramientas TIC y el nivel de competencia de los estudiantes teniendo en cuenta la taxonomía de Bloom.

Se establecieron para tal efecto dos hipótesis. En términos estadísticos la H0: El uso de los mapas mentales, videos animados, Kahoot y Quizlet no impactan en el desarrollo de habilidades cognitivas de acuerdo con la taxonomía de Bloom en los estudiantes de la Escuela de Negocios de la Universidad del Norte y como H1: El uso de los mapas mentales, videos animados, Kahoot y Quizlet impactan en el desarrollo de habilidades cognitivas de acuerdo con la taxonomía de Bloom en los estudiantes de la Escuela de Negocios de la Universidad del Norte.

El estudio contó con la participación de 180 estudiantes matriculados en el periodo Julio - diciembre de 2019 en los Programas de Administración de Empresas del Departamento de Emprendimiento y Management y de Negocios Internacionales del Departamento de Mercadeo y Negocios Internacionales de la Escuela de Negocios de la Universidad del Norte de Barranquilla Colombia. Se utilizó un muestreo a conveniencia para la aplicación del cuestionario y se contó con el consentimiento informado de los participantes.

Resultados Obtenidos

Análisis Estadístico

Para analizar los datos en primer lugar se aplicó una prueba de Kolmogorov-Smirnov con el fin de comprobar si los datos se distribuían normalmente y de esta manera tomar la decisión de aplicar un test paramétrico o no paramétrico. Debido a que los datos no se comportaban normalmente, pues el nivel de significancia era menor de 0,05 confirmando la hipótesis alternativa de que los datos son diferentes a la distribución normal, se procede aplicar el test de correlación de Spearman un test no paramétrico que se utiliza para establecer relaciones de variables en datos que no se comportan tal como la distribución normal, es decir, son asimétricos.

A partir de lo anterior, se aplicó entonces el test de Spearman trabajando con un margen de error del 5% o 0,05 y un nivel de confianza del 95% o 0,95 y atendiendo a los niveles de correlación establecidos en donde se estima que la correlación más es fuerte es 1,00 y las más baja 0,00, procesando los datos obtenidos por medio del programa SPSS.

Los resultados arrojaron que, para el caso de la asignatura Gestión del Talento Humano, del programa de Administración de Empresas, si hay correlación entre los niveles de la taxonomía de Bloom "Comprender, aplicar y analizar" evaluadas en el primer parcial y la herramienta "quizlet", denotando como esta herramienta permitió a los estudiantes alcanzar los tres niveles mencionados y por ende teniendo mejores resultados en su calificación del parcial 1, de la misma manera, se puede afirmar que hay correlación entre el nivel de la taxonomía de Bloom "Comprender" y el video animado, denotando como la creación de videos y procesar la información en una forma distinta a la convencional, permite a los estudiantes comprender mejor la información ayudando a su proceso académico. Lo anterior se sustenta en que su nivel de significancia fue menor a 0,05 como se observa en la tabla 1 en los datos resaltados.

Tabla 1: Resultados de la investigación cuantitativa materia Gestión de Talento Humano

Correlaciones

			P1recordar	P1comprender	P1aplicar	P1análizar	Quizle1	Quizlet2	Quizlet3	Quizlet4	Kahoot	P2recordar	P2comprender	Video
Rho de Spearman	P1recordar	Coeficiente de correlación	1,000	0,033	-0,021	0,221	0,033	0,002	0,081	-0,003	0,050	0,051	0,108	0,135
		Sig. (bilateral)		0,775	0,857	0,055	0,778	0,987	0,485	0,981	0,666	0,659	0,354	0,244
		N	76	76	76	76	76	76	76	76	76	76	76	76
	P1comprender	Coeficiente de correlación	0,033	1,000	0,206	,228*	,345**	0,044	0,087	,246*	0,154	0,058	,268*	0,200
		Sig. (bilateral)	0,775		0,075	0,047	0,002	0,704	0,456	0,032	0,184	0,617	0,019	0,083
		N	76	76	76	76	76	76	76	76	76	76	76	76
	P1aplicar	Coeficiente de correlación	-0,021	0,206	1,000	0,172	0,166	-0,074	-0,200	-0,066	0,172	0,056	-0,191	-0,041
		Sig. (bilateral)	0,857	0,075		0,137	0,152	0,526	0,083	0,569	0,137	0,631	0,099	0,726
		N	76	76	76	76	76	76	76	76	76	76	76	76
	P1análizar	Coeficiente de correlación	0,221	,228*	0,172	1,000	,280*	-0,072	0,044	0,164	0,060	0,066	0,132	0,184
		Sig. (bilateral)	0,055	0,047	0,137		0,014	0,538	0,707	0,157	0,605	0,569	0,254	0,112
		N	76	76	76	76	76	76	76	76	76	76	76	76
	P2recordar	Coeficiente de correlación	0,051	0,058	0,056	0,066	0,165	0,023	-0,064	0,195	0,016	1,000	,369**	0,091
		Sig. (bilateral)	0,659	0,617	0,631	0,569	0,155	0,847	0,584	0,091	0,892		0,001	0,432
		N	76	76	76	76	76	76	76	76	76	76	76	76
	P2comprender	Coeficiente de correlación	0,108	,268*	-0,191	0,132	0,222	-0,025	0,054	0,180	0,085	,369**	1,000	,302**
		Sig. (bilateral)	0,354	0,019	0,099	0,254	0,054	0,834	0,644	0,119	0,468	0,001		0,008
		N	76	76	76	76	76	76	76	76	76	76	76	76

*. La correlación es significativa en el nivel 0,05 (bilateral).

**. La correlación es significativa en el nivel 0,01 (bilateral).

Fuente. Resultados del Laboratorio Pedagógico del Centro para la Excelencia Docente. Universidad del Norte.

En el caso de la asignatura de Culturas Globales, del programa de Mercadeo y Negocios Internacionales, si hay correlación entre el nivel de la taxonomía "Aplicar" evaluado en el primer parcial con el video interactivo y el nivel de la taxonomía de Bloom "Analizar" y la herramienta de kahoot, denotando como estas herramientas permitieron a los estudiantes alcanzar los niveles mencionados respectivamente y por ende permitiendo tener mejores resultados en su parcial 1. Así mismo, se evidencia una correlación entre el nivel de la taxonomía "Comprender" evaluado en el segundo parcial con la herramienta de "Quizlet y Kahoot", dando a conocer como el uso de ambas herramientas ayudaron a los estudiantes a la obtención de resultados positivos en su parcial 2. Lo anterior se sustenta en que su nivel de significancia fue menor a 0,05 como se observa en la tabla 2 en los datos presentados.

Tabla 2: Resultados de la investigación cuantitativa materia Negocios y Culturas globales

Correlaciones

			Recordarparcial1	Comprenderparcial1	Aplicarparcial1	Análizarparcial1	Quizlet1	Quizlet2	Mapaconceptar	Mapa4qimen	Kahoot	Video	Recordarparcial2	Comprenderparcial2
Rho de Spearman	Recordarparcial1	Coeficiente de correlación	1,000	,466**	0,132	,492**	-0,054	-0,162	-0,017	-0,100	0,030	0,027	0,112	0,127
		Sig. (bilateral)		0,000	0,316	0,000	0,634	0,155	0,887	0,378	0,795	0,812	0,326	0,266
		N	79	79	60	79	79	79	76	79	79	79	79	79
	Comprenderparcial1	Coeficiente de correlación	,466**	1,000	0,054	,488**	-0,007	-0,076	0,097	0,112	0,084	-0,029	0,048	0,022
		Sig. (bilateral)	0,000		0,683	0,000	0,953	0,505	0,405	0,326	0,463	0,801	0,677	0,847
		N	79	79	60	79	79	79	76	79	79	79	79	79
	Aplicarparcial1	Coeficiente de correlación	0,132	0,054	1,000	0,115	-0,135	-0,103	0,113	0,213	0,208	-0,226	0,002	-0,107
		Sig. (bilateral)	0,316	0,683		0,381	0,304	0,424	0,390	0,102	0,111	0,082	0,990	0,417
		N	60	60	60	60	60	60	60	60	60	60	60	60
	Análizarparcial1	Coeficiente de correlación	,492**	,488**	0,115	1,000	0,117	0,038	0,020	0,014	,246*	0,010	0,164	0,172
		Sig. (bilateral)	0,000	0,000	0,381		0,305	0,737	0,863	0,905	0,029	0,933	0,150	0,129
		N	79	79	60	79	79	79	76	79	79	79	79	79
	Recordarparcial2	Coeficiente de correlación	0,112	0,048	0,002	0,164	0,167	0,073	,314**	,277*	0,102	0,078	1,000	0,215
		Sig. (bilateral)	0,326	0,677	0,990	0,150	0,140	0,523	0,006	0,013	0,371	0,497		0,057
		N	79	79	60	79	79	79	76	79	79	79	79	79
	Comprenderparcial2	Coeficiente de correlación	0,127	0,022	-0,107	0,172	0,198	0,185	0,146	0,110	,244*	0,142	0,215	1,000
		Sig. (bilateral)	0,266	0,847	0,417	0,129	0,081	0,103	0,209	0,332	0,030	0,212	0,057	
		N	79	79	60	79	79	79	76	79	79	79	79	79

**. La correlación es significativa en el nivel 0,01 (bilateral).

*. La correlación es significativa en el nivel 0,05 (bilateral).

Fuente. Resultados del Laboratorio Pedagógico del Centro para la Excelencia Docente. Universidad del Norte.

Análisis Encuesta De Percepción

Con el propósito de medir las percepciones de los estudiantes frente al uso de las herramientas tecnológicas utilizadas en la clase, se procedió a realizar una encuesta en google forms, obteniendo los siguientes resultados:

Tabla 3: Resultados porcentuales de la implementación tecnológica según herramientas y beneficios

HERRAMIENTAS /BENEFICIOS	MAPA MENTAL	QUIZLET	KAHOOT	VIDEO
Organizar el conocimiento para un mejor aprendizaje	79%	79%	73%	72%
Sintetizar ideas, resumir la información y conocimiento	83%	82%	72%	77%
Priorizar y señalar aspectos importantes de un tema	82%	82%	77%	78%
Comprender la información de manera sencilla	74%	83%	79%	76%
Facilitar el aprendizaje al poner en práctica la temática	76%	83%	77%	75%
Estudiar de manera más práctica	77%	83%	76%	74%

Mejorar el entendimiento del tema	80%	83%	77%	78%
Identificar fácilmente los conceptos	79%	83%	77%	75%
Relacionar las temáticas con mayor facilidad	77%	80%	76%	76%
Analizar fácilmente la temática	79%	81%	76%	78%
Desarrollar trabajo colaborativo	68%	74%	74%	72%
Retroalimentar aprendizaje	70%	77%	78%	71%
Incrementar y estimular la creatividad	74%	70%	70%	74%
Comparar aprendizaje	72%	73%	76%	72%
Diseñar una forma de presentar el aprendizaje	79%	81%	81%	76%

Fuente. Elaboración propia.

Como se puede observar en la anterior tabla, la percepción de aprendizaje de los estudiantes con la utilización de las cuatro herramientas tecnológicas fue alto. Este porcentaje unió las categorías totalmente de acuerdo y de acuerdo. Es importante destacar que todas ellas, apuntan al desarrollo de habilidades cognitivas de la taxonomía de Bloom: Recordar, Comprender, Aplicar, Analizar, Evaluar y Crear.

Sin embargo, resaltaremos algunos porcentajes especiales: en el **mapa mental** sobresale el aporte de la herramienta para sintetizar ideas, resumir la información y el conocimiento; en **quizlet** se valora la comprensión de los temas, el entendimiento de los mismos, el identificar fácilmente los conceptos y estudiar de manera más práctica; con **Kahoot**, se distingue aprender por medio del juego, recibir retroalimentación inmediata y comprender la información de manera más sencilla y con **los videos** priorizar y señalar aspectos importantes de un tema, mejorar la comprensión del mismo y analizar fácilmente los temas.

A continuación, se analizan los resultados de la percepción del estudiante sobre el uso de herramientas para mejorar su aprendizaje.

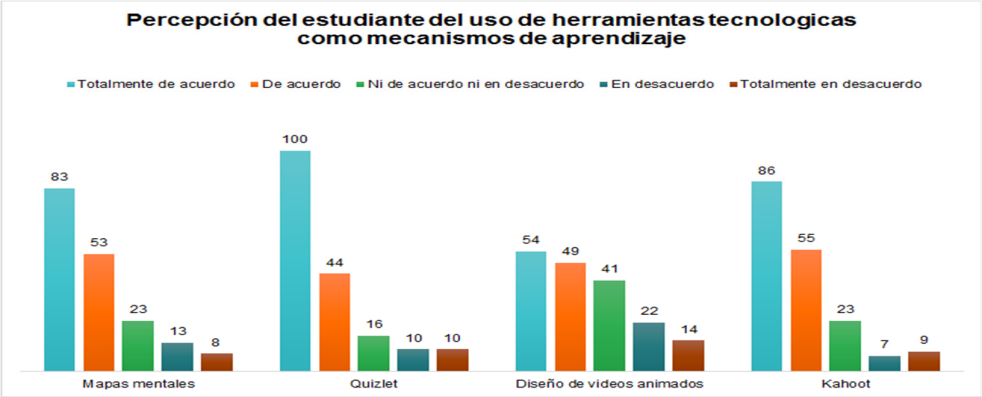

Figura 2: Las herramientas tecnológicas como mecanismo de aprendizaje

Fuente. Elaboración propia

La herramienta que más facilitó el aprendizaje fue quizlet por que de acuerdo con lo manifestado en los grupos focales, ayudó a recordar, comprender y evaluar conceptos, fue la herramienta más valorada por los alumnos por que aprenden de los errores que van cometiendo al resolver las preguntas; mientras que el video fue considerada una herramienta que no facilitó el aprendizaje.

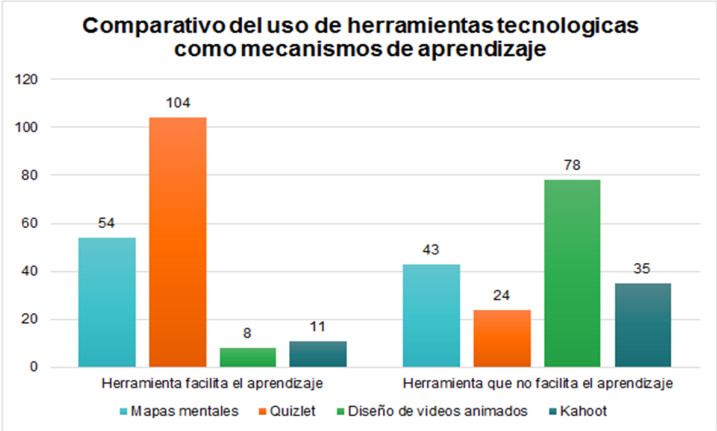

Figura 3: Las herramientas que facilitan y dificultan el aprendizaje del estudiante

Fuente. Elaboración propia

Las herramientas que menos presentan dificultades en su uso son kahoot (15%) y quizlet (19%) respectivamente y las de mayor dificultad son los mapas (23%) y los videos (31%). La explicación para estos resultados es que, las dos primeras plataformas ponen al estudiante en un contexto determinado con un test previamente definido por el docente. Mientras que los mapas y videos deben ser desarrollados por los estudiantes con base en una guía previamente diseñada, pero donde ellos pueden poner su creatividad al servicio del trabajo solicitado.

Continúa ratificándose que la herramienta que más ayudó al estudiante a desarrollar estrategias y habilidades de estudio fue quizlet con un 83%, seguido por los mapas mentales (76%), kahoot (72%) y videos (67%).

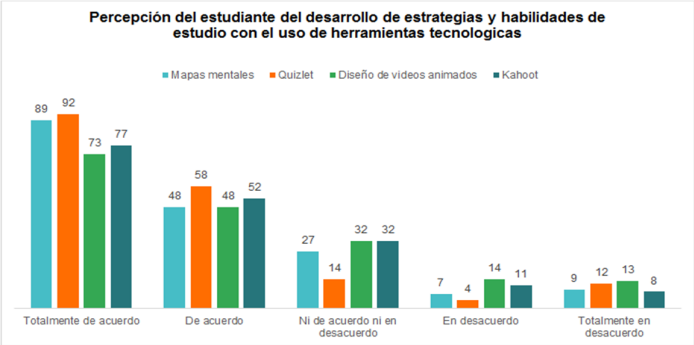

Figura 4: El aporte del uso de las herramientas tecnológicas en el desarrollo de estrategias y habilidades de estudio

Fuente. Elaboración propia

Para culminar, los estudiantes percibieron que han obtenido un aprendizaje significativo a través del uso de quizlet (82%), kahoot (78%), mapas mentales (73%) y los videos (71%).

La experiencia más agradable con el uso de las herramientas fue kahoot con un 87%, seguido de los videos animados (86%), mapas mentales (72%) y quizlet (65%).

Con respecto a la edad, podemos encontrar que entre las edades de 16 a 19 años se percibe un aprendizaje mejor con Quizlet, mientras que las edades entre 20 a 22 años el mapa mental es mejor percibido. Todas las edades presentaron dificultades en el uso de videos animados y en el rango de 20 a 21 años de edad no se percibe aprendizaje con Kahoot ni Quizlet.

Finalmente, por semestre se evidenció que a los alumnos de segundo semestre, se les facilitó quizlet mientras que se les dificulta el uso de videos animados, kahoot y mapa mental. Mientras que a los estudiantes de los semestres V y VII se les facilita el aprendizaje con el uso de mapa mentales y el quizlet, aunque también hay un porcentaje del séptimo semestre, que indica que con el uso de mapa mentales se les dificulto el aprendizaje.

Análisis Grupos Focales

Con base al análisis de contenido cualitativo realizado al grupo focal con 25 estudiantes de la asignatura Gestión del Talento Humano, se pudo concluir con respecto a la proporción o frecuencia de los datos obtenidos de los alumnos, que el uso de las tecnologías educativas favorece el aprendizaje haciendo que la clase sea distinta al tener una nueva forma de enseñanza y que no se debería cambiar nada de ella.

Con respecto a las herramientas y materiales usados a lo largo de la materia, manifiestan que las guías son útiles para el estudio, que los mapas mentales y quizlet al ser concisos ayudan al aprendizaje, en quizlet agregan que les ayuda a aprender de los errores, pero que al ser de memoria no ayuda a llevar el concepto a la práctica. En cuanto a la guía y el video cuentan que les ayudó para su aprendizaje y análisis de la información.

Sin embargo, de las herramientas utilizadas cambiarían quizlet, debido a los inconvenientes al momento de escribir el concepto por errores en tildes o formas de escribirlo. Con la herramienta de Kahoot dijeron que ayuda al aprendizaje y que el vídeo desarrolla la creatividad.

Con base al análisis de contenido cualitativo realizado al grupo focal de la asignatura de Culturas Globales, se concluyó de la información obtenida de los alumnos que las herramientas facilitaron el aprendizaje de esta.

Por otra parte, dicen que las herramientas fueron útiles, que quizlet (mayormente usada) y los videos les sirvieron bastante, que las herramientas son dinámicas, sintetizan los contenidos, les ayudan a recordar la información y tener un mejor desempeño en el parcial. Además, agregan que los mapas mentales, kahoot (usado una vez), los videos también fueron útiles y que quizlet fue la herramienta que mayor facilitó su aprendizaje, es decir, fue útil.

En conclusión, para recordar, comprender y evaluar les sirvió quizlet; para analizar y crear fueron de utilidad los videos en powtoon; y los mapas y las lecturas, les permitieron aplicar los conceptos aprendidos en clase.

Discusión

Esta investigación da cuenta del impacto que tiene el uso de las tecnologías educativas en el desarrollo de habilidades cognitivas de acuerdo con la propuesta de Bloom, validando la H1. Los resultados de los diferentes análisis (estadístico, encuesta de percepción y grupos focales) determinaron como el uso del mapa mental promovió la habilidad de recordar al hacer posible que los estudiantes pudieran identificar conceptos, resumir y sintetizar ideas; quizlet activó las habilidades de comprender, aplicar y analizar, que llevaron a los alumnos al entendimiento de la información, facilitar el aprendizaje, y priorizar los aspectos más importantes de un tema. Kahoot fue percibida como la herramienta que brinda retroalimentación en tiempo real sobre el aprendizaje y el video como mecanismo para incrementar y estimular la creatividad, ayudar a la comprensión, aplicación y análisis de la información.

Los anteriores hallazgos nos permiten validar que, para desarrollar habilidades cognitivas en los estudiantes a través de las tecnologías educativas implementadas en el aula, hay que alinearlos con el diseño de objetivos de aprendizaje, contenidos, temas y actividades coherentes y pertinentes de la

asignatura y con esquemas de evaluación, que permitan a los docentes determinar si dichas habilidades están siendo efectivamente desarrolladas. Según Churches (2009) la taxonomía para la era digital, no se enfoca en las herramientas y en las TIC, pues éstas son apenas los medios. Se enfoca en el uso de todas ellas para recordar, comprender, aplicar, analizar, evaluar y crear. Como lo expresa Cortés (2012) que, a partir del contenido temático y las habilidades involucradas en el aprendizaje, se debe seleccionar el recurso TIC para lograr un aprendizaje significativo.

Por último, se pudo evidenciar la necesidad que el estudiante tenga un rol activo en el uso de herramientas para que estas puedan generar un efecto en el aprendizaje; la tecnología demanda de autorregulación y autonomía que muchas veces el estudiante de primeros semestres puede tenerlo en menor medida por su pequeño lapso de tiempo en la universidad. Por lo tanto, el uso de estas herramientas debe ser dado con retroalimentación y tutoriales de uso en estos semestres.

Conclusiones

Sin lugar a dudas, la incorporación de tecnología al aula de por sí establece un cambio en la forma cotidiana de dar las clases. En este sentido, haremos alusión a cada herramienta utilizada por ejemplo **quizlet,** además de que concentró la atención de los estudiantes y fue la más valorada, incorporó a través de diversos juegos una manera diferente de aprender conceptos básicos y necesarios para el desarrollo posterior de la materia.

Con **kahoot,** mecanismo de respuesta rápida, se incentivó al estudiante en una sana competición por el resultado, es una forma de aprender jugando. Allí al estudiante se le clarificó también los conceptos y preparó para posteriores pruebas de medición de conocimientos adquiridos.

La elaboración de **mapas mentales y videos**, llevó a los estudiantes a revisar los textos para desarrollar las guías de trabajo y con este insumo proponer una forma de organización del conocimiento adquirido, de manera creativa, novedosa y útil para su proceso de aprendizaje.

En el grupo focal realizado con los estudiantes de Gestión del talento Humano y Negocios y Culturas Globales quedó manifiesto lo anterior: “que el uso de las herramientas tecnológicas favorece el aprendizaje haciendo que la clase sea distinta al tener una nueva forma de enseñanza y que fueron útiles. Los estudiantes consideran que no se debería cambiar nada de la clase”, lo que significa que realmente las herramientas tecnológicas utilizadas lograron su cometido.

Los principales cambios asociados en la utilización de las herramientas fueron primero la incorporación de las rúbricas con el propósito de medir de manera clara, efectiva y equitativa los resultados de los mapas mentales y videos animados e interactivos desarrollados por los estudiantes. Este sistema brindó transparencia a la calificación ya que permitió que los estudiantes supieran de antemano los items tenidos en cuenta y el resultado final de su esfuerzo y dedicación.

El segundo cambio y más importante fue poder incorporar en la elaboración de los parciales, las preguntas alineadas con las habilidades cognitivas de la taxonomía de Bloom que se pretendían reforzar en los estudiantes. Este aspecto es el más relevante de la experiencia, porque realmente nos permitió determinar qué herramientas les sirvieron para desarrollar dichas habilidades y consecuentemente qué resultados en el desempeño académico pudieron obtener de su uso.

La transformación de metodologías docentes aplicando la teoría constructivista, puede crear impacto en el estudiante que está acostumbrado a clases convencionales, donde el profesor entrega la información y el estudiante no se encarga de practicar o investigar en clase. En la medida en que el docente tenga un pleno conocimiento y dominio de su materia, puede derivar estrategias pedagógicas que faciliten el proceso de aprendizaje de sus alumnos, combinándolos con las habilidades necesarias para que el proceso de enseñanza se logre de una manera óptima.

Los docentes deben apropiarse de las tecnologías de educación o herramientas digitales, atendiendo a las exigencias del mundo contemporáneo enfocando sus esfuerzos en el desarrollo de habilidades de orden superior como analizar, evaluar y crear en sus alumnos. Por tanto, es necesario fomentar la creatividad e innovación desde el inicio de la carrera, para que el desarrollo de mapas mentales, videos y demás tecnologías sean vistas como herramientas más amigables con su proceso de aprendizaje.

Recomendaciones

Los mapas mentales como organizador gráfico son una herramienta eficiente para el aprendizaje, al igual que los videos, pero deben ser guiados por preguntas y enseñar de manera práctica su uso para lograr los resultados esperados con su implementación.

Para integrar exitosamente las tecnologías en los procesos de enseñanza- aprendizaje, se requiere que los docentes centren la atención no tanto en el recurso tecnológico en sí, sino en las experiencias de aprendizaje que se diseñan y determinar la forma y el momento para integrarlos en la práctica de forma creativa e innovadora, de tal manera que favorezcan el proceso de aprendizaje.

Para finalizar, se recomienda realizar investigaciones que correlacionen tecnología usada, con habilidades cognitivas y desempeño académico de los estudiantes.

Agradecimentos

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Industry 4.0 and the new role of universities

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Abstract

The article reveals the results of a study of the role and place of universities in the formation of "Industry 4.0", based on the rapid development of industries and fields of activity that form a new technological structure. The basis of technological development is the generation of intellectual property. A detailed analysis of the processes of university participation in the creation of a new technological structure is considered on the example of nanotechnology. The study showed a significant lag in the contribution of universities to the creation of intellectual property products to be commercialized. It is proved that this situation is connected, first of all, with the absence of new models of universities in the conditions of radical changes in the external environment. Changes in the activities of universities are of a point-like nature: a significant part of higher education institutions in Russia carry out passive changes, focusing more on factors of influence from the state. Therefore, most universities in terms of their development dynamics are not real leaders in their subject areas. Moreover, many universities still do not pose such tasks, mainly engaged in the reorganization of current activities in the traditional format. The authors recommend accelerating the development and implementation of university development

strategies, which should be aimed at enhancing their participation in the transition of the economy to "Industry 4.0". In addition, a transition to a new model of the university's activity is required using the drivers of changes within universities, based on the development of their scientific potentials.

Keywords: Industry 4.0; digital economy; Virtual Factories of the Future; innovation; digital supply chains; intellectual property; nanotechnology; new technological way.

Introduction.

Significant changes in the activities of universities are point-like in nature: a significant part of higher education institutions in Russia make passive changes, focusing more on external factors of influence from the state, and therefore most of them are not real leaders in their subject areas of activity. Moreover, many universities still do not pose such tasks, mainly engaged in the reorganization of current activities in the traditional format. Universities can make a difference by recognizing the needs of society, reflecting the irreversibility of change processes in «Industry 4.0». The fundamental moment in the formation of the new role of universities in society, which determines the development of an innovative strategy for managing the development of universities, is the concept of "Industry 4.0".

As part of the formation of a new management paradigm in the context of the transition of the economy to "Industry 4.0" using digital technologies, it is necessary to identify and substantiate the transformation processes in the development of modern universities. The concept of "Industry 4.0" is used in scientific research as an analogue of the concepts of "wave of innovation", "technical and economic paradigm", "technological structure", etc. Previously, the emergence of the industry took a relatively long time, since the speed of dissemination of innovations that determine the emergence of technological mode was slow. Currently, there is a tendency to reduce the duration of cycles. It should be noted that a study of the literature on changes in the education system for "Industry 4.0" allows us to conclude that the problem zones are updated and there are no ready-made solutions.

1. Relevance of the research

A review of the literature shows studies formulating the direction of changes of various types of universities under the changes of technological revolutions. Authors [2] define Industry 4.0 technologies as "disruptive," such as Internet of Things, Data Science, Deep Learning, Augmented Reality, Edge Computing, and Digital Twins. This is due to the fact that, despite new opportunities for many areas, educational methods for teaching these technologies are not yet available. In this connection, the authors talk about the need to form a common structure to support education in the context of Industry 4.0. Industry 4.0 has different requirements for technological education, which should be fully gamified, because it is precisely this approach that they believe contributes to the development of innovation [8].

However, the previous training paradigm [5] today does not close the gap between training and changes in the industry, regardless of the profile of the university. Thus, the university itself should become such a factory that quickly responds to changes in the external environment. Within the framework of the "training factory" paradigm, the introduction of cyberphysical systems will be required [6].

The vision of Industry 4.0 means new approaches and technologies, but also a methodology for working in a company, which requires high financial costs and a staff shortage [1], namely other competencies from managers. For example, an important problem, according to the authors in the implementation of Industry 4.0, is the formation of new job roles and the construction of new employee management systems in companies. The Fourth Industrial Revolution and its underlying digital transformation, known as Industry 4.0, are progressing exponentially. The digital revolution is fundamentally changing the way people live and work. The fundamental design principles and technological trends of Industry 4.0 also require the architectural design of Industry 4.0, but we must not forget about the dependence of the sustainability of changes in Industry 4.0 from management [3]. For example, researchers claim that there are no proven systems for managing sustainable supply chains, which is a problem for management [12].

Another example of the study of the "Industry 4.0" phenomenon from the point of view of management is the value chain of a business, and therefore it is increasingly analyzed by management scientists [8]. However, there

are no studies that define new rules for university participation in the creation of Industry 4.0 values. All the above determines the relevance of research on the participation of universities in the implementation of Industry 4.0.

2. Contents of the study

It should be noted that at present Russia, having passed the stage of the birth of Industry 4.0, is at its ascending stage. The transition to Industry 4.0 is based on the development of nanotechnology, cellular technology, genetic engineering methods, as well as the emergence of alternative energy (hydrogen energy, the use of wind and solar energy), taking into account the acceptability of their economic parameters). Modern society not only translates innovations into innovations, but first of all creates the conditions for the accelerated development of those industries and fields of activity that are leading in the formation of Industry 4.0.

Changes in industries consist in the fact that they are transitioning to fundamentally new processes of creating value for consumers. These processes are a sequence of stages of creating a product (product, service) with new functional properties for the end user. Thus, the manufacturing activity that characterizes Industry 4.0 and creates unique products / services for the consumer is a long-term competitive advantage of economic entities. It should be noted that an important role in the development of technologies belongs primarily to technical universities, which are directly involved in the creation of new basic technologies.

Confirmation of entry into the phase of Industry 4.0 is the development of the economy of a new technological generation - Digital Economy. In Russia, this transition is carried out as part of the National Technology Initiative through the implementation of the nationwide TechNet project. TechNet is a cross-market and cross-industry sector that provides technological support for market development by the National Technology Initiative and high-tech industries through the formation of Digital, Smart, Virtual Factories of the Future.

Understanding the essence of “factories of the future” is based on the principles of combining material and digital / virtual activities, which sets up fundamentally new business processes at all levels in a single value chain. The organization of production must comply with the requirements for creating products “best in class”, that is, a fundamentally new, customized / personalized new generation of products. “Factories of the future” use value chains of the type “technology - competencies - TestBeds - product” for each task to achieve this goal.

Important tasks are also set during the development of fundamentally new - digital - control systems for production systems within the framework of the Industry 4.0 concept. The inefficiency of the "factories of the future" may arise due to the abandonment of company management from the technology of production of new products inevitably can result.

Modern universities not only preserve, but also objectively expand their role in the transition of the economy to Industry 4.0, as they are one of the few institutional structures of society that are able in the process of their educational, scientific, innovative activity to form the competencies of specialists for the future technological structure.

Currently, the role of universities in the formation of Industry 4.0 in Russia is generally small. So, according to the Agency for Strategic Initiatives, the market for educational services for factories of the future is 0.9%, which, unlike all other areas of development, is the last position. Thus, at present, the technologies of Industry 4.0 have gone much ahead compared with the positions of universities in this process, which indicates that universities, as a scientific organization, are not in full compliance with the modern challenges of the economy. This means that universities have to transform their activities in accordance with the requirements of the sixth technological order.

Analysis of the use of intellectual property and developments for the period 2012–2018 shows the lag of university participation in the use of intellectual property compared with other types of economic activity, despite the tendency to insignificant stable growth, which clearly does not correspond to the required pace for a change in technological structure. A similar situation is observed when analyzing the use of the resources of intellectual activity in education, where even with insignificant positive dynamics, a decrease in the share of growth in the use of intellectual property in education by an average of 20% over years is visible (Figure 1).

The absence of significant changes in the use of the results of intellectual activity in universities indicates minimal changes in their educational and scientific processes. As a result, there is no increase in the introduction of unique educational technologies in universities, which is explained by the weak orientation of the management system towards the growth of integration of educational and scientific activities.

The statistics on Russia allow us to conclude that the total number of organizations performing research and development in 2018 decreased by 1.6% compared to 2012 [11, p. 8, 23-24]. The reduction in the number of research organizations is associated with the policy pursued by federal ministries and departments to optimize the subordinate network of scientific organizations. The reform was carried out through the enlargement or liquidation of those organizations that practically stopped scientific activity [11, p. 23-24]. At the same time, the share of organizations performing research and development in the total volume of economic activity in 2018 amounted to 53% and decreased, compared with 2005 (73.7%), by almost 20 percentage points [ibid, from. 23-24], which

indicates a certain lag in this sphere from serving the needs of the nascent way of life.

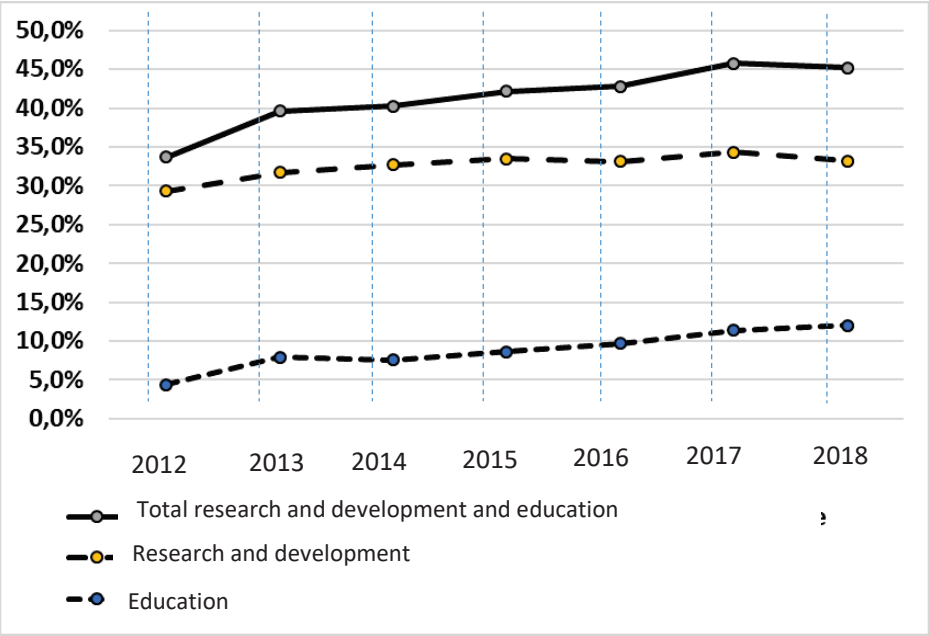

Figure 1 – The share of intellectual property in research and development and education
Source: calculated by the author according to statistics [7, 9, 10 and 11].

At the same time, the share of organizations performing research and development in the "Education" section, in the total number of organizations performing research and development, in 2018 amounted to 26.9% and increased, compared to 2005, by 14.9 percentage points. n. This dynamics testifies to the positive dynamics and the involvement of educational organizations in conducting research. At the same time, statistics on the number of organizations cannot reflect qualitative changes in the field of development of science.

For a qualitative analysis, we consider the results of scientific research and research for the period 2012–2018 using the example of the “Use of Intellectual Property” indicator (Figure 2), using the data for 2007 as the basis for a comparative analysis of changes.

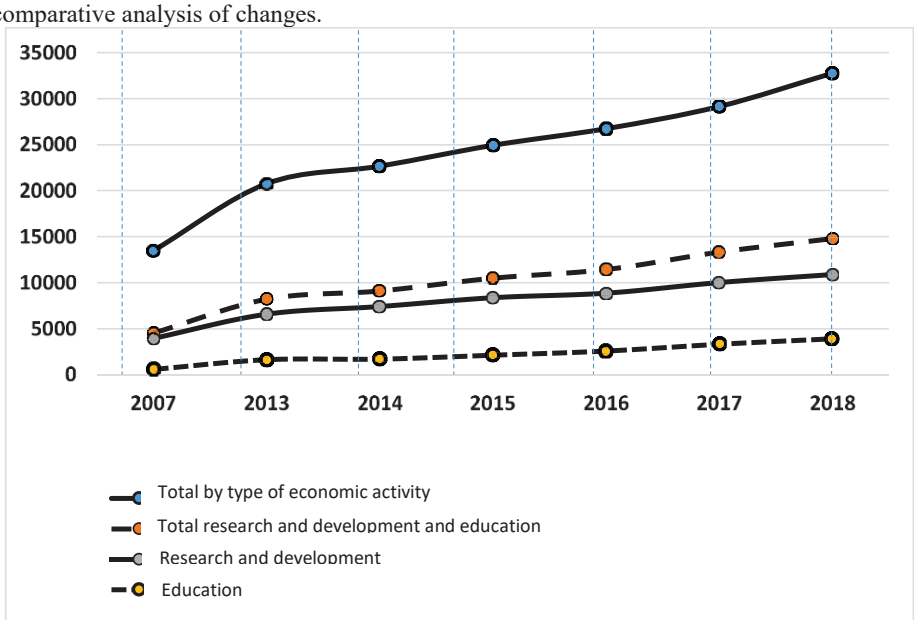

Figure 2 - Use of intellectual property, 2007–2018.
Source: calculated by the author according to statistics [7, 9, 10 and 11].

The total number of uses of intellectual property has a tendency to stable slight growth without significant changes. The share of the use of intellectual property in research and development remains almost unchanged over the years. In education, there is a similar trend in the use of intellectual property.

An analysis of data over recent years does not indicate a change in the policy of using intellectual property in the field of scientific development and education, but rather characterizes positive dynamics without breakthrough changes reflecting the transition to a new technological structure. This contradicts the forecast expectations of a trend towards a peak increase in the use of intellectual property in the field of scientific research and education in accordance with a change in technological structure.

The education sector does not make a significant contribution to the use of intellectual property, even having a slight positive trend over the years: the share of using intellectual property in education is on average 20% less (Figure 3).

It should also be noted that there are no significant changes in educational activities based on the widespread use of the resources of intellectual activity. This means minimal changes in the educational and scientific processes associated with an increase in the introduction of unique educational technologies.

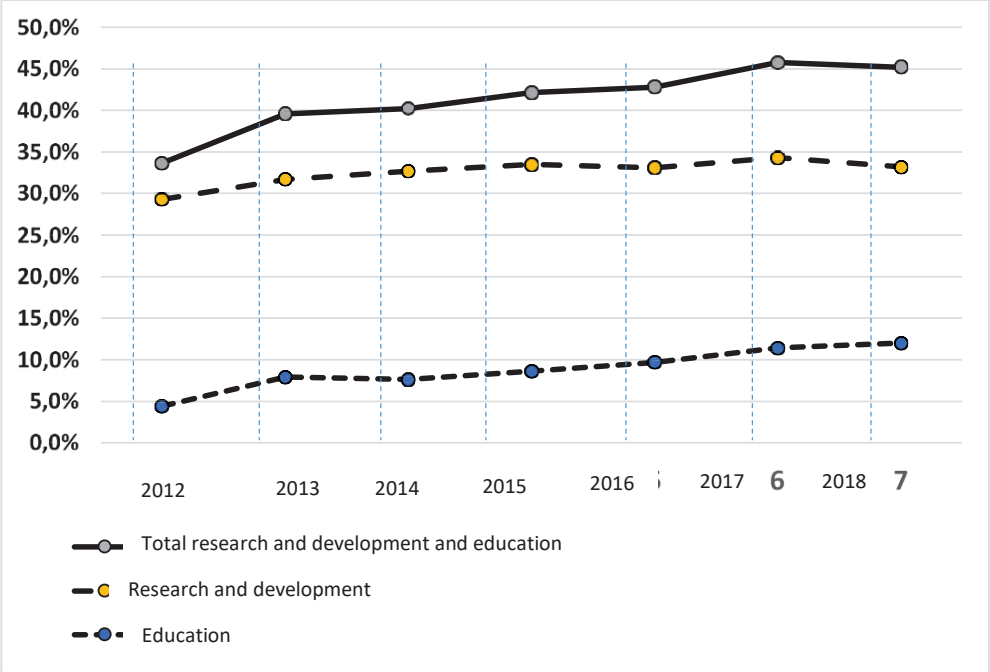

Figure 3 - Share of the use of intellectual property in research and development and education.
Source: calculated by the author according to statistics [7, 9, 10 and 11].

The share of the use of intellectual property in scientific research is slightly higher than in the educational sphere. However, there is no need to talk about an increase trend either. In scientific developments, to the same extent as before, the results of intellectual property are used, each time focused on the search for new solutions, without developing or commercializing the results of intellectual activity. This indicates the implementation of short-life innovations, ending in limited use. Since the sixth Industry 4.0 is characterized, among other things, by the active development of nanotechnology, we consider the scale and dynamics of growth in the creation and use of nanotechnology in general by type of economic activity, as well as in relation to scientific development and education.

The number of nanotechnologies developed (Figure 4) tends to increase, but it is extremely small in all types of economic activity, as well as in the research and educational sectors.

The dynamics of the number of nanotechnologies used is close to this trend (Figure 5): it reaches its peak in 2018 and amounts to 1166 units. However, these increases in use are so insignificant that we cannot talk about the trend: 2015 and 2018 indicators, comparable in values, respectively 1,152 and 1,166. If we consider the use of nanotechnology in scientific research, we can see that their share is decreasing. A similar picture regarding education.

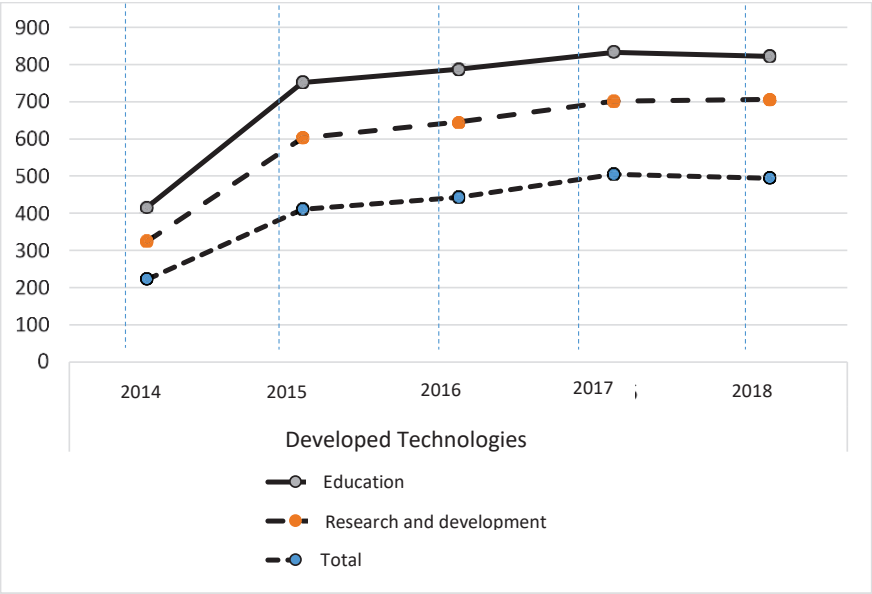

Figure 4 - The number of developed nanotechnologies in 2014–2018.
Source: calculated by the author according to statistics [7, 9, 10 and 11].

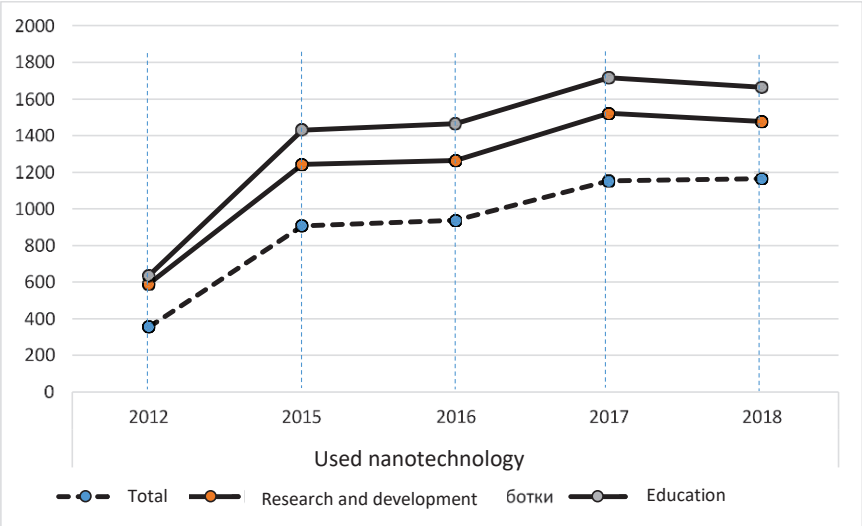

Figure 5 - The number of nanotechnologies used in 2010–2018.
Source: calculated by the author according to statistics [7, 9, 10 and 11].

Analysis of the developed nanotechnologies from the position of their specific weight among all types of economic activity: the share of nanotechnologies in the field of scientific research shows a decrease from 2013 to 2015, and in 2018 there was a slight increase of 4%. At the same time, nanotechnological developments in the field of education in 2015 amounted to 26%, and in 2018 - 23%, which corresponds to a decrease of 3%.

Thus, an analysis of the development and use of intellectual property and nanotechnology suggests that in the development of "Industry 4.0" there is no clear evidence of the active role of the field of science and education. So, for example, the state allocates significant resources to the nanotechnology sphere, including in the organization of the educational sphere, but the effectiveness of these organizations not only does not remain the same, but also decreases (Figure 6).

The analysis of statistical data allows us to conclude that universities and scientific organizations do not

meet the modern requirements of the economy; at the moment, Industry 4.0 has gone much further compared to the positions of universities in this process.

The lack of efficient use of state resources allocated for the formation of a new technological structure is largely due to the mismatch between the activities of organizations in the field of science and education, including due to insufficient compliance of the management system with available resources and performance requirements.

To change the current situation, a fundamentally new innovative university strategy is needed that can ensure the active participation of universities in the new technological structure on a regular, sustainable basis and thereby realize the new role of universities in society.

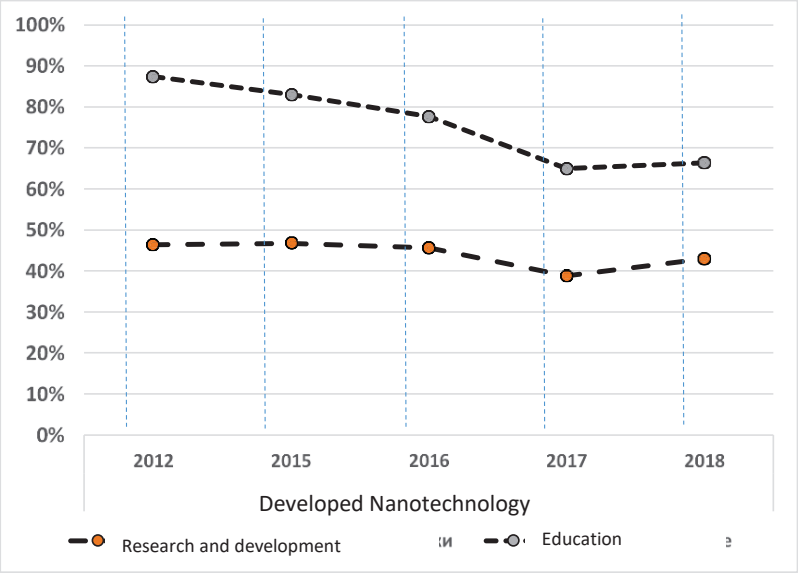

Figure 6 - The proportion of developed nanotechnology in science and education in 2010–2018.
Source: calculated by the author according to statistics [7, 9, 10 and 11].

3. Conclusion

At the same time, the adaptation of universities to changes in Industry 4.0 does not have a single theoretical scheme, which leads to the implementation of various transitional options for constructing organizational and economic mechanisms for universities serving various technological structures that coexist in society. This fact reflects a certain spontaneity of the process of changing Industry 4.0, which is characteristic of the previous stages, and at the same time right now it is possible to pass this period in a controlled manner.

It should be noted that the university's product management system is many times more complicated and allows independent implementation of several value chains, however, with a further increase in value chains, a crisis will inevitably occur, since there is no automation of management. As a result, the organization of product integration processes while maintaining the old management system leads to duplication of functions. It should be noted that in the organization of universities, elements of a self-organizing system are emerging.

The aspect of the influence of the new technological structure requires additional research on the new capabilities of the university, since this phenomenon determines the development factor. Previous models of university activities have exhausted themselves, do not meet the requirements of the external environment. At the same time, the external and internal components of the forces that influence the university's organization model should not be opposed; they do not contradict, but complement each other: the university must ensure its rapid development in the context of the formation of a new technological structure, while ensuring the current effectiveness and efficiency of its activities.

Universities, as well as the entire sphere of education, are inevitably integrated into Industry 4.0 and must support transitional changes, which requires a certain amount of activity of organizations in the field of science and education among other types of economic activity. This means that universities will have to transform their activities

to meet the requirements of the sixth technological order. The development of modern universities can be achieved not only in the competition for consumers and in finding answers to market challenges by improving the quality of current activities, but also primarily by understanding the role and place of universities in the development of products that create value for consumers in movement towards a new technological mode.

В этой связи существенно возрастает значение научного потенциала университета, который не только обеспечивает развитие продуктов, но и требует от менеджмента соответствующего ресурсного обеспечения. Формирование и реализация научного потенциала вузов возможны за счет принципиально новой инновационной стратегии университета, способной обеспечить активное участие университетов в новом технологическом укладе на регулярной, устойчивой основе и тем самым реализовать новую роль университетов в обществе.

In this regard, the scientific potential of the university is significantly increasing, which not only ensures the development of products, but also requires appropriate resource support from the management. The formation and realization of the scientific potential of universities is possible due to a fundamentally new innovative strategy of the university, capable of ensuring the active participation of universities in the new technological structure on a regular, sustainable basis and thereby realizing the new role of universities in society.

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Main Limitations of Using Information Technologies in Drafting Annual Financial and Non-Financial Reports

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Abstract

Evolving economy and the development of robotization refers to many areas of economic life. Accounting and reporting is no different here, yet the manner in which the process is progressing and the areas it concerns attracts great interest among employees of finance and accounting departments and is becoming a subject of studies which will allow for getting the answer- is accounting nothing but a set of repetitive evidencing operations, which could be entirely handled by automatization of work? To present the areas of accounting in which economic entities are introducing or will introduce robotization and automatization of work and to describe those areas related to presenting data in annual reports which are not covered by information technologies. As a result of the conducted research, four fields were distinguished, in which the robotization processes will be implemented and human labor significantly limited, as well as those areas in which implementing robotization is currently impossible. Directions of further works on that topic have been presented for the perspective of next 5 years. In addition, the essence of narration in accounting and reporting was pointed to.

Keywords Accounting, Reporting, Robotization And Automatization

Introduction

Economic entities which aim to stay on the market must base their operations on a number of right decisions, including financial ones. Undoubtedly, the decision-making process is to large extent dependent on access to reliable information concerning the economy. Thanks to such data, it is possible to make not only strategic decisions, but tactical and operational ones as well. With their help, it is possible to eliminate deviations from the established patterns, make amendments in the operation plans, or modify the range of operations. The information one uses in the course of decision-making process may have a synthetic or analytical form. Synthetic data is processed with the available computational and analytical tools. Analytical data, on the other hand, are essential for explaining the reasons, and consequently the results of the ongoing changes and determining the factors which impact the shape of a company's financial outcome. However, a crucial role in the decision-making process is played by both financial and non-financial data.

It is worth emphasizing that in the period of such sharp competition the need for access to financial information is constantly growing. Annual reports play an important role in the evaluation of the outcomes of the activity performed by the entity, with the data allowing for an analysis of cause and effect relationships. Managers of organizations need analytical information, as it helps them to study future trends, and on their basis to forecast future conditions of functioning for the company, as well as the outcomes achieved by it.

Having a well-functioning system of financial reporting helps to prepare in advance to the changes taking place in the business environment, and diagnose the risk factors to protect oneself from their

effects. In order to prepare reliable financial information, an entity is obliged to keep record of its business operations, whose effects have an impact on individual values of assets, sources of financing, operation outcomes and the amount of fiscal liabilities (both the income tax and the VAT liabilities/overcharge). Making annual reports is regulated by individual legal solutions of a given country or is based on international solutions included in international standards of financial reporting. Regardless of the legal conditions, the execution of financial and accounting processes requires the use of modern technological solutions, especially in terms of digital reporting. However, not all elements of an annual report can be prepared with the use of specialized financial and accounting software.

Materials and Method

The aim of the study is to point to the financial and accounting fields which have undergone automatization and robotization of processes, as well as those where the processes have not been implemented.

Critical analysis of literature was used as the research method. For the purpose of identifying the financial and accounting areas which have undergone automatization and robotization of processes, the results of own study conducted between November 2019 and February 2020 among accountants employed in two large economic entities operating in two regions of Poland. The above findings were compared with the data coming from the report entitled Robotic Process Automation – Robots conquer processes in back office prepared in 2016 by Capgemini Consulting and Capgemini Business Services (Capgermini Consulting, 2016). The report contains the processed findings of the research on the possible implementation, and the areas in which an entity had already implemented RPA processes, and which areas were still to undergo the process.

Using IT in accounting and Financial Reporting

In recent years, in increasing number of publications and amount of researchers' interest has been focused on specialized financial and accounting programs. Computer software was a guarantee of quality of the performer recording and accounting operations, processes and data storage. Using integrated IT systems (ERP class) provides the opportunity to import/export data, limits the time and costs related to recording, allows for generating comparisons and reports, with the interference of systems effectively shortening the time of data generation in different cross-sections and areas, at the same time supporting organization management systems.

Currently, the range of information technologies is becoming wider and includes, among others, digital recording, e-declarations, remote accounting, cloud accounting. Other solutions used in accounting practice are international financial centers, sharepoint platforms and digital documentation related to them. The presented solutions allow for full access to digital financial and accounting data, reduce costs related to creating backup, and contribute to increased efficiency and speed of transactions. In terms of financial and accounting services for companies, an increasing role is played by the progressing automatization and robotization, which requires next generations of technological solutions. Automatization of business processes is widely discussed and described in papers on management (Attaran & Woods, 2018), financial accounting (Toth, 2012) and management accounting (Tessier & Otley, 2012), which is evidenced, among others, by an increase in the number of publications on that matter in ScienceDirect database (36 in 2017, and 41 publications in 2018). The analyzed publications point to increased interest in automation and robotics in terms of handling logistic processes, sales, finances and accounting- which are referred to as Robotic Process Automation – RPA. In a traditional approach of the RPA language– a computer software license is considered a robot (Willcocks, Lacity & Cragi, 2015). A different view is presented by ForProgress, which defines a robot as a tool functioning in such a manner as if a human being was physically operating a given software. For other authors, however, automatization of business processes involves replacing human labor, leading to the realization of tasks and processes in a manner which is faster, less costly and more dynamic (Fersht & Slaby, 2012). It should be remembered that automatization of financial and accounting processes is not merely a result of works aimed at replacing human labor by robots. The implemented changes are meant to combine the labor of humans and robots- referred to as virtual workers. Such complex work

allows a robot to perform simple, repetitive tasks, leaving creative tasks, which require subjective evaluation, individual, homogenous solutions, as well as devising and implementing modifications in technological systems to the accountants. Among the major benefits resulting from automation of business processes there are (Delotitte, 2017):

- increased level of compliance with process realization procedures,
- improved quality,
- higher effectiveness,
- reduced costs of operation,
- increased productivity,
- better and wider access to management information,
- automatization of some round-the-clock
- flexibility of scaling and configurations of comparisons and their areas,
- availability of process history,
- monitoring and supervision of process,
- reduced service time,
- adjusting solutions to the requirements of business users.

In contemporary literature on accounting, the authors emphasize the important role of the processes of automatization and robotization in the fields of: recording business events, writing reports and analyses, synchronizing account balances, processing transactions, generating year-end closings (Chew & Robinson, 2012; Brazina & Urgas, 2018). It should be noticed that modern technological solutions provide business managers with fast access to financial information relevant to the process of making management decisions (Percells, 2016).

The use of RPA in financial and accounting processes

The fields of robotization of processes presented in literature are reflected by research. On the basis of conducted and presented research included in the report entitled Robotic Process Automation – Robots conquer processes in back office, published in 2016 by Capgemini Consulting and Capgemini Business Services, it appears that 53% of respondents use RPA solutions in the field of finances and accounting. The results of the research conducted are presented on Graph 1

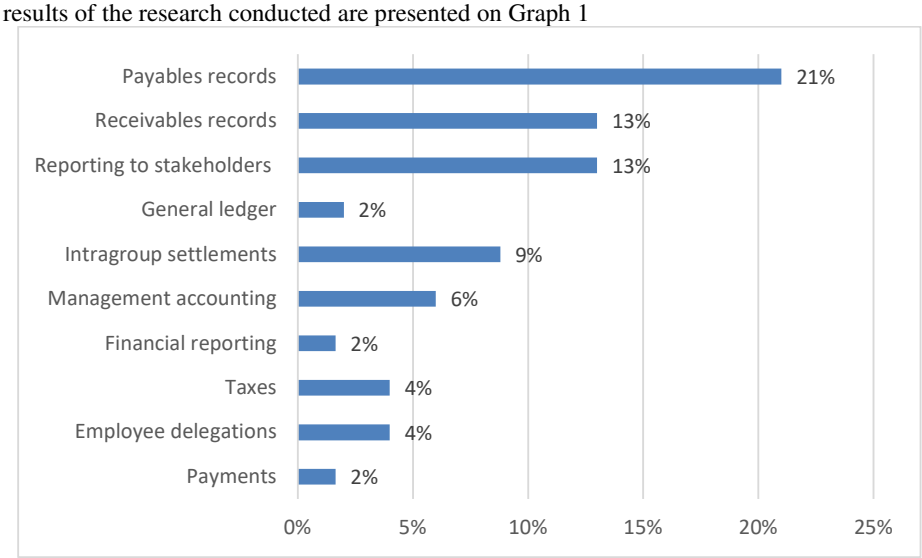

Graph 1: Financial and accounting processes in which RPA solutions were implemented

Source: Capgeminin Consluting. (2016). Robotic process Automation – Robots Conquer Business Processes in Back Office.

The presented findings indicate that the process of robotization and automatization was most commonly employed during recording liabilities (21% of respondents pointed to that field), with the next position being held by recording debt and reporting to stakeholders (13% of respondents pointed to those areas). The lowest percentage, merely 2%, was recorded in the cases of payments, running the general ledger, or financial reporting.

Similar studies were con ducted among accountants employed in large business entities operating in Pomeranian and Kuyavian-Pomeranian regions. The study involved 90 accountants from various business entities, representing different sectors. The survey was conducted between November 2019 and 10 February 2020. The respondents were asked, among others, about the manner in which the processes of robotization and automatization were progressing in their organizations in terms of financial and accounting services, and which of the proposed fields are most frequently subject to such processes. The survey results are presented on Graph 2. The robotization processes progress gradually, as the implementation processes require both financial investments and time necessary for a proper development of the automatized processes.

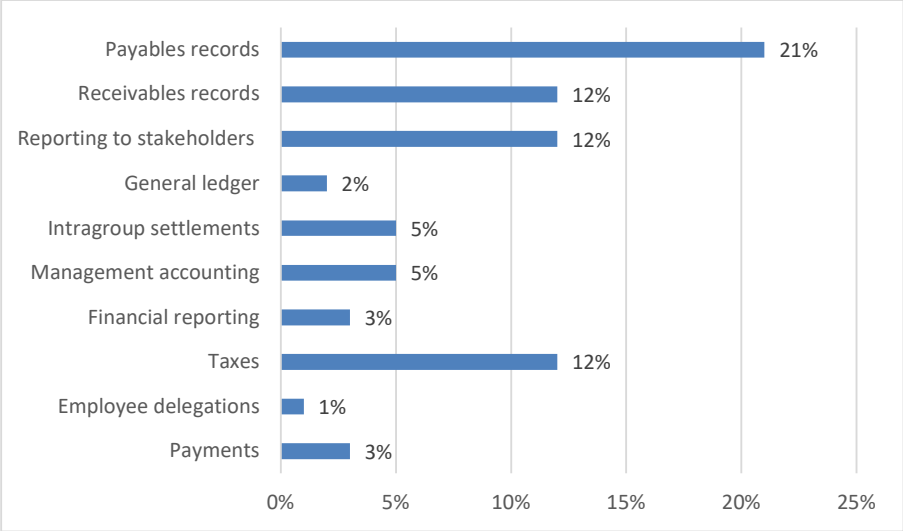

Graph 2: Financial and accounting processes in which RPA solutions were implemented according to accountants in Polish business entities.

Source: Own study based on an own survey

Based on the survey findings presented, it appears that the processes of robotization most frequently involve the fields related to recording liabilities, evidencing employee delegations, external reporting and taxes.

While making a comparison of the results, it is worth noting that, according to accountants, one field which is often pointed to as one undergoing the process of robotization is taxes. According to 12% of the respondents, the process of automatization is being implemented, which may be the result of introducing e-declarations, uniform controlling files related to the tax on goods and services (VAT) and the possibility of them being controlled by organs of fiscal administration.

RPA processes have already been implemented in some units, but as the report indicates, respondents were asked to point to the fields in which the studied entities were planning to introduce automatization and robotization within the next 3-5 years. As shown on Graph 3, the number of planned implementations is impressive.

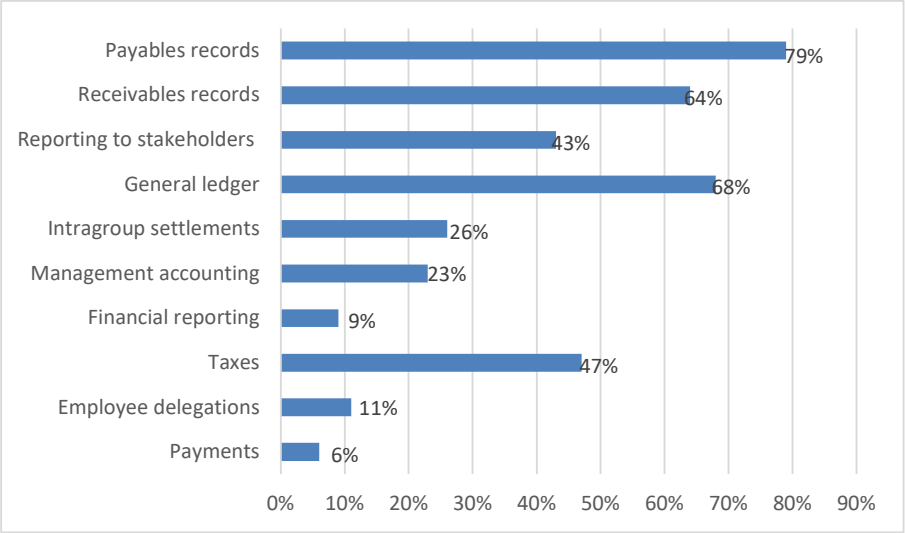

Graph 3 : Financial and accounting processes in which implementation of RPA solutions is planned

Source: Capgeminin Consluting. (2016). Robotic process Automation – Robots Conquer Business Processes in Back Office.

The respondents most frequently pointed to robotization in terms of dealing with liabilities to contractors (79%), running the general ledger (68%) and dealing with payments from customers (64%). On that basis, Polish respondents were also asked about the planned changes in terms of accounting and implementation of robotization processes in finance and accounting departments. However, the respondents were rather moderate in pointing to further robotization processes, which was demonstrated on Graph 4.

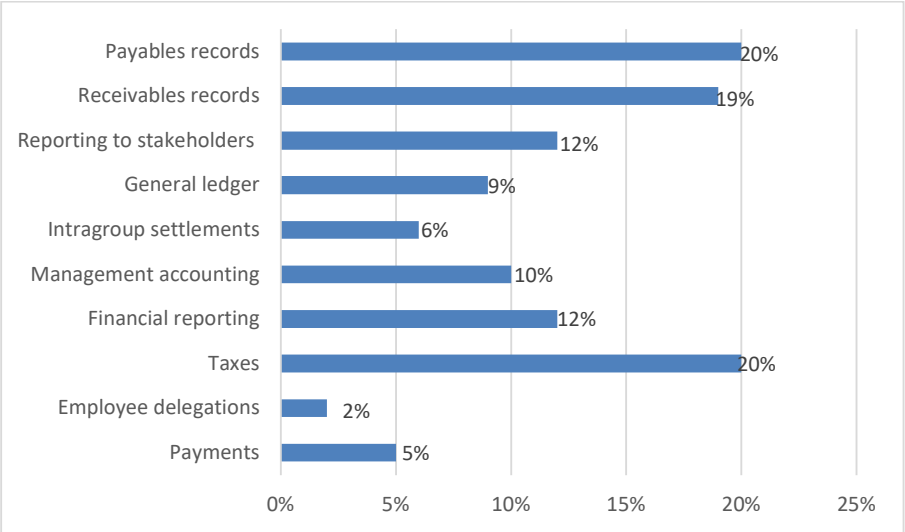

Graph 4 : Financial and accounting processes in which implementation of RPA solutions is planned according to accountants in Polish business entities

Source: Own study based on an own survey

As shown on the graph above, among the Polish business entities the processes of robotization will most commonly concern handling liabilities and debts (dealing with contractors) and doing the taxes. According to the respondents, it had been caused by the introduction of changes in the Polish fiscal regulations related to Uniform Controlling Files (so-called JPK, which are related to paying the tax on goods and services- VAT), and the introduction of shared payment mechanism.

However, for some of the respondents, the introduction of processes of robotization and automatization of payments is dependent upon high costs being involved in software implementation.

The respondents were also asked about the fields of finances and accounting in which the RPA process would not be implemented. Almost 90% of the studied accountants pointed to changes in yearly reports, resulting from the changes included in the Accountancy Act (Polish legal regulations) concerning non-financial information in reports.

Non-Financial Information in Annual Reports

The cautious approach of respondents to the prospects of development of the automatization process in accounting, mentioned in the previous part of the article, may have a number of causes. However, one of the limitations to the expansion of robotization in accounting which is hard to negate is the recent rapid increase in the importance and the practical usage of non-financial information in reporting. Financial information reflect ex post data, whereas contemporary economy is oriented towards providing ex ante information, which is why more and more frequently the financial data presented in reports are supplemented with non-financial information in a descriptive form. Narrative accounting has become a verbal description used both in theory, policies and practice of accounting. Such a description is commonly used in annual reports of economic entities. The descriptive form is becoming more and more complex in the reports generated by accounting systems, and supplemented with graphic elements, in the form of charts, diagrams or drawings. Such a presentation of data greatly limits, or even eliminates the possibility to robotize labor. Using narration in reporting results from economic changes and technological progress, but first of all belongs to the practices which are more and more commonly used by business entities. Using past (historical) and previously used solutions is becoming impossible, as the process of perfecting financial reporting plays and important role in the information system and the manner in which an entity communicates with its environment. Preservation of the status quo in this respect, according to G. Mueller, will be a certain recipe for disaster in the field of financial information. However, development of the narration in accounting is predominantly the strengthening of the communication process, which is greatly impacted by the complexity of economic phenomena, growing needs of users, changes and development of accounting standards. Such an approach allows for creating the image of accounting in financial reports addressed at external recipients, and is related to creative accounting, making it possible to present the economic situation according to the expectations and carry out an organization's projected goals. Creating an organization's image may be analyzed from two perspectives: positive (improving the usability and suitability of information and increasing the transparency of the company's presented image) and negative (manipulating with information, providing a false image, fraud). Apart from the widely recognized creative accounting, a new solution in the field of accounting is narration.

Narrative accounting and its impact on the growing importance of non-financial information

Narrative accounting attracts significant interest and has become a subject of scientific research. V. Beattie, B. McInnes and S. Fearnley (2004) have devised the methodology of conducting an analysis and evaluating narration in accounting. They have also presented the concept of qualitative analysis based on coding any disclosures in annual reports, distinguishing four areas:

- the past and the future,
- financial and non-financial data,
- quantitative and non-quantitative information (description of a fact or an opinion),
- disclosures related to finances, strategies, management analysis and goal completion.

A different approach to analysis and the research conducted in 2011 and 2013 was adopted by N.M. Brennan and D.M. Merkl-Davies (Brennan & Merkl-Davies, 2011; Brennan, Merkl-Davies & Doris, 2013), who based the possibility to use narration in accounting on the feasibility of creating a desired image of an entity by managing the recipient's impression. According to the authors, it may lead to a decrease in the quality of reporting, as well as erroneous allocation of capital by users who are susceptible to suggestions. In addition, they concluded that the areas of managing the impression in reporting include:

- building an entity's reputation by its stable evaluation over time (comparing to selected years in comparison to which the current data demonstrate tendencies for growth).
- creating market and/or financial image.

As a part of communication with a user in narrative accounting, areas have been distinguished, allowing for:

- manipulating the clarity and comprehension of information by using complex language, which makes it possible to provide a company's blurred image in the periods of poor performance,
- rhetorical manipulation, which allows for raising the level of trust and improving an organization's reliability,
- thematic manipulation, thanks to which it is possible to highlight positive information and hide negative one,
- visual manipulation, making use of graphic elements aimed at diverting the user's attention from the remaining information,
- presenting comparisons on the basis of properly selected periods in order to accomplish an entity's projected goal,
- crediting oneself with accomplishments, positive results are the outcome of an organization's actions, whereas negative ones have appeared as a result of external factors, which can be described as independent by an organization.

Narrative reporting has not been unambiguously defined, as it includes all types of information which supplement annual reports, which constitute a set of financial and non-financial information necessary for presentation, understanding the context and diagnosing and evaluating the results of the whole of a company's operations and resources, as well as its current and future financial and market situation (Samelak, 2013). The Federation of European Accountants defines non-financial reports as all information other than financial (FEE, 2015), which is revealed by a company, but cannot be presented by means of concrete amounts of money, despite the fact that they may involve financial consequences (FEE, 2015a, p. 46). Up till the present, no single and commonly accepted definition of non-financial reports has been adopted (Sniezek, Krasodomska & Szadziewska, 2018, p. 68). Narrative reporting allows for presenting a wide range of information concerning an organization's results and accomplishments, and at the same time it may be overly complex and present information in such a manner that it enables the creation of an organization's outcomes and image in accordance with the management's expectations, but in the form it is currently taking, it seems unlikely that it will be subject to robotization of labor due to its individual nature, wide variety and lack of repetitive elements.

The problem of standardizing non-financial reporting and automatization of processes in accounting

Achieving homogeneity in terms of structure and range of information in non-financial reporting is extremely difficult due to lack of appropriate standards, which would compel all entities to write reports in a manner which is transparent, clear for stakeholders and, most of all, comparable. EU Directive 95 on disclosure non-financial information and information on diversity leaves entities with the possibility to choose the form and range of disclosure and publication of information, pointing only to the necessity to preserve the minimum of information required by the directive. Business entities make use of various norms and directives available on the market published by international organization, which facilitates diversity in terms of disclosures. However, non-financial reporting is gaining importance year by year, and a growing number of companies is deciding to disclose their data on customer relations, ethics and preventing corruption, responsibility for the product, employees, natural environment, dialogue with their environment or social responsibility. Such an approach provides companies with the opportunity

to take a holistic and strategic look at their organizations and estimate their impact on the business, social and natural environment. In addition, it allows to notice new business opportunities. Such a transparent presentation of information makes a company appear more trustworthy in the eyes of both external and internal stakeholders. Directive 4 by GRI (*Global Reporting Initiative*) is the best-known and most commonly used document which provides assistance in writing non-financial reports, both in Poland and worldwide. It contains rules concerning a good report, writing it, or the set of indicators which allow companies to write a report which would be a valuable management tool for them, as well as a relevant source of information about a company and its approach to building up value for stakeholders(Deloitte, 2016). Non-financial information in a report should be presented in an organized manner and concern the following groups of information concerning (Deloitte, 2016a):

- strategy and analysis – including the presentation of the company's vision and mission, as well as projected goals in economic, environment and social terms, as well as the values an organization creates,
- organizational profile – information about the company and its basic products and areas of activity, the property structure and legal form, as well as the markets of operation and the scale of organization,
- identification of relevant aspects and limitations- the key areas of activity which influence the stakeholders' evaluation and decisions, description of changes in terms of disclosure and their outcomes, pointing to the ways to verify a report, as well as presenting the reasons for not disclosing some information,
- stakeholders' involvement – information on the key stakeholders and their participation in the processes of revealing the organization's results,
- corporate order – information about the managers and management in terms of effectiveness of management, organizational structure and responsibilities of individual units, as well as reference to the realization of projected goals and motivational system,
- ethics and honesty– disclosures concerning the rules, norms and standards of ethics used within the company,
- indicators and results – presentation of the calculated indicators related to economic, environmental and social results, whose choice should take into account the needs of particular groups of stakeholders in the decision-making process,
- report's profile– information concerning the period described in the report, as well as the attitude towards external verification.

It is not difficult to notice that a vast majority of the abovementioned groups of non-financial information cannot be subjected to a far-reaching and detailed standardization. It is due to not only to the specific nature of information itself, but also to its varying role from the point of view of providers and recipients. Even if the groups include figures, the crucial aspect for both parties is to interpret the data in the context of the issue they demonstrate. It is a message which allows for operating with such elaborate nuances that automatization of those actions would be impossible.

Regulative Framework of Presenting Non-Financial Information

When presenting a non-financial report, it should be assumed that, according to GRI 4 directive, there are two types of indicators: profile and detailed. Profile indicators concern:

- strategy and analysis,
- organization's profile,
- identification of the relevant aspects and their limitations,
- stakeholders' involvement,
- report profile,
- corporate order,
- ethics.

Detailed indicators describe the information related to the approach to management and refer to the economic, environmental and social categories.

In terms of ethics, the most important indicators concern:

- values, rules, standards and norms used by the organization,

- functioning of internal and external mechanisms of consulting within the organization in terms of ethical and law-abiding behavior,
- functioning of internal and external mechanisms of reporting cases of unethical or lawless behavior within the organization,

It is worth noting that as part of GRI4 directive, an entity should describe internal and external mechanisms in the field of breaching ethical standards or law, as well as issues related to an organization's honesty, providing an example of reporting cases of unethical behavior to direct superiors, describing the rules of whistleblowing or ethics helplines.

Despite various, often differing approaches to accounting and narrative reporting in Poland, the lawmakers have introduced the legal rules in terms of presenting financial and non-financial information. They are undergoing constant changes, which are driven by the need to tailor them to the expectations of external users and the remaining stakeholders. According to the legal act on accounting, the extent of presented non-financial information is dependent upon the size of a business entity and includes statements which contain the information on (Legal act from 29 September 1994 on accountig):

1) a brief description of the entity's business model,
2) the key non-financial indicators of effectiveness related to the organization's operations,
3) a description of policies used by the entity in relations to social, employee, environmental, human rights and anti-corruption issues, along with a description of the results of using them,
4) a description of due care procedures- if the entity makes use of them among the policies mentioned in point 3,
5) a description of relevant risks related to the entity's operations which may have detrimental effect on the issues mentioned in point 3, including the risks related to its products or relations with the external environment, including contractors, along with a description of managing those risks.

Regardless of the law-maker's intentions, in order to force the reporting entities to be brief and concrete in terms of the information they disclose, the nature of the issues to which reporting entities are meant to refer to facilitates their use of vast amounts of non-financial information. The motivation behind the selection and range of non-financial information by those entities may be influenced by the factors described above in relations to the issues of narrative accounting.

Conclusions

Robotic Process Automation (RPA) – automatization of complicated processes which replace humans thanks to the implementation of advanced software – changes the future of back office processes. Companies all over the world are starting to realize that RPA is another digital transformation which will allow employees to stop working on repetitive tasks.

The comparison of Capgemini Consulting research results and the authors' own research shows that the concentration on financial and accounting processes in the area of automation and robotization already accomplished is very convergent. This is particularly visible in receivables and payables, and among processes of heterogeneous nature, in reporting to stakeholders. However, studies in the Pomeranian and Kuyavian-Pomeranian regions show clearly reduced expectations for further automation and robotization compared to the results of Capgemini Consulting, except for financial reporting processes. Compared to Capgemini's research, the noticeably greater importance of taxes processes in relation to other processes, both already subjected to automation and robotization, as well as planned ones, is also characteristic. In both cases, the low importance of intragroup settlements for respondents from the Pomeranian and Kuyavian-Pomeranian regions results from simpler organizational structures of enterprises, usually operating in this area as one unit (dominance of small and medium enterprises).

The presented findings indicate that the repetitiveness of work mainly concerns dealing with suppliers and recipients, but also other areas, for example writing reports. Robotic Process Automation allows

employees to concentrate on initiatives which provide more value added, essential for the company's bottom line. Undoubtedly, accounting and narrative reporting constitutes the area which so far has not been subjected to the robotization process, due to its unique nature, but also because of the lack of standardized rules of presenting non-financial information.

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Trust in Products in The Context of Final Purchasers' Active Participation in Creating A Marketing Offer

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Abstract

This article is theoretical and empirical in nature. Its main purpose is to determine the significance of trust shown by final purchasers in their openness in jointly creating a marketing offer with the offerors. A cognitive-critical analysis of the literature on marketing, marketing management and relationship management was used to prepare the theoretical section. The results of the analysis indicate a cognitive and research gap regarding the trust in a product felt by final purchasers in the context of their active participation in the process of creating a marketing offer. In order to reduce the gap, four research hypotheses were formulated, and empirical studies were conducted in which a questionnaire was used to gather primary data. The data were subjected to statistical analysis using Pearson chi-square test and V-Cramer coefficient analysis. The results indicated that there were statistically significant dependencies between trust in products and the following aspects: (a) respondents' willingness to cooperate with offerors, (b) respondents' opinions concerning producers listening to purchasers' suggestions, and (c) the way respondents interpret cooperation with producers. There were no statistically significant dependencies between trust in products and respondents' opinions on the effectiveness of producers as initiators of final purchasers' marketing activity.

Keywords: Trust, Final Purchaser, Product, Offeror, Marketing Offer, Commitment of Final Purchasers

Introduction

Trust is the basis of any long-term relationship between at least two entities, both private and professional. This results from the definition of the verb 'to trust' defined as 'to believe that someone is good and honest and will not harm you, or that something is safe and reliable' (https://dictionary.cambridge.org/dictionary/english/trust). Given the definition, trust is part of key market values that determine the competitive strength of contemporary companies operating in the consumer market. Offerors having trust in themselves and their products is a prerequisite for final purchasers to undertake purchase and extra-purchase activities. This has special significance when deciding on repeat-buying of a particular product or products from a particular offeror. Therefore, it determines the creation and strengthening of behavioural and emotional loyalty to a reliable, credible and honest offeror. It is also vital to have even stronger involvement by the final purchasers in relationships with offerors when creating a marketing offer with them. Accordingly, it is extremely important to undertake theoretical and empirical research on the significance of trust relating to the scope of market behaviours exhibited by contemporary final purchasers.

The results of the cognitive-critical analysis of the literature on the subject, presented further in this article, indicate that the role of trust has not yet been analysed, especially when it comes to the willingness of final purchasers to participate in the creation of a marketing offer and their perception as initiators and recipients of this activity. The purpose of this study is therefore to determine the significance of trust shown by final purchasers in their openness in jointly creating a marketing offer with the offerors.

Literature Review

Trust is a multi-dimensional category (see Fang, Guo, and Zhang, 2015). It can be considered from various perspectives, including sociological, psychological and ethical (see Bauman, and Bachmann, 2017). Virtually all perspectives are used to analyse trust in management (see Guillén Parra, et al., 2011), including marketing management and marketing, or macromarketing (see Pirson, Martin, and Parmar, 2016), which analyses interactions between offerors and purchasers as large groups of entities.

Similar to trust, which is the basis for marketing relationships, especially long-term ones, (see Bauman, and Bachmann, 2017; Kim, Ferrin, and Rao, 2009), interactions are multi-dimensional, beginning with the initiation of a particular relationship until its effects appear. The most important dimensions of marketing relationships are sociological (social), psychological and ethical. Obviously, this also concerns relationships between final purchasers and offerors, including producers, traders and service providers. On the one hand, a given purchaser decides to establish a relationship with a particular offeror based on his/ her subjective feelings (see Dietz, 2011) which result from, among other things for example, the hierarchy of values they share, which is a psychological dimension. On the other hand, in the decision-making process the purchaser considers the behaviour and opinions of other people, especially those visible in social media (see Hanaysha, 2018) and current consumer trends, which is a sociological dimension. For both perspectives, ethical issues are of great importance as they reflect an offeror's previous behaviour towards purchasers and other groups of market entities, the natural environment and an individual purchaser, provided that the purchaser already has some experience of previous relationships with the offeror. Ethical issues are particularly important in online transactions (see Elbeltagi, and Agag, 2016) which result from the specificity of the virtual environment which does not involve personal contact between a final purchaser and an offeror.

Taking into consideration the perspective of time, trust can be considered as a category relating to the past or the future. In the first approach, trust is based on the experience of the individual and/or other people reflecting the conduct of a particular offeror. In the second approach trust refers to assumptions about the actions that may be taken in future by a particular offeror and whether those actions comply with the expectations of the individual. An example of connecting trust with the past is the definition presented in the introduction to this article, and referring to trust in the future is exemplified in a definition proposed by P. Sztompka (2007), according to which trust is a kind of bet taken on uncertain future actions of other people. However, it seems that in market relationships it is the right approach to analyse trust as a category that reflects past experience, as it allows the risk of choosing the wrong partner to be reduced, while increasing the likelihood of establishing a relationship that brings the expected benefits to both parties. From the point of view of offerors, one of the key benefits is purchasers' loyalty to them, their offer and brand (see Bakator, et al., 2019).

As can be seen, trust is a very complex category that forms the basis of virtually any market relationship (see Maia, et al., 2018). It is of key image-forming importance, determining the perception of a particular offeror, which affects the perception of products and other elements of a marketing offer. A high level of trust helps create positive attitudes towards a given company and its offer (see Chen, and Dibb, 2010) and consequently its positive image, whereas distrust in a particular entity leads to building a negative image, as well as a negative image of its offer.

The feeling of trust in an offeror, or its lack thereof, is reflected in specific forms of activity undertaken both of a purchase and non-purchase nature. Purchasers are definitely more eager to buy products from companies that they trust, showing greater openness to various forms of contact with such offerors, even when they require much more involvement than typical shopping activities. These include two basic forms of behaviour: communication and creation (see Baruk, 2019). Considering the paradigm shift in contemporary marketing from creating an offer for a purchaser to jointly creating the offer (see Dellaert, 2019), it is extremely important that offerors skilfully initiate such involvement and use its effects appropriately.

However, it should be emphasised that the lack of trust on the part of final purchasers also results in behavioural and emotional consequences felt by offerors (see Fang, Guo, and Zhang, 2015). People do not willingly buy the products of unreliable companies, and this generates a negative emotion of the perception of these companies. In addition, purchasers share their unflattering opinions with others (see Chen, and Yuan, 2020), contributing to the creation of an unfavourable image of an offeror and their offer; they effectively discourage other purchasers from buying.

It is worth noting that so far in the literature on the subject trust has been analysed primarily in relation to shopping and communication behaviours. In recent years, trust in products in the context of shopping behaviour has been most often analysed in relation to online shopping (see Kooli, Ben Mansour, and Utama, 2014; Thi Mai Anh, and Huong, 2019), especially the intention to repeat it (see, inter alia, Sullivan, and Kim, 2018; Kim, et al., 2012; Shiau, and Luo, 2012). In turn, for communication behaviour trust is increasingly being considered in relation to online communication (see Huete-Alcocer, 2017; Abubakar, and Ilkan, 2016; Lee, Park, and Han, 2011; Awad, and Ragowsky, 2008), i.e. electronic word of mouth (eWOM) (see Hussain, et al., 2017).

The theory and research consideration has not yet been applied to trust in the context of creative behaviours involving active cooperation between final purchasers and a company in creating a marketing offer. One can therefore speak of a cognitive and research gap in this respect. The pursuit to reduce the gap was the main premise for choosing the scope of this study. An attempt was made to solve the following research problem: how significant for final purchasers is their trust in products that they adopt an open attitude to creating a marketing offer jointly with a company?

In order to solve the research problem, the following goal was pursued: to determine the significance of trust shown by final purchasers in their openness to create a marketing offer jointly with offerors. An attempt was also made to achieve the following specific research goals:

G1: to identify the share of respondents who are willing to engage in the preparation of products, advertisements and other elements of a marketing offer.
G2: to identify respondents' opinions on the effectiveness of offerors in encouraging purchasers to cooperate in the process of preparing an offer.
G3: to identify respondents' opinions on whether offerors listen to purchasers' opinions and use their spontaneous willingness to cooperate.
G4: to define respondents' trust in products according to the extent of final purchasers' commitment in their preparation.
G5: to check whether there is dependence between trust in products and respondents' willingness to cooperate with offerors.
G6: to check whether there is dependence between trust in products and respondents' opinions on the effectiveness of offerors in encouraging purchasers to cooperate.
G7: to check whether there is dependence between trust in products and respondents' opinions on offerors' listening to purchasers' suggestions.
G8: to check whether there is dependence between trust in products and the way respondents interpret cooperation with producers.

Four research hypotheses have also been verified:

H1: there is dependence between trust in products and respondents' willingness to cooperate with producers.
H2: there is dependence between trust in products and the perception of producers as initiators of final purchasers' participation in marketing activity.
H3: there is dependence between trust in products and the perception of producers as recipients of final purchasers' spontaneous activity.
H4: there is dependence between trust in products and the way of interpreting the cooperation between final purchasers and producers.

General Characteristics of The Research

In order to achieve the research goals and verify the hypotheses, primary research was conducted. The research was implemented as part of research project 11/B/HS4/00430 financed by the National Science Centre. The research was conducted in the third quarter of 2018 among 1,200 people representing Polish adult final purchasers from all over Poland. A total of 1,012 completed questionnaires qualified for statistical analysis. The survey population was 61% female, which corresponded to the structure of the general adult population of Poland (see http://www.polskawliczbach.pl/#ixzz4F3Nogl1N). Non-random selection of a quota-type sample was applied. It must be underlined that according to M. Szreder (2010), it is not always necessary to apply random selection, and more and more often non-random selection can even be treated as an opportunity for a researcher. The research was direct in nature, requiring the interviewer's personal contact with respondents. This made it possible to obtain a high return rate of completed questionnaires.

The present study represents only a small fragment of research covering a much broader scope. The scope of the research presented in this article includes the following: (a) respondents' opinions reflecting their trust in products based on purchasers' involvement in the preparation of the products, (b) respondents' opinions on the cooperation with producers reflecting their willingness to jointly create a marketing offer, (c) the perception of producers as initiators of purchasers' marketing activity and as recipients of the effects of purchasers' spontaneous activity, and (d) the interpretation of cooperation between final purchasers and producers.

The primary data collected during the research were used in further stages of the research process, namely statistical analysis using the following methods and tests: cross-table analysis, Pearson chi-square independence test, and V-Cramer contingency coefficient. The chi^2 test was used to determine if there were statistically significant dependencies between the analysed variables, and the V-Cramer coefficient was used to determine the strength of relationships between the analysed variables. The V-Cramer coefficient is used when at least one variable has more than two values (see King, Rosopa, and Minium, 2018), i.e. if the contingency table has dimensions of at least 2×3.

Research Results

The results of the research indicate that almost 41% of respondents showed an open attitude to the creation of a marketing offer with the producers of a product (Table 1). Such cooperation may be the result of its stimulation by producers or it may result from spontaneous attempts of involvement by final purchasers in joint activities. However, nearly one third of respondents positively assessed producers as the initiators of purchaser marketing activity. It is true that a slightly larger percentage of respondents positively assessed offerors as beneficiaries of purchasers' spontaneous activity, but in both cases the majority of respondents perceived producers unfavourably. Perhaps this was one of the reasons for more than half of respondents declaring their unwillingness to participate in marketing activities.

Table 1: Respondents' attitudes towards cooperation with producers (%)

Variable	Ratings (%)	
	yes	no
Willingness to engage in the preparation of products, advertisements and other elements of an offer	40.8	59.2
Respondents' opinions on the effectiveness of producers in encouraging purchasers to cooperate in the process of preparing an offer	31.1	68.9
Respondents' opinions on whether producers listen to purchasers' opinions and use their spontaneous willingness to cooperate	39.2	60.8

Source: own study based on research results.

As clearly seen in Table 2, the largest percentage of respondents trusted products prepared by manufacturers in accordance with the principles of the classic marketing approach most, i.e. based on the results of research into purchaser expectations. However, it is worth noting that almost every third respondent felt the greatest trust in the products jointly prepared by producers and purchasers, i.e. in accordance with the assumptions of the prosumer marketing approach. By far the smallest portion of respondents most trusted products prepared by purchasers only with the support of the offeror. An analogous structure of indications reflecting trust in products is observed for respondents expressing their willingness to participate with producers in the preparation of an offer together, although for this group a clearly different percentage of indications for individual types of products can be seen. This applies especially to products jointly prepared by manufacturers and purchasers, and products prepared by producers based on purchasers' own ideas. For respondents showing openness to cooperation with producers, the share of respondents who mainly trust products created jointly was almost 12% higher than for all respondents, whereas the percentage of respondents who mainly trusted products prepared by producers without the participation of purchasers was almost two times lower than it was for all respondents.

Table 2: Products that generate the greatest level of trust in respondents and their willingness to engage in the preparation of products, advertisements and other elements of a marketing offer (%)

Products that generate the greatest level of trust in respondents	Respondents' willingness to engage in the preparation of products, advertisements and other elements of a marketing offer (%)		
	yes	no	total
prepared by producers based on their own ideas	10.6	28.0	20.9
prepared by producers based on the results of research on purchaser expectations	44.7	44.3	44.4
jointly prepared by producers and purchasers	41.3	21.5	29.6
prepared by purchasers only with the technical assistance of producers	3.4	6.2	5.1
total	100,0	100.0	100.0

Source: own study based on research results.

However, a different structure of trust in products was identified for respondents showing a closed attitude towards cooperation with producers. It is true that in this group the largest proportion of respondents trusted products prepared within the framework of the classic marketing approach the most, but the second position in terms of the percentage of indications was taken by products prepared by producers themselves, i.e. not in line with the marketing approach. The percentage of respondents who felt the greatest confidence in products prepared by producers themselves was clearly higher than among all respondents and almost 2.5 times higher than among those ready to cooperate with producers. It can therefore be assumed that there is dependence between trust in products resulting from the way they are prepared and the attitude towards joint creation of the offer. This issue is analysed later in this study.

Taking into account respondents' opinions on the effectiveness of producers in encouraging purchasers to jointly create a marketing offer, it turns out that the structure of trust in the four product types considered is the same for all respondents and for those who perceive producers positively and negatively (Table 3). The differences are only visible in the case of the percentage of indications concerning particular types of products. The largest proportion of respondents who most trust products prepared by producers based on the results of research on purchaser expectations (i.e. according to the assumptions of the classic marketing approach) occurred among respondents who positively perceive the effectiveness of producers. For the same group of people, the smallest percentage of respondents showing the greatest trust in products prepared in accordance with the principles of a prosumer marketing approach was identified at the same time, which may cause some surprise. However, it should be remembered that joint actions may also be a result of spontaneous

activity by final purchasers. Therefore, unfavourable opinions about the role of producers as initiators of purchaser involvement do not prejudge the scope and level of this involvement, as it may also be autonomous.

Table 3: Products that generate the greatest level of trust in respondents and their opinions on the effectiveness of producers in encouraging purchasers to cooperate in the process of preparing an offer (%)

Products that generate the greatest level of trust in respondents	Respondents' opinions on the effectiveness of producers in encouraging purchasers to cooperate in the process of preparing an offer (%)		
	yes	no	total
prepared by producers based on their own ideas	20.3	21.2	20.9
prepared by producers based on the results of research on purchaser expectations	48.3	42.7	44.4
jointly prepared by producers and purchasers	25.4	31.5	29.6
prepared by purchasers only with the technical assistance of producers	6.0	4.6	5.1
total	100.0	100.0	100.0

Source: own study based on research results.

An identical structure reflecting trust in products was also identified for both all respondents and for those who positively assess producers as recipients of purchasers' spontaneous activity, and those with a different opinion about manufacturers (Table 4). However, unlike the context discussed earlier, the largest percentage of respondents who most trust products prepared jointly by producers and purchasers was identified for those who perceive manufacturers positively. It amounted to almost 32%, although it was clearly lower than for respondents who were willing to cooperate with producers (where it exceeded 41%) (see Table 2). It can therefore be assumed that there is dependence between trust in products and the perception of producers as beneficiaries of the spontaneous activity of final purchasers.

Table 4: Products that generate the greatest level of trust and highest opinions of respondents and whether producers listen to purchasers' suggestions and use their spontaneous willingness to cooperate (%)

Products that generate the greatest level of trust in respondents	Respondents' opinions on whether producers listen to purchasers' suggestions and use their spontaneous willingness to cooperate (%)		
	yes	no	total
prepared by producers based on their own ideas	19.1	22.1	20.9
prepared by producers based on the results of research on purchaser expectations	42.1	45.9	44.4
jointly prepared by producers and purchasers	31.7	28.2	29.6
prepared by purchasers only with the technical assistance of producers	7.1	3.7	5.1
total	100.0	100.0	100.0

Source: own study based on research results.

The trust in products was also analysed from the perspective of cooperation between purchasers and offerors. As seen in Table 5, both for all respondents and for those who mostly trust products prepared as part of the classic marketing approach, and for those who mainly trust products prepared as part of the prosumer marketing approach, the largest proportion of respondents identified

cooperation with producers with the possibility of preparing an offer that would better meet purchasers' expectations. It is worth noting that for respondents primarily trusting products prepared without any participation by recipients, the largest percentage considered cooperation with producers as a waste of time, whereas for all respondents the number was over two times lower. Cooperation with manufacturers was identified as a waste of time by the smallest proportion of respondents in the group of people who mostly trust products prepared with offerors. It can therefore be assumed that there is dependence between trust in products and the way of interpreting interaction between final purchasers and producers.

Table 5: Products that generate the greatest level of trust in respondents and the way respondents interpret their cooperation with producers (%)

The way respondents interpret their cooperation with producers	Products that generate the greatest level of trust in respondents (%)				Total
	P1	P2	P3	P4	
Waste of time	35.8	12.7	8.0	43.1	17.7
Possibility of preparing an offer that better meets purchaser expectations	34.0	47.2	44.7	35.3	43.0
Producers pretending that they consider the opinion of purchasers	10.8	15.3	7.7	2.0	11.5
Producers' possibility of saving money by using purchasers' ideas	7.1	7.6	11.3	7.8	8.6
Opportunity for purchasers to show creativity	6.1	6.4	11.3	0.0	7.5
Producers' manipulation of purchasers	1.5	2.4	5.7	2.0	3.2
Producers' form a genuine appreciation of purchasers and their growing market role	1.4	2.0	8.0	7.8	3.9
Producers' build good relationships with purchasers	3.3	6.4	3.3	2.0	4.6
Total	100.0	100.0	100.0	100.0	100.0

where: P1 – products prepared by producers based on their own ideas; P2 – products prepared by producers based on the results of research on purchaser expectations; P3 – products jointly prepared by producers and purchasers; P4 – products prepared by purchasers only with the technical assistance of producers

Source: own study based on research results.

Table 6: Analysis of dependencies between respondents' trust in products based on the extent of purchasers' involvement in their preparation and variables reflecting respondents' attitudes towards cooperation with producers

Dependence	Pearson chi-square test value	V-Cramer coefficient value	Level of significance 'p'
Trust in products and willingness to cooperate	71.605	0.266	**0.000**
Trust in products and opinions on producers' effectiveness in encouraging purchasers to cooperate	5.242	0.072	0.155
Trust in products and opinions on producers' listening to purchasers' suggestions	8.086	0.089	**0.044**
Trust in products and the interpretation of cooperation with producers	152.789	0.224	**0.000**

Source: own study based on research results.

In order to check whether there are statistically significant dependencies between the analysed variables, statistical testing was conducted. It was concluded that such dependencies exist in the case of trust in products and openness towards cooperation with producers, trust in products and the perception of producers as the recipients of final purchasers spontaneous activity, and trust in products and the interpretation of cooperation with producers (Table 6). Preliminary conclusions about the occurrence of these dependencies proved to be correct. However, the dependencies identified are weak. The values of the V-Cramer coefficient in each case are less than 0.3, i.e. the boundary value between the weak and medium strength of dependence between the analysed variables (King, Rosop, and Minium, 2018). Therefore, hypotheses H1, H3 and H4 for respondents can be considered valid. However, hypothesis H2 is not valid. There was no statistically significant dependence between trust in products and the perception of producers as initiators of marketing activity by final purchasers, as evidenced by a significance value greater than the limit value of 0.05.

Conclusions

Based on the considerations presented above, the majority of respondents did not show their willingness to engage in joint preparation of a marketing offer with the offerors. This may result from the fact that offerors were unfavourably perceived by over half of respondents. It was visible especially in the case of assessing producers as initiators of initiators of final purchasers' marketing activity. Considering the scope of purchasers' engagement in the preparation of products as key elements of a marketing offer, the majority of respondents trusted products prepared by manufacturers based on the results of research into purchaser expectations the most, i.e. in accordance with the principles of the classic marketing approach. Products prepared jointly by producers and final purchasers generated a lower level of trust by respondents.

Statistically significant dependencies were identified between trust in products resulting from the scope of purchasers' engagement in their preparation and the following three variables: (a) respondents' willingness to cooperate with offerors, (b) respondents' opinions concerning producers listening to purchasers' suggestions, and (c) the way respondents interpret cooperation with producers. The first dependence was relatively the strongest, although none of them was characterised by high strength. Thus, hypotheses H1, H2 and H3 were considered valid for respondents. However, hypothesis H2 for respondents was not valid. There was no statistically significant dependence between trust in products and the perception of producers as initiators of marketing activity by final purchasers. The results obtained from the research have a cognitive and applicability value. They allow the gap identified when analysing the literature on the subject to be reduced and make it easier for managers to take more effective actions aimed at including final purchasers in the process of joint creation of a marketing offer by creating their trust in products and in the offerors.

Obviously, the conducted research has some limitations including its subjective scope (the research comprised only adult final purchasers), objective scope (the research comprised only selected aspects of trust in products in the context of final purchasers' cooperation with offerors), and geographical scope (the research was conducted only in Poland). The pursuit to overcome the limitations will guide future stages of the research process, and the degree of detail of the analysis will be deepened.

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Analysis of Stated Consumer Preferences Using Multinomial Logit Models and Discretechoice R Package

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Abstract

The purpose of the article is to analyze consumer preferences using the selected multinomial logit models consisting of unordered categories. These models are included in the area of microeconometrics and are applied to analyze stated consumer preferences following the approach based on choices and random utility theory. The conducted empirical research was based on the authors' DiscreteChoice package developed for CRAN R project. The package implements a multinomial, conditional and mixed logit models as well as the functions which can be applied in the discrete choice method for the construction of an experiment, e.g., for a fractional factorial design development, option set coding and model parameter estimation.

Keywords: consumer preferences, discrete choices, microeconometrics, multinomial logit models, R program.

Introduction

One of the key elements of marketing research is measuring and analyzing consumer preferences. If this measurement is based on the data collected using surveys, allowing the registration of consumers' intentions at the time of the survey, the measurement is focused on stated preferences corresponding to the hypothetical (declared) consumer preferences.

Various methods and models are applied in the study of stated preferences, which are generally classified into three groups: composition, decomposition and mixed methods.

Decomposition methods, including conjoint analysis methods and discrete choice methods [Walesiak and Bąk, 2000], [Bąk, 2004], represent the most commonly used methods, which allow both measurement and analysis of stated preferences.

The analysis of stated consumer preferences, in terms of products and services, using decomposition methods consists in the distribution (decomposition) of empirical preferences (stated, e.g., in a survey) into partial utilities of attribute levels describing the analyzed profiles of products or services. A statistical model (e.g., linear regression model or logit probability model) represents the basic decomposition tool.

Probabilistic models, which describe the probabilities of choosing profiles from the offered set of different product or service variants are used within the group of discrete choice methods. The choice of individual profiles is influenced by both their attributes and the characteristics of respondents. These variables are usually of a discrete nature (representing categorical variables and nominal variables). The purpose of estimating discrete choice models is to analyze the probabilities of choosing individual options (profiles) and parameters, which indicate the importance of attributes.
The theory of random utility constitutes the theoretical basis for the discrete choice models [Coombs, Dawes and Tversky 1977, p. 214]. It allows quantifying utilities and, as a consequence, identifying the

factors followed by the consumers when choosing the specific products or services. These factors can be related to both consumer characteristics and product or service attributes. It means that the unordered category models are applied in the survey of consumer preferences, among which the most commonly used models are: multinomial logit model, conditional logit model and mixed logit model [Winkelmann and Boes 2006]. The distinction between these models is not clearly interpreted in the subject literature.

The purpose of the article is to discuss the basic differences between the aforementioned logit models [So and Kuhfeld 1995], [Long 1997], [Agresti 2002], [Cameron and Trivedi 2009], [Jackman 2007], [Powers and Xie 2008], [Gruszczyński 2010], [Bąk 2012], [Bąk 2013] and to present the Discrete-Choice package [Bąk and Bartłomowicz 2020] developed for R program, the functions of which allow the implementation of the research procedure based on choices using multinomial models. The package functions were illustrated by the example of using stated consumer preferences in empirical research.

Multinomial Unordered Logit Models in Stated Preference Measurement

The application of variables in microeconometric models results, most frequently, from performing measurements on weak (non-metric) scales. The collected observations usually take the form of discrete numerical values.

In the area of microeconometric research, the following types of response variables (referred to as qualitative variables) are most often used [Gatnar and Walesiak 2011, p. 113], [Gruszczyński 2012], [Bąk 2013]:

a) dichotomous variables (binomial, bi-category, e.g. binary),
b) polytomous variables (multinomial, multi-category), among which the variables representing ordered and unordered categories are included,
c) limited variables, among which censored and truncated variables are distinguished,

The listed below types of models are most frequently used in microeconometrics to apply in the analysis of stated consumer preferences [Gatnar and Walesiak 2011 p. 113], [Gruszczyński 2012], [Bąk 2013]:

a) binomial models:
- linear probability models,
- logit and probit models,
- complementary log-log models,
- log-linear models,

b) multinomial models:
- unordered category models,
- ordered category models,

c) latent class models,
d) survival (duration) models,
e) limited variable models.

The unordered category models are applied in the marketing research conducted using discrete choices, taking the form of MultiNomial Logit Model (MNL) and Conditional Logit Model (CLM) and also the Mixed Logit Model (MLM) representing the combination of the aforementioned models[So and Kuhfeld 1995], [Long 1997], [Agresti 2002], [Cameron i Trivedi 2009], [Jackman 2007], [Powers and Xie 2008], [Gruszczyński 2010], [Bąk 2012], [Bąk 2013].

The multinomial logit model is a generalization of a logit model for binary data and can be applied when the response variable, in a discrete way, takes values from the set consisting of more than two categories (multinomial variable). The model derives from the random utility theory and the so-called Luce's choice axiom (constant utility model) [Coombs, Dawes and Tversky 1977, p. 217], [Bierlaire 1997]. The multinomial logit model can be presented in the following form [So and Kuhfeld 1995],

[Long 1997, p. 151], [Agresti 2002], [Powers and Xie 2008, p. 243], [Cameron and Trivedi 2009, p. 500], [Gruszczyński 2010, p. 161]:

$$P_{ki} = \frac{\exp\left(x_k^T \beta_i\right)}{\sum_{l=1}^{n} \exp\left(x_k^T \beta_l\right)} \tag{1}$$

where: P_{ki} – probability of choosing *i*-th category with *k*-th status of predictor variables describing consumers; x_k^T – vector describing *k*-th row of **X** matrix (values of predictor variables for *k*-th consumer); β_i – parameter vector related to *i*-th category of a response variable.

In the case of conditional logit model proposed by McFadden [McFadden 1974, pp. 105-142] the probability of choosing *i*-th profile from the set consisting of *n* elements is estimated based on the following correlation [So and Kuhfeld 1995, p. 7], [Long 1997, p. 178], [Powers, Xie 2008, p. 256], [Cameron and Trivedi 2009, p. 500], [Gruszczyński 2010, pp. 172-173]:

$$P_{ki} = \frac{\exp\left(z_{ki}^T \alpha\right)}{\sum_{l=1}^{n} \exp\left(z_{kl}^T \alpha\right)} \tag{2}$$

where: P_{ki} – probability of choosing *i*-th category with *k*-th status of predictor variables; z_{kl}^T – *k*-th vector of **Z** matrix (predictor variables describing the *i*-th option chosen by *k*-th consumer); α – parameter vector.

Both multinomial and conditional logit models are used to analyze individual choices from the set of available alternatives (categories, options, profiles), and while in the multinomial model (1) the probability of choosing the *i*-th option is estimated taking into account the predictor variables which characterize consumers, in the conditional model (2) it is the probability of choosing the *i*-th option regarding the values of predictor variables characterizing this option. It results from the assumption – constituting also the main distinctive feature of the discussed models – that the multinomial logit model analyzes the characteristics of consumers and their impact on the choices of specific options, whereas the conditional logit model the characteristics of products or services (choice options) and their impact on the choices made by consumers.

In terms of the mixed logit model (3), the probability of choosing *i*-th category with *k*-th status of predictor variables can be described using the following correlation [Hoffman and Duncan, 1988], [So and Kuhfeld 1995], [Powers, Xie 2008, p. 258 et seq.], [Cameron and Trivedi 2009, p. 500]:

$$P_{ki} = \frac{\exp\left(x_k^T \beta_i + z_{ki}^T \alpha\right)}{\sum_{l=1}^{n} \exp\left(x_k^T \beta_l + z_{kl}^T \alpha\right)} \tag{3}$$

In the mixed logit model both consumer characteristics and the attributes describing the choice options are considered. It means that the predictor variable matrices take into account both the individual characteristics of consumers and also the attributes of products or services.

To estimate the binomial and multinomial models the concept of Generalized Linear Models (GLM) is used. A regression model is formulated in which the expected value of the predictor variable distribution (consumer preferences) depends on the linear combination of the predictor variables:

$$E(\boldsymbol{y}) = \mu = \boldsymbol{x\beta} \tag{4}$$

The distribution of $\boldsymbol{y}$ observation vector is characterized by μ expecred value. If the observations are independent and present $N(\mu, \sigma^2)$ distribution, then $\boldsymbol{\beta}$ parameters are estimated using a classical Ordinary Least Squares (OLS) method. As a result a systematic component of GLM model is obtained:

$$\eta = \boldsymbol{x\beta} \tag{5}$$

referred to as η linear predictor.

The distribution of $\boldsymbol{y}$ observation vector depends, e.g., on the measurement scale and often such distribution is a non-normal one, e.g., a binomial or Poisson in the case of non-metric scales. The representation of various distributions of $\boldsymbol{y}$ observation vector (in particular from the exponential family of distributions) in the generalized linear model is allowed by g link function, which links μ expected value with η linear predictor:

$$g(\mu) = \eta = \boldsymbol{x\beta} \tag{6}$$

Inverse link function:

$$g^{-1}(\eta) = \mu \tag{7}$$

is called a mean function.

The basic advantages of generalized linear models include the following features:

- discrete and continuous variables can be present in the model,
- many predictor variables can be included in the model,
- linear transformations of variables with non-linear distributions can be used,
- non-normal distributions may be included, in particular the discrete distributions,
- a model can be estimated in the case of collinearity of variables (when the inverse matrix to $\boldsymbol{X}^T\boldsymbol{X}$ matrix does not exist, the so-called generalized inverse matrix is specified).

The subject literature also points to the limitations in the application of generalized linear models, which include: the assumption about the independence of observations, inadequacy of the adopted observation distribution, a limited number of nonlinear models which can be re-represented in the model using the link function [Halekoh, Højsgaard 2008].

The characteristics of DiscreteChoice R package

DiscreteChoice statistical software package represents the authors' [Bąk and Bartłomowicz 2020] extension (module) of R program, including the implementation of selected multinomial logit models, applied in measuring consumer preferences using the discrete choice methods. The package correct functioning requires installing the latest base version of R program (3.6.2) [R Development Core Team 2011] and some additional packages, the most important of which are AlgDesign [Wheeler 2012], rms [Harrell 2019] and ggplot2 [Wickham et al. 2019]. The package can be downloaded and installed from the package homepage – the website of the Department of Econometrics and Computer Science of Wrocław University of Economics (http://keii.ue.wroc.pl/DiscreteChoice). DiscreteChoice package is written in R programing language and available under the GNU license (free of charge and provides access to the source code). The package, in addition to R program, is also compatible with the software dedicated to R environment such as: RStudio and Microsoft R Application Network.

The total of 16 functions are offered in the current version of the package (1.07) (see Tab. 1), among which 9 functions allow: converting the data about individual consumer choices into the data sets for logit models (functions: MNLdata, CLMdata, MLMdata), the estimation of model parameters and determining the intercept values for the individual consumer characteristics (functions: MNLmodel, CLMmodel, MLMmodel) and also the probability estimation of the profile choice (functions:

MNLprob, CLMprob, MLMprob) for each of the three logit models (multinomial, conditional and mixed). The special purpose functions include the functions which allow generating the set of non-collinear variables (the possibility of removing collinearity between artificial variables based on the Variance Inflation Factor (VIF) value [Maddala 2006; Greene 2008]) – CLMattrsel function) and the hazard ratio graph (CLMgraph function) for the conditional logit model.

In addition, the package provides a tool supporting the survey design, i.e. the construction of the appropriate factor systems characteristic for the analysis of consumer preferences in accordance with the discrete choice methods. For this purpose, the DiscreteChoice package uses the AlgDesign package functions [Wheeler 2012]. Its implementation in the DiscreteChoice package is carried out in the form of a function which allows generating partial factor systems with the suggested number of blocks and profiles in each block, including "none of the above" profile for given vectors covering the number of levels and the names of variables (MNMdesign function). This means the possibility of designing an experiment followed by obtaining the preference measurement results using the DiscreteChoice package function of R program.

The detailed characteristics of all available functions, data sets and the selected examples of the package application in measuring stated preferences are available in the documentation of the DiscreteChoice R package.

Table 1: Functions of the DiscreteChoice R package

Functions of the package	
MNMdesign (vars, names, blocks=3, profiles=6) – function makes sectional, fractional factorial design with suggested number of profiles and alternatives in each block of profiles using vectors of variables' number and variables' names	
MNLdata(y, x, z) – function returns data set for multinomial logit model	
CLMdata(y, x) – function returns data set for conditional logit model	
MLMdata(y, x, z) – function returns data set for mixed logit model	
MNLmodel(y, x, z) – function returns intercept coefficients and slope coefficients (parameters estimates) for individual specific variables using multinomial logit model. Intercepts and variables' coefficients corresponds to the effects on the probability of choosing options (profiles) over reference option (profile)	
CLMmodel(y, x) – function returns slope coefficients (parameters estimates) for characteristics of alternatives using conditional logit model	
MLMmodel(y, x, z) – function returns slope coefficients (parameters estimates) for individual specific variables and characteristics of alternatives using mixed logit model	
MNLprob(y, x, z) – function returns probability of profiles choice using multinomial logit model	
CLMprob(x, y) – function returns probability of profiles choice using conditional logit model	
MLMprob(y, x, z) – function returns probability of profiles choice using mixed logit model	
CLMattrsel(x, y) – function returns set of attributes (without duplicated attributes) for conditional logit model	
CLMgraph(x, y, type=1) – function returns graph of hazard ratio using conditional logit model	
Functions' arguments	
vars	vector of empirical preferences
names	vector of variables' names
blocks	number of blocks (optional), default value: blocks=3
profiles	number of profiles in every block (optional), default value: profiles=6
x	matrix of choice-specific attributes (profiles, alternatives)
y	vector or matrix of individuals choices (dependent variable)
z	matrix of individual-specific characteristics
type	type of ratio hazard graph (optional, 1 – vertical bars, 2 – horizontal bars), default value: type=1

Source: authors' compilation.

The application of DiscreteChoice package in measuring stated preferences

In the example illustrating the application of selected multinomial logit models, the identification and analysis of respondents' preferences referred to gastronomic services. 4 attributes were selected in the study (along with their corresponding levels): a price (up to 10 PLN, 10-20 PLN, above 20 PLN), a place of consumption (restaurant, gastronomic facility, canteen, bar), a kind of consumption (meal, dessert, drink) and an hour of consumption (morning, afternoon, evening). The study was conducted using 136 correctly completed survey questionnaires (Marta Więcław is the author of the survey).

The number of variables along with the number of their implementation levels means that a maximum of 108 different gastronomy service profiles could be used in the example. Finally, as results from the applied discrete choice method, for the purposes of the study 3 data sets were selected, 6 profiles in each set, with the reference profile in the last position. The used in the study sets of profiles assessed by the respondents are presented in Tab. 2-4.

Table 2: The first block of profiles ("none of the above" profile)

Price	Place	Kind	Time	Choice
10-20 PLN	bar	dessert	morning	1
to 10 PLN	restaurant	drink	morning	2
to 10 PLN	canteen	dessert	afternoon	3
above 20 PLN	canteen	drink	afternoon	4
10-20 PLN	canteen	meal	evening	5
none of the above				6

Source: authors' compilation.

Table 3: The second block of profiles (with profile "none of above")

Price	Place	Kind	Time	Choice
to 10 PLN	bar	meal	afternoon	1
above 20 PLN	restaurant	dessert	afternoon	2
10-20 PLN	gastronomic facil-ity	dessert	afternoon	3
10-20 PLN	gastronomic facil-ity	drink	afternoon	4
10-20 PLN	restaurant	drink	evening	5
none of the above				6

Source: authors' compilation.

Table 4: The third block of profiles (with profile "none of above")

Price	Place	Kind	Time	Choice
10-20 PLN	canteen	drink	morning	1
10-20 PLN	restaurant	meal	afternoon	2
above 20 PLN	bar	drink	afternoon	3
above 20 PLN	bar	dessert	evening	4
to 10 PLN	gastronomic facil-ity	drink	evening	5
none of the above				6

Source: authors' compilation.

In coding variable levels, the reference profiles (positions 6, 12 and 18) use coding indexes one higher than the number of a given variable levels.

```
> library(DiscreteChoice)
> data(catering)
> print(X)
   price place kind time
1      2     4    2    1
2      1     1    3    1
3      1     3    2    2
4      3     3    3    2
5      2     3    1    3
6      4     5    4    4
7      1     4    1    2
8      3     1    2    2
9      2     2    2    2
10     2     2    3    2
11     2     1    3    3
12     4     5    4    4
13     2     3    3    1
14     2     1    1    2
15     3     4    3    2
16     3     4    2    3
17     1     2    3    3
18     4     5    4    4

> print(head(Y))
  block1 block2 block3
1      4      4      2
2      4      1      3
3      1      4      2
4      1      4      2
5      3      2      1
6      6      3      2
...

> print(head(Z))
  sex age home education status person income
1   1   3    3         4      3      2      4
2   1   4    3         3      2      3      3
3   2   4    3         3      2      3      3
4   2   5    1         4      2      3      2
5   1   5    1         4      2      3      2
6   1   5    1         4      2      4      2
...
```

All the applied factor systems and data are included in the DiscreteChoice catering data set.

The Multinomial Logit Model

In the case of a multinomial logit model, the analysis used a single set of profiles to choose from, which means that the final number of observations corresponded to 136 respondents (136 · 1), whereas the number of rows in the data set was 816 (136 · 6 · 1), the fragment of which is presented below:

```
> z1<-as.data.frame(Z[, 7])
> n<-names(Z)
```

```
> colnames(z1)<-n[7]
> data=MNLdata(Y3, X3, z1)
> head(data)
  subject option choice int1 int2 int3 int4 int5 age1 age2 age3 age4
age5
1       1      1      0    1    0    0    0    0    3    0    0    0
0
2       1      2      1    0    1    0    0    0    0    3    0    0
0
3       1      3      0    0    0    1    0    0    0    0    3    0
0
4       1      4      0    0    0    0    1    0    0    0    0    3
0
5       1      5      0    0    0    0    0    1    0    0    0    0
3
6       1      6      0    0    0    0    0    0    0    0    0    0
0
```

In the structure of the above data, each row presents 1 choice option, while the full set from which the respondent was choosing one option (profile) corresponds to 6 rows. The choice options are represented by a zero-one variable in the set; in each case the option 6 is the reference profile. The respondents were choosing 1 out of 6 profiles each time. The respondent-specific variable was age, the chosen option was determined by the price and the selected profile was represented by the choice variable.

As a result of applying the DiscreteChoice package of R program for the above data in the multinomial logit model, the parameter estimates are obtained for the age-specific variable characteristic for the respondents:

```
> MNLmodel(Y3, X3, z1)
$estimate
                 coef        se           t  Pr(>|t|) exp(coef)
intercept1 -3.8384611 2.1502095 -1.78515680 0.0742359 0.0215267
intercept2  1.0990329 0.7011029  1.56757717 0.1169798 3.0012621
intercept3  1.0298781 0.9619891  1.07057149 0.2843621 2.8007244
intercept4 -0.0127671 1.0149001 -0.01257966 0.9899631 0.9873141
intercept5  1.9049344 0.8047372  2.36715092 0.0179256 6.7189668
age1        0.5098369 0.5252525  0.97065107 0.3317221 1.6650196
age2       -0.0460678 0.2040738 -0.22574088 0.8214029 0.9549772
age3       -0.5154486 0.3236660 -1.59253243 0.1112651 0.5972326
age4       -0.2220330 0.3141375 -0.70680196 0.4796895 0.8008889
age5       -0.5731541 0.2643481 -2.16817938 0.0301450 0.5637445

$logLik
[1] -199.8646

$McFaddenR2
[1] 0.026917

$L
     df    Chisq Pr(>Chisq)
[1,]  5 11.05714 0.05025874
```

The obtained set of results (5 intercepts and 5 parameters for the age-specific variable) represents the effect affecting the probability of choosing an option (profile) 1–5 in relation to the reference profile marked as number 6. The profile No. 1 is more often chosen by younger respondents.

As a result of applying the MNLprob function, the estimates of the probability of choosing individual profiles by the respondents are obtained (at an individual level and in the cross-section of all respondents).

```
> pmnl=MNLprob(Y3, X3, z1)
> apply(pmnl, 2, "mean")
        p1         p2         p3         p4         p5         p6
0.02205912 0.41911326 0.10293990 0.08088135 0.21323584 0.16177054
```

Out of the six selection profiles p1-p6, the probability of choosing the profile number 2 is the highest (price –10-20 PLN, place – restaurant, kind – meal, hour of consumption – afternoon). The probability of choosing the profile number 1 is the lowest (price – above 20 PLN, place – canteen, kind – drink, hour of consumption – morning).

The Conditional Logit Model

In the case of a conditional logit model, the analysis used all 3 sets of profiles to choose from, which means that the number of observations corresponded to the number of the respondents multiplied by 3 (136 · 3), i.e. 408 observations, whereas the number of rows in the data set amounted to 2448 rows (136 · 6 · 3).

As a result of applying the DiscreteChoice package of R program for the above data in the conditional logit model, the parameter estimates are obtained for the selected variable specific variants characteristic for the choice option, i.e. price, place, kind and hour:

```
> CLMmodel(X, Y)
$estimate
              coef        se           t  Pr(>|t|) exp(coef)
price1   0.0625235 0.2709762  0.23073429 0.8175212 1.0645195
price2   0.0112104 0.2982141  0.03759178 0.9700131 1.0112735
price3  -0.4218441 0.2426206 -1.73869861 0.0820878 0.6558363
place1   0.4116794 0.1848646  2.22692392 0.0259524 1.5093505
place2  -0.1219120 0.2678896 -0.45508299 0.6490495 0.8852263
place3  -1.1846648 0.2621713 -4.51866699 0.0000062 0.3058487
kind1    0.4288651 0.2170864  1.97555029 0.0482057 1.5355139
kind2   -0.1440630 0.1637459 -0.87979607 0.3789698 0.8658332
time1   -1.9088592 0.3150913 -6.05811458 0.0000000 0.1482494
time2   -0.0713187 0.1431154 -0.49833002 0.6182515 0.9311651

$logLik
[1] -652.0696

$McFaddenR2
[1] 0.0696202

$LR
     df   Chisq   Pr(>Chisq)
[1,]  5 97.5886 1.702566e-19
```

The results' interpretation using hazard ratios is presented in Figure 1. The values of hazard ratios greater than 1 indicate the stimulating effect of variables on the choice of profiles. From among the variables included in the study, the stimulating effect is achieved by the variable price up to 10 PLN (price1) and 10-20 PLN (price2), and also a restaurant as a place of consumption (place1) and a kind of a meal in the form of a meal (kind1). The other variables have a negative impact on the choice

of profiles. It means that the respondents prefer a low or medium price, a restaurant as a place of consumption and meals (as well as an afternoon hour of consumption).

Based on the model parameter values, the probability of choosing the particular profiles was calculated and the obtained values indicate that the profile No. 14 (price – 10-20 PLN, place – restaurant, type – meal, hour of consumption – afternoon) is the most preferred one, to be followed by the profiles No. 11, 7, etc. The profile No. 13 is characterized by the smallest choice probability (price – 10-20 PLN, place – canteen, type – drink, hour of consumption – morning).

```
> pclm<-CLMprob(X, Y)
> print(pclm)
$probave
         p1          p2          p3          p4          p5          p6
0.009243354   0.016961742   0.018691963   0.013300332   0.033819154
0.071208816
         p7          p8          p9         p10         p11         p12
0.108384655   0.056830334   0.051394611   0.059358559   0.108690721
0.071208816
        p13         p14         p15         p16         p17         p18
0.003265141   0.155407830   0.043486643   0.040435557   0.067102958
0.071208816

$probavesort
        p14         p11          p7          p6         p12         p18
0.155407830   0.108690721   0.108384655   0.071208816   0.071208816
0.071208816
        p17         p10          p8          p9         p15         p16
0.067102958   0.059358559   0.056830334   0.051394611   0.043486643
0.040435557
         p5          p3          p2          p4          p1         p13
0.033819154   0.018691963   0.016961742   0.013300332   0.009243354
0.003265141
```

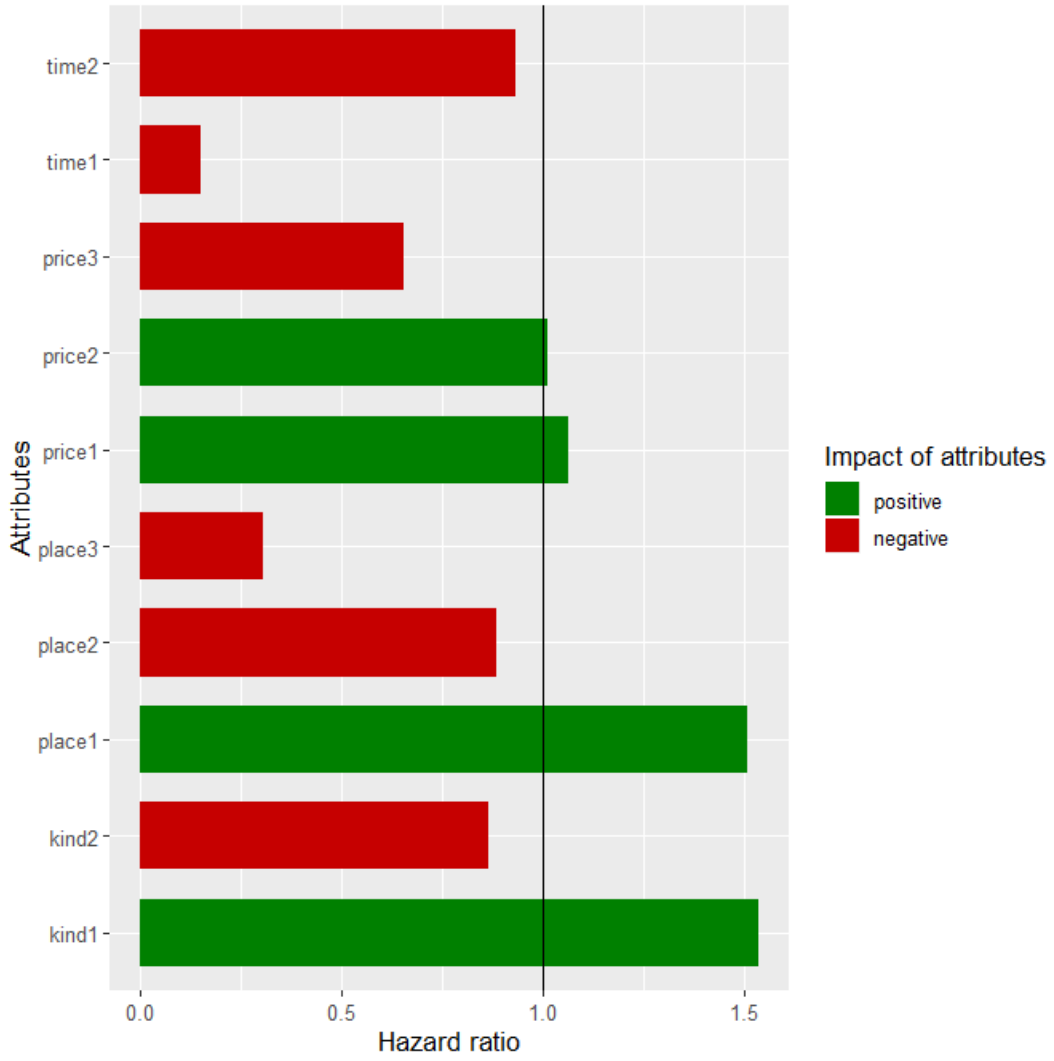

Fig. 1: The impact of attributes on profile selection

Source: authors' compilation.

The Mixed Logit Model

In the case of a mixed logit model, 1 set of profiles to choose from was used in the analysis, which means that the number of observations corresponds to 136 respondents (136 · 1), whereas the number of rows in the data set is 816 (136 · 1 · 3). The model uses one variable characterizing the set of alternatives (choice options), i.e. the hour of consumption and one variable characterizing the unit of analysis (a respondent) in the form of age. As a result of using the DiscreteChoice package of R program for the above data, the parameter estimates of the selected specific variables are obtained.

```
> z1<-as.data.frame(Z[, 2])
> n<-names(Z)
> colnames(z1)<-n[2]
> x1<-as.data.frame(X3[, 4])
> n<-names(X3)
> colnames(x1)<-n[4]
```

```
> MLMmodel(Y3, x1, z1)
$estimate
               coef        se          t  Pr(>|t|) exp(coef)
time1 -3.8379549 2.1497884 -1.7852710 0.0742174 0.0215376
time2  1.0852322 0.6827252  1.5895593 0.1119342 2.9601271
time3  1.3255037 0.7480226  1.7720102 0.0763929 3.7640808
age1   0.5097286 0.5251316  0.9706683 0.3317135 1.6648393
age2  -0.0422501 0.1992195 -0.2120781 0.8320461 0.9586300
age3  -0.5342782 0.2284567 -2.3386410 0.0193540 0.5860922
age4  -0.6599694 0.2598772 -2.5395433 0.0110997 0.5168672
age5  -0.3801175 0.2345624 -1.6205389 0.1051166 0.6837811

$logLik
[1] -201.8715

$McFaddenR2
[1] 0.0171456

$LR
     df    Chisq Pr(>Chisq)
[1,]  3 7.043195 0.07053368
```

The estimated parameters of the mixed logit model should be interpreted in terms of probability [Gruszczyński 2002]. With regard to the variable characterizing the set of alternatives, i.e. the time of consumption, the most probable choice is the evening (time3), the least probable choice is the morning (time1), which results from a negative parameter value for this variable. Regarding the variable characterizing the unit of analysis (a respondent) – age, the option No. 1 (age1) is the most probable choice, while the option No. 4 (age4) is the least probable choice.

Despite using a smaller number of data in the case of a mixed logit model, the obtained probabilities of profile choices correspond to the results obtained using the CLMprob function – the least preferred profile is the profile No. 1.

```
> pmlm=MLMprob(Y3, x1, z1)
> apply(pmlm, 2, "mean")
        p1         p2         p3         p4         p5         p6
0.02206093 0.41837146 0.10368093 0.09633502 0.19778767 0.16176399
```

The full version of the following example illustrating the application of discrete choice method in the analysis of stated preferences is available in the documentation of the DiscreteChoice R package [Bąk and Bartłomowicz 2020].

Conclusions

The article addresses the differences between the selected models of unordered categories: multinomial, conditional and mixed logit models. These models can be regarded as complementary in the applications aimed at measuring latent preferences in the microdata. The examples of using multinomial logit models presented in the article confirm the above conclusions.

The estimation of different types of multinomial logit models requires different empirical data structure. The DiscreteChoice package includes functions that transform empirical data into the required structures and also the functions estimating the parameters of all three types of multinomial logit discrete choice models, which in further analysis means the possibility of conducting more detailed analyses of consumer behavior based on the carried out empirical studies, taking into account both the unit of analysis – consumers (identified by its characteristics), and the objects of analysis – products or services (described by means of their attributes).

The article presents an example of using the most important functions of the DiscreteChoice package in analyzing the stated consumer preferences based on the example of gastronomic services.

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The Role of E-Service Quality in Online Customer Loyalty in Retail Industry

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Abstract

Nowdays, online platforms are one of the channels used by retailers to trade their products. In this sense, measuring customer satisfaction online is essential to assess the quality of the service provided, the existing physical infrastructures and to identify the causes of dissatisfaction and organizational inefficiencies. Thus, the objective of this paper is to analyze the satisfaction and loyalty of the online customer of the Auchan commercial brand through the evaluation of the dimensions of the quality of the electronic service. The findings obtained show that customers are satisfied with the online services of Auchan of the Famalicão (Portugal), showing greater preference and satisfaction with the Drive service. The dimensions of the e-service with the highest levels of satisfaction correspond to Guarantee, Fulfillment and Security, and the levels with the lowest level of satisfaction refer to reliability. Furthermore, customers expressed strong loyalty to Auchan of the Famalicão's e-commerce. In this sense, it is recommended that Auchan should be established priorities and intervene in the dimensions with the worst assessment to increase customer satisfaction and loyalty and, therefore, boost the performance, profitability and sustainability of the Auchan Famalicão online channel.

Keywords: E-Service Quality, Customer Loyalty, E-commerce, Online Retail Industry.

Introduction

Electronic commerce is a distribution channel that is undergoing great expansion, being considered as the future of retail. Undoubtedly, e-commerce is an area of great importance and has a competitive advantage for organizations that have this distribution channel. Nevertheless, this channel is very competitive and presents some difficulties in retaining customers. According to several studies in the field of marketing (Abd-El-Salam, Shawky & El-Nahas, 2013; Disfani et al., 2017; Durvasula & Lysonski, 2010; Khare, Parveen & Rai, 2010; Martinelli & Balboni, 2012; Tang et al., 2015; Yu & Ramanathan, 2012; Yuen & Chan, 2010) to retain customers it is crucial to keep them satisfied, through the service provided, providing a pleasant and excellent shopping experience, and for that it is essential to guarantee a effective logistical support, which ensures that the product reaches the customer at the location, time and quantity required by the customer.

The transactions of goods or products, through online means, have seen a considerable increase in recent years, being increasingly one of the methods chosen by customers for the purchase of goods or services. Online services show a gradual and fleeting increase in the share of sales volume, thus representing a channel to which retail companies should pay attention, importance and investment, given that it is a future trend for retail. Several companies that operate through traditional commerce (physical stores) complement their services, with online means, creating synergies between the two marketing methods, thus achieving greater market penetration, as well as satisfying a greater number of customers in a way more practical and more comprehensive. Organizations try to offer customers several advantages in order for them to opt for online services, but they have certain characteristics such as their intangible dimension, the impossibility of immediate possession of the products and contact with them. To this extent, despite certain impossibilities, e-retailers must present their customers with advantages that overcome these aspects, such as the convenience and convenience of the process, the reduction of time with the purchase act, as well as the fact that the process is simple and less stressful.

According to several studies (Galego, 2014; Hofacker et al., 2007; Rao et al., 2011; Wolfinbarger & Gilly, 2003) customer satisfaction in online media is related to the maximization of the various logistical components inherent throughout the process: the place, the time and the availability of the products at the specified time and without great efforts for the customer. According to Zeithaml, Parasuraman and Malhotra (2002) the quality of the e-service is central to the success of online sales in any organization, being the main means of creating value and the main factors of customer retention.

There is a difficulty in determining the satisfaction factors, as well as the failures that customers perceive, that is, obtaining feedback from them. This fact makes it difficult and postpones the improvement of less satisfactory processes for customers, and organizations must find ways to analyze their customers' satisfaction with the various services they have available. To this extent, this study emerged to help the Auchan supermarket in Famalicão to assess customer satisfaction and loyalty in its electronic channels, with the central objective of determining which attributes of the e-service have the greatest influence on online customer satisfaction, as well as, factors that do not please customers and therefore should be improved in order to increase their satisfaction and, consequently, foster their loyalty. The paper is organized into three sections, in addition to this introduction and the main conclusions, as follows. On section two, a short review of the main literature on quality e-service, customer satisfaction and customer loyalty. After, on section three (methodology), the instrument to collect data is presented. That is, in this section, we describe the questionnaire used and along with the formulation of the research hypotheses. Then, on section four, the data analysis and findings are presented. The paper finalizes with the discussion of findings and main conclusions of the research. This study is of particular interest for modern Portuguese distribution, given that most retail insignia are still taking their first steps on the online channel. Knowing in this study the dimensions of quality e-service that the Auchan customer is most satisfied with, as well as the dimensions that are determinants of customer satisfaction and loyalty online. It is also relevant for the development of the literature in the Portuguese traditional retail industry.

Literature Review

E-Service Quality

The e-service is defined as an action that brings value and benefits to the consumer through online platforms (Hofacker et al., 2007). The e-service encompasses the procedures on the website, allowing access to the consumer's purchase decision process, as well as order fulfillment. E-service involves different levels of service from research to obtaining the product (Rabinovich, 2007). Zeithaml, Parasuraman and Malhotra (2002) developed e-servqual to measure the quality of the online service. According to them, e-servqual consists of seven dimensions, which are divided into a main service scale and a customer recovery service scale. The first four dimensions (efficiency, reliability, fulfillment, privacy and security) form the main e-servqual scale, being the means of evaluating customers' perceptions of the quality of service offered by online retailers. These dimensions include the criteria that customers use to evaluate the online service:

- Efficiency refers to the ability of customers to access the website, find the product and the information they want easily, as well as check out with minimum effort;
- Fulfillment incorporates the accuracy of service promises, having products in stock and selling the products in the promised time;
- Reliability is associated with the technical functioning of the website, mainly in relation to its activity and availability;
- The Privacy and Security dimension includes ensuring that shopping behavior data is not shared and that personal information is secure.

The e-service is characterized as an information system made available to customers in order to facilitate transactions through online means, which can create a competitive advantage if it occurs in an efficient way (Herington & Weaven, 2009). For Parasuraman et al. (1988), service quality can be defined as the organization's ability to meet or exceed customer expectations and the difference between customer expectations and perceived service. When expectations are not met, the customer is dissatisfied with the quality of the service, and when these are exceeded, the customer is delighted. Briefly, the quality of the e-service results from the difference between expectations and consumer assessment (Parasuraman et al., 1988).

The quality of the e-service results from the processes made available to customers in order for them to purchase and receive the items in an effective and efficient manner, which is constantly being evaluated by consumers (Zeithaml et al., 2002). According to Wolfinbarger and Gilly (2003), the quality of the e-service is centered on the fulfillment process, in which the dimensions of stock availability, punctuality and reliability are inserted. Therefore, for e-fulfillment to have quality, it needs to be effective from the information process and transport of the stock to its delivery. According to Rao et al., (2011), there are three determining factors in the quality of the e-service, namely:

- Operational factors include parameters of the service that contribute to quality, productivity and efficiency, these can be characteristics of the service such as the location, time, availability and conditions of the product and fit into the fulfillment.
- Relational factors are parameters such as proximity and understanding of the consumer, such as communication and responsibility.
- Logistic costs are parameters of the logistics service that allow the perception of consumer satisfaction regarding the price they pay and the cost that the logistics service requires, being able to establish standards of service quality levels.

Customer Satisfaction

Customer satisfaction should be the main concern of companies, as satisfied customers are loyal, being a primary step for the success of any organization (Mansano & Gorni, 2014). Customer satisfaction with services occurs in the process of purchasing or providing a service and is influenced by individual emotional factors, the context and the cost-benefit ratio (Moura, 2006). Satisfaction represents an appreciation on the part of customers in relation to a product or service and is influenced by the specific qualities of the products and / or services and their perception of quality (Zeithaml, Parasuraman & Berry, 1994). The concept of satisfaction is formed by two distinct components, the structural part related to the tangible components and emotional satisfaction, which refers to the intangible components, such as the company's image. The emotional component of customer satisfaction is related to the subtraction of expectations with the perceived perception. Perception is a value judgment based on the senses, but with a lot of emotional content (Huete, 1998). There is a strong link between customer satisfaction and service quality, a factor that makes it possible to determine higher prices. Service quality consists of responding to customers' needs and expectations (Vavra, 1996). Customer satisfaction results from a comparison between perceived performance and their expectations, and when expectations are not exceeded, the customer is discontented and may not use the services again. On the other hand, a satisfied customer, that is, if he reaches his expectations, he will probably resort to the service again, and when the expectations are exceeded, the customer is delighted (Kotler & Keller, 2006). Consumer satisfaction is the primary factor in creating the company's competitive advantage, when the activity or service exceeds customer expectations (Woodside, Frey & Daly, 1989). According to investigations carried out, satisfaction is the primary factor for customer loyalty (Shankar,

Smith, & Rangaswamy, 2003). Accordingly, retaining and expanding the number of loyal customers, as well as creating actions in order to increase that same satisfaction are factors of high importance for companies that operate online. According to Folstad et al. (2010), ease of use and utility of the process are factors with an impact on customer satisfaction and consequent on customer loyalty in the context of e-commerce.

Customer Loyalty

Customer loyalty is a term with relevant relevance in terms of literature, given the belief that it contributes to the creation of sustainable competitive advantage and consequent profitability for companies, through the act of buying or communicating with a recommendation about it before others (Zau, 2010). Customer satisfaction is the result of the quality of the service and guaranteeing it increases the probability of the customer becoming loyal. This term has been commonly defined as the action of repeatedly buying goods or services in the same organization (Veloso, Magueta, Fernandes & Ribeiro, 2017). The positive perception of service quality increases the possibility for customers to be dedicated to supporting, developing and strengthening loyalty behavior (Yuen & Chan, 2010). The truly loyal customers are those who feel that the company is able to meet their needs much better than other companies, thus excluding the possibility of change (Shoemaker and Lewis, 1999).

Bothe (1996) stated some methods that make it possible to maintain the achievement of loyalty towards its customers, namely: knowing the customer's needs; evaluate competition in relation to the ability of others to satisfy and retain customers as well as measure the degree of customer satisfaction and loyalty.

The emergence and expansion of the Internet, such as electronic commerce, allowed the supply of products or services in an agile and individual way. This new way of doing business has led marketing to reinvent itself, being a more relational marketing, that is, there is a focus on managing customer relationships through a personalized and impersonal relationship, a fact that allows you to respond more easily to the needs of customers and create a lasting relationship and mutual benefits, which can lead to customer loyalty (Brexendorf et al., 2010).

According to several studies, the main factors that lead to customer loyalty online are: price, product quality and performance of fulfillment. The quality of the product is related to third parties, which makes it difficult to change, leaving only the price factor and fulfillment as factors of competitive differentiation (Galego, 2014).

Methodology

This study aims to assess the satisfaction of Auchan Famalicão's online customers, identifying the attributes and dimensions related to the quality of the e-service and its performance in order to determine which attributes reveal an impact on customer satisfaction and also, obtain a view of this store's ability to attract and retain its customers online. In other words, it is intended to: 1) Assess the degree of satisfaction of Auchan Famalicão's online customers with online services ?; 2) Assess the degree of satisfaction with the quality of e-service and its sub-dimensions, as well as perceive the degree of loyalty to the online services of this supermarket; and 3) Analyze whether the quality of e-service (placing and delivery of the order) are determinants of customer satisfaction and whether the quality of e-service and satisfaction are antecedents of the loyalty of Auchan / Auchan Famalicão online customers.

In order to be able to respond to the proposed objectives, a quantitative exploratory research was carried out through the application of questionnaire surveys in which the target population was Drive customers looking for Auchan Famalicão online services. In this sequence, a questionnaire adapted from Galego (2014) was applied to answer the following questions: 1) Are the online consumers of Auchan Famalicão satisfied with the different online services ?; 2) Which e-service variables allow the perception of quality (order and delivery) to perform better ?, 3) Which e-service items (quality of order placement and quality of delivery receipt) with better and worst performance/consumer evaluation)?; 4) What is the consumer preferred product delivery method ?; 5) What is the online service most used by Auchan Famalicão customers ?; and 6) Which product categories are most frequently purchased online at Auchan Famalicão? The Questionnaire was applied directly to customers of Drive Famalicão, during the first half of 2019. In this study, respondents were required to fill out three sections. The first

section consisted of a standard demographic profile of respondents. The second section contained the characterization of purchase process. The last section includes the statements of dimensions e-service, customer satisfaction and loyalty. Respondents were asked to use a five-point Likert-type scale (between 1 = 'strongly disagree' and 5 = 'strongly agree') to record their perceptions. Construct reliability was assessed by using the Cronbach's alpha coefficient. Reliabilities ranged from 0.7 to 0.88, suggesting that the construct could be used with confidence. In line with the study objectives and the literature review, five study hypotheses were outlined:

H_1: There are differences in customer satisfaction regarding the attributes of the e-service related to placing the order (availability of stock; delivery time, quality of information, ease of use, website design, privacy and security and guarantee and accountability).
H_2: There are differences in customer satisfaction regarding the attributes of e-service quality (fulfillment, efficiency, reliability, privacy, guarantee and accountability).
H_3: There are differences in customer satisfaction regarding the attributes inherent to receiving the order (location, time, product quality, stock availability, ease and communication and price.
H_4: There are differences in the degree of customer satisfaction regarding the three factors (operational, relational and cost) of the e-service.
H_5: The dimensions of the quality of the e-service (placing and receiving the order) have a direct and positive influence on online customer satisfaction.
H_6: The dimensions of the quality of the e-service (placing and receiving the order) have a direct and positive influence on customer loyalty online.
H_7: Customer satisfaction has a direct and positive influence on their loyalty to the online service.

In order to respond to the objective of the study and the research hypotheses, exploratory / descriptive analysis techniques were used with the presentation of graphs and tables of absolute and relative frequency. To measure the intensity of the linear correlation between variables, Spearman's correlation coefficient was used. Additionally, linear regression was used to estimate models that allow identifying the determinants of the behavior of the variables under analysis and the influence between them. In all analysis was considered a significance level of 5%.

Data Analysis and findings

Demographic Profile

About ninety (89) individuals participated in the investigation, of which 70.8% (63) were female. Most individuals who buy online, 69.7% (62), were aged between 30 and 49 years. As for the distance from the residence to the store, it is verified that in 52.8% (47) of the cases it is less than 6 km and that 23.6% (21) was greater than 10 km. Most individuals, 74.2% (66) had an income of up to € 1400. The level of education is essentially secondary and higher. As for technological capacity, respondents classified it in most cases as good and / or very good.

Characterization of the online process

It was found that 50.6% (45) of the respondents used Auchan's online services exclusively. As for online shopping, the majority, 59.6% (53), do it once a week and 31.5% (28) monthly. Regarding the amount spent, it is observed that 65.2% (58) said they spent between 50 and 100 € and 20.2% (18) between 100 and 150 €. It was found that the majority of consumers surveyed have a preference for the DRIVE service (collection in the car park) offered by Auchan over other services (Average = 4.25; Median = 5).

Correlation and Regression Analyses

The Table 1 shows the results obtained for the degree of satisfaction with the online shopping experience of Auchan by the surveyed consumers. In general, it can be said that consumers are satisfied in all the items evaluated, since all the average values obtained are higher than three (theoretical expected value) and the median varies between four and five, which means that at least 50% of the respondents are satisfied or very satisfied. However, the items that stand out are: contacts by employees (Ave = 4.71); compliance with the deadline (Ave = 4.70) and comfort and convenience of the service (Ave = 4.69) with the highest levels of satisfaction. On the other hand, the items with the lowest average

levels of satisfaction stand out: website design (Ave = 3.69); quality of product information available on the website (Ave = 3.70) and ease of use on the website (Ave = 3.75). It should be noted that the dispersion values are relatively low, which reveals an agreement in response among the respondents. Regarding the way these items that constitute the delivery of the order correlate with customer satisfaction, it is observed through Spearman's coefficients that not all are statistically significant and those that are have direct correlations and of low intensity.

Table 1: Characterization of the degree of satisfaction with the online shopping experience of Auchan

Item	Online purchase frequency					Average	DS	Median	Correlacion
	MI	IS	IN	S	MS				
Convenience	0,0%	0,0%	5,6%	20,2%	74,2%	4,69	0,58	5	0,101
Service time	0,0%	0,0%	5,6%	21,3%	73,0%	4,67	0,58	5	-0,134
Contacts by employees	0,0%	0,0%	5,6%	18,0%	76,4%	4,71	0,57	5	0,241*
Immediate availability	2,2%	4,5%	18,0%	31,5%	43,8%	4,10	1,00	4	0,181
Compliance with the deadline	1,1%	0,0%	3,4%	20,2%	75,3%	4,70	0,59	5	0,212*
Ease of use website	3,4%	15,7%	16,9%	30,3%	33,7%	3,75	1,18	4	0,101
Website design	3,4%	16,9%	15,7%	36,0%	28,1%	3,69	1,15	4	0,002
Quality of product information	2,2%	15,7%	21,3%	31,5%	29,2%	3,70	1,12	4	0,176
Monetary savings	0,0%	0,0%	21,3%	34,8%	43,8%	4,22	0,78	4	0,188
Privacy and security	0,0%	0,0%	18,0%	22,5%	59,6%	4,42	0,78	5	0,216*
Warranties and accountability	0,0%	0,0%	16,9%	20,2%	62,9%	4,46	0,77	5	0,165

Figure 1 shows the results obtained for the degree of satisfaction of the sub-dimensions of the quality of the e-service, the Guarantees (Ave = 4.63), followed by Fulfillment (Ave = 4, 40) and Security (Ave = 4.15). The lowest values are shown by Efficiency (Ave = 3.69) and Reliability (Ave = 3.72)

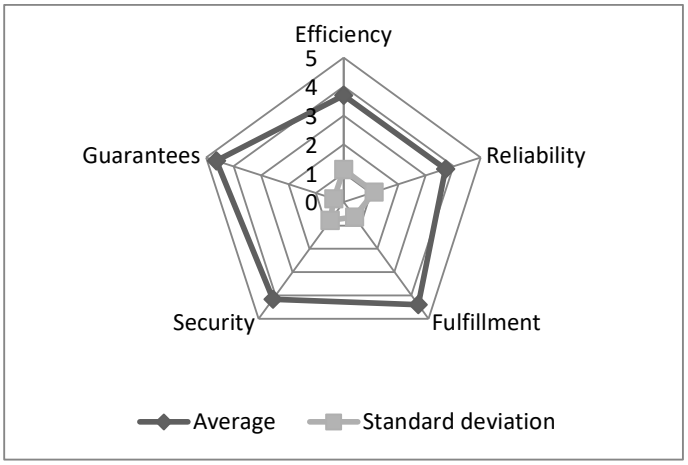

Fig. 1: Degree of satisfaction by sub-dimension of e-service quality

Table 2 shows the results obtained for the degree of satisfaction with Auchan's online delivery processes. In general, it can be said that consumers are satisfied with all the items evaluated, since all the average values obtained are higher than three (theoretical expected value) and the median varies between four and five, which means that at least 50% of the respondents are satisfied or very satisfied. However, the items that stand out are: delivery time (Ave = 4.82); right product and in good condition (Ave = 4.67) and ease of communication (Ave = 4.62) with the highest levels of satisfaction. On the other hand, the items with the lowest average levels of satisfaction stand out: place of delivery (Ave = 3.72); service price (Ave = 4.28) and products offered (Ave = 4.42). It should be noted that the dispersion values are relatively low, which reveals an agreement in response among the respondents. Regarding the way these items that constitute the delivery of the order correlate with customer satisfaction, it is observed through Spearman's coefficients that not all are statistically significant and those that are have direct correlations and of low intensity.

Table 2: Characterization of the degree of satisfaction with Auchan's online delivery processes and Spearman's correlation with Satisfaction

Item	Online purchase frequency					Average	SD	Median	Correlacion
	MI	IS	IN	S	MS				
Delivery place	2,2%	20,2%	15,7%	27,0%	34,8%	3,72	1,21	4	0,212*
Delivery time	0,0%	0,0%	2,2%	13,5%	84,3%	4,82	0,44	5	0,361**
Right product and in good condition	0,0%	0,0%	3,4%	25,8%	70,8%	4,67	0,54	5	0,079
Replacement of products	0,0%	0,0%	6,7%	28,1%	65,2%	4,58	0,62	5	0,260*
Products offered	1,1%	0,0%	10,1%	34,8%	53,9%	4,42	0,72	5	0,256*
Ease of communication	2,2%	2,2%	0,0%	24,7%	70,8%	4,62	0,75	5	0,137
Service price	0,05	0,0%	7,9%	56,2%	36,0%	4,28	0,60	4	0,278**

Figure 2 shows the results of the degree of satisfaction of the delivery of the order distributed by the factors of the quality of the e-service, with the highest value of satisfaction related to relational factors

(Ave = 4.62), followed by operational ones (Ave = 4.44) and finally the logistical cost factors (Ave = 4.28).

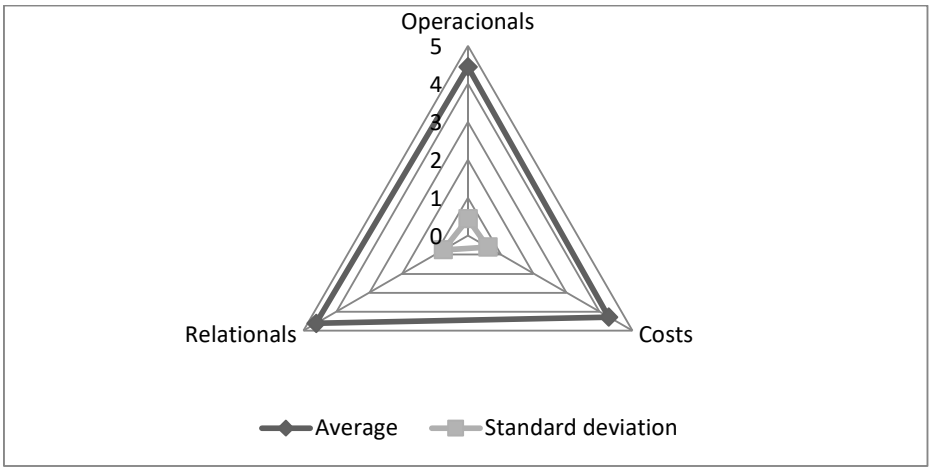

Fig. 2: Degree of satisfaction by sub-dimension of e-service

The results obtained for the place of delivery of the purchases preferred by consumers and what is actually used most. It is observed that 93.26% use the drive, but 60.67% responded that they prefer this place. In reality, 33.71% of the respondents stated that their preferred place of delivery is the home, but later they end up using the drive. Therefore, it was observed that the delivery location coincided with the preferred location in 64.0% (57) of the cases. It was found that the satisfaction results were statistically identical between the individuals who received the order at the preferred location (Ave = 4.59; SD = 0.50) and the individuals who received the order at another location other than the preferred one (Ave = 4.55; SD = 0.57).

As to the reason for using this service, 71.9% (64) of the respondents referred to the convenience and convenience of the delivery point; 22.5% (20) responded that it was the fact that the service charge was lower and 5.6% (5) stated that other delivery points were unavailable.

Regarding the degree of satisfaction with the online services provided by Auchan, table 3, it is observed that the DRIVE service was used by all respondents and that they are very satisfied (Ave = 4.71; Ave = 5). The other services were used by few consumers, but they also registered high levels of satisfaction.

Table 3: Characterization of the degree of satisfaction with the online services provided by Auchan

Item	Online purchase frequency					Average	DS	Median
	NS	PS	S	MS	TS			
Delivery of home (n=18)	0,0%	0,0%	27,8%	50,0%	22,2%	3,94	0,73	4
In-store pickup (n=3)	0,0%	0,0%	0,0%	66,7%	33,3%	4,33	0,58	4
DRIVE (n=89)	0,0%	0,0%	2,2%	24,7%	73,0%	4,71	0,51	5
App Auchan (n=26)	3,8%	0,0%	11,5%	50,0%	34,6%	4,15	0,78	4

As for the loyalty of Auchan's services, Table 4 concluded that the surveyed consumers revealed high levels of loyalty, intend to continue using the services, have positive aspects to mention about the services and intend to recommend the same to others.

Table 4: Characterization of the loyalty of Auchan online services

Item	Online purchase frequency					Average	DS	Median
	I	PP	NINP	MP	C			
Intention to return	0,0%	0,0%	4,5%	5,6%	89,9%	4,85	0,47	5
I would say positive aspects about services	0,0%	0,0%	4,5%	14,6%	80,9%	4,76	0,52	5
Would recommend Auchan online services	0,0%	0,0%	4,5%	28,1%	67,4%	4,63	0,57	5

The majority, 98.9% (88) of the respondents believe that the service fee pays for the entire purchase process. Table 5 shows the internal consistency of the dimensions of the scale used. Values above acceptable are verified, even being considered good. The placement of the order has a reasonable consistency, the reception of the same shows a low correlation and the issues inherent to the customer's loyalty present a good consistency of the values.

Table 5: Scale dimensions composition and internal consistency

Dimension	Indicators of scale	Cronbach Alpha dimension
1 – Placement of order	6.1 a 6.11	0,775
2 – Reception of order	7.1 a 7.7	0,671
4 – Customer Loyalty	12.1 a 12.3	0,882

By analyzing Table 6, it was concluded that the correlations between the dimensions under study are of low intensity, with the exception of the coefficient obtained between placing and receiving the order that has moderate intensity. All coefficients are positive, which indicates direct correlations between variables. Between loyalty and satisfaction, the coefficient obtained is not statistically significant.

Table 6: Spearman correlation coefficients between dimensions

	Placement of order	Reception of order	Customer Loyalty	Customer Satisfaction
Placement of order	1	0,593**	0,363**	0,218*
Reception of order		1	0,250*	0,342**
Customer Loyalty			1	0,122
Customer Satisfaction				1

**-significative to 5%; ** - significative to 1%.*

In general, it can be said that the users of the service were satisfied. Looking at Table 7, it can be seen that in the ordering, placing and receiving processes, the average values obtained are higher than 4 points, which indicates satisfaction with these services. These results certainly influence the overall satisfaction of the customer with the service point, whose average obtained was 4.57 points, a value very close to the maximum possible (5 points). It should be noted that the average level of customer loyalty in this service is also very high, 4.75 points.

Table 7: Characterization of dimensions

	Minimum	Maximum	Average	Standard deviation
Placement of order	3,27	5,00	4,28	0,48
Reception of order	3,14	5,00	4,44	0,43
Customer Loyalty	3,00	5,00	4,75	0,47
Customer Satisfaction	3,00	5,00	4,57	0,52

The application of the multiple linear regression model, Table 8 allowed to obtain a parsimonious model that makes it possible to predict the dependent variable from a set of independent variables. The first regression model presented tests the influence of placing and receiving orders on the variation in customer satisfaction. The model obtained has a significance level of 1% statistical significance, that is, the variation in customer satisfaction is explained significantly by the estimated model. By applying the t test, it is concluded that the receipt of the order ($\beta = 0.412$; p values <0.01) significantly determines the behavior of customer satisfaction. The order placement variable has no significant influence on the variation in customer satisfaction. The estimated model explains, on average, about 14.5% of the variation in customer satisfaction. The estimated model 2 relates customer loyalty to the variables: order placement, order receipt and customer satisfaction, it is at a significance level of 5% statistically significant. The determinant of the model that significantly influences the variation in customer loyalty was by the t test: placing the order with a coefficient $\beta = 0.377$ and p-value <0.01. The estimated model explains, on average, about 12.5% of the variation in customer loyalty.

Table 8: A summary of Regression Models

Dependent variable	Independent variables	Adjusted R^2	*F* value (p value)	Standardized coefficients	*t* value (p value)
Customer Satisfaction	Constant	0,145	8,451 (0,000)	2,384***	4,176(<0,001)
	Placement of order			-0,011	-0,094(0,925)
	Reception of order			0,412***	3,423(0,001)
Customer Loyalty	Constant	0,125	4,051 (0,010)	3,383***	5,824(<0,001)
	Placement of order			0,377***	3,044(0,003)
	Reception of order			-0,042	-0,319(0,750)
	Customer satisfacion			-0,004	-0,033(0,974)

Conclusion

Currently, the measurement of online customer satisfaction by retailers participating in online commerce is essential to assess the qualification of the service provided, the existing physical infrastructures and the quality of the service, and also to identify causes of dissatisfaction and organizational inefficiencies (Costa & Ruiz, 2011). Therefore, this investigation aimed to assess Auchan Famalicão's online customer satisfaction and loyalty. The results obtained show that the customers of the Drive service at this store are globally satisfied with the services provided by this retailer. This can be justified, given the lack of competition, in the city under study regarding the DRIVE service. However, the attributes: employee contacts, meeting the delivery deadline, comfort and convenience of the service stand out for the high satisfaction they present. On the contrary, the design of the website, the ease of use of the website and the quality of the information available on the website are the items with the lowest rating by customers. Regarding the sub-dimensions of the quality of the electronic service, there is greater satisfaction in the response capacity and guarantees, followed by compliance, on the other hand, reliability is the sub-dimension that needs to be improved. This study is in line with the results presented by the study by Galego (2014) and by Wolfinbarger and Gilly (2003), who stated that compliance was one of the sub-dimensions of the quality of the electronic service, which brings satisfaction. Regarding the attributes of receiving the

order, there are also values in all items, higher than the theoretical value expected, however, the delivery time, the right products and in good condition and the ease of communication present greater associated satisfaction and place of delivery. delivery stands out by the negative. Regarding the performance factors of the e-service, all present high values, highlighting the relational factors. Operational factors that, according to the literature, are the most important carriers, have high value (4.44).

Through this research it was noticed that, in general, customers are satisfied and loyal with the service under study. However, it was concluded that the attribute of the electronic service with the highest degree of satisfaction is the responsiveness and guarantees, and compliance also has a high degree of satisfaction. On the contrary, the attributes of the electronic service: efficiency and reliability showed substantially lower values. The items, ease of use of the website, website design and quality of information about the products showed the least appreciation by the customer. In this sequence, it is observed that the items with less satisfaction are associated with the site, being able to affirm that it needs to undergo some changes, namely, to become more appealing, intuitive and highlight the information about the products that customers really want. These measures would improve customer satisfaction and loyalty and, therefore, the profitability and sustainability of this service. In addition, in the items inherent to the size of the order placement, the delivery location is notable, due to its small size and space with little coverage, which is inconvenient, both for customers and for employees, on days of greater precipitation. , checking a customer's discontent and even failure. Thus, suggesting the increase in the size of the space allocated to the service, as well as the implementation of a cover from the entrance of the gallery to the place destined for the service.

It is possible to affirm that studies of this nature are of immeasurable importance, since they allow determining the degree of customer satisfaction in relation to the various associated attributes, as well as the causes responsible for the impact on customer satisfaction, loyalty and involvement in the online service and the redefinition of organizational strategies to fill these gaps. To this extent, the present investigation made it possible to identify the level of satisfaction of Auchan Famalicão's DRIVE service online customers, as well as to identify the dimensions related to their satisfaction and loyalty. This work also contributed to the identification of factors that influence customer satisfaction and loyalty and which require intervention by management bodies. It should also be noted that the priorities must be defined and intervened in terms of the quality of the electronic service provided to customers, in order to increase their satisfaction and loyalty to this commercial store in Famalicão and, consequently, achieve better performance while strengthening their competitiveness and sustainability.

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Cost Optimization for The Production of Innovative Products: The Use of Functional-Cost Analysis Methods

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Abstract

The article considers the possibility of applying the methodology of functional-cost analysis to the study of the processes of production of railway sleepers from modified wood. It has been established that coniferous wood is currently in short supply. Therefore, it is proposed to produce railway sleepers from soft hardwood, a lack of which in Russia does not exist. Sleepers made from innovative hardwood modified according to innovative technology are not inferior in performance to sleepers from natural coniferous wood. However, the production of railway sleepers from modified hardwood is expensive. Functional-cost analysis allowed optimization of costs for the production of innovative products. Functional-cost analysis allowed us to determine the contribution to the production of railway sleepers from modified wood of each function. It is proved that the greatest contribution to the formation of production costs is made by the costs of monitoring the parameters of the installation during the warm-up cycle. The use of functional-cost analysis made it possible to study the process of creating the value of innovative products, make operational management decisions to optimize production, and set prices for railway sleepers from modified hardwood.

Keywords: Innovative Products, Railway Sleepers From Modified Wood, Functional-Cost Analysis, Costs.

Introduction

In modern Russia, the development of innovations in the industrial sector is a state priority, and industrial policy is considered inextricably linked with innovation. Innovation is the main tool for modernizing national industry and enhancing its competitiveness.

Russian railway transport is one of the largest railway networks in the world. According to the Federal State Statistics Service, the operational length of general-purpose railways in the Russian Federation in 2018 is 86,613.4 kilometers.

Sleepers are elements of the upper structure of the railway track and are designed to ensure a constant gauge, transfer loads from the rails to the ballast cushion, and secure the track on the roadway. When choosing a material for the manufacture of sleepers proceed from such basic factors as cost per life cycle and operational characteristics. Currently, the following types of sleepers are used on the world's railways: wooden; reinforced concrete; metal; polymer (plastic) (Kuryanova, 2017).

The characteristics of various types of sleepers are also considered by foreign scientists. Thus, E. Ferro, J. Harkness, L. Le Pen (2020) study composite sleepers and load-bearing elements made of polymers, and sometimes steel or fiber reinforcement, which are an alternative to traditionally used analogues of wood or prestressed concrete. S. Laryea, M. Safari Baghsorkhi, J-F. Ferellec, G. R. McDowell, C. Chen (2014) compare the characteristics of concrete and steel sleepers using experimental and discrete elements.

The main barrier when choosing wooden sleepers is a short service life, the quality of impregnation and a depleted raw material base. Coniferous species, mainly pine, are the raw materials for the production of wooden sleepers. But with a shortage of these species, sleepers can be made from soft hardwoods, a lack of which is not observed in Russia (Shamaev, 2013).

Sleepers made of modified hardwood are impregnated with high-quality impregnation in terms of their physical and mechanical properties and are not inferior to sleepers made of natural softwood. The predicted service life of modified wood sleepers can be significantly higher than that of wooden sleepers made from natural coniferous wood (Shamaev, 2013). The planned sleepers made of modified wood should be identical to the sleepers made of natural wood for the purpose, shape, size, method of processing tolerances of defects, but with improved performance.

The innovative production of modified wood sleepers is costly. Therefore, it is necessary to establish the possibility of optimizing costs for the production of innovative products.

In modern conditions, various methods of making managerial decisions are applied in terms of determining the costs of the production processes of innovative technologies. One of these techniques is the functional-cost analysis.

Functional-cost analysis as a system of economic and analytical work in close coordination with design work was developed in 1947 by an American engineer Lawrence D. Miles. A feature of this technique is the application of a functional approach, which is implemented through the organization of collective discussions of rationalizing proposals in an analytical working group (team). An important place in this process is given to the application of various methods of technical creativity, activating the search for non-standard technical solutions, due to the implementation of which the object undergoes serious reconstruction, becomes competitive and highly profitable (Sheremet, 2017). Thus, the initial functional-cost analysis was conceived as a tool for improving the construction of material objects. Currently, the objects of functional-cost analysis in Russian practice are both material objects and technological processes, production, organizational and information structures, as well as their individual elements or groups of elements.

Functional-cost analysis is a systematic study of the functions of the studied object in order to optimize the ratio of the claimed quality of the functioning of the studied object and the cost of implementing its functions in the life cycle of this object (Kuzmina, 2015). Functional-cost analysis refers to the methods of systematic research of all the functions of any object. It is aimed at minimizing costs at all stages of the design, production and operation of the facility, at least while maintaining (improving) its quality and usefulness (Misakov, 2016).

Thus, the use of functional cost analysis can increase the competitiveness of enterprises by solving specific problems of cost management (Morkovina, 2018). The object of the study of functional-cost analysis in this work is the process (technology) of manufacturing railway sleepers from modified wood.

In the study, the functional-cost analysis allows us to assess the real value of the sleepers from modified wood.

Methods

During the study, the methods of questioning, comparison, comparison and observation were used in part:

- surveys of employees of enterprises producing wooden sleepers;
- identifying and establishing the significance of factors affecting the organization of the production of sleepers from modified wood, coordination of expert opinions was carried out based on the calculation of the dispersion coefficient of Kendall concordance;
- desk study, including an assessment of the results. In the course of desk research, experience and forms of innovation support in the Russian forest sector were studied.

The cost of functions was determined on the basis of the developed technology for the production of railway sleepers from modified wood. When determining the time for the operation of the technology, methods of photographing working time and rationing were used. The production technology of sleepers from modified wood differs from traditional solutions by the combination of three operations in time: impregnation, drying, pressing of wood. To process the information received, the generalization method was used by summarizing and grouping the data. When conducting a functional-cost analysis of the process of obtaining railway sleepers from modified wood, we adhered to the corrective form, which identifies unnecessary costs, saving reserves, reducing costs, increasing the competitiveness of innovative products.

The use of functional-cost analysis in various fields was also considered by foreign scientists. So, Takeo Yoshikawa, John Innes, Falconer Mitchell (1994) studied the application of functional cost analysis in a production environment. Shannon L. Charles, Don R. Hansen (2008) carried out cost estimates based on activity and functional costs.

Results and Discussion

For enterprises engaged in innovative developments, special preferential conditions are provided, the state stimulates the innovative activity of economic entities (Kuznetsov, 2017).

However, despite numerous reforms of the state forestry management system of the Russian Federation, the production of wooden sleepers in Russia is currently in a state of depression. This is confirmed by a survey of managers of railway sleepers (Figure 1).

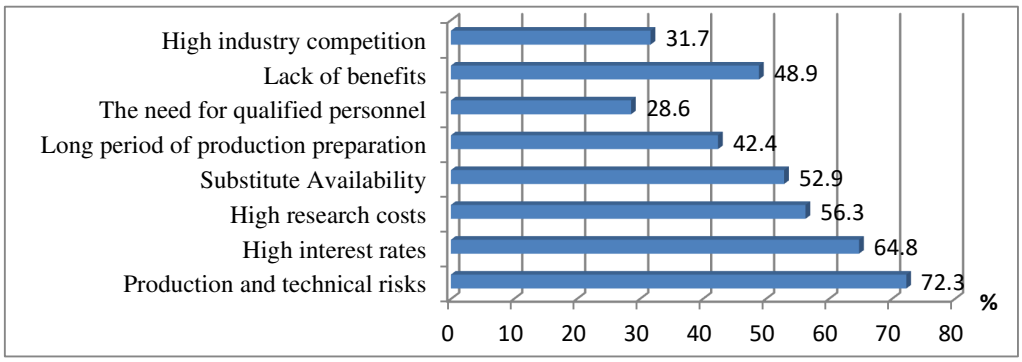

Figure 1: Factors holding back the development of innovative technologies in the Russian forest sector

In order to ensure the use of innovative technologies as the basis for reducing production costs, we studied the transition to an innovative method for the production of sleepers from modified hardwood (table 1).

Table 1: a description of the process for producing modified wood sleepers

Process name	Name of works
1. Preparatory work before starting the operation for the impregnation of blanks	Transportation of birch timber to the wood modification workshop
	Installation Inspection
	The inclusion of heating elements for heating an antiseptic in a bath with a hot antiseptic
2. Impregnation of sleeper blanks	Lifting the pressure plate
	Installation of thermocouples in sleepers
	Loading sleeper blanks into cassettes
	Loading cassettes with blanks in the impregnation bath
	Closing the lid of the working bath clamp
	Lowering the pressure plate to contact the workpieces
	The inclusion of a pumping unit that provides the injection of hot antiseptic into the working bath
	Turning on the pumping unit, which ensures the pumping out of a hot antiseptic from the working bath, setting the level of antiseptic in the working bath
	Monitoring the parameters of the installation during the warm-up cycle
3. Pressing sleeper blanks	Draining a hot antiseptic from a working bath and simultaneously pouring a cold antiseptic into it with the addition of a stabilizer
	Setting the level of cold antiseptic in the working bath, turning off the pump units
	Temperature control of workpieces and antiseptics
	Monitoring the parameters of the installation
	The inclusion of a hydraulic station for pressing sleeper blanks to a given degree
	Pumping cold antiseptics from the working bath
	Lifting the pressure plate
	Trolley rolling out
	Unloading a package of cassettes with sleeper blanks to a workshop site

The working procedures carried out during the functional-cost analysis with the aim of systematic analysis of the functions of the object are carried out in a certain logical sequence [1]:

- construction of a structurally elementary model of an object;
- the formulation of the functions of the object;
- a group of functions of the object;
- checking the correct distribution of the functions of the object;
- description of functional relationships;
- graphic representation of functional relationships;
- assessment of the significance of the functions of the object;
- assessment of the functional reserve of the object.

Based on the algorithm of the system analysis of functions, we compiled a structurally elementary model, determined the functions of the process for producing railway sleepers from modified wood (table 2), and presented a combined functional-structural model for producing innovative sleepers.

Table 2: functions for the production of railway sleepers from modified wood

Item name	Functions	The code
Production of railway sleepers from modified wood	home	F0
Preparatory work before starting the operation for the impregnation of blanks	Main	F1
Transportation of birch timber to the wood modification workshop	Subsidiary	F1.1
Installation Inspection	Subsidiary	F1.2
The inclusion of heating elements for heating an antiseptic in a bath with a hot antiseptic	Subsidiary	F1.3
Impregnation of sleeper blanks	Main	F2
Lifting the pressure plate	Subsidiary	F2.1
Installation of thermocouples in sleepers	Subsidiary	F2.2
Loading sleeper blanks into cassettes	Subsidiary	F2.3
Loading cassettes with blanks in the impregnation bath	Subsidiary	F2.4
Closing the lid of the working bath clamp	Subsidiary	F2.5
Lowering the pressure plate to contact the workpieces	Subsidiary	F2.6
The inclusion of a pumping unit that provides the injection of hot antiseptic into the working bath	Subsidiary	F2.7
Turning on the pumping unit, which ensures the pumping out of a hot antiseptic from the working bath, setting the level of antiseptic in the working bath	Subsidiary	F2.8
Monitoring the parameters of the installation during the warm-up cycle	Subsidiary	F2.9
Pressing sleeper blanks	Main	F3
Draining a hot antiseptic from a working bath and simultaneously pouring a cold antiseptic into it with the addition of a stabilizer	Subsidiary	F3.1
Setting the level of cold antiseptic in the working bath, turning off the pump units	Subsidiary	F3.2
Temperature control of workpieces and antiseptics	Subsidiary	F3.3
Monitoring the parameters of the installation	Subsidiary	F3.4
The inclusion of a hydraulic station for pressing sleeper blanks to a given degree	Subsidiary	F3.5
Pumping cold antiseptics from the working bath	Subsidiary	F3.6
Lifting the pressure plate	Subsidiary	F3.7
Trolley rolling out	Subsidiary	F3.8
Unloading a package of cassettes with sleeper blanks to a workshop site	Subsidiary	F3.9

In accordance with the combined model, using data on the costs of the production of innovative sleepers, we determined the costs of producing sleepers from modified softwood species.
Production costs for the production of modified timber sleepers for one cycle are presented in table 3.

Table 3: production costs for the production of sleepers from modified wood per cycle (16 sleepers), Euro

Type of work	Payroll Fund, Euro	Depreciation, Euro	The cost of acquiring materials, Euro	Electricity costs, Euro	Costs of fuels and lubricants, Euro	Costs of repair and maintenance of premises and equipment, Euro	Production cost, Euro
Preparatory work before starting the operation for the impregnation of blanks	2.47	3.72	130.15	2.68	7.12	2.24	148.38
Impregnation of sleeper blanks	110.55	49.93	0	13.18	0	6.06	179.72
Pressing sleeper blanks	13.64	14.23	24.10	17.66	0	6.34	75.97
Всего	126.66	67.88	154.25	33.52	7.12	14.64	404.07

The cost of functions and the importance of the technological processes for the production of sleepers from modified wood are shown in table 4.

Table 4: costs of functions and their significance for the production of modified timber sleepers in one cycle

Items	Function code	Costs, Euro	Cost ratio,%	Significance, %
Production of railway sleepers from modified wood	F0	404.07	100	100
Preparatory work before starting the operation for the impregnation of blanks	F1	148.38	36.7	33.2
Impregnation of sleeper blanks	F2	179.72	44.5	37.5
Pressing sleeper blanks	F3	75.97	18.8	29.3

The ranking of the costs of the functions for the production of sleepers from modified wood is presented in Figure 2.

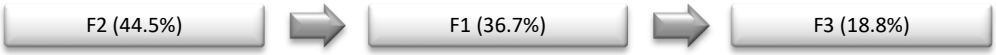

Figure 2. The ranking of the costs of the functions for the production of sleepers from modified wood

The ranking by significance is shown in Figure 3.

Figure 3: Ranking by importance of the functions for the production of sleepers from modified wood

Thus, the most expensive and significant function in the production of railway sleepers from modified wood is the main function of “Impregnation of sleeper blanks”.

In order to ensure the competitiveness of innovative products, it is necessary to optimize the most costly processes identified using the functional-cost analysis. The most expensive function is the F2

function “Impregnation of sleeper blanks” due to the high cost of the auxiliary function “Monitoring the parameters of the installation during the warm-up cycle”, which provides for two operations - direct control of the parameters and passive rest between the control points.

The duration of passive control for one cycle of impregnation of sleeper blanks is 44.68 hours. The work to improve the structure of working time costs in the operational work of manufacturing sleepers with improved operational performance may consist mainly in eliminating passive monitoring and increasing active work time due to this, which can be achieved by developing multi-unit service, expanding service areas, combining professions and functions.

Under these conditions, a reduction of passive surveillance by 50% will significantly reduce the production cost of railway sleepers. So, while saving time at 22.34 hours with the operator’s pay for the installation operator 2.08 euros per hour, the total savings for the “Impregnation of sleeper blanks” function will be 46.47 euros. The optimization results are presented in table 5.

Table 5: cost comparison of existing and design options for the production of railway sleepers from modified wood

Items	Function code	Production costs, Euro		
		Existing option	Design option	Change
Production of railway sleepers from modified wood	F0	404.07	357.6	46.47
Preparatory work before starting the operation for the impregnation of blanks	F1	148.38	148.38	0
Impregnation of sleeper blanks	F2	179.72	133.25	46.47
Pressing sleeper blanks	F3	75.97	75.97	0

The analysis shows that the optimization of production costs for the most costly functions made it possible to increase the competitiveness of railway sleepers from modified wood with improved performance indicators (Figure 4).

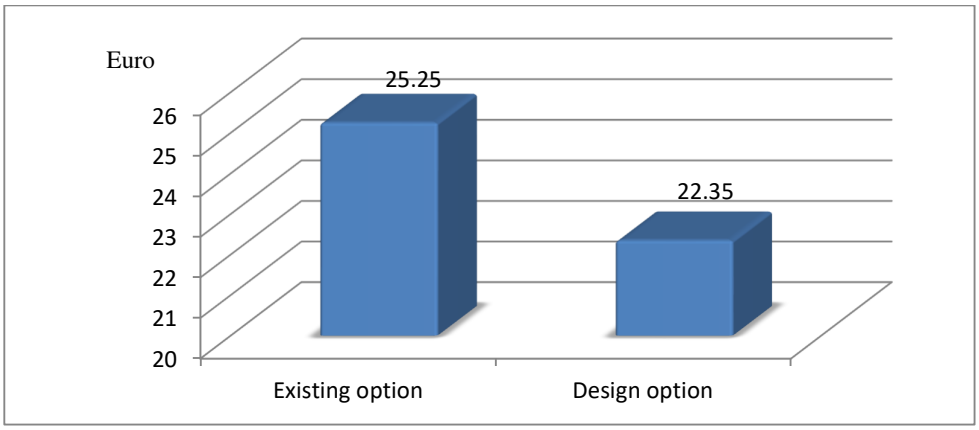

Figure 4: Production cost of the modified-wood sleepers of the existing and design (after cost optimization) options, Euro

According to Figure 4, the production cost of one sleepers from modified wood of the existing version is 25.25 euros, the production cost of one sleepers from modified wood of the design (after cost optimization) option is 22.35 euros.

Thus, the functional-cost analysis apparatus turned out to be effective and allowed to achieve cost optimization by the functions of the production process for manufacturing railway sleepers from modified wood - the production cost per unit of production will be reduced by 2.9 euros.

Conclusions and Recommendations

Thus, the functional-cost analysis is a means of cost management, which shows the specific relationships of all the functions of the system with respect to each other, reveals the need and importance of functions, and also helps to identify unnecessary, duplicate and problematic (costly) functions.

The performed work on the functional-cost analysis of the innovative technology for the production of sleepers from modified wood revealed that the technology does not require significant changes, it does not have unnecessary and duplicate functions.

The main function "Impregnation of workpieces" takes first place in terms of importance and the amount of costs due to the high cost of the auxiliary function "Monitoring the parameters of the installation during the warm-up cycle".

It is necessary to modernize the identified cost function in the technology under study by eliminating passive monitoring and increasing the time of active work (with an increase in production volumes this can be facilitated by multi-unit service, expansion of service areas, combination of professions and functions).

According to the results of the functional-cost analysis in the existing version (according to the current technology), the production cost of one sleepers made of modified wood is 25.25 euros.

According to the results of the functional-cost analysis in the project version (results of cost optimization planning), the production cost of one sleepers made of modified wood will be 22.35 euros.

After cost optimization based on cost-based analysis, railroad ties made of modified wood will become more competitive in the market for relevant products. The introduction of innovative technologies in the woodworking industry will reduce the cost of manufacturing products and increase their useful lives.

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HELLWIG'S Measure of Development and Comparative Analysis of The Best Companies in The Dairy Sector of The VISEGRAD Group Countries

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Abstract

The article presents selected methods of multidimensional comparative analysis called taxonomic methods that enable the classification, grouping and ordering of economic objects according to selected diagnostic features. The dairy sector companies were selected by revenue in 2017 in the Visegrad Group countries and 20 companies were included in the analysis. The business entities were subjected to comparative financial analysis using parameters of descriptive statistics based on 10 most popular indicators representing profitability, operational efficiency, financial liquidity and debt of dairy sector entities in 2015-2018. Then, the companies were ordered according to Hellwig's synthetic measure of development, using the average values of these indicators in the examined years and normalizing them earlier. The article shows that multidimensional comparative analysis allows to determine the most attractive entities using the synthetic measures and taking into account the values of financial indicators. It also makes it possible to show a graphic presentation in the form of two- and three-dimensional charts. In its classic form, however, it has its drawbacks and limitations that are pointed out.

Keywords: multidimensional financial analysis, Hellwig's synthetic measure of development, Wroclaw taxonomy

JEL codes: G3, D63

Introduction

Rankings and analyses of attractiveness of the best companies are conducted all the time and they are always popular among, for example, future investors. Frequently, rankings are based on financial data.
The aim of the article is to carry out a multidimensional comparative financial analysis of the best companies in the dairy sector of the Visegrad Group countries, on the one hand using financial analysis indicators and on the other, selected methods of multidimensional comparative analysis (the so-called MCA methods). These are also called taxonomic methods and can be used as tools to describe economic and natural phenomena that allow to define the relations between the objects studied, at the same time reducing the excess of information, ordering and synthesizing study results (Kolenda M.,

2006). When measuring the financial efficiency of economic entities (companies, branches, sectors) characterised by financial indicators, these methods allow to classify, group and order the entities by creating rankings according to selected features (financial indicators). If a comparative analysis refers to the value of financial indicators in a given moment of time (e.g. at the end of a period: month, quarter, year), one deals with statistical methods. On the other hand, if multidimensional comparative analysis is used to evaluate the financial situation of selected business entities at the end of reporting periods in a given time range, one deals with a dynamic comparative analysis. The selected MCA methods presented in the article were implemented on the financial data of 20 companies in the dairy sector that represent the Visegrad Group countries, gathered in the Emerging Markets Information Service (EMIS) database. From each country, i.e. Poland, Hungary, the Czech Republic and Slovakia, five best companies with the highest income in 2017 were qualified to the study.

Theoretical background: characteristics of selected methods

The template method that is certainly commonly known and most frequently used in practice is the measure proposed by Z. Hellwig, where a template object of the following coordinates is set based on matrixes of standardized input variables (Panek T., 2009):

$$O_0 = [z_{oj}]$$

Hellwig's measure allows to order selected objects according to the level of phenomena that cannot be measured with one measure, e.g. technological progress, social and economic development, life conditions, social and technological infrastructure. Hellwig's measure of development synthesizes information from a sequence of diagnostics variables and assigns one aggregated measure to the phenomenon analysed (Krakowiak-Bal A., 2005).
In this type of multidimensional comparative analysis, the vector of variables (financial indicators) is analysed:

$$X = [X_1 , X_2 , \dots ,X_m]$$

where: m – number of variables (financial measures)

After analysing economic entities, variables (financial indicators) are often expressed in heterogeneous units of measurements. Also, their values are presented with the use of units of different orders of magnitude. In order to use the methods of Multidimensional Comparative Analysis (MCA), it is necessary to carry out the process of normalization according to the following general formula:

$$z_{ij} = \left(\frac{x_{ij} - a_j}{b_j}\right)^{c_j}, \ (i = 1,2, \dots, n; j = 1, 2, \dots , m)$$

Z_{ij} – value of the X_j variable for i-th object after normalization

a_j ,b_j ,c_j – different values depending on the method of normalization.

One of the most popular methods of normalization is standardisation according to the formula:

$$z_{ij} = \frac{x_{ij} - \overline{x_j}}{s_j},$$

$\overline{x_j}$ - arithmetic mean of the X_j variable (financial measure),

s_j – standard deviation of the X_j variable.

Applying the above solution is useful for standardising diagnostic characteristics adopted for the study and classified as stimulants and destimulants (Świardyńska N., 2018 s. 74). After normalization, financial indicators (variables) become dimensionless quantities, i.e. quantities without a unit, whereas the variables are unified according to their location and variability. Unitisation is another method of variable normalization. It is carried out according to the following formula:

$$z_{ij} = \frac{x_{ij} - min_i x_{ij}}{O_j},$$

z_{ij} – unitised value of the X_j variable for the i-th object,

$min_i x_{ij}$ – minimum value of the X_j variable for the i-th object,

O_j – range of the X_j variable.

The aim is to order the objects from the best to the worst, and the ordering criterion is the level of the complex phenomenon. Variables should be normalized. Variables can be stimulants, destimulants, nominants or of neutral character. In case of stimulants, the increase in their value reflects an increase in the level of the complex phenomenon. In case of destimulants, the increase in their value reflects a decrease in the level of the complex phenomenon. In case of nominants, variables have a specific, most beneficial value called the nominal value. The increase in its value to the nominal value causes the increase of the level of the complex phenomenon, whereas the increase over the nominal value causes the decrease in the level of the complex phenomenon. Such a variable is undesired in the set of variables that describe the phenomenon.

After normalization, some variables (financial indicators) that describe a given object have to be transformed to stimulants. And so, the indicators that are destimulants are transformed to stimulants by deducting the value of the destimulant from the unity (for unitized data) and multiplying the value by (-1) (for standardized data).

Changing a dominant into a stimulant is carried out based on the formulas below:

$$\left\{ \begin{array}{ll} 1, & dla\ x_{ij} = N_j \\ \dfrac{-1}{x_{ij} - N_j - 1} & dla\ \ x_{ij} < N_j \\ \dfrac{-1}{x_{ij} - N_j + 1} & dla\ x_{ij} > N_j \end{array} \right\}$$

where:

Nj – nominal value for the j-th variable.

The values of the stimulant are within the range of (0,1].

Similarity is the feature that makes it possible to compare objects (leaders), i.e. the closer the values of variables (financial indicators), the more related two objects are. In multidimensional comparative analysis, similarity is defined by the distance between the objects which is expressed according to the following formula:

$$d_{il} - \sqrt[p]{\sum_{j=1}^{m} |z_{ij} - z_{lj}|^p},$$

where:
d_{il} – distance between the i-th and l-th objects,

z_{ij}, z_{lj} – normalised values of the i-th and l-th objects for the X_j variable,

p – constant.

If p=1, then the result is the New York distance, also called city-block, Hamming's or Manhattan, which is defined by the formula:

$$d_{il} = \sum_{j=1}^{m} |z_{ij} - z_{lj}|.$$

When p=2, however, then the most frequently used formula for Euclidean distance is created:

$$d_{il} = \sqrt{\sum_{j=1}^{m} (z_{ij} - z_{lj})^2}.$$

Using the distance method and Hellwig's method of development pattern requires variables to be normalised and converted to the form of stimulants or destimulants.

Afterwards, a pattern, i.e. an abstract object of the best values for each feature (indicator) is defined, as well as an anti-pattern consisting of the "weakest" values for each variable (each indicator). In practice, the most convenient method is the one where, assuming that all diagnostic variables are reduced to stimulants, the coordinates of the model object (Grabiński T. i inni, 1989), also known as the pattern, can be expressed in the following way:

$$Z_0 = [z_{01}, z_{02}, \dots, z_{0j}, \dots, \dots \; z_{0m}]$$

$$z_{oj} = \begin{Bmatrix} max_i z_{ij} & for\ z_j\ that\ is\ a\ stimulant \\ min_i z_{ij} & for\ z_j\ that\ is\ a\ destimulant \end{Bmatrix}.$$

The anti-pattern is expressed as follows:

$$Z_{-0} = [z_{-01}, z_{-02}, \dots, z_{-0j}, \dots, z_{-0m}]$$

$$z_{-oj} = \begin{Bmatrix} min_i z_{ij} & for\ z_j\ that\ is\ stimulant \\ max_i z_{ij} & for\ z_j\ that\ is\ a\ destimulant \end{Bmatrix}$$

This assumption is often useful, e.g. in research into economic development, when there is no fear that the selection of maximum values is not "too good" (Strahl D., 1978). The interpretation of this method is as follows. As it is assumed that all variables are stimulants, the higher the value of m_i, the higher the level of the complex phenomenon studied characteristic of the object. Thus, already based on the sum values, it is possible to order objects, e.g. from the best to the worst, according to the level of the complex phenomenon (Dziechciarz J., 2003).

On the other hand, the synthetic measure in the distance method is based on the formula of unitising transformation, i.e. a method of variable normalization, and is as follows:

$$z_i = \left(\frac{d_{i0} - min_i\{d_{i0}\}}{max_i\{d_{i0}\} - min_i\{d_{i0}\}} \right)^p.$$

In the next step, the similarity of each object to the pattern created is measured with Euclidean distance. The smaller the distance between the object and the pattern, the closer (more similar) the object is to the pattern, thus representing a high level of the financial situation analysed of entity (a dairy company). Euclidean distance between the i-th object and pattern (d_{i0}) is as follows:

$$d_{i0} = \sqrt{\sum_{j=1}^{m} (z_{ij} - z_{0j})^2}, (i, l = 1, 2, \dots, n)$$

The last stage in both methods is about setting a synthetic measure that makes linear ordering of objects possible. In Hellwig's method of development pattern, this (m_i) measure is expressed with the following formula:

$$m_i = 1 - \frac{d_{i0}}{d_o}, (i = 1, 2, \dots, n).$$

The (m_i) measure usually takes values from the range of [0; 1]. The less distant the object is from the pattern, the higher the values. The fraction denominator (d_0) is the distance between the pattern set (the exemplary company) and the anti-pattern, and it is calculated based on the formula:

$$d_{i0} = \overline{d_0} + 2\, S_d$$

where,

$\overline{d_o}$ – *mean*

S_d – *standard deviation*

Multidimensional comparative analysis is based on the construction of the synthetic measure of development (SMD). One has to remember that many SMD constructs were designed with reference to the topic of linear ordering. In 1990, M. Walesiak took up one of the first attempts at completing the gap in the subject of discussing various SMD constructs (Walesiak M., 1996). An interesting modification was also presented by A. Młodak in his paper where he used a set of positional measures to normalise input variables when constructing Hellwig's measure (Młodak A., 2006). Following Hellwig's pioneering proposal made in 1968, there has been a number of its developments, as well as novel ideas. It is worth mentioning the following papers (in chronological order): Cieślak (1974), Dittmann, Pisz (1975), Bartosiewicz (1976), Pluta (1976), Nowak (1977), Strahl (1978), Panek (1984), Jajuga (1986), Lira i inni (2002), Strahl (2006), Strahl, Markowska (2008), Młodak (2009), Walesiak (2011), Wydymus (2013), Pietrzak (2014) (Muller-Frączek I., 2017). The modifications listed above are just a few examples of a whole set of proposals for the improvement of the synthetic measure of development.

Although the method is commonly known and used, it has many variants and modifications. This is particularly influenced by various methods of standardization and unification of variables, and adopting a pattern and an anti-pattern. What is also important is the denominator that defines the space where the objects studied are located and the distance between them set by the distance from the pattern. In this paper, the solutions described and considered to be the most classic were applied.

Data sources and Research Methodology

In the research conducted, data from dairy companies published in the Emerging Markets Information Service (EMIS) database were used. Based on statements for twenty best dairy companies in the Visegrad Group countries, ten selected and most popular financial analysis indicators were calculated.

The highest values of profitability indicators were scored by the Olma a.s. (ROE – 19.76%, ROA – 11.40%) company, and the lowest by SOLE-MIZo Zrt, (ROE – minus 34.79%). The highest values of CR and QR financial liquidity indicators were scored by the Tolnatej Zrt. (CR – 3.25, QR – 2.69) and Syraren Bel Slovensko a.s. (CR – 3.23, QR – 2.76) companies, and the lowest by the Danone sp. z

o.o. (0.32, 0.26) company. The highest cash financial liquidity was that of Savencja Fromage&Dairy (0.78), and SM in Piątnica (0.60) came second. The highest debts are those of the SOLE-MIZo (DR – 91.06%) and Agro Tami a.s. (DR – 80.49%) companies, and the least indebted companies are Olma a.s. (DR – 1.50%) and Tolnatej Zrt. (DR – 20.86%). As far as operational efficiency is concerned, the fastest receivables rotation is that of FrieslandCampina (2.7 days) and Korostej Kft (3.24 days), whereas the slowest receivables rotation is that of Milk Agro (26.14 days). The best inventory rotation is that of Korostej Kft (11.76 days), and the worst that of OSM in Piątnica (43.98 days). The highest liabilities rotation is that of Danone (168.8 days) and SOLE-MIZo (162.68 days). Liabilities are settled fastest by OSM in Łowicz (41.72 days) and SM Mlekovita (43.92 days).

Table 1: Income and average values of financial analysis of the best dairy companies of the Visegrad Group in 2015-2018.

No.	Company	Income in 2018	Mean for the indicator in 2015-2018									
			ROE	ROA	ROS	CR	QR	Cash-Ratio	Debt Ratio	Receivables turnover	Inventory turnover	Liabilities turnover
1	Spółdzielnia Mleczarska Mlekovita	1,103,144.27 EUR	6.91%	3.97%	1.45%	1.72	1.29	0.10	42.91%	8.16	19.03	43.92
2	Bidfood Czech Republic s.r.o	956,613.01 EUR	5.56%	1.32%	0.89%	1.08	0.68	0.24	79.33%	11.39	12.98	72.49
2	Spółdzielnia Mleczarska Mlekpol w Grajewie	398,905.44 EUR	2.10%	1.40%	0.73%	1.86	1.50	0.55	32.97%	6.98	16.73	61.10
4	Danone Sp. z o.o.	301,554.30 EUR	3.33%	2.28%	5.58%	0.32	0.26	0.01	31.77%	8.38	32.74	168.80
5	Okręgowa Spółdzielnia Mleczarska w Łowiczu	301,194.45 EUR	-5.78%	-2.79%	-0.89%	1.43	0.85	0.03	47.62%	11.20	15.25	41.72
6	Okręgowa Spółdzielnia Mleczarska w Piątnicy	294,040.03 EUR	1.87%	1.26%	0.61%	1.77	1.59	0.60	32.89%	7.86	43.98	44.50
7	SOLE-MiZo Zrt.	232,130.63 EUR	-34.79%	-0.21%	-0.22%	0.56	0.41	0.00	91.06%	6.03	13.31	162.68
8	Madeta a. s.	205,007.17 EUR	16.90%	10.25%	4.64%	1.21	0.76	0.15	39.47%	12.19	16.71	49.23
9	Rajo a.s.	178,442.60 EUR	4.29%	1.43%	0.72%	0.98	0.63	0.03	66.43%	8.65	14.86	52.10
10	Alfoldi Tej Kft.	172,660.19 EUR	1.48%	0.77%	0.38%	0.90	0.61	0.00	53.25%	10.95	14.99	81.30
11	Olma a.s.	132,628.61 EUR	19.76%	11.40%	4.28%	1.35	0.92	0.31	1.50%	11.27	15.98	53.33
12	Milk-agro, spol. s r.o.	119,141.71 EUR	10.77%	5.07%	1.53%	1.30	0.69	0.36	55.30%	26.14	13.51	44.81
13	Savencia Fromage & Dairy Czech Republic a.s.	117,258.82 EUR	8.87%	6.48%	3.47%	2.30	1.79	0.78	27.31%	8.56	15.52	45.01
14	Mlekarna Hlinsko a.s.	116,332.67 EUR	10.32%	6.03%	2.21%	1.49	0.98	0.09	41.86%	7.94	13.74	51.30
15	Tolnatej Zrt.	99,797.65 EUR	12.11%	9.59%	5.71%	3.25	2.69	0.00	20.86%	9.20	14.19	44.62
16	FrieslandCampina Hungaria Zrt.	97,379.54 EUR	15.12%	10.90%	5.86%	2.53	2.31	0.00	27.77%	2.70	27.53	52.10
17	Korostej Kft.	93,080.73 EUR	7.82%	4.71%	2.97%	1.76	1.38	0.00	41.65%	3.24	11.76	110.23
18	Syraren BEL Slovensko a.s.	90,192.89 EUR	6.19%	4.83%	3.62%	3.23	2.76	0.03	21.89%	13.38	16.35	46.71
19	Tatranska Mliekaren a.s.	79,253.66 EUR	6.06%	2.22%	1.36%	1.36	1.06	0.09	62.38%	4.51	14.41	86.49
20	Agro Tami, a.s	67,176.72 EUR	3.94%	0.78%	0.45%	1.15	0.79	0.06	80.49%	6.13	13.96	83.85

Source: Own study based on financial statements from the Emerging Markets Information Service (EMIS) database.

Results and graphic presentation of the research

The algorithm presented in point 2 was applied, and the results of the multidimensional comparative analysis gathered are shown in Table 2. The best dairy companies were ordered according to the highest aggregate score of Hellwig's method, i.e. synthetic measure of development.

Table 2: Results of the multidimensional comparative analysis of the best dairy companies.

Hellwig	Dairy company	ROE	ROA	Income
0.992	FrieslandCampina Hungaria Zrt.	15.12%	10.90%	97,379.54 EUR
0.982	Tolnatej Zrt.	12.11%	9.59%	99,797.65 EUR
0.859	Savencia Fromage & Dairy Czech Republic a.s.	8.87%	6.48%	117,258.82 EUR
0.791	Olma a.s.	19.76%	11.40%	132,628.61 EUR
0.777	Madeta a. s.	16.90%	10.25%	205,007.17 EUR
0.724	Syraren BEL Slovensko a.s.	6.19%	4.83%	90,192.89 EUR
0.651	Milk-agro. spol. s r.o.	10.77%	5.07%	119,141.71 EUR
0.535	Okręgowa Spółdzielnia Mleczarska w Piątnicy	1.87%	1.26%	294,040.03 EUR
0.489	Danone Sp. z o.o.	3.33%	2.28%	301,554.30 EUR
0.471	Korostej Kft.	7.82%	4.71%	93,080.73 EUR
0.443	Mlekarna Hlinsko a.s.	10.32%	6.03%	116,332.67 EUR
0.398	Spółdzielnia Mleczarska Mlekpol w Grajewie	2.10%	1.40%	398,905.44 EUR
0.398	Spółdzielnia Mleczarska Mlekovita	6.91%	3.97%	1,103,144.27 EUR
0.378	Bidfood Czech Republic s.r.o	5.56%	1.32%	956,613.01 EUR
0.355	Tatranska Mliekaren a.s.	6.06%	2.22%	79,253.66 EUR
0.283	Agro Tami a.s.	3.94%	0.78%	67,176.72 EUR
0.237	Rajo a.s.	4.29%	1.43%	178,442.60 EUR
0.202	Alfoldi Tej Kft.	1.48%	0.77%	172,660.19 EUR
0.086	Okręgowa Spółdzielnia Mleczarska w Łowiczu	-5.78%	-2.79%	301,194.45 EUR
0.032	SOLE-MiZo Zrt.	-34.79%	-0.21%	232,130.63 EUR

Source: Own study based on financial statements from the EMIS database.

Using Hellwig's algorithm, the synthetic measure of development was calculated for 10 indicators of each of the best dairy companies that participated in the study. The highest value of the indicator close to 1 was scored by the FrieslandCampina Hungaria Zrt. company, which was characterised by high profitability of own capital in all the years analysed in the study (min. 13.8%, max. 16.11%). The Tolnatej Zrt. Company's score was similar; however, its results were lower (min. 10.63%, max. 13.22%). The results in Table 2 can have various interesting graphical presentations, as shown in the following picture. It often gives a better perspective of the ranking.

Fig. 1: Results of the multidimensional comparative analysis of the best dairy companies.
Source: Own study based on financial statements from the EMIS database.

The company with the lowest evaluation is SOLE-MiZo Zrt. It has considerable fluctuations due to over 7 million EUR net loss that affects its negative -178% profitability of own capital. Due to the weak last year, even over 20% of own capital profitability in 2016 does not allow SOLE-MiZo Zrt to hold a higher position according to Hellwig's algorithm.

Continuing the analysis based on Picture 1 and Table 2, the second lowest position is held by Okręgowa Spółdzielnia Mleczarska in Łowicz whose profitability is min. -22.26 % in 2018 and 0.11% in 2015, as shown in Picture 1. Data in Table 2 were also used to make a three-dimensional bubble plot (a bubble plot is a scatterplot where a third dimension is added), where the results of multidimensional comparative analysis were ordered according to the Y axis. The X and Z axes show achievements of dairy companies with respect to ROE and ROA indicators, whereas the size of the object, the so-called bubble, is created by income. The largest objects with respect to income are Spółdzielnia Mleczarska Mlekovita and Bidfood Czech Republic s.r.o.

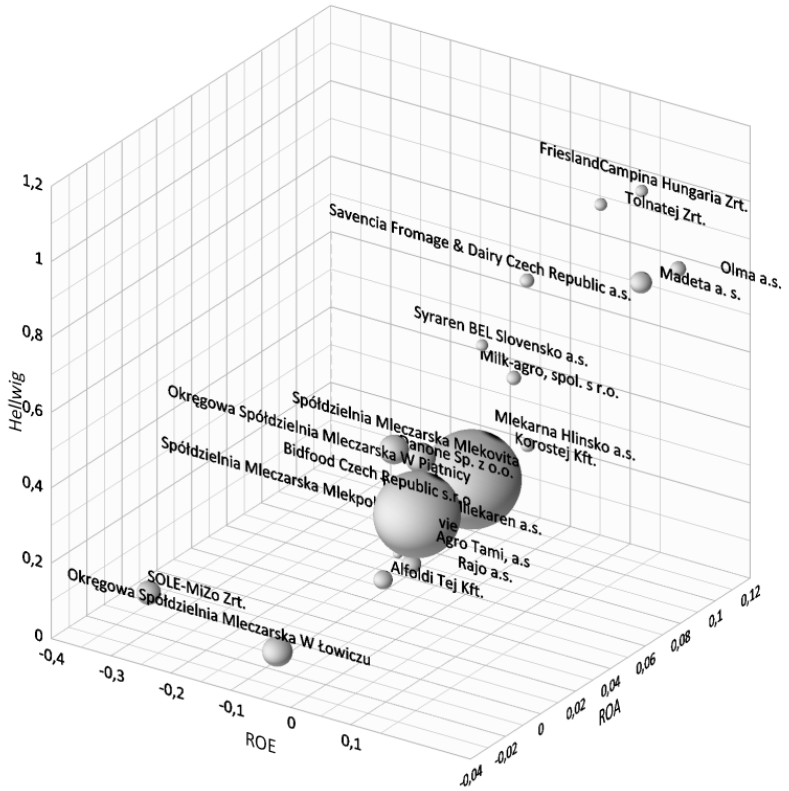

Fig. 2: A three-dimensional bubble chart of multidimensional comparative analysis of the best dairy companies against their profitability and income.

Source: Own study based on financial statements from the EMIS database.

The three-dimensional version can be simplified to a flat two-dimensional form which is also attractive as it singles out larger entities with respect to income.

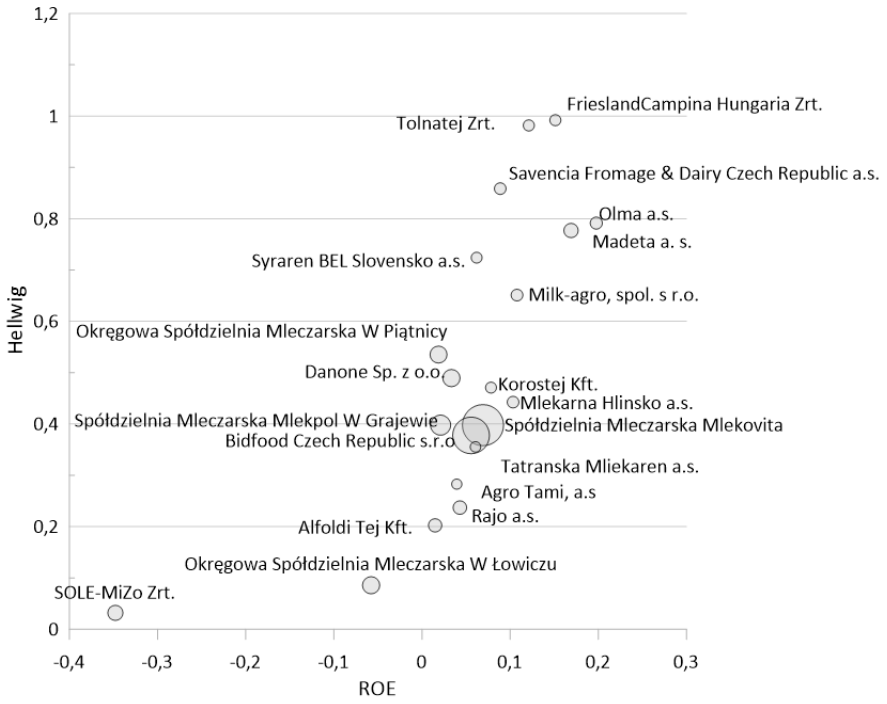

Fig. 3: A two-dimensional bubble chart of multidimensional comparative analysis of the best dairy companies against their profitability and income.

Source: Own study based on financial statements from the EMIS database.

Based on the above charts, one can state that companies which have highest income, i.e. the Polish Mlekovita and Czech BidFood do not score high according to Hellwig's algorithm. Although the Czech leader improved profitability from -4.37% in 2015 to 13.26% in 2018, it was listed next to the Polish leader whose situation was reverse: its profitability of own capital in 2015 was 7.27% and fell to 1.40% in 2018.

Conclusion

The article presents Hellwig's algorithm and calculates 10 most popular financial analysis indicators for 20 best dairy companies in the Visegrad Group. One has to remember that there may be some distortions due to the legal form of conducting business activity or secondary activity, e.g. the sale of frozen food or ice cream, as is the case for a few companies. These are, however, the best companies that the EMIS database qualifies as companies with predominantly dairy activity. These companies also compete with one another on local markets and use products that are not only their leading ones for that. According to the assumptions made in the article, the algorithm made it possible to order companies from the best to the worst by the level of synthetic measure of development based on selected indicators. The algorithm presented should be modified as it treats all the indicators as stimulants only. When improving the algorithm, indicators should be divided into destimulants, nominants and stimulants. Each of them should have an arbitrary best pattern defined, which does not always and for each indicator means the maximum.

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Review of Selected Conventional and Unconventional Marketing Strategies

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Abstract

The purpose of the article is to characterize selected conventional and unconventional marketing strategies and to determine their role in generally understood marketing. The analysis is a literature review of various sources related to the studied subject. The article is an introduction to conducting own research in the above research area. The characteristic of both marketing techniques shows that unconventional marketing is more effective in attracting customers 'attention, but is also a time-consuming and demanding task for marketers' creativity, taking into account the amount of research and work they need to put into preparing this strategy, the final effect of this strategy is shocking or intriguing consumers, which can actually be profitable.

Keywords: Marketing, Strategy, Conventional Marketing, Unconventional Marketing

Introduction

Nowadays, many companies, organizations and business activities look for a way to attract new groups of consumers. Present-day market is saturated by numerous services and products by companies that promise to potential customers flawless, high-end products using different, sometimes untrue, techniques of marketing. As most people think, marketing is not only focused on advertising, even though it is an important aspect of this study. The idea of marketing is much more complexed and can be defined in various ways. It is a crucial aspect of any company in the present, ruthless, business society and economic profit is contingent on the marketing skills of a given enterprise. Business aspects such as accounting, management, administration and finances will not have estimated impact if the management of the company does not know the market demands and won't identify properly the consumers' needs. Many types of companies such as banks, restaurants, factories etc., use marketing to meet the objectives of their customers. It helps them to develop their companies, make greater profit and strengthen the position on the market. The biggest companies in the world are aware of that they cannot allow to lose their guard when their management has been confronted not only by rapid change in consumer needs but also ruthless competitors. It is not a secret that the modern world is quickly changing and it won't wait for big, now successful, companies to follow (Kotler, et al., 2009).

Marketing is undoubtedly one of the most important elements, the core of the good prospering company and organization. Good advertisement helps the company to develop on the market by gaining the needed attention to prosper within the next years. Nowadays, when the technology develops rapidly, many entrepreneurs have more ways to promote their services and commodities, since with the well-developed market, gaining customers' attention became harder than ever and they have to try to use less conventional techniques. Entrepreneurs try different types of media in order to differentiate from their competitors but it is hard to predict if their marketing strategy will work the way as it was predicted. It is clear that the task of promotion the company is not easy thing to do but with the right means and vision of the brand presented within those advertisements, it becomes possible.

Definitions and Marketing Theories

In the modern society, it seems that marketing is not purely focused on the products but also, appraisal of the customers, is something that truly matters. Many people think that marketing is an essential discipline of the economy and business studies, and also the very first quality of collective culture is known as the "customer orientation". Although, the theoretical definitions of marketing vary and it is based on point of view and research made by given person.

According to the American Marketing Association: "Marketing is the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large." This definition clearly shows that "communicating" is not a sufficient term of the marketing process and services. It is clear that it is much more than this; marketing is forming those services, from the beginning and gives it to their allies and partners. It is not a whim based on having enough resources but the necessary part of the well developed and managed enterprise, next to the financial management, strategic planning, estimating person's influence in enforcing given task, etc. (Miller, 2010).

Moreover, the term "exchanging offerings that have value" from definition above, means that one person gives something worthwhile to another person and in the end the product or service is returned to the first person in shape of something equally valuable. In other words: customer gives their resources (money) and receives from company service or product. Before those goods are distributed to stores, the sector which is responsible for marketing actions, decides about the looks and the main characteristics of the given product (taste, smell, texture etc.) based on the customers' needs and priorities. People responsible for marketing are aware of how much potential customers are willing to give to buy desired products, not by using the data about the costs of production. It is crucial for them to decide in which stores their products will be placed, what kind of advertising campaign they will use, etc. (Miller, 2010).

Another definition is provided by the Chartered Institute of Marketing who says that this study is accountable for recognizing, predicting and meeting consumers' expectations. This point of view can be comparable to value-based marketing, which described role of marketing as an aspect increasing shareholder's contribution. Based on this definition, marketing may be perceived as the process of management which purpose is to boost the returns to shareholders by building up relations with important customers and making the "competitive advantage" (Paliwoda, Ryans, 2008).

According to Business Dictionary, marketing is a process by which products and services leave the production or concept stage to the consumers, waiting to purchase it. It is closely connected with four, vital marketing elements which are called "4 P's" (http://www.businessdictionary.com/definition/marketing.html):

- product – identifying, selecting and developing service or product;
- price – establishing the price of given service or product;
- place – choosing which way of distribution is the best to deliver it to customer;
- promotional Strategy – the stage of establishing and enforcing.

This management process is used as a tool which helps the companies to determine customers' expectations and, in the end, satisfying their needs. It is different than just selling products or services. Professor Theodore C. Levitt claimed that sale is only focused on the way of luring potential customers to give their money in exchange of given product and it does not matter how this is happening. Selling does not concern about the whole process, identifying, building and satisfying customer's objectives. To put it in another way, marketing is not entirely focused on making consumers pay for services but on creating perfect product which will live up to customer's expectations (Pizam, 2008).

Other theory says that, marketing used to be once perceived as a "creative industry" which included such science branches like advertising or selling but now, thanks to studies such as psychology, sociology, economics etc. marketing is perceived as science, which is supported by various universities

by Master-of-Science program (Zhou, 2012). Marketing process launches the product to the market by using such techniques like market research, segmentation, targeting, strategies of promotion etc. Many of involved studies, such as i.e. product design, involve the usage of the creative arts.

Marketing, besides being the creative art, might be also seen as "societal process" because people create, offer and sell their services and products to other people. The general term for this phenomenon is known as "social marketing", which shows how this study is able to not only inspire the positive behaviors, but also contains the green marketing. Today, exist two roles of modern marketing and have following impact on society. Firstly, inspires marketers to use their abilities in order to develop social good. Secondly, it embraces the idea of the controlling and regulating the traditional market by using specific ways. This type of marketing is often used to share publicly the techniques in changing the human behavior such as gambling, smoking and other addictions (Kotler, et al., 2009).

Meeting the organizational objectives in Marketing Concept, might be risky if given company is oblivious to the customers' needs. It is important for the company to be better than their competitors, in order to gain new groups of consumers. Marketing concept is one of the ways which focuses on profits and selling but at the same time, it is not their only one concern. This study tries to focus less on production and sales and instead, it is focused on customer service, trying to figure out what consumer need, etc. "The job is not to find the right customers for your product but to find the right products for your customers". Selling concept focuses on maximizing sales, manufacturing products, while marketing concept has more personalized approach towards business by using the data and information about personal preferences of consumers. More concerned about customers companies, try, besides enforcing marketing concepts, search for the most accurate studies about consumers' desires towards given products or services. This type of company policy works out well, when the customers' needs are specified clearly but there are cases when customers are not aware of their requirements for company's products or services, which is caused by fast development of the market and technology. Many years ago, people didn't know they needed such things as computers, television or cellphones, so it is important for companies to know the consumer's needs better than them in order to excel the competition (Kotler, Armstrong, 2010).

In order to present exactly what opportunities marketing has today and what tools it uses, first they will be placed in the table below (tab. 1).

Table 1: Described selected conventional and unconventional Marketing Techniques

Conventional Marketing Techniques	Unconventional Marketing Techniques
Public relations	Viral marketing
Storytelling	Street marketing
Branding	Guerilla marketing
Email marketing	Ambush marketing
Visual marketing	Astroturf marketing
	Buzz marketing
	Advergaming
	Cause marketing

Source: own research

Conventional Marketing Techniques

One of the best-known strategies in marketing is the *public relations,* which role is to describe the issues, manage the research and at the same time be a channel of communication with the customers. In other words, public relations might be defined as the "strategic conversation", which could be also interpreted in various ways since the term of public relations is hard to definitely characterize because some people it is an interpretation or the way of stating facts. This phenomenon is often used in the various fields, not only in business, like in charity organizations and also government. What is more, there are different types of conducting the public relations – corporate or agency. In corporate public

relations, the organizations use their employees for managing, while in case of the agency the company is using the people from the outside of their own enterprise like professional consultants.

One of the most citied definitions of this term is by J. Grunig, who said that public relations is "the management of communication between an organization and its publics" which popularity might be reasoned by the amount of information which this definition contains in this short sentence. What is more, it presents the basics of the career among the board, in contrast to the marketing and journalism (Bowen, 2010). In contrast to promotion, which is often characterized as the financed media recognition, the Public Relations works on the relations with media in order to send the given information which tends to be more credible and informative than the standard marketing techniques (Lamb, Hair, McDaniel, 2012). One of the main aim of Public Relations is to improve the organization's image, since the people responsible for this field in the industry are obliged to communicate with the media in order to secure the company from the bad press, which transfers directly to improving the organization's image. What is more, people responsible for the PR may play the role of be the proxy of given enterprise by appearing on the proper events and help with the bad publicity and give the management a hand in the general marketing during the rolling-out the new commodities (Wetfeet, 2008).

Next conventional marketing strategy is *storytelling*. By using this tool in the marketing, management creates the picture of their enterprise by establishing its values, culture and other crucial aspects used in creating a successful brand. Each company has its own story and the marketing team is responsible to be certain it's a positive one (Tybout, Calkins, 2005). Even though, storytelling seems to be a good solution for the company's marketing strategy, its history was very rocky since it seems marketing management mixed feelings towards this method. It comes back from time to time because it seems to be timeless in contrast to other strategies considering the fact that storytelling has greater impact on the audience because it is influencing audience's emotions. As technology developed, people who are in charge of marketing realized that they have more chances to use this form of strategy in order to achieve their goals. Since the development of social media and many other channels used in viral marketing, dissemination of information they wanted to share became much easier than in the past, before the digital era. The important aspect of storytelling is the fact that the company shouldn't tell any story, it needs to be interesting, memorable and generally, valuable to make the audience feel the desired emotions (Snow, Lazauskas, 2018).

Another strategy used by various companies is *branding*, which seems to have the great power in influencing the way of perceiving given commodities and services. It is believed that consumers first see the name of the company and then the product, they are considering to buy, which means that the opinion they have about given enterprise is the same as about the product itself. As the opinion varies between the two individuals, it is not quite truthful towards the product which doesn't really matter since the main problem in marketing is how people actually perceive given product and as long as it meets the customers' needs, it is fine. The way the audience perceive given commodity is connected with how the product's brand is popular between other brands and if they will notice that the thing has the logo of the known brand (for example Apple or Samsung) they will instantly assume the product has the best looks, quality and won't question its price, since it is the brand they admire. However, if customers will see that something is on sale, they will instantly assume there is something wrong with given product and they will think longer about purchasing the item. This phenomenon is called prism (fig. 1) which it generally means that if people have a positive opinion about the brand, they will automatically assume that the product they launch is also as good as the company behind it. The quality is strictly connected with the name of the enterprise because for example customers who wear skirt from Gucci or Zara feel better than those who wear identical skirt from local supermarket.

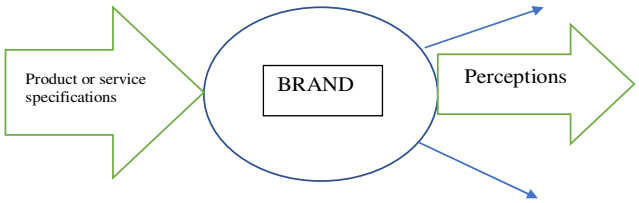

Fig. 1: Brand Prism

Source: own research

The vast majority of people think that branding revolved around captivating slogans, nice looking logo and the name of the company which sounds good but in reality, the idea of branding is more complex. It is considered to be one of the "greatest challenges" the marketing team is struggling with. Behind every successful brand there are hundreds of other companies which failed during the time they were launched on the market alongside today's top enterprises and their successful products. The biggest challenges those companies had to face was dealing with finances, image, price and the quality of their products during those years.

Another type of the marketing strategy is *using an email* as the mean of promoting the product. Although it might have different meaning, some people believe it's the ultimate communication link between the clients and the company of their choice, others just see it as another advertisement, like other, more traditional ones. Nowadays, almost every person has personal email which is used to communicate in business dealings and personal messages and it's rapidly pushing away the traditional letters which used to be sent for centuries. The main advantage of this strategy is the low costs of the marketing which is the direct cause of the sent amount of email advertisements to many people. Once the ad is created it might be sent to the millions of people, the only cost the company has it's the cost of designing and writing the advertisement – which usually looks, more or less, the same as the traditional one, used in TV commercials or newspaper advertisements. Emails can be also applied to send the notifications about the company's discounts, special offers and new products, which makes it the fastest way to catch the customers attention towards the company's offers. It's believed that the electronical mail is the ultimate tool which provides more accurate data for the marketing research since the customer's data about shopping habits and preferences might be sold outside of the company. Email, in contrast to traditional advertising, offers such advantages as for example: less time for creating the advertising campaign, reduced expenditures, quicker response. What is more, it might be used for registering the complete consumer's shopping cycle beginning from the selection of a given product to the purchase (Chaffey, 2007). Before creating the strategy of the email marketing, the marketing team should come up with the interesting content of the emails and it is important to influence people by the personalized messages which will create the emotional bond with the customer, and in the end, it will result in loyal customers who won't even think about choosing the competitors' products. By creating the email strategy which varies from the typical advertisements, the company guarantees themselves that after the purchase the given person will come back to buy more offers presented by the company (Ellis, 2013).

The last strategy used by the companies is *the visual marketing* which is considered to be one of the most popular marketing techniques among all. Potential customers are surrounded by the numerous ads in everyday life, not only commercials, banners, billboards, and others. Going through the local store, one can see various product packages, which are also a form of advertising. The integral elements of visual marketing are flyers, displays, road signs, gadgets, clothes, parts of cars and parts of food supplies packaging. It is common to see in the enterprise those communicational features and methods of organization which are seen in the coherent way. What is more, those elements are also an important asset in the marketing protection, companies use this type of strategy to increase the effectiveness in selling products after recognizing the taste of potential consumers and it all comes to the visual concept of given advertisement. Main features of this type of design are such things like texture, shape, color, size and the general look. Although the background of presented commodities is also important in the customers vision of given product. All of those elements are the integral part of the strategy called

visual marketing which it generally means the studied use by the companies the visual elements such as symbols and signs, which sent beneficial information for potential customers. What audience sees is the important aspect of enlarging predicted financial gain and nowadays management team tends to hire special companies for such areas as package design, logo, advertising, website and other visual elements which are important for the audience (Wedel, Pieters, 2008).

Unconventional Marketing Techniques

Unconventional marketing is perceived as one of the most innovating marketing techniques which provides new perspectives not only for the companies but also for its consumers. It is one of up to date marketing trends which helps to highlight the advantages of company's image or the environment in business, since one of the greatest challenges met by businesses is competing against bigger and known brands in the world of marketing. Since those big businesses spend huge amounts of money on marketing, their less financed and known competitors still have an opportunity to run against them. Unconventional marketing is one of the most effective methods to make the company more visible, attractive and interesting for potential consumers without spending fortune on the marketing. What is more, this strategy allows smaller companies to have an impact on the international, national or regional market.

As it is observed in everyday life, making the information surprising or scandalous is the fastest way to reach out to people and the message, given by word of mouth, is the most popular one. Customers trust more their family and friends than the stranger who passes the message. Nowadays, the information is usually not only send through emails and phones, but also through social media, forums and blogs. The purpose of *viral marketing* is to pass on information about the enterprise, services and products by using mass means of communication to reach greater number of potential customers. It is a great and relatively cheap way to promote company's offerings because the information is not perceived as the advertisement or commercial because Internet users chose themselves if they are keen to read it or not. This kind of information is usually send by the friend or family member, which makes it more believable source than the company's (Fong, Yazdanifard, 2014). Well-designed viral advertising should contain elements of surprise (Southgate et al., 2010) and elicit emotional responses with high arousal, positive or negative (Berger and Milkman, 2012; Brown et al., 2010; Eckler and Bolls, 2011; Henke, 2013).

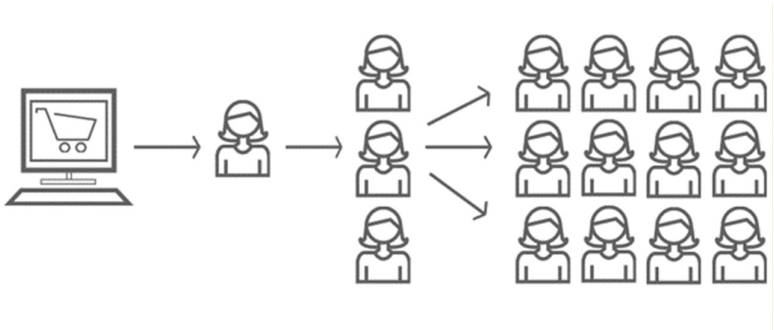

Fig. 2: Visualization of the Viral Marketing

Source: own research

The environment of marketing is very amenable to fashion in their area. Viral marketing (fig.2) is an up-to-date expression and the term describes the phenomenon which have been around since the 90's. It focuses on delivering the message in the expanded areas, which main goal is to reach the specific groups of customers. Viral marketing uses the mechanism of the vocal medium and it spreads very fast, which also might be compared to the literal virus. During the development of the phone communication, this kind of advertising also developed, which the direct cause might be that the internet is the best mean of the transmission of information. It is important, to remember that the viral marketing copies the positive approach towards the process of "infection". What is more, it could be also observed the emotional aspect of viral marketing, in the behavioral analysis of salesmen and

clients. This type of marketing uses two assumptions – first part of the consumers has a connection with newest products and the second part, usually the same customers, have an enormous impact on adaptation of the newest products by the other customers. Using this type of clients, who have an impact on the strategy, allows to use the effect in the marketing means (Wyściak, 2013).

Other types of *viral marketing*, used by the marketing teams are (Gębarowski, 2007; Henke, 2013):

- Using the mechanism of "recommend" or "send" which allows the customer to send the link to the friend or family member.
- Offering the free computer programs, crucial for Internet users.
- Sharing the valuable articles about the given product.
- Promoting product by using the interactive gadgets such like wallpapers, screensavers and e-cards.
- Sharing media files about interesting topic or content (photos, animations, videos or songs).

Enabling the option "share" on the websites, helps to inform other users about the given portal and company's scope of products. After clicking on the right link on the website, the person who recommends it has the opportunity to send their friend's email address, who will receive message sent indirectly by the website owner. What is more, the content of this email should be written more informally, like it would be written by the friend, for example: "Hi! I recommend you the XYZ website which…". The email form of this kind increases the credibility of the recommendation. The message also has to have the link to the given website and the short text written by the sender. Sometimes, the message written by the website is more developed by the creator and it contains flashy animations and pictures which will be more memorable in receival. About 57% of the interviewed internet users, admits that recommendations given by their friends, influences them to visit website. 92% of internet users send message on at least one person in their lifetime (Gębarowski, 2007).

Another type of marketing strategy is *the street marketing*, which takes place in very different locations than the advertisements usually take place. The general purpose of this marketing is that the actions take place on the streets, shopping malls, railway stations and other unique places. In contrast to regular, urban marketing which usually uses means like posters and billboards, this marketing strategy focuses on the creative way to show their product in order to gain the potential customers personal attention. One of the purposes of this marketing strategy is to create a personal bond with the customers and the main goal is to make clients to perceive a given brand in the other form than before (Saucet, 2015).

Even though the online marketing has huge impact on the marketing environment, street marketing is still an effective way to promote given products. It is based on the techniques executed by the professional marketers by using the most efficient, marketing analyses. Public places, such as streets, are not only used for everyday activities such as transporting from one place to the other but they are also locations which are used by the people to meet their family and friends, which makes it a good place for mass marketing. Because of the primary purpose of the public places, the specialists noticed that it has created marketing strategies which perceive it as a "raw material". It started explicit research on how streets became a concept, which is used in marketing strategies. It is essential to remember that the usage of the streets as the place for marketing is more than handing the brochures to the people. Usage of the streets as the advertising technique is more and the companies need to create a bond with their potential customers by presenting them fresh, inspiring and extraordinary entities. One of the best examples of presenting the given ideas is the street art, where the creators use public places as their own place to show their emotions, thoughts and opinions. It helps them to present their point of view on the given topic. By using their technique of expression, companies also can present their own services in more unconventional and personal way. Even though it is one of the newest marketing techniques, it is still treated very carefully. Companies monitor street marketing from the beginning till the end by the management who is aware of the costs of distribution and operations (Saucet, 2015). This marketing strategy does not require big investments and it can convert existing places to use as an advertisement like a bench or bus stations.

Next marketing strategy is the *guerilla marketing*, which might be executed not only by using internet means, but also companies tend to use it by the phone or personally. The main purpose of this marketing strategy is to create an environment for the customer which is not only simplified and pleasing, but also

valuable. It all starts in the moment when the company creates a product and wants to launch it for the public to buy. The guerilla used to be a very unpopular mean of marketing but nowadays it a well-known mean of promoting services and products by the smaller and bigger companies. The direct purpose for using it, it is a fact that guerilla simplifies more complicated topics and it has an impact on potential customers, when the company does it properly (Levison, Levison, 2011). The main advantages of guerilla marketing are: unique, surprising, humorous, affordable, effective (Levinson, McLaughlin, 2011; Cova, Saucet, 2014). Some authors claim that marketing activities are a battle to conquer the mind of the customer, such activities are conducted for years by the Burger War (McDonalds vs. Burger King) and the Cola War (Coca Cola vs. Pepsi) they are used as examples of battles with words and pictures (Baltes, Leibing 2008).

From the beginning, this particular strategy does not focus on the big budget spend on marketing – it focuses on the great force which is the imagination in advertising (fig. 3). It differs greatly from the conventional, traditional marketing. If a given company does not have an opportunity for big investment in their marketing strategy it is enough for them to spend their energy, time and creativity to promote their products or services. This marketing strategy gives the enterprises needed control of their marketing operations, which are much clearer than the traditional marketing since many entrepreneurs aren't quite certain what marketing is about – if it's just PR or just the company's website with all the crucial information about the given enterprise and its products. It helps the companies to maintain the size of their profits by focusing on the most important numbers, instead of bankrupting because of the strategy implemented by the given enterprise. What is more, this strategy also helps the companies to focus on their primary goals instead of losing it in the process. While the conventional marketing suggests to gain customers slowly, during the time the company grows – the guerilla marketing helps to expand the business in several ways at once by increasing numbers of business dealings and expanding the sales. What is more, standard marketing suggests which competitors the given company should be aware of, while guerilla marketing also determines the principles of those competitors, which is a help for the given company to accompany in marketing dealings, which also is an opportunity for marketing research and cutting the expense of advertising while sharing it with different company (Levison, Levison, 2007).

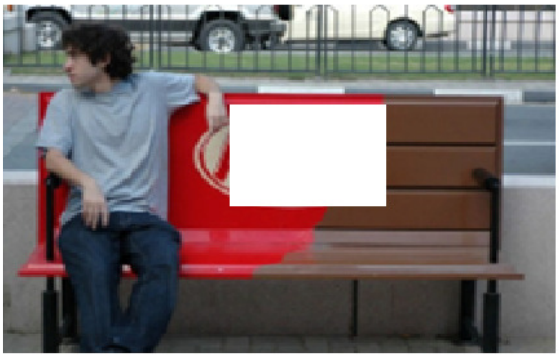

Fig. 3: Example of Guerilla Marketing

Source: own research

One of the form of guerilla marketing is *ambush marketing*. An *ambush marketing* is a form of associated marketing, used by an organization to derive awareness, attention, goodwill, and other benefits generated by its association with an event or property, and the organization has no official or direct connection with the event or property (Crompton, 2004)). Ambush marketing, operating in the world since the late 1980s, defines the activities of companies that, by undertaking specific actions, strive to become part of the awareness of recipients, by associating the brand with a particular sporting event. There would be nothing extraordinary about it, if not for the fact that a given company, which is identified as the sponsor of a sporting event, is not the sponsor at all. By not paying the sponsorship fee and by undertaking such activities that will allow the consumer to assign the title of sponsor to a company, large brands show considerable cleverness and creativity. Kodak was the company that

initiated the ambush marketing activities. In order to appear in the minds of the recipients and become a brand strongly associated with the Olympics without being a sponsor of the games, Kodak used other means. Namely, he became the sponsor of the United States athletics team, as well as the broadcast of the games themselves. Due to such activity and through constant presence in the media, Kodak was one of the official sponsors of the games in the opinion of the recipients. Another example of a brand that has made the most of ambush marketing is Nike. When the Olympic Games took place in Atlanta in 1996, Nike did not have the purchased rights to the name of the official sponsor of the games, but this did not prevent it from appearing among potential customers. To meet the recipients, the company Nike in Atlanta placed posters and billboards promoting the games in bulk, and created an Olympic village near the stadium. Thanks to such actions, it is Nike's view that it has strengthened itself as the official sponsor of the events (Kast, 2019).

Other option also very clever is an *Astroturf marketing*. Americans call it the laying of artificial grass. Astroturf marketing (the name comes from a synthetic turf-like flooring brand) involves running campaigns pretending to be spontaneous initiatives of individuals or groups (grassroot, which explains the association with grass) that express support or opposition to services, products, ideas, events or activities parties and politicians. Such a campaign gives the impression of an independent social response and hides the identity of its real initiators, as well as their true intentions. In fact, more and more consumers are looking for opinions about it on the Internet before buying a product. Meanwhile, a significant proportion of entries that can be found on the web are fake. Astroturf marketing, in other words, buying favorable reviews. The law allows those who pay for positive comments to be punished. The penalty can reach up to 10 percent. turnover from the year preceding the year of the decision, however, it is difficult to prove such an act. One of the world's most famous examples of this form of marketing was the activity of the Working Families for Wal-Mart group and its fake blog Wal-Marting Across America. Allegedly a grass-roots organization was supposed to support the resistance of the trade network against trade unions. In fact, it was created, as it later turned out by Wal-Mart himself and the PR agency Edelman (https://www.telix.pl../2017).

As can be seen from the above, social media play an important role in marketing today. Social media marketing is a rapidly growing form of internet marketing. Social media marketing can be included in the current Web 2.0 trend. based on a specific, two-way form of communication made through social media. Consequently, social media users are not only recipients, but also full-fledged creators of published content and active participants in marketing communication activities of enterprises. Social networks give an incredible amount of tools that can be used to promote products and services. Easy communication is the biggest advantage of social networks. The communication with the target group is extremely easy. Firm can inform its clients about the most important events, give discount coupons for products, ask for opinions and many other things. Facebook, twitter or Instagram are very useful nowadays for online marketing, so as different kind of communicators, like messenger, whatsapp and others. Company can in easy way built the relationship with customers and encourage them to buying products.

Next strategy worth mentioning is *the buzz marketing*, which is also known as word-to-mouth marketing. According to Michael R. Solomon, who explained in his book, buzz marketing is “using high-profile entertainment or news to get people to talk about your brand” (Solomon, 2013) which in other words it is simply a reaction of the customers on the given company’s products. Nowadays, potential customers are “assaulted” by the hundreds of various commercials, advertisements, banners and billboards which makes most of traditional marketing means less effective than in the past and buzz marketing helps the companies to advertise themselves using the more visible and unique way. The main problem for the companies, is the younger generations who grew up surrounded by the commercials showed on TV and other medias. Because of that they are one of the hardest target audiences among all. Young people prefer to find products and brands using the less conventional way, since regular advertising makes them more irritated than interested.

Considering the fact that *buzz marketing* is still a very new concept, the intellectuals are still doing a research on its range and influence. What is known now is that the buzz can’t be conducted by any person or blocked, its flow is natural and it is up to the customers on how big it is or if it’s positive or negative, which might be a huge drawback for some (not only small and medium) companies (Moore,

Pareek, 2009). A good example of bad buzz marketing is the one of the recent TV Commercials which was produced by the Pepsi. It supposed to be friendly and positive, but the internet users were furious when they thought the company diminished the meaning of protests, which in the commercial was solved by the drinking Pepsi's product by the opposite side of the protest.

It is important, to create buzz advertising which, ironically, will not be perceived as the "commercial message". What is more, this type of advertising is not advised to be used only for a special target audience, since its spread may migrate from target audience to another in a matter of time. The best way to create a buzz is to let the customers to build their own, subjective message about the given product, since it will have more credibility among their friends and family. Sometimes, companies themselves conduct special movement to promote their products via hired customers. One of the most known examples is when the Sony Ericsson used actors who gave the pedestrians their phones to take the photos and at the same time, those actors, admired the quality of the camera in their "new phones". Although, it is believed, that this type of strategy should never be aimed at kids, because they as customers are very gullible which makes them easy to be misled, in contrast to more mature audience (Solomon, 2013). To conclude, the enterprises should be very cautious about implementing this strategy because the risk might be too high for some of the companies, if the buzz is not created properly. It might result in the loss in the profits, losing the good name of the brand/company or even bankrupt. Companies must remember that buzz should be genuine and the way it is conducted should be as natural as possible, since modern customers are more aware than in the past years.

Next valuable asset in the marketing strategies is *the advergaming* which is conducted by the marketing team of the given company and it is considered to be a good chance for unified marketing effort. It is a game which is containing the commodity or service by a given company. Sometimes those games are created by the company only to promote given product, service or brand in general and the game is published as a marketing tool. Customers often visit companies' websites to search for information about given topic concerning the given enterprise because if the given person is interested in the product it means that he is more likely to check the information, in order to buy it. Advertising games , shows the company likeness of the given product by the data of the number of views and time spent on the website. The advergaming may also take another form and it is not necessary that a given company will make their own game by themselves. The company can also buy a place in the regular video game. Those games not only include the digital world with characters created by the game developer but also shows the company's product which makes customers more invested in the company and it simultaneously creates the positive image of the enterprise. Companies buy the place for ad on the billboards, product placements or display formats in the already existing games to promote the brand (fig. 4). The best way to do it, is the way of adding the authentic, natural elements and implementing the environment of the game. Product placement has the form of brand elements, which for example can help the gamer show the new possibilities. The last form of advergaming is buying the market spot in the user interface or during the time when the game starts and the consumer waits until the game loads. It is a good way to promote product since the video gaming industry is very developed and it possesses new consumers every day by people of all ages (Yilmaz, 2017).

Fig. 4: Example of Advergaming

Source: own research

The last presented unconventional marketing technique is *cause marketing*. It is based on the psychological aspect that people feel better among the causes which are socially close to them and they share the same perspectives and values. It engages consumers in relations between the product and the whole society and does it in a way that the part of the profits of a given product goes to the cause or problem which is important and useful for the society. If a consumer buys given product, personally contributes in solving the problem, chosen by the producer. On the list of the companies who donate part of their profit to help a cause, there are large companies like Reebok, Tesco, Cadbury or McDonald's (Straszyńska, 2013).

One can divide *cause marketing* in two terms:

- Marketing techniques is used to change the attitude of the society like promoting healthy lifestyle, prevention of pathological behaviors & charity events.
- Supporting social causes is a part of commercial marketing which direct goal is creating the good company's or brand image through sponsorship of the social activity.

From the independent studies concerning this type of marketing strategy, it is established a lot of information about perceiving cause marketing in the North America. Almost ¾ of Americans thinks that this kind of activity is the direct solution of a given social problem and 1⁄3 admits that if various brands present the same products, they will buy the one which manufacturer is conducting the cause marketing. When it comes to the Polish nation, it is known that more than the half of surveyed consumers agrees with the charity and they like to contribute` by giving the money by themselves. It is clear that this type of marketing creates a very good image about the brand or company since people like to feel invested in a noble cause. If the company says that after buying given product consumer contributes in a good cause, the given person is more likely to choose their product than the competitors' (Straszyńska, 2013).

Conclusions

In conclusion, marketing is not only the advertising aspect in a given company. It is much more – analysis, researching, studying the demography in order to gain the new groups of consumers etc. For example, marketing analyzes the characteristics appearing on the given product, the amount of money which is going to be spend by the consumer, how the commodities are going to be delivered etc. One of the most interesting abilities marketing has, is not only the ability to know the change in the consumer and needs, but also the analysis of given market sector. Marketing might have changed from its previous form in the previous era, which was mostly focused on the organization produced. Now it gives the bigger understanding of the market and customers.

It is tempting to say that, unconventional marketing is more effective in gaining the customers' attention, which might be challenging for the management of given company considering the amount of research and work they have to put in the strategy, but in the end, when the company manages to create the image which amuses, shocks or intrigues consumers it pays off. What is more, unconventional marketing strategy helps the company to grow and differentiate among their competitors in the market without spending a big budget on the marketing. Some of marketing methods are safe in the aspect on the company's image or brand but some of them must be conducted with the extra care since the incompetent and badly done strategy, may result in the opposite effect which company seems to achieve. What is more, the companies should remember to adapt their strategies to their target audience, since different people look for different products. Still some companies choose to neglect the influence of marketing strategy on the enterprises accomplishments that is why this topic is worth to analyze. Deciding on any marketing strategy, one can first conduct the market research, test ideas and approaches towards clients and staff, and check what works, which techniques give the desired results. Importantly, one should choose more than one marketing tactic to meet customer needs, reach customers market targets and improve sales results. That is why it cannot be decided clearly which marketing strategy is better, in which the company should put the most organizational possibilities and involvement of marketers.

The article is an introduction to conducting own research on the impact of conventional and unconventional marketing strategies on consumer purchasing trends.

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Forecasting of GDP and R&D Spending in Transition Economies. Estimation Using S-Curve and Modified S-Curve

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Abstract

The most important measure of a level of economic activity is GDP. Growing GDP stimulates other economic quantities, including the research and development spending (R&D) or information communication technology (ICT) expenditure. This impact has a bilateral character - high level of spending on R&D, including the development of ICT techniques, intensifies economic activity and improves productivity. The aim of our research is to present the application of the S-curve, as well as, the modified S-curve as a tool of economic development forecasting, based on data from transition economies. According to paper's aims, we pose the following research hypotheses: (*H1): the S-curve and the modified S-curve are effective tools of economic development forecasting for transition economies; H2: the modified S-curve is more efficient than ordinary S-curve of economic development forecasting for transition economies.* We confirm both hypotheses using data from V4 countries (the Czech Republic, Hungary, Poland, Slovakia) for GDP per capita time-series (1991-2015) and R&D per capita (1995-2015). Our analysis of R&D spending per capita also suggest, that, both Poland and the Czech Republic are in the phase of fast growth, and in the relatively earlier phase of development, comparing to GDP, what implies, that the GDP growth is an important factor of the R&D spending growth. For Poland, the growth rate is the highest, which can result from the smallest level of expenditure. However, the trend analysis indicates that, within 10 years, the level of expenditure per capita should be higher than in the Czech Republic, which are the current leader of V4 countries.

Keywords: R&D, ICT, transition economies, logistic law of growth, forecasting.

JEL: C130, C220, C530, E320

Introduction

Nowadays global economy is particularly sensitive to various types of disturbance, as a result of progressive globalization (Siedlecki & Papla, 2013), (Brunnermeier, 2009), (Coffee, 2009), (Guillen, 2009), (Kolb, 2010), (Shiller, 2008). Those turbulent environment cause economic shocks, or even breaks, which interrupt economies' growth trend. Similar effects, but on a larger scale, can be observed in the case of economies, that carried out a process of economic transition. This process of transition usually follow a clear path: (1) a period of economic slowdown, which is a result of a fast and dramatic change of business environment; (2) a span of dynamic growth, which gets slower along with time.

The most important, and commonly used, measure of a level of economic activity is the Gross Domestic Product (GDP) – the rate of its growth is influenced by multiple factors, however, the level of GDP also stimulates other economic quantities, including the research and development spending (R&D) or information communication technology (ICT) expenditure. This impact has a bilateral character - high level of spending on R&D, including the development of ICT techniques, intensifies economic activity and improves productivity.

The aim of this research is to present the application of the S-curve, as well as, the modified S-curve as a tool of economic development forecasting, based on data from transition economies. According to paper's aims, we pose the following research hypotheses:

H1: the S-curve and the modified S-curve are effective tools of economic development forecasting for transition economies;

H2: the modified S-curve is more efficient than ordinary S-curve of economic development forecasting for transition economies.

The H1 hypothesis refers to the law of logistic growth. After the economic / structural transformation, the economy suffers from a dramatic breakdown, characterised by a strong decrease of economy's activity. After this phase of decline a new growth cycle opens. An initial phase of growth goes through a phase of rapid growth, which leads to a stabilization phase. We assume, that this path of development can be successfully modelled using the S-curve. The H2 hypothesis refers to the characteristic of the modified S-curve, which do not have any saturation level, in contrast to the regular S-curve. That's way the modified S-curve might better reflect the nature of business processes.

We use data coming from 4 Central and East European (CEE) countries, which, in the 1990's, went through the economic transformation: Czech Republic, Hungary, Poland and Slovakia (V4 countries). We analyse two important economic variables – GDP per capita and R&D spending. Data are obtained from OECD Database, and cover the years 1991-2015 for GDP and 1995-2015 for R&D time-series.

The paper is organised as follow: after the introduction, we shortly characterise the transformation process, which took place in V4 countries in the 1990's, (section 2), referring to the pattern of GDP growth, and R&D&I spending as GDP ratio. We want to show, that the pattern of development, which can be observed in transition economies follow the law of logistic growth. In the section 3 we present the methodology and data, first of all the mathematical form of the S-curve and the modified S-curve, which are the mathematical expression of the law of logistic growth. In the section 4 we propose the application of S-curve, and modified S-curve, in forecasting of selected time-series: GDP per capita and R&D expenditure as GDP ratio. Finally we conclude our findings in the section 5.

This paper contribute to the science in several way. First, we prove, that the S-curve, as well as the modified S-curve, can be effectively used in economic forecasting, especially in the case of transition economies. We also show, that modified S-curve better fits and explains important economic time series. Additionally we present the original method of estimation of the modified S-curve parameters.

Economic transition in CEE countries – GDP and R&D spending growth patterns

Political changes, which took place in the beginning of the 1990's, pushed CEE countries into a path of economic transformation - from a planned socialist economy into a private market economy, ergo from socialism to capitalism. For the countries of the CEE region, this meant a dramatic change of economic and social environment, which consisted of liberalization of trade and prices, as well as huge institutional reforms, involving competition policy, labour markets, privatization and enterprise restructuring (Roaf et al., 2014). Most of these changes met with significant resistance, due to severe social consequences. Part of the CEE societies couldn't find themselves in the new reality, which promoted enterprising and educated people. This transition bared, with great force, all weaknesses of socialistic economy, such as structural maladjustment or hidden unemployment. On the other hand, huge societal expectations increased pressure on decision-makers. People expected, that the fall of communism would generate rapid economic growth and fast catch up with

West European developed countries (Svejnar, 2002). It should be mentioned that, despite many similarities, resulting from implemented, for almost 50 years, the economic model of socialistic economy, initial conditions in each country were a little bit different. The situation was most advantageous in Hungary, where the economy was relatively low centralized and a degree of macroeconomic imbalance low, comparing to Czechoslovakia - much more centralized. On the other hand, Polish economy, despite of a lower level of centralization, suffered a much greater degree of internal and external macroeconomic imbalance (Fischer & Gelb, 1991), (Balcerowicz, 1994).

Regardless this different initial conditions, we can conclude, that the transformation process were characterised by the same stages in every CEE country. Tridico (2013) suggests, that the process of economic transition, which took place in CEE countries, consists of three phases: (1) chaotic, (2) macro stabilization, and (3) consolidation. At the beginning of the transition process, all CEE countries experienced the important transition recession, which consisted of dramatic decreases in GDP, high unemployment rates, and galloping inflation (Lee & Jeong, 2006), (Huw Edwards, 2006). Sicherl (1999) emphasises, that the severity of this GDP drop was as serious as during the Great Depression in developed countries after 1929. This GDP decline ranged from 13.1 percent for the Czech Republic to 25.2 percent for Slovakia (Rapacki & Próchniak, 2009). The stage of macro stabilization created stable conditions for progressive economic recovery, which could be observed after consolidation process (Tridico, 2013), (Roaf, et al., 2014). Finally, all transition economies experienced relatively high, comparing to developing countries, growth of GDP (Nur-tegin, 2007). Poland rebuilt the GDP level after 7 years, what was the best result in the region (Sicherl, 1999), (Rapacki & Próchniak, 2009) what was accompanied by important expansion of a private sector (Fischer & Sahay, 2000), (Huffman & Johnson, 2002). This privatization process, accompanied by structural reforms, was very important from the point of view of quick recovery - higher speed of reforms contributed to faster recovery (Fischer & Sahay, 2000), (Lee & Jeong, 2006), (Staehr, 2005), (Fidrmuc, 2003). The economic transition resulted in the launch of a quite new development cycle for CEE economies. We assume, that this process can be successfully modelled using the logistic law of growth, and expressed by the S-curve, or the modified S-curve.

A similar path of development can be observed in the case of R&D spending, including expenditure on ICT. As we mention above, the process of transition was accompanied by important expansion of a private sector. The massive privatisation, the opening to global economy and strong activity of international companies, allowed the transfer of technology, including ICT, and boosted R&D spending.

Globally, we can observe a long-term upward trend in the ratio of expenditures on R&D to national income (Welfens, 2008). It should be also emphasised, that the distinction between R&D and ICT spending might be a little bit tricky, because this upward trend of economy's growth usually takes the form of ICT and knowledge (R&D&I) (Nepelski & De Prato, 2014), although some research suggest, that R&D spending affect productivity much faster than ICT (Edquist & Henrekson, 2017). On the other hand, that there is complementary relationship between ICT and all others types of innovations (Arendt & Grabowski, 2018). Many research confirm the positive relationship between ICT or R&D investment and GDP growth (Niebel, 2018), (Cardona, Kretschmer & Strobel, 2013), (Sağlam, 2016), (Samoilenko, 2008), (Vu, 2011), (Jin & Cho, 2015) by higher firms productivity (Bonanno, 2016), (Piatkowski, 2003) also in the case of "old economy" industries (Piatkowski, 2006). Hong (2017) also reports the existence of bidirectional Granger-causality between investments in ICT and R&D, and the economic growth. We can conclude, that firm's productivity depends on current investments in R&D (Aw, et al., 2007), what stimulates economic growth (Wang, Yu & Liu, 2013), regardless the source of funding (private or public) (Czarnitzki & Hussinger, 2004).

Transition economies, in the beginning of transition process, suffered from the low level of R&D spending, which decreased as a result of a reduction of R&D employment in manufacturing sector. After some period of recovery, they entered a phase of catching-up process (Czarnitzki & Licht, 2006). This phase of intensive growth was a result of higher R&D efficiency of foreign enterprises which were interested in investment on newly-opened markets (Zhang, et al., 2003), (Damijan et al., 2003). From today's perspective, we can conclude, that those investments in ICT, in the case of CEE countries, played a major role in convergence process , during the 1990s (Lengyel, 2012), by generating greater productivity than in the EU-15 (Piatkowski & Bart, 2005), (Van Ark & Piatkowski, 2004), although the benefits of individual

countries varied as a result of different quality of economic and legal environment (Roztocki & Weistroffer, 2011).

Now, as members of the EU, CEE countries face the challenge of the common EU strategy Europe 2020, what means achieving the level of 3% R&D expenditure to GDP ratio by 2020 (Zawalińska, Tran & Płoszaj, 2017). Data, presented below, show clearly, that the gap between CEE countries, especially for Poland and Slovakia, and highly-developed European countries is still significant. According to that we can speculate, whether CEE countries have the potential, both in financial and human dimension, to meet the target set by EU. Forecasts, built on the basis of the S-curve, or the modified S-curve, can contribute significantly to this discussion.

Data and Methodology

The literature review, as well as the simple observation of natural and economic processes, suggests, that there are always some limits of growth, what do not automatically means that, after reaching some level, the development would stop, but we can expect the continuous decrementing of growth rates. This phenomenon can be observed both in the case of GDP (Nordhaus, Stavins & Weitzman, 1992) and R&D expenditures, and usually is caused by physically-determined upper limits (Beaudreau & Lightfoot, 2015). That characteristic implies the possibility of forecasting the time-series using the logistic growth functions.

The literature propose a lot of functions describing the logistic law, based on generalized logistic growth function (table 1). Unfortunately, in technology, finance and economy (even demography) they often don't work well, mainly due to the "unlimited growth" phenomenon - quantities such as GDP, stock market indexes, salaries in enterprises, sales or company value cannot be limited.

Table 1: Logistic growth functions

Generalized logistic growth function: $\frac{dN}{dt} = rN^{\alpha}\left[\left(1-\frac{N}{K}\right)^{\beta}\right]^{\gamma}$		
Name	Differential equation	Solution
Exponential growth	$\frac{dN}{dt} = rN$	$N(t) = N_0 e^{rt}$
Verhulst logistic equation	$\frac{dN}{dt} = rN\left(1-\frac{N}{K}\right)$	$N(t) = \frac{KN_0}{(K-N_0)e^{-rt}+N_0}$
Generic Growth Function	$\frac{dN}{dt} = rN^{1+\beta(1-\gamma)}\left[1-\left(\frac{N}{K}\right)^{\beta}\right]^{\gamma}$	$N(t) = \frac{K}{\left[1+\left[(\gamma-1)\beta rK^{\beta(1-\gamma)}t+\left[\left(\frac{K}{N_0}\right)^{\beta}-1\right]^{1-\gamma}\right]^{\frac{1}{1-\gamma}}\right]^{\frac{1}{\beta}}}$
Blumberg's equation	$\frac{dN}{dt} = rN^{\alpha}\left(1-\frac{N}{K}\right)^{\gamma}$	Not always exists
Von Bertalanffy's growth equation	$\frac{dN}{dt} = rN^{\frac{2}{3}}\left[1-\left(\frac{N}{K}\right)^{\frac{1}{3}}\right]$	$N(t) = K\left[1+\left[1-\left(\frac{N_0}{K}\right)^{\frac{1}{3}}\right]e^{-\frac{1}{3}rK^{-\frac{1}{3}}t}\right]^{3}$
Richards growth equation	$\frac{dN}{dt} = rN\left[1-\left(\frac{N}{K}\right)^{\beta}\right]$	$N(t) = K\left[1-e^{-\beta rt}\left[1-\left(\frac{N_0}{K}\right)^{-\beta}\right]\right]^{-\frac{1}{\beta}}$
Gompertz growth function	$\frac{dN}{dt} = rN\left[\ln\left(\frac{K}{N}\right)\right]$	$N(t) = K\exp\left\{\left[\ln\left(\frac{N_0}{K}\right)\right]^{1-\gamma}+r'(-1)^{\gamma}(1-\gamma)t\right\}^{\frac{1}{1-\gamma}}$
Hyper-Gompertz growth function	$\frac{dN}{dt} = rN\left[\ln\left(\frac{K}{N}\right)\right]^{\gamma}$	$N(t) = K\exp\left\{\left[\ln\left(\frac{N_0}{K}\right)\right]e^{-rt}\right\}$

Source: own study based on (Tsoularis, 2001).

The S-curve is a simple, and relatively reliable, tool which allow construction of long-term economic forecasts (Davis, 1941) of time-series which follow the rule of logistic growth. At the same time, it also enables to measure, observe and analyse, the efficiency of large scale economic systems. The S-curve is the only solution of a differential equation, called the Robertson's, Prescott's, Kuznets' law (Robertson, 1923), (Prescott, 1922), (Kuznets, 1971) (compare: (Siedlecki, 2006), (Siedlecki, et al., 2015). This function can be employed in economic growth forecasting, among all, in the case of transition, or developing economies. Despite undeniable advantages, the S-curve is characterized by several disadvantages, above all, the limited growth (an asymptote). This disadvantage can be avoided by employing the modified S-curve, which assumes the elastic and unlimited growth. The problem is, that parameters of the modified S-curve are relatively difficult to estimate.

Using the method an iterative method of estimation for functions with three or more parameters (Siedlecki, Papla, & Bem, 2017).we analyse the following time-series: (1) GDP per capita, and (2) Gross domestic spending on R&D per capita. According to OECD definition – the gross domestic spending on R&D is defined as the total expenditure (current and capital) on R&D carried out by all resident companies, research institutes, university and government laboratories, etc., in a country (OECD, 2018).

Data come from OECD Database and cover the years 1991 - 2017 for GDP time-series and 1995-2017 for R&D time-series (due to the lack of data). We analyse the process of economic development in V4 countries – the Czech Republic, Hungary, Poland and Slovakia.

Results and Discussion

Smoothing and forecasting GDP per capita

In order to present the practical application of the S-curve and the modified S-curve, in first step we use annual data for GDP per capita (PPP USD), from the period after the communism fall (1991-2015) (for Slovakia from 1992). The linear trend and the S-curve, as well as, the modified S-curve, is estimated.

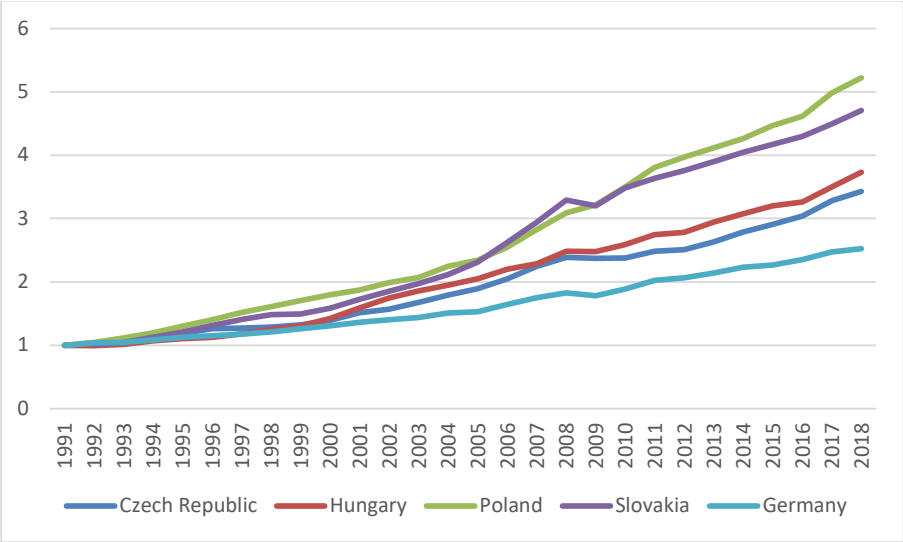

Figure 1: Growth rate of GPD per capita 1991-2017 (PPP USD, 1991 = 1)
Source: own study

We calculate the GDP per capita growth rate, for all analysed countries, assuming that this ratio is the best to describe countries' development and wealth (Fig, 1, Fig, 2). This trajectory of development is quite similar to other ratios, calculated for GDP or GNI (Siedlecki & Papla, 2013), despite demographic

decrease, which can be observed in CEE countries (compare: Siedlecki & Papla, 2016). In order to illustrate obtained results we propose to use the data for Germany, for the same period.

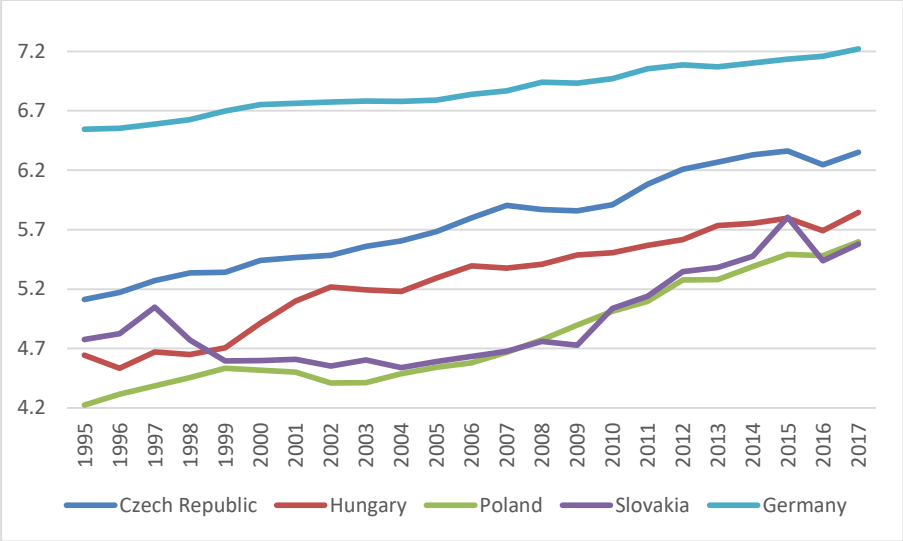

Figure 2: GPD per capita , PPP 1995-2017

Source: own study

The analysis of the figure 1 (rates of growth of GDP per capita) and the figure 2 (GDP per capita, PPP) for V4 countries and Germany (as the example of the developed economy) suggest, that the growth rate for V4 countries is significantly higher than for Germany, what suggests, that V4 countries can be still in the phase of intensive growth (development). On the other hand, although relatively high growth rate, which can be observed during last 24 years, the level of GDP per capita in V4 group is still very low, comparing to Germany, or other developed countries. The highest growth rate are reported in the case of Poland and Slovakia, but Poland started with the lowest GDP per capita and this growth rate was too small to reach the Czech Republic or Slovakia level. This is the result of the most difficult initial conditions (compare: section 2).

In the next stage we test the hypothesis of time-series stationarity of GDP per capita, which allow us to prove, that there is some tendency (trend) in analysed process. We employ the KPSS test, for which a null hypothesis is that the time series are stationary around a deterministic trend, against the alternative of a unit root. According to the KPSS test results, we are forced to reject the null hypothesis, and adopt the alternative hypothesis, which assumes non-stationarity. For all examined countries we receive significance level under 0.01, what suggests, that there is some tendency (trend) in the GDP per capita growth (table 2).

Table 2: Results of KPSS test for GDP per capita, PPP

Country	Test statistic	Interpolated p-value
Czech_Republic	0,8590	less than 0.01***
Hungary	0,8515	less than 0.01***
Poland	0,8678	less than 0.01***
Slovak Republic	0,8570	less than 0.01***
* significance level α = 0.1, ** significance level α = 0.05 *** significance level α = 0.01		
Interpolated p-value (critical values): α = 0.1(0.355); α = 0.05(0.462); α = 0.01(0.704)		

Source: own study

Then we examine the hypothesis of stationarity of residuals for analysed time-series. Based on KPSS test, we reject the null hypothesis of stationarity for all V4 countries. That implies, that we cannot use the linear trend to smooth and forecast (table 3) - non-stationarity of linear trend residuals suggest the presence of nonlinear trend. Concluding, there is a trend in analysed process, but it doesn't have a linear form.

Table 3: Linear trend estimation for GDP per capita, PPP

Trend analysis	Czech Republic	Hungary	Poland	Slovakia
KPSS test for residuals (test statistic p-value)	0,1143 (p > 0.1)	0,2009 (0,014)	0,0976 (p>0.1)	0,1488 (0.051)

Source: own study

Those findings encourage us to use the S-curve, and the modified S-curve. We estimate the parameters of both curves (table 4 and table 5). Analogously we teste the stationarity of residuals for estimated functions, using, again, the KPSS test. Results strongly confirm, that the logistic trend exist. For all countries residuals are stationary and estimated functions are perfectly fitted (R^2 higher than 0.98 for all countries).

Table 4: S-curve estimation for GDP per capita, PPP

Analysis	Czech Republic	Hungary	Poland	Slovakia
Coefficients	K = 0,9499 b = 3,1081 r = 0,2767 intercept = 9,5286	K = 1,0900 b = 2,8575 r = 0,2813 intercept = 9,1246	K = 1,4178 b = 2,7320 r = 0,2236 intercept = 8,9527	K = 1,3073 b = 3,0404 r = 0,2831 intercept = 9,0690
R^2	**0,9837**	**0,9832**	**0,9943**	**0,9952**
KPSS test for residuals (test statistic p-value)	0,1194 (p>0.1)	0,1641 (p>0.1)	0,1238 (p>0.1)	0,0880 (p>0.1)

Source: own study

Table 5: Modified S-curve estimation for GDP per capita, PPP

Analysis	Czech Republic	Hungary	Poland	Slovakia
Coefficients	K = 0,3074 b = 2,2383 r = 0,2553 intercept = 9,5286	K = 0,3548 b = 1,8291 r = 0,2566 intercept = 9,1246	K = 0,4756 b = 1,5641 r = 0,1615 intercept = 8,9527	K = 0,4264 b = 2,0718 r = 0,2545 intercept = 9,0690
R^2	**0,9892**	**0,9940**	**0,9974**	**0,9955**
KPSS test for residuals (test statistic p-value)	0,0652 (p>0.1)	0,1203 (p>0.1)	0,0872 (p>0.1)	0,1070 (p>0.1)

Source: own study

First of all, the modified S-curve is better fitted for data (R^2 are a little bit higher) and KPSS test's parameters are lower. Secondly, as we can observe on fig. 3, the forecasts prepared using the modified S-curve are not limited by the saturation level, as in the case of the S-curve. This can be a source of better estimation's results, especially in case of developing (transition) economies. It can be concluded, that V4 countries are quite close to the slow growth rate phase, but based on the S-curve forecast, those countries will never reach the level of German's GDP per capita, or other highly developed countries. The maximum level of GDP per capita (PPP), estimated using the S-curve, based on parameters, are equal to: 35 461 USD for the Czech Republic, 27 248

USD for Hungary, 31 482 USD for Poland and 32 014 USD for Slovakia. All countries are even before the transition to the phase of stable growth (table 4, figure 3).

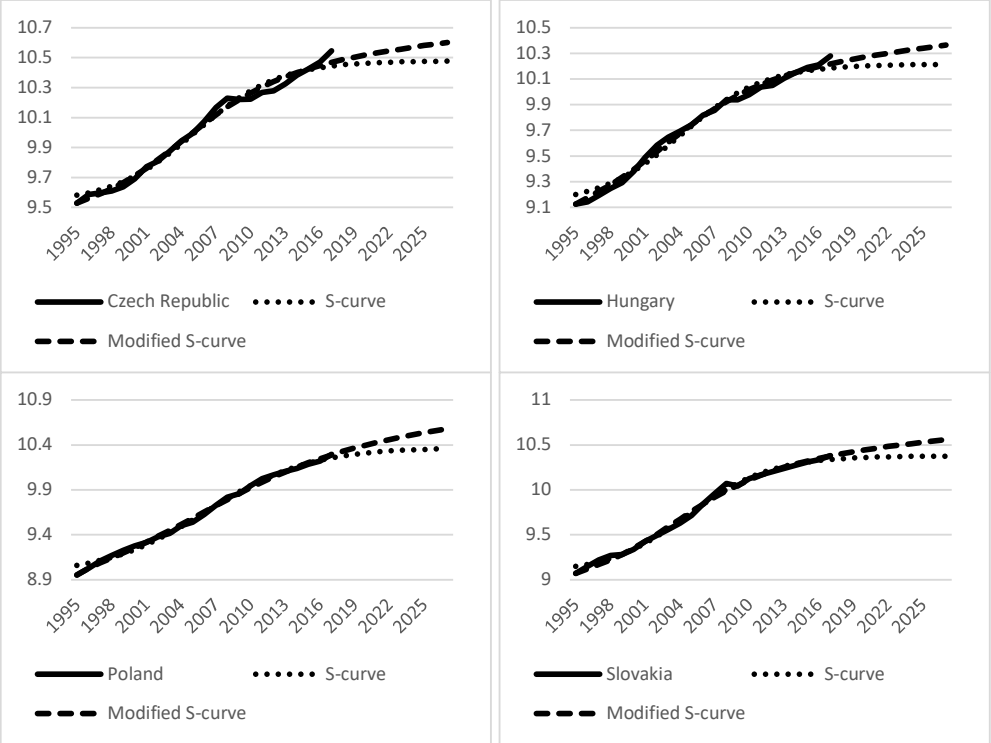

Figure 3: GDP per capita (PPP), estimated values of the S-curve and the modified S-curve (1991-2017) and forecasts (2018-2027)

Source: own study

Smoothing and forecasting for Gross domestic spending on R&D per capita

As the literature study suggests, the level of R&D spending (as well as the ICT spending) are related to the rate of economic growth, expressed by GDP. In the period 1995-2017 we can observe the constant growth of gross domestic expenditure per capita on R&D (fig. 4).

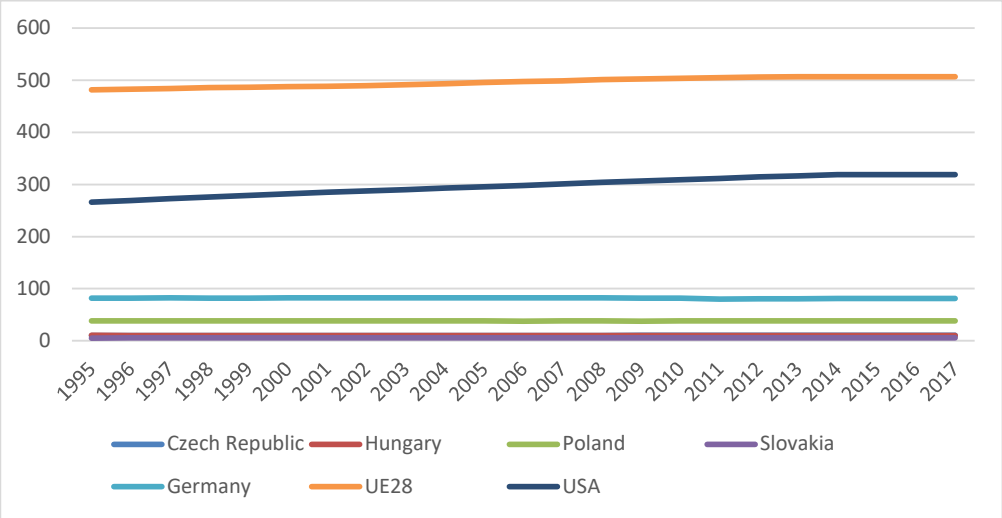

Figure 4: Gross domestic spending on R&D 1995-2017

Source: own study

In Poland and Slovakia, expenditure on R&D are still at a very low level, in relation to developed economies or developing Asian countries, while the Czech Republic have already achieved the level of expenditure (as % GDP) similar to the average of the developed EU countries, but the gap between the most developed countries, like Germany, is still important (fig. 4, fig. 5, fig. 6).

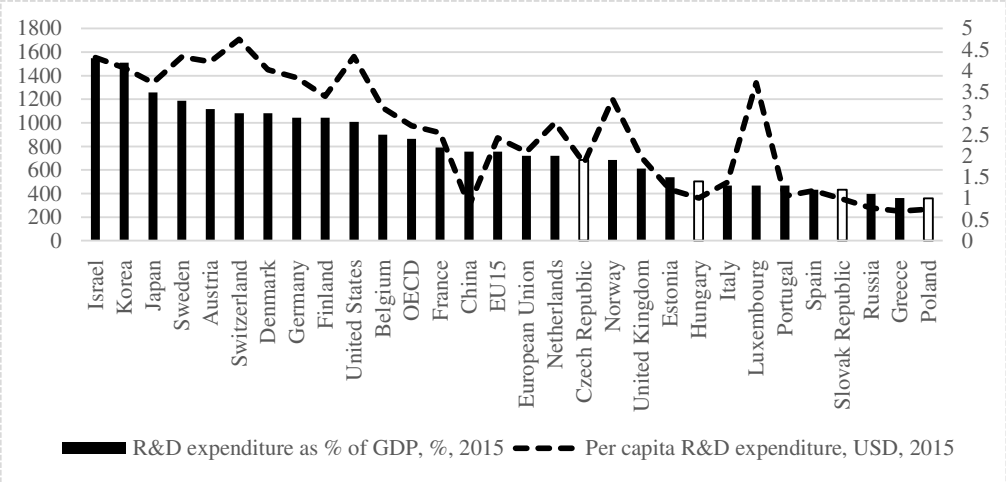

Figure 5: Gross domestic expenditure on R&D in selected countries in 2015

Source: own study based on OECD Database

In the case of V4 countries, there is clearly faster upward trend, both in expenditure per capita and % GDP, what is consistent with the higher GDP growth. We should expect, that other V4 countries have also a chance to close up the gap and reach the level of developed countries (fig. 4 and fig. 6).

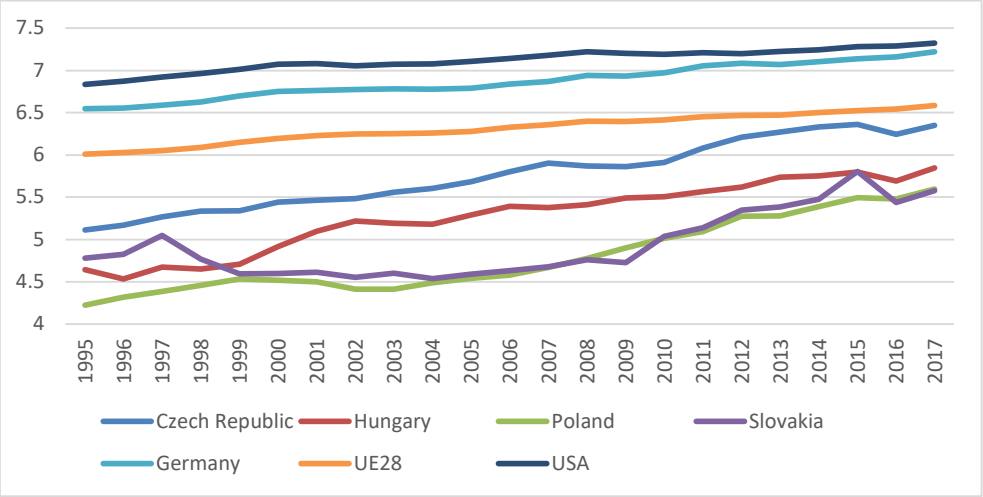

Figure 6: Gross domestic spending on R&D per capita 1995-2017

Source: own study

As in the case of GDP, we test the hypothesis of time-series stationarity for gross domestic spending on R&D per capita, which allow us to prove, that there is some tendency (trend) in analysed process. Based on the KPSS test, we are forced to reject the null hypothesis, and adopt the alternative hypothesis, what means, that there is some tendency (trend) (tab. 6).

Table 6: Results of KPSS test for Gross domestic spending on R&D per capita, 1995-2017

Country	Test statistic	Interpolated p-value
Czech_Republic	0,8544	less than 0.01***
Hungary	0,8282	less than 0.01***
Poland	0,8062	less than 0.01***
Slovak Republic	0,5862	0,029*
* significance level α = 0.1, ** significance level α = 0.05 *** significance level α = 0.01		
Interpolated p-value (critical values): α = 0.1(0.357); α = 0.05(0.462); α = 0.01(0. 697)		

Source: own study

Unlike the analysis of GDP, in the Czech Republic we can estimate the linear trend, while for other countries, the existence of non-linear trend can be assumed (tab. 7), what encourage us, once again, to apply the S-curve and the modified S-curve.

Table 7: Linear trend estimation for Gross domestic spending on R&D per capita, 1995-2017

Trend analysis	Czech Republic	Hungary	Poland	Slovakia
KPSS test for residuals (test statistic p-value)	0,0542 (p>0.1)	0,1542 (0,047)	0,1943 (0,019)	0,2034 (0,012)

Source: own study

We estimate the parameters of both curves (tab. 8, tab. 9). Analogously, we teste the stationarity of residuals for estimated functions, using, again, the KPSS test. Results strongly confirm, that the logistic trend exist. For all examined countries residuals are stationary and estimated functions are very good fitted although the fitting measures are not as high as for GDP time-series (R^2 from 0.8684 to 0.9809, comparing to 0.9837 to 0.9974 for GDP).

Table 8: S-curve estimation for Gross domestic spending on R&D per capita, 1995-2017

Analysis	Czech Republic	Hungary	Poland	Slovakia
Coefficients	K = 1,3985 b = 2,6905 r = 0,2097 intercept = 5,1131	K = 1,1145 b = 3,0948 r = 0,3051 intercept = 4,6444	K = 2,0763 b = 3,5251 r = 0,1857 intercept = 4,2239	K = 0,7953 b = 18,8835 r = 1,0964 intercept = 4,7771
R^2	**0,9770**	**0,9484**	**0,9705**	**0,8884**
KPSS test for residuals (test statistic p-value)	0,0732 (p>0.1)	0,1540 (p>0.1)	0,1146 (p>0.1)	0,1747 (p>0.1)

Source: own study

Table 9: Modified S-curve estimation for Gross domestic spending on R&D per capita, 1995-2017

Analysis	Czech Republic	Hungary	Poland	Slovakia
Coefficients	K = 0,4803 b = 1,5394 r = 0,1429 intercept = 5,1131	K = 0,3591 b = 2,3101 r = 0,3157 intercept = 4.6444	K = 0,7680 b = 2,8191 r = 0,1387 intercept = 4.2239	K = 0,2574 b = 19,7738 r = 1,1616 intercept = 4.7771
R^2	**0,9809**	**0,9646**	**0,9653**	**0,8886**
KPSS test for residuals (test statistic p-value)	0,0476 (p>0.1)	0,1398 (p>0.1)	0,1706 (p>0.1)	0,1740 (p>0.1)

Source: own study

The forecasts estimated using the modified S-curve are not limited by saturation level, as in the case of the S-curve (fig. 7). This can be a source of better estimation's results, especially in case of developing (transition) economies. Same as before, it can be concluded, that V4 countries are quite close to the slow growth rate phase. Based on the S-curve, we can forecast, that only the Czech Republic and Poland might reach, in the future, the level of R&D spending comparable to USA or Germany. The maximum level of spending on R&D per capita, estimated using the S-curve, based on parameters, are equal to 659,57 USD for the Czech Republic, 316,68 USD for Hungary, 471,99 USD for Poland and 263,14 USD for Slovakia (table 8, figure 7). As in the case of GDP, the estimation using the modified S-curve seems to be a better solution. The modified S-curve indicates the unlimited growth along with the decreasing growth rate, what is consistent with economic theories, suggesting that a man is committed to increasing technological progress and development, what is the source of the unlimited growth, as in the case of GDP.

Poland, despite the lowest expenditure, has the highest dynamics and growth potential. The dynamic of growth, in the Czech Republic, is significantly lower, however, it should be mentioned, that the Czech Republic is already quite close to the EU average. The Czech Republic is a leader, characterised by the highest in the region GDP per capita and R&D spending per capita. Both Slovakia and Hungary have the most unfavourable situation, and the projected growth is relatively lower. In the case of Poland and the Czech Republic R&D spending grow faster than GDP, while for Slovakia and Hungary the ratio of growth is comparable to the GDP growth (fig. 7).

As in the case of GDP, we may notice, that *both* the S-curve and the modified S-curve are very good tools to estimate the non-linear trend, regardless of the fact that the value of the fitting measures are a little bit lower for R&D spending. *Those results allow us to adopt the H1 hypothesis, which assumes, that S-curve and modified S-curve are effective tools in analysing the processes of growth and phases of development cycle for transition economies*. Moreover, on the same time, we can adopt the *H2 hypothesis, assuming, that our the modified S-curve is a better tool, than the S-curve*.

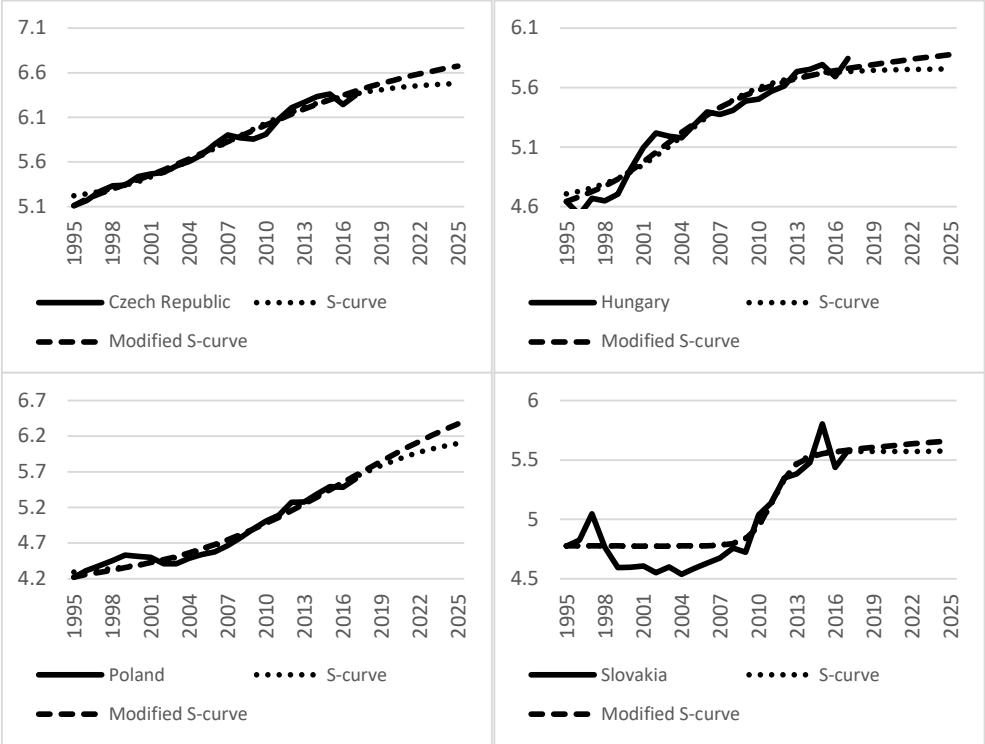

Figure 7: Gross domestic spending on R&D per capita, estimated values of the S-curve and the modified S-curve (1991-2017) and forecasts (2018-2027)
Source: own study

Conclusions

In this research we successfully confirm that, in the case of V4 countries after the economic transition, the new development trajectory can be shaped using the S-curve or the modified S-curve shape. We can observe all phases of development (or business) cycle: slow, intensive and stable growth. Additionally, we present the new method of parameters' estimation, both for the S-curve and the modified S-curve. This estimation method can be successfully employed not only for the modified S-curve, but also for other functions, that cannot be presented in simpler, linear form.

Based on presented empirical findings, we can form some concluding remarks:

- in the case of transition economies the S-curve, and the modified S-curve can be successfully employed in the analysis of economic development and forecasting. A linear trend could not be employed;
- the modified S-curve is a very good tool, which allows smoothing of time series due to its monotonic and flexibility and it is slightly better fitted to the data, than the ordinary S-curve;
- the modified S-curve allows far extrapolation of economic and financial time series (especially for transition economies) because it doesn't have a saturation level;
- this findings are important for forecasting, or modelling of economic processes, which follow the rule of the logistic growth law.
- the analysis of R&D spending per capita in Poland and the Czech Republic suggests, that both countries are in the phase of fast growth, and in the relatively earlier phase of development, comparing to GDP, what implies, that the GDP growth is an important factor of the R&D spending growth
- for Poland, the growth rate is the highest, which can result from the smallest level of expenditure. However, the trend analysis indicates that, within 10 years, the level of expenditure per capita should be higher than in the Czech Republic, which are the current leader of V4 countries.

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Leveraging Information Communication Technology for Manpower Training in Nigeria's Public Sector

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Abstract

The paper examines the role of ICT in achieving effective manpower training in Nigeria's public sector. It is a qualitative paper that relied on secondary data which were textually and descriptively analysed. The historical approach to the empirical review on manpower training in Nigeria's public bureaucracy revealed some reforms and attempts at remedying the challenges to manpower training. The application of Human Capital and Scientific Management theories illuminated the discourse. Notable impediments to manpower training in Nigeria's public sector are bureaucratic lapses in the identification of training needs; obsolete or poor strategies/approaches to manpower training; and limited appreciation of the role of ICT in achieving robust training outcomes. The paper discussed four ICT-driven learning techniques and suggested the utilisation of competent ICT professionals in manpower training (among others) as bulwark to the deficiencies identified.

Keywords: Manpower, Training, Information and Communication Technology, Public Sector.

Introduction

In today's competitive work environment, manpower training plays a significant role in organisational development (Sunday, Benjamin and Ekpe 2015). This finds expression in the fact that manpower training is a key requirement for all employees to be equipped with multiplicity of skills geared towards work improvement for future work activities and achieving organisational objectives (Attah, 2017). Similarly, the 21st century organisational environment gives another situation where machines and artificial intelligence are slowly taking over jobs, yet the essential role of human resources in realising organisational objectives cannot be overemphasised (Obisi, 2011).

Training is a significant part of human resource development which focuses on the efficiency of employees in organisations. Absence of training accounts for low manpower utilisation. Manpower training in the Nigerian public sector has been identified as a cause for concern to policy makers and researchers (Omitola, 2017; Oni-Ojo, Salau, Oludayo, and Abasilim, 2014). Furthermore, available evidence from the public sector adduces waste and lacklustre performance based on insufficient or absence of budgetary provisions, poor financing and corruption as major threats to training activities in some organisations, including Industrial Training Fund (ITF), Centre for Management Development (CMD) National Manpower Board (NMB), National Productivity Centre (NPC), to mention a few (Ofobruku and Nwakoby, 2015).

While several researchers have conducted studies on manpower training in the public sector globally, (Adiele and Ibietan, 2017; Fajoh and Faniran, 2016;; Dialoke et al, 2016; Halidu, 2015; Idoko, 2015; Aibieyi, 2014; Ibrahim and Yemen, 2014), there are limited research on the role of ICT in enhancing manpower training in Nigeria's public sector, and this constitute the focus of this paper.

Methodology

This paper employed the qualitative approach with reliance on secondary data from articles, books, conference papers and journal publications on manpower training in Nigeria. This paper is divided into subsections, beginning with the introduction, which highlights manpower training and links the concept to Nigeria's public sector. This is followed by the empirical review on manpower training; theoretical framework and its application. The nature and methods of manpower training, challenges to manpower training in Nigeria's public sector, and the extent to which ICT can enhance manpower training in the sector were sequentially discussed.

Empirical Review on Manpower Training in Nigeria's Public Sector

Manpower training in Nigeria's public sector can be traced to the 1967 Wolle's Commission which sought to identify the need for manpower training in the Federal Civil Service. The report of the commission titled- "Training Needs of the Federal Civil Service" was submitted to the Federal Government in 1968 which led to a follow-up whitepaper in 1969 titled- "Federal Government's Approach on Staff Training and Development in the Federal Public Service" (Obadan and Odushola, 2003).

Obadan and Odushola (2003) noted the following in the whitepaper:

> First, the arrangement of Department of Training Officers with duty regarding surveying staff improvement needs, getting ready and actualising projects to address these issues. Second, restructuring all Ministries to guarantee that more prominent need is given to manpower training. Third, the foundation of standing board of trustees on training. Fourth, the consolation of offices/services to build up a training unit similar with the size and capacity of the service, and ultimately, the development of Administrative Staff College of Nigeria (Obadan and Odushola, 2003, p.5).

Additionally, the 1970 Adebo Commission was set up to strategically examine the public sector issues at that time, which were compensation and wages in public enterprises and state-owned organisations, foundation of the public service commission and to suggest satisfactory courses of action for staff training (Ewoh, 2014). In 1971, the establishment of Industrial Training Fund (ITF) to advance the right skills for indigenous manpower through training received further consideration.

Okotoni (2015) documented that the Federal Government again made attempts to provide training for public sector staff through the 1972 Udoji Commission and it realised that manpower training strategies and retraining of employees would greatly impact public sector productivity. In addition, the 1985 Dotun Phillips commission/Presidential Task Force on revamping of the public sector recommended that the public sector must set aside 10% of its staff cost for training of workforce yearly, and that the professional success of public sector employees through manpower training should be seen as ideal for the development of all government employees (Adeyoriju and Fajebe, 2019, p.32).

In order to ensure faithful execution, the Ministerial Training Committee framework was presented as a significant part of the execution system (Adiele and Ibietan, 2017). During this period, the National Centre for Economic Management and Administration (NCEMA) was inaugurated in 1986 with the aim of providing training for employees. Also, in 1991, the National Manpower Board (NMB) was mandated to evaluate skill requirements for employees in the public sector.

The 1995 Allison Ayida Commission was initiated to deal with the complaints of top civil servants concerning the politicisation of the post of Permanent Secretaries. The board was saddled with the duties to review and reclassify the goals concerning the execution of programmes in government organisations, and make suggestions on modalities for improving work/efficiency in the public service (Omitola, 2012).

Under the Obasanjo presidency in the Fourth Republic, the Adegoke Adegoroye Panel was instituted with the goal of restructuring the civil service and setting up standard rules concerning the workforce. The Steve Oronsaye Committee was similarly commissioned during the Yar'adua/Jonathan administration to streamline and reposition Ministries, Departments and Agencies of government for effectiveness. The recommendations of these panels have not been faithfully implemented due (perhaps) to lack of political will and commitment by successive administrations.

Application of the Human Capital and Scientific Management Theories

Applicable to this paper is the human capital theory by Becker (1962) who saw individuals as assets that must be continuously improved through training and other considerations for higher efficiency and productivity (Eriko, 2017). This theory perceives individuals and their skills/expertise and experience alongside capacity to discharge their duties in the light of a legitimate concern for their organisations and individuals as wellspring of resources for the organisation. This theoretical approach is underscored by the essentials of manpower training, having the tendency to improve efficiency and productivity ultimately.

Also, this paper applies the scientific management theory by Frederick Taylor which takes an atomistic view of employees as economic beings to be maximised for efficiency, using manpower training for the development of organisations (Halidu, 2015). It is argued that the scientific management theory is geared towards improved profitability and efficiency through the application of effective methods targeted at maximising output and employees' training for organisational effectiveness.

The Nature and Method of Manpower Training

Manpower training deals with the information and capacities utilised in the advancement of capacity and mental power, obtained through methodical giving of guidelines for the general improvement of employees' expertise and productivity (Ofobruku and Nwakoby, 2015). Training is also a learning procedure that includes the procurement of information, abilities, ideas, and rules to improve employees' performance at work (Sabir, Akhtar, and Bukhari 2014).

Manpower training could be on the job or off the job. On one hand, the hands-on-training method is one that is given to employees within the formal setting of an organisation. This method helps in training employees in real work situations or conditions (Aibieyi, 2014). Hands-on-training strategies incorporate exhibition, work pivot, arranged work activities, entry level induction and apprenticeship (Kulkarni, 2013). In the first place, instructing is the technique for training whereby a manager helps the employee to discharge his/her duties and obligations more productively by responding to questions, directing the people in discovering answers to their concerns, setting the correct model and widening their perspectives (Banjoko, 2011). The manager should have harmonious relationship with employees and adopts appropriate remedial measures in order to accomplish organisational objectives (Fajana, 2016).

The next method is job pivot, which deals with moving employees starting with one employment position then onto the next in order to widen their experience and familarise themselves with different parts of the organisation's activities (Stoner et al., 2008). This is followed by exhibition, where the manager acquaints the employees in question with models, which is more of demonstrations than telling. This method is referred to as learning by observing. Moreover, exhibition is a deliberately created activity, displayed on practical circumstances, in which learners partake and get inputs. They are especially helpful for occupations in which the hazard and mistakes are high or in which direct perception and criticism are commonly missing.

Off the job training operates outside the real workplace. It is utilised in training both old and new employees. Off-the-work training adopts workshops, classes, contextual investigations, vestibule as strategies (Ekundayo, 2015). For example, vestibule is a type of training which includes employees

learning in a non-workplace in which conditions and hardware are for all intents and purposes not different from what will be experienced at work. Formal work situations are invigorated through this strategy so that employees are furnished with starter learning encounters preceding any real work practice. Consequently, the issue of moving the learning conditions to work is limited since the employees are engaged in what they would inevitably end up doing in real work circumstances (Adeyoriju and Fajebe, 2019).

Off-the-work training can be in form of discussions, where the study strategy is the most customary type of training. It includes the transmission of information, thoughts and verifiable data from the educator to many learners one after another along these lines having the benefit of applying minimal effort. It could also be a contextual analysis which is composed or oral portrayal and synopsis of a genuine or speculative setting or issue.

Challenges to Manpower Training in Nigeria's Public Sector

There are major obstacles to effective training outcomes in the public bureaucracy which includes poor financing and inadequate budgetary provisions for training activities. Another impediment to training is the issue of corruption which is a cankerworm that has eaten deep to the moral fabrics of the Nigerian society. It finds expression in illegal diversion of funds and conversion of public resources to private gain and advantage which circumscribe the attainment of manpower training objectives.

Other impediments are bureaucratic lapses typified by spoil system and cronyism in identifying training needs/personnel; faulty appraisal system or process that obstructs objective discovery of training beneficiaries; obsolete or poor strategies and approaches to delivering robust outcomes and improved performance in Nigeria's public sector.

Leveraging ICT for Effective Manpower Training in Nigeria's Public Sector

The role of ICT in revolutionising and achieving effective manpower training in Nigeria's public sector cannot be overemphasised. This has been established in literature as Onodugo (2016) stated that using ICT for training purposes has changed how training is conducted, and corroborated thus:

> Appropriate utilisation of ICT can change the delivery of objectives for the Nigerian public sector, in light of 21st century technological advancements and training strategies which when set up, will significantly improve the productivity levels of employees in terms of skills and expertise for the sector's development (Onodugo, 2016, p.2).

ICT, if utilised through its various processes (particularly the digital innovation, will produce employees who will perform better in carrying out their duties. ICT approaches are developed by identifying specific areas that the employees require training and will ensure that the employees go through series of activities- contextual investigations, exhibitions and other processes as contained in Onodugo (2016). The following approaches can enhance manpower training:

- **The Dynamic Learning Approach** - ICT improves learning devices for testing, counting and reviewing of information. In this manner, a motivation for training with current devices for employees to figure out how to function and adopt certifiable issues within and outside work becomes apparent (Okeh and Opone, 2014).

- **The Community Learning Approach –** This is an ICT-based learning and participation between employees and expert trainers, where the training is focused on identifying opportunities for employees to learn from successful individuals within work community, which gives the relational abilities of employees to improve on their relationship skills (being mindful/showing empathy at work) (Lopez, 2014).

- **The Innovative Learning Approach** - is ICT-based learning and application of information relevant to current realities. Training is conducted for employees based on previous information on the organisation and applying same to the attainment of organisational objectives (Onodugo, 2016).

- **The Mixed Learning Approach** - is the way to deal with training through ICT features that advances organisational coordination. This approach applies different theories to the current workings of the organisation, and explores the extent to which the theory can enhance the organisation's strategies (Okeh and Opone, 2014).

The adoption or utilisation of ICT has made significant impact on manpower training in organisations. There are electronic advances utilised for training, gathering, controlling and showing or conveying information which incorporates programming, equipment, and even the network (Anderson and Baskin, 2017). When ICTs are utilised in training correctly, they can quicken, improve, and extend essential abilities in human resources, and they can inspire employees to learn as they become increasingly autonomous and responsive to learning (Yusuf, 2015). Besides, ICTs help to link employees to their work and its impact is felt in organisational communication which has been found to energise the work environment and activates employees to become efficient in carrying out their duties (Cradler and Bridgforth, 2016).

Other advantages of leveraging ICT for manpower training are that it can help lighten the workload in the public sector through its utilisation for computerised worksheets and reports, where employees can send in weekly reports which can be verified to ensure that weekly objectives are achieved (Kulik and Cohen, 2017) in line with the strategic objectives of the sector. This is important as it will help the administrators identify areas where the employees are lacking in terms of skills and expertise, specifically with the tasks given to them and the reports they turn in (Ben and Ashang, 2017). Also, ICT can be utilised in getting essential training content for the employees, and coordinated efforts can be guaranteed through trainers comprehensively (Anderson and Baskin, 2014).

In addition, ICTs can aid the human resource department significantly towards general improvement, through e-learning expressed variously in courses, workshops, and different activities - formal and casual, where employees adopt ICTs crosswise in training programmes (Bamigboye, Aderibigbe and Buraimo, 2017). There are a few worldwide portals/on-line resources to facilitate human resources development, and if these materials are utilised properly, the efficiency level within the public sector will significantly improve (Bamigboye et al., 2015), leading to increased productivity and national development.

Conclusion and Recommendations

The paper interrogated the extent to which ICT can be leveraged upon to achieve effective manpower training in Nigeria's public sector. The empirical review on manpower training in the Nigerian public bureaucracy took a historical approach that unearth the trajectory of reforms and remedial steps/attempts at redressing the lapses and obstacles to manpower training. It identified lack of commitment and deficient political commitment as part of the factors thwarting successful execution and realisation of training objectives in the public sector. Based on these and the discussions of this paper, the following suggestions are proffered:

1. The Federal government should ensure that ICT strategy statements are clearly communicated and implemented in Ministries, Departments and Agencies.
2. The ICT component of the Federal Ministry of Communications and Digital Economy should be adequately funded and invigorated to enable the public bureaucracy take advantage of technological tools and impact the citizens maximally through improved service delivery.
3. ICT training should be mandatory for all public sector workers as part of the manpower training module by professionals/competent ICT trainers.

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Managing the Payback of Innovative Products Based on Matrix-Cyclical Model of Coordination of Producers' and Consumers' Interests

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Abstract

Introduction: Nowadays coordination of consumer and producer interests is a mandatory element of the managing process the payback of innovative products. The coordination of interests consists in reaching a compromise between the goals of the producer and the consumer, if there are certain benefits. For this purpose, the characteristics of consumer values and product parameters must be systematically agreed between the consumer and the producer.

Materials and methods: the article is dedicated to improving the payback management of innovative products by coordination the interests of producers and consumers. This is only possible if a compromise is reached on the interests of consumers with respect to the price and quality of the products, and of producers with respect to the financial results of the sale. The purpose of the study is to develop a matrix model of ROI management of innovative products based on the introduction of criteria for assessing product innovation. Matrix-cycle management is proposed for efficient payback management. The proposed method is based on integral matrix analysis, integrated analysis, system analysis and other methods. Improvement of efficiency of management of return on innovative products on the basis of coordination of interests of interested parties can be achieved by application of the developed matrix-cyclic model of management. To eliminate the conflict between the interests of stakeholders in the methodology of management of payback of innovative products, it is necessary to introduce new quality criteria. The article presents a matrix-cyclic model. It is based on the principles of the theory of systems and the principles of management of payback of innovative products. This model allows us to justify the cyclic processes, starting with the selection of the object of payback and ending with the sale of an innovative product.

Keywords: Management, Payback, Matrix-Cyclic Model, Compromise Of Interests Of Producers And Consumers.

Introduction

The theme of effective management of payback of innovative product is relevant in modern economic conditions. This is due to the need to improve the efficiency of the processes of bringing innovative products to the Russian and international market.

The study of the problem of conflict of interests of market participants in the process of payback management is considered in the works of such authors as A.V. Dmitriev, V.P. Sheinov, T.A. Nestik, Yu.D. Krasovsky and others *(Dmitriev, 2000), (Krasovsky, 2006), (Nestik, 2001), (Scheinov, 2010)*.

It should be noted that few authors pay attention to the economic component in the conflict of interests of the parties concerned, and more attention is paid to interpersonal conflicts and their social component. The impact of product innovation on ROI management processes is not addressed.

Therefore, there is a need to introduce a matrix-cyclical model of harmonization of the interests of producers and consumers in the process of managing the payback of innovative products.

For this purpose it is necessary to include the stages of planning and coordination of the parameters of innovative products in the processes of cokability in accordance with the requirements of the consumer and the interests of the manufacturer. Therefore, it is necessary to develop ways to incorporate consumer values into the matrix-cyclic model. For this purpose in the process of interaction "consumer-producer" we will highlight direct and reverse links of agreement of interests, which affect the level of innovation of the product. Consider the fact that the balance of interests may change as a result of changes in the quality of managing the ROI of innovative products. The quality of management, in turn, depends on the completeness of the criteria taken into account. Basic management functions are the basic criteria, and additional special management functions are proposed as additional criteria.

To build a matrix-cyclic model, four types of stakeholder interaction in managing the payback of an innovative product are identified:

- conflict of interest;
- the imbalance of interests;
- consensus of interests;
- compromise of interests.

The validity of evaluation methods and the justification of their accuracy will determine the effectiveness of the development and implementation of an action plan to correct the imbalance. This determines the need to develop the methodology in the present study on the basis of the following matrix cyclic model and a set of methods for managing the payback of innovative products on the basis of basic and additional special management functions and their control indicators.

The application of a set of methods is due to the complexity of the management of payback products. It should provide conditions for harmonization of regulated characteristics of consumer value and possibilities of their provision by producers. Improvement of control quality is proposed to be implemented in formed mechanism on the basis of control procedure built into its circuit of direct and reverse links.

Materials and Methods

For the solution of the tasks set in article works of domestic and foreign scientists in the field of the theory of interested parties, managements of development, strategic management, adoption of management decisions, the economic theory, sociology, conflictology and econometrics are studied.

The main methods of a research used in work are: synthesis, analysis, comparison, system approach, induction and deduction, generalization, formal logic, analogy, classification, expert estimates, economic-mathematical methods, methods of the functional analysis.

Discussion

The realization of the idea of increasing the payback of the innovative product on indicators of reconciliation of interests consists in achieving and maintaining compromise of the goals of producers and consumers. This requires more accurate planning of the process of harmonization of consumer values and product parameters provided by the manufacturer. There is a need to develop a methodology to incorporate consumer values into the factors governing the payback management mechanism. Application of additional specialized functions of coordination of the specified goals should be carried out in the loop of direct and reverse connections of producers and consumers. This mechanism can be reflected in the matrix-cyclic model (Fig. 1).

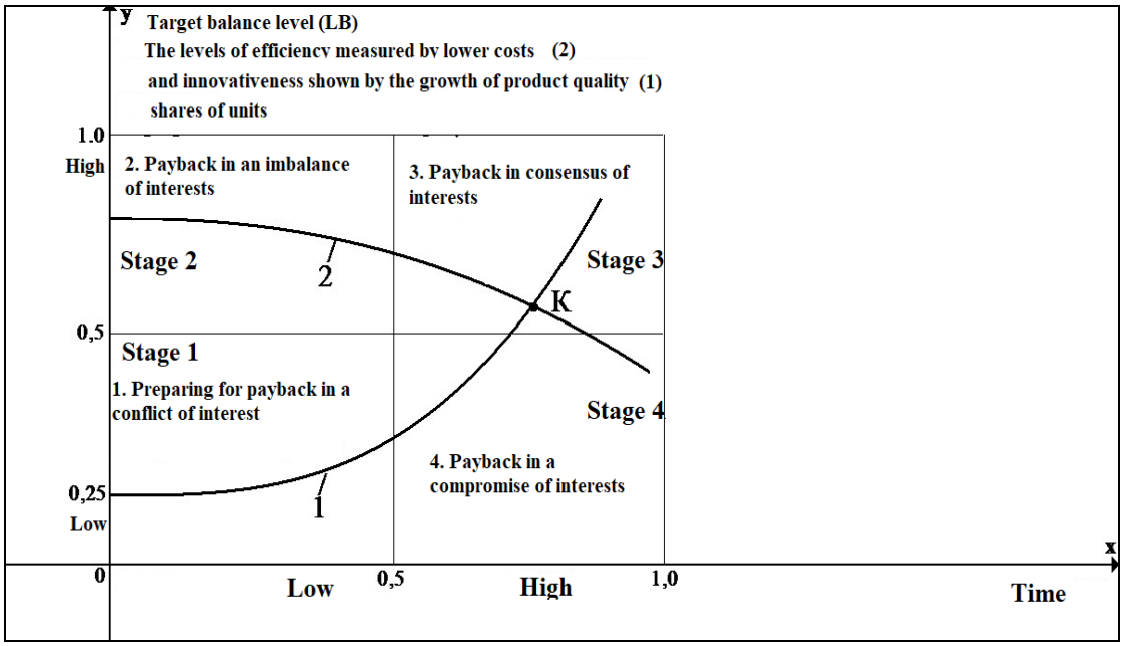

Fig. 1: Matrix-cyclic model of substantiation of methods of management of payback of innovative products

(Source: compiled by the authors)

The vertical axis represents the main indicator - "balance level." The horizontal axis is a measure of time. The dashed line indicates the negative quality level of the innovative product.

The stages and content of the matrix-cyclic model of managing the payback of innovative products determine the characteristics of the life cycle of the balance of interests of producers and consumers.

Conflict as the ultimate mismatch between the goals of economic sustainability and the assessed quality of the product. It occurs when the utility of a unique product is not recognized. The quality level in this case is considered negative. The solution to the conflict is to form and apply a management mechanism in the payback project (phase 1 in quadrant 1). The result is a slight reduction in the inconsistency between the goals of producers and consumers, as shown by the dynamics of the indicator factors in step 2 in quadrant 2. At this stage, the project is started at the product manufacturer. Reducing the costs of producing innovative products and increasing their quality create opportunities to achieve a narrow and short-term "consensus of interest zone" (phase 3 in quadrant 3). Finally, consumer awareness of the value and increased production of innovative products allows for the achievement and maintenance of a long-term compromise of interests (phase 4 in quadrant 4).

The cyclical model ensures complete coverage of the phases, taking into account changes in the balance of interests of stakeholders. The implementation of a set of payback management methods ensures that changes are controlled by cycle stages.

The parameters of quadrant 1 are due to inefficient payback methods leading to stagnation due to the production of low-innovation products of basic quality and the use of standard control tools. This ensures a certain level of profitability and economic sustainability mainly on the basis of lower costs per unit of production (economies of scale). Methods that ensure the stability of indicators with a low level of innovation of products make the enterprise move towards a situation of crisis even with some improvement of its quality (quadrant 2).

It is logical to assume that the parameters in quadrants 3 and 4 are due to methods that can be described as effective and highly innovative. Indeed, a jump in quality estimates from negative to positive values is possible with innovative technologies for manufacturing products and managing the "breakthrough" level. The result is achievable in less time under conditions of compromise or (ideally - consensus) interests of producers and consumers of the corresponding products of unique level of competitiveness.

Thus, in order to effectively implement the proposed hypothesis, payback control methods corresponding to the parameters of quadrants 3 and 4 should be selected. In this case, some reduction in economic stability due to a decrease in the economies of scale of production (in quadrant 3) should be compensated by a significant increase in the quality of the innovative product (in quadrant 4) to the level of its utility characteristics, which meets the requirements of consumers in the extended range. For this purpose, it is necessary to apply intensive methods of managing the imbalance of interests.

As a result of the analysis, it can be concluded that there is no acceptable definition of an imbalance of interests in the payback process in the scientific literature. It is therefore proposed to supplement this concept.

Imbalance of interests is an unacceptable degree of their divergence in the production enterprise and in the interested parties-consumers of products from the level of their balance, or consistency in the area of compromise of interests *(Dmitriev, 2000)*. The degree of discrepancy should be expressed in the actual and planned targets of the level of balance of interests of the producing enterprise.

At the heart of the organization of an evolutionary regulated process to achieve compromise or consensus in the life cycle of the balance of interests of the consumer and the producer is a mechanism of payback management, formed in stages on the basis of a matrix-cyclic model of justification of methods of payback management of innovative products. The mechanism for managing the payback of innovative products is based on aligning the interests of innovation and product quality for consumers with the goals of quality management and cost reduction for manufacturers.

Analysis of industrial development experience shows that the desire to maintain stability at all costs often leads to rapid, unmanageable and undesirable changes. At the same time, the consequences are catastrophic. At the macro level, as well as at the micro level, not only the short-term efficiency of dynamic processes is important. It is desirable to take into account the prevailing focus of different factors on balancing the interests of producers and consumers in payback management.

Thus, it is necessary to take into account differentiated factors of coordination of interests of producers of innovative products and its values for consumers in the extended range of quality and innovation of products. Flexible management is the goal of the management entities, is achieved by methods of maximum coordination of the action of three groups of main factors of balance of interests in the complex of producers and consumers of products (Figure 2).

1) technical and technological characteristics of product quality evaluated by the consumer (1);
2) organizational and economic, affecting the capabilities of producing enterprises in reducing costs per unit of production (2);
3) quality of ROI management taking into account all factors (3).

This is the essence of improving the quality of payback management by the stages of minimum (a), medium (b) and maximum (c) levels of balance of interests in the evaluation of product quality and management indicators.

It has been established that enterprises with low characteristics of innovative potential and coherence of interests (at zero or small intersection of areas in Fig. 2 (a, b) the efficiency of the payback process will be small. This is due to the low level of coherence of interests of the participants in the process by factors. It is necessary to expand this area of productive payback management as a compromise of the objectives of the group of enterprises under consideration (Fig. 2 c, b).

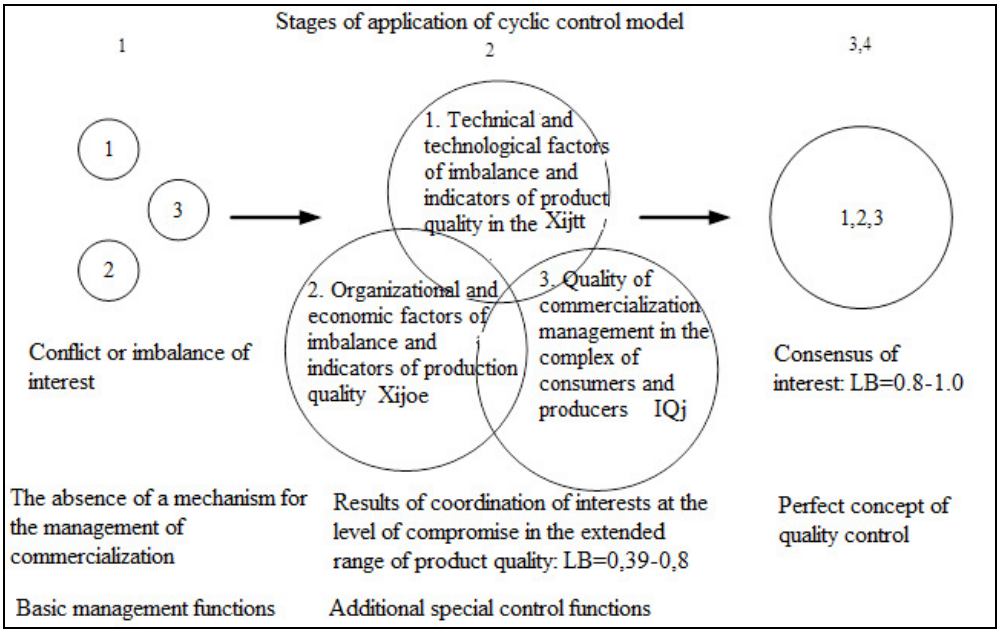

Fig. 2: Process of interlinkages of factors, functions and indicators of balance of interest management in the payback management model

(Source: compiled by the authors)

In order to achieve and maintain a balance of interests in the compromise area, product quality and ROI management indicators, unit costs and other indicators must be adjusted according to the stages of their changes in the life cycle.

Figure 3 shows the evolution of ROI across the life cycle phases of the Product Balance of Interests between Manufacturers and Consumers.

Consider the expected shift in quality and time of curve 1 to represent the change process more realistically. It can be assumed that A0 time is required in Phase 1 of the cycle for the processes of forming and incorporating the mechanism into the existing payback management system and showing signs of increasing the quality of consumer-aware products. The need to inform consumers about them is due to inertia in the process of consumer awareness of the general utility of the innovative product. The consumer's negative perception of the quality level of a completely unknown innovative product is explained by the conservative inertia of thinking, the habit of existing technologies and the fear of losing the existing way of meeting the need. Therefore, at point 0 of cycle 1, the balance of interests in question is minimal; hence the production and consumption of low innovation products prevail. Curve 3 corresponds to changes in the balance level, or consistency of the interests of the producer (curve 2) and consumers (curve 1). The interests of the manufacturer are expressed through the indicator of the level of costs; the interests of the consumer are determined by the level of quality of the product. Since these facts and processes are repeated periodically, there is a cyclical nature of dynamics in the life cycle of changes in the balance of interests.

A slight decrease in the quality of products of the type in question at the middle or end of cycle 1 (curve 1 in step IV) is due to the fact that each additional increase reduces the expression of psychological responses of consumers with each assessment of the product value requirements. This means that the marginal utility of even an innovative product decreases and the imbalance of interests grows *(Babanova and Tomasheva, 2012), (Garaedagi, 2011)*. In order to maintain the level of consistency and transition to the compromise zone modernization based on low or medium innovation products (version 3.1) or transition in the next development cycle to a new product (version 3.2) and to a higher level of its quality is necessary. To do this, you should start the design of a new product (curve 2 ') with lead time.

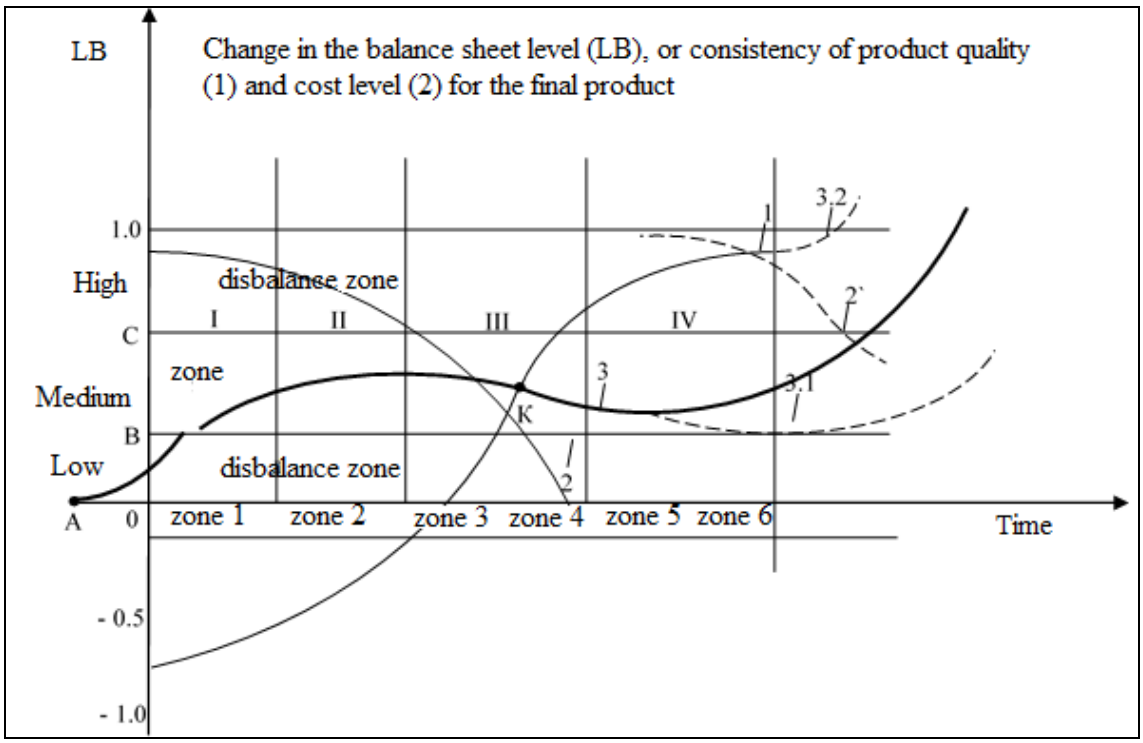

Fig .3: Dynamics of ROI indicators in the presentation of the life cycle of the balance of interests of producers and consumers of products

(Source: compiled by the authors)

The developed concept and model of the mechanism of product payback management allow to justify the theory of life cycle of processes, which involves selection of innovative object of payback, stages of control of imbalance of interests, which are completed by transition to the subsequent payback cycle of the new product using tools of basic and additional control functions and indicators of quality of their application.

Results

When using the ROI quality criteria, it is necessary to define the ROI quality index indicators. To do this, the relationships of cause estimates, or actual values of indicator-results, to the goals or standards of the same indicators measuring interests are investigated.

The main resulting indicator of the process of improving the quality of ROI management in the study is the level of balance of interests, and intermediate - factors estimated by indices of quality of performance of management functions.

The direction of their action can be expressed in the form of a tree of goals for achieving planned (ideal or compromise) values of the main property - the level of balance of interests and factors - indices of quality of performance of management functions (IQj), dependent and determined by the corresponding indicators Xi, j (Fig. 4), organizational-economic and technical-technological types, taking into account the corresponding factors.

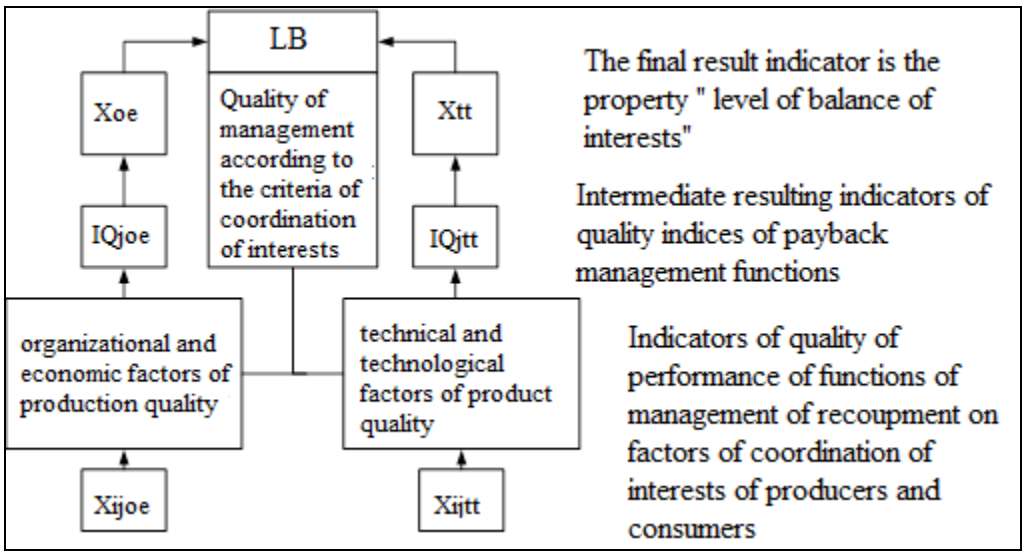

Fig. 4: Interrelation of factors and indicators of improvement of payback management quality according to the criterion of compromise of interests
(Source: compiled by the authors)

The task of determining quality index of j-th payback management functions (IQj) by indicators Xij of their application for each function j (j = 1,2,... n), i (i = 1.2,... m) is solved for groups of factors of two types:

$$IQ_{joe} = f_1(x_{ijoe}), IQ_{jtt} = f_2(x_{ijtt}), \quad (1)$$

where subscripts oe, tt - mean taking into account organizational-economic and technical-technological factors of interest imbalance, respectively.
Level of balance of interests is the resulting function of indicators of quality of management by the set of specified factors:

$$LB = f_3(IQ_{joe}, IQ_{jtt}), \quad (2)$$

The control subsystem is considered by us as a system of sets of operational dependencies of the type "input - process of performance of payback control function of innovative products - output, or result," included in the specified mechanism. The applicability or intensity of application of specific basic functions in the enterprise management system and additional management functions should vary. Variability will depend on the degree of imbalance between the interests of manufacturers and consumers of innovative products in an extended range of quality, taking into account the innovation of the products. In order to manage the transition towards balanced development of the system of producers and consumers of innovative products, concrete and measurable results are still needed.

Standards of higher order systems (meso- and macroeconomic systems) are among the external factors of the production enterprise activity, which are taken into account in the development of its own goals and plans. On the one hand, these standards can be considered development guidelines, on the other - they can be considered as some limiting indicators, limiting the range of changes in the indicators of application of management functions in the field of compromise of interests.

A common characteristic of satisfaction at these levels of management can be considered the degree of compromise as the consistency of needs and values (individual and corporate consumers, producers, etc.) with planned goals or regulated regulations. Sufficient satisfaction is reflected in the performance of

management in terms of indicators of achieving target levels of balance of interests and long-term sustainability of the relationship system.

Today, many industrial enterprises have developed a high degree of inconsistency between management targets and staff needs and values. This is primarily due to poor performance indicators for management functions. This leads to an increase in economic losses due to delays in management decisions and the presence of lag processes in their implementation.

The operation of the management mechanism ensures the sustainable transformation of the main elements of the enterprise producing innovative products in the direction of compromise of interests throughout the life cycle of the balance of interests. Each of the proposed functions will allow to organize the performance of standard basic management functions (general and specific) in case of changes in external factors and imbalance of interests, in addition, will allow to build rational relations between divisions of the enterprise.

The basic set includes management functions by directions: 1) main operational activity for production of products, works or services; 2) accounting; 3) technical and social development; 4) marketing; 5) development and implementation of strategies; 6) finance; 7) consulting activities; 8) practical; 9) sales, or sales; 10) economics, etc. Summarizing the above-mentioned factors and directions of improvement of quality and payback management by factors of reconciliation of interests can be presented in Table 1 (with indication of function numbers).

The analysis of basic management functions existing in most enterprises shows that they are sufficient to achieve satisfactory results of changes only in case of low and medium innovation challenges of the external environment. In the face of uncertainty and revolutionary technological change, additional special management functions are needed. In the work they are represented by a set of functions and indicators in the mechanism of payback management.

In order to regulate the relationships of dependent (LB) and independent variables (IQj, Xij), we propose an additional set of specific payback management functions and quality indicators for their application to basic functions. The simulation of control functions is carried out later using two kinds of mathematical tools.

According to the matrix cyclic model of justification of the set of methods, the dynamics of the main payback indicators in the life cycle of the balance of interests can be defined three coverage areas of the management functions. They are consistent with the conditions of imbalance, compromise and consensus of interest. In quadrant 1, poor control quality can be noted as the performance of applying basic specific control functions. Additional functions should be used intensively in the 2,3,4 quadrants (Table 1).

Table 1: continuum of functions of management of increasing the level of balance of interests of producers and consumers of innovative products

Distribution of the overall set of functions for managing the quality and effectiveness of the reconciliation of interests according to the characteristics of their balance sheet															
The levels of balance of interests															
Low (imbalance) or conflict									**Averages (compromise)**				**High (consensus)**		
Set of basic specific management functions									Additional specific functions for managing the payback on innovative products						
1	2	3	4	5	6	7	8	9	…	MQI	MQI 1	…	QM	QM 1	…

(Source: compiled by the authors)

Additional specific management functions take into account these groups of key indicators and the characteristics of the payback cycle:

1) a group of functions for managing reliability of relations within and outside the manufacturing enterprise and its subfunctions (MR1 - MR4);
2) a group of functions for managing the sustainability of the payback process on organizational and economic indicators of the balance of interests (management of quality indicators - MQI) and its subfunction (MQI1, MQI2);
3) group of elements for control of payback process stability according to technical and technological indicators and criteria of economic efficiency (quality management - QM) with its subfunctions (QM1, QM2).

The “Reliability management” function allows you to better implement the tasks of the control mechanism's early response to changes in the external and internal environment. It regulates the behaviour and state of the manufacturing enterprise, taking into account the stages of the life cycle of the balance of interests in the context of conflict, imbalance, consensus or compromise of the interests of the parties concerned. The inertia of processes depends on the manifestations of the organizational culture of the enterprise.

The “Reliability management” function solves a set of tasks, so it is implemented by this function itself (RM) and by a number of its sub-components (RM1, RM2, RM3, RM4) and their application indicators. Indicators such as the number of update incentives, the degree of flexibility of structures, the amount of delegation of authority, the availability of capabilities and the number of methods of quantitative modelling of change forecasts and others can be planned and measured as indicators of the quality of performance of Reliability management functions.

The continuity of the payback process, provided that the management mechanism operates on the basis of the RM function and its display, is improved due to the growth of stabilizing properties of the balance of interests. Consequently, the ability of the complex of producers and consumers to adapt to the diversity of the environment increases with increasing dynamics of innovation factors or to adjust the environment so that changes in the behaviour of their own subsystems and elements are not required. For this purpose, a number of "Reliability Management" sub-functions are additionally introduced and implemented, which perform the following sub-tasks (sub-functions) of ROI management:

– control of changes in external factors of consumer demand (RM1 subfunction) at stages 1, 2;
– management of development of personnel of the enterprise for factors of coordination with values of consumers (in abbreviated form - management of development of personnel) (reliability management – RL2) at stages 3, 4;
– management of development and realization of strategic objectives and problems of coordination of interests (RL3) at stages 3, 4;
– coordination of functions of management of coordination of the purposes of payback at the enterprise (RL4) at stage 2.
At stages 1 and 2 it is assumed to increase intensity of application of stabilizing subfunctions of RL1 and RL4, at stages 3,4 - subfunctions of provision of innovative flexibility of RL2, RL3.

Under quadrants 2 and 3 of the matrix model, the implementation of Reliability Management is no longer sufficient. In conditions of uncertainty, a specific management function is needed to enhance the sustainability of internal payback management processes (MQI).

Implementing ROI Sustainability Management on Business Balance of Interest (MQI) will improve product quality based on business factors and capabilities.

The intensity of application of sub-functions of leadership style regulation in areas of interest matching at payback of innovative products (sub-function MQI1 "leadership style") and compliance of structural elements and methods of payback with stages of life cycle of interest balance changes (sub-function of MQI2 "process") should increase.

For application of the function "ROI Stability Management by Organizational and Economic Indicators of the Balance of Interests" at stages 3,4, evaluation and regulatory indicators are used, which allow to determine quality and efficiency of ROI management according to the indicators of technical-technological and normative-criterion type: standards of quality of innovative products, which take into account consumer requirements; Degree of knowledge and resource efficiency of production of such products; Requirements to quality of payback management according to the degree of environmental friendliness and safety of the product, etc.

The set of functions "Control of payback process stability by technical and technological indicators and criteria of economic efficiency" includes subfunctions:

- management of payback quality by technical and technological factors of interest imbalance, taking into account parameters of specific costs, innovation (QM1);
- indicators of cost efficiency of process of payback of the manufacturing enterprise (QM2).

Indicators of QM1 are usually: the degree of conformity of the technology of producers, its competitiveness relative to the modern level of resource efficiency, knowledge intensity, environmental friendliness, safety; Growth rate of product innovation, intervals of technological and technological renewal. The indicators of QM2 subfunction regulate the economic efficiency of the payback management mechanism. For example, the existence or number of control procedures in the use of financial resources, their sources for assessing the focus on harmonization of consumer and technological characteristics.

Thus, interaction of organizational and economic factors of production quality, technical and technological factors of product quality and functions of payback management quality should be organized with their distribution in the extended range of product innovation quality. The structure of factors, management functions and quality indicators of the results of the complex of enterprises-producers and consumers is shown in Fig. 5.

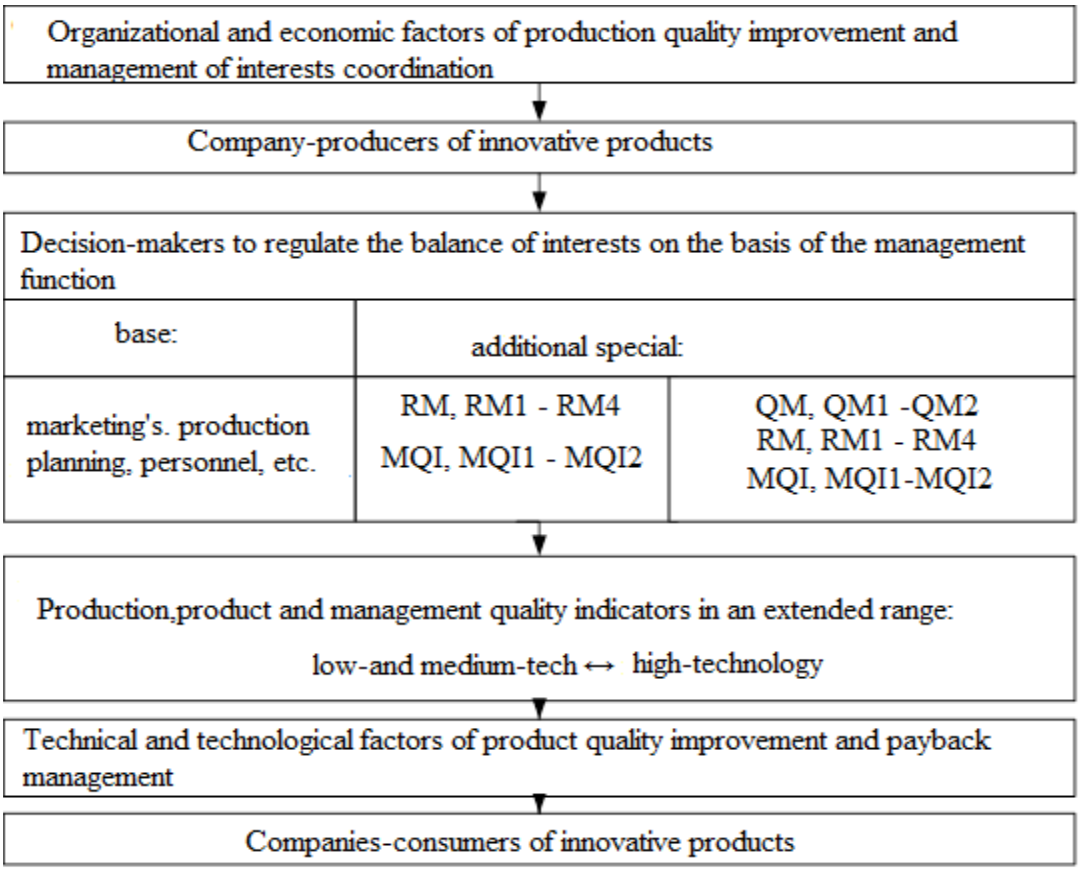

Fig. 5: Interlinkages of process participants, factors and functions of improving the quality of management of payback of innovative products in the complex "enterprise-producer - enterprise-consumer" (Source: compiled by the authors)

Conclusion

As a result of the system analysis carried out, the relationship between laws, principles and methods in the concept of forming a mechanism for managing the payback of innovative products on indicators of harmonization of interests of producers and consumers has been established.

An approach based on the concept of "life cycle of balance of interest" has been proposed for implementation in evolutionary cyclical processes of regulation of the mechanism of payback management of innovative products. The cycle is defined as a period of time that includes the main stages of changes in the balance of interests of producers and consumers, estimated by the indicator-property "level of balance of interests." The cycle defines four stages of changes to the key figure-property "balance of interest's level." Depending on the level of balance of interests (low, medium, high) and 4 stages of the cycle, four zones of imbalance of interests of producers and consumers are distinguished: consensus; compromise; conflict; imbalance.

The Lead Balance Life Cycle Toolbox highlights four groups of methods. They correspond to quadrants and the direction of changes in the matrix cyclic model.

Special criteria indicators have been developed, which allow to quantify the quality of payback management of innovative products by indicators of harmonization of interests of producers and consumers: level of balance of interests, indices of quality of payback management and their indicators-factors.

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La Mobilité Internationale Des Etudiants-Alternants Au Coeur De La Construction D'une Economie De La Compétence : L'exemple Du Territoire Corse

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Résumé

A l'heure d'une globalisation exacerbée, l'éducation, et plus généralement la formation, représente un facteur clef pour notre société, au cœur de territoires mis au défi de se renouveler face à l'émergence tout autour du globe de nouveaux centres de gravité économiques et démographiques, avec leurs propres modèles. La formation, et son articulation avec la vie professionnelle, représente un véritable enjeu pour faire face, dans un futur proche, aux révolutions technologiques, économiques, politiques, environnementales auxquelles nous sommes d'ores et déjà confrontés. Au-delà de ce que l'on appelle l'alternance ou la formation professionnelle continue dans l'Enseignement Supérieur, le défi actuel se situe bel et bien autour d'une Formation Tout au Long de la Vie (FTLV), vieux concept mais dont les formes en appellent toujours à une actualisation dans la modernité. Au cœur d'un petit territoire ilien comme la Corse, ce challenge est d'autant plus crucial à relever qu'il préfigure son attractivité dans un contexte de *glocalisation* (Mair, 1991) désormais durablement ancré. Dans un environnement mondial en perpétuelle évolution, avec des repères mobiles, des vies personnelles et professionnelles toujours plus complexes, et où tout ce qui semblait bien compartimenté hier fait face à une porosité croissante, l'objet de cette contribution vise à expliciter que la mobilité internationale des étudiants-alternants, au cœur de la construction d'une économie de la compétence, constitue un enjeu stratégique majeur au service du développement et de la structuration d'un petit territoire comme celui de la Corse.

Mots-clés : mobilité internationale des étudiants-alternants – FTLV - formation / emploi – économie de la compétence - développement et structuration du territoire corse.

Introduction

La formation, et son articulation avec la vie professionnelle, représente un véritable enjeu pour faire face, lors les décennies à venir, aux révolutions technologiques, économiques, politiques, environnementales auxquelles nous sommes d'ores et déjà confrontés. Si l'on s'imagine déjà mal, aujourd'hui, comment une formation initiale pourrait suffire à un individu pour ses 40 ans de carrière à suivre, la rapidité d'évolution de nos sociétés (la nôtre mais aussi, voire surtout, celles qui nous entourent et qui ainsi constituent au plan mondial notre environnement, ou encore notre écosystème), les transitions numériques et énergétiques en cours, ne feront qu'accentuer l'obsolescence de cette représentation d'une formation découplée des formes d'apprentissage ultérieures.

L'enjeu pour les individus, le monde économique et in fine la place de notre pays au niveau mondial, est donc celui de l'actualisation des connaissances, de l'évolution des savoir-faire, du renouvellement des représentations, de la compréhension des enjeux macroscopiques.

Dans un petit territoire ilien comme celui de la Corse, peuplé de quelques 330 000 habitants et en quête de structuration d'une économie de la compétence bénéfique à son développement pérenne, cet enjeu revêt une priorité d'autant plus fondamentale. Après avoir démontré dans des précédents travaux (Storaï C., Rinieri L. et Boulenger M., 2014 ; Storaï C. et Rinieri L., 2016), comment le dispositif de l'alternance dans l'Enseignement Supérieur en région Corse peut constituer un outil stratégique au centre d'une politique territoriale de croissance du capital humain, nous portons aujourd'hui notre réflexion sur la problématique de la mobilité internationale des étudiants-alternants en qualité de vecteur générateur d'une économie de la compétence profitable au développement et à l'attractivité d'un espace géographique insulaire comme celui de la Corse.

Après avoir rappelé l'importance du concept de mobilité internationale des étudiants-alternants en matière de croissance des compétences relatives aux savoir, savoir-faire et savoir-être, notre analyse montrera comment une politique pédagogique d'un CFA[i] est susceptible de contribuer à valoriser l'insertion professionnelle et l'employabilité des ressources humaines qui structureront les entreprises locales.

La Mobilité Internationale Des Etudiants-Alternants : Un Concept Dual Et Novateur

En marche depuis une vingtaine d'années, l'internationalisation de l'Enseignement Supérieur a connu une croissance notable cette dernière décennie. L'Unesco[ii] a recensé 4,1 millions d'étudiants internationaux en 2013 et estime ce chiffre à 7,2 millions à l'horizon 2025. En Europe, les Universités ont inscrit au coeur de leurs offres de formation la mobilité des étudiants, fortement soutenues par l'ensemble des programmes proposés par l'Agence Erasmus. L'objectif clairement affiché est de contribuer au renforcement l'employabilité de leurs diplômés « *en les dotant de compétences académiques et non académiques, que l'immersion en environnement interculturel favorise* » (Brassier-Rodrigues C., 2016, p.59).

Cela étant, dès 2016, un rapport du député Jean Arthuis[iii] avait pointé les freins à la mobilité internationale des alternants. En effet, le dispositif de formation en alternance n'est pas harmonisé en Europe, comme c'est le cas depuis 2010, avec le processus de Bologne pour *l'espace européen de l'enseignement supérieur*. Pour mettre en place ce projet, il faut prendre en compte les pratiques de 28 pays différents. Pour chaque ministère de l'Enseignement Supérieur, les difficultés pratiques seraient, notamment, de mesurer quels sont les secteurs professionnels qui, à l'étranger, sont demandeurs tout en répondant simultanément aux critères d'enseignements nationaux.

En France, si la récente *loi pour la liberté de choisir son avenir professionnel* du 5 septembre 2018 a levé certains obstacles juridiques pour faciliter la mobilité internationale des étudiants-alternants (Storaï C. et Rinieri L., 2019), le focus que s'est fixé la ministre du Travail, Muriel Penicaud, d'atteindre 15 000 apprentis en Erasmus pro[iv], risque de ne pas être une sinécure.

Des Référents « Mobilité Internationale » Dans Les CFA Et Une Exonération D'une Partie Des Obligations De L'entreprise Prévus Par La Loi

Jusqu'en 2018, les rares apprentis qui ont bénéficié de la mobilité européenne étaient issus de centres de formation particulièrement volontaristes. Concrètement, la mobilité est effective lorsqu'il y a une équipe dédiée à cette problématique. Il est indispensable que la mobilité soit structurée autour de référents mobilité visibles et identifiables par l'ensemble des acteurs.

Le décret n° 2019-1086 du 24 octobre 2019 portant diverses dispositions relatives à la mobilité à l'étranger des apprentis et des bénéficiaires de contrats de professionnalisation[v] précise les modalités de mise en œuvre de la mobilité des alternants dans ou hors de l'Union européenne, notamment le contenu des relations conventionnelles qui lient l'apprenti ou le bénéficiaire de contrat de professionnalisation, l'employeur en France, l'employeur à l'étranger, le centre de formation en France et le centre de formation à l'étranger. Il prévoit également que l'organisme ou le centre de formation en

France se substitue à l'employeur pendant la période de mobilité, s'agissant du versement des cotisations relatives aux accidents du travail et maladies professionnelles, pendant la période de mobilité longue, exonérant l'entreprise d'une partie de ses obligations.[vi]

La mise en œuvre de projets de mobilité européenne et internationale pour les alternants dans les CFA nécessite de mobiliser une ingénierie dédiée. Cette ingénierie de la mobilité internationale, exercée autrefois souvent de manière informelle par les équipes pédagogiques et/ou administratives des CFA, s'est au cours des dernières années largement professionnalisée eu égard aux compétences spécifiques requises pour mener à bien ce type de projets.

Considérant cette réalité et en conformité avec l'article 24 de la loi du 5 septembre 2018, les CFA devront se doter de *« référents mobilité »* dont les caractéristiques principales du travail exercé recouvrent une gamme étendue d'activités (gestion administrative et financière, organisation, construction et animation des partenariats, coordination et communication…). L'implication des staffs de direction et la mobilisation collective des équipes pédagogiques et éducatives est une condition première du développement de mobilité longue des alternants. L'organisation de la mobilité requiert des compétences croisées de nature juridique, réglementaire, pédagogique ou organisationnelle qui devront être pleinement déployées au sein des CFA.

Au-delà d'une expérience de vie personnelle valorisant une employabilité future pour l'étudiant-alternant, le dispositif de mobilité internationale est également profitable pour sa structure d'accueil formatrice.

Une expérience internationale autant bénéfique à l'étudiant-alternant qu'à sa structure d'accueil

Beaucoup de travaux de recherche (Cours des Comptes 2019, Brandenburg et alii, 2014 ; Tarrant et ali., 2014) ont été menés sur les compétences acquises par les étudiants lors de la mobilité internationale, qu'il s'agisse de semestres d'études ou de stages en entreprises. L'essentiel de ces enquêtes sont des études quantitatives réalisées auprès d'un nombre élevé d'étudiants qui ont rempli, à leur retour de mobilité ou lorsqu'ils sont diplômés, des questionnaires. Fréquemment réalisées immédiatement, ces évaluations *à chaud* ont également été renforcées par des analyses traitant des effets à moyen et long termes de l'expérience internationale.

Dans cette optique complémentaire, Brassier-Rodrigues (2015) a sondé les étudiants, diplômés et en activité professionnelle, au sujet de leur expérience de mobilité internationale deux ans au moins après sa réalisation, afin de comprendre et analyser les compétences qu'ils associent spontanément à celle-ci.

Compétences relatives aux savoir et savoir-faire	Compétences relatives au savoir-être
1. Compétences linguistiques 2. Savoirs académiques 3. Connaissances techniques 4. Méthodes d'apprentissage 5. Méthodes de travail	***Compétences liées au développement personnel*** 6. Connaissance de sa propre culture 7. Connaissance de la culture d'accueil 8. Empathie, écoute, tolérance, patience 9. Curiosité, ouverture d'esprit 10. Organisation, débrouillardise, rigueur, sens des responsabilités 11. Adaptation 12. Gain de confiance, indépendance, ténacité, autonomie
	Compétences relationnelles 13. Communication interpersonnelle : compétences linguistiques et langagières 14. Intégration sociale : dans un groupe, constitution de réseaux de contacts, etc.

Source : Brassier- Rodrigues, ibid, page 47.

Au final, les réponses formulées par les répondants à l'occasion des différentes études confirment l'éventail des compétences acquises en communication interculturelle : compétences en langue, en adaptation, en empathie, en communication interpersonnelle, en intégration sociale et, enfin, en connaissance de la culture d'accueil en sus de l'adaptabilité et du gain de confiance issus de l'expérience internationale.

Dans le cadre du dispositif de l'alternance, aucune étude n'a démontré, à ce jour, le bénéfice potentiel acquis par la structure d'accueil de l'étudiant-alternant dans le cadre d'une mobilité internationale co-construite intégrant les référentiels de compétences propres à chaque cursus de formation suivi. C'est précisément l'objet de notre réflexion exploratoire et sa prospective globale au niveau de l'économie d'un petit territoire insulaire assimilable à celui de la Corse.

En effet, depuis septembre 2018 et en coordination avec l'évolution législative du 5 septembre 2018, le CFA Universitaire en région Corse s'est engagé dans une politique volontariste visant à construire des parcours de mobilité internationale des quelques 400 étudiants-alternants de l'Université de Corse, dans une perspective duale tenant compte simultanément des aspirations estudiantines et des attentes en matière de compétences complémentaires exprimées par les structures d'accueil (entreprises, associations et collectivités locales).

Fort de plus 1500 partenaires entrepreneuriaux et institutionnels ayant accompagné la formation de près de 3500 étudiants-alternants depuis sa création en 2009 (Storaï C. et Rinieri L., 2019), le CFA UNIV et ses équipes pédagogiques se sont évertués à aménager des référentiels de compétences intégrant des missions spécifiques relatives à la mobilité internationale des étudiants-alternants.

La construction d'une économie de la compétence véhiculée par la mobilité internationale des étudiants-alternants en quête de fondement

En Corse, la promotion et le développement de l'alternance de même que la problématique de la qualité de l'insertion professionnelle des étudiants-alternants de l'Université de Corse, notamment en matière de sensibilisation à l'entrepreneuriat, a révélé l'enjeu stratégique de la maitrise des fondamentaux

managériaux au cœur de la dynamique de développement et de structuration du territoire corse (Storaï, Rinieri et Rezzi, 2017), renforçant ainsi ce que d'autres auteurs ont démontré dans un cadre plus théorique (Marchesnay et alii, 2006) ou global (Drucker, 2016).

L'économie insulaire locale se caractérise par l'absence des grands groupes multinationaux qui dirigent et façonnent l'économie mondiale. On ne remarque pas davantage l'existence de moyennes entreprises qui, dans bien d'autres régions à l'instar de la Lombardie, constituent le fer de lance d'une économie dynamique. Le tissu économique corse est constitué majoritairement de très petites entreprises, de petits agriculteurs et producteurs, d'artisans, de commerçants. L'enjeu de la structuration d'un écosystème entrepreneurial spécifique par une politique régionale de FTLV adaptée revêt donc une importance stratégique dans la perspective de construction d'un schéma de développement local pérenne.

La mobilité internationale des étudiants-alternants au centre d'un dispositif de FTLV bénéfique à la structuration d'une petite économie insulaire

La Corse présente également l'exemplarité d'un territoire caractérisé par un vieillissement de sa population active impliquant un nécessaire ajustement à moyen terme des stratégies régionales de formation en réponse à cette réalité. Levier majeur du développement territorial et de la régulation sociale, le dispositif insulaire de formation doit adapter son offre dans la perspective ciblée de l'adéquation de la relation emploi-formation. Le dispositif de formation en alternance, la formation professionnelle continue et plus globalement la FTLV constituent ainsi les deux faces d'un même joyau au service d'un schéma de construction des compétences, des qualifications et de l'employabilité des ressources humaines disponibles et actives sur un territoire donné.

Dans un petit territoire insulaire caractérisé par un tissu économique composé de 95% d'entreprises de moins de 10 salariés, la vocation à la fois ancrée et intemporelle du CFA UNIV consiste à contribuer à la valorisation de l'insertion professionnelle des étudiants-alternants de l'Université de Corse, par le développement et l'adaptation des stratégies de formation fondamentales pour l'émergence et la stimulation de la disponibilité en ressources humaines qualifiées et de la logique entrepreneuriale qui repose sur les activités innovantes à forte croissance potentielle (Marchesnay et alii, *ibid*).

Dans ce contexte spécifique, la structuration du tissu économique local est largement impacté par le maillage des différents acteurs (les CFA, la région Corse, les entreprises, les associations, les collectivités locales, les Opérateurs de Compétences (OPCO), les maisons de l'emploi, les chambres consulaires) dans le cadre d'un Contrat de Plan Régional de Développement des Formations et de l'Orientation professionnelles (CPRDFOP) qui a fixé, sur la période 2018-2022, des objectifs clairement centrés sur la réponse aux besoins de acteurs locaux en matière de sécurisation des parcours vers l'emploi et d'acquisition des nouvelles compétences avérées via la mobilité des étudiants (inter-régionale, nationale et internationale).

Un processus de mobilité internationale des étudiants-alternants pragmatique et exploratoire à l'initiative du CFA UNIV

Dans son contrat d'établissement quadriennal 2018-2022, l'Université de Corse a inscrit, au cœur de ses axes stratégiques, l'approfondissement du développement de l'alternance et l'internationalisation accrue de son offre de formations. Néanmoins, la réalité actuelle révèle des situations hétérogènes selon les composantes pédagogiques : alors que l'Ecole de Management et d'Economie (IAE de Corse) impose la mobilité internationale des étudiants (stages) et des étudiants-alternants (dans le cadre d'un contrat d'apprentissage et de professionnalisation) pour accéder à la diplomation de ses Masters *Sciences du Management* (sauf si la césure internationale a été effectuée avant l'inscription dans un cursus proposé)[vii], les autres Instituts ou Facultés (IUT, INSPE, Ecole d'Ingénieurs Paoli Tech, Facultés de Droit, de Lettres et Arts, des Sciences, Département Santé) ont opté pour offrir l'opportunité de bénéficier d'une mobilité internationale estudiantine seulement à titre optionnel.

Ce constat n'engendre pas, pour l'heure à l'Université de Corse, la mise en place d'une politique générale homogène relative à la mobilité internationale des étudiants, ce qui a conduit le CFA UNIV à proposer un processus spécifique, pragmatique et exploratoire en la matière concernant les étudiants-alternants.

Partant du caractère obligatoire de la mobilité et de sa durée variable (8 semaines à 6 mois), les référentiels de compétences des Masters *Manager Entrepreneur, Marketing et Ressources Humaines* ont été remaniés dans un double objectif :

- apporter une plus value pédagogique et opérationnelle aux missions dévolues aux étudiants dans le cadre de leur mobilité internationale ;
- répondre aux perspectives stratégiques déterminées par les structures d'accueil en matière de développement international.

Par exemple, *l'Union des Vignerons de l'île de Beauté (UVIB)*, cave coopérative qui exporte 75% de sa production, souhaite développer une nouvelle marque *Terra Corsa* destinée en priorité aux marchés internationaux. Dans cette optique, elle proposera à trois étudiants-alternants de mettre en place un PMI[viii] et la création d'un réseau de distribution internalisé à cet effet.[ix]

La franchise *Cuir Center*, spécialisée dans la vente de canapés et de mobiliers haut de gamme, souhaite créer un cluster méditerranéen et soumet à deux étudiants-alternants une mobilité internationale au siège social européen du groupe *Roche Bobois* en Italie afin de décliner cette stratégie par grandes problématiques RH, fixer des objectifs généraux et spécifiques par site/population/département...[x]

L'extension d'un processus de mobilité internationale pragmatique et exploratoire des étudiants-alternants permettant de valoriser l'insertion professionnelle et l'employabilité des ressources humaines figurent désormais au nombre des prérogatives essentielles du CFA UNIV. La structuration, le développement et l'attractivité d'une petite économie territoriale insulaire inhérents à son évolution en particulier, et plus généralement à celles des centres de formation, en constituent un enjeu sous-jacent.

Conclusion

A l'heure où l'économie de la connaissance et de la compétence est véhiculée comme LA solution de sortie d'une crise endémique, le CFA UNIV s'efforce de contribuer, notamment, à la construction d'un schéma consolidé et pérenne de structuration du tissu socio-économique par la gestion optimisée d'un dispositif renforcé de formation/information, d'encadrement et de suivi individualisé de l'orientation professionnelle des étudiants-alternants de l'Université de Corse.

Si L'enjeu essentiel de la loi *pour la liberté de choisir son avenir professionnel* concerne la nature des compétences placée au centre du projet individuel de formation de chaque citoyen, mais également considérée comme la pierre angulaire de la réponse appropriée aux besoins des entreprises en matière d'embauches, rien ne garantit que la recentralisation du dispositif de FTLV assurera le pari de la confiance dans les acteurs, les entreprises, les salariés et les partenaires sociaux dans l'optique de lever les freins à l'embauche des entreprises et de sacraliser la notion de compétences comme un enjeu primordial au cœur du projet professionnel tant individuel que collectif (Storaï C. et Rinieri L., 2019). Quand bien même les branches professionnelles nationales co-construiront les diplômes des formations professionnelles avec l'Etat afin de mieux répondre aux besoins en compétences des entreprises, il n'en demeure pas moins que les liens, jusqu'alors concrets, entre les régions et les CFA encourront un risque de distension au détriment d'un développement propre des compétences indispensables aux entreprises locales.

Dès lors, il appartiendra aux CFA régionaux, en qualité d'agents développeurs de formations diplômantes et qualifiantes en symbiose avec les attentes exprimées par un tissu économique local, de développer une nécessaire capacité d'innovation dans l'ingénierie pédagogique des actions menées permettant tant la croissance de qualification des étudiants que la conversion ou la reconversion des parcours professionnels au bénéfice d'un petit territoire ilien en quête d'attractivité.

C'est là tout l'enjeu de l'émergence d'un nouveau modèle de FTLV, gage de l'évolution et de la sécurisation des parcours professionnels, auquel le CFA UNIV cherchera à contribuer par l'évolution de sa dynamique d'activité. Nul doute que l'opérationnalité de la mobilité internationale des étudiants-alternants, que chaque acteur de la formation appelle de ses vœux, en constituera la pierre angulaire particulièrement dans le cadre d'une économie locale spécifique et identitaire comme celle de la Corse.

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[ii] http://www.uis.unesco.org/education/

[iii] « Erasmus pro: lever les freins à la mobilité des apprentis en Europe », *Rapport de Jean Arthuis, député européen,* Ministère du travail, République Française, janvier 2018.

[iv] Erasmus +, un tremplin à l'international pour les apprentis, https://www.letudiant.fr/educpros/actualite/erasmus-tremplin-international-apprentis.html

[v] JORF n°0250 du 26 octobre 2019 texte n° 13.

[vi] JORF n°0026 du 31 janvier 2020 textes n° 34 et n° 35.

[vii] Cf. La circulaire n°2019-030 du 10 Avril 2019.

[viii] Plan Marketing International.

[ix] « *Grâce à une mobilité internationale de 2 mois au Maghreb et de 3 mois en Asie du Sud-Est* », selon Eric Pinelli, directeur adjoint, administratif et financier de l'UVIB.

[x] D'après Jean Pierre Battistelli, gérant de la franchise Cuir Center en Corse.

The Impact of Microeconomic and Macroeconomic Factors on Financial Structure of US Listed Companies

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Abstract

The paper explores the microeconomic and macroeconomic drivers of financial structure, for a sample of 30 companies listed on the New York Stock Exchange, which are part of the technology sector, over the period 2005-2018. The financial structure was assessed via long-term debt rate, short-term debt rate and total debt rate, whereas the size of the company, tangibility of assets, growth opportunity, effective tax rate and financial return were selected as microeconomic factors, alongside macroeconomic indicators concerning interest rate, inflation rate and gross domestic product per capita. The empirical outcomes by means of panel data regression models provided support for a positive influence on financial structure of natural logarithm of total assets, financial return, effective tax rate, interest rate and gross domestic product per capita. However, tangibility of assets showed mixed associations with financial structure, whereas sales variation and inflation rate proved the lack of statistical significance.

Keywords: Financial Structure, Microeconomic And Macroeconomic Factors, Panel Data Regression Models

Introduction

The financial structure of companies differs in the emerging and developed countries. In some countries, the financial system is oriented towards the bank-based market, while in other countries, it is oriented towards the capital market. In the specialized literature there are studies that capture the differences regarding the financial structure using culture, history, politics, legislation as analysis factors. And yet, the influence of these factors remains unclear, despite the existence of many empirical studies on this topic. One explanation could be that most studies focus on proving a certain theory, as proof. Nevertheless, up to the present moment, no clear delineation between the strengths and weaknesses of the theories can be made.

Most studies on financial structure have focused on non-financial companies with access to the American capital market or other international markets. These companies have a variety of financing sources to choose from and can be adjusted at a relatively low cost. Researching financing strategies emphasizes the importance of agency costs, information asymmetry and taxes. The question remains if these factors have a major effect on the debt / equity ratio. Most of the investments of the American companies were financed from internal funds. External financing covers less than 20% of investments, and a large part of this is represented by loans. Of course there are companies that focus strongly on the issue of shares, but they tend to be smaller, riskier and with a faster development rate.

The debt ratios of listed US companies vary by industry. For example, oil companies have relied on loans as external financing, while those in the pharmaceutical industry have negative debt ratios, which

have large holdings of cash and market securities. In general, debt rates are low or negative when profitability and business risk are high (Myers, 2001).

In the technology industry, where companies are constantly innovating and evolving, having to meet the needs of consumers, which are always changing, creates a high level of risk and profitability. Therefore, it is utmost important to study what financing strategies these companies choose to adopt given this highly competitive and volatile market. In this paper we set out to analyze what factors influence the financial structure of technology companies listed on the New York Stock Exchange.

1. Literature review

There are many theories in the literature regarding the financial structure, but only a part of them have been positively evaluated by critics. Trade-off theory (Kraus & Litzenberger, 1973), one of the most important theories, argues that capital structure is characterized by a trade-off between the benefits of borrowing and its costs. Thus, the company should balance the fiscal benefits, due to debt financing, with the related costs, which increase the risk of bankruptcy. From an agent theory perspective (Jensen & Meckling, 1976), indebtedness can reduce agency costs by disciplining managers to act in the firm's interest, to the detriment of their own interest. Although the debt mitigates, on the one hand, the conflict between managers and shareholders, it can intensify, on the other hand, the conflict between shareholders and creditors.

The pecking order theory is based on the ordering of the sources of financing, under the conditions of information asymmetry, namely: internal sources, non-risky debts and issue of shares. From the point of view of an external investor, the issue of shares is much riskier than the debt, he can perceive the company as a solid one. However, a rational investor should reassess the value of the shares when announcing the issue. From the employee's perspective, internal funds are a much safer and more favorable source, when it is possible to use them. If their level is not tailored to their needs, then they will have to reorient themselves to loans, the issuance of shares being used ultimately.

From the mid-1980s to the present, there have been many empirical researches that aimed to compare and distinguish the predictive powers of the famous theories, the most common being those formulated as a comparison between the trade-off theory and pecking order theory. While older works have focused on developed markets, such as the US, recent ones have focused on testing theories in the context of emerging economies. However, the evidence from both categories of studies is quite mixed, some supporting the trade-off theory, while others support the pecking order theory. The researchers tried to modify or improve existing theories, develop new ones, use different types of data and methods, in order to resolve this controversy between the two theories. Despite considerable progress, this subject has yet to be clarified.

A list of factors that claim to have some influence on the capital structure can be extracted from the literature. Rajan and Zingales (1995) used four independent variables in their paper: profitability, tangibility, size, growth. These firm-specific variables are explained below.

- Profitability

Trade-off theory supports a positive relationship between profitability and debt. Profitable companies have lower costs in terms of financial distress and consider that tax deductions are much more valuable (Han-Suck, 2005). The pecking order theory highlights a negative relationship between profitability and debt, as profitable firms tend to reinvest profit to sustain investments, to the detriment of external financing (Titman & Wessels, 1988), (Rajan & Zingales, 1995), (Krishnan & Moyer, 1996). From the point of view of agency costs, debts involve a smaller free cash flow available to managers.

- Tangibility

Trade-off theory supports a positive relationship between tangibility of assets and debt. This is due to the fact that tangible assets can be offered as collateral, and at the same time they suffer a lower value loss if the company faces financial distress (Rajan & Zingales, 1995). The pecking order theory considers that there is a negative relationship between tangibility of assets and debt (Demirguc-Kunt & Maksimovic, 1999). The low information asymmetry associated with the tangibility of assets causes a decrease in the issue of shares costs. Thus, debt rates should be lower for firms with high tangibility.

- Size

Trade-off theory states that there is a positive relationship between firm size and debt. Larger companies are more diversified, and thus have a lower risk of default. Older firms in the market with a better reputation have lower agency costs in terms of debt. Thus, this theory states that larger firms tend to have more debt (Rajan & Zingales, 1995), (Han-Suck, 2005), (Psillaki & Daskalakis, 2008). The pecking order theory opposes and supports a negative relationship between size and debt. Large companies have the ability to use internal funds, but also have the opportunity to issue shares more easily compared to small firms (Alipour & Mohammadi, 2015).

- Growth

Trade-off theory predicts a negative relationship between firm growth and debt. Intangible assets of growing companies may lose much of their value in the event of financial distress. At the same time, growth reduces the problems of free cash flow. In opposition, the pecking order theory states a positive relationship between the two variables. Internal funds are insufficient to support the investment opportunities of the growing companies, which causes an increase in the demand for external financing. Most empirical studies have shown that there is a negative relationship (Alipour & Mohammadi, 2015), (Cortez, 2012).

In addition to the firm-specific factors, macroeconomic factors are of particular importance, thus, many studies including Deesomsak et al. (2004) and De Jong et al. (2008) have shown that economic stability has a considerable effect on the financial structure.

- Inflation

According to Taggart (1985), the characteristics of the U.S. tax code determines the increase of the real value of the tax deductions regarding the interest expenses, when it is estimated that the inflation will be high. Thus, the trade-off theory predicts a positive relationship between debt and inflation. In contrast, it is difficult to observe the effect of inflation on financial decisions, according to the pecking order theory (Frank & Goyal, 2008).

- The gross domestic product

The growth of the gross domestic product can be regarded as a measure of the growth possibilities available for companies in an economy. In a developing economic environment, the shortfall of tangible assets in relation to the available investment opportunities, implies a large loss of value in the event of financial distress. Thus, the trade-off theory highlights a negative relationship between debt and gross domestic product growth. In contrast, the pecking order theory emphasizes a positive relationship between the two variables, because a large proportion between growth opportunities and internal funds implies a greater need for external funding (Köksal & Orman, 2015).

The objective of this paper is to analyze how the factors which were specified above, influence the financial structure of the company. For this, it is necessary to formulate hypotheses, which will subsequently be affirmed or rejected, as the case may be.

Hypothesis 1 (H1): There is a positive relationship between the size of the company and debt ratio;

Hypothesis 2 (H2): There is a positive relationship between the tangibility of assets and debt ratio;

Hypothesis 3 (H3): There is a negative relationship between the growth opportunity and debt ratio;

Hypothesis 4 (H4): There is a positive relationship between the tax rate and debt ratio;

Hypothesis 5 (H5): There is a negative relationship between the financial return and debt ratio;

Hypothesis 6 (H6): There is a negative relationship between the inflation rate and debt ratio;

Hypothesis 7 (H7): There is a negative relationship between the interest rate and debt ratio;

Hypothesis 8 (H8): There is a positive relationship between GDP and debt ratio;

Data and Methodology

To measure debt we used three indicators, namely, the total debt rate, long-term debt rate and short-term debt rate. According to Rajan and Zingales (1995), the ratio of debt to assets explains much better than the ratio of debt to liabilities, because it clearly indicates whether the company is about to collapse and at the same time provides a much clearer picture of past financial decisions.

The database consists of 30 companies listed on the New York Stock Exchange, which are part of the technology sector. Financial data was collected over the period 2005-2018, from Thompson Reuters and The World Bank databases, the last one being required for macroeconomic variables.

The following table shows the three dependent variables included in the analysis. The estimation of the equations on each variable highlights the influence of the independent variables on the debt structure

Table 1: Dependent variables included in the empirical study

Variable Name	Symbol	Description	Authors
Long-term debt rate	LTD	Long-term debt / Total Assets	Bokpin (2009), Chaklader & Chawla, (2016), Psillaki & Daskalakis (2008), Su (2010), Viviani (2008)
Short-term debt rate	STD	Short-term debt / Total Assets	Viviani (2008), Titman & Wessels (1988), Van der Wijst & Thurik (1993), Amidu (2007)
Total debt rate	TD	Total debt / Total Assets	Eldomiaty & Azim (2008), Ezeoha (2008), Hall, et al. (2004)

Source: Author's own work

The following table includes the independent variables, classified into two categories, namely, firm-specific / microeconomic and macroeconomic factors.

Table 2 : Independent variables included in the empirical study

Variable Name	Symbol	Description	Authors
Microeconomic Indicators			
The size of the company	Size	Natural logarithm of total assets	Psillaki & Daskalakis (2008); Chaklader & Chawla (2016); Su (2010);
Tangibility of assets	Tang	Tangible assets / Total Assets	Bokpin (2009); Chaklader & Chawla (2016); Cortez (2012); Su (2010), Titman & Wessels (1988)
Growth opportunity	Growth	Sales variation	Psillaki & Daskalakis (2008); Karadeniz, et al. (2009); Eriotis, et al. (2007); Ooi (1999)
Effective tax rate	Etax	Tax / earnings before taxes	Karadeniz et al. (2009)
Financial return	ROE	Net income / Equity	Chaklader & Chawla (2016)
Macroeconomic Indicators			
Interest rate	Interest	Interest rate	Bokpin (2009)
Inflation rate	Inflation	Inflation rate	Bokpin (2009)
Gross domestic product per capita	GDP_cap	Gross domestic product / number of inhabitants	Bokpin (2009)

Source: Author's own work

The influence factors will be studied based on the multiple regression model, using the least squares method, the data being panel type.

$$Financial_structure_{i,t} = \alpha_0 + \alpha_1 * Size_{i,t} + \alpha_2 * Tang_{i,t} + \alpha_3 * Growth_{i,t} + \alpha_4 * Etax_{i,t} + \alpha_5 * ROE_{i,t} + \alpha_6 * Inflation_{i,t} + \alpha_7 * Interest_{i,t} + \alpha_8 * GDP_cap_{i,t} + \varepsilon_{i,t}$$

where Financial_structure = TD, LTD, STD;

α_0 = constant;
$\alpha_1 .... \alpha_8$ = coefficients of the parameters;
ε = error term;
t = 2005....2018;
i = 1, 2....30;

Empirical Outcomes

The table below presents the descriptive analysis of the dependent and independent variables. The average total debt ratio stands at 20%, underlining the fact that firms use other sources of financing, such as internal funds or equity issues. The median is below the average for all three types of debt, this divergence being accentuated by the short-term debt rate. Thus, most companies prefer to borrow for short term rather than long term. Moreover, the growth variable has the largest variance, the mean being significantly higher than the median.

Table 3: Descriptive statistics

Variable	Observations	Mean	Median	Maximum	Minimum	Standard Deviation
TD	369	0,2042	0,1862	1,1913	0,0006	0,1501
LTD	369	0,1898	0,1600	1,3639	0,0006	0,1537
STD	369	0,2717	0,2258	0,6829	0,0238	0,1569
Size	369	8,1794	7,7664	18,6037	3,8897	2,5436
Growth	369	106,6581	7,4228	28600,00	-81,4106	1489,995
Tang	369	0,3210	0,2408	1,2117	0,0002	1489,995
ROE	369	0,1232	0,1170	1,8810	-1,2560	0,2165
Etax	369	0,3010	0,2970	6,8610	-0,8930	0,4277
Interest	369	0,1400	0,1366	0,1605	0,1295	0,0086
Inflation	369	0,0200	0,0210	0,0410	0,0010	0,0102
GDP_cap	369	52396,08	51556,0	62996,0	44026,0	5581,474

Source: Author's own work in Eviews 10

The rate of financial return is around 12% and is positively correlated with all the three dependent variables, according to Table 4. The size variable, as well as the interest rate, are also positively correlated with the dependent variables. The tangibility of assets and growth opportunity are negatively correlated only with the short-term debt ratio. The technology sector is in full development, and from the statistical point of view, according to Table 3, the average growth is 106%. The inflation rate is negatively correlated with the total and long-term debt, while the gross domestic product per capita is negatively correlated only with the short-term debt rate.

Table 4 The correlation matrix

	TD	LTD	STD	Growth	Size	ROE	Tang	Etax	Inflation	Interest	GDP_cap
TD	1	0,98	-0,26	0,11	0,09	0,03	0,14	0,09	-0,04	0,11	0,17
LTD	0,98	1	-0,29	0,13	0,05	0,02	0,16	0,10	-0,04	0,10	0,17
STD	-0,26	-0,29	1	-0,07	0,02	0,20	-0,25	-0,02	0,05	0,07	-0,02
Growth	0,11	0,13	-0,07	1	-0,03	-0,03	0,11	0,80	0,07	0,03	-0,08
Size	0,09	0,05	0,02	-0,03	1	0,06	-0,21	-0,09	-0,03	-0,01	0,04
ROE	0,03	0,02	0,20	-0,03	0,06	1	-0,13	-0,05	0,05	0,07	0,09
Tang	0,14	0,16	-0,25	0,11	-0,21	-0,13	1	0,02	0,02	0,05	0,00
Etax	0,09	0,10	-0,02	0,80	-0,09	-0,05	0,02	1	0,06	-0,02	-0,13
Inflation	-0,04	-0,04	0,05	0,07	-0,03	0,05	0,02	0,06	1	0,35	-0,37
Interest	0,11	0,10	0,07	0,03	-0,01	0,07	0,05	-0,02	0,35	1	0,16
GDP_cap	0,17	0,17	-0,02	-0,08	0,04	0,09	0,00	-0,13	-0,37	0,16	1

Source: Author's own work in Eviews 10

After estimating the regressions for the three dependent variables we obtained the coefficients presented in Table 5.

Table 5 : Estimated coefficients of the model

Independent Variable ↓	Dependent Variable ↓		
	TD	**LTD**	**STD**
Growth	5,25E-06 (0,60)	5,11E-06 (0,57)	-1,11E-05 (-1.24)
Size	0,008 (2,97)**	0,005 (1,65) †	-0,0029 (-0.95)
Tang	0,09 (3,006)**	0,10 (3,29)***	-0,13 (-4.26)***
ROE	0,011 (0,31) †	0,02 (0,57) †	0,11 (3.33)***
Etax	0,02 (1,27)*	0,03 (1,08) †	0,029 (0,94) †
Inflation	0,08 (0,10)	-0,20 (-0,22)	-0.09 (-0.11)
Interest	1,25 (1,27) †	1,81 (1,15) †	1.08 (1,09)
GDP_cap	5,05E-06 (3,29)***	4,52E-06 (2,81)**	-1.16E-06 (-0.75)
R^2	0,09	0.08	0.08
F-statistic	4,84***	4,16***	4.94***

*Statistical significance: †p < .10; *p < .05; **p < .01; ***p < .001.*

Source: Author's own work

The growth variable was positive in relation to the variables, but statistically insignificant, this assumes the rejection of the previously formulated hypothesis. Chaklader and Chawla (2016), Psillaki and Daskalakis (2008) also obtained an insignificant relationship, while Cortez (2012) obtained a negative relationship.

The inflation rate also presents a statistically positive and insignificant relationship with the three variables, which suggests the rejection of hypothesis H6. The variable of size has positive and statistically significant coefficients, in relation to the total debt and long-term debt rate. In relation to the short-term debt ratio, the coefficient is negative, but not statistically significant. Thus, we can accept the first hypothesis and support trade-off theory, according to which there is a positive relationship with the debt ratio, because the larger and more diverse firms tend to have more debt. The tangibility of the assets has positive coefficients, for the total debt rate, respectively for the long term, and statistically significant ones. The second hypothesis is accepted, and trade-off theory proves to be applicable again. Companies in the technology sector, which have an average tangibility of assets about 32%, according to Table 3, offer tangible assets as collateral for contracting bank loans. The financial return variable was statistically positive and significant compared to the three dependent variables. In this case, it is necessary to reject hypothesis 5 which supported a negative relation, and at the same time, to highlight the applicability of the trade-off theory. The effective tax rate has a positive and statistically significant relationship with all the three dependent variables, the fourth hypothesis being accepted. As a result of a high effective tax rate, companies will benefit from substantial tax deductions when they are indebted. The interest rate has positive and significant coefficients, less compared to the short-term debt ratio, hypothesis 7 is rejected. The gross domestic product per capita is also statistically significant and positive, in relation to the total and long-term debt ratio. Hypothesis 8 is accepted, but in this case the pecking order theory proves its applicability. However, companies with high investment opportunities also need external financing.

Conclusions

In this paper, the influence of the main factors on the financial structure, such as size, growth, profitability, tangibility, was sought. Our results show that tangibility, profitability, size, effective tax rate, interest rate and gross domestic product per capita are relevant determinants. The positive coefficients of the variables on total debt rate and long-term debt demonstrate that companies in technology sector rely on debt financing. These findings are consistent with trade-off theory. On short-term level, tangibility and gross domestic product per capita have a negative impact. In this case, we confirm the applicability of pecking order theory. Therefore, the firm-specific variables, but macroeconomic variables as well, impact debt ratios differently. Technology companies have various financing strategies to leverage, such as venture and bank debt. It seems that, companies, in order to financially support their operations, have no retainers to borrow.

The capital structure is determined by many more firm-specific factors, such as business risk, but also by industry-specific and macroeconomic factors, as we have shown in this paper. Economic stability is reflected in the proper functioning of companies and has an effect on their financial decisions. This empirical study is limited, because the database is made up of a small number of companies over a relatively short period of time. This topic can be extended in many directions in the future.

According to the literature, we have obtained mixed results regarding the applicability of theories. Of course, in this case, the trade-off theory has proven to be far more relevant than pecking order theory. Thus, the controversy of the two theories is far from clear.

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Teacher Competence in Implementing Technology, Pedagogic, Content, And Knowledge (TPACK) In Learning of Industrial Revolution 4.0

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Abstract

Curriculum 2013 in implementation implies that professional teachers in learning activities must be able to follow the learning process in the era of the industrial revolution 4.0 based on TPACK (Technology, Pedagogical, Content, Knowledge). However, learning in the era of the industrial revolution 4.0 requires teachers to utilize pedagogical abilities in integrating digital literacy technology and knowledge in developing creative content in accordance with the demands of the times. This study aims to describe the ability of teachers to implement the learning process of the 2013 curriculum based on TPACK which is focused on the countenance evaluation model: (1) antecedents, (2) transactions, and (3) outcomes. The method used in this research is a descriptive-qualitative approach by taking a population and random sampling from 100 teachers in one province in Indonesia. Data collected through questionnaire, documentation, observation, and interview methods. The results show that the ability of teachers to implement TPACK-based curriculum 2013 based on the Countenance Stake's analysis can be concluded that the lowest component among the components of knowledge, pedagogy, content, and technology is the ability to use technology. As a recommendation there needs to be serious attention to the procurement and improvement of school facilities and infrastructure especially those related to learning technology.

Keywords: Teacher Ability, K-13 based on TPACK, *Countenance Stake's* Evaluation.

Introduction

In applying the 2013 curriculum, professional teachers are not only required to master pedagogical content but are also expected to be able to master technology in learning, and be able to utilize/develop the latest technology in the learning process. TPACK-based curriculum 2013 is how the teacher's method/strategy in conveying knowledge to students in facilitating learning starting from planning certain content (subject matter) through pedagogical approaches and utilizing/developing learning technology. Moreover, the latest learning challenges in the industrial era 4.0 teachers must have the ability of Technological Pedagogical and Content Knowledge or abbreviated TPACK properly. TPACK is knowledge of how to facilitate student learning of certain content through pedagogic and technological approaches (Cox, S., & Graham, C. R, 2009; Mishra & Koehler, 2006; Shulman, 1986). TPACK is considered as a framework that can potentially provide new directions for teachers and

students in solving problems related to integrating ICT into teaching and learning activities in the classroom (Chai, CS, Koh, JHL, Tsai, CC, & Tan, LLW 2011). By integrating ICT into learning activities, teachers are expected to be able to answer the challenges of learning in the era of the industrial revolution 4.0.

One of the big challenges faced by teachers in the industrial era 4.0, is adaptation and digital literacy. Adaptation is about the effects that arise. For example; the basics of the correctness of knowledge and the status of each information authority at issue. The industrial revolution 4.0 made a time when technology and information provided billions of knowledge data to anyone who could access it, so that teacher status and authority could be questioned (Irawan, YS, & Koesoema, AP, 2015). In this era the value of knowledge is no longer a teacher's monopoly. Because, people live a world in which there are values of knowledge that can be accessed by anyone. The second basic ability for teachers in the industrial revolution 4.0 era is digital literacy, scientific literacy, cultural literacy, and citizenship, as well as critical thinking literacy. The communication space on social media that is so broad and easy, with a variety of patterns and issues, requires clarity of thought to understand it. The depth of analysis and clarity of mind, makes it possible to explore other aspects of the development of social media. Because if not, it is difficult for teachers and students to distinguish whether the received digital content is good and right on target for learning objectives.

This situation certainly makes the teacher's role as a teacher and transmits knowledge and knowledge needs to be revitalized again. Learning activities began to diversify, which used to be a lot carried out in the classroom (Synchronous), now it has become more flexible. Learning activities can be done anywhere, anytime, and with anything (Asynchronous). The emergence of the Learning Management System (LMS) program and the use of interactive and portable media and learning resources. And the presence of learning activities based on blended learning, hybrid learning, distance learning, web-based learning, open and distance learning. Changes to the curriculum in Indonesia, in fact, add new problems in education, especially for the readiness of teachers to implement it. The implementation of the 2013 curriculum which has been running for 5 (five) years is felt to be still not evenly implemented, including in the city of Banjarmasin. There are still many schools that will only be implementing the 2013 Curriculum starting in 2018 and there are still many schools that have not implemented the 2013 Curriculum in Banjarmasin. The results of the 2017 study showed that the ability of teachers to conduct 2013 Curriculum assessments and the ability of students to conduct material reasoning activities especially in concluding information was still relatively low (Mansur, H., & Mastur, 2018).

For the current conditions so that teachers are able to present learning that is relevant to the conditions of the all-digital era, teachers only need to be given continuous technological understanding or literacy. When all teachers have been technology literate and are no longer allergic to technological change and development so quickly, the challenges of learning in the era of the industrial revolution 4.0 or the ability of teachers to deliver technology-based learning (TPACK) can be faced to be better, right on target, and meaningful. Departing from the several descriptions above, this study aims to describe the ability of teachers in implementing TPACK-based K-13 learning processes that are focused on countenance stakes evaluation model: (1) antecedents, (2) transactions, and (3) outcomes and to find out problems in the application of the 2013 curriculum in the city of Banjarmasin. For this purpose, the results of this study in the form of data about the ability of teachers to integrate knowledge, technology, pedagogy, and content in the learning process.

A Literature Review

21st Century teachers must have knowledge as well as skills in using various technological devices both traditional and modern to facilitate learning and improve learning outcomes (Graham, RC, Burgoyne, N., Cantrell, P., Smith, L., St. Clair, L., & Harris, R., 2009). TPACK is a type of new knowledge that teachers must master to be able to integrate technology well in learning and measurement (Koehler, M., & Mishra, P., 2009). TPACK is an activity of assessing the level of mastery of TPACK carried out using the TPACK framework, and the development of TPACK is a continuation of the measurement process carried out to improve the mastery of TPACK itself (Archambault, LM, & Barnett, JH, 2010). TPACK can be used as a framework for designing teacher education curricula that

is more in line with the era and demands of 21st Century learning (Rahmadi, 2019). Role TPACK's in the ability to compile learning tools using the POST-PACK learning model (Niess, ML, 2011). TPACK has an important role and has a strong influence on the ability to compile learning tools. In addition, the results of the study showed that TPACK and the ability to compile learning tools showed a significant influence (Sholihah, MA, Yuliati, L., & Wartono, W., 2016). The integration of ICT into the curriculum certainly involves the three basic dimensions of TPACK, namely TK, PK, and CK (Sukaesih, S., Ridlo, S., & Saptono, S., 2017). In TPACK there are 3 main knowledge or foundation of TPACK itself, namely Technology Knowledge, Pedagogy Knowledge, and Knowledge Context. Which later will form interconnected slices that are Pedagogical Content Knowledge, Technological Content Knowledge, Technological Pedagogical Knowledge, and Technological, Pedagogical, Content Knowledge. According to the 2013 curriculum structure which also applies to junior high school education, according to Minister of Education and Culture Regulation No. 65 of 2013 concerning Basic and Secondary Education Process Standards, the learning principles used are the use of information and communication technology to improve the efficiency and effectiveness of learning (Iftitah, KN, 2017).

Methodology

The subjects in this study were junior high school teachers in Banjarmasin, who on average had received educator certificates. The distribution area consists of 20 Middle Banjarmasin District Middle School Teachers, 20 South Banjarmasin District Middle School Teachers, 20 East Banjarmasin District Middle School Teachers, 20 West Banjarmasin District Middle School Teachers, and 20 Middle Banjarmasin District Middle School Teachers with a total of 100 people consisting of 50 men and 50 women. Data collected through questionnaire, documentation, and observation methods. The questionnaire method contains 24 statements which partly adapted from the evaluation instrument of K-13 learning implementation and some researchers formulated to be able to obtain the required data related to the indications of antecedents, transaction, and outcome components. The documentation method is carried out by examining the teacher's teaching completeness documents, curriculum and syllabus, learning implementation schedule, and students' score recap. The observation method the researcher made a written record of the learning process in the form of transcripts of observations and records of the learning process every day. The three methods are used simultaneously with the aim of triangulating the data of this study, namely the comparison of data between those obtained through questionnaires (by participants), observations (by researchers), and re-examination of documents (examining the truth and completeness of physical evidence).

The collected data is then analyzed using data analysis techniques by Miles and Huberman, which includes data reduction, data presentation, drawing conclusions or data verification (Huberman, 2002). Data reduction is carried out starting from observing the completeness of learning material documents prepared by the teacher, then collecting data during the learning process, to observing the document data of students and teachers' grade scores after the learning process takes place. Presentation of data includes questionnaire data quantification and descriptive description. Data obtained through documentation and observation techniques are presented descriptively-qualitatively. While the data obtained through questionnaires are presented in descriptive-narrative form. The data presentation process is complemented by an analysis that includes empirical logical analysis. The conclusion or verification of data in this study is done by making a judgment or decision whether the K-13 learning activities that have been carried out are in accordance with the original expected goals and the criteria as standardized in drawing conclusions. The conversion of TPACK-based K-13 learning evaluation results is focused on the Countenance Stake's evaluation design which includes: (1) antecedents, (2) transactions, and (3) outcomes into qualitative form to determine the categories of achievement of the learning process. The range of values presented are as follows: Very good: 85% -100%, good: 70% - 84.99%, sufficient: 56% -69.99%, and less 0-55.99% (Arikunto, 2010).

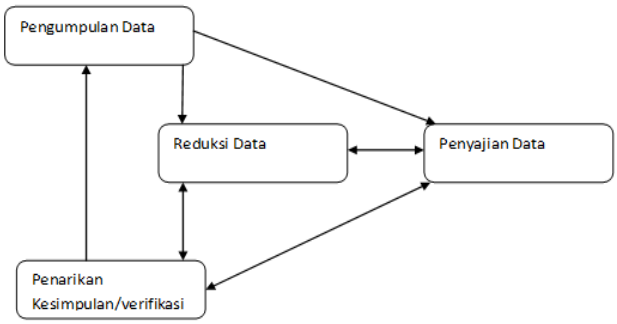

Fig. 1: Data Analysis Techniques by Interactive Model Miles and Huberman

Results and Discussion

1. Antecedents (Learning Planning)

The first learning planning component includes technology knowledge (TK). In the technology knowledge (TK) questionnaire, it includes knowledge of whether the teacher knows and is able to overcome technical problems on the computer, whether the teacher is easy to use technology, whether the teacher follows the latest technological developments, does the teacher have an understanding of the basic components of the computer, whether the teacher is proficient using the program word processors, numbers, and presentation processing programs, whether teachers are proficient at using printers, scanners, projectors, and digital cameras, whether teachers store data on digital media, and whether teachers use the internet as a medium of educational communication. The second learning planning component is about content knowledge (CK). The CK questionnaire includes whether the teacher understands the concepts, laws, and theories taught, whether the teacher knows the history of the development of the material being taught, whether the teacher designs and implements learning, does the material use the latest sources such as books and journals, does the teacher attend the seminar or activity related to the field of science being taught.

From the explanation above, the researcher tried to meet several junior high school teachers in Banjarmasin. There were 20 schools that were successfully visited and 100 teachers that were successfully met. The aim is to determine the ability of technology knowledge (TK) and content knowledge (CK). The ability of technology knowledge (TK) is the ability of teachers to use technology in learning, such as operating computers and relevant software. Data obtained from the interviews show that teachers' understanding of ICT for learning is very diverse. As many as 30% of teachers in Banjarmasin City Junior High School have good ability to use ICT in schools. Then 20% of ICT skills are sufficient or moderate, and the remaining 45% of teachers do not understand or have never used ICT for learning.

The understanding of ICT referred to here is the ability to design and plan learning using computers, the internet, web learning, e-books, and smartphones. As a result of the lack of understanding and ability to use ICT, finally the use of e-learning learning is considered less applied in learning (if not said to be nonexistent). It was seen based on the results of field observations, often found the use of methods and media that are still oriented towards conventional learning. As for teachers who have good and sufficient understanding, this ability is seen in the developed learning design (RPP). The lesson plans developed by teachers who have good and sufficient ability in the use of ICT include the use of the internet, computers, smartphones and LCDs for their learning media. This is also the case with learning resources, they also use e-books and the internet as learning material.

From the above data it can be interpreted that teachers' understanding of the use of ICT is very diverse, but it is more dominant on the lack of ability to use ICT. This means that there are still teachers who

apply learning using conventional methods and media such as the use of lecture methods or also the use of drawing and whiteboard media only. This condition occurs because one of the factors is the involvement of the stakeholders who rarely conduct training of teachers. So that the impact on the lack of teacher understanding of the use of media and methods that are considered more modern. Teacher's understanding of content or what is called content knowledge (CK). Content knowledge (CK) is knowledge about the subject matter to be taught (for example, earth science, mathematics, language arts, etc.). The teacher must understand the subject to be taught including knowledge of facts, concepts, theories, and procedures in a particular field, knowledge of a framework that can regulate and connect ideas and knowledge about rules and also evidence of the content of the knowledge material.

In this section, there are four questions that are asked of teachers. Questions raised focus on the ability of teachers in mastering learning strategies. From the results of research in the field shows that the ability of teachers in understanding learning strategies is quite good. This condition was obtained because the schools which were the subject of the study had a program of learning strategy development workshops conducted at the beginning and at the end of the semester. The workshop was held so that teachers have the ability to modify strategies and have the ability to develop constructivist understanding of the material from the subjects in subsequent learning (Hamalik, O., 2007).

In addition to the foregoing, the ability of CK studied includes the breadth of the material, the depth of the material, the suitability of the material, and the development of the material. The extent of the material from the data produced 50% of the 10 subject schools studied and categorized as not good, this is because the teacher has been able to describe the material in accordance with the basic competencies that exist in the lesson plan. But the teacher has not been able to develop the material and provide the latest information related to the material, this is because the teacher's educational background. With the concept of integrative curriculum in the 2013 curriculum which eliminates the separation of cognate subjects and is integrated in the same family, this becomes a problem for teachers. This can be found in the field when the subject matter is related to biology in natural science subjects while the educational background of teachers graduating from physics education so the teacher does not understand the subject of biology.

Then for the depth of the material to get a score of 20%, the majority of the teachers have included the subject matter in the RPP, but there are still some teachers not including the material in detail. In conveying the material has been able to analogize the material in everyday life, so that the material will be easily accepted by students. The suitability of the material gets a score of 20%. In the lesson plan that has been made by the teacher shows the suitability of the material with basic competencies, objectives and indicators, but between the material and the time of lesson hours has not found any suitability. Material development gets a score of 40%. To develop a subject matter, it is necessary to have reference material. In the RPP the teacher has included reference material such as LKS books, textbooks and the internet. Overall, the ability of content knowledge (CK) gets a percentage of 80% which is included in the good category, while the remaining 20% of teachers do not understand the development of material in the lesson plan or even the teacher does not make any lesson plans at all.

Table 1: Results of TK-CK-Based Learning Planning

No	Antecedents (Learning Planning)	
	Technology Knowledge (TK)	*Content Knowledge* (CK)
1	50%	80%
	Poor Category	Good Category

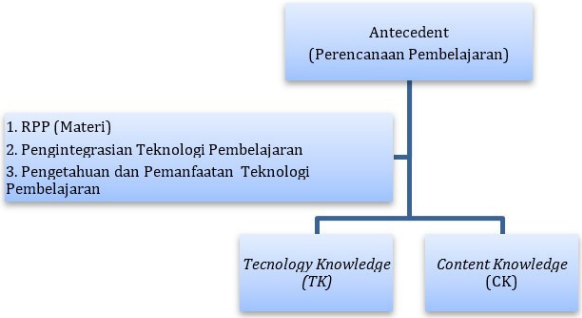

Fig. 2: TK-CK Learning Planning

Transaction (Implementation / Process Learning)

The contents of the pedagogical knowledge (PK) questionnaire include whether the teacher implemented varied learning, whether the teacher was able to manage and master the class well, whether the teacher used various assessment methods and techniques, whether the teacher did reflective actions to improve the quality of learning. In addition, the PK ability research includes aspects of learning strategy knowledge, learning media knowledge, and evaluation knowledge. Based on interview, observation, and questionnaire data, the results obtained in the aspects of knowledge of learning strategies get a score of 30% for the sub-aspects of the learning approach, this is because in the RPP all teachers list what approaches are used, but there are still those that include but lack detail. Aspects of using learning methods and models get a score of 30%. The teachers in the sample include what methods are used in the lesson plans that have been made, namely using the method of discussion, problem-based learning, discovery learning, demonstrations, and other methods. While the aspect of learning media knowledge gets a score of 20% for the use of instructional media and types of learning media. The teacher has included several media in teaching both conventional and digital learning media such as using videos, power points, e-books, and appropriate media such as puzzles and school environments.

Evaluation of learning also needs to be done by the teacher to find out whether the learning objectives have been achieved or not, so that it can be used as consideration for improvement for teachers and students. Cognitive assessments are listed in each teacher's lesson plan, written assessments that are often used by teachers by attaching multiple choice questions or descriptions. Affective assessment is carried out using class journals and psychomotor assessments through performance observation sheets. Overall in the realm of assessment there are no standardized instruments made by the teacher. Selection of assessment techniques get a score of 30%. The lesson plan can be seen in making written tests, portfolio assessment techniques and non-written techniques. The written test is in the form of multiple choice and a description that is used for daily tests. The questions are made using bloom taxonomy from C1 to C4 which is considered to be suitable for junior high school students. Non-written assessment techniques are carried out by observing performance during exploration and practicum activities. Half of the teachers who were sampled did not make an assessment rubric, so there were no definitive guidelines for conducting an assessment, while half made an assessment rubric, but according to the results of a short interview with the teachers who developed it, the assessment rubric was not used in the implementation only for formality requirements in writing RPP only (Wahyudin, D., 2014). Suitability and improvement of the assessment get a score of 30%. Appropriateness of assessment can be seen from the making of daily test questions in accordance with the material

presented. Teachers often do daily tests or tests but are not accompanied by further actions such as enrichment and discussion of questions.

As a whole, the pedagogical knowledge (PK) ability of teachers gets 60%, which is included in the sufficient category and still needs to be developed further, especially on the appropriateness and improvement of assessments that must be adjusted to the ability of students. The results of direct observation when learning is done by teachers, ie teachers carry out learning activities based on the lesson plans that have been made, meaning that there is a match between the methods listed in the lesson plans and the implementation of learning. The selection of good learning methods is adjusted to the characteristics of students. The teachers have a pretty good strategy, it can be seen from the observations of teachers doing various learning methods that are adapted to the material and conditions of students.

The contents of the Technology Content Knowledge (TCK) questionnaire include whether the teacher uses technology to help understand the concepts, laws and theories of learning materials, whether the teacher knows computer applications related to the material being taught, whether the teacher has knowledge in developing activities and assignments. students involving the use of technology. The ability of meticulous technology content knowledge (TCK) is the integration of content knowledge and technology in learning. The TCK assessment results of teachers get 55% results which are included in the sufficient category, this is because teachers tend to use the worksheet as a learning medium compared to the use of ICT-based learning media. The results of direct observation when learning in class, teachers are very minimal using ICT-based media, teachers still often teach using blackboard media and the surrounding environment. The teacher includes the use of video and picture media on the power point to deliver the material to the lesson plan. However, the lack of LCDs owned by schools forced teachers to continue teaching conventionally. In addition to the LCD factor, the low electrical power also triggers a lack of use of ICT-based learning media. This condition is a serious problem that also requires the seriousness of various stakeholders to overcome them. Because LCD is the simplest example of learning media, while in addition to LCD there are still many other ICT-based media that also need to be held and developed in schools.

In addition to the ability to use ICT in learning as described above, the ability to understand learning materials that require ICT-based media to facilitate students in learning activities is also part of the focus of research. From the results of studies and research data, the ability of teachers to understand content that requires ICT-based learning media can be categorized as quite 55%. The teachers basically understand that to produce quality learning activities requires learning media, but due to limited access and lack of creativity the learning patterns undertaken instead rely solely on the lecture and group discussion methods.

The ability of technology content knowledge (TCK) to be studied is the integration of learning approaches with content in learning. The results of the teacher's TCK ability get 55% which can be categorized as sufficient. Before learning the two teachers have prepared a lesson plan as a guide in teaching. Based on the results of interviews with teachers, the lesson plan is not made by the teacher itself but is the result of MGMP, so there are still many discrepancies between the lesson plan and its implementation and the teacher does not make lesson plans that lead to learning in the classroom. Teachers tend not to use lesson plans as a guide when teaching, but teachers teach based on their experience of teaching for more than 20 years that has become a habit. Teachers still make annual programs, semester programs, syllabi, and lesson plans as administrative requirements for teacher assessment.

Table 2: PK-TCK Based Implementation / Learning Process Results

No	Antecedents (Learning Planning)	
	Pedagogical Knowledge (PK)	*Technology Content Knowledge 1* (TCK)
1	60%	55%
	Fair Category	Fair Category

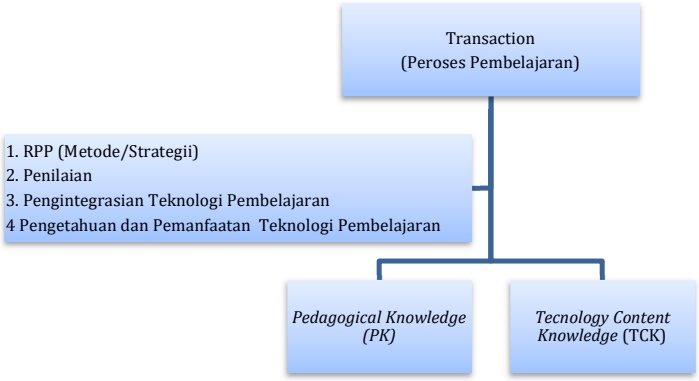

Fig 3. Implementation / PK-TCK Learning Process

3. Outcome (Learning Products in the Form of Achievement of Learning Objectives)
The ability of TPACK under study is the integration of technology, content, and learning approaches. Overall assessment results for the ability of TPACK to get the highest score of 80% for the content knowledge component (CK) in the good category, for the pedagogical knowledge and technology content knowledge component, the score is between 55-60%, while for the technology knowledge component a score of 50% is obtained. included in the category of not good. After adjusting to the results of direct observation, the ability that teachers lack is the ability to use learning technology.

Table 2: Outcome / TPACK-Based Learning Products

No	Outcome (TPACK-Based Learning Products)			
	Technology Knowledge (TK)	*Content Knowledge* (CK)	*Pedagogical Knowledge* (PK)	*Technology Content Knowledge* (TCK)
1	50%	80%	60%	55%
	Poor Category	Good Category	Fair Category	Fair Category

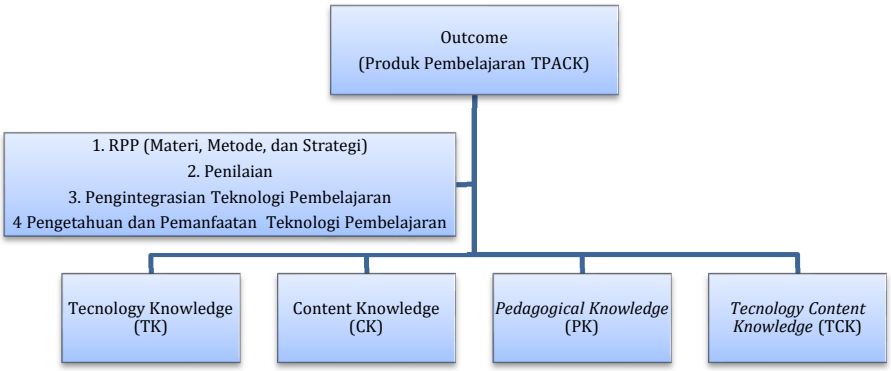

Fig. 4: TPACK Learning Products

Conclusion

Based on the results and discussion above, it shows that the teacher's ability to carry out TPACK-based K-13 learning based on the Countenance Stake's analysis can be concluded that the lowest component among the components of knowledge, pedagogy, content, and technology is the ability to use technology.

Acknowledgment

As a recommendation there needs to be serious attention to the procurement and improvement of school facilities and infrastructure especially those related to learning technology. Then the ability to use learning technology can actually be trained by conducting training related to ICT-based learning media to assist teachers in the use of technology and be able to explore information creatively about the use of technology in learning.

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Labour Standards, Human Rights and

The Public Health in the World Trade Organization

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Abstract

This study investigates the effects the interaction of labor standards and human rights that has become a key issue in the World Trade organization. Policymakers gradually developed new rules to achieve both trade and human rights objectives. England signed treaties with the U.S., Portugal, Denmark, and Sweden to ban trade in slaves ect. The trade labour linkage has a long history. It has become one of the most contentious contemporary issues in trade and labour policy circles and debates. The idea of using international labour standards to protect workers from economic exploitation was first promoted by individual social reformers in Europe in the first half of the nineteenth century during the early stages of the industrial revolution. Calls for international labour legislation increased dramatically during the second half of the nineteenth century and found expression in various international organizations that were formed (often international associations of trade unions). Besides, international trade policy and labor standards can also hurt the right to health directly or indirectly. As the result there are several problems can be identified regarding the International rules on trade as whole and from the public health perspective. Without the national or international action required international trade will not bring prosperity to all, but, on the contrary, is likely to result in more income inequality, social injustice, environmental degradation and cultural homogenization.

Keywords: human rights, world trade organization, public health.

Introduction

According to the S.Charnovitz (Charnovitz, 1987) the trade labour linkage has a long history. It has become one of the most contentious contemporary issues in trade and labour policy circles and debates (Langille, 1997). The idea of using international labour standards to protect workers from economic exploitation was first promoted by individual social reformers in Europe in the first half of the nineteenth century during the early stages of the industrial revolution. The work of these reformers was later taken over by various non-governmental organizations. Calls for international labour legislation increased dramatically during the second half of the nineteenth century and found expression in various international organizations that were formed (often international associations of trade unions).

Opponents of labor standards argue that international pressure on foreign countries is an unnecessary and counterproductive interference in the workings of the free market. In this view pressure for international labor standards represents either disguised protectionism or misplaced compassion. Proponents of labor standards argue that a set of minimal labor standards is necessary to promote fair competition and to facilitate efficient operation of the labor market. In industrialized countries there

has also been a growing undercurrent of resentment toward trade with countries with low labor costs, which threatens the viability of international trade agreements. The core areas of labor standards typically include freedom of association, collective bargaining, prohibition of forced labor, elimination of exploitative child labor, and nondiscrimination.

The International Labor Organization (ILO) has been the main institution concerned with international labor standards since its inception in 1919. The ILO establishes conventions that are binding only on the countries that ratify them. The ILO is not empowered to enforce compliance with ratified conventions; instead, it relies on international pressure, advice, and monitoring to encourage compliance. Additionally, several bilateral and multilateral trade agreements cover labor and environmental standards. For example, the labor side agreements were a critical element of the North American Free Trade Agreement (NAFTA). But how it s collaborate with public health?

The International Labor Organization and its role from the Human rights perspective

The (ILO) formally entered the trade labour interface debate in 1994 at the time of discussion of a possible inclusion of a social clause in the WTO, the establishment of link between trade and labour in differing forms within NAFTA and the EU, and the conditioning of trade preferences and concessions by some developed countries on respect for labour standards. The ILO set up a working party on the social dimensions of the liberalization of international trade, but in 1995 the ILO's governing body concluded that the working party would not pursue the question of trade sanction and that further discussions of a link between international trade and social standards or a sanction-based social clause mechanism would be suspended. With respect to trade an labour standards linkages in regional trading arrangements, within the EU the social dimension of European integration took concrete form in 1991 when 11 of the 12 Member States (excluding the UK) signed the community's Charter of Fundamental Social Rights. Another important step in the development of EU social policy was the adoption by the11 member (excluding the UK) of the protocol on Social Policy at Maastricht in 1991 (Trebilock, Howse, Eliason, 2013).

Recently, the debate over trade and labour rights has been extended to human rights more generally an entirely logical development. However, in the case of other human rights, the debate is much less focused on 'linkage', including sanctions, and much more on the effects of trade obligations on the ability of states, especially developing countries, to fulfill economic, social and cultural rights, such as the right to health or to adequate food. Here, developing countries, although wary about sanctions have been generally supportive of efforts to evaluate and interpret trade agreements in human rights terms (Alben, 2001).

Core labour standards (CLS) and human rights

Various CLS have been characterized as human rights the UN Universal Declaration of Human Rights, the subsequent international Covenant on Civil and Political Rights, and International Covenant on Economics, social and Cultural rights. The ILO's 1998 Declaration of Fundamental Principles and Rights at Work enumerates a short list of core international labour standards that are defined more fully in eight background Covenants incorporated by reference, namely, freedom of association and collective bargaining, the elimination of forced labour, the elimination of child labour, and the elimination of discrimination in employment, which is also consistent with the characterization of certain core labour standards or rights as human rights, especially that guarantee basic freedom of choice in employment relations (Michaeel, Trebilcock, Howse, 2005). Labour standards have been used in the Generalized System of Preferences a preferential system to provide duty free access to exports of developing countries by (most notably) the European Union and the United States of America. Currently, there is a revision of the EU's GSP scheme, the potential implications of which may be considerable given that the new GSP plus scheme appears to target not only ratification of the fundamental Conventions, but also application of Conventions in line with

comments from the ILO supervisory bodies. This has the potential to be very problematic for employers.

Anartya Sen argues in his book Development as Freedom that basic goals of development can be conceived of in universalistic terms where individual well-being can plausibly be viewed as entailing certain basic freedoms irrespective of cultural context:

1. Freedom to engage in political criticism and association;
2. Freedom to engage in market transactions;
3. Freedom from the ravages of preventable or curable disease;
4. Freedom from the disabling effects of illiteracy and lack of basic education;
5. Freedom from extreme material privation. (Sen, 1999).

According to Sen, these freedoms have both intrinsic and instrumental value. Importantly, in contrast to the unfair competition and race to the bottom rationales for linking international trade policy and international labour standards, the human rights perspective focuses primarily on the welfare of citizens in exporting, not importing countries. The assumption underlying this concern for basic or universal human rights is that failure to respect them in any country is either a reflection of the decision of unrepresentative or repressive governments rather than the will of the citizens or a sign of the majoritarian oppression of minorities, for example, children, women or racial religious minorities; alternatively, there may be paternalistic concerns that citizens in other countries have made uninformed or ill-advised choices to forgo these basic rights.

The linkage of international trade policy, including trade or other economic sanctions, with CLS that reflect basic or universal human rights is a cogent one. When citizens in some countries observe gross or systematic abuses of human rights in other countries, the possible range of reactions open to them include diplomatic protests, withdrawal of ambassadors, cancellation of air landing rights, trade sanctions or more comprehensive economic boycotts, or at the limit, military intervention.

Arguing that doing nothing is always or often the most appropriate response is inconsistent with the very notion of universal human rights. In extreme cases, such as war crimes, apartheid, the threat of chemical warfare in the case of Iraq, genocide in the case of Serbia, or the Holocaust in the case of Nazi Germany, excluding a priori economic sanctions form the menu of possible options seems indefensible. Whether it is the most appropriate option may, of course, be context specific and depend both on the seriousness of the abuses and on the likely efficacy of the response choice of instrument, issues to which we turn next. But it is sufficient for present purposes to restate the point that to the extent that CLS are appropriately characterized as basic or universal human rights, a linkage between trade policy and such labour standards is not only defensible but arguably imperative, in contrast to the other two rationales for such a linkage which, despite their much longer historical lineage, are largely spurious and inconsistent with the central predicates of a liberal trading system. However, CLS viewed as basic or universal human rights, by promoting human freedom of choice, are entirely consistent with a liberal trading regime that seeks to ensure other human freedoms, in particular the right of individuals to engage in market transactions with other individuals without discrimination on the basis of country of location (Molatlhegi, 2002). Having said this scope and definition of the class human rights viewed as sufficiently universal as to warrant potentially the imposition of trade sanctions for their violation is problematic in various respect. Even CLS are not susceptible to uncontentious understandings of their scope. The scope of many economic, social and cultural rights is controversial (Ignatiefee, 2001). These controversies do not obviate the normative force of the rights themselves, but do have implications for the choice of instrument and choice of institutional arrangement for addressing the trade policy-labour standards linkage, to which we now turn. As regards developing country: From a developing country perspective, the conventional wisdom is that unlike the case with developed countries, increased integration with the world economy will be beneficial to less skilled workers. However, this does not seem to be supported by the available empirical evidence, which suggests that many developing countries experienced rising wage inequality after opening to international trade. It appears possible that there is a pervasive skill bias in globalization. It is also uncertain what prospects international trade offers in creating jobs in developing countries, particularly those located in Africa and Latin America.

Human rights beyond labour rights

Since the end of the Cold War, two main visions have guided the evolution of international law and institution the visions of human rights and humanity and that of economic globalization. Both visions have offered challenges to traditional and understandings of sovereignty: they have given a new significance to non-state actors in the evolution and implementation of international law. Both have often given rise to demands and aspirations to global politics and constitutionalism as well as new relationship between local, national, regional, and global levels of governance. However, the legal, institutional and policy cultures of international human rights law and of international trade, financial and investment law have developed largely in isolation from one another (Howse, Teitel,2007).

As a matter of international law, the International Covenant on Civil and Political Rights (ICCPR) and the International Covenant on Economic, Social and Cultural Rights (ICESCR) and the WTO are, in the first instance treaty regimes. A fundamental structural characteristic of the international legal system is that of decentralization without hierarchy. Treaty norms in the ICCPR and ICESCR and other human rights instruments have an equal legal status to those in the WTO (a few such norms, related to prohibitions on torture and slavery have a higher status as ius cogens or preemptory norms of International law, trumping treaty obligations to the extent of inconsistence).

A large majority of states are signatories to both the WTO Single Undertaking (the core WTI treaties) and the ICCPR and ICESCR. The principle of decentralization without hierarchy, along with that of giving full effect to international obligations, implies the need to interpret and to develop these regimes in a complementary and consistent fashion to the extent possible. As the Report of the international Law Commission (ILC) on fragmentation of international law notes, 'In international law, there is a strong presumption against normative conflict (Koskenniemi, 2006).

The Declaration on Trade-related Intellectual Property Rights (TRIP) and Public Health and the Kimberly (Conflict Diamonds) waiver reflect an unacknowledged debt to human rights consciousness in the WTO. The current Director-General of the WTO, Pascal Lamy, has written about globalization with a human face, and his conception of the economic sphere, including the international economic sphere, is deeply routed in the notion of humanity. More recently, a joint study by the ILO and the WTO Secretariat explicitly refers to freedom of association and the right to collective bargaining as 'universally recognized Human Rights', urges their respects as such and not just for instrumental reasons of social peace, ad refutes with empirical evidence the notion that respect for such rights harms competitiveness (Knoll, 2003).

Sen vigorously challenges the view that human rights are 'luxury goods' that poor countries cannot afford until they have achieved a certain level of prosperity; instead, the improvement of economic welfare depends upon respect for rights in many and complex ways. More recently, Alan Sykes has noted that, generally speaking, there is a positive correlation between a country's openness to trade and its tendency to respect human rights. This puts into question the idea that poor countries should or must sacrifice human rights or postpone their realization for the sake of openness to trade, and an outward-oriented development strategy (Sykes, 2003).

Liberalization of trade and Health Policy Perspective

Health care policy in common is one of the important rights. Healthcare as one of the freedoms is protected by human rights. In national as well as international legal systems, the expression of health policy is under high protection. (Palkova, Kudeikina 2020)

International trade also hurt the right to health directly or indirectly. In this case it should be mention that the Regional Committee for the Eastern Mediterranean of World health Organization discussed in its Forty-fifth Session the impact of the GATT Agreements on health and passed a resolution urging Member States to: A. Ensure that ministries of health are represented on national committees

entrusted with the task of studying the negative impact of World Trade Organization agreements on the health sector; B. Conduct studies to coordinate response to World Trade Organization health-related agreements in cooperation with the Regional Office. World health Organization expressed its concerns in a statement at the Third WTO Ministerial Conference as follows - trade and public health should not be discussed in isolation from each other. Decisions made outside the health sector have tremendous influence on health outcomes, especially in poor societies. World health Organization supports the main purpose of promoting trade, that is, to improve living conditions and to raise real income. It strongly reaffirms that health is central to this development goal. The benefits to be derived from expanding trade should further the goal of improving the health of the population, especially that of poor or marginalized groups who may find themselves excluded from the process of economic growth. (WHO, 2013).

TRIPS is the importance of interpreting WTO treaties from a health policy perspective. Health policy experts and organizations were able to promote the protection of the safeguards in TRIPS for parallel importing and compulsory licensing by stressing that the treaty text accorded WTO members these rights. In addition, health policy activism helped stimulate subsequent state practice in the form of the Doha Declaration on the TRIPS Agreement and Public Health which reinforced WTO members' rights to use TRIPS flexibilities and safeguards for public health purposes. Treaty interpretation from a health policy perspective remains important in other areas of TRIPS as well.

The question arises whether the provisions of GATS may also provide insufficient flexibility for health policy makers, transferring the issue from the realm of treaty interpretation into treaty implementation or revision. Health concerns often seem to have insufficient weight in decisions many governments make in international forums, such as the WTO. GATS forces WTO members to think about health in connection with the growing role of services in modern economies and the impact of globalization trends, particularly on the poor. In addition GATS establishes a process designed to progressively liberalize trade in services and health policy-makers must be prepared to participate in this process to ensure that such liberalization unfolds in a way sensitive to the needs of national governments in ensuring the provision and regulation of health-related services. GATS "institutional framework' and particularly dispute the dispute settlement mechanism, are also important parts of the GATS for health policy (Mattoo, Stern, Zanini, 2008).

Any liberalization under GATS should aim to produce better quality, affordable, and effective health-related services, leading to greater equity in health outcomes. Liberalization should also ensure the necessary policy and regulatory space governments require to promote and protect the health of their populations, particularly those in greatest need. GATS create health opportunities and challenges, especially for developing countries. GATS accords countries considerable choice, discretion, and flexibility so that proper management of the process of liberalization of trade in health-related services can adequately protect health. In key areas of GATS, governments face choices about the breadth and depth of liberalization of trade in health relatedservices and the impact of such liberalization on health policy. In fact, countries are free to decide whether liberalization in the health sector should be pursued or not and to what extent. Countries are not obliged to liberalize health services if they do not wish to do so. These choices make it imperative that health officials understand the structure and substance of GATS, collaborate with other government agencies on GATS implementation and liberalization, and act to ensure that the GATS process does not adversely affect national health policy. (Drager Smith, 2006).

As regards key provisions of GATS, it creates the multilateral legal framework for international trade in nearly every type of service. The Agreement's 29 articles establish the scope of its rules' coverage, impose general obligations, structure the making of specific commitments, construct a process for progressive liberalization of trade in services, and link the treaty to the WTO's dispute settlement mechanism. Although experts acknowledge that GATS has not, to date, significantly affected trade in health-related services, the potential for GATS to do so through the progressive liberalization process is tremendous. In the GATS 2000negotiations, countries may be receiving requests from and may consider submitting offers to other WTO members for market access and national treatment commitments in many different health-related service sectors.

On the basis of the above-mentioned very interesting subject is WHO's work on GATS and policy. WHO's work on GATS has, to date, focused on collecting evidence on the potential and actual impact of GATS on the functioning of health systems. These efforts involve:

1. Collecting data on trade in health-related services;
2. Undertaking a wide range of country-based studies;
3. Conducting regional and national training programs;
4. Supporting a legal review of GATS from the perspective of health policy;
5. Developing a Handbook on Trade in Health-Related Services and GATS; and
6. Tracking and disseminating information on the GATS 2000 negotiations (Adlung, Carzaniga, 2001).

Although the environment per se is not a WTO issue, several WTO Agreements and rules are relevant to environmental issues. There have been several environmental related WTO disputes often centering on the issue of "like product". In making a determination of "likeness", WTO rules permit health risks to be taken into account. In a recent case on asbestos, the Appellate Body found the objective pursued, i.e. the preservation of human life and health, to be "both vital and important in the highest degree", and concluded that an import ban on asbestos was a "necessary" measure to protect human health (WTO, 2002).

Summary

Summarizing the results of the dissertation research, the following conclusions are presented. T*he International rules on trade*, are necessary for four related reasons, Firstly, to restrain countries from taking trade-restrictive measures, both in their own interest of the world economy. Secondly, to give traders and investors a degree of security and predictability regarding the trade policies of other countries. Thirdly, to allow for the effective protection and promotion of important societal values and interests (such as public health, a sustainable environment, consumer safety, cultural identity and minimum labour standards), while at the same time ensuring that countries meaning only those measures that are necessary for the protection of these values and interests. And fourthly, to achieve a greater measure of equality economic relations. It should be noted, that the potential of international trade to be realized, there must be good governance at the national level, as well as further reduction of trade barriers and more development aid.

Without the national or international action required in these four areas, international trade will not bring prosperity to all, but, on the contrary, is likely to result in more income inequality, social injustice, environmental degradation and cultural homogenization.

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User Choice Preferences For Business Management: An Application To Tourism Services

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Abstract

Information and Knowledge Society are transforming the habits of users; a phenomenon related to an increase in the quantity and availability of data. Within this context, the choice of a product or service is influenced by the information that exist about these in digital ecosystems. To do this, potential target audiences use the so-called Online Reputational Indexes, known as ORIs, that provide a user-generated valuation of the establishment, to select their products or services. The aim of this work is to propose a novel procedure to incorporate the user choice in the for business management, by generating the rules of choice of the public, to be incorporated into the decision-making process. The process has been applied in a real example, which has allowed to know, how is the of the stakeholder assessment respect to the three-star, four-star and five-star hotels, in North America, South America, Europe and Asia, to help in the decision process.

Keywords: Stakeholder; Sentiment Analysis; Social Networks Analysis (SNA); Tourism Destination; Hospitality Management; Competitiveness of Tourism Destination.

Introduction

The technological revolution of recent years has given rise to what is known as the "information society", which has not only brought about changes in purely economic aspects, but also in social and organizational aspects. (Novabos, Matias and Mena, 2015; Narangajavana *et al.*, 2017). The Information Society has become a phenomenon of transformation that has democratized information through social media; social networks, blogs or mobile social media that have developed peer-to-peer communication with an increasingly participative and influential audience. Tourism industry and particularly tourist destinations have not been oblivious to this transformation (Gulbahar and Yildirim, 2015; Kiráľová and Pavlíčeka, 2015). Since the 1980s, the development of tourism services and products and Information and Communication Technologies have evolved together (Jacobsen and Munar, 2012; Chung *et al.*, 2015; Narangajavana *et al.*, 2017), as well as interoperability between businesses and users. Buhalis and Law (Law, Qi and Buhalis, 2010) (Kotler and Gertner, 2002; Xiang, Magnini and Fesenmaier, 2015).

Different investigations have shown that during the 20th century the tourism industry mainly focused its development on the quality of services, while at the end of the 1990s and beginning of the 21st century, they introduced corporate reputation and the importance of managing it as an axis for their sustainability (Lusch, Vargo and Tanniru, 2010; Zeng and Gerritsen, 2014; Huang *et al.*, 2017; Assaf and Tsionas, 2018), as more and more users decide where to travel based on criteria of choice such as: the impact and footprint of the trip in terms of sustainable tourism, the capacity for personalization and accessibility in terms of tourist intelligence, and especially the reputation and notoriety of the destination.

In this context, the social media have represented a new advance in the management of tourist destinations, where stakeholders can obtain, share and process any information by technological means, from any place and in different media (Ho, Lin and Chen, 2012), giving users the opportunity to create their own experiences, going from one-way communication to two-way communication processes. These new trends go in search of the positive user experience. In the design of tourist destination strategies, Destinations Management Organizations (DMOs), seek that the user, with that experience

based on intangible values, gets excited, feels, enjoys, shares and remembers. (Barreiro, 2019; Rodríguez-antón and Alonso-almeida, 2019).

To measure experience in general, different tools and monitors have been defined (Casado and Peláez, 2014), which measure experiences, mainly by asking audiences or experts, through questionnaires. But this type of measurement presents problems such as the strategic aspect of decisions, the diversity of communication channels where audiences express themselves, or the availability of real-time valuations, among others. In order to solve these problems, companies and researchers have designed different indexes, called "Online Reputation Index - ORIs".

ORIs are built using models such as WOM (Word-Of-Mouth) and eWOM (electronic-Word-Of Mouth),(Gunawan and Huarng, 2015; Seker and Eryarsoy, 2015). They use ascending discrete value scales for the user to give their opinion, where accommodations with a higher rating reflect a better prescription. This rating is usually represented by several stars, or like mainly, that make it easier for users to see the indicator(Abubakar *et al.*, 2017). The ratings on the accommodations or services that are exposed to the user through the web serve as a form of prescription for the final decision making, that is, the reservation of the accommodation or service in question (Williams *et al.*, 2017). Therefore, it is possible to consider these valuations as an approximate representation of the value that the hosting delivers to the user.

The objective of this work is propose a novel procedure to incorporate the user choice in the for business management, by generating the rules of choice of the public, to be incorporated into the decision-making process. The work has been organized in the following way: in the second section the methodology used is presented, together with the examples of experimental validation, where the hypothesis was raised that "there are no statistically significant differences in the measurement of the Interval Reliability Index (IRI) depending on the number of stars in the hotels", and the business model for the construction of a rating system; in the third section, the results are presented; and finally, the discussion and conclusions are presented in the fourth section.

Materials and Methodology

In this section we present the business model proposed, and the different processes that make it up. Firstly, we present the initial data that the model uses. Secondly, the process for extracting and analyzing the data extracted from the digital ecosystems. Thirdly, the operator used for the construction of the opinion intervals. And finally, the proposed business model.

Initial Data

The baseline data needed by the model comes from the set $r = \{r_1, r_2, \dots, r_n\}$ where $r_i = (v_i, c_i)$, v_i are the value of the opinion expressed by the public in social media, and c_i, the cardinality of that value. For example, $r_i = (0.5, 50)$ means that the value 0.5 (represents a valuation of a comment or opinion), has been repeated 50 times. These data correspond to communications issued by the public in the social media, related to the products and services to be evaluated.

Extraction And Analysis Of Data From Digital Ecosystems

The extraction of information from social media can be done through several alternatives: public APIs, for example, those provided by Twitter, Reddit, YouTube, Foursquare and TripAdvisor; Scraping Algorithms; RSS news feeds.

Data analysis uses semantic analysis algorithms, which extract feeling about a product/service. In this work we have used the multi-agent system that incorporates two algorithms, the first based on neural networks; and the second, based on machine learning that calculate the polarity of the feeling of communications, which calculate the polarity of the feeling of the communications in an interval [-1, 1] (positive emotion (0, 1], neutral emotion 0 and [-1, 0) negative emotion).

Figure 1 shows the architecture that carries out the extraction and classification of public valuations. The information is obtained from digital ecosystems (in this case the Internet) through web scraping processes, then it is contextualized and finally, through a process of analysis, it is evaluated.

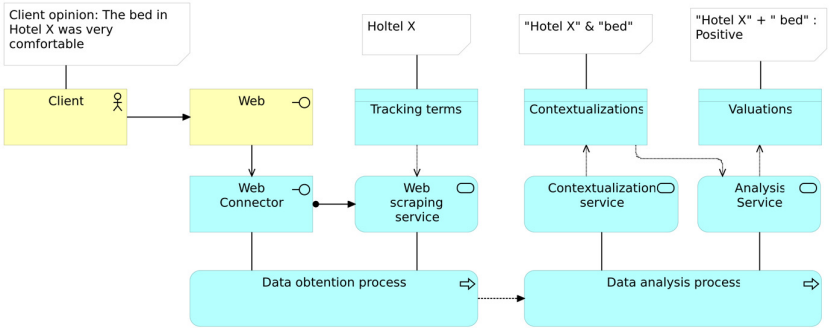

Figure 1. Extraction and Analysis architecture.

Opinion Interval

To construct the valuation interval of products and services, the model proposes to use the QV-ORI valuation index, defined by (Peláez, Martínez and Vargas, 2019). The Quorum Valuation Online Reputation Index (QV-ORI), as the tuple QV-ORI = (X, IRI), where X is a opinion interval and IRI is a reliability index of the assessment interval. Both values, provides more information to improve the decision-making process.

Business Model

Figure 2 shows the business model for the analysis of public valuations and the design of the selection guides of tourist accommodation. The model is built using the TOGAF enterprise architecture framework, which provides an approach to the design, planning, implementation and governance of an enterprise information architecture. The model is divided, at this level of abstraction, into three sub-models: the first is the one corresponding to the motivation and objectives of the model. In our case it is the design a general criteria guideline of tourist accommodation, the assessment does not depend in experts and use public social-media information. The second sub-model is related to the audiences involved in the business model. In our case, the clients of the hotels, who give their opinions. Finally, the third sub-model, shows the valuation process, hotel selection, semantic analysis, aggregation operators, and valuation indices.

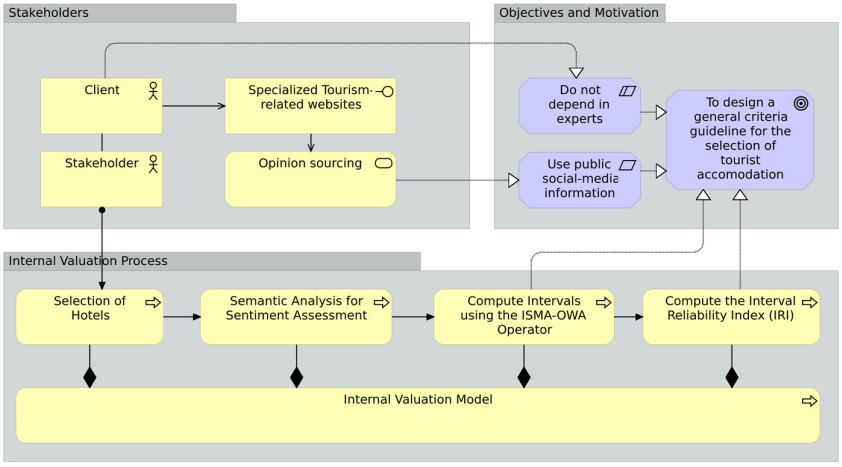

Figure 2: Business Model to Generating the Rules of Choice of the Skateholder.

Application Example

Study population

The hotels considered have been selected from the list offered by the Word Tourism Organization (UNWTO). A total of 60 hotels of 5, 4 and 3 stars, located in Europe, North America, South America and Asia, and different cities have been considered (Annex 1).

Criteria for Inclusion and Exclusion Hotels

Located in cities and metropolitan areas with a high GDP in terms of purchasing power parity and global impact. For this purpose, the following rankings have been used: PwC PricewaterhouseCoopers Full listing of urban agglomeration GDP rankings in 2005 and illustrative projection to 2025 (using definitions and population estimates); Mastercard's 2018 Global Destination Cities Index; Forbes 2019 Emerging Travel Destinations.

Inclusion Criteria and Exclusion of Comments

Inclusion:

- Be between 18 and 65 years old, reported to services and data sources if it is available.
- The communication is public and can be viewed without the need to subscribe to the data source or explicit permissions of the issuer of the communication.

Exclusion:

- Opinions have been generated by bots (procedural methods).

Data sources: The data have been obtained from TripAdvisor's website.

Period: March 2019 - May 2019.

Data collection procedure: The collected data were processed in a procedural and automatic way. The data analysis algorithms were developed in Python 3 language, using the NLTK natural language analysis library and the SCIPY artificial intelligence library.

Semantic analysis is performed using a neural network that provides values between [-1, 1], being -1 totally negative, 0 neutral, 1 totally positive.

Results

The results obtained are shown below and have been segmented as follows:

- Global study of hotels.
- Global study of hotels grouped by category.
- Global study by continents.
- Global study by continent and category.
- Global study by country.
- Global study by country and category.

Finally, a statistical study is carried out to check the probability of variation of the IRIs, depending on the continent and the category of the hotel, five, four and three stars.

Global Study of Hotels

In Table 1, the interval and its IRI value for the total of hotels is shown. The results show that at a global level there is a polarization of user opinions.

Table 1: Rating Interval and IRI for Global Hotels.

Interval	IRI
[-0.753, 0.958]	0.1198

Global Study by Category

Table 2 shows the interval and its IRI value for the global hotel segment by category. This study also shows a polarization in user ratings.

Table 2: Valuation Interval and IRI for hotels segmented by category.

Category	Interval	IRI
5 Stars	[-0.752,0.997]	0.139
4 Stars	[-0.752,0.840]	0.055
3 Stars	[-0.752,0.958]	0.120

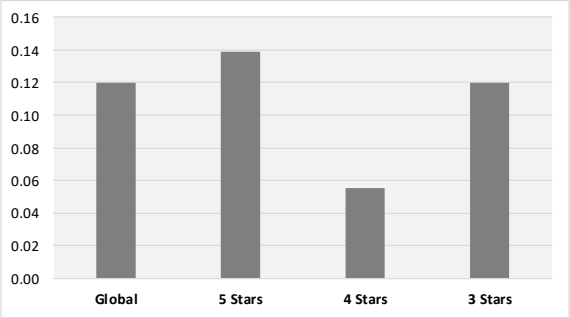

Figure 3: IRI for hotels segmented globally by category.

Study by continent

Table 3 shows the interval and its IRI value for global hotels segmented by continents.

Table 3: Valuation Interval and IRI for hotels segmented by continent.

Continent	Interval	IRI
Europe	[-0.740, 0.995]	0.146
South America	[-0.140, 0.958]	0.744
North America	[-0.752, 0.958]	0.120
Asia	[-0.753, 0.854]	0.063

Study by continent and category

Table 4 shows the interval and its IRI value for global hotels segmented by continents and categories. Meanwhile, figures 4, 5, 6 and 7 show the IRI values by continent and category.

Table 4: Valuation Interval and IRI for hotels segmented by continent and category.

Category	Continent	Inf	Sup	IRI
General	North America	-0.752	0.958	0.120
	South America	-0.140	0.958	0.744
	Europe	-0.740	0.995	0.146
	Asia	-0.753	0.854	0.063
5 stars	North America	-0.002	0.951	0.99
	South America	-0.649	0.95	0.187
	Europe	-0.554	1	0.286
	Asia	-0.669	0.917	0.156
4 stars	North America	-0.752	0.950	0.116
	South America	-0.285	0.935	0.531
	Europe	-0.615	0.840	0.154
	Asia	-0.634	0.840	0.139
3 stars	North America	-0.733	0.958	0.132
	South America	-0.429	0.958	0.381
	Europe	-0.382	0.958	0.429
	Asia	-0.751	0.954	0.118

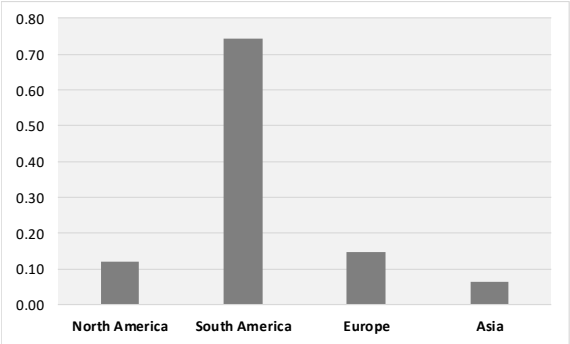

Figure 4: IRI for hotels segmented by category and continent.

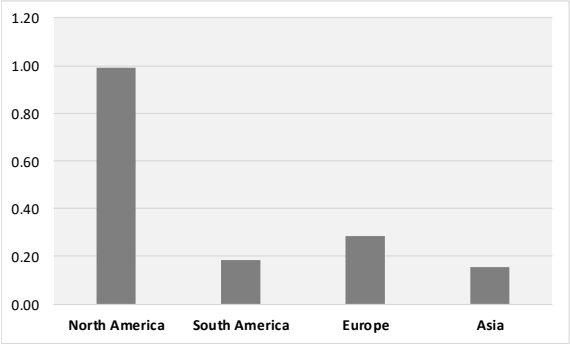

Figure 5: IRI for hotels segmented by 5-star category and continent.

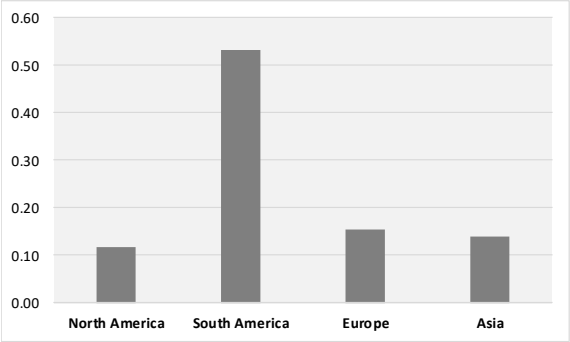

Figure 6: IRI for hotels segmented by 4-star category and continent.

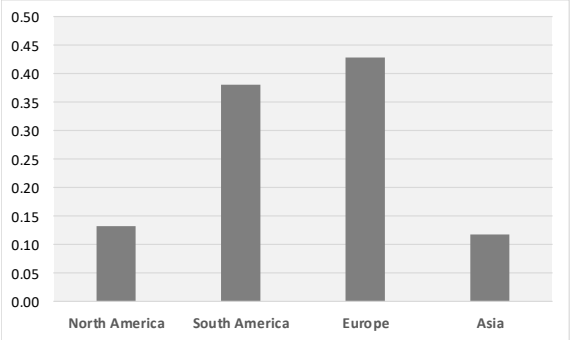

Figure 7: IRI for hotels segmented by 3-star category and continent.

Global Study by Countries

This study analyses all the hotels in each country. Table 5 shows the different intervals and their corresponding IRI values. The study shows that the best hotels can be found in Japan and France.

Table 5: Valuation Interval and IRI for hotels by country.

Countries	Interval	IRI
Germany	[-0.607,0.997]	0.243
Argentina	[-0.246,0.739]	0.500

Brazil	[-0.264,0.958]	0.567
Canada	[-0.745,0.920]	0.105
Chile	[-0.182,0.958]	0.680
EAU	[-0.224,0.944]	0.615
France	[-0.121,0.864]	0.753
United Kingdom	[-0.555,0.968]	0.271
Spain	[-0.340,0.799]	0.402
Italy	[-0.569,0.954]	0.253
Japan	[-0.118,0.844]	0.754
South Korea	[-0.669,0.957]	0.177
Malaysia	[-0.747,0.865]	0.073
México	[-0.749,0.957]	0.122
Singapore	[-0.708,0.865]	0.099
Thailand	[-0.337,0.999]	0.495
USA	[-0.748,0.957]	0.122

Global Study by Country and Category

This study analyzes countries and their hotels by category. Tables 6, 7 and 8 show the assessment intervals together with their corresponding IRIS.

Table 6: Rating Interval and IRI for 5-star hotels.

Category	**Country**	**Interval**	**IRI**
5 Stars	Germany	[-0.187,0.999]	0.6838
	Argentina	[-0.209,0.868]	0.611
	Brazil	[-0.004,0.944]	0.99
	Canada	[-0.544,0.989]	0.2902
	Chile	[-0.752,0.756]	0.0027
	EAU	[-0.408,0.902]	0.3771
	France	[-0.408,0.902]	0.3771
	United Kingdom	[-0.183,0.998]	0.6891
	Spain	[-0.117,0.895]	0.768
	Italy	[-0.576,0.888]	0.2127

	Japan	[-0.277,0.923]	0.5373
	South Korea	[-0.029,0.952]	0.9404
	Malaysia	[-0.634,0.856]	0.1487
	México	[-0.121,0.954]	0.7739
	Singapore	[-0.652,0.892]	0.1553
	Thailand	[-0.708,0.875]	0.1059
	USA	[-0.408,0.902]	0.3771

Table 7: Rating Interval and IRI for 5-star hotels.

Category	**Country**	**Interval**	**IRI**
4 Stars	Germany	[-0.566,0.869]	0.211
	Argentina	[-0.285,0.745]	0.446
	Brazil	[-0.139,0.840]	0.716
	Canada	[-0.614,0.842]	0.156
	Chile	[-0.471,0.950]	0.336
	EAU	[-0.707,0.952]	0.147
	France	[-0,707,0.952]	0.147
	United Kingdom	[-0.293,0.857]	0.489
	Spain	[-0.332,0.787]	0.406
	Italy	[-0.358,0.918]	0.438
	Japan	[-0.537,0.877]	0.240
	South Korea	[-0.184,0.861]	0.647
	Malaysia	[-0.440,0.860]	0.323
	México	[-0.724,0.952]	0.135
	Singapore	[-0.128,0.931]	0.756
	Thailand	[-0.526,0.956]	0.290
	USA	[-0.707,0.952]	0.147

Table 8: Rating Interval and IRI for hotels by 5-star countries.

Category	Country	Interval	IRI
3 Stars	Germany	[-0.506,0.929]	0.294
	Argentina	[-0.242,0.604]	0.426
	Brazil	[-0.619,0.958]	0.214
	Canada	[-0.628,0.960]	0.208
	Chile	[-0.246,0.958]	0.590
	EAU	[-0.647,0.958]	0.194
	France	[-0.647,0.958]	0.194
	United Kingdom	[-0.254,0.920]	0.566
	Spain	[-0.570,0.715]	0.112
	Italy	[-0.125,0.957]	0.768
	Japan	[-0.603,0.808]	0.145
	South Korea	[-0.456,0.957]	0.353
	Malaysia	[-0.632,0.836]	0.138
	México	[-0.704,0.944]	0.145
	Singapore	[-0.436,0.854]	0.323
	Thailand	[-0.301,0.882]	0.490
	USA	[-0.647,0.958]	0.194

Statistical Study of the Values of IRIs

Finally, we have carried out a statistical study to check the probability of variation of IRIs in terms of continents and stars. Table 9 shows the results obtained from the Friedman parametric test (Zimmerman and Zumbo, 1993) applied to the set of values emitted by users.

Table 9: Descriptive Statistics.

Descriptive Statistics				
	N	**Percentiles**		
		25th	50th (Median)	75th
Five Stars	15	0.16	0.38	0.69
Four Stars	15	0.15	0.29	0.49
Three Stars	15	0.19	0.21	0.49

Table 10:Ranks

Ranks	
Category	Mean Rank
Five Stars	2.40
Four Stars	1.67
Three Stars	1.93

Table 11: Friedman Test Statistics

Friedman Test Statistics	
N	15
Chi-Square	4.13
df	2
Asymp. Sig.	0.12

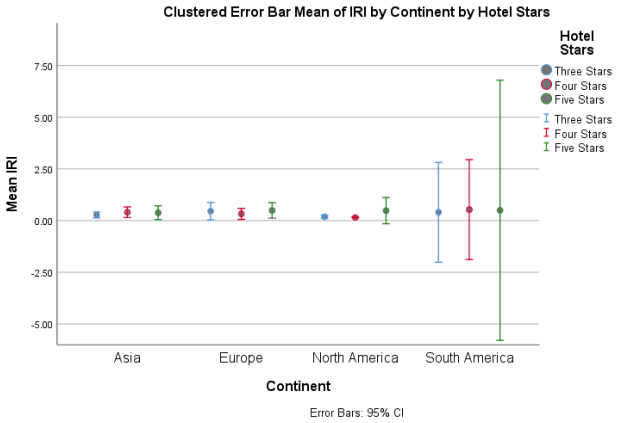

Figure 8: Mean and confidence intervals of IRI measurements by Continent and grouped by Number of Stars.

Discussions

The previous section has shown the different results obtained from the TripAdvisor data source in the study period between March and May 2019. The different studies carried out have shown the following behavior of the public, according to the different segmentations carried out:

The different studies carried out have shown the following behaviors, according to the different segmentation carried out:

Global Study of Hotels. This study has shown in table 1 and figure 1, that the ratings considering all hotel categories and continents are polarized.

Global Study of Segmented Hotels by Category. This study has shown in table 2 that considering global ratings, although segmented by category, does not provide information as the ratings are polarized, and cannot extract any guide to the behavior of the users of the same.

Therefore, from the comparison of ratings of hotels on a global level and segmented by categories it can be concluded that:

The comparison of hotels at the global level shows a polarization of user feedback at both the hotel and category level. This result confirms aspects of the decision-making processes, which establish that comparisons should be made between alternatives that are comparable. These results indicate that hotel valuation studies should not be carried out at a global level, since no information can be extracted from them. There are differences between hotels, categories that hide the characteristics of hotels.

The study shows that there is a similar proportion between positive and negative valuations, taken in the time interval of the study. This shows the importance of digital information, since it rejects the general opinion that only the public comments negative aspects in the social media.

Comparisons should be made based on defined criteria, and where alternatives can be compared based on such criteria.

Study by Continents. Table 3 shows the interval values for each continent and their corresponding IRI. From these values it can be concluded that:

The study shows that the ratings of hotels on the South American continent are the least polarize, with a value of IRI 0.74, which indicates that the opinions are consistent, for the period of studies.

The hotels with the best feeling are those located in the South American continent. The rest of the continents show polarize information, and therefore no general conclusions can be drawn from them.

Study by Continent and Category. In table 4, and figures 4, 5, 6 and 7, they show the values of intervals and IRIs of user ratings for the different continents and their respective hotel categories.

According to these values, the 5-star hotels with the best opinion in the world are those located in North America, according to the rating of the public (IRI: 0.99). While the rest of the continents have a more polarize rating. The ranking obtained has a relationship with the GDP (figure 9) of the continents, so that the higher the GDP, the higher the standards of quality in high value products or services, are. The following graph shows the GDP of the different continents in 2015, where North America predominates, followed by Europe, Asia and South America, the latter two with very similar values.

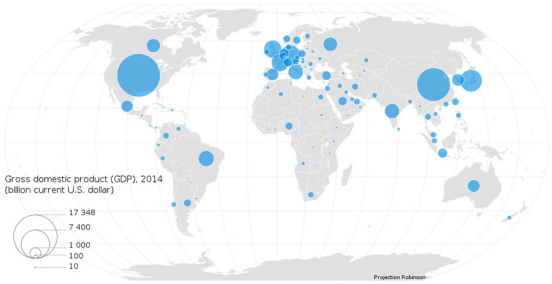

Figure 9: Map of countries by GDP in 2014, according to IMF estimates (October 2015). Source. Fond Monétaire International (IMF), World Economic Outlook Database, October 2015, http://www.imf.org.

This same study shows that the 4-star hotels with the best ratings are those located in South America, followed by Europe, Asia and North America. While the best rated three-star hotels are those located in Europe, followed by South America. From these ratings, the best hotels of medium category, three and four stars, are in Europe and South America.

Global Study by Country and Category. Table 5 shows the interval value and its corresponding IRIs. From these values it can be concluded that the best rated hotels in the country are in Japan, followed by France and Chile.

This same study shows that the five-star hotels with the highest ratings are those of South Korea, Mexico, Spain and Germany. The four-star hotels are in Singapore, Brazil and South Korea; and the three-star hotels are in Italy and Chile.

Conclusion

The objective of this work is propose a novel procedure to incorporate the user choice in the for business management, by generating the rules of choice of the public, to be incorporated into the decision-making process.

The model has been applied to a total of 60 hotels, with categories of 3, 4 and 5 stars, located in different cities of the European continent, North America, South America and Asia, showing its applicability, obtaining the rating of the different hotels, as well as the behavior of the public through their ratings. These comparisons have allowed us to have a general view of the audience's valuation behavior according to the classification criteria, which can be incorporated into business decision processes.

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Annex 1

City	Hotel	Stars
Washington DC (USA)	Sofitel Washington DC	5
	Melrose Georgetown Hotel	4
	One Washington Circle Hotel	3
Munich (Germany)	Hotel München Palace	5
	K+K Hotel am Harras	4
	Vi Vadi Hotel Bayer 89	3
Bangkok (Thailand)	Bangkok Marriot Hotel Surawongse	5
	Anantara Sathorn Bangkok Hotel	4
	Bangkok Loft Inn	3
Singapore (Singapore)	The Fullerton Hotel Singapore	5
	Orchard Singapore Hotel	4
	Park Avenue Changi Hotel	3
London (United Kingdom)	Park Grand London Hyde Park	5
	Double Tree by Hilton Hotel London-Tower of London	4

	The Belgrave	3
Paris (France)	Le Pavillon de la Reine	5
	Hotel Eiffel Blomet	4
	Hotel 34B-Astotel	3
New York (USA)	11 Howard	5
	Novotel New York Times Square	4
	Ameritania Hotel	3
Tokyo (Japan)	Hotel Century Southern Tower	5
	Hotel East 21 Tokyo	4
	Shibuya Tokyu REI Hotel	3
Dubai (EAU)	Le Meridien Dubai Hotel & Conference Centre	5
	Wyndham Dubai Marina	4
	Ibis Styles Jumeira Dubai	3
Chicago (USA)	Radisson Blu Aqua Hotel	5
	Chicago Athletic Association Hotel	4
	Majestic Hotel	3
São Paulo (Brazil)	InterContinental Sao Paulo	5
	Hotel Transamerica Sao Paulo	4
	H3 Hotel Paulista	3
Ciudad de México (EUM)	The St. Regis Mexico City	5
	Galeria Plaza Reforma	4
	Hotel Geneve Ciudad de Mexico	3
Rome (Italy)	Grand Hotel Via Veneto	5
	iQ Hotel Roma	4
	Amalfi Hotel	3
Buenos Aires (Argentina)	Melia Recoleta Plaza Hotel	5
	El Conquistador Hotel	4
	Selina Palermo	3
Madrid (Spain)	Hotel Hilton Madrid Airport	5
	Media Castilla	4
	Hotel Puerta de Toledo	3
Santiago de Chile (Chile)	Hotel Santiago	5
	Best Western Premier Marina Las Condes	4
	Hotel Panamericano	3
Los Angeles (USA)	Beverly Wilshire Beverly Hills	5
	The Line LA	4
	BLVD Hotel & Spa	3

Toronto (Canada)	Windsor Arms Hotel	5
	Thompson Toronto – A Thompson Hotel	4
	The Strathcona Hotel	3
Seoul (South Korea)	Lotte Hotel Seoul	5
	Shilla Stay Gwanghwamun	4
	G2 Hotel	3
Kuala Lumpur (Malaysia)	Mandarin Oriental Kuala Lumpur	5
	The Kuala Lumpur Journal	4
	Travelodge City Centre	3

Forecasting the absorption rate of European funds related to Cohesion Policy 2014 - 2020 in Romania

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Abstract

European funds are one of the main instruments used by the EU Member States to finance sustainable development. Absorption of European funds is an objective at Member States level which is part of the European Union. The purpose of the article is to bring to the attention of the stakeholders the issue of the absorption of European funds by using a methodology based on a composite indicator that integrates the functionalities provided by the management authority in absorbing the European funds. The article deals with a topic neglected by the specialized literature, namely identifying the absorption that can be achieved by a Member State, a process based on a methodology that uses the criteria that characterize the absorption process. The article addresses the situation of Romania and includes in the analysis of the operational programs that are financed from the Cohesion Policy 2014-2020. The article proves the modest results of Romania in the absorption of the European funds related to the programming period 2014-2020.

Keywords: EU funds, absorption, programming period 2014-2020, Cohesion Policy.

Introduction

Globalization, the mobility of the workforce, climate change, and a strong demographic decline are one of the most important challenges that need to be managed effectively and coherently by the European Commission. One of the instruments which the European Commission is using to manage the main development challenges are the European funds. The main objective assumed by European funds aims to reduce regional disparities as well as to promote sustainable and harmonious regional development, concepts found in the strategic and programmatic framework with which European funds operate. European funds are the main motivational element found at Member State level, also is the main pillar of the policies used by the European Commission. Both the Cohesion Policy and the Common Agricultural Policy are using European funds so that the importance of European funds for the success of these policies is significant. Ensuring a process of absorption of European funds requires compliance with a process governed by national and European law, this process is sometimes difficult. States deliver different performances in terms of the absorption rate of European funds precisely because performance in managing process specific to a significant absorption rate varies from one Member State to another. However, the first indicator that characterizes the performance of states in relation to European funds is the level of absorption. Literature focuses generally on the impact of absorption of European funds. In order to have a qualitative impact, it is necessary to have a level of absorption that is considered relevant to measure and assess their impact. The quantitative aspect of European funds is also very important. This aspect was neglected by the literature, the references are referring mostly to the impact of absorption rather than the absorption process itself. There is no such index to provide a prediction of absorption so that the absorption process can be optimized during the implementation period of the operational programs. This process is considered to be complex in the sense that the number of variables involved in the absorption of European funds is high and, last but not least, different from one operational program to another.

Romania is involved as a European Union Member State in the implementation of the 2014-2020 programming period, which is halfway through the implementation period, taking into account the N + 3 rule. Romania's performance in the first programming period was modest so that the actual

absorption rate achieved during the programming period 2007 - 2013 was about 80%, this being made on the basis of several procedural concessions made by the European Commission. Expectations regarding the current programming period are also pessimistic as the 2014-2020 programming period is much more complex than the first programming period managed by Romania. The existence of the Partnership Agreement, a comprehensive and difficult to follow the strategic framework, as well as significant economic and social challenges, justify the existence of pessimistic views regarding Romania's ability to capitalize on the opportunities offered by European funds. The funds allocated by the European Commission to Romania under the Cohesion Policy are 22.586.232.192 euro, the allocation being distributed based on 6 main operational programs. The absorption of European funds is an important objective for Romania, European funds represent a clear and direct investment in the sustainable development processes in the period 2014-2020. The identification of some methodologies capable of optimizing the absorption process and of ensuring an increased complementarity between investments made from other sources and European funds is a necessary prerequisite for Romania because the development deficits to other Western states are significant.

Methodology

In order to identify the level of absorption of European funds, we will proceed with using a methodology that systematically addresses the managerial process applied by the managing authorities in the implementation of the operational programs. The proposed methodology is based on the management system used by the managing authorities in Romania, focusing on the specifics of the Cohesion Policy 2014-2020 and the procedural rigors for the 2014-2020 programming period. The steps used in the implementation of the methodology are the following:

Step 1. Inventory of the entire set of variables, called criterias, that interfere with the European funds management system. 28 variables were identified with which the European fund management system manages, which are classified into 4 major classes of criterias, each class covering the functionalities of the management system.

Step 2. Each criterion class was assigned a weighting, the total amount being 100%, depending on the managerial effort imposed at the level of the management authority. Also, each criterion has a coefficient of importance from 1 to 10, 1 representing the minimum level, 10 the maximum level.
Step 3. To calculate the score obtained by each class of criteria using the following formula:

$$Po = \sum_{i=1}^{n} Cis \times PC$$

where,

Cis represents the coefficient of importance obtained at the level of each sub criterion

PC is the importance assigned to the criterion level

Po is the score obtained at the class of criteria

Step 4. Calculate the absorption prediction indicator by calculating it using the following formula:

$$Vpapo = \sum_{i=1}^{n} Po \times \text{financial allocation of the operational program}$$

where,

Vpapo = the predicted absorption value at the operational program level
and

the budgetary envelope allocated to that operational program represents the amounts allocated by the European Commission to the operational program concerned; they do not include national co-financing.

Step 5. Calculate the absorption absorption value by using the following formula:

$$\text{Predicted absorption value} = \sum_{i=1}^{n} Vpapo$$

Literature Review

Specific literature has paid particular attention to European funds. It mainly focused on the impact that these funds have on regional development primarily because regional development and reducing development deficits are the main objectives for European funds. Although the literature adds significant exposure to European funds, there is no unanimously accepted opinion on the capacity and effectiveness of these funds to contribute to regional development, the opinions are being contradictory. Some authors do find evidence of a positive impact of structural funds on economic growth (Dall'erba, 2005; Ramajo et al., 2008), others only find a weakly positive (Esposti et Bussoletti, 2008), no statistically significant (Dall'erba et Le Gallo, 2008) or even a negative impact (Eggert et al., 2007). Regarding the economic impact of European Funds, the empirical literature (Boldrin et Canova, 2001; Checherita et al, 2009; Ederveen et al, 2006; Santos, 2008) generates different results. Boldrin and Canova (2001) find that European funds are on average ineffective. Checherita et al (2009) show that European funds help to reduce income disparities at the regional level but are incapable of promoting output growth. Other authors (Ederveen et al, 2006; Santos, 2008) find that European funds become effective only when accompanied by an appropriate institutional framework (strong institutional quality, lack of corruption, etc). Other authors believe European funds payments may increase one region's growth, which, in turn, may affect neighboring regions' growth rates. In particular, the new economic geography (Krugman, 1991; Krugman et Venables, 1995) highlights the importance of regional spillovers. If these spillover effects cannot be separated from the "original" impulse, the estimated effect of European funds payments is biased. There are also authors who consider that only certain types of funds have a positive contribution to regional development. For example, only funding on education and human capital has positive effects (Rodriguez-Pose et Fratesi, 2004). We can identify authors who consider that grants are not effective in stimulating private investment or improving general economies (Garcia-Milá et McGuire, 2001). European funds have a positive but not statistically significant impact on regional growth (Hagen et Mohl, 2008). European funds accelerate and region's convergence, but reduce the average growth rate (Eggert et al., 2007). The impact of European funds is synergistic with the level of absorption, in the sense that a significant impact is the consequence of an absorption process that provides for the approximate use of funds allocated to a Member State. The process of absorbing European funds is one that has proven to be complex, the ability of Member States to respond to procedural rigidities differs from one Member State to another, thus there are different differences in absorption performance. A high absorption process involves a mix of elements which be achieved at Member State level. Implement a project financed from European funds requires amending the legislation for harmonization with European standards (Bigioi, 2015), adapting accounting and fiscal policies of the entity, and improve the expertise of professional accountants (Bigioi, 2015). The absorption capacity in terms of supply is determined by three main factors, namely: macroeconomic absorption capacity, financial absorption capacity, administrative absorption capacity (Horvat, 2004). Berica believes that absorption capacity is mainly influenced by managerial and administrative capacities of co-financing. The relationship between the absorption capacity of the European funds and the regional economic situation is at least one paradox, demonstrating that the most disadvantaged regions face the greatest difficulties in absorbing these funds, although the need for financial support for the restructuring of the economy is paramount in these regions. The main explanation for this phenomenon is given by two factors: on the one hand, the difficulties faced by regional authorities lack the experience and qualifications, followed by the red tape and the slowness of EU decision-making in the circumstances where sequential programming at central and regional level in particular is not quite clear (Beric, 2010). According to the Commission's recommendations and best practices from EU countries, a golden rule becomes evident, namely the possibility of higher rates of absorption is directly proportional to the number of institutions in the new Member States involved in different levels of management and sectorial programs and regional (Horvat, 2009). The diverging results are also based

on differences in the research design. While earlier papers largely use cross-section analyses (Rodriguez-Pose et Fratesi, 2004), the recent findings are mostly based on panel data approaches (e.g., Esposti et Bussoletti, 2008). The estimation results might be biased due to the use of imprecise data. This problem is of special concern as the current literature often utilises structural funds commitments instead of actual payments. This results in a measurement error as commitments may not be entirely completed or be called up with a delay, e.g. due to missing absorption capacity (Mohl, 2010).

The performances registered by Romania in terms of the absorption of European funds are somewhat modest, much lower compared to other states in the European Union. The problems that Romania should approach in order to quantitatively, improve them, point mainly at the ability of the institutions of managing the process. Romanian authorities should improve the beneficiaries co-financing capacity more, since, despite the efforts made for the facilitating of the credit, this category of factors maintains its effect. (Valentin, 2013) Unfortunately, most empirical studies carried out in Romania pointed out a waring process of deepening the regional disparities started from the transition period and continuing up to now (Dachin, 2008; Goschin, 2008; Patache et al, 2011; Antonescu, 2010; Antonescu, 2012; Boldea et al, 2012). Despite the availability of European funds and significant cohesion funds, which should enhance the economic development for the underdeveloped regions, the European Union accession did not counteract the disparities for the regional based growth. On the contrary, the developed regions obtained the largest part of the post-accession benefits, based on their expertise in accessing European funds (Zaman et Georgescu, 2009; Goschin et Constantin, 2010). The main reason of the lack of absorption of European funds by Romania is the lack of transparency of the central government, particularly at the operational program management and also denial of existing vulnerabilities in this regard that prevents the identification of potential problems. Instead of analytical images an incomplete picture of absorption is presented, emphasizing only the positive aspects that ultimately make any scientific approach difficult. To be noted that during the implementation of a project (Zaman, 2009), absorption may be influenced by the macroeconomic vulnerabilities arising from both internal and external Romania (Zaman et Georgescu, 2009). The need for an approach that integrates the variables involved in the absorption process is justified precisely by the multitude of approaches and opinions, sometimes found at the level of the literature. However, up to now, the literature did not address the issue of absorption projection, which is imperative for any process of assessing the impact of European funds.

The level of absorption of European funds in Romania - the programming period 2014-2020

At the end of 2017 payments were made to beneficiaries in the weight of 8.96% of the total value, 16.1% on 03.08.2018, 23.98% at the end of 2018 and 24.1% in 01.02.2019. It is appreciated that the amounts of payments to beneficiaries are modest, given that at the end of 2018, 5 years have elapsed since the start of the programming period. It should be noted that payments to beneficiaries are potential absorption, with ineligible expenditure or suspicion of irregularity, all of which negatively affect the absorption. At the end of 2018 compared to 2017, payments to beneficiaries increased by 3.889.442.300 euro, the increase being by more than 100%. The year 2018 is the year when payments to beneficiaries doubled, a situation that positively influences future absorption. In fact, we can assume that the absorption of 2014 – 2020 programming period started in 2018. From a quantitative point of view, the current absorption rate was 3.355.106.939 euro at the end of 2017, 6.845.113.531 euro at the end of 2018 and 7.168.943.527 euro at 01.02.2019. The difference between 2018 and 2017, in terms of amounts sent to the European Commission, was 3.490.006.592 euro, and on 01.02.2019 compared to 31.12.2018 euro 323.829.996. As regards the amounts actually reimbursed by the EC, which are expenditure verified and assimilated as eligible by the European Commission, respectively amounts settled, we assert that at the end of 2017 they were 3.091.525.532 euro, 6.121.625.959 euro at the end of 2018, with 3.030.100.427 euro higher than the level of 2017 and 6.206.356.915 euro respectively on 01.02.2019.

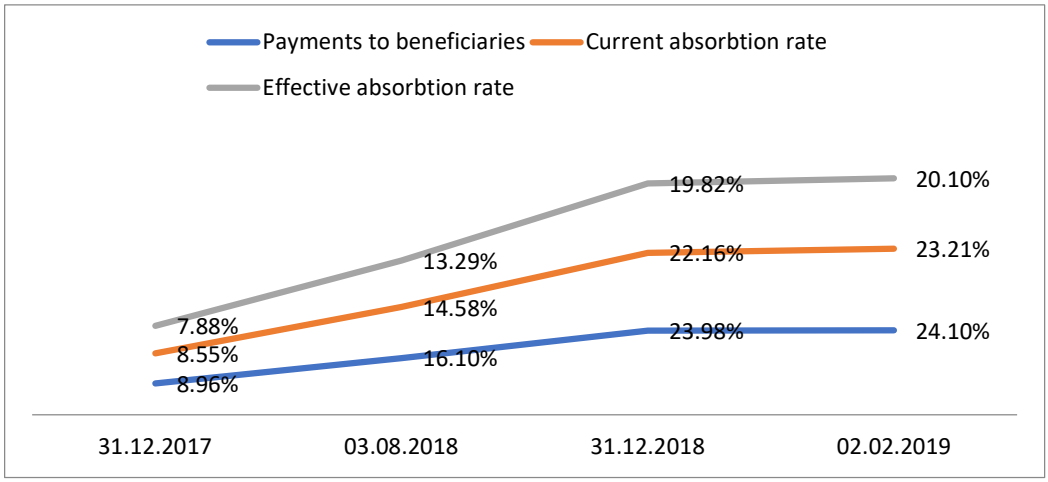

Figure 1: Absorption rate reported to total allocation, Source: European Commission

Thus, we can see that European Commission reimbursements increased from 7.88% in 2017 to 20.1% in February 2019. The relationship between these indicators is important because it illustrates the speed at which the European funds transfers payments made to beneficiaries on the basis of a financing contract, implicitly based on a project in amounts settled by the European Commission. Analyzing the absorption rate dynamic, taking into account the links between the three indicators mentioned above, we can see that at the end of 2017 the percentage difference between the amounts paid and the amounts sent for reimbursement was 0.41% and the difference between the amounts reimbursed from the European Commission and the amounts sent for reimbursement by Romania was 0.67%.

At the end of 2018, the percentage difference between the payments made and the amounts sent for reimbursement to the European Commission was 1.81% and the one between the amounts sent for reimbursement to the European Commission and the amounts reimbursed by the European Commission was 2.34%. At the end of 2017, an amount of 423.794.570 euro was blocked on the reimbursement process, namely within the national management authorities or the European Commission, at the end of 2018 the sum being 1.283.136.443 euro. With the increase in the amount of payments to the beneficiaries, the amount blocked in the reimbursement circuit has increased significantly. Thus, if in 2018 compared to 2017 the value of payments to the beneficiaries increased by 110%, the value of the amounts in the reimbursement circuit increased by 202%. Hence the conclusion that the higher the amounts processed by the management authorities, the slower the response rate of the system is, the reason for the higher sums implicitly generating more documents to be analyzed and verified. Romania's performance in terms of absorption of European funds is reduced, therefore their impact is low due to the lack of absorption. Such a situation generates problems in ensuring the complementarity of funding sources to finance regional development.

Projections on the absorption of European Funds in the Cohesion Policy 2014-2020 in Romania

Using the proposed methodology, an inventory of the main operational programs which are part of the Cohesion Policy 2014-2020 found in Romania was made. For each operational program identified, the proposed methodology will be applied, such an approach is likely to ensure good integration of the operational program's specificities. The set of identified criteria are tailored and used according to the particularities and specifics of each operational program.

Table 1: Projected value of the Regional Operational Program

Indicator	Weight Class of criteria	Coefficient of importance	Score obtained
Programming	5%		
Institutional synergy		8	
Correlation between needs amplitude and financial allocation		9	
Dynamic of the Operational Programs		8	
Synergy with adjacent strategies		9	
Synergy with current legislation		9	
Total subcriteria		43	2,15
Managing operational programs	35%		
Institutional architecture		10	
Human ressources		9	
Ensuring the financial resources required for reimbursement		9	
Communication capacity and help desk		7	
Evaluation system		8	
Decision-making and management structure		9	
Low bureaucracy		7	
Total subcriteria		59	20,65
Project implementation	55%		
Trust in the system		7	
Level of experience and expertise		8	
Financial capacity - financing capacity to provide the required liquidity		8	
Implementation capability		8	
Access to expertise		8	
Ability to draw up grant applications correlated with priority needs		8	
Integration capacity principle of complementarity at institutional level		7	
Ability to integrate the principle of sustainability at project level		10	
Total subcriteria		64	35,2
Monitoring and control	5%		
Programmatic monitoring - early warning		9	
Absorption monitoring		10	

Dynamic of the absorption		10	
Project-level monitoring		9	
Control capacity		8	
Synergy control layers		10	
Total subcriteria		56	2,8
Prediction indicator of the absorption %			60,8
Allocation value - euro			6.760.000.000,00
Absorption - euro			4.110.080.000,00

Source: Own methodology, Regional Operational Program 2014 - 2020

The Regional Operational Program benefits from an important allocation at the level of the Cohesion Policy, the needs covered by this operational program being complex and diverse. Urban development or revitalization, the environment, or the competitiveness of the business environment are some of the needs covered by this operational program. The absorption forecast indicator obtained 60.8% of the total allocation, whereas on 01.02.2019 the amount sent to the EC for reimbursement was 12.78% (876.649.527 euro) and the amounts actually reimbursed represented 8.09% (555.067.839 euro). Mentioning this absorption was a procedural exception, so the status of the program is a difficult one right now.

Table 2: Projected value of the Large Infrastructure Operational Program

Indicator	**Weight**	**Coefficient of importance**	**Score obtained**
	Class of criteria		
Programming	5%		
Institutional synergy		9	
Correlation between needs amplitude and financial allocation		7	
Dynamic of the Operational Programs		7	
Synergy with adjacent strategies		6	
Synergy with current legislation		10	
Total subcriteria		39	1,95
Managing operational programs	35%		
Institutional architecture		10	
Human resources		8	
Ensuring the financial resources required for reimbursement		9	
Communication capacity and help desk		7	
Evaluation system		8	
Decision-making and management structure		8	
Low bureaucracy		6	
Total subcriteria		56	19,6

Project implementation	55%		
Trust in the system		8	
Level of experience and expertise		8	
Financial capacity - financing capacity to provide the required liquidity		8	
Implementation capability		8	
Access to expertise		8	
Ability to draw up grant applications correlated with priority needs		6	
Integration capacity principle of complementarity at institutional level		9	
Ability to integrate the principle of sustainability at project level		10	
Total subcriteria		65	35,75
Monitoring and control	5%		
Programmatic monitoring - early warning		9	
Absorption monitoring		10	
Dynamic of the absorption		10	
Project-level monitoring		8	
Control capacity		9	
Synergy control layers		8	
Total subcriteria	100%	54	2,7
Prediction indicator of the absorption %			60
Allocation value - euro			9.218.524.484,00
Absorption - euro			5.531.114.690,40

Source: Own methodology, Large Infrastructure Operational Program 2014 - 2020

The Large Infrastructure Operational Program aims at developing a large infrastructure, the central need of Romania. This is one of the most important operational programs in terms of allocation but also one of the most difficult to implement. Projects funded under the Large Infrastructure Operational Program are somewhat difficult to implement, the variables involved in such a project being significant. The absorption prediction indicator for this program is 60%, given that the actual absorption at the beginning of February was 15.79% (1.472.127.764 euro). Absorption value is unusually high compared to other operational programs because it was influenced by the previous programming period.

Table 3: Projected value of the Competitiveness Operational Program

Indicator	Weight Class of criteria	Coefficient of importance	Score obtained
Programming	5%		
Institutional synergy		8	
Correlation between needs amplitude and financial allocation		9	
Dynamic of the Operational Programs		7	
Synergy with adjacent strategies		10	
Synergy with current legislation		9	
Total subcriteria		43	2,15
Managing operational programs	35%		
Institutional architecture		8	
Human resources		8	
Ensuring the financial resources required for reimbursement		8	
Communication capacity and help desk		10	
Evaluation system		9	
Decision-making and management structure		9	
Low bureaucracy		8	
Total subcriteria		60	21
Project implementation	55%		
Trust in the system		8	
Level of experience and expertise		9	
Financial capacity - financing capacity to provide the required liquidity		8	
Implementation capability		9	
Access to expertise		8	
Ability to draw up grant applications correlated with priority needs		10	
Integration capacity principle of complementarity at institutional level		9	
Ability to integrate the principle of sustainability at project level		10	
Total subcriteria		71	39,05
Monitoring and control	5%		
Programmatic monitoring - early warning		9	
Absorption monitoring		10	

Dynamic of the absorption		10	
Project-level monitoring		9	
Control capacity		8	
Synergy control layers		10	
Total subcriteria	100%	56	2,8
Prediction indicator of the absorption %			65
Allocation value - euro			1.329.787.234,00
Absorption - euro			864.361.702,10

Source: Own methodology, Competitiveness Operational Program 2014 - 2020

Competitiveness Operational Program finances needs such as R&D, innovation or digitization, crucial needs for the competitiveness of the Romanian economy. Competitiveness Operational Program is a small program, its value being small compared to other operational programs, the number of beneficiaries with which the program interacts being reduced, generating an easy-to-manage absorption frame. However, the level of technical expertise required by the program is high but also expensive at the same time. The expected absorption value for this indicator is 65%. On 01.02.2019, the value of the absorption, in relation to the total allocation, was 15.31% (203.612.561 euro), referring here to the actual absorption.

Table 4: Projected value of the Operational Program for Administrative Capacity

Indicator	**Weight** / **Class of criteria**	**Coefficient of importance**	**Score obtained**
Programming	5%		
Institutional synergy		8	
Correlation between needs amplitude and financial allocation		9	
Dynamic of the Operational Programs		10	
Synergy with adjacent strategies		6	
Synergy with current legislation		10	
Total subcriteria		43	2,15
Managing operational programs	35%		
Institutional architecture		7	
Human resources		9	
Ensuring the financial resources required for reimbursement		10	
Communication capacity and help desk		10	
Evaluation system		9	
Decision-making and management structure		9	
Low bureaucracy		8	
Total subcriteria		62	21,7

Project implementation	55%		
Trust in the system		10	
Level of experience and expertise		9	
Financial capacity - financing capacity to provide the required liquidity		10	
Implementation capability		10	
Access to expertise		10	
Ability to draw up grant applications correlated with priority needs		10	
Integration capacity principle of complementarity at institutional level		9	
Ability to integrate the principle of sustainability at project level		10	
Total subcriteria		78	42,9
Monitoring and control	5%		
Programmatic monitoring - early warning		10	
Absorption monitoring		10	
Dynamic of the absorption		10	
Project-level monitoring		9	
Control capacity		9	
Synergy control layers		10	
Total subcriteria		58	2,9
Prediction indicator of the absorption %			69,65
Allocation value - euro			553.191.489,00
Absorption - euro			385.297.872,09

Source: Own methodology, Operational Program for Administrative Capacity 2014 - 2020

The Operational Program for Administrative Capacity aims at developing administrative capacity of the public institutions, important elements for sustaining economic and social development in a sustainable manner. Sustainable development processes require an efficient public administration capable of supporting regional development processes in an efficient and effective manner. Program allocation is low, the program interacts mainly with central and local public authorities using the same procedural framework. Based on the proposed methodology, absorption of 69.65% is anticipated. On 01.02.2019, the Operational Program for Administrative Capacity recorded an actual absorption value of 7.84% (43.375.785 euro).

Table 5: Projected value of the Operational Program for Technical Assistance

Indicator	Weight Class of criteria	Coefficient of importance	Score obtained
Programming	5%		
Institutional synergy		10	
Correlation between needs amplitude and financial allocation		10	
Dynamic of the Operational Programs		10	
Synergy with adjacent strategies		9	
Synergy with current legislation		9	
Total subcriteria		48	2,4
Managing operational programs	35%		
Institutional architecture		10	
Human resources		9	
Ensuring the financial resources required for reimbursement		10	
Communication capacity and help desk		10	
Evaluation system		10	
Decision-making and management structure		10	
Low bureaucracy		9	
Total subcriteria		68	23,8
Project implementation	55%		
Trust in the system		10	
Level of experience and expertise		10	
Financial capacity - financing capacity to provide the required liquidity		10	
Implementation capability		10	
Access to expertise		10	
Ability to draw up grant applications correlated with priority needs		10	
Integration capacity principle of complementarity at institutional level		9	
Ability to integrate the principle of sustainability at project level		10	
Total subcriteria		79	43,45
Monitoring and control	5%		
Programmatic monitoring - early warning		10	
Absorption monitoring		10	

Dynamic of the absorption		10	
Project-level monitoring		10	
Control capacity		9	
Synergy control layers		10	
Total subcriteria		59	2,95
Prediction indicator of the absorption %			72,6
Allocation value - euro			252.765.958,00
Absorption - euro			183.508.085,51

Source: Own methodology, Operational Program for Technical Assistance 2014 - 2020

The Operational Program for Technical Assistance is a support program for the management of European funds, aimed at providing the necessary framework for the implementation of other operational programs. However, the importance of the program is important because it affects absorption. The program delivers an average difficulty in terms of its modest allocation as well as the small number of beneficiaries the program interacts with. Also, the diversity of needs with which the program interacts is a small one. In view of the above, the absorption forecast indicator is 72.6% and 183.508.085,51 euro, respectively. The absorption value at 01.02.2019 was 32.07% (81,051,606 euro).

Table 6: Projected value of the Human Capital Operational Program

Indicator	**Weight** / **Class of criteria**	**Coefficient of importance**	**Score obtained**
Programming	5%		
Institutional synergy		7	
Correlation between needs amplitude and financial allocation		8	
Dynamic of the Operational Programs		8	
Synergy with adjacent strategies		10	
Synergy with current legislation		8	
Total subcriteria		41	2,05
Managing operational programs	35%		
Institutional architecture		8	
Human resources		8	
Ensuring the financial resources required for reimbursement		9	
Communication capacity and help desk		8	
Evaluation system		8	
Decision-making and management structure		8	
Low bureaucracy		6	
Total subcriteria		55	19,25
Project implementation	55%		

Trust in the system		8	
Level of experience and expertise		9	
Financial capacity - financing capacity to provide the required liquidity		5	
Implementation capability		5	
Access to expertise		6	
Ability to draw up grant applications correlated with priority needs		10	
Integration capacity principle of complementarity at institutional level		8	
Ability to integrate the principle of sustainability at project level		7	
Total subcriteria		58	31,9
Monitoring and control	5%		
Programmatic monitoring - early warning		8	
Absorption monitoring		10	
Dynamic of the absorption		10	
Project-level monitoring		7	
Control capacity		8	
Synergy control layers		8	
Total subcriteria	100%	51	2,55
Prediction indicator of the absorption %			55,75
Allocation value - euro			4.371.963.027,00
Absorption - euro			2.437.369.387,55

Source: Own methodology, Human Capital Operational Program 2014 - 2020

One of the difficult programs to implement and manage at the level of European funds is the Operational Program for Human Capital. It addresses 3 main needs, namely the labor market, education and poverty reduction. The difficulty of this program derives from the very large number of beneficiaries with whom the program interacts and from the operations financed. Also, the number of documents generated by a project funded from the Operational Program for Human Capital is significantly higher than for other operational programs, such as the Large Infrastructure Operational Program, for example. The expected absorption value calculated on the basis of the proposed methodology is 55.75% in the respective weight of 2.437.369.387,55 euro. Please note that on 01.02.2019 the actual absorption value was 13.38%, or 584.933.097 euro.

Table 7: Predicted absorption value

Operational program	Predicted absorption value euro	Predicted absorption rate %
Regional Operational Program	4.110.080.000,00	60,8
Large Infrastructure Operational Program	5.531.114.690,40	60
Competitiveness Operational Program	864.361.702,10	65

Operational Program for Administrative Capacity	385.297.872,09	69,65
Operational Program for Technical Assistance	183.508.085,51	72,6
Human Capital Operational Program	2.437.369.387,55	55,75
Predicted absorption - euro	13.511.731.737,65	63,97
Total value allocated – initial allocation	22.586.232.192,00	
% Predicted absorption rate	59,82%	
% absorption at 01.02.2019	2,940,168,652 euro	13,02%

Source: Own methodology

Based on the methodology approached, analyzing the situation of the operational programs that are an integral part of the Romanian Cohesion Policy, we can see that the expected absorption is at 59.82%, given that the value of the absorption at the beginning of 2019 was only 13.02%. The Human Capital Operational Program is the program that, based on the proposed methodology, will deliver an absorption rate of 55.75%, which is one of the lowest in the Cohesion Policy 2014-2020 in Romania. The situation is different in the case of the Technical Assistance Operational Program, where an absorption rate of 72.6% is anticipated. Large infrastructure and urban development are needs to be delivered at 60% and 65% respectively, which are small compared to the previous programming period. The references are related to actual absorption, namely the amounts actually reimbursed by the European Commission. References to actual absorption are generated by the fact that these expenses go through the entire procedural process imposed by the European funds management system.

Conclusion

Sustainability of development has become one of the most important features in development processes. The entire European strategic and programmatic framework addresses development in a sustainable context, with European funds being used to finance sustainable regional development and reduce regional disparities. Implementation of European policies, but also their success depends to a large extent on how to approach European funds. Above all, absorption is an imperative element to underpin these types of discussions. This article proposes to use a methodology that integrates an index composed of the entire set of variables that are involved in the management of European funds, depending on its importance. With different characteristics from one operational program to another, we adapted the methodology according to each operational program that we find in Romania, within the Cohesion Policy 2014-2020. At the end of 2018, Romania's performance in the absorption of European funds is reduced, given that it has been 5 years since the start of the programming period. A current absorption rate of 15.75% and an effective absorption rate of 13.02% represent the small percentages registered by Romania, which are lower than in the previous programming period. Although the programming period 2007 - 2013 was the first programming period administered by Romania as a Member State so that the level of experience was much lower, the absorption performance was higher than the current programming period, the situation considered unusual.

This article addresses an element little addressed by the literature, namely the prediction of absorption. The limits of this methodology refer to the level of high subjectivity, which is found at the level of the criteria integrated in the methodology and at the score awarded. Applying the proposed methodology, we can see that the forecasts for the absorption of European funds dedicated to Cohesion Policy in Romania are 13.511.731.737,65 euro, representing an absorption rate of 59.82%. This amount is exclusive of the European Commission contribution, excluding ineligible expenditure or national contribution. The applied methodology highlighted the existence of differences from one operational program to another. Programs with a small financial allocation have predicted greater absorption while higher allocation programs deliver lower absorption. This is caused by the number and diversity of beneficiaries and the needs with which large-scale programs are operating. Also, the financial and managerial effort required by programs such as the Regional Operational Program, the Large

Infrastructure Operational Program or the Operational Program for Human Capital is significantly higher than for the Operational Program for Technical Assistance or the Operational Program for Administrative Capacity. This is clearly revealed by the differences in the absorption forecast so that the Human Capital Operational Program benefits from a predicted absorption rate of 55.75% while the Operational Program for Technical Assistance benefits from a 72.6 %. The average absorption of funds dedicated to the Cohesion Policy 2014-2020 is 63.97%, which is lower than the one realized during the 2007-2013 programming period. Romania's absorption performance will remain low in 2014-2020, so sustainable development processes must find substitutes for other sources of funding than those funded by European funds.

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Use of Social Media in Open and Closed Models of Building the Educational Institutions' Image

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Abstract

This article presents the issue of managing the image of the organization in an environment characterized by high level of saturation with modern Internet and mobile technologies. Significant role in the process of shaping the image is played by marketing communication. The new model of marketing communication is mainly based on social media. The attributes of social media predestine them to be used in the process of image creation. The process of building the organization's image may be conducted in an open system – according to a linear model, or a closed system – according to a feedback model. The method of building the image is largely translated to the effectiveness of the entire process. Market economy principles apply not only to business organizations but also, increasingly, to other types of organizations, including educational institutions. Educational institutions must also build a positive image of the organization. The main goal of this article is to assess the process of building the image of educational institutions in the social media era. In the presented results of empirical studies, the analysed entity was limited to one type of educational institutions – secondary schools. The research has shown that in the process of shaping the school's image, many schools still concentrate mainly on building their identity and communicating it to their stakeholders, and, to a much smaller degree, on obtaining and analysing feedback. Therefore, in theory, the image is built in a closed system – the feedback model, and, in practice, in an open system – the linear model.

Keywords: Image of The Organization, Marketing Communication, Social Media, Linear Model, Feedback Model, Educational Institutions, Secondary Schools.

Introduction

The key of market success of every organization is the satisfaction of stakeholders – various groups in the organization's environment. The image is the reflection of satisfaction. A positive image allows the organization to be distinguished amongst competition, build trust of recipients and gain their loyalty. Therefore, the image is of key importance in the organization-environment relation.
Building the organization's image is a complex process, which the organization controls only partially. This results from the essence of image. The organization's image is usually understood as a reflection of the organization's identity, its picture in the mind of stakeholders, an idea about the organization in the environment, in which it operates. The image management process should be focused on two aspects:

1) Shaping own image, i.e. deliberate influence on the shape of the image from the stakeholders' point of view;
2) Collection and analysis of opinions of stakeholders in order to undertake corrective actions, and to improve, strengthen and enforce the image.

The effectiveness of this process largely depends on the quality of marketing communication, both external as well as internal. The process of building the organization's image may be conducted in an open system – according to a linear model, or a closed system – according to a feedback model. The method of building the image is largely translated to the effectiveness of the entire process – building the image in a closed system is more effective. The contemporary model of marketing communication is mainly based on social media.

Social media are becoming increasingly popular not only in the society but also in business. This is an effect of progressing technological development and the growing potential of social media. The main benefits of present social media include: large range, general availability, low costs, mobility, interactivity and multimedia, higher level of effectiveness, better engagement of the user. SM allow existing in the virtual space, which is becoming important as much as the reality.

Market economy principles apply not only to business organizations but also, increasingly, to other types of organizations, including educational institutions. Similarly to enterprises, educational institutions must also build a positive image of the organization.

This article consists of two main parts. Part one includes a synthetic description of changes in the organization-environment relation under the influence of social media. Principal models of building the organization's image are presented. The distinguished elements were referred to the process of managing the image of educational institutions. In addition, part one also presents the most important characteristics of social media, which predestine them to manage the image of organizations. Part two presents the results of own research. This article has been prepared for analytical and research purposes. It was drawn up based on an educational approach, with the use of source literature and results of empirical studies.

The main goal of this article is to assess the process of building the image of educational institutions in the social media era. In the presented results of empirical studies, the analysed entity was limited to one type of educational institutions – secondary schools.

Relations of the Organization with the Community in the Hyper-media Environment

As a result of technological development, which led to the currently intensifying digital transformation, organizations are carrying out many changes covering mainly the organizational structure, manner of operation, and the work environment (Jędrzejczyk, 2019). Changes mostly relate to all organizational areas, including public relations (PR). PR shapes the relations between the organization and the external environment. An important role in PR activities is played by marketing communication, which is becoming virtual – and then by skilful combination of traditional and digital channels of communication with recipients, whereas the share of digital channels is increasing systematically (Kaushik, 2012; Chaturvedi and Gupta, 2014). The significance of the Internet, which is constantly evolving, and the related social media, is invaluable. The information flow environment, created in this manner, is defined as a hyper-media environment, and the new model of marketing communication, based on hyper-media, is characterized by a different type of interactions and a new interpretation of the function of a medium (Mangold and Faulds, 2009; Pavenkov and Rubtcova, 2019). Thanks to two-way and interactive communication, the position and the role of the message recipient is changing. The recipient has a possibility to generate feedback, e.g. through expressing own opinions. The traditional division of market players into organizations responsible for creation and promotion, and clients – who were passive recipients of marketing activities to date – is fading (Vescovi et al., 2010). Currently, recipients – consumers are more active in the Internet, which significantly affects the image of the organization and its services.

Most important changes triggered by the influence of social media on shaping the relations between organizations and clients are as follows (Kietzmann et al., 2011; Kaplan and Haenlein, 2012; Mazurek, 2012; Barker et al., 2013; Mazurek-Łopacińska and Sobocińska, 2017, p. 345):

- The paradigm of a media user is changing. A user is not just a recipient, but also a message author;
- The new role of the user facilitates more influence and control in terms of generating content. However, taking advantage of the potential of the Internet depends on the level of the user's competencies, and requires a sense of responsibility for the activity in the network;
- Content generated using social media increase information resources and may be useful both to organizations and clients;

- Information asymmetry is decreasing, thus the client's bargaining power is growing;
- The value and manner of distributing the message depend on assessment of the message, which is performed by users of social media;
- Communication based on social media requires a long-term dialogue with the client;
- Using social media by organizations increases the engagement of clients in processes happening within the organization.

The idea of using social media in the management process has already been named a "concept". Technical possibilities offered by SM and their easy accessibility caused organizations to start using the modern concept of managing relations with clients provided by Social CRM (SCRM). Social CRM is a concept of management consisting in creating the value of the organization through maintaining relations with clients using social media (Paliouras and Siakas, 2017).

The Model of Building the Organization's Image

Two basic models of building the organization's image may be distinguished: the linear model, and the feedback model – figure 1.

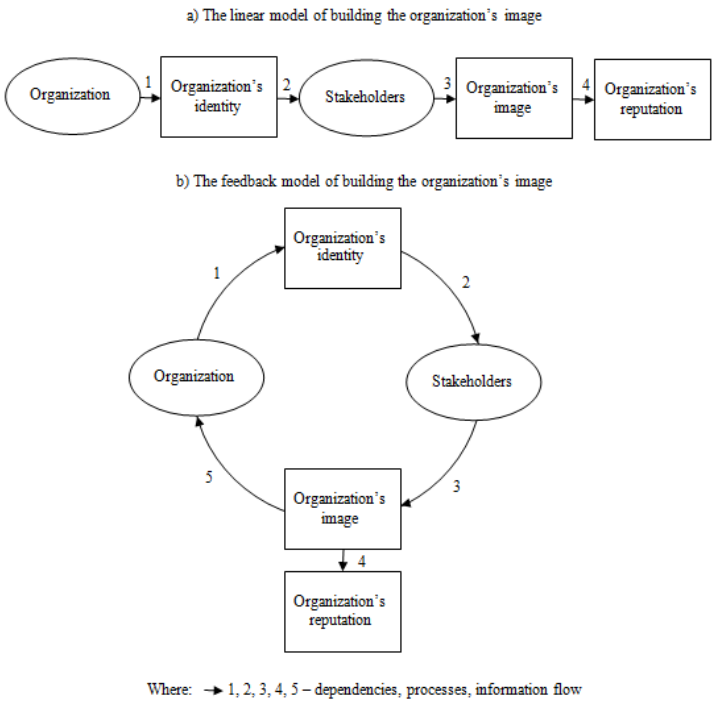

Fig. 1: Image building models

Source: own elaboration

The image building process according to the linear model consists of the following sub-processes: 1 – The organization builds its identity based on its strengths; 2 – Stakeholders receive/obtain information about the organization – its weaknesses and strengths; 3 – base on information held, stakeholders create the organization's image, whereas images of defined groups of stakeholders may vary; 4 – Development of a summarized image effect, defined as reputation, which consists of the sum of images of individual groups of stakeholders, maintained during a longer time horizon.

The linear model of building the organization's image is a non-closed system. This is a fundamental weakness of this model because information flow is conducted one-way only – from the organization

to stakeholders – one-way communication. The organization may have directly influence only dependencies 1 and 2 – processes, which should be initiated by the organization. Whereas dependencies 3 and 4 do not depend directly on the organization – these are autonomous processes.

In the feedback-based image building model, dependencies 1-4 have the same significance as in the linear model. Whereas in sub-process 5 the organization obtains information about its image, which may then be used in improvement activities. The organization may also directly influence dependency 5.

The feedback-based image building model is a closed model. The organization knows what are the effects of undertaken activities in the scope of building the image and, in case of a weak image, it can undertake corrective actions.

The process of continuously obtaining data from the surrounding environment by organizations, including information about the organization itself, is defined as monitoring (Draghicia et al, 2014).
Due to the application of two-way communication in the feedback-based image building model, it seems natural to use social media in the process of shaping the relations of the organization with its surroundings. A similar view is presented by other researchers, for example according to J. Leskovec (2011) social media allow obtaining feedback.

Businesses usually indicate the following principal benefits of using social media in relations with stakeholders (Stelzner, 2009, p.14-18):

1. Increasing brand awareness;
2. Increasing visibility/inquiries about the organization in the network;
3. Meeting new business partners;
4. Improving the results of the search for the business entity amongst users, who are seeking companies and other institutions near their location;
5. Winning new clients;
6. Decreasing total marketing costs;
7. Signing specific contracts.

The Potential of Social Media

Social media are a new method of communication based on Internet and mobile technologies, which transform communication into an interactive dialogue, which allows creating and sharing content generated by users (Bingham and Conner, 2010, p. 6; Kaplan and Haenlein, 2010). Social media are identified with a natural, unrestricted form of exchanging information in the network between users in the area of their common interests (Laroche et al., 2012). In all definitions it is clearly emphasized that communication in social media is based on network technologies. Most important characteristics, which differentiate social media from traditional media include (Kaplan and Hanlein, 2010; Gladwell and Shirky, 2011):

1. Range – SM can reach a larger group of recipients;
2. Access – SM are generally accessible for many recipients free of charge or against a minor charge;
3. Use – creating content via social media does not require any special skills, it is enough to be able to use new technologies;
4. Immediacy – SM form a space where reactions are immediate;
5. Impermanence – messages may change almost the minute they were published;
6. Usability – social media are mainly based on what most users are capable of.

The social media area includes: social websites/portals, blogs, social tabs, Wiki and Internet forums. Certain types of social media are characterized by special attributes such as (Mazurek-Łopacińska and Sobocińska, 2017, p. 345):

- Social portals – wide scope of functionalities, as well as general or specialized content. They allow building relations between users e.g. Facebook, LinkedIn, GoldenLine, Google+;
- Internet knowledge data bases – the value of a knolwedge data base results from the activity of users in the scope of creating, updating and verifying the content e.g. Wikipedia;
- Internet multimedia repositories e.g. YouTube, Snapchat;
- Communicators, which form an alternative to communication using telephone or e-mail, e.g. Skype, Messenger;
- Blogs – allow authors to publish various types of content, e.g. Blogger, WordPress, Photoblog, including microblogs, which facilitate publishing short messages created as a response to current events e.g. Twitter;
- Forums – for publishing opinions and views.

Available social media offer users various functions, whereas the functionality of the various types of social media availability is synonymous to a large extent.

The Specificity of Managing the Image of Educational Institutions

Educational institutions are divided into schools and educational establishments. Schools are in the definitive majority, and they are usually divided into primary schools, secondary schools, and higher schools. Sector-specific literature includes numerous elaborations on shaping the image of higher schools, e.g. by J. Ivy (2001), H. Alves and M. Raposo (2010), R. Ryńca and J. Radomska (2018), H.B. Akıncı and H. Serin (2020), and much fewer on building the image of secondary schools, e.g. by L. Eger et al. (2018). This is because higher schools have been battling for best students for years. Whereas the problem of growing competition on the market of educational services has affected secondary schools only recently. The main reason for this is the increasing demographic decline in many countries, coupled with a substantial increase of the importance of school education and the school as a social institution in the era of a dynamic technology development. In the Polish reality, there is an additional factor, namely the educational reform, which commenced in 2017. Based on the above it may be stated that there is a gap in the literature in regard to managing the image of secondary schools.

The process of managing the organization's image may be come down to the following stages (Schuler, 2004; Massey, 2016; Świeczak, 2017, p. 91):

1. Defining the goals of building the desirable image of the organization,
2. Defining the main stakeholders of the organization,
3. Analysing the present image of the organization,
4. Defining the determinants of the organization's image,
5. Selecting the instruments for creating the image and channels of communication with stakeholders,
6. Defining the team and persons responsible for executing image-related tasks,
7. Implementing and executing the image management strategy,
8. Supervision over results achieved.

The specificity of building the educational institutions' image is, however, different than in the case of companies (Ryńca and Radomska, 2018). This is due to the fact that educational institutions have different management characteristics, different funding rules and specific legal regulations. Execution of the process of managing the image of educational institutions, in particular managing the image of secondary schools is relatively easier than the analogical process carried out in business organizations. In case of educational institutions (Kazoleas et al., 2001; Alves and Raposo, 2010), it is easy to define the main goal of marketing activities. The main goal is to attracting candidates during recruitment. It is easy to precisely define the most important groups of stakeholders. Schools have strongest connections with own students and their parents. In turn, the group of stakeholders, which receives the school's largest attention, are potential students – graduates of lower level schools. To continue operation, schools must attract these stakeholders. It is relatively easy to define the most important determinants of the image. For this purpose, in its on-going marketing activity the

school should expose elements with the most importance for the student, such as: educational offer, teaching level, teaching staff, premises, technical facilities (Eger et al., 2018). The task concerning the selection of tools for image creation is also relatively simple. The portfolio of methods should definitely include social media. Usability of social media in educational institutions is increasing systematically. This is confirmed by numerous publications e.g. examples of good practices in using social media in higher schools presented in: V. Lavrusik (2009), F. Rosmala and D. Rosmala (2012), P.A. Tess (2013). It is relatively easy to define the persons engaged in image-related activities. They should include not only school principals, but also all teachers since they are in direct contact with the most important school stakeholders – the students.

Assessment of the Process of Creating an Image of Educational Institutions – Research Results

Research Method

The main goal of the conducted empirical studies is to prepare a model approach to effective management of the image of educational institutions[i]. Three principal research questions are asked in relations to the main goal, in order to facilitate achieving this goal:

1. Is the potential of social media in the management of the image of educational institutions used in an effective manner?
2. What are the main reasons of ineffective use of social media in managing the image of educational institutions?
3. How to manage the image of educational institutions using social media, so that the process of creating the image was effective?

Responses to such questions were sought in a survey addressed to defined groups of respondents. Research was conducted in the years 2015-2019. In search for the answer to the research question in empirical studies, emphasis was placed on those elements of the process of shaping the image, which depend on the organization and which should be combined with the use of social media: sub-process 1 and 2 in the linear model, and sub-processes 1, 2 and 5 in the feedback model (look Figure 1). Three sub-processes were analysed:

1. Building of organization's identity – sub-processes 1,
2. Communicating the organization's identity to stakeholders – sub-processes 2,
3. Obtaining feedback from stakeholders on the current image of the organization – sub-processes 5.

Within each sub-process, attempts were made to define and assess activities undertaken by analysed schools in the image building process with the use of social media.
This article presents results of research, which allowed obtaining a partial answer to the first research question. The main goal of this article is to assess the process of building the image of educational institutions in the social media era. Educational institutions are divided into schools and educational facilities. Schools are in the definitive majority. Due to the substantial differentiation of types of schools (every educational level has its specificity) it was adopted that the subject of the research will cover secondary schools.
Empirical research was conducted on two principal research populations. The first population comprised employees of secondary schools (principals, vice-principals, teachers), and the second one – main stakeholders – students and their parents. Schools were located in Poland in the Łódzkie voivodeship. 201 employees participated in the research, including three principals, five vice-principals and one hundred and ninety three teachers from thirteen secondary schools, as well as 1465 students from these schools and 467 parents of students. Research was conducted in 13 schools – in schools where principals agreed to conduct this research. In every school the study population included both school staff as well as current students and their parents.

Research Results: Employee's Perspective

All school staff, including the management as well as teachers, should be engaged in the process of shaping the school's image. Teachers play an extremely important role because they have direct contact with students. From the teachers' perspective, things are looking good. In their opinion, they are engaging in the school's promotional activities, which aim at presenting and promoting information about the school's strengths (94% of respondents). Many of them use social media to support these activities (68% of respondents). Most engaged teachers undertake numerous activities in social media. They check information placed by the staff, students and graduates, analyse opinions and comments, as well as post information, photographs and films on daily life at the school. Many teachers also follow the activity of other schools in social media (55% of respondents) – they view teaching materials made available to students and parents, analyse Facebook profiles, follow discussions on forums attended by students and parents as well as blogs created by teachers for students. An analysis of strengths and weaknesses of other schools makes it easier to undertake activities aimed at strengthening own position on the market.

Schools also attempt to obtain information about the quality of their work from main stakeholders. Unfortunately, theses activities are not sufficient. Teachers indicated that opinions about the functioning of the school from students are usually obtained in direct discussions (85% of respondents). The greatest disadvantage of this manner of obtaining information is the questionable objectivity of received feedback due to the nature of the teacher-student relation. Additionally, opinions and comments posted by students on social media are analysed but to a much smaller extent – 28% of respondents declared to be obtaining feedback in this manner – figure 2.

Feedback from the second most important group of the school's stakeholders – parents of students – is obtained mainly during parent-teacher meetings (92% of respondents). The greatest disadvantage of this manner of obtaining feedback is significant inertia resulting from the low frequency of meetings – usually four time a year. In addition, opinions and comments of parents posted in social media are analysed but to a much smaller degree – 13% of respondents declared to be obtaining feedback in this manner – figure 2.

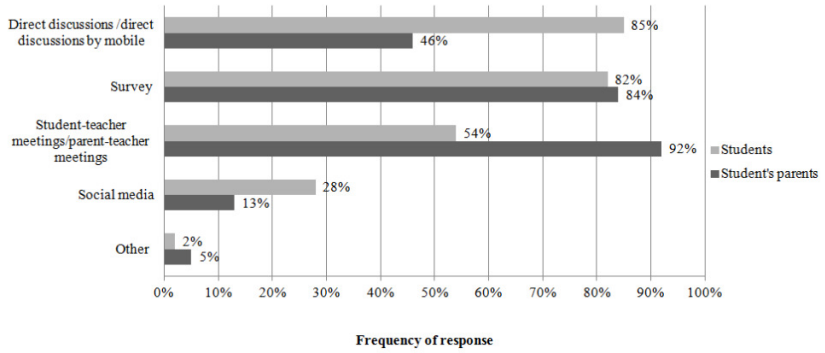

Fig. 2: Methods used by schools to obtain information about the quality of their work from main stakeholders

Source: own elaboration

In the opinion of school staff, the schools where they work are positively assessed by in the local environment (91 % of respondents).

Research Results: Main Stakeholders' Perspective

Some activity in social media is directly related with the school. Students are eager to share opinions about the school (46% of respondents). Before making the decision on choosing a school, students review content posted by schools in social media (51% of respondents). They also rely on opinions

on school students in social media (38% of respondents). The main determinants of selecting the particular school included: offered class profiles (43% of respondents), teaching level (30% of respondents), opinion about the school (28% of respondents), exam passing rate (25% of respondents), and peers (18% of respondents) – Figure 3. This indicates that principal determinants are composed of the school's identity and the ability to communicate it to stakeholders.

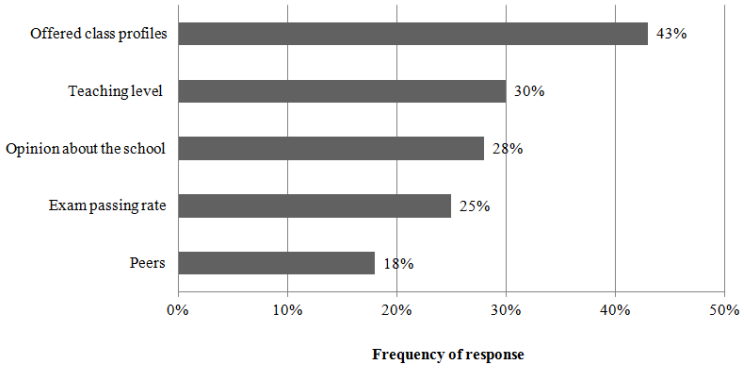

Fig. 3: The main determinants of selecting the school by students
Source: own elaboration

Opinions generated by current students and their parents significantly contribute to the school's image in the eyes of future students and their parents. Therefore, the process of monitoring these opinions, in particular in social media – where young people feel completely no restrictions – is incredibly important from the point of view of managing the school's image. Negative opinions should trigger corrective action.

Discussion

The process of building the educational institutions' image may be conducted in an open system – according to a linear model, or a closed system – according to a feedback model. In the linear model, information flow takes place one way only – from the organization to stakeholders. In the feedback model, information flow also takes place in the reverse direction – from stakeholders to the organization. The linear model is highly ineffective in the era of agile methodologies. A school, which bases its image on the linear model, does not assess its image, does not obtain information from students about the factors which would most likely persuade them to choose the school, does not track information shared between various groups of stakeholders.

In the process of shaping the school's image, many schools still concentrate mainly on building their identity and communicating it to their stakeholders, and, to a much smaller degree, on obtaining and analysing feedback. Therefore, in theory, the image is built in a closed system – the feedback model, and, in practice, in an open system – the linear model. The linear model uses classical public relations tools, based on one-way communication such as: the press, television, radio, open days. The effects of such activities, however, are characterized by a substantial inertia, whereas recipients of messages usually look for additional sources confirming the truthfulness of provided information. These restrictions are not present in case of social media. In the process of image management, schools do use social media but the results of studies demonstrated that activities in this area are insufficient. To take full advantage of the potential of social media, a system approach is required, which consists of including social media in the general school management strategy. School principals must remember this.

Conclusions

To meet market challenges, contemporary organizations are forced observe the changes in expectations of buyers, and quickly adjust to them. Organizations are interested in modern types of

communication, which allow monitoring the changes in expectations, in the manner of thinking, and to maintain and deepen relations with clients.

In the era of digital transformation, monitoring the Internet and social media is gaining significance and popularity. Monitoring the Internet and social media is becoming common business practice. It is used to track feedback from consumers, to better understand consumers, and to monitor conversations. Reports from Internet monitoring constitute one of the elements of the assessment of the effectiveness of the organization's marketing and public relations activities.

Educational institutions are also necessitated to undertake the same activities. Schools should concentrate, to a greater extent, on obtaining and analysing feedback from the environment, as well as take better advantage of the potential of social media. In case of using social media in public relations activities, the relations between the organization and its stakeholders are based on two-way communication and may have interactive nature. Social media are characterized by speed – immediate reactions between the sender and the recipient are possible. Feedback may be provided in comments, opinions, posts etc.

The model of creating the image applied to date – i.e. a one-way flow of information about learning and the offer of the given school, provided to the local community, is no longer sufficient. The need to compete for the student means that schools cannot ignore what is written and said about them. Therefore, they must radically change the manner of communicating with their stakeholders – and transform it into an interactive dialogue. In technical terms, this is enabled by social media.

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[i] Research is conducted by a research team managed by Waldemar Jędrzejczyk, the author of this article. The principal study area concerns the issue of competences, both those currently desirable as well as prospective, referring to sectors, kinds and types of organizations, professional groups, and key positions in organizations. In the area of the organization's competences to create the image using social media, the main owner is Marta Konieczna-Kucharska.

Determinants of The Development of Family Businesses in Poland. Regional Aspect

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Abstract

In the analyses of determinants for the development of family businesses, regional determinants of their development are usually neglected. The majority of research focuses chiefly on internal determinants. The present article constitutes an attempt to identify and assess the impact strength of local (regional) determinants on the development of family businesses. The analyses are based on empirical research conducted at the turn of the years of 2017 and 2018 on a sample of nearly 15 thousand Polish family businesses.

Keywords*:* Family Business, Determinants of The Development, Family Firm Heterogeneity

Introduction

Family businesses, according to the definition proposed by the EC (European Commission, 2009), which is accepted both in theory and practice, are treated as a separate category with their own distinct characteristics.

The source literature highlights the different motives of family enterprises for establishing these (Donckels and Fröhlich, 1991, Wangen, 1995); a broader range of strategic planning is emphasized (Ward, 2000) which takes into account the need to plan a generational change, intra-family and inter-family conflicts, almost inscribed in the structure of the family enterprise (Degadt, 2002, p. 459), and the mystery that surrounds many family enterprises and their owners (Simon, 2009). There is no stronger focus on the global market and there is a stronger focus on the local market (among others, Gallo and Sveen, 1991), conservatism in the use of external sources of financing (Redlefsen and Eiben, 2006), emotional behaviour especially on the managerial level (Alderfer, 1988, Pieper, Astrachan and Manners, 2013), an ability to take quick decisions, being ready for bold and risky solutions (Cohn, 1992).

From among these characteristics, relatively the least attention is paid to the regional (local) rooting of family businesses, while attempts to identify the regional determinants of the development of family businesses and their impact on the businesses are not included in the main research issues. According to the research conducted by C. Quintan-Garcı, V. F. Guzma'n-Parra (2013, pp. 41-57), those problems that are most frequently explored by researchers in this area are related to internal development factors. In research into family businesses, it is generally agreed that it is internal factors that determine the ability of a family business to survive and develop. These are usually related to the owner's position and the succession process (Sharma, Chrisman and Chua, 2003, Kammerlander and Zellweger, 2019), the nature of funding sources and financial management (López-Gracia and Sánchez-Andújar, 2007), innovation (Classen, Carree, van Gils and Peters, 2014), personnel management (Astrachan and Kolenko, 1994) and owner supervision (Hülsbeck at al., 2012). An important role in ensuring the competitiveness of family businesses is also attributed to strategic management (Sharma et al. 1997) or internal entrepreneurship (Kellermann, 2006) and the ability to overcome internal crises (Ruessen and Schlippe. von, 2007). The discussion oscillates around the dilemma as to whether the influence of the family on business behaviours is positive or negative.

Successful succession is regarded by the vast majority of the authors as the main determinant of the development and survival of family businesses. Their analyses refer to the classical research by Ward (1987), who indicates that a properly planned and conducted succession process increases the company's chances of survival. This diagnosis, although being erroneous as it fails to take into account any other factors of company mortality or comparisons with non-family companies (Rossaro 2007, pp. 162), is accepted without any proof as a result of unsuccessful succession.

Meanwhile, the context of the impact of external determinants, especially regional determinants for the development of small and medium-sized enterprises, is of a great importance: not only cognitive but also practical importance. It is cognitive, as the knowledge about the strength of this influence in relation to family businesses, especially small and medium-sized ones, is slight, while its practical significance is connected with the possibility and need to manage those instruments that serve to support their development (Stiftung, 2018). We treat regional (local) determinants as those that do not fall within the competences of the central government.

Particularly over the last two decades, the source literature has been raising the issue of the importance of regional environmental factors for the development of enterprises (Wach, 2008), especially the smallest ones. What constitutes a guideline for many researchers is not merely general reflection that what happens in the environment is more important for the survival of an organization than what takes place within its framework (Nizard, 1998), but also the conviction, supported by research results, that precisely SMEs are more closely related to and "anchored" in the local environment, as they are dependent on the regional environment due to their weaknesses. Many researchers conclude that the quality of the regional business environment is not sufficiently taken into account both by researchers and local authorities (Porter, 2003), and many questions concerning the impact of regional environmental factors on entrepreneurship remain unanswered. An attempt to understand the appropriate sources of competitive advantage requires an analysis on the meso-economic level (Wach, 2008), as the competitiveness of business entities is co-created by the determinants of their immediate environment (Janiuk, 2004), and they are of a permanent rather than temporary nature (Fritsch and Schmude, 2007).

As regards family businesses, this type of issue escapes scientific reflection, although it is perceived. It should be recognised, as it seems, that any research that limits observations to one (several) regions (provinces) will, in principle, recognise that the regional specificity is an important distinguishing feature of the sample selection. (Safin, Pluta and Pabjan, 2014). These determinants are often included among those factors that determine the success of a family business (Koładkiewicz and Wojtyra, 2014).

The asymmetry revealed here between the influence of regional determinants on the development of enterprises (especially small and medium-sized ones), which can be observed on the basis of theory and practice, and scarce attempts to conduct systematic research in this area, is the main reason for the analyses presented here. This article is based on the results of the experimental research conducted by the Central Statistical Office, and it constitutes an attempt to identify and assess the strength of the impact of regional determinants on the behaviour of family businesses.

Research Methodology

The research which became the grounds for the analyses presented below was carried out within the framework of the following project: *Determinants for the development of entrepreneurship in the SME sector* (Łobos and Stańczyk, 2019). The primary source of empirical data constitutes selected results of an experimental questionnaire survey conducted by the Central Statistical Office throughout Poland, in the period from December 2017 January 2018. The questionnaire survey was conducted using an electronic form via the Central Statistical Office Reporting Portal. The survey covered the opinions presented by entrepreneurs on the assessment of the importance and strength of the impact of the proposed groups of factors on development and achievement of success in business.

The survey covered non-financial sector enterprises with 10-249 employees (i.e. small and medium-sized enterprises). The research was conducted with 72.6 thousand entrepreneurs, in the period from 18.12.2017 to 31.01.2018. If we take into account the fact that according to the BDL database, 57,198 small enterprises (in the non-financial sector) and 15,251 medium-sized enterprises (in total, 72,549 enterprises of both types) were registered in Poland in 2016, this means that the research covered all (sic!) enterprises from this category. In total, 44.9 thousand questionnaires were received from the respondents. This represented 62% of the total number of the entities covered by the survey. Out of the total number of the respondents, 14.7 thousand considered their businesses to be family businesses (cf. Table 1). The identification of family businesses was done using a subjective criterion, i.e. the respondents decided on the basis of the definition provided whether or not their own business could be considered as a family business. The definition adopted was taken from the previously conducted research on a nationwide sample (Kowalewska, 2009). As a family enterprise, the study considered an economic entity where at least two members of the owners' family or those related to this persons work; at least one of them has an influence on the management of the enterprise, and the family or persons related to them own more than 50% of the shares in the enterprise. Those entities that operate in the form of a single-person business are classified as family businesses provided that they employ workers (Kowalewska, 2009).

Table 1: Profile of family enterprises against the background of other (no-family) in 2017

Specification	**Family enterprises**	**Non-family enterprises**
	in % of total enterprises in a group	
By size classes		
small (10-49 employees)	84.0	78.3
middle (50- 249 employees)	16.0	21.7
By years of conducting activity		
less than 3 years	3.8	4.1
3 years and more	96.2	95.9
of which 6 or more years	88.3	86.0
of which 9 or more years	79.0	75.0
By legal form		
natural persons conducting economic activity	43.7	28.4
civil law partnerships	10.4	4.2
commercial companies	45.7	60.3
of which limited liability	23.1	46.8
By type of relationship that an enterprise could have with another		
ownership (autonomous)	90.6	80.2
partnerships	3.8	3.7
linkages (linked enterprise)	5.6	16.1
Activity range - market:		
Local	30.2	31.9
Regional	17.3	14.8
country-wide	34.8	36.0
international	17.7	17.2
Type of principal activity		
manufacturing	35.2	24.5
Construction	11.7	12.5
trade; repair of motor vehicles	30.4	26.3

transportation and storage	7.4	6.0
accommodation and food service activities	3.5	2.7
information and communication	1.1	3.7
real estate activities	0.9	4.3
professional. scientific and technical activities	2.6	5.7
administrative and support service activities	2.1	3.7
human health and social work activities	2.4	3.8
Selected elements of financial condition		
Entities with net profit	54.5	59.1
Enterprises in which the net turnover did not exceed EUR 10 million	86.1	85.4

Source: (Safin and Stańczyk, 2019)

Results

In accordance with the methodology adopted, the following variables included in the questionnaire were included among the main determinants of the development of the SME sector: (1) factors related to the local environment and institutional support on the local level, (2) factors related to the personal and personnel aspects of the functioning of enterprises, (3) factors related to the management of the enterprise, relations with the market and the closer (competitive) environment, (4) factors related to management systems, management methods and IT support for operations (Łobos, Stańczyk, 2019). Considering the purpose of the article, the subject of the analysis will cover mainly factors related to the local (regional) environment.The results of the research demonstrate a large spatial diversification of the various aspects of business operations. The diverse economic structure in spatial terms is reflected in data concerning both the percentage of family businesses in individual provinces and detailed data related to their behaviour.

From among the total number of the respondents, 33.9% declared that they run family businesses. The highest percentage of family businesses was observed in the Wielkopolskie, Podlaskie and Łódzkie Provinces, and the lowest one in the Mazowieckie Province. In the case of entities where the number of employees ranged from 10-49 persons, family enterprises constituted 35.4% and, in the case of larger entities with the numbers of employees between 50-249 persons, this was 27.4%. There were 32 family businesses per 100 entities operating mainly on the local market, while there were ca. 40 family businesses per 100 entities operating mainly on the regional market.

It is also worth noting that the percentage of family enterprises in (urban) districts, which are the capitals of provinces (in two cases, these are additionally the seats of local government provincial authorities) is lower than the provincial average. This concerns all the provinces and their capitals. For example, in the Mazowieckie Province, the percentage of family businesses (in the small and medium-sized group) is 29.2, while in the District of the Capital City of Warsaw this is 18.8 (a difference of over 10 p.p.), in the Dolnośląskie Province, the percentage of family businesses is 30.2 and in the district of Wrocław this is 22.5 (a difference of almost 8 p.p.). It seems that this is yet another proof of the impact of the specific determinants of the local environment on the activities of small and medium-sized businesses. This may mean that large urban centres are not a friendly environment for the establishment and development of small and medium-sized family businesses. There may be many reasons for this state of affairs: the neighbourhood and competition of corporations, operating costs, alternative opportunities for career development, etc.

Another manifestation of the impact and importance of the regional environment for the operation (and success) of the family business was revealed when analysing the replies to the question concerning the

main market where a given company operates. More than 47% of the family businesses described their market as local and regional. It can therefore be assumed that all the social, legal and economic parameters that describe this market are particularly analysed by companies, and their impact is predominantly noticeable.

When analysing the environment as a success factor, the company's approach to legal or social management determinants and its openness to cooperation as well as its openness to business environment institutions were assessed. This is an important aspect of development determinants especially from the perspective of family businesses. They are considered to be "locally oriented", while situating their market in the immediate vicinity, using the resources of the local environment and cooperating intensively with local environment institutions (Zellweger, 2017).

In the assessment of the strength of the local orientation, a cumulative measure was used based on six factors and their impact on the success of the company as assessed by the respondent. These factors included the availability of local education and training centres, favourability of the local community / good relations with the local community, the absorption capacity of the local market, local service institutions (e.g. accounting offices), and the possibility to use local advisory institutions.

The local orientation of a company was considered to be high when 5 or 6 of these factors were significant (by a subjective measure) for the success of the company; it was considered to be average if 2, 3 or 4 factors were significant; and low if at most one factor was significant. Respondents made assessments according to the following scale: key factor, significant, neutral, completely insignificant, rather insignificant, no factor

The family businesses under examination, regardless of their sizes, are much more likely to have a strong local orientation than non-family businesses. In total, nearly ¼ of the family businesses surveyed indicated this direction of their development, while among non-family businesses, this was slightly over 18%. At the same time, ¼ of the family businesses exhibit a low local orientation; a similar attitude is presented by over 30% of non-family businesses (cf. Table 2).

Table 2: Strength of local orientation of companies surveyed (percentage of companies surveyed)

Evaluation of the strength of local orientation	Family businesses			Non-family businesses		
	low	medium	high	low	medium	high
Total	24.6	50.8	24.6	30.7	51.2	18.1
Small businesses	24.7	49.7	25.6	31.6	49.4	19.1
Medium-sized enterprises	24.2	56.2	19.5	27.6	57.9	14.4

The interpretation of these results is not explicit. It seems that the strength of local orientation measured by the measure proposed, although high in relation to family businesses, seems to be lower than it could be expected on the basis of an analysis of the results of previous foreign studies referred to in this article. It seems that micro-enterprises may be of a great importance for this perception of family businesses (as extremely attached to local areas of operations). The lack of their representation in our research corrects this picture significantly.

With regard to small and medium-sized companies, this space is significantly much wider. The companies surveyed define their market of operations largely as national and international (cf. Table 3.) Local orientation in relation to family businesses is important regardless of the main market of operations. However, with respect to companies for which the market of operations is national or international, their local orientation is by several p.p. weaker. At the same time, it is clearly weaker in relation to non-family businesses.

Table 3: Evaluation of the strength of local orientation by the main market where the company operates (% of respondents)

Main market	Family businesses			Non-family businesses		
	assessment of the strength of local orientation					
	Low	medium	high	low	medium	high
Local	24.2	49.5	26.3	29.3	52.6	18.1
Regional	19.1	53.5	27.5	25.8	53.7	20.5
National	26.2	51.0	22.8	32.6	50.0	17.4
International	27.6	49.8	22.5	33.2	49.4	17.5

A detailed analysis of the impact of individual determinants: a decomposition of the indicator on the factors of the local environment, the factors of the institutional environment and the factors of institutional support, makes it possible to assess which factors and, to what extent, affect the importance of the regional (local) environment. The research took into account the factors of the local and institutional environment as well as the scope and nature of external support.

Local Environment Factors

Those factors that characterize the local environment, which in the light of the respondents' opinion were of a great importance for the development of the enterprise, included the following: the level of telecommunications services provided, local demand for goods and services, and the favour on the part of the local community. A relatively high importance of local demand frequently resulted from the location of an entity in the vicinity of large urban centres, which may be a significant source of a competitive advantage for entrepreneurs. The favour on the part of the local community, in turn, is important in times of a high importance of reputation as one of the most important intangible resources of enterprises.

What is interesting is that for family businesses, these factors are usually more important than for non-family businesses. A particularly important determinant of development for family businesses is favour from the local community. The percentage of family businesses that consider good relations with the local community to be of an importance for development was by almost 7 p.p. higher than in the case of non-family businesses. This attitude is not surprising. Family businesses are strongly rooted in local communities both through the descent of their founders and employees as well as a geographically close circle of business partners. The importance attached by family businesses to the road infrastructure (proximity to expressways and motorways) may be surprising here. Ca. 51% of the family businesses surveyed and ca. 43% of the non-family businesses considered this factor as a key and important determinant of development. The technical and telecommunications infrastructure is similarly important, and this is much more important for family businesses than for non-family businesses (50.5 and 63.4% of indications respectively).

Factors of Institutional Environment

From among those factors that characterise the regional (local) environment of the enterprises surveyed, the respondents attributed these to efficient public administration entities. This factor was considered by 16.6% of the small and 20.6% of medium entities to be a key to their own success. (Safin, Stańczyk, 2019) It may be considered that any administrative facilitations are not only important, but they will remain so for a long time to come, to entrepreneurs in a situation where their institutional environment is still complex (a large number of entities and regulations that should be taken into account when conducting a business activity). It is worth noting that in these assessments, family and non-family enterprises are consistent, although family enterprises emphasize the behaviour of administrative services as an important factor of development more frequently than non-family enterprises (the difference here is almost 9 p.p.). What is equally significantly different for both groups

is the assessment of the impact of the local business environment as a success factor. For family businesses, the possibility to use local accounting and bookkeeping offices, or local consulting companies in order to obtain EU funds and other sources of external financing is significantly more important than for non-family businesses (the difference here is about 7 p.p.). The information efficiently provided by local governments on tenders, compliance with the rules of public procurement and the adopted spatial development plans and economic development plans also held a high position. Each of these areas was significantly more important for family than non-family businesses.

Institution Support

The most important component of institutional support was considered by the entrepreneurs surveyed to be the possibility to take advantage of tax credits, reductions in taxes and local charges. Ca. 20% of the entrepreneurs assessed it as crucial for their enterprises, regardless of the main market where they operated (local, regional, national or international ones). The possibility of gaining support from employment agencies and from those institutions that counteract unemployment was rated very high by the entrepreneurs. (15.8%).

The instruments of support adopted in the study were generally more important for family businesses than for non-family businesses. More than 55% of the family enterprises surveyed considered the possibility of receiving support from labour market institutions as an important or key success factor, while among non-family enterprises, this opinion was expressed by 46%. In turn, more than 46% of family enterprises consider the possibility of obtaining financial support from territorial local-government units (39.4% of non-family enterprises) as a key or important determinant of development. The possibility of obtaining support from business environment institutions is crucial or important for 40% of family enterprises (for 32% of non-family enterprises). One of the characteristics of the success factors included in the concept of the regional (business) environment is to assess the behaviour of companies in the search for opportunities to establish partnerships and cooperation with companies and institutions in general.

The companies examined avoid quite commonly formalised, long-term cooperation of a cooperative (network) nature. Both small and large enterprises, regardless of their ownership structure, admit that such relationships do not function well. Only ca. 30 per cent of them admit that they have such agreements; in the case of medium-sized enterprises, this is around 35 per cent. The differences in this respect between family and non-family businesses are minimum (cf. Table 5).

Table 5: Companies that are in formal network cooperation with other entities (percentage of the companies surveyed)

	Family businesses		Non-family businesses	
Enterprise type	**yes**	**no**	**yes**	**no**
Total	29.4	70.6	29.1	70.9
Small sized enterprises	28.4	71.6	27.3	72.7
Medium sized enterprises	34.7	65.3	35.6	64.4

Incidentally, it is worth noting that those companies that declared network cooperation exhibited a significant improvement in the value in those areas that were considered as the measures of company success. Thus, among other, an increase in the number of customers serviced was recorded by 44.4% of the family companies, demonstrating the existence of network cooperation with other entities, compared to 37.5% of those companies that did not have such cooperation (in the case of non-family companies, 41.8% of companies cooperating with other entities were noted, compared to 32.5% of those companies that did not cooperate).

Those companies which declared that they conduct such cooperation as a key (decisive) activity, recognise cooperation with suppliers and customers, while they only occasionally consider cooperation with research and development units or consulting companies to be of a key importance. The profiles of these preferences in relation to family and non-family companies are similar (cf. the fig.1.).

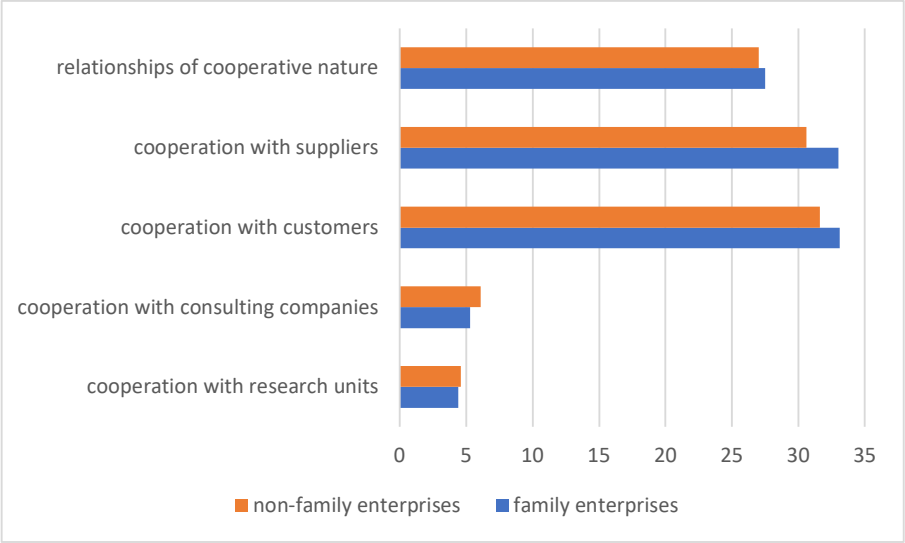

Fig.1: Areas of formal cooperation of a key importance for the company (percentage of companies that declare having formal and long-term agreements)

Discussion and Implications

Although it is quite commonly accepted that people's lives are lived within the framework of general macroeconomic and political determinants, on the level of local natural and infrastructural determinants, with a certain level of safety, the determinants of the environment or a specific level of relations, ties and trust, the issue of regional determinants for the development of businesses and entrepreneurship is addressed only rarely (Wach, 2008). The reviews of the source literature available (e.g. Busenitz, 2003) demonstrate that those articles that take into account the environmental context constituted 14% of all the articles on entrepreneurship and entrepreneurial behaviour.

They furthermore demonstrate that there are such areas, which remain outside the mainstream, that emerge at their intersection, (B. Glinka 2008. p.53), known as "slot areas" because they reveal themselves at the intersection of issues/dominant areas. It is the regional determinants of business development that these include. The validity of undertaking research on regional context is also confirmed by the results of the study presented in the article. The influence of the variables adopted in the model on the operations of enterprises is spatially diversified, and the results between provinces differ from each other even by 8 p.p. (nota bene, in the case of non-family companies, these differences were even greater). Detailed research confirms this general suggestion.

Use of research results in scientific and practical aspects

It also seems that the research results can be perceived as a voice in the discussion related to an old dilemma: whether family businesses can be considered as a relatively homogeneous category of business (Simon, Wimmer, Groth 2005, p. 24) or whether "family businesses worldwide follow the same logic and are basically similar in terms of their constituent elements, the processes that occur in them and the existing barriers and problems, as well as possible ways of solving them" (Gallo, 1994).

Studies show that both the size and age of the enterprise are important variables that differentiate the behaviour of family businesses.

The model of observations adopted in the research contained variables characterizing the company's environment, variables characterizing its management and variables related to human resources. The research demonstrates that in the opinion of respondents, for the development and competitiveness of enterprises, external factors are as important as internal factors. What is more, the research shows that the economic situation of companies that emphasize the importance of the environmental factors (hence, they analyse external factors and makes efforts to use the advantages of the environment) is better than that of those that treat it as a neutral or insignificant factor.This type of research seems to be of a great practical value. It provides reliable data and assessments of the impact of certain regional determinants, and thus it verifies the usefulness of using specific development support tools: it is entrepreneurs themselves who define the scope of their needs.

Limitations and Avenues for Further Research

The research served to confirm the situation diagnosed in earlier studies (Safin, 2014), namely that micro-enterprises have a deforming effect on the results of the entire population defined as SME sector enterprises. An important element of the research concept was to narrow down the research subject to a group of small and medium-sized enterprises. Micro-enterprises account for ca. 96% of all the enterprises in this category. Their specificity, which is determined by the scale of operations or the number of employees, has a significant impact on the assessment of the behaviour of the entire micro, small and medium-sized enterprise sector. At the same time, it is difficult to unambiguously qualify this group of enterprises as family (non-family) enterprises. These enterprises are often single-person businesses: both formally and actually run not by families but by those persons who are not in any partnerships. Therefore, undertaking research on the basis of representativeness understood in terms of the necessity to generalise conclusions on the so-called populations does not seem to be effective.

Such sampling also has an advantage of comparability. In countries with different legal systems, the inclusion of micro-enterprises (especially in the form of an individual activity) as family businesses raises doubts and lack of understanding of the fact that in Poland "one-person activity" may mean an enterprise that employs even as many as a thousand people.

In the present studies, the problem of assessing the family nature of an enterprise was solved by referring to the self-assessment on the part of the respondents. Limiting the impact of subjective assessments consisted in informing the respondent in advance about the manner in which the study defined the family business. The effectiveness of this type of approach was confirmed in many studies also conducted in Poland (Kinast, 2000), Pricewaterhouse Coopers (2009), Kowalewska (2009). Nevertheless, this approach is questionable among some researchers. As a rule, "objective" criteria and more unambiguous assessments are expected.

Conclusions

The conditions under which family businesses operate is a neglected research problem and, at the same time, one of the most important practical challenges for local authorities and for entrepreneurs themselves. The article constitutes an attempt to identify the significance and to measure the strength of the impact of these determinants on the functioning of family businesses, and at the same time to inspire further research, including comparative studies. The research conducted on a different (international) scale by *Familienuternehmen Stiftug* proves the importance and practical significance of the assessment of the determinants for the functioning of family businesses, especially if we compare these with the specificity of this group.

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Social Business Incubator as an Example of an Innovative Social Service

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Abstract

The objective of the article is to analyze the phenomenon of social entrepreneurship in relation to social business incubators. On the basis of the national and foreign literature review, the research gap was identified, related to the functioning of social business incubators. Admittedly, a lot of attention is paid to the traditional understanding of business incubators. On the other hand, there are no suggestions for using them to activate entrepreneurial attitudes in groups at risk of social exclusion. For this reason, the research problem focuses on innovative social services allowing for the individualized approach to solving social problems. The following were used as the research method: literature review, documentation analysis and direct interview. As a result of the conducted research, the idea of the Social Business Incubator model emerged. Its functioning is based on the cooperation of the three partners: Housing Management Department (ZGM TBS) in Częstochowa, Faculty of Management of Częstochowa University of Technology and Foundation for Development in Częstochowa.

Keywords: Incubator, Social Business Incubator. Social Entrepreneurship, Social Services

Introduction

Social entrepreneurship is a specific type of entrepreneurship which has become increasingly noticeable. An increase in the interest in this subject matter is indicated, among others, by Yildiz, Çelik and Aykanat, who analyzed the set of nearly 1800 scientific papers from the Web of Science (WoS) Core Collection database, using text mining and scientific mapping methods with the SciMAT and VOSviewer software. The results show that the number of publications has been increasing since 2006 to reach the number of 316 scientific papers in 2017 (Yildiz, Çelik, Aykanat, 2019). Moreover, the concept of social entrepreneurship is even considered as the appropriate solution to the latest social problems. Therefore, any attempt which investigates the evolution of social entrepreneurship in the existing literature may provide valuable information.

The objective of the paper is to analyze the phenomenon of social entrepreneurship, i.e. to present the way in which it is defined and, on the basis of the above, to discuss selected interpretation problems in relation to social business incubators. On the basis of the literature review, the existence of the research gap concerning social business incubators was identified. The research problem, which focuses on innovative social services allowing for the individualized approach to social problems, was formulated. The value added is the presentation of the Social Business Incubator model, which was developed in cooperation with Faculty of Management of Częstochowa University of Technology and ZGM TBS in Częstochowa.

Social entrepreneurship and the social enterprise – the review of definitions

In the subject literature, there are many definitions and approaches to the three synonymous terms, i.e. social entrepreneurship, social enterprise and social entrepreneur. The concept of social entrepreneurship is explained in many different ways. The discussion on finding the proper definition

is still being held both among academia and other entities involved in this field. Generally, one may identify four components of the concept of social entrepreneurship: it implements social value; it takes place in or with the participation of the civil society – then, it adopts a critical attitude; it contains a novel component and it is important for the economy.

Initially, the definitions of social entrepreneurship mainly focused on the characteristics of social entrepreneurs (Alter, 2004; Alvord et al., 2004; Martin and Osberg, 2007; Thompson, 2002). In most definitions, the characteristics, such as ethical principles of social entrepreneurs, orientation to social development, constant adjustment, innovation, resourcefulness, flexibility and visionary are highlighted (Bornstein, 2007; Dees, 2001). However, many of these characteristics are also in line with the characteristics of traditional entrepreneurs (Sohel, Shamsuddoha, 2019).

There are three different ways of understanding social entrepreneurship by researchers. Firstly, as the search for alternatives for financial strategies for *not-for-profit* initiatives or management programs for creating social value. Secondly, as practices of the business socially involved in cross-sectoral partnership. Thirdly, as a way to mitigate social problems and to catalyze social change (Mair, Martí, 2006).

The social enterprise is analyzed as an outcome of social entrepreneurship. In comparative studies devoted to social enterprises in Europe and the United States, different origins, institutional and legal aspects of operation, management style and the role (involvement) of public authorities are indicated (Defourny, Nyssens, 2010; Kerlin, 2006). In Europe, social enterprises are perceived within the framework of the idea of social economy, the driving force of which is s*ocial benefit*. The following are typical in here: democratic organization management mode, involvement of customers in activities of entities and involvement of public authorities. Except for Great Britain, the social enterprise usually takes the form of social cooperatives or associations providing employment or certain care services with the involvement of beneficiaries (Kerlin, 2006, p. 249). The concept of the social enterprise in Europe focuses on the way in which the organization is managed and the objective rather than the fact whether it strictly respects the limitation of profit sharing in relation to formal *non-profit* organizations (Pacut, 2010, p. 433, [after:] Kerlin, 2006, p. 249). In turn, in the United States, the social enterprise is basically each type of a *non-profit* organization involved in income generation. As pinpointed by Janelle A. Kerlin (2006, pp. 248–249; 2008, pp. 120–122), there is no concept of social economy in here, and the operation of the social enterprise of the *non-profit* type is often perceived within the framework of the market economy. The category of the social enterprise includes every type of a non-profit-oriented initiative, aimed at generating income. They can take different organization forms. This group includes both entities oriented to profit which engage in social activities within business operations and philanthropic activities or corporate social responsibility as well as hybrid forms: enterprises which combine both the pursuit of profit and the social objective as well as *non-profit* organizations which conduct their business activities supporting the implementation of their mission. The economic activity of social enterprises in the United States was to fill in the gap left after the loss of State funds. The European understanding of social entrepreneurship is closer to the latest proposal for defining social entrepreneurship in relation to the typology by Mair and Martí (2006), whereas the American definition relates to the first and second approach (Spear, Bidet, 2003).

Social value as the key component of social entrepreneurship

Social entrepreneurship can also be defined through the prism of differences in relation to the traditionally understood entrepreneurship. To put it simply, this means that, while the traditional entrepreneur is primarily defined by their ability to run a company and generate profits which constitute the criterion of success in here, the social entrepreneur is mainly characterized by the willingness to create social value for the target group or the society as a whole. Social entrepreneurship has, therefore, two unique characteristics – the motive of the entrepreneur to "change something" in the society (Alvord et al., 2004; Certo and Miller, 2008; J. Thompson et al., 2000) and the proposal for social value (Sohel, Shamsuddoha, 2019). The researchers, such as Mair

and Marti (2006) or Trivedi (2010), suggest evaluating social value proposition on a scale, from purely social to socioeconomical, rather than dichotomous outcomes (purely social or purely economic). J.G. Dees (2001) listed the creation of social value as the "clear and central" criterion of social entrepreneurs. On the other hand, he recognized wealth for social entrepreneurs as the means to accomplish the objective. This suggests that the social entrepreneur cannot consider their financial profit as one of their objectives. This view was supported, among others, by Dees, Emerson and Economy (2001), Guclu, Dees and Anderson (2002), Austin et al. (2006) and Urban (2010).

In the light of the above considerations, the creation of social value and profit making are the objectives which are situated at the opposite ends and distinguish social entrepreneurship from traditional entrepreneurship (Fig. 1). Only ventures directed to the entirely social objectives can be recognized as social entrepreneurship. Therefore, it is possible to distinguish a group of entrepreneurs who are completely and exclusively guided by the objective of creating social value (Sundin, 2011). Such entrepreneurs do not engage in any commercial exchange. Another group is constituted by entrepreneurs who engage in commercial exchange, but only to raise funds for the implementation of social projects (Nicholls, 2006). There are also entrepreneurs who give priority to social value creation, but at the same time they intend to generate economic benefits for themselves and stakeholders. In their case, social objectives are the main objectives of the activity, but they do not exclude generating profits to survive. In the long run, however, they may choose to generate an increasing profit and thus bring social projects to the secondary objective. Therefore, the last group includes entrepreneurs whose main objective is to generate profits and social value creation may become a by-product or an additional result (Sohel, Shamsuddoha, 2019).

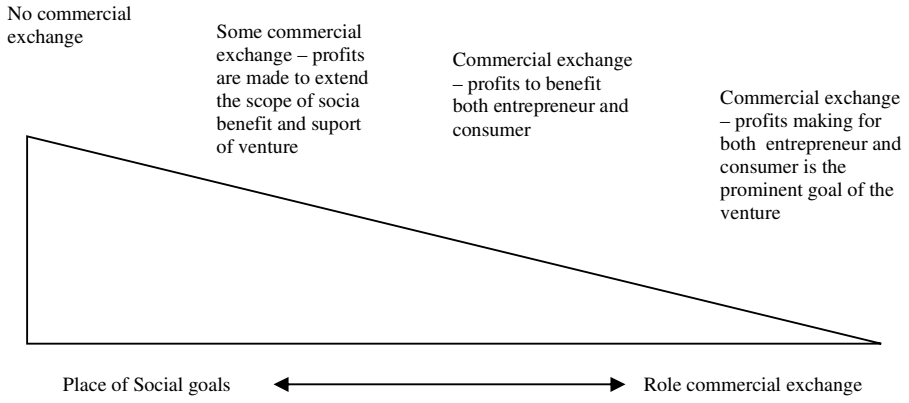

Fig. 1: The continuum of social entrepreneurship

Source: Sohel, H. and Shamsuddoha, M. (2019), 'The Essence of Social in Social Entrepreneurship, 'Society & Sustainability, 1 (1), 42.

The model of the social enterprise developed in Europe, against the background of the ongoing considerations, is very different. It is primarily characterized by the objective hybridization (Defourny, 2005). Emergence of Social Enterprise in Europe (EMES) suggested their own definition of the social enterprise. It describes the activity of the social enterprise using nine indices (criteria). Four of them are economic in nature (production/sales of goods and services, autonomy, a significant level of economic risk, employment of paid staff), and five are social (the primacy of social objectives over economic ones, bottom-up nature, participation in decisions not based on shareholding, participatory management, limited distribution of profits) (EMES). EMES reserves the right not to treat this proposal as a test or pattern for social enterprises. The area of operation of social

enterprises in Europe is wide. In the subject literature, there are three types of initiatives: (Pacut, 2010)

1. Initiatives in the field of socio-occupational reintegration for groups affected by social exclusion (people able to work but professionally inactive).
2. Social services (e.g. elderly care, pre-school education for people, tourism, services for households).
3. Local development (e.g. agritourism, social revitalization, waste disposal).

In the literature devoted to social entrepreneurship, the term of social business incubators emerges, but mainly in the context of supporting the functioning of social enterprises and organizations (Ariza-Montes, Muniz, 2013; Sahu, 2018). There is no mention of incubators which would focus on solving the problems of specific social groups. Traditionally understood incubation of entrepreneurship is not oriented to the accomplishment of social objectives. Social value can be found only in the tasks of incubators, such as reduction in unemployment or creation of cooperation networks. Incubation is most of all the process of supporting enterprises, which accelerates the successful development of newly created economic entities by providing entrepreneurs with targeted resources and services (NBIA 2016). This development consists of two components, namely, on the one hand, it allows enterprises to survive, on the other, provides them with an opportunity for expansion in the period in which their existence in the market is most at risk (Katz 2010). Incubation of entrepreneurship is the process most frequently lasting for 2-5 years (Goddard 2005). In practice, however, there are no rules for how the incubator is to operate. Each center itself decides how intensively to support enterprises and to which stage of their development.

In the subject literature, there is a lot of segmentation of business incubators. The multitude of these classifications is primarily due to the number of entrepreneurship support institutions and their specificity, including unique characteristics assigned to individual organizations. Despite the attempts made by numerous authors, one standardized segmentation of business incubators which would apply all over the world has not been adopted so far, which is also associated with the dynamic development of these organizations over several decades, and also multiple changes, among others, in their organizational and legal forms (Ingram, Luo, Eshun 2010, pp. 135-138). The most common one is the division into academic business incubators, business accelerators, centers for entrepreneurship, incubator foundations, corporate incubators, virtual incubators, community incubators, entrepreneurial initiative centers (Klonowski, 2010). In the Polish practice, there are also social entrepreneurial initiatives, which focus on supporting the activities of social organizations and most frequently take the form of foundations and associations (Górka, 2013, p. 114).

Research Method

Taking into account the above considerations presented in relation to the theory, the research part relates to the innovative method of solving social problems, in the form of social business incubators.

In view of the above, the main research problem in the field of the analyzed subject matter focuses on the identification of the need for and the way of providing innovative social services allowing for the individualized approach to social problems. Consequently, the following research questions, being the basis for the accomplishment of the research objective, were formulated:

P1. What social problems do the residents of the municipal resource cope with?
P2. Are the applied solutions to social problems of the residents of the municipal resource effective?
P3. Is there a demand for innovative social services allowing for the individualized settlement of social problems?

Zakład Gospodarki Mieszkaniowej Towarzystwo Budownictwa Społecznego Sp. z o.o. (ZGM TBS) (Housing Management Department Social Housing Association, Ltd.) in Częstochowa was selected as the subject of the research. The choice is determined by the several-years-cooperation of the author

with the municipal entity managing apartments and commercial premises owned by the Municipality of Częstochowa.

In the first step, in the period of February – June 2019 the author and the appointed team conducted the analysis of the documentation of ZGM TBS, concerning the initiatives undertaken for the benefit of the residents. In the subsequent step, the search tests were carried out and only those who were in a difficult personal situation and thus had difficulty in the timely payment of the rent were selected for further analyses. On the basis of the above, a group of 130 debtors of ZGM TBS was identified.

The analysis of the collected material indicated that nearly 54% of that group amounted to people who, after the settlement of debts, got into debt again. Those people were qualified for the next stage of the research. Therefore, in the course of elimination, a group of 70 people was identified with whom direct interviews were conducted in the period of August – December 2019. At this point, it should be pinpointed that the interviews, according to the preferences of the respondents, were held at the office of ZGM TBS and had the form of individual meetings and their objective was to identify the reasons for the re-incurrence of debts.

The results and the proposal for the Social Business Incubator model

The conducted analysis of the documentation enabled the indication of the main problem which is debt in rental charges of the residents of the municipal resource. Generally, the people using municipal resources are the economically weakest group of city dwellers since they face a difficult financial, family and personal situation. Regardless of the above, among those occupying social housing, there are people permanently in debt, who do not take up legal employment due to the physical lack of an opportunity to take up employment or escape from creditors. The problem of housing indebtedness in Poland affected 11% of residential units in 2015, which amounted to a total debt of PLN 1282 million. The most arrears are of a lasting nature, threatening with eviction from premises. This amounts to 68.9% of a total debt held by 30.2% of debtors. Taking into account the ownership structure, the most indebted are municipal premises, of which 37.5% showed the largest debt in 2015 (Napiórkowska-Baryła, Witkowska-Dąbrowska 2018). Such a situation arises directly from the statutory solutions, according to which the Municipality is to provide the conditions to satisfy the housing needs of its residents, however, the primary objective is not income-based (Pałka 2019). The obligation imposed on the municipality to provide premises within the framework of social rent, i.e. premises for people with particularly low income meeting the criteria of poverty, is crucial in here.

The structural nature of the debt of tenants poses particular challenges to entities managing housing resources of municipalities. The classic “hard” debt enforcement faces obvious problems resulting from the fact that debtors do not have assets which could be the subject to satisfy the creditors. Additionally, they earn income below the enforcement thresholds and most frequently they do not take up the legalized forms of employment. The efficiency of the conventional forms of debt enforcement is therefore low in this group of debtors.

Another very important issue is social costs of debt recovery activities (Dziadkiewicz, Pabian 2017, p. 33; Bengston 1995, p. 4). Enforcement against the basis of existence, which the house is, carries a range of negative consequences:

- increased housing poverty of this group of residents (Sikora-Fernandez 2018, p. 106),
- social exclusion of debtors and their family members (Kozera, Stanisławska, Głowicka-Wołoszyn 2017, p. 78),
- generating actual homelessness – some of the proceeding end up moving people to the shelter,
- exacerbating problems occurring in this group of people, such as addictions and crime.

In order to help solve the debt problem, ZGM TBS developed the program of tenant debt deleveraging - “Work for rent”. The initiative lies in the fact that the indebted person repays their

financial arrears to the Administrator in the form of labor, which, among others, includes cleaning stairways, maintaining cleanliness around buildings or delivering correspondence. This idea was approved by the debtors who willingly report to the program. The data shared by the Company indicate, however, that nearly 54% of the program participants (the data for June 2019) get into debt again, which indicates the temporary nature of the suggested solution.

Individual interviews carried out with 70 people from the group of debtors for whom the applied solutions proved to be inefficient allowed for the indication of reasons for re-indebtedness. These are:

- low income in relation to expenses (65% of indications),
- no steady income (19% of indications),
- family problems (11% of indications),
- health problems not allowing for a permanent job (8% of indications).

Low income was often accompanied by the indication of family problems mostly associated with the illness of a family member, the abuse of alcohol by one of family members and single child raising. As the reason for low income and lack of steady income the respondents indicated the problems with finding a satisfactory job. As many as 45 people have specialized skills but also, they have problems with finding themselves in the labor market. The interviews also paid attention to a very important aspect. Most people (61) claimed that the solutions applied by ZGM TBS (the initiatives "Work for rent", "Clean yard", "Be safe, senior citizen!", neighborhood picnics) created local communities where one may find support and help. It was also pinpointed that systemic solutions, such as the Labor Office or career guidance services have limited possibilities to act and services are of a mass nature.

The result of the search for a long-term solution is the Social Business Incubator (SBI) model. The suggested initiative mostly focuses on the socio-occupational reintegration for groups affected by social exclusion (people able to work but professionally inactive) and, subsequently, it assumes the implementation of diversified social services.

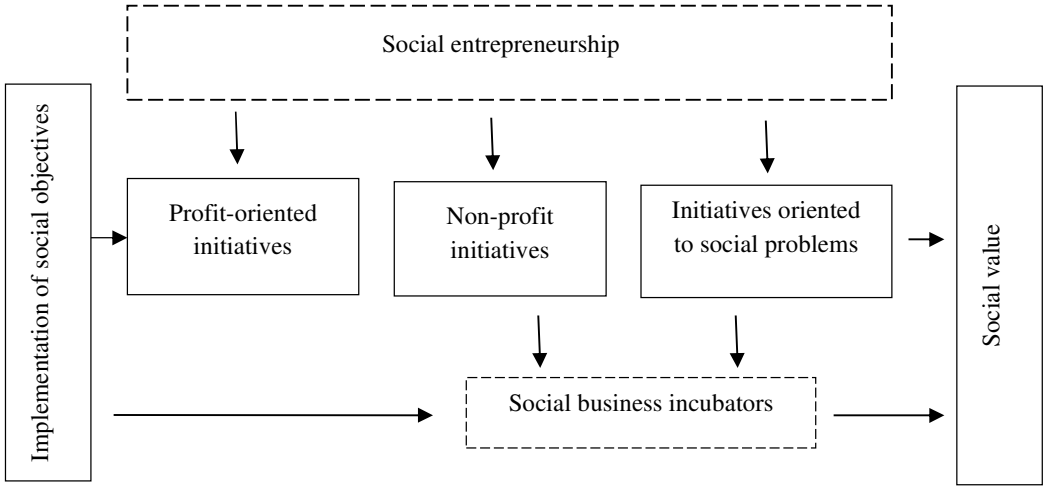

Fig. 2: Social business incubators as a social initiative

Most of all, SBI may constitute an innovative method for solving social problems and, by activating entrepreneurial attitudes, it may help those at risk of social exclusion and their families (Fig. 3). The primary objective of SBI is to activate indebted people and help them set up and run companies based on the labor of the owner and/or family members (Path I). However, not everyone will be interested in establishing their own company or they will not have relevant predispositions or skills. SBI

assumes providing individual support to such people so that their potential could be used in line with the conditions of the local market (Path II).

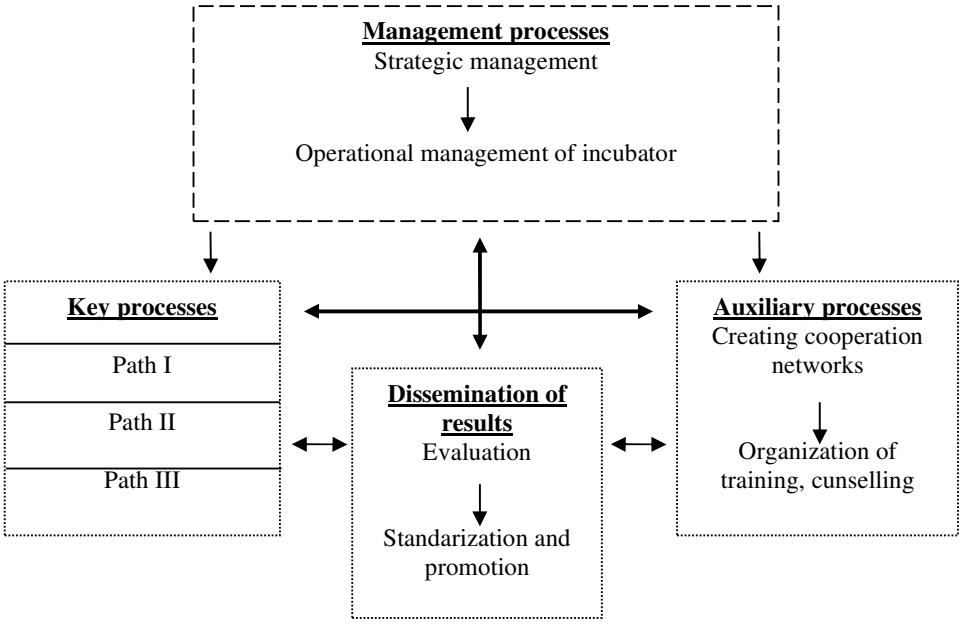

Figure 3: The map of processes of Social Business Incubator

The activities of Social Business incubator include free assistance:

- for Path I – determining the potential of customers in terms of setting up and running the company, continuous analysis of the local market and its environment, supporting customers in activities associated with the preparation and creation of companies, defining the possible scope of activities of the entity being created and necessary preparatory actions, selection of an adequate business model for the needs and expectations of the company's founder, consultancy in the adaptation of the business model in the specific local conditions, assistance in obtaining funds essential for the establishment and operation of a new company, support in terms of formal aspects associated with starting a business activity, current advisory services and coaching;
- for Path II – determining the needs of customers, identifying the potential of customers, i.e. qualifications and skills, counselling and coaching adjusted to individual customer needs, assistance in adaptation to the requirements of the local market;
- for Path III - determining the needs targeted at a wider range of customers going beyond debtors.

The customers of the Social Business Incubator will be primarily the indebted residents of the municipal resources who, in spite of their participation in the program "Work for rent", do still have problems with current settlement of financial obligations. Paths I and II are dedicated to them. In Path I, the initiative to set up a company is in the hands of customers – founders, whereas, in Path II, the incubator takes the initiative to use and adjust the customer potential to the local market conditions. The SBI model also assumes the activation of Path III, within the framework of which the ideas will be searched for to solve social problems and adjust the existing solutions to local conditions. These will be activities targeted at a wider range of customers going beyond debtors – the people at risk of social exclusion due to age, loneliness, health, financial standing.

The main partners in the operation of SBI are: Housing Management Department (ZGM TBS) in Częstochowa, Faculty of Management of Częstochowa University of Technology and Foundation for Development in Częstochowa. ZGM TBS provides the technical infrastructure and legal service to the customers of the incubator. The employees of Faculty of Management of Częstochowa University of Technology provide support in terms of business, economic, marketing and management counselling, whereas Foundation for Development provides the organization of coaching and psychological assistance. It is assumed to extend the group of partners to provide the individualized approach to customers of SBI. This need was often highlighted during the individual interviews.

Conclusions

The above considerations confirmed the existence of the research gap concerning social business incubators. There was also identified the need for innovative social services allowing for the individualized approach to solving social problems. The concept of Social Business Incubator presented in the article results from the assumptions of social entrepreneurship. The basic conditions "to change something" in the society and to propose social value are met. In this case, social value is addressed to the target group created by the indebted residents of municipal resources of the city of Częstochowa. The presented research results indicate that there is some space for operations aimed at restoring at least some of the indebted people to business networks of the local community by helping them to set up their own company and embed it under contracts with the immediate environment, e.g. condominium, other property managers or local service users. The objective is to prevent the phenomenon of re-indebtedness. The solutions applied by ZGM TBS are not effective enough since the problem arises again once the support is completed. The success of the incubator can be determined by the individualized approach to solving social problems, which systemic solutions lack. The research indicates that it is very important to create the local community, which creates the atmosphere which is conductive to solving social problems. Therefore, the suggested concept also assumes the activities aimed at prevention of social exclusion, among others, of lonely and elderly people. It is assumed to continue research on the effects of implementing the model of incubator. The aim will be to indicate a catalog of good practices for the implementation and functioning of this model. It should be pinpointed that the model of Social Business Incubator can be also applied in other cities or regions in which it is necessary to socially and occupationally reintegrate the groups affected by social exclusion.

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Dandyism – A New Trend on The Fashion Market Or Just A Blast from The Past?

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Abstract

Dandyism is a notion related to fashion, aesthetics and philosophy. This phenomenon, that has its roots at the beginning of the 18th century, has undergone strong changes over the years, losing its unique reasoning. Dandyism in the new millennium has been reduced to a relatively small, yet thriving market niche, that adapts a form of an online consumer community. Contemporary dandies fit into a broad image of the metrosexualism, fusing the trends of postmodern hyper-personalization, prosumerism and deconsumption, but also far-reaching hedonism and narcissism. This article is based on the analysis of a secondary data, including the historical roots of dandyism, as well as on observations made among online dandies' communities. The results can be used by clothing companies, especially those offering sartorial menswear, in order to better understand the very essence and fundamental concepts behind dandyism. By showing the heterogeneity of styles and aspirations of its representatives, the article also indicates the direction of a further research on the characteristics of the modern-day dandies, which perhaps should no longer be referred to as with this name.

Keywords: Consumer Behaviour, Fashion Market, Trend, Dandyism

Introduction

Fashion is an inseparable element of the clothing market, but its idea is not limited solely to an economic dimension of consumption (Crane & Bovone 2006). Fashion is a social norm that affects not only clothing, but also many areas of social life (Fang et al. 2012). A distinction should be made between an outfit, that is a result of physical conditions (such as a weather), and clothing, that depends on a psychological sphere, e.g. social status (Boucher 2003). Therefore, a garment on the clothing market is bought not solely because of its physical features, but also symbolic ones, which is a result of an individual's desire to obtain high status and social prestige (Grandys & Grandys 2013). In economics, a conviction of irrationality of fashion (above all its luxury segment) is widely held, with the prime example of the concept of ostentatious consumption created by Veblen in 1899 (Aspers & Godart 2013). Luxury goods, however, are not necessarily purchased just because of the vain need to outstand with one's wealth. The consumer may look for aesthetic pleasure or originality of a product, in order to present their own, unique sense of style (Amatulli & Guido 2011).

A potentially new, poorly developed niche in the clothing market may result from the return of dandyism, which paradoxically seems to combine contemporary trends of hedonistic and sustainable consumption. Originally inseparable from a particular worldview, the 21st century dandyism seems to derive primarily from a distinctive sense of aesthetics in clothing and self-worship (Ferrero-Regis 2017), which evokes some associations with metrosexualism. Products dedicated to dandies may be

put in the category of luxury clothing and accessories. The largest markets for this type of goods in Europe exist in Italy and France, where in 2018 they reached value of 9.4 billion EUR and 9.8 billion EUR respectively. Moreover, the luxury segment accounted there for over 20% of the clothing market in general. In Central and Eastern Europe, such a segment is relatively small and underdeveloped – in Poland in the same year it was worth less than 700 million EUR (www 1). Only 28% of Poles declare possession of a luxurious piece of garment in the wardrobe, with an average value of approximately 1400 PLN (~ 330 EUR) - in 30% of cases an outwear (mainly coats, www 2). However, it can be predicted that this segment will develop along with an increase in the wealth of the society.

An important challenge for marketing is therefore to identify the portrait of a modern-day dandy as a consumer of luxury goods. The purpose of this article is to present the rise and current image of dandyism in an interdisciplinary approach, as well as its interpretation from the perspective of economics and marketing. The article is based on results of an exploratory research, that was carried out on the basis of analysis of secondary data sources.

Trends in the clothing market - at the crossroads of hedonism and deconsumption

Increasingly diverse needs of customers require an individualized approach in companies' marketing (Dibb 1998), as exemplified by customer segmentation, which is an idea implicitly present in activities of entrepreneurs since they have begun to differentiate their methods of struggle for the buyer (Dickson & Ginter 1987). Contemporary seeds of segmentation can be found in the article by W.R. Smith (1956), where he presented its outline as an alternative marketing strategy. It is based on the assumption of the existence of homogeneous groups of entities (e.g. consumers), that possess some common features, that can be identified and classified (Walesiak 2000). It should be noted that although markets can be segmented in many ways, some of them appear to be completely useless (Beane & Ennis 1987). There is also a danger of segmentation for segmentation's sake (Green 1977).

A slightly narrower group of consumers with similar needs is the market niche (Dalgic & Leeuw 1994). The company's focus on operating in a niche limits the number of potential customers, but allows to gain a relatively large share (Kotler & Armstrong 2004, p. 228), which paradoxically may mean expanding the market (Trzmielak 2003). Niche marketing concentrates on meeting the needs of consumers in a possibly complete manner (Toften & Hammervoll 2013; Slavik & Bednar 2014), which is why they are willing to pay a higher price and are characterized by higher loyalty to the company. Such a customer's attitude towards the brand may be particularly important on the clothing market, dominated by cheap products from China (Parrish, Cassill & Oxenham 2006; Maciejewski 2016a). A major challenge for manufacturers appears to be building a global cooperation network, that provides opportunities to deepen knowledge, internationalize business and - as the main goal - expand markets. However, cultural idiosyncrasies between nations, that may affect fashion preferences, should also be taken into thorough consideration (Vaiginiene 2011, Wróblewski et al. 2018).

The postmodern consumer, more and more often living in single-person households, is characterized by the desire to individualize their own consumption, which manifests in looking for unique products. In response to these needs, manufacturers are increasingly offering customers the opportunity to exert far-reaching influence over features of a final product, which leads to the phenomenon known as the mass-individualization (also called hyperindividalization, Maciejewski 2014). Such possibilities are characteristic of prosumerism, in case of which a client of a brand becomes at the same time its active partner, having a real impact on the shape of the final product (Szul 2013, Wróblewski 2017). This partnership comes into being thanks to consumers' activity in social media, where interactions such as discussions, exchange of opinions or ideas between fans of a given brand are possible (Zalega 2016).

Within the clothing market, there are many parallel and often opposing trends, defined mathematically as general direction of changes in time of given phenomena (Altkorn & Kramer ed.

1998, p. 261). In case of fashion, cyclical and classic trends are distinguished. The former are subject to constant changes - first in one direction, then in the opposite. On the other hand, classic trends remain relatively stable, being subject to very slow changes in the long run, as exemplified by the relative stability of men's suits' cannons (Miller, McIntyre & Mantrala 1993). Since the 1970s, the manufacturer's large and well-visible labels have been observed on clothing. Counter to this trend are products dedicated to connoisseurs, where garment's quality is more important than its brand (Svendsen 2006, pp. 124-125).

On the fast fashion clothing market (brands offering many rapidly changing collections), an opposite movement has developed. The slow fashion opts for consumer rationalism: buying more expensive and higher quality products, but using them for a longer period (Sempruch-Krzemińska et al. 2016), which evokes connotations with the ethical fashion (ecofashion). Ecofashion results from the growing awareness of the impact that the fashion has on the natural environment and man (Beard 2008, Wasilik 2014). Counterrevolutionary deconsumption (which proclaims the need to limit and even reject consumption) is composed of the ideas of "Reduce" and "Reuse". According to them, it is recommended to buy products of the highest utility value - without unnecessary, flashy and only temporarily fashionable elements - and exchange them in society as to use them for the longest possible time (Frątczak-Rudnicka 2011, Mazurek-Łopacińska 2011). A combination of these trends can be found within the modern dandyism, beginnings of which contain some analogies to the modern fashion market.

Historical background of dandyism

Dandyism is a phenomenon inextricably linked to fashion, but also to customs. The movement arose in the nineteenth century and can be described as a closed circle of truly elegant men, where certain rules prevail (Howells 1996, p. 25). The very meaning of dandyism is multidimensional and has evolved over the years. At its core, it is characterized by a unique aesthetics of clothing and its recognition as the highest value. One may maliciously say that a dandy lives only to dress up (Okulicz-Kozaryn 1995, p. 39).

However, it is a stereotype that dandyism is based only on clothing, and each of its representatives must be a homosexual. In former centuries dandyism constituted a complete personal philosophy, being ahead of its time and constantly generating innovations, above all in fashion (Visser 2011). Back in the days (but also nowadays) "sprezzatura" has been a key-concept to this trend: artificial and trained behaviors or a certain dose of nonchalance in breaking the rules of elegant style are to give an impression of a full naturalness to an outside observer (Goeller 2014). Although dandies aroused strong feelings among high society, they were usually characterized by stolid character and truly English cold blood (Przybylski 1986).

Beau Brummel (1778-1840) is considered the ancestor of all dandies, being kind of an exemplar for subsequent generations of his followers, although some believe that dandyism is older than its oldest representative (Visser 2011). Brummel's dandyism was based on several fundamental principles: neatness, simplicity, high-quality clothing and attention to every, even the smallest detail. Brummel adhered to the principle that one should not follow fashion too eagerly, and clothing should be above all natural and comfortable (Nalewajska 2010, pp. 14-15). He also raised the importance of garment's perfect fit and cut to the perverse level (Okulicz-Kozaryn, p. 24), which was possible only thanks to close cooperation with personal tailor. This specific dandy-tailor relationship is associated with the still vivid concept of sartorialism, manifested in profound knowledge and interest in the methods of tailoring. High quality elegant clothes and accessories, in harmony with the classic art and cannons of tailoring, are considered sartorial (from Latin *sartorius* – pertaining to a tailor), while people who take delight in this style are called sartorialists (www 3).

Dandies should be contrasted with other types of smart dressers who are not characterized by equally high level of perfectionism (Okulicz-Kozaryn, p. 14). However, it is particularly difficult to divide a dandy and a gentleman. The characteristics of the latter include, above all, conformism without any deviations from the savoir-vivre (Okulicz-Kozaryn, p. 38). Gentleman is a heir to the knightly ethos:

honorary and hardworking. Nowadays - a businessman, a capitalist, whose elegant clothes are to emphasize his appearance and good manners, but not overshadow them (Skucha 2012). It is noted that a dandy could have been a gentleman, but a gentleman could not have been just a dandy (Przybylski 1986).

Oscar Wilde, an Irish poet from the second half of the 19th century, is considered the person who redefined dandyism. He opted for a widespread use of luxurious materials (such as silk) in clothing, as an expression of an opposition to the pessimistic and decadent vision of the end of the century (fin-de-siècle, Visser 2011). Dandyism began to fade after the death of the poet in 1900. Various types of 20th-century smart dressers did not have much in common with real dandyism, being slaves to fashion rather than its masters (d'Hamilton 2015).

Modern-day dandyism

Nineteenth-century dandies may be viewed as "clotheshorses", more or less attentively following fashion, but not being in a stark contrast with the latest trends. It is hard to say that about people who today consider themselves dandy, as modern fashion distances itself from elegant style. The spread of the internet has granted dandies around the globe an opportunity to communicate, exchange opinions and knowledge. There are online forums and thematic groups on Facebook dedicated to contemporary elegance, where it is possible to discuss sartorial brands, details and design of garments, as well as user for advice in the field of clothing, size selection or recommended brands (see www 4, www 5, www 6).

Fashion bloggers associated with this trend also participate in the spread of knowledge about the elegant style. They describe the basic principles of formal dress and present own photo sessions, which are intended to be an inspiration for readers (while also an advertisement of sponsored products - see www 7 and www 8). Photos from the session are often also posted on Instagram, where the largest channels have over 100,000 followers (see www 9 and www 10), which creates an original type of fashion icons with power to start new trends and influence their observers (Gregor & Kaczorowska-Spychalska 2014; Wiażewicz & Zatwarnicka-Madura 2016). Activities and recommendations of the so-called opinion leaders have a measurable impact on their followers' purchasing decisions. However, bloggers must maintain their credibility, so as not to loss own authority (Mazurek 2008, pp. 148-153).

In the case of traditional tailors, there are generally no marketing campaigns, while the emphasis is on personal, informal contacts and the reputation in entourage – a positive word of mouth may mean more than an expensive advertisement. It is noted that the process of tailoring for some customers may take the form of an almost mystical ritual, and a final product - a pass to a closed club of *true* dandies (Gautrand 2011; Shirkhodaie & Rastgoo-deylami 2016).

Dandyism in View of Economics

Given the historical background of dandyism and its current shape, we propose to consider this phenomenon from the perspective of economics and marketing at two levels. Firstly, as a highly specialized and thoroughly informed virtual community, that fits into the characteristics of consumer e-communities. Secondly, as a movement, which has certain common features with metrosexual trends.

The concept of metrosexualism was created in 1994 by journalist Mark Simpson, who, however, attempted to define this trend only after 8 years. Metrosexuals are described as young, well-off men from large cities, spending a significant portion of their salary on shopping for clothes. For this reason, they can be considered as "dandy narcissists". It is rightly pointed out that dandyism was an intellectual fad of the social elites, while the metrosexuality – of the masses (Gębala 2008). Metrosexual's obsessive interest in own appearance and hours spent in front of the mirror connect with the desire to consume only unusual products, in order to outstrip the mainstream and mark own

sense of a good style and taste. Such efforts are characteristic of gay aesthetics, although metrosexuals are almost by definition heterosexual (Masi de Casanova, Wetzel & Speice 2016).

Moreover, metrosexuality, despite its name, is not at all related to the sexual sphere. It is rather an attempt to fill an emotional void through hedonistic pleasures (Skrudupaitė, Virvilaitė & Kuvykaitė 2006). There is no women's version of this trend, so it can be viewed as a strictly male strategy of seduction based on impeccable presence - just like in dandyism (Halligan 2011). It is also noted that the affliction of both dandies and metrosexuals may be so-called Narcisstic Personality Disorder, that consists of a lack of empathy, sense of entitlement and preoccupation only with beauty, power and success (Gheorghe 2015).

Due to its numeric variations, metrosexuality as the core is believed to be a market segment. Its successor is the über style, whose representatives are (or at least are to be) the real, harsh men, but equally stylish and addicted to the best quality fashion (Rinallo 2007). The similar type of macho should be distinguished from übersexualism. Although the macho has no suffix “-sexuality”, it focuses on male (hyper)sexuality - aggressive and strictly physical. One can get the impression that for macho, the aesthetics of clothing is of a marginal importance, as long as it does not undermine his image of a warlike and dominant alpha male (Mosher 1991).

To some extent countering the above characteristics, it should be noted that in postmodernity the relation between individual’s consumption of specific goods and social position has been lost. The latter no longer determines clothing: a man in a suit no longer has to be a gentleman, obliged to such a style by his profession or social norm. Postmodernism is also marked by a new form relationships, that are built virtually. Virtual spaces have replaced traditional, personal meetings and have taken over the role of "places" for creating relationships, e.g. mutual consumer communities (Leszniewski 2007). They are “electronic tribes” bringing together individuals with similar interests (Kozinets 1999), for example related to the dandy style. The main goal of such a community is to transfer a knowledge, opinions, experiences and thoughts. Its members have the opportunity to actively learn by participating in interesting discussions (Lee, Vogel & Limayem 2003).

Efficient and sound consumer e-communities can successfully attempt to affect brands’ decisions and wield influence over development of new products (Maciejewski 2016b, p.23). An economic symbiosis is possible, as community members gain real influence on features of the products they desire (Kaczorowska-Spychalska 2012), while companies gain access to unique information provided by one of the most valuable, well-informed clients. Although customers’ posts are often emotionally charged, they usually remain objective and highly factual (Mazurek 2008, p. 121). What's more, an e-community may adopt the function of a brand's virtual customer service for free, even advising with choosing a correct product size or suggesting an item that best meets the given expectations (Mazurek 2008, pp. 124-127). According to the observations made, such actions take place on forums and groups devoted to dandyism.

Conclusion

Dandyism has been subject to many changes over the years, gradually losing its philosophical foundations. What has remained inherent in dandies, is their fascination with male elegance and distinct aesthetics of clothing. In the era of postmodernism, the main trend is to move away from an elegant style in favor of a more casual approach, which is particularly visible in professions with traditionally restrictive dress code. Paradoxically, this may entail a new dawn of dandyism and presence of its sympathizers on city streets. Due to the fact that suits or ties cease to be symbols of coercion, resulting from social conventions, their perception by consumers may change.

The roots of modern metrosexual trends can be traced back to dandyism, although such a connection seems to have almost reversed. While metrosexuality is an independent market segment, dandyism has been reduced to just a niche, dedicated to a relatively small group of enthusiasts, that fit into the characteristics of the broadly understood metro style. However, thanks to their active discussions and

good organization on Internet forums and thematic groups, contemporary dandies may be considered as a thriving electronic consumer community focused on elegant style.

The question remains to what extent present-day representatives of this stylistic current are really successors of classic, nineteenth-century dandies. Perhaps they should be called at most just sartorialists, that focus on semi-rational (less garments, but of better quality) and strictly hedonistic (new fabrics and cuts every now and then) premises in their consumption.

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Challenges For Modern Enterprises – The Issue of Mismatching Professional Competencies from The Perspective of Own Research

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Abstract

The discussed issues are aimed at characterising the challenges for modern enterprises in the field of continuous improvement of employee competencies in the face of dynamic technological progress. Based on the literature review, the authors of the paper presented the issue of skill mismatch and indicated the reason for this state of affairs. For many years, enterprises have been struggling to find suitably qualified employees whose competencies would be closely correlated with the needs of the labour market. The problem area is very broad and requires in-depth analysis not only on the scale of the enterprise but the entire education system. Enterprises, despite the undertaken actions, are constantly looking for a way out of this situation, recruiting candidates within their own organisation. However, the problem remains unsolved. Based on the conducted research, the authors of the paper considered this problem from the perspective of the employee. While analysing the research results, an attempt to answer a number of questions was made and future directions of actions aimed at solving the above-mentioned problems were outlined.

Keywords: Skill Mismatch, Talent Shortage, Education

Introduction

Globalisation and development of modern information technologies result in consequences (Pypłacz, Liczmańska-Kopcewicz, 2018) that have a huge impact on changes in the enterprise management system. Innovations in the field of products are emerging, which in turn create new output markets and new types of services (Ismail, et al., 2019). The organisation of the company functioning is also changing (Ślusarczyk, 2018). As a result, the introduction of a change in the organisation system in the enterprise leads to the emergence of new jobs and, above all, the emergence of demand for new skills.

The difficulty in filling jobs increases year by year. In the period 2014-2020, this indicator more than doubled, which was influenced by the still decreasing unemployment rate and widespread digitisation of business processes. The development of information technologies forces employees to constantly acquire new skills, and this leads to an increase in the group of people who do not match the needs of the labour market.

To acquire, develop and retain the most talented people in a company, it is necessary to know the demand for and opportunities to develop specific skills. Undoubtedly, this requires changes in the approach to staff training and a flexible way of responding to market demand. This is because the dynamics of market changes is so huge that fossilised education systems are not able to adapt curricula so quickly to the needs of the labour market, and thus equip future graduates with current

professional competencies. The education system in Poland, unfortunately, cannot keep up with changes, educating in professions that are not reflected in job offers.

On the basis of this statement, the following research question was posed *The issue of a mismatch of qualifications and a lack of employees with appropriate competencies determines the need to build an efficient education system in the workplace, which will allow obtaining the desired skills on the dynamically changing labour market.*

The undertaken research issues seem to be important due to the need to constantly monitor processes occurring in the area of education and the labour market, and to update information on the demand for specific professions and qualifications, and in particular in the context of meeting these expectations seen from the angle of Polish enterprises.

As a result of the conducted literature review and own research, data was obtained, which allows for a broader look at the challenges of modern enterprises in the field of skill mismatch and the need to constantly improve the qualifications of employees. The presented data and research results used do not allow for a comprehensive analysis of the research problem, however, they may become a contribution to more detailed research in the future.

Professional qualifications and competencies

Professional qualifications are both knowledge and skills that are needed to perform a specific profession. Professional qualifications form a set of individual messages, skills and attitudes conditioning the completion of specific professional tasks. Thanks to appropriate skills, as well as psychophysical characteristics, it is possible to perform tasks that belong to a given speciality. Qualifications are shaped by the configuration of various factors, which include the level of general and vocational education, job seniority and psychophysical characteristics (Nagel, 2016). These are some more or less measurable characteristics reflecting the potential of a given person, which is closely related to the expenditure incurred for its creation, and their usefulness is verified by the changing environment in which a given entity functions (Orczyk, 2009). Therefore, qualifications are knowledge, skills, education and experience necessary to perform a given profession. They have a formal dimension and are modified through changes in a given environment. Employers learn about specific qualifications on the basis of diplomas, attestations or certificates. In turn, professional competencies include individual and cognitive skills, professional predispositions, such as communication skills, teamwork skills, flexibility, adaptability to changes and risk taking, and above all the ability to use acquired qualifications (Pinkowska, 2011). On this basis, it can be concluded that qualifications are learning outcomes that are documented, e.g. through a diploma with an academic degree or acquired during training, while competencies include the ability to acquire knowledge and its proper use, professional experience, dealing with corresponding situations, as well as cognitive and physical skills.

From the perspective of the company operation, competencies play a significant role because they enable, among others, product development, implementation of new solutions, building authority. It is so-called hard competencies. On the other hand, soft competencies are becoming more and more important, allowing for a more complete and effective implementation of the company strategy (Varkoly et al.,2019).

Possessed qualifications shape competencies, but competencies determine the possibility of undertaking and implementing the tasks posed by the employer in a responsible manner (Orczyk, 2009).

When applying for a job, the employer checks the compliance of qualifications with competencies qualifications do not always reflect competencies. This is mainly due to the process of acquiring knowledge, which is outdated and requires radical reorganization, and which contributes to the emergence of an ever-increasing skills mismatch gap.

Research Context

The issues related to the skills mismatch to the needs of the labour market are presented in the source literature in various ways (Altindağ, et. al. 2018; Radu, et. al., 2019). Although it can be analysed in various dimensions, it is usually the result of a complex interaction between labour demand and supply, which are influenced by delayed adjustment processes and market imperfection. Referring to the source literature, different types of mismatches to the labour market can be distinguished (CEDEFOP, 2014), however, the authors will mainly focus on the mismatch resulting from the lack of proper qualifications (skill mismatch). A mismatch of skills in the labour market occurs when there is an imbalance in the labour market resulting from the failure to adapt the level or type of available skills to the requirements of the labour market or requirements related to a specific job, analysed at different levels (individuals, enterprises). And here overskill when there is a surplus of skills or qualifications compared to those desired in a given position or profession, underskill, shortage in skills or qualifications compared to those desired in a given position or profession can be distinguished (CEDEFOP, 2010).

The source literature and results of research conducted so far in Poland (Work Service, 2019), as well as in market economy countries, clearly indicate that one of the reasons

for the imbalance in the labour market is a mismatch in the structure of supply and demand for work, especially associated with the profession, qualifications and education. A synthetic approach to these mismatches and determination of their causes is illustrated, among others, by the Hays Global Index (Hays, 2019), or the results of studies presented in ManpowerGroup reports (Manpower Group, 2020). The relative demand for highly qualified staff has generally increased and the relative importance of skill types has also changed. Both Information and Communication Technologies and soft skills have gained in importance in the context of many professions. The demand for the most desirable skills changes fundamentally. Qualifications, to which employers did not pay attention a few years ago, are at the top of the most desirable skills ranking today. According to the latest LinkedIn work trend report, blockchain technology, which was not included in previous rankings (LinkedIn, 2020), has outperformed other emerging technologies this year, such as cloud computing, analytical reasoning and artificial intelligence. This only confirms the point that the demand for skills is dynamically changing, which is why both educational units and employers should constantly adapt their education and training offer to the constantly changing market environment.

According to the Manpower Group report, the most sought-after employees are employees with very high qualifications and professional competencies, as well as people with professional experience that determines their professional competencies, but often requires confirmation with appropriate certificates (Manpower Group, 2020).

The shortage of qualified employees is also shown in the Hays Global Index according to which companies in 2019 had much more difficulty finding employees with specific qualifications in the IT and technical sector. The Hays Global Index takes into account the flexibility of the education system and the labour market as well as the mismatch of qualifications (Hays, 2019). The main pressure on the market is caused by the problem of mismatch, especially since from year to year, the gap between the skills of job seekers and the skills sought by employers is constantly growing.

Results

In view of the growing problem of skills mismatches and staff shortage, as well as the lack of effective tools that eliminate this gap, and at the same time prevent the adaptation of skills to the needs of the labour market, the authors of the paper tried to answer many burning questions and make a diagnosis of the current state.

A shortage of employees with the desired qualifications may indicate a lack of an appropriate education structure, which in turn is manifested in a skill mismatch (McGuinness, et al., 2018; Kriechel,et al., 2019; Battu, et al., 2020; Schweri, et al., 2020). In turn, the lack of effective training

tools has a negative impact on the possibility of permanent improvement of employees' competencies, which is necessary to meet the challenges of a dynamically changing business environment (Manpower Group, 2020; Silvaggi, et al., 2019; Attaran, et al., 2019; Hays 2019).

So what strategy should enterprises adopt? Should they implement internal education systems? What is the situation in Polish companies and what actions are taken in this respect? Are employers aware of the continuous improvement of their employees' qualifications, what tools do they use and are they effective? The authors attempted to answer these questions by analysing the results of the conducted research and outlined future directions of actions aimed at solving the above-mentioned problems.

In order to diagnose the current state, a survey was conducted in which people employed under an employment contract in the SME sector and entities belonging to the group of large enterprises took part. The research was conducted in the fourth quarter of 2019 using CAWI online surveys and direct interviews. Answers were obtained from 526 employees, but due to inconsistency or lack of some data, less than 60% of the collected responses (312 respondents) were included in the analysis. 68% of answers came from employees of micro and small enterprises, 23% from medium ones and 9% from employees employed in large business entities.

Research shows that many employees perceive the need to improve their own professional competencies (Fig. 1).

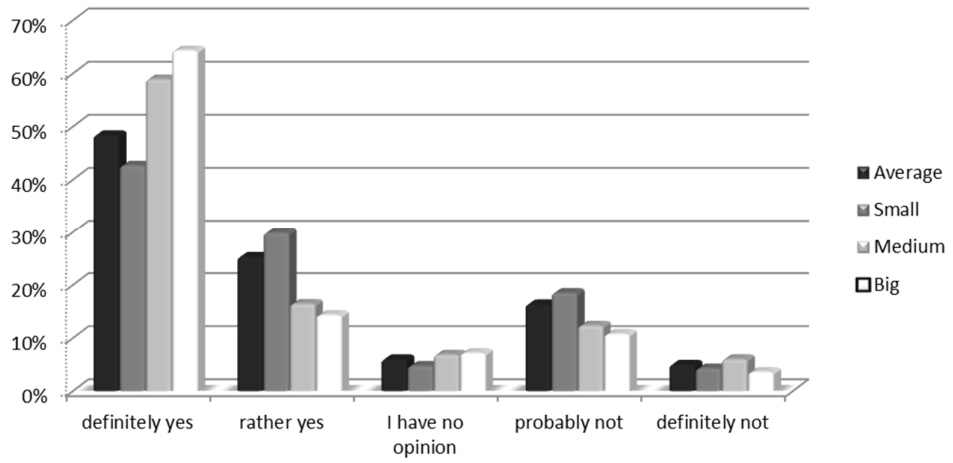

Figure 1: The need to improve own professional competencies
Source: Own analysis

Over ¾ of respondents have participated in a training in the last 12 months (Fig. 2).

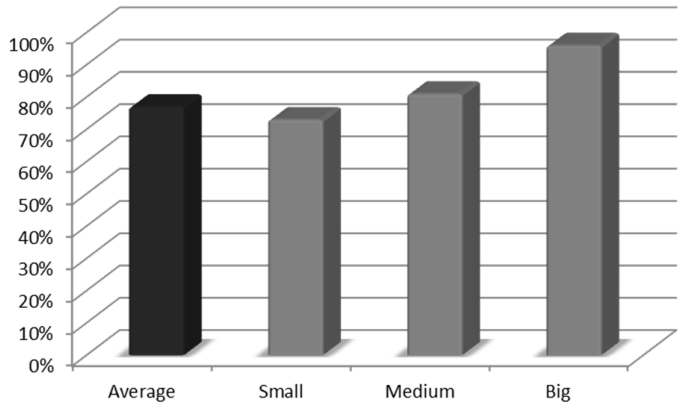

Figure 2: Number of employees who have participated in a training

Source: Own analysis

Large enterprises strictly focus on the development of their employees, which may be evidence of the high awareness of employers as to the need to improve professional qualifications of their subordinates. Respondents who did not participate in a training most often indicated a lack of financial resources, of a proper training offer and too high training costs. These trends occur mainly in small enterprises. Employers sent their employees for training, most often due to changes in regulations, too low employee competencies and the possibility of co-financing training, which ultimately did not burden the company budget.

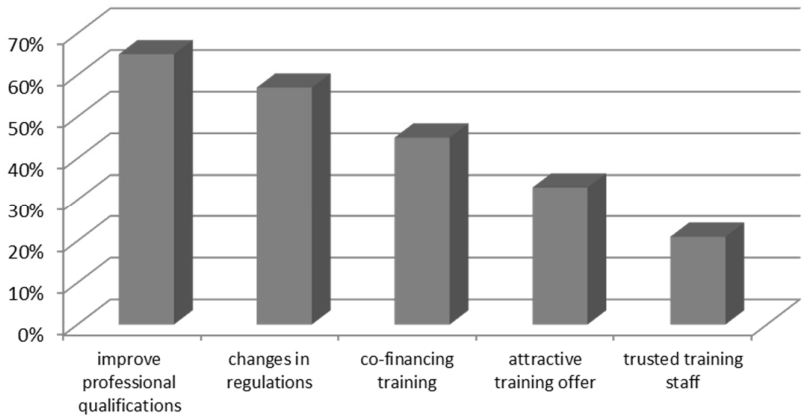

Figure 3: Main reasons for participating in training

Source: Own analysis

According to respondents, the best form of training are workshops that enable the acquisition of practical knowledge. E-learning trainings are also very popular. However, in most opinions, the trainings in which they took part were ineffective and did not significantly contribute to the improvement of their professional competencies (Fig. 3). In order to take full advantage of the acquired knowledge, they need additional time, support and counselling after the training process.

Figure 4: Percentage of employees who, after completing the training, were able to fully use the acquired knowledge

Source: Own analysis

In turn, the factors that cause that the information obtained during the training are not fully used are, above all, lack of commitment during the training, lack of motivation, as well as problems with implementing the acquired knowledge in practice. Factors that can have a positive impact on the effectiveness of training are the adaptation of training to the individual needs of participants, the use of modern technologies, as well as verification of results and achievements (Fig. 5).

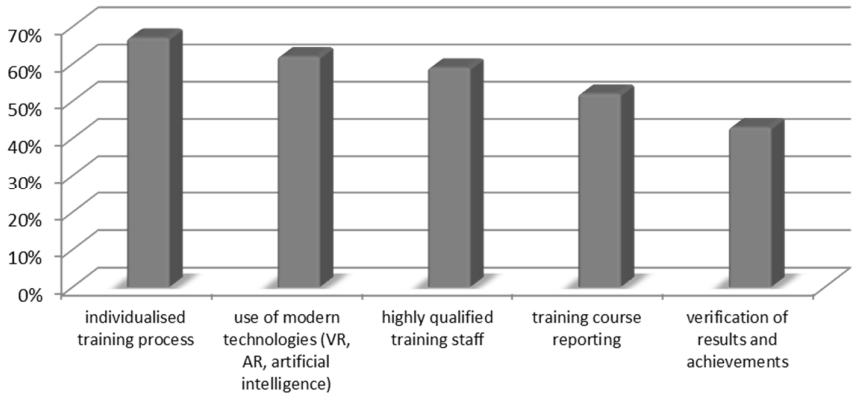

Figure 5: Factors increasing training effectiveness

Source: Own analysis

In most enterprises, there is no assessment of employees' professional goals or assessment of their professional skills (Fig. 6).

Figure 6: Assessment of employees' professional goals and skills

Source: Own analysis

Unfortunately, in the opinion of employees, companies do not conduct them with the right conditions to improve professional qualifications (Fig. 7).

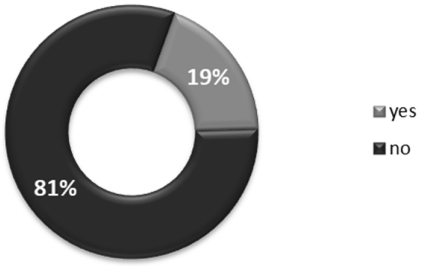

Figure 7: Does the company provide conditions for improving professional qualifications for its employees?

Source: Own analysis

Research results clearly show that lifelong education and training are key to development, but they are not the only point in shaping professional competencies. From the employees' point of view, it is very important to increase the scope of professional opportunities of own teams by assigning tasks from various areas to different positions. Employers can also implement projects involving all employees and ensure efficient cooperation of various teams. Employees would like to get involved in numerous projects, which would allow them to gain new experience, knowledge and skills (Fig. 8). Employees are aware of the need to increase their value in the labour market and expect opportunities for professional development.

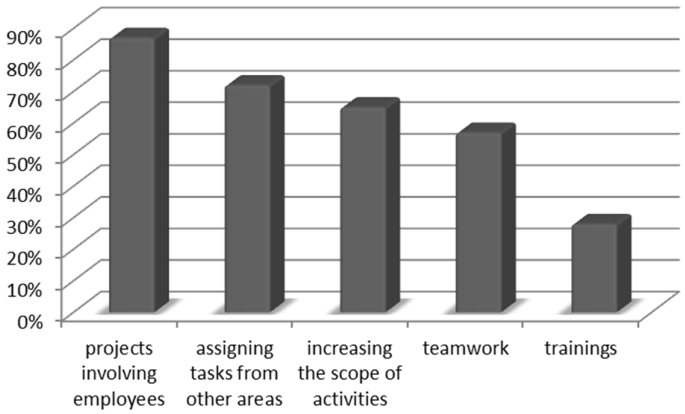

Figure 8: Factors supporting the acquisition of new knowledge and skills

Source: Own analysis

In the group of respondents highly assessing their professional competencies, over 90% declared that the company provides them with the right conditions for their development. However, in the group of people with medium or low level of competencies – 86% did not participate in any training in the last 12 months.

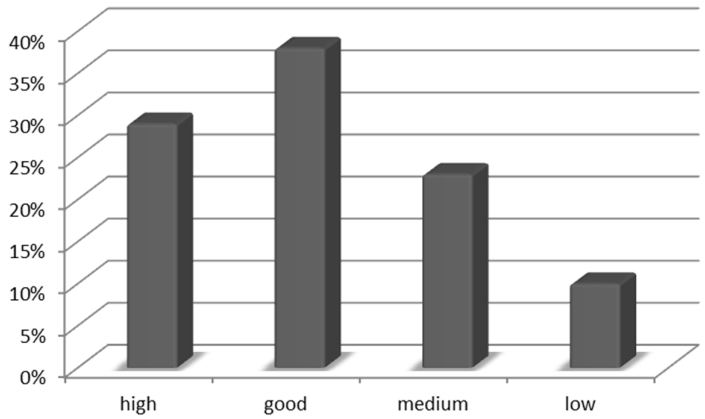

Figure 9: Assessment of the level of professional competencies
Source: Own analysis

Employees are interested in improving their own professional competencies, especially in medium and large enterprises. At the same time, they expect more engaging tools for professional development oriented at continuous improvement of qualifications (Fig. 10).

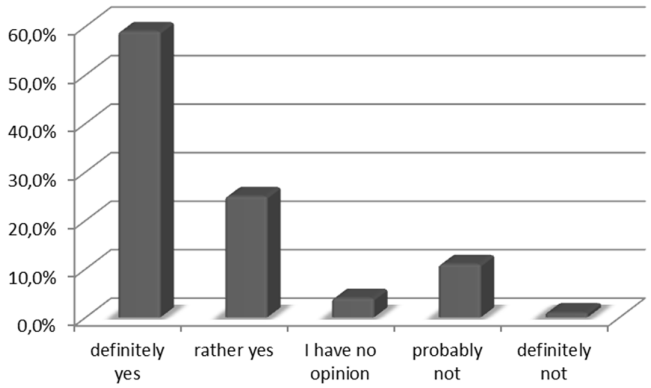

Figure 10: The need to implement modern tools for improving professional competencies
Source: Own analysis

Employee development plans are implemented in less than 8% of the surveyed entities, which includes 25% in large enterprises and 15% in medium enterprises. Less than 3% of employees say that such plans exist in small enterprises (Fig. 11).

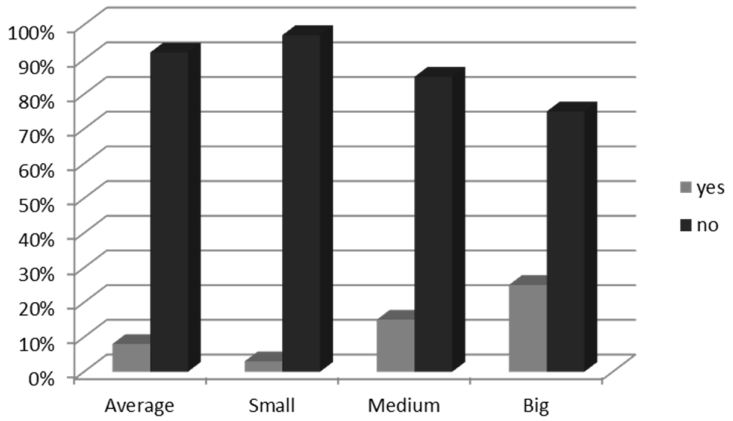

Figure 11: Percentage of companies with employee development plans
Source: Own analysis

According to employees, only few enterprises have internal career management programs, which may indicate the low maturity of Polish enterprises (Tansley, et al., 2006).

Conclusion

From the perspective of the current talent shortage, activities aimed only at acquiring relevant candidates within the market are insufficient nowadays. To build their competitive advantage, companies must expand their development programs and increase employee mobility in organisations.

The conducted research gave a clear picture of Polish reality. Professional competencies are at a low or very low level. Employees expect support and more effective tools for professional development, such as the implementation of an internal career management program. Thanks to such a solution, the company could gain a motivated and committed employee who has competencies relevant to the organisation and, as a consequence, efficiently achieves the goals on their position. In addition, by increasing the efficiency of their activities, they could bring measurable benefits to the company. They would gain more self-confidence, as well as responsibility for building their career and awareness of independent career path management. The benefits of implementing such a tool are also the security of further professional career development as well as acquiring and developing the competencies needed in the company. Such a solution would also increase the efficiency of activities undertaken to develop competencies. This is because despite the fact that most of the surveyed companies focus on the development of their employees, there is a significant problem with the effectiveness of educational activities. Lack of motivation and commitment on the part of employees are an effective barrier in the development of professional competencies.

Based on the analysis of the obtained research results, the research question can be confirmed. The respondents' answers confirm the assumptions of the authors of the study. There is a great need for professional development of employees. However, they need more flexible tools for raising competences. It is necessary to propose new tools and methods to improve employees' competencies. It is important that they engage participants and are effective enough to enable them to examine their impact on achieved business results and give specific results. This requires a completely new approach and implementation of solutions that will not only allow collecting data on the educational behaviour of employees, but also enable the use of this information to personalise the learning process. In combination with the employee performance data, the system will be able to verify the effectiveness of planned training activities and update them accordingly.

In the opinion of employees, the future of developing professional competencies also includes internal career management systems that enable employees to independently assess their interests and opportunities, match them to jobs and facilitate the development of personalised career paths. In practice, they will enable employees to assess their professional goals, find a future role, assess their current skills and create development plans. This is because every employee should be able to constantly improve, develop and implement their professional goals. From the perspective of enterprises, it is important to skilfully use the potential and knowledge of employees and manage their careers in such a way that the retention rate remains high.

Enterprises should focus their efforts on developing their own employment strategies, while also providing their employees with the opportunity to retrain or even change their profession. Implementing innovative solutions and focusing on the competencies of candidates as well as undertaking initiatives to encourage wider participation in the labour market, especially within inactive groups and mature employees, will be of key importance for companies. This is particularly important from the perspective of demographic change and the need for enterprises to be open to employ older employees, as well as to provide them with opportunities and possibilities for professional development.

The future of staff training, due to the variability and dynamics of the business environment, should be directed towards workplace training and apprenticeships so that the education effect meets the needs of enterprises, while giving young people valuable first experience. Ensuring appropriate development paths requires individualisation of the training process, supported by modern technology, which will make the process more flexible and will positively influence the commitment and training quality. An effective solution may also be demand-driven training, which would not only fill the educational gap, but would be a tool for quick retraining for people who are professionally inactive or have insufficient qualifications.

In order to reduce skills mismatches to the needs of the labour market, it is necessary to focus on greater professional mobility, which allows enterprises to find the talents they need, despite the shortages in the local labour market. Currently in global companies, internal mobility of employees is one of the most important human resource management strategies. A recent LinkedIn survey (LinkedIn 2020) has demonstrated that over 70% of organisations currently focus on internal recruitment, and companies with active internal career management programs have 41% greater ability to retain employees.

Skill mismatch is today one of the main challenges faced by the economies of the entire Central and Eastern Europe region. It not only has an impact on the productivity and efficiency of enterprises, but also can be an effective obstacle to the pursuit of prosperity in developing countries.

In order to keep up with global trends and to further reduce differences in the level of development and standard of living between Poland and Western European countries, it is necessary to change the way of thinking about preparing young people to enter the labour market as soon as possible and provide them with tools that will allow them to shape competencies tailored to market needs. Therefore, it seems that the implementation of a workplace education system that will manage employee development will allow the development of desired skills in a dynamically changing labour market.

This is because only continuous access to properly trained and motivated staff will provide enterprises with development opportunities and will allow for long-term economic success.

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Cyber Terrorism and Effective Counteraction to it in Modern Conditions

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Abstract

At the turn of the 20th century, the transformation of terrorism from a means of power struggle at the country level to a global threat took place. The rapid development of new technologies has significantly expanded the ability of terrorist organizations to manipulate the people's mind engaging them in terrorism. The purpose of the work is to study the place and role of information technology in the activities of terrorist organizations and to determine a set of measures for the prevention and detection of threats of contemporary terrorism. It is concluded that there is a special information and communication strategy of terrorism that distinguishes it different from rebel or sabotage actions. Cyber terrorism is not just aimed at harming the interests of certain states, but also at growing the political, economic, and ideological influence of international terrorist groups in the world community. Effective counteraction to contemporary terrorism requires coordination of efforts based on public exchange of information on national and world achievements in cyber security.

Keywords: Terrorism, Information Technology, Cyber Terrorism, Counter-Terrorism Activities.

Introduction

The widespread introduction of modern information technologies into all spheres of public life has significantly increased the dependence of society on the functional reliability of the information infrastructure, information actuality, and information protection from unauthorized modification. The use of new technologies for criminal and antisocial purposes is becoming increasingly relevant. At the same time, a huge gap remains between the accelerating pace of technological innovation and change on the one hand, and the delayed reaction of political and legislative institutions, on the other. Nowadays, terrorist groups use a wide range of new technologies in planning and implementation of their attacks.

The purpose of the work is to study the place and role of information technology in the activities of terrorist organizations and to determine a set of measures for the prevention and detection of threats of contemporary terrorism.

Research Material and Methods

The global problem of terrorism and its manifestations are analyzed by philosophers, historians, politologists, sociologists, lawyers, economists and other scientists. B. Hoffinan (1999), D. Byman (2005), B. Crazier (1975), Alex P. Schmid (1984, 1988) and Yu. P. Kuznetsov (1998) offer in-depth studies on understanding the essence of terrorism and its definition as a social and political phenomenon.

Many scientific works are devoted to the study of the causes of terrorism and its main components - violence and aggression: M. Crenshaw (2007), W. Laquer (1999), D.C. Rapoport (2004), and P. Bergen (2006).

Methodological background of the research is based on philosophical, general scientific and special methods. The general scientific methods used in the work include analysis and synthesis, induction, deduction, ascent from the abstract to the concrete and the historical method. Among the special methods the comparative analysis was used. Selection of scientific information sources is based on the principles of scientific objectivity.

Research Results

Terrorism as a phenomenon has deep roots, it has been known since ancient times. As a rule, terrorism rises during the period of major socio-political disasters such as revolutions, civil wars, interfaith and interethnic conflicts, aggressive protest movements and their suppression. In one way or another all such conflicts were followed by terrorist attacks and terror against the population.

Terrorism was actively used during the Cold war as part of the bipolar confrontation. It was a period when at the end of the 20th century the well-known Taliban and Al Qaeda terrorist groups were founded. Al-Qaeda emerged at the end of the war in Afghanistan in 1988. The United States regarded the entry of Soviet troops into Afghanistan in 1979 as a case of Soviet aggression. The US supported and began sponsoring Al Qaeda to fight against the Soviet troops. After the Soviet troops' withdrawal, al-Qaeda leaders decided that their next enemy would be the United States, which lay claim to world political and economic domination.

At the turn of the 20th century, the transformation of terrorism from a means of power struggle at the country level to a global threat took place.

The studies show that terrorism spread to over 100 countries in 2019. Table 1 presents the ranking of countries on the impact of terrorism (ranks 138 countries) (Global Terrorism Index 2006-2020).

TABLE 1 : Ranking the nations of the world according to terrorist activity

Ranking	Country	Index
1	Afghanistan	9.60
2	Iraq	9.24
3	Nigeria	8.60
4	Syria	8.01
5	Pakistan	7.89
6	Somalia	7.80
7	India	7.52
8	Yemen	7.26
9	Philippines	7.14

10	Democratic Republic of Congo	7.04
11	Egypt	6.79
12	Libya	6.77
13	Mali	6.65
14	Central African Republic	6.62
15	Cameroon	6.62
16	Turkey	6.53
17	South Sudan	6.32
18	Thailand	6.03
19	Colombia	5.91
20	Sudan	5.81
21	Kenya	5.76
22	the USA	5.69
23	Niger	5.60
24	Ukraine	5.55
25	Mozambique	5.54
26	Myanmar	5.51
27	Burkina Faso	5.42
28	the UK	5.41
29	Ethiopia	5.35
30	Saudi Arabi	5.24
31	Bangladesh	5.21
32	Palestine	5.18
33	Burundi	5.10
34	Nepal	5.09
35	Indonesia	5.07
36	France	5.01
37	Russia	4.90

Among the countries with a zero index of terrorism are Belarus, Cuba, Turkmenistan, and the Democratic People's Republic of Korea.

At the same time, the methods and means used by terrorists have undergone significant changes.

Along with the obvious benefits, the world information technology revolution has created fundamentally new threats.

The rapid development of new technologies has significantly expanded the ability of terrorist organizations to manipulate the people’s mind engaging them in terrorism.

We use the Islamic State of Iraq and the Levant (ISIS), also known as the Islamic State (IS), as an example. The rapid expansion of this terrorist group and its large-scale actions, the new technologies and mechanisms of ideological and informational work of ISIS allow us to conclude the transition of terrorism to a qualitatively new level of development.

A small and relatively unknown terrorist group that emerged as an al-Qaeda affiliate in Iraq in 2003 ten years later managed not only to proclaim the concept of a worldwide caliphate, but also to create a quasi-state with laws, territory, tax and monetary systems in real life. The total area of ISIS-controlled territory

as of 2014 was estimated at 40-90 thousand km² with an estimated population of 8 million people (Tarasov, 2014).

The use of different modern information technologies by the Islamic State fundamentally distinguished it from other previous terrorist groups. Terrorists daily posted on the Internet professionally shot and carefully choreographed videos with public executions, the destruction of cultural monuments, military operations, interviews with their warlords, radical preachers and activists, photographs of trophies and killed opponents. This terrorist organization had its own professional studios. The created videos were posted by the terrorists on video platforms such as YouTube. The terrorists of the Islamic State also actively used social networks; they created accounts on the most popular social networking sites (Facebook, Twitter, Instagram, Friendica, VKontakte and Odnoklassniki, etc.), and used them for distribution of information about the Islamic State and recruiting new members. According to some reports of Shanghai Cooperation Organization Regional Anti-Terrorism Structure, more than 45 thousand Islamic State accounts were registered on Twitter alone.

Analyst and publicist J. Berger described the Islamic State media campaign as 'very organized', noting that the terrorist organization 'uses misleading methods and demonstrates a deep understanding of the principles of social networks'.

We can conclude that there is a special information and communication strategy of terrorism, which makes it different from rebel or sabotage actions. Cyber terrorism is not just aimed at harming the interests of certain states, but also at growing the political, economic, and ideological influence of international terrorist groups in the world community.

It makes the information counter measures against terrorism one of the main tasks of the fight against terrorism. However, in practice, the information aspect of counter-terrorism is often limited by the use of protective measures (Minakova, Parkhomchuk, Golovin and Bukreeva, 2018). The implementation of effective measures of anti-terrorist information campaigns is not specified in the official legal documents. It is necessary to point at some main measures of information counter-terrorism:

- information support of counter-terrorism activities through the media and other information channels;
- forecast terrorist threats, its roots and causes, as well as the conditions for manifestation;
- search, collection and analysis of up-to-date information on the actions of terrorist groups and their accomplices;
- public awareness campaign among the population, increasing vigilance, moral and psychological stability, cohesion, discipline and personal responsibility;
- prepare the population for acts of terrorism, provide first aid training, material and moral support for people affected by terrorists;
- maintain persistent information pressure on terrorists, their accomplices, leaders, inspirers, and international terrorist organizations;
- create organizational, legal, scientific, technical, personnel, financial and other favorable conditions for effective information support of counter-terrorism activities.

The most targeted activities on the information counter-terrorism in the Russian Federation are carried out by the National Antiterrorism Committee established on February 15, 2006 by decision of the President of the Russian Federation aimed to improve public administration in the field of counter-terrorism. The Committee is chaired by the Director of the Federal Security Service of the Russian Federation. The main tasks of the Committee are: develop antiterrorism measures, participate in international cooperation, and prepare proposals to the President of Russia on shaping national policy and improving legislation in this area, as well as organizing informing the public about the emergence and neutralization of terrorist threats.

The most important direction of information counteraction to international terrorism is the development of cooperation among the CIS countries. In particular, informational counteraction to terrorism is one of the priorities of the Collective Security Treaty Organization (CSTO). The measures implemented in this area involve promoting the establishment and strengthening the potential of collective informational counteraction against terrorism, drug trafficking and other challenges in the CSTO space (Armenia, Kazakhstan, Kyrgyzstan, Russia, Tajikistan and Uzbekistan).

In this regard the Organization is building up international relations, finding supporters and allies in the most influential media, engaging writers, scientists, cultural figures, and organizing work so that truthful materials on counter-terrorism, fight against extremism and the ideology of violence, anti-drug topics appear on screens and printed pages.

Thus, the informational fight against of terrorism implemented by the Russian Federation and the regional structures of the CIS includes the comprehensive realization of measures for the prevention and detection of terrorism through the collection and analysis of information about terrorist groups and their neutralization using information resources, primarily the media.

It is worth to strengthen the efforts of international anti-terrorism cooperation within the CIS and the CSTO (Minakova, Bukreeva, Masalov, Galchenko and Kharlanova, 2019). The efforts of the international community can be focused on the following directions: development of international legal mechanisms to protect the information space of partner-states from spreading the ideology of terrorism and radicalism, promotion of violence; improve the national legislation aimed at increasing social responsibility and media ethics; thwart by partner-states all kind of terrorist and extremist propaganda on the Internet, given that only national prohibitive legal regulations is ineffective in view of the creation and registration of terrorist sites in other countries; coordinate partner-states' activities of public, cultural and other humanitarian resources in countering the ideology of terrorism and extremism and provide the population with reliable and objective information (RG, 2013).

Conclusion

Analysis of media technologies used by ISIS shows that contemporary terrorism has gone through transformation and actively penetrated the social media space. Contemporary terrorism has a developed media infrastructure and demonstrates a high level of proficiency in advanced technologies, including skills in navigating social platforms. It is actively involved in information wars along with the world's great powers.

The study of existing practices and trends in the development of information counteraction to terrorism shows different approaches to preventing and neutralizing threats of terrorism.

Effective solution of this problem requires coordination of efforts based on public exchange of information on achievements in the field of information security both for individual States and for the world community as a whole. This is due to the fact that modern globalization implies both the globalization of terrorism and, accordingly, the globalization of information counteraction to it.

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The Role of Business Analysis Methods and Techniques in IT Systems Set Up and Adoption

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Abstract

The purpose of the article is to assess the importance of business analysis in the context of new IT initiatives. The authors analyze challenges of IT systems implementation and the role that business analyst can play to mitigate the risk and enable smoother adoption. An example of efficient application of business analysis techniques is given using a case study of CRM implementation. The article proposes the analysis of six techniques including their description, goal and benefit for the examined project. It also includes an action plan elaborated based on the analysis results and its positive impact on the company.

Keywords: Business Analysis, Business Analyst, IT Systems Implementation, CRM.

Introduction

The increasing role of information technology not only in daily operations of companies but also in its products and services drives frequent implementation of new IT systems. In particular, Aghabaghery el all (2020) write about this. The process of software design, development and delivery often takes from several months to several years based on the complexity and balance between bespoke and off the shelf elements. During that time significant number of people from different disciplines is collaborating on the project (development, project managers, enterprise architects, business analysts, product managers and other business stakeholders). Some people will leave the company before the end of the project and new employees will take their place. Without the proper planning and documentation, the project risk to become a never-ending working group without structure or deadlines. Organization of the project lies within the responsibility of the project manager, but another important element is consistent documentation of requirements and other artifacts that is part of business analysis field of study. It enables the transfer of knowledge between different parties in the project and ensures easier handover.

New IT Systems Implementation Challenges

Leaving aside the questions of efficient software design and infrastructure, another main challenge is systems set up and adoption. In every big project the period of hyper-care is introduced in the price and planning representing in average 10-20% of the duration of the project. During that time dedicated personnel helps users to transition from legacy software and create processes around the new one. But in smaller-scale project the hyper-care is often neglected, and users are left with half-configured systems and lack of knowledge to ensure its correct use. This is when business analyst intervention is particularly valuable to create missing processes and train staff on them.

Role of a Business Analyst

Business analysis is a relatively new field of study that emerged as a practical discipline responding to direct need to create an additional layer between technical IT specialists and wider business. As a bridge between IT and business, business analyst plays a role that has two main aspects:

1. Translator from IT to business language and backwards. In order to be efficient in this function, business analyst needs to have a double competence: technical IT systems to be able to communicate with development and thorough knowledge of the company and industry to have a good understanding of business processes. Depending on the organization of the function, business analyst will have to have different proportion of IT vs Business centricity, that can vary from 50:50 to 80:20 (Yayici, 2013, p. 12).

2. Organizer. Depending on whether there is a project manager involved in the project or not, business analyst will take more or less organizational responsibilities. But either way it will be an important part of the job to organize the cooperation of multiple stakeholders. Many of the issues and obstructions to the successful implementation and subsequent usage of the systems stem from absence of structure and communication. Stakeholder infrastructure is not a self-organizing system and need thorough planning and management. Simple activity like having all relevant stakeholders gathered in one meeting to discuss the challenges with the clear plan with actions assigned to relevant people can help resolve quite a few issues. Some issues acquire exaggerated complexity just due to the lack of common understanding and fragmented knowledge of the subject scattered between different actors.

Business Analysis Body of Knowledge

Three main sources of knowledge in business analysis can be distinguished:

1. The main and probably best-known standard for practice of business analysis is the BABOK Guide (A guide to the business analysis body of knowledge) published by the IIBA (International Institute of Business Analysis) (2015). The long handbook was first published in 2006 and has been improving with new techniques and approaches having its 3rd and current edition published in 2015.

2. Other less formal books like Emrah Yayici's "Business analyst's mentor book" (2013) that are also useful in understanding the role.

3. But main source of knowledge in business analysis being a new and applied field is, of course, presented in the internet sources. One of the most popular ones is Roman Pichler's blog (www.romanpichler.com) that has an extensive complex of articles in product ownership and business analysis written by the recognised practitioner.

Business Analysis Techniques

BABOK guide has a description of 50 different Business analysis techniques. To show an example of its application bringing benefits to the business, let's examine a simple case study. A new system (CRM - Customer Relationship Management) being implemented in a firm without a proper methodology resulting in the inability of staff to properly use its functionalities. This has already been written, Ullah, Iqbal and Shams (2020) or Gavval and Ravi (2020) for examples of the banking industry. Previously, we examined the business consequences of increasing the VAT rate in Russia by 2 points (Soboleva, Terenteva, and Kurtseitova, 2019). Company managers could have calculated these consequences in advance, as the government announced VAT reform in 2018. These effects can be calculated in advance, including using CMR.

Table 1 below represents different techniques that can be used to perform business analysis in the case of implementing CRM.

Table 1: Business analysis techniques applicable in CRM implementation case study

Technique	Description	Goal	Benefit (case study)
Stakeholder analysis	Several techniques can be used to identify relevant stakeholders: 1. Stakeholder lists. 2. Stakeholder maps (stakeholder matrix, onion diagram or RACI matrix). 3. Personas: archetype that exemplifies the way a certain kind of users interact with the system.	To identify the stakeholders that can be influenced by the changes in the system, are decision-makers or need to be informed.	RACI matrix is used to ensure that all the requirements are captured and to develop the communication plan to mitigate the risk of fragmented knowledge about the usage of the system.
Root cause analysis	Fishbone diagram (pic. 1) is most widely used along with the five Whys technique (repeatedly asking Why question).	Enables to identify the deep cause of the issue in order to correct the problem itself rather than its effects.	The analysis revealed multiple root causes, ex.: lack of accountability of the vendor, lack of motivation of the IT staff caused by historically ungratifying relationship with marketing.
Document analysis	Consists in going through the documentation about the current solution making relevant notes.	Better understand the current implementation and processes around it, concentrating on discovering inefficiencies.	Analysis of user guides revealed that they were written by users not fully familiar with the solution and contain omissions or long-winded workarounds.
Process modelling	Visual representation of the workflow in a graphical model, usually performed using a diagramming application like MS Visio.	Define the current and future workflow, actors, alternative paths and exceptions.	Visually presenting the process flow enables to simplify the task of streamlining the activities as well as providing documentation for the future reference.
Gap analysis	Analyses the difference between business requirements and current capabilities and consists in the description of current state, future state, gap between them and possible solutions.	To deduct a course of action to bring the current state closer to the desired one.	Analysis showed the necessity to set up additional functionalities in the CRM to be able to perform the full range or required tasks.
Business case	A document consisting of the following elements: 1. Needs assessment: identifies the problem or potential opportunity. 2. Desired outcomes: describes the future state if the need is fulfilled, should be measurable. 3. Alternatives: assessment of each alternative solution (technology or process) in	To provide justification and course of action for the implementation of additional software or process change.	The implemented of a third-party software enabled more streamlined and timelier upload of data in the system.

Technique	Description	Goal	Benefit (case study)
	terms of its scope, feasibility, assumptions and risks as well as implementation cost. 4. Recommended solution: describes the best solution, its cost and duration to implement it.		

Source: based on BABOK guide.

Conclusion

The conducted business analysis in the described above case study enabled to determine the course of actions to improve the efficiency of the CRM usage. Document analysis combined with root cause analyses helped identify the following issues: lack of understanding of the system by the direct users (marketing team) due to a number of reasons: incomplete set up from on vendor's side, lack of training and lack of coordination and support from the IT team. Process modelling via a flowchart helped to change parts of the existing workflow to streamline and simplify it. The proposed solutions during gap analysis were the following: business analyst to step in as a facilitator of the relationship between IT and marketing team, an external consultant to be invited to finalize necessary set up and conduct training for the team. The analysis also revealed the technical challenge around data flow between CRM and other systems that is to be resolved by introducing the third-party tool aimed to partly automate data uploads. Business case is created to obtain the sign-off of the budget for the implementation. The use of business analysis tool as well as the involvement of the business analyst helped to automate a list of marketing-related tasks ensuring time-saving benefit, increased efficiency of marketing campaigns as well as improved morale and relationship between IT and the business.

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Big Data Analytics in Saudi Arabian Higher Education: Technological and Human Perspectives

Research in Progress

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Abstract

This study investigates the effects of Technological and Human Factors for Big Data Analytics (THFFBDA) on Technological Improvements of (BDA) towards improving decision making by top management in Saudi Higher Education. In this study, Technological factors revolve around Big Data Analytical Tasks (BDATs), where Human factors focus on Big Data Analytics Performers (BDAPs). This paper seeks to enhance our understanding of how these factors impact on the implementation of big data analytics to improve the decisions by exclusives in Higher Education Context. The study draws on the Socio- Technological Theory to define and investigate social technical components for BDA, and the Delone & McLean IS Success Model to highlight the technological improvements of BDA. The study hypothetically presents a model on the potential effects of THFFBDA on decision making among universities' top management, and proposes a mixed methods approach to study the above phenomenon.

Keywords: Technological, Human Factors, Big Data Analytics, Saudi Arabian Universities

Introduction

Developing countries realize the benefits of new technologies for gaining business Values. Saudi Arabia is one of these developing countries that investing in new technologies such as Internet of Things, Artificial Intelligence, and Big Data Analytics to meet the country vision 2030, Communication and Information Technology Commission (CITC, 2016).Big data analytics is one of emerging technologies in Saudi Arabia especially in educational firms, which could enhance value realization for organizations (Günther et al. 2017).Earlier studies have shown how big data analytics can convert and create business values in public and private sectors (Gupta and George, 2016).Although, big data analytics (BDA) researches prove the benefits of big data analytics in various fields, few studies focus on the importance of BDA for supporting decision making in Higher Education in Saudi Arabian Higher Education context (Mukthar and Sultan 2017).

Like other IT and IS instances, BDA is a socio-technical system, which could be shaped by social and technical forces (Günther *et al.*, 2017). To overcome the challenges associated with BDA, we could therefore consider technological and human factors in the implementation and use of BDA. The technological factors revolve around the big data analytics tasks (BDATs) such as storing, analyzing, and visualizing which are inevitably essential for gaining the value of big data analytics and improving decision making in Higher Education Context (Al Ghamdi and Thomson, 2018). To achieve BDA tasks mentioned above, we need to consider the human component, conceptualized in this study as big data analytics performers (BDAPs). BDAPs in the proposed research model include IT academic and non-academics staff who are responsible for the security and privacy of BD for improving decision making in institutions context.

Given the issues discussed above, this research paper presents a model on the effects of Technological and Human Factors in Big Data Analytics (THFFBDA) for improving executive decision making basing on perspectives from the Saudi Higher Education Institutions . The following section discuss the theoretical perspectives on technological and human factors in IT supported environments and the improvement and success of such developments.

Theoretical Background

While there are rapidly expanding literature on big data analytics for improving business performance, there is limited researches empirically grounded on Information System theories that merge social and technological factors(Gupta and George, 2016).Thus, this research paper draws from two important theories. First is Socio-technical theory. Second is Delone & Maclean Information System success model. Besides, we might begin with the socio-technical theory which we named it in this study as big data analytics tasks (BDATs).

Socio-technical Theory

This research paper mainly built on socio-technical theory. This theory is closely connected and supportive of the arguments of this study. Socio-technical theory has been founded by Cherns (1976) and his theory pointed on how the implementation of a new information system can be merged with human factors such as tasks, rules, and culture to achieve organization objectives (Wyatt, 1981). Therefore, in this study, we select components from socio- technical theory that merged technological and human factors which we conceptualized it as big data analytics tasks (BDATs).

Recently, big data analytics has attracted academics and researcher to establish further investigation on the benefits of applying socio-technical theory in big data analytics. One of those studies is reinforced on a suggestive case study, the researcher investigates the actualization of four BDA affordances at an automotive manufacturing company to explain how organizational actions conduce to actualizing BDA affordances. The study concludes that socio-technical perspective, which frames actualization as the process of a recursively shaped on social and technical entities (Dremel *et al.*, 2018).

Delone & Mclean IS Success Model

Delone and Mclean IS success model is the second theory for this research paper. This model was first developed in 1992 as a multidimensional model with interdependencies between the different success categories (Grover *et al.*, 1992). In this research paper, we select those factors which consists of system quality that includes big data security& privacy, as mediating components. We then, shaped these factors as big data analytics technological improvements (BDATI). Thus, these components can assist successful implementation of big data analytics in Higher Education system in Saudi Arabia. Additionally, One of Previous studies that used Delone and Mclean in BDA discussed how is the quality dynamic in big data environment linked with enhancing business value and firm performance (FPER). The study indicates that system quality and information quality are important factors for improving performance aspects (Ji-

fan Ren *et al.*, 2017). Hence, this study aims to investigate on big data technological and human factors for big data analytics in education firmss. Eventually, THFFBDA conceptualized framework of the current study will be discussed in the next section followed by research model and research propositions.

Research Conceptual Model on THFFBDA

Based on reviewed literature, this model is developed based on socio- technical and Delone and Mclean IS success model. The proposed model for this study contains four categories. Big data analytic tasks (BDATs), big data analytics performers (BDAPs), big data analytics technological improvements (BDATI) for successful implementation of big data analytics in Saudi higher education (mediator), and the outcomes of applying these factors, which is improving decision making by top management in Saudi Arabian universities.

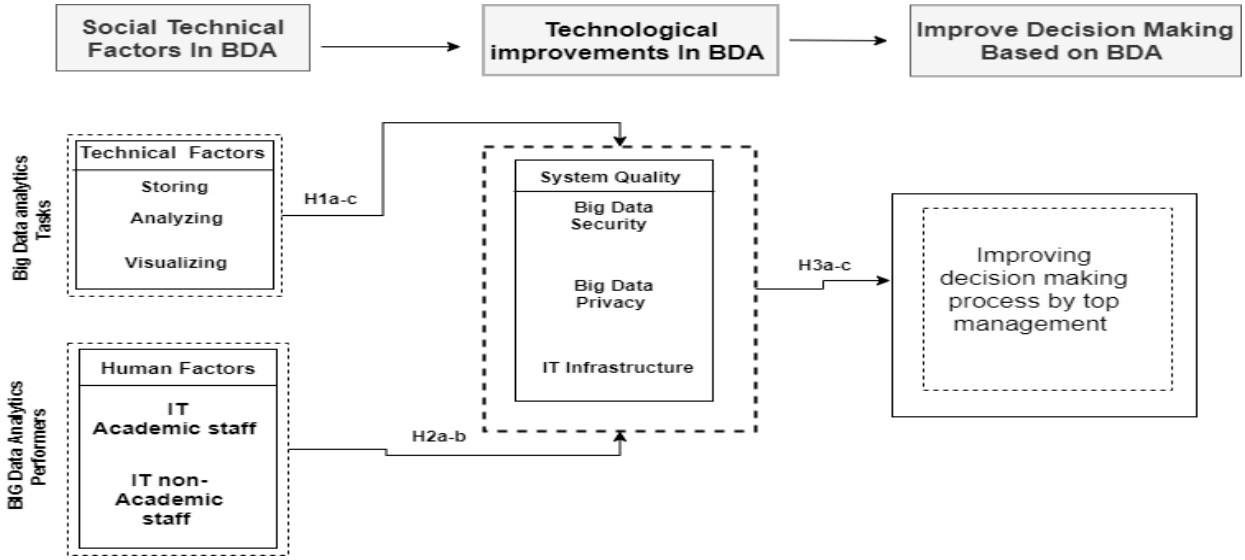

Figure 1: Proposed Research Model

Propositions for Emerging Research

The propositions presented in this paper aimed at technological and human factors along with technological improvements for BDA to improve decision making by top management in Saudi Higher Education.

Technological Factors (Big Data Analytics Tasks - BDATs)

Storing Big Data

Big data is characterized by high volume, high velocity, and high variety which posits serious implications on the firm's ability to create sufficient storage that can support quick access to different forms of data (Watson, 2014). Ability to store big data from various sources could support decision making by top managements teams (Alghamdi, 2016). The increasing need to manage a huge volume of data has seen multiple advances in big data systems to fulfil organisational need for scalability and availability which lead to improve the decisions by top management (Siddiqa *et al.*, 2016).

Analysing Big Data

Storing big data and analyses it often go hand in hand. Firms not only store big data, but they are increasingly doubling their big data management tools to support data integration and analysis for better information outcomes (Magdanz, 2014). For instance, universities in Saudi Arabia are considering the possibilities for analyzing stored data for supporting decision making.

Visualizing Big Data

Data visualization is the next big step in big data analytics tasks as firms increasingly adopt different business intelligence and data visualization tools to enhance the management and use of big data. Visualization "has proven effective for not only presenting essential information in vast amounts of data but also driving complex analyses"(Keim et al. 2013, p. 20). Unlike BD storage and analysis, BD visualization is the ultimate step towards enhanced decision making. **Proposition 1a-c**: BDATs (i.e., storage, analysis and visualisation) will be positively related to system quality.

Human Factors (Big Data Analytics Performers – BDAPs)

Academic and non-Academic Information Technology Staff

Other studies argue that the security of information system affected by IT staff (Betz, 2016). Besides, BD systems like other IT systems are prone to the effects of the IT staff that use and maintain these systems (Russom, 2011). In this research academic and non-academic staff is crucial human factor for securing big data within universities in Saudi Arabia as well as ensuring the privacy of BD is taking place. The security and the privacy of BD performed by the system quality. **Proposition 2a-b:** BDAPs will have a positive effect on system quality.

Technological Improvements in Big Data and Improved Decision Making

System Quality

System quality in our research paper is the main theme for BDATI. Besides, system quality is measures as system reliability, accessibility, adaptability, integration, response time and privacy(Ji-fan Ren *et al.*, 2017).However, in this study, system quality measured by allowing big data tasks such as storing, analyzing, and visualizing as well as BD security and privacy, which will ultimately improve decision making.(Siddiqa et al. 2016; Cavallo et al. 2019)

Security of BD

Information security is crucial factor not only in IS failed, but also important for securing BD (Jung, 2017). Data integrity improved decision making, leads to effective decisions and ultimately supports organization planning and control process (Cavallo et al. 2019). Similarly, data available creates efficiency in the organization's decision making process.

Privacy of BD

The role of BD privacy cannot be underestimated. Recently, various researches have discussed the value of BD privacy which allow organizations to gain business values and competitive advantages(Oussous *et al.*, 2018). Therefore, **Proposition 3a-b:** system quality (i.e., System security, privacy) will have a positive impact on improving decision making by top management.

Improving Decision Making by Top Management

The outcomes of the current proposed model is Improving the decision making by top management. Now a days the quality of decision made by top management allow them to improve firm performance. Therefore, the decision made by analyzed data allow Saudi universities to gain business vales (Elgendy and Elragal, 2016).

Research Methods

For the current study, both quantitative and qualitative methods of research will be used to examine the hypotheses and prove the underlying central theme of the proposed research model. First method is quantitative method where data would be collected from IT staff in Saudi Universities which include academic and non-academic through closed-ended surveys (Creswell et al. 2003).Second method for data collection is qualitative method with the purpose to validate/endorse quantitative results. Additionally, qualitative method would be gathered through semi-structured interviews with the top managements and IT managers in Saudi Arabian universities.

Conclusion

This research paper investigates on the effect of technological and human factors that enables the creation, facilitate the process of big data analytics for improving decision making executives in Saudi Arabian Higher Education through big data analytics tasks BDATs and human factors. A conceptual framework is created via extensive research literature that allows the creation of technological and human components that support the implementation of BDA. To conclude, technological and human factors through technological improvements are crucial aspects for improving decision making in Saudi Universities, to achieve it successfully within the organization, human factors which we named it big data analytics performers must include skill full IT staff to gain the business values of these mentioned factors.

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ICT Potential of Enterprises Within Industry 4.0 Requirements in New EU Member States

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Abstract

The article concentrates of the problem of ICT usage by enterprises within the context of Industry 4.0 challenges. The main objective of the paper is to analyse heterogeneity in ICT utilisation by enterprises in the Central and Eastern European countries that joined the EU after the year 2004. The research is done for the years 2010-2018 and it is based on the Eurostat data. The presented scientific problem is considered as a multi-criteria phenomenon. Thus, in the analysis a taxonomic approach was applied based on zero unitarization method. The method enabled to obtain a synthetic measure of development for the analysed phenomenon in the case of group of the countries under consideration. Based on the obtained measure a ranking of the countries was proposed. In the next step the natural breaks method was applied to group the countries into three homogenous subsets. On the one hand, the research confirmed relatively high dynamics of the phenomenon, especially in the group of the less developed economies. On the other hand, it also showed significant disparities between the countries, which are still present. The research can be applied for forming the guidelines and assessing the effectiveness of the national and the EU structural policies, which should aim at supporting utilisation of the Industry 4.0 potential and the conditions for fulfilling this objective.

Keywords: Industry 4.0, ICT usage, multi-criteria analysis, zero unitarization method, natural breaks method, Central and Eastern European countries, New UE members

Introduction

The emergence of Industry 4.0 concept and standards has significantly influenced the modernisation strategies of Central and Eastern European economies (Simionescu et al., 2017; Kuc, 2017; Jasinska & Jasinski, 2019). It has been not only considered as strictly technological phenomenon (Balcerzak, 2016a; Romeo et al., 2020; Asim et al., 2020), but it has resulted in the growing importance of higher quality management of human capital both at micro and macro level (Hariharasudan & Kot, 2018; Mačerinskienė & Survilaitė, 2019; Markhaichuk & Zhuckovskaya, 2019; Stankevičienė et al., 2019). It has created new challenges for entrepreneurs and policies requirements for supporting entrepreneurship (Pietrzak et al, 2017; Rogalska, 2018; Virglerová, 2018; Bartosik-Purgat & Ratajczak-Mrozek, 2018). It has also created new managerial and organizational standards at corporate level (Pisar & Bilkova, 2019). These issues are of special importance for Central and Eastern European Union countries that still face the problem of closing their development gap and increasing international competitiveness of the economy, as the ability to use the potential attributed to Industry 4.0 can give a new impetus in the process of modernization (Braja & Gemzik-Salwach, 2019; Bilan et al., 2019). On the other hand, in the case of ineffective public policy, the challenges already pointed, can also lead to "Industry 4.0 underdevelopment trap" (Ślusarczyk, 2018; Nimeczyk et al., 2019; Prause & Atari, 2017).

Within this context it is needed to provide current common understanding of the main issues relating to the concept of Industry 4.0. Since the emergence of the idea at the 2011 Hanover Fair in Germany, the term Industry 4.0 has been related to the comprehensive digitisation of industrial production that transforms all aspects of production processes based on new technological achievements, including digitalisation and robotisation, artificial intelligence and the Internet of things (IoT), new materials and biotechnology (Krykavskyy et al., 2019; Vasin et al ., 2018; Buhr & Stehnken, 2018).

Taking into consideration the above given arguments it is obvious that a basic condition to be able to utilise the potential of Industry 4.0 phenomenon and to avoid its threats is to build effective ICT infrastructure (Lechman, 2018). It is currently unquestionable that the infrastructure is the first condition for effective utilistaion of cyber-physical systems, the internet of things, cloud computing or finally cognitive computing and artificial intelligence.

As a result, the main objective of the article is to analyse heterogeneity in ICT potential of enterprises in the Central and Eastern European countries that joined the EU after the year 2004. The research was done at the aggregated national level. Based on the availability of crucial Eurostat data the research was done for the years 2010-2018. In the research zero unitarization method was used for proposing the ranking and obtaining the data for grouping the countries with application of natural breaks method.

Methodology

In order to reach the objective of the research zero unitarization method was used, due to fact that the problem under research was considered as a multi-criteria phenomenon (see Kiseľáková et al., 2019; Piersiala, 2019; Liu et al., 2019; Balcerzak, 2020). The current research should be considered as a preliminary study, therefore, the applied method was mostly chosen due to its simplicity, its high recognition among researchers within social sciences, and common empirical applications in economics and management sciences (Kukuła & Bogocz, 2014). In the case of economics the application of the method can be found for multi-criteria studies on fiscal activities of the countries (Balcerzak, 2016), innovation activities of enterprises at the national level (Zygmunt, 2017), analyzing the entrepreneurial potential (Rogalska, 2017, 2019) and quality of information infrastructure within the context of knowledge-based economy at regional level (Wierzbicka, 2018), or research on obtaining the aims of Europe 2020 plan (Balcerzak, 2015).

In the case of current study the zero unitarzation method was applied for a dynamic research. As a result a constant reference point for the whole analytical period was applied here (Kukuła & Bogocz 2014; Wierzbicka, 2017). In the case of multi-criteria analysis the set of potential diagnostic variables should be analyzed with respect to the taxonomic information effectiveness criteria. The variables should be characterized with low correlation, high space variation and information significance (see Cheba, 2017; Szopik-Depczyńska et al., 2018, 2019). Then, a set of diagnostic variables should be shared classified into two groups: stimulants and dis-stimulants. The stimulants are considered as variables that improve the situation of analyzed object. The dis-stimulants describe the aspects that hamper the position of the object (Hellwig, 1972). In the case of current research only stimulants were selected for the research. Therefore, based on the assumption of keeping constant reference point the stimulants are normalized with application of equation 1.

$$z_{ijt} = \frac{x_{ijt} - \min\limits_{it}\{x_{ijt}\}}{\max\limits_{it}\{x_{ijt}\} - \min\limits_{it}\{x_{ijt}\}} \; (i = 1, 2 \ldots n); \; (j = 1, 2 \ldots m); \; (t = 1, 2 \ldots l), \; N(x_{ijt}) \in [0, 1] \quad (1)$$

where: x_{ijt} is a diagnostic variable for a given country in a given year.

After normalization procedure the synthetic measure (SMD_{it}) describing analyzed phenomenon can be obtained with application of equation 2.

$$SMD_{it} = \frac{1}{m}\sum_{j=1}^{m} z_{ijt} \quad (2)$$

$$(i = 1, 2 \ldots n); \; (j = 1, 2 \ldots m); \; (t = 1, 2 \ldots l); \; SMD_i \in [0, 1]; z_{ij} \in [0, 1]$$

where: SMD_{it} is a synthetic measure of development for the analyzed phenomenon in a given year.

In the next step, the obtained data on *SMD* was used for grouping the countries into three homogenous subsets. For this purpose natural break method was used. The method is based on the procedure of minimization of variance for objects from the chosen subsets and maximization of variance between the subsets (Jenks, 1967; Balcerzak & Pietrzak, 2016).

Results

In the current research the new member states of the EU were analysed in the years 2010, 2014 and 2018. In the preliminary stage of the research the analysis for the whole EU countries was done with application of Ward method, which indicated that the Central and Eastern European countries are similar enough to concentrated on. Additionally, the analysed group of countries is characterized with relatively similar level of socio-economic development, which makes them comparable. The research was done based on Eurostat data. The set of diagnostic variables was chosen based on the literature review (see Balcerzak & Pietrzak, 2017; Wierzbicka, 2018; Ozcan, 2018; Batkovskiy et al. 2019; Pogodina et al., 2019) and mostly restricted by data availability for the whole panel of countries. Due to this reason such data as cloud computing services or applications of social media with use enterprise's blog or microblogs or the data on the development of e-administration could not be included in the research. Due to special importance of small and medium sized enterprises for development of the analysed countries (Kljucnikov et al. 2016, 2018; 2019; Meyer & Meyer, 2017; Patora-Wysocka, 2018; Haviernikova et al., 2019; De la Hoz-Rosales et al., 2019; Succurro & Costanzo, 2019), when it was only possible (based on data availability) the diagnostic variables devoted to small and medium sized enterprises were added. It should be also stressed that it was assumed that the research concentrates on the real economy, as a result the data on enterprises without financial sector was applied here. The set of diagnostic variables applied in the research is given in table 1.

Table 1: Diagnostic Variables

ICT Usage in enterprises	
X_1	E-commerce purchases - enterprises having purchased via computer mediated networks (Percentage of enterprises)
X_2	E-commerce purchases - small enterprises (10-49 persons employed) having purchased via computer mediated networks (Percentage of enterprises)
X_3	E-commerce sales - Enterprises having received orders via computer mediated networks (Percentage of enterprises)
X_4	E-commerce sales - small enterprises (10-49 persons employed) having received orders via computer mediated networks (Percentage of enterprises)
X_5	Value of e-commerce sales - Enterprises' total turnover from e-commerce (Percentage of turnover)
X_6	Value of e-commerce sales - small enterprises (10-49 persons employed) total turnover from e-commerce (Percentage of turnover)
Employment based on ICT	
X_7	Use of computers and the internet by employees - Persons employed using computers with access to World Wide Web (Percentage of total employment)
Connections to the internet within Industry 4.0 standards	
X_8	Enterprises with broadband access (Percentage of enterprises)*
X_9	Small enterprises (10-49 persons employed) with broadband (Percentage of enterprises) *
Websites and functionalities	
X_{10}	Enterprises with a website (Percentage of enterprises)
Integration of internal processes	
X_{11}	Enterprises who have ERP software package to share information between different functional areas (Percentage of enterprises)

*Note: * Data for the year 2017 was used due to availability of data for 2018; ** Data for the year 2019 was used due to availability of data for 2018.*
Source: own work.

The obtained rankings of the analyzed countries for the years 2010, 2014, 2018 and the dynamics of the synthetic measure of development for the years 2010-2018 is given in table 2.

Table 2: Synthetic Measure of Development (SMD) based on zero unitarisation method for EU-13

Country	SMD_{i2010}	No.	SMD_{i2014}	No.	SMD_{i2018}	No.	Dynamics in the years 2010-2018 in %
Czechia	0.6079	1	0.8881	1	0.8965	1	47.47
Lithuania	0.5510	3	0.6065	4	0.7804	2	41.62
Slovenia	0.4711	5	0.6292	3	0.7542	3	60.09
Estonia	0.4439	6	0.5684	6	0.6618	4	49.08
Malta	0.4910	4	0.5899	5	0.6554	5	33.50
Croatia	0.5540	2	0.7025	2	0.6454	6	16.51
Slovakia	0.3305	8	0.5442	7	0.6117	7	85.11
Hungary	0.3358	7	0.4697	9	0.5604	8	66.88
Poland	0.2583	10	0.4335	10	0.5512	9	113.39
Latvia	0.2079	11	0.3906	11	0.5484	10	163.78
Cyprus	0.2819	9	0.5419	8	0.5372	11	90.57
Romania	0.0906	12	0.2802	12	0.3182	12	251.26
Bulgaria	0.0536	13	0.2466	13	0.3107	13	479.28

Source: own estimation based on Eurostat data: https://ec.europa.eu/eurostat/data/database.

Finally, the natural breaks method was used for grouping the countries into three homogenous subsets based on SMD values in the years 2010, 2014 and 108. The results are given in figures from 1 to 3.

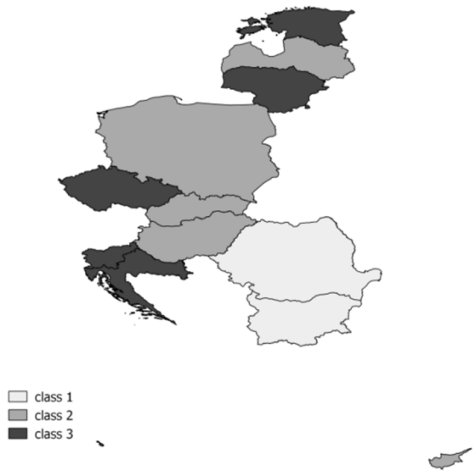

Fig. 1: Grouping of the countries based on natural breaks method in the year 2010

Fig. 2: Grouping of the countries based on natural breaks method in the year 2014

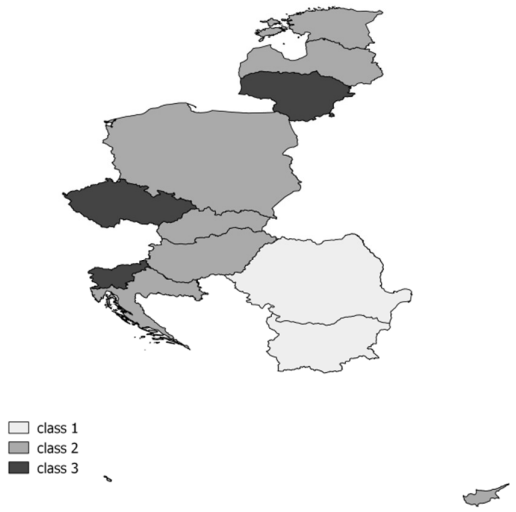

Fig. 3: Grouping of the countries based on natural breaks method in the year 2018

The conducted analysis confirms relatively high stability of the obtained results, where the Czech Republic, Slovenia and Baltic countries with exception of Latvia can be considered as the leaders. The mentioned countries were generally grouped in class 3, which is characterised with the highest level of ICT utilisation by enterprises. On the opposite side, in the class 1, groping the countries with the lowest level of SMD, in the first and last year of the research we have Bulgaria and Romania, additionally in the year 2010 Poland and Lithuania could be found here.

Poland as the biggest economy of the region was rated at the 10th position in the years 2010 and 2014 and moved to 9th position in the year 2018. This result can be considered as negative not only from the perspective of Polish society, but also from the perspective of the competitive position of the whole Central Europe as one region.

The dynamics of the SMD measure starting with the Czechia with 47% growth and finishing with Bulgaria with the growth of almost 480% confirms quick modernisation process of the analysed economies. Especially, the results obtained by Bulgaria and Romania as the least developed countries can be considered as very positive. But still the distance between these two relatively big economies

and the leaders is very high, which confirms relatively high heterogeneity between the counties and it shows the scale of challenges in building basic infrastructure for utilising the Industry 4.0 potential in the region.

Conclusions

The aim of the article was to assess the heterogeneity in ICT usage by enterprises in the Central and Eastern new EU member states in the years 2010-2018. In the research zero unitarization method with dynamic approach and natural breaks methods were used for obtaining the rankings of the countries and grouping them. From the empirical perspective the conducted research provides the following new information to the literature in the field: First of all, the study has confirmed relatively high dynamics of the phenomenon. What is especially important the speed of positive changes for two least advanced economies Romania and Bulgaria were especially high. However, the research also confirms that in spite of this dynamic changes the high heterogeneity between the countries is still present, which can affect negativity to potential for closing the development gap.

This research should be applied for monitoring the countries or regions, therefore for forming the guidelines and assessing the effectiveness of their national and regional modernisation policies, and finding good benchmark examples. The suggested methodology of the multi-criteria analysis can be easily modified, it is replicable and can be adjusted to the specific detailed analytical aspects of the phenomenon or to more regional research under condition of data availability, which is crucial for obtaining the current information on that complex issue.

The author is aware, that the presented research can be considered as preliminary and is not free form important limitations, which should be stressed here. First of all, the main limitation of the current research can be attributed to general critics addressed to all kind of multi-criteria studies in social sciences, which are usually affected by the normative approach of the researchers and therefore possibilities of affecting composite indicators. This issue was very well analyzed by Kuc (2019) and Kuc-Czarnecka et al. (2020). Then the objective problem of data availability significantly affects the information quality of the research.

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A Structural Equation Modeling Approach to Study Social Exclusion in Poland

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Abstract

The phenomenon of social exclusion brings many negative consequences not only from the microeconomic perspective affecting individuals, but also it is of crucial importance from the macroeconomic perspective of social stability and policies affecting long term growth. Within this context the current research aims to provide deeper inside into relationships between social exclusion, life satisfaction, trust in institutions and households income in Poland. As investigated phenomena are mostly unobservable and multidimensional ones, which are significantly affected also by psychological factors, we decided to apply the Structural Equation Methodology (SEM). The analysis was run based on the data for Poland taken from the Fourth European Quality of Life Surveys (EQLS 2016). The research confirmed some negative factors such as an increase in social tensions, and negative attitude of Polish society towards an increase in income disparities and participation in benefits form economic growth. The obtained empirical outcome can be used in the process of building national and regional strategies supporting sustainable long term growth not only for Poland, but they can be used as benchmark results for other Central and Eastern European Economies.

Keywords: social exclusion, Poland, European Quality of Life Surveys (EQLS), Structural Equation Modeling (SEM) .

Introduction

The article concentrates on the issue of social exclusion in Poland. At the beginning of the 1990s, Poland began its political transformation. The institutional reforms carried out and Poland's accession to the structures of the European Union has resulted in systematic socio-economic development (see Simionescu et al., 2017), which to some extent supported the process of reducing the level of social exclusion. In the last three decades, in the case of Poland and other Central and Eastern European countries undergoing rapid economic modernization, among the macroeconomic factors influencing positively the level of social exclusion one can find institutional changes in economies resulting in improvements in quality of institutors, development of the digital economy with its benefits and threats for social exclusion (see Pietrzak & Ziemkiewicz, 2018a, 2018b; Balcerzak & Pietrzak, 2017), an increase in the level of innovation (see Szopik-Depczyńska et al., 2018a; 2018b), and improvement in the labor market (Hadaś et al., 2016; Dmytrów & Bieszk-Stolorz, 2019; Bieszk-Stolorz & Dmytrów, 2019; Tatarczak & Boichuk, 2018; Landmesser, 2019). It should be emphasized that strong economic convergence processes has been observed in Poland and Central Europe since 2004, which is a consequence of the country's membership in the EU structures and the abilities of Polish economy, and the whole Central European region to benefit from the processes related to globalization (see Kuc, 2017; Hadaś-Dyduch, 2016; 2018; Jankiewicz, 2018a; 2018b; 2018c; Hadaś-Dyduch et al., 2019). Despite these positive processes, the phenomenon of social exclusion both in Poland and other Central and Eastern European countries is still a threat to the persistence of long-term sustainable growth.

Therefore the main objective of current article is to provide deeper inside into relationships between social exclusion, life satisfaction, trust in institutions and households income in Poland. To reach that objective SEM model is used. It seems that the structural equation modeling (SEM) method can be a good alternative in research on social exclusion (Hajdu, 2003; Sam & Bayram, 2017; Temporin, 2019).

Literature Review

In the current research the empirical contribution concentrates on Poland as a country that can be considered as an example of relatively successful transformation from central planned to market economy. It should be emphasized, however, that the phenomenon of social exclusion itself is not a problem concerning only post-transformation Central and Eastern European countries. It is also a very serious policy problem on a whole European Union basis. From the time when the Lisbon Treaty was launched, social exclusion, or rather counteracting its occurrence, has been a critical element of the EU's sustainable growth policy. The European Pillar of Social Rights proclaimed in 2017, together with Europe 2020 strategy and EU Youth Strategy are a policy response to this problem (Balcerzak, 2015).

Form the theoretical perspective the phenomenon of social exclusion is the subject of special interests for social science researchers specialising in political sciences, sociology, psychology and economics (Atkinson & Davoudi, 2000). Notwithstanding, researchers agree that social exclusion is a multidimensional phenomenon that can be observed both in an economic and socio-cultural context (Charavarty & D'Ambrosio, 2006; Jehoel-Gijsbers & Vrooman, 2007; Levitas et al., 2007; Mathieson et al., 2008; Sam & Bayram, 2017). The most popular approach in the analysis of social exclusion is to understand it as an exclusion mainly from consumption goods and services (Jankiewicz & Pietrzak, 2019; Pietrzak & Jankiewicz, 2019), and from the labour market or social relations. The last element is strongly connected with the households or individuals income, allowing to determine how deep the poverty of the analysed entity is (Böhnke, 2001; Moffatt & Glasgow, 2009 Jankiewicz, 2018b; Novo-Corti et al., 2019). It would seem, therefore, that this is an individual problem, while in fact, social exclusion affects both the quality of life of individuals and the equity and cohesion of society as a whole (Lee, 1999; Nowak, 2018; Miłek, 2018; Bernard et al., 2019; Cyrek, 2019; MacLeod et al., 2019; Pourahmad et al., 2016; Power, 2001).

Due to its character, social exclusion is typically analysed as a set of separate indicators or as a composite indicator (Pietrzak, 2019; Giambona & Vassallo, 2014; Mathieson et al., 2008). However, the growing criticism of composite indicators (Kuc-Czarnecka et al., 2020; Kuc-Czarnecka, 2019; Muller, 2018; OECD & JRC, 2008; Romer, 2015) encourages the application of other research approaches. These factors were the main determinant of the choice of the methodological approach applied in empirical part of the article, which is presented in the next section.

Research Methodology

Due to the complex and multidimensional nature of social exclusion, we decided to use the SEM approach as an analytical tool (Derevianko, 2019; Pietrzak. & Balcerzak, 2016). In short, the SEM model is the effect of a merger between confirmatory factor analysis and the causal models built on its base. The variables are not measurable in a direct way as they represent a set of observed variables strongly correlated with each other. They are hypothetic conceptual structures and are treated as potential determinants that influence the category that is under consideration. In general, the SEM model consists of two parts (Balcerzak & Pietrzak, 2016a; Pietrzak et al., 2018):

1. internal model – describing the casual dependencies,
2. external model – which is used to measure endogenous and exogenous latent variables.

An internal model can be described as:

$$\overline{\eta} = B\overline{\eta} + \Gamma\overline{\xi} + \overline{\zeta}, \quad (1)$$

where: $\overline{\eta}$ - vector of endogenous latent variables,
$\overline{\xi}$ - vector of exogenous latent variables,
B - matrix of regression coefficients at endogenous variables,
Γ - matrix of coefficients at exogenous variables,
$\overline{\zeta}$ - vector of disturbances.

While the external one:

$$\overline{Y} = \Pi_y \overline{\eta} + \overline{\varepsilon}, \quad (2)$$

$$\overline{X} = \Pi_x \overline{\xi} + \overline{\delta}, \quad (3)$$

where: $\overline{Y}$ - the vector of observed endogenous variables,
$\overline{X}$ - the vector of observed exogenous variables,
Π_y, Π_x - matrices of factor loadings,
$\overline{\varepsilon}$, $\overline{\delta}$ - vectors of measurement errors.

Usually, the models are fitted by maximum likelihood, and likelihood ratio tests can be used to compare the fit of nested models. Among the measures of goodness-of-fit of the SEM model the most crucial are: IFI, TFI, RFI, NFI, CFI and RMSEA. The detailed description of assumptions and procedures of SEM modelling can be found in the world literature (Bollen, 1989; Byrne, 2010; Goldberger, 1972; Kaplan, 2000; Kline, 2010).

In our paper, we used Eurofound's European Quality of Life Survey (EQLS) data from 2016 wave. The EQLS database provides a means to monitor and assess outcomes of social progress, also about social exclusion. The EQLS provides responses to 104 questions from which we have selected only those issues related to social exclusion. The data set selected by us contains the following latent variables:

- Y_1 – the quality of public services – including seven sub-factors, such as quality of health services, education system, public transport, child care services and state pension system.
- Y_2 – perceived social exclusion – including four sub-factors assessing persons's feelings about given statements: 'I feel left out society', 'Life has become so complicated today that I almost can't find my way', 'I feel that the value of what I do is not recognised by others' and 'Some people look down on me because of my job situation or income'.
- Y_3 – life satisfaction – including eight sub-factors, such as general life satisfaction, satisfaction with education, job, standard of living, family life, local area
- Y_4 – life optimism – including four sub-categories – optimism about own future, optimism about children's and grandchildren's future, sense of meaningful existence and sense of freedom.
- Y_5 – social tensions – including five sub-factors: tensions between poor and rich, management and workers, men and women, different racial groups, different religious group.
- Y_6 – trust in institutions – including seven sub-factors, for example, trust in parliament, the legal system, police, government, municipal authorities or banks.

The estimated model also includes four quantitative variables, i.e.:

- X_1 - equivalised monthly household income in PPP euros,
- X_2 - social exclusion index,
- X_3 - WHO-5 mental wellbeing index,
- X_4 - average satisfaction with public services.

The choice of these factors has support in the literature. The first latent variable describing the quality of public services can be used as a proxy of the conditions in place in a region, and as research shows, social exclusion depends on these factors (Di Cataldo & Rodríguez-Pose, 2017). Moreover, social exclusion is influenced by institutional quality (Di Cataldo & Rodríguez-Pose, 2017; Balcerzak & Pietrzak, 2016b; Balcerzak, 2020), since those are perceived as drivers of effective social development policies. Moreover, regions with effective and accountable governments, the efficient rule of law and low corruption have been more able to establish measures to control social exclusion than regions with a worse government quality (Di Cataldo & Rodríguez-Pose, 2017). Variables denoted as latent variable Y_2 capture the sense of connectedness and sense of barriers to participation in broader society (*Third European Quality of Life Survey Quality of life in Europe: Impacts of the crisis*, 2012). According to the previously mentioned research, the perceived social exclusion has a moderate negative correlation with measures of subjective well-being.

We have also decided to include factors concerning life optimism and life satisfaction in our research as social exclusion is associated with lower mood, self-esteem and sense of meaningful existence (Bayram et al., 2012; Fuhrmann et al., 2019; Robila, 2006), and committing a suicide that can be perceived as the worst form of social exclusion (Pohlan, 2019). Social exclusion decreases peoples' perceived strength of belonging to one's immediate neighbourhood (Appau et al., 2019), which directly translates into a feeling of security in the immediate environment and influences subjective wellbeing (Pena-Lopez et al., 2017). Figure 1 shows the structural equation model estimated based on the variables presented above.

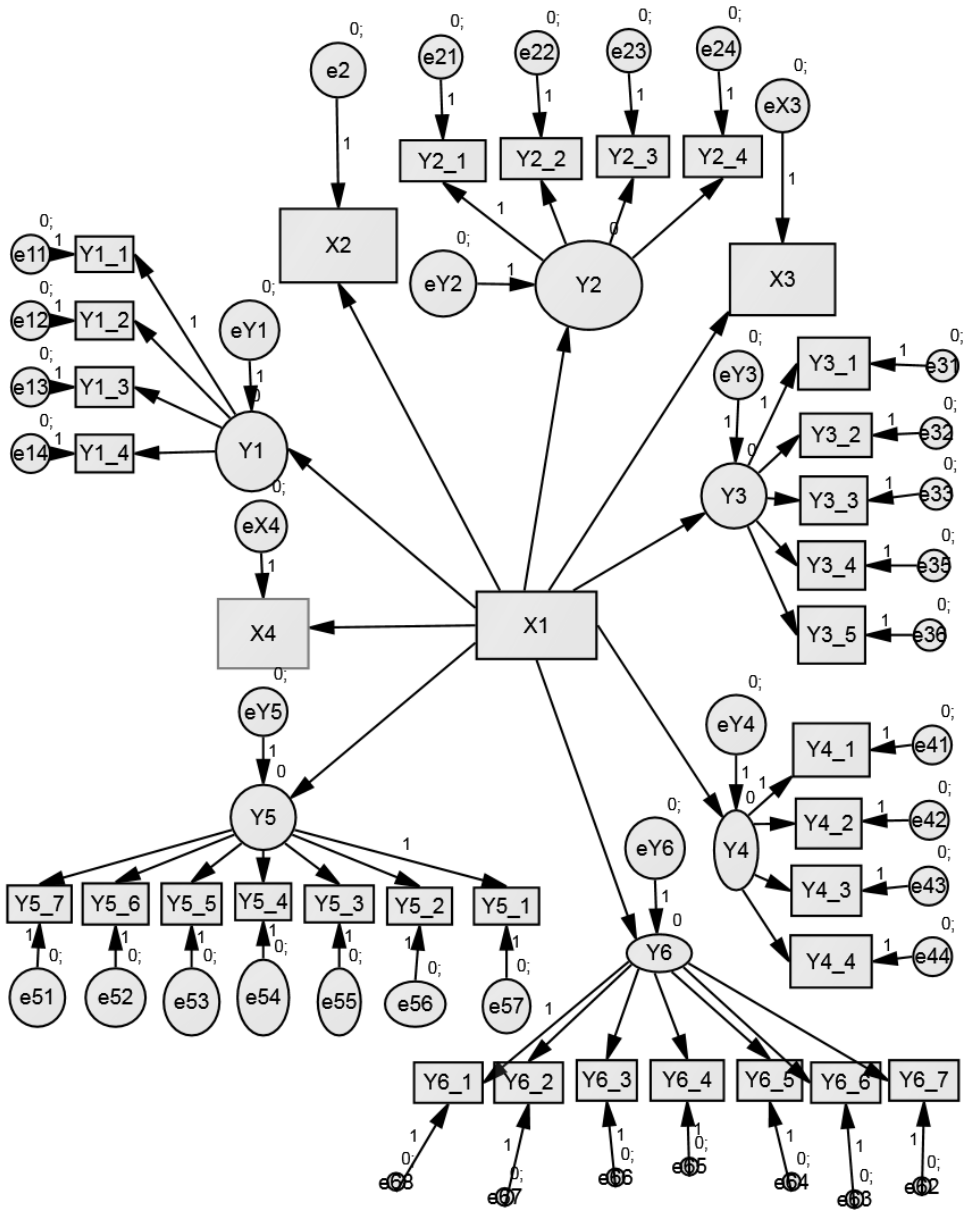

Fig. 1: SEM model for social exclusion.

Source: Authors' study.

In our research, we focus on estimating hypothetical structural path coefficients on the one hand and testing their significance on the other.

Empirical Analysis

Based on the data and model presented in section 2 of this article, the following parameter estimates were obtained (Table 1).

Table 1: Parameter estimation results – the structural part of the model

Dependence	Standardised estimate	p-value
Y2 ← X1	0,036	0,311
Y1 ← X1	0,024	0,511
Y5 ← X1	0,079	0,020
Y6 ← X1	0,077	0,021
Y3 ← X1	0,186	~0,00
Y4 ← X1	-0,072	0,042
X2 ← X1	-0,033	0,298
X4 ← X1	0,045	0,151
X3 ← X1	0,156	~0,00

Source: Authors' study.

The results obtained for the structural part of the model, contained in Table 1, indicate that not all dependencies are statistically significant. It turned out that based on the analysed sample, equivalised monthly household income in PPP euros (variable X_1) does not have a statistically significant impact on perceived social exclusion (Y_2), the quality of public services (Y_1), social exclusion index (X_2) and average satisfaction with public services (X_4). Statistically significant parameters estimates for variables Y_3, Y_5, Y_6 indicates that there is a weak increase in social tensions, trust in institutions and life satisfaction caused by the increase of the equivalised monthly household income in PPP euros. On the other hand, the negative impact of household income growth on life optimism of the respondents is surprising. However, it seems that it should be combined with an increase in income disparities in society. For the reason that, in general, society does not participate evenly in economic growth. Table 2 contains the results of the confirmatory factor analysis. The first column contains dependencies between the observed variable and latent variables.

Table 2: Results of the confirmatory factor analysis

Latent variable	Standardised estimate	P-value	Latent variable	Standardised estimate	P-value
Y1			**Y5**		
Y1_1	0,547	---	Y5_1	0,669	---
Y1_2	0,691	~0,00	Y5_2	0,633	~0,00
Y1_3	0,648	~0,00	Y5_3	0,583	~0,00
Y1_4	0,709	~0,00	Y5_4	0,645	~0,00
Y2			Y5_5	0,74	~0,00
Y2_1	0,677	---	Y5_6	0,725	~0,00
Y2_2	0,718	~0,00	Y5_7	0,734	~0,00
Y2_3	0,661	~0,00	**Y6**		
Y2_4	0,616	~0,00	Y6_1	0,851	---
Y3			Y6_2	0,746	~0,00
Y3_1	0,843	---	Y6_3	0,628	~0,00

Y3_2	0,817	~0,00	Y6_4	0,593	~0,00
Y3_3	0,556	~0,00	Y6_5	0,847	~0,00
Y3_5	0,823	~0,00	Y6_6	0,634	~0,00
Y3_6	0,624	~0,00	Y6_7	0,467	~0,00
Y4					
Y4_1	0,784	---			
Y4_3	0,664	~0,00			
Y4_4	0,652	~0,00			

Source: Authors' study.

The results obtained for the latent variables, contained in Table 2, indicate that all loading factors are statistically significant. Almost all of the 'standardised' values contained in Table 2 are close to 0,70, confirming a proper identification of the latent variables.

The next table (Table 3) summarises goodness-of-fit measures of estimated models. The IFI value of the estimated SEM model is 0.631, which provides information about the correct fitting of the estimated to empirical data. However, RMSEA for the default model is slightly too high (desired value for a good fit is around 0,08).

Table 3: Goodness of-fit-measures

Model	NPAR	CMIN	CMIN/DF	IFI Delta2	TLI rho2	CFI	NCP
Default	110	6584,075	11,863	,631	,604	,630	6029,075
Saturated	665	,000	---	1,000	---	1,000	,000
Independence	70	16897,84	28,400	,000	,000	,000	16302,84
Model	**FMIN**	**RMSEA**	**AIC**	**BCC**	**ECVI**	**HOELTER .05**	**HOELTER .01**
Default	6,525	0,104	6804,075	6812,215	6,743	94	98
Saturated	,000	---	1330,000	1379,209	1,318	---	---
Independence	16,747	0,165	17037,842	17043,022	16,886	39	41

Source: Authors' study.

Discussion

The obtained empirical results are consistent with other previous studies in the field, which were obtained both with application of different methodological approaches and concentrated on different perspectives towards the issue. The result is consistent with the empirical research done for the year 2011 by the Central Statistical Office, which was based on the survey concentrating on the multivariate aspects of the quality of life recommended by the Stiglitz-Sen-Fitoussi Report (See: Central Statistical Office, 2013).

The presented analysis is also in line with the contribution provided by Owen et al. (2016) who indicated that social inclusion improvements are the result of a complex set of factors on the demand and supply side, which include macro-level institutional reforms and changes to local service delivery for inclusion of vulnerable groups, mobilization and capacity support, and strategies for local employment generation.

Conclusions

The issue of social exclusion is of high importance from the perspective of long term sustainable growth both for individual countries and the European Union as a whole. Therefore, it must be the subject of constant monitoring and research. In current empirical proposal, which has been done for Poland, the social exclusion is considered as a multi-criteria phenomenon that is described with latent variables. Therefore, in the research the Structural Equation Methodology was applied. The research was based on the data Fourth European Quality of Life Surveys (EQLS 2016). Form the methodological perspective the article confirms the high usefulness and applicability of Structural Equation Modeling in the process of analysis of social exclusion.

From the empirical perspective the obtained results provide new information in the field with respect to the social tensions in Polish society, which can be present during relatively good economic conditions of the research. To be specific the research confirmed some negative factors such as an increase in social tensions, and negative attitude of Polish society towards an increase in income disparities and the fact that in general, society does not participate evenly in economic growth.

The outcome of the research is not fee from limitations, which are mostly related to the latent character of the phenomenon under evaluation. Therefore, the value of the contribution is significantly affected by the choice of the diagnostic variables and availability of data. Additionally, it must be remembered that the phenomenon of social exclusion can be affected by cyclical factors that cannot be included in the current study.

The outcome of the research can be used in the process of forming national and regional strategies aimed at improving the welfare of society and supporting sustainable long term growth not only for Poland, but they can be used as benchmark results for other Central and Eastern European Economies.

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An Approach for Demand Assessment of Retailer in Residential Zone

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Abstract

The paper proposed approach for demand assessment of retailer in residential zone. Implications made for on one of the consumer's zone. Accordance with the algorithm for determining the boundaries of the area servicing the retailers, the service zone was established. On the next stage the urban trading area of service was determine, 11 retailers were found and underline, the zone was divided into 10 districts. A origin-destination matrix of distances from the zone of households to the retailer was calculated, also, in this section the factor of non-linearity and slope factor were estimated. Limitations consist of data used in experiment. Further, the probability of visiting retailers was estimated. The regression models of parameters of purchase process were established. The aim is to developed an approach for demand assessment of retailer in residential zone considering end-consumers, retailers and their surrounding.

Keywords: Consumers, end-users, zone, service, non-linearity factor, slope factor.

Introduction

The market is currently based on competition. Manufacturers of goods and services, shops, shopping centers, cities and countries compete among themselves. Thanks to this, the end-users receives a better product, at a lower price for similar products (Birkin, Clarke, Clarke, 2017).

In order to increase customer loyalty and sales growth, modern trading enterprises offer many additional services, becoming centers of socialization and leisure activities. The International Council of Shopping Centers studies have shown that in general the concept "live, work, shop, play" is interesting to more than half (56%) of the adult, and the availability of retailers, cafes and restaurants near the place of residence directly affects people's satisfaction with the quality of life (Mixed-Use Properties: A Convenient Option for Shoppers, 2019). The prospects of the proximity to retail stores were also appreciated by other service sector participants, especially travel agencies and hotels. Moreover, according to results from the University of Wisconsin and Center for Community Economic Development, in this case the benefit is mutual, since shopping is an important component of tourism activities (Sharma, Chen, Luk, 2018).

It becomes important for the enterprise to evaluate the unknown capabilities of competitors, predict their actions and analyze the degree of competitive threat. In this regard, the analysis of the competitive environment sets the following main goals and objectives: determining the type of competitive market; identification of actual and potential competitors, determination of the number, type and size of competing firms; calculation of market share occupied by competitors; characteristics of the intensity and direction of competition; identifying strengths and weaknesses, strategies and evaluating the competitiveness of their competitors' products; analysis and forecasting of competitor's behavior in the market, his reaction to various marketing actions (Halkin, et al., 2019).

Many years of practical experience using geomarketing research proves that geography plays a key role in business success. In the retail sector, for which the national science uses Anglicism «retail», choosing a place for a new business is a fundamental decision, since even a small mistake in this matter can multiply the financial risks. In the 80-90s, most retailers around the world, when choosing the location for the construction of a new outlet, relied on the methods of «intuitive choice» (Reilly, 1963; Nakanishi & Cooper 1974), «checklist» (Colomé, Lourenço, Serra, 2003) and the «method of analogies» (Huff, 1964). An intuitive choice, considered the simplest method of spatial analysis, consists in making decisions by the company manager primarily on the basis of intuition, after visiting potential sites for construction (Louviere, Hensher, Swait, 2000). Despite its apparent simplicity, this method should not be underestimated, since the intuition of an experienced manager, supported by experience, is a significant factor in making decisions (Fotheringham, Brunsdon, Charlton, 2000). In economic geography, this method is well known as «peer review». However, it is obvious that this method is subjective and time-consuming, as it is often complicated by contradictions that arise among decision-makers, as well as an increase in the number of factors affecting the choice of site (Galkin, 2018).

The checklist method, which is most suitable for preliminary selection of potential sites for the construction of a shopping facility, is a set of procedures for assessing the location of a shopping facility relative to specified parameters, such as, for example: structure and size of a potential shopping area, traffic density, ease of access, competitors proximity, etc (Shubenkova, et al., 2018). To decide on the most successful, according to experts, sites, potential variants are evaluated by weighing the parameters and further ranking the objects by weighted parameters (Colomé, Lourenço, Serra, 2003). An analog approach is to calculate the possible sales volume of a new property by comparing (analogy) with another retail facility, often of the same retail network, having similar characteristics, location and trading area (Halkin, 2020). Experts, by conducting surveys of visitors or regression modeling, find out the factors affecting the profitability of the outlet which is the object of comparison (Oruc and Tihi, 2012). Potential sites for building a store are then compared based on

identified factors (Hernandez & Biasiotto, 2001). The success of such a method largely depends on the ability to find a similar object for comparison.

Certain parameters of existing models and methods do not provide a systematic approach to determining retailer visiting probability according to integration of end-users factors, retailer factors and enviromental factors. Therefore, purpose of study is: development of the approach for demand assessment of retailer in residential zone including geographical, demographic of the service area and the economic, technological parameters of the retailers.

Methodology

Modern forms of retail include three main types of retailers: hypermarkets, supermarkets, and discount stores, while the traditional form of retail is called «home shopping» (Galkin, et al., 2019b). The form of retail forms the parameters of retailers: area, time of service, range, number of cash desks, etc. To relate the change in price and volume of demand in one indicator, using relative changes in prices and quantities that are independent of their units of measurement, is possible using elasticity of demand.

Elasticity shows how many percent one variable changes when another changes by one percent. The degree of influence of individual parameters of the product can be determined only in stable conditions of the external and internal environment. The more significant are changes in the environment, the sharper is the dynamics of demand, the more active factors associated with end-consumer properties work (Galkin, et al., 2018).

The area of service based on marketing approaches (Popa, 2015). The retailer service area has formed under influence on individual end-consumer behavior parameters (Verroios, Efstathiou & Delis, 2011), geographic characteristics of the territory (Russo & Comi, 2012), tech. Considering the influence of these parameters will allow adjusting the limits of the retailer's service area, which will more accurately evaluating the demand. The presented zone is the basis for gathering socio-economic information about the service area (Halkin, 2020; Galkin et. al, 2019a). Taking into consideration the influence of these parameters will allow to adjust the boundaries of the service area. In order to estimate the boundaries an algorithm is used, which consists of 5 stages, described at fig. 2.

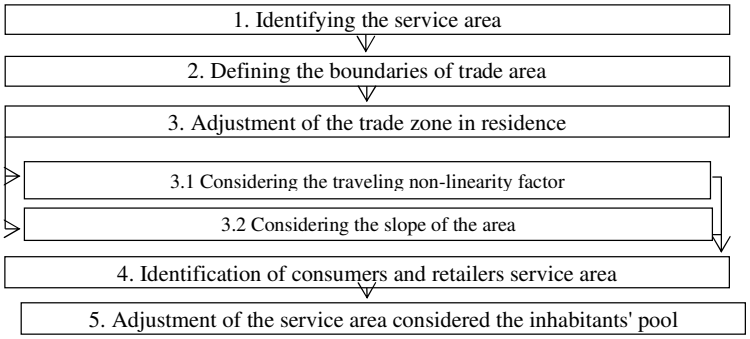

Figure 2: The method of the boundaries of the store's service area setting

For calculations, the zone of the first level (residential type) was chosen. The study was conducted for a retailers in Kharkiv, Ukraine. The received research area is the primary service area (fig. 3).

Figure 3: Adjusted trade area:

1 – microdistrict; A – stores; ★ - retailer

The supermarket "Posad" was chosen as a retailer, located at the following address: Valentynivska street 26, Kharkiv. The next stage was to determine the service zone, the retail outlets in the chosen zone were considered too, and the zone was divided into 10 districts. Also, in the first section, a matrix of distances from the neighbourhood to the retailer was calculated, also, in this section the factor of non-linearity and slope factor were estimated (Schlosser, et. al., 2019).

Retailers of different ownership and legal forms, as well as individual entrepreneurs who use different forms of trade organization (formats) are considered in the model.

Presented trading zone analysis (Fig. 3) indicates a large cluster of retailers in it – 11 units. 25 retailers are not included in the trading area, "waived" after correction. According to this it is possible to determine: the area; quantity of inhabitants; end-user income and behavior; distances from buildings and stations of urban passenger transport to retailer (places of gravitation); calculate the time of movement to each retailer. In the table 1 are distance from the zone to the stores by air and along the way.

The trip-based approach was used for customer movement calculations (Galkin et al, 2019a). Multi-objects purpose of buyers, when the attends several shops not considered in the paper.

Table 1: Origin-Destination distance matrix from zone of households to stores

Store	Consumer's zone							
	1	2	3	4	5	6	7	8
ATB	0,796	0,6	1,2	1,15	1,08	1,51	1,59	1,99
Posad	0,500	0,532	1,18	0,949	1,1	0,6	0,846	2,27
Silpo	0,700	0,6	1,05	1,07	1,5	0,5	0,337	1,79
Gorizont	1,710	1,22	1,19	2,22	1,91	1,33	0,426	0,6
Klass	1,310	0,578	0,346	1,64	1,11	1,33	0,774	0,779
Posad	1,220	0,421	0,5	1,41	0,664	1,48	1,11	1,22
ATB	1,480	0,717	0,12	1,65	1,5	1,68	1,16	1,07
Digma	0,429	1,13	1,83	0,872	1,4	0,701	1,5	2
ATB	0,907	0,972	1,41	0,482	0,414	1,69	1,91	2,29
Posad	0,125	0,764	1,52	0,654	1,04	0,764	1,32	1,9
ATB	1,550	0,8	0,113	1,73	1,3	1,7	1,17	1,01

Results

For an hour, namely from 18:00 to 19:00, in the retailer under consideration there was a certain number of packages sold for delivering goods home. The chart below (Figures 4-5) shows the total number of packages sold per hour. The largest number of packages was sold with a carrying capacity of 5 kg, the lowest number of packages was sold with a carrying capacity of 30 kg.

The above diagram characterizes the dependence of the total volume of sales on the package carrying capacity. As can be seen from the diagram, most of the number of purchases is delivered to the place of consumption in packages with 10 kg carrying capacity.

At the next stage, field studies were carried out, as a result of which information was obtained on the flow of customers and the volume of sales for a certain time.

After an analysis of sales volumes during the operation of the trading facility, data were obtained on the average sales per hour, namely 777 kg, and the average sales per person – 6.4 kg.

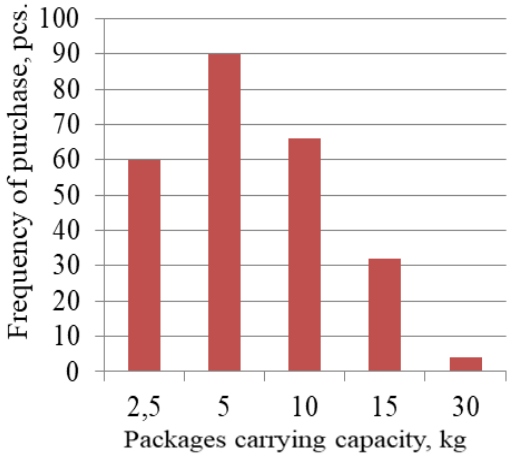

Figure 4. Chart of the purchase frequency of packages of different carrying capacities

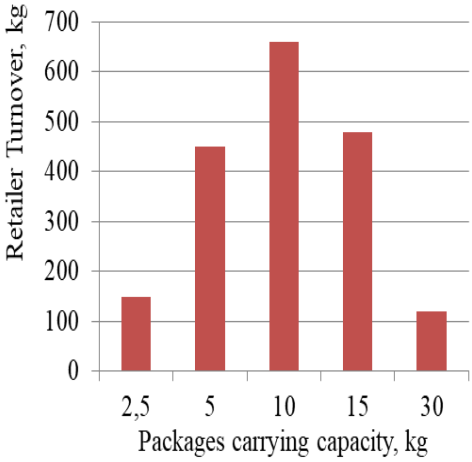

Figure 5. Diagram of changes in the total number of purchases depending on the «carrying capacity» of the bought packages

For the study, different days of the week and time of day were selected. This made it possible to determine the distribution of purchases during the day. It was found that in the morning, the volume of purchases is minimal compared to other periods, its fluctuations occur in the range below the average hourly per day. Starting at 2 p.m., the hourly average volume of purchases is observed. The growth in sales throughout the day is observed from 4 p.m. and lasts until 8 p.m. The «peak» of purchases is observed from 5 p.m. to 7 p.m. This is due to the fact that at this time most part of the population of the region goes home from work. In subsequent periods of time, purchases are reduced. Observations showed that the number of buyers who make purchases changes similarly to the volume of purchases (Fig. 6-7).

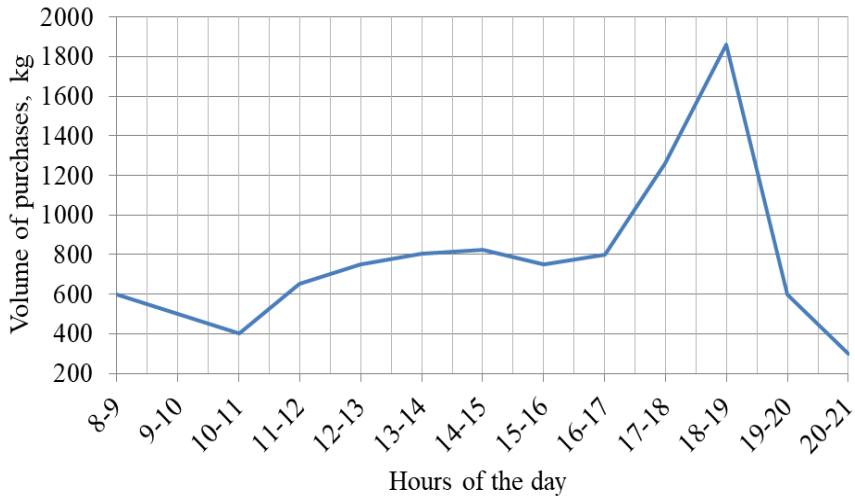

Figure 6: The graph of changes in the volume of sales during the day

The graph below shows the dependence of the volume of sales on the time of day obtained from the survey. Based on these data, one can accurately determine the «rush hour» of shopping at the presented retail outlet. In the morning, the sales volume is low and suggests that at this time the level of purchasing power is low. After 11 hours, the volume of sales of products increases, as the number of customers per given period of time increases. It can be established that at lunchtime the level of sales at a given retail outlet is average, so the main flow of people is made up of pensioners, schoolchildren and young mothers who do not care about shopping time. In the evening, namely during the period from 5 p.m. to 7 p.m., there is a «rush hour», during which the sales volume is rapidly increasing, more than twice as much as the average sales per hour (770 kg). This phenomenon is caused by an increase in the flow of buyers, since it is during this period that the majority of people leave work and need to make purchases. After a rapid increase, there comes a moment of decrease in the volume of sales to the very minimum. The maximum value of sales was recorded in the evening (18–19 p.m.) – 1870 kg and the maximum in the evening (8–9 p.m.) – 310 kg.

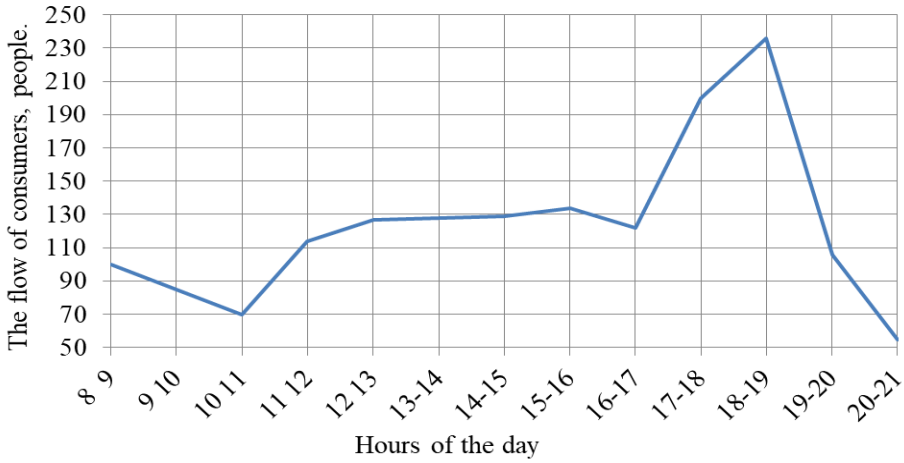

Figure 7: Graph of changes in the number of customers per day

This graph shows the dependence of the number of customers on the time of day. The resulting dependence is very similar to the previous one, since the volume of sales depends on the number of customers. There is also a tendency to increase and decrease in purchasing power depending on the time of day. This is influenced by a lot of factors, for example: the working hours of consumers of retail goods, the age category of consumers, social status and their needs. During the lunch period, more school-age consumers, young mothers, and people of retirement age were recorded, since at this time of the day various walks and returning home from work are carried out. This is precisely what influenced the increase in consumer flow during these hours. «Rush hour» also falls on the period from 17 to 19 hours. Then a rapid decline to a minimum. The maximum number of customers during rush hour is 237 people, and the minimum is 56 people. Knowing the total number of customers during the work of the shopping point (1,608 people) and its average daily sales (10,200 kg), the average sales volume per person was 6,4 kg.

The probability of visiting retailers was estimated. The regression models of parameters of purchase process were established. The probability of a retailer visit depending on the slope factor:

$$P_{j\omega z} = 0,0013568 \cdot (\frac{k_{\omega jz}}{\overline{k_z}}), \quad (1)$$

where j - is the store; w-residential district of end-user; z – urban zone; $k_{\omega jz}$ - slope ratio from retailer to the urban zone; $\overline{k_z}$ - the average value of the slope factor from the end-user to the urban zone.

Depending represented the price and non-price factors of the purchasing process, which allows more accurately identify the behaviour of end-user. There graphs of the influence of the probability of visiting a retailer on parameters changes in the service area have been constructed (fig. 8 – 11).

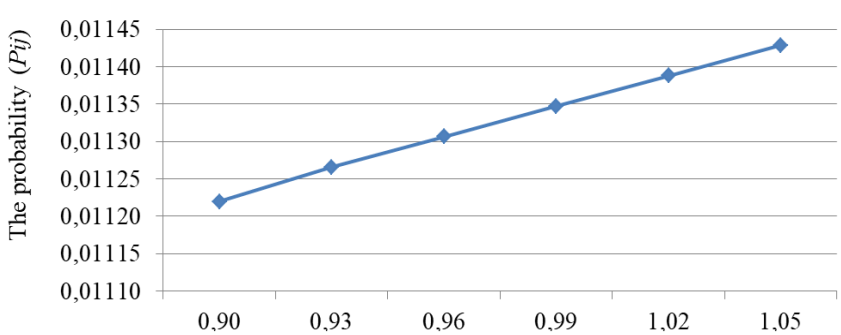

$k_{\omega jz} / k_z$

Figure 8: Probability of retailer selection depending on the slope factor from the retailer to the urban zone

The increase of slope factor value of the leads to an increase in the time and distance of movement to the retailer, thereby reducing the radius of the trade zone.

The probability of retailer visiting depending on the average distance to the various retailers in urban zone:

$$P_{j\omega z} = -0,002452(\frac{L_{\omega jz}}{\overline{L_z}}), \tag{2}$$

$l_{пов}^{ijz}$ - distance from household to retailer, km; $\overline{l_{пов}^{ijz}}$ - the average distance from the household to the retailer in the urban zone, km.

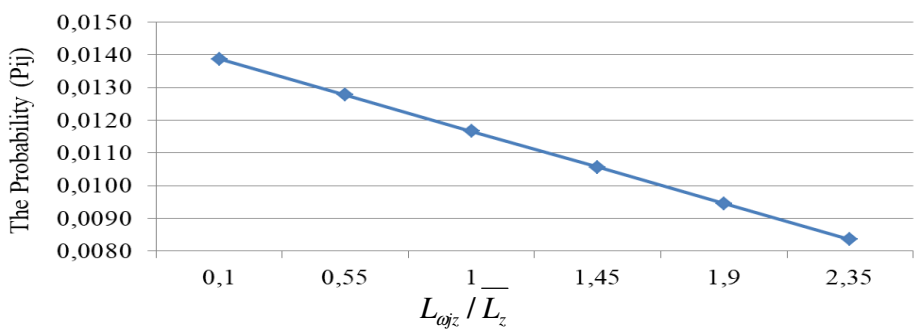

Fig. 9: Probability of retailer selection depending on the distance to them

The probability of retailer visiting depending on the average quantity of residents in urban zone:

$$P_{j\omega z} = 5,38327 \cdot 10^{-7}(\frac{N_{\omega jz}}{\overline{N_z}}), \tag{3}$$

$N_{\omega jz}$ – quantity of residents in urban zone, consumers.; N_z – the average quantity of residents in the urban zones, consumers.

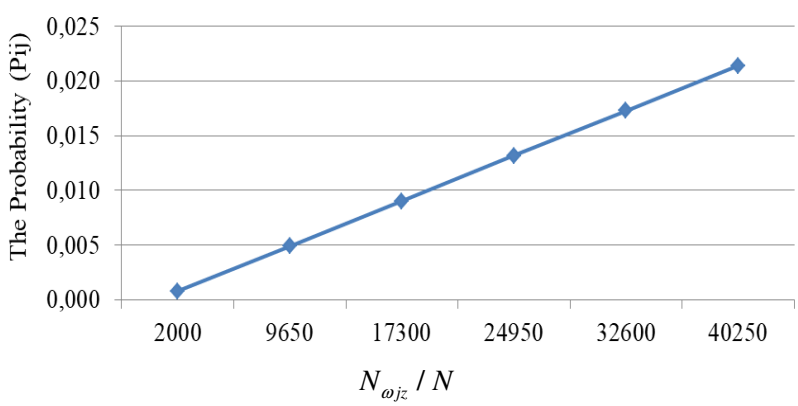

Figure 10: Probability of retailer choice depending on the quantity of residents (households)

The probability of visiting retailers depending on their parameters and parameters of competitors:

$$P_{j\omega z} = -9,03447 \cdot 10^{-7} (\frac{S_{\omega jz}}{\overline{S_z}}), \quad (4)$$

$S_{\omega jz}$ – shop area, m^2; $\overline{S_z}$ – the average size of retailers in the urban area, m^2.

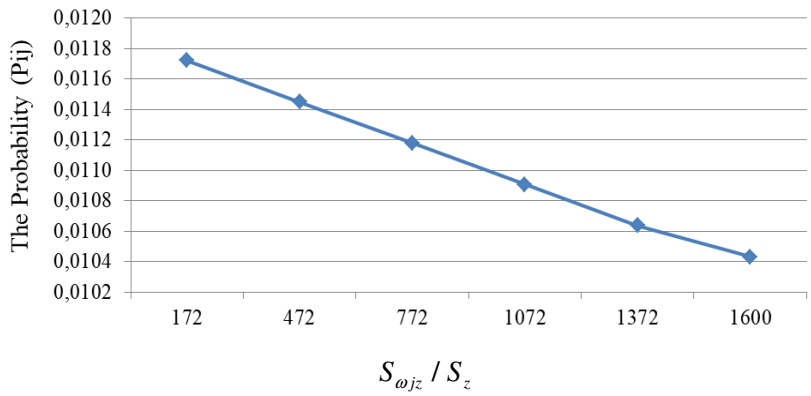

Figure 11: Probability of retailer selection depending on their parameters and parameters of competitors

The probability of retailer visiting, depending on the average consumer's expenses for the purchase of goods:

$$P_{j\omega z} = 0,0000452464 (\frac{Q_{2jz}}{\overline{Q_{2z}}}), \quad (5)$$

$Q_{2\omega jz}$ – cash cost the consumer to purchase a product, UAH; $\overline{Q_z}$ – average cash expenses of the consumer for the purchase of goods, UAH.

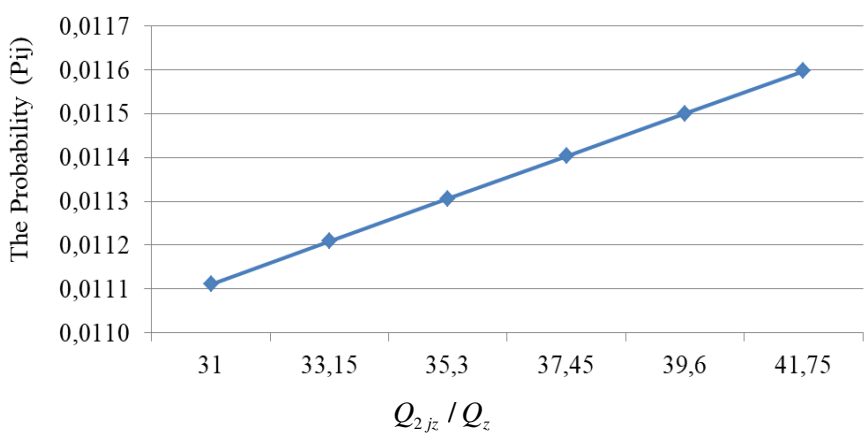

Figure 12: The Probability of retailer choice depending on the average end-consumer expenses for the purchase of goods in current retailer

Modelling allows to make the next conclusions:

1) The greater ratio of the slope factor leads to the smaller the probability of visiting the retailer (Fig. 8). This is explained by the fact that it is easier for people to move along the slopes, and this affects the reduction of overall fatigue and the reduction of the total cost of the buyer.

2) Analysing the received timetable for changing the probability of a retailer visit, depending on the increase in the distance to the retailer (Fig. 9), one can conclude that the larger the distance from the household to the retailer, the less probability of its visit, since in this case the rates of such factors as the value of the buyer's time and hence the total costs of the buyer at the retailer.

3) With the increase in the quantity of inhabitants in the district, the probability of visiting the retailer will increase (Fig. 10), since this indicator affects the quantity of potential end-consumers of certain goods of a certain type, which positively affects the probability of its visit.

4) With the increase in the ratio of the retailer’s size, the probability of visiting the retailer will be increased (Fig. 11). This is due to the fact that when shopping in a large store, people spend more time and energy on finding and purchasing goods, which increases the cost of the buyer's time when visiting the shop.

5) Analysing the received timetable for changing the probability of visit a retailer, depending on the increase in the cost of purchasing goods (Fig. 12).

Based on the calculations, we will study the laws of changing the characteristics of demand and their impact on the likelihood of choosing a retailer in the service area. The general view of the model of the probability of choosing a retailer in the service area is:

$$\begin{aligned} P &= 0,0013568 \cdot k_{to\ shop} + 5,38327 \cdot 10^{-7} \cdot N - 0,002452 \cdot L_{sky} - \\ &-9,03447 \cdot 10^{-7} \cdot S + 0,0000452464 \cdot Q_2 \end{aligned} \tag{6}$$

Where $k_{to\ shop}$ - slope ratio from retailer to urban zone; N - residents quantity, people.;

L_{sky} - distance from household to retailer, km; S - retailer size, m^2; Q_2 - expenses of the consumer for the purchase of goods, UAH.

Obtained models can be used for finding market probability for set up variation range. Presented is variation range values are cover data all-over Ukraine and most east Europe countries. Obtained data allows to define limitations of the trade zone, volumes of retailers visiting and been origin demand: average check, retail network sales volume and other parameters.

Results of the study are limited by the range of the data variation range. The results are valid for the selected range of data variation. Data not included in the variation range require further study and calculations. Further research could extend the data and application of the model. However, expanding the range data will not change the results (obtained patterns). It will change the efficiency of calculation of specific option.

Conclusions

In connection with the ongoing shifts in the structure of the population, it is important to take into account the level of economic activity, employment and unemployment, which affect the nature of purchases, the working hours of trade objects, their location, transport accessibility, and other factors. Of great importance is the grouping of households by the number of members employed in the social

production, which, combined with the data on the size of the household can find an important indicator – the coefficient of economic burden on a working family member (household), which also allows to address the issue of targeting the services offered, maximizing the use of scarce household resources, taking into account objective criteria that make it possible to choose between different alternatives.

Obviously, such a wide variety of households and significant differences in their way of life, traditions, birth rates, and living standards that occur in individual regions require a differentiated approach to the implementation of various programs by market entities based on a complex and comprehensive description of the object of study.

Due to competition in the market, end-consumers receive a wide selection of quality same-type goods at different prices. The influence of the average cost of the goods on the market and the value of the goods within the retailer under consideration influences the likelihood of visiting the retailer, and accordingly the volume of demand in it.

The paper is been continuation of previous research (Galkin et. al, 2019a) In the proposed approach, demand generation in transport systems, which, unlike established, uses the geographical, demographic of the service area and the economic, technological parameters of the retailers.

Proposed model can be used for evaluating efficiency according to external consumption system data. Give practical advice for improving retailer operations according to consumer's choice and behavior. Implications made for on one of the consumer's zone. Limitations consist of data used in experiment. Extend range of data could provide new regularities and update found one. Obtained patterns give opportunity to better reacting on consumer's choice and behavior and tune retailer system according to it. For the first time the model of the probability of visiting retailers was presented, which the total expenses of consumers were used.

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Social Innovations in Municipal Housing Management

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Abstract

The purpose of the article is to identify the possibilities of implementing social innovations in municipal housing management. A review of the literature pointed to the existence of potential and needs to search for innovations within the relations of tenants of municipal housing, other city residents and jointly inhabited urban space. The article identifies the special role that can be played by the entity managing municipal premises in the process of implementing social innovations. The network of municipal premises scattered throughout the city creates a special environment in which the needs for social innovation can meet with the creativity of research communities or social activities in finding them. The publication presents the results of research on a representative group of 531 respondents in the area of their interest in activities related to improving the quality of common space, developing neighbourly bonds, creating a network of neighbourhood aid scheme and willingness to participate in such assistance system. The obtained results for the questions above confirm the special role of the entity managing the municipal housing in implementing innovations and their positive reception by respondents. Conducted research allowed for examination of municipal housing's needs, managed by ZGM TBS in developing solutions that are the tools for the formation of civil society

Keywords: Social Innovations, Municipal Premises Management, Urban Space.

Introduction

The municipal housing creates an environment with great potential for seeking and implementing social innovations. This is due to the investment gap regarding the housing stock and the fact that these apartments are inhabited by the economically weakest group of the city's citizens. The combination of the lack of funds and the economic and social problems of residents, results in a number of problems requiring an innovative approach in order to their solution, these are the phenomena of vacancy, housing poverty and energy and social exclusion.

Thus, the purpose of the article is to identify the potential for implementing social innovations in the area of municipal premises, tenants and the surrounding urban space. The considerations will include the special role of the premises management entity in the process of searching for innovations, their implementation and coordination of social and research environments in the implementation of this process.

The article presents the results of research conducted on a group of 531 respondents. The obtained results confirmed that the municipal resource manager has significant potential to implement social innovations. The implementation of the obligation to meet the housing needs of tenants and care for the shared space of the city, requires the implementation of social innovations in terms of the quality of the common space, combating social exclusion or use of available housing resources in the best

way. The examined activities of the ZBM TBS manager in this area met with a positive assessment of the respondents.

Social Innovations

Social innovation is understood as the process of implementing new solutions in the field of products, services and action models aimed at satisfying social needs, building social bonds and cooperation models. The purpose of social innovation is to increase the quality of life, improve the general physical and mental state of people, or strengthen the ability to act of social groups and the individuals that are part of them (EU Commission Guide to social innovation, 2013; Eichler G.M. and Schwarz E.J. 2019). Social innovation is characterized by the will to meet social needs neglected or poorly implemented by traditional public and private forms of social services (Harris, Albury, 2009).

Social innovations should place an emphasis on solving the problems of excluded people (e.g. the poor, the unemployed, the disabled) and increase social and ecological resilience (Westley, 2009, Gasparin M., Green W. et al. 2020). They should lead to better integration of excluded groups and individuals in various spheres of social life at different spatial scales (Brendzel-Skowera, 2019). Social innovation is associated with social integration processes, but also with the opposition against conservative tendencies that help to strengthen or maintain social exclusion (Brendzel-Skowera et al., 2016). That is why social innovation explicitly refers to ethical social justice (Moulaert et al., 2005). Therefore, social innovations should not be assessed on the basis of economic criteria, and the measure of their quality should be the creation of real social value (Phills et al., 2008).

Social innovations are characterized by high dynamics and interdisciplinarity, as they cover practically all areas of human activity, i.e. activity at home and family, in professional work in the sector of production of goods and services, in administration and public institutions (Olejniczuk-Merta, 2013). Stimulating the activity of citizens and local NGO communities in order to create a knowledge-based society has become the basis of the "Europe 2020" strategy (EU Commission Guide to social innovation, 2013).

The definition of social innovation for the needs of the research program "Social Innovation" has been prepared by the National Centre for Research and Development. "Social innovations, in the sense of this Programme, mean solutions which simultaneously respond to social demand and cause a lasting change in given social groups. These solutions may be associated with innovative products, services or processes that enable different solutions to typical social problems." (Social Innovation Programme of the National Centre for Research and Development, 2012).

For the purposes of the programme, a catalogue of good practices for supporting social innovation has been identified, which includes:

– promoting sustainable education,
– promoting sustainable transport,
– promoting active and healthy aging,
– supporting the activation of people with disabilities,
– supporting the activation of the unemployed,
– supporting the financing of innovative investments,
– supporting innovative architectural and communication solutions (Social Innovation Programme of the National Centre for Research and Development, 2012).

Implementing Social Innovations in The Process of Managing the Municipal Housing Stock

The basic unit of local government in Poland is the municipality. The role of the municipality is to meet the collective needs of its residents, including the basic need to provide housing to members of the local community. The obligation to conduct a policy conducive to satisfying the housing needs is

guaranteed by both The Polish Constitution of April 2, 1997 r. in art. 75(1) as well as ordinary legislation - in accordance with art. 7 item 1 point 7 of the Act of 8 March 1990 on local government, satisfying the collective needs of the community is one of the municipality's own tasks, in particular these own tasks include matters of municipal housing construction. Furthermore, in art. 4 of the Act of June 21, 2001 on the protection of the rights of tenants, the municipal housing stock and the amendment to the Civil Code, the legislator provided that creating conditions to meet the housing needs of a local government community is one of the tasks of the municipality (sec. 1), the municipality, under the rules and in cases provided for in the Act, provides social and substitute housing, and also satisfies the housing needs of low-income households (sec. 2).

In order to implement tasks related to satisfying housing needs, the municipality creates the commune's housing stock. The stock may include premises owned by the municipality, municipal companies (excluding Social Housing Associations), and premises in the independent possession of the indicated entities. The implementation of the above task is also possible by means of renting premises from other owners by the municipality and sub-letting them to persons whose households achieve low income. The Act allows the municipality to charge a lower rent from sub-tenants than the one that pays itself (Chaciński, 2019, Doliwa, 2015).

Municipalities can also create social housing associations (hereinafter abbreviated as SHA, in Poland - TBS), whose purpose is to build apartments for rent. SHA may carry out repairs and modernization of facilities intended to meet housing needs on a lease basis, as well as rent commercial premises located in the association's buildings (Doliwa 2015). The rent for TBS residential premises is regulated, allowing it to be paid by people on average incomes (Dziadkiewicz and Pabian, 2017).

In practice, the entity which manages municipal premises on behalf of the municipality can administer the following premises:

– social – i.e. of very low rent intended for people unable to maintain housing due to poverty,
– regular municipal – serving the purpose of meeting the housing needs of people who, due to the economic situation, are unable to buy or rent real estate on the free market,
– premises within the Social Housing Association, provided that it was created by the municipality – the premises that are occupied by better-off people who are yet unable to meet the housing needs of a similar standard on the free market,
– the so-called private – some of the social and municipal premises are located in real estate owned by the commune in its own right (leading to the acquisition of property through acquisitive prescription), these real estate have unexplained ownership situations and are often refundable to heirs.

For the purposes of this article, these premises will be called municipal premises.

The above-mentioned premises usually cover the entire city surfaces, achieving higher accumulation in areas requiring regeneration (neglected city districts).

In the process of managing municipal premises, there have been opportunities to implement social innovations. The entity managing municipal premises may play a special role in this respect. The management of municipal premises raises a number of possibilities for the managing entity to initiate processes of creating social innovations (see Fig. 1). These possibilities result from the fact that municipal premises are spread in the urban fabric, the manager makes direct decisions regarding the quality of life in the space surrounding municipal premises, forced by the essence of direct business activity and frequent contact with residents of the managed premises.

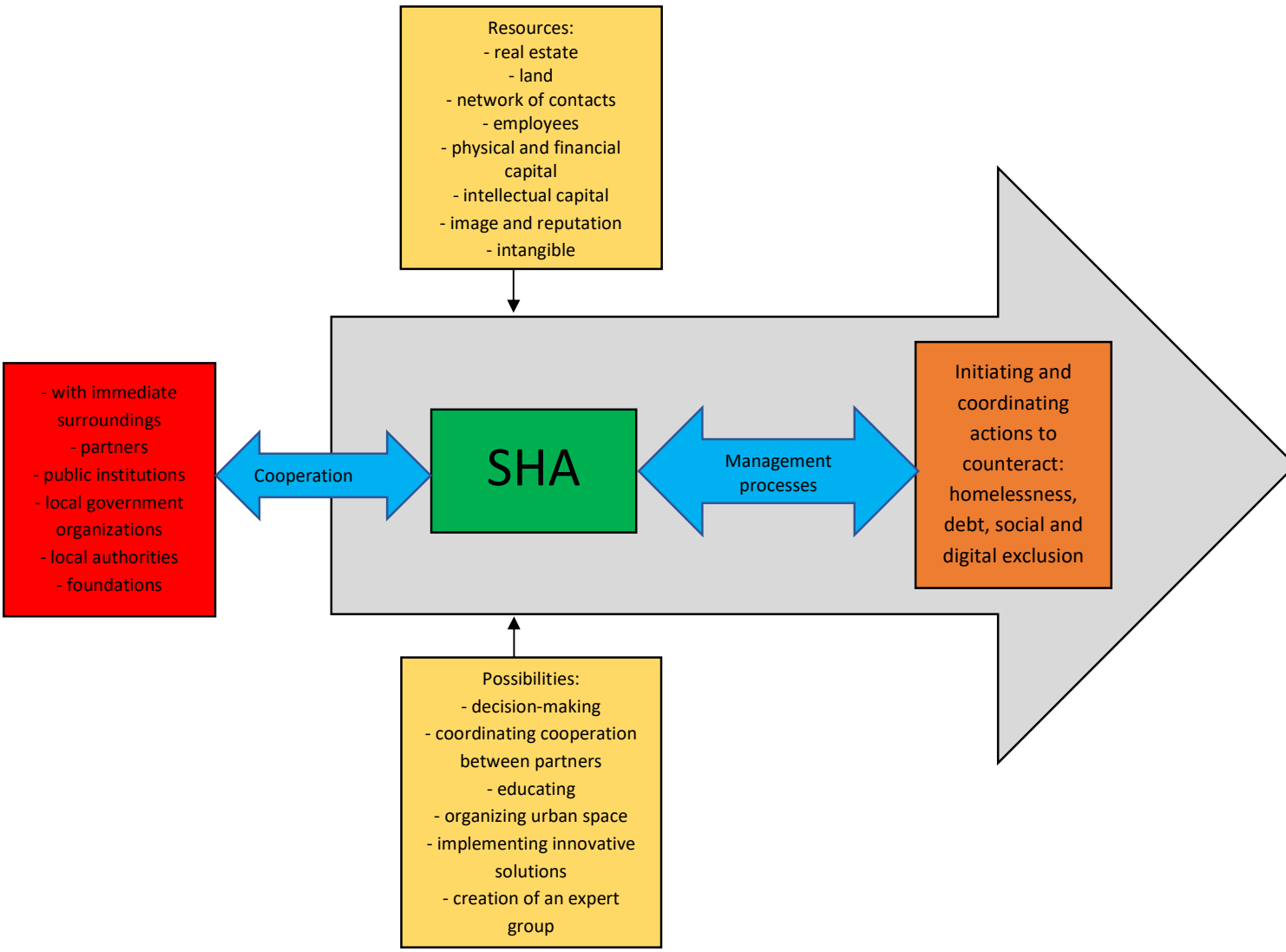

Fig. 1: Social innovations model

On the other hand, the housing stock manager needs the creativity of many environments where ideas with the potential of social innovation arise; it is about confronting different points of view, insights and practices, a kind of departure from the same old pattern (Kowalewski M., 2014, Nicolopoulou, K et al. 2017).

The needs for social innovation regarding municipal housing are further increased by the problems faced by local governments striving to meet the housing needs of the economically weakest group of residents – these are in particular issues of social exclusion, economic or energy exclusion, (a significant proportion of tenants remain in the so-called debt spiral), or the existence of the phenomenon of vacancies in city centres (Wronka-Pośpiech, 2015, Hiteva, R. et al. 2017.).

Research Methodology and Structure of The Research Group

Based on in-depth literature studies and the results of actions taken by the Department of Housing Management - Social Housing Association (*ZGM TBS*) in Czestochowa, a concept of research was developed among residents to identify activities whose implementation will contribute to shaping the civil society. This assumption allowed to define the research group, among which, the survey questionnaires were distributed. The only criteria used in order to select the respondent was their status – residents of the Department of Housing Management - Social Housing Association. The prepared study took the form of a questionnaire, consisting of a research part and the respondents' particulars. The research part of the survey consisted of 22 questions and 7 questions constituting the respondents' particulars. The questionnaire contained 22 main research problems related to various aspects of the quality of life in the city of Czestochowa.

All obtained data came from the residents of six branches of *ZGM TBS* in Czestochowa, among which the questionnaire was distributed via internal communication channels in August and September 2019. Due to the low percentage of returns, shaped at the level of only 100 correctly completed questionnaires, the study period was extended (late October - November) and used the method of direct interview (PAPI). The final sample size was n = 531 correct answers.

The first stage of the research was to conduct pilot studies among the residents of the *ZGM TBS* housing stock in order to identify any inaccuracies that may hinder the understanding of the questions by the respondents and clarify any ambiguities. The next step was to conduct a study directed at 550 people. When choosing the study using the representative method, the authors attempted to minimize the sample size while maintaining the required certainty and accuracy of further inference. While estimating the probability of success p in the general population, the minimum sample size was calculated on the basis of the formula for the sample size for a very large population:

$$N_{min} = \frac{N_p\ (\alpha^2 * f(1-f)}{N_p * e^2 +\ \alpha^2 * f(1-f)} \approx 384$$

where:

N_{min} = minimal sample size,
Np = population size,
α2 = confidence level for results,
e2 = assumed maximum error,
f = size of the fraction

For population size the number of polish population was adopted (37,98 mln). As the calculations show, the minimum sample size, with an accepted confidence level of 1-2 = 0.90 and the maximum estimation error e = 5%, should amount to 384 questionnaires. Due to the fact that 531 questionnaires were qualified for the study, it can be assumed that this condition has been met and the sample obtained meets one of the assumptions of the representative method.

The nature of the answers to individual questions took the form of an answer on the 4-point Likert scale. The scale used in the study consists of 4 categories of answers (4 - yes, 3 - rather yes, 2 - rather not, 1- no), which are arranged in the correct order. The 4-point Likers scale was chosen because in this case, the respondents expressed their own opinions and experience about the issues being the subject of research. The authors also, decided to use this kind of Likert scale, in order to avoid an excess number of "I do not know" answers. The analysis of the measurement data using the Likert scale involves comparing and interpreting the points counted for individual items or for individual respondents.

Structure of the Research Group

In total, 531 survey questionnaires have been returned, and all of them have been classified for further analysis. Descriptive statistical results (table 1), showed that in the structure of the research group, 57% were female and 43% were male. Almost half of the respondents (46%) were between 40 and 59 years old, followed by seniors in the second place (29%), and young people between 25 and 39 years of age in the third place (25%). The smallest percentage were very young people between 18 and 24 years old (4%).

Table 1: Descriptive analysis results

Factor		Frequency	Percent	Cumulative percent
Gender	Female	302	57%	57%
	Male	229	43%	100%
Age	18-24 years old	19	4%	4%
	25-39 years old	134	25%	29%
	40-59 years old	222	42%	71%
	60 and above	156	29%	100%
Education	Higher education	162	31%	31%
	Secondary / technical	193	36%	67%
	Vocational	132	25%	92%
	Primary school	39	7%	99%
Marital status	Single	77	15%	15%
	Married	245	46%	61%
	Widowed	86	16%	77%
	Divorced	59	11%	88%
	Separated	22	4%	92%

	Partnership	37	7%	99%
Status	Housing Association member	204	39%	39%
	Tenant	313	61%	100%

Source: Own work.

With regard to education, the highest percentage of people were people with secondary / technical education (36%), followed by people with higher education (31%) and a quarter of respondents (25%) with vocational education. Only 7% of respondents indicated primary / lower secondary education. The respondents were also characterized by a fairly high diversity in relation to their marital status, but the vast majority were married (46%), there were almost as many widowed (16%) as lonely people (15%), and fewer were divorced (11%). However, the smallest percentage were people in partnerships (7%) and those who were separated (4%). In case of the number of persons living in a given household, the largest number of respondents indicated only one person (30%), followed by households with two persons in the second place (26%), followed by three persons (21%). Subsequently, there were households with four people (18%), five people (3%), six people (1%) and only one household with eight people. 61% of the respondents were ordinary tenants of the *ZGM TBS* municipal housing stock, and 39% were members of the housing cooperative.

Interpretation of the findings

For the purposes of this article, the authors have interpreted issues related to the level of interest of the respondents in activities implemented in their living space, the development of neighbourly bonds, creating a network of neighbourhood aid scheme and willingness to participate in such aid schemes. The answers obtained to the above issues will allow to examine to what extent the *ZGM TBS* housing stock meets the conditions of a civil society and to examine the level of need to develop a solution constituting a tool for the formation of the civil society.

First, the type of activities in the living space was identified, the implementation of which aroused the greatest interest of the respondents (table 2).

Table 2 : Evaluation of average ratings for activities implemented in the living space

	Average	Dominant	Percent	Standard Deviation
Allocating a friendly space for animal owners	2.98	4	43%	1.17
Creating "pocket parks" - small green areas	2.97	4	44%	1.22
Promoting care for the cleanliness of yards and green areas	3.16	4	50%	1.14
Promoting cleaning up after dogs	3.19	4	55%	1.20
Allocating parking spaces for residents	3.04	4	49%	1.21
Creating playgrounds for children	3.02	4	47%	1.24
Designing a friendly space for seniors	2.86	4	41%	1.28

Source: Own work.

Actions in the form of promoting cleaning up after dogs (3.19) were definitely the highest marks, which is connected with the second most important action - promoting care for the cleanliness of yards and green areas. This shows that awareness of the appearance and condition of the nearest residential space is growing among its residents. Further on were the activities in the form of allocating parking spaces for residents (3.04) and creating a playground for children. In addition, parking spaces are the result of a growing number of cars owned by the residents, and the desire to further create playgrounds for children indicates that the number of existing playgrounds is insufficient. The respondents also showed great interest in activities in the form of allocating animal-friendly space (2.98) and creating the so-called pocket parks in the form of small green areas. This indicates a high awareness of the needs of animals that must not be unleashed in the general living space as well as a desire to "green" the nearest living space, which can be a respite from the hustle and noise. In addition, the allocation of such space can also result in an improvement in air quality and an increase in the sense of comfort in common space. The last place was taken by designing a friendly space for seniors. But this may be due to the belief that the implementation of the previously indicated activities will also contribute to the comfort of living for older residents.

Subsequently, the authors analysed the structure of average ratings for activities to develop neighbourly bonds (table 3). The obtained results indicate that in this aspect the most important activity for the respondents was the resignation from the fencing of areas in favour of creating public space (2.76). This shows a change in the inhabitants' attitudes, since in recent years there has even been a trend of fencing from one's neighbours. However, as the obtained results show, this "trend" is in the reverse. In the next place were actions in the form of allocating common space (senior clubs, tenant clubs or clubrooms) and co-designing space by the residents (2.69). On the one hand, the choice of these activities may indicate a certain level of involvement of the residents, but on the other hand, provided that the dominant answer was "rather yes", this level of involvement is still not very high.

Table 3: Evaluation of average ratings for activities to develop neighbourly bonds

	Average	Dominant	Percent	Standard Deviation
Resignation from fencing areas in favour of creating public space	2.76	4	35%	1.17
Allocation of common space, e.g. senior clubs, tenant clubs, clubrooms	2.69	3	30%	1.18
Attending meetings aimed at getting to know neighbours	2.48	3	30%	1.17
Co-designing space by the residents	2.69	3	31%	1.20

Source: Own work.

The last place was taken by attending meetings that are aimed at getting to know one's neighbours (2.48). The fairly low rating of this action indicates that the stock's inhabitants are not interested in establishing and maintaining contacts with their nearest neighbours. These results confirm the fact that close relations with neighbours are rather a thing of the past. Besides, people living next door are not interested in each other.

Then, the authors analysed the structure of average ratings of the level of interest in the neighbourhood aid scheme by the inhabitants of the housing resource (table 4). The highest score was given to the form of assistance provided in case of illness (2.79), followed by the form of assistance provided when looking after a sick or disabled family member (2.56). The respondents also showed interest in the form of neighbourly help in running a household (2.53).

Table 4: Evaluation of average ratings for the development of the neighbourhood aid scheme

	Average	Dominant	Percent	Standard Deviation
Help in case of illness	2.79	4	35%	1.20
Help in the household (e.g. shopping, repairs, writing applications, dealing with official matters)	2.53	3	28%	1.21
Help with caring for a sick / disabled family member	2.56	3	30%	1.22
Care for the household during someone's absence	2.43	3	28%	1.20
Help using the expertise of neighbours	2.41	3	28%	1.23

Source: Own work.

The last two places included: taking care of the household during someone's absence (2.43) and getting assistance using the expertise of neighbours (2.41). At the same time, it is worth noting that only in case of help in the event of illness, the respondents most often chose the answer "yes", while in the remaining cases the most frequently chosen answer was "rather yes", which indicates a not very high level of involvement of respondents in participating in the neighbourhood aid scheme.

The last examined issue was the question about the level of the respondent's interest in providing assistance as part of the neighbourhood aid scheme (Table 5).

Table 5 : Assessment of average ratings for the level of interest in providing assistance under the neighbourhood aid scheme

	Average	Dominant	Percent	Standard Deviation
Help in case of illness	2.73	3	31%	1.19
Help in the household (e.g. shopping, repairs, writing applications, dealing with official matters)	2.53	3	32%	1.20
Help with caring for a sick / disabled family member	2.53	3	31%	1.20
Help with childcare (e.g. when parents are absent, doing homework, tutoring)	2.40	2	29%	1.21
Care for the household during someone's absence	2.45	3	29%	1.19
Specialist help resulting from your education / profession	2.33	3	29%	1.21

Source: Own work.

The obtained results regarding this issue clearly indicate that the respondents are least interested in providing assistance under the social assistance system. The overwhelming majority of the responses were "rather yes", indicating a lack of determination in this matter. The highest rated activity was in the form of providing help to a sick neighbour (2.73), but the respondents would also be eager to provide assistance in running a household and taking care of a sick or disabled family member (2.53). The respondents also declared their willingness to take care of the household in the absence of the owners, but they would be least willing to help with childcare (2.40) and to provide specialist assistance related to their education. In case of help with childcare, the most often indicated answer was "rather not".

However, taking into account the structure of average ratings for all the indicated activities, it is clear that the respondents showed the greatest interest in developing the neighbourhood aid scheme (Table 6).

Table 6: Structure of averages for particular areas

Group of activities	Average level
Level of commitment to living space management	3.03
Level of interest in developing neighbourly bonds	2.65
Level of interest in developing a neighbourhood aid scheme	3.18
Level of interest in providing assistance under the neighbourhood aid scheme	2.50

Source: Own work.

On the other hand, the respondents showed the least interest in providing help by themselves, which may indicate that they are more willing to use assistance than to offer it. Next, there is the level of commitment to managing the living space, which indicates the inhabitants' growing awareness of their impact on the nearest residential environment. The respondents also showed some interest in developing neighbourly ties, but this is not a key issue for them.

Discussion

The conducted research on contemporary housing resource management processes has clearly indicated the need to implement social innovations that, not only, contribute to improving the quality of life of residents but also affect the formation of civil society. Social innovations not only create, renew and transform social relations in such a way that they shape civil society, but social innovation also favors transformation on a regional scale, which in turn contributes to socio-ecological development. However, as indicated by K. Castro-Arce and F. Vanclay (2020), the shaping of social innovations is influenced by the residents of a given area, in other words social innovations are developed by using management mechanisms from the bottom. Social innovations are triggered by local interests and context at a specific time and place. However, when social innovation deals with more than just urgent issues and actively seeks new paths for sustainable development, it contributes significantly to social transformation. The target research group was selected due to the fact, as pointed out by M. Angelidou (2020), the residents who have deep knowledge of the specific needs and resources of their own area; they experience these needs personally and are able to suggest simple and practical solutions. What's more, appreciating them as facilitators of innovation implementation processes will increase their commitment to both innovation implementation and civil society shaping. According to research by F. Fug and O. Ibert (2019), innovations implementation is a process in which the gradual development and consolidation of new solutions goes hand in hand with the emergence of a new local professional community. Thus, the implementation of social innovations also increases the professional activity of the society. E. D'Amario and G. Comini (2019), on the other hand, propose a scale consisting of 23 elements that classify and identify social innovations, and the scale itself can be a tool stimulating social entrepreneurs or new market participants to work to better allocate their resources or draw attention for the needs of specific social groups. The use of this scale in further research will contribute to a deeper understanding of social innovation but also to better identify the needs and expectations of society. Whereas there are several types of social innovations, such as: socio-juridical, socio-cultural, socio-political, socio-analytical, eocio-ecological, socio-technical, socio-organisational, socio-economic, socio-ethical and socio -ideological (Wigboldus, 2016), subsequent research should focus on identifying social needs in specific areas and then developing and implementing appropriate solutions. This will significantly increase the likelihood of the process of transformation of society into civil society.

Conclusions

Contemporary housing management processes should assume the implementation of social innovations whose main task is to satisfy social needs, strengthen social ties and create new models of cooperation. The role of the housing stock manager plays a big role in implementing social innovations. Thus, he/she fulfils the obligation to meet the collective needs of the local community. In addition, the housing manager has appropriate resources and has the ability to effectively manage, which in turn will increase the level of supply of social innovations such as the development of social entrepreneurship, reducing the level of homelessness as well as social and digital exclusion, will improve the image and perception of the city's brand but above all will contribute to improving the quality of life of the local community. The results of the research presented in the article, which aimed to identify the activities that shaped the civil society, allowed the following conclusions to be drawn:

- the respondents pay a lot of attention to cleanliness and care for their immediate surroundings, which is manifested in the implementation of measures to promote cleaning up after animals and caring for yards and green areas,
- the respondents also show high awareness of meeting the needs of animals,
- more and more people prefer to create common spaces for everyone, thus giving up fencing,
- while the respondents are not very interested in getting to know their neighbours, they have shown great interest in various forms of neighbourly assistance.

However there is a limitation of the study. The conducted study was conducted in Czestochowa municipality only, thus limiting its generalizability. Thus in order to obtained more reliable results in this area, the further research regarding the social innovation will be carried out among the other polish municipalities.

To sum up, the obtained results indicate that the studied community is seeking to become a civil society, however, only in the aspect of creating a common space and caring for it rather than developing neighbourly bonds. Therefore, it can be assumed that appropriate actions should be taken to increase the level of interest/commitment in matters regarding their living space or developing interpersonal relationships. One of the proposed solutions is the Municipal Social Services Platform, whose main goal is, among others, promoting civic attitudes leading to the creation of civil society and rebuilding social and interpersonal ties.

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Sealing the Tax System in Poland

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Abstract

Sealing the tax system is the priority, and at the same time a major challenge for financial policy in many countries. In the European Union and Poland, numerous actions are taken to reduce the tax gap. The activities of businesses in the so-called shadow economy, their involvement in the fictitious turnover under the carousels of VAT abuse, and tax optimization associated with tax avoidance or evasion are considered the main reasons of the tax gap. Measurement of the scale of irregularities provides information on the effective functioning of tax regulations. The purpose of the paper is to determine the tax gap in Poland and European Union Member States (EU-28). The basic research method is to identify the activities of the tax administration aimed at limiting the loss of tax revenues in Poland, as well as to review the literature in this area. Based on the research, one can notice an improvement in that tax collection efficiency in Poland. This implies the need to continue reforming the activities of tax administration, which are crucial for the development, security of companies and credibility of economic processes.

Keywords: tax system, tax gap, tax revenues, legislative changes.

Introduction

Tax system leakage causes particularly dangerous consequences for the public finances of each state. In recent years, the issue of the tax gap has become the subject of numerous international political and media debates. First of all, the level of the VAT gap is widely commented. The reason is that the calculation of the gap in the income tax of natural or legal persons is a much more difficult process than estimating the gap in the tax on goods and services.

The issue of the tax gap is extremely important not only from the point of view of the state budget, but also for companies which run reliable business, and which experience the indirect implications of its occurrence. The leakage in the state tax system contributes, among others to distort the principle of fair competition, reduces the supply of public goods or intensifies the state's actions regarding documentation and reporting obligations (Polish Economic Institute hereinafter: PIE 2019a). Estimation of the tax gap is a sort of control measure in the process of public finance management. It provides information on the scale of compliance of business entities with tax regulations, the effectiveness of the functioning of the state in terms of obtaining tax revenues, or the allocation of resources in order to reduce the scale of irregularities.

The development of fair tax systems in individual countries in the face of globalization is an international, not a national challenge. Actions taken internally to combat tax fraud can only be a temporary solution, due to the fact that criminal activities will penetrate other sectors of the economy or other countries with more favorable legal or organizational conditions under the influence of legislative changes. When fighting undesirable practices of businesses, states uses various procedures and benefits from the back-up of advanced IT solutions that support tax

administrations. In Poland, in the last decade, a number of coordinated efforts have been made to adopt modern legislation, consolidate tax authorities and establish cooperation with the IT and banking sectors, which resulted in an increase in tax revenues to the state budget and, as a result, a significant reduction of the tax gap.

The purpose of the paper is to determine the tax gap in Poland and European Union Member States (EU-28). The basic research method is to identify the activities of the tax administration aimed at limiting the loss of tax revenues in Poland, as well as to review the literature in this area.

The analysis conducted has become the basis to identify and formulate the strengths and weaknesses as well as opportunities and threats of measures to seal the tax system in Poland. The choice of topic is dictated by the desire to speak in the current debate on the shape of the tax system in the country. The first part of the article presents the concept of the tax gap and the factors determining its emergence (2). The gap estimation and solutions introduced by the Polish tax administration are discussed in parts 3-5.

Literature Review

The tax gap is an integral part of every economy. It is described as the difference between tax revenues that should be achieved and the amount of revenues actually obtained (KE 2016b, OECD 2017). The US Internal Revenue Service (IRS 2019) defines the tax gap as the amount of tax liability that is not repaid voluntarily and on time. In other words, it is the difference between tax revenues actually collected on an annual basis and the amount that should have been collected assuming timely payment by taxpayers (Olson 2009). The literature on the subject gives the definition developed by the Financial Policy Institute of the Ministry of Finance of the Slovak Republic according to which the tax gap is the difference between the tax actually paid and the tax that should be paid if all natural and legal persons declared their activities and transactions in the right way in accordance with the law and intention of the employer. When calculating the tax gap, it also considers the costs of tax control by the tax administration (Novysedlak and Palkovicova 2012).

In Poland no official definition of this phenomenon has been developed yet due to the relatively short history of research in this area. One of the first reports prepared on request of the Scientific Foundation of the Institute for Structural Research was developed in 2013 by PwC and concerned the identification of phenomena leading to budget losses in the field of VAT. The first report, in which an attempt was made to comprehensively determine the gap in CIT, is the report of the Polish Economic Institute from 2019. Undoubted reasons to recognize the issue of the tax gap are also the following analyzes: CASE (2017a, 2017b), PIE (2018, 2019a, 2019c), which are related to the budgetary revenues of the tax on goods and services, CASP REPORT (2019) that describes the structure of CIT tax revenues in the context of sealing the tax system or the results of NIK audits regarding aggressive tax optimization in the field of CIT (NIK 2019).

The tax gap definitions presented by some researchers assume its division into three basic components, such as (Plumley 2005): failure to file a return, under-reporting of income and overstating of deductions and also under-payment. Some approaches are based on the concepts of shadow economy and hidden income not disclosed to tax authorities. In this context, the tax gap is recognized as the amount of hidden income multiplied by a specific tax rate (Giles 1999). However, such an approach may create a number of methodological problems related to, e.g. determining the components of hidden income (Dobrovič et al., 2019; Gemmell and Hasseldine 2012).

The analysis of issues from such a scope indicates a number of factors affecting the existence of the tax gap. The most frequently mentioned are (Khlif and Achek 2015; PwC 2014, Quintano and Mazzocchi 2015, Skalická Dušátková et al., 2017):

- activities of business entities hidden from the tax administration (tax evasion), which includes the occurrence of so-called shadow economy and tax fraud,
- business activity aimed at reducing the amount of liabilities using legal means (tax avoidance), the so-called tax optimization,
- errors in the method of determining the tax assessment by taxpayers themselves, unnoticed by the tax institution,
- low efficiency of the tax institutions in controlling and collecting taxes due,
- taxes not recovered as a result of bankruptcy of business entities,
- low effectiveness of state authorities in the field of comprehensive support for socio-economic processes,
- lack of well-organized cooperation and exchange of tax information in the conditions of intensified international trade.

According to Raczkowski and Mroz (2018) these are not all determinants of the emergence and expansion of the tax gap. In their view, it should also include the cross-border nature and mobility of the informal economy, which skillfully uses the opportunities offered by the development of new information and communication technologies to expand into new markets, as well as the dominance of neoliberalism in previous decades, which may indirectly undermine the willingness of entrepreneurs to meet their tax obligations.

Generally, the premises for the occurrence and the size of the tax gap can be grouped into several segments: macroeconomic, demographic, institutional and relational, which is closely correlated with the confidence of entrepreneurs in state bodies (Szczypińska 2018).

The studies on the identification of mechanisms underlying the international process of tax avoidance and tax evasion, and determining the loss suffered by individual countries are the subject of numerous publications. This is due to the importance and enormous scale of this phenomenon (Allingham and Sandmo 1972; Beer et al. 2018; Liu et al. 2017; Markle 2016; Merz and Overesch 2017; PIE 2020; Tørsløv et al. 2018). The studies on the compliance with tax regulations, taxpayers' behavior and the ones indicating the use by public administrations of behavioral techniques in improving tax collection in Poland (Hernandez et al. 2017; PIE 2019d) and worldwide (Basrowi 2020; Kirchler 2009; Kirchler and Hoelzl 2017; Slemrod 2001) seem to be interesting aspects. Andreoni, Erard and Feinstein (1998) believe that the compliance with tax regulations is a matter of public finances, tax law enforcement, the tax authority's organizational structure and tax ethics. According to them theoretical canons developed to explain the complex problem of tax compliance were not fully used in empirical research.

The analytical literature on measuring the tax gap can be broadly divided into two approaches. The first one includes micro methods that comprise control and audit studies based on a large sample of taxpayers, and where the results are generalized for the entire population (Gemmel and Hasseldine 2012). This type is used, inter alia, in the US tax gap research by the IRS (GAO 2017). The second group are macro methods (Giles 1999, Raczkowski 2015). According to Raczkowski (2015), this is an indirect approach to measure the tax gap. The disadvantage of this approach is primarily the high level of aggregation of macroeconomic variables which reduces the accuracy of the size of the tax gap for individual taxes. Currently, CASE reports (2019) are the basic source of information and reference point regarding the size of the VAT gap in EU Member States. They are based on the so-called “top-down method”, whose basic assumption is to use data from the

national accounts of each EU Member State to determine the theoretical VAT liability and compare it with the actual collected VAT revenue.

Tax system in Poland

The tax system determines the formation of a strong and fair economy for each state. The obvious task of taxes is to finance expenditure, and therefore the expenditure of a given country determines the degree of fiscalism. Poland, together with Spain, Slovakia, Luxembourg, the Netherlands, belongs to the group of countries with an average level of public expenditure in relation to income (41.6%). France (56.0%) and Finland (53.1%) have the highest level of public sector spending among EU-28 Member States, while Ireland has the lowest level with a 25.4% ratio (fig. 1).

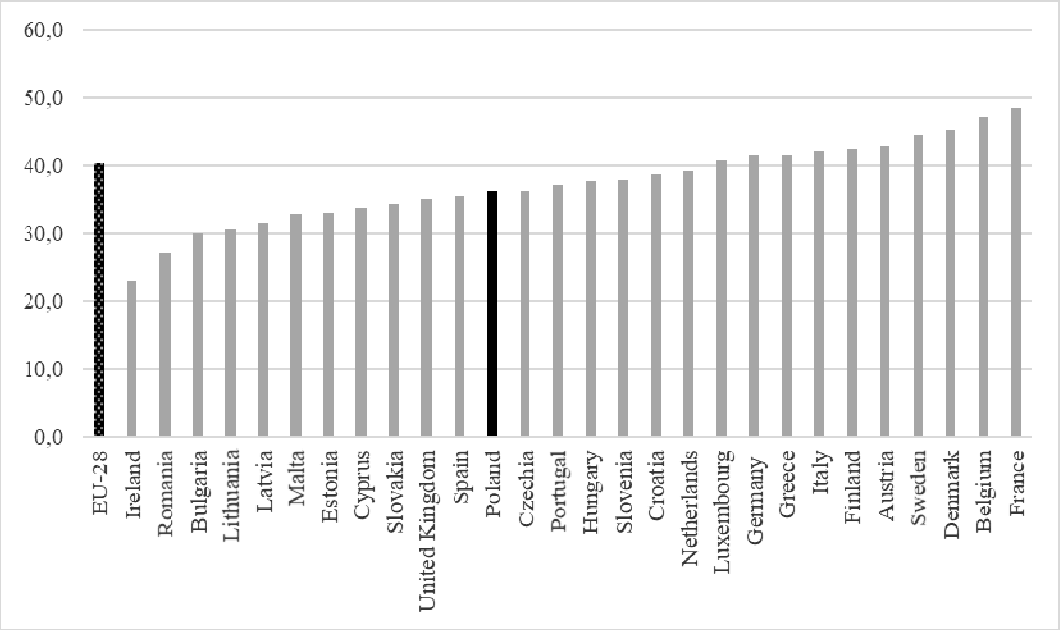

Fig. 1: Share of public sector expenditure in GDP in 2018 (%)
Source: author's own study based on Eurostat

In the perspective of the years 2008 - 2016, a decreasing trend of the share of public expenditure in GDP in Poland could be seen (fig. 2). According to the authors of More for Less Report: What tax system for Poland (CASE 2017b) this situation was related to the excessive deficit procedure in force since 2009. 2016 was the beginning of the reform of tax administration and legislative changes. A slight increase in the ratio of government expenditure to GDP in 2018 by 0.5 pp. compared to 2016 was caused by the high absorption of EU funds from the financial perspective for 2014-2020, an increase in spending on social benefits (e.g. Family 500+, Good Start, benefits paid by SII (the Social Insurance Institution) and ASIF (the Agricultural Social Insurance Fund) and the government's aid program for farmers associated with limitation of drought damage (Program Konwergencji 2019).

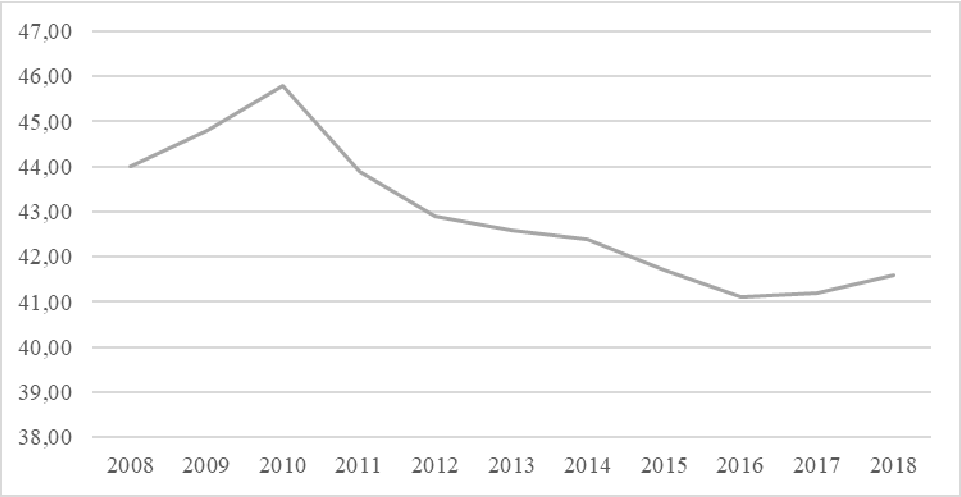

Fig. 2. Share of public sector expenditure in GDP in Poland in 2008-2018 (%)
Source: author's own study based on Eurostat

Tax revenues in Poland constitute a significant part of the total revenues of public finances. When analyzing the structure of tax burdens in EU countries, it should be noted that, contrary to popular belief, Poland is not among the most taxed economies. Taking into account the degree of fiscalism, Poland ranks 12th from the end (fig. 3). Compared to other EU countries, taxes in Poland are rather average. The aggregate index calculated by Eurostat includes, among others, taxes on production and imports, social security contributions and taxes on income. According to Case (2017b), the inclusion of contributions in the ratio is important due to political decisions regarding the choice of financing social benefits from taxes or contributions.

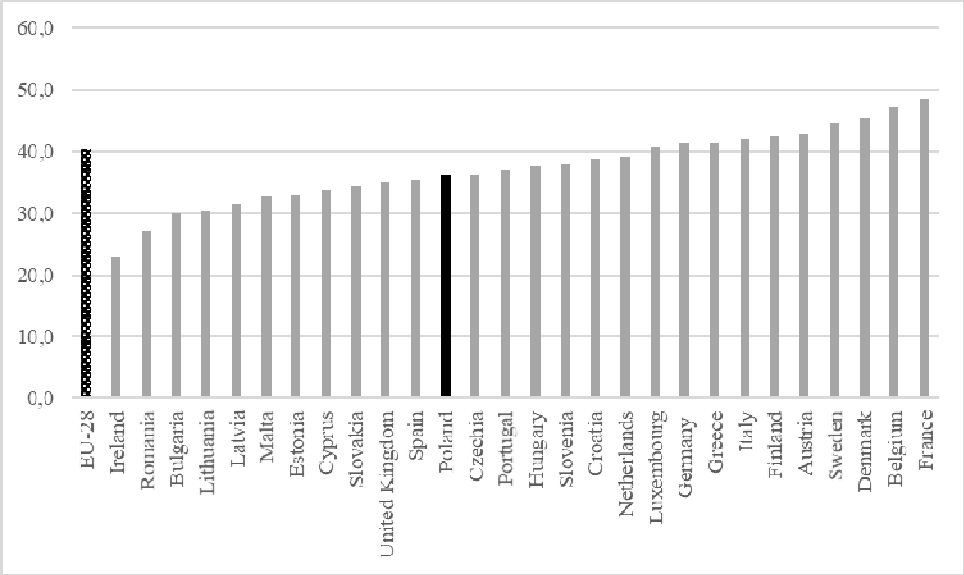

Fig. 3: Level of fiscalism in the countries of the European Union in 2018.
Source: author's own study based on Eurostat

In 2018, tax revenues (including social security contributions) in relation to GDP in Poland amounted to 36.1%, which means an increase of 1.1 pp. compared to the previous year, and an increase of 4 pp. compared to 2009. A growing trend in this respect is characteristic, especially since 2016, which is the result of a number of measures to seal the tax system (fig. 4). In the entire European Union, this ratio amounted to 40.3% in 2018.

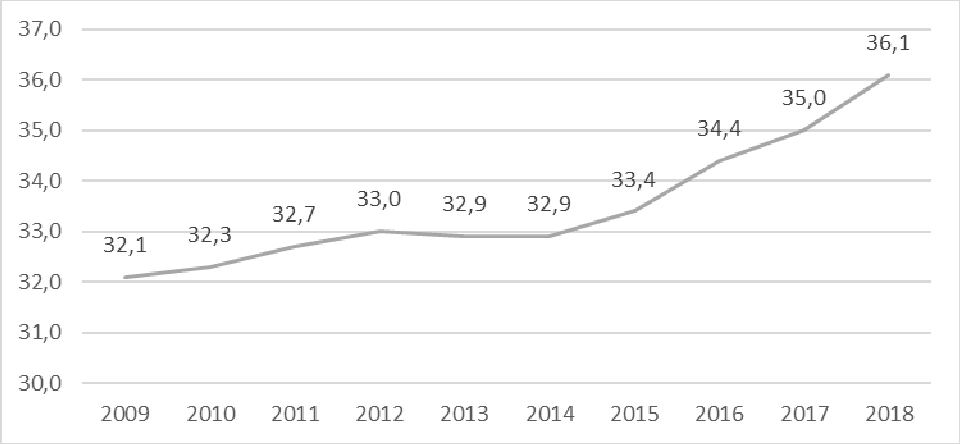

Fig. 4: Share of tax revenues in total in GDP in Poland (%)

Source: author's own study based on Eurostat

Of the four basic central taxes (VAT, CIT, PIT, EXCISE), tax on goods and services is one of the most important sources of tax revenues in the EU Member States as it generates about one-sixth of total tax revenues. In Poland, VAT plays an equally important role (22% in 2018), therefore the volume and stability of revenues from it is of the key importance from the point of view of public finances. Revenue from VAT is characterized by the greatest volatility resulting from the implemented reforms of the tax administration. In the entire analyzed period, the share of VAT revenues in GDP was at a high level of 6.8-8.3%. The share of basic taxes in the country's GDP is presented in fig. 5.

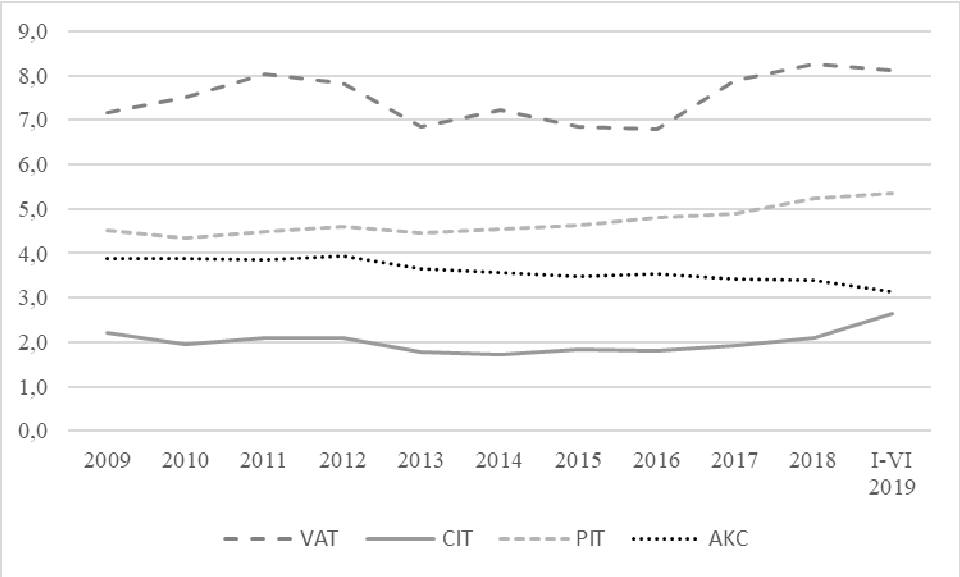

Fig.5: Share of basic central taxes in GDP in Poland (%)

Source: author's own study based on the data from the Ministry of Finance and the Central Statistical Office

Research indicates a significant improvement in VAT collection. In 2016, the VAT gap in EU countries was nearly EUR 150 billion in total, of which EUR 7.7 billion in Poland. According to the data presented by CASE (2019), in 2017 Poland was 8th from the end among EU countries in terms of the VAT gap, with a value of EUR 5.7 billion. This means that the country was two places lower than a year earlier and had 6.4 pp. less. This is the greatest success in the fight against VAT fraud among the Member States. A higher gap was recorded in Hungary, Latvia, Slovakia, Lithuania and Italy, Greece and Romania (fig. 6). According to preliminary estimates of the Ministry of Finance, the VAT gap in 2018 once again narrowed to 12.5% (Program Konwergencji 2019). It should also be noted that the revenues from VAT in 2016-2018 grew faster than the dynamics of GDP growth and the dynamics of turnover in the economy constituting the taxable basis (PIE 2019c). Revenue from VAT increased by 38.2%, while GDP by 17.5%.

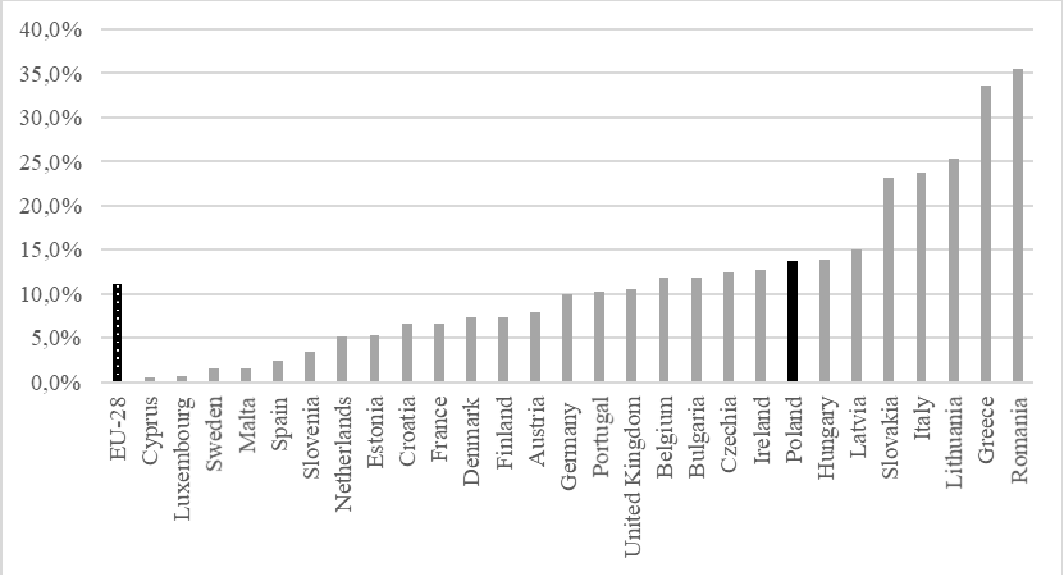

Fig. 6: VAT gap in EU countries (% of theoretical revenues) in 2017

Source: CASE (2019). Study and Reports on the VAT GAP in the EU-28 Member States: 2019 Final Report. Access: https://ec.europa.eu/taxation_customs/sites/taxation/files/vat-gap-full-report-2019_en.pdf

Strong economic situation and measures implemented in the country to close the VAT gap have been reflected in limiting tax avoidance also in the area of CIT and PIT. In 2018, revenues from corporate income tax recorded a very high level of PLN 44.3 billion, i.e. 2.1% of GDP. According to forecasts for the first half of 2019, this share amounted to 2.6% of GDP. It is estimated that CIT revenues for 2019 will be 15% higher compared to 2018. According to the authors of the CASP SGH report (2019), activities related to private consumption (caused by the 500+ program) and manufacturing of semi-finished products commissioned by international corporations account for 92% of this increase. The data on the CIT gap were prepared only for 2015-2017 as there were no detailed data and specific standards. According to analysts of the Polish Institute of Economics (PIE 2019b), the CIT gap in 2017 was in the range from PLN 11 to 21.4 billion, which translates into 0.55% -1.08% of GDP. The maximum gap in 2017 decreased by 57.2% compared to 2015.

Taxation of the natural persons' income funded the state budget in 2018 by PLN 110.8 billion, i.e. 11% more than in 2017 and 24% more than in 2016. This had been the largest increase for ten years. Apart from the good economic situation, the low level of unemployment and the inflow of foreigners to the Polish labor market are the factors which improve the condition of the state budget and the budget of the Social Insurance Fund.

The decrease in the share of excise tax revenue is explained by the very structure of this tax and the systemic change in excise tax rates for electricity (CASE 2017b). According to the report of the Supreme Audit Office (NIK 2020), this situation was also affected by an inadequate analysis of personnel needs and the failure to adapt the organizational structure of the newly established units of the National Tax Administration to the tasks assigned to them, which resulted in a reduction of the amount of excise duties outstanding by 51.5% in 2018 compared to 2016.

The analyzes indicate an exceptionally high percentage of indirect tax revenues to the state budget, which is considered a modern structure (PIE 2019c). Such a share of revenues in the state's revenues makes Poland a leader among European Union countries.

Legislative measures sealing the tax gap in Poland

The strategy of sealing the tax system in Poland is basically based on three areas of interconnected activities, which include: reform of the tax administration, legislative activities closely related to the appearance of specific irregularities, and cooperation with business (PIE 2019a).

As part of administrative operations, with a view to improve the state's public finances and combat the so-called VAT carousel, it was decided to conduct a comprehensive reorganization of the tax system. The National Tax Administration was established, which cumulated the operations of the tax administration, tax control and the Customs Service (Act of November 16, 2016). The reform carried out on such a large scale resulted in a change in 156 applicable regulations. The end of the second decade of the new millennium can be described as a period of revolution in business taxation. A rapid increase in the tax gap after 2008, up to 24.2% in 2015 (PIE 2019c) forced government institutions to introduce a series of sealing measures that are both temporary and innovative system solutions.

One of the main reasons of the significant increase in irregularities was the crime in liquid fuels trading. The report prepared by Ernst & Young showed that in 2013 the state budget losses due to VAT fraud in the fuel industry had ranged from PLN 4.3 to 5.8 billion (NIK 2017). The fuel and transport packages implemented contributed to a strong growth trends in the legal sale of liquid fuels and reduced significantly the shadow economy. These solutions sorted out the right to trade in fuel in Poland and ordered digital registration of transport. According to the analyzes of the Ministry of Finance, in 2018 compared to 2016 there was an increase in legal consumption of motor gasoline by 12% and diesel oil by 15% (MF 2019a). This is one of the most spectacular successes of NRA (the National Revenue Administration) as an institution to combat VAT carousels.

Provision of the tax administration with innovative analytical tools allowed the introduction of the obligation to report VAT registers in the Standard Audit File for Tax (SAF-T) format (Act of 13 May 2016). The JPK file is a package of structured information on purchases and sales, which is provided only in an electronic version, which results from VAT records. This construction of the file allows detecting irregularities as quick as possible. According to the data from the Ministry of Finance, after the first public JPK collection, 85,000 suspicious invoices for PLN 105 million were detected. In the accounts for 2018 and the first half of 2019, discrepancies worth PLN 1.7 million were identified (MF 2019a).

Also one of the first mechanisms aimed at reducing the tax gap was the VAT reverse charge, initially introduced only for trading in scrap metal, then gradually extended to, among others, trading in certain steel and copper products, supply of electronics, and services within rights transfer for greenhouse gas emissions, or construction services (Act of 11 March 2004, Act of 26 July 2013, Act of 12 June 2015). The application of this mechanism meant that the taxpayer was the buyer of the reverse-charged goods. However, the analysis of the functioning of this solution showed that the mechanism, although focused on eliminating carousel fraud, might in the long run cause new types of irregularities and, as a result, the growth of the shadow economy. As the catalog of goods and services covered by it expanded, irregularities were moved to those types of products in relation to which the mechanism was not applicable (Ćwiąkała – Małys and Piotrowska 2016; Omidi et al., 2017; Pustylnick et al., 2017). This philosophy of combating VAT

scams did not result in counteracting these phenomena and did not solve the problem in a wider dimension.

Due to the disadvantages of the reverse charge, it was replaced with a split payment which allowed tax authorities monitoring cash on VAT bank accounts and overseeing their release. The purchaser's payment for goods or services is made to two entrepreneur's bank accounts, with the net value of sales going to the supplier's bank account and payment of the VAT amount to a special VAT account. The funds accumulated on the VAT account are the property of the seller, but their disposal is limited (Szymankiewicz 2019). In order to seal better the tax system in Poland, from November 1, 2019 the legislator introduced two models of the split payment: optional and obligatory, which differ in the prerequisites for their application. The method the of split payment was developed by the European Commission (2016a) as one of the alternative methods of improving the functioning of VAT. In addition to Poland, this mechanism has been introduced, among others, in the Netherlands, the Czech Republic, Romania and Italy, and it should be noted that these mechanisms significantly differ from each other in the catalog of items and services covered by the regulation and the VAT account formula (Kowalski 2019).

Parallel to the implementation of the obligatory split payment, some changes were made to the joint and several liability of the purchaser for the supplier's VAT obligations, expanding the catalog of goods and services covered by this mechanism from 24 to 65 items in Appendix 15 to the VAT Act.

The effect of cooperation between the National Tax Administration and the banking sector was the implementation in 2018 of the STIR ICT program (Act of November 24, 2017). Its task was to limit the possibilities of using the financial sector for tax fraud. The measurable result of the operation of this system was the blocking of bank accounts of 39 entities in 2018 for the amount of PLN 10.2 million and 311 bank accounts belonging to 71 entities for the total amount of approx. PLN 35.2 million in the period from January 1 to August 31, 2019 of the year (MF 2019a).

In order to limit the risk of cooperation with dishonest contractors, the legislator gave the taxpayer an opportunity to verify them during transactions, in the form of an electronic list of entities, the so-called whitelist of VAT payers (Act of April 12, 2019). At the same time, these provisions impose an obligation to make payments only on the bills from the list. The use of the integrated register of entrepreneurs means in practice to introduce high transparency of transactions and enables control of financial flows in business transactions.

Also the regulations introduced in May 2019 regarding online cash registers, used for recording sales to natural persons who do not run a business (Act of 15 March 2019) are the key tool to fight the shadow economy. This is a new category of fiscal devices that communicate with the Central Register of Cash Registers maintained by the Head of the National Tax Administration. The task of new cash registers is to send information that allows determining the amount of sales and amounts of tax due, VAT rate, type of goods or services, and the place of installation of the cash register. The obligation to purchase and use cash registers is gradually introduced for individual groups of entrepreneurs. Thanks to real-time data transfer, current taxpayer control and monitoring are possible. According to the Ministry of Finance, the introduction of a new type of cash registers is also dictated by the need to modernize the existing cash register system, which has been functioning in Poland for over 20 years in an unchanged form, and to use new technological solutions (Justification of April 28, 2018).

An introduction in Poland of a number of regulations regarding transfer prices related to the documentation of transactions between related entities (Act of February 15, 1992; OECD 2015) was undoubtedly, an important breakthrough in the area of tax optimization. The need for legal regulations in this respect resulted from the assumption that the enterprises, for which the effects of economic activities, i.e. revenues, become joint, may transfer income between themselves without using market prices in mutual transactions, and thus generate income in the entity that is subject to lower level of taxation (NSA of May 21, 1998). The solutions implemented affected significantly the functioning of small, medium and large businesses, and imposed numerous documentation obligations on them. Poland, as one of the first countries decided to adapt national regulations to international standards.

Another activity aimed at reducing aggressive tax planning was the introduction of provisions obliging units to inform the tax administration about the MDR (Mandatory Disclosure Rules) tax schemes (Act of August 29, 1997, Act of October 23, 2018). This is an additional reporting obligation that provides information on how to optimize tax entrepreneurs. The implementation of the provisions resulted from Council Directive (EU) 2018/822 of 25 May 2018, but the scope of the Polish provisions is broader and relates to reporting of both cross-border and domestic schemes. From the very beginning this mechanism aroused numerous controversies and doubts among entrepreneurs, which were compounded by the amount of penalties for a failure to provide information on the tax scheme.

The provisions on mandatory reporting are part of a larger change process which include separation of operating and capital income, a change in withholding tax rules, and the introduction of so-called minimum CIT on commercial real estate or exit taxation (Program Konwergencji 2019).

Tax regulations and obligations implemented in previous years aimed at further sealing of the tax system will be continued and expanded in 2020. System activities are planned within taxation of digital enterprises, sealing of the recycling fee, excise tax rate indexation or limiting the tax wedge (Program Konwergencji 2019). The VAT rate system will be also changed by an introduction of the so-called VAT matrix. A new institution named Binding Rate Information will be constituted, and a VAT and JPK_VAT declarations will be combined into one document (Rączkiewicz 2020).

Conclusions

Starting from 2015, tax authorities introduced a number of coherent legislative solutions in Poland aimed at counteracting tax fraud and, as a result, increasing revenues for the state budget. The solutions implemented in the Member States of the European Union, such as reverse charge mechanism, joint and several liability, transfer prices or tax schemes, or innovative regulations developed on the domestic basis, such as the split payment mechanism. A thorough reform of the tax administration was also conducted. The reform resulted in the establishment of the National Tax Administration. Modern analytical tools were used, and an electronic form of financial statements were implemented.

Against this background, an attempt was made to synthesize the activities carried out in the area of sealing the tax system in Poland. Selected groups of factors influencing the assessment were analyzed, while identifying legal, administrative and socio-economic conditions. The legal conditions took into account the number and stability of tax regulations and their transparency. Administrative factors include: compliance of customs and tax administration reforms with regulations, the scale of IT solutions in the field of taxpayer control tools, time and efficiency of tax audits, speed of analyzes of taxpayer data and the data on the state budget. However, from the

point of view of socio-economic conditions, it is necessary to take into account the amount of tax receipts, costs of implemented reforms, as well as cooperation between the National Tax Administration and entrepreneurs.

Undoubtedly, the strengths of sealing measures include reducing the tax gap and increasing tax revenues to the budget, as well as reducing the shadow economy, which determined greater stabilization of state finances. Sealing measures allowed reducing the VAT gap to 12.5% and revenues from VAT increased by PLN 52 billion in 2018 compared to 2015. Income tax revenues also went up. It is worth noting that the number of fiscal controls was reduced by more than half from 55,793 in 2015 to 26,102 in 2018. It is estimated that in the first half of 2019 the number of inspections was 10,116. The effectiveness of inspections also increased during this period from 84.15% to 91.34% (MF 2019b). A certain specialization of tax authorities is also characteristic, which consists in checking specific transactions related to specific tax benefits. Implemented IT tools significantly reduced the time of analyzes. An undoubted advantage of administrative activities was also conducting numerous educational and information campaigns regarding, among others, JPK_VAT reporting and security of business transactions. A number of explanations and tax warnings can also be found on the website of the Ministry of Finance. Numerous tools were made available to help the taxpayer avoid the possibility of becoming entangled in the so-called tax carousels and checking the reliability of contractors. A black and gray list of unfair market practices was published. In order to build good relations between tax administration and key entities in the market, a Key Entities Service Center and the National Tax Information Center were created.

Considering the weaknesses of tax administration reforms, it should be noted that they resulted primarily in significant production and volatility of tax regulations. The measurable effect of these activities were 362 pages of amendments to tax laws in 2018 and 152 pages of provisions up to the third quarter of 2019 (Grant Thornton 2019; Sejm RP). It reduced their transparency. The attention should also be paid to the short time allocated for consolidation of the tax apparatus and the related underdevelopment of regulations regarding tasks in the area of excise tax and limitation of the efficiency of centralized debt collection in the initial period of administrative reform, as well as the controversial nature of personnel formation. The Supreme Audit Office (NIK 2020) also negatively referred to the lack of gathering information on the costs of ongoing reforms and the costs of processes related to it.

Considering the continuation of activities of tax authorities, opportunities and threats of undertaken actions should be indicated. They should be seen primarily in the possibility of development and implementation a coherent tax policy in all EU Member States aimed at reducing the transfer of earned profits in individual countries to tax havens and a definite reduction in the activity of countries applying unfavorable tax optimization. On the other hand, the threats include the risk of an increase in harmful tax competition between Member States and intensification of activities aimed at expanding the base of economic instruments of international corporations supporting tax optimization strategies.

The instruments used to combat criminal practices in VAT and other activities aimed at sealing the tax system in Poland, from the point of view of the overall activities, should be assessed positively, as they have brought measurable effects. Both actions taken by tax authorities to reduce the scale of irregularities and good macroeconomic situation contributed to the reduction of the general government deficit in 2018 to 0.2%. GDP. This is the lowest result since Poland's accession to the European Union in 2004. The Budget Act adopted by the Government for 2020 envisages the first budget without deficit since 1990. The public finance sector deficit is expected

to be 0.3% of GDP, which seems to be the most important considering the 3% threshold in force in the EU (MF 2019c).

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Application of the Concept of System Product in the Management of Cultural Institutions in Poland

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Abstract

The purpose of the paper is to show the possibility of implementing the concept of a system product in the sphere of management of cultural institutions. The study is based on literature studies and the results of quantitative empirical research that was performed on a sample of 451 people managing cultural institutions in Poland. The implementation of the formulated goal required identification of the attributes of the system product on the basis of the literature analysis, as well as to determination of their relationship with the offer created by cultural institutions. The analysis of the results of empirical research aims to present the approach to the implementation of the system product concept in cultural institutions through the prism of the role of product attributes in various areas of marketing of cultural institutions. Moving in the analysis from the quantitative to qualitative approach to the discussed issues, the idea of a system product in the sphere of culture is presented on the example of the functioning of the cultural institution of New Horizons Cinema. Consequently, the conducted research procedure allowed to formulate the conclusion that creation of system products that serve the satisfaction of not one, but the whole bundle of culture needs experienced by the consumer is one of the trends of development in the management of cultural institutions.

Keywords: System Product, Marketing, Marketing In Culture, Cultural Institutions

Introduction

The discourse regarding the functioning of the sphere of culture shows the need of managing cultural institutions, while taking into consideration the achievements of marketing and its various paradigms. This is related, among others to the need of increase in the level of participation in culture, changes in lifestyles, as well as the development of new media.

At the same time, it should be noticed that development of marketing is multidirectional. This is reflected in the emergence of new marketing concepts, including the concept of a system product, which was created by L. Żabiński. The essence of system products is the fact that by purchasing them, the buyer simultaneously acquires many values without the need to compose them themselves. It should be emphasized that system products support satisfaction of not one, but a whole bunch of needs felt by the consumer, which belong to many levels of needs. What is more, further features of system products also include the fact that they often have an innovative character and are distinguished by a high level of technological advancement. Intangible resources, including information and knowledge, play an important role in creation of system products. It should be added that also consumption of system products requires knowledge and skills from the consumer. Networking, perceived both through the prism of co-designing of this type of products by active users while applying new media, as well as in the context of the functioning of entities creating system products within networks created with entities in the market environment is an important distinguishing feature of system products. It cannot be neglected either that system products are distinguished by brand and have a global or glocal character (Żabiński 2012).

In this context, there occurs a question about the need and possibilities of using the concept of a system product in the management of cultural institutions. Formulating the answer to this question, which is goal of the paper, required literature studies and reference to the results of empirical research.

Adequacy of the system product concept for the sphere of culture

The specific character of the sector of culture means that using the marketing approach (Vitkauskaitė 2015) in this sphere requires taking into consideration the function of culture. The role of marketing in culture is often expressed in finding appropriate audience for the works that are the result of artistic activity (Mokwa, Dawson, Prieve 1980). In the case of cultural institutions, application of marketing does not mean that the artist must create a work while adapting to the tastes of the consumers. Marketing in culture consists in reaching market segments that may be interested in the artwork and meeting their needs. The forms of artwork promotion and distribution, as well as pricing policy should be adapted to the types of consumers and their differing behaviours. Shaping the tastes of the recipients and sensitizing them to culture, and not just satisfying the currently felt needs is also the role of marketing in culture is also (Apostolakis, Jaffry 2018; Colbert 2007; Diggles 1986; Leko-Šimić M., Štimac H., Mikrut M. 2018; Varbanova 2013, Wróblewski, Dacko-Pikiewicz, Cuyler 2017). It should be added that marketing in the sphere of culture focuses its interest both on the consumer and artist, as well as on their artwork, and also ensuring contact between creators and consumers (Wróblewski 2017).

The adequacy of the assumptions of the concept of system product from the point of view of the specificity of the sphere of culture results from the fact that culture products can perform many functions and thus enable the consumer to satisfy not one, but a wide range of needs. Among the permeating and jointly occurring functions of cultural goods that make a culture consumer receive, as in a system product, many values at the same time, especially, it is necessary to indicate the aesthetic, impressionist, cognitive, didactic, ludic and therapeutic function, as well as to the communication and integration function (Szczęsna 2002; Zimnica-Kuzioła 2003). The fulfilment of the aesthetic function by products belonging to the sphere of culture is associated with enabling the consumer to achieve satisfaction resulting from contact with an attractive form of the artwork. This is possible if the consumer adopts the aesthetics proposed by the creator. In turn, through the impressive function, cultural products affect the recipient, causing an emotional response, and sometimes also changing their attitudes. On the other hand, satisfying the cognitive needs by the products of cultural sphere results from the fact that they are a source of historical or ethnographic knowledge for example. The presented systematic character of the cultural sphere product also results from the fact that, beside the functions already discussed, it also often has a didactic function, because films or books, showing models and negative examples of characters, contain some kind of guidelines on proper conduct. It should also be stated that fulfilling functions presented above by culture products does not mean that they do not serve, as in the case of the ludic function, to provide entertainment to consumers. It is also associated with their therapeutic function, which is reflected in the fact that participation in culture can also be a form of relaxation, and through entering the world created and shown by the artists, the recipient has the opportunity to forget about their own problems. Another group of needs satisfied by culture products results from their communication and integration function, consisting in creation of the sense of community of culture participants with artists and other recipients.

When analysing the assumptions of the concept of a system product in relation to the specificity of the sphere of culture, reference should also be made to the category of innovativeness, which may apply to both the very work, as well as the forms of its distribution and promotion. Among the factors facilitating the creation of innovative solutions, the use of an interdisciplinary approach in the process of generating ideas should be indicated. It is illustrated by the "Medici effect" who brought representatives of the world of science and culture, including philosophers, poets, painters, sculptors and architects to their hometown. While establishing relationships with each other, the creators, began to develop new concepts at the intersection of the areas they were dealing with. This formed the basis for the development of the Renaissance as one of the most innovative eras in the history of the European culture. The skill of associative thinking, questioning the status quo, observing, experimenting as well as establishing contacts that consists in building relationships with people representing various environments, cultures and having different points of view are especially important from the point of view of development of innovativeness (Dyer, Gregersen, Christensen 2011).

The analysis of the attributes of the system product indicates that they are strongly interrelated, and they permeate with each other. his is illustrated by the relationship observed between innovativeness and the innovative nature of the system product and networking. On the one hand, networking is a feature of the

system product, whereas on the other hand, creation of valuable relationships within the network of connections between creators and cultural institutions with various market entities can be the source of innovation. This is proved, among others, by the example of creative clusters (e.g. Hollywood cluster). They enable creation of target teams, whose participants represent complementary skills that are necessary for a given venture to succeed. The open and changing network of interpersonal relations, which should contribute to individual development and personality enrichment performs an important function in the development of creative clusters (De Propris, Hypponen 2008; Mikołajczyk, Kurczewska, Fila 2009). Cooperation within creative clusters can translate into the introduction of innovations, because within these types of structures it is relatively easy to exchange ideas, knowledge and experiences of many creative people who can inspire each other. It should be emphasized that the so-called artistic buzz consists of ideas and concepts that are not only the result of relationships between artists, creators, but also culture consumers, art critics and representatives of science and business (Szultka 2012).

The adequacy of the concept of the system product for the sphere of culture also results from the fact that creation of such a product, as well as its distribution and promotion is increasingly based on new technologies. Relationships between new technologies and the sphere of culture are manifested, among others in the use of drones that enable taking shots that could not be made with the use of other techniques. The fundamental change resulting from the development of digital techniques also applies to visual effects. Virtual reality, which is defined in the context of a computer-generated three-dimensional environment, allowing the user of this technology to interact with virtual artefacts also has the potential (Guttentag 2010). In addition, technologization of the culture is associated with the development of streaming platforms. It is also worth noticing that, on the one hand, technological progress makes the artworks available on the Internet, and on the other hand, it increases the possibilities of deepening relationships, e.g. between film and museum, which is reflected in the artworks presented in the exhibition space, which are part of the media art, as well as film exhibitions, which create a repertoire of emotions and sensations unavailable elsewhere. These types of activities, aimed at expanding the cultural offer, well reflect the possibilities of implementing the concept of a system product into the sphere of culture. Considering the fact that knowledge plays an important role in creating a system product, it should also be emphasized that professionalization and specialization are progressing in the sphere of culture.

Transmedia projects associated with network creation of value should also be approached as system products in the sphere of culture. Their essence is the artwork functioning on many levels because a story presented in one medium is developed in other media (Jenkins 2006). They are often distinguished by a strong brand, which is an attribute of a system product. At the same time, it should be noticed that in the modern world cultural institutions are becoming brands that well promote cities, regions and countries. The analysis of the processes of management of cultural institutions also allows to state that cultural products increasingly more often have a global or glocal nature. It is associated with the development of the Internet, television formats, international distribution of cultural products and it requires culture managers to solve standardization problems and adapt their offer to the local market in the conditions of growing internationalization.

Methodology of Own Research

Aiming to implement the goal of the paper, reference should be made to the results of conducted quantitative empirical study. Its features include objectivity, verificationism, quantifiability, coherence, as well as the use of statistical data analysis (Leavy 2017). The questionnaire survey was conducted on a Poland-wide sample of 451 cultural institutions selected in a probabilistic manner. From the point of view of groups of respondents, the survey included general directors, artistic directors and managers, managers of marketing, promotion and sales departments, as well as owners of cultural institutions. Random layer selection was used as the basic method for selection of entities for the study. The layers were separated according to the type of cultural institution and the study comprised museums, art galleries and salons, theatres and music institutions, cinemas, cultural centres, as well as publishing houses as the key entities from the point of view of the development of the book industry. The number of entities surveyed within individual groups was proportional to the number of institutions operating in individual areas that are found in the created database of cultural entities. The surveyed market entities represented all voivodships in Poland.

Considering the scope of the quantitative research and the type of respondents as well as the nature of their work, the technique of computer-assisted telephone interviewing (CATI) was chosen (Hague, Cupman, Harrison, Truman 2016; Burns, Veeck, Bush 2016). The choice of research technique was also determined by the need of standardisation of the interview process and minimisation of the interviewer's effect. This technique also enabled flexible adaptation of the interview time to the respondent's preferences. Technical performance of computer-assisted telephone interviews with the use of a standardized questionnaire took place in the CATI studio of the ARC Rynek i Opinia research institute in Warsaw, which is equipped with professional equipment and software ensuring the proper execution of the study (Sobocińska 2015).

Implementation of the formulated goal of the paper required focusing the analysis of the results of empirical research on obtaining answers to the following research questions:

- Is increasing the diversity of the offer as the feature of a rich program of cultural institution perceived as a stimulus for the development of the cultural market? (P1)
- Do cultural institutions in Poland create and operate within a network of relations with culture consumers, other cultural institutions, creators, artists and universities to achieve their goals,? (P2)
- What role does the Internet play in the processes of management of the value for a culture consumer? (P3)
- What is the position of the brand among the instruments that cultural institutions in Poland compete with? (P4)
- What is the position of the introduction of innovation in the offer among the priorities of managing cultural institutions in Poland is the? (P5)

Answering the above questions will allow researchers to present the approach observed in cultural institutions in Poland to the implementation of the system product concept through the prism of implementation of the assumptions of the concept in the sphere of various marketing areas of the functioning of cultural institutions.

Implementation of the concept of system product in cultural institutions in Poland in the light of the results of quantitative research

Striving to show the scope and determinants of the implementation of the system product concept in cultural institutions in Poland, the attitude of people managing cultural institutions towards increasing the diversity of the offer should be analysed. This is even more important because increasing the diversity of the offer is immanently associated with features of system product as the complex nature and performance of many functions, which translates into a broader and more varied bundle of consumer needs satisfied by cultural institutions. The analysis of the results of conducted quantitative research allows to state that increasing the diversity of the offer of cultural institutions seems to stimulate the development of the culture market in Poland. This factor reached an average value of 6.04 on a seven-point scale, on which one represents a little important stimulant of the development of the culture market in Poland, and seven means a very important stimulant. It is also important that increasing the diversity of the offer, that allows cultural institutions to meet a broad range of consumer needs, is accompanied by attaching great importance to the increase in the quality of the offer. Among the stimulants of the development of the culture market in Poland, the respondents attributed the value of 6.02 to increasing the quality of the offer. The obtained results are the basis for giving a positive answer to the first research question (P1). It should be added that there is a relationship between perceiving the increase in the offer diversity by surveyed decision-makers in cultural institutions in Poland and experiencing by them of the need to increase the scope of marketing activities (Kruskal-Wallis test: χ^2=14,146, df=2, p-value=0.000). This means that the implementation of the concept of a system product by cultural institutions is in line with the adoption of market orientation by them, which is manifested in the implementation of marketing principles.

It is also characteristic that there are also correlations between high ratings given to such determinants as: increasing the quality of the developed cultural offer and increasing the diversity of this offer (Spearman's rank correlation coefficient of 0.710) and increasing the scope of cooperation between

cultural institutions (Spearman's rank correlation coefficient of 0.527). In this context, it is important to answer the second research question (P2) regarding the functioning of cultural institutions in Poland within the network of relationships created with entities in the environment.

It should be emphasised that 98.9% of the decision-makers in cultural institutions claim that in order to achieve the assumed goals, they must create and function within a network of relationships with culture consumers, other cultural institutions, the media, schools and other entities in the market environment. 63.4% of the respondents strongly agree with this opinion, and 35.5% rather agree with it. Therefore, the results of the conducted quantitative research indicate that for people managing cultural institutions in Poland, networking is especially important, which is an important attribute of the system product. The fact that that definitely more decision-makers in cultural institutions perceive relationships with other cultural institutions through the prism of cooperation, not competition complements the image that expresses the specificity of the sphere of culture. 33.7% of respondents believe that the relationship between the cultural institution they represent, and other cultural institutions is based on pure cooperation, whereas 49.7% of respondents claim that these relationships are based on cooperation with elements of competition. By way of comparison it can be added that only 16.6% of respondents indicate that relationships between cultural institutions take the form of competition with elements of cooperation (13.1%) or pure competition (3.5%).

The analysis of functioning of cultural institutions through the prism of networking needs a holistic view of the entities with which cultural institutions establish relationships. Considering the multitude of entities with which cultural institutions create relationships to meet their needs and expectations, it seems important to recognize the importance attributed to specific groups of stakeholders. The results of the performed study show that people managing cultural institutions attach great importance to meeting the needs of culture participants. This is because almost 98% of respondents included culture consumers in one of the four most important groups of entities that the cultural institutions they represent are currently focused on in terms of meeting their needs and expectations. The high position of culture consumers in the ranking of groups of recipients of cultural institutions is proved by the fact that a relatively large percentage of respondents (88.5%), while including culture recipients in one of four priority stakeholder groups, almost always put them in the first place in the ranking. The employees, including creators and artists occupy the second place in the hierarchy of the importance of entities that cultural institutions focus on in terms of satisfying their needs. Media and representatives of municipal, regional and central authorities are found in successive places in this hierarchy of importance of entities. On the other hand, such entities of the environment as sponsors, reviewers and critics, as well as the owners of cultural institutions and volunteers were less often included in the priority groups.

Moving in the analysis towards identifying subsequent features of the network of the relationships established by cultural institutions, it should be emphasized that these institutions are oriented on building permanent and trust-based relationships with various entities in the environment and, according to the decision makers participating in the study, they have such relationships. This is proved by the fact that the average rating of relationship durability for most groups of the environment is over 4 points on a seven-point scale. At the same time, the respondents also highly evaluate the relationships of cultural institutions they represent with the entities in the environment in terms of the level of trust. In this case, the lowest average rating was 3.31 (with research agencies) and the highest was 5.92 points (with culture consumers).

Conducted statistical analysis, aiming at identifying the features of the network of relationships built by cultural institutions, allows to observe that together with the increase in the duration of the relationships between cultural institutions and individual groups in the environment, there is a growing trust in these entities. In all cases, the Spearman rank correlation coefficient reached a positive value between 0.471 and 0.661. The strongest correlation occurred in the case of relationships between cultural institutions and cooperating people, including creators and artists, as well as universities (Spearman's rank correlation coefficient = 0.661, p-value = 0.000). This means that the higher the decision-makers in cultural institutions rated relationships with these entities in terms of durability, the higher they also rated the level of trust in these relationships.

Summing up the considerations regarding various aspects of the functioning of cultural institutions within the network of relationships, in the light of the analysis of collected empirical material, a positive answer to the second research question should be formulated (P2).

Relationship with new media are another important dimension of a system product related to networking. While analysing this attribute of the system product, the role of the Internet in the processes of management of the value for the culture consumers should be shown. It is worth noting that almost all surveyed cultural institutions (97.8%) have their own website, which is the heart of marketing activities conducted on the Internet. The response of cultural institutions to the development of functions and the evolution of the Internet is the fact that slightly over 82% of the surveyed cultural institutions use social media in marketing activities. This is reflected, among others, in the fact that 77.4% of the entities on the culture supply market, included in the survey, have a Facebook profile, and 64.5% of the surveyed cultural institutions that have a Facebook profile believe that the scope of its use should be expanded, while in every third it is stated that nothing should be changed in this respect.

Conducted quantitative research also shows that the managers of the studied cultural institutions perceive creating the image of cultural institutions and shaping relationships with culture recipients as the main purposes of using social media. They are indicated among the three main goals by 71.2% and 51.3% respondents respectively. Advertising cultural institutions (44.9%) is found on the third place in the hierarchy of goals of using social media. In the studied cultural institutions social media support the sale of cultural goods and services (30.9%) and obtaining information for the needs of management in a cultural institution (30.4) to a lesser extent.

Considering that social media can support engagement of consumers in the process of value creation, it should be emphasized that only every third of the surveyed cultural institutions that conduct activities based on social media includes co-creation of the offer with culture recipients among its three main goals. Furthermore, even a smaller percentage of cultural institutions (17.2%) recognise using social media as the opportunity to obtain the ideas concerning changes in the offer. This may prove that managers of cultural institutions notice many negative consequences associated with departing from the classical division of roles into professional creators, artists and recipients. Thus, the obtained results correspond well with the view presented in the literature on the subject that even though all Internet users can enrich its resources, entities belonging to the music, film and television industry, as well as the press and publishing industries that introduce to the network the content created both before its emergence and new ones are still the key providers of messages (Mrozowski 2020). However, this does not mean that the Internet is not used by cultural institutions in the process of management of value for culture consumers. A relatively broad scope of applications of the Internet in the functioning of cultural institutions is demonstrated by the fact that over 68% of them sell their cultural goods and services online. Furthermore, a larger percentage of cultural institutions (85.4) use the Internet to advertise their offer. When formulating the answer to the third research question (P3), it should be emphasized that the Internet is more used to distribute and communicate value than to engage recipients to define and shape it at the stage of artwork creation.

From the point of view of the features of the system product identified on the basis of the literature analysis, which also includes the brand, it should be noticed that it occupies a high position among the instruments that cultural institutions in Poland compete with (see Figure 1). On the basis of conducted empirical study of quantitative character, it can be stated that among competition instruments, cultural institutions attach the greatest importance to having a unique offer and to having a reputation and brand. The instruments are indicated as the three most important ways of competing by respectively 72.5% and 50.6% of the decision-makers in cultural institutions in Poland. This is also closely related to having a professional team of employees, creators and artists, which is indicated by 47.5% of respondents. In comparison, it needs to be emphasised that having low prices of the offered products was indicated as one of the three most important competitive factors only by 22.4% of respondents. While interpreting obtained research results, it is worth stating that they confirm that the specificity of the culture sector is expressed by high uniqueness of cultural goods. In addition, it should be noticed that economic determinants,

including the level of prices of cultural goods and services in relation to income, constitute a barrier to participation in culture only for people who feel cultural needs and want to increase the scope of participation in culture. The main problem related to low cultural activity is largely not caused by economic determinants, but by the absence of cultural needs or low position of these needs in the hierarchy of life values, or low interest in participation in culture (Kotler, Scheff 1997).

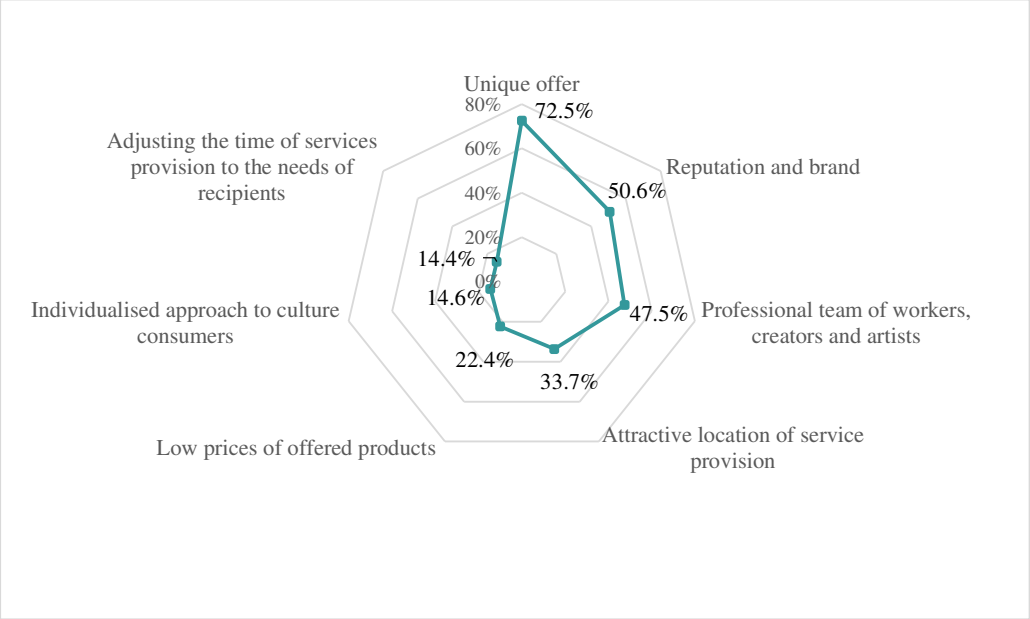

The results do not add up to 100%, because the respondents could indicate three answers.

Fig. 1: Brand position among the ways of competing in cultural institutions

Source: Own study

Answering the fourth research question (P4), it should be stated that on the culture market in Poland, non-price methods of competition, especially those related to creation of a unique offer in terms of artistic experience, as well as having a strong brand are applied to a much greater extent.

While aiming to determine the extent to which cultural institutions in Poland implement the assumptions of the system product concept, the analyses should include the aspect of implementation of innovations. 45% of the surveyed decision-makers in cultural institutions in Poland perceive the implementation of innovations in the offer as one of three management priorities. For comparison, it is worth indicating that a similar percentage of respondents (45.5%) include care of the high artistic quality of the offer among three main areas on which managers of cultural institutions should focus. This is illustrated in figure 2.

It should be positively assessed that such categories as building long-term relationships with culture consumers and gaining culture recipients occupy the highest places in the hierarchy of management priorities in cultural institutions in Poland. They are indicated as the three most important aspects of management respectively by 55.4% and 50.1% of people managing cultural institutions in Poland. The image of the way of assessing the priorities in managing cultural institutions that emerges from the analysis of the results of the study allows to state that introduction of innovations in the offer is an important aspect of management in cultural institutions. Referring to the respondents' answers, it is worth noting that the introduction of innovation in the offer ranks fourth among eight determinants that can be perceived as priorities in the management of cultural institutions. This constitutes the answer to the fifth research question (P5).

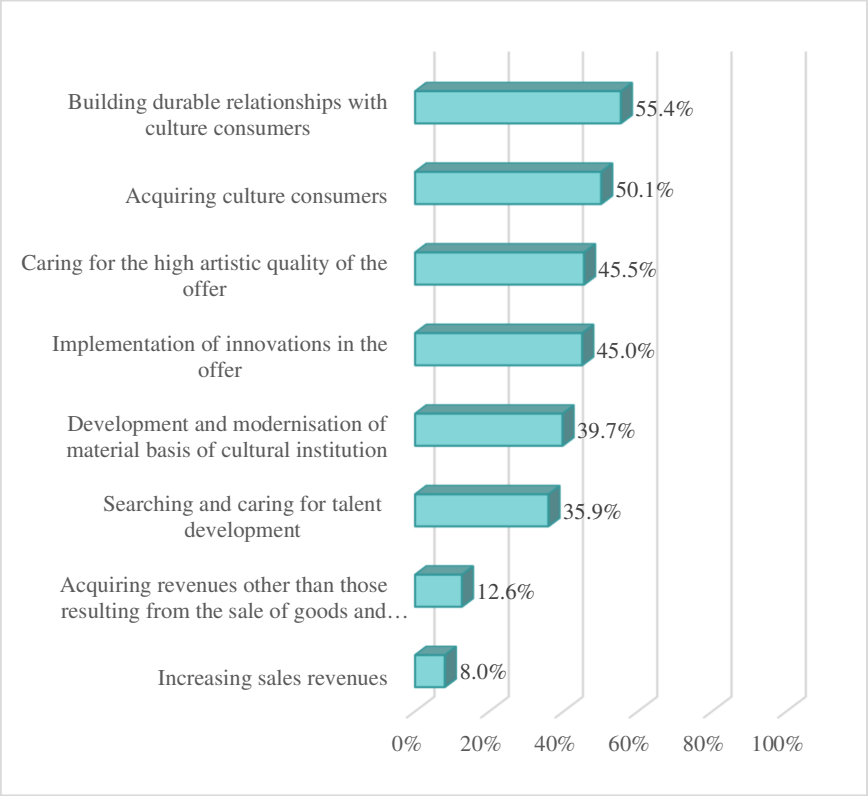

The results do not add up to 100%, because the respondents could indicate three answers.

Fig. 2: Priorities in managing cultural institutions in Poland

Source: Own study.

Conclusions

Conducted research procedure allows to state that the concept of a system product well reflects the changes taking place in culture management. The emergence of an increasing number of system products appears to be one of the trends of development in the management of cultural institutions. Considering the fact that the essence of a system product is that the consumer acquires many values at the same time and has the opportunity to meet different needs, the trend that cultural institutions provide recipients with many impressions in one place and in a relatively short time should be indicated. This is reflected, among others, in organizing concerts and film shows by museums, fine art exhibitions by theatres or separating recreational and cafe spaces in cinemas. This leads to blurring of boundaries and disappearing of divisions into firmly separated fields of art through combining various areas of art within the framework of activity of one cultural institution. The attractiveness of such solutions for culture consumers results from the insufficiency of free time, as well as a large number of cultural events. Therefore, culture consumers often choose such cultural events that enable them to acquire many values as well as feel many sensations and impressions in the same place and time (Szlendak, 2010). On the basis of literature studies and the results of empirical research, it should be stated that also other attributes of the system product are quite strongly observed in the management of cultural institutions.

Moving from the general to the specific, in accordance with the deduction method, the possibilities of implementing the idea of a system product should be shown in the conclusions on the example of the cultural institution of New Horizons Cinema. The method of creating system product attributes by this culture entity is shown in Figure 3. This example also confirms the attractiveness of the concept of system product for the sphere of culture and indicates the legitimacy of its implementation.

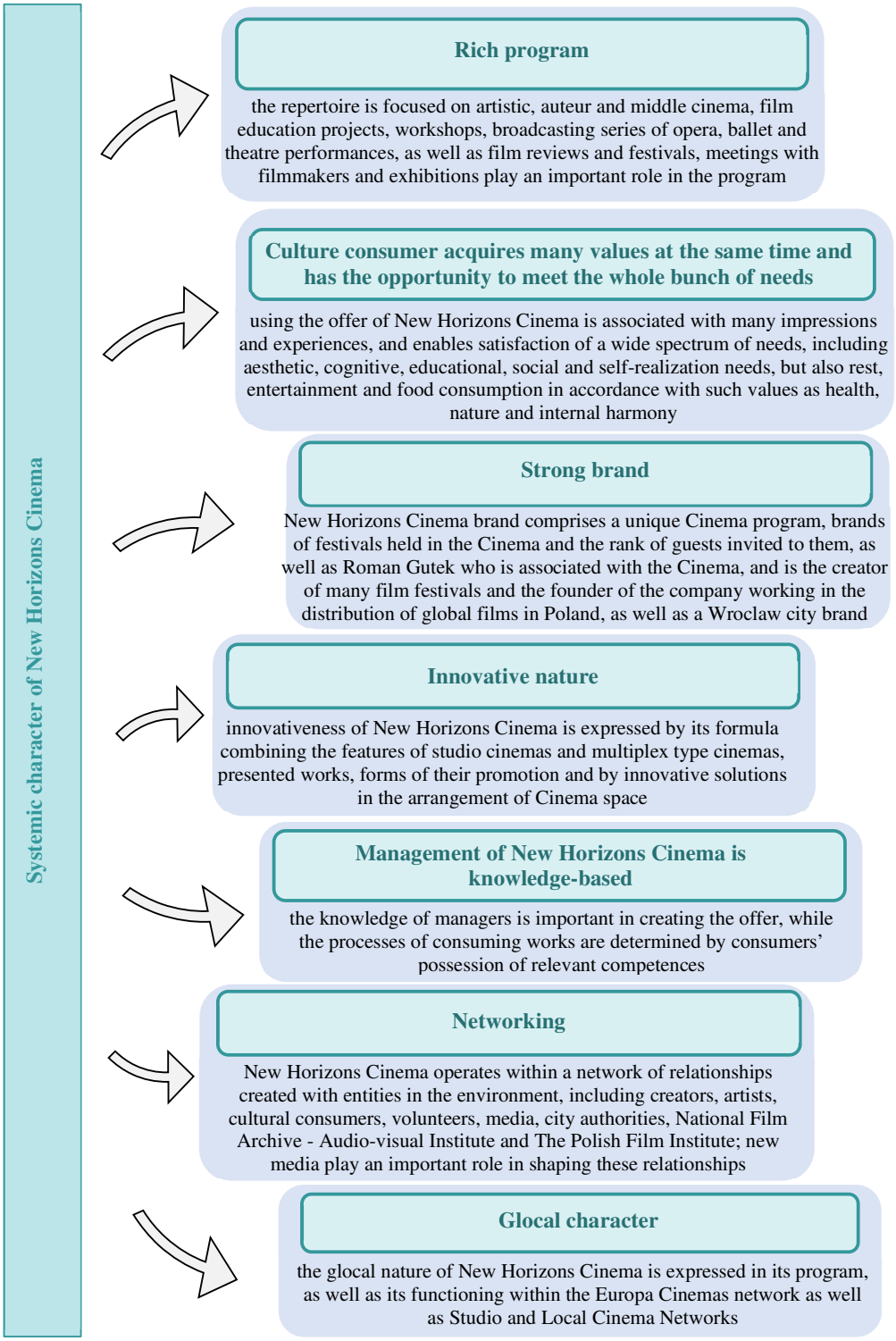

Fig. 3: New Horizons Cinema as a system product

Source: Own case study.

The analyses performed in the paper indicate the need for further research in the field of discussed issues. It would be especially reasonable to extend the scope of empirical research and to include cultural institutions from other countries. Recognizing the level of satisfaction of culture consumers using various system products created by cultural institutions could be another trend of research.

Acknowledgements

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Indicators and Measures of Thermal Energy Poverty in The Shaping of The National Energy Security Policy, Based on The Example of Poland

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Abstract

The aim of this paper is to present a proposal to use indicators and measures of thermal energy poverty of households and an attempt to develop, based on the indicators and the measures, a definition of the thermal poverty phenomenon, which such a definition shall enable a proper shaping of the national energy security policy. The main motive for addressing this subject is, first of all, the lack of this deprivation's unambiguous determinants and the lack of this deprivation's unambiguous measures covering all households that experience the deprivation; secondly, the lack of an unambiguous definition of the thermal poverty phenomenon - which such definition would be recognised by all experts specialized in this subject, as well as by various public policies dealing with the elimination of this phenomenon. The research problem will focus on three issues: the attempt to define the concept of the household thermal energy poverty based on an international literature review; the discussion on the household thermal energy poverty phenomenon in Poland and the presentation of the research methodology in determining indicators and measures of household thermal poverty. The research problem addressed in the article is theoretical and empirical. For a deeper presentation of the problem, the following methods were used: analytical and synthetic methods, inference and also quantitative and qualitative methods.

Keywords: Security; Thermal Energy Poverty; Thermal Poverty Indicators; Thermal Poverty Measures.

Introduction

Polish households are among those, which are characterized, among other European Union countries, by one of the highest ratio of expenditure on thermal energy. They amount to 11% and constitute the basic part, i.e. 2/3 of all energy expenditure. To heat a flat or to heat meals, households use various types of thermal energy carriers, depending on the type of heating installation in a flat. The largest share is held by expenditure on hard coal (21%), followed by natural gas (17%), municipal gas (17%) and central heating (16%) (Świerszcz 2017b). The Czech Republic (13%), Slovakia (14%) and Hungary (17%) have a slightly higher share of expenditures on thermal energy than Poland (Bouzarovski 2018). However, it should be noted that a high share of these countries is characteristic for almost all Central and Eastern European countries. This shows that the thermal energy expenditure burden in this part of Europe is much higher than in other European countries.

The high share of thermal energy and the consequent high expenditures on it have long been a serious challenge for households, consisting of difficulties in maintaining the thermal comfort and ensuring healthy existential and living conditions for their inhabitants. It can be said that the care to maintain optimal heat in households is one of the basic activities for those inhabitants. Ensuring these standards is at the same time a fundamental element of social security systems, as well as the subject of strategies and policies for energy security developed both on local and on national level in all developed countries. The United Nations HABITAT Agenda, which deals with the sustainable development of housing estates worldwide, in its "The Right to Adequate Housing" document it highlights, inter alia, the need for households to have access to energy for cooking and heating; to be

protected against cold, humidity and heat; and to be protected against other health and structural risks (The Right 2009). Despite this fundamental need and necessity to have access to thermal energy and the possibility to provide optimal thermal standard to household residents, the issue of setting unambiguously the limit of deprivation of these needs is not fully defined at present. There are no clear deprivation's indicators and deprivation's measures covering all households that experience it. One of the manifestations of this phenomenon, referred to as thermal energy poverty, until now has not been clearly defined in a way that would be recognized by all experts specialized in this subject, as well as by various public policies whose task is to eliminate this phenomenon (deprivation).

The aim of the paper is therefore to present a proposal to use indicators and measures of household thermal energy poverty and an attempt to develop - based on them - the thermal poverty phenomenon definition enabling the proper shaping of the national energy security policy.

The research problem addressed in the article is theoretical and empirical. For a deeper presentation of the problem, the following methods were used: analytical and synthetic methods, inference and also quantitative and qualitative methods. Polskie europejskich.

The concept of household heat energy poverty based on an international literature review

Thermal poverty, which is the element of energy poverty (fuel poverty, energy poverty), is currently a disturbing phenomenon in social life, which is experienced in Poland, as well as in other low- and high-developed countries of the European Union and even in the world. Among the member-countries of the European Community, it is estimated that the problem of energy poverty affects between 50 and 125 million people, particularly in the countries of Central and Eastern Europe, as well as in the countries of Southern Europe. In Poland, however, this phenomenon is experienced by about 12% of households in winter and 27% in summer, especially in large voivodships with an increased number of single-family houses, such as: Wielkopolskie, Mazowieckie, Podkarpackie, Małopolskie and Lubelskie; as well as in less developed voivodships, such as: Warmińsko-Mazurskie and Opolskie. This rate is higher than the European average of 9.8% in winter and 18.1% in summer (Owczarek and Miazga 2015; Howard 2015); (Sánchez-Guevara Sánchez, Mavrogianni and Neila González 2017). This is shown in Figure 1.

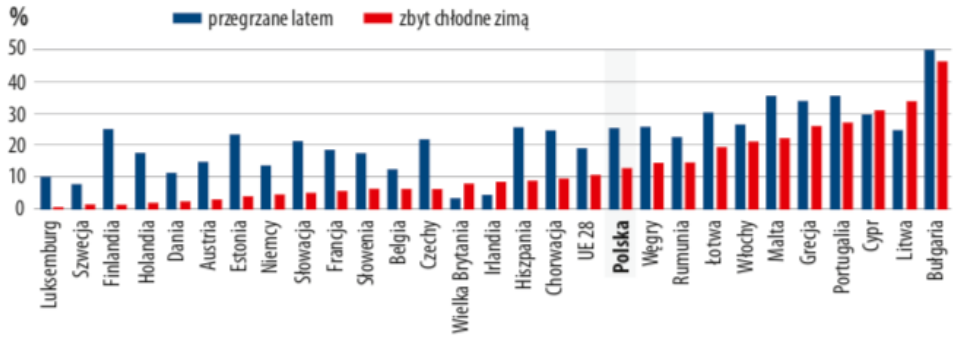

Fig. 1: The level of household energy poverty in winter and summer, in individual European countries in 2018.

The studies show that these figures can increase continuously as energy prices rise. The scale of the energy poverty experienced indicates that this phenomenon is not something new in human (social) empiricism, but nevertheless it has only nowadays been conceptualized and studied as an autonomous problem. Due to its scale and importance, this problem is particularly visible in the aspect of the thermal poverty phenomenon. At this point it should be noted that this concept, in its wording, is not

present and used both in Polish law and in all-Poland public policies. It is also not directly articulated in the subject literature, both domestic one and foreign one. However, aspects and traits of this concept can be found in this literature. They can particularly be seen in the statements of subject's experts examining the energy poverty phenomenon, the scope of which is much broader, because it also includes electricity.

Referring to the thoughts shown in a national literature, it is worth noting the definition by D. Owczarek and A. Miazga, in which one can find aspects concerning thermal poverty. They can be seen when, as the authors say, households' inhabitants experience two difficulties in terms of energy needs. The first one is the problem to maintain a certain thermal standard, which allows to adequately satisfy the basic needs of a biological and social functioning of household's inhabitants. At this point it should be emphasized that the thermal standard in Polish flats, determined by law, allowing you to experience the sense of comfort, is the temperature of 21oC and in other occupied rooms is 18oC (Świerszcz 2017a; Owczarek and Miazga 2015). The second difficulty are problems to purchase thermal energy for a reasonable price in a place of residence (Szpor 2016; Scarpellini, Sanz Hernández, Llera-Sastresa, Aranda and López Rodríguez 2017). A significant complement to the understanding of the thermal poverty phenomenon can be found in the definition of energy poverty developed in the Research Paper by A. Stępniak and A. Tomaszewska. Speaking of the various aspects of the problem they are discussing, the authors draw attention to such aspects as: experiencing by household members the problem to maintain a comfortable thermal level (temperature), the lack of funds to pay bills for heating or to repair a non-functioning system or heating device; the inability to buy and install a new system or device; and, finally, the inability to adequately modernise their heating system. Another, very important element defining the thermal poverty phenomenon in the discussed problem of energy poverty is the constant experiencing by the inhabitants not only the coolness, but even the cold, and related humidity of the air and walls, as well as fungus of walls, whose natural consequence are frequent diseases of the inhabitants and mental discomfort. Thermal poverty means also a difficulty to heat up utility water, which is needed by inhabitants in their everyday lives (Świerszcz and Osial 2019; Stępniak and Tomaszewska 2013).

The issue of thermal poverty and an attempt to define it in the context of energy poverty can be found not only in the subject literature dealing with this issue in the scientific aspect, but also in government documents. The example is the "the Draft of the Energy Policy of Poland until 2050" proposed in 2014. In this document, the thermal poverty phenomenon considered in the context of energy poverty is understood as the situation, in which households are exposed to a reduction in energy consumption to the spheres and level absolutely necessary for them to function on daily basis (Projekt Polityki 2014).

In the foreign subject literature, the authors from the Great Britain are the precursors of the scientific approach to the thermal poverty phenomenon discussed in the context of energy poverty. Among these authors, B. Boardman deserves special attention, who, undertaking a thorough examination of energy poverty, based on her experience and specificity of the phenomenon in her country, which is Great Britain, specifies the definition, from which elements concerning the thermal poverty phenomenon can be extracted. These elements refer to a situation in which, as the author notes, households - in order to achieve a sufficient level of heating, i.e. a temperature of 21oC in main rooms and 18oC in other rooms - are forced to spend more than 10% of their income. These expenditures relate both to costs incurred for heating and to the costs of water heating, cooking, lighting and the use of electrical equipment. In other words, these expenditures relate to all types of energy, including thermal energy, and vary depending on types of flats (Bordman 2012; Pye and Dobbins 2015; Hilbert and Werner 2016). In this definition, the author draws attention to two issues: hypothetical expenditures on energy and the threshold for household income, which is 10%. It should be stressed that this definition has, for a long time, been the basis to shape public policies not only in the UK but also in other countries experiencing the thermal poverty problem.

A complementary definition - functioning in parallel - is the Low Income High Costs (LIHC) definition, developed in the UK in mid-2013. This definition, specifying the energy poverty phenomenon, uses two criteria to determine the state of thermal poverty, which are: low financial

income of household members (Low Income) and high energy expenditures (High Costs). Considering these criteria, this definition is referred to as Low Income High Costs (LIHC), i.e. high costs and low income (The UK Fuel Poverty Strategy 2008). It should be stressed that the above-mentioned definition of energy poverty, which includes elements of thermal poverty, was until recently the only formally adopted and preferred definition of the phenomenon. Therefore, most of the research and statistics done so far, have been and are still being carried out on the basis of this definition.

A major contribution to a more precise definition of thermal poverty discussed in the context of energy poverty is the definition by J. Hills of the London School of Economics, which the UK Department for Energy and Climate Change (DECC) adopted in 2013 as officially binding (Fuel poverty 2013; Bakirtas and Akpolat 2018; Zalewski 2015). In this definition, the author, referring to the thought B. Boardman and Low Income High Costs (LIHC) methods, more precisely specifies this phenomenon, taking into account two aspects. The first one concerns the situation where the thermal energy costs borne by the household members exceed the average value for a given type of household. The second one refers to the situation where the costs incurred shift the remaining income of the household below the official poverty line (Fuel poverty 2013). The above two definitions authored by B. Boardman and J. Hills, as well as the developed LIHC method, are currently one of the best developed definitions that allow to determine, in a reasonably accurate manner, the level of thermal poverty and groups of addressees of relevant public policies in individual countries of the European Union.

A slightly broader definition of thermal poverty can also be seen in the definition of energy poverty proposed by A. Asher. According to him, this phenomenon means the situation, in which the inhabitants of households experience certain disadvantages, such as: the difficulty to maintain a comfortable temperature of a flat (house), i.e. warmth in winter and coolness in summer, difficulty to pay energy bills, difficulty to repair a non-functioning heating system, or difficulty to modernise it or install a completely new one due to lack of funds and finally experiencing humidity in a house (Asher 2016). Another noteworthy aspect, despite the less precise concepts, is the definition drawn up by the European Economic and Social Committee in the context of an international project. Their 2009 European Fuel Poverty and Energy Efficiency Project (EPEE) report on energy poverty also reveals elements of the definition of thermal poverty. This term is understood as a situation where a household experiences difficulties or is completely unable to provide an adequate level of heating at an affordable, fair and affordable price to ensure comfort and healthy living, working and other forms of everyday life for its residents (EPEE project 2009). The quoted way of understanding thermal poverty is a general concept of its understanding. However, due to the lack of a clear focus on the concepts contained therein, it is difficult to take it as a reference point for setting criteria for supporting households as groups experiencing this phenomenon or sensitive to it, within public policies. However, being aware of the dynamics of phenomena affecting the nature and state of energy poverty, in 2011 the European Economic and Social Committee proposed that their definition should be adapted to the national conditions of each of the Member States of the European Community and that the problem of energy poverty should become a new social priority (EPEE project 2009).

An attempt to define thermal poverty can also be found in the definition of energy poverty in the UN-HABITAT Agenda for the Sustainable Development of Housing Estates in the World. In The Right to Adequate Housing, this phenomenon is defined as a state of experiencing difficulties in meeting basic household needs at the level of free access to the energy needed to heat rooms and cook food. It is also a condition in which households experience difficulties to protect against cold, moisture and heat. In other words, it is the situation that constitutes the serious barrier to the exercise of the fundamental right to adequate housing and creates the obstacle to the sustainable development of settlements and communities (“he Right to Adequate Housing 2009).

The analysis of both domestic and foreign literature on energy poverty leads to an attempt to define the own concept of thermal poverty phenomenon of households. Therefore, thermal poverty can be defined as the state of experience in a longer period of time, the state of difficulties in integral

satisfaction of basic needs of thermal energy - affecting the state and existential and living level (health, development, education) of households - both in terms of quality and price, inaccessible to its inhabitants, which results in difficulties in adapting to the requirements and standards in terms of thermal energy and, as a consequence, results in social exclusion.

The definitions of thermal poverty given above, due to their content, in which they draw attention to various aspects and aspects of this phenomenon, and which complement each other, can be ordered and thus divided into specific types (kinds) of thermal poverty. The first type that emerges among the definitions of the studied phenomenon are the definitions of thermal poverty in economic terms. They point to the deprivation of access to basic material goods and resources, which is experienced by the inhabitants of households, among whom heat energy is mentioned as a significant good. It should be stressed, however, that the understanding of thermal poverty in economic terms cannot be equated with economic poverty, even though it coexists with it. This is all the more important because the measures taken to protect against the loss of thermal poverty can never be complete when using instruments to counteract economic poverty (Sałach and Lewandowski 2018).

The second type of definition of the studied phenomenon are the definitions of thermal poverty in absolute terms. This type of definition, speaking about the essence of thermal poverty on the one hand, draws attention to the unavailability by households in a given country (region), at a given time (year, quarter, month), to a given, abstract and minimum (necessary) set of a basket of goods, among which there are thermal energy resources and related values. They consist of basic products and services necessary to satisfy the needs to maintain an optimal standard of household heat and to satisfy other needs requiring such heat, necessary to maintain biological functions (reduced to a minimum of existence or extreme poverty), or to satisfy basic biological and social needs (reduced to the so-called social minimum threshold). On the other hand, these definitions draw attention to the criterion of the necessary thermal energy expenditures (energy costs) in reference to a type of dwellings (buildings), in terms of their surface area, which such expenditures are borne by the inhabitants of households in order to meet their thermal needs. This criterion is the affluence of their budgets, and more precisely the exceeded 10% threshold of household budget expenditures (Deniszczuk, Kurowski and Styrc 2007; Maj 2018). It should be noted that this assumption is arbitrary, but is nevertheless considered optimal by many countries.

The third type of definition of the analysed phenomenon are the definitions of thermal poverty in relative terms. These definitions, when referring to "basic thermal needs" and "reasonable price", refer to average (mean) expenditures of the entire population (country, region), with which a given household is compared. In other words, these expenditures are related to the income of households in the population (country, region) (Owczarek and Miazga 2015; Wojnarowska-Szpucha 2019). Thermal poverty in this respect is therefore a variable value and refers to the average standard of living in a given population (country, region), which is most often measured by the amount of average income (expenditures). In this approach, these definitions generally understand thermal poverty as 50% of the average monthly expenditure of all households, taking into account the equivalence of the OECD (Świerszcz and Osial 2019; Świerszcz 2019; Gawlik-Kobylińska 2018) These definitions assume that if, per household member, energy expenditures are higher than average expenditures in the population (country, region), it is very likely that the costs of thermal energy will constitute a significant burden on the budget of the household, and thus it can be assumed that this household will be exposed to the experience of thermal poverty. Definitions of thermal poverty in relative terms, draw attention to two aspects, such as: data on high (hypothetical) expenditures on heat per household population and data on low incomes of a household. In these data, they simultaneously indicate the threshold of expenditure for energy purposes (which is more than the mediana of equalized energy expenditure) and the threshold of economic poverty (which is less than 60% of the mediana of equalized income per capita of the household) (Węglarz, Kubalski and Owczarek 2014; Domalewska and Bielawski 2019).

Presenting above three types of approach to the concept of thermal poverty, i.e. economic approach, absolute approach and relative approach, it seems that at present the most appropriate and precise way to understand this concept and phenomenon is the last approach, i.e. relative approach.

Nevertheless, also this way to capture the thermal poverty raises some doubts and reservations. These doubts and other doubts show that in practice, in order to credibly and reliably determine the thermal poverty phenomenon in a given area, one should not use a pure relative approach. It may lead to the promotion of inefficient and irrational use and wastage of thermal energy. Moreover, there is a risk that those people (the poor) who save heat will not be considered poor in heat energy because, in their case, the percentage of expenditures they incur will always be lower. To sum up, it can be said that despite the great interest in the issue of energy poverty, especially in the scientific aspect, expressed in numerous attempts to define this phenomenon, no reliable, unambiguous, coherent and universal content has been developed so far - both in scientific and sociological terms, as well as for the needs of public policy instruments. The reason for this seems to be the nature of the phenomenon of energy poverty (the phenomenon of thermal poverty), which on the one hand is characterised by relativity and on the other hand by dynamism.

Another, also important reason resulting from the first reason is the difficulty to select appropriate measures (indicators). It results from the lack of an unambiguous definition of energy poverty (thermal poverty), which allows to precisely determine the level and scope of the analysed phenomenon. This issue will be discussed in more details in the next subsection (The measures of thermal poverty and their imperfections). Considering this fact, it is still valid to make recommendations on the need to conduct further research on this phenomenon, which has not yet been sufficiently recognised in our country, in order to develop a definition of energy poverty, including thermal poverty, together with the indication of clear criteria allowing to qualify people to the group of poor in energy terms (also in terms of heat), as well as to estimate the scale of this phenomenon in Poland, taking into account the geographical division. The challenge of the need to adjust public policy to the scale and characteristics of this phenomenon is also up to date, as well as a reliable assessment of the appropriateness of reaching and effectiveness of the hitherto applied aid (shielding) instruments in alleviating energy poverty (thermal poverty), thus implementing a policy model based on knowledge (evidence) rather than intuition. Moreover, it seems advisable that the final shape of the definition of thermal poverty of households - if it is to be the basis for shaping public policy instruments - should be constituted in a broad public debate on the scope and forms of support for the inhabitants of households affected by thermal poverty.

The phenomenon of thermal energy poverty of households in Poland

Thermal energy poverty in Poland is little known and therefore little researched, although it is experienced and felt in practice. Its manifestations can be seen in various aspects of the existence of Polish families and their households. They are most often expressed in the following forms: lack of access to central heating - 16% of households; at least once a year late payment of utility bills - 14% of households; flats not heated up in winter - 11.5% of households; spending more than 10% of one's income on energy - 9.6% of households; lack of hot running water - 4.0% of households; late payment of energy bills - 2.5% of households. The situation is shown in Figure 2.

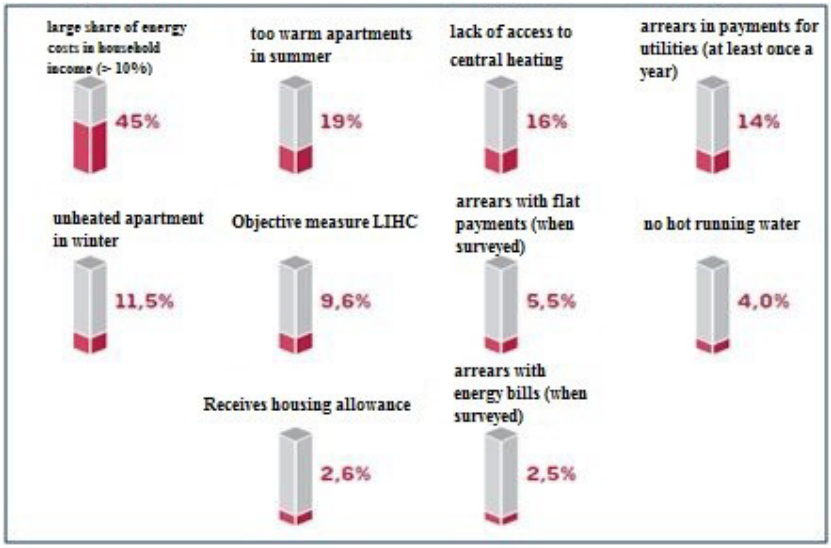

Fig. 2: Lack of meeting basic energy needs of households in Poland in 2018.

Preliminary studies show that to some extent every fourth or fifth household has difficulty to close its home budget, and the share of thermal energy expenditure is becoming a dominant position in the necessary expenditure. The cost of thermal energy used by household inhabitants is influencedby its price and consumption, as well as the technical condition of buildings, their energy efficiency, thermo-modernization, awareness of efficient use of energy and many other factors. As shown in Figure 3.

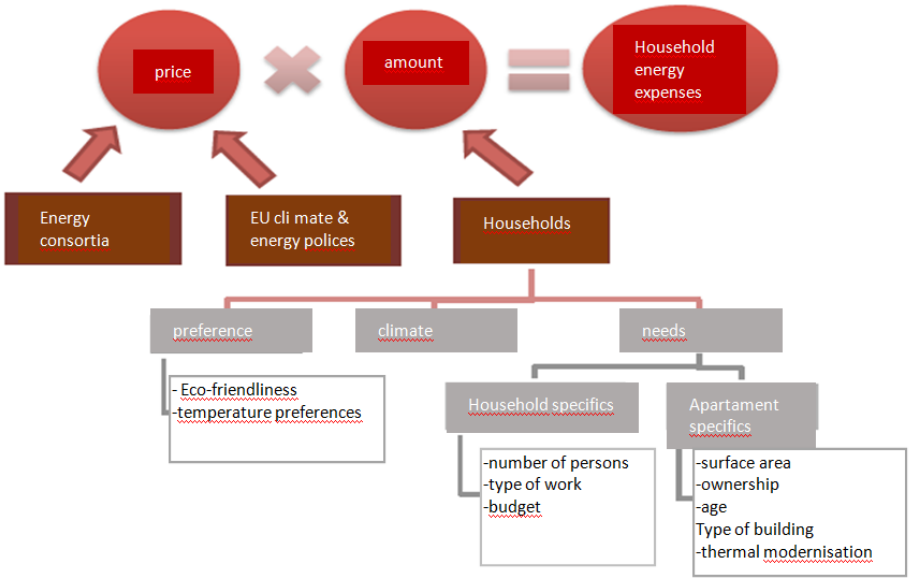

Fig. 3: Schematic representation of the energy expenditure generation mechanism in Polish households.

Based on the research conducted by the Central Office of Statistics (GUS, 2018) in 2016-2018, households (about 14 million) consumed on average about 2100-3000 kWh (kilowatt hours) of thermal energy within the year. This energy is used mainly for room heating, water heating and food preparation. This is shown in Table 1.

Table 1: Household thermal energy consumption by type of use

The areas of use	2016	2017	2018
The heating of rooms	71.3%	70.2%	68.8%
The heating of water	15.0%	14.4%	14.8%
Preparation of meals	7.1%	8.2%	8.3%

Comparison of the results of the amount of thermal energy consumed with the expenditures allocated to it in the total household budget - which, according to the definition, may be a criterion for determining the poverty of thermal energy - shows that in 2016-2018 the share of expenditures on thermal energy carriers themselves remained at the same level, i.e. 20.1%.

The price of electricity for households increased on average by more than 3% annually between 2016 and 2018. This price increase caused the share of expenditures to use a flat or a house and energy carriers to slightly increase within this period. According to Eurostat data, in 2016-2018 on average about 22% of the Polish population, i.e. about 8.6 million people, were not able to cope with the costs to heat up their flats in winter to a degree that would ensure thermal comfort. In the same period, less than 17% of the population, i.e. about 6.4 million people, had problems to timely pay their electricity bills. These arrears to energy companies were as follows: in 2016. - 3.9%; in 2017. - 4.3%; in 2018. - 4.7% of all households (Pachauri & Jiang, 2008); (Sovacool 2013). Therefore, as can be seen, the level of energy poverty among households is constantly increasing, which clearly indicates that the problem of energy poverty in Poland is of significant importance.

The results of the conducted analyses showed that the level of energy poverty in our country in 2018 was 17.1% (6.44 million Poles). Particularly vulnerable groups include, inter alia, multi-generational or multi-children families, farmers and villagers, pensioners and residents of single-family houses or flats ranging in size from 91 to 120 m2. Taking into account the technical condition of buildings, studies show that the highest percentage of energy poverty was observed in buildings between 1946 and 1960, and the lowest in buildings put into service after 2006 and new buildings, i.e. those built between 2000 and 2018. This fact clearly illustrates the existing link between the occurrence of this phenomenon and the low energy efficiency of buildings, e.g. the lack of appropriate insulation, or the leakage of windows and doors.

As socio-economic reality shows, the level of energy poverty depends to a large extent on, inter alia, the price of energy and the volume of its consumption. The latter, in turn, depends on the factors such as: the degree of energy efficiency of the building, the use of expensive heating sources, inadequate management of temperature in a flat, the use of other energy-using devices and many others.

However, these two criteria (energy price and consumption) do not provide a clear indication of the existence of energy poverty. Not every household will suffer from inconvenience as it pays high costs for energy and consumes a lot of it. This fact indicates that also in this case, an appropriate criterion for determining energy poverty should be an income criterion - however, in relative terms (relative income) in relation to the income of households in the population. Such a criterion is relative economic poverty. Thus, if a household has a higher energy expenditure per population and at the same time has lower income than the average in the population, then there are grounds to believe that

the household is experiencing or at high risk of energy poverty (Owczarek and Miazga 2015; Bouzarovski and Petrova 2015).

Research methodology in determining indicators and measures of thermal poverty of households

The existing definitions of thermal poverty are not sufficiently precise in both domestic and foreign literature. In their content, they do not clearly define the limit of deprivation of basic needs, the exceeding of which gives rise to the thermal poverty phenomenon. The lack of an unambiguous conceptualisation of this phenomenon means that the way it is understood is not clear both among experts and in public policy on energy security, which sets the priority to reduce this deprivation.

The possibility to achieve this objective, therefore, raises the need to define appropriate indicators and indicate the thermal poverty measures, which will allow for a more precise definition of this phenomenon and show its scale both in the national and local aspect, depending on the needs.

Referring to the hitherto developed definitions of thermal poverty, two types of indicators of this phenomenon can be distinguished: the measure in absolute terms and the measure in relative terms. They are two separate types of measures that require adjustment (appropriate adaptation) to the appropriate conditions of households in a given country, in this case in Poland.

The first type of measure of thermal poverty is the type in absolute terms, talking about the 10% threshold of expenditures on thermal energy. This type of measure requires the identification of two issues. The first issue is to determine the indicator, which is a basket of goods (i.e. the determination of specific, basic energy needs) and its value (i.e. a reasonable price), which includes products and services necessary to maintain biological functions, i.e. life support (limited to the level of extreme poverty / minimal existence) (Deniszczuk et al. 2007; Dębicka and Mitkow 2015) or, alternatively, the satisfaction of basic biological and social needs (defined as the social minimum threshold) by the inhabitants of households. The second issue is to determine the indicator of the threshold for expenditure on heating relative to household income, which should be considered reasonable and necessary in the household budget. This determination is all the more necessary because it makes it possible to determine whether and to what extent a household can afford to maintain its flat of its own type and nature. Taking into account the different types and characteristics of the flats of the households, criteria such as, for example, the biological type of the household; the type of person in the household; the type of child in the household; the types of socioeconomic groups; the type of surface area of a flat; the type of year in which a building is constructed; the type of ownership of a flat and others should be taken into account.

The amount (threshold) needed to fulfil these functions and needs is calculated for the household per capita by applying the equivalence scale established by the OECD each year. It should be noted that the data thus obtained on the amount (threshold) of the household surveyed (converted per capita) are objective in nature. This data is calculated on the basis of the actual purchasing power of the household in a given place and at a given time. The construction of this indicator is therefore simple, it assumes an objective value of the defined basket of goods consisting of thermal energy. Fulfillment by a household of this indicator (criterion) of extreme poverty (existence minimum) or social minimum depends exclusively on financial resources and current prices of goods (thermal energy), which are necessary for it to maintain biological functions (life) or possibly to satisfy basic social needs (Świerszcz 2016a; Owczarek and Miazga 2015).

Using this type of measure of thermal poverty, it should be stated that in 2018 this phenomenon affected about 46% of Polish households (about 19 million people). Among them, the most vulnerable are people from single-person households (59%), people living on disability benefits (57%), people living on social benefits (49%), and also married couples with one child (23%). The problem of thermal poverty is most visible in the eastern and southern part of Poland, in the following voivodships: Podkarpackie (48%), Świętokrzyskie (47%), Lubelskie (45%), Małopolskie

(40%) and Podlaskie (39%). The reason for this phenomenon in these areas of Poland is low household incomes. These are also predominantly rural areas, where thermal poverty affects more than 50% of households, while in cities with more than 500,000 inhabitants, it affects only 12%.

The second type of thermal poverty measure is a type in relative terms, which refers to the definition of thermal poverty defined as Low Income High Costs (LIHC), defining the conjunction of two independent criteria (indicators), which are: low household income (Low Income) and high energy costs (High Costs). This type of meter also requires two steps within each criterion.

Under the first criterion, which is "High Costs" (HC) - the first step is to determine two uncertainties, which are two indicators (criteria) of thermal poverty, which are: hypothetical (model) data on household thermal energy expenditure per capita (person) in the household and data on financial income of this household. When talking about the model energy expenditure of a household, it is necessary to take into account its specific characteristics, such as e.g. the type of buildings, the period of construction of the building, its character, the method of heating, insulation of the building and many others, in order to satisfy the standard needs for heat. The standard expenditure on thermal energy is 60% of the mediana of the actual expenditures on thermal energy. The obtained model thermal energy expenditures constitute the sum of the model expenditures, which the household spends to purchase heat and hot water. The methodology to calculate the model expenditures is shown in Table 1.

Table 1: The mediana of the model expenditures and equivalization rate in proportion to the number of people in the household

Number of persons in the household	Mediana of heat expenditure (PLN)	Equivalization rate in Poland	Equivalization rate in UK
1	220,59	0,96	0,82
2	230,35	1,00	1,00
3	235,16	1,02	1,07
4	273,27	1,19	1,21
5 and more	435,91	1,89	1,32

The next task taken within this first step, under discussion, is to carry out the equivalization, taking into account the number of persons in a household. The aim of this action is to make it possible to compare household expenses regardless of the number of members. This equivalization consists in dividing the expenditure the household spends on thermal energy by the appropriate coefficient, which is shown in Table 1 above. The next task taken within this first step is to divide the model expenditures by the resulting equivalization rate. This action makes it possible to take into account the impact of energy expenditure diversification, which is the effect of the size of a given household. The actions described in step one and the data derived from them are also necessary because they help to eliminate those households that spend too little or too much money on heat.

The second step is to determine two indicators of thermal poverty, which are: the threshold of expenditure on thermal energy and the threshold of financial income per capita in the household under research, using the scale of equivalence, in relation to the mediana or average income, which is in the country (region), at a specific time (year, quarter, month). At this point it is worth noting that for Poland - the Main Statistical Office (GUS, 2018) sets the threshold of 50% of average household expenditure, while for Europe - Eurostat sets the threshold of 60% of the mediana of household financial income (Świerszcz and Grenda 2018; Mitkow 2018).

When taking the second step, a number of tasks needs to be carried out. The first task is to determine the mediana of equivalized energy expenditures for the whole population. This mediana divides the collection of households into two equal parts. The first part consists of households whose expenditure

on thermal energy is above the mediana and thus meets one of the first criteria of the Low Income High Costs (LI-HC) definition, i.e. high energy costs (HC). To this end, a variable has to be created which will divide the set into households that meet and do not meet this criterion. Therefore, if a household is characterised by higher equivalent model expenditures on thermal energy per number of inhabitants in a given household - in relation to the mediana in the population (which is the criterion of high thermal energy expenditures) and at the same time has lower equivalent financial income than an average household in the population (i.e. it has less than 60% of the median income in the population) (which is the criterion of low financial income - the relative poverty threshold adopted by Eurostat for the EU) then it can be said that the household experiences thermal poverty (Owczarek and Miazga 2015; Szyłkowska 2019b). It can be assumed that the costs incurred by a household will be a serious burden on its home budget.

It should be noted that in this case, the thermal poverty indicator (criterion) is relative one. It is based on a ranking (comparison) of the income situation (average expenses, items) of a given household in relation to other households (average expenses, items) in the country (region) in a given period of time. In other words, this comparison relates to the “basket of basic energy needs” of the household and the “reasonable price” incurred for this good which is thermal energy, against the background of households in the country (region) at a given time.

Within the second criterion (indicator) which is “Low Income” (LI) - the first step is to calculate the Low Income criterion of a household by using the variable which is disposable income. For this purpose, the value of disposable income shall be reduced by all expenditures which include the costs of the accommodation - which gives rise to a income variable after deducting the expenditures for accommodation. This action makes it possible to determine the actual resources available to households after all the necessary expenditures has been made, which are always intended to be incurred. The deduction of costs related to the accommodation also eliminates from the analysis the impact of expenditures made on accommodation (which depend on the size of a flat, technical condition, location, etc.), on the resources of the household.

The second step in the "Low Income" criterion is to equivalize the household income on the basis of a previously received variable. It is the disposable income obtained after accommodation expenses are made due to the number of people in the household. The aim of this step is to be able to compare this income with each other regardless of the number of households. This equivalization is carried out on the basis of the OECD coefficient, which is shown in Table 2.

Table 2: The OECD equivalence ratios used in the calculation of disposable household income

Number of persons in the household	Equivalence ratio
The first adult in a household	0,58
The subsequent adults in a household	0,42
Children under 14 years of age	0,2

This conversion consists in dividing (quotient) the disposable income obtained, after accommodation expenses are made (IAHC), by the OECD rate.

The third step in the "Low Income" criterion - after the above calculations - is to determine the income poverty threshold. This action requires the four tasks to be taken. The first task - within the determination of the income poverty threshold - is to determine the mediana of equivalized disposable income after deducting accommodation expenses. The second task is to calculate 60% of the value above the calculated mediana. The third task is to determine the income threshold of households by adding equivalized energy expenditures in individual households to the value calculated in the second task - i.e. 60% of the mediana of disposable equivalized disposable income after deducting accommodation expenses. This task makes it possible to obtain an individual income threshold for each household. Moreover, it also allows for a result to be obtained in which the income

threshold is higher for households that have more expenditure compared to households that have less expenditure. The fourth task is to create a variable that qualifies households below or above the income threshold (Owczarek and Miazga, 2015).

Bearing in mind the above mentioned measure of thermal poverty, which is the relative Low Income High Costs (LIHC) measure, one can say that a household is poor in thermal energy when it simultaneously meets two criteria described above: high energy costs and low financial income. In other words, a household has model equivalized energy expenditures above the median in Poland and at the same time has equivalized disposable income after deducting accommodation expenditures below the economic poverty threshold (determined by the sum of 60% of the median equivalized energy expenditures of this household). The situation can be summarised as follows:

Thermal poverty = Low Income criterion met + High Cost criterion met

The analysis of this measure clearly shows that its construction, in comparison to the first measure, is more sublime and assumes the necessity of a difference in the wealth of individual households. In other words, some households must always be less affluent than others in order to be able to determine the existence and level of thermal poverty of a household. It should also be noted that the adoption of the above type of measure in relative terms, in defining the concept of thermal poverty and determining its level and scope, makes it impossible to eliminate thermal poverty understood this way. For, as it has already been pointed out, households with lower income than others are always considered poor in heat (Świerszcz 2016b; Szyłkowska 2019a).

Using this type of thermal poverty measure, it should be stated that in 2018 this phenomenon affected about 19% of Polish households, i.e. 8 million Poles experienced thermal poverty.

In addition to the presented two types of thermal poverty measures that adapt the UK definitions of energy poverty, other alternative versions of thermal poverty measures, based on other alternative definitions of heat poverty, may also be used. These alternative versions are the modifications of the original versions of the UK definitions. In this study we will focus our attention on the methodology to determine variant versions of energy poverty measures (thermal poverty measures) based on the modification of the original definition of energy poverty "Low Income High Costs" (LIHC). The first part of the alternative version of the modification of the energy poverty (thermal poverty) measure of households concerns the modification of the "Low Income" (LI) criterion. The modification consists in setting other income thresholds under which households can be classified as energy poor households.

The first possibility is to set an income threshold of 50% of the average. In this case, the same steps are taken in developing the Low Income Criterion (LI) as in the original version of determining measures of the Low Income High Costs definition (LIHC) - changing only the income threshold. The "High Costs" (HC) criterion remains unchanged here. Therefore, in the alternative (modified) version, the following steps are taken when developing the "Low Income" (LI) criterion. The first step is to determine the average of the disposable income available for sale, after deducting the expenditure on accommodation, and then to calculate 50% of this value. The second step is to add, to the threshold thus set, the equivalized energy expenditures in individual households to determine the individual threshold for each household. As the third step, a two-tier variable should be created to classify households below or above the individual thresholds. The fourth (last) step is to qualify the household as the energy poor one in the aspect of heat - by applying the conjunction of the criteria "Low Income" (LI) - 50% threshold and "High Costs" (Owczarek and Miazga 2015; Włodarczyk 2018).

The second possibility to determine the income threshold concerns the determination of the income threshold on the basis of poverty determined by law. The poverty limit determined by law (understood as the limit of social intervention) is determined by the Ministry of Labour and Social Policy on the basis of household income, which is converted per capita in the household. Income

below this threshold entitles the holder to financial benefits from social assistance institutions. In this case, the following steps are taken when developing the "Low Income" (LI) criterion. The first step is to set the poverty threshold, determined by law, based on the number of people in a given household. It should be noted that the social intervention threshold is modified every 3 years (Owczarek and Miazga 2015; Gawlik-Kobylińska 2018b).

The second step related to adding - to the poverty threshold determined by law - real, i.e. not equivalizated, energy expenditures that are incurred in individual households. This action will allow for the setting of an individual threshold for each household. The third step relates to the calculation of whether the real, i.e. non-equivalized disposable income derived from accommodation expenditure, is above the threshold determined. To this end, a two-tier variable should be created which qualifies households below or above these individual thresholds. The fourth (last) step relates to the determination whether a given household is energy poor (heat poor) through the application of the conjunction of the "Low Income" criterion (understood as the threshold of poverty determined by law) and "High Costs" criterion.

The second part of the alternative version of the energy poverty (thermal poverty) indicator concerns the modification of the "High Costs" (HC) energy expenditure criterion. Instead of equivalization of the model energy expenditures per person, based on the OECD equivalence rate, the determination of average energy expenditure per m^2 of a flat occupied by a household may be used based on the model energy expenditures. In this case (alternative) used, expenditure for energy is more linked to the technical aspect of the household building and less to the number of inhabitants. The next tasks to be performed when creating the "High Costs" (HC) criterion are the same as in the original version of the LIHC definition. Thus, the mediana of the model energy expenditures per m^2 of an occupied flat is determined.

Results and Discussion

The adopted indicators and measures of thermal poverty defining this phenomenon and determining its scope in a given area, when confronted with subjective measures of households assessing the thermal comfort experienced by them, turns out to have a negligible degree of coverage. This is evidenced by the research conducted in 2018, where among the residents of households declaring that they live in buildings of low technical quality and damp walls, as much as 24% were qualified to the group poor in thermal energy, using the relative "Low Income High Costs" (LIHC) measure. However, as regards the inhabitants talking about experiencing the cold because of failing to heat up their flats during winter, 19% of them were classified as poor in heat energy. This small degree of overlap, between households that declare a lack of thermal discomfort and those that are low in thermal energy, can have a dual source. The first one may be the subjective character of the respondents' statements, the second one may be the relatively high income of households declaring the thermal discomfort of their flats. Research shows that people who talk about experiencing the cold or moisture in their homes may have relatively high expenses, but for some reasons they do not decide to warm or dry their homes. Therefore, the low degree of overlapping of thermal poverty with the measures adopted so far clearly shows the lack of an unambiguous conceptualisation of both the phenomenon of thermal poverty in households and the lack of the unequivocally adopted indicators and measures of this phenomenon (Świerszcz 2017a; Bakirtas and Akpolat 2018; Acharya and Marhold 2019).

The existing measures of thermal poverty, i.e. absolute and relative measures, use as the basis the model expenditures of households on thermal energy. The absolute measure adopts a 10% threshold of expenditures on thermal energy in relation to household income, while the relative measure of the threshold of expenditures on thermal energy is subject to additional verification, which consists of three criteria: income criterion of a given household, equipment criterion (in relation to expenditures on thermal energy and income of individual households) and income criterion verified by fixed accommodation expenditures (e.g. rent, credit instalments, mortgage loans), which decrease disposable income of a given household. Moreover, the empirical distribution used in this respect is

consistent with the assumed correlates of thermal poverty, which consists of subjective measures of experiencing difficulties in maintaining the thermal comfort in a given household. It should also be noted that the applied criteria modifying the thermal poverty threshold indicates a moderate correlation coefficient between thermal poverty and economic poverty. It also shows that the phenomenon of thermal poverty is a phenomenon separate (specific) from economic poverty, i.e. it requires the use of other instruments and security policy to eliminate this phenomenon. This is not the case with absolute measurement, which points to the large link between thermal poverty and household economic poverty, and therefore proposes a different conceptualisation of the phenomenon and a different way of solving the problem. However, the accuracy of this measure is verified by reality, which shows that the financial assistance from the state to the people poor in energy does not solve the problem of thermal poverty in their households (Świerszcz, 2016a; Pino-Mejías, Pérez-Fargallo, Rubio-Bellido and Pulido-Arcas 2018).

The different methodologies used in both measures to determine the thermal energy poverty threshold, as can be seen, give different concepts of how to understand this phenomenon, as well as different results of the range of its scale. Using an absolute measure, it turns out that almost half of the Polish population is subject to this phenomenon. Similar results are also found in other European countries, such as: Estonia, Bulgaria, Romania, Latvia, the Czech Republic, Slovakia or Hungary. However, such a result does not seem to correspond to reality. Therefore, currently the most accurate and objective measure of thermal poverty, which allows to determine the definition of this phenomenon and its scope, seems to be the relative measure. This measure, however, is not final in its shape, and it also requires constant improvement. This is indicated by a number of important facts. The first fact is the continuous evolution of the phenomenon of thermal poverty, which may be caused by new factors over time. The second fact is the perception of the phenomenon of thermal poverty mainly among households living in rural areas (34% in 2018), single-family houses heated locally - which results from low precision of this measurement. Meanwhile, reality shows that the phenomenon of thermal poverty also occurs in urban areas, especially among households living in communal, social and small poor housing communities. This is evidenced by the fact that in 2018 about 14% of households were not connected to the central heating system. It should also be taken into account that about 9% of flats in cities are municipal flats with a very low level of energy efficiency. The third fact is the failure to notice thermal poverty in small flats - which results from too low model expenditures assigned on thermal energy, which after the equivalization relating to a number of persons living in a given household, less frequently exceed the threshold of energy expenditures higher ones than the mediana in the population in a given area. In other words, there is less chance to meet the High Costs (HC) criterion. The fourth fact is the failure to notice thermal poverty also among wealthy households, which most often occupy larger flats requiring bigger expenditures on thermal energy. In this case, these households meet both criteria, both the High Costs (HC) criterion (high costs of thermal energy) and the Low Income (LI) criterion (high expenditures for thermal energy), because their income is reduced by rent and mortgage loan, which households are often burdened with (Świerszcz and Osial 2019; Świerszcz and Grenda 2019).

The presented analysis of the hitherto applied indicators and measures of the thermal poverty phenomenon in households continues to show their various shortcomings and imperfections. The conducted research also shows that the lack of existence of developed perfect measurements of this phenomenon has its consequences in the absence of an unambiguous conceptualisation of the thermal poverty phenomenon, as well as an unambiguous determination of the scale and scope of this phenomenon in Poland, other European countries and even in the world. Despite these imperfections or deficiencies, the theoretical analysis of domestic and foreign literature on the subject, as well as the analysis of numerous pragmatic research conducted among scientists on behalf of various governmental and non-governmental institutions, bring a lot of hope at the same time. The relatively advanced indicators developed at the present stage of research, which define the criteria of thermal poverty and the method of its measurement (the LIHC measure), make it possible to define this phenomenon relatively accurately and to outline its scale and scope to some extent. In addition, they open up a new space for analysis primarily in Poland and other European countries.

However, bearing in mind the need for a more efficient and effective fight to reduce or even eliminate thermal poverty among households, there is still a need to conduct intensive research to develop the most universal, unambiguous indicators and measures of thermal poverty, and thus to develop an unambiguous definition of thermal poverty. Responsibility for conducting research lies with both people (entities) of the world of science and entities representing governmental and non-governmental administration offices, as well as various types of companies involved in the production, distribution and sale of thermal energy. These needs and related activities are all the more important and even urgent as they are the basis not only for the already mentioned proper way of describing and conceptualising thermal poverty, but also for the proper development of policies and strategies in the area of energy security, both locally and nationally, in both micro and macro-social terms. In other words, the point is to select the most effective and efficient instruments that would counteract this phenomenon, namely to direct social assistance towards the most needy households. How the household thermal poverty phenomenon will be understood and what thresholds of thermal poverty and related indicators and measures of thermal poverty will be determined and applied - will have an impact on which groups of households will be qualified as poor in thermal energy - whether they will be households with many children or households of pensioners and disabled pensioners; whether they will be rural households or households from urban areas, whether they will be small households or households living in large areas; etc. This choice, as can be seen, is the political decision. Aware of this, it is therefore necessary to continue to systematically pursue research using a variety of methodological instruments, both quantitative and qualitative, in order to reach those most in need with effective help. The current level of knowledge that we have about the household thermal energy poverty phenomenon may already constitute a certain foundation for shaping public policies (e.g. housing allowance, energy allowance), which are aimed at meeting this challenge. Nevertheless, their inadequacy resulting from the imperfections of the currently used indicators and measures of thermal poverty and the related definitions of this phenomenon - not only in Poland, but also in other European countries - is still the challenge topical for all people.

Conclusion

As it results from the presented analysis of the currently applied indicators and measures of the household thermal energy poverty phenomenon, many imperfections and related deficiencies can be observed in them. The lack of unambiguous measurements of this phenomenon leads to consequences being the lack of a developed unambiguous understanding of the phenomenon of heat poverty, as well as an unambiguous determination of the scale and scope of this deprivation both in Poland and in other European countries, and even in the world. This fact is distressing, because it depends on him how to properly develop policies and strategies in the field of energy security of households, both locally and nationally; in micro- and macro-social terms. This is about using the most appropriate instruments to counter this phenomenon, targeted at the most needy households. The way, in which the household thermal energy poverty phenomenon will be understood and which indicators and measures will be applied to it, will have an impact on which groups of households will be qualified as poor in thermal energy.

Despite existing imperfections or shortcomings, the theoretical analysis of international literature on the subject, as well as the analysis of numerous pragmatic research conducted among scientists, also bring a lot of hope. The relatively advanced indicators and measure of thermal poverty developed at the present stage of research seem to be an inspiration and a new space for analysis, first of all in Poland, but also in other European countries, in search of new solutions, in the development of the most universal, unambiguous indicators and measures of thermal poverty, and thus in the development of an unambiguous definition of thermal poverty, which such indicators and measures enable to take a more efficient and effective fight to reduce or even eliminate the phenomenon of thermal poverty of households. Responsibility for this fact lies with both people (entities) of the world of science and entities representing governmental and non-governmental administration offices, as well as with various types of companies.

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Reserves of Cost Reduction Identified Through the Index-Factor Approach in The Process of Managing Turnover Inventory

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Abstract

This article presents the index-factor approach in management of material resources turnover, including inventory. It allows managers to identify a current problem, which affects the final financial result, during the management process. Thus, submitted practically oriented approach of index-factor method for calculation of the cost intensive turnover index and average level of distribution costs enables financial managers to develop reduction reserves of commercial and trading companies, to monitor the inventory turnover, helping to determine amount of released or the additionally attracted monetary assets as commodity stocks are frozen funds unavailable for using.
The purpose of the study is disclosure of the analytical methodological approaches descriptive character of index method and showing a practically oriented approach in management process relying on relative and absolute values of activity cost, considering an example of commercial trading company and monitoring the average level of distribution costs that influence the sum of distribution costs of certain productive groups and the assortment structure of trade turnover.

Keywords: Assets, Inventory, Inventory Management, Distribution Costs, Turnover, Assortment of Goods, The Cost of Turnover.

Introduction

In economic practice the assets of companies are listed as a complex economic category, which prediction aspects are not systematically investigated in the scientific works of economists [3]. Assets are the most turning funds of trading and commercial companies, including cash, accounts receivable, raw materials, finished goods, work in progress, stocks of goods. Inventories are less liquid in short-term assets of these asset, as the funds are considered to be absolutely liquid, which can be invested in any assets and generate income, and the sooner they are released from the inventory items the more profit the company will receive.

The point of management process of inventories is providing commercial and trading companies with the optimum size and diversification of stocks satisfying customer demand of certain territorial segment, as well as providing them with funding.

In trade, the commodities circulation process continuity is provided by mass of goods, consisting of food, non-food products, household chemicals, products of a complex range (audio-video equipment, cell phones), and others. [2]. Most often independent on desire to guide trade and commercial companies there is growth of stocks on large enough sum, that in turn [1] increases selling and administrative expenses, that, ultimately, can lead to a loss that is not profitable nor leadership or employees or contractors trade and commercial companies. The impact on the final profit depends on volume of sales, its structure, price policy, prime cost, administrative and commercial expenses (selling costs), current assets turnover, the attractiveness of the brand and the property complex of trade and commercial companies [5]. As a rule, the selling (retail) price of inventories includes the direct costs for the purchase of goods (cost - purchase price), expenses (costs) for sale connected with the location of the goods in the scope of circulation (advertising, public relations, sorting, storage, freezing). The more time (days) a product is in the form of inventory, the bigger amount of the costs, the higher the selling price of it.

As a result of said above distribution costs structure analysis and evaluation of factors influence on distribution costs sum change by separate elements and in whole acquires increased importance for financial managers and all management staff.

Material and Methods

One of the most important and challenging stages in inventory management is the calculation of the optimum size for current reserves main groups. Methods of inventory values management are proposed by A. M. Kovalev, M. A. Chaplygina, A. I. Zolotarev, O. I. Rashidov and others. These economists recognize different models and the most common is the «Model of economically reasonable order size» based on optimization of all company's operating expenses on purchase and storage of inventory. However, experts do not pay enough attention to such economic factors as the absence of highly developed market, high inflation, an unstable stock market, currency restrictions, especially the tax system in different countries. Thus, it is obvious that the commodity-material values, management practices need to be improved for effective use in various economic situations. World practice of inventory management at an enterprise by economists I. A. Blank, U. Brighaym, Van Horne J. C. shows stocks growth should be a bit behind the demand.

Results and Discussion

In the aspect of analytical and methodological approaches of the index method imagine an index-factor model (Formula 1) of circulation costs changes dependent on the average level of distribution costs, the level of costs in the reporting period, cost intensive turnover.

The quantitative effects of these factors is determined by the following system of interrelated indexes:

$$\boldsymbol{I}_{\text{average level of distribution costs}} = I_{\text{distribution costs in the reporting structure of commodity circulation}} = \boldsymbol{I}_{\text{the cost of turnover (the impact of the structure of turnover on the dynamics of the average level of distribution costs)}} \quad (1)$$

It has its own separate index calculation formula (formula 2,3,4)

$$I_{\text{average cost}} = \frac{\sum Y_1 T_1}{\sum T_1} : \frac{\sum Y_0 T_0}{\sum T_0} = \bar{Y}_1 : \bar{Y}_0 \quad (2)$$

$$I_{\text{distribution costs in the reporting structure}} = \frac{\sum T_1 Y_1}{\sum T_1 Y_0} \quad (3)$$

$$I_{\text{the cost of turnover}} = \frac{\sum Y_0 \ (P_0 q_{1:} \sum P_0 q_1)}{\sum Y_0 \ (P_0 q_{0:} \sum P_0 q_0)} \quad (4)$$

The data borrowed from statistical reports of investigated organizations was substituted in these indexes. The practical results are presented in Table 1.

Table 1: Baseline data for calculating indices level of distribution costs of commercial and trading company «LLL»

Product Groups	Percentage of distribution costs, in the selling price of the goods		The sum of distribution costs, thousand roubles.		Revenues from sales, thousand roubles.		Structure of revenues from sales, in %		The amount of distribution costs per 100 rubles sales revenue	
	2018 year basis	2019 year report	2018 year basis	2019 year report	2018 year basis	2019 year report	2018 year basis	2019 year report	Base period	Conditional
designations	Y_0	Y_1	U_0	U_1	T_0	T_1	d_0	d_1	$Y_0 d_0$	$Y_0 d_1$
Non-food products groups	73.6	77.1	4565	4780	6200	5387	25.1	21.4	1847	1650
Food productsgroups	76.7	78.3	15014	15499	18472	19786	74.9	78.6	5744	6028
In total	79.3	80.5	19579	20279	24672	25173	100	100	7591	7678

In the above shown factor model formula substitute the data from Table 1.

The index of the average level of distribution costs

$$I_{\text{average cost}} = \frac{\sum Y_1 T_1}{\sum T_1} : \frac{\sum Y_0 T_0}{\sum T_0} = \bar{Y}_1 : \bar{Y}_0 = 80{,}5 : 79{,}3 = 1{,}015 * 100 = 101{,}5\ \% \quad (5)$$

The index of cost treatment in the reporting structure:

$$I_{\substack{\text{distribution costs in} \\ \text{the reporting structure}}} = \frac{\sum T_1 Y_1}{\sum T_1 Y_0} = \frac{20279}{19786 \bullet 0.767 + 5387 \bullet 0.736} = 1.004 * 100 = 100{,}4\% \quad (6)$$

Index of turnover cost intensive:

$$I_{\text{the cost of turnover}} = \frac{\sum Y_0\ (P_0 q_1 : \sum P_0 q_1)}{\sum Y_0\ (P_0 q_0 : \sum P_{0 q_0}} = \frac{7678}{7591} = 1{,}011 * 100 = 101{,}1\% \quad (7)$$

Consequently, the level of distribution costs in the reporting period in 2019 amounted to 80.5%, in the base period in 2018 to 79.3%, as a whole the average cost level of the index in two groups of products (food and non-food) amounted to 1,015 or 101.5%. Distribution costs changes calculated by the formula 6 in the reporting structure reached 1,004 or 100.4%. Cost intensive turnover index (turnover structure influence on the dynamics of the average level of distribution costs) amounted to 1,011, or 1011%.

Increase of the average level of distribution costs by 1.2% led to an increase in the absolute amount of distribution costs by 302.1 thousand roubles. The effect of this factor is determined by the formula 8:

$$\frac{(Y_1 = Y_0) \bullet \sum T_1}{100} = \frac{(80{,}5 - 79{,}3) \bullet 25173}{100} = 302{,}1\ \text{ths. rub.} \quad (8)$$

The calculated increase was due to growth of the distribution costs level for foodstuffs by 1.6% and nonfood products by 3.5%, also the changes of assortment structure towards reduction of nonfood products by 3.7% and towards growth in food group of goods by 3.7%

The absolute amount of distribution costs increased by 700 thousand roubles (20279 - 19579) occurred due to the growth of distribution costs level for individual product groups.

Since cost intensive turnover increased by 1.1%, then the expense of 100 rub. turnover increased by

0.87 rubles. (7678 - 7591), and the entire turnover by 2.1 thousand roubles (20279 * 0.87)
Therefore, the actual overrun in the amount of 702.1 thousand roubles (700 + 2.1) is obtained because of average level raising of distribution costs during the reporting period, which is caused by increasing of distribution costs levels for individual products (700), and overrun, that is a result of turnover distribution costs increase (2,1).

Performing calculations allows to notice a direct correlation of the final financial result (profit) of the distribution costs average level, the level of costs in the reporting period, distribution costs of trade turnover, which should be reduced.

Continuing the research in finding a cost-cutting reserves, pay attention to inventory turnover.

Table 2: Predictive data immobilization of funds in the turnover or the release of funds from the turnover of commercial and trading company «LLL»

Indicators	2017 report	2018 report	2019 report	2020 forecast	Change in 2020 of 2019 (+, -)	The relative deviation of 2020 At 2019, at%
Turnover , days T^{ov}	37.0	37.9	39.7	36	-3.7	x
One-day turnover (N^{r}_{od1}) ths. rub.)	67.44	68.53	69.93	69.93	x	100
Amount of funds immobilization or release of funds , $N^{r/i}$thousand roubles.	67.44 * = 1.2 - 80.92	68.53 * 0.98 = -69.93	69.93 * 1.7 = -118.8	69.93 * (-3,7) = 258.74	176.94	248.9

Table 2 estimated data allow to note that in 2018 the time of circulation of goods T^{ov} increased by 0.98 days, in 2019 by 1.7 days, which means a reduction of the inventory turnover velocity or slowdown of turnover, leading to overstock by the commercial - trade company «LLL», entailing the loss of turnover volume in 2018 in amount by 69.93 thousand roubles. and in 2019 in the amount of 118.8 thousand. rub.

As a result of the represented calculation, it can be clearly noted that there is a direct correlation between inventory turnover and revenue. In particular way inventory turnover slowdown leads to additional immobilization of monetary liquid assets and acceleration of inventory turnover positively influence on profit thereby releasing the resources from circulation to expand the assortment of inventory structure.

Prognostic information in the short term in 2020 (Table 2) allows to observe the release of cash from circulation in the amount of 258.74 thousand roubles., that were influenced by inventory turnover acceleration primarily for 3.7 days at a constant one-day turnover 69, 93 thousand roubles. Released funds can be sent into circulation for the purchase of a new range of inventory items, for the modernization of fixed assets, for the reconstruction and modernization of commercial equipment in their turn.

The quantitative effect of changes in the level of distribution costs for individual goods and a change in the assortment structure of commodity circulation in the forecast for 2020 with the established acceleration of the turnover of the commodity mass (Table 2) are shown in Table 3, which give grounds to identify the following effect:

Index of the average level of distribution costs:

$$I_{\text{average cost}} = \frac{\sum Y_1 T_1}{\sum T_1} : \frac{\sum Y_0 T_0}{\sum T_0} = \bar{Y}_1 : \bar{Y}_0 = 76{,}2 : 80{,}5 = 0{,}946 = 94{,}6\ \% \quad (9)$$

Index of distribution costs in the reporting structure:

$$I_{\substack{\text{distribution costs in}\\ \text{the reporting structure}}} = \frac{\sum T_1 Y_1}{\sum T_1 Y_0} = \frac{21090}{22152 \bullet 0.783 + 5538 \bullet 0.771} = 0{,}965 = 96{,}5\% \quad (10)$$

Index of cost intensive turnover:

$$I_{\text{the cost of turnover}} = \frac{\sum Y_0 \ (P_0 q_1 : \sum P_0 q_1)}{\sum Y_0 \ (P_0 q_0 : \sum P_0 q_0} = \frac{7806}{7678} = 1{,}017 = 101{,}7\% \quad (11)$$

Conclusions

Thus, in the forecast (Table 3) with an increase in turnover by 10% (27690/25173 * 100%) and an increase in distribution costs by 4% (21090/20279 * 100%) from the index system, we can conclude that in the reporting period compared with the baseline, the relative level of distribution costs will decrease on average by 5.4% (100-94.6), including due to changes in the relative level of distribution costs for individual product groups will decrease by 3.5% (100-96.5) but due to the increase in the cost-intensiveness of commodity circulation will increase by 1.7%.

As you can see, the reduction in the average level of distribution costs is associated with a decrease in the relative level of distribution costs for the group of food products and changes in the assortment structure of commodity circulation.

Table 3: Calculation of forecast values for calculating indices of the level of distribution costs for the planned 2020

Product Groups	Percentage of distribution costs, in the selling price of the goods		The sum of distribution costs, thousand roubles.		Revenues from sales, thousand roubles.		Structure of revenues from sales, in %		The amount of distribution costs per 100 rubles sales revenue	
	2018 year basis	2019 year report	2018 year basis	2019 year report	2018 year basis	2019 year report	2018 year basis	2019 year report	Base period	Conditional
designations	Y_0	Y_1	U_0	U_1	T_0	T_1	d_0	d_1	$Y_0 d_0$	$Y_0 d_1$
Non-food products groups	77.1	89.8	4780	4971	5387	5538	21.4	20	1650	1542
Food products groups	78.3	72.7	15499	16119	19786	22152	78.6	80	6028	6264
In total	80.5	76.2	20279	21090	25173	27690	100	100	7678	7806

A decrease in the average level of distribution costs 4% (76.2% - 80.5%) will lead to a decrease in the absolute amount of distribution costs (1191 thousand rubles).

The impact of the distribution costs level will be:

$$\frac{(Y_1 = Y_0) \bullet \sum T_1}{100} = \frac{(76{,}2 - 80{,}5) \bullet 27690}{100} = -1191 \text{ ths. rub.} \quad (12)$$

In the forecast for 2020, from a decrease in the level of distribution costs for individual product groups by 4% (in particular the food group of goods) and a growth in turnover by 10%, the absolute

amount of distribution costs will increase by 811 thousand rubles. (21090 - 20279) or by 3.99%
Since the cost of trade will increase, the cost of 100 rubles. turnover will increase by 1 rub. 28 kopecks (7806 - 7678/100), and for the entire turnover of 370 rubles. (21090 * 1.28 / 100).

Consequently, 811 + 370 = 1181 thousand rubles, due to the rounding error of 1191 thousand rubles. (formula 12), i.e., the actual cost overrun from the decrease in average levels of distribution costs in the reporting period is equal to the savings caused by the growth of individual levels of distribution costs for certain goods (811 thousand rubles), plus the savings resulting from the decrease the cost of goods turnover 270 thousand rubles. As a result of practice-oriented analysis with the use of index-factor model in the management of inventory turnover allows to identify reserves to reduce costs, marked in Figure 1

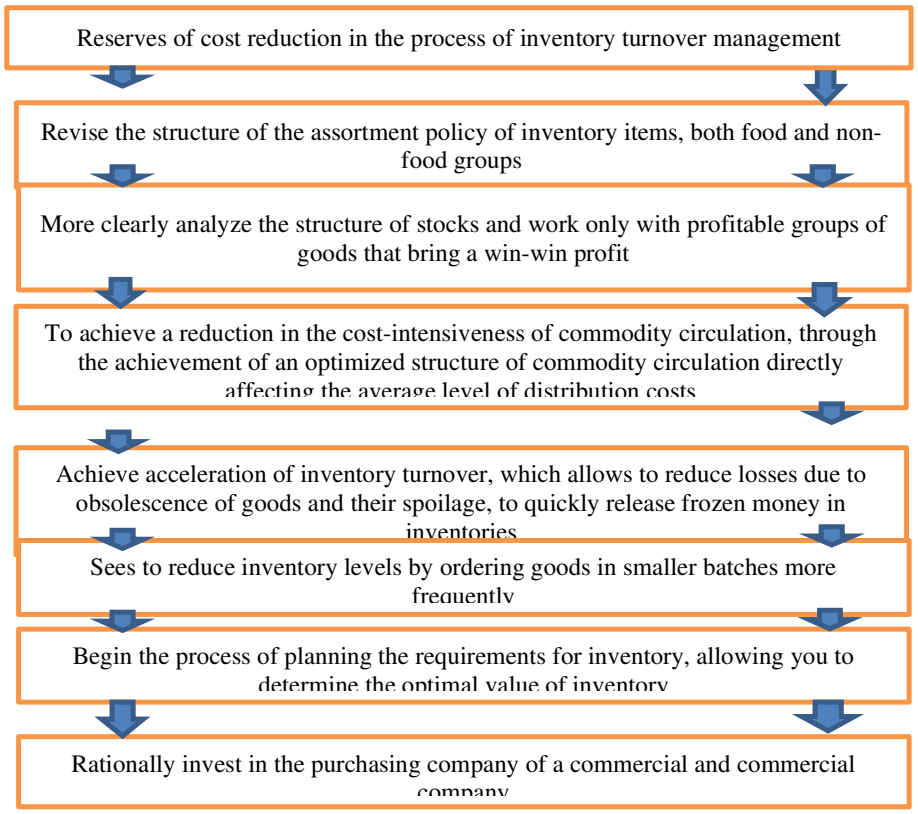

Fig. 1: Provisions cost reduction in the management of inventory turnover

In conclusion, we note that trading companies require strict control over stocks, ensuring minimum investment in them, as well as achieving a higher inventory turnover, which leads to a lesser likelihood of losses due to obsolescence of goods and their spoilage, which increase the liquidity of commercial and commercial companies.

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Accuracy of the Beneish Model as Applied to Polish Enterprises Known to Manipulate Financial Reports

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Abstract

The paper presents the results of its author's original research into the capability of Beneish M-score to detect accounting fraud using data presented in earnings reports. The research performed is unique in that it uses a sample consisting of enterprises which vary by their legal status, are not listed in regulated markets, and whose managers were known to have been on trial due to suspicion of report falsification. Analysis shows that the Beneish model can detect accounting fraud, although the five-element model gives better results than the eight-element model.

Keywords: Beneish model, M-score, accounting manipulation, accounting fraud.

Introduction

The problem of low financial report credibility usually comes into light in the context of big financial scandals, such as the US cases of Enron or Worldcom. In Poland, recent famous cases include Amber Gold, Get-Back S.A. and the Wołomin Cooperative Bank. The effects of economic information manipulation are not, however, restricted to big corporations, banks or enterprise networks. Information manipulation, including accounting fraud where companies report earnings higher or lower than was actually the case, happens in smaller entities as well, and leads to bad investment decisions by other economic agents.

The International Accounting Standard 1, paragraph 15, states that a financial report presenting the situation, financial effectiveness and cash flow should be presented fairly, and this is only possible through faithfully presenting actual economic events. (IAS 1). Subject literature gives a lot of thought to methods of perpetrating and of detecting accounting fraud.

M. Kutera divides financial report falsification into several classes: overstating the value of company capital and property, manipulating the elements that shape the financial results, liabilities and reserves, and omitting some or all information about capital relations, contingent liabilities or balance liabilities on the company assets. (Kutera, 2016) Other authors, such as H. Schilit and J. Perler, concentrate on manipulation techniques (Schilit, Perler, 2010) or the motives for company image manipulation. (El Diri, 2018).

A practical approach to the problem of identifying report manipulation was proposed by Messod Daniel Beneish, of Indiana University, in 1999. Beneish noticed that changes in certain financial markers over time can be an indicator of possible accounting fraud. His research culminated in his statistical model, which calculates the probability of report manipulation by a company. (Beneish, 1999).

Research Methods and Analysed Material

Beneish based his idea on comparing changes in financial markers over time – markers that include positions which can change an economic image of an entity. These changes are not necessarily due to fraud; they may result from practices well within the boundaries of acceptable accounting. According to Beneish, relevant markers include: sales income, cost level and the relationships between the

various types of assets and their respective financing sources. Since it's difficult to ascribe fixed critical values to specific research areas or markers, Beneish decided to base his analysis on comparing the markers for the current year (*t*) with to the markers of one year back (*t-1*). Beneish created eight- and five-element algorithms for the purpose of this comparison, which follow the formulae below.

(a) the 8-element model:

$$M(8) - score = -4{,}84 + 0{,}92 \cdot DSRI + 0{,}528 \cdot GMI + 0{,}404 \cdot AQI + 0{,}892 \cdot SGI + 0{,}115 \cdot DEPI - \\ - 0{,}172 \cdot SGAI + 4{,}4679 \cdot TATA - 0{,}327 \cdot LVGI$$

(b) the 5-element model:

$$M(5) - score = -6{,}065 + 0{,}823 \cdot DSRI + 0{,}906 \cdot GMI + 0{,}593 \cdot AQI + 0{,}717 \cdot SGI + 0{,}107 \cdot DEPI$$

where:

DSRI (Days Sales Receivable Index) – the receivable to sales ratio over the t and t-1 periods. A disproportionate rise in receivables compared to sales income may be due to overstating revenue.

GMI (Gross Margin Index) – the sales margin in t period to t-1 period ratio. Dropping margins (below 1.0) may push the company management to manipulate income or sales costs.

AQI (Asset Quality Index) – the total current and fixed assets in t period to t-1 period ratio. If the AQI is over 1.0 and the DSRI marker shows growth while GMI remains unchanged, the company may have carried over some of its costs, thus improving its results.

SGI (Sales Growth Index) – sales over t period to t-1 period ratio. Expecting continuous sales growth may lead a company to manipulate its reported revenue.

DEPI (Depreciation Index) – depreciation to gross value of fixed assets in t-1 compared to depreciation to gross value of fixed assets in t. A drop of this marker may be a signal to lower depreciation rates, which would show better financial results.

SGAI (SG&A Expense Index) – a change in sales and administrative expenses to sales revenue ratio. Growing administrative costs and excessive activity in sales support may lead a company to manipulate its financial results

TATA (Total Accruals to Total Assets) – the marker shows total accruals of a company to total assets over the t time period. It defines total accruals as the difference between the net income and cash flow operations. Large differences between income and cash flow may suggest manipulating financial results.

LVGI (Leverage Index) – liabilities to total assets over the t and t-1 time periods. A large increase in this marker is a bad sign for investors, which in turn may lead a company to manipulate its stated liabilities in year t (for instance by changing its liability appraisal methods).

Both the eight- and five-element models indicate an M-score of -2.22 as their threshold. Surpassing this value (M-score higher than -2.22) classifies a company as likely to be a manipulator (MP) , while a lower value means a company is not likely to be a manipulator (N-MP). An undisputed advantage of the Beneish model is that it points to areas that are especially vulnerable to manipulation. In literature, such areas are called "red flags," or "green flags" if there are no manipulation symptoms. (Beneish, Lee, Nichols, 2012).

Table 1: Tresholds for variable values in Beneish model

Marker	Manipulators (MP)	Non-manipulators (N-MP)
DSRI	1.412	1.030
GMI	1.159	1.017
AQI	1.228	1.031
SGI	1.581	1.133
DEPI	1.072	1.007
SGAI	1.107	1.085
LVGI	1.124	1.033
TATA	0.049	0.015
Threshold value	*M-score ≥-2.22*	*M-score≤-2.22*

Source: Beneish, Lee, Nichols, 2012, p.33.

Research described in this paper was conducted on 10 economic entities of varying legal status (2 public limited companies, 6 private limited companies, 1 company owned by a natural person and 1 state-owned company) which followed the Polish accounting laws. These laws are in accord with the International Accounting Standards. The small research sample was due to difficulties in obtaining credible information about possible fraud and about the result of inquiries.

The companies represented such varied sectors as production industry food industry, agriculture, financial services and construction services. One can be classified as a "new technology" entity (website). The common factor was the fact that all the companies were declared bankrupt. In eight cases the company was under criminal investigation for economic offenses and accounting fraud. The reason for fraud was soliciting bank loans (seven cases) and presenting a false economic image due to stock exchange position of a master company (one case). In two cases, the management was suspected of deliberately bankrupting the company, but was not convicted of accounting fraud.

In three cases of information manipulation, experts have examined the reports and have not found significant irregularities. This was chiefly because companies have concealed debt of sales units while at the same time creating false invoices for sold product, and have sold fixed assets not owned by the company in question (operating lease).

Due to ongoing investigations, more specific information about the analysed companies is classified.

Research Results

Table 2: M-score and marker values

Legal status and marker	PLC	NP	Ltd.	Ltd.	Ltd.	PLC	Ltd.	Ltd.	Ltd.	SO
DSRI	2.06	1.86	3.01	1.98	1.56	0.98	1.18	3.25	5.69	1.33
GMI	1.48	2.33	1.56	1.21	0.95	1.02	1.50	2.67	-0.06	0.48
AQI	3.15	1.30	-0.63	1.12	1.02	1.18	0.89	-0.52	1.22	-0.82
SGI	0.50	1.44	0.39	0.51	2.58	1.05	0.83	0.55	0.15	0.74
DEPI	0.76	0.70	1.13	0.96	0.63	1.00	0.95	0.91	0.55	1.40
SGAI	0.80	0.49	2.08	1.86	1.11	1.17	1.22	1.19	1.33	1.57
TATA	-0.04	-0.27	-1.28	-0.17	0.06	-0,54	-0.89	-0.20	-0.19	-1.30
LVGI	0.75	1.41	0.91	1.52	0.97	0.96	1.66	1.03	1.19	2.08
M(8)-score	-0.94	-1.83	-7.65	-2.96	-0.35	-4.89	-5.73	-1.50	-0.44	-9.91
result	M	M	N-MP	N-MP	M	N-MP	N-MP	M	M	N-MP

M(5)-score	-0.72	-0.54	-2.15	-2.20	-1.39	-2.77	-1.68	-0.79	-0.54	-4.34
result	M	M	M	M	M	N-MP	M	M	M	N-MP

Source: original research.

In the table above, M stands for "manipulator" and N-MP for "non-manipulator." The grey colourmarks the values that exceed the thresholds for manipulatory companies as stated in Table 1 (reg flags). Abbreviations for the legal status of companies: PLC – public limited company; NP – company owned by natural person; Ltd. - private limited company; SO – state-owned company.

Results Evaluation

The five-element model pointed unerringly to those companies that were not manipulators. The eight-element model was wrong three times.

An analysis of the specific markers shows that DSRI is the most credible, rightly pointing to both manipulator and non-manipulator companies. GMI gave slightly worse eresults, being wrong twice. Interestingly, exceeding the GMI threshold also meant a growth in the DSRI marker for all analysed companies. The least credible results were offered by SGI, DEPI and TATA, which resulted from their values being below the threshold. The Sales Growth Indexes were low because the companies have been winding down their activities and were in high risk of bankruptcy. Low DEPI values were due to selling fixed assets, while the TATA indexes were low due to negative values for equity and working capital, also caused by high risk of bankruptcy.

Conclusions and Recommendations for Further Research

Weaknesses of the Beneish model include a wide range of the value thresholds for indicating manipulators (or non-manipulators). For instance, the TATA marker admits a value range of 226.7%, the SGI marker – 39.5% and DSRI – 37.1% (other markers admit from 2.0% to 19.1% - see Table 1). Thus, using the model requires not only precise calculations, but also a narrow definition of the methods used to calculate each marker from the accounting point of view.

Research shows that the Beneish model is not widely used to detect accounting fraud in Poland, because it is simply not known. This in turn means that evaluating the credibility of its results for Polish companies is difficult. Polish law does not require publishing information about manipulated financial reports, which is another obstacle to importing the Beneish model to Poland.

Therefore, we can conclude that action is needed to change the relevant laws, since revealing information about manipulatory companies is necessary for creating a model fully effective in local conditions – one that would aid in detecting accounting fraud and thus help develop Polish accounting in general.

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Transgressions of Concepts by Michel Foucault Discipline – Supervision – Safety

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Abstract

The concept of power, discipline, supervision and their relations with safety undoubtedly constitute the object of interest of social sciences, including the science of safety. Michel Foucault, being an undisputed theorist of the mechanisms of power, presents a wide range of its concepts. One of them concerning the analysis of power and discipline based on the concept of prison – Panopticon, by Jeremy Bentham, confirms that the concept of panopticism is still up-to-date in modern scientific thought. In particular, it concerns research on mechanisms of supervising and using opportunities they provide by the state for the purpose of ensuring safety to the entities.

Keywords: Supervision, Discipline, Safety, Disciplinary Society.

Introduction

It seems that in the discourse concerning dependency and supervision, Michel Foucault[1] is a fundamental thinker and his publication entitled *Discipline and Punish. The Birth of the Prison* (Foucault, 2009) constitutes an essential source of a new transdisciplinary areas of research over supervision which is specified especially in his work entitled *Safety, Territory, Population* (Foucault, 2014). The concept of disciplinary power by Foucault makes reference to the rules of panopticism modelled after excellent visibility machinery, i.e. *Panopticon*[2], a model of a perfect prison used to discipline „soul and body". Discipline and concern for safety are connected with supervision over units and all the societies and the reason for legitimacy of such actions consists first of all in the need to ensure safety by influencing behaviours and actions of people and organisation of their life.

However, review of opinions on the functioning of the French philosopher in contemporary scientific analyses indicates that reinterpretation of his theory of panoptic power took place.

The purpose of this article is to answer the question whether the concept of disciplinary power by Michel Foucault referring to the principles of panopticism is up to date in relation to contemporary times and can be used to describe contemporary supervision and its association with safety?

Striving at the response to the aforementioned question, the following detailed research problems should be considered:

- What were assumptions of the concept of disciplinary (panoptic) power from the perspective of Michel Foucault?
- How the concept by Foucault based on the principles of panoptic visibility changed?
- Can the concept by Michel Foucault and other concepts developing his ideas be used to describe contemporary supervision and its connection with safety?

Disciplinary power in a thought by Michel Foucault

Along with the advent of 17th-century administrative countries of western Europe acting on behalf of regulations and discipline, there has been an increase in the use of power techniques. They were other

than those known from the feudal times, where punishment had a form of bloody tortures, the description of which was provided by M. Foucault in his work *Discipline and Punish.* It also contains an interpretation of the original theory of disciplinary power and mentions changes in the method of exercising power (and penalties) that came up along with the development of capitalism and the commencement of administrative and bureaucratic country. The old model of punishment adopted in public execution became impossible to be performed in the developing capitalistic society. Bloody and public spectacles of absolutist Renaissance country gave place to long-lasting and idealised procedures taking place behind the walls of new institutions called prisons. It became necessary to find methods of dealing with criminals and developing in them (an in the remaining part of the society) the qualities such as submission, obedience, punctuality etc. Discipline was to serve these purposes as a modern instrument of management of the society, defined by Foucault as „a certain type of power, method of exercising power" which produced (..) subordinated and trained entities, 'prone' entities'" (Foucault, 2009, p. 209; pp.133-134). Discipline was a type of power, containing a whole set of mechanisms, techniques and levels of application, and was manifested in the assessment, forecast, modification or socialisation. It was interested mainly in individual that did not meet social norms, entrenched and monitored in specialised closed institutions, such as prisons, barracks or youth detention centres, the aim of which was to establish and maintain order as well as control and normalise the entity so that it behaved in a desirable and consistent manner, in compliance with the system of values and norms. As a result, in addition to its external impact, self0-discipline arose, as Foucault would say – self-subjugation. This was also the assumption regarding the exercise of disciplinary power so that it would not manifest its strength and repressiveness but was exercised without coercion and with the use of self-discipline (self-control). Foucault called the operation and exercises used by the authorities, and performed unrestrained by individuals – „self-technologies", constituting the art. of governing people in our societies. Speaking of them, he defined them as „a different type of techniques that allowed individuals to carry out a number of operations on their own bodies, their own souls, their own thoughts, their own behaviour using their own means in a way that transformed, changed themselves" (Foucault, 1985, p. 367).

The task of the disciplinary authority was to influence individuals which was to be effected by way of separation to resemble arrangement of prisoners in wards. Foucault used this analogy in his considerations included in *Discipline and Punish*. He used the design of a perfect prison – Panopticon. A conceptual architectural diagram proposed, also called a *House of Supervision,* comprise a ring-shaped construction with a centrally located tower with large windows facing inside and outside part of the building where a single caretaker could watch many prisoners, while remaining invisible: „here everyone closed in the ward is in one's place: the caretaker can watch them from the front, while the walls effectively prevent them contact with comrades. He is visible but he himself cannot see; it is the subject, not the object of information" (Foucault, 2009, p. 195). Uniqueness of Panopticon was due to the ideal form of its mechanism and construction properties: wards were separated with thick walls and windows were placed in such a way that the wards could be seen through. The project was an excellent visibility machinery using only optics and architecture. Specific arrangement of the Bentham prison established a hierarchical relationship between observers and observing parties thanks to „the power of gaze" observers. Thanks to this, the visibility of individuals allowed complete transparency of their lives, in opposition to the anonymity of power, transforming „entire social body into a field of perception (…) registering (…) the way of life, attitude, possibilities, suspicions – permanent balance sheet of human behaviours" (Foucault, 2009, p. 208). Panoptic „device" – as Foucault would like it – *dispositiff*[8], allowed the supervision to be exercised unintentionally and incessantly, constituting a trap of visibility into which all prisoners were caught, being subject to regular control of the observer-caretaker. In fulfilling the assigned role, it became necessary to gather knowledge concerning individual and their behaviour, which was to be achieved through „detailed techniques of recording, registering, creating files, entering into columns and tables" (Foucault, 2009, p. 229).

Foucault used Panopticon as a metaphor describing disciplinary society. Disciplinary (panoptic) authority used technique of spatial break down of individuals using separation, ordering, ranking and increased supervision. Visible (observed) individuals were to be described and classified later and evaluated – depending on the result – awarded or punished and corrected. In the Foucault's opinion, institutions such as prisons were undeveloped surveillance systems the aim of which was to influence

behaviour of individuals (normalise them), rather than control them only. These places were to transform prisoners, not just serve the purposes of punishment. Controlling the body and „soul training" were to change both behaviours and its motives, in line with words: „who has been placed in the field of vision and knows about it, accepts restrictions imposed by the authorities: voluntarily allows them to be influenced, fits into relations of power where he plays both roles – becomes the principle of self-subjugation" (Foucault, 1995, p. 198).

Foucault's disciplinary society is a society in which panoptical mechanisms in form of the observer's ubiquity, invisibility, regular observation and universal visibility of the observed are used, in the conditions of repression, coercion, but also restraint and self-discipline.

Contemporary researchers of Foucault's thoughts have taken up the problem of recognizing the features of a disciplinary society. According to the professor of philosophy, Szymon Wróbel, it can be assumed that this is a society „which provides few people, and even in an extreme version - one person, with an immediate insight into the great mass of people" (Wróbel, 2002, p. 239). In turn, a historian - Maciej Ożóg, claims that „a disciplinary society modelled after Panopticon is a society without private space: order applies to everyone and does not tolerate any exceptions to the general principle of visibility. Unattended areas are a challenge and a threat that should, or even must, be removed in the name of system consistency" (Ożóg, 2018, p.18). A similar opinion was expressed by Zygmunt Bauman - a world-famous sociologist and philosopher - claiming that the ideal version of Panopticon did not allow non-transparent privacy - as he called it - and uncontrollable space. Hence, the ruled were to live in the belief that the ubiquitous eye of superiors would always reach them and punish them for an offense committed even in secret. This was to serve discipline to be maintained under constant threat of punishment (Bauman, 2000, p. 60). The historian and sociologist, Bartłomiej Błesznowski interpreted this issue slightly differently. According to him, the disciplinary society „enters (the unit) into the network of supervisory relations, where it is subjected to constant tests, examinations, interrogations - it is a carrier of information" (Błesznowski, 2009, p. 88).

Evolution of panoptic vision

The slogan of rejection of the concept of Panopticon to describe contemporary surveillance practices of that time is invoked more and more often. Instead, complete cessation of references to Foucault in research on surveillance is proposed and preparation of post-Foucault theory of supervision. The tendency is reflected, among other things, in the statements by David Lyon - sociologist and co-founder and theoretician of studies on the Surveillance Society: „people who have been dealing with serious surveillance studies, Panopticon appears to be a fantastic idea. It is a theory describing surveillance and at the same time, on a different level, a tool that enables to put it alone in the history of modernity (…). Among those who devoted a little more time to study surveillance, there very mention about Panopticon often causes annoyance" (Bauman and Lyon, 2013, p. 79). Lyon, calling Panopticon „a child of his times", emphasizes at the same time the idea of an invisible observer with reference to contemporary times. As an example, he gives monitoring cameras that, like panoptic eyes, closely observe the surrounding space, extort specific behaviour of individuals, and acquire and save data to resemble registers kept by the disciplinary authority. Lyon, however, draws attention to the restrictions arising from the use of the Bentham scheme to analyse contemporary reality, mainly due to technological development and social structural transformations. According to him, the situation changed primarily together with computerization, which created connections and information flows, which researcher of supervision calls „leaking tanks" (Ożóg, 2018, p. 25) and points at a difference in comparison to the Foucault society: „supervisions tanks were properly isolated. It happened rarely that the thing that happened in one sector had impact on the other sectors. Today, the situation is changing, because the tanks have become more permeable. Supervision practices and data flows are penetrated more easily by different sectors" (Lyon, 2001, p. 37). The division of Panopticon led to the segregation and separation of units, as a result of which the supervisory institutions did not permeate, constituting closed and independent spaces with specific resources of acquired information. Today, in virtual communication and information systems, the situation is quite different, for instance due to the decentralization of supervision, which is no longer closely related to the authorities, as it was in the reality of modernism. Currently power is dispersed and control is one of the functions of exercising it

over citizens, but also citizens over the authority. Z. Bauman speaks in a similar tone; in his opinion in today's system of global and extraterritorial area of freedom, security and justice, those exercising power „can melt in the air at any time - become inaccessible and unreachable" (Bauman, 2006, p. 17). Bauman is critical of the Bentham project, which in his opinion, thanks to Foucault, has grown into the „arch metaphor of modern power". He even claims that today's challenges do not pretend to accept the use of unflagging enthusiasm - as he emphasizes – of „orthodox panoptical strategies" (Bauman, 2000, p. 61). According to Bauman, today's reality is post-pan-optical. Its metaphorical figure ceased to be a universal model and set dominant strategies for action in the modern world, which is described as „liquid modernity". In this world, supervision is not very transparent, which is mainly due to technological progress, the information flow system and confidentiality issues in the security sector.

The development of new techniques of power enabled it - thanks to the progress of the mass media - to remain in the shadows in a more sophisticated way than it did in the Panopticon. There has been a reversal of the panoptic view, the transformation of a situation in which few observe many, into a situation where many observe few. This thesis became the basis for Thomas Mathiesen to develop the concept of *Synopticon*[4]. Here peeping (seeing) and supervision are no longer reserved for selected observers and does not result directly from exercising power. At the same time Synopticon is of a global nature, in opposition to Panopticon entrenched in a local environment where the governing bodies remained „immobilised". In the model by Mathiesen everyone can join the extraterritorial network in which many can observe few without coercion, and to the contrary: (Synopticon) „is tempting for the people to watch". According to Z. Bauman, it is a „panopticon used for self-implementation and use (…) modified significantly, based on the supervision deprived of caretaker" (Bauman and Lyon, 2013, pp. 103-104). At the same time, it points to the fact of voluntary sharing of data and images of the private life of Synopticon participants, which indicates a completely new (unknown for panoptic surveillance) type of supervision – some form of exhibitionism[5]. A similar narrative was adopted by Maciej Ożóg who claiming that it was associated with „voluntary participation in the procedure of universal surveillance (…) which prompts many authors to announce the arrival of the participatory era of Panopticon (…) consisting in constant, universal, horizontal, mutual observation" (Ożóg, 2018, p. 30), carried out on account of being interested in the life of others, curiosity and the need to appear in the information space. The Finnish researcher - Hille Koskela is also inclined towards this perspective; Koskela speaks of „exceeding panoptical logic" (Koskela, 2009, p. 42), effected due to new techniques of looking, presenting and distributing images. The author challenges the Foucault connection of power with visibility, arguing that deliberate presentation or exposure is not tantamount to subordination to the operation of power. To the contrary, to be visible does not need to be weaker (here: subordinated to authority). The former power-observer ratio has been questioned. The objective consists no longer in strengthening control, but in blurring and undermining its borders.

The fall of the walls of Panopticon, as described by the French post-modernist philosopher Gilles Deleuze in his *Post-scriptum about control societies*, marked the end of oppressive supervision, while becoming the beginning of its transformations, qualitative changes and uncontrolled spread. The author describes this process with the term ′rhizome′ meaning 'rootstock' and referring directly to his rhizome theory. According to her, „rootstocks of power" have a wide range of impact and are themselves techniques of supervision (Deleuze, 1990).

The opening of former Panopticism is clearly marked by the atrophy of supervision procedures and tools, and the overriding goal is no longer discipline and the establishment of „submissive bodies". The centres of power, creating this decentralized order, have limited knowledge, but due to their constellation arrangement, they possess large data resources. All this contributes to the emergence of a new social structure, referred to by Manuel Castells in *Rise of the network society*. In opposition to the panoptical figure, he proposes the concept of a new spatial form, characteristic of social practices that dominate in a network society and shape them: it is the space of flows. Thus, network societies are no longer characterised by disciplinary power, but by power that is realised through conducted control in an immanent and unsupervised manner in the context of revolution of the information technology (Castells, 2008).

Remaining at the analysis of information flows, a similar pattern can be found at Mark Poster[6], who, referring to Panopticon, wrote that „today's communication flows replace old walls, shutters and other architectural instruments supporting electronics with the controller's constant look, thus creating a superpanopticon" (Poster, 1990, p. 71). The authority at Poster disciplines his subordinates, but only to participate in electronic communication systems. They, by providing huge amounts of information, stored in databases, constitute a voluntary factor in the supervision process. In the author's opinion, this type of control mechanism took on an even more common and oppressive character than that using a panoptic look.

Didier Bigo also addressed the issues related to computer databases in his concept, describing the operation *'Ban-opticon'*[7] consisting in device-related supervision, a contemporary 'dispositiff'[8]. However, this supervision has a different form than Panopticon, because its tools are based on information technology and digital. It allows to „produce" knowledge and image – staring from a suspect to (un)judged, enabling reconstruction of all stages of its transformation. It delivers messages concerning threats, information flows and traffic controls – he monitors the future. It is used for hazard profiling for the purpose of preventive selection and isolation, and exclusion of unwanted units. The thing that definitely distinguishes Ban- from Pan-optics is the need to ensure security, as opposed to discipline characteristic for Panopticon. For Didier Bigo the purpose of its device and instrumentation is to „follow everything in motion: goods, information, capital and people" (Bigo, 2008, p. 109)[9].

Supervision vs. safety – Mutual Relations

Supervision itself is nothing bad, and the consequences of its operation depend on who and for what purpose it serves. Hence, the mechanisms of its operation can be considered in various aspects. The first concerns the use of supervision tools[10] by state institutions appointed for the purpose of protection and defence against threats[11]. Today in a technologically advanced world, surveillance aims at anticipating threats and prediction of events based on the information collected and processed. The attack on the World Trade Center was an impulse and a contribution to the introduction of a wide range of surveillance tools in the name of improving security. Safety is often a pretext, a flagship, explicitly exposed goal that is to cover other, less spectacular or ideological goals. The formula „for security reasons" functions in every area of life as a keyword and serves to impose a narrative on the need to justify the actions of various institutions, not only state institutions[12].

Modern forms of electronic supervision introduce a new, preventive and a future-oriented control measure, used by the authorities to distribute and redefine knowledge about the individual. Thanks to new technologies[13], gathering information has become a routine, obscure intention and at the same time a highly automated operation. Data on the past, presence and future of each individual are collected on a continuous basis. For this reason, the state follows the Internet communications, administers public databases, sets up cameras and scanners, uses biometric systems, etc. All this contributes to the lustration of human life in almost every aspect and at every level. It seems that the boundary between the level of supervision necessary for security and maintaining the human rights guarantee in this regard has been crossed.

The new supervision also included everyday experiences and interpersonal relationships of almost every individual and social group. It changed the mentality and has become (and in particular its observational form) a way of life for many people. D. Lyon aptly defines this process in his latest work: „supervision is not only 'done to us' - it is something that we do in everyday life. We surrender to supervision believing that 'we have nothing to hide'. Or we try to protect our privacy or negotiate terms under which others have access to our data. At the same time, we participate in supervision to supervise children, monitor other road users, and protect our property. Social media allow us to follow others, including strangers, as well as one another. This is a culture of supervision. Observation has become a way of life" (Lyon, 2018). It is not only about observing others but also about observing oneself (self-supervision) and monitoring one's own health, how fat one's wallet is, capabilities and competence in various fields of activity using commonly available technological tools. According to the author, today we should pay special attention to supervision in everyday life, and less so on the global intelligence and police network. Z. Bauman speaks in a similar tone. Speaking about „smooth supervision", he finds

the lack of its oppression, what's more, makes it a desirable phenomenon that provides the supervised with interesting experiences, mainly due to active stay in the virtual world (Bauman, Lyon, 2013). That is why a part of the society is under surveillance by free choice. In this context Mark Andrejevic talks about *'Lateral Surveillance'*, otherwise known as „peer-to-peer" monitoring using surveillance tools used by individual units to keep people from its immediate surroundings under surveillance (Andrejevic, 2004). This is done through media shows such as 'reality show', where the observed person has a chance to „appear" in the media market, by exposing his or her own life (exhibitionism), but also by exercising voyeurism. Consequently, it is about a certain fashion, recognition and the need to present yourself.

The tools used by state institutions and the interested parties themselves - based on new technologies, indisputably contribute to the improvement of security on an individual and national scale, as well as contribute to the improvement of the quality and functionality of everyday life on an individual basis. However, there is no doubt that these tools affect human rights and freedoms. Therefore, it seems that their use can contribute to creating opportunities for improving safety, but also to the occurrence of threats related to excessive control and limitation of human rights. It is therefore important to feel responsible for one's own choices, preferring the subjectivity and freedom of each individual in his quest for independence, wisdom and ensuring security without focusing only on the custody provided by the authorities.

Summary

A society based on disciplinary power took a different, open form of networking, and, as post-Marxist philosophers Antonio Negri and Michael Hardt wrote in their Empire, „transfer of control to the society in no way means the end to discipline (…) it is characterized by the intensification and dissemination of normalizing disciplinary instruments, which stimulate our ordinary everyday practices from inside, but unlike discipline, this control extends far beyond the structured areas of social institutions" (Hardt and Negri, 2005, p. 350, pp. 38-39). Hence the figure of Panopticon as a metaphor of power and the foundation of a disciplinary society, although it undoubtedly requires reinterpretation, is clearly outlined in today's reality: panoptic model of power did not stay behind the walls of barracks, hospitals or schools, but began to spread, affecting our daily lives, spreading in every area as a pattern that symbolically describes the society of flourishing capitalism - a society of the age of security.

The concepts referred to in this study allow us to state that the discourse of Panopticon is replicated with varying intensity and in various areas of life. It manifests its unrelenting conceptual weight in scientific reflection and undoubtedly, it is a reference point for understanding contemporary supervision. It can even be considered, following Hungarian philosopher - Imre Lakatos that Panopticon is the hard core of scientific research programs for supervision, control and security.

Nevertheless, in modernized versions that develop the ideas of Michel Foucault's panoptic theory, the object and purpose of surveillance is no longer to shape „submissive bodies" by means of discipline. Now sophisticated forms of supervision, on the one hand, serve the purposes of state institutions, such as ensuring security and keeping order. On the other hand, supervision is a more or less conscious choice of individuals that meet their numerous needs, often created by virtual reality. (Self) supervision has nothing to do with disciplining the spirit or body. Not only that - it seems to increase the sense of security, freedom, choice and participation in the act of consumption of various goods and services. A human being, therefore, lives today in an amorphous world, where surveillance has become invisible and dispersed, and its negative connotations have at least weakened.

Footnotes

[1] Michel Foucault (1926-1984) – a French philosopher deemed to be one of the most eminent, inspiring and influential contemporary thinkers. Author of numerous publications, using extraordinarily valuating and highly rhetoric language.

[2] See: (Bentham, 1995). The idea to create *Panopticon* (Greek *pan 'everything'; optikos 'see'*) was taken by its author, Jeremy Bentham – a philosopher and social reformer from his younger brother Samuel who designed, upon the order of a Russian prince, a circle shaped factory where workers (especially those not accustomed to work) were to be observed (controlled) from the central unit located in a factory tower.

[3] See: (Błesznowski, 2009). The concept of '*dispositiff*' ('device', 'machine') is an expression of Foucault's thought about technology in the 70s and in this context it refers to the forms of social control (discipline, panopticism).

[4] Synoptykon – is a model of inverted Panopticon (many are watching the few), proposed by the Norwegian sociologist - Thomas Mathiesen.

[5] See: (Koskela, 2009). Exhibitionism in this context means a form of empowerment - liberation from shame and hiding: „when you show" everything", you become „free".

[6] Mark Poster was a professor of history and media studies at the University of California, Irvine. His *Superpanopticon* is an electronic prison without specialized architecture, in which databases work constantly and systematically while collecting information about individuals.

[7] Ban-opticon is a neologism derived from two words: banishment and opticon. The first term means the penalty of exile and exclusion, while 'opticon' from Greek means 'to see.' The author of this formulation is Didier Bigo, a sociologist and professor at King College in London.

[8] In this context '*dispositiff*' means all discourses concerning risk and threats, norms and rules of conduct (legal and administrative measures), institutions and architectural forms (concrete buildings and places e.g. airports – areas where preventive detentions take place).

[9] See: (Marx, 2015, online). There are many more concepts based on the principles of panopticism. It is impossible to refer to all of them but it is worth recalling some of them by name: *Dataveillance* by Clarke, *Telematic Society* by Bogard, *Techno-Policing* by Nogal, *The Maximum Surveillance Society* by Norris and Armstrong, *Surveillant Assemblage* by Haggert and Ericson, *Post-panopticon* by Boyne, *Global Panopticon* by Gill, *Myoptic Panopticon* by Leman-Langlois or *Oligopticon* by Bruno Latour.

[10] Modern tools that are equipped with cameras, sensors, GPSs, RFID, used for surveillance include: biometric and biomimetic systems, video monitoring, wearables, unmanned vessels, predictive systems, positioning systems and others.

[11] It is about police institutions and other security and public order forces, special forces, armed forces.

[12] Supervisory practices work just as well in the private sector, helping to better manage the requirements, tastes and preferences of customers.

[13] The market of new technologies is shaped by a modern product, i.e. advanced technology that is used in supervision. This market offers a variety of advanced devices for access control, monitoring, espionage, logging, eavesdropping, etc., cooperating separately or integrated in the network.

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The Impact Of Blockchain Implementation On Pharmaceutical Supply Chain Sustainability: A Conceptual Study

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Abstract

In recent years, there have been many problems in information integration among key pharmaceutical supply chain players in Saudi Arabia. This issue has resulted in problems such as medication shortage, lack of coordination among healthcare stakeholders, product wastage, and lack of demand information. However, blockchain, as a distributed digital ledger technology which ensures transparency, traceability, and security, is showing promise for easing some supply chain management problems. Local and global government, community, and consumer pressures to meet sustainability goals prompt us to further investigate how blockchain can address and promote supply chain sustainability. This study aims to explore the impact of blockchain technology implementation on the sustainability of the pharmaceutical supply chain. The objectives of this study are to identify the current information system infrastructure in the pharmaceutical supply chain of Saudi Arabia; to examine the barriers and challenges of blockchain adoption; and to examine the barriers and challenges of blockchain implementation. The result of this research is expected to contribute to the explore the role of blockchain in sustainability efforts. In addition, it will help managers, practitioners, consultants and decision makers who are interested in a deeper understanding of blockchain and its implementation and will evaluate its influence on sustainable supply chain management.

Keyword: Blockchain, Sustainability, Supply chain, Pharmaceutical, Saudi Arabia. IT Integration.

Introduction

Two topics have gained more importance in recent years in supply chain management (SCM). Firstly, sustainable supply chain management (SSCM), which has already received significant attention by many researchers. Secondly, information technology (IT) has been progressively considered as a key efficiency factor in supply chains. IT contributes to the sustainable development of supply chain operations, which is considered as one of the most important sectors where high quality logistics management is needed (Walker & Jones 2012). A sustainable business is defined as business with a long-term goal of maintaining economic, environmental and social well-being (Hassini, Surti & Searcy 2012). SSCM relates to a growing awareness of environmental and social responsibility across all areas of the supply chain (Wu, Zhang & Lu 2018). Thus, coordination among supply chain players is vital in order to meet sustainability goals.

The use of supply chain technologies can facilitate organisations decrease their lead time, lower the product life cycle, improve efficiency, and enhance ultimate customer satisfaction (Khan, Ahmad & Abdollahian 2013). Adoption of suitable supply chain technologies in organisations ensures timely and accurate information availability for their decision-making process. One of the most important factors to maximise the efficiency of all key players in any supply chain is the adoption of appropriate IT tools

in the SC (Khan, Ahmad & Abdollahian 2013). New technology adoption may require new infrastructure and nascent skills. Therefore, researchers need to investigate the factors affecting the adoption of technology for an entire organisation (Jela 2013).

Healthcare services have been given high government priority in the Kingdom of Saudi Arabia (KSA) (Almalki, FitzGerald & Clark 2011). However, due to the insufficient number of healthcare practitioners and the lack of technology applications, the e-health system in the country has been lagging behind the developed countries around the world (Alyami 2018). These shortages have resulted in problems such as medication shortage, lack of coordination among healthcare stakeholders, product wastage, and lack of demand information (Alruthia et al. 2018; Kapoor, D, Vyas & Dadarwal 2018; Privett & Gonsalvez 2014). Hence, many of these prevalent issues will be addressed in this research.

There are five major health authorities in KSA: the Ministry of Health (MOH), the Medical Services of the Armed Forces (MSAF), King Faisal Specialist Hospital and Research Center (KFSH&RC), the Ministry of National Guard Health Affairs (MNGHA), and the Security Forces Hospitals (SFH). These health authorities provide healthcare services in KSA; however, there is a lack of IT integration among them (Alsulame, Khalifa & Househ 2016). Additionally, Khalifa (2014) state that insufficient electronic data exchange and poor integration among different Saudi hospitals' IS modules and other electronic systems has been identified as another barrier to implementation and use of IS in hospitals. Furthermore, Alsulame, Khalifa, and Household (2016) also claim that some of the health IS modules used in KSA hospitals are coming from different vendors and have not yet been integrated and synchronised. Therefore, the study will assist practitioners to identify the role of blockchain adoption in the sustainability of the pharmaceutical supply chain in KSA, which would increase information sharing among them, making their supply chain agile and results in less human errors.

The real root cause of the above issue is not related to the availability of technology, as IT and IS are becoming available to many countries worldwide. The main reason is the lack of technical support during and after implementation of these systems (Khalifa 2013). In addition, according to Amatayakul (2010), health care sectors usually face a lack of financial resources for inevitable costs such as information systems implementation and relevant training courses for the users.

The pharmaceutical industry holds an important position within the Kingdom's Vision 2030. Therefore, the regulator and local industry players as well as international pharmaceutical manufacturers have recognised the importance of this vision and have begun to promote and develop KSA's domestic pharmaceutical industry. According to Saudi vision (2019), the Ministry of Health (MOH) seeks to preserve the environment by relying on technology to implement internal transactions and provide services to citizens in electronic form, which means electronic paperless services provided to the beneficiary everywhere. The MOH aims to preserve the environment, and strives to achieve sustainability in all its electronic services (Ministry of health 2019). Thus, one of the most significant goals of KSA vision is to adopt and implement of modern technology in order to serve the society and collect enough basic data to allow proper development planning (Saudi vision 2019).

Furthermore, there are several IT applications which can be used to organise whole records in health care facilities. Electronic Data Interchange (EDI), Enterprise Resource Planning (ERP), and Radio Frequency Identification (RFID) are some of the potential IT applications (Georgise, Klause-Dieter & Seifert 2014). Additionally, blockchain (BC) is one possible technology to enhance integrity, authenticity, and consistency of stored and exchanged medical records. BC offers a shared and transparent history of all the transactions to create trust, accountability, decentralisation, transparency, and immutability applications. Moreover, BC addresses security issues associated with a deployed distributed patient records database that could be managed by different advisories such as caregivers, hospitals, pharmacies, insurance companies, regulators and the patients (Alhadhrami et al. 2017). BC is also an appropriate solution when it is required to document a patient's health record or to secure medications' movement through the supply chain (Sadiku, Eze & Musa 2018).

The challenges faced by supply chain sector can be reduced or even avoided by using blockchain technology, and sustainability can be greatly improved (Tijan et al. 2019). However, BC and

sustainability integration have been somewhat neglected in academic research; therefore, more studies should be conducted to investigate the potential use of blockchain in the area of sustainable supply chain (Queiroz, Telles & Bonilla 2019; Schmidt & Wagner 2019).

The number of available KSA e-health studies remains low. Data is limited to a few organisations and does not necessarily reflect the breadth and depth of the current and potential use of e-health for healthcare organisations in the region (Alsulame, Khalifa & Househ 2016). Therefore, this study will explore the impact of blockchain implementation in the pharmaceutical industry in the context of KSA. To be more specific, the study will explore the potential impact of BC on the quality of supply chain practices. It also provides suggestions to decision makers and system implementers on proper plans and actions to overcome potential implementation challenges.

Literature Review

This chapter focuses on the literature pertaining to sustainable supply chain management (SSCM), information technology (IT) and blockchain (BC). It especially discusses the study's theoretical basis, the concept of SSCM, IT, and the barriers and challenges that impede successful BC's implementation.

Overview of sustainability and supply chain management

For the past decade, sustainability and supply chain management have been of great interest to academia and practitioners (Hassini, Surti & Searcy 2012; Rasool, Ahmad & Nazam 2016). While various research efforts have been dedicated to evaluating the sustainability of supply chains, few have taken into account all three dimensions of sustainability (Galal & Moneim 2016). In fact, integrating sustainability into the supply chain practices plays an important role in ensuring that certain social, economic and environmental benefits are achieved (Alzawawi 2014). Silvestre (2015, p. 166) states that indeed integrating sustainability into supply and value chain management is not "a destination", but an "endless journey characterised by trajectories of progress" as a result of the dynamic, radical, and emerging nature of the issues.

Sustainability

Sustainability has three main pillars, namely: environment, economic and society (Gopalakrishnan et al. 2012). Collectively, these three sustainability elements are called "triple bottom line" or 3BL. The environmental dimension refers to the involvement in practices that will not compromise future generations' environmental resources (Alhaddi 2015). The social aspect relates to empowering minority groups, diversity and inclusion, and healthy social living (de Carvalho 2018). The economic aspect refers to improving living standards and economic well-being (Abdullah et al. 2018).

Businesses are paying increasing attention to sustainability issues (Ahi & Searcy 2013). A major challenge for an organisation, however, is to integrate and balance the three sustainability aspects in a responsible manner that maintains financial stability and competitiveness while incorporating ecological and social demands (Abdullah et al. 2018).

Supply chain management

Growing interest in SCM has led to various definitions being created to describe it (Ahi & Searcy 2013). SCM identifies all the activities involved in delivering a product from raw materials to the end consumer. These activities are manufacturing and assembly, warehousing and inventory tracking, order entry and order management, supplier management, distribution across all systems, delivery to the customer, and the information systems required to control all of these activities (Habib 2011). In addition, research by Baah and Jin (2019) describes SCM as materials and services flow, supply chain partners collaboration, and sharing of information. Therefore, sharing information is a well-advocated way for improving SC efficiency (Choi, Wallace & Wang 2016).

The SCM sector was initially created to manage the flow of information, products and services across a network of consumers, business and supply chain partners (Felea & Albăstroiu 2013). SCM trends such as business markets globalisation, shorter product life cycles, digitalisation, and multi-faceted customer expectations, along with innovations such as resource scarcity, more restrictive regulatory requirements, and a longer-term emphasis, have led to the development of highly complex supply chains (Saeed & Kersten 2019). In fact, as the development of new forms of organisations such as virtual enterprises, global manufacturing and logistics evolve, coordination in the supply chain has become strategically important (Arzu Akyuz & Erman Erkan 2010).

For many companies SCM excellence has become a crucial differentiator (Kyengo 2012) and a key competitive advantage. In fact, a SCM's main objective is to improve organisational effectiveness and efficiency (Alzawawi 2014). As a result, a number of studies emphasises SCM's criticality as a means to ensuring organisational success (Habib 2011).

Sustainable effort in supply chain management

Sustainable supply chain management (SSCM) has attracted considerable interest among academics and practitioners. According to Dubey et al. (2017), there is a growing body of SSCM-related literature. SSCM can be defined as the planning, managing, regulating and organising of a supply chain to make it truly sustainable, while ensuring that there is no harm to economic, environment and social systems over a longer period of time (Pagell & Shevchenko 2014). Also, SSCM is the expansion of the traditional concept of the supply chain, by adding social, economic and environmental elements of sustainability (Wittstruck & Teuteberg 2012).

Unlike other business and management fields, because of its direct impact on sustainable development, SCM has long been associated with the sustainability discourse. In the supply and value chain sector, an evolving point of view is that "a company is no more sustainable than its supply chains" (Krause, Vachon & Klassen 2009, p. 19). SSCM is perceived to be the emergence of a new era that combines environmental performance, social efficiency, and economic contribution (Ansari & Kant 2017). Therefore, the economic, environmental and social aspects of sustainability must be taken into account by a truly sustainable organisation (Ahmadi, Kusi-Sarpong & Rezaei 2017). Today, it is no longer enough for companies to be profit-oriented; businesses must reduce their negative environmental effects and be responsible for child labour, health, safety, and pollution (ÖZÇELİK & ÖZTÜRK 2014). Therefore, SSCM focuses on the environmental effects throughout the supply chain (Rasool, Ahmad & Nazam 2016).

SCM practices not only play a vital role in achieving business goals, but they also have the potential to tackle sustainability concerns. The SCM's strategic role and its potential for significantly contributing to sustainable development is evident from academic research on the topic (Touboulic & Walker 2015). However, there is a limited number of studies on sustainability development in developing countries (Eitiveni, Kurnia & Buyya 2017; Khuntia et al. 2018). Hence, in order to address this gap in the literature, the current research has been conducted.

Pharmaceutical supply chain

The current pharmaceutical supply chain system is complex (Katuwal et al. 2018; Schöner et al. 2017; Suhail, Pandey & Hong 2019) and outdated (Haq & Esuka 2018; Shrikant 2019); it does not allow producers and regulatory authorities visibility and influence over the delivery of drugs, and it cannot overcome the challenge of cyber security in the 21st century (Shrikant 2019). In addition, many health systems and hospitals have difficulties in achieving a high level of service as they have not addressed how to manage, supply, and use medicines to save lives and improve health (Uthayakumar & Priyan 2013). A strategic feature of any health system is access to medicines (Kapoor, Devesh 2018). This feature depends on sustainable financing, comprehensive information systems, reliable supply systems and essentially on coordination and collaboration, either between internal supply chain partners or global supply chain partners (Benazzouz, Charkaoui & Echchatbi 2019).

Improper use of essential medicines may be costly in terms of wasted resources and preventable disease and death (Uthayakumar & Priyan 2013). In fact, for all healthcare industries, a high level of medical supply service is a primary objective (Uthayakumar & Priyan 2013). However, many hospitals in KSA do not have well-functioning supply management departments (Alruthia et al. 2018). Hence, more studies are needed to improve the pharmaceutical supply chain in developing regions (Privett & Gonsalvez 2014) such as KSA.

Pharmaceutical sector in KSA

The pharmaceutical sector in KSA is still in a phase of development (Alruthia et al. 2018; Alsaddique 2017). In fact, it is important to have an efficient and transparent system whereby the pharmaceutical supply chain can maintain accurate records of its pharmaceutical supplies in terms of expiry dates and accessible quantities through a computerised program (Alruthia et al. 2018). Blockchain is one technology that improves the integrity, authenticity and coherence of medical records that have been preserved and shared (Alhadhrami et al. 2017). Furthermore, blockchain can be an effective solution when tracking a patient's health record or moving drugs through the supply chain (Sadiku, Eze & Musa 2018). Therefore, this study will explore the technology of blockchain in the pharmaceutical supply chain in the context of KSA.

Blockchain definition and characteristics

Although an accepted definition of blockchain has not been agreed upon, according to Seebacher and Schuritz (2017, p. 3), a blockchain is a distributed database, which is shared among and agreed upon a peer-to-peer network. It consists of a linked sequence of blocks, holding timestamped transactions that are secured by public-key cryptography and verified by the network community. Once an element is appended to the blockchain, it cannot be altered, turning a blockchain into an immutable record of past activity.

Blockchain technology varies from most information systems by including four key characteristics: non-localisation (decentralisation), security, auditability, and smart execution (Saberi et al. 2019). Indeed, the underlying information technology architecture and its 'unbreakable' data chain which is provided for secure and open transactions is the key promise of blockchain (Randall, Goel & Abujamra 2017).

Through reducing the need for multiple intermediaries, blockchain can simplify supply chains by eliminating some transaction costs (Montecchi, Plangger & Etter 2019). Additionally, blockchain, in memory computing, data leaks etc. can contribute to increased data availability at the point of use (Pflaum et al. 2018b).

Blockchain Evolution

Leslie Lamport created the core ideas behind blockchain technology in the late 1980s and early 1990s (Dylan Yaga & Scarfone 2018 cited in ; Leslie 1998). In 2008, Satoshi Nakamoto developed digital ledger technology as the basis for the digital cryptocurrency known as Bitcoin. Cryptocurrencies like Bitcoin, Litecoin, and Ethereum are the foundations in blockchain. They function in a distributed ledger to track transactions (Alhadhrami et al. 2017; Sadiku, Eze & Musa 2018).

The detailed technical foundations of blockchain technology are outside the scope of this research. However, it is essential to shed light on some blockchain concepts, features and terminology to enable understanding of how blockchain is applied to solve healthcare problems. Technically, blockchain refers to either a distributed data infrastructure or a method for recording data using a crypto-analytic hash function (Wang, Han & Beynon-Davies 2019). An important element of the technique that maintains the blockchain's strength is hashing (Dylan Yaga & Scarfone 2018). The new block's hash contains the previous block's hash. This makes falsifying new or existing parts of the blockchain

extremely difficult, as the hash of a previous block determines the hash of future blocks. In order to change one block, the whole blockchain should be rewritten (White 2017).

Today, many sectors have introduced blockchain technology for using its benefits in their respective fields (Gupte, Gupta & Sinha 2019). Therefore, in recent years, blockchain technology has gained significant popularity with increased interest in various fields, including the healthcare industry (Angraal, Krumholz & Schulz 2017). While Internet of Things (IoT) technologies like radio frequency identification (RFID), low-power wide area networks (LPWA), wireless sensor networks (WSN), cyber-physical systems (CPS) etc. enable the vertical integration of information and material flows in supply chains, blockchain technology gains importance as far as the horizontal integration of information systems between companies is concerned (Pflaum et al. 2018a).

Although the benefits of blockchain are obvious, such as integrity protected data storage and process transparency (Wüst & Gervais 2018), there are concerns about efficacy and efficiency, which emerge for any new technology as well as its application (Randall, Goel & Abujamra 2017). Despite blockchain's potential to improve all kinds of supply chains, the literature about blockchain technology in the SCM field is in its infancy (Queiroz, Telles & Bonilla 2019).

Blockchain Types

There are two types of blockchain: public and private. Public blockchain are cryptocurrencies such as Bitcoin, enabling peer-to- peer transactions. Private blockchains use blockchain-based platforms such as Ethereum or Blockchain-as-a-service (BaaS), running on private cloud infrastructure. A private BC is an intranet, while a public BC is the Internet (Sadiku, Eze & Musa 2018). Although the technology of blockchain was originally intended to be truly public and distributed (i.e. public blockchain), private blockchains have also been developed. Private blockchains are controlled by one or more entities. Otherwise, public and private blockchains do not differ from one another (Kurki 2016).

Blockchain technology in pharmaceutical supply chain

Blockchain's decentralised form is more trustworthy, transparent, and traceable within business processes, whereby all the transactions are constant, saved, immutable, and distributed among all network nodes (Sinclair, Shahriar & Zhang 2019). In fact, both scientists and business representatives are considering the possibility of adopting the basic idea of Bitcoin technology in the context of supply chain management because of the disruptive role of blockchain in financial applications (Pflaum et al. 2018a).

Operating costs in the health sector must be reduced more than ever, as patient care and safety are improved (Bevilacqua et al. 2013). Safe, secure, and scalable (SSS) data sharing in the field of health care is extremely important for successful decision-making (Siyal et al. 2019). Pharmaceutical supply chains are very different from typical supply chains, starting with the raw materials extraction and after a few production phases continuing with shipping to stores and selling to end customers (Kurki 2016). This is because any disagreement in the healthcare supply chain might have an effect on patients' wellbeing (Clauson et al. 2018).

Medicines move through a supply chain with several key players such as manufacturer, wholesaler and retailer, who participate in the production, transportation, distribution, and sale of these products (Bryatov & Borodinov 2019). As counterfeit medicines have become one of the world's most complicated and challenging issues (Evans 2018), blockchain allows the tracking of medicines at every point of the supply chain (Clark & Burstall 2018). Previous studies have also focused on the safety of medicine distribution, lack of drugs, matching medicines' price in the market, and accessibility to the standard recorded temperature, which are summarised in Table 1. In fact, blockchain may be an ideal technology to improve performance and reduce the risk of the above-mentioned issues (Kurki 2016; Siyal et al. 2019). However, there is a lack of studies on the influence of blockchain on the sustainability of the pharmaceutical supply chain. Therefore, considering this research gap and the overall scarcity

of blockchain research, this study conceptually evaluates the effect of blockchain implementation on pharmaceutical supply chain sustainability.

Benefits and challenges of blockchain implementation

Blockchain has numerous benefits, including decentralisation, persistency, anonymity and auditability (Zheng et al. 2018). Perhaps the most evident and popular feature of blockchain is that it removes the need for a centralised trusted third party in distributed applications; in other words, it allows two or more parties to conduct transactions without a centralised authority in a distributed environment (Agbo, Mahmoud & Eklund 2019).

Another benefit of blockchain implementation is the establishment of a national registry of patients' medical information. This will make research and development of new medicines easier, cheaper, and faster (Plotnikov & Kuznetsova 2018). Therefore, it is expected that by implementing blockchain some challenges in the supply chain can be reduced or even avoided, such as delays in delivery, loss of documentation, unknown source of products, errors, etc. (Tijan et al. 2019).

Although blockchain has numerous benefits that can help organisations achieve their goals, the implementation of blockchain faces many challenges:

Firstly, due to the nature of blockchain, data stored or transferred out of the chain is not securely confidential (Alhadhrami et al. 2017). Since transactions are public, traceable clues may still be used to disclose users' identities and personal information (Gao, Hatcher & Yu 2018).

Secondly, blockchain implementation consists of bringing together all the relevant parties, which can in many cases be a difficult undertaking (Kshetri 2018). Participants need to agree on the terms of a transaction or a contract. This requirement will be one of the bigger barriers in the coming few years to the broader implementation of blockchain applications. Once the rules are in place, blockchain systems could automate many sustainability processes that professionals struggle to manage manually, allowing them to run much more efficiently (Clancy 2017).

Table 1: Summary of previous studies about using blockchain in the pharmaceutical supply chain.

Author (S)	problems	context	Solution using blockchain
Bryatov and Borodinov (2019)	Counterfeit Drug	Russia	The details collected on the identity of drugs manufactured by the plant and their movements throughout the supply chain in blockchain will accurately determine the authenticity of pharmaceutical products on pharmacies' shelves.
El-Din (2019)	Matching medicines price, lack of drugs	Egypt	BC can help address the undercurrents problem in Egypt. This causes the deaths of hundreds of children due to lack of milk cans and the death of hundreds of people with chronic diseases due to lack of medicines and import problems.
Erdenebold, Rho and Hwang (2019)	Counterfeit Drug	Worldwide	The primary goal and demand for using blockchain is to validate drug originality, increase transparency, inspect medication history, keep drugs secure, improve interoperability performance, provide protection against falsification and save costs within the supply chain. This can potentially save thousands of lives, as well as benefiting drug manufacturers and consumers financially.
Jamil et al. (2019)	Counterfeit Drug	Worldwide	BC has shown the ability to transform the traditional supply chain system into a secure, digital, transparent, continuous, audible, and decentralised supply chain. Using blockchain technology increases the performance in terms of throughput and also minimises the latency of the system proposed by utilising less resources.
Kumar et al. (2019)	Counterfeit Drug	India	The main benefit of the BC-based supply chain network is transparency of transactions, drug traceability by auditing and the ability to track any attempt to tampering of data.
Menezes et al. (2019)	Safety of medicine distribution	Worldwide	BC uses a decentralised system which help to checks the temperature, humidity during transport using sensors and drug manufacturing area.
Nayyar et al. (2019)	Falsified and substandard drugs	USA	BC ensures the provenance of data from the drug supply chain and can potentially detect the infiltration of fake medicines.
Pashkov and Soloviov (2019)	Counterfeit Drug Operational costs	Europe	Use of BC technology in pharmacy could provide reliable legal protection for the supply and tracking of pharmaceutical products. It also ensures transparency of delivery and reduction of logistics costs.
Raj, Rai and Agarwal (2019)	Counterfeit Drug	Worldwide	BC helps to build a transparent and open traceability system, allowing the logistics industry to track the goods in real time. BC helps to develop a proof of ownership concept whereby only the authorised party can pass ownership to another.

Shrikant (2019)	Counterfeit Drug	India	BC helps to track the medications from its manufacturing until its delivery to patient. After the use of a drug, its impact on patient will be recorded to a database for future statistics.
Zhang et al. (2019)	Temperature records	USA	BC helps to reduce lags between temperature measurement and timely corrective action in internal processes.
Boulos, Wilson and Clauson (2018)	Counterfeit Drug	USA	BC implementation can help to monitor the materials used in production and detect substandard or falsified medicines.
Chavali et al. (2018)	Counterfeit Drug	Worldwide	As the BC platform ensures drug identification tracing verification and notification, trust and transparency among parties in the course of ownership changes of the supply chain, BC can be seen as an answer to the illegal drug problem. BC allows genomic data to be recorded that can combat counterfeit drugs and protect intellectual property rights.
Clark and Burstall (2018)	Counterfeit Drug	Worldwide	BC has great potential for revolutionising the pharmaceutical companies' own anti-counterfeiting and enforcement efforts. BC also offers greater potential to engage and educate customers about the risks of counterfeits and provide the ability to verify whether the products they have purchased are genuine.
Evans (2018)	Counterfeit Drug	USA	BC helps to ensure safety and identify potential safety risks for supply chains. It even builds consumer confidence. The use of BC will also allow pharmaceutical companies to avoid counterfeit drugs by giving consumers the right to alert the company in case they are purchased.
Jochumsen and Chaudhuri (2018)	Counterfeit Drug	USA	BC may also make tracking and tracing redundant by IoT devices, as it has the ability to track products throughout every party in the supply chain and the product life cycle.
Katuwal et al. (2018)	Counterfeit Drug	Worldwide	BC offers primitives such as data integrity and provenance that can be used to build solutions to prevent drug counterfeiting.
Soundarya, K, Pandey and Dhanalakshmi (2018)	Counterfeit Drug	Worldwide	BC technology is used, through the supply chain, to identify the ownership specifics of each product. Therefore, even if the RFID tags can be cloned, b the ownership of each product cannot. BC is immutable, transparent and secure which will help in avoiding many misconducts in the supply chain.

Plotnikov and Kuznetsova (2018)	Counterfeit Drug	Russia	BC can ensure information cannot be falsified. It can exclude the selling of substandard or counterfeit drugs by regulating all elements of the drug production, logistics and distribution chain.
Radanović and Likić (2018)	Counterfeit Drug	Worldwide	BC could be used for tracking pharmaceutical movement throughout the supply chain and also for its authentication. Produced items could be labelled with a unique code, and blockchain could be used to verify the code and product authenticity. This could be a big step in the ongoing fight against the easy availability of counterfeit drugs.
Scott et al. (2018)	Counterfeit Drug Contamination of medicines	USA	Providing pharmaceutical traceability via the supply chain is a suitable use case for implementing BC.
Bocek et al. (2017)	Temperature records operational costs	Europe	BC allows pharmaceutical supply chains to monitor temperature and humidity during medical product transport.
Mackey and Nayyar (2017)	Counterfeit Drug	Worldwide	BC stands out as a potential revolutionising technology platform to better ensure a modernised and 'digitised' drug supply chain that is more trustworthy, accountable, transparent, and protected from fake drug infiltrations.
Rabah (2017)	Counterfeit Drug	USA	Traceability of drug product offers where each transaction between drug manufacturers, wholesalers, pharmacists and patients can be tracked in order to verify and secure information important to address issues like counterfeit medicines.

Thirdly, blockchain provides constant data integrity. The clear drawback of this is that, as the number of transactions continues to grow, blockchain size will increase accordingly (Gao, Hatcher & Yu 2018). The consequence of this continuous growth is not only higher storage costs, but also the decrease in blockchain distribution speed over the network. In addition, scalability is a difficult issue and must be taken into account in the design of blockchain applications (Gao, Hatcher & Yu 2018).

Fourthly, not all countries are ready to participate in blockchain-based solutions due to the need for a high level of computerisation. Many supply chain partners in developing and least developed countries are often far from willing to embrace blockchain. Without their involvement, the full potential of blockchain in the supply chain is difficult to realise (Kshetri 2018). However, KSA has made great progress in implementing blockchain in different ministries such as SAMA, Customs, and Municipalities. These achievements demonstrate that the Kingdom is in the midst of implementing blockchain technology. The KSA implementation of blockchain technology is considered an important development because it supports its goals to become a digital country, and this transforming technology naturally integrates with the Saudi's vision 2030 (Saudi Press Agency 2018).

Modern applications of blockchain have to adapt to certain technical challenges and drawbacks that blockchain technology requires. For example, security, privacy, throughput, size and bandwidth, performance, usability, data integrity and scalability are just some of the attributes required to implement blockchain in high quality (Koteska, Karafiloski & Mishev 2017).

Theoretical foundation of the study

Transaction Cost Theory

Transaction cost theory (TCT) has been described as the cost of the resources used to define, establish, maintain, use and change institutions and organisations, and to describe the problems to be solved by these institutions and organisations (Marshall 2013). Furthermore, TCT focuses on transferring services or products between two parties, and transaction costs are any costs incurred during the transaction's implementation process (Prasad & Shivarajan 2015). Therefore, from a TCT point of view, addressing the concept of uncertainty could provide further insight into the value of information sharing among organisations (Yigitbasioglu 2010). The adoption of blockchain can reduce supply chain uncertainty because of the high information flow among key players, which can lead to low transaction costs, less opportunistic behaviour of supply chain members, high visibility in supply chain, and good governance, thus helping achieve supply chain sustainability.

Organisation Culture

Scholars define organisational culture in different ways. Jones and George (2014) suggested that organisational culture is the shared values, rules, behavioural norms, and expectations that affect the interaction and cooperation between individuals, organisations, and teams in the process of achieving organisational goals. Al Saifi (2015) indicated that organisational culture is a complex entity of values, beliefs, behaviour norms, meanings and practices shared by personnel within an establishment.

Moreover, organizational culture seems to be a crucial factor for the success of every organisation (Attar & Kang 2018). According to Tuan and Venkatesh (2010), organisational culture affects the extent to which innovative solutions are encouraged, supported and implemented. In a supply chain scenario involving multiple participants, where each participant still has autonomy and its own organisational identity, however, it seems that as long as cultures are compatible, the culture of each organisation in the supply chain could differ with successful outcomes (Cadden, Marshall & Cao 2013).

Blockchain and sustainable supply chain

Supply chain management (SCM) plays a variety of vital roles in different sectors or industries (Elango 2018). Thus, the benefits of integrating SC with blockchain are: increased sustainability; decreased errors and delays, reduced transportation costs, faster issue identification, increased consumer and partner trust, and improved product transportation process and inventory management (Tijan et al. 2019).

Blockchain technology as distributed, immutable, transparent, and trustworthy databases shared by a community can also affect sustainable supply chain networks (Saberi et al. 2019). BC can be a useful tool in tackling certain sustainable development issues (Lund et al. 2019). Therefore, by removing third party intermediaries, BC could minimise transaction costs as the trust becomes more process-based than characteristic or institutional-based (Avital et al. 2016; Schmidt & Wagner 2019).

Although sustainability has gained increasing interest in SCM research, there is limited research in management information system to explore the contribution of IT resources to help firms develop sustainability capabilities (De Medeiros, Ribeiro & Cortimiglia 2014). In future research, sustainability dimensions can be used to study blockchain-enabled SC effectiveness (Saberi et al. 2019). These arguments result in this study's propositions, which serve as the foundation to investigate the impact of blockchain implementation on pharmaceutical supply chain sustainability in the context of KSA.

In addition, triple bottom line (TBL) sustainability has three major areas which focus primarily on interplay and overlap of the social, environmental and the economic factor (Brandenburg et al. 2014). Thus, these dimensions have been described in the following sections.

Economic Dimension

The economic dimension refers to raising living standard and economic well-being (Abdullah et al. 2018). SC faces significant challenges in the economic area of sustainability including procurement contract, insurance claims, increased financial transaction costs, sustainability monitoring cost , and investment (Chandan, Potdar & Rosano 2019). Therefore, firms are likely to get benefit from BC technology adoption and its SC from a number of business aspects that influence its economic performance.

Environmental Dimension

The environmental dimension relates to the practices that do not influence future generations' environmental resources (Alhaddi 2015). Sustainability can be improved throughout the SC by sharing information that will help in resource planning and policy-making, which in turn can lead to a decrease in the consumption of natural resources (Kouhizadeh & Sarkis 2018). Therefore, BC technology has the ability to contribute to the environmental aspect of the supply chain sustainability.

Social Dimension

The social dimension refers to the empowerment of groups previously considered to be minorities, diversity and inclusion, as well as a society with a healthy lifestyle (de Carvalho 2018). The stabilisation and immutability of information is one way to build SC's social sustainability (Saberi et al. 2018). However, there are few studies discussing social issues (Brandenburg et al. 2014; Galal & Moneim 2016; Rajeev et al. 2017). Moreover, there is not clear evidence yet that shows the impact of the use of IT applications in social aspect of supply chain sustainability (de Camargo Fiorini & Jabbour 2017; Thöni & Tjoa 2017). Thus, researchers should attempt to explain how value is created, captured and distributed in a blockchain-enabled social supply chain (Wang, Han & Beynon-Davies 2019).

The Research Model

The proposed research model will establish a relation between blockchain adoption and sustainability (see Figure 1). From the wider literature review it seems relevant to consider sustainability for SCM because sustainability is necessary in the case of environmental, social, and economic disruptions. The model has been developed based on transaction cost theory, with literature from the triple bottom line approach of sustainability in the supply chain, organisational culture and blockchain. There is evidence that KSA's pharmaceutical supply chain is vulnerable to environmental, social, economic non-compliance; in such a situation the proposed research model (see Figure 1) has been developed for the sustainability of the pharmaceutical supply chain of KSA.

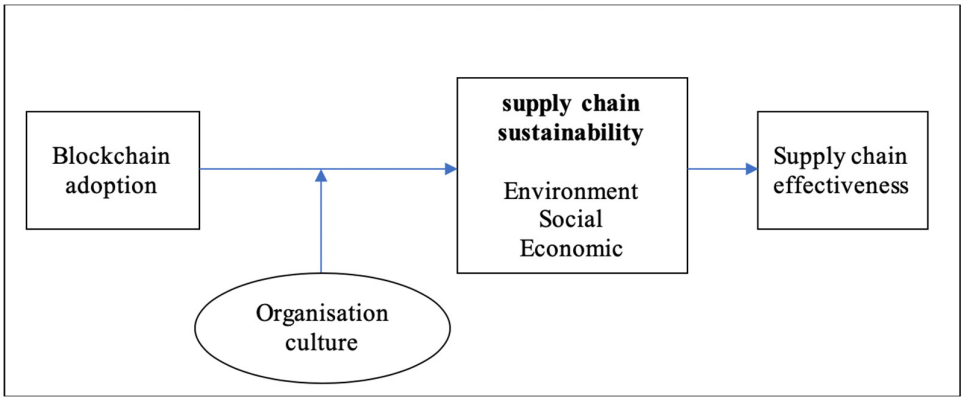

Fig. 1: conceptual framework

Expected contributions of the study

Theoretical contributions

The first theoretical contribution of this research is to explore the role of blockchain in contributing to sustainability efforts. By integrating variables from supply chain, blockchain and organisational culture, the study will provide a clear picture to better understand the influence of these factors on the sustainability of the supply chain. The second theoretical contribution of this research is discovering and diagnosing the barriers and challenges of blockchain implementation in the pharmaceutical supply chain in the context of KSA.

Practical implications

This study has important implications for managers, practitioners, consultants and decision makers who are interested in a deeper understanding of blockchain, its implementation, and its influence on SSCM. This research will provide some outcomes and recommendations that may assist them in making a more informed decision.

Conclusion

This paper presents a conceptual model to study the impact of blockchain implementation on pharmaceutical supply chain sustainability. We pointed out the issues in current pharmaceutical supply chain management and explained how blockchain can be used to solve these issues as well as how blockchain can address and promote supply chain sustainability. Although blockchain technology is certainly in its infancy, we are already seeing progress regarding its implementation in everyday life, mainly the financial one and the pharmaceutical especially. Nevertheless, this is an ongoing work, and we plan to make it more efficient and robust.

Table 2: present issues in the supply chain concerning sustainability dimensions and how blockchain can solve these issues.

Sustainability issues	Solution using blockchain
Economic issue	BC may result in SC disintermediation where fewer tiers result in transaction and time costs reduction, reducing the supply chain's business waste (Saberi et al. 2018). BC utilisation may lead to more secure payment possibilities through the use of cryptocurrencies and tokens (Kouhizadeh & Sarkis 2018). BC reduces time delays, miscommunications, and fraud, while eliminating third party oversight (Ally & Wark 2019).
Environmental issue	BC accurately helps to track substandard products and detect further products' transactions which may help to reduce rework and recall (Saberi et al. 2018). BC also has the ability to improve transparency and traceability in SC, which leads to improved environmental sustainability (Chandan, Potdar & Rosano 2019). BC could help in the monitoring and regulation of climate-altering gases by tracking emissions against targets and limits (Sulkowski 2018).
Social issue	BC technology makes it easier for supply chain key **players** to bring transparency, trust, security, reliability in SC which can potentially lead to social sustainability (Chandan, Potdar & Rosano 2019). BC helps customers to feel safe, comfortable in using the product because they can transparently trace the product flow (Parung 2019). BC helps governments to retrieve the working hours of workers from a blockchain network to judge whether companies are violating the overtime limits and whether living wages are paid to workers on time (Venkatesh et al. 2020).

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Possibilities of Integration of Strategic and Project Management in The Supporting System of Small and Medium-Sized Businesses at Local and Regional Levels

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Abstract

The specific nature of medium-sized business requires an understanding of its nature and criteria for distinguishing these entities from other companies. One of the problems of the slow development of small and medium-sized businesses in transitive economies is the lack of coherence between the business development programs implemented by local authorities and the real needs of business entities. This result was confirmed on the basis of a survey of small and medium-sized businesses (150 respondents) on the example of one of the local communities of Ukraine. It is proved that the low efficiency of entrepreneurship development programs is due to the methodological flaw that persists in the formation of strategies of community development at different levels. Building the analysis of existing problems and the choice of community development priorities on the methodological principles of environmental analysis, including SWOT analysis, further adjusting strategies using dynamic strategic analysis and balancing of the territorial community project portfolio are not carried out, as a result of which programmatic indicators of goals achievement are usually not achieved. This is based on the example of an analysis of five topical development strategies that have been developed using a common methodology, each of which supports entrepreneurship as one of the priority operational goals. In order to increase the efficiency of local business development with the support of the authorities, it is proposed to combine the methodology of strategic community development management and the methodological principles of project management. To this end, criteria and an algorithm for making decisions on adjusting the community development strategy and keeping it up to date are developed, which are based on the results of the environmental assessment. Approaches to strategic management of "weak signals" (I. Ansoff) to the specificity of strategic planning in territorial communities are adapted and developed.

Keywords: Project Management, Strategic Analysis, Territorial Community, SWOT-Analysis, Strategic Management.

Introduction

The stimulation of the development of small and medium-sized enterprises (SMEs) at the regional and local level is mainly through a program-based management mechanism, which underlies the whole model of state management. This approach is enshrined in the Constitution of Ukraine, and the essence of the program-target method and its application at different levels of the budget process is defined by the Budget Code. The implementation of state programs of economic and social development is foreseen on the basis of projections in the respective sphere of their use in planning projects at different levels of the state sphere of influence (VRU, 2012).

In the field of entrepreneurship development at different levels of government and local self-government, two-year or three-year programs are approved. However, the effectiveness of such programs is very low, since their implementation in most cases does not lead to systematic changes in entrepreneurial activity. According to the State Statistics Service of Ukraine, the volume of sales of small enterprises in Ukraine increased from 2010 to 2018 by only 20% (SSU, 2020) despite having an extensive network of state, regional and local small business development programs. Such growth does not meet the needs of the national economy, which by value of GDP per capita is the poorest country in Europe after Moldova. In some regions, in 2018, the volume of sales even decreased. In 2016, Ukraine and the EU concluded the Deep and Comprehensive Free Trade Area (DCFTA), but as the statistics show, it also did not become a stimulus for dynamic development of small business.

One of the main reasons for the slow development of small businesses is the lack of coherence between entrepreneurship development programs implemented by local authorities and the true needs of business entities. This can be confirmed by the results of a survey of SMEs(150 respondents) in Rivne, conducted with the participation of the authors within the project "Research of the quality of services of local authorities for SMEs" (2019). It has been found that entrepreneurs consider credit reduction (23% of all responses) as a priority area of financial support for business (Fig. 1).

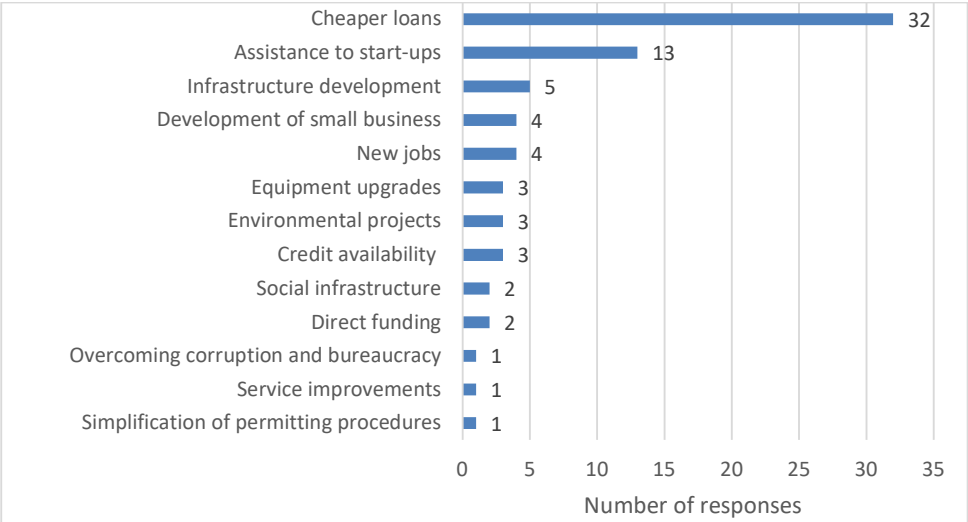

Figure 1: Priority areas for SMEs financial support

Source: *own computations*

However, such an instrument did not become a key in the SMEs Development Program in Rivne for 2018-2019, which is why only 2 entrepreneurs received partial compensation for interest on bank loans in 2019, and in 2018 no such compensation was made. Such inconsistencies can be observed in the area of business infrastructure development and information support. Therefore, the projects and activities through which the overall goals of local business development are to be achieved do not have a significant impact on business development processes.

Another problem is that most business support programs are out of sync with regional and territorial development strategies, including their expected results. Programs at different levels are just a tool for achieving the strategic and operational goals of the strategies. In the absence of such a link, the value of both strategic planning, the results of which become declarative and of the program-management system, disappears. This system consumes resources aimed at obtaining products of projects and programs (outputs), the totality of which does not produce the proper outcomes of projects and programs (outcomes), without which it is impossible to change the state of the system (impact), which is why strategies and programs are develop.

The substantiation of methodological approaches to the integration of strategic and project management in the systems of regional and local governance is an important scientific and practical task to which this research is directed.

Literature Review

Conceptually, the integration of strategic and project management is simple enough. It is quite understandable and logical that the results of the projects must ensure the achievement of the goals of the programs, which should lead to the realization of the goals of the strategies that have been developed in order to move the system from one state to another. This approach is embedded in the results-based management approach, used by the United Nations.

This approach is based on the UN principles (UN, 2017):

- Establishment of strategic vision and goals, the achievement of which should be focused on all management activities and the management system;
- Causality and the results chain, hierarchically combining inputs, outputs, outcomes and impact (which is the ultimate goal of management);
- Systems operation and strategic management, according to which openness of systems and permanent influence of environmental factors on them requires constant monitoring of such factors and management of the system according to their influence.
- Performance measurement, when indicators are defined in terms of quantity, quality and time dimensions, or in a SMART (specific, measurable, achievable, relevant and time-bound), which provides the necessary information basis for making informed decisions.
- Monitoring and evaluation, providing (a) progress towards results, (b) the validity of the results chain and causal assumptions, and (c) the contribution of the organization towards long-term goals.

This approach formed the basis of the EU Recommendations for Project Cycle Management (European Commission, 2004), which is offered as a Handbook for EU projects preparation (Papadimitrov and Nikolovski, 2017).

The practical implementation of this approach requires the application of a wide range of methods and tools, different combinations of which create different strategic and project management mechanisms. They are evolving under the influence of a constant increase in the turbulence of the environment, with the emergence of new information technologies, whose volume is also hyper-dynamically increasing (Bilan et al., 2019). Therefore, static methods of strategic analysis (such as SWOT analysis, PESTLE analysis widespread in the practice of strategy development) lose their value and need to adapt to new conditions. In today's world, it is virtually impossible to make long-term predictions about the behavior and condition of complex socio-economic systems and build rigid strategic plans on the basis of information known at the time of forecasting. Therefore, the ideas of Ansoff, H. I. (1975) on "management on weak signals" are taking on a new meaning and becoming a paradigm of modern strategic management in various complexity and size of socio-economic systems (Ansoff et al., 2019; Holopainen and Toivonen, 2012; Raišienė et al., 2019;).

Since the environmental factors affecting the system are probabilistic in nature, and therefore the impact on the system in terms of both strength and content may change over time, it is necessary to track such changes. This requires, in addition to qualitative assessments, a more intensive use of

quantitative ones, which will allow to track the speed of change, the combination of different trends, and to respond in advance to any likely changes in the external environment. In this context, Gasparini and Bianco (2011) suggest a quantitative assessment of strengths and weaknesses in the SWOT analysis, which are noteworthy.

The methodology for addressing internal and external problems as well as internal and external strengths has been thoroughly described today, as in Brad and Brad (2015), Nazarko et al. (2017), Delafontaine et al. (2015). This approach is the basis for the development of projects of different levels – the development of the enterprises themselves (Abosede et al., 2016; Bilan et al., 2017; Mishchuk et al., 2016), the need to develop knowledge for project purposes (Januska, 2017 Krayneva et al., 2017; Sułkowski, 2019; Poór et al., 2018), as well as to identify and implement development priorities as an integral mechanism of entrepreneurship in public administration (Fyliuk et al., 2019; Mazouz et al., 2016; Shvets et al., 2013; Valickas et al., 2017).

Method and Data

The key in the processes of strategic and project management integration is understanding the cause-and-effect chain "Input-Output-Outcome-Impact", which shapes the hierarchy and logic of expected results. Well-known international institutions provide excellent interpretations of some of these terms (OECD, 2002;European Commission, 2004;UN, 2017).

Each type of result should be measured using indicators. By the term "indicator" we understand the "quantitative or qualitative factors or variables that provide a simple and reliable means to measure achievement, to reflect the changes connected to an intervention, or to help assess the performance of a development actor or intervention" (OECD, 2002, p.25;UN, 2017, p.48). The results indicators are also hierarchical and characterize the degree of achievement of the results at different levels. In the context of strategic and project management integration, it is advisable to follow the objectives and outcomes of the various levels and indicators:

1) *Impact indicators* characterize the achievement of strategic goals and describe changes in the properties of the system or part of it. Achieving their targets will signal the achievement of the vision outlined in the strategy. In the context of the SMEs development, such indicators can be the number of employees, their income level, export volumes, ease of doing business, etc.
2) *Outcomes indicators* show the degree of achievement of operational goals and targeted programs aimed at achieving them. They characterize the changes that have occurred in the target groups as a result of the intervention. Therefore, the methods of evaluating such indicators should take into account the ability to receive feedback from these target groups. Such indicators may include investment volume, availability of business support infrastructure, quality of services provided, etc.
3) *Outputs indicators* may correspond to Critical Success Factors (CSFs). They characterize the time and number of facilities created that the beneficiaries or target groups can use. In entrepreneurship development projects, such CSFs include the number of administrative services provided.
4) *Inputs indicators* correspond to individual Key Performance Indicators, (KPIs) programs or projects that achieve the expected outputs and outcomes. Such are not of value to the target groups, but are necessary to create the conditions for obtaining higher results. These indicators include the number of SMEs, the amount of financial support, the number of activities carried out, etc.

A properly designed system of indicators should correspond to the condition that the target value of the upper level indicator can be obtained only when all the target values of the lower level indicators are reached. The system of indicators will be flawed if at least one of the following conditions occurs between any levels of the hierarchy:

1) *The upper-level indicator value can be reached if the target value of one or more lower-level cause-and-effect indicators is not reached.* This means that one or the number of lower-level rating objects are unrelated or insufficiently related to higher-level scores. If such cases are identified at any stage of the strategy, program or project implementation, these indicators should be modified

or the possibility of change of the list of projects or individual activities carried out within them should be considered. Otherwise there are risks of inefficient use of resources for project activities.

2) *If the target values of all lower level indicators are reached, the target level of the higher level cannot be achieved.* This may indicate the imperfection (imbalance) of the project portfolio and its inconsistency with the strategic or operational goals and the ability to provide project activity resources. In this case, it is advisable to start the process of optimizing the project portfolio, and if the problem cannot be solved, it is worth initiating the process of revising the operational and strategic goals.

To build a flexible and integrated strategic management system that will cover both program and project management processes and respond quickly to environmental disturbances, it is advisable to carry out an axiom-based strategic analysis that no opportunity ($O_{(i,\,t)}$) or threat ($Th_{(i,\,t)}$)can exist on their own. It is the result of the action of one or a certain set of environmental factors (events, phenomena, processes) that may occur at different periods that precede the occurrence moment of opportunity or threat:

$$X_T \rightarrow \left\{ \begin{matrix} Th = \{Th_{(i,\,t)}\} \\ O = \{O_{(i,\,t)}\} \end{matrix}, when\ t > T \right\} \quad (1)$$

where i – the sequence number of the opportunity or threat, t – the period of time when the opportunity or threat may arise.

That is, a set of threats and opportunities for a particular system at each discrete time point will be unique in content or probability of occurrence. It follows that in a turbulent, high uncertainty environment, any strategy with a fixed list of operational goals, objectives and projects for the entire period of its implementation will not be viable. Instead, a set of time-shared and coordinated strategic alternatives that are updated as new threats or opportunities emerge will have greater dynamic resilience.

Strategic goals are achieved through a program-target management mechanism that requires the application of quality project portfolio management. We will use the term portfolio management in the context of The Standard for portfolio management (PMI, 2017).

To ensure the integration of strategic and program-target management, it is advisable to apply the methodology of value-based approach implemented in the Japanese standard for management of innovative projects (P2M, Program Management for Enterprise Innovation) (PMAJ, 2001).

The methodology for comparing actual results against identified strategic indicators of achievement of goals for finding opportunities to balance the SMEs portfolio of development projects has been tested by us as an example of the analysis of socio-economic development strategies of five regions of Ukraine, which were first developed in Ukraine using the EU strategic planning methodology.

Results

Based on the above methodological framework, a conceptual model of integration of strategic and program-target management in conditions of environmental turbulence at the regional and local level was developed (Fig. 2).

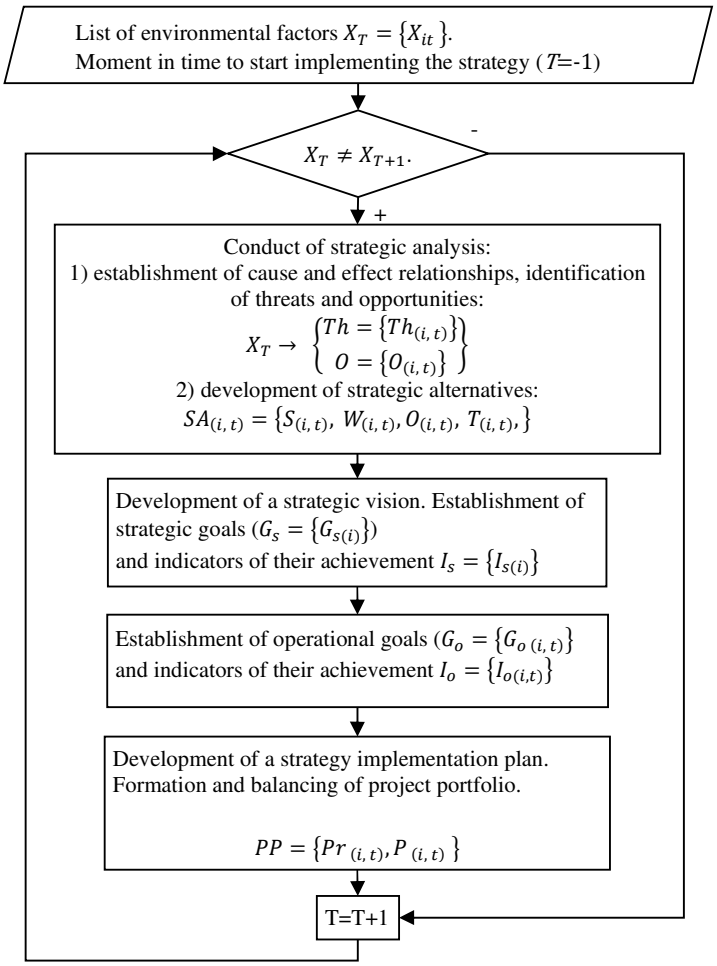

Figure2: Conceptual model of strategic and program-target management integration under the conditions of environmental turbulence

Source: own elaboration

Since open socio-economic systems are constantly influenced by environmental factors, strategic alternatives ($SA_{(i,t)}$) are periodically reassessed. In order to decide whether it is appropriate to move from one strategic alternative to another and to rebalance projects, a quantitative indicator should be used to characterize the integral state of the internal and external environment.

The practice of strategic analysis using the SWOT analysis method is widely used to quantify threats and opportunities based on the determination of their probabilities and the impact on the system (European Commission, 2004). However, such assessments are generally made only during the strategy development period and are no longer reviewed despite changes in the environment.

For example, the Sumy Region development strategy up to Year 2020 is the only one among the studied regions where quantitative assessment of the priority of threats and opportunities was carried out during the SWOT-analysis. However, after the change in the environment, such an assessment was not carried out again, and the identified strategic alternatives did not meet the real conditions of activity. For example, the weakness of "Excessive export orientation of enterprises in the region to the Russian Federation", which had a high level of importance in 2014, lost its influence in 2017, which is why a reassessment of strategic alternatives should have been made in the formation of the

project portfolio for 2018–2020. Instead, the emergence of new opportunities is not considered in the strategy. Particularly, the state program of the Entrepreneurship Development Fund will significantly influence and create great opportunities for the development of small business for year 2020. The application of the proposed method of dynamic strategic analysis would make it possible to see such "weak signals" and to envisage appropriate measures to ensure the active participation of the entrepreneurs of the region in this program.

Considering that each threat or opportunity depends on one or a certain set of events related in time and content, quantitative assessment of the aggregate level of threats (opportunities) can be determined by the formulas:

1) The probability of occurrence of a certain opportunity ($p^{O}_{i(T)}$) and threat ($p^{Th}_{j(T)}$)within the period *T* will be determined by the product of the probability of occurrence of all interrelated events, processes or phenomena (p^{x}_{it}andp^{x}_{jt}respectively):

$$p^{O}_{i(T)} = \prod_{t=0}^{T} p^{x}_{it} \ , \qquad (2)$$

$$p^{Th}_{j(T)} = \prod_{t=0}^{T} p^{x}_{jt} \qquad (3)$$

2) The quantitative assessment of the state of the external environment of the system ($ThO_{(t)}$) can be carried out with the following dependencies:

$$O_{(t)} = \sum_{i=1}^{n} \vartheta^{o}_{i(t)} \cdot p^{o}_{i(t)}, \quad (4)$$

$$Th_{(t)} = \sum_{j=1}^{m} \vartheta^{Th}_{j(t)} \cdot p^{Th}_{j(t)}, \ (5)$$

$$ThO_{(t)} = O_{(t)} - T_{(t)}, (6)$$

where$p^{o}_{i(t)}, p^{T}_{j(t)}$are the probabilities of occurrence of *i-th* opportunity and *j-th* threat in the period *t*; $\vartheta^{o}_{i(t)}, \vartheta^{T}_{j(t)}$ are the forces of influence of the *i-th* possibility and the *j-th* threat in case of their manifestation on the state of the system in period *t*.

3) The state of the internal environment of the system in period *t*($SW_{(t)}$) can be calculated by the following dependencies:

$$S_{(t)} = \sum_{i=1}^{n} \vartheta^{s}_{i(t)} \cdot p^{s}_{i(t)}, \quad (7)$$

$$W_{(t)} = \sum_{j=1}^{m} \vartheta^{w}_{j(t)} \cdot p^{w}_{j(t)}, \ (8)$$

$$SW_{(t)} = S_{(t)} - W_{(t)}, (9)$$

where$p^{s}_{i(t)}, p^{w}_{j(t)}$ arethe probabilities of maintaining the *i-th* strengths and *j-th* weaknesses of the system in period *t*; $\vartheta^{s}_{i(t)}, \vartheta^{w}_{j(t)}$ is the magnitude of the influence of the *i-th* strengths and *j-th* weaknesses on the system; $S_{(t)}$, $W_{(t)}$isrespectively quantitative assessment of the strengths and weaknesses of the system within period *t*.

4) The feasibility of moving from one strategic alternative to another can be determined by analyzing the intensity of the dynamics of the environment by using indicators of changes in the levels of the dynamics for each factor, in particular by the chain rate of change, which can be determined by the formulas:

$$T_t^{SW} = \frac{SW_{(t+1)}}{SW_{(t)}} \cdot 100\%, \quad (10)$$

$$T_t^{ThO} = \frac{ThO_{(t+1)}}{ThO_{(t)}} \cdot 100\%, \quad (11)$$

where T_t^{SW}, T_t^{ThO} – the rate of change of state according to the internal and external environment.

Based on the rate of change of the internal and external environment, it is possible to calculate the predicted rate of their change during the analyzed period, which will give a general characteristic of the dynamics of the environment and can be used as one of the criteria for determining the strategic behaviour of the system:

$$\overline{T}_{SW} = \sqrt[n-1]{T_1^{SW} \cdot T_2^{SW} \cdot T_3^{SW} \cdot \ldots \cdot T_{n-1}^{SW}}, \quad (12)$$

$$\overline{T}_{ThO} = \sqrt[n-1]{T_1^{ThO} \cdot T_2^{ThO} \cdot T_3^{ThO} \cdot \ldots \cdot T_{n-1}^{ThO}}, \quad (13)$$

Where n – number of periods analyzed.

The degree of strategic uncertainty and risk of open poorly structured organic systems, to which communities belong, can be estimated as a business development environment by analyzing entropy, a characteristic of disorder (chaos).

The entropy of the project at the conceptual stage of the life cycle $E_{SWOT(t+1)}$)can be estimated by such dependencies:

$$E_{SW(t+1)} = \frac{S_{(t+1)} - W_{(t+1)}}{S_{(t)} - W_{(t)}}, \quad (14)$$

$$E_{ThO(t+1)} = \frac{O_{(t+1)} - Th_{(t+1)}}{O_{(t)} - Th_{(t)}}, \quad (15)$$

$$E_{SWOT(t+1)} = \frac{E_{SW(t+1)} + E_{ThO(t+1)}}{2}. \quad (16)$$

Not only the absolute level of entropy of the project is subject to evaluation (not all forms of entropy are evaluated), but only its one aspect is related to the dynamics of factors of the project environment and the uncertainty of system behavior(the first form of entropy),accordingly. The influence of the amount of information and other factors on the degree of entropy is not investigated in the study.

For value$E_{SWOT(t+1)}$>1,the entropy of the system is expected to increase over the period [t: t + 1], which will require adjusting the components of the strategy or plan of its implementation. If the entropy of the project is in the range $0 < E_{SWOT(t+1)} \leq 1$and goes to 0, the strategy implementation environment is sufficiently concentrated and understandable and with positive metric values$SW_{(t+1)}$and $OT_{(t+1)}$, it can be expected that the strategy will be implemented as planned. In accordance with the above models, a mechanism for balancing the project portfolio was constructed (see Figure 3).

The recommendations developed in this study can be applied to assess the quality and level of integration of five regional development strategies that have been developed on a methodological basis and have the same planning horizon (Year 2020). In particular, within the framework of the EU project "Support for Regional Development Policy in Ukraine" in 2014, strategies were developed in Ivano-Frankivsk, Kyiv, Poltava, Rivne and Sumy regions (relevant data are available on the official sites of regional state administrations of each region). Each of these strategies contained a strategic objective aimed at developing the region's economy and a corresponding small and medium-sized business objective (Table 1).

Table1: Strategic and operational goals of regional development strategies in individual regions of Ukraine

Region	Cipher and name of operational target	Type of indicator	Number of indicators by hierarchy of results, items				Overall number of indicators
			Impact	Outcomes	Outputs	Inputs	
Kyiv	1.3. Creating conditions for the priority development of SMEs	Result	0	1	2	2	**5**
		Indicator	3	1	0	3	**7**
Poltava	2.2. Strengthening of SMEs	Result	1	1	4	1	**7**
		Indicator	2	0	3	2	**7**
Ivano-Frankivsk	1.2. Stimulating SMEs development	Result	1	1	3	0	**5**
		Indicator	0	1	3	2	**6**
Rivne	1.2. Stimulating SMEs development	Result	3	0	1	0	**4**
		Indicator	0	2	3	1	**6**
Sumy	1.2. Stimulating SMEs development	Result	1	2	4	0	**7**
		Indicator	2	0	4	1	**7**
Total, by regions		**Result**	**6**	**5**	**14**	**3**	**28**
		Indicator	**7**	**4**	**13**	**9**	**33**
Structure of indicators, in %		**Result**	**21,4%**	**17,9%**	**50,0%**	**10,7%**	**100,0%**
		Indicator	**21,2%**	**12,1%**	**39,4%**	**27,3%**	**100,0%**

***Source**: own computations according to regional development strategies for 2015-2020*

As it can be seen from Table 1, none of the areas has a balanced structure of the expected results and the corresponding indicators. Most expected results (67%) are low. In addition, 27.3% of indicators are at Input-level. And the strategies of Ivano-Frankivsk and Rivne regions have no Impact indicator.

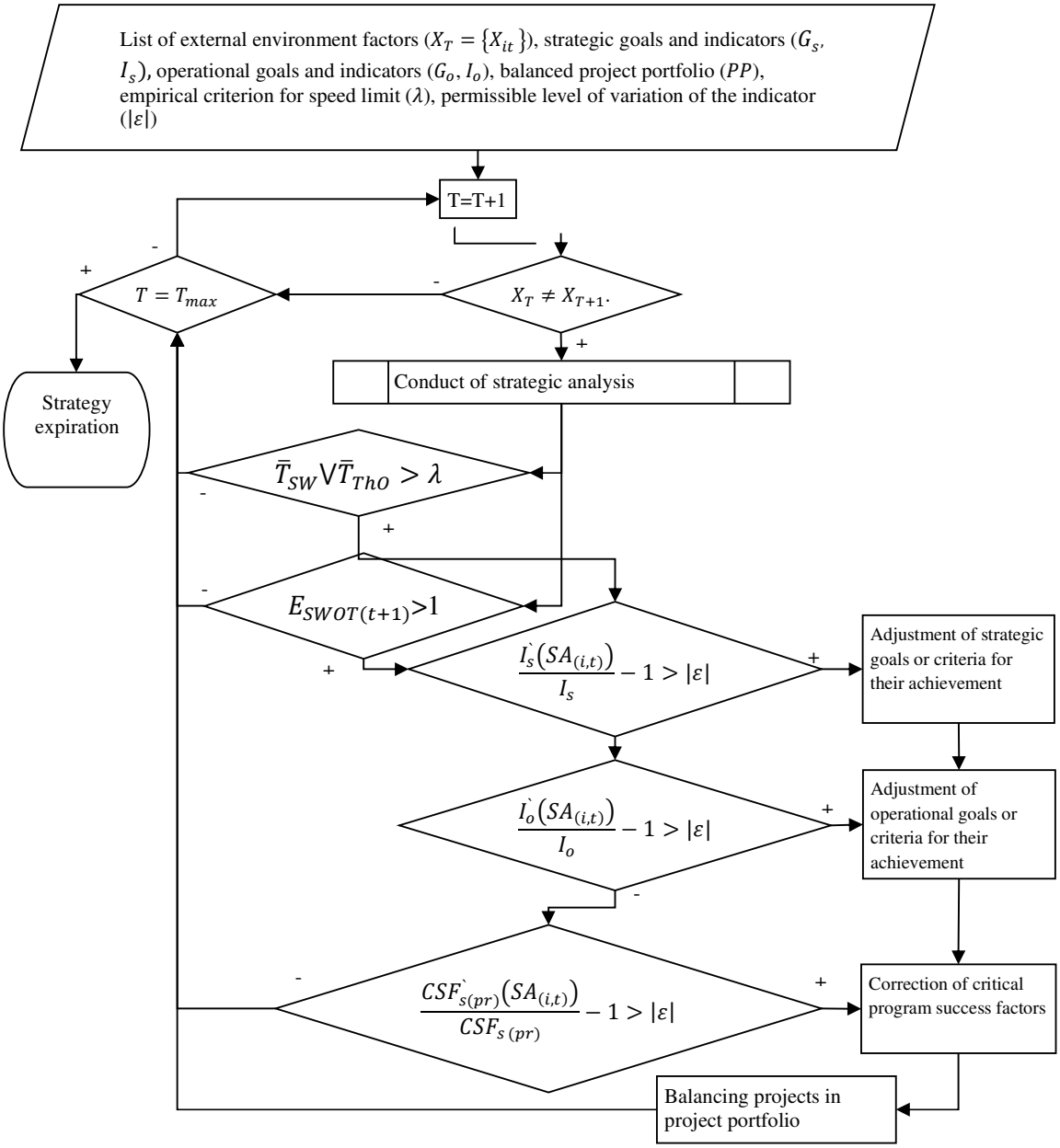

Figure3: Mechanism of project portfolio balancing in a turbulent environment
Source: *own elaboration*

This structure of indicators leads to the fact that project portfolios will also be focused on achieving low level results. This, in turn, is the reason that, despite reporting of responsible persons on successful implementation of programs and projects, their results do not lead to systematic changes in the field of entrepreneurship.

The analysis of the project portfolios of the study areas showed that none of them applied the prioritization of projects and did not balance the portfolio in terms of both strategic and operational goals. Although the vision of each region is based on the expectation of economic development, the goals related to the development of SMEs are hardly funded (see Table 2).

Table2: State of financing of projects aimed at the development of SMEs

Region	Estimated cost of projects, thous. UAH										Total, for2015-2020 (plan)
	Realization plan for 2015-2017						Realization plan for 2018-2020				
	2015	2016	2017	Total		Plan implementation, %	2018	2019	2020	Total, (plan)	
				Plan	Fact						
Rivne	16,4	8,8	5,2	30,4	7,6	25%	15,1	18,2	21,2	**54,4**	**84,8**
Kyiv	1,5	1,0	0,2	2,7	0,0	0%	21,4	34,1	0,4	**55,9**	**58,6**
Ivano-Frankivsk	2,4	4,4	4,4	11,2	0,0	0%				**0,0**	**11,2**
Poltava	4,2	6,1	3,9	14,1	0,9	6%	0,1	1,5	1,0	**2,6**	**16,7**
Sumy	1,7	1,6	1,6	4,9	0,9	19%	2,0	5,0	5,0	**12,0**	**16,9**
Total	**26,1**	**21,8**	**15,3**	**63,2**	**9,5**	15%	**38,7**	**58,8**	**27,5**	**124,9**	**188,1**

Source: *own computations according to reports of regional state administrations departments*

For example, according to the Report on the state of implementation of the Ivano-Frankivsk region Development Strategy, by 2017, there had been no project related to the operational objective of SMEs development that would have been implemented, is being implemented or is about to be implemented. In addition, projects related to other objectives were funded during this period to the amount of 148.8 million UAH. Due to the lack of a system of priorities set in the strategy and in the project portfolio, the regional commissions annually determine the projects to be financed, the selection of which is often of a political character.

Conclusions

Summarizing the results of these studies, it can be argued that the problem of the slow development of small and medium-sized businesses in transitive economies is the lack of coherence between entrepreneurship development programs implemented by local authorities and the true needs of business entities. The poor effectiveness of such programs is due to the methodological flaw that persists in the formulation of community development strategies at various levels. Based on the analysis of existing problems and the choice of priorities of community development, the methodological principles of environmental analysis, the SWOT-analysis in particular, are not further adjusted to the strategies using dynamic strategic analysis and balancing of the territorial community project portfolio. As a result, programmatic goal achievement indicators are generally not achieved. In order to increase the efficiency of local business development with the support of the authorities, it is proposed to combine the methodology of strategic community development management and the methodological principles of project management. Their implementation in methodology of regional development strategic planning both with estimation of efficiency of such approach in strategic goals achievement belong to future research directions.

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Environmental Risk and Sustainable Business Model

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Abstract

The transformation from the traditional to sustainable business model causes the reorientation of the enterprise's management system. Nowadays the enterprises tend to take the first places in the rating lists not just from the economic or financial dimensions, but to increase the demand for own product in the frame of the green economy. On the one hand, the management system should consult all stakeholders' interests, while on the other, provide the minimization of risks including the environmental ones. Given the above, it becomes relevant to reorient the whole enterprise management system including risk management. Since the modern market environment has been changed, the risk management model which needs the transfer from isolated to integrated control has been changed. It should be noted that the management complex (ERM) is considered to be the system directed to maximize the positive effects and to minimize the negative ones regarding the unforeseen events. Moreover, using ERM provides opportunities for enterprise efficiency improvement. Generally, ERM is considered to be the combination of three following blocks: factors in ERM; ERM impact on enterprise efficiency; risk management mechanisms in certain organization conditions. Thus, this study is aimed to establish the relation between ERM implementation and enterprise efficiency. In view of this, the list of following factors which influence the enterprise efficiency has been formulated: environmental uncertainty, market competition, company size as well as company complexity. In turn, the above-mentioned factors formulate the external environmental impact on entrepreneurship and internal enterprise resistance to uncertain actions. In accordance with the obtained results, it has been established that the effect from one factor differs from another for each business entity. Furthermore, each group of factors included separate variables. For analysis, the investigated enterprises were divided into two following categories: the etalon enterprises which were highly efficient and the general enterprises. Thus, highly effective enterprises were used as a landmark to define the relation between ERM and as variables in emergencies. Based on the obtained results, the existence of the relationship between the results of enterprise performance and ERM implementation was established. However, the several following limitations, which demand the future investigation could be detected: chosen variables on the base of the interpretation method of existent literature as well as the short analysis period of environmental uncertainty factor. In view of this, the determined limitations are the prerequisite for future investigations.

Keywords: Enterprise Risk Management, Market Environment, Enterprise Efficiency, Variables, Environmental Uncertainty, Sustainability Of Enterprise.

Introduction

The great support for sustainable development programs and green focus by enterprises has become increasingly popular (Sokolenko et al. 2017; Vasylyeva et al. 2014; Vasylyeva et al. 2019a; Lyeonov et al. 2019; Stankevičienė et al. 2014). This trend affects not only the enterprises' activity but also consumers. Under the influence of the eco-education popularization, the increasing trend of eco-products consumption and healthy lifestyles, consumers are increasingly willing to pay more for products and goods that do not hurt the environment (Nielsen report, 2018; Bilan et al. 2018a; Kalinowski 2017; Rutkauskas et al. 2011; Jelinkova et al. 2015; Kendiukhov et al., 2017; Shuquan, 2018; Ryabchenko et al. 2017; Lyulov et al., 2019).

Some authors have identified a list of ways in which products can be made more environmentally friendly. Thus, according to A. Prakash (2002), products will be more environmentally friendly if they are produced in such a way that they can be repaired, restored, re-manufactured, reused, recycled, produced with minimal risks. One of the most effective ways to prevent negative consequences is to prevent them. Therefore, it becomes relevant to use a method of risk reduction in the production of products. For this purpose, a risk management system is used by enterprises since they form an objective and inevitable factor of any economic activity (Grytsenko et al. 2010; Ganushchak-Efimenko et al., 2018).

Risk management should be aimed at maximizing the positive and minimizing the negative effects of unforeseen events. However, changing the paradigm of risk management in today's market environment requires a transition from isolated to integrated management (Kozmenko et al., 2011, Djalilov et al. 2015, Vasilyeva et al. 2019b, GrenÄ Ã-kovÃ¡ et al. 2019). At the same time, an important prerequisite for enterprises should be to take into account the basic principles of organic production (Vysochyna et al., 2015, Mentel et al., 2018, Bilan et al. 2018b, Androniceanu et al. 2019), such as:

- focus on long-term goals;
- expansion of product range in the perspective direction;
- obtaining additional competitive advantages;
- access to a new highly profitable segment of developing consumers;
- compliance with standards and additional quality control;
- creating a positive image in the eyes of consumers, shareholders, investors and other stakeholders, etc.

Literature Review

Noted, that issues on environmental risks analysed by the scientists as the key instruments to increase the profitability of the company. In this case, most of the scientists defined the positive impact of environmental risks management on the company's profitability. Besides, the sustainable business model could not operate without such a system. The most of the scientists proved that environmental risks could be declined by implementing the green energy projects (Cebula et al., 2018; Chygryn et al., 2018; Yevdokimov et al., 2018; Chigrin et al., 2014; Lyulyov et al., 2015)

Enterprise Risk Management (ERM) has become a well-known and widespread concept in the world. This is a new concept that should be addressed by individual businesses and industries. A comprehensive approach to risk management is commonly referred to as enterprise risk management (Karpishchenko et al. 2014; Myroshnychenko et al. 2019; Kwilinski, 2018; Belas et al., 2015; Belas et al., 2018; Tommaso et al., 2019; Pechancová et al., 2019).

However, despite the growing need and interest in risk management, there is no generalized approach to ERM implementation. One of the major problems is the difficulty to develop a reliable measure for the ERM design.

Scientists identify three areas of ERM research. One block of studies examine factors that influence ERM (Beasley et al. 2005; Kleffner et al. 2003; Liebenberg and Hoyt 2003; COSO, 2004; Ong, et al., 2018). Other studies concern the impact of ERM on work efficiency (Beasley et al., 2008; Gordon et al. 2009; Andersen & Roggi, 2012; Abdullah et al. 2019). Another block of research examines risk management mechanisms in specific organizational settings (Mikes 2009; Paape & Spekle, 2012; Kuznetsov et al., 2019; Garayeta-Bajo et al., 2017).

The scientists in the paper (Beasley et al., 2005) focuses on factors related to the implementation of the ERM system to understand why some businesses respond to changing risk profiles using ERM while others do not. This study provides initial empirical evidence that demonstrates the organizational features related to the degree of ERM implementation at various US and international enterprises. As a result, it was found that the ERM implementation is positively influenced by the presence of a certain list of positions, such as risk manager, auditor, legal entities in various fields at the enterprise.

This study has been continued in (Beasley et al. 2008), where the reaction in the securities market when appointing individuals to oversee the risk management processes of an enterprise, was considered. It was found that the unambiguous reaction to the market was not significant. However, regression analysis showed that there was a relationship between the value of the securities market and certain specific features of the enterprise.

This article (Kleffner et al. 2003) observes the use of corporate risk management (ERM) by Canadian companies. The results of this study show that 31% of enterprises selected for analysis have adopted the ERM system. The main reasons for it included the risk manager's influence (61%), the encouragement of the board of directors (51%) and the observance of the rules of the Toronto Stock Exchange (37%). The article also notes that although about a third of enterprises have applied the ERM approach, the rest of the companies are also moving in this direction.

A study (Liebenberg and Hoyt 2003) indicates that ERM enables companies to take an integrated risk management approach that shifts the focus of the risk management function to an increasingly offensive and strategic one. The study found that businesses with greater financial leverage are more likely to appoint a risk manager. This finding supports the hypothesis that enterprises appoint risk managers to reduce incomplete information about the current and expected risk profile of the enterprise.

Mikes (2009) presents evidence of two large banking organizations that suggest that there are systematic differences in the practice of ERM management in the financial services industry. The following examples illustrate four types of risk management and show how they form the combination of risk management within an organization. The obtained results indicate the coexistence of alternative ERM models.
The study (Paape and Spekle 2012) describes the factors that influence the implementation of ERM - regulatory environment, internal factors, ownership structure, firm and industry features. The paper also notes that perceived risk management effectiveness is related to the frequency of risk assessment. The study (Gordon et al. 2009) confirmed the argument that the enterprises' activity result ratio using ERM depends on the relevant relationship between ERM and certain variables. In particular, it was found that for a group of high-performing enterprises, all variables have a significant effect on ERM effectiveness. The only variable that did not significantly affect ERM was environmental uncertainty. For non-high-efficiency enterprises, none of the emergency variables had a significant impact on ERM. Based on these calculations, it was concluded that highly efficient enterprises perceive emergency variables more seriously than other enterprises in their ERM implementation.

In spite of the authors' approaches diversity to ERM implementation, they all agree that ERM can improve enterprise efficiency (Mura et al., 2018; Brychko et al., 2018; Ryabenkov et al., 2013; Vasylyeva et al., 2015; Savčuk, 2007).

The main aim of the study is to define the dependence of ERM implementation on enterprises and their productivity. The study is based on the fact that ERM is considered as a correlation of external environmental factors for the enterprise, and the sustainability factors of the enterprise itself.

Methodology and Research Methods

To check the hypothesis, the article proposes to use the models (Gordon et al. 2009) given in equations (1) and (2).

The subjects of the analysis are the processing industry enterprises of Ukraine. There are two categories of enterprises: high-efficiency and medium-efficiency. The division into categories is based on the net income of the enterprises (Bondar et al., 2015; Bilan et al., 2019; Belás et al., 2015; Jarošová et al., 2019; Horská et al., 2019; Grigorieva et al., 2019; Shevchenko et al., 2016).

The coefficients in equation (1) are calculated in turn. First, for high-efficiency enterprises that serve as standard-sample-enterprises and have the highest efficiency in risk management, and then for medium-sized enterprises. Based on the reviewed literature (Gordon et al. 2009, Paape and Spekle 2012, Pakhnenko et al. 2018) and the specificity of the environmental risk, several factors that affect enterprise efficiency have been proposed:

1) environmental uncertainty;
2) the level of innovation;
3) competition in the industry;
4) firm size;
5) the complexity of the firm.

$$ERM = \beta_0 + \beta_1 EU + \beta_2 IN + \beta_3 CI + \beta_4 FS + \beta_5 FC + \varepsilon, \quad (1)$$

where ERM – efficiency of risk management in the enterprise; EU – environmental uncertainty; IN – the level of innovation; CI – competition in the industry i; FS– firm size; FC – the complexity of the firm; β_i – parameters of the model, i = 0 – 5, $\mathcal{E}$ – term of the error.
Model (2) considers the relationship between the activity results of the enterprise and the corresponding coincidence. Equation (2) is based on the analysis of residuals according to which the absolute residual values (ARES) of the model (1) affect the activity of the enterprise.

$$P = \beta_0 + \beta_1 ARES + \varepsilon, \quad (2)$$

where P – enterprise productivity; $ARES$ – the absolute value of model residues (1); β_i – parameters of the model, i = 0 – 1; ε – term of the error.

Table 1 demonstrates the main constituents of each represented factor and the principle of their calculation.

Table 1: an information base to form the data to analyze the factors influencing the enterprise ERM system

Factor	Constituents	Database
Environmental uncertainty (EU)	The efficiency of the country's environmental policy	Environmental Performance Index (EPI)
	The number of emergencies and dangerous events	The Ukrainian Civil Protection Research Institute (UkrCPRI)
Level of innovation (IN)	Introduction of innovation at the enterprises	State Statistics Service of Ukraine

Competition in the industry (CI)	Sales volume of an individual enterprise	Stock market infrastructure development agency of Ukraine(SMIDA)
	Sales volume of the industry	State Statistics Service of Ukraine
The complexity of the firm (FC)	Number members of Board of Directors	Stock market infrastructure development agency of Ukraine(SMIDA)
The size of the firm (FS)	Average total assets of an individual enterprise	Stock market infrastructure development agency of Ukraine(SMIDA)

Source: Compiled by the authors.

At the first step, the normalization was done as the parameters have different economic nature and measurements. For the eliminating such differentiation of the parameter, the approach to normalize of criteria (Glänzel et al., 2019):

$$f_j = \frac{f_j(X) - f_j^{min}}{f_j^{max} - f_j^{min}}, \quad (3)$$

where f_j- the normalized value of the j criteria according to the variant under study;
$f_j(X)$ - the current value of the j criteria according to the variant under study;
f_j^{min}; f_j^{max}- relevant min or max value of analysed parameter.

The main goal of any business entities is to be profitable which allow developing of the company. The value of the profit is the main indicator which characterized the company's capacity to stable development. The stakeholders use the profit as the key indicator for making decisions. Besides, the normalized parameters "net profit" allow comparison of the different type of companies.

Environmental uncertainty is calculated as the change or variability in the external environment of the enterprise. The danger is the probability that an event with specified parameters occurs over a period of time. The effects of the same danger will have different impacts on individual entities.

The environmental uncertainty in this study is planned to be measured in the combination of two indices:
- effectiveness of the country's environmental policy;
- the number of emergencies and dangerous events;
It is proposed to calculate the total index and individual indices by formulas (4) – (6).

$$EU = log(\sum_{k=1}^{2} CV(X_k)), \quad (4)$$

$$CV(X_k) = \frac{\sqrt{\sum_{t=1}^{5} \frac{(z_{k,t} - \bar{z}_k)^2}{5}}}{|\bar{z}_k|}, \quad (5)$$

$$z_{k,t} = (X_{k,t} - X_{k,t-1}), \quad (6)$$

where $CV(X_k)$ – uncertainty change coefficient, from 1 to 5 years; $X_{k,t}$ – uncertainty k in the year t; k – the uncertainty index related to the country's environmental policy effectiveness and to the number of emergencies and dangerous events; t – the period from 1 to 5 years; $\bar{z}_k$ – the average value of changes over 5 years of uncertainty.

An absolute value $\bar{z}_k$is used as a denominator$CV(X_k)$, to avoid the case when the negative $\bar{z}$ transforms the uncertainty situation into certainty ones.

The level of innovation is seen as the process of development, implementation, exploitation of production, economic and socio-organizational potential, which is the basis of innovation (Zakharkin et al. 2019; Olefirenko 2015). Innovation is, on the one hand, in contradictions with everything conservative, aimed at maintaining the existing state, and on the other - aimed at significant

improvement of the technical and economic efficiency of the organization (Masharsky et al., 2018; Peresadko et al. 2014).

In order to calculate this index, we use the natural logarithm of the number of new technological processes implemented in the country per year.

$$FS = ln\, T\, P_i, \quad (7)$$

where TP – number of new technological processes in the country in the year

Industry competition is based on the calculation of the Herfindahl-Hirschman Index (HHI). The index is a conventional concentration indicator in the market. It measures concentration in a particular industry and is calculated from the sum of the squared market shares of all enterprises in the industry (8). According to (Krishnan, 2005), HHI is considered to be the best index of competition intensity as it combines information on the number of enterprises in the market and their size distribution.

$$HHI = \sum \left(\frac{V_i}{V_j}\right)^2, \quad (8)$$

where HHI – Herfindahl-Hirschman Index; V_i – sales volume of the i-enterprise; V_j – sales volume of the industry.

Since less industry concentration is required to increase sectoral competition, sectoral competition is measured as a minus HHI (9).

$$CI = 1 - HHI, \quad (9)$$

The size of the enterprise is the dimension of its development scale. One of the main terms related to the development of the enterprise's property and financial position is the concept of assets. Given this, the study proposes to calculate the enterprise's size as a natural logarithm of the average total assets by the formula (10).

$$FS = ln\, A_i, \quad (10)$$

where A_i – the volume of assets of i-enterprise.

The assessment of the enterprise's complexity is based on the analysis of organizational structure and management segments. It means that the more management segments, the more difficult the enterprise is. In order to determine the complexity of the enterprise, it was proposed to calculate this index as a natural logarithm of the number of enterprise's shares issuers.

$$FC = ln\, I\, S_i, \quad (11)$$

where IS_i – number of shares issuers of the *i*-enterprise.

ERM is generally devoid of any quantitative specificity. (Gordon et al. 2009) transforms this indicator into an index (ERMI) based on COSO goals (COSO, 2004). The study will calculate ERMI based on achievement of strategy, operations and goals compliance (11).

$$ERMI = \sum_{i=1}^{n} Strategy_i + \sum_{s=1}^{n} Operation_i + \sum_{i=1}^{n} Compliance_i, \quad (12)$$

where $Strategy_i$ – strategy goals for i-company (13); $Operation_i$ – operations goals for i-company (14); $Compliance_i$ – goals for operating within the legislations of i-company (15); n – numbers of the companies.

$$Strategy_i = \frac{V_i}{\sum_{i=1}^{n} V_n}, \quad (13)$$

$$Operation_i = \frac{V_i}{A_i}, \quad (14)$$

$$Compliance_i = \frac{I_i}{A_i}, \quad (15)$$

where I_i – net profit of i-company, where V_n – sales volume of the analysed companies.

Results

For analysis, the panel data was compiled from the 10 Ukrainian companies of the processing industry. The data was obtained from the open database Smida.gov.ua. All companies were divided related on the net profit into two groups in the 2017 year: high and medium net profit companies. The companies were chosen as follows:

PJSC "Arcelormittal Kryviy Rih", PJSC "Zaporizhzhya Metallurgical Company "Zaporizhstal ", PJSC" Motor Sich", PJSC" Zaporizhzhoks ", PJSC " Interpipe NTRP", PJSC" Zhytomyr Company "Fences, Built Works, PJSC PJSC "Kyiv Plant of Experimental Structures", PJSC "Ladyzhyn Repair and Mechanical Company", PJSC "Kharkiv Hardware Company". Thus, high net profit group involved the companies with net profit was higher 100 million UAH. Other companies were involved in a group with medium net profit companies.

Table 2 showed the findings of summary statistics for high and medium net profit companies. Comparison analysis of two groups companies proved the huge differences among indicators as follows: ERMI, FS, FC. Thus, the average level of ERMI for high net profit companies was less than for medium net profit companies – 0.26514. Such dynamic showed that the management of environmental risks become complicated with the increasing of the company's size. The average level of parameters FS and FC for high net profit companies were higher than such parameters and for the medium net profit companies corresponding 7.266 та 0.418.

Table 2: summary statistics of ten analysed companies, 2013-2017 years

High performing firms

Variable	Obs	Mean	Std. Dev.	Min	Max
ERMI	25	1.061356	.3763911	.3744	2.0861
EU	25	.8512	0	.8512	.8512
IN	25	7.52002	.3556932	7.1041	8.1574
CI	25	.999616	.0005218	.9986	1
FS	25	16.65688	1.122246	14.3227	18.3049
FC	25	2.29858	1.015156	0	3.3673

The other firms

Variable	Obs	Mean	Std. Dev.	Min	Max
ERMI	25	1.326492	.8193325	.2317	4.1948
EU	25	.8512	0	.8512	.8512
IN	25	7.52002	.3556932	7.1041	8.1574
CI	25	1	0	1	1
FS	25	9.390832	1.685829	6.6295	12.0842
FC	25	1.880924	.3510598	1.0986	2.3979

Source: authors' calculations based on the SMIDA data, estimated with Stata 14.0.

The findings on correlation analysis Spearman-Pearson of analysed companies were showed in Table 3.

Table 3: correlation analysis between ERMI, IN, CI, FS, FC of analysed companies

	ERMI	IN	CI	FS	FC
ERMI	1.0000				
IN	-0.0768	1.0000			
	(0.5959)				
CI	0.0389	-0.0058	1.0000		
	(0.7887)	(0.9682)			
FS	-0.2699	0.0270	-0.5796*	1.0000	
	(0.0580)	(0.8525)	(0.0000)		
FC	-0.4465*	0.1504	-0.1056	0.3715*	1.0000
	(0.0012)	(0.2971)	(0.4655)	(0.0079)	

Source: authors' calculations based on the SMIDA data, estimated with Stata 14.0.

The findings in Table 3 proved the statistical significance at 1% for direct correlations between parameters FC and FS (Pearson correlation coefficient - 0,3715 with p-value < 0.01), an inverse correlation between indicators FC and ERMI (Pearson correlation coefficient = -0,4465 with p-value < 0.01), FS та CI (Pearson correlation coefficient = 0,5796 with p-value < 0.01). The findings on regression analysis of panel data of both groups of the analysed companies were presented in Table 4.

Table 4: regression analysis of the panel data of chosen companies

High performing firms				The other firms			
ERMI	Coef.	Std. Err.	z	ERMI	Coef.	Std. Err.	z
EU	-.023324	.0321232	-0.78	EU	-.1309702	.0886497	-1.44
IN	-.2490416	.19754	-1.26	IN	-.0205641	.1330803	-0.15
CI	-0.2866	365.2348	-0.46	CI	-0.2558	198.6757	-2.64
FS	-.0363354	.0410832	-0.88	FS	-.2309702	.0946497	-2.44
FC	-.3452366	.1667117	-2.07	FC	-.1655006	.0639743	-2.59
_cons	171.5348	365.4226	0.47	cons	529.4945	199.6689	2.65

Source: authors' calculations based on the SMIDA data, estimated with Stata 14.0.

Considering the results the statistically significant impact on ERMI had indicator FC for high net income group. Thus, the increasing by 1 point of FC lead to decreasing of ERMI by 0,34 points. At the same time, for the medium net profit group, the statistically significant impact at 1% on ERMI had indicators CI and FS. The increasing by 1 point of CI lead to decreasing of ERMI by 0.25 points, FS – by 0.16. Besides, the statistically significant impact at 5% level had the indicator FS. Thus, the increasing of FS by one grade lead to decreasing of ERMI by 0,23 points.

Conclusions

The paper deals with the linking between ERMI implementation in the companies and their productivity. ERM was considered as a correlation between external environmental factors and companies sustainability parameters. The study was based on (Gordon et al. 2009) and the proposed regression model for the determination of ERMI. The analysis was conducted for 10 Ukrainian processing industries. For the analysis of the companies, the parameters were chosen and modified considering the Ukrainian economy.

Thus, a study (Gordon et al. 2009) found that the average ERMI for high-performing enterprises was -0.067, compared to 0.061 for other businesses. Besides, the values of all other emergency variables of highly efficient companies on net profit were not statistically different from those of medium-performing ones.

For Ukrainian companies, a comparative analysis of the averages of the two companies groups showed significant differences in the ERMI, FS, FC indicators. Regression analysis of panel data for high-net income companies revealed only one FS indicator (0.038) for ERMI, competition for medium net profit companies (0.008), size of the company (0.015), and company complexity (0.010). Increasing each of these indicators would reduce ERMI while increasing the likelihood of risk for the companies.

However, the negative value of the coefficients for each indicator indicates that for these companies the inflow of these factors would be insignificant.

It should be noted that the results of the study identified several limitations that need further consideration and improvement – the variables selected based on the method of interpretation of existing literature, the study covers a short period of analysis, analyzed companies in only one industry.

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Decision Model for Planning the Transport of Goods in The International Aspect

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Abstract

The process of planning transport processes is one of the most important tasks performed in transport companies. The aim of the publication is to improve the transport process by creating a generalized model of planning the transport of goods in Europe, together with the decision-making model for the problem under investigation. In the field of research methods, observation methods of transport service providers were used. As a result of the analysis, a generalized model of the transport planning process has been created, on which an example of transport planning is presented and the optimal solution for selecting a transport option is presented. From the developed model of the decision-making process it can be concluded that if transport is by road and sea route with hired means of transport can be eliminated. The optimal result of the decision analysis can be if the transport is carried out using an external forwarding company, the choice of the transport process and the determination of the type of transport remains unknown. Thanks to the applications contained in the article, both transport companies and manufacturing companies can simply and transparently make a decision on the choice of international freight transport services

Keywords: Decision-Making Model of Transport Process, International Transport, Forwarding, Planning Process

Introduction

Transport process planning is one of the most important tasks carried out in transport companies. Proper organization and planning guarantees that the company can achieve its goals, such as: profit or further development. Proper planning of transport processes is to serve primarily to minimize the mistakes made. This will result in lower costs incurred by forwarding companies and increased customer satisfaction.

When planning transport processes it is important to remember that all accepted orders should be fulfilled. At the same time, an important issue during the realization of transport processes is to minimize the costs arising during the process. Enterprises are looking for experts who deal with rational transport planning. The point is to combine at the same time the expectations of customers, which are:

speed, price competitiveness, safety of transported goods, with the goals of transport companies, which strive to maximize profits (Ding, 2020).

When organizing transport processes, important factors to take into account are (Masłowski, Kulińska, Kulińska, 2019: 309–319):

- proper selection of a vehicle and a driver for a given transport task,
- determining the best route for the carriage of goods or passengers from point A to point B.

Such problems can be easily eliminated if you have the appropriate technical facilities, in the form of one or two vehicles, with multiple orders during the week. The situation becomes more complicated if the company has just entered the market and does not have a large technical background. Then good route planning is a priority, but it becomes complicated and time consuming.

The aim of this publication is to improve the transport process by creating a generalized model for planning the transport of goods in Europe, together with a pre-determined decision-making model for the problem under investigation. An example of the process of planning the transport of dangerous goods from Opole to Stockholm is presented. To verify the objective, theoretical research tools were used, such as analysis, synthesis, generalisation and comparison. In terms of practical methods, observation methods of companies providing transport services were used. Realization of each transport process of hazardous material implies a certain risk of an unwanted(accident) event, caused by scattering (effusion, shedding, etc.) of burden, with the consequences related to the nature of the hazardous material that is being transported. By mentioning all of these risks, the transport safety is a very important and responsible task. In the case of an accident, the consequences can be very large and can cause damage to people and their environment, namely, death, diseases of human beings, plant and animals, pollution of environment, destruction of natural and national resources, damage of industrial buildings, traffic communications and their respective facilities. Potential danger, on one hand, and the need for transport of hazardous materials, on the other hand, both lead to the necessity of setting specific requirements related to risk reduction and attempts to increase the safety in the transport of hazardous materials. With the growth of ecological consciousness, there is also a growing demand for reduction of transport risks, but also in handling, in general, hazardous materials. Because of these reasons, numerous countries, institutions and organizations have different regulations and other regulatory measures in order to manage the safety of these transport processes (Noureddine, Ristic, 2019: 66-85).

The Essence of The Transport Process

Almost all aspects of early preparation are taken into account when planning a transport. The most important factors influencing the organisation of the transport process are: drivers' working time, costs of transport charges, loading and unloading dates, determination of the maximum time for transporting cargo.

The transport planning process is related to forwarding, which organizes the cargo movement for profit as a substitute for the principal and performs related activities, except for the physical transport itself (Marzec, 1996: 23). The article presents the basic forwarding activity, i.e. planning and organization of physical transport process.

The Transport Process

Transport is an activity consisting in the provision of services against payment. It involves the movement of people and/or cargo from the starting point to the ending point and the enrichment of activities with auxiliary services closely related to transport (Rydzkowski, Wojewódzka-Król, 2007: 1). However, each industry has its own specificity. In transport, factors such as punctuality, quality, reliability, reliability, confidentiality and brand are of paramount importance. Gaining the trust of a new customer is often a difficult and time-consuming process (Wojtynek, i in., 2016: 357-372). The transport process, on the other hand, according to the Polish standard no. 72, is a series of interrelated transport operations, performed in a fixed order on a given route and at a given time (PN – 72/ M –

78000). Therefore, it is necessary to consider which operations during the planning of the transport process are most important for the effective transport of goods or services. The following activities can be distinguished in the transport process: organizational, executive, and commercial. Activities in the transport process are responsible for various aspects of transport organisation. Examples of organizational activities can be planning routes or preparing proper transport documentation. The executive activities may include activities directly related to physical transport. They are key elements of the transport process. The process also lists the commercial activities that regulate the charges for transport services (Stajniak, i in. 2007: 10). In practice, the transport process includes the following phases (Kulińska, Masłowski, Wojtynek, 2018: 40-60):

- preparation of the transport concept,
- preparing the cargo for transport,
- the organization of the transport process,
- physical movement of the cargo,
- handling commercial activities,
- analysis and evaluation of the completed process (costs, time, quality, complaints).

They condition the transport process and its efficiency. The article presents in detail the first phase, i.e. preparation of the transport concept.

International Transport

International road transport in general, as well as in accordance with Article 4, point (a), (b), (c) and (d). 2 of the Road Transport Act of 6 September 2001 is understood as transporting cargo beyond the borders of one country (Dz.U. 2001 Nr 125 poz. 1371).

In transnational corporations, building an international supply chain is important to achieving the organization's goals. One of the main reasons for building international supply chains is for companies to reduce costs. It concerns both the costs of transport, servicing of logistics centers and transaction costs (Izdebski, Jacyna-Gołda, Jakowlewa, 2019). In addition, they allow you to reduce the time of transport and storage of materials, goods and semi-finished products and reduce inventory. The transport of dangerous goods concerns many economic sectors, as materials and objects meeting these criteria are present in almost every industry. Dangerous goods are not only used as raw materials in the production process, but are also used in other areas, e.g. to assist in conducting analytical tests or as means of keeping machines and equipment in the production line clean (van Heeswijk, Mes, Schutten, 2019: 469-491). Dangerous goods must be transported in accordance with the requirements set out in the relevant regulations before they can be placed in the company. Meeting the guidelines in this area guarantees safe transport, which ensures protection of human health and life, protection of the environment and property by eliminating the risk of accident, incident or emergency. Transport of dangerous goods is carried out by road, rail, air, inland waterway and sea (Noureddine, Ristic, 2019: 66-85).

A prerequisite for the admission of dangerous goods for transport is to comply with ADR regulations, laws, procedures, preparations and the provision of appropriate technical resources. In the transport system, an object or substance having the characteristics of a dangerous good must be identified, classified and named with a unique and standard name, used in ADR regulations. Dangerous goods are classified by comparing their physicochemical and biological properties with the classification criteria specified in the ADR agreement. In case when a good may pose more than one hazard, allocation to a given class is made on the basis of the "dominant hazard" criterion. (Akhmedov, i in., 2019: 133-141) When planning the route for a vehicle on which hazardous materials will be placed, particular attention should be paid to roads with the best possible surface and low traffic. Due to the potential threat to the environment as well as human health and life, roads running near active leisure centers as well as sports or built-up areas of the city should be excluded (van Heeswijk, Mes, Schutten, 2019: 469-491). In the management of international transport, it is important to follow the regulations in force in the given country. However, an important factor in their implementation is the appropriate integration of

many aspects such as: time, cost, transport capability (Romanova, i in., 2019: 537-541). Therefore, regardless of whether it is the transport of dangerous goods or other types of goods, the transport process should take place on the main decision-making principles, constituting problems in the provision of services.

Generalised Transport Process Model

In practice, the transport process creates serious obstacles for planners in companies due to its complexity and the lack of structured activities. Figure 1 shows a generalized model of the transport process presented as a block diagram.

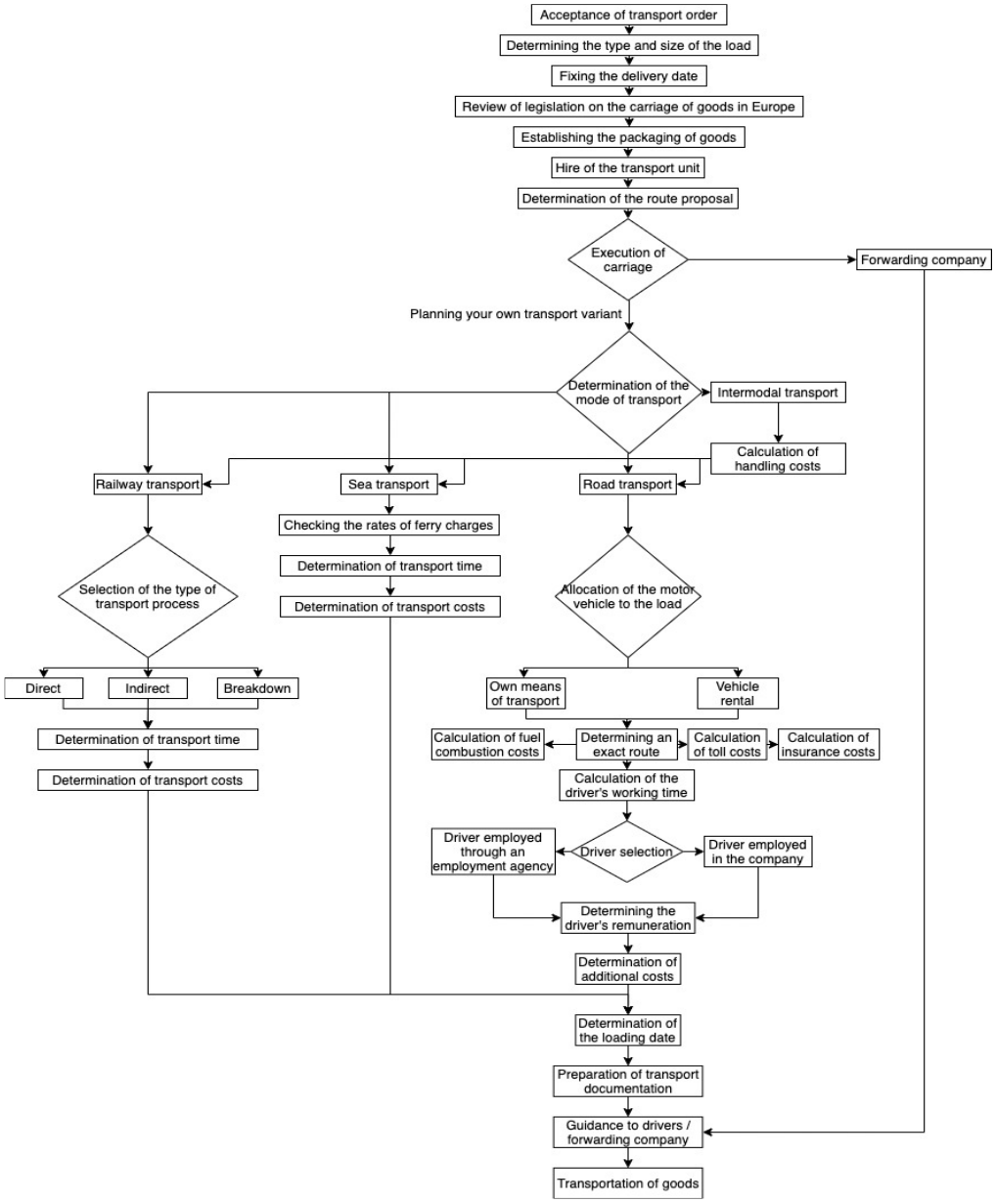

Fig. 1: Generalised transport process model [own study]

Thanks to its construction, the transport planners in companies can easily read out the activities that follow in order to complete a transport order. Unfortunately, the whole transport process is much more complicated and intricate, so it cannot be fully systematized and modelled. The proposed model does not take into account, for example, such issues as document flow, time of execution of individual tasks, or some important assumptions when planning transport by other means of transport than road transport.

Decision Boards

Decision boards are used to document and analyze the system, which are complementary to the classic schemes of modification and solution search. The basis for the construction of decision boards is the condition: "If ..., then ...", which is why they allow the construction of automatic information processing diagrams. Decisionboards consist of a set of rules that are designed to describe what set of conditions must be met in order for the proper scope of activities to be undertaken (Partyka, 2001: 31, Paszek, Partyka, 2014: 209-215). Table 1 presents a standard decision-making table.

Table 1: Example of a decision table [own study based on Partyka, 2001: 31]

Name of the table		Rules of decision R_1, R_2, R_3, … R_n
Set of conditions	W_1 W_2 W_3 … W_n	Set of conditionality indicators
Set of activities	C_1 C_2 C_3 ... C_n	Set of activity indicators

The set of conditions defines the expressions "If...", which define the variables that have the greatest impact on the decision-making system. The set of actions describes the expressions "to...", which contain all possible actions. The set of condition indicators is based on the symbols T (Yes), N (No) and "-". (nothing) that specify whether or not a given condition is met or whether or not it influences decisions. A set of activity indicators is described in the same way as a set of condition indicators.

Sample Cargo Transport Plan

This chapter presents a sample plan for the transport of 220 m^3 of dangerous goods (ADR) from Opole to Stockholm. The transport process has been created on the basis of the generalized model proposed in the article.

The provisions of the Act on the Transport of Dangerous Goods of 19 August 2011 and the restructured European Agreement on ADR impose an obligation on an entrepreneur who performs road transport of dangerous goods or loading or unloading related to such transport to appoint, at his own expense, a safety advisor for the transport of dangerous goods (www.doradca-adr.pl/…).

After analysing the possibilities, the following types of transport were identified:

- road-sea transport with hired means of transport
- road-maritime-rail transport

Road-sea transport with hired means of transport

The route was planned in 3 different variants:
- Option 1 contains 3 transport stages: the total length of the route: 1507 km
  - Stage 1: Opole (PL) - Rostock (DE) - 657 km - land road
  - Stage 2: Rostock (DE) - Gedser (DK) - 49 km - seaway
  - Stage 3: Gedser (DK) - Stockholm (SE) - 801 km - overland road
- Option 2 contains 3 transport stages: total length of the route: 1129 km
  - Stage 1: Opole (PL) - Gdansk (PL) - 542 km - land road
  - Stage 2: Gdansk (PL) - Nynäshamn (SE) - 529 km - seaway
  - Stage 3: Nynäshamn (SE)- Stockholm (SE) - 58 km - land road
- Option 3 contains 3 transport stages: total length of the route: 1819 km
  - Stage 1: Opole (PL) - Frederikshavn (DK) - 1252 km - land road
  - Stage 2: Frederikshavn (DK) - Gothenburg (SE) - 90 km - seaway
  - Stage 3: Gothenburg (SE) - Stockholm (SE) - 477 km - land road

Fixed costs for road and sea transport:
- fuel (ON) as of 9.12.2019 (www.e-petrol.pl/notowania): Poland - 4.96 PLN/l, Germany - 5,46 PLN/l, Denmark - 6.31 PLN/l, Sweden - 6.17 PLN/l. The average of 5.73 PLN/l was used for calculations,
- the driver's salary (www.pracuj.pl/praca/..., www.postawnaswoim.pl/kariera/…): 341 PLN for a driver in individual transport and 295 PLN/day for one driver in two-person transport,
- renting a means of transport (www.automilan.pl/…): tractor - 6000 PLN net/month (burning 25 l/100km empty, with load +0.3 l), tank - 7000 PLN net/month (gross capacity 38200 36200 net), for loading 220 m^3 6 road sets are needed, where the cost of driving with an empty tank is 127.5 PLN/100 km, while the cost of driving with a loaded tank is 180 PLN/100 km,
- ferry crossing (www.aferry.pl… , www.freightlink.pl…): Rostock-Gedser, Gedser-Rostock: 3475.6 PLN, Gdańsk-Nynäshamn: 1 driver - EUR 928.75, 2 drivers: 1046,35 EUR, Nynäshamn - Gdansk: 1 driver: 661,48 EUR, 2 drivers: 1 driver: 661,48 EUR: 779,09 EUR, Frederikshavn - Gothenburg: 1 driver: 1914,6 PLN, 2 drivers: 2115.8 PLN,
- road tolls (www.viatoll.pl…): Opole - Olszyna: 60.75 PLN, Opole - Gdańsk: 70.99 PLN,
- cleaning of the tank (www.b10.com.pl/wash-price.html…): 1 set - 440 PLN, 6 sets - 2640 PLN.

Calculation of the cost of the road driven:
- variant 1: Opole - Stockholm: stage 1: 657 km - cost 1182.6 zł, stage 2: ferry trip, stage 3: 801 km - cost 1441.8 zł, Stockholm - Opole: stage 1: 801 km - cost 1021.28 zł, stage 2: ferry trip, stage 3: 657 km - cost 837.68 zł,
- variant 2: Opole - Stockholm: stage 1: 542 km - cost PLN 975.6, stage 2: ferry trip, stage 3: 58 km - cost PLN 104.4, Stockholm - Opole: stage 1: 58 km - cost PLN 73.95, stage 2: ferry trip, stage 3: 542 km - cost PLN 681.29,
- variant 3: Opole - Stockholm: stage 1: 1252 km - cost PLN 2253.6, stage 2 - ferry trip, stage 3 - 477 km - cost PLN 858.6, Stockholm - Opole: stage 1: 477 km - cost PLN 608.18, stage 2 - ferry trip, stage 3: 1252 km - cost PLN 1596.3.

Working time of drivers:
variant 1: for 1 driver: departure on Monday at 00:00, return on Thursday at 7:43. The transport time is: 3 d 7 h 43 min, for 2 drivers: departure on Monday at 04:00, return on Thursday at 15:43. The transportation time is as follows: 2 d 11 h 43 min,
variant 2: for 1 driver: departure at 09:00 on Monday, return at 7:32 on Thursday, for 2 drivers: departure at 10:00 on Monday, return at 10:32 on Wednesday,
variant 3: for 1 driver: departure at 08:00 on Monday, return at 15:45 on Friday, for 2 drivers: departure at 20:00 on Monday, return at 01:55 on Friday.

The cost analysis shows that the most advantageous option for own transport organisation is option 2, with 2 drivers employed. The cost of such transport is PLN 71353.12.

Road, Sea and Rail Transport

The route was planned on different sections: Opole - Gdańsk: 617 km (rail transport), Gdańsk - Gdańsk Port: 11 km (rail transport), Gdańsk Port - Nynäshamn: (sea transport), Nynäshamn - Stockholm: 58 km (road transport). Fixed costs as for road and sea transport with the following differences:

- container-tanker rental (www.tws-gmbh.de/wynajem-kontenerow-typu-cysterna…): 6000 PLN net/month (capacity 26000 gross 24700 net), for loading 220 m^3 9 transport sets are needed,
- ferry crossing for 1 driver (www.aferry.pl… , www.freightlink.pl…): Gdansk - Nynäshamn EUR 928,75, Nynäshamn - Gdansk EUR 661,49,
- railway journey at a rate of up to 620 km (www.pkpcargo.com/media/100869/…): 5858 PLN (including 30% of the fee for dangerous goods): additionally, there are correction coefficients: load capacity over 22 t and length of the container, costs lower than 6.15 m are 4979.3 PLN (coefficient 0.85 of the price), additionally the ADR fee should be paid: 6473.09 PLN (coefficient 1.3 of price). On the way back from Gdańsk the costs will amount to PLN 4979.3 (0.5 price coefficient),
- road tolls (www.viatoll.pl…): Opole - Olszyna - PLN 60.75, Opole - Gdańsk - PLN 70.99,
- HDS services (www.pkpcargo.com/media/100869/…): 100 PLN/h, loading/unloading the car (www.pkpcargo.com/media/100869/…): 200 PLN,
- loading of goods on the railway in Opole (www.pkpcargo.com/media/100869/…): 400 PLN,
- cleaning of the tank (www.b10.com.pl/wash-price.html…): 1 set - 440 PLN, 6 sets - 2640 PLN.

Calculation of the cost of the road driven:
- transport by rail: Opole - Gdańsk: 1 set - PLN 6473.09, 6 sets - PLN 58257.81, Gdańsk - Opole: 1 set - PLN 2929, 6 sets - PLN 26361,
- road transport: Gdańsk - Gdańsk Port, Nynäshamn - Stockholm (69 km): 1 set - PLN 552, 6 sets - PLN 4968,
- sea transport: 1 set - PLN 6885.74, 6 sets - PLN 61971.65.

Drivers' working hours for 1 driver: departure on Monday at 04:00, return on Thursday at 7:43. The transport time is: 2 d 19 h 43 min. The cost analysis shows that this type of transport is for one set PLN 19299.83, while for 6 sets the cost is PLN 173698.46.

Transportation Commissioned to An External Company

External companies calculate the following transport costs: the rate per kilometre (www.della.pl/price/international…) from Europe to Poland is 3.65 PLN/km, from Poland to Europe - 4.15 PLN/km, average rate: 3.9 PLN/km. The additional charge for dangerous goods is from 15 to 25%. In the case of some transport companies, the rate should be doubled (www.della.pl/price/international…). Calculated costs for the case under consideration:
- option 1: 1458 km - 1 driver: 1 set: 17562.48, 6 sets: 105374.9, 2 drivers: 1 set: 17562.48, 6 sets: 105374,9,
- option 2: 600 km - 1 driver: 1 set: 12941,74, 6 sets: 77650.44, 2 drivers: 1 set: 13960.16, 6 sets: 83760,93,
- option 3: 1729 km - 1 driver: 1 set: 20538.04, 6 sets: 123228.2, 2 drivers: 1 set: 20856.84, 6 sets: 125141.

Summarising the costs for external transport, it can be seen that the lowest rate would have to be paid for Option II if one driver was employed.

Use of decision boards in the transport process

Decision boards belong to algorithmic schemes of information circulation. From the presented block, economic and decision-making analysis it results which elements are priority and which can be presented in a queue sense (Partyka M., 2001, p. 30). The decision-making model describes the choice of the type of transport of hazardous materials on the route from Opole to Stockholm. Five decision-making rules have been proposed:

- **Regulation 1:**

If transport is by road and sea route with hired means of transport, the first option concerns Opole - Rostock - Gedser - Stockholm.

- **Regulation 2:**

If transport is by road and sea route with hired means of transport, the second option concerns Opole - Gdańsk - Nynäshamn - Stockholm.

- **Regulation 3:**

If transport is by road and sea route with hired means of transport, option three concerns Opole - Frederikshavn - Gothenburg - Stockholm.

- **Regulation 4:**

If transport is by road, sea and rail, then option four concerns Opole - Gdańsk - Gdańsk Port - Nynäshamn - Stockholm.

- **Regulation 5:**

If the transport is carried out using an external forwarding company, the choice of the transport process and the determination of the type of transport remains unknown.

Table 1: Decision-making model for transport process selection [own study]

	R1	R2	R3	R4	R5
Is land transport an entry point?	T	T	T	T	T
Is rail transport the entry point?	F	F	F	T	-
Is sea transport the entry point?	T	T	T	T	T
Is transport by hired means of transport an entry point?	T	T	T	N	T
Is there one driver?	F	F	F	T	-
Is there two drivers at the entrance?	T	T	T	F	-
Is the entry point for a ferry trip?	F	F	F	T	-
Is the ferry crossing an entry point?	T	T	T	F	T
Is it a rental of a container?	T	T	T	T	F
Is the choice of a forwarding company an entry point?	T	T	T	F	T
Is the transport implementation an entry point?	T	T	T	T	T
Is it an input to determine the type of transport?	-	-	-	-	T
Is the choice of the type of transport process an input element?	-	-	-	-	T
Is the car's allocation an entry point?	F	F	F	T	T
Is the driver's choice an entry point?	F	T	T	F	-
Is transport from Opole an entry point?	T	T	T	T	T
Is transport to Rostock an entry point?	T	F	F	F	T
Is transport from Rostock an entry point?	T	F	F	F	T
Is transport to Gedser an entry point?	T	F	F	F	T
Is transport from Gedser an entry point?	T	F	F	F	T
Is transport to Nynäshamn an entry point?	F	T	F	T	T
Is transport from Nynäshamn an entry point?	F	T	F	T	T
Is transport from Frederikshavn an entry point?	F	F	T	F	T
Is transport to Frederikshavn an entry point?	F	F	T	F	T
Is transport to Stockholm an entry point?	T	T	T	T	T
Is transport to Gdańsk an entry point?	F	T	T	T	T
Is the transport from Gdansk an entry point?	T	T	T	T	T
Is transport to Gdańsk Port an entry point?	-	-	-	T	-
Is transport from Gdańsk Port the entry point?	-	-	-	T	-
Is the entrance element over 1500 km?	T	F	T	T	T

Is the entrance element over 1100 km?	T	T	T	T	T
Is the entrance element over 1800 km?	F	F	T	F	T
Acceptance of the transport order	X	X	X	X	X
Determination of type and size of cargo	X	X	X	X	X
Fixing the delivery date	X	X	X	X	X
Review of legislation on the carriage of goods in Europe			X	X	
Determining the type of packaging of goods				X	X
Hire of the transport unit	X	X	X		
Route mapping	X	X	X	X	
Checking toll rates				X	
Determination of transport time	X	X	X	X	X
Determination of transport cost	X	X			X
Direct carriage		X			
Intermediate carriage				X	
Broken carriage	X	X	X		
Own means of transport				X	
Vehicle rental	X	X	X	X	
Hiring a new driver		X			
Driver employed in an undertaking			X	X	
Fixing the loading date	X	X	X	X	X
Preparation of transport documentation	X	X	X	X	X
Carriage of goods	X	X	X	X	X

The presented structure of the decision board corresponds to the structure of the decision boards. The lines describe the conditions for the transport of dangerous goods and activities related to the transport process. The rules are described in columns R1÷R5. As a result of the analysis, it was obtained by associating logical values of meeting or not meeting the conditions of required actions for the realization of the transport process. It can be seen that the conditional and action parts of these rules are multi-elemental.

	R1	R2	R3	R4	R5
W1	T	T	T	T	T
W2	F	F	F	T	-
W3	T	T	T	T	T

W4	T	T	T	F	T
W5	F	F	F	T	-
W6	T	T	T	F	-
W7	F	F	F	T	-
W8	T	T	T	F	T
W9	T	T	T	T	F
W10	T	T	T	F	T
W11	T	T	T	T	T
W12	-	-	-	-	T
W13	-	-	-	-	T
W14	F	F	F	T	T
W15	F	T	T	F	-
W16	T	T	T	T	T
W17	T	F	F	F	T
W18	T	F	F	F	T
W19	T	F	F	F	T
W20	T	F	F	F	T
W21	F	T	F	T	T
W22	F	T	F	T	T
W23	F	F	T	F	T
W24	F	F	T	F	T
W25	T	T	T	T	T
W26	F	T	T	T	T
W27	T	T	T	T	T
W28	-	-	-	T	-
W29	-	-	-	T	-
W30	T	F	T	T	T
W31	T	T	T	T	T
W32	F	F	T	F	T

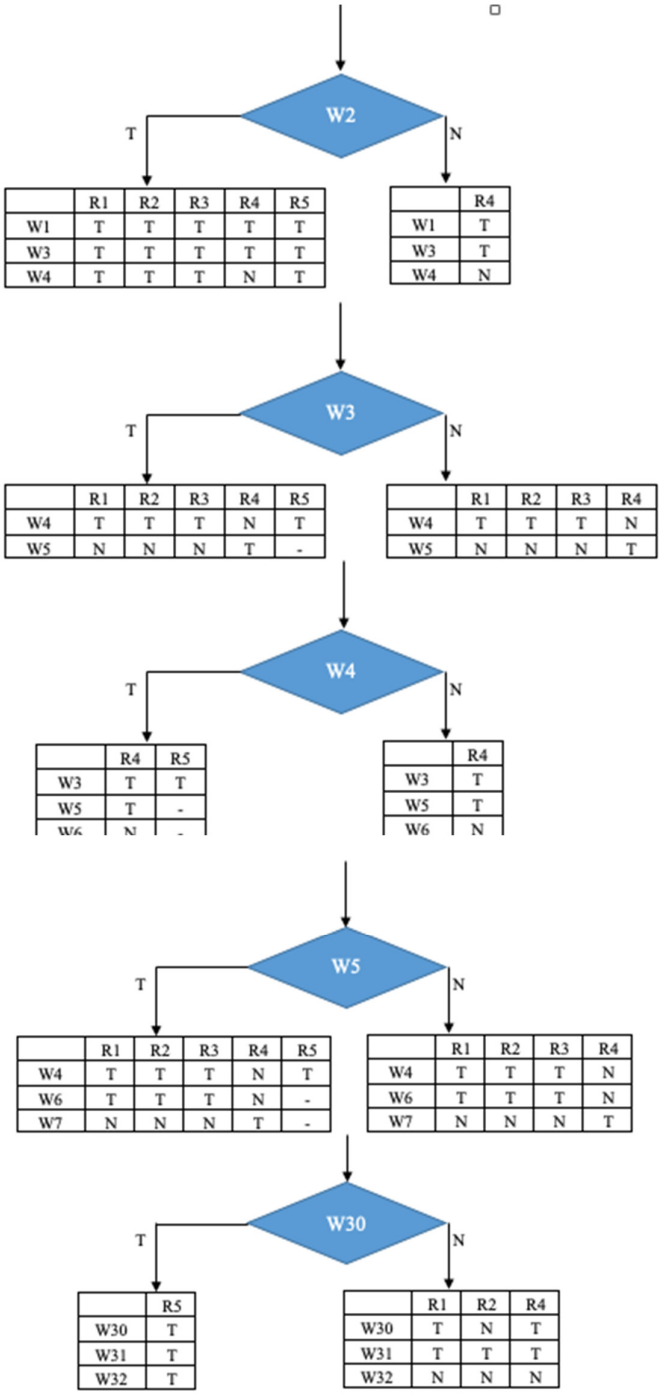

Fig. 1: Example of the endings of the deniers from the decision board [own study]

The presentation of the numerical taxonomy for the decision boards allows the introduction of stages with different levels of detail. The above issue corresponds to the emergence of the so-called partial needs, which are connected with the implementation of the solution to the problem under investigation. The hierarchical approach corresponds to the structure of the process of designing the transport of hazardous materials (Partyka M., 1998, p. 43). Various examples of possible endings of dendrite are

presented above. According to the decision analysis, rule 3 was eliminated, while rule 5 is the optimal result of the decision analysis.

Conclusions

The competition on the forwarding market is very high. Currently, transport companies are obliged to use a range of different methods in order to keep the customer and acquire new ones. The most important factors taken into account when choosing a forwarding company are: punctuality, costs, quality and reliability.

In order to meet customer requirements, forwarding companies must first of all operate quickly, efficiently and, of course, offer attractive prices. The most important determinant of a forwarder's actions is time. The first steps that determine whether the customer chooses a given transport company are the duration of the analysis of the forwarding order. This process must be shortened to a minimum.

The decision to choose a forwarding company usually falls on one of the first submitted offers. That is why it is so important to systematize the knowledge of freight forwarders about transport conditions in Europe. The presentation of a generalised transport model is aimed primarily at shortening the time of preparation of a forwarding offer and faster and more efficient execution of subsequent transport procedures.

Each forwarder analyses the given transport model, knows what steps need to be taken for the transport order to come into effect. The analysis of the transport process included in the article also allows to verify and select the most advantageous transport method. The information contained in this article is intended to help people planning international transport of goods to organise transport processes more efficiently.

The presentation of the numerical taxonomy for the decision boards allows the introduction of stages with different levels of detail. Various examples of possible endings of dendrite are presented in the paper. From the developed model of the decision-making process it can be concluded that rule 3 (If transport is by road and sea route with hired means of transport) can be eliminated. The optimal result of the decision analysis can be rule 5 (If the transport is carried out using an external forwarding company, the choice of the transport process and the determination of the type of transport remains unknown).

Thanks to the applications contained in the article, both transport companies and manufacturing companies can simply and transparently make a decision on the choice of international freight transport services. The competitiveness of companies in the field of forwarding services makes the choice between own and foreign transport simple enough to make the choice of the price factor directly affect the decision and not the organization of transport by means of own vehicle fleet.

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Effects of Young-Adults' Loyalty on Their Behavior Towards Brand - A Comparative Analysis of Consumer Groups with Different Levels of Innovative Potential

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Abstract

Loyal consumers seem to be a group with the greatest potential for innovative companies who want to create new product solutions based on customer expectation. As heavy users, they have an idea of any advantages and shortcomings of a brand offer and a part of them is likely to get involved in the innovation process. Taking into account that the profile of innovators (according to Rogers theory) is connected with looking for adventure and benefits and in that with lower level of loyalty potential, the question arises, how innovative potential affects typical loyalty effects like price sensitivity, recommendation inclination, stable future purchasing Demonstrating or not innovative potential for the brand has become the basis for the analysis of loyalty behavior of young consumers. The purpose of the article is to describe profile of loyal young adults who show the innovative potential in comparison to young consumers, who lack the innovative idea for a brand. The survey method was used on the sample of 459 students in Poland. It has been concluded that level of innovativeness has a slight impact on loyal consumer behaviour and that the loyal consumers should be considered as a source of innovation

Keywords: loyalty behaviours, user-driven innovation, innovative potential, young adults.

Introduction

Consumer loyalty is an issue that has gained the interest of both business practitioners and researchers in management science for a long time. Already in the 1960s, Theodore Levitt drew attention to the so-called "marketing myopia" and the fact that focusing on customers' needs and creating value for them in the long run is crucial for long-term success (Levitt, 1960). By providing consumers with arguments to repeat purchasing decisions, their loyalty can be buid up. However, it is worth being aware here that the relationships between the client and the brand are not analogous to interpersonal relations, and what is called loyalty in marketing, it is a phenomenon slightly different from friendship and faith. I is a consistent supportive behavior regardless of conditions what constitute the premise of loyalty in interpersonal relationships, and therefore a man loyal to a friend is prone to altruism and even sacrifice. When considering loyalty towards authorities, this phenomenon manifests itself in devotion, service, and acting in accordance with the will of the authorities. (SJP PWN, 2020). An important feature associated with loyalty is therefore the credibility of the attitude, which when translating into behavior, affects its predictability. (Dick and Basu, 1984). Translating loyalty into the relationship between the consumer and the brand, then a feeling of support or allegiance is no longer as strong, selfless and enduring (Dziewanowska, 2012), due to the transactional nature of the relationship, it is based on economic benefits (from the perspective of enterprises) as well as economic and psychological (from the perspective of consumers). A consumer, as a market entity, is interested in receiving products suited optimally to his or her needs (at an acceptable cost). His or her loyalty does not therefore result from a sense of responsibility, faith or even altruism. On the contrary, it can be assumed that the basis of brand loyalty is posed by consumer egoism associated with desire to ensure satisfaction of needs at a expected level in the long term

(which can give reasons for repetition of purchases) as well as with building social acceptance for their own decisions and simultaneously reducing dissonance buying behavior (premise for recommendations) (Wiśniewska, 2014).

It is in the interest of consumers to communicate their needs, ideas for satisfying them or even engaging in the process of creating new products. A loyal consumer seems to have adequate knowledge not only about the product category, but also about the brand that is the object of loyalty. Their support for the brand may therefore translate into the fact that they will be an attractive source of ideas for innovation for a given brand. On the other hand, openness to innovations may be associated with gathering experience with various brands and thus with reduced brand attachment. Therefore, it is worth considering how the innovative potential of loyal consumers affects the loyalty effects indicated in the literature such as repeatability of purchases, recommendations as well as price sensitivity. (Dick and Basu, 1984).

The purpose of the article is to conduct a comparative analysis of loyalty behavior of young consumers divided into two groups due to the different degree of innovation potential. The analysis will be carried out in three dimensions: recommendations, price sensitivity and the likelihood of future re-purchase.

This article focuses on the young adults group. These are consumers who are in the early stages of a customer's life cycle - in the phase of customers starting shopping repetition. It is the time when, while gaining direct experience with various products and based on collected information about the experiences of other users (indirect experience), cognitive and affective components of attitude are built that will ultimately affect the long-term propensity for certain decisions and purchasing behaviors and translate into real market behavior (learning process) (Zanna, Olson and Fazio, 1981; Dick and Basu, 1984). On this occasion, it is worth noting that one of the techniques that stimulate consumer loyalty (based on the principle of influence identified by Robert Cialdini - Commitment and Consistency (Cialdini, 2006)) is building experience by brand engagement, which can be implemented through the user-driven innovations concept.(Rajala, Westerlund and Möller, 2012; Zajkowska, 2017).

Related Literature

As previously mentioned, consumers are interested in receiving products that are optimally suited to their needs (at an acceptable cost). Their decision-making process is determined by consumer egoism, which arises from the concept of homo-oeconomicus (Schopenhauer, 1994) and should be treated as a natural feature of the consumer (Wiśniewska, 2014). By optimizing his or her decision-making process, the consumer strives to choose the best (in their perception) solution from many that are available (according to their knowledge), he or she also wants to feel the sense of independence of the decision (Kieżel, 2004). It is worth paying attention to the fact that consumer egoism, which provides the basis for the phenomenon of loyalty, is associated not only with the desire to meet the needs directly related to the product core (the basic function of the product), but also the needs associated with different levels of the Maslow Pyramid , including the need for respect, recognition, cognitive needs, aesthetics and transcendence (compare: (Maslow, 2006)). The desire to ensure continuous satisfaction of needs in the long run, while minimizing the risk of disappointment, translates into a phenomenon that can be described as loyalty (Wiśniewska, 2014). Definitions of loyalty generally ignore the issue of consumer egoism, however, emphasizing benevolent attitude towards brand and / or repeated shopping (Dick and Basu, 1984; Oliver, 1999; Solomon *et al.*, 2006; Karasiewicz, Trojanowski and Dziewanowska, 2008; Urban and Siemieniako, 2017), at the same time, do not exclude it directly. Therefore, it can be assumed that consumer loyalty is a type of consumer strategy aimed at ensuring continuous achievement of benefits by repeating proven (safe) decisions, which in practice is manifested in the form of repeated purchases and benevolent attitude.(Wiśniewska, 2014; Wiśniewska and Liczmańska-Kopcewicz, 2019).

The paper focuses on three basic dimensions of loyalty: price sensitivity, propensity to recommend and stability of purchases. These factors positively affect the predictability of demand and the company's stable market share in the long run.

Price sensitivity is associated with consumers response to a change in price. The literature indicates that loyal consumers are resistant to price changes, thanks to which it is possible to generate higher revenues by enterprises with regular customers (Dick and Basu, 1984; Donio', Massari and Passiante, 2006). Reduced price sensitivity occurs in a situation of monopoly or monopolistic competition. This means that the product / brand provides the consumer with a differentiated value for which there is no substitute (compare: (Dixit and Stiglitz, 1977).

Recommendations are a form of brand promotion that is cheap from the perspective of enterprises and reliable from the point of view of consumers. They constitute an argument for the attractiveness of the transaction for potential customers (social proof as a technique of influence indicated by Robert Cialdini (Cialdini, 2006). Many authors in the literature indicates that building brand awareness (recommending), as well as creating a positive brand image in the community (word-of-mouth) are typical behaviors of loyal consumers (Rudawska, 2005; van Doorn *et al.*, 2010).

Repetition of purchases is indicated by many authors as the basic effect of loyalty (Dick and Basu, 1984), which at the same time is insomuch expected benefit from the perspective of enterprises that it is often the parameter that defines the phenomenon of loyalty. Despite the quantification of this parameter (compared to qualitative nature of benevolent attitude towards a brand), a strong criticism of this approach is present in the literature (Uncles, Dowling and Hammond, 2003; Dziewanowska, 2012). Notwithstanding the different approach to defining consumer loyalty, predictability of consumer purchase can be considered as a positive result of this phenomenon and in that treated as one of the principal dimensions of it.

Due to rapid changes in the competitive environment, enterprises focus on high innovation and at the same time seek effective sources of innovation (Pypłacz and Liczmańska-Kopcewicz, 2018). In such conditions, users got in the sphere of interest of manufacturers (Marczewska, 2014; Plawgo and Klimczuk-Kochańska, 2015) as those whose needs are to be met on the one hand and those who have knowledge of the product on the other. Consumers test products in everyday use and are able to tell in what direction products should develop and what they lack, and then evaluate prototypes (Bagozzi and Dholakia, 2002; Lettl, 2007; Mahmud, Aryanto and Hasyim, 2017). It is worth noting that consumers are more loyal to brands with a high level of innovativeness and simultaneously they are also more indulgent to product innovations, which is also confirmed by research results (Henard and Dacin, 2010). At the same time loyal users are strongly motivated to support brands in the innovative process (Lettl, 2007). They are likely to participate actively in the community around the brand (engaging, seeking information), and advising the brand (suggesting ideas for offer development and product innovations) (van Doorn *et al.*, 2010).

Research assumptions – Method and A Theoretical Model

Taking into account the expectations of loyal consumer behavior described above, the authors of the article decided to ascertain how customers who meet two conditions behave:

- they are at the beginning of their loyalty relationship with the brand (the so-called young adults),
- they show a higher level of innovation potential (they have an idea for product innovation for brand).

The adopted research model is based on three dimensions related to consumer behavior: the level of price sensitivity, propensity to recommending and stability of purchases (Figure 1). Each of the dimensions is successively a variable explained by the level of innovation potential within the loyalty appearance.

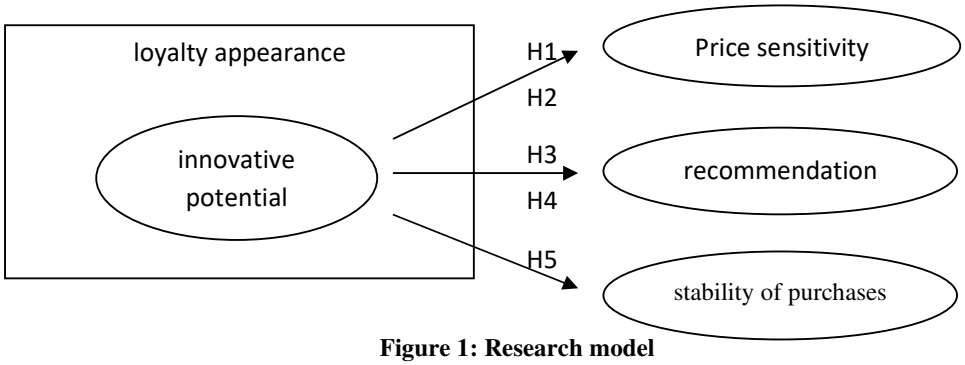

Figure 1: Research model

Source: the authors' elaboration

Due to verifiability, the model assumes that consumer loyalty is a phenomenon determined by repeated purchases of the same brand as the only one or as one of the evoke set. It was assumed that for easily accessible products, repetition of purchases is associated with a positive attitude towards the brand. Consumer loyalty is a boundary condition for a study in which only consumers declaring repeated purchases of the same brand are taken into account.

The research model consists of three submodels, in which, in turn, the function of the explained variable is assumed by:

- price sensitivity, measured by the level of willingness to keep buying at the current level after a price increase
- recommendation potential - measured by the propensity to recommend the brand and simultaneously the fact of recommending the brand in the past
- stability of purchases - measured by the declaration of consistency in futer purchases and a negative reaction to competitors efforts

In the area of consumer loyalty, the explanatory variable is constitute by the level of innovation potential defined as brand engagement that translates into generating an idea for product innovation for the brand.

Based on the literature review, the main threads of which are presented in this article, the following research hypotheses were established.

H1: young adults with a higher level of innovation are more sensitive to small price increases.

H2: young adults with a higher level of innovation are more sensitive to significant increases.

H3: young adults with a higher level of innovation are more willing to recommend the brand.

H4: young adults with a higher level of innovation are characterized by a higher level of brand recommendation.

H5: young adults with a higher level of innovation are characterized by lower stability of purchases in the long run.

The distribution of answers to the question about an idea for product innovation for a brand against which the respondent declares to repeat purchases, is presented in Table 1

Table 1: Distribution of answers to the question about an idea for product innovation for a brand towards which the respondent declares to repeat purchases

	respondents' declarations	
group 1 – respondents with an innovaitive idea for the brand	129	28,10%
group 2 – respondents without any innovaitive idea for the brand	330	71,90%
total	459	100%

Source: the authors' elaboration based on the survey results, N=459.

The cosmetics market was adopted as a reference point. The data have been collected at three Polish Universities with a print questionnaires. The findings from pilot studies showed that diverse motivation and antecedents may be related to different product categories on this market (body care or make-up cosmetics). Therefore, only body care cosmetics were taking into account in the survey. All respondents indicated a medium or lower price brand in the research.

For the purposes of the study, it was assumed that young adults is a group of people aged 18-25 (Phau and Cheong, 2009; Pich, Armannsdottir and Spry, 2018), often without income, displaying his lifestyle through shopping decisions (O'Cass, 2000; Lim and O'Cass, 2001; Phau and Cheong, 2009), demanding, but at the same time willing to building relationships with the brand (Ndubisi and Nataraajan, 2018), inclined to risk and acceptance of innovation(Rogers, 1962).

The research sample consists of 349 female and 110 male respondents. The distribution of the age variable is presented in Table 2.

Table 2: The characteristics of the research sample

sex / age	female	male	total
20	21	3	24
21	100	26	126
22	87	34	121
23	55	16	71
24	58	20	78
25	28	11	39
total	**349**	**110**	**459**

Source: the authors' elaboration based on the survey results, N=459.

Most of the respondents did not admit the idea for the cosmetic brand, which buying is repeated, but the 28.1% group is large enough to consider engaging young loyal consumers in the innovation process at least as a source of innovation. In the further part of the study, while verifying the hypotheses, the differences between these two groups will also be determined. For the purposes of analyzes, it was assumed that a group of young adults with an innovative potential is identified by having an innovative idea for the brand and is marked as group 1 hereinafter, whereas the gruop without such a potential (without such an idea) is signed as group 2.

Research Findings and Discussion

To verify the first and second hypothesis regarding the price elasticity of demand of young loyal consumers with a small (H1) and a significant (H2) price increase, the respondents' answers are presented in Figures 2, respectively.

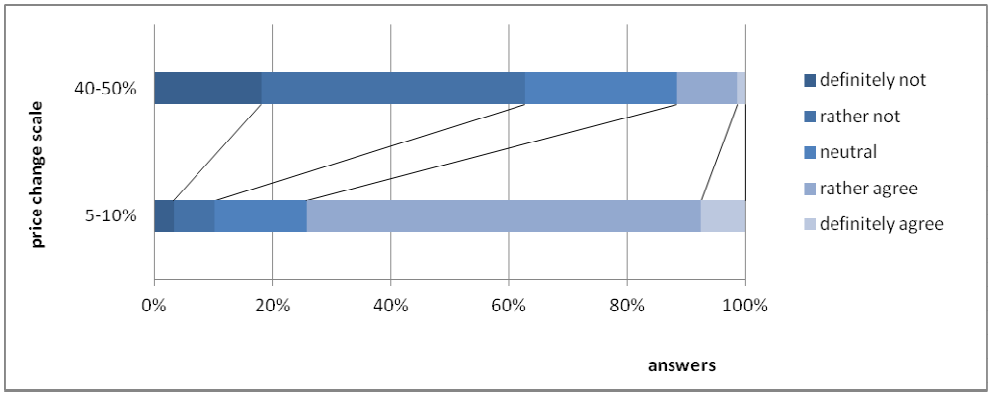

Figure 2: Distribution of answers to the questions: "I will buy this product of this brand even after a slight increase in price (by 5 -10%)" and "I will buy this product of this brand even after a significant increase in price (by 40 -50%)"

Source: the authors' elaboration based on the survey results, N=459.

74.29% of respondents claim that they would not give up buying products of the brand towards which they are loyal in the situation of a slight price increase (total answers: agree and rather agree). It should be noted, however, that in the survey no respondent indicated that the care cosmetics brand towards which they are loyal is from a higher price range. This may mean that a 5-10% price change is not a high nominal value, and this in turn may translate into the lack of significance of such a change among decision-making factors, especially in view of the strategic benefits that consumers attribute to using a brand they know. All in all, young loyal consumers are not sensitive to small price increases. However, the percentage of such consumers drops dramatically when they are faced with the decision to stay with the brand, whose price increases by 40-50%. Only 11.55% of respondents admitted that they would buy a product towards which they are loyal, even at a high price increase. The distribution of answers is not surprising. Young consumers are characterized by lower income or are still dependent on their families, therefore the real income effect and substitution effect will work here. Smaller resources at the consumer's disposal will change their purchasing decisions. At the same time, the above results lead to the hypothesis for research in the future that loyal consumers, regardless of age, accept small price increases, but significant increases in result in seeking other brands to meet the needs.

Analyzing the data in more detail, it can be seen that consumers with innovative potential are slightly more sensitive to price change, as shown in Table 3.

Table 3: Distribution of respondents' declarations regarding continuation of purchases with low and high price increases in groups of respondents with and without innovation potential

	Would you by the product if the price increased by…	
	…5-10%	**…40-50%**
	difference of relative values (gr2 - gr1) in percentage points	**difference of relative values (gr2 - gr1) in percentage points**
definitely not	0,23pps	3,59pps
rather not	-1,08 pps	**-12,28pps**
neutral	**-10,84** pps	**7,72pps**
rather agree	**15,40** pps	2,38pps
definitely agree	-3,72 pps	-1,42pps

Source: the authors' elaboration based on the survey results, N=459.

As can be seen while analyzing the structure of responses in both groups, for a 5-10% price increase the percentage of affirmative answers in a group with innovative potential (1) is higher with neutral responses for a 5-10% increase and with negative (rather not) responses with a rise by 40-50%. At the same time, price increases seem to be slightly less significant for respondents without innovation potential. The percentage of answers in this group (2) is higher than in group 1 with answers indicating the continuation of brand purchases with a slight increase in price and indecision with a 40-50% increase. The above conclusions allow to adopt the H1 and H2 hypothesis for the examined respondents, taking into account the non-representativeness of the research sample, which may, however, be the basis for conducting further research in this area.

One of the benefits of having loyal customers is the Word of mouth phenomenon, including brand recommendation. Young consumers' declarations regarding the intention to recommend the brand in the future and the fact that the brand has been recommended in the past are presented in tables 4 and 5 respectively.

Table 4: Intentions of future brand recommendation

	Answers (number and %)		**Difference of relative values (gr2 - gr1) in percentage points**
definitely not	0	0	0
rather not	6	1,31%	1,82%
neutral	104	22,66%	-8,38%
rather agree	221	48,15%	-4,19%
definitely agree	128	27,89%	10,75%
total	459	100,00%	0

Source: the authors' elaboration based on the survey results, N=459.

Table 4: Fact of brand recommendation in the past

	Answers (number and %)		**Difference of relative values (gr2 - gr1) in percentage points**
never	119	25,93%	-7,07%
once	91	19,83%	12,48%
several times at least	171	37,25%	8,69%
very often	78	16,99%	-14,10%
total	**459**	**100,00%**	0

Source: the authors' elaboration based on the survey results, N=459.

Respondents rarely declare that they would not recommend the brand (only 6 indications), while the intention to recommend the brand reports over 76% (total answers: rather agree and definitely agree). At the same time, when analyzing responses to previous ones, it can be seen that only 25.93% of young consumers have not recommended their brand before, the others have happened at least once (of which it is even several times). This corresponds roughly to the number of people who are hesitant or negative about future recommendations. This may be related to both the specificity of the cosmetics market and the openness of young consumers to exchange of experiences, including care. Comparing response structures in groups with and without innovation potential (1), it can be seen that the second group more willingly than the first declares its intention to recommend the brand in the future, which means that the H3 hypothesis is rejected. In terms of real behavior, however, consumers

with innovation potential most often recommend the brand (accumulation of answers "I recommend it very often"), However, Young adults without innovation potential also show activity in recommending, although a single consumer recommends less often, but accumulation of answers "at least once" and "at least several times "is higher than for consumers with a higher degree of innovation. Based on the conducted research, the H4 hypothesis cannot be positively verified.

Finally, the time has come to analyze the declarations of young consumers regarding their future brand behavior, independent of price. The study findings are presented in Table 5.

Table 5: Respondents' declarations regarding future purchases of the indicated brand (multiple choice possible)

I buy and use this brand's product ...	**Answers (number and %)**		**Difference of relative values (gr2 - gr1) in percentage points**
… and I intend to continue using it without considering offers from other brands	162	35,29%	25,37pps
… but I follow other brands' offers and if I find something better, I will change the brand	193	42,05%	-25,62pps
… until other brand makes an effort and provides me with a better offer	148	32,24%	-22,00pps
… until I get bored with the current brand - then I will look for a different brand product	175	38,13%	-6,27pps

Source: the authors' elaboration based on the survey results, N=459.

Less than half of the respondents declare that they are not considering switching to another brand. At the same time, most respondents assume that they will buy another brand in the future. As much as 42% actively observes competitive offers. 38% of respondents suggest that young adults will look for another brand when they get bored. Comparing the distribution of answers within a group of consumers with innovation potential (1) and without (2) it is clearly seen that in the first group respondents declare openness to the offer of competitive brands more often than in the second group, in which the share of answers indicating long-term loyalty is by over 25 points higher percentages, which in turn confirms the H5 hypothesis.

Conclusions and Research Limitations

The results of the study confirmed three out of five hypotheses. Before summarizing, however, basic restrictions should be reminded and pointed out. First of all, the research sample is not representative of both size and selection procedure. This means that the verification of hypotheses can only refer to the sample or population (students of three universities). Nevertheless, the findings may become an inspiration for further research on the behavioral profile of young consumers showing loyalty behavior in terms of repeating purchases and innovation potential.

After verifying the hypotheses, it can be summarized that (with earlier restrictions) young adults are not very sensitive to small price changes, however, this situation changes significantly with high increases. This is probably the result of a relatively short relationship between the client and the brand, which means that enterprises that aims this target group should adjust their pricing strategy accordingly. Consumers with a higher level of innovation are more sensitive to price increases than young consumers who do not think about the new solutions for their preferred brand. Although they all are likely to recommend brands the study shows, that consumers of lower level of innovative potential are more willing and active in this. Thus in turn may confirm the higher level of expectations of the innovative consumers and some kind of difficulties with satisfying them. Young adults seem to be a little bit less loyal and companies should take into account, that this group monitors the market and competitive offers. Thus stems their knowledge and creativeness for innovations on the one hand but simultaneously it results with less confidence of their future

patronage behavior on the other hand. All in all, this profile seems to be fairly consistent with what Rogers said about innovators (Rogers, 1962).

It is worth remembering that everything that the consumer does, should bring him or her sense of economic, psychological and image benefits. This means that even an acquired customer should be cared for by providing him with arguments to keep them in positive relations with the company (Dziewanowska, 2012). The loyalty of young consumers has a chance to grow stronger over time. Companies should take advantage of their innovative potential to provide this consumers in the future with arguments to stay with a brand that meets their demanding expectations.

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Poland's Similarity to Other EU Member States with Respect to The Level of Financial Globalization

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Abstract

The subject of the article concerns the issue of the development of financial globalization in the European Union. In order to measure the level of financial globalization processes, the index of financial globalization, which was developed by the Swiss Economic Institute, was used. The main goal of the article is to analyze changes in the development of financial globalization in the EU countries in 1993-2018. A special attention is given to the degree of Poland's similarity to other member countries in terms of the level of financial globalization. The Wavelet Dynamic Time Wrap (WDTW) model was used for the research, where the Dynamic Time Wrap (DTW) measure is used as part of the wavelet analysis. The DTW measure allows to assess the similarity of two time series by finding the optimal path, with the lowest total cost criterion, measured by the cumulative distance between these series.

Keywords: Financial Globalization, European Union, Dynamic Time Wrap (DTW), Wavelet Dynamic Time Wrap (WDTW).

Introduction

Globalization is a progressive process. Its development was influenced by many factors. However, the development of the Internet, telecommunications and IT had a decisive impact on accelerating globalization processes (Dresher, 2006; Balcerzak & Pietrzak, 2017; Hadaś-Dyduch, 2016; 2017; Pieterse, 2019). Therefore, there is no single definition of globalization. The changes brought about by globalization affect entire economies. They affect the functioning of the national capital markets (Bekaert and Wu, 2000; Meluzín et al., 2017; Pietrzak et al., 2017; Strýčková, 2017; Zinecker et al., 2017), they lead to an increase in the level of international cooperation and foreign trade (Łapińska, 2013; 2016; Cieślik et al. 2019; Cieślik & Hien Tran, 2019), the similarity of countries and social processes (Kuc, 2015; 2017a; 2017b; Jankiewicz, 2018a; 2018b; 2018c; 2019; Kuc-Czarnecka et al., 2020), influence on the national labour markets (Bieszk-Stolorz & Dmytrów, 2019), result in the new patterns of spreading innovation and technology (Cheba, 2015; Balcerzak, 2016; Cheba & Szopik-Depczyńska, 2017; Szopik-Depczyńska et al. , 2017; 2018a; 2018b; Kijek & Matras-Bolibok, 2019; Jakimowicz & Rzeczkowski, 2019a; 2019b), and the process of duplication of institutional solutions (Balcerzak & Pietrzak, 2016; Balcerzak, 2020).

However, the greatest impact of globalization is recorded on the financial and capital markets, where a long-term systematic increase in financial integration (financial globalization) is recorded (Meluzín et al., 2018a; Meluzín et al., 2018b; Meluzín et al., 2018c; Zinecker et al., 2018a; 2018b; Gaigaliene et al., 2018; Legenzova et al. 2019; Skalická et al., 2019a; Skalická et al., 2019b; Stavytskyy et al., 2019; Shkolnyk et al., 2019). Financial integration is usually understood as a real or 'actual' increase in capital flows between countries (or the potential of these movements), strengthening links between economies (see Schmukler & Abraham, 2017). As the world moves towards deeper financial

integration and the potential for arbitration disappears, the return of identical assets in international trade should be the same in different markets, which means that the markets are indeed integrated (Prasad et al. 2007; Kose et al., 2009, 2010; Łapińska, 2016; Litavcová et al., 2017; Jaklič & Svetličič, 2019).

The essence of global financial diversification is that a country is able to transfer some of its income risk to global markets (Edison, 2002; Rodnik & Subramanian, 2009; Obstfeld, 2009). Since most developing countries are rather specialized in their production and equipment structures, they can theoretically get even greater profits than developed countries through the international sharing of consumption risk, i.e. effectively selling their share of domestic production in exchange for participation in global production (Sánchez-López et al., 2019).

The aim of the article is to analyse changes in the development of financial globalization in the EU countries. A special objective of the paper is to determine the degree of Poland's similarity to other member countries in terms of the level of financial globalization taking into account long-term trends. To determine the degree of similarity of countries due to the adopted criterion, the Dynamic Time Wrap measure was used (DTW) (Keogh & Ratanamahatana, 2005; Hadaś-Dyduch, 2019).

Development of the globalization process and financial globalization in the world and in the EU countries

Globalization processes have such strength and range of influence that they cannot be resisted by a single country or even a group of countries. Hence, in addition to the positive effects of globalization, it carries a high risk of unpredictable crises and severity (Skare & Porada-Rochoń, 2019a, 2019b; Wajda-Lichy & Kawa, 2018). Figure 1 shows the changes for the globalization index in the years 1970-2018, where we define globalization to be the process of creating networks of connections among actors at multi-continental distances, mediated through a variety of flows including people, information and ideas, capital and goods. The values of globalisation index are given after Swiss Economic Institute. In the entire period, the globalization index increased annually on average by 1.03%, in the years 1980-2018 it increased annually on average by 1.08%, and in the years 2000-2018 by 1% (a detailed analysis of the globalization process changes was presented in the works of Hadaś-Dyduch, 2016, 2017, 2018, 2019).

In the article, the authors concentrated on the issue of the development of financial globalization. For this purpose, the index of financial globalization was used, which was developed by Swiss Economic Institute. Figure 2 presents changes in the value of the financial globalization index in the years 1970-2018. Over the period under review, the global financial globalization index increased on average annually by 1.14%. A strong increase in the level of globalization processes in the nineties of the last century is visible. Based on the visual analysis of Figure 2, it can be concluded that the processes of financial globalization in Europe and countries with the highest level of income have slowed down or even decreased in recent years.

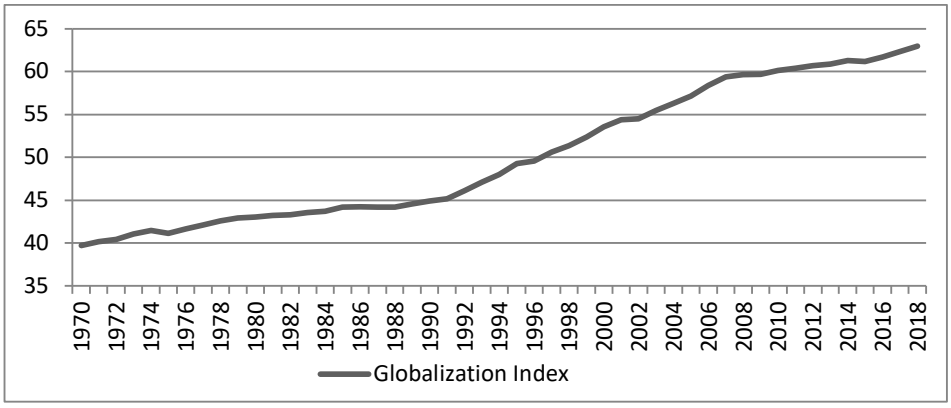

Fig. 1: Intensity of globalization index

(Source: own study based on data from the Swiss Economic Institute)

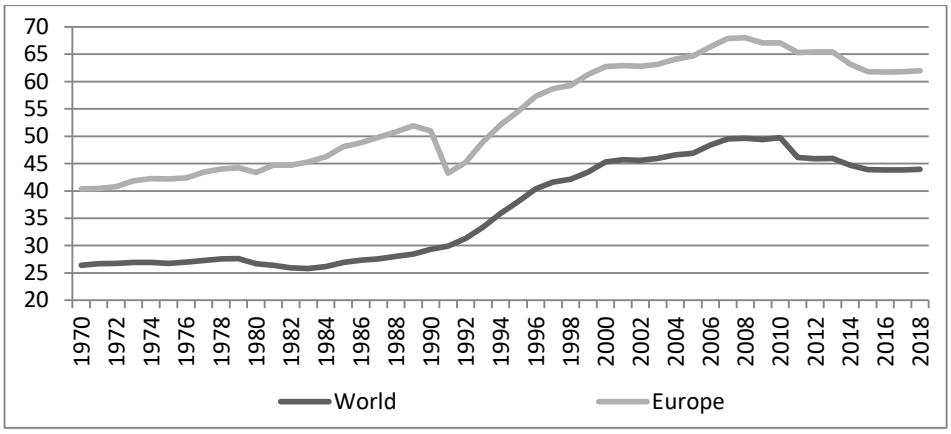

Fig. 2: Graphic Financial globalization index

(Source: own study based on data obtained from the Swiss Economic Institute)

In the next step, the authors assessed the level of financial globalization in the EU member states in 1993-2018. The year 1993 was chosen due to the dynamic increase in the level of globalization processes in the early 1990s and the beginning of transformation process in Central and Eastern European countries. The values of the financial globalization index in 1993 for the 27 member countries are listed in Table 1. Next, the countries were assigned to four classes according to the level of financial globalization using the natural breaks method (Pietrzak et al., 2017b). The percentage changes in the financial globalization index in the years 1993-2004 and 2004-2018 were also calculated. The year 2004 was chosen as the accession year of some Central and Eastern European countries to the structures of the European Union.

The first class with the highest level of financial globalization was created in 1993 only by the countries that joined the EU before 2004. The following countries have been assigned to class 1: Ireland, Luxembourg, Belgium, Netherlands, United Kingdom, Denmark. In class 2 with a high level of financial globalization in 1993, there were four countries of the so-called old Union: Sweden, Austria, France, Finland and two countries that joined the EU in 2004: Malta and Cyprus. In class 3 with an average level of financial globalization in 1993, selected countries of Southern Europe and

Central and Eastern Europe dominate. The following countries have been assigned to class 3: Germany, Portugal, Italy, Hungary, Spain, Bulgaria, Poland, Czech Republic. In class 4 with a low level of financial globalization in 1993, apart from Greece, there were only new EU member states. In the case of the countries that joined the European Union, the following were assigned to class 4: Slovenia, Estonia, Latvia, Croatia, Lithuania, Romania. The very low values of the financial globalization index should be noted for two countries: Lithuania and Romania.

Table 1: Changes in the level of financial globalization in the EU from 1993 to 2018

Country	1993	Class	1993-2004	2004-2018	Country	1993	Class	1993-2004	2004-2018
Ireland	86.96	1	11.88%	0.84%	Italy	52.78	3	35.93%	9.31%
Luxembourg	86.2	1	14.98%	-0.12%	Hungary	51.62	3	53.61%	13.39%
Belgium	83.04	1	14.08%	-0.35%	Spain	51.48	3	56.39%	10.22%
Netherlands	80.44	1	20.12%	2.11%	Bulgaria	41.02	3	76.23%	7.66%
United Kingdom	79.18	1	17.24%	0.17%	Poland	40.08	3	60.05%	19.66%
Denmark	78.04	1	9.76%	9.40%	Czech	40.01	3	75.52%	20.07%
Malta	73.08	2	30.18%	4.50%	Greece	38.05	4	58.39%	36.59%
Sweden	71.59	2	26.06%	4.38%	Slovenia	36.7	4	63.55%	47.46%
Austria	68.89	2	24.88%	8.68%	Estonia	36.67	4	127.70 %	7.22%
France	67.01	2	25.85%	8.38%	Latvia	33.99	4	112.44 %	26.16%
Finland	64.75	2	34.62%	6.42%	Croatia	31.18	4	102.72 %	19.71%
Cyprus	60.28	2	46.40%	13.82%	Lithuania	22.53	4	152.79 %	40.26%
Germany	54.78	3	54.48%	5.02%	Romania	15.72	4	219.82 %	26.65%
Portugal	53.64	3	57.71%	5.49%	-	-	-	-	-

(Source: own work based on Swiss Economic Institute)

When analysing the dynamics of changes in the financial globalization index, it should be stated that the period of 1993-2004 was subjected to a much larger increase in financial globalization processes compared to the period of 2004-2018 (Table 1). In both analysed periods, the largest percentage growth of the value of the financial globalization index were recorded in the case of countries assigned to the 4th class. For most of the countries in this class, there were two-fold percentage increases in the financial globalization index: Estonia (127.70%), Latvia (112.44%), Croatia (102.72%), Lithuania (152.79%), Romania 219, 82%). The situation is completely different for countries assigned to class 1, where for most countries the index increase did not exceed 20% in the period 1993-2004, and in the period 2004-2018 one can speak of a slowdown in the development of financial globalization processes. In the case of two countries, there was even a decrease in the value of the financial globalization index in the period 2004-2018: Luxembourg (-0.12%) and Belgium (-0.35%). In the case of countries assigned to class 2, the increases in the index value in the period 1993-2004 did not exceed 50%, and for countries in class 3 the increases ranged from 40 to 53%.

Table 2 presents the values of the financial globalization index for the 27 member countries in the selected years: 1993, 2004 and 2018. The countries were again assigned to four classes due to the level of financial globalization using the natural breaks method. However, in this case the year 2018 was taken into account. In 2018, Cyprus, Malta, Luxembourg, Ireland and Belgium were assigned to the class with the highest level of financial globalization. Class 1 was increased by Cyprus and reduced by the following countries: Netherlands, United Kingdom, Denmark. Apart from Latvia, only the countries of the "old" EU were assigned to the second class with high level of financial globalization: Denmark, Austria, United Kingdom, Finland, France. The following countries have been assigned to class 3 with a medium level of financial globalization: Hungary, Estonia, Portugal, Germany, Spain, Slovenia, Czech Republic. Class 3 was extended in 2018 to Estonia, while three countries: Italy, Bulgaria and Poland were assigned to class 4 with the lowest level of financial globalization. In 2018, in the last class, there were two countries of southern Europe: Greece and Italy and new member countries: Lithuania, Bulgaria, Poland, Croatia, Romania.

Table 2: Values of the financial globalization index in the EU in selected years

Country	1993	2004	2018	Class	Country	1993	2004	2018	Class
Cyprus	60.28	88.25	100.45	1	Estonia	36.67	83.49	89.51	3
Malta	73.08	95.14	99.42	1	Portugal	53.64	84.6	89.24	3
Luxembourg	86.2	99.11	98.99	1	Germany	54.78	84.62	88.87	3
Netherlands	80.44	96.63	98.67	1	Spain	51.48	80.51	88.73	3
Ireland	86.96	97.29	98.1	1	Slovenia	36.7	60.03	88.52	3
Belgium	83.04	94.73	94.4	1	Czech Republic	40.01	70.22	84.31	3
Sweden	71.59	90.24	94.19	2	Greece	38.05	60.27	82.32	4
Denmark	78.04	85.66	93.71	2	Lithuania	22.53	56.96	79.89	4
Austria	68.89	86.03	93.5	2	Italy	52.78	71.74	78.42	4
United Kingdom	79.18	92.83	92.99	2	Bulgaria	41.02	72.3	77.84	4
Finland	64.75	87.17	92.77	2	Poland	40.08	64.15	76.76	4
France	67.01	84.33	91.39	2	Croatia	31.18	63.22	75.68	4
Latvia	33.99	72.21	91.11	2	Romania	15.72	50.28	63.69	4
Hungary	51.62	79.29	89.91	3					

(Source: own work based on Swiss Economic Institute)

Analysis of Poland's similarity to other EU countries in terms of financial globalization

The purpose of the article is not only to analyze financial globalization in EU countries, but also to determine which countries Poland is most similar to in terms of financial globalization, taking into account long-term trends. The article uses the Wavelet Dynamic Time Wrap (WDTW) model to determine the Dynamic Time Wrap (DTW) measure for various components obtained on the basis of wavelet analysis (Hadaś-Dyduch, 2019).

The obtained DTW measure values enable the assessment of the similarity of two time series by finding the optimal path allowing to align these series at the lowest total cost measured by the cumulative distance between these series (see Keogh & Ratanamahatana, 2005). The DTW measure

allows for flexible shift of the timeline to match sequences that are similar, but not in the phase, as shown in Fig. 3. A detailed description of the algorithm for determining the DTW measure is given in the works of Keogh & Ratanamahatana (2005) and Hadaś-Dyduch (2019).

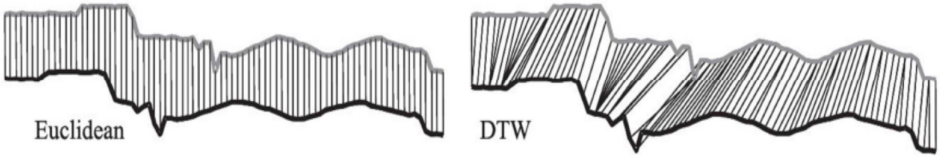

Fig. 3: Graphic comparison of Euclidean measure with DTW measure
(Source: Keogh & Ratanamahatana, 2005).

Based on the assumed goal, the DTW values for pairs of objects were determined, where the first object was Poland and the second object was selected from other EU countries. The analysis was performed again for 27 member countries, excluding Slovakia. The calculations carried out were based on the index of financial globalization in the period 1970-2018, which allowed for taking into account long-term trends. The obtained values of the measure for selected country pairs at the level of decomposition corresponding to long-term trends are presented in Table 4. The similarity of Poland to selected countries determined in this way will mean a lasting relationship between countries in terms of the development of financial globalization processes.

Table 3: Degree of similarity between Poland and other EU member states

Country	DTW value	Class	Country	DTW value	Class
(Luxembourg, Poland)	959.82	1	(Italy, Poland)	746.08	2
(Malta, Poland)	958.17	1	(Latvia, Poland)	715.67	2
(Cyprus, Poland)	946.44	1	(Portugal, Poland)	711.32	2
(Netherlands, Poland)	912.69	1	(France, Poland)	709.35	2
(United Kingdom, Poland)	903.02	1	(Greece, Poland)	698.03	3
(Belgium, Poland)	894.61	1	(Spain, Poland)	647.68	3
(Germany, Poland)	879.58	1	(Czech Republic, Poland)	626.73	3
(Sweden, Poland)	865.29	1	(Lithuania, Poland)	545.83	3
(Denmark, Poland)	837.64	1	(Hungary, Poland)	363.72	4
(Austria, Poland)	807.6	2	(Bulgaria, Poland)	345.25	4
(Ireland, Poland)	789.5	2	(Romania, Poland)	297.99	4
(Finland, Poland)	788.32	2	(Slovenia, Poland)	283.33	4
(Estonia, Poland)	752.73	2	(Croatia, Poland)	147.83	4

(Source: own study based on calculations in the Matlab program)

Class 1 has been assigned to countries with which Poland has the lowest degree of similarity due to the level of financial globalization. In class 1 there were Luxembourg, Malta, Cyprus, Netherlands, UK, Belgium, Germany, Sweden, Denmark. In the group of countries mentioned above, only Malta and Cyprus represent new members of the EU. This class is made up of countries which, unlike

Poland, were characterized by a high level of financial globalization processes in the period 1993-2018 (Table 2). Class 2 is made up of countries in relation to which Poland has a low degree of similarity in terms of financial globalization, but it is at a higher level than in the case of countries in Class 1. The following countries belong to this class: Austria, Ireland, Finland, Estonia, Italy, Latvia, France. In 2018, with the exception of Estonia and Italy, these countries were assigned to class 1 and class 2, characterized by a high level of financial globalization (Table 2).

In the class 3 there has been assigned countries in relation to which Poland shows a moderate degree of similarity in the development of financial globalization processes. Class 3 includes the following countries: Greece, Spain, Czech Republic and Lithuania. Class 4 was created by the countries to which Poland is the closest in terms of the level of development of financial globalization. The group of these countries included: Hungary, Bulgaria, Romania, Slovenia and Croatia. Class 3 and class 4 were created by countries that in the period 1993-2018 had medium or low levels of financial globalization.

Conclusions

In the article the issue of financial globalization in the EU was considered. This phenomenon is becoming a significant exogenous factor affecting the efficiency of national economic policy and affects risk management processes at the microeconomic level. Therefore, the analysis of financial globalization processes is an important issue for domestic macroeconomic decision makers and is becoming an important element of risk management related to the functioning of financial and capital markets. As the experience of the recent global financial crisis has shown, the internationalization of capital market shocks can lead to the collapse not only of weak capital players, but also of global financial entities with the greatest access to liquidity in international financial markets, which may result in the collapse of entire national financial systems. The article uses financial index of financial globalization, developed by the Swiss Economic Institute.

The article analyses the changes in the level of financial globalization in the EU member states in the period 1993-2018. A significant difference between the so-called old EU countries and new member countries was confirmed. With the exception of Malta and Cyprus, the countries that joined the EU before 2004 were characterized by a high level of financial globalization. Poland and other selected countries of Central and Eastern Europe were characterized by the lowest level of financial globalization. Additionally, the degree of Poland's similarity to other member countries in terms of the level of financial globalization was examined using the WDTW model, taking into account long-term trends. Based on the results obtained, it was found that Poland is the most similar in terms of financial globalization processes to Hungary, Bulgaria, Romania, Slovenia and Croatia, Greece, Spain, Czech Republic and Lithuania. These countries were mostly characterized by the lowest level of growth in financial globalization in the group of EU member countries. Additionally, in the period 1993-2018, only slight changes were found in the membership of countries in obtained classes. This fact proves the high stability of financial globalization processes in the long term. Despite the free movement of capital, EU Member States create classes of countries with different levels of financial globalization.

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Environmental Workplace Behaviors in Small and Medium-Sized Enterprises: The Students's Perspective

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Abstract

The present study deals with the problem of evaluation of employee behaviors in the workplace. The basic aim was to check whether in the sector of small and medium-sized enterprises there occur behaviors qualifying as counter-ecological. The article is of the empirical character. The respondents in the sample (working students) are educated groups compared to the general level of education in the country. Their insights could help to formulate effective initiatives to perfect the sphere related to environmental protection in the workplace. The conducted research indicates that in SMEs there appear a series of counter-ecological behaviors. The results show that there are differences between factors influencing pro-environmental behaviour in the workplace. This paper analyses the determinants of workers' behaviour towards environmental protection using structural equation models with observed and latent variables. Small and medium-sized enterprises should pay special attention to effectively functioning system of control.

Keywords: Workplace Behaviors, Counter-Ecological Behaviors, Small And Medium-Sized Enterprises, Structural Equation Model

Introduction

Works in the field of sustainable development have highlighted the importance of integrating economic, social and ecological systems. Economy is a tool and sustainable development is an overarching goal. Considerations have been guided by the need for new thinking about the role of enterprise for society end environment.

Organizations undertake to carry out various actions in the sphere of environmental protection (Chodyński, 2008; Mazur-Wierzbicka, 2013; Śmiechowski et al., 2017; Valcárcel, 2014). Focusing the attention on ecology, in the above-mentioned meaning, protection of environment can be understood as minimizing the negative influence exerted by the company on natural environment and also as communicating with stakeholders on behalf of pro-ecological actions (Chodyński, 2008; Jabłoński et al., 2010; Leoński, 2016; Olejniczak, 2013; Rybak, 2007). In a broader sense, this refers to not only actions, but also to neglect on the part of the management and their subordinates in this respect. There is extensive literature on the subject of green workplace behaviors (Francoeur et al., 2019) and environmental counterproductive workplace behaviors (Ciocirlan, 2017). There has always been debate over how to manage human resources for environmental sustainability and how individuals can contribute to the achievement of environmental sustainability (Ones, Dilchert, 2009; Ones, Dilchert, 2012).

Bearing the above in mind, the authors concentrated their research attention on questions connected with environmental workplace behaviors. The aim of the article is to present the problem of environmental workplace behaviors in small and medium-sized enterprises. Structural equation modeling was used to find the significant influence factors on environmental protection initiatives. Many

studies find an association between educational attainment levels and concern for the environment (De Silva, Pownall, 2014; Meyer, 2015). While preparing the present work, the diagnostic survey among students of WSB University in Opole was used.

Bottom-Up Approach

The bottom-up approach is best exemplified by the quality circle. The conception of forming the so-called quality circles appeared in Japan in the 1960s. By means of the model, Joseph Juran, the founder of the idea, expected to have each worker in individual departments activated to engage in controlling their actions and - in consequence - to improve the quality of products.

In practice, managing sustainable development in a company is founded on the top-down approach. Engagement of the management is one of the key factors in the company's sustainable development. The top management establish sustainable development to be their strategic target and the management of the lower level determine how this aim is to be put into life. The voice of common workers is rarely taken into account, whereas successful elimination and prevention of counter-ecological behaviors depends on involvement of all employees. There arises therefore a need for conducting research which will help define different aspects of employees' involvement.

Definitely, common workers can greatly contribute to the company's sustainable development in, at least, three ways, that is as implementers, ambassadors and recipients of corporate sustainability practices (Süßbauer et al., 2019). Employees possess tacit knowledge that can be used to introduce changes in the organization (Boiral, 2009; Buhl et al., 2016; Fernández, 2013; Wolf, 2013). Employees' pro-environment-oriented initiatives in many cases derive from this kind of knowledge which is not stipulated in any procedure and is not known to the management of the middle and higher levels. Common workers hold a strong influence on how the company is perceived by the environment, since they interact with external groups of stakeholders (clients, suppliers), as well as with the local community (Hasu, 2015). The workers are also receivers of internal means of sustainable development, which aim to secure good working conditions (Süßbauer, Schäferet, 2019).

It needs considering in what way employees should be engaged in order to successfully eliminate counter-ecological behaviors in organizations pursuing sustainable development. The bottom-up process connected with increased engagement of common workers in transformation processes targeting sustainable development offers a chance for enterprises.

Similarly, O'Donohue and Torugsa (2016) recommend application of Green HRM concept. This idea is understood as taking up activities within HRM, in compliance with targets of sustainable development. Relevant actions are meant to serve the development of skills, motivation and involvement of workers in supporting goals which are connected with, among others, protection of environment on the level of the company. Results of research on the sector of small enterprises show that Green HRM has a positive influence on the relation between proactive environment management and the company's financial results. What is more, they confirm the assumption that a high level of Green HRM increases financial profits from proactive environment management in comparison with a low level of Green HRM. Thus, it becomes evident that Green HRM provides an added value to the enterprise in the case when it is used as a factor in proactive management of environment. The extant literature has stressed the influence of human factors on companies' environmental policies. For example, Ramus and Steger (2000) assessed the relationships of environmental policy with supervisory support behaviors and employee environmental initiatives. Also Fernández et al. (2013) maintained that ecological initiatives very often emerge from creative ideas supplied by employees in the lowest ranks.

One may formulate the following hypotheses:

Hypotheses 1 (H1): *Reason of counter-ecological behaviors has a significant influence on environmental protection initiatives.*

Research Method

The diagnostic survey was carried out among students of WSB University in Opole between 15 July and 15 August 2019. The first stage of the research consisted in sending out information on the intended research to students of the following majors: management, management engineering, logistics, finances and accountancy, administration and internal security. The request to fill in the Internet-based questionnaire (CAWI) was addressed to students in employment, representatives of small and medium-sized companies. The examination was of the pilot character. Participation in it was voluntary and anonymous.

The first research hypothesis (H_1) let to the formulation of the following sub-hypotheses:

Hypotheses 1a (H_{1a}): *Economic factors of counter-ecological behaviors have a significant influence on environmental protection initiatives.*

Hypotheses 1b (H_{1b}): *Approval of counter-ecological behaviors on the part of organization have a significant influence on environmental protection initiatives.*

Hypotheses 1c (H_{1c}): *Lack of support on the part of organization have a significant influence on environmental protection initiatives.*

In order to test the hypotheses regarding the relationships between the variables considered, structural equation modelling was adopted. A total of 342 questionnaires was used for analysis using SmartPLS (Ringle et al., 2015).

The study is limited by its non-random sample, reducing the study's power.

Analysis of Respondents' Opinions

The applied CAWI survey covered 342 students of WSB University in Opole. The respondents (262 women and 80 men) were in employment, at different ages and varying length of employment and work experience. Over 90% of them live and work in the area of Opole Voivodship (south-western Poland), the largest number of them (over 50%) ranging between 24 and 38 years of age. Nearly 60% of the questioned declared over 5 years of work experience. This is connected with the specifics of the University - study courses in WSB University are designed for people who are professionally active, ones who want reconcile working and studying.

It is most worrying that as many as 68% of the examined have witnessed taking rubbish to a forest, dumping rubbish on "wild landfills" or pouring hazardous substances straight into the regular sewerage (Table 1). The survey revealed that 24% of the respondents declared not reporting problems or instances of abuses of environment which were observed in the place of work, and 21% - not complying with recommendations and internal procedures with respect of environmental protection. Then, 47% of the respondents indicated the cases of not sorting rubbish, 17% - burning of leaves, grass and tree branches and 31% - burning of rubbish. Another 31% observed wasting of food in their places of work, 68% - using greater amount of material than it was necessary, 9% - intentional dirtying the place of work, 37% - leaving lights on in unused rooms, 24% - using old-type, non-energy-efficient electric bulbs, 21% - using obsolete, non-energy-efficient household appliances in social rooms, 41% - overusing the standby mode of electrical/household appliances (instead of switching them off completely), 9% - using disposable ball-pens; 37% - using plastic cutlery, styrofoam food containers, polystyrene mugs, etc.

Table 1: Do you notice in your place of work any of the behaviors against the environment which are listed below?

	Yes, definitely	Yes	Rather yes	I do not know	Rather no	No	No, definitely
Wasting food	33	33	39	32	73	63	69
Using greater amount of material than it is necessary (e.g., wasting paper through unnecessary printing)	74	69	91	18	51	24	15
Intentional dirtying the place of work	9	3	20	43	82	84	101
Leaving lights on in unused rooms	22	30	74	18	68	68	62
Using old-type non-energy-efficient electric bulbs	15	32	36	55	51	81	72
Using obsolete, non-energy-efficient household appliances in social rooms	14	31	27	61	71	84	54
Overusing the standby mode in electric/household appliances (instead of switching them off completely)	33	36	70	39	44	78	42
Not sorting rubbish	47	50	63	21	33	65	63
Burning of leaves, grass, tree branches	15	18	25	18	24	76	166
Burning of rubbish	33	33	39	32	73	63	69
Taking rubbish to dump it in the forest, dumping rubbish secretly on “wild landfills”, pouring hazardous waste into the sewerage system	74	69	91	18	51	24	15
Using disposable ball-pens	9	3	20	43	82	84	101
Using plastic cutlery, Styrofoam or plastic food containers or mugs, etc.	22	30	74	18	68	68	62
Not reporting problems or abuses of environment in place of work	15	32	36	55	51	81	72
Not complying with recommendations or procedures connected with environmental protection	14	31	27	61	71	84	54

Decidedly, it is both employees and the organization who bear the responsibility for the occurrence of behaviors which are detrimental to environment (Table 2). Still, as it follows from the survey, 6.1% of the respondents blamed solely the employee who uses negative forms of conduct for the occurrence of behaviors which are harmful to natural environment. On the other hand, 4.4% of the questioned declared that it was exclusively the organization who are responsible for this.

Table 2: Who, in your opinion, bears the responsibility in your place of work for the occurrence of behaviors which are harmful to environment?

	Frequency	%
Exclusively the organization	15	4.4
Only the worker who uses negative conduct	21	6.1
Both the worker and the organization	306	99.5

36.3% of the respondents observed that the majority of workers and superiors happen to behave in a way that is harmful to environment. On the other hand, 11.7% of the questioned put the blame chiefly on workers (irrespective of the sex) (Table 3).

Table 3: Who, to the greatest extent in your place of work, commits acts of behavior which are detrimental to environment?

	Frequency	%
Co-worker (woman)	9	2.6
Co-worker (man)	15	4.4
Superior (woman)	3	0.9
Superior (man)	12	3.5
Most workers and superiors happen to behave like that irrespective of their sex	124	36.3
Most workers happen to behave like that irrespective of their sex	40	11.7
Most superiors happen to behave like that irrespective of their sex	9	2.6
I do not know, hard to say	130	38.0

The examined most often listed the following among the reasons for the occurrence in the place of work of conduct which is harmful to environment: personality (41.2%), acceptance of behavior detrimental to environment on the part of co-workers in the organization (31.6%), colleagues' idleness (30.4%), approval on the part of the organization/superiors of the occurrence of negative behaviors (27.5%), poorly functioning system of supervision/control over workers (25.4%), economic reasons connected with the lack of financial means (24.6%), superiors' idleness/inactivity (20.8%).

The survey proved that 28.4% of the respondents are aware of the fact that the company which employs them prevents behaviors which are harmful to environment. In the relevant open question, the examined indicated the ways of the preventative measures. Among them there were found the following: workers' trainings, introduction of relevant procedures, punishing for acts that are detrimental to environment, promotion of pro-ecological approach towards environment on the

Internet, installation of anti-smog shields on stacks, introduction of sorption mats, exchange of equipment, exchange of electric bulbs, running actions with regard to protection of environment required by the law, control of substances emitted into the atmosphere, instructing personnel on the necessity of switching off the light, requiring workers to develop pro-ecological actions (sorting rubbish, switching off lights and appliances), prevention of utilization of waste in an inappropriate manner, placing containers for used batteries (e.g., in both offices and production halls there should be enough bins to collect segregated specific types of rubbish), launching the platform of Near-Miss Incidents (NMI). One of the respondents stated, "We take all possible measures in every possible direction." Unfortunately, as many as 71.6% of the questioned admitted that they did not know whether their companies prevented in any way behaviors which are harmful to environment.

According to the respondents, the effectivity of preventative actions with respect to environmental protection can be raised through external financing obtained from sources which come from pro-environmental enterprises realized by the company outside it (44.2% indications), effectively functioning internal system of control (38.9%), effective execution of punishments for negative behaviors (31.9%), as well as active external system of control (19.9%). The examined pointed to the great significance of education in the sphere of actions preventing the occurrence of behaviors which are harmful to environment ("People should be kept aware of green issues, which must constantly be repeated loudly everywhere", "A set of principles of pro-ecological conduct in the company must be formulated and a system of rewards for abiding by them ought to be introduced", "Education. People have to understand first that by harming the environment they harm themselves. Pro-ecological behaviors must be first developed privately at home, and it is not until then that they will become a norm also in the professional life", "First of all, it is superiors who must be made interested in pro-ecological actions").

Lastly, 65.8% of the respondents were of the opinion that their current work environment created a possibility for them to freely express their views on pro-ecological actions and on those which are harmful to environment, while 20.5% did not have their opinion on the issue). At the same time it needs drawing attention to the fact that 39.5% of the questioned claimed that there exists a possibility of choosing variants of realization of tasks at their work stations, taking into account pro-ecological actions. This creates a possibility of limiting counter-ecological behaviors in many enterprises.

There are four components of the concept of the environmental protection (PROT): external financing (PROT_1), effectively functioning internal system of control (PROT_2), effective execution of punishments for negative behaviors (PROT_3), and active external system of control (PROT_4). Each of the latent variables ECO, ORG, LACK are measured using an appropriate set of empirical indicators (see Table 4 for these indicators). In order to test the hypotheses regarding the relationships between the variables considered, structural equation modelling was adopted (Figure 1).

A path coefficient estimate is considered as statistically significant different from zero at a 5% significance level. The influence of economic reasons (ECO) and protection (PROT) was found to be significant, but influence was weak (Figure 2). It may be hypothesized that firms improve financial performance at the expense of environment. It is worth mentioning that, because the initial model tested (Model 1) did not satisfy any of criteria of goodness-of-fit. In consequence, it was decided to consider alternative models.

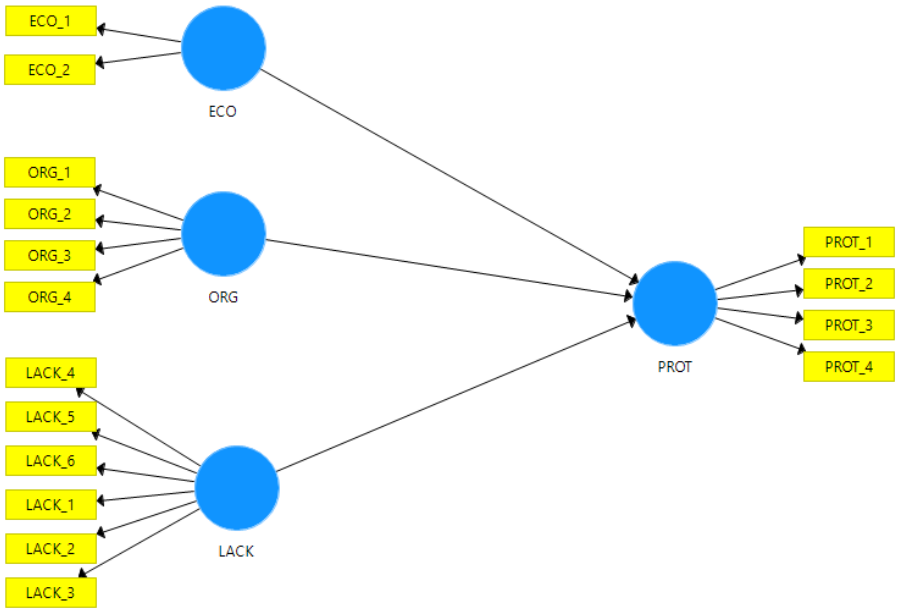

Figure 1: The theoretical model proposed (Model 1)

Table 4: What are the reasons behind the occurrence in your place of work of behaviors which are harmful to environment?

	Frequency	%
Economic reasons connected with limiting costs of activity of the organization (e.g., instead of utilizing waste which is paid for, the organization disposes of it illegally) (ECO_1)	45	13.2
Economic reasons connected with the lack of financial means (e.g., purchase of new energy-efficient appliances) (ECO_2)	84	24.6
Poorly-functioning system of supervision/control over workers (ORG_1)	87	25.4
Approval on the part of organization/superiors of occurrences of negative conduct (ORG_2)	94	27.5
Acceptance on the part of co-workers in the organization of behaviors detrimental to environment (ORG_3)	108	31.6
It happens that superiors themselves make their inferiors commit acts of negative behavior (ORG_4)	15	4.4
The feeling among the colleagues that since they have undertaken to do positive acts for the organization, in consequence of which the organization has profited, this entitles them to commit negative behaviors (LACK_1)	25	7.3
Lack of support on the part of superiors (LACK_2)	58	17.0
Lack of support from co-workers (LACK_3)	34	9.9

Personality (e.g., lacking in the sense of responsibility, inclination towards breaking norms) (LACK_4)	141	41.2
Idleness of superiors (LACK_5)	71	20.8
Idleness of colleagues (LACK_6)	104	30.4

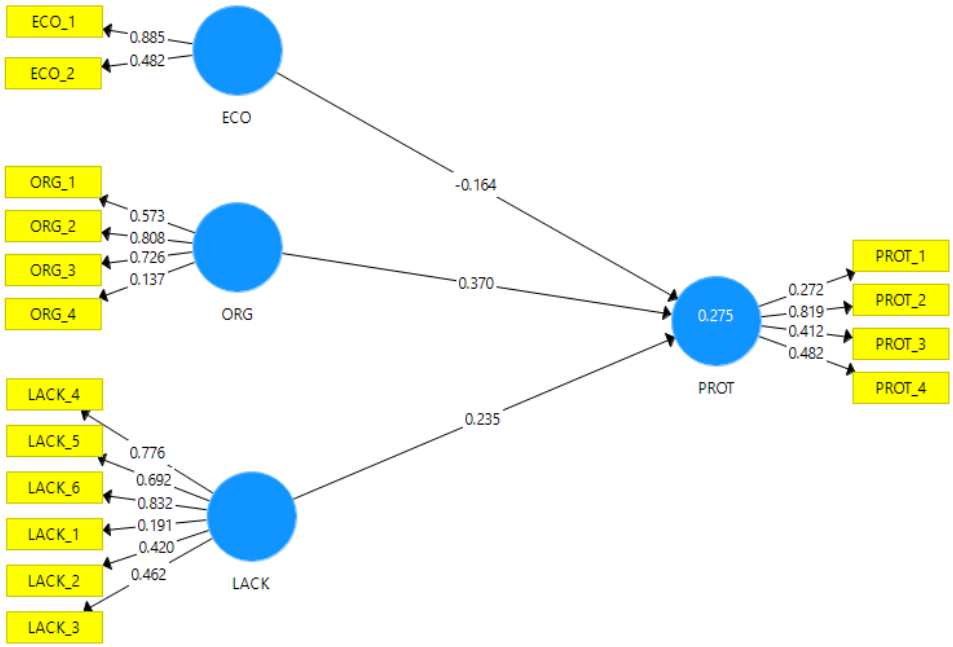

Figure 2: Estimates of the Parameters in the Model 1.

The model 2 presented in Figure 3 satisfied the acceptance criteria ($R^2 = 0.204$; $d_{ULS} = 0{,}756$; $d_G = 0{,}182$). Reason of counter-ecological behaviors has a significant influence on environmental protection initiatives (H_1 was supported; H_{1a} wasn't supported; H_{1b} was supported; H_{1c} was supported). Small and medium-sized firms should pay special attention to system of supervision (ORG_1, ORG_2, ORG_3) and employee behavior (LACK_4, LACK_5, LACK_6), in order to increase the chances of attaining environmental protection. The results have been consistent with the literature. Effective environmental sustainability requires crucial contributions from HRM (Govindarajulu, 2004; Rothenberg, 2003). This could occur, for example, in the form of a bottom-up process, as described by Dangelico (2015) or Ramus and Steger (2000). The initiatives to implement sustainability consisted in creating a favorable business environment with high levels of environmental orientation, providing employees with the appropriate training to improve environmental competences and awareness of employees and providing extensive support from managers to employees in environmental issues.

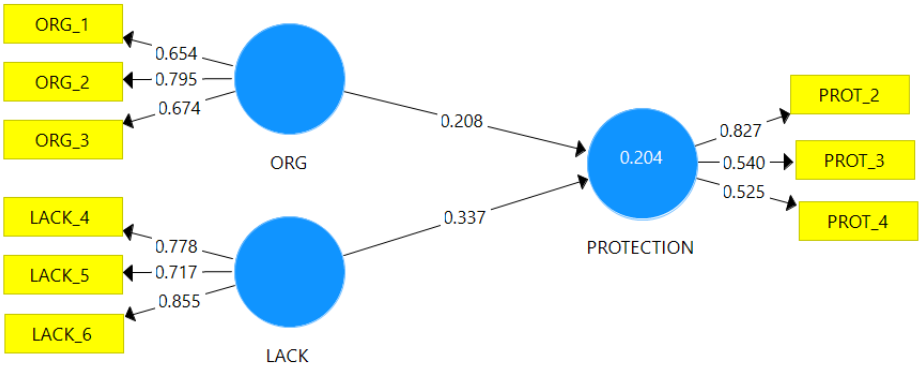

Figure 3: Estimates of the Parameters in the Model 2.

Conclusion

In SMEs protected area of the environment is neglected and there occur a series of counter-ecological behaviors. In respondents opinion, it is both employees and the organization who bear the responsibility for the occurrence of counter-ecological behaviors. It is worth noting that more than 70% of respondents admitted that they did not know whether their companies prevented in any way behaviors which are harmful to environment. It seems that in many enterprises, it is the duty of workers "to do" and the duty of managers "to think". In order to increase the chances of attaining environmental protection, small and medium-sized firms should pay special attention to employee behaviors. This could occur, for example, in the form of a bottom-up process. Stronger worker involvement at all organizational levels can make unique and valuable contributions. Nearly 40% of respondents perceived that there exists a possibility of improvements, taking into account pro-ecological actions. Enterprises should pay more attention for effectively functioning system of control and effective execution of punishments for negative behaviors. This creates a possibility of perfecting the sphere related to environmental protection.

In the opinion of the authors, applying the Japanese model of quality circles in enterprises (in particular in SMEs), it is first of all “environmental circles” that should be taken over and assume the form of team work. In connection with the above findings, the authors recommend carrying out experiments by researchers who might be interested in this problem area. The last stage of the experiment could thus aim to verify whether the state of environmental protection is better in the given enterprise in comparison with the base period (when the environmental circles were not in operation yet). Apart from improving the sphere of the company’s environmental protection, there can arise such assets in connection with the functioning of the environmental circles as increasing the knowledge of the work environment by workers/participants and increasing the use of their potential, including the hidden knowledge.

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Shaping Decision-Making Competences of Managers in The Area of Logistics Using Thermoactive Diagnostics

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Abstract

The tendency to make decisions in certain circumstances is due to human personality, which in turn is due to heat regulation, neuroregulation and neuropsychomatics. When seeking sources of decision-making processes resulting from human personality, the problem of systemic thermoregulation should be considered. Practice proves the effectiveness of diagnostic methods using psychometric tools. The article is an attempt to assess the possibility of using scanning thermoregulatory diagnostics - STRD in the process of examining the competences and predispositions of managerial staff in logistics.

Keywords: Logistics competences, decisions, neuroplasticity, thermoregulatory diagnostics

Instrumentary for decision analysis

Well-known personality types (temperaments) classified by Hippocrates, i.e. sanguine (*lat. sanguis - blood*), choleric (*gr. chole - bile*), melancholic (*gr. mélanos - black + chole - bile*) and phlegmatic *(gr. phlegma - phlegm*) are an insufficient classification in the assessment of human predispositions, competences or decision-making inclinations.

In scientific and research practice, a number of psychometric tools are used to study and describe personality. They facilitate diagnosis and differentiation, as well as allow you to monitor changes in equal aspects of personality. Commonly used tools of this type include: Minnesota Multidimensional Personality Inventory MMPI-2, Personality Inventory NEO-FFI, Eysenck Personality Questionnaire EPQ-R, and Cattel 16PF Personality Questionnaire [Hall, Lindzey,1990].

The latest research by scientists from Northwestern University confirms that four types of personality can be distinguished in humans. These are: the reserved type, the type recognized as a role model, the non-average type and the self-centered type [Roberts, 2008]. So far, the most popular and widely used personality test was the Myers-Briggs test (MBTI), which is an extended concept of Carl Gustav Jung. The psychologist noted that people have some tendencies regarding energy management (extraversion / introversion), the way information is collected (cognition / intuition), decision making (thinking / feeling) and dealing with the surrounding world (judgment / observation). The personality type is determined by the preferences in each of these four dimensions. According to modern psychologists, a more reliable tool than the researcher's observational sense is the analysis of data sets. According to L. A. Nunes Amaral, Big Data is the perfect tool for collecting and processing "personality data" and combining it with existing psychological knowledge.

Analyzing huge data sets in terms of repetitive regularities, the so-called Big Five. This model includes five personality factors such as: neuroticism, extraversion, openness to experience, agreeableness and diligence. These dimensions are treated as operational regulators defining the basic personality type, and in the context of research in the area of decisions determines the predispositions of potential decision makers [Nunes Amaral, 2018].

The Importance of Thermoregulating Diagnostics

When seeking sources of decision-making processes resulting from human personality, the problem of systemic thermoregulation should be considered. The human thermal regulation center consists of several separate centers located in the striatum (*lat. corpus striatum*), visual thalamus (*lat. thalamus opticus*) and gray tumors (*lat. tuber cinereum*).

Nervous system and centrifugal stimulations increase and decrease body temperature, which in turn is due to metabolism. Thermoregulation is therefore one of the most important processes of homeostasis. Through changes in temperature regulation, we can observe energy changes and responses to the stress stimulus of organs, systems or even entire systems under study. To understand thermoregulatory diagnostics well, it is important to understand what we study. The temperature distribution in the human body is layered and depending on the type of tissues and the depth of their distribution, so we distinguish the cortical and medulla part [Krupka, 2018].

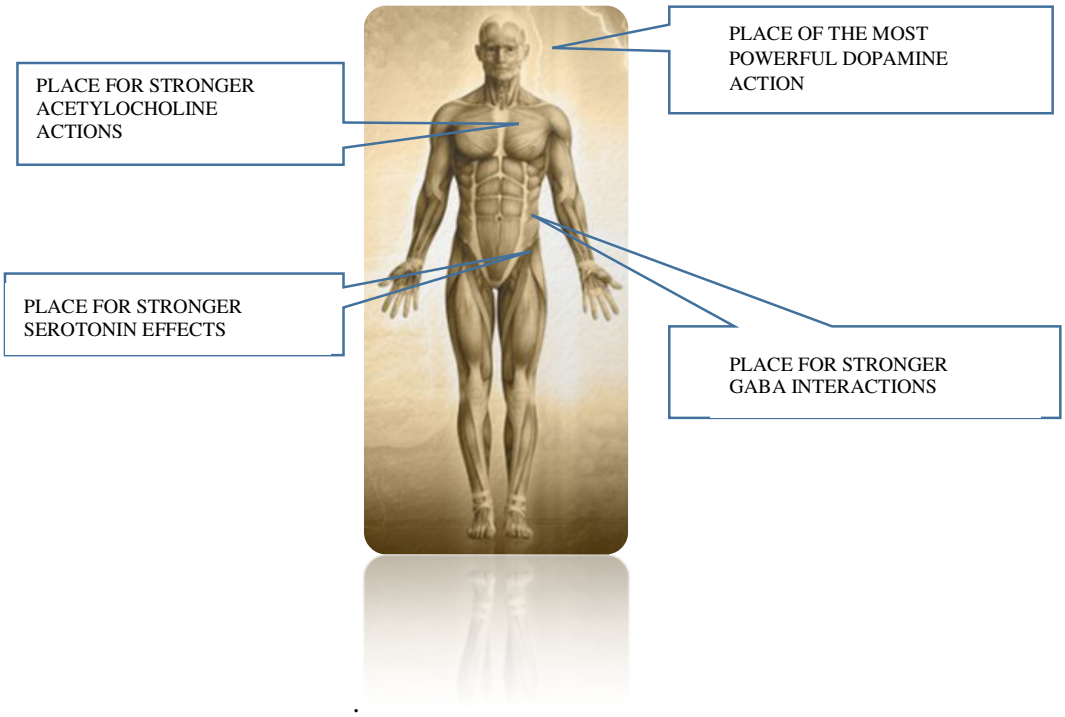

Fig. 1: Areas of interaction of neurotransmitters in the human body

Source: own study based on: K. Krupka, Fundamentals of neuropsychosomatics, Basic set of information needed to work with the neuropsychosomatic process in the leadership project, training materials (unpublished), Krakow (Poland), 2018.

Research by G. Heim's team on thermoregulatory diagnostics, conducted at the Institute of Social Medicine and Occupational Medicine of the University of Heidelberg in 1978-88 provided a lot of evidence in the field of radiation thermography (in other words: thermoregulatory diagnostics according to the Heidelberg Model), which uses infrared radiation of the skin resulting from from giving away body heat in the form of heat radiation to maintain homeostasis. Earlier, in the early 1950s, E. Schwamm justified the thermoregulatory diagnostics together with J. Reeh. They developed a measuring instrument for capturing human infrared radiation. From then on, he called his method regulatory thermography as opposed to existing thermoregulatory diagnostics. These studies resulted in the development of radial thermometers based on the principles of Planck radiation. As a result of these studies, thermoregulation diagnostic methodology based on STRD devices was developed. This

method currently provides a reliable basis for assessing competences and predispositions regarding personality types.

Figure 1 presents four neurotransmitters found in the human body (acetylcholine, dopamine, serotonin and GABA / γ-aminobutyric acid), whose interaction has a direct impact on human nature, behavior, predispositions and competences, and in the context of this work on making decisions with varying degrees conservatism or even refraining from having to make a decision

STRD tests the body's response to a stressor and analyzes them for the effects of neurotransmitters on the body. Complementing the study with the Braverman test and Plutchik's emotion diagram, the research has become a reliable instrument for assessing managers (managers, commanders) in recent years in terms of making decisions [Plutchik, 1980].

Analysis of logistic competences supported by STRD

Logistics as a special flow-oriented management area requires extraordinary performance. The 7R (right) rule is based on the fundamental pillars of the place, time, customer, assortment, costs, quantity and quality of the product. Therefore, the logistics manager is a person who is required to have a specific set of professional competences.

These competences, according to research conducted by the interdisciplinary research and development center of the organization, are a vector result of the expectations of employers of the logistics sector and competences acquired as a result of education at the high school level and academic centers extended by the acquired professional experience [6].

Research conducted in 2015 shows that the area of competence expected from managers in the logistics sector includes in particular: knowledge of the industry (in particular about transport), honesty, concern for quality, conscientiousness, ability to design logistics processes, knowledge of law and selected IT systems. There is also a group of soft competences which include: initiative, goal orientation, organization of own work and ability to cooperate. In addition, features such as self-development, innovation, cognitive abilities and empathy (including intercultural) are also increasingly mentioned.

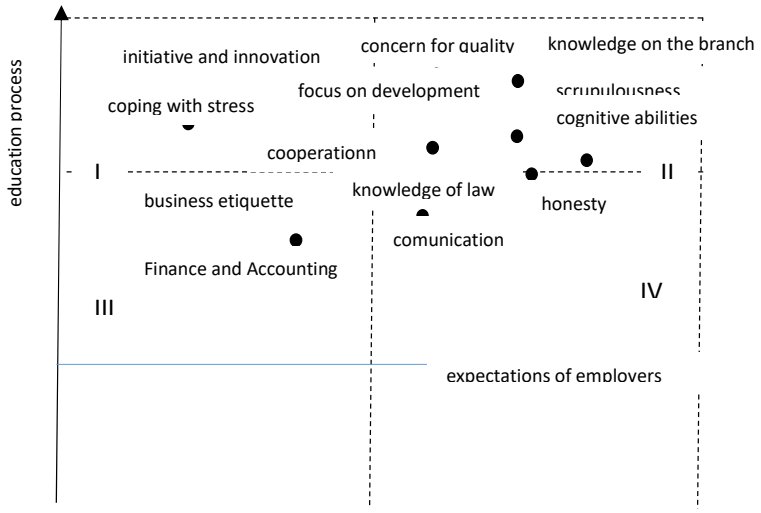

Fig. 2: Competence matrix (relationship between competences acquired in the education process and expectations of employers) in the logistics industry

Source: Report of the Interdisciplinary Center for Research and Development of University Organizations, Jagiellonian University, Krakow, november 2015

In recent studies based on the method of thermoactive scanning, dominant features resulting from the predominance (concentration) of specific neurotransmitters have been determined over the last few years. This knowledge is currently the foundation for the development of the theory of neuro-leadership, and the desired ability to lead and lead a group, the ability to make collective decisions or conceptual network thinking are now not only part of building artificial intelligence but constitute a virtual model of the neuroliner in particular areas of social life.

In determining professional competencies, a competence matrix presenting the place of individual competences in its space is increasingly used.

Figure 2 presents the competence matrix as a result of the expectations of employers in the logistics industry and the professional competences obtained in the process of education.

The matrix shows that the majority of these competences are (according to Plutchik's theory of emotions) a neurotransmitter called dopamine (focus on development, learning, cognitive ability, self-development and compliance with the law). These competencies are mostly concentrated in the second part of the matrix (dominate). In other parts, there are no more visible competences that could be assigned to a specific neurotransmitter. The ability to cooperate (cooperation) or concern for quality are characteristic for the neurotransmitter - GABA, but the initiative and ability to cope with stress are characteristic for serotonin.

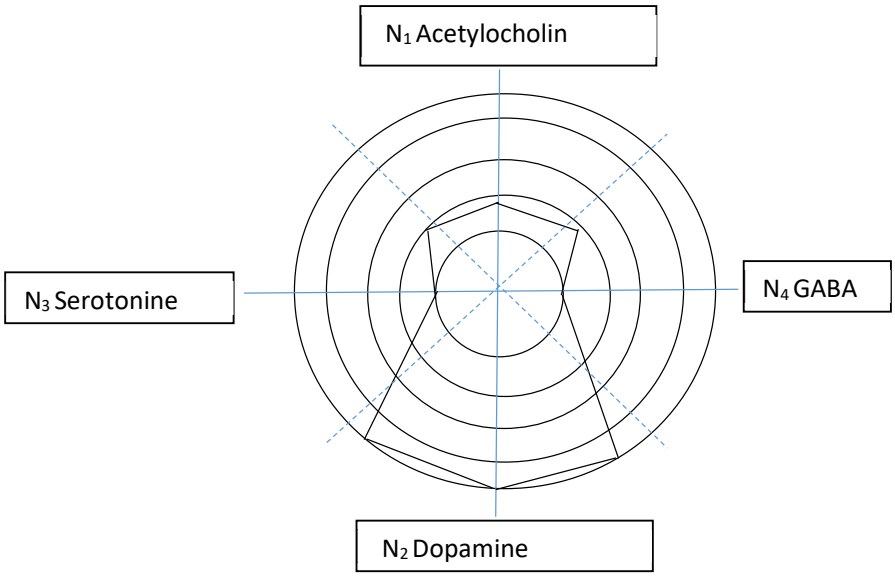

Fig. 3: Classic "dopamine type" (manager-specific profile with a tendency to make decisions in high-risk conditions)

Source: own study based on: K. Krupka, Fundamentals of neuropsychosomatics, Basic set of information needed to work with the neuropsychosomatic process in the Leadership project, training materials (unpublished), Krakow, 2018

From the above analyzes, the image of a manager emerges - logistics with a dominant dopamine profile with features (competences) in the area of GABA and serotonin. Figure 3 presents a graphic visualization of the manager's profile in the logistics industry, whose professional competence is focused in the area of dopamine impact. This area was diagnosed using thermoactive scanning using a STRD scanner.

Scaniging Method In Decision Making Processes In Logistics

Decision making as a proces is the result of other complex processes in the human mind. It is a consequence of the processes of expansion, condensation, coherence and mobilization. The result of these processes is process transformation (the ability to smoothly transition between all of the above processes). This process depends on the balance between all neurotransmitters. The natural (biological) foundation of the whole is neuroplasticity (the ability of nerve tissue to create new connections aimed at their reorganization, adaptation, variability and self-repair as well as learning and memory processes).

Decision making is determined by the need to achieve the objectives, perform tasks, in logistics, planning and distribution of resources, coordination of flows, hence it becomes so important to determine the personal characteristics of the decision maker (logistics, manager, commander). Thermoregulatory scanning determines the impact of dominant neurotransmitters on behavior (including propensity to decision risk, conservatism, or decision regression). Research (conducted on military listeners) shows that when acetylcholine and GABA are in equilibrium, the brain is focused on exploration and cognition (including creative problem solving). In the case of the dominant effect of acetylcholine, there is a sense of success, while GABA's dominance creates a sense of need to improve. Disturbance of this balance causes an excessive search for novelty (stimuli, impressions), contacts with other people. According to pilot studies conducted on a population of over 2,000 people, the predominance of dopamine was visible in entrepreneurs with a tendency to make decisions under risk conditions (possibility of material losses). This is due, inter alia, to the fact that dopamine triggers a strong sense of motivation in achieving goals. The predominance of serotonin triggers a sense of help and interest in the problems of others. With the subordinate role of logistics, this is a very important aspect of staff evaluation and selection. With imbalance dopamine - serotonin; there is a strong suppression of any action (including decision-making), the decision-maker is afraid of challenges, he avoids all actions leading to possible loss.

Summary

The conclusions result from research carried out under the project "Balance of competences of the Krakow scientific center" in the transport and logistics industry in southern Poland and constitute a knowledge base in the context of planned and implemented investments, development of the city and the region, and implementation of its strategy. Research is extremely important for companies that deal with the transport of goods by road, their storage and storage, and activities related to supporting this process (excluding rail, air and human transport). As part of the work, on the basis of the analysis of job offers and in-depth interviews with opinion leaders and company representatives, verification was carried out in the area of selected competences expected from university graduates, having various significance for the development of the industry. These competences have been divided into four areas: specialist knowledge and skills (11 competences), business knowledge and skills (9 competences), soft skills (11 competences) as well as language skills and other requirements (13 competences). In the next steps, quantitative research on the demand for competences was carried out (the analysis took into account the results of 20 companies in the transport and logistics industry employing a total of over 1,200 employees), which were then compared with the results on the supply of competences as part of the balance sheet.

Appropriate selection of human resources in an organization (including functional divisions) is a key part of organizational health, which is an important driving force, e.g. perception of the organization, e.g. by shareholders, NATO allies or other organizations outside. At the same time, it determines the effectiveness of actions. Organizations that want to focus their efforts on priorities such as role modeling, quick decision making, defining visions and shaping leaders should increasingly use 'niche' methods to assess the competences and predispositions of managerial (commanding) staff, not only in decision making. Therefore, it is reasonable to strive to develop a holistic personality model on the basis of which neuroplasticity changes can be interpreted, and the method of such research is scanning thermoregulatory diagnostics - STRD.

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Infology In Logistics Decision Making Processes

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Abstract

In the procesess of teleinformatic (r)evolution in logistics, the ability to selectively approach the "information noise" also takes on the significance of the instrumentarium and software supporting it. Considering the information as a set of data, is possible to conclude that the primary element of any information is data that requires proper ordering, because in all other cases they do not matter, despite the fact that they can be stored (eg in the form of writing to disk) . A large part of the records requires only formal gathering for records, others are "the need of the moment" and are treated as "information waste". The article is an attempt to present causal relationships in the data - information - decision - relationship in making logistic decisions for which the management background is the infology background, and the criteria included costs.

Keywords: Infology, IT Systems In Logistics, Decision-Making Processes, Material Identification, RFID, Logistics Costs.

Introduction

Traditionally in IT, data is understood to mean numbers, concepts or orders presented in a manner that is convenient for sending, interpreting or processing by manual or automatic methods. The basic unit of information in the binary system is bit. It means one of two values 1 or 0. This is the smallest amount of information needed to determine which of two equally probable states has adopted the system. A larger unit is a byte, defined as the shortest addressable bit sequence treated by the computer as an indivisible whole in the processing and storage processes and sending information. Most often, the byte consists of 8 bits (possibly plus a control bit)[Ash,1990].

In the infinitive interpretation, data are elements of the message and are referred to as "a slice of reality adapted to represent another slice of reality". Such a term covers various types of data: character recordings, analog representation, speech, images, sounds, schemes, films, etc. Signs - data and information are the basis of the path in key logistics areas.

Infology in Communication Standards

The infological information concept was already presented in the 1970s. by B. Sundgren [Sundgren, 1973] and B. Langefors [Langefors, 1995] assumed that the U-observer dealing with a certain segment of the surrounding reality causes that a specific image is created in his / her mind (image) this slice. This mapping can be treated as information about R. Information is therefore a binding relation U and R. This relation can be treated as an informative R model in the U message. This model is created as a result of the received description of the analyzed reality using the current knowledge and experience of the observer U. Possessed by U the knowledge and experience of Sundgren and Langefors are called the frame of reference. These resources can also be called the observer's thesaurus. Analysis of the selected segment of R surrounding reality means the separation of specific objects O, their characteristics X (attributes) and relationships (relations) between them. In general terms, and according to Sundgren [Sundgren, 1973], the description of each distinguished object O can be presented in the form of an arrangement:

$$K: = < O, X, t > \quad (1)$$

where:

K - message;
O - object belonging to the analyzed reality R; in this case, O can mean any material object, process, event, abstract concept, property of another object, etc .;
X - a feature of object O or its relation to other objects also belonging to R;
t - time at which the object O is considered due to the X feature.

In summary, the information approach treats information as the content provided by the K message. It can also be considered as a relation binding elements (data) of the K message. One of the consequences resulting from the adoption of such an approach is a clear distinction between the two concepts - data and information: data are only building blocks of information [Stefanowicz, 2004]. Therefore, a very important role in improving the decision-making process, due to the data provided and information play complex systems based on information, i.e. information systems [Milewski, Stankiewicz, 2015].

The information system is thus a multi-level structure that allows the user of this system to transform specific information entering the desired exit information using appropriate procedures and models. As a result of obtaining this information, specific decisions are made. The essence is technical means of sending and processing information. They are IT and non-IT devices used in the enterprise to acquire, collect, process and send information. In the structure of decision trees - information is a key element of decisions at specific levels

Identification of Resources in Logistics

An important element in modern logistics is identification. The term commonly defines a univocal recognition of a given object by a human or a suitable electronic device. You can also distinguish the third, currently the most popular, way of identifying, which is a combination of both techniques - it is called semiautomatic identification.

Automatic identification is considered one of the cheapest methods of recognizing objects primarily thanks to the use of barcodes. Logistic processes have been saturated for many years in the field of identifying material flows in logistics chains and networks. The concept of traceability becomes more and more important [www.unglobalcompact.org.]. It refers to the ability of an information system to be traceable, detectable or readable. Colloquially this idea is designed to "track" the location of resources in the circulation of matter (people).

The benefits of automatic data identification are primarily: reducing the time of object recognition, supporting all available services, increasing security, reducing service costs, simplified work, help in obtaining information in real time. In logistic processes, automatic identification allows you to quickly determine the location of all materials / goods in the warehouse, and above all allows you to instantly check current data on, for example, the location of products, the quantity of materials in warehouses at a given moment and the quantity of goods distributed and sold. The key purpose of automatic identification in many cases is to track the flow of materials and goods throughout the entire logistics supply chain, including also internal flows in its individual links.

The technology used, using the possibility of remote, contactless reading of large amounts of data, allows for quick and reliable identification of any element and control its status and location in the logistics chain system. One the technology used more and more often is based on the transmission of electromagnetic (radio) waves of RFID (Radio Frequency Identification technology)[Wieczerzycki, 2012].
In 1948, H. Stockman published a work that gave rise to the development of passive RFID tags. In the 1950s and 1960s, scientists conducted research into the use of radio waves to identify objects. The first commercial projects of RFID technology mainly concerned systems that were designed to protect products against theft. In 1972, T. A. Kriofsky jointly with L. M. Kaplan patented the induction system of the transmitter - receiver, and in 1973 M. Cardullo received a patent for passive RFID tags with

writeable memory. In the 1970s, Los Alamos National Laboratory, commissioned by the US Department of Energy, developed a nuclear tracking system. A few years later, the system was used in commercial solutions, including road travel payments. In the early 1990s, IBM developed a high frequency RFID system. During this period, a great number of enterprises were established that developed standards, technologies and concepts related to RFID [Figurski, Niepsuj, Ząbkowski, 2012]. Radio Frequency Identification is a technology that uses to identify radio waves at a specific frequency. The ability to read miniature systems using radio waves allows for many innovations and practical applications. Currently, the dominant area of their applications is the TSL sector (Transport - Shipping - Logistics).

Transponders (RFID tags) operating with the use of radio waves are the identification technology sometimes called the radio bar code, which was still in the research and development phase in 2005. The essence lies in the fact that a radio wave at a specific UHF frequency excites a chip antenna, which implies a radio data transmission from the memory of the chip to the reader and then to the computer. RFID tags (transponders) have many uses. They are used, among other things, for marking products or transport units, but they are also used, among others, for marking animals. They are built of two main elements: an electronic system that is responsible for data storage and the antenna. The tags are read remotely by readers (manual or stationary). The information stored in tags can be changed many times (but it requires the use of specialist software), as well as stored for a period of 10 years.

Scenario Analysis Using A Decision Trees

Implementation of the assumed objectives in the international approach requires knowledge of the conditions limiting the assumed functions of the objectives (separated from the bundle of goals). From the point of view of heuristic, you can consider the so-called heuristic models, which in addition to optimization and simulation models are an effective tool for forecasting and implementing complex logistics processes (including transport). In many cases, the heuristic analysis methodology requires IT support resulting from mathematical simulation, benchmarking or good ex post practices [Golebska 2007, Mlinar, 1992]. In international logistics it is possible to use scenario analysis developed on the basis of decision variants. Therefore, it is possible to use decision theory in the construction of decision trees based on the probabilities of individual scenarios and transport costs. Transport costs seem to be a particular problem, which in the article presented in the article determine logistics decisions. The assumed thesis is based on the statement that logistic decisions in the field of transport services for military entities should result from a deep cost analysis based on scenario analysis methodology, i.e. no costs should result from ineffective decisions, but rather ex ante decisions should be preceded by cost analysis of options scenarios.

Heuristics of Scenario Methods

The scenario method is one of the heuristic methods of decision making. The ability to detect (Greek heurisco) new facts and find connections between facts, especially using hypotheses, is based on the assumption that events (in the future) can not be predicted with certainty. It is therefore necessary to foresee and develop various scenarios for the development of the current situation, and for each variant to develop a way of behaving in case it turns out to be real. In the event of failure resulting from the implementation of the most likely option, alternative solutions are used.

In the modeling of logistic processes, which are influenced by strong turbulent factors, attention should be paid to the approach that functions successfully in the management sciences (eg quality) of the so-called process mapping, which is a mapping of existing objects and relations between them. The key to developing the process model is observation with observance of perceived relationships and regularity, which is important, with particular emphasis on knowledge resulting from practical activities in a variable spectrum of aspects. In creating a process model (integrated processes) it is necessary to define preliminary criteria (general assumptions) and outline the directions of actions (goals) for the needs of scenarios in the decision-making model. Among the many criteria taken into account in the work dominates the problem of transport costs related to the simulation of the transport process associated with legislative and legal reasons for logistic responses outside the country and the

right selection of infrastructure elements (existing and possible to create - in accordance with the location theory)[Krawczyk, 2011].

The notion of probability is the key issue in building a decision-making model. In the classic theory of von Naumann and Morgenstern, the probability was introduced into the theory from outside as part of the decision analyzing apparatus. The struggle with paradoxes has shown that one must first show how the decision maker attaches probabilities to the possibilities he considers.

There are several philosophical approaches to probability. Generally, they can be divided into objective ones, referring to such properties of the world, as the frequency of events of a certain type or dispositional property of events, and subjectivistic, referring to the property of beliefs whose contents are possible states of affairs. Both approaches to probabilities have advantages and disadvantages, but rather applications in which they perform better or worse. In searching for the basis of human subjectivity, it is natural to turn to the properties of beliefs. However, in this respect, there is a significant difference between the epistemological concept and the subjectivist conception in the proper sense. According to the epistemological concept, the probability is the same as the degree of justification for the right belief [Dąbrowski, Schumann, Woleński, 2014].

The Essence of Epistemology in Logistics

The epistemological approach raises two problems difficult to solve, because of which they have turned towards subjectivism. The first problem concerns the calculation of the degree of belief. In this matter there are a number of purely logical ideas, referring to the degree of embedding beliefs among other beliefs, the relationship of belief in the set of beliefs (determining its relative strength), a relation of relevance is needed.

In most cases, the term relevance is defined by the concept of probability. It seems that one can talk about probability even when stating some uncertainty, we only collect the data used to determine its measure. This does not mean that such uncertainty has no measure; in fact, something is assumed about it, for example, that it is not very close to 1 or very close to 0 [Gärdenfors, 1990].

The subjectivist theory of decision formulates the conditions for the rational construction of a certain set of beliefs about possible states of things. The probability here is the uncertainty of the mind included in a rational system of uncertain judgments, which, after being ordered, turn into judgments about uncertainty (subjective estimates of uncertainty). L. Savage proved that rationally ordered preferences are consistent with subjective probabilistic judgments, in which the concept of probability is consistent with the universally accepted axiom of A. Kolmogorov for the theory of probability. Thus, he created the basis for thinking about the human subject as being capable of this type of construction [Hacking, 2001].

In the classic theory of decision, the subject is where the theoretician of the decision is - it is not expected that the persons who speak about the theory would actually perform the deliberative activities provided for by this theory, but only that they would behave as if these activities were performed. The problem, then, is to develop the concept of an entity that is constructed when the person actually embodies the norms of rational decision making into his natural mechanism of reflection.

One of the most frequently used unreliable heuristics concerns the probabilistic component of our preferences and consists in ignoring the base probability, i.e. the frequency of occurrence of S in the considered set of states of affairs. The necessity to take this probability into account results from the Bayes rule [Tversky, Kahneman, Slovic1982]:

$$P(A/B) = [P(A) \times P(B/A)]/P(B) \qquad (2)$$

In order to assess the probability that some event A occurred because an event B occurred, multiply the base (independent) probability of occurrence A (the frequency of its occurrence in the considered

population of events) by the conditional probability that B will occur if A occurs and divide by probability, that there will be B with no relation to A, ignoring the basic P (A) and focusing only on P (B | A), which we usually do, we systematically violate this rule. We are prone to this error in the assessment of probability, because P (A) seems irrelevant to us. According to Peterson, Bayes' rule well characterizes the process of acquiring scientific knowledge [Peterson, 2009].

Premises of decision tree construction in logistics

The essence of a decision tree is a graphic representation of the structure of elements of the decision process using vertices (nodes) and edges (branches) for the whole so-called learning sample. Moving along the branches of successive elements of the test by nodes in which decisions are made as to the selection of branches is a key action scheme. The criterion of the division performed in a given node is common (same) for all elements of the learning test that are included in this node.

Formally, the decision tree is defined as any consistent directed acyclic graph with a vertex with one incoming edge and an outgoing edge number of 0 or greater than 1. Nodes, branches and tree leaves correspond to: tests performed on attribute values of the examples, possible test results and category labels [Cichosz, 2000].

According to J. Koronacki, the classification tree is built to allow the classification of future observations, which we do not know to which classes belong. In this case, the conditions of division must take the form of conditions imposed only on the values of the observation vector, and not on (known to the elements of the learning sample) belonging to these classes [Koronacki, Ćwik, 2005].

From the point of view of the conducted research on the logistic system of international logistic service of military contingents, the effectiveness of the system itself is important, as it is expressed in the expenditure of resources for rational effects of all subsystems and processes taking place within them. The assumption that high costs of logistics services (mainly transport) are determined by the time of property delivery is too much a simplification of the problem and should not justify excessive costs generation and increasing the budget of the Defense Ministry budget to the detriment of the functioning of current operations. The justification of this type of activity leads to the duplication of not quite rational solutions in the field of logistic management in the armed forces of many countries participating in reacting outside their own countries, and as a result, the consolidation of bad habits, whose possible changes require deep reengineering not only in the area of structures but also in the sphere cognitive changes.

Decision Trees for Selected Scenarios

The issue of military supply chains is based on assumptions resulting from state commitments assumed by the state in terms of participation in operations abroad, and, consequently, in an executive act expressed in the actual movement of specific property and personnel at a given distance. The time spectrum can be divided into phases depending on the development of the situation on the international arena. Regardless of the number of phases, all actions for a specific mission are based on the stage: initiation (commencement of the operation of the mission), maintenance (regular and cyclical transports, constant supply of material resources, staff turnover, and other) and termination of operations (return of people, equipment, financial and material settlement) (Fig 1).

In the development of the decision tree (T), it is assumed that the set of nodes is marked by NT, and the set of leaves as LT, the set of examples P is limited to one, and the subsets marked as n, for which tn will be a test. In the oval symbols of nodes (as a rule) there are corresponding tests, while rectangular symbols denote their category labels. Test results are marked with the symbol r.

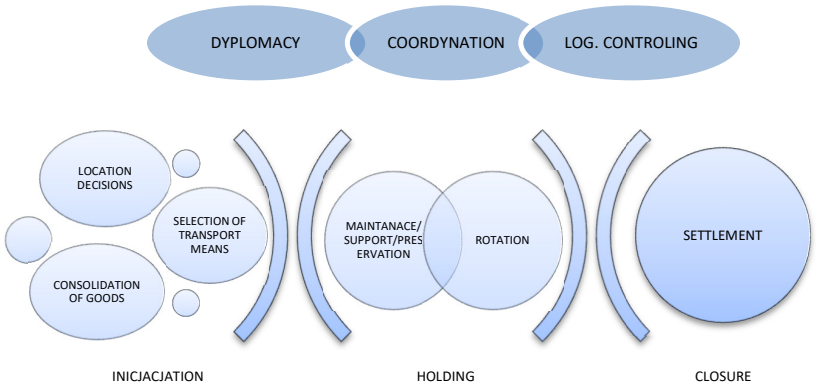

Fig. 1: The main processes and the chain of ailments of international military logistics
source: personal study.

Using the data contained in the attachment, we can develop several decision trees or one complex (with limited assumptions). One of the decision problems is the transport cost, taking into account the limitations in the use of means of transport depending on the distance (range) and potential diplomatic consent. A simplified decision tree for such a variant is shown in the Figure 2.

For shipment variants, where delivery time is not a priority, we can use sea transport (low cost and long range) for land transport or S4 scenario to use sea transport to a possible (substantiated port) and then apply a solution in line with scenario S3 and reload the means of supply by air. Determining the potential intermediate (or several) base using the network method allows you to estimate cost variants with a certain probability of an event (based on historical data) and consequently, choose the lowest-cost scenario.

Assuming the cost criterion and assumed probability (eg using a logistic intermediate base), the scenario for which the lowest level of total displacement costs was observed is S3 scenario. In a situation where they are not the only criterion there is a need for solutions based on multicriteria methods. These criteria should consider variants of purchase of means of transport in the context of their long-term use, which is related to economic reasons for depreciation of fixed assets and spreading fixed costs over time (Fig 3). It is also important to consider the sensitivity of solutions correlated with variants (scenarios).

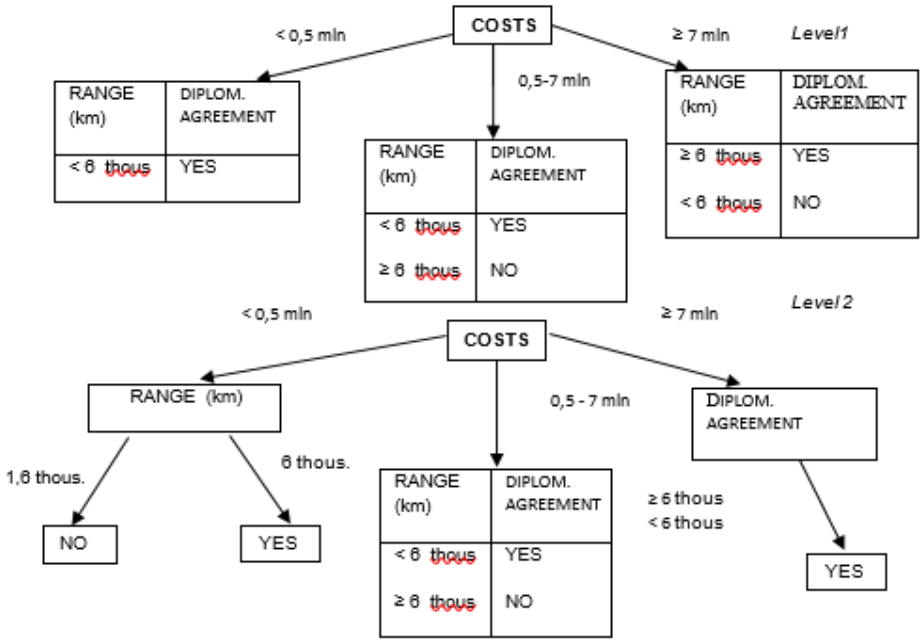

Fig. 2: Cost decision tree (for coverage criteria and diplomatic approval)
source: personal study

Based on historical data, it is possible to develop several scenarios for future solutions. The idea of supplying military contingents over the years does not differ significantly from the reference SCOR supply chain model, however, functioning in a highly turbulent environment, a deficit in the means of transport and a strong need of the recipient in meeting the needs in a timely manner (resulting from the specificity of activities) scenario models should include sensitivity analysis and the probability of failure of selected "paths".

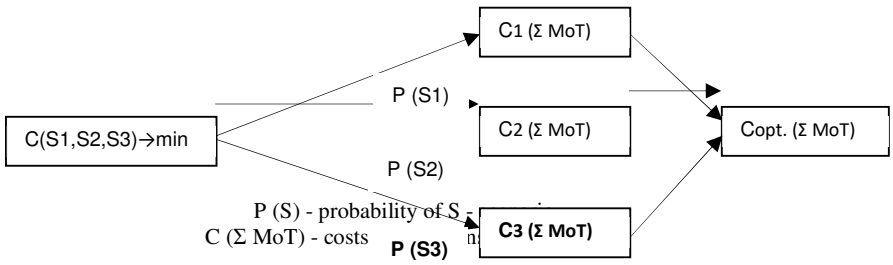

Fig. 3: Decision tree (according to the transport cost criterion)
Source: personal study.

High uncertainty regarding the predictability of results (resulting from a shortage of material and transport resources, maladjustment of the rules of conduct to cooperate in the international system) is what distinguishes modern logistics processes occurring in the area of military logistics.

Research Methodology - Test of Assumptions Simulation

In the quantitative research methodology, it is important to use total R events sets to search for the function with the highest desired value. For this purpose, it is possible to use the point estimation method, also known as the maximum likelihood method. Suppose we have a function:

$$f: K \rightarrow R, \text{ where } K \subset R$$

where: R is a fixed set. We say that this function takes the largest value at $x \in K$ if:

$$f(x) \leq f(x), \text{ for each } x \in K$$

Of course, the largest value can not be determined for all functions, but with some additional assumptions it can be concluded that such a value exists. From a practical point of view, we are interested in determining the point x, in which the function takes the largest value.

A derivative is a very important tool here. The problem is to calculate the derivative and solve the equation:

$$f'(x) = 0$$

Very often it happens that our problem written in the form of an equation has exactly one root and that it is easy to check that the largest value can not be accepted at the ends of the range of specificity - in this case it is this solution that is the only point where the function takes the largest value . In the method of highest credibility, it is helpful to use the SOLVER function. Next, it is necessary to calculate the probability with the indication of the value for which the calculated probability is the highest. This methodology is helpful in developing multi-variant scenarios with probability estimation at particular stages of the decision tree.

Conclusions

In the scenario analysis, it is important to define the objective function and define restrictive conditions. After developing the above, simulate theoretical assumptions to test the assumptions made. Assumptions of the cognitive model (variables) depending on the situation determined by turbulent factors may change and specify criteria (priorities). At the initial stage, this may be the criterion of delivery time, and in the option of completion (settlement) and maintenance - e.g. Transport cost. Developing the test will allow you to make a decision (choose one or several of the total available), e.g. What type of transport to use for a given mass of cargo meeting the criterion of delivery time or what mode of transport can you use to perform the transport service with the assumed financial resources. This can be done by testing accepted hypotheses in positive and negative scenarios (e.g. Increasing the likelihood of minimizing transport costs as an expected value). Choosing the right scenario is designed to help you develop auxiliary calculators (usually you don't need the right software). Information and communications technology (ICT) support for logistics processes based on codification and material identification are very helpful in this area.

As a result of the conducted tests, the necessity of making decisions based on decision support systems, cost analysis and infological support (radio frequency identification - RFID) for individual operating options was verified. Implementation of logistics (transport) processes in international terms requires:

- in-depth economic analysis using decision trees;
- knowledge of the basics of probability in estimating probability;
- skills in constructing and modeling decision scenarios;
- knowledge of the construction of decision trees and target trees;
- knowledge of IT tools supporting the decision-making process;
- need to test simulated assumptions.

Testing hypotheses (assumptions) in a positive and negative approach will maximize the objective function in the form of reducing the costs of logistics (transport) processes.

The globalization of logistics processes requires precise codification (labeling) of matter, which is: goods, products, goods and cargo. This also applies to the intangible area, i.e. services. Infology as a science of communication includes the data (information) exchange subsystem, which focuses on the industry Big Data. The better this system is ordered, the more likely it is to determine deterministic or indetermistic relationships (relationships) (regardless of whether they are ontological, epistemological or methodological).

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The Entrepreneurial Intention of the University Students in the Context of Emerging Entrepreneurial University Environment (Research in progress)

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Abstract

The study of entrepreneurial intention is a subject of interest for the sphere of entrepreneurship. The purpose of the proposed research is to determine to what extent the characteristics of the entrepreneurial university along with the behavioral traits of the university students exert an influence on the entrepreneurial intention of the university students. The study is based on the Theory of Planned Behavior (TPB) model, but proposes the inclusion of a construct that measures the influence of the entrepreneurial university environment on the entrepreneurial intention of the students. The target group of the empirical study is represented by students from the Faculty of Economics and Business Administration within "Alexandru Ioan Cuza" University in Iași, Romania.

Keywords: Entrepreneurship, Intention, Entrepreneurial University

Introduction

Why is entrepreneurship intention important generally and particularly within the context of entrepreneurial university? Some arguments in support of this study:

- The analysis of students' entrepreneurial intention can explain their behavior towards entrepreneurship
- Can provide information on the stages / path of the decision to become an entrepreneur
- It can reflect elements related to the functions and structure of the organization that result in the formation of the entrepreneurial intention (entrepreneurship courses, initiatives to support entrepreneurship among students and academic staff, the university-business relationship)

The literature within the field presents several research results regarding models of entrepreneurial intention formation. The foremost popular are: The TPB (Theory of Planned Behavior) model developed by Ajzen (1991), Entrepreneurial Event model (Shapero and Sokol, 1982) and also the Entrepreneurial Action model (McMullen and Shepherd, 2006). These models analyze individual perceptions of the feasibility and willingness to start a business.

There is a broad array of opinions among researchers within the field of entrepreneurial intentions on considering that TPB offers a consistent framework for predicting entrepreneurial intention, taking into account both the personal factors and the social ones (Autio et al., 2001; Iakovleva and Kolvereid, 2009; Rueda et al., 2011).

In the entrepreneurial context, the entrepreneurial intention shows the effort that a person will make to adopt the entrepreneurial behavior. The motivational factors that influence the intention are: attitude towards behavior, subjective norms, perceived behavior control. In this model for the formation of the entrepreneurial intention, both the psychological and the behavioral variables are important.

Study objective

The objective of the research is to test the causal links between the predictor variables of the entrepreneurial intention and also to what extent the predictor variables influence the entrepreneurial intention of the university students, based on TPB model. The starting point is that certain characteristics of the entrepreneurial university contribute to the configuration of a favorable context for the formation of the entrepreneurial intention among the students.

Methods

The research method is quantitative analysis, based on surveys administered to 200 undergraduate students from the Faculty of Economics and Business Administration within "Alexandru Ioan Cuza" University in Iași, Romania. The proposed analysis model is illustrated below:

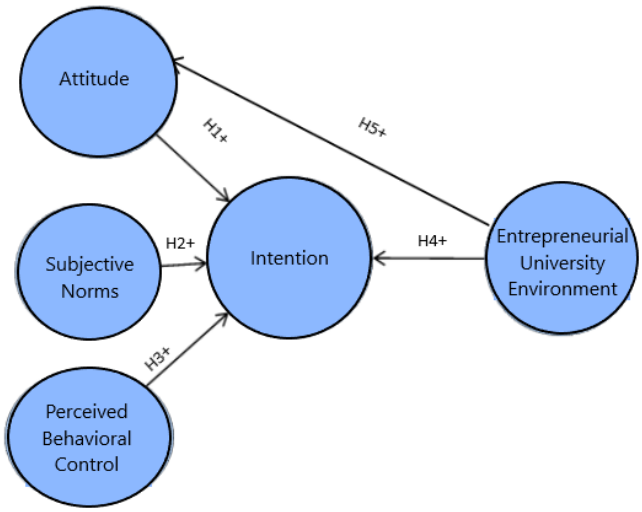

Fig. 1: The analysis of entrepreneurial intention of students based on TPB

For defining the construct we used a conceptual model of entrepreneurial university, result of the literature review. We formulate this framework (Tab.1) to substantiate the analysis model of the students' entrepreneurial intention (together with the TPB model, as we mentioned above).

Table 1: Entrepreneurial university analysis model (own construction)

Perspective for analysis	Elements of analysis	Indicators	Role in the analysis model of Entrepreneurial Intention
Institutional	Promoting, rewarding	Motivation system	**perception regarding institutional perspective** Motivation system for students with entrepreneurial incentives

Perspective for analysis	Elements of analysis	Indicators	Role in the analysis model of Entrepreneurial Intention
Knowledge and Innovation	Entrepreneurial culture	Number of programs/curriculum for entrepreneurial education	**perception regarding received support for knowledge and innovation** - entrepreneurship education courses - existing innovation and technological transfer infrastructure
Strategic management	Regional, national and international networking	number of partnerships with public institutions / institutions and private companies, number of participation in research networks, number of participation in entrepreneurship networks, clusters	**perception regarding support for strategic management** - entrepreneurship networks, Student Entrepreneurial Societes, clusters

The construct proposed for Entrepreneurial University Environment is including:

•Perception regarding institutional perspective, measured using the motivation system for students with entrepreneurial incentives
•Perception regarding received support for knowledge and innovation measured using:
- Entrepreneurship education courses
- Existing innovation and technological transfer infrastructure
•Perception regarding support for strategic management, measured using:

Entrepreneurship networks, Student Entrepreneurial Society, clusters
The hypotheses we want to test are:

- ✓ H1 The attitude towards entrepreneurship positively influences the entrepreneurial intention
- ✓ H2 The subjective norms positively influence the entrepreneurial intention
- ✓ H3 Perceived behavioral control positively influences entrepreneurial intention
- ✓ H4 The environment of the entrepreneurial university positively influences the entrepreneurial intention
- ✓ H5 The environment of the entrepreneurial university positively influences the attitude towards entrepreneurship

Survey Tools

The questionnaire comprises four intermediate scales: the attitude towards entrepreneurship, subjective norms, the perceived behavior control and the environment (characteristics) of the entrepreneurial university. All items are measured on a Likert scale from 0 to 7.
We will use the items from the table below.

Table 2: Items to be used for the analysis

Nr.crt.	Indicator	Affirmation	References
1.	A1	Being an entrepreneur for me means more advantages than disadvantages	Liñán and Chen (2009)
2.	A2	If I were an entrepreneur I would have great moral satisfaction	Liñán and Chen (2009)
3.	A3	If I had the necessary resources I would prefer to become an entrepreneur	Liñán and Chen (2009)
4.	SN1	My family thinks I should become an entrepreneur	Yakovleva and Kolvereid (2009)
5.	SN2	My friends think I should become an entrepreneur	Yakovleva and Kolvereid (2009)
6.	SN3	The opinion of my close ones regarding the choice of entrepreneurial career is important	Yakovleva and Kolvereid (2009)
7.	PBC1	I believe that I have acquired the knowledge necessary to become an entrepreneur	Yakovleva and Kolvereid (2009)
8.	PBC2	I believe that the entrepreneurship education courses from my university have contributed to the formation of my entrepreneurial skills.	Adaptation (Schwarz et al., 2009)
9.	PBC3	I am confident that I will be able to set up my business	Adaptation Liñán and Chen (2009)
10.	PBC4	If I had opportunities to start a business I am confident of its success	Adaptation Liñán and Chen (2009)
11.	I1	I'm seriously thinking about setting up a firm in the near future	Liñán and Chen (2009)
12.	I2	I am determined to set up a firm in the near future	Liñán and Chen (2009)
13.	I3	I intend to set up a company within 5 years after completing my university studies	Adaptation Liñán and Chen (2009)
14.	I4	My professional goal is to set up a firm	Liñán and Chen (2009)
15.	EUE 1	My university has a system of recognition and reward for students with entrepreneurial incentives	Own form

Nr.crt.	Indicator	Affirmation	References
16.	EUE 2	My university offers entrepreneurship education courses that provide me with the information needed to start a business	Own form
17.	EUE3	My university has an infrastructure that stimulates entrepreneurship (technology transfer center, business incubator, student entrepreneurial society)	Own form
18.	EUE4	In my university the infrastructure that stimulates entrepreneurship is underdeveloped	Own form
19.	EUE5	My university encourages faculty activities and initiatives that stimulate entrepreneurial capacity	Own form
20.	EUE6	My university organizes networking events between students and entrepreneurs (eg workshops, presentations, round tables, etc.).	Own form
21.	EUE7	My university organizes various competitions for students in order to stimulate entrepreneurship (eg competitions of business ideas, contests of business plans, etc.).	Own form

Expected Results

We expect our research to contribute to predicting students' entrepreneurial intentions related to characteristics of emerging entrepreneurial university environment.

Acknowledgment

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The Government Regulation of The Economy in Russia At the Present Stage

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Abstract

The article discusses the main concepts and approaches to government regulation of the economy in Russia at the present stage. There are three approaches: 1) liberal – non- interference of the government , 2) command-administrative, 3) public-private partnership. For the first time, the author offers a set of necessary and sufficient basic interdisciplinary methodological tools for studying the objective limits of government participation (government regulation) in a particular area (sphere) of the economy.

Keywords: Economy, Social Production, Government Regulation Of The Economy, The Law Of Conservation Of Full Capacity.

Introduction

The government regulation of the economy is the most important prerequisite for success or failure in the development of each person, business entity and the economy as a whole.

The approaches to government regulation of the economy in Russia at the present stage

Historically, the first idea of the role of the government in the economy was the theory that was reflected in the work of A. Smith (1723-1790), “An Inquiry into the Nature and Causes of the Wealth of Nations” [14], in which he argued that “the free play of market forces creates harmonious device. " Proponents of this trend proceeded from the fact that the government should guarantee property rights and inviolability of contracts, protect economic freedoms of citizens by establishing laws. They believed that government intervention in social production harms economic activity and inhibits economic growth [14; 15].

The second point of view is presented by supporters of socialist ideas, the command-administrative system of economic management and proceeds from the need for an active role of the government in managing social production [9; 11; 13; 15].

In the XX century, as a result of building socialism in the USSR and the spread of socialist ideas, the need to combat the Great Depression in foreign countries under the influence of Keynesian theory, the limits of government participation in the economy were expanded: the public sector was expanded, public work programs appeared (construction and repair of highways, highways, canals , bridges, public buildings), special compensation funds have been created, government spending on education and health has increased, government pension systems have been introduced, etc. Social assistance programs, subsidization of certain categories of goods. By and large, these transformations in public administration were the result of a high degree of specialization and cooperation of the social and international division of labor, which, from the standpoint of maintaining the socio-economic independence and sovereignty of the national government objectively imply the need to coordinate the life of the country's population by economic levels, ensuring continuity of reproduction and stability development.

At the end of the twentieth century, as practice has shown, the socialist system of economic management, as a result of destructive decisions by individuals in the country's leadership, was compromised, and the processes of "liberal-democratic perestroika" and "restoration of the government-monopoly system" led to the destruction of the great country - the USSR.

In modern conditions, the socio-economic functions of the government are largely predetermined by the concepts of “imperfection of the market system” that prevail in theory and practice. The socio-economic functions of modern governments cover almost the entire spectrum of economic relations in any society, directly or indirectly, regardless of which country we are considering: the USA, Germany, China or Japan. The exception is Russia, where the government has largely eliminated the full implementation of socio-economic functions.

The World Bank report on “The State in a Changing World” [2] states that only the government can influence economic policy, social services and infrastructure, protect vulnerable groups of the population, and protect the environment.

As a result, the question of government intervention in the economy and the question of the economic functions of the government remains the most acute, as in past centuries. The absolutization of one of the opposing points of view cannot lead to a constructive solution to this issue. The main reason for this is the lack of an objective scientific base among public administration and market institutions of society, simpler and more accurate scientific and practical tools that allow the government to carry out its socio-economic functions at the economic level in the internal and external spheres of life.

Today, the third point of view is coming to the agenda in the Russian Federation and becoming more and more relevant, involving joint partnership between the government and other participants in social production in the implementation of the socio-economic functions of the government. Such cooperation is called public-private partnership.

A broad interpretation of public-private partnerships implies constructive interaction between government and business, not only in the economy, but also in politics, culture, science, etc. These include, first of all, projects on infrastructure, urban transport, urban construction, real estate projects, roads and railways, seaports, airports, energy systems, pipeline transport, utilities: gas, water, electricity, heat supply to cities , enterprises, population [1; 15; 16]. In addition, the “Open Government” system has also been created and is functioning in Russia, within the framework of which new mechanisms are created for Russia to interact with the expert community, civil society structures and authorities [3].

The author's approach to government regulation of the economy at the present stage

In determining the degree of influence of the government on the economy, the key value, from our point of view [4], should be taking into account the law of conservation of full power, which involves the assessment of each type of activity-consumption of any business entity, including government, any form of "partnership" of participants in social production from the standpoint of the utility of cost-results for a person, society, government. The ranking of the obtained estimates in this regard and in the objective indicators of a single system of dimensionality of physical quantities (useful, useless, harmful, loss of cost-results and reserves of cost-results for development according to the same structure) for all participants in production in dynamics and from reproductive positions will reveal the most effective structures and forms of the mechanism of interaction between business entities performing these socio-economic functions, the most rational forms of public-private partnerships, as well as the optimal degree, depth and forms of government participation in the economy in a particular historical period, taking into account the level of development of productive forces, production and superstructure relations (see Table 1).

Table 1: Table of socio-economic utility of the types of consumption-activities carried out by the government, its links and other participants in social production*

№№	Types of activity-consumption by level of management	Participants in public production (government bodies, government-owned enterprises, business entities, etc. participants in public production, including in the form of public-private partnerships)	Cost-benefit structure				
1.	TA-C_1	P^n	UR_1^n	ULR_1^n	HR_1^n	Lo_1^n	R_1^n
2.	TA-C_2	P^n	UR_2^n	ULR_2^n	HR_2^n	Lo_2^n	R_2^n
3.	TA-C_3	P^n	UR_3^n	ULR_3^n	HR_3^n	Lo_3^n	R_3^n
4.	TA-C_4	P^n	UR_4^n	ULR_4^n	HR_4^n	Lo_4^n	R_4^n
5.	TA-C_5	P^n	UR_5^n	ULR_5^n	HR_5^n	Lo_5^n	R_5^n
…	…	…	…	…	…	…	…
i.	TA-Ci	P^n	URi^n	$ULRi^n$	HRi^n	Loi^n	Ri^n

Note: UR, ULR, HR, Lo, R - quantitative characteristic of useful cost-results, useless cost-results, harmful cost-results, loss of cost-results and reserves for the development of cost-results of each participant in social production - P^n, including the government, its bodies and enterprises, each form of public-private partnership for each type of activity-consumption and the level of management TA-$C_{1\text{-}i}$.

Thus, the objective limits of government participation (government regulation) of a particular area (sphere) of social production become clear, as well as the possibility of achieving a synergetic effect with a plus sign by all participants in social production. As a result, scholastic disputes will run out, but discussions will arise that are practical and constructive in nature.

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An Organizational Behavior Study to Evaluate Project Performance

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Abstract

In this research, significant components of organizational behavior in a commercial company were investigated and studied. In order to perform this task, we analyzed a business case where a structured questionnaire was applied into the company. We assessed that the success of the company is influenced by factors such as motivation, job satisfaction, emotions and decision making, with the indication that perception factors and attitudes are in need of reinforcement. In addition, recommendations for intervention of organizational behavior are also presented, with the perspective of reducing the negative impact that these findings might have on the results obtained.

Keywords: Organizational Behavior, Human Behavior, Psychological Factors.

Introduction

Organizational behavior (OB) theory researches the effect of human behavior within an organizational environment, focusing on improving organizational effectiveness by reducing behavior such as absenteeism and staff turnover (Robbins and Judge, 2013; Organ, 2018), which affect negatively organizational performance.

OB theory is a multi-faceted discipline with a major contribution from behavioral sciences and evidence-based practices. OB uses the measurement and analysis of human behaviors to maximize employee productivity and maximize the performance of human resource development and management organizational systems (Luthans, 2011; Chams-Anturi, Moreno-Luzon and Escorcia-Caballero, 2019; Pangil and Nasurdin, 2019).

The application of OB theory using systematic methodologies results in a more accurate prediction than those based on intuition, which is necessary to generate management solutions adjusted to each organizational needs, instead of general solutions (Griffin and Moorhead, 2011; Robbins and Judge, 2013). Therefore, OB has become a critical aspect of organizational success if properly applied within the organization (Bateman and Crant, 1999).

Then, the purpose of this research is to study a current organizational behavior case, highlighting the theoretical foundations of organizational behavioral research, measuring and analyzing the behavior of

the individuals while facing changes in the environment, and defining practical implications for the entrepreneur.

Theoretical Framework

Organizational behavior (OB) is defined as the field of study that investigates the behavior of individuals within an organization, aiming to learn about their perceptions, values, and cognitive capacity in working environments (Davis and Newstrom, 2002; Chiavenato, 2009; Robbins and Judge, 2013; Mcshane, 2018; Mullins and Mclean, 2019). Chiavenato (2009) states that OB distinguishes an organization from other, even in the same economic sector. Also, stays that each person is subject to different influences, both external and internal, that affects his behavior in exclusives ways, and therefore his interaction with other people in the organization.

Psychological constructs such as attitudes, motivations, job satisfaction, perceptions, emotions, and decision making are popular ways to describe and analyze what goes into OB (Heath and Sitkin, 2001; Miner, 2003). As follows, we present a brief description of each.

I) Attitudes are statements of favorable or unfavorable evaluation of objects, people, or events. These reflect how a person feels about something. Attitudes are mainly composed of three components: cognition, affection and behavior (Breckler, 1984). The cognitive component of an attitude describes the belief of how a person sees things, for example, “my boss is unfair”. The affective component is based on the emotional part of an attitude, for example, “I dislike my boss”. Moreover, the behavior component of an attitude refers to a person’s intention to behave in a certain way towards someone or something, for example, “I will look for another job, because my boss does not listen to me”. These components are closely related, which denote a negative attitude towards the boss.

An individual has many attitudes, but regarding organizational behavior the number of attitudes at work is limited, these are positive or negative evaluations that employees have about various aspects of their work environment (Moreno-Luzon, Chams-Anturi and Escorcia-Caballero, 2018). Organizational behavior researchers have focused on three attitudes: work involvement, job satisfaction and organizational commitment (Brooke, Russell and Price, 1988). Other attitudes considered by researchers are organizational support and dedication of employees.

II) Job satisfaction is defined as the positive feeling resulting from personal work accomplishment (Robbins and Judge, 2013). Enjoying work highly correlates with greater intensity with high levels of satisfaction. The jobs that generate and provide their employees with greater training and independence satisfy most workers (Barling, Kelloway and Iverson, 2003). Employees prefer stimulating jobs that pose challenges versus a predictable and routine one.

Evidence also indicates that employees who are satisfied with their jobs increase customer satisfaction and loyalty (Schneider and Bowen, 1985). Satisfied workers are more friendly, optimistic and responsible, they are also less likely to change jobs, these are advantages appreciated for the client who receive a more familiar and experienced service (Bitner, Booms and Mohr, 1994).

III) Motivation affects the intensity, direction, and persistence of the effort exerted by a person to achieve a goal. Intensity refers to the energy applied by a person in reacting to events, which requires direction to get favorable results. Finally, persistence is the time in which the individual maintains the effort. Those people that are motivated remain on a task until their goal is achieved (Robbins and Judge, 2013; Pinder, 2014).

In the decade of the 50s, several concepts on motivation were developed, and four specific theories were formulated. (1) Theory of the hierarchy of needs, by Abraham Maslow, who raised the idea that each person has a hierarchy of five needs: physiological, safety, social, esteem, and self-realization (Maslow, 1954). (2) Theories X and Y, by Douglas McGregor, who proposed two visions of human

beings. A negative or X vision where the employee dislikes his work and must be directed, and another positive or Y vision where the employee likes his job and is self-responsible for it (McGregor, 1960). (3) McClelland's theory of needs, by David McClelland, focuses on three needs: achievement (based on the urge to excel and fighting for triumph), power (based on the need to make others behave according to a specific way) and affiliation (desire to have friendly and close relationships) (McClelland, 1961). And, (4) the theory of the two factors or theory of motivation and hygiene, by Frederik Herzberg, who states that the individual-work relationship and the attitude adopted to meet any work challenge, are fundamental to determine the success or failure of the job (Herzberg, Mausner and Snyderman, 1959). Although these theories are widely known, there are several arguments regarding their validity.

Recently, OB researchers have developed new contemporary theories of motivation, such as (5) The theory of cognitive evaluation, which introduces extrinsic awards for doing work that previously had intrinsic rewards (De Charms, 1968). (6) The theory of goal setting, which states the importance of establishing goals to increase performance (Tubbs, 1986). (7) The theory of personal effectiveness, or social cognitive theory or social learning theory, which refers to a person's belief in carrying out a task (Bandura, 1997). (8) The theory of reinforcement, which states the importance of reinforcement to get a desired behavior (Komaki, Coombs and Schepman, 1996). (9) The theory of equity, which encourages people to compare their work results (Ronen, 1986). (10) The theory of expectations states that a good evaluation of the employee performance will lead to a better performance, requiring organizational awards, such as salary bonuses (Robbins and Judge, 2013).

IV) Perception is the process in which people interpret the impressions they have of a situation to get a meaning of what happens in the environment. There are some factors that can distort the perception of people such as the recipient (e.g., motives and expectations), the object (e.g., news), and the situation (e.g., time) in which the perception unfolds.

There are also some valuable simplifications that allow subjects to get a quickly and accurately perception (Robbins and Judge, 2013): (1) Selective perception, useful when we highlight some stimuli to assimilate everything we see. This characteristic highlights a person, object or event to what is perceived. (2) Halo effect, which is when an impression of a person is outlined based on a characteristic such as appearance. (3) Contrast effect when evaluating and comparing characteristics of people. In addition (4) Stereotyping, where someone is judged based on the perception of the group on which they belong.

V) Emotions are defined as those feelings direct toward someone (Fridja, 1993) and usually transitory. Some examples of emotions are anger, fear, sadness, happiness, and surprise, accompanied by facial expressions and caused by specific events (Ashkanasy, Hartel and Daus, 2004).

The founder of modern philosophy, René Descartes, identified six primitive passions - astonishment, love, hate, desire, joy, and sadness - arguing that they compose all other emotions (Descartes, 1989). Charles Darwin took a broader approach, who suggested that emotions developed to help solve problems. Emotions motivated people to take actions to survive.

VI) Decision making occurs when an individual chooses between two or more alternatives. There are different ways to decide. (1) The rational model occurs when choices are made by maximizing value within constraints (Simon, 1986). These choices follow a method by first defining a problem, identifying the decision criteria, weighting the criteria, developing and testing alternatives, and finally selecting the best alternative. Several assumptions support this model, including that all information is available in order to choose a good alternative (March, 1994). (2) Bounded rationality, where the individual responds to the problem by reducing it to a level easier to understand (Kahneman, 2003); and (3) intuition, which although is considered to be the least rational of the options, is the most usual, this is an unconscious process formed from experience (Gilovich, Griffin and Kahnemann, 2002).

Before starting with the decision-making, it is important to know how to reduce biases and errors. Focusing on the goals facilitates the elimination of options that contradict interests, nullify excess of confidence, do not give meaning to random eventualities, and increase decision alternatives by developing a wide range of different elections.

Research Methodology

We analyze the organizational behavior using a case study in a retail store that offers consumer goods and operates nationwide in Colombia (referred as ABC company). To obtain the information, we worked with a structured questionnaire of 44 questions following the Robbins and Judge (2013) method. All items were measured using a Likert scale with values ranging from 1 (totally disagree) to 5 (totally agree). The questionnaire was applied to the ABC company interest group, which included commercial directors of each category, customs agency, international cargo agent and operators. The total population is equal to 65 participants. In order to calculate a proper sample size, we used the following calculation:

$$n = \frac{Z^2 * \mathrm{N} * \mathrm{p} * \mathrm{q}}{e^2 * (N-1) + Z^2 * p * q}$$

Where:
n: sample size
Z: degree of confidence
N: population
p: probability of success
q: probability of failure
e: estimation error

Replacing values;

$$n = \frac{0.95^2 * 65 * 0.5 * 0.5}{0.03^2 * (65-1) + 0.95^2 * 0.5 * 0.5}$$

$$n = 52 \text{ participants}$$

Then, our study was carried out on 80% of the total population (i.e., n= 52). The observation of the individuals and their specific behavior within the organization prevailed. Therefore, content analysis and participant observation are considered as a key part of the process.

We based our research on the six basic principles of qualitative validity (Robbins and Judge, 2013). (1) Credibility or internal validity, where different methods were combined such as the observation of the process, questionnaires and analysis of written documents. In addition, the research was carried out by people who are not part of the area under investigation, which reduces biases and guarantees the credibility of the study. (2) Transferability or external validity, although the results of the present investigation are not extrapolated to other organizations, the methodological experience can be applied to other commercial establishments. (3) Reliability, where studies developed with respect to the object of analysis were taken into account. (4) Confirmation, where the investigation was configured by the triangulation of methods, analysis of document content, observation and surveys. The data collected are analyzed by the researchers, which guarantees the objectivity of the research. (5) Integrity, where the identification of informants is reserved, maintaining relationships of trust with them. Finally (6) Consistency, where research seeks to respond to a need evidenced by researchers in one of the most important commercial chains in the country, in order to provide a solution to the problem described.

Results

We measured individual factors to study the organizational behavior of the ABC company using a survey questionnaire for the 52 participants. The results are as follow:

Demographic Information

From the 52 of responses obtained, we gather the following information:

1. 44% belong to senior management, 37% to middle managers, and 19% to professional and operational staff.
2. 44% of respondents are female. 56% are male. As for the average age, it is approximately 38 years old.
3. 88% of respondents have professional training in the postgraduate modality, which shows a high level of skills in specific areas within the process.
4. On average, the personnel surveyed are more than 3 years old in the ABC company. All of them know the strategy of the organization at each corresponding level.

Analysis of Results

Below are the results obtained for each of the factors - attitudes, motivations, job satisfaction, perceptions, emotions, and decision making - of the ABC company, accompanied by a behavioral analysis or a diagnostic description and a series of recommendations for each one.

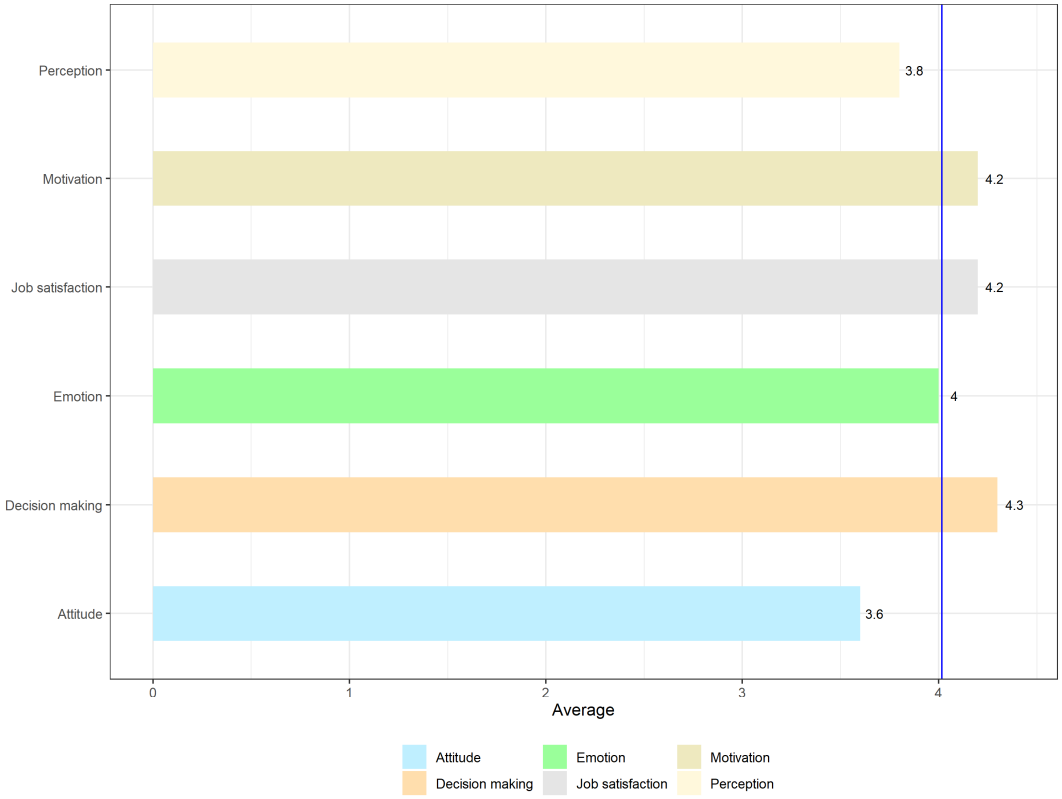

Figure 1: Survey results

Attitudes

The results show that the individuals in the business process of the ABC company are not completed satisfied with their assigned work and their involvement in the organizational decisions. Results show low levels of organizational commitment and a perception of low organizational support and recognition.

Table 1: Attitude

AVERAGE	FINDINGS	PROPOSALS FOR IMPROVEMENT
3,6	✓ It is considered that immediate bosses and co-workers are friendly, organized and flexible. ✓ No significant features of irony or injustice on their part are denoted. ✓ Attempts to adapt to new team situations are evident. ✓ The staff is considered important for the ABC company, and they are committed to the quality of their work. ✓ Sometimes employees feel that their boss is unfair.	✓ Generate spaces for interaction with employees to forge effective communication and facilitating their social function. ✓ Promote the participation of employees in the changes that affect their work. ✓ Define communication actions that illustrate clarity in the process, both in the tasks and in the planned objectives, generating work empowerment.

Motivation

The individuals involved in the business process in the ABC company show a good level of motivation which involves intensity, direction, and persistence of the individual's effort towards achieving a goal.

Table 2: Motivation

AVERAGE	FINDINGS	PROPOSALS FOR IMPROVEMENT
4,2	✓ The employees consider that their leaders are aware of their skills. ✓ They also consider that their cognitive capacity has increase as an effect of the training processes received at the ABC company. ✓ Staff can ask questions and suggest modifications to the traditional way of doing things without any fear. ✓ There is a feeling of commitment, but sometimes the staff does not feel aligned with the direction of the ABC company. ✓ Recognitions and incentives are received for their actions, exalting their growth in the ABC company. ✓ Workers do not feel at all heard, but this gap is compensated with the training process, a respectful work environment, and remuneration according to the profile.	✓ Establishment of spaces to improve organizational communication, in which workers can express their feelings and meet their social needs.

Job Satisfaction

This factor involves several elements such as: activities, compliance with internal labor regulations, relationship with managers and colleagues, and performance criteria. This sample does not illustrate absenteeism or employee turnover.

The results show a good level of job satisfaction among the employees of the ABC company. The staff is satisfied and speak positively about the organization, help others, exceed the expectations of their job, and strive beyond their duty.

Table 3: Job satisfaction

AVERAGE	FINDINGS	PROPOSALS FOR IMPROVEMENT
4,2	✓ Employees are interested in the well-being of their colleagues. ✓ The leader of the process effectively directs his subordinates and gives them confidence in their work. ✓ Workers share that wages are proportional to what other companies offer. ✓ Staff can count on their bosses, feel their support, and consider that they are properly directed. ✓ They feel satisfied with their current work and have confidence to consult doubts and concerns, and cooperation from their peers. ✓ They believe that work is a good opportunity to grow and improve. ✓ The tools provided to perform their job require improvement.	✓ Generate interactive spaces between work teams, to encourage communication that is more effective. ✓ Design a formal mechanism for the evaluation of job satisfaction, considering alert indicators that allow constant monitoring of this variable.

Perception

The perception factor shows that personal involved in the business process in the ABC company are not correctly perceiving and interpreting the different situations presented at work.

Table 4: Perception

AVERAGE	FINDINGS	PROPOSALS FOR IMPROVEMENT
3,8	✓ The work area is adequate to perform daily functions. ✓ The workplace induction process is clear and adequate. Team work is encouraged at all stages. ✓ Leaders avoid rumors to arise. ✓ It is difficult for the group to work with people with weak work habits. ✓ Not everyone agrees that their work contributes to the institutional objectives.	✓ A performance evaluation system is suggested. A critical factor to evaluate is the impact generated by the achievements of workers in meeting the objectives of the ABC company. ✓ It is suggested to work on skills as resilience at the workplace to minimize unwanted behaviors among the employees while a new process is implemented.

Emotions

Emotions at the ABC company are properly shown among the employees.

Table 5: Emotions

AVERAGE	FINDINGS	PROPOSALS FOR IMPROVEMENT
4,0	✓ Employees are constantly encouraged to improve their cognitive capacity and skills. ✓ Employees consider that the ABC company has played an important role in their life and they feel proud to belong to it. ✓ Employees show properly manage of their emotions. ✓ Open communication channels are present. ✓ It is not easy for them to discuss their fears, or clearly demonstrate their joys and feelings. ✓ The employees are comfortable receiving compliments.	✓ Promote participation of employees in the planning of organizational changes. ✓ Generate interactive spaces between work teams, to encourage communication that is more effective.

Decision Making

The results show that employees in the ABC company are skillful in decision making. They are good at analyzing the situation, staying bias alert, combining rational analysis with intuition, and maintaining high levels of creativity.

Table 6: Decision making

AVERAGE	FINDINGS	PROPOSALS FOR IMPROVEMENTS
4,3	✓ Staff feel supported by their bosses. ✓ Problems are analyzed and alternatives for their solution are identified, verifying the possible risks and benefits. ✓ Creativity is a factor that helps new solutions, and participants feel responsible for them. ✓ Time and organizational alignment are obstacles in their performance.	✓ A performance evaluation system is suggested. A critical factor to evaluate is the impact generated by the achievements of workers in meeting the objectives of the ABC company. ✓ It is suggested to work on skills as resilience at the workplace to minimize unwanted behaviors among the employees while the new process is implemented.

Conclusions

According to the results, the success of the ABC business process is influenced by favorable characteristics of organizational behavior as motivations, job satisfaction, emotions, and decision making. In contrast to characteristics as perceptions and attitudes, which require a prompt intervention from the company to reduce their negative impact in current and future projects.

Then, some recommendations for intervention are:

(1) Design a communication plan for all levels of the organization for implementation of current and future projects.

(2) Open spaces of communication must be designed to promote integration, personal and professional development, and employee's recognition, in order to generate favorable changes on the organizational behavior of workers involved in the process.

(3) Implement positive reinforcement motivation strategies. This reinforcement must be supported by specific achievements, which must be previously arranged and communicated. Also, these should be aligned with the goals of the organization. Productivity results can be also considered.

(4) Designing and implementation of an intervention for the control of emotions, especially in those who have the responsibility to negotiate with external suppliers and internal clients. An important section of the success in the performance of the process corresponds to the purchase price of the products imported and the management of the inventory.

(5) Considering that the information generated by the process is shared, it is necessary to reconcile the entire structure to favor and potentiate these advantages. We suggest to improve communication down and up into the organizational levels. Establishing interdisciplinary teams to make strategic decisions that would allow to measure the performance with the suggested motivation strategy.

The study of organizational behavior provide to managers challenges that can be considered as opportunities for business growth. It can improve employee productivity, as it teaches managers how to treat their staff, understand how to implement change programs, and helps employees to balance the different conflicts between work and their lives (Robbins and Judge, 2013; Wagner and Hollenbeck, 2014; Mullins and Mclean, 2019). In addition, organizational behavior offers managers a useful guide to create a healthy work environment by stimulating the innovation of their employees. We believe that the described intervention recommendations will generate positive results into the organizational behavior for the ABC company and will be key to contributing on its increase of productivity.

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Mirror Data Asymmetry in International Trade. Insights from Research on INTRASTAT Data

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Abstract

The main goal is to evaluate the accuracy of intra-Community trade data. An additional goal is to assess whether there is a structural difference in the quality of data reported by the 'old' and the 'new' Member States. The data on international trade are stored in the form of mirror data. It appears, however, that the data collection processes in different EU Member States are incompatible and that is why mirror data often do not match. The discrepancies between recorded values may cause numerous problems in various macroeconomic analyses. Fortunately, there exist ways to spot data inconsistency and to partially resolve the problems arising. The Authors used methods of testing the accuracy of the data on international trade found in the literature and their own. We used data from the COMEXT database provided by Eurostat. Data regarding intra-Community trade in 2016, 2017 and 2018 were used. We calculated data discrepancy indices for individual Member States and for groups of countries and performed Kruskal-Wallis tests to confirm the differences between them. The study reveals a significant, structural difference between the 'old' and the 'new' Member States in respect to intra-Community trade data accuracy. Some 'new' Member States, however, quickly adopted the high data quality standards which we also pointed out. In the latter part of the work a comparison of the data on ICA and their mirror ICS was done for the EU Member States divided into groups of 'old' EU15 countries that were members before 2004 and the 'new' EU13 countries. The results of this research can be used by both public statistics and tax administrations. They can also provide a value to researchers conducting macroeconomic analyses in a broader sense.

Keywords: Official Statistics Data Quality, Mirror Data, Intra-Community Trade, EU.

Introduction

On a country level INTRASTAT is a system for collecting, aggregation, control and processing of data on trade in goods shipped between EU member states (known as intra-Community trade). On the EU's level it is rather a system of public statistics on intra-Community trade. Eurostat performs data aggregation from files collected in all member states and disseminates the data in the form of Comext database.

The details of data collection procedures differ between member states, hence mirror data on the intra-Community supplies (ICS) and on the intra-Community acquisitions (ICA) are not fully compatible. Mirror data are information on the same transactions as recorded in official statistics of both countries of dispatch and acquisition (Fig 1). Differences in declared values of transactions between partner states measure the accuracy of data collected which is a dimension of overall data quality (Markowicz and Baran 2019b).

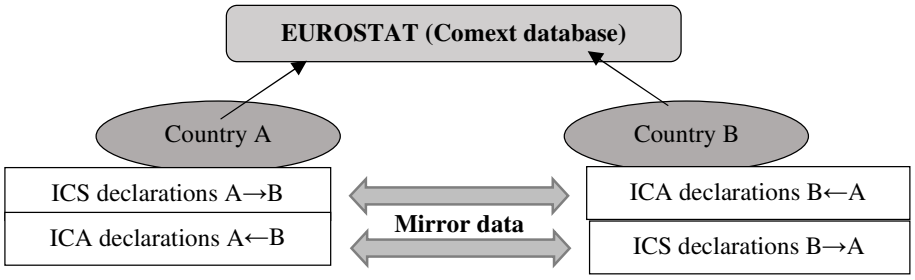

Fig. 1: Mirror data in intra-Community trade

The aim of the analysis presented below was to assess the accuracy of data on intra-Community trade in goods within the old fifteen Member States and the new thirteen Member States as well as between these groups, and to indicate which directions have affected the observed inequalities between mirror data the most.

The authors have put a hypothesis that countries of the old fifteen (EU15) as a group are different from the new thirteen (EU13) according to quality of statistical data on intra-Community trade in goods. Another hypothesis was that the differences in mirror data between said groups should be decreasing over time which would lead to an appropriate decrease in data quality index levels.

Dividing the EU into the 'old' and the 'new' Union is straightforward from the point of view of the time of accession. It seems safe to assume that the 'old' 15 countries provide better data quality based on their long lasting experience in monitoring and correcting typical errors that exist in country-level INTRASTAT databases (since they're in INTRASTAT system from 1993). We verify this statement in our study.

Literature Review

Data on foreign trade, including intra-EU trade in goods, are of a bilateral nature and are called mirror data (Eurostat 1998). A synthetic review of the proposed methods of analysing mirror data is presented in a research study by Markowicz and Baran (2020).

According to Guo (2010), the first researchers to observe and describe data asymmetries in foreign trade were Morgenstern (1963) and Tsigas et al (1992). Morgenstern studied differences in data on world exports and imports. In Tsigas et al (1992) the appropriate balance between declared export and import values resulting from differences in the treatment of transport and insurance costs by the declarants is raised. The CIF/FOB ratio was also described by Carrère and Grigoriou (2014).

The methods of studying differences in mirror data proposed in the literature are used to study different relations (between two countries or between a country and a group of countries). Proposals for methods and studies for pairs of countries are described by Morgenstern (1963), Parniczky (1980), Ferrantino and Wang (2008), Guo (2010), Hamanaka (2012), Carrère and Grigoriou (2014), HMRC Trade Statistics (2014), Bogdanova et al (2017) and Eurostat (2017b). Some surveys focus on the analysis of data differences between a country and a group of countries, i.e. in one-to-many relations (Federico and Tena 1991; Hamanaka 2012). The methodological proposals mainly concerned the intensity index and when aggregation was used, it concerned goods or countries, but the values of exports and imports (and not the differences) were added up.

Data and Methodology

For the survey COMEXT data for 2016, 2017, and 2018 were collected through Eurostat's bulk download facility. All three datasets contain values (in EUR) of dispatches and acquisitions for every EU Member State collected from individual trade transactions with all other EU member states. In our survey data quality is represented by data accuracy and the level of data accuracy depends on the

differences between declared supply and mirror acquisition (recorded in a partner country).

In the survey two types of indices were used to measure the quality of data on intra-Community trade in goods; these are individual and aggregated indices described below (Markowicz and Baran 2019a).

Comparison between Eurostat's data on ICS and their mirror ICA for all pairs of EU Member States was made with the use of the individual index of data quality (sometimes referred to as relative asymmetry (Eurostat 2017a)), defined as follows:

$$W_E^{AB} = \frac{E_{AB} - I_{BA}}{K} \tag{1}$$

where:

E_{AB} – declared dispatches (supply) from country *A* to country *B*,

I_{BA} – declared acquisitions by country *B* delivered from country *A* (mirror data),

$K = \frac{E_{AB}+I_{BA}}{2}$ or $K = I_{BA}$ or $K = E_{AB}$.

Data on trade between single countries and groups of 15 'old' Member States or 'new' 13 Member States were compared with the use of indices (ZW) of data quality (asymmetry), given by:

$$_{Z}W_E^{A,EU} = \frac{\sum_{i=1}^{n} \left| E_{AB_i} - I_{B_iA} \right|}{K} \tag{2}$$

where:

E_{AB_i} – declared dispatches (supply) from country *A* to country B_i (EU member state),

I_{B_iA} – declared acquisitions by country B_i delivered from country *A* (mirror data),

$K = \sum_{i=1}^{n} \frac{E_{AB_i}+I_{B_iA}}{2}$ or $K = \sum_{i=1}^{n} I_{B_iA}$ or $K = \sum_{i=1}^{n} E_{AB_i}$.

In the survey the values of *K* in formulas (1) and (2) were computed the first way, i.e. as the sum of exports and mirror imports divided by two, i.e. as the mean value of supply and mirror acquisition (which can be treated as a hypothetical value of supply). Such a policy let the authors avoid favouring one of the sides.

An individual index of data asymmetry (1) takes values from −2 to 2. Its positive value means that declared supplies were greater than declared acquisitions in the partner state. Aggregated indices of data quality can take values from 0 to 2. Use of the absolute values of differences between supply and acquisition protects us from compensating those differences of different signs.

Research Results

In the first part of the survey we analysed the quality of data on trade between every pair of EU countries. We hypothesised that the level of data inaccuracy, measured with index (1) absolute values will be smaller in the group of 'old' Member States on average which could be explained with the long lasting experience of both businesses and statistical offices in these countries. To verify the hypothesis, we computed all the individual indices of data quality and divided them into four groups: the 'old' Member States compared with their own group (O-O), the 'old' Member States compared with the 'new' Member States (O-N), then the 'new' Member States compared with the 'old'(N-O) and within their own group (N-N). Part two of the survey refers to the analysis of data quality in the trade between a country and groups of the 'old' and the 'new' member states. This time we used aggregated indices (2) which are preferred in mirror data asymmetries aggregation (Markowicz and Baran 2020). The third part of the survey is a formal verification of the hypothesis that the 'old'

EU15 countries differ significantly from the 'new' EU13 according to quality of INTRASTAT data. We used Kruskal-Wallis' (1952) and Dunn (1964) post-hoc tests to verify hypotheses that that distributions of individual indices vary between groups of the 'old' and the 'new' EU Member States.

The lowest calculated values of index (1) were shown in Fig 2, in which we presented five values of the index in every group of directions (namely the 'old' EU15 to EU15, the 'old' EU15 to the 'new' EU13, the 'new' EU13 to EU15, and EU13 to EU13). The subsequent values from top to bottom, either positive or negative, indicate the pairs of countries with the best quality of mirror data in each of the groups of directions. The lowest of the observed index values is for the Lithuanian ICS sent to Latvia (LT-LV 0.000014). However, considering the four groups of directions, the best quality of data is characteristic to transactions between the 'old' EU15 countries (top-most group in Fig. 2 and 3, cf. also Fig 12). Latvia and Romania are the two of the 'new' Member States that have a number of low values of index which can be interpreted as the highest overall quality of data. We consider these countries as the early adopters of the highest standard of INTRASTAT data collection.

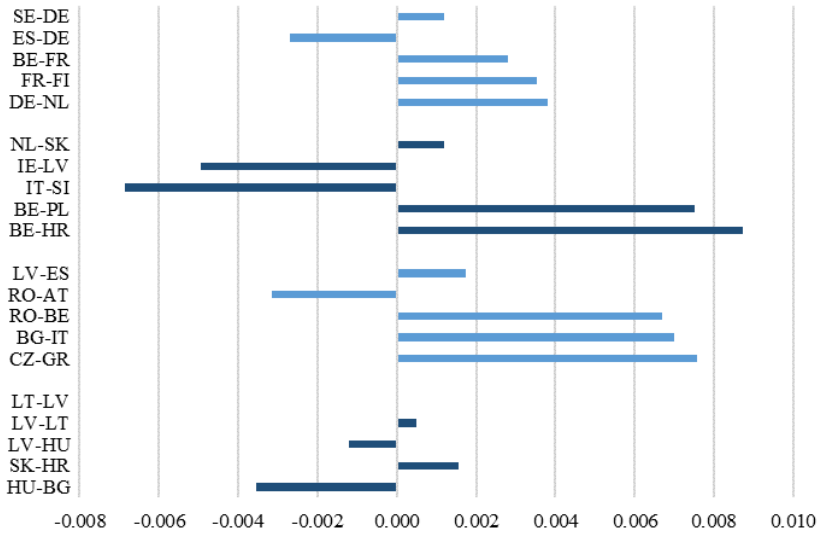

Fig. 2: The lowest indices of mirror data quality among pairs of EU member states in 2018

In Fig 3 the highest values of these indices were presented (again every group of directions is represented by 5 indices). Among these four groups the highest (i.e. the worst) values are for transactions between the 'new' EU13 countries, the highest two being for trade between Cyprus and Hungary (CY-HU; –1.9049), and Malta and Estonia (MT-EE; –1.7969). Two countries with the lowest data quality are Cyprus and Malta according to our survey.

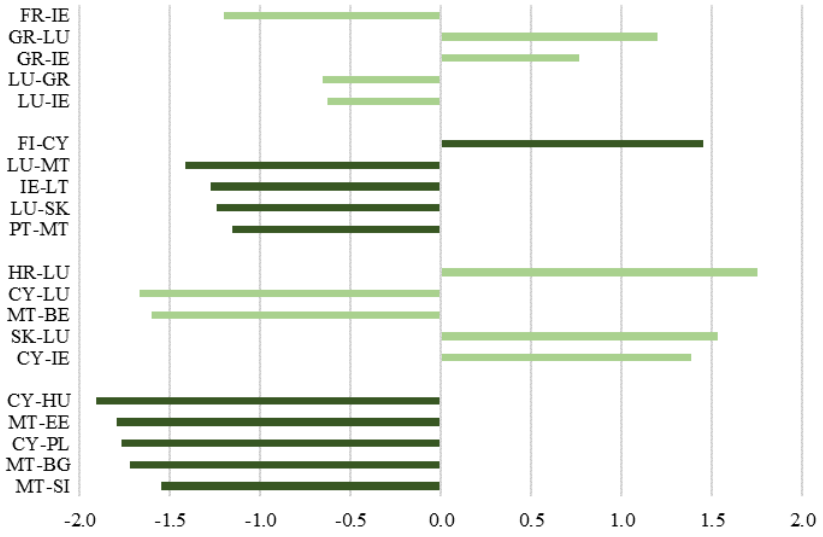

Fig. 3: The highest indices of mirror data quality among pairs of EU member states in 2018

In the second part of the survey the aggregated indices of data quality (2) have been used to measure the quality of data on ICS of a specific country against aggregated mirror data from all partner countries of the 'old' EU15 or the 'new' EU13 group. Figs 4-5 present the values of such indices calculated for every country in the 'old' EU15 group against all the countries in EU15 and in EU13. Figs 6-7 show the values of the appropriate indices calculated for every country in the 'new' EU13 against all the EU15 and the EU13 groups' members, respectively. The actual values of declared ICS and mirror ICA are also shown in these charts in order to prove that the values of data quality index are not correlated with the amount of goods traded by the countries. In the 'old' EU15 trade it's Germany occupy the first position (Fig 4) both in terms of data quality index and in trade turnover. However, the second position according to the quality of data belongs to Austria, which is ranked eighth in terms of trade turnover. The values of indices for this group of countries are relatively low, from 0.0486 (Germany) to 0.1857 (Greece). In the trade between EU15 and EU13 countries the prevalence of Germany's trade is even more explicit (Fig 5), but Belgium has the best quality data. Indices are from 0.0534 to 0.6151 (Luxembourg, which is an outlier accompanied by Ireland). Within the group of 'new' Member States their ICS are dominated by Poland (Figs 6 and 7). However the quality of Polish data tops the ranking within the group only, with Bulgaria being the country with the highest quality of data on trade with the 'old'EU15. The values of data quality index are not high except for those of Malta and Cyprus – in the case of the trade within the 'new' EU13 group they even exceed 1 which indicates low quality of statistical data.

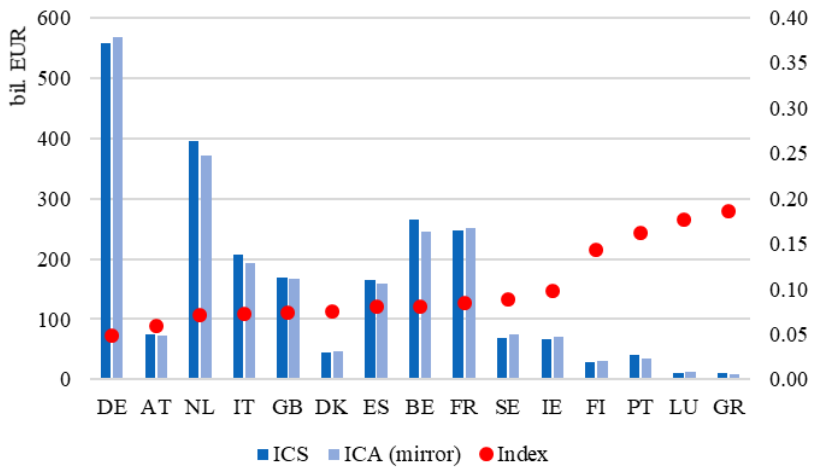

Fig. 4: Aggregated indices of data quality for ICS – EU15 in 2018

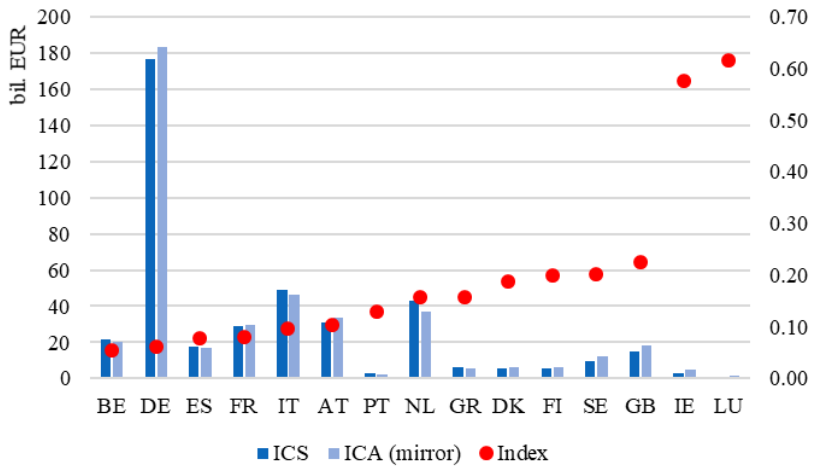

Fig. 5: Aggregated indices of data quality for ICS – EU15 to EU13 in 2018

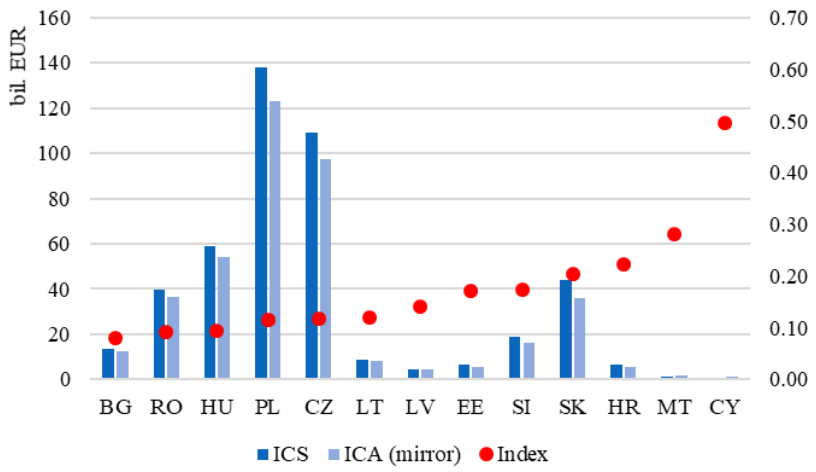

Fig. 6: Aggregated indices of data quality for ICS – EU13 to EU15 in 2018

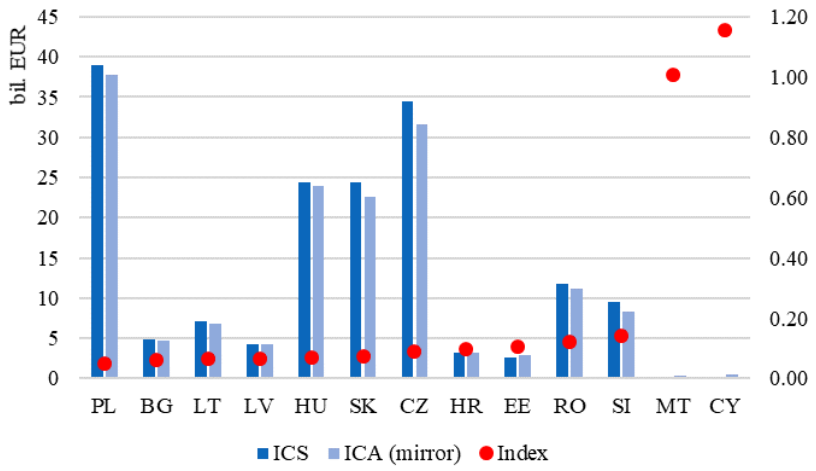

Fig. 7: Aggregated indices of data quality for ICS – EU13 in 2018

We calculated the aggregated indices in all groups of countries for 2016, 2017, and 2018. The charts (Figs 8-11) show that the quality of data in 2016 was slightly higher than in 2017 and 2018. In most cases the values did not exceed 0.2, and the most equal values can be observed for the trade within the group of the 'old' Member States. In all the charts containing indices calculated for directions to od from the 'new' Member States there are evident outliers, i.e. there exist countries with lower quality of data – in Fig 9 it's Ireland and Luxembourg, in Figs 10 and 11 it's Malta and Cyprus.

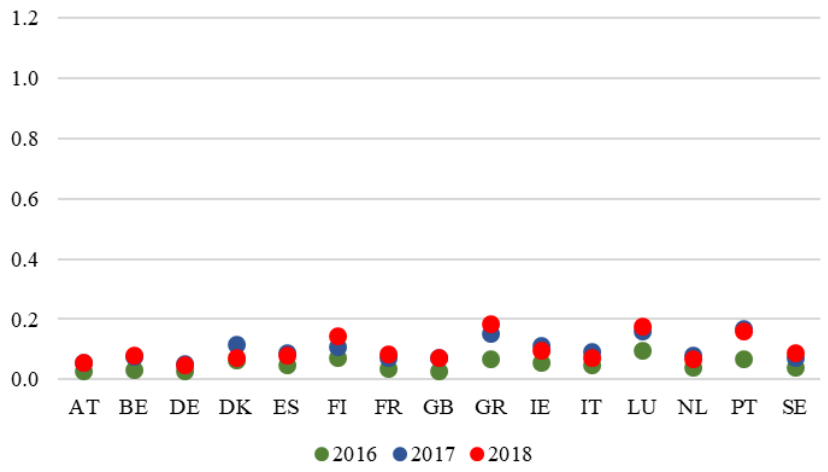

Fig. 8: Aggregated indices of data quality for ICS – EU15 in 2016-2018

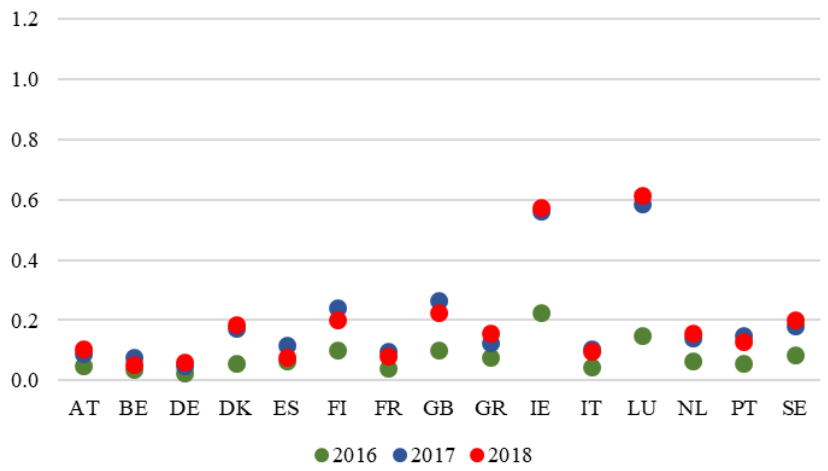

Fig. 9: Aggregated indices of data quality for ICS – EU15 to EU13 in 2016-2018

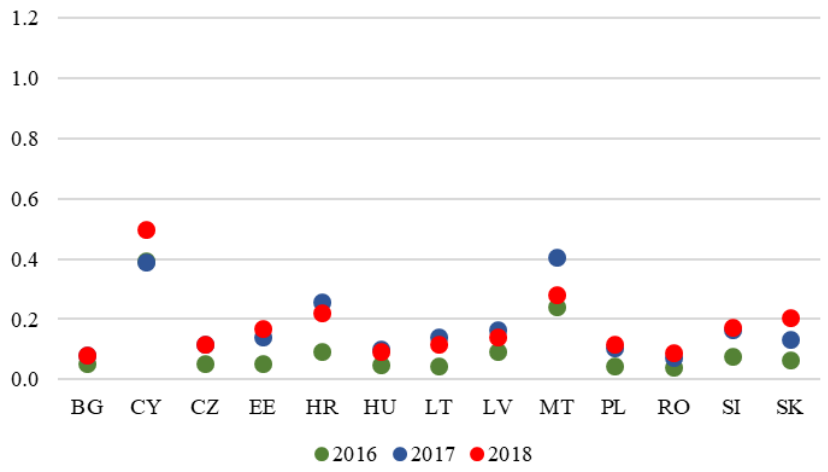

Fig. 10: Aggregated indices of data quality for ICS – EU13 to EU15 in 2016-2018

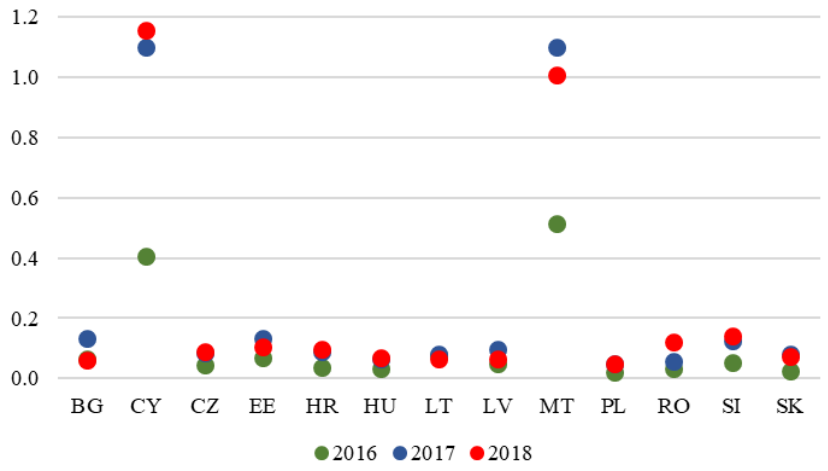

Fig. 11: Aggregated indices of data quality for ICS – EU13 in 2016-2018

To check whether data quality varies between the 'old' EU15 and the 'new' EU13 we utilized a following approach. Countries were divided into two groups, then individual indices of data quality fell into four groups: O-O (ICS direction: from the 'old' to the 'old' Member States; 210 indices were grouped together), O-N (the 'old' to the 'new'; 195 indices), N-O (the 'new' to the 'old'; 195 indices), and N-N (the 'new' to the 'new'; 156 indices). For such groups of indices Kruskal-Wallis test was performed to investigate the differences between the aforementioned four direction groups. Then we performed post-hoc analysis using Dunn test (with Bonferroni correction for multiple comparisons) to show for which pairs of groups the differences are significant.

We chose the Kruskal-Wallis for its flexibility; the distributions of the variables do not have to be normal, the groups do not have to be either of equal size nor of equal variance. Observations in a group should be independent. Identified groups include the same countries, which may suggest that the data were generated in a similar process. However, in an individual country, data are generated by

obliged entities that export or import goods. As transactions in particular directions are usually carried out by different entities, they are independent. No formal test was carried out to check this property.

INTRASTAT data from the Comext database are not complete. This is the reason for the authors' research on their quality. The available dataset contains gaps and errors, therefore we treated them as a sample. In Fig 12 individual indices' distributions are shown concerning transactions within groups described above. The least varied are indices for the trade within the first group (O-O). Other groups are characterized by a huge variance. Table 1 presents the results of Kruskal-Wallis and Dunn tests. It turns out, there are significant differences in data quality between groups of the 'old' and the 'new' Member States divided into four ICS direction groups. Analysis of all pairs of direction groups shows no evidence of significant difference between N-N and N-O (i.e. ICS from the 'new' member states), between N-N and O-O (ICS within groups) as well as between O-N and O-O (which renders to ICS from 'old' member states altogether). Significant differences exist between directions in groups of N-N and O-N, N-O and O-N, as well as between N-O and O-O. And this confirms the existence of systematic differences in quality of data on trade in goods between the 'old' and the 'new' EU Member States. The greater variance in all direction groups originating or ending in the 'new' Member States indicates a lower quality of data on transactions of the 'new' EU13 group. Medians and quartiles of indices in O-N, N-O, and N-N groups are of higher absolute values than for O-O group (Fig 8). This means that errors and data gaps which affect the index value appear more frequently in the mirrored declarations of the EU13 traders and their trade partners.

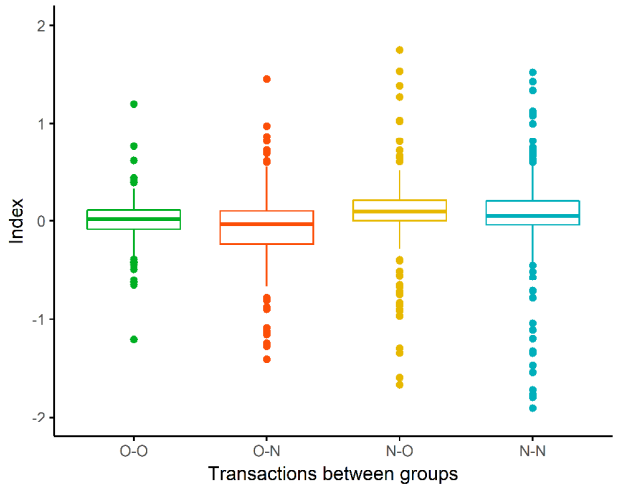

Fig. 12: Distributions of data quality index in four groups of directions (containing all directions of dispatches between the 'old' and the 'new' EU), 2018 data

Table 1: The results of Kruskal-Wallis and Dunn tests

Kruskal-Wallis Test		
EU – 4 groups of directions combined		$\chi^2 = 41.3925$ (**)
Dunn Test		
N-N	N-O	$Z = -1.3840$ (–)
N-N	O-N	$Z = 4.2029$ (**)
N-N	O-O	$Z = 2.5056$ (–)
N-O	O-N	$Z = 5.9257$ (**)
N-O	O-O	$Z = 4.1579$ (**)
O-N	O-O	$Z = -1.8766$ (–)

*significance level 0.05; ** significance level 0.01

Conclusions

Our research was conducted with the use of Eurostat's COMEXT data of 2018. The level of quality of data on trade in goods among EU member states is a consequence of differences between declared supply and mirror acquisition (recorded in a partner country).

The most important conclusions from the study can be stated as:

- The quality of data on intra-Community trade in goods for EU can be assessed with the use of INTRASTAT data (declared ICS and ICA values confronted with their mirror data) using data quality indices (relative asymmetry indices).
- EU15 countries are characterized by more level values of data quality indices and on average share a higher data quality than EU13 countries.
- The least varied are indices for trade within first group (O-O). Other groups are characterized by huge variance.
- It is possible to separate countries of definitely lower data quality; these are Malta and Cyprus within EU13 or Ireland and Luxembourg within EU15.

Such an analysis can help monitoring of the country-level INTRASTAT data quality; it can also be useful in finding and tackling anomalies that appear in intra-Community trade.

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Marketing Tools in The Process of Building The Relationship Between The Cultural Institutions And Citizens of The City Divided by The Border

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Abstract

The concept of relationship on cross-border cooperation in sphere of culture has been recognised as very important in global strategic documents of European Union for more than a two decades. It is also increasingly reflected in the cultural polices of particular states, and-very importantly-cultural managers who are responsible for shaping the cultural offer in euroregions are becoming more interested in this concept. Despite the increasing attention being paid to this topic among both practitioners and theoreticians of management, in none of these documents or other works can we find content that is directly related to the cities divided by the border. This gap was the direct impulse for taking up research in this field. Based on in-depth interviews carried out with fifty experts from the Polish and Czech side of the city divided by the border (Cieszyn PL - Czech Cieszyn CZ) the possibilities of marketing tools in the process of building the relationship between the cultural institutions and citizens of the city divided by the border were recognized. The conducted research shows that Polish and Czech managers of cultural institutions differ in terms of the key tools of the marketing. In their opinion they should have a primary application at the stage of establishing and strengthening relationship, connecting cultural institutions with Polish and Czech citizens of the city divided by the border. According to Polish experts the key tool for building relationships (establishing and strengthening relationship) is marketing communication, whereas in the opinion of Czech respondents these will be activities related to shaping the product.

Keywords: Relationship Marketing, Marketing Tools, Cultural Institutions, Citizens, City Divided By The Border, Cross-Border Market.

Introduction

Changes taking place in the cultural sector (growing competition, the virtualization of consumption, development of new technologies, and globalization) clearly show that cultural institutions in the cities divided by the border must create long-term relationships with citizens of both sides of border in order to secure their future existence. The traditional concept of marketing is increasingly being criticized. The cultural institutions in the cities which use classic marketing primarily focus on acquiring as many new customers or donors as possible, often neglecting their present, often most valuable customers. The concept of relationship marketing enables us to take a modern look at the nature of the interactions and relationships between the cultural institution and the various segments of citizens located in the city divided by the border (Grönroos 2004, Palmatier et al. 2008, Peck et al. 2013, Sobocińska 2017).

The main goal of this paper is to explaining the significance and weight of marketing tools (product, price, place, promotion and people) used by Polish and Czech cultural institutions in the process of building relationship with citizens (recipients of their offer) on both sides of the border.
In this article, a research hypothesis was adopted according to which it is assumed that: Polish and Czech managers and employees of cultural institutions located in the cities divided by the border from marketing tools such as product, price, place, promotion and people find product as the most

important instrument in the process of establishing and strengthening relations with Polish and Czech citizens - recipients of cultural offer. The product, which according to the assumptions of cross-border cooperation, should be tailored to the needs of recipients on both sides of the border. In order to verify the adopted research hypothesis for the purposes of the article, interviews were conducted in the form of individual in-depth interviews (IDI) with fifty experts - directors of cultural institutions, creators, animators, heads of communes, officials, organizers of cultural projects on the Polish-Czech border (twenty-five experts from the Polish side and twenty-five experts from the Czech side of the small city Cieszyn- Czech Cieszyn).

The Process of Forming Relationships - The Theoretical Approach

Relationship marketing is a marketing concept which has been developing since the early 1980s and is currently considered to be the dominant paradigm in this field, gradually displacing the concept of transaction marketing (Egan 2008, Hollensen 2015). Relationship marketing in cultural sphere is a philosophy that developed out of the need for maintaining a base of current customers (citizens of the city divided by the border) who are committed to the cultural institutions. In relation to the services market, the change in marketing towards building lasting relationships with customers came in 1983 when Berry (1995) first described the whole concept of relationship marketing as a concept for the management of a services company. He distinguished five strategic elements of the application of relationship marketing, which today represent the theoretical basis of the concept: developing core services, adapting the offer to the expectations of the individual customer, enriching the core service with special benefits (added value), pricing to stimulate consumer loyalty, and undertaking intensive marketing activities in regard to one's own employees. According to Berry (1995) it involves strengthening relationship with current customers and retaining them rather than acquiring new ones. The logic underlying relationship marketing in cultural sphere is that customer relationship should be approached on a long-term basis such that customers acquired are retained (Dibb and Meadow 2001). Shani and Chalasani (1992) assert that a long-term relationship with customers enables the cultural institutions to add value to its offerings. Accordingly, relationship marketing is an "integrated effort to identify, maintain and build networks with individual consumers and to strengthen continuously the network for the mutual benefit of both sides, through interactive, individualized and value-added contacts over a long period of time" (Shani and Chalasani 1992, Hollensen 2015). This definition buttressed the existence of interpersonal relationship built between exchange partners through continuous interactions. Such interaction between exchange partners is a necessary precondition for strengthening relations between exchange partners and a predictor of long-term relationship (Kim et al. 2004, Peck et al. 2013). Citizens' expects a positive outcome in the form of value and convenience in their interpersonal relationship with service provider just as cultural institutions' desire sustainable relationship. Thus, confirming Ndubuisi (2007) assertion that the concept of relationship marketing in cultural institutions growth strategy is possible to reach through a mutual and symbiotic relationship that guarantee a clear understanding of the customers' needs such that superior value is created and deliver. In other words relationships are achieved by mutual symbiosis and fulfillment of promises.

Building long-term relationships by cultural institutions located in the city divided by the border is a continuous process and does not end when a citizen is persuaded to participate in an cultural event. Forming lasting relationships goes beyond a single transaction and is cyclical in nature. This means that the cultural institution located in the city divided by the border and citizens (consumers of the cultural offer) pass through successive, repeated stages. If the course of a given cycle of the relationship is undisturbed, the partners in the exchange start a new cycle. Passing through subsequent cycles is a prerequisite for the continuation of the relationship (Furtak 2005, Claycomb and Martin 2013). The process of cultural institutions building long-term relationships with the citizens (consumers of cultural offers) is presented in Figure 1.

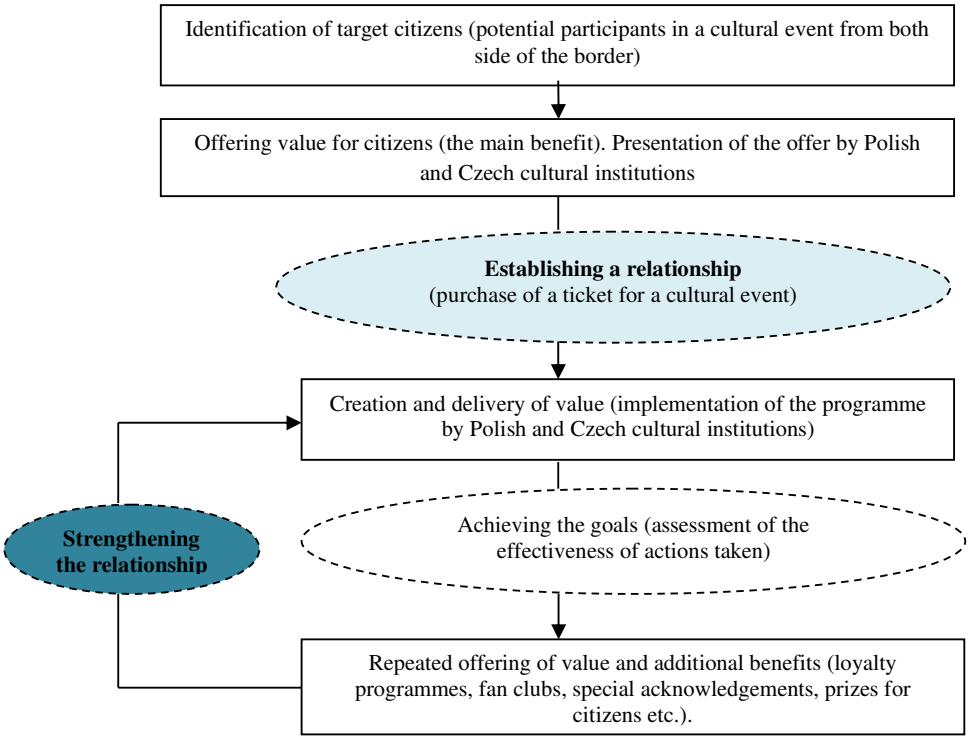

Fig. 1: The process of forming long-term relationships by cultural institutions with the citizens of the city divided by the border

In the process of building long-term relationships, we can distinguish two main phases: the initial phase - the creation of a relationship (this phase ends when a citizen of the city divided by the border is persuaded to participate in a cultural event) - and the main phase of strengthening of the relationship (which is a closed cycle and continues for a longer time). The main objective of the initial phase is for the cultural institution to establish ties with selected Polish and Czech citizens of the city divided by the border (consumers of the cultural offer). This phase can be divided into three stages: the first stage consists of identification of target citizens, the second stage of offering value to potential customers (the main benefit), and the third stage of acceptance of the cultural institution's offer by the citizens (or its rejection) and their decision to purchase the cultural services. The initial phase of building a relationship is therefore synonymous with the classic marketing process.

A characteristic feature of the main phase is the cyclical implementation of subsequent stages of relationship marketing: creation and delivery of value, re-offering value, accepting value, creation of and delivering value, etc. This is the basis on which the relationship is continued and deepened. In this phase, the citizens (consumers of the cultural offer) beside the main benefits are offered additional benefits by the cultural institution, such as a loyalty programs for Polish and Czech citizens. Breaking this cycle means breaking the relationship between the cultural institution and the citizen. Therefore, it is important to constantly monitor the process of relationship marketing, and not only the achievement of the objectives of the cultural institution, but also to constantly monitor the so-called critical moments, such as the rejection of the value offered by the institution (Kinard and Capella 2006). The inclination of the consumer of the cultural offer is determined by their beliefs and emotions regarding the Polish and Czech cultural institution and has been shaped by the previous interactions. Therefore, the creation of long-lasting relationships in cultural institutions requires a departure from the traditional way of doing business. The basis of such a system is to create exceptional values for the citizens (consumers of the cultural offer) rather than maximizing profits.

Materials and Methods

The field of research in the article is a city, which after the end of World War I, was divided into Cieszyn on the Polish side of the border (about 36,000 inhabitants) and Czech Cieszyn (Czech Republic, with approximately 25,000 inhabitants). It is a system of cities that, in 2007, entered the so-called Schengen Area, i.e. a visa-free movement without border checks (Figure 2).

Fig. 2: Location of the border cities Cieszyn (PL) – Czech Cieszyn (CZ)

Despite the opening of borders the functioning of cultural institutions both on the Polish and Czech side of the city are still intertwined with the past history. That is, not only the most recent history, but that going back hundreds of years. The cultural offer of both cities is being developed by numerous cultural entities whose offers are not limited only to the consumers on one side of the border (Wróblewski 2017, Wróblewski et al. 2017). Despite the relatively small size, the city as a whole has two theatres. The Polish side has the Adam Mickiewicz Theatre, and the Czech side has a theatre with a double, Polish and Czech, stage. What is particularly interesting, the Polish stage located in Czech Cieszyn is financed by the Czech marshal's office without subsidies from Polish sources. Two large cultural centres operate in the city, important cultural spots include also the Municipal Library in Cieszyn, the Municipal Library in Czech Cieszyn, the Avion Reading Room and Literary Café Avion, the internationally known Cieszyn Castle, involved in the area of design, the Museum of Cieszyn Silesia, as well as the Cieszyn Old Library, having many unique publications spanning over the last five hundred years. Cultural offer for both cities also includes the activities of associations. The most prominent ones include the Olza Association for Regional Development and Cooperation, the Polish Cultural and Educational Association, the Polish Congress in the Czech Republic, the Culture on the Border Association, the Man on the Border Association, the Polish-Czech-Slovak Solidarity and the Education Talent Culture Association in Czech Cieszyn. We should also not forget about the more or less significant initiatives and places held in private hands. Such places also enrich the cultural offer of this unique city. These include the Kornel i Przyjaciele Literary Café, the Laja Tea House, the Dziupla Club or events like the series of charity concerts called Aktywuj Dobro. The above group is enriched by activities in the social sphere, undertaken by 3rd sector organisations, for example, the Być Razem Association for Mutual Assistance (Wróblewski et al. 2018).

Individual in-depth interviews with representatives of the Cieszyn cultural institutions (25 interviews) and Czech Cieszyn cultural organizations (25 interviews) were carried out from August to December 2018. The list of people interviewed included the directors of all Polish and Czech local cultural institutions, heads of cultural departments in the city Cieszyn and Czech Cieszyn, cultural organisers and employees of cultural institutions. The questionnaire of the interview (in Polish and Czech)

contained a total of seventeen questions, of which nine were short projecting questions based on associations and supplements, while the next eight questions were open-ended deep questions, based additionally on the seven-point Likert scale. The studies were preceded by consultations with employees of cultural institutions operating in the Euroregion Cieszyn Silesia. The purpose of the consultation was to check the accuracy of the research assumptions along with testing the prepared research tool. Discussions in the relevant forums have allowed the refining of the final version of the guidelines for the interview, as a result it was possible to start proper research.

Results

The first topic concerned the impact of marketing tools such as product, price, place, promotion and people on establishing and strengthening relations of cultural institutions with the citizens of their own (national) side of the city Cieszyn-Czech Cieszyn. The experts were asked to distribute 100 points between individual marketing instruments. The results are presented in Figure 3.

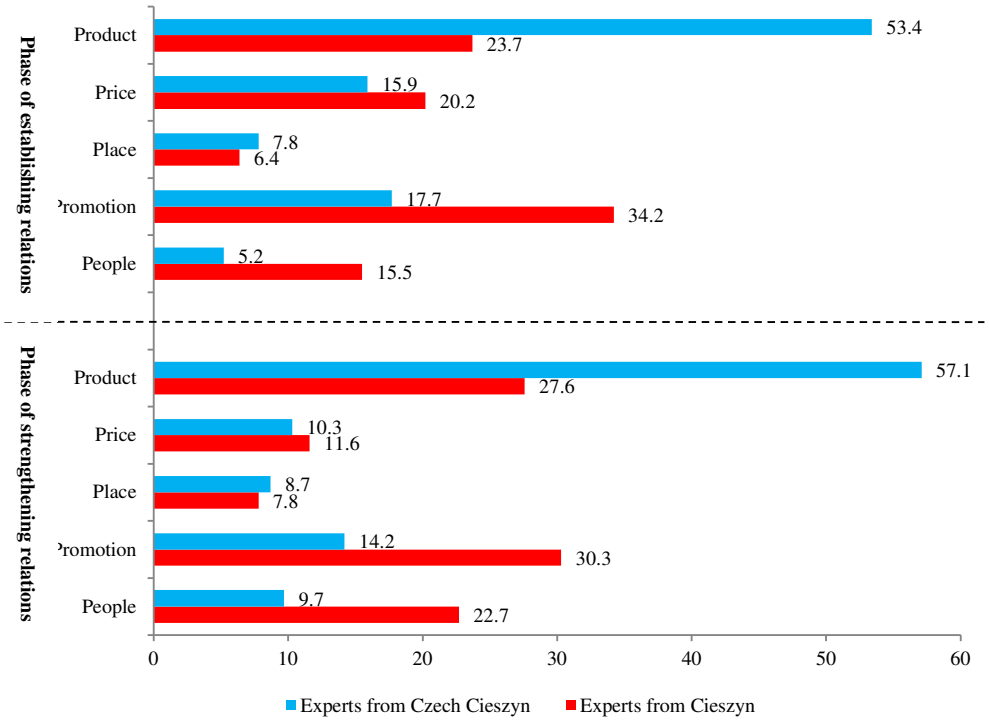

Fig. 3: The impact of marketing tools on establishing and strengthening the relations of cultural institutions with the citizens of their own (national) side of the city Cieszyn-Czech Cieszyn

The answers obtained from Czech experts show that it is a product (cultural offer) of a cultural institutions - its further development, modification in order to better match the needs of recipients that plays a key role in establishing and strengthening the relations of cultural institutions with recipients (citizens) of their own (national) side of the city Cieszyn-Czech Cieszyn. However Polish experts have recognized that it is not a product, but better marketing communication (promotion) which is important for establishing (34.2 points) and strengthening relations (30.3). Polish experts stated that the product offered by their cultural institutions is well suited to the needs of recipients from the own (national) side of the city and does not require significant changes or modifications, but it is necessary to use more advanced based promotion instruments, such as social media and new technologies. The experts also stated that cultural institutions are combined with strong, lasting

relations with recipients of the offer from their own (national) side of the city. Forty four experts gave such answers, which included 21 respondents from the Polish side and 23 from the Czech. Justifying their opinion, they pointed to: large attendance at organized cultural events, a growing number of book borrowed from the library, a large number of visits of the official website of the institution, frequent expressions of fondness shown on the occasion of the anniversary celebrations, a large number of likes on the posts or photos published on the official social profile of the institution, high interest in organized competitions or meetings, and the growing number of volunteers who willingly joined the organization of cultural events.

Importantly, the statements of both Polish and Czech experts show that at the phase of strengthening relationships, the price of the product, as well as activities related to its promotion lose (compared to the phase of establishing relationships). On the other hand, the product is gaining in importance (product quality or activities making up the extended product), as well as the activities of the personnel of the cultural institutions (its professionalism, empathy, kindness or enthusiasm).
The experts were asked also about the impact of marketing tools such as product, price, place, promotion and people on establishing and strengthening relations of cultural institutions with the citizens of other (foreign) side of the city Cieszyn-Czech Cieszyn. Similarly to the previous practice, the experts had to split 100 points between individual marketing mix instruments (product, price, distribution, promotion and staff). The results are presented in Figure 4.

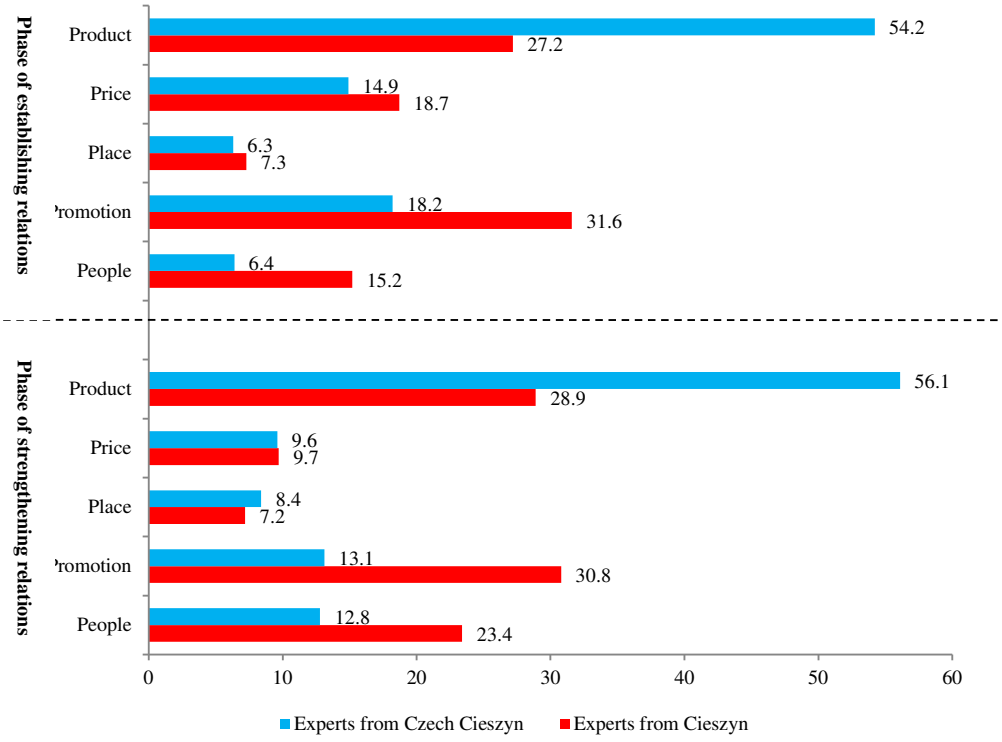

Fig. 4: The impact of marketing tools on establishing and strengthening the relations of cultural institutions with the citizens of the other (foreign) side of the city Cieszyn-Czech Cieszyn

In the opinion of Czech experts cultural institutions wishing to establishing and strengthen relations with the recipients from the other side of the border should first focus on the product, which in their opinion, in its current shape, is not well suited to the needs of residents from the neighboring country

(e.g. libraries do not have book collections in Polish and Czech, cinemas display films only in one language version - no subtitles in the other language). This instrument (product) obtained the highest number of points (57.1). However, Polish experts, unlike the Czech experts, decided that this promotion should play a key role in the process of establishing and strengthening relations with citizens from the other side of the city Cieszyn-Czech Cieszyn. In their opinion, in order to strengthen ties with the recipients on the other side of the border, it is first necessary to reach those recipients with properly prepared information about the cultural offer that is available in the neighboring country. The offer, in the opinion of Polish experts may be in its current shape equally, and maybe even more attractive than that of the one available abroad.

Discussion and Conclusion

Interactions, cultural institutions–citizens of the city divided by the border, in early phase of development they are generally transactional form. For relationships to migrate from this state in a positive manner, stronger relational bonds must develop through increased commitment and trust (Morgan and Hunt 1994). In the other hand, repeated interactions and positive evaluations of reciprocal behaviors build long-term relationships (Cannon, Achrol, and Gundlach 2000; Heide 1992). Performance likely improves in step with stronger relational development, representing significant value creation through sales growth, for example. Jap and Anderson (2007) define this pattern of change as an exploration relationship migration mechanism, because the customer explores the value creation potential of the relationship and demonstrates a willingness to share rewards and costs as their relational bonds strengthen.

Identifying value-creating opportunities and building norms to share value between cultural institutions and citizens in the city divided by the border are both key to exploration migration and the continuation of the relationship beyond arm's-length, one time transactions. Considering that initial phase of building long-terms relations refers to the search, trial and compare (Dwyer and LaGace 1986; Brown and Hayes 2008) cultural offer which is available in the city divided by the border, with the goals such as uncertainty reduction and an assessment of the potential value of continued interactions (Jap and Anderson 2007), two strategies such as strategy of product and strategy of marketing communication could be an effective for facilitating the exploration mechanism.

Strategy of product fulfills the trial aspect of exploration (initial phase) by capturing the cultural institution's offer and the variety of desirable products available to meet Polish and Czech customer needs (Dwyer and LaGace 1986; Brown and Hayes 2008). Because trials may include extended periods of testing and evaluation, an appropriate strategy of product provides an avenue through which value of the cultural offer may develop and build the relationship (Vitkauskaitė 2015). Marketing communication refers to the amount, frequency, and quality of information shared between Polish and Czech cultural institutions and citizens of city divided by the border (Mohr, Fisher, and Nevin 1996), such that it facilitates the search aspect of exploration. The flow of information from the cultural institutions reduces customer uncertainty as well as facilitates the search and identification of value creating opportunities (Mohr, Fisher, and Nevin 1996). In addition, communication helps establish the goals and relational norms needed to manage the exchange on the cross-border market (city divided by the border) and ensure an equitable division of value, which in turn increases confidence about investing for further value creation (Jap and Anderson 2007).

Strategy of product and strategy of marketing communication directly address the primary roles of the exploration mechanism (search and trial), which provide to increase the likelihood that a relationship migrates from a less developed to a more developed relational state. From initial phase to the main phase of strengthening of the relationship (which is a closed cycle and continues for a longer time). Both product and marketing communication are relatively low-risk, high-reward strategies compared with relationship-specific investments, which can be costly and ineffective when deployed without due diligence to identify needs or value-creating opportunities (Brown, Dev, and Lee 2000).
Transitional relationships working toward the long-term relationship between Polish and Czech cultural institutions and citizens of city divided by the border must continue to develop trust,

commitment, and relational norms to persist in strengthening relational bonds. In contrast with exploration of initial phase, relational norms are already present at sufficient levels to depth develop cultural institutions–citizens interactions in semi advanced relationship states of this type (Dwyer, and LaGace 1986; Heide 1992). The crucial state variable to migrate to the most developed relationship is dependence, which can lock in a cultural recipients and prevent switching. It arises when the Polish or Czech cultural institutions can offer, or endow, customer benefits that would be difficult to procure from other sources (Hibbard, Kumar, and Stern 2001). This endowment migration mechanism induces stronger relationships, with a great increase in dependence (Dwyer and LaGace 1986; Jap and Anderson 2007).

Given that relationship endowment (i.e., expansion or exploitation) refers to the continual increase in benefits obtained by exchange cultural institutions with citizens of the city divided by the border and to their increasing interdependence (Dwyer and LaGace 1986, Brown and Hayes 2008), author believes two strategies from extant literature are most effective for facilitating the strengthening of the relationship: seller and customer relationship investment. Research conducted by Palmatier et al. (2007) indicate the key role of relationship investments, or "time, effort, spending, and resources focused on building a stronger relationship". These investments leverage cultural institution' value-creating capabilities by providing the resources necessary to exploit opportunities identified during the exploration mechanism (De Wulf, Odekerken-Schröder, and Iacobucci 2001) and thus increase exchange performance and benefits accrued from the relationship. Although a cultural institution can invest resources to induce a more effective cultural offer through traditional means, such as accurate citizens segmentation in the city divided by the border, targeting, and positioning to inform the development of its product line, Kahn (1998) states that these resources do not necessarily improve the customer relationship.

Relationship investments are very effective strategies for increasing the dependence of an exchange partner because the difficulty of redeploying resources to other exchanges mitigates concerns of opportunism and signals ongoing support for further investments (Heide 1992; Scheer, Miao, and Palmatier 2015, Maciejewski et al. 2019). Considering that our context deals with a single, relatively powerful seller such as cultural institution and many relatively weaker customers (citizens of the city divided by the border), author states that cultural institution investments to have a greater impact than customer investments in inducing positive migration because the "[customer] perceives such investments as a credible pledge" to the relationship (Jap and Anderson 2007). This perception results in greater relationship strength, in that the Polish or Czech recipient of the cultural offer knows that the cultural institution will sustain economic consequences if the relationship ends (Anderson and Weitz 1992). Moreover, author expects a positive interaction between cultural institution and customer investments. Reciprocal action theory suggests that when both partners provide resources, the opportunity to create synergistic value and self-reinforcing interdependence increases (Kozlenkova, Samaha, and Palmatier 2013). Therefore, cultural institution investments, and then customer investments, should have the greatest impact in terms of enhancing the endowment mechanism by providing the necessary resources to exploit opportunities and build a protective shield of interdependence. The result of these actions is a long-term and strong relationship that is communal in nature.

The in-depth individual interviews carried out in the city Cieszyn-Czech Cieszyn show that Polish and Czech managers of cultural institutions differ, for example, in the tools of the marketing. According to Polish experts, the key instrument for establishing and strengthening relations is promotion, in the opinion of Czech respondents it will not be promotion but product. Therefore, the hypothesis that the Polish and Czech managers and employees of cultural institutions located in the cities divided by the border from marketing tools such as product, price, place, promotion and people find product as the most important instrument in the process of establishing and strengthening relations with Polish and Czech citizens - recipients of cultural offer is not confirmed. The cultural institutions in the cities divided by the border should balance the views on the cultural offer, including claims that it should be modified and adapted to the needs of the recipient from the neighbouring country, and the views that the cultural offer should be addressed primarily to residents

of their own (national) side of the city and the recipient from the other side of the border should be obtained only through properly conducted promotional activities.

Of course, the above considerations do not exhaust the problem, rather, they are only a modest contribution to further research. Cities divided by the border in Europe constitute a very heterogeneous category, which is internally diverse in many respects. In many cases, the only element connecting them with each other is the fact that there is an international border dividing the city into two parts. Therefore, the results and research conclusions presented in the article cannot be generalised to all cities divided by a border. They may, however, be a good starting point for building long-term relationship connecting cultural institutions with citizens of the cities, which are located in the European Union and the Schengen Area. The next step is to conduct similar research in the cities located on the external border of the European Union. The examination of various case studies and viewpoints should contribute more fully to the explanation of the phenomenon described.

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Green Marketing As An Instrument For Business Competitiveness: A Theoretical Contribution

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Abstract

Green marketing has been an important academic research topic for at least three decades but few studies have focused specifically on green branding. A green brand identity is defined by a specific set of brand attributes and benefits related to the reduced environmental impact of the brand and its perception as being environmentally sound. A strategy of green brand management should provide benefits to environmentally conscious consumers and sustainable. Therefore, the present manuscript focuses on green marketing and green consumers, with the intention of contributing preliminarily to a greater knowledge of this marketing segment in the management of companies' brands. From a theoretical perspective, the present study intends to assert itself as instrument to aid future studies and development of green marketing strategies at the business level. The preliminary results seem to show the growing recognition and the high importance that this market segment presents for organizations (for profit and non-profit).It employs an interdisciplinary perspective, with contributions to management (of green marketing products or services) and marketing (i.e., segmentation). In order to further this study and facilitate the comparison of results, it should be extended to other specific sectors (e.g., tourism). This study intends to contribute to the development of scientific knowledge in the area of green marketing, consumer behavior and brand management.

Keywords: Green Marketing, Green Consumer, Brand Management, Consumer Behaviour

Introduction

Environmental concerns and consumer demand for environmentally friendly products have led to the emergence of a new marketing philosophy called green marketing. The great forces behind the green marketing are the demand for green products coupled with concern for the environment (Hartmann et al., 2005). On the other hand, companies seek to balance their sales and profit objectives with social and environmental concerns (Peneda de Oliveira & Sousa, 2020). Academic investigation of green marketing has a long and rich history. Some papers from multiple disciplines have examined various stages in the green purchase decision making process (e.g. Peneda de Oliveira & Sousa, 2020; Ferreira & Sousa, 2020). Nowadays, the decision-making power is in the customer: it is the consumer who chooses where to buy and how to pay and, from internet searches, finds information about the product

that he wants to acquire and solves his doubts (Silva et al., 2019). Green Marketing must focus on minimizing environmental damage, and not necessarily to eliminate it. For this reason, Green Marketing appears as a way of adding value to products and services whose consumers respect the environment and value companies that also do so, adopting programs that look out for the protection of the environment. From a theoretical perspective, the present study intends to assert itself as an instrument to aid future studies and development of green marketing strategies at the business level. The preliminary results seem to show the growing recognition and the high importance that this market segment presents for organizations (for profit and non-profit). It employs an interdisciplinary perspective, with contributions to management (of green marketing products or services) and marketing (i.e., segmentation). In order to further this study and facilitate the comparison of results, it should be extended to other specific sectors (e.g., tourism). This study intends to contribute to the development of scientific knowledge in the area of green marketing, consumer behavior and brand management.

Literature Review

Green Marketing

The concern with the environment mobilizes the global market, which affects organizations that want to continue in the current business market, however, it is essential to add social responsibility, the economic situation and sustainability to provide services and products required by consumers and the Green Marketing appears as a tool that can facilitate and inform the issues that are decisive for conscious consumption. The term Green Marketing came up in the year 1970, when AMA discussed the impacts of marketing on the environment. At that time, the term was defined as the "study of the positive and negative aspects of marketing activities in relation to pollution, energy depletion and non-renewable resources."

Polonsky (1994) wrote an article considering that Green Marketing consists of all activities aimed at producing and facilitating the commercialization of products or services, with the aim of satisfying human needs and desires, so that they occur with minimal impact on the environment. This second point is important for consumerist humanity by nature and that plays a harmful role to the environment. Thus, Green Marketing must focus on minimizing environmental damage, and not necessarily to eliminate it. For this reason, Green Marketing appears as a way of adding value to products and services whose consumers respect the environment and value companies that also do so, adopting programs that look out for the protection of the environment (Vieira et al, 2005). Kotler (1995) defined Green Marketing as a movement for companies to create and place on the market products that are environmentally responsible in relation to the environment. Green Marketing incorporates a wide range of activities, including product modification, changes in production processes, changes in packaging, as well as changes in advertising. These activities should aim to guide, educate and create desires and needs in consumers, with the aim of causing less environmental impact, in addition to achieving the organizations' marketing objectives. According to Ottman and Jacquelyn A. (1994) and Polonsky (1994), Green Marketing is exercised by the efforts of organizations to satisfy the expectations of green consumers that determine lower environmental impacts throughout their life cycle. According to Gonzaga (2005) the activities of Green Marketing should be aimed at the development of ecologically oriented products that are less aggressive to the environment, that use less energy, produce less waste, consume less raw material, are easier to maintain, have more packaging be distributed without risk and allow disposal without waste. According to Valério (2006), Green Marketing can be defined as an activity that aims to focus on the needs of ecologically conscious consumers and contribute to the creation of a sustainable society. Dias (2007) defines Green Marketing as "a set of communication policies and strategies designed to obtain a competitive advantage for the products or services that the company offers in relation to competing brands, thereby managing to increase its market share, consolidating competitive positioning." In this context, Green Marketing is a very important tool, as it establishes ecological and competitive consumption patterns. According to Valério (2001) when using Green Marketing strategies, the organization can increase its credibility and legitimacy, define its personality, area of operation and image, in addition to adding value to the brand with the various buyers. However, this will only be a consequence of all the effort and investment in improving the quality of its products and in the concern for the environment and sustainability. In short, Green Marketing is characterized by a strong sustainable influence within organizations, involving all sectors

until it arrives as a product or service for consumers, explaining its real intention of preserving the environment, attracting and satisfying the target audience, and acting as a strong competitive variable. Companies have never been more concerned with the environment. There are several reasons proposed to explain the growing use of Green Marketing by companies. Five possible reasons are presented:

1. "Organizations perceive environmental marketing as an opportunity that can be used to achieve their goals" (Keller, 1987; Shearer, 1990); 2. "Organizations believe that they have a moral obligation to be more socially responsible" (Davis, 1992; Freeman & Liedtka, 1991); 3. "Government agencies are forcing companies to become more socially and environmentally responsible" (Naag, 1990); 4. "The business environment and competing companies put pressure on organizations to use green marketing activities" (Naag, 1990); 5. "Cost factors associated with waste disposal, or material reductions, force companies to change their behavior" (Azzone and Manzini, 1994).
According to Peneda de Oliveira and Sousa (2020), market orientation and market segmentation are two aspects that marketers should pay close attention to. The growing number of organizations that enter the green market leads to a need of adapting these strategies (Paco et al., 2009). For the aforementioned authors, segmentation is the selection of a set of variables or characteristics used to assign homogeneous groups to individuals. These segments can be defined by reference to descriptive characteristics as easily observable as geographical location or demographic characteristics. The "greener" segments should be studied since they present characteristics very different from other segments. They must study how they will attract and position themselves for these consumers (Peneda de Oliveira & Sousa, 2020). The main challenges for green marketing are awareness of environmental causes, increased consumer demand and selectivity, and increased competitiveness. Companies that do not respond to the "green challenge" with safer products for the environment are running the risk of losing some credibility in the eyes of consumers most concerned about environmental issues. In addition, companies that use green marketing strategies can take advantage of the many opportunities presented by environmental consumerism (Paco et al., 2009).

Green Consumer Profile

Quality of life is called into question when day-to-day habits start to interfere with the environment, compromising a citizen's future (Silva et al., 2019). Thus, the concern with the environment has led to a change in the consumer's profile and in his choice of a product or service on the market. "Consumers must be the first to change their consumption habits, that is, without their participation and understanding, the‘ culture ’of current consumption is unlikely to change. The most important thing is that consumers have the perception that we live in a global world and that the application of sustainability habits must be a priority in their decisions for the good of all "(Caetano et al., 2008). In other words, the green consumer is detected from the moment he associates the purchase or consumption of products with environmental preservation. The individual believes that it will make a difference when investing and using pro-environmental actions that will be effective in combating environmental degradation. He is aware that he has the purchasing power and choice in his hands, understanding that from the moment he begins to reject certain products that are not ecologically correct, he can decrease or even end the production of products that help in environmental degradation, thus contributing to the sustainable development of the planet.

In the 60s and 70s it was often accepted that to protect the environment it was only necessary to consume less, thereby saving energy and natural resources. Scientific and technological developments have excused excesses from consumption, as it has become possible to produce clean energy and control pollution at the source. However, in recent years, as mentioned by Paço (2005) "consumers, despite continuing to want to see their needs met, now feel that they must take a more active role in protecting, preserving and conserving the environment" and as that environmental concerns, the scarcity of natural resources and the need to protect the planet have gained importance, instead of limiting consumption, consumers have sought to find and purchase environmentally friendly products, replacing conventional ones. Thus was born the green consumer, that is, the consumer with environmental awareness (Schlegelmilch, Bohlen and Diamantapoulos, 1996), which aims to meet the needs of current consumers without forgetting the needs of future generations (Antonides and Van Raaij, 1998).

More and more individuals are expressing their environmental awareness through the products they buy (Sousa et al., 2020). Thus, the green consumer is one whose daily behavior is influenced by environmental concerns, which are reflected in the moment when he needs to decide which product to buy, and who bases his purchase decisions, at least in part, on environmental criteria (Hartmann and Ibáñes, 2006), which is concerned with the production process, in terms of consumption of scarce resources and with the waste produced and its deposition (Zinkhan and Carlson, 1995).Paço (2005) also mentions that the green consumer is one who is concerned with purchasing products that in the whole production process are less harmful to the environment and do not threaten or adversely affect the health of people and countries; on the other hand, he is a type of consumer who is concerned with life on earth, with others, with the search for less destructive economic development and with the desire for a more just world.

Another definition of green consumer is presented by Shrum, McCarty and Lowrey (1995) who define him as that individual whose purchasing behavior is influenced by environmental concerns. For Banerjee, Gulas and Iyer (1995), being a green consumer implies having a lifestyle that causes a minimal harmful effect on the environment. These consumers are willing to pay more for green products such as food, because they believe that they are more tasty and healthy, and to buy appliances with less energy and water consumption, because they associate this act with their own benefit, whether for more health or savings (Ginsberg and Bloom, 2004). Vermillion (2010) states that although consumers are concerned about the environment, this concern only translates into the purchase of green products if they obtain an immediate benefit that goes beyond the argument of environmental protection. He also argues that many consumers buy green products in an individual attempt to be more environmentally friendly.
Mujumdar and Zhang (2009) argue that, in addition to what the market has offered to consumers, that is, goods and services that seek to improve their well-being, a market for social recognition of environmental behaviors should be chosen and developed. An individual will not behave in an environmentally friendly manner if he is not aware that he will be recognized for it. However, if the behaviors depend on rewards or punishments, in the long run they will not be maintained. On the contrary, social recognition is durable; more than creating laws, creating a market based on recognition can save natural resources and the environment.

Green consumers are consumers who prefer products that are not likely to endanger human health or damage the environment (Tekade & Sastikar, 2015). In this study, green consumerism is conceived as a broader concept than green consumers. Green consumerism includes a broader social awareness of green consumer behaviors, where green consumers are the main drivers of green consumerism (Peneda de Oliveira & Sousa, 2020). Almeida et al. (2012) present the consumer behavior as the reaction of people or groups before, during and after, buying products, goods and services. According to Peneda de Oliveira and Sousa (2020), it is a process that occurs for several reasons, of an internal or environmental nature that interfere with the purchase decision. It is part of the human condition because it seeks to satisfy humankind needs, from the most basics to the most superfluous. The study of consumer behavior makes it possible to understand the day - to - day routines of consumers and their daily lives as well as how they relate to products and services.

Green Marketing Communication

Entrepreneurs recognize the creation of an ecological market that arises from the will of consumers, which combines with the appearance of new parties, legislation as well as citizen movements. It has also stimulated the appearance of new companies with “environmentally friendly” behaviors and products and others that have reversed their course. Zenone (2006) says that in recent years, investments made by companies in environmental activities have been getting more and more attention, both by the media and by society in general.

For Caetano et al. (2008) the performance of marketing was initially limited to operationalizing the marketing mix, that is, the 4 P's (Product, Price, Place, Promotion) through the product, price, distribution and communication, but the importance of the customer was quickly perceived and this

being followed up in the after-sales phase. The importance of the product was supplanted by the attempt to understand the needs of the market, the competition and the target audience to whom to direct the positioning strategy. However, several P's were being added to the original marketing mix, the P of Participation being noteworthy, that is, participation and consumer power, which allows you to choose between brands, sales channels, prices, to speak well or badly about the brands and companies / organizations that share the same market, etc.

Kotler and Keller (2006) believe that modern marketing is required not only to create quality products at a good price and make them available on the market, but also to communicate with current and potential interested parties and the general public. In this way it becomes clear that communication is essential: knowing who to communicate with, what to communicate with, what means and objectives is essential for the success of the entire Marketing strategy.

The importance given by the media to the theme of ecology, sustainability has led to a growing concern among the population. This concern leads to greater environmental awareness, which ends up influencing the purchase, that is, they verify whether a product is ecological and sustainable. Consequently, companies need to act immediately to respond to this demand, which can use this factor as being differentiating and competitive. In this sense, Gonçalves (2009) refers that communication professionals increasingly feel the challenge of integrating messages focused on corporate responsibility in their communication strategies, in a serious and creative way. New forms of communication have been modified and developed, in a world where information is made available in record time, it is important to know how to communicate and how to do it in a transparent way. Kotler (2009) states that in this context of change, marketers must understand the fundamental elements of effective communication, tailor campaigns to specific segments, niches or even individuals and use new technologies to encourage consumers to seek information and products.

Environmental communication is currently used as a differentiation strategy and at the same time as innovation by companies and certain products, which, according to Alves (2005), adds emotional benefits to products, while reinforcing the primary benefits associated with environmental attributes, thus increasing the value perceived by the consumer. In environmental terms, the companies' communication is directed to the stakeholders, so that they perceive the company's effort and its contribution to the creation of a more sustainable society. According to Pietro Nigra "the secret of a successful marketing campaign is to guide it to the right person, with the right message, through the right channel".

According to Peneda and Sousa (2020), one of the main reasons why organizations bet on Green Marketing and other actions for the environment is to improve their image. However, for these authors organizations should also encourage environmental education and practices more clearly because environmental initiatives favor positively relationships with consumers and thus create such a competitive advantage and improved image. A consumer can only value the ecological attributes of a product when he knows them well (Meyer, 2001). For example, Paiva & Proenca (2011) see the consumer with some difficulty in the analysis of information, this means that they cannot clearly distinguish whether a product is environmentally friendly or not. This is one of the reasons why communication should be able to inform consumers about the product and its use and confection (Paiva & Proenca, 2011). For Eidt et al. (2017) organizations are not only required to improve the efficiency of their environmental measures, but also to improve their communication. The organizations that adopt Green Marketing strategies put in their communication actions sustainability messages, showing the market the value of their brand and its products (Granero & Couto, 2014). The credibility of the message is one of the most important points of communication (Paiva & Proenca, 2011).

Socio-Environmental Responsibility Of Companies

With the growing interest of citizens in getting to know better the agents that operate in the market and their business activities, in addition to production and commercialization, public opinion over time has been forming and sharing ideas about the performance of these entities at a social level. Being “socially responsible” has become a necessity, which can help to strengthen the credibility of companies.

According to Caetano and Gouveia (2009) “companies, in particular, are expected to adopt strategies, policies and organizational processes that transversally implement a culture of sustainability, choosing it as a goal of continuous improvement, not only internally, but also of propagation of this culture to its entire area of influence, particularly suppliers and customers ”. Thus, it will not be a way to look good in society, but a commitment to Sustainable Development, as a possible way to ensure, in the medium and long term, leadership in responsible competitiveness and the creation of value for all stakeholders. Marketing has a social responsibility that translates into seeking to direct consumer needs and desires towards products that are less harmful to the environment (Sousa & Silva, 2019). There is a growing number of companies that engage with green marketing strategies as part of a more comprehensive social responsibility plan.

Pranee (2010) states that marketers perceive green marketing not only as an opportunity to achieve business goals, but also as a way to fulfill a moral obligation - to be socially responsible. The European Commission defines corporate social responsibility (CSR) as “a concept according to which companies, on a voluntary basis, integrate social and environmental actions in their activity and in their interaction with their stakeholders. They are companies that decide to go beyond the minimum requirements and obligations resulting from collective agreements in order to meet the needs of society. Through CSR, companies of all sizes, in cooperation with stakeholders, can help to reconcile economic, social and environmental ambitions”. In response to “the growing public expectations regarding the impact of business activity on society and the environment”, in the Green Paper - Entrepreneurship in Europe - presented in 2003, by the Commission of the European Communities, it was mentioned that many companies had adopted formal strategies of responsibility social "which implies the voluntary inclusion of social and environmental aspects in the respective operations and in its relations with stakeholders". Gonçalves (2005) states that whenever a company seeks better ways to induce citizens to adopt socially responsible behaviors, it develops social marketing programs, corporate citizenship, community relations, global citizenship or corporate social responsibility. These initiatives, decided by free will, benefit not only the internal public of companies, but society in general. Companies can also use green marketing in an attempt to address issues related to costs or profits. The Elimination or reduction of damages to the environment, such as those generated by the release of oils that are contaminating the environment are becoming increasingly expensive and, in some cases, very difficult. Therefore, companies that can reduce harmful waste can incur substantial cost savings. In trying to minimize waste, companies are often forced to reexamine their production processes. In these cases, companies often develop more effective production processes that not only reduce waste, but also reduce the need for some raw materials. Caldwell (1999) reports large savings incurred by a CocaCola bottler in Mexico after implementing a reverse logistics management system. These gains came from a better coordination between promotions and expected peaks in the return of bottles, reducing the need to produce new bottles and reducing the production of non-returnable bottles.

Another example is from giant AmBev, a beverage manufacturer that reduced the volume of water needed for beer production by almost 20%. In addition, it sells practically everything that remains from the manufacturing process, where the malt bagasse becomes animal feed, the yeast is transformed into spices and the glass is recycled to give rise to new bottles. In 2009, the sale of these by-products represented an extra revenue of R $ 78.8 million (Barrucho, 2010). This serves as a cost savings, since both waste and raw materials are reduced. In other cases, companies try to find solutions after the production process, instead of reducing waste. In these situations, companies try to find markets or uses for material waste, where the waste produced by one company becomes a necessary input for the production of other companies. A Brazilian example of this is companies that collect demolition waste and transform it into by-products for civil construction. It is a vision of improving environmental quality as a result of control (John, 2000). Behind the investments in sustainable business there is the certainty that products with less environmental impact promote more wealth for companies and become stronger and more competitive in the market.

Conclusions and Future Research

Until recently, Green Marketing, also known as Environmental or Ecological Marketing, was not in the plans of most companies. Nowadays, companies already see it as a strategic opportunity to

communicate and promote their services or products.The implicit demand by consumers has led many companies to explore this change in a sense of business opportunity. However, this does not mean that all companies are committed to environmental activities and that they really improve their behavior with the environment. In some cases, many companies "cheat" consumers in an attempt to gain market share. Some companies embark on the green movement without precisely considering their strategy in the future. In an attempt to avoid these problems, several regulations were created to ensure that all information was adequate for consumers so that they can assess the environmental claims used by companies' marketing campaigns.

However, communication / advertising continues to be valued, given that, despite the fact that the environmental appeals communicated elude more than they inform, they are not willing for the ads to disappear. Television remains the main source of information, possibly due to the role, still very important, that it continues to have in family life in Portugal. Green Marketing should be used in order to reconcile consumers' short-term desires, such as their long-term well-being. This strategy serves to create a dividing line between those companies that will be able to obtain a competitive advantage over competitors and achieve long-term survival and those that have tried to react late to this increasingly growing change and may not exceed that moment. The world has changed and so have people and companies, they need to continue to implement change if they want to remain in the market successfully. Companies that do not respect the environment are subject to fines by the state, however there is still a long way to go, however, this has negative effects and may end up losing its customers and without customers a company cannot survive.

For future research, the ethnographic experience of the researchers allowed them to understand the phenomena of brand attachment with the green products and the consequent effect on satisfaction and loyalty. These conclusions are based on the researchers' perception derived from the ethnographic research. Future research might also profitably concentrate on the further development of the several constructs, particularly the emotional dimension of green brand associations. The method used could be combined with others, such as semantic differential scaling, which should in turn result in a better assessment of dimensions (Peneda de Oliveira & Sousa, 2020). This will in turn result in improved understanding of the relationships between the considered constructs and other variables - particularly involvement, which is considered a fundamental moderator of attitude formation processes in revised models. Involvement with environmental issues constitutes an essential factor in environmental behavior. Future studies should aim to develop standardized instruments for measuring the perceptual and attitudinal effects of alternative green positioning strategies, which finally should lead to the development of more competitive green branding initiatives. Therefore, future studies can set forth toward the longitudinal study to find out the differences of green brand image, green satisfaction, green trust, and green brand equity in the different stages of the environmental regulations in the world.

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Importance of Risk Assessment for Running Events Organization On the Example of Half Marathons in Poland. Case Study

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Abstract

Research Question: The aim of the research was to determine and assess Polish long-distance running events' (half marathons') risk factors (the timespan of runs was limited to 2017 and 2018).
Research Methods: Ten major half marathons held in 2017-2018 in Poland were considered. Ten experts carried out the multi-stage risk factor identification for the organization of a large-scale run with the use of the Delphi method, while 21 practitioners - representatives of the ten events' organizers conducted risk assessment. Furthermore, the Cronbach's alpha statistics was applied to establish the questionnaire's reliability. The analysis was concluded with the factor analysis of the most significant risks. **Results and Findings**: In the context of the outcome and probability of a given risk factor the following risks appeared to be dominant: financing marathons, organizational issues (including the start date), the acceptance of the event by local community, the organization of the finish line, delayed start, cyber security, disclosure of personal data and problems with the measurement of time.
Implications: The risk assessment results proved to be ideal input data for efficient sport events' risk management, especially in the context of mass runs. Professional risk management based on the risk factors database created on the basis of the research most frequently leads to providing the highest possible safety and satisfaction levels for all stakeholders (primarily: participants, organizers, local society).

Keywords: Risk Management, Risk Management in Sport, ISO 31000, Safety Management, Satisfaction.

Introduction

Not only is recreational running a physical activity but also amounts to the modern lifestyle model for a significant portion of the society. It is relatively inexpensive, as it does not require any special sports facilities (Petridis, 2015).

Relevant data suggest that 58% of amateur runners in Poland are willing to participate in professional running events (Raport Polska Biega, 2014). Such participation needs the implementation of training plans and significant time spending of both runners and their families. It also contributes to the growing sport tourism and the emergence of new risks (Hitchings & Latham, 2017).

In 2010 almost 800 different runs were registered in Poland, while in 2015 we could observe an increase of nearly 132% in comparison with 2010 (1,856 events). More than 2,500 runs were registered in Poland in 2018 (www.maratonypolskie.pl). 74,971 runners participated in the largest 12 Polish half marathons in 2019 (the number excludes the participants who did not complete the run). It is a 2% decrease in comparison with 2018 (76,598).

The decreasing number of finishers accompanied by the growing number of runs on the sport market encourage their organizers to better the quality and efficiency of the events by implementing professional management tools (Leopkey & Parent, 2009a).

Professional management is a necessary element for the efficient attainment the objective of proper organization the run (Piekarz, Jenkins, & Mills, 2015). Threats to the safety of participants and viewers, the risk of a terrorist attack, and the need to protect personal data are increasingly important nowadays (Lamont & Kennelly, 2012). An early understanding of the risk level, various risk issues, complexity and uncertainty related to risk management supports the determination of the project scope and the eventual success of the running event (Nohr, 2009).

Formal management of the project, which is the organization of a sporting event in compliance with a recognized methodology, is not implemented by 51% of sports events' organizers in Poland. 78% of them do not formally estimate the risk of organizing their events (Miśniakiewicz & Łuczak, 2014). It is likely that organizational decisions are not made in the optimal manner, no significant risks are identified and, consequently, they cannot be properly mitigated (Hanstad, 2012). As a result, a sports event will probably not produce the expected benefits and its course may be significantly disturbed (Helms, 2011; Reid & Ritchie, 2011). Such disturbance can lead to further risks linked with damages to the organizer's reputation and participant dissatisfaction (Nohr, 2009; Moyle, Kennelly, & Lamont, 2014). Major incidents and deaths in top runs have obviously contributed to exaggerated public worries about their safety and made their organizers avail of professional risk management (Bjarnason & Cannell, 1999).

There are no significant mandatory legal requirements for risk management in large-scale runs today but it surely allows for the identification, assessment and mitigation of risks (Ammon & Brown, 2007).

The possible answer the question of the extent running event organizers can provide a safer environment for the participants and manage the risk of their events certainly amounts to a significant research challenge.

Literature on Risk Management of Running Events Organization

Risk can be seen as "any future incident that will negatively influence the event" (Bowdin, Allen, O'Toole, Harris, & McDonnell, 2006), whereas risk management as a tool for "minimizing liabilities and maximizing opportunities" (Silvers, 2008).

Sporting events occur in conditions of uncertainty caused by both internal and external factors (DSDM Consortium, 2010). Sometimes risk and uncertainty are considered synonymous (DSDM Consortium, 2010, p.12). The ISO 31000 standard defines risk as the effect of uncertainty in pursuing a set goal (ISO 31000, 2018) and emphasizes the management of diversified risk. Context determination, risk assessment (including risk identification, analysis and assessment) and risk treatment are essential parts of risk management (ISO 31000, 2018).

According to relevant literature risk management is a proactive process, as it aims at controlling the effect of unforeseen issues or incidents taking place during the event (Hanstad, 2012; Ammon & Brown, 2007; Łuczak & Miśniakiewicz, 2011).

Risk management in large-scale sporting events gains importance and should be examined from different angles (Emery, 2010; Moyle et al., 2014). Most papers on risk management and reports on sport event risk notably come from the US, Canada and Australia (Helms, 2011; Nohr, 2009; Masteralexis, Carol & Hums, 2014). In Europe the problem of the organization of large-scale running events and their risk assessment have been rarely researched (Łuczak & Miśniakiewicz 2014; Kose, Argan & Argan, 2011).

Researchers have focused on injuries (Hespanhol, Pena Costa, & Lopes, 2013; Linton & Valentin, 2018), security and crowd control (Giulianotti & Klauser, 2010), effect of terrorism (Toohey & Taylor, 2008; Giulianotti & Klauser, 2010), facility management (Preuss, 2007), actual losses caused by an event (Crompton, 1995), spectator aggression and hooliganism and lack of organizational planning (Getz, 2002). The overall impact of a sporting event on stakeholders (Leopkey & Parent, 2009a), risk

management strategies by stakeholders (Parent & Séguin, 2007), as well as practices (manager profile, skills required and critical success factors) in sporting events (Emery, 2010) have also been highlighted.

In addition, professional literature identifies risk issue categories by stakeholder groups. Research have provided the list of 15 risk issue categories significant when coping with risk management in sporting events: environmental, financial, human resources, infrastructure, interdependence, legacy, media, operations, organizing, participation, political, relationship, visibility and human resources. The present research in the assessment of risk management in large-scale running events originates from these considerations (Leopkey & Parent, 2009a).

Researchers mostly have analyzed sporting events of international importance embraced in the social, economic, promotional or planning context (Boo & Gu, 2010).

Methods

This paper was preceded by the preparatory research (1) of 2017 and the proper research (2) conducted in 2017-2018. They aimed at assessing risk and analyzing data in the context of determining the type of managerial decisions within half marathon organization. The research resulted in: (1) the identification of risk factors related to organizing 21K runs, (2) the assessment of risk factors along with factor grouping and prioritization (table 1).

Table 1: Characteristics of preparatory and proper researches

	Preparatory research	Proper research
Research method, analyses	Delphi method	Reliability analysis, risk assessment; cluster analysis, factor analysis
Research instrument	Discussed questionnaire	Questionnaire
Size of sample population	10 experts	31 representatives of 10 21K Runs
Duration	2017	2017-2018
Research objective	Identification and grouping of risk factors related to organizing marathons. Preparation of the proper research	Risk assessment and analysis in reference to organizing marathons
IT tools, form of research realization	E-mail contact, meetings	e-risk app

I created a list of risk factors on the basis of the relevant professional literature (Leopkey & Parent, 2009a), own experience and legal requirements in Poland and classified them with the use of the Ishikawa diagram (Łuczak, Matuszak-Flejszman, 2007). Next, the list was discussed by experts (via Internet). Most of the experts exchanged remarks several times (5-9), which resulted in the modification of the factor list. These actions became the basis of the research questionnaire. The risk factors were assessed within the proper research on the scale ranging from 1 to 4 according to their significance and likelihood (table 2).

Table 2: Characteristics of selected values in the proper research.

Scale	Likelihood		Significance	
1	Marginal and little (0-30%)	• Risk will not occur or will occur occasionally • Expected number of occurrences within a period: fewer than 1 time in 5 editions.	Insignificant	Difficulty in realizing a sporting event, which influences its course and objective realization in an insignificant way

2	Medium (31-60%)	• Risk occurrence is real but does not exceed 60%. • 1 occurrence in the last two editions.	Medium	Clear and tangible impact on the organization and course of a sporting event as well as objective realization
3	High (61-80%)	• There are rational premises that the risk will materialize. • It occurred once in the last edition.	Large	Significant impact on the organization and course of a sporting event as well as the realization of objectives, including the ones related to health, large impact on an event's reputation
4	Very high (81-100%)	• There are rational premises that the risk will almost surely materialize. • In the last edition it occurred at least 2 times.	Very significant	Related to health and life of participants, the necessity to terminate the event, no objectives are achieved.

The research was supported by the e-risk IT platform (e-risk.pl). It allows for multi-dimensional configurability in the context of methodology and risk factors. All 21K runs were held in cities on flat or moderate terrain in Poland. The events were similar in many aspects, e.g. climate conditions, participant profile, the declared standard of organization, legal regulations relevant to the organization process. The factors analyzed in the paper led me to the conclusion that each expert's assessment should be treated individually and not a concrete half marathon.

Risk assessment aims at determining priorities related to additional security measures, which reduce risk to an acceptable level. These priorities were established in the statistical analysis of factors with tagging the major ones.

Reliability analysis (Cronbach, 1951) was applied with the use of the Cronbach's alpha statistics to confirm that the research instrument's (a questionnaire prepared during the preparatory research) adequacy (Cronbach, 2005).

The factor analysis was used to distinguish risk factor groups. This method is considered unobjective, nevertheless, it is very important while exploring the structure of varied data (Balicki, 2013). It allowed for categorizing observations in an adequate way so as the groups were coherent due to variables (internally cohesive), but, at the same time, dissimilar to others (i.e. characterized by external isolation – Walesiak & Gatnar, 2016).

At the stage of selecting variables I decided to examine the impact of factors of the highest risk. Therefore, variables were grouped on the basis of the arithmetic average of risk assessment, and then I applied both scree plot and the minimal risk value criterion at level 4 (in order to distinguish the risks larger than minimal probability and consequences).

I also deemed the selection of insignificant variables is an incorrect approach as it may hinder the emergence of a coherent or relevant class difference within the set. The variables were then standardized (with the average and standard deviation) (Wilk, Pietrzak, Bivand, & Kossowski, 2015).

The factor analysis aimed at distinguishing a new set of variables – a set, which is less numerous than the original one, but can expose its variability. These factors should retain a significant portion of information included in the original variables (Walesiak & Gatnar, 2016).

Risk Assessment Results and Discussion

The research led to determining 75 risk factors grouped into nine sets: Safety (G1), Budget and finance (G2), Information (G3), Comfort and satisfaction of participants (G4), Other organizational aspects (G5), Start package (G6), Recovery and energy support (G7), Reputation (G8), Environment and force majeure (G9). Within the factor groups the specific risk factors were indicated.

Table 3: Groups and risk factors – the result of the preparatory research

G1. Safety	G2. Budget and finance	G3. Information
1.1. A serious accident on the route 1.2. An intrusion of a third party onto the running route 1.3. A participant of insufficient health condition 1.4. A collision between people, people and objects, etc. on the running route 1.5. A terrorist attack 1.6. Intentional pollution of food/beverages available along the route/in the finish zone 1.7. Insufficient medical support	2.1. Insufficient income from participant fees 2.2. Insufficient funding from sponsors 2.3. Insolvency 2.4. Lack of profit at the planned level 2.5. Time overlapping with another rival event 2.6. Large participation fee	3.1. Obsolete news on the website 3.2. Lack of/insufficient contact with potential participant 3.3. Insufficient promotion/information on external web sites 3.4. Unintended disclosure of personal data 3.5. Personal data theft 3.6. A cyber attack – modification, blocking of the website 3.7. Lack of a clear, interactive map of the route 3.8. Lack of early information about the result
G4. Comfort and satisfaction of participants	**G5. Other organizational aspects**	**G6. Start package and medal**
4.1. Lack of free accommodation 4.2. Poor organization of the deposit office 4.3. Difficulty in reaching the start of the marathon 4.4. Lack of parking space near the start 4.5. Inability to receive start packages on the day of competition 4.6. Mass start (not in waves) 4.7. An inappropriately narrow route, narrows 4.8. Lack of/unclear information about the covered distance 4.9. An unattractive route 4.10. An unattractive export, a poorly-located expo 4.11. Lack of access to showers after competition	5.1. Inappropriate running route identification 5.2. Insufficient access to toilets 5.3. Unattractive catering at the finish 5.4. Impossibility of gathering spectators in the start and finish zones 5.5. Inappropriate organization of the run – jams after the start 5.6. Inappropriate organization of the finish 5.7. Lack of the appropriate atmosphere during the event 5.8. Problems related to organization, time of the event etc. with the local community and the administration 5.9. Delayed start 5.10. A smaller than usual number of nutrition points 5.11. Inappropriate organization of nutrition points 5.12. An insufficient number of volunteers 5.13. Lack of volunteers' engagement 5.14. Faulty time measurement	6.1. An unattractive start package 6.2. An unattractive design of the medal 6.3. An insufficient number of medals 6.4. An insufficient number of start packages

	5.15. Lack of established procedures 5.16. Limited human resources 5.17. Incompatibility of the running route capacity with the number of participants	
G7. Recovery and energy support	G8. Reputation	G9. Environment and force majeure
7.1. Lack of access to massage in the finish zone 7.2. Lack of appropriate hydration of participants 7.3. An insufficient amount of water at recovery points 7.4. An insufficient number isotonic drinks at recovery points 7.5. An insufficient number of energy gels, fruit etc. at recovery points 7.6. Random choice of nutritional products at recovery points and the finish 7.7. Low health quality of the offered nutritional and recovery products 7.8. Lack of nutritional awareness of participants 7.9. Lack of nutritionists' support 7.10. Lack of/insufficient number of cooling points along the route	8.1. Unfavorable media information on the national scale 8.2. Unfavorable media information on the local scale 8.3. Lack of information about the event in the national media 8.4. Lack of information about the event in the local media 8.5. An insufficient number of participants 8.6. A rival local event	9.1. Downpour 9.2. Strong wind 9.3. An overly low temperature 9.4. An overly high temperature 9.5. Difficult conditions of the running route 9.6. Traffic in the direct vicinity of the event 9.7. Force majeure

Experts highlighted the significance of factors linked with the physical safety of participants and organization. They also underlined risks relating to accidents on the route, bad health condition of participants, as well as terrorist and bioterrorist threats. Moreover, personal data protection, especially compliance with GDPR were considered significant. Experts clearly noticed the risk of not assuring participant satisfaction, as they took account of issues linked with start packages, start organization, route attractiveness and deposit organization. Finally, the risk factors resulting from the preparatory research were used in risk assessment conducted in the proper research. The grouping was arbitrary and then discussed with experts. The Cronbach's alpha statistics result reached the level of 0.933 (21 positions). In light of the classical interpretation the coefficient should have the minimum value of 0.6, whereas the preferable value of the coefficient is approx. 0.9. Therefore, the internal cohesion of the research instrument was confirmed.

The presentation of the proper research results concentrated on the classical approach to risk assessment – the statistical analysis of risk factors' average values accompanied by tagging the ones of the highest risk and largest frequency.

The scree plot led to the emergence of 5 risk factor groups: (i) the most significant (15) – the average value from 5.10 to 6.23, (ii) less significant (21) – the average value from 4.14 to 4.94, (iii) neutral (18) – the average value from 3.14 to 3.90, (iv) of little significance (9) – the average value from 2.48 to 2.95, and (v) insignificant (13) – the average value from 1.33 to 2.24.

Respondents stressed the risk related to financing a 21K run (insufficient income, profit at an unsatisfactory level, insolvency), organization (limited human resources, inappropriate organization,

delayed start, incompatibility of the running route capacity with the number of participants), safety issues related to terrorist threats, cyber safety and participnt's health condition (table 4).

Table 4: The most significant risk factors of organizing a 21K Run

Code	The most significant risk factor	Average	Range	Standard deviation
2.2.	Insufficient funding from sponsors	6.23	7.53	2.50
5.16.	Limited human resources	6.03	5.00	1.56
5.8.	Problems related to organization	6.01	7.50	2.35
9.7.	Force majeure	5.97	6.00	1.96
2.5.	Time overlapping with another rival event	5.93	3.00	0.92
5.6.	Inappropriate organization of the finish	5.92	6.00	1.67
3.4.	Unintended disclosure of personal data	5.79	6.75	2.39
5.14	Faulty time measurement	5.77	7.50	2.55
2.1.	Insufficient income from participant fees	5.71	5.89	1.86
6.3.	An insufficient number of medals	5.71	4.50	1.45
2.4.	Lack of profit at the planned level	5.27	7.00	2.13
3.6.	A cyber attack – modification, blocking of the website	5.26	6.75	2.34
5.9.	Delayed start	5.26	3.44	1.00
5.17.	Incompatibility of the running route capacity and n° participants	5.17	5.50	1.69
2.3.	Insolvency	5.10	7.78	2.69

The selected factors with the average value of risk at 4.1 or higher (36 most important factors) were standardized. The cut-off reflected the factual evaluation. The declining graph of averages of specific variables may be treated as a scree plot. Hence, I could omit the variables whose importance was marked as marginal and which might have influenced the grouping after standardization (Guyon & Elisseeff, 2003).

The results suggested that emphasis be placed on specific factors while making organizational decisions. Problems with funding and organization (limited human resources) are critical. For participants and spectators, it is a festival, however, sport events disturb the life of local communities. Furthermore, the large number of events and the limited season frequently lead to a decrease in the number of participants due to rival runs organized at the same or similar time.

Respondents deemed the factors related to the half marathon budget and achieving objectives the most probable along with the ones linked with physical safety (an intrusion of a third party onto the running route), data protection (a cyber attack, disclosure of personal data) and organization (start and finish, issuing start packages).

It should be noted that I use factor analysis so as to structure data and identify specific interrelations. Within the analysis 7 components were identified, which explained 91% of data variability (table 6).

Table 6. Identification of components within the factor analys

	Total sum of squared loadings after rotation		
	Total	% variance	% accumulated
1	7.105	20.896	20.896
2	6.628	19.495	40.390
3	4.776	14.048	54.438
4	4.355	12.807	67.246
5	2.988	8.789	76.034
6	2.712	7.975	84.010
7	2.273	6.686	90.696

The risk factors explained by specific components were identified. The first factor mostly refers to issues directly linked with the route – its identification, time measurement, capacity, start packages, access to water (recovery) and weather. The second and third factors relate to budget issues and sports-unrelated questions, which may occur during the event – a terrorist attack, personal data theft, an intrusion of a third party onto the route, or problems with the deposit office (in competition). The fourth factor is associated with health problems of participants and competing with other running event (organized at the same time). The remaining factors include variables such as unintended personal data disclosure, or issues of too little interest from potential participants (table 7).

Table 7: Risk factor groups

Factor 1	Factor 2	Factor 3	Factor 4	Factors 5, 6 and 7
3.3. Insufficient promotion/information on external websites	1.5. A terrorist attack (an explosion, shooting, ramming)	1.1. A serious accident on the route	1.3. A participant of insufficient health condition	3.4. Unintended disclosure of personal data
5.1. Inappropriate running route identification	2.4. Lack of profit at the planned level	1.2. An intrusion of a third party onto the running route	2.5. Time overlapping with another rival event	8.5. An insufficient number of participants (too little interest)
5.6. Inappropriate organization of the finish (e.g. inability to finish freely)	3.6. A cyber attack – modification, blocking of the website	2.2. Insufficient funding from sponsors		8.6. A rival local event
5.8. Problems related to organization, time of the event etc. with the local community and the administration	5.16. Limited human resources	2.3. Insolvency		
5.12. An insufficient number of volunteers		3.5. Personal data theft		
5.13. Lack of volunteers' engagement		4.2. Poor organization of the deposit office		
5.14. Faulty time measurement		4.7. An inappropriately narrow route, narrows		
5.17. Incompatibility of the running route capacity with the number of participants		5.5. Inappropriate organization of the run – jams after the start		
6.1. An unattractive start package		5.9. Delayed start		
6.3. An insufficient number of medals				
7.3. An insufficient amount of water at recovery points				

9.1. Downpour				
9.4. An overly high temperature				
9.7. Force majeure				

It should be stressed that factor analysis aims at describing and arranging data. Factor analysis also helps the process of alternative risk factor grouping completed as a result of the preparatory research.

Conclusions and Future Research

The presented paper pioneered the systematic and methodological risk assessment of organizing Polish half marathons. The research allowed for creating a database of risk factors of long-distance running (75). It should unquestionably be continued in the context of taking mitigation actions as well as examining their efficiency.

The follow-up research has already begun. I plan to verify the efficiency of mitigation actions and study the estimation result in this light. Moreover, the research allowed for verifying the applied methodology (including the e-risk application). The study may be used as the source of methodology for any running event organizer.

The emerging industry of large-scale running events, as the example of Poland shows, needs a mature approach to risk management. Risk assessment from organizers' point of view seems to be a step in the right direction. From mass running event organizers' perspective, the analysis and assessment of relevant risks can help to develop more effective ways to minimize threats. It surely increases the security of mass running events and the level of confidence of both organizers and participants.

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Evaluation of the Effectiveness of Professional Activisation Forms in Voivodeships of Poland

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Abstract

Since Poland's accession to the European Union in 2004, the Polish labour market has changed. Activities of labour offices aimed at economic activisation of the unemployed and reduction of structural mismatches on the labour market have increased. Costly implementation of such measures is connected with carrying out evaluation studies and research on their effectiveness. To assess the effectiveness of the implemented forms of economic activisation, the cost of participation in the form of activation, employment and cost effectiveness coefficients are determined. The aim of this article is to assess the effectiveness of using, by poviat employment offices, funds from the Labour Fund in the years 2008-2018 for financing basic forms of professional activisation. The evaluation of the effectiveness of programmes was based on the map: cost effectiveness - employment effectiveness. The study pointed to the differentiation of effectiveness of the use of funds in individual voivodeships. In Poland, after 2011, the effectiveness of labour offices' activities related to economic activation of the unemployed improved.

Keywords: Forms Of Professional Activisation, Cost Of Participation, Cost And Employment Effectiveness.

Introduction

In order to mitigate the effects of unemployment, a variety of tools are used to influence its duration. Labour market research indicates that increasing unemployment benefits and extending their duration has an impact on the duration of seeking employment (Moffitt, 1985; Katz & Meyer, 1990; Hunt, 1995; Card & Levine, 2000; Hahn et al., 2001; Lalive, 2007). This in turn can lead to long-term unemployment. Therefore, various programmes are introduced to increase the economic activity of people seeking employment. Big expenses connected with leading active labour market policy make necessary to perform research on effectiveness of their instruments and evaluation studies. These analyses are to a high degree based on the scientific output of the Nobel Memorial Prize in Economic Sciences laureate, James Heckman (Heckman et al., 1999). Due to different situation on the labour markets in the United States and European countries, research on effectiveness focussed on different aspects of the labour market policy. In the USA usually the income effects of active employment programmes are analysed. On the contrary, in the European Union the employment effects are usually analysed. After accession of Poland into the European Union, the scope of professional activisation of the unemployed persons increased. The main aims of the amendments are: increase of the professional activisation of persons in difficult situation, extending access to labour market services, promotion of the life-long learning and modification of the system of unemployment benefits. One of main goals of these changes is increase of motivation for job seeking. These activities increase the probability and intensity of finding jobs by the unemployed persons (Bieszk-Stolorz, 2017). Applied by the labour offices instruments affect the two sides of the labour market: supply and demand. The following instruments can be considered as supply-oriented: on-the-job training, traineeships and professional preparation. Intervention works, public works, socially useful works and means for the unemployed to take up business activity and for equipping the job for the unemployed person constitute a group of demand-oriented instruments – the subsidised employment (Wiśniewski & Maksim, 2013). From the

social point of view it is important to employ as many looking for job persons as possible. On the contrary, from the point of view of institutions financing the active programmes of support the essential is evaluation of disbursement of funds. To this end, the effectiveness of the actions taken is examined. This is an important tool for measuring performance. In theory of economics we can distinguish the two aspects of effectiveness. The first is to strive for maximum efficiency, i.e. to achieve the highest possible result from a certain amount of inputs. The second is related to the saving of resources, which means achieving the specified results with the lowest possible outlays (costs) (Knapińska, 2015). The active labour market policy in Poland brings positive effect consisting of only on temporary reduction of unemployment (Rękas, 2013).

The goal of the article is the assessment of effectiveness of forms of professional activisation in Poland with respect to voivodeships. In the first stage of the analysis the three indicators were compared: cost of activisation of the unemployed person, cost and employment effectiveness for Poland. Next, using the map: cost effectiveness – employment effectiveness the effectiveness of forms of activisation in particular voivodeships was compared.

Registered Unemployment in Poland

The labour market in Poland after 2004, i.e. since the accession to the European Union, has been undergoing significant changes. Figure 1 presents the unemployment rate in Poland and the countries of the European Union in the years 2004-2018 for people aged 20-64. Initially, it was equal to 19%, while the average unemployment rate for the European Union countries was 9%. In 2008, both these rates came closer (7% - Poland, 6.7% - EU). Then, as a result of the financial crisis, both unemployment rates increased until 2013. Starting from 2013, the unemployment rate in Poland decreased and was lower than its average level in the EU (Fig. 1).

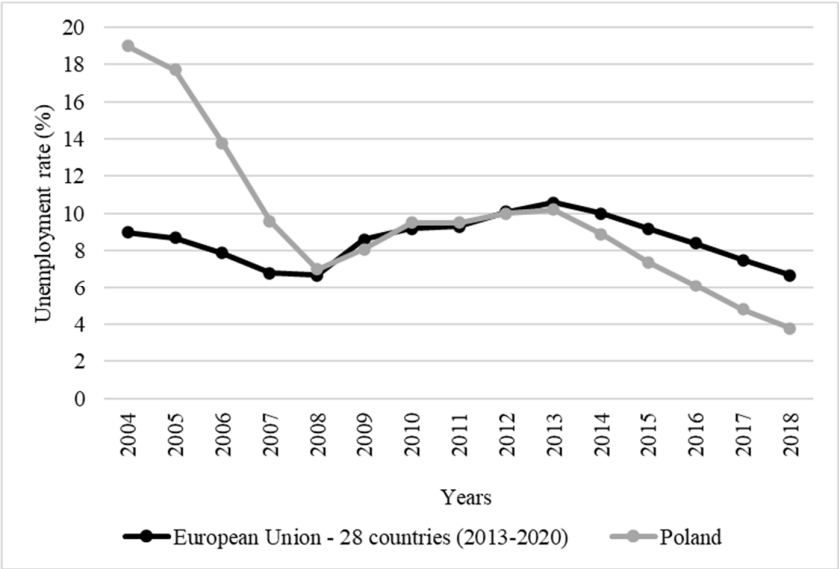

Fig. 1: Unemployment rate in the European Union and Poland in the years 2004-2018 in the age group 20-64, based on Eurostat data

The registered unemployment rate is determined on the basis of data provided by labour offices and is generally lower than the unemployment rate reported by Eurostat. It includes persons aged 18-64 registered in county labour offices. In 2004, this rate was 19% and in the following years it decreased to 9.5% (2008). Then as a result of the global financial crisis it increased to 13.4% (2012). It remained at the same level in 2013 and then decreased to 5.8% in 2018. The number of registered unemployed people changed similarly (Fig. 2).

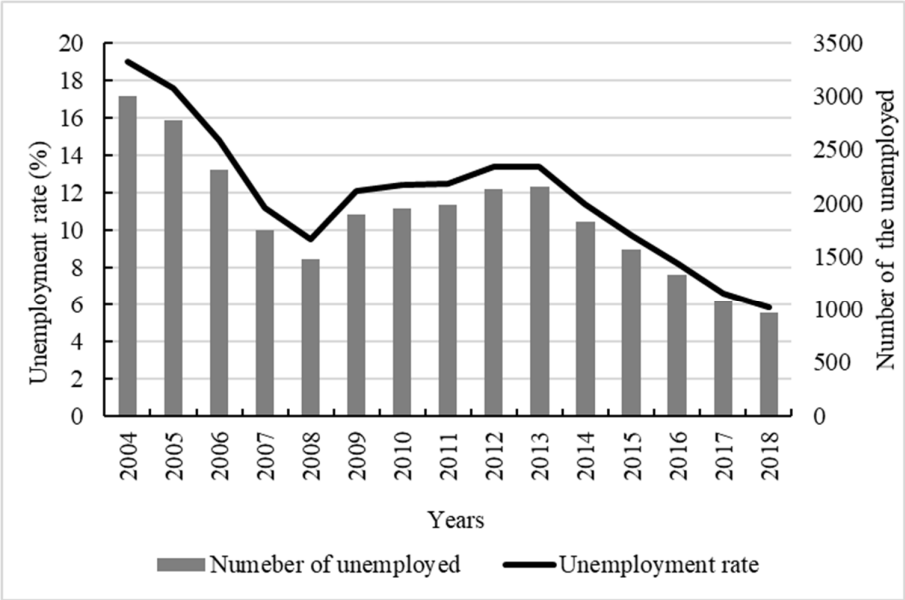

Fig. 2: Registered unemployment rate and the number of registered unemployed (in thousands) in Poland in the years 2004-2018

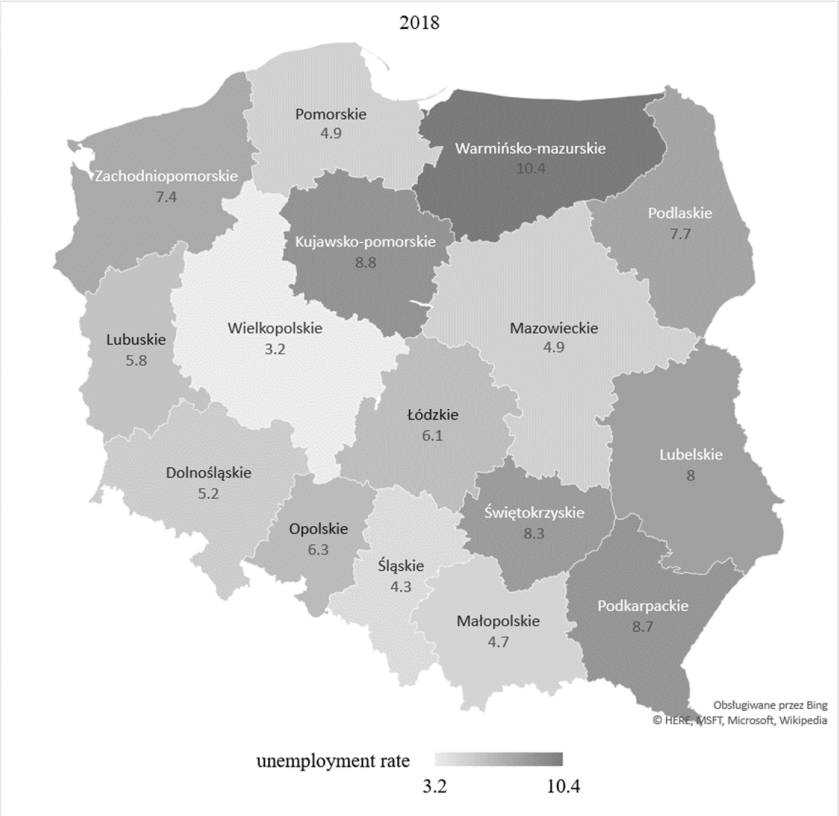

Fig. 3: The registered unemployment rate in Poland by voivodeship in 2018

Numerous studies indicate the spatial diversity of unemployment in Poland (Murawska, 2016; Tatarczak & Boichuk, 2018; Woźniak-Jęchorek, 2015). This may be due to the fact that the Polish labour market is strongly distorted by annual fluctuations of other macroeconomic economic factors (Hadas-Dyduch et al., 2016). The registered unemployment rate varied from one voivodeship to another. In the years 2004-2018, the highest unemployment rate was in Warmińsko-Mazurskie Voivodeship, and the lowest: in Wielkopolskie Voivodeship (2007-2008, 2010-2018), Mazowieckie Voivodeship (2004-2005, 2009) and Małopolskie Voivodeship (2005-2006). It is obvious that the number of registered unemployed people depends on the number of people living in a given voivodeship. The largest number of registered unemployed persons was in the Mazowieckie Voivodeship and the smallest in the Opolskie Voivodeship (2004-2016) and Lubuskie Voivodeship (2017-2018). In the analysed period the number of the unemployed on all markets changed cyclically in the same direction, but the changes in the number of the unemployed, both in a decreasing and increasing trend, were the biggest on metropolitan markets and the smallest on peripheral markets (Rembeza & Klonowska-Matynia, 2017). Figure 3 presents the unemployment rate in voivodeships in Poland in 2018.

Basic Forms of Professional Activisation

The amount of expenditures on the implementation of programmes for employment promotion in Poland in the years 2005-2018 varied. Figure 4 presents the amount of these expenditures in current and fixed prices from 2018. In the years 2005-2010 expenditures increased rapidly. This increase was justified by the ongoing economic slowdown, which resulted in limited demand for labour. At that time, the unemployed had much less chance of finding employment on the labour market. In 2011, there was a noticeable sharp drop in these expenditures in relation to 2010 (by about 64%). This was associated with the need to reduce the expenditures of the public finance sector. Poland was subject to the excessive deficit procedure and, in line with the Ecofin Council recommendation (of 7 July 2009), was obliged to correct the general government deficit below 3% of GDP by 2012. The procedure included a reduction of expenditure from the Labour Fund, which is part of this sector. Between 2010 and 2015, expenditures increased and decreased again between 2016 and 2018. In Poland, registration of the unemployed and their activisation takes place in poviat labour offices. There are 340 of them. Earlier studies by the authors indicate that due to their large number and large variety of economic conditions, better results are given by analyses based on the division into voivodeships (Bieszk-Stolorz, Dmytrów 2019). The amount of expenditures for the implementation of programmes for employment promotion in 2008-2018 varied in particular voivodeships (Figure 5). They were the largest was in the Mazowieckie Voivodeship, and then in the Śląskie Voivodeship, and the smallest in the Opolskie Voivodeship (2008-2014) and Lubuskie Voivodeship (2015-2018). This amount depends, inter alia, on the size of the voivodeships and the number of registered unemployed.

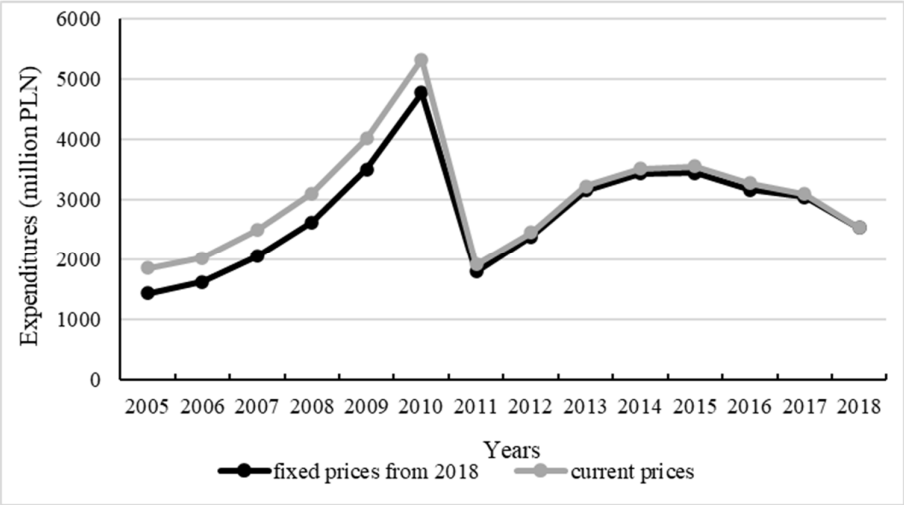

Fig. 4: Expenditure on the implementation of programmes in the years 2005-2018 in Poland (million PLN, current and fixed prices from 2018)

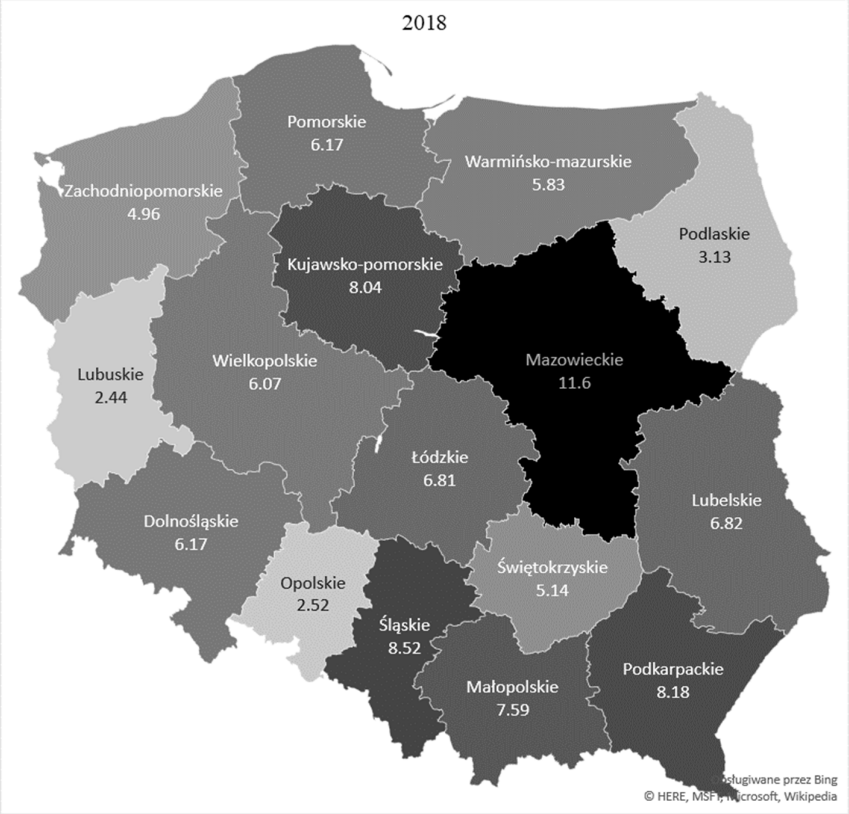

Fig. 5: Structure of expenditure on implementation of programmes in 2018 by voivodeships (%)

The catalogue of basic forms of professional activisation is determined by the minister in charge of labour matters. In the years 2006-2018 this catalogue evolved. Due to the auxiliary character or insignificant share in expenditure incurred on a national scale, in years 2006-2018 some forms of

support did not become the basic forms of professional activisation (for example activation allowance, scholarships in the period of continuing education, reimbursement of travel and accommodation costs, reimbursement of social security contributions to farmers made redundant from work, training loans). Table 1 presents the basic forms of professional activisation in years 2006-2018.

Table 1: Basic forms of professional activisation in Poland in years 2006-2018

Basic forms of professional activisation	2006–2009	2010–2013	2014–2018
trainings	+	+	+
employment in intervention works	+	+	+
employment in public works	+	+	+
internship with an employer	+	+	+
granting the unemployed one-off funding for business start-ups	+	+	+
granting employers reimbursement of costs of equipment/supplementation of workstations for the unemployed who are directed to those places of work	+	+	+
carrying out socially useful work	+	+	–
preparing adults for the profession in the workplace	+	–	–

Figure 5 presents the number of the unemployed persons participating, ending participation and employed after graduating participation in activisation programmes. The largest number of persons participated in trainings and internships and the least – in reimbursement of costs of equipment/supplementation of workstations.

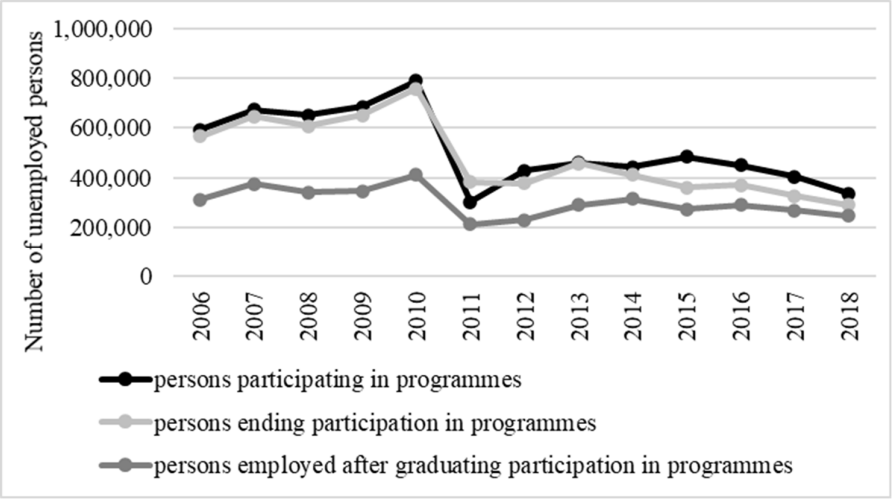

Fig. 6: Number of unemployed persons participating, ending participation and employed after graduating participation in activisation programmes in years 2006-2018

Assessment of effectiveness of forms of professional activisation

In order to assess the effectiveness of realised programmes, the cost of participation in the form of professional activisation and coefficients of cost and employment effectiveness were calculated. These coefficients are calculated for basic forms of professional activisation.

The employment effectiveness is the indicator allowing for assessment of chances of finding employment after finishing participation of in the form of professional activisation. It is calculated by means of the following formula:

$$EE = \frac{number\ of\ persons\ employed\ during\ or\ after\ ending\ participation}{number\ of\ indicated\ persons\ who\ ended\ their\ participation} \cdot 100\% \qquad (1)$$

Cost effectiveness allows to assess the cost of leading the unemployed person to employment. It is calculated by means of the following formula:

$$CE = \frac{amount\ of\ expenditure\ from\ the\ Labour\ Fund}{number\ of\ persons\ indicated\ as\ employed} \qquad (2)$$

Cost of participation in the form of activisation informs about mean cost of activisation of one person. It is calculated by means of the formula:

$$CP = \frac{amount\ of\ expenditure\ from\ the\ Labour\ Fund}{number\ of\ persons\ who\ participated\ in\ the\ given\ form\ of\ activisation} \qquad (3)$$

Persons, for who in given year the expenditures from the Labour Fund are incurred are considered as participating in a given form of activisation, regardless of the period of activisation and multiple participation in the same form of activisation.

Persons, who ended their participation in a given form of activisation are these ones, who in given year ended their participation in the given form of activisation financed from the Labour Fund, including persons, who ended their activisation started in previous years.

Persons, who were employed were these ones, who during or in the period of 3 months after ending their participation in a given form of activisation took a job and had worked for at least 30 days – with accordance to the data obtained from the Social Insurance Institution.

Due to the change of methodology of calculation of the employment effectiveness for basic forms of professional activisation in 2015, it is not possible to directly compare this coefficient for the year 2015 and previous years. The change of methodology referred mostly to the change of definition of ending participation and change of definition of employment (MRPiPS, 2016).

The research was based on the statistical data referring to the cost and employment effectiveness, published by the Ministry of Family, Labour and Social Policy (www1).

In years 2006-2018 there are visible significant differences between the percentages of persons participating in various activisation programmes and persons ending their participation and employed afterwards (table 2). In the analysed period on the average slightly over 93% of persons starting their participation in programmes ended it, but only about 59% of them found employment. In the year 2011 the percentage of persons ending their participation in various programmes is over 100%. It results from the fact that large number of persons started their participation in the year 2010 and ended in 2011.

Table 2: Percentage of persons ending their participation and employed after ending participation in programmes in years 2006-2018

Year	Percentage of persons	
	ending their participation (%)	employed after ending participation (%)
2006	95.54	52.44
2007	96.30	55.58
2008	93.11	52.13
2009	95.12	50.61
2010	96.27	52.13

2011	126.58	70.48
2012	88.38	53.80
2013	99.45	63.00
2014	93.29	71.13
2015	74.44	56.49
2016	81.97	64.55
2017	81.06	66.45
2018	86,44	73,44

In connection with these differences, cost effectiveness is much higher than the cost of participation of one person in a programme (figure 7). In years 2006-2010 high increase of the cost effectiveness (from ca. PLN 6.5 thousand to ca. PLN 13 thousand) was accompanied by relatively constant employment effectiveness on the level of about 55% (figure 8). In 2011 in comparison with the previous year, the cost effectiveness decreased significantly from ca. PLN 13 thousand to ca. PLN 9 thousand. This was related to a decrease in expenditure on the implementation of programmes for the promotion of employment (by about 64%) due to the excessive deficit procedure. Inclusion under this procedure entailed a reduction in expenditure from the Labour Fund, which is part of this sector. Next both types of effectiveness had increasing trends. Since 2015, the cost-effectiveness has started to decrease. It proves better use of funds for professional activisation of the unemployed in 2011-2018.

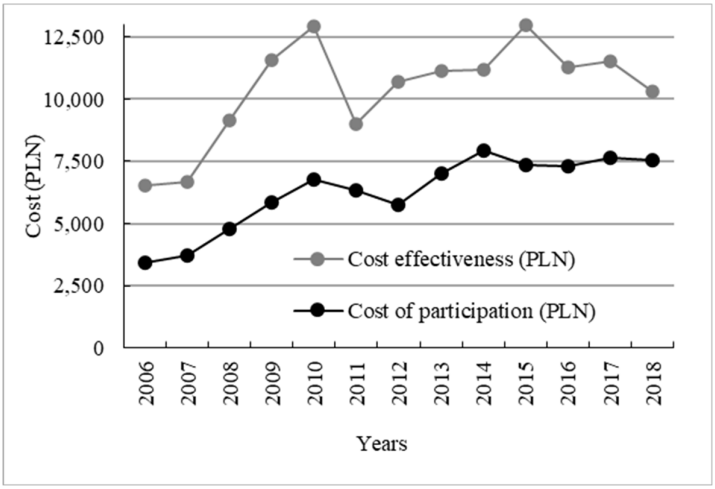

Fig. 7: Cost of participation, cost effectiveness of the activisation programmes in Poland in years 2006-2018

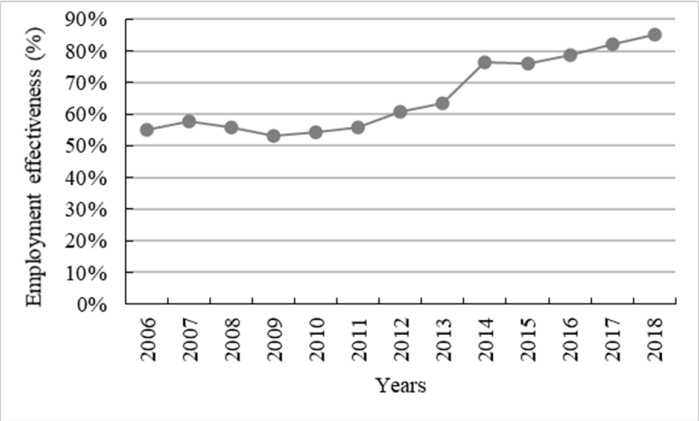

Fig. 8: Employment effectiveness of the activisation programmes in Poland in years 2006-2018

In order to compare the costs of participation and cost effectiveness of the activisation programmes the absolute and relative differences between them were calculated (figure 9). In years 2006-2010 the absolute difference between the costs of activisation and the cost effectiveness increased. However, the relative difference was on similar, but high level (almost 2 in 2009). In year 2018 the absolute difference was equal 2,731.76 PLN, or the cost effectiveness was by 36% higher than the cost of activisation of one person. In the same year the employment effectiveness was 82%. It proves slightly better, but still high cost of leading the unemployed person to employment.

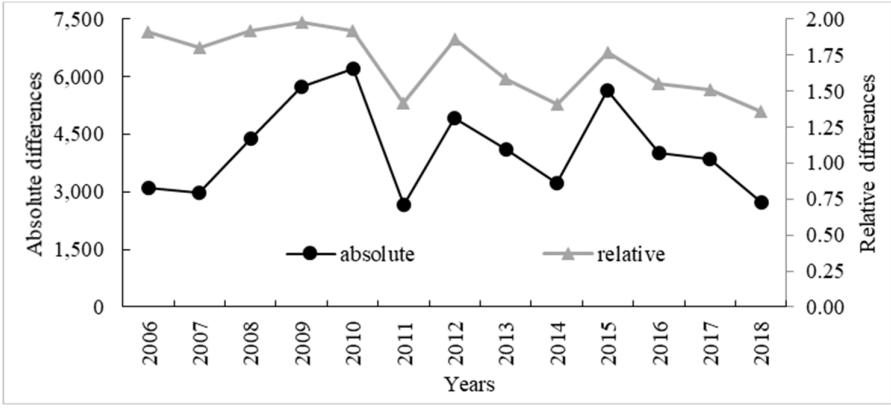

Fig. 9: Absolute and relative differences between the cost of participation and the cost effectiveness of the activisation programmes in Poland in years 2006-2018

In order to group voivodeships with respect to the effectiveness, the maps: cost effectiveness – employment effectiveness for basic forms of professional activisation for years 2008-2018 were made. The studies of the Ministry of Family, Labour and Social Policy do not include data for 2006-2007 concerning cost and effectiveness for voivodeships. It allowed for separation of four groups of voivodeships due to their location in relation to average effectiveness: cost and employment. Figure 10 presents the exemplary map for the year 2018. Horizontal and vertical axes constitute mean cost and employment effectiveness for Poland, respectively. These axes divided voivodeships into four groups. The best ones are in group IV, where lower value of the cost effectiveness corresponds with higher value of the employment effectiveness. The worst situation is in group II, where the cost effectiveness is high and the employment one – low. Good standing with respect to the employment effectiveness is in the group I (both types of effectiveness are high) and with respect to the cost one – in the group III (both types of effectiveness are low). However, from the point of view of the social policy the employment issue is more important, therefore better situation is in the group I. Designated groups are presented in table 3.

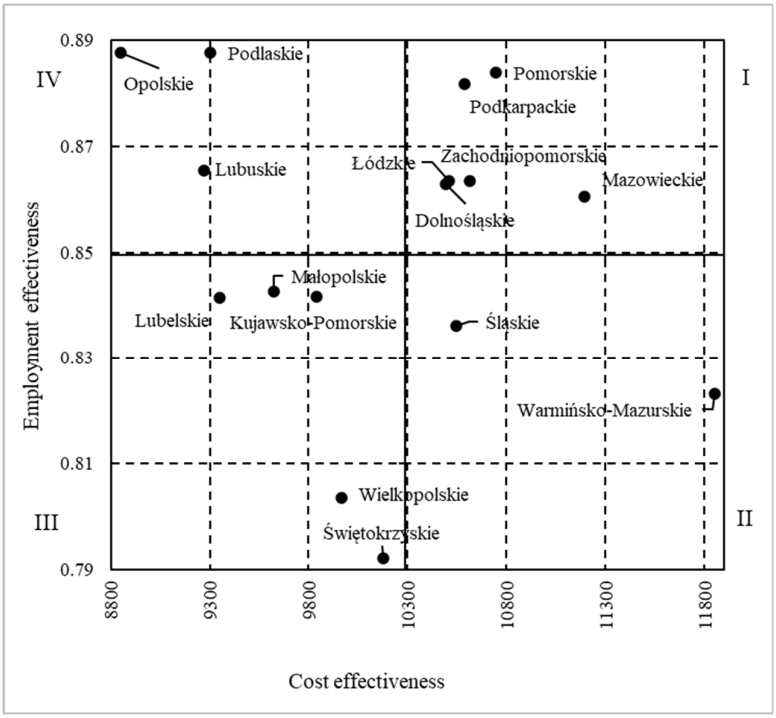

Fig. 10: The map: cost effectiveness – employment effectiveness in 2018

Table 3: Division of voivodeships with respect to the forms of effectiveness against Poland (2008–2018)

Voivodeship	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Dolnośląskie	I	I	I	I	I	I	I	IV	I	I	I
Kujawsko-pomorskie	III	III	III	II	III	III	III	II	III	III	III
Lubelskie	II	II	II	I	I	IV	IV	IV	IV	III	III
Lubuskie	IV	IV	IV	IV	III	III	I	IV	IV	II	IV
Łódzkie	I	IV	I	I	I	I	I	IV	I	I	I
Małopolskie	II	II	II	II	II	II	II	III	II	III	III
Mazowieckie	II	II	II	II	II	II	I	I	I	IV	I
Opolskie	IV	III	III	III	III	III	IV	IV	IV	IV	IV
Podkarpackie	II	II	II	II	I	IV	IV	II	I	I	I
Podlaskie	IV	II	III	I	IV	IV	IV	IV	I	IV	IV
Pomorskie	IV	IV	IV	IV	IV	III	IV	IV	IV	IV	I
Śląskie	IV	IV	IV	II	III	II	II	II	II	II	II
Świętokrzyskie	II	I	I	II	I	III	II	II	II	II	III
Warmińsko-mazurskie	II	II	II	II	II	II	II	II	III	II	II
Wielkopolskie	IV	IV	IV	IV	IV	IV	IV	IV	IV	III	III
Zachodniopomorskie	IV	IV	IV	III	IV	III	II	I	IV	I	I

With respect to accepted criteria, in the whole analysed period the best situation was in Wielkopolskie and Pomorskie (except for the year 2013) voivodeships and the worst – in Warmińsko-Mazurskie (except for the year 2016) and Małopolskie (except for the years: 2015 and 2017). Taking into account the social aspect of professional activisation, the main goal is finding a job by the unemployed persons. Therefore high value of the employment effectiveness is desirable even when the cost effectiveness is

high. In years 2008-2018 such situation was in Dolnośląskie and Łódzkie voivodeships, which in the analysed period belonged mostly to the group I. The largest number of the unemployed persons is registered in the Mazowieckie voivodeship and therefore this voivodeship holds the largest resources designed for their activisation. However, in years 2008-2013 both types of effectiveness took the least favourable values (group II). The situation improved only after the year 2014. Authors' earlier research proved that voivodeships, in which the largest amounts of resources were destined for activisation generally used them worse and vice versa (Bieszk-Stolorz & Dmytrów, 2018).

Conclusions

Performed analysis indicates that in years 2006-2018 the effectiveness of use of funds for financing the basic forms of professional activisation of the unemployed persons was gradually improving. The funds entrusted were best managed by the Wielkopolskie and Pomorskie voivodeships and the worst – by Warmińsko-Mazurskie and Małopolskie voivodeships. Also the Dolnośląskie and Łódzkie voivodeships should be viewed as positive. Despite high values of the cost effectiveness, the employment ones were high as well. In the year 2011 the funds destined for professional activisation of the unemployed persons were used the worst (the largest number of voivodeships was in the group II). In years 2006-2018 the percentage of persons starting and resigning from participation in selected forms of professional activisation was not high and (about 7%). However, percentage of persons who found employment was also quite low (60%). In the analysed period the increase of the cost effectiveness was accompanied by the increase of the employment one. As long as the increase of the cost effectiveness should be considered as the negative phenomenon (from the point of view of public finances), it should be noticed that at the same time the relative difference between this effectiveness and the cost of activisation of the unemployed person decreased. All this proves that the effectiveness of activities of labour offices connected with professional activisation of the unemployed persons improved.

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Influence of Weights in TOPSIS And TMAL Methods on Time of Order-Picking - Simulation Analysis

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Abstract

In shared storage, the product is often located in many different (often very distant) locations. When completing an order, one of them (or several if visiting one will not cover the demand for the product) should be selected. Locations can be selected according to different criteria: distance from the I/O point, from other locations to be visited during the picking process, degree of demand satisfaction or according to product storage time. One or all of the criteria listed above may be used. For this purpose, multi-criteria decision-making methods can be used. One of the methods used to select a location is TMAL (Taxonomic Measure of Location's Attractiveness) based on Hellwig's Composite Measure of Development, and the other is the well-known TOPSIS method. The aim of the article is comparison of results obtained by both of these methods. Both methods have been compared in terms of the total distance the picker will have to travel during order-picking and the total picking time. Obtained results showed that the shortest order-picking route and time was obtained when the highest weight was put on the degree of demand satisfaction. Also, generally the TOPSIS method generated better results than the TMAL method although only for the order-picking time results were statistically significant.

Keywords: Taxonomic Measure of Location's Attractiveness, TOPSIS method, warehouse management, simulation analysis

Introduction

On average, warehouse management accounts for about 20% of total logistics costs in a company. Order-picking is the most labour- and cost-intensive element of warehouse management, accounting for about 55% of its total costs (De Koster et al., 2007). The most cost- and time-consuming element of picking is the travelling of the picker. Therefore, it is extremely important to optimise the organisation of work in the warehouse. Nowadays, due to the technological development, intelligent systems supporting the process of managing an enterprise such as ERP, this goal is much easier to be achieved. There are many ERP software systems, such as open-source (for example Adaxa Suite, Apache OFBiz, ERPNext and many others) or proprietary ones (for example SAP ERP, Microsoft Dynamics ERP or Oracle ERP Cloud and many others). Additionally, automated *product-to-picker*, AS/RS, S/R or VLM (Le-Duc, 2005) systems can be used. Despite the existence of these advanced systems, a large majority of companies still use classic *picker-to-parts* systems (Napolitano, 2012), so from the point of view of order picking time it is important to optimise the route the picker travels, as it is the one that determines the total time of the picking process. The picker's working time schedule during picking is shown in Table 1.

Table 1: Distribution of picker's working time during picking (%)

Activity	% of order-picking time
Movement	55
Searching	15
Download	10
Documentation and other activities	20

Source: Bartholdi and Hackman (2019)

It can be seen that the most can be gained by optimising the route the picker travels. For this type of issue, the optimal route to be taken by the picker can be determined with the help of the modified travelling salesman problem, presented by Ratliff and Rosenthal (1983). However, the path set by such an approach, although it optimises the distance covered, has several disadvantages that may disqualify it in practice (Le-Duc, 2005):

1. The route may seem illogical for the pickers, which often makes them deviate from it.
2. The optimal route depends largely on the location of the I/O point.
3. Determining the optimal route can be a heavy burden on the company's IT system, as it has to be done for each order, and with a large number of locations to visit, the calculation algorithm is very labour-intensive.
4. The optimal route does not take into account the organisation of pickers' movement around the warehouse, so it can cause downtime on aisles.
5. The optimal method does not take into account that changing the direction of movement and changing the aisle can be time consuming.

All the above mentioned drawbacks of the optimal picking route method result in the use of heuristic methods such as *s-shape*, *return*, *midpoint*, *largest gap*, *composite* or *combined* (Le-Duc, 2005). These methods, especially *s-shape* and *return* are commonly used in the classic *picker-to-parts* systems. However, in order to apply any of them, we need to have selected locations that are to be visited by the picker.

Theoretical Background

It should be noted that the problem of designating the route taken by the picker is secondary to the problem of choosing the location to visit. Which locations to choose depends on how the products are stored. Basically, there are two main storage systems – *dedicated* and *shared storage* (Bartholdi & Hackman, 2019). The first type means that a given product is only stored in one location and a given location is assigned to store one product. In the latter case, a given product may be stored in different, often very distant locations and many different products may be stored in a given location. Both storage methods have their advantages and disadvantages. The most important advantage of dedicated storage is its simplicity, and its disadvantage – poor use of storage space. The shared storage is free from this disadvantage, but it often results in a large dispersion of products in different locations in the warehouse and even for small warehouses – the need to use an IT system that supports warehouse management. If dedicated storage is used in a warehouse, the choice of location is unambiguous, while in the case of shared storage, the product can be taken from different locations. Which location to take a product from depends on a number of criteria – this may be the storage time, the distance from the I/O point, the level of demand satisfaction or the distance from other locations where the other products in your order are located. One or more criteria may be taken into account. Hitherto performed analyses in this field did not specified the methods of locations' selection in the shared storage systems explicitly. In general it can be assumed that when the decision maker has to select locations, when the shared storage system is applied, it is generally connected with certain trade-offs (Bartholdi & Hackman, 2019). The selection of least-filled locations can help emptying and replenishing them, but increases travel time. On the other hand, selection of the most convenient location (the closest to the I/O point or fully satisfying the demand) saves time and labour, but result in small quantities of a product remaining in the locations. There are several possible take-out strategies that can be applied when choosing the locations to be visited by the picker (Gudehus & Kotzab, 2012):

- FIFO (*First-In-First-Out*) – units will be picked accordingly on their arrival to the warehouse;
- priority of partial units – locations with the lowest content of the product will be accessed first, even if it increases labour;
- quantity adjustment – the picker retrieves the product from the locations where the requested quantity is fully satisfied even if it generates additional low amounts of products in the locations;
- taking the access unit – if the amount of the product on a given location exceeds or is equal to the requested quantity, the complete unit is taken after the excess quantity is removed.

As seen in the above-mentioned list, there are several criteria mentioned. The first strategy considers the storage time. The second and third one considers the amount of products in the location, however, each does it the opposite way. The fourth strategy is similar to the third one, but also prefers locations with complete units of products. The decision-maker can consider one or several criteria at the same time. In the latter case, multi-criteria decision-making methods such as TOPSIS (Hwang & Yoon, 1981) or TMAL (Taxonomic Measure of Location's Attractiveness) (Dmytrów, 2018a, 218b) can be used. The use of multi-criteria decision making methods requires the weighting of decision criteria. The aim of this article is to examine whether the system used will affect the length of the road covered by the picker and the total picking time. Simulation methods will be used for this purpose and comparisons will be made on two planes:

a) Each method (TMAL and TOPSIS) will compare the results obtained for different weighing systems,
b) the results generated for both methods will be compared.

Methodology

Each location where the completed products are found is described using three criteria:

x_1 - distance from the location to the I/O point (measured in contractual units, which are the width of the rack),
x_2 - degree of demand satisfaction,
x_3 - number of other completed products in the proximity of analysed location (locations lying in the same aisle are assumed to be the proximity).

The first criterion is a "loss" type criterion. It measured in contractual units, which are the width of the rack.

The second criterion – degree of demand satisfaction – is the "profit" type one. It is calculated by means of the following equation:

$$x_2 = \begin{cases} \frac{l}{z}, & \text{if} \quad z > l \\ 1 & \text{if} \quad l \geq z \end{cases}, \tag{1}$$

where l – number of units of the picked product in the analysed location and z – demand for the picked product.

The term "proximity" can be understood in different ways. It can be the same rack, the same shelf, the same aisle or even the same sector in the warehouse. Selection of the appropriate approach is very important because if we set this proximity very narrowly (as the same rack or the same shelf), it may happen that in most situations there will be no other picked products in the proximity of the analysed location, so in most situations this criterion will not differentiate locations. On the other hand, if we set the proximity too widely (as for example the whole sector), there might be in most cases the situation that almost every location will have all other products in the proximity, thus this criterion will also not differentiate locations. In the research, the proximity of the analysed location will be all locations placed on the shelves within one aisle.

Decision criteria should be weighted appropriately. There are several possible methods of assigning weights to the criteria. Popular methods of assigning weights to the criteria are based on the Shannon's entropy (Lotfi & Fallahnejad, 2010) or the AHP method (Brunelli, 2015). However, application of the Shannon's entropy would cause that for every order and every product in the order there would be different weights. Also, setting weights for each order would be a lot of work and be time-consuming and it would be difficult to notice any regularity. Application of the AHP method, on the other hand, would cause that the expert (or experts) would set the weights that would be the same for every order, every warehouse, every storage assignment, etc. Moreover, there would be no guarantee that obtained weights would assure optimal (e.g. minimal) picker route length and order-picking time. Therefore in the research several combinations of weights were assumed and their performance were assessed by means of the simulation methods. The following combinations of weights were adopted:

Table 2: Weighting of decision-making criteria

Combinations	x_1	x_2	x_3
C1	0.333	0.333	0.333
C2	0.5	0.25	0.25
C3	0.25	0.5	0.25
C4	0.25	0.25	0.5
C5	0.4	0.4	0.2
C6	0.4	0.2	0.4
C7	0.2	0.4	0.4

The first combination, where all weights are equal, is used as a reference. The combinations C2, C3 and C4 are the combinations, in which one criterion is twice as important, as the other two and, at the same time, its impact on the final decision is the same as total impact of the remaining two criteria. The last three combinations indicate that two criteria are twice as important as the remaining one. The reason for such approach is to analyse, if any criterion should be more important than others in order to decrease the order-picking route and the order-picking time.

One of the steps in the construction of a synthetic variable is to normalise the variables. As all criteria are measured on the ratio scale, every normalisation formula can be used. The study used the quotient transformation given by the following formula:

$$z_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{n} x_{ij}^2}}, \tag{2}$$

where:

z_{ij} - standardised value of the *j*-th criterion in the *i*-th alternative,
x_{ij} - the actual value of the *j*-th criterion in the *i*-th alternative.

The reason for choosing this method of normalisation was the desire to maintain differences in the average level of variables and their volatility. Moreover, this approach was used by Hwang and Yoon for the TOPSIS method (1981). Also, the quotient transformation preserves the ratio scale, on which all criteria are measured.

The stages of construction of the Taxonomic Measure of Location's Attractiveness are as follows (Dmytrów, 2018b):

1. After the distance has been converted into a 'profit' criterion by determining its inverse, the variables have been normalised using the equation (2).
2. The maximum standardised values of the criteria forming the so-called "perfect alternative" were set.
3. Euclidean distances between the values of the criteria in a given location and the "perfect alternative" were calculated.
4. The criteria were weighted.
5. The pattern was calculated.
6. TMAL values have been calculated.
7. A ranking of locations from the highest to the lowest TMAL value was drawn up.
8. Locations with the highest positions in the ranking were selected until the demand was satisfied.
9. The above steps were repeated for all products in the order.

The stages of construction of the composite variable in the TOPSIS method are as follows (Hwang & Yoon, 1981):

1. The criteria have been weighted.
2. Normalised by equation (2) values of the criteria are multiplied by their weights.

3. For each criterion, a *pattern* and *an anti-pattern* were determined. For criteria of the "profit" type, the pattern is the maximum standardised values of the criteria, and the anti-pattern is the minimum values. For criteria such as "loss" it is the opposite.
4. Euclidean distances of each decision variant (location) from the pattern and anti-pattern were determined.
5. The similarity of each location to the pattern was calculated using the formula:

$$q_i = \frac{d_{i0}^-}{d_{i0}^- + d_{i0}^+}, \tag{3}$$

where:

d_{i0}^- - Weighted Euclidean distance of the i-th alternative (location) from the antipattern,
d_{i0}^+ - Weighted Euclidean distance of the i-th alternative (location) from the pattern,
qi - value of a synthetic variable specifying the similarity of the i-th alternative (location) to the pattern.

6. A ranking of locations from the highest to the lowest similarity to the pattern was made.
7. Locations with the highest positions in the ranking were selected until the demand was satisfied.
8. The above steps were repeated for all products in the order.

The results generated by both methods for all combinations of weights were obtained using simulation methods. The research of the order picking process with the use of simulation tools was carried out by Tarczyński (2012) or Jakubiak and Tarczyński (2012), among others. The following simulation experiment was used in the study:

1. A simple rectangular warehouse with 400 locations was established. The warehouse had one main aisle and eight aisles between the shelves. There were 25 locations in each shelf.
2. The distribution of products in the warehouse is purely random (chaotic warehouse).
3. Each order consisted of 10 products.
4. Each product was available in four locations.
5. The available product quantities at each location ranged from a single unit to a quantity covering double demand.
6. For each location selection method and each combination of weights, 100 orders were generated.
7. For each order, the locations to be visited were selected using the TMAL and TOPSIS methods.
8. After choosing the location to visit, the order was completed using the *s-shape* method.
9. The picking time was the sum of the time of the picker's movement and the time of taking products from the location. It was assumed that the time to cover a unit of distance (shelf width) was 2 seconds and the time to retrieve the product from the location was 10 seconds (Dmytrów, 2018b).
10. For each method, the *H* Kruskal-Wallis test (Aczel & Sounderpandian, 2009) examined whether the routes travelled by the picker and picking times were equal. The choice of the test was due to the fact that the distributions of both road lengths and picking times were not normal. If the null hypothesis had to be rejected, the *post-hoc* analysis was done using the Dunn's test of pair comparisons (Aczel & Sounderpandian, 2009). Samples differ if the inequality is satisfied:

$$\left|\bar{R}_i - \bar{R}_j\right| > \sqrt{H_\alpha} \cdot \sqrt{MST} \cdot \sqrt{\frac{1}{n_i} + \frac{1}{n_j}}, \tag{4}$$

where:
H_α – critical value of the Kruskal-Wallis test,
MST – the average sum of squares of deviations of ranks from the average of all ranks,
$\bar{R}_i$, $\bar{R}_j$ – average ranks in samples i and j,
n_i, n_j – size of i-th and j-th sample, respectively.

11. The results obtained for both methods for each weighting combination were compared with the Mann-Whitney *U* test (Aczel & Sounderpandian, 2009).

Results and Discussion

Selection of locations by means of the TMAL method

The results of the Kruskal-Wallis test for total route lengths and order-picking times are shown in Table 3.

Table 3: Medians, mean ranks and results of the Kruskal-Wallis test for the total route lengths covered by the picker and picking times after applying the TMAL method

Description	C1	C2	C3	C4	C5	C6	C7
The total distance travelled by the picker							
Median	208	205	200	216	200	213	222
Mean ranks	341.94	336.76	308.17	386.12	311.69	385.33	383.51
H	17.629						
p-value	0.00289						
Picking time (seconds)							
Median	560	553	539	575	544	565	577
Mean ranks	338.44	345.90	285.81	400.20	304.33	397.71	381.12
H	29.651						
p-value	0.00002						

Both for the total length of the road the picker travels and for the picking time, the zero hypothesis that all populations have the same distribution should be rejected. The Dunn's test was carried out for both variables. For the total distance travelled by the picker, the right-hand side of the equation (4) was 100.94 and for the picking time – 101.46 (in both cases the significance level $p = 0.05$ was assumed). The results of the Dunn's test are shown in Table 4.

Table 4: Results of the Dunn's test for the total route lengths covered by the picker and picking times after the application of the TMAL method (significant differences are bolded)

	C2	C3	C4	C5	C6	C7
The total distance travelled by the picker						
C1	5.185	33.775	44.180	30.255	43.390	41.565
C2		28.590	49.365	25.070	48.575	46.750
C3			77.955	3.520	77.165	75.340
C4				74.435	0.790	2.615
C5					73.645	71.820
C6						1.825
Picking time (seconds)						
C1	7.460	52.635	61.760	34.110	59.270	42.675
C2		60.095	54.300	41.570	51.810	35.215
C3			**114.395**	18.525	**111.905**	95.310
C4				95.870	2.490	19.085
C5					93.380	76.785
C6						16.595

In the case of the total distance travelled by the picker, although the Kruskal-Wallis test showed that the samples came from different populations, the Dunn's test did not show significant differences between the pairs, so it can be said that the weighting system used did not affect the length of the distance travelled by the picker during the picking process, if the locations were selected using the TMAL method.

The total picking times for the K3 scale combinations were significantly different from those for C4 and C6. Thus, when selecting locations using the TMAL method, it turned out that they are the shortest when the degree of demand is most important (variable x_2). The longest one is when the biggest weight is given to the variable x_3 and when x_2 has less weight than other variables.

Selection of locations by means of the TOPSIS method

The results of the Kruskal-Wallis test for total route lengths and order-picking times are shown in Table 5.

Table 5: Medians, mean ranks and results of the Kruskal-Wallis test for the total route lengths covered by the picker and picking times after the TOPSIS method

Description	C1	C2	C3	C4	C5	C6	C7
The total distance travelled by the picker							
Median	202	204	200	221	200	227	220
Mean ranks	345.37	332.14	286.90	411.02	268.80	422.86	386.43
H	52.605						
p-value	0.00000						
Picking time (seconds)							
Median	548	556	528	582	524	610	583
Mean ranks	338.48	353.08	245.03	431.85	246.22	458.18	380.68
H	100.972						
p-value	0.00000						

Both for the total length of the road the picker travels and for the picking time, the zero hypothesis that all populations have the same distribution should be rejected. The Dunn's test was carried out for both variables. For the total distance travelled by the picker, the right-hand side of the equation (4) was 100.91, and for the picking time - 101.46 (in both cases the significance level $p = 0.05$ was assumed). The results of the Dunn's test are presented in Table 6.

Table 6: Results of the Dunn's test for the total route lengths covered by the picker and picking times after the application of TOPSIS (significant differences in bolded)

	C2	C3	C4	C5	C6	C7
The total distance travelled by the picker						
C1	13.230	58.470	65.645	76.575	77.485	41.055
C2		45.240	78.875	63.345	90.715	54.285
C3			**124.115**	18.105	**135.955**	99.525
C4				**142.220**	11.840	24.590
C5					**154.060**	**117.630**
C6						36.430
Picking time (seconds)						
C1	14.595	93.455	93.365	92.260	**119.700**	42.195
C2		**108.050**	78.770	**106.855**	**105.105**	27.600
C3			**186.820**	1.195	**213.155**	**135.650**
C4				**185.625**	26.335	51.170
C5					**211.960**	**134.455**
C6						77.505

In the case of the total distance travelled by the picker, the results for combinations C3 differed significantly from the values obtained for combinations C4 and C6, and the results obtained for combinations C5 – from the results obtained for combinations C4, C6 and C7. Thus, using the TOPSIS method for location selection resulted in the picker going the shortest way if high weight is given to the variables x_2 and x_1.

In the case of total picking time the results obtained for combinations C3 and C5 differed significantly from those obtained for combinations C2, C4, C6 and C7. Additionally, the results for C6 combinations differed significantly from the results for all other combinations except those for C4 combinations. When choosing locations to visit, it pays off most to give a high weight to the variables x_2 and x_1. It is in accordance with the comparison of results obtained for various combinations of weights and selected take-out strategies, when the ABC-class storage system was applied. The best results (shortest order-picking routes and times) were obtained for the quantity adjustment strategy when the variable x_2 (degree of demand satisfaction) had the highest weight (Dmytrów, 2018b).

Comparison of results obtained using TMAL and TOPSIS methods

The results generated by both methods were compared with the Mann-Whitney *U* test. The results are shown in Table 7.

Table 7: Results of the Mann-Whitney *U* test comparing the total length of the roads covered by the picker and the total picking times after the application of TMAL and TOPSIS methods (significant differences are bolded)

Description	C1	C2	C3	C4	C5	C6	C7
	The total distance travelled by the picker						
z	–0.0135	–0.2726	–0.8043	–0.7421	–1.6358	–1.2524	–0.0393
p-value	0.4946	0.3926	0.2106	0.2290	0.0509	0.1052	0.4843
	Total picking time (seconds)						
z	–0.3153	–0.0086	–1.7023	–0.7308	–2.4602	–1.8946	–0.1356
p-value	0.3763	0.4966	**0.0443**	0.2324	**0.0069**	**0.0291**	0.4461

There were no significant differences between the total roads driven by the picker during the picking process, if the locations were selected using the TMAL or TOPSIS method. Such differences existed for total picking times and differed for combinations C3, C5 and C6, whereas for combinations C3 and C5, i.e. for those in which the degree of demand satisfaction (x_2) and the distance from the I/O point (x_1) were most important, Shorter picking times could be achieved by selecting locations using the TOPSIS method, and for combinations C6 (i.e. when the variable x_2 has less weight than other decision variables) better results (shorter picking times) were achieved if locations were selected using the TMAL method. The superiority of the TOPSIS method lies in the fact that obtained by its means composite variable – formula (3) takes into consideration distance of each alternative (location) from both the pattern and antipattern.

Conclusions and Directions for Future Research

The following conclusions can be drawn from the analyses carried out:

1. With chaotic distribution of products in the warehouse, when choosing the location to visit, the different weights assigned to the decision criteria resulted in significant differences in both the length of the route travelled by the picker and the total picking time.
2. It is advantageous to assign high weight to variable x_2 which is the degree of demand satisfaction and the distance of the location from the I/O point.
3. As far as the total distance travelled by the picker is concerned, the results obtained using the TMAL method did not differ significantly from those obtained using the TOPSIS method.
4. The use of TOPSIS method to select the location to be visited by the picker allowed to shorten the order picking time.

The next stage of research in this area will be:

a) the use of *return* heuristics for chaotic distribution of products in the warehouse;
b) conducting the analysis for distribution of products according to ABC classes using *s-shape* and *return* heuristics;

c) to carry out the analysis for a different layout of the warehouse (for more than one main aisle) and for a different placement of the I/O point.

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The Potential of Cost Internalisation in Strategies Related to Management of Maritime Security/Safety Systems in Poland

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Abstract

Operational management of maritime security/safety systems comes as one of the key responsibilities of maritime administration of coastal states. In Poland, the scope of the above-mentioned responsibilities is implemented under the National Maritime Security/Safety System (NMSS) [*Krajowy System Bezpieczeństwa Morskiego, KSBM*], the beneficiary and operator of which is the Maritime Office in Gdynia. The implementation of NMSS has taken place with a considerable amount of EU funds, furthermore further maintenance and management does not include internalisation of the maintenance costs, indicating the state budget as a founder. In the light of the growing operational costs, necessary modernisation, current depreciation of the morphological structure of NMSS and highly probable limitations to the obtaining of EU funds in the subsequent financial perspective (a change in the EU budget priorities in the perspective 2021–2027, Brexit, Covid-19), the question related to the internalisation of the NMSS costs should be seriously considered, along with the strategy of transferring them to the end-users of the system. The aim of the article is to present an attempt at a holistic analysis of the systemic premises related to the concept of a new safety surcharge which could provide external funding to the operation, development, modernisation and depreciation of the NMSS structures. In the article, the assumed working hypothesis stated that there are identifiable premises for the internalisation of the NMSS costs in Poland has been positively verified. Using a social and economic analysis of the NMSS as background, three potential strategic options of calculation and implementation of the suggested safety surcharge have been identified. The safety surcharge procedure is of universal nature and it can be implemented under any system of maritime security/safety management in any country.

Keywords: Maritime Security/Safety Management, NMSS [KSBM] (Poland), Internalisation Of The Costs Related To The Operation Of The NMSS, Security/Safety Surcharge.

Introduction

Facing global competition, maritime transportation with all associated port operations, according to Neider (2015), take place under extremely high technological and operational regimes and also under extreme time pressure. Moreover, an imperative of reducing costs and the most important current principle, namely: providing the above-mentioned operations with the highest level of security and safety must be also considered as stated in Makowski (2000). The growing value of vessels and their cargo, their significance in economic processes of modern civilisation and increasing congestion cause an increase in threats both to security (terrorism, piracy) and to safety (maritime accidents, collisions, growing anthropogenic impact – environmental loss). Hence, security, safety and freedom of navigation, which have been the constitutional right of all coastal states for ages,[1] become some of the main determinants of economic efficiency for maritime transport processes as stated in Rydzkowski (2007), especially when their external results are taken into consideration. Therefore, according to Miler (2016) the problem related to providing safety and security to maritime navigation and to more broadly understood maritime transport through efficient counteraction against the above-mentioned threats becomes of key importance to all coastal states, including Poland.

Within the domain of security and safety of navigation in the maritime territory of the Republic of Poland, the National Maritime Security/Safety System (NMSS) [KSBM] has been implemented. The NMSS [KSBM] comes as a sensory platform (acquisition of data from the monitoring), an analytical and decision-making platform (intelligent decision-making algorithms) and an effector platform (transferring decisions to the particular stakeholders of the system with the use of telematics tools). The main aim of the development of the concept and of the subsequent implementation of the NMSS [KSBM], as it is stated in study by Krystek (2009), is to provide relevant bodies of maritime administration with an innovative tool to increase efficiency of maritime security/safety management (and of all associated port operations), to counteract pollution of marine environment in the maritime areas belonging to the Republic of Poland and to provide information and operational support to the SAR service.[2]

Defined in such a way, the tasks clearly indicate that in its fundamental operational aspect, the system supports current processes (operations) undertaken to provide safety and security to maritime navigation (transportation) and to the handling of vessels that enter Polish sea ports of the primary importance to national economy (Gdańsk, Gdynia, Szczecin, Świnoujście). The implementation of the advanced telematics technology (including the optical fibre trunk line) considerably supports (integrates, streamlines and simplifies) the response of maritime administration to potential maritime accidents and disasters, pollution and acts of asymmetric nature (including acts of terrorism) which may appear in the area of the south-eastern Baltic Sea (as an area of the maritime administration's responsibilities). According to Miler (2016) at the same time, it generates relatively high operating and managerial costs. The NMSS [KSBM] provides the continuity and reliability to the exchange of information through the Maritime Safety Information Exchange System (MSIES) [*System Wymiany Informacji Bezpieczeństwa Żeglugi, SWIBŻ*][3] under the HELCOM and it also offers a possibility to redistribute sensitive data from the system to the authorised institutions (such as SAR, the Regional Unit of the Maritime Border Guard, the Navy and the NATO) in order to increase efficiency of security/safety management, as considered from a more holistic point of view (including the regional and European levels as indicated in Krystek 2009).

As an example of maritime security/safety systems applied at the national level, the NMSS [KSBM] may become a subject of scientific research in the field of the potential related to the internalisation of its operational and management costs, including a possibility of drawing generalised conclusions.

Methodology and identification of the research field (NMSS, Poland) [KSBM]

Apart from other numerous determinants, the implementation of all the functionalities of the discussed security/safety management system on the Polish maritime areas has required a clear conceptual and investing policy with allocation of its funding sources. The field of financial management (starting from the project plan, through its implementation and maintenance, to its current operational management) becomes the key research field. The analytical tool is a social and economic analysis (including the *Total Social Cost/Total Social Benefit TSC/TBS* categories) with consideration of external outcomes and a calculation method applied in the category of the research results (in order to assume an algebraic formula of the suggested external fee for the exploitation of the system, namely: a safety surcharge).

In the years 2010–2020 (the current period of the main implementation and operation of the NMSS [KSBM]) the funding of initiatives related to the Integrated Maritime Policy for Poland, aplied to maritime areas indicated in Act of Maritime Areas (1994), has been possible under the funds allocated to the programme for further development of the integrated maritime policy as stated in Ordinance of the EU Parliament… (2011). Hence, in order to implement the strategic assumptions of the NMSS [KSBM], at least at the investment stage, it has been decided that the available (domestic and foreign) funds dedicated to investment operations shall be involved. The domestic funds have been obtained from the public sources (the state budget through the Ministry responsible for maritime economy and infrastructure); the foreign funds have been allocated from the EU funds of the financial perspective 2007–2013 and the financial perspective 2014–2020 (from the European Maritime and Fisheries Fund (2011) and the Cohesion Fund). There have not been any private

funding sources involved in the programme related to the implementation of the subsequent stages of the NMSS [KSBM] (at the strategic level).[4]

The above-mentioned example confirms the statement that the investment into the infrastructure of security/safety systems – by definition (in most cases) – comes from the state budget because providing maritime safety and security is one of the prior and inalienable functions of the State. It largely contributes to restrictions imposed on the use of private funds for supporting the improvement of economic efficiency and potential economisation processes; it also refers to the lack of any possibilities to use internalisation of operating and managerial costs in the complete perspective of the life cycle of an implemented security/safety system (*Life Cycle Assessment* – LCA), despite the fact that in the pragmatics of investment and project behaviour, numerous examples of the potential related to the application of funds other than state funds used for the above-mentioned purposes can be mentioned.

Therefore, it is possible to formulate the following working hypothesis stating that there are identifiable and objective premises for the internalisation of operational and managerial costs in maritime security/safety systems, which are universal for all coastal countries and which can be verified based on the pragmatics of the operation of the NMSS [KSBM] in Poland.

Premises of the internalisation of operational and managerial costs in the National Maritime Security/Safety system (NMSS [KSBM], Poland)

Defining the demand for the results of the NMSS project (I and IIA) in the social categories (social demand) is of specific nature. As it has already been mentioned, it results from the fact that according to the general security/safety doctrine of the Republic of Poland, providing maritime safety and security is not a commercial task but a responsibility undertaken by the state services. This principle is directly translated into the budgeting process and the high share of EU funds (85%) in the total value of the NMSS [KSBM] project, with no funding sources other than the state budget indicated for management and operation of the already implemented system. According to Raport z przebiegu…(2011), the implementation of the NMSS [KSBM] has taken place in two stages:

- National Maritime Security/Safety System, stage I (NMSS I) [KSBM I],
- National Maritime Security/Safety System, stage IIA (NMSS IIA) [KSBM IIA].

The data referring to both stages of the project are presented in Table 1.

Table 1: Basic information referring to the financial aspect of the NMSS [KSBM] implementation strategy [Beneficiary: Maritime Office in Gdynia]

Basic data of the project	NMSS I [KSBM I]	NMSS IIA [KSBM IIA]
Type of the project	Individual project	Individual project
Priority	VII – Environmentally friendly transport	VII – Environmentally friendly transport
Action	7.2 – 6 Development of maritime transport	7.2 – 6 Development of maritime transport
Date of the agreement	28th Feb. 2011	20th Dec. 2012
Total value of the project	111 665 386 PLN	85 584 014 PLN
Amount of the EU funds in the project	86 078 346 PLN (Cohesion Fund)	72 250 000 PLN

Share of the EU grants in the eligible costs	85%	85%
Scope of the project	development of a monitoring and controlling system for uniform safety/security management in the maritime areas of the Republic of Poland carried out by maritime administration and for the exchange of maritime safety/security information with cooperating domestic and foreign institutions	design and construction of the Pomeranian Data Transmission Trunk Line in the form of an optical fibre pipeline between Gdynia and Świnoujście
Contractor entity (a contractor selected by tender procedures)	Alcatel – Lucent Polska Sp. z o.o. Indra Sistemas S.A.	Wasko Sp. z o.o.

Source: the Author's own study based on the information provided by the Centre for EU Transport Projects https://www.cupt.gov.pl/?id=1522; http://www.cupt.gov.pl/?id=933 [Retrieved March 24, 2015].

The NMSS [KSBM] and the MSIES [SWIBŻ] as its sub-system come as excellent examples of efforts undertaken by the particular countries of the Baltic Sea Region (BSR) and of the EU in order to achieve an acceptable level of risk and to provide security/safety to all the processes involved in maritime transport in the areas they are responsible for (as coastal states). Unfortunately, such efforts are largely determined by the specific character of the particular countries, including their wealth, significance to maritime transport in pursuit of economic goals, access to advanced technologies and techniques and the level of determination to provide maritime safety/security. Additionally, despite integration and unification efforts, such decisions are largely made individually by the particular countries (with consideration of their own national interests, however often with a large share of regional – European funds).

Another argument for incurring considerable investment expenses to increase maritime safety/security through implementation of innovative management systems is a systemic social and economic analysis in the categories of social costs TSC/TSB: Total Social Cost/Total Social Benefit, determining the indication of considerable social benefits resulting from the implementation of the above-mentioned systems.

A social and economic analysis of the state maritime security/safety system at the national level (NMSS [KSBM], Poland)

While carrying out a social and economic analysis[5] of the NMSS I [KSBM I] project, it is necessary to make, after KSBM etap I… (2007), the initial simplifying assumptions:

- the Maritime Office in Gdynia (Beneficiary) obtains its own funds (own contribution) for the implementation of the project from the Ministry of Infrastructure; during the implementation of the investment under the Infrastructure and Environment Operational Programme, Action 7.2 – Development of Maritime Transport, the own funds account for 15% of the eligible costs obtained in instalments in the years 2009–2012; in this way, the contribution of the EU grants is 85% of the eligible costs;
- the launching of the NMSS I took place in 2011 and, in this way, the surge in the costs related to the maintenance of that system during that year can be justified;
- for the purpose of the costs-and-revenues analysis, the prices of materials and services from the second half of 2007 are accepted; the analysis has been carried out in real prices, without any consideration of the inflation impact;

- considering the fact that the project can be treated as a project in the IT field, for the purpose of projecting the economisation processes, a period of 17 years of the project operation has been assumed, starting from the year in which the investment is to be completed, that is until 2028; the assumed period indicates the cyclicality in the replacement of the IT equipment and radars (operational costs do not change during the projection period);
- for the purpose of the financial and economic analysis, the value of the discount rate has been assumed as d = 6%, as the value recommended for the analysis of costs and benefits of the investment projects in the IT and transport sectors;
- the VAT has been treated as the non-eligible cost.

According to the operational principles of the Maritime Office in Gdynia (Beneficiary) and the specificity of the project, the only revenues obtained by the Office come from the state budget and they should cover all the costs related with the operation of the system (without depreciation) as indicated in Analiza kosztów… (2012).

The operational costs of the project are the costs resulting from the launch and exploitation of the new NMSS I [KSBM I] (and subsequently the NMSS IIA [KSBM IIA]) and from the increased number of employees (25 new employees). Furthermore, it has been assumed that during the exploitation of the system the replacement of some structural elements of the system (radars, computers, servers)[6] will take place in the 5-year and 10-year cycles.

There has not been any calculation of the financial evaluation indicators (the financial internal rate of return – FIRR, the financial net present value – FNPV) for the project, in a situation when the project does not generate the assumed revenues and the modernised National Maritime Security/Safety System is not depreciated (Beneficiary does not obtain any revenues which are derived from depreciation from the state budget). It results directly from the form of the calculation made for this type of investment mentioned in KSBM etap I… (2007):

$$\mathrm{FIRR} = f\left(-\mathrm{N};+\mathrm{D}\right) \tag{1}$$

where:

N – is the capital expenditure;
D – is the revenue resulting from the project = 0 (Beneficiary's operational costs are covered directly from the state budget).

The analysis of the social and economic efficiency of the NMSS I [KSBM I] project has been provided from the perspective of the state interests (Poland) and the perspective of the regional interests (BSR), through the calculation of the economic internal rate of return (EIRR) and the economic net present value (ENPV), with the analysis of C/B (TSC/TSB), assuming that the system will prevent only one maritime catastrophe with the participation of one large tanker (the total loss in the final year of projection: 2028; the estimated value of the vessel with the cargo: 441 647 500 PLN,[7] excluding the costs of search and rescue operation and potential environmental loss as stated in KSBM etap I… (2007).

The value of the EIRR for the own contribution and the value of the total investment have been calculated with the use of the following equation:

$$\mathrm{ENPV} = 0 = \sum_{t=0}^{t=n} \frac{\mathrm{K}_n}{(1+\mathrm{EIRR})^n} + \sum_{t=0}^{t=n} \frac{\mathrm{NCF}_n}{(1+\mathrm{EIRR})^n} + \mathrm{RV}_n \tag{2}$$

where:

t = 0, the initial year of the investment (2007);

$t = n$, the final year of the projection (2028);
K_n – is the amount of the own contribution of the Maritime Office to the total investment;
NCF_n – is the value of the net cash flows generated by the project in a particular year;
i – is the assumed discount rate (6%);
RV_n – is the residual value calculated with the use of the equation W_n/i where W_n is the value of the operational costs in the final period of the projection (2028).

The values of the indicators of the economic internal rate of return (EIRR) calculated for the NMSS I and indicated in KSBM etap I… (2007) project are:
- of the total investment (EIRR/C): 7.5%[8]
- of the own contribution (EIRR/K):15.3%

The values of the ENPV of the equity capital and of the total investment have been calculated with the use of the following equation:

$$\mathrm{ENPV} = -\sum_{t=0}^{t=n} \frac{\mathrm{K}_n}{(1+i)^n} + \sum_{t=0}^{t=n} \frac{\mathrm{NCF}_n}{(1+i)^n} + \mathrm{RV}_n \tag{3}$$

As described in KSBM etap I (2007) the values of the economic net present value (ENPV) calculated for the NMSS I [KSBM I] project are:

- of the total investment (ENPV/C): + 14 701 955 PLN
- of the own contribution (ENPV/K): + 67 738 291 PLN

In accordance with the accepted assumptions for the funding the NMSS [KSBM] operation, the society must incur additional expenses to maintain full operational readiness of all the structures of the National Maritime Security/Safety System. The above-mentioned expenses are presented in the financial analysis as the operational costs of the system and they form the TSC category. Most components of the TSB category are difficult to quantify because they include:
- potential decrease in the number of maritime accidents and failures;
- potential decrease in environmental loss resulting from maritime disasters and failures;
- better and more efficient coordination of search and rescue operations at sea;
- decrease in risk related to threats against maritime security (piracy, terrorism, asymmetric threats);
- fast and more efficient information exchange in the field of maritime transport security and safety (including the international aspect – EU).

Meeting the assumptions identified above, the implementation of the NMSS [KSBM] indicates its efficiency also in the TSC/TSB categories. It is a strong reason to discuss the problem of the internalisation of the NMSS [KSBM] operational costs in the further perspective of its exploitation and management. Therefore, Maritime Offices, as the entities responsible for the management and operation of the NMSS [KSBM], might be directly interested in searching for other available funding sources for the current operation of the system, especially in the light of Centrum Unijnych Projektów… (2015) findings. The following concept comes as one of the potential possibilities to obtain other funding sources through the internalisation of the operational and managerial costs of the current maritime safety/security system.

The concept of a safety surcharge as the potential of the internalisation of the operational costs of the maritime security/safety system (NMSS [KSBM], Poland)

All the calculation elements of the social and economic analysis of the NMSS [KSBM] assume that it is actually possible to prove the causal relationship between the operation of the system and a decrease in the number of maritime disasters (failures, disasters, including environmental disasters). Another argument is the fact that providing funds from the state budget does not usually foster

financial rationality and pressure towards economisation. Furthermore, after the end of the implementation stage, which has been financed from the EU funds, all other costs are covered exclusively from the state budget, hence they burden the society (the TSC category). Considering the growing operational costs, all indispensable modernisation, current depreciation of the fixed assets (elements of the morphological structure of the system), highly probable restrictions imposed on the co-financing of the investment with the use of the EU funds in the subsequent financial perspective (2021–2027) caused by some probable changes in the priorities and the budget expenditure axis[9] and the impact of Brexit, it is necessary to analyse the question related to the internalisation of such costs through the implementation of the strategy in which the costs of the current maintenance of the system are transferred on the end-users of the NMSS [KSBM] (the strategy of cost internalisation). For this stage of the research, the Author assumes three potential strategic options of the suggested solution:

- internalisation limited exclusively to the operational costs resulting from the exploitation of the NMSS [KSBM] – the strategy of limited internalisation of costs;
- internalisation of depreciation costs and intended modernisation of the NMSS [KSBM] – the strategy of partial internalisation of costs;
- internalisation of all the costs related to the maintenance of the system after the EU funding of the NMSS [KSBM] is finished (operational costs + depreciation + modernisation) – the strategy of full internalisation of costs.

The potential implementation of the above-mentioned solution shall require some considerable legislative amendments which would make it possible to transfer (internalisation) the operational costs of the NMSS [KSBM] to its end-users (ship owners) in the form of an additional port fee (following the example of the fee for the ISPS security system – a security surcharge). It shall also require precise calculation of such a surcharge for each of three strategic options. The amount of the discussed surcharge (the suggested name: a safety surcharge – the S-surcharge) should be calculated for the subsequent years based on the data provided from the previous years, with the consideration of the following equation:

$$\text{S-surcharge} = \sum_{i-n} \frac{\mathrm{W}_n}{\mathrm{N}} \tag{4}$$

where:

W_n – is the value of the following costs:

1) operational costs,
2) depreciation + modernisation,
3) operational costs + depreciation + modernisation in the previous period (previous year); the costs of modernisation should be spread over the whole period between the subsequent stages (in 5-year and 10-year cycles),

N – is the number of vessels handled at all the sea ports in Poland in the previous period (previous year).

Considering the above-mentioned data referring to the operational costs and intended modernisation of the NMSS [KSBM] (in the 5-year and 10-year periods until the end of the LCA, that is namely: 2028) and the statistical data presenting the number of calls at the sea ports in Poland, it is possible to calculate the amount of the S-surcharge for 2020, using the equation presented above. It will include the following amounts for each strategical option respectively:[10]

- approximately 180 PLN/a vessel for the option of the limited internalisation of costs;
- approximately 250 PLN/a vessel for the option of the partial internalisation of costs;
- approximately 320 PLN/a vessel for the option of the full internalisation of costs.

Despite the fact that the amount of the discussed fee (the suggested S-surcharge) seems to be relatively low,[11] its impact on the competitiveness of the Polish sea ports should be taken into consideration, especially taking into account other overlapping potential determinants related to the limitation of the above-mentioned competitiveness (e.g.: establishment of the SECA in the BSR) and the multiplication of costs for ferry ship owners and ship owners who provide regular line connections on the Baltic Sea. Therefore, the potential decision about the implementation of the S-surcharge should be made based on a comprehensive profit-and-loss analysis with consideration of all the aspects, including the costs of S-surcharge collection and issuing a relevant legal act (legislation).

Conclusions and Recapitulation

Provided in the article, a limited and estimated analysis of the social and economic efficiency of the NMSS [KSBM] (as a real system operated at the national level) presents complicated phenomena related to the potential of the economisation of integrated systems dedicated to maritime transport safety/security and the strategic options for the internalisation of their operational costs which can be implemented. In conclusion, it is possible to state that the economisation of the NMSS [KSBM], understood as a process of improving the economic efficiency of the system, can be a viable and efficient process if it is considered in its broadest (holistic) dimension, including external costs and benefits (social TSC/TSB) – despite some restricting mechanisms (budgeting, lack of competitiveness, maritime security/safety as the responsibility of the State). The suggested fee (the S-surcharge) imposed on vessels calling Polish sea ports would allow the interested parties to provide continuous operation of the system, also in a situation in which the current funding sources would be seriously limited (being based mainly on the prevailing contribution of the EU funds).

Hence, the discourse presented in the article allows the Author to state that in order to become independent from the budget funding in the fields of the NMSS [KSBM] operation, its operational costs, depreciation and modernisation (especially, considering the fact that the investment is made into information technology of a short life span – LCA), it may be necessary to implement an additional safety surcharge, based on the principle referring to the internalisation of the operational costs of the maritime transport security/safety systems (in this particular case: the NMSS [KSBM]). The calculation method for the surcharge suggested above is of universal nature. Hence, based on the research he has carried out, the Author believes that it is possible to apply the obtained results and conclusions in a wider population (other coastal countries which operate similar systems).

Endnotes

[1] In one of his contemporary studies, *Europe and the Sea – Making of Europe,* Michel Mollat du Jourdin discusses widely freedom of the sea and a necessity of providing objective regulations to maritime transport; see more [in:] Makowski A., *Siły morskie współczesnego państwa*, Impuls Plus Consulting, Gdynia 2000 – the Author's note.

[2] The Polish maritime zone of the responsibility for search and rescue (SAR) operations does not correspond to the Polish state borders (TTW) and its area is defined by the Act on Maritime Areas and Maritime Administration of the Republic of Poland (Journal of Laws,1994 No. 32, item.131 with later amendments) – the Author's note.

[3] The Maritime Safety Information Exchange System (MSIES) [SWIBŻ] and its data transmission infrastructure was developed by the Maritime Office in Gdynia with the financial participation of the European Union (the Sectoral Operational Programme – Improvement of Competitiveness of Enterprises 2004–2006; Priority 1: Improvement of entrepreneurship and innovation through enhancement of institutions in business environment; Action 1.5 Development of a system providing *entrepreneurs* with an access *to* information and public services online*)* – the Author's note.

[4] Tasks of public administration and public entities will not result in any additional expenses in the public finance sector because they will be funded under the restrictions imposed on the expenses defined in the State Budget Act, in the relevant parts of the state budget – the Author's note.

[5] According to *The Analysis of costs and benefits of the European Structural Fund – EFRD Cohesion and ISPA,* the guidelines provided by the Unit for Evaluation of Regional Policy, the economic analysis is to provide an evaluation of the way in which the project contributes to the economic growth of the particular region or country (improvement of welfare). It is provided with the consideration of the interests of the population of a particular region or country, through the calculation of the economic internal rate of return (EIRR), the calculation of the economic net present value (ENPV) and the C/B(TSC/TSB) analysis – the Author's note.

[6] According to the project documentation, the first year of the increased operational costs was 2011 – the Author's note.

[7] In order to provide a consistent way of calculation, the prices from the initial period of the projection (2007) have been assumed – the Author's note.

[8] The high value of the EIRR indicator for the total investment means that if the NMSS I [KSBM I] prevents even one maritime catastrophe during the projection period, it is still profitable in terms of social and economic efficiency, considering its maintenance and modernisation costs – the Author's note.

[9] Working on the EU budget perspective 2021–2027 was initiated in 2018, in accordance with the procedures. In May 2019, the European Commission submitted a proposal in which the cohesion policy, under which popular grants are provided as financial aid, would obtain EUR 330 billion. It would be about EUR 20 billion less than in the budget defined for the years 2014–2020. Poland is to obtain EUR 64 billion – approximately 20% less than in the current financial perspective. See more: https://businessinsider.com.pl/finanse/fundusze/budzet-ue-na-lata-2021-2027-ile-pieniedzy-dla-polski/swq0594 [Retrieved February 20, 2020] – the Author's note.

[10] It has been calculated on the basis of the modernisation schedule (5-year and 10-year cycles) the analysis of the operational and managerial costs of the NMSS [KSBM] in the perspective to 2028 (according to *KSBM Etap I, Studium wykonalności*…, p. 210 and the subsequent documents) and the data provided by the Central Statistical Office referring to the number of calls at Polish sea ports (in 2017, 19 488 commercial vessels called at all the Polish sea ports, excluding passenger vessels and ferries) – in: *Rocznik Statystyczny Gospodarki Morskiej*, Statistical Office in Szczecin, Warszawa-Szczecin 2018, pp. 171, 339 – the Author's note.

[11] The suggested amount of the S-surcharge can be compared to the gross tonnage fee; for example, in the Port of Gdańsk it is 1,07 PLN/1 GT for a container vessel, so for a container vessel of 50,000 GT x 1.07 PLN = 53,500 PLN. See more: https://www.portgdansk.pl/port/charges/Taryfa-2020.pdf – the Author's note.

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Modern Mechanisms for Restoring the National Economy of Syria

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Abstract

the article outlines the essence of the problem, which indicates the need for recovery measures in relation to the Syrian economy. In the course of the study, the regions of the state are divided into several sectors, each of which has its own set of goals and priority measures in the framework of economic recovery. The importance of investment, including the role of public-private partnership for the recovery of the Syrian economy, is highlighted. Effective investment schemes that are best suited to the current conditions in Syria are proposed.

Keywords: Economic Recovery in Syria, Economic Recovery Mechanism, Investment in Syria, PPP In Syria.

Introduction

Due to a durable military conflict in Syria lasting from 2011 to the present day, the national economy of the country has undergone a number of negative changes. The main macroeconomic indicators have low or negative values (GDP, production growth, unemployment, inflation, etc.). In addition, a number of objects were destroyed during the course of military operations in Syria: from historical places to infrastructure and residential areas. The people who lived in conflict zones were forced to move to safer places in search for social support that is currently needed. Therefore, the fulfillment of social obligations is now a priority for the Syrian government, as well as the restoration of the national economy in order to replenish the country's budget.

These facts determine the relevance of the research. The search for the most effective mechanisms for restoring the country's economy is considered a particularly acute issue. This is the purpose of the given study.

The main indicators of the Syrian economy's development within 2010-2018 are represented in Table 1 (Economic indicators of Syria).

Table 1: The main economic indicators of Syria

Indicator	2010	2011	2012	2013	2014	2015	2016	2017	2018	Abs. m.
GDP, %	3,4	4,7	-26,3	-26,3	-14,7	-6,1	-4	1,9	2,4	-1
Unemployment rate, %	8,6	14,9	14,5	14,4	14,4	14,6	15	15,2	14,9	6,3
Inflation rate, %	3,8	5	15	52	19	-27	46	39	1	-2,8

The table shows fairly stable indicators of the Syrian economy in the pre-war period (up to 2011): a positive GDP growth rate, the average unemployment rate, and acceptable inflation parameters. Since 2012, there has been a sharp change in the country's GDP – a significant decline in production until 2017. The unemployment rates reached 14-15% until the end of 2018. The inflation rate varied significantly from 2012 to 2017. Thus, the Syrian economy has been inefficient for six years and has been subject to many negative impacts.

A significant resource for the recovery of the Syrian economy is the labour potential. However, according to the UN, the number of refugees in the country reaches 3% of the total population of Syria. Fig. 1 shows the dynamics of Syrian refugees registered since 2013 (U.N. statistics).

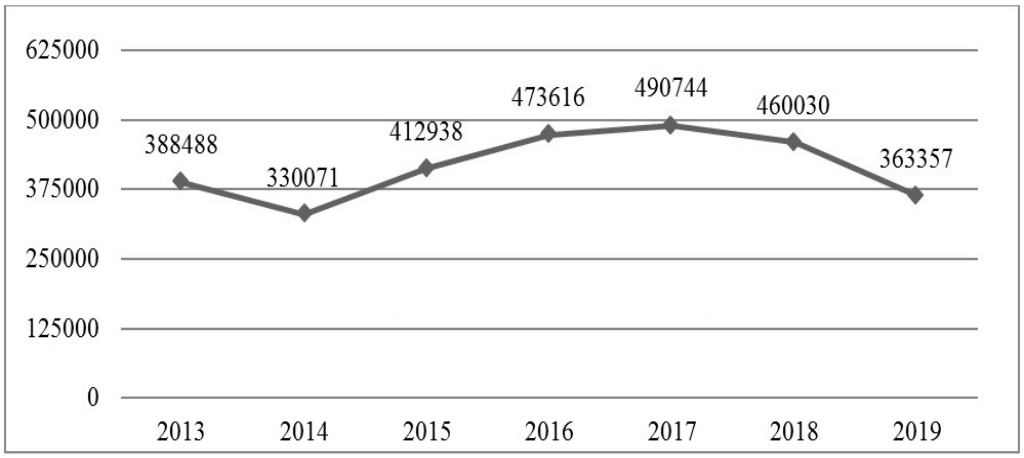

Fig.1: The number of registered Syrian refugees, people

The data show that the number of refugees from Syria reached its peak in 2017 equaling almost half a million people. Moreover, more than 70% of Syrian refugees remains in the country, which implies the state's obligation to provide them with adequate living conditions and pay benefits, according to the country's social policy.

In order to restore the economy and solve national problems, the Syrian government should use special mechanisms. Modern mechanisms of economic recovery in the world are quite diverse, but in most cases the following measures are used (Chernenko, V. A., 2019, p. 84):

1) increase in government borrowings;

2) increase in the state's budget deficit;

3) softening of monetary policy and stimulation of investments in the country.

The first two options are classic methods that are easiest to implement, but they imply a short-term effect, rather than establishing stability in the country's economy.

By resorting to external borrowings, the government is aware of the fact that it is committing itself to the international community or international organizations. Creating a negative credit history, the state may lose the trust of foreign partners in all economic relations for a long time. Moreover, international funds and organizations may refuse to lend. Therefore, this mechanism of economic recovery is not considered highly effective.

Increase in the state's budget deficit is used when spending exceeds income significantly, social programs for the country's development are usually cut, and most of the money supply is directed to the economy. If the state of the economy does not have a protracted crisis, then this mechanism takes place in a short period of time. But with long-term processes of destabilization of the economy, this method of its restoring will only aggravate the situation: the country may default leading to its bankruptcy in the future.

Softening of monetary policy and the development of the effective investment policy is the mechanism for restoring the national economy considered to be the most acceptable solution for most world countries.

To determine a more precise scheme of the mechanism of economic recovery in Syria, the country should be divided into several sectors. This is due to the fact that such a mechanism must have a point nature and a target orientation. Not all regions of Syria are affected by destruction and negative consequences of the military conflicts. Some of them continue their performance as usual, that is why the government has received a positive rate of GDP growth in recent years. Therefore, the mechanism of economic recovery should be applied intensively to the regions suffering from a difficult economic situation.

Syria's regions are divided into sectors based on their losses from military and terrorist events. Thus, the division can be represented as follows (Map of military operations in SAR):

– Sector 1 – the regions of Syria where the destruction of the infrastructure and economy reaches 90% (for example, Palmyra or Homs);

– Sector 2 – the regions of Syria where the degree of destruction of the infrastructure and economy ranges from 30 to 70% (for example, Aleppo or Damascus);

– Sector 3 – the regions of Syria where the level of losses from military conflicts reaches 30%, i.e. the potential for the economic development has been preserved (for example, Idlib);

– Sector 4 – the regions of Syria that have suffered insignificant losses during military conflicts (for example, Latakia or Tartus).

Accordingly, the Syrian government should apply a sufficient mechanism for economic recovery to the regions of each sector depending on the goals and tasks set. The goals and measures aimed at the economic recovery for various sectors of Syria are represented in Table 2.

Table 2: Goals and measures aimed at the economic recovery in various sectors of Syria

Sector	Goals and tasks	Priority measures
1	Goal: the recovery of the region's economy after military destructions	– to restore the landmarks and historical values; – to ensure the population's safety; – to restore the infrastructure and communication lines; – to restore destroyed enterprises; – to organize the construction of new enterprises.
2	Goal: the recovery of certain sectors of the economy after military destructions	– to restore the landmarks; – to restore the infrastructure; – to create new enterprises in attractive industries.
3	Goal: the elimination of negative consequences of the crisis caused by military destructions	– to restore the enterprises of attractive industries and equip them with new technologies; – to conduct an active marketing campaign to attract foreign investments; – to develop channels of communication with potential investors, etc.
4	Goal: to increase the attractiveness of the industries reduced due to military destructions	– to use new technologies in the activities of the enterprises; – to attract investors for joint construction of large enterprises; – to conduct an active marketing campaign to attract foreign investors.

The given table shows the main differences in goals and priority actions that are common to different sectors of Syria.

The goals differ as follows. The goals for Sectors 1 and 2 include the usage of modern mechanisms for restoring the national economy in the regions located in the area of military conflicts. They are aimed at restoring sectors of the economy and peace in the region. To determine the sector to which this or that region of Syria belongs in this case, it is necessary to evaluate two types of impacts by their strength:

– direct impact, i.e. fire, physical destruction of buildings, structures, facilities and infrastructure in the region of Syria;

– indirect impact, i.e., a decrease in investment and tourist flow, a decrease in the production rate of the economy, a decline in social and economic growth indicators in the region of Syria;

The goals for Sectors 3 and 4 include the usage of modern mechanisms for restoring the national economy in the regions partially or indirectly affected by the military events in the country. They are aimed at improving the efficiency of the affected sectors of the economy and developing new industries. To determine the sector to which this or that region of Syria belongs in this case, it is necessary to measure the impact of the following indicators:

– production rate;

– state of fixed assets;

– average salary of the population;

– investment activity;

– the level of the population and business credit, etc.

It is also necessary to note the different orientation of the mechanisms for restoring the national economy based on the sectors of Syria:

– Sectors 1 and 2 are characterized primarily by providing social assistance to the population of the country – housing, jobs and social benefits. Afterwards, the strategically important sectors of the economy are restored for a particular region (for example, regarding Syria, it is predominantly oil or the tourism industry). To increase attractiveness and attention of the international community to the country's problems, historical values and landmarks are also restored. For example, many cultural heritage sites were destroyed in the center of Aleppo (part of the ancient neighborhoods from the UNESCO world heritage list). Moreover, it is important to restore the infrastructure and eliminate negative consequences in certain sectors of the economy that take the largest share of GDP;

– Sectors 3 and 4 are characterized by support and development of the most profitable sectors of the economy, the improvement of functioning enterprises due to their technical and innovative renewal, and increasing investment attractiveness.

In other words, the mechanism for restoring the national economy of Syria in Sectors 3 and 4 will be applied to the world countries suffering from crisis, while the mechanism in Sectors 1 and 2 – to the states affected by military conflicts and terrorist attacks. Therefore, the priority is given to the most urgent social and economic problems, the solution of which depends mostly on the further independent development of the state.

It is also worth noting that Table 2 shows that the content of the measures included in the national economic recovery mechanism varies by sectors.

The regions of Syria belonging to Sectors 1 and 2 have been significantly damaged by military conflicts: landmarks, cultural and religious sites, roads, railway stations, water supply systems, and other infrastructure have been affected. The standard of living in these locations has significantly decreased due to a high outflow of refugees from these regions. As a result, the purpose of the national economic recovery mechanism is to restore at least one profit-generating industry, since the tasks of the government include a lot of other actions.

In addition, it is necessary to form a high Committee for Syria's cooperation with UNESCO and other international organizations that are engaged in preservation of cultural heritage sites, which will help restore destroyed historical areas of the country. Therefore, it will renew the interest of tourists, increasing the level of usage of services and products offered by the Syrian enterprises.

The regions of Syria belonging to Sectors 3 and 4 have certain opportunities for self-recovery, but they still require additional government support. In such regions of Syria, the enterprises and the infrastructure are preserved, and the social status of the population is higher, which allows them to continue to lead their usual way of life, including crediting and small business development. The crisis of the enterprises in such regions is related only to the financial component caused by the loss of customers and investors due to the nationwide problems.

The mechanism for restoring the national economy of Syria is based on the investment component.

The main areas of investment activity are displayed in Fig.2.

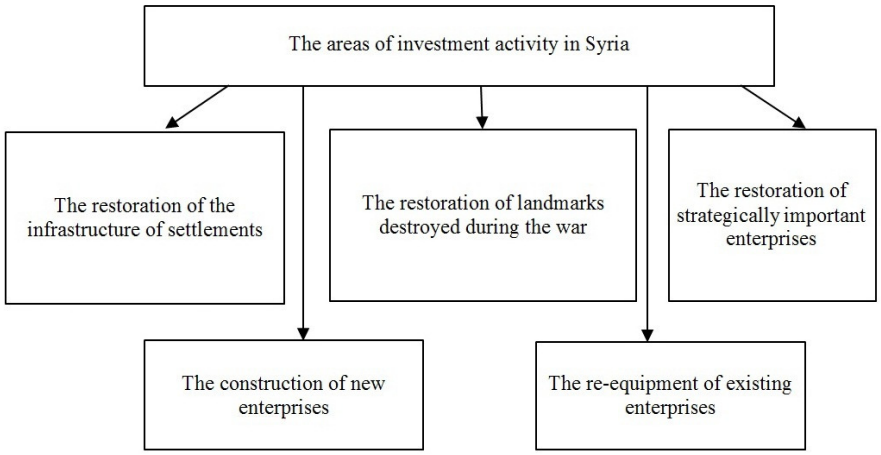

Fig.2: The main areas of investments in Syria

These areas of investment should be distributed across regions based on the degree of disruption.

Sector 1 (the regions that have been damaged significantly).

Period of the investment projects implementation: long-term strategies, over 5 years.
Investment objects: places of interest, infrastructure, and strategically important sectors of the economy.
Investment sources: international organizations, state budget, PPP, foreign investors, private investors of SAR.

Sector 2 (the regions with an average degree of destruction).

Period of the investment projects implementation: long-term (over 5 years) and medium-term strategies (3-5 years).
Investment objects: places of interest (above five years), infrastructure, and strategically important sectors of the economy and large enterprises (3-5 years).
Investment sources: state budget, PPP, foreign investors, private investors of SAR.
Sector 3 (the regions with insignificant degree of destruction).

Period of the investment projects implementation: medium-term strategies (3-5 years) and short-term strategies (1-3 years).
Investment objects: the reconstruction and implementation of innovations at existing enterprises, the construction of new enterprises in efficient sectors of the economy.
Investment sources: PPP, foreign investors, private investors of SAR.

Sector 4 (the regions that have not suffered from military actions in the SAR).
Period of the investment projects implementation: short-term strategies (1-3 years).
Investment objects: the construction of new enterprises in efficient sectors of the economy.
Investment sources: PPP, private investors of SAR and other countries.

The main investment sources depending on Syria's region sector are represented in Fig.3.

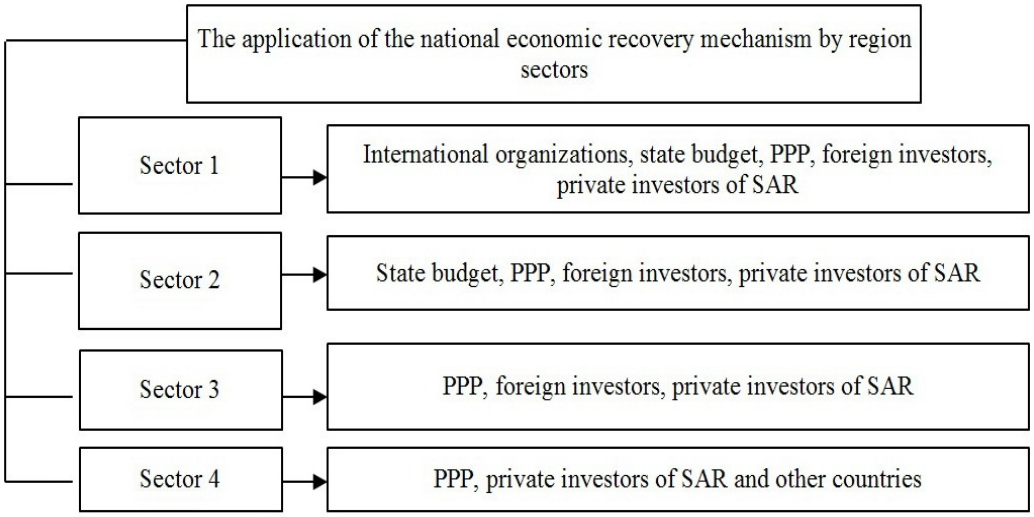

Fig.3: The main investment sources depending on Syria's region sector

A public-private partnership (PPP) is of particular interest among these investment sources. This mechanism of economic recovery is the most advanced now.

The international organization "The United Nations Economic and Social Commission for Asia and the Pacific" in its researches defines PPP as the conclusion of a contract between state agencies and business in order to improve the quality of provision and performance of various infrastructure services [6]. The state and business enter into a legally executed cooperation agreement designed to share responsibility in the future joint project. PPP is based on the principle of competence of participants, clear allocation of resources, separation of interests and risks, as well as responsibility and receipt of monetary compensation.

A typical PPP scheme is provided in Fig.4.

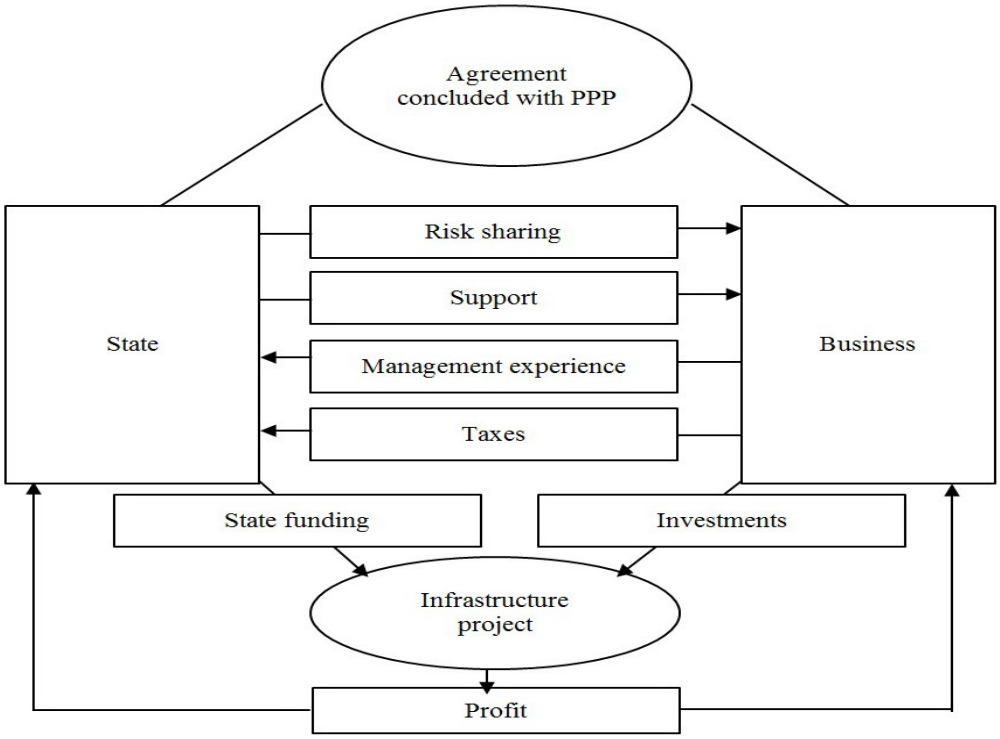

Fig.4: A typical PPP scheme

It can be concluded that PPP is the conclusion of an agreement between two parties, where one participant is a representative of the state structure, and the other is a businessman or private person. The purpose of the agreement is to implement the infrastructure project. In its turn, the state offers business support and risk sharing, while business agrees to contribute its existing experience to the development and management, and will act as a tax payer in the future. The project is financed by the state and business with the shares indicated in the agreement, and the future profit is also distributed according to the agreed terms.

The existing forms of PPP, as well as tools for their implementation, which are most frequently used, are represented in Table 3 (Konovalova, M. E., 2019).

Table 3: Forms and tools for the PPP implementation

PPP tools	Explanation
1. Creation of special economic zones (industrial, tourist and recreational, technical, port)	PPP in this area occurs due to the accumulation of financial resources by the state from private structures on favourable terms. This form of partnership is implemented only in certain territories of the state.
2. Investment fund of the state	The form of implementation of PPP at the expense of the state's investment fund is as follows: the state offers business on a competitive basis to make investments in projects that are of public importance. Part of the funds for the project are allocated from the state investment fund, the remaining part is allocated by the winners of the competition (the private sector).

3. Concession	This form of PPP is implemented by transferring state-owned facilities (utilities, real estate, road sections, power grids, etc.) to the private sector. The purpose of the transfer is repair and reconstruction, modernization, management and commercial service on the terms and conditions stipulated in the contract.
4. National projects	This is another interesting form of PPP that involves participation of private business in the development and support of key areas.
5. Formation of integrated structures	This form of PPP involves the creation or expansion of functioning holdings that operate in socially important sectors on mutually beneficial terms – for the state and business.

Several effective investment schemes can be proposed to the Syrian government in order to restore the national economy (Yuzvovich, L. I., 2018, p.212). Fig.5. represents the ring scheme of the PPP implementation.

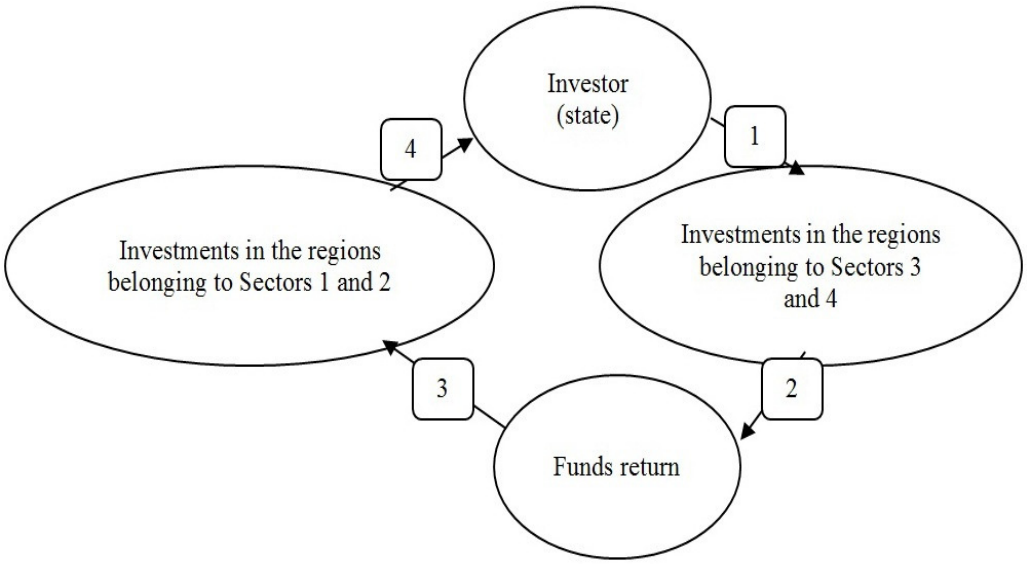

Fig.5: The ring scheme of investments in the national economy of Syria

The given scheme shows that the state serves as the main investor in the ring scheme of the economic investment. This is determined by the fact that the goal of implementing such a scheme is to find funds to restore the economy of the regions affected by military actions (Sectors 1 and 2). Individuals are not interested in investing in such projects, because they are concerned about the payback periods and profitability. Investment projects for Sectors 1 and 2 have long payback periods. External investors also do not take much interest in this kind of investments, only in terms of increasing political significance and influence on the global scale.

The essence of the ring scheme is as follows:

– Stage 1 – the state directs funds to invest in projects in the regions belonging to Sectors 3 and 4;

– Stage 2 – the funds are returned;

– Stage 3 – as a result, the funds received from investments are transferred to the development of the regions belonging to Sectors 1 and 2;

– Stage 4 – at the end of the payback period, the funds are returned to the state again.

Fig.6. shows the usage of cross-investment scheme of the Syrian economy in the framework of PPP.

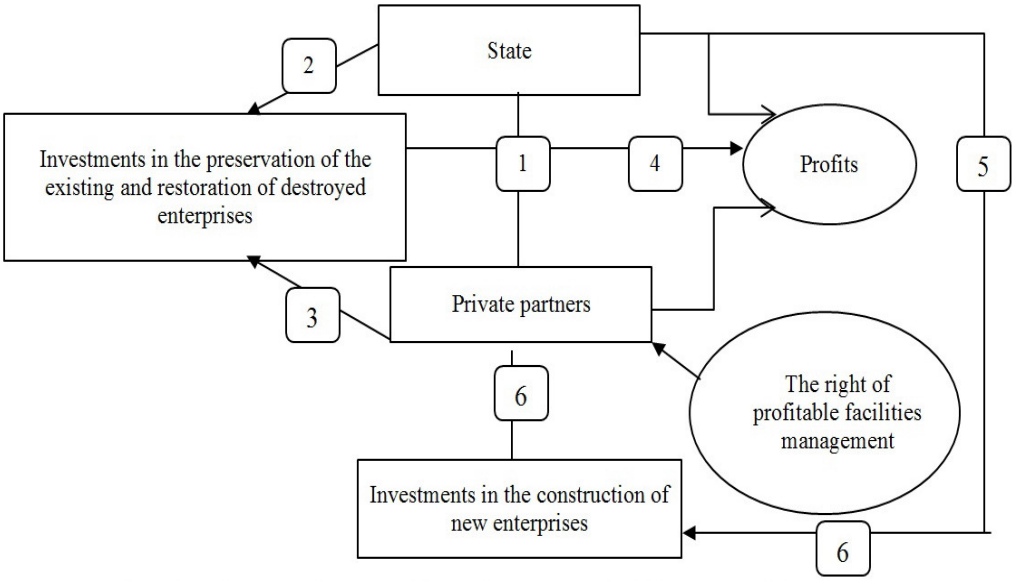

Fig.6: Cross-investment scheme of the Syrian economy in the framework of PPP

The given investment scheme for the Syrian economy is suitable for the implementation of the projects in several types of regions simultaneously. The essence of the scheme depending on the stages is represented below:

– Stage 1 – at this stage, the state and private partners join together to invest in destroyed and strategically important enterprises for the Syrian economy, as well as to restore existing enterprises. Such projects are located in the regions belonging to Sectors 1 and 2, as well as partially to Sector 3. This measure is the goal of the state. In this case, the private partner pursues the ultimate goal to invest in the construction of new facilities with full right to manage profitability;

– Stages 2 and 3 – direction of investment funds on the part of the state and private partners to restore existing and destroyed enterprises;

– Stage 4 – the receipt of a return on the investments;

– Stage 5 – the state transfers the right to full management of newly created efficient enterprises on the basis of PPP;

– Stage 6 – the investments in the construction of new profitable facilities (with the participation of a certain share of the state specified in Stage 1 in contractual cooperation with private partners).

The importance of PPP for the Syrian economy is as follows:

1) the state attracts investments to those sectors of the economy that are strategically and socially important on mutually beneficial terms, namely, the risks of projects are reduced due to the usage of the market procedures for selecting participants;

2) the quality of infrastructure facilities is improved automatically affecting the growth of investment attractiveness;

3) the infrastructure facilities operation costs are reduced due to the effective performance, management and innovative technologies applied;

4) the technological component of the economy grows, it is necessary to develop innovations and innovative companies due to the scale of PPP projects;

5) PPP allows charging the users of the infrastructure facilities, while creating additional budget revenues. In addition, by improving the efficiency of infrastructure facilities, PPP makes additional financial funding available;

6) the financial return from the operation of the infrastructure facility is increasing due to the private sector's interest in it. Consequently, the amount of income and tax payments increases.

Summing up, the essence of the mechanism for restoring the national economy of Syria includes the measures to change the monetary and investment policy of the state (with a bid to attract investment) and the distribution of the regions of Syria due to the degree of destruction of the economy caused by military actions. This is necessary for pinpointing goals, objectives, and priority investment activities. In addition, the proposed mechanism for restoring the national economy of Syria includes the choice and application of the most effective investment schemes, comprising those based on PPP. It is also important to stress the state's focus on the priority of economic recovery: in some regions attention should be paid more to strategically significant industries and infrastructure, while in others – to profitable and efficient activities.

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Green Intellectual Capital for Sustainable Business Model: Bibliometric Analysis

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Abstract

The paper deals with analyses of the approaches to define green intellectual capital. The results of analyses proved that green intellectual capital is a part of intellectual capital. At the same, developing of green intellectual capital in the tendency of the greening economy is becoming increasingly important to companies due to customer and stakeholders needs. The main goal of the paper is to analyse the tendency in the scientific literature on green intellectual capital to identify future research directions. For the analysis, the tools of VOSviewer and Scopus were used. This study reviews 5501 papers from Scopus and Web of Science. The time for analysis were 1991-2019. Using the Scopus analyse tools showed that in 1997 the numbers of paper which focused on intellectual capital issues began to increase. At the same time, in 2014, the focus of investigation moved from general issues of the intellectual capital to green (environmental, sustainable) issues of intellectual capital. The most significant share of the scientists which investigated issues on green intellectual capital was from the USA, Great Britain and Spain. In 2018 the number of papers which focused on analyses of green intellectual capital increased in such journals with high impact factor as Sustainability and Journal of Intellectual Capital. The results proved that the theme of green intellectual capital is in the ongoing trends green or sustainable economy. The findings from VOSviewer identified 11 clusters of the papers which investigated intellectual capital from the different points of views. The first most significant cluster merged the paper which contains the keywords as follows: agent theory, business model, multinational companies, informational asymmetry etc. The second biggest cluster contained such issues as follows: sustainability, green intellectual, green human resources, green innovation, green intellectual development etc. The third biggest cluster focused on: trust, values creation, added value, return on equity, intangible assets, profitability etc. Such tendency allows concluding, that green intellectual capital is a part of intellectual capital and the improvement of green intellectual capital allows to create added value for different groups of the stakeholders.

Keywords: Capital, Intellectual Capital, Sustainable Development, Green Economy, Green Entrepreneurship, Green Human Capital.

Introduction

The ongoing tendency on extending the sustainable future lead to a reorientation of the human and business activities from the overconsumption behaviour to green/sustainable behaviour which supported by the indicative Sustainable Development Goals. Besides, the rapid increase of green consumers and stakeholders' needs provoke the rapid transformation of companies' activities considering green aspects. In this case, the quality changes in this direction could not be achieved without effective management of intellectual capital, considering the green/sustainable features of development. Thus, at the first stage, the definition, principals and features of green intellectual capital should be defined. Traditionally green intellectual capital analysed as a part of intellectual capital. However, the massive range of scientists in the papers (Amrutha et al., 2019; Mousa et al., 2020; Fawehinmi et al., 2020) analysed of green intellectual capital as a part of green human recourses management which influences on employee green behaviour. Vice versa approach had the authors in the paper (Yusoff et al., 2019) and proved that green intellectual capital contained green human capital, green structural capital and green intellectual capital. Mostly, the concept for developing of green intellectual capital implement the companies which try to promote their activity as green or eco-responsible.

Literature Review

The scientists in the paper (Zainol et al., 2018; Hajduk, 2018) proved that human capital is a core element of intellectual capital in small business. Besides, Lentjushenkova et al. (2019) and Akpoviroro et al. (2019) underlined that intellectual capital was an essential part of a company's value. At the same time, in the papers (Zainol et al., 2018; Mačerinskienė et al., 2019; Mercado et al., 2019; Rajan, 2019) the scientists proved that the efficiency of intellectual capital management influence on the company's performance. A similar conclusion was made by the authors in the paper (Poór et al., 2018; Sotnyk, 2012), investigating the efficiency of human resource management.

The results of the analysis showed that range of scientists investigated the intellectual capital as a key force of country's social progress, the creative economy and macroeconomic stability (Bilan et al., 2019b; 2019d; 2019e). Thus, scientists proved the linking between social progress and economic efficiency (Rui et al., 2019; Abaas et al., 2018; Bilan et al., 2019a). From the other side, companies should invest in the development of intellectual capital through education (Pryima et al., 2018).

The authors in the paper (Alani et al., 2018) analysing the linking between strategic orientation and product innovation identified that knowledge management was the core elements of intellectual capital. The authors made similar conclusions of the positive impact of intellectual capital on innovation development of the company in the paper (Abdi et al., 2018). Besides, in the paper (Wendra et al., 2018) proved that improving intellectual capital leads to increasing of innovation performance.

Using direct evaluations, the scientists in the papers (Demidova et al., 2019; Sokolenko et al., 2017) proved that intellectual capital had an impact on economic security.

Slinták K., Briš P. and Jurigov Z. analysing of the sustainable business model of Czech company Linet justified that intellectual capital should develop considering the core elements of green/sustainable economy (Slinták et al., 2018). Thus, the sustainable business model bootstraps the innovation development of the company. Ginevicius R. (2019), Razminiene K. (2019), Kendiukhov et al. (2017), Meyer et al. (2017), Sotnyk et al. (2014) and Miguel et al., (2019) underlined that developing of any socioeconomic system could not realising without considering the principals of sustainable development. In the paper (Chitsaz et al., 2019) the scientists analysed the human and social capital as a key part of intellectual capital which had a positive statistically significant impact on the company's performance.

The scientists (Žižka et al., 2018; Lušňáková et al., 2019; Fitri et al., 2019; Bilan et al., 2019f) analysing of the impact of the cluster on the innovation development of companies concluded that intellectual

capital had an impact on the innovation development of the company. Abu-Hamour H. M. J. (2018), Ślusarczyk et al. (2014), Myroshnychenko et al. (2019) and Pohludka et al. (2018) emphasised the role of intellectual engagement in developing company's sustainable business model. The similar results were obtained by the scientists in the papers (Ulewicz, et al., 2018; Lyulyov et al., 2017). They proved the linking between sustainable development and intellectual capital from the stakeholders' point of view. Using hierarchical regression analysis, the authors in the paper (Androniceanu et al., 2019) proved the positive relationship between organisational performance and parameters of human resources management.

Gumelar M. Sutisna and Herwany A. (2018) analysed the intellectual capital as a proxy of intangible assets. The scientists in the paper (Fogarassy et al., 2018; Zámečník, 2016; Boutti et al., 2019) underlined the necessity of considering the green assets, including intellectual capital during environmental accounting. At the same time, that process could be realised without corresponding legislation regulations. Thus, Marikina M. (2018) and Sutopo et al. (2018) proved the necessity of developing the mechanisms of green assets' assessment.

The scientists Mikalauskiene A. and Atkociuniene Z. (2019) highlighted that the intellectual capital of the company could be transformed into the sustainable competitive advantage of the company. Palaščáková et al. (2019) analysed the human capital as a core element of intellectual capital. Besides, the authors underlined the necessity of government supporting intellectual capital through investment policy. In this case, the government investment policy should consider the green policy of the company and if the company develop green intellectual capital. In the papers (Ma et al. 2018; Sotnyk et al., 2013), the scientists proved that green intellectual assets were a core force to develop eco-innovation. Noted, that development of green intellectual capital in the sustainable business model could not be realised without effective financing system (Lyeonov et al., 2019; Chygryn et al., 2018; Bilan et al., 2018a; Bilan et al., 2019c).

Besides, the scientists who investigated the innovations in green energy proved that the rapid growth of renewable energy could not be achieved without powerful green intellectual capital (Cebula et al., 2018; Yevdokimov et al., 2018; Vasylyeva et al., 2014; Bilan et al., 2018b; Vasylieva et al., 2019a; Mental et al., 2018).

Atkociuniene Z. O. and Mikalauskiene A. (2019) proved that the efficiency of intellectual capital had a significant impact on implementing sustainable development principals in the company. In the paper (Masharsky et al., 2018; Alam et al., 2019; Kasztelnik et al., 2019) the scientists proved that implementation of green innovations could not be realised without developed green intellectual capital.

The findings proved that despite massive range investigations of intellectual capital from different points of views, the green intellectual capital had not analysed yet considering different aspects of green activities, sustainable development, green assets etc. In this case, the aim of the paper was analysed of the tendency in the scientific literature on green intellectual capital to identify future research directions.

Methodology

The aim of investigation is cheeking the increasing tendency on analysing of green intellectual capital issues by the scientists. For this purpose, the investigation was done in the following scheme:

1. Identifying the quantity tendency of the papers which focused on the analyses of green intellectual capital issues.
2. Allocating the main subject areas under analyses of green intellectual capital issues.
3. Identifying the most citation papers and Journals which contained the papers on green intellectual capital.
4. Clustering the papers on the main directions for investigations with the purpose to identify the further options for analyses.

For the analysis, the following keywords were chosen: green human capital, green capital, green intellectual capital, intellectual capital, green human, sustainable capital, green human resource management, sustainable human resource management. That keywords were chosen as bullet part of intellectual capital and green capital.

This study reviewed 5501 papers from Scopus and Web of Science. The abovementioned scientific databases are two biggest worldwide scientific databases, contain the scientific papers of worldwide scientists. Considering it, those databases were chosen as the base of analysis. The time for analysis were 1991-2019. The analyse was done by using the software of VOSviewer and Scopus analyse. Thus, VOSviewer allows to allocate and visualize the network of definitions which used and co-citation during the investigation of green intellectual capital. Scopus tools allowed to analyse the publication towards different parameters: affiliation, journal, citation, number of the papers, funding, the subject area and citations. Thus, in the network visualization of VOSviewer allow to allocate and visualize the scientific direction which has strong relationships. The closer keywords are located to each other, the stronger their relations.

Results

The findings of analysing proved that in 1997 the numbers of paper which focused on intellectual capital issues began to increase. Besides, in 2014 the focus of investigation moved from general issues of the intellectual capital to green (environmental, sustainable) issues of intellectual capital. It could be justified by extending the climate problems in the world among society and scientists. In 2019 the number of papers which analysed green intellectual capital was increased by 45.6% compared with the 2014 year (figure 1).

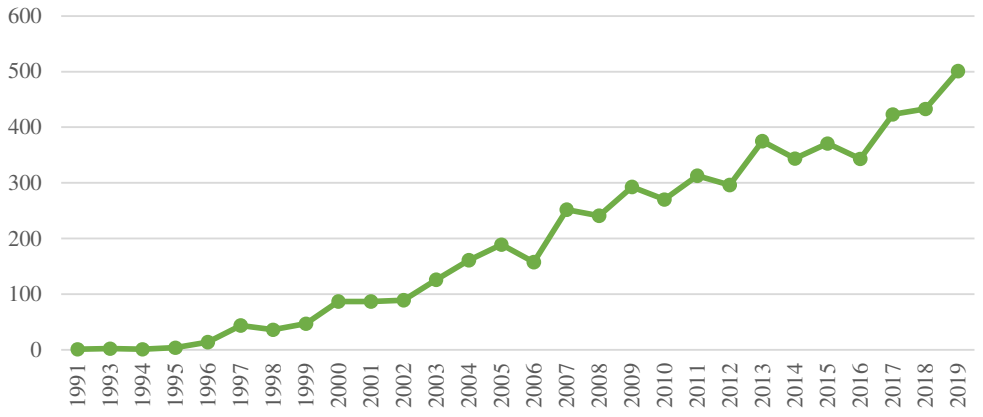

Figure 1: The number of documents in Scopus which contain the green intellectual capital issues

Sources: compiled by the authors using data from Scopus

The findings proved that the green intellectual capital was analysed in the framework of the subject area as follows: Business and Management– 33.5%; Social Sciences – 19.1%; Economics, Econometrics and Finance – 9% and others (Computer, environmental, energy etc.) – 38.40%.

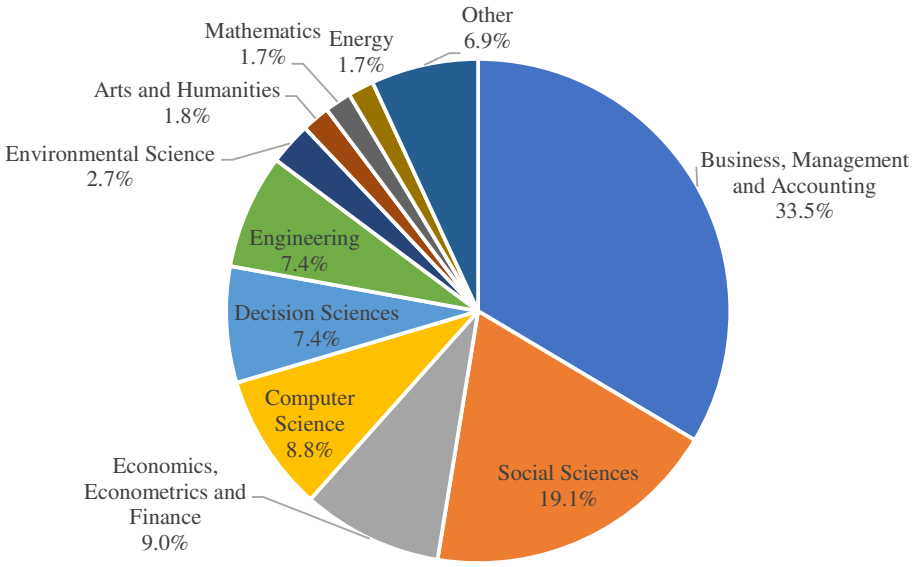

Figure 2: The subject area in Scopus for analysing the green intellectual capital issues

Sources: compiled by the authors using data from Scopus

The analysis by country showed that mostly the scientist with the USA, Great Britain and Spain affiliations investigated the green intellectual capital issues. The top 20 countries' affiliation of the scientists which investigated the green intellectual capital issues showed in Figure 3.

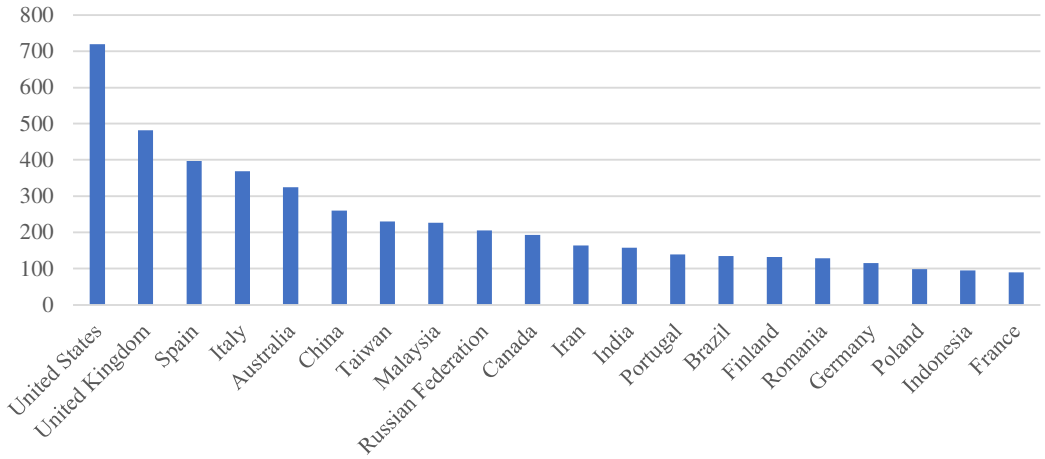

Figure 3: Top 20 country's affiliation of the scientists which investigated the green intellectual capital issues

Sources: compiled by the authors using data from Scopus

Besides, considering the findings from Scopus in 2018 the high ranked Journal such Journal of Intellectual Capital, Journal of Knowledge Management, Sustainability began to publish more papers on green intellectual capital issues (Table 1).

Table 1: The top 5 Journal which published the papers on green intellectual capital

Title of the Journal	Covered by Scopus	CiteScore 2018	SJR 2018	SNIP 2018	Numbers of the papers
Journal of Intellectual Capital	2000 to 2019	5.79	1.29	2.06	587
International Journal of Learning and Intellectual Capital	2006 to 2019	1.11	0.33	0.64	172
Journal of Knowledge Management	1997 to 2019	5.63	1.29	2.07	91
Knowledge Management Research and Practice	2006 to 2019	2.02	0.40	0.88	59
Sustainability Switzerland	2009 to 2019	3.01	0.55	1.17	53

Sources: compiled by the authors using data from Scopus.

Thus, 5 from 10 the most cited papers were published by the high ranked Journals. The most cited papers were published by the scientists Renwick D.W., Redman T., Maguire S. in 2013 in International Journal of Management Reviews. In 2008 Chinese scientists published the paper "The positive effect of green intellectual capital on competitive advantages of firms" which cited 155 and proved that green intellectual capital created the added values for the company.

Table 2: The most cited papers on green intellectual capital 1991–2019

Authors and Title	Year	Source title	Cited
Renwick D.W., Redman T., Maguire S. Green Human Resource Management: A Review and Research Agenda	2013	International Journal of Management Reviews	271
Jackson S.E., Renwick D.W.S., Jabbour C.J.C., Muller-Camen M. State-of-the-Art and Future Directions for Green Human Resource Management: Introduction to the special issue	2011	Zeitschrift fur Personalforschung	159
Chen Y.-S. The positive effect of green intellectual capital on competitive advantages of firms	2008	Journal of Business Ethics	155
Paillé P., Chen Y., Boiral O., Jin J The Impact of Human Resource Management on Environmental Performance: An Employee-Level Study	2014	Journal of Business Ethics	154
Kramar R. Beyond strategic human resource management: Is sustainable human resource management the next approach?	2014	International Journal of Human Resource Management	141
Jabbour C.J.C., De Sousa Jabbour A.B.L. Green Human Resource Management and Green Supply Chain Management: Linking two emerging agendas	2016	Journal of Cleaner Production	122
Jabbour C.J.C. Environmental training in organisations: From a literature review to a framework for future research	2013	Resources, Conservation and Recycling	103
Birch K., Levidow L., Papaioannou T. Sustainable capital? The neoliberalization of nature and Knowledge in the European "Knowledge-based bio-economy"	2010	Sustainability	93
Dumont J., Shen J., Deng X. Effects of Green HRM Practices on Employee Workplace Green Behavior: The Role of Psychological Green Climate and Employee Green Values	2017	Human Resource Management	69
Ahmad S. Green Human Resource Management: Policies and practices	2015	Cogent Business and Management	50

Sources: compiled by the authors using data from Scopus.

The findings from VOSviewer identified 11 clusters of the papers which investigated intellectual capital from the different points of views (Figure 4).

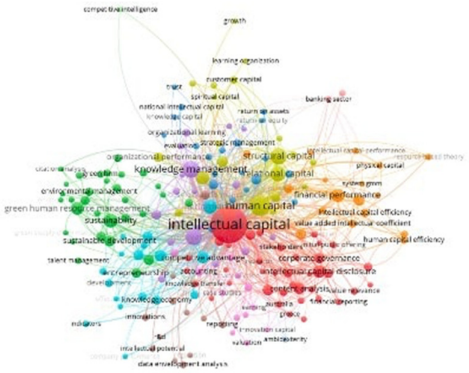

Figure 4: The network visualization of the co-citation of the papers on green intellectual capital

Sources: compiled by the authors using the data from Scopus and VOSviewer tool.

The first most significant cluster (red cluster) merged the paper which contained the keywords as follows: agent theory, business model, multinational companies, informational asymmetry etc. The second biggest cluster (green cluster) contained such issues as follows: sustainability, green intellectual, green human resources, green innovation, green intellectual development etc. The third biggest cluster (purple cluster) focused on: trust, values creation, knowledge management, added value, return on equity, intangible assets, profitability etc. Noted, that two clusters green (green intellectual capital) and red (intellectual capital) located close to each other. The closer location of the abovementioned cluster to each other proved the stronger their relations. Such tendency allows concluding, that green intellectual capital is a part of intellectual capital and increasing efficiency of green intellectual capital allows to create added value for different groups of the stakeholders.

At the same time, the findings proved that green human resources management, as part of intellectual capital, has been investigated by the massive range of the authors. At the same time, green intellectual capital which involved green human resources management is new directions of investigation. Thus, considering the findings from Figure 5, the green intellectual capital relates to corporate social responsibilities, sustainable development, competitiveness and green human resources management.

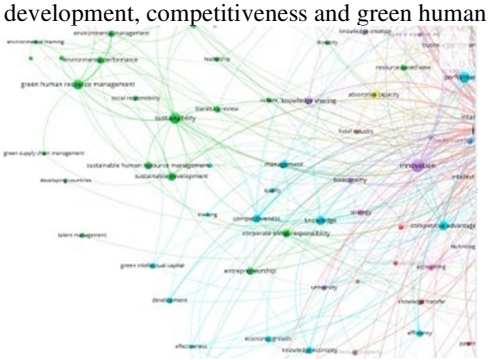

Figure 4: The network visualization of the co-citation of the papers on green intellectual capital with close areas

Sources: compiled by the authors using the data from Scopus and VOSviewer tool.

Thus, at the next stage, with the purpose to do an in-depth analysis of the co-citations on green intellectual capital, the second biggest cluster from Figures 3 and 4 were analysed in detail. The

keywords were chosen as follows: green intellectual capital, green capital, green assets, green innovations and development. The findings showed in Figure 5.

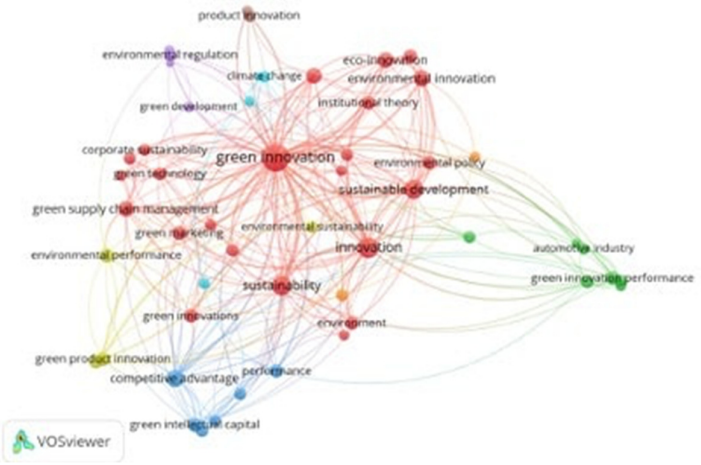

Figure 5: The network visualization of the co-citation of the keywords on green intellectual capital, green capital, green assets, green innovations and development

Sources: compiled by the authors using the data from Scopus and VOSviewer tool.

Considering the results, 6 clusters. The biggest was red, green and blue. In this case, the blue cluster contained keywords as follows: green intellectual capital, green human capital, intellectual capital, competitive advantages, manufacturing and performance. Thus, the findings proved the research hypothesis that from 2018 the quantity of the papers which analysed the green intellectual issues are increasing – the increasing tendency on analysing of green intellectual capital issues by the scientists. At the same time, the most related areas with green intellectual capital were corporate social responsibilities, sustainable development, competitiveness and green human resources management, green capital, green assets, green innovations.

Conclusion

The results of the analysis proved that green intellectual capital is a new direction for investigation which formed in separate scientific school. Besides, the quantity of paper become increased from the 2018 year. The findings from VOSviewer allow allocating 11 clusters. Three among 11 clusters have a close relationship. The first most significant cluster merged the keywords as follows: agent theory, business model, multinational companies, informational asymmetry etc. The second biggest cluster merged the keywords as follows: sustainability, green intellectual, green human resources, green innovation, green intellectual development etc. The third biggest cluster focused on: trust, values creation, added value, return on equity, intangible assets, profitability etc. Such tendency allows concluding, that green intellectual capital is a part of intellectual capital and increasing efficiency of green intellectual capital allows to create added value for different groups of the stakeholders.

Discussion

For further investigation, it would be necessary to analyse the most significant time of analysing. Besides, the findings focused on a strict combination of keywords. In this case, it would be necessary to check the other options of keyword combinations. The cluster authors analysis would allow visualising and identifying scientific schools and scientists' cooperation in further analysis.

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Social Protection of Employees as A Tool of Social Responsibility and Increase of Business Efficiency

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Abstract

The study of social protection of employees of small and medium-sized enterprises was conducted on the example of a local labour market (one of the regional centres of Ukraine). The survey included 526 respondents, including 170 business owners and 356 employees. This made it possible to compare social security performance assessments from both sides, as well as to identify the basic patterns of social protection ties as a tool for corporate social responsibility (CSR) and the economic success of businesses. As a result, it has been found that in the labour market of a country with the transition economy and the slow adoption of CSR standards, social protection for workers has numerous problems. In particular, even minimum protection standards, such as working time, holidays, wages below the minimum and inflation-related indexation, do not meet the norms. We conducted the grouping of enterprises by the level of their economic performance on several characteristics (growth of assets, sales volumes, productivity, profit availability) allowing to state that social protection of employees can be an effective tool for business development. Thus, in enterprises where the basic standards of social protection are best fulfilled, the growth of assets and volumes of sales is mostly observed (exceptions are only the guarantees in remuneration with the highest indicator in enterprises with decreasing sales volumes). Weak social protection links are only available with profitability indicators. Instead, by comparing the level of social protection of employees at enterprises with the productivity growth, a linear dependence was obtained, which proves the effectiveness of such a CSR tool as a lever for improving gross economic performance and, consequently, increasing profitability over the long term. Entrepreneurship as a form of economic activity plays a significant role in enlargement processes, integration and competitiveness improvement policies of the European Union.

Keywords: CSR, social protection, labour market, small and medium-sized enterprises (SMEs), economic efficiency.

Introduction

The social protection of employees in Ukraine is formally subject to the minimum legal guarantees. However, the crisis in the system of state social protection of the population is manifested in low financial capacity to provide a decent standard of living, especially in periods associated with the onset of certain social risks. In this regard, there is increasing public attention to corporate social

responsibility (CSR), in which social protection can be a tool not only to formulate a positive social enterprise policy and to strengthen the employer brand with relevant social consequences. Business practice has confirmed that CSR can be a factor in improving the economic efficiency of the business.

The positive links between the use of social security instruments and the economic success of enterprises have been substantiated by numerous empirical studies. For example, a sample of SMEs from different countries found out that the increase of their (employees') social security coverage experiences a revenue gain and a profit gain (Lee, and Torm, 2017), improving social protection in conditions and safety leads to an overall increase in enterprise productivity (Dumitrescu and Deselnicu, 2018). Responsibility for workers' social protection as an integral component of CSR has a proven positive impact on increasing competitive performance in both developing and highly developed countries (Madueno et al., 2016), reducing bankruptcy risks – especially noticeable in SMEs (Gangi, 2018)

We agree that despite the proven business practices, the positive economic effects of enhancing social protection for workers, nevertheless, the relationship between social protection and enterprise performance is debated in the literature (Torm, 2019). This discussion has led scientists to pay considerable attention to the continuation of relevant research and to identify those components of responsible employment behavior that are most relevant to the interests of both business owners and employees in order to balance positions and achieve the best socio-economic outcomes.

Business opportunities to implement a range of social protection measures for employees depend on a number of factors that can be divided into objective and subjective. Objective factors that determine the level of social responsibility of the business to the employees, are related to its financial capabilities, while subjective – to the worldview approaches of business management to understanding the expediency of social protection as a motivational component of staff and formation of their own competitive advantages therefore. In Ukraine, whose social protection of SMEs employees is the subject of this study, business operates in the conditions of dynamism, uncertainty, spreading of risks in all spheres of management. This leads to the formation of objective prerequisites for reducing business initiatives for social protection of employees. At the same time, a large proportion of employers in Ukraine are not mentally prepared to show social responsibility. This is due to the fact that the social protection of employees is often considered by business management as a vector of additional business expenses rather than investment in human capital. Moreover, a significant proportion of domestic entrepreneurs in line with such an outlook, not only does not implement social protection programs for workers on their own initiative, but also does not fulfil the statutory social norms and guarantees. This makes it necessary to study the features and problems of social protection of workers in Ukraine.

Given the aforesaid, the overall objective of our paper is research on social protection of employees as a tool of social responsibility and economic efficiency of business.

To achieve the goal of the study, appropriate hypotheses were formulated. First, social protection of employees is an indicator of the level of social responsibility of a business, which is defined by a number of objective (outcomes of business performance) and subjective (business management outlook) factors. Secondly, there is a link between the level of corporate social responsibility and the efficiency of business activities. Meanwhile, account that the official statistics do not reflect the real trends and problems in the field of social protection of workers due to the considerable level of shadowing of the national economy. Therefore, in order to conduct relevant research, it is advisable to rely on the results of sociological monitoring.

To achieve this, we used the results of a sociological survey of labour market actors. In particular, we have tested our own methodology of sociological monitoring of features and problems of social protection of workers at the local level. Such research was commissioned by the authorities of one of the regional centers of Ukraine (Rivne) to analyze the observance of decent work standards, where a number of issues touched upon social protection issues.

Literature Review

Social protection of employees as an integral part of the CSR of a business is aimed at preserving the development of the most valuable asset of enterprises – human resources. However, CSR practices are not always simply implemented in the business environment, especially in SMEs, which in many countries have a specific mode of financial regulation. Due to this, the costs of social programs for workers in the form of compensation benefits / employee benefits are not uniform in all countries, and state guarantees are often so different that the usual standard of social protection for one country, such as maternity leave in Ukraine, is a particular privilege or benefit in other countries that requires a proper justification for terms and payments (Dahl et al., 2016; Raute, 2019; Stumbitz et al., 2018).

Despite the differing positions of entrepreneurs and national social protection systems for workers on many issues, not only the types and duration of vacations, CSR as a particular manifestation of civilized business relations and other stakeholders of relevant communities, provides more scientific evidence and empirical justification for economic rather than social expediency.

It is argued that the development of CSR practices contributes to increasing competitive performance both directly and indirectly, through the ability of these organizations to manage their stakeholders (Madueno et al., 2016); CSR is an important driver mechanism for companies to be more innovative, efficient and effective (Martinez-Conesa et al., 2017).

A study of 2480 firms in 51 countries shows that both CSR engagement and corporate governance mechanisms can be an effective tool to mitigate conflicts among stakeholders as well as have a significantly negative impact on the firms' risk of financial distress (Gangi, 2018), to cause the growth of financial performance of companies (Myšková and Hájek, 2019; Akimova et al., 2018).

Accordingly, designing a work environment to meet the needs of employees and job requirements is a fundamental factor for improving productivity (Dumitrescu and Deselnicu, 2018). If such studies are conducted on the example of overall performance in terms of sales, then it is also proven that CSR activities related to the workforce are crucial to avoid sales decline (Stoian and Gilman, 2017).

If we examine the impact of social protection on the direct financial performance of enterprises, such links are also confirmed with a rather noticeable effect on the example of countries that are just beginning to actively implement CSR and are in a similar stage of development in Ukraine. Thus, following the work of Lee, and Torm (2017), it is proved that Vietnamese firms that increase their social security coverage by 10 per cent experience a revenue gain of 1.4–2.0 per cent worker and a profit gain of up to 1.8 per cent. In a similar study in Indonesia using census data from 2010 to 2014, it was found that increased social security spending of 10 per cent is associated with a per-worker revenue gain of up to 2 per cent. Moreover, profits did not decrease due to the increased social protection coverage, suggesting that increasing worker benefits may be a worthwhile business investment (Torm, 2019).

Understanding the benefits of CSR at the state level, reducing the burden on state social funds, there are specific requirements for CSR in individual countries. Yes, there are examples of countries actively initiating social and environmental programs, which normally involve a contribution from businesses. Also, there is growing pressure on export-oriented SMEs from international markets, which demand exporting companies to be responsive to society's needs (Aras, 2016).

At the same time, not only an external regulatory instrument, but also the influence of entrepreneurs' mental, cultural attitudes on economic behavior, including the use of CSR, is very significant. For example, it has been proven that foreign institutional investors domiciled in countries with social norms supportive of strong environmental and social commitments are the ones that impact firms' environmental and social performance (Dyck et al., 2019), in addition, a decisive influence on responsible decision making has the education and culture of the entrepreneurs themselves (Virglerova et al., 2017; Vveinhardt and Andriukaitiene, 2017).

In addition to direct positive effects in the form of productivity gains, profits, reduced occupational injuries and related financial costs of enterprises (Oliinyk, 2017), reducing the financial risks of CSR practitioners, including social programs to employees, indirect effects in the form of increasing motivation of employees are also important (Aliekperova, 2018; Grishnova, 2019), involvement in active social life (Bilan et al., 2017; Stacho, 2019), development of inter-institutional collaboration (Raišienė et al., 2019). Thus, employees who envisioned working in a firm that was active regarding CSR activities reported greater pride and organizational embeddedness (Ng et al., 2019).

At the country level, satisfaction with the social protection system, which is formed at the enterprise level and supported by active state regulation, is manifested in migration sentiment through overall satisfaction with the level of comfort (Mishchuk and Grishnova, 2015; Holovatyi, 2015), the sense of fairness of income distribution (Bilan et al., 2020; Mishchuk et al., 2018; Mishchuk et al., 2019). Thus, positive microeconomic effects have a macro-effect in the form of changes in countries' competitiveness, their sustainable development and social well-being, as demonstrated in many papers (Bánociová and Martinková, 2017; Bilan et al., 2019; Klymenko, 2016; Koisova, 2018; Mostenska and 2018; Bilan, 2015; Shvedovsky et al., 2016).

Method and Data

Based on the results obtained by other researchers, in our study, the relationships of social protection of employees are analyzed with the results of the enterprises that characterize the economic success of the business: increase in sales, assets, availability of revenues. In order to carry out such an analysis, as well as to assess the social protection of workers in general and in terms of the key social guarantees identified in Ukraine, we conducted our own sociological survey of representatives of small and medium-sized businesses in one of the local labour markets – the regional center of Ukraine (Rivne). The authors' sociological survey was conducted using questionnaires of target groups of respondents. The peculiarity of this sociological monitoring is the parallel cross-examination of workers and entrepreneurs (employers). This approach revealed the relationship between workers' social protection responses and employers' social responsibility and business performance. Despite this preference, obtaining such results was accompanied by some difficulties in providing impartial responses on both sides, despite the assurances of their anonymity.

The survey included 526 employees, including 170 business owners and 356 employees. The survey was conducted in June – September 2018. The standard sampling error does not exceed 3.5% for SMEs owners and 2.6% for employees with a 95.4% confidence level.

The analysis was made with the grouping of enterprises according to the characteristics of economic success of the activities described above. The social protection of employees is analyzed in two directions: (1) – to assess the achieved level of social responsibility of business owners of different groups on the economic results; (2) – to find links between subjective assessments of the effectiveness of workers' social protection and the prerequisites for achieving the above economic results. Such prerequisites are increased productivity (as a partial factor in overall productivity) and possible staff turnover due to dissatisfaction with social protection.

In the analysis of the links between social protection and changes in labour productivity, a grouping of estimates of employees into 6 homogeneous groups according to the integrated level of social protection was made. According to this distribution of assessments, the enterprises where the respondents are employed are selected and the entrepreneurs' responses as to the growth of labour productivity are grouped. Thus, we obtained 6 classes of enterprises out of a total of 170 SMEs surveyed, which determined the average values of changes in labour productivity and social protection. Further processing of the obtained estimates was performed in Microsoft Excel, which resulted in econometric dependence of changes in labour productivity on the level of social protection of employees.

Results

One of the manifestations of employers' social responsibility to employees is their legal employment. After all, the negative consequence of illegal employment of employees is their stay outside the system of compulsory state social insurance, and therefore the lack of guarantees of insurance payments in case of occurrence of social risks. Based on the survey results, it can be stated that within the local labour market, 24% of employees work illegally.

Unfortunately, the practice of deliberate non-compliance with the established legislative norms has become widespread in the national labour market. According to the results of sociological monitoring (Fig. 1), the minimum social wage is the only social guarantee whose level of compliance is close to 100%.

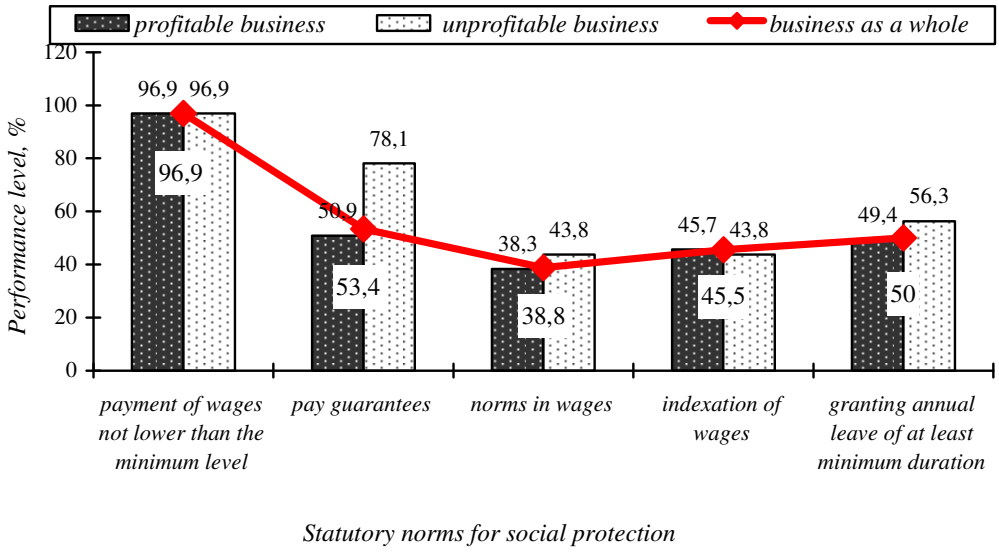

Fig. 1: Level of implementation of certain social protection instruments of workers, defined by law,% of respondents

Source: own research

At the same time, an extremely threatening problem, which shows that even legally defined social security instruments are violated by businesses, is a low level of compliance with pay standards (only about 39% of employees indicated that employers comply with such pay standards as nighttime pay and overtime, weekends and holidays, for defective products). The guarantees in remuneration, such as annual leave, business trips, during the performance of public duties, in the case of professional development, are fulfilled by business only in relation to 53.4% of employees. Such an important tool for social protection of workers in inflation, such as wage indexation, is accessible to less than half of the surveyed workers (45.5%), and providing annual leave of at least a minimum duration of 50%. Obviously, the results obtained are extremely disappointing, as they show a low level of business responsibility for social protection of workers, even in the part of the so-called basic component of the social package, which is legally defined. At the same time, a higher level of implementation of the social protection instruments defined by the legislation demonstrates unprofitable business (the exception is only the indexation of wages). Particularly, wage guarantees among profitable business entities are fulfilled only at the level of 50.9%, while among the unprofitable ones – at the level of 78.1%. A similar pattern is observed in the implementation of pay standards – 38.3% against 43.8%; in granting annual leave – 49,4% against 56,3% respectively.

The analysis of the implementation of the legally defined instruments of social protection of employees by the volume of sold goods, works and services (Table 1) by business reveals that the business, which by its own estimations has the highest economic success in the growth of the sales volumes (more than 20%), shows a relatively lower level of performance of statutory social protection instruments. Higher level of compliance is observed in business entities in which sales growth did not change or had a moderate increase (not exceeding 20%). Regarding the observance of guarantees in the pay, the criterion of responsible social protection was better for the enterprises that had a decline in sales compared to the previous year. These results can be explained by the fact that high-growth business is focused mainly on maximizing its own profits (without taking into account the social interests of employees). However, a business with little or no increase in sales volumes, to a greater extent, demonstrates social orientation when implementing a business strategy.

The pattern of change in assets shows the opposite pattern: higher level of compliance with statutory instruments of social protection for workers is observed among those entities in which there is an increase in assets. Such a difference in results is difficult to explain unambiguously. However, one possible argument for explaining such a divergence in the performance of statutory social protection instruments on profitability and sales dynamics, as well as asset dynamics, is lower level of shadowing and the impact of the market environment on the value of assets relative to profit and sales. That is, a significantly growing business is demonstrating a long-term strategy of expanded reproduction, which is not possible without proper social motivation for staff.

Table 1: Level of implementation of legally defined instruments of social protection of employees by the business depending on changes in sales volumes and assets

	Payment of wages not lower than the minimum level	Pay guarantees	Norms in wages	Indexation of wages	Granting annual leave of at least minimum duration
Change in sales volume					
Increase in sales volume, incl. in %	97,0	50,2	38,2	44,5	48,8
50% or more	96,3	51,9	37,0	25,9	48,1
20% to 49%	97,3	46,8	23,4	40,5	39,6
up to 20%	98,3	56,7	50,8	54,2	58,3
Constant volume of sales	88,0	64,0	40,0	56,0	56,0
Reduction in sales	96,6	69,0	37,9	41,4	51,7
Change of assets					
Increase in assets, incl. in %	95,5	54,9	39,2	45,0	54,4
50% or more	91,7	62,5	41,7	45,8	58,3
20% to 49%	97,1	43,5	34,8	40,6	39,1
up to 20%	95,8	82,5	39,2	50,8	58,3
Decrease in assets	93,0	49,6	40,3	44,2	48,1
Permanence of assets	93,0	49,6	40,3	44,2	48,1

– maximum level of implementation of the relevant social protection instrument

Source: own research

It is important in the social protection of employees that the implementation of minimum social norms and guarantees may not necessarily be associated with an overall high or low level of social protection. An important role in this aspect is played by the additional social protection programs often provided by enterprises, as well as the subjective comparison of the adequacy of certain programs and measures to personal needs and interests. Having received the appropriate answers from the respondents, it was found that the distribution according to their level of general social protection is rather ambiguous. Overall, 47% of employees rate their social protection in the workplace quite high (76 to 100%). Also, about 24% of the surveyed employees gave the appropriate assessment in the range from 51 to 75%. At the same time, almost one third of employees estimated

their level of social protection at the level less than 50%. In general, the results of the relevant survey confirm that social protection for workers is not without many disadvantages.

Saving on employee social protection programs is not just a violation of the law, but, as we have found, is contrary to the economic motivation of the business owners themselves. Thus, having an effect in the form of cost savings on the social protection of their personnel, entrepreneurs lose other opportunities for their development and formation of a stable basis for economic efficiency. This effect is caused by the direct links we have identified to self-assessment of the level of social protection and productivity gains at the same enterprises where employees with an adequate level of satisfaction with social protection work. The methodology for grouping estimates and matching them on both sides (employers and employees) is described in the Method and Data section, and the results are presented in Fig. 2. As we can see, the growth rates of labor productivity are higher in those business entities whose level of social protection of employees is also higher.

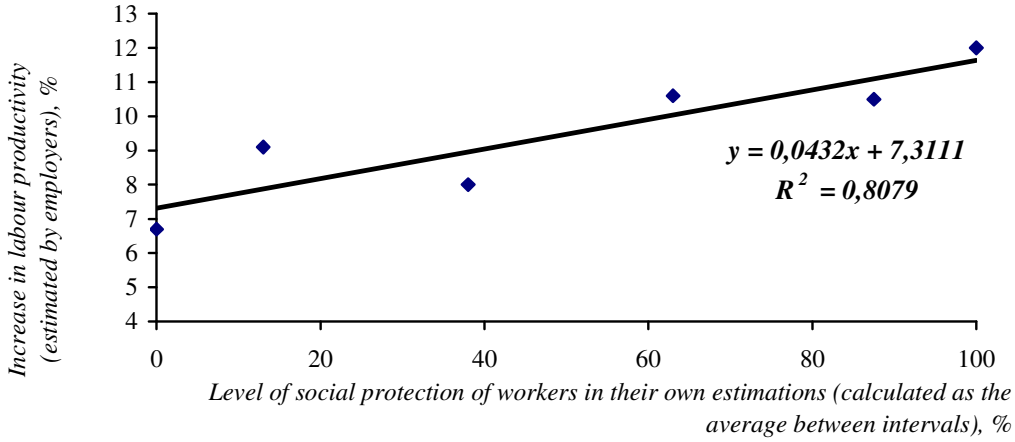

Fig. 2: Diagram of the scattering and regression equation between the level of social protection of workers and the increase in labour productivity

Source: own research

In addition, the correlation analysis of the link between employers' valuations of the success of their efforts to attract employees and retain skilled workers, and the success of their own efforts to protect workers' social protection, also indicates that there is a direct close relationship between them. That is, social protection of employees contributes to the formation of a positive employer brand in the labour market, generates employee loyalty to business, which ultimately leads to an increase in productivity and can be a powerful driver of growth in overall results - sales and assets of the enterprise. Such links are clearly undervalued by business owners today.

In addition, the results of the survey suggest that the higher the share of employees satisfied with their level of social protection, the lower the level of staff turnover and vice versa (Fig. 3).

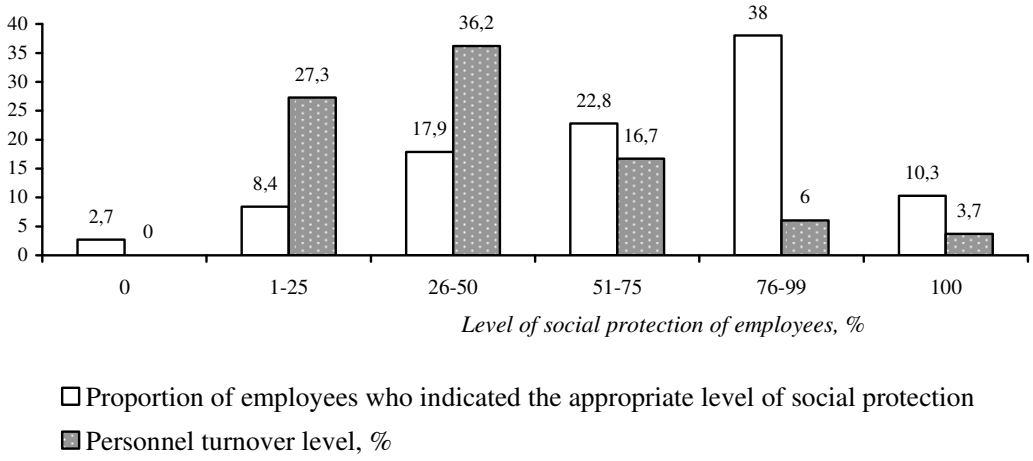

Fig. 3: Relationship between the level of employee turnover and their distribution regarding the level of their own social protection in the business environment

Source: own research

That is, an adequate level of social protection for employees is a factor in reducing their turnover. At the same time, a high level of staff turnover leads to significant business losses in the need to find, adapt and test new employees. Therefore, such links can also be seen as a manifestation of the potential for improving the economic efficiency of the business as a result of the development of employee social protection programs.

Acknowledgements

The data used in this work were obtained in the process of a sociological study of the development of small and medium-sized enterprises on the compliance of employment with the criteria of decent work, commissioned by the Department of Economy of Rivne City Council in June - September 2018 (contract # 3 of June 1, 2018).

Conclusions

The social responsibility of business in providing social protection for workers, as revealed in our study, is characterized by numerous problems. There is a significant level of shadowing of employment (24%) and wages, which leads to a significant decrease in the level of social protection of workers in the compulsory state social insurance system. A particularly acute problem, which is evidenced by the low level of social responsibility of the business, is the low level of implementation of even the legally defined instruments of social protection of employees. The relatively higher level of compliance with social norms and guarantees, which are legally defined, is observed only in business entities that have positive economic dynamics in the form of asset growth. At the same time, there is a weak link between the level of corporate social responsibility for employees and its results in the form of profitability and dynamics of sales volumes.

Thus, the conducted researches prove that in Ukrainian realities the factor of successful business activity is not a factor of its high level of social responsibility and vice versa. The level of social responsibility of business in the national economy is to a greater extent determined by such subjective factors as the worldviews of business management on the necessity and expediency of social protection of employees, and therefore by the social orientation of the business strategy. However, research has convincingly shown that social protection of employees should be seen as an effective business investment tool in human capital development, which will ultimately have a positive

economic impact on the financial performance of the business. After all, a high level of corporate social responsibility for employees is a factor in the growth of their productivity and decrease in turnover, and consequently a decrease in business losses and increase in profits and profitability in the long run. Therefore, the transformation of business management's outlook approaches towards awareness of the feasibility of developing social protection tools for employees should be a priority vector of activity in building a socially oriented market economy in Ukraine. Given the considerable range of problems in the field of social protection of workers in the national economy, the prospects of further scientific exploration will be to continue monitoring of the level of social responsibility of business in the context of the volatility of the external and internal environment and the choice of adequate tools to stimulate the increase of CSR of the business, especially given the positive links with productivity and potential reduction in turnover.

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Revitalization as An Innovative Public Governance Tool Reacting to The Socio-Economic Problems on Local Level

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Abstract

After regulations changes, in Polish small and medium-sized cities a new approach to revitalization has been implemented. Currently the revitalization became one of the key instruments of public governance as a crucial response to the processes of social, economic, spatial and environmental degradation. These crisis processes result the special impact on urban space in cities. One of their effects is the phenomenon of shrinking cities, which has a very varied background in Poland, among others: migrations and the loss of economic functions by cities. The article analyses and evaluates individual mechanisms of social and economic changes introduced by revitalization processes managed by the local authorities as one of their tasks, thanks to the cooperation with local communities and other stakeholders. The conclusion is that revitalization processes can be a tool to effectively manage a local development, thanks to using the innovative mechanisms presented in the paper. It should be also included in public policies and strategies as a crucial direction of socio-economic changes in self-governments.

Keywords: Public Governance, Revitalization, Self-Government, Urban Shrinkage, Local Development.

Introduction

The aim of this article is to analyse and evaluate the possibility of using the local revitalisation programme as a management instrument at the regional level to counteract negative socio-economic changes in city areas, including the process of urban shrinkage.

In the context of the research objective of this article, the revitalisation process has been analysed from the point of view of such management processes in cities which may affect the solution of their shrinkage. The qualitative analysis includes documentation concerning 7 revitalisation programmes for small cities (up to 30 thousand residents) such as: Żywiec, Cieszyn, Pyskowice, Kalety, Sułkowice, Brzeszcze, Baranów Sandomierski. The author personally participated in the development of revitalisation programmes for these areas. The study analysed factors influencing the process of urban shrinkage. They have been classified in terms of direct or indirect impact on the analysed problem and this impact was assessed based on interviews with persons responsible for the implementation of revitalisation programmes in mentioned cities.

The analysis has been conducted in the social, economic, spatial-functional, technical and environmental spheres. The research has been conducted in 2019 and the conclusions from it are presented in the further part of this article.

Revitalization - the theoretical approach in the public management context

As we know, the management of local development should be based on a strategy leading to the desired changes and enabling to solve key problems in a given area (Fitzgerald, Leigh, 2002). Nowadays, one of the most important challenges is the socio-economic revitalisation of these cities, which are losing their functions, where we can observe an exodus of residents, processes of population ageing, progressing degradation of some neighbourhoods degradation (Campbell, 1996) and other phenomena being symptoms of a crisis (Hoff, 1998). This poses new challenges at government level, regional level, but also in self-governments, especially in cities, where these processes are most visible.

Poland in recent decades has done a lot to get closer to the level of the most developed EU countries. Nevertheless, this development is still very diversified in terms of territory. Some regions and cities have adapted more to global development trends and others (mainly small and medium-sized cities) are increasingly marginalised. These developmental discrepancies accelerate depopulation processes. A forecast of the Statistics Poland indicates that the population of Poles will systematically decrease and in 2035 will reach about 35.9 million people. This loss is associated with low fertility rate and emigration, mainly economic. A special situation occurs on the borderlands, where migration processes overlap with trends in cross-border cooperation (Bohm, Kurowska-Pysz, 2019).

Mainly young people emigrates from less developed regions, often from small and medium-sized towns. One of the challenges facing these cities is therefore to counteract urban shrinkage, associated with multi-directional migration. The urban depopulation has a strong regional dimension, particularly in the east, north and south of the country. Intensive migration, including women in reproductive age, a decrease in the number of births, as well as an increasingly higher life expectancy, are exacerbating negative demographic trends, i.e. the progressive ageing of the Polish nation. It is estimated that in 2035 the number of deaths in Poland will exceed the number of births by 180 000. Depopulation and negative demographic trends are directly related to the difficult housing situation, especially in the sector of municipal rented housing. The economic sphere is also an important factor of developmental disproportions. Many small and medium-sized cities are in a state of stagnation (higher unemployment rate, lower rate of economic development compounded by unfavourable demographic trends, low level of productivity and innovation of local enterprises). The extremely low air quality is another factor that discourages people from living in cities, especially in the small and medium-sized ones, where the so-called near-ground emissions are intense. According to WHO data from 2016, 33 out of 50 the most polluted cities are located on Polish territory; according to 2017 data from the European Environment Agency (EEA), Polish cities, apart from Bulgarian ones, dominate the ranking of the most polluted cities in the Union. About 45 000 Polish citizens die prematurely every year due to air pollution. Poland has the largest share in the emission of the majority of harmful substances into the atmosphere - according to the 2017 report of the European Environment Agency. A very important problem in the efficient functioning of cities is the limited institutional capacity of self-government administration, which often does not carry out regular diagnoses and analyses of the local situation, enabling identification of key development problems and challenges. In many cities, strategic documents do not exist or are of poor quality (Koliba, Meek, Zia, Mills, 2018). There is a lack of coordination and cooperation between public institutions and other entities responsible for the implementation of these documents, as well as limited participation of different stakeholders in the decision-making processes is observed (Remenova, Jankelova, 2019). Therefore, cities need support to improve their strategic documents.

A consequence of the high concentration of these problems is the marginalisation of cities. The revitalisation processes currently being carried out are intended to support self-governments in limiting the scale of crisis phenomena, such as, for example, urban shrinkage (Cristea, Grabara, 2019).

Understanding the concept of revitalisation requires an interdisciplinary and comprehensive approach to the various areas of urban life. Traditionally it is combined with the protection and revalorisation of historical monuments, but nowadays it is also used in relation to many spheres of city functioning.

The revitalisation issues are most often analysed in a spatial, economic, social or geographical context. In the countries of Western Europe or the USA revitalisation has been carried out for many years and there is a lot of literature on this subject, whereas in Central and Eastern Europe this issue has become more important in recent years only (Boryczka, 2016).

Regardless of the considerations about the essence of revitalisation carried out on scientific grounds, in practice this process is currently carried out in Poland on the basis of the Act of 15 October 2015 on revitalisation (Journal of Laws 2015, item 1777). According to this legal act (Article 2), revitalisation is the process of bringing degraded areas out of the crisis state, carried out in a comprehensive manner, through integrated actions for the benefit of the local community, space and economy. These activities must be territorially focused and cover a maximum of 20% of the municipality's area and must be carried out by revitalisation stakeholders on the basis of the municipal revitalisation programme. Up to 30% of the city's population may be directly affected by revitalisation processes, while indirectly, much more revitalisation stakeholder groups may be identified. These are primarily residents of the revitalisation area and the remaining residents of the city as well as owners and users of properties located in the area, e.g. housing cooperatives, business enterprises, non-governmental organisations, self-government units and other entities operating in the area (Kurowska-Pysz, 2017).

The revitalisation gives priority to the removal from the crisis state of areas with a dominant housing function and, at the same time, these where social problems, such as unemployment, exclusion, professional and social inactivity, criminality, low level of education of the residents, economic and educational migrations or low social capital, are most strongly felt. It is precisely such social problems that contribute to the outflow of residents from the areas covered by them and leads to the loss of the existing functions by these cities. Today we can talk about four fundamental dimensions of the revitalisation process: social, economic, spatial and cultural. Each of them is connected with the problem of urban shrinkage discussed in this article and has the instruments to counteract this negative phenomenon:

- social revitalisation concerns various activities related to improving the socio-economic situation of city residents, increasing their active citizenship, social participation and involvement in the process of urban co-management; it is aimed at combating all inequalities and discrimination;
- economic revitalisation is aimed at rebuilding the economic base of the city, stimulating local entrepreneurship and leading to effective restructuring of economic entities (Godlewska-Majkowska, 2008), thus providing a pool of attractive jobs in the city and improving the profitability of local business, which will translate into tax revenues, the level of investment and consumption in cities, as well as the availability of goods and services;
- spatial revitalisation refers to transformations of urban composition, architecture and its special qualities, as well as to the improvement of the quality of the city space and its optimal management, and also to the introduction of spatial order and the elimination of development barriers related to the insufficient provision of the areas with technical infrastructure (transport, water, energy etc.);
- cultural revitalisation is focused on activities aimed at maintaining and developing traditions, protecting the cultural and material heritage of city's degraded areas so it will be possible to "resurrect" the spirit of the city and stimulate the involvement of its residents e.g. around the cultivation of common values, traditions, cultural heritage.

Urban revitalisation is not an end in itself, but the process is intended to lead to multidimensional, beneficial changes in the socio-economic situation of its residents as well as to the economic (Porter, 1997), social and cultural revival of degraded fragments or entire cities (Ross, 2000).

It is commonly noted that urbanised areas are becoming more and more similar to each other (Gibas, 2015). Such unification reduces the competitiveness of cities, while cultural values rooted in the mentality of local communities are some of the potential grounds for gaining a competitive advantage.

All analyses concerning planned revitalisation transformations should refer to the specificity of the area concerned. Each revitalisation process should be carried out individually and directed at solving the diagnosed problems of a particular city and its residents, as well as using the unique potentials that are there.

The revitalisation process is extremely complicated and comprehensive and therefore requires adequate time for its implementation. In the short term the first greater effects of transformation can be observed about 5 years after the start of the process. In the long term, permanent changes are noticeable after at least 25-30 years and in such a time horizon the revitalisation process should ultimately be carried out. For this reason, revitalisation is considered in relation to the overall city development policy and the objectives of its performance are highly varied.

The Revitalization Process in Poland – Key Elements Regarding the Public Governance

The new approach to revitalisation objectives comes also with a number of consequences for local development management. The idea is to prevent urban areas from losing their functions or making life in cities less attractive. In a broader context, these activities are within the responsibility of the government administration, as well as regional and county self-governments, but to the greatest extent - municipality authorities. As it results from the above-mentioned Act on revitalisation, this is a process carried out jointly by local authorities, local community and other participants (entrepreneurs, investors, institutions, users of the area). Revitalisation is therefore an element of the development policy created and implemented by self-government units (Skalski, 2009, p. 182-210). Municipal self-governments are responsible for diagnosing socio-economic problems, delimiting areas to be revitalised and then developing revitalisation programme, their implementation, control and evaluation. The implementation of projects included in revitalisation programme is one of the processes aimed at effectively counteracting the diagnosed problems. The aim is to make cities more attractive places to live, work and rest, and thus counteract the phenomenon of their shrinkage. The key management problems in the revitalisation process (Noworól, 2010) are:

a) determination of the specificity of the area and type of its degradation (environmental, post-industrial, residential, etc.);
b) delimitation of the revitalised area and determination of the scale of its degradation;
c) recognition of demographic resources as well as trends and nature of migration from cities;
d) recognition of the quality of life in a crisis area, including social exclusion, possibilities of eliminating disclosed deficits, identification of revitalisation beneficiaries;
e) identification of stakeholders responsible for animating revitalisation, cooperation of social and economic partners in the revitalisation process (public, private and from the so-called third sector);
f) promotion of socio-economic development instruments, e.g. in terms of improving the attractiveness of urban areas;
g) identification of potential areas of public intervention related to stimulating socio-economic life and shaping spatial order of the city, especially in the revitalisation area.
Although the management of the revitalisation process is concentrated in municipalities, its effectiveness depends to a large extent on two factors related to and resulting from relations with the environment:

- abilities to create at the municipality level institutional and organisational networks of cooperation between authorities, beneficiaries and partners of revitalisation processes, including public institutions of various levels, civil society organisations, business environment institutions, informal beneficiary groups, local leaders, etc.;
- decentralisation of the revitalisation process and compliance with the principle of subsidiarity, i.e. provision of mechanisms for the participation of the local community in revitalisation decisions.

An example of using social relations in revitalisation processes is local community participation at the stage of creating and implementing a revitalisation programme. It enables a dialogue between the

authorities, administration and residents based on three forms (levels). These three forms of social participation in the revitalisation process are presented below.

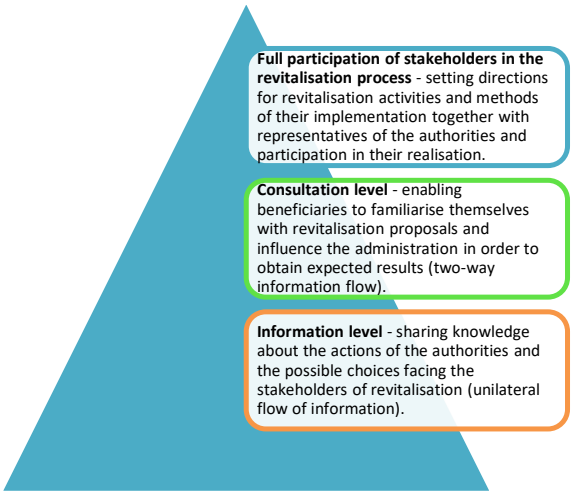

Figure 1: Levels of public participation in the revitalisation process

Source: own elaboration

Another factor determining the proper management of the urban revitalisation process is the professional knowledge and experience of the officials responsible for the process. As a rule, the management process is based on three elements:

- the legislative structure (municipal council);
- the supervision structure over the unit responsible for revitalisation (the head of the municipality, the mayor, the president of the city and the city treasurer);
- the executive structure (revitalisation officer and his/her subordinate staff).

Professional implementation of the revitalisation process requires the use of a broad knowledge of strategic management, which makes it possible to link revitalisation with a comprehensive development policy. In particular it is important to:

- integrate socio-economic and spatial planning;
- implement in programmes and projects of the management system revitalisation a full cyclical process of strategic planning, organisation, motivation and control;
- apply innovative design solutions in the field of urban, architecture and spatial planning;
- use a variety of financial instruments, including both public and commercial funds;
- have a mutual partnership that gives better opportunities to implement revitalisation processes than if each partner will act separately;
- use social media to communicate with the stakeholders of revitalisation;
- motivate the stakeholders of the revitalisation processes to maintain high dynamics of cooperation.

Currently, the most of revitalisation programmes in Poland are at the initial stage of implementation. For this reason, it is difficult to identify and assess the concrete results of these processes, and even more so to assess ex-post the quality of revitalisation process management in municipalities. However, it is worth quoting statistical data concerning the initiation of revitalisation processes in municipalities through the adoption of appropriate programmes. According to the Statistics Poland (the statistical data on revitalization at the level of municipalities, Warsaw 2018) in 2017 53% of

municipalities had independent revitalisation programmes. Urban municipalities were much more interested in revitalisation than rural ones. Out of 2478 municipalities 1357 had designated within their territory a revitalisation area, i.e. an area in which priority intervention activities in order to get the zone out of a state of crisis were undertaken. In 2017 the total area of all revitalisation zones in Poland was 10.0 thousand km² (the area of Poland is 312 679 km²). The revitalisation areas of the municipalities which carried out this process were inhabited by 20% of their residents. On average, the revitalisation area covered 6.3% of the municipality. The municipal revitalisation programme in force in 2017 included 33 thousand undertakings. On average, there were 28 undertakings per 1 revitalisation programme. A greater number of undertakings were contained in revitalisation programmes drawn up for cities than for rural municipalities. The thematic structure of the basic undertakings planned in the independent revitalisation programmes in force in 2017 were dominated by undertakings from the social area (about 36%), i.e. those carried out in particular in the area of unemployment, poverty, crime, low level of education or social capital, as well as insufficient participation in public and cultural life. Subsequently, numerous interventions included activities in the spatial-functional (27%) and technical area (22%) were carried out. The smallest number of undertakings were of an economic (8%) and environmental nature (7%). Apart from municipalities which played a fundamental role in the implementation of revitalisation processes, the most frequently mentioned stakeholders were housing communities (about 40%), other public sector units (about 30%), NGOs (about 20%) and leaders from outside of the public sector (about 10%). In total, in all revitalisation programmes in force in 2017, undertakings were planned for the amount of PLN 73725.5 million. These projects were financed from the self-government's own resources as well as from EU, government and private funds. The most funds in the revitalisation programmes were allocated to undertakings of spatial-functional nature (38% of the planned expenditure), followed by the funds planned in technical and social areas. The least funds were allocated to the environmental area of intervention.

The Revitalization Programme as A Tool Supporting the Local Problems Solving – The Case of Counteracting Urban Shrinkage

For the success of the revitalisation process and for combating the diagnosed problems it is essential that the key elements of the revitalisation programme will be properly developed, as it is shown on the figure below.

Figure 2: Determinants of the revitalisation programme

Source: own elaboration

The key issue is the correct delimitation of the revitalisation area with the highest intensity of crisis phenomena (no more than 20% of the municipality area, inhabited by no more than 30% of the municipality population). An exemplary illustration of the spatial intensity of the problem concerning the degradation of municipal infrastructure in a city for the purpose of delimiting the revitalisation area is presented on figure 3 and an exemplary delimitation of the revitalisation area is presented on figure 4.

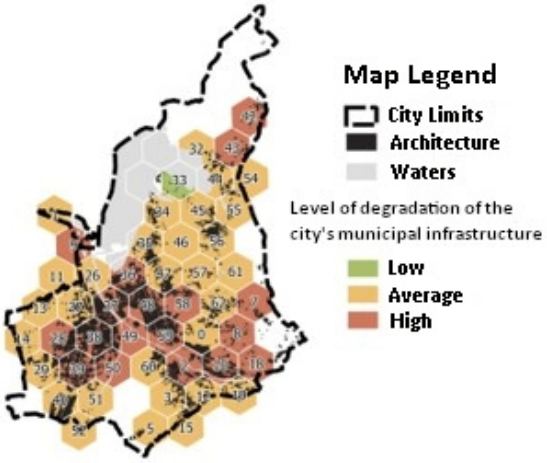

Figure 3: Spatial intensity of social problems for the purpose of delimitation of the revitalisation area - the city of Żywiec (map 23)

Source: Revitalization Programme for Żywiec city, 2015

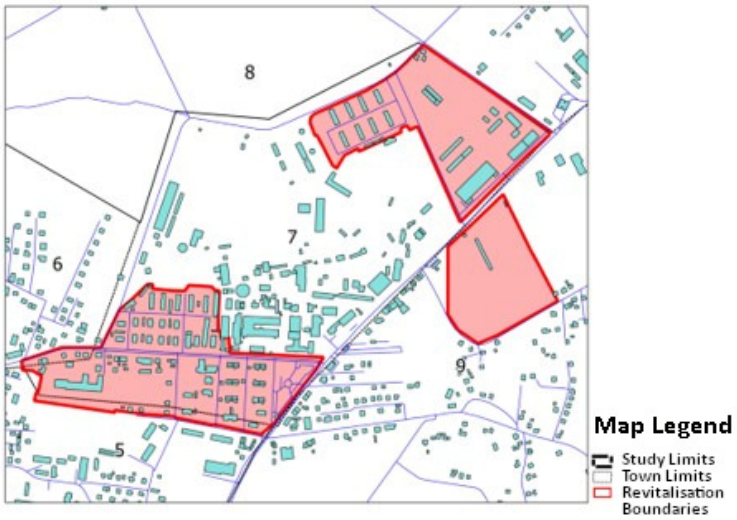

Figure 4: Example of delimiting a revitalisation area – Brzeszcze city

Source: Revitalization Programme for Brzeszcze city, 2015

Despite these limitations, it must be assumed that the causes and effects of the revitalisation process go beyond the directly designated area and have a broader social and territorial context. Rational, objective selection of the revitalisation area results in appropriate selection of revitalisation objectives. They should be specific, measurable, achievable, relevant and possible to reach within scheduled time. In order to achieve properly defined objectives, it is necessary to plan appropriate activities (projects) and corresponding results. In order to confirm the

correctness of actions at the stage of planning and implementation of revitalisation processes an evaluation of the programme shall be carried out, also taking into account the changing socio-economic situation of the city. As a result of the evaluation it is possible to make a decision to continue the implementation of revitalisation projects in a fixed shape or to correct: the area of revitalisation, revitalisation objectives, scope of projects or expected results.

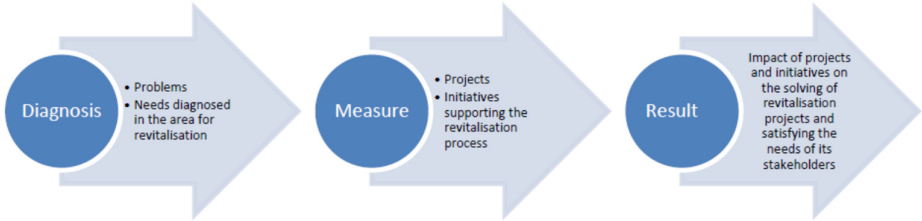

Figure 5: Logic of interventions as part of a local revitalisation programme

Source: own elaboration

Revitalisation is an element of a development policy created and implemented by the local authorities (Skalski, 2013). They are responsible for diagnosing the socio-economic problems and for designating areas for revitalisation and subsequently for preparation of local revitalisation programmes and their implementation, control and assessment. Performance of projects included in a local revitalisation programme should counteract the diagnosed revitalisation problems. It is meant to make the cities more attractive places for settlement, work and leisure, and thus counteracting their shrinkage. One of the key managerial challenges refers to guaranteeing, by the local government, of proper financial and organisational potential for this purpose. Unfortunately, numerous revitalisation programmes are not implemented after preparation and many projects included in them cannot be realised in practice. This indicates a common mistake, which is maladjustment of goals and expected outcomes to the actual potential of local governments which are responsible for the revitalisation process.

The process of developing a local revitalisation programme is carried out in two essential stages. The first one is connected with the delimitation of the revitalisation area and the second one is directly connected with the development of the local revitalisation programme. The integral tasks involved in the implementation of both stages are presented in the tables below.

Table 1: First stage of development of the local revitalisation programme

Name of the stage	Tasks to be implemented
Delimitation of the revitalisation area in order to develop a local revitalisation programme	1. Determination of quantitative and qualitative data, necessary to define the area of revitalisation, in the following spheres: social, economic, functional-spatial, technical and environmental. 2. Designation of spatial units (territorial units) for the purpose of delimiting areas at the level of neighbourhoods, streets, grids, etc. 3. Collection of as much quantitative and qualitative data as possible broken down into established spatial (territorial) units. 4. Participation activities (e.g. workshops, social research, consultation meetings, research walks) to deepen the diagnosis in order to determine the area of revitalisation. 5. Delimitation of the revitalisation area boundaries. 6. Public consultation. 7. Approval of the revitalisation area boundaries.

Source: own elaboration

Table 2: Second stage of development of the local revitalisation programme

Name of the stage	Tasks to be implemented
Development of the local revitalisation programme	1. Participation activities (e.g. workshops, meetings, debates) connected with the analysis of the main problems and potentials of the area to be revitalised in terms of defining its revitalisation needs, vision of revitalisation, setting its strategic goal and operational objectives. 2. Collection of proposals of revitalisation projects. 3. Analysis and assessment of project proposals in terms of their impact on solving problems in the revitalisation area and their compatibility with the expectations of the local community and revitalisation objectives. 4. Determination of the method of financing and the schedule of project implementation. 5. Determination of links of the revitalisation programme with other municipality strategic documents as well as with other investment and non-investment projects carried out in a given area. 6. Determination of result indicators of the local revitalisation programme. 7. Determination of the way the programme has been implemented and the conditions for its monitoring, evaluation and updating. 8. Public consultation. 9. Assessment of the local programme by entities and institutions whose scope of activity is related to the implementation of this document. 10. Adoption by the self-government of a resolution to implement a local revitalisation programme.

Source: own elaboration

As shown in Table 1 - delimitation of the revitalisation area boundaries determining the key spatial scope of intervention to solve revitalisation problems is preceded by the collection of various quantitative and qualitative data. This is a direct premise for the designation of the revitalisation area.

In the context of the aim of this article, 7 revitalisation programmes for small and medium-sized cities have been analysed and factors have been identified (in at least 4 programmes) whose impact can be linked to the process of urban shrinkage. Employees responsible for the implementation of revitalisation programmes in municipalities assessed the impact of these factors on the processes of urban shrinkage (the type of impact has been determined based on the majority of indications - at least 4). In this way, it has been identified which factors contribute directly or indirectly to the process of urban shrinkage. The results of these analyses are presented in the table below.

Table 3: Factors contributing to the intensification of urban shrinkage

No.	Factor type and name	Number of indications	Impact on urban shrinkage	
1	**SOCIAL FACTORS**		Direct	Indirect
1.1.	High level of crime in the city	7		✓
1.2.	High level of alcoholism among residents	6		✓
1.3.	High level of long-term unemployment	6	✓	
1.4.	Poor vocational and academic education offer	5	✓	
1.5.	Low quality of educational services for children and teenagers	5	✓	
1.6.	No possibility of self-realization	5	✓	
1.7.	Insufficient access to health care	5	✓	
1.8.	Large number of residents under the care of social services	5		✓
1.9.	Not a very attractive leisure offer	4	✓	
1.10.	Low level of social capital	4	✓	
1.11.	Low level of integration with the local community	4		✓
1.12.	Lack of mechanisms of co-management and social participation	4		✓
1.13.	Weak offer for seniors	4	✓	
2	**ECONOMIC FACTORS**			
2.1.	Insufficient employment	7	✓	
2.2.	Low salaries	6	✓	
2.3.	Low purchasing power of residents resulting in the lack of a diversified	5		✓

	offer of goods and services in the city			
2.4.	Nuisance of tourist traffic	4		✓
2.5.	Insufficient support for business start-ups	4	✓	
2.6.	High prices of real estate rental for business activities	4		✓
3	**SPATIAL-FUNCTIONAL FACTORS**			
3.1.	Low level of security in public sphere	7	✓	
3.2.	Poor state of public transport	7	✓	
3.3.	Low public space aesthetics	5		✓
3.4.	Lack of parking spaces	4		✓
3.5.	Availability of liquor stores and gambling outlets	4		✓
4	**TECHNICAL FACTORS**			
4.1.	High level of infrastructure degradation	7	✓	
4.2.	Shortage of council housing for rent	6	✓	
4.3.	Poor coverage by water, sewage, heating and gas networks.	4	✓	
4.4.	Low level of road safety	4		✓
5	**ENVIRONMENTAL FACTORS**			
5.1.	Pollution by near-ground emissions	7	✓	
5.2.	High prices for utilities (e.g. waste, water)	4		✓

Source: own elaboration

The data contained in Table 3 indicate that social, economic and spatial-functional factors are of key importance for the process of urban shrinkage of cities undergoing revitalisation. They constitute the largest part and most of them have been recognised as factors directly influencing this process. The authorities' awareness of the impact of these factors on the functioning of cities, including the process of urban shrinkage, is the first step towards initiating changes that can be achieved through revitalisation processes involving various stakeholder groups and using different methods and forms of public participation.

Discussion and conclusions

Currently, about 60% of Poles live in cities, but there is a clearly visible decrease in the number of residents, mainly in large cities, with over 100000 citizens, although more and more often also in small and medium-sized ones, which have weaker defensive mechanisms against the loss of their functions. It is widely recognised that the key causes urban shrinkage includes a decline in the birth rate and rising migration. From the other side, at the same time, a number of cities can be identified in Poland, which successfully attract new residents, mainly young people starting work or education there. The unfavourable changes resulting from negative demographic trends and migration (most often foreign) have been minimised in these cities by improving the quality of life of the residents, creating new jobs and an attractive educational offer (Murgas, Bohm, 2015). It is also noted that leaving the cities does not necessarily have to be due to negative factors. The reason for this is more and more often the enrichment of Polish society and the desire to move from housing estates (blocks of flats, skyscrapers) to cottages with a garden in the countryside. This is the result of sustainable development and the desire to live in accordance with nature as well as signalling a change in our material and social status.

We cannot also ignore the aspect of the loss of function by cities, which were associated with typical industrial monocultures implemented and developed during the communist time (Wróblewski, 2014). These were cities connected with large companies specializing in coal mining, metallurgy, chemistry or textile industry (Gąbek, Biały, Livenskaya, 2019). Following Poland's opening up to global competition, some of these companies became bankrupt or have been privatised and now operate on completely different conditions.

The shrinking population results from the migration caused by the worsening possibilities of career development in cities combined with the lack of inflow of new residents. This kind of situation occurs in the majority of Polish cities, but above all, it is severely felt in small towns, which do not have sufficient potentials and resources to counteract such negative trends. Especially for such cities,

the Polish government had implemented the Act on revitalisation, thus creating mechanisms and making public funds (Andonov A., Hochberg Y. V., Rauh J. D. 2018), both EU and national, available for the implementation of revitalisation projects.

One of the objective factors influencing the process of urban shrinkage is the ageing of the population. Although at the moment the number of deaths and births is not yet highly different, but when the post-war baby boom generation will start to pass away, there is no chance that it will be replaced by children born now.

According to the scientific research (Szukalski, 2014), apart from natural factors influencing the population shrinkage in cities, the attractiveness of the place itself is also of great importance. People who have changed their place of residence and moved out of cities admit that this decision was most strongly influenced by the situation on the labour market, the level of earnings and the cost of living (Kotulic, Adamisin, 2012) But access to goods and services is equally important in order to consume at a level commensurate with earnings. Therefore, as a place of residence, we are looking for locations where a high quality of life can be felt. In this aspect, the revitalisation process is an action to improve the quality of life in the city in order to:

- keep existing residents;
- attract new residents, investors, entrepreneurs, but also people coming to the city for shopping, offering them the possibility of using various types of services (e.g. personal, educational, health),
- taking advantage of the cultural or sport and recreation offer, but also finding a job, and as a result stay or frequently visit the city.

The conclusions from Table 3 prove that the greatest impact on improving the city's attractiveness is caused by limiting the impact of negative social factors which determine the residents' quality of life. In crisis areas in cities requiring urgent revitalisation, the residents are particularly disturbed by the situation in their surroundings, a large representation of people who are professionally and socially inactive, often living on social benefits, the long-term unemployed, shaping an unattractive image of the neighbourhood or a major part of the city, not interested in active inclusion in the life of the local community. This is most often accompanied by an increased level of crime and alcoholism, which causes many residents to fear that they may become victims of crime, especially robbery. Usually, the occurrence of the phenomena described above are combined with the insufficient number of jobs on the local market, or a mismatch between the structure of jobs and the professional competences of the residents. In many Polish cities, a natural consequence of the fall of communism was economic restructuring. Cities still struggle with its effects, among others, in the form of so-called structural unemployment. In many towns, the so-called employer's market still dominates, dictating working conditions, often with almost minimum wages, especially in case of people with low professional qualifications. Low incomes do not encourage residents to self-develop, get involved in the problems of the city or develop their passions. Thus, they suppress many activities that are typical for better earners. In this situation, it becomes a natural need for many people to get out of the circle of poverty and helplessness, and above all out of an environment where there are no professional or personal prospects. For young, ambitious people, many of whom want to start their own business, the lack of support from business environment institutions (Pierzyna, 2019) and from the state is another argument in favour of changing their place of residence (Bartniczak, 2014). In recent years, many such people have not only moved out of cities saturated with crisis phenomena but even left the country and are living abroad. This is for every city a loss of valuable social capital, which should be counteracted by successful revitalisation processes. Thus, the availability of jobs, the possibility of obtaining a salary to cover the cost of living, but also to provide appropriate conditions for education, settling (especially for young families), living and working in a safe place (not marked by crime) are the basic factors in maintaining the attractiveness of a city from the point of view of the effect of revitalisation processes. The availability of public transport and affordable housing is also important factor in this context.

The quality of life in the city is for the residents one of the basic determinants of its attractiveness. This group of residents, who have an income at a level that meets their basic needs, primarily due to

appropriate qualifications and adequate wages, expects that city will give them more opportunities to meet their consumption needs. It is not just about providing a diverse range of shopping and service offerings, as this is shaped by the market itself, if there is only sufficient purchasing power. It is also important to offer residents attractive opportunities to spend their leisure time, based on the cultural or sport and recreation offer, as well as to provide them with an appropriate level of health care, pre-school care or care for seniors. The conditions important for the quality of life in the city include also the broadly understood aesthetics of public sphere, well-maintained housing estates, squares and parks, modern and resident friendly communal infrastructure. These conditions, as well as the environmental requirements described in Table 3 (especially clean air) can be considered as one of the factors increasing the attractiveness of the city. From the point of view of revitalisation processes, it is therefore necessary to act to strengthen such elements in cities.

The third group are integration factors, which primarily build the emotional connection between the resident and the city. Cities in which the authorities conduct a dialogue with the residents and where social consultations and participatory activities enable citizens to co-decide on the directions of the city's development or the way of solving its problems are considered particularly attractive. In this way, the residents' consciousness draws a picture of the city that is friendly to the realization of professional, personal and social ambitions, developing its social capital based on individual citizens' activity and their commitment to the local community.

The above considerations lead to the conclusion that through skilful management of the revitalisation process, a local authority can reduce the scale and number of crisis phenomena in a city or in some parts of it, which contributes to improving the attractiveness of the city and can also contribute to reducing the scale of urban shrinkage. A synthetic approach to this thesis is presented in the figure below.

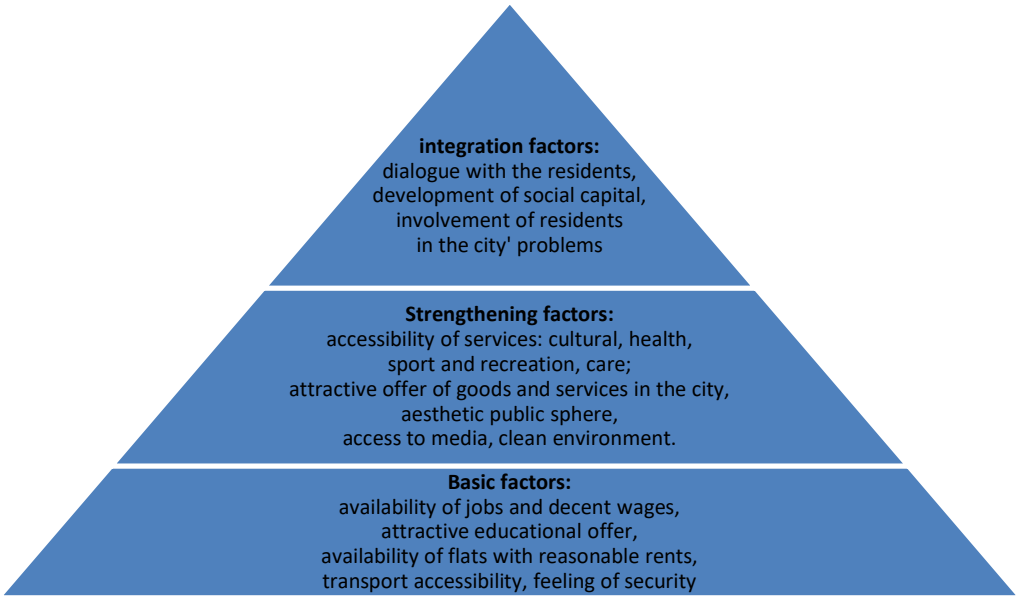

Figure 6: City attractiveness factors in the context of counteracting urban shrinkage

Source: own elaboration

The implementation of revitalisation processes aimed at solving problems (especially social ones), and thus reducing the scale of crisis phenomena in the city, can be directly related to the need of creating a city attractive enough to reduce or eliminate migration phenomena related to employment, education or

seeking better living conditions. Effective management of the revitalisation process in a way which ensures that the attractiveness of the town will be maintained or strengthened must be carried out in an orderly manner. First of all, intervention should take place where the level of crisis phenomena is the highest, that is in the area of revitalisation. Secondly, the intervention must be based on properly diagnosed crisis phenomena (an example of such phenomena is shown in Table 3). Thirdly, it is necessary to develop and implement the revitalisation programme in a professional manner, with the involvement of all stakeholder groups and the extensive use of participatory methods. Fourthly, the revitalisation process should be carried out in an orderly manner, based on a revitalisation programme. It should begin by triggering changes which are aimed at generating the basic attractiveness factors of the city as described on figure 6. Only when the evaluation of the revitalisation process has brought about positive changes it is possible to move on to the next level of activities which are aimed at triggering factors strengthening the attractiveness of the city. Achieving these two levels in the revitalisation process can be considered as an action ensuring an appropriate level of attractiveness of the city or neighbourhoods threatened by the risk of urban shrinkage, while activation of integrating factors will complete the process of building the attractiveness of the town sphere. The city will begin to be treated by its residents as their common good, over which they have influence and for which they bear responsibility. Creating a sense of local community and building an emotional relationship between the residents and the city, with the prior establishment of the basic and strengthening factors, should be regarded as a success of the revitalisation process, which can essentially reduce urban shrinkage as well as other local problems. In order to achieve this success, it is necessary to carry out revitalisation activities in accordance with a programme which can be considered as a public management instrument and the execution of which may counteract the processes of urban shrinkage.

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Study of Financial Business Development Trends in Russian Regions

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Abstract

The introduction of the sanctions regime in relation to the Russian banking market by a number of Western states entailed significant risks. They resulted in a restriction on the freedom of movement of financial capital, increased competition in the financial segment. In the interests of economic growth of the Russian economy, the task was set to ensure liquidity and stability of commercial banks.
The banking market in the regions determines the features of the development of the banking system of the country as a whole. The development, maintenance and improvement of the level of development of regional banks is an important aspect that characterizes the level of development of the national banking system as a whole.This study is devoted to the analysis of regions in terms of the potential development of the banking business. The authors assessed the dynamics and volumes of loans issued and deposits attracted by credit institutions. The authors identified trends that determine the path of development of the banking sector in an unstable environment and the active introduction of digital technologies. It is noted that the modern banking business will be competitive when it adopts a strategy of rejecting excess profits and is adaptive to new business conditions.

Keywords: Digital Economy, Banking, Banking Innovation, Regional Banking System

Introduction

The stability and efficiency of the banking sector creates the basic conditions for the stable development of the national economy. The current state of the banking sector is characterized by a significant dependence on external factors. They are caused by international sanctions and trade restrictions on Russia. There is also a specificity of banks in the national financial services market.

The conditions of an unstable external environment create difficulties in the conduct of the banking business. The transition to the new international financial reporting standard (IFS9) is expected, which will require the formation of reserves based on predicted losses not incurred. According to experts, the introduction of the standard may lead to a change in volatility in terms of profit and equity. This will entail a change in key indicators of the financial performance of banks [2, 5].

In the near future, Basel IV standards will be introduced, which establish stricter rules for assessing risks in bank assets. According to McKinsey & Co agency for European banks, the introduction of new rules will entail the need for additional capital in the amount of about 120 billion euros.

Analysts note that the main goal of the national banking sector is to maintain a competitive position and ensure its reliability [6, 7, 9]. The stability of the banking system is determined by the stability characteristics of individual banks. Therefore, research on the functioning of regional commercial banks is very relevant.

Analysis of the dynamics and level of development of the national banking system.

A study of the statistics of the Central Bank of the Russian Federation shows clear imbalances in the development of the regional banking system [8].

The decrease in the number of credit institutions in the Central Federal District was 15%, in the Northwestern Federal District - 5%, in the Southern Federal District - 29%, in the North Caucasus Federal District - 30%, in the Volga Federal District - 6%, in the Urals Siberian and Far Eastern Federal Districts - 12%. The largest decline was noted in the Central Federal District. More than half of credit institutions (56.2% as of January 1, 2019) are located in the Central Federal District. The three leaders (but with a significant lag behind the Central Federal District) include the Volga and North-West federal districts (13.8% and 8.4% of credit organizations, respectively). It is noteworthy that 50% of credit organizations are registered in Moscow.

The sample of regions with the largest number of credit organizations in 2018 demonstrated the following. As of 01.01.2019, the leader in the number of credit organizations is Moscow (239 credit organizations). In general, in the whole country only three regions (not taking into account the leader) have more than 10 operating credit organizations:

- in the North-West Federal District - this is St. Petersburg, in which there are 28 credit organizations;
- in the Southern Federal District - the Republic of Tatarstan (16 credit organizations) and the Samara Region (10 credit organizations).

Consider the subjects of the Russian Federation by the potential of regional banks. We will carry out an assessment using two indicators: the volume of assets and the volume of total profit. The largest volume of assets is concentrated in the Central Federal District, as the number of credit organizations is 56% of the total Russian.

In terms of total profit, the top three are as follows:

- Central Federal District (1,598 billion rubles);
- North-West Federal District (11.5 billion rubles);
- Ural Federal District (10.3 billion rubles).

Two federal districts (Volga and Far East) show a cumulative loss as a result of the total activity of credit organizations.

Important indicators characterizing the development of the banking system are placed and attracted funds in a regional context. Consider the quantitative characteristics of deposits attracted by credit institutions (deposits) from business entities (table 1).

Table 1: Dynamics of deposits attracted by credit organizations

Federal District	2016		2017		2018	
	Deposits of commercial organizations, bn. rub.	Deposits of individuals bn. rub.	Deposits of commercial organizations, bn. rub.	Deposits of individuals bn. rub.	Deposits of commercial organizations, bn. rub.	Deposits of individuals bn. rub.
Russian Federation	6966,7	18471,9	8939,1	20640,8	12106,8	22348,4
Tsentral'nyy	4883, 9	8150,3	6590,6	9195,4	9240,7	10001,9
Severo-Zapadnyy	560,7	2145,6	567,2	2435,8	727,9	2669,8
Yuzhnyy	124,9	1303,8	140,5	1455,3	164,5	1590,1
Severo-Kavkazskiy	37,3	339,7	34,3	378,1	48,8	409,4
Privolzhskiy	584,9	2751,5	641,9	2980,3	773,5	3220,1
Ural'skiy	383,5	1402,9	503,9	1546,4	647,9	1665,2
Sibirskiy	228,1	1582,0	290,9	1775,8	294,1	1714,4
Dal'nevostochnyy	163,4	796,2	166,9	873,8	209,2	1077,4

From 2016 to 2018, the total amount of deposits of both legal entities and individuals made in rubles increased:

- deposits of legal entities increased from 6966.7 billion rubles. up to 12106.7 billion rubles, i.e. 73%;
- deposits (deposits) of individuals increased from 18,471.9 billion rubles. up to 22348.4 billion rubles, i.e. by 21%.

At the same time, deposits in foreign currency and precious metals in the Russian Federation as a whole amounted to:

- as of 01.01.2017, legal entities 4,597.2 billion rubles, individuals 5831.4 billion rubles;
- as of 01.01.2019, 5565.9 billion rubles, individuals 6229.4 billion rubles.

Growth is observed in all federal districts without exception. The leader among the federal districts in attracted resources is the Central Federal District: 9,240.7 billion rubles. - deposits of legal entities and 10,001.9 billion rubles. - deposits of individuals.

It is necessary to highlight Moscow, which is the leader in this indicator. Thus, the volume of deposits of legal entities amounted to 8760.5 billion rubles, i.e. 72% of the total deposits of legal entities in the Russian Federation, and the amount of deposits of individuals amounted to 6356.9 billion rubles. (30% of the total deposits of individuals).

Table 2 presents data on loans granted.

Table 2: Dynamics of loans granted

Federal District	2016		2017		2018	
	Loans to companies, bn. rub.	Loans to individuals, bn. rub.	Loans to companies, bn. rub.	Loans to individuals, bn. rub.	Loans to companies, bn. rub.	Loans to individuals, bn. rub.
Russian Federation	35579,6	7210,3	38452,7	9233,7	45005,1	12456,1
Tsentral'nyy	19873,0	2424,7	20658,1	3005,6	27145,8	4017,1
Severo-Zapadnyy	3558,4	883,9	4179,5	1198,8	4521,4	1548,9
Yuzhnyy	2294,8	552,1	2494,2	715,9	2698,8	1001,4
Severo-Kavkazskiy	224,8	169,7	255,3	225,2	268,4	306,99
Privolzhskiy	4614,4	1253,2	5410,2	1626,0	4535,97	2224,6
Ural'skiy	2022,7	701,8	2390,6	909,3	2455,3	1233,9
Sibirskiy	2303,3	872,2	2220,3	1112,5	2282,9	1383,1
Dal'nevostochny y	688,2	352,7	844,5	440,5	1099,5	740,0

The volume of funds provided to legal entities and individual entrepreneurs demonstrates growth both in Russia as a whole and in federal districts. The growth of loans to individuals amounted to 72% in 2018 compared to 2016.

As of January 1, 2019, the largest volume of loans granted to legal entities and individual entrepreneurs was concentrated in the Central Federal District (59%). Also, the largest amount of funds provided to individuals is concentrated in the Central Federal District. The growth of loans for individuals amounted to 65%, for companies - 36.6% in 2018 compared to 2016.

Funds to companies and individuals are provided, as a rule, in rubles. The share of loans issued in foreign currency and precious metals accounts for about 0.7% of the total borrowing.

The company overdue debts as of 01.01.2019 on loans amounted to 2099.6 billion rubles, i.e. 4.7% of the total volume of loans issued; for individuals - 757.6 billion rubles, i.e. 6.1%.

Modern trends in the development of banking

An important trend is a decrease in margins in the banking sector, which follows a decrease in inflation to 4%. The consequences of easing monetary policy, manifested in the constant control of inflation and lower key rates, lead to lower interest rates on loans.

An analysis of the nominal level of rates in the context of the main types of banking assets and liabilities shows that banks are currently not able to restore a margin of 4-5%, as it was before the crisis of 2014. Before the crisis, net interest income amounted to more than 70% of operating income in the banking sector as a whole. Now banks have lost a third of the margin and profitability has decreased by more than 20%.

Of the significant problems, one should point to the deterioration of the demographic situation in Russia. This entails a change in demand and structure for banking services, in particular for mortgage and consumer loans.

The structure of the economy, its focus on the commodity model, also has an impact on the banking sector, change its profitability and focus on servicing export-oriented sectors.

Another important trend is the global processes of networking and digitalization, which, according to experts, will grow and change the architecture of economic systems at all levels [1, 3, 4]. These processes are actively used in banking. Digital technologies are being introduced into banking offices: blockchain, contactless payments, Internet of things, cybersecurity systems. Widespread electronic payments, remote customer service systems, digital applications. New electronic money and payment methods with their use, cryptocurrencies are appearing. Traditional banking services are being replaced by new, competitive services based on artificial intelligence technologies. New banking products are present in the virtual space, among them: Internet banking, blockchain service, cryptocurrency mining and storage, creation of digital assets, development of smart contracts.

Conclusions and Recommendations

Thus, regional banks will have to look for their place in building a new model of investment business development for the future. For successful competition in a high-tech environment, a traditional banking business needs to adapt to a changing market. Modern banks are able to survive by applying a strategy of abandoning excess profits and demonstrating flexibility and high adaptability to new business conditions.

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Investment Aspects of Business Development in Russia

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Abstract

Small and medium-sized businesses play an important role in the development of the modern economy, which directly affects the standard of living of the population in particular, as well as ensuring the stability of modern society as a whole. To perform their significant functions for the economy as a whole, and for the population in particular, small and medium-sized businesses need credit security. The main role in this issue is assigned to banks, which are one of the largest participants in the financial market. It should be noted that the share of small and medium-sized businesses in the structure of lending by banks is insignificant. The main reasons for this situation are: low profitability of lending to small and medium-sized businesses for banks; difficulty in assessing the real financial condition of the subjects under consideration; high risks of non-repayment of the loan. Based on this, the relevance of the study is due to the need to identify the degree of development of lending to small and medium-sized businesses, which is especially important at the regional level. To analyze the state of lending to small and medium-sized businesses, the volume of loans issued to legal entities and individuals in the territorial context was analyzed; their share in the total volume was determined; their comparative analysis was carried out; and the types of economic activities where the largest volumes of loans for the development of small and medium-sized businesses are concentrated were also identified.
Conducted in the study, on an actual topic, allowed us to draw conclusions about the state of development of lending to small and medium-sized businesses, as well as to offer recommendations for improving an important aspect of the country's economy.

Keywords: Small and Medium-Sized Businesses, Credit Organizations, Banking Sector, Lending to Small and Medium-Sized Businesses

Introduction

According to experts, in the current conditions of instability , effective development and transformation of the Russian economy is possible with the active development of one of its important sectors – small and medium-sized businesses [1; 6, p. 57; 15, p.100].

Small and medium- sized businesses play a huge role in the development of the country's economy in General and the regions in particular. Small and medium- sized businesses are a guarantor of competition between the main market participants, which promotes the introduction of technologies, provides a return on investment, and is aimed at eliminating problems related to employment and unemployment [9, p. .86].

The development and successful functioning of small and medium sized businesses depends on how well entrepreneurs are provided with long term and short term financial resources. For small and medium- sized businesses, lending provides a wide range of opportunities to expand and improve their business activities. With the help of Bank financing, small and medium-sized businesses have the opportunity to improve their performance (increase in liquidity and profitability, financial security,

compliance with regulations and legal requirements). Despite the development of credit instruments for business, the necessary economic growth rates are not provided. To solve existing problems, both on the part of borrowers (high requirements to the borrower; lack of quality collateral; long-term loan application review process; predominance of short-term lending; high rates; large volume of documents requested by banks) and on the part of creditors (non-transparency of borrowers; high risks; banks ' unwillingness to work with small and medium-sized businesses; high operating costs when considering applications) it is necessary to analyze the state and dynamics of lending to small and medium-sized businesses, primarily at the regional level [8, p. 34].

Research on the level and dynamics of loans to small and medium-sized businesses in the Federal districts of the Russian Federation

The mechanism of lending to small and medium-sized businesses, it is necessary to start with the study of its features:

- assets of small and medium- sized businesses are limited in size, and the specificity of their structure,
- the life cycle of small and medium-sized businesses is short- term, which does not allow them to build a reputation in the financial market,
- instability to the volatility of the external environment (orientation to local markets, limited number of partners)
- there is little need for the volume of debt financing of small and medium- sized businesses, which is a consequence of increased costs for lending
- low indicators that characterize the efficiency of the company (profitability, profit
- lack of specialists in financial and economic activities.

Therefore, small and medium-sized businesses have a certain specificity, which leads to the presence of a certain credit mechanism.

Let's consider the main quantitative indicators that characterize the level of lending to small and medium- sized businesses. The Central Federal district is the leader in terms of financing loans to individuals and legal entities (figure 1).

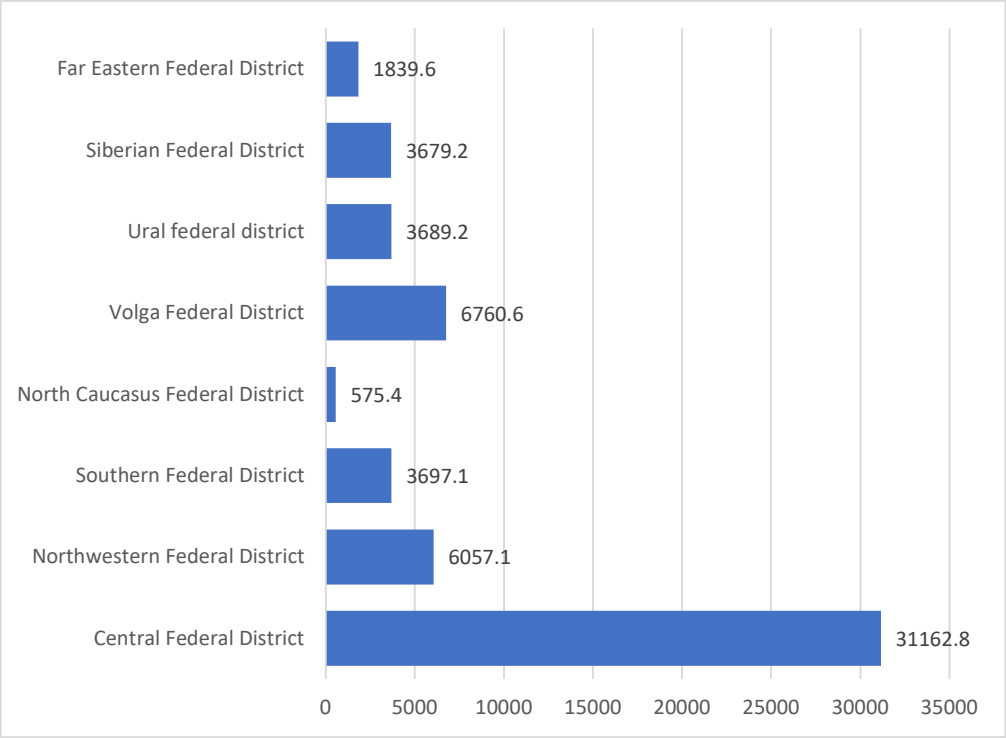

Fig. 1: The volume of loans issued to legal entities and individuals in the territorial aspect for 2018, billion rub.

The Central Federal District accounts for 54% of the total volume of loans issued to legal entities and individuals. Thus, more than half of the volume of loans granted to individuals and legal entities issued to the Central Federal District.

A significant share of loans is also provided to business entities (legal entities and individuals) of the Volga Federal District (11.7%) and the North-West Federal District (10.5%). The same volume of lending to business entities is in the Southern, Ural and Siberian Federal Districts (about 6.4% per district). Outsiders in this indicator include the Far Eastern Federal District (3.2%) and the North Caucasus Federal District (1%) [4, p.94].

A study of the structure of loans issued by districts made it possible to note that in the structure, in all federal districts, most of the loan was granted to legal entities (more than 50%). However, in 2018, the North Caucasus Federal District is characterized by the fact that the largest volume of loans was issued to individuals (53.4%).

The largest volume of loans for individuals is concentrated in the Central Federal District (as of 2018, more than 32%). This trend is observed throughout the period under review. The smallest amount of loans to individuals is provided in the North Caucasian (2.46%) and Far Eastern (5.94%) federal districts.

The situation with loans to legal entities is similar. More than 50% of loans granted to legal entities are concentrated in the Central Federal District (as of 2018, more than 60%). The smallest amount of loans to legal entities is provided in the North Caucasian (0.59%) and Far Eastern (2.44%) federal districts. The central (32.3%) and Volga (17.8%) districts are leaders in terms of the volume of loans issued.

A comparative analysis of the volume of loans granted to individuals and legal entities by districts of the Russian Federation for 2018 indicates the following (figure 2).

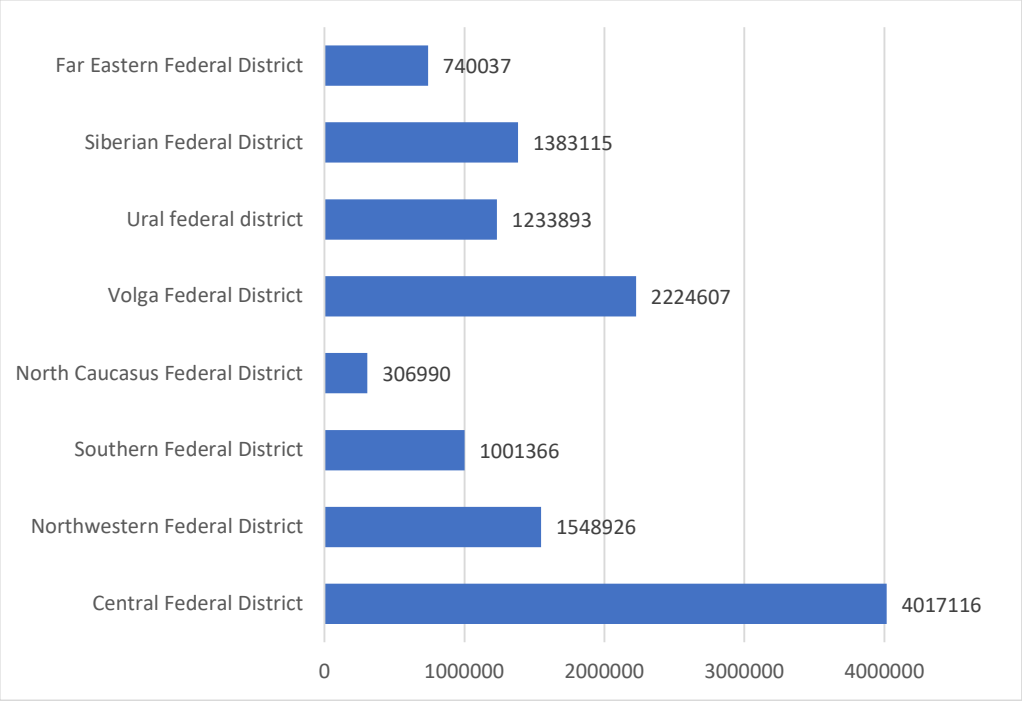

Fig. 2: The volume of loans issued to individuals by federal districts for 2018, billion rub.

The Far Eastern District (740037 million rubles or 5.9% of the total) shows low indicators for the number of loans issued to individuals North Caucasus Federal District (3,306,990 million rubles, or 2.5%). The undoubted leader in this indicator is the Central Federal District (4,017,116 million rubles or 32.3%).

As a leader in this indicator, we will identify the territorial directions of loans to individuals by the Central Federal District. The largest volume of loans issued to individuals by the Central Federal District is concentrated here (33.2%). A significant amount of loans issued was also directed to the Volga (7.8%), North-West (12.3%) and Siberian (11.2%) districts of the Russian Federation.

An analysis of the dynamics of loans granted to legal entities in federal districts shows that the leading positions also belong to the Central Federal District (27145782 million rubles, or 60.3% of the total). The three leaders include the Northwestern Federal District and the Volga Federal District (each district about 10% of the total). Outsiders on loans granted to legal entities include: the Far Eastern Federal District (2.4%) and the North Caucasus Federal District (0.5%).

The largest amount of credit funds was provided to the Central District (23747931 million rubles) or 60% of the volume. Such districts of the Russian Federation as North-West and Volga constitute 10% of the volume of credit funds for legal entities. The leaders among the regions in terms of loan funds are Moscow and the Moscow Region; St. Petersburg; Republic of Tatarstan. The largest amount of credit in the Central Federal District was presented to wholesale and retail enterprises (5177198 million rubles). Also a common activity for lending in the Central Federal District are manufacturing enterprises, transport and communications, real estate operations [11, p.141].

The problem of lending to small and medium-sized enterprises in the modern economy is important, and measures are needed to minimize them in the future. The factors limiting the lending process for small and medium-sized enterprises include:

- the lack of a resource base that provides loans for the long term;
- priority and profitability of working with large borrowers compared to borrowers of small and medium enterprises;
- the presence of high risks and non-transparency of the activity of small and medium enterprises.

An analysis of the existing problem of lending to small and medium-sized enterprises of various researchers made it possible to combine them into several groups: short-term or lack of credit history [7, p. 157; 13, p. 156; 5, p. 32; 3, p. 376; 2, p.5861]; opacity and the presence of high risks for small businesses [7, p. 157; 12, p. 67; 5, p. 32]; lack of collateral; short-term loans [[7, p. 157; 12, p. 67; 5, p. 32; 3, p. 376; 2, p.5861]; groundlessness of the high volume of loans for small businesses [10, p. 156; 5, p. 32; 16, p. 158].

Conclusion

The territorial analysis shows that the leading position in all indicators of lending to small and medium-sized enterprises belongs to the Central District, whose share is 54% of the total volume of loans issued to legal entities and individuals. A significant share of loans is also provided to constituent entities of such districts of the Russian Federation as Volga (11.7%) and North-West (10.5%). Most of the loan was granted to legal entities (more than 50%). However, in 2018, the North Caucasus Federal District is characterized by the fact that the largest volume of loans issued was provided to individuals (53.4%). The largest amount of credit in the Central Federal District was presented to wholesale and retail enterprises (5177198 million rubles). Also a common activity for lending in the Central Federal District are manufacturing enterprises, transport and communications, real estate operations. Therefore, the three leaders in the territorial context are represented by the following districts: Central, Volga, North-West. Outsiders in terms of the volume of loans are Far Eastern and North Caucasian Federal Districts.

Thus, it is possible to single out the main activities that will contribute to the improvement of the activities of commercial organizations in various territorial entities in the field of lending to small and medium-sized businesses: strengthening diversification by lending industry, with the aim of gradation of target segments of small business; the use of mechanisms aimed at reducing risk in lending to small businesses in order to minimize credit risk; transition to in-line lending technologies in order to reduce costs; reduction of time for processing a loan application, i.e. automation of the lending process; improving the quality of customer service; development and implementation of new loan products focused on the needs of small businesses in terms, objectives and collateral.

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Sustainable Energy – Definitions, Scope and Areas

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Abstract

The energy transition consisting in a change in the management model and a shift from brown to green economy has been observable in the EU since the beginning of the first decade of this millennium. The climate policy established by the EU authorities prioritises resource-efficient, low-carbon and sustainable technologies. The notion of sustainable energy is one of the terms that emerge in the relevant literature in connection with the energy transition. However, it has not been specified yet and its origin, sense, scope, area and components have not been discussed properly. Therefore, the aim of this paper is to define the notion of sustainable energy, its scope and area, beginning with the determination of the essence of sustainable management and ending with the identification of components of the sustainable energy paradigm. The first part of the paper specifies and defines the notion of sustainable management taking place in the sustainable economy. Subsequently, according to the iterative method subsequent components of sustainable energy are defined, such as sustainable energy development or sustainable energy system. The final part presents the scope and area of the sustainable energy as well as its paradigm. The leading research method applied is the iterative approach, methodology of systemic analysis and multi-level, multi-aspect and – at the same time – holistic approach to problems observed.

Keywords: Sustainable Energy, Energy Paradigm, Sustainable Economy, Sustainable Management, Energy System

Introduction

Due to the increasingly more acutely perceived climate changes, the necessity for the transition from an economy based on fossil resources and resource-intensive and pollutant technologies to a resource-efficient, environment friendly and low-carbon economy is the superior goal of the EU energy policy. Green economy is such economy, within which such technologies as renewable energy sources (RES), being part of sustainable energy (SE), are distinguished.

The relevant literature includes various terms that combine the notions of sustainable development and energy: sustainable energy, sustainable energy system, sustainable energy development (Osipova and Kharlamova, 2019; Chouinard, Ellison, and Ridgeway, 2011, A Guidebook, 2019). However, they are rarely defined. The few attempts at defining this thematic area were made by Hycner, Bugajczyk and Duda (2002), Borys (2014), Poskrobko (2011), Rogall (2009) and Prandecki (2014). Sustainable energy is a new notion in economics. It belongs to the research area of heterodox economics - economics of sustainable development (ESD, sustainable economics). Economics of sustainable development is a science that has been developing since the beginning of the new millennium.

The paper aims to create and structure basic definitions related to sustainable energy, which will permit the delineation of its area and scope. Furthermore, the place of sustainable energy will be indicated in the context of such notions as sustainable economy or green economy. The author will also identify the components of the primary process being the beginning of formation of sustainable economy: sustainable management. The paper will also present the sustainable energy paradigm along with its main components. Few studies concerning this topic have been prepared in the literature so far and certainly none cover the notion of sustainable energy comprehensively.

Sustainable energy permits the achievement of the primary goals of the EU climate policy until 2030 being the reduction of greenhouse gas emissions by at least 40% (relative to the 1990 level) and the increase in the energy efficiency by at least 32.5%. An important goal is the at least 32% share of energy from renewable sources in the total consumption of final energy in the EU by 2030 (Clean Energy, 2016; 2030 climate, 2020). A new strategy - European Green Deal speaks of the delivery of clean, affordable and safe energy (A European Green, 2019). This document is a roadmap for making the EU's economy sustainable.

Methods

In this paper the iterative approach is adopted method. It allows elaborate a step-by-step definicions, scope and sustainable energy area. The analysis is conducted in the society-economy-environment macrosystem in the field of sustainable economics. For the evaluation of research problems, the methodology of systemic analysis is adopted, which offers a multi-level, multi-aspect and – at the sametime – holistic approach to problems observed.

Sustainable Management and Sustainable Economy

One of the earliest definitions of sustainable management was developed by Polish economist B. Prandecka already in early 1990s, in her books titled: "Nauki ekonomiczne a środowisko przyrodnicze" (1991) or "Interdyscyplinarne podstawy ochrony środowiska przyrodniczego" (1993). According to that author, management consists in the use of resources of the natural environment and the protection thereof, which proves the rational activity of the human. B. Prandecka pointed to the interdisciplinary nature of the issues related to the environment and to the problems that cannot be solved by the neoclassical economics in the context of the human use of the environment. She noticed that the protection of natural environment was an important part of economic sciences and was directly related to the satisfaction of "individual and collective needs of contemporary societies and future generations" (Prandecka, 1991, p.23). She underlined that "the humans manage their planet ineptly" (Prandecka, Współzależność, 1985, p.16), providing the example of the failure to take into account in the present management the possibility to fulfil the requirements and goals of future generations and the failure to give them any choice in the future management process (Prandecka, Cele, 1985, pp.661-662). Moreover, B. Prandecka highlighted the changing approach of the human to the use of the environment, from extremely egocentric to moderately anthropocentric, with the emphasis that the primary goal of management was the development and survival of the human race (Prandecka, Współzależność, 1985, p.18). This may be regarded as early implications for the formation of a new discipline: economics of sustainable development.

Management in sustainable economics (sustainable management) differs considerably from management in neoclassical economics, where the maximisation of own benefit from consumption as well as profit were the primary motivation. Such management takes place in the society-economy-environment macrosystem. This means the strive for integrated governance and for balancing of the dimensions (areas) of sustainable development: social, environmental, and economic, which implies their simultaneous incorporation in the decisions concerning the whole process. In light of the above discussions, it may be assumed that sustainable management is a process aimed to ensure the sustainability of existence of the present and future generations, at the same time preserving the boundaries of nature's tolerance. This guarantees the materialisation of the principle of intra- and inter-generational justice. The criterion of justice means that the contemporary management of resources that facilitates strong human environmental impact in the form of environmental pollution and depletion of environmental resources should not lead to the loss of possibility to manage these resources by the present and future generations. Important features of sustainable management are the principle of strong sustainability, social participation and the principle of subsidiarity (Fig.1). Sustainability, understood according to the principle of strong sustainability, means the transfer of resources to the successors in the quantity and quality not worse than those used by the present generation. Only substitution within the same type of capital is permitted (Graczyk, Gospodarowanie, 2019, p.222). Operationalisation of sustainable management is related to the implementation of sustainable development.

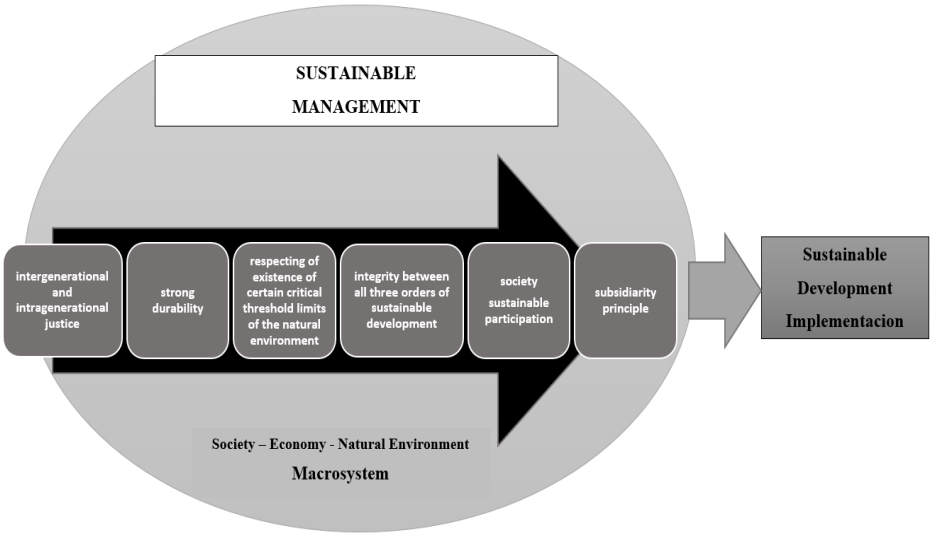

Fig. 1: Sustainable management: elements and area

Source: own elaboration

Sustainable management takes place in sustainable economy. Sustainable economy is defined by E.S. Goodstein and S. Polasky (2014) according to the approach to sustainable development presented by J. Pezzey (1992). They refer to such a management method that leads to the achievement of an equal or a higher living standard by the members of the future generation in comparison to the members of the present generation. This means that the life usability should not be worse for a typical member of the future generation. Apart from incorporating the criterion of justice in the activities, the primary goals of such management are civilisation development that reduces the human environmental impact and is in line with the protection of natural environment.

Sustainable Energy, Sustainable Energy Development, Sustainable Energy System

Definitions of sustainable energy are created often based on the idea of sustainable development and the most popular definition from Brundtland. W. Patterson (2009) defines sustainable energy as energy consumption and supply that satisfy the parents' needs without compromising the children's capacity to satisfy their own needs. International Energy Agency – IEA (2001), OECD organisation, defines sustainable energy as long-term energy generation with the global reach, guaranteeing environmental protection, economic viability and competitiveness as well as social responsibility. W. Patterson's definition does not convey the essence of the notion fully as it refers selectively to sustainable development aspects, underlines the principle of inter-generational justice. Although the IEA's definition stresses the sustainability of development, it does not take into account all considerations of sustainable development dimensions. Sustainable energy is such a sector of sustainable economy in which sustainable energy development takes place. A sustainable energy system is an important component of sustainable energy.

Sustainable energy development is a notion related to the implementation of the sustainable development in energy generation, and is a process occurring in sustainable energy. The fundamental principle of sustainable energy development - is treating economic and social development and environmental protection as strongly correlated tasks and taking care that economic development does not contribute to the degradation of the natural environment. This requires the compliance with the following conditions in the energy management process (Lorek, 2007, pp.163-176):

- take into account the scale and strength of impact of energy production and consumption on the natural environment, including know the effects of such management and the preventive measures possible to be taken,
- provide integration of all dimensions of sustainable energy management at each stage of decision-making as regards directions of energy generation systems, including energy planning;
- account for the interest of future generations in the taken measures so that the measures are prudent, economically viable and socially acceptable now and in the future.

The aim of the sustainable energy development will be energy-related well-being concerning both the society and the individual. It means such use of energy sources that does not reduce energy management for future generations, does not cause permanent depletion of the natural environmental capital, remains in compliance with the adopted local and national law. The goal is also the lack of energy poverty, the fair distribution of energy resources, the equal access to energy sources for the society and its individuals.

Energy generation is one of the economy sectors one of the components of which is the energy system. It may be defined as a combination of various technologies of acquisition, generation, processing and use of energy and heat. A sustainable energy system should have the following features (The Political 2010; Voβ, 2020; Wach, 2008):

- give rise to the growth of economic potential of energy service provision for future generations,
- provide energy services with the minimum use of resources, including mineral resources and other natural environment resources,
- release only so much substances related to energy acquisition, generation, processing and use to the environment as not to exceed the assimilative capacity of the environment to neutralise them,
- the occurring hazards to human health related to energy production must be lower than the avoided natural hazards thanks to delivery of energy services,
- internalise external costs,
- strive for the use of new technologies in the field of generation and management,
- use renewable energy sources,
- put emphasis on achievement of long-term economic and environmental goals,
- act in competitive markets, including international markets, with equal rules of competition.

Scope and Areas of Sustainable Energy

The sustainable energy consists in management in the society-economy-environment macrosystem. Sustainable energy management is a process performed in the sustainable energy development in the sector of sustainable economy being sustainable energy. Thus, sustainable energy is one of the sustainable economy sectors (Fig.2).This refers primarily to green energy technologies but not only. Also other low-carbon technologies and those characterised by increased ecology standards belong to it, e.g. biomass co-firing with coal. Management of renewable energy sources (RES), in turn, is an inextricable component in the sustainable energy consumption or production process, natural environment friendly sources, supporting the socio-economic development. This process takes place as part of sustainable energy and green economy simultaneously (their common component and subset of each of them).

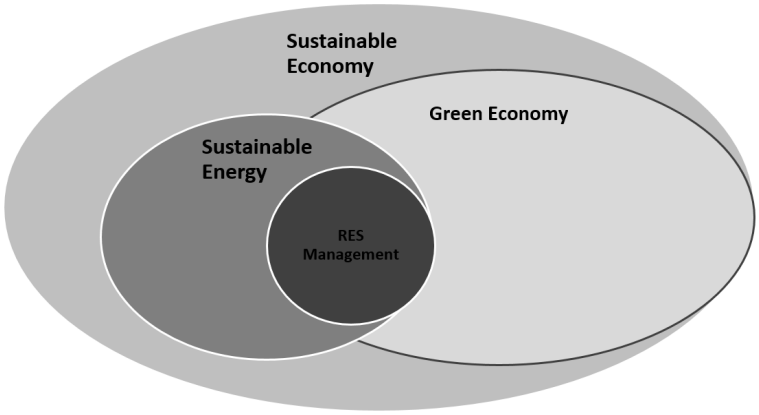

Fig.2: Relations between sustainable economy, green economy, sustainable energy and renewable energy sources management

Source: author's own research based on Graczyk, A.M. (2019) 'Gospodarowanie odnawialnymi źródłami energii w ekonomii rozwoju zrównoważonego. Teoria i praktyka', Polish Scientific Publisher (PWN), Warsaw. p.182.

The scope of sustainable energy should be considered broadly, i.e. in terms of processing, generation, transport, distribution and consumption (see Fig.3). For this reason one should bear in mind the whole energy system, which will affect local markets up to global relations. This system operates in two primary areas: sustainable production and consumption of energy. Sustainable energy consumption should be understood as (Graczyk, Gospodarowanie, 2019):

- change in the energy consumption model to a resource- and energy-efficient one,
- reduction of demand for primary energy thanks to the increase in the efficiency of appliances that use energy,
- increase in the energy efficiency of the appliances used,
- thermal upgrade of non-building structures and buildings, industrial and home use installations, local district heating networks and local heat sources,
- use of energy-efficient construction and eco-friendly transport,
- use and recovery of waste heat thanks to recuperation,
- use of appliances generating energy from renewable sources.

Sustainable production of energy according to G. Boyle, B. Everett, J. Ramage (2004) should use such energy sources the use of which does not cause big threats to health and considerable degradation of environment and reinforcement of social injustice. Such sources should not be subject to considerable depletion through their long-term use. This definition embraces numerous alternative sources: renewable energy sources, co-firing, hydrogen use, etc. However, it is renewable energy that is called the "driver" of the green and low-carbon economy. The use of solar energy or heat pumps to increase the energy efficiency of buildings, investments in local biomass-fired CHP plants, biogas plants or other renewable installations in municipalities are increasingly more popular. The renewable energy sector belongs to the market of innovative green technologies. RES contribute to the reduction of the greenhouse effect and to energy efficiency. Energy generation in local sources and energy source diversification strengthen the energy security.

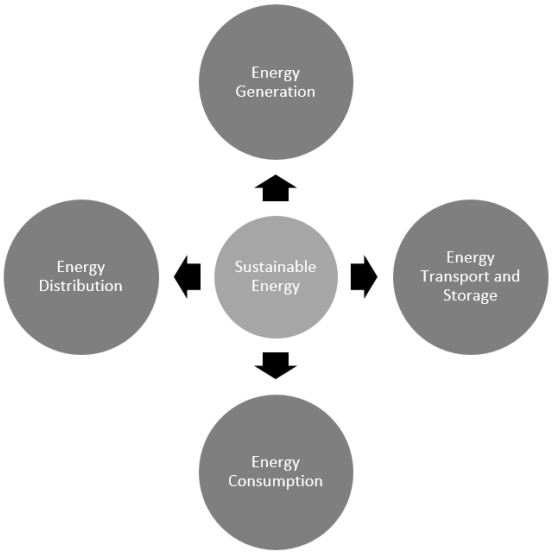

Fig.3: Scope and areas of sustainable energy

Source: author's own research based on Graczyk, A.M. (2019) 'Gospodarowanie odnawialnymi źródłami energii w ekonomii rozwoju zrównoważonego. Teoria i praktyka', Polish Scientific Publisher (PWN), Warsaw. p.188.

Sustainable energy covers areas related to sustainable use of energy in transport and construction, and thanks to the use of biomass and energy crops for biofuels it even partly concerns sustainable agriculture. The areas and sectors of operation include also industry, services and trade related to green energy, including energy consulting as well as local energy production and consumption, including prosumption. A prosumer is an end consumer who purchases electricity under a master agreement but at the same time generates electricity for its own needs, unrelated to the economic activity. This definition refers to electricity generation from RES in micro-installations (A.M. Graczyk, A. Graczyk, Żołyniak, 2020, pp. 160-162).

The Paradigm of Sustainable Energy

The paradigm of sustainable energy sets the directions of energy management and is of crucial significance for the contemporary social processes in environmental protection and in the political and institutional sphere. A.M. Graczyk (2019, Gospodarowanie, pp. 327-323) was the first in Poland to define the paradigm of sustainable energy. Those investigations were also presented on the 34 IBIMA conference in her article *The Formulation of Fundaments and Form of Paradigm of Sustainable Energy* (2019, The Formulation, pp. 12827-1289*).* The paradigm of sustainable energy originates from the paradigm of sustainable development and from the paradigm of sustainable development economics, hence it must refer also to the primary features of the new development concept (durability, sustainability and balance) (Fig.4). In general, the sustainable energy paradigm is build on intra- and inter-generational justice, moderate strong rule of durability. The reasons for the use of moderate strong durability principle is to maintain parity between the three orders (social, economic and environmental) and to meet the requirement of intergenerational justice in RES management. Its axiological basis must be at least moderate anthropocentrism. The quintessence of the paradigm of sustainable energy is the new concept of a managing human - human managing energy – *homo energeticus*.

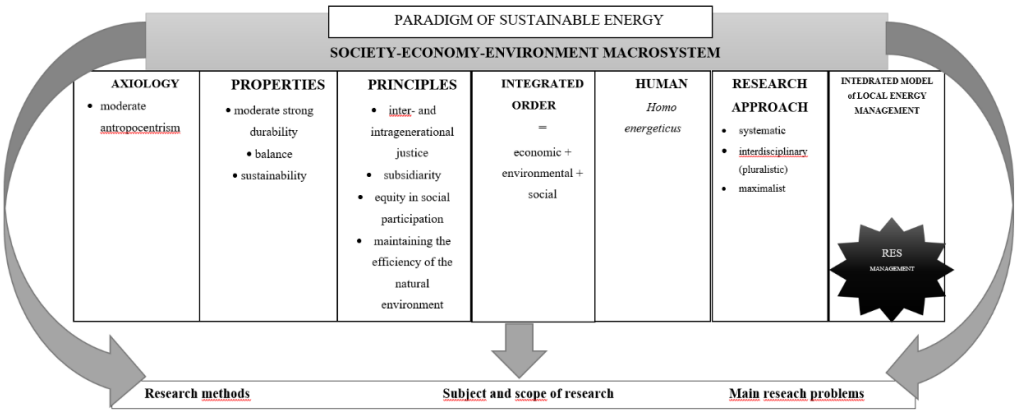

Fig.4: The paradigm of sustainable energy

Source: author's own research based on Graczyk, A.M. (2019) 'The Formulation of Fundaments and Form of Paradigm of Sustainable Energy', Proceedings of the 34 th International Business Information Management Association Conference (IBIMA), ISBN: 978-0-9998551-3-3, 13-14 November 2019, Madrid, Spain, p.12828.

Conclusions

The determination of the primary definitions, scope and areas of sustainable energy has not only a theoretical but also a practical dimension. At present, the priority of the EU energy and ecology policy is sustainable energy, which includes the development of RES. Renewable energy sources on the international arena are called a "win-win-win" solution. Energy generation is perceived as a strategic sector by the governments of member states. Therefore, it is very important to manage the energy in a sustainable manner. Sustainable energy provides citizens with permanent, stable, secure and effective supplies of energy and enables consumers to generate energy on their own. Permanence is related to the guarantee of supplies, which creates a sense of security of satisfaction of one of the primary needs of the management process. Efficiency of energy supplies involves the use of modern appliances which reduce energy consumption.

The author is convinced that sustainable energy and the RES belonging to it, operating within green economy, is an introduction to a new paradigm of development and a new business model. The return to the brown economy is no longer possible due to the escalating human environmental impact that causes environmental and health threats deteriorating the life quality and causing the loss of biodiversity.

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Short-Term B&B Rental in Asia: Measurement and Analysis of Prices, Housing Attributes, Image and Popularity

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Abstract

The article presents studies on selected aspects pertaining to the private rental market of housing stock, operating on the principles of sharing economy. Detailed studies were carried out on rental offers that are filed in Asian countries, with respect to which the type of rental was identified, rental prices and their structure, amenities offered in the premises, ratings given by clients and popularity. Purpose: The aim of this article is to measure and analyze prices of short-term B&B rental in Asia, as well as to parameterize housing attributes, to assess the image and popularity of the resources on offer. Research Methodology: The research of the market of B&B rental was carried out for 14 capital cities of countries lying in Asia. All in all, there were 1,400 offers studied. Results: It can be concluded that the studied capitals of Asian countries are characterized by considerable differences as regards the prices of B&B rental offers. A comparison of the housing resources can also be made from the point of view of their amenities and furnishing, as well as their image and popularity of the rental market functioning on the basis of co-sharing economy. Novelty: The research may serve as a good example for conducting further theoretical studies in the sphere of housing rental market which functions on the basis of co-sharing economy. The results which were obtained can also be of practical use, since they determine prices and features of the resources on offer. Finally, parameterization of the studied attributes can indicate the place of this type of housing rental in the market, especially that of hotel services.

Keywords: sharing economy, real estate, rental housing, peer-economy, price level, Asian B&B.

The paper presents the personal opinions of the authors and does not necessarily reflect the official position of the Narodowy Bank Polski or the Warsaw School of Economics or the Opole University of Technology

Introduction

Booking accommodation is very easy; it is enough to visit a website, search for and choose one among thousands of offers, contact the owner of the property and determine the detailed terms of rental with the owner. Thanks to the use of peer-to-peer technology described above, the activity is not limited by geo-location aspects, foreign exchange rates and, due to the fact that the presented offers are presented in several language versions, linguistic barriers. New technologies and new business ideas contributed to the emergence, in 2008, of a new community on the rental market of residential premises. The largest community of this type brings together over 60 million guests and has, in its' databases, rental offers from over 34,000 cities which are located in 191 countries. This community, which makes use of the sharing economy, is a significant competitor and a challenge for the hotel industry and theories and models applied in it. The new rental service, in this article known as one-day rental or B&B rental, is a dynamically growing market, which makes and will continue to make changes in the classic models of business activity (in particular in the hotel industry).

This study presents the parametrisation of the Asian B&B rental market. The parametrisation was made by determining the preferred type of rented premises (entire house, private room), determination of prices which have to be paid for rented premises, defining the components of the final price (rental, cleaning fee, service fee), defining the equipment and amenities offered in the rented premises. For the purpose of carrying out a comprehensive analysis of B&B rental market, the quality of offered premises was additionally examined and their popularity was measured in the countries covered by this analysis. The evaluation of quality was carried out by verification of ratings given by clients who rented the premises, whereas the examination of popularity consisted in checking the occupancy calendar of individual premises offered for rental.

Analysis of literature on B&B rental platforms and sharing economy

The analysis of the literature of the subject was carried out, concentrating on the thematic range of the conducted study, that is the latest research in the sphere of sharing economy. Also the problem of one-day accommodation rental, which is directly connected with the former, was examined accordingly. The analysis of the literature focused on aspects concerning the impact of sharing economy on the economic system and on creating business models which are relevant to it. Works were presented which have the form of guidebooks or contain recommendations in the sphere of sharing economy, showing lines of development of this type of economy. Also, the possibility of applying sharing economy in the socioeconomic, legal and sociological dimensions was indicated. Additionally, the analysis of the literature focused on the dilemmas of measuring the level of trust and reputation existing on the B&B rental market. Studies which determine price-setting factors as well as price convergence in selected localities were presented, too. In his research, Martin (2016) stresses that peer-to-peer technology makes it possible to provide services which base on the assumptions of sharing economy, at the same time pointing to possible directions of the development of economic reality that take into account the principles of sharing economy, therefore changes in economic models from sustainable development through economy based on the principles of neo-liberalism. The described studies cast light on the possibility of a threat being posed to contemporary economic systems, which consists in the decreasing role of the state as the regulator of economy. Dyal-Chand (2015) defines the philosophy of sharing economy as an alternative to capitalism. In another study, Daunorienė et al. (2015) make an attempt at elaborating on a business model which goes in line with the principles of working of sharing economy. Simultaneously, they indicate the durability of this model and its impact on sustainable development. Still another work dealing with sharing economy is that by Guttentag, Smith (2017), who point to a real threat

to the traditional business model, since in the hotel industry it is not adjusted to the philosophy of working that is based on sharing economy. There are also publications which are a peculiar type of guidebooks or which offer recommendations to managers – they advise on how to apply sharing economy in business (cf. Habibi at al. 2017) and show possible lines for the development of future research in the sphere of economy of this type (Cheng 2016). Lastly, in recent years, sharing economy has been widely-described in the literature with reference to the socioeconomic (cf. Wu, Zhi 2016; Kung, Zhong 2017; Frenken, Schor 2017), legal (cf. Frenken, Schor 2017; Koopman at al 2015; Ranchordas 2014) and sociological dimensions (cf. Gregory, Halff 2017; Böcker, Meelen 2016).

Considering sharing economy in the framework of Airbnb platform, we can indicate studies which describe and measure the level of reputation and trust in services of the peer-to-peer type, as regards the aspect of the renting which is taking place (Ert at al. 2016). In other research, we find also an answer to the question of the impact of sharing economy on the employment market, with particular taking account of the tourist industry (Fang at al. 2016). The studies by Wang, Nicolau (2017) attempt to determine the factors which influence the level of prices of one-day accommodation facilities. On the other hand, in their work, Liang at al. (2017) investigate the validity of the rating system by clients who take advantage of the rental and their influence on the functioning of the one-day renting market. An analysis of convergence of ratings for three localities was executed. It consisted in analyzing offers on Airbnb service (cf. Brochado at al. 2017). In other studies, which are worth mentioning, the authors Varma at al. (2016) discuss the question whether the use of sharing economy via Airbnb is a new wave of innovativeness or only a temporary fad. It also needs observing that – like in the case of every object of an economic analysis – there appears criticism of the functioning of economic systems based on the principles of working of sharing economy (cf. Cockayne 2016; Kathan at al. 2016) here as well.

Research Assumptions and Research Methodology

The analysis of Asian rental market was carried out in the capitals of Asian countries, i.e.: Abu Dhabi, Ankara, Bangkok, Beijing, Doha, Hanoi, Jerusalem, Kuwait City, Manila, New Delhi, Seoul, Singapore, Tokyo and Vientiane. Data on the basis of which the study was performed constitutes offer data pertaining to the rental of B&B type premises, which may be found on the largest website of this type, i.e. www.airbnb.com. The offers were searched for the period between 22.03.2019 and 24.03.2019; in the search criteria, it was specified that the search referred to 2 persons. In total, 1.400 data related to rental offers were collected. Based on the collected data, a study was performed, which allowed for detailing the knowledge on the B&B rental with respect to:

- preferred type of rental depending on the examined country;
- total price of rental and its' structure divided into type of rental (price of rental for one night, service fee, cleaning fee);
- provision of rented premises with typical hotel attributes and additional ones;
- ratings given by guests and pertaining to rented premises and their owners;
- occupancy (popularity) of rented B&B premises in the examined countries.

Summing up, the performed study allows for measuring and evaluating the prices, residential attributes, image and popularity of private residential premises intended for short-term rental. Bearing in mind the dynamic growth of business interest in the management relying on the principles of sharing economy and, in particular, the increasing interest in B&B-type rental, the received results will offer significant support in undertaking the actual decision-making processes, both in the area of individual and business activity. Paragraph: use this for the first paragraph in a section, or to continue after an extract.

Analysis of Study Results in the Area of Asian B&B Rental

Within Asia, it is possible to differentiate a group of countries where rental of entire residential premises is predominant, as well as a group where the popular mode is rental of private rooms. In line with the performed studies, the first group includes such cities as: Manila, Hanoi, Bangkok, Seoul and Jerusalem. On the other hand, the second group covers the following capitals: Vientiane, Singapore, New Delhi, Kuwait City, Tokyo, Beijing and Abu Dhabi. The capital of Turkey, Ankara, is the place where rental offers of entire premises and rental offers of private rooms are on a similar level (this is evidenced by the structure indicator oscillating around 49% - 50%) - cf. fig. 1. It should also be noted that as many as 93% of rented premises in the capital of Philippines belong to the category of entire house. More than 70% of rented premises in Hanoi, and Bangkok constitute the category of entire house. In the examined region, cities such as Vientiane, Singapore and New Delhi have, within their structures, over 60% share of private room rental.

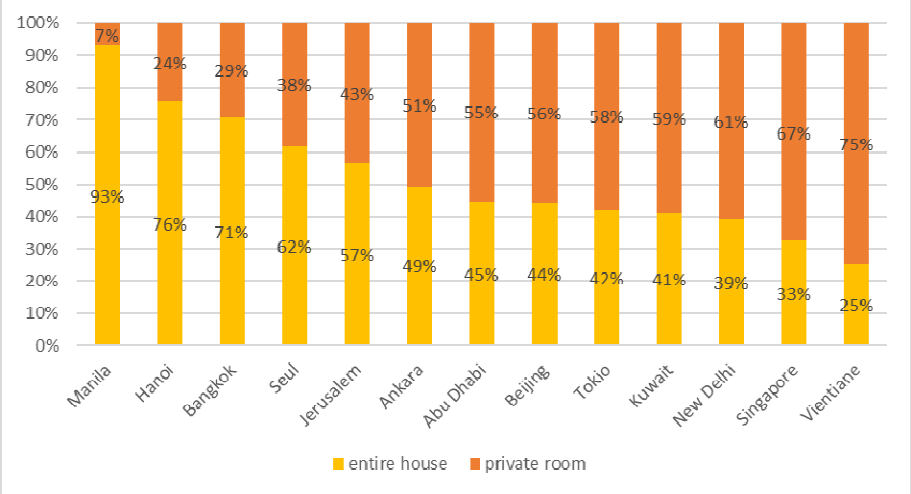

Fig. 1: Structure of types of rented premises (entire house vs. private room). Source: own study

A question arises: what causes such differences? It may definitely be examined on multiple dimensions (social, technical). In the economic aspect, this may be the criterion of price, and in the technical one, the availability of accommodation, whereas in the social dimension - cultural determinants. Due to the fact that this study relies on offer data pertaining to the market of short-term rental, an analysis of formation of prices of residential premises was performed in the next step; it is divided into the type of rented premises, along with a description of the component structure of the final price (prices expressed in USD) - cf. Table No. 1.

Based on the data contained in Table No. 1 (in left sub-columns named Entire house), it may be noted the cities of Abu Dhabi, Kuwait City, Singapore, Jerusalem and Tokyo are above the average of the total price calculated for all the analysed places. Among the examined cities, Abu Dhabi is definitely the most expensive. In this city, rental of an entire house by two persons for two nights costs USD 439. Exactly 100 dollars less is to be paid in Kuwait City. On the other hand, the cities of Seoul, Beijing, Ankara, Vientiane, New Delhi and Hanoi are below the average. Among the examined cities, lowest prices are in the capital of the Philippines (on average, USD 72) and in the capital of Vietnam (on average, USD 76). Total rental prices of the entire house for all examined countries are presented in Table No. 1 (in left sub-columns named Entire house). This table also shows the components making up the total price of rental. It should also be noted that there is a great diversity in the cleaning fee category. The highest cleaning

fees are charged in the capital of Japan (USD 32), whereas smallest, i.e. only USD 1 on average, in the capital of Laos.

Table 1: Total price, price structure: rental of entire house / private room rental

City	Total price for 2 persons for 2 nights		Price for 1 night		Payment for service		Payment for cleaning	
	Entire house	Privat room	Entire house	Entire house	Entire house	Privat room	Entire house	Privat room
Abu Dhabi	439	192	183	80	60	27	13	4
Kuwait	339	186	137	72	49	27	16	15
Singapore	273	146	108	60	39	21	17	6
Jerusalem	223	141	84	56	32	20	23	8
Tokyo	170	110	57	42	25	16	32	11
Seoul	124	86	48	36	18	13	10	2
Beijing	121	79	49	32	18	12	5	3
Ankara	121	77	50	32	17	11	4	1
Vientiane	97	72	41	30	14	11	1	2
New Delhi	95	69	39	25	14	10	3	9
Bangkok	83	65	31	27	12	10	10	1
Hanoi	76	60	30	24	11	9	4	3
Manila	72	53	28	21	11	8	6	2
Total average	142	102	56	42	20	15	10	4

Source: own study

Table No. 1 also presents (in right sub-columns named Privat room) the average offer prices that are to be paid for private room rental. The most expensive offers are in Abu Dhabi, Kuwait City, Jerusalem, Singapore and in Tokyo (in these cities, the offers on average exceed the value of USD 100). Offers with lowest rental prices of private rooms are to be found in Hanoi, Bangkok and New Delhi (prices in these cities are on the level of USD 52, USD 62 and USD 65, respectively).

Table 2: Differences in prices pertaining to a private room and entire house and savings

City	% of the private room's price in relation to the entire house	Savings ($)
Abu Dhabi	44%	247
Singapore	52%	132
Kuwait	55%	153
Seoul	64%	45
Tokyo	65%	60
Jerusalem	66%	77
New Delhi	69%	30
Hanoi	70%	23

City	% of the private room's price in relation to the entire house	Savings ($)
Ankara	71%	35
Bangkok	73%	23
Beijing	74%	31
Vientiane	78%	21
Manila	96%	3

Source: own study

Table No. 2 presents differences in prices between the rental of an entire house and rental of a private room. Two persons renting a private room for two nights have to pay USD 247 less than in the case of renting the entire house. The rental price of a private room in Abu Dhabi constitutes 44% of the rental price of the entire house in this city. Apart from Abu Dhabi, the difference in the rental price exceeding USD 100 is also encountered in such cities as Kuwait City and Singapore. It should be noted that in the capital of Laos, there is practically no difference in the rental price of individual types of premises. The rental price of a private rooms makes up as much as 96% of rental of an entire house.

The next part of the article presents an analysis of equipment and amenities in the rented premises. Table No. 3 contains attributes of residential premises marked in the paper as hotel attributes. Such attributes include: parking space, 24-h gate keeper service, access to a swimming pool, possibility of ordering breakfast and presence of attributes directly related to the rented premises, i.e. air-conditioning, hair-dryer, bed linen, towels and personal care products. The most free parking spaces are available in Kuwait City (74% of premises have a free parking space). Every second rental offer in the cities of Abu Dhabi, Ankara, Bangkok, New Delhi and Vientiane offer free parking spaces. The worst parking situation is in Tokyo and in Manila, where respectively 4% and 6% of places have a free parking space. The second examined attribute is air-conditioning. The worst situation is in the capital of Turkey. In Ankara, only 22% of owners declare that they have air-conditioning. On the other hand, over 90% of premises are provided with air-conditioning in Abu Dhabi (98%), Bangkok (95%), Beijing (95%), Hanoi (95%), Manila (95%), Singapore (97%) and Tokyo (98%). The next examined attribute is provision with personal care products.

Table 3: "Hotel" attributes of rented premises.

City	Parking	Air- cond.	Towel, personal care products	Coat hangers	Hair-dryer	TV	Breakfast	24h gate services
Abu Dhabi	58%	98%	84%	80%	40%	68%	15%	10%
Ankara	54%	22%	89%	76%	76%	79%	27%	12%
Bangkok	52%	95%	97%	89%	84%	85%	11%	13%
Beijing	19%	95%	96%	90%	90%	56%	11%	13%
Hanoi	45%	95%	100%	89%	94%	69%	10%	8%
Jerusalem	32%	63%	99%	76%	46%	43%	14%	3%
Kuwait	74%	89%	81%	44%	30%	93%	11%	4%
Manila	6%	95%	95%	83%	41%	89%	3%	20%
New Delhi	58%	96%	96%	85%	56%	73%	45%	13%
Seoul	21%	89%	99%	94%	93%	51%	26%	7%
Singapore	30%	97%	87%	91%	86%	74%	22%	10%
Tokyo	4%	98%	94%	76%	97%	46%	9%	1%
Vientiane	59%	83%	87%	68%	34%	66%	40%	4%

Source: own study

Provision of personal care products, towels and bed-linen is a standard in the majority of offered premises. They are offered, depending on the examined city, in 81% up to 100% of the examined premises. Provision of coat hangers is a standard in 94% of rental offers in Seoul and 91% in Singapore. A definitely worse situation is in Kuwait City, where the owners declare that their premises are provided with coat hangers in 44%. The next four attributes are commonly treated as standard attributes of classic hotel accommodation. Only 30% of premises in Kuwait City and only 34% of premises in Vientiane are provided with hair-dryers. The best, in this respect, are Tokyo (97%), Seoul (93%), Hanoi (94%) and Beijing (90%). Only 43% of premises in Jerusalem and only 46% of premises in Tokyo are provided with TV. The last two attributes is the possibility of ordering breakfast and gate-keeper services. Only 3% of premises in Manila have the possibility of buying breakfast and only every tenth offer from Tokyo (9%). 45% and 40% premises in New Delhi and Vientiane offers accommodation with breakfast, respectively. Gate-keeper services are also not a very popular option in B&B type premises. Most offers with gate-keeper services are in Manila and the value amounts to 20%. One out of 100 offers in Tokyo includes gate-keeper services (1%).

Another group of examined residential attributes are the so-called additional attributes, typical for B&B premises. Such attributes include: adjustment of the facility for children's use (children-friendly), access to the gym and swimming pool, access to the equipped kitchen and possibility of using a washing machine and iron - cf. Table No. 4. Least attention to make the rented apartment adjusted to children's needs is paid in Kuwait City (only 22% of premises), whereas premises best adjusted to children's needs is located in Hanoi (75%). Presence of subsequent two attributes is closely correlated (Pearson's correlation coefficient amounts to 0.96). Amenities such as the swimming pool and gym are most often encountered in Manila (as many as 80%), then Bangkok (44%) and Abu Dhabi (42%). One out of 100 offers has access to the swimming pool in such cities as Tokyo, Jerusalem and Beijing. None of the offers in Seoul and New Delhi included access to a swimming pool.

Table 4: Additional attributes - typical for B&B premises

City	children-friendly	gym	swimming pool	equipped kitchen	washing machine	iron
Abu Dhabi	39%	47%	42%	78%	79%	64%
Ankara	56%	5%	3%	84%	77%	71%
Bangkok	53%	45%	44%	65%	69%	59%
Beijing	43%	5%	1%	77%	85%	44%
Hanoi	75%	1%	2%	86%	65%	66%
Jerusalem	50%	2%	1%	86%	67%	49%
Kuwait	22%	19%	26%	89%	74%	41%
Manila	56%	54%	80%	87%	26%	61%
New Delhi	68%	3%	0%	79%	56%	69%
Seoul	41%	3%	0%	89%	96%	67%
Singapore	52%	26%	28%	59%	85%	76%
Tokyo	38%	2%	1%	70%	77%	52%
Vientiane	60%	6%	6%	52%	45%	27%

Source: own study

A very important parameter making up the marketing image of the rented premises are ratings given by the users. Every client renting the premises may, after the end of stay, assess the rented property in five dimensions, i.e. accuracy, communication, cleanliness, location and check-in. Table No. 5 presents average ratings obtained in individual cities for the above-listed aspects. The column entitled below average contains the number of aspects for which the calculated values were below the average (e.g. the value of 5 means that all five aspects were evaluated below the average). The clients evaluated the premises in Hanoi, Beijing, Seoul and Singapore the best (all examined components were evaluated above the average value). On the other hand, the situation is worst in the capital of Japan (all average ratings are below the average). Most maximum ratings were recorded in Beijing, which is to be considered the best evaluated by persons using B&B premises. The last examined parameter is the popularity of B&B type premises in the analysed cities. An assumption was adopted that B&B premises are popular in cities where the so-called booking schedule is greatly occupied. The popularity/ occupancy rate of rental of private B&B premises operating on the principle of sharing was assessed by checking the number of booking requests filed in the month following the month for which the rental offers were searched. Table 6 present the structure of occupancy in the examined cities. The least popular are Abu Dhabi, Kuwait City and Ankara. In these cities, in the examined period 72%, 89% and 84% of premises, respectively, had no day booked in the rental schedule. Most popular B&B premises are in Tokyo, Jerusalem and Seoul. In Tokyo, 6% of premises had 26 - 31 days booked.

Table 5: Evaluation of rented premises (rating scale from 1 to 5)

City	Accuracy	Communication	Cleanliness	Location	Check-in	Below average
Hanoi	4.90	4.96	4.75	4.85	5.00	0
Pekin	4.83	5.00	4.83	5.00	5.00	0
Seoul	4.85	4.92	4.74	4.79	4.94	0
Singapore	4.87	4.89	4.87	4.76	4.95	0
Jerusalem	4.76	4.96	4.70	4.89	4.98	1
Manila	4.78	4.97	4.69	4.77	4.88	2
Abu Dhabi	4.80	4.95	4.25	4.60	4.85	3
Bangkok	4.80	4.82	4.72	4.52	4.84	3
Doha	4.83	4.78	4.56	4.83	4.78	3
Ankara	4.72	4.83	4.48	4.72	4.90	4
Kuwait City	4.36	4.25	4.61	4.79	4.36	4
New Delhi	4.59	4.88	4.50	4.50	4.81	4
Vientiane	4.71	4.86	4.57	4.64	4.93	4
Tokyo	4.74	4.84	4.58	4.60	4.84	5
Total average	4.79	4.88	4.68	4.74	4.89	-

Source: own study

Table 6: Structure of occupancy in the examined cities

City	Days of Rental						
	0	1-5	6-10	11-15	16-20	21-25	26-31
Abu Dhabi	72%	8%	20%	-	-	-	-
Ankara	84%	16%	-	-	-	-	-
Bangkok	18%	21%	25%	18%	13%	5%	-
Beijing	40%	32%	16%	4%	4%	2%	2%
Hanoi	8%	16%	30%	14%	24%	6%	2%
Jerusalem	4%	8%	18%	22%	26%	20%	2%
Kuwait	89%	-	8%	-	3%	-	-
Manila	40%	22%	12%	8%	6%	12%	-
New Delhi	38%	35%	16%	3%	2%	2%	4%
Seoul	11%	9%	14%	21%	27%	14%	4%
Singapore	16%	24%	21%	14%	11%	9%	5%
Tokyo	2%	2%	10%	26%	30%	24%	6%
Vientiane	63%	27%	6%	2%	2%	-	-

Source: own study

Conclusion

Making use of offers presented in on-line B&B databases pertaining to the rental of Asian private residential premises, the type of preferred rental was determined, depending on the examined country and the total rental price was calculated, as well as its' structure (rental price per one night, service fee, cleaning fee). What is more, provision of rented premises with attributes typical for hotels and additional ones was also defined (i.e. equipped kitchen, washing machine, etc.). A verification was also made on how the B&B rental type service is rated by the persons using it. A supplement for the study was assessment of popularity of rental relying on the principles of sharing economy in Asian countries. The most important conclusions from the study include:

- 93% of rented premises in the Philippines belong to the "entire house" category, whereas 75% premises in Laos are rented as private rooms.
- Most expensive rental prices of entire house and private rooms are in the United Arab Emirates.
- The greatest difference between the rental price of entire house and private room is in the United Arab Emirates, Kuwait and in Singapore.
- In Ankara, only 22% of owners declare that they have air-conditioning. On the other hand, over 90% of premises are provided with air-conditioning in Abu Dhabi (98%), Bangkok (95%), Beijing (95%), Hanoi (95%), Manila (95%), Singapore (97%) and Tokyo (98%).
- Only 30% of premises in Kuwait City and only 34% of premises in Vientiane are equipped with hair-dryers. The best, in this respect, is Tokyo (97%), Seoul (93%), Hanoi (94%) and Beijing (90%).
- Only 3% of premises in Manila allow for purchasing breakfast.
- One out of 100 offers in Tokyo includes gate-keeper services.
- One out of 100 offers has access to the swimming pool in such cities as Tokyo, Jerusalem and Beijing. None of the offers in Seoul and New Delhi included access to a swimming pool.

- The clients evaluated the premises in Hanoi, Beijing, Seoul and Singapore the best (all examined components were evaluated above the average value). On the other hand, the worst ratings are for the capital of Japan.
- The least popular are Abu Dhabi, Kuwait City and Ankara. Most popular B&B premises are in Tokyo, Jerusalem and Seoul. New paragraph: use this style when you need to begin a new paragraph.

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The concept of Collaborative Innovation with Customers and its significance for creating innovations in the food sector

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Abstract

Contemporary corporate environment is characterized by a high level of complexity and customers' growing requirements force the implementation of innovations, which are necessary to gain and maintain competitive advantage. The results of conducted research indicate that interaction with customers has a positive effect on the success of implemented innovations, and is gaining increased interest in subject literature. Creating successful innovations requires a combination of knowledge from different perspectives, including especially the customers' knowledge, since they are the most appropriate for the purpose of revealing their needs and expectations. The body of research presented in this article was motivated by the question whether and how can the success of interaction with customers be increased in the context of developing innovations. The research objective was to diagnose the use of concept of collaborative innovation with customers in food sector companies and its significance for innovation outcomes. The questionnaire technique was used in CAWI and CATI methods to collect data. As a result, 80 observations were taken into account. The research has demonstrated that there is a positive relationship between orientation toward cooperation by food sector companies, their involvement in creating innovation in cooperation with customers and the degree of realizing the objectives concerning product innovations.

Keywords: Innovation, Product Innovation, Collaborative Innovation With Customers,

Introduction

In recent years, scientists and practitioners have regained their interest in development of innovations, which are considered the key source of competitive advantage in the increasingly competitive environment (Dess, Picken, 2000; Crossan, Apadyin, 2010; Zastempowski 2019). It is thus obvious that managing staff is very interested in detecting the ways which would allow for development of successful innovations (Dyduch, Bratnicki, 2018). The localization of innovative processes is to a large extent moving from a company's external environment into inter-organizational domain. The decreasing benefits of scaling in research and development encourage companies to cooperate (Chesbrough 2010), and the expanding relations between them goes as far as to change the nature of competition and cooperation, (Lichtenthaler 2011, Czakon 2012, Czakon et al. 2018). Constant competitive advantage can be achieved by integrating the relations between manufacturers and their environment (Buganza, Verganti, 2009; Zakrzewska-Bielawska, 2016; Chang, 2017). Significant benefits for companies oriented towards innovations stimulate their readiness to anticipate the customers' needs and react before their competitors identify such opportunities (Siguaw et al., 2006; Liczmańska, 2016). A literature review indicates that a decreased number of failures and increased return of the funds invested in their development are determined mostly by those innovations' ability to satisfy customers' needs and expectations (Moore 1982; Martin, Bush 2003). An increasing number of companies are actively identifying and anticipating customers' needs, using the knowledge on expectations and solutions, and then responding to them appropriately, creating greater value for the buyers (Liczmańska, 2016; Liczmańska-Kopcewicz, Wiśniewska, 2019). More and more frequently, the concept which may improve the efficiency of innovation by including customers into the process of its creation is employed. Entrepreneurs involve customers at various stages of creating product innovations (Gruner, Homburg, 2000; Fang, 2008). An analysis of the influence of customer interaction

on the efficiency while developing a new product may provide important data on management. Whether a given product gains acceptance on the market is determined by the consumer, who plays a fundamental role in each of the stages of designing a product, both in terms of initiation of the creative process, testing, and implementation, and then sale. Customers can provide relevant information, which reflects their desires and wishes, as well as information about solutions which are manifested by concrete suggestions concerning improvements and ideas for using. Processes of product development based on cooperation with users can be more efficient than those which did not involve users' participation (von Hippel, 2005). Cooperation with customers can thus be viewed as a bridging strategy, which ensures access to the most important information about customers' needs (Gruner, Homburg, 2000).

Much of the previous research was concentrated on the results related to innovative actions, such as the number and type of innovation, and there are also analyses of positive and negative consequences of being oriented towards innovation (Olson et. al., 2005; Siguaw et al., 2006), and towards customers (Helfat, Peteraf, 2003; Prahalad, Ramaswamy, 2004, Liczmańska et al. 2018), or conditions related to knowledge management (Glińska-Neweś, 2007; Stańczyk-Hugiet, 2007; Sopińska, 2008). In the existing literature there is, however, a noticeable gap concerning the involvement of food sector companies in realizing the concept of collaborative innovation with customers and its significance for the realization of innovation strategy. The gap requires further studies on the ability to realize the innovative goals of those companies who create innovations in cooperation with their customers.
The aim of the study is to diagnose the relationship between the realization of concept of Collaborative Innovation with Customers and its significance for the innovation outcomes of food sector companies. In particular, the factors diagnosed were the companies' openness to cooperation, realizing the concept of including customers into the process of developing innovations and the importance of this concept for the realization of goals concerning product innovations.

Innovations and Innovativeness - Theoretical Background

In today's intensely competitive environment, where all innovative activity is a crucial source of long-term success (Rosenbusch et. al, 2011), it is hardly surprising that innovations have become a key objective for all companies (Lipit, 2006). Competitiveness in the field of innovations boils down to introducing an innovative strategy of operation, openness to cooperation, openness to new ideas from customers, shaping pro-innovation attitudes of management and staff (Bełz, Cyfert, 2017; Pypłacz, 2017; Klimas, Czakon, 2018; Liczmańska-Kopcewicz et al., 2018, Zastempowski, 2019).

Innovation defined as "successful implementation of novel and useful ideas to create new products, processes, services, business models and structures" (Amabile, 1988) is currently believed to be the key source of competitive advantage (Klincewicz, 2011). Schumpeter (1960) defined innovation as a discontinuous enterprise involving new combinations of efficiency factors. Innovations may take various forms, from new products to management-supporting processes. According to the methodology from Oslo (OECD, 2008), innovation is the introduction of a new or significantly improved product (product innovation), new or significantly improved process (process innovation), new marketing method (marketing innovation) or a new method of organization in terms of business practices, workplace organization or relations with the external environment (organizational innovations). More and more frequently, researchers emphasize a direct relation between innovation and a company's competitiveness (Guan, Ma, 2003; Hernández-Espallardo et al, 2005; Perdomo-Ortiz et al., 2009; McAdam et al., 2010; Yam et al., 2011). Companies eagerly engage in innovative activities in order to build their market position (Talke et al., 2011; Yang et al., 2012) and note high accomplishments. The reasons for developing and introducing innovations are focused mainly on: improving quality, entering new markets, expanding the offer, lowering costs, optimizing the use of materials, decreasing energy usage, adaptation to the existing norms or meeting legal regulations. The ability to create and implement innovative solutions is currently the primary measure of a company's efficient functioning on the market. Innovative ability is defined as continuous improvement of a company's abilities and resources in order to explore and use the possibility to develop new products necessary to meet the market's expectations (Forsman, 2011; Boly, Morel 2014).

The idea of innovation is closely related to the term of innovativeness, which reflects a company's tendency and ability to introduce and support new ideas, experiments, practices and processes, which might generate innovative products, services or techniques (Qian and Li, 2006; Du et al., 2016). Innovativeness can be understood as the ability to create, implement and absorb innovations, which is connected with active participation in the innovation processes (Zakrzewska-Bielawska, 2018).

The aforementioned definitions of innovativeness focus on various aspects of innovative activity, whose result are product, process, organizational or marketing innovations. In the case of product innovation, the attention is focused on the examples of company's innovativeness, whose final result are product innovations, meaning completely new or improved products or services. Product innovations allow companies to maintain growth, distribute market risk, increase the company's value and increase competitiveness (Sojkin, 2012). Product innovations are of key importance, as the contemporary field of competition concerns new products, and their successful introduction into the market is a condition for development of a company which functions on a competitive and demanding market. Changing market trends and consumers' expectations result in the functioning products soon losing their attractiveness and products' lifecycles being shorter, which forces companies to immanently create innovations.

Innovations have ceased to be exclusively an outcome of systematic, often very costly, research. At present, they have become combinations of resources of many units, entities or teams which represent various fields of knowledge. Each innovative change may be initiated by a company's internal sources (endogenous) or external ones (exogenous). Due to the reason for the creation of innovations, they can be divided into demand-driven (initiated by the market), and supply-driven (initiated by science and technology).

At present the localization of innovation processes is to a large extent moved from the inside of a company to the inter-organizational space (Zakrzewska-Bielawska, 2016). Open innovation means that a given entity creates formal and informal networks and involves external stakeholders at various stages of the innovative process (Chesbrough, Schwartz, 2007; Song, Thieme, 2009; Sopińska, 2013). It is highlighted in literature that the primary source of inspiration for innovative activity in companies should be the market. The basis for innovation is knowledge, which is why in order to obtain it companies build relations with entities which could be their customers, suppliers, general partners, communities, local authorities etc. (Zakrzewska-Bielawska, 2016; Klimas, 2019).

The subject of further analysis will be innovations developed in collaboration with consumers. Companies which are involved in innovative activities are increasingly concentrating on cooperation with customers undertaken for the purpose of participating in the creation of value (Thomke, von Hippel, 2002; Prahalad, Ramaswamy, 2004). Some scholars analyze in what way customers can contribute to spreading innovations (Biemans, 1991; Lynch et al., 2016; Liczmańska et al., 2018), but do not put special emphasis on customers' complete integration in the whole process of innovation. Customers are one of the key sources of knowledge, and their ability to be integrated at all stages of the innovation process is considered a major component of innovation capacity (Danneels, 2002).

The concept of Collaborative Innovation with Customers

Development of companies' innovative potential is based on many pillars, among which the key position is held by cooperation with the environment, which by means of exchange of information contributes to an increase in the company's value and shaping its competitive advantage in the market. According to the demand-based approach, the factor of special significance for the emergence of innovation are the users who participate in its process of development. From a consumer's perspective, the aim of shopping decisions is the urge to satisfy one's own needs and ensuring oneself the desired benefit and maximum satisfaction (Karasiewicz et al. 2008; Wiśniewska, 2014). Thus consumers and their knowledge significantly contribute to creating innovations characterized by a high degree of adaptation to the market. Research conducted in recent years confirm the strategic importance that customers may have in the increasing innovativeness and adding benefits for buyers (Bagozzi, Dholakia, 2002; Liczmańska-Kopcewicz et al., 2018).

Companies, striving for satisfaction, and thus loyalty of buyers, as well as sustainable development, aim to provide new solutions in order to meet the explicit and implicit, as well as future, needs of their customers (Prahalad i Ramaswamy 2000; Skaggs and Youndt 2004; Blocker et al.., 2011; Sudolska, Lis, 2017; Liczmańska-Kopewicz et al., 2019). Researchers and business practitioners involved in company development strategy more and more frequently concentrate on cooperation with customers, aimed at collective creation of value (Thomke, von Hippel, 2002; Chesbrough 2003; Prahalad, Ramaswamy, 2004; Prandelli et al. 2006; Chesbrough, Appleyard 2007). Contemporary trends related to consumers' behaviors and needs set the directions for development of product innovations, as well as new technologies to produce them. Thus, an increase in consumers' ecological awareness forces food sector companies to start producing ecological goods. On the other hand, and increase in consumers' awareness in terms of healthy lifestyle suggests looking for products with lower dose of sugar, fat or fillers. For many years, one can observe demand for ecological food, which is attractive to the senses and has high nutrition value, is safe for one's health and requires small amount of time and work to prepare (Sojkin, 2012). Collecting information on consumers' behaviors and including them into the process of collective creation of innovations is the basis for creating innovative solutions which will be adopted by the market.

The concept of Colaborative Innovation with Customers (CIC) is one of the main streams of open innovation (OI) (Gianiodis et al. 2010), which has been defined as "systematic exploration of knowledge, keeping and using it within and organization and beyond it in the process of innovation (Lichtenthaler 2011). The concept of CIC generally includes incoming, outgoing and combined processes, as well as the flow of knowledge (Gianiodis et al. 2010; Lichtenthaler 2011). Chang and Taylor (2015) conclude that involving customers into the idea and process of creating product innovations improve the financial outcomes of new products both directly and indirectly by accelerating their market entry. At the stage of creating an idea, companies involve customers to obtain relevant knowledge, evaluate the potential of new ideas on innovation and define which ones can be selected for further analysis. At the stage of product development customers can provide knowledge such as technological know-how or design skills. At the implementation stage, customers are often invited to test prototypes in the conditions of actual usage (Chang, Taylor, 2015). As part of prototype testing, market testing and introduction to the market, customers give their opinions on the product's usability, its efficiency, potential problems with the prototype or the manner of positioning (Grunner, Homburg, 2000). In literature, the term "collective creation with a customer" is often treated as a synonym for "customer's involvement".

Implications of collaborative innovation with customers are significant, as there has been a noticeable shift in the paradigm and companies are learning from customers and go towards more open forms of innovation (Prahalad and Ramaswamy 2000; Chesbrough 2003; Skaggs and Youndt 2004; Prandelli et al. 2006; Chesbrough and Appleyard 2007). Individual customers often possess specialist knowledge which can improve product designs, emphasizing the preferred features or design flaws (Nonaka and Konno 1998). They can also be a source of hidden knowledge, especially in relation to using and designing a product (Prahalad and Ramaswamy 2000; Selden and MacMillan 2006), hence they can effectively supplement the knowledge of internal experts (Magnusson 2009). Manufacturers' or suppliers' ability to learn from their customers and engage in CIC depends on the quality of relationships with customers (Payne et al., 2008). Learning from customers and suppliers was presented as mutual interactions which are connected to relationships that are potentially influential on future CIC. With even greater mutual co-dependence, companies may view their customers as the key participants of their general research and development strategy. A customer a s a source of information provides a company with numerous benefits, implementing innovations, with ideas showing a greater degree of novelty and compatibility. Strict cooperation with customers at all stages of the innovation process is a key factor in ensuring efficiency of the process measured in users' acceptance (Liczmańska-Kopcewicz, Wiśniewska, 2019).
Such integration allows a company to make sure that it responds appropriately to the market's expectations, and thus allows to avoid potential losses caused by imperfections of the offer (Danneels, 2002). The innovation process carried out in cooperation with a customer allows to better meet the consumers' preferences, with many companies adopting the design processes and customer-oriented

guidelines to reach the highest possible level of realization of goals concerning product innovations (Franke, Piller, 2004; Kristensson et al., 2004; Franke et al., 2006; Elofson, Robinson, 2007).

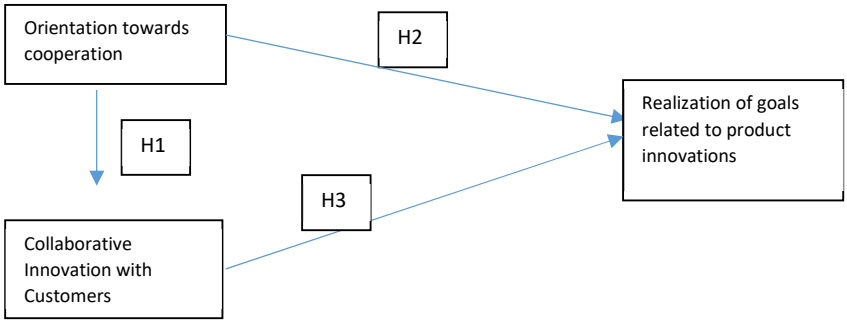

Bearing in mind the above aspects, the following hypotheses were put forward:

H 1. There is a positive dependence between orientation towards cooperation and involvement of food sector companies in collaborative innovation with customers
H 2. There is a positive dependence between orientation towards cooperation and the degree of realization of goals related to product innovations
H 3. There is a positive dependence between the involvement of food sector companies in collaborative innovation with customers and the degree of realization of goals concerning product innovations

Research Methodology

For the purposes of the research objective, a literature review was carried out and used mind mapping. Cognitive methods were supported by our own research. The aim of this study was to diagnose the involvement of food sector companies in the concept of collaborative innovation with customers and its significance for innovation-related outcomes.

Representatives of the management of companies operating in the food sector were invited to take part in a survey conducted in the period from January 2016. Until February 2017, sample selection was intentional. One of the techniques of non-random study is nonprobability sampling. It involves the selection of those entities which are the source of the most valuable information concerning a given phenomenon. In this case, it meant companies which demonstrated innovativeness in the filtering question. The study included those companies that were assessed by their management boards as innovative. Another qualifying criterion for participation in the study was the introduction of new products in the last three years. Considering the research objectives and purposefulness of the sample, decided to use the interview method implemented via the Internet (CAWI) as a method of gathering information. If contact with the respondent was problematic, the computer-assisted telephone interview (CATI) method was used. In each case, the same interview questionnaire was used. The study was conducted using the questionnaire method. Although this article presents partial results of empirical research, it allowed to evaluate the use of the concept of Collaborative Innovation with Customers by food sector companies and the significance of the concept for the outcomes of product innovations. In total, 80 observations were taken into account. Table 1 shows the characteristics of the test sample.

Table 1: Characteristics of the enterprises surveyed (N = 80)

The questionnaire elements	Volume	Participation in %
Enterprise size:		
- small (10 - 49 employees)	39	40.75
- medium (50 - 249 employees)	28	35.00
- large (over 250 employees)	13	16.25

Source: elaborated by the authors based on the results of the study conducted.

The food industry as the area of business activity which fulfils the population's basic needs is one of the most common and diverse branches of industry in the world. It operates in every country and holds a high position in terms of employment, turnover, value added and investments. In Europe, it is one of the most important and most dynamic sectors of the economy. It consists of over 300 thousand companies which employ 4 million people, with their annual turnover exceeding 900 billion euro (Date & Trend 2017). Its importance for the Polish economy is evidenced by the sales revenue at the level of 150 billion PLN and over 3.5% share in the country's GDP. It employs 10.5% (1720 thousand) of all employees of the industrial sector (Rocznik Statystyczny, GUS, 2019). Poland is one of the leading producers of fruit (apples, raspberries, blackcurrants, blueberries), meat (poultry, pork) dairy products and champignon mushrooms. However, the sector remains susceptible to risks related to consumer habits, changing market trends or changing prices of goods. Companies operating in the food sector contribute to the improvement of the whole economy, stimulate local and regional development, and support the functioning of large companies.

Most of the wide range of products in the food sector in question have similar characteristics. These are branded, unstable products, sold in unit packaging, offered at low prices and purchased in large quantities (Landschützer, Ehrentraut, Jodin, 2015).

Statistical analyzes were carried out using the IBM SPSS Statistics version 24 software package. In total, 80 observations from enterprises operating in the food sector were considered as innovative. Table 2 presents descriptive statistics of the studied variables.

Table 2: Descriptive statistics of the variables examined (N = 80)

Variable	Range	Min.	Max.	Mean	Median	Mode	Standard deviation	Variance
Level of realization of goals related to product innovations	6	4	10	7.89	8	9	1.676	2.810
Level of involvement in collaborative innovation with customers	5	5	10	8.11	9	9	1.607	2.582
Orientation towards cooperation	6	4	10	7.78	8	9	1.583	2.586
Number of new products introduced	26	4	30	11.19	10	10	5.988	35.850
Number of improved products intoduced	35	5	40	11.44	10	10	6.842	46.806

Source: elaborated by the authors based on the results of the study conducted.

Significance of the concept of Collaborative Innovation with Customers for the realization of goals related to implementing product innovations- conclusions drawn from the study

The studied variables were evaluated on a 11-grade scale, with the Cronbach's Alpha reliability indicator for the whole group being 0.723, and the Cronbach's Alpha based on standardized positions being 0.914. The result indicates internal cohesion of the analyzed factors.

Firstly, in order to verify the existence of the mentioned dependence and answer the question about the extent of influence of orientation of companies towards cooperation on their involvement in collaborative innovation with customers, and thus confirm the validity of the adopted research hypothesis H1, a statistical analysis was conducted of the dependencies occurring between the studied variables. Spearman's rank correlation was used, with the obtained values being presented in Table 3.

Table 3: Correlation between orientation towards cooperation and companies' involvement in collaborative innovation with customers

			Involvement in collaborative innovation with customers
Spearman's rho	Orientation towards cooperation	Correlation coefficient	0.926**
		Significance (two-sided)	0.000
		N	80

*** Correlation significant at 0.01 (two-sided).*
Source: elaborated by the authors.

The obtained values of Spearman's rank correlation coefficient indicate a positive and statistically significant relationship. The positive nature of the correlation means that an increase of individual factors connected to orientation towards cooperation is accompanied by increased involvement in collaborative innovation with customers. The correlation coefficient is 0.926**, which indicates a very strong dependence.

Next, in order to answer the original question and confirm the validity of the research hypotheses H2 and H3, a statistical analysis was conducted concerning the dependencies that occur between the variables: orientation towards cooperation, companies' involvement in collaborative innovation with customers and the realization of goals concerning product innovations. Spearman's rank correlation coefficient was used, with the values obtained being presented in Table 4.

Table 4: Correlations between orientation towards cooperation and companies' involvement in collaborative innovation with customers and the realization of goals concerning product innovations

Spearman's rho			The degree of realization of goals related to product innovations
	Orientation towards cooperation	Correlation coefficient	0.959**
		Significance (two-sided)	0.000
	Involvement in collaborative innovation with customers	Correlation coefficient	0.954**
		Significance (two-sided)	0.000

*** Correlation significant at 0.01 (two-sided).*
Source: elaborated by the authors.

As mentioned, the analyzed factors are correlated with the evaluation of the degree of realization of goals related to product innovations by a positive and statistically significant relationship. The positive nature of those correlations means that an increase in both orientation towards cooperation and involvement in the concept of Collaborative Innovation with Customers is accompanied by an increase in the degree of realization of goals related to product innovations. When analyzing the strength of correlation for r, it should be noticed that in the case of both factors there is a very strong relationship (0.959** and 0.954**).

The next step was to assess the relationship between the number of new products and the number of improved products introduced by the studied companied during the last 3 years, and the evaluation of the degree of realization of goals related to product innovations using the Spearman rank correlation coefficient (Table 5).

Table 5: Correlation between the number of new products and improved products introduced by the studied companies during the last 3 years and the evaluation of the degree of realization of goals related to product innovations

Spearman's rho			The degree of realization of goals related to product innovations
	The number of new products introduced	Correlation coefficient	0.736**
		Significance (two-sided)	0.000
	The number of improved products introduced	Correlation coefficient	0.464**
		Significance (two-sided)	0.000

*** Correlation significant at 0.01 (two-sided).*
Source: elaborated by the authors

The correlation coefficient between the number of new products introduced by the studied companies in the last 3 years and the evaluation of the degree of realization of goals related to product innovations is 0,736**, which indicates a fairly strong dependence. On the other hand, the correlation coefficient between the number of improved products introduced and the evaluation of the degree of realization of goals related to product innovations is 0,464**, which points to moderate dependence.

Conclusions

Contemporary food market is characterized by a relatively high level of innovativeness, which is a consequence of increasingly varying expectations of customers in relation to food products, as consumers now expect food to satisfy not only their hunger, but also their hedonistic needs (tasty products), to help them keep slim (*light* products), to provide them with or increase their vitality (energy drinks), to save their time during food preparations (ready-made products) or to help preserve the natural environment (ecological food). It should be noted that innovative companies from the food sector are very willing to engage in collaborative innovation with customers, since they experience more rigorous competitive pressure, as well as stronger organizational culture oriented towards implementation of new products.

The presented findings provide no grounds for rejection of hypotheses H1, H2 and H3. The implications of this study indicate that there is a positive relationship between orientation towards cooperation, involvement if collaborative innovation with customers, and the degree of realization of goals related to product innovations. It is thus justified to claim that involving customers into creating innovations at every stage of the innovation process brings tangible results, especially in terms of the degree of realization of goals related to product innovations. In the course of further studies, it is worth to think how to make customers more willing to get involved in such cooperation.

The impact of the concept of Collaborative Innovation with Customers on innovative activity of companies is a complex and multi-dimensional problem, which is why its analysis requires a multi-aspect approach and constant research in this field. It seems reasonable to agree with the conclusions from the conducted research which indicate that collaboration with customers is of key importance for the development of effective product innovations. A kind of limitation of the conducted research, however, may be nonprobability sampling, which included only companies that defined themselves as innovative.

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Economic Security: New Threats and Countermeasures

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Abstract

Economic security - a guarantee of the country's independence, the condition of stability and effective life of society, to achieve success. Therefore, economic security is one of the most important national priorities. At the present stage of development of Russia objectively present both external and internal threats to the economic security of the state. The greatest danger to Russia are its internal threats. Taking place for a long time and the economic security of the continuing internal threats to Russia make it vulnerable to external influence. Crime in the economy stands today as one of the manifestations of the internal threats to economic security in Russia. Economic crime stands today as the most powerful negative factor, undermining the economic and, consequently, the national security. Economic crime occurs in areas where there is the opportunity to compete with the legal economy. In this case, the crime in this area cause more economic harm to citizens, society and the state than any other criminal acts.

Keywords: National Safety, Economic Security, Internal Threat, Economic Crime.

Introduction

By the end of the twentieth century. National Security category has taken a special place among the system-wide categories that characterize the state of society. The reason for this are profound changes in the whole system of international relations. Today, globalization is leading to greater interdependence and interaction of national economy, it is one of the key processes of the international community. In a globalized world the borders of national economies are no longer important, the world economy is gradually acquiring a common basis. Globalization is accompanied by complex and contradictory processes, the growth of global development imbalances. The question of nationality, in particular economic, security in this world is particularly acute. National security - a state of defending the vital interests of the nation against external and internal threats. Each country has its own national interests, due to the totality of its needs. Economic security is also an integral part of, and the basis of national security. Without downplaying the importance of addressing security issues in all areas and fields of activity, it is necessary to emphasize the basic role of the economy, as the production, distribution of wealth and consumption are primary for each of them, determine the livelihoods and the viability of the company.

maintenance problems of economic security of Russia and attract more and more attention of politicians, scientists, most of the general population. Such attention is not accidental. The scale of the threats and even the actual damage caused by the economic security of the country, push the mentioned problems to the forefront of public zhizni.Ekonomicheskaya security of the state is recognized as the object of scientific attention, both in Russia and abroad. Study on the economic security issues has been widely discussed, developed a significant number of concepts and theories. The fundamental nature of economic security research works have such foreign scholars as K. Woodruff, S.Dzhonson, D.Kaufman, E.de Soto, T. Watkins, F. Schneider and others.

Domestic economic science the theoretical aspects of economic security issues most actively started to be developed since the mid-1990s. Questions of economic security of the state are in LI studies Abalkina, LV Afanasyeva, IJ Bogdanova, VA Bogomolov, SY Glazyev, Senchagova, VL, TY Tkachev Tambovtseva, LP Goncharenko and others. In the works of these scholars studied in detail the threat of economic security in a period of transformation and disclosed mechanisms to identify, prevent and neutralize these threats.

Investigation of economic crime as economic security threat given sufficient attention. Constantly in the field of view of professionals and problemsthe impact of economic crime on the economic security of the state. She, in particular, have been devoted to the work of scholars such as Dadalko VA, Protasov KA, Chekmarev VV (Dadalko VA et al. 2014). Certain issues related to combating economic crime in the system of economic security were considered VY Tsiklauri, LV Afanasyeva, N. S. Belousovoj, SA Markina, TY Tkacheva et al. (Tsiklauri VY and soavt.2018). Proceedings of these authors are of great scientific and practical importance, however, do not cover all aspects of the problem.

Results and Discussion

Under the economic security of the state is to be understood of the economic system, ensuring its independence, helping to maintain normal living conditions of the population, to ensure the sustainable development of the national economy and consistently implement national and state interests. Economic security - a guarantee of the country's independence, the condition of stability and effective life of society, to achieve success. Therefore, economic security is one of the most important national priorities. The economy is the most complex system has thousands of parameters describing its condition. Because of the diversity and scale of manifestations of threats, a set of indicators characterizing the economic security of the country, is very significant.

From the perspective of globalization processes should distinguish between internal and external threat to the country's economic security. Under the internal threats to the country's inability to understand self-preservation and self-development, due to the state of its economy. External threats are geopolitical and foreign economic factors, as well as global environmental processes that undermine national sovereignty.

Today, when the world was on the verge of great conflict, when Russia itself is on the complex and controversial stage of development, the state stands identity problem and the protection of national interests. The question is whether Russia will remain in the global economy as an independent sovereign state or become only the territory, have the resources and human capital. In the current climate of falling prices for energy resources, development of the Ukrainian conflict, the imposition of tough economic sanctions on the role of ensuring the economic security of Russia is only strengthened. Ensuring the economic security of the state - one of the priority and the priority of internal problems of the Russian Federation, as reflected in the National Security Strategy of the country.

Today, the greatest threat to Russia are its internal threats. Taking place for a long time and the economic security of the continuing internal threats to Russia make it vulnerable to external influence. Crime in the economy stands today as one of the manifestations of the internal threats to economic security in Russia. Economic crime stands today as the most powerful negative factor that

undermines the economic and, consequently, the national security. It should be noted that the scale of economic crimes, representing a major threat to democratic and economic development, are growing today in all countries of the world. No state currently can not be completely free of this socio-economic phenomenon. Modern scientific literature gives a wide variety of approaches to the definition of economic crime. In this context, we can talk about some vague ideas about economic crime, its essence, borders, the nature of threats to the national economy, which does not allow to fully appreciate the impact of this phenomenon on the economic security of Russia. However, given the impact of economic crime on all aspects of life of both the state and society and the individual, the study of this effect seems though difficult, but extremely important. that does not allow to fully appreciate the impact of this phenomenon on the economic security of Russia. However, given the impact of economic crime on all aspects of life of both the state and society and the individual, the study of this effect seems though difficult, but extremely important. that does not allow to fully appreciate the impact of this phenomenon on the economic security of Russia. However, given the impact of economic crime on all aspects of life of both the state and society and the individual, the study of this effect seems though difficult, but extremely important.

A key feature of economic crime are capitalizing on the anonymity of victims, there are two entities, substantial damage, multiple character, redistribution of wealth, long systematic harakter1. Economic crime occurs in areas where there is an opportunity to compete with the legal economy. It should be noted that economic crime reflects the state of the legal economy: the worse the state of the second, the bigger one.

Despite the adopted legislative and administrative measures, economic crime continues to signs of a large-scale threat to national security. According to the auditing company Pricewaterhouse Coopers (PwC) on the basis of "Global Economic Crime Survey for 2017". (The Global Economic Crime Survey), 37% of organizations in Russia were victims of economic crime (Table 15).

Table 1: Economic crimes in Russia and around the world

Types of economic crimes	Russia (%)	World (%)	Factor relation deposits of Russian show-teley to world
Misappropriation of assets	72	72	1.0
Bribery and corruption	40	24	1.66
Data Manipulation boo. accounting	23	24	0.96
cybercrime	23	23	1.0
Unfair competition	17	7	2.43
Infringement of intellectual property rights	thirteen	7	1.86
Securities transactions of insider	9	6	1.50
Espionage	2	2	1.0
Laundering of money	2	9	0.22

Source: World Economic Crime Survey. Center of Humanitarian Technologies.

Note that the increase in crime in almost all sectors of the economy

Everyone knows that the offenses in the economic sphere are distinguished by their species diversity, high latency, algorithm identification and documentation (in most cases the need for judicial and economic expertise: financial, economic, accounting, finance and credit, nalogovedcheskih). In this case, the crime in this area cause more economic harm to citizens, society and the state than any other

criminal acts. Also, this type of crime has a high tendency to modification and transformation depending on the prevailing economic, social and political situation in the country.

Dynamics of registered crimes of an economic nature is shown in Figure

According to official statistical reports in 2018, compared to the same period the amount of economic crimes increased by 4.2%. It is noted that in just 2018 revealed 109.4 thousand. Economic Crimes, whose share in the total number of recorded crimes is 5.5%.

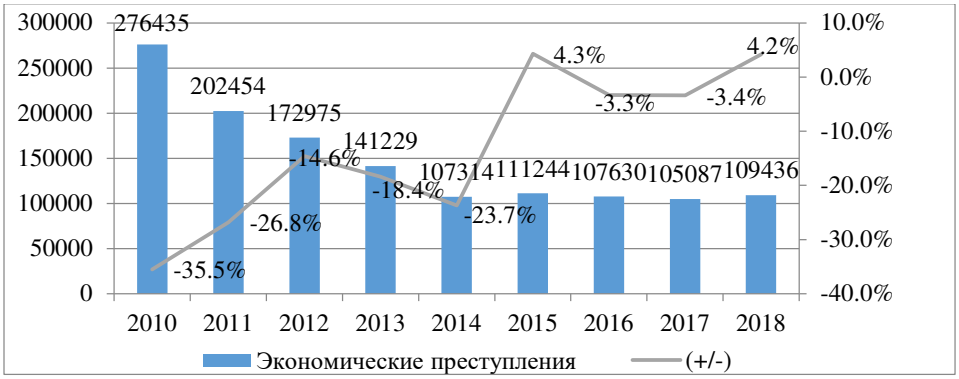

Figure 1: Dynamics of registered crimes of an economic nature

Economic crime damages as a national security state and its well-being and prosperity (as reduced revenues to the state budget), and the interests of individual citizens.

Table 2 - Dynamics of registered economic crimes and caused them material injury in the Russian Federation in 2011-2018.

Indicators	years							
	2011	2012	2013	2014	2015	2016	2017	2018
1	2	3	4	5	6	7	8	9
economic orientation	202454	172975	141229	107797	112445	108754	105087	109436
The proportion of crimes ekonom.napravlennosti%	8.4	7.5	6.4	4.9	4.7	5.0	5.1	5.5
Material damage by consummated criminal cases bln.	160.71	144.85	230.0	194.8	272.0	398.0	234.3	403.8

Source: crimestat.ru/offenses_table

More clearly the dynamics of economic crimes and damage them is shown in Figure 2.

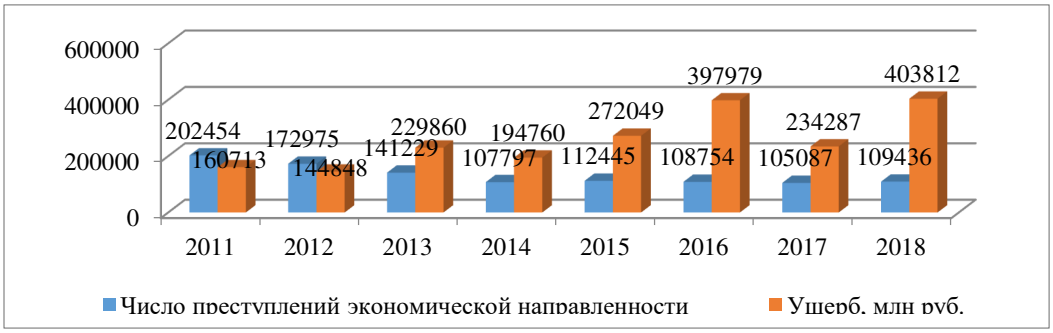

Figure 2: The dynamics of economic crimes and damages on them in 2011-2018.

Starting with 2012, the number of economic crimes is significantly reduced, this is due to:

- with the implementation of public policies and the improvement of the normative-legal regulation in the economic security;
- the implementation of the Russian Interior Ministry of joint measures with the General Prosecutor's Office of the Russian Federation, Russian Federal Tax Service, the FSB of Russia, Central Bank of Russia, Rosprirodnadzor, Federal Financial Monitoring Service, Federal Customs Service of Russia on strengthening the fight against economic crime;
- dissemination of information on suspicious transactions containing elements of economic crime;
- complexity of the nature of economic crime and the emergence of new forms of illegal activities with the use of information, communi-
munication and high technology;
- the improvement of detection methods, detection and prevention of crimes.

However, it is increasing the size of the material damage. The amount of damage is one of the key issues arising in the case of economic crimes. In 2018, 41% of Russian companies reported that they were victims of economic crime, as a result of which they suffered direct financial loss. Note that resolution losses of less than 100 thousand. US dollars, and that below the global figure (45%).
At the same time 22% of respondents in Russia as a result of economic crimes suffered losses of more than 1 mln. US dollars, while around the world the same damage amounted to 19%.

Dynamics of registered economic crimes in the total population in the territory of the Russian Federation in 2011-2018 years. is provided in tables 3,4.
Analysis of the structure economic crimes total population presented in Table 3 shows that the highest numbers have grave and especially grave crimes. They make up 59.2% of total offense.A positive trend is worth noting their decrease in comparison with 2011 by 40.5%, as well as reducing corruption crimes by 52.6%. It is for these kinds of criminal acts characterized by a high level applied to the state economic losses and special social danger.

Analysis of the structure of economic crime provided in Table 4 demonstrates the dominance group economic crimes (31%). Their total number of prevalent offenses such as fraud. Fraud, from 2011 to 2014. There has been a positive trend to a decrease in the number of these crimes by 58.8%. But since 2015, the trend is very negative, the number of crimes increased by 24.1%.
A positive trend is worth noting the decrease in illegal acts qualified as serious and very serious, and corruption-related crimes associated with bribery and commercial bribery. It is for these kinds of criminal acts characterized by a high level applied to the state economic losses and special social danger.

Offenses in the sphere of economic activity account for 27% of the total number of reported crimes. Law enforcement agencies are often recorded and investigated the facts of manufacturing, storage, transportation or sale of counterfeit money or securities. Nevertheless, the number of crimes decreased by 34.9% compared to the year 2011. There is decrease in the criminalization of foreign

economic activity, which is expressed in the smuggling of resources by 94%. Just reduced the number of crimes related to bribery by 35.3%. This is due to a decrease in the number of crimes of petty corruption.

Table 3 : Dynamics of registered economic crimes in the total population in the territory of the Russian Federation in 2011-2018.

offenses	revealed crimes															
	2011	2012		2013		2014		2015		2016		2017		2018		2018 to 2011 %
	Total	Total	Ave Temp.,%	Total	Ave Temp.,%	Total	Ave Temp.,%	Total	Ave Temp.,%	Total	Ave Temp.,%	Total	Ave Temp.,%	Total	Ave Temp.,%	
Total, including:	202454	172975	-14.6	141229	-18.4	107797	-24	112445	3.7	108754	-3.3	105087	-3.4	109436	4.2	-45.9
serious and very serious	108834	99277	-8.8	81593	-17.8	65761	-19.8	70401	6.5	65134	-7.5	59819	-8.2	64736	8.2	-40.5
Corruption. directed, and	-	49028	-	41542	-15.8	30113	-27.8	30143	-0.7	27050	-10.3	21948	-18.9	23234	5.9	-
breach of copyright and related rights	5033	3580	-28.9	2584	-27.8	2084	-19.3	1781	-15.1	1294	-27.3	1046	-19.2	672	-35.8	-86.6

Source: crimestat.ru/offenses_table

Table 4 : Dynamics of reported crimes in the economic sphere in the Russian Federation in 2011-2018.

offenses	revealed crimes															
	2011	2012		2013		2014		2015		2016		2017		2018		2018 to 2011%
	Total	Total	Ave Temp.,%	Total	Ave Temp.,%	Total	Ave Temp.,%	Total	Ave Temp.,%	Total	Ave Temp.,%	Total	Ave Temp.,%	Total	Ave Temp.,%	
Economic crimes, including:	73687	72004	-2.3	55783	-22.5	36065	-35.6	35182	-3.2	34673	-1.4	33615	-3.1	33873	0.8	-54
theft	2022	1859	-8.1	1453	-24.8	1198	-17.7	827	-30.9	836	1.1	941	12.6	860	-8.6	-57.5
fraud	50899	52754	3.6	34746	-34.1	20967	-39.9	22108	4.6	22397	1.3	24916	-10.1	26002	4.4	-48.9
embezzlement	20304	16971	-16.4	13903	-18.1	9216	-34.0	8808	-5.2	8308	-5.7	7402	-10.9	6612	-10.7	-67.4

Source: crimestat.ru/offenses_table

We consider it appropriate to analyze the dynamics of registered crimes in the sphere of economic activity in the context of the following articles of the Criminal Code.

Table 5 : Dynamics of reported crimes in the sphere of economic activity in the territory of the Russian Federation in 2011-2018

offenses	revealed crimes															
	2011	2012		2013		2014		2015		2016		2017		2018		2018 to 2011%
	Total	Total	Ave Temp .,%	Total	Ave Temp .,%	Total	Ave Temp .,%	Total	Ave Temp .,%	Total	Ave Temp .,%	Total	Ave Temp .,%	Total	Ave Temp .,%	
In the sphere of economic activity, including:	40496	34405	-15.0	27388	-20.4	26737	-2.8	30028	11.9	28967	-3.5	30042	3.7	36543	21.6	-9.8
illegal enterprise	486	397	-18.3	401	1.0	374	-7.0	397	4.8	342	-13.9	329	-3.8	377	14.6	-22.4
manufacture, storage, transportation or sale of counterfeit money or securities	26948	24073	-10.7	16824	-30.1	20525	21.4	21136	2.6	18778	-11.2	16290	-13.2	17550	7.7	-34.9
production, acquisition, storage, transportation or sale of goods and products without marking	24	28	16.7	69	146.4	35	-49.3	40	14.3	46	15.0	37	-19.6	56	51.4	133.3
legalization of money and other property	704	611	-13.2	582	-4.7	774	33.0	863	10.6	818	-5.2	711	-13.1	993	39.7	41.1
trafficking drag. metals, stones or pearls	710	71	-90.0	81	14.1	79	-2.5	85	6.3	102	20.0	77	-24.5	65	-15.6	-90.8
misconduct in bankruptcy	529	474	-10.4	426	-10.1	313	-26.8	279	-10.6	274	-1.8	281	2.6	271	-3.6	-48.8
commercial bribery	1397	1212	-13.2	1958	61.6	1557	-21.5	1802	14.8	1165	-35.3	840	-27.9	740	-11.9	-47
smuggling	2796	129	-	194	50.4	210	7.2	328	57.7	243	-25.9	250	2.9	168	-32.8	-94
related bribery	10952	9758	-10.9	11521	18.1	11893	2.5	13311	11.5	9984	-25.0	6270	-37.6	7090	13.1	-35.3

Source: crimestat.ru/offenses_table

In various regions of the Russian Federation dynamics of economic crime varies.

Table 6 : Distribution of economic crimes by federal districts and cities of federal importance of the Russian Federation

federal district	2011	2012	2013	2014	2015	2016	2017	2018
1	2	3	4	5	6	7	8	9
Central FD	50872	42984	37180	26047	26357	25616	26369	28664
Volga Federal District	41896	38183	25985	19948	19079	18643	18245	19904
Moscow city	9441	9485	10282	8602	9199	9325	10430	12997
Siberian Federal District	21423	20765	16370	12975	13914	12618	11654	10784
Southern FD	16326	14011	11548	10600	11347	12022	10923	10391
Northwest FD	16260	12694	10496	8959	9349	8955	9335	9780
Ural FD	21710	18591	15267	8100	7976	8111	7923	9184
North-Caucasian	10354	10379	9922	7684	9147	8664	7689	7121

Federal District								
Far Eastern. DOF	5969	4374	4316	3624	4099	4142	4083	4750
St. Petersburg	4410	2994	3061	2490	2747	2671	2930	3196
Crimean FD	-	-	-	384	845	856	-	-
Sevastopol	-	-	-	86	328	268	362	240

Source: crimestat.ru/offenses_table

The largest number of economic crimes in 2018 accounted for the Central Federal District. Leadership belongs CFA during the period analyzed. Of course, of great importance belongs megacities Moscow in the statistics, in the same way as inNorthwestern Federal District- Saint-Petersburg. Nevertheless, the basic number of economic crimes is localized in the Central, Volga and Siberian federal districts.

Table 7: TOP - 20 Russian regions the number of registered economic crimes in 2018

number p / p	Regions	The number of economic crimes	number p / p	Regions	The number of economic crimes
1	Moscow city	12997	eleven	Rostov region	2178
2	Krasnodar region	4048	12	Nizhny Novgorod Region	2145
3	Moscow region	3688	thirteen	Novosibirsk region	2126
4	St. Petersburg	3196	14	The Republic of Dagestan	2117
5	Chelyabinsk region	3137	fifteen	Perm	2065
6	Sverdlovsk region	2528	16	Irkutsk region	2003
7	Republic of Bashkortostan	2456	17	Omsk region	1662
8	Samara Region	2246	18	Saratov region	1597
9	Stavropol region	2214	19	Krasnoyarsk region	1582
10	Republic of Tatarstan	2204	20	Voronezh region	1576

Source: crimestat.ru/offenses_table

The most numerous economic crimes in 2018 in the following regions: Moscow, Krasnodar, Moscow region, St. Petersburg. Chelyabinsk region and Sverdlovsk region.

Conclusions

In conclusion, I would like to note that, despite the results of our analysis of official statistics Ministry of Internal Affairs Russia, testifying to the annual improvement of the situation in the area under consideration, reducing the number of crimes and reducing the number of persons who have committed them, it is still necessary to consider that this type of crime has high latency (90%), and contains a principle discretionary, according to which on certain types of crime (articles 146, 159, 159.1, 159.2, 159.3, 159.5, 159.6, 160 CC RF) energized criminal proceedings I do not except to a person or organization that causes property damage.

The situation in the socio-economic sphere shows that so far, despite the measures taken, the level of economic security of our country is at a dangerous point. The high level of economic crime in the country gives rise to two sets of interrelated problems that affect the economic security of Russia. On

the one hand, Russian businesses need protection both from criminal attacks, and from unreasonable (from the legal and economic point of view) of the state. On the other hand, the state, society and individual citizens need to be protected from both inefficient and criminalized business. Delaying the decision considered the problem worsens very state of economic activity threatens the economic and national security of Russia.

Ensuring economic security of Russia, among other things, involves solving the economic problems of crime through the formation of a new policy of national security. Cupping and improvement in economic crime require a whole range of state-legal action, economic, administrative and other measures. To ensure the stable development of the economy and strengthening the rule of law to law enforcement authorities need to make full use of all available and provided by the law means and opportunities (including the results of Investigative activities) in order to timely prevention, detection and suppression of offenses committed in the economic sphere. The effectiveness of these measures will depend on the activity and competence of law enforcement. However, focusing attention only on the methods of force impact on economic crime is not enough promising. The first step is the formation of a system of values common to all social strata of society, contributing to the inclusion of self-organization mechanisms and spiritual revival of society, contributing to the reduction of the social base of crime, including economic. Among the most important components of the fight against economic crime and strengthening the economic security of the country can be called a reduction of the tax burden, improving the economic legislation, improving the protection of the effectiveness of all forms of ownership, strengthening the legal advocacy of economic and criminal law.

Ensuring the economic security of the state - offensive system task and at the same time an integrated approach. Of course, the economic block unit MBD Russia will not be able to cope with this task alone. Therefore, to date, the main work to be undertaken and already underway, - improving the efficiency of inter-agency cooperation.

For example, in part to counter criminals in the credit and financial sphere is - cooperation with the Bank of Russia, Federal Tax Service, Federal Financial Monitoring Service and the Agency for Deposit Insurance, whose main task is the rapid response to the committed wrongful acts in order to prevent possible crimes and minimize the negative effects.

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Management in The Modern Organisation - Motivating for Work as A Function of Human Resource Management

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Abstract

The paper attempts to investigate the role of motivating in human resource management on the example of a selected enterprise. The point of departure was to present the essence of motivating employees and to determine the factors motivating employees according to the national and international literature. This allowed to assess the current state of knowledge on motivating as one of the functions of efficient human resource management, taking into particular consideration selected factors of motivation. The verification of the hypothesis and the realisation of the stated goal was made on the basis of a critical analysis of the source literature and the case study. The following hypothesis was put forward in the paper: motivation, especially non-remuneration incentives, plays a crucial role in human resource management. The paper aims to present the issues of motivating as a function of human resource management as well as a rank of factors motivating employees for work in the investigated enterprise. The paper attempts to assess the current factors and indicates solutions that would be beneficial both for the employees and the organisation.

Keywords: HRM, Human Resource Management, Motivation, Organisation, Work.

Introduction

Motivating for work is one of the most important, yet one of the most difficult, functions of human resource management in the enterprise. It involves influencing employees' behaviour with such stimuli that they will convert into action in line with the goals of the enterprise.

The issue of motivating for work is becoming more and more crucial in the period of social and economic transformation that has occurred on the Polish labour market. It has been proved that an enterprise attains its robust and strong position and competitive edge thanks to people. Therefore, they should be treated as valuable capital, which can be multiplied by raising its value. A well motivated employee is satisfied with their job, identifies with the company, which in turn satisfies their needs: not only economic needs, but also the so-called higher needs, for instance the need for self-actualisation. Such an employee is efficient – their work brings considerable benefits to the enterprise. In other words, there is feedback, which is of benefit for both sides – the enterprise and the employee.

The paper attempts to investigate the role of motivating in human resource management on the example of a selected enterprise. The point of departure was to present the essence of motivating employees and to determine the factors motivating employees according to the national and international literature. This allowed to assess the current state of knowledge on motivating as one of

the functions of efficient human resource management, taking into particular consideration selected factors of motivation.

The verification of the hypothesis and the realisation of the stated goal was made on the basis of a critical analysis of the source literature and the case study. The following hypothesis was put forward in the paper: motivation, especially non-remuneration incentives, plays a crucial role in human resource management.

The paper aims to present the issues of motivating as a function of human resource management as well as a rank of factors motivating employees for work in the investigated enterprise. The paper attempts to assess the current factors and indicates solutions that would be beneficial both for the employees and the organisation.

Literature Review

Kopaliński (1999) defined motivation as stemming from Latin word motus and English word move, which means "change from one position to another, bring into motion, encourage, influence someone and drive them to take action". As a general notion, it is well expressed as "willingness, desire, intention, interest in something". Penc (1997) claims that all those feelings evoke in a human being the readiness to achieve specific aims. Therefore, motivating employees means making effort to achieve them or, as Sajkiewicz (2002) states otherwise, motivation is a force that evokes, directs and maintains human behaviour. On the other hand, Sikorski (2004) noticed that motivation occurs as an impulse to unfulfilled needs and Penc (1997) specifies that it covers a set of factors concerning the psychic, philosophical and mental human nature, which trigger and organise the human behaviour for achievement of a specific goal. In connection with this, Maciejewska (2000) emphasised that motivation can be regarded in terms of mathematics as a function of expectations that certain actions, behaviours and activity will bring about the expected result and achievement of a specific goal. As Kalimullah et al. (2010) suggested, a motivated employee has goals that are parallel to those of the organisation. As a result, motivation is a term of many meanings and has an effect on various forms of behaviours – beneficial or adverse for a given person or organisation (Boon et all, 2018). A lot of various definition makes pinpointing what motivation actually impossible. However, it might be stated that effects of motivation are better visible for instance in the form of internal change of a person or a change in the situation of a person (Belenzon & Schankerman, 2015).

As Borkowska (1985) notices, motivating involves deliberate and intentional interaction with the motifs and behaviours of subordinates at work by providing them with conditions and opportunities for actualisation and using such stimuli that will meet the employees' expectations so that the goals of the organisation can be met. Given that organisation employees are an added value and that they are the main and most valuable resource of the enterprise (Graham & Weiner, 1996) both in terms of their own abilities and in terms of competitive edge (Pfeffer, 1994). Motivating to work is to encourage employees to specific behaviours, according to the intention and interest of the organisation. However, what is needed are management skills and ability to make an organisation, a competitive edge generator, out of the human capital (Lado i Wilson, 1994; Pfeffer, 1994).

Motivation used in the organisation can push the employee, with various force, towards fulfilment of both the goals of the organisation and their own needs. It requires properly selected motivators and using them to shape behaviours of subordinates according to the assumed, not always stable, goals of the organisation (Delery & Roumpi, 2017). The concept of enterprise motivation system, which includes all major parts of the enterprise, includes for instance the systems developed by: Borkowska (1985), Stoner and Wankel (Kozioł, 2002), and Stabryła (1996). Building a motivation system (Stoyanov, 2017) is undoubtedly a complex task requiring reasonable preparation, introduction, supervision and updating (Winston, 2016). Nevertheless, one must not forget that employees are the most valuable capital of the organisation and that creation of such a system is indispensable for keeping them in the enterprise and motivating them to work effectively (Kanfer, Frese and Johnson, 2017). What is most important in that process is to identify employees' needs and allocate proper motivators (motivating factors) to them.

Motivators are management instruments aiming to ensure high level of motivation of the employed personnel. The most important motivators are presented in Table 1.

Table 1: Classification of incentives

Criterion	Division
impact scope	– internal (respect, prestige, development, independence, sense of accomplishment) – having a long-term and deep impact on the behaviour of employees – external (pay, promotion, position in the professional hierarchy, sense of security) – having an instantaneous impact on the behaviour of employees, the effects of which are not always long term
form	– remuneration (pay, awards, bonuses) – generally having the strongest impact on the behaviour of employees, motivating to effective performance of work – non-pay (oral praise, good working conditions, courses, trainings, having a company phone or car, holiday trips) – making the work itself being a sad necessity and instead becoming the source of contentment and an opportunity for personal development
impact direction	– positive (awards) – strengthening desirable behaviours – negative (punishments) – motivating to avoid undesirable behaviours
impact type	– individual – related to fulfilment of individual aspirations and needs – team-oriented – related to work in groups and teams, where employees, without the enterprise's assistance, form relations between each other that are based on mutual help and support, friendship and solidarity, responsibility, reliability, etc.
fulfilment of needs	– factors fulfilling the basic stimuli (vital needs) – factors fulfilling higher stimuli (social, aesthetic and moral needs)

Source: own study based on Czempliński, et al. (1994).

A lot of problems concerning motivation are strategic and long-term in nature. When an enterprise has a motivation strategy, it excludes any random activities and extends the time horizon, so it makes the decisions taken in that respect more rational.

Methodology

The paper used surveys as the main investigation technique of investigation (researching). They were pilot in nature and are an introduction to further, more in-depth investigations. A questionnaire of the survey was development and then pilot investigations were conducted in the selected enterprise. The enterprise was PKP Cargo S.A. Zakład Przewozów Towarowych (Cargo Carriage Enterprise) in Szczecin, which consented to participation in the investigation and participate in it highly committed. This is the largest logistic operator in Poland (second largest in the EU) in the field of railway cargo carriage. The investigated Enterprise is one of 21 units comprising PKP Cargo S.A. The investigations lasted from September to November 2019 and were conducted in the registered office of the company, among its administrative employees. 112 people participated and 100 questionnaires, duly and completely filled in, qualified for further investigation. As a result, 39% of administrative employees were investigated.

The investigation results were the basis for an analysis of the issues at hand, with application of a case study, and allowed to determine the rank of employee motivating factors in the investigated enterprise. Out of 15 motivating factors specified in the questionnaire, the respondents were asked to choose up to ten they deem most important and most effectively motivating for professional commitment and effective and high-quality work. Subsequently, the respondents assessed them from 1 to 5, 1 being the lowest and 5 the highest score. Only such motivating factors were selected for the investigation that were actually applied in the examined enterprise. As a result, each employee could assess the stimuli known to them. For the purposes of the investigation, the analysed motivating

factors were classified as pay and non-pay. In addition, a specification is provided of assessment of given motivating factors along with employees' expectations as to their magnitude.

The paper mostly used secondary data collected during the questionnaire-based investigation and primary data from the internal documents of the examined enterprise. Investigation results were drawn on the basis of results of own studies and inductive and deductive reasoning. The results are presented in tables.

Motivating Employees in The Enterprise – Case Study

Pay-Related Factors

In the Cargo Carriage Enterprise (Zakład Przewozów Towarowych w Szczecinie) in Szczecin, the terms of remuneration are specified by the so-called Enterprise Collective Bargaining Agreement for the Employees Hired at PKP CARGO S.A. The remuneration for the employees is determined so that it corresponds to the type of work performed, qualifications required for its performance as well as the quantity and quality of provided work.

The position classification of a given employee is determined according to the so-called Table of Positions, Qualification Requirements and Employee Position Classifications, which specifies position names, qualification requirements in terms of education, exams and seniority as well as employee position classifications. Appointment to a given position requires that an employee complete professional preparation, sit the required exams and have proper qualifications as specified in the position table. For the performed work, an employee is entitled to monthly base remuneration based on their position classification and the rate of monthly base remuneration corresponding to that classification.

Apart from the base remuneration, the employees hired at the investigated enterprise are eligible for the following allowances:

- functional allowance for employees in managerial positions,
- seniority allowance,
- overtime allowance,
- onerous or harmful working condition allowance (e.g. when operating electronic visual displays),
- compensatory allowance (when an employee is transferred to another job and their remuneration is reduced).

An employee is also entitled to statutory bonus – their employer allocates means to bonuses out of their remuneration resources. This is a regular pay component, which aims to motivate employees to perform tasks correctly, effectively and on time. Another type of bonus is discretionary bonus, which is an award for the best employees for extraordinary work results. An employee hired in the railway business is also eligible for long-service benefit.

The above variable remuneration components supplement the base remuneration. The respondents assessed the remuneration components presented in Table 2.

Table 2: Assessment of pay-related factors at the investigated enterprise

Item	Factor type	Indicated stimulus value*
1	base wage	3.3
2	statutory bonus	3.1
3	discretionary bonus	3.0
4	long-service award	3.2

5	overtime allowance	2.9
6	pension and disability pension severance pay	3.4
7	position allowance	3.0
Average score		3.1

** The respondents assessed the examined factors in the scale from 1 to 5, 1 being very low and 5 – very high.*
Source: own study based on conducted research.

The examined pay-related factors were assessed by the employees at a similar level. The monthly pay is constant, so it is not a good working motivator; even though the respondents assessed the base remuneration as good, i.e. 3.3, compared to other pay-related factors. The statutory bonus, despite high stability and clarity of criteria, is a stimulus the motivating value of which was assessed as moderate (i.e. 3.1), which resulted from the lack of link with work effectiveness assessment. It is commonly accepted that it is a negative stimulus, it is due for proper fulfilment of obligations and there is possibility of excluding the bonus or its part as a result of failure to observe the working discipline.

The value of the discretionary bonus, which should promote commitment and extraordinary achievements, was assessed at 3.0. This is not a regular remuneration component and employees do not know what its value is, they receive it rarely and it is treated as a prize. The long-service benefit was also of low motivating merit for the respondents, i.e. 3.2. This is a benefit given every 5 years and is a considerable amount. Such a low assessment results from the period for which that prize is given. The employee generally does not remember about that stimulus as it is quite a rarely occurring motivating factor. For overtime, employees most often receive time off, not so much remuneration: hence the low score (2.9).

The earning function of pay was assessed poorly because as many as 81% of respondents declared that the received remuneration suffices for the basic needs only and the remainder stated that it allows an average standard of living. Despite that, few respondents, i.e. ca. 5%, accepted additional work to improve the living standards of their families.

Non-Pay Factors

Apart from the pay-related factors, the Cargo Carriage Enterprise in Szczecin motivates its employees using various non-pay motivating factors. In this group, the respondents assessed satisfaction from the performed work the highest, i.e. at 4.1. Assessment of all investigated non-pay factors is presented in Table 3.

Table 3: Assessment of non-pay factors at the investigated enterprise

Item	Factor type	Indicated stimulus value*
1	Rewarding work	4.1
2	Independence at work	4.0
3	Recognition by the supervisor	4.0
4	Acceptance by co-workers	3.9
5	Full benefit package	3.8
6	Access to trainings	3.6
7	Stable and reliable employment	3.3
8	Access to promotions	3.0
Average score		3.7

** The respondents assessed the examined factors in the scale from 1 to 5, 1 being very low and 5 – very high.*
Source: own study based on conducted research.

Most respondents (46%) admitted that they started to work out of passion and traditional families were the cause for employment of 38% of respondents. Few owe working in the railways to luck (16%). Such high assessment of satisfaction from the performed work that is not so well paid (according to employees) resulted from independence at work, which was assessed at 4.0. According to 65% of respondents, decisions to perform work are imposed by managers only in very important matters. In turn, an employee having a problem could consult their superior or discuss it with co-workers at any time.

The respondents underlined that they can personally, at any time, suggest their superior new solutions concerning the work provided by them. It turned out that managers often implement good ideas of their subordinates. In the investigated enterprise, current performance evaluation is performed. The evaluation is fair according to 46% of respondents, sometimes fair according to 38% of respondents and unfair according to the remaining 16%. The respondents cherish recognition by their superior, both oral and written, as much as independence at work. In 2019 21% of employees declared receiving a praise in writing along with a monetary bonus and 33 of employees received oral praise.

The respondents quite highly (3.8) assessed the benefit package offered by the employer, which was an additional set of motivating factors for them, created on the basis of the Employee Benefit Fund Act (Table 4).

Table 4: Assessment of level of motivation of benefit package

Item	Benefit type	Incentive value	Employees' access to
1	Christmas vouchers	3.8	All
2	Non-refundable allowances	3.6	Employees in special need
3	Residential home loans	4.2	Applicants for a loan
4	Financing of holidays and summer	4.5	All
5	Trips and team-building events	3.7	All
6	Books of tickets for a swimming	3.2	All
Average score		3.8	

Source: own study based on conducted research.

The attractiveness of the benefit package at the enterprise results from increased deductions and additional reinforcement from the profit of the benefit fund. The package is extended compared to typical benefits and applies not only to employees in special need, but to all employees. Grant of some benefits is conditional upon fulfilment of the income criterion. Those benefits, thanks to their interesting range and measurable monetary value, are a reinforcing stimulus.

Among the non-pay motivating factors, the respondents assessed access to promotions the lowest (3.0). The Cargo Carriage Enterprise applies to types of promotions:

- vertical, consisting in offering the employee a higher tier position in the specific professional group,
- pay promotions based on pay raises.

The vertical promotion is based on the several-tier structure of positions for the given profession, e.g. specialist, senior specialist. The pay-based promotion is applied for the best employees, but there are no specifically determined promotion criteria and conditions. The company has also admitted that it does not take care of development of individual professional careers of employees, instead applying the "invisible hand" strategy which consists in the best employees taking care of themselves and proving their worth. Participation in the implementation of the most important projects as well as high level of commitment give the opportunity to stand out and be noticed. The application for promotion is submitted by the manager/personally by the employee. However, 73% of respondents believe that promotion options in the company are available only to a narrow group of persons. The

respondents stated that promotion should depend mostly on the possessed competences proper for the given position (62%) as well as very good assessment of work performed so far (54%).

It must be added that the studied enterprise has also a specific catalogue of penalties in the form of partial or full deduction of the statutory bonus as well as the penalty of admonition or reprimand it applies to its employees. Those are penalties provided for in the Labour Code. These penalties are rarely applied, although 10% of the respondents had their bonus partially deducted in the last two years, 5% received reprimands in the said periods and the penalty of admonition for failure to observe OHS regulations was imposed on 3% of them. This implies that the catalogue of penalties is not restrictive but reduces the inadmissible behaviours at work on the basis of reinforcement.

The Cargo Carriage Enterprise appreciates the role of trainings and professional development, believing that it is the obligation as well as common interest of the employee and employer to improve qualifications and professional skills of the employee continuously. The purpose of the trainings is professional development of the employee which is to guarantee quality and effectiveness of work. However, only 30% of respondents consider the subjects of the trainings sufficient, 28% of them believe it is rather sufficient, whereas 36% - sometimes sufficient and 6% - not sufficient. The employee can turn for assistance to the Instructor at any time to have issues causing difficulties in performance of work explained.

In addition to internal trainings, the Cargo Carriage Enterprise finances in full the trainings in dominant entities of PKP CARGO S.A. for its employees, e.g. in marketing. It also provides partial financing for such forms of education as foreign language courses, higher studies or post-graduate studies. In general, the respondents awarded the score of 3.6 to the access to training. The low score may result of the limited access to external trainings and inability to commence studies at universities due to low earnings as the company covers the costs of employees' education only partially.

Motivating Factors Expected and Assessed by The Employees

The motivating factors expected and most valued by the respondents are presented in Table 5 with comparison to the scores the respondents awarded to the factors applied in the company to motivate them for work. Juxtaposing of the awarded and expected scores allow to determine the differences between them. Thus, the employees indicated which pay-related factors should be reinforced in the scope of motivating factors applied by the studied enterprise.

The motivating factor most valued and expected by the respondents is a stable and reliable job. All respondents granted the highest score, i.e. 5, to this factor. This results from the fact that the average age of the enterprise employees ranges from 40 to 50. At this age, the employees already have great professional experience in their industry and what they mostly expect is stability. Most employees fear potential change of their jobs, new tasks or necessity to learn or gain new skills or qualifications.

High and reliable earnings are the next most valued factor according to the respondents' assessment (score: 4.9). The respondents assessed their real earnings low - 3.7 (the difference is 1.2) which proves that the level of remuneration is not fully satisfying for them.

Table 5: Indicated and expected value of non-pay factors according to the self-assessment of the studied employees

Item	Types of non-pay factors		Non-remuneration factor types		Difference (Indicated stimulus value → Expected stimulus value)
	Factor type	Indicated stimulus value	Factor type	Expected stimulus value	
1	rewarding work	4.1	stable and reliable employment	5.0	0.4
2	independence at work	4.0	high and reliable earnings	4.9	0
3	recognition by the supervisor	4.0	recognition by the supervisor	4.8	0.8
4	acceptance by co-workers	3.9	acceptance by co-workers	4.8	0.9
5	full benefit package	3.8	access to trainings	4.7	0.4
6	high and reliable earnings	3.7	access to promotions	4.7	1.2
7	access to trainings	3.6	rewarding work	4.5	1.1
8	stable and reliable employment	3.3	full benefit package	4.2	1.7
9	access to promotions	3.0	independence at work	4.0	1.7

Source: own study based on conducted research.

Acceptance of co-workers and appreciation of the superior (score: 4.8) is another important motivating factor for the respondents. The difference between the value of the indicated and expected score is 0.8. Employees appreciate the efforts of the superiors who praise them but, along with the praise, they would like to receive pay raises (77% of respondents) and monetary awards (69% of respondents) as a form of appreciation for their effective work.

Another factor the respondents assessed highly, i.e. 4.7, is the access to promotions and education opportunities. The employees see the sense in improving their qualifications, but the company finances their education only partially. The respondents would also like to participate to a greater extent in external trainings and have a better access to promotions which would confirm their suitability for work, improve their value and self-esteem.

Another factor distinguished in the research is rewarding work (score: 4.3), i.e. a job that gives the sense of value of the performed work. The person feels needed in the organisation, sees sense in performance of daily duties. Here, the difference between satisfaction with performed work and expectations of the respondents is minor and is 0.4. The conclusion is that the respondents like their work and if the employment establishment could meet the expectations of the employees at least partially, the satisfaction with performed work would be even higher.

On the other hand, the score granted to independence at work was 4.0, the same as for the expectations regarding this factor. The explanation for this could be that freedom of action in the enterprise is fully satisfying for the respondents or that the employees do not really want the freedom of action as it is easier to follow instructions than to make independent decisions on important matters.

Conclusions

Motivation makes the person aim consistently at the set goal. To achieve this, such a person overcomes multiple obstacles, concurrently drawing satisfaction from the performed work. Surely, every employer dreams of strongly motivated subordinates. Knowledge and motivation are key development factors in the contemporary world, as is manifested, inter alia, in the increase in competitiveness of enterprises.

The presented study results allow to put forward the research thesis that motivation plays a significant role in human capital management in modern organisations and, in particular, the pay-related and non-pay incentives allow to draw the conclusion that employees of the studied enterprise would first like to have their need for security and stability as well as physiological needs satisfied at the workplace, thus: they want stable and reliable employment, high earnings and, a bit further in the order of priorities, a full benefit package. They want to guarantee life in decent conditions for themselves and their families, without the necessity to take up addition work. Next, they would like to have their social needs satisfied: they want to enter into close, cordial relations with other people. The manager can contribute to satisfaction of these needs, admitting social interactions and reinforcing the sense of association with the team in the employees. Then, they want respect, appreciation, i.e. gaining appreciation in their own eyes as well as the eyes of other people.

To conclude, economic motivation for work is of basic significance in the enterprise. Well-designed motivating solutions contribute to order in the work processes, incentivise the employees to demonstrate positive and desired approach to work, allow to fulfil the set goals and tasks, both at the level of the entire enterprise as well as particular positions. The existence and development of the company, its efficiency and effectiveness of operation depend on its employees, their skills and motivation to work, technological changes and advances. It is them who use the technology and corporate resources to process them into the final goods and it is them who participate in the life of the company. The implementation of the concept of the company's operation and growth depends on who the employees are, on their knowledge potential and the way they use it for the benefit of the company.

In general, the results of the study showed that employees of PKP CARGO S.A. Cargo Carriage Enterprise in Szczecin value their work, are loyal to the employer and most of them work in the railway industry out of passion and family traditions. Despite the currently good situation on the Polish employment market where low unemployment and increase in demand for work are observed, many respondents would not make an immediate decision on transfer to another enterprise should such an opportunity arise, 69% of employees would have to think about it and 31% stated that they are not interesting in changing their job at all.

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Change of the Paradigm of Competitiveness in the Conditions of Industry 4.0

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Abstract

This study was inspired by the interest in examining the impact of innovative modern technologies associated with Industry 4.0 upon the competitive advantage of companies. This approach resulted in formulation of a new paradigm of competitiveness, as an innovative contribution to the theory and practice of strategies of competitiveness. The postulated paradigm represents a holistic construct characterized by clear departure from the established of knowledge in this segment of studies. The original character of observations and findings presented in this study is evidenced in the following:
- challenging the established view by M.E. Porter which holds that, at any given time, a company may in principle adopt only one of the available three strategic approaches, namely: low cost strategy, quality strategy, or the strategy of concentration (exploitation of market niches).
- demonstrating that the application of modern and innovative Industry 4.0 solutions (artificial intelligence, advanced robotics, the Internet of things, 3D printing, nanomaterials) will allow for concurrent realization of all four strategic approaches described below.
- formulating a new paradigm of competitiveness holding that, under the conditions of Industry 4.0, it may be possible to pursue a holistic approach to competitive strategies of companies, involving production of items described by: low cost; high quality; adjustment to the requirements of individual consumers (mass customization);
The study belongs in the realm of futurology and is largely based on the use of predictive analytic techniques, synthesis and induction. It based on the selective literature of the subject and is the result of desk research.

Keywords: Competitiveness, Industry 4.0, Technological Progress

Introduction

Competition is one of the most important mechanisms of development in a market economy. It is based on the rivalry of entities seeking to achieve similar goals, and the participating entities can be competitive or not competitive, i.e. able to accomplish the intended objectives or not meeting that criterion. Competitiveness can be considered on these levels (Gorynia, 2009):

- micro-micro, i.e. individual persons;
- micro, i.e. enterprises;
- meso, i.e. related to branches, sectors and industries in the economy;
- macro, regarding individual national economies;
- regional, meaning a group of countries located in a given geographic region, occasionally connected by integration links of varying strength;
- global, comprising the world economy.

The considerations in this article address the issue of competitiveness on the level of a company. The authors propose and verify the thesis that the ongoing sequential progress in the production processes,

i.e. the subsequent industrial revolutions, constitute a continued process of development in the techniques and technologies of production, leading to a change in the paradigm of competitiveness. At the presently commencing stage of the industrial revolution Industry 4.0 this means abandoning the traditional, represented by M. E. Porter, approach to competition which assumes the possibility of an effective implementation by a company of essentially just one kind of strategy, namely that of costing or differentiating, or the concentration strategy. A new paradigm means that a company is able to use at the same time all three strategies, thus its strategy of competitiveness has a holistic nature.

The Concept of Competitiveness

There exist many definitions of competitiveness which probably results from the fact that this phenomenon is usually analysed from a practical as well as scientific viewpoint (Liu, 2017). The most general and concise definition of a company's competitiveness is expressed in the statement that "it is a company's ability to achieve success in economic rivalry against other companies' business' (authors' own definition). A more elaborate version says that "competitiveness means a permanent ability to design, make and sell products (services) whose price, quality and other features mean that they are more attractive than the respective products (services) offered by domestic and foreign competitors' (Kisiel, 2005). According to Buckley et al., "a company is competitive it is able to make and sell products and services of a higher value at the costs lower than its domestic and foreign competitors. Competitiveness means that in the long term the company makes a profit and can pay wages to its employees, and provide its owners with an above-average income' (Buckley, Prescott, Pass, 1998). The definition of competitiveness assumed in the official British document, *White Paper* (Edmonds, 2000), is given as follows: "a company's competitiveness is the ability to make appropriate goods and services at the right time. This means satisfying customers' needs in a more effective way than other companies'. The above quoted definitions and many others suggest that the essence of competitiveness rests in the achievement of competitive advantage when realising the same and similar objectives compared with other companies.

Economic development in modern times has been marked by changes in the form of competing and the implemented instruments, the transition from free competition to the monopolistic and oligopolistic variant. The fundamental changes in the instrument of competing have been gradually altering and will radically transform the processes of creating value resulting in the change of the competition model and companies' competitiveness. All these processes are described as an industrial revolution, Industry 4.0.

Evolution of an Industrial Revolution

The essential role in the development of industrial culture, and in economic as well social culture in general, is played by breakthrough inventions, on the basis of which are derived hundreds and thousands of others. These allow us to distinguish four basic periods in the modern history of industrial development of societies, which are referred to as industrial revolutions (Extreme, 2016; Cimini, Pinto, Pezotta, Cavalieri, 2019; Benazzouz, 2018; Petrillo, De Felice, Zomparelli, 2018). The first industrial revolution dates back to the latter part of the 18th century and the first half of the 19th century. The fundamental role in its development was linked to the use of the steam engine, above all in transport, metal and textile industries. Coal and crude oil became the main sources of energy, quickly replacing the power of human and animal muscle. The second industrial revolution took place in the period 1870-1914. The development of production in industry was based above all on a new source of energy, i.e. electricity, which took on the role previously played by steam. Its characteristic feature was the automatization which enabled the mass production of standard goods in the system of an assembly line introduced by Ford and Taylor. The subsequent, i.e. third industrial revolution, also referred to as 'digital' commenced in the 1980s and is still continuing (Extreme, 2016). The passage from the analogue, electronic and mechanical appliances to digital technology constitutes its essence. The ubiquitous computer, the Internet and ICT (*Information and Communication Technology*) decide about development not just in industry but in almost all areas of life of both individuals and societies.

The fourth industrial revolution, or Industry 4.0, is a consequence of technological development which determined the nature of economic and social processes in the past, classified into three time brackets and described as the first, second and third industrial revolutions, however it differs from them in (Schwab 2016):

- speed caused by the complexity and profoundness of connections in the modern world;
- extent and depth; it is based on the previous digital revolution and combining numerous technologies, which resulted in the unprecedented changes occurring in the economy, business, society and in individual lives;
- systemic impact, i.e. transforming the entire systems existing in enterprises, industries, societies and countries, as well as between them.

These can be defined as development processes based on combining breakthrough technologies which leads to eliminating differences between the physical, digital and biological spheres in industry, services and other areas of human activity.

Megatrends of Industry 4.0

K. Schwab, a founder of the World Economic Forum and a pioneer in research on Industry 4.0, distinguished three megatrends which power revolutionary changes in the modern world, namely physical, digital and biological. The physical megatrend is most apparent because of its tangible character. The most important technologies it comprises are:
- advanced robotics;
- autonomous vehicles;
- 3D printing;
- new materials.

Advanced robots are the appliances which operate autonomously almost completely or partly, and possess the capacity to interact physically with people and networks of other robots, and are able to modify their behaviour on the basis of information transferred from the 'cloud' (Impact 2017). The usage of advanced robots and smart automatization will become the key factor of companies' competitiveness practically in all branches of industry and services, including medical, leisure, telecommunication, household and financial. In particular, the advanced robots will be able to (Manufacturing, 2011; Gronau, 2015; Impact, 2017; Freeman, 2018; Ghobakhloo, 2018):

- perform actions relying on their mobility;
- act in an unorganised and uncertain environment;
- interact with their environment via electronic contact, sound, gestures and physical contacts with other robots and people;
- achieve the desired effect without the need for the full reprograming of the particular set of actions required for this purpose;
- safely perform tasks when in close contact with humans or in highly dangerous conditions.

Their great speed of acting, faithful reproduction, precision in execution, dexterity, flexibility, mobility and interactivity, combined with the ability to use external and internal resources of knowledge in order to make autonomous decisions, will allow entrepreneurs to respond to the demands of the rapidly growing competition in a more efficient and cost-effective way.

The first autonomous vehicles, i.e. those not requiring human participation, will be passenger cars, soon to be followed by lorries, drones, planes and ships. The development of artificial intelligence and the widespread use of sensors will further increase their capabilities and commercial usage. The potential advantages will be linked above all to an increase in road safety, and therefore eliminating the vast number of accidents resulting in human casualties, damage to equipment and insurance costs. Traffic flow will be easier, which will result in saving time needed to arrive at work (no traffic jams), avoiding delays and reducing tiredness caused by travel. There will be a growing tendency to suburbanisation, which will result in the improvement of living conditions in cities through their deglomeration. Human mobility will be on the rise, which in turn will reduce the shortage of manpower

in some regions. All this will increase effectiveness of companies in terms of transport and logistics, and lower their costs, thus raising the level of their competitiveness.

3D printing, also called additive production, is based on creating three-dimensional physical objects through putting on subsequent layers of material in accordance with their digital image or model (Ramya, Vanapallis, 2016; Hannibal, Knight, 2018; Rayna, Striukova, 2016). This technology requires the usage of a computer, modelling software, mechanical equipment and material for the layers. It finds its use in the production of a wide range of appliances such as parts for cars, planes, machines, equipment, implants, prosthetics, food, clothing and leatherware, optical equipment and weapons, etc. Its advantages are the ease of making highly personalised products (customisation), the possibility of introducing changes in the production process, lower labour-intensity than when applying traditional methods, quicker realisation of products, greater precision of their execution, higher quality and lower costs. It is expected that this technology will shorten global supply chains and thus replacing by reshoring (Di Mauro, Frattocchie, Ones, Sartor, 2018; World Investment Report, 2017; Wiesmann, Snoei, Hilletofth, Eriksson, 2017). Nowadays there is ongoing work on the technology of the process of 4D printing, creating new generations of products capable of self-regulation, and the appropriate response to changes in the environment such as temperature or humidity. They will find their use primarily in the textile and shoe industries, as well as producing medical items such as implants. Being able to outrun one's partners in implementing this technology will undoubtedly increase the competitive advantage of a company.

New materials comprise a wide range of characteristics which positively distinguish them from traditional materials. This regards, among others, their weight, resilience, size, suitability for recycling and adaptability. One can mention here such smart materials as self-repairing and self-cleaning nanomaterials like graphene which is 200 times harder than steel, stronger than diamond and a million times thinner than a human hair (Pitkethly, 2004; Isaiach, 2015), metals with memory which enables them to return to the original shape, some crystals and ceramics, in which when subjected to mechanical stretching, the electric current is strengthened. Parts made from such materials are longer-lasting and allow to avoid costs connected with repairing breakdowns of machinery, whereas self-cleaning materials are capable to remove from their surface impurities and bacteria. The scope for inventions in this area is simply fantastic, yet at the same time real. The above mentioned and the still undiscovered features of new materials will make it possible to produce goods which are extremely durable, material and energy-effective, environment-friendly, renewable, high-quality and also cost-effective, and they will certainly provide their producers and companies using them with competitive advantages.

The technologies representative for the digital megatrend include:

- artificial intelligence;
- Internet of Things;
- *blockchain*.

Artificial intelligence means the ability of devices to copy human intelligence, i.e. being able to undertake rational actions in order to achieve a periodic objective; they are capable of (Shabbir, Anwer, 2015; Fabrik, 2016; Dhillon, Metcalf, Hooper, 2018):

- recognizing images and sounds;
- recognizing speech and interlocutors;
- gaining knowledge and applying analysis techniques;
- learning to plan and make their own decisions based on the data they already have and obtain from their environment;
- self-improvement of their actions.

There is a concept of 'weak' artificial intelligence such as that used only for performing specified tasks, and a 'strong' one which could exceed human intelligence in practically all areas. Therefore, this leads to the concern that super-intelligent machines can eliminate human civilisation. Artificial intelligence differs greatly from automatic robots which take on manual tasks performed by humans. The tasks

performed by devices equipped with artificial intelligence are far more complex. It is possible for them to continuously analyse and improve the parameters of the performed actions, consequently the products made match precisely their models, are of high quality and use little material. Artificial intelligence is even capable of improving models without any human input, gather new data and create smart products. It can be applied at all stages of creating value, including that of research and development, ensuring the advantage for business entities implementing it, in terms of quality, cost and market niche.

Internet of Things refers to a virtual (Internet) web of people, processes, devices and products, in which information is gathered, processed and sent in order to manage the environment in a smart, automatic way. This environment can be located in industry, transport, consumer services, as well as medical, financial and others, also in agriculture and in commerce. It can comprise smart homes, factories, cars, machines, devices for the remote monitoring of the state of health, smart car parks, appliances monitoring the localisation and route of cargo transport, as well as those monitoring conditions for farming, credit rating of banks' clients, etc.

Appliances which generate and process information on a regular basis are the foundation for the digital transformation of the value creation chain. The IT combination of smart transport, storage, production and distribution through the platforms of the Internet of Things ensures the availability of information on the course of these processes in real time, enabling their monitoring and improvement of their effectiveness (Impact, 2017), which undoubtedly has a positive impact on the competitiveness.

Blockchain is a technology which enables online transfers of digital coded assets such as contracts, documents of financial transactions, currencies, certificates, and financial reports, from one entity to another/others without the participation of an intermediary, using a decentralised scattered system of accounting (Swan, 2015; Casey, Vignal, 2018; Upadhyay, 2019). In this system there is no need for a central administrator to confirm the authenticity and control transactions because every participant of the system can look at any transaction and together decide about its legality. All the participants of that network have their own identical copies of digital books of accounts, which almost immediately record changes which took place as a result of introducing another coded block of information. Each subsequent block of information contains an abbreviated version of the previous one, in this way creating their chain (*blockchain*). This system is more resilient to hackers' attacks because instead of just a single database they would have to attack simultaneously all the copies of it. *Blockchain* can be and certainly will be in common use in companies and institutions, in industry, commerce, banking, insurance, financial and investment management, etc., contributing to cuts in transaction costs and time required for transactions, elimination of errors, reduction of risk of forgeries and attacks by hackers, and thus improving their competitiveness.

Biological megatrend is above all linked to synthetic biology, which constitutes a union of biology with engineering. Within this field there are being developed such disciplines as genetic engineering, biotechnology, molecular biology, molecular engineering, biophysics, chemical and biological engineering, computer engineering, systems biology, industrial automatics and evolutional biology. The conducted research aims at building artificial biological systems and modifying the existing ones. This concerns not only flora and fauna but also humankind. It will be possible to produce better varieties (as already happens in respect of plants), more resilient to external threats, and also able to produce pharmaceuticals and other forms of medication. Artificial human organs will be also possible to obtain through combining technologies 3.0 with genetics. Nowadays it is already possible to 'print' skin, bones, heart cells and blood vessels.

Revolutionary innovations linked to synthetic biology have, and will have, a direct impact on the effectiveness and competitiveness of business entities whose activity is connected with the production of plants and animals, pharmaceuticals and other aspects of medicine, and research and development in these areas. An indirect if positive influence may occur in all the spheres of the functioning of society and the economy through the improvement of the mental and physical capabilities of human organisms, the slowing down of the ageing process and extending both the productive age and lifespan in general.

Traditional and innovative strategy of competitiveness

The way of competing used by companies during the first three industrial revolutions was based on choosing one of three strategies:

- production at a cost lower than for competitors;
- production of higher quality (differentiation);
- concentration, in other words the implementation of the former or the latter way of competing in a market niche in regard of a particular group of clients, a segment of the product range or a geographic market. According to M. E. Porter, a classic theorist of company strategies and their competitiveness, it is rarely possible that a company is able to successfully employ more than one of these strategies (Porter, 1992). In the conditions of Industry 4.0, the instruments for realising competitive advantage on a company level undergo a drastic change, which means that the company implementing them is able to realize simultaneously all three strategies. This leads to the emergence of a new paradigm of competitiveness, i.e. a holistic way of its realisation. In order to achieve competitiveness in conditions of Industry 4.0, companies have to introduce significant changes to their model of running a business, which has to be totally oriented on satisfying the increasing individualisation of their customers' taste (Kinder, et al., 2014). This idea should dominate over the entire chain of creating company value, starting from research and development, through design, purchase, storage, production, distribution, customer services and recycling. Through the union and interaction of people, smart machines and appliances, there are created dynamic cyber-physical systems in the form of self-organising digital networks of creating value, optimal from the viewpoint of the criteria of cost, quality, time, space, customisation and functionality.

The digitalisation of the value creation chain enables:

- concentrating on the segments with key importance for creating added value;
- minimising costs;
- eliminating breakdowns;
- flexibility and standardisation of flows of material assets and information;
- transparency of their flow;
- improvement in planning and managing production processes;
- customisation of products;
- reducing redundancy.

There will exist excellent coordination between the individual segments of the value creation, and any possibility of turbulence will be immediately automatically eliminated. Purchasing will be synchronised with the stages of the production process which will lead to eliminating costs of storage and the related losses. Not only purchasing but also distribution will be appropriately correlated with the process of production, which will mean that customers will receive the required product almost straightaway and directly into their own hands. The supplies of consumer goods will be cyclically renewed at the clients' place according to a previously set programme, and the equipment will be serviced and repaired.

In the factory of the future, production processes will be fully automated and realised by smart robots which will carry them out with extreme precision, impossible to achieve with the use of other technologies. Smart robots will select the most appropriate materials and their composition, with maximum savings in their usage. This will ensure the highest possible quality of the manufactured products and services provided by companies, meeting to the highest degree the criteria of durability, reliability, functionality and aesthetics. The robots will be able to use constantly their own resources and data, obtain them from a cloud, prevent failures and reprogram their own operations.

The use of 3D printing will enable the automatic production of three-dimensional objects based on digital designs or models. Thus products can be produced in a short time, at low cost, high quality and in small series or even as one-offs. They may be created based on *peer-to-peer* contacts between producers and clients who directly supply a model or description of the required design. In this way

there will be fulfilled simultaneously the criteria of competition on the basis of the price, differentiation and market niche.

The supplied products will differ significantly from the present-day ones, not just because of their relatively low price, high quality and customisation but also their functionality, changing automatically depending on the conditions in which they are used. Smart products equipped with alarms, sensors and processors will react to changes of temperature, rainfall, wind, atmospheric pressure and other weather conditions and threats posed by other objects in their surroundings.

Payments for the supplied goods will be affected using a virtual, scattered cryptocurrency, safer, resilient to attacks by hackers, solid and trustworthy, and will not require a central institution to regulate its use and exchange. Even today the value of the cryptocurrency Bitcoin in circulation is estimated at over 3 billion USD and approximately 100 thousand traders accept it (Kelly, 2017). The blockchain technology which provides the basis for the functioning of cryptocurrencies, will enable the automatic conducting of decentralised transactions between companies and private individuals with the use of a chain of blocks which will eliminate several middlemen, make the transactions transparent and safe, generate high levels of trust between partners in business, and as a consequence will significantly lower transaction costs.

Creating high-quality products at an attractive price and 'made to measure', i.e. adapted to the specific requirements of clients, will certainly rely on the deepening and strengthening of network connections not just within the corporations but also between them and their clients. Competition and cooperation, or the so-called coopetition, will become a common phenomenon in the companies of Industry 4.0. Electronic platforms will be a highly useful instrument for its realization, used by many different stakeholders such as designers, suppliers, producers, service providers and customers (Reuber, Knight, Liesch, Zhou, 2018). They will become a kind of business ecosystems which through providing the combination of complementary capabilities will facilitate and speed up R&D, design, implementing innovations, production and distribution of customised high-quality modern products and services.

Conclusions

The presented revolutionary changes in production processes, and the combination of the physical, digital and biological dimensions will have not merely an economic effect but also vast social consequences, which are not the subject of this discourse. However, in the sphere of competition they will cause a change of its paradigm and, as was already said above, will allow companies the simultaneous effective use of the strategy of low costs, of differentiation and of concentration, which was practically unattainable in the traditional economy. Already today one can observe the introduction of innovative techniques and technologies of production, as well as ways of managing the chain of creating company value and the systems of creating value such as the coordinated value chains of cooperating companies, which in comparison with traditional ones have a revolutionary character and lead to their creative destruction. These comprise the automation of production processes, installation of advanced robots which replace human labour, 3D printing, usage of new materials (nanomaterials), 'weak' artificial intelligence, the Internet of Things, *blockchain*, cloud technology, enhanced reality and elements of synthetic biology. The gradual introduction of these innovative solutions is accompanied by intensive research aimed at minimising the costs of their implementation and industrial use. It is expected that they will become reality over the next ten or so years. Apart from their undisputed advantages described in this article, they will be also connected with various threats such as unemployment, deepening social divisions, cyberattacks and with the domination of the human race by artificial intelligence, which for some belongs to the domain of *science fiction*. For companies pioneering in the introduction of the elements of Industry 4.0, this will mean the achievement of a significant competitive advantage over others through applying a holistic strategy of competition. The future research should concentrate in particulary in the determinants, barriers, promoters and a course of the implementation processes of industry 4.0 in the individual companies and the influence them on their competitiveness.

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Risk Factors of Virtual Supply Chains

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Abstract

The article is part of a series of publications on virtual supply chains. The first part characterizes determinants defining virtual supply chains. There were identified nine areas affecting virtual supply chains. This study presents risk factors affecting virtual supply chains. The research is complemented by FMEA risk analysis for virtual supply chains. The research was conducted at the turn of 2019 and 2020. The purpose of the publication is to show aspects where the risk related to virtual supply chains is the greatest.

Keywords: Virtual Supply Chain, Supply Chain, Risk, Risk Factors

Introduction

Over the past few years, artificial intelligence has become an integral part of the modern world. People, companies, organizations benefit from the benefits of IT, technology and digitization on a daily basis. In addition to supplying basic next-generation applications and other digital products, artificial intelligence is able to transform industry activities, including the supply chain and logistics, into new stages of operation. In fact, companies are already using AI resources. According to the 2017 Vanson Bourne survey, it can be seen that operations and supply chains are the most important processes in which companies increase revenues through investing in artificial intelligence. The flow of goods in the contemporary world is becoming faster and easier, by arranging companies in global supply and logistics teams. In order to avoid delivery delays, inefficient management of inventory or flow of goods, and to eliminate bottlenecks, it becomes necessary to manage large data sets and to analyze them.

Aside from data management in the supply chain, the issue of communication and information flow is becoming extremely important. The physical flow of goods no longer exists without digitization and virtual supply chain support. The collection, verification, storage and analysis of data in the supply chain becomes a necessary element to function in the age of globalization but is also the first step to the risk of business operations and the exchange of data and information (Avetta 2019, p. 4). The digitization of logistics processes and supply networks is designed to help achieve huge savings and competitive advantage by supporting new thinking and management methods. Data and information processing in the cloud computing enables greater freedom and mobility of supply chain management. The use of cloud computing makes it possible to cope with the growing speed of change in unstable economic and political conditions. The virtual sphere not only allows for easier, faster and more precise management of the growing amount of data and information, but also enables creation of digital supply chains. The most important element of managing digital supply chains or the physical flow of goods using IT solutions is cooperation with each link in the supply chain in real time. Optimization and digitization of logistic and economic processes can help business entities achieve significant savings and competitive advantage. The efficiency of the entire supply chain also

increases, and the utilization of enterprise resources is improving (Lee 2013, pp. 35-48; Raj, Sharma 2014, p. 2).

The virtual supply chain is a more complex creation than the "traditional flow of goods". According to J. T. Mentzer, the virtual supply chain is based on physical transport, management processes, execution, reporting, and control of these processes, creating a matrix with a horizontal time axis and an operational flow as a vertical axis (Degen, Janssen, Da Cruz Caria, Hermans, Sweerts 2016, p .2). The activities of the virtual supply chain are also based on the ability to create temporary cooperation and dependence on short business opportunities. Cooperation is based on temporary consortia or alliances of companies created to share costs, skills and take advantage of rapidly changing market opportunities. The virtual supply chain is primarily geared to driving the use of innovation and innovative digital, ICT and system solutions, along with the distribution of knowledge. In order to design effective cooperation in the virtual sphere, there must be a workflow and information flow, conditioned by well-defined decision-making process and internal process coordination (Samdantsoodol, Cang, Hongnian 2012, pp. 1-2).

The research methodology is based on the analysis of virtual supply chains in terms of the impact of risk factors. Virtual supply chains have been analyzed. The research carried out in this article is part of the analysis of determinants affecting virtual supply chains and the conclusion of the research carried out in the form of FMEA risk analysis of virtual supply chains. This article deviates from the classic form because the main part of the research are risk factors for virtual supply chains developed in the form of a table. Presenting risk factors for virtual supply chains is necessary to understand which area the factors affect and what the consequences are. As already mentioned due to the extensive research, the considerations have been divided into three parts and each of them supplements the given article (Kersten, Blecker, Ringle 2018, pp. 30-67; Pires, Bremer, 2010 pp. 297-311).

Risk factors shaping virtual supply chains

The vast scope of the term risk means that it is necessary to categorize and divide it. Correct risk classification helps to answer the questions of how, when and where the risk may occur. Different types of risk can be grouped according to many criteria (Dendera-Gruszka, Kulińska 2017, s.5–22; Staniec, Klimczak 2015, s.23–36).

Virtual supply chains are the main source for agility and responsiveness, becoming market sensitive, enable to synchronize supply with demand and achieve shorter cycle times. However, virtual supply chains, despite their many advantages, also pose a threat to the functioning of the organization. In the era of globalization and progressive digitization, it is necessary to characterize the risk factors that are responsible for the virtual sphere and to determine the risk (Samdantsoodol, Cang, Hongnian 2012, pp. 2-3). There are many considerations about the risk of virtual supply chains, while none of them defines risk factors taking into account their areas of impact and so far no compendium of knowledge about risk factors affecting virtual supply chains has been presented in such a detailed way. The results of other authors' research on a similar topic are also included in the table below. The table below sets out the determinants that characterize risk in virtual supply chains.

Area	Determinants of virtual supply chains	Risk factors corresponding to virtual supply chains
Technological	- technological progress - development of technology	- no current system updates - lack of adequate technical equipment - lack of adequate software
	- the growing role of telecommunications	- no access to the telephone network - the low range of the telephone network - no telephone network synchronization with IT systems - lack of funds for ICT
	– access to a fast internet network	- no access to a fast internet network - high costs of implementing a fast internet network
	– access to new technologies	- lack of access to new technologies - unfair competition - theft of know-how - high costs of implementing new technologies - dynamic changes on the IT market - no interest in new technologies - loss of license - patent refusal - no rights to use individual technologies - poor decision-making regarding new technologies - lack of suitably qualified workforce responsible for implementing new technologies - lack of modern equipment - barriers on the given market - lack of properly equipped laboratories - distrust in the dissemination of research on new technologies - theft of technological knowledge
	- access to information - quality of information flow - quality of information transfer	- bad information flow - no access to information - lack of access to public information - no access to documents - refusal to share information - poorly secured access to information - failure to meet the deadline - long circulation of information - disruptions in the flow of information - information noise - lack of information flow model and procedures - loss of information media - loss of information - excess or lack of information - information is outdated - lack of credibility of information - no link between information and the given environment
	– development of interactive media	- no communication - hacking into a computer or Internet network - hacking into the telecommunications network - creating a new reality - previewing and eavesdropping on

		conversations, video conferences and audiovisual broadcasts - addiction to interactive media - sharing too much information using interactive media - lack of control over the transmission and transmission of information using interactive media - no verification of all interactive media users - ease of losing data and information
	- IT competences - IT and media competences - interaction between the user and the virtual environment	– lack of relevant contractual provisions guaranteeing security
	- database - capturing sensitive information	- data loss - database corruption - virus - data theft - hacking into the database - data sales - public sharing of data - failure to obtain appropriate licenses - - inappropriate data processing - unfair competition - downloading data from foreign portals - IT crimes - violation of the rules of personal data processing - hacker attack - no detection of violations - unauthorized physical access to an important room with processed data, - flooding - fire, - physical failure of data carriers - wiring failure
	– *cloud computing*	- no availability - possibility of rapid change of business model by cloud service providers - complicated recovery procedures - possibility of single failure points - loss of data confidentiality - disclosure of data to third parties - deleted company data can still be stored in the cloud - insufficient authentication methods - it is not possible to audit the service - conflict of laws - lack of continuity of service - link failure - low quality of services offered
	- *phishing*	- unconscious or accidental sharing of information
	- networking	- cyberterrorism - criminal networks

	- virtualization - data and information exchange platforms	- poor performance - cyber hacking - high security costs - illegal downloading of source code from a file server - threats from other systems on which our resource is based
	- immediate access to knowledge and information - high level of knowledge and information flow - use of homogeneous or compatible digital, information and IT technology - disinformation of individual industry groups	- poor data security on digital media - lack of interest and funds for innovation - IT system failures - too much information flow - fake news - use of pirated software / pirated content inside the organization - absence of the administrator
	- increase in investment expenditure on the latest technologies, servicization and digitization of entities	
	- ICT services	- eavesdropping - interference - operator errors
	- *link manipulation*	- URL control vulnerability - sending confidential data - user manipulation
	- *whaling*	- hacker attacks on people in important positions
	- artificial intelligence - machine learning	- lack of relevant legal regulations - taking control of the systems by inappropriate people - lack of defined total possibilities of artificial intelligence - unlimited possibilities
	- computer simulations	- data entry errors - lack of full reflection in reality
	- computer generated environment - interaction between the user and the virtual environment	- theft of data carrier - illegal modification or damage of website content - inability to process source code
	- backups - saving information	- loss of data
	- internet of things - using mobile devices -dependence of industrial and security systems on a common internet network - digital transformation	- weaknesses in authorization and authentication systems - insecure web interfaces - software gaps and errors - cloud computing failure - uncontrolled surveillance of people - taking control of devices - theft of access passwords - modification of system software by third parties - eavesdropping - illegal copying of device contents without the user's knowledge and consent - problems with the object software update - DoS (Denial of Service) attacks - user errors - no data transmission encryption

		- power failure, - loss/theft of equipment containing relevant data, - immobilizing parts of the IT system caused by malware, - sale of equipment (e.g. hard drives) without proper, permanent deletion of data - disclosure of confidential information
	- Ransomware-as-a-Service	
	- Malware-as-a-Service	
	- DDoS-for-Hire	
	- broadband access - increasing the efficiency of technological and IT processes - lack of support for technological transformation - lack of understanding of technology - technological and technical innovations	- delays in implementation - lack of adequate infrastructure - high financial outlays - lack of funds for the investment - theft of know-how - badly allocated financial resources - theft of idea - rejection of the project - no allocation of funds
	- electronic banking	- loss of funds on bank accounts - contracting financial obligations by third parties on user accounts - hacking into electronic banking - insufficient protection of the electronic bank account
Time	- development of emerging markets	- less competitive in terms of costs and time in relation to the eastern markets
	- technology development - development of IT techniques - development of cybernetics	- not keeping up with technological, technical and IT progress
	- quick response to customer inquiries and wishes	- too late response or lack of response to customer inquiries and wishes
	- development of competition	- more attractive competition offers
	- flow of information - communication	- disruptions in the flow of information and communication - delays in the flow of information
Localization	- reduction of spatial barriers - deterritorialization - integration - limitation of state sovereignty	- impact of globalization - transferring production to Asian markets - free flow of information - changes in economic conditions in international markets - increase in the share of Asian economies
	- transport network density - transport infrastructure - communication network density - port automation - lack of port integration with customs systems - lack of coordination of the ministry of transport, industrial development, communication and finance - spatial mobility	- lack of adequate transport or communication network - lack of properly synchronized IT network
Mark	- development of telework	- lack of supervision over employees

	- non-standard forms of employment - changes in existing forms of education - new jobs related to intelligent work, - requirements for new qualifications and information and information technology as well as communication and media skills - changes in work styles	- no contact with the employer - overtime - dependence on technical means - limiting social and professional contacts - disturbed family life - delegating official duties to third parties - secondment of employees - lack of control over the flow of information - lack of qualified labor force - lack of human capital - staff shortages - decrease in employment
	- impact of the virtual world on global stock exchanges - situation of global markets - volume of foreign exchange turnover - average customs duties - market regulation mechanisms - stock exchange quotations - exchange rates - cryptocurrency quotes - inflation - turmoil in energy markets - economic situation - liberalization of markets - economization of politics	- market changes - changes in interest rates - fall of stock prices - exchange rate fluctuations - changes in customs duties - embargo - turbulence on global stock exchanges
	- no jobs for people without proper IT skills	
	- limitations of resources	
	- e- services	
	- limited access to financing	
	- focusing on the needs of large producers	
	- digital economy	
	- dual economy	
	- no tax deductions to support technology implementation	
	- balance of payments charges	
Political and social	- no legal regulations regarding digitization, computerization and virtualization - lack of exchange of information in the international environment of law enforcement agencies - inability to respond to cyber crimes - no cyber security strategy on the national and international arena	- ineffectiveness of law enforcement in tracking and enforcing crimes in the virtual sphere - lack of properly trained specialists in the area of internet crimes
	- lack of law enforcement agencies operating exclusively in the virtual world	
	- lack of structures for cyber resilience, cybercrime and defense operations	
	- no exchange of information between the private sector and national entities	- new possibilities for online crime
	- no insurance policy against cyber attacks	- high costs
	- international legal and social relations - international tax regulations - assistance received from public funds - policy of state authorities towards enterprises - volatility of legal regulations	- complicated international legal regulations - high tax rates - incorrect interpretation of legal acts - non-compliance with national and international law - lack of economic freedom

	- legal regulations regarding the freedom of establishment	- restriction of economic freedom - unfavorable tax system reforms
	- effectiveness of corporate governance mechanisms - economic freedom - changes in economic conditions - tax rates - fiscal policy of the state - condition of the public finance sector - effectiveness of state control bodies - export value - value of state investments - changes in the political and economic structures of the state - limitations of political and economic sovereignty - tax system reforms	- changes in the purchasing value of money - fashion - changing customer preferences - checks at border crossing points - border crossing blocks - inefficiency of state regulatory authorities
Economy	- increase in the efficiency of business entities - increase in innovation of business entities - increase in the competitiveness of business entities	- economic backwardness - decrease or low economic growth rate - price / wage gap - lack of innovation development
	- lack of cooperation between research centers and business entities	- increasing opportunities for online crime
	- reluctance to share information - business complexity of entities - limited competition - political restrictions - failure to recognize the country's industrial context - lack of public cooperation	- lack of cooperation between entities - lack of economic confidence - unfair competition - high costs of information flow
	- lack of coordinated supply chain strategies - system incompatibility between entities	- delays in implementing logistics processes - the need to implement more than one IT system - duplication of data and information - high service costs
	- standardization - geopolitical cyber attacks - unification - integration - fragmentation - formalization - institutionalization - innovation of the economy - level of economic growth - uncertainty about market position - uncertainty about market identity - economic volatility - volatility - leveling prices / wages - price/wage level - number of international corporations and branches – share of intra-company flows - concentration of production	- lack of access to international markets - bad information flow - unfavorable business relations - too many changes - lack of market orientation - lack of industry orientation - no focus on the range produced - lack of opportunity or desire to develop a business entity on the international stage - no product presence on international markets - no additional production capacity - no export possibilities - product and assortment stability - too much product variety - no investment projects - unemployment - lack of new jobs - adapting public administration to digitization

	- export rate - share of production value in global production - level of foreign direct investment - investment projects - consolidation / transformation of the industry - implementation of strategic transactions - changes in company structures - increase in costs - demand and supply changes - competitiveness policy - enhanced competition policy - business relations with clients - uninterrupted communication - commitment to the implementation of orders - flow of information - payment transactions - customer insolvency - payment deadlines - international flow of capital, goods, services and knowledge - export value - value of international investments - internationalization of the company - number of contractors / foreign branches - fragmentation of production - export capacity - international division of labor - changes in production structures and product offer - enlarging sales markets - new jobs - access to international raw materials, capital and production resources - access to the global labor market and sales market	
	- digitization of logistics services	- theft of confidential data
	– disinformation in virtual reality	
	– economic fraud	
	– impersonating public institutions	
	– phishing confidential business data	
	– phishing data from public institutions	
	– creating common logistics functions	
Social	– social exclusion	
	- global society	
	– automation and robotics society	
	– constant supervision and control over society	
	– conditions of exceptional social competition	
	– decrease in the prestige of traditional social forms	
	– no control over content posted on the internet	
	– interdependence of the spoken and printed word with digitalism and interactivity	

	– consumerism	
	– commercialization of social relations	
	– increasing employee rights	
	– instability of life	
	– depleting cultural diversity	
	– commercialization of consumer culture	
	– instability of life	- lifestyle changes
	- deterritorialization of culture	–
	- links with the cultural, territorial and professional community - social disintegration - changing social structures - change of social functions	- lack of appropriate education and experience of people in managerial positions - lack of adequate education and experience of people in state administration - increasing pay gap
	- transfer of qualifications to cyberspace and the virtual world - change of existing authorities - the impact of the virtual world on socio-educational activities - access to knowledge and information as a determinant of social status - digitization which is the basis for the functioning of every family and institution - accelerating the development of intellectual and social capital - the impact of technology on social relations - social manipulation	- society's desire to exist only in the virtual world - attractiveness of unreal patterns - knowledge from unverified sources - access to unverified and false information - addiction to modern technologies
	- bad habits of employees	- too much time spent using modern technologies
	- increase in social activity	- decrease in social activity
	- fees for social and social benefits	
	- demand and supply of qualified labour	
	- minimum wage	
	- increase in labour costs	
	- knowledge of foreign languages	- lack of language skills
	- population movements	- migrations
Globalization	- transformations and movement of civilization waves - the importance of information and knowledge in the globalization process - industrialization - no retreat from digitization - the growing role of non-state, non-elective and undemocratic economic power centers - lack of control over cyberspace - concentration of power resulting from superpower - separating the world of finance from the real economy - increase in differences between individual market segments - uncontrolled privatization of the sector and public space - centralization of political and economic decisions taken - globalization of social pathologies - social threats and terrorism - universalization	

Environmental	- ecological disasters - natural disasters

Fig. 1: Risk factors corresponding to virtual supply chains

Source: Own study based on (Andrzejewska, Bednarek, Ćmiel 2013, pp. 11-66; Lizut 2014, pp. 17-294; World Economic Forum 2019, pp. 6-70; Hogg pp. 1-19; Ray, Marshall, Coderre R 2019, pp. 8-13; Marsh 2019 pp. 1-3; Kulińska, Dendera-Gruszka 2019, pp. 143-146; www.computerworld.pl/news/Zarzadzanie-ryzykiem-bezpieczenstwa-informacji-w-systemach-TI,318160.html access: 13.02.2020; www.purepc.pl/oprogramowanie/wirtualizacja_systemu_operacyjnego_poradnik_dla_poczatkujacych?page=0,1, access: 13.02.2020; https://cyberpolicy.nask.pl/unijna-ocena-ryzyka-cyberbezpieczenstwa-w-sieciach-5g/ access: 13.02.2020; https://www.controlengineering.pl/zarzadzanie-ryzykiem-zwiazanym-z-rozwojem-technologii-internetu-rzeczy/ access: 13.02.2020; https://securitum.pl/baza-wiedzy/czym-analiza-ryzyka-it-wprowadzenie/ access: 13.02.2020; https://www.avast.com/pl-pl/c-phishing dostęp na dzień 13.02.2020; https://www.computerworld.pl/news/Ransomware-ewolucja-technik-atakow,409205.html access: 13.02.2020; https://www.gov.pl/web/cyfryzacja/internet-rzeczy dostęp na dzień 13.02.2020; 9. Maj I. 2015, s. 51-57; Marczyk M. 2018, s. 59-72; Rot A., Blaicke B. 2017 pp. 188–198; Pires, Bremer, 2010, pp. 280-282;

Risk factors that characterize virtual supply chains relate to nine areas that have been characterized in detail in the table above. The most important risk factors for virtual supply chains relate to the technological area. Due to the close connection of technology and new technologies with the virtual sphere, these factors are becoming the greatest threat to virtual supply chains. Attention should also be paid to the social aspect, which significantly determines the functioning of not only real supply chains, enterprises, but also every community. The table also shows that there is no turning back from progressing digitization. This is undoubtedly a risk factor perceived in plus and at the same time in minus. The specificity of the term risk is an opportunity and at the same time a threat to the functioning of organizations, social groups, introducing new products to the market, etc. The same applies to risk factors for virtual supply chains. Some of them are definitely perceived and cataloged as a threat and something negative and dangerous, while some may prove to be an opportunity and influence the development of a given organization or supply chain. In addition to risk factors relating only to elements of digital, IT infrastructure or virtual networks, there are also elements regarding natural disasters or physical flow of goods. Currently, the virtual world is closely related to the physical flow of goods and it is impossible to strictly isolate only virtual factors without analysing physical elements. Based on the above table, the FMEA risk analysis will be presented in the further course of the research. Based on the above table and the data contained therein, a further analysis of the FMEA risk will be presented in the further cycle of the research (Veynberg, Koslova, 2020, pp. 2-7; Reliham, 2020, pp. 23-30)

The limitations of the conducted research is constantly changing reality, in particular virtual reality. In the era of globalization and progressing digitization, it becomes extremely important to know the risk factors affecting virtual supply chains. At the same time, globalization processes and the transfer of more and more services into the virtual sphere contribute to the emergence of more and more dangers and threats in sending data or information via the Internet. Therefore, the factors that have been cataloged in the above table may not be sufficient in the near future. Due to the dynamics of changes taking place in virtual supply chains, the authors relied on the opinion of experts in this field, in relation to the maximum year preceding the publication of this publication.

Summary

Access to the internet and ubiquitous digitization enables fast and flexible flow of goods and services. Currently, to become competitive in a given market, speed of response to customer inquiry and flexibility is becoming the paramount feature. Without access to the Internet and the use of specialized computer software, achieving a market leadership position would be impossible. However, virtual supply chains, which are primarily oriented on the Internet, carry some danger and risk. The determinants presented in Table 1 are the first stage to analyse the risk of virtual supply

chains. Based on the distinguished determinants, it is possible to determine which elements have the greatest impact on risk in virtual supply chains, and which particular attention should be paid.

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The Role of The UN Security Council in The Collective Security System

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Abstract

The aim of the article is to present the issue of differentiation of legal collective security systems, with particular emphasis on the role of the United Nations Security Council. The article indicates that despite the existence of various collective security systems, including The European Union or the Council of Europe, currently the United Nations system still allows the most effective institutionalization of the legitimacy of collective response procedures. The text emphasizes the special role of the Security Council in maintaining or restoring international peace and security, resulting from the content of art. 42 UN Charter. Finally, it has been shown that the military and political competences of the Security Council, although unprecedented in legal and international dimension, have not yet been able to make the Council an effective guarantor of global security. The research problem raised in the article has both a theoretical and practical dimension. The research methods used in the work include analysis, synthesis, inference and reference to the position of representatives of the doctrine of international law. In the practical part, the author referred to the effectiveness of the UN Security Council in cases of armed conflict in countries such as the Syrian Arab Republic or Libya.

Keywords: Collective Security System, UN, Security Council, Global Security, Syria

Introduction

There is no doubt that among modern systems of collective security resulting from the existence of such international organisations as the North Atlantic Treaty Organisation, the Council of Europe, the European Union or the United Nations, it is the global system of collective security of the United Nations that has a special role to play both in shaping and guaranteeing modern international relations and global governance. Historically, it should be remembered that the creation of the United Nations was the aftermath of the nightmare of the Second World War, so it is not surprising that Article 1 of the United Nations Charter already indicates expressis verbis that the most important task of this organization is: "To maintain international peace and security, and to that end: to take effective collective measures for the prevention and removal of threats to the peace (...)" (UN Charter). The impact of the United Nations system on international security, especially in terms of political and military threats, is undoubtedly a key issue from the point of view of the representatives of the doctrine of international law, but due to the volume and formula of this work, the author has decided to limit himself to showing the impact of the importance of the Security Council on the effectiveness of the UN collective security system.

It will be a truism to say that within the UN it is the Security Council that plays a special role. It is the guarantor of the still most effective institutionalisation of the legality of collective response procedures under the UN Charter. The author shows the special role of the Security Council in maintaining or restoring international peace and security, resulting from the content of Article 42 of the United Nations Charter. The aim of the work is also to try to assess to what extent the military and political competences of the UN Security Council, although unprecedented in legal and international terms, are paradoxically unable to make the Security Council an effective guarantor of

collective security. The author refers to the practical dimension of the effectiveness of the UN Security Council, mainly in terms of civil wars in the Syrian Arab Republic and Libya.

The impact measures by UN Security Council - selected aspects

As the author pointed out in his earlier deliberations, referring to the issue of differentiation of legal systems of collective security, Article 51 of the United Nations Charter "enables the institutionalization of the legitimacy of collective response procedures". (Kowalski 2019). The Council's responsibility is derived both from Article 51, which states that: "Measures taken by Members in the exercise of this right of self-defence shall be immediately reported to the Security Council and shall not in any way affect the authority and responsibility of the Security Council under the present Charter to take at any time such action as it deems necessary in order to maintain or restore international peace and security" and Article 42 of the UN Charter, which includes the competence of the Council to use the formula for military intervention (UN Charter). Ian Hurd points out that " (...) the Council has an unassailable position atop the international legal hierarchy. The Charter grants it the authority to decide what situations constitute threats to international peace and also the right to determine what, if anything, should be done about that. This includes the right to order military intervention against a UN member, and the domestic sovereignty of a target state is no impediment. In signing the UN Charter, all UN members are committed in advance to carrying out the Council's decisions" (Hurd 2014). A similar view in legal doctrine is also expressed by Boubacar S. Diallo, pointing out the key role of the Security Council in the security system that is represented by UN (Diallo 2018). With regard to the specific role of the Security Council in maintaining or restoring international peace and security, it should be stressed that the Council prioritises the use of peaceful means over military ones. The obligation to settle international disputes peacefully follows directly from the content of the Charter and applies not only to the Security Council but also to the Member States of the organisation see Article 2 sec. 3 (UN Charter).

The UN Charter contains a specific mandate for the Security Council's peacekeeping and security activities, making this body a depositary of powers to draw on the vast military resources of UN Member States. However, there is no doubt that in the face of further challenges to be faced by the Council, these military resources, while allowing for potentially effective interventions, are often of an abstract nature. Both the international community and UN Member States are increasingly reserved about potential opportunities to address further threats to the international order. Suffice it to recall that the current bloody civil war in the Syrian Arab Republic is entering its ninth year and that the conflict in Libya, which has been going on since 2014, has already been called 'Second Civil War'. (Ilardo 2019). Therefore, the bloody conflicts indicated above and selected from among others, cast a shadow over the long criticised effectiveness of the Security Council. This criticism is reinforced by the fact that in both cases, the implications of these conflicts, especially the unrestrained waves of refugees resulting from the humanitarian crisis in these countries, directly affect the level of security in Europe. The scale of the problem is illustrated by the data. For example, according to data, presented by United Nations High Commissioner for Refugees, on the consequences of the Syrian conflict, which are referred to by Human Rights Watch: "Years of relentless fighting left 6.6 million displaced internally and 5.6 million around the world" (hrw.org).

The sanctions available to the Council for possible violations of international peace and security include numerous peaceful measures, in particular the adoption of resolutions, the imposition of economic sanctions, the sending of observation missions and the possibility of military sanctions. The latter can be implemented by Member States' armed forces, but under the aegis of the United Nations. It should be borne in mind, however, that the Council's functionality in this area is in practice not due to the scale of human rights violations, for example in the cases of internal conflict referred to above, but rather, (...) from both de jure and de facto voting in the Security Council'. (Kowalski 2019). The armed conflicts in the Syrian Arab Republic and Libya are therefore a kind of *vote* of no confidence in the effectiveness of the Security Council as the key body of the most important collective security system in the world. Therefore, it is not surprising to criticise the Council's conduct in the context of the above-mentioned challenges.

Effectiveness of the Security Council in the context of the armed conflict in the Syrian Arab Republic

The example of armed conflicts, especially the one in the Syrian Arab Republic, shows both the complexity of contemporary international relations and the specificity of the powers' influence on the parties to the civil war. Anne Barnard and Karam Shoumali analyzing the ongoing proxy war in Syria between the United States and the Russian Federation, pointing out that supplying arms to the parties in the civil war: "have raised morale on both sides of the conflict, broadening war aims and hardening political positions, making a diplomatic settlement all the more unlikely" (Barnard, Shoumali 2015). The result of the involvement of the powers in this conflict is the formation of regional alliances aimed at achieving both military and political objectives. The participants of the alliances are both state and non state actors, see the Russia-Syria-Iran-Hezbollah axis (Khouri 2018). The cooperation between the United States and the Syrian Democratic Forces (Balanche 2018), which runs until 2019, should also be mentioned.

These realities mean that the rival powers, whether regionally - Middle East or nationally - Syria, do not in practice seek to ensure effective cooperation at the United Nations. This, in turn, raises problems of international law enforcement in relation to the fundamental principles of international law, especially respect for state sovereignty. Furthermore, it should be stressed that this issue concerns the involvement of the permanent members of the Security Council who have a veto right under the Charter of the United Nations. So it makes the whole situation almost paradoxical. It would be naive to think that the powers with the power to impose sanctions and with the right of veto would be subject to self-restraint.

It is not surprising, therefore, that some researchers are pessimistic that the starting point for a more effective use of the potential available to the Member States of the United Nations is now to focus on the procedural changes enshrined in the United Nations Charter. This means reviewing the Charter *de iure* and *de facto* Matuš Štulajter points out that: “However, due to the current power structure within the United Nations, it is only possible to argue about proposed innovations and changes. Current events in Ukraine and Syria clearly indicate that it is necessary to envisage the amendment of the UN Charter, its sanctions and enforcement mechanisms (…)” (Štulajter 2017). It is also a problem to bring motions for resolutions to the Council's deliberations, in particular by its permanent members, in an instrumental manner, in full knowledge that the motion will be rejected by the countries that are the adversaries on the matter. This view is presented in the doctrine of, among others, Muharrem Eksi, indicating that the powers deliberately bring issues related to the Syrian civil war to the Security Council, in full knowledge that other permanent members of the Council will oppose such initiatives (Eksi 2017). In this way, individual countries are trying to create a picture of their opponents as not interested in solving the humanitarian crisis in Syria. Similar conclusions are reached by Hafeez Ullah Khan and Waseem Khan, stressing that not only the countries of the region but also the major powers are to blame for the nightmare unfolding in Syria (Khan, Khan 2018).

It is significant that the rivalry shown above between the permanent members of the United Nations Security Council takes place within a body that often sees itself as the hub of values emanating from the United Nations Charter. Although the Council does not deny the effective exercise of the function of a kind of global legislator - for example Council Resolution 1373 of 28 September 2001 on combating international terrorism (S/RES/1373(2001)), as well as imposing certain obligations on Member States (Kowalski 2019), paradoxically, the greatest difficulties are generated in the Council by its permanent members denying the adaptation of legal, both legal and substantive competences to the present day. In the light of the findings so far, it should be clearly stressed that the greatest obstacle to reviewing the content of the United Nations Charter beyond the will of the States forming the United Nations system is, paradoxically, the very construction of the Charter. This unique piece of legislation, which is unique in international law, obviously contains a procedure for amending the content of the Charter, see Articles 108 and 109 (UN Charter). After all, both the ordinary procedure for amending the UN Charter by means of amendments - Article 108 - and the special procedure for the revision of the Charter - Article 109 - must be unanimously ratified by all the permanent members of the Security Council for the amendments to enter into force. At present, it seems reasonable to

assume that the change in the content of the Charter expected by some Member States, in particular the number of permanent members of the Security Council with a right of veto, will not take place in the coming years. It is worth noting that this issue is part of a dispute that has been going on for decades, during which some researchers raise arguments about the lack of representativeness and the lack of democratic character of the Security Council (Talmon 2005).

Conclusion

In conclusion, it should be noted that the long-standing armed conflicts in Syria and Libya are milestones that show that, on the one hand, the UN and the international community are not able to use effectively the enormous potential for influence, including military influence, of the Member States. On the other hand, the mechanism currently in place to legalise the use of force on the basis of decisions of the Security Council based on Article 42 of the Charter of the United Nations has led Council members, especially steel members, to often put particular issues before the responsibility of the Security Council for maintaining international order. These problems can be emanated, for example, by the results of the votes in the Security Council relating to the adoption of certain resolutions concerning Syria. For example, the well-known Security Council proposal for a resolution on the humanitarian disaster in Syrian Alleppo in 2016, vetoed by the Russian Federation (S/2016/846), should be mentioned. On the other hand, it should be noted that the Council, as a kind of emanation of the international community, often manages to adopt resolutions which have a significant practical impact in reducing the intensity of certain conflicts. In the context of the Syrian conflict, it was important to adopt unanimously (sic!) on 27 September 2013 Resolution 2118, which enabled the dismantling of the Syrian chemical weapons arsenal (S/RES/2118). This success, however, cannot conceal the problem of the instrumental treatment of the right of veto by permanent members of the Council.

This problem is in line with the need to reform the Security Council, which has been postulated for many years by both states and representatives of the doctrine of international law. In particular, the issue of extending the number of permanent members of the Council with a veto right should be addressed. This problem is pointed out by many researchers according to whom the key to the effectiveness of the collective security system is the International Security Law system (Nasu 2011). Eugenia Lopez - Jacoiste underlines that the problem of the delimitation of the Council's competences in Chapter VII of the United Nations Charter is not a new challenge, but an impediment to the exercise of the Security Council's powers. “The debate on the scope of the Council's powers in particular has been ongoing since the establishment of the United Nations. As alreadysaid, the Council's powers under Chapter VII are quite broad, but neverthless are also subject to limitations” (Lopez – Jacoiste 2010). According to Longin Pastusiak: “One way to strengthten the Security Council would be to establish new equitable representation. The question of equitable representation in, and an increase in the membership of the Security Council is of utmost importance to the future of the United Nations and its role in maintaining international peace and security” (Pastusiak 2010). There is a clear convergence between the material and legal powers of the Security Council under the UN Charter and the lack of response by the international community in situations of armed conflict. It seems reasonable to assume that until the UN Charter is amended, the effectiveness of the Security Council's work will continue to be criticised. It should be remembered that the power structure between the then powers in 1945 does not translate into today's reality. The fundamental principles of the United Nations' collective security mechanism, which have remained unchanged for 75 years, need to be enriched with new ways of addressing the challenges to international order and peace, especially as the challenges to the international community continue to evolve.

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Self-Management of Students in Drug-Prone Depok Area

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Abstract

The abuse and illicit trafficking of narcotics in Indonesia from year to year are increasingly agitating. Currently, the drugs penetrating students' circle. The purpose of this study is to analyze the self-management of high school and vocational high school students in drug-prone areas, so they are not exposed to drugs. This research employed descriptive quantitative research methods and surveys with questionnaires. The results showed that students' self-management is determined by age, living with parents, extracurricular activities, smoking activities, brawl/fighting activities, academic/non-academic achievements, drug consumption, and drug socialization.

Keywords: Drug-Prone; Narcotics; Self-Management; Student.

Introduction

The abuse and illicit trafficking of narcotics in Indonesia from year to year are increasingly agitating (BNN, 2018). Data from the Indonesian Child Protection Commission (KPAI) revealed that during 2017, there were around 22 cases of children who became drug couriers. Still, in the same year, there were about 46 children who were victims of drug abuse (KPAI, 2018). Student problems related to drugs have an impact on the sustainability of the school. Drug user students will experience mental health disorders and commit criminal acts (Maynard, Salas-Wright & Vaughn, 2015). Drug use in school-age children often occurs because of a lack of knowledge about these substances. The prevalence rate of narcotics abusers in Indonesia is 1.77% of the total population (BNN, 2018). The high prevalence rate of narcotics abuse in Indonesia is a form of threat to the current educated young generation.

Depok city has been declared drug-prone with the potential of drug trafficking and drug abuse. The number of drug abusers among students at all levels of the school in Depok city is 3.1%, which is quite high. Parents play an essential role in preventing drug use and related dangers among adolescents. Childcare interventions are also identified as crucial components of effective prevention programs (Thornton *et al*., 2018). Aside from parents, schools must be able to prevent school-based prevention by conducting comprehensive supervision (Midford *et al*., 2014). Furthermore, the self-management of students is also required to prevent drug abuse at schools. There is no research focused on drug-prone areas in Depok City yet. Specifically, high schools and vocational schools in drug-prone areas have the potential to be exposed to drugs.

Methods

This research has been conducted at Senior High School (SMA), and Vocational High School (SMK) in the drug-prone areas of Depok City, Pancoran Mas district has been selected among 11 districts within Depok City. The study utilized a qualitative method with student surveys. The sampling

technique was non-probability sampling, using convenience sampling. The sample of the study is 5% of the population, which is 129.5 or about 130 respondents from five high schools and six vocational high schools in Pancoran Mas district. Respondents filled out questionnaires, and the data has been tested for validity and reliability using the IBM SPSS application.

Result and Discussion

The valid questionnaires obtained from 150 respondents out of 162 total respondents who participate in the research. The rest of the respondents (12 respondents) did not complete the questionnaire. All respondents were from three high schools and five vocational schools in Pancoran Mas district, with different numbers of respondents in each school, as shown in Table 1.

Table 1: Questionnaire distribution of high school (SMAS) and vocational school (SMKS) students in Pancoran Mas district

NO	SCHOOL NAME	STATUS	RESPONDENTS COUNT
1	SMAS Muhammadiyah 1	Private	14
2	SMAS IT Nurrurahman	Private	26
3	SMAS PSKD VII	Private	8
4	SMKS Setia Negara	Private	18
5	SMKS Baskara	Private	37
6	SMKS Fajar Depok	Private	35
7	SMKS Kesehatan Bhakti Insani	Private	7
8	SMKS Galang Farmasia	Private	5
TOTAL RESPONDENTS			150

Characteristics of respondents from five vocational schools and three high schools in drug-prone areas were 65% female students, and 35% were male students. Physical characteristics of men and women can influence self-management, including aggressive behavior (Santrock, 2007). The results showed that women were wiser in doing things compared to men (Siegel & Spiegel, 2011). Women are more likely to be gentle, affectionate, and sympathetic compared to behaving aggressively. Thus, it means that the possibility of women aggressively behaving is less than men (Hasan, 2014).

The survey results showed that only 3% of respondents admitted that they did not live with their parents. Two out of five respondents explained that they lived with their siblings, and the rest did not explain their situation. This condition can be concluded that high school and vocational school students in drug-prone areas are not easily exposed to drugs because 97% of them have an intact family. At such a young age, students require direction and attention from their parents to provide comfort and guidance (Wang & Fredricks, 2014). Hirschi & Gottfredson, (2017), in their theory of social control, says that delinquency arises when social ties are weak or absent. It takes attachment of parents in controlling a child's emotional factors, especially during the adolescent phase. Children do this attachment with parents, school, and peers, including parental supervision, communication quality, togetherness, parents' understanding of their children's friendship and beliefs (Breslau, Miller, Joanie Chung, & Schweitzer, 2011; Dockery, 2012).
Respondents who live with their parents certainly feel more comfortable while getting more intense supervision than those who do not live with parents. If parenting patterns of adolescents involve adolescents' warmth and control, then parental efforts to control adolescents may experience collisions with adolescent desires for autonomy (Papalia, 2015). Some parenting patterns also offer

warmth to adolescents, so parents can communicate their intentions and goals in controlling adolescent behavior well.

Parents can help protect their children from any possibility that may happen in the future (Yap, Cheong, Zaravinos-Tsakos, Lubman, & Jorm, 2017). Family conflict causes divorce and separation, which affects the stability of family and children. Further research shows that students from unstable family backgrounds are more likely to abuse drugs than those who have stable family backgrounds (Barasa, 2013).

Survey results show that 62% of students attend extracurricular activities in their schools, while the 38% remaining do not participate in extracurricular activities. The above findings are under one of the social bond theories developed by Hirschi & Gottfredson (2017), namely involvement. Children's involvement is related to how much time a child spends interacting with other individuals in an activity. If the right interaction with an activity or a person, such as sports, arts, and other activities that are predominantly carried out by the children, the possibility of performing delinquent behavior will be even less. Conversely, if improper interactions and activities such as skipping class, fighting, conflict with parents, stealing, etc., are things that children experienced often, then delinquency will be more easily formed.

The data reveals that 20% of respondents have smoked. Students explained that they had smoked since elementary school age because their peers influenced them. Many will continue to use tobacco even during abstinence from other drugs and alcohol, which often leads to smoking-related illnesses (Marsiglia, Wu, Ayers, & Weide, 2019). Campaigns and outreach on smoke-free laws can support helping to create a smoke-free environment (Thrasher *et al*., 2011).

The survey indicates that 77% of respondents are never fighting or caught brawling, while as many as 23% of respondents were involved in fighting or brawling. Respondents who had fought were respondents who came from SMK (STM) and were dominated by male students. Drug-user students will experience mental health disorders and commit criminal acts (Maynard *et al*., 2015). In addition, there are 57% of students who have received achievements. The teachers who always acknowledge the students' presence at school are a form of concern from the teacher for the sustainability of the students' academic achievement. Regular student attendance can reduce the severity of the crime and drug abuse (Nardi, Cunha, Bizarro, & Dell 'Aglio, 2012). There are 36% of respondents who have taken drugs without a doctor's prescription. Some respondents explained that the drugs they took without a doctor's prescription are drugs that are sold freely, such as paracetamol and sort of.

The survey explains that 49% of respondents had participated in the socialization of the dangers posed by drugs. One of the efforts to prevent drug abuse in schools is by continuously socializing the risks of drugs for students by conducting various methods such as training, lectures, discussions/ talk shows, film screenings about drugs, leaflets and performing arts (Das, Salam, Arshad, Finkelstein, & Bhutta, 2016). It also collaborates with research conducted by Das *et al*., (2016), which found that among smoking/ tobacco interventions, schools have been conducting school-based prevention programs. Family-based intensive interventions usually address family functions that are effective in reducing smoking. Students are part of young people who have a great desire in social interaction in the school environment and outside the school environment, namely the community.

Conclusion

The result findings are 65% of respondents are female students, 97% of students have intact family, 62% of students attend extracurricular activities in their schools, 80% of students never smoke, 77% of respondents never fight/brawl, and 49% of students have participated in drug socialization. Thus, there are several determining factors of self-management, namely age, living with parents, extracurricular activities, smoking activities, brawl/fighting activities, academic/non-academic achievements, drug consumption, and drug socialization. In addition to self-management, schools are

also encouraged to play a multidimensional role in tackling the problem of drug abuse among students. Anticipation of the school against drug abuse among students is absolutely necessary.

Acknowledgment

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Material Supplies to Companies in The Metal Industry

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Abstract

The paper presents the results of research on the supply of companies in the metal industry in terms of creation relations in supply chains. The research was carried out using a proprietary survey questionnaire and covered companies operating in Poland. The issues examined included: assessment of the impact of effective cooperation with suppliers, actions taken to increase the effectiveness of supply tasks, estimated share of supply costs in total costs, the number of suppliers, actions taken in cooperation with suppliers, factors conducive to effective cooperation, elements of supply risk and methods of its reduction, supplier assessment criteria, and causes of conflicts in the area of supply.

Keywords: Material Supplies, Metal Industry, Cooperation with Suppliers, Supply Risk

Introduction

The basic objectives of supply resulting from the general objectives of companies, i.e. to achieve competitive capacity in the market and a certain level of profitability, are related to the significant economic importance of supply and its impact on costs, but also on efficiency, quality, and reliability of deliveries. This forms the basis for viewing supply as an important function in companies with a significant impact, but above all as an area with considerable potential for changing competitiveness. It can result from creation of market links with partners that are durable, reliable, flexible, and capable of continuous development within integrated supply chains. Supply in today's market economies is therefore of a strategic nature, which requires adaptation to the business strategies of buyers and management of the structure and culture of relations within the functioning supply chains. The tasks related to supply are carried out on all levels of management, from operational to strategic, covering entire supply chains. Such an integrated approach is the basis for a change in the approach to task performance in the direction of teamwork and sharing of experience and knowledge. Supply in companies should therefore constitute a comprehensive system adapted to the type of activity and industry, the scope of the tasks performed, and the nature of the relations with suppliers. The research was conducted in order to identify and evaluate the implementation of supply-related tasks in production companies in Poland’s metal industry. The motivation to undertake the research is the significant share of costs of materials in the general costs of businesses in the metal industry and the need to identify areas where there is potential for broadly defined improvement in the area of supply, as well as to identify limitations and barriers to creation of relationships with suppliers.

Literature Review

According to K. Lysons (2004), the factors that determine the role of supply in businesses are the impact of supply on the expenditures of businesses and the importance of its effectiveness for the competitiveness of businesses. As stated by C. Bozarth and R Handfield (2007), supply involves a number of activities related to identification of needs, identification and selection of suppliers, negotiation of terms, etc. Cost is not the only relevant factor to be taken into account. The goods and services purchased can have a major impact on various dimensions of performance, including quality, reliability of deliveries, and the ability of companies to exploit new technologies. The role of supply purchases from the point of view of companies has changed and evolved from a typically transactional function to a strategic function. As stated in P. Fung (1999), purchases include strategic purchases, alignment of the performance of suppliers with the business strategies of the buyers, management of

the supplier base, management of the structure and culture of the relationships with suppliers and cost-effective organization of deliveries, and creation of flexible organizational structures supported by effective information systems. An important aspect of such a strategic approach is the sharing of management experience throughout the supply chain. However, in order to achieve such a goal, it is necessary to undertake, as indicated by Ch. Ellegaard and Ch. Koch (2014), internal integration measures which constitute the first stage of improvement. They consist in mitigating the conflict of objectives in functional units and help avoid suboptimization. The next stage is shaping of the relations with business partners as a potential for improvement of the broadly defined quality and increase of the value offered to the final customer through optimal use of financial resources, reduction of the funds invested in stocks, and ensuring the continuity and reliability of deliveries (cf. M. Haensel, E. Hofmann (2018)).

The structure of expenditures related to purchases of supply goods depends on the type of activity and the industry. The supply organizations in different companies should constitute a comprehensive system adapted to the type of activity and industry, the scope of the tasks performed, and the relations with suppliers. In the case of companies in the metal industry, due to the significant share of supply costs in total costs, this plays a strategic role, as indicated by W. Waszkielewicz et al. (2005) and E. Staniewska (2007). The primary purpose of supply is to ensure availability of materials, which contributes to the achievement of the assumed level of customer service, optimization of planning and use of resources and costs incurred, and as a consequence, to increase the market value and the profit of the company. As indicated by A. Agrawal (2014), active management of sourcing of materials can increase the value of the supply chain. At the same time, the consequences of a failure to quickly respond to market signals, especially in the case of strategic materials, are indicated by G. Gaustad et al. (2018), E. Alonso et al., and Kirchain R. (2007).

The basic decision affecting the competitive advantage, in the opinion of J. Rezaei et al. (2016), is to define the strategies for the selection of the supplier, which may take into account different assessment criteria. An important role can be played by outsourcing which, according to H. Wee et al. (2010), depending on the industry, may be crucial to ensure the competitiveness of the company. In many cases, an advantageous solution may be a reduction in the number of suppliers, which, according to D. Song et al. (2014), may provide a basis for improving the effectiveness of cooperation with suppliers. However, it requires the establishment of long-term relationships with suppliers based on partnership principles. An additional advantageous consequence of creation of relationships with suppliers may be their involvement in the process of development of new products, as indicated by K. Petersen K. et al. (2005). As pointed out by A. Agrawal et al. (2014), one of the important opportunities for acquiring knowledge in the area of supply can be the implementation of the concept of a sourcing center proposed by the authors, which is a center of cooperation between the company, its suppliers, and the suppliers of raw materials.

In the area of supply, risk management has been an important issue that has been very widely discussed in recent years in the literature on this subject. A detailed and comprehensive review of work in the area of risk management in a supply chain has been presented by, e.g. Ho et al. (2015), Tang and Musa (2011), and Rao, Goldsby (2009). The need to implement the risk management concepts in the supply chain stems in particular from the globalization of operations, the implementation of the lean management concept, and the need for flexibility. Many authors have attempted to identify the risk factors in the area of supply, e.g. Zsidisin and Ellram (2003), Kull and Talluri (2008), Chopra and Sodhi (2004), Gaudenzi and Borghesi (2006), Wu et al. (2006), Tummala and Schoenherr (2011), Samvedi et al. (2013). The risk factors in the area of supply include: demand volatility, quality and flexibility assurance, dependence on a supplier, supplier's market power, limited number of suppliers, risk related to the choice of supplier, lack of price competitiveness, monopoly, outsourcing, risk of a supplier's bankruptcy, one supplier, lack of integration with suppliers, problems related to the implementation of contract terms and conditions, lack of compliance with delivery requirements, low technical reliability, lack of timely deliveries, errors in deliveries, sudden increase in costs, lack of cooperation transparency, the supplier's opportunism, low technological competitiveness, and management problems.

Cooperation in the supply chain, as pointed out by Speier et al. (2011), requires a detailed threat analysis and a focus on actions intended to mitigate and limit the possible effects of risks, as well as initiatives such as process management, information sharing, partner/supplier relationship management, and enhanced trust in relationships, as indicated by Christopher and Lee (2004). However, this requires managing the relationships with partners through integration, as indicated by Wiengarten et al. (2016), as an important factor for productivity gains resulting from implementation of effective risk management practices.

Research Question

The research objective is associated with the following research questions:

- What was the assessment of the level of influence of cooperation with suppliers on the effectiveness of the entire supply chain?
- What is the estimated share of supply costs in total logistics costs?
- How many suppliers do companies in the metal industry cooperate with and what are the main criteria for their assessment?
- What factors are conducive to effective cooperation with suppliers?
- What are the risks of cooperation with suppliers and what are the methods that help mitigate them in business practice?
- What are the root causes of conflicts in the area of supply?

Answers to these questions made it possible to assess the role of supply in achievement of the objectives of businesses, as well as to identify the factors that influence the assurance of effective cooperation in supply chains.

Research Design and Methodology

The research that formed the basis of this paper was carried out by means of a proprietary survey questionnaire, which comprised questions concerning the characteristics of the surveyed companies: the size and the scope of operations, the capital engaged, the industry, the organizational maturity, and the research problems undertaken. The survey questionnaire contained closed-ended questions with the possibility of extending or supplementing some answers. The survey questionnaires were completed by the target respondents, who were people in management positions, mainly from the area related to logistics, supply chain management, or other related areas (e.g. procurement, production). The results obtained were subjected to a quantitative and qualitative analysis and formed the basis for conclusions.

The selection of the study sample was intentional and targeted at companies in the metal industry, covering the broadly defined metalworking sector, i.e. production and processing of steel and steel products. The research was conducted in 50 Polish companies (did not include micro-businesses) in 2017-2019. The detailed structure of the surveyed businesses in terms of size, type, scope of operations, ownership, engaged capital, and length of existence in the market is presented in Figure 1.

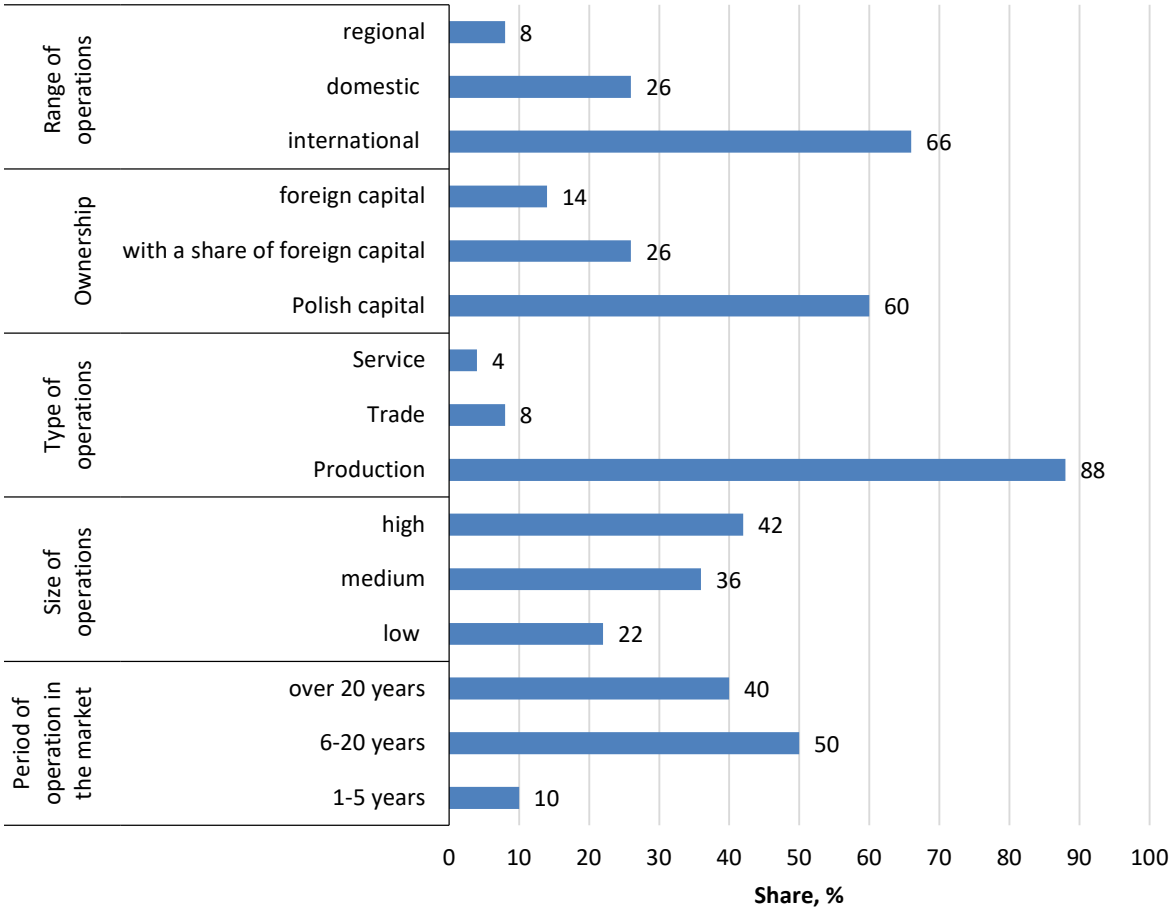

Fig. 1: Characteristics of the surveyed businesses

A majority of the surveyed businesses were mature enterprises present in the market for 6-20 years (50%) and longer (40%). In terms of type of operations, the largest group was manufacturing companies (88%). In terms of range of operations, 66% were companies operating in the international market. The basis for financing of 60% of the surveyed companies is Polish capital.

Results

The first of the examined issues concerned the impact of selected aspects related to running a business on the increase in the effectiveness of supply chains. Factors such as sales and customer service issues, internal integration of activities, flexibility, innovation, logistics processes, knowledge management, the importance of outsourcing, etc. were taken into account. To the 17 factors indicated in the questionnaire, the respondents assigned ratings using the 5-point Likert scale, on the basis of which the results were elaborated using the ranking method. Based on the results obtained, it can be concluded that the assessment of the factor *Effective cooperation with suppliers* is an important element of value creation in supply chains. This factor ranked second (after the sales growth factor) as one of the most important factors in the opinion of respondents from metal industry companies. The detailed result of the assessment is shown in Figure 2. Another factor rated highest in the ranking was the creation of customer relations. This confirms the important role of supply in this type of operations and the relations with business partners as the basic elements of value creation in supply chains.

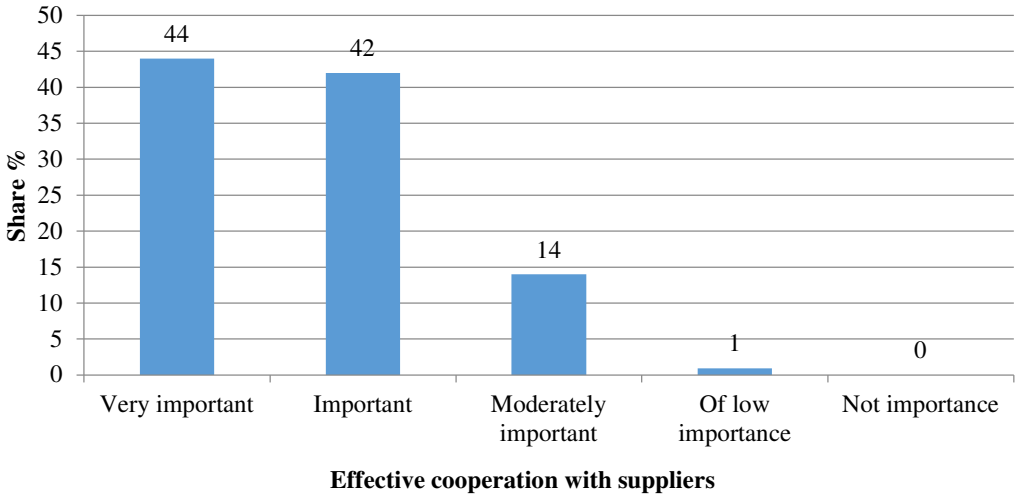

Fig. 2: Assessment of the impact of effective cooperation with suppliers in value creation

The importance of supply results from the significant share of raw materials and materials in the total costs of companies in the metal industry. In the research conducted, the respondents were asked to estimate the cost of raw materials and materials. The results indicate that it represents on average 59% of total costs of the surveyed metal industry companies.

Another piece of information obtained as a result of the research was the number of suppliers with which the companies cooperate. The main factors that determines the number of suppliers are usually the size and scope of the company's businesses. The number of suppliers with which the surveyed metal companies cooperate is shown in Figure 3.

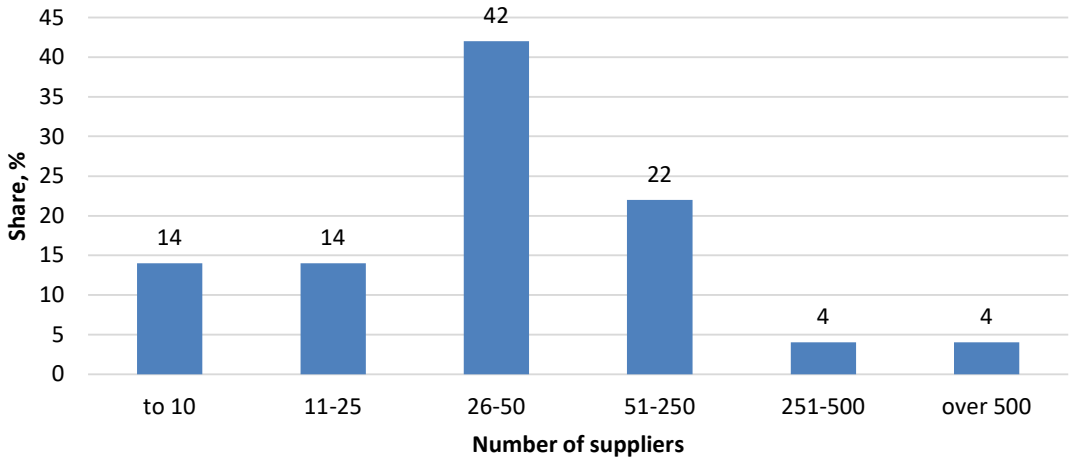

Fig. 3: Number of suppliers

The number of suppliers most frequently indicated by the respondents is in the range of 26-50. Few (8%) companies cooperate with more than 250 suppliers and this is especially true for very large metallurgical companies.

An important issue in creation of relationships is the choice of supplier selection criteria. The research included more than 20 assessment criteria, which were evaluated by the respondents using a 5-point scale and the results formed the basis for the ranking of the criteria. The most important criteria for the evaluation of suppliers in metal industry companies are: quality, price, reliability of deliveries, comprehensiveness of the offer, and positive cooperation to date. Next in the ranking were such criteria as service level, supplier's length of presence in the market, timeliness of deliveries, payment terms, service provision, way of dealing with disputable issues, good financial condition of the supplier, willingness to cooperate in the long term, technological flexibility, and provision of delivery transport. The criteria whose importance in the evaluation of suppliers was rated by the respondents as the lowest include: brand, audit results, ISO14000 certificate, informal contacts, possession of approvals, possibility to test the products, ISO 9001 certificate, and distance from the supplier.

Another aspect of the research was to determine the nature of relations with suppliers, taking into account the type of contracts concluded and their time range. The results of the respondents' indications lead to the conclusion that in 58% of metal industry companies relations with suppliers are characterized by long-term nature and refer to long-term cooperation, while in 34% of companies short-term agreements with suppliers were indicated. Only 4% of the companies are supplied on the basis of regular buy-sell transactions and another 4% indicated a lack of relations with suppliers.

The scope of cooperation with suppliers and the creation of relationships depends on factors that determine the scope of cooperation, including such strategic aspects of material supply as share of materials in total costs, regularity of demand for materials, and risk related to supply. The use of the ranking method and of assessment with the use of a 5-point Likert scale was the basis for the conclusion that the importance of materials for production is the basic determinant of the choice of strategic business partners, followed by the share of material costs in total costs and regularity of demand, while the risk related to the availability of materials was assessed by the respondents as the lowest.

Another element in the evaluation of relationships of metal industry companies with suppliers was the assessment of factors that are conducive to cooperation and creation of lasting relations. The use of the ranking method and the 5-point Likert scale made it possible to rank the factors which positively influence the creation of relationships, in the following order of importance:

1. Previous experience of cooperation.
2. Common objectives and points of view.
3. Common competitors.
4. Common end-users.
5. Possibility of exclusive cooperation.
6. Similar values.
7. Similar bargaining power.
8. Similar organizational culture.
9. Similar philosophy and managerial techniques.
10. Physical proximity.

Another issue concerning the analysis of cooperation with suppliers was the actions undertaken in relationships with suppliers. The results obtained are shown in Figure 3.

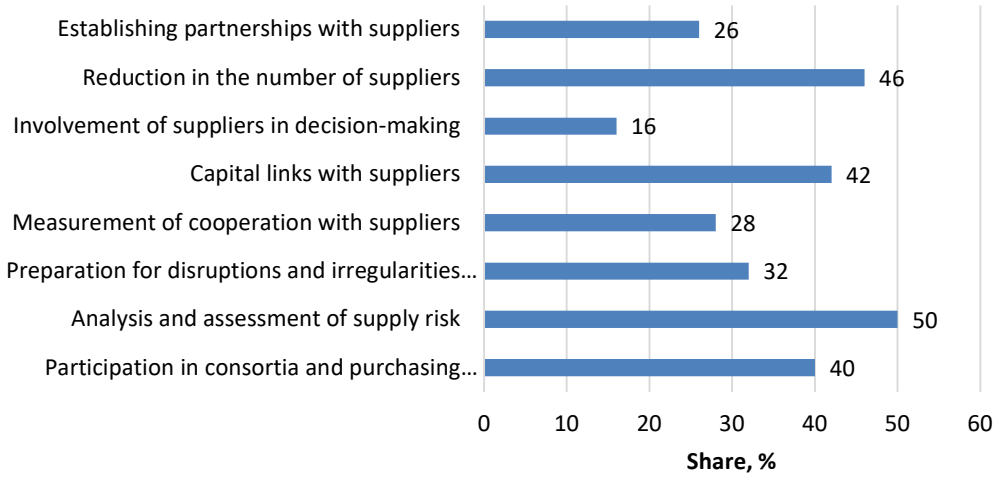

Fig. 3: Integration activities undertaken in relationships with suppliers

One of the activities in the area of supply in metal industry companies most frequently indicated by the respondents is analysis and assessment of the supply risk. It is also important to reduce the number of suppliers, which may indicate an awareness of the important role of creation of relationships with suppliers based on lasting relationships and partnerships. At the same time, only 26% of respondents indicated that they created partnership relationships with suppliers, while only 16% indicated that they were involved in decision-making. Figure 4 shows the methods and concepts related to cooperation with suppliers and used in metal industry companies.

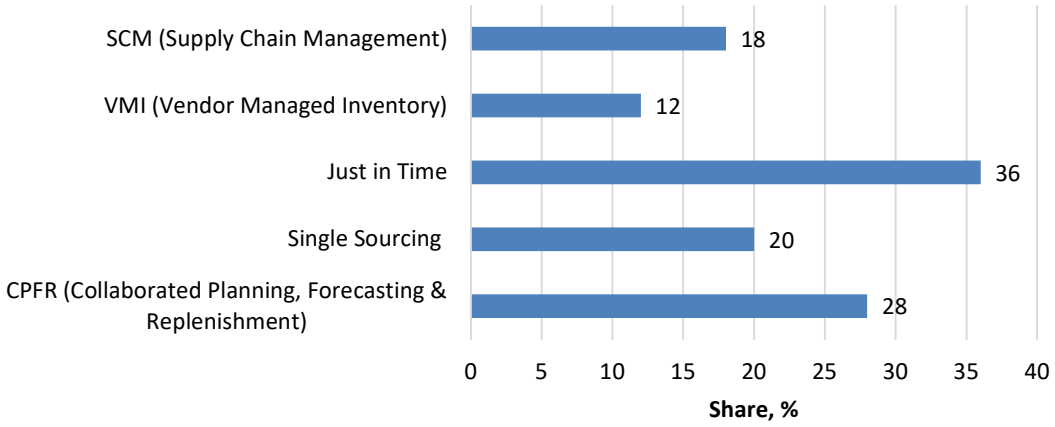

Fig. 4: Concepts used in relationships with suppliers

The surveyed companies most often indicated use of the Just in Time philosophy in their relationships with suppliers (36%); at the same time, it can be noted that 28% of metal industry companies use the CPFR technique, which enables improving the quality of forecasting and cooperation of companies in supply chains. The Single Sourcing model is used in 20% of the companies.

An important element of cooperation with suppliers, as indicated in Figure 3, is the proper preparation for disturbances. This primarily involves identification of risk elements. The results of the assessment of the role of the selected risk elements on the performance of the process of supply in cooperation with suppliers are shown in Figure 5.

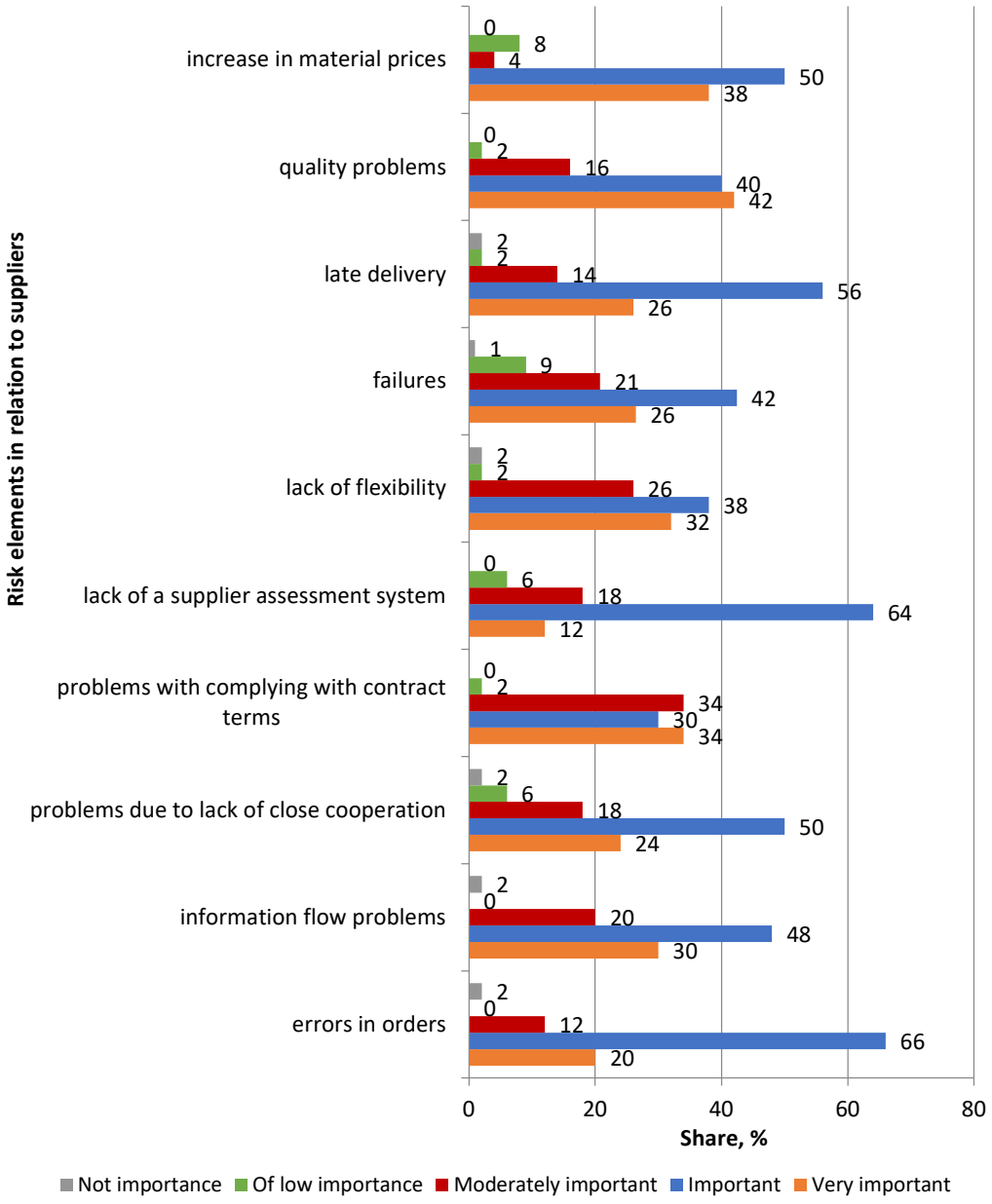

Fig. 5: Risk elements in relation to suppliers and their role in terms of consequences

The assessment of risk elements using the ranking method allows to rank the indicated risk factors from the most important ones and to indicate the most important elements of supply risk, which include quality problems, increase in material prices, and information flow problems.

Another element of the assessment of cooperation with suppliers was the risk assessment methods used by the surveyed companies. The results of the respondents' indications are shown in Figure 6.

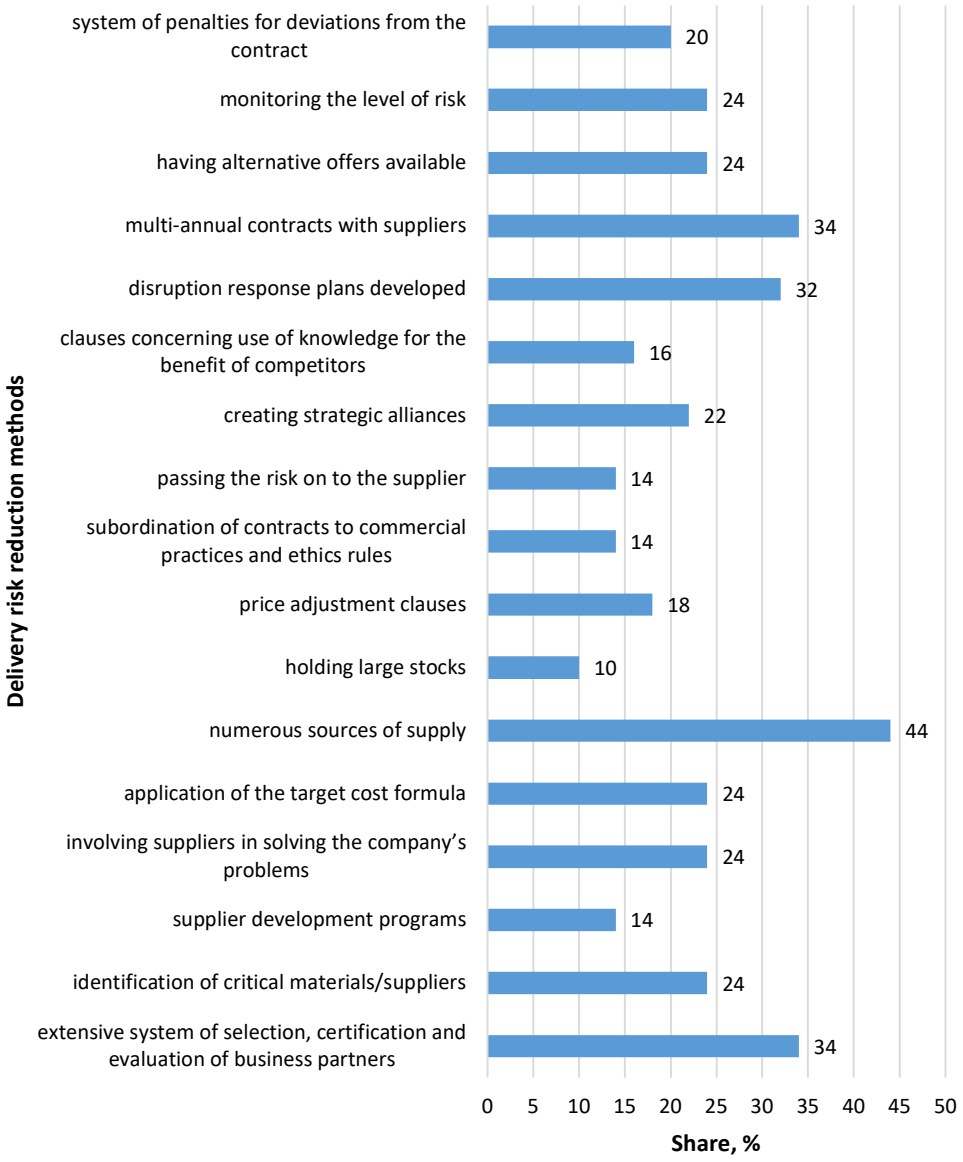

Fig. 6: Supply risk reduction methods

The most frequently indicated ways of reduction of the supply risk in the surveyed metal industry companies are numerous sources of supply, long-term contracts with suppliers, extensive selection system, certification and evaluation of business partners, and development of plans for responding to disturbances. At the same time, one of the least frequently indicated methods is risk reduction through stock building.

Further analysis of cooperation with suppliers concerned the causes and the frequency of conflict situations and the results obtained are shown in Figure 7.

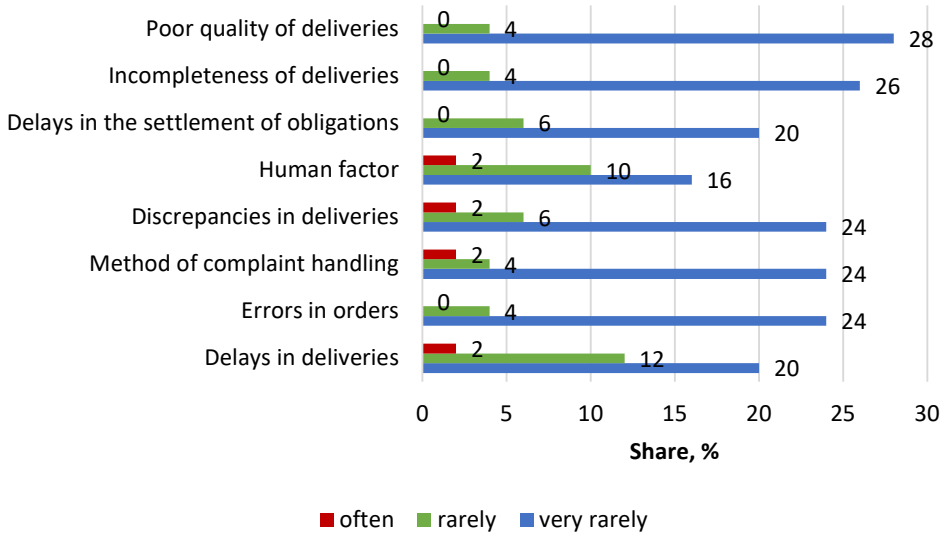

Fig. 7: Causes of conflicts with suppliers and their occurrence

The most frequently indicated cause of conflicts and problems is delays in deliveries (34 indications in total). The frequency of their occurrence was also assessed by the respondents as the highest. Although the high number of indications concerned problems with the quality of deliveries, the frequency of occurrence was assessed as very rare. It should also be emphasized that a significant number of the respondents (depending on the cause of the conflict), indicated that conflict situations do not occur or did not indicate their frequency (66-74%).

Discussion

Changes in the environment determine the actions aimed at increasing competitiveness and ensuring an appropriate level of safety of the processes performed. Gaining an advantage in the market does not involve competing with individual companies but with entire supply chains or even supply networks. As M. Hugos (2011) states, one of the biggest challenges, and at the same time one of the biggest opportunities to stimulate the growth of companies is to build sustainable and efficient supply chains that can gain competitive advantage in their markets. The aim of cooperation is to benefit all the links in the supply chain as a result of optimization of the processes taking place in it, which is different from traditional cooperation between companies where the aim of the actions taken is to achieve individual benefits. Other features of cooperation in a supply chain include a larger scale of cooperation, a longer time horizon, and more partners than in the traditional approach. The benefits of cooperation in a supply chain include the possibility of improvement, whereby the first stage of improvement, referred to as internal integration, consists in mitigating conflicts of objectives in functional units and helps avoid suboptimization. The second stage concerns external partners, i.e. relationships in the supply chain, and consists in the implementation of joint projects to improve common processes in the supply chain. These activities form the basis for sustainable and, above all, stable supply chains, the aim of which is to ensure the safety of the implemented processes and to create value for the customer. The basis for ensuring stability is identification and analysis of the risk in order to counteract emerging problems resulting from the cooperation and the processes. Awareness of the role of partners in the supply chain and identification of risks and factors that determine relationships is important in this respect.

Study Limitations

The results of the research presented in the paper are limited to cooperation with suppliers. An important element in the analysis of customer value creation and cooperation within supply chains is the assessment of cooperation with customers. In a free-market economy and in a highly competitive environment, it is important to assess cooperation with customers, but above all to analyze risks and assess the possibility of establishing long-term stable relations with them that affecting the safety of entire supply chains and their individual links. It is important and justified to complement the research with results concerning the broadly defined cooperation of companies in the metal industry within their supply chains. The analysis of relations in the supply chain has been limited to the connections between contractors/links in the chain, however, social and environmental aspects are also worth considering. An important aspect of the functioning of supply chains is risk analysis, which, however, has been limited in the study to risk factors in terms of relations with contractors.

Conclusion

Supply is a basic function of businesses and one of the functional areas of businesses that is responsible for the effective flow of supply goods from suppliers to their recipients. The relationships between businesses and their suppliers provide a potential for increase in the value for partners but also for the end customers as a result of cost reduction and optimal quality shaping to ensure continuity and reliability of deliveries.

On the basis of the research concerning the execution of the supply function in metal industry companies, it can be concluded that the surveyed businesses see an important role of effective cooperation with suppliers in creating value. This is mostly due to the significant share of raw materials and materials in the total costs of companies in the metal industry. These companies most often cooperate with a significant number of suppliers, while at the same time almost a half of the respondents indicated that they take measures intended to reduce the number of suppliers. Positive experiences from cooperation and common goals are the basis for creating relationships with suppliers. In the surveyed companies, an important role is played by risk analysis in the area of ensuring continuity of supplies and implementing methods and concepts aimed at eliminating the risk. These actions may reduce the occurrence of conflict situations in the area of cooperation with suppliers.

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Management of Available EU Funds and The State of Municipal Waste Management In Poland

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Abstract

Municipal waste, although it accounts for less than 10% of all the waste produced in the EU in a year, is a very high-profile issue, and managing it in an ecologically rational way can be a huge challenge due to its non-homogeneous composition. The current activities of the European Union aim towards a circular economy. Consequently, the member states are required to implement specified measures and prioritise prevention, reuse and recycling activities over landfilling and incineration. The recycling and landfilling targets set for the next years represent an ambitious path for a better municipal waste management in Europe. The aim of the publication was to examine whether the available EU funds in the current EU budgeting period 2014-2020 are fully used for investments, thus showing effectiveness or ineffectiveness of management in economic entities, and how these activities impact the state of municipal waste management in Poland. Quantitative methods, including classic descriptive statistics and taxonomic methods based on a linear ordering of objects, were used for the research. The effectiveness of EU funds management was examined in a general way as well as within an environmental dimension through result indicators , broken down into categories by regions. The obtained values of the indicators at the current stage of the conducted analysis are not satisfactory, and that indicates a low level of effectiveness of management and illustrates the fact that much more remains to be done to improve the state of municipal waste mamagement.

Keywords: Management, Effective Fund Management, EU Funds, Municipal Waste Management

Introduction

The quantity of generated municipal waste depends mainly on a society's consumption model and environmental awareness. Prevention of food waste alone makes a significant difference for the environment (Gentil et al., 2011). Each of us produces a large amount of waste, which we usually forget about once we throw it away. However, we should avoid perceiving waste in this way and remember that it can be reused. The best ways of managing waste problems through recycling, incineration, landfilling and other processes were addressed extensively in a book by Trevor Letcher and Daniel Vallero (2011). However, waste management activities can be hindered by a problem no less grave that waste itself, namely costs. Economic entities' awareness of the sources of financing environmental investments and appropriate use of such resources provide a chance for changes, and consequently improvement of the state of the natural environment. Thus, it should be pointed out that the current system of financing waste management undergoes constant changes as a result of the transformations taking place in the country's economy. Lack of sufficient own funds significantly blocks the possibilities of undertaking necessary investments. This is the reason for continued importance of EU funds, which received as subsidies do not constitute an additional burden on local communities benefiting from the effects of such investments. The aim of the publication was to examine whether the available financing system based on EU funds functions in an efficient way, allowing necessary municipal waste management investments to be implemented in order to improve the state of the natural environment in Poland and whether the available EU funds allocated for such activities are fully used in the current budgeting period 2014-2020 by economic entities, thus showing effectiveness or non-effectiveness of the way they operate.

The State of Municipal Waste Management In Poland and The European Union

The main purpose of waste management is to protect the life and health of population as well as the environment. According to the waste law, whoever undertakes activities that cause or are likely to cause the generation of waste should carry out such activities in a way that prevents waste generation, and if waste could not have been prevented it should be recycled (Journal of Laws 2019, item 701). Despite catchy slogans connected with circular economy, a lot of waste is still not reused and ends up at landfill sites. One can thus conclude that waste separation and management continue to be the most important challenge today. Nevertheless, both the current EU perspective, which is reaching an end, and the new one clearly state that what can be financed in the area of waste management is everything that makes us closer to an economy based on rational use of resources and reduction of the negative environmental impact of manufactured products, which should stay in circulation as long as possible. This mainly involves activities aimed at raising the level of recycling and investments in infrastructure such as for example biogas installations. What's important, a circular economy is not meant to end economic growth. Its aim, as the EU Commissioner for the Environment Janez Potočnik put it in the introduction to a 2013 report by Ellen MacArthur Foundation, is to restore harmony in nature and prosperity in a world of limited resources.

The waste management policy is governed by relevant national laws and EU directives (Directive 2008/98/EC, Directive 1999/31/EC). The waste management principles currently applicable in Poland were laid down in the waste law of 14 December 2012 and closely related law of 13 September 1996 on maintaining cleanliness and order in communes. Communes, which represent the lowest administrative level, but at the same time the most important one in the environmental management structure, are obliged to maintain cleanliness and order within their territories and to ensure the construction, operation and maintenance of regional installations for municipal waste processing (Journal of Laws 2019, item 2010). Municipal waste is waste generated in households as well as in economic entities and public institutions with character and composition similar to that of the waste generated in households (Polish Monitor 2016, item 784). The quantity and morphological composition of such waste depends to a very large extent on where it was created, including on the wealth of a society, level of the consumption of goods, as well as the season. Moreover, the annual per capita amount of collected waste is strongly correlated with the economic condition of the different regions of a given country (Polish Monitor 2016, item 784).

Statistical data for the period 2014-2018 in Poland show a clear upward trend in collected municipal waste, and, what's important, indicate a faster growth rate of separately collected waste. Nevertheless, the average annual amount of collected municipal waste per capita in Poland was over 300 kg, and recorded a significant growth. Still, it is one of the lowest indicators among European countries. The average amount of generated municipal waste per capita for the EU-28 is almost 500 kg per year, with Denmark, Germany, Cyprus, Malta and Luxembourg recording much higher amounts (Energy, transport and environment statistics, 2019). Table 1 presents data on collected municipal waste in Poland in the years 2014-2018.

Table 1: Municipal waste collected by fractions in Poland

	Municipal waste generated		Mixed in thous. tonnes	Collected separately in thous. tonnes
Year	in thous. tonnes	kg per capita		
2014	10330	268	8280	2050
2015	10864	283	8326	2538
2016	11654	303	8712	2942
2017	11969	312	8729	3240
2018	12485	325	8877	3608

Source: own study based on data from Environment 2015-2019, Central Statistical Office

Figure 1 presents data on the amount of municipal waste generated per capita in European Union countries in 2016.

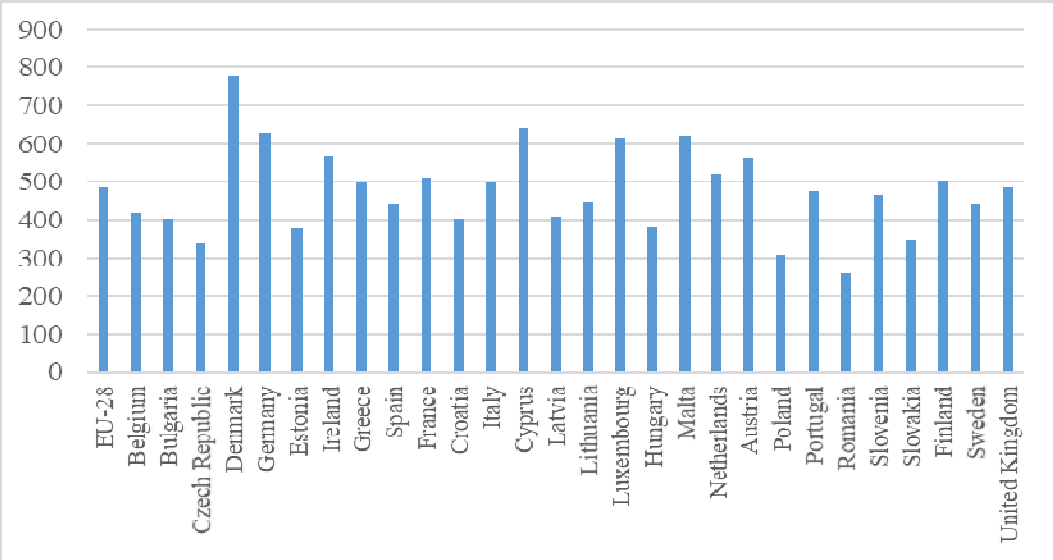

Fig. 1: Municipal waste generated (kg/capita) in 2016
Source: own study based on data from Energy transport and environment statistics 2018

What is important, EU Member States approved a set of ambitious measures to make EU waste legislation fit for the future, as part of the EU's wider circular economy policy. The new rules, based on Commission's proposals part of the Circular Economy package presented in December 2015, will help to prevent waste and, where this is not possible, significantly step up recycling of municipal waste. Commissioner for Environment, Maritime Affairs and Fisheries, Karmenu Vella said that the new recycling and landfilling targets set a credible and ambitious path for better waste management in Europe (Brivio & Petsa, 2018). Recycling targets for municipal waste were fixed at: 55% by 2025, 60% by 2030 and 65% by 2035. In turn by 2035, according to assumptions, the amount of municipal waste landfilled must be reduced to 10% or less of the total amount of municipal waste generated (Bourguignon, 2018).

Thus, an important element of the assessment of the current municipal waste management is the level of recycling and share of municipal waste landfilled. In 2016, 2 312 million tonnes of all waste in the EU were treated, of which 45.7% was landfilled, and 37.8% was recycled. The EU members vary greatly in terms of waste treatment methods used. For instance, in 2016 some member states recorded a very high level of recycling (Italy and Belgium), whereas others preferred landfilling, e.g. Bulgaria, Romania, Greece, Sweden and Finland (Eurostat, Waste statistics 2016). Landfilling is almost non-existent in countries such as Belgium, the Netherlands, Denmark, Sweden, Germany, Austria and Finland). Here incineration plays an important role alongside recycling. The practice of landfilling remains popular in the eastern and southern parts of Europe. Twelve countries landfill almost half or more of their municipal waste. In Greece, Malta, Cyprus and Romania this is more than 80%. In Bulgaria, Croatia, Latvia and Slovakia this is more than 60%, while it is also more than half in Spain, Portugal, the Czech Republic and Hungary (Waste management in the EU, 2018). As far as the rate of recycled municipal waste in Poland is concerned, over the years 2015-2018 it stood at 26-27%, compared to 21% in 2014. Worryingly, there was an increase in landfilled waste, which amounted to thousands of tonnes, especially in 2016 and 2017. This was despite the decrease in the number of active landfilling sites accepting municipal waste. Their number in 2018 was 286, down by 108 compared to 2014, and their total area decreased from 1927 ha to 1700 ha (Environment 2014, Environment 2019). Table 2 presents data on collected municipal waste by management method in the years 2014-2018.

Table 2: Municipal waste collected according to the treatment operations in Poland

	Municipal waste in thous. tonnes designated for:			
Year	**recycling**	**composting or fermentation**	**incineration**	**landfilling**
2014	2180	1154	1560	5437
2015	2867	1750	1439	4808
2016	3244	1890	2266	4255
2017	3199	848	2922	5000
2018	3269	1012	3013	5191

Source: own study based on data from Environment 2015-2019, Central Statistical Office

The situation looks somewhat differently when analysing individual voivodeships in Poland. As data for the years 2014 to 2018 show, there was a significant increase in the amount of landfilled municipal waste per capita in the Lower Silesian Voivodeship, Lubusz Voivodeship and Kuyavian-Pomeranian Voivodeship. In contrast, the Podlaskie Voivodeship and the Silesian Voivodeship recorded a significant decrease. As far as the municipal waste recycling rate per capita is concerned, it grew in the period under analysis for all of the voivodeships, especially in the Silesian Voivodeship and the Lesser Poland Voivodeship. Table 3 presents data on collected municipal waste in the different voivodeships by treatment method over the years 2014-2018, as a result indicator.

Table 3: Municipal waste collected according to the treatment operations in individual voivodeships in Poland – as a result indicators

Voivodeship	2014					2018				
	Collected	Recycling		Landfilling		Collected	Recycling		Landfilling	
	in thous. tonnes	in thous. tonnes	per capita in kg	in thous. tonnes	per capita in kg	in thous. tonnes	in thous. tonnes	per capita in kg	in thous. tonnes	per capita in kg
Dolnoslaskie	943	307	106	355	122	1142	391	135	567	195
Kujawsko-pomorskie	546	154	74	216	103	666	167	80	297	143
Lubelskie	382	58	27	187	87	470	96	45	205	97
Lubuskie	328	71	70	150	147	367	72	71	194	191
Lodzkie	642	123	49	390	156	788	185	75	461	187
Malopolskie	762	117	35	455	135	1073	257	76	318	94
Mazowieckie	1399	250	47	657	123	1812	381	71	687	127
Opolskie	268	57	57	170	170	323	79	80	149	151
Podkarpackie	381	73	34	208	98	498	89	42	219	103
Podlaskie	275	32	26	201	168	299	66	56	90	76
Pomorskie	695	123	53	413	180	827	160	69	416	178
Slaskie	1552	306	67	981	214	1664	698	154	637	141
Swietokrzyskie	199	42	33	124	98	250	64	52	156	126
Warminsko-mazurskie	363	70	48	206	143	441	84	59	225	157
Wielkopolskie	1045	280	81	490	141	1224	310	89	383	110
Zachodniopomorskie	549	117	68	236	137	642	172	101	187	110

Source: own study based on data from Environment 2015&2019, Central Statistical Office

Thanks to national and EU funds, Poland has a chance to improve the state of the natural environment, in particular a chance to take actions that will get us closer to a circular economy. However, there is still a long way to go, and that's why it is so important to effectively manage available sources of financing municipal waste management.

Available EU Funds For Municipal Waste Management Purposes

A chance for improving the state of the natural environment in Poland through waste management is provided by European Union funds allocated under various programmes. One of them is the Infrastructure and Environment Operational Programme for the years 2014-2020. This programme defines national objectives in the area of sustainable development while maintaining coherence and balance between investments in necessary infrastructure and support for selected areas of the economy. An amount of EUR 27,4 billion was allocated to this programme, the biggest one at national level, with EUR 301,2 million allocated to waste management activities under priority axis 2, action 2.2 Municipal waste management (Programming of the financial perspective 2014-2020). Action 2.2 supports projects following competitive and non-competitive procedures that aim to reduce the amount of landfilled municipal waste by rationalising the waste management system. The purpose of the projects is to ensure appropriate infrastructure for waste management, including that which enables the use of the material characteristics of waste and energy characteristics of mixed municipal waste through thermal treatment with energy recovery (Detailed description of the OPI & E priority axes 2014-2020). Beneficiaries of this measure include local government units and their associations, organisational units acting on their behalf, entities providing public services as part of the fulfilment of the obligations of local government units as well as entrepreneurs. In the case of public entities, the EU can finance up to 85% of eligible expenditure at the level of a particular project, whereas in the case of entrepreneurs - not more than 50% (Detailed description of the OPI & E priority axes 2014-2020).

As far as operational programmes are concerned, the largest allocation of EU funds, i.e. EUR 31.2 billion, went to a total of 16 Regional Operational Programmes (ROP) (Programming of the financial perspective 2014-2020). These programmes play an important role in financing endeavours that significantly improve the state of the natural environment and are adjusted to the specificity of given regions, representing a response to local needs. Almost EUR 2.0 billion from the European Regional Development Fund was earmarked for environmental protection activities under 16 Regional Operational Programmes for the years 2014-2020, with EUR 314.8 thousand earmarked for waste management activities (Web-1). Crucial data on potential beneficiaries, project types and the amount of subsidy is presented in the detailed descriptions of the priority axes of the individual 16 Regional Operational Programmes. Potential beneficiaries of waste management measures include local government units and their associations, organisational units of local government units, entities providing waste management services as part of the fulfilment of the tasks of local government units, housing co-operatives and communities, entrepreneurs and private partners in cooperation with public entities in the case of public-private partnership projects. The types of projects implemented as part of such programmes concern infrastructure that is necessary for ensuring a comprehensive management of municipal waste in regions, planned in accordance with the hierarchy of waste handling. The maximum EU co-financing rate for projects not covered by public aid is 85% (Web-1).

The Methodology of Studies

The own research conducted previously on factors influencing an improvement of the natural environment condition showed that the accessibility of the EU funds is the most important factor for implementation of ecological investments (Bień, 2007).

The purpose of current research was to determine to what extent the availability of EU funds makes entities to apply for financial contributions for ecological purposes and activities. Specifically speaking, to what extent the entities are effective in obtaining the EU funds and how the received resources have affected the condition of the natural environment in the area of municipal waste management in the analyzed period, as seen through the mechanism of achieved result indicators.

As part of the adopted research methodology, one determines the level of effectiveness of entities in particular voivodeships in obtaining EU funds, indicated by a successfully completed procedure finalized with signing of contracts enabling a commencement of necessary ecological investments. The value of the effectiveness was calculated on the basis of the amount of resources formally

approved for environmental investments in ROPs and OPI&E, seen in relation to the value of indicative allocations received as part of ERDF and CF financing.

In order to explore the theme and measure to what extent the implementation of investments undertaken with the share of the EU funds resulted in development of municipal waste management in particular voivodships, one of the taxonomic methods was used. The methods are taken advantage of in many fields of modern research (Młodak, 2006). The currently used method allows a linear ordering of objects based on introducing of standards and patterns that were presented by Z. Hellwig in 1968. It involves an analysis of complex phenomena described by at least two features. In the analyzed case, a set of diagnostic variables was based on the result indicators in terms of municipal waste management specified in Table 3: level of achieved recycling municipal waste in % of total collected (x1); level of landfilling municipal waste in % of total collected (x2). Importantly, the first variable was stimulant and the second was destimulant. In the case of non-uniform variable character, they required unification.

The construction of the Hellwig's development measure is (Młodak, 2006):

a) standardization of variables: $z_{ij} = \frac{x_{ij} - \overline{x_j}}{s_j}$, x_{ij} - observation of the j-th variable for the object i, $\overline{x_j}$ - arithmetic mean of observation j-th variable, s_j - standard deviation of observation j-th variable;

b) coordinates of the standard: $z_{oj} = \max_i \{z_{ij}\}$ for variables of booster character;

c) the distance of objects from the standard: $d_{io} = \sqrt{\sum_{j=1}^{m} \left(z_{ij} - z_{oj}\right)^2}$;

d) variable values: $q_i = 1 - \frac{d_{io}}{d_o}$, wherein: $q \in [0;1]$; $d_o = \overline{d_o} + 2s_d$; $\overline{d_o} = \frac{1}{n}\sum_{i=1}^{n} d_{io}$; $s_d = \sqrt{\frac{1}{n}\sum_{i=1}^{n}\left(d_{io} - \overline{d_o}\right)^2}$.

After the standardization of variables, an abstract object was determined, i.e. a so-called standard with the best values for each variable - a hypothetical voivodeship with the best result indicators in 2018. Testing the similarity of objects, i.e. similarities between specific voivodeships and the best abstract object, consists of a process of determination of the Euclidean distance of each object from the standard. The distance was measured both for 2014 (the year beginning the EU budgetary period 2014-2020) and for 2018. During the next stage of the research, development measures with properties were determined for each object (voivodeships): the higher the measure, the higher the level of the phenomenon. This allowed to establish the ranking for the level of effectiveness of investments Effectiveness of managing EU funds under the OPI & E and ROP for municipal waste management activitiespart of municipal waste management.

Effectiveness of Managing EU Funds Under The OPI & E And ROP for Municipal Waste Management Activities

Effectiveness is seen as one of evaluation criteria used for measuring the action quality. Lack of the effectiveness or resourcefulness can easily negate the sense of foreseen undertakings. The activity may be called successful when it is purposeful and leads to achieving set objectives and targets (Kotarbiński, 1969). Proved willingness to obtain the chosen goals and doing one’s best to reach the destination point means that the taken action and introduced activities had been efficient (Sobolewski, 1998). Generally speaking, in the currently described situation, the effective

management defines that kind of activity that within available EU funds leads to the achievement of certain goals and to creating appropriate conditions for improvement of municipal waste management systems in particular areas.

The Infrastructure and Environment Operational Programme plays an important role in financing municipal waste management projects. According to data at the end of 2019, nine calls for proposals following a competitive procedure were issued under measure 2.2 Municipal waste management. This accounts for 8.9% of all the contests announced in that period under the Infrastructure and Environment Operational Programme. The first call was issued already in 2015, and the most calls were announced in 2016 and 2019, i.e. 3 in each year (Web-2). In the period under analysis, 56 contracts were signed, with the amount financed from the Cohesion Fund being EUR 231.2 million (Web-3). This means that only 28.1% of the allocation to measure 2.2. under the Infrastructure and Environment Operational Programme, as measured by contracted funds, was used (Web-4). Not a single contract was signed in the period under analysis in the Opole and Świętokrzyskie Voivodeships. The most contracts were signed in the Pomeranian Voivodeship, with the amount co-financed being EUR 101.7 million, whereas the least contracts were concluded in the Silesian Voivodeships, with the amount co-financed being EUR 1.3 million. Figure 2 presents data on the funds contracted as part of measure 2.2 under the Infrastructure and Environment Operational Programme by voivodeship.

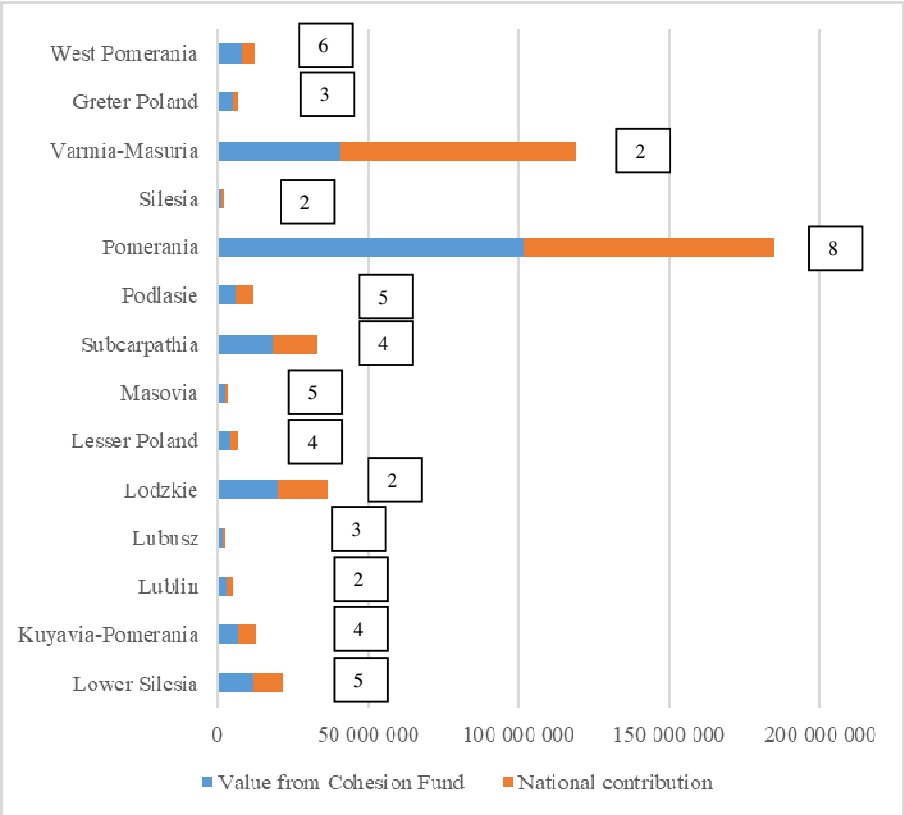

Fig. 2: The number of signed contracts and financial resources allocated for their performance as part of Measure 2.2 II Priority Axis of OPI & E as at 31.12.2019, in euros

Source: own study based on data from Web-3 and Web-4

Looking at the number of investments completed by 2019 as part of Measure 2.2 Municipal waste management under the Infrastructure and Environment Operational Programme, it accounted for only

29% of all the contracts signed. The amount from the Cohesion Fund to co-finance these projects was EUE 17.6 million. In three voivodeships: Lublin, Łódź and Varmian-Masurian, not a single project was completed by 31 December 2019. Figure 3 presents data on completed projects and the amount of subsidy from the Cohesion Fund by voivodeships.

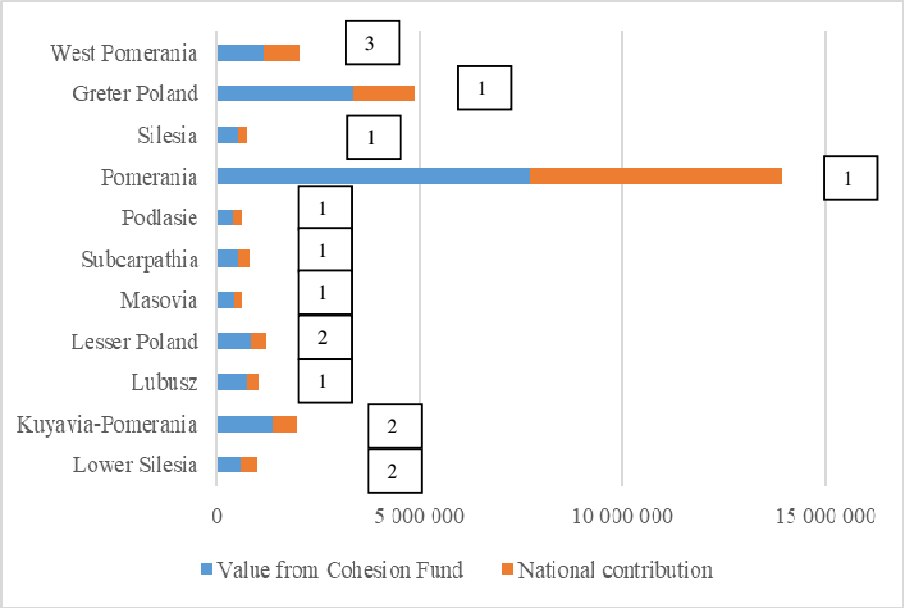

Fig. 3: The number of completed investments and financial resources allocated for their performance as part of Measure 2.2 II Priority Axis of OPI & E as at 31.12.2019, in euros

Source: own study based on data from Web-3 and Web-4

According to data at the end of 2019, under 16 Regional Operational Programmes for 2014-2020, a total of 395 contracts for waste management activities were signed following a competitive procedure with a total value of EUR 277.7 million and EU contribution from the ERDF amounting to EUR 171.2 million. This constitutes around 54.4 % of the total indicative allocation for the years 2014-2020. Within the 16 voivodeships, the most contracts, i.e. 90 (22.8%), for the total amount of EUR 17.4 million in co-financing was signed in the Lesser Poland Voivodeship, while the least contracts, i.e. 3 (0.8%), for the total amount of EUR 0.8 million in co-financing, were signed in the Lubusz Voivodeship. It should be noted that not all investments contracted in the Lesser Poland Voivodeship concerned municipal waste management, but only 54 projects for the total of EUR 13.7 million in co-financing from the ERDF. A similar situation was in the Lublin, Podlaskie and Silesian Voivodeships. What is important is that in the period under analysis, municipal waste management investments were undertaken under 16 Regional Operational Programmes in all of the voivodeships. Figure 4 presents data on EU funds contracted in the individual voivodeships.

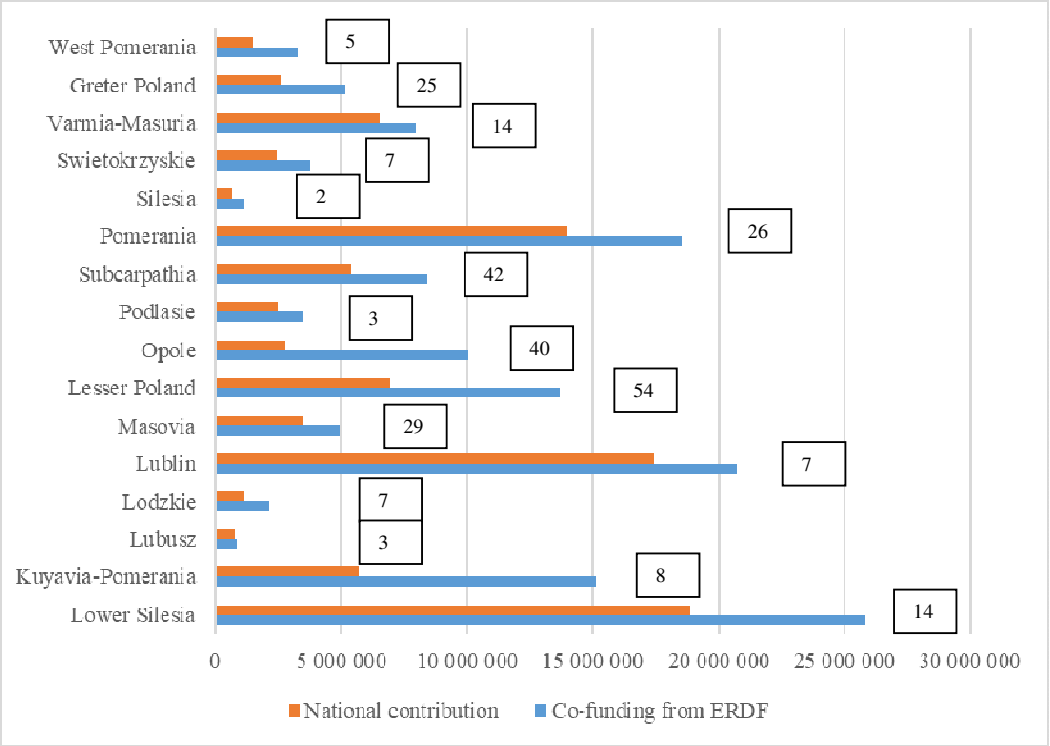

Fig. 4: The number of signed contracts and financial resources allocated for their performance in ROPs as part of municipal waste management as of 31.12.2019, in euros
Source: own study based on data from Web-3 and Web-4

By December 2019, 54.9% of municipal waste management projects under 16 Regional Operational Programmes were completed. The amount from the ERDF to co-finance these investments was EUR 55.3 million. Figure 5 presents data on the number of completed projects and the amount in ERDF co-financing for such projects in the individual voivodeships at the end of 2019.

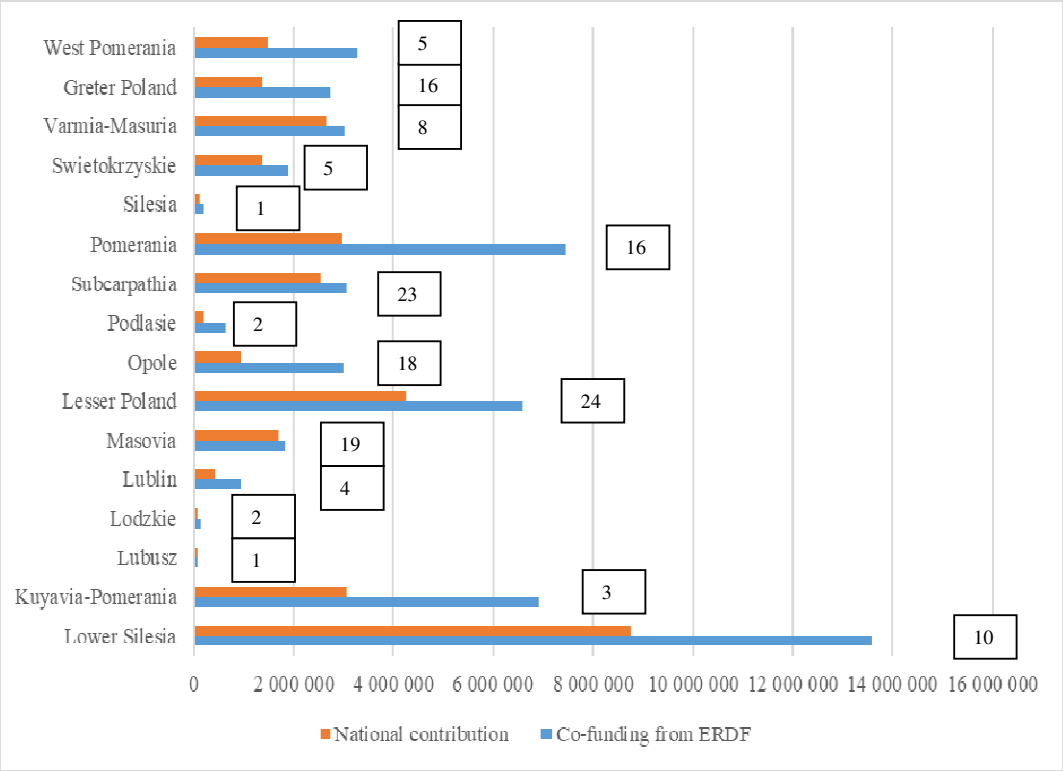

Fig. 5: The number of completed investments and the use of ERDF resources for activities connected with municipal waste management as of 31.12.2019, in euros

Source: own study based on data from Web-3 and Web-4

Analysis of the funds officially allocated for waste management investments from 16 Regional Operational Programmes in relation to the indicative allocation under the ERDF shows that such funds have not been yet allocated in most part through signed contracts. The 54.4% rate is too low given that the EU budgeting period 2014-2020 is coming to an end. This may indicate ineffectiveness in securing EU funds under Regional Operational Programmes for such a purpose. At the end of 2019, the Lublin Voivodeship recorded the highest amount of funds allocated from the ERDF for co-financing waste management activities, which accounted for almost 100% of the indicative allocation for this purpose. EU funds were also effectively used in the Pomeranian, Masovian and Kuyavian-Pomeranian Voivodeships, with the use of EU funds at around 80%, and in Opole Voivodeship (slightly over 90%). Ineffective use of the ERDF funds was recorded in seven voivodeships, where it was below 40% of the allocation assigned to waste management activities. This data is presented in Figure 6.

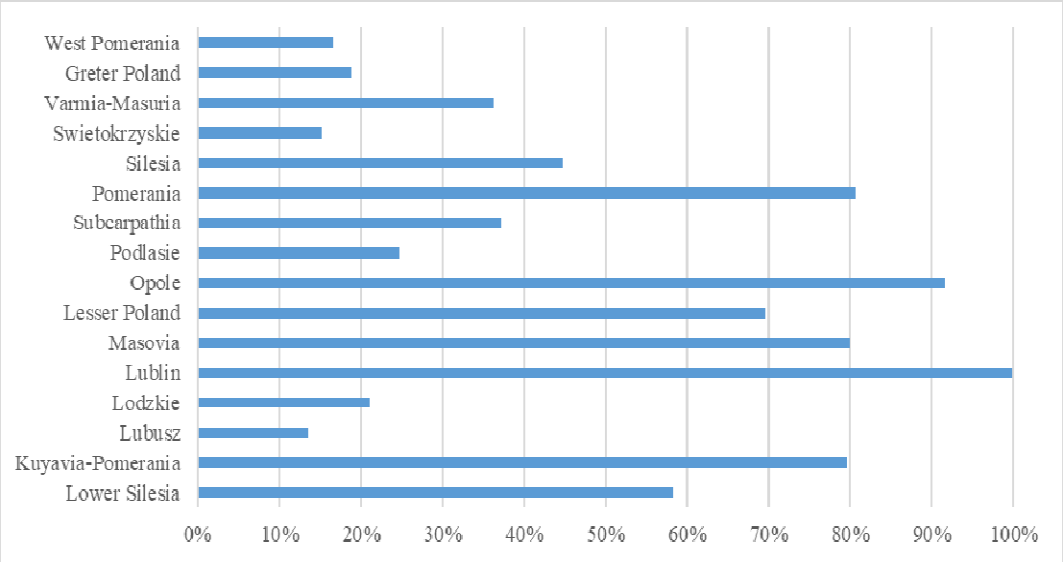

Fig. 6: The use of ERDF resources as part of ROPs for activities connected with waste management as of 31.12.2019, in %

Source: own study based on data from Programming of the financial perspective 2014-2020, Web-3 and Web-4

Analyzing the impact of EU funds invested in development in the framework of municipal waste management of particular voivodeships, based on the measured result indicators, it should be stated that it is generally positive but not satisfactory. The distance of voivodeships from the reference object in the analyzed period decreased in a small of the cases, i.e. in 6 out of 16 analyzed objects. Nevertheless, the value of the development measure located the Silesian Voivodeship in first and the West Pomeranian Voivodeship in second ranking position in 2018. A significant improvement occurred in the Podlasie and Lesser Poland Voivodeships. Moreover, ambiguous information can be obtained from analyses of relations between the area in which projects supported by EU assistance were implemented and the change in the level of development. There was no correlation between the value of EU co-financing for municipal waste management in a given voivodeship and the measure of its development. Data regarding the level of development of voivodeships in 2014 and 2018 as part of municipal waste management and the values of EU co-financing, regarding completed investments, is presented in Table 4.

Table 4: Development level of voivodeships as part of municipal waste management in 2014 and 2018

Voivodeship	2014			2018			Value of EU co-funding in thous. Euro
	di	qi	rank	di	qi	rank	
Lower Silesia	0,6041	0,8949	1	2,6423	0,4893	3	14 153,00
Kuyavia-Pomerania	1,3665	0,7622	2	3,3683	0,3490	7	8 286,68
Lublin	4,1074	0,2852	14	3,9696	0,2328	10	933,59
Lubusz	2,8010	0,5126	5	4,4252	0,1448	15	800,68
Lodzkie	3,9279	0,3165	11	4,1248	0,2028	12	145,07
Lesser Poland	4,4940	0,2179	15	2,9299	0,4338	5	7 423,59
Masovia	3,5413	0,3837	6	3,6455	0,2955	9	2 264,50
Opole	3,7384	0,3494	10	3,5213	0,3195	8	2 988,40
Subcarpathia	3,6476	0,3652	7	4,3540	0,1585	13	3 586,53
Podlasie	5,5410	0,0357	16	3,2390	0,3740	6	1 040,43

Pomerania	4,1001	0,2865	13	4,3742	0,1546	14	15 158,52
Silesia	3,9515	0,3123	12	1,3453	0,7400	1	709,40
Swietokrzyskie	3,7099	0,3544	8	4,0095	0,2251	11	1 885,15
Varmia-Masuria	3,7276	0,3513	9	4,4400	0,1419	16	3 008,12
Greater Poland	1,9713	0,6570	3	2,7324	0,4719	4	6 120,32
West Pomerania	2,7606	0,5196	4	2,4662	0,5234	2	4 409,37

Source: own study

Summary

The more complex the system for financing municipal waste management, the bigger the possibilities of financing pro-environmental projects. The high cost of investments, which usually do not generate profit, is difficult to borne in full by economic entities from their own funds. This is why EU funds continue to play an important role. Only an appropriate use of such funds can lead to completion of necessary projects and improvement of the state of the natural environment. The analysis of the use of EU funds under the Infrastructure and Environment Operational Programme 2014-2020 showed that at the current state of the assessment only 16 projects were completed, and the rate of the use of the allocation for measure 2.2 Municipal waste management at the end of 2019 was 28.1%. Given that the EU budgeting period 2014-2020 is coming to an end, it is a very low rate. Similarly, the rate of the implementation of waste management activities under 16 Regional Operational Programmes at 54.4% of the indicative allocation from the ERDF is unsatisfactory. Especially that calls for proposals were organised in 2019 in only ten out of sixteen voivodeships. It is thus important to effectively organise more calls for proposals in 2020, so that the available EU funds allocated under these programmes are fully used. Due to the fact that municipal waste management investments were undertaken in most cases only in the final part of budgeting period 2014-2020, it is difficult to assess their impact on the current state of waste management in Poland. Studies in this area require further analysis and will be continued. Nevertheless, it should be borne in mind that although there are many available sources of financing waste management, EU funds are the main form of non-repayable financing that does not put any burden on society benefiting from the effects of pro-environmental investments, and efficient management of such funds contributes to the improvement of the state of the natural environment.

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The Use of Social Media in Recruitment Processes In Polish Armed Forces

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Abstract

Polish Armed Forces, as the menaces and forces established to secure Poland's interests and to defend the country, are an element of the defense system designed for the effective implementation of security policy. Despite this special status, as an institution, they are subject to human resource management processes similar to other organizations, including the search for personnel capable of carrying out statutory tasks. In the modern world, this means using all available recruitment channels, including social media. The aim of this study was to analyze the use of social media in the recruitment processes conducted by Territorial Military Administration Units. The paper presents the results of qualitive analysis Facebook profiles of this units. The obtained results indicate that however almost all of them use Facebook, mostly for recruitment and promotion of military service, the quality of that use is rather poor and needs strategic improvement to be able to gain results. Conducted studies were the first in Poland regarding the analyzed topic.

Keywords: Social Media, Armed Forces, Recruitment, Media Strategy, Military Administration

Introduction

After the end of the Cold War, armed forces around the world had to develop new competences in both conducting operations and gaining public acceptance for them (Foster, 2006). Like other public institutions, they became subject to the rules of the Old Public Management model, market values (New Public Management model) and e-democracy (New Public Service model) (Deverell et al., 2014). According to M. Fredriksson and J. Pallas (2013), these factors caused that armies began to include in their communication strategies the need to open to the public and to inform about their activities (democratization processes) as well as to put more emphasis on using modern means of communication to build own image (Polko, 2016; Wæraas, 2008), visibility and - in situations where military service ceased to be an attractive workplace - to recruit new members of the organization.

There is no doubt that social media still can be seen both as a risk and an opportunity by armed forces. Even if research shows how armed forces can be reinforced with strategic narrative (Hellman et al., 2016), they are still seen by commanders and their political superiors as a potential source of problems. Military decision-makers all over the world are still more to avoid communication with society about their operations than to clarify their decisions, motivations and circumstances of action. Of course, awareness of the inevitability of presence in these communication channels is growing, and the example of military leaders (Israeli Defense Forces, US Army) in using social media to communicate about army activities is closely monitored around the world and successfully copied in many places (example of communication strategies used in Poland by Territorial Defense Forces).

As noted by R.L. Stein (2012), social media are contradictory to the military institution. Any army is a closed organization, and usually it keeps its secrets and operational details inside. And new media works on the opposite. The military language is very strict. There's a lot of abbreviations; it has very specific

intonations. And the new media is exactly the opposite - a lot of emotions, a lot of questions, informality. However, finding a compromise between the nature of social media and the interests of organizations such as the military is necessary for the continued functioning of armed forces around the world.

Social media and recruitment processes in organization

Kaplan and Haenlein (2010) define social media as a group of Internet based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user-generated content. The term Web 2.0 was introduced in 1999 to describe web sites that use technology beyond the static pages of earlier web sites. A Web 2.0 site allows users to interact and collaborate with each other in a social media dialogue as creators of user-generated content in a virtual community, in contrast to websites where people are limited to the passive viewing of content. (Broughton et al., 2013:1).

According to A. Kaplan (2012), mobile social media applications can be differentiated among four types:

- Space-timers (location and time sensitive): Exchange of messages with relevance mostly for one specific location at one specific point in time (e.g. Facebook Places WhatsApp; Foursquare)
- Space-locators (only location sensitive): Exchange of messages, with relevance for one specific location, which is tagged to a certain place and read later by others (e.g. Yelp; Qype, Tumblr, Fishbrain)
- Quick-timers (only time sensitive): Transfer of traditional social media mobile apps to increase immediacy (e.g. posting Twitter messages or Facebook status updates)
- Slow-timers (neither location nor time sensitive): Transfer of traditional social media applications to mobile devices (e.g. watching a YouTube video or reading/editing a Wikipedia article)

T. Aichner and F. Jacob (2015:259) provide more wide classification, indicating:

- Blogs (e.g. The Huffington Post, Boing Boing)
- Business networks (e.g. LinkedIn XING)
- Collaborative projects (e.g. Wikipedia Mozilla)
- Enterprise social networks (e.g. Yammer, Socialcast)
- Forums (e.g. Gaia Online, IGN Boards)
- Microblogs (e.g. Twitter, Tumblr)
- Photo sharing (e.g. Flickr, Photobucket)
- Products/services review (e.g. Amazon, Elance)
- Social bookmarking (e.g. Delicious, Pinterest)
- Social gaming (e.g. World of Warcraft, Mafia Wars)
- Social networks (e.g. Facebook, Google+)
- Video sharing (e.g. YouTube, Vimeo)
- Virtual worlds (e.g. Second Life, Twinity)

Characteristics of the most popular social media is presented in table no 1.

Table 1: Types, characteristics and popularity of chosen social media (Clement, 2019; Broughton et al., 2011)

Social networking sites and tools	Characteristics	Number of users (in millions)/country of origin
Facebook	a social networking service where users create personal profiles, add other users as friends and exchange messages, including automatic notifications when they update their own profile. Additionally, users may join common-interest user groups, organized by common characteristics (e.g. workplace).	2,375 USA
YouTube	a (Google-owned) video-sharing website on which users can upload, share, and view videos. A wide variety of user-generated video content is displayed, including film and TV clips as well as amateur content such as video blogging.	2,000 USA
WhatsApp	A freeware, cross-platform messaging and Voice over IP (VoIP) service owned by Facebook. It allows users to send text messages and voice messages, make voice and video calls, and share images, documents, user locations, and other media.	1,600 USA
Facebook Messenger	a messaging app and platform developed by Facebook. Users can send messages and exchange photos, videos, stickers, audio, and files, as well as react to other users' messages and interact with bots. The service also supports voice and video calling. The standalone apps support using multiple accounts, conversations with optional end-to-end encryption, and playing games.	1,300 USA
WeChat	a multi-purpose messaging, social media and mobile payment app developed by Tencent. Has been described as China's “app for everything” because of its wide range of functions.	1,112 China
Instagram	A photo and video-sharing social networking service owned by Facebook. The app allows users to upload photos and videos to the service, which can be edited with various filters, and organized with tags and location information. An account's posts can be shared publicly or with pre-approved followers. Users can browse other users' content by tags and locations, and view trending content. Can also like photos and follow other users to add their content to a feed.	1,000 USA
QQ	an instant messaging software service and web portal which offers services that provide online social games, music, shopping, microblogging, movies, and group and voice chat software.	823 China
QZone	a social networking website which allows users to write blogs, keep diaries, send photos, listen to music, and watch videos. Users can set their Qzone background and select accessories based on their preferences so that every Qzone is customized to the individual member's taste.	572 China
TikTok	a video-sharing social networking service owned by ByteDance, a Beijing-based company. It is used to create short lip-sync, comedy, and talent videos. The app allows users to create short music and lip-sync videos of 3 to 15 seconds and	500 China

	short looping videos of 3 to 60 seconds.	
Sina Weibo	a microblogging (weibo) website.]	465 China
Twitter	a microblogging service enabling its users to send and read publicly visible messages called tweets. Tweets are text-based posts of up to 140 characters displayed on the user's profile page. Users may subscribe to other users' tweets.	330 USA
Reddit	a social news aggregation, web content rating, and discussion website. Registered members submit content to the site such as links, text posts, and images, which are then voted up or down by other members. Posts are organized by subject into user-created boards called "subreddits", which cover a variety of topics.	330 USA
Baidu Tieba	a communication platform hosted by Chinese search engine company Baidu. It is an online community that heavily integrates Baidu's search engine. Users may search for a bar, which will then be created if it does not exist already.	320 China
LinkedIn	a business-related social networking site mainly used for professional networking. Users maintain a list of contact details of people with whom they have some level of relationship, called connections. This list of connections can then be used to build up a contact network, follow different companies and find jobs, people and business opportunities.	310 USA
Snapchat	a multimedia messaging app, where pictures and messages are usually only available for a short time before they become inaccessible to their recipients. It also allows users to keep photos in the "my eyes only" which lets them keep their photos in a password protected space.	294 USA
Pinterest	a social media web and mobile application company. It operates a software system designed to enable saving and discovery of information on the www using images and GIFs and videos. Users can upload, save, sort, and manage images—known as pins—and other media content through collections known as pinboards. Content can also be found outside Pinterest and similarly uploaded to a board or be implemented by a webmaster directly on the website.	265 USA
Viber	a cross-platform voice over IP (VoIP) and instant messaging (IM) software application operated by Japanese company Rakuten. Users are registered and identified through a cellular telephone number, although the service is accessible on desktop platforms without needing mobile connectivity.	260 Israel
Discord	a proprietary freeware VoIP application and digital distribution platform designed for video gaming communities, that specializes in text, image, video and audio communication between users in a chat channel.	250 USA

Social media usage is one of the most popular online activities. In 2018, an estimated 2.65 billion people were using social media worldwide, a number projected to increase to almost 3.1 billion in 2021. Social network penetration is constantly increasing worldwide and as of January 2019 stood at 45 percent. The average time per day spent on social media varies greatly by country. Whilst U.S. users spent approximately one hour and 57 minutes using social media each day, the Philippines ranked first in terms of user engagement. The average time per day spent on social media in the country amounted to four hours and one minute, twice the amount of time spent by U.S. users. (Clement, 2019).

The use of social media as a recruitment tool is providing opportunities and challenges for employers. Social media potentially offers speed, efficiency and the ability to target and attract specific, particularly apposite candidates in the recruitment process. It can provide a useful additional source of information on potential job candidates, especially since some data (at the personal as well as the professional level) may not be generated for the purpose of recruitment, and therefore may provide candid supplementary information on the applicant. For candidates it potentially offers multiple sources of information about the employer and the possibility of contact with existing employees to gain a more realistic job preview. (Broughton et al., 2013:4-5)

According to Smith and Rupp (2004), e-recruitment has a number of important advantages compared to more traditional forms of recruiting:

- It allows companies to shorten hiring times through an increase in information flow and an acceleration of recruitment processes.
- It can help reduce recruiting costs, hiring times and employee turnover as processes are generally job-specific and offer computer assisted screening interviews and statistical predictions.
- It gives employers the opportunity to hire staff both locally and globally, significantly extending the reach of more traditional staff recruitment.
- It offers companies and prospective employees a number of important features and specific abilities such as: (1) the ability to initiate interview requests and order back ground checks; (2) unlimited cost information tracking for all activities associated with the hiring process; (3) customised e-mail notification of recruiters for both active and passive candidates; (4) Improved integration of recruiter-specific communications activities; (5) Dynamic creation of an employer's job page; (6) Multiple language support with candidate accessibility for US and global partners; (7) Extensive ability to personalise the candidate experience by allowing employers to tailor the candidate and recruiter interfaces.

However, there are a number of issues that need to be considered. According to R. Landers and G. Schmidt (2016: 3), although social media are increasingly used in the employee selection and recruitment process, some significant challenges remain. First, reliability and validity is unknown. Second, even if reliable and valid, social media data may not be practical. Third, even if practical, the use of such information may not be legal. Fourth, even if legal, their use may not be ethical. Fifth, even if ethical, it is unclear how to optimally include them in existing systems.

Social Media Nature and Military Forces Priorities

Across the world defense forces are using social media platforms most effectively for educating the populace about their job content so as to entice them in joining the organization. Social Media has the ability to reach sections of society where traditional media in unable to do so due to logistical constraints (Malhotra, 2016: 19). They have been in use in armed forces since the Kosovo crisis in 1999 (Nissen,

2015:8). The increasing use and importance of social media, alongside intensifying debate about the reliance on communication for successful operations tends to put more attention on that developing tool. Researchers have paid little attention to how armed forces beyond the US and the UK have dealt with the social media (e.g. UK: Bjerg Jensen, 2011; Maltby et al., 2015; and Jones and Baines, 2013; UK, US, Israel: Rid and Hecker, 2009). Research has mainly focused on whether or not armed forces have been harmed by or have managed to exploit social media, whether they have tried to control social media and to what degree they have allowed personnel to communicate freely via social media. (Hellman et al., 2016)

For the Army's audience of potential recruits, social media is especially important. Young adults use social media at higher rates than other groups. Technology use is prevalent among this population, with more than 90 percent of 18- to 29-year-olds owning a smartphone (USA data). About the same proportion use social media. (Smith, 2017, Perrin, 2015). The widespread use of technology suggests that internet and social media use are the norm among potential Army recruits and also among the adults who might influence potential recruits. (Wenger et al. 2019:1).

Although different platforms target different audiences (e.g. Facebook is the most popular among users after 35, while younger users are more likely to spread their time across a wide variety of platforms, including Twitter and Pinterest), all technological changes allow individuals and organizations to communicate information to one another in new and creative ways and on a nearly real-time basis.

Research on the relationship between the use of social media by the armed forces and the increased interest in performing service in these formations (their recruitment abilities) do not give an unequivocal answer as to the existence of the relationship between these two factors. From the RAND report published in 2019 (Wenger et al. 2019: 1), which examined three online sources of information about the USArmy: GoArmy.com; the GoArmy Facebook account; and the @GoArmy Twitter account, it follows that:

- In general, visitors are likely to view pages containing career-related information and, to a lesser extent, about procedures and requirements to join the military.
- The number of visitors is positively correlated with contracts, but the relationship is very small.
- People living in densely populated areas and those living in places with higher proportions of minority groups and immigrants appear to use GoArmy.com more intensively than others. In some cases, there are more contracts than would be expected in these areas.
- @GoArmy's Twitter is a good source for building awareness of Army culture, but the platform is less effective in producing contracts.
- GoArmy's Facebook page has an audience made up of the general public, soldiers, veterans, military families, and potential recruits.

The present trend points to a growing number of armed forces all over the world imbibing social media for a variety of functions such as recruiting soldiers, gathering intelligence, spreading propaganda and even communicating with their own and other military groups. The situation has come to the fact that the broad spectrum of social media is identified as the newest international military battleground with its inbuilt challenges.

In the year 2015 the British army created its own special force known as the 77th Brigade for social media warfare. It is based in Berkshire and comprises reservists and regulars with journalistic skills who are social media savvy (Malhotra, 2016: 26). According to The Career Transition Partnership (CTP) (the Ministry of Defense working with Right Management) the British Army recruits up to 20,000 people each year. Their target audience is 14-24 years old's, who are statistically the most comfortable with social media, often using it as their main communication tool.

Facebook is the main channel for recruitment as research has shown that 89% of the Army's target audience are users. Their Facebook site "Army Jobs" has over 55,000 followers. The site:

- Links to online and telephone recruitment offices.
- Allows potential recruits to ask general and specific questions about life and training in the British Army.
- Shows videos of serving soldiers and officers who talk about aspects of army life and training.
- Increasingly uses online gaming to attract candidates, as it allows people to demonstrate skills they may not have realized they have which are relevant to the Army.
- Links gaming experience to the British Army website to show type of jobs available that match demonstrated skills. (CTP, 2020)

The British Army also uses Twitter to engage with its target audience, through "Digital Pioneers" programme, which enables potential recruits to communicate with serving personnel.

Israel Defense Forces (IDF), one of the world's most active armies in social media, became famous for its historic precedent set by announcing the launch of Operation Pillar of Defense (in mid-November 2012) on Twitter (Shavit, 2016:7, Polko, 2016:153) (see figure 1). For several years, it has been successfully using social media to implement the IDF mediatization strategy described by M. Shavit. (Shavit, 2016:8).

On 14 November 2012 at 6.29 AM the spokesperson of the Israel Defense Forces published on Twitter the following post: „The IDF has begun a widespread campaign on terror sites & operatives in the #Gaza Strip, chief among them #Hamas & Islamic Jihad targets". Fania Oz-Salzberger, Israeli historian and writer, commented the information: "the first war ever declared on Twitter has just begun". In the evening spokesman announced: "Ahmed Jabari: Eliminated."

Fig. 1: IDF Twitter offensive

Given the above, it seems reasonable to analyze the use of social media in Poland to conduct recruitment processes for the needs of the Polish Armed Forces.

Methodology

The research conducted in this work was aimed at checking how facebook is used by Army Recruiting Command (WKU) to recruit new army members. All WKU profiles in Poland were analyzed (86 units). The Army Recruiting Command is a unit of military administration dealing with the administration of

personnel reserves in the area under its responsibility. WKUs perform the executive role of the Minister of National Defense, they are directly subordinated to the Provincial Military Staff. They implement defense issues and military administration in the administered area. The tasks of the Army Recruiting Command are:

- cooperation with Poviat Starosties in the field of national defense policy,
- cooperation with the Civil Defense,
- **securing the mobilization of military units,**
- **appointment of reserve soldiers to active (contract) military service,**
- **appointment of reserve soldiers for military exercises,**
- applying for the appointment of reserve soldiers for military ranks,
- **recruitment of candidates for military schools,**
- **conducting collection together with government administration offices,**
- **military records of persons subject to universal defense,**
- **adjudging on granting conscripts postponement of basic military service,**
- **designation of conscripts for basic military service,**
- applying for the performance of personal and material benefits for national defense purposes,
- creating a positive image of the Polish Army in the area of its own operations.

As can be seen from the above list of WKU tasks, most of their activities should focus on providing the Polish Armed Forces with sufficient personal resources, i.e. recruitment, service calls and mobilization. It is therefore reasonable to examine to what extent these tasks are carried out with the help of selected social media. The main research problem raised in this study was whether, and if so, how (in qualitative and quantitative terms) the army recruitment commands use Facebook for recruitment purposes for the needs of the Polish Armed Forces. Therefore, the figures on the following areas were collected:

- profile coverage (number of likes / number of views);
- period of their activity;
- number of published posts;
- percentage of recruitment posts,

which have been quantified. This data is presented in Table 2.

In further stages of research, a qualitative analysis of the discussed profiles was carried out in terms of:

- consistency of the message of individual branches with the general information line of the Polish Armed Forces
- the relationship of own materials of WKU units or their direct superiors (Provincial Military Staffs) to materials made available from other profiles;
- content that includes WKU's own materials;
- content implementing Real Time Marketing (RTM)
- making use of the Facebook platform's communication capabilities, such as: creating groups, events, surveys, competitions, live broadcasts, watching movies together.

The research was conducted in the period 20-29 February 2020.

Table 2: Numerical analysis of the activity of individual WKU on Facebook accounts (as of 29.02.2020)

WKU	Date of joining	Number of likes / number of followers	Number of recruitment posts	Number of all posts	Percentage of recruitment posts	Number of posts per day (average for the whole period)
WKU Białystok	24.09.2018	2796/2817	455	679	67,01	1,30
WKU Biała Podlaska	02.08.2017	352/379	94	191	49,21	0,20
WKU Bielsk Podlaski	06.09.2017	176/185	167	191	87,43	0,21
WKU Będzin	22.12.2017	509/532	312	545	57,24	0,68
WKU Bielsko-Biała	19.02.2011	1183/1250	501	1190	42,1	0,36
WKU Bolesławiec	05.12.2017	303/319	22	30	73,33	0,04
WKU Brodnica	18.12.2017	323/344	578	1052	54,94	1,31
WKU Brzeg	07.12.2017	511/530	593	1311	45,23	1,61
WKU Busko-Zdrój	16.11.2018	123/129	21	33	63,63	0,07
WKU Bydgoszcz	22.12.2017	421/455	118	193	61,14	0,24
WKU Chełm	11.12.2017	352/369	42	66	63,64	0,08
WKU Chorzów	01.12.2017	258/287	300	440	68,18	0,54
WKU Ciechanów	05.12.2017	973/1005	291	436	66,74	0,54
WKU Częstochowa	27.07.2017	770/802	193	531	36,35	0,56
WKU Człuchów	21.03.2018	227/245	101	124	81,45	0,18
WKU Elbląg	19.12.2017	518/556	371	469	79,10	0,59
WKU Ełk	27.12.2017	1085/1123	253	428	59,11	0,54
WKU Garwolin	07.12.2017	228/244	96	159	60,38	0,20
WKU Gdańsk	20.08.2015	905/960	721	1276	56,50	0,77
WKU Gdynia	28.11.2011	1635/1704	2001	3578	55,93	1,17
WKU Giżycko	27.12.2017	279/297	79	123	64,23	0,15
WKU Gliwice	No profile on FB					
WKU Głogów	22.12.2017	346/366	213	276	77,17	0,35
WKU Gorzów Wlkp	11.06.2013	854/893	293	584	50,17	0,24
WKU Grudziądz	11.05.2017	514/557	456	597	76,38	0,58
WKU Inowrocław	31.01.2017	619/645	487	601	81,03	0,54
WKU Jarosław	14.12.2017	243/254	20	36	55,56	0,04
WKU Jasło	04.12.2017	215/228	22	34	64,71	0,04
WKU Kalisz	28.07.2017	805/826	379	576	65,80	0,61
WKU Katowice	21.12.2017	379/394	168	361	46,54	0,45
WKU Kędzierzyn-Koźle	07.12.2017	630/660	265	307	86,32	0,38
WKU Kielce	No profile, unused profile: Press officer Wkukielce					
WKU Kłodzko	22.11.2017	429/461	220	284	77,46	0,34
WKU Kołobrzeg	27.07.2019	85/91	48	61	78,69	0,28
WKU Konin	07.04.2011	898/1116	1897	3001	63,21	0,92

WKU Koszalin	21.12.2017	441/466	135	227	59,47	0,28
WKU Kraków	18.12.2017	819/860	323	624	51,76	0,78
WKU Leszno	05.12.2017	541/567	345	478	72,18	0,59
WKU Lidzbark Warmiński	15.12.2017	2223/2264	388	443	87,58	0,55
WKU Lublin	12.12.2017	499/524	67	69	97,10	0,09
WKU Łomża	21.03.2018	522/541	221	326	67,80	0,47
WKU Łódź	05.02.2011	1033/1065	766	897	85,40	0,27
WKU Malbork	15.12.2011	716/759	49	97	50,52	0,12
WKU Mielec	19.12.2017	459/475	223	301	74,09	0,37
WKU Mińsk Mazowiecki	15.10.2018	211/222	205	275	74,55	0,63
WKU Nisko	19.12.2017	343/359	17	30	56,67	0,04
WKU Nowy Sącz	07.12.2017	196/207	206	346	59,54	0,43
WKU Nowy Targ	29.11.2017	932/943	301	399	75,44	0,48
WKU Nowy Tomyśl	10.02.2014	700/723	1960	2508	78,15	1,13
WKU Olsztyn	24.11.2015	1703/1770	290	588	49,32	0,38
WKU Opole	28.04.2017	550/571	253	308	82,14	0,30
WKU Ostrołęka	20.11.2017	358/378	216	365	59,18	0,44
WKU Ostróda	18.12.2017	350/374	66	85	77,65	0,11
WKU Oświęcim	04.12.2017	297/315	214	299	71,57	0,37
WKU Piła	17.01.2013	506/538	567	790	71,77	0,30
WKU Płock	30.11.2017	419/438	17	46	36,96	0,06
WKU Poznań	25.01.2011	2605/2622	1978	2608	75,84	0,78
WKU Puławy	13.12.2017	276/289	64	79	81,01	0,10
WKU Radom	17.11.2017	514/542	65	92	70,65	0,11
WKU Rybnik	10.04.2013	1207/1268	765	902	84,81	0,36
WKU Rzeszów	19.12.2017	181/192	197	298	66,11	0,37
WKU Sandomierz	No profile					
WKU Sanok	18.12.2017	358/380	301	345	87,25	0,43
WKU Siedlce	04.07.2017	965/1002	279	333	83,78	0,34
WKU Sieradz	13.04.2017	2380/2418	142	268	52,99	0,26
WKU Skierniewice	24.11.2017	257/279	307	368	83,42	0,45
WKU Słupsk	02.03.2011	942/995	878	1567	56,03	0,47
WKU Stargard Szczeciński	18.12.2017	260/277	267	304	87,83	0,38
WKU Suwałki	15.09.2017	826/1031	423	656	64,48	0,73
WKU Szczecinek	07.12.2017	482/516	355	411	86,37	0,51
WKU Szczecin	09.02.2018	431/462	223	278	80,22	0,37
WKU Świnoujście	20.11.2017	197/210	168	234	71,79	0,28
WKU Tarnów	12.12.2017	1272/1311	175	298	58,72	0,37
WKU Tomaszów Mazowiecki	18.12.2017	2399/2432	420	721	58,25	0,90
WKU Toruń	28.09.2017	715/759	478	703	68,00	0,80
WKU Tychy	01.12.2017	329/347	356	654	54,43	0,80
WKU Warszawa-	14.11.2017	450/478	175	199	87,94	0,24

Mokotów						
WKU Warszawa-Ochota	08.12.2017	482/510	166	212	78,30	0,26
WKU Warszawa-Praga	15.11.2017	557/590	160	248	64,51	0,30
WKU Warszawa-Śródmieście	15.12.2017	361/385	17	46	36,96	0,06
WKU Włocławek	08.12.2017	529/553	859	1550	55,42	1,91
WKU Wrocław	24.02.2011	1581/1642	1273	2767	46,00	0,84
WKU Wyszków	07.12.2017	287/307	112	142	78,87	0,17
WKU Zamość	26.10.2011	582/602	244	297	82,15	0,10
WKU Zielona Góra	20.12.2017	276/298	405	629	64,39	0,79
WKU Żagań	15.11.2017	568/583	229	337	67,95	0,40

Results and findings

Quantitative and qualitative analysis of WKU profiles

The vast majority of WKU Facebook profile likes are in the range 350-800. However, there are profiles that have over 2000 fans. The most likes were collected by WKU in Białystok (2796), the least - 181 – by WKU in Rzeszów. Figure 2 presents distribution of the number of likes of FB profiles of WKU units.

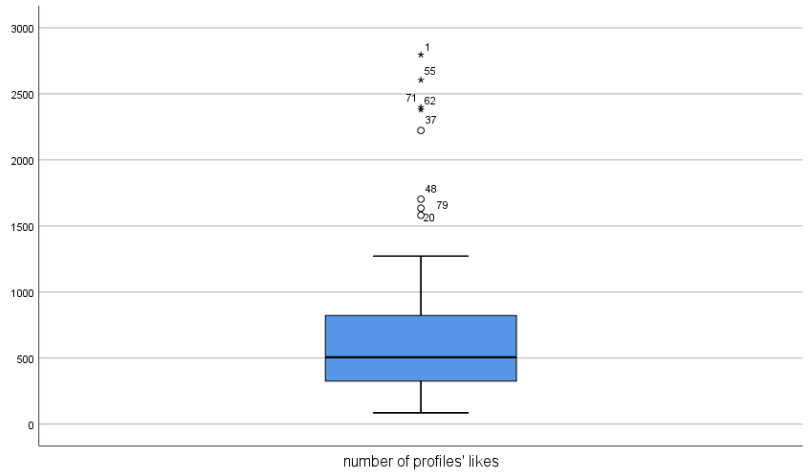

Fig. 2: Number of WKU FB profile likes (source: own research)

Most WKU unit profiles were founded in the fourth quarter of 2017. This was related to the decision of the Chief of the General Staff to support the promotional processes of recruitment to the Territorial Defense Forces and other forms of service in the Polish Armed Forces. 8 oldest profiles were founded in 2011 (the oldest - WKU Poznań: 25.01.2011). However, the activity of these profiles in the first years after establishment is low, it increased in 2016 or 2017, i.e. when WKU began to use Facebook massively

for promotional activities for military service and recruitment processes. Three units (WKU Gliwice, Kielce and Sandomierz) do not have profiles on FB to this day. WKU Kołobrzeg has the youngest profile (27/02/2019). Figure 3 presents distribution of dates of establishing WKU unit profiles on FB.

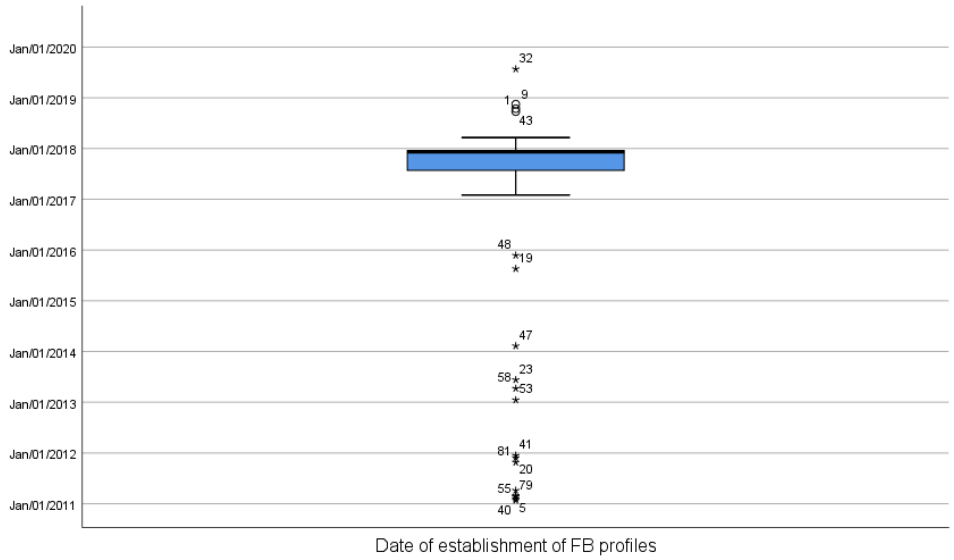

Fig. 3: Date of establishment of FB profiles of WKU units (source: own research)

On average, WKU units publish one post every two days, which, however, is not the same as the frequency of status updates. Usually, even a dozen or so posts per day are published (when there are announcements of military units with qualifications), after which the status is not updated for several days. In addition, all profiles are significantly hyperactive in 2019 compared to previous years. Six units publish on average more than 1 post per day (most - WKU Włocławek). Figure 4 presents the average number of posts per day published by WKU units on FB.

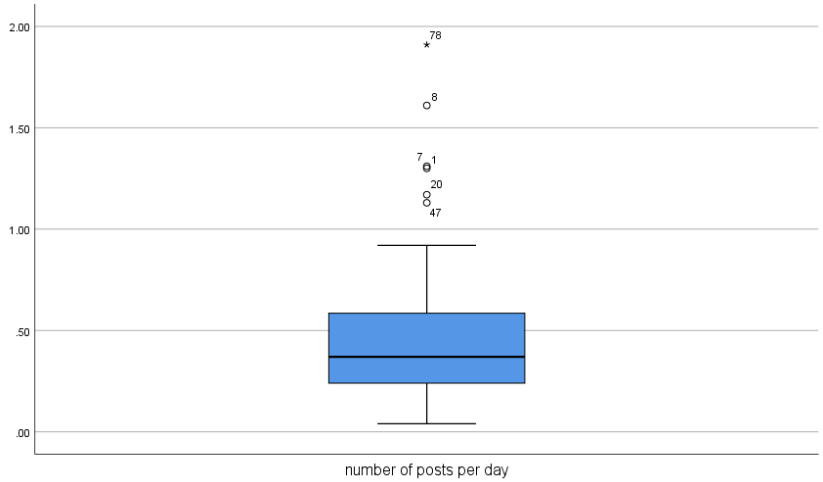

Fig. 4: Number of posts per day (average for the whole period) (source: own research)

Recruitment posts constitute a significant part of the content published on the FB profiles of WKU units. As a percentage, the majority of profiles in this area are in the range of 58-79 percent, which means that on average about 200 to 450 posts with this content were published. WKU Gdynia (2001) published the most of such materials. In percentage terms, WKU in Lublin had the most recruitment posts - they accounted for over 97 percent of all presented content. Figure 5 presents distribution of the number of recruitment posts and percent of these posts on the profiles of WKU units.

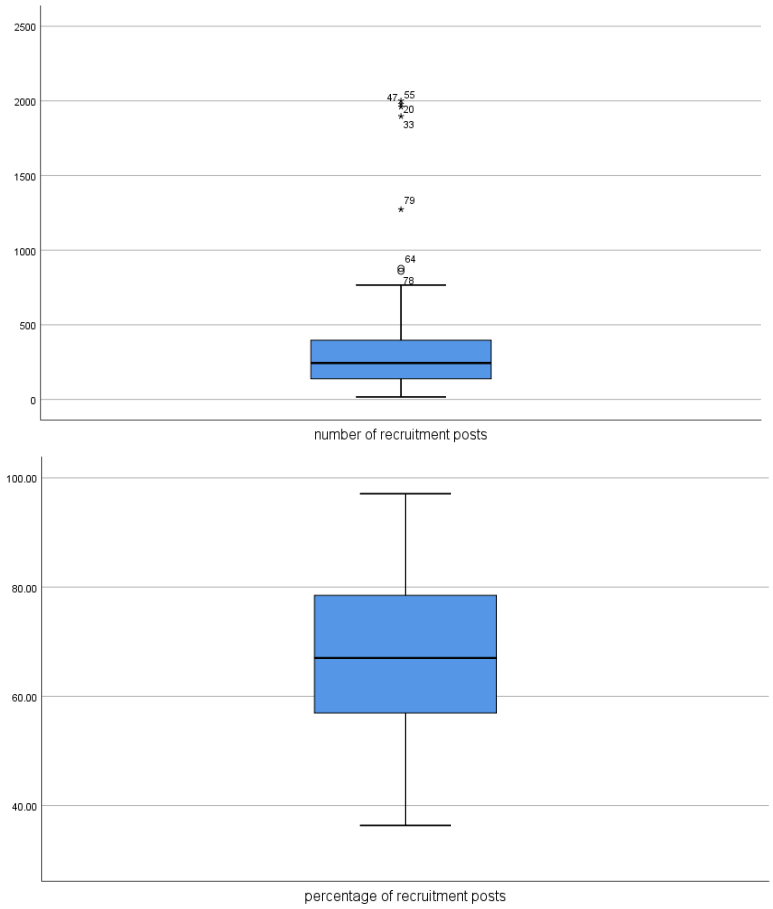

Fig. 5: Number and percentage of recruitment posts on the profiles of WKU units (source: own research)

Therefore, as can be seen from the above analysis, the profiles of the 83 WKU units surveyed show quite high convergence in the area of Facebook activity. Indeed, the majority in individual areas is about 10 percent of units. Recruitment is the key activity that WKUs undertake through their profiles in the analyzed social medium. Although the profiles belong to different units, the presented content is similar or even the same. This is largely due to the fact that the content is usually published by sharing posts of others (e.g. military units) or materials prepared centrally by the Ministry of National Defense. Especially in the last two analyzed years: February 2018 - February 2020, the coordination of the topics of published posts can be seen through references to such central promotional campaigns of the Polish Armed Forces as: become a soldier of the Republic of Poland, military challenge, parade: strong in alliances, academic legion, holidays with the army. Own posts, if they appear at all, present: reporting on participation in public holidays and promotional campaigns, organizational information regarding the functioning of the unit, occasional wishes.

In addition, a qualitative analysis of posts indicates:

- low responsiveness of WKU profiles tracking. The most-liked post, published by WKU Gdynia, had 39 of them. Most posts remain unresponsive (sharing, liking, commenting). This means that even employees and well-wishers of this institution do not respond to posts from their own organization.
- sharing the same content multiple times;
- sharing many posts in one day (limiting the reach of your own posts);
- little local content about the WKU administration area;
- little content relating to important safety issues in the area of responsibility of the WKU;
- poor quality of photos and graphic materials in own posts;
  little information about the army's activities as such (presentation of the Polish Armed Forces);
- no Real Time Marketing posts.

Discussion

Analyzing Facebook activity of WKU one should remember about some factors:

- Decision about the use of Facebook and other social media to promote and recruit to the army was taken centrally, at the level of the heads of these units. There was no substantive, personal or financial support following this decision. There is no doubt that this lack of support had a strong impact on quality of activity of these units on FB;
- In WKU units, especially smaller ones, apart from voivodship cities, there are no separate posts / employees responsible for recruiting and promoting the army through social media. These tasks are performed by employees who also are responsible for other duties;
- Persons who are responsible in WKU for communication via social media are usually not sufficiently prepared for these obligations. Social media management training is not a standard covering all units;
- Slightly more than two years of using social media (on average) by WKU units should be considered as an introductory period, which should be subject to evaluation and development of changes, with the financial and substantive support of superiors.

Conclusions

It cannot be denied that WKU units use Facebook and carry out recruitment tasks assigned to them in the Polish Armed Forces through it, which is a part of the global trend. This demonstrates the understanding of the importance of social media for the promotional purposes of the institution. However, in many areas, the way in which WKU units use this tool demonstrates an approach typical of older types of media (reporting) rather than new ones - building relationships, animating activity. There is also a change to be made from reproduction to creating one's own content. This should be changed by good practices in this area (both foreign and Polish, e.g. activity in social media of Territorial Defense Forces), strengthening of WKU units on the part of supervisory institutions and by time. Therefore, it is reasonable to repeat similar research in the future to analyze the quality of using social media for recruitment purposes to the Polish Armed Forces.

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Identification of Evaluation Signs of Illegal Impact on The Critical Information Infrastructure of The Russian Federation

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Abstract

The article is devoted to one of the most pressing problems in the field of criminal liability for illegal impact on the critical information infrastructure of the Russian Federation - determination of estimated signs of illegal impact on the critical information infrastructure of the Russian Federation. The relevance of the selected topic is dictated both by strategic priorities and official views of state authorities in the field of national security in the information sphere. Together with the trend of large-scale proliferation of computer crimes, issues related to criminal liability under the offences provided for in Chapter 28 of the Criminal Code of the Russian Federation, including under Article 274.1 of the Criminal Code, are of particular importance. Given the increased public danger of encroaching on the critical information infrastructure of the Russian Federation. Modern problems of legislative formulation of certain characteristics of the crime provided for in article 274.1 of the Criminal Code of the Russian Federation have been identified. Legislative initiatives have been proposed in the field of determining the evaluation characteristics of the offence provided for in article 274.1 of the Criminal Code of the Russian Federation, which are necessary in the absence of established law enforcement practice.

Keywords: Critical Information Infrastructure, Criminal Liability, Serious Consequences, Harm, Evaluation Signs, Critical Infrastructure, Categorization, Administrative Responsibility.

Introduction

The intensification of criminal activities, together with the development of information technologies, has made the phenomenon of crime more complex, as reflected in the introduction into its structure of cybercrime (computer crime), which is transnational and organized. According to the data of the General Prosecutor 's Office of the Russian Federation for January - December 2019, the law enforcement agencies of the Russian Federation registered 294,409 (+68.5%) crimes committed using information and telecommunication technologies or in the field of computer information [1]. The study of the dynamics of crime in the sphere of high technologies shows its twenty-sixfold growth in the last seven years (in 2013 there were 11 thousand cybercrime). At the same time, computer crime is characterized by hyperlatence, which is explained by a number of factors: According to E.A. Russkevich, the main factor is the high level of tolerance of the victims themselves, who either attempt to address data loss in alternative ways or are slow to report it to the police, Because they do not want to spend their own time on proceedings, do not believe in the ability of law enforcement agencies to

capture intruders, do not want to publish any compromising information when examining the prior virtual activity of the victim himself on the Internet, etc. [2].

Intensive improvement of the means and methods of using information and telecommunication technologies for illegal purposes forms new threats to the security of Russia in the context of globalization of advanced information systems based on borrowed software with vulnerabilities in the field of management of production and technological processes.

The National Security Strategy of the Russian Federation [3] (hereinafter referred to as the Strategy), acting as an officially recognized system of strategic priorities, goals and measures in the field of domestic and foreign policy, reveals the concept of national security of the Russian Federation, the fundamental component of which is information security. Paragraph 43 of the Strategy states as the main threat to State and public security the violation of the security and sustainability of the operation of the critical information infrastructure of the Russian Federation (hereinafter referred to as the CII). The Doctrine of Information Security of the Russian Federation, which is a system of official views on ensuring the national security of the Russian Federation in the information sphere, in paragraph 8 provides as national interests in this field for the sustainable and uninterrupted functioning of the information infrastructure, especially the CII [4].

Standard legal support of information security CII is carried out now by a number of normative legal acts among which predominating role is occupied by the backbone act which came into force since January 1, 2018 - the Federal law of 26.07.2017 № 187-FL «About safety of critical information infrastructure of the Russian Federation» (further - Federal Law 187-FL). The need to legitimately consolidate the said legislative act, according to the legislator, is due to the direct dependence of «stability of social and economic development of the Russian Federation and its safety on reliability and safety of operation of information and telecommunication networks and information systems» [5].

At the same time as the adoption of Federal Law 187-FL aimed at creating a legal and organizational basis for the effective functioning of the security system of the critical information infrastructure of the Russian Federation, amendments were made to the Criminal Code of the Russian Federation by Federal Law № 194-ФЗ of 31 July 2017 in order to ensure the sustainable functioning of the Criminal Code, concerning the criminalization of unlawful effects on the CII of the Russian Federation (Criminal Code, art. 274.1).

Results

According to the fair opinion of I.G. Puchtin and V.E. Novichkov, article 274.1 of the Criminal Code of the Russian Federation, in addition to the fact that it combines the key objective and subjective characteristics of the compositions of crimes provided for in articles 272-274 of the Criminal Code of the Russian Federation, integrates the difficulties inherent in the process of legal qualification of the criminal legal structure under consideration when establishing the of the main and qualified characteristics [6]. The specificity of the composition under consideration is due to the increased degree of criminal legal protection, as well as the features of the object of encroachment – objects of CII.

The absence of a well-established law enforcement practice of bringing persons to criminal responsibility for committing an illegal act that consists in unlawfully influencing the CII of Russia is due to the presence of gaps in the criminal legal structure of article 274.1 of the Criminal Code of the Russian Federation:

- the absence of an indication of the scope and significance of the social consequences of criminal attacks on objects of the Scientific Research Institute - damage caused to objects and serious consequences;

- the design of part 5 does not provide for the possibility of bringing to criminal responsibility a person who has committed a wrongful act provided for in the article under consideration in the event of a threat of serious consequences.

An equally important omission of the legislator in the design of the article 274.1 of the criminal code is ignoring the criteria for the categorization of objects, CUES, rules for determining which installed a Government Decree from 08.02.2018 № 127. According to item 7 of the above-mentioned rules, all objects of CII are divided into three categories - highest - first, lowest - 3 [7]. Article 7 of Federal Law 187-FL specifies the criteria used in categorization: social importance, political importance, economic importance, environmental importance and importance for security.

Despite the fact that, in fact, the category of the object of the CII indirectly reflects the public danger of criminal attack on a certain object of critical information infrastructure, the text of the Criminal Code does not reflect this in any way [8], and the qualifying characteristics are damage (part 2, part 3 of article 274.1 of the Criminal Code of the Russian Federation) and serious consequences (Part 5 of Article 274.1.

It should be noted that Part 4 of article 274.1 of the Criminal Code of the Russian Federation provides for forms of complicity (committed by a group of persons by prior conspiracy or organized group) and the commission of a criminal act by a person using his official position, but within the framework of the subject under consideration it is not necessary to study the above-mentioned characteristics.

The nature and extent of the consequences are essential categories in determining the degree of social danger of the crime. However, in modern criminal law there are no uniform scientific recommendations on the criteria of the degree of social danger, although considering this characteristic is a statutory obligation of the court articleы 60, 64, 73 of the Criminal Code of the Russian Federation) [9].

The analysis of the crimes provided for in chapter 28 «Computer crimes», makes it possible to state that in articles 272-274 the damage caused by the commission of a criminal act is specified, which is reflected in the note to article 272 of the Criminal Code of the Russian Federation: «major damage in the articles of this chapter is recognized damage, the amount of which exceeds one million rubles» At the same time, with regard to article 274.1 of the Criminal Code of the Russian Federation, the prerogative in determining the extent of the severity of the harm belongs to the judicial system, which allows it to independently determine both the threshold of the extent of the minor importance of the harm caused and the maximum damage caused to the objects of the CII.

Turning to the systemic interpretation of domestic criminal legislation, A.Y. Reshetnikov A.Y. and E.A. Russkevich conclude that the destruction, blocking, modification, copying of information contained in the critical information infrastructure, neutralization of means of protection of the specified information or failure of hardware and software tools ensuring the operation of the critical information infrastructure should be considered as harm [10]. On the one hand, the above-mentioned interpretation of harm is justified on the basis of the concept of CII facilities provided for in article 7 of Federal Law 187-FL (information systems, information and telecommunication networks, automated management systems of critical information infrastructure entities); on the other hand, the nature of the damage may be both material and technological and operational, for example, in the form of violation and termination of the operation of the CII facility.

Associate Professor of the Department of Criminal Law and Criminology of the Altay State University, Candidate of Legal Sciences, N.V. Tydykov, based on the absence of a legitimate definition of harm, suggests that «it should be only one rule: it should not be minor» [11]. As a counter-argument to the author 's point of view, the increased importance of the CII, expressed in ensuring the stability of the functioning of society and the State in conditions of digitalization, and the attack on the facilities of the CII can lead to disruption of the smooth functioning of the information infrastructure.

At the same time, the question arises as to the qualification of the act in a situation where the person exercising the objective side of part 2 of article 274.1 of the Criminal Code of the Russian Federation has failed to cause harm to the CII, for example, as a result of the successful operation of anti-virus software or the action of employees responsible for information security. If you qualify what you did according to part 3 of article 30, Part 2 of article 274.1 of the Criminal Code of the Russian Federation, a number of questions arise, as in this case some impact on the software code was carried out,

accordingly, the damage to the CII object was caused and immediately eliminated by restoring the initial algorithm of software functioning. The most dangerous consequence of malware attack is the disruption of supervisory control and data acquisition systems (SCADA) and other computer systems used to control technological processes, machines, mechanisms and other industrial equipment [12].

Considering the problems of qualification of actions of person under article 274.1 of the criminal code of the Russian Federation with infringement of the credit-financial sphere, E. A. Soloviev believes that «the harm should not necessarily be expressed in causing property damage to owners of KII of the Russian Federation, in this case is an evaluation category that will be set by the court each time the classification of the offence, taking into account the opinion of the victim» [13]. In terms of determining the opinion of the victim, a number of questions arise: if the owner of the object of the CII is a legal entity or an individual entrepreneur, the calculation of the damage will be made from the value costs incurred by the subjects of the CII as a result of a computer incident, or from the costs necessary to restore the functioning of the object, or damage caused to citizens, the state ? What is the expression of non-material harm and how it should be compensated, etc.

Investigating the features of criminal prosecution of CII subjects, the list of which is defined in paragraph 8 of Federal law № 187-FL, the auditor of the Department of information technologies of Moscow V. Komarov notes: «since damage to the «critical infrastructure of the Russian Federation» is prescribed, and not «computer information», the amount of damage is easily calculated by the investigator and proved in court» [14]. Supporting the author 's point of view, it should be noted that the determination of the property characteristic of the harm should be based on the cost of ensuring the effective functioning of the automated system, information system, information and telecommunication network used in the sphere of health, science, transport, communications, energy, banking and other spheres of the financial market, fuel and energy complex, in the field of nuclear energy, defence, rocket and space, mining, metallurgical and chemical industries, that is, applied at the facilities of the CII, as well as lost profits, for example, as a result of the disruption of the production process of a particular enterprise.

Mikhail Koptenkov, Head of the Audit and Consulting Department of the Competence Center for the IP of Technosthe Company, states that «on average, the cost of meeting all mandatory requirements for the protection of CII facilities starts from 10 million rubles (for organizations with a small number of significant objects of the third category) and can reach several hundred million rubles (for large organizations operating in different regions of the Russian Federation and having many significant objects of CII of different categories) » [15]. Considering the average indicator, it seems that the property characteristic of the harm in the considered composition of the criminal act amounts to at least a quarter of the specified minimum costs for the fulfillment of all mandatory requirements for the protection of the facilities of the CII.

On the basis of the above, we consider it necessary:

(1) Replace «harm» with «major harm» in parts 2 and 3;

(2) The note to article 274.1 shall read as follows:

«Note. The acts provided for in this article are considered to have been committed on a large scale if the amount of costs for ensuring the safety and sustainable and uninterrupted functioning of the critical information infrastructure exceeds two million two hundred and fifty thousand rubles»;

(3) Paragraph 2 of the notes to article 272 shall read as follows:

«2. Major damage in the articles of this chapter, with the exception of article 274.1, shall be considered damage the amount of which exceeds one million rubles»

The evaluation characteristic, which is particularly qualified and placed in part 5 of article 274.1 of the Criminal Code of the Russian Federation, - «serious consequences» includes in its content more

dangerous consequences than «harm» of the CII, enshrined in part 2 and part 3 of this article. A distinctive feature of this category is the scope of its application - in addition to the objects of the CII, serious consequences are considered with regard to the activities of the subjects of the CII.

As S.D. Brezhnik rightly points out, in the assessment of the serious consequences of computer crimes, there are two approaches: proponents of the first approach understand by them the loss of extremely irreplaceable information, the availability of which ensures the operation of means of automated processing of computer information or is necessary for the functioning of a natural or legal person; Most scientists treat the grave consequences as «loss of life, injury to health, disruption of production in the enterprise or industry, complication of diplomatic relations with another State, emergence of armed conflict» [16]. In addition, a third approach, formed with the adoption of the rule under study, is identified - serious consequences mean improper impact on information resources of strategic importance related to ensuring public and State security.

According to Y.V. Truntsevsky, «in the case of CII, serious consequences should not be limited to material damage, that is, the gravity of the consequences should be determined taking into account the causing (or reality of the created threat) of serious harm to human health or death, material damage, serious disruption of the activities of enterprises, accidents and disasters, destruction, blocking, modification or copying of privileged information of special value» [17].

A.N. Popov proposes to recognize under serious consequence «the fact of termination of operation of the facility of critical information infrastructure of the Russian Federation, the telecommunication network used for organization of interaction of facilities of critical information infrastructure of the Russian Federation, and (or) violation of security of information processed by such facility» [18].

The methodological recommendations of STEP LODGIK, the system integrator of the National Computer Corporation, dated 05.07.2019 «Categorization of Critical Information Infrastructure Facilities 187-FL «On the Security of the Critical Information Infrastructure of the Russian Federation» contain criteria for assessing possible consequences as a result of computer incidents at CII facilities [19]:

- Social importance: damage to life and health of people, termination or disruption of functioning of facilities of life support of the population, termination or disruption of functioning of transport infrastructure facilities, termination or disruption of functioning of communication network, lack of access to public service;

- Political significance: termination or disruption of the functioning of the state body in terms of non-fulfillment of its assigned function, violation of the terms of the international treaty of the Russian Federation, breakdown of negotiations or signing of the planned international treaty of the Russian Federation;

- Economic significance: occurrence of damage to the subject of CII, which is the state corporation of State Joint Stock Company, State Company, Strategic Joint Stock Company, Strategic Enterprise, occurrence of damage to the budgets of the Russian Federation, termination or disruption of functioning of transactions by clients on bank accounts and (or) without opening a bank account or operations performed by a subject of a critical information infrastructure, which is in accordance with the legislation of the Russian Federation a systemically important credit institution;

- Environmental importance: harmful effects on the environment;

- Importance for security: termination or disruption of the functioning of the control point (situation center), reduction of the indicators of the state defense order performed by the subject of the CII, termination or disruption of the functioning of the information system in the field of national defense, state security and law and order.

These criteria should be considered as serious consequences provided for in Part 5 of article 274.1 of the Criminal Code of the Russian Federation.

Turning to the question of the legitimate definition of serious consequences, two steps should be highlighted in addressing the current dilemma:

1. Specifying the list of consequences relating to serious in the law itself: for example, «caused the termination or disruption of the activities of human life support facilities or other serious consequences». The formulation of one of the most serious consequences will serve as a guide for the law enforcement agency. However, this will not allow to offset the possibility of considering certain consequences as serious.

2. Judicial interpretation of the evaluation feature being analysed is considered most appropriate. There is an objective need for a qualified explanation by the Plenary of the Supreme Court of the Russian Federation not only of the list of consequences relating to serious, but also of other issues related to the qualification of crimes provided for in chapter 28 of the Criminal Code of the Russian Federation.

Of particular importance in the analysis of socially dangerous consequences is their division into real damage and the threat or danger of causing them. Chapter 28 of the Criminal Code of the Russian Federation provides as a particularly aggravating circumstance the occurrence of «serious consequences or the threat of their occurrence». In the analysis of the offence, the well-established phrase «if it has serious consequences or has threatened to occur» is not used by the legislator. In this regard, according to A.A. Chavgun and S.D. Brezhnik, «it is quite reasonable for the legislator to use this design" creating danger "in the compositions of Article 272-274 of the Criminal Code, while when protecting a more significant object, the legislator simply ignores it [20]. In this regard, we propose:
«In part 5 of article 274.1, the phrase «grave consequences» should be replaced by the phrase «grave consequences or threatened to occur».

The need to improve criminal law requires the expansion of the scope of the Administrative Code of the Russian Federation. In this regard, it is necessary to draw attention to the initiative of the legislator in establishing administrative liability for non-compliance of the subjects of the CII with the requirements in the field of security of significant objects of the CII in order to differentiate the punishment depending on the severity of the consequences of violation of the requirements of the law in the field under consideration. Administrative offences provided for in the draft law of 18.02.2020 № 02/04/10-19/00096058: art.1.12.1 Violation of requirements in the field of security of critical information infrastructure of the Russian Federation, art.19.7.15. Failure to provide information provided for by the legislation in the field of security of the critical information infrastructure of the Russian Federation.

Conclusion № 4250-AH/D26i of 14.02.2020 on the assessment of the regulatory impact of the bill states that «at present the balance of violations and measures of liability for them has been observed, and the additional establishment of a wide range of administrative liability measures should be synchronized with the simultaneous reduction of criminal liability measures» [21]. In addition, the risk of assigning additional costs to the relevant budgets of the budget system of the Russian Federation is considered to be a negative impact of the adoption of the bill.

However, the analysis of the above-mentioned bill allows to state that the norms provided for in it do not duplicate the norms of article 274.1 of the Criminal Code of the Russian Federation in terms of ensuring the functioning of the CII, but are aimed at regulating the procedure for categorizing the objects of the CII of the Russian Federation; Violation of the procedure for informing about computer incidents, violation of the procedure for exchanging information about computer incidents between subjects of the Criminal Code of the Russian Federation, etc.

Allocating as one of the important directions of improvement of the criminal legislation decriminalization of a number of the acts provided in Chapter 28 of the Criminal Code of the Russian Federation in case these acts did not entail causing damage/harm S.D. Brazhnik notes that legal

relationship in the sphere of computer information, information resources, information systems and technologies need regulation by norms of administrative law [22].

In conclusion, we note that in the absence of a well-established law enforcement practice of bringing persons to criminal responsibility for committing an illegal act that consists in unlawfully influencing the CII of Russia, it is proposed to apply the following recommendations and proposals aimed at improving criminal legislation on criminal liability in the field of critical information infrastructure:

1. Due to the absence of an indication of the scope and significance of the harm caused by criminal attacks on the facilities of the CII, it is necessary to

- replace in part 2 and part 3 of article 274.1 the word «harm» with the word «major harm»;

-note to article 274.1 to read as follows:

«Note. The acts provided for in this article are considered to have been committed on a large scale if the amount of costs for ensuring the safety and sustainable and uninterrupted functioning of the critical information infrastructure exceeds two million two hundred and fifty thousand rubles»;
paragraph 2 of the notes to article 272 shall read as follows:

«2. Major damage in the articles of this chapter, with the exception of article 274.1, shall be considered damage the amount of which exceeds one million rubles»

2. To consider the list of heavy consequences according to part 5 of article 274.1 of the Criminal Code of the Russian Federation to identical criteria for evaluation of possible consequences as a result of emergence of computer incidents on objects CII, the provided methodical recommendations of STEP LODZHIK, system integrator of National computer corporation, of 05.07.2019 «Categorization of objects of critical information infrastructure 187-FL «About safety of critical information infrastructure of the Russian Federation».

3. We propose to establish the scope of serious consequences either in the criminal law itself («caused the termination or violation of the activities of human life support facilities or other serious consequences»), which will serve as a guide for the law enforcement officer, or to state the updating of the qualified explanation of the Plenum of the Supreme Court of the Russian Federation on issues related to the qualification of crimes provided for in chapter 28 of the Criminal Code.

4. Based on the fact that the design of part 5 does not provide for the possibility of bringing to criminal responsibility the person who committed the wrongful act provided for in the article in case of threat of serious consequences: replace in paragraph 5 of article 274.1 the phrase «serious consequences» with the phrase «serious consequences or created threat of their occurrence».

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Economic Component of Improving the Efficiency of Engineering and Technical Means of Supervision in Ensuring the Safety of Facilities of The Penal Correction System

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Abstract

The task of ensuring the security of facilities and staff of the penal correction system with regard to the reliable protection and isolation of convicted persons and persons detained in accordance with the requirements of law and order remains one of the relevant tasks in the activities of the staff of the penal correction system. In this regard, the article analyses the effectiveness of measures to introduce new technologies in the security system of facilities and staff of the penal correction system in terms of the economic component of this process. Special attention is paid to the economic efficiency of the implementation of engineering and technical means of protection and supervision. Proposed method is to evaluate efficiency of engineering and technical means of protection and supervision on the basis of certain indicators and methods of calculating integral indicator of efficiency of the system as a whole.

Keywords: Engineering and Technical Means of Supervision, Criminal Enforcement System, Control and Supervision, Efficiency of Application, Security, Correctional Institutions, Economic Component of Security.

Introduction

One of the directions of improvement of the penal correction system of the Russian Federation according to the concept of development of the penal correction system of the Russian Federation until 2020 is the development of engineering and technical means of protection and supervision (hereinafter - ITSON). In order to implement this direction, it is envisaged to establish a system to counter the unlawful behaviour of convicted persons on the basis of the use of modern ITSON, state-of-the-art technologies and approaches to the organization of security of facilities of the penal correction system.

ITSON should be understood as the means used to ensure the security of facilities of the penal correction system, the isolation and supervision of convicted persons and persons in custody, as well as to carry out other tasks of operational and performance activities of staff of the penal correction system.

It is undeniable that one of the most effective methods of improving the effectiveness of supervision in correctional institutions of the penal correction system is the introduction of ITSON into their activities. The use of ITSON at security facilities allows to minimize the impact of the «human factor»» and to

ensure prompt adoption of the necessary decisions and their documentation. It is undeniable that one of the most effective methods of improving the effectiveness of supervision in correctional institutions of the penal correction system is the introduction of ITSON into their activities. The use of ITSON at security facilities allows to minimize the impact of the "human factor" and to ensure prompt adoption of the necessary decisions and their documentation.

At present, the Federal Penal Correction Service is taking a number of consistent measures to improve the engineering and technical equipment of the facilities and to ensure the necessary level of their technical safety. Equally important in this area is the formation of a unified technical policy in equipping the facilities of the penal correction system with ITSON complexes and the introduction of new technologies, and the active improvement of the legal and regulatory framework governing the organization of the use of ITSON in correctional institutions and remand centres.

At present, there is a need to further improve the supervision system in order to improve the efficiency of correctional institutions of the territorial bodies of the penal correction system. The tasks are primarily related to the elaboration of measures ensuring the achievement of the main goal of supervision - the isolation of convicted persons, the prevention of crimes and offences, while at the same time bringing the procedure and conditions for the serving and execution of sentences in the form of deprivation of liberty into line with generally accepted international standards and rules for the treatment of convicted persons.

Results

The activities of the penal correction system in the present period can be described as transitional in the context of the administrative reform of the Federal Penal Correction Service of the Russian Federation in general and the re-equipping of institutions and bodies of the penal correction system with modern technical means and new information technologies, in particular. According to E.A. Scherbakov, «there is a clear lack of funding, much needed right now, a shortage of specialists in the use of engineering and technical means of protection and supervision, sometimes their weak preparation for new tasks, problems of organizational nature, as well as the entrenched in recent years approach of the management of many institutions and bodies of different levels to problems of technical re-equipment as secondary ones» [1].

ITSON, as the basis for equipping the facilities of the penal correction system with security equipment, has a direct influence on the organization of the activities of the staff of the operational units and bodies of the penitentiary system. As A.A. Babkin rightly notes, «without a well-developed, equipped with new modern technical means of the ITSON complex, the implementation of the regime of serving sentences in correctional institutions of the Federal Penal Correction Service of the Russian Federation becomes not only ineffective, but also inadequate to the main goals and objectives of the penal correction system, economically unprofitable» [2]. The authors of the manual "Use of technical means in the mode, Ensuring isolation, safety and supervision of convicted persons, "only with reliable and effective protection of facilities by technical means of supervision and control, Their timely, complete and competent operation, continuous improvement of engineering and technical support for the activities of institutions and bodies of the penal correction system are possible due organization of the regime of execution of punishment in the form of deprivation of liberty, progressive and sustainable development of the penal correction system of Russia [3].

One of the proposals made by the authors is the creation of a single integrated ITSON complex of the institution consisting of safety and security subsystems, implemented in a modular version with a single software, will significantly improve the efficiency of the system of regime and protection of the UIS institutions. In our opinion, this approach in the equipment of ITSON UIS facilities will allow not to involve third-party organizations in the installation works, to operate within the existing number of engineering and technical support specialists, thus reducing the spending of budgetary funds of the state for the implementation of the creation of a single integrated complex of ITSON institutions and bodies of the penal correction system. However, upgrading and adding video surveillance systems and

access controls to existing ITSON systems will not require additional costs for the acquisition of peripherals and cable products.

The creation of this system implies that on the basis of the achieved potential and further development in the field of detection, video surveillance, access control and communication, it is planned to organize in the unit - territorial body - federal district - central apparatus automated telemetry data control and video surveillance stations. The creation of this infrastructure will allow to respond quickly to changes in the situation in the institutions and bodies of the Federal Penal Correction Service of the Russian Federation, to make timely management decisions.

Using a system-wide approach to modelling the application of ITSON, P. M. Nikolayev, in his study shows that "the effectiveness of protection and supervision in the institutions of PIS will be significantly influenced by the following factors: the technical characteristics of ITSON; Methods and tactics for the use of ITSON; Types and number of ITSON used. For example, incorrect tactics of use or insufficient quantity of ITSON reduces the effectiveness of supervision and protection, as well as creates prerequisites for the commission of escape or violation of the regime. On the other hand, the excess of ITSON leads to the over expenditure of funds for their purchase, installation and operation, while the effectiveness of supervision and protection remains unchanged» [4]. This presents a complex and complex technical challenge of calculating the needs of prison institutions in ITSON and how they can be applied to ensure an adequate level of security at such facilities. Such a task is carried out through in-kind experiments involving equipment and personnel, which requires significant financial costs.

Exploring the methodological basis of increasing the efficiency of protection of UIS institutions by means of security units against external threats A.S. Bondarchuk and V.G. Zarubsky show that «the synthesis of simple, reliable, highly efficient, universal security systems, taking into account the justification of their rational structure and parameters ensuring the maximum probability of protection of objects under the calculated conditions of external threats (attackers), is an urgent necessity today»[5].

It should be noted that equipping the institutions of the penal correction system with automated equipment requires careful assessments, as the costs of robotics, maintenance of equipment and training of specialists in its operation are high, which will require significant material and financial costs. In addition, it should be considered that in the process of using ITSON, they may suffer damage, the subsequent elimination of which requires certain costs.

According to M. Y. Popov and A.E. Kostromtsov, «when equipping the correctional institution with automated security and fire systems, it is mandatory to consider the configuration of the facilities, as a large enough number of correctional institutions are located in the urban area, the fire capacity of such systems, their rate of fire and striking factor, as well as the probability of physical damage to civilians» [6].

An important part of the assessment of the effectiveness of security systems is economic efficiency, under which the effectiveness of the funds invested in the security activities of the institution should be considered, the criterion of which is the maximum economic result obtained at the minimum cost and rational use of resources. Of course, the cost-effectiveness of the implementation of ITSON in institutions and bodies implementing punishment should be assessed not from the point of view of the operation of the security system, but by the amount of damage prevented. In this regard, E.G. Tsarkova, «noting the importance of the economic component of ITSON, proposes to understand efficiency of safety systems of UIS facilities, and efficiency in the sense of economy to allocate to the group of complex indicators of the type "efficiency - cost» [7].

Measuring the effectiveness of ITSON is a procedure aimed at determining qualitative and/or quantitative performance indicators and calculating the integral performance indicator of the system as a whole. Based on the system approach of safety system development, it follows that the results of safety efficiency assessment serve as initial data for the stage of detailed system design, comparative

analysis of technical solutions and proposals for equipment of institutions of the penal correction system with technical means, including at the stage of study of projects on equipment of the facility with the ITSON complex.

A comprehensive assessment of the effectiveness of the security system provided by ITSON is important, consisting of a system analytical study, which should provide a synthesis assessment of its effectiveness, which is a basis for comparing with the effectiveness of possible options for security systems, as well as ranking institutions by degree of security.

The evaluation of the effectiveness of ITSON shall be carried out on the basis of certain indicators and methods of calculating the integral performance indicator of the system as a whole. It should be noted that there is no unified methodological approach to the construction of a system of indicators that together reflect the effectiveness of the security system of the protected facility of the penal correction system. It should be noted that the lack of a unified approach to assessing the effectiveness of the ITSON penal correction system introduced into bodies and institutions leads to a decrease in the level of safety of facilities.

In order to obtain a comprehensive assessment, the security indicators of the institution should be considered as much as possible, which should then be consolidated into a single integral indicator, which allows to measure the difference between the analysed security system and others and plan its modernization by analysing each individual indicator included in the common system. An indicator of the effectiveness of any of the subsystems of the security system is the extent to which it has achieved any of its objectives. The value of a private performance indicator in which the system meets its requirements is a private performance criterion. For example, a particular criterion for the effectiveness of a security system may be to meet the conditions of the GOST from the point of view of the reliability of the system. So, GOST P 53704-2009 establishes requirements to the size of availability quotient of a security system: ≥ 0,93 Kг [8].

Performance indicators can be divided into groups:

1. Single (private) - reflecting any of the significant aspects of ITSON operation (for example, Pobn - probability of detection of the intruder by technical means, Pneitr - probability of neutralization of the intruder by security forces, cost indicators, design costs, etc.);

2. Complex (generalized) - are a combination of private indicators (for example, Pper = Pob. Pzad - probability of detention of the offender by the security forces acting on signals of actuation of the security equipment).

As private indicators, the alarm reliability of the perimeter of the protected facility of the penal correction system should be considered, Engineering preparation of terrain and perimeter, characteristics and parameters of the information collection and processing system, Characteristics and parameters of the access control system, characteristics and parameters of the video surveillance system, The characteristic of the alarm lighting system, the characteristic of the operational communication system, the persistence in case of industrial network outages and in other abnormal situations, Measures to counter technical intelligence of organized criminal groups and illegal armed groups.

Security performance measures include one-time and long-term costs. Single cost represents the cost of costs of initial purchase, installation, installation and debugging of ITSON. The long-term cost consists of the cost of maintenance, repair, replacement of ITSON per month.

In order to obtain an integral indicator of efficiency, a convolution of private indicators into one general integral indicator must be used, taking into account the specified "weights" of criteria (private, value, special efficiency indicators taking into account their weights), each of the indicators is separately aimed at: Substantiation of conclusions on quality of created or modernized safety system, verification

of performance criteria compliance, formulation of requirements to characteristics of technical means ensuring compliance with these criteria.

Obtaining an integral indicator of efficiency in numerical value makes it possible to optimize according to the main criteria when implementing ITSON in bodies and institutions implementing criminal penalties, among which the maximum level of protection at the specified costs and the specified level of protection at the minimum costs can be allocated.

At present, there is a need for a systematic assessment of the effectiveness of security systems for protected facilities of the penal correction system. Accordingly, it is necessary to specify and approve a single list of safety system performance indicators, and to determine for each of them the method of calculation, as well as the method of obtaining a comprehensive performance indicator. The evaluation process should be based, inter alia, on the use of GOST, guidance documents, as well as real statistics, making maximum use of the opportunities provided by the existing information infrastructure of the agency.

Modernization in this area, first of all, should be based on the definition of a uniform policy for the introduction of ITSON into the bodies and institutions implementing penalties, which should provide for:

- Development of a list of ITSON, as well as standards for such facilities and requirements for equipping facilities of the penal correction system;

- unification of ITSON;

- Acceptance of ITSON from manufacturers whose products meet the technical requirements and standards stipulated by departmental acts of bodies and institutions of the penal correction system;

- Increasing the level of utilization of the productive capacity of the authorities and institutions of the penal correction system in the context of the development and establishment of ITSON.

The introduction of new engineering and technical means developed on the basis of modern technologies is economically profitable and useful, as it allows to carry out protection and supervision in institutions in more progressive ways, to redistribute and find funds for further rearmament of PIS.

The use of all available methods and means of ensuring the safety of facilities and personnel of PIS can certainly have a significant result, but will also prove to be as costly as possible in material and physical aspects, as well as in complexity of implementation. Therefore, it is advisable to use only methods and means that have high efficiency and low average costs of material and labor resources for their implementation and operation. The effectiveness of the results of the use of modern ITSON is largely determined by the professional and moral qualities of the staff of the UIS, whose activities constantly involve attacks on their safety, various threats against them, as well as their loved ones. It is therefore necessary to modernize in a timely manner the system of economic, political, institutional and other measures adequate to threats to their vital interests within the framework of a unified State security policy.

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GIS Technology Implementation in Ecological Footprint Analysis for Management of Sustainable Transmigration Development

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Abstract

The implementation of development policies in the field of transmigration as an integral part in accelerating economic equality and development in Indonesia has actually been implemented since the era of Dutch colonialism in Indonesia, and is known as "colonization" which was later adopted by the Government of the Republic of Indonesia as "transmigration". This research was conducted to implement technology in the field of territorial analysis in a series of geographic information systems (GIS) as part of knowing the condition of the ecological footprint in developing transmigration settlement locations synchronized with forest conservation policies. Data collection methods used in this study are by conducting literature reviews on documents from the results of transmigration development and implementation of placement with enrichment of literature related to the implementation of transmigration programs in the form of thematic geospatial information (IGT) / thematic maps, forest management, utilization of information system technology geographical and related scientific works. The steps of data analysis are carried out by making spatial analysis by overlaying the thematic geospatial information data from the distribution of transmigration sites as well as forest and water areas. The results showed that there was an implementation of transmigration settlement development policy that was not in accordance with the rules because it was inside a forest area, thus triggering an opportunity to increase the ecological footprint of the Transmigrant community from the aspect of exploitation of the forestry sector.

Keywords: Transmigration, Deforestation, Forest Area, Geographic Information System.

Introduction

Forest is one of the natural resource that is important for human life. Trees provide many benefits in human life, especially for producing oxygen and absorbing carbon, thus makes human beings can breathe well and remain comfortable living environment. Besides that, if properly managed, forest will provide economic benefits through job creation while maintaining environmental advantages (Kandari *et al.*, 2015). Major changes began to occur in the forested landscapes of Indonesia in the 1970s with the introduction of powerful tractors for timber harvesting. The introduction of these machines paved the way for large-scale harvesting of the tropical lowland forests, which continues today in many parts of Indonesia (Suyanto *et al.*, 2004). The deforestation and degradation in several location of Indonesia are caused by the illegal logging, commercial agriculture, farming, mining, the big scale of plantation, and aquaculture (Angi and Wiati, 2017). The construction of the transmigration settlements location is seen as a part of the several sectors which cause the deforestation in Indonesia, because the implementation of land provider and service scheme in the transmigration which come from the state's land and with the status of forest area. Whereas in Indonesia, forest is the main natural vegetation and the most important natural resources (Manik, 2018).

Between 1950 and 1997, 59.0 Mha of forest was deforested, while 7.1 Mha of arable land, 10.2 Mha of permanent crop, and 41.7 Mha of "other" land category were increased. Between 1997 and 2015, 5.6 Mha of arable land and 11.3 Mha of land for permanent crop were increased, while 9.0 Mha of forest and 7.9 Mha of the "other" category decreased. Prior to 1970, no trend of severe forest loss was apparent. Between 1970 and the mid-1990s, export-oriented log production and global demand were the primary pressures underlying deforestation. Cultivation of rice and other crops was also found to be associated with a growing population and transmigration policy (Tsujino *et al.*, 2016). In the other side, Indonesia with huge population, unequal spread, and unbalance between the natural carrying and environment capacity, if not handled properly, it can cause social insecurity or environmental damage (Iskandar, 2010).

In the scope of transmigration field related to forestry problems, the forms of disturbance that considered serious and needed to be handled are the practice of illegal logging and theft of forest products, encroachment of forest areas, shifting cultivation, forest fires, poaching and disturbance of wildlife resulting in material losses and decreasing environmental quality. The transmigration development basically is the regional development through new rural development. The use of forest areas for the construction of transmigration settlements cause the agro-climate change and environmental damage (Husodo, 2003). The rules for the utilization of forest areas in the scheme of land provision and services in the field of transmigration, are actually quite clearly stipulated, that the transmigration land from the State land and the forest area includes Production Forest (HP), Permanent Production Forest (HPT), Protected Forest (HL) dan Nature Reserve and Tourism Forest (HSAW) are forbidden (Departement of Manpower and Transmigration Republic of Indonesia, 2006).

Nothing hides the fact that environmental problems such as global warming, large-scale deforestation, desertification, loss of biodiversity, have disturbed our ecological balance in our world (Sonu, Binod and Sonika, 2011). Utilization of the forestry sector is one aspect that forms a pattern of community ecological footprint (EF) in an area. Ecological footprint is a theoretical category of the use of bioproductive areas in meeting human needs. But keep in mind that nature has a maximum carrying capacity to meet the needs of human life (Muta'ali, 2012). Analysis of the ecological footprint of the forestry sector is one aspect that is integrated with other aspects with functions as an important part of the ecological sustainability chain of the region as well as the main source of timber producers that are used in a sustainable manner (Haberl, Erb and Krausmann, 2001). As part of regional management based on the ecological footprint, this study also aims to identify populations and cultivation areas through regional management, infrastructure development, and the implementation of good environmental management (Ministry of Public Works of Republic of Indonesia, 2010). Simply put, the description of the relationship between the ecological footprint analysis framework, the use of GIS technology and the efforts to achieve sustainable transmigration development can be seen in *Figure 1*.

The issue of implementing the transmigration program is considered as one of the causes of deforestation in forest areas and environmental degradation (Sunderlin and Resosudarmo, 1999; Gatto, Wollni and Qaim, 2015; Darmawan, Klasen and Nuryantono, 2015; Bellfield *et al.*, 2016; Mulyani and Jepson, 2017), in Indonesia. Through this research it is expected to provide a technical review of the implementation of the use of GIS technology in the management of transmigration development and reveal the background to the increasing value of the EF forestry sector in transmigration sites that were built to achieve more sustainable transmigration development.

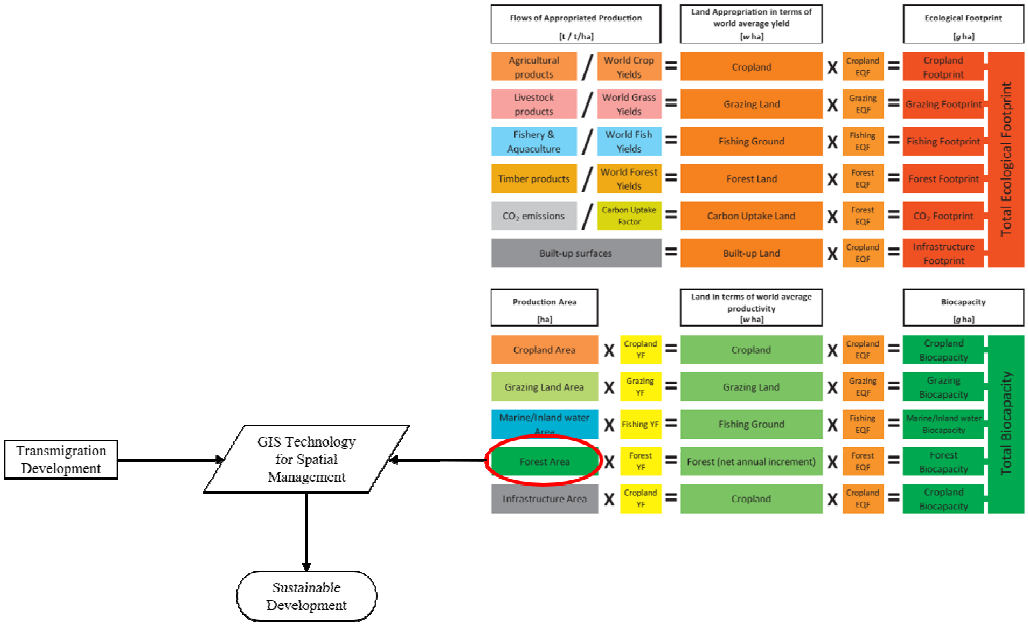

Figure 1: Relationship framework of ecological footprint analysis by utilizing GIS technology for the management of sustainable transmigration development (reprocessed from Borucke *et al.*, 2013).

Methods

The study was conducted on the transmigration locations with the status of under coaching by the Ministry of Village, Development of Disadvantaged Area and Transmigration Republic of Indonesia and included in the action plan for One Map Policy programe at the level of map accuracy 1: 50.000 in 2015-2018 or as many as 222 locations of transmigration locations. The description of the method used can be seen in *Figure 2*.

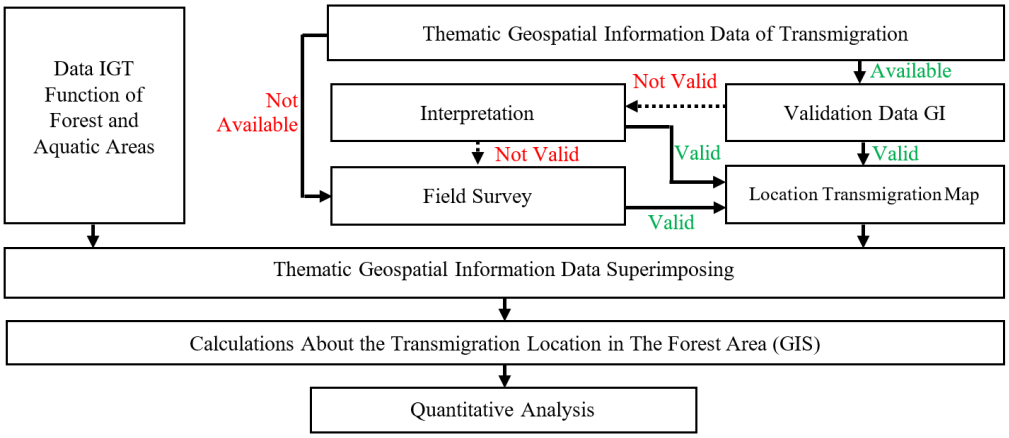

Figure 2: Diagram of Research Flow

Data Availability

Database can be interpreted as a collection of data about an object or event that are interconnected with each other. While data is a fact that represents an object such as humans, events, concepts and others. Data is recorded in the form of numbers, letters, symbols, images and sounds, or the

combination of them (Kresnanto, 2010). Based on the results of data collection using a literature review method consisting of documents from the implementation of development and transmigration placement result, not all of them were supported by geospatial location information data. From 222 transmigration location targets, there were 204 locations (92%) supported by information geospatial (IG) data, while 18 locations (8%) were not supported by IG data. It could be seen on the *Table 1*.

Table 1: Data availability of IGT Transmigration Location Distribution

MAP SOURCE	AMOUNT	UNIT
As Built Drawing Image (ABD)	28	Locations
Map of Field (National Land Agency)	8	
Map of Land Measurement / Design Plots	10	
Transmigration Borders Sign / Land Opening Map	11	
Aerial Photos	34	
Map of Topography	1	
Map Plan (RTSP)	112	
Not Available	18	
TOTAL	**222**	

Result and Discussion

Validation of Geospatial Information Data

The requirement for a data be used for an analysis which results could be accounted is if the data quality standards were fulfilled. One of the criteria for quality data is having a high level of validity. Therefore, every data used as a reference for analysis must be tested first. This testing process can be done with several approaches (Susilo and Harini, 2018). Analysis using geographic information systems is often used as spatial analysis, unlike the other information systems, by adding dimensions of 'space' or geography. Spatial analysis was made by overlaying two maps which then produce new maps as a result of analysis (Ningsih, Soelistijadi and Sunardi, 2005).

The method of map superimposed had proven to be very good if it is used to conduct impact studies on projects which the distribution area had a very wide range of integrated project activities, area projects and regional projects. In its development, the method of map superimposed is combined by scoring and statistical calculations so that it could be used to determine land use (Fandeli, 2017). This process can be understood as adding together the spatial frontiers of the data in the case of polygonal entities, in which a set of polygons is obtained with the same homogeneous attributes as those of the factors from the previously established layers. After overlaying the spatial data, the decision rule is applied to the simple objective and multiple criteria problem in order to obtain the alternatives map according to suitability (Quinta-Nova, Fernandez and Pedro, 2017).

The results of the validation of geospatial data on research objects were 222 transmigration locations, only 92 locations (41%) supported by the availability of geospatial information data that met the validity standard. While another 112 locations (50%) were not supported by the availability of geospatial information data that met the validity standard because it was sourced from the map of transmigration settlement development plans which were often very different from the existing conditions of transmigration settlement development and the rest 18 locations (9%) were not supported by the availability of information data geospatial.

Field Survey

Field check activities included the checking of geometry accuracy and verification of land cover, which both were part of the field completeness survey. Geometry accuracy checking is a comparison between the coordinates on the manuscript map and the coordinates of the Global Positioning System

(GPS) in the same location, while the land cover verification is a land cover comparison between the results of the stereoplotting stage and the land cover which was checked directly on the field (Susetyo and Perdana, 2014). Field surveys or field checks were conducted at 130 transmigration location consisted of 112 transmigration locations with information geospatial (IG) data sources in the form of development plan maps and 18 transmigration locations with no supporting IG data.

Spatial Analysis Results

The result towards the spatial analysis on 222 transmigration location, seen from the distribution location perspective, could be explained that 55 (25%) location were under the territory of Sumatera region 47 (21%) location were under territory of Kalimantan/Borneo, 71 (32%) location were under the territory of Sulawesi/ Celebes region, 19 (9%) location were under the territory of Maluku/ Moluccas region, 21 (9%) location were under the territory of Papua, 9 (4%) location were under the territory of Nusa Tenggara. Generally, the result from the spatial analysis of transmigration location on the forest area which was synchronized with the land provider and service in the field of transmigration showed that the wide of development in 222 transmigration location were 14.9654,96 ha, where 139 (63%) transmigration location were built outside of forest area (APL) and 83 (37%) transmigration location were built on the forest area. The detail can be seen on the *Table 2*, *Table 3* and *Figure 3*.

Table 2: Wide Recap of Transmigration Locations on Forest Area

CATEGORY	AMOUNT (ha)
Other Usage Areas/ Non-Forest Area (APL)	135.497,64
Convertible Production Forest (HPK)	8.025,31
Production Forest (HP)	1.909,50
Permanent Production Forest (HPT)	2.298,62
Protected Forest (HL)	1.540,97
Nature Reserve and Tourism Forest (HSAW)	382,92
TOTAL	**14.9654,96**

Table 3: Recap of Total Transmigration Location on Forest Area

CATEGORY	AMOUNT	UNITS
Other Usage Areas/ Non-Forest Area (APL)	139	Locations
Convertible Production Forest (HPK)	29	
Production Forest (HP)	10	
Permanent Production Forest (HPT)	12	
Protected Forest (HL)	13	
Nature Reserve and Tourism Forest (HSAW)	6	
Multi Zone Forest	13	
TOTAL	**222**	

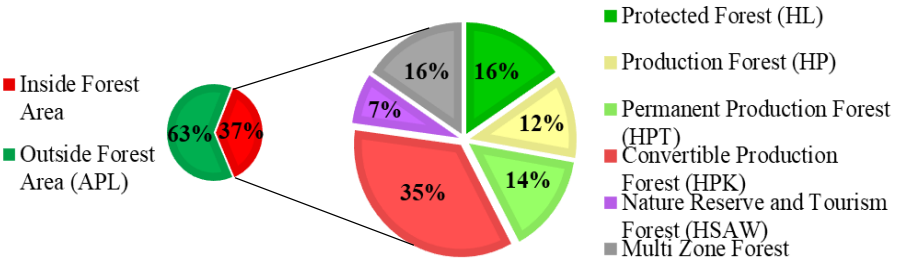

Figure 3: Diagram of Suitability of Transmigration Location Towards Forest Area

The detail of spatial analysis with the regional base showed that from 55 transmigration location which was built in the Sumatera region 40 (73%) transmigration locations were Other Usage Areas/ Non-Forest Area (APL), 3 (5%) transmigration locations were under the function of Convertible Production Forest (HPK), 11 (20%) locations were under the production forest area (HP) and 1 (2%) transmigration location were multiregional area. In the Kalimantan/ Borneo, from 47 transmigration locations which was built, 32 (68%) transmigration locations were Other Usage Areas/ Non-Forest Area (APL), 6 (13%) transmigration locations were under the function of Convertible Production Forest (HPK), 7 (15%) locations were under the forest area and 2 (4%) transmigration location were multiregional area.

From 71 transmigration locations which were built in the Sulawesi/ Celebes region 39 (55%) transmigration locations were Other Usage Areas/ Non-Forest Area (APL), 6 (8%) transmigration locations were under the function of Convertible Production Forest (HPK), 7 (10%) locations were under the forest area and 2 (4%) transmigration location were multiregional area. While from 19 transmigration locations which were built in the Maluku/ Moluccas region 8 (42%) transmigration locations were Other Usage Areas/ Non-Forest Area (APL), 9 (47%) transmigration locations were under the function of Convertible Production Forest (HPK), 2 (11%) locations were multiregional area.

In Papua region, from 21 transmigration locations which were built in the Papua region 16 (76%) transmigration locations were Other Usage Areas/ Non-Forest Area (APL), 4 (19%) transmigration locations were forest area, 1 (5%) locations were multiregional area. And from 9 transmigration locations which were built in the Nusa Tenggara region 4 (44%) transmigration locations were Other Usage Areas/ Non-Forest Area (APL), 5 (56%) transmigration locations were under the function of Convertible Production Forest (HPK). Example of analysis spatial map can be seen on *Figure 4*.

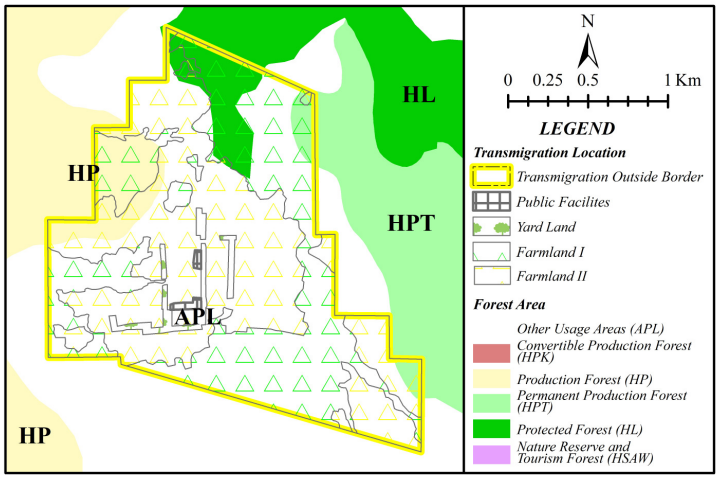

Figure 4: Map analysis of transmigration locations for forest areas (Lengoro Pantai transmigration site)

Conclusion

Based on this research, it shows that not all transmigration sites are built following regulations on the use of forest areas for transmigration development. In total, 83 (37%) transmigration sites entered the forest area. With details as many as 29 locations (13%) transmigration settlements are in the area of the Conversion Production Forest (HPK). There are 13 (6%) locations of transmigration settlements located in more than one function of a multi-area forest area which is prohibited for development. The total area of transmigration settlement location in the function of forest area which is prohibited for the accumulative development of transmigration settlement is 6.132 ha.

Basically, the implementation of GIS technology for spatial analysis in the planning and evaluation stages of development in various fields is a very effective regional analysis scheme. In the context of being part of the implementation of transmigration development in Indonesia, GIS plays a major role in implementing sustainable development policy directions that are integrated with forest area conservation efforts.

Based on these facts, it shows that the proportion of the use of forest areas to build transmigration sites is still very large. This is very likely to trigger the soaring value of the ecological footprint of the Transmigrant community in the context of utilizing forest resources to meet their daily needs. Departing from this point of views, the hypothesis regarding the transmigration sector as one of the drivers of deforestation in Indonesia still occurs. If examined deeper, then the inconsistency of the implementation of the rules becomes the main cause of this phenomenon.

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Application of Modern Digital ERP Systems in Company Management Accounting and Reporting

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Abstract

In the conditions of competition existing in the world market, the role of forms and methods of management for the enterprise based on identification and transformation, as well as forms of convergence of accounting, control and analytical systems of all levels and directions is increasing. In this regard, the importance of creating a generalized concept, methodology, as well as used tools and methods to improve management accounting is increasing. At the same time, management accounting is a management function; its tasks are to collect, register, generalize and provide reliable information about the organization's activities, which is necessary for making competent management decisions. Consequently, the identified problems of the conducted research are to a greater extent aimed at identifying strategically important aspects of the enterprise, regardless of ownership forms, the most important of which are: lack of clear understanding of the users of management reporting, underestimation of the role and importance of creating the financial structure of the company, as well as the lack of appropriate level of regulatory regulation of the formation of internal reporting of the organization.

Keywords: Economics, Management Accounting, Information Support, Reporting Users

Introduction

At the heart of modern financial and economic activity of the company effective accounting systems, in particular software products existing on the market of information services are used. At the same time, the current world practice over the past decades has developed a wide application of ERP (Enterprise Resource Planning) system, which allows to centrally manage the company and coordinate the relationship between its structural units. At the same time, ERP are automated or modular programs based on the management and structuring of Bajwa (2004) information. In this regard, the specifics of management accounting are most closely related:

(a) Operative presentation of more complete analytical information to company management (Parr, 2000);

(b) More information users (Bradford, 2014);

(c) Multiple reporting forms for obtaining information (Haines, 2003).

The digital economy is currently undergoing intensive development and is characterized by its distinctive features:

- the existence of a digital environment and information infrastructure;
- the use of modern information technologies;
- a direct relationship between producers and consumers, for example, through Internet commerce;
- customer orientation;

- application of artificial intelligence for processing large volumes of information.

Proceeding from the fact that the leading function of management accounting is to provide internal users with information for making management decisions, in conditions of digital economy the scope of application of management accounting is significantly increased. In this connection, not only the formation of costs and identification of reserves for their reduction, but also the analysis of the impact of internal and external factors on the development of the company using modern digital ERP systems become relevant issues.

Literature Review

Scientists-economists notice that in the conditions of existence of a market competition for granting to interested users of the accounting and analytical information to the companies it is necessary to have the developed technological platform allowing to carry out planning and forecasting of directions of activity of the organisation and to promote acceptance of administrative decisions (Abu-Shanab, 2015). Thus, in conditions of digitalization of economy the administrative account becomes an information basis and an analytical subsystem of enterprise management. In particular, in researches of economist Drury C. (2005) management accounting is defined as the process of identification, measurement, accumulation, analysis, preparation, interpretation and presentation of financial information, which is used by management in planning, evaluation and management of the organization to ensure the optimal use of resources of the enterprise, as well as the completeness of their accounting Fiss (2007).

In turn, in economic research Garefalakis, (2017) under management accounting means an integrated system of cost and income accounting, rationing, planning, control and analysis, systematizing information for operational management solutions and coordination of problems of future development of the enterprise. Thus, it is possible to distinguish the following principles of realization of the tasks of management accounting (Fig. 1).

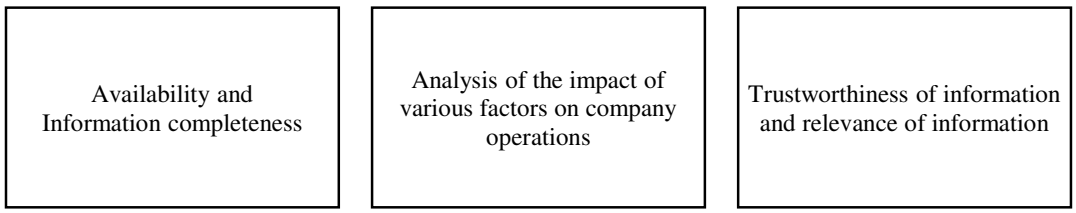

Fig. 1: Main aspects of implementation of practical tasks of management accounting at an enterprise

At the same time, it may be noted that the way to implement the principles of accessibility and information completeness is to form managerial and financial statements. The provision of relevant information, as well as analysis of the impact of various factors on the importance of the company is carried out through operational accounting. At the same time, the principle of trust is based on the budgeting process. In its turn, according to Aloini (2007), the means of implementing the principles of accessibility and information completeness is the budget of revenues and expenses. Provision of relevant information and analysis of the impact of various factors on the significance of the company is implemented through the cash flow budget (Petrova, 2019). The principle of trust is implemented by means of a forecast balance, which means the necessity to organize an internal control system and a management accounting reporting system.

Theoretical Background

The internal control system is one of the elements of management accounting. On the one hand, such system can perform a separate management function in the company, and on the other hand, it can be combined with the management accounting system. This will help the management accounting system to obtain additional information and use new methods of control by the internal control system. At the same time, the existing internal control system should contribute:

- efficient conduct of financial and economic activities of the company;
- detection, correction and prevention of errors and distortions of information on the state of the company;
- ensuring compliance with established norms and rules;
- ensuring the safety of the company's assets.

At the same time, an effective internal control system contributes to a significant increase in the efficiency of the company's management system and guarantees its sustainable development. While studying the works of economists engaged in research in the field of management accounting and reporting, it should be noted that to date no mechanisms of management reporting have been disclosed. Since the purpose of management reporting is to provide interested users with the necessary information for making competent management decisions, such reporting should meet the following requirements:

a) promptness (to be provided in due time);
b) utility (to be necessary and necessary);
c) neutrality (not affecting the interests of a certain group of users);
d) targeting (intended for a particular group of users);
e) cost-effectiveness (expenses for preparation of management reports should not be higher than the economic result obtained from their use).

Consequently, management reporting contains structured internal information that reflects the conditions and results of the company and its divisions' activities and contributes to making effective management decisions (Lehoux, 2019). It should be noted that in practical terms, economists highlight the following generalized features of classification of management reports by:

- the period of periodicity of preparation (short, medium and long term);
- structure of information content (complex, thematic, analytical);
- characteristics of information users (owners, shareholders, managers, employees, etc.);
- presented information objectives as well as management levels (operational, current, consolidated);
- volume of information (summary, summary, total);
- responsibility centers (cost center (expense center), profit center, investment center, income center);
- forms of information presentation (tabular, text, graphic, paper, electronic);
- peculiarities of the activity (segments of activity, taxation systems applied, etc.).
- areas of activity (operating, investment, financial).

Also, management reporting can be classified depending on the stage at which it is in the digital economy, namely, on:

a) the stage of formation;

b) the stage of use (using digital technologies);

c) the stage of impact (when there is a possibility that the digital transformation may affect the company's activity).

At the same time, the information contained in management reports influences the company's activity through analysis, observation, verification, forecasting, as well as planning of the work of individual structural divisions of the organization. The content and essence of all types of management reporting affect the activities of the organization by assessing, monitoring, forecasting and planning the activities of its individual structural units or areas. Among the main problems connected with the fact that many companies present information in the management reporting not in full, it is possible to allocate the following:

(a) Insufficient understanding by the management of the company of the meaning and role of management reporting; in order to solve this problem, it is necessary to develop and implement standards and rules of management reporting, which will allow quicker and more accurate formation of management reporting, corresponding to the requests of the company management. This can be achieved by assessing the direction of the company's development, determining the goal, as well as the available resources;

b) underestimating the role and importance of establishing the financial structure of the company; in order to solve this problem, it is necessary to analyze the financial structure of the company, as well as to consider the relationships within the divisions of the organization and to ensure consistency of goals of the responsibility centers;

(c) The absence of a regulatory framework for internal reporting of the organization that allows for correct and clear structuring of the information received, which would guarantee that users receive truthful and accurate data.

(d) A choice of the optimum software of automation of the management accounting and the reporting; the given problem can be solved by simultaneous performance of actions in the following directions: first, to check up coordination of administrative plans and budgets of divisions; secondly, to provide uniform structure and the maintenance of analytical directories of the accounting; thirdly, to provide reliability of the management reporting by the organization of a uniform database of the primary data used for drawing up of the accounting and management report; thirdly, to provide a uniform database of the primary data used for drawing up of the management report. At the same time, when developing a management accounting system, a company should use the Methodological Recommendations on Management Accounting approved by the Expert and Consulting Council on Management Accounting under the Ministry of Economic Development and Trade of Russia, as well as international financial reporting standards; all this will improve the quality of information provided, resulting in more informative and structured company reports. At the same time, the distinctive features of the organization's management reporting are as follows expediency and suitability of the information on the basis of which the level of competitiveness of the company is determined, the forecast of its development is made. In this regard, the efficiency and quality of management decisions depend on the following conditions:

a) availability of developed forms of management reporting in the company;
b) degree of automation of management accounting;
c) coordination of the relationship between users and the information system.

Research Question and Discussion

Individual management accounting researchers point to the relationship between the management and financial accounting system. For example, the Hassab (2012) study emphasizes that the subject of financial and accounting management accounting is the same capital of an organization. In this connection, it is possible to agree on the unity of financial and management accounting systems. Thus, according to Keil (2006) any information required for the management of the company, including the preparation of reports, can be obtained in the management accounting system. In turn, the integration of accounting (financial) and management accounting can be observed. Thus, when providing information on segments, there is a need to use internal information of management accounting when

making an explanation of the annual financial statements. At the same time, Liang and Xue (2004) singled out components of information and analytical support of management for solving modern management tasks and summarized them in the following directions, which, in our opinion, is sufficiently justified:

a) bookkeeping and control and analysis of economic activity (Avvakumova, 2020);
b) the account of uncertainty and risk;
c) generation of information data and database creation.

All the above components contain elements of management accounting. However, the implementation of software based on the ERP strategy is necessary in the following cases:

- separation of accounting types (Akhmadeev, 2019);
- lack of a single source of reference and regulatory information (Chang, 2013);
- stockpiling and lack of centralized planning, sales accounting;
- lack of in-demand product at points of sale;
- lack of control over the calculation of production costs;
- long formation and submission of management reporting (Daoud, 2013).

In the practical aspect of the company's activity, according to Boehm (1991), ERP programs perform the following functions:

- financial planning and modeling and business planning and modeling;
- marketing planning and management (Morozova. 2020);
- planning and sales management, sales planning and management (Petrov, 2019);
- supply management, resource management and demand modeling (Korableva, 2019);
- production management and simulation (Riemenschneider, 2000).

With the help of the program it is possible to set up differentiated access to the database, and also to form variable security policies at one enterprise. All working documentation is concentrated in the database, which allows to provide control over it and protect it from unauthorized access by unauthorized persons (Morabito, 2005). Features If necessary, the automated system can be limited or expanded depending on production volumes, business needs. At the same time, ERP systems imply integration with software products of third-party companies, suppliers, customers (Lehoux, 2019). Platforms for workflow organization, planning and control today are as convenient as possible, easy to use and open wide opportunities for business development.

Conclusion

Implementation of ERP components allows not only to establish control over business processes, synchronize interaction between departments, but also to minimize costs by eliminating duplication of working documentation. Moreover, the automated system allows to optimize personnel and warehouse accounting and to minimize costs that arise due to inconsistency of functional blocks. The main advantages and distinctive features of the ERP-system are as follows:

a) simplicity and efficiency of obtaining necessary data and consistency of work processes at all levels;
b) standardization of reporting documentation and reliability of information protection against unauthorized hacking;
c) automation of typical, standard operations of departments - in warehouses, accounting and human resources;
d) increased transparency of business operations and possibility to organize own corporate mechanism of personnel training.

Despite the big list of advantages of introduction of programs on the basis of ERP, they have a number of features. The use of such a system is possible only if the business processes in the organization are fully established. At the same time, it is necessary to carry out consulting expertise, involving independent specialists. It will help to reveal errors operatively and correctly to correct firm activity. Thus, before starting to start a software product, it is necessary to analyse thoroughly functional areas, features of manufacture which should be automated. If you try to install all program components simultaneously, it can lead to unpleasant consequences. The stage-by-stage technique of introduction of ERP-system works at the enterprises with simple structure and uncomplicated industrial activity. Consequently, the use of information technologies has a great influence on further development of management accounting.

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Stock Management Analyses in a Modern Distribution Firm

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Abstract

The correct study of stocks in modern distribution firms is a key concept to the management teams, since they are essential for the correct functioning the organization, with the objective of a future sale, its application or transformation. The existence of stock, as well as stock control analysis systems, can facilitate the analysis of firm stock levels, which allows for a better delineation and allows for better demand response. To analyze and optimize the stock levels of the modern distribution firm store several performance indicators were analyzed during this study. It was found that breaks in stocks were very high and far from the objectives outlined for the store. The origin of the ruptures in the two analyzed time-spaces, came from the universe of fast-moving consumer goods. Forecasting models were studied to determine which could be more appropriate to adopt by the firm. Given the retail sector characteristics, in which there was a strong seasonal component, for the sweet grocery category the additive Holt-Winters model was shown to be the most effective. However, it was not the most effective in all categories, so the model should be adopted according to the category in question.
The results show that the grocery markets have a continuous breakage levels reduction between Monday and Saturday, which demonstrated that the first days of the week are the most impactful, thus more. The results also show that the causes of ruptures are mainly due to the lack of replacement.

Keywords: Stocks, Modern Distribution, Breaks, Forecast.

Introduction

The modern distribution industry is characterized by a high change in demand due to several factors such as promotions, increased demand during weekends and at the ends of the months. Such factors must be considered in the stock management process. Products stocks management has numerous difficulties, namely due to the variation in demand levels and the impossibility of accurately forecasting it (Barlas and Gunduz (2011), Carvalho (2010).

Stocks may be defined as the physical articles or resources that are essential for an organization operation, that will be used in a future sale, in an application or used to be transformed, thus managing to meet customer demand. It's a crucial item to be managed with a high level of accuracy since stocks can represent a large percentage of firm fixed capital. It is through the existence of stocks that it is

possible to support a business from constant changes in demand levels, react to several needs during the production phase and carry out promotions campaigns.

An effective stock system incurs several policies and analyzes of inventory levels, in order to determine the correct level of stock, time to place the order, as well as the quantity, always aiming to satisfy the searching for a more economical way (Chase and Nicholas, 1995).

The creation of stocks also intends to respond to certain events such as delivery failures, production problems, loss of orders, as well as meeting variations in demand for a particular product (Carvalho, 2010). For Sanders (2012), the time between the creation of the order and the merchandise reception is called Lead Time or provisioning time. The longer the lead time, the greater the need to order larger quantities, because their failure represents longer periods without offering them. Correct stock management needs to look at different lead times each product may have and model all of its stocks decision around this key analyses.

A low rate of disruption should be an essential goal for any customer-centric organization and the basis of any quality process. In retail, this process is even more important. In fact, for the customer it is an unsatisfactory shopping experience not to find the item highlighted by its implantation and markings, being even more disgusting, if the customer goes to the store because of unavailable items.

Based on any item sought by the customer, there is an unmet need. If the product is broken, it is possibly possible that the customer will be able to satisfy it by another who responds to the same need, resulting in a minor disappointment. If the customer does not satisfy this need, and especially if it is not the first time, the company risks losing that customer.

There is a purpose to reduce this dissatisfaction, by offering a wide variety of products to meet the most frequent needs and a more restricted choice for more specific needs. High-speed products generally cover more frequent needs and are therefore more easily replaceable. In the total of the store, the products of high rotation represent only 20% to 30% of the products of the active range.

In addition to the monetary loss obtained by multiplying the price of the product with the estimated value of its average daily sale, there is also a real loss from the customer. Companies in the retail sector should, therefore, consider that disruption is a source of dissatisfaction for the customer and should try to keep it to a minimum.

The rest of the paper is organized as follows: First, in chapter 2, we briefly present an overview of the relevant literature in the topic. The methodology is presented in chapter 3. In chapter 4 we present the main results of our study, and the conclusions are exposed in chapter 5.

Literature Review

According to Cencal (2004), the existence of stock can have two opposite origins, from one hand, a "voluntary" origin, that is, its creation is planned, on the other hand, an "involuntary" origin, resulting from a lower demand than expected at the time of purchase. The main reasons for creating stocks can be due to changing of the pace of entry and exit of the organization's raw materials and final products; demand forecast errors; suppliers with extended Lead Times and non-compliance; pre-orders and with greater volume to reduce the probability of rupture; take care of changes in the demand levels, because given the fact that they are not stable; speculative purpose; and to avoid frequent purchases and in small quantities due to the impossibility of the supplier making them available.

The existence of stock, as well as stock control analysis systems, can facilitate the analysis of firm stock levels, which allows for the delineation of these and allows responding to demand (Chase and Nicholas, 1995). On the other hand, the existence of high-level stocks, represents negative impacts on the firm, namely, at financial and competitive sides, since they represent 25% to 35% of the capital invested annually (Courtois, 2006). In this way, they must be constantly analyzed and subject to

strategies that make it possible to determine them at the optimum level, thus being related to the quantity to be ordered and its timing (Chase, 1995). If their management occurs in a controlled and effective way, this leads to a reduction in functional costs, increasing in profits (Samal and Pratihar, 2014).

Although the forecasts may help in determining the stock needed within the store, they are uncertain, and may, therefore, be insufficient or exaggerated concerning real demand. If expected consumption is lower than the actual one, this will result in disruption and customer dissatisfaction. On the other hand, if the forecasts are too optimistic, they will translate into an increase in stock. Studies claim that the existence of ruptures is more harmful to companies than excess stocks, which is why they choose to establish conservative minimum stocks (Carvalho, 2010).

Security Stock

To be able to respond to fluctuations in demand and delivery uncertainty, factors that generate some uncertainty, a firm should have a safety stock for each article, reducing the probability of the article breaking down.

The greater the safety stock, the greater the likelihood that it will be able to respond to variations in demand. In this context of safety stock, an important factor is the level of service, being a factor of enormous importance in the constitution of the size of the stock. The option of having security stock entails a higher cost of ownership, which can be offset by sales opportunities that would not have occurred without it.

The determination of the safety stock, also, depends on the inconsistency of the demand concerning the average values, because given its great variability to respond to a higher level of service, it is necessary to increase the level of stock. On the other hand, if there is a greater demand constancy, the smaller the necessary safety stock will be (Carvalho, 2010).

In a study by Bhunia et al (2019), the optimal order quantity for single item price break inventory models and multi-item purchasing model with different constraints like investment, average inventory and space constraints are analyzed and related to the importance to firms of a good management of shortages, lead time and the implications of several kinds of inventory cost. They develop a single item purchasing and business inventory models with and without shortages.

Stocks at the Store Level

The point of sale (POS) represents the place where products and/or services sales happens to the consumer. At the retail level in the modern distribution industry, hypermarkets, supermarkets, and convenience stores are examples of points of sale (Blessa, 2008).

According to Blessa (2008), at the point of sale, the exhibition of products must be effective, facilitate the act of purchase and present a harmonious environment to its customers to attract them. Products sold at the must respect some fundamental bases for their efficiency and effectiveness, such has presence, that is, that the item at the time of its search is available for sale since 70% of purchase decisions occur at the place of sale and most of these are influenced by impulses; visibility, to highlight the article and boost its sale. The quantity sold is directly linked to its exposure, and the doubling of the sales space for an article leads to an increase of 50% in sales; and stock, as there is no use in high product exposure if the stock is unable to meet your demand, to this extent, the exposure and stock levels must have sufficient stock for consumption.

In the modern distribution industry context, the stock allows sales to occur in a given period by offering the products at the point of sale, and this must be insufficient quantities to meet demand in a certain period so that its replacement does not have to occur more times.

Stock Control Systems

According to Ballou (2003), there are two distinct philosophies responsible for stock management, which are the push and pull philosophy. The push system is based on accurate forecasting methods to meet customer needs. Organizations that work through this system must be able to predict the intensity of demand for articles closely. In this philosophy, products are "pushed" to the consumer. This supply method has some limitations, namely, because the forecasts are imprecise, derived from the variation of the levels of demand over time and require a greater quantity in stock, which presents great costs.

In contrast, in the pull philosophy, in-store stock levels result from a response to customer demand, that is, based on actual consumption. Ballou (2003), states that this philosophy main disadvantage is the fact that the supply chain is more susceptible to problems external to the organization. But it has the advantage of reducing stock levels in stores, consequently leading to a reduction in costs. This stock management system makes it possible to create stock levels within the store that are closest to the demand since their replacement occurs to respond to the particular needs of each store.

The operationalization adopted for the products vary according to their characteristics, the supplier and the associated lead times. Usually, products with a presence in the logistics center can be operated in two different ways: picking by line (PBL) and picking by store (PBS). The operationalized items, according to the picking by store method, a traditional method of the distribution chain, are stored in stock at the distribution center until their dispatch, upon their order. On the other hand, articles belonging to the PBL method, are subject to the principle of cross-docking, that is, a stock level is not created in the logistics center, and they are dispatched directly to the respective stores.

The segmentation of articles in PBS and PBL is based on several factors such as the rate of rotation, the quality of the supplier's service, as well as the validity of the articles.

Lean System

Among the various methodologies for continuous process improvement, within the organizations, the six sigma models and the Lean Manufacturing philosophy stand out. According to Endler et al. (2016), adoptions of these methodologies have positive impacts for organizations, as well as an increase in financial gains.

This model was adapted for supermarkets, through the perception that the application of these standards could present advantages for companies in this sector (Ohno, 1997), since an efficient availability of materials would result in a high reduction in waiting times between orders, delivery of the goods, resulting in greater operational efficiency, as there was not so much interruption. According to Ohno (1997), customers go to supermarkets to acquire goods immediately and in the quantity they need. The supermarket replenishes the shelves after the products are removed by the customers, and the necessary material is made available immediately to the worker without wasting time, through easy access to it.

Demand forecast

In retail, sales forecasts represent speculation about demand and/or sales volume, being an essential activity for business planning, these same forecasts are the basis on which organizations plans are outlined, a focal point for companies' competitive capacity (Guo and Li, 2013).

Forecasting future demand levels are the foundation for all strategic and planning decisions throughout the supply chain, and without them, operations would only respond in a retroactive manner that would result in insufficient production, customer dissatisfaction, and inefficiency in the use of resources (Wong and Guo 2010).

Predictions, to facilitate decision making in a more rational way, can follow two different paths, whether quantitative or qualitative. Forecasts allow companies to analyze the paths that are being taken,

adjusting them if necessary to the current forecast, aiming to determine predicted values as close as possible to reality, to act more effectively (Enders, 1995).

According to Johnson (1994), the uncertainty associated with purchase forecasts is characterized as one of the main obstacles inherent to the management and control of stock levels, that companies use forecasting models that assist in making the most appropriate decision.

The problems related to the uncertainty of demand are evident in the most varied areas of business, which has led to the development of several forecasting methods, such as linear regression and exponential smoothing which are methods that have been used for decades to make predictions (Bartezzaghi et al., 1999).

Prak and Teunter (2019) propose a framework with estimation uncertainty applied to any inventory model, demand distribution, and parameter estimator. They show that the relative savings are among 10% and 30% for mean demand and in the presence of a trend, savings are among 50% and 80% for several scenarios. The savings are bigger when the estimates are based on fewer observations, if backorders are costlier, or when the lead time is longer.

The forecasting of demand levels, associated with forecasting methods, facilitates the determination of the necessary inputs for the management and control of stock levels, being an aid tool in determining stock within the organization. The management of an organization needs to have the data at the right time to be able to make predictions more effectively. Given this, it is necessary to develop a simple method, with high precision and low associated costs.

Exponential smoothing is one of the most successive forecasting methods used by companies that use inventories (stocks), considering that an exponential decrease in weights as they become more distant, with the most recent data showing greater weight. Referring to Hyndman et al. (2008), in exponential smoothing models, the first component under analysis is the trend, in which the term level is combined with the term growth. Simple exponential smoothing is the simplest and most appropriate method when analyzing time-series forecasts with no trend pattern and no seasonality. Holt (1957) created an amplified model of simple exponential smoothing in which the trend component would be applied, but without seasonal movements, being an alternative to the double exponential smoothing method to estimate the level and slope of the series trend. This model, in contrast to the simple exponential smoothing, uses two smoothing constants, namely α and β, with values between 0 and 1. The Holt double exponential smoothing prediction model, expanded in 1960 by Winters adding the seasonality component to the level and trend component, that is, this model has three smoothing constants, as well as different equations for its calculation (Caiado, 2011).

The Holt-Winters methods present two models for modeling seasonality, which may present an additive or multiplicative form in relation to the seasonality component, and in both methods the trend component has an additive form. According to Caiado (2011), the multiplicative model of Holt-Winters is the appropriate model for series that present a linear trend and seasonal movement. This model is based on the fact that the amplitude of seasonality varies over time, and this occurs, generally in an increasing way. The Holt-Winters additive model should be used for time series with a tendency and additive seasonality. This method is the most suitable for series where the seasonal effect does not occur due to the average level of the series and can be added or subtracted from a forecast that depends only on the level and the trend.

Methodology

Several quantitative analyzes techniques are used to present and analyze key indicators related to the stock management of a store of a major firm of modern distribution operating in the Portuguese market. A store rupture analysis, a key indicator of operational efficiency is the first indicator shown, to verify its origins. Stochastic methods to determine the target stock are also applied to some specific products and categories.

In the analysis of ruptures to discover their origins to reduce them, it will be evaluated in several components, such as the markets with the most impact, the days of the week, the activities with the highest level of rupture and the causes of it.

Concerning stochastic models, the application of the periodic review model will focus on the products with the highest breakage index and excess stock in the store understudy, to verify the impact that this model would have on the application of these articles with a mismatched stock.

All data collected refer to the grocery store categories, with the selected article based on the breakage index and the efficiency process.

Within the scope of this investigation, one of the questions to be answered is: What is the best forecasting method for store sales? The techniques used to answer the question will be presented, namely through the description of the data analysis that provided the necessary information to determine which is the best forecasting model taking into account the past values of the time series.

Exploratory analyzes will be approached to characterize the data and assist the performance measures of the various models analyzed. To determine which models are most suitable to be analyzed, historical observations will be established identifying the most suitable model for each time series. To determine the model, there are aspects to consider: i. identify the models that fit the time series; ii. estimate the parameters estimated in the previous phase; iii. diagnosis: check if the proposed model is adequate by analyzing its performance; iv. make future predictions.

The determination of the most adjusted model for making predictions depends on the behavior of the series and its components, such as seasonality and trend. Thus, exploratory data analysis provides fundamental information in the application and determination of forecasting models. The objective of the study is to determine the forecast model that presents values closer to reality, for that, certain statistical measures are used to find the model with the least forecast error.

Within the different forecasting models, it’s important to adopt the one that provides data as close as possible to reality. To determine the model, the data must be analyzed constantly over time to understand whether the observed data is in line with the predicted. Simultaneously analyzes of several models, to compare the forecast errors obtained must be held. Forecasting errors are dependent on the scale of the data and cannot be used in other series at different scales. The most used measures to measure forecasting errors are the Mean square error (MSE), the Mean absolute error (MAE) and the Mean absolute percentage error (MAPE).

Store Stock Management Analysis

Activity Description

The company's policy is based on lean philosophy, seeking to reduce waste in all its processes. Among the various methodologies for continuous process improvement, within the organizations, the six sigma models and the Lean Manufacturing philosophy stand out. The firm supply chain practices its operation almost exclusively through a pull strategy, that is, the operations respond to store orders. This process begins with a request for the necessary goods in the store, through the creation of an order, this can come from the automatic calculation carried out by the system or through manual orders. The store understudy has articles with PBL and PBS operations. The articles with PBS operation, with stock in the logistics, allow the creation of the order every working day, and its delivery occurs on the following day, except for the order received on Monday, which must be done on the previous Friday (Table 1). PBS activity in the Fast-moving consumer goods (FMCG) universe is controlled almost exclusively by activity 004-PGC (AZ Stock).

Table 1: Activity 004 - FMCG (AZ Stock) (Own Elaboration)

Order Creation Day	Order receipt day	*Lead Time* (in days)
Monday	Tuesday	1
Tuesday	Wednesday	1
Wednesday	Thursday	1
Thursday	Friday	1
Friday	Saturday	1
Friday	Monday	3

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday

On the other hand, and representative of a large part of the articles, PBL activities have higher lead times, with several activities associated with it. Most of these activities feature three deliveries to the store per week. Table 2 shows the activity 043-3x Week (Inf. PBL), in which delivery occurs three times a week and the average lead time is approximately 3 days. As shown in the table below, orders are delivered on Mondays, Thursdays, and Saturdays.

Table 2: Activity 043- 3x week (Inf. PBL) (Own Elaboration)

Order Creation Day	Order receipt day	*Lead Time* (in days)
Tuesday	Thursday	2
Wednesday	Saturday	3
Friday	Monday	3

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday

Stock Breaks

Disruptions represent a deficit of items in stores, that is, they are not made available to the customer at the time of their search, presenting several consequences for the organization, such as loss of sales, devaluation of the brand, and even a factor with a high impact on satisfaction. of the customer. In this way, it is essential to act on disruptions when it is intended to manage stock.

Table 3 shows the average number of disruptions per universe in the entire year 2018 and the first half of 2019. As shown in the year 2018, no universe managed to achieve the proposed objective, with the store remaining 38% of it. In the 1st semester of 2019, with the implementation of the new rupture counting rules, the goal was changed, reducing from 575 to 400 ruptured units. Besides, it is still possible to see through table 3 that the number of ruptures has decreased compared to the previous year.

Given the objective, it appears that the universes toys and stationery and home and decoration (universes with little impact in total) managed to overcome the proposed objectives. Although overall there is a 10% reduction concerning the target, the numbers of global disruptions are still far from the target.

Another fact that must be taken into account is the fact that the ruptures come mostly from the FMCG universe.

Table 3: Breaks by universe (own elaboration)

	Break Avg (2018)	Objetive (2018)	Diference (%)	Break Avg (2019, 1st Semester)	Objetive (2019, 1st Semester)	Diference (%)
FMCG	464	353	31%	271	198	37%
Fresh produce	85	55	54%	60	43	40%
Toys and stationery	31	18	72%	12	15	+20%
Nutrition, health and well-being	35	22	59%	45	33	36%
Technological equipment	13	9	44%	10	9	11%
Exterior leisure	106	70	51%	67	57	18%
Home and interior decoration	40	34	18%	30	34	+12%
Textile	22	14	57%	15	11	36%
Total	**796**	**575**	**38%**	**510**	**400**	**28%**

Given the fact that the FMCG universe is responsible for more than 50% of disruptions, table 4 aims to determine which markets are responsible for this very significant impact. Concerning the markets under study, that is, the grocery store, it appears that these together accounted for more than 15% of total disruptions.

Table 4: Comparison of ruptures in the FMCG (own elaboration)

	Break Avg (2018)	Objetive (2018)	Diference (%)	Break Avg (2019, 1st Semester)	Objetive (2019, 1st Semester)	Diference (%)
Sweet grocery	79	58	36%	45	35	29%
Grocery	41	35	17%	27	20	35%
Alcoholic beverages	51	45	13%	30	15	100%
Household products	49	45	9%	27	30	+10%
Perfumery	100	83	20%	53	35	51%
Self-discount	12	8	50%	9	6	50%
World products	8	5	60%	6	4	50%
Beers	7	4	75%	6	2	200%
Frozen foods	29	18	61%	17	10	70%
Dairy	71	40	78%	42	35	20%
Soft Drinks	17	12	42%	13	6	117%
TOTAL	**464**	**353**	**32%**	**275**	**198**	**39%**

About the markets under study, that is, the grocery store, it appears that these together accounted for more than 15% of total disruptions.

Through figure 1 it is possible to verify that there was a reduction in the number of ruptures, in the first half of 2019 in relation to 2018, but despite the changes suffered, these are still very high considering the objective. Through it, it is possible to see an overrun of objectives in the first months of 2019, but after changing the lifting rules, contrary to what is expected, disruptions increased.

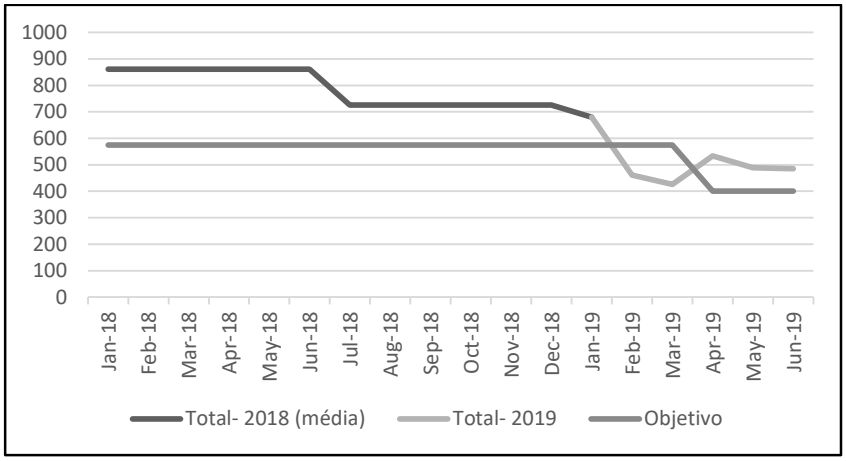

Figure 1: Breakdowns from 2018 to June 2019 (own elaboration).

Figure 2 shows the variation in breakdown levels throughout the week in the FMCG universe and in particular in the sum of the grocery markets, this component being analyzed to verify whether or not oscillations occur over the days of the week.

Through the analysis of the figure it can be said that the FMCG universe presents a greater number of ruptures on Tuesday, and Thursday as the day with the least ruptures, with a decrease of these exceeding 100 units in the space of two days. Concerning the grocery markets, there is a gradual reduction over the week, with the worst day being Monday, when only PBS items are delivered to the store.

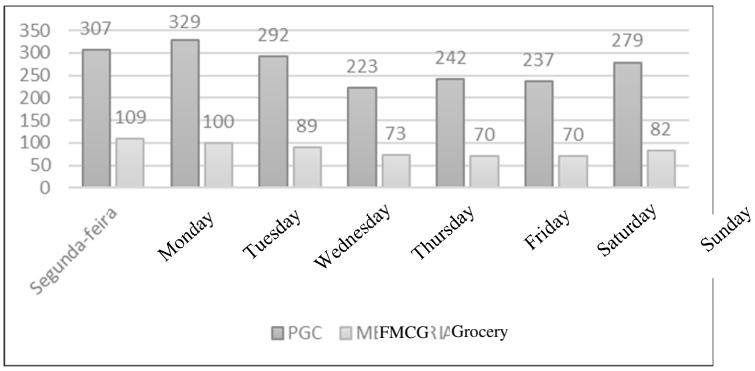

Figure 2: Variation of breaks in relation to the day of the week (own elaboration)

Addressing the grocery markets, in particular, there is an increase in the cause "lack of replacement", accounting for 72% of total disruptions. Given this discrepancy, the market leader must act to solve this specific cause.

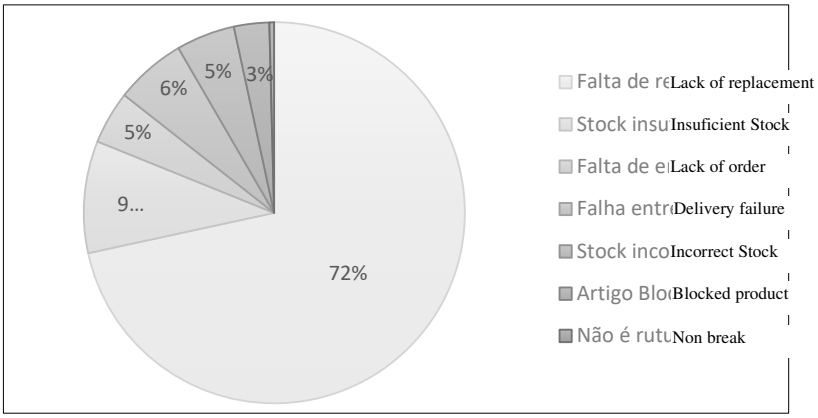

Figure 3: Cause of breakage as a percentage (own elaboration)

Through figure 4 it is possible to verify that the highest percentage of rupture of the articles is centered on the PBL activity. The main cause may be associated with operationalization with superior lead times.

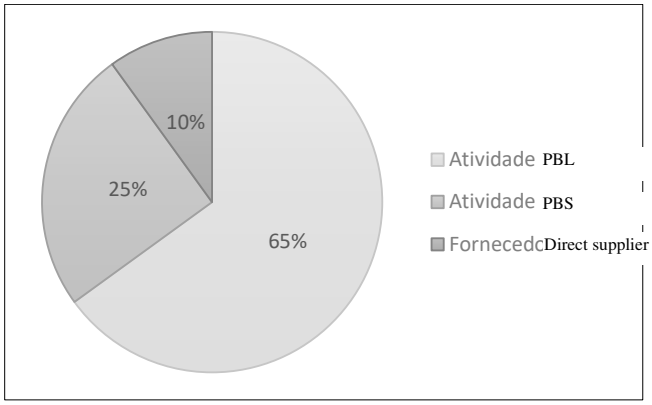

Figure 4: Percentage of breakages due to the operation of items in the grocery store (own elaboration)

Forecasting Methods

This investigation aims to determine the most effective forecasting method for the observed time series, to combat budgets that are very out of touch with reality.

Due to the high quantity of items in the store, and the impossibility of accessing other markets, this investigation will focus on the Sweet grocery market, in its entirety and categories that constitute it. This combination of products into categories is because there is a very high number of articles and that a detailed analysis of each article would be impossible to carry out. Given the fact that articles belonging to the same category present similar responses to customer needs and to reduce the impact of the promotions inherent in them, the values by category will be analyzed.

Through figure 5, in which the total sales of Sweet grocery between January 2010 and December 2018 are shown, it was found that it had a high seasonal character, being able to determine that the seasonal component needs to be associated with the model adopted, that is, the methods in which this component is not included in its resolution, should be excluded from the analysis.

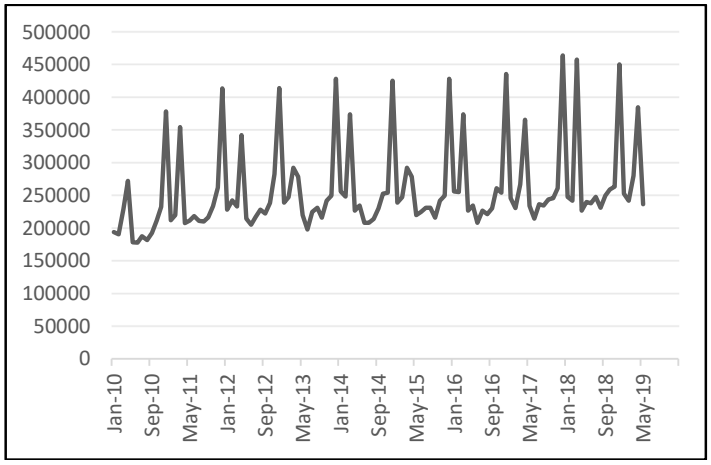

Figure 5: Time series of the grocery store (own elaboration)

Through the analysis of the previous figure, it was not possible to determine which model to adopt, thus, an empirical analysis was carried out to determine which of the methods have better predictive values.

Table 5 describes the data obtained with the application of the additive Holt-Winters model in the time series of the sweet grocery under study.

Table 5: Data from the additive Holt-Winters model in the sweet grocery time series (own elaboration)

Smoothing parameters			α **0,044856**	β **0,70233**	γ **0,02098**		
Initial states			**a0**		**b0**		
			186616,6		86,27597		
			s1	**s2**	**s3**	**s4**	**s5**	**s6**
			-21293,8	-27713,7	60326,93	14355,97	-34730,6	-48776,9
			s7	**s8**	**s9**	**s10**	**s11**	**s12**
			-37358,9	-43254,8	-35087,3	-4027,54	19496,41	168753

Table 6 shows the values of the measurement measures for forecasting errors, with an average absolute percentage error of 7.71%, thus being a relatively low percentage error.

Table 6. Measures for the evaluation of forecasting errors (own elaboration)

MSE	MAE	MAPE
910254392,4	30170,4224	7,71%

After analyzing the time series using the additive Holt-Winters model, the same study was performed for the additive model, with the data inherent to it in table 7.

Table 7: Data from the multiplicative Holt-Winters model in the time series of the grocery store (own elaboration)

Smoothing parameters							
			0,075961	0,000628	0,193981		
Initial states			**a0**		**b0**		
			186616,6		86,27597		
			s1	**s2**	**s3**	**s4**	**s5**	**s6**
			0,885896	0,851494	1,323267	1,076928	0,813893	0,738625
			s7	**s8**	**s9**	**s10**	**s11**	**s12**
			0,799809	0,768216	0,811982	0,978418	1,104473	1,904276

Table 8 shows the assessment measures studied using the multiplicative model. Noting that the forecast errors presented by this model are higher than those shown by the additive model. Thus, the most appropriate additive Holt-Winters model, that is, with forecasts closer to reality.

Table 8: Measures for the evaluation of forecasting errors (own elaboration)

MSE	MAE	MAPE
1242224416	35245,20416	8,01%

Through the exploratory analysis of the two models, it was found that they do not present very high forecasting errors, but the additive method presents better values in the measurement measures of forecasting errors.

Through the use of different formulas to calculate future forecasts, a high approximation was found between the values obtained in the two models with the real value (shown in figure 6). It can be said that the use of Holt-Winters models are good predictors of sales, except March and April, in which forecasts were very different from reality, justified by the fact that Easter, the second season with more sales in the year, not having a fixed day and month.

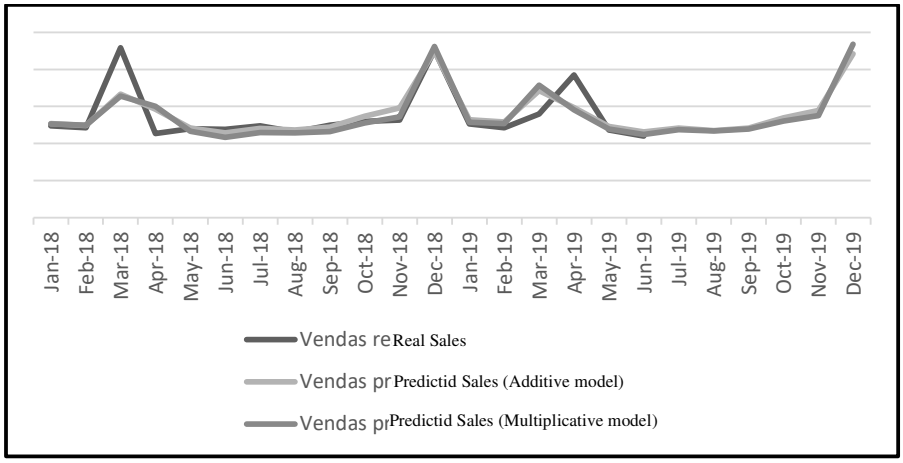

Figure 6: Comparison of actual sales with those predicted by the Holt-Winters forecast methods (own elaboration)

After the application of Holt-Winters models to the sweet grocery market, in general, the same study was carried out for the needs that contemplate the same. The data concerning the mean absolute percentage error (MAPE), shown in table 9, justify that the adopted model varies according to the need, because for some the additive model presented better results, in contrast, for the others, the application model was the most appropriate. Despite this fact, in general, the values presented by the two models are similar. Also, it was found that these models are not good predictors for the "seasonal sweet" need, since they presented high forecasting errors, a fact justified by the Easter day to vary annually.

Table 9: Comparison of the MAPE in the Holt-Winters models in the sweet grocery different categories (own elaboration)

	Multiplicative Holt-Winters	Additive Holt-Winters
Capsules	13,30%	12,79%
Dairy products	7,05%	7,10%
Sugar	11,13%	9,43%
Fruits	10,89%	10,45%
Industrial Pastry	6,23%	6,36%
Industrial bakery	4,58%	4,30%
Coffees and filters	6,03%	6,02%
Teas	8,42%	8,99%
Breakfast cereals	5,86%	5,75%
Cookies	5,44%	5,13%
***Drops* and candy**	7,28%	6,80%
Chocolate	9,67%	10,48%
Milk	9,40%	9,42%
Cakes	8,92%	9,5%
Deserts	9,95%	10,25%
Cocoa	6,76%	6,56%
Fine bakery	6,41%	6,57%
Chewing-gum	5,55%	5,56%
Seasonal sweet	270,60%	510,44%
Sweet Grocery	**8,01%**	**7,76%**

Conclusions

To analyze and optimize the stock levels of the modern distribution firm store several performance indicators were analyzed. One of the indicators evaluated was ruptures. It was found that they were with very high values and far from the objectives outlined for the store. Since, in 2018, no universe managed to reach or even approach the pre-established goal. Overall, the store had 38% more disruptions than intended. Concerning the first half of 2019, there was a general reduction of 56% compared to the previous year. This decrease can be justified, in part, by the change in the rules for lifting breaches. The origin of the ruptures, in large part and in the two analyzed time-spaces, came from the universe of products of the fast-moving consumer goods. Accordingly, the categories inherent to the same market were evaluated to discover the markets with the greatest impact, with the sweet grocery category being one understudy, since it was one of the most impactful in terms of disruptions. Regarding breakage levels during the week, it was found that the grocery markets showed a continuous reduction between Monday and Saturday, reducing, on average, almost 40 units of break between these days, which demonstrated that the first days of the week they are the most impactful, thus acting more efficiently and corresponding to the needs of consumers.

About the causes of ruptures, in the markets under analysis, it was observed that more than 70% of the ruptures are due to the lack of replacement, as verified in the description of the company's activities, this cause is assumed whenever an article is in rupture and the theoretical stock is greater than zero. This leads to the fact that this is associated with non-real causes, such as when there is a delivery failure, if the stock is greater than zero, as the theoretical stock is not correct, the system states as a cause of rupture lack of replacement, and this cause is generally not analyzed by those responsible, as theoretically the article is in storage and just needs to be replaced. The causes of the disruptions presented by the software are not the real causes, which means that its treatment is not the most effective and correct.

Finally, the forecasting models were studied to determine which one had the least associated forecasting errors, to select the most appropriate model. Given the characteristics of the retail sector, in which there was a seasonal component, for the sweet grocery the additive Holt-Winters model was shown to be the most effective. However, this was not the most effective in all categories, so the model should be adopted according to the category in question.

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New Cooperation Strategy Based on Synergy Effect

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Abstract

Synergy effects start to be more important in strategy management of current cooperative organizational forms. Synergy represents stronger cooperation relations in business environment, which participates in formation of synergy effect. Cooperation strategy of those collaborations achieves innovative and sustainable solutions of many problems. The purpose of this article is to point out emerging importance of synergy effect in formation of successful cooperation strategy. Creation of recommendations for praxis towards successful cooperation is an important step in the following analysis. The coexistence of cooperation and competitiveness is a common solution that will support the creation of added value (synergy effects) of the cooperative relationship of several environmental elements. This research confirms the versatility of synergy within different conditions and environments, achieving it as a result of being managed. Mapping the synergy in a current environment within the chosen cooperation relations shows that each one contributor of such a relationship builds stronger relation if all cooperation´s actors build stronger competitiveness. In general the main consensus from single conceptions is that proposal of measurement and management of synergy effects in business environment through cooperation relations is the fundamental competitive strategy in current dynamic environment.

Keywords: Cooperation; Cooperation Strategy; International Companies; Strategy Management; Synergy; Synergy Effect

JEL classification: Q13, M14, O31

Introduction

Prerequisite for investigation of synergy in business environment thus cooperative organizational forms is complex content analysis of investigated phenomenon. Because of this it is important to strengthen the knowledge about synergy in business environment where it is possible not only to find the synergy but also to apply it as a method which supports cooperative organizational forms and it is necessary to identify the right elements for strategy management of cooperation – cooperation strategy.

The obstacle of current business environment is an incessant searching for new, more effective ways of getting competitiveness and business aims.

The aim of the whole research included in this article is to identify the emerging synergic effects in real cooperation environment and to propose the recommendations for effective cooperation strategy.

Synergy in the current interconnected market has to represent a new contribution in the concept of strategy management itself within cooperation and competition. The basis of focusing on synergy is in the issue of solving the failing strategy management of cooperative organizational forms as strategy alliances (Ireland, et al., 2002; Kubina, et al., 2015; Varmus, et al., 2015, b) the most of which ends in failure in opposition with the given aims and cooperation itself. The starting prerequisite for successful cooperation strategy based on synergy effect is the investigation of theoretical and practical knowledge from this article within the qualitative research for strategy management of cooperative organizational forms oriented on maintenance and formation of synergy effects.

The current business environment consists of companies trying to make such a business policy and strategy that enforce their policy for policy of competitive company in a specific environment with specific aims and conditions. Collins (Collins, et al., 2008) explained the point of strategy policy of each enterprise within the various fights, competitive or cooperation such as: "The basic distinguishing feature of the most lasting and the most successful corporations is that they preserve the basic ideology while simultaneously stimulating the development and change in everything which is not the part of the basic ideology." The strategy of individual cooperative relations in business environment shows us closely the strategy management within cooperation and it is also possible to identify closely the motives of individual relations from the perspective of outstanding synergy effects.

The problem is the need to conceptualise and measure the performance of effective cooperation. This way the participants in cooperation can not only document the conditions for benefits of cooperation, but they can also determine if their activities and affords are on the right track (Lasker, et al., 2001; Zrakova, et al., 2017; Varmus, et al., 2016, c). In a dynamic market demonstrates that previous cooperation bolsters contractual adaptability, which in turn nurtures current cooperation between the same partners (Luo, et al., 2002; Jankal, et al., 2018, a). Contract and cooperation differ in the contribution of contract completeness to performance declines as completeness increase contribution of cooperation. Cooperation is a paradoxical relationship between two or more subjects. It doesn't matter if the relationship between the subjects is horizontal or vertical, they are still engaged in cooperative and competitive interactions (Bengtsson, et al., 2014; Varmus, et al., 2018, a). Effective management is crucial for maintaining the cooperation (Mazzarol, et al., 2013; Jankal, et al., 2016, b). Authors (Ireland, et al., 2002) offer obvious fact: The effectiveness of alliance management should come from its accomplishable benefits. According to (Wallenburg and Schäffler, 2016), the use of cooperation in performance measurement reduces the overall conflict in horizontal cooperation. This fact can be seen for example in:

- The success of agricultural cooperatives. Set of rules and directives is crucial for this success. This set of cooperative rules should help create a detailed business plan and future success of the cooperation (Altman, 2015). Cooperatives represent an alternative to large-scale corporate farms as well as to independent unaffiliated small private farms.

- The success of Cheese Board Collective helped by 3 aspects: small size, the right selection and firm customer base. Gupta (2014) confirms the internal trust and reciprocity in Ostrom´s principle and expands its use to different areas.

- The analysis conducted by Carini (2014) empirically proves the endurance of cooperation during the economic crisis, the growing number of employees working in cooperation and the positive reaction of Italian cooperation to the financial crisis.

The modern enterprise should integrate the external design forces and make a good job of design cooperation management. According to Yao & Guo (2009) this is a way as good products be

designed and the enterprise strategy be carried out. Kafi & Ghomi (2014) conclude that under intuitive conditions coopetition strategy is superior to the pure competitive relationship between the suppliers in terms of profitability.

Materials and Methods

In the background of the cooperation issue, cooperation management, strategy management and synergy is the research which we have been dealing with for a longer time. Methodologically it is about the deep content analysis of secondary data about synergy, their induction into the seven basic admissions. The second analytical part includes closer analysing of the eleven chosen successful cooperation connections which have been analysed from the available secondary sources about the given real cooperation. The form of case studies which represents qualitative access in analysing of business environment is used for gaining information about the aims, accesses and results of cooperative organizational forms. After that there is the synthesis of theoretical and practical knowledge about the given issue used in the article and there are formulated the concrete solutions for practice in the field of cooperation management for the purpose of creation of synergy effects. Logical order of the article is preserved within the switching from the general to the concrete information which is pulled together in the final discussion.

The content analysis at the beginning highlighted some branches of science in which synergy picked by watching and confirmed (biology, chemistry, physics, economics, management, sociology and others). Wide field of the influence of synergy and synergy effects consequences from this fact and it can influence the duration time of research and it is important to concretize the borders of research. The environment made by knowledge about synergy, strategy, strategy management, methods of strategy management, cooperation and cooperation management create the basic theoretical and practical level for research of the chosen topic.

Identified Approaches to Synergy

By induction of individual acts of famous authors and with the help of synthesis the following definitions and accesses to the synergy are created. Those accesses refer to generalized accesses of synergy and synergy effects (concentrating on reality of the inspected phenomenon and closer characteristics of synergy with its forms). It is possible to identify the result of the mentioned research which is that synergy exists in common conditions and it also has an impact on the inspected issue – the origin and creation of synergy and synergy effect within the cooperative organizational forms in order to use suitable strategic management. During the next research being interested in their connection with strategy management by the help of identified features of strategy management in concrete conditions will be needed.

Synergy is a connection, interconnection, engagement in the cooperation in concrete environment which is changing, evolving and reacting. This connection results from combination of features of two and more elements between which mutual reversible interactions (one of the basic elements of the synergy basis) are under way. Controlled interaction connections do not secure only gained synergies within expected and unexpected, thus synergy effects (value added cooperation). Synergy effect is a value, expected and unexpected result, condition which emerges within the certain environment. It does not present only the value but also input-output substance of many processes and changes in the evolution. For instance for the corporation itself it means its evolution towards the future. In terms of the condition it stands for cooperation, connecting the corporations together in a specific environment. Synergy remains the main issue of the research and consideration. From the theoretical point of view of synergy issue it is possible to make the partial conclusion that synergy creating can be conditioned or unconditioned. On the other hand it is important to show the fact that synergies depend on the resources (tangible, impalpable), processes, features and characteristics of interacted elements through which the potential synergy effects can be realized.

On the basis of the following accesses of synergy it is necessary to point out on its complexity and connectivity within the whole researched world. The following "Seven basic accesses to synergy" present the induction of complex synergy research and they present the unification of individual researched synergy fields and occurrence of synergy effects.

(1) The access to synergy within naturalness (the basic nature of things, animals and human beings)

According to Corning (2006, a) synergy in biology formulates associated effects which are made by two or more parts, elements or organisms. They are effects which are not possible to gain in other way. Closely connected synergy definition from the sociology field shows us: Team, society is the place for synergy individuals where gaining the common aim is the possibility of gaining the individual aims (Hewstone, et al., 2001, a; b). From the point of medicine synergy is the process in which two muscles, organs, substances or parts work contemporarily together and cooperate with each other for improving the function of the unit and increase of its impact, performance (Morasso, et al., 2010).

The elements in grouping, individuals in groups, corporations in branch are based on certain basic functioning attributes and they show certain behaviour in an environment they live in. synergy is in interaction of those systems as its basal form of creating certain features, abilities or position.

(2) Synergy as an evolution approach

Synergy causal role depends on success of survival and evolution. As writes Corning (1995, b) synergy is everywhere around us and inside us, it is inevitable. However, trajectory of evolution shifted the causal dynamics away from autocatalytic (Chemical reaction accelerated by catalyst which is created as its product.) phenomenon to purposeful and function phenomena. In accordance with it, the future lies in self-determination which means it is based on information and purposeful innovations. We can safely predict that new synergy forms will play the key role in creating our future development.

Synergy causal role does not depend only on random and unpredictable phenomena any more, but with evolution it is forced to purposeful reactions and interactions within the elements between individuals, business subjects and so on. Those new phenomena carry out the future of the evolution itself.

(3) Synergy as something new, newly appeared

According to Ivanička (1997) synergy reflects also newly appeared features such as: bearing no relation structures, dividing into more parts and developing states of the system. Those features are interconnected for certain behaviour of systems. Authors Shannon (1998) and Taylor-Power (1998) and col. picked out that synergy is not only the cooperation and information change but by combination of individual perspectives (attitudes), sources and skills of partners, the group creates something new and valuable.

Dynamics of current environment provides us combination of various elements, individuals, corporations which are characteristic by various features, abilities and sources – within so diverse environment synergy is able to create something new.

(4) Synergy within the cooperation

From the point of lexicology the term synergy is derived from Greek word "synergin" which means "to work together" – "cooperate". According to Ivanička (1997): "Evolution and progress of social

system have their own structure of worldwide behaviour which is after passing the synergetics theory better to identify and use in constructive attitude and in conflict situations".

Synergy is based on cooperation of two or more elements, people or corporations and that is why it is needed to look at synergy as from the point of view of cooperation strategy as state: If the corporation managers want to create cooperation strategy it is important to analyse cooperation potential of corporation, create common vision with partners and depict the cooperation orientation. By this it is important to deal with constructing cooperation management tasks such as: the transition to cooperation conception (requirements, activities), the change of point of view on cooperation (change to mutual relations within the cooperation on a long-term basis oriented), changes of thinking in all participating sides (the advantages of cooperation), measurement of achieved level of processes of creating cooperation management in corporations, usage of modern technologies.

Common work of elements, individuals, corporations, in various conditions, accesses and situations with the help of knowing the synergy sense and meaning can realize evolutionary movement of cooperation within the individual and worldwide behaviour.

(5) Access to the synergy within the interaction influence

Synergy, according to Eye and col. (1998) is in situations including the activity of two or more subjects making certain output, result. Corning (1995, b) confirmed that synergy is in the same way with two different types, such as integration (aggregation, fusion, alliance of various kinds) and the internal differentiation. Authors Goold M. and Campbell A. (1998) have the similar theoretical specification and they understand the synergy as a result of interaction connection and cooperation affects between partial entrepreneurial groups which lead into the creating of additional value. Authors Vodáček and Vodáčková (2009) dealt with interaction affects and they defined synergy as a change of system´s behaviour and features by the influence of creating interactive impact on its partial subsystems.

Causal interactions between elements, individuals, corporations show additional results which the individuals would not get themselves – this is the output of mutual interaction impact in synergy and evolution relations.

(6) Approach to the synergy as a higher value

Author Knoll (2008) states that synergy is an effect which combines profitability of the whole, which is bigger than the total of profit of individual parts. This thought is supported by authors Bartol and Martin (1991) with the handbook of management in which they state: synergy is the ability of system to be more performing as a total of performances of its individual parts. That means organization would be able to gain its aims as more efficiently as it is possible if its individual parts worked separately.

Synergy does not affect only higher profit but according to Sirower (2007) there is bigger competitiveness and final cash flow opposite of both corporations predicted to gain separately.

Synergy in individual and common performance can make opportunities for added value in environment of higher profit, performance, faster growing, competitiveness and others.

(7) Approach to the synergy in business environment

In present world the aims based on gaining some benefits cannot be gained by one person, corporation or sector. They are based on cooperation, synergy which forms the system. System which is overpowered by economic and technology changes and it is getting more and more competitive and specific (Lasker, et al., 2001). Authors in field of management define synergy as a value made by two

cooperating divisions (corporations) which is bigger than value which would both divisions make if they worked separately (Jones, et al., 2000). This solution is needed to be filled by author Griffin (1990) who thinks synergy is an important management concept based on coordinated cooperation. Synergy occurs when cooperating subsystems are able to create bigger effect as if they tried themselves separately. Convincing evidence of existence of synergy performance (dissynergy) provides support for existence of common value, common effects. The existence of common effect depicts that common strategy plays an important role in the whole corporation performance. The performance of common grouping is not caused only by extraordinary industrial structure or total of individual performances of business features (Martin and Eisenhardt, 2002).

Interactions in business environment are within various management attitudes, coordination, cooperation, common strategy, tuning of subsystems, competitiveness represent the mechanism for gaining the benefits which would not be gained without the value made within the synergy.

Case study – locate synergies within selected cooperative strategies

The previous approaches to synergy present its basic learned types of repeated patterns in so far explored issue. They spread the point of view on synergy, on something with bigger sizes (more elements) and wider impacts (more results from common reactions). On the basis of those synergy approaches it is inevitable to show its complexity and connectivity within the whole inspected world in which the life exists, reactions on changes, development towards the future and mutual influencing of organic or inorganic objects in intentional or unintentional actions by which intentional and unintentional results (values) are created. One of the approaches is the synergy in business environment which confirms the actuality and importance of chosen topic. On the basis of approaches we can conclude the dynamic character of synergy which can function as stimuli to new acts, values and results.

If the corporation wants to gain synergy throughout its cooperation groups the critical meaning in this case has the perception of results which they can gain together. We can put between them some synergy effects which can bring to the cooperation new added value. From the point of view of management it is important to learn by which conditions of cooperation environment and by which way of management (concretized elements of management) those synergy effects occur and are maintained.

If the managers want to create cooperation strategy it is needed to analyse cooperation potential of corporation, create the common vision with partners and determine cooperation orientation. Identified findings out in the article are worthy solutions of creating and realisation of cooperation strategy in corporation within creation of synergy effects and strengthen the competitiveness.

Achievement of each corporation in cooperation organization forms is based on its strategy. We can assume that corporation which does not have effective and purposeful working strategy and strategy management it cannot survive in this competition world. Each corporation strategy is a unique piece of work. From this point of view synergy comes from the working of individual strategies of cooperation corporations itself together in cooperation environment and it only harmonizes its influence for creating synergy effects.

Chosen Cooperative Relations

From the exploration of cooperation strategy in chosen connections it is possible to relatively exactly identify synergies and synergy effect which is in a relation with mentioned successful management – strategies of cooperation organization forms. Common cooperation environment depicts many cooperation connections however strategy steps which stand firmly behind the success or failure it is important to analyse constantly. The following context presents the main findings out in theoretical research of secondary resources of investigated issue.

The first part is the introduction of chosen cooperation connections. The selection was taking place on the basis of those criteria: gained success rate of cooperation strategy, international environment, interesting and unusual environment of cooperation and conditions of its creation.

Tata Starbucks Identification of cooperation relation: Joint venture Tata Starbucks represents cooperation connection between Indian corporation Tata Global Beverages and American corporation Starbucks Coffee Corporation. Tata Global Beverages is the representative of non-alcoholic beverages and Starbucks is a famous coffee seller. In this cooperation connection was the main point to establish in an Indian market which is famous for its population and fast growing branch of commerce (to increase market share). It is important to pick up that Starbucks first try to get on the Indian market failed. Delimitation of cooperation relation: the aim of cooperation was to closer and built more powerful customers base. Of Starbucks in which the strong emphasis was on customers, employees and local coffee provider. Starbucks should be treated as foreign brand in the role of marketing participant by the connection with Tata Global Beverages as home and famous provider.

One World. Identification of cooperation relation: Joint venture of flying companies American Airlines, British Airways, Ibera and Finnair are the partners of worldwide alliance OneWorld. The aim of it is to cooperate on transatlantic flights which have to empower global competitiveness on transatlantic ways and empower position on the market and create better conditions for customers, employees, shareholders and community. Delimitation of cooperation relation: the content of this cooperation is to delimit common creation of prices, transportation capacities, coordination of flight prices and partnership on profit shares.

Comité Colbert. Identification of cooperation relation: Association Comité Colbert, which is oriented on cooperation of right competitors of various kinds of luxury goods depicting the French lifestyle. Delimitation of cooperation relation: cooperation is based on empowering of awareness and strengthening of home and foreign competitiveness in items: export of home luxury goods around the world (development on new markets), identity of trademark (to protect from plagiarism, lift up sector of luxury goods), quality and etiquette.

Aerospace Valley. Identification of cooperation relation: Aerospace Valley is a French cluster of flying engineering which joins together many various subjects. Delimitation of cooperation relation: Cluster has a non-profit character its primary aim is to share knowledge, technology and know-how (contributes to support of competitiveness of participants with development in the field of science and research, production and education in form of transferring knowledge between corporations, institutions together with meeting the flying and astronautics market). In the current time it belongs to the European and worldwide leaders in employment in the field of aviation and astronautics. The main participants are small, middle and big corporations, state and region power bodies, high schools, educational and research institutes.

Disney a Pixar. Identification of cooperation relation: Fusion between two film corporations Disney and Pixar. Delimitation of cooperation relation: Cooperation delimited Disney as a corporation with many distribution networks (propaganda), financial sources and status while Pixar in this cooperation field represents corporation with modern technologies and know-how for creation of 3D films. At the beginning there was identified problem in the hope of mutual relation. Later this mistrust led to strong cooperation connection based on strong brands and reputation which form films for the whole families, for all age categories.

Danish Food Cluster. Identification of cooperation relation: Cluster which is placed in Denmark under the name Danish Food Cluster. Delimitation of cooperation relation: Danish Food Cluster is a membership non-profit organization for corporations, research institutions and public bodies working in food processing and agriculture industry sector in Denmark. Maximizing of potential of this sector for global growth, strengthening the innovations in the field, support of sharing knowledge and cooperation. Cluster is focused on organization of events, creation of contacts and broadening of cooperation in this sector. To the aims of cluster belong: support of innovations, strengthening of

competitiveness and attracting new corporations and investments. Growing turnover and growing production of this cluster has a big importance in food processing and agriculture industry sector in Denmark.

The California Wine Cluster. Identification of cooperation relation: cooperation connection The California Wine Cluster. Delimitation of cooperation relation: The California Wine Cluster spreads the production and quality of wines and connects winemakers, restaurants and tourism into one part in the purpose of propaganda and distribution of Californian wine around the whole world.

IT Valley Košice. Identification of cooperation relation: IT Valley Košice is a cluster from the Slovak Republic. Delimitation of cooperation relation: IT Valley Košice represents cluster, association of IT firms, educational institutes and parts of self-government. The signification of existence of this association is creation of prerequisites and ideal conditions for creation of the centre of information and communication technologies in eastern Slovakia and to make its social-economic environment more attractive. It is also about creation of prosperous region, qualified education and attractive job opportunities.

Global Brands Group a Li&Fung. Identification of cooperation relation: cooperation of the form in which Li&Fung made spin-off called Global Brands Group. Delimitation of cooperation relation: the result for making it was to broaden its relations with existing and new retail customers. Li&Fung can be interested in gaining the resources and logistics and Global Brands Group is interested in abilities to design and make brands, marketing abilities and licensing.

One Nucleus. Identification of cooperation relation: British cluster One Nucleus. Delimitation of cooperation relation: One Nucleus is international membership organisation which deals with: biotechnology, diagnostics, medical mechanisms and pharmaceutics. It also provides and creates specialised services, consulting, trainings and conferences.

Chery Jaguar Land Rover Automotive Company. Identification of cooperation relation: British-Chinese joint venture with the name Chery Jaguar Land Rover Automotive Company. Delimitation of cooperation relation: cooperation connections of cars manufacturer Chery Automotive Company and automobile company Jaguar Land Rover provides the creation of automobiles and motors, also the research centre and centre for design of new models. The intention of it is to grow selling abroad in the way of creating distributive network in China. Cooperation connections of cars manufacturer Chery Automotive Company and automobile company Jaguar Land Rover provides the creation of automobiles and motors, also the research centre and centre for design of new models. The intention of it is to grow selling abroad in the way of creating distributive network in China. JLR tries to find responsible partner in Chinese market who will provide production capacities for those brands by what it will reduce the costs for production and it will improve the availability of automobiles JLR on Chinese market.

Identification of key aspects of cooperation strategy and synergy effects

On the basis of learned situation within the current business environment one of the main tasks, the meaning of business strategy is to be able to compete, cooperate and innovate in ahead of time of competitors or to choose strategy of following or filling the gap on the market. In the total global environment it is obvious that the attitude of synergy has a big potential in the present in the field of strategical management of cooperation relations of corporations. Synergy, synergy effects create competitive benefit by creating of common value if we speak about conditioned (aims) or unconditioned (added effects) of expectation which depend on concrete case. From the complex qualitative analysis of individual cases of cooperation it is important to point out on its important output.

- Delimitation of cooperation relation – The aim of cooperation (Mission. Aims. Common strategy.)

- Provision of cooperation in mutually created environment – Provision of environment (Development and growing of members. Creating the attractiveness of members. Gaining the information. Spreading the knowledge.)

- Support of mutual cooperation – Creating the relations (Following the contacts. Categorization. Long-term partnerships.)

- Cooperation relation built on assimilations (to a certain extent) – Acceptation of culture (Outward environment. Internal environment. Mutuality and unification of cultures. Effective and creative environment.)

- Cooperation relation built on common values – Sharing the same values in partnership (Trust. Reciprocity. Loyalty. Mutual reversible cooperation.)

- Cooperation based on development of ĽP and reversible interaction – Effective cooperation (work) with human potential. (Mutual interaction. Experience. Education. Motivation.)

- Cooperation relation based on individual rights for all participants on a certain place – Observance of legislation (Restriction and possibilities on a certain place)

- Common cooperation of various subjects on delimited places – Creation of common mutual resolution (Combination and sharing the resources. Reconciliation. Creation of background. Connectivity. Dividing tasks. Common organization. Flexibility. Integration.)

Identified elements have a big impact on widening the partnership relationships in cooperation organization forms. Strategy management of cooperation organization forms needs to gain full potential of cooperation. The full potential is not only fulfilling the expectations and aims but it is also opening the new possibilities – synergy in cooperation relations or creating the synergy effect (expected or unexpected added value). Strategy management of corporation is a tool which can provide filling the long term aims and intentions. Groups of corporations nowadays, such as various cooperation groups (networks, clusters, alliances, fusions and others) show us the need of stability of cooperation relations not only on a long-term cooperation but also with the intention of creating synergy which creates conditioned or unconditioned synergy effects. Identified common synergy effects introduce areas in which it is possible to reach common synergy effects however throughout previously delimited elements of cooperation strategy.

Higher competitiveness which is characteristic by stronger position within the place in which subjects cooperate and compete for example: in the form of bargaining power, wider product portfolio,

- Gaining higher level of expertise in abilities, knowledge and skills of individual subjects of cooperation relation.

- Creating new partnerships, which bring reversible advantageous common results and synergy effects.

- Creating new solutions in many fields and common creations (new added value) for example: products, services, innovations, various departments and centres (controlling, training), distribution opportunities and job vacancies,

- Growing performances in economic factors, for instance: employment, market share, takings, sale support, growth of customers, income, energy saving and costs, growth of production,
- Gaining of positive acceptance and change of culture of participate subjects.
- Combination of resources within cooperating subjects and their interacting place.
- Growing loyalty of customers by which help sustainability of common business is gained for example, by increasing awareness.
- Development and growth of individual subjects of cooperation.

Mentioned synergy fields show where it is possible to find synergy and synergy effects. On one hand in given examples we can see how synergies were created, on the other hand there were some certain barriers created. Synergy in individual areas did not have only positive effect and positive results, but it also depicted on possible parasitizing, disadvantage of second side or bad results. In the research it is learned that synergies depend on characteristic interactive elements, processes, features and resources (tangible and impalpable) through which they can be realized. On the basis of results it is important to add that creating synergy can have conditioned or unconditioned effects. Thanks to it corporations can use shared environment (advantages) but mutually compete and prosper. Second area are partnerships or strategy alliances which have the purpose to activate synergy effects in the combination of resources, lowering takings, filling in individual activities, growing performances and other effects. New trend of cooperation is looking for the fact how to maximize effectivity and profits. On the one hand the corporations create cooperation connections, on the other hand they compete – create competitive alliances.

Proposal Model of New cooperation strategy based on synergy effect

Discovering and learning elements of cooperation strategy in front of sustainable cooperation and emerge synergy effect as base for successful and strong cooperation has strongly importance of these days.

We can certainly show on many successful and failure cooperation connections. The question is: what is standing in the background of this cooperation? Within the chosen successful cases we can depict many common elements which were by the strategic management of created cooperation important for gaining the final wanted effect. Each cooperation act is created on the basis of some certain stimuli. It can be internal or external stimuli. The stimuli of cooperation can be also the intention, the answer for the question: Why do we need to cooperate? The most common stimuli come from:

- Absenting area in which its members could create solutions, mutually help each other and involved their effect (to go forward). Solving the problem.
- Creating new one

Interacting area on the picture emphasizes the connection of two elements, home and foreign market. Globalization enlarges opportunities of cooperation. It is not only about internal relations of corporations but it is about more intervening of external, foreign environment. The importance of interacted environment is needed to be seen in the:

- Less delimited conditions for creating common business relations in two ways:

1 Creating of culture of shared values and mutual acceptance of various cultural features.

2 Newly created conditions of cooperation areas show 6 important elements which relate to: legal and legislative conditions on a certain area, interconnection of cultures of participants, sharing the values of participants, creating the relations, work with human potential and provision of environment in which they will be working together.

All the above mentioned solutions create new dynamic environment. Creating the common strategy solution is based on unity of cooperation participants in those solutions and mutual reversible interaction.

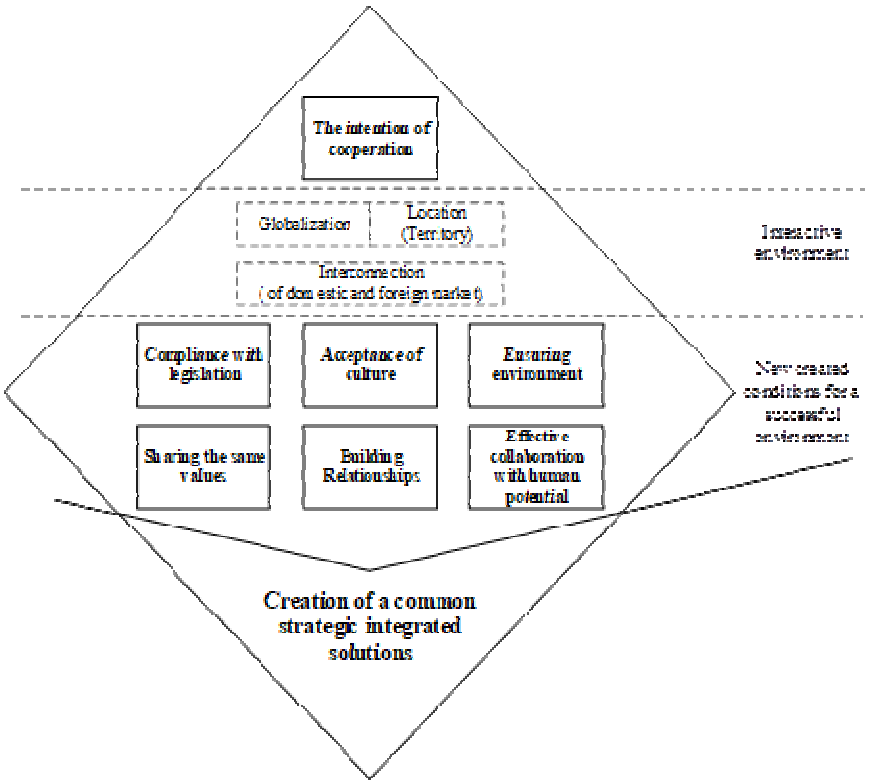

Fig. 1: Proposal Model of New cooperation strategy within the key aspects of cooperation strategy

Identified elements (see Figure 1) have a big impact on creating the synergy effects throughout the common cooperation strategy and so common strategy solution (management). In order to cooperation strategy gained its full potential by creating synergy effects it is important to join the formation of common strategy and later create synergy in expected and unexpected areas. By this step new common solution will be created which will support the added value of cooperation relation of many elements of environment.

Cooperation environment which is about application of strategy management is influenced by internal and external environment and vice versa. The changes held in the present influence all the market environments. Information about strategy depicted the importance of chosen basic elements of strategy management which are important within the gaining the aims and so management of

corporations or group of corporations. Each management is based on certain solutions which are presented by the grade of cooperation, measure of sharing information, experience, knowledge, know-how and others. Management also results from the analysis of history, current environment and prediction of future. Strategy management is the mean by the help of which we can provide long term management of interaction relations within cooperation environment. The important element by the help of which strategy management is able to adapt during the change of external or internal area of corporation and it also can use the opportunities which lowers the risk of threats. It is important to see the strategy access as a wide part of possibilities for solving certain problems and aims, creating new solutions, provision of competitiveness and impact on the market.

Model of simplified strategy management which is needed to be kept for gaining the creation and holding the synergy and synergy effect makes its main components in the meaning of:

- External environment, its changes influence not only cooperation environment but also strategy management, observing and creation of synergy effects.
- Cooperation environment in which are main researched objects, it is internal environment which is important to be managed appropriately in order to gain synergy effect.
- Chosen steps of strategy management represent the sequence of activities which are needed for application of certain management framework in cooperation environment for observing and gaining synergy effect.
- Creation and observance of the synergy and synergy effect is secured by applying the right (effective) strategy management –cooperation strategy, choosing the right components of management. Those components can differ depending on internal and external cooperation environment. It is inevitable to come from the condition of uniqueness of each subject, its relations, current environment and changes affecting the creation and implementation of chosen strategy.

Conclusion

Corporation is needed to be prepared for the future time which is characteristic by being unrecognizable future but from the point of view of current changes in business it is inevitable to predict the future development, potential areas of growth and direction of corporation needs. One of those ways how to prepare for the future is not only to react on the occurrence of changes but also to sign cooperation relations which have synergy potential and can create synergy effects – it is the cooperation strategy.

In this point there is very important optimization of cooperation relations and it is shown in the field of cooperation strategy – strategy management of cooperation organization forms. Strategy management is needed to be seen as a specific strategy processes aimed on activities which come from corporation intentions. Strategy thinking of managers is needed to be lead in intentions of a current global environment which is characterized by dynamics of changes and increasing number of mutually influencing interactions on the market and in the internal area of corporation. Newly created conditions of cooperation areas show 6 important elements which relate to: legal and legislative conditions on a certain area, interconnection of cultures of participants, sharing the values of participants, creating the relations, work with human potential and provision of environment in which they will be working together.

Identified elements of strategy management of cooperation organization forms: The aim of cooperation, Provision of environment, Acceptation of culture, Sharing the same values in partnership, Effective cooperation (work) with human potential, Observance of legislation, Creation of common mutual resolution have a big impact on creating the synergy effects throughout the common cooperation strategy and so common strategy solution (management). In order to

cooperation strategy gained its full potential by creating synergy effects it is important to join the formation of common strategy and later create synergy in expected and unexpected areas. By this step new common solution will be created which will support the added value of cooperation relation of many elements of environment.

Groups of corporations nowadays, such as various cooperation groups (networks, clusters, alliances, fusions and others) show us the need of stability of cooperation relations not only on a long-term cooperation but also with the intention of creating synergy which creates conditioned or unconditioned synergy effects. Identified common synergy effects introduce areas in which it is possible to reach common synergy effects however throughout previously delimited elements of cooperation strategy. The most important area is the area of coexistence of competitiveness and cooperation.

Many connections of corporations are spreading nowadays because of the globalization phenomena. That is why it is more difficult to lead and it is important to find correct cooperation connections with the correct corporations in the right time for creating the synergy from which synergy effects are created. This innovation of managers thinking is important for right understanding and setting the strategy thinking of cooperation organization forms.

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Managing Market Segments with Environmental Concerns: Geotourism And Geodiversity

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Abstract

Tourism is a multifaceted and geographically complex activity, with tourism increasingly creating new (and different) market segments with different individual interests. These segments are characterized by the motivations that make them travel and, in turn, by the differentiation of the existing offer. On the other hand, and in a recent tourist segment, geotourism, geotourists seek to enjoy contact with nature, perform sports activities and acquire authentic experiences. The present study aims to explore how this niche has developed, so it will be presented a contextualization of the concepts that are related to geotourism. Therefore, initially an approach to geodiversity and Geoconservation will be made (essential elements of this type of tourism) that will help to better understand the concept of geotourism, followed by a trip to the geosites that will end in the geoparks. Like companies, tourist destinations can also develop their own brands, becoming increasingly different and competitive destinations. Thus, this study aims to better understand the role of marketing applied to places and territories as a contribution to the tourist segmentation. In particular, a conceptual model is proposed to be tested empirically in geotourism contexts. In the end, some limitations and lines of investigation for the future will be

presented. In an interdisciplinary perspective, this study presents inputs from the perspective of tourism and marketing (segmentation and consumer behavior of geotourism).

Keywords: Geoconservation, Geopark, Geosite, Geotourism, Niche Tourism

Introduction

Niche tourism has been asserting itself in recent decades and is strongly associated with the theory of niche marketing (Sousa, 2014). In this sense, and as an example, geotourism has recently been considered a leisure activity. Geodiversity is the variety of elements and processes related to the abiotic elements of nature. Landscapes, rocks, minerals, fossils and soils are some examples that form the basis of life on Earth. According to Gray (2004), it began to be used by geologists and geomorphologists in the 90s, serving to describe the variety of the abiotic environment, as it is a recent term. This form of natural tourism that focuses on landscape and geology (Newsome and Dowling, 2010) is spread across the world. Honduras was the first country to make Geotourism its national tourism strategy. According to López and Salazar (2008), Geotourism aims to promote and develop sustainable communities with economic deficits through the use and protection of their Geological Heritage as a high quality tourist resource. For this niche to reach a greater number of tourists and be successful, it is necessary, according to Pforr and Megerle (2006), the establishment of communication networks alongside the appropriate exchange of information.

In parallel, and according to Sousa, Malheiro and Veloso (2019), management and territorial identity is the vital element on which a city or region is defined, and thus intends to measure, manage and to develop a distinct image of the place in order to satisfy its interests by creating a positive international reputation (Blair, Kung, Shieh, & Chen, 2014; Ferreira et al., 2019). Territorial marketing managers should increasingly focus on establishing places as brands and promoting them to their different target audiences, through a good territorial branding strategy (Rola, Malheiro & Sousa, 2018). In terms of strategic planning and brand management, it is important to define the nature of a destination in all its aspects so that the conditions necessary for the success of the marketing strategy defined for geotourism and positioning of geoparks can be pre-conceived. Thus, and in an interdisciplinary perspective (i.e. marketing and tourism), the present study intends to bring an exploratory contribution to geotourism and geoparks. In particular, it will be in the interest of the research to empirically test the conceptual model proposed here by the authors (e.g. in specific geotourism and geoparks contexts).

Geodiversity and Geotourism

The concern with the environment mobilizes the global market, which affects organizations that want to continue in the current business market, however, it is essential to add social responsibility, the economic situation and sustainability to provide services and products required by consumers and the green marketing and geotourism appears as a tool that can facilitate and inform the issues that are decisive for conscious consumption (Peneda de Oliveira & Sousa, 2020). The term Green Marketing came up in the year 1970, when AMA discussed the impacts of marketing on the environment. At that time, the term was defined as the "study of the positive and negative aspects of marketing activities in relation to pollution, energy depletion and non-renewable resources."

Tourism is an example, assuming itself as a multifaceted and geographically complex activity, with tourism increasingly creating new (and different) market segments with different individual interests (Sousa & Simões, 2010). In this sense, the term niche, from a marketing perspective, refers to two interrelated key ideas: that there is a place in the market for the product, and that there is an audience for that same product. This refers to a specific product capable of keeping up with the needs of a specific market segment (Sousa et al., 2019). Therefore, one should not look at the market in a simplistic and homogeneous way, since it represents a set of individuals with specific characteristics and needs.

geodiversity is the variety of elements and processes related to the abiotic elements of nature. Landscapes, rocks, minerals, fossils and soils are some examples that form the basis of life on Earth.

According to Gray (2004), it began to be used by geologists and geomorphologists in the 90s, serving to describe the variety of the abiotic environment, as it is a recent term. Stanley (2000) describes "The variety of geological environments, phenomena and active processes that give rise to landscapes, rocks, minerals, fossils, soils and other deposits that are the support for life on Earth", that is, this is the " stage "where we talk about biodiversity, later called geodiversity. Examples that mark geodiversity over biodiversity are the nesting of certain birds, such as eagles, and several birds from coastal regions, occurring on cliffs. Experienced geologists use the vegetation cover as a whole to identify the soil and the source rock, so this knowledge can be used for geological interpretation with intrinsic, cultural, aesthetic, economic, functional and scientific values.

Geoconservation is the enjoyment, conscious use and protection of geodiversity resources. Leopold (1993), in the middle of the 20th century, considers that "Conservation is a state of harmony between men and the land. By "earth" I mean all things about, above, or within the Earth. " Sharples (2002), on a case of geoconservation explains that "geoconservation aims to preserve the natural diversity (or geodiversity) of significant aspects and geological (substrate), geomorphological (landscape forms) and soil aspects, by maintaining natural evolution those aspects and processes ". To understand geoconservation it is necessary to apply common sense with the use of natural resources, therefore, humanity defines itself in one word: "to live", otherwise, to promote the conservation of specific places. For this reason, conservation requires investment and intends to evaluate, select, prioritize and measure the geoconservation initiatives themselves. Thus, the component is subjective, allowing to decrease the degree of subjectivity of the decision.

Heritage protection takes place through conservation or preservation, that is, preservation considers that for effective protection, heritage must be intact. For Barretto (1999), preservation is a form of protection, leading to the destruction of heritage, due to the lack of financial conditions for restoration and / or maintenance works. On the other hand, conservation understands that the heritage results from changes and shows the testimony of a specific time and adapts over time. For Pellegrini (2000), conservation is "Giving natural and cultural goods a convenient function, with appropriate solutions implying the appropriate use of nature and cultural attractions, however, avoiding or minimizing the damage to them or their loss. ", that is, the geological heritage is classified as a natural heritage, being subject to natural dynamics, leading to incessant modification. The concept of conservation for Thomas (1988), in relation to the 18th century, considers that "human civilization" refers to the conquest of nature. For example, England is characterized by a high dependence on natural resources, such as work, food, clothing or transportation. Sharples (2002) attributes the following main geoconservation objectives: to conserve and ensure the maintenance of geodiversity; protect and maintain the integrity of sites with relevance in terms of geoconservation; minimize the adverse impacts of important sites in terms of geoconservation; interpret geodiversity for visitors to protected areas and contribute to the maintenance of biodiversity and ecological processes dependent on geodiversity. On the other hand, the conservation of geodiversity is divided into three categories of values, being intrinsic or existence values; ecological values; and equity values (Sharples, 2002). The intrinsic value means that the geological heritage justifies the conservation and maintenance of its integrity; ecological value, according to Pereira (2004), is related to the importance of geodiversity for maintaining biological processes; the patrimonial value associates the need to conserve any type of heritage, encompassing the geological for the benefit of humanity.

Geotourism and Geosites

Planet Earth stands out from the rest of the planets in the solar system, not only because it allows for the existence of human life, but because it is also full of unique landscapes and unparalleled places of authentic nature. In the 19th century, tourists began to gain interest in visiting landscapes linked to geology, however, it was only in the late eighties of the past century that the approach to Geotourism began to be developed, in the United Kingdom. The problems of loss of mines and quarries for insensitive purposes and recovery plans, as well as the natural geological exposures that were being lost due to the lack of development and construction of infrastructure, were the main factors that led to the development of this niche (Hose, 2011). In Europe, the same concern led to the creation of the European Association for the Conservation of Geological Heritage (ProGEO), in 1993, whose main

objective is to promote geoconservation, as well as the protection of sites and landscapes of geological interest (Geotopes).

Just as geodiversity has developed as an abiotic equivalent to biodiversity, in recent years Geotourism has become a very popular segment alongside Ecotourism (Gray, 2008). Although some authors consider Geotourism to be an aspect of ecotourism, some argue that the former is an expanding segment of its own (Jorge and Guerra, 2016). Ecotourism is essentially based on aspects related to the biodiversity of tourist destinations, while Geotourism has some advantages over "traditional" ecotourism. According to Brilha (2005), Geotourism represents an active attraction throughout the year (it is not seasonal) and does not depend on the habits of the fauna. It is an alternative for those who want to escape overcrowded places, ending up complementing the offer in tourist areas and promoting local geodiversity crafts. Some authors like Robinson and Roots (2008) claim that Geotourism is more "eco-friendly" than ecotourism.

There is no concrete definition of Geotourism, however, several authors try to explain this term. Thomas Hose (1995) presented as the first explanation of Geotourism, the "provision of interpretive and service facilities that allow tourists to acquire knowledge and understanding of the geology and geomorphology of a place (including its contribution to the development of Earth sciences)), in addition to the level of aesthetic appreciation '. Subsequently, Hose (2011) reformulated this definition, then including the terms «geosites and geomorphosites, as well as their comprehensive topography, together with their associated in situ and ex situ artifacts, for the construction of components for conservation, generating appreciation , learning and searching for and for present and future generations ». It was then intended that access to geosites and geomorphological spaces be opened and maintained, through the development of sustainable products and services. Hose's original definition (1995) and the approach around it were accepted by UNESCO in its initial documentation on geoparks (Patzack and Eder, 1998; UNESCO, 2000), which should support the development of modern geoparks. Also Dowling and Newsome (2010) updated a definition that they had already exposed in 2006, stating that this tourism niche "promotes geosites, the conservation of geodiversity and a knowledge of earth sciences through appreciation and learning. This is achieved through independent visits to geological features, the use of geo-trails and points of view, guided tours, geo-activities and sponsorship of geo-site visitor centers».

A successful geotourism strategy is only possible with the knowledge of the target audience, so knowing the habits and motivations of geotourists becomes essential. According to Hose (2000), geotourists can be considered dedicated, when they choose to visit a place of geological and geomorphological interest, or exhibitions, for profit or for pleasure; casual, when visiting places of geological and geomorphological interest only for pleasure and intellectual stimulation. After carrying out some studies in the United Kingdom, Hose characterizes the "average geotourist" as an individual who visits, most of the time, a geosite casually, who has no experience of working in the field and therefore cannot "read the maps". He is usually over 30 years old, travels in small groups of friends or family and his "reading ability" is average. This tourist is not always familiar with the topic of geoconservation, nor well prepared in terms of footwear and prefers to keep a distance close to the vehicle. As for behavior, geotourists tend to observe the interpretive panels for a short period of time, and some may ignore them. The attention paid to interpretive panels on Geology is low, however, the interpretation activities in which there may be direct interaction and visits and field trips with expert guides captivate geotourists more. The knowledge of these characteristics helps to create a strategy to disseminate and understand the Geological Heritage, and it is necessary to recognize the existence of different profiles of geotourists.

One of the advantages of this type of tourism is the fact that it encourages knowledge of the environment from a geological education, causing an awareness in the population in relation to the Geological Heritage. However, Geotourism can cause some negative impacts, such as damage to geological sites (resulting from their excessive or incorrect use), modification of environmental conditions (Carcavilla et al. (2007)), vandalism and illegal removal of articles such as fossils and minerals. However, as it is a growing niche, the impacts are not yet fully understood or calculated (Dowling and Newsome, 2006). With regard to the term of Geosite, this applies to elements of the Geological Heritage that constitute an occurrence of recognized scientific value, in view of the rest of

the environment, however, it may present more than one type of importance, namely didactic, cultural or aesthetics. The geological heritage comprises the natural occurrences of elements of geodiversity - the geosites - which have exceptional scientific value. These are places where minerals, rocks, fossils, soils or geoforms have their own characteristics that allow us to know the geological history of our planet. Geosites, in addition to having a scientific value, can also have an educational and tourist value, whose sustained use must be promoted for the benefit of society.

UNESCO Geoparks and Geoparks Network

We can understand how Geopark is a territorial area with clearly defined limits, which includes a notable heritage known for its richness and geological interest, usually associated with a sustainable development strategy. Associated with this concept, a Geopark should have a defined set of sites of international, national and / or regional importance, which make it possible to tell and learn about the geological history of the region. The geosites that are also inserted in the geoparks are points of geological interest with scientific, aesthetic, educational or economic value.

A geopark should also highlight the protection and dissemination of the archaeological, ecological, historical and cultural values of the region and always look for their sustainability. According to this panorama, geoparks started at a meeting held in June 2000 in Greece, organized by representatives of four initiatives that promoted the conservation of geological heritage and sustainable development in Europe. This meeting gave rise to the creation of the European Geoparks Network (REG), with the first geoparks in Europe (MC Keever; Zouros, 2005). This sustainable development strategy that must focus on geoparks is based on three main elements, geoconservation, education and geotourism. Geotourism tends to stimulate the creation of economic activities based on the geodiversity of the region, involving the local community and making known to those who visit us the best that the geopark and the region where it may be inserted contains.

When talking about geotourism or geoparks, it is necessary to approach the World Geoparks Network, which today is known as a pioneer and investor in this theme (Liberato, Bernardo & Liberato, 2019). This was established in 2004 through a partnership between UNESCO and the International Union of Geological Sciences. It aims to distinguish natural areas with high geological value, in which a sustainable development strategy based on geology and other natural or human values is being executed.

UNESCO also defined its own concept of Geoparks, according to which they are: “Unified geographical areas where sites and landscapes of international geological relevance are managed based on a holistic concept of protection, education and sustainable development. Its approach combines conservation with sustainable development that at the same time involves local communities and visitors. ” According to UNESCO, the list of geoparks worldwide already has 127 geoparks in 35 different countries, and in Portugal there are 4 (Geopark Terras de Cavaleiros, Geopark Arouca, Geopark Naturtejo and Geopark of the Azores). These should show the geological heritage of international relevance. Despite this, its purpose is to explore, develop and celebrate the relationship between this geological heritage and all other natural, cultural and immaterial heritage aspects of the area. The European Geoparks Network (REG) created in the year 2000, and which currently has 69 Geoparks, has as main objective the sharing between Geoparks of strategies and common good practices for environmental preservation and tourism development. In 2006, Portugal constituted the lists of the European and Global Geoparks Networks, with the Geopark Naturtejo da Meseta Meridional, followed by the entry of Geopark Arouca in 2009 and Geopark Azores in 2013, as mentioned above and lastly the Geopark of Knight's Lands. There are currently 120 geoparks that are part of the Global and European Geoparks Networks.

Conceptual Model Proposed

Preliminary research was conducted in order to develop the research instrument. Details of the preliminary research are given below. After the collection of the preliminary data, empirical data would be collected through fieldwork. This study discusses the increasing phenomena of geotourism and the relationship marketing perspective associated to specific tourism contexts. Based in the literature

review, we propose a model that connects the relationship marketing dimensions (i.e. commitment, trust and cooperation) with the consequent satisfaction with geotourism and the behavioural intention of repeating the experience or reinforcing the experience with a niche marketing and niche tourism perspective. Several studies in marketing and tourism contexts have discussed the association relationship marketing to the site and consumer purchasing behaviour, including the study of satisfaction, loyalty or quality of service (Sousa & Alves, 2019). An extensive review of the current literature reveals that no integrated theoretical framework for the holistic study of the niche tourism industry exists. The proposed research model not only has implications for future research, but also provides useful information for practitioners in the geotourism. Several studies have shown that more brand commitment and brand trust leads to more positive satisfaction behaviour. According to Sousa and Alves, 2019 commitment is the necessary condition of loyalty. The investigations into the brand's engagement relationship have found that commitment plays a central role in predicting brand loyalty. Other studies postulate that more commitment leads to positive loyalty behavior (Amine, 1998). The correlation between trust, commitment, cooperation and satisfaction is also a well-studied area, being supported by the literature (Lin & Wang, 2006). The credibility and integrity components of brand trust appear to be predictors of brand loyalty. To reclaim loyalty and achieve success, companies should pay more attention to consumer relationships and, in that way, gain trust. The literature highlights that satisfaction tends to favour the development of behavioural loyalty. These results are particularly evident in tourism contexts, as the example of the importance of satisfaction in revisiting or recommendation family or friends (Bigné et al., 2005; Prayag, 2008). This aspect was corroborated in our empirical study. Based on this discussion, we propose that, in a context of geotourism, the increase in trust, cooperation and commitment facilitates the development of behavioural satisfaction and loyalty. The proposed model is presented in figure 1. Hence we propose that: P1: cooperation has a positive effect on satisfaction of geotourism; P2: commitment has a positive effect on satisfaction of geotourism; P3: trust has a positive effect on satisfaction of geotourism; P4: Satisfaction has a positive effect on the geotourist.

Figure 1: relationship marketing and behavioural intentions in geotourism services

Final Considerations and Future Research

Geotourism is an area still growing. It is essential to relate this niche with the concepts of Geoconservation and Geodiversity, since they correspond, respectively, to the actions implemented with the purpose of preserving geodiversity and geological heritage and to the variety of geological environments or landscape formation processes through rocks, minerals , fossils, among others.

Geotourism aims to provide tourists with the opportunity to get involved with the environment, in order to acquire geological and geomorphological knowledge and experience activities.

To complement this segment, points of specific geological interest have emerged, that is, Geosites, which have great value at various levels and require an assessment to receive this title. These Geosites are generally inserted in Geoparks - places whose geological heritage is recognized and where sustainable development strategies generally exist. Although there are four geoparks in Portugal, the Terras de Cavaleiros Geopark, which is part of the Global Network and European Network of Geoparks, was approached. After a brief exploration of this place, it is concluded that foreign tourists are the ones who visit it most, so a bigger promotion must be made at national level to make the Portuguese known, what the country has to offer. Now, in an exploratory logic, the present manuscript seeks to present some insights so that in the future it will be possible to establish causal relationships between the study variables presented here. In our understanding, it is an instrument to assist all those who directly or indirectly work in territorial management and marketing, namely in specific segments of geotourism and geosites. In an interdisciplinary perspective, this study presents contributions to tourism, marketing and local development. Future studies should, however, allow the empirical testing of the conceptual model presented here (administration of surveys by questionnaire to geotourists and subsequent treatment of data using the structural equation models with the AMOS software), also using the focus group methodology in a attempt to analyze and understand the point of view of different stakeholders in the territory (ie residents, businessmen, politicians, tourism agents).

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Do Policies Support, Finance, and Infrastructure Accessibility Impact the Earnings Performance of Malaysia Small Medium Enterprises (SMEs)?

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Abstract

This study investigates the influence of external factors environment, such as government regulations, access to finance, and access to infrastructure on the performance of Small and Medium Enterprises (SMEs). The sample used for this study comprises 152 SMEs, and they were given a three-section survey questionnaire. Normality tests, correlation, and regression analysis were employed for data analysis. The findings indicate that access to finance and infrastructure has a significant positive influence. Meanwhile, government regulation and policy have no significant influence on SMEs' performance. These findings may add to the literature about the importance of some external factors in influencing the SMEs' performance, especially for developing countries. The results may also assist the government, policymakers, and SME agencies in searching for a progressive and inclusive approach from the explicit factors environment to strengthen the performance of SMEs. Additionally, this study also discusses several recommendations and limitations for consideration in future research.

Keywords: Access to finance, government policy, infrastructure, performance, small and medium enterprises.

Introduction

Among all types of business entities, the roles of Small and Medium Enterprises (SMEs) in contributing to the economy of most nations, including Malaysia, have grown through resources optimisation, reduction in the number of unemployment, entrepreneurship activities promotion, wealth creation (Umar & Hashim, 2017), and also the initiation of multinational and big corporations development (Madanchian, Hussein, Noordin, & Taherdoost, 2015; Mat Dangi, Ismail, Johari, & Md. Noor, 2017). SMEs can be established in any form of business activities, and usually operated by owners or co-owners with a small market share (Chin & Lim, 2018). Technically, SMEs in Malaysia are governed by SME Corporation Malaysia (SME Corp.), one of the government agencies responsible for formulating policies and strategies for SMEs, as well as coordinating various programmes for SME development. There are two main sectors of SMEs in Malaysia, which are 1) manufacturing and 2) services and other sectors, including construction, agriculture, mining, and quarrying, which are categorised into three business types—micro, small, or medium enterprise. The categorisation takes into account the number of employee and sales turnover, as the determinants. For instance, a business entity with a sales turnover of less than RM300,000 and the number of employees of less than five is categorised under micro businesses, which is applicable to both manufacturing and services and other sectors. Meanwhile, the small business category is grounded by sales turnover of more than RM300,000 up to RM15 million, and with employees of five to seventy-five for a manufacturing company. The services and other sectors company can be categorised as a small business if it has a sales turnover of RM300,000 to RM3 million, and the number of employees is from five to thirty persons. On the other hand, a company is categorised as a medium company if its sales turnover is in

the range of RM15 million to RM50 million, or with employees of seventy-five to two hundred for the manufacturing sector, while for services and other sectors, the sales turnover is RM3 million up to RM20 million, or with thirty to seventy-five number of employees.

It is interesting to note that SMEs contributed up to 99.2% of the overall business establishment in Malaysia across all sizes and sectors (Bhuiyan, Said, Ismail, Mohd Jani, & Fie, 2016). According to the Department of Statistic Malaysia (2018), SMEs contribution to the country's GDP increased to 38.3% in 2018 compared to 37.8% in 2017, which amounts to the total GDP of RM1,174.3 billion. This increment of GDP contribution implies that SMEs made a crucial contribution to the nation's economy; in fact, SMEs account for 98.5% of the total business establishment in Malaysia. In addition, SMEs existence facilitates the development of the economy through creativity, innovation, technology advancement, and competitiveness (Abdul Razak, Abdullah, & Ersoy, 2018). With this prominent role, the government of Malaysia has planned numerous programmes that include the access to financing, access to market, technology and innovation, development of human capital, infrastructure, and the legal and regulatory improvement (National Entrepreneur and SME Development Council, 2019). The government has also launched the National Entrepreneurship Policy 2030, which highlights important strategies to upsurge the number of resilient and competitive entrepreneurs as well as to expand the capabilities of SMEs.

With the exceptional role of SMEs in the economy, scholars and practitioners placed a high interest in studying the factors that could influence SMEs' performance in various aspects. This paper focuses on the impact of external factors, particularly government regulation and policies, access to finance, and infrastructure on the performance of SMEs. Although various aspects of the external environment could be taken into account, the external environment is regarded as a critical aspect by some scholars, as it can influence entrepreneurs' motivation and business performance (Machmud & Sidharta, 2016). Besides, some studies suggest that for SMEs to compete effectively in the market, it is imperative to use the external environment as a source of support, in terms of strategic advice and for business growth (Appiah, Possumah, Ahmat, & Sanusi, 2018). Thus, SMEs need to be sensitive to the external environment where they ventured their business as it may influence their decision-making and determine their success. In line with the notion, it is expected that the findings of this study would be invaluable for SMEs and practitioners in identifying the external environment approach that could augment their performance in order to attain success, domestically and internationally.

Literature Review

Generally, the external environment in the business context includes factors that either positively or negatively affect business activities happening outside the company; hence, making it difficult to control (Appiah et al., 2018). Researchers have outlined the numerous factors of external environments, such as government policies, sociocultural, and economic aspects (Munizu, 2010), technological advances, regulatory changes, customer expectations, supplier requirements, increased competition (Banham, 2010), market turbulence, competitive intensity (Wan Mohd Nasir, Al Mamun, & Breen, 2017), and perceived customer benefit and perceived competitive value (Kartiwi, Hussin, Suhaimi, Mohamed Jalaldeen, & Amin, 2018). Mole, North, and Baldock (2017) asserted that for SMEs to compete effectively in their businesses, they need to seek external support and assistance for efficient operational and strategic direction. Among all of these factors, the information about government regulations and tax policies, access to finance, resources, and infrastructure are the crucial determinants that could influence SMEs' performance (Mole et al., 2017; Appiah et al., 2018; lwidiko, Esther, & Baisi, 2019).

Performance of SMEs

Performance can be described as the strategic outcomes that an organisation uses to realise its goals, whether it is attainable or vice versa (Eniola & Entebang, 2015). Performance is repeatedly measured based on the conventional method; for example, sales growth, market share, liquidity return on investment (ROI), and cash flow (Nastasiea & Mironeasa, 2019). However, in the case of SMEs, the performance measurement is more difficult compared to large companies because only a few objective

data can be used to support the relationship between the companies' activities and corporate performance. For instance, when ROI is used to measure performance, it can be easily manipulated (Gáti, 2015). In another view, there is a growing trend of researchers paying great attention on exploring the non-financial aspect, including capital, infrastructure, business network, production and operation, competitiveness, and even market and distribution, as the key performance indicators to gauge SMEs performance (Nastasiea & Mironeasa, 2019), besides the quantitative and financial measurement that has been used extensively (Mat Dangi, Ismail, Saad, & Johari, 2018). Nastasiea and Mironeasa (2019) concluded that the traditional performance measurement that based on financial management had hit its limits; thus, many scholars have shifted to non-traditional indicators, which is based on non-financial strategic and qualitative indicators, methods, and models. Therefore, it is justifiable for this study to include government regulation and policies, access to finance, and access to infrastructure, as the external factors and determinants for measuring the performance of SMEs. Furthermore, the three factors are some of the identified driving forces of Malaysian SME performance, as stated in the SME Masterplan (Chin & Lim, 2018). In this study, monetary measurement using profit will be used to indicate the performance. The following section discusses these variables further and its application in the performance measurement.

Government Regulation & Policies and SMEs Performance

Government regulation and policies associated with SMEs can be described as external policies, which contain the plan of actions, approved and chosen by a group of people, organisation, or political party that fosters the startup and sustainability of entrepreneurship activities (Akinyemi & Adejumo, 2018). From a global perspective, governments worldwide have taken initiatives to encourage entrepreneurship and new firms, including SMEs growth in particular (Pickernell, Atkinson, & Miller, 2015). For instance, the government of the United Kingdom has a policy supporting SMEs' access to resources, such as financial aid (Pickernell et al., 2015), while the government of South Africa is focusing on reducing the gap between the rural SMEs and high-end SMEs by creating an environment where both can succeed (Gopaul & Manley, 2015). Similarly, the Malaysian government also put concerted efforts to nurture the entrepreneurial culture ever since the inception of New Economic Policy (NEP) in 1971, followed by the Industrial Master Plan (IMP) and the establishment of the National SME Development Council, as the policy-making authorities with a strategic function that include all SME of every sector in Malaysia (Wan Mohd Nasir et al., 2017). Studies have documented that government policies, such as financial assistance (Peter et al., 2018), facilitation of infrastructure, nurturing innovativeness and technology (Sharom, Cheng, & Yahya, 2016; Simiyu, Namusonge, & Sakwa, 2016; Nguyen, Van, Bartolacci, & Tran, 2018), registration process, credit policies and tax system (Ndiaye, Abdul Razak, Nagayev, & Ng, 2018; Nyarku & Oduro, 2018) have a significant impact on firm performance. However, several studies also argued that certain government regulations and bureaucratic procedures had become a burden that could hinder SMEs growth, as well as one of the challenges faced by SMEs while doing their business activities and it could affect their viability in the long run (Eniola & Entebang, 2015; Kitching, Hart, & Wilson, 2015; Simiyu et al., 2016; Peck, Jackson, & Mulvey, 2018). Nevertheless, Kitching et al. (2015) asserted that although there are mixed perceptions of government regulations and policies, they are actually a dynamic force; they could be enabling or constraining the performance of SMEs, depending on how they were designed, enforced, implemented, and whether SMEs can exploit those regulations and policies to support their business environment.

Access to Finance and SMEs Performance

Many studies claimed that access to finance is vital for the business since it is functioned as a capital for starting up and running a business (Onyiego, Namusonge, & Waiganjo, 2017). Fanta et al. (2017) explain that access to finance can be viewed from two perspectives, namely the macro-level (access is based on the legal and business environment, and the efficiency of a banking system) and firm-level (factors such as life cycle profile of the firm, age, gender, and educational level of the business owner), which are essential aspects for accessing external financial aid. However, access to finance is also one of the biggest challenges for SMEs because they are facing many problems in obtaining financial assistance (Ullah, Bilal, Hamza, & Iqbal, 2018), and it is ranked as the most significant obstacle to

growth (Onyiego et al., 2017). This scenario is also supported by the World Bank in 2018, who reported that almost 70% of SMEs worldwide are not using external financing from financial institutions, while the rest were underfinanced (Ramalho et al., 2018). Among the reasons for this circumstance are insufficient collateral and high-interest rate (Yoshino & Taghizadeh-Hesary, 2018), macroeconomic instability and competition (Ramalho et al., 2018), and also the character of the owner and the capacity of the finance required (Mohd Ali, Haron, Nik Abdullah, & Abdull Hamid, 2019). Generally, most SMEs financed their operation by internally generated funds, for example, from personal savings, financial assistance from family or friends, and microfinance institution, whereas the amount might be insufficient for the firm to grow and expand (Mohd Ali et al., 2019). Many studies (see Abdullahi, Ghazali, Awang, Mohd Tahir, & Mat Ali @ Salim, 2015; Ibrahim & Mohd Shariff, 2016; Effendi & Yasmin, 2017; Nyanzu & Quaidoo, 2017; Andries, Marcu, Oprea, & Tofan, 2018) acknowledged that the financial aspect has positive and significant impact on the performance of SMEs. This is also recognised by the Organisation for Economic Co-operation and Development (OECD) during their SME ministerial conference 2018, which stated that access to finance is the key to the creation, growth, and productivity of SMEs since it is imperative at all stages of a business life cycle (OECD, 2018).

Access to Infrastructure and SMEs performance

Chin and Lim (2018) stated that infrastructure is essential to support SMEs and entrepreneurs as it provides a conducive environment for business activities. It is the facilities and services needed for the economy to function, which includes the technical structures, such as electricity, water supply, roads, bridges, telecommunications, sewers and other products or services that are crucial in enabling, sustaining, and improving a society living condition (Abdullahi et al., 2015). Generally, the government is the main provider for the infrastructural facilities because of the massive cost of acquiring them (Akinson, 2018). In Malaysia, one of the programmes under the government initiatives for SMEs developed by the National Entrepreneur and SME Development Council (NESDC) is to provide and enhance the infrastructure, which amounts to RM69.2 million in 2018, and RM44.0 million in 2019. The quality of these physical infrastructures is vital in emerging economies, as it is one of the crucial factors for SMEs growth and global opportunities (Organisation for Economic Co-operation Development, 2017). Previous studies (see Abdullahi et al., 2015; Akinyele, Akinyele, & Ajagunna, 2016; Akinson, 2018) confirmed that infrastructures have a significant positive impact on the performance of SMEs in Nigeria due to its major role in ensuring the businesses' operations and activities. In another view, a study by Mohd Khan, Md. Noor, and Anuar (2016) on SMEs in Malaysia found that the sales performance is influenced by the infrastructure facilities, such as electricity, water, and information technology facility. Conversely, poor infrastructure and inadequate facilities would result in the firms bearing the cost of obtaining such services instead of using it to expand their business (Ndiaye et al., 2018). Thus, reflecting the view, this study strongly believed that infrastructure facilities play a vital role in supporting the business operation of SMEs.

Mohd Khan et al. (2016) explain that SMEs' profit within three years of business operation is likely to be influenced by government regulations and policies (such as tax information, market information, rules and regulation), infrastructure facility (such as electricity, water, and information technology) and business support (such as entrepreneurship programme, management expertise, and financial support). Therefore, with the mixed criticisms, different findings of past research, and the importance of the three external elements mentioned in other studies, this research attempts to analyse the significant influence of those factors on SMEs' performance in Malaysia. The findings would be useful for the related parties in determining whether government intermediation through the regulations, finance, and infrastructure enhanced SMEs' performance, which then motivates the firms to excel in the global arena and assists in achieving the socio-economy and welfare aspirations. Thus, based on the view and relevant literature discussion, the following Table 1 presents this study proposed hypotheses:

Table 1: Hypotheses Development

Hypothesis 1 (H1)	There is a significant influence of government regulations and policies on SME performance.
Hypothesis 2 (H2)	There is a significant influence of access to finance on SME performance.
Hypothesis 3 (H3)	There is a significant influence of access to infrastructure on SME performance.

Based on the hypotheses, Figure 1 below reflects the relationship between independent variables and the outcome variable, in which this study believes that SME performance is influenced by government regulations and policies, access to finance, and access to infrastructure.

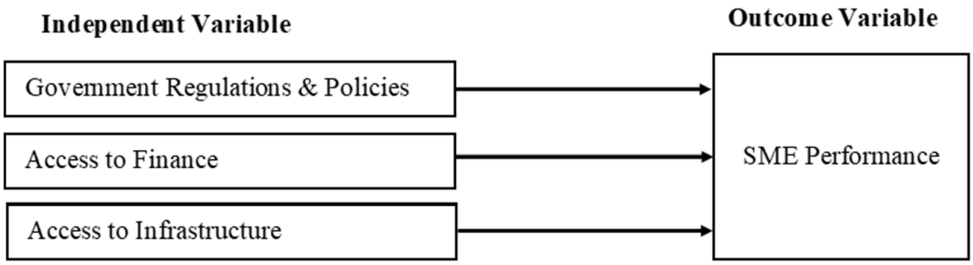

Figure 1: The framework of association between independent variables and the outcome variable.

Research Methodology

This study intends to investigate the influence of the external factors on SMEs' performance. The random sampling method was used to collect primary data on the performance of firm-year observation. A total of 152 (76%) survey questionnaires were returned and usable from the 200 samples distributed to various states in Malaysia. The structure of the research model used in this study comprised the three independent variables, namely government regulations and policies, access to finance, and access to infrastructure, with SMEs' performance as the dependent variable. The survey questionnaire using the five-point Likert scale is adapted from a combination of instruments by Abdullahi et al. (2015) and Mag (2015) with some modifications to fit the context of this study. The questionnaire is divided into two main sections; Section A contains eight items related to the respondents' demographic profile, while Section B comprises 27 items related to the three external factors and SMEs' performance. Data collected were analysed using Statistical Package for Social Science (SPSS) software to get the descriptive statistical analysis, correlational test, and multivariate analysis as well as normality tests in order to achieve the study's hypotheses and validate the findings.

Additionally, this study also employed the assumption testing to ensure that the model yield from the sample can be accurately applied to the population of interest. Accordingly, the model used to represent the SMEs performance in this study is projected as follows:

Model:

$$\textit{PERFORMANCE} = ß0 + ß1\ (Ext_GRP) + ß2\ (Ext_AF) + ß3\ (Ext_AI) + \varepsilon it$$

Where PERFORMANCE = Performance is measured by monetary performance
(Notes: Ext_GRP = Government Regulations & Policies; Ext_AF = Access to Finance; Ext_AI = Access to Infrastructure)

Results and Findings

This study performed the Kolmogorov-Smirnov (K-S) and Shapiro-Wilk on all items to test the normality in order to meet the regression assumptions, and the result indicated that they are significant ($P<0.05$). On the other hand, the results for the test conducted for homogeneity of variance for all variables show an unequal variance with $p<0.05$. Meanwhile, the multicollinearity and the Variance Inflation Factor (VIF) values were below 10 with the tolerance values of above 0.2; hence, the results implied that there is no collinearity within the data. Next, to certify the reliability and internal consistency of the survey questionnaire used in this study, the reliability analysis was also performed, and the result demonstrated a score of more than 0.85, which means the scale used is good, reliable, and sufficient to gather data for this study.

Demographic Analysis

Most of the respondents in this study (33.1%) have been operating their business within six and ten years, and the majority of them are involved in consumer goods production. For the demographic profile of the respondents, 72 (47.4%) of them aged between 31 and 35 years old, while the gender profile showed male respondents as the majority (65.8%) compared to females (24.2%), and 10% skipped the question. The ethnic group profile indicated that the Chinese have the highest number, with a total of 84 (55.6%) respondents, compared to the Malays, Indian, and other ethnicities. Meanwhile, in terms of educational background, 109 (71.7%) respondents stated bachelor degrees as their highest level of education. Other than that, this study also asked the respondents about their business operation location, where the majority of them (64.2%) claimed the township as the strategic location compared to the city centre, and the district or suburban area. For business operations, on average, most of the SMEs had about 16,000 customers per year, and to fulfil the demands, the number of employees is more than 15 staff with the production of at least 2,000 units per month. In terms of strategies, the result shows that about 55.3% of SMEs in this study introduced at least one new product per year to boost up their sales and maintain business sustainability.

Pearson Correlation Analysis

The result in Table 2 presents the Pearson correlation matrix analysis conducted between variables. The rule of thumb for this analysis can be referred to Sekaran and Bougie (2010), who stated that the result of $0 < /r/ < 0.3$ indicates a weak correlation; $0.3 < /r/ < 0.7$ implies a moderate correlation, while $/r/ > 0.7$ signifies a strong correlation. The results of this study show that Ext_GRP, Ext_AF, and Ext_AI are positively correlated with PERF at 0.379^{**}, 0.749^{**}, and 0.759^{**}, respectively. Likewise, the correlation results among the independent variables of this study were also positive (Ext_GRP and Ext_AF: 0.441^{**}; Ext_GRP and Ext_AI: 0.426^{**}; and Ext_AF and Ext_AI: 0.776^{**}). Therefore, there are no multicollinearity issues, as the values for all variables of this study recorded <0.9, which is within the acceptable range.

Table 2: Pearson Correlation Matrix

		PERF	Ext_GRP	Ext_AF	Ext_AI
PERF	Pearson Correlation	1	$.379^{**}$	$.749^{**}$	$.759^{**}$
	Sig. (2-tailed)		.000	.000	.000
Ext_GRP	Pearson Correlation		1	$.441^{**}$	$.426^{**}$
	Sig. (2-tailed)			.000	.000
Ext_AF	Pearson Correlation			1	$.776^{**}$
	Sig. (2-tailed)				.000
Ext_AI	Pearson Correlation				1
	Sig. (2-tailed)				

Notes: PERF = Performance; Ext_GRP = Government Regulations and Policies; Ext_AF = Access to Finance; Ext_AI = Access to Infrastructure

** Correlation is significant at 0.01 level (2-tailed).

* Correlation is significant at 0.05 level (2-tailed).

Multivariate analysis

This study proceeds with the multiple regression analysis to examine if the external factors, namely government regulations and policies; access to finance; and access to infrastructure, have a significant influence on SMEs' performance. The result is displayed in Table 3 with most of the variables employed are positively significant with the performance of SMEs, as the *p*-value is recorded at 0.000 ($p<.005$), which means that the model of this study is sufficiently developed to determine the influence of external variables on SMEs performance. The resulting yield of the F ratio value is high (87.927), which is also highly significant ($p<.001$); thus, it is safe to say that the model can predict the outcome that the external factors could influence SMEs performance. In order to certify the multicollinearity of this study, the value of VIF was observed, and all variables signify the value below 10 (VIF<10) with a tolerance value of more than 0.1. Therefore, no collinearity within the data used. The coefficient result shows that, Ext_AF (β=0.484, $p<.005$) and Ext_AI (β=0.540, $p<.005$) are significantly associated with SMEs' performance; thus, H2 and H3 are supported. In essence, the variables used in this study can predict 63.3% of the relationship of the outcome variable. The outcome for H2 is parallel with Almansour, Almansour, and Almansour (2019), who claimed that there is a positive and significant association of the financial factors as better access to finance would improve the performance of SMEs. This is also consistent with Nyanzu and Quaidoo (2017) and Fanta et al. (2017), who asserted the importance of financial access in boosting the SMEs' performance since it is required for the growth, expansion, and function of their business. Access to finance is not only imperative for SMEs to operate their business activities but also serves as an enabler for the transition in the economic systems, where economic and environmental performance are reconciled to create value and transact financial assets towards a more sustainable economy (Andries et al., 2018). On the other hand, the significant association between access to infrastructure with SMEs performance, as suggested in H3, is parallel to the findings of Akinson (2018) that infrastructures are vital for SMEs because it provides an enabling environment for the business operations to grow, hence, improving its performance. Furthermore, infrastructures, such as electricity, road, water supply, and the telecommunication system are basic essential services, and SMEs cannot afford most of the infrastructures on their own (Akinyele et al., 2016). Thus, access to these infrastructures provided by the authorities could create a conducive business environment and encourage business activities.

However, for Hypothesis 1, which represents factors of government regulations and policies (Ext_GRP) in SME, it is found that they do not significantly influence the performance of SMEs. This finding is also mentioned in Simiyu et al. (2016), as they discovered that government policy and regulation had no significant influence on the growth or SMEs' performance. Simiyu et al. (2016) explained that this could happen when a bureaucratic regulatory regime exists, which may hinder the growth of business operations and activities. Nevertheless, it also depends on how SMEs accept the regulations or policies, either favourably or unfavourably, and it does not impact all phases of SMEs' decisions and actions (Akinyemi & Adejumo, 2018). In addition, regulations and policies influence SMEs not only by prohibiting or mandating some actions but also stimulating other forms of adaptation issues. For example, regulations and policies could discourage the process of innovation in producing products or services, which could also influence stakeholders' behaviour (Kitching et al., 2015). Consequently, from the analysis, the regression framework can be outlined by switching the β coefficient in Equation 1 as follows:

$$\text{PERFORMANCE} = 3.261 + 0.020\ (\text{Ext_GRP}) + 0.484\ (\text{Ext_AF}) + 0.540\ (\text{Ext_AI}) + \epsilon it$$

Table 3: Regression Results

Variables	Beta Coefficient	Std. Error	t-value	Prob.	Tolerance	VIF
Constant	3.261	.328	9.936	.000		
Ext_GRP	.020	.075	.266	.790	.788	1.269
Ext_AF	.484	.097	4.988	.000**	.383	2.611
Ext_AI	.540	.096	5.631	.000**	.389	2.568
F-statistic	87.927					
p-value	.001					
Adjusted R^2	.633					
Notes: PERF = Performance; Ext_GRP = Government Regulations and Policies; Ext_AF = Access to Finance; Ext_AI = Access to Infrastructure						
** Represent the significant at the 1% level. * Represent the significant at the 5% level.						

Conclusion and Recommendation

This study examined the external factors of an environment, namely government regulations and policies, access to finance, and access to infrastructure, whether they have a significant influence on SMEs' performance. The results indicate that two hypotheses are accepted; access to finance and access to infrastructure are positively significant and could influence SMEs' performance. These findings imply that there is a dire need to maintain financial assistance and infrastructures to support the economic growth of SMEs in Malaysia, as the findings suggest a significant influence of the two variables on SMEs' performance. Conversely, the variable of government regulations and policies have no significant influence on the performance of SMEs. This might be because this factor can be a dynamic force as it could simultaneously act as an enabler and restrictor to performance. These effects may have a different consequence on a different level of SMEs and how it is perceived by the owner of SMEs, suppliers, customers, and other stakeholders. Therefore, it is suggested that future research should explore this issue more in particular to determine the impact of government regulations and policies on SMEs' performance or acceptance from different perspectives and the reason behind these findings as well. Such an effort is imperative to identify whether the current policies and regulations should be revamped or revised to cater to the specific needs of the SMEs and to enhance their overall performance.

This study also identified some limitations; firstly, it pertains to the sample size, which is limited in terms of the total population. Future studies may include a larger and broader range of samples to acquire more information and robust findings between regions. Secondly, the external factors used in this study only covers three variables. Alternatively, research in the future could explore other factors, such as competition, technological changes, customers, country's economy trend, market conditions, and labour market, to get a better understanding of the various external factors that could influence SMEs' performance.

Based on the findings of this study, policymakers should take into account any initiative that could create an environment that allows for continuous access to finance and conducive infrastructure to boosts up the economic growth among SMEs to a larger scale. Nevertheless, this study contributes greatly to the literature. It also hopes to assist government institutions and SME agencies in looking for a progressive and inclusive approach for the improvement of SMEs' development.

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Agile-Methods as A Managerial Instrument in Education

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Abstract

The scope of Agile-methods application is growing substantially . And educational sector is not being left out. We can establish at least two aspects of applying Agile-methods in education – (1) in the students' educational process itself and (2) in the management system of educational institutions. When we are applying Agile-methods as a managerial instrument in education, we can use Agile transformation framework. In that case not only we are able to diagnose the problematic areas (bottlenecks) in the educational institution's management, but discover possible ways of solving these issues.

Keywords: Agile, Management, Education Organization

Introduction

For the most part, appliance of Agile-methods in education has started due to their successful usage in team management in the software development field, which has been followed by the willingness of many researchers to adapt these methods to the educational sector (Dewi, Muniandy, 2014). However, that adaptation is mostly happening within the context of improvement of the schooling methods (Salza, Musmarra, Ferrucci, 2019). Thus, an adaptation of one of the most demanded, in terms of practical use, framework of the Agile – Scrum (Schwaber, Sutherland, 2011) to the educational sector, has led to an invention of a new method - "eduScrum" (Delhij, van Solingenm Wijnands, 2015). Yet still, Agile-methods are, first of all, managerial instruments, which is why we have made an attempt to apply them precisely to the management system of one of the educational institutions.

Main Part

One of the most interesting approaches to the analysis and development of the organization administration systems is Agile transformation framework (Spayd, Madore, 2020). Let us recall, that this framework suggests a reviewal of the four levels of corporate management development within four quadrants: I (leadership and mindset), IT (behavior and intention), ITS (organization design) and WE (organization culture); where each level has a color appointed to it – amber, orange, green or teal, in a manner similar to that of the spiral dynamics (Beck, Cowan, 2005).

After conducting an analysis of one of the russian higher education establishments, we have arrived to the following conclusions.

Within the I (leadership and mindset) quadrant, the organizational leader is an "achiever" (orange level), as he is constantly striving to improve the employees' performance indicators, by applying a system of financial rewards. A good method for an upward transition in that case is Sahota's bubble model (Sahota, 2012), where certain employees are able to utilize a "catalyst" approach (green level), or even a "co-creator" approach (teal level). In which case, employees must set up certain connectors – external behavioral features, that imitate fulfillment of the organization's "rules of the game"[1] and

[1] For more information on the implication of the "rules of the game" in management see (Obydenov, 2016; 2018).

are performance level oriented, consciously investing their time and cognitive resources to set these connectors up.

Within the IT (behavior and intention) quadrant, the organization is on the "goals" (orange) level and is marketing oriented, stimulating potential students to enroll in that particular higher education establishment. However, certain departments are demonstrating a higher level – "organization" or even "vision" (teal level), where one of the main goals of the education is consistently forming new thinking skills in students. Consequently, we'd recommend giving more freedom and responsibility in decision-making to these departments in that case.

Within the ITS (organization design) quadrant the organization is more or less on the "hierarchy" (amber) level, mostly focused on the bureaucratic side of the organization, exercising the maintenance function of the core business (education and scientific research). Although, it is fair to say that the scientist-employees are on the "team" (green) level, because that organization design allows them to fulfill their duties. Recommendations – to define more exactly and set up the value chain and transform the organization design of that higher education establishment accordingly.

And finally, within the WE (organization culture) quadrant, the "conformistic" (amber) level is being implemented in the organization, where most employees are forced to follow the "achiever" rules based on their performance levels, and not actually incorporating this culture within themselves or feeling strongly about it. At the same time they are applying such strategies, that would maximize their performance indicators. Our recommendation is that the scientist-employees set up a pool of trans-organizational agencies akin to labor unions, that could determine the new set of "rules of the game" in the future, correspondent with the "pluralistic" (green level) or even "evolutional" (teal level) organization culture.

It is worth noting that in certain departments of this educational institution such management methods are being implemented, that are relevant to the complex systems, where the truth criterion and the department buildup are dictated by exploratory experiment, which is consistent with scientific tradition and is in complete accordance with the David Snowden's complexity concept (Kurtz, Snowden 2003).

Conclusion

We were the first to apply Agile transformation framework to an educational institution. Our research allowed us to structurize characteristic aspects and determine main problematic areas in one particular educational institution's management. On top of that, we were able to formulate a set of recommendations for the transformation of the management system in that institution: application of the Sahota's bubble model; delegating more freedom and responsibility in the decision-making to the departments; organization design optimization based on a more defined value chain; creation of trans-organizational agencies by the scientist-employees akin to labor unions.

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Time Management in a Group of Working and Non-Working Students

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Abstract

The subject of this paper is time management in a group of students. The paper explained the meaning of the concept of time management and presented techniques and methods for effective time management. It pointed to various traps that lead to making mistakes, resulting in the waste of precious time. The paper described the authors' own research on the level of knowledge about time management and the knowledge of and ability to apply time management methods within a study group. The research tool was a survey questionnaire composed of 21 questions. The research was conducted among random 132 working and non-working students. The analysis of the survey results showed that the students surveyed were not familiar with the concept or techniques of time management, but employed such techniques unconsciously. Detailed data analysis did not reveal significant differences between working and non-working students in terms of the knowledge about time management and effective use of time management methods for implementation of a specified goal.

Keywords: Time Management, Time Management Principles and Techniques, Time Wasters

Introduction

Most students today have a tight schedule. Each of them has to deal with every-day stress connected with duties in such areas as work, family, hobby or other tasks they would like to complete. We live ever faster, we have more and more things to do, we race against time. According to scientists, after homo erectus and homo sapiens, homo insomnis, i.e. man who undersleeps, appeared on the Earth (Szeląg, 2010). We live in a constant stress due to shortage of time and forgetting about important issues that should have been done. We would like to know how to manage time effectively in order to organise every day well. We often feel that others are better-organised than we are. By constantly comparing ourselves with others and expecting more self-discipline and self-control we may become even more frustrated. We should ask ourselves whether having too little time is the real problem. Perhaps, we are unable to manage it properly. According to P.F. Druckers, "time is one of the scarcest resources and unless it is managed, nothing else can be managed" (Drucker, 2009). P. Zimbardo and J. Boyd (2009) disagree with B. Franklin's statement that time is money. They claim that time, our most limited asset, is in fact much more precious than money.

This paper addresses the issue of time management in a group of working and non-working students.

Meaning of the concept of time management

According to Stephen R. Covey (2013), what is important is not managing time, but "managing oneself in time." Technique and technology is helpful in execution of certain tasks. A human equipped with a computer, tablet or smartphone is more efficient and effective in what they do.
In order to manage time properly, one has to practice self-discipline and concentrate on oneself. According to K. Płuska (2019), managing oneself in time is a game of choices, knowledge about how to cope given the disposable time.

Time management, according to J. Kardas (2008), is "conscious planning and controlling one's own life so that a chaotic working style can be transformed into planned, systematic execution of tasks aimed at achieving a success."

D. Fontana (1999) notes that the benefits of skilful time management are obvious and the most important of them include:

- increased effectiveness,
- increased productivity,
- more time for oneself (for entertainment, hobby, etc.),
- more job satisfaction (everyone likes working until they are overwhelmed by work), less stress,
- more time to "tune out" after work (after completing all the work, our mind relaxes more easily at night),
- easier planning of long-term tasks (in advance) (without tormenting emotions, a human is more free to think ahead),
- increased creativity (a human is most creative when they can daydream in free time).

Time management refers to the way we organise and plan how much time we will spend on specified activities. Good time management allows you to work smarter, not harder, so that you can do more in less time even if there is not much time and the pressure is high. Failure to manage time decreases effectiveness and increases stress (Web-1).
Time management is a practical aspect of managing oneself. It involves taking decisions about the role we will take on next, time horizons, how we will use the time and what tasks we will engage in (Hutter, 2008).

L.J. Seiwert (1998) defines the concept of time management as a consistent and goal-oriented practical application of tried and tested work techniques so that managing oneself and one's environment is effortless, and the time available is used meaningfully and optimally.

Selected time management methods and techniques

In pursuing one's goals, one should avoid perfection and perfectionism. Allowing for some imperfection eliminates rush, unnecessary stress and demotivation due to failure to complete the task at hand in 100%. There is a variety of methods to improve the effectiveness of time management. They include the following:

- The 60:40 principle: This method is mainly based on the fact that not everything can be planned, and so we should be realistic and only plan 60% of the time available for fulfilling our duties. 40% should be time buffer for unplanned situations and actions. According to this rule, planning 100% of the time for accomplishing a task is pointless, because there are always unpredicted situations and chance events that should be taken into consideration in order to avoid overestimation in task planning (Płuska, 2019, Seiwert 1996).
- Golden hour in time management: According to this rule, we should determine the best moment for starting or finishing the day. We can decide to get up an hour earlier than the other household members. By doing so, we will have "time for us." This additional hour should be spent on activities that are most important to us or on things that we never can find time to do during the day. Similarly, we can choose a time in the evening when everybody at home goes to sleep (Płuska, 2019);
- The 20/80 rule (the Pareto Principle): It is a popular principle developed by Italian economist Vilfredo Federico Damaso Pareto, who noted, while analysing statistical data during his research, that 80% of the country's wealth was owned by 20% of the population. Soon afterwards, it turned out that similar distribution applied to other areas of life as well. Thus, it can be pointed out that only 20% of the time we spend on specific activities produces 80% of the final result. The remaining 80% of the time is translated to only 20% of the result. This

suggests that when trying to get things done we should concentrate on the most important issues, because they will guarantee us a success (Haughey, 2009).

- Parkinson's law: The main assumption of Parkinson's law described by English historian Cyril Northcote Parkinson in 1955 is the following thesis: "Time is wasted in proportion to the overall time available to us." According to this principle, the more time we have to complete a task, the more time it takes us to complete it. This means that the completion of a task will take the exact amount of time we scheduled for it. If a given person has a specified amount of time to execute a task, it will eventually be executed at the last moment (Grzyb, Kryzhanivska, 2019, Parkinson, 1955);
- The Pomodoro Method: The aim of this method is to ensure maximum focus and creative freshness to the user so that they can complete tasks faster and with less psychological fatigue. In its original form, it involves taking short 5-minute breaks after working for 25 minutes. Each 25-minute work period is called "pomodoro" after the Italian word for "tomato." Francesco Cirillo (2013) used a tomato-shaped kitchen timer as his personal timer and that's where the name comes from. Every time you finish "pomodoro", you should mark your progress with "X" and write down how many times you wanted to put off working on the task to skip to another (Web-2).
- Mind mapping: Mind mapping is a method that aims to boost work effectiveness. The technique involves writing down information relying both on image and text, with an emphasis put on the form of representing thoughts. When we use words, symbols, colours, rhythm, three-dimension effects, all the brain's regions are activated, which facilitates creative thinking. Mind maps organise ideas in the form of a circle. The ideas are branches that start from the centre, where the problem or question is placed (Płuska, 2019);
- SMART(ER) Method: This method defines the characteristics of a well-formulated goal. It helps define the effect of a task in a way that will improve the chance of its completion and ensure that it is known what exactly should be done. According to this method, a goal should be:
  a) S (Specific) - a goal should be understandable, clear so that is is known what is aimed at,
  b) M (Measurable) - there should be a way to specify clearly when a goal is achieved. The goal has to be formulated in a way that will make it possible to quantitatively determine the progress made to achieve it,
  c) A (Achievable) – can be accomplished,
  d) R (Realistic) - embedded in reality,
  e) T (Time & Cost oriented) – bound by time and costs,
  f) E (Exciting) - increasing motivation to achieve it,
  g) R (Recorded) – evidence of decisions and implementation, (https://poradnikprzedsiębiorcy.pl/zarzadzanie-czasem);
- A "to-do" list: This method is a classic in time management. It involves deciding on where to write down all the tasks to be completed in the nearest future. A notebook, calendar, smartphone or special block lists can be used for that purpose (Płuska, 2019).
- Eat the frog: It is a method presented by Briana Tracy (2020) in his best-selling book titled "Eat the frog." The author describes 21 methods to increase work productivity and overcome procrastination. The method assumes that the completion of the most difficult task should not be delayed or postponed. A difficult task should be completed within the shortest possible time (Tracy, 2020);
- Time tracker: It is a method that allows us to trace our time and identify the spheres of life we have spent it on. Time tracker makes us more aware of how much time we waste on work-unrelated tasks so that we can eliminate them more quickly and easily. This knowledge allows us to focus on the most important goals (Natalia, 2019, April 2);
- Eisenhower Matrix: It is one of more effective methods for time management, where division of tasks by importance makes it easier to complete a large number of tasks. According to this method, tasks should be divided into the following four groups:
  a) urgent and important – tasks requiring immediate action,
  b) important but not urgent – important tasks that do not require immediate action,
  c) urgent but not important – tasks of little importance that should be completed quickly,

d) not urgent and not important – tasks that can be eliminated (Brett, McKay, 2019).

Mistakes in Time Management and Time Wasters

The most common time management mistakes include:

- doing too many things at once – as we cannot focus consciously on several matters simultaneously. One should always devote 100% of attention to one task and complete it within the time limit, before moving to the next one;
- lack of self-discipline – according to Brian Tracy (2013), the habit of self-discipline guarantees success in professional life. Every successful person has this characteristic (even if it is latent) allowing them to do things regardless of the external circumstances or whether they feel like doing them or not. Lack of self-discipline leads to failure to complete tasks on time and limits personal development;
- no planning – if we are not good at setting goals and do not plan, we will not achieve anything in our professional life. It is recommended to always plan work in advance;
- putting things off – we should follow the DIAO ("Do it at once") principle. The author of this method, Kerry Gleeson (2009), thinks that if there is something we want to do and it will take us not more than 5 minutes, we should do it at once;
- not finishing tasks – we should remember to follow another important principle – GTD (Getting Things Done), i.e. finishing every started thing/task. If we begin to postpone finishing tasks, it will become our habit. As a result, more and more unfinished things will accumulate in our life;
- doing everything on your own – some employees think that unless they do certain things by themselves, no one else will do them well. The best way to save time is by delegating tasks. The principle is simple – if we can do something on our own, we can also teach our co-workers how to do that;
- attention distraction – the main sources of attention distraction are devices such as mobile phones or laptops. In order to fulfil our duties effectively, we need to focus. We should eliminate everything that can interfere with our focus on the task at hand;
- poor space organisation – we should organise our working space, i.e. our desk, computer or other space where we do our work. It is recommended to use binders, document sleeves, boxes and document shelves. It is good to arrange them by theme or alphabetically;
- lack of priorities – we should first do the most important tasks. When planning a day, task priorities should always be set;
- doing unnecessary things – the biggest waste of time is doing things that are completely unnecessary. When working on a specified task, we should always ask ourselves the question: Is the task I am working on important and essential or can it be done at a later time? (Kowalski, http://www.sudeckibiznes.hb.pl/pigulki/5-2.pdf).

Time wasters take up a lot of our precious time and decrease our effectiveness. The most common ones include: lack of motivation, indifferent attitude to work, an attempt to do everything at once, breaks for unplanned phone calls, lack of priorities, lack of discipline, lack of coordination, insufficient task delegation, inability to say "no", work-unrelated chats, putting work off, rush and impatience, staying on Facebook and other social networking sites, computer games, watching TV, mess at home, working place / on the computer / on the telephone, perfectionism, excessive bureaucracy, unexpected guests, chance situations (Web-3).

Research Methodology

In order to analyse the level of knowledge about time management as well as the knowledge and capability of applying time management methods in striving for the best academic performance in a group of working and non-working students, a survey was used. The research tool was a questionnaire. The survey was conducted in person among randomly selected full-time and part-time students. The sample subjected to analysis comprised 132 students, of whom 66 were working students and 66 – non-working students. The questionnaire contained 21 questions, including those related to the

understanding of the "time management" concept, the employment of time management techniques and methods by students, time wasters, self-assessment of time management effectiveness, and how that translated to students' better academic performance. Additionally, the questionnaire contained 5 socio-demographic questions, revealing that 87 females and 45 males participated in the survey. In terms of age, the participants belonged to the following categories: 18-25 – 102 students, 26-30 – 9 students, 31-40 – 8 students, over 40 – 13 students. In terms of the place of residence: 63 students lived in the city, whereas 69 students – in the countryside. The survey was anonymous.

Survey findings and their interpretation

Good time management allows one to do more in less time, reduces stress and leads to accomplishment of a set goal. Based on the analysis of the first two questions of the questionnaire, 120 out of 132 surveyed students declared knowledge of the concept of "time management", which accounts for over 90% of the students of the sample under analysis. Only 10 working students and 2 non-working students admitted not knowing this concept. Nevertheless, 78 students associated the concept of "time management" only with planning and systematic fulfilment of planned tasks aimed at accomplishment of a specified goal, whereas 49 students – with the process of planning and controlling the amount of time devoted to specified actions. Only 4 students indicated that both these issues are significant for proper time management, with one student unable to define the term and indicating "I don't know."

The situation looked different in the case of the knowledge of time management techniques and methods. Only 10 students reported being familiar with such techniques and specified which ones. This group included 5 working students and 5 non-working students. The techniques most often indicated were: the Pareto Method and the Eisenhower Matrix, followed by Parkinsow's Law, Pomodoro method and a "to-do" list.

A total of 130 out of 132 surveyed students reported that they did not employ time management techniques in their student lives. This means that those who indicated knowledge of certain time management techniques do not use them in practice, as only 2 out of 10 students answered positively to the question about the use of such methods, one from each of the groups analysed. Responding to the question "As part of time management, do you set yourself (as a student) goals to achieve?", only 51 students answered positively, mostly indicating the following goals: finding time for oneself, having fun, rest, relax, time for work, meeting new people. This shows that these students are not familiar with the SMART method, which indicates significant characteristics of a well-formulated goal. Only 13 students from that group indicated the following goals: completing an academic term, passing an exam, completing studies, finding a job after graduation or acquiring a language certificate. However, the survey showed that some students used time management techniques and methods quite unconsciously.

With respect to the Pareto principle, the following question was asked: "Do you set tasks to complete as part of your goals?" Of the students who indicated not knowing this principle, as many as 67 reported that they only focused on tasks that could bring specific benefits (including 34 working students and 33 non-working students), which is in line with Pareto principle. A similar number of students, i.e. 28, set themselves tasks to complete, but did not think about their significance, whereas 27 students did not set themselves tasks to complete at all. In the case of the Eisenhower Matrix, it turned out that as many as 103 students from the group that admitted to not knowing time management methods divide the tasks to be completed into urgent, not urgent, important and not important (including 52 working students and 51 non-working students). As far as the Pomodoro Method was concerned, responding to the question "When working on specified tasks for a long period of time, do you take short 5-minute breaks?", 27 students indicated "yes", including 13 working students and 14 non-working students. The biggest number, i.e. 45 students, responded that short breaks improved their concentration and allowed them to look at the problem from a broader perspective. On the other hand, 16 students claimed that they did not tend to take breaks, because it impaired their concentration, and 34 students wanted to finish the task as quickly as possible. However, quickly does not mean well. With respect to the Parkinson Method, students were asked the following question: "When planning to complete a specified task, do you allow for a big time buffer?" Of 122 surveyed students who reported not knowing this method, 51 indicated that they liked having a large margin of time for completing a task, whereas

71 reported trying to fulfil tasks efficiently without unnecessary time margins. Such people accounted for 65.6% among working students, and 50.8% among non-working ones. Another question, this time related to the Time Tracker Method, was: "Have you ever checked what happens to your time – where did you lose it and what spheres did you spend it on?" Over 70.5% of those surveyed answered "yes", with the number of non-working students 9.8% higher. As far as the method of a "to-do" list was concerned, when asked the question "Do you draw up a day schedule to match your tasks to the energy level you can expend?", only 18.0% of those surveyed confirmed writing everything down in a paper or electronic calendar (10 working students and 12 non-working students). This shows that most of the surveyed students were not familiar with this method, although it is among classics in time management. As much as 50% claimed that they had a schedule in their heads, thus risking forgetting about certain things, whereas 32% of students reported not writing down the things to do in their day schedule.

As far as the question "Are you an organised person or do you postpone everything until later?" is concerned, the survey showed that most, i.e. 61.4% of those surveyed, regard themselves as organised people, while the rest postpone everything until later and there is a constant chaos in their lives.

In terms of practical tips on time management, the students were aware of time wasters in their lives that stole their time. Among external time wasters, working and non-working students most often indicated the Internet and social networking sites. Third place was occupied by TV among working students and by commuting to the university among non-working students. As far as internal time wasters are concerned, both working and non-working students mainly indicated: lack of energy, postponing things until later and laziness. The biggest incentives for resisting time wasters were getting a passing grade and passing an exam. Desire to acquire knowledge and new skills came only third. As many as 30 students from all of those surveyed were most motivated to resist time wasters by the fear of failure and shame of not passing all of the exams in a session. This data is presented in Figure 1.

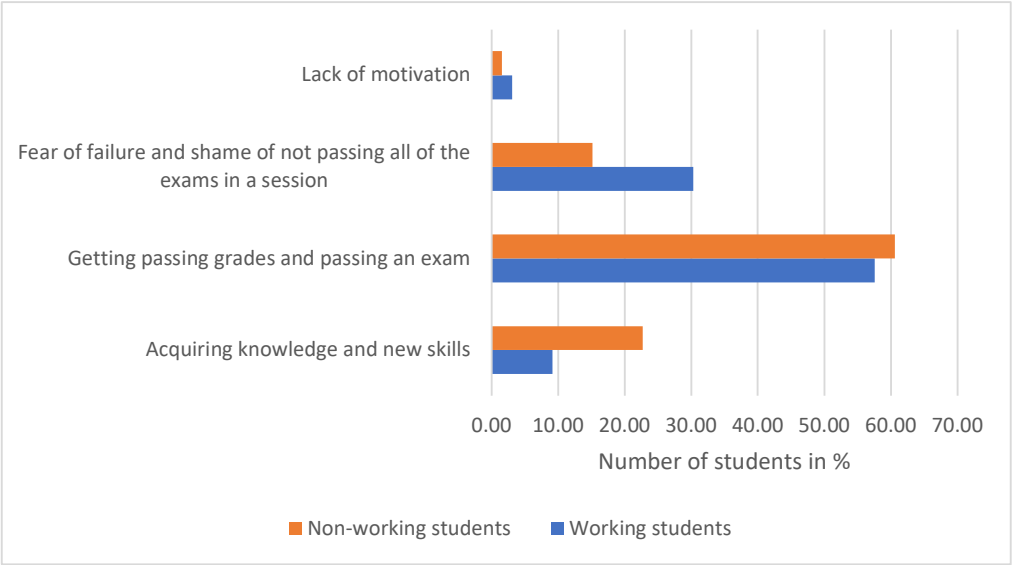

Fig. 1: Distribution of the incentives for resisting time wasters among working and non-working students, expressed in percentage

In terms of planning the process of defining goal implementation programs, the survey asked students to arrange questions that are useful in the planning process from the most important to the least important one. As the first question, the biggest number of students indicated "What should be done?" followed by "When should it be done?", "Where should it be done?", "How should it be done?" and finally "What resources are needed to complete the task?" Figure 2 shows the distribution of the responses in both the groups of students.

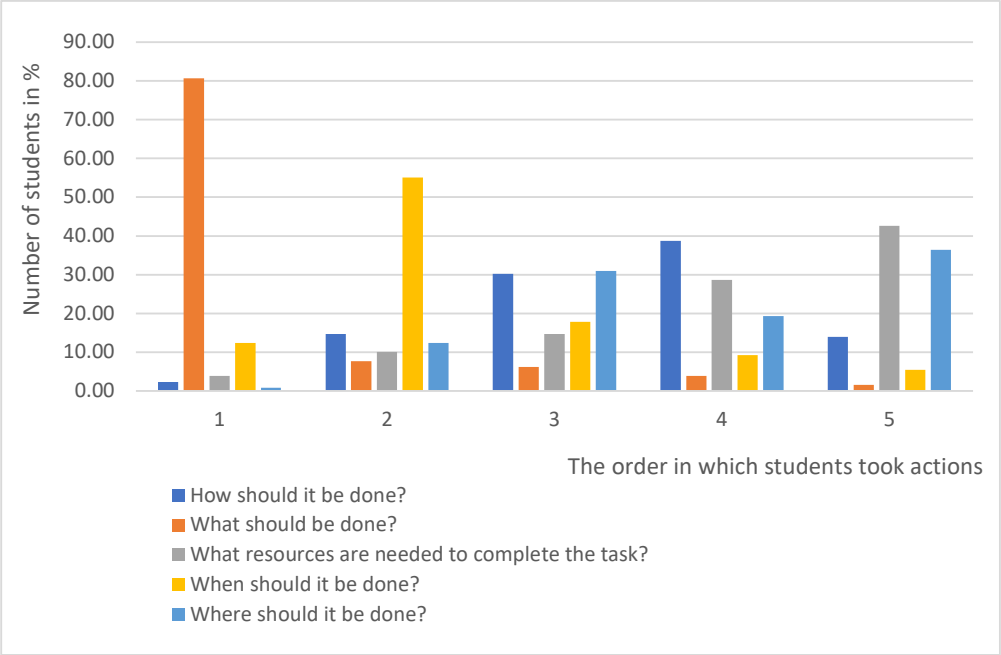

Fig. 2: Percentage distribution of the order of tasks taken by students in order to achieve a set goal

To assess the effectiveness of time management among the students, the following question was asked: "How much time do you spend daily on learning apart from university classes?" The survey showed that this time was limited, as only 5.3% of those surveyed devoted to learning more than 2 hours a day. Most of the surveyed students, i.e. 43.9%, spent less than an hour a day on learning. When preparing for an exam or getting a passing grade, those surveyed tended to start learning towards the end of a term (53.8%) or even left studying until the last moment (28%). Only 14.4% of the students studied systematically. The situation was similar in both the groups under analysis. Of those surveyed, only 5.3% completed a fast reading, effective learning and remembering course, and only 3 people in the group of working students perceived the need to take such a course. Interestingly, most students from the group under analysis, i.e. 72.7%, got a passing grades and passed exams at the first sitting (46 working students and 50 non-working students). Only 27.2% of the students declared completing a term sometimes at the first attempt while other times at the second one.

As part of self-assessment, students were asked the following question: "How do you assess the effectiveness of your "time management"?". Analysis of the data showed that only 7 out of 132 surveyed students assessed their effectiveness as very good (4 working students and 3 non-working students), whereas 3 students as terrible (2 working students and 1 non-working student). Most of the students assessed the effectiveness of their time management as good or medium. This data is presented in Figure 3.

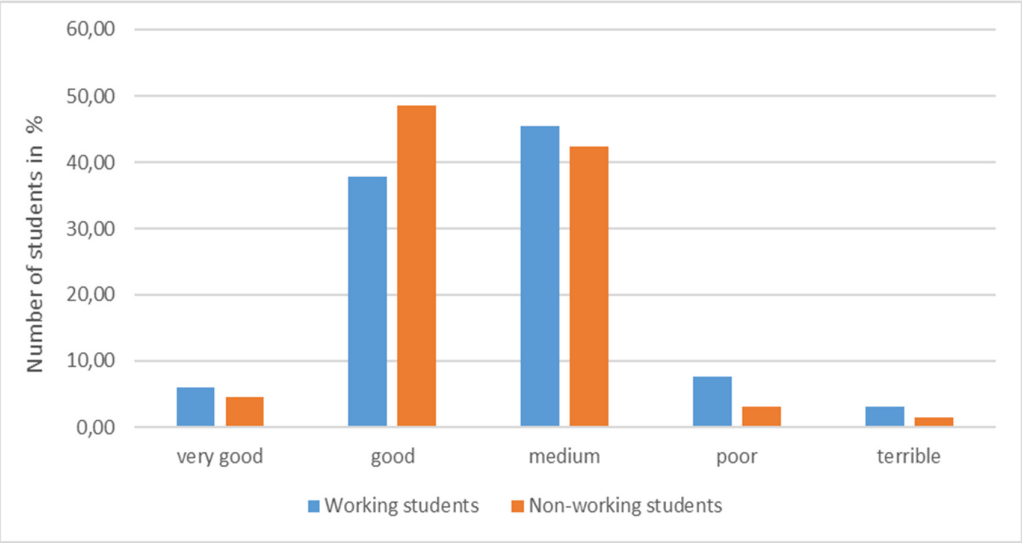

Fig. 3: Self-assessment of time management effectiveness among working and non-working students, expressed in percentage

Nonetheless, faced with the question: "Do you see a need to improve the effectiveness of your time management?", as many as 92 (69.7%) students answered "no" (44 working students and 48 non-working students). Only 40 students, i.e. 30.3% of those surveyed, reported seeing such a need, indicating the necessity of eliminating and exercising greater control over time wasters, both those external and internal.

Summary – Survey Results

The survey may not be fully representative, but it indicates certain trends in the awareness and knowledge of the subject of time management in a group of students. The survey results confirmed that students did not have knowledge about time management and were not familiar with methods and techniques for better time management, relying more on intuition. Only 3.8% of those surveyed were able to define this term correctly, and 7.6% were able to name a time management method or technique known to them. Most of the surveyed students employ these methods unconsciously, mainly: the Pareto Principle, the Pomodoro Method, the Eisenhower Matrix and the Time Tracker method. As the survey showed, in striving to achieve the goal of completing a term, completing studies or finding a job, only a small number of students worked systematically with good time organisation. Most of them postponed everything until the last moment. Nonetheless, the students assessed the effectiveness of their time management as good or medium, which can be explained by the fact that in most cases they got passing grades or passed exams at the first attempt.

Summing up, based on the survey, there are no significant differences between working and non-working students in the level of knowledge about time management and effective application of time management methods to accomplish a specified goal.

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The Importance of Social Farming in the Socio-Economic Development of Romania and of the EU States

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Abstract

Social farming embodies a strong asset in view of the rural development nowadays. Hence, traditions are preserved, the cultural heritage passed down by our ancestors as legacy is revered, as well as the readiness for innovation and the aspect of adjusting to the good practices of the neighbouring Europeans.Putting farming into practice results in merging blissfully plant cultivation, raising animals with social activites destined to socially deprived persons, disabled individuals, or with psychological or emotional disorders. Social farming metamorphoses the rural area into a site favourable for the people with special needs and could highly contribute to implementing European policies as regards health, social protection and education. The paper presents the most important features of social farming at international and European levels, and analyses its current state at national, regional and local levels based on interviews with representatives of authorised protected entities, cooperatives, family farms, houses of mutual aid, NGOs (associations and foundations), and SMMs. Social farming needs recognition at national level, establishment of a social farming regulatory framework, building up of social farming networks, creation of a social farming database, inclusion in education programmes, in research programmes and in the sustainable development strategy, as well as strengthening of the role of civil society.

Keywords: Social Farming, Rural Development, Regional Development, Social Investment, Sustainability.

Introduction

This article aims at demonstrating that social farming, through its activity, has the power to support sustainably the regional development and mitigation of disparities much accentuated in-between the rural and urban zones. Since the industries and services replaced agrarian activities becoming an engine of the XXth century economy, the rural development has stemmed from the urban systems. The main pattern exhibits the areas where the agrarian activity is prevalent and records a minimum economic growth, whilst in the urban areas it modernizes, taking shape a dual economy (Lipton, 1977). Hence, the regional development is disproportionate, due to an imbalance in power distribution, not only of the available resources throughout the said territory (Walerstein, 1977).

Farming has earned a significant social character, especially considering the fact that the contemporary rural zones face major drawbacks such as a plunge in the degree of poverty, limitation of possibilities of expanding and implementing new investments, depopulation, redundancy, lack of a sustainable development of the intercommunity space. Social farming, as (Andrei and others, 2016; Antohi, 2011) state, is at times associated with the hike in the underdevelopment of rural communities and of the hindrance to their development perspectives than with the pluriactivity and diversification of the role and place of farming within the rural space.

In this respect, social farming is an approach merging innovation and the traditional activities within the farm or agricultural exploitation. This engulfs all those activities which entail agricultural resources to promote or facilitate social services in the rural environment, such as: recovery, healthcare and treatment, creating jobs for the local rural community, ensuring lifelong education, or other activities which support social inclusion (Di Iacovo and O'Connor, 2009).

The type of social farming developed within the community zone represents a genuine form of farming accounting for the fact that it combines the support of the citizens in the rural areas with agricultural practices and social protection. The emergence and development of social farming may be viewed as answer to the growth of insecurity degree regarding rural communities as well as a drop in the buying power and of the paradox of development in the rural environment. The fairly more difficult accessing of financing sources and markets, population migration from the rural areas, a lowering of birth rate and a rise in the price of dietary products has led to finding novel development approaches.

Portraying a pivotal support for the development of the rural communities, social farming purveys a relatively high degree of sustainability and multi- functionality typical of the rural environment. Within social farming it is developed a typical mechanism of intervention and support of certain activities typical of rural communities by means of which it is attempted a dwindling of poverty, a depletion of social vulnerabilities and of the existing economic discrepancies both in-between communities and mainly among the citizens of rural areas.

Starting from these realities, in specialty literature, throughout time there is a main threefold approach considering social farming, as follows (The European Social and Economic Committee, 2012; MADR 2014):

- The Institutional Approach, focused mainly upon the dominant of public healthcare institutions, being typical of a series of states such as Germany, France, Ireland, Slovenia. Regarding these states, it is likewise conspicuous a significant subsidy in undergoing the social objectives within rural communities;
- the second approach bears a deep private, particular feature, normally related to the emergence, diversification and functionality of farms/ranches with a therapeutic aim, pervading in such states as the Netherlands, and Belgium;
- a third approach features a mixed character, engulfing traits of both above mentioned categories, being based upon social cooperatives and private farms, specific to Italy.

Despite playing a momentous role in the local communities' development and in the diversification of intervention tools within these ones, social farming has not succeeded in implementing a generic framework of directives or of criteria which should impose the enforcement of certain specific policies in the community environment. Without guidelines in this regard, it facilitates even more the identification, applying, subsidizing and implementing of the notion of social farming. Even though its applicability enjoys a wider horizon, social farming may be developed and enforced successfully in most fields of activity found in the rural areas, especially for:

- determining the agricultural activities in the rural environment and redirecting the workforce towards these activities;
- an enhanced attention in view of the personal assistance services in the rural zones by increasing and diversifying them;
- appealing to the disfavoured categories in the rural environment, thus enabling social inclusion;
- an approach mainly of the increase of the literacy degree within rural areas and of a further digital literacy.

Agriculture, an indispensable activity in Romania and in some UE member states

In the European context, the adopted agricultural pattern experiences a permanent process of adjustment and valuing of exchanges and transformations engendered within the community economic space, contributing efficiently to supporting the policies of sustainable rural development and to the growth of the rural area inhabitants' standard of livelihood. This standpoint considered, farming embodies for Romania an economic link with deep meanings and a major impact both regarding the compliance with the exigency criteria, typical of a market economy, and mainly in carving the development of rural communities, dependent on the evolvement of this sector. Via the analysis of farming's role and place at the level of the European Union, this one, though it still owns a dwindling percentage in terms of defining the gross value added (GVA), represents an essential branch in the European economy. In fig.1 the GVA structure is devised as regards a series of UE member states, in the year 2018.

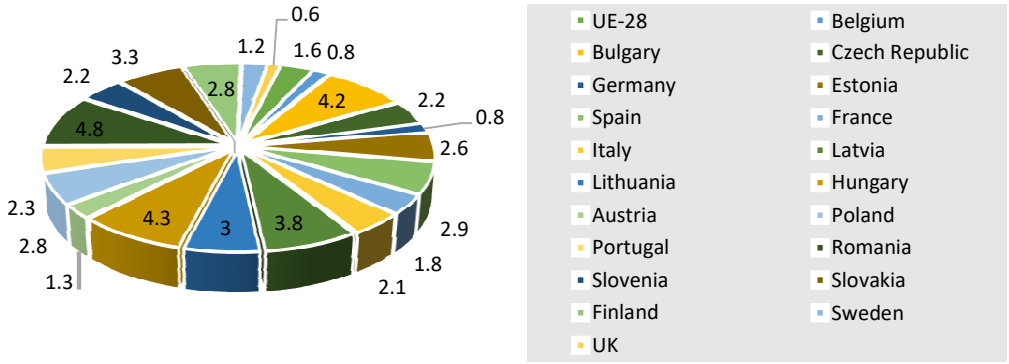

Fig.1: The sectoral structure of GVA in some UE member states, 2018 Source: Eurostat (data online code: nama_10_a10)

It is observed in fig 1 that, both at the UE level and concerning the states analysed individually, the primary sector has a reduced weight compared to the secondary and tertiary sectors in shaping the GVA. Therefore, in 2018 at European level, farming contributes to framing the GVA by a sheer 1.6%, compared to 19.5% of the secondary sector and 19.1% of the tertiary sector. In the member states, such as

Bulgary (4.2%), Romania (4.8%) and respectively Slovakia (3.3%), the primary sector records fairly significant values. Instead in the Baltic states, Latvia (3.8%), Lithuania (3.0%) and Estonia (2.6%), values reach around 3 percents. In the developed states of the European Union, such as Great Britain (0.6%) and Germany (0.8%), the weight in creating the GVA is downsized. Even so, farming is still deemed as an essential economic branch within the community environment through the complementary influences it engenders. As (Popescu and Andrei, 2011; Otiman, 2011; Zahiu and others, 2010) state, farming provides a shield of insulation for the population in the rural environment contributing to the hindrance of redundancy consequences ensuring a good part of the consumption of rural households. Hence, agriculture provides an added value to the fulfillment of an array of prominent social objectives with a major effect upon the communities in the rural areas.

As important a feature in measuring the prominence and role of the primary sector for the economy of the European Union is represented by the configuration of the workforce employment opportunities on distinct activities of the rural environment. This thing represents a setback with determined consequences in ensuring the safety of the inhabitants' life standard. Fig.2 displays the activites typical of the rural zone in some UE member states in 2017.

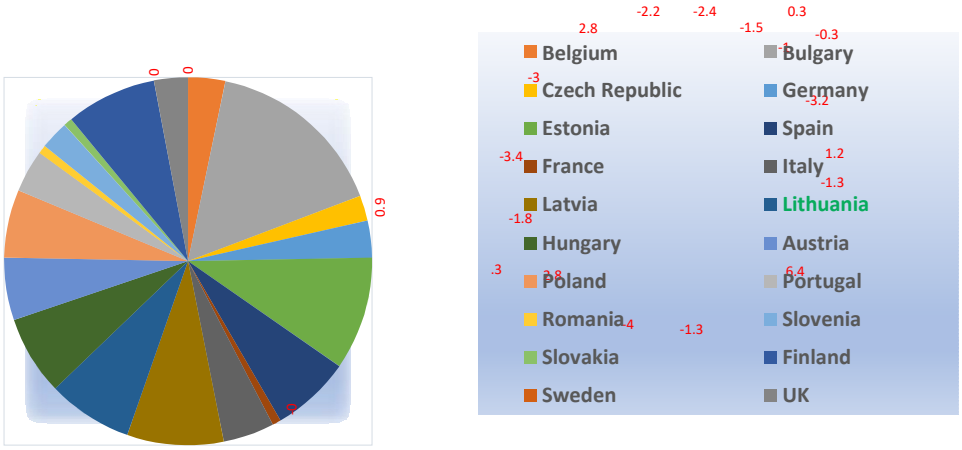

Fig.2: The structure of employment opportunities within the fields, on activities typical of the rural environment, in a series of UE member states, 2017

Source: Eurostat (online data code nama_10_a64_e)

In fig.2 it is conspicuous that farming, as the branch belonging to the rural space displays a stability of the migration of the human resource at European level, whereas the tourism and dietary industry record growths as regards the employment opportunities. Likewise, in some specialty studies (Albu and others, 2012; Toma and others, 2009; Ciutacu and Chivu, 2007), the impact of the new technologies, of digitalization and of optimization of production structures is present in the depletion of the degree of job occupation. The rate of job occupation in farming at UE level, in 2017, is of 0.0%, whilst in the dietary industry is of 1.7%, in tourism of 3.3% and of 2.9% in forestry activities. Tourism tends, thus, to become the suppliant economic

branch of farming in the rural area. The diversity of activities within the rural environment can contribute to supplement the earnings for a significant part of the rural population.

Consequently, social farming can be a sustainable "brainwave" for problem solving in terms of the degree of employment of the workforce in the rural area, having in view the tendency of the human resource migration from the actual agricultural activities of the tertiary sector, tourism, respectively. This reorientation is able to generate even much higher earnings than the agricultural ones and can influence even the direction of finance resources in aid of supporting the investments towards the rural zone. As (Andrei and Alecu, 2016) stated, the rural itself embodies a starting point in framing the governmental social and economic policies towards the rural space, and the permanent comparison with the urban mitigates its significance, transforming the rural in an insipid space, where the principal determinant activity is farming (Andrei and Alecu, 2016).

Spreading the concept of social farming throughout Europe and Romania

In Europe, social farming has spread heterogenically in rapport with its various convictions and economic patterns found in distinct countries.

At European level, there took shape various social local networks so as to enable the global development of the regions based on the experiences in the field of social farming which have displayed an upward tendency.

Holland was a European country where, since the 90s', the notion of social farming has developed and spread through a growth in the number of farms, which also provided therapeutic services and rehabilitation. In short time, Holland's healthcare system has adopted social farming as a purveyor of healthcare services and the phenomenon has already received full support.

With the help of PDR 2007-2013 – The Plan of Rural Development- in Belgium, this contributed to the farm reshuffle, correct acknowledgement and remuneration of farmers. In Norway, social farming has developed within the private medium-size businesses and often faces inclement weather conditions. From this standpoint, most Norwegian farmers were forced to find alternative income sources, including the aspect of supplying social services.

In Germany, social farming is found especially within private and public organizations, foundations and public services, which address to integrating the physically and psychically disabled persons, or those affected by the civil society's social setbacks, where the social aspect is a priority for production.

The French view social farming as an activity endowed with a high social- ethical value with side economical implications. The prime aim of social farming engulfs integrating vulnerable persons in the working field in the fruit and vegetable farms lying in suburban areas. These proceedings have created bridges among companies, characterized by diversity, despite their common inspirational paragon. They are portrayed according to the real territory and the local needs (Shortall, 2004). In Ireland, social farming envisions some restrictive forms. Therapeutic treatment for various persons with special needs, institutionalized or not, includes an array of activities involving animals and growing fruits and vegetables. Great Britain enjoys the concept of "therapeutic garden", lying within the national healthcare system, as well as in the local communities, where the therapy through horticulture is

successfully practiced, whilst in the private zone it is still in incipient phase. In Italy, social farming exhibits a fairly special feature, on the one hand from the legal viewpoint, where there are social structures and organisms which practise farming in collaboration with private societies involved in social activities, and, on the other hand, through the operational aspect, notable being the process of organization and professional adjustment. Moreover, farmers have assumed their commitment, beside the organic approach, to highlight the cultural and ideological thriving of enterprises. In Slovenia, social farming is practised by the structures in the public system, whereas in the private system they do not enjoy the same success, such initiatives being scarce and supported by volunteers without the support of specific policies on behalf of institutions. (Smith and others, 2005).

The situation seems to improve almost everywhere, such as in Italy, where there are more and more organisms willing to join the paragon based on the partnership with the civil society. In Germany, apart from the multitude of public institutions, the difficult access to funds for the private ones determines these ones to find novel approaches on addressing to the issue. In France, the initiatives of the volunteer associations have managed to win even more land for the "therapeutic gardens", by combining the ethical values with the organic productions, involving via a short chain the inhabitants as "the actors consumers".

Considering the above mentioned context, Fig.2 envisions an analysis of the reasons which characterize the social farming in various countries, based on the findings of the SoFar COST Action 866 project, as well as other projects from the international bibliography (Di Iacovo and O´Connor, 2009; Hassink, 2006; Matthews, 2008), with the aim of deriving a conclusion upon the existing various differences. The assessment comprises a scale from 1 to 5, where 1 has a low value and 5 represents the maximum.

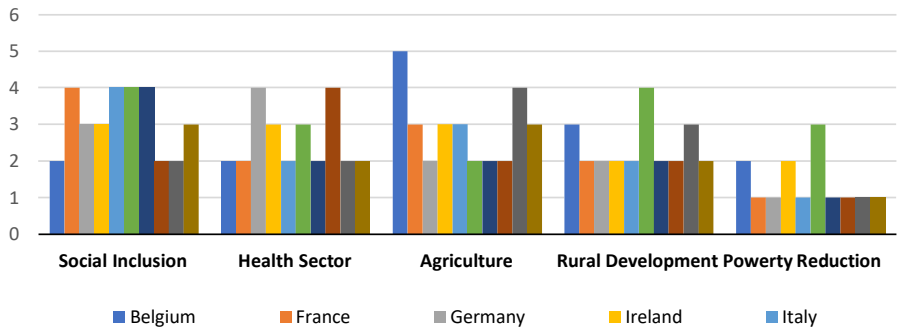

Figure 2: Valuation of the main motivations that characterize social farming in Europe
Source: direct survey, SoFar, COST Action 866 Project

The exhibited data conclude that social farming supports social integration and less the rural development and the fight against poverty. Therefore, social farming undergoes a conceptualization refining process in distinct countries, that of pioneer, using social farming for health care, and the developed ones, which are strictly compliant with the community policies.

Materials and Methods

The present article envisions a simultaneous approach by means of a comparative study of social farming in Europe and Romania (FAO, 2015). based both on literature and official data and papers.

Results and Discussion

For a long time and still today in the European debate on rural development the social issues have had a minor consideration. In the ordinary approach the social issues can be faced once the economic development has taken place and the state has redistributed resources also to less favoured and populated territories, like the rural ones. Perhaps in rural areas the provision of social-health services is normally made difficult from the low density of the inhabitants, the increasing concentration of elderly people, the need of generational change as well as the large variety of needs deriving from emerging members of rural communities as a consequence of new flows of migrants (from poor but also from wealthy countries). However, the fact that social and health issues are not integrated in the EU approach to rural development does not help to pursue in this direction.

However, it seems quite evident that the traditional approach has to be reconsidered in light of recent global economic and environmental issues and innovative solutions should be defined. Again that in rural areas social development is strongly connected with the immaterial values of the local offer (product, identity, symbolic values) and that social and economic development cannot proceed separately. This also to avoid the rise of new trends of exclusion and social unsustainability as well as new phenomena of exploitation linked to an unfair use of migrant work. To avoid such threats a larger reflexion on social sustainability in rural areas should be developed also in the perspective to define smart, inclusive and sustainable pathways of change.

In fact, social farming connects the co-production of economic, social, and frequently also of environmental values (most of the social farming initiatives are organically driven) in a different perspective of prosperity based on the regeneration of vibrant and proactive communities. In such a trend the production of health takes directly origin from the territory and community in a perspective where human wellbeing is part of a process able to establish new interdependencies among people, nature, and knowledge.

Back in 2014, the National Rural Development Program (NRDP) published a booklet on the adaptation and implementation of social farming (MADR, 2014) in which it is seen as a way to reduce disparities between regions through the consolidation of economic, social and territorial cohesion. It is seen as playing an important role in rural development programmes by supporting the setting up of rural enterprises involved in co-therapy, social development and inclusion on the labour market, and services for disadvantaged people using agricultural resources. Thus, through cooperation between different administrative and political entities (farming, education, employment, health, justice, social affairs), agricultural services turn into social services: in addition to basic agricultural activities, social farms invite people from disadvantaged groups to participate in agricultural activities, and social farmers are rewarded.

According to Mihalache (Mihalache, N. M., 2015), in social economy the conventional operations include farming crop or animal production and agro-touristic activities. These types of actions are adapted basically in regions where the entrepreneurship benefits of a greater acceptance and subsequently the social economy. Particular productions based on bio-production and processing are encouraged including various forms of short food chains. Aside from the farming and food processing traditional rural crafts are included incorporating manufactures and handmade local products.

As far as social farming is concerned, in Romania they:

- adopted two important laws and a national strategy,
- developed guides to setting up "social enterprises for beneficiaries of guaranteed minimum income", for persons with disabilities, for Roma people, and for "young people over 18 who leave the institutionalised child protection system",
- conducted studies on social economy developing occupations, including their growth potential in farming, with gender mainstreaming on the labour market,
- established 247 LAGs in 17 counties, and they published a brochure on Social Farming, but that was a unique occurrence of the term in both official and non- official approaches.

However, the current state of Social Farming in Romania should be assessed from several points of view:

Proportion

Romania has experienced different forms of social farming beginning with the 90s' by integrating these practices as a novel experience with increased sustainability. Though they do not use such phrases as care farming, farming for health, green care, green therapies, or social farming, the Romanians have unknowingly practiced social farming under the form of different operations or practices in the care, rehabilitation, social reintegration, and training of the disadvantaged people or of people with particular needs, aiming at enabling them to boost self-esteem and participation in social life, to contribute to their well-being, to facilitate learning, to improve health and social inclusion, to re-establish contact with the natural environment and productive activity.

Stakeholders

Ideally, social economy relies on the following entities (Medeleanu, C., 2013), but only black-faced ones are operating in Romania (Nicolăescu, V si altii, 2011): Authorised Protected Entities; Cooperatives; Family farms; Houses of mutual economic aid; Non-Governmental Organisations (associations and foundations); Small and Medium Enterprises.

In January 2019, in Romania, there were 304 Authorised Protected Entities of which none farming-related, 1644 Houses of Mutual Economic Aid, of which 6 farming related, and 114,363 Non-Governmental Organisations (associations and foundations) (RN - ONG, 2019):of the 92,403 NGOs labelled associations, only 3,860 are related to people with disabilities and to disadvantaged people, but none of them social-farming related.

The 12 associations contacted deal with problem-solving linked to the community issues where Roma people minorities live; building healthy and accessible buildings and new community centres; supporting novel and innovative approaches in Romania's rural area, such as the first travel social business entirely based on community"; developing senses in the sensory garden; introducing and emboldening

the rural communities rich in nature and traditions heritage suitable for tourism to introduce forms of responsible tourism with the assistance and the involvement of the community; exchanging knowledge in organic farming; facilitating collaboration between volunteers and host farmers; finding active citizens and developing community-based organizations; Integrating children in loving families; organising annual horse-riding contests for children; organising annual international conferences on complementary therapies in children with disabilities; repairing and rehabilitating buildings; revitalising horse-riding as a sport for children and teenagers; rising awareness on the society, regarding the difficulties of a person with disabilities has to face; training horses; treating children through horse-assisted therapy, people with special needs through horse-assisted therapy, children through horse and dog therapy for neuro-motor disorders (ataxia, dystonia, hemiparesis, infantile cerebral palsy, muscular dystrophy, muscular hypotony, paraparesis, post-traumatic sequelae, Prader-Willi syndrome, pyramidal syndrome, spastic tetra-paresis), neurological disorders (cranio-cerebral trauma, Down syndrome, emotional disturbance, epilepsy, growth disorder, multiple sclerosis, muscular dystrophy, paralysis, Spina Bifida, spinal cord diseases, visual disturbance).

The 6 foundations contacted deal with: building Community-Based Organisations capacity; conducting instructive-educational programmes; improving housing and living conditions; organising summer camps for children in foster care or at risk; preventing family abandonment and school dropout; promoting children rights to prevent abuse, neglect, and exploitation, juvenile justice, migrants‟ integration and social inclusion, children's rights to prevent abuse, neglect, and exploitation; providing access to health services, community prevention services, education for children and for youth, educational support for children with disabilities, employment services for young people from vulnerable groups, entrepreneurship and financial education for disadvantaged people, family houses and children access to hosting, care, breeding, education, emotional support, counselling, independent life skills, preparation for family, social, and professional re-integration or integration, family placement, lobby and advocacy for the NGO sector, protected employment for people with disabilities, services protecting and promoting the rights of persons presenting different incapacities, special services for children and their parents, specialised social services for people from vulnerable groups, vocational counselling and pre- professional training; supporting children in trafficking and migration situations, children with severe, medium, and light mental handicap, inclusion of Roma and other minorities communities, young people aged 18+ to integrate socially and professionally; taking care of foundlings; training foster parents and teachers.

The 9 Local Action Groups contacted deal with: creating and promoting local brands and association in the agri-food sector, associative forms, networks and clusters, operational groups to diversify rural activities, support centres for rural and small urban population: starting associative organisations; developing and modernising villages, associative forms for the diversification of rural activities, non- agricultural activities, rural and micro-urban localities through investments in small scale infrastructure, basic services for population and investments associated to cultural and natural patrimony, social infrastructure, the micro-region through investments in infrastructure and equipment, the social and health infrastructure, villages; encouraging cooperation through association aiming at finding innovative

solutions and at facilitating market access; establishing and developing farms and non- agricultural activities; investing in broadband infrastructure, in creating and developing activities, in infrastructure and equipment, in renewable energy and energy saving, in social and education infrastructure for marginalized groups, in social and health infrastructure; modernising agriculture and agri-tourism businesses, agricultural and fruit holdings; preventing depopulation through job creation in non-agricultural domains; promoting associativity, innovation and transfer of knowledge, innovative solutions for competitive farming / food industry, multiethnicity, social inclusion, sports, cultural and local activities and supporting the administrative capability of civil society, innovative solutions for competitive farming, services and renewing the LAG area; renewing farmer generations through support for young farmers; restoring, consolidating and promoting ecosystems and biodiversity; setting up and developing businesses, non-agricultural activities; supporting associative structures through investments in real estate, innovative solutions for competitive farming / food industry, small and medium farms, the establishment of non- agricultural activities, the integration and promotion of quality schemes for local products, young farmers; transferring knowledge, training and lifelong learning.

The case studies carried out on the 25 Romanian stakeholders, indicate that, of the three main approaches in social farming at EU level, "institutional approach with the prevalence of health/public institutions, private approach based on therapeutic farms, and mixed approach based on social cooperatives and private farms", only the second and third seem to somehow fit social farming in Romania: the private approach rarely concerns therapeutic farms and the mixed approach concerns LAGs and private farms. The Romanian social farming is apparently more oriented towards the public system of health and social care than towards the rural economy and farming.

Financing of social farming in Romania relies on assistance originating from NGOs (associations, foundations, social enterprises), on un-intermediated presence on markets (where they can practice direct selling), on public projects, on rural development policies aiming at supporting social farming launch and development, and on social cooperatives.

Social farming in Romania contain several elements: relays on NGOs involvement and support for private farming as a supplementary income without altering the initial productive activities oriented to the market and happening on agricultural household sites." Social farming in Romania consists in activities that use both plant and animal agricultural aiming at generating social services (lifelong learning, rehabilitation, sheltered jobs, therapy) in semi-rural and rural areas.

The main Romanian institutions dealing with aspects of social farming are: the Ministry of Farming and Rural Development, the Ministry of Justice, the Ministry of Labour and Social Justice, and the Ministry of Regional Development and Public Administration.

As far as social farming networks are concerned, the stakeholders are linked individually since there is no national database and no official network for Social Farming in the country.

There is both state and public support for Social Farming activities in general.

Conclusions and Proposals

Although the EU proposals for next structural fund planning have opened new perspectives, and the fund implementation policy includes among its explicit targets, the fight to poverty, social integration and diversification of farming activities, which can be combined with Social Farming, it seems necessary to highlight this latter's role both in future 2014-2020 planning and the partnership contract, in order to offer the sector a stronger support.

For this, EU and member states together with officials and people in charge of EU Fund management, should strengthen their collaboration to remove barriers that prevent territorial actors to access to the structural funds. With the same purpose, specific steps can be identified to promote the change (Di Iacovo, F and others,2014) like:

a) Scouting of local pioneering initiatives and potential forerunners;

b) Pro-active planning of paths able to support innovation started by forerunners and to facilitate new solutions;

c) Understanding and coding of features, meanings, implications of the innovative solutions, and organizational changes required for key stakeholders;

d) Selecting and mapping actors able progressively to share initiatives and knowledge;

e) Supporting dialogue to facilitate the actors involved in the processes of change, in order to tackle: rational choices, collective sense making, power conflicts and coalitions, the acceptance of new cultural symbols and repertories. Consequently, to enable the dialogue among stakeholders in order to reinforce broader alliances and to avoid the fragmentation of arenas and meanings;

f) Opening, mediating, extending, in a progressive and gradual way, the arenas where debate may run and enlarge from forerunners toward actors of the existing regime, to share key principles of innovative initiatives and to integrate them in the ordinary governance arenas, at different institutional levels.

According with such steps, policies may be re-oriented to support social innovation initiatives in a broader sense, also in rural areas. The debate on European innovation partnerships may be useful from this point of view as well as the opportunity to integrate different policy tools like FESER, ESF and ERSF.

The analysis shows that:

- Social farms are almost inexistent, except for 2-3 cases.
- The public has never heard about Social Farming, however, numerous organisations practice some kind of social farming.
- The main institutions and organizations dealing with aspects of Social Farming are Authorised Protected Entities, Cooperatives, Family Farms, Houses of mutual economic aid, Non-Governmental Organisations (associations, foundations, local action groups).
- The stakeholders are linked individually, since there is no nationaldatabase.
- There is no official network for Social Farming.
- There is some state and public support for Social Farming activities, according to legislation.

Therefore, social farming in Romania needs:

- Recognition at national level;

- Establishment of a social farming regulatory framework;
- Building up of social farming networks;
- Creation of a social farming database;
- Inclusion in education programmes;
- Inclusion in research programmes;
- Inclusion in the sustainable development strategy;
- Strengthening of the role of civil society.

What is becoming clear is that the debate on social services in rural areas opens issues that cannot be addressed only by State intervention. It asks for innovative solutions able to redesign relationships inside the society and to redefine the responsibility of public and private actors and their role the local society but also the possibility to create, at the same time, economic and social values. Social farming initiatives move on the path of EU2020 strategy. It is:

- Smart: In the way they mobilize local resources, promoting a retro- innovative use of farming by the way of "grassroots initiatives" driven by farmers, third sector, public bodies. Social farming initiatives are able to reorganize value creation and distribution by promoting subsidiarity, co-production, civic economy;
- Sustainable: By using plants and animals, rural spaces and time organisation, in order to promote therapy, rehabilitation, social inclusion, education and social services in rural and peri-urban areas, and promoting local farming, local markets, reputation;
- Inclusive: Stimulating active social inclusion, innovative services, vibrant communities towards small groups of people which can live and work together with family farmers and social practitioners on farm. Addressing diverse needs for less empowered people (mental disability, physical disability, psychiatric, drugs & alcohol recovery, children, young people, prisoners (ex), long run non occupied, terminal patients, burn out, elderly people).

In order to achieve such results social farming reorganises in a completely different deepens values in the everyday way of operating of the actors involved. Along social innovation processes the ethic of profit and the role of the State are put under debate creating a new sense of possibility. In this perspective once again rural areas seem to offer advanced solutions thanks to the pro-active role of forerunners. It's up to the public bodies to accompany and to facilitate pathways of change where innovation and innovators are fully recognized and accompanied along transition processes able to reshape right ways to support rural change in a wider perspective of sustainability were also the social components are fully taken into consideration.

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The Relationship Between Occupational Stress and Retention in The Service Sector: A Mediating Role of Internal Organisational Factors

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Abstract

The paper aims to analyse the connection between occupational stress experienced by employees in the service sector and their willingness-to-stay on the one hand, and the effect internal organisational factors have on this relationship on the other. An empirical, quantitative study was conducted among 292 respondents employed in the service sector in Poland. Two psychometric questionnaires were used as well as one questionnaire developed by the author. Results of statistical analysis show that there is a negative correlation between the level of stress and employee retention. Importantly, this relationship is mediated by the assessment of organisational factors (studied using a construct of organisational climate), especially the management style of superiors and the possibilities of promotion and development in the workplace. The results significantly broaden the research on employee retention factors, as they indicate that individual level of occupational stress, which depends both on the job context and personal traits, is as important or even more important than the assessment of organisational factors alone (literature usually points to the importance of organisational factors for employee retention). The study thus contributes to the literature on employee retention in the service sector and provides practical conclusions for employers in countries where there is a problem with employee retention and recruitment of the right candidates.

Keywords: employee retention, service sector, occupational stress, organisational climate

Introduction

Employee retention becomes a crucial challenge at the time when employee market is growing in strength, especially for countries with insufficient labour force or high employee mobility and ease of job change. However, because of increasing globalisation and outsourcing, more and more frequently not only countries, but also particular industries experience difficulties with employee retention. High employee turnover contributes to numerous problems, mainly increased costs of employee recruitment, training, or temporary replacements, as well as loss of output and knowledge due to lack of employees, especially highly-qualified ones (Armstrong, Taylor, 2017; Mitchell et al., 2001). One of the sectors where increased retention is of special importance is the service sector (Singh, 2014). The service sector has been contributing to the dynamic development of the global economy for the last 50 years, and its employees are responsible for value-creation both by properly presenting the product or service and by providing customer satisfaction, establishing good relationships, and ensuring an experience of value, which cannot be obtained without the participation of the service provider and the customer (Bowen, 2016; Denison et al., 2012).

In order to increase employee retention, it is important to create a friendly work environment and eliminate factors that put too much strain on employees. Referring to the job demands-resources concept (JD-R) (Demerouti et al., 2001), it is believed that each job comes with specific stress-related risk factors which can be divided into two categories: job demands and job resources. The individual is protected from overload and exhaustion by its resources (e.g. intellectual and cognitive skills, behavioural strategies, social support), which allow to mitigate the costs incurred due to job demands. Importantly, each employee can perceive the level of demands and his own resources differently, which explains why the same work situation can cause different reactions in different employees. This is why it is important to increase the efficiency of a workplace, but also to monitor the factors that affect the psychological well-being of employees, which is the foundation of their job satisfaction and willingness-to-stay. One of the main such factors is organisational stress (Meier, Spector, 2013; Tuten, Neidermeyer, 2004).

This paper focuses on the role of organisational stress and the effect of the assessment of organisational factors on employee retention in the service sector. As a measure of the perception and assessment of organisational factor, the author adopted the concept of organisational climate, which reflects the feelings and reflections of employees about their workplace, co-workers, superiors, and other factor affecting their physical and psychological state (Rosenstiel, Bögel, 1992). It can therefore be assumed that a negative organisational climate can affect the relationship between the level of stress and employee retention.

1. Employee retention in the service sector

The service sector is a domain of the post-industrial era. Around 1970, the service market dominated the economy, providing space to exchange relations, information, products, and other elements between service providers and customers (Bowen, 2016). The service sector provides work for employees performing different kinds of services, i.a. related to trade, food, tourism (traditional services often not requiring high qualifications), as well as banking, medicine, law, or education (contemporary services, often specialized). The service sector deals with individual clients, households, companies, and even government institutions (Kisiel, Wiśniewska, 2016). Moreover, by using knowledge and modern technologies, it functions as the basis for the development of an information society and knowledge-based economy (Kwiatkowska, 2015). Service sector employees are therefore a valuable resource of an organization, contributing to its growth and strategic importance.

The essence of the service sector are the intangible aspects of the person offering a service which affects customer satisfaction – most often interpersonal skills, attitudes, and behaviours of the employee which rarely result from organisational procedures (Bowen, 2016; Kisiel, Wiśniewska, 2016; Morrison, 1996). This is why employee turnover in this area is especially tough on employers who are unable to quickly replace their employees or train others to create the same value as a qualified employee who left the company. "The people that organisations wish to retain are often the ones most likely to leave" (Armstrong, Taylor, 2017, p. 289). This quote suggests that it is especially important to retain talented and experiences employees, but in the context of the employee market and recruitment difficulties it is essential to manage all factors that promote overall employee retention.

Poor employee retention is caused by different factors which can be broadly categorised into internal and external. External factors originate outside of the organisation and incentivise employees to leave (e.g. higher pay, better development opportunities in a rival organisation). Internal factors reflect the functioning of the organisation, its management style, work system, employer branding quality, etc. While external factors are largely beyond organisation's control, it has a huge impact on internal factors. This is why it is important to manage those organisational factors so as to improve the employees' willingness-to-stay. According to Armstrong and Taylor (2017), employee retention is mainly affected by such organisational factors as employer branding, quality of work (terms and conditions of the working environment), leadership quality, social factors, learning and development opportunities, as well as performance recognition and rewards.

Still, the role of personal factors (personality, experience, age, financial situation, etc.) cannot be overlooked, for they can colour the employee's interpretation of the quality of work, social relations, or development possibilities. It is therefore worth taking a look at employee retention from a broader

perspective – as an expression of job satisfaction or dissatisfaction, which according to academic research is a major factor of employee retention (Mitchell et al., 2001; Van Vianen et al., 2004). Job satisfaction is usually perceived as the attitude resulting from the individual's reaction to the surrounding work conditions (Judge, Kammeyer-Mueller, 2012), which suggests the importance of both organisational and personal factors. One of the main factors that reduce job satisfaction is stress in the workplace (Jain, Giga, Cooper, 2013; Karabatak, Alanoğlu, 2019; Meier, Spector, 2013; Tuten, Neidermeyer, 2004). Work-related stress or, more broadly, occupational stress, is a result of an interaction between the work environment and the individual – various organisational factors and situations are assessed by the employee (consciously or subconsciously) and affect his emotional, cognitive, and behavioural reactions. Stressors in the workplace usually put the most psychological strain on employees and lead to anxiety, frustration, intent to quit, and job dissatisfaction (Spector, Jex, 1998). This indicates the importance of reducing occupational stress for employee retention.

2. Effect of organisational stress and organisational climate on employee retention in the service sector

Since employee retention hinges on both organisational factors and employee's personal traits, it is worth taking a look at the factors that put a strain on employees in the service sector and increase the level of stress they experience. Based on the job demands-resources model (Bakker, Nachreiner, Schaufeli, 2001), factors that put a strain on employees in the service sector (job demands) can be divided into three categories: job characteristics, organisational context, and personal factors (Lukić, Lazarević, 2018). Job characteristics include factors specific for a given job, e.g. straining interactions with clients; organisational context include organisational factors (superiors' management style, work overload, development opportunities, etc.); and personal factors include individual traits of each employee (age, personality, sex, etc.). Although management studies usually focus on organisational factors, psychological and sociodemographic context cannot be overlooked, because it has an effect on employees' perception of the workplace and their reactions to different stimuli.

In the service sector, interactions with clients are particularly stressful – clients demand from employees that they meet their needs, both on the cognitive, emotional, and behavioural level, which is especially demanding if the clients' requests stand in contradiction to the company's expectations of the employee or if they require putting in much time and energy (Dollard, Winefield, Winefield, 2003). The highest level of stress is caused by interaction with a so-called difficult client (Hannif et al. 2006). Additionally, work in the services is often emotionally straining, as it is characterised by intense personal interactions, the need to express various emotions in order to cause a desired reaction in the client, and the existence of principles of emotional expression in the organisations (Hochschild, 1983). Employees can cope with emotionally demanding job by modifying their internal experiences

depending on the situation (so-called deep acting) or artificially adjust their expression to suit the existing rules (surface acting) (Grandey, 2000; Gross, 1998). Surface acting is correlated with a higher level of experienced stress resulting from emotional and cognitive overload, which can lead to occupational burnout (Grandey, 2003; Springer, Oleksa, 2017).

Apart from personal and client-related factors, there are also organisational factors that can lead to increased stress, which can be divided into two categories: work content and work context (Leka, Griffiths, Cox, 2003). Work content includes factors specific for a given job, e.g. monotonous or unpleasant tasks, workload, time pressure, lack of control, or poorly organised shift work. Work context includes, i.a., job security (especially in developed countries, where many service workers, e.g. in the financial sector, have their own businesses, work under contract or as freelancers), disturbed career development, unfavourable organisational culture, poor relationships with co-workers and superiors, lack of support, experiencing injustice in the workplace, discrimination, mobbing, or harassment (Leka, Griffiths, Cox, 2003; Landsbergis et al., 2017).

A concept combining the feelings of employees with the assessment of organisational conditions is organisational climate. It is a set of observations and opinions shared by employees on managerial practice, procedures, relationships between employees and management staff, and other attributes of an organisation (Kopelman, Brief, Guzzo, 1990; Payne, Pheysey, Pugh, 1971; Rosenstiel, Bögel, 1992). The impression of the organisational climate is affected by numerous factors. According to Rosenstiel and Bögel, German researches who thoroughly studied the concept of organisational climate, there are six main dimensions of work that influence employees' attitudes and behaviours (Durniat, 2012):

1) Co-workers – relationships and mutual trust among employees;
2) Superiors –general impression referring to whether the management staff is oriented towards people or towards tasks (based on Blake and Mouton's managerial grid theory);
3) Work organisation – work structure, delegation of responsibility, and level of control;
4) Flow of information and communication – model of communication and level of information transparency;
5) Representation of employees' interests – respect shown to the rights of employees;
6) Remuneration and opportunities for development – promotion, training, evaluation.

In order to retain employees it is important to analyse the relationship between the level of perceived organisational stress and the willingness-to-stay, as well as in what way this relationship is affected by the assessment of organisational climate and its dimensions.

Thus, the author decided to verify the following hypotheses:

H1. The higher the level of organisational stress, the lower the willingness-to-stay.

H2. The willingness-to-stay is affected by the assessment of the dimensions of organisational climate.
H3. The assessment of the dimensions of organisational climate mediates the relationship between the level of occupational stress and employee retention.

3. Research design

In order to verify the hypotheses, a survey was conducted among a group of Polish service workers (N= 292) in the first half of 2019. The survey was conducted using three tools: two psychometric questionnaire and one questionnaire developed by the authors.

The level of organisational stress was determined using a Polish adaptation of the Perceived Stress Scale (PSS-10) questionnaire developed by Cohen, Kamarck, and Mermelstein, whose Polish version is called Perceived Stress at Work (Chirkowska-Smolak, Grobelny, 2016). The questionnaire comprises ten questions and the respondents are asked to mark their answers on a 5-point Likert scale. The validation study of the Polish version of the questionnaire (Chirkowska-Smolak, Grobelny, 2016) showed its high reliability; Cronbach's alfa coefficient was 0.85 (N=537). In the authors' own study (N=292) Cronbach's alfa was 0.71, which also shows high reliability of the questionnaire.

Organisational climate was assessed using Durniat's (2012) Polish adaptation of Rosenstiel and Bögel's Organisational Climate Questionnaire. The questionnaire comprises 55 statements; the respondents are asked to mark their response to these statements on a 5-point Likert scale. Polish validity studies showed very high reliability of the questionnaire; Cronbach's alfa coefficient (N=367) was 0.96 (Durniat, 2012). In the own study (N=292) the Cronbach's alfa coefficient was 0.97, which is also a very high result.

Employee retention was measured using a short questionnaire developed by the author which comprises four statements; the respondents were asked to mark their response to these statements on a 4-point Likert scale from "strongly disagree" to "strongly agree". The statements were supposed to determine the level of job satisfaction, which is one of the main determinants of employee retention, and the intention to leave, in line with the assumption that a thought "I intend to leave" often causes people to look for other offers and leave their job (Mitchell et al., 2001). The authors' own study (N=292) showed high reliability of the questionnaire; Cronbach's alfa was 0.92.

4. Sample

The sample comprised 292 employees working in the service sector in Poland. The authors decided to focus on the Polish labour market because of the change it has undergone in the last 20 years – from an employer market into an employee market. In 2000 the unemployment rate was 20%; now it is around 5% , at the same time, after Poland's accession into the European Union in 2004, over a million employees left Poland to work abroad (Lewandowski, Magda, 2018). In 2016, over 65% of Poland's GDP was linked to the service sector; the increase in the country's productivity is also largely due to the development of this sector of the economy (Kisiel, Wiśniewska, 2016).

Globalisation and increasingly accessible travel increases the mobility of workers and contributes to high fluctuations of people employed in the market. Because of this employers in Poland are facing a challenge of retaining their employees, especially those with experience and skills enough to ensure customer satisfaction.

Among the respondents there were 167 women and 125 men, including unqualified salespeople and customer advisors (N=95), qualified financial and insurance specialists (N=87), employees providing advisory and consultative services in various specialised areas, e.g. law, medicine, and IT (N=91), and employees working as education and training providers (N=19).

5. Analysis and results

In order to verify the hypotheses, the authors applied Pearson correlation analysis and linear regression as well as a parallel mediation model with two mediators. Pearson correlation analysis and linear regression were performed using a statistical analysis programme SPSS v26, and for parallel mediation the Process function V.3.4 was used (model 4). Employee retention (measured as employees' willingness-to-stay) was chosen as the dependent variable, and level of occupational stress as the independent variable. It was assumed that the mediator between these variables could be the dimensions of organisational climate.

The correlation analysis shows that employee retention (willingness-to-stay) is negatively correlated with occupational stress (r=-.416) and positively correlated with all dimensions of organisational climate (see Tab. 1).

Table 1: Pearson correlation coefficients between employee retention and other variables

Variable	Occupational stress	Co-workers	Superiors	Work organisation	Flow of information and communication	Representation of employees' interests	Remuneration and development
Employee retention	-.416**	.489**	.690**	.574**	.612**	.649**	.701**

Notes: ** p<0.001.
Source: Own elaboration.

The obtained correlation results show that as the level of stress rises, the willingness-to-stay (employee retention) decreases, and in the case of organisational climate as the assessment of its dimensions becomes increasingly positive, the willingness-to-stay increases as well. Thus, the results confirm H1 and H2.

The main aim of the study was to determine whether organisational climate can significantly mediate the relationship between occupational stress and employee retention. In order to identify those dimensions of organisational climate that could act as significant mediators, multiple linear regression was calculated (see Tab. 2).

Tab. 2. Multiple linear regression for employee retention

Model	R	R^2	Adjusted R^2	Std. error of the estimate
1	.733	.538	.535	2.54284

Notes: Predictors: (constant), remuneration and development, superiors.
Source: Own elaboration.

Two dimensions of organisational climate were included in the model: "superiors" and "remuneration and development opportunities". A significant regression equation was found (F(2.289)=168.199; p<.000), with an R^2=.538, which explained 53.8% of the variance in willingness-to-stay and shows the good fit of the model. The respondents' willingness-to-stay is equal to 1.043+0.235 (remuneration and development) + 0.133 (superiors). It means that when the assessment of remuneration and development opportunities increases by 1 point, the willingness-to-stay increases by 0.235 points, and as the assessment of the relations and management style of superiors increases by 1 point, the willingness-to-stay increases by 0.133 points. Thus, the author decided to perform non-parametric bootstrapping analyses in order to test the mediational model of "remuneration and development" and "superiors" assessment as parallel mediators of the relationship between occupational stress and employee retention (see Fig. 1).

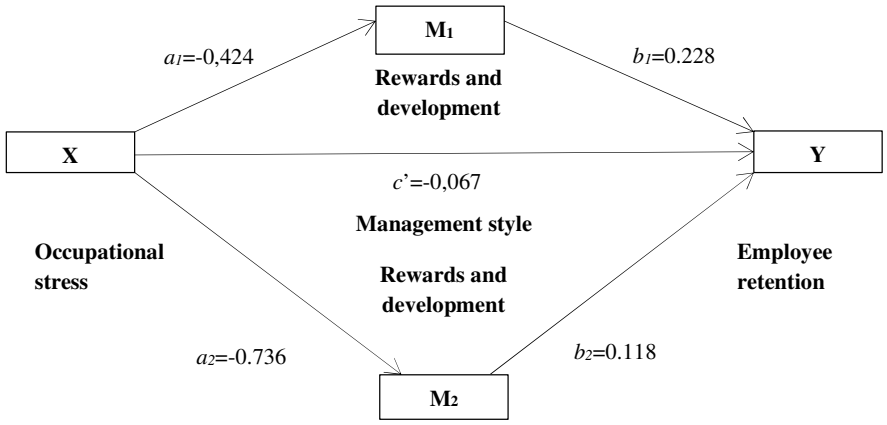

Source: Own elaboration.

Fig 1. A diagram of the parallel multiple mediator model for the interaction between occupational stress and employee retention

Results based on 5,000 bootstrapped samples (with p-value <0.05 considered as statistically significant) indicated that the total indirect effect (which is the measure of the amount of mediation) is -.186. The direct effect of occupational stress on employee retention, independent of the proposed mediators, is -.067 (se=.027; p=.013), whereas the total effect (which is a total sum of direct and indirect effect of X on Y) is -.250 and has higher significance (se=032; p<.000). All coefficients of the model are presented in Tab. 3.

Tab. 3. Regression coefficients, standard errors, and model summary information for the parallel multiple model of the interaction between occupational stress and employee retention

		Dependent variables										
		M_1 (rewards and development)				M_2 (management style)				Y (employee retention)		
Explanatory variables		Coeff.	SE	p		Coeff.	SE	p		Coeff.	SE	p
X (occupational stress)	a_1	-.424	.057	<.001	a_2	-.736	.085	<.001	c'	-,067	.027	.013
M_1 (co-workers)		-	-	-		-	-	-	b_1	.228	.038	<.001
M_2 (work organisation)		-	-	-		-	-	-	b_2	.118	.025	<.001
Constant	i_{m1}	31.523	1.169	<.001	i_{m2}	54.528	1.756	<0.001	i_y	1.577	1.031	.127
		R^2= 0.161 F (2.900)=55.722; p=.000				R^2= 0.204 F (2.900)=74.416; p=.000				R^2=.548 F (2.880)=116.218; p=.000		

Source: Own elaboration.

Results shows that the mediators – remuneration and development opportunities along with the assessment of superiors partially mediated the effect of occupational stress on employee retention. This means that the significance of the path from X to Y is reduced when mediators are introduced, yet it remains significant. Thus, as the level of organisational stress increases, the willingness-to-stay decreases, but this decrease is more pronounced in employees who become increasingly negative about their development opportunities, remuneration, and management style of their superiors as they experience higher levels of stress. At the same time, the analysis partially confirms H3, because the mediation is not complete but partial, which means that the mediators do not fully eliminate the effect of organisational stress on employee retention.

6. Discussion

In accordance with the assumptions based on literature, the independent variable, i.e., the level of stress, is strongly correlated with the dependent variable, the willingness-to-stay. The higher the level of stress, the more reluctant employees are to continue working in their company, as confirmed by other studies (Hannif et al., 2006; Jou, Kuo, Tang, 2013; Lan et al., 2019; Malik, Shahabuddin, 2015).

Development opportunities and a sense of being appropriately rewarded as well as the management style of superiors turned out to be important mediators, in line with the results of other analyses. Development opportunities such as training courses and even opportunities to use one's own skills in one's job promotes a sense of control, and thus helps to better cope with job demands (Landsbergis et al., 2017; Singh, 2014). Offering training courses, skill development programmes, or opportunities to gain new competences required in one's job shows that the employee is appreciated and perceived by

the organisation as an asset worth developing in the long-term (Morrison, 1996; Singh, 2014). The results of analyses also confirm the assumptions of the effort-reward imbalance model (Siegrist, 1996). When employees put effort in their work, they expect a reward in the form of external incentives such as money, but also internal ones such as praise, which raises their self-esteem (Landsbergis et al., 2017).

As for the mediating role of supervision, the results show that employees who perceive the management style of their superiors as people-oriented rather than task-oriented expressed more willingness-to-stay. In the literature, employee retention is connected precisely with managerial support, which promotes better work efficiency and allows to establish satisfying relationships with co-workers (Singh, 2014). The research of Hannif et al. (2006) showed that adopting a unitarist management style, which induces obedience, procedure-orientation, and task-completion, impairs communication between subordinates and superiors and makes employees more prone to stress and stress-related conditions. On the other hand, partnership management promotes establishing support nets which moderate the experience of stress.

The conducted research shows that the selected dimensions of organisational climate only partially mediate the relationships between the level of stress and the willingness-to-stay. The results indicate that organisational factors can increase or decrease the effect of stress on employee retention, but they are not its main predictor. This means that if an employee is offered better financial terms or additional training, but his level of stress remains the same, his willingness-to-stay will probably increase, but not by much, and after a certain time it can decrease again if his level of stress is not lowered. In reality, an employee's level of stress is affected by numerous factors, including mainly work content, organisational factors, and personal factors (Lukić, Lazarević, 2018), which is why a change in organisational factors alone will not bring long-term effects in the case of employees in the service sector, for whom working with clients, ensuring their satisfaction, and meeting their needs are often the most demanding elements of their work.

The results broaden the literature on the relationship between stress, employee retention, and organisational climate, which often points to the key role of organisational factors in increasing or decreasing the level of employee retention (Lan et al., 2019).

7. Practical implications, limitations, and further research

The conducted research provides practical implications for service sector management. Paying attention to organisational factors, mainly such as remuneration, development opportunities, as well as the attitude of superiors and their approach to subordinates, can have a positive effect on the employees' willingness-to-stay and help to alleviate stress. It is important to adjust the organisational

climate to the needs of employees so as to reduce their strain and increase their resources – this can be done by offering training courses developing competences especially useful for service workers, e.g. dealing with a difficult customer, emotion control, or communications techniques. In the service sector it is often important to perform a particular task (in many organisations pay is also linked to results, e.g. bonuses for bringing in a client, commissions on sales), which is why superiors tend to be task-oriented. But in the case of working with a client, the result is affected by the employee's soft skills and his personality, attitude, which is why superiors should also be people-oriented – take care of their employees' needs, offer support, show understanding, especially in stressful situations. By ensuring that their employees feel comfortable doing their job, they can better influence the results they achieve than by constantly controlling efficiency rates and other measures. At the same time, the research shows that proper management of the work environment and motivational factors is not enough to retain an employee – because of the importance of the perceived level of stress it is crucial to ensure that the employee is not overloaded with the amount of work and a busy schedule and that he can develop the resources that will help him reduce stress.

A limitation of the research is the lack of an analysis of factors affecting the perceived level of stress in service workers and the size of the sample (N=292), which does not allow for a generalisation of the results. However, the sample was large enough to attain statistical significance of correlations and mediate effects.

In further research, it would be beneficial to expand the sample size and use measurement methods which will allow to study personal factors (e.g. temperament type or personality) and the assessment of work-content. This could broaden our knowledge about stressors in the service sector, and thus about the factors contributing to the willingness-to-stay, which, along with organisational factors, play a crucial role in employee retention. It is also important to monitor the economic situation and the non-organisational factors which affect the service sector and the employees' frame of mind – the current situation of a pandemic shows that any change in the external environment can severely affect the economy, the market, and the disposition of the workers.

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Applications of Unmanned Aerial Vehicles in Romanian Agriculture: Past, Present, And Perspectives

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Abstract

The paper proposes the presentation of preliminary research on the use of drones in precision farming so that Romanian farmers can get the optimization of agricultural production. Drones are currently widely used in international agricultural production, mainly in primary crop and livestock production. Demand for drones has increased significantly recently as drone costs have fallen and as drone software in agriculture becomes more sophisticated.The aim of this research is to highlight the importance of drone in agriculture on the basis of SWOT analysis, for monitoring and observing plant vegetation, in order to provide farmers improved crop management and production.

Keyword: Drone, precision agriculture, GPS, sensor

Introduction

Drones have become an integral part of smart agriculture (PA), helping farmers to face a wide range of challenges and to achieve an important number of economic benefits, related to the reduction of operating costs, by reducing uncertainty and the human resources involved in agricultural production. The success of agriculture normally depends on a variety of factors where farmers have little control and forecasting: Soil-climate factors, temperature, precipitation.The use of drone-based agricultural technology can become a real driver of progress for domestic farms. By gaining access to a vast amount of data, farmers can increase crop yields, save time, reducing the expenses through precision actions.Figure 1 shows the pattern of the use of drones in agriculture.

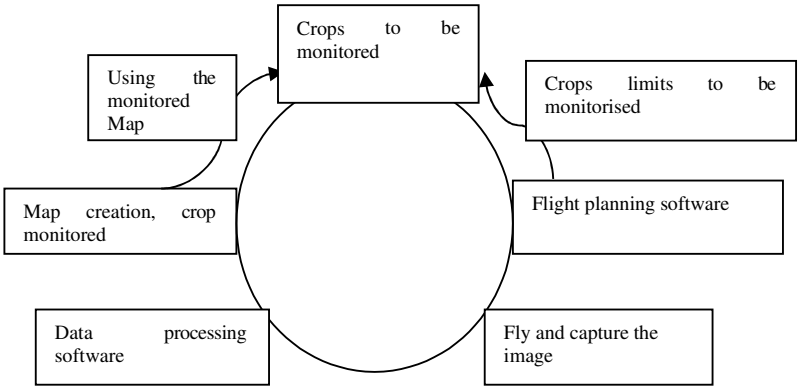

Fig. 1: Scheme of drone use in agriculture
Source: authors contribution

Global sales of drones were worth $ 8,5 billion in 2016 and are expected to exceed $12 billion by 2021 (EC- Digital transformation Monitor, 2019). Many industries continue to rely on increased dependence on drones in areas such as infrastructure, transport, security and agriculture. To better understand the use of drones in agriculture, let us take a closer look at the technology of a drone. Typically, a drone construction includes propulsion and navigation systems, GPS, sensors and cameras, programmable controllers as well as automated flight equipment. The technology used for UAV drones for agriculture is constructed in a way that allows them to collect more accurate information than the airplane and satellites are capable of collecting.Agritech drone-based software processes the data collected and delivers it in an easy-to-read format.The data collection process for the use of agricultural drones includes four steps (Fig.2).

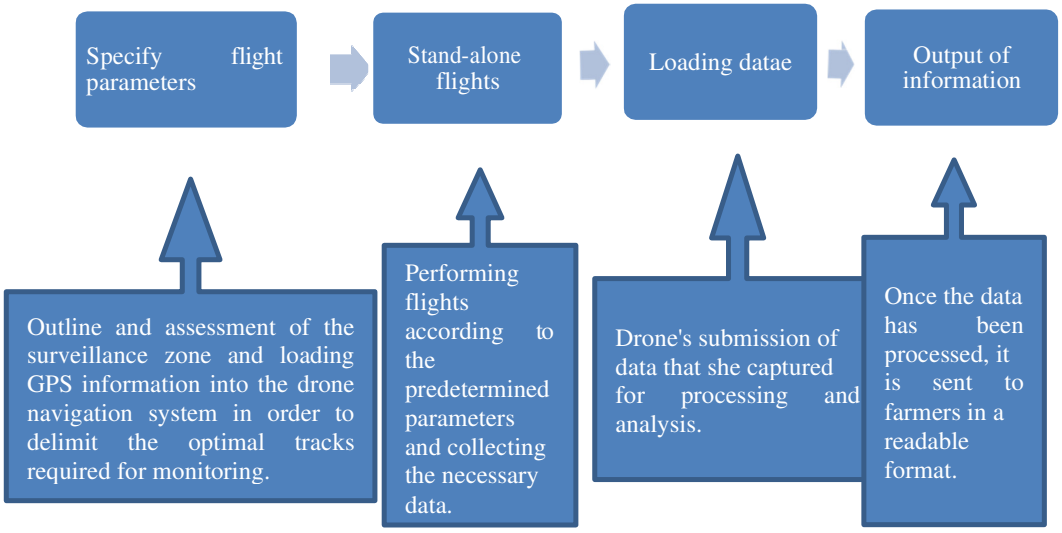

Fig.2: The stages of data collection by drones
Source: Authors contribution

Currently most agricultural drones are medium size (typically used for analysis applications), while larger drones are used when a load is needed (e.g. for planting or spraying applications) however, all such equipment shall be used per season according to tab.1.

Tab.1 Use of drones by season

Season	Spring	Summer	Autumn	Winter
Tasks	*equipment preparation	*application of herbicides	*harvest	*acquisition
	(drone)	*application of fertilizer	*management of	of cars
	*application of fertilizer	*application of fungicides	soil rescots	*acquisition
	*application of	*application of insecticides	*application of	of input
	herbicides	*irrigation management	fertilizers and	*acquisition
	*soil processing, seed		manure	of insurance
	bed preparation		*land	
	*set up cultures		improvement	
Utilisation	*early soil analysis, soil	*analysis of samples	*pre-harvest:	*evaluation
	preparation and	*irrigation management	constant	of equipment
	drainage	*observation of variability of	observation	performance
		growth	*post-harvest:	(drones -
		*evaluation and observation of	*soil analysis,	types)
		the need nitrous	soil processing	

		*the crop monitoring phase for	and topography	
		the time of application		
All the years round	*post rain: analysis of the soil drainage system *post storm: determination of damage			

Source: EuropeanCommission, Digital Transformation Monitor, Drones in agriculture, 2018

About the history of drones use in Romania we have as an example the launch in 2014 of the project "using multispectral information in crop management" in Brasov , which led to the development of two other viable projects, namely: "Designing , implementing and experimenting with a system of acquisition , processing , storage and transmission of multispectral information (SAPSTIM) for the improvement of the management of agricultural crops" carried out by the university of Brasov and the second project:"Design, development and experimentation of a terrestrial multispectral mobile mecatronic system (SMMMT) for multispectral monitoring of the vegetation status of agricultural crops" at the Technical university of Cluj Napoca , Romania for short MANY CULTS.

Identification of the vegetation condition by multispectral images was possible due to the interaction of solar radiation with vegetation relative to the surface under investigation of the soil.the spectral domains with the best results in the monitoring of vegetation are located between 600-700 nm and between 750 – 1350 nm.

SWOT Analysis

Strengths

Drones and robots are the future of agriculture. Agricultural drones have substantially changed the traditional approach of agriculture and cultivation over the last 3-5 years and in some cases have completely restructured the way many farmers and other entities operate(Drone Deploy/CNH Industrial, 2017).In Romania are opperetead 18 robots per 10,000 inhabitants operate, twice as many as in 2014, but far fewer than in other European countries (Fig.3).

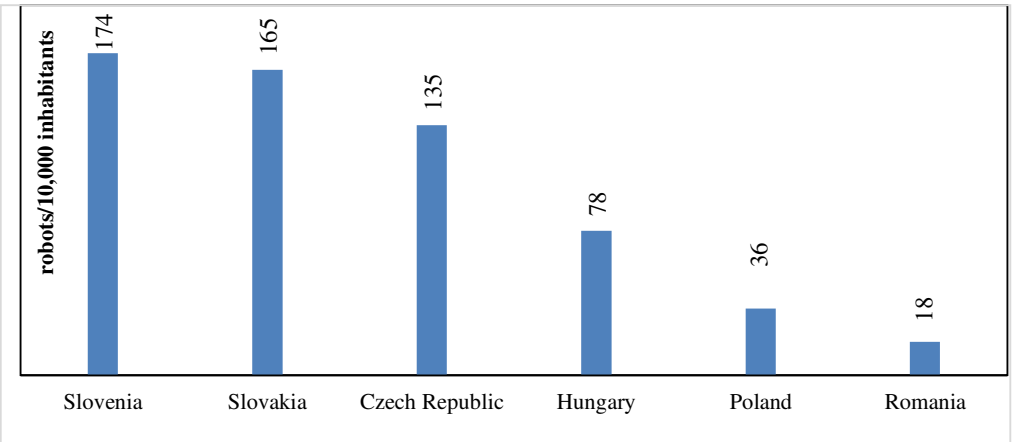

Fig.3 :Industrial robots/10,000 inhabitants Source: International Federation of Robotics,2020

INACO (Competitiveness Initiative) shows that only 1% of the companies active in Romania (Fig.4) in the agro-food industry use industrial robots – compared to the European average of 7%, with its performance: Sweden 31%, the Netherlands 22%, Denmark 16%, Slovenia 10% - in an analysis dedicated to the main challenges of agriculture 4.0, discussed at the Romanian Farmers' Club on 6 February 2020. Romania is the last in the EU in this respect in 2018.

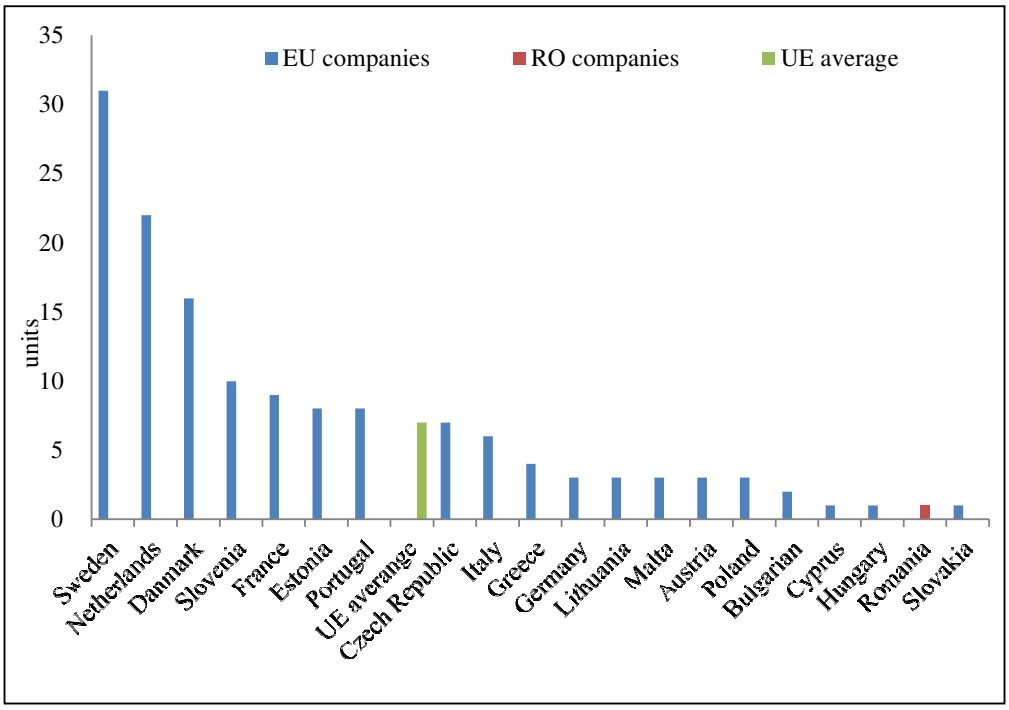

Fig.4. Active enterprises in Romanian agri-food production using industrial robots Source: Eurostat, 2020

Drones supporters argue that for many applications their use will deliver faster and more accurate results than traditional processes and methods, which are generally based on a large human workforce. In addition to the expected speed and time gain for many tasks, drones are expected to bring significant cost savings compared to the employment of human workers. Such savings will be particularly visible in sectors where people have usually done difficult or dangerous work, as safety and compliance costs will be reduced or avoided altogether.The way in which drones can be used for agriculture:

- **Analyzes soil condition**

Smart farming is data-based and allows farmers to take action on the basis of accurate information about soil conditions. The extraction of this data subsequently involves visits on the fields and manual gathering of information. Equipped with intelligent sensors for agriculture, drones can collect and provide this data – in a quick and accurate manner.

- **Establishment of future crops**

The soil is prepared for establishment and a drone throws seeds on it, instead of using techniques to establish old crops. The use of drone for planting seeds is relatively new, however, some companies are experimenting with this approach. Unmanned aircraft can also spray fields with water, fertilizers or herbicides, reducing costs, manual labor and time spent with these processes.

- **Infection and pest control**

Agricultural drones are not only able to inform farmers about soil conditions using thermal, multispectral and hyperspectral technology, but can also detect fields that are flooded by weeds, infections and pests. Based on this data, farmers can decide on the exact quantities of chemicals needed to combat infestations and not only help to reduce expenditure, but also contribute to better health on the ground.

- **Atomization of cultures**

Smart farms also use drones to atomize crops, which helps the limit of human contact with fertilizers, pesticides and other harmful chemicals. Drones can manage this task faster and more efficiently than vehicles and planes; they are also an excellent alternative for farms that still use manual labor. Drones are also irreplaceable when it comes to treatment on site. They can detect sensor and camera infected

areas and work on them leaving the healthy part of the field intact. This not only saves time and increases security, it helps to reduce expenses.

- **Crop surveillance**

Agricultural fields take up large areas and it is often almost impossible to estimate the overall condition of crops. Using drones to map agriculture, farmers can stay informed of the plant health status in a given area and indicate which areas of land require attention. To estimate crops, drones inspect the field by infrared camera and determine light absorption rates. Based on accurate and real-time information, farmers can take measures to improve the condition of plants at any location.Drones can help farmers optimize their use of inputs (seeds, fertilizers, irrigation), react more quickly to threats (weeds, diseases and pests), save time for on-the-spot checks (treatment validation or other actions undertaken), improve their variable application in areas, fertilization / plant protection treatments for each crop, or for real-time estimation of crop yields.High resolution images and data taken by the drone overflying the agricultural land are collected and transmitted directly to the cloud / software made available to the customer. With this data, the user can select the desired information and make different treatment maps depending on the operation the farmer wants to do in the field. The maps can then be loaded onto agricultural equipment, which will adjust the amount of raw materials (seeds, fertilizers, pesticides) to be applied in the field accordingly.

Weaknesses

While the potential for using drones in agriculture is significant, there are still some notable impediments to their progress beyond the niche market it occupies today. Agriculture remains a difficult business, a small margin for many farmers, with governments often helping when the adverse effects of bad weather or difficult market conditions are felt. Despite their saving potential, drones still require substantial investment and technical expertise to be acquired and used properly, making it difficult to justify purchases for many small and medium-sized farms, which are less likely to benefit from large-scale savings.According to the MSA (Farmers' Social Security Organization in France), around 30% of farmers reported income below €350 per month in 2016. At present, drones used in agriculture are generally purchased and used directly by a farmer or farmers' cooperative (to share the costs). Alternatively, they can be operated by a company with drone technology and contracted by the farmer. Regardless of the ownership model, it is clear that drones will have to demonstrate that they can substantially and reliably improve existing processes before they are widely adopted.A standard drone for public use starts at € 1.300.In the agricultural sector, small drones without advanced technologies can be purchased from €2.000 - €3.000. Classic wing-type drones start from around €5.000-3.000, and special drones equipped with superior technologies used excusive for agriculture start from €20 000.

Opportunities

The digital revolution has the potential to profoundly change agriculture: Decision making becomes clearer, smarter and simpler. By combining farmer's instinct with state-of-the-art technologies such as drones, satellite images, variable application algorithms, high-tech sensors, mobile applications or GPS, a farmer can make better informed choices leading to higher yields. Drones can monitor any type of crop in any geographical area. This new technology in agriculture is expected to grow significantly over the next few years as drones offer a wide range of unique applications that improve precision farming.To find out the impact of using agricultural drones, CEMA – European Association of Agricultural machinery manufacturers has provided further answers to questions on the use of drones in agriculture:

Drones fly at an altitude of approx. 50 to 100 m. For more than 50 m in height, a special authorization is required. At present, the use of agricultural drones depends on national laws. However, an authorization is normally required. The packages offered by our specialized companies in the country generally include drone, training, a drone insurance and its authorization. A drone can fly in all weather conditions. Drones are water resistant, but image quality may be degraded if images are taken in rainy weather. This depends on the capacity and size of the drone. Fixed wing drones have longer flight time and can cover multiple fields in one flight. For example, 50 minutes of flight time will cover up to 12km².Drones can take pictures with a resolution of up to a few centimeters per pixel. Drone can

achieve greater image quality and accuracy in real time as they may fly below the cloud ceiling. In addition, a satellite can only provide images once a week or once a month when its orbit is above the

agricultural plot. The data collected by drones are translated into useful information that is easily understood by farmers, thanks to specific algorithms. Some of the formations provided by these images are: Density of plants: Number and size of plants, agricultural batch statistics, compromised or unsown plots.
Vegetative indices: Volume of leaves, detection of anomalies, effectiveness of treatment, infestations, influence of meteorological factors, etc. plant water requirements and drought damage.The agricultural drones provide continuous field monitoring of the crop from crop establishment to harvest.

Threats

- ***Carbon farming***

Covering and maintaining an ever-growing culture on agricultural land is a way to remove carbon (CO2) from the atmosphere and to store it on the ground - private companies invest and government programs develop incentives to do so, in a global carbon market estimated at usd 160 billion today.

- ***Microbial agriculture***

New findings show that microbes, such as bacteria, fungi, viruses and protozoa, have real potential for new developments in agriculture. The microbial agricultural market is estimated at $6 billion by 2022.

- ***Hyper-precision agriculture***

To maximize yields and profits in every inch, using only the resources the harvest needs, hyper-precision agriculture is developing, which is estimated worldwide to be around USD 10 billion by the middle of this decade.
SWOT analysis also has its limitations, as organizations can see some circumstances as very simple and overlook some key strategic contacts that may arise. Moreover, categorizing issues as strengths, weaknesses, opportunities and threats could be very subjective because there is a high degree of uncertainty on the market.

The prospects for using drones in Romania have led to the establishment of research institutions and numerous companies in recent years to develop and implement new technologies for drones. The first, the Institute for Training, Studies and Research - for unmanned vehicle systems (ITSC-SVFP) was founded in Medias, Sibiu in 2016 to promote and develop research, development and education models and to provide advice tailored to the specificities of unmanned vehicle systems.The Institute has developed the first online system that allows the registration of Romanian civil drone holders and operators, whether natural or legal, that allows the introduction, Modification and viewing OF PSPS flights in Romania.FAE roads is one of the Romanian companies with extensive experience in developing and providing solutions for drones, for applications from various branches of the economy: Topography, agriculture, industrial inspection, etc. FAE Dries also provides training services for the pilot of drones.

Currently, Romanian legal framework governing drone use, includes the following regulatory acts:
Civil Aviation Code (2016), Government Decision 912 of 25/2010, RACR-OPS LAAG (2009) , Civil Aircraft Regulation of Romania , RACR-A (2016) , RACR-AZAC (2010) and Law No 257 of 22 May 2001 "on action against aircraft using Romania's unauthorized airspace".

Conclusions

Drones are used in farms in Romania, but significant use has not yet been achieved. Role of drones inagriculture is important in both large and small production areas, with examples of the most common operations being water management and crop diseases Drone businesses will soon be able to offer services such as improving planting and crop rotation strategies. They can also provide a better understanding of how crops grow daily in different areas of a cultivated land.As a consequence, data quality is crucial and should be a key priority for decisions to use drones, while issues such as speed and flexibility of drones should only be secondary considerations.This extent of information on crops could make farms more efficient and help small organizations compete with large, better-developed agricultural organizations.A challenge for Romanian agriculture is the adoption of new technologies and innovative practices. But the solution to this problem requires Romania's support through its institutions and associations, along with European experience in this sector.

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Digital communication in health care: the physicians' perceptions on benefits and challenges

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Abstract

Digital communication can contribute to a higher efficiency of organizations. This study aimed to describe the physicians' perceptions about the use of digital communication in Romania, with an emphasis on the strengths and challenges in implementing this kind of approach in daily care. Several advantages of digital communication were consistently reported: global scale, user-friendly profile, multi-shaped form, the role of facilitator in what concerns the therapeutic partnership and the progressive construction of more adequate protocols of care. Still, a number of challenges emerged as significant and potentially detrimental for the quality of care and wellbeing of patients: the low consistency of patient decisions across time, the short buying cycle of e-products, including digital communication, the novelty of the e-patient concept, the difficulty in controlling the quality of information delivered or received through digital communication, the risk of self-diagnosis and self-medication, and additional technical issues, related to the shift from classical communication to digital communication and back, GDPR, or the proper selection through DC of cases requiring special treatment. A lot of efforts should be still implemented for increasing the functionality of digital communication in health care systems and the long-term satisfaction of actors involved in the therapeutic process.

Keywords: digital communication in Medicine, advantages, challenges, physicians' perceptions.

Introduction

Successful medical organizations are preoccupied by the strategic alignment of the factors potentially enhancing their efficiency, as a whole, but also by the wellbeing of their members, taken individually. In terms of internal politics, these organizations are characterized by: (a) a continuous learning process at different levels; (b) emphasis on the creation and distribution of knowledge and information; (c) their ability to adapt to change, and (d) the capacity of their employees to improve the organizational performance by learning (Kim et al. 2015).

In practice, and especially in Clinical Medicine, the construction and maintenance of this kind of models is notoriously difficult. In the particular case of Romania, this is due to a number of historical and societal reasons, including conservative routines and traditions, chaotic procedures and regulations, and the low perceived benefit-cost ratio, among many health care employees, of working in such

environments. In these cases, individual "survival strategies" or ad-hoc group solutions are often preferred for managing the difficult relationship with patients (Popa-Velea et al. 2018) or for dealing with professional stress (Popa-Velea et al. 2014, 2019a). The mistrust in the ability of the organizations to deal with current daily problems many health employees face (such as burnout, exhaustion, or lack of motivation) is also highly prevalent (Popa-Velea et al. 2019b).

One possible way of overcoming these obstacles and counterproductive perceptions is the use of new technologies. This study focused specifically on exploring the perceptions about digital communication (DC) among Romanian physicians.

Method

This research aimed to describe the physicians' perceptions about the use of DC in Romania, making an overview of the self-reported strengths and challenges in implementing this kind of approach in daily clinical care. Previous research published in Romania on this theme in the last decade (2010-2020) was reviewed and thematic analysis was used for highlighting the key areas.

Results

1. Advantages

DC has been described by Romanian physicians as having a series of undeniable advantages. A significant part of them is also reflected in the international literature in the field:

- DC is *widespread,* meaning that it allows a large access to information, to both patients and physicians (Purcărea et al. 2014). The continue refinement of user interfaces and the increasing customer satisfaction in using digital instruments have developed constantly to the point they wiped away the original distinctions between "digital natives" and "digital immigrants" (Prensky 2001a, 2001b) and the stereotype considering younger generations as having the exclusivity in being "innately technology savvy and active users of digital media" (Davies et al. 2014; Hargittai 2010; Taipale 2016);

- DC is *user-friendly,* this increasing the probability to utilize it on a daily basis, but also to consider it reliable in case of emergency. Beside strengthening the physicians' existing professional networks, the convenient use of e-tools facilitates the emergence of *patients communities,* which are united by their will to find peers who share similar experiences, in order to ease their decision-making processes (Gheorghe & Liao 2012);

- DC is *multi-shaped* (fig.1) (Weiner 2012; Committee on the Future of Health Care Services, Institute of Medicine 1994), this making it suitable for many health professionals and patients, irrespective of their cultural background or education;

- DC allows an *authentic therapeutic partnership,* as patients using e-technologies are more comfortable seeking information about their disease and participating in their own care (Gustafson et al. 2001; Reents 1999);

- *DC facilitates the communication between primary and secondary health care providers,* allowing continuity, which can be of paramount importance (for example in shifting from curative to palliative treatments);

- DC allows the *implementation of artificial intelligence,* thereby lowering the risk of malpractice and *fostering the progressive construction of more reliable and valid protocols of care.*

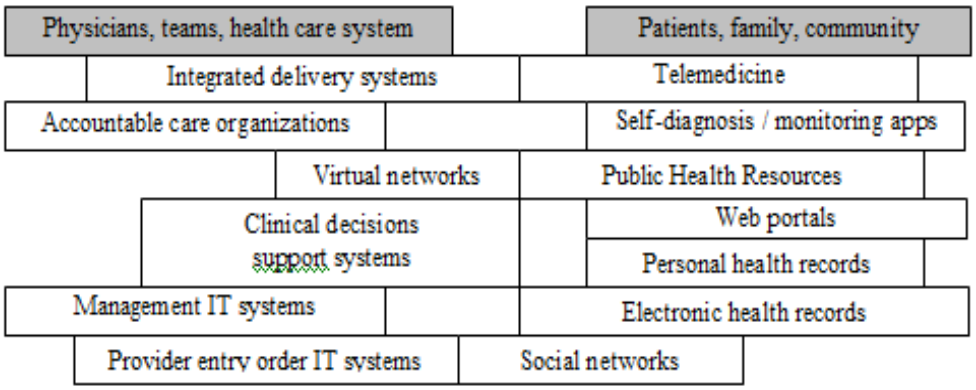

Fig.1. Forms of digital communication in Medicine

2. Challenges

Despite these advantages, DC is also described by physicians as creating a number of challenges, which can evolve into real disadvantages, if not properly acknowledged and / or addressed:

- *the effectiveness of DC is variable across time and may largely depend on the context.* Thus, patient's willingness to purchase health care services is considered to be influenced by factors such as source credibility, message strength, perceived risk and usefulness of information. These factors may explain up to 70% of adherence variance (Purcărea et al. 2013). Particular attention should be paid in DC to the reinforcement of physicians' messages, with an emphasis on the match between the needs of the patient and the content of care;

- *the buying cycle of DC is much shorter,* this making problematic the building of interest and of loyalty towards a certain health care provider;

- the *concept of "e-patient" is brand new* for many physicians and health care systems: even if the devices exist, the therapeutic relationships may have not yet met the level of technology. The DC's improper use, with potentially negative consequences, may discourage many individuals in exploiting its full potential;

- *the control of the quality of information* delivered to the patient exclusively through DC can be problematic, as often there is no time to double check its interpretation;

- *technical issues may occur,* such as the difficulty in selecting cases for special treatments, the challenges regarding GDPR, or the continuous *shift from classical communication to DC and back,* which can be exhausting for many clinicians;

- *the risk of self-diagnosis and self-treatment* is always present in telemedicine or in any virtual type of communication, including the digital one.

In the particular case of Romania, a number of specific challenges are reported to complicate this landscape and offer a rather long-term perspective for the functional implementation of DC in health care (Mesko & Győrffy 2019; Purcărea 2010). Among these obstacles, the most important are the insufficient level of digital literacy and skills, the poor penetration of digital technologies in the bureaucratic apparatus, the low interoperability of digital communication services, and the high costs of building a system based in its entirely on digital technologies.

Conclusions

DC is a technology which is still perceived by physicians in Romania as having pros and cons. Despite this, most recent papers dedicated to this topic, written in national literature, emphasize the openness of health professionals to this kind of new technologies and their hope in the positive effect of DC on the quality of the health care system, and on the satisfaction of patients and physicians. DC could ideally bring to all of them a new sense of empowerment and engagement, but the preliminary action of managers and policymakers in this direction is decisive. Helpful vehicles for a smoother and efficient implementation of DC include, for example, extensive use of shared decision-making; management of patients through teamwork; dedicated training for physicians, so that they can address patients from distant locations and properly make use of their datasets; reshaping of the medical curriculum; preserving the general orientation of physicians towards personalized Medicine and compassionate healing, especially in chronic or demanding medical conditions; offering meaningful incentives to clinicians succesfully using DC; creating the possibility to patients and physicians to fully adapt to the cultural changes caused by DC (Purcărea & Vîrgolici 2014).

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Strategic Management of Modern Family Businesses on The Example of Poland

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Abstract

In all economies of the world, family businesses are an important component of economic and social systems. Due to the fact that they are the driving force of the development, it was decided to study more closely the issues related to strategic management in Polish family businesses The research intention of the article was to identify the forms of strategies applied by Polish family businesses and to determine priorities and factors taken into account when building it. The objective of the research is also an attempt to find the response to the question whether the selection of the appropriate strategic option is reflected in the accomplishment of the assumed strategic objectives.

Keywords: Family Business, Strategy, Development, Succession.

Introduction

Family businesses are an important component of economic and social systems. They are a significant driving force of development and create material prosperity and stable jobs. They create their future through the construction and implementation of the strategy. There is a range of specific characteristics which clearly distinguish family businesses from other economic entities and have a significant impact on the process of formulation and implementation of their strategy. The key factor is certainly the combination of ownership and management as well as the integration of the business area with the area of owner family. The outline of the article is the following. The first part contains the information related to the literature review concerning the description of family businesses, including definitions which indicate various criteria in defining family businesses. In the subsequent part, presenting the results of the empirical research conducted among Polish family businesses (n-121), selected problems of strategic management in the surveyed companies are discussed. The forms of the strategies applied are indicated as well as the significance of the components of the environment of enterprises in the strategy building as well as the impact of the applied forms of strategy on the implementation of the assumed strategic objectives. The last part is devoted to the conclusions and future research directions.

Literature Review - An Attempt to Define A Family Business

Family firms represent a significant economic force worldwide (IFERA, 2003). While the structure and number of family businesses is the subject of numerous debates, their significance in the economy does not raise doubts. Their share in the creation of GDP and employment are broadly defined (Abdellatif, Amann, Jaussaud 2010, p. 108; Patel, Pieper, Hair Jr 2012, p. 232).

Family businesses have been the subject of scientific research since 1964 when the article entitled *The Family Business* by R. G. Donolley was published in the journal Harvard Business Review Donelley defined a family business as an enterprise closely linked to at least two generations of one family in which family relationships directly affect the policy of the company as well as the objectives and interests of the family. Since that moment, in many publications, the attempts have been made to create a single universal definition of a family business (Harms 2014, pp. 280-314). P. Sharma (2014), in his article devoted to the current knowledge in the field of family business, draws attention to the existence of certain factors underlying the analysis of family businesses as

separate economic entities other than non-family businesses. These are specific control mechanisms, visions and resource development.

In family businesses, there is a combination of two diametrically opposed systems: the family and the company, which are characterized by different objectives and various value systems. The family is the objectives associated with procreation, ensuring the security of its members, and the business is financial objectives, rationality, enforcement of certain behavior and contribution to development in relation to its members. In the model of the contemporary enterprise, one cannot be limited only to two systems (family, business). Due to social changes (including demographic, intrafamily ones), complicating ownership relations, employing people from the outside, the third component of the system is introduced, i.e. ownership, which, among others, according to A von Shlippe et al. (2011, p. 22), results in the fact that relationships/conflicts on the line of ownership-family are more important that the one on the line of ownership-business.

In practice, there is a three-component model of a family business, which consists of:

- the family system, the components of which are family members, successive generations, with the main objective directed to family members,
- the economic system (company), consisting of all employees, managers, customers; its task is to accomplish the objectives pursued by the company,
- the value system, the components of which are all the company owners – both family and non-family members.

The definitions of family businesses which can be found in the subject literature take into account the specificity, principles and standards of the operation of family businesses and describe basic relationships between the aforementioned components. A comprehensive catalogue of the characteristics of family businesses is presented in the research by Del Giudice (2017), Maloni et al. (2017), Sousa Paiva et al. (2016), Cucculelli & Bettinelli (2016). Some definitions, as the filtering criterion, indicate the strength and durability of family involvement (in work/management and/or capital). Other authors emphasize that family and business relationships must relate to at least two generations (at least one successful succession) to talk about a family business. Sometimes only capital involvement is pinpointed and/or current management of the company (compare: Table 1).

Table 1: Examples of diversity of criteria for defining family businesses

Criterion	Author	An example of the definition
Ownership	R. Donckels, E. Fröhlich	The company is a family business if family members have at least 60% of the capital.
	M.A. Gallo, J. Sven	The family business is the one in which family members have the legal control of ownership.
Ownership and management	P. Davis	Family businesses are the ones the policy and direction of development of which are the subject of a significant influence of one or several families; this impact takes place through ownership and sometimes through participation of family members in management.
	M. H. Stern	The family business is the company owned and managed by the members of one or two families.
Intergenerational transfer	C. Churchill, K.J. Hapten:	The family business is the company in which a younger family member has or will take over the control of the company

		from senior members.
Diversity	R. Beckhard, W. J.Jr. Dyer	The family business is the company which consists of independent subsystems: the company as a whole, the family as a whole, the founder and the board.
	J. J. Chrisman, J. H. Chua, P. Sharma	Differentiate between definitions that focus on family business components, such as ownership, governance, management, and transgenerational succession, and those focused on what a family business is, including the intent of the family to keep control, firm behavior, and idiosyncratic resources arising from family involvement.
	B. Villalonga, R. Amit	Argue that most definitions include at least three dimensions: one or several families hold a significant part of the company's capital; family members retain significant control over the company (e.g., distribution of capital, voting rights) with possible statutory or legal restrictions; and family members hold top management positions.

Source: Own study based on Donckels, Fröhlich (1991); Gallo, Sven (1991); Davis (1983); Stern (1986); Churchill, Hapten (1987); Beckhard, Dyer (1983); Villalonga, Amit (2004); Chrisman, Chua, Sharma (2005).

To sum up the above definitions, it can be concluded that the company, in order to be defined as a family business, must fulfill the following conditions:

- family members must participate in active management of the company,
- there is the advantage of ownership of family members in the company,
- the development of the company is based on successive generations, which means that the company is or is planning to be owned by the family.

When analyzing these characteristics, one must agree with I. Lansberg (1983, pp. 39–49), who suggests that the owner family has an impact on the company in the manner unattainable for family members in companies not belonging to the family. It is precisely the involvement of individual family members in conducting the business that makes it different from the others (Miller, Rice, 2002, p. 44).

A family business can be defined as a business governed and/or managed by a dominant coalition controlled by members of the same family who shape the vision of the business with the intention of transferring it across generations of the family (Chua, Chrisman, Sharma, 1999). Thus, the family nature of a business is essentially determined by the cultural and behavioral aspects introduced by the controlling family, whose members strive to achieve and/or maintain intra-organizational family-based relationships (Chrisman, Chua, Steier, 2005; Litz, 1995; Zellweger, Eddleston, Kellermanns, 2010).

It is also worth indicating a very sensitive aspect of family businesses, namely family succession, the description of which can be found in many references (Baù, Hellerstedt, Nordqvist, Wennberg, 2013). The long-term perspective of business operations conducted by successive generations is the basis for the survival and development of the family business. Succession, which is often a turning/critical point in the life cycle of each family business, consists in the preparation of the company for intergenerational transfer (Suess-Reyes, 2017). In its case, the human factor gains value, which is represented by both employees and family members, often not formally related to the

company. Management succession in family businesses is a vitally important and complex phenomenon in most family businesses (Blumentritt, Mathews, Marchisio 2012, p. 57).

Method

Research context and the population of Polish family businesses

Family businesses are a challenge to contemporary scientists. The first problem they face is a uniform separation of these entities from all entities operating in the market so that the obtained results can be comparable. Due to the fact that, in any Polish legal act, there is no accepted definition of family businesses and in addition there is no consensus among the researchers of the phenomenon, it is difficult to give the number of these enterprises. In Polish realities, family businesses have become the subject of the research relatively recently. It must have been affected by the fact that the Polish economy has become a free market economy only after the economic transformation. In 1989 private business activity was legalized, which resulted in massive setting up companies.

In 2016 the Family Business Institute began the implementation of the project „Family business statistics" under the Program for the Competitiveness of Enterprises and SMEs (COSME) 2014–2020, which was to determine the share of family businesses in the total number of enterprises in Poland. The data presented in the publication indicate that 36% of the surveyed Polish enterprises declare that they are family businesses. These companies generate 18% of GDP to the Polish economy (Lewandowska 2016). Against the background of other European countries, it is relatively low, however, it is worth pinpointing that the authors of the research asked whether entrepreneurs considered themselves as family businesses. In the presented Report, there are some inconsistencies since the same group of the surveyed enterprises, asked about who owned their company, in 92%, indicated that it was in the hands of the family. Therefore, 92% of the companies are "potentially family" businesses, i.e. the ones whose owners are families, however, for some reasons, these companies do not admit to being family ones. For comparison, the social significance and contribution to the generation of GDP in selected countries of the European Union are illustrated in in Table 2.

Table 2: Family businesses in selected European countries

Country	The share of family businesses in the total number of enterprises	The share of family businesses in generation of GDP	The share of family businesses in employment structure
France	85%	65%	50%
Italy	85%	80%	75%
Spain	90%	70%	70%
Germany	91%	55%	57%
Sweden	86%	45%	56%

Source: based on the scientific expertise developed for the needs of the Supreme Chamber of Control [https://www.nik.gov.pl/aktualnosci/firma-rodzinna-czy-to-moze-sie-udac.html accessed on 09.303.2020]

The research into Polish family businesses is hampered by the fact that this group includes both small family businesses, consisting of several people, and also large entities, often conducting their operations internationally, in which the functions of ownership and control are performed by the family. As indicated by the research, family businesses are mostly microenterprises with the local coverage, which are 10-20-year-old, where the owner is male and, in the company's structure, there is no isolated board. Such enterprises operate in wholesale and retail trade and industry. The predominant sectors for family businesses in Poland are wholesale and retail trade (32.2%), industrial processing (16.3%), construction (11.9%) and professional activities (10.6%). From the point of view of classification, it is important to assess the shares in the family ownership. The vast majority, since as much as 92% of business families in Poland, has more than 50% of shares in business, which

corresponds with the size structure of family businesses. Such a package is possessed by micro- and small enterprises. The ownership package below 25% is owned by medium and large enterprises. The owners of family businesses in Poland are primarily male (69%), however, in nearly 1/3 of enterprises, the owners are female. This is consistent with global trends (Lewandowska 2016).

Research Objectives

Having in mind the above context concerning the significance of family businesses in the economy and how significant this number of enterprises is, the research was intended to identify the forms of strategies applied by Polish family businesses and to specify priorities and factors taken into account when building it. On the basis of the previously established knowledge, the objective of the research was an attempt to find the response to the question whether the selection of the appropriate strategic option is reflected in the possibility of the accomplishment of the assumed strategic objectives.

Methodological Assumptions and Demographic Characteristics

In order to explore the issues associated with strategic management in Polish family businesses, the survey was conducted (December 2019 - January 2020), covering a 121-person group of owners (successors and seniors) of family businesses. The research tool was the previously prepared survey questionnaire for the purposes of verification of the research assumptions. The questionnaire contained 29 questions concerning both the issues related to strategic management, the strategy itself, the degree of strategy formalization, the impact of the environment on the company's operation, development prospects. The questions also concerned the issues related to the specificity of family businesses, i.e. the practiced model of the family business or the approach to succession.

The research objective was an attempt to identify and define the strategic context of contemporary family businesses operating in Poland.

The characteristics of the respondents indicated that, among the surveyed companies, the prevailing group was the companies hiring fewer than 10 people (57%). Most companies were service providers (72%). The structure of the enterprises in terms of legal personality is similar to the structure of the Polish economy. In this group, the majority is sole proprietorship (57%). Half of the companies were operating in local markets. The detailed structure is presented in Table 3.

Table 3: Structure of the surveyed companies

Classification criterion	Specification	Percentage share
Number of employees	fewer than 10 employees	57%
	10-50 employees	14%
	51-250 employees	29%
Dominant industry	Services	72%
	Industry	28%
Legal personality	Sole proprietorship	57%
	Civil company, general partnership	14%
	Commercial company (Ltd./S.A.)	29%
Range of operation	Local	50%
	National	36%
	European	7%
	Global	7%

Source: Own research

Analysis

One of the components of the general division of enterprises into family and non-family ones is often related to the unaware consideration of family businesses as a homogenous group of entities. Enterprises can be distinguished from each other in terms of the degree of personal and capital involvement of the family, a different share of "strange" components in the ownership and management structure, predominant management style, relationships between employees, level of entrepreneurship and others. When analyzing these factors, it is possible to determine at which stage of development the surveyed family businesses are (more: K.E. Gersick et al., pp. 15–24). Polish companies are in the first stage of development. They are mostly characterized by the founder ownership structure. They are managed by the first generation and thus by the business founders (57%). These entities belong to the owners.

In most of the surveyed companies, the company's owner and founder (in one) is involved in conducting the business (57%). The companies belong to the owners (50%). They are characterized by high entrepreneurship (43%), non-formalized communication (38%) and participatory management style (71%). Participatory management style indicates the fact of the gradual transition of the company to another development stage, i.e. family partnership structure (compare: Table 4). Family partnership is associated with the transfer of shares in the family business to the close family members, usually of the next generation (50%). The company is characterized by an increasing degree of formalization (14%), participatory style dominance (71%) and declining entrepreneurship. Another ownership structure is family consortium related to the dispersion of shares between a greater number of family members of a different degree of kinship. The area of corporate governance becomes complicated. Communication takes formalized forms (14%), where the professional management style predominates (7%).

Table 4: Ownership structure in Polish family businesses

Classification criterion	Specification	Percentage share
Involved family members	Owner and founder in one	57%
	Owner (founder) and a child/children	29%
	Siblings or another narrow group of the close kinship	10%
	A larger family group of a different degree of kinship	18%
Ownership generation	The first (founder)	50%
	The first and second	43%
	The second and/or above the second	7%
Relationships between employees	Non-formalized	38%
	Gradually increasing formalization	14%
	Formalized	14%
Level of entrepreneurship	High	43%
	Average	50%
	Low	7%
Predominant management style	Patriarchal	21%
	Participatory	71%
	Professional, corporate	7%

Source: Own research

The above research results confirm that, due to the time of emergence, most Polish family businesses are at the stage of founder entities for which the strategic challenge becomes the first succession. In

the case of half of the surveyed companies, the owners are planning to transfer the business to their children (50%). There is also a small group of the companies planning to sell (8%) or to liquidate the company (6%) (compare: Figure 1).

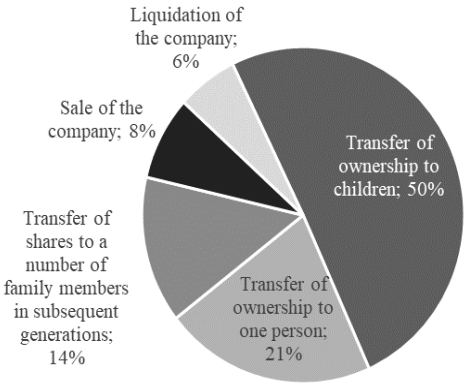

Fig. 1: Type of succession planned

Source: Own research

Succession is one of the most important components of the strategy. Its planning may demonstrate a conscious approach to strategic management. Creating and implementing an effective strategy is the basic most important challenge of each company and, in particular the one which wants to grow. It does not matter if this strategy takes the form of expanded documents or if it is a set of well-established thoughts and intuition of the main decision-maker/owner – it must simply exist as the determinant and main factor of the existence and development of the company. In the case of Polish enterprises, in most companies, the strategy exists while taking different forms; 1) it is manifested only in the form of oral transmission, employees are to know what vision of development the company's owner has (36%), 2) it is a set of a number of documents, materials, analyses (36%), 3) it is a single document in which it is accurately described (14%). Unfortunately, in more than every fourth company (21%), the owners claim that there is no such thing as a strategy (compare: Figure 2).

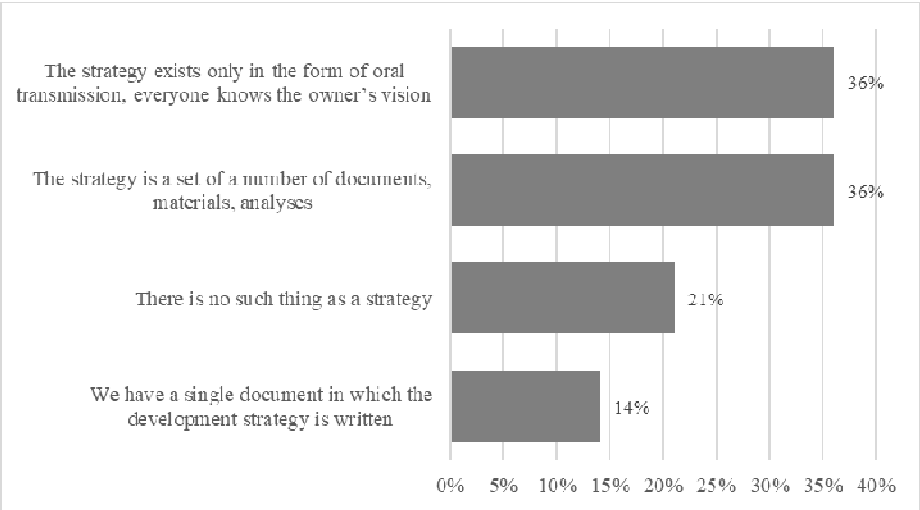

Fig. 2: Percentage of indications of the form of the applied development strategy in the surveyed enterprises

Source: Own research

The research results indicate that Polish family businesses are willing to take individual decisions, often of the key importance for the development of the entire business. Family business owners do not formalize some processes, thus not allowing all in the company to be aware of the motives behind fundamental changes in the company. Such behavior may become the reason for conflicts again: both in the area of the family and the entire family business, bringing about a decline in motivation, involvement and identification with the most important aspects of the family business operation.

In the processes of shaping the development strategy from the perspective of the surveyed entities, the most important was the possibility of extending the company's offer – this priority was indicated by nearly half of the respondents (49%). The respondents also indicated expanding the business to new areas of operation (24%) and entering new geographic markets (21%). The surprising results were obtained in the case of the maintenance of the achieved market position and an increase in the company's value since these priorities were usually indicated as the most significant (compare: Figure 3).

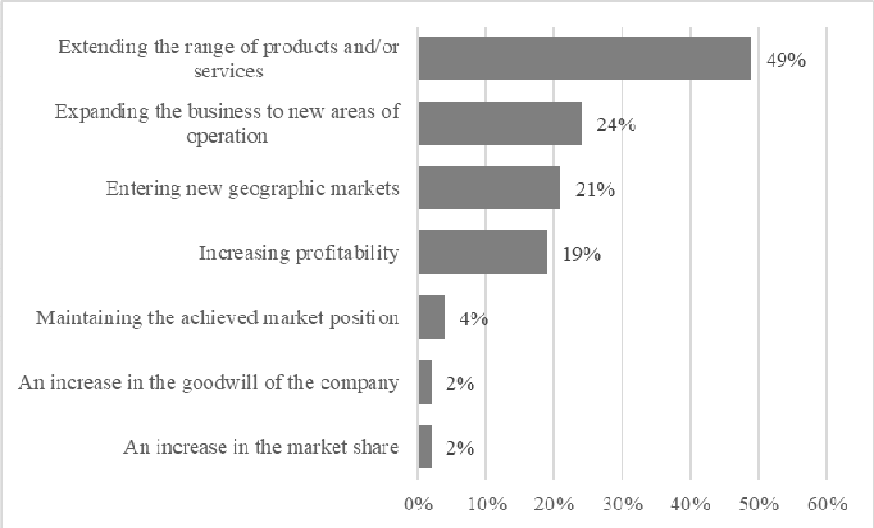

Fig. 3: Priorities taken into account in building the development strategy in %
Source: Own research

The company's development is not a spontaneous phenomenon, it depends on external operating conditions and capabilities of the company. The analysis and scanning of external environmental factors are necessary to capture changes in the market and most of all, to quickly respond to these changes. The flexibility of the strategy involves the ability to follow the changing environment. Currently, most of the scientific papers related to strategic management describe and proclaim agile enterprises, with the dynamic and flexible reorientation of the strategy in relation to the changing environmental conditions. The ability of the company to respond to changes through the adaptation and modification of current organizational activities as well as business models will allow for maintaining its market position. On the other hand, the lack of monitoring of the environment is one of the symptoms of the reckless approach to the conducted business activity. It can be associated with the uncritical implementation of the assumed strategic objectives of the company, but it seems to be a task which, in the long term, will not bring the assumed expectations. In the opinion of the respondents, more than 57% of those questioned indicate the priority of monitoring competitors and the environment in the company's operations (compare: Figure 4.).

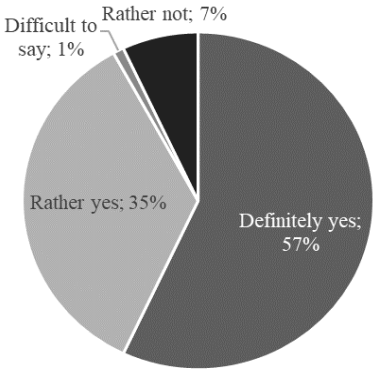

Fig. 4: Significance of the analysis of the environment in building the strategy
Source: Own research

The respondents were also asked about the essence and significance of the factors taken into account while observing competitors. The essence of each factor could be rated using the 5-point Likert scale. The structure of responses is presented in Table 5.

Table 5: The essence of factors taken into account while observing the activities of competitors in % on the 5-point scale

Specification	[1]	[2]	[3]	[4]	[5]
Product/service	70	23	0	7	0
Price	64	29	0	3	4
Product/service quality	81	12	7	0	0
Commercial offer	37	53	10	0	0
Selling arrangements	21	43	31	5	0
Building relationships with customers	43	7	50	0	0
Marketing	36	36	29	0	0
Policy in social media	36	38	21	0	5
Sponsorship/social activities	5	14	21	38	21
Forms of payment	25	33	5	16	21
Implemented innovation/novelty	25	25	14	5	31
Qualifications and experience of employees	21	36	5	38	0
Suppliers	15	20	25	25	15
Customers	43	36	14	7	0

[1] Definitely important; [2] Rather important; [3] Difficult to say; [4] Rather unimportant; [5] Definitely unimportant
Source: Own research

The conducted research indicates that only every fifth company does this very often. Half of the companies claim that often (50%), and every third that occasionally. Family businesses analyze all the important aspects of conducting a business activity compared to the operations of competitors. The research results may indicate that family businesses are aware of the significance of the analysis of the competitive environment in building the development strategy. The factors such as:

observation of the competitor's product/service (70% - definitely important and 23% - rather important); price (respectively 64% and 29%), product/service quality (81% and 12%) are the most important in the process of observation. There are three components which are definitely most often taken into account while creating the commercial offer as well as when building future development plans. Half of the companies could not decide on whether they analyzed building relationships with customers by competitors (50% - difficult to say). The companies also do not notice that, in building competitive advantages, sponsorship and social activities are important (38% - rather unimportant and 21% - definitely unimportant).

The findings of the research into the results obtained in the last three years indicate that success in the form of an increased interest in the products offered was achieved by a very large group of enterprises (86%) – see: Figure 5. This result was recorded by small enterprises with the number of employees below 10 (40% of all indications), which mostly deal with services, (76%), are characterized by sole proprietorship (45%) and operate in the domestic market (47%) – compare: Table 6).

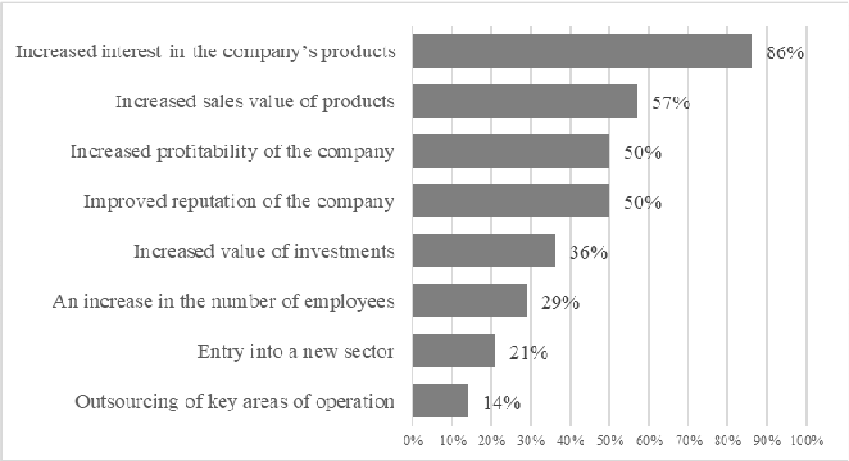

Fig. 5: Results achieved by Polish family businesses in years 2016-2019

Source: Own research

More than half of the companies indicated an increase in the sales value of products as their success (57%). These are also mostly small enterprises (47%), dealing with production (70%), conducting their activities as a commercial company (44%), operating in the domestic market (38%). A small number of companies (14%) indicated the implementation of the process of inclusion and transfer of key areas of their operation to external entities as their success. These were medium enterprises (100% of indications), primarily operating in the production industry (96%), in European (47%) and international (49%) markets.

Table 6: Results achieved by Polish family businesses in years 2016-2019 depending on the distinguished characteristic features of enterprises (% of indications)

Classification criterion	Specification	Increased interest in the company's products	Increased sales value of products	Improved reputation of the company	Increased profitability of the company	Increased value of investments	An increase in the number of employees	Entry into a new sector	Outsourcing of key areas of operation
		Percentage of indications (%)							
Number of employees	fewer than 10 employees	40	47	36	45	24	0	4	0
	10-50 employees	22	8	29	4	24	30	6	0
	51-250 employees	38	45	35	49	52	70	90	100
Dominant industry	Services	76	28	70	25	40	21	12	4
	Industry	24	72	30	75	60	79	88	96
Legal personality	Sole proprietorship	45	38	42	55	19	2	7	5
	Civil company, general partnership	19	12	14	20	40	53	33	46
	Commercial company (Ltd./S.A.)	36	47	44	26	41	43	60	48
Range of operation	Local	37	36	57	32	26	26	35	0
	National	47	38	28	31	26	26	33	4
	European	7	14	14	2	24	26	32	47
	Global	9	12	1	35	25	21	0	49

Source: Own research

Verification of the hypotheses

When verifying the hypothesis that possessing the defined and detailed strategy for the company's operation is, in the respondents' opinion, a tool to achieve the assumed strategic objectives, the following sub-hypotheses were formulated:

I. possessing a single document in which the company's development strategy is written – in the respondents' opinion has an impact on:
   a. increased interest in the company's products
   b. increased sales value of products
   c. improved reputation of the company
   d. increased profitability of the company
   e. increased value of investments
   f. an increase in the number of employees
   g. entry into a new sector
   h. outsourcing of key areas of operation

In order to analyze the relationships between the selected variables for each combination of variables, the Pearson's correlation coefficient r was calculated, at the assumed significance level of α=0.05.

Table 7: Value of correlation coefficients for sub-hypothesis

Sub-hypothesis testing		Vale of Pearson's correlation coefficient
a)	Possessing a single document in which the company's development strategy is written and increased interest in the company's products	0.356
b)	Possessing a single document in which the company's development strategy is written and increased sales value of products	-0.076
c)	Possessing a single document in which the company's development strategy is written and improved reputation of the company	-0.051
d)	Possessing a single document in which the company's development strategy is written and increased profitability of the company.	0.312
e)	Possessing a single document in which the company's development strategy is written and increased value of investments.	0.503
f)	Possessing a single document in which the company's development strategy is written and an increase in the number of employees.	0.285
g)	Possessing a single document in which the company's development strategy is written and entry into a new sector.	-0.040
h)	Possessing a single document in which the company's development strategy is written and outsourcing of key areas of operation.	0.371

Source: Own study.

When adopting the following five-dimension description of the strength of the relationship between the analyzed variables:

- (0 – 0.2) - no relationship,
- (0.2 – 0.4) - poor relationship,
- (0.4 – 0.7) - moderate relationship,
- (0.7 – 0.9) - significant relationship
- (0.9 – 1.0) - very strong relationship,

it should be concluded that one may talk about the existence of only, at most, moderate relationship between possessing a single document in which the company's development strategy is written and increased value of investments. The relationships between 1) possessing a single document in which the company's development strategy is written and increased interest in the company's products; 2) possessing a single document in which the company's development strategy is written and increased profitability of the company and 3) possessing a single document in which the company's development strategy is written and outsourcing of key areas of operation are poor. This also applies to the relationship between possessing a single document in which the company's development strategy is written and an increase in the number of employees.

The results of the empirical verification indicated that in the case of 1) possessing a single document in which the company's development strategy is written and increased sales value of products, 2) possessing a single document in which the company's development strategy is written and improved

reputation of the company and 3) possessing a single document in which the company's development strategy is written and entry into a new sector, the variables are not correlated.

Conclusions

In the face of changes which are inevitable and taking place at an accelerating rate, family businesses must respond to challenges of the new, variable reality. To be able to skillfully manage changes and direct the company towards innovation and development, it is worth becoming aware of the fact that the strategy is actually the starting point for any major change in the enterprise. The beginning of the strategic process is associated with verifying the efficiency of operations already functioning in the company and often, at this stage, certain shortcomings, inconsistencies and inaccuracies come to light, the solution of which is fundamental for the implementation of changes related to the entire company.

The obtained research results suggest that the strategy of Polish family businesses functions as a set of documents, analyses and materials and in the form of oral transmission rather than a single written document. The main directions of development of enterprises are most of all the desire to expand the offer of companies and to extend business to new areas of operation. Interestingly, entrepreneurs hardly take into account an increase in the market share or an increase in goodwill. The highly competitive environment of enterprises requires careful observation of competitors, primarily in terms of the products and services they offer, their quality and also the price.

The current situation caused by the economic crisis related to the global pandemic COVID19 indicates that the previous conclusions from the conducted research may have been devaluated. The future direction of the research is to study how the issues related to succession planning and the path of development of family businesses have changed in the face of the existing changes. It is worth looking at this problem by comparing the economies of different countries, paying attention to what has been important in strategic management so far and what new strategic challenges are posed to enterprises by new realities. The research results presented in the article are the starting point in relation to new economic challenges.

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LCC As A Tool for Assessing Sustainable Business in Circular Economy on The Example of Recycling Industry in Poland Under the EU Project CIRCE 2020

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Abstract

Transition towards the circular economy, a core priority of the EU 2020 Strategy, is particularly relevant for central European industrial areas due to the outstanding use of primary natural resources in various production stages: processing, packaging and transportation. The aim of CIRCE 2020 project is the realization of a set of pilot actions based on the results of local surveys in order to identify the unevaluated waste streams using innovative instruments derived from the MFA, LCC and LCA analysis. The purpose if this paper is to present the results of the LCC analysis of two case studies of Polish companies from the recycling industry. Each case study contains two solutions – BaU (Business As Usual) and CE (Circular Economy). LCC analysis in the first case study covers multi-layered plastic. Current treatment of multipolymer waste is landfilling (BaU). In the CE solution multipolymer waste become the input to the conversion process, include regrinding, shredding, mixing and thermic processing. As an output polymer board is generated, that may be treated as a finished product. LCC analysis in the second case study covers highly contaminated or heavily printed plastic (mostly packings - foils) that cannot be recycled in the traditional way. Current treatment of unpure waste is landfilling (BaU). In the CE solution plastic waste become the input to the extrusion process, which allows to use a different combination of plastic waste. As an output the terrace board is generated. The overall conclusion indicates the efficiency of using the circular economy solution. The LCA analysis showed environmental effectiveness in both case studies, the LCC analysis showed the economic effectiveness of the first case study. The LCC results come from the author's own calculations as LCC expert in the CIRCE 2020 project in Poland.

Keywords: Circular Economy, Life Cycle Costing, Recycling, Activity-Based Costing.

Introduction

In recent years, there has been a significant increase in publications in the field of corporate social responsibility. Generally, CSR represents the impact of an entity on the economic, environmental, and social areas in which it operates (Golub, Podnar, Elving, Nielsen, Thomsen and Schultz 2013, p.177). Those three areas con not be skipped, because companies cannot conduct business in isolation from the environment and the needs and expectations of all stakeholders – both internal and external (Matten and Moon 2005). It must be stated, that "the increasingly important role of socially responsible management has been recognized, which in the long term should guarantee sustainable development, that is, one that achieves the objectives of the company while taking care of its environment – the environment being key

to the company's operation" (Garstecki, Kowalczyk and Kwiecinska 2019). This study focused precisely on the recycling activities as a form of circular economy.

One of the most interesting topics of broadly understood social responsibility is the circular economy. There is a tendency to minimize the environmental impact of business operations. The use of recycling becomes one of such activities. This article presents the results of LCC analysis in two Polish recycling companies that have switched to a circular economy. Each case study was carried out in two solutions - business as usual (BaU) and circular economy (CE). The study is the result of two-year research in the CIRCE2020 project.

Transition Towards Circular Economy

Undoubtedly, economic progress has more or less a negative impact on the environment. However, in recent years there has been an increased interest in corporate social responsibility. It can be stated that one of the many areas of corporate social responsibility is an attempt to minimize production waste and its subsequent storage or incineration. Recycling is becoming more and more important (Zhao 2018) as production waste is reused. According to recent publications "the circular economy (CE) proposes that all materials flow in a close-looped system. Waste generated by one production stage may be useful in another. Thus, the idea of a CE is linked to the goal of zero waste (ZW) and promotes a range of sustainable economic, social and environmental benefits in each sector" (Li, Meng, Leung, Zuo, Tang and Wang 2018). There are several benefits of circular economy (Sehnem, Vazquez-Brust, Pereira and Campos 2019):

- environmental,
- economic,
- operational,
- social.

As we can see, circular economy affects three basic corporate social responsible fundamentals – environment, economy and society. There is a linear relationship between circular economy and CSR (Scarpellini, Marin-Vinuesa, Aranda-Uson and Portillo-Tarragona 2020).

Some authors also point to the fact that circular economy is part of industry 4.0 (Cezarino, Liboni, Stefanelli, Oliveira and Stocco 2019) and highlight positive influence from improving business sustainability by reinserting waste into the supply chain in order to manufacture products on demand (Nascimento, Alencastro, Quelhas, Caiado, Garza-Reyes, Rocha-Lona and Tortorella 2019) in different industries, like fashion (Hvass and Pedersen 2019; Sandvik and Stubbs 2019).

Recycling can be analyzed from the perspective of its impact on the natural environment and the economic situation of an enterprise that applies the principles of circular economy. It is obvious that no company will implement the circular economy if it would be unprofitable even in the long run. Therefore, it is important to assess the environmental and economic benefit of the circular economy together. This approach was used in the CIRCE2020 project.

The aim of the CIRCE2020 and basic assumptions of Polish case studies

Transition towards the circular economy, a core priority of the EU 2020 Strategy, is particularly relevant for central European industrial areas due to the outstanding use of primary natural resources in various production stages: processing, packaging and transportation. The aim of CIRCE 2020 project is the

realization of a set of pilot actions based on the results of local surveys in order to identify the unevaluated waste streams using innovative instruments derived from the MFA (Material Flow Analysis), LCC (Life-Cycle Costing) and LCA (Life-Cycle Assessment) (CIRCE2020). Therefore, the project aims to change the economic path from linear economy to circular economy (CIRCE2020).

Identification and verification of the most relevant industrial waste streams in Wielkopolska region (Polish state) were the initial stages of the CIRCE2020 project. Reaching this goal was possible due to the MFA (Material Flow Analysis) step. Data for the MFA analysis were obtained from the Wielkopolska Marshal's Office and they came directly from companies producing and managing industrial waste.

Taking into consideration the specificity of the studied region economy, the largest waste streams are those generated by sorting of paper and cardboard, ashes and various mixed plastics. Multi-layered plastics and mixed plastics are often contaminated and hard to separate and as such cause difficulties during sorting and recycling. For this reason, improving the reuse and recycling rates for plastic waste is still challenging and gives a lot of space for development of new waste-treating technologies. Due to the above it was decided to put a lot of emphasis on the MFA analysis of this type of waste.

Out of eleven analysed waste streams, up to five were plastic waste, including two streams (EWC: 15 01 02 - plastic packaging, 15 01 06 - mixed packaging waste) have the higher generation parameter indicator of all studied streams (respectively 60.6 and 20.1 thousand Mg produced in 2016). Moreover, several following factors had great impact on the decision to select waste plastics (especially multi-layered plastics) as the most promising stream for the LCA and LCC analysis:

1) plastic waste is a major environmental problem, and therefore the aim is to eliminate plastic landfilling and minimalize its energy recovery,
2) low level of recycling (in the case of 15 01 06 - less than 3%),
3) large expected drop in the amount of generated waste after applying new technological solutions,
4) possible diversion of some waste stream parts for recycling or material recovery instead of energy recovery,
5) openness, fast decision-making process and positive attitude to the idea of the CIRCE2020 project by the stakeholders and the related good data availability for LCA and LCC analysis.

Results of the LCC analysis

First Case Study

LCC analysis in the first case study covers multi-layered plastic. There are a lot of multi-layered plastic products that are delivered to the recycling facilities (packagings, construction elements, pieces of equipment, etc.). Another source of multipolymer waste is the rest fractions coming from recycling processes on the sorting line. Such waste is not homogenous material and it is very difficult to recover individual polymers to process them and to produce regranulates.

Current treatment of multipolymer waste is landfilling (BaU), which means that multipolymer waste goes directly to the landfill. The other option (less likely) is RDF production. RDF is usually used in cement factories or lime works with rotary kilns, where adding RDF allows to replace conventional fossil fuels. This solution was not applied in the study.

In the identified CE solution multipolymer waste become the input to the conversion process. Physical treatment allows to use a different combination of multipolymer waste to produce plastic plates. The main

technological processes include regrinding, shredding, mixing and thermic processing. As an output polymer board is generated, that may be treated as a finished product. What makes recovered product valuable is the potential possibility of many applications, e.g. as a building material or a cargo-transport unit. For example, it is an excellent substitute for original board protected top layer of ground in pigsty.

The main goal of the study was the cost assessment of the plastic board production from multipolymer waste in two solutions: existing business as usual (BaU) and circular economy (CE).
The system boundary of LCC study carried out for the BaU scenario includes processes that occur in the end-of-life stage of multipolymer waste (material composition: HDPE 30%, PP 30%, PC 10%, PA 10%, ABS 10%, Aluminium foil 10%). In the BaU scenario the process of landfilling is considered (Figure 1). The recycling company doesn't run such a process, has no influence over it and as well no access to the specific information (background system). BaU_2 is not included in the LCC study. In BaU solution the system expansion is applied - production of the conventional polymer board, for which secondary data set is used.

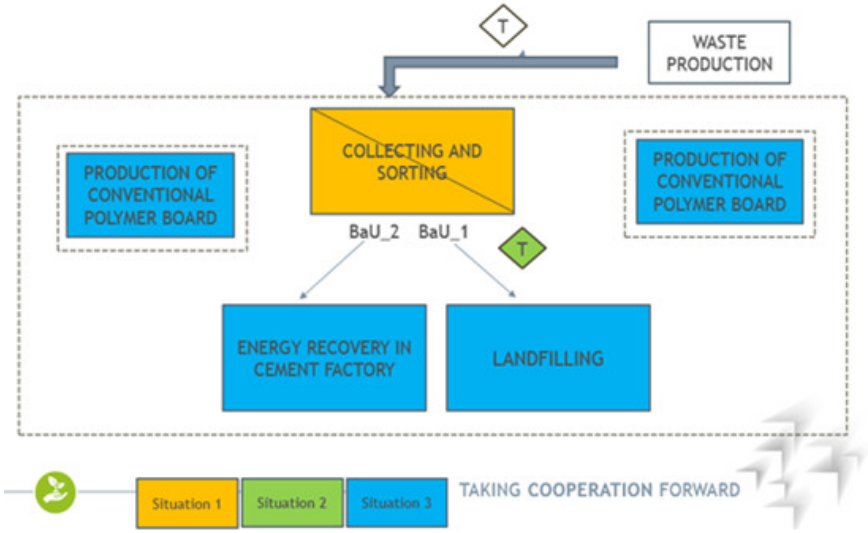

Fig. 1: System boundaries of BaU solution (CASE 2)

The system boundary of LCC study carried out for the CE solution includes processes that occur in the stage of plastic board production from multipolymer waste (Figure 2). Following technological unit processes are taken into account:

- shredding,
- regrinding,
- mixing,
- thermic processing.

In the scope of carried LCC study internal transport and packaging process also are included. All above-mentioned processes are the company's foreground system and primary data for them are collected. Finished products, just as waste, are stored in an open space and this process is included in the study (just as in the second case study). In the CE solution there are no co-products, by-products and waste streams. Waste generated after thermic processing (overflow) is reused as an input

in the conversion process. Wastes generated in the foreground system are mostly indirect materials.

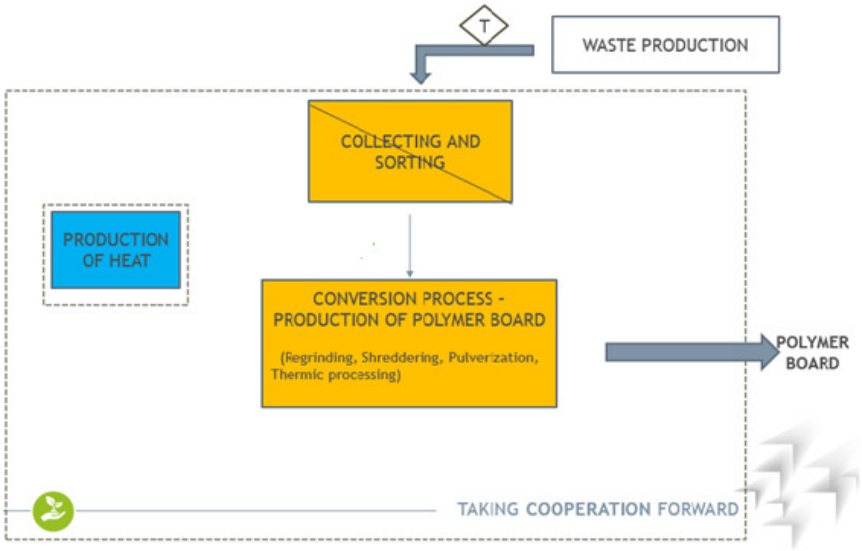

Fig. 2: System boundary of CE solution (CASE 1)

The analysis show that the BaU solution is more expensive than the CE solution. The unit cost of the BaU solution is 524.42 PLN/unit and the CE solution is 204.64 PLN/unit. The LCA analysis showed much greater environmental benefit of the CE solution as well. It can therefore be concluded that applying the principles of circular economy is beneficial for the company and the environment.

The total unit cost of the board in CE solution seems to be relatively high. The high cost-consuming production of the board is primarily influenced by:

- high purchase price of wastes,
- high energy consumption,
- high depreciation value of fixed assets.

Additionally, indirect costs were calculated also for each manufacturing phases. Simplified ABC costing was used. It shows that the most cost-consuming is phase II – production of boards. The conclusion arising from the analysis is that the company should implement lean production and lean accounting, in other words looking for savings by eliminating or minimizing bottlenecks.

Second Case Study

LCC analysis in the second case study covers highly contaminated or heavily printed plastic (mostly packings – foils) that cannot be recycled in the traditional way. In contrast to the previous study, it is a single-layered plastic, however, analyzed wastes are a mix of different kinds of polymers (e.g. HDPE, LDPE, PP, PS, ABS) coming from both industrial sectors and municipal sphere.

Current treatment of unpure waste is landfilling (BaU), which means that waste goes directly to the landfill. The other option (less likely) is RDF production. As in the previous study, the first mentioned scenario is considered as „zero scenario" (BaU).

In the identified CE solution plastic waste become the input to the extrusion process, which allows to use a different combination of plastic waste. It is concluded that also multi-layered waste may be processed with the use of designed technology. Realized processes are categorized into two groups: preparatory processes (regrinding, cleaning, drying) and basic processes (homogenizing, extrusion, cooling). As an output also the board is generated. It should be mentioned that the new production is in the early phase of implementation. For the purpose of process testing, production was realized in a very small extent. It is concluded that recovered product is valuable and its most potential application is a terrace covering but it needs to be further processed by polishing, brushing and painting with a protective UV varnish. The outgoing secondary product that was received in pilot production is smaller than a traditional average terrasse board.

The main goal of the study was the cost assessment of the plastic board production from multipolymer waste in two solutions: existing business as usual (BaU) and circular economy (CE).

The system boundary of LCC study carried out for BaU scenario (Figure 3) covers processes that occur in end-of-life stage of unpure plastic waste (material composition - homogeneous fractions: HDPE 30%, LDPE 20%, PP 20%, PS 15%, ABS 10%, sludge 5%). As in the previous case study, the BaU includes the process of landfill (with no access to the specific information) and transport of waste, which is not run by the analyzed recycling company but the specific information about transport are available. BaU_2 was conducted only on the LCA study. Analyzed waste is stored in an open space and this process is included in the study. In BaU the system expansion is applied – production of conventional terrace boards, for which secondary data set is used.

The system boundary of LCC study carried out for CE solutions includes processes that occur in the stage of terrace board production from unpure, homogeneous plastic waste (Figure 4). Those processes are categorized into two groups:

1) preparatory processes – regrinding, cleaning, drying;
2) basic processes – homogenizing, extrusion, cooling.

In the scope of the carried out LCC study for CE solution, internal transport is included. All above-mentioned processes are the company's foreground system and primary data for them are collected. Finished products, just as waste, are stored in an open space and this process is included in the study. In the CE solution there are no co-products, by-products and waste streams. Waste generated after extrusion is reused. Wastes generated in the foreground system are mostly indirect materials and wastewater with sludge.

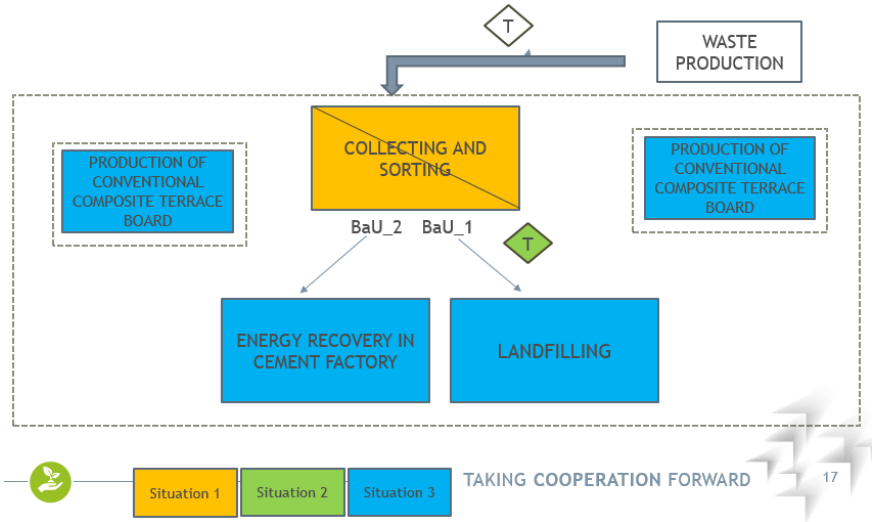

Fig. 3: System boundaries of BaU solution (CASE 2)

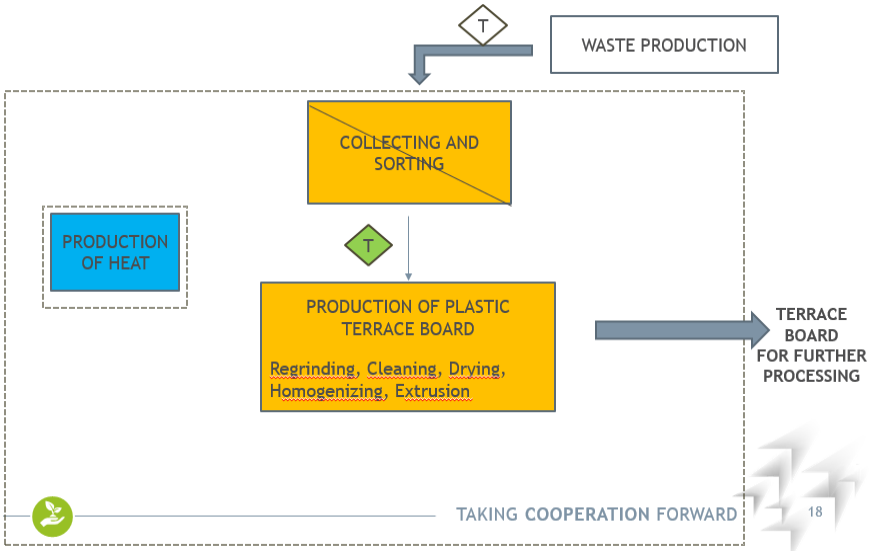

Fig. 4: System boundary of CE solution (CASE 2)

The analysis show that the BaU variant is more expensive than the CE variant. The unit cost of the BaU solution is 9.47 PLN/unit and the CE solution is 31.22 PLN/unit. The LCA analysis showed much greater environmental benefit of the CE solution than the BaU solution. In this case study, the operating company started producing terrace board recently, so initial expenses still affect financial income. It can be assumed that as the scale of operations increases, the unit cost of the terrace board will be lower, and therefore the company's profit as well. The last conclusion is the same as in case 1 - the company should implement lean production and lean accounting in order to lower the unit cost of terrace board.

Final Conclusions and Future Research

First, the CIRCE2020 project has proven that the circular economy is not only environmental but also economically beneficial. This is a pilot project, but it can already be stated that widely understood recycling has a positive impact on the environment, as shown by LCA analysis in both case studies. In one case, LCC analysis showed the economic profitability of production using recycled raw materials. In the second case study, the CE solution turned out to be less profitable, however, this is due to the specificity of the company and the small scale of activity in the area of the analyzed product.

Secondly, the analysis and reports prepared as part of the CIRCE2020 gave both companies the opportunity to implement changes. These changes will also largely affect their economic situation.

Thirdly, the study may be extended to include external costs in the future. In this project externalities were not included in the LCC analysis. Therefore, there is a research gap that can further demonstrate the efficiency of circular economy, due to the reduction of various external costs, such as the cost of renovating public roads used to transport waste or disposal of waste.

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Economic Security of Households: Threat Identification and Risk Diagnosis Tools

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Abstract

The security of the national economy is largely determined by the economic security of the households operating in it. The stages of this study includes: pre-processing of open statistical data, identifying trends in socio-economic status of the households, determination the factors of influence on the state of economic security of households and formalization of the relevant groups of indicators, grouping municipalities based on significant factors that affect the state of economic security of households. In this article we study the interrelation of internal (availability of own resources, directions and volumes of their use), external factors (social orientation of state budget expenditures) and the state of economic security of the household. Authors propose to use groups of indicators, characterizing the activities of households by functional basis for analyzing the state of economic security of a household. We have developed and applied relative indicators and generalized estimation coefficients that allow us to calculate the normative values of criteria for assessing the state of economic security of households depending on the specified values, as well as to assess the degree of risk of violation of economic security of households.

The positioning of the municipalities of the studied region was carried out according to the criteria of providing households with their own resources, resources allocated from the regional budget, and the use of total resources.

The proposed approach broadens the possibilities of identifying threats and diagnosing the risk of economic security of households. This method can be used in the methodology for assessing the current socio-economic policy of the subject of the Russian Federation and its municipalities.

Keywords: economic security of the household; indicators for assessing the state of economic security of a household; household income; household expenses; socio-economic policy.

Introduction

The attention of the state and the scientific community is gradually focused on the issues of economic security of the household. As a result of changes in internal and external conditions, there is a loss of stabilization factors in the economic security of the household. Because of changes in internal and

external conditions, there is a loss of stabilization factors in the economic security of the household. The principles of market management are being introduced into the practice of state economic policy. The structural imbalance of the labor market is deepening. Social risks associated with a temporary loss of working capacity, unemployment, and limited availability of medical and educational services are becoming more acute. The structure of population expenditures is deformed with the predominance of food and medicine purchases.

Ensuring economic security is one of the urgent tasks that modern Russia tackles. According to the Federal Law "On Security" No. 390-FL dated 12/28/2010, the objects of security are a person, society, and the state *(Alifanova, Nivorozhkina and Evlakhova, 2018)*. In turn, the National Security Strategy emphasizes the need to focus resources on the priority of improving the quality of life and high standards of livelihoods, investment in human capital, strengthening the role of the state in ensuring the development of education, health care, and culture *(Animitsa and Naumov, 2016)*.

Materials for study

The development of the concept of households, risks, dangers and threats to its functioning is carried out mainly in the framework of the resource *(Ivanaeva, 2017)*, factor *(Alifanova, Nivorozhkina and Evlakhova, 2018)*, and institutional approaches *(Ledyaykina, 2019)*. The complexity of the tasks necessitates the search for tools that meet the requirements of an objective and high-quality measurement of the parameters of the safe state of households, as well as deviations from their given values. A variety of research approaches is associated both with the breadth of understanding of the household contents, and with the many processes that determine its safe state.

The processes of functioning of the household are considered by researchers as relatively independent phenomena. Accordingly, a qualitative and quantitative assessment of certain areas of the household activity is carried out: production *(Sedova, 2015)*, exchange, consumption *(Animitsa and Naumov, 2016)*, saving *(Malkina and Khramova, 2017)*, entrepreneurship *(Litvinova, 2016)*, financial activity *(Kislitsyna and Untanov, 2015), (Glukhov, Ostanin and Rozhkov, 2015)*, reproduction of human capital.
The main problem is the issue of the correlation between the internal resource capabilities to ensure the economic security of the household and external sources of its support and strengthening. On the one hand, the economic safety of a household should not depend entirely on the state *(Podolnaya, 2016)*, on the other hand, the state's non-attention can lead to destabilization of both the household economy and the national economy as a whole *(Kaplun, 2015)*.

In the works of Russian and foreign authors, the study of economic security of households is mainly carried out in the following areas:

- assessment of the actual state of households;
- dynamic changes in the state of households;
- threats and risks of household functioning;
- priorities of socio-economic development of households.

In foreign studies, the approach based on actual and factor assessments of the state of economic security of the household is widely used. The economic security of households is affected by guarantees of health care, the presence (loss) of work, the presence (loss) of property *(Dominitz and Manski, 1996)*, *(Kaldor, 1939)*; income from financial assets and securities, social and pension payments *(Popova, Yakimchuk and Nadezhina, 2018), (By a Thread: The New Experience of America's Middle Class | Demos, n.d.)*; structure and volume of ownership, availability (absence) of health insurance, the size of the monthly budget *(Nivorozhkina, 2016)*, *(Hicks, 1939)*. The statistical indicators used in the study quantitatively reflect the social and economic aspects of the life of the household.

Since all socio-economic processes are dynamic, the index method has great scientific and practical significance: the methodological apparatus for assessing the economic security of households is ex-

panding, and the possibility of generalizing and concretizing essential processes is provided. The calculation of indices of the capacity of social institutions, the commissioning of social institutions, the coverage of the population by social institutions, investments in the social sphere, etc. *(Beeferman, n.d.)* is used when analyzing the impact of social infrastructure on the standard of living of the population. A personification of the economic security of a household is achieved by using the quality of life index *(Kaplun, 2015)* and the integral welfare index *(The level and dynamics of quality of life in the regions of Russia 2006-2013, 2015)*. The limitation of the index method is mainly associated with the numerical characteristics of the functioning and development of households, their dynamic states.

Socio-economic indicators visualize a breach of the safe state of the household; scale of threats to economic security; the effectiveness of state policy *(The level and dynamics of quality of life in the regions of Russia 2006-2013, 2015)*. The analysis is carried out according to the absolute value of the indicators, which is justified only when determining the general directions of measures in the field of ensuring economic security of the household.

To assess the effectiveness of public administration, indicators of achieving the set goals are associated with the calculation of rate indicators. The list of relevant indicators includes: the availability of modern education and health care, support for labor employment, advanced training and the quality of labor resources, supplying the population with high-quality and affordable food and medicines, poverty reduction, maintaining a healthy lifestyle, social support for vulnerable society groups, the development of housing and improving the quality of housing and communal services *(Kislitsyna and Untanov, 2015)*. Such an application of the indicator does not allow making an objective assessment of the economic security of the household due to both the diversity of the measures the uncertain dimension of the weight of the indicators.

The indicators find practical application in the process of monitoring the socio-economic state of the household in the aspects of the labor market, demographic trends, and the state of public law *(Found and Belousova, 2018)*. The methodology is focused on evaluating the current level or assessing changes in particular indicators.

It is obvious that a special assessment of indicators is necessary to ensure the economic security of the household:

– proportions ensuring the sustainability and safety of households;
– trends characterizing the socio-economic situation of households;
– systems of factors ensuring the social and economic well-being of households;
– efficiency of social and economic policy of the state;
– the degree of relevance of priorities in the field of economic security of the household.

The need for a comprehensive assessment of the state of economic security of the household makes it advisable to introduce into the methodological apparatus not individual indicators, but groups of indicators that characterize the activity of household households on a functional basis *(Sliva, Gladkovskaya, Gurlev and Mikhalina, 2018)*. As a result, a generalized indicator is formed based on data of different origin and purpose, and groups of indicators are brought to a single measurement system. The proposed approach allows you to:

- establish the normative values of the criteria for assessing the economic condition of households, depending on the set (established) values for relative indicators and estimated ratios;
- diagnose and establish the degree of risk of household functioning;
- analyze the relationship of the social orientation of the state budget policy with the state of economic security of the household;
- identify measures to ensure increased economic security of the household.

Within the framework of the established methodology, taking into account current trends, using an integrated approach, we define the economic security of households as the state of the sufficiency of resources (own and redistributed from the budget), which allows the household to implement its in-

herent functions, counteract threats, and ensure continuous reproduction. The purpose of this study is to develop a methodology for assessing and predicting the state of economic security of households based on the identification of patterns with obtaining mathematical models.

The object of the study is a household that operates in conditions of risks and threats. The subject of the research is trends reflecting the state of economic security of the household.

As a hypothesis, we consider the relationship between internal (own income) and external factors (redistributed income) and the state of economic security of the household. Threat identification and the diagnosis of the economic security risk of a household are carried out according to the income criterion.

We focus the study of household economic security on the relationship between the social orientation of regional budget expenditures and the availability of resources for households in the region.

Methodology

The studied regularities of the influence of factors on the effectiveness of the interaction of the studied groups of indicators characterizing the activities of households in general can be described by the function ψ. The function ψ is a set of indicators in the form of a polynomial of the second degree of the corresponding evaluation parameters:

$$\psi = \varphi(\chi_1, \chi_2, \chi_3, \ldots \chi_m, F, \gamma),$$

where $\chi_1, \chi_2, \chi_3, \ldots \chi_m$ - factors affecting the function ψ;

F and γ - internal "noise", factors that influence indicators, but are difficult to take into account (reporting distortion, emotional background, etc.).
The accepted list of optimization indicators according to the functional basis with factors influencing them is as follows.

The accepted list of optimization indicators according to the functional basis with factors influencing them is as follows:

1. The indicator of economic security of households by the factor of resource availability (ESRA), determined by the formula:

$$\mathrm{ESRA} = \frac{\mathrm{DR-CE}}{\mathrm{DR}}, \quad (1)$$

where DR - disposable resources on average per household member, rubles / person;
CE - current expenses on average per household member, rubles / person.

The disposable resources of households include cash income, savings, borrowed funds, and the value of in-kind income. Consumer expenditures, the cost of in-kind receipts of food and non-food goods, services form the totality of current expenses. To solve partially the problem of assessing the state of economic security of a household by the resource endowment factor, we use the calculation of the financial security coefficient through the ratio of disposable resources and household current expenses.

2. The indicator of economic security of households by resource use factor (ESRU), determined by the formula:

$$\mathrm{ESRU} = \frac{\mathrm{DR-CE}}{\mathrm{CE}}, \quad (2)$$

3. The indicator of economic security of households by the factor of availability of resources distributed from the regional budget (ESSE), determined by the formula:

$$ESSE = \frac{SE}{RB}, \quad (3)$$

where SE - expenditures of the regional budget for the social sphere, including education, healthcare, physical education and sports, etc.;

RB - expenditures of the regional budget.

4. The indicator of the mathematical expectation of household reliability (ESrisk), determined by the formula:

$$ES_{risk} = e^{t/T}, \quad (4)$$

where t - the forecast time period of assessment, year;
T - the estimated time period of evaluation, year;
e - the base of the natural logarithm (exponent).

The mathematical expectation of household reliability (ESrisk) characterizes the "temporary" reliability of the functioning of households (a kind of "risk") *(Gurlev and Khomyakova, 2016)*. The analysis of the functioning of households indicates that basically the termination of economic activity (t, years in relation to T-the total time of operation, years) is "sudden undesirable events", which leads to a consistent design of reliability - an exponential distribution as a special case of the Poisson distribution.

5. The coefficient of the frequency of termination of the economic functioning of households per 1000 households (EFH), determined by the formula:

$$EFH = \frac{n}{N} \cdot 1000, \quad (5)$$

where n - the number of economically inactive discontinued households;

N - the total number of households.

A further analysis of the economic activity of households is advisable to produce by the relative values of the indicators.

The use of relative indicators is appropriate, since the state of the object, characterized by indices, is evaluated in a large numerical range - from thousandths of a unit to as many as tens of units. Therefore, the presented indicators are brought to a single measurement system in which they can be compared with each other. One of such systems is the system of dimensionless (normalized) relative calculus. In the presented study, for each indicator Y_i(i = 1…n) we determine the "best" values (maximum or minimum) Yi_{max} (Yi_{min}) upon reaching which the object accepts the best (maximum) evaluation criterion *(Gurlev and Khomyakova, 2016)*. Analysis of changes in the assessment indicators of the studied objects, expressed by generalized relative (integral) criteria within the unit by the formula:

$$RC_{Yi} = \frac{Y_i}{Y_{i_{max}}} \text{ or } RC_{Yi} = \frac{Y_{i_{min}}}{Y_i}, \quad (6)$$

where RC_{Yi}- the generalized (relative) criteria;

Y_i - the estimated (studied) value of the response function of optimization indicators;

$Y_{i_{max}}$ - the maximum value of the response function;

$Y_{i_{min}}$ - the minimum value of the response function.

The relative indicator under ideal conditions of the most successful combination of optimization parameters should satisfy the condition $RC_i = 1.0$.
In this article authors present the degree of change in economic security of households taking into account the GRP_{reg} of the analyzed region, as the generalized estimated coefficient (integral)

$$GEC_{Yi(GDP)} = RC_{Yi} * 10 * \lg\frac{GDP_{Russia}}{[GRP_{reg}]}, \quad (7)$$

where $RC_{Yi} = \frac{Yi}{Y_{i(max)}}$ - the generalized indicator provided that Yi(max) is the value of the i-th coefficient in the group of indicators should be the largest;
$RC_{Yi} = \frac{Y_{i(min)}}{Yi}$ - the generalized indicator provided that Yi(min) is the minimum value of the i-th coefficient is the best;
$10 * \lg\frac{GDP_{Russia}}{[GRP_{reg}]}$ - is a logarithmic coefficient taking into account the level of Gross Domestic Product of the Russian Federation (GDP_{Russia}) of the estimated period in relation to the GRPreg - of the estimated period.

The value of GEC_{Yi} must satisfy the condition when GEC_{Yi}> 0.0. In this case, the larger the logarithmic coefficient $10 * \lg\frac{GDP_{Russia}}{[GRP_{reg}]}$ is, the more favorable are the conditions for stable functioning of households in the corresponding period of the analyzed object.

In the Table 1 there is a version of their interpretations in the form of the obtained critical quantities (a fragment of the set of solutions) in the form of a generalized indicator (relative estimate) according to the adequacy of the models. Based on the developed mathematical models of generalized indicators, an analysis of the motivated choice of groups of territories of the Chelyabinsk region for a significant contribution to the GRP was made: Chelyabinsk, Miass, Zlatoust, Kyshtym, Magnitogorsk.

The analysis of the obtained models, which have many solutions, it is advisable to produce in tabular form, which shows the results of a joint solution of the system of all the equations obtained. Table 1 shows the found critical indicators by the quantitative and qualitative criteria as optimal – Optim. Optimal critical indicators are a combination of all values of the criteria (critical) of optimization, corresponding to conditions that satisfy all indicators. Factors that determine the optimal relationship (Optim) of the estimated groups of indicators have the following meanings.

Gross regional product per capita of the Chelyabinsk region *(Popova, Yakimchuk and Nadezhina, 2018)*: GRP = 13234 dollars per person; with this GRP disposable resources can be DR = 38126 -...38203 dollars per person with the existing number of households N = 44478 -...44488.

Under these conditions, the optimal critical indicator was determined:

ESSE an indicator of the total social expenditures on education, health, culture, etc. with a value of 0.1902 -... 0.2181 (with GEC_{ESSE} = 1.7756 ... 2.0367).

Thus, the methodology for assessing the state of economic security of households includes the following indicators of the analyzed region:

RC_{ESDR} – indicator (of economic security) of financial security of disposable resources;
RC_{ESCE} – an indicator of financial security of current expenses;
RC_{ESSE} – an indicator of the total (total) social spending on education, healthcare, culture, etc.;
RC_{ESrisk} – an indicator of the mathematical expectation of the effective activity of households (risk indicator);
RC_{EFH} – indicator of the reliability of household activities (frequency of inefficient households);
RC_{SEE} – an indicator of the assessment of spending on education;
RC_{SEC} – an indicator of the assessment of expenditures on culture;
RC_{SES} – an indicator of the assessment of the costs of physical education and sports;

RC_{SEHC} – an indicator of the assessment of health care spending;
RC_{SEOE} – an indicator of the assessment of other regional social expenditures of the budget (i.e., excluding the costs of education, healthcare, physical education and sports).

The developed methodology allows diagnosing the degree of risk, highlighting threats to the economic security of households, assessing the degree of sufficiency of budget social expenditures, taking measures to increase the efficiency of social policy implementation, and predicting the state of economic security of households.

Results

Authors tested the presented methodology for identifying threats and diagnosing the risk of economic security for households using the example of the Chelyabinsk region. The information base of the study was the data on the budget execution reports of the Chelyabinsk region in 2016-2018 *(Hicks, 1939)*, as well as data from the Federal State Statistics Service of the Chelyabinsk Region on the standard of living of the population for the same period *(Animitsa and Naumov, 2016)*.
Options for existing and recommended critical indicators of the analyzed territorial entities are shown in the histogram (Fig 1.). The recommended option of the optimal solutions (the last columns of the histogram) in relative terms by mathematical models will be 0.2181 ... 0.1902, which corresponds to the "critical" indicator of RC_{ESSE} - an indicator of the total (total) social expenditures on education, health, culture, etc. This indicator is the criterion from which economic security is assessed.
In this study all other indicators will have larger values (Table 1).

Table 1: the recommended critical indicators of the analyzed territorial entities

Critical indicators	Range of values
RC_{ESSE}	0.2181 ... 0.1902
RC_{ESDR}	0.263…0.264
RC_{ESCE}	0.376…0.377
RC_{ESSE}	0.190…0.218
RC_{EFH}	0.258…0.374
RC_{ESrisk}	0.347…0.547
RC_{SEE}	0.240
RC_{SEC}	0.233
RC_{SES}	0.249..0.297
RC_{SEHC}	0.248…0.252
RC_{SEOE}	0.304…0.314

(Source: counted by the authors)

The above calculation of indicators for assessing the economic security of households based on the fact of financial security of disposable resources (RC_{ESDR} = 0.263) and the indicator of resource use (RC_{ESCE} = 0.376 ... 0.377) indicates the fact that the availability of resources reallocated from the state budget can lead to significant improvement in household activities. This forecast is indicated by the maximum calculated values of the indicators of the mathematical expectation of the reliability of the functioning of households and the coefficient of the frequency of termination of the functioning of households.

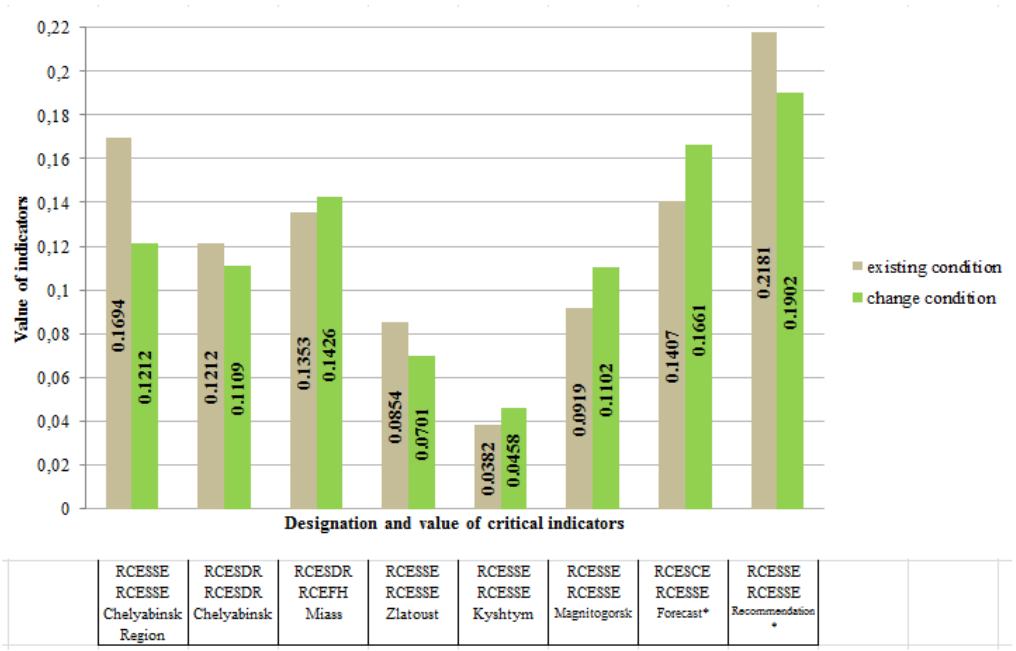

Fig. 1: A histogram of the distribution of territories of the Chelyabinsk region by the "Critical Indicator" with the optimization option (*recommendation)
(Source: compiled by the authors)

Based on the developed mathematical models with a significance level of α=0.05 according to the Plan-ex program, an analysis of the motivated choice of groups in some municipalities of the Chelyabinsk region was performed: Chelyabinsk, Miass, Zlatoust, Kyshtym, Magnitogorsk. Table 1 presents analysis and optimization of the results of the obtained models, which have many solutions. Also in table 1 we present the results of the optimization of the economic assessment of household activities by indicators RC_{Yi} и GEC_{Yi} . All values of optimization indicators correspond to conditions that satisfy the selected criteria.

In the presented optimization variant, the corresponding values of the factors will be as follows (Table 1):

DR=37886 ... .38076 dollars per person;
CE=1027 ... 1031 dollars per person;
SE=$2.769 • 10^7 ... $2.780 • 10^7.
Factors that determine the optimal relationship between the estimated groups have the following values:

- fixed GRP = $ 13 234 per person in 2019 and GRP = $ 14178 per person, as the best option for time forecasts;
- t = 5 ... 9 years at T = 9 ... 11 years.

The developed models allow us not only to analyze the interactions of various groups of indicators, but also to search for solutions that contribute to ensuring the economic security of households. According to the calculated threshold values of generalized indicators (Fig. 1), the municipalities of the Chelyabinsk region were ranked.

The values of the "threshold" of the critical relative indicator were calculated using mathematical models under the condition that RCyi> 0. For example, for the Chelyabinsk region the minimum value of the relative indicator of the mathematical expectation of household reliability is RC_{ESrisk}=0.169 (GEC_{ESrisk}) (Table 1). Moreover, the values of the factors will be: t = 9 years and T = 11 years. And

for the forecast period a critical indicator of the assessment will be the indicator of social expenditures with the value of RC_{ESSE}= 0.103 ... 0.169 with the values of factors SE=$ 2.616 • 10^7 ... $ 2.341 • 10^7. Similar analysis is also possible for other combinations of factors and indicators (see Table 1).

Table 2: assessing the economic security of household functioning in Chelyabinsk region on critical indicators (optimization fragment)

Critical indicators and factors			Name of territorial entity						Forecast *	Recommendation 1*
			Chelyabinsk region	Chelyabinsk	Miass	Zlatoust	Kyshtym	Magnitogorsk		
Estimated indicator, relative values	RC_{Yi}	Indicator	RC_{ESSE}	RC_{ESDR}	RC_{EFH}	RC_{ESSE}	RC_{ESSE}	RC_{ESSE}	RC_{ESSE}	RC_{ESSE}
		Value	0.1694	0.1212	0.1353	0.0854	0.382	0.0919	0.1407	0.2181
	Overall optimization score		"no-optim"	"no-optim"	"no-optim"	"no-optim"	"no-optim"	"no-optim"	"no-optim"	"optim"
	The generalized estimated coefficient GEC_{Yi}		1.5045	1.2122	1.3318	0.6523	0.2657	0.7283	1.1999	2.0367
Change Option	RC_{Yi}	Indicator	RC_{ESDR}	RC_{ESDR}	RC_{ESDR}	RC_{ESSE}	RC_{ESSE}	RC_{ESSE}	RC_{ESSE}	RC_{ESSE}
		Value	0.1245	0.1109	0.1426	0.0701	0.0458	0.1102	0.1661	0.1902
	Overall optimization score		"no-optim"	"no-optim"	"no-optim"	"no-optim"	"no-optim"	"no-optim"	"no-optim"	"optim"
	The generalized estimated coefficient GEC_{Yi}		1.1331	1.115	1.4115	0.5395	0.3212	0.8794	1.4255	1.7756
Critical indicators and factors (Xi)	GRP, dollars per person	Existing	11 923	15 418	14 876	8 955	7 659	9 565	10 988	13 234
		Change option	12 543	15 603	15 055	9 062	7 751	9 679	11 120	13 234
	DR, dollars per person	Existing	35 922	37 562	37 511	32 113	31 852	37 141	35 865	38 127
		Change option	37 086	38 028	37 976	32 511	32 247	37 601	36 310	38203
	N, number of households	Existing	45 505	38 656	25 057	32 578	27 755	39 101	43 670	44 478
		Change option	45 619	38 745	25 115	32 653	27 819	39 190	45 081	44 488
	T, years	Existing	11	12	11	10	10	12	10	12
		Change option	11	12	11	10	10	12	10	12
	CE, dollars per person	Existing	1 787	1 840	1 803	1 916	1 768	1 856	1 850	998
		Change option	1 855	1873	1835	1950	1 800	1 889	1 647	1 003
	SE,thousand dollars	Existing	26 157	28 207	32 807	24 897	23 897	23 296	22 487	28 787
		Change option	27 465	25 245	29 362	22 283	21 388	20 850	23 611	28 795
	SEC, thousand dollars	Existing	42 676	35 089	33 667	38 169	35 267	43 267	33 722	36 561
		Change option	43 316	35 510	34 071	38 628	35 691	43787	34 127	36 566
	SEE, thousand dollars	Existing	16 256	15 758	13 254	11 725	12 655	13 767	12 750	11 411
		Change option	16 264	15 758	13 254	11 725	12 655	13 767	12 050	11 411
	SES, thousand dollars	Existing	1 166	1 030	1 207	1 092	968	1 130	1 161	1 156
		Change option	1 184	1 045	1 224	1 108	981	1 146	1 177	1 157

	SEHC, thousand dollars	Existing	120	116	120	112	128	113	122	127
		Change option	123	115	119	111	126	112	120	127
	SEOE, thousand dollars	Existing	298	290	346	336	335	383	344	353
		Change option	314	294	351	341	339	389	349	353
	t, year	Existing	10	5	9	8	9	6	10	10
		Change option	10	5	9	8	9	6	10	10
	n,number of house-holds	Existing	9 734	8 667	9 797	8 957	7 989	7 790	7 624	9 276
		Change option	8 654	6 844	7 736	7 073	6 309	6 151	6 021	7 263

(Source: compiled by the authors)

*Note: * The results of the estimated and forecasted periods are presented as a result of calculation according to the obtained mathematical models. Developed by the authors.*

Conclusion

As a result of the study, authors determined that the solution to the problem of sustainable development is associated with the study of the state of economic security of the household. The authors proposed a methodology to identify threats and diagnose the risk of a breach of the security of the household.

The analysis of the results showed on an example that regional social policy measures are not sufficient to ensure the economic security of households. As a function in determining the region's development strategy, as a means of expanding and multiplying the region's potential we should consider competitive advantages, limits of sustainability and imperatives of economic security of households in the region.

The proposed approach can be applied in any constituent entity of the Russian Federation to both directly assess the state of economic security of a household and to predict its dynamics. The findings can be useful in assessing the effectiveness of regional development management, as well as in developing measures to increase the sustainability of the regional economy.

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The Impact of Cross-Selling in Hospitality

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Abstract

Hospitality, like most industries today, is constantly changing. Markets keep growing, consumers are increasingly demanding, and this requires from the hotel units a continuous work to achieve success where often the key factor is differentiation. The present study intends to observe if the cross-selling techniques are important tools for the hotel industry and if they become an effective differentiation factor on what concerns customer satisfaction and loyalty. For the accomplishment of this study, the authors applied surveys to three types of public: a) consumer; b) hotel manager; and c) hotel employee. It was found that, currently, these tools are effectively used in the hotel market and that they contribute to improve the relationship between the customer and the organisation.
This means that these companies, in order to survive in today's market, must create new sales strategies and therefore distinguish themselves from the competition. Furthermore, this study also demonstrates that consumers take into consideration the opinion of others who already know these services. This word-of-mouth trend, now globalized across digital platforms, influences demand, and hotels are already aware of it, leading them to base their strategy on the increase of customer satisfaction, sometimes by implementing cross-selling techniques.

Keywords: Hospitality; Cross-selling; Word-of-mouth; Satisfaction; Loyalty.

Introduction

Cross-selling is still currently defined as offering current customers additional products or services that can provide added value for them.

According to Levine (1996), Cross-selling has been linked to increased sales, greater levels of customer satisfaction, loyalty, and a higher overall level of spending per customer. Therefore, cross-selling can be considered an important tool for organisations to use in support of their customer relationship strategies.

Nowadays, one cannot associate hospitality only to the service of accommodation; it is something far more complex deserving a multi perspective analysis. Guests are more demanding, and the market is more competitive.

Danubianu M. (2008) mentioned that a successful company not only puts customers first but puts customers at the centre of the organization because the changes in customer behaviour determines unpredictable profitability.

When purchasing, the diversity of the offer makes the customer analyse a set of considerations, such as the price, the composition of the services, the location, and other guests' feedback.

Therefore, it becomes crucial for Hospitality units to find new ways of distinguishing themselves and of providing their guests with new and impacting experiences, able to establish a level of customer loyalty. It is the case of *cross-selling* strategies.

These dynamics enable hotels to generate more sales and, therefore, more revenue. Nevertheless, these sales, if applied correctly, may produce a better and longer relationship between the hotel unit and its customers.

Organisations need to adapt to the new market needs, and Hotels are no exception.

All details matter when it comes to gaining a new customer or making a customer loyal to the hotel. To understand the customers' needs it becomes crucial to be able to satisfy those needs.

Having this in consideration, techniques such as cross-selling techniques may present as important in the organisation strategy.

The present study intends to understand if cross-selling techniques are applied to the Hospitality sector and, if so, to understand their impacts.

Cross-Selling

In a research study by Kamakura (2007), cross-selling is referred as a technique previously used by salespeople to increase order size and to transform single-product buyers into multi-product ones, but more recently, also as a technique that has evolved into a strategy for customer relationship management.

In this scenario, and acknowledging that for companies, the cost of retaining a customer is substantially lower than the cost of gaining a new one, many customer-focused enterprises - such as Hospitality companies - are taking advantage of cross-selling techniques as a tool for customer development.

Several authors point cross-selling as a fundamental CRM (Customer Relationship Management) tool to gain proximity with their customers.

When a complementary offer to a customers' purchase is made, the company reveals acknowledgement of its customers' needs, perceptions and behaviours, showing therefore, a distinguishing mark over its competition (Kamakura et al, 2002).

Along the last decades, this practice gained relevance and managers understood that they can raise their sales by satisfying their customers offering them customed products/services, based on their real needs (Sharma and Sharma, 2015).

But cross-selling is far more than proposing a complementary service/product; it is, in fact, a real tool to sell new products/services.

Customer Satisfaction

Customer's satisfaction is measured through a comparison between a service/product performance and the existing expectations regarding that same service/product (Tsiros et al, 2004).

It becomes necessary to understand that what the customer wants from a product or service depends on several factors, being one of them the fact that they already established a relationship with the brand (Aaker et al, 2004).

It is important for companies to measure the level of satisfaction of their clients because that factor directly influences the loyalty to the brand and, therefore, the organisation's sales and revenue (Morgan et al, 2005).

In Hospitality, it becomes difficult to justify the customer satisfaction. This is true since in Hospitality, the satisfaction perceived by customers is measured by their expectations. The fact that customers' profile is different from customer to customer, makes the service evaluated from different points of view, since that same evaluation/satisfaction varies according to customers' personal expectation (Knutson and Yen, 2004).

Based on this reality, Kotler (2007) explains that when performance/result does not meet expectations, customer becomes unsatisfied; if it meets, the customer is satisfied, enlarging the probable customer loyalty to the brand.

Customer Loyalty

According to Afsar, Nasiri and Zadeh (2009), the term *loyalty* gained visibility in 194, being defined as the act of purchasing continuously from the same supplier or brand. When referring to the term customer loyalty we are assuming that this customer has established a relationship with the company/brand he is loyal to, making him more resistant to change (Kim et al, 2009).

Many Marketing researchers try to understand which factors contribute to customer loyalty, concluding that satisfaction can be obtained before the purchase, during it or through after-sale service, influencing, therefore, customer loyalty (Chang and Chen, 2009).

Loyalty cannot always be measured through the amount of times a customer purchases a product or a service. Nevertheless, if the brand fulfils or overcomes customer expectations, he will recommend the product/service to others and, in those cases, one can say that the customer is loyal (Kotler et al, 2007).

The Word-Of-Mouth

Arndt (1967) and Buttle (1998) mentioned WOM, *Word-of-mouth*, as synonymous of oral communication from people to people, between an issuer and a receiver, where the receiver perceives information related to the brand and its products/services as non-commercial information.

As mentioned before, current clients are more informed and before deciding a purchase of a service/product, they analyse all the available information, either through other customers' feedback or through social networks or related websites (Kotler et al, 2007).

A customer knows that a company aims sales and, therefore, the given information will always show the good side of their services/products. Thus, other customers' sharing of opinion regarding a service/product has higher impact amongst customers (Kotler et al, 2017).

The Analysis of The Impact of Cross-Selling in Hospitality

The Hospitality sector has changed along the years, mainly due to its customers' profile change.

Nowadays, customers are more demanding and require from Hotels much more than mere accommodation; they seek for experiences, which starts in the moment they make a reservation and ends when they make the check-out. For that same reason, cross-selling techniques may, effectively, help improving customers' experience.

Although cross-selling in Hospitality is not widely studied, it becomes relevant to produce studies in such thematic.

This way, in an attempt to understand the topic within the hospitality scope, a study, based on Inquiries directed at Customers and Hotel Managers was developed in order to assess the impact of these tools in this particular sector, and also assessing if its application increases customer satisfaction, enhancing their loyalty.

The sample of this study is composed by customers and hotel managers in Portugal. Since the population is large, and in order to obtain answers from specific targets, some exclusion criteria were applied, namely: based on proximity, only Hotels and other accommodation units in Porto were

selected (180 total). Since the study works with a sample, the Survey was done to 20% of the population – 25 hotels.

Regarding Customers, the number of the sample was defined based on the average occupation: 64%[1] in 2018. From these 25 hospitality units, there are, in average, 40 available room to sale. Given the occupation rate average, the number of customers is 25,6. Given the fact that the objective of this study is to understand the impact of cross-selling in Hospitality, for proximity issues, and consequent larger amount of answers, only resident customers were inquired. Such decision is based on the fact that a local customer tends to be more loyal when compared to a foreign customer, whose motive for visiting is normally connected to specific factors.

In the North of the country, in 2018 the number of nights represented 45%[2], meaning that the total amount of customer's sample is 288 (25 hospitality units x 25,6 customers in average x 0,45 nights). The total number of inquired Customers was 324.

Survey *Framework*

Although the Inquiries are different, the content of the proposed questions are very similar, since the aim of the present study is to be able to compare opinions to obtain a final indication of cross-selling impacts in customers satisfaction and, therefore, their loyalty. In the Figure below it is possible to assess the involved dimensions of the present study.

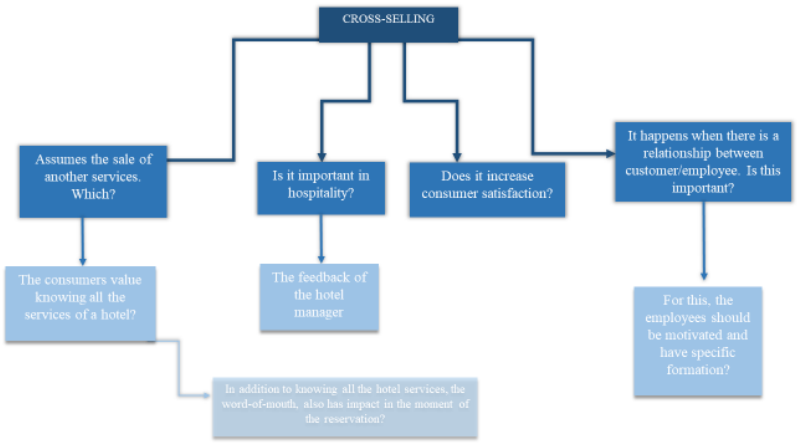

Figure 1: Survey framework.

Source: *Authors' elaboration*

Questions directed to Customers are related to demographic issues, frequency of hotel visiting, and other questions related to several aspects of the hotels (most valued services, importance of available information, impact of other customers' opinion, etc.).
Questions directed to Hotel Managers are related to cross-selling notions, necessary training, the *word-of-mouth*, and the most requested services in their hotels, aiming to know if their awareness of the importance of these techniques to enhance the customer-organisation proximity.

Results Analysis

The Customer Survey

On what concerns the Gender of the respondents, there were no major differences: 142 were male and 182 female – a percentual of 44% of men and 56% of women.

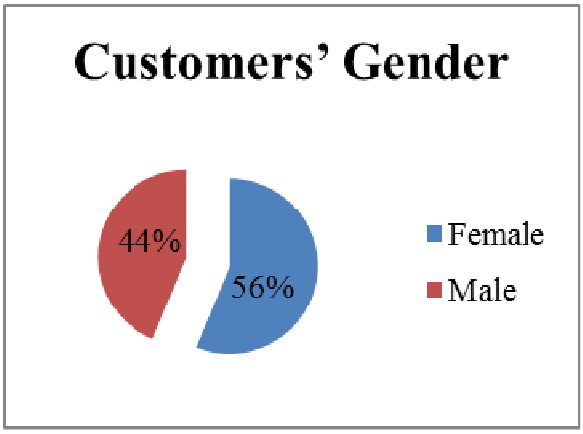

Figure 1: Customers' Gender

Source: *Authors' elaboration*

Regarding Age, 55% of the Customers were under 35 years old.

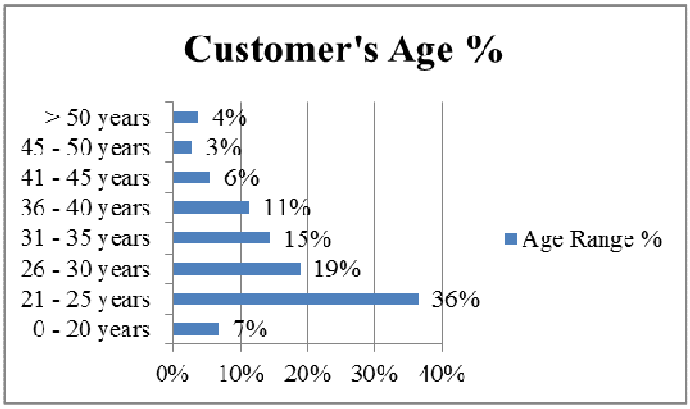

Figure 2 : Customers' age %

Source: *Authors' elaboration*

On what concerns the Most Valued Services demanded by the customers, besides accommodation, the state of the art reveals that restaurant services are considered essential and highly valued by hospitality customers - 36% of the inquired individuals also agreed with this statement. Nevertheless, the most valued serviced by them (57%) are leisure and wellness spaces, such as the swimming-pool or the Spa. A minority (8%) gave preference to extra activities and a small percentage (3%) preferred other options not considered in the Survey – although the other considered options were the view, the cleanness, and comfort, these aspects are considered as hotel characteristics and not services.

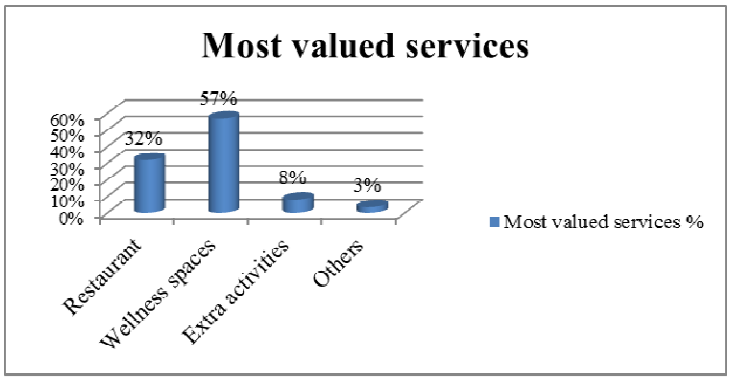

Figure 4 – Most valued services by customers %.

Source: Authors' elaboration

Analysing this topic over the individuals' gender point of view, opinion does not change - both genders consider wellness and restaurant as the most valued services.

Table 1 – Male most valued services

Service	Nº People	% Male Opinion
Restaurant	49	35%
Wellness spaces	79	56%
Extra activities	9	6%
Others	5	4%
Total Respondents	142	100%

Source: *Authors' elaboration*

Table 2 - Female most valued services

Service	Nº People	% Female Opinion
Restaurant	54	29,7%
Wellness spaces	105	57,7%
Extra activities	17	9,3%
Others	6	3,3%
Total Respondents	182	100,0%

Source: *Authors' elaboration*

From the respondents' age point of view, preferences for most valued services do not differ amongst different ages – a large majority of the inquired population refers wellness and, secondly, restaurant as the most valued services.

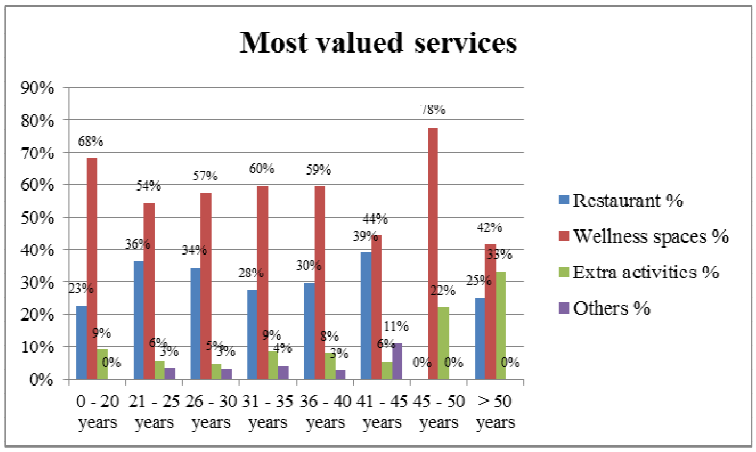

Figure 5 – Most valued services per age

Source: *Authors' elaboration*

If analysing the same parameter related to the hotel visit frequency, the panorama maintains – independently of the frequency, customers continue to value wellness services as the most valued ones, followed by restaurant services.

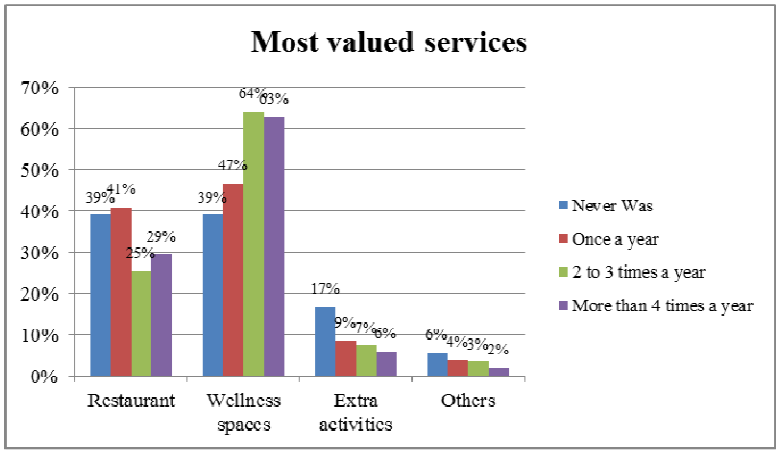

Figure 6 – Most valued services based on visit frequency

Source: *Authors' elaboration*

Regarding the Word-of-Mouth impacts on customers, respondents considered it a relevant fact (4, on a scale of 1-5), independent of the customers' gender.

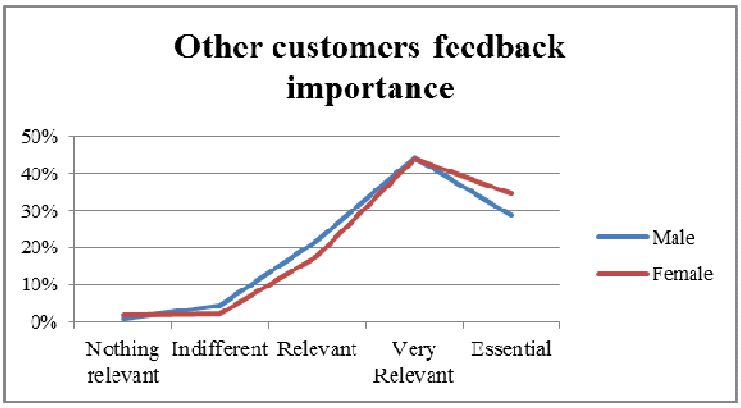

Figure 7 – Other customers feedback importance / gender
Source: *Authors' elaboration*

This same topic valued by age presents some differences: respondents from 25 to 35 years old are the only ones considering the word-of-mouth 100% relevant. The remaining generations, although the majority values this topic, there is a small amount that does not value it particularly.

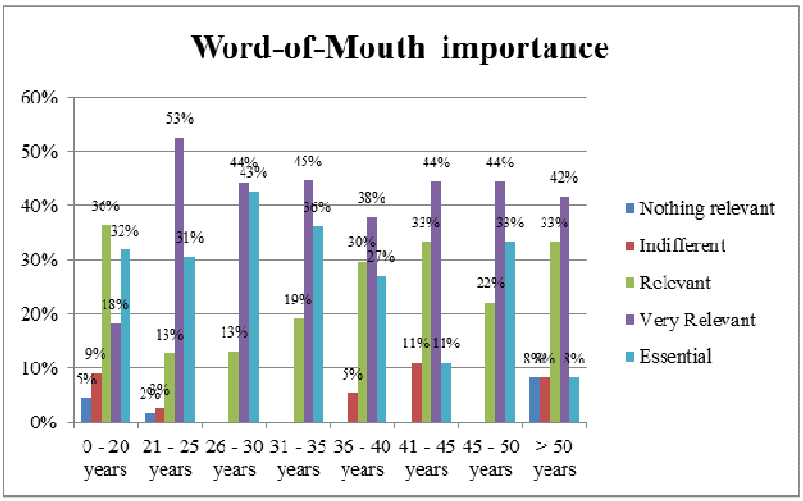

Figure 8 – Word-of-Mouth importance / age
Source: *Authors' elaboration*

The Hotel Manager Survey

The selected sample for the Hotel Manager Survey was of 25 Managers, although it was only possible to obtain responses from 23 of them.

If through the Customer Survey it became possible to understand that Hotel Information Availability (available services) was a major requirement, the majority of the respondents to the Hotel Manager Survey considered "effectively important" that customers become aware of all the available services at the Hotel. This was, in fact, the most valued topic in Hotel Managers Survey.

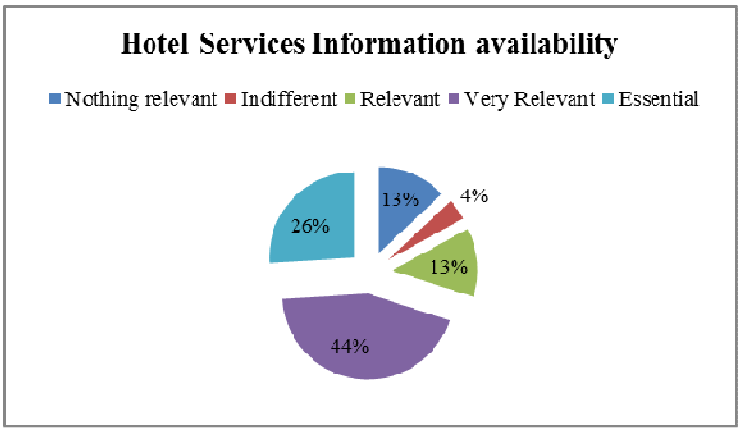

Figure 9 – Hotel Services Information availability
Source: *Authors' elaboration*

Regarding the perception of the Most Valued Services by the customers, most of the Hotel Managers consider the extra activities, such as tours and field trips, as the most valued service. After this, the most valued service according to Hotel Managers are the Wellness services, such as the Spa, and only in third comes Restaurant as a valued service for customers.

Two of the respondents pointed "other" services, namely the view and customer service as the most valued ones.

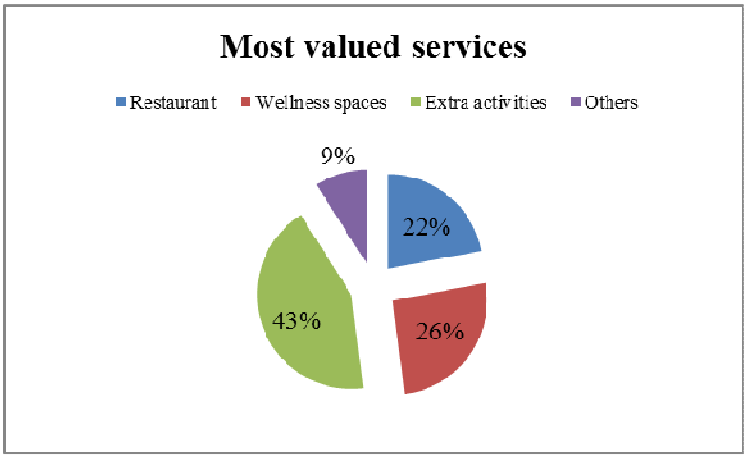

Figure 10: Most Valued Services (apart from Restaurant)
Source: *Authors' elaboration*

On what concerns the importance of the Word-of-Mouth, the Managers Survey mentioned it as the main factor of influence on the customer-organisation relationship since its beginnings – from the moment a customer purchases a hotel unit. More than 50% of the respondents revealed that the positive or negative opinions clients post on the Internet have significant influence on the Hotel purchase.

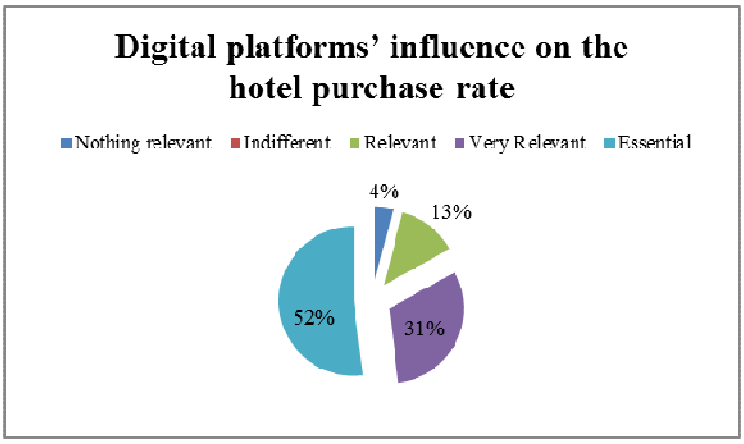

Figure 11: Digital platforms' influence (eWOM) on the hotel purchase rate
Source: *Authors' elaboration*

When it comes to evaluate the Hotel Managers' perception about the influence of the Cross-Selling Techniques on the customer relationship management, most of the answers did not signed this topic as "essential" to make a difference in the customer relationship management. Nevertheless, Hotel Managers revealed to be aware of these techniques' importance, when correctly applied, on broadening the scope of the relationship with the customer and increasing customer retention.

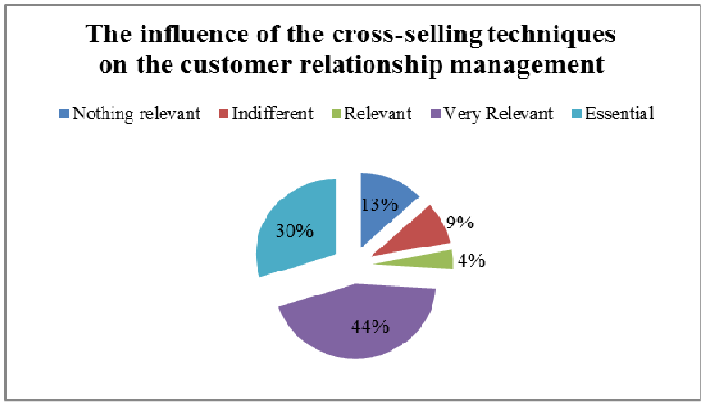

Figure 12 - The influence of the cross-selling techniques on the customer relationship management
Source: *Authors' elaboration*

Meaning, Hotel Managers do not clearly point Cross-Selling techniques as an "essential" influence on the customer relationship management (and, therefore, the customer loyalty and consequent retention), but they do consider as "highly important" the remaining variables that influence these same Cross-Selling techniques, such as the importance of having the Hotel Services Information available worldwide to customers; the customer-service importance; and the influence of the Word-of-Mouth in the Hotel rate.

Furthermore, nowadays the way the Word-of-Mouth (eWOM) influences a Customer purchase of a Hotel, requires Hotel Managers to use Cross-Selling techniques to obtain total Customer Satisfaction and, therefore, Customer Loyalty.

The objective of the present study was to understand if Cross-Selling techniques were widely used in Hospitality and to evaluate their impact in the sector.

The absence of literature review on the subject raised the question.

Even though the specific question was never exposed during the Customers Survey, since most of the respondents could not be familiar with the term Cross-Selling, the validation made to the remaining topics of the questions, demonstrate the importance they give to these techniques as Customers.

On the other hand, the Hotel Manager Surveys enabled the conclusion that managers consider Cross-Selling techniques important for Customer Satisfaction and, therefore, Customer Loyalty.

Although managers tend to consider these techniques as specific tools apart from several other techniques involved in the customer-service relationship management (and consequent loyalty), it is possible to conclude that, at the end, Cross-Selling techniques are daily used during the entire process of Customer-service management. In fact, the most a Hotel exposes itself to their customers – being present in the digital platforms (such as Booking, etc.); having a website; informing their customers about the entire Hotel services and products; enabling a more direct and closer relationship with their customers, through ways such as the word-of-mouth – the stronger is its Customer-service relationship.

In conclusion, Cross-Selling techniques aim to build loyal and profitable customer relationships, overcoming competitive pricing strategies in customers' attraction from competitors, and developing strong relationships with customers cross-selling them other services, according to their needs.

As Customers require from Hotels much more than mere accommodation, they seek for experiences, cross-selling techniques may, effectively, help improving customers' experience and, therefore, have significant impact in Hospitality.

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Reflexing Tools of Managing Consumer Choice in The Marketing System of Industrial Enterprises

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Abstract

The article proposes the application of a reflexive approach to consumer behavior management in the marketing system of industrial enterprises. It is based on the study of individual behavioral responses of consumers and the organization of influences on them. The analytical model of decision-making reflection, which is the author's modification of V. Lefevre's model of bipolar choice is proposed in the article. The proposed model allows us to identify the rational factors and the irrational factors in which the management will be able to most significantly influence the likelihood of the expected purchase decision, allows assessing the readiness of the consumer to choose before and after the implementation of reflective influence. The results of the study made it possible to identify the main areas of application of reflexive consumer choice management tools in the industrial enterprise marketing system. It is substantiated that the use of reflexive consumer choice management tools in the industrial enterprise marketing system is an important low-cost factor in declining the consumer to make a purchase decision.

Keywords: Consumer Choice, Marketing System, Model of Decision-Making Reflection, Reflective Management.

Introduction

Globalization processes in the global economy, intensification of competition, increasing instability of the external environment, complications of consumer needs require industrial enterprises to seek innovative tools for managing consumer choice. After all, the aggravation of competition in consumer markets leads to a rise in prices and a decrease in the effectiveness of the use of traditional marketing tools. In the unstable conditions of the operation of industrial enterprises, marketing tools should be taken into account. In addition to the rational component, the subjective component of consumer behavior are worth attention as well. The isolation of irrational factors of consumer choice allows the use of low-cost reflexive methods to persuade potential consumers to make a decision on purchase, and, consequently, to achieve the highest efficiency of marketing communications of industrial enterprises. In this context, marketing is considered as a system for managing the development of the network, ensuring consumer loyalty, partnerships that arise between the enterprise and consumers in the process of production and consumption of goods. Therefore, the purpose of the article is to justify the reflective tools of consumer choice management in the industry of marketing of industrial enterprises as a promising and low-cost adjustment direction favorable for enterprises interaction with consumers.

Literature Review

The research of consumer choice issues focuses on the work of many scholars. In particular, D. Kaneman in his work (2011) laid the conceptual foundations of the theory of consumer choice management, taking into account the psychological motives of consumer behavior, putting forward the hypothesis that people can not systematically and consistently make rational decisions because there is always a problem of asymmetry of information. Representatives of the Ukrainian Marketing Association also paid considerable attention to the studying of the influence of psychological and social factors on behavioral responses of modern consumers, the study of the motivational aspects of consumer choice and the management of behavioral changes in consumers when introducing innovations in the market of industrial goods (Reshetnikova and Sahaidak, 2016; Stankevich, 2017). By purchasing industrial and other products businesses should encourage consumers to become their partners, interaction both online and offline lets meet their hidden, emerging and future needs (Liczmańska-Kopcewicz and Wiśniewska, 2019; Nguyen et al., 2018). Also an important factor is consumer choice. It also takes into account the type of consumer's personality (Gangai and Agrawal, 2016; Gohary and Hanzaee, 2014; Pelau et al., 2018) and factors of its multicultural behavior in modern conditions (Manrai et al., 2015). Although culture as a construct has been defined and practiced in many ways. Marketing researchers have acknowledged that it is a comprehensive element that is central to any individual's thought processes, actions, and, of course, consumption practices. Worth of attention and research by scholars on the impact of age, religious affiliation and cultural peculiarities on consumer emotions (Sarofim and Tolba, 2018). The role of emotions in implementing consumer choice is decisive (Bagozzi et. al, 1999; Beckett and Nayak, 2008). Therefore, in the management of consumer choice it is necessary to take into account rational and irrational factors of consumer behavior that form their emotional attitude to a particular product (Julmi, 2019). Practically these situations indicate the presence of a subjective irrational component that affects consumer choice (Levy et al., 2013). The ability to highlight this subjective component would allow low-cost reflexive methods to incline a potential consumer to purchase (Mavrina, 2017). Mathematically this process was presented in his writings by the author of the concept of reflexive games V. Lefevre (2009). The scientist described the human behavior in the form of equations, the parameters of which are the influence of the environment on the behavior of the subject, the subjective image of this influence and the intentions of the subject. Reflexive management in this case is the process of transferring the grounds for making the necessary decision by the subject (Smolyan, 2013; Rusinova and Zhovkovska, 2017). Combining the ideas of reflective management and marketing concept, A. Dlygach formed the concept of system-reflexive marketing, which involves a system distribution of interests of subjects, the coordination of which takes place from the standpoint of a reflexive marketing manager (2017). Therefore, S. Turlakova and J. Shumilo, considering the theory of reflexive games V. Lefevre, suggests that aspects of the behavior of the subjects should be taken into account when they make certain decisions (2016).

Considering the investigations above, it should be noted that many modern scholars are prone to traditional approaches in assessing consumer behavior patterns (Foxall, 2010; Wei and Zhang, 2018); the study of the problems of irrationality of choice attracts much less attention from the representatives of economic thought and is carried out fragmentarily. In this regard, outstanding issues of searching of new, low-cost approaches to managing consumer choice by industrial enterprises remain unresolved, one of which is the reflexive approach.

Methodology and Research Methods

The theoretical and methodological basis of the study is the classical position of the theory of management of economic systems, individual choice and reflexive management and marketing. In the process of solving the tasks, the general scientific and special methods of research were used. They are the dialectic method, it allowed to investigate the factors of consumer choice and the main directions of realization of reflexive

influences in relation to consumers in their interconnection and interdependence. Analysis and synthesis was to determine the directions of use of reflexive instruments in the management of consumer choice by industrial enterprises in the market. Methods of mathematical modeling was used to develop an analytical model of decision-making reflection, which allows assessing the readiness of the consumer to choose before and after the implementation of reflective influence; grouping, matching and scientific synthesis – were used in developing recommendations for the effective implementation of reflexive tools for managing consumer choice in the marketing system of industrial enterprises.

Results

In modern theory of management one of the approaches is based on the study of individual behavioral reactions of consumers. It is a reflexive approach. The image of the enterprise is formed in the minds of the consumer as a result of obtaining information from various sources. At the same time each message received interacts not only with previous one, but also with certain ideas of a person, knowledge, principles and judgments. As a result, in the minds of the consumer is formed a single impression about the company and the product which affects the decision to buy. That is the process of making a decision on the purchase can be regarded as an information process. It is called the way of processing the consumer information (incentives). Purchase is the result of the processing of information. Managing consumer choice with the use of the marketing system of reflexive instruments in this case is to create for the consumer such an information field, which will incline it to the decision necessary for the company, and it is, the decision to buy the goods.

The main directions of reflexive actions affecting the choice of the consumer are presented in Figure 1. Numbers in Figure 1 show the following directions of realization of reflexive influences in the management of consumer choice are indicated:

1. Formation of representations about quality of goods on the basis of quality. This involves bringing to the consumer information about those aspects of the quality in which the goods have advantages, the demonstration of these benefits. About those aspects of quality, in which the goods yield to competitors' products, should either be quashed, or try to reduce the level of their significance in the perception of the consumer.

1'. Formation of new needs based on quality. This implies the formation of the need for those aspects of product quality that were not initially significant to the consumer, but which it has advantages over competitors. For example, when buying cement for internal construction work, the consumer may not be aware of the high waterproofness of a particular cement cement, but information about it may lead to the buyer's choice being directed to this type of cement.

2. Formation of representations of value based on functional characteristics. This implies bringing to the consumer information about the functionality and features of the product, in which it has advantages over competitors. Reduction in the consumer's presentation of the significance of those functional characteristics, in which the goods are inferior to the goods of competitors.

2‘. Formation of new needs based on functional characteristics. This means the formation of the need for those functional characteristics in which the buyer first does not feel the need, but which distinguishes the product favorably.

3. Management of irrational factors based on non-functional features. Influence on irrational selection criteria requires a considerable competence of the seller in psychology, since it is important to establish which irrational criteria can positively affect the choice of the consumer. Examples of the impact on the irrational component of the choice include the following: "This type of cement is popular among

construction industry professionals", "This is the choice of a true professional", "It is this model that is used by the company X, and there, as you know, very high requirements for quality of building materials", etc.

3'. Formation of new needs based on non-functional features. The influence on the irrational factors of choice (3) can be so successful that the consumer for a long time may need to own a product with certain properties, although these properties have no significance in terms of exploitation of the product. Often this may be pseudo-properties in general, which the product does not possess and to check that it is difficult or impossible to have it. Or it may be such properties as any other competing product, but the consumer does not know about it and chooses the product in which this property focuses attention. For example, the inscriptions on packages "made of environmentally friendly raw materials", "certificate of quality", etc., as a rule, taking into account the requirements of domestic legislation, are not binding on the enterprise and in most cases are not taken seriously by the consumer, but for others equal conditions, an advantage may be given to goods having similar distinctive features.

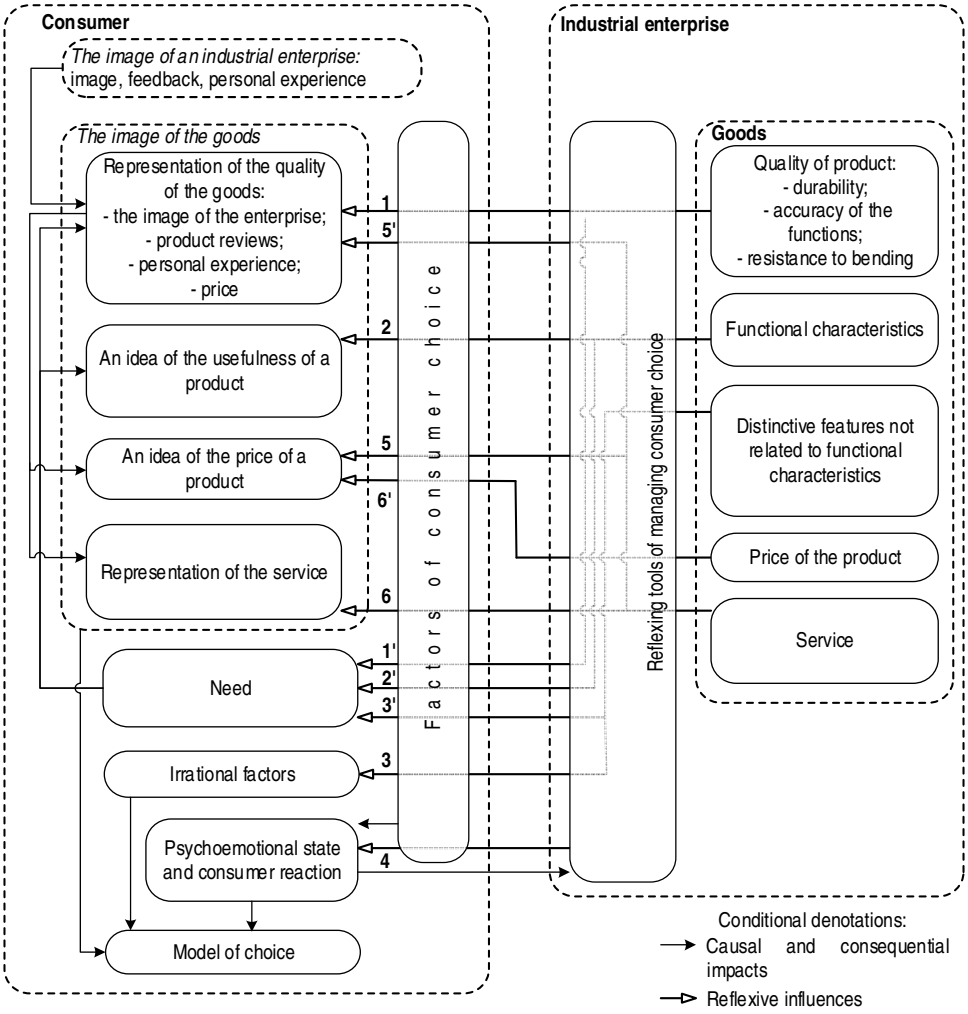

Fig. 1: Areas of realization of reflexive influences by an industrial enterprise in the management of consumer choice

Sources: developed by the authors

4. Management of the emotional state of the consumer. The implementation of these reflective actions requires a constant analysis of consumer reactions to certain reflexive influences, their behavior, emotional state. This type of reflexive management is effectively used together with the management of irrational factors (3), with which it is closely linked, and de facto difficult to separate from each other. However, the main difference here is that there is absolutely no binding to a particular product and its properties, but the main emphasis is on emotions, human values, a sense of patriotism, and the like. Examples of such actions can be: "better domestic goods, high quality, than foreign, with impurities", "I envy you, that you can build from high-quality materials", etc.

5. Formation of price representations on the basis of price. Modern marketing provides a whole set of techniques that allow you to change the perception of a seemingly absolutely deterministic and unambiguous value, as a price. This is not the inclusion in the price of the cost of related goods or complementary goods, the binding to the "favorable" exchange rate, the use of the principle of contrast, and the like.

5'. Formation of representations about quality on the basis of price. An overpriced price for certain consumers may be an indicator of high quality goods. In the absence of other quality criteria, a consumer who wants to buy a quality product will choose an item that is slightly more expensive if he is to make it clear that the high price is due not to a speculative surcharge, but to a high quality of materials.

6. Formation of representations about after-sales service. Informing about after-sales service (free transportation, cement loading of the required capacity) may prove to be a strong argument in favor of a product that is inferior to other criteria. To this end, the industrial enterprise must as accurately as possible identify the needs and expectations of its customers and clearly articulate its logistics profile, adhering to the criteria specified in it service. 6‘. Formation of representations about the price of goods taking into account after-sales service. If the goods are delivered free of charge and in the required quantity, then this fact can be profitable to justify the higher price.

7. Formation of ideas about an industrial enterprise – provided through the use of a number of marketing tools (personal sales, direct advertising, advertising in industry magazines, participation in exhibitions, etc.).

For industrial enterprises, for example, the cement industry, where market is segmented, the proposed directions of using reflexive tools in the management of consumer choice are presented in Table 1.

Table 1: Directions of use of reflexive instruments in the management of consumer choice by industrial enterprises in the segmented B2B market

Tool management	The object of management					
	New needs	The idea of quality	The idea of utility	The idea of the price	Irrational and subjective advantages	Emotional state
1. Quality						
2. Functional characteristics						
3. Distinctive features						
4. Price						
5. After-sales service						
6. Individual emotional influences						

7. Massive influences						
Symbols: – may be present in this market; – especially effective for the given market; – the possibility of this control is not installed						

Sources: compiled by the authors

Since in the segmented market the consumer purchase decision is made more carefully than, for example, in the non-segmented market, the consumer is often interested in additional information about a particular product, the decision on purchase can be taken not immediately, but through several stages of comprehension - this creates the conditions for more flexible and selective use of reflective influence tools of choice with the possibility of observing feedback and assessing the reaction of the consumer to such reflexive influences.

To reach the effectiveness of reduced reflective influences, especially those that are planned in advance, it is necessary to apply analytical models of decision-making reflection that will allow us to assess the readiness of the consumer to choose before and after the use of reflexive influence.

Consider the bipolar case, when some reflexive control of the industrial enterprise m is aimed at inducing the consumer to a specific action A (purchases). Before the consumer, there are two alternatives: to perform this action or not to do so. Technically, such an action can be motivated, for example, in the form of some informational message, which the consumer receives from a certain source.

Let the potential consumer face the choice: to buy the goods of the industrial enterprise (action A), from which received a reflective message, or not. Alternative 1^0 is the purchase of goods – this alternative is desirable and expected for the enterprise. Alternative 2^0a (checking the message, collecting additional information) is less satisfactory for the enterprise, but it is also acceptable if the proposed product has real competitive advantages. Alternatives 2^0b (ignoring the message) and 2^0c (the principle is not the purchase of goods or goods of the enterprise) – are undesirable for the industrial enterprise. The choice of an alternative consumer is affected by the following factors:

The 1st factor reflects the rational component of the choice and shows how much of the product offered in the presentation of a potential consumer meets his needs, or how much his own knowledge of the consumer about this product (its value, utility) correlates with the ability to meet certain needs.

The 2nd factor is closely related to the 1st factor, it is information about the product (enterprise) received / received by the consumer from other consumers, from Internet resources, publications in specialized publications, etc. This information also affects the consumer's perception of the product / company.

3rd factor is information mainly on the advertising nature of the product / enterprise, coming directly from the enterprise or from the media, which provides information about the company;

The fourth factor is trust in certain sources of information. Of course, independent sources (for example, reviews from other consumers) will be more trustworthy when making a purchase decision, for example, an advertising offer.

The fifth factor is any subjective factors that are not related to the rational characteristics of the product and its ability to meet consumer needs. This may be: the desire to buy from the domestic manufacturer, personal sympathies, antipathies to the managers of the enterprise, their own intuitive doubts or beliefs of the consumer, which are not backed by rational factors.

The 6th factor is the desire of the consumer to purchase the goods before receiving a reflexive message (the level at which the consumer was ready to purchase the goods, if he had not had a reflexive effect).

We formalize these factors for the quantification of the readiness (or probability) of the consumer, which is subject to reflexive effects, to the implementation of action A (choice of alternative 1^0), namely the purchase of goods.

1. Let the consumer have some function of the value of the consequences of the purchase A, which expresses the objective (in the opinion of the consumer) the need for purchase, and which acquires value on the interval [0; 1]: $f_0(A) = 0$, if there are no objective prerequisites for the purchase, or the consequences of the purchase give a purely negative result; $f_0(A) = 1$, if all the consequences of the purchase A give a definitely positive result. Let the consumer also have some doubts about the authenticity of his own knowledge of the product, which allows him to doubt the accuracy of the evaluation of the function $f_0(A)$. This parameter also becomes a value on the interval [0; 1]: $\alpha_0 = 0$, if the consumer feels completely incompetent in relation to the characteristics of the product / company; $\alpha_0 = 1$, if the consumer is absolutely sure of the reliability of his knowledge and, accordingly, the accuracy of the evaluation of the function $f_0(A)$. Then the value $\alpha_0 f_0(A)$ – reflects the level of action of the 1st factor – the consumer's own knowledge of the product / enterprise.

2. Let the consumer receive information about the product / company from n independent sources that are not interested in the consumer's opinion in his action A. Let $f_1(A), \ldots, f_n(A)$ estimates of the utility of action A obtained from each source $f_i(A) \in [0;1]$. Denote $\alpha_1, \ldots, \alpha_n$ – the level of trust in the source (its competence, credibility): $\alpha_i = 1$, if the consumer completely trusts the source and is ready to accept his opinion unconditionally, $\alpha_i = 0$, if the view of the source is completely ignored by the consumer. Then the magnitude $\max\limits_{i=\overline{1,n}} \alpha_i f_i(A)$ reflects the level of action of the 2nd factor – the impact of the environment surrounding the consumer on the consumer. Such an assessment may look somewhat simplistic, since in practice it is sometimes possible to observe a multiplier effect, however, in any case, the proposed score does not exceed the magnitude of the influence of factor 2 and in general corresponds to most real situations. The 1st and 2nd factors are conveniently combined into some general factor, which reflects the value of action A for the consumer. This factor $x_1 \in [0;1]$ is estimated by the value:

$$x_1 = \max_{i=\overline{0,n}} \alpha_i f_i(A). \tag{1}$$

3. Let the consumer receive information about the product from k independent sources that are interested in the consumer's opinion in his action A. Similarly to the 2nd factor, the functions $f_{n+1}(A), \ldots, f_{n+k}(A)$ reflect the usefulness of action A, received from each source; $\alpha_{n+1}, \ldots, \alpha_{n+k}$ – the level of competence of the source. Suppose, besides this, the consumer has some estimates of the interest of the sources in the action A: $\beta_{n+1}, \ldots, \beta_{n+k}$, $\beta_i \in [0;1]$: $\beta_i = 1$, if the consumer is absolutely sure that the information on this the sources are biased and directed exclusively to force the consumer to act A, $\beta_i = 0$, if the consumer is absolutely sure that the given source is objective and has no motive to manipulate it (for $i = \overline{1,n}, \beta_i = 0$). Then the value $\beta_i \alpha_i f_i(A)$ is perceived by the consumer as a pressure that forces the choice of action to be beneficial to third parties. Accordingly, the value $\max\limits_{i=\overline{n+1,n+k}} \beta_i \alpha_i f_i(A)$ reflects the level of action of the 3rd factor.

4. The level of mistrust of the source of the message m will be determined by the magnitude $\beta_0 \in [0;1]$, which is determined similarly to the values β_i in estimation of the 3rd factor.
3rd and 4th factors are also convenient to combine into some common factor, which reflects, in the opinion of the consumer, the level of compulsion to implement action A, which is beneficial to manipulators. This factor $x_2 \in [0;1]$ is estimated by value:

$$x_2 = \max\left(\beta_0; \max_{i=\overline{n+1,n+k}} \beta_i \alpha_i f_i(A)\right). \tag{2}$$

Since in practice it is impossible to always unambiguously divide the environment of the consumer information environment into disinterested and interested in manipulating the source of information, it makes sense to estimate the values β_i for all N = n + k sources of information. Then formulas (1) i (2) will be:

$$x_1 = \max\left(\alpha_0 f_0(A); \max_{i=\overline{1,N}} \alpha_i(1-\beta_i) f_i(A)\right); \tag{3}$$

$$x_2 = \max\left(\beta_0; \max_{i=\overline{1.N}} \beta_i \alpha_i f_i(A)\right). \tag{4}$$

It should be noted that even if some sources of information are insignificantly interested in the implementation by the consumer of action A (the value of β_i is slightly different from zero), but it is quite authoritative (α_i is close to one), then they can also have an effect on 2nd factor and the value x_1, which completely corresponds to practical observation.

5. Attempts to formalize irrational factors causing a consumer to carry out Action A are illogical, since the effect of these factors is perceived by the consumer at the subconscious level, and at an informed level it is manifested in the form of intentions whose causes are difficult to explain even to the consumer himself. Therefore, the combined effect of these factors will be denoted by the magnitude $\gamma_0 \in [0;1]$. In this case, if the consumer is aware of the complete absence of a rational component in action A and at the same time there is no pressure that forces the choice of action A (that is $x_1 = x_2 = 0$), then with $\gamma_0 = 0$, probability of choice of action P = 0, and with $\gamma_0 = 1$, probability P = 1.

6. The consumer may think about the expediency of the action A before receiving the information message m, then the consumer is aware of some level of readiness for action A, which depends on the value x_1 (formula (3)), the value x_2 (formula (4) without β_0) and value γ_0. Then the factor that reflects the intentions of the consumer to carry out action A before he receives a message m can be described by the function:

$$x_3 = g\,(x_1; x_2; \gamma_0), \tag{5}$$

where x_1 and γ_0 has a direct effect on x_3, but x_2 – reverse.

It should be noted that the consumer's awareness of his willingness to act A leads to the fact that this conscious readiness becomes an intention to this action, and the actual value of readiness may change. Proceeding from this, the desired function P is the probability of choosing an alternative 1^0 when the consumer receives an informational message m, depending on x_1, x_2, x_3, has the same form as the function g:

$$P = g\,(x_1; x_2; x_3). \tag{6}$$

Let's underline that the above 1-6 factors reflect the impact on making a decision on consumer choice of alternative 1^0, that is, making a purchase. If an alternative to 2^0 was studied by the consumer, it would be possible to collect additional information about the product that would lead to some action $\widetilde{A}$, which is an alternative A, or inactivity in general, then the methodology for evaluating factors 1-6 would remain the same, but proceeding from the formulas (3)-(4), it is obvious:

$$x_1(\widetilde{A}) \geq (1 - x_1(A)); \tag{7}$$

$$x_2(\widetilde{A}) \geq (1 - x_2(A)); \tag{8}$$

$$\gamma_0(\widetilde{A}) + \gamma_0(A) \leq 1. \tag{9}$$

Thus, the value of the alternative 2^0 ($x_1(\widetilde{A})$) does not depend on the value of the alternative 1^0 ($x_1(A)$), as well as the level of coercion to $\widetilde{A}$ ($x_2(\widetilde{A})$) does not depend on the level of coercion to A ($x_2(A)$). And only an irrational component $\gamma_0(\widetilde{A})$, by definition, should be no more $(1-\gamma_0(\mathrm{A}))$. The fact that $\gamma_0(\widetilde{A})+\gamma_0(\mathrm{A})$ may not be equal to units due to the fact that at the subconscious level the consumer feels that his possible actions are not necessarily limited to two alternatives, and alternatives may be greater. Difference $(1-(\gamma_0(\widetilde{A})+\gamma_0(\mathrm{A}))$, reflects the degree of consumer dissatisfaction with all conscious alternatives.

For example, a potential buyer is faced with a choice: to buy one bag of cement with a capacity of 25 kg, or two capacity of 20 kg and 15 kg, with a bag of 15 kg at a discount of 50 %. Despite the fact that the consumer to some extent wants to buy one unit of the product, and two, but remains unaffected, the alternative is not to buy the product at all. This alternative will make a difference $(1-(\gamma_0(\widetilde{A})+\gamma_0(\mathrm{A}))$.

The analysis of formulas (3) - (4) allows us to conclude that the proposed methodology for estimating factors can be applied not only to bipolar choices, but also in situations where choices are faced with more than two alternatives. However, in a bipolar choice, only one of the two alternatives will be evaluated, usually aimed at the implementation of an action (considering the expediency of action A, the need for which the information message was initialized).

In addition, depending on which of the two alternatives was considered by the consumer, probabilities *P(A)*, calculated by the formula (6) can be different. Lets identify $P(A)|_{1)}$, $P(\widetilde{A})|_{1)}$ – the probability of consumer action A, $\widetilde{A}$, if it was considered an alternative 1^0; $P(A)|_{2)}$, $P(\widetilde{A})|_{2)}$ – the probability of consumer action A, $\widetilde{A}$, if it was considered an alternative 2^0. Then:

$$\mathrm{P(A)}|_{1)}= g\left(\mathrm{x_1(A); x_2(A); x_3(A)}\right),\quad P(\widetilde{A})|_{1)} = 1-\mathrm{P(A)}|_{1)};$$

$$\mathrm{P}(\widetilde{A})|_{2)}= g\left(\mathrm{x_1}(\widetilde{A}); \mathrm{x_2}(\widetilde{A}); \mathrm{x_3}(\widetilde{A})\right),\quad P(\mathrm{A})|_{2)} = 1-\mathrm{P}(\widetilde{A})|_{2)}. \tag{10}$$

In this case x_1 has a direct effect, it follows from (3), that $P(A)|_{1)} + P(\widetilde{A})|_{2)} \geq 1$.

Thus, one more factor influencing the probability of choosing an alternative is that where two alternatives are estimated by the consumer. This (seventh) factor is polarity, and this alternative, which the consumer estimates, is a positive pole. Let's underline, that is the source of the message m, makes on P(A) the same influence as any other source of information, and no unique role for him is not given, but getting an informational message triggers the launch of this decision-making process. And if we assume that at first the consumer is in an 'information hunger' with respect to the product and in principle does not think about the possibility of A (purchase), or is conceived in some distant future, then the information message m is the initiator and catalyst for the decision. If $x_1 = x_2 = 0$, then the readiness to choose, by definition, of the 5th factor equals γ_0 and equals x_3: $P(0, 0, x_3) = x_3$. This reflects a situation of free choice when the consumer decides by his conscious intentions. Then we get two extreme points: 1) $P(0, 0, 0) = 0$; 2) $P(0, 0, 1) = 1$.

If $x_1 = 1$, then regardless of the values x_2 та x_3, readiness for selection is equal to one $P(1, x_2, x_3) = 1$. A situation where $x_1 = 1$ is possible only if the consumer is absolutely sure of his correctness and realizes the absolute value of the purchase or when the consumer completely trusts the source of information that declares the absolute usefulness of the purchase. The latter situation explains the effect of aging in decision-making and the desire to follow the authorities. In the case of $x_1 = 1$, regardless of the information message, the level of coercion and its own intentions, will be made the choice to make a purchase. Then we get four more extreme points: 1) $P(1, 0, 0) = 1$; 2) $P(1, 0, 1) = 1$; 3) $P(1, 1, 0) = 1$; 4) $P(1, 1, 1) = 1$.

If $x_1 = 0$, a $x_2 = 1$, then regardless of x_3 readiness to choose is equal 0: $P(0, 1, x_3) = 0$. It is here that the inverse effect of the factor x_2 is manifested: an increase in pressure in the absence of a rational component

leads to a decrease in the influence of internal intentions - the coercion “kills desire”. This situation can also be described as the development of manipulation, when the compulsion to make a purchase, which is felt by the consumer, is directly opposite to this need. In this case, regardless of the initial intentions, the consumer will not choose this alternative. As a result, we get two extreme points:1) $P(0, 1, 0) = 0$; 2) $P(0, 1, 1) = 0$.

Assuming that each of the described variables in a fixed value of the latter affects P linearly, then the function P has the following additive-multiplicative form:

$$P = g\,(x_1; x_2; x_3) = a_0 + a_1x_1 + a_2x_2 + a_3x_3 + a_4x_1x_2 + a_5x_1x_3 + a_6x_2x_3 + \\ + a_7x_1x_2x_3. \quad (11)$$

Substituting the extreme points 1)-8) into (11), we obtain the system of equations:

$$a_0 = 0;$$
$$a_0 + a_3 = 1, \rightarrow a_3 = 1;$$
$$a_0 + a_1 = 1, \rightarrow a_1 = 1;$$
$$a_0 + a_1 + a_3 + a_5 = 1 \rightarrow a_5 = -1;$$
$$a_0 + a_1 + a_2 + a_4 = 1 \rightarrow a_2 + a_4 = 0;$$
$$a_0 + a_1 + a_2 + a_3 + a_4 + a_5 + a_6 + a_7 = 1; \rightarrow a_6 + a_7 = 0;$$
$$a_0 + a_2 = 0, \rightarrow a_2 = 0, a_4 = 0;$$
$$a_0 + a_2 + a_3 + a_6 = 0 \rightarrow a_6 = -1, a_7 = 1.$$

Where

$$P = x_1 + x_3 - x_1x_3 - x_2x_3 + x_1x_2x_3 = x_1 + (1 - x_1)(1 - x_2)x_3.$$

Thus, the three-factor analytical model of the reflection decision-maker's decision to make a purchase will have the final form:

$$P = x_1 + (1 - x_1)(1 - x_2)x_3\,. \quad (12)$$

The proposed model allows us to identify the rational factors and the irrational factors in which the management will be able to most significantly influence the likelihood of the expected purchase decision. This allows you to identify the main areas of application of reflexive consumer choice management tools in the marketing system of industrial enterprises, taking into account after-sales service, formation of ideas about an industrial enterprise.

Conclusions

However, for the successful implementation of the reflective management tools of the consumer choice the industrial enterprise must take into account both rational and irrational factors that influence the choice of the consumer. It depends not only on the effectiveness of marketing communications, but also on successful management in the competitive environment as a whole. After all, knowing how the consumer thinks, what information he has at his disposal, how he decides to buy certain goods through the organization of reflective influences can lead him to the actions necessary for the company to achieve its goals – increase sales and increase the efficiency of activities.

Moreover, in today's conditions of limited financial, time and intellectual resources, the use of reflexive tools in the management of consumer choice is an important low-cost factor in strengthening the competitive position of enterprises in the market. The suggested analytical model of decision-making reflection of consumers, based on the model of bipolar choice V. Lefevre, allows us to assess the probability

of making quick decisions, to predict and evaluate the effectiveness of reflective influences aimed at changing the influence of certain factors influencing consumer choice.

Prospects for further research are the formation, on the basis of analysis of the models of reflection, decision-making by consumers of the strategy of reflexive management of consumer choice, taking into account the specifics of different types of market, the development of information support reflexive management of consumer choice in the marketing system of industrial enterprises.

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Risks of Investment Projects in Russia

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Abstract

The article presents the results of a study of the process of transferring forest land for lease for the implementation of priority investment projects. In total, 142 priority investment projects in the Russian forest complex were examined with a harvesting volume of 82.7 mln cub. m of timber and investments in excess of 7 mln. $. The largest concentration of priority investment projects falls on the forest regions of Russia: Northwestern Federal District, Volga Federal District and Siberian Federal District. The results of the study show that the forestry business is developing and there are high growth rates in production capacities and product sales. A significant part of the projects demonstrates high efficiency. However, macroeconomic and microeconomic risks remain that hinder the development of investment projects. A risk profile has been built that reflects the characteristics of the level of attractiveness of investing in forestry complex projects. It has been established that a high level of risk of administrative barriers and changes in forest legislation remains in the forest complex. High risk factors in the implementation of investment projects in the forest sector include the demand for products and the organization of production. The lack of a unified methodological approach to presenting preferences to investors reduces the effectiveness of the mechanism of priority investment projects in the Russian forest complex. The most effective measures of state support of the forest complex are tax incentives and financial support for projects. To further increase the investment attractiveness of the forest complex, systematic work is required to expand the resource base of enterprises, as well as the maximum use of all types of wood raw materials in production.

Keywords: Investments, Risks, Investment Projects, Forestry Complex.

Introduction

The forest industry is one of the most promising areas of Russian industry. This is due to several factors, among which are the low cost of raw materials and a wide sales market both domestically and abroad. However, the forest business is still one of the most risky.

Risk is understood as the probability of an adverse event, as a result of which the achieved results and indicators do not coincide with the planned values. Risk accompanies any investment project, but

projects implemented in the forestry sector have a greater risk than other sectors. The problem of risk management in forestry does not lose its relevance (Morkovina S.S.et al., 2018). This is due to the fact that activities in the forest are influenced by a number of factors related to natural, industrial, and social processes (Brumelle S. et al., 1990). The authors note factors influencing the implementation of investment projects in the forest sector of Russia (Kuznetsov S. G. et al., 2018; Morkovina S.S. et al., 2017).

Researchers have noted a high association between risk and project investment in forestry (Runsheng Yin et al., 1996; Rodríguez-Vicente V. et al., 2010).

The mechanism of priority investment projects in the forest sector of Russia has been implemented since 2007 (Karjalainen T. et al., 2013). A priority investment project is a special status that is assigned to investment projects aimed at creating new wood processing plants with an investment volume of 5 mln established by the state. $. up to 13 mln. $. (Petrov A.P. et al., 2018).

Russian legislation also provides criteria for evaluating investment projects, in most cases which are:

- economic efficiency of the investment project;
- budgetary efficiency of the investment project;
- social significance of the project for the region;
- environmental safety of production;
- the quality and cost of production relative to similar products sold on the Russian market (Morkovina S.S.et al., 2018).

Preference is given to projects that have the best economic indicators: the payback period of investments; simple rate of return; net present value; profitability index; discounted payback period.

Despite the development of the mechanism of priority investment projects, the influence of numerous risks reduces the effectiveness of investments in the forest industry (Chudy R.P. et al., 2020; Yakovlev A.V. et al., 2013). The aim of the study was to assess the risks of business in the implementation of priority investment projects in the forestry of Russia.

Methods

To identify and assess risks in the implementation of priority investment projects in the Russian forestry, we used an expert method based on a survey of the forest business.

Heads of forest enterprises were involved as experts; in total, heads of 72 forest enterprises acted as respondents.

To process the results of the survey and risk assessment in the implementation of priority investment projects in the forestry of Russia, two criteria:

1. the result (magnitude of consequences) from the manifestation of risk (scale: from « the consequences are minimal » to «the consequences are very large »);

2. the probability of occurrence of risk (scale: from « manifestation is unlikely » to «constantly manifests itself »).

To assess risk values, the Harrington scale was used, supplemented by a verbal description of each scale interval.

The desirability scale is divided in the range from 0 to 1 into five subranges. Harrington scale average numerical rating:

$$RL_{av} = (0.9; 0.71; 0.51; 0.28; 0.11) \quad (1)$$

Assessing such an indicator as the level of risk, we identified: «critical risk level» (numerical rating=0.9), «dangerous risk level» (numerical rating=0.71), «acceptable risk level» (numerical rating=0.51), «low risk» (numerical rating=0.31). «Insignificant level of risk» (numerical rating=0.11) (Table 1).

Table 1: Risk Assessment Scale

Risk Change Interval	Risk level	Risk description
1.0-RL-0.80	Critical	Very high risk. The consequences of the onset of risk are catastrophic
0.79- RL-0.60	Dangerous	High level of risk. The consequences of risk are critical
0.59 -RL - 0.40	Valid	Medium risk level. The consequences of the onset of risk are significant
0.39-RL-0.20	Low	Low risk. The consequences of the onset of risk are small
0.19-RL-0.00	Minor	An insignificant level of risk. The consequences of the onset of risk are minimal

To calculate the integral risk indicator, we used the function:

$$R_v = f(P_n, W) \quad (2)$$

where P_n – an indicator of criteria assessments;

W – an indicator of the weight of the criteria.

The weights of the criteria were also determined using expert judgment. The sum of the weights for all criteria is equal to one. Since the number of criteria is not large, to determine the value of the weights, the method of pairwise comparisons was used, which made it possible to increase the accuracy of the estimate.

Assessment of the consequences and probability of the implementation of entrepreneurial risk was carried out according to the following formulas:

$$P_{ni} = \frac{\sum_{J=1}^{N} P_{n_{ij}}}{N} \quad (3)$$

where P_{n_i} – risk consequences from the implementation of *i*-risk;

$P_{n_{ij}}$ – risk consequences from the implementation of *i*-risk, according to the *j*-expert;

j – expert number (from 1 to N).

$$P_{bi} = f(P_{n_i} \times W_i) = \frac{\sum_{J=1}^{N} P_{n_{ij}} \times W_{ij}}{N} \quad (4)$$

where P_{bi} - assessment of the probability of occurrence of *i* risk by the *j* expert;

W_{ij} - the probability of occurrence of the *i* risk, according to the *j* expert.

The studied risks were represented by two groups: macroeconomic and microeconomic. Each group analyzed 12 risks (Table 2).

Table 2: Systematization of risks of investment projects in the Russian forest sector

Risk group	Name of risks
Macroeconomic	Risk of restriction of export of forest products
	Buyer default risk, customer bankruptcy
	The risk of adverse changes in tax legislation
	Administrative Barrier Risk
	Risk of unreasonable growth in requirements from forestry authorities
	Risk of adverse changes in forest legislation
	Risk of lack of support from regional government
	The risk of adverse changes in the ruble exchange rate
	Risk associated with reduced demand for products
	The risk associated with high interest rates on loans and the inaccessibility of the latter
	Risk of growth in rental rates and payments
	Risk of rising prices and tariffs for third-party services
Microeconomic	Risk, lack of own financial resources
	The risk associated with the organization of the production process
	Risk associated with failure, equipment breakdown
	Risk of process disruptions
	Risk of forest fires, forest diseases
	The risk of exceeding planned costs and cost increases
	Risk, absence (insufficiency) of forest roads
	Risk of destruction of engineering and energy infrastructure
	Risk, lack of qualified specialists
	The risk associated with an ineffective personnel management system
	Risk, changes in the cost of raw materials, materials, equipment, finished products
	Risk associated with the organization of marketing and advertising of manufactured products or services rendered

Based on a study of the factors determining the occurrence of risk situations, we formed recommendations on the proactive management of investment projects in forestry.

Results and Discussion

Volumes of production of the Russian forest complex currently have a positive trend, the most characteristic period from 1990 to 2016 (Table 3).

Table 3: Indicators of production of selected major types of products of the Russian forest complex in retrospect

Product name	Year value						
	1990	1995	2000	2005	2010	2015	2018
Harvesting, mln cub. m	304	150	165,9	185	175,5	205,2	238
Production of lumber, mln cub. m	75	26,5	20	23,9	28,9	41	26
Paper and paperboard production, thous. t	8325	4074	5312	7448	7583	8196	9058
Furniture production, billion rubles (at current producer prices)	6	12	18	48	89	137	189
Plywood, thous cub. m	1597	939	2777	2556	2689	3607	4018

n 2018, the growth in wood processing and wood products amounted to 10.6%, in the production of paper and paper products - 12.6 percent.

This growth was largely due to the implementation of priority investment projects in forestry.

Participation in the project allows the company to apply a decreasing coefficient of 0.5 to the approved payment rates per unit volume of forest resources and the rates per unit area of a forest plot owned by the federal government for 3, 5, 7, or 10 years, depending on the amount invested in implementation of the project funds. The minimum investment to participate in a priority investment project in the forest sector is 7 mln. $. in case of modernization of the existing production and 7.2 mln. $. in case of creation of forest and timber processing infrastructure facilities.

The risk factor in the implementation of such projects is the methodology for selecting investment projects, which does not take into account the proposals of competitors for the same forest fund. As a result, competition in the implementation of priority investment projects is limited.

We have carried out a study of the process of transferring forest land for lease for the implementation of priority investment projects. In total, 142 priority investment projects in the Russian forest complex were examined with a harvesting volume of 82.7 mln cub. m of wood (Table 4).

When evaluating a priority investment project, the following criteria were considered:

– budgetary efficiency of the investment project;

– economic efficiency of the investment project;

– volume of investment costs.

Table 4: Implementation of investment projects in the forest sector

Federal districts of Russia	Number of investment projects (pcs)	Volume of investments (mln. $.)	Investment structure, %	Estimated cutting area (mln cub. m)
In general in Russia	142	8550	100.0	82.7
Северо-Западный	49	1842	21.0	22.1
Central Federal District	17	733	8.0	3.9
Southern Federal District	1	162	1.0	0.3
North Caucasian Federal District	1	7	1.0	0.03
Volga Federal District	23	480	5.0	8.0
Ural Federal District	10	87	2.0	2.0
Siberian Federal District	29	4630	54.0	38.3
Far Eastern Federal District	12	606	7.0	8.1

During the analysis, we studied the goals of creating investment projects:

– creation of production facilities for processing wood waste, including for bioenergy purposes;

– reduction of energy consumption of production (for investment projects on the modernization of timber processing infrastructure);

– increase in the volume of import-substituting products;

– creating high-performance jobs.

Priority investment projects are aimed at attracting private investment in key sectors of the economy of the country and regions by providing preferences from the state and regions

Investment projects are implemented in 32 constituent entities of the Russian Federation. Among the production areas within the framework of priority projects in terms of wood consumption, the first two places are divided by sawmilling and pulp and paper production - 30% of the total processing volume in all directions.

The highest concentration of priority investment projects falls on the forest regions of Russia: Northwestern Federal District (49 projects), Volga Federal District (23 projects) and Siberian Federal District (29 projects).

The volume of attracted investments in priority investment projects varies from 7 mln. $. up to 4630 mln. $. The maximum investment volume is Northwestern Federal District 21.0% of the total investment and the Siberian Federal District - 54.0% of the total investment in priority projects.

Most of the projects are aimed at the creation and modernization of woodworking facilities. The largest volume of investments (49%) is attracted to pulp and paper production, 30% was invested in

wood processing, and investments in the production of wood-based panels accounted for 16% of the total investment.

It was assumed that priority investment projects will help reduce or eliminate the negative impact of external and internal economic, environmental and social factors on the forest complex. However, an analysis of the main indicators shows that in some cases the indicators declared in priority investment projects were not achieved, with regard to the creation of new jobs, fees for forest use and taxes. This is due to the presence of risk factors in the implementation of investment projects.

The results of a survey of business representatives allowed us to build a risk profile that reflects the characteristics of the level of attractiveness of investing in forestry complex projects (Table 5).

According to business representatives, a high level of risk of administrative barriers and changes at the level of forest legislation remains in the forest complex.

Table 5: The risk profile of the implementation of priority investment projects in the forest sector

Type of risk	Assessment of the significance of risk (magnitude of consequences)	Assessment of the frequency of manifestation (probability)	Final Risk Assessment
Administrative Barrier Risk	0.92	0.65	0.598
Risk associated with reduced demand for products	0.8	0.61	0.488
The risk associated with the organization of the production process	0.58	0.36	0.208
Risk, lack of own financial resources	0.33	0.48	0.150
Risk of rising prices and tariffs for third-party services	0.21	0.36	0.075

An important risk factor for business is the demand for products and the organization of production. The probability of these risks manifesting during the implementation of investment projects in the Russian forest sector remains high and amounts to more than 50%.

Among the pressing issues, the forestry business considers the problems associated with the transportation of raw materials and products (rising tariffs for transport, lack of rolling stock, insufficient capacity of the railway and lack of timber roads) and a lack of qualified personnel.

High level of industry risks (price volatility, weather dependence, exchange rate fluctuations) and geopolitical factors also negatively affect the investment attractiveness of projects in the forest sector.

Despite the fact that borrowed funds are becoming more affordable, and the state subsidizes interest rates for priority projects in the forest sector, most participants highlight the lack of own funds and lack of financing as the main factor limiting the possibility of effective implementation of investment projects in the forest sector.

Despite the fact that the average payback period of priority investment projects is 6.8 years, the level of risk of rising tariffs and prices for contractor services remains high.

Conclusions and Recommendations

Most sectors of the Russian forest complex show significant growth rates in line with global trends. The results of our research show that the forestry business is developing and there are high growth rates in production capacities and product sales. This is due to high consumer properties, environmental friendliness and relatively low cost of production. To support the forest business in Russia, 142 priority investment projects with an investment volume of 8550 mlrd. $. and harvesting volume of 82.7 mln cub. m of wood.

A significant part of the projects demonstrates high efficiency. However, macroeconomic and microeconomic risks remain that hinder the development of investment projects. The forestry business is developing under the conditions of administrative barriers, inaccessibility of credit funds and changing tariffs for services.

This negatively affects the achievement of target indicators of investment projects and reduces the investment attractiveness of the forest complex as a whole. Issues of commissioning new production facilities for the development of deep processing of forests are among the highest priorities, according to industry participants. The lack of a unified methodological approach to presenting preferences to investors reduces the effectiveness of the mechanism of priority investment projects in the Russian forest complex. The most effective measures of state support of the forest complex are tax incentives and financial support for projects. To further increase the investment attractiveness of the forest complex, systematic work is required to expand the resource base of enterprises, as well as the maximum use of all types of wood raw materials in production.

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The Role of Sensory Marketing in The Rock in Rio Brasil Event and The Tourist Dynamics of The Destination

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Abstract

Sensory marketing as a new strategic tool, through the stimulation of the five human senses (touch, taste, sight, hearing and smell), seeks to increase profits in the short term and create bonds with customers providing them with unique experiences and emotions, with their brands, becoming one of the success factors of share of mind (brand recall), corroborating the process of fixing it in the consumer's mind. Affection for the brand happens when the needs have been met, the experiences lived and the sensations felt. The objective of this manuscript is to identify the role of sensory marketing in the Rock in Rio Brasil event and the tourist dynamics of the destination Rio de Janeiro. The present study will include a theoretical background reflection, where it is verified on sensory marketing, tourism and the Rock in Rio 2017 event. This study represents an important contribution to the area, since marketing and tourism, need constant planning to obtain effectiveness in the expected results, earning dividends to the brands and communities to which they are inserted. Future studies should continue this work, using a qualitative and quantitative methodology, in addition to the participation of Rock in Rio Academic. Although Rock in Rio Brasil is a consolidated event in the country's Events calendar, there is a lack of scientific research with more data about the event, which brings more originality and value to this study.

Keywords: sensory marketing, tourist dynamics, destination, Rock in Rio Brasil

Introduction

Tourism is characterized as a social phenomenon, which maintains interrelation with several sectors. It is a multifaceted and geographically complex activity, with tourism increasingly creating new (and different) market segments with different individual interests (Sousa, Malheiro & Veloso, 2019). Generally, it can be said that consumers choose a product or service according to the degree of correspondence with their tastes, interests and also taking into account how it can transform them (Sousa & Rocha, 2019). The advancement of technology has changed consumer behavior. In an era marked by information and knowledge, it is imperative to create value and differentiate (Lages; Sousa

& Azevedo, 2018). Tourism is characterized as a social phenomenon, which maintains interrelation with several sectors. It is a multifaceted and geographically complex activity, with tourism increasingly creating new (and different) market segments with different individual interests (Sousa, Malheiro & Veloso, 2019). The advancement of technology has changed consumer behavior. In an era marked by information and knowledge, it is imperative to create value and differentiate (Ferreira & Sousa, 2020; Vilas Boas, Sousa & Fernandes, 2019).

Since sensory marketing is related to consumer experiences with all human senses (sensory, emotional, cognitive and behavioral) (Lovelock; Wirtz & Hemzo, 2011). Through smells, flavors, colors, textures and sounds that Sensory Marketing "seduces" and takes the consumer shopping. Due to a generation that is more demanding in terms of consumption, companies had to reinvent themselves, and before that, Rock in Rio, one of the most popular music festivals in Brazil, in 2017, is no longer just a musical festival and becomes offering entertainment to the participating public and delivering differentiated experiences. Thus, major brands look for the festival and there (in) directly compete for the attraction of the public present. The objective of this research project is to identify the role of sensory marketing in the Rock in Rio Brasil event and the tourist dynamics of the destination Rio de Janeiro. The research problem involves asking, what is the role of sensory marketing in the Rock in Rio Brasil event and what is the tourist dynamics of the destination? The choice of the theme is justified, due to the lack of scientific materials related to the experiences and sensations lived by the public participating in the Rock in Rio Brasil Event and the affection that can be built by the participating public towards the event, after the experiences lived, and for this event one of the biggest in the world.

Therefore, the methodology used is descriptive research, presenting the Rock in Rio Brazil 2017 case as an object of study, where it is verified bibliographically on sensory marketing, tourism and the Rock in Rio Brazil 2017 event. from this article it was necessary to build a solid theoretical foundation that was divided into 3 chapters, the first of which was the approach to marketing actions that were developed for major festivals as well as about and sensory marketing; In the second chapter, whose object of study is Rock in Rio, its history, since its creation, was approached, as well as the sensorial marketing, offered by the sponsoring brands of the event, highlighting the actions developed in each stand to cause unique sensations to the customers and a souvenir after the event; making brands loyal to them; and finally, in the third chapter, the dynamics of the destination of Rio de Janeiro was presented, in front of the Rock in Rio Event.

Sensory Marketing And Events

In the current context of advertising, brands use all the technical / technological devices at their fingertips to express themselves through all possible channels, and then reach their consumers sensorially (Vollmer, Precourt, 2008). The brands are intended to "penetrate our senses and cause pleasant and even affective sensations that lead us to an approximation (Perez, 2016, p. 49). Sensory marketing analyzes consumer behavior and involves it emotionally in a way that associates experiences, sensations and emotions (positive or negative) with the brand, product or service (Sousa, 2019). According to França et al (2015), she says that sensory marketing as: "the activity that involves the sensation of experiencing the part of the world that is supposed to be sold, using the senses: sight, touch, smell, hearing and taste, as a basis to choose this or reject that". Sensory marketing is an action to stimulate consumers' senses, in order to generate engagement through emotional bonds through memories and desires that can make the consumer associate a specific positive feeling with a certain brand (Soares, 2013, p. 09). It lists the set of stimuli (elements) capable of creating a multisensory atmosphere that meets the brand's purposes, whether in the sales environment, in the advertising communication actions and in the product's characteristics (Filser, 2003). According to Schmitt (2000); Silva, Teixeira and Luchini (2018), both reason and emotion drive the consumer to purchase. It is known that all human experiences and perceptions are initially acquired through the senses. Knowing how much the five senses of the human being play a fundamental role in their choices, sensory marketing invests in elements that enhance these senses through increasingly elaborate designers, strong and vibrant colors, fragrant, clear environments and with ambient music (Silva, Teixeira & Luchini, 2018). "Brands that appeal to multiple senses will be more successful than those that focus on

just one or two." (Dooley, 2012, p. 34). Schmitt (2002), reports that "sensory marketing can provide numerous benefits to the company, since it stimulates the desire to buy, differentiates the product or service offered from the competition, strengthens and positions the brand identity, creates image and identification a company, promotes innovations and mainly "induces the consumer to experience, purchase and, more importantly, to consume the product faithfully". Therefore, in the next chapter, the Rock in Rio Brasil event is addressed, based on its creation, until arriving in 2017, in the marketing strategies designed to retain customer loyalty to the event.

An event has as main attributes, the attraction and congregation of people, the intrinsic character of ephemerality, the relationship with leisure and free time, and the space-time selectivity in its realization. It can be represented by exhibitions, fairs, festivals, shows, congresses, meetings of a scientific, cultural, commercial, social and / or political nature, sports competitions, etc., comprising, therefore, different natures, dimensions, scales of reach, duration and it can also sometimes occur regularly and with certain periodicity (Molina, 2016). Mega-events are configured, notably, as urban strategies adopted by the government combined with private initiative, and bring with them a profusion of urban mega-projects (involving various constructions) that directly impact the urban structure of cities (Sposito, 1991; Molina, 2016). The various elements linked to mega-events are directly linked to the proposal for urban development and tourist segmentation, as well as the creation of infrastructure and facilities for their realization, which can and should be extended to the local community, in the search for beneficial results for all actors involved (Silva, Braga & Romano, 2016).

The events segment has been consolidating itself as a prosperous market in the ranking of the tourist economy (Silva et al, 2016). It is configured as an alternative to the struggle of seasonality and countless environmental externalities, contributing, above all, to the multiplying effect of tourism for the cities that host them as well as for the surrounding cities. Piscopo et al (2015) and Coutinho; Coutinho (2007) state that the number of international events hosted by Brazil has grown and the country stands out in Latin America. Getz (2008) explains that one of the main objectives of investment in events is to highlight the city development and marketing plans in most destinations. Events entertain the local population, generate media, helping destinations to develop their confidence and a positive image in the tourism market (Yeoman, Robertson, Ali-Knigth, 2006; Mackay, Barbe, Van Winkle & Halpenny, 2017) . The events aim to attract visitors and tourists to a city, including offering the entire tourism production chain, in addition to the travel experience and knowledge acquired (Turgay; Dikman, 2013, Garbuio; Generoso; Gonçalves, 2018) . Festivals, considered a type of event, have experienced significant growth in the event segment, especially as they highlight the local and / or regional culture of a destination (Zucco, 2012; Garbuio; Generoso; Gonçalves, 2018). They are configured as a strong business opportunity (Yeoman, Robertson, Ali-Knight, 2006; Getz, 2010; Santos; Zucco; Kraus, 2015).

Music festivals have taken on an increasingly important role in the development of tourist destinations around the world (Soria et al, 2014; Dinis, Eusebio & Brenda, 2019). Currently, there is a wide variety of music festivals and have become popular tourist attractions, taking on an important role in the social, cultural and economic development of destinations. It is highlighted in the literature that these events generate positive but also negative impacts (Soria et al, 2014; Moisescu et al, 2019; Dinis, Eusebio & Brenda, 2019; Panomareva & Tkachenko, 2020).

Music festivals have recently undergone an exponential increase (Leenders, Telgen, Gemser & Wurff, 2005; Gonçalves, 2014). Therefore, implementing innovative marketing strategies that allow them to attract and retain visitors while positioning themselves in a different way, personifies the brand. (Gonçalves, 2014). Nowadays "both private companies and public institutions tend to invest in building opportunities so that their audiences can live innovative experiences (Carapinha, 2013; Gonçalves, 2014). Starting from the concept of Kotler (2002, p.44); Silva et al, (2016) that marketing has the function of facilitating and consummating exchange relations, it is understood that brands are increasingly preparing themselves to bring differentiation and value to the business, offering, in addition to the quality of product, a quality of life also for the consumer, providing emotions, innovative experiences.

Rock in Rio Brasil: Event and Differentiation

The challenge of creating a large entertainment event in 1985 was related to the unique moment in Brazilian history, when the country underwent major transformations, after a long period under a military dictatorship and still beginning to take its first steps towards democracy. The established economic fragility made it impossible for large shows to come and corroborated the world's lack of knowledge about Brazil. Given this scenario, believing in innovating through a communication platform with unique experiences, which could bring economic gains to the city of Rio de Janeiro, visibility to Brazil, and possible investors and entrepreneurs to Rio de Janeiro, Roberto Medina, creates the Rock in Rio event (Medina, 2019; Costa e Igreja, 2019).

It had its first international edition, in Lisbon, kept its original name that makes reference to the city in which it originated and to which it returned in 2011, after 10 years of absence. After his last stay in Brazil in 2001, the event took a tour of the world for 10 years and only returned home in 2011, bringing renowned attractions. Currently, the event takes place in Brazil every two years (Silva, Lima, 2014).

Rock In Rio, which this year is 35 years old, is a music festival originally Brazilian. The event has had worldwide repercussions, being recognized as one of the biggest music festivals in the world, if not the biggest, and due to its popularity among the most varied tastes, it took off from the Brazilian territory to Portugal, Spain and the United States, respectively. In all of its 20 editions, eight of them were in Brazil, eight in Portugal, three in Spain and one in the United States. (Lira, et al, 2016) Counting in numbers the entire trajectory of Rock in Rio since 1985, there is the 20th edition of Rock in Rio, the eighth on Brazilian soil, since 1985 (Medina, 2019). Over the years and with new editions, Rock In Rio has become a very interesting branding case. The event starts offering unique experiences in all of its fields that link brands with a meaning of belonging and much greater intimacy with the audience present (Silva et al, 2017). Each sponsoring company has its own exclusive stand to carry out its marketing action and link its name to the event, through advertising. Given this reality, in the next chapter, it will be treated about the experiences lived by the participants of the Rock in Rio Brasil Event.

Sensory Marketing: experiences and emotions in Rock in Rio Brasil

Rock In Rio as an event that provides several brand experiences. For this reason, brands need to be true to their customers in order to really strengthen what they really are (Lira et al, 2016). The brand has three purposes, the first being: name, term, sign, symbol or design. The second is its function, or what it is for: identifying and distinguishing, describing and giving meaning. And the third, the results: differentiate it so that consumers and other audiences have a reason to prefer it over their competitors (Silva et al, 2017).

Vision: Most worked sense in the scope of advertising. When creating a brand the first thing to think about is visual communication and appearance. Colors, shapes, images and symbols are the main elements of this sense.

Hearing: Every time a sound is emitted, the consumer is able to receive the information and can generate a brand positioning. Vignettes, jingles, music and sound effects are the sensory elements worked on at this time.

Touch: The human being likes to touch, touch, hold and feel the product. A key moment at the point of sale after viewing the product is for the consumer to get it. Format and texture are the main elements.

Nose: The purchase stimulus may be linked to the consumer's memory. He remembers the smell, the taste, the image of the product. The fragrance can associate memories and emotions to the customer, so smell and aroma are the elements of this sense.

Palate: Used by food industry brands and is closely linked to smell. Flavor is, therefore, the element worked in this sense (Silva et al, 2017, p.4).

Thinking about the brands, and the meanings worked by them, the Rock in Rio 2017 event in Brazil, had a master sponsor, which was Itaú, 6 Sponsors, which were: Coca Cola, Doritos, Heineken, Ipiranga, Ford and Natura (Almeida, 2017). Next, the most creative stands of sponsors who were present at the Rock in Rio Olympic Park will be presented. They worked on sensory marketing, transforming desires and desires into real experiences.

Itaú, master sponsor of the event in 2017, had the brand Giant Wheel activated, which has been present in other editions, only in these, a little bigger than previous editions, which allowed the consumer audience to have a live marketing (experience marketing) in the environment. Another difference was that it inserted a giant 8 meter phone installed at the entrance of the event, allowing the public to listen to the songs on the playlist of the festival day. It also featured actions such as the presentation of bands in the Itaú arena #issomudaomundo (Silva et al, 2017). It provided a playground; set up a music arena, which will host concerts and offer cell phone recharge points. He set up Bike Rio at the festival, giving the program user the possibility to ride his bike to the festival (Diniz, 2017). As for sensory marketing, Itaú stimulated hearing by offering the playlist of songs from the event; the vision, with the provision of materials and decorative objects, which in addition to entertaining passing the bank's identity; tact, when taking an Itaú bicycle to stroll in the Olympic Park; smell and taste were not stimulated by the brand, as it did not act in this direction.

Heineken delivered to the participating public, one of the most fun and exciting attractions of the festival, in which the company has been present since 2011, the zip line that this time was 22.5 meters high and was one of the most disputed activations, working with live marketing. In addition, Heineken invested in 2017 in a proposal for responsible consumption and recycling, in addition to interactive panels that are sensitive to sound waves that will stay in connection with the track (Silva et al, 2017). The company also distributed the drink at the festival. , there were more than 350 thousand liters of draft beer with 16 water trucks; 190 traveling backpackers and 200 beer coolers installed at the festival's food outlets. Acting as a sponsor since 2011, Heineken even allocates 25% of its marketing investment in the year to the festival (Diniz, 2018) Heineken acted in sensory marketing stimulating the palate when distributing drinks; tact when it stimulated the sensations of height and touch in the structures of the toys and separation of the recyclable; vision when presenting an innovative stand persuading people to look at the structures assembled to serve the customer; as for hearing, they installed interactive and audible panels. They did not act on smell only because they did not relate the smell to the available environments.

Coca-Cola in its planning of brand activation, provided a special stage, the action took the Coca Cola Band, a group formed by young musicians where the general public of the event can sing along with the band the songs of the artists. There was also the presence of the Fanta brand, which was promoted in the Guaraná flavor at Casa Fanta Guaraná on Rock Street Africa, whose theme was Tropical Forest (Silva et al, 2017). At Casa Fanta Guaraná, on Rock Street Africa, the main objective was to generate experimentation of this new drink from the company's portfolio with tasting of the products (Diniz, 2017). Scenography that simulated a tropical forest, in addition to “stone” poufs and released soda, the environment had room flavors. Several vines hung with cell phone chargers will be available to the public. He set up an area of 180m² with musical instruments (Silva et al, 2017). As for sensory marketing, they emphasized the sensations related to hearing, when they joined the band with young people; the palate was also enhanced when offered to Fanta Guaraná, evaluating the drink's flavor; The vision, with the projection of scenery over the forest; the formats and lighting that drew public attention; smell when smells were in the drinks they offered. Lastly, when people need to charge their cell phones, they need to touch the vines that were scattered throughout the stand environment and feel which vines would have the tip with a charger. Coca cola, to stimulate the audience to the 5 senses, previously treated.

Doritos in the 2017 edition, entered the event with a more solid positioning, which was being worked on throughout the year. Bet on the presentation of seven garage bands, in addition to a toy in the style "Megadrop" and launched three items of the special line of snacks, being offered to the public participating in the event that circulated through the stand. One of Doritos' main attractions was a megadrop (free fall tower) of more than 100m working with live marketing in its audience. The brand also promoted shows for 7 garage bands (Silva et al, 2017). As for sensory marketing; one can observe

the stimulus to hearing; with the songs offered by the bands; the taste when offering the special line snacks launched for the event; smell with the smell of snacks; the touch, in function of the megadrop and the sensations stimulated in the free fall and, finally, the vision, with the use of colors, shapes and light that attracts the public to approach the stand, working the 5 senses.

Ipiranga is the sponsor of the roller coaster, one of the main attractions of the festival and the success of the public working on live marketing, covered it using its profiles on Facebook, Instagram and Snapchat and the actions close to the festival. The brand also had an exclusive filter on Snapchat, activated by geolocation only for those in the City of Rock. Thematic playlists about the festival were also launched in the Ipiranga profile (Levin, 2017). "Ipiranga communicated with all types of customers, in a good-natured and relaxed way (Scheller, 2017). For the third time, it arrives in this edition with more activations of the Km de Vantagens program. The actions also include five buses with the Km de Vantagens logo, which will circulate in Rio de Janeiro. Consumers who scan these logos with the application were able to win tickets instantly (Oliveira, 2017). As for the sensorial marketing worked by Ipiranga, there is a stimulus to touch, through the sensations stimulated by the roller coaster, and access to social networks, a vision with the presentation of the brand's layout on the sticky buses, at the brand's stand; listening through the playlists that were played on the stand. The company only did not act on taste or smell.

Natura with its project Nave - Nosso Futuro É Agora, was another novelty of this edition of the festival and a co-creation with Natura, it was a success among the public: over the seven days, the attraction received 100 thousand spectators. The experience materialized the discourse that to build the future it is necessary to change the present, from projections, scenographic and special effects, music and smells to stimulate a look to the future (Guimarães, 2019). As for sensory marketing; one can observe the stimulus to hearing; with the songs played in the presentations; the sense of smell, due to the smell of the environment and finally, the vision, with the use of colors, shapes and light from projections and scenographic effects, which attracts the public to approach the space.

Finally, it is worth remembering that in the identification of any brand, the first meaning that is evident is the visual sense. This sense dominates others, as it is more appealing and gives the first opinion that the consumer builds on the brand. Thus, it can be said that the set of dimensions that arise from the use of the five senses in the image of a brand, will strengthen it and contribute to a better relationship with the consumer (Marques, 2016). This research aimed to analyze the multisensory experience in the brands present in Rock in Rio, making all the senses present in their image, using strategies of image, sound, palate, odor and touch that lead to the strengthening of the image of the brands in the Rock festival market.

The Rock in Rio event and the dynamics of the destination

Tourism and events have been widely used in initiatives aimed at urban regeneration, through promotional strategies framed in the marketing of cities. Events have a comprehensive role functioning as a means of boosting the local economy, stimulating social inclusion, promoting local culture, contributing to urban regeneration and "putting" cities on maps (Rola et al., 2018, Moseiscu, 2019). Festivals as a specific type of event can be great deals for a destination, becoming part of tourism strategies. Event tourism can be used as an instrument to support the development of a city / region. It works as an ally to combat seasonality and help revitalize the culture of a place. Event tourism, if well planned and organized, can positively influence the image of a tourist destination. It can attract visitors or tourists, encourage the economy and enrich the cultural and social life of the regions where it takes place (Marujo, 2015).

The realization of events profiles one of the most beneficial measures in the context of city marketing, states that "Cities see events as engines of development for city marketing.", As they provide the city with opportunities for dynamization at the urban level (such as the construction of new infrastructures or the restructuring of existing ones), social, economic, institutional and even in the projection of the city's image, which stimulates the appearance of new investments, new tourists, new residents, among others (Ribeiro & Sousa, 2016). The benefits and values of a destination must be promoted internally

(for residents), and externally (for visitors, investors), to take advantage of the best results, in terms of notoriety and visibility (Lages et al, 2018, p . 17).

In the second week of Rock in Rio (September 21 to 24, 2017), the ABIH-RJ survey shows that 77% of the rooms reserved. RioCeptur calculations indicate that the occupancy rate was 46,200 rooms, with 258,700 potential guests and estimated revenue of R $ 45 million (Rio Convention & Visitors Bureau apud O Dia, 2017). According to a survey conducted by FGV (2017) Rock in Rio generated R $ 1.4 billion in the city's economy, 65% of the audience came from outside Rio, 20 thousand people worked at the event and 700 thousand people attended the shows during the week of the event (FGV, 2017 apud RJTV, 2017). As can be seen, the events are great stimulators for the development of the destinations to which they are inserted. In addition, the events have contributed to mitigate tourist seasonality, moving the city's economy, generating opportunities for direct and indirect jobs, for the policy of publicizing the location, in addition to the possibility of generating socio-cultural benefits through the exchange of information. carried out among the actors involved in holding events.

Final Considerations and Future Research

Eveno Rock in Rio became known in the world, respected and synonymous with music festival, a case of marketing and brading. Today, the event represents musical diversity and a point of dissemination of brands and entertainment. It was born as a promotional event, and today in the 21st century, it has reached levels, reaching an experimental event with sensory appeal. All the sponsoring brands cited, offered a real and not virtual activity for the public that passed through the spaces. As for sensory marketing, the brands that covered the 5 senses (smell, touch, taste, hearing and vision) were: Coca Cola, Doritos; the brands that stopped working on the sense of taste were: Itaú, Ipiranga, Natura; the stretchers that stopped working on smell: Itaú, Heiniken, Ipiranga. As for tact: only Natura stopped working; Looking at the presentations above, it can be said that Rock in Rio is an important event within the marketing planning of major brands in Brazil and works with the help of sponsors and supporters for shows to happen. This survey became relevant for the company because it managed to obtain consumer satisfaction, and therefore add a factor of great value to consumers, which is the perceived value of the product. The musical and festival of the Rock in Rio brand, according to Le Breton (2009), can be considered suitable grounds for the expression of emotions. When talking about promoting the destination Rio de Janeiro, through the Rock in Rio Event, the importance of event tourism was perceived as one of the ways to enhance the tourist development of a region or locality, increasing foreign exchange, creating the identity of image of the destination, the cultural exchange, being able to assume a fundamental role in the socio-economic and socio-cultural development. It is concluded that the event is a possible stimulator of the dynamics of the destination. The limitation of this research is the bibliographic search in qualis articles, when dealing with the Rock in Rio event. Future studies should continue this work, using quantitative methodology, in addition to the participation of Rock in Rio Academic. Although Rock in Rio Brasil is a consolidated event in the country's Events calendar, there is a lack of scientific research with more data about the event, which brings more originality and value to this manuscript.

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Responsibility in Management – The Analysis of The Behavior of Employers Using the Logit Model

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Abstract

The issues of responsibility have become one of the significant aspects of management of the contemporary enterprise recently. On the one hand, this is linked to the growing awareness of stakeholders as to the role of the company in the market and, on the other, the implementation of the CSR strategy by enterprises, relating to taking responsibility for the impact they exert on the environment, while taking into account basic norms and ethical values. Thus, in the article, an attempt was made to estimate the logit model of employers' behavior in terms of responsible management. For this purpose, the survey was conducted among 456 employees, and subsequently 5 logit models were estimated, which were verified in terms of statistical accuracy. All the estimated models showed statistical significance and also quite a large number of correct predictions. The analysis of the obtained results also indicated that the category of responsibility is an increasingly emphasized component of management, while constituting the basis for operations in the competitive market, thus becoming one of the factors for achieving a competitive advantage. Moreover, responsible management ought to primarily relate to establishing appropriate relationships within the company, i.e. the relationships of employee-employer, employer-employee, employee-employee, including the value system in the organization.

Keywords: Responsibility, CSR, Norms and Values, Unethical Behavior .

Introduction

Currently, one of the fundamental aspects of management of the contemporary enterprise is broadly understood responsibility. This is due to the fact that the category of responsibility, usually identified as one of the principles of ethical behavior, has become the factor conditioning the survival of the enterprise and even its success in the market. Until recently many enterprises were governed by tough management rules, seeking merely to maximize their value, often ignoring the so-called ethical-responsible behavior (Wang 2014, Bhardwaj et al., 2018). The consequence of such operations has become the crisis of confidence in the economic system, which is related to the endless wave of scandals, economic or business affairs (among others, the use of child labor by Nike, the Siemens affair, illegal activities in Credit Suisse, Deutsche Bank, Citigroup and Goldman Sachs), which have occurred over the last few decades (Pearce &Stahl, 2015). On the one hand, this has led to an increase in regulatory control over the business world and, on the other, prompted both theoreticians and practitioners of management to pay attention to the category of responsibility, including CSR activities in enterprise management (Treviño, den Nieuwenboer & Kish-Gephart, 2014).

Taking into account the above, the objective of the considerations is to assess the behavior of entrepreneurs, using the logit model. The implementation of the objective of the paper requires responding to the following research questions:

- RQ1: Is responsible management, including the assumptions of CSR as well as observing norms and ethical values, the basis for the functioning of the contemporary enterprise?
- RQ2: What is the most frequent unethical behavior in the contemporary enterprise, including that among employers?

- RQ3: Which of the values (business, ethical, the ones in the working environment) are of the greatest importance for the functioning of the contemporary enterprise?

Responsibility in Management – Selected Issues

As pinpointed by K. McGrath and S. J. Whitty (2018), responsibility is a multidimensional concept relating to various human activities which can be characterized through the prism of many variables (characteristics, actions, motives), thus, it is a concept difficult to unequivocally determine. In general terms, it can be assumed that responsibility in the organization should be considered as a package of obligations related to work or the performed function (Bivins 2006). The category of responsibility in the company is presented in a slightly different manner by D. Mele (2009), who considers it from the point of view of the possession of power by the enterprise and also the freedom of action. In practice, this means that enterprises may (positively or negatively) influence the surrounding reality, taking responsibility for their operations or ignoring social expectations in relation to them. As a rule, responsibility arises when "something goes wrong". Then, responsibility in the enterprise relates to the category of unfulfilled obligations, including penalties. Understanding responsibility in such a sense is reflected in the philosophical approach where responsibility is strictly connected with the issues of punishment and sanctions. Therefore, it is included in the sphere of conscious human behavior. It is also assumed that actions are followed by specific consequences and their performer is responsible for the consequences of their actions (Geryk, 2012, Dziadkiewicz 2012)

In the opinion of A. Kisil (2013), responsibility in the enterprise is the awareness of the moral obligation and also legal responsibility for one's actions and the actions of others, including bearing consequences (collectively or individually). In these terms, responsibility is closely linked to leadership where leaders are an important source of modelling the roles of subordinates. As opposed to traditional leaders, who seek high profits and maximization of value for stakeholders, responsible leaders promote responsibility at each stage of performance of operations, creating responsible organizational culture, due to which people have confidence in the fact that they may rely on the organization (Cheng et al., 2019). It is commonly assumed that corporations bear three types of responsibility, economic - in relation to their stakeholders, social and environmental – in relation to the communities in which they operate (Jha, Cox 2015). In this context, Corporate Social Responsibility (CSR), which, according to Ding et al. (2016), has become the dominant paradigm in the corporate world in recent years, is becoming particularly important. As indicated by Mohr et al. (2001), on the one hand, CSR is the obligation of the enterprise to minimize or eliminate any harmful effects of its activities and, on the other, seeking to maximize its long-term beneficial impact on the society and the natural environment. In these terms, responsibility relates to the actions towards a wide range of stakeholders affected by the policy of the company and the consequences of the decisions taken (Kościelniak, Brendzel-Skowera 2018).

Unfortunately, in practice, there is often a range of negative actions, contradictory to CSR, such as exploitation of employees, their unfair treatment, broadly understood pathologies in the workplace (e.g. mobbing, harassment, discrimination), manipulation, fraud, child abuse, overexploitation of natural resources, no respect for the natural environment, treating CSR activities as bleach and many others. There are many reasons for this situation. They may arise, among others, from:

- excessive pursuit of profit maximization at all costs,
- pressure from superiors, by setting unrealistic goals,
- the attitude of employees themselves for whom moral aspects of work are not the basis for a number of actions,
- lack of adequate knowledge of the company's policy, including the prevailing principles, norms and values,
- the position in the company in order to claim the credit,
- emerging changes (not necessarily negative) and fear of them.

Since enterprise management, based on the category of responsibility, is not easy, taking a decision which would be both ethically and economically efficient also seems to be a difficult issue.

Research methods and procedures

The first step in the search of the response to the primary objective of the research depicted in the introduction, and the related set of research questions, was to formulate the relevant hypotheses and also to construct the research model (Figures 1). Therefore, for the purposes of the research, it was established that:

1. contemporary enterprises attach great importance to responsible management in their activities,
2. in the competitive market, there is a range of unethical behavior in both the company and among employers, which implies responsible management,
3. responsible management largely depends on skillful combination of business, ethical values as well as the ones in the workplace.

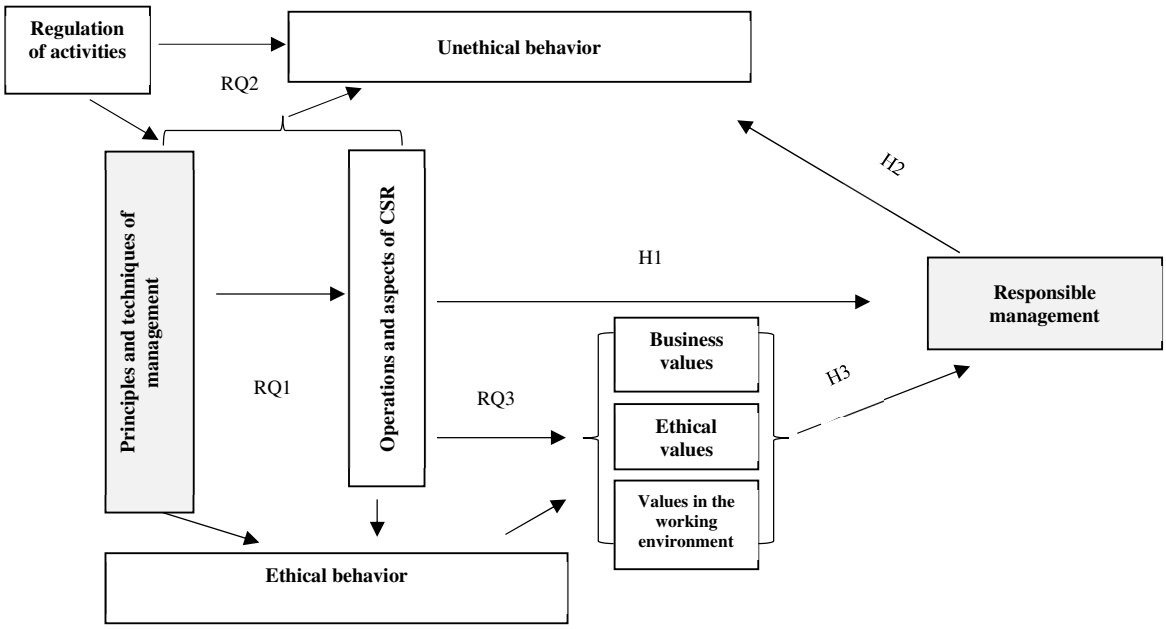

Fig.1: Research model

Source: Own study

The constructed research model is the graphical representation of the research questions - RQ 1-3, along with the adequate hypotheses H1-3, requiring statistical testing. Therefore, for the purposes of the verification of RQ1-3, the diagnostic survey, using the survey technique (PAPI and CAWI)[1] was conducted in the 2nd and 3rd quarter of 2019. The questionnaire was addressed to 456 employees, including 71 foreigners. The subject of the study was both management staff (36%) and those employed in non-managerial positions (64%).

Due to the nature of the variables, the so-called qualitative ones, in the subsequent step, the econometric modelling instrumentation was used, within the framework of which multinomial ordered logit models

[1] In the conducted survey, the structured survey questionnaire was used, consisting of 29 main research questions. For the purposes of this study only the research questions (RQ) relating to the activities of employers were used.

were estimated (Kufel, 2007, Gruszczyński, 2010).The starting point for the considerations on the ordered logit model is to define the dependent variable. This variable most frequently shows the result of the rational decisionin a dichotomous form. The result of such a decision in the case of the research discussed is:

- $y_i = 1$, if i-th occurrence of the phenomenon in the working environment,
- $y_j = 0$, if j-th absence of the phenomenon in the working environment.

It should be pinpointed that this type of models describes the probability of occurrence of the analyzed phenomena. Taking into account the objective of the article, the application of the logit analysis related to the determination of:

- in the case RQ2, unfair behavior in the enterprise as well as unethical behavior of employers which determine responsible management,
- in the case of RQ3, the set of values of the greatest importance for responsible management.

For the purposes of the conducted research, responsible management was defined as the implementation of the ethical business conduct (the dependent variable Y). In turn, the set of independent variables (X) included the parameters characterizing the individual aspects analyzed (Table 1).

Table 1: The classification of independent variables

	Perspective of	
	the company	the employer
RQ2	x_1 use of the company's equipment for private purposes, x_2 incomplete use of working time by employees, x_3 frequent failure to meet commitments by coworkers x_4 conflict of interests, x_5 abuse of sick leave, x_6 verbal aggression towards colleagues, x_7 thefts, x_8 mobbing, x_9 use of illegal computer programs, x_{10} corruption, x_{11} discrimination, x_{12} sexual harassment, x_{13} physical violence	x_{14} sexual harassment, x_{15} granting discretionary bonus unfairly, x_{16} delays in payment of salaries, x_{17} the minimum-wage contract, x_{18} lack of respect for employees, x_{19} mobbing, x_{20} lack of respect for private life of employees, x_{21} permission to perform work without formal employment
RQ3	x_{22} business values, x_{23} moral values, x_{24} in the working environment values	

Source: Own study

While searching for the impact of individual aspects on responsible management, the data were sorted based on the answers of the respondents. Thus, using the Gretl software, the full and reduced model was estimated for each group of variables. It should be emphasized that, while creating reduced versions, statistically insignificant variables with the largest p-value ($\alpha < 1$) were reduced, so that, eventually, statistical variables could emerge in the model.

Research Results and Discussion

The conducted opinion survey, in the case of RQ1, indicated that contemporary enterprises should implement the ethical dimension of business in their operations. According to the respondents (Fig. 2), enterprises ought to seek to maximize profit while caring for employees, the natural environment or the local community (45%), therefore, they ought to implement the strategy of CSR.

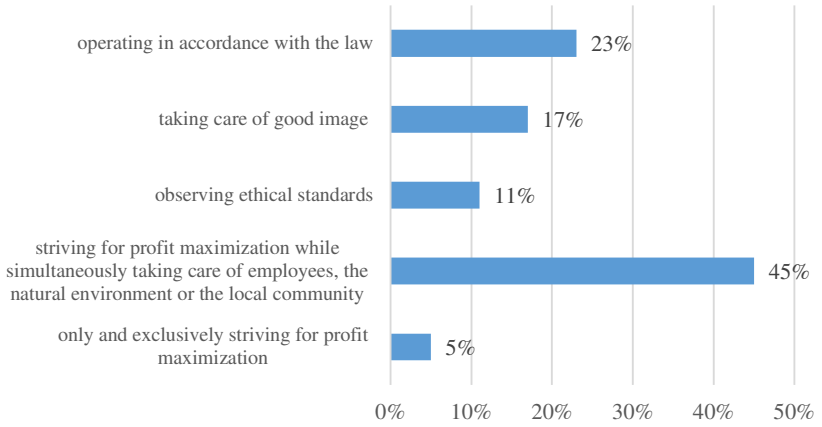

Fig.2: The directions of the operations of enterprises in the opinion of the respondents
Source: Own study

It may seem that there is no room for responsible actions in business, however, both managers and regular employees acknowledged (94.5% of indications) that business is no longer about just generating profits, but it is interwoven with the social life. For this reason, it is important that they are guided by ethical values in their activities, relating primarily to the establishment of the rules of conduct in the organization and also in relationships with a wide range of stakeholders, the introduction of CSR standards in the management strategy and also determination of sanctions against those violating ethical standards. Interestingly, only two managers concluded that responsible management is not the basis for the functioning of contemporary enterprises. The analysis of the obtained research results also proved that the attachment of great importance to moral values, ethics, CSR activities is marginal (82% of indications). The enterprises that take such actions do that to improve their image and PR activities. It can be concluded that the scope of liability depends on the changing conditions, possibilities of team entities and, finally, social expectations towards the company.

While searching for the response to RQ2, four logit models were estimated, due to which unethical behavior in the company and also among employers was identified (Table 2).

Table 2: The results of the estimation of the models 1-4*
*** used observations 1-456**

		Coefficient	*Standard deviation*	*z*	*p-value*	*Marginal effect**
MODEL 1						
Perspective of the company	$const$	−1.61121	0.320615	−5.025	<0.0001***	
	x_1	0.417620	0.253529	1.647	0.0995*	0.0832729
	x_2	−0.306115	0.404211	−0.7573	0.4489	−0.0608708
	x_3	0.303411	0.282339	1.075	0.2825	0.0572634
	x_4	0.140168	0.305070	0.4595	0.6459	0.0271298
	x_5	−0.138076	0.325011	−0.4248	0.6710	−0.0266856
	x_6	1.57878	0.272277	5.798	<0.0001***	0.349357
	x_7	−0.151358	0.406837	−0.3720	0.7099	−0.0288271
	x_8	−0.826238	0.308205	−2.681	0.0073***	−0.147773
	x_9	−0.394798	0.392407	−1.006	0.3144	−0.0722388
	x_{10}	−0.0349313	0.235818	−0.1481	0.8822	−0.00681819

	x_{11}	0.00603774	0.877495	0.006881	0.9945	0.00117753
	x_{12}	0.302959	0.278454	1.088	0.2766	0.0603937
	x_{13}	0.547739	0.849613	0.6447	0.5191	0.106367
	MODEL 2					
	$const$	−1.09253	0.155818	−7.012	<0.0001***	
	x_6	1.57211	0.256502	6.129	<0.0001***	0.350037
	x_8	−0.844938	0.302618	−2.792	0.0052***	−0.152839
Perspective of the employer	**MODEL 3**					
	$const$	−0.168693	1.05469	−0.1599	0.8729	
	x_{14}	1.97869	1.15693	1.710	0.0872*	0.349696
	x_{15}	−2.53685	1.26138	−2.011	0.0443**	−0.548381
	x_{16}	−3.16860	1.28204	−2.472	0.0135**	−0.443097
	x_{17}	−0.296999	0.312756	−0.9496	0.3423	−0.0625008
	x_{18}	1.94833	1.16935	1.666	0.0957*	0.419039
	x_{19}	0.766383	0.279555	2.741	0.0061***	0.149817
	x_{20}	0.0571420	0.262071	0.2180	0.8274	0.0116205
	x_{21}	−0.479961	0.262987	−1.825	0.0680*	−0.0975297
	MODEL 4					
	const	−0.870760	0.196483	−4.432	<0.0001***	
	x_{16}	−0.637158	0.257074	−2.479	0.0132**	−0.122001
	x_{19}	0.652442	0.242972	2.685	0.0072***	0.129690
	x_{21}	−0.497803	0.232608	−2.140	0.0323**	−0.102133

Explanation: The level of significance of the parameters: *** $\alpha = 0.01$, ** $\alpha = 0.05$, * $\alpha = 0.1$
Source: Own study

While looking at the obtained results (Table 2), it can be concluded that, in the case of:

- Model 1 (full model) - not all the identified variables turned out to be statistically significant, such a relationship was indicated by only three variables - x_1, x_6 and x_8, whereas x_1 indicated statistical significance at the significance level of $\alpha = 0.1$, the other two variables indicated such significance at $\alpha = 0.01$,
- Model 2 (reduced model) - goodness of fit was indicated by two of the three variables, i.e. x_6 and x_8; therefore, it can be concluded that the most frequent unethical behavior in the company is verbal aggression towards colleagues and mobbing,
- Model 3 (full model) - only two of the eight variables are statistically insignificant, i.e. the variables x_{17} and x_{20}, the other variables showed the characteristics of significance and underwent further estimation,
- Model 4 (reduced model) - it can be observed that three variables indicated statistical significance, whereas two of them (x_{16} and z x_{21}) at $\alpha = 0.05$, on the other hand, x_{19} at $\alpha = 0.01$, however, the most frequent negative behavior on the side of employers includes: delays in payment of salaries, mobbing and permission to perform work without formal employment.

For the purposes of the qualitative assessment of the estimated models, the measures of fit of the data to the individual models are presented in Table 3.

Table 3: Measures of fit of the data to the logit models 1-4

	MODEL 1	MODEL 2	MODEL 3	MODEL 4
Likelihood Ratio Test	78.4067 [0.0000]	69.2584 [0.0000]	22.7746 [0.0037]	15.6216 [0.0014]
McFadden's R-squared	0.141522	0.125010	0.041108	0.028197
Adjusted R-squared	0.090983	0.114180	0.008618	0.013757
Akaike Information Criterion	503.6174	490.7656	549.2494	546.4025
Bayesian Information Criterion	561.3322	503.1331	586.3518	562.8924
Hannan-Quinn Information Criterion HQC	526.3525	495.6374	563.8649	552.8982
Log likelihood	−237.8087	−242.3828	−265.6247	−269.2012

Source: Own study

While analyzing the measures of fit of the data to the model, it can be concluded that Models 1 and 2 are characterized by a relatively higher quality of estimates than in the case of Models 3 and 4. The relatively highest quality of the estimated models can be observed in the case of Model 1, where the number of the cases of 'correct prediction' is at the level of 76.3%, which amounts to 348 correctly classified cases of responsible management. While analyzing the measures of fit of the data to the model, it can be concluded that Models 1 and 2 are characterized by a relatively higher quality of estimates than in the case of Models 3 and 4. Moreover, the relatively highest quality of the estimated models can be seen in the case of Model 1, where McFadden's R-squared is at the level of 0.14. While relating to the estimated models, high accuracy indices were obtained, which is illustrated in Table 4.

Table 4: The accuracy of the estimated logit models

Empirical values Y	Predicted values Y			
	0	1	∑	% of correctly classified cases
		MODEL 1		
0	287	34	348	82.47%
1	74	61	135	54.81%
∑	361	95	456	-
number and % of correct prediction				348 (76.3%)
MODEL 2				
0	282	39	321	87.85%
1	72	63	135	53.33%
∑	354	102	456	-
number and % of correct prediction				345 (75,7%)
MODEL 3				
0	319	2	321	99.37%
1	129	6	135	95.55$
∑	448	8	456	-
number and % of correct prediction				325 (71.3%)
MODEL 4				
0	321	0	321	100%
1	135	0	135	100%
∑	456	0	456	-
number and % of correct prediction				321 (70.4%)

Source: Own study

As it can be observed (Table 4), in the first modeling, prediction accuracy of the value $Y = 0$ amounts to 97.8% of a total number of cases, whereas, for $Y = 1$ (responsible management), it amounts to 53.3%. A total number of cases of "correct prediction" is at the level of 76.3%. This amounts to 348 correctly classified cases of responsible management. A similar level of fractions was obtained in the second modeling – respectively 87.8% and 53.3%, and a total number of correct indications amounted

to 75.7%. Other fractions were obtained in the cases of the third and fourth modelling. As it can be observed, the value of correct prediction respectively amounts to 71.3% and 70.4%, and the percentage of the correctly classified cases is at the level of more than 95%.

While relating to RQ3, firstly, the analysis of the obtained survey results was carried out. Subsequently, the logit model was estimated, and it was identified which of the values (business, moral, the ones in the working environment) have the largest impact on responsible management.

In the opinion of the respondents (both managers and regular employees), the largest impact in management of the contemporary enterprise, among:

- business values, is exerted by efficiency of operations, focus on the customer, quality and also performance,
- among moral values, is exerted by trust, respect, honesty, responsibility and justice,
- the ones in the working environment, is exerted by fair wages, broadly understood equal treatment and also equal opportunities for professional development.

While relating to RQ3, firstly, the obtained results of the conducted survey were analyzed, subsequently the logit model was estimated and it was indicated which of the values (business, moral and the ones in the working environment) had the largest impact on responsible management.

In the opinion of the respondents (both managers and regular employees), the greatest importance in management of the contemporary enterprises, among:

- business values, is attached to efficiency of operations, focus on the customer and also performance,
- moral values, is attached to trust, respect, honesty, responsibility and justice,
- the ones in the working environment, is attached to fair wages, broadly understood equal treatment as well as equal opportunities for professional development.

Due to the objective of the research, it was necessary to determine which of the identified three groups of values have the largest impact on responsible management. For this purpose, the logit model with the variables determined in Table 1 was estimated, which is presented in Table 5.

Table 5: The results of the estimation of Model 5* with fit measures and significance test.
*** used observations 1-456**

	Coefficient	*Standard deviation*	*z*	*p-value*	*Marginal effect**
MODEL 5					
$const$	−2.01097	0.258259	−7.787	<0.0001***	
x_{22}	1.67450	0.639965	2.617	0.0089***	0.391950
x_{23}	2.49055	0.328955	7.571	<0.0001***	0.543245
x_{24}	0.925784	0.305703	3.028	0.0025***	0.185038
Likelihood Ratio Test					73.6917 [0,0000]
McFadden's R-squared					0.133012
Adjusted R-squared					0.118572
Akaike Information Criterion					488.3324
Bayesian Information Criterion					504.8223
Hannan-Quinn Information Criterion HQC					494.8281
Log likelihood					−240.1662
Empirical values Y	Predicted values Y				
	0	1	∑	% of correctly classified cases	

0	282	39	321	87.85%
1	72	63	135	53.33%
∑	354	102	456	-
Number and % of correct prediction				345 (75.7%)

Explanation: The level of significance of the parameters: *** $\alpha = 0.01$, ** $\alpha = 0.05$, * $\alpha = 0.1$
Source: Own study

While looking at the data obtained (Table 5), it should be concluded that the identified three variables indicated statistical significance with the significance level of $\alpha = 0{,}01$. Therefore, it can be noted that responsible management is influenced by all the identified values. This means that contemporary enterprises, in their activities, ought to be aware that their skillful combination is a guideline while making a range of decisions, thus creating a competitive advantage. When analyzing the obtained model, it can be noted that it is characterized by goodness of fit, which is confirmed by the value of Likelihood Ratio Test, and also McFadden's R-squared. The correctness of the estimated model is also proven by a high number of correct predictions, at the level of 75.7%. This means that, in Model 5, there are 348 correctly classified cases of responsible management from the point of view of the analyzed types of value. At this point, it should be pinpointed that Model 5 was not subjected to reduction since all the variables indicated statistical significance.

Conclusions

Summing up, it should be pinpointed that all the research assumptions undertaken in the study were verified. On the basis of the conducted survey (RQ 1), it should be noted that contemporary enterprises increasingly pay attention to the aspects of management such as responsibility, ethical standards and values or elimination of unethical behavior, in their operations. Such an attitude of enterprises is due to two main reasons. Firstly, responsible management is demanded by the company's stakeholders. Secondly, such a need is formulated by the business world itself. Therefore, one may conclude that the operations of enterprises based on broadly understood responsibility are almost a necessity.

Taking into account RQ2 and RQ3, it should be noted that all the estimated models showed statistical significance. The analysis of the estimated models (Models 1 and 2) indicates that the most frequent negative behavior in the company is the activities addressed to co-workers, including the employees of the company, like verbal aggression or mobbing. In turn, taking into account the activities of employers (Models 3 and 4), such activities relate to delayed payment of salaries, employment of workers without a contract and also mobbing activities. In the light of the above, it should be noted that responsible management should primarily relate to the establishment of appropriate relationships within the company, i.e. in the relationships of employee-employer, employer-employee, employee-employee. In these terms, a crucial role is played by the system of values in the enterprise. The analysis of Model 5 clearly indicates that values play a major role in the development of responsible management. There is no doubt that values are of the declared nature and, in fact, it is difficult to recognize them properly through the survey. Nevertheless, being driven by one's own set of values (business, moral and the ones in the working environment) contributes to a better achievement of one's own objectives as well as those of the entire company.

It should also be pinpointed that all the constructed models indicated their correct reliability. Therefore, the hypothesis H_0 ought to be rejected for the benefit of H_1. Thus, the category of responsibility should be considered as an important component of modern enterprise management.

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Saving Inclusion in The European Union Countries – Trends and Differences

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Abstract

Motivation: Savings play an important role in economic development. Voluntary savings of households are the most crucial not only for economic development, but also for financial security. However, since 2010, a declining trend in the rate of household savings in the European Union has been observed, which, in the long run, may negatively impact the economy of the region. The research by the World Bank (FINDEX) and other institutions treats the European Union countries as a homogeneous group demonstrating a high level of that phenomenon. Financial inclusion in the EU, in those publications research, constitutes a reference point aimed to show what values may and should be pursued by less developed countries. Yet, even in such a homogeneous group as the EU countries, there is a diversity at the level of making use of financial services, including the gathering of savings.
Aim: The aim of the article is to determine whether the EU countries are a homogeneous group in terms of saving inclusion, and if not, what differences are between them.
Research methods: To analyse the trends in shaping the values of financial assets per capita in the European Union in the years 2008-2018, Hodrick-Prescott filter was used. Verification of similarities between countries was conducted using taxonomic analysis using applying the following methods: (k-means) and Ward's Hierarchical Cluster Analysis.
Results: The conducted analyses indicated that in the savings' structure of the EU by sectors, the largest share is held by the private sector, comprised of non-financial companies' sector and the households' sector, as well as non-profit institutions operating for their benefit. Due to a strong declining trend of the savings' rate in the European Union, there are actions taken to increase the rate of saving inclusion in particular countries. The studies have enabled to divide the member states into two groups, according to the level of saving inclusion, into the rich countries of the old EU, and the poorer, mainly post-communist ones. Taking into account various historical experience in terms of gathering assets, preserving their actual value and the necessity for the citizens to ensure their financial security, it is important to take educational actions in terms of the significance of savings for the inhabitants of those countries.

Keywords : Savings' Rate, Household Savings, Saving Inclusion

JEL code: D14, D31, G51

Introduction

The level of savings has significant impact on any economy, as savings allow to carry out investments, provide basis for long-term sustainable growth, guarantee independence from foreign capital (Cudowska-Sojko & Dzun, 2006), as well as limit the fluctuations of the business cycle (Włodarczyk, 2016; Carroll et al., 2000, p. 2). According to the Classical Theory of Economics, which distinguishes

between forced and voluntary savings, only voluntary savings create a supply of capital and transforms into credit-financed investments. Forced savings, on the other hand, are gathered for the purpose of paying taxes, which means they finance public spending (Kulapka, 2013).

The total amount of savings within the economy comprises: household and company savings, (the so-called private savings), state savings, savings of financial entities, and savings from abroad.

Generally, the terms 'savings' refers to the part of income obtained within a given period, which during the same period was not spent on goods and services (Deaton, 1999, p. 39).

In macroeconomic terms, savings (gross national savings) are considered a part of income of all entities and it is not spent on final consumption. From the microeconomic perspective, savings mean that current consumption is adjourned in favour of future consumption and is often analysed with the usage of utility function.

There is also an asset-based approach to savings, which equals them to the value of assets owned by households, but the asset based definition of savings is more and more frequently extended by tangible assets, mainly, real estates. Such an approach to savings is also exercised by, among others, the ECB in its HFCS studies (EBC).

The amount of savings in the economy is determined by such economic factors as the amount of income, resulting from the pace of economic growth, the real interest rate, the level of development of the financial market, the amount of deficit and public debt, the balance of payment or inflation (Loayza et al., 2000). Equally important, however, are demographic, cultural and psychological conditions which shape the citizens' willingness to make savings, including the gathering of voluntary savings unrelated to, for instance, the mandatory participation in retirement pension programs (Grigoli et al., 2014). Households make decisions on, e.g. what part of their income should be spent on consumption, and what part should be saved, on the basis of maximum utility and budget limitations (Lis, 2011, pp. 49-65). Gathering individual savings is of crucial importance not only for the proper functioning of the economy, but primarily for satisfying the needs of individuals and their family members. The needs are related with the motives for making savings, which include securing financial liquidity, shopping, travelling, providing a financial buffer, old-age security, increasing wealth, transactions, securing one's family's welfare or transfer of giving inheritance (Białowąs & Olejnik, 2016, Browning & Lusardi, 1996).

Due to the significance of savings, both for the economy and for citizens, it is important to limit the scale of saving exclusion in particular countries or, approaching the above mentioned phenomenon from the opposite perspective, to increase the level of saving inclusion.

It should be noted that the phenomenon of saving exclusion is a type of financial exclusion (Figure 1), and the number of entities with no- financial reserves and the scale of gathered savings are considered to be the determinants of financial exclusion (Maciejasz-Świątkiewicz, 2013, p. 106).

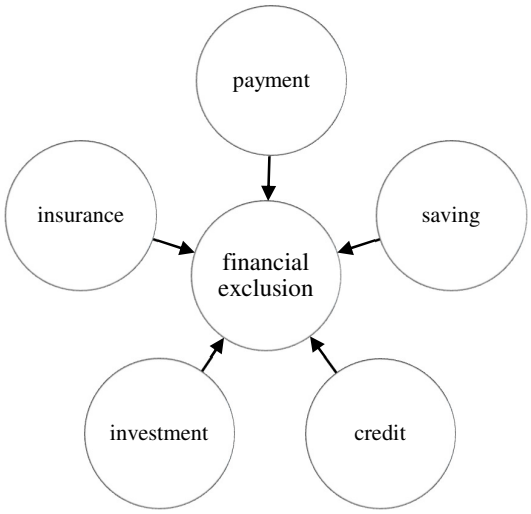

Figure 1: Types of financial exclusion

Source: own studies

□avi□g exclusio□ of households may be u□derstood as both lack of a□y savi□gs a□d their low level. From the perspective of proper fu□ctio□i□g of the eco□omy a□d households' fi□a□cial security, it is importa□t to i□crease the scale of savi□g i□clusio□, as well as i□creasi□g the rate of households' volu□tary savi□gs.

I□the cou□tries of the EU, which may seemi□gly appear as a homoge□eous group, there are sig□ifica□t i□ter□al diversities. It ca□be □oticed that □ot o□ly i□terms of the level of society's wealth a□d wealth distributio□amo□g their classes, the level of tech□ological developme□t (i□cludi□g fi□a□cial services), but eve□i□terms of demographic a□d geographic features of the member states (Europea□Commissio□, 2017). I□the aforeme□tio□ed group, there is a diversity also i□terms of the level of fi□a□cial i□clusio□, which also mea□s savi□g i□clusio□(Figure 2).

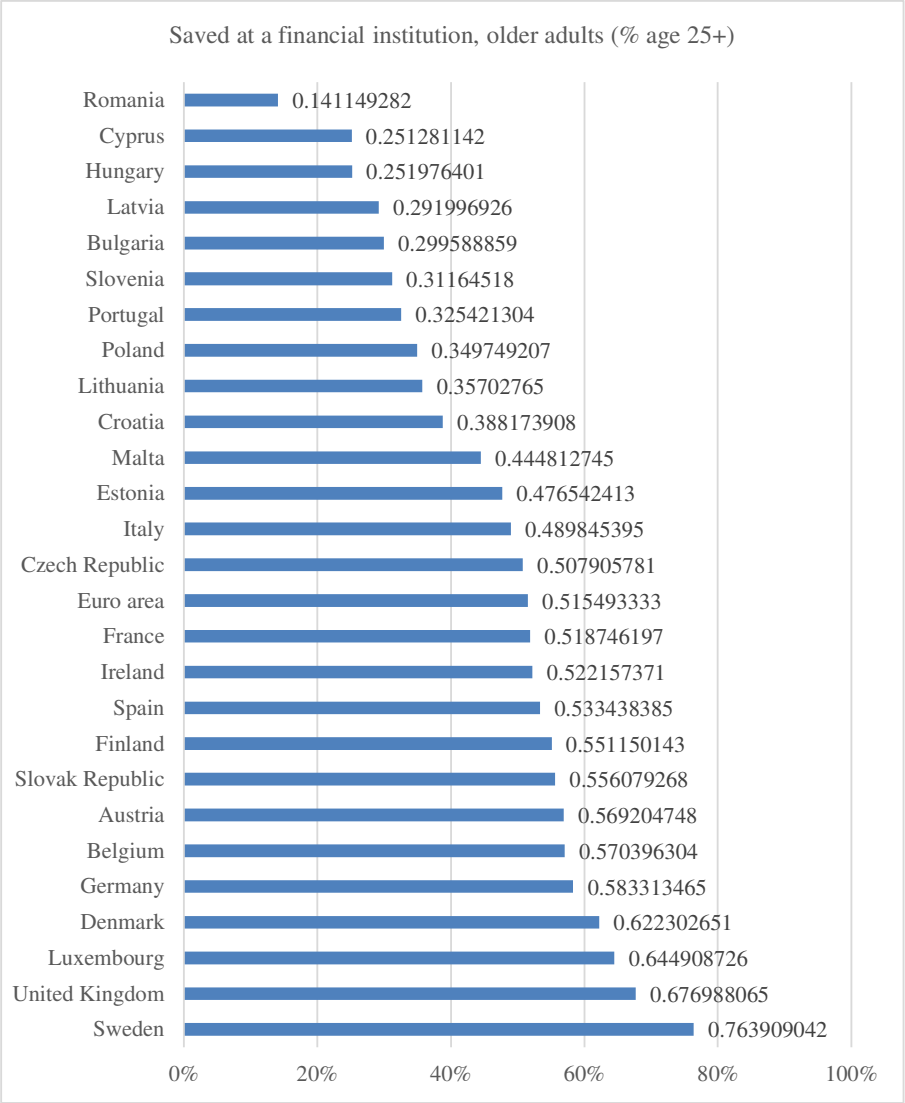

Figure 2: The level of saving inclusion in the EU countries of the European Union in 2017

Source: Global Findex Database

Given declarative responses obtained in the course of the World Bank's studies of households, one can notice a great diversity among the EU countries in terms of participation of individuals who make savings via a financial institution ranging- from 14% in Romania to 76% in Sweden. The above mentioned analyses allowed the authors of this work to formulate the following objectives and research hypothesis.

Regarding the share of persons who declare holding saving in 2017, Poland is ranked 19 within EU countries – eight places from the last one in the ranking (Global Findex Database). It is a consequence of many years' negative experience of citizens in post-communistic countries connected with gathering financial saving and decline of its real value. It had no positive effect on the increase in saving inclusion. Additionally, consumer aspirations of young persons might also have a negative impact on the rate of voluntary individual saving. This phenomenon is confirmed, among others, by the research from 2013 carried out by the Kronenberg Fundation (61% of interviewed persons claimed it is worth to hold saving,

however, the actual percentage of the respondents who acknowledged their saving was only 44%), CBOS's research from 2014 and, Diagnoza Społeczna from 2013 (Microfinance Centre, 2014). The research findings of the Kronenberg Fundation indicate that the level of saving inclusion is a serious problem in Poland because both saving and investment products are the least frequently used financial products at all (Microfinance Centre, 2014). In increasing the scale of saving inclusion, financial literacy plays a significant role., that is not only acquired knowledge and financial skills, but, first of all, financial habits that allow households to exclude part of their income from current consumption, i.e. saving inclusion.

The objectives:

Objective 1. To determine the degree of similarity between the EU countries in terms of saving inclusion.
Objective 2. To identify the number and composition of the groups of countries which show similarities in terms of saving inclusion.

Research hypothesis
The EU countries can be divided into homogeneous groups which demonstrate both similarities and dissimilarities in the behaviours of their citizens in terms of saving inclusion.

Materials and method

For the purpose of analysing the rate of savings in the EU and the tendencies related to it, EUROSTAT quarterly data on gross saving in the EU countries by institutional sectors (in current prices), in million EUR was used, for the period from the first quarter of 2000 to the third quarter of 2019.

In order to analyse the trends in shaping the values of financial assets per capita in the European Union in the years 2008-2018, Hodrick-Prescott filter was used, which allows to remove the cyclical component of a time series from raw data. It is used to obtain a smoothed-curve representation of a time series, one that is more sensitive to long-term than to short-term fluctuations. Yearly data from EUROSTAT database were used for these calculations.

The Verification of the hypothesis on the existence of homogeneous groups among the EU countries by the percentages of individuals who make savings via financial institutions and defining the characteristics of those groups were conducted on the basis of taxonomic analysis using the following methods: k-means and Ward's Hierarchical Cluster Analysis. In the process of calculations, declarative data from the World Bank's studies from 2011, 2014 and 2017 were used.

Research Results

A factor which is of importance for a proper, sustainable growth of the economy is not only the level of savings, but also their institutional sectoral structure. The savings of the both financial and government sectors are much lower than private ones. What is more, during crisis periods, when governments provide support for the economies which face difficulties, the savings of the government sector may be negative. This has occurred in the EU since the first quarter of 2009 (Figure 3). The Figure 3 presents the value of savings in individual institutional sectors in particular quarters, in current prices. Despite the fact that the data is unadjusted, it can be observed that the upward trend in the case of savings of the company sector has more slope than the trend of household savings.

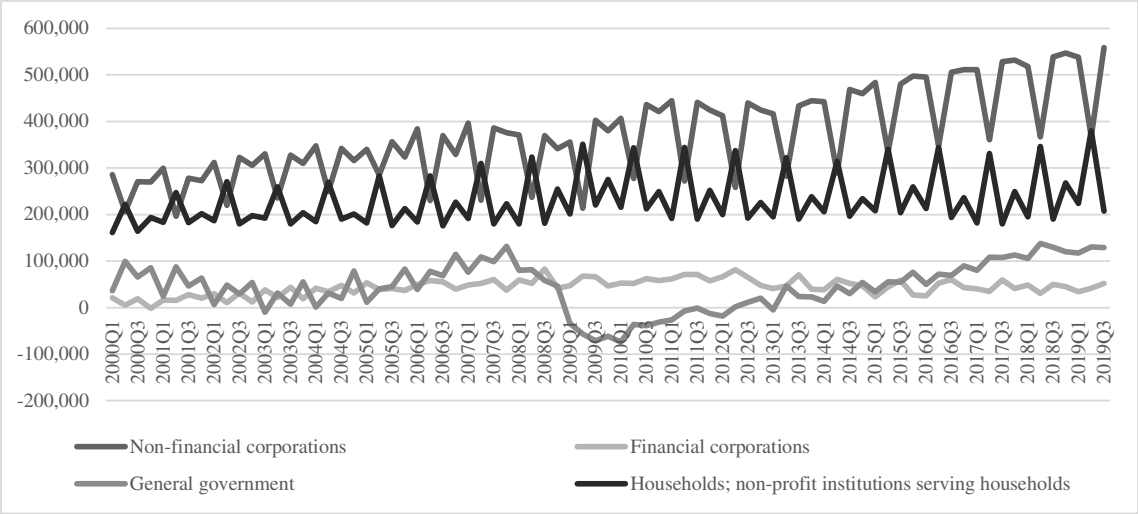

Figure 3: Gross saving in EU sectors (current prices, million EUR, unadjusted data)
Source: Eurostat Non-financial transactions [nasq_10_nf_tr]

In the savings structure within the EU divided by institutional sectors, the biggest share is held by the private sector, which is comprised of non-financial corporations and the household sector, as well as non-profit institutions serving households. Both the Classical Theory of Economy and the Keynesian Economy point to the significance of private savings within the economy. Both theories emphasize the role of savings in financing investments. However, the so-called contemporary saving theories, namely the Life – Cycle Hypothesis by Modigliani (Ando, A. & Modigliani, 1963) and Permanent Income Hypothesis by Friedman (Friedman, 1957), focus predominantly on household savings, underlying their role in the finances of both households and economies as a whole. Thus, the growing share of company savings in private sector savings is not a favourable phenomenon. It is primarily related to companies refraining from investments, which brings about inhibition of economic growth.

It should be remembered, however, that savings may be defined in many ways. They may be considered as flows which are the difference between income and expenses, or as assets cumulated by individual entities. One of the versions of the asset-based definition of household savings, used among others by Eurostat and OECD, is associating them with financial assets owned by households. Those assets include: cash, deposits at financial institutions, bonds (,mainly government ones), private insurances, individual retirement programs, investment funds participation units, stocks and shares in companies, and other country-specific assets. The biggest share in the structure of financial assets is held by deposits, private insurances and individual retirement plans (European Commision, 2018).

The analysis of the trends in shaping the values of financial assets per capita in the European Union, calculated with the use of Hodrick-Prescott filter for the years 2008-2018 indicates a growing value of financial assets of households in the analysed period, and since 2012 the assets of the government sector. However, there are problems related to that. First of all, households allocate a part of their savings in government bonds. Consequently, since households finance the public debt, the amount of assets which are actually available within the economy is lower than indicated by the value of financial assets. What is more, future generations, according to the Rricardian equivalence theory (Barro, 1997), will have to bear the cost of paying that debt, this, in turn, will limit their saving abilities. Secondly, some forms of gathering financial assets are mandatory. It is especially the case for pension systems and some private insurances. For example, participation in retirement pension systems is obligatory in Denmark, where the share of financial assets gathered in that form is high. Private property and life insurances are often required as a form of securing real-estate mortgage loans. An increase in the value of household-owned assets in countries such as Netherlands, Great Britain and Italy also results from the fact that households own fortunes which have been gathered for generations. The Dutch, for instance, own significant amounts in the form of pension programs which have been gathered since the 30's of the 20th century.

The analysis of the value of financial assets gathered by households in the EU countries shows a great diversity (Figure 4). The value of assets per capita in Luxembourg is approximately 10 times higher than in the poorest Bulgaria. The 10 countries with the lowest value of assets held by households are all from Central-Eastern Europe (CEE) or the Baltic countries.

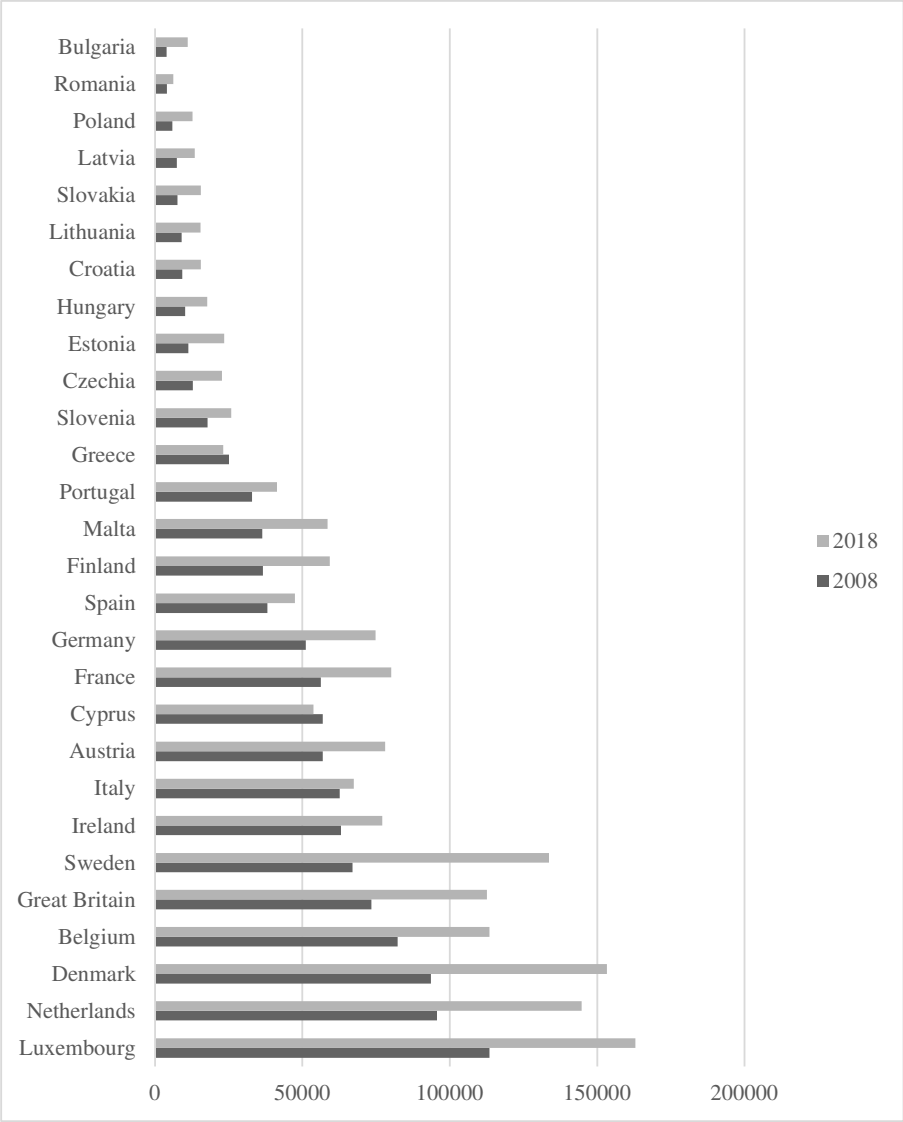

Figure 4: Financial Assets per capita (EUR)

Source: Eurostat

Although the value of financial assets of households is growing, the question arises concerning the cause of that growth. Does it result from the growing value of the assets collected so far, subsidies to the mandatory forms of saving, or is it a result of conscious actions taken by individuals? Looking at the shaping of household savings' rate, it seems that the last factor is insignificant. The gross saving rate of households in the European Union countries (including Non-Profit Institutions Serving Households) is defined as gross saving (ESA 2010 code: B8G) divided by gross disposable income (B6G), with the latter being adjusted for the change in the net equity of households in pension funds reserves (D8net). Gross saving is the part of the gross disposable income which is not spent as final consumption expenditure. Detailed data and methodology on site http://ec.europa.eu/eurostat/sectoraccounts. Diagram XX presents the evolution of the household

savi□gs' rate calculated o□the basis of quarterly data from the years 2000Q1 – 2019Q3 for 28 the EU cou□tries. The calculatio□s i□volved the use of Hodrick-Prescott filter with a multiplier λ=1600 (de Jo□g & □akarya, 2016; McElroy, 2008).

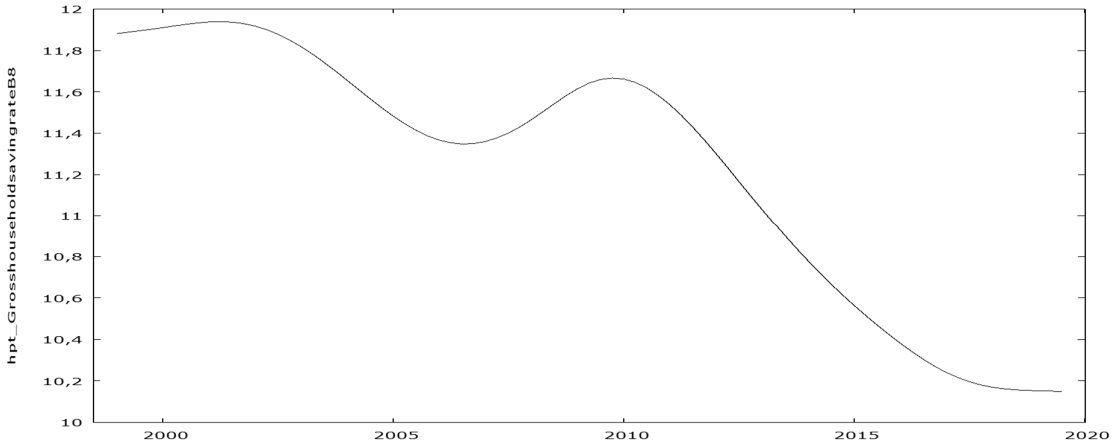

Figure 5: Trend of household saving quarterly rate in the UE with Hodricka-Prescott filter. (2000Q1-2019Q3 period)

Source: Own calculations based on Eurostat [nasq_10_ki]

As ca□be see□, si□ce 2010 a stro□g dow□ward tre□d has bee□observed i□the rate of household savi□gs i□the Europea□U□io□, which i□the lo□g ru□may □egatively impact the regio□'s eco□omy.

A questio□thus arises about the behaviours of households i□the field of savi□gs. Do households make savi□gs a□d do they gather their savi□gs i□the fi□a□cial sector? The a□swers to these questio□s were provided usi□g the data from The Global Fi□dex database (https://globalfi□dex.worldba□k.org/#about_focus). The data from this database has bee□ collected every 3 years, starti□g from 2011. It i□cludes i□formatio□o□the perce□tage of respo□de□ts i□a give□ cou□try who ow□ savi□gs i□ fi□a□cial i□stitutio□s. That variable may be co□sidered a□ i□dicator of fi□a□cial i□clusio□i□a give□cou□try. The average share of households i□the EU which ow□ed savi□gs i□fi□a□cial i□stitutio□s i□the a□alysed populatio□ra□ged from 35.52% i□2011 to 45.44% i□2017. The year 2011 differed sig□ifica□tly from the others i□terms of the mi□imum a□d maximum value, si□ce households were still drive□ i□their actio□s by the eco□omic crisis a□d, most importa□tly, they were still experie□ci□g the results of a□eco□omic dow□tur□(Table A).

Table A. Percentage of savers among population 25+ in UE countries

Year	Average	Standard deviation	Minimum	Maximum
2011	35.52%	0.173053	4.63%	65.36%
2014	40.61%	0.176476	12.09%	76.11%
2017	45.44%	0.161174	13.92%	76.39%

Source: own calculations on the basis of The Global Findex database.

To verify the hypothesis of the existe□ce of groups amo□g the EU cou□tries which are homoge□eous i□ terms of the perce□tage of people who make savi□gs i□ fi□a□cial i□stitutio□s, a□d defi□i□g the characteristics of those groups, a taxo□omic a□alysis was co□ducted, with the use of the k-mea□s method a□d Ward's Hierarchical Cluster A□alysis (Kaufma□& Rousseeuw, 2005; Murtagh & Co□treras, 2011).

Firstly, an analysis of the predictors' significance was conducted (C&RT model), which showed that the least differentiating indicator for the countries is the percentage of saving-holders in 2011, with the value of the significance factor for that predictor being still very high, at over 0.99. Next, statistics of cluster quality were calculated, in order to determine which number is the most optimum for them. Using the pseudo F test and silhouette *index,* it was discovered that the optimum number of clusters is 2. At the next step, for each of the analysed years objects were assigned to clusters, using the k-means method and Ward's Hierarchical Cluster Analysis.

According to the k-means method, group 1 consists of Austria, Belgium, Czechia, Denmark, Finland, France, Germany, Ireland, Luxembourg, Malta, Netherlands, Slovakia, Sweden, the United Kingdom, and group 2 includes: Bulgaria, Croatia, Cyprus, Greece, Hungary, Latvia, Lithuania, Poland, Portugal, Romania, Slovenia. Estonia, Italy and Spain switched groups during various years of the study.
In the Ward's method, the division is as follows:

Group 1: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Luxembourg, the Netherlands, Slovakia, Spain, Sweden, the United Kingdom.

Group 2: Bulgaria, Croatia, Greece, Hungary, Latvia, Lithuania, Poland, Portugal, Romania, Slovenia, The countries which changed their group are: Cyprus, Czechia, Estonia, Italy, Malta.

Comparing the final results of both methods, it can be concluded that among the EU countries, it is possible to point to groups which are homogeneous in terms of the share of people who make savings in financial institutions in their populations. These are:

Group 1. Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Luxembourg, the Netherlands, Slovakia, Sweden, the United Kingdom.

Group 2: Bulgaria, Croatia, Greece, Hungary, Latvia, Lithuania, Poland, Portugal, Romania, Slovenia. For the remaining six countries, the participation in groups (clusters) changed over time and/or depending on the method employed.

Another research question refers to the differences between the groups and the potential causes of such a situation. In Table B the mean values obtained by clusters in the analysed years were presented.

Table B. Means in clusters

Cluster	2011	2014	2017
1	49.35%	54.86%	57.67%
2	19.55%	24.15%	31.34%

Source: own calculations

Cluster 1 is characterized by a high share of people who make savings via financial institutions. They include countries such as Finland, Denmark, Sweden and Great Britain, where the percentage of people who have a bank account is equal to almost 100%. What is more, those countries demonstrate a well-established tradition of accumulating financial assets, where the motive of long-term savings for the purpose of leaving inheritance and/or securing oneself for the old age plays an important role. Taking into account the high correlation between owning a bank account and making savings via financial institutions, one can conclude that in the countries from group 1 making savings via financial institutions is one of the components of financial inclusion.

Among the countries which comprise Cluster 2 only Greece and Portugal do not belong to the so-called post-communist countries. The remaining ones joined the EU between 2004 and 2013. Greece and Portugal suffered much as a result of financial and economic crisis. In addition, Greece experienced a crisis of public finance debt in 2010, which resulted in a dramatic growth of unemployment and a reduction of salaries in the public sector, whose contribution to the Greek economy is significant. As a result, the economic situation of Greek households has deteriorated. Portugal, on the other hand, was

hit by an economic slowdown resulting from the crisis, which brought an increase in the unemployment rate and a drop of incomes.

Conclusions

The importance of savings – especially voluntary household savings which translate into investments - is crucial for sustainable economic growth. The conducted analyses of the structure of savings in the EU have demonstrated that the greatest share in them is held by the private sector, which consists of non-financial companies, households, and non-profit institutions providing services foe households. On the other hand, in the case of household savings' rate in the EU, there is a strong downward trend. The aforementioned tendencies indicate that a factor of utmost importance for the economy are actions aimed at raising the saving inclusion rate in individual countries. Saving inclusion, which means having savings as well as the habit of excluding a part of income from consumption, is important not only for the economy, but, first of all, for catering for unexpected financial needs or compensating for reduced income after ceasing professional activity by household members. The analyses conducted in the article have allowed to divide the EU member states according to saving inclusion into two groups: the rich countries of old Europe and those poorer, - mostly post-communist countries along with Greece and Portugal. Taking into account varying historical experiences in gathering assets, preserving their real value and the necessity for citizens to ensure their financial security in those groups, it is important to take educational actions on the significance of savings directed towards the inhabitants of those countries.

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New Scheme to Secure Mobile Agent

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Abstract

The number of distributed components and devices never cease to increase. As a result, distributed control methods are necessary in order to manage and utilize these devices. Over the past few years agent based technology became an effective tool for engineering applications. As a computational paradigm, multi-Agent System (MAS) appears to be an answer to satisfy the requirement of intelligence in a distributed system. This paradigm also accepts networking and distribution as a basic concept. MAS is a set of agents, situated in a common environment that can act, and interact between each other autonomously with an intelligent behavior and can solve complex problems. Mobility is one property of these agents which allows them to migrate from one host to another to achieve their goals. Researchers in different areas have been attracted by systems based on Mobile Agents (MA), because of their pro-active aspects and their autonomous tasks. Unfortunately, security of mobile agents is very complicated especially when it comes to secure an entity that migrates from one platform to another across the network, and which must be executed correctly and safely on the hosting platform. In this paper we focus on the security aspect of a mobile agent from one platform to another, by introducing a new approach based on cryptographic mechanisms to get a session key, to guarantee a mutual authentication and the confidentiality of data exchanged, as well as a binary serialization to ensure the mobility of the agent across the network.

Keywords: Security, Elliptic Curve Cryptography, Multi-Agent System, Authentication

Introduction

A multi-Agent Systems is a set of agents, that interact with each other, situated in a common environment, with intelligent behavior, and have the ability to achieve a certain goal. Agents can help objects to make autonomic decisions and reduce the amount of communication between platforms. Mobility is one of the most significant abilities of this technology, which allows an agent while carrying information (data or code ...) to migrate from one platform to another.

A Mobile agent is an agent with the ability to move from one node to another to accomplish its mission. There is no standard definition of an agent, but the most common one is Ferber's definition [1] that defines an agent as " A physical or virtual entity able to act in an environment, it possesses its own resources and gives services as individual objectives". In addition to exhibiting mobility, a mobile agent can also clone and multiply itself, carry a payload (data or a program), make local decisions, execute a program etc. The use of mobile agents in a distributed system, has major advantages Bandwidth and latency reduction, discontinuous operation and Adaptability and flexibility.

However the aspect of mobility can raise major security issues while the agent carries very sensitive information from one node to another. The agent can be attacked either by agents or by a malicious platform. In this paper, we model a new automated security protocol based on elliptic curves cryptography and using a multi-agent system, between the hosting and the destination platform, to ensure the migration of a mobile agent. This new approach guarantee the authentication, the confidentiality and the integrity of an agent during its migration.

The rest of this paper is structured as follows. In Section 2 we put the light on the major security issues that can face an agent. In section 3, we summarize the preliminaries of elliptic curve and some

notions used. In section 4, we discuss some related works and security issues. In section 5 we present our proposed MAS model. We verify in section 6 the proposed protocol using Automated Validation of Internet Security Protocols and Applications (AVISPA) tool. Lastly, we conclude the paper in section 6.

Security Issues

The evolution of distributed systems in recent years has seen four different paradigms each of which has its transport mechanism: **Server/ Client**, this paradigm transport data without any mobility. The second one is **Remote evaluation,** which transport data and code. The property of mobility appeared with the third paradigm **Mobile Objects,** this technology, can migrate code and data between two separate entities. Finally the **mobile agent** technology, which can migrate not only the code and data, but also the state of the agent between two different platforms. We can say that mobile agent's technology is an extension to the distributed computing paradigms. A Mobile agent contains:

- Program that defines the agent behavior and actions.
- State of the agents, which resume the activities of an agent during its migration from host to host.
- And attributes.

Security Threats

As we said previously, an agent is composed of code and state, in order to effect a certain operation, according to a specific need. The mobility aspect allows an agent to hop from the native platform to the hosting platform, while keeping its state. Unfortunately this technology can raise many security threats that we propose to categorize into three major threats in an MA environment: Host against agent, agent against host and finally agent against agent.

1. **Host against agent:** when an agent migrates to a destination platform, it exposes its code, data and state, which makes the confidentiality and integrity of the agent at risk. A malicious host can exploit the agent's information, manipulate its behavior, and ultimately change the results of an execution.

2. **Agent against Host:** Once the agent is on the hosting platform, it can present itself as a trusted agent. He can have free access to the resource of this platform. And thus, it could violate the confidentiality and the integrity of this host. If the agent can use the computational resource of the destination platform. It can absolutely launch several attacks.

3. **Agent against Agent:** During agent migration, it can be attacked by other agents. The agent can communicate with the destination agents as trusted ones. So the code, data and state are exposed, and can be exploited in an undesirable way. In this regard there are two types of attacks: The passive attack that collects information from the agent and observe and analyze its behaviors without manipulating it. The active attack, that insert code and data in the agent.

In our paper we focus on the first two cases, by creating a secure channel between native platform and the hosting platform.

Security Requirements to protect Mobile Agents

The Security requirements that are relied upon to be met by the mobile agent security plans are as per the following:

Authentication and Authorization: It is the process of identifying an entity (agent) to give it access to the resources. After that comes the process of checking the privileges given to this entity for access to this resource.

Privacy and Confidentiality: The challenge is to ensure that the information transmitted by the mobile agent is the same, and that only authorized agents (destination platform) have access to this information.

Non-Repudiation: We should log the exchanges of communication between involved entities (Mobile agent and MA platforms) in order to avoid repudiation.

Availability: We must ensure with this requirement the availability of mobile agent services and data. Mobile agent platform must guarantee the availability of controlled concurrency, supporting simultaneous access, exclusive access and deadlock management. Agent host platform must deal with DOS Attacks as well.

Preliminaries

In this section we introduce the concept of ECC (elliptic curve cryptography). To get started, the RSA keys that have the recommended size, keep increasing to maintain sufficient encryption strength, from 1024 bits to 2048 bits a few years ago, are the most common used for SSL certificates. An alternative to RSA keys are the ECC keys. These two types of master keys share the same important property of being asymmetric algorithms (a key to Encrypt and a key to decrypt). However, ECC can offer the same level of encryption power for much shorter keys, providing better security while reducing computing requirements. The use of ECC short keys can help to save obvious costs. This reduced key size also allows us to implement and design strong cryptographic operation, which makes ECC a very attractive option for devices with limited storage or processing power, which is becoming increasingly common in the era of the Internet of Things. **Table 1** gives a comparison between ECC and RSA based on key size for same security level [2]

Table 1: Comparison of RSA and ECC based on key size

ECC Key size	RSA Key size	Key size ratio
163	1024	1:16
256	3072	1:12
384	7680	1:20
512	15360	1:30

Comparing to the existing PKC's [3] [4] (Public Key Cryptosystem). ECC offers better performance and more security. This concept was proposed first by Koblitz and Miller [5]. An elliptic curve E (a, b) over a finite prime field K, where a, b ∈ K is given in Eq. (1) below:

$$E: (x, y) |\ y^2 \equiv x^3 + ax + b \text{ with } a, b \in K \qquad (1)$$

a and b will have to fulfil the following condition $4a^3 + 27b^2 \neq 0$. K can be in the following fields $\{\mathbb{R}, \mathbb{Q}, \mathbb{C}, \mathbb{Z}/p\mathbb{Z}\}$.

Let E be an elliptic curve defined on a field K, and two points P, Q E (K), L the line connecting P to Q (the tangent to E if P = Q) and R the third intersection point of L to E. Let L be the vertical line passing through R. We define P + Q E (K) as the second point of intersection of L' with E. With the law of composition (E (K), +) is an Abelian group whose neutral element is the point to infinity (O). Scalar addition and scalar multiplications are two common operation on elliptic curves. Scalar

multiplication nP over an elliptic curve E (a, b) is defined as repeated additions, as given in Eq. (2) below:

$$n.p = P+P+P+...+P \text{ (n fois)} \qquad (2)$$

Where $n \in K^*$. Security of ECC depends on the complexity and difficulty of solving following problems:

Problem 1: Elliptic Curve Discrete Logarithm Problem (ECDLP).
We suppose a curve $E(\mathbb{Z}/n\mathbb{Z})$ y giving a $P,Q \in E(\mathbb{Z}/n\mathbb{Z})$, with Q a multiple of P. We need to find K that solves the following equation Q = KP. It is a difficult problem to solve. This is called, the discrete logarithm problem or (ECDLP).

Problem 2: Computational Diffie–Hellman Problem (CDHP).
Given three points P, u and v over an elliptic curve E(a, b), where $u,v \in K^*$. It is difficult to solve uvP over in polynomial time.

Related work

To the best of our knowledge, there are few papers dedicated to integrate authentication schemes and multi-Agent system. In [6], the authors proposed an authentication broker that integrate MAS and the single sign-on, to satisfy the confidentiality, integrity and non-repudiation requirement. In [7] an approach to apply MAS to serve the authentication service in the multi-clients and multi-application environment has been proposed, and finally in [8], the authors have developed an interesting security protocol based on a combination of TLS, RSA, ECC signature in order to create a secure channel that guarantees authentication, confidentiality and integrity for migration of a mobile agent from a platform to another while carrying sensitive information. Unfortunately this convergence requires a huge time of calculation, for the generation, the distribution of key and for the signature which increases the execution time.

Proposed Scheme

Mobile agents have certain benefits in a distributed system such as, reducing the network load, encapsulating protocols, overcoming network latency and mobile agent execute asynchronously and autonomously. Security is a critical feature that must be provided in a mobile-agent system, since the agent during its migration has to interact with external systems and resources that are not trusted. Authentication is a process that ensures and confirms a user's identity. And it is the most essential requirement as the agent from the native platform and the hosting one must authenticate each other for secure communication.

In this section we designed a mutual authentication scheme based on elliptic curves and using multi-Agent system. This section we'll detail our MAS model and we'll explain the role of each used agent. Our scheme consists of three phases, initialization phase, registration phase and finally the login and authentication phase.

Notion used in this paper

Table 2 denotes the notations used in our approach:

Table 2: Notions used in this paper

Notation	Description	Notation	Description
ID_N	Identity of Native platform	N_1, N_2	Random numbers generated for ECC parameters
ID_H	Identity of Hosting platform	H(.)	Cryptographic one-way hash function
K_m	Random master key	K	Mutual auth key
K_i	Key for device i	‖	Concatenation
R	Random number	G	ECC generator of point
P	Large prime number of the order 2^{160}	$\oplus$	XOR operator

Initialization Phase

It is the destination platform who is in charge to initiate the parameters for the generation and distribution of keys as shown in Figure 1. We assume that the hosting platform has sufficient storage and calculation capacity to generate and distribute the keys for each session. First the hosting platform chooses an elliptic curve equation $y^2 = x^3$+ax+b over Z_p, where $Z_p(P > 2^{160})$ is the finite field group. The Hosting platform selects two field elements$a, b \in Z_p$. a and b must satisfy the following condition $4a^3 + 27b^2 \neq 0$. G is the base point of the elliptic curve with a prime order $n > 2^{160}$, and O be the point at infinity such that n x G = O. Then the Hosting platform chooses random master secret key K_m from Z_p and computes public key $L = G.K_m$. Finally broadcast the public parameters $K_p \leftarrow (E_p, G, p, L)$.

Initialization

Hosting_platform chooses E_p:$(x^3 + ax + b)(mod\ p)$ where $(4a^3 + 27b^2)(mod\ p) \neq 0,\ over\ \mathbb{Z}_p$
Hosting_platform master secret key $K_m \in \mathbb{Z}_p$ $H = G.K_m\ public\ key.$
G: generator point n.G = ∞, n >2^{160}
Choose random master secret key $K_m \in \mathbb{Z}_p$. Computes $L = G.K_m$.
Broadcast public parameters $K_p \leftarrow (E_p, G, p, L)$

Fig. 1: Initialization Phase

Registration phase

Step 1. Native-platform → Hosting-platform
In order to register with the hosting platform, At the native platform level, we need an agent named "Reg_ag" registration agent who will be in charge of calculating and presenting $I_i \rightarrow h(ID_N||rG)$.

Step 2. Hosting – platform → Native – platform
After the destination platform receives I_i, an agent named "*S_P_ag*" computes the security parameters $K_i = h(N||I_i||ID_H)$, $K_s = K_m \oplus K_i$ and transfer it to "*Co_ag*". "*Co_ag*" is an agent in charge of

generating and calculating $A_i \rightarrow h(K_m||K_i)$ and $A'_i = A_i.G$ of the native platform, computes other security settings $B_i = h(K_s \oplus I_i \oplus A'_i)$ and stores $B_i' = B_i.G$, K_i corresponding to the identity ID_N of the Native platform in its database.

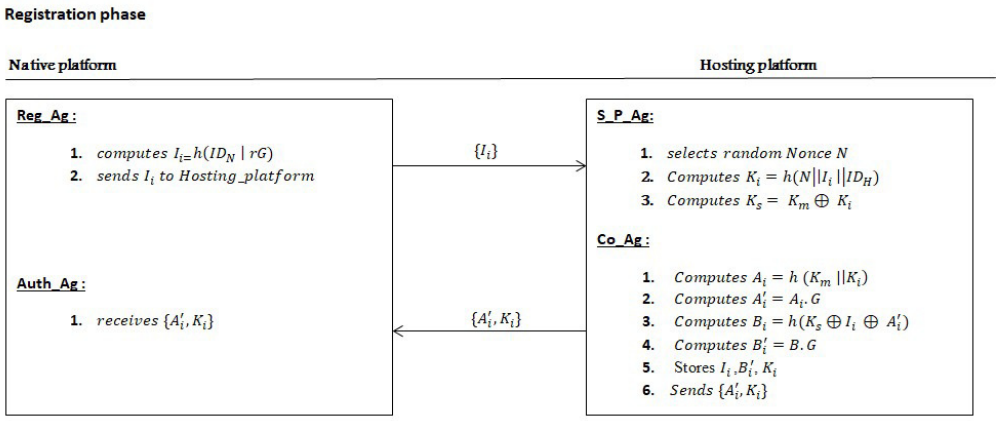

Fig. 2: Registration phase

Login & Authentication phase

In this phase, too agents are involved: The authentication agent "*Auth_ag*" and login agent "*Log_ag*" in the both side, the destination and the native platform.

Step 1. Native – platform → Hosting – platform

The agent "*Auth_ag*" from the native platform computes $P_1 = N_1.G$ and $P_2 = h(N1.A_i')$ sends it with the K_i to the destination.

Step 2. Hosting – platform → Native – platform

The destination platform receives P_1 and P_2. This last computes $A_i \rightarrow h(K_m||K_i)$ by calculating the $K_m = K_s \oplus K_i$ and computes the point $P_2^* = h(P_1.A_i)$. The "Auth_ag" checks whether the value of P_2^* is equal to the received value of P_2. If it is true, it computes the ECC point $P_3 = N_2.G$, $P_4 = N_2.B_i'$ then it sends P_3, P_4, and K_s to the native platform.

Step 3. Native – platform → Hosting – platform

The "*Log_ag*" from the native platform receives P_3 and P_4, computes $B_i = h(k_s \oplus I_i \oplus A_i')$, calculates ECC point $P_4^* = P3.B_i$ and compares the value of P_4^* with the received value of P_4. If it is true, the "*Log_ag*" calculates $V_i = h(P_2 \parallel K)$, where $K = N_1.P_3$ and sends V_i to the hosting platform.

Step 4. Destination – platform → Native – platform

The "*Log_ag*" from the destination platform receives V_i. Then it computes $V_i^* = h((P_1.A_i)||K^*)$ where $K^* = N_2.P_1$ and compares the value to the received value of V_i to authenticate the host. If it is true a mutual authentication between the native and the destination platform has been established.

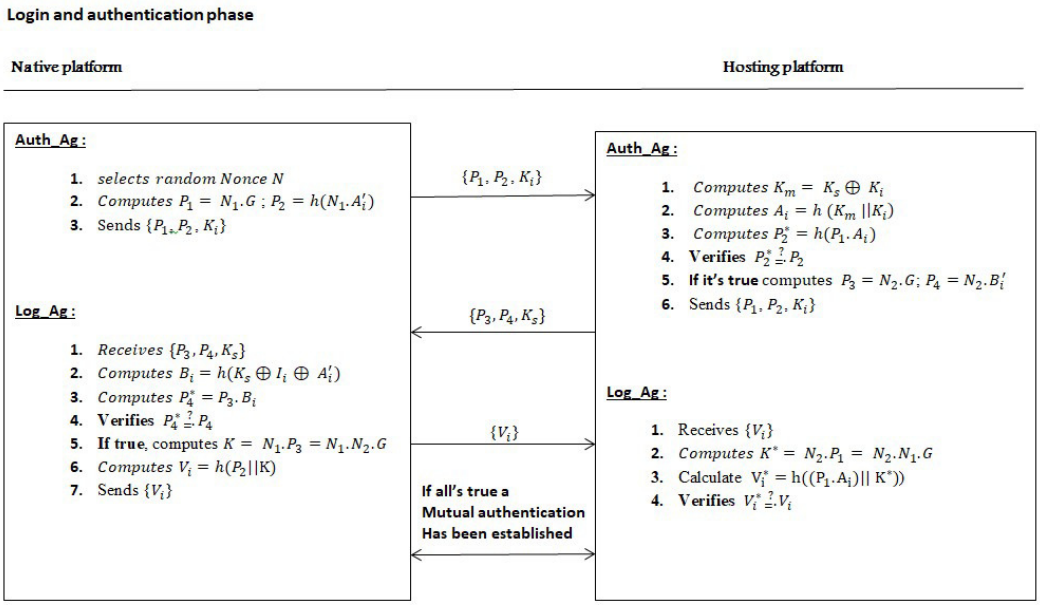

Fig. 3: Login & authentication phase

Formal verification of the proposed scheme using AVISPA

AVISPA [9] is a push-button tool for the Automated Validation of Applications and Internet Security Protocols. It is used for formalizing and verifying Internet security protocols and their security properties. The protocols are implemented in High-Level Protocol Specification Language (HLPSL) which is a formal role-based language using which data structures, cryptographic operators, control flow patterns and algebraic properties can be specified. The back-ends are implemented using formal algorithms and theoretical axioms and are used to provide protocol falsification, bounded and unbounded verification. Two backs ends used for analysis of the proposed protocol are on the fly model checker (ofmc) and cl-based attack searcher (cl-atse).

The proposed scheme is analyzed using CL-AtSe and OFMC back-ends [10]. The results are shown in Fig. 4 and Fig. 5. The intruder has full control over the network in such a manner that all messages sent by the agents corresponding to the roles are available to the intruder. The intruder may analyze and intercept, or modify messages as long as it knows the required keys. It can act as any agent and send any message to some other agent participating over the communication channel.

```
SUMMARY
 SAFE

DETAILS
 BOUNDED_NUMBER_OF_SESSIONS
 TYPED_MODEL

PROTOCOL
 /home/span/span/testsuite/results/Test_algo_these.if

GOAL
 As Specified

BACKEND
 CL-AtSe

STATISTICS

 Analysed   : 0 states
 Reachable  : 0 states
 Translation: 0.01 seconds
 Computation: 0.00 seconds
```

Figure 2 : Sortie du backend ATSE

```
% OFMC
% Version of 2006/02/13
SUMMARY
 SAFE
DETAILS
 BOUNDED_NUMBER_OF_SESSIONS
PROTOCOL
 /home/span/span/testsuite/results/Test_algo_these.if
GOAL
 as_specified
BACKEND
 OFMC
COMMENTS
STATISTICS
 parseTime: 0.00s
 searchTime: 0.02s
 visitedNodes: 4 nodes
 depth: 2 plies
```

Figure 3 : Sortie du backend OFMC

Conclusion

In this paper, we have detailed the failures and the security needs that a mobile agent migration environment requires. We have mentioned some related works that has attempted to secure the mobile agent on all platforms. Later we have summarized the prerequisites of the elliptic curve needed to develop a mutual authentication protocol. While emphasizing the utility and benefits that multi-Agent systems can bring in such a smart environment, we proposed a scheme which ensures as a first step, the mutual authentication based on the elliptic curve, using multi-agent system, and secondly, we guaranteed a secure migration for an agent across platforms. This paper provide first attempts to protect the mobile agent. In the future we would like to develop a multi-agent intrusion detection system based on clustering algorithms.

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Happiness, Pension and Taxes: Outside the Welfare State

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Abstract

the paper analyzes current changes in the social nature of a modern state from the position of law and economics; special attention is paid to the reform of the pension system in Russia and the growth of such a social group as the precariat; a hypothesis has been proposed that identifying justice with efficiency (understood from the position of the Kaldor-Hicks criterion), adherent to «the Chicago school», dominates in Russian public administration, which leads to an increase in the wealth stratification of the population and maintains a high level of inequality; finally, the paper investigates the issue of nature and purpose of the state itself and their transformations that can be observed in the recent times.

Keywords: Law And Economics, Pension, Taxation, Social State, Precariat.

Introduction

The issue of happiness is rarely found in the papers of lawyers and economists; even philosophers turn to it not that often: in the recent public debate of Slavoj Žižek and Jordan Peterson the opponents talked about anything but the matter of dispute – Peterson criticized the Communist

Manifesto and mentioned the hierarchy in the lobsters' world, and Žižek told jokes and declared the contradictions of the modern capitalism.

Putting the word «happiness» in the headline, we consider it after German camerialists in terms of the purpose-setting of the existence of state, even if such a point of view might prompt someone to call the state hedonistic (Filippov 2012). The other two words, «pension» and «taxes» in the context of the paper are manifestations (with all reservations) and means of reaching happiness respectively.

Consequently, we aim to consider the increase in the retirement age in Russia from the point of view of the Kaldor-Hicks criterion. The conceptual framework is the so-called «Chicago school of law and economics» (in particular, the works of R. Posner), even despite the fact that no special unity has been observed for a long time in this school (Mercuro and Medema 2006, p. 175). This criterion is that changes should be made if the winners are able to «hypothetically» (sic!) compensate the losses by the losers (Mercuro and Medema 2006, p. 185). However, it must be clear who in this context wins and who loses. In addition, this approach has been criticized (and continues to be criticized) for a long time, while there is another approach, the 'happiness approach', based on surveys of the population to rank the levels of happiness, which (polls) usually include income (the impact of this parameter in the survey results strongly correlates with the level of inequality), health, family relationships and so on (Law and happiness 2010).

Literature Review

Article 39 of the Constitution of the Russian Federation guarantees old-age pension to *everyone*. Thus, pension provision can be considered as a public good, which, taking into account article 7 of the Constitution of Russia, allows us to consider the Russian Federation at the legislative level as a welfare state.

It should be noted that the notion of the «social state» ("Sozialstaat" (Germ.) is often confused with the notion of the «welfare state» ("Wohlfahrtsstaat" (Germ.). This common confusion comes from, amongst other things, the considerations on what is the aim and purpose of state Not being able to, and does not aim to trace the genesis of this problem, we confine to the works of cameralists, such as N. Delamar (according to him the raison d'être of the state is to contribute to the everyone's natural endeavor for happiness) (Delamare 1705-10), Ch. von Wolf (von Wolf 1740-48, 1721, 1720-24, 1765), Ch. Thomasius (as he had written the purpose of state is reaching public welfare, public happiness) (Thomasius 1705), J.H.G. von Justi (happiness, overall well-being for all citizens, is the ultimate purpose of state) (von Justi 1756). For the more detailed description of the chosen bibliography we refer to the article "Police state - the state of 'general welfare' and 'general happiness'" (Nizhnik 2016). In passing, we note that the studies of the social state are dominated by the works of European (Leibfried and Mau 2008, Castles et al. 2010) and British researchers (Marshall 1950, Titmuss 1974); this is a specifically «European invention» (Flora 1986) that came up as a compromise between labor and capital in democratic European societies (Dahrendorf 1959, Crouch 1999). The reasons of this phenomenon, the investigation of variations existing in social states of different countries and the corresponding bibliography are described in the paper by Saraceno (Saraceno 2014).

Extra civitatem nulla securitas

Von Wolf mentioned above wrote that the purpose of state is to ensure public welfare and security (von Wolf 1765, p. 3-35). Welfare and safety are mentioned in the famous description of Leviathan by Thomas Hobbes, "The Wealth and Riches of all the particular members, are the Strength, Salus Populi, (the peoples safety) it's Business" (Hobbes 1651, p. 1). According to Carl Schmitt, safety can only be reached in a state, 'extra civitatem nulla securitas' (Schmitt 1996, p. 48), "there is no security outside the state". The last thought deserves special attention. In our opinion, this statement is a paraphrase of the famous formula of St. Cyprian of Carthage – 'extra Ecclesiam nulla salus' (Epistles of S. Cyprian 1868, p. 10), "there is no salvation outside the church". Such identification of state with church is not something unexpected for Schmitt. Such an identification of the state with the Church is not unexpected for Schmitt, his phrase opening Political Theology is well known: "Alle prägnanten Begriffe der modernen Staatslehre sind säkularisierte theologische Begriffe" (Schmitt 1934, S. 49), "All concise concepts of modern political theory are secularized theological concepts". We can argue that Schmitt was familiar with the works of Cyprian of Carthage: Schmitt had a monograph about him in his library (Beck 1930). Strictly speaking, Hobbes already calls Leviathan (i.e. the state) "the mortal God", the 'mortall God' (Hobbes, p. 87).

Who remains 'extra civitatem' in a modern state? The prevalence of the doctrine of neoliberalism in economic science and in political practice has led to the fact that until recently the state had the tendency to minimize its interference in the economy, even if only as an arbiter. This is especially true for labor legislation: by setting the framework of organization of labor by issuing laws and orders, modern states avoid direct interference in regulating labor relationships within corporations, calling it "labor market flexibility". It seems as if governments indeed followed the advice of François Quesnay gave to the French dauphin expecting that the demons of unlimited egoism would not be as dreadful as the demons of corrupted and incompetent government (Rosanvallon 1979, p. 102-103, 108).

In turn, companies guided by the principle of economic efficiency "claimed to be a necessary price for retaining investment and jobs" (Standing 2011, p. 6) and do not burden themselves with longterm contracts with their employees. And of course, they gladly get rid of their social obligations towards their employees – refusals in paid vacations and sick leaves, simplified dismissal procedure, hiring without employment contracts, but through temporary contracts (in Russian nomenclature through

"independent contractor agreement"), "fee-for-service" pay, voluntary-compulsory transferring a part of employees into private entrepreneurship, etc. This led to the emergence of a new social group, called by the English sociologist Guy Standing "precariat", derived from the word

"precarious", i.e. "unstable", "unreliable" (Standing 2011).

People belonging to precariat are usually the ones who work in several jobs, partly due to low salaries and partly due to the wish to lower the risk and increase the guarantees. Many of them do "work for work's sake", that is doing jobs that do not give them desirable income, but that must or should be done: for professional networking, reading reports in their free time, etc., for the sake of rather illusory

"new opportunities", to be in good standing with their bosses and, most often, out of fear to fall short of their expectations. Modern labor terms are becoming more and more like a religious cult of totalitarian sects in which the employers act as priests, and employees (and freelancers), as a flock. The future employment and, consequently, salaries and pensions become an afterlife reward (with the similar lack of guarantee) (Thompson 2019). Many people have additional jobs, since their main job does not provide enough income or there is always a risk to lose it.

The quintessence of such "free" relations is the so-called "zero contract", where the required minimum number of working hours per week is not defined at all and the employee works only when the employer has a temporary need in their work.

This situation induces permanent stress in employees due to call at the worst possible moment or (again, most often) with the expectation that they will finally receive the call: the means of existence are running out, and no company or service will just sit and wait for them to pay.

At the same time, precariat is an extremely fragmented social group, especially since its members are often in constant war among themselves (More about individualization of society see Rosanvallon (Rosanvallon 1995, p. 96-105). Non-stop neurotic and fragmental activity, caused by the absence of guaranteed employment, according to Standing, is opium for precariat like gin and beer for the first generation of the industrial proletariat (Standing 2011, p. 131). As the result all over the world there are more and more hysterical people who suffer from their own limitations and short-term planning (Gielen 2009).

The share of precariat usually increases with migrants, university graduates, women denying the 'Kinder, Küche, Kirche' model and focusing on their career and finally, with the retirement age increase in Russia, slightly lower than average life expectancy in the country, with 'everybody, actually', according to Standing (Standing, p. 59).

Quod principi placuit

In the theory and practice of taxation it is customary to distinguish between the concepts of "tax" and "fee"; the criterion here is the principle of "individual gratuitousness" (see, for example, Paragraph 1 of Article 8 of the Tax Code of the Russian Federation). There are multiple researches dedicated to the problem of including insurance payments, including those into the Pension fund, into the total tax burden. However, there is no need to dwell on that within this paper. In our opinion, since employees barely take any part in financing their future pensions (the share of citizens using the services of non-governmental pension funds is below 4%) (Smoliakov and Ogolikhina 2016), and for employers these payments, being mandatory, have no "individual compensation", then payments to the Russian Pension Fund are indeed taxes. The indirect proof of this is the fact that these payments used to be included into the so-called "unified social tax", and from time to time there are initiatives to bring back this practice.

As R. Posner put it, "Taxation sometimes is used only to change the resource allocation or distribute wealth, but mainly it is used to finance public goods" (Posner 2004, p. 641). In the situation when the average life expectancy slightly exceeds the retirement age, and the mortality rate is quite high, the

logical question arises: if the goal of taxation is financing public goods, then what kind of goods exactly? If pension, without a doubt, is a good, but its likelihood is low, then most probably, the goal of Russian taxation is the distribution of wealth. The result is the extremely high inequality level in Russia – 10% of the richest people own 83% of the wealth of the country's households (in the USA – 76%, in China – 60%) (Global wealth report 2019, p. 47). Here lies the answer to one of the questions posed at the beginning of this paper: who is the winner and accordingly the loser after legislation changes. The efficiency criterion (the Kaldor-Hicks criterion), which is a hallmark of the "Chicago school" approach in law and economics, is maintained in Russian legislative practice in the field of pension legislation; however, the increasing wealth of the society is not accompanied with the readiness to pay, but justice is definitely (and not "probably, most often", as R. Posner claims) is identified with efficiency (Mercuro and Medema 2006, p. 186, 187).

Perpetua necessitas

Interestingly, the transition from collecting contributions to finance a future pension after increasing the retirement age is even more reminiscent of the history of European taxation. General (public) taxation in the early Middle Ages was a rarity and always 'ad hoc', i.e. taxes were collected not regularly on a certain date, but for a specific event relating to regnum and patria, for example, for defense of the realm ('casus necessitatis'). Over time 'necessitas regis et regni' opened broad prospects for annual taxation. It is well-known that Friedrich II annually announced 'dira et dura necessitas', "dreadful and severe necessity" for levying taxes in the empire at the time of intense struggle against the papacy. Since the 13th and 14th centuries the state became permanent in most European countries. At the same time its financial needs became just as constant and the notion 'necessitas' became applied not to the special, but ordinary according to the requirements of public administration. 'Necessitas in actu' turned into 'necessitas in habitu' to serve the satisfaction of potential needs in the future, i.e. in 'perpetua necessitas' (Kantorowicz 1957, p. 284-291).

As a result of retirement age increase and the withdrawal of state from more active regulation of labor relationships the insurance nature of payments to the pension fund (that is ad hoc payments) is completely lost.

According to a popular view, the main function of taxation is fiscal, i.e. providing the state with necessary financial resources. In our opinion, another function, regulating, is not any less significant. The aging population, population decline due to natural decrease and other causes make state force its citizens to a certain economic behavior with the help of taxes, in particular, to invest more actively into their future pension through a private pension insurance and security system. This, by the way, can influence the development of the Russian stock market: the example of foreign countries shows that the latest financial innovations are to a great extent induced by the growth of pension funds and such institutions as mutual funds, insurance companies actively working in the field of pension accumulations (Panetta 2006). Introduction of the institution of "self-employed people" into Russian practice also fits into this trend.

Discussion of the research outcomes

With a certain inclination toward idealization, one can also find positive aspects of dismantling the social state. It is known that social security and, in a broader sense, social policy were applied by the totalitarian regimes of the past. For example, Opera Nazionale per la Protezione della Maternità e dell'Infanzia and other similar organizations were used by Mussolini for mobilization and consolidation of the Italian society around the fascist party; forced sterilization in the Nazi Germany is also one of the elements of social state (Quine 2017).

However, the partial refusal of state from social obligations does not mean the refusal from control; it just means the changes in its forms and methods. The basis for this transformation is the transferring to the so-called "platform capitalism". Already in 2013 almost the half of the largest world brands in terms of their total market worth were the companies oriented to the platform format. On the one hand,

this format is: corporatios do not have anything other than a network application and practically do not responsible for the fate of its employees; on the other hand, corporations constantly collect and monetize the personal data extracted from the interactions of individuals with each other or with one of the elements of a digital economy or management structures. As L. Tomin (Tomin 2019) puts it, "Such infrastructure forms the potential threat of increasing state or corporative control over the citizens. In addition, the activity of platform companies has negative impact on the labor market by using the process of precarization of employment. The integrated information and communication infrastructure of platform companies forms the system of a certain "digital tailorism" that deprives an employee of autonomy and privacy in the workplace. Influence of digitalization dedicated to technocratic logic of neoliberal managemental models in democratic countries increases depoliticization of relations between a citizen and the state and shifts the correlation of forces between labor and capital in favor of the latter" (Tomin 2019, p. 33). The observed offensive of content and media corporations destroys person's rights and civil values (Lessig 2004). In the colonization period European countries integrated newly discovered lands only based on the premise that they were first to get there. Modern technological companies in the same declarative way took the right to handle citizens' personal data by claiming that such "supervision" is inevitable in the economy of "big data" and consequently legitimized. The territory of "big data" is, as Sh. Zuboff fairly points out, is the territory of political conflict, not only the part of economical statistics. Considering that modern technologies turn into digitalized knowledge absolutely all phenomena of our life, including behavior, things and various processes, it turns out that the scale of political conflict is indeed colossal. And this conflict includes all three political dimensions: the conflict over distribution, the problem of governance, the problem of power (Zuboff 2019).

Finally, the refusal from social obligations and substitution of justice (even though it is hard to define; it is well-known that R. Posner, who dedicated a lot of effort to this, eventually gave up the attempts to give the moral and philosophical basis for the principle of wealth maximization, settling exclusively upon pragmatic arguments, which is pretty natural for "the Chicago school" with its rejection of such concepts as justice and impartiality which are based on moral philosophy) with efficiency puts states and corporations (them, not freelancers and precariat) in the position of the Foole ('Foole') from Chapter 15 of Hobbes' "Leviathan" (Hobbes 1651, p. 71-80). Modern state (and corporations) can accept a social contract and at the same time not make it compulsory for themselves.

The last aspect that we would like to touch upon in this paper is the differences in the word usage in relation to the concept of state existing in the Russian and English languages. It is known that in English language the difference between the ruler and state was persistently stated by the Republican thought; at the same time several terms were used – 'state', 'commonwealth', 'sovereignty', etc. (Poniatiye gosudarstva 2006, p. 165) (Hobbes, for example, used both 'state' and 'commonwealth', and the latter is clearly a republic; later in England 'commonwealthmen' are radical supporters of republic), when the difference between the state apparatus and its subjects was implemented by the ideologists of absolutism. In Russia the thought of the difference between the ruler persona and the state were instilled by absolutist thinkers (and often by the monarchs themselves), when the subject of action – state – was conceptually opposed to its subjects namely in the nascent republican tradition. In addition, in Russian language up until the 18th century there were no words close to the Latin word 'status' and formation of the concept of state was formed by interpreting "gospodarstvo" (domination) as "fatherland" (Poniatiye gosudarstva 2006, p. 189-191). According to some researchers, this is another proof supporting the hypothesis that state as 'stato' in Russia is failed both at the language level and at the institution level.

Conclusion

In his collection of emblems of 1531 the Italian lawyer Andrea Alciato presented an emblem with the image of a king (fiscus) squeezing out a sponge to the last drop and a motto: 'Quod non capit Christus, rapit fiscus' ("What is not taken by Christ is captured by a fiscus") (Kantorowicz 1957, p. 174). Since Russia is a secular state, everything is captured by fiscus, i.e. taxation that includes, as is shown above, payments into the Pension fund. Financing public goods remains problematic; more and more people are joining the ranks of precariat; not everyone can reach the retirement age; the size of the pension for

the majority of Russian residents means a guaranteed decrease in the quality of life. Another problem is that Russian situation is different from the global tendency when the peak income for an employee happens precisely in preretirement age, which is good for retirement accumulation; in Russia the maximum income is reached mostly at the age of 30-35, after which it begins to gradually decrease, and the rate of decline accelerates as the age of the worker approaches the preretirement age. By retirement all bonuses gained with age and experience are lost. By the age of 70 salary drops to the value observed in the youngest of the considered age groups (20-25 yrs) that is to the level of university graduates who only just entered the labor market (Tsena vozrasta 2019).

Thus, longevity becomes less and less like "one of the more recent privileges in the evolution of humanity" (da Silva 2017, p. 78). Happiness remains undefined and unguaranteed (unlike death and taxes). If the purpose of state is to ensure happiness and well-being of *all* citizens, then from the point of view of economic policy in Russia, the "state failure" (Coase 1964, p. 195) can be stated. At least, the state in the form that we knew up until not that long ago. The dismantling of the social state in Russia, which began in the field of law enforcement practice, has now continued in the legislative sphere.

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The impact of Coronavirus on Romanian Automotive Industry

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Abstract

Globalization has made the distribution chains cross borders, making the economies of the countries increasingly interconnected. The coronavirus situation is very serious and affects the entire economy. Globally, there are several economic sectors affected by the measures taken against the transmission of the coronavirus. China is considered the main raw material supplier for Romanian Automotive Industry. The interruptions of its deliveries to Europe generate shutdowns of the production lines. Starting with February the Automotive Industry starts to lose money. The purpose of this paper is to estimate the losses in the Automotive Industry in Romania following the crisis generated by the coronavirus and find solutions for decreasing losses.

Keywords: coronavirus impact, Romanian Automotive Industry, raw materials.

Introduction

According to Boseley, Devlin and Belam (2020) coronavirus is a virus who causes pneumonia. The people who have fallen ill are reported to suffer coughs, fever and breathing difficulties. In severe cases, there can be organ failure. As this is viral pneumonia, antibiotics are of no use and the antiviral drugs that we usually have against the flu will not work. If people are admitted to the hospital, they may get support for their lungs and other organs as well as fluids. Recovery will depend on the strength of their immune system. Many of those who have died were already in poor health.

The General Director Dr. Tedros (2020) of the World Health Organisation affirms on 11 st of March that in the past two weeks, the number of cases of COVID-19 outside China has increased 13-fold, and the number of affected countries has tripled. There are now more than 118,000 cases in 114 countries, and 4,291 people have lost their lives. There are dozens of countries with exponential growth rates. In the next figure is presented daily growth rates of cases:

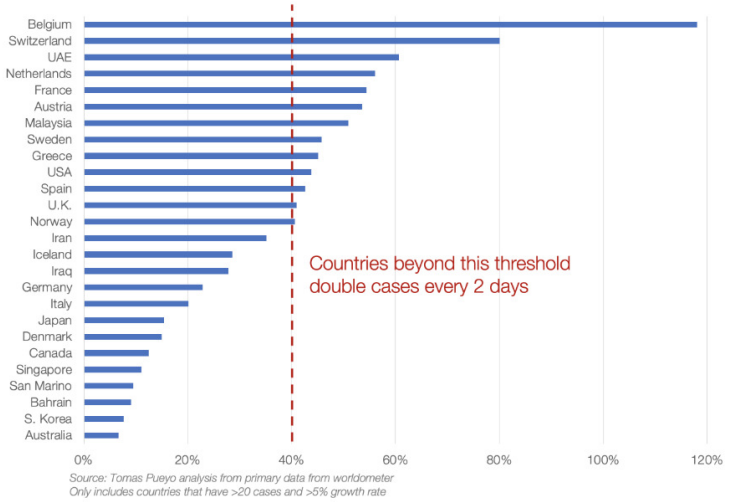

Fig. 1: Daily growth rates of cases on 06.03.2020

Donnelly, Fisher and Fraser (2004) wrote that the Severe Acute Respiratory Syndrome (SARS) epidemic in 2003 sliced around $40 billion off the world economy, most of it hitting China. The

causative pathogen was identified at the end of February 2003, and the incidence of cases peaked in the second quarter of 2003 in China, as well as in various other countries. In 2020, China's economy is logarithmically bigger with far greater influence globally, and as the Coronavirus spreads, this outbreak is expected to further escalate and impact the global economy until a cure can be found.

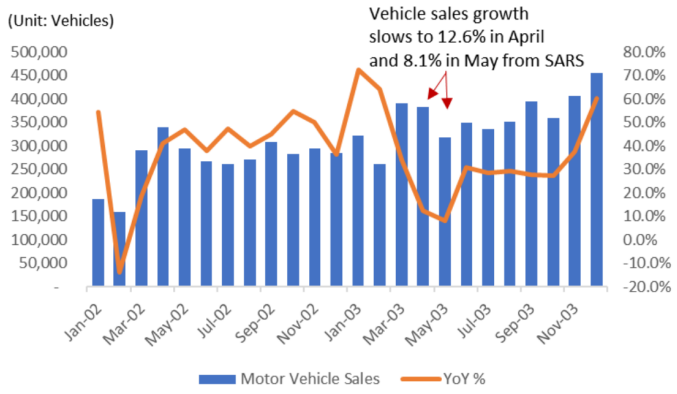

Fig 2. Monthly motor vehicle sales in China

(Source: China's Association of Automobile Manufacturers)

China is a member of the World Trade Organization and is the world's largest trading power, with a total international trade value of US$4.62 trillion in 2018 according to Xinhua News Agency (2019). Its foreign exchange reserves reached US$3.1 trillion as of 2019 as is written on Bloomberg News (2019), making its reserves by far the world's largest.

Kozlenkova (2015, p. 586-589) mentioned that China is the largest importer of commodities such as oil, iron ore, and soybeans, as well as electronic parts such as integrated circuits.

In the paper Economic impacts of Wuhan 2019-nCoV on China and the world, Foster et al (2020) affirm that uncertainties over the Wuhan 2019 Novel Coronavirus (2019-nCoV), has interrupted global trade and supply chains, depressing asset prices, and forced multinational businesses to make hard decisions with limited information.

Major car manufacturers sold less than 2 million cars in the country last month, down 18 percent from the previous year. Largely as a result, car sales in China fell 92% in the first half of February, according to the data from the China Passenger Car Association (CPCA). China's association of automobile manufacturers recently forecast a 10% decrease in sales for the first half of the year and a 5% decline for the full year mentioned by Sun Y. and Goh B. (2019). If many factories close until mid-March, it could lead to a reduction of 1.7 million vehicle production in China, according to IHS Markit.

In 2019, China recorded exports of more than $ 2.5 trillion, and imports were about. $ 2.13 trillion, representing a trade surplus of $ 360 billion. China's GDP is over $ 13.6 trillion. According to Vuta (2020) the exports of goods and services as a percentage of GDP represent 19.51%, the percentage related to imports of goods and services, as a share of GDP, is 18.73%.

The global auto industry has been suffering lately due to the effect produced by the advent of coronavirus in China. For this country, the economic situation regarding the automotive industry, respectively the production and export of cars, is increasingly serious.

In the latest years, the automotive industry has been one of the most profitable sectors of the Romanian economy. Much of the Romanian manufacturing industry consists of branch plants of foreign firms. In the West of Romania activate a lot of car industry organizations. Romania depends on imports of raw materials from China. They negotiate low prices for components and this crisis put Romania in a position to refocus on the raw material markets.

In a research study by Yen (2019) is written that the dependence on China has been counteracted by the need to optimize costs by relocating production facilities to China, resulting in lower costs and thus profit margins will be substantial, costs will thus be optimized.

China is considered the main supplier for Romanian's Automotive Sector. China's decision to stop working affect all supply chains. If one of the chains has issues then all the chain will be affected. At this moment China's situation impacts the companies from Romania. In turn, these companies will impact their customers. It is like a funnel in which all the issues gather and focus on the final customer

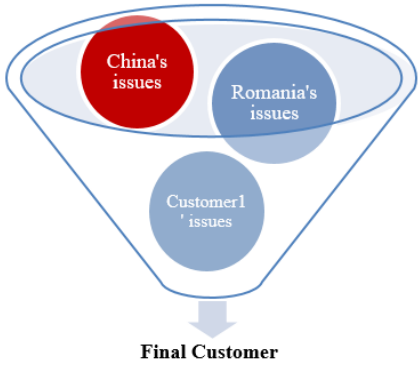

Fig. 3: The impact on the final customer

To produce a finished product, all the materials that enter into its bill of materials (BOM) must be available. If only one material is missing then the finished product cannot be made. When it happens the costs for the company increase because the products cannot be sold, it will be an excess of raw materials inventory, the warehouse's storage location will be reduced, and the non-operative times increase.

At the end of January China stopped its activity and of course the deliveries of the raw materials to Romania. Because of Chinese New year they send in advance the materials to cover 2 weeks from February. Starting with the third week of February the factories from Romania starts to stop their production. The workers are sent home in technical unemployment. The sales decrease significantly with 28%. Below is a comparison between 2019 and 2020:

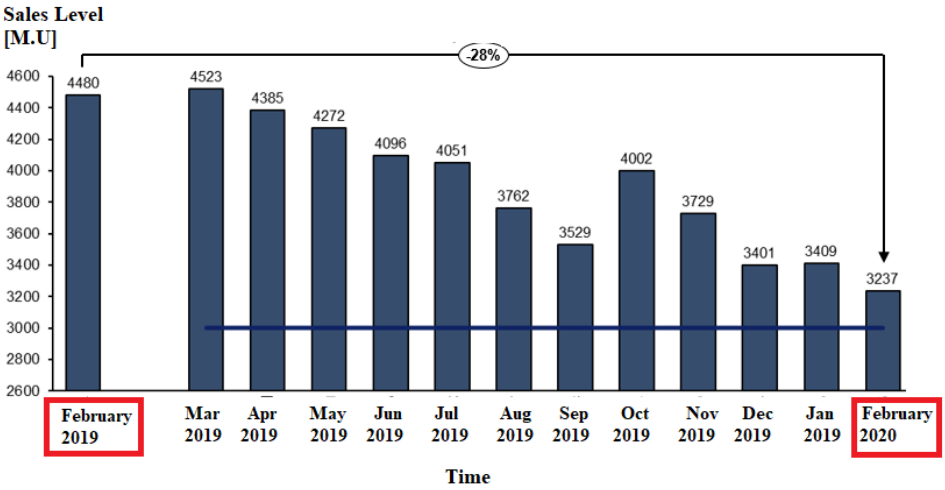

Fig. 4: Comparison between Sales Level from February 2019 and February 2020

Companies from the Romanian Automotive Industry must work according to the demands of their customers, but because they did not receive raw materials on time, they will stop first their production, and after that customer's production. The figure below shows the parts produced by the companies and the forecast sent by the customer. It can be seen that from week 7 nothing can produce and deliveries will be missed.

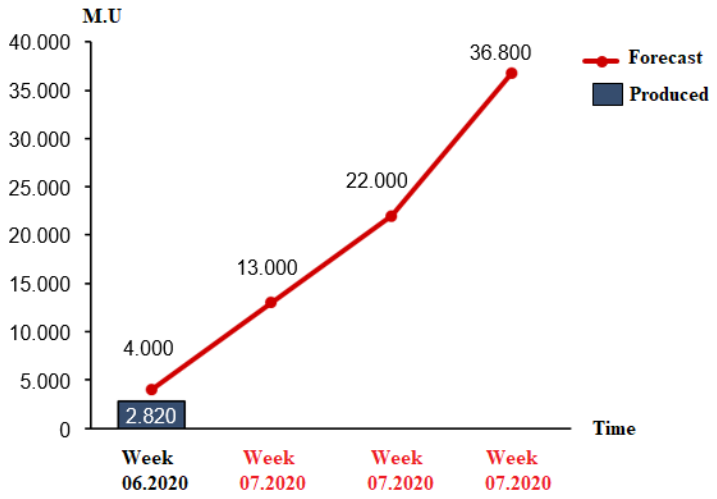

Fig. 5: Produced parts vs Forecast

The production process itself is randomly subjected to disturbance. To ensure a continuous flow it is necessary to maintain a safety stock. The stock constitutes a financing need that involves the allocation of financial resources that involve a certain cost. Therefore its value must be kept at a low level. As mentioned before, for the production of a finished product, all the raw materials need to be available. If only one component is missing the product cannot be built and the rest of the materials cannot be used. This leads to overstock. The following figure shows a comparison between the current situation and the last 4 quarters from 2019, for materials whose coverage exceeds the safety stock already set. In the second month of the 1st quarter, we had 92 materials with coverage bigger than 1 week over safety stock. In the first 10 days of February, we had 637 materials. For the entire month are 1874 raw materials with coverage bigger than 1 week. If each material would cost 1 monetary unit and the storage cost would be 0.5 monetary units then only for February 2811 would be spent monetary units that were not included in the budget.

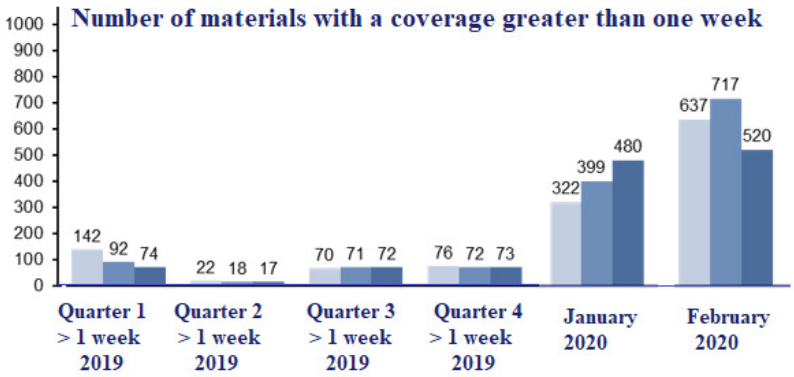

Fig. 6: Number of materials with coverage greater than one week

Starting with week 07, the directly productive staff will no longer come to work. A part of the administrative staff works at home and the other part approximately 70% are at home. For the company this means losses. They pay salaries without adding value. The average salary for a worker is 10 M.U. and the average salary for an indirect worker is 20 M.U. The company loses by keeping people at home 34000 M.U.

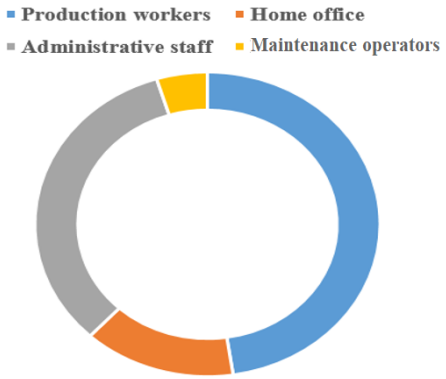

Fig. 7: Workers' repartition

It is difficult to accurately estimate how much a generalized epidemic might cost because such phenomena have very specific characteristics. Currently, we have the following financial losses: salaries paid for people who do not work, maintenance costs for non-functional equipment, overstock, special fright.

In general, all companies have 2 suppliers for every component. If one company cannot deliver then the other can provide support. The main issue is if these two companies are both from China. Then you must find another way to work and minimize the impact.

The first solution is to buy components from brokers. When China announces about Coronavirus the brokers bought all the surplus on the market from unique raw materials. Now when the automotive industries need components because the main supplier doesn't work they buy from brokers at overpricing. Because a desperate situation has been created, the broker gives the materials to those who offer more. Are organized auctions. Usually, most powerfully companies took all.

If a component normally costs 2 monetary units (M.U) and the daily requirement will be 30.000 pieces, the company should spend 60,000 M.U daily. Buying from brokers for 8 M.U it will conduct to daily expenses of 240.000 M.U (the expenses would be 4 times higher). If it normally earns 4 monetary units for each product sold, in this case, the company will lose all the profit and it will also have additional costs of 2 M.U per unit. The next figure presented in case 1 the normal situation when the profit is 120000 UM and the second case where the components are bought from the brokers and the company losses money.

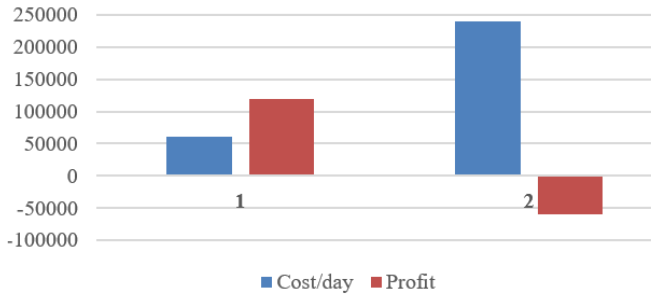

Fig. 8: Comparison between cost and profit in the usual situation and broker situation

Figures show that buying from material brokers to overpricing is not a very good solution, at least not a long-term one. What remains to be done is to try to reorient yourself to other companies in order not to be dependent on a single country. China's situation must be a very good lesson for companies in the auto industry. Dependence on a particular country is not good and you must always have an alternative. In this situation is no possible without China to have the same output but is mandatory to prepare a strategy for the future.

The situation may worsen before they improve. On 11.03.2020 the World Health Organization on Wednesday declared the rapidly spreading coronavirus outbreak a pandemic. Following this announcement, local authorities can extend the period during which the factories are closed to limit the spread of the epidemic.

The Romanian car industry has lost 63600 monetary units so far. If the situation persists the losses will be in the order of hundreds of thousands of euros.

Solutions

The main problem for the Romanian Automotive Industry was that it had 2 suppliers from the same country, respectively China. Both suppliers the main and the secondary came from this country. To avoid this kind of issue in the future, alternative suppliers from different countries must be found. The procedure is not simple.

Developing a procurement strategy is essential. When developing the strategy it is important to take into account the client's requests, even if it will always focus on the result of an optimal purchase. A comprehensive and coordinated strategy is essential to get the following benefits:

- Time-saving (strategic decisions made early and coordinated ensure that misunderstandings are avoided, overlaps and problems during the award procedure)
- Involving all stakeholders
- Timely inclusion of the basic strategies and values (e.g. sustainability strategies, social criteria, etc.)

To make the right decision it is important to make a specific calculation to know how much you could spend on your future acquisitions, Product cost calculation consists of the calculation of all relevant cost elements and revenues over the product lifetime. To ensure a consistent understanding of the different cost types, it is important to have a common understanding of project cost estimation. We will consider two types of costs: material costs and manufacturing costs. The material costs are considered:

- Purchase material
- Production material
- Inbound logistics
- Supplier packaging

The manufacturing costs are considering: machine costs, labor costs, setup costs. The material costs are calculated as landed costs, including all direct and indirect costs for deliveries. Especially for a comparison between different quotations (supplier decision sheet), all logistic and packaging costs must be the same. They usually should be DDP. Material costs consist of costs for:

- Ex-works price of the supplier
- Packaging of material
- Project expenses at the supplier
- Freight / logistics

The price is considered an important criterion. But it is important to take into consideration also the other criteria as having a good quality, short lead time or to have DDP. Sometimes it is possible to save 30% by accepting a seven-weeks lead time instead of four weeks, but it is not all the time a good solution.

After agreeing on the constraints and criteria, the supplier must agree on a hierarchy:

- Lead times from receipt of your order to delivery
- Minimum and maximum order quantities
- Storage and handling facilities
- Specific methods of delivery
- Quality assurance processes
- Payment terms and conditions
- Return policy

In most cases, supplier offerings will differ and there will be tradeoffs involving the criteria: you may get a better price from one supplier (cost) but that supplier insists on contract terms less favorable to you (risk).

Setting the criteria in advance will enable you to evaluate potential suppliers on each of the listed items and ensure that you don't overlook any important requirements.

During the negotiations, samples are made to verify that the quality standard is the one negotiated. Below are all the steps in the production process through which a raw material must go through:

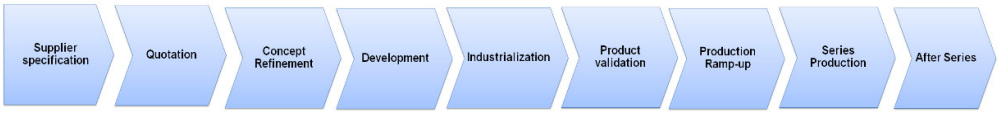

Fig. 9: Raw material life cycle

In general, choosing a new supplier can take up to 1 year because, in addition to the decisions you have to make, you have to take into account the capacity and quality it offers. But in the long term, there will be solutions in case of a supplier's inability to send the goods.

The time when the production is stopped can be used productively. The monthly and annual maintenance of the equipment can be done.

Conclusions

The auto industry is severely affected by coronavirus. The epidemic not only affected production, but also sales. Many potential customers stay in the house and avoid entering the auto showrooms until the epidemic passes. The closed factories will depend on the recession in the auto industry, and the epidemic will force the Romanian manufacturers to reduce production by 30% in the first quarter. Some suppliers from China started their activities but to start production you need all your suppliers to start their activity. The Romanian car industry has lost 63600 monetary units so far. If they do not start production the losses will be higher. Governments must offer their business support in order not to lose any further. A fund of 20 billion euros will be created to reduce the effects of the economic crisis caused by coronavirus.

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Mechanisms for Stimulating Innovation Activity of Small Businesses in The Region

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Abstract

In the conditions of rapidly changing global conditions, the development of the national economy is possible only with an active innovative position of the subjects of the real sector of the economy. The mechanism for stimulating the innovative activity of small businesses should be considered as a system of interconnected elements, with the help of which a single continuous effective development of their innovative potential is ensured. The view that investment policy may have a role in supporting innovation has become widespread. For innovative development of industry, increasing competitiveness, intensive development, small enterprises need financial resources. The research findings indicate that the innovation activity of small businesses depends on the access to investment resources (direct investments and credits, etc.). The scientific and practical significance of the topic is due to the need to increase the efficiency of regional economies in order to overcome crisis phenomena.

Keywords: Small Businesses; Innovation Activity, Investment Policy; Region

Introduction

In the conditions of rapidly changing global conditions, the development of the national economy is possible only with an active innovative position of the subjects of the real sector of the economy. According to a number of researchers, a small role is played by a small business, since it has such advantageous qualities over medium and large businesses as prompt response to market demands, mobility of technical and technological processes, and wide specialization of personnel (Sikatsky and Zhuravleva, 2008). However, innovation is accompanied by significant financial costs, which limits the ability of small businesses to actively implement innovative ideas. In this regard, the development of small innovative business is possible only in conditions of formation of effective mechanisms for its activation.

The mechanism for stimulating the innovative activity of small businesses should be considered as a system of interconnected elements, with the help of which a single continuous effective development of their innovative potential is ensured. At the same time, market requirements; the principle of negative feedback, for the design of which it is necessary to take into account the lag of the delay between the exposure to risk factors and the manifestation of their negative consequences and the presence of internal cyclical mechanisms (including cycles of individual innovative products, technologies and projects).

An important problem and a central issue of the innovation process is the need for its investment financing. It should be noted that a significant imbalance in the resource potential of the Russian regions, affecting their investment potential leads to significant differences and contradictions in their implementation of innovative activities (Donichev, et al., 2016). The article discusses organizational and managerial relations arising as a result of the mutual activity of government and business to

increase the investment potential of the regions, contributing to the growth of innovative activity. The authors analyzed the results of investment activities of the Penza region.

Theoretical Background

Schumpeter's theory laid the foundation for innovation theory and substantiated the link between innovation and economic development (Schumpeter, 1939).

There has long been a discussion among scientists about which specific elements affect the innovative activity of small businesses. Many studies substantiate the impact of the human factor and effective management on innovative development in small enterprises (Cooper et al., 2016; Martinez-Roman and Romero, 2017; Ucbasaran et al., 2008).

Innovation requires both tangible and intangible investments, which have been very important for the growth and competitiveness of the company. The justification of state support is based on the assumption that innovations implemented by enterprises will directly or indirectly stimulate the production of new goods and services. The high riskiness of implementing innovations, the unwillingness of banks to issue loans for innovative projects require public policy measures (Gamidullaeva, 2019; Gamidullaeva, et al, 2017).

The question of whether bank lending can help enterprises to carry out innovative activities in the absence of a significant supply of risk capital is debatable. From the report on the transition process of the European Bank for Reconstruction and Development, it follows that one group of researchers adheres to a rather pessimistic point of view, emphasizing the uncertainty of the nature of innovation, and justifies the lesser suitability of banks as sources of financing for a number of reasons, including the difficulty of using intangibles involved in innovation assets to secure a loan; characteristic volatility of cash flows that does not fit into the inflexible repayment schedules of most loans; lack of expert capacity to evaluate technologies at the initial stage and others.

According to another group, one of the key functions of banks is to establish long-term relationships with companies, which should form a deeper understanding among bankers of borrowers and their business plans. Thus, banks can have all the opportunities to finance innovatively active enterprises.
And finally, even without financing directly or indirectly innovative projects, banks are able to stimulate intra-company innovations, for example, by providing funds directly for working capital replenishment or short-term loans, which can help free up internal resources for their subsequent investment in innovation development.

Public policy measures to stimulate the private sector to increase investment in research and development have always been an important part of innovation policy. Governments, over the past half century to date, have allocated large amounts of public funds to expand the base of scientific and technical knowledge to reduce risks and uncertainties (Cunningham, P., et al., 2013). Various tax and subsidizing measures are introduced to stimulate enterprises to implement innovative projects (David, P., et al., 2000).

Meanwhile, we should admit that the most effective way to stimulate innovation development in the region is to develop an effective system of special investment institutions for innovation support (Gamidullaeva and Tolstykh, 2017).

Research Methodology

The methodology is based on the assertion that the successful implementation of innovative strategies by an enterprise is determined by the stability parameters of the enterprise as a mini-system and the stability parameters of macro-, meso- and microeconomic systems of which it is an element. The developed system of principles of enterprise sustainability management includes methodological, methodological and operational principles. The main methodological principle is the formation of a leading, preventive impact on threats of risk factors in order to prevent their negative impact on the

functioning of the enterprise. In addition, it is also necessary to highlight the principle of adaptation of innovative processes to changes in the external environment, the growth of instability of which is caused by the global financial crisis and the long-term nature of investment decisions, as well as the high probability of inconsistency of technical and economic characteristics of products. The most important aspect of successful resource support of small businesses' innovation is the task of increasing the regional investment potential. At the same time, two directions for achieving this goal are possible: attracting foreign investment and mobilizing domestic investment resources.

Results

The existing system of investment development management in the Penza region is represented by executive bodies of state power in the region and regional development institutions created to implement investment policies and increase the investment attractiveness of the region. This system includes the following elements (Figure 1).

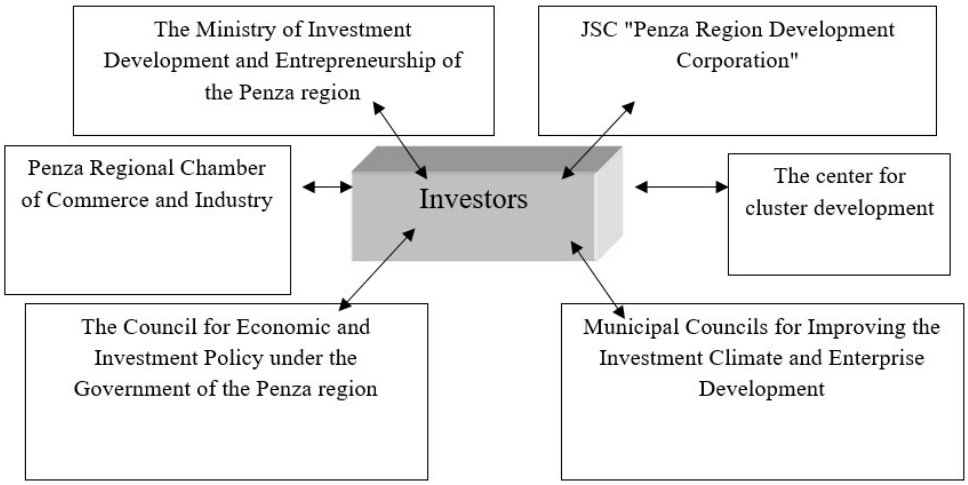

Figure 1: Penza Region Investment Development Management System

The Ministry of Investment Development and Entrepreneurship of the Penza Region carries out its activities in accordance with the Decree of the Government of the Penza Region dated January 31, 2012 N 46-pp. Within the framework of this resolution, the Ministry carries out the functions of developing a unified strategy for investment development, strengthening the entrepreneurial sector of the economy in the Penza region, identifying priorities and development paths for the relevant industries that ensure the sustainable economic development of the Penza region.

Joint Stock Company "Penza Region Development Corporation» carries out preparation of investment sites and the implementation of investment projects to them, the creation and development of industrial and industrial parks for profit, create new jobs and increase the tax base. The sole shareholder of the company is the Penza region represented by the Department of State Property of the Penza Region.
The Council for Economic and Investment Policy under the Government of the Penza Region is a permanent consultative and advisory body headed by the Governor of the Penza Region, created to improve the conditions for the development of investment activity in the Penza Region. Its main tasks are: to ensure a favorable investment climate in the Penza region, coordinate state policy in the field of investment activity, stimulate investment activity in the region, reduce administrative barriers, analyze the progress and results of investment projects, review the results of the Penza Region Investment Strategy, and the results of the implementation of long-term target and state programs of the Penza region, aimed to increase investment potential.

Municipal councils for improving the investment climate and the development of entrepreneurship were created under the heads of administrations in order to monitor the investment climate in the Penza region, make operational decisions and measures in all urban districts and municipal districts of the Penza region.

The Penza Regional Chamber of Commerce and Industry is a non-governmental non-profit organization designed to promote the development of a market economy in the region and its integration as part of the Russian economy into the global economic system. The main task facing this organization is to facilitate the attraction of foreign investment in the Penza region

LLC "Center of Cluster Development" provides support to enterprises and organizations of Penza instrument engineering cluster “Bezopasnost”, a cluster of information technology, engineering and production cluster "Biomed", confectionery cluster "Union Penza confectioners', a cluster of light industry" Light industry "in attracting both public and private investment.

It should be noted that all elements of the investment management system in the region are actively working to create a favorable investment climate in the region and increase its investment attractiveness. Moreover, work is being carried out in all sectors of the region’s economy. In its work, the Ministry of Investment Development and Entrepreneurship of the Penza Region works closely with other regional ministries and departments. As a result of active work of regional authorities, the volume of investments in the period from 2012-2015 increased annually and amounted to 89 billion rubles in 2015 comparatively to 2012. However, by 2016, the volume of investments has significantly decreased, and amounted to about 65 billion rubles (Figure 2).

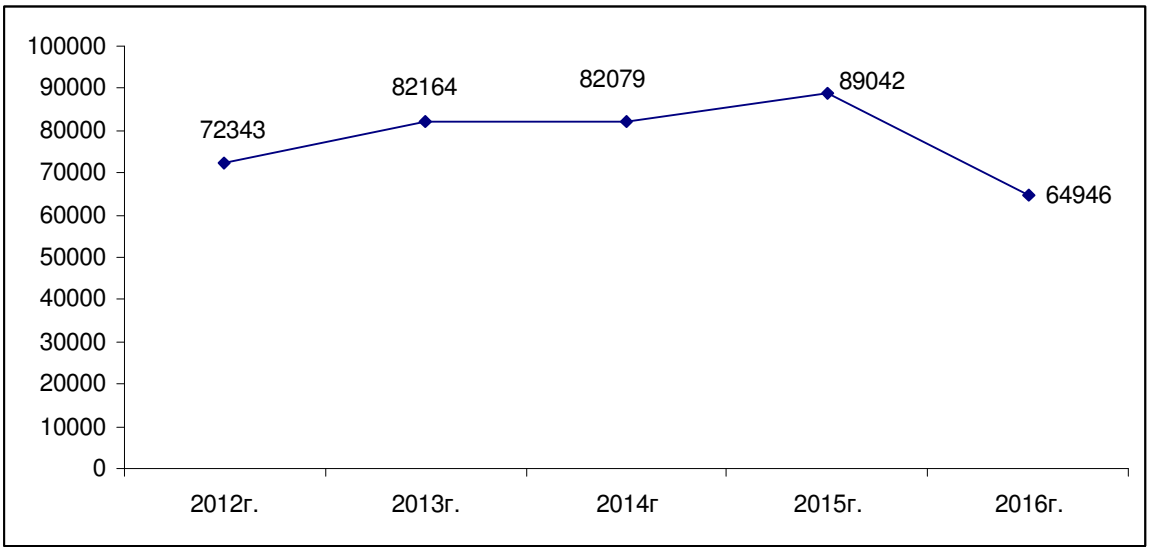

Figure 2 : The volume of investment in fixed assets, million rubles.[1]

In turn, the dynamics of index of physical volume of investments in fixed assets in the Penza region indicates that during the study period there is an annual increase in investments in the regional economy, with the exception of 2014, when the index of physical volume was 98.4%, and 2016 with an index of 68 , 7% (Figure 3).

[1] Ministry of Investment Development and Entrepreneurship of the Penza Region [electronic resource] // access mode: http://mirp.pnzreg.ru/

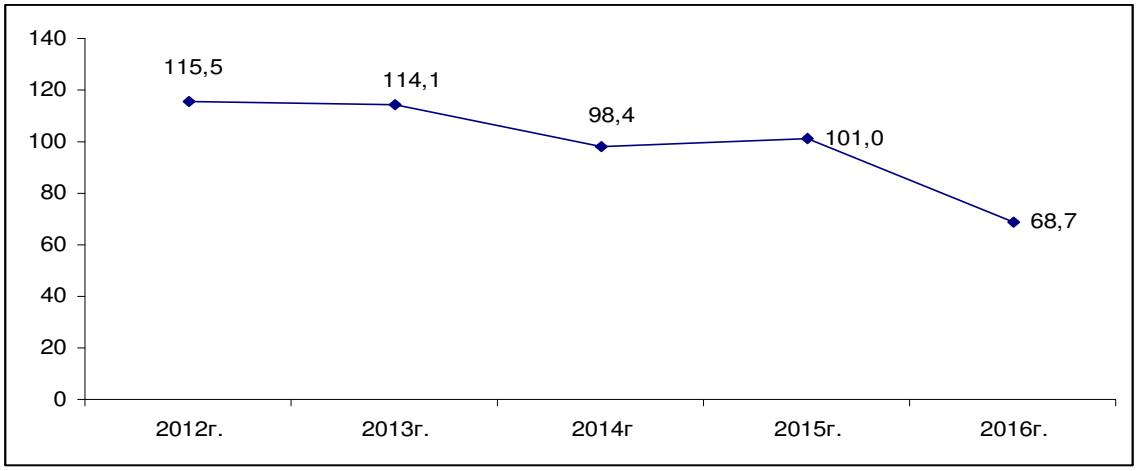

Figure 3 : Index of physical volume of investments in fixed assets, %

It should be noted that in the region there is a clear tendency towards a decrease in the growth rate of the index of physical volume of investments in fixed assets.

The structure of investments by type of economic activity is presented in Table 1.

Table 1: Structure of investments in fixed assets by type of economic activity, % [2]

Types of economic activity	2012	2013	2014	2015	2016
Total	100	100	100	100	100
Agriculture, hunting and forestry	12,9	11,1	19,1	20,4	22,1
Mining	0,8	0,1	0,0	0,0	0,0
Manufacturing	16,2	26,1	18,6	16,8	16,3
Production and distribution of electricity, gas and water	5,1	3,9	3,2	2,6	9,3
Construction	0,7	0,7	0,3	0,2	0,6
Wholesale and retail trade; repair of motor vehicles, motorcycles, household products and personal items	1,2	0,7	3,0	2,1	4,0
Hotels and restaurants	0,0	0,0	0,1	0,1	0,2
Transport and communication	35,7	29,5	26,4	44,1	24,2
Financial activities	1,7	0,9	1,7	0,4	0,7
Real estate operations, rental and provision of services	9,3	11,5	15,8	8,2	11,3
Public administration and military security; compulsory social security	2,5	1,4	2,4	1,1	2,1
Education	2,2	2,4	1,7	1,2	2,6
Health and social services	4,3	3,1	2,2	2,0	3,4
The provision of other utility, social and personal services	7,4	8,6	5,5	0,8	3,2

[2] Ministry of Investment Development and Entrepreneurship of the Penza Region [electronic resource] // access mode: http://mirp.pnzreg.ru/

The data show that for the study period one of the main areas of investment is agriculture. Thus, the share of investments in this industry during the study period increased 12.9% in 2012 to 22.1% in 2016. This is due to the fact that large investment projects of an innovative nature are being implemented in the Penza region. For the study period, with the participation of investors, three dairy complexes for 8,200 cows with milk production of more than 44 thousand tons per year, 1 pig-breeding complex with a capacity of 12.5 thousand tons of pork per year were built in the region, 2 pig-breeding complexes with a capacity of 7 thousand tons were also reconstructed meat per year. The largest poultry farm in the region, OJSC PTF Vasilievskaya, was modernized. The reconstruction and construction of new sites with a capacity of 140 thousand tons of poultry meat per year has been completed. A hatchery was built at 105 million eggs per year. Reconstruction and modernization of the slaughter plant. The total investment in the company for the period from 2004 to 2015 amounted to more than 9 billion rubles.

Currently, the largest project in the Penza region and one of the country's largest projects in the country, APK Damate LLC, is aimed at expanding the industrial turkey farm to 100,000 tons of finished products per year. The total investment in the turkey project, taking into account the expansion, will amount to 25.6 billion rubles. According to the results of 9 months of 2016, the implementation of the project allowed the Penza region to take 1st place in the Russian Federation for the production of turkey meat.

Another major investor, Russian Dairy Company, is completing a project to build an elevator in the Pachelma with a capacity of 100 thousand tons of one-time grain storage. Acceptance capacity will be 5 thousand tons of grain per day - the highest among the elevators of the Penza region. As part of the general concept of creating a closed production cycle, Rusmolco completed the construction of a seed processing center with a capacity of 10 tons per hour in the Bashmakovsky district, which allows the preparation of seeds of almost any direction of plant growing and vegetable growing. The total investment is 1.8 billion rubles. The project will create 50 new jobs.

For several years of work in the Penza region, the company launched a number of serious production capacities that significantly improved the situation in animal husbandry: a dairy complex for 4,600 cattle places in the village was put into operation. Arshinovka located in Nizhny Novgorod Region, designed for the production of 120 tons of milk per day or 46 thousand tons per year. The investment volume of the project amounted to 3 billion rubles, about 200 high-tech jobs were created within the framework of the project.

Under the Protocol of Intent between the Government of the Penza Region and AGSEN Property Limited Liability Company, the construction of the second stage of an elevator complex with a capacity of 100 thousand tons of one-time grain storage is actively underway in the Tamalin district. The created elevator will be equipped with modern equipment for acceptance, storage, drying, part-time sieving, shipment of finished products by rail and road. The total investment in the project, taking into account the expansion, will amount to almost 2 billion rubles. In 2016, Agrofirma Razdolie LLC completed the construction of a modern logistics complex with a one-time storage capacity of 13.8 thousand tons of potatoes and vegetables in Olenevka settlement of the Penza region. The investment volume of the project amounted to 240 million rubles. At the same time, the company is completing the construction of a land reclamation system on an area of 880 hectares. The volume of investments is more than 100 million rubles.

CJSC "Bashmakovsky bread" in the village. The Shiryaevo Belinsky District modernized the logistics complex, as a result of which the capacity of simultaneous storage of potatoes and vegetables was increased to 17 thousand tons. Within the framework of the project, a high-tech line for packing and packaging vegetables and potatoes was acquired. The amount of investment under the project in 2016 is 73 million rubles.

Also, a significant place in the structure of investments is occupied by industrial production. In order to increase the investment activity of business entities, the State Program of the Penza Region “Development of Industry in the Penza Region and Increasing Its Competitiveness for 2014-2020” has

been implemented since 2014. Under this program, from the budget of the Penza region in 2016, the Ministry of Industry of the Penza Region provided a subsidy in the amount of 10.0 million rubles to JSC "Biosintez" for reimbursing part of the cost of paying interest on loans and leasing payments to modernize production and release new, innovative products .

Thanks to active work with the Ministry of Industry and Trade of the Russian Federation, 11 Penza enterprises and industry institutes took part in 6 state programs of the Russian Federation and the Federal Target Program in 2016, while they received about 600 million rubles from the federal budget. on the technical re-equipment of production and the development of new products.

Also, in order to increase the investment attractiveness of the region, the government of the Penza region adopted Law No. 1755 – ZPO "On Investments and Public-Private Partnerships in the Penza Region" dated June 30, 2009, fixing all forms of state support for investment activities, and establishing a progressive system of tax benefits. Under this law, tax incentives in the Penza region can be granted to the following categories of investors (Figure 4).

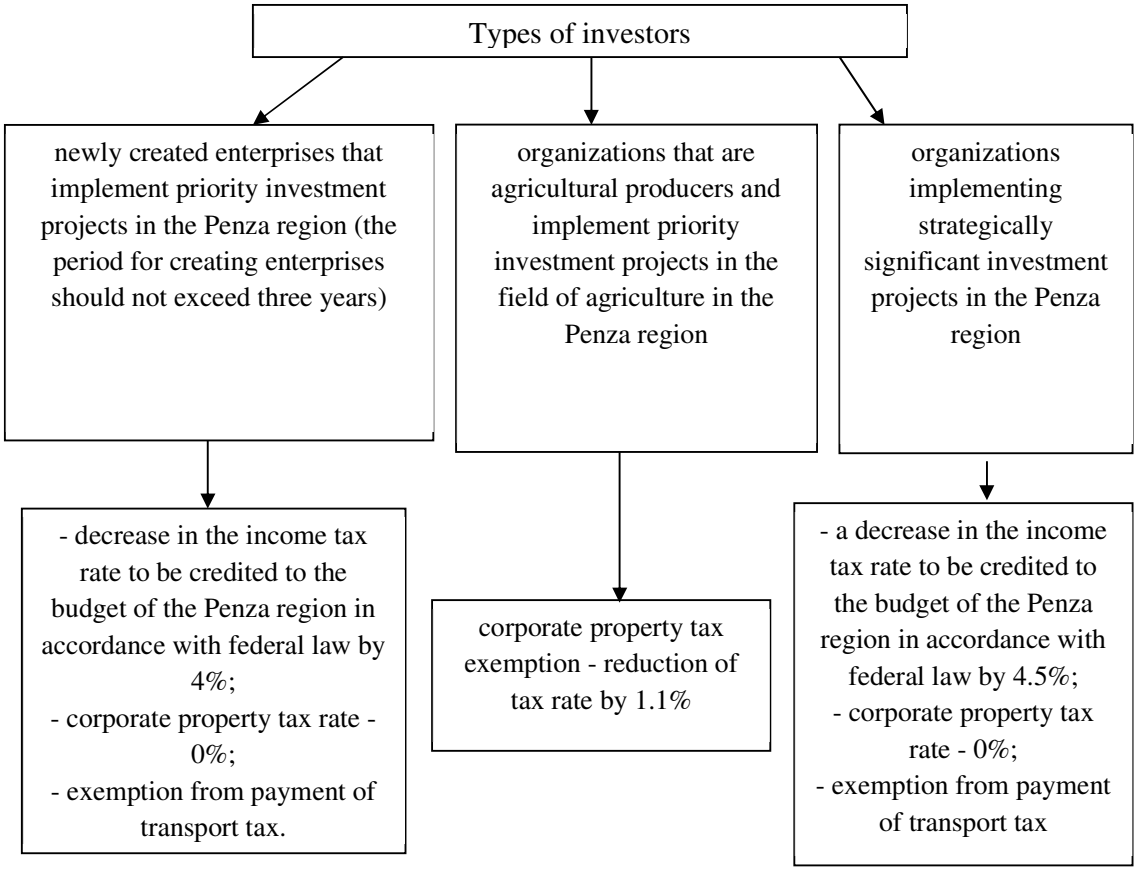

Figure 4: Categories of investors eligible for tax benefits in the Penza region

As a result of the implementation of this law, the share of equity in the structure of sources of investment in fixed assets has significantly increased (table 2).

Table 2 : Structure of investment in fixed assets by sources of financing, %

Sources of financing	2012	2013	2014	2015	2016	2016 in % comparatively to 2012
Own funds	19,42	16,55	28,29	24,72	42,36	22,94
Involved funds	80,58	83,45	71,71	75,28	57,64	-22,94
budgetary funds	27,51	28,50	18,09	10,12	17,57	-9,93
budgetary funds from the federal budget	17,82	21,80	9,45	5,97	9,51	-8,30
budgetary funds from the regional budget	6,93	4,22	6,88	2,40	4,14	-2,80
borrowed funds from bank loans	20,72	24,40	18,27	20,14	14,07	-6,65
borrowed funds of other organizations	3,70	3,19	5,43	3,80	10,09	6,39
extrabudgetary funds raised	0,35	0,18	0,22	0,11	0,20	-0,15
other borrowed funds	28,29	27,18	29,70	41,12	15,70	-12,59

At the same time, there is an annual reduction in the share of attracted budget funds (both from the federal and regional budgets). At the same time, the share of borrowed funds from other organizations, which include various types of investment funds, increased, which indicates an effective investment policy of regional authorities.

In the Penza region, a number of regulatory acts are in place aimed at stimulating the investment activity of the region and providing additional benefits and preferences to investors (table 3).

Table 3 : Regulatory framework for stimulating investment activity in the Penza region

Legislative act	Content
Law of the Penza Region dated 30.06.2009 No. 1755-ZPO “On Investments and Public-Private Partnerships in the Penza Region” (as amended)	It is aimed at the development of investment activities and determines the legal, economic, social conditions and forms of additional support for investment activities in the Penza region, the procedure for its provision, as well as the basics of legal regulation, principles and procedures for participation in public-private partnerships in the Penza region.
Law of the Penza Region of September 18, 2002 No. 397-ZPO “On the Enactment of the Transport Tax in the Penza Region”	Establishes a list of enterprises exempted from paying transport tax in the territory of the Penza region.
The law of the Penza region of April 26, 2004 No. 596-ZPO "On the procedure for providing state guarantees of the Penza region"	It determines the procedure for obtaining guarantees to the subjects of investment activity when attracting borrowed funds for investment activity
Law of the Penza Region dated 30.06.2011 No. 2098-ZPO “On the Centers for Regional Development of the Penza Region”	Law of the Penza Region dated 30.06.2011 No. 2098-ZPO “On the Centers for Regional Development of the Penza Region”

Law of the Penza Region dated 01.03.2004 N 579-ZPO "On the Investment Strategy of the Penza Region for the Period until 2021 (and for the Perspective until 2030)"	It reflects the system of modern priorities, goals, principles, main directions, tasks and mechanisms for implementing the investment policy of the Penza region.

In order to develop investment attractiveness, development institutions have been created in the Penza region. A Cluster Development Center has been created, through its support is provided to 4 priority industry clusters (biomedical cluster "BioMed", instrument engineering cluster "Bezopasnost", light industry and confectionery clusters).

The successful practice of business development is demonstrated by the "Penza Confectioners Union", which brings together small and medium-sized enterprises in a cluster, the total number of employees at which is more than 1,500 people. Penza region is in the top - 5 regions - the largest manufacturers of confectionery products.

The BioMed cluster provides targeted support to the high-tech segment - manufacturers of medical devices. The cluster products are highly competitive both in the Russian and foreign markets. This is indicated by the leading places of the cluster among domestic manufacturers in the following segments of the domestic market: "artificial heart valves" - 64%, "suture material" - 17%.

As part of the development of instrument engineering cluster "Bezopasnost", focused support is given to manufacturers of high-tech engineering security equipment. In this segment, the share of Penza products in the Russian market is 61%. The volume of products shipped by the cluster enterprises is more than 3 billion rubles annually.

Conclusion

In conclusion, the analysis shows that the Penza region is pursuing a targeted policy to develop the investment attractiveness of the region; all the necessary conditions are created to attract investors.

Thus, the considered investment aspects of ensuring innovative activity on the example of the Penza region allow us to draw conclusions. First of all, it is necessary to actively develop innovative investment funds intended for targeted support of innovative projects in the regions, to attract budget financing and venture capital funds. Secondly, the regional authorities should pay more attention to improving the methods and techniques of strategic planning for the development of regions in order to improve their innovation and investment climate.

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Transforming the Role of Human Capital in The Digital Economy

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Abstract

The article is devoted to research of transforming the role of human capital in the digital economy. The problem of modifying the role of human capital becomes particularly relevant in the context of digital transformation. Due to the growing trends in the transition to the digital economy, there have been a number of changes in the use and development of human capital. It becomes obvious that the availability of human resources and their involvement in the country's economy can provide an unprecedented growth of the state's economy. The transformation of the social and economic system has largely affected young people due to the greater sensitivity and high social mobility of the younger generation. Due to changes in the economic system, Russian youth have experienced changes in their attitude to various fields of activity. Special attention is required to analyze the formation, development and implementation of the human capital of young people in the labor sphere. Based on the materials of sociological research among young people of the Volga region and secondary analysis of data from other studies, the human capital of Russian youth, life attitudes and values in modern conditions are considered. The article analyzes the impact of the current socio-economic situation on the features of effective use and development of human capital. It is proved that a significant labor potential, expressed in a large number of people capable of active labor activity, in the presence of well-thought-out national projects, can ensure rapid growth of the country's economic indicators. the Empirical basis of the analysis undertaken in the article was the materials of a sociological study conducted in the Penza, Saratov region and the Republic of Mordovia in 2018. The results of the study led to the conclusion that there are different behaviors in the minds of young people. The analysis of motivations that make students work showed that material incentives for the purpose of acquiring material wealth were in the first place. The more often young people make long-term plans, the more interesting, creative, high-paid work that benefits people and society is important for them, and the less important is a prestigious job, a job with good working conditions and social guarantees. Responses from working and non-working students led to a conclusion about the "preferred work" model, which includes high pay, as well as the possibility of career growth. In General, for most young people, the most common in the labor sphere is the socio-psychological attitude "work hard and earn good money".

Keywords: Human Capital, Human Resources, Staff Development, Digital Transformation, Digital Competencies, Digital Technologies, Digital Economy.

Introduction

Before proceeding to the presentation of the main material of this study, it should be emphasized that many facts related to the topic under consideration will not be analyzed in detail due to the limitations of this scientific work in the format of the article.

The idea of this work is to talk about the modification of the role of human capital in the conditions of digital transformation of modern youth in the Volga region on the example of the Penza, Saratov region and the Republic of Mordovia, according to the results of the study, in the context of studying the basic values of the young generation.

It is well known that as a result of the formed modern parameter of economic relations, built on the digital transformation of all areas of life of individuals, the current trend is the use of digital technologies, which in turn lead to increased productivity, improved product quality, and an increase in the level of service delivery. Such changes have a beneficial effect on the efficiency of the country's economy, stimulating its competitiveness on the world stage. Thus, the transformation of human capital can serve as one of the most important conditions for effective digital transformation of the economy. Based on the above, the study of the problem of human capital development in order to increase labor productivity in the digital economy is becoming quite relevant.

Research Design & Methodology

Descriptive and exploratory type of study is used in thus study. As part of the grant of the President of the Russian Federation for state support of young Russian scientists MD-328.2018.6 on the scientific research "socio-cultural features of the formation of social potential of youth in the crisis and transformation of Russian society" in 2018-2019, sociological research was conducted among the youth of Russian regions: the Volga region (Penza region, Saratov region, Republic of Mordovia, n=754, 2018).

Study Rationale

This study is an attempt to identify variables factors influencing the independence of them augmentation of physical capital, accumulation of human capital to the digital economy.

Objectives of Study

- To study the relationship between human resources and the growth of the state's economy.
- To research the impact of digital transformation on the development and implementation of human capital of young people in the labor sphere.

Statement of Research Problem

The present study is an attempt to identify variables related to human capital in the conditions of digitalization of the economy. Variables of job motivation among young people have also been examined.

Sampling Design

For this study the data has been secured from young people in the Volga region. A representative **sample of 754 respondents** is taken from higher education institutions operating in Penza, Saratov regions, and the Republic of Mordovia a stratified and convenient sample obtained as a result of segmentation of the gender-age (quota) and their availability to respond to questionnaire, Stratified & Convenient sampling is employed for this purpose.

Sample size: 754.

Sample technique: the sample is quota – based (gender, age).
To process sociological data, a specially developed computer program "Sociology" was used, which allows you to fully automate all processes(actions): from the preparation of the questionnaire to its processing; it is based on scanning questionnaires and automatic recognition of respondents ' responses, makes it possible to use primary and secondary sociological information by creating databases, allows you to conduct both one-dimensional and multidimensional analysis.

Data Collection

Primary data is collected from different educational institutions of the Volga region through a questionnaire (distributed via online/ in person) as well as through direct observation method to collect the data. The research instrument for the collection of data is structured questionnaire. Parameters for questionnaire design is developed on the basis of similar past studies reviewed in the literature review section.

Data collection technique: multipurpose surveys and questionnaires method has be used.

Data collection instrument: Structured questionnaire.

Results and Discussion

Digital transformation refers to the process of integrating digital technologies into business processes that have a direct impact on technology, culture, operations, and the principles of creating new products and services. At the same time, this process encourages the gradual abandonment of outdated technologies, the content of which becomes unprofitable for the organization, as well as a change in the culture, the need for which is to accelerate the processes provided by digital transformation.

The importance of studying human capital in the new modern conditions of a transforming society has been proved by the results of scientific research conducted by the Russian school of Management. The results of the survey were the need to train young professionals in business schools, the need to use their own potential (mentoring systems and internal corporate training) (Gunina, et al, 2019).

Human capital should be viewed from two sides. First, it is the potential of the person himself, and secondly, it is formed by means of a new application of modern, innovative forms and methods of work, typical for the new economic order (Xu and Sylwester, 2017).

In the process of studying the development of human capital, attention should be paid to various ways to determine the content of human capital.

So, according to A. Tkachenko: "the Theory of human capital is directly related to the new concept of "information society", which needs workers who acquire a number of skills and constantly adapt these skills, and is also the basis of the" learning economy " (Anopchenko, 2019).

In the traditional interpretation, human capital is an investment in education, professional experience, health, culture, etc., which can bring income.

Thus, the formation of human capital in the organization should lead to the growth of absolutely all indicators of business processes on the basis of stimulating the motivation of employees and their ability to work in unstable, changing working conditions. This, in turn, will have a positive impact on the development of the country's economy as a whole.

Today, for the effective formation of human capital in the conditions of digitalization, the state has an important task: stimulating the labor activity of young people and the working-age population in order to create high-tech products.

One of the factors of stable functioning of a particular state in the conditions of transition to the digital economy, as well as any process of change, can be the system of formation of values of an individual and various groups of society. It is well known that the value orientations of young people have an impact on the formation of human capital. Human capital can cause economic growth in a country. In this regard, the issues of human capital development in order to increase labor productivity in the digital economy remain relevant (Soboleva, 2010).

The degree of human development is considered a basic indicator of the country's socio-economic development. It has a deep mechanism of influence on the economic growth of the state (Fig. 1) (Baranova and Sorokin, 2017).

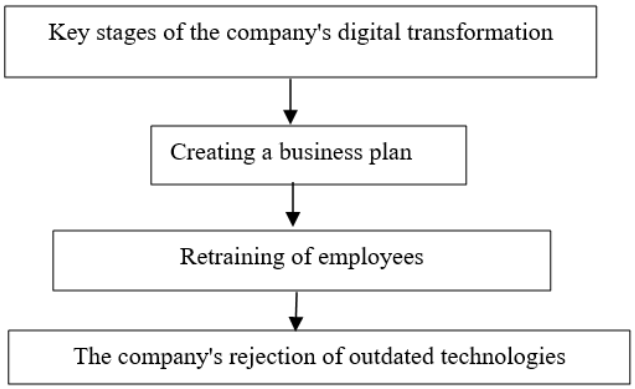

Fig. 1 : Key stages of the company's digital transformation

Source: Gunina, I. A., Logunova, I. V., & Pestov, V. Y. (2019). INCREASE OF EFFICIENCY OF USE OF HUMAN CAPITAL IN THE CONDI-TIONS OF DIGITAL TRANSFORMATION. Region: Systems, Economy, Management, 44(1), 18–25. doi:10.22394/1997-4469-2019-44-1-18-25

The peculiarity of the formation of human capital consists in its gradual formation under the influence of various factors, such as the interest of the population, justified by the increasing need for innovative knowledge (Volodin, et al, 2016). Young people are a special age group of society, which is characterized by high susceptibility to the influence of external factors, actively developing, gradually making a choice of their professional and life path. The fear of the younger generation, associated with the inability to ensure a decent standard of living for themselves and their family members, leads to the loss of citizens ' effective labor motivation. An important factor affecting labor motivation is the demand for specialists in the labor market of the region. In recent years, Russia has seen an aggravation of the problem of employment of University graduates. Currently, 25 to 30% of University graduates can't find a job after graduation, only about 20% of University graduates work in the specialty acquired at the University. By itself, education less and less guarantees the possibility of employment and decent earnings. This often leads to dissatisfaction with work and can generally form a negative attitude to work (Martyshenko, 2016).

In the youth environment, late adulthood and consumer attitudes have become quite common. Many young people believe that the state should take care of them, their employment and income. This leads to a reluctance to take responsibility for your life.

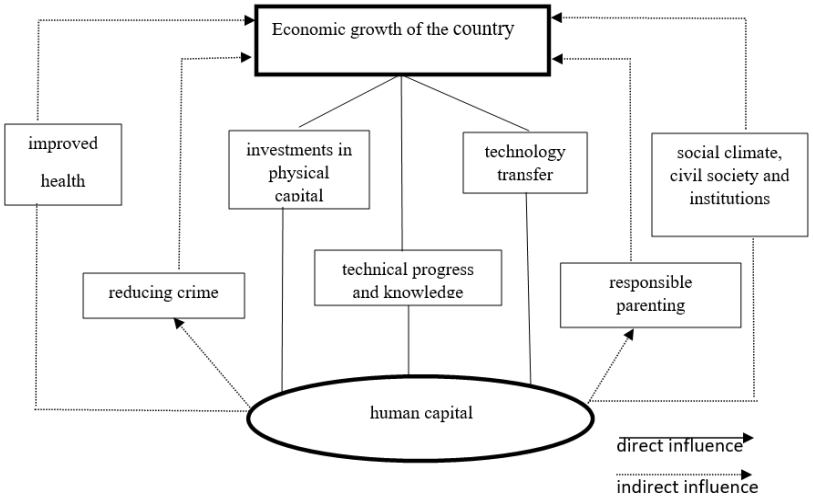

Source: Anopchenko, T. Y. (2019). Human Capital Gender Structure as a Factor Of Socio-Economic Regional Development. doi:10.15405/epsbs.2019.04.84

Fig. 2: The impact of human capital on the country's economic growth

Based on the results of a sociological study conducted in 2018-2019 among the youth of the Volga region (Penza, Saratov regions, Republic of Mordovia, 2018, n=754), it was possible to identify the value structure and life attitudes of modern Russian youth, which are mainly made up of traditional values. Based on life attitudes, young people are planning their plans for life in the short and long term (Rozhkova, et al, 2019).

The paper will describe the life experiences of young respondents. As for value orientations, the value of the family is still the most important thing for young people (65.34 %). Among vital values, the value of health (43.97%) and material well-being (36.21%) are very popular (Rozhkova and Dubina, 2018).

Modern society has undergone global changes over the past period, the consequences of which are reflected equally in all spheres of human life, and in particular, on their consciousness. Today's youth grew up in a new reformed society (Dubina,2016).
Due to the ideological uncertainty of the younger generation, the negative effects of the media, planting the psychology of the consumer society transformation of values and life attitudes that have a direct impact on the formation of human capital of the country. Differentiation and material stratification among the population, existing in modern socio-economic conditions, adversely affect the values and orientations in the field of work of the young generation of Russians and stimulate their alienation from workv (Blokhin, 2017).

According to our 2018 survey, a third of respondents (28.31 %) rate the current situation as normal and calm, the majority (59.32 %) as tense, crisis, and another 12.37% as catastrophic. And to answer the question: "Have any impact on your work or may affect a future career crisis, instability in the country, the region?"44.09 % of respondents reported such an impact, 26.04 % noted that the crisis phenomena in the country do not affect their work activities. 29.87 % - found it difficult to answer. Among respondents who believe that the crisis in Russian society has an impact on the labor attitudes of young people, slightly more respondents would like a stable salary. In terms of stability, good earnings are shown in Figure 3 are more important.

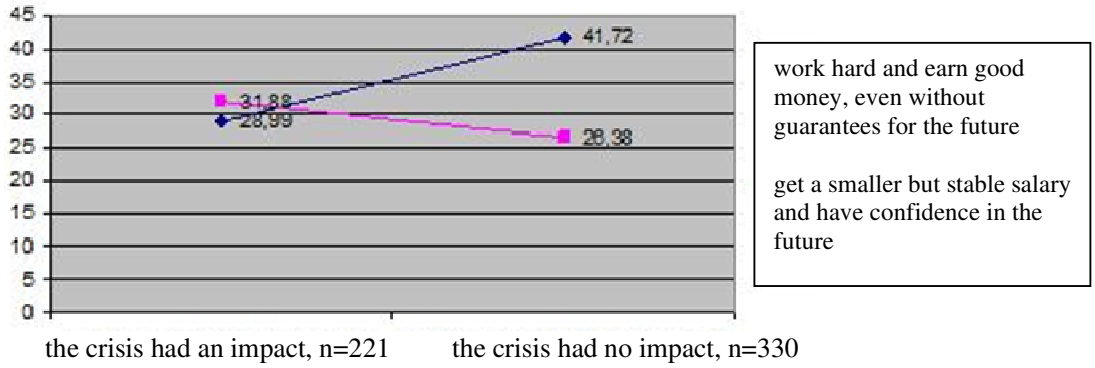

Fig. 3 - Distribution of respondents 'responses to the question:" *What would You prefer if you could choose*?" and to the question:" Do crisis phenomena and instability in the country have an impact on your work? »

Source: Rozhkova, L., Vlazneva, S., Salnikova, O., & Dubina, A. (2019). Sociocultural Potential of Modern Youth in Russian Cities. Proceedings of the 1st International Scientific Practical Conference "The Individual and Society in the Modern Geopolitical Environment" (ISMGE 2019). doi:10.2991/ismge-19.2019.116

Research in 2018 shows that today's young people are more likely to think about creating their own business: 20.86 % of young people in the Volga region (Penza, Saratov regions, the Republic of Mordovia). In 2010, according to research by F. E. Gorshkov, this figure was 4.8 % among young people aged 18 to years. There are also significant differences among the young people of the Volga region in their orientation to create their own business with certain opportunities and actually built a business. So, if the Crimean youth often dreams of opening their own business, the youth of the Volga region often already creates it.

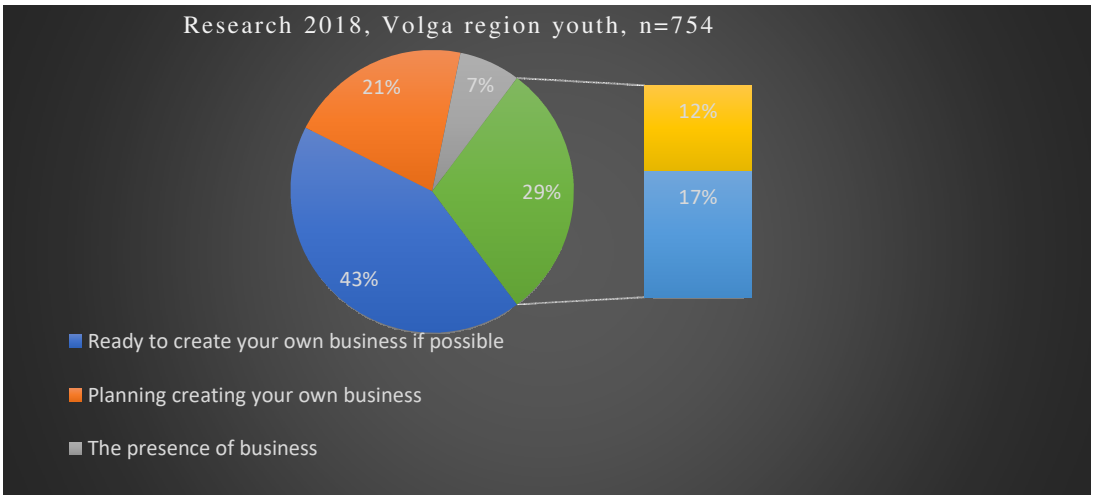

Fig. 4 - Distribution of answers to the question: "What is Your attitude to creating your own business?"(in % of the number of respondents for each study)

Source: Dubina A. Sociocultural orientations of modern industrial workers/ / Sociology and society: social inequality and social justice Materials of the V all-Russian sociological Congress. Russian society of sociologists. 2016. P. 39-3947.

Considering the external factors that influence the entrepreneurial attitudes of modern youth, we should highlight the impact of the current socio-economic situation in the country (figure 3, figure 5). It is obvious that the crisis phenomena have a negative impact on the attitude of modern youth to creating their own business. The uncertainty of the economic situation acts as a primary factor that constrains the functioning of modern business (Filimonova, et al, 2016).

According to the research, the need of young people for stable pay increases in the conditions of the crisis. In a situation of tension and crisis, 28 % of young people would like to have a stable salary and 27 % a large salary without guarantees for the future. In a situation where young people view the current situation in the country as catastrophic, young people are more likely to want high wages and less likely to receive less, but guaranteed, pay. When summing up the responses of respondents who assess the situation as a crisis and a disaster, it turned out that 29.96 % of respondents would like a stable salary, and 36.99 % would like to work hard and earn well, even without guarantees for the future. The data is shown in figure 5.

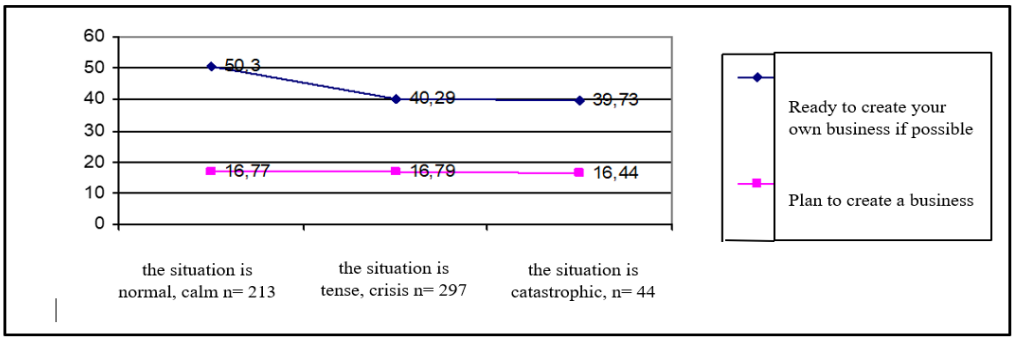

Fig. 5: Distribution of respondents 'responses to the question:" What would You prefer if you could choose?" and to the question:" How can you assess the socio-economic situation in the country (since the beginning of the currency crisis, anti-Russian sanctions)?''

Source: Dubina A. sh. Sociocultural orientations of modern industrial workers/ / Sociology and society: social inequality and social justice Materials of the V all-Russian sociological Congress. Russian society of sociologists. 2016. P. 39-3947.

The socio-economic crisis in the country has a great impact on the labor attitudes of young people, which have an impact on the formation of human capital (Gnatuk and Pechkurov, 2016).. So, among the students who noted the presence of crisis phenomena in modern society, there are more those who would like to have an interesting and non-physically and mentally tiring job, where there is a lot of time for other activities. For young people who assess the current socio-economic situation in the country as normal, calm, interesting, prestigious work with career opportunities is more important (Rajskaya et al, 2019).

It is significant that the worse the youth assesses the current situation in the country, the less significant the work that benefits people is for them, and the work with good pay comes to the fore (Fig.6).

Taking into account the growing trends of the digital economy in the country, young people are becoming a priority in the management of a digital enterprise (Vasin, et al, 2019). Due to the need to attract mobile, fast-adapting employees, create and distribute digital competencies of the employee, develop and implement appropriate motivation programs, and ensure involvement in the process of change, it is the younger generation that best reflects all these requirements (Gamidullaeva, 2019).

If You could choose, which job would you prefer? (multiple answers)	How can you assess the socio-economic situation in the country (since the beginning of the currency crisis, anti-Russian sanctions)?		
	The situation is normal, calm, n=213	The situation is tense, crisis, n=497	The situation is catastrophic, n=44
Interesting, creative	43,71%	49,43%	54,79%
Prestigious	31,74%	21,71%	20,55%
That benefits society and people	24,55%	16,29%	15,07%
Does not cause mental or physical fatigue	7,78%	9,43%	13,70%
With good working conditions	26,35%	29,43%	28,77%
Working with career and professional growth	38,32%	32,57%	28,77%
High-paying	42,51%	51,71%	47,95%
With social benefits and guarantees	13,17%	11,71%	13,70%
With good relationships in the team	21,56%	17,43%	20,55%
With free time for other activities (leisure, family, study)	13,77%	18%	20,55%
Other	3,59%	2%	1,37%

Fig. 6: Preferences of young people in choosing a job depending on the assessment of the socio-economic situation in the country (in % of the number of respondents, n=754

Source: Rozhkova L. V. Sociocultural features of the social potential of youth / L. V. Rozhkova, A. sh. Dubina, I. A. Golubev/ / SEARCH: Politics. Civics. Art. Sociology. Culture. 2018. No. 3 (68). Pp. 88-99.

Thus, irreversible crisis phenomena are taking place in all spheres of our society's life. Including in the sphere of labor, which leads to the transformation of its values and life attitudes that have a direct impact on the formation of the country's human capital. Research clearly shows the close relationship of values and value orientations of modern youth with the crisis phenomena occurring in modern Russian society (Gamidullaeva and Tolstykh, 2019).

Conclusion

Digitalization, being the basis of socio-political and economic stability of the country, leads to optimization of management processes, improvement and increase of transparency of political processes, increase of efficiency and competitiveness in all sectors of the economy, provides creation of high-performance jobs, contributes to the development of social infrastructure and preservation of the environment (Tolstykh, et al, 2018).

Describing the process of transition to the digital economy of our country based on modern realities, it should be noted that Russian able-bodied youth are not involved in most of the current economic and business processes in the country. Moreover, there is a reduction in the working-age population. Most of the territory of the Russian Federation has a significant resource potential
the potential demonstrates a very small labor potential due to the low population density in the North-Western, southern, Volga, Ural, Siberian, and far Eastern Federal districts (Ershova, et al, 2016).

As a solution to these problems, it is necessary to create conditions for the maximum attraction of available human resources and, if possible, to include individuals who are not employed in the economy and who are able to work in the labor process. Work with human resources should be carefully planned and systematized at the level of state policy (Ershova, et al, 2016).

At present, irreversible changes are taking place in all spheres of life in our society. Including in the field of labor, which leads to the transformation of its values. Research clearly shows the close

relationship between the values and value orientations of modern youth and the transformations taking place in modern Russian society.

According to the study, more than half of the respondents rate the current socio-economic situation in the country as tense. At the same time, the higher such negative ratings are, the more significant the values of material well-being and health become for young people. In addition, studies have shown that the crisis and instability in the country and the region have a greater impact on the labor plans of young people and educational strategies than on their political orientation and political activity.

Since one of the most important basic values of young people as the most active and able-bodied population is material stability, employees should ensure constant growth and continuous development of employees of the organization, work on organizational culture and creating a comfortable psychological climate in the team.

Naturally, the state and enterprises will need to invest in human capital, which is the main catalyst for economic growth. Human potential cannot develop without high-quality state support, and, on the contrary, in modern conditions, the state cannot function without the full use of human capital.

Today's young people have significant potential, which is not being used very effectively at the moment. Such qualities of youth as mobility, initiative, susceptibility to innovative changes, technological innovations, and the ability to find adequate responses to social challenges were not fully disclosed. The realization of the interests and satisfaction of the needs of young people largely depends on the specific policies and actions of the authorities, not only at the national level, but also at the level of regions and municipalities. Youth policy acts as a tool for social design.

In line with the influence of youth policy on the formation value orientations of young generation need regular spiritual and moral work by education and socialisation, consolidation and cohesion of young people, all groups of society based on patriotism and citizenship, promoting the principles of social justice and ethics.

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Prospects for The Development University 4.0 Concept and Digital Transformation of Russian Economy

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Abstract

The article is devoted to the actual modern problem, namely, establishment of a new formation in educational institutions, the University 4.0 that will serve as bases for technology and innovation development. Authors associate this concept with the digital transformation of the economy. Article contains an analysis of this educational formation in the articles of Russian authors. As a result, were described the main directions in the transition to University 4.0 model.

Introduction

The Fourth industrial revolution is rapidly changing the world around us. One of the current trends is the transition to Industry 4.0 and digital transformation. Among the priority areas, the authors of the Strategy of scientific and technological development of Russia until 2035 highlighted digital production technologies, development of systems capable of processing large volumes of data, artificial intelligence and machine learning. With the Order from July 28, 2017, No. 1632-r the Government of the Russian Federation approved the program “The Digital Economy of the Russian Federation”. It defines the goals, objectives, directions and timing of the implementation of the main measures of the state policy to create the necessary conditions for the development of the digital economy in Russia, in which digital data are a key factor of production in all spheres of social and economic activity.

Notoriously, the digital economy is an economy based on the production and use of digital technologies. The transition to Industry 4.0 implies a change in trends in future professions. Companies will need specialists such as Project Manager, Technical Leader, Systems Technologist and Technical Coordinator, that is, trained advanced skills capable of working in an increasingly international environment, to solve the problem of introducing incentive technologies into new production processes, integrating technical and management skills that are critical to production in the future. Therefore, the

task of universities is to train such specialists. For example, Polytechnic University of Turin already offers new master's degree programs organized in close cooperation with leading companies such as: Avio Aero, Comau, Inpeco, Magneti Marelli, Prima Industrie, SKF and Petronas.

Analysis

The first question that comes up in our study is the analysis of the concept of "University 4.0." E. B. Kuznetsov, A. A. Engovatov (2016) in their work indicate that there is no single model allowing to divide the levels of development of universities. The authors propose the classification of universities according to the importance of the value added they form. According to the proposed parameter, a typical example of "University 3.0" is Stanford, whose graduates are such companies as Hewlett-Packard, Yahoo, Google. The annual revenue of the companies created by the university is $2.7 billion.

After analysing a number of studies, it can be concluded that the authors propose to consider the change of "location" of the university relative to several parameters.

V. S. Efimov, A. V. Lapteva (2016) propose to analyze "universities" regarding the following components:

• activity

• social

• anthropological.

In the transition to phase 4.0, the following characteristics are realized:

In activity content: teaching becomes the realization of participation in the creation of virtual realities and immersion in them, participation in the creation of the basis of new practices. New methods and technologies are in place. The student becomes the creator of his new reality.

In social content: the new university is pouring into the surrounding society, becoming one of the basic social institutions. The university is being integrated with society, and the university is becoming a platform for the emergence and existence of various collective intelligence.

In anthropological content: the role of professor and student is united, they become subjects of search, trial activities.

Thus, the key technologies of the new university 4.0 become cognitive technologies, there is an increase in intelligence through the use of IT-technologies. In addition to using these technologies, the university itself becomes a manufacturer and distributor of cognitive technologies.

Neborsky E.V. (2017) proposes to compare university formats according to the following set of parameters:

• requirement of society

• customer

• purpose

• axiological basis

• key category (categories)

• external reviewer

• features of the organization

•p of the educational process

• form of education

• disciplinary kernel

• criterion at "exit".

The author points out the following characteristics of Formation 4.0: analysis of global and local problems, the goal of the new university is the development of the noosphere and individual ecosystems of society, the main categories are creativity, ecosystem, and business. The main criteria, the indicator of work is the creation of a viable product, the contribution to the development of the ecosystem of society, which should contribute to the abolition of the existing formal system of assessment.

The prospect is the use of digital platforms, the use of adapted applications and analytical resources, so-called Learning on Demand. Not only the form of the representation, but also the content will change: theoretical knowledge will be replaced by analytical knowledge.

A similar approach to the analysis of the format "University 4.0" is seen by S.V. Titov in the work "Basic provisions and prospects for the development of the concept" University 4.0. "

It is also envisaged to change the methods of training. The popularity of learning methods such as SCALE-UP is growing, and institutions such as North Carolina State University are enjoying this practice.

- Teaching transformed – how should human teachers focus their efforts if AI and other technologies become used to their full potential in the university experience?
- Personalised adaptive learning – an individualised approach that takes learner diversity, performance and behavior into account.
- Assessment re-imagined – can AI, digital experiential learning and micro-credentials replace high stakes summative tests?
- Intelligent digital and physical estates – this concept is responsive to student journeys and interactions, helping universities deliver efficiencies and a smart approach to campus design.

Distance education experience at Penza State University

PSU has implemented the distance learning technology since 1996. The Center of Distance Education (CDE) is a university's department in charge of distance learning programs administration.

The next step was the development of blended learning programs for a number of higher education programs starting from 2001. The technology included a limited number of face-to face classroom lessons and face-to face tests and examinations with the increased time for independent work of students. To equip students with everything necessary for independent work the learning content was initially issued on CDs / DVDs sent to them, and since 2006 it has been placed in LMS Moodle on the CDE's server. The LMS Moodle has been used to display students' results and counseling since 2006. The CDE has been granted some functions of dean's office to administer distance-learning programs of higher education (Mkrttchian, et al., 2019).

Now PSU uses distance learning programs completely or partially for advanced studies and training of public employees and business managers, university professors and teachers, and a number of other programs. In most cases, LMS Moodle is used to conduct distance learning. For videoconferencing, taking into account the need to optimize the demand on the PSU's Internet channel, the university rents videoconferencing services from an external data center.

In previous research the authors identified two main processes in the case of Penza State University (PSU): development of distance learning and digitalization of training that are represented now at almost every academic university (Mkrttchian, et al., 2019). The authors considered theoretical and practical aspects of the university's transition to level 3 of Distance Learning / Digitalization of traditional training. In these conditions, it is important to improve the university's administration of the educational process concerning the Electronic informational educational environment (EIEE) and to comprehensively implement distance learning, as well as enhance management of external courses

(MOOC etc.). Accumulation of detailed information in the Electronic informational educational environment about current learning outcomes creates opportunities for emerging trends, such as data analysis using Big Data and Machine Learning technologies (Mkrttchian, et al., 2019).

Big data analysis and analytics help user organizations get value in the form of more numerous and accurate business insights. Similarly, universities can get value with Big Data analytics, - one gets a host of new possibilities ranging from new ways of providing students with basic support to new ways of getting students to learn what the faculty needs them to learn. Furthermore, the rapid advancement of big data analytics make it necessary for any university to coincide it with their management and measurement (Mkrttchian, et al., 2019).

Results

As a result, there is a need to build a plan for the transition to University 4.0. Such a transition involves not just changing the name, but changing the status of the university. University 4.0 should have the following trends (Figure 1).

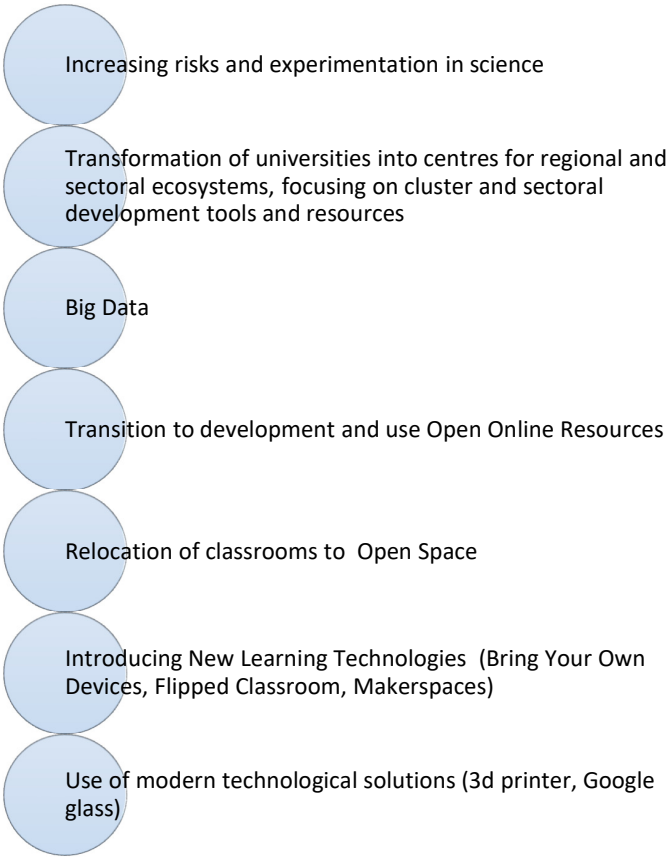

Figure 1: Main trends of University 4.0

From the positions put forward, the perspective was laid within the framework of the National Technology Initiative project.

STI is initially built as a broad coalition action involving the formation of project groups of technology entrepreneurs, representatives of leading universities and research centers, major business associations of Russia, development institutions, expert and professional communities, as well as interested executive bodies. One of the directions of STI work is the educational program of STI University "20.35." (https://2035.university/). University 20.35 is the first university in Russia providing

opportunities for professional development by creating individual educational trajectories and tracking digital skill profiles.

Advancement along the intended STI University "20.35" trajectory implies the planned goal of University 4.0.

According to this concept, it is necessary to organize the transition from the existing program to the development of a student's educational trajectory: the student receives a diploma based on the development of a certain standard (GEF), while he can be actively involved in research and development, undergo practical training at enterprises.

The target is the following educational path: the student receives education on the basis of digital interaction with a network of enterprises, which helps to form professional competencies based on the use of their resources. Such an arrangement of the educational trajectory will make it possible to bridge the gap between the requirements and expectations of modern enterprises and the level, content of graduates' professional competencies formed as a result of training.

The result of this transition should be a flexible digital environment that provides the opportunity to combine training and the formation of professional competencies based on organizations of production practices. As part of working in such an environment, online training will be available, organized in cooperation with international experts in the mastered professional field. It is also possible to organize international project activities, where a combination of professional competencies of each participant will be organized.

In K.G. Razumovsky Moscow State University of Technologies and Management (FCU) has been implementing comprehensive graduation qualification projects for several years, work on which is carried out by a design team of students of various directions and training profiles. The implementation of such a comprehensive graduation qualification work is carried out by order of the leading enterprise in the region. Students of various specialties have the opportunity to complete their educational trajectory based on the application of professional skills that are in demand for a real project proposed by a potential employer.

Conclusion

In this study, the authors raise an urgent problem that arises during the transition to Industry 4.0 - the modernization of the existing formation of the university, University 4.0. The analysis of approaches to the description of this concept in the works of domestic authors. Several directions for such a transition are proposed. The national project of the National Technology Initiative is seen as a platform for transition to University 4.0. In K.G. Razumovsky Moscow State University of Technologies and Management (FCU) is implemented through comprehensive graduation qualification work one of the areas of development proposed by this program is interdisciplinary project teams.

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Innovativeness and Innovation Management in Health Service Units

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Abstract

Innovativeness is of key importance for any health care organisation in order for it to maintain a competitive position in the medical service market. The implementation and proper management of medical innovations are perceived to be indispensable in the operation of health care entities, which are places where new solutions are implemented in medicine. The purpose of this paper is to show the importance of innovations in health care entities, the approaches and aspects involved in management innovation, as well as highlighting the significance of standardisation in the management process. Health care entities, which are often treated as *sui generis* companies, often require the use of different forms of innovation management to improve productivity and contribute to the change of hitherto activities. This includes the application of communication and information technologies, which is of critical importance in creating the possibility of using new and effective solutions in health service provision.

Keywords: Innovations in Health Care Organisations, Management Innovation, Standardisation

Introduction

Provision of health benefits, as a service offered to consumers by organisations, frequently implements innovative solutions, although they may not always bring the expected effects. Both decision makers and payers, striving to improve overall quality and the quality to price ratio in health care, must pay significant attention to barriers to innovations and the possibilities of applying specific inventions to obtain expected results.

Hospitals are the primary place where innovative solutions, as pertaining to innovative medications, are first introduced. These solutions are the result of innovations in laboratory medicine which, to a significant degree, contributes to the growth of innovative activity in medicine. Yet in spite of the fact that it is a crucial component in advancing health care, it is typically not considered an essential element in achieving expected benefits (effects). The cause of such state of affairs is the often insufficient evidence showing positive relationships between results of laboratory studies and improvements in clinical benefit.

On account of the fact that medical innovations (inventions – in the technical and bio-pharmacological sense) are usually "verified" and implemented in hospitals and clinics, these health care entities or organisations often serve the role of research centres in the health care sector. Furthermore, such health care entities provide comprehensive medical services, the quality (level) of which depends on implementation of new solutions. Both aspects contribute to the fact that the operations of hospitals are often perceived to be based on technological and bio-technological options, or analysed in reference to the introduction of IT systems. It is without a doubt that a significant position must be attributed to new communication and information technologies within hospitals, which offer benefits both to patients and health care systems, as well as society in general. This is because information and communications technology (ICT) offers better management of health resources, may improve safety of patients and reinforce reciprocal relations between the service provider and the service recipient [Dymyt and Dymyt, 2018; Gledic et al., 2011]. Apart from this, application of any type of digital innovation is of major importance in the monitoring of patients' health and in the overall operation of health care facilities [Kozak, Goral and Danioł, 2018]. Their implementation has allowed for the rapid development of e-health, tele-health or m-health,

which are related to the use of state-of-the-art information and communication technologies to connect all actors of the health care market (doctors, health care institutions and patients) [Furmankiewicz, Sołtysik-Piorunkiewicz and Ziuziański, 2016; Botrugno, 2018].

Irrespective of the fact of how a given health care centre operates, every organisation requires proper management. This is especially significant in the case of preparing and introducing new solutions in hospitals, particularly because innovation management is material for the development of these facilities. Innovation management helps deliver the newest ideas in management and practices, which emerge from search processes and are introduced via various forms of organisational changes [Birkinshaw, Hamel and Mol, 2008]. Furthermore, such processes are becoming more frequently adjusted to individual persons, groups or entities. Management consultants act to help implement innovation management as they are well prepared to go beyond organisational inertia and break existing standards. Thus, innovative management consultants are critical in helping prepare and implement "new" solutions.

The author of this paper has adopted the stance that while introduction of new solutions allows for streamlining and improving medical processes, with innovation management involving the participation of consultants, it does not fully exclude existing standardized operations in health care entities.

The purpose of this paper was to present some of the issues involved in the implementation of medical innovations in health care organisations. This includes information related to innovations in a hospital as a health unit, which is both 'recipient' of innovation and supplier of comprehensive services in the health care system. The importance of information and communication technologies in health care entities has been discussed as ICTs support transfer of information in innovative solutions. The role of consultants in the innovation management process is also mentioned. In addition, management innovation has been characterized with respect to standardisation, with a discussion on the differences and intersection between standardisation and innovation.

The author of this paper has drawn examples of innovations in health care systems from published peer-reviewed medical literature as well as websites. The discussion relies on reference books and the analysis is supplemented with the author's remarks.

Innovation In Health Care Units

Medical innovations, which encompass introduction and/or development of tangible and intangible technological innovations or application of new solutions in treatment processes, may be examined as [Djellal and Gallouy, 2007]:

1. Bio-medical innovations or bio-pharmacological innovations (i.e. new medications, new chemical or pharmaceutical substances, etc.)
2. Tangible medical innovations (introduction of technologies and technical systems, which rely on investment goods and various types of technical devices used to ensure care, i.e. for diagnostic or therapeutic purposes)
3. Intangible values of medical innovations (treatment charts, diagnostic or therapeutic strategies, etc.).

Jończyk proposes another division of innovations. According to her, innovations in health care may be divided as follows [Jończyk, 2013]:

1. Organisational innovations: all attempts at modernising the organisation and operation of non-medical divisions of a health care facility, creation of new units to prepare or take responsibility for supply of catering services, accommodation, management, etc. Furthermore, they refer to any innovations, which take place next to a health care organisation, e.g. creation of new types of clinics, reorganisation of administrative and logistic divisions, assessment of health care quality, organisation of work time, etc.

2. Managerial innovations: new techniques and methods of management, including new accounting and financial techniques and procedures, new management methods
3. Relations or service innovations: all innovations affecting the nature of relations between service providers and service recipients, along with families, such as: improvement of quality of places of stay of patients, management of patient flows, shortened waiting times, accommodation for families of patients, etc.
4. Social innovations: processes based on social negotiations and formal and informal compromise leading to changes in the provisions pertaining to coordination and motivation, as well as development of programmes improving employees' condition and conditions of work
5. Innovations in external relations: new, more or less complex forms (depending on the number of engaged entities) of individual relations with customers, suppliers, public authorities, various organisations, etc. They refer to the relationships among partners with respect to the joint use of heavy equipment (medical or logistic equipment), joint purchases of such equipment, as well as mergers of hospitals and sale of services with other hospitals, companies or organisations in other sectors. The scope of services may encompass areas such as: catering, laundry services, logistic services, trainings, counselling, lease of premises for conferences or cultural activities, etc.

In health care organisations, medical innovations are renewed very quickly or replaced by newer solutions of the same problem. For example, invasive tests are often replaced by non-invasive ones, methods using radiation are replaced with methods that do not make use of it and standard surgical procedures are substituted by therapeutic techniques based on interventional radiology. These new solutions are frequently added to the group of existing diagnostic and therapeutic methods; it may thus be claimed that in practice, the life cycle of medical innovations is relatively long [Djellal and Gallouy, 2007].

Laboratory medicine is an area that provides innovative solutions to allow for the improvement of already existing possibilities or the provision of new services (or services on a higher level). Innovative solutions in this area are created around the framework of so-called *Evidence-Based Medicine*, which takes into account clinical teams and financial solutions and management aspects in a given organisation. It is a tool for the further development of modern medical laboratory diagnostics, also in Poland [Naskalski, 2010]. The innovation process may be managed in line with the needs of all stakeholders. The key to achieving success in this area includes determination of unsatisfied clinical needs, awareness of the path of medical care, procuring evidence of clinical and cost efficiency along with successful implementation, which takes into account changes occurring in processes, proper management of resources and monitoring of results. Familiarity with the course of the health care path is a decisive element because it shows how medical tests may be used and which decisions in a given medical case may be made with respect to the use of a test result, i.e. whether it is helpful in screen tests, diagnostics and/or when monitoring treatment [Desmond and Desmond, 2016].

Examples of innovations in laboratory medicine include invention of new bio-markers, performance of genetic tests, preparation of new analytical methods, automation, as well as determination of the manner in which the received results and the knowledge related to them will be delivered to the entities interested in the inventions. An indisputable benefit for the consumer of medical services is the development of the laboratory test technique called *point-of-care testing* (POCT). In this case, various technological [St John and Price, 2014] solutions are proposed during the performance of medical tests, in which the possibility of immediately receiving results may lead to radical changes in health care provision, in relation to the place of service provision, the service provider and the patient's participation in tests [Vashist, 2017]. However, there is a certain risk related to the costs of test performance. Such costs may grow (and this usually happens) as a result of the potential necessity of confirming the correctness of POCT in a central laboratory [Luppa et al., 2011.

However, it is to be noted that the function of innovations in the medical care sector is very often reduced to the introduction of *New Information and Communication Technologies (NICT*). In many studies, a hospital is described as a system of information, whereas innovations in hospitals are analysed with respect to information paradigms i.e. the digitisation of hospitals where integrated IT

systems are used to an increasing degree. In medical care, medical technologies are applied in every form of care for the patient, namely at the start of treatment, during a diagnosis, in the process of treatment and in the course of monitoring. These technologies may be divided into: hybrid medical technologies that combine NICT with other technological elements (robotics, transport, etc.) and NICT which facilitate the receipt of health care services [Jończyk, 2013]. The first group most often includes computer-assisted diagnoses, treatment monitoring and diagnostic equipment automation. The second one, applied much more frequently now, is a form of providing services remotely, which contributes to improved access to offered health care services, reduces the number of unnecessary visits at health care facilities or allows for quicker and more convenient use of specialist services [Nieszporska, 2012; Agomo, 2019; Devanbu, Nirupama and Taneja, 2019]. This is accompanied by introduction of organisational and technological innovations related, in particular, to telecommunications.

In medical facilities, ICT is used for better (quicker) flow of information among entities providing health services, more efficient information management or reduction of undesirable events. All of the proposed and applied solutions are aimed at increasing the level of health services, improving patient safety and raising the quality of servicing recipients by service providers. This may be accomplished by the introduction of electronic data exchange standards, which help the physician in deciding on a patient's treatment based on current medical information [Omboni, Caserini and Coronetti, 2016].

The currently existing standards with respect to the use of IT in the health care sector do not help health care facilities in creating a network that enables exchange of information among health care establishments. Modern technologies are often so complex that they do not find recipients among hospital personnel or outpatient clinics. In consideration of the existing difficulties in communication among health care units, the *Health Level Seven* (HL7) standard was set up, which is aimed at the management and integration of electronic information pertaining to health care [Strzelecka, 2018; Noumeir, 2019].

Summing up the discussion above, any innovation in health care services requires not only new IT tools, but is primarily aimed at improving the quality of services for service recipients or increasing their safety. Nevertheless, whilst analysing innovation in hospitals, three points of view should be considered: introduction of medical technology or a system of information by senior medical staff and hospital managers, providing medical and non-medical services (accommodation, catering, management, logistics, laundry, transportation, etc.), as well as the skilful adjustment to quickly changing environments.

Innovation Management in the Context of Standardisation – Short Considerations

In innovation management, groups of stakeholders are internally diversified, as they bring together various persons/entities who are related to the provision of patient care, which includes the preparation and implementation of technological solutions during care. On account of cooperation among stakeholders and their individual expectations with respect to innovations, certain tensions may appear among these units.

In this situation, the practical approach to satisfying the desires of all stakeholders is the assessment of service performance through the prism of quality improvement and changes introduced in the health care system. These changes affect health outcomes, evolution of the health care system or use of resources related to achieving the results. All innovations affect the relationship between the service recipient and the service provider, as they change the interaction between some health care entities and processes involved in the care [Freed et al., 2018].

Health protection nourishes a common belief that an innovation holds the possibility of capturing three dimensions of health care, namely the product, the process and the organisation. Taking these three aspects into account in any innovation makes it a successful determining factor for a company, as it may help clarify operations in an organisation. However, one should not overlook another

important issue: innovation barriers, e.g. lack of knowledge about the priorities in health care, lack of engagement of all interested parties when considering introduction of a new solution, necessity of taking various aspects of health care into account in the decision making processes and planning implementation [Price, 2014]. In other words, failures during the performance of new activities may result from a low of level of organisation, communication and access to information, incorrect knowledge and employee management, lack of proper leadership and the performance of inadequate activities in reference to badly set (or baldy formulated) goals. Furthermore, the main causes of innovation failure in health care are social insurance programmes that focus more on the quantity of delivered care rather than its value, as well as insufficient information with respect to the quality of provided health care services [Cutler, 2011].

As part of innovation in health care units (often compared to enterprises), consideration of two aspects is of essence, namely innovation and standardisation. They are often juxtaposed, because innovation is creation, discovery and implementation of new ideas and methods, which may contest or replace current models of behaviour and actions, whereas standards and normalisation refer to principles that pertain to similarities, uniformity and continuity of such paradigms. Therefore, it may be said that innovation primarily refers to novelty and diversity, whereas standardisation introduces order in operation or structure and offers a potential for efficiency improvement by determining certain standards of operation, simplification of already applied solutions and greater attention to costs. However, it cannot be claimed that standardisation is not conducive to new solutions. It may offer numerous benefits in the area of innovations by creating common languages (e.g. programming, understanding), methods of study or introduction of gradual improvements based on prior experiences. Consequently, a certain form of creativity seems to be necessary in both cases, as persons introducing new ideas or actions constantly have to clarify them [Ansari, Fiss and Zajac, 2010]. What is more, whilst introducing new solutions, most probably more loose organisational structures are necessary with a distanced approach to standardisation. In other words, organisations (e.g. health care), in order to operate efficiently, have to use both existing knowledge and the potential that they have, as well as having the possibility of discovering or creating new knowledge. It must, however, be emphasised that even though the sole fact of innovation implementation may cause adversity among employees (i.e. persons may perceive introduction of innovations as an attempt to control their work, or result in loss of the unit's identity), whereas innovation management may be understood as a "lack of understanding for prior solutions" [Birkinshaw, Hamel and Mol, 2008], yet forms of innovation management are common techniques for the improvement of productivity and they contribute to the change of hitherto activities. However, it must be remembered that not all elements are always bad and necessarily require changes.

Given the fact that the approach to innovations may be subjective, it is necessary to rely on standardisation during their implementation, at least at the beginning. This happens because while new solutions may be well known on a general level, they may be new and inspiring for a given manager or organisation and may be locally perceived as radical innovations [Mol and Birkinshaw, 2009].

Taking the above into account, innovation management and standardisation should be viewed from various perspectives, namely: the perspective of possible conflicts between innovation management and standardisation (e.g. innovation management delivers new non-standard solutions and is thwarted by standardisation), maintenance of relationships between innovation management and standardisation (e.g. innovation management is supported by standardisation, on which diffusion and implementation depends) and ambivalent relationships between innovation management and standardisation (e.g. innovation management is subjective).

Taking the above analysis into account, use of consultancy services is recommended during the promotion, distribution and implementation of new organisational practices. They are meant to help customers of organisations (patients, physicians) during the implementation of changes, exhibit a higher level of standardisation of activities (including medical) and promote and clarify new ideas and methods of management. A consultant's role is very important because medical companies introducing new technologies, programmes or medications are looking for new and larger orders,

expect better market knowledge (internal and external) and supervision of the operation of organisations. Due to this, consultants often customize solutions to their clients in order to overcome the ostensible contradiction between innovation in medicine and standardisation and control of programmes and methods [Styhre et al., 2010].

Summary and Conclusions

All innovations should be used to meet the needs of patients and persons engaged in patient care. New solutions are mainly created in laboratories, so one may risk claiming that laboratory services drive innovations, where new solutions are deemed to be so-called breakthrough innovations.

The situation is slightly different in hospitals, which often focus on cooperation with one another rather than competing for service recipients as it is important that the applied innovations offer benefits for patients. Also due to this, innovation in hospitals is primarily examined from two points of view: 1) as a set of technical and bio-pharmacological possibilities and 2) an IT system. This happens because medical and IT innovations are tangible and often spectacular. Furthermore, application of modern technologies makes a hospital a "showpiece" of health care and testifies to the degree of modernity and enhances the level of competence of technicians, physicians, nurses, etc. Apart from this, application of ICT plays a significant role in the management of health care units, e.g. by improving communication among parties in the market of health care services and monitoring of treatment results and the costs of an organisation. Therefore, it is necessary that persons who work in hospitals (physicians, directors, managers) take various innovations and entities participating in them into account. Inclusion of all persons and organisational forms in innovative activities of a hospital contributes to improvement of services, economic efficiency and advances the "production" and the financial standing of the overall health care unit.

When analysing the flow of information in health care, it may be concluded that application of ICT in health care plays a vital role in the management of health care establishments, e.g. by improving communication between the parties of the market of health care services and monitoring the results of treatment and the costs of an organisation. Here, tele-health plays a special role, which allows for establishing and/or maintaining relationships among actors in the market of medical services. Existence of this type of inter-dependence facilitates access to health services or improves their quality (e.g. application of portable devices monitoring a patient's condition, performing remote rehabilitation with the use of ICT or the use of robots in surgery).

Whilst analysing innovation management processes in organisations, it must be noted that it may be shaped both by standard programmes or methods, as well as result from conflicts or negotiations. On the other hand, application of standard methods contributes to the preparation of incremental innovations by delivering a methodology that allows for examining and changing (designing anew) the existing practice and behaviour.

In summary, innovative solutions designed and introduced in health care units are primarily aimed at creating new possibilities of providing health care services to improve their quality as well as increasing patient safety and satisfaction. Thus, innovations and inventions in health care, in spite of the fact that they require, as a rule, significant financial outlays, are a necessary element of satisfying the growing needs and expectations of health care consumers. Furthermore, implementation of new solutions testifies to the position of health care units and their "good" perception by potential patients. Also due to this, in order for units operating in the medical service market to survive, a proper approach to innovation management and standardisation is necessary. For this, creativity, the ability to adjust and the "modernity" of management consultants are necessary factors in the face of continually changing external environments, internal conditions and market challenges.

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The Relevance of Creative Marketing, Innovation and Luxury in The Contexts of Tourist Events

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Abstract

Recent studies indicate that organizations have been looking for creative and innovative alternatives to position themselves in the market in a competitive way. Tourism has so far been one of the sectors that has most contributed to the development of the countries' economy and has shown the highest growth rates. Within the tourism sector, one of the fastest growing segments is events. The concepts of creative marketing, innovation and luxury applied in the context of tourist events, specifically in the luxury wedding market, arise in order to establish a dialogue between the areas of knowledge, enabling the construction of new knowledge and the adoption of new event practices, desired by contemporary clients. The aim of this manuscript is to present the relevance of creative marketing, innovation and luxury in the context of tourist events, with an emphasis on new wedding trends: destination weeding, elopement wedding and honeymoon glamping. In specific, this study intends to understand the relevance of creative marketing, innovation and luxury in the context of tourist events. In a preliminary perspective, a research model will be proposed by the study authors. In an interdisciplinary perspective, this study presents contributions to tourism, marketing and event management. At the end, guidelines for the future will be presented.

Keywords: Creative marketing, Innovation, Lux segment, Tourist events, Weddings market.

Introduction

Creativity, considered a skill, inherent in people, is linked to the process of having new, original ideas to be offered to the consumer, who each day seeks a greater number of innovative trends, of great value in the market. Creative marketing is a new theory, where customer and company together, through insights, use creativity, to develop innovative products / services proposals, which will meet the market's wants and needs (Sousa, Silva & Malheiro, 2020). The innovative proposals in this context, are understood as the recombination of old ideas, originating new ideas. Tourism characterized as a social phenomenon, which maintains interrelation with different sectors, is a multifaceted and geographically complex activity, which gives rise to new (and different) market segments with different individual interests (Sousa, Malheiro & Veloso, 2019). Tourism consumers choose a product or service according to the degree of correspondence with their tastes, interests and also taking into account the power to transform them (Machado et al., 2018).

The advancement of technology has changed consumer behavior. In an era marked by information and knowledge, it is imperative to create value and differentiate (Lages; Sousa & Azevedo, 2018). So there

are social luxury events, these, considered a lever for destinations, control seasonality, move the economy, generate direct and indirect jobs, spread the image of the places. The more creative, innovative and luxurious a social event is, the more fans it will acquire. Consequently, the consumption of luxury products and services has grown in recent decades, mainly due to the insertion of consumers from emerging countries in this segment and the emergence of the concept of "new luxury". When talking about luxury, the understanding was reduced to the meaning of power, ostentation, pleasures and waste (Wong & Ahuvia, 1998; Dall'Olmo Riley & Lacroix, 2003 Ferreira & Sousa, 2020). However, luxury is no longer limited to ostentation, and is seen through your senses and pleasure, being more closely related to sensations than to appearances (Kapferer & Bastien, 2008; Atwal & Williams, 2009).

Therefore, the innovations caused in the wedding market stand out, focusing on three luxurious events that have gained prominence today: destination wedding, elopement wedding and honeymoon glamping, these stimulate the consumption of experiences never lived by the consuming public. The objective of this article is to present the relevance of creative marketing, innovation and luxury in the context of tourist events, with an emphasis on new wedding trends: destination weeding, elopement wedding and honeymoon glamping. The theoretical basis was divided into 4 parts, the first being the approach to creative marketing actions and the creative marketing model was created for that; In the second chapter, it was about innovation and its contributions; in the third chapter, we approached tourist events showing how they can boost tourist destinations; and in the fourth chapter, it was about luxury events focusing on the wedding market, thus presenting three luxury events which are: destination wedding, wedding elopement and glamping for honeymoon.

Creative Marketing and Innovation

Creative Marketing

Creativity is a characteristic attribute of human beings, often valued by Western cultures. It is a multidimensional concept since it admits cognitive, environmental and personality variables (Becker et al, 2001; Pocinho & Garcês (2018)). It is a valuable resource that needs to be encouraged, especially at this moment in history, of intense competition and rapid and continuous changes. Changes that occur both at the social and cultural levels, as well as at the political, economic, scientific and technological levels (Bragança, Zaccaria, Giuliani & Pitomba, 2016). If in the past, organizations could respond to market needs almost always with the same formula, now they have to reinvent themselves to maintain their market value. Competition is no longer limited to a small number of similar companies. We currently compete against everyone. In this challenging context, creativity can play a key role for any organization that wants to assert itself or even survive. Organizations must have the capacity to produce innovation and be receptive to it, and people are essential in this process. It is people who are creative in problem solving, decision making, research and development of new products, services or work methods (Williams & Yang, 1999; Braia, Curral & Gomes, 2014)

Creativity is then understood as a set of knowledge that the individual often has unconsciously and appears in different ways, which can be relative, productive, negative or destructive. Relative creativity is one that generates a new idea for the person, but does not add to the existing collection. Productive creativity generates an idea that can be transformed into a really new product or process, producing a competitive advantage. Negative creativity is developed by people who have a very special ability to create obstacles and restrictions, demonstrating the infeasibility of new ideas proposed by others. It is important for the company to know that there are certain times when this conduct must be blocked and, in others, encouraged. Finally, destructive creativity is that used for socially undesirable actions, such as crimes (Vasconcellos, 2007 and Bragança, Zaccaria, Giuliani & Pitomba, 2016).

One of the basic principles that guide this type of marketing is the creation of ideas with the customer and not for him. Nowadays, customers are not only consumers, they are also creators, who develop content and ideas, so working with them allows the construction of a better and more targeted product. Other principles are: engaging in the customer experience from start to finish; treating all customers as if they were an extension of your team; measure the public's digital relationship with products; and

think like an entrepreneur. These are the foundations that define how creative marketing works. Marketeers currently have a more global and entrepreneurial vision, which promotes the creation of more efficient projects with better results (Buzzmedia, 2017; Peneda de Oliveira & Sousa, 2020). Creative marketing is about attracting something creative (original, different, innovative, humor, etc.) that leads to an awareness of the brand, company or self-branding (personal brand). The idea is that your study of possibilities has a focus on innovation and proposals that generate word of mouth (Limeira, 2017). With competition increasingly narrowing the differences between products, it is clear that originality is one of the strengths to be exploited by organizations that want to maintain a market share or increase it when they find an opportunity available before the competition (Menshhein, 2007).

In addition to fully meeting the wants and needs, it is up to the marketer to make products and services unique, different from everything the consumer already knows and even allow the customer to be part of the organization by involving him in the creative process. At certain times the greatest creativity is composed of a simple detail, practically imperceptible and that brings a lot of knowledge, vision and studies. The best and most creative ideas do not come out of nowhere, they are the result of hard work, dedication and effort. (Menshhein, 2007)

Innovation

Throughout history, innovation has been present in all phases of civilization, with events that have marked its evolution, in the most diverse fields of human activity and that have boosted the progress of society. (Bragança, Zaccaria, Giuliani & Pitomba, 2016). An innovation is the recombination of old ideas, giving rise to a new creative idea, capable of modifying the current order. (Bruno-Faria & Fonseca, 2014)

Innovation is a modest or revolutionary initiative, which appears as a novelty for the organization and the market and which, applied in practice, brings economic results to the company, whether they are linked to technology, management, processes or business model. (Simantob & Lippi, 2003; Mascarenhas Bisneto & Lins, 2016) "A marketing innovation is the implementation of a new marketing method with significant changes in the design of the product or its packaging, in the positioning of the product, in its promotion or in price fixing" (Oslo Manual, 2005; Mascarenhas Bisneto & Lins, 2016, p. 90). Innovation can be seen as a specific tool of entrepreneurs, the means with which exploit change as an opportunity for a different business or service, being able to be understood and, as such, to be practiced, leading to a common distinction between invention and innovation (Drucker, 1993). Almost all the innovations reflect existing knowledge, combined with new uses, suffering the concept of innovation as a shift towards emphasis on the interaction between institutions, focus on interactive for the creation, dissemination and sharing of knowledge and relevance of the role of government processes as an important actor in an innovative environment. It is important to clarify the difference between two concepts that, for different times, tend to be confused: Process Innovation and the Innovation Process. Innovation Process is essentially related to the set of steps that tend to incorporate both the market and technology. Companies have the ability to go seizing, building your knowledge base and thus make the continuous improvement of process management (Tidd, Bessant & Pavitt, 2003). Monitor the internal and external environment and analyze the relevant signals will be the starting point. After this, we have the decision about how to respond. Finally, we will implement the project with the development of technology and the domestic and foreign market (Sousa, 2014). The Process Innovation, by the way, combines the adoption of a process view of the organization's business with the application of innovation to key processes. This is the big difference, compared with the Innovation Process, but it allows us to understand its complexity. Process Innovation encompasses the prediction of new work strategies, the actual process activity and the implementation of change in their complex human, technological and organizational dimensions (Davenport, 1993).

For Bessant and Tidd (2009) innovation cannot be seen in isolation as an insight, but rather, as a process, a sequence of integrated activities where the company generates, selects and implements actions mentioning, including, that companies need to develop competencies little by little, through trial and error, as they are not yet created with the capacity to organize and manage the innovation process. Innovations can be classified in terms of incremental innovation or radical innovation. Incremental innovation explores the potential of established structures, improving the functional

capabilities of a technology or practice through small-scale improvements in its attributes, such as performance, safety, quality and cost. Radical innovation introduces new concepts that significantly break with past practices and allow the creation of products and processes based on different scientific and / or technological principles (Carayannis, Gonzalez and Wetter, 2003).

In a world where globalization has become a reality and where cities increasingly compete with each other for investment, turnover, revenue from tourism, media projection, events or even residents, in order to differentiate themselves , a more focused management for the city as a product becomes essential. (Sousa & Ribeiro, 2018) The realization of events is a beneficial measure in the context of city marketing. Cities see events as engines of development for city marketing in that they provide the city with opportunities for dynamization at the urban level (such as the construction of new infrastructures or the restructuring of existing ones), social, economic, institutional and even in the projection of city image, which stimulates the appearance of new investments and new visitors (Tseng et al., 2015; Sousa & Ribeiro, 2018)

The events segment has been consolidating itself as a prosperous market in the ranking of the tourist economy (Silva et al, 2016). Getz (2008) explains that one of the main objectives of investment in events is to highlight the city development and marketing plans in most destinations. Events entertain the local population, generate media, helping destinations to develop their confidence and a positive image in the tourist market (Yeoman, Robertson & Ali-Knigth, 2006; Mackay, Barbe, Van Winkle & Halpenny, 2017) .Special events have grown in the tourism industry as an indispensable alternative product for various destinations, working as generators of additional visits to the destination where a given event takes place (Dimanche, 2008; Rola, Malheiro & Sousa, 2018)

An event has as main attributes, the attraction and congregation of people, the intrinsic character of ephemerality, the relationship with leisure and free time, and the space-time selectivity in its realization. They are subdivided by types, since each type will have its own objective of achievement (Molina, 2016). Given the above, the focus of this research is on social events. These, understood as any meeting that allows interaction, fraternization and entertainment among the participants, have the characteristics of providing a favorable occasion for the meeting of people, gathering them around a specific objective that, simultaneously, constitutes its main theme and justifies the its realization. They are on a considerable scale of annual growth, as the types of ceremonies and gatherings have diversified and increased in number (Mota, Coelho, 2016).

Social events are part of a niche market, which needs articulate, creative and entrepreneurial spirit. The more creative and innovative a social event is, the more fans it will acquire, heating the economy, controlling seasonality in different spaces, which can range from a hotel to a tourist destination. Being creative is being able to transform something that already exists, giving originality to the product / service, making it unique, differentiated, never seen and that, in this way, will be able to attract curiosity and generate people's motivation and interest in to know it, making it desired (Britto & Fontes, 2002).

Within social events, creativity is important so that a worn event, with little demand, is desired and stimulates people's purchasing power. But it is important that in this transformation of the product / service, the customer can participate in the co-creation process with his insights, elaborating something that he really wants to consume. The closer to the unusual, the more real the customer experience can be. It is relevant to understand that a transformed product / service generates demand for a period of time; but as the market always needs to be heated, new ideas are emerging and new products / services are being recreated and innovated, so on, making the “cycle turn”.In view of this fact, the wedding market appears, which is innovated, recreated, to meet the expectations of customers who wish to live unique, innovative and luxury experiences, the focus of the next section.

Events and Lux Segment

Tourism Events

In a world where globalization has become a reality and where cities increasingly compete with each other for investment, turnover, revenue from tourism, media projection, events or even residents, in

order to differentiate themselves , a more focused management for the city as a product becomes essential. (Sousa & Ribeiro, 2018) The realization of events is a beneficial measure in the context of city marketing. Cities see events as engines of development for city marketing in that they provide the city with opportunities for dynamization at the urban level (such as the construction of new infrastructures or the restructuring of existing ones), social, economic, institutional and even in the projection of city image, which stimulates the appearance of new investments and new visitors (Tseng et al., 2015; Sousa & Ribeiro, 2018; Sousa & Rocha, 2019)

The events segment has been consolidating itself as a prosperous market in the ranking of the tourist economy (Silva et al, 2016). Getz (2008) explains that one of the main objectives of investment in events is to highlight the city development and marketing plans in most destinations. Events entertain the local population, generate media, helping destinations to develop their confidence and a positive image in the tourist market (Yeoman, Robertson & Ali-Knigth, 2006; Mackay, Barbe, Van Winkle & Halpenny, 2017) .Special events have grown in the tourism industry as an indispensable alternative product for various destinations, working as generators of additional visits to the destination where a given event takes place (Dimanche, 2008; Rola, Malheiro & Sousa, 2018)

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Luxury in Tourist Events

When dealing with luxury, the vast majority of available literature, supports the idea of ostentation, comfort, beauty, refinement and a sumptuous lifestyle. Its connection to an object supposedly of superior quality is associated with social codes and behaviors related to pleasure and refinement (Mangorrinha, 2014, p. 118). For Galhanone (2005), as an example, the definition of luxury goes through something exclusive, little accessible to many people (and inaccessible to others), thus preserving its (apparent) exclusivity.

It was agreed to call luxury within marketing and management, all that product or service with quality, aesthetics, price and brand image superior to the conventional ones. (Ko, Phau & Aiello, 2016; Scussel & Demo, 2019). In the luxury fashion brand segment, value creation is associated with the development

of strong bonds with consumers through unique interactions, based on cognitive and emotional aspects (Choi, Ko & Kim, 2016; Scussel & Demo, 2019) . This means that the assessments of luxury consumers are created from their perceptions, especially those related to the quality of service, the anticipation of their needs and experiences (Kim et al, 2016; Scussel & Demo, 2019.).

If luxury is commonly associated with exclusive objects and price, it is understood, however, that it must go beyond this: in detail, in the message, in meeting the needs of the consumer, in satisfaction, in magic, in the empowerment of ecological values, increasingly considered, in short, in the unique experience (Okonkwo, 2016). Luxury goods represent values for individuals, luxury products correspond to the expression of human desires and emotions, it is said that, for through these, one can learn a little about the values, beliefs and attitudes of the individuals who consume it (Lipotetsky & Roux, 2008; Machado & Sousa, 2018).

The philosopher Lipovetsky (2007) defends a change in the status of luxury, initially it was related to the sense of accumulation and ostentation. Today, in the 21st century, there is a change in the meaning and motivations of luxury consumption for the field of the senses, i.e., the consumption of luxury products, is much more focused on experiences, emotions and pleasure.

In this context, the symbolic component is increasingly decisive in the choice of luxury products, becoming a differentiator, through the new present values, where the growth of environmental concern on the part of society is seen (Valente, 2008). In this scenario, contemporary luxury is surrounded by new values and appeals regarding environmental care, as well as social well-being. Companies have resorted to marketing strategies aimed at preserving the environment as a competitive variable. Given these aspects, luxury weddings grow and define the dynamics of this market, which expands every day.

What you see, are newlyweds leaving the traditional patterns and style of weddings, looking for unusual patterns and styles, where they can include their own characteristics in the details of the ceremony. These new values, linked to luxury events, make it possible to immerse a new concept of consumer, one who wants to live unique experiences, in different destinations. Then there are the luxury events that move the world's tourist destinations, they are: Destination Wedding, Elopement Wedding and Glamping for honeymoon, items that will be presented below.

Destination Wedding

The destination wedding is an English term that means, in this context, marriage in a tourist destination. It is considered a mini event, with few people being invited, being family and close friends. Which means that guests who wish to participate in the ceremony, will need to travel to the tourist destination chosen by the bride and groom.

There are three types of destination wedding, the first being the one where the bride and groom are from the same country, but want to have their wedding in another destination. The second type, the groom and the bride are from different countries and one of them will travel to the other's country for the wedding; and the third type, the groom and bride are from different countries but decide to get married in another country. In the three cases mentioned, the wedding may only be for the couple and a few guests as relatives and close friends, totaling approximately 20 people. (Lemos, 2018)

When we talk about these types of weddings, there are two types of financing involved. The first is that the bride and groom are responsible for the overhead costs of the wedding - in addition to the expenses of the wedding itself, it includes round trips and the guests' stay - a very personal issue that varies a lot from couple to couple, depending on everyone’s conditions. What can influence this scenario is to be able to form a package at the hotel of your choice, in which the wedding and accommodation for a certain number of guests encompass a single cost. The estimate is that a wedding for 200 people in the city of the bride and groom will have the same cost as a destination wedding for about 20 people, with the difference that these 20 guests will not simply attend a wedding, but an experience of 4 or 7 days. (Portugal, 2018)

The second is to be invited to pay for travel and accommodation. In this case, it is normal for the bride and groom to send the save the date in advance, so that the guests can go ahead to buy the dresses for the ceremony, air travel if necessary and accommodation. In this type of wedding, where the expenses will be for the guests, the chances of confirmation of presence are much less. This type is the least usual but it can happen. (Portugal, 2018)

The destinnation wedding market segment has a growing trend in much of the world and additionally brings to the country that develops it, a relevant number of new tourists, being a new way to promote national tourism. A Destination Wedding can represent a global revenue of more than € 50,000 considering the multiplier effect of the guests. (Multisector, 2016) An example exercise is done and the average bride and groom spend of € 20,000, plus stays of 20 guests for 7 nights at € 75 per night, we get a value of € 30,500, not counting feeding these guests at the tourist destination and transportation.

The advantages of this type of wedding are numerous for both the couple and the tourist destinations, such as: for the couple - luxurious, intimate wedding; choice of a tourist destination dreamed of being in the mountains, sea, church, tourist spot, among other options; a very small number of people which translates into having very special guests; elegant way of reducing the guest list; the experience that the ceremony will provide to the guests, a place that matches the couple's history or personality, getting to know another culture, differentiated photos and memorable days, always using creativity. For the tourist destination: control of seasonality, entry of additional foreign exchange, sale of hotels, restaurants; dissemination of the image of the destination; return of guests at another time; disclosure of the destination to other people. But the main reason that enchants so many grooms is, without a doubt, the opportunity to confirm the "yes" in the dream scenario and live unique experiences.

Elopement Wedding

Elopement Wedding is nothing more than a wedding for two, that is, only with the presence of the bride and groom. But, despite being a trend of the moment, this appointment is not as new as it seems. According to the Oxford Dictionary, the term “elope” means to secretly flee to marry, and this practice intensified in 1754 due to the need to escape family taxes or impositions. Today, the term "run away to get married" no longer represents something so radical or wrong. (Universo das Noivas, 2019) Modern couples were responsible for redefining the meaning of elopement wedding. This time, couples do have the blessing of families, but they travel to get married without the presence of any guests. (Canudo, 2017; Castro, 2017) The Elopement Wedding has become a luxurious proposal for couples, as it unites infinite possibilities of destinations, an intimate ceremony.

Bride and groom dressed to marry, entitled to veil, wreath, bouquet, suit, boutonniere, a table with multi-storey cake, sweets and flowers, many flowers. A celebrant, photographers, videographers, and so on. No groomsmen, bridesmaids, parents of the bride and groom or guests. The exchange of votes takes place in a beautiful landscape (tourist destination), most of the time, somewhere far from the couple's city. A wedding format that is getting more and more (literally) cool fans. Now, the term comes as an offshoot of another great trend, since the contemporary elopement is a discreet, luxurious wedding, in some paradisiacal destination - perfect ingredients to attract the attention of young famous couples who wish to escape the flashes on the day of the yes. (Caesar, 2017)

The advantage of this type of wedding ceremony: in an elopement wedding, the focus of everything will be the union of the couple and, because of this, the concerns surrounding the ceremony will be much lower than for a wedding with several guests. The question of the economy. With lesser expenses, the wedding for two can be very advantageous for allowing the bride and groom to save on the preparations and spend on what they really want and need. The main advantage and reason why the bride and groom seek an elopement wedding is the freedom to organize everything according to the couple's desire to enjoy their moment, using their creativity to the maximum. Marriage for two allows the couple to have a unique experience, luxury and refinement in the ceremony and live the occasion in an intense, intimate and very true way, without worrying about whether or not they will be pleasing the guests. (Universe of Brides, 2019)

Glamping for honeymoon

The word glamping emerged from the junction of the word glamor with the word camping. This concept translates into a form of accommodation that, like camping, implies a great contact with nature but with a high level of comfort, in a simple and summarized way, it is the practice of luxury camping (Lopes, 2016). Studies on glamping focus on this form of camping as a new low cost tourism trend (Brooker & Joppe, 2013; Rebocho & Correia, 2017), or as a hybrid tourist product, combining camping and luxury, which is considered to be the trend of tourism in 2020 (Ergüven, Yılmaz & Kutlu, 2015; Rebocho & Correia, 2017).The term covers all types of semi-permanent camping structures, such as tents, tree houses, igloos, houses on the water, huts, yurts, among others (Coelho, 2017). These types of structures have served couples on honeymoon very well, who want to experience innovative experiences and have made a destination wedding or an elopment wedding. At a deeper level, glamping is also considered a new way of perceiving and contacting nature, in a truly segregating experience where tourists, places and places interact (Pine & Gilmore, 1998; Rebocho & Correia, 2017). It is a possibility to experience the splendor of the outdoors and contact with nature without sacrificing comfort, removing the negative attributes of camping, such as dripping tents, sleeping bags, improvised food (Boscoboinik & Bourquard, 2012; Brooker & Joppe, 2014) .

When thinking about getting married, the destination of the honeymoon is one of the items of great relevance. In this type of travel, hospitality plays a fundamental role and is usually the second biggest concern for couples. Glamping, being a luxury camping, has been highlighted when it comes to honeymoon, since in these types of experiences, a high level of comfort and amenities are seen, such as: beds with special mattresses, sheets with Egyptian yarns, rugs from rustic to sophisticated ones that accompany the type of tent decoration, heating, catering service, equipped kitchens, private bathrooms, in addition to the experience of breathing fresh air, living days of tranquility together with animal diversity, getting to know untouchable spaces in unusual destinations and places, living the experiences of being in sustainable environments and with high development of social responsibility.

The tourist experience of these couples when settling in a glamping, according to Ryan (2001) is explained by physical intimacy (real contact with the place), verbal intimacy (exchange of words and communication), spiritual intimacy (sharing of values and beliefs) and intellectual intimacy (sharing reflections and disseminating knowledge). Schmitt (1999) and Rebocho & Correia (2017) argue that there are five different types of experiences that can be developed to attract consumers and that are directly linked to various intimacies: Sensory Experiences (senses); Affective Experiences (feeling); Creative / Cognitive Experiences (thinking); Physical, Behavioral and Lifestyle Experiences (acting); Social / Identity Experiences that result from the identification with a reference group or culture (reference). These different types of experiences are transmitted through the form of communication, visual and verbal identity, presence of the product in the media, with the main objective of creating holistic experiences. With all these types of experiences, the high level of comfort of the spaces, the luxury, the innovation, the feeling of nature without returning to the basics, but referring to the rustic chic, make these types of spaces something to be sought by honeymoon customers.

Final Considerations and Future Research

Given the importance of creating innovative products / services for the markets, and offering customers luxury experiences never before experienced, creative marketing emerges with its current model, which is capable of contributing to the construction of projects, focused on customer insights. The wedding market, a type of social event that leverages the economy of tourist destinations, has gained prominence, due to the innovations inserted in the perspective of luxury and unusual experiences. Thinking about the future of luxury, in terms of industry, due to the constant global and socioeconomic changes and transformations that this market has undergone, this industry will continue to adapt to the new circumstances dictated by it, in order to adapt to the future challenges. It is necessary to take a look at the future, in order to foresee the paths where this industry may eventually follow in the coming years. Among these paths, luxury events called destination wedding, elopement wedding and honeymoon glamping are alternatives for social events, of high acceptance, since they arrive to meet the expectations of customers, who wish to live the refinement, the luxury, the elegance of a sophisticated wedding ceremony.

Thus, according to the theories presented and the dynamics of the event markets, the destination wedding appears, as a mini-solemnity option, designed to serve the bride and groom and a maximum of 20 guests, making the event intimate and welcoming. The main focus of this type of event is a tourist destination to be chosen, which offers advantages for both the couple and the tourist destination due to the dividends that are leveraged. The elopment wedding, on the other hand, is aimed at the bride and groom, and the photographer, the cameraman, the wedding planner, and a celebrant are to perform at the ceremony. No other guests are present. Luxury and refinement are present, but this wedding, in addition to being intimate, is super exclusive for the couple and usually happens in a prominent tourist attraction. Finally, both after the destination wedding and after the elopment wedding, couples dream of a honeymoon. So to maintain this differentiation that has already been followed in the types of weddings mentioned above, the option is glamping, a form of luxury camping, in a natural or rural environment, where the couple will have all the glamor of a wedding night with experiences innovative experiences, such as: Sensory Experiences (senses); Affective Experiences (feeling); Creative / Cognitive Experiences (thinking); Physical, Behavioral and Lifestyle Experiences (acting); Social / Identity Experiences that result from the identification with a reference group or culture (reference). In addition to the tourist experiences that are developed when settling in glamping: physical intimacy (real contact with the place), verbal intimacy (exchange of words and communication), spiritual intimacy (sharing values and beliefs) and intellectual intimacy (sharing reflections and knowledge dissemination). So, the event is a possible stimulator of the dynamics of a destination. The limitation of this research is the bibliographic search in qualis articles, when dealing with creative marketing, innovation, luxury in the context of tourist events and the wedding market. Future studies should continue this work, using quantitative methodology, scientific research is lacking with more data on social events: destination wedding, elopement wedding and honeymoon glamping, which brings more originality and value to this study.

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Privacy in Electronic Health Records: A Comparative Study

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Abstract

Despite the benefits that the use of electronic health records (EHR) provides for doctors, other healthcare professionals and researchers, people have genuine privacy concerns that their data might be leaked or accessed by unauthorised parties. This paper investigates and compares security measures that are implemented in three countries namely Denmark, England and Australia, to protect EHR systems. A comprehensive analysis of literature (including official documentation of EHR in the three countries) was conducted to identify countermeasures related to the technologies, policies and human factors that implemented in Denmark, England and Australia to safeguard their EHR. The findings of this paper highlight the importance of adopting a more holistic approach where strong policies and practices are implemented, and cyber security awareness and training are provided to the users of the system. Such approach will address people privacy concerns and increase their trust in using EHR. The comprehensive analysis has revealed countermeasures implemented to protect EHR in three countries. It shows that more focus needs to be given to users training and awareness to prevent any human related security incidents.

Keywords Electronic Health Record, Information Security, Privacy, Information Security Management, Security Awareness.

Introduction

Over the last decade, there has been a global push for the use of electronic health records (Kanwal, Lonie and Sinnot 2018). There are many benefits to having an EHR. A study has found that EHRs can improve the quality of care, reduce medical errors as well as improve financial and operational performance (Menachemi and Collum 2011). From a research standpoint, EHRs can allow researchers to access more quality data and use data linkage to help them produce more accurate results for their research. For example, data linkage has enabled researchers to compare hospital caseloads with outcomes of oesophagogastric cancer surgery (Smith et al. 2014).

Although EHRs provide several benefits, it also raises several challenges in implementing such a system. Most of these challenges are in the area of privacy, confidentiality and data security. These challenges become of significant concern when EHRs are shared across healthcare professionals, researchers and other interested parties. A leak in the identity of a patient can lead to discrimination or embarrassment. If these fears manifest in the public, people may feel reluctant to disclose their symptoms or even visit their doctor.

Many countries have implemented various forms of EHRs. However, this study will only be focusing on Denmark, England and Australia. Denmark had been selected because of its high adoption rates of

its EHR system, sundhed.dk, with more than 2.4 million unique users each month (OECD, 2019). In contrast to Denmark, England was selected because it had not been so successful which was why it was also selected for this study. It uses Summary Care Records (SCR) to manage their patients' data and later implemented care.data which failed only months after it was released to the public (Godlee 2016). Australia has had a centralised electronic health record system, Personally Controlled Electronic Health Record (PCEHR), since 2012. PCEHR is now known as My Health Record (MHR) and since February 2019, 9 out 10 Australians have a MHR account (Australian Digital Health Agency 2019). Australia was selected because its MHR was not as widely used as sundhed.dk but it also did not fail as care.data did. Thus, this research aims to provide a comparative study of the security measures across Denmark's sundhed.dk, England's SCR/care.data and Australia's MHR.

Methods

To best compare the security measures in place across the three countries, the McCumber cube will be used to evaluate information security (McCumber 2004). The cube has three dimensions: data states, security goals, and security measures. This research will only be focusing on the security measures dimension.

One aspect of this dimension is the technological solutions. The underlying technology plays an important role as it helps sets the foundations for the security measures to be built upon. The cube also highlights the importance to consider the human element that is involved in the security measures. Thus, the paper will also examine the policies and human factors that surround the use of EHRs.

We conducted the literature review in four steps. First, we utilized University of Melbourne's digital library to collect and screen academic journals based on filters detailed in Table 1. Second, we omitted articles that did not focus on electronic health records. Finally, we grouped the articles based on the three factors of security measures. This paper will apply these three areas of the countermeasures as a criterion to compare the security measures of the different EHR systems across Denmark, England and Australia.

Table 1: Research steps

Step	Actions performed	Results
1	Broad search in University of Melbourne's digital library. **Keywords:** *privacy in electronic health records, privacy in Sudhed.dk, privacy in Summary Care Records, privacy in My Health Records* **Year since:** 2009 **Language:** English	Articles found: **2,565**
2	Omit those that did not focus on the technology, policy or human factor element of cyber security	Articles selected: **45**
3	Select documents based on abstract relevance and years since published	Articles selected: **20**
4	Group the articles based on technology, policy and human factors	

Technology

The first security measure that is often proposed is information security technologies. These technologies are IT components, both hardware and software, that are used as security controls to enforce a particular security requirement (McCumber 2004). Although it has been argued that

information technology alone should not be relied upon, it is still an important element of security that must be maintained to improve an entity's security posture (Blakley, McDermott and Geer 2001). In this section we will identify the different technologies employed by each of the countries and examine its effectiveness.

Denmark

Sundhed.dk is an online public health portal that provides healthcare professionals and the citizens of Denmark a single point of access to electronic health records and other information surrounding the health services provided in Denmark. Citizens can log into this portal to view their own patient summary, book appointments electronically, request renewal of medications and view discharge summaries and laboratory results. Healthcare professionals can also use this portal to view their patients' health records and laboratory results.

Secure communication in this network of electronic health services is achieved through the Danish National Health Data Network that was established by MedCom, a publicly funded non-profit organisation. This network is a secure infrastructure that provides both public and private organisations the means to securely transmit and exchange health data, images, as well communication with external systems such as Sundhed.dk.

To authenticate access to the electronic health systems and secure the interactions between systems, the public-key infrastructure (PKI) is employed. From 2010, NemIDs were used to further improve the ease of access to the system. NemIDs is a six-digit security number that can be read from a paper or electronic token which is also used for authentication in banks and other public Danish agencies. This essentially serves as a form of multi-factor authentication to authenticate the user accessing the portal. In 2017, there were a total of 4.7 million Danish citizens that had NemIDs (Agency for Digitisation 2017). Therefore, at the time, almost 5 million Danish citizens could have logged into the Sundhed.dk portal.

Patients can monitor the log files where all activity is recorded and report any discrepancies. A letter is sent to the patient if a healthcare professional who does not have any direct treatment related relationship with the patient, has accessed the patient's record. The patients also can prevent any healthcare professionals from accessing certain information such as medical conditions and current medications.

England

SCR is one of the services provided by NHS Digital. It is an EHR system that contains patient information created from GP medical records. Patient data can be viewed by health care professionals in other areas of the healthcare system who are directly involved in the patient's care. In contrast to Denmark and Australia, there is no portal for the patient to access this data. However, the patient can request to view or add information to the SCR by visiting their GP.

The SCR has three controls in place to control access to its information. The first is through authentication and Role Based Access Control. This is achieved through smartcards that are used in combination with the user's passwords, hence providing multi factor authentication. The second control is through Legitimate Relationships. This requires the healthcare professional to have a legitimate reason to view the patient's SCR. The third control requires patients' consent to be obtained before their SCR is viewed. Legitimate relationships and consent are recorded by a member of the staff. However, selecting emergency access or self-claiming a legitimate relationship will produce an alert. These alerts will be audited by the organisation's privacy officer to ensure that access to the SCR was valid.

Information on the SCR is recorded in a national database, The Spine. Although the Spine is a national database, it is not integrated into a single system and therefore does not link to EHRs obtained through the hospital systems. In 2013, care.data programme was announced which would link patient data from

GPs with data obtained through hospitals and other healthcare organisations. This program had faced many criticisms since its launch and was eventually abandoned in 2016 (Saleem 2009).

Australia

The PCEHR system is a distributed system that provides numerous repositories for essential services. A registered repository must inform an indexing service of the existence of patient data available for retrieval upon request. This essentially interrogates the system to see if there are any atomic data, which is the lowest level of detail. This differs from other EHR systems where they act more like a central repository. Only the data sent to the repositories are used by the MHR system. EHRs are never queried directly. Users of MHR can create patient health summaries and health notes. This includes both the healthcare providers and the patient.

For an organisation to use MHR, they need a Healthcare Provider Identifier-Organisation (HPI-O) and a National Authentication Service for Health (NASH) PKI certificate. These certificates use secure hash algorithm (SHA) technology to send secure messages online. Multifactor Authentication can be enabled through the MyGov portal where a code received via a text message is used in addition to the password.

Once a patient is registered on MHR, healthcare providers will have default access to their records if they have had a relationship with them before. Documents can be restricted but can be revealed if the healthcare professional possess a limited document access code. Once a healthcare provider has accessed to the patient's record, they will be placed on a list. Patients can access this list and remove providers to deny their access. The system logs all access to the patient's records and is available to review as an audit log. The audit logs do not provide information on individual access, but patients can request to see which individuals has accessed their record and notifications can be set when their records have been accessed.

Policy and Practices

Information security policies are used to identify valuable information assets, provide governance over these assets, and strengthen the controls over these assets (Flowerday and Tuyikeze 2016). Policies in nature are more control oriented. Practices, however, are more individually constructed (Burdon Siganto and Coles-Kemp 2016). A practice can be viewed as the procedure that helps ensure the policy is followed (McCumber 2004). Effective policies and practices are required to maintain the security posture. This section will compare the different policies and practices adopted by the three countries.

Denmark

In 2006, Danish General Practice Database (DAMD) was established to record a patient's prescription and clinical data based on their consultations with their GP. By 2013, all 2,100 general practices were obliged to supply their data to the DAMD (Paulsen et al. 2012). This database was initially designed to enable quality improvement in general practice, but the Danish Quality Unit of General Practice (DAK-E) later provided Danish Health and Medicine Authority permission to conduct research using this data. Statistics Denmark, a government institution, would perform linkages with other data sources using a personal identification number that is assigned to all Danish citizens. In 2014, the National Board of e-Health (NSI) and the Danish data protection agency ruled that this collection of data was illegal and ordered all collection of data to DAMD to be stopped and the data on DAMD to be deleted (Christiansen and Rudkjøbing 2015).

EHRs from hospitals are available to researchers through the Danish National Patient Registry. However, the use of this data is regulated by the Data Protection Act (DPA) which acts as an extension of the General Data Protection Regulation (GDPR) since Denmark is a part of the European Union. This act covers the legal basis for the use of personal data. Personal data can be considered as any data that identifies an individual (GDPR 2018).

The use of health data for research also requires permission to be obtained from the Danish Data Protection Agency. If the linkage between various data sources is required, then permission from the Danish Health and Medicine Authority is required. This legislation also governs the way EHRs can be transferred amongst healthcare professionals. There is a provision that states that healthcare professionals involved in the patient's episode of care will by default have access to important information. Health data can be collected electronically without patient consent, but the patient must be informed. Patient consent is required when confidential information is shared with parties outside of their healthcare.

England

NHS England is responsible for providing health services to the citizens of England. The collection of personal data on its patients and other parties involved in the provision of the healthcare services is governed by England's DPA. When care.data was introduced in 2012, some legislations and policies became even less clear. During this time, the Health and Social Act (HSCA) was passed that included a provision where the Information Centre would be created from. This legislation gave the Information Centre the power to collect, collate, and gain access to the medical records of all patients that have received health services by NHS England, including both hospitals and general practices.

To address concerns on the confidentiality of patient data, the amendments to the HSCA was passed through the Care Act in 2014 (Sterckx et al. 2016). This act contained a provision stating that patient data can only be released for the provision of the healthcare services, adult social care or the promotion of health. However, the exact boundaries imposed by this were not clear.

GPs were directed to the Information Commissioner's Office (ICO), for more information on the DPA and the legislation that surround patient data. According to ICO, HSCA gives NHS England the power to direct the Information Centre to collect certain data from a patient's medical record. It also requires the disclosure of the data and therefore is exempt from the DPA. Since this law in the DPA is exempt, both the GPs and the patient are legally not allowed to prevent the transfer of information into the Information Centre. However, Secretary of State for Health offered patients an option to not upload their information to this service.

The HSCA also contains a provision that allows all EHRs to be used for purposes other than patient care, e.g. research. The DPA requires the healthcare professionals to notify the patient of the intended use of their data unless it is impractical to do so. However it has been pointed out that the DPA can be overruled in this instance as the healthcare professional is obliged to transfer such information to the Information Centre and the Information Centre is not obliged to notify the patient on the use of their data, once the data has been "anonymised" (Grace and Taylor 2013).

Australia

Australian Digital Health Agency (ADHA) acts in accordance with the Australian Privacy Principles which can be found in the Privacy Act (1988). My Health Record Rule and My Health Record Regulation were introduced as an extension of the Privacy Act. These legislation gives patients the right to monitor and control access to their data. However, these legislations are not comprehensive in its protection of the patients' privacy. The MHR's privacy policy mentions that the privacy controls used to manage access to patient information, cannot be applied to the Shared Health Summary if it has been uploaded by the GP. The privacy controls are also no longer effective when the documents have been downloaded from the portal.

Data obtained through the MHR portal can be used for secondary purpose such as research. Patients do have the option to opt out of secondary use of their data. The data released for secondary use will not be sold and only provided to organisations that can prove that it will use the data for public good. This means that insurance companies will not be able to access the data and government entities cannot use it to assess eligibility for benefits. MHR's Secondary Use of Data Governance Board will assess all applications that request access to this data. The Secondary Use Framework states that this board will

ensure that the patient's privacy is protected, and the data made available will be of adequate quality (Department of Health 2018).

Under the Privacy Act, organisations are required to notify affected individuals and the Office of the Australian Information Commissioner (OAIC) when a data breach is likely to result in serious harm to individuals whose personal information is involved in the breach. Organisations must also provide suggestions to mitigate the impact. For example, if your credit card details are leaked, the organisation can suggest cancelling your credit card to prevent further unauthorised use of the card. However, the suggestions of similar nature cannot be provided to patients to reduce the impact if their personal details are leaked. A privacy breach victim cannot also claim for emotional distress or other damages.

Human Factors

Human factors are commonly overlooked factors when assessing cyber security measures, but they are just as important as they are often the last line of defence. Improving the human factors can enhance the security posture of the individual and ultimately the organisation (Hadlington 2018). These factors can include motivation, awareness, belief and behaviour (Shouran, Priyambodo and Ashari 2019). This section will investigate the human factors that are present in each of the countries in terms of the use of electronic health records.

Denmark

Government and healthcare entities are required to have business continuity and disaster recovery plans in place. This involves identifying potential security threats, analysing the impact it will have on the organisation and the recovery of specific applications and functions. Healthcare providers train its users who operate the Danish Health Data Network and other services. However, there is no cybersecurity training provided to the healthcare professionals or other end users. A report has found that healthcare organisations requires its staff to frequently update their password which has led to clinicians sharing passwords and not signing out of their computer for others to use (Kierkegaard 2013). An audit is conducted twice a year on a random sample of log files from the Sundhed.dk portal to identify any discrepancies that may have occurred. With these procedures and practices in place, another study has found that that the abuse of the EHR system detected each year is low and only a small portion of cases result in a sentence (Nøhr et al. 2017).

In Denmark, citizens do not have the option to opt-out of the Sundhed.dk system. However, the data obtained through the Sundhed.dk portal is also not used for research and they do have the right to opt out of research on biological samples.

England

NHS England provides a range of free cyber security training to health care providers including a free Government Communications Headquarters (GCHQ) certified board-level cyber security training. This includes a two-hour briefing session followed by online learning modules that are designed for the board members. NHS England has also partnered with IBM to provide health care organisations a limited number of free user licenses to their Immersive Labs cyber security eLearning platform. This platform helps cyber security professionals in a healthcare organisation develop their cyber security skills. Between 25th of May 2018 to 31st of December 2018, 683 notifications have been made to the Information Commissioner's Officers (NHS England 2018).

When NHS England first rolled out its Summary Care Report, it was mandatory for all users of its services. However, due to public pressure, NHS England adopted an opt out model. The opt out model was also used for care.data even though there is no legislation that regulates this.

Australia

MHR provides online training modules for healthcare professionals that cover topics such as privacy and security of MHR. MHR has also published a checklist that healthcare organisations must follow to be compliant with MHR's policies. This includes the requirement to train the staff on how to operate the system and the legal obligations that surround the use of it. Despite these learning modules and checklists, it has been found that only a third of the healthcare organisation implement cyber security awareness and training (Health Informatics Society of Australia 2018).

In 2012, when MHR was initially known as PCEHR, it adopted an opt-in model. In 2014, after it was rebranded to MHR, it used an opt out model. Between 2012 to 2013, under 400,000 people were registered to the system (Department of Health and Ageing 2013). This figure grew significantly to over 22 million people by April 2019, representing 90.1% of the number of people eligible for Medicare (Australian Digital Health Agency 2019).

Discussion

Technology

The technology for all three countries must be robust enough to maintain the confidentiality, integrity and the availability of the data. These three factors are known as the CIA triad is a widely used benchmark that assesses the effectiveness of the information system security (Fenrich 2008). A summary of the security features can be found in Table 2.

Table 2: Summary of Security Features

	Denmark (Sundhed.dk)	England (SCR)	Australia (MHR)
Multi-Factor Authentication	NemIDs	Smart Cards	Temporary Access Codes
PKI	Yes	Yes	Yes
Who has access?	Healthcare Staff and Citizens	Healthcare Staff	Healthcare Staff and Citizens
Access Controls	Through Sundhed.dk	A visit to the GP	Through My Health Records

All three countries use PKI. This is a system that provides a framework for encryption and authenticating of a user. A common challenge with PKI is authenticating remotely for the first time. However, each country has a system in place to address this challenge. For example, in Australia, only organisations registered through the Healthcare Identifier service can request a public key certificate. Studies have found that using PKI can reduce the complexity of the security systems whilst compartmentalising the security risks (Weise 2001). Multifactor authentication has also been utilised by all countries to authenticate all users of the system.

Assurances need to be made that the integrity of the data is maintained even after the authentication of its users. In both Denmark and Australia, the citizens can access the logs through their portal to see who has accessed and/or modified their information as well as biannual audits are conducted in Denmark by the Data Protection Agency. Since there is no technological solution for patients from England to view the access and modification logs, patients will have to rely on the privacy officers of each healthcare organisations. Since the privacy officer is a member of the organisation, if a user has doubts about the staff's use of their data, it can lead to an erosion of trust in the accuracy of the information presented to the patient.

Availability of data is crucial in EHR systems especially in time sensitive situations when someone's life is at risk. The adoption of EHR systems has improved access to health data by healthcare professionals who are in direct care of patients. All three countries have a distributed system in their

implementation of their EHR systems. Research has shown that distributed systems can improve the availability and reliability of the data through the replication of data at several locations (Nadiminti et al. 2006). One of the differences between Australia's implementation of the EHR system compared to the other two countries is that Australia uses multiple repositories to store its data. This provides greater administrative flexibility in terms of managing multiple essential services. One of the greatest threats that a distributed system faces is a distributed denial of service.

Policy and Practices

One of the key reasons why care.data had failed relative to the other EHR systems is because it had failed to obtain its social license. Social license can be described as the expectations of society that exceeds the legal requirements and regulations. One research notes that care.data had failed to obtain the social license in three areas: erosion of public trust in care.data, disruption of the traditional role of a GP and the public's doubts on whether the care.data system can be a public good (Carter et al. 2015). The erosion of trust can be attributed to the legislation that were passed to circumvent the data protection laws. Table 3 summarises the Secondary Use of Patient Data.

Table 3: Secondary Use of Patient Data

	Denmark	England	Australia
Programme	DAMD and Danish National Patient Registry	Care.data	MHR
Use of patient data for research	DAMD abandoned in 2014 but Danish National Patient Registry still operates	Care.data was abandoned in 2016	Yes

Australia's MHR has a similar structure for the secondary use of its data to care.data and therefore faces similar challenges. To address the first challenge on trust as well as to show that this system will be used for the good of the public, MHR has vowed to not sell the data or provide the data to the insurance companies but they can still provide pharmaceutical companies with the data provided that they can show that they will use the data for good. Care.data had promised the same assurances, but the new legislations allowed care.data to still sell the data to these companies.

Sundhed.dk did not face this challenge because they do not permit the secondary use of its data. As a result, a survey of a group of Sundhed.dk users had found that most of the participants had expressed positive attitudes towards the use of this service and half the participants could see the benefits of combining data from various sources (Karampela et al. 2018).

Furthermore, Anderson has defined nine principles in his research that will lead to a more effective privacy policy (Anderson 1996). For the most part, all three countries have policies in place that are compliant to these principles. For example, these countries maintain an access control list and has a responsible officer in charge of maintaining this access control list. However, these countries do not satisfy the principle that requires people who have access to the health data of many people, to be added to their access control list. This is more of an issue in larger healthcare organisations such as hospitals. Typically, in a hospital, there will be large number of staff members that can access an even larger number of patients. This is magnified when all the data is connected in a network. In Australia, the MHR system only allows for the access controls to be placed on healthcare providers who have already accessed the record. In Denmark, all healthcare providers by default have access to all patients' data. For SCR, there is no access control list a that a patient can easily configure. However, patients can visit their GPs and choose to seal their data in a sealed envelope and dictate who can have access the sealed envelope. Although these countries have a role-based access controls in place, they fail to place healthcare providers in a patient-controlled access control list before the healthcare provider has accessed the data.

Human Factors

One study has identified that one of the principal sources of privacy breach is the inappropriate disclosure of data where the data has been exported from an organisation without authorisation (Neame 2014). In England, an incident in 2009 occurred where one GP downloaded a complete patient database, including the medical histories of 10,000 people, on to an unsecured laptop (Savage 2009). This laptop was then stolen and never retrieved. Incidents like this have also occurred in Denmark and Australia. Cyber security training and awareness is required to reduce incidents like these.

All three countries have awareness programs in place. England is the only country to provide tailored cyber security training programs based on the role of the user. This is achieved through strategic partnership with organisations that provide cyber security services. Australia also provides learning modules online to its users in the area of privacy and security, but the module is only aimed at clinicians such as the GP and nurses, not other staff members such as the management team of the larger healthcare organisations. With this combined with the fact that only a third of the healthcare organisations implement cybersecurity awareness and training, 55% of Health Sector data breaches in Australia has occurred due to human error compared to the average of 35% across all other sectors (Office of the Australian Information Commissioner 2019). Denmark does not provide any direct cybersecurity training and as a result unsafe practices can be found in clinics such as sharing passwords with other staff members.

In terms of the opt in/out models used, all three countries have used different approaches and therefore yielded different results from it as displayed in Table 4. The mandatory approach that Denmark took, has contributed to the high monthly users. It can be argued that this mandatory approach was successful due to the transparency in its legislation on data protection. The summary care record and the care.data programme were both initially mandatory, but due to the inadequacy of the legislation and regulation, the public pressure forced NHS England to adopt an opt out model. Australia started with opt-in model that lets individuals decide on whether they want to participate or not. This model will give individuals greater control over their personal information. However, this also poses a challenge to register the critical mass of the population. In the first two years, there were under 400,000 individuals registered to the MHR compared to the 22 million people after the opt-out model was used (McLoughlin, Garrety and Wilson 2017).

Table 4: Opt in/out method used by each country and its respective number of patients registered to the service.

	Denmark	England	Australia
Opt in/out	Mandatory	Opt-out	Opt-out
Number of Patients Registered	Total Population (5.8 million)	96% of population (55 million)	90.1% of Population (22 million)

Limitations

This paper was restricted to the data only available from public sources that are in English. There were documents published in Denmark that may have provided meaningful insights but were not included in this paper as it was written in Danish. Furthermore, the healthcare sector is constantly evolving in terms of both technology and legislation. For example, NHS England are rolling out new strategy that will enable patients to view their own data through a portal like Denmark and Australia (NHS England 2019). As these are proposed projects, they are not included in this research.

This paper only examined the security measures in place for Denmark, England and Australia. However, there are many more countries that have implemented their EHR systems with varying levels of success. Further research is needed to examine the security measures adopted in these countries and its relative success in protecting the patients' data.

Conclusion

All three countries utilise secure technologies such as PKI and multifactor authentication to ensure that the EHR systems can protect the patient's data. However, from the results, it is apparent that strong policies and practices as well as cyber security awareness and training are equally important to keep the patient's data protected. Weak policies and practices allowed government entities in England to sell patient data to insurance companies without their consent. The lack of cyber security awareness and skill has also contributed to higher rates of data breaches.

At the core of a successful implementation of a shared EHR system is the trust and support of its users. Whether it is a mandatory, opt-out or opt-in model, if there is no trust in the system, people will opt out or force the abandonment of the project like what happened to care.data. To combat against this, it is vital that governments provide greater importance in the development of security policies and human factors to strengthen its cyber security measures. These policies should not contain ambiguity on the right of access or ownership of patient data. Providing more tailored cyber security awareness programs to both organisations and the end users can promote safer security practices. Adopting these approaches can in turn help build the trust from its users and contribute to the success of a shared EHR system.

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Black-Market Exchange in a Digital Era

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Abstract

The paper addresses dilemmas arising in the context of black-market operations in a digital economy. Some of the inherent properties of the World Wide Web, such as the relative anonymity, IP and connection masking, and the asynchronous character of interactions may, in some cases, stimulate and support the development of nefarious uses of digital systems, resulting in a rise of black-market economy. The aim of this study was to present the nature of black-market operations along with some of the most important regularities associated with this form of illicit activity in economies based on digital networks. The findings provide insight into some of the reasons for the rapid growth of black-market operations in the global networking system, including: extremely low reproduction cost of virtual commodities, continued development of connection masking techniques, the rise of cryptocurrencies, and wide dispersion of both supply and demand.

Keywords: Black-Market, Internet, Network Economy.

Introduction

Black market typically bears close associations with criminal actions, organized crime, exchange of stolen property or, in a more general approach, with any type of unlawful or illegal operation deemed as indictable offence and prosecuted ex officio by formally authorized services of the state. However, the term 'black market' is also often invoked in association with the shadow economy. For this reason, it may be advisable to start off with a proper differentiation of the two notions, to ensure a clear and non-ambiguous definition of both the subject and the main objective of this study.

Based on the well-established definition, black market operations are those where income is generated from transactions deemed illegal and made in violation of the adopted institutional norms of market conduct. In other words, if public trade in some commodity is expressly forbidden by the law, then any operation involving exchange of such commodity will be identified as a black-market operation, and persons involved in such an exchange will be recognized as criminals (Feige 1989). In contrast to the above, the shadow economy (or grey economy) represents operations which are legal from a formal standpoint, but made outside the legal taxation framework or otherwise unrecognized by regulators as a taxable exchange (Williams 2005).

The term 'black market' is only one of the many expressions evoked in relation to the phenomenon under study. Professional literature provides examples of related terminology, including: underground economy, clandestine market, and illegal economy. However, all of these terms seem to place focus on the statutory regulations that define the scope of trade considered as legal.

The introduction of the World Wide Web and virtual networks has made a considerable impact on both the volume and the development potential of illegal (black market) trade. One of the earliest and most fundamental commodities exchanged over virtual networks was the unauthorised distribution of digital content (file-sharing), and the rise of this segment was largely stimulated by the lack of methods for effective regulation of this type of exchange. For this reason, the aim of this study was to present the nature of black market and to describe some of the regularities observed with regard to its operation in economies based on digital networks.

Black market valuation of prices

The theory of black-market operation has evolved over the years. The earliest economic evaluations of this concept date back to the era of the US prohibition in the 1920s and 1930s. The modern shape of the concept was solidified in the two decades following the end of World War II. At the time, the axis of the dispute between economists involved in the formulation of the black-market theory revolved around the notion of pricing. Some experts, such as Bronfenbrenner, approached black markets in much the same manner they did any other type of market failure, where black market prices are related solely to the level of formal state regulations (Bronfenbrenner 1947; Plumptre 1947). Others suggested that a black-market price would always be in excess of the market price or the state-regulated price (Boulding 1947). Ultimately, it was generally agreed that supply, in this case, cannot be reduced to a linear function related solely to the officially regulated price and that it need to be closely correlated to the demand. As expressed by Gönensay: "it is inappropriate to represent black market demand as a fixed curve determining a different black-market price for each quantity supplied in that market. In a situation with a given total output, the black-market price changes only if the *slope* of the black-market demand curve changes with different allocations of the total quantity between the official market and the black market" (1966).

A black-market exchange, just like any other form of exchange, is established on three elements: demand, supply, and price. The demand side is represented by economic entities interested in a purchase of goods or services, while the supply side constitutes producers and suppliers of such goods or services. The most important difference between legal and illegal markets can be observed in relation to the pricing process. Prices on black markets may be: below the market price, in excess of the market price, or in excess of the regulated price.

The first scenario is typically observed in relation to such phenomena as fencing of goods and sale of substandard quality merchandise. Here, the black-market price will be markedly lower than that of similar products offered on regular markets, as the goods on offer are often obtained in an illicit fashion or produced illegally to pass for original brands. In this context, some studies emphasize the effects of information asymmetry observed between the buyer and the seller in this type of black-market exchange (Feige 1989). This view bears a suggestion that the seller is aware of the illicit origin of the merchandise on offer, while the buyer is largely oblivious to the fact. This argument, however, cannot be defended. Both parties are equally aware of the illegal character of the exchange, as this suggestion is potently communicated by the difference in price. While buyers are obviously unable to verify the illicit origin of such merchandise, they have all the reasons to come to such an assumption.

Another scenario can be observed when black market prices are in excess of regular market prices. This typically applies to goods and services formally declared as illegal (narcotics, prostitution, human trafficking, etc.) or those with formal access restrictions (prescription drugs, firearms, etc.). Obviously, it may be difficult to make a rational valuation of market price for goods and services expressly prohibited by law. For this reason, professional analyses are often made with reference to substitution prices and assumed relative homogeneity with products offered on legal markets (Feige 1989). In the case of narcotic substances, substitution price will reference legal pharmaceutical products of similar effect and composition; for illegal services such as prostitution, black market valuation can be related to prices registered on foreign markets, i.e. in those economies that tolerate this form of gainful activity. For cases involving human trafficking, price valuation is typically established on the basis of alternative costs. While the cost of human life escapes valuation, it is possible to measure the cost of lost opportunity. Thus, it may be stated that product/service valuation in this case is akin to that employed on the insurance market.

Black market pricing in excess of the relative market prices is the effect of the restricted or prohibited access to specific goods or services. Thus, the demand for such products or services is clearly in excess of the formally regulated supply. Therefore, customers are more inclined to pay a higher price to satisfy their demand. This is one of the crowning arguments on the part of proponents for the legalization of drugs and prostitution. It is assumed that legalization of such products and services would lead to effective reduction of prices and offer improved control and regulation to formally appointed services

(regulatory bodies, state treasury, etc.). However, product regulations as such may also stimulate the development of black markets. The underground market of prescription drugs is good evidence of this scenario. In Poland, black market exchanges in this segment are common for foreign medications which are not yet legally approved by the national pharmaceutical regulator. Illegal trade includes, among others, to weight-control drugs and psychoactive drugs (Brzozowska 2017).

Black market exchanges can also be stimulated by the introduction of goods offered at regulated prices. This applies mainly to products sold at maximum prices, i.e. well below the equilibrium price. This type of regulation results in market shortage, as demand is clearly in excess of supply. In Poland, such scenarios were registered in the times of centrally planned economy, and mostly associated with black market exchanges of food products and foreign currencies (Kochanowski 2010).

The nature of the network economy

The notion of network economy is typically evoked to describe the sum of interactions between economic entities held over the Internet. Although practical applications involve a great variety of other types of IT-supported communication networks, the World Wide Web (Internet) is clearly dominant. The notion of network as such is not a novel addition. According to Giddens, networks have been the staple of social systems for centuries, and their transition has only been stimulated and propagated by the technological development (2012). A network is a structure described by three fundamental properties: flexibility, scalability, and vitality. These, according to Castells, determine the existence of a network society (2013).

Network flexibility describes its ability to adjust to changes in external environment. For example, if a social networking gains recognition, the increased demand may not necessarily involve the development of a single node, as the task may be dispersed over multiple nodes (servers, information processing centres, etc.). This property allows to eliminate many obstacles, such as network congestion. Flexibility can also be analysed in relation to another network property, namely: scalability. This term represents the network ability to adjust its size (by adding new nodes or by redirecting traffic to the existing ones) without any disturbance in network operation. These two properties provide the network with the attribute of vitality, i.e. the ability to sustain its operation even when some of the nodes are removed from the grid, by making use of another network property, namely – their decentralized structure (Castells 2013).

Another characteristic property of networks is the asynchronous nature of interactions, which provides those types of structures with capability to synchronize activities of economic entities without the limits or constraints of time and space. This phenomenon forms the basis for the operating potential of 'markets that never sleep', as the asynchronous nature of interactions is capable of supporting exchanges made between any number of currently active network nodes, irrespective of their physical location (or time zone, for that matter). The notion is also closely related to the capacity for servicing time-delayed interactions (Brol, Czetwertynski 2013). For instance, offers for commodity exchanges can be responded to and serviced at any time, even outside the working hours. It this fashion, trade contracts can be entered to and negotiated at any such time that suits all the parties involved in such exchange.

In addition, the asynchronous nature of network interactions has the effect of eliminating some of the natural barriers to market entry observed on traditional markets. Since offers of supply can be made from any place in the world, they are free from the constraints of local trade regulations (this statement also holds true for the purchasing party). This effect is widely exploited by online distributors registered in countries characterized by lenient approach to intellectual property rights. Networks are not only capable of limiting the effects of the existing legislative barriers, but also of reducing barriers associated with financial position or social status. The former includes cost limitations offered by e-commerce, such as limitation or outright elimination of warehousing facilities or cutting the cost of office space. E-commerce companies can be managed from any place (such as a shared office, or an apartment), and providers of such services are not in any way constrained by the traditional model of retail outlets kept in suitable and attractive (and thus expensive) locations. In effect, e-commerce activities can be

undertaken by persons who – due to their social, financial or educational status – are typically excluded from more traditional forms of economic pursuit. This can also be related to another common phenomenon, namely: conduct of economic activities outside the framework of the formal company registration, although the scale of such practices escapes easy assessment.

Since networks offer the prospect of conducing economic activities without proper registration, on illegal markets, and/or with reference to illegal commodities, it may be assumed that the asynchronous character of network interaction is one of the key determinants in the development of grey and black markets observed in this particular segment. And the sole obstacle to their otherwise unconstrained development is the requirement of dispatching the physical commodities to the buying party. However, even this barrier can be eliminated if the trade applies to illegal copies of digital content, i.e. audio, video and image files, and computer software. One of the newest additions to this list is the STL format of files used to store models for 3D printing. Such models can be reproduced by purchasers in the comfort of their home, mostly from resin, but also from other materials.

Another important barrier to uncontrolled development of black markets is the requirement of transaction settlement. While barriers to trade are negligible in the context of demand and supply fluctuations, transaction settlements must be regulated directly (in cash) or via bank transfer. With regard to the former, physical distance is the main barrier to trade. For the latter, the most important barrier is the ease of tracking and blocking any such order.

Black Markets in a Network Economy

The most fundamental attribute of any type of illegal transaction is the clandestine character of the process – a natural consequence of the fact that they are penalized by law. If such a transaction is revealed, its participants will be pursued by law and tried before proper authorities. For this reason, access to black markets was, from a historical perspective, considerably restricted, and populated largely by intermediaries offering access to illegal products and services (dealers, money-changers, fences, profiteers). In a network economy, this barrier can largely be limited through the use of basic and advanced transaction masking technologies.

While it is easy to refute the popular misconception that the Internet is a warranty of anonymity, some of the recent technological developments already provide support for relatively secure and clandestine communication between users. The most popular solutions in this context involve the use of: public WiFi, proxy servers, the Deep Web (TOR), and VPN services.

The most basic method of access is the use of public wireless networking (WiFi) on offer by municipalities, hotels, restaurants, in trains, etc. These have largely replaced the previously popular services of Internet cafés, which offered per-hour access to the Internet from desktop computers in a dedicated café space. Rapid development of WiFi services has effectively brought an end to this type of service. The attribute of ‘public’ in relation to the Internet access does not necessarily warrant the effective elimination of barriers to access (in the form of passwords or permissions from the owner of such routing service). However, if no such barriers are present, these forms of access to the Internet retain some degree of anonymity, but surely not enough to make them untraceable. On the one hand, users connecting to the network with the purpose of involving in illegal transactions will only leave a trace in the form of their IP address (the Internet Protocol address is a unique numerical sequence assigned to each individual device connected to the Internet). On the other hand, their connections are recorded at login, including the identification number of the device used to access the service (computer, smartphone), the time and duration of their connection, and their approximate geographic location. These bits of information, in tandem with the ubiquitous monitoring and CCTV services (municipal, industrial) are often sufficient enough to ensure effective identification of persons involved in illegal operations. In addition, connections via public networks are typically time-constrained (typically requiring users to resend their login information to the network after 60 minutes) and with poor throughput.

Another solution is the use of proxy servers. These serve as intermediaries for requests passed by users to Internet services, allowing for effective masking of the sender's IP address. Proxy services come in the form of paid subscriptions or gratuitous support (the latter are usually offered at reduced throughput speeds). Paid services are usually more effective in ensuring relative anonymity of their users. Other factors may also play a role in this process, such as the place of company registration, as some national legislations are more supportive in providing user details in response to claims issued by third parties.

The Onion Router (TOR) is a more comprehensive solution designed to offer access to the Deep Web. TOR is not a service (in the sense represented by proxy server functionality) but an entire network localized within the existing Internet structure. This solution prevents authorized services from accessing and analysing network traffic data (a scenario not that unlikely in the case of intermediation services). The TOR network utilizes multilayer encryption and relay techniques (the name is a reference to encryption layers arranged in an onion-skin fashion). Since TOR is a network, it offers anonymity not only to individual users, but also to entire servers, which allows for setting up permanent black-market servers with restricted third-party access. This makes the Deep Web a perfect location for all manner of clandestine platforms to support exchange of such commodities as arms and weapons, drugs, digital content, etc. The TOR network is not impermeable, but the tracing procedures involved are quite complex and can only be used to locate servers, with no capacity to identify and track individual users (Murdoch, Danezis 2006).

Another approach is to mask the data traffic through the use of virtual tunnelling techniques between the existing Internet nodes. The functionality of Virtual Private Network (VPN) services provides methods for tunnelling data traffic into concealed streams to make an impression of a direct and non-intermediated connection between two physical machines in a network. If such solutions are additionally equipped with basic cryptographic techniques, the content of such streams is completely resistant to external capture. The authorities may, however, block the access to VPN servers, as clearly evidenced by the Chinese Golden Shield Project of mass surveillance (Wei Chun Chew 2018).

One of the most important consequences of the relative user anonymity in networks is the decrease in transparency. This, in turn, stimulates the development of black-market transactions. Virtual commodities are particularly susceptible to this form of misappropriation. With reproduction cost reduced to zero, the modern masking and anonymization techniques allow for unrestrained exchange of all types of digital content, from films and audio files, through e-books and other digitized publications, up to .STL files. Aside from the more straightforward forms of piracy or intellectual property theft (Czetwertynski 2017), such exchange may also include illegal content, such as child pornography, weaponry designs, DIY instructions for home production of explosives and psychoactive substances, and so on.

In addition, as already noted, some of the TOR functionalities allow for effective design and operation of permanent networking platforms of support for global exchange of black-market commodities. These, in association with the existing cryptocurrency solutions, offer unrestrained access to global transactions and exchanges which are completely under the radar of any relevant authorities. The only practical obstacle to this trade can be observed with regard to the shipment phase (naturally, this applies only to physical goods). Tracking of transport, deployment or reception of such goods is the sole method available to the authorities willing to capture the transaction.

The volume of Black-Market Exchanges in a Network Economy

For obvious reasons, total volume of black-market transactions is difficult to assess in practice. After all, each and every participant of such exchanges wants to remain anonymous. In addition, the authorities' potential for effective tracking of financial transfers is fairly limited. Hence, the bulk of data available for this segment is produced from forecasts based on anonymous surveys or from extrapolation of police and surveillance reports.

The majority of data available on black market transaction applies to the illegal trade in virtual commodities. The BSA Global Software Survey report is by far the most often quoted source of

information on this segment. The latest edition of the report was based on 22.5 thousand survey responses from 32 countries. The survey findings are employed to calculate estimations of both the volume and the value of unlicensed software installed on personal computers across economies. For Poland, the indices for 2017 suggest that 46% of software installations were unlicensed, and represented an estimated value of 415 million USD. In comparison, the index for the entire EU area was 26% (to a total estimated value of 10.5 billion USD. Thus, it may safely be assumed that only one in every two copies of software installed in Poland comes from a legal source. However, a noticeable decrease of this trend can be observed in the long perspective, as evidenced by the following regression of the index for Poland: 48% in the year 2015, 51% in 2013, and 53% in 2011, and valued at an estimated 447, 563, and 618 million USD, respectively (BSA 2018). Similar trends can be observed for the entire EU area and for each of the countries included in the survey. The main reason for this development is sought in the wide proliferation of software installations based on cloud distribution, i.e. installed and operated in a virtual space controlled by the software provider. This solution allows for effective elimination of the problem of unlicensed use, as each software session requires direct permission from the supplier.

A slightly different scenario can be observed on the black market of illegal psychoactive substances, commonly referred to as drugs. According to a report by the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), the asynchronous character of network interactions stimulates the development of the following effects: increased organizational and technological complexity of criminal groups; cooperation, coordination and trade specialization between groups; globalization and development of new technologies improving the pace of changes in drug supply, expansion to new (i.e. geographically distant) markets (2016).

Cannabis is by far the most popularly used psychoactive drug offered on the black market in Europe, with a 38% share in the drugs category, and an estimated value of between 8.4 and 12.9 billion EUR. Bracket values are used to signify that the estimates are based on extrapolation of data obtained from police reports. The remaining drugs (in the order of demand) sold on the European black markets are: heroin (28% share in the segment, to an estimated value of 6.8 billion EUR), cocaine (24%, 5.7 billion EUR), amphetamine (8%, 1.8 billion EUR). There is also a notable increasing trend observed on the market, in the form of new 'designer drugs', also referred to as 'legal highs'. In 2015, ca. 100 such substances were identified on the market, with more than 560 identified in 2017 (EMCDDA 2016).

In the case of illegal drugs, economy networking processes seem to stimulate the development of black markets. With regard to cannabis, black market transactions via the Internet are no longer limited to illegal supply of the finished product, as this form of distribution has already expanded to cover other related products or by-products, including a wide assortment of hemp seeds for home-growing purposes. In addition, the network-facilitated ease of access to expert information on methods of hemp cultivation and processing has resulted in a dramatic increase of local production of the drug. Similar effects can be observed in relation to amphetamine production, since the availability of information (coupled with modern technological possibilities) makes it possible to synthesize the drug at home, and from easily accessible by-products.

Other factors – but also clearly associated with the digitalization of economies – can be identified in the context of the observed increase in illegal supply of heroin and cocaine. According to the EMCDDA, the notable increase in drug shipment impound reports, coupled with a similar increase of large impounds (upwards of 100 kg of product) and the fact that such seizures have no observable effect on the markets, can be seen as evidence of the persistent saturation of drug supply. The use of the Internet in this case may focus on providing close coordination of activities between criminal groups, particularly those associated with tracking and protection of shipments, resulting in impressive logistic improvements and, consequently, leading to a rapid increase of drug traffic. Despite these efforts, transport of the physical product remains the most prominent barrier to the development of drug trade.

Another important phenomenon to facilitate the development of black markets in networked economies is the gradual replacement of national currencies by modern cryptocurrencies. Main properties of cryptocurrencies include dispersion and encryption of bookkeeping records and the virtual character of

this particular pecuniary instrument. Modern cryptocurrency solutions are organized around nodes (wallets); each of these can only be fully accessed by a single user – holder of a unique, encrypted key (Nakamoto 2009). In effect, the user has full control over its content, just as they do with respect to cash resources held in a regular wallet. Each transaction held within a cryptocurrency system (and there are many, with at least a dozen representing significant market capitalization) is registered by means of internal algorithms and securely stored in the respective nodes. In theory, this mechanism offers potential for tracking individual financial transaction. In practical applications, such a scenario is highly unlikely, due to the decentralized and global character of cryptocurrency systems. This fact alone makes the instrument an ideal choice for settling illegal transactions on black markets.

However, there is a notable lack of hard data available to directly confirm the above observations. All we have at our disposal is traces and hints of present developments, raised, among others, in a report by the European Union Intellectual Property Office (EUIPO), of "activities based on modern coding technologies, such as TOR and the virtual Bitcoin currency, employed for criminal misuse of intellectual property for gainful purposes and in concealment from the authorities" (2017). The present capitalization of the global market of cryptocurrencies is estimated in the range of 830 billion USD, and is assumed to reach the threshold of 1 trillion USD by the end of 2018 (Comparic.pl 2018). Thus, assuming that only 1% of transactions conducted and settled by means of cryptocurrency instruments represent traces of black-market operations, their total value will still be in the vicinity of 10 billion USD.

Conclusions

Summing up the above considerations, it must be remembered that black market operation can only proceed in the context of largely reduced transparency or the lack of it. The assumed relative anonymity of Internet users is the main stimulus for the development of non-transparent procedures and expansion of black-market activities in modern networked economies. This development is also facilitated by the marginal or negligible cost of reproduction (in the case of virtual commodities). Modern masking technologies offer the prospect of 'concealing' the activities of not only individual users, but also entire servers as potential platforms for global black-market exchanges.

For these reasons, it becomes increasingly more difficult to ensure effective identification and control of such forms of exchange by the respective authorities and services of the state. Similarly, these types of markets are naturally devoid of basic protection against fraud (no transaction guarantees can be offered) and offer no safeguards against proliferation of socially undesirable commodities. Moreover, the considerable fragmentation of supply (particularly in relation to virtual commodities) hampers the potential to track and penalize each and every transaction made. The deterioration of the regulator role on black markets can also be attributed to the decentralized nature of the Internet and to the fact that these types of activities often surpass the limits of national jurisdictions, to the effect of hampering investigation and penalization procedures.

The emergence of cryptocurrencies also seems to clearly favour the effective development of digital black markets.

Virtual currencies of tangible pecuniary value are an ideal solution for the support of illegal trade. Since these forms of pecuniary instruments are issued outside the existing system of public monetary institutions, no formal control from state authorities can be established over such a resource.

Consequently, the bulk of policing interventions and investigations is focused on effective capture of physical shipments of black-market commodities. In other words, police operations seem to emphasize seizures of mass transports of high value merchandize, such as drugs and weapons. However, the criminal world is quite apt in adopting the wealth of new technologies to eliminate even this weak link in their operations. According to many experts specializing in drones (unmanned aerial vehicles – UAV), modern aerial devices may already serve to transport packages of several dozen grams over large distances, including border crossings and checkpoints. In fact, these methods are already employed in practice by criminal groups (Gazeta Prawna 2016). Making use of flight route automation

and destination programming capabilities offered by most devices of this type, the sole risk for perpetrators is the potential loss of a drone. While drones can only be used to shop small quantities of products, they are inexpensive and their movement is automated and unrestrained. These attributes make them perfect for making repeated flights over short distances, resulting in a fairly effective accumulation of the total value shipped in this manner.

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Employability skills for Fresh Graduates from the Perspective of Malaysian Employers

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Abstract

Industrial revolution 4.0 (IR4) has quickly shifted the skill sets required in the workplace and employability skills are the elements employers demand from the fresh graduates. Given this shift in skill sets, it is important to determine whether employability skills will affect the recruitment-base decisions of employers with respect to fresh graduates. The focus towards employability skills in this study was directed towards information competencies, system competencies and technology competencies which were adopted and modified from the SCANS (1991) model. The population of this study is the person in charge who make decision in recruitment, which are employers in Malaysia. Member of Malaysian Employers Federation (MEF) are invited to be the respondents and this research paper is specifically focusing on manufacturing sector employers. A self-administered questionnaire was employed as the data collection instrument, also adopting a purposive sampling method to collect and analyse the data and hypotheses were formulated and tested in order to achieve the aim of the study. The findings of this study demonstrated that employability skills have a significant positive relationship on recruitment-based decisions, implicating that manufacturing employers need to assess the employability skills of fresh new graduates when making recruitment-based decisions. The results of the descriptive analysis also demonstrated that all three specific employability skills were essential in the context of fresh new graduates as well based on the views and opinions of manufacturing employers. Additionally, technology competencies were perceived as the main employability skill that employers seek when recruiting fresh new graduates.

Keywords: Industrial Revolution 4.0, Employability Skills, Recruitment Decision

Introduction

Industrial Revolution 4.0

Industrial revolution 4.0 (IR4) has rapidly advanced on a global scale to many countries, including Malaysia causing wide-ranging disruption to labour markets (World Economic Forum, 2016). Most professional occupations, as a result, are undergoing transformation through the adjustment of many industries (World Economic Forum, 2016) where many jobs are now becoming vulnerable to this change due to replication and the need to transform the necessary skill sets. It is estimated that due to IR4 together with other demographic and socio-economic changes occurring simultaneously, this will cause a loss of more than 5 million jobs in 15 major developed and emerging economies (Cann, 2016).

The World Economic Forum (2016) has reported the net employment outlook based on job families between 2015 and 2020 in Mexico, India, Australia, China, Germany, the United Kingdom (UK), Brazil, Italy, Japan, South Africa, the Association of Southeast Asian Nations (ASEAN) – including Malaysia, the Gulf Cooperation Council (GCC), Turkey, France and the United States (US). There are

2 million total gain of jobs in few smaller job families and 7.1 million total loss of jobs where two thirds sources from the Office and Administrative job family (World Economic Forum, 2016).

Nevertheless, given the exponential vastness of the digital age has yielded unfamiliar technologies, there is a need to anticipate and prepare for the need to gain new skills and acquire new knowledge (Ministry of Higher Education Malaysia, 2018). Specifically, the employability skills that are required for the workplace will undoubtedly transform, given the penetration of the IR4 in society. Sani (2017) mentioned that the problem of Malaysia is surrounding the shortage of skills that new jobs will demand. Thus, graduates in Malaysia will need to quickly adapt and acquire digital-focused skills which will help to identify future marketability (Ministry of Higher Education Malaysia, 2018).

Manufacturing Sector in Malaysia

Manufacturing sectors play an essential role in transforming Malaysia into an industrialised nation and as a major player in the global value chain. The Malaysian manufacturing industry is one of the most important and influential economic sectors that contributes to the nation's GDP (Department of Statistics Malaysia, 2019b) and according to Ministry of International Trade and Industry (2018) its growth has led to attract investments, create business opportunities in the related services sectors and downstream activities as well as stimulate jobs. According to the Department of Statistics Malaysia (2019), in the third quarter of 2019, the manufacturing sector comprised of around 2.286 million jobs, contributing to 26.42% of total jobs in Malaysia. Further, the expectation within the industry is to leverage the high proportion of jobs in the labour market. As such, this study focuses on the manufacturing sector in the context of Malaysia.

According to the Industry4WRD framework, in order to realise Malaysia's vision for the manufacturing sector to embrace IR4, one of the national goals relates to the growth of labour productivity and the shift factor is belong to people (Ministry of International Trade and Industry, 2018). Additionally, the enablers that determine the strategies for producing future talent fall under the category of skills and talent. This strategy requires that students are equipped with the needed skillsets to work in the industry 4.0 environment to ensure the availability of future talent. Notably, one of the strategic outcomes is to equip graduates with relevant and practical industry 4.0 skills.

Therefore, based on the above discussion, fresh Malaysian graduates are encouraged to equip themselves with employability skills to meet future demands. Indeed, this will also assist and support the recruitment needs and decisions of Malaysian manufacturing employers under IR4. Thus, this study aims to measure the relationship between employability skills and recruitment decisions. If employability skills result in a positive outcome regarding employment, the expectation of employers is equally important since they are ones making the recruitment decision. Then, the employability skill (s) that Malaysian employers perceive to be the criteria in making recruitment decision towards fresh graduates is also important to be identified.

Literature Review

Employability Skills

In order to remain competitive, graduates must cater to changes in the emerging workplace, as mentioned by Malaysia's Deputy Minister of International Trade and Industry (The Star Online, 2019). Thus, contemporary employability skills are essential in preparing fresh graduates for IR4.

Employability skills can be defined as skills required to acquire, retain and perform well in a job (Robinson, 2000). Although in this context, employability skills are not specific to a job in general but cut across all job levels within both industries and business (G. K. G. Singh & Singh, 2008). Many researchers have named employability skills like soft skills, generic skills, transferable skills, non-technical skills, necessary skills and core skills (Singh et al., 2013; Ncver, 2003). Further, employability skills are instilled in each individual to produce a productive workforce (Kazilan et al., 2009) since

these are the skills that most people need in performing almost any job (UKCES, 2009). Different counties named employability skills with different terms. For instance, the US names employability skills as necessary skills, Workplace know-how and basic skills, while the UK names it as Common skills, Core skills and Key skills (Wibrow, 2011). Additionally, Canada uses the term employability skills, while France names it as transferable skills (Alrifai & Raju, 2019).

Nevertheless, the most cited employability skills set is sourced from SCANS (1991) which consists of information skills, thinking skills, interpersonal skills, basic skills, system and technology skills, resources skills, and personal quality (Husain et al., 2010). In this research paper, only three competencies are referred to from SCANS (1991) which are information competencies, system competencies and technology competencies due to their relevancy to IR4. This is also supported by Agolla (2016) where education for smart manufacturing and the evolution of IR4 is defined as technology literacy, information literacy, etc., which implicate the relevancy of the competencies mentioned above regarding IR4.

Information Competencies

The function and role played by of information competencies are to gain and apply information in which the elements of information competencies are acquires and evaluates information, organizes and maintains information, interprets and communicates information, and uses computers to process information (SCANS, 1991). Due to IR4, skills acquired to analyse data are anticipated in the workforce as new skills (Aulbur et al., 2016). In the report, the ability to work with data is important and comprises of the ability to process and analyse machine-generated data and information, basic statistical knowledge, and understanding visual data output in making well-informed decisions. This statement is also demonstrated by IR4, which requires expertise to work especially with information from both production and skilled managerial labor (Grzybowska & Łupicka, 2017).

Additionally, not only the emergence of new skills makes information competencies to be important, the CEO of Hays Recruitment mentioned that there are an increase in the number of data-related roles due to the growth of digital information accelerated via the internet (Hays, 2018). As such, this further increases the importance of acquiring information competencies. According to the CEO of Hays, business data without insights adds no value whatsoever. Hence, with the aid of professionals in transforming zeros and ones into feasible insights, new opportunities are generated which are yet to be discovered by human eyes. Hence, it is anticipated that information competencies are one of the employability skills that employers seek when recruiting fresh graduates. Also, due to the need to develop human capital having adequate digital and data literacy in IR4, students from different disciplines will be required to become more literate in the field of data and digital (Haseeb, 2018).

System Competencies

Not to mention, according to SCANS (1991), system competencies can be described as the ability to understand complex inter-relations and elements to understands systems, monitors and corrects performance, and improves and designs systems. According to Aulbur et al. (2016), system skills and cognitive abilities will become more prominent in a vast proportion of jobs rather than simply having physical abilities as key work-related skill sets. The report also describes system skills as one of the subcategories of key work-related skills which incorporate several elements: judgement and decision making, and system analysis. This skill category is recognised as one of the topmost skills relating to three skills expected to in high demand in future and will persist among key work-related skills. Notably, this is because IR4 signifies the growth of digitalisation in the value chain and the emerging interrelationship of objects, people and systems via the exchange of real-time data (Grzybowska & Łupicka, 2017).

According to Rasul & Puvanasvaran (2009), system skills are considered essential for employers from within the manufacturing industry in Malaysia. In future, challenging jobs which are monotonous and ergonomically hazardous will be reduced substantially (Aulbur et al., 2016). This will invariably lead

employees to share jobs with intelligent robots, although skilled employees will continue to make the final decisions, while the artificially intelligent assistant systems will support the work. Aulbur et al. (2016) mentioned that teamwork would be pivotal, not only across horizontal and vertical levels but also with assistant systems at the actual workplace.

Moreover, teamwork with the assistant systems will increase the demand for system-based competencies as employability skills that employers seek when hiring fresh graduates. In addition, the advantage of such systems as mentioned by Aulbur et al. (2016) is where the assembly system is controlled by the remote server autonomously in auto-equipment manufacturers (OEM) and will consequently benefit the company in removing human error, leading workers to choose the correct parts based on the car model. This advantage will further boost the application of system in companies and causes the importance of system competencies in employees to be risen.

Technology Competencies

The tools, technologies and machines utilised will also differ from conventional types due to a higher level of automation and interconnectivity within the manufacturing process via IR4 (Aulbur et al., 2016). Consequently, for every industrial revolution that occurs, the skills required will likewise change, and therefore HEIs must equip graduates to handle new technologies (Mustafa, 2018). In other words, technology competencies will be the competencies that employers seek in future. Technology competencies can be defined as the ability to perform with different types of technologies, in which the elements are selects technology, applies technology to task, and maintains and troubleshoots technology (SCANS, 1991).

Similarly, businesses will continually seek those individuals who can apply artificial intelligence (AI) technology in a consumer context such as AI developers (Hays, 2018) which reflect the requirement of technology competencies in the workplace. This is supported by Aulbur et al. (2016), in which skills in the field of information technology (IT) will be expected in the workforce as new skills given the advent of IR4. One of the sections in their report listed that knowledge about information, communications and technology (ICT) is important in IR4 which includes the knowledge of basic IT aspects and having the ability to employ and interact with smart machines and computers such as robots and tablets and understanding machine to machine communication. In Malaysia, employers with the manufacturing industry also consider technology skills to be important (Rasul & Puvanasvaran, 2009). As mentioned above, IR4 will result in intensifying the application of automation and robotics since these robots are able to function with higher accuracy and more efficiently compared to humans (Aulbur et al., 2016). As such, technology competencies will increasingly be emphasised by employers during the recruitment process.

Recruitment Decision

Before making recruitment decision, employers will take the candidates related information to form the impression towards the candidates. After that, the impression formed by the employer will be compared with the company's requirement for employees before a decision is made to progress to the next stage in the recruitment process. According to the Conference Board of Canada, employability skills are known as skills, attitudes and behaviours that employers look for in employees (Nasir et al., 2011).

Similarly, the Science, Technology, Engineering, and Mathematics Network (STEMNET) compile the Top 10 Employability Skills regularly, in which UK based companies look for in potential employees such as companies like Accenture, AstraZeneca, BP, Cobra, Cogent, Shell, Nokia, and Siemens. STEMNET (2017) defines employability skills as transferable skills that are important enabling an individual to be "employable" and enabling the individual to perform a task to the best extent of their competence, while Saterfiel & McLarty (1995) refer to employability skills as the skills required for acquiring and retaining a job. As mentioned above, employability skills are required to make the workforce productive, and a productive workforce is what employers are looking for from candidates.

Thus, it can be hypothesised that there is a significant positive relationship between employability skills and recruitment decision.

H_A: There is a significant positive relationship between the employability skills and recruitment decision.

Due to the emergence and penetration of IR4, employability skills such as information, system and technology competencies are stressed. Additionally, graduates should aim to equip themselves with relevant and practical IR4 skill sets. As such, it is predicted that these skills will contribute to employability skills, resulting in a positive significant relationship with recruitment decisions.

Research Methodology

This research paper examined the effect of employability skills on the decisions made by employers when hiring fresh graduates. Moreover, in achieving this aim, it was important to gain the opinion of employers having the authority in making recruitment decisions. Here, members of MEF were invited to participate in a survey. In this research, manufacturing sector employers were the primary focus given the vast range and number of jobs in this sector. As such, it was anticipated that by examining the opinions of employers within this sector would offer further insight into the issues and implications in their ability to leverage from a high proportion of jobs in the labour market. In this study, a purposive sampling method was adopted.

The most effective means to quickly gather data is via a survey questionnaire which has the ability to reach many respondents at a single point in time (Hair, Celsi, Money, Samouel, & Page, 2011). Hence, a self-administered questionnaire was developed for respondents to answer without human intervention from the researchers of this study. The exogenous variable of this study signified the employability skills that contributed formatively by Information Competencies, System Competencies and Technology Competencies, while Recruitment Decision acted as the endogenous variable, which was the core element of this study. The measurement items for the variables, such as information competencies, system competencies and technology competencies were adopted and modified from the SCANS (1991) model given the well-established elements that have been widely used by other researchers. While the Recruitment Decision items were adopted and modified from the previous studies such as Ang et al., (2013). The reliability and validity of the measurement items for this research were confirmed via conducting a pilot test before the actual data collection process began.

Findings and Discussion

Findings

Descriptive Analysis

Table 1: Demographic Profiles of the Respondents and Company Information

	Category	Frequency	Percent
Gender	Male	29	35.4
	Female	53	64.6
Age	Below 30 years old	13	15.9
	31-40 years old	19	23.2
	41-50 years old	31	37.8
	Over 50 years old	19	23.2
Highest Education Level	Diploma's degree	11	13.4

	Bachelor's degree	45	54.9
	Master's degree	25	30.5
	Others	1	1.2
Working Experience	< 5 years	10	12.2
	5-10 years	14	17.1
	11-16 years	8	9.8
	> 16 years	50	61.0
Number of Employees	5-29 employees	4	4.9
	30-74 employees	7	8.5
	75 employees	1	1.2
	76-200 employees	15	18.3
	>200 employees	55	67.1

The total number of respondents in this research was represented by 82 of manufacturing employers, in which the majority were female (64.6%). More than 50% of the respondents held a bachelor's degree, with the proportion of other education levels, such as holding a master's degree, diploma/degree and others constituted 30.5%, 13.4% and 1.2% respectively. Sixty-one per cent of respondents were aged above 40 years, which was aligned with the proportion of respondents having more than 16 years of working experience. From these statistics, it was predicted that most of the respondents began work at 24 years of age, which is the graduation age from acquiring a bachelor's degree. This explained the high proportion of bachelor degree holders from among the respondents. Also, since the respondents were manufacturing employers, thus it was not surprising to see that the number of employees for most organisations was predominantly more than 200 employees.

Table 2: Mean and Standard Deviation of the Indicators and Variables

Coding	Indicators	Mean	Std. Deviation
Information Competencies		4.3140	.55945
Information1	acquire and evaluate information.	4.33	.630
Information2	organize and maintain information.	4.30	.642
Information3	interpret and communicate information.	4.28	.594
Information4	use computers to process information.	4.34	.652
System Competencies		3.9715	.68534
System1	understand systems (social, organisational and technological systems).	4.11	.720
System2	monitor and correct performance.	4.05	.768
System3	improve and design systems (social, organisational and technological systems).	3.76	.854
Technology Competencies		4.0203	.69556
Technology1	select technology that will produce desired results.	4.04	.728
Technology2	apply technology to the task.	4.06	.709
Technology3	maintain and troubleshoot technology.	3.96	.777
Recruitment Decision		4.0650	.80455

Decision1	I would hire fresh graduates if there is an opportunity to do so.	4.30	.715
Decision2	I am willing to hire fresh graduates for my organisation.	4.20	.838
Decision3	I expect to hire fresh graduates for my organisation.	3.94	.960
Decision4	I want to hire fresh graduates for my organisation.	3.98	.942
Decision5	I intend to hire fresh graduates for my organisation.	3.96	.895
Decision6	I will hire fresh graduates for my organisation.	4.01	.923

As depicted in Table 2 above, Information Competencies was measured through four indicators which acquired the highest overall mean score of 4.3140. With a mean score ranging between 4.28 and 4.34 made it the most important employability skill for fresh graduates as agreed by the employers. In other words, Information Competencies is signified as the most important skill among the three specific employability skills. The second employability skills considered important among the employers was Technology Competencies, which was measured via three indicators having an overall mean score of 4.0203. The highest mean score among the indicators of Technology Competencies was "apply technology to the task" (mean = 4.06, SD = 0.709).

Although System Competencies which was measured with three indicators, had the lowest overall mean score, the value was approximate to 4.0 and was above the neutral level. System1 "understand systems (social, organisational and technological systems)" was the topmost indicator which contributed to System Competencies. This was because the manufacturing employers perceived that understanding systems was a fundamental skill in System Competencies. Thus, it signified the indicator having the highest mean score for System Competencies. There were six indicators measured under the construct of Recruitment Decision in which the overall mean score was 4.065. This implied that employers had the intention to hire fresh graduates if the opportunity was presented.

Inferential Analysis

Measurement Model

First Order Construct

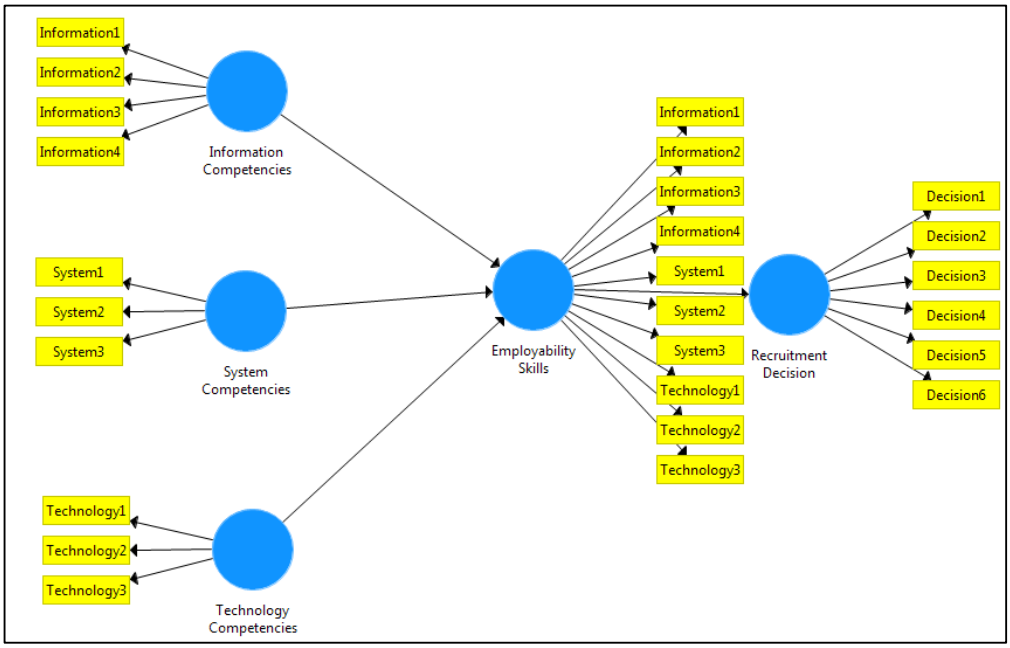

Figure 1: First Order Construct

All first-order constructs, as shown in Figure 1, such as Information Competencies, System Competencies, Technology Competencies, and Recruitment Decision, are represented in a reflective mode. The reflective measurement model consisted of two steps: internal consistency and convergent validity, in addition to discriminant validity.

Table 3: Internal Consistency and Convergent Validity

Construct	Items	Loadings	CR	AVE
Information Competencies	Information1	0.92	0.939	0.795
	Information2	0.936		
	Information3	0.92		
	Information4	0.783		
System Competencies	System1	0.888	0.91	0.771
	System2	0.891		
	System3	0.855		
Technology Competencies	Technology1	0.944	0.96	0.89
	Technology2	0.961		
	Technology3	0.925		

Recruitment Decision	Decision1	0.827	0.967	0.832
	Decision2	0.935		
	Decision3	0.919		
	Decision4	0.948		
	Decision5	0.925		
	Decision6	0.913		

Table 3 indicates that composite reliability (CR) for all constructs are higher compared to the minimum value of 0.70, and the AVE, which is greater than the threshold value of 0.50. Therefore, it was concluded that all first-order reflective constructs achieved reliability and convergent validity. Next, two criteria were employed to evaluate the discriminant validity of the measurement model in a reflective mode which was Fornell-Larker Criterion and HTMT.

Table 4: Fornell – Larker Criterion

	Information Competencies	Recruitment Decision	System Competencies	Technology Competencies
Information Competencies	0.892			
Recruitment Decision	0.273	0.912		
System Competencies	0.655	0.194	0.878	
Technology Competencies	0.541	0.298	0.664	0.943

Table 5: HTMT

	Information Competencies	Recruitment Decision	System Competencies	Technology Competencies
Information Competencies				
Recruitment Decision	0.289 CI.90 (0.126, 0.455)			
System Competencies	0.743 CI.90 (0.623, 0.830)	0.21 CI.90 (0.086, 0.381)		
Technology Competencies	0.583 CI.90 (0.423, 0.712)	0.311 CI.90 (0.126, 0.475)	0.745 CI.90 (0.606, 0.848)	

According to Fornell & Larcker (1981), the square root of AVE for the construct should be greater than the correlation of the construct with other constructs. In Table 4, all diagonal areas which represent the square root of AVE for the constructs are larger than the off-diagonal area, which represents the correlations of the respective constructs with other constructs. Hence, the discriminant validity of the reflective measurement model was achieved.

HTMT was a further criterion used to evaluate discriminant validity for the measurement model in reflective mode. HTMT is defined as the ratio between trait correlations to the within trait correlations. HTMT value greater than 0.90, and the confidence interval consisting of the value of 1 at a 90% confidence level indicates a lack of discriminant validity (Henseler, Ringle, & Sarstedt, 2015). From

the HTMT in Table 5, it can be surmised that all HTMT values were less than 0.90 or even less than the conservative threshold value of 0.85. At the same time, the confidence interval did not contain a value of 1 on any construct. Therefore, this result further supports the achievement of acquiring discriminant validity of the measurement model.

Second Order Construct

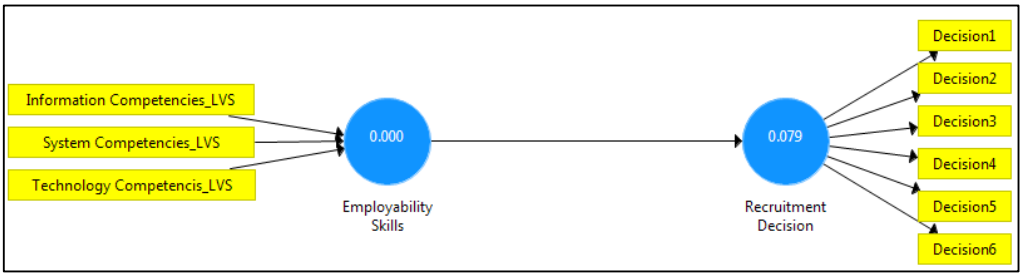

Figure 2: Second Order Construct

Since the first-order construct had achieved a satisfactory level, the analysis continued with the second-order construct assessment by attaining a computed latent variable score. Figure 2 presents the Employability Skills as the second-order construct measured with three formative indicators, namely Information Competencies_LVS, System Competencies_LVS and Technology Competencies_LVS.

Table 6: Formative Measurement Model

Construct	Items	VIF	Weights	t-value weights	sig
Employability Skills	Information Competencies_LVS	1.814	0.625	1.667	0.096
	System Competencies_LVS	2.294	-0.359	0.681	0.496
	Technology Competencies_LVS	1.854	0.786	2.054	0.04

Since the second-order construct was a formative construct, a formative measurement model assessment was carried out. Here, two forms of analysis were used to assess the formative measurement model, which were collinearity among the indicators in addition to the significance and relevance of the formative indicators. The results, as shown in Table 6 above, demonstrate that all VIF (outer) of the respective formative indicators were below the threshold value of 5, suggesting that the formative indicators were free from a collinearity issue.

For the formative indicators' significance and relevance, Technology Competencies_LVS was shown to have significant outer weights while the remaining two formative indicators for employability skills had insignificant outer weights. As mentioned earlier, these three employability skills were sourced from well-established and the most cited employability skills sets in the SCANS (1991) model. The popularity of these employability skills sets adequate to confirm the validity and reliability of these three competencies in contributing to the employability skills construct. Although the statistical analysis showed the insignificance of Informative Competencies_LVS and System Competencies_LVS contributing to the construct of Employability skills, both indicators were retained based on theoretical support and evidence.

Structural Model

Following confirmation of the satisfactory results in the first and second-order constructs, the analysis proceeded with structural path model estimation. The first step of the structural model assessment was conducting a lateral collinearity assessment used to ensure that two variables, hypothesised to be in a causal relationship, are measuring different constructs.

Table 7: Lateral Collinearity Assessment (Inner VIF)

	Recruitment Decision
Employability Skills	1

Since one construct, Employability Skills predicts the Recruitment Decision, only one (1) Inner VIF is presented in Table 7, which is lower than the threshold value of 5. This result indicates that the lateral collinearity (Inner VIF) is not shown to be at a critical level. Hence, the evaluation of the structural model could proceed.

Table 8: Hypothesis Testing

Hypothesis	Relationship	Std. Beta	Std. Error	t-value	Decision	R^2	f^2	Q^2	q^2
H	Employability Skills → Recruitment Decision	0.336	0.092	3.644	Supported	0.113	0.127	0.079	0.086

Once confirming that the structural model was free from a lateral collinearity issue, only path model estimation needed to be conducted. The result, as shown in Table 8, indicates that there is a significant positive relationship between Employability Skills and Recruitment Decision with t-value larger than 1.645 at the significance level of 0.05. Also, the R^2 value of the endogenous construct Recruitment Decision is 0.113, which suggests that the exogenous construct - Employability Skills explains an 11.3 % variance in the Recruitment Decision. According to Cohen (1988), if the R^2 value 0.113 is less than 0.13, the model is signified as weak. Here, the effect size, f^2 is equal to 0.127 which is less than 0.15 which represents a marginal effect regarding Employability Skills in producing the R^2 for Recruitment Decision.

Furthermore, a blindfolding procedure was employed to examine the predictive relevance of the model; Q^2 where the value greater than 0 is considered to achieve predictive relevance to the endogenous construct. The value of 0.079, which is above 0 is evidence that the model is sufficient regarding predictive relevance. For the values of 0.086 in q^2 this indicates that employability skills have a small predictive relevance on Recruitment Decision.

Discussion

From the results as mentioned, it can be concluded that employability skills will positively affect the recruitment decision of manufacturing employers with respect to fresh graduates. The results also support the research undertaken by Fulgence (2015) where employers' expectations during the interview process were mostly grouped into the broader aspects of employability skills, and most preferenced factors that influenced the recruitment decision was communications skills which fell under the category of employability skills.

Moreover, among the three specific employability skills, Technology Competencies was the skill that significantly contributed to the employability skills construct. Therefore, it can be concluded that Technology Competencies is the dominant employability skill that explains the positive effect of employability skills on recruitment decisions. That is to say; Technology Competencies is the main employability skill that manufacturing employers are seeking when hiring fresh graduates. The rationale of manufacturing employers in seeking fresh graduates having Technology Competencies is due to the emergence of IR4. Also, the technologies utilised in IR4 are distinctly different, given the high level of automation and interconnectivity in the manufacturing process (Aulbur et al., 2016). Thus, graduates as the future workforce are urged to handling new technologies causes the accelerating importance of Technology Competencies among the fresh graduates that never happen before.

In this research, Information Competencies was found to be the most dominant employability skill for fresh graduates. This finding is also supported from the qualitative research findings of Head, Van Hoeck, Eschler, & Fullerton (2013) where they found that the majority of employers have similar expectations regarding the baseline with respect to information competencies since nearly all the employers in the study expected candidates to have the ability to search online. Even though Information Competencies is one of the important employability skills that manufacturing employers are seeking from fresh graduates, it is not the main skill that employers consider during the recruitment process. The reason is that manufacturing employers perceive information competencies as a necessary skill that fresh graduates will already possess from the education programme of HEIs. Thus, employers anticipate that every fresh graduate would possess these skills. Due to the common of information competencies among fresh graduates, the employers will not take information competencies as the differentiator in evaluating the fresh graduates although it is important in the eyes of manufacturing employers.

With regards to system competencies, manufacturing employers agree that this skill is important for fresh graduates. However, on the other hand, the negative outer weights in this study implicate that employers do not consider system competencies as the criteria when recruiting fresh graduates. This phenomena is because manufacturing employers perceive that system competencies is important for fresh graduates because it will benefit them in the future due to the need for doing space sharing with intelligent robot (assistant systems) (Aulbur et al., 2016). However, it is not important to the extent that employers will consider it as the criteria because the importance level is not that high as compare to information competencies and technology competencies. System competencies acquired the lowest level of agreement from manufacturing employers based on its importance towards fresh graduates because system competencies are perceived as being more technical, which is not a requirement for an entry-level position within these organisations.

Conclusion

Overall, employability skills are perceived as an important factor for fresh graduates to acquire and to gain successful employment in the competitive labour market nowadays given the emergence of IR4. The literature review provided further insight regarding information competencies, system competencies and technology competencies which are important employability skills given IR4. This was also supported via the descriptive analysis conducted in this study, indicating that all three specific employability skills relevant to IR4 are important for fresh graduates to acquire based on the opinions and views of manufacturing employers. Notably, Technology Competencies was shown to be the main employability skill emphasised by the manufacturing employers when making a decision to recruit fresh new graduates.

Nonetheless, based on the findings and results of this research, the practical implication suggested in this study is that fresh graduates should enhance the development of their human capital by acquiring appropriate and needed employability skills that manufacturing employers are demanding in the workplace which include Information Competencies, Technology Competencies and System Competencies. Accordingly, these employability skills sets will enable new graduates not only to be successful in obtaining job offers but also to survive in uncertain workplaces transformed through IR4.

From the perspective of the education provider, higher education institutions (HEIs) should conduct training with respect to the development of employability skills relevant to IR4, as part of the syllabus given these employability skills are increasingly important and needed in the workplace. Additionally, it needs to be highlighted that since technology competencies are the main criteria that employers seek during graduate recruitment, the visibility of technology competencies will add further value to fresh graduates following training. Likewise, the evaluation system with a recorded score will enable employers to easily assess the proficiency level of Technology Competencies of graduates. Also, through the implications awarded via IR4 for fresh graduates and HEIs respectively, employers will find it much easier to employ high productive employees in achieving short term and long-term goals of the organisation and also create a competitive advantage in respect to new disruptive technologies and landscape.

There are several limitations inherent in this study which are next discussed, followed by recommendations for future study. First, this study was limited in the generalisability of the findings given the small sample size of respondents employed. Therefore, it is recommended that future research should include a greater number of respondents. In addition, the respondents of this study originated from the manufacturing sector, which restricts the findings of the study in being applicable or implied to the manufacturing industry only. Accordingly, in order to achieve a wider perspective in a future study, the researchers may invite respondents from different sectors to participate in the survey and to compare the perceptions and opinion of employers from different sectors accordingly. Finally, this study focused on the recruitment decision of employers towards fresh graduates. Thus, the insights gained from this study are only relevant with respect to fresh graduates, and not for experienced job applicants.

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Reconstructing the Ontological Perspective of The New Institutional Economics on The Basis of Oliver E. Williamson's Hierarchical Model of Institutional Systems – An Attempt

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Abstract

This study represents an attempt to reconstruct the ontological perspective of the New Institutional Economics (NIE) on the basis of Oliver E. Williamson's hierarchical model of institutional systems, and supported by elements of the ontological perspective postulated by Leszek Nowak as a specific set of basic statements. The reconstructed ontological perspective of NIE was then employed as basis for scientific analyses performed using the method of idealization and gradual solidification. The analytical findings served to reveal a strong correlation between individualism and holism as a property deeply embedded in the NIE. Apart from the theorygenic benefits, the study was also intended to reinforce and advertise the scientific achievements of the Polish anti-naturalist school of thought in social sciences.

Keywords: NIE, Idealization, Methodology

Introduction

One of the most important challenges in construing new theories, theoretical systems and paradigmatic theories is to provide a clear definition of their fundamental assumptions. Jerzy Kmita (1973, pp. 113-114) in his lecture on statement-proving in formal disciplines of science emphasizes the need for an underlying *axiomatic system*, consisting of axioms (also referred to as *basic statements* or *axiomatic language*). Each successive set of statements designed in the context of a given theory is a direct descendant of the initially adopted axiomatic system. In other words, each new statement is logically derived from the set of basic statements. This property is characteristic for formal sciences. For instance, the essence of Euclidean geometry is directly descended from the set of axioms originally postulated by Euclid. However, properties characteristic for formal sciences do not necessarily take a similar role in the case of empirical or real sciences. The above reservation can also be applied in the case of social sciences, where sets of basic statements are not always precisely delineated. As suggested by Thomas S. Kuhn (1996), social sciences are still in their pre-science phase of development, as evidenced by the lack of formalized and universally adopted sets of basic statements.

This study represents an attempt to reconstruct the ontological perspective of the New Institutional Economics (NIE) on the fundament of a hierarchical model of institutional systems postulated by Oliver E. Williamson. In other words, the main objective of this study was to formulate a valid set of basic statements for the NIE theory. This challenge was approached in the context of two concepts: (1) the ontological perspective by Leszek Nowak (1977b), and (2) the hierarchical model of institutional systems by Williamson (2000). In this case, the ontological perspective concept plays the role of a formal set of basic statements, while the hierarchical model of institutional systems by Williamson provides the substantive content used for the purpose of the attempted reconstruction of the studied theory. Thus formulated, the above objective was supplemented by a hypothesis that the hierarchical model of institutional systems by Williamson may be employed as a fundament for deducing the ontological perspective of the NIE. In line with the above hypothesis, the diagram conceptualized by Williamson may serve as a point of departure for the formulation of basic statements for the entire theoretical system represented by the NIE concept.

Preliminary notes on the object of the study

The object of this study comprises of two fundamental research elements. The first element is represented by the formal diagram of institutional analyses by Williamson, as a vehicle for the reconstruction of the basic statements of the NIE, the other element is the ontological perspective constituting a formal interpretation of the basic statements of the studied system. Thus defined, the object of the study may be considered important for the purpose of our deliberations for two fundamental reasons. Firstly, each theoretical construct requires a set of fundamental statements – these should be conceptualized in accordance with the selected criteria. Secondly, since social sciences (particularly the economic sciences) display a tendency to develop in a fashion which, after Stephen E. Toulmin (1972), can be described as evolutionary, then no specific points of reference are available to mark the onset of each change in the set of fundamental statements describing such theoretical constructs.

With respect to the former, problems can be observed even at the earliest stage involving the selection of criteria to serve as basis for the formulation of the set of fundamental statement. Two of the most widely recognized concepts postulated in the context of fundaments of any science, namely – Kuhn' paradigms (1996) and Imre Lakatos' analytical concept of research programmes (1978) – provide a clear identification of problems in defining that which can be seen a fundament for the entire domain of science. For Kuhn (1996), a paradigm (or, more specifically, its methodological substance) is assumed to play the role of a set of basic statements. However, aside from the methodological substance, it is important to include the sociological one which serves as a set of norms describing the direction of scientific research. Problems encountered by Kuhn in his formulation of the exact nature of paradigms (Masterman, 1970) suggest that it may be quite difficult to establish a clear and conclusive set of basic statements. Kuhn himself was well aware of these shortcomings, as evidenced by his largely futile attempts to formalize the paradigm concept by evoking the concept of *disciplinary matrix* (Blaug, 1992; Chalmers, 2013).

In contrast to the above, and in line with the concept of scientific research programmes by Lakatos (1978), the role of sets of fundamental statements is served by the 'hard core' – a set of unfalsifiable theses that determines the heuristic potential of a given research programme. For Lakatos, the set of theses forming the hard core of a science is quite formalized. The Lakatos' approach is deceptively simple, since it may be supported by straightforward similes, as in the case of the previously evoked Euclidean geometry. Nonetheless, the concept of research programmes aspires to become an example of a rational and formalized concept of development in science (Chalmers, 2013).

Thus, the approaches cited above can be viewed as either exceedingly general (Kuhn) or extremely simple (Lakatos). In addition, in both cases, the principal objective of the philosophical deliberations was to explain the nature of developments in science. For the purpose of studying, construing and reconstructing the theoretical fundaments of science, it may be useful to employ the concept of *ontological perspective* which helps produce a formal and fastidious image of the perspective adopted in our perception of what is real. This constitutes a competitive angle not only to that displayed in the concepts by both Kuhn and Lakatos, but also to any other approach defined by different heuristic properties, as it invites the deployment of the idealization and gradual concretization method as well as the idealized theory of development in science.

With respect to the other issue at hand, it may be quite difficult to produce evidence of scientific revolutions in economic sciences, in the sense postulated by Kuhn. The prospective breakpoints in this realm are neither spectacular nor obvious. On the contrary: the economic sciences are notorious for their tendency to produce elaborate syntheses that serve to recapitulate and unify rather than provide a breaking point in their development. Given such a trend, the existing sets of basic statements belonging to a given theory may in consequence be subject to uncontrolled change or even bypassed. Evidence for this trend can be observed in comparisons between individual philosophical systems and their subsequent synthetic depictions employed in handbooks. One of the best examples of this trend is the striking case of deliberations by John Stuart Mill (1844) associated with the definition of the object of economic policies. The case in question relates to the concept of *homo oeconomicus*, a staple element

of Mill's theoretical system, which has become a shadow of its former significance in the elaborate synthesis by Paul A. Samuelson and William D. Nordhaus (2009). In contrast to modern approaches, Mill's deliberations of an economic man are made without clear definition of the concept of *homo oeconomicus* as such. Moreover, the synthetic approach of mainstream economics or the neoclassical economics does not provide any central element to serve the role of a set of basic statements.

A similar observation can be made with respect to more heterodox approaches to the economic sciences, including the NIE. Handbooks of New Institutional Economics fail to provide evidence of clear and unambiguous attempts to reconstruct the basic statements of the NIE. Naturally, some notes to that effect have already been put forward, and these can be seen as a sort of preliminary endeavours. For instance, Éric Brousseau and Jean-Michel Glachant (2008) present their view on condensed research objectives of the NIE. These authors postulate the use of three fundamental levels of analysis, namely: organizations, contracts, and institutions. And while their approach may certainly be regarded as apt in describing the objectives of research in this area, it does not offer any valuable insight into the fundaments of the NIE. On the other hand, Eirik G. Furubotn and Rudolf Richter (2005) postulate to extend the framework of neoclassical economics with the institutional dimension, which may be interpreted as a suggestion for employing the basic statements of the Neoclassical school to also describe the institutional angle. At the same time, however, they clearly emphasize the futility of perceiving the NIE as an extension of the neoclassical approach. Nonetheless, these attempts can only be interpreted as indications rather than evidence for the reconstruction of basic statements.

Studies of the gnoseologic attributes of paradigms (Motycka, 1980), i.e. processes associated with formulation and dissemination of paradigms, provide indication that paradigms are not formed as deliberately as the rational philosophers of science would like them to be. Oftentimes, a theoretical reconstruction of such collectively formulated constructs is required. In the case of the NIE, deliberations on the gnoseologic attributes have already been put forward (Czetwertyński, 2019b). These are suggestive of an internal opposition between methodological individualism and methodological holism well-rooted in the NIE concept, but with no conclusive determination of the associated set of basic statements. Attempts have also been made to formulate the new paradigm of economic sciences in a more indirect fashion (Godłów-Legiędź, 2010) by evoking the historical development of individual theories constituting the NIE. Professional literature seems to place strong focus on deliberations of classificatory and knowledge-ordering aspects of the broadly defined institutional economics (Hodgson, 1998; Hodgson, 2004; Stankiewicz, 2014; Ratajczak, 1994). One of the most important problems of the institutional approach is the effective differentiation between the 'old' and the 'new' institutionalism. In his demarcation between the 'new' and the 'old' institutionalism, David Dequech (2002) emphasizes the central significance of institutions and the need for a proper definition of institutions, opening up a prospect for making conclusive judgements on the theoretical fundaments of the NIE. Geoffrey M. Hodgson (1998) declares his intent to expose the hard core of institutional economics by depicting *custom* as its central element, but only in the context of his broader analytical discussion on the ways of the 'old' and the 'new' approach to institutionalism. Hodgson (2000) places his focus chiefly on the evaluation of the 'old' institutional economics, with its hard core defined after Walton H. Hamilton (1919) as a set of five basic statements. Nevertheless, and irrespective of any scientific attempts, this particular aspect can still be seen as a cognitive gap that impedes the development of theoretical fundaments of the NIE.

In this author's view, the original character of this study lies in juxtaposing the ontological perspective postulated by Nowak with the theoretical perspective offered by Williamson. The use of Nowak's concept bears a promise of formal reconstruction of theoretical fundaments of science as a method competitive to that offered by the formal hard core concept by Lakatos. This approach can also be described as alternative to the disciplinary matrix concept by Kuhn, although the latter represents more of an outline, as opposed to the fully formed ontological construct by Nowak. In addition, the use of Williamson's diagram of institutional analysis as a fundament of the NIE offers the merit of combining the internal attribution of methodological individualism and holism.

To sum up, the approach presented herein may serve as a premise for further formulation of the theoretical fundaments of the NIE. It was also this author's intention to publicize the achievements of

the Polish school of methodology, with particular emphasis on the anti-naturalistic idea of science. If this approach proves sufficiently effective, it may serve to constitute a cohesive foundation for the formulation of theoretical aspects of the NIE based on the use of the idealization and gradual concretization method.

The ontological perspective offered by the idealization and gradual concretization method

Before we attempt to depict the notion of ontological perspective, it may be useful to address the concept of idealizational theory of science by Nowak (1977b). The theory is based on the central assumption that science (as one of the aspects of human involvement) is aimed at uncovering a prime (central, or the most significant) factor describing a given phenomenon. Thus, it may be seen as a pursuit for the exact nature of phenomena under study – and this task is realized through the use of the idealization and gradual concretization method. The ontological perspective, on the other hand, serves to construe the set of principles of essential stratification and of the ontic referents that determine the process of idealization of a given phenomenon under.

The idealization concept itself, as a tool for the study of social reality, is largely derived from Max Weber's (1978) reflections on the ideal type (German: Idealtypus). In the context of the Polish school of methodology, these views were developed into a stream of anti-naturalistic epistemological concepts. The most important input on the subject can be found in the works of Oscar Lange (1978), Kmita (1973), and Nowak (1977a; 1977b; 1980; 1991), with the latter strongly influenced by the methodological approach postulated by Karl Marx. Nowak was the first philosopher to develop the method of idealization and gradual concretization into a fully-fledged methodological system envisaging the existence of the ontological perspective. The anti-naturalistic view provides for idealization as a necessary supplement to social sciences, due to the wealth of accessory factors that influence the study of economic phenomena. These accessory factors have the effect of obscuring the true image of the socio-economic reality and may lead to erroneous generalizations and formulations of false scientific rules. Many of the views constituting the anti-naturalistic stream have already received recognition from other authors (Hodgson, 1998; Mäki 1992; Mäki 2004).

The method of idealization and gradual concretization, as the name suggests, consists of two parallel processes: that of idealization, and that of concretization or solidification. The former process serves to determine a central factor describing a given phenomenon under examination. Thus, in the process of idealization, a researcher is involved in successive elimination of items from the list of significant factors, with the view of determining the sole element that is crucial for the purpose at hand. This task is typically approached by means of mental elimination (Lange, 1978), or by the introduction of idealizational assumptions (Nowak, 1977b). In general, the process of idealization involves abstraction from the factual conditions observed in reality, with the purpose of discovering the very essence of any studied phenomenon. In effect, it helps deduce a hypothesis and formulate the idealization rule. However, such a rule can only be used to describe an idealized situation. For it to be able to accurately describe a factual situation, the idealization process must be reversed by means of gradual reintroduction of each individual element that has previously been subject to elimination. This process is referred to as concretization, since it involves solidification of the rule to fit the factual state or situation.

The explanatory power of this method rests in the fact that it offers potential for deducing detailed statements from general rules. Successors of the idealization hypothesis represent corrected detailed hypotheses adjusted to fit real and factual situations. Thus, the rules of idealization may be applied to abstract deliberations, but their testing against real situations requires the use of concretization. The mechanics of the idealization and gradual concretization method is, in principle, a relatively simple task, but in order to operate freely at each stage of the idealization and concretization processes, researchers need to adopt certain principles for the selection, segregation and ordering of significant variables. This objective can be served by the use of the ontological perspective. Without adopting such a perspective, it may be impossible to determine the reasons for any observed course of idealization processes.

Hierarchies of factors deemed significant for the course of a studied phenomenon can be determined by the set of principles of essential stratification. This means that, after determining the composition of the set of significant factors, the set of essential stratification principles can be employed to determine the relative significance of each such factor. The main task in this context is to determine the sequential ordering of the idealization process, i.e. to make informed decisions on which factors should be eliminated and at which stage of the idealization process. In effect, the set of essential stratification principles determines the selection of the most significant factor. Similarly, over the course of concretization processes, the set of essential stratification rules helps us determine the ordering of factors to be included in each stage of the concretization process. To sum the above deliberations in the simplest possible way, it may be stated that the set of essential stratification rules serves to determine the relative levels of significance for each factor deemed significant for the studied phenomenon. Similarly, sets describing the ontic relations between the studied factors provide insight into the reciprocal relations between significant factors. Thus, the ontological perspective serves to determine the advisable course of both processes, i.e. idealization and concretization. It also allows to deduce the relative weights of the studied factors and the actual relations and dependencies between them. Therefore, it may be viewed as a framework structure for the entire course of idealization and concretization processes. At the same time, it should be noted that concretization processes also require the use of the ontological perspective.

Williamson's Diagram of Institutional Analysis

The diagram of institutional analysis by Williamson (2000) is one of the most widely recognized and studied approaches to conceptualization of the methodological base of the NIE (Aoki, 2007; Czetwertyński, 2019b; Hardt, 2009; Hodgson, 2007; Klimczak, 2019; Rudolf, 2015; Rutherford, 2001; Wilkin, 2016). The diagram postulated by Williamson represents a convincing line of approach to the study of relations between the various analytical levels of institutions, supported by a wealth of research material describing each individual level of analysis. Williamson's diagram of institutional analysis postulates a distinction of four distinct levels of analysis, namely: (1) embeddedness, (2) institutional environment, (3) governance, and (4) resource allocation and employment. Each of these levels is described by frequency, i.e. the rate of institutional change, and by purpose. In addition, each of the levels is associated with a specific detailed theory. Thus, the first level of analysis is described by the most generalized theory representing the broadest outlook upon the studied social phenomena, with consecutive levels employing more and more detailed theories addressing specific and narrow segments of the socio-economic reality. In addition, Williamson supplements his analytical approach with a dynamic element, in the form of reciprocal impact and feedback loops between all levels, based on the assumption that any given level of analysis exerts an impact upon the one positioned directly above it, while higher levels are related to the lower ones by means of a feedback loop mechanism.

Embeddedness represents the lowest level (L1) of analysis and comprises such elements as informal institutions, customary practices, traditions, and religious norms. This level is extremely durable. Its constituent elements may remain relatively unchanged for hundreds or even thousands of years. Institutional changes observed at this level will develop in an evolutionary rather than revolutionary fashion. Changes in customs typically extend beyond the time limit of a single generation, and this trend is particularly notable with respect to substantial changes that affect the entire structure of the embeddedness level. Objectives at this level are non-calculative and spontaneous, although a certain degree of reservation must be applied in this context, since clear and precise social objectives can be identified even with respect to informal institutions formed spontaneously in the course of the evolution of the social order. In principle, the embeddedness level contains social norms responsible for practical manifestations of relations between all members of the society as well as forms of social control (Mead, 1925). As such, it represents a source – or the very root – of cultural dynamics and civilizational constructivism (Czetwertyński, 2019a). Karl Polanyi (1957, p. 243) provides an apt description of the substantive meaning attached to the economic science in terms of such relations of individuals with nature and with other members of the society which serve to amass sufficient resources to satisfy individual needs. The dynamic character of relations between the natural and the social environment is a force responsible for the constitution of the spontaneous level of embeddedness, in the shape of sets

of informal norms – customs, traditions, or taboos (North, 1991). As suggested by Polanyi, norms embedded in the social order may play the role of more formal norms that typically regulate the coordination of economic processes in those environments that lack such formal constructs. It may safely be assumed that informal norms, such as those embedded in social and religious beliefs, do indeed exert an impact upon the entire social order, including the economic order. Arguments in favour of this assumption can be seen, for instance, in the classical deliberations of Max Weber (1992) on the significance of the protestant tradition upon the shaping of the capitalist doctrine as well as in more contemporary analyses by Tomáš Sedláček (2012) related to the economic aspects embedded in the cultural domains of various nations throughout history. In the knowledge structure approach, the role of the embeddedness level is played by social theories, as they provide a more accurate explanation of social order and its formation.

The level of institutional environment constitutes the order of formal rules. This level, after Douglass C. North (1990, p. 3), is typically formulated on the basis of the assumption that "institution are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction", with formal institutions commonly defined in terms of constitutional, parliamentary, and legal systems (in the broad sense of the term; see: Hodgson, 2004; North, 1991; Williamson, 2000). Institutions contain not only sets of rules (or limitations), but also those related to the execution of such rules (North, 1990; 1991). Thus, the level of institutional environment represents a system of reciprocally correlated (in a more or less cohesive fashion (Aoki, 2001)) institutions. The institutional environment is formed in a purposeful way, and designed to ensure proper organization of the political and economic environment (North, 1991) or, in more general terms, the entire social environment, although some researchers seem to support the view that this level also displays certain forms of social evolution (Klimczak, 2019). Nonetheless, the main focus is placed on intentional activities, undertaken by (and affecting) individuals. Therefore, changes observed at this level are decidedly more expedient compared to L1, and described by frequency of anywhere between several and several tens of years. A generation would be a sufficient measure in this context, as the institutional environment is often characterized by changes from one generation to the next. Another factor deemed of importance in this context is the arbitrary nature of human decisions, as stressed, for example, by the Hobbesian definition of social contract (Hobbes, 1998). Some insight into the understanding of the institutional environment can also be found in deliberations of Gustav Radbruch (1924; 1938), a legal scholar and philosopher. Radbruch attempted to explain the nature of law formation on the fundament of social custom. To place his ideas in the context of modern institutionalism, the wealth of informal norms serves as a source of more formalized standards. The most significant element in this context can be seen in Radbruch's (1938) 'idea of law' concept, describing law as a triad of: justice, utility, and certainty. Each of the above concepts can be viewed as a manifestation of the human intent to bring some order to the existing state of things, by introducing corrections formed by means of conscious reflection. The mere assumption that informal norms are the source of formal standards does not necessarily give rise to the view that the latter is a direct continuation of the former. On the contrary: they may – in some cases – represent the intent of limiting the effects of customs and informal norms upon societies. As aptly put by Richard H. McAdams (1997, p. 349) "law can influence the norm". In its most extreme form, this process can be described in terms of injudicious institutional engineering, with formal institutions imposed upon informal ones with the intent of affecting the desired change (North, 2005). Jakub Sukiennik, Zbigniew Dokurno and Bogusław Fiedor (2017, p. 130), in their elaboration of the theses postulated by Svetozar Pejovich (1999) suggest, that basic relations between formal and informal institutions can be described in four distinct forms. In their approach, formal institution may: (1) hamper the effects of informal institutions (but without the capacity of changing them – according to Pejovich (1999, p. 170), (2) function in explicit conflict with informal institutions, (3) remain ignored by or be neutral in relation to informal institutions, or (4) function in cooperation with informal institutions in an attempt to harmonise the two constructs. *De facto,* two principal objectives can be established with respect to the formulation of the second level of analysis, i.e. the institutional environment. The distinction involves the opposition between purposeful limitation, reformulation or definitive elimination of the effects of informal institution on the one hand, and reinforcement of their effects by elevating the informal institutions to the rank of a written rule. In an economic dimension, the level of institutional environment can be equated, according to Williamson (2000), with the proprietary order. From this perspective, the economic processes require proper regulation of

proprietary rights. As aptly observed by Radbruch (1938, p. 194): "In a world of limited resources, the regulation of relations between individuals involves also regulation of relations between individuals and objects, and the allocation of objects between individuals". Thus, from Thomas Hobbes (1998) to James M. Buchanan (2000), the shape of institutions designed to regulate the rights of property is believed to represent a direct manifestation of the rules regulating the allocation of resources in the economy. At the same time, it is important to take heed of the fact that, while the very idea of property is a highly stable construct, the formal institutions should be perceived in the specific context of time and space. This view corresponds with the concept of mutable law (Radbruch, 1938; Szyszkowska, 1993), with its content adjusted to specific social, political, and economic requirements. Hence, the level of institutional environment is manifested in theories of property laws and in the positive political theory.

The governance level of analysis represents the formation of governance structures, i.e. regulations characterized by a lesser strength of impact, designed to supplement the formal structures of the law system. As emphasized by Williamson (2000), the institutional environment – regardless of its weight – will never operate in a perfect manner. This means that, at the level of individual activities, practices should never be perceived as parallel to ideas. Consequently, contractual refinements are needed to define and safeguard the relations between individual elements of the social (or economic, in the case of the NIE) environment. Contracts of this type may be used, for instance, to support the transfer of parts of the property rights with the view of increasing the benefits of each party or limiting the social cost of such transfer. A classic example of this can be found in Ronald H. Coase (1960) in his deliberations regarding optimization of relations between parties on the ground of negotiations and contractual agreements held without resorting to formal arbitration at the level of institutional environment. Thus, the governance level represents a network of contractual regulations between entities, including private sector, non-profit organizations, and even those public institutions which are not covered by formal statutory regulations. Compared to formal institutions of the law, solutions of this type are more flexible and more prone to effective change. At the same time, they may – and are intended to – optimize the reciprocal relations between the parties. Their expected timeframe (frequency) is measured in years or decades. In the analytical approach, this level is correspondent with the economics of transaction costs. Significant input to the study of relations at the governance level can also be found in the work of Elinor Ostrom (1990) and her analysis of detailed solutions based on contracts between entities.

The last level of analysis is represented by resource allocation and employment, correspondent with the postulate of marginal value balancing. This level is associated with continuous balancing of relations between resources and their allocation by micro-entities of the economic environment. This level is the most distant from the institutional aspects and most closely related to the theories of neoclassical economics and agency.

The ontological perspective of the New Institutional Economics

The above, and necessarily concise, presentation of Williamson's diagram of institutional analysis may serve as a fundament for the attempted formulation of principles of essential stratification (as the first stage of the process), followed by determination of ontic relations between thus identified levels of stratification (stage two). In principle, Williamson already provides suggestions for the desired direction of idealization attempts. The only difference between the approach presented by Williamson and the mechanics of idealization is the direction of the process. Williamson postulates a natural transition from the first level (embeddedness) to the fourth level (resource allocation and employment), whereas the idealization process will naturally proceed from L4 to L1. This direction will only be reversed by the ensuing concretization process.

Thus, the resulting set of essential stratification principles will take the form presented in Fig. 1. The initial stage of idealization (level zero) will comprise factors belonging to all four levels of Williamson's diagram of institutional analysis. As such, it will examine the effects of both informal and formal institutions as well as contracts and individual attempts of entities designed to maximize the benefits or optimize the objectives function. This stage represents the factual level (concretization),

which is *de facto* free from any idealization attempt. At this level, each factor operates in a 'piecemeal fashion', which – according to Lange (1978, p. 96) – has the effect of excluding any proper formulation of economic relations between individuals or determination of any regularities.

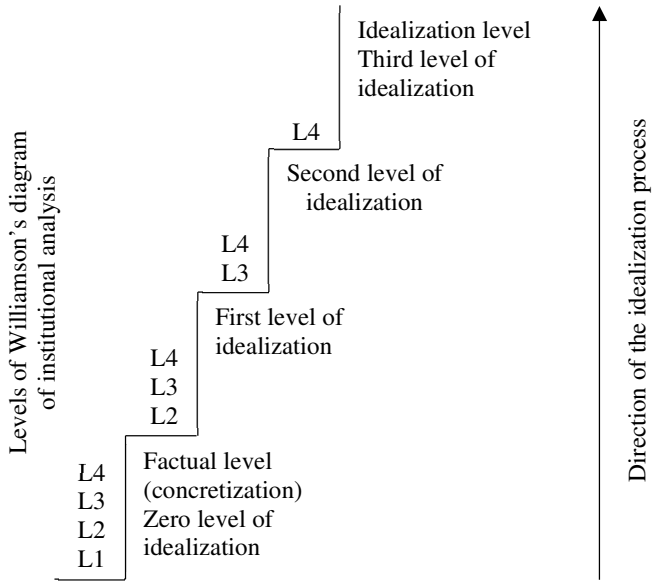

Fig 1. Idealization and concretization, based on Williamson's diagram of institutional analysis.
Source: own research

The first level of idealization involves elimination of L1 from Williamson's diagram of institutional analysis. This represents an abstraction from the instruments of neoclassical economics. In line with Nowak's observations (1991, p. 286), this may be viewed in terms of radical individualism, as a clear departure from ideas represented by pure methodological individualism (Blaug, 1992) or even, in a more radical approach, as existential and essential individualism (Nowak, 1991). The above may also be viewed in the context of the methodological approach assuming the existence of solely individuals, and in line with the assumption that only individuals are the sole elements of significance upon decision-making processes. Entities are only interpreted as collections of individuals. Zbigniew Staniek (2007, pp. 86-87) presents this type of scenario in terms of *methodology of representative subjects*, with holistic phenomena represented by simple summations of individual phenomena. A classic example of the analytical approach employed at the first level of Williamson's diagram can be found in the work of Garrett Hardin (1968) on the notion of self-interest and its effects upon common good. While the first level is involved in the identification of factors that influence individuals in separation from the societal context, the second level of analysis will be devoted to solutions that ensure optimum benefits for entire communities – or, in the nomenclature postulated by Hardin, those that serve to prevent the tragedy of the commons. By eliminating the analysis of individual actions in the context of individual self-interest, deliberations can be shifted towards analytical evaluations of contracts and institutions. Thus, the transition from zero level to level one of idealization constitutes a step in the direction of the factual object of study, namely: that of institutions.

The second level of individualization entails elimination of level two from Williamson's diagram. This step reinforces the notion of formal and informal institutions as the essential objects of the study. Elimination of the governance level brings us to an even more general level of analysis, as it serves to disengage not only the notion of momentary individual decisions (as in the case of the first level of individualization), but also structures designed to elaborate the shape of relations within local communities (Ostrom, 1990). In principle, this step represents the idealization level involved with the study of legal structures superimposed upon such notions as customary practices and taboos, as it serves

to depart from detailed solutions towards deliberations of a more general character, i.e. those that apply to larger social groups, including whole nations with their formal legislation systems.

The third level of analysis, i.e. the level of idealization, is an abstraction from all the formally established constructs. This level is involved solely with informal institutions, therefore it serves to distinguish only the most general and durable correlations which are formed spontaneously rather than by way of conscious and purposeful reflection. Consequently, deliberations at this level bear associations with the social theory. At this stage of the idealization process, in contrast with the zero level, the emphasis is placed on holistic constructs. Their existence (and, therefore, their existential dimension) is, by all means, indorsed, but it is unclear whether their essential dimension is ruled by holistic structures or individuals. If the latter holds true, then facts would necessarily emphasize their social context (Durkheim, 2013). In effect, what we deal with in this case is the transition from methodological individualism to methodological holism. At the same time, following the approach by Williamson, it must be stated that the case at hand is not one of radical holism (in its existential and essential sense), as attested by the shape of relations between the consecutive levels of analysis.

The set of principles of essential stratification, produced on the basis of Williamson's diagram of institutional analysis, suggests that determinants of human actions should be sought in the social strata, i.e. that of informal institutions. After eliminating all the remaining levels of institutional analysis, we are left with raw material of social order founded on the fundament of the most rudimentary social 'tissue'. Thus, the process of idealization should provide us with a root cause (a form of *arché*) – a property founded in informal institutions, and literally embedded in the society it applies to.

The set of ontic relations is described by Williamson (2000) in plain terms, as a rule stating that levels of lower order exert a direct and significant effect upon those of a higher order. Thus, the embeddedness level will significantly influence the level of institutional environment, while the latter will significantly affect the level of resource allocation and employment. Williamson's deliberations display a certain regularity, suggestive of direct and incremental nature of such impact upon levels of a higher order. In practical applications, it seems that the nature of ontic relations is more complex. Lower levels exert their impact upon all levels of the higher order. However, it is also true that a level of a higher order is most strongly influenced by the level directly below it. At this point, it may be useful to introduce a correction with respect to levels of idealization (and, consequently, in the levels of Williamson's diagram of institutional analysis). Namely, levels one, two, and three are products of the institutional approach with certain degree of holism (at least in the existential dimension, while the fourth level is a product of the neoclassical approach.

The first level is a point of departure which, in a sense, can be described as pre-established, due to its duration and frequency. The second level describes a primarily purposeful relation to informal norms of the first level. Thus, it stems from the first level and is produced in response to the need for reinforcing, weakening or eliminating the informal institutions. Nonetheless, and in the context of human activities, this response is based on institutions; and institutions are also the targets of such activities. Human activities at this level are collective in character, and their effects apply to entire social groups. A similar relation can be observed between levels there and two, though it takes a more detailed character. In this case, the structure of governance is formed in response to shortcomings of the lower order or in response to the need for optimizing the solutions produced by the previous level (institutional environment). Institutions still remain the main focus of interest, but the main emphasis is placed on the formal ones. But it is also true that some solutions may be derived from informal institutions, as more effective in this context compared to the formal structures. However, it must be noted that the governance structure should not be in manifest contradiction to the level of institutional environment, unless it is designed to target particular types of structures, such as grey economy. Activities at the third level may be described as a form of contractualization of the lower levels. And though contracts affect smaller groups (with the minimum of two persons), the process requires consideration of interests of at least two parties to such contract.

The fourth level is quite different from the other ones, as it serves the purpose of seeking optimal solutions for market players, established on the firm basis of the existing order. It may be stated to

represent a decision-making mechanics consistent with the economic approach postulated by Gary S. Becker (1976). This level is involved with optimization of costs and benefits within the bounds of the existing structures and conditions, including those descendant from the levels of a lower order. However, levels of the lower order are perceived here on the *ceteris paribus* principle, where decision-makers are only allowed to optimize costs and benefits related to their subordination to informal and formal institutions, and governance structures.

While Williamson (2000) seems to recognize the strength of impact exerted by levels of the lower order upon those of the higher order, he is also adamant in stating that effects of feedback information are characterized by a lesser strength. This statement should not be read as evidence of no strength whatsoever in this relation. Feedback information occurs naturally in all cases, but it may, firstly, be perceived or acknowledged with a delay, and, secondly, their force of impact may be insufficient to exert an effective impact upon levels of the lower order. At the same time, the lower the level of institutional analysis, the more expedient are the immediate effects of such feedback. Another important observation can be made with regard to the fact that, at the first level, the informal institutions are formed in a spontaneous fashion – on the fundament of social relations – rather than as a result of conscious determination of the rules of play. Nonetheless, a certain degree of impact can still be observed, for instance in cases involving purposeful circumvention of governance solutions produced by choices made on the fourth level. Avoidance of contractual obligations may be seen as a symptom generating the need for the improvement or reformulation of such contracts. Similarly, the structure of governance may influence the level of institutional environment, particularly in the context of more mature systems of legislation, which are naturally more susceptible to grass-root initiatives.

It may also be useful at this point to emphasize the fact that feedback information is not necessarily passed between the adjoining levels. One of the most important observations in this context is that activities undertaken at the fourth level of analysis (if sufficiently exposed) have the potential of affecting the level of institutional environment. A good evidence of this can be seen in legislative changes made in response to social pressure or those intended to counteract the effect of pathological behaviours. These represent a special case, as the legislative authorities are purposefully involved in regulation of activities of individual members of the community, as opposed to the frequent practice of making laws in separation from the society (Radbruch, 1938), i.e. formulation of *de facto* pathological laws (Bałandynowicz, 2019). Another special case can be discerned in relation to the fact that individual members of the society are vehicles or carriers of social norms. Therefore, social change may result from spontaneous response to specific conditions. In such scenarios, informal institutions are formed by the practice of human activities, for instance those intended to oppose or circumvent the rules established at the level of institutional environment.

Conclusions

To sum up, it may be useful to revisit the original hypothesis posed at the onset of this study. Reconstruction of the ontological perspective provides suggestion of factual combination (at the level of concretization) between orthodox instruments and heterodox institutional factors. As such, it may be viewed as an elaboration of the popular assumption that institutions are of notable significance. At higher levels of idealization, the analytical significance of institutions is even more pronounced. Despite the fact that the New Institutional Economics is an elaboration of the framework of neoclassical approach by inclusion of the institutional dimension (Furubotn, Richter 2005, pp. 505-506), the real object of study at higher levels of idealization is that of institutions *per se*.

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Quality Concept and Its Role in Ensuring Competitiveness of Products and Services

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Abstract

The purpose of this study is to define quality as an economic category and its role in the modern economy. The article considers the problem of products and services quality in the context of globalization. To this end, an analysis of approaches to the definition of concepts 'quality' and 'quality management system' was carried out. As an example, the educational system and its role in shaping the quality of educational services are considered. Elements of the analysis methodology of possible labor market conditions of young specialists are presented, taking into account the qualitative and quantitative characteristics. A feature of this technique is that it allows you to determine the optimal strategy for the behavior of higher education institutions in the educational services market and it is the basis for further study of educational services quality. In order to carry out the research, methods of statistical and mathematical analysis were used.

Keywords: Quality, Competitiveness, Services, Products, Market.

Introduction

With the development of Belarus national economy, more and more attention is paid to the quality of products and services. Quality is an integral factor in competition, which provides an economic advantage to an economic entity. It includes the usefulness of a product or service, expressed in ergonomic, aesthetic, technical and other properties. Moreover, a low level of quality can harm the national economy and directly affect the living standard of the population (Borbotko, 2016a, p. 87).

The organization functioning in market conditions and fierce competition forces us to improve constantly the technological processes used in the production of goods. At the same time, an increase in the quality of goods is a reaction to consumer signals that may come in case of recognition and the absence of a trade brand negative image. Competitiveness is determined by a combination of qualitative and cost characteristics of goods, which are aimed at meeting the needs of the buyer. Moreover, the highest competitiveness corresponds to the highest utility in the total cost of the acquired goods (Borbotko, 2016b, p. 26).

The study purpose is to define quality as an economic category and its role in modern economy.

Methods

When preparing the article, first, logical and deductive methods were used, which allowed to define various concepts such as 'organization competitiveness' and 'goods competitiveness' and to highlight the approaches to the 'quality' concept interpretation.

The analysis and synthesis methods made it possible to understand the problem of studying the main provisions of the ISO 9001standard: 2015, closed loop PDCA and to highlight the methodology for young specialists training in the Republic of Belarus.

Results

Today, the Republic of Belarus is actively integrating into the global economic system. This integration is manifested not only in the promotion of goods on the world market, but also in the promotion of services, including educational ones. Almost every organization is faced with increasing competition, increasing the complexity of technological processes, reducing innovative and technological cycles. In this regard, the functioning organizations are the ones whose benefits fully correspond to the preferences of consumers.

There are two concepts that can be distinguished. The first one is 'organization competitiveness', the second one is 'goods competitiveness'. The 'goods competitiveness' is the totality of quality, cost and other characteristics that correspond to certain preferences of consumers and compare favorably with similar properties of other goods. In describing the 'goods competitiveness', a comparative analysis of its combined characteristics and the characteristics of the benefits of competitors is used, in which, as a rule, the cost of consumption is taken into account.

The 'organization competitiveness' is the ability of the organization to use its financial, production and labor potential effectively in order to produce competitive goods. Based on these definitions, new types of goods, or new forms and methods of providing services, are highly competitive.

Historically, the quality concept originates from the approach of 'bad' - 'good' differentiation to the marketing concept. Initially, the quality concept was purely philosophical in its nature, i.e. the good ceases to be by itself when it loses its quality. Now quality is a property of the good to satisfy the actual and hidden needs of a potential buyer. Quality reflects the relationship of the basic elements of an object that characterize its specificity.

As a rule, researchers offer the following interpretations of the concept of 'quality'.

1. Quality is an essential feature, a property that distinguishes one object or one person from another.

2. Quality is the degree of dignity, value, suitability of things, actions, etc., full compliance with what it should be.

3. Quality is the essential certainty of an object, its phenomenon being the object given and not any other (Zabavskaya and Burdyugova, 2015, p. 12).

Based on the quality concept interpretations, we can formulate the following definition of quality. Quality is a certain characteristic that determines the socio-economic feature of an object, and its distinctive properties. At the same time, the socio-economic category, on the one hand, is a combination of existing characteristics, determined by indicators determining consumer utility, and, on the other hand, reflects the consumer's opinion of goods.

The quality concept can be considered in four aspects, i.e. legal, economic, social and philosophical one. As a legal category, quality can be defined as the conformity of the aggregate properties of an object with established regulatory documents. As an economic category, quality can be defined as a set of characteristics of an object that maximize profits by its implementation. The social aspect of quality is realized in the property of an object to satisfy the needs of the population. Quality, as a philosophical category, can be defined as the essential purpose of the given object.

Quality is a comprehensive category that reflects the effectiveness of the entire organization, seeing this, we can distinguish the objective quality, i.e. the quality of a particular good and its ability to satisfy a particular need and functional quality, i.e. the needs satisfaction level of the independent demand (Lisenkov, 2019, p. 147).

In the ISO 9001 standard: 2015, the following provisions are reflected concerning the issue of 'quality concept'.

1. A quality-oriented organization encourages a culture of behavior, relationships, actions and processes that create value by fulfilling the needs and expectations of consumers and other relevant stakeholders.

2. The quality of an organization's products and services is determined by its ability to satisfy consumers and by deliberate or unintentional influence on relevant stakeholders.

3. The quality of products and services not only includes the performance of functions in accordance with the purpose and their characteristics, but also the perceived value and benefit to the consumer.

Thus, the standard proceeds from the fact that the quality of an object is determined by its consumer properties, which is natural.

All existing interpretations of quality can be united into five groups:

1. Concepts that reveal the essence of quality as an absolute assessment, i.e. not measurable sign of good.

2. The concepts that reveal the essence of quality as a property of a product, these concepts consider quality as a derivative of any measurable product characteristic, the higher the characteristic, the higher the quality.

3. Concepts that reveal the essence of quality as the correspondence of a product to its value, i.e. quality is defined as the ratio of the product cost to its usefulness (i.e. the product is useful and cheaper than its counterpart is).

4. Concepts that reveal the essence of quality as the conformity of a product to its intended purpose, i.e. the ability of a product or service to perform its functions (or suitability).

5. Concepts that reveal the essence of quality as a norm of compliance with standards, i.e. compliance of the facility with technical specifications and tasks, including target values of the facility's characteristics.

In modern literature, the 'quality management' and 'quality management system' concepts are used as a generalization of the action to form the quality of an object.

Based on the 'quality management system' concept presented in the standard ISO 9001: 2015, the following aspects can be distinguished.

1. A quality management system is a set of actions by which an organization determines its mission and goals, processes and resources necessary to achieve the desired results.

2. A quality management system is a set of actions aimed at managing the interacting processes and resources required to form the value of the results obtained.

3. The quality management system is a system that allows management to optimize the resources used, taking into account the consequences of their decisions.

4. A quality management system is a set of management tools used to identify actions taken with respect to intentional or unintended consequences in the provision of products and services.

Quality planning is an integral element of the quality management system aimed at setting goals in the field of quality, determining the necessary processes, allocating appropriate resources for the implementation of these processes, and achieving their goals. Quality management is expressed in the preparation and inclusion in the quality plan of indicators to assess the results of the organization, as well as monitoring of these indicators. Quality assurance is a set of measures to build confidence that the facility will meet the stated requirements. Quality improvement, this element of the quality management system is determined by the cyclical nature of the organization.

Such a closed loop control is known as the PDCA or Plan-Do-Check-Act cycle or Deming cycle. The PDCA methodology is the simplest algorithm of the manager's actions to manage the process and achieve its goals. The control cycle begins with planning.

Planning is the setting of goals and processes necessary to achieve goals, planning work to achieve the goals of the process and customer satisfaction, planning the allocation and distribution of necessary resources. Fulfillment is the fulfillment of the planned work. Verification - collecting information and monitoring the result obtained during the process, identifying and analyzing deviations, establishing the causes of deviations. Influence (management, adjustment) is taking measures to establish the reasons for deviations from the planned result, changes in planning and allocation of resources.

The PDCA cycle underlies the management of any activity, i.e. applicable both to the process as a whole and to individual work included in the process. The cycle can be applied to itself. For example, if you apply the PDCA cycle to its Act part, this is an adjustment; you get the following systematic control scheme. For example, Plan is planning, developing corrective actions based on the analysis of deviations. Do is the implementation, implementation of corrective actions. Check is a check of the effectiveness (or efficiency) of corrective actions. Act is the analysis of the reasons for the unsuccessful elimination of the reasons for the deviation and the decision to develop (or not develop) new corrective actions.

In practice, the PDCA cycle is used repeatedly with varying frequency. When carrying out its core business, the PDCA cycle is applied with the periodicity of reporting and planning cycles. When performing corrective actions, the duration of the PDCA cycle can be less or longer than the duration of the reporting and planning cycle and is set depending on the nature, scope, duration and content of measures to eliminate the causes of deviations.

Thus, the quality concept plays a key role in determining the business entity functioning effectiveness and it depends on the technologies used in the work of structural units.

Let us consider the approach to the 'quality' definition, using the example of education system interaction and young specialists' labor market.

The interaction of educational system and young professionals' labor market can be represented through the following categories (Borbotko, 2016a, 2016b).

1. The correlation between the number of graduates and the declared need for them by the labor market (correlation between supply and demand) are the quantitative characteristics.

2. 2. The relationship between the level of residual knowledge of graduates and the level of knowledge determined by the current development of the economy (i.e. the ratio of specialist knowledge to required knowledge) are the qualitative characteristics.

The balance between supply and demand is based on the needs for graduates and the required level of knowledge; a current analysis of trends in technologies used in the economy is necessary. Based on the possible results, a training plan for graduates is drawn up, which is drawn up both in the context of the economy and by educational institutions. Training plans for young specialists are promising, link the additional needs of the economy with the possibility of training in educational institutions, and include:

1. The student enrollment plan is determined for each year of the planned period by the result and by the forms of training in the context of specialties and specializations.

2. The curriculum is determined by the requirements for educational process quality.

3. The graduation plan for young specialists determines the need of the economy for young specialists through a full cycle.

Key indicators for the student enrollment plan.

1. A generalized acceptance indicator is a general indicator reflecting the number of students recruited by educational institutions.

2. A general indicator of graduated young specialists. It is a general indicator reflecting the need of the economy for young specialists.

3. The retirement rate characterizes the dynamics of students' retirement in preparation process.

Key indicators of the training plan:

1. The general indicator of training, which reflects the ratio between the generalized indicators of required and current knowledge.

2. The general indicator of the required knowledge, which reflects the general level of the required knowledge, skills, and abilities presented to a young specialist.

3. The general indicator of current knowledge, which reflects the knowledge of the student or graduate.

Key indicators of the graduation plan for young professionals:

1. The economy’s need for young specialists.

2. The demand coefficient in the current period and in n-periods preceding the current.

3. Needs change coefficient.

Other indicators:

1. The young specialist training cost.

2. The cost of adaptation actions.

3. The share of academic work in the annual time balance.

Assessment of quantitative and qualitative indicators is presented in Figures 1, 2 and mathematically expressed by formula 1 and formula 2.

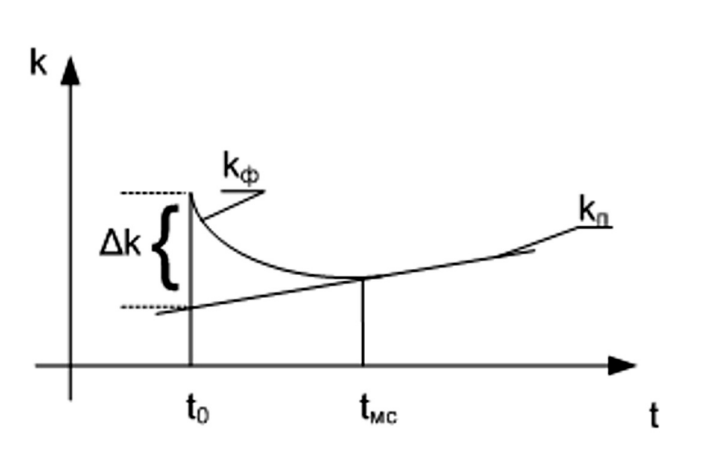

Fig. 1: Temporal dependence of the young specialists number being trained and who are required by the country's economy (t_0 – educational institution admission time; $t_{мс}$ – young specialists entry time to the labor market)

$$\begin{cases} \Delta k = k_{прог} - k_{Ф} \\ k_k = \dfrac{k_{прог}}{k_{Ф} - \Delta k} \\ k_k = 1 \end{cases}, \quad (1)$$

where $k_{прог}$ – the number of young professionals required by the economy, the measure units;
$k_{Ф}$ – the number of students actually trained in an educational institution, units;
Δk – the difference between the predicted value of the need for young specialists and actually trained educational institutions, current time;
k_k – the need for young specialists coefficient.

The quantitative analysis is based on the social method, i.e. the need for young specialists is determined by social needs.

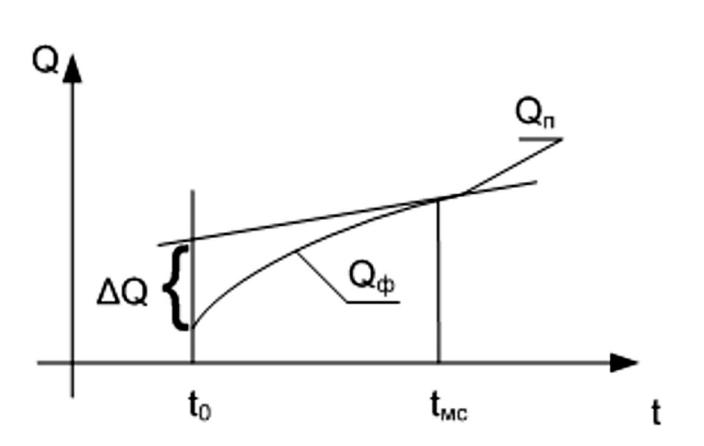

Fig. 2: Temporal dependence of actual and required education quality (t_0 – admission time; $t_{мс}$ – young specialists entry time to the labor market)

$$\begin{cases} \Delta Q = Q_{Ф} - Q_{прог} \\ k_Q = \dfrac{Q_{Ф} + \Delta Q}{Q_{прог}} \\ k_Q \geq 1 \end{cases}, \qquad (2)$$

where $Q_{прог}$ – education quality;
$Q_{Ф}$ – the actual quality of education;
ΔQ – the difference between the predicted value of educational programs quality;
k_Q – the quality level coefficient of young specialists.

Figures 3 and 4 show the changes in the k_Q and k_k indicators. Let us consider the case when these coefficients are not equal to the unit.

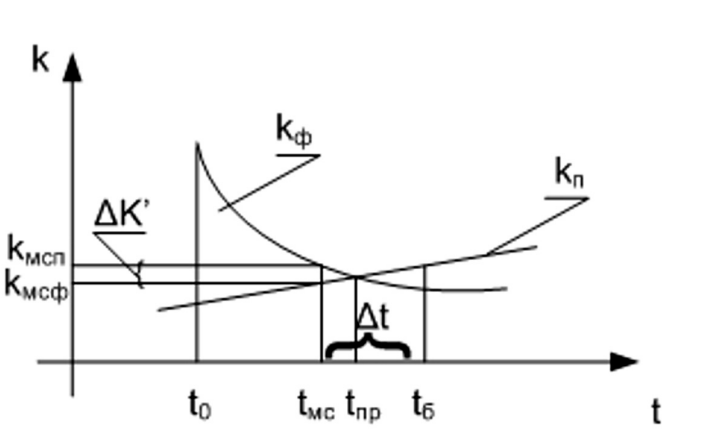

Fig. 3: Time required to create jobs (Δt) depending on the number of trained young specialists (Δk'), provided that the coefficient of demand for young specialists is less than one (k_k <1)

(t_0 – admission time; $t_{пр}$ – the time when the predicted value of the need for young specialists is equal to their graduation)

$$\Delta k' = k_{мсп} - k_{мсф} \tag{3}$$

$$\Delta k = \sum_{t=t_{мс}}^{t_б - 1} \left(k_{мсп}(t+1) - k_{мсф}(t)\right) + \Delta k' - k_п \tag{4}$$

$$\begin{cases} k_ф + \Delta k \le k_п \\ \Delta t = \Delta t + 1 \\ t_б = t_{мс} + \Delta t \end{cases}, \tag{5}$$

where $k_п$ – the number of young professionals needed by the economy in the forecast period;
$k_ф$ – the of students trained by educational institutions;
$\Delta k'$ – the difference between the predicted value of the need for young professionals and actually trained ones by educational institutions;
Δk – the value reflecting the accumulated excess of young professionals in the economy;
$k_{мсп}$ – the number of young professionals trained by educational institutions at the time of graduation;
$k_{мсф}$ – actual need for young specialists at the time of graduation;
$t_{мс}$ – young specialists entry to the labor market;
$t_б$ – the time when the excess of young specialists in the labor market will be eliminated.

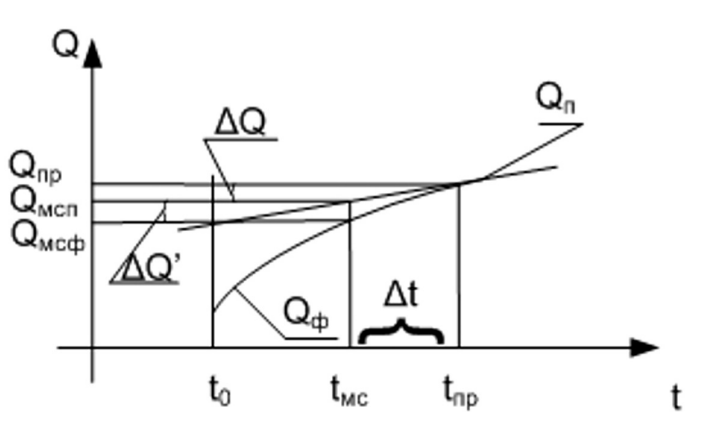

Fig. 4: Time (Δt) dependence required to achieve equality between the level of required and existing knowledge of young specialists, provided that the quality coefficient of young specialists training is less than the (kQ <1) unit (t_0 – admission time)

$$\begin{cases} \Delta Q' = Q_{мсп}(t_{мс}) - Q_{мсф}(t_{мс}) \\ \Delta Q = \sum\limits_{t=t_{мс}}^{t_{пр}-1} \left(Q_{мсп}(t+1) - Q_{мсф}(t)\right) + \Delta Q' \\ Q_{пр} = Q_{мсп}(t_{мс}) + \Delta Q \end{cases}, \quad (6)$$

$$\begin{cases} Q_{п} \le Q_{пр} \\ \Delta t = \Delta t + 1 \\ t_{пр} = t_{мс} + \Delta t \end{cases}, \quad (7)$$

where $Q_{п}$ – quality of education in the forecast period;
$Q_{ф}$ – actual quality of education;
$\Delta Q'$ – the difference between the predicted value of the education quality and the actual one;
ΔQ – the difference between the actual value of the education quality and the forecast one at the balance onset;
$Q_{мсф}$ – actual education quality at the time of graduation;
$Q_{мсп}$ – the required education quality at the time of graduation;
$Q_{пр}$ – education quality of at the balance onset;
$t_{мс}$ – the time that young professionals enter the labor market;
$t_{пр}$ – balance between actual and necessary quality of education.

All possible dependencies of the time required creating (Δt) jobs, and the number of ($\Delta k'$) trained young specialists and the (Δt) time necessary to achieve equality between the level of required and existing knowledge of young specialists.

When considering the processes of interaction between the education system and the labor market of young specialists, an integrated approach is needed, i.e. qualitative and quantitative indicators should be considered simultaneously (Table 1).

Table 1: Labor market organizing strategies for young specialists, depending on their coefficient need and the level of training quality of young specialists

Indicator	$k_Q>1$	$k_Q=1$	$k_Q<1$
$k_k>1$	1. High level of expertise of young professionals and the market's lacking for them	4. Necessary level of expertise of young professionals and the market's lacking for them	7. Low level of expertise of young professionals and the market's lacking for them
$k_k=1$	2. High level of expertise of young professionals and the balance between supply and demand in the labor market	5. Necessary level of expertise of young professionals and the balance between supply and demand in the labor market	8. Low level of expertise of young professionals and the balance between supply and demand in the labor market
$k_k<1$	3. High level of expertise of young professionals and unemployment among them in the labor market	6. Necessary level of expertise of young professionals and unemployment among them in the labor market	9. Low level of expertise of young professionals and unemployment among them in the labor market

The ratio between these indicators are the second and fifth strategies. However, if there is a chance of meeting the economy needs for specialists at the expense of the retired, other specialists retraining. It is possible to alternate the third (and the sixth) strategies with the first (and the fourth) strategies. Other combinations are not permissible, since they lead to a disproportion between supply and demand. The seventh through the ninth strategies are not acceptable, as the specialists trained in them do not possess the necessary knowledge.

If the need of the country's economy can be quickly filled, then improving the quality of knowledge is a more complex process (Borbotko, 2016a, p. 88).

The algorithm for basic requirements and their application in an educational institution are as follows:

1. The definition is formed based on the results of the economic sectors development, taking into account the changes in technology over the period of student preparation, and the adaptation period.

2. The procedure of detailing the general required level of knowledge for each year of preparation is carried out.

3. An educational institution forms a training plan for a young specialist, so that they fully take into account the results of the general required level of knowledge, and, if possible, a detailed, general required level of knowledge.

4. The plan for training a young specialist in an educational institution is being detailed.

5. In the process of training young specialists, with a frequency of one year, the quality of the educational process is monitored in the form of an assessment of acquired theoretical knowledge and practical skills.

6. The planned results are compared with the obtained ones and appropriate decisions are made to adjust the preparation procedure.

Young specialist knowledge assessment is a comprehensive assessment. It is calculated for each year and comprehensively for the entire period. The final value ranges from 0 to 1 and is defined as the sum of the theoretical knowledge indicator and the indicator of practical knowledge. Possible correlation between theoretical and practical knowledge is 0.42 / 0.58.

$$Q_j = \frac{\sum_{i=1}^{n} O_i}{\sum_{i=1}^{n} I} * \frac{K_j}{O_{i\max}}, \tag{8}$$

where Q_j – j level indicator;
O_i – i examiner grade;
I – the number of examiners;
K_j – j knowledge coefficient;
$O_{i\max}$ – maximum rating;

$$K_{ОБЩ} = K_T + K_П; K_{ОБЩ} = 1, \tag{9}$$

where $K_{ОБЩ}$ – total coefficient value;
$K_{Т}$ – coefficient of theoretical knowledge;
$K_{П}$ – practical knowledge ratio.

The j knowledge indicator is divided into ranges. Each range is assigned to its own characteristic, i.e. from the lack of knowledge to complete knowledge. This action allows you to summarize indicators of the knowledge level in the educational unit (i.e. group, stream and course).

The following methods of training young specialists in the Republic of Belarus are based on the level of knowledge:

1. Knowledge either exceeds or equals the required level, while the graduation of young specialists meets the market needs.

2. Knowledge either exceeds or equals the required level.

   2.1. The need for the young specialists in the base period is much less, if it is replenished at the expense of other categories (as pensioners, retraining, work contracts, etc.).

   2.2. The graduation of young specialists in the next period is much more due to the lack of specialists in the base period (Borbotko, 2016b, p. 33).

Other options for training young specialists are unacceptable, because either young specialists do not have the necessary level of knowledge, or there is a likelihood of unemployment among them.

Thus, the labor market system for young professionals depends on two groups of indicators:

1. The indicators of the management system in terms of quantity characterize the level of meeting the needs of the labor market in young specialists. The coefficient of need for young specialists should be equal to one. If the indicator exceeds unity, then this indicates errors in forecasts of the need for specialists. If it is less than one, then this indicates unemployment.

2. Quality management system indicators characterize the level of young specialists' knowledge. The coefficient of the quality level of young specialists training should be at least one. If the indicator is less than one, then this indicates the training system inefficiency (Borbotko, 2016b, p. 34).

Discussion

Having completed the analysis and generalization, we can indicate that the problem of quality and its impact on the competitiveness of products and services causes considerable interest among researchers. More than 2,000 articles published only over the past 10 years (Schetkina, 2011; Zabavskaya and Burdyugova, 2015; Loginova and Balzamova, 2018; Lisenkov, 2019) evidence this. At the same time, we can say that all studies are characterized by the absence of a single approach and views on the formulation of basic terms and concepts (Lisenkov, 2019, p. 148).

Only a few authors try to analyze the experience of some states in providing a quality management system for national educational systems (Schetkina, 2011, p. 273).

Acting on the premise that, the authors tried to highlight the main approaches to the formulation of basic categories, derive formulas that allow us to assess the needs of the market for young specialists, the impact of the quality management system on their competitiveness.

Conclusion

The authors propose to formulate the category 'quality' as some characteristic defining the socio-economic peculiarity of an object and its distinctive properties. They concluded that the concept of 'quality' plays a key role in determining the effectiveness of business entity functioning and it depends on technologies used in the work of structural units. To assess the effectiveness of their work, a number of calculation formulas (8 units) are proposed.

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Pork Production in the World and in the Main Producing Countries in the period 2009-2019 and Forecast for 2020-2015 Horizon

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Abstract

The paper analyzed pig population, pork production and consumption globally and in the main producing countries in the period 2009-2019, using trend analysis and regression models and forecasting the estimates for the 2020-2015 horizon. Despite that pig livestock declined by 18.4 % due to the African Swine Fever (AFS) and the drift of the breeders to broilers fattening, pork production reached 106.1 Million tons Carcass Weight Equivalent, to which the contribution of the main producing countries was: China (56.4%), EU (19.2%) and USA (9.3%). In 2019, pork comes on the 2nd position with 12.3 kg consumed/capita (35.7% of 34.4 kg in the world). The other main producing countries are: Brazil, Russia, Vietnam, Canada, Philippines, Mexico, South Korea and Japan. China is the top producer with 46.5 Million tons achieved in 2019, which is equivalent to the output achieved by the EU, USA, Brazil, Russia and Vietnam. China is also the largest pork consumer and the top importing country. The EU is the 2nd pork producer and the main exporter in the world. Pig number declined, but pork production increased reaching 24 Million tons in 2019. The EU and the USA are the main exporting countries advantaged by the increased demand and price mainly in the Asian countries after the outbreak of ASF. In 2025 it is expected that the world pork production to reach 110.1 Million tons as the demand will continue to grow, stimulating the increase of price and export.

Keywords: Pork Production, World, Main Producing Countries, Trends, forecast

Introduction

Meat consumption is the key factor influencing production. Meat consumption is imposed by the need of protein in human diet, as protein supplies a large variety of amino acids responsible to synthesize new proteins in muscle tissues, antibodies, and blood cells. More than this, our body is able to produce just 11 amino acids of the 20 amino acids existing in proteins. For avoiding the protein deficiency and for being healthy, humans must consume meat to procure the other 9 essential amino acids.

Meat nutrients are essential for vital functions of humans. Pork is an important source of protein, a tasteful meat prepared in various ways, providing a high nutritional value, a high digestibility, at an acceptable price.

The chemical content of 100g pork consists of: water 51.5g, proteins 41.3g, fats 33.3g, vitamins (especially B3-niacin, B6-pyridoxine and B12-cobalamine), minerals 0.9 g (zinc and iron), and produce an energy value of 357 kcal, which is higher than in case of other sorts of meat as mentioned Soare and Chiurciu (2017).

Meat nutrients are essential for vital functions of humans and also for animals. Pork chemical composition determines meat quality and is deeply influenced by pig breeds, lines and cross-breds (hybrids), feeding type, diet structure and intake, age, sex, growing conditions, live weight at slaughter etc as specified Skobrák and Bodnár (2012).

The optimum slaughter weight is closely connected to the basic chemical composition of pork as mentioned Lukač el al (2015).

The need of protein of animal origin, considered the most valuable protein, has determined producers to develop business in pig, cattle, poultry, and sheep fattening in order to produce more meat.

Along the time, pork has been on the top in the world consumption, but at present it passed on the 2nd position in favor of chicken meat. In 2009, pork represented 40 %, beef 24%, chicken 29% and other meats 5% in the world meat consumption (Anonymous, 2015). In 2019, pork accounted for 35.9%, poultry meat 38%, beef and veal 21.4% and sheep meat 4.7% (OECD-FAO, 2019, OECD-FAO Agricultural Outlook).

This is due to the high competition between pig and poultry sectors regarding meat quality and the change in consumer preferences to a healthier meat, with a low cholesterol content, rich in high value protein and cheaper as broilers' meat (Popescu, 2009 and 2013).

The high competition among meat producers has been an incentive for implementing modern technologies which assure a higher profitability and meat quality. As a result, pork producers and processors are aware that they must be focused on consumer's behavior and preferences in order to develop the most adequate strategies in pork sector to produce more meat and of higher quality and also to benefit of the export opportunities on the international markets, mainly in the countries affected by African Swine Fever (ASF) as affirmed Rotaru (2018).

More than this, the development of pork sector is very important to keep pace with the globe population growth. In 2020, it is expected as the world population to account for 7.79 Billion people and in 2025 for more than 8.2 Billion. And this population needs more food to assure its survival, and especially meat as the main source of protein. Therefore, pork will remain an important meat in human consumption (Plain, 2018).

In this context, the paper aimed to analyze the dynamics on pork production at the world level and in the top producing countries, emphasizing the main tendencies, challenges and opportunities in the period 2009-2019 and to set up the forecast for the 2020-2025 horizon.

The paper is structured as follows: *Introduction* presents the results regarding the pork production importance in the world, *Materials and methods* present the study area, the sources of data, the specific indicators analyzed in this study, and the methodology used in this research. *Results and Discussions* provide the obtained results, comments and interpretations, and *Conclusions* present the main ideas resulting from this research work.

Materials and Methods

Data collection

The paper needed a large range of data which have been provided by FAOSTAT Database, Livestock primary, for the period 2009-2019 and also from other sources like: USDA Reports, USDA, Livestock and Poultry: World Markets and Trade, OECD-FAO Agricultural Outlook, Statista etc.

The studied indicators were:

(i)pig livestock and its distribution among the leading countries in the world,
(ii)pork consumption compared to the other sorts of meat in absolute figure and also in kg per capita at the world level and also in the developed and developing countries,
(iii)pork production at the world level and in the main producing countries,
(iv) a few aspects about imports as a factor destined to cover the domestic market needs in the main pork producing countries and also about exports in case of the countries with high production potential and ASF-free.

Methodological aspects used in this study

Dynamics analysis was used in order to quantify the growth rate on the interval 2009-2019, based on the formula: $I_{FB(\%)} = (Y_n/Y_0)100$, where: Y_n is the value of the variable in the year n and Y_1, the value of the variable in the year 0.

Trend line for each indicator was established using either the linear regression or polynomial models depending on the distribution of value in the graph.

For instance for the linear trend, the used formula (Stefanescu and Dumitriu, 2018) was:

$E_l(y_{ti}) = \beta_0 + \beta_1 \text{ x } t_i$,
where:
$E_l(y_{ti})$ = the value of the linear trend of the variable y_i for the term with the order number i;
t_i = the value of the time variable for the term with the order number i;
β_1 = the trend slope, that is a coefficient associated to the time variable indicating the variation of the trend value when t raises by one unit;
β_0 = a constant, reflecting the value of the linear trend when the variable t_i = zero.
The associated linear regression model has been:
$y_i = \hat{y}_i + \epsilon_i = \beta_0 + \beta_1 \text{ x } t_i + \epsilon_i$,
where:
y_i = the empirical value of the dependent variable;
$\hat{y}_i = \beta_0 + \beta_1 \text{ x } t_i = E_l(y_{ti})$, that is the mathematical model associated to the regression obtained based on the t_i value of the independent variable;
ϵ_i = error, that is the difference between the value given by the regression function and the empirical one, provided by the data; the error is supposed to have a normal distribution with the arithmetic average = 0 and a variance which does not depend on the predictor variable.

Testing the regression equations was based on F test, based on the hypotheses:

H_0: $\beta_0 = \beta_1 = 0$, meaning that the values of the equation coefficients do not significantly differ of zero;
H_1: $\beta_0 \neq 0$ or $\beta_1 \neq 0$, meaning that at least one of the equation coefficients significantly differs from zero.

The interpretation of the regression test of significance: H_0 is accepted if Sign F > 5%, H_1 is accepted if Sign F< 5%.

The determination coefficient, R^2, was also illustrated next to the regression model to explain in what measure the regression equation is valid.

The results were both graphically illustrated and tabled. The conclusions pointed out the main aspects regarding the analysis of pork production in the world in the main producing countries.

Results and Discussions

World Pig Livestock

Pork production evolution is closely related to the number of pigs raised in various countries, herd size, growing and fattening systems, feeding systems, genetic potential of the used breeds, lines, hybrids, number and weight of piglets at birth and weaning, capacity of using feed, daily gain, pig health and maintenance conditions, number of slaughtered pigs, pig live weight at slaughter, carcass weight, carcass classification system and quality as mentioned Babovic et al (2011) and Chirila et al (2012).

Compared to poultry raising, pig farming involves higher input costs linked to the assurance of the biological material (piglets), feedstuff, labor, energy, wastes recycling etc. Pig price per kg live weight at the farm gate increased covering production costs and assuring profit to pig breeders stimulating business in pig fattening as specified by Popescu (2012b and 2012c).

In the emerging economies, pig farming is encouraged by the low input costs and the need to assure farmers' income and living standard of their families.

In the last decade, the world pig livestock registered in general a decreasing trend from 941 million heads in the year 2009 to 767.6 million heads in 2019, meaning by 18.43% less than in the first year of the analysis. The highest number of pigs was 963 million being recorded in 2011, then the pig livestock varied up and down till 2019, when it was registered the lowest level. The R^2 shows that 68% of the variation of world pig livestock depends on the time variable (Fig.1).

In this case, H_0 was rejected, and H_1 was accepted, as Sign F = 0.173 % < 5%, that is at least one of the coefficients of the regression equation is different by zero.

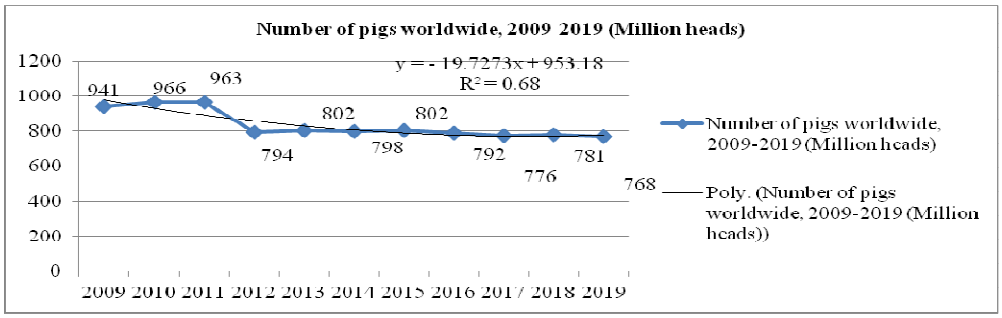

Fig.1: The world pig livestock trend, 2009-2019 (Million heads)
Source: Own design based on data from Faostat, 2020, Data, Livestock primary and Statista, 2020.

The decreasing trend in pig livestock during the last years was determined by many causes, the main ones being:

-the extend of the African Swine Fever (ASF), which restarted since 2014 affected pig breeders in about 50 countries, mainly from Asia (China, Vietnam, South Korea, Myanmar, Indonesia, Philippines, Georgia, Armenia, Azerbaijan etc), but also from Europe (Poland, Lithuania, Russia, Ukraine, Belarus, Slovenia, Romania, Bulgaria, Belgium) and Africa (Zambia, South Africa). It is estimated that about 25 % of the world pig population will die due to this disease, with a deep economic and social impact: pork production decline, the boom of pork price on the international markets, the increase of imports in the affected countries, mainly in China, who is the top pork producer where millions of pigs have been lost. Also, pork consumption will be affected obliging consumers to be focused on poultry, fish, beef and sheep meat, whose price will go up (Anonymous, 2019; Deblitz et al, 2018; Pitts and Whitnall, 2019).

-the increased competition of the development of poultry farming, broilers fattening offering advantages *for breeders:* a shorter fattening period, more growing series per year compared to 2.5 series in case of pig fattening, lower production cost per kg live weight, high profitability, and *for consumers* who changed their preferences being more oriented to lean meat with a high protein content, chicken meat being considered by nutritionists a healthier meat than pork due to its low cholesterol content (Bogosavljevic-Boskovic et al, 2012).

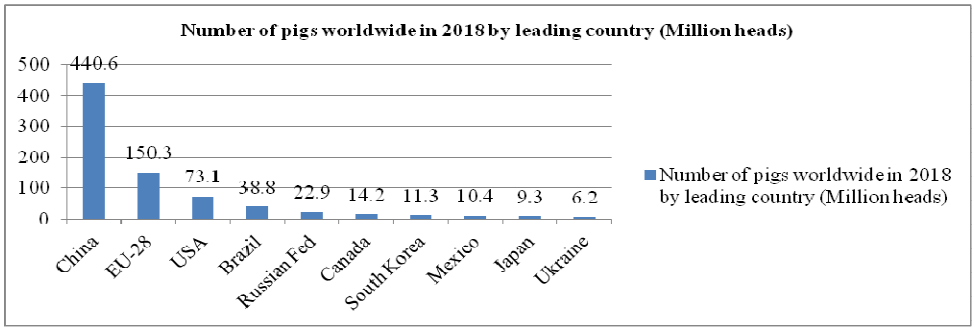

Fig.2: Pig population in the leading countries worldwide in 2018 (Million heads)
Source: Own design based on the data from Statista, (2020).

The distribution of pig livestock on the globe reflects that about 60% of the number of pigs is in Asia and about 20 % in Europe. While in Asia the pig population is increasing, in Europe is declining (Kemp et al, 2012).

The main pig growing countries are China, EU, USA, Brazil, Russia, Canada, South Korea, Mexico, Japan and Ukraine, whose pig livestock is shown in Fig.2.

Therefore, a number of 10 countries in the world keep and grow the largest number of pigs summing 777.15 million heads, representing 99.4% of the world pig livestock in the year 2018.

In 2018, the share of pig number in the main growing countries was the following one: China 56.4%, the EU 19.2%, the USA 9.3%, Brazil 4.9%, Russia 2.9%, Canada 1.8%, South Korea 1.4%, Mexico 1.3%, Japan 1.2%, Ukraine 0.8% (Fig.3).

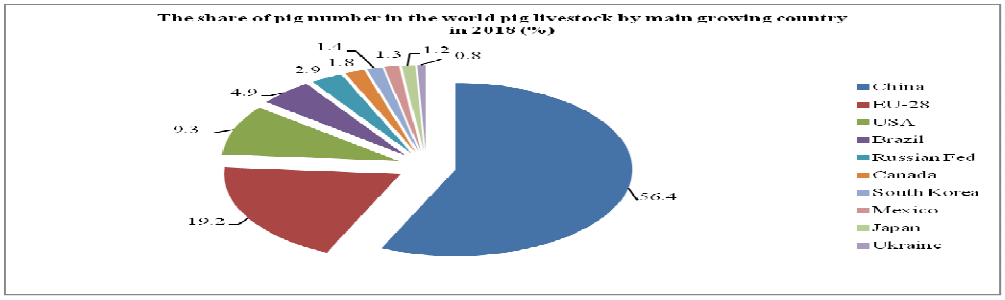

Fig.3: The share of the main pig growing countries in the world pig livestock in 2018(%)
Source: Own design and calculation based on the data from Statista, (2020).

Taking into account the average annual decline rate in the number of pigs in the analyzed interval, -1,85%, it is expected that the number of pigs to continue to decrease and in 2025 to account for only 686.26 Million heads (Table 1).

Table 1: World pig population forecast for 2020-2025 horizon (Million heads)

	2020	2021	2022	2023	2024	2025
World pig population forecast	753.40	739.46	725.78	712.36	699.19	686.26

Source: Own calculation.

World Pork Consumption

Table 2: World meat consumption by meat sort in 2019

Meat sort	World meat consumption		Meat consumption in the developed countries		Meat consumption in the developing countries	
	Amount	%	Amount	%	Amount	%
Beef and veal	70,480	21.4	29,649	24.1	40,831	20.0
Pork	117,809	35.9	41,387	33.7	76,422	37.2
Poultry meat	124,637	38.0	48,779	39.8	75,858	36.9
Sheep meat	15,048	4.7	2,812	2.4	12,236	5.9
World	327,974	100.0	122,627	100.0	205,347	100
World average meat consumption per capita (kg)	34.4	-	69.2	-	26.5	-
World average pork consumption (kg)	12.3	-	23.3	-	9.85	-

Source: Own calculation based on the data from OECD-FAO, 2019, Agricultural Outlook.

The need of protein of animal origin has stimulated meat production whose share in daily diet increased both in the developed and developing countries.

Pork is situated in the 2nd position in the world meat consumption after poultry meat and compared to the other sorts of meat. In the structure of the human diet, in 2019, pork represented 35.9% of total meat intake, poultry meat 38%, beef and veal 21.4% and sheep meat 4.7%. The world average meat consumption per capita in 2019 was 34.4 kg, of which pork 12.3 kg/capita.

However there are differences between the developed countries and the developing countries regarding pork consumption. While in the developed countries, the average meat consumption per capita was 69.2 kg, of which pork 23.3 kg (33.7%) in 2019, being situated on the 2nd position after poultry meat, in the developing countries, the average meat consumption per capita was 26.5 kg, of which pork 9.85 kg (37.2%) in 2019, being situated on the 1st position (Table 2).

World Pork Production

Pork production registered a continuous increase along the time grace to its importance in human diet, except the countries where the religion does not allow pork consumption.

Compared to the year 1985, when the world pork production accounted for 60 Million tons, in 2019 it reached 106.1 Million tons CWE (Carcass weight equivalent), meaning 1.76 times more. During these 35 years, the peak of pork output worldwide, 111.9 Million tons, was achieved in the year 2018 (Fig.4).

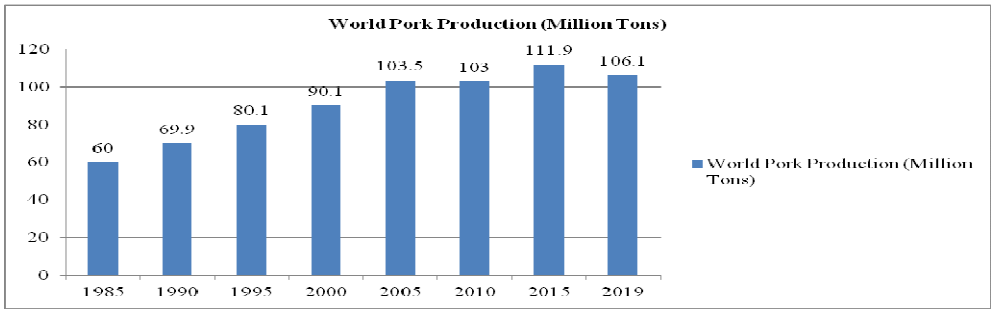

Fig.4: World pork production evolution between 1985 and 2019 (Million Tons)

Source: Own design based on the data from Faostat, 2020, Data, Livestock primary and Popescu (2009).

Analyzing the evolution of pork production in the last decade, the output growth was 6.13% in the whole interval from 100 Million tons CWE in 2009 to 106.13 Million tons CWE in 2019.

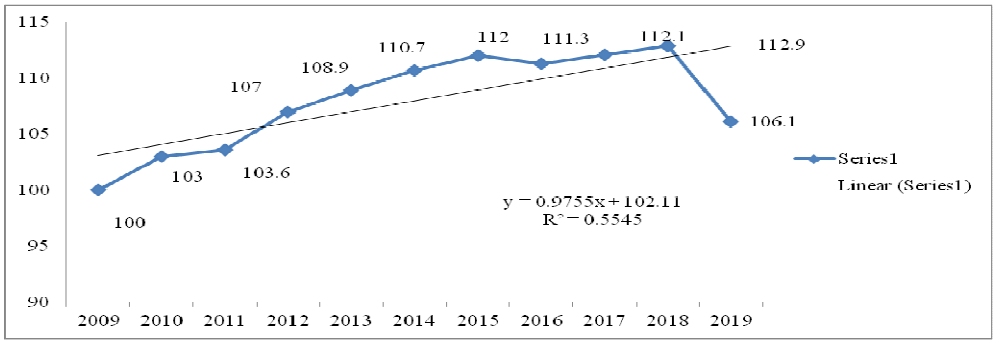

Fig. 5: World pork production trend line, 2009-2019 (Million Tons CWE)
Source: Own design based on Faostat Data Base, 2020, OECD-FAO Agricultural Outlook, and USDA Reports.

The regression model confirms the increasing trend and R^2 tell us that 55.45 % of the variation of pork production depended on the time variation. The regression model is suitable to this trend line, as Sign. F = 1.02 % is smaller than 5%, and the H_1 was accepted, meaning that at least one of the coefficients of the equation is different from zero (Fig.5).

The increase of pork production is justified by achievements in the developed countries regarding the industrialized and integrated pig farming and processing, the progress in modern technologies based on high performance tetra-linear hybrids for pig fattening, balanced feed rations assuring a high daily gain, the optimum average weight at slaughter 100-110 kg/pig which provide a lean meat and a low fat layer on the back line and in general a lower fat content in the carcass.

In the developing countries there are different swine raising and processing systems, which do not support enough the population's needs of meat, the average consumption being the much lower than in the developed countries.

The distribution of pork production by continent reflects that Asia comes on the top position with 55.9%, followed by Europe with 24.29%, North America 11.53%, South America 4.95%, Central America 1.6%, Africa 1.17% and Oceania 0.56% (Istvan and Vida, 2017).

The average growth rate of pork production in the studied period was + 0.62 % and based on this, the forecast for 2020-2015 horizon estimates that in 2025 the world pork production will reach 109.46 Million tons CWE (Table 3).

Table 3: World pork production forecast for 2020-2025 horizon (Million Tons, CWE)

World pork production forecast	2020	2021	2022	2023	2024	2025
	106.78	107.45	108.12	108.79	109.46	110.14

Source: Own calculation.

The world pork production is sustained by eleven main producing countries: China, the EU, the USA, Brazil, Russia, Vietnam, Canada, Philippines, Mexico, South Korea and Japan, which summed 100.47 Million Tons CWE representing 94.66% of the world pork output in the year 2019 (Fig.6).

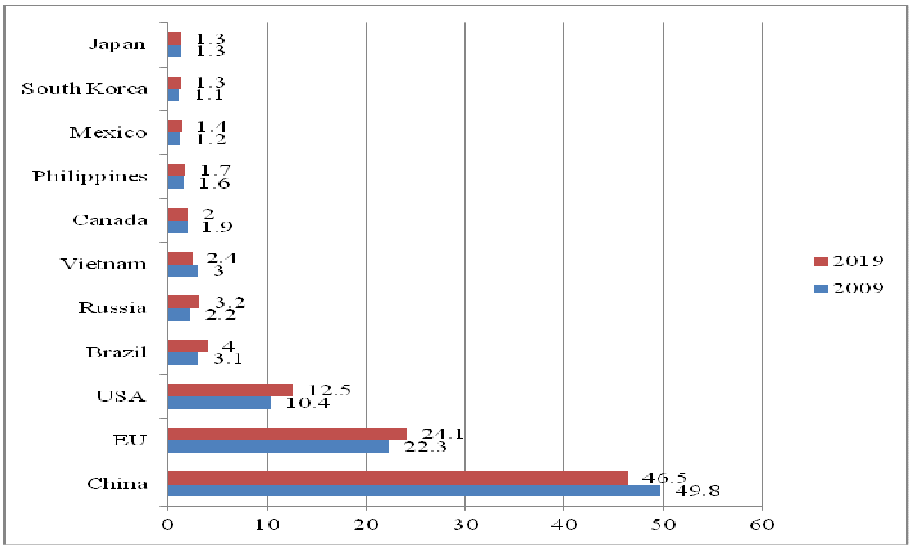

Fig.6: Pork production in 2019 versus 2009 in the top producing countries in the world (Million tons CWE)

Source: Own design based on the data from Faostat, 2020.

In the analyzed period 2009-2019, the pork production increased in the following countries: Russia +49.37%, South Korea +28.17%, Brazil +26.99%, USA +19.86%, Mexico +19.62%, EU +8.05%, Philippines +2.82%, Canada + 2.56%, and decreased by -20.93% in Vietnam, -6.81 % in China and -1.15 % in Japan (Anonymous, 2019e; FAO, 2017, Food Outlook).

***In China*,** pork production declined by 6.81 % from 49.89 Million tons in 2009 to 46.5 Million tons in 2019. The highest pork output in China was 57.66 Million tons achieved in 2014 and the smallest performance was noticed in 2019. The determination coefficient reflected that 80 % of the variation of pork production was determined by the variation of time period. The polynomial regression is suitable to the trend in Chinese pork production as Sign F was lower than 5%.

China is the main pork producing country in the world, its contribution to the world output being 43.8% in 2019. China has a high potential in producing pork, its performance of 46.5 Million tons in 2019 being equivalent to the pork production carried out by the EU, USA, Brazil, Russia and Vietnam all together (Fig.7).

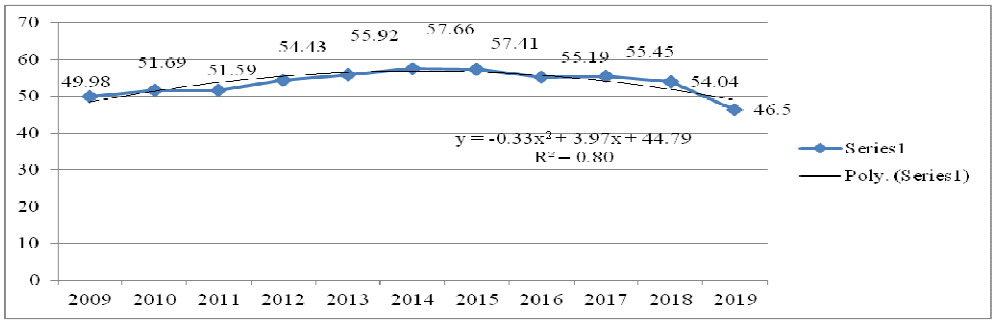

Fig.7: Pork production trend line in China, 2009-2019 (Million Tons CWE)

Source: Own design based on Faostat Data Base, Koopman el al (2014) and USDA Reports.

Together with EU and USA, China represents the trio dominating the world pork production, all together producing 83.13 Million tons CWE, accounting for 78.33 % of the world pork output in 2019.

China keeps the top position as pork producer due to the measures taken to consolidate the pork sector regarding herd size and applied growing and fattening technologies, despite the damages caused by AFS. Till 1985, China raised pigs in the small scale family farms, but after the new strategy applied by Government regarding the free trade in the rural areas, China changed its production system in pig farming stimulating the development of larger producing units (Oh and Whitley, N.C., 2011).

The reduction in pig livestock started with the AFS outbreak and after that pork price reached the highest level which resulted in a lower supply. It is expected that at the end of 2020, the pig population in China to decline and reach 275 Million heads, by 40% less than at the beginning of 2018 and pork production to be by 25 % lower. Pork crisis determined many breeders to leave the industry. As a result, pork consumption also declined by about 32% only in two years 2018 and 2019 (Anonymous, 2019c; Stefanescu and Dumitriu, 2018).

China is also the largest pork consumer in the world (57 Million tons) and because the domestic production is not able to cover the population needs, China is the top importing country of pork.

Together with EU and USA, China totalize 74% of the world pork consumption. The average pork consumption per capita accounts for about 38 kg, meaning twice than the world average. This is normal as pork is traditional in Chinese diet being the main source of protein besides the poultry meat. Along the time, pig industry has grown to better satisfy the population requirements and that is why China is the top importing country of pork in the world.

For this reason, China is not among the top exporting countries of pork in the world, as it has first to cover the domestic market and just a small amount of pork is traded in the international market. However, it was notice that China imports pork when the prices are high, and the imports are coming mainly from the USA, Canada, Brazil and the EU affecting the local producers.

However, despite of the high demand on the Chinese market, the Government imposes strict regulations on foreign suppliers which limit the imports if they do not fit.

Pork industry in China is deeply influenced by a large range of factors such as: African Swine Fever and other disease, feed prices, government measures, consumption habits and consumers' orientation to other meats etc (Gale et al, 2012; Istvan and Vida, 2017).

Taking into account the average annual decline rate of - 1.62 % registered in the period 2009-2019, it was estimated that in 2025, China will produce 42.21 Million tons pork (Table 4).

Table 4: Pork production forecast in China for 2020-2025 horizon (Million Tons, CWE)

China Pork production forecast	2020	2021	2022	2023	2024	2025
	45.75	45.02	44.30	43.59	42.89	42.21

Source: Own calculation.

The EU comes on the 2nd position in the world for pork production after China. Along the time, the countries consisting the EU have made important efforts to assure a amount of high quality protein passing from the small scale family farms to industrialized production units of high productivity and efficiency. However, in the EU there are still many family farms dealing with pig farming whose contribution to the EU pork production can't be ignored.

The EU has established strict regulation regarding animal welfare and food safety compared to the USA for example, which is a guarantee of the high quality of pork like of all the other animal species and assures a high export price on various markets (Rees et al, 2014).

In 2019, it produced 24.12 Million tons CWE, by 8.05% more than in 2009, when it achieved 22.3 Million tons. The highest pork production was registered in 2018, accounting for 24.08 Million tons compared to the lowest production 22.3 Million tons achieved in 2014. About 68% of the variation of pork production in the EU was determined by the changes in time (Fig.8).

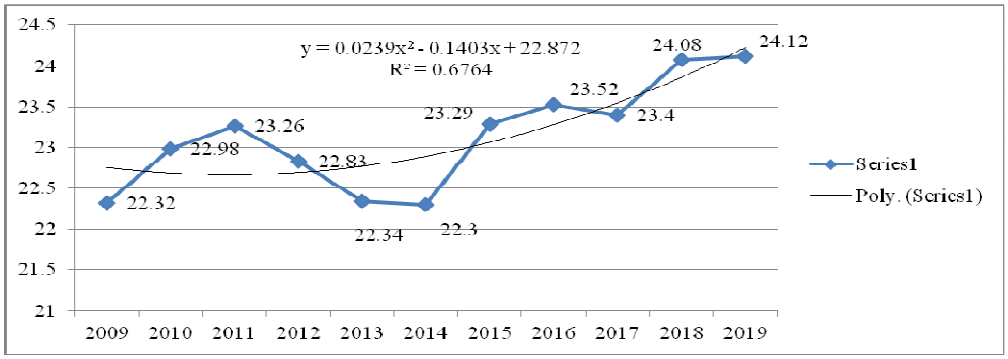

Fig.8: Pork production trend line in the EU-28, 2009-2019 (Million Tons CWE)

Source: Own design based on the data from Faostat, 2020 and USDA Report, 2019.

The EU contribution to the world pork output is 22.7% in 2019, being slightly higher than 22.3 % in 2009.

The EU pork production is sustained by the high number of pigs raised in Spain, Germany, France, Poland, Denmark, Netherlands, Italy, Belgium, Unites Kingdom, Austria and Portugal which are the main growing and pork producing countries.

In the EU, pork is satisfactory regarding the population needs, the self sufficiency rate accounting for 110 % (Eurostat, 2017).

The increased Chinese demand, the lower feed prices, the higher slaughter weight of the pigs will advantage the EU to push the production up, despite of the decline in pig livestock, the reduction of sow herds, the decrease in the slaughter rate. However, the expansion of the pork industry is constrained by the EU environmental regulation applied in Spain and in several other Western countries (Flach, 2019).

The decline of the number of pigs in the EU during the last decade will not affect too much pork output as swine sector is well consolidated in the largest producing countries. However, the small pig breeders mainly from Poland, Italy and Romania are affected by the lack of piglets in the market,

high farm inputs (feed, energy, labor). The low price per kg live weight at the farm gate will lead to a low profitability (EU, 2020, Pig meat statistics; Istvan and, 2017; Popescu, 2012a, 2015, 2016).

The expectations for pork production in the EU are high for 2020 and the coming years and also for its exports destined to maintain the EU position as the largest pork exporter in world. Its export are especially oriented to China, and Japan, where their domestic markets are not covered by internal output. Also, its export is oriented to the USA and Switzerland.

However, due to the ASF which affected the Central and Eastern European countries, they will be prevented for a while from taking the advantage of pork production growth and increased demand in the China market.

Because the EU produces more than the internal market requirements, the EU imports of pork are in non significant amounts and made from a limited number of extra EU countries due to the EU strict food safety requirements.

Pork consumption in the EU is high, in average accounting for 33 kg/inhabitant representing 47.3% of the total meat annual consumption which accounts for 69.8 kg/inhabitant. Therefore, the pork consumption in the EU is 3 times higher than the world average.

The highest pork consumption is in Austria, Germany, Spain, Poland, Italy, Netherlands, and France. In the other countries pork consumption is lower than the EU average. Also, during the last decade, despite that it is still in the top position, pork consumption is slightly declining in favor of beef and poultry meat considered healthier having less cholesterol and being richer in high valuable protein (EU Commission, 2020, EU Agricultural Outlook, For Markets and Income; EU, 2020, Pork).

In the EU, pork sector is under a continuous control by strict regulations regarding "animal welfare, environment, human health and spatial planning". The increased demand of pork and high prices in the international market will stimulate EU exports which will have a beneficial effect.

However, the high prices for pork have increased input cost, mainly feed cost which does not account for about 50-55% in the pig cost but for about 70 % which is expected to affect farmers in a while (Rabobank, 2020).

Taking into account the positive average growth rate of pork output in the last decade, 1.16 %, the forecast for 2025 is that the EU will produce about 25.96 Million tons (Table 5).

Table 5: Pork production forecast in the EU for 2020-2025 horizon (Million Tons, CWE)

EU Pork production forecast	2020	2021	2022	2023	2024	2025
	24.51	24.79	25.08	25.37	25.66	25.96

Source: Own calculation.

The USA comes on the 3rd position as a pork producing country. In 2019, it produced 12.52 Million tons CWE pork by 19.86% more than in 2009, when its output accounted for 10.44 Million tons. The highest production was achieved in 2019, 12.52 Million tins and the lowest one was 10.18 Million tons carried out in 2010 (Fig.9).

The main USA states where the pig number and pork production is high are Iowa, North Carolina, Minnesota, Illinois, Indiana, Missouri, Nebraska, Oklahoma, South Dakota, Pennsylvania and Virginia (Rees et al, 2014).

The USA contribution to the world pork production accounted for 11.85 in 2019 compared to 10.4% in 2009.

The USA registered +2.39 % average annual growth rate in the period 2009-2019, double than the EU.

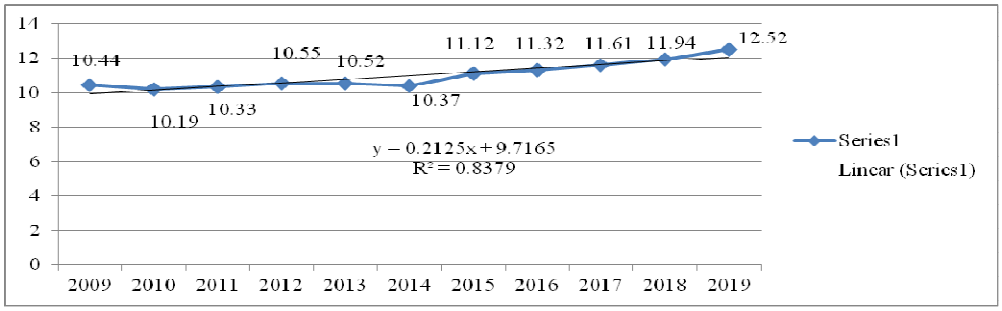

Fig.9: Pork production trend line in the USA, 2009-2019 (Million Tons CWE)
Source: Own design based on the data from Faostat, 2020 and USDA Report, 2019.

Pork industry in the USA is stimulated by the increased global consumption, high market share of the country and easy access on various markets (Borror, E., 2016).

The a boost in production in the United States is mainly absorbed by the Asian countries and is advantaged by high international pig.

Pork consumption in the USA registered a declining trend in general from 65 kg/capita in 1950, then registered the minimum level in 1975. In 1980, it went up again and continued to vary up and down 50 kg till 2010 when it declined to about 46 kg, and now it is around 53 kg/inhabitant.

The USA is the 2nd pork exporting country in the world after the EU and on the 4th position as an importing country of pork after China, Japan, Mexico and South Korea (EU Commission, 2019, Meat Market Observatory-Pig).

The USA pork export accounts for about 27% of the world pork export, and comes the 2nd after the EU whose exports represent 45%. Then, the USA is followed by Canada and Brazil, whose shares of the world's pork export are 14% and, respectively 9%.

Because, the USA pork output is raising faster than the world production, its export will increase in order to keep the domestic market in balance and not to face an overproduction.

The main beneficiaries of the USA pork exports are China and Japan (Anonymous, 2017; Plain, R., 2018; USDA Report, 2019).

The forecast established based on this average growth rate in the last decade, 2.39%, estimates that in 2020 the USA will produce 14.08 Million tons pork (Table 6).

Table 6: Pork production forecast in the USA for 2020-2025 horizon (Million Tons, CWE)

	2020	2021	2022	2023	2024	2025
USA Pork production forecast	12.81	13.12	13.43	13.76	14.08	14.42

Source: Own calculation.

Brazil is ranked the 4th for its performance in pork output. In 2019, it produced 3.97 Million tons CWE by 26.99% more than in 2009, when it achieved 3.13 Million tons. The highest pork production was recorded in 2019, and the lowest in 2009 (Fig.10).

Brazil is a powerful emerging economy with a high developed agriculture. Its pork production contributed by 3.74% to the world pork output and this share continue to increase.

In Brazil, pork consumption is about 11.5 kg/capita, almost twice less than beef consumption and coming on the 3rd position after poultry meat (Istvan and Vida, 2017). Due to the embargo against Russia, Brazil has become the major pork supplier for this country.

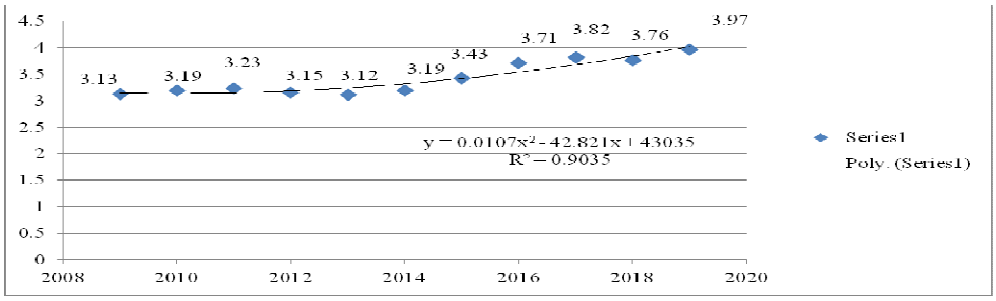

Fig. 10: Pork production trend line in Brazil, 2009-2019 (Million Tons CWE)
Source: Own design based on the data from Faostat, 2020 and USDA Report, 2019.

Also, in 2019, the pig culls in China due to ASF diminished pork production and intensified the supply coming from Europe and Brazil accounting for about 10 Million tons. From the middle of 2018, Brazil increased its sales to China by 70% and Spain by 90% (Hancock et al, 2019). Considering the average growth rate of pork output in the analyzed period, +2.97%, for the 2025 it is expected as Brazil to produce 4.74 Million tons (Table 7).

Table 7: Pork production forecast in Brazil for 2020-2025 horizon (Million Tons, CWE)

Brazil Pork production forecast	2020	2021	2022	2023	2024	2025
	4.09	4.21	4.34	4.47	4.60	4.74

Source: Own calculation.

Russia is ranked the 5th for pork production, which accounted for 3.24 Million tons CWE in 2019, being by 49.37% higher than in 2009, when the country achieved 2.17 Million tons, the lowest level. The highest pork production was 3.53 Million tons in 2017 (Fig.11).

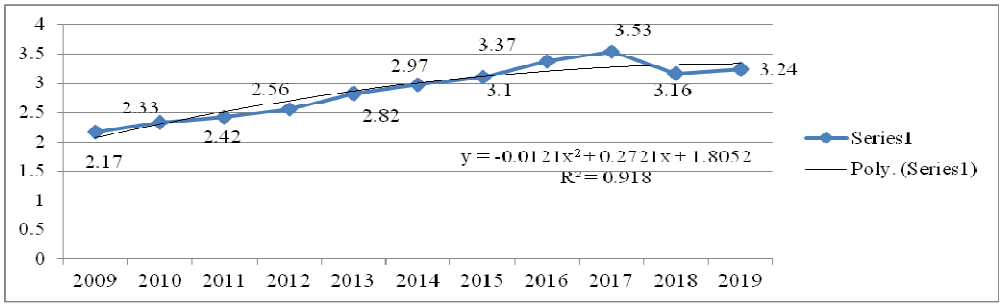

Fig. 11: Pork production trend in Russia, 2009-2019 (Million Tons CWE)
Source: Own design based on the data from Faostat, 2020 and USDA Report, 2019.

Therefore, Russia registered a higher and higher pork production year by year and in 2020 it is expected as the output to equalize the domestic consumption. This will be possible as Russia had

about 23.6 Million pigs in 2019 and it is expected as their number to continue growing (King, 2019a).

In 2019, Russia exported 100,000 tons pork by 20 % more than in 2018 and the exports were mainly directly to Hong Kong and it is expected an open access on other Asian markets like in Vietnam, China, Japan and South Korea (Vorotnikov, V., 2019).

In the analyzed period, the average annual growth rate was +4.24%, which allowed to forecast that in 2025, Russia will produce 4.16 Million tons pork (Table 8).

Table 8: Pork production forecast in Russia for 2020-2025 horizon (Million Tons, CWE)

Russia Pork production forecast	2020	2021	2022	2023	2024	2025
	3.38	3.52	3.67	3.82	3.99	4.16

Source: Own calculation.

Vietnam is situated on the 6th position in the world for pork production achieved in 2019 and accounting for 2.4 Million tons CWE, by 21 % more than in 2009. For this record, Vietnam's contribution to the world output accounted for 2.26%.

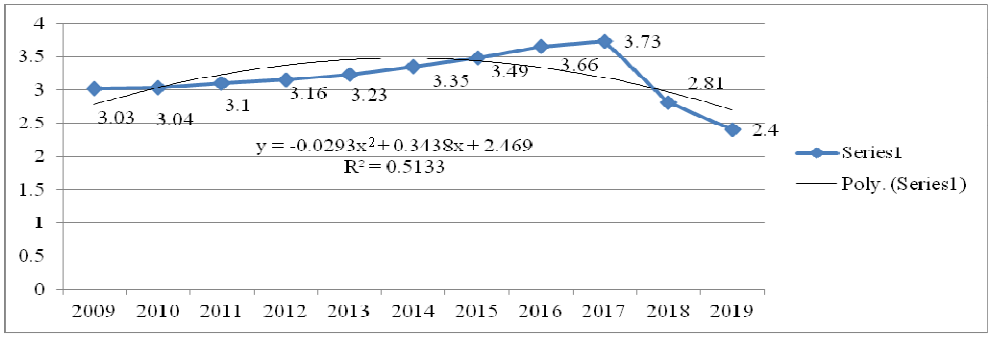

Fig. 12: Pork production trend line in Vietnam, 2009-2019 (Million Tons CWE)
Source: Own design based on the data from Faostat, 2020 and USDA Report, 2019.

Production declined mainly in the last years due to ASF which affected pig livestock. The highest pork output, 3.73 Million tons, was noticed in 2017 and the lowest one, 2.4 Million tons in 2019 (Fig. 12).

Vietnam is on the 9th position regarding pork consumption in the world. Due to ASF, production and consumption diminished. For this reason important measures were taken to stimulate chicken, fish and seafood consumption and to intensify pork imports to cover the internal market needs. The pork imports are also destined to protect farmers and business and will be severely controlled regarding their origin. Only the large farms will be allowed to develop their business, the smallest farmers being obliged to quip because ASF affected the small households (Anonymous, 2019f; USADA Report, 2019).

Due to the average annual decline rate of -1.83% recorded in the analyzed interval, t is estimated that Vietnam will register a lower and lower pork production in the coming years, reaching 2.15 Million tons in the year 2025 (Table 9).

Table 9: Pork production forecast in Vietnam for 2020-2025 horizon (Million Tons, CWE)

Vietnam Pork production forecast	2020	2021	2022	2023	2024	2025
	2.35	2.31	2.27	2.23	2.19	2.15

Source: Own calculation.

Canada is on the 7th position for pork output, contributing by 1.885 to the world production. In 2019, it achieved 2 Million tins CWE by 2.56% more than in 2009. The highest record was 2.14 Million tons in 2017 and the lowest production 1.94 Million tons in 2010. Pork production varied from a year to another and after the peak of 2.14 Million tons in 2017, it declined to 1.96 Million in 2018 and then recovered to 2 Million tons (Fig.13).

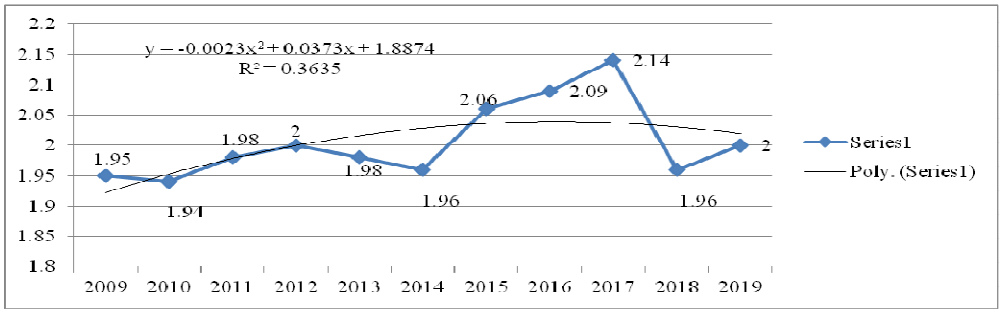

Fig. 13: Pork production trend in Canada, 2009-2019 (Million Tons CWE)
Source: Own design based on the data from Faostat, 2020 and USDA Report, 2019.

Canada occupies a good position among the top exporting countries of pork after the EU and USA. Her main beneficiary is China, in 2018, the Canadian exports of pork accounting for USD 514 Million, representing 12.85% of total export value. As China claimed a false certificate related to a pork import from Canada, the Canadian exports to this country stopped for a short period of time in favor of USA, Brazil and Argentina. Then, after clarifying this unpleasant situation, Canada continued its export of pork to China and in June 2019 it reached the highest level, about USD 80 Million (Anonymous, 2019b).

Canada is also a pork importer mainly from the USA.

Canada comes on the 11th position for pork consumption. In 2019, the average consumption accounted for 22.1 kg of carcass weight per capita and in 2020 is expected to reach 22.3 kg (Statista, 2020a).
Based on the average growth rate per year recorded in the analyzed decade, 0.48%, the forecast for 2025 estimates that Canada will produce 2.06 Million tons pork (Table 10).

Table 10: Pork production forecast in Canada for 2020-2025 horizon (Million Tons, CWE)

Canada Pork production forecast	2020	2021	2022	2023	2024	2025
	2.01	2.02	2.03	2.04	2.05	2.06

Source: Own calculation.

Philippines is ranked the 8th among the top pork producing countries. Its contribution to the world output was 1.57% in 2019. In the last decade, pork production increased by 2.82 % from 1.63 Million tons CWE in 2009 to 1.68 Million tons in 2019 (Fig. 14).

About 60 % of the internal production covers the pork demand in the country. About 65 % pig breeders are backyard farmers, while 35 % are large scale farms.

However, Philippines was also affected by ASF which diminished a part of its pig livestock and production mainly after 2016. In this case, higher supply of chicken and imports were required to balance the demand. Pork imports increased by 32 %, but the boom of prices on the sensitive markets has limited the imports.

Pork production recovered and in 2018 it reached 1.63 Million tons and continued to raise reaching 1.68 Million tons in 2019 (Anonymous, 2019a; USADA Report, 2019).

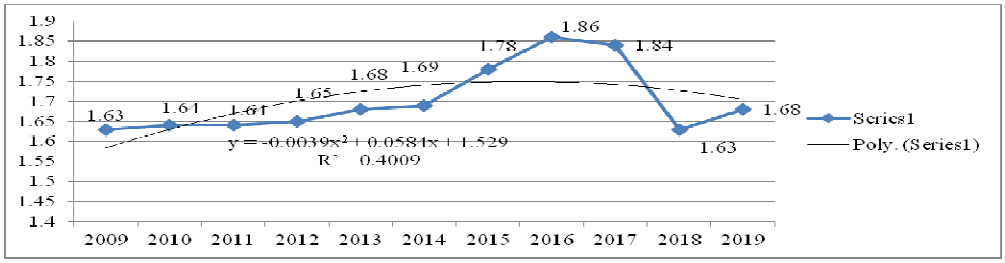

Fig. 14: Pork production trend in Philippines, 2009-2019 (Million Tons CWE)
Source: Own design based on the data from Faostat, 2020 and USDA Report, 2019.

The forecast for 2025 is that Philippines will produce 1.71 Million tons, starting from the pork production in 2019 and taking into consideration the average growth rate in the analyzed interval, +0.53% (Table 11).

Table 11: Pork production forecast in Philippines for 2020-2025 horizon (Million Tons, CWE)

Philippines Pork production forecast	2020	2021	2022	2023	2024	2025
	1.68	1.69	1.70	1.71	1.71	1.73

Source: Own calculation.

Mexico comes on the 9th position in the world for its pork production which accounted for 1.39 Million tons in 2019, when it produced by 19.625 more than in 2009. The highest level was 1.44 Million tons in 2017 and the lowest one 1.16 Million tons in 2009. About 84 % of pork production change was linked to the variation of the time factor. Sign F < 5 % confirmed the regression model and allowed to accept H_1 (Fig. 15).

Pork production in Mexico increased due to the high demand and because it is a cheaper alternative compared to beef. In Mexico, pork demand is much higher than the domestic production, a reason to cover the market needs by imports.

The present pork consumption per inhabitant accounts for 17.9 kg, for which Mexico occupies the 20th position in the world.

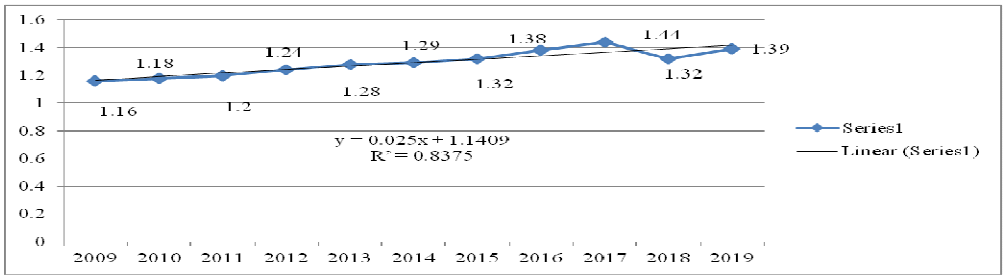

Fig. 15: Dynamics of pork production in Mexico, 2009-2019 (Million Tons CWE)
Source: Own design based on the data from Faostat, 2020 and USDA Report, 2019.

Pork production was facing various problems among which the most important ones are: infrastructure, diseases, sanitary aspects and processing. Passing from the small scale farms to the largest ones, it was an opportunity to solve most of these problems as Mexico would like to produce more pork and of a higher quality compiling with the international standards in order to increase its exports. As long as at present Mexico is declared ASF-free, the exports will raise. The main beneficiaries of the Mexican pork are Japan, which accounts for 75 % of the pork exports and the USA.

Also, Mexico needs to import pork which represents about 50 % of the consumption. The increased demand is closely linked to the meat taste and high quality, cheap price and the large variety of pork products. About 32% of imports come from the USA (Anonymous, 2018).

In the analyzed decade, pork production average annual growth rate accounted for 1.77% which allowed to estimate that in 2025 the country will carry out 1.51 Million tons (Table 12).

Table 12: Pork production forecast in Mexico for 2020-2025 horizon (Million Tons, CWE)

Mexico Pork production forecast	2020	2021	2022	2023	2024	2025
	1.41	1.44	1.47	1.49	1.52	1.54

Source: Own calculation.

South Korea is on the 10th position among the top pork producing countries. In 2019, it achieved 1.36 Million tons CWE by 28.17% more than in 2009 and contributed by 1.29% to the world output. The lowest production was registered in 2011, 0.84 Million tons and the highest one, 1.37 Million tons in 2019. Despite that the country reported 14 cases of ASF, at present it is free of this disease due to the strong biosecurity measures and production is not any more affected. About 67% of the variation of production was connected to time change. Sign F was smaller than 5%, attesting that the regression model is correct. The H_1 hypothesis is accepted, because at least one of the coefficients of the equation is different from zero. (Fig. 16).

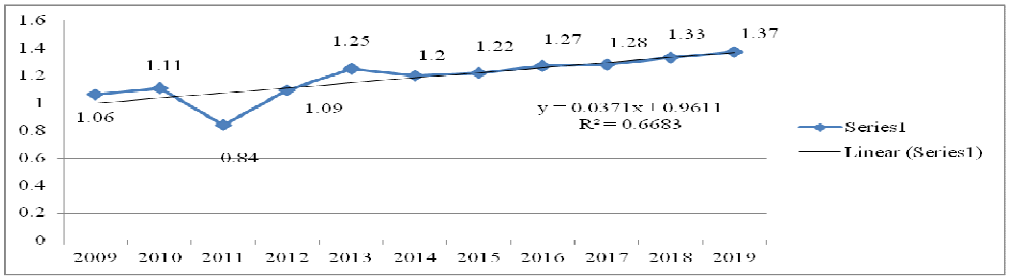

Fig. 16: Pork production trend in South Korea, 2009-2019 (Million Tons CWE)
Source: Own design based on the data from Faostat, 2020 and USDA Report, 2019.

Due to the high demand, South Korea imports pork to better cover the domestic market needs. The South Korea is the 5th market for pork exports of the USA. Since 2017, South Korea the amount and value of the imported pork increased year by year. Also, South Korea is supplied with pork coming from Germany, Spain, Canada, and Chile which are the main competitors of the USA on the Korean market.

The protein needs on the Korean market are covered by the imports of fish, pork, beef, poultry and sheep meat (Eastwood, C., 2018; USDA Report, 2019).

Table 13: Pork production forecast in South Korea for 2020-2025 horizon (Million Tons, CWE)

South Korea Pork production forecast	2020	2021	2022	2023	2024	2025
	1.41	1.46	1.51	1.56	1.61	1.67

Source: Own calculation.

South Korea is on the 6th position in the world for its pork consumption which accounts for 36.9 kg/capita being three times higher than the world average.

Considering the +3.38% average annual growth rate of pork production in the analyzed period, the expectations for the year 2025 accounts for 1.67 Million tons (Table 13).

Japan is another important producing country of pork, occupying the 11th position in the world. In 2019. Japan produced 1.3 Million tons of pork by 1.15% less than in 2009, and its contribution to the world output accounted for 1.22% (Fig.17).

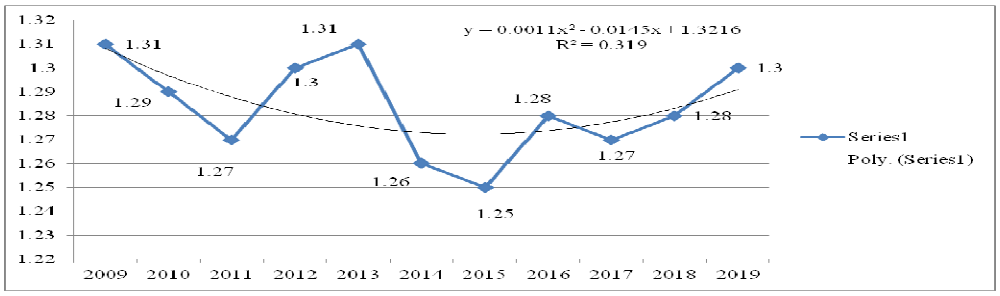

Fig. 17: Pork production trend line in Japan, 2009-2019 (Million Tons CWE)
Source: Own design based on the data from Faostat, 2020 and USDA Report, 2019.

Japan is facing a high demand for pork, a reason to make imports to cover the domestic market.
The most preferred is fresh and frozen pork and the main suppliers are USA, Canada, Mexico, Chile, Denmark, Netherlands and Germany.

Based on the last trade agreement concluded between Japan and the USA at the beginning of 2018, which reduced or eliminated the tariffs, Japan is an important beneficiary of 6% of the USA pork and 25 % of beef exports (King, 2019b).

The average annual decline rate of pork production in Japan accounted for -0.1 %, this means a relatively stable production at the level of 1.29 Million tons in 2025 (Table 14).

Table 14: Pork production forecast in Japan for 2020-2025 horizon (Million Tons, CWE)

Japan Pork production forecast	2020	2021	2022	2023	2024	2025
	1.29	1.29	1.29	1.29	1.29	1.29

Source: Own calculation.

Conclusions

The paper analyzed the trends in pig population, pork production and consumption at the world level and in the main eleven producing countries in the period 2009-2019.

Pig population declined by 18.4% in the world during the last decade reaching 768 million heads in 2009 compared to 941 million in 2009. This was due mainly to the outbreak of African Swine Fever since 2014 in many countries from Asia, Europe and Africa and the increased competiveness of broilers fattening which is more profitable for breeders and also by the increased consumers' preference for chicken meat considered much healthier than pork due to its lower content in cholesterol.

About 85 % of the world pig population is in China (56.4%), EU (19.2%) and USA (9.3%).

Pork is the 2n meat after poultry meat preferred by consumers. In 2019, from 34.4 kg meat consumed per capita, 12.3 kg represented pork, that is 35.7%. In the developed countries chicken is the most consumed meat followed by pork, while in the developing countries, pork is on the top.

Pork production registered a slight growth in the last decade, 6.13%, so that in 2019 it accounted for 106.1 million tons CWE. About 56% of pork output is achieved in Asia, 24% in Europe and 12 % in North America. About 95 % of the global pork production is produced by eleven countries, whose importance in the decreasing order is: China, EU, USA, Brazil, Russia, Vietnam, Canada, Philippines, Mexico, South Korea and Japan. In the most of countries, pork production increased in the last decade, except China, Vietnam and Japan.

China is the top producer of pork with 46.5 Million tons achieved in 2019, its contribution to the world output being about 44%, equivalent to the pork production achieved by the EU, USA, Brazil, Russia and Vietnam all together. About 78% of the global production is achieved by China, EU and USA.
China is also the largest pork consumer and for this reason is also on the top as an importing country. About 74 % of pork consumption is made by China, EU and USA.

The EU is the 2nd pork producer and the main exporter in the world. Despite that the pig number declined, pork production increased reaching 24 Million tons in 2019.

The USA produced 12.5 Million tons pork in 2019, bringing the country on the 3rd position in the world. Besides the EU, the USA is also an important pork exporter, and this has been stimulated by the increased demand mainly in the Asian countries and by the high price after the outbreak of ASF.

The forecast for 2025 estimates that world pork production will reach 110.1 Million tons CWE grace to the increase of production in almost all the producing countries, except China and Vietnam. It is expected that pork production to reach 42 Million tons in China, 26 Million tons in the EU, 14.4 Million tons in the USA, 4.7 Million tons in Brazil, 4.2 Million tons in Russia, 2.1 Million tons in Vietnam, 2.06 Million tons in Canada, 1.7 Million tons in Philippines, 1.54 Million tons in Mexico, 1.7 Million tons in S. Korea and to remain stable at 1.29 Million tons in Japan.

As a conclusion, the effects of the ASF have led to the intensification of pork production and export in the non affected countries, the increase of pork price on the international market, to more security measures to protect the countries against the extend of this disease.

Pork will remain one of the most important source of animal protein to nourish the globe population in a continuous growth.

Producers and processors are more and more focused on the improvement of pork quality due to the competition with poultry meat.

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Trends and Prospects in the EU's Cow's Milk Marketed to Dairies

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Abstract

The paper aimed to analyze the dynamics of raw cow's milk delivered to dairies (RCMD) in the EU-28 and the top 10 producing countries in the period 2009-2018 using the Eurostat data and fixed basis indices, and descriptive statistics. Also, average milk yield (AMY) and the number of dairy cows (NDC), and their impact on RCMD using correlation and determination coefficients, and regression equations. Finally, it estimated RCMD for the 2019-2023 horizon. In the EU, RCMD increased accounting for 160.28 million tonnes in 2018, while the NCD declined. The contribution of the top producing countries to the EU's RCMD is: Germany 19.7%, France 15.9%, United Kingdom 9.5%, Netherlands 8.7%, Italy 7.9%, Poland 7.5%, Spain 5%, Ireland 4.9%, Denmark 3.5% and Belgium 2.5%. AMY was 6,997 kg at the EU level in 2018, but much higher in Denmark, Netherlands, Spain, United Kingdom, Germany and Belgium. Between RCMD and AMY it was found a strong and positive coefficient of correlation, $r > 0.776$, except Italy ($r = 0.125$). Between RCMD and NDC, the correlation coefficient was higher than 0.733 in Ireland, Poland, Netherlands, United Kingdom and Belgium, in France 0.5, and in Germany, Italy and Spain, it was below 0.266. The regression equations and $R^2 > 0.5$ proved that AMY has a deep influence on RCMD, in almost all the countries, except Italy, and that NCD comes on the 2nd position. In 2023, the EU will supply 157.18 Million tonnes, taking into account the Brexit.

Keywords: Trends, Forecast, Cow Milk Marketed to Dairies, Main Producing Countries, EU-28

Introduction

Milk is a basic food for humans and animals and also a raw material for processing industry as sustained by Faostat (2019), Perhrsson et al (2000), Popescu (2011, 2012a, 2015b).

Grace to their high nutritive value, milk and dairy products are very important in human diet as mentioned by Garcia et al (2019).

Milk production followed a continuous ascending trend and the EU-28 is one of the main contributors to the world milk output, being on the second position after Asia as affirmed by Popescu (2006a), De Lucia et al (2017), and Ridder (2019).

In 2018, the EU-28 produced 172.2 million tonnes raw milk representing 33.26 % of the global milk production, which accounted for 517.72 million MT (Popescu et al, 2019; Statista, 2020).

About 97% EU milk production is provided by dairy cows and the remaining by sheep, goats and buffaloes. In 2018, the ewes and goats produced one million tonnes milk in Spain and 0.8 million tonnes in France, while the buffaloes contributed by 0.7 million tonnes to Itlay milk production (Eurostat, 2020, Milk and milk products).

Most of the raw milk is destined to processing industry after subtracting the consumption on farm by farmers' family and animals (calves, cats, dogs, piglets etc) (Popescu, 2005b and 2009b).

In 2018, about 12.2 million tonnes were used on farm by farmer's family and animals, sold directly to consumers or processed directly (Eurostat, 2020, Milk and milk products; Eurostat, 2020, Milk Market Observatory).

The cow milk supplied to dairies must meet the quality standards regarding the percentage of fat and protein, and not to exceed the thresholds concerning the pathogenic germs and somatic cells.

Milk quality depends on the dairy farming system, mainly on milking system, feeding, watering, hygiene measures, the existence of cooling tanks for milk storage till the moment of delivery (Popescu, 2017, Popescu and Angel, 2009 and 2019).

Milk quality determines milk price and together with the marketed amount contributes to farmers' income as found by Popescu (2003, 2006c, 2012b, 2014a, 2014b).

Milk price is also determined by offer/demand ratio, seasonality, geographic location of the farm, the price of farm inputs (feed, electricity, fuel, medicines and veterinary services etc) and also by the economic and political situation as affirmed by Popescu (2015d) and Paura and Arhipova (2016).

Cow's milk is also claimed by milk processing industry being its raw material for achieving dairy products. In the EU-28, about 37.7 raw milk is used for producing cheese, 29.4% for butter,11.9% for cream, 11.1% for drinking milk, 4.35 for acidified milk, 2.9% for powder products, 2.7% for other products (Eurostat, 2020, Milk and milk product statistics).

The abolition of milk quota in April 2015 has stimulated the growth of the number of cows, milk output and milk delivered to processing industry by the large farms in Netherlands, one of the most important milk producing country in the EU, as mentioned by Popescu (2004a) and Groenveld et al (2016).

Milk quota abolition also stimulated much more the exports of the competitive countries compared to the less competitive states as found by Popescu et al (2010), and Persson (2016).

In 2018, the raw milk supply to dairies accounted for 160.28 million tonnes consisting of a mixture of cow, ewes, goats and buffaloes milk, the cow milk representing 97.3% (Eurostat, 2020, Milk and milk product statistics).

Therefore, cow's milk production and the amount of marketed milk reflect the importance of milk sector in the EU-28 agriculture and food industry, and for farmers assuring the perpetuation of their profession, income and the raise of their living standard.

In this context, the objectives of this paper are:

(a)To analyze the dynamics and trend of the raw cow's milk delivered to dairies at the EU level and in the top 10 milk producing countries in the period 2009-2018;
(b)To analyze the dynamics and trend of the number of dairy cows at the EU level and in the top 10 milk producing countries in the same period;
(c)To analyze the dynamics of the average milk production per cow at the EU level and in the top 10 milk producing countries in the same interval;
(d)To analyze the milk production per inhabitant;
(e)To estimate the correlation coefficients between raw cow's milk delivery and the number of dairy cows and average annual milk yield, considered the key determinants;
(f)To determine the regression models reflecting in what measure the number of dairy cows and average milk yield contribute to the increase of raw cow's milk marketed to dairies;
(g)To set up the forecast of raw cow's milk marketed to dairies for the 2019-2023 horizon.

The paper is structured as follows: *Introduction* presents the results regarding the milk production importance in the EU, *Materials and methods* present the study area, the sources of data, the specific indicators analyzed in this study, and the methodology used in this research. *Results and Discussions* provide the obtained results, comments and interpretations, and *Conclusions* present the main ideas resulting from this research work.

Materials and Methods

The study area

The study refers to the EU-28, whose population is increasing and on January 1st 2019 accounted for 513.5 million inhabitants (Eurostat, Statistics Explained, 2020, Population and population change statistics).

Taking into account the contribution to the agricultural output, after the vegetable and horticultural plant sector and before cereals, the EU's dairy sector is its second biggest contributor.

In the EU-28 there is a large diversity of dairy farms, regarding their number by member state, herd size, milk yield, milk output per farm, types of dairy farming systems, economic size in terms of standard output, and all these features are determined by the differences in natural potential and socio-economic development of the member states (Popescu, 2016b; Popescu et al, 2019; EU, 2018, Dairy farms report based in 2016 FADN Data; European Parliament, 2018, The EU dairy sector Main features, challenges and prospects).

Investments in dairy farming based on the EU financial support has substantially contributed in the farm modernization or creation of new modern dairy farms as found by Popescu (2006a).

The number of dairy cows is 22.9 million producing in average about 7,000 kg/year. Also, in the EU-28 there are about 12,000 milk processing plants, of which about 55% are cooperatives (European Parliament, 2018, The EU dairy sector Main features, challenges and prospects).

Data collection

The paper is based on the data collected from Eurostat Database in 2020 for the period of reference 2009-2018.
The main indicators analyzed in this study have been the following ones:
(i)raw milk on farm in the EU-28;
(ii)raw cow's milk delivered to dairies (RCMD) in the EU-28 and in the top 10 producing countries;
(iii)the number of dairy cows (NDC) in the EU-28 and in the top 10 producing countries;
(iv)the average milk yield (AMY) in the EU-28 and in the top 10 producing countries;
(v)cow's milk delivered to dairies per inhabitant in the EU-28 and in the top 10 producing countries.

Methodological Aspects

Index method was used to study the evolution of the indicators mentioned above in the period 2009-2018. Fixed basis Index, $I_{FB,}$ was determined based on the formula is: $I_{FB} = (X_i/ X_0)100$, where $X_{i =}$ the variable in the years i= 1,2,...10 of the chronological series 2009-2018 and X_0 is the variable in the first year.
The structural index, $S_{\%,}$ was calculated based on the formula is: $S_{\%}= (X_i/X_{ij})100$, where X_{ij}= the value of the j variable in the country i. It was used to establish the market share of the top 10 milk producing countries in the EU-28 level.

The descriptive statistics includes: mean, standard deviation, coefficient of variation, skewness, kurtosis, Min, and Max were determined using the Excel facilities.

The Bravais - Pearson correlation coefficient was used to reflect the relationships existing between: raw cow's milk delivered to dairies (RCMD) and number of dairy cows (NDC), on one side, and between: raw cow's milk delivered to dairies (RCMD) and average milk yield (AMY), on the other side. The correlation coefficients were calculated based on the formula:

$$r_{xy} = \frac{n\sum xy - \sum x \sum y}{\sqrt{(n\sum x^2 - (\sum x)^2)(n\sum y^2 - (\sum y)^2)}}$$

t Test (Student), Two-Tails for the significance threshold α = 0.05 was applied for testing the significance of the coefficient of correlation.

Linear regression model, Y=bx + a, was used to reflect the relationship between the dependent factor Y, in terms of raw cow's milk delivered to dairies, RCMD, and the independent factor: X considered either the number of dairy cows, NDC, or average milk yield, AMY.

The determination coefficient, R^2 was also computed in order to reflect in what measure the variation of the dependent factor Y id caused by the variation of the independent factor X. share of influence of the independent factor variation on the dependent factor variation.

Forecast of raw cow's milk marketed to processing industry in the EU and in the main producing countries was based on the average annual gain calculated for the period 2009-2018.
The calculus was made using Excel facilities.

The results were illustrated in graphics and tables, and also they have been interpreted.

Results and Discussions

Raw cow's milk delivered to dairies has registered an increasing trend in the EU-28 in the studied period, from 134.2 million tonnes in 2009 to 160.3 million tonnes in 2018, meaning a surplus of +19.4% (Fig.1).

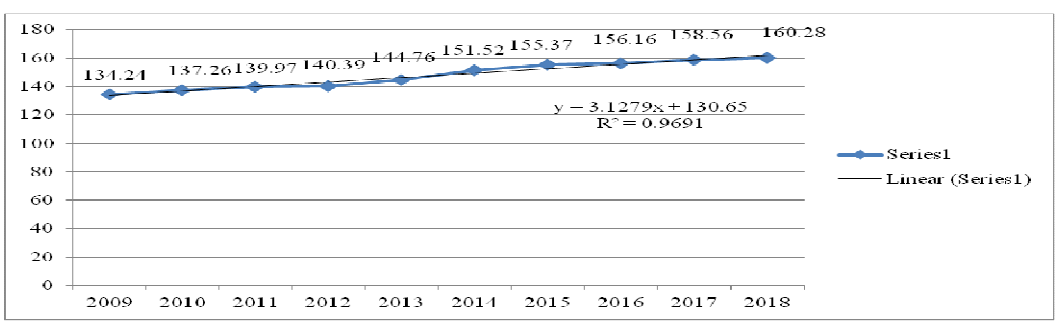

Fig.1: The dynamics of raw cow's milk delivered to dairies in the EU-28, 2009-2018 (Million tonnes)

Source: Own design based on Eurostat, 2020, Collection of cow's milk (1,000 tonnes).

The descriptive statistics tells us that at the EU-28 level the mean in the analyzed period was 147.85 million tonnes, the deviation standard accounted for 9.62 and the coefficient of variation was very small, 6.5%.

Table 1: Descriptive statistics for raw cow's milk delivered to dairies at the EU-28 level and in the top 10 milk producing countries, 2009-2018

	Mean (Million tonnes)	St. Dev.	Coeff. of variation (%)	Kurtosis	Skewness	Min	Max
EU-28	147.85	9.62	6.50	-1.81	-0/06	134.24	160.28
Germany	30.59	1.60	5.23	-0.22	-0.70	27.46	32.49
France	24.39	0.75	3.07	0.42	-0.71	22.90	25.40
United Kingdom	14.28	0.76	5.32	-1.96	0.04	13.23	15.19
Netherlands	12.68	1.15	9.06	-1.72	0.44	11.46	14.32
Italy	10.61	0.31	2.92	8.45	2.83	10.40	11.49
Poland	10.34	1.05	10.15	-1.40	0.18	9.00	11.95
Ireland	6.12	0.98	16.01	-0.97	0.67	4.94	7.81
Spain	6.39	0.54	8.45	-2.09	0.09	5.74	7.11
Denmark	5.11	0.31	6.06	-1.33	0.34	4.73	5.61
Belgium	3.67	0.31	8.44	-1.59	0.36	3.28	4.17

Source: Own calculation based on Eurostat, 2020, Collection of cow's milk (1,000 tonnes).

In the top 10 milk producing countries of the EU, the mean of raw cow's milk delivered to dairies in the analyzed interval was the following one: 30.5 million in Germany,

24.4 million in France, 14.3 million in United Kingdom, 12.7 million in Netherlands, 10.6 million in Italy, 10.3 million in Poland, 6.3 million in Spain, 6.1 million in Ireland, 5.1 million in Denmark and 3.6 million in Belgium (Table 1).

In 2018, the raw cow's milk delivered to dairies reached the following level in million tonnes in the selected countries: 32.4 in Germany, 24.5 in France, 15.2 in United Kingdom, 13.8 in Netherlands, 10.6 in Italy, 11.9 in Poland, 7.8 in Ireland, 7.1 in Spain, 5.6 in Denmark, and 4.2 in Belgium (Fig.2).

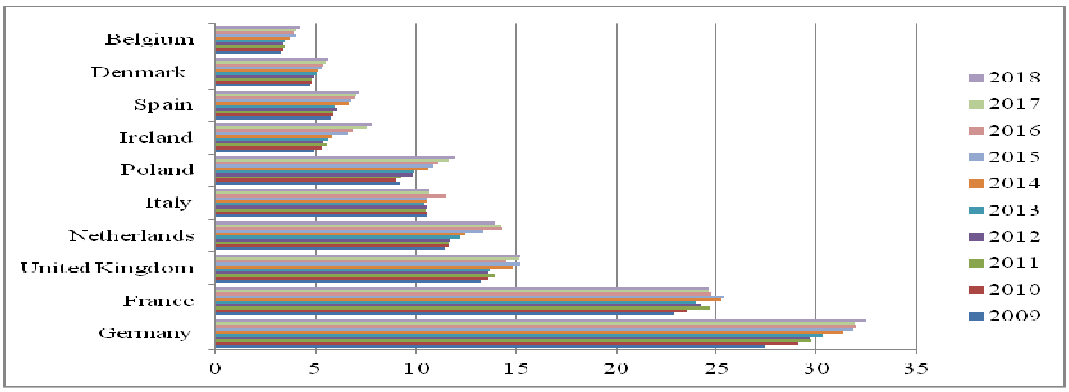

Fig.2: The dynamics of raw cow's milk delivered to dairies in the EU-28 top 10 producing countries, 2009-2018 (Million tonnes)

Source: Own design based on Eurostat, 2020, Collection of cow's milk (1000 tonnes).

In the analyzed interval 2008-2018, in the top 10 milk producing countries in the EU-28, raw cow's milk marketed to dairies increased in various percentages from a country to another as follows: Ireland +58%, Belgium +44.1%, Poland 30.7%, Netherlands 21%, Spain 19.6%, Denmark +18.6%, Italy 14.2%, United Kingdom +13.9%, Germany +13.1%, and France +7.3%.

The contribution of the top 10 producing countries to the EU-28 cow's milk sold to dairies is the following one: Germany 19.7%, France 15.9%, United Kingdom 9.5%, Netherlands 8.7%, Italy 7.9%, Poland 7.5%, Spain 5%, Ireland 4.9%, Denmark 3.5% and Belgium 2.5%.

The raw cow's milk marketed to dairies followed a similar evolution like the one of raw milk production. Milk produced by cows has the main share in the raw milk production. The contribution of dairy cows to raw milk production increased from 91.03 % in 2013 to 97 % in 2018 (Fig.3).

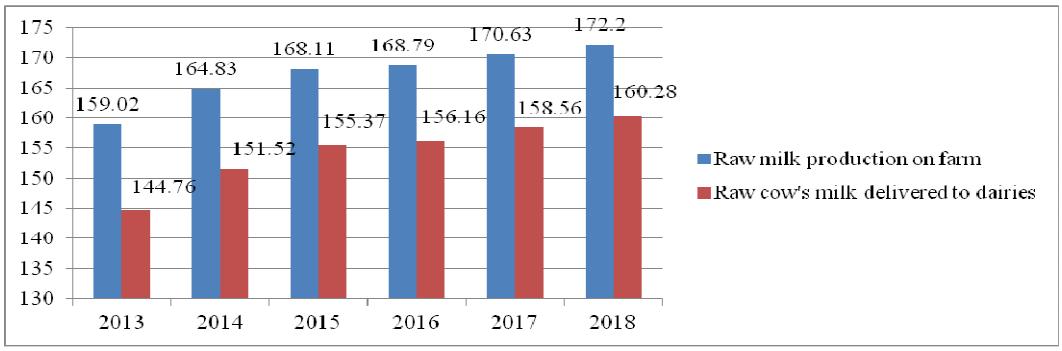

Fig.3: The dynamics of raw milk production on farm and raw cow's milk delivered to dairies in the EU-28, 2009-2018 (Million tonnes)

Source: Own design based on EU, 2020, Milk market observatory.

The raw milk production delivered to dairies is determined by the volume of raw milk obtained on farm as mentioned before but less the consumption at the farm level by the farmer's family and animals and direct deliveries to consumers.

The raw milk output on farm is deeply influenced by a large range of factors such as: number of cows, herd size, milk yield, farmer's experience and management skills.
Milk yield is the main factor with a deep impact on milk production and it depends on: breed and its milk potential, reproduction activity, feeding, health conditions, breeding programme applied on farm, the selection pressure assured by the artificial insemination with doses of frozen seminal material from bulls of high breeding value.

The number of dairy cows in the EU-28 registered a general decreasing trend in the last decade.
In 2018, the EU had 22.9 million dairy cows, by 4.1% less than in 2009 (Fig.4).

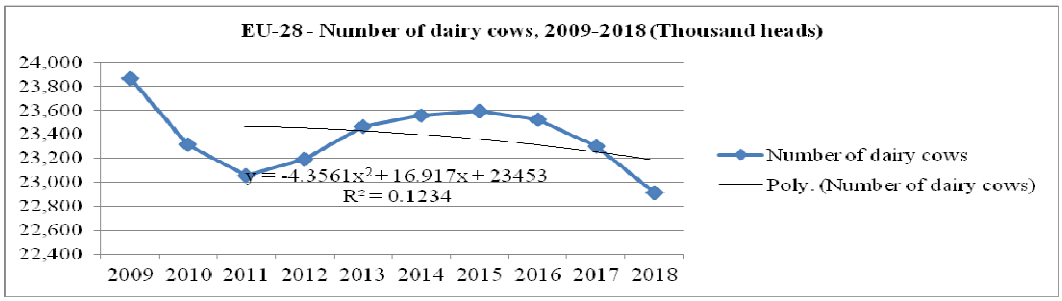

Fig.4: The dynamics of dairy cows in 2018 versus 2009 in the EU-28, 2009-2018 (Million heads)
Source: Own design based on Eurostat, 2020, Number of dairy cows.

However, in the top 10 producing countries the situation of the number of cows is different from a country to another. In 2018, Germany had the highest number of cows, 4.1 million, by 1.6% less than in 2009. France came on the 2nd position with 3.55 million cows, by 5.2 % less than in 2009. Poland was ranked the 3rd for 2.21 million cows, and their number was smaller by 14.4% than in 2009. Italy had 1.9 million cows, by 3.2% less than in 2009. United Kingdom came on the 5th position with 1.87 million cows by 0.8% more than in 2009. Netherlands was ranked the 6th for 1.55 million dairy cows whose number was by 0.7% smaller than in 2009. On the 7th position was situated Ireland which had 1.36 million cows, by 33.9% more than in 2009, the highest increase in the analyzed interval. Spain came on the 8th position for 0.82 million cows, by 1.3% less numerous than in 2009. Denmark kept its 9th position having 0.57 million cows by 0.7% less than in 2009 and Belgium was placed on the 10th position for 0.53 million cows, a number by 2.1 % higher than in 2009 (Fig.5).

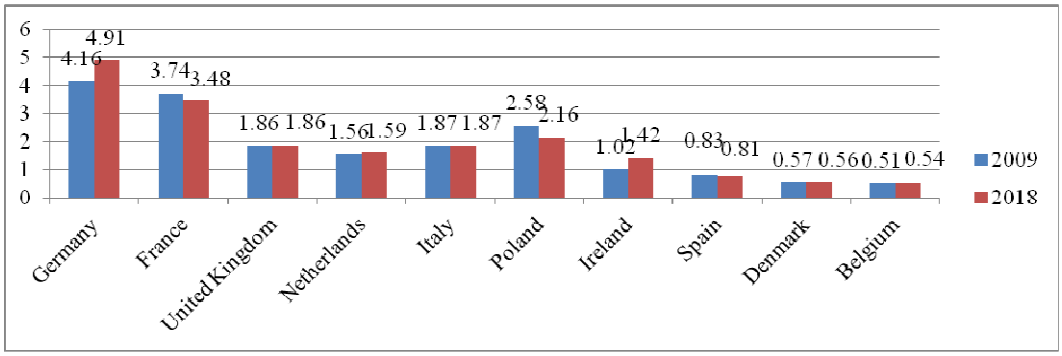

Fig.5: The dynamics of dairy cows in 2018 versus 2009 in the top 10 main milk producing countries of the EU-28, 2009-2018 (Million heads)
Source: Own design based on Eurostat, 2020, Number of dairy cows.

The number of dairy cows, despite of its decreasing trend remains an important factor determining milk production. In the EU countries where milk yield is low, the number of dairy cows supports milk output as affirmed Popescu (2015a, 2015b).

The average herd size. In 2016, the number of dairy cows per farm in LU was in average 33 heads. The highest number of dairy cows per farm was in Denmark, 160 LU and United Kingdom 130 LU, followed by Netherlands 90 LU, Ireland 73 LU, Belgium 70 LU, Germany 66 LU, France 59 LU, Spain 59 LU, Italy 50 LU.

Poland is the only country with 18 LU, meaning by -45.4% less than the EU mean and by -88.7% less than Denmark (EU, 2018, Dairy farms report based in 2016 FADN Data).

However, in the EU, there are many subsistence farms with a very small herd size and their situated in Romania, Bulgaria, Croatia, Hungary, Latvia, and Lithuania.

Various research studies proved that dairy farming at a small scale is not efficient, and compared to the EU-15 there are substantial differences in terms of production, production costs, gross profit, gross margin, and standard output (Popescu and Muresan, 2004 and Popescu, 2007).

Average milk production per dairy cow is another influencing factor of raw milk output delivered to dairies. In the EU-28, the average yield per cow marketed to milk processing plants accounted for 6,997 kg/cow, being by 24.4% higher than in 2009.

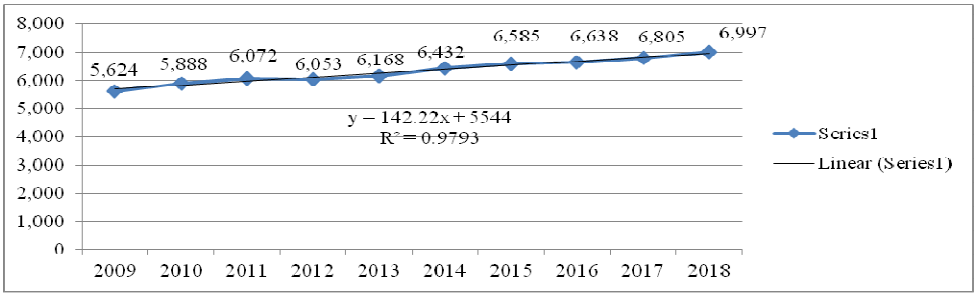

Fig.6: The dynamics of average yield per cow sold to the EU-28 dairies, 2009-2018 (kg/cow/year)
Source: Own design and calculation based on the data from EU, 2020, Milk market observatory.

In 2018, a number of 6 countries from the top 10 milk producing countries exceeded the EU-28 average of raw cow's milk as follows: Denmark 9,851 kg/cow and +40%, Netherlands was on the 2nd position with 8,944 kg and + 27.8%, Spain came the 3rd with 8,711 kg and + 24.5%, United Kingdom was ranked the 4th for 7,985 kg and +14.1%, Germany came the 5th with 7,923 kg and +13.2%, Belgium was on the 6th position with 7,900 kg and +12.9% (Fig.7).

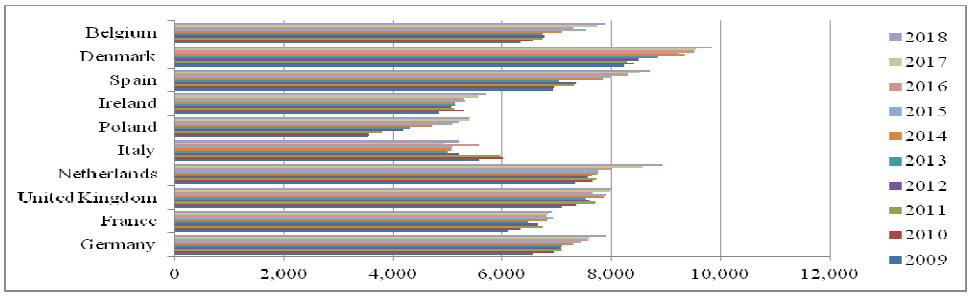

Fig.7: The dynamics of the average milk yield in the top 10 main producing countries (kg/year)
Source: Own design and calculation based on the data from EU, 2020, Milk market observatory.

The other four countries registered in 2018 a lower milk yield than the EU-28 average. It is about: France with 6,919 kg/cow and -1.1%, Ireland 5,707 kg and -18.4%, Poland 5,399 kg and -22.8% and Italy 5,220 and -25.4%.

In the studied interval, the average milk yield increased by 52.7% in Poland, by +25.6% in Spain, by +24.5% in Belgium, by +21.8% in Netherlands, by +20.2% in Germany, by +19.5% in Denmark, by +17.9% in Ireland, by +13.2% in France, by +12.4% in United Kingdom, but it declined by -6.6% in Italy (Fig.7).

However, in the EU milk yield is very different if we make a comparison between the EU-15 and the EU-13, representing the countries who adhered since 2004 to the common market. The lowest levels of milk yield are in Bulgaria and Romania.

Milk yield is one of the most important factors which has to be managed in order to increase milk production and the efficiency in dairy farming. The higher milk yield, the higher milk production, the higher gross margin and economic size of the farm as found by Popescu (2004b, 2009a, 2010a, 2010b), Popescu and Condei (2014) and Popescu and David (2014).

Milk production per inhabitant in the EU-28 increased year by year and reached 312.82 kg/capita in 2018, meaning by +17% more than 267.36 kg in 2009.

In 2018, seven countries exceeded the EU average milk production per inhabitant as follows: Ireland 1,625 kg/capita, Denmark 965.5 kg, Netherlands 837.2 kg, Germany 398.8 kg, France 388.6 kg, Poland 373.6 kg, Belgium 368.4 kg.

The other countries recorded a lower milk production per capita: United Kingdom 23.7 kg, Italy 216.5 kg and Spain 179.9 kg.

These figures reflect that in the top producing countries, production assures and exceeds the consumption requirements, therefore self sufficiency is higher than 100.

In the analyzed period, milk production per inhabitant increased in all the top EU producing countries in various proportions as follows: +37.9% in Ireland, +28.4% in Belgium, +15.4% in Poland, +14.9% in Netherlands, +11.5% in Spain, +10.2% in Germany, +8.4 % in Denmark, +5.1% in Italy and +4.3% in United Kingdom (Fig.8).

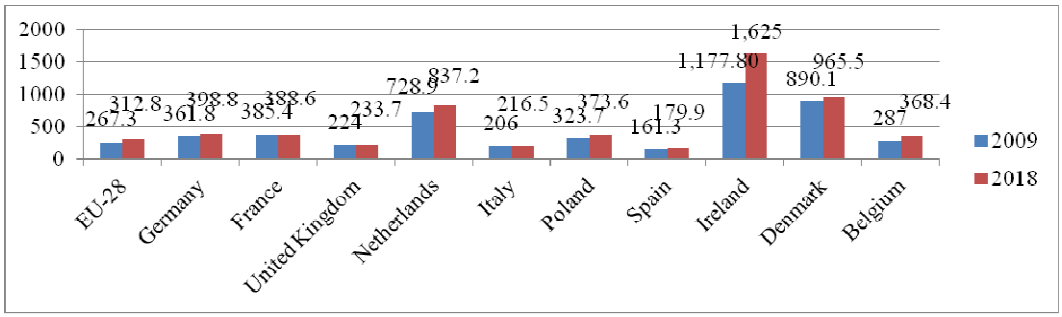

Fig.8: Milk production per inhabitant in the EU-28 top 10 milk producing countries in 2018 versus 2009 (kg/capita)

Source: Own calculation.

The correlation coefficients between: (a) the raw cow's milk delivered to dairies, RCMD, and average raw cow's milk, AMY, and (b) RCMD and the number of dairy cows, NDC are presented in Table 2.
At the EU level, the coefficient of correlation between RCMD and AMY was r = 0.985 and in the top 10 milk producing countries its value varied between 0.989 in Belgium and 0.125 in Italy. In almost all the countries such as Germany, France, Unites Kingdom, Poland, Ireland, Spain, Denmark, Belgium, the correlation coefficient was over 0.9 reflecting a very strong positive relationship between these two indicators. In Netherlands, it was 0.776 also a strong correlation, but in Italy, the value of the correlation coefficient showed a very weak positive connection between these indicators, meaning that the raw cow's milk delivered to dairies is not related to the average raw cow's milk marketed to the milk processing plants.

The coefficient of correlation between RCMD and NDC registered positive and high values in Ireland, Poland, Netherlands, United Kingdom and Belgium, over 0.733. In France, its value was 0.5, reflecting a moderate positive relationship, while in the other countries Germany, Italy and Spain, it registered the lowest values, below 0.266 showing the existence of very weak connection between the raw cow's milk marketed to dairies and the number of dairy cows (Table 2).

Table 2: The correlation coefficients between: (a) the raw cow's milk delivered to dairies, RCMD, and average raw cow's milk, AMY, and (b) RCMD and the number of dairy cows, NDC at the EU-28 level and in the top 10 main producing countries

	RCMD & AMY		RCMD & NDC	
	r	t_{calc}	r	t_{calc}
EU-28	0.985*	16.07	0.225	0.65
Germany	0.961*	9.79	0.163	0.46
France	0.940*	7.79	0.500	1.63
United Kingdom	0.906*	6.03	0.744*	3.14
Netherlands	0.776*	3.47	0.751*	3.21
Italy	0.125	0.355	0.266	0.77
Poland	0.984*	15.55	0.888*	5.45
Ireland	0.909*	6.16	0.981*	14.22
Spain	0.978*	13.18	0.052	0.14
Denmark	0.970*	11.29	0.232	0.67
Belgium	0.989*	18.85	0.733*	3.04

** Statistically significant for a= 0.05.*
Source: Own calculation.

T Test (Two tails) for α= 0.05 significance level reflected that the coefficient of correlation between RCMD & AMY is statistically significant in case of the EU-28, Germany, France, United Kingdom, Netherlands, Poland, Ireland, Spain, Denmark and Belgium, as $t_{calc} > t_{critical\ (tabled)}$, $t_{criticaL}$ being equal to 2.306 for df = N-2 = 8. The only exception is the correlation coefficient for Italy where $t_{calc} < t_{critical}$, and this proved that its value is not statistically significant.

The correlation coefficients between RCMD & NDC were statistically significant only for United Kingdom, Netherlands, Poland, Ireland and Belgium, while in case of the EU-28 and Germany, France, Italy, Spain, and Denmark were not statistically significant.

The regression models between: (a) RCMD and AMY, and (b) RCMD and NDC, and ***the values of the determination coefficients*** are presented in Tables 3 and, respectively in Table 4.

They could serve for quantifying in what measure an increase by one unit of the independent variable X could change of the dependent variable Y, in this case raw cow's milk delivered to dairies.

Analyzing the situation at the EU-28 level, the regression equation tells us that if AMY will grow by one unit, RCMD will raise by 0.021, in other words if the average milk yield per cow will increase by one kilogram, the row cow's milk delivered to dairies will raise by 0.021 kg.

The values of the determination coefficient, R^2 values higher than 0.5 reflect the existence of a positive and strong relationship the studied variables, while its values below 0.5 show that an increase by one unit of the value of X will have no impact on the Y value.

More concrete, judging the R^2 values for the relationship between RCMD (Y) and AMY (X), we may easily notice that only in case of Italy, the increase by one unit of the average milk yield will have no impact or could have a very reduced influence of the raw cow's milk marketed to the processing industry (Table 3).

Table 3: Regression models between RCMD (Y) and AMY (X), R^2 and Sign F at the EU-28 level and in the top 10 milk producing countries

	Regression equation	Sign F	R^2
EU-28	Y = 0.021 X + 10,044	2.030	0.970
Germany	Y = 0.004 X + 1,277	8.75	9.925
France	Y = 0.0026 X + 7,011	5.23	0.883
United Kingdom	Y = 0.0024 X - 4,396	0.0003	0.821
Netherlands	Y = 0.0018 X - 1.784	0.0082	0.603
Italy	Y = 0.0001 X + 10,071	0.7295	0.015
Poland	Y = 0.0013 X + 4,025	2.67	0.968
Ireland	Y = 0.0036 X - 12.94	0.000267	0.826
Spain	Y = 0.0008 X + 0.221	9.39	0.957
Denmark	Y = 0.0005 X + 0.539	3.22	0.941
Belgium	Y = 0.00059 X - 0.507	5.87	0.978

Source: Own calculation.

At the EU-28 level, the regression equation reflects that an increase of the number of dairy cows by one could determine a decline of the raw cow's milk delivered to dairies by 0.0076. For this reason, the growth of milk production is based on the increase of yield and not of the number of cows, whose trend is declining during the last decade.

Analyzing the values of R^2, in case of the relationship between RCMD (Y) and NDC (X), we may notice that only in Italy, Poland, Ireland and Belgium the number of cows has a deep influence on the raw cow's milk delivered to dairies, in Ireland being the strongest impact. This happens because milk yield is lower than in the other milk producing countries selected in this study (Table 4).

Table 4: Regression models between RCMD (Y) and NDC (X), R^2 and Sign F at the EU-28 level and in the top 10 milk producing countries

	Regression equation	Sign F	R^2
EU-28	Y = -0.0076 X + 326.80	0.5308	0.050
Germany	Y = 0.0044 X + 1,277	0.657	0.026
France	Y = - 0.0064 X + 48.13	0.1405	0.250
United Kingdom	Y = 0.0126 X - 9,157	0.0135	0.054
Netherlands	Y = 0.0093 X - 2,296	0.0121	0.565
Italy	Y = 0.0006 X + 9.33	0.4571	0.070
Poland	Y = - 0.0056 X + 23.43	0.0005	0.789
Ireland	Y = 0.0069 X - 1.89	4.750	0.963
Spain	Y = 0.0019 X + 4.81	0.8846	0.002
Denmark	Y = - 0.007 + 9.54	0.5183	0.053
Belgium	Y = 0.0027 X -10.56	0.015	0.537

Source: Own calculation.

Forecast of raw cow's milk delivered to dairies for the 2019-2013 horizon was based on the average annual gain (AAG) whose level in the analyzed period 2009-2018 accounted for 2,604.57 thousand tonnes. The average annual gain in the top 10 milk producing countries in the EU is presented in Fig. 9. According to the forecast raw cow's milk which will be marketed to milk processing plants in the EU-28 for the horizon 2019-2013, it is estimated that in 2013, the dairies will be supplied with 173,309.23 thousand tonnes raw milk.

In Germany, milk processing industry will receive 33,560.18 thousand tonnes raw milk, in France 26,358.39 thousand tonnes in Netherlands 14,604.71 thousand tonnes, in United Kingdom 16,121.15 thousand tonnes, in Italy 13,590.19 thousand tonnes, in Poland 13,359.08 thousand tonnes, in Spain 8,763.62 thousand tonnes, in Ireland 9,247.10 thousand tonnes, in Denamrak 6,055.90 thousand tonnes and in Belgium 4,749 thousand tonnes (Table 5).

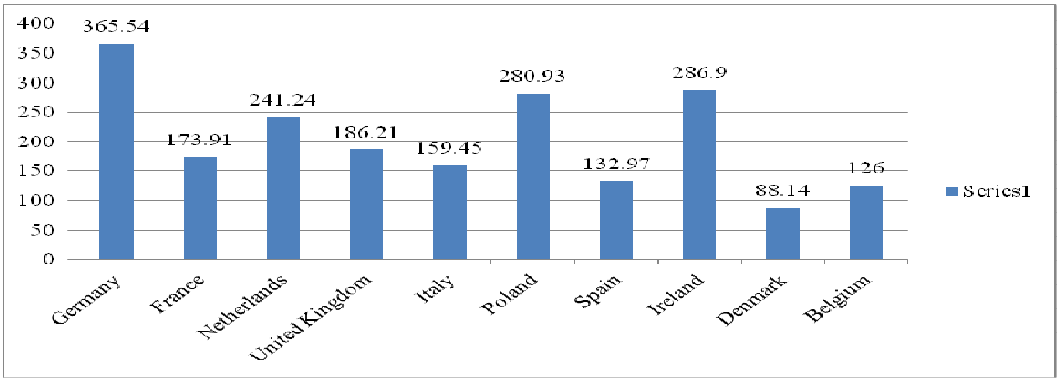

Fig.9: Average annual gain in raw cow's milk delivered to dairies in the EU-28 top 10 milk producing countries, 2009-2018 (Thousand tonnes)

Source: Own calculation.

Table 5: Forecast of raw cow's milk delivered to dairies in the EU and the top main producing countries for the 2019-2023 horizon (Thousand tonnes)

	2019	2020	2021	2022	2023
EU-28	162,890.95	165,495.52	168,100.09	170,704.66	173,309.23
Germany	32,098.02	32,463.56	32,829.10	33,194.64	33,560.18
France	25,662.75	25,836.66	26,010.57	26,184.48	26,358.39
United Kingdom	15,374.31	15,560.52	15,748.73	15,934.94	16,121.15
Netherlands	14,122.24	14,363.48	14,122.23	14,363.47	14,604.71
Italy	12,952.32	12,516.26	12,797.20	13,430.74	13,590.19
Poland	12,235.32	12,516.26	12,797.20	13,078.14	13,359.08
Ireland	8,099.50	8,386.40	8,673.3	8,960.20	9,247.10
Spain	8,231.74	8,364.71	8,497.68	8,630.65	8,763.62
Denmark	5,703.34	5,791.48	5,879.62	5,967.76	6,055.90
Belgium	4,245	4,371	4,497	4,623	4,749

Source: Own calculation.

Conclusions

Dairy cows are the main source of raw milk contributing by 97 % to processing industry in the EU-28.
In the period 2009-2018, raw cow's milk delivered to dairies has continuously increased accounting for 160.28 million tonnes in the last year of the studied interval, and this was a consequence of the increased milk yield and less by the number of dairy cows whose number registered a continuous decline.

In the decreasing order of their contribution to raw cow's milk supplied to dairies, the top 10 producing countries in the EU-28 are: Germany 19.7%, France 15.9%, United Kingdom 9.5%, Netherlands 8.7%, Italy 7.9%, Poland 7.5%, Spain 5%, Ireland 4.9%, Denmark 3.5% and Belgium 2.5%.

The marketed milk to processing industry increased in almost all these countries, the record being registered by Ireland +58%, and on the last position being France +7.3%.

The main influencing factor on this performance was the continuous growth of milk yield sold per cow, which at the EU-level increased from 5,624 kg in 2009 to 6,997 kg in 2018. Denmark, Netherlands, Spain, United Kingdom, Germany and Belgium registered a higher milk yield than the EU average, while France, Ireland, Poland and Italy are situated below this average.

In almost all these countries, milk yield increased in the last decade, the highest growth being 52.7% in Poland, and the lowest one +12.4% in United Kingdom. Only in Italy, milk yield was by -6.6% lower in 2018 compared to 2009.

In 2018, the EU had 22.9 million dairy cows, by 4.1% less than in 2009. The highest number of cows is in Germany while the lowest number is in Belgium. The number if cows declined in various percentages in almost these selected countries, except Ireland where the number of cows increased by 33.9 % and in Belgium by 2.1%.

Raw cow's milk output delivered to dairies accounted for 312.82 kg/capita in 2018, meaning by +17% more than in 2009. Ireland, Denmark, Netherlands, Germany, France, Poland and Belgium exceeds the EU average, and the figures of this indicator reflects a high self sufficiency.

Between raw cow's milk delivered to dairies and average milk yield it was found a strong and positive coefficient of correlation, statistically significant for $\alpha = 0.05$, both at the EU-28 level ($r = 0.985$) and in almost all the main milk producing countries, ranging between 0.989 in Belgium and 0.776 in Netherlands, except Italy were the relationship is very weak ($r = 0.125$).

Between raw cow's milk delivered to dairies and the number of dairy cows, the correlation coefficient had positive values and higher that 0.733 in Ireland, Poland, Netherlands, United Kingdom and Belgium, over 0.733, in France 0.5, while in Germany, Italy and Spain, it registered the lowest values, below 0.266.
The regression equations calculated at the EU-28 level and for each selected country proved that average milk yield has a deep influence on raw cow's milk delivered to dairies, a fact also attested by the value of R^2, which was higher than 0.5 in almost all the countries, except Italy.
The number of dairy cows comes on the 2nd position as importance in determining raw milk delivered to processing industry. The decline of the number of cows at the EU level and in many top producing countries is compensated the growth in milk yield which could more efficiently sustain raw milk production.

The lower milk yield compared to the top producing countries like Germany, France, United Kingdom, Netherlands, Spain determined Italy, Poland, Ireland and Belgium to increase the number of cows for producing more raw milk for dairies.

In consequence, at the EU level and as well as in the top 10 milk producing countries, the supply of cow raw milk to dairies is estimated to grow in the 2019-2013 horizon. In 2023, the EU is expected to produce 173,309.23 thousand tonnes raw cow milk and if we take into account that United Kingdom will leave the EU according to the Brexit agreement, the forecast is for 157,188.08 thousand toness, that is less 9.4%.

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Occupational Health and Safety Influence on Work Quality and Efficiency from Management Perspective

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Abstract

The main goal of any enterprise is to make a profit. The possibilities of obtaining it are determined, among others, by proper management. Skillful disposal of the resources possessed and their effective use gives an opportunity not only for the profit of the company, but also allows its development. Appropriate planning, organizing, motivating and controlling human resources strengthens the achievement of this goal. Appropriate quality and efficiency cannot be achieved without safe working conditions. The purpose of the article is to show that the costs incurred by enterprises on health and safety at work generate quality and productivity at work. Employer's involvement in health and safety issues may bring economic benefits to the enterprise. Through the analysis of profits and losses, the authors present short-term and long-term economic benefits resulting from the improvement of occupational health and safety in the enterprise.

Keywords: Management, Occupational Health and Safety, Work Quality and Efficiency.

Introduction

All entrepreneur's activities are mainly limited to achieving the highest possible profit with the least financial outlay. However, the entrepreneur must pay attention that the areas in which he optimizes costs do not bring him more losses than goods.

Unfortunately, the experience of the authors of the article indicates that a frequent elements optimizing the costs of the company are the aspects of occupational health and safety (OHS). The vast majority of enterprises (especially those from the micro and small sector) belittle the OHS obligations imposed by normative acts on the employer. This situation means that the employer does not properly care for the safety of employees by not adapting the working environment to the requirements set out in law, thus exposing employees to more frequent accidents at work and adverse events.

The employer should be aware of the hazards that occur in the workplace and effectively counteract them. The costs associated with adapting the work environment to OHS requirements often exceed the psychological capabilities of the company. In the opinion of the authors of the article, this is wrong thinking, because the funds allocated to improving the health and safety conditions in the enterprise should be treated as an investment that can not only pay back, but can bring the real financial benefits to the employer.

Impact of OHS At Work Quality and Efficiency

Appropriate management of the company determines the quality and efficiency of work. The way the employer will approach individual management elements (planning, organizing, controlling and motivating) will have a significant impact on work processes, and thus on work quality and

efficiency. The employer's impact on these factors is very large, because he decides to optimize the work process and manages resources (Cameron, 2006).

Skillful OHS management allows limiting or eliminating an important factor that is meaningful for shaping the work quality and efficiency. It is about loss, lost opportunities or resources that affect the functioning of an enterprise. The occurrence of loss determines specific behaviors not only for the employer but also for the employee, which makes it difficult to get the right motivation to work. Inappropriate management of an enterprise, including OHS management, may result in:

- material losses,
- losses related to adverse effects on employee health,
- other losses depending on the negative consequences arising in the enterprise (Rzepecki, 2002).

It is in the interest of the employer not to allow losses to the enterprise. Therefore, the employer should have an occupational health and safety service that supports him in proper safety management. However, it happens that the interpretation of the enterprise's protection against loss varies. In most cases, the employer sees losses through an economic perspective. The functioning of OHS service understands loss protection as a safe work environment. Differences in the perception of loss confirm that the OHS service plays an important role in the company. Figure 1 presents the types of losses that may arise as a result of the employer's wrong approach to issues related to occupational health and safety (Główczyńska-Woelke, 2009).

Fig. 1. Losses that may arise through improper management of OSH (Główczyńska-Woelke, 2009).

A. Woźny, A. Pacana and others have indicated in their research the impact of management on work quality and efficiency. The authors of the article changed the approach of A. Maslow's pyramid of needs and confronted them with the needs of the company. According to A. Maslow, to meet the needs of a higher order (affiliation, respect and recognition, and self-fulfillment), lower-level needs (physiological and safety) should be ensured. Through the prism of the pyramid of job needs, lower-level needs can be understood as the need to have a job (physiological need) (Woźny et al., 2015).

Each unit signing an employment contract establishes an employment relationship with the employer. Having the status of an employee determines the next level of the pyramid of job needs, namely the need for security. The employer's role is to meet the requirements set out in the Labor Code. Therefore, the employer is obliged to provide a new employee (The Act of 26 June 1974 - Labor Code):

- medical examinations in accordance with the workplace. It is important that referrals for medical examinations take into account all hazards that may occur in the workplace. Hazards identification is carried out in consultation with an OHS inspector who works full-time or provides outsourcing services (Council of Ministers' decree on 2nd September 1997 on occupational health and safety at work),
- general initial training and on-the-job training. General initial training should be carried out in accordance with the company's specific health and safety training program. In addition to the initial training framework set out in the OHS Training Regulation, it is important for the program to include industry-relevant issues that affect employee safety. Professionally implemented on-the-job training in the number of 8 teaching hours (45 minutes) allows not only familiarizing with the workplace, but above all getting to know the processes and people that the new employee will be surrounded by,
- properly assessed occupational risk and inform the employee about its result. Each employer is required to assess the likelihood of adverse events occurring in a given position and to inform each employee about its result. Proper risk assessment allows to detect the most dangerous threats that can result in loss, injury or death,
- familiarize with the safety instructions and procedures. The employer is obliged to draw up job instructions and all equipment necessary for the work process,
- allocate personal protective equipment that is a consequence of proper occupational risk assessment,
- get acquainted with the procedures related to fire protection and first aid (Woźny, Dobosz, 2014).

The number of employer's obligations to create an OHS culture for the employee shows that these issues are very important. The employer's right approach to OHS management enables this key need to be met in accordance with the described pyramid.
Failure to implement the indicated elements may affect the quality and efficiency of work. Meeting the employee's need for security will result in fewer factors that may cause a loss to the enterprise through:

- higher frequency of potentially accident occurrences and accidents themselves at work, which may be caused by the improper use of personal protective equipment,
- lack of knowledge on the safe use of machines and equipment used in the work process,
- extending the technological process as a result of insufficient knowledge of work processes due to the lack of on-the-job training, etc.,
- other losses related to non-compliance with occupational health and safety regulations by both the employer and the employee.

Meeting the needs of the lower level by the employer will determine the quality and efficiency of work, which are the needs of the higher level according to the pyramid of the needs of work proposed by A. Woźny, A. Pacana and others. An employee who is aware of a safe working environment will perform tasks and instructions in accordance with ordinances and procedures.

The needs realized by the employer towards the employee enable reaching the apex of the pyramid of job needs, namely success and self-fulfillment, which are related to the employee's relationship with the enterprise. Employer's commitment to successive pursuit of individual levels of the pyramid means that the employee feels job satisfaction and is ready for greater quality and efficiency. Figure 2. shows a pyramid of job needs.

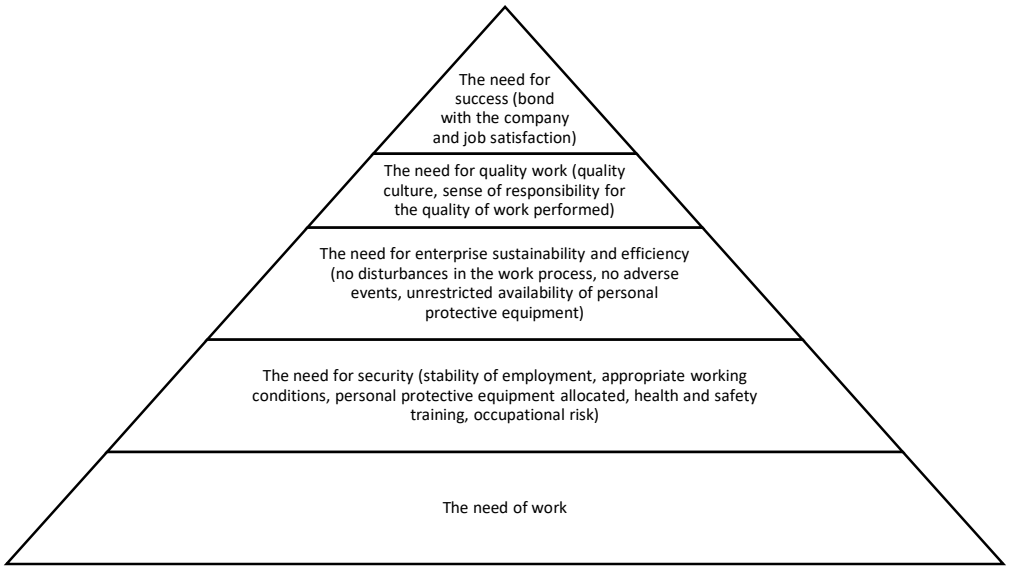

Fig. 2. Work needs pyramid (Woźny et al., 2015).

OHS management aspect – case study

An analysis of the work needs pyramid has shown that occupational health and safety issues are very important to the company and that they have an impact on the quality and efficiency of work. The subject of the analysis is a transport company, which main orders are based on outsourcing carried out for large logistics centers, warehouses, as well as for small chain stores, etc.:

- permanently employs approximately 40-45 employees,
- has a fleet of 60 cars.

The authors of the article attempted to analyze the selected enterprise in terms of profits and losses resulting from reliable implementation of lower-level needs by the employer. The need for changes in the enterprise resulted from the National Labor Inspectorate's (NLI) inspection in 2017 and the order to change the work organization. The order and the NLI's appearance focused on the area:

- too many accidents and accidental events,
- improper and insufficient selection of personal protective equipment,
- lack of systematic OHS training of employees,
- lack of a dedicated, detailed training program for individual positions,
- bad working conditions.

As a result of the NLI audit carried out in 2017, the entrepreneur decided to change the outsourcing company providing OHS services. The newly recruited occupational health and safety team at the analyzed company began the process of implementing a new health and safety policy in line with the need for security of the pyramid.

The first element showing gaps in the safety management process was the underestimation of occupational risk in the workplace. The previous occupational health and safety inspector assessed occupational risk using the PHA method, and the new occupational health and safety team performed risk assessment using the Risk Score method. Analysis of selected threats included in Table 1 indicates that some threats were underestimated, which increased the likelihood of adverse events (Woźny, Pacana, 2014).

Table 1. Occupational risk update by the OHS team - selected threats (Own elaboration).

Occupational hazard factor	PHA (2 indicators "S","P")	Risk Score (3 indicators "S","E","P")
	Risk assessment before changes	Risk assessment after changes
Physical factors		
Stumble and fall at the same level	D	N
Striking, being crushed by falling objects	D	N
Impact on stationary objects	N	N
Sharp, rough surfaces and edges	D	D
Hit by moving objects	N	N
Overload of the musculoskeletal system	D	N
Changing atmospheric conditions	N	N
Psychophysical threats		
Mental burdens (stress)	N	N

**D - acceptable level of risk*
**N - unacceptable level of risk*

Due to the thorough process of estimating occupational risk, the occupational health and safety team was able to diagnose some of the problems that caused improper organization of work and the increased number of accidents at work. An update of occupational risk has resulted in a change of work clothing, footwear and personal protective equipment. It is noteworthy that before the change, employees used their own private clothing as work clothing, and the safety footwear was of poor quality. As a result of the changes, the employer was recommended to equip employees with:

- summer and winter work clothing (work trousers, jacket, 3 T-shirts, winter jacket)
- work footwear for summer and winter,
- an unlimited number of protective gloves for use in warehouses and when loading and unloading goods at the customer's,
- protective helmets for use in logistics warehouses that required it.

The adaptation of work clothing and footwear as well as personal protective equipment to the guidelines specified in occupational risk resulted in a significant increase in financial outlays. The data in Figure 3 indicate expenditure in the months January-May in 2017 (before NLI control) and 2018 as amended. It is worth to note that the sum of costs before the changes in the analyzed months amounted to PLN 2,518.78, and after the changes as much as PLN 11,144.10.

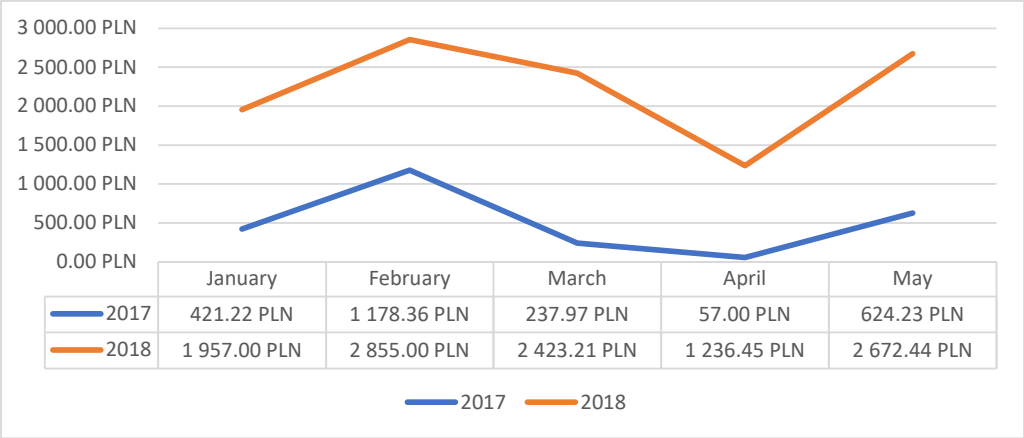

Fig. 3. Expenses for clothing and footwear as well as personal protective equipment (Own elaboration).

As a result of audit the NLI showed deficiencies in general initial training, position instructions and periodic training. The OHS team updated the detailed training programs and re-trained all employees in line with the new training program. It is worth to mention that thanks to the efforts of the occupational health and safety team, some employees were delegated for specialized training in the operation of electric-powered lift trucks. This was necessarily due to the unacceptable level of risk associated with overloading of the musculoskeletal system. Due to the fact that the employees of the analyzed company work in different warehouses and with different goods, it happened that they had to transport goods exceeding 450 kg with a hand pallet truck, which is not in line with applicable regulations on manual transport works (Regulation of the Minister of Labor and Social Policy of March 14, 2000 on occupational health and safety during manual transport operations).

As a result of the changes, expenditure on training and employee development increased significantly in 2018, compared to 2017. In the examined months of 2017, the cost of training and improvement was only PLN 460, and in 2018 as much as PLN 12,250.

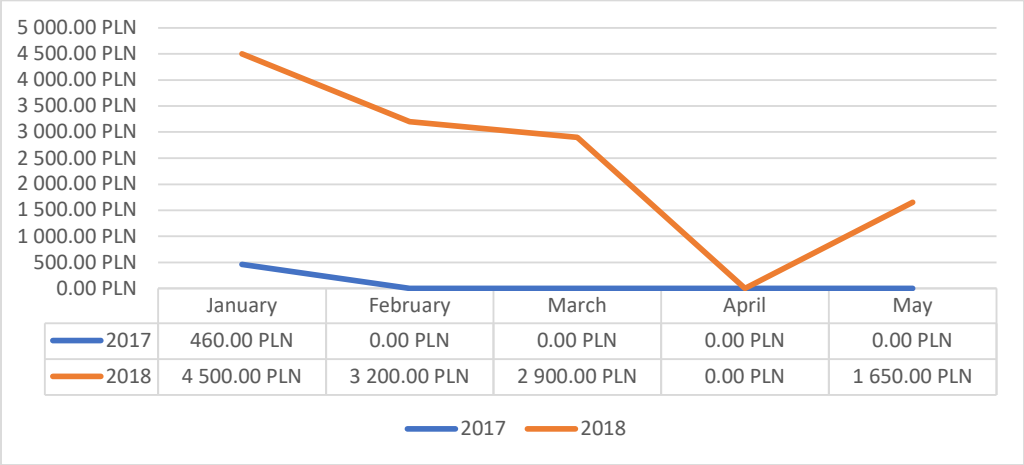

Fig. 4. Expenses for training and improvement (Own elaboration).

In accordance with the obligations arising from the Labor Code, the employer is to subject the employees to initial, periodic and control medical examinations. In the case of the analyzed enterprise, this scope is expanded to include neurological and psychological tests in connection with driving

vehicles. During the analysis of hazards in the work environment, the occupational health and safety team obtained information on a large number of back pain in employees, therefore they recommended employers to facilitate access to private treatment in the form of additions to visits to an orthopedic specialist and a physiotherapist. In 2018, these activities generated expenses of PLN 9,910. In the previous period, the expenditure on occupational medicine doctor and medical care of employees amounted to PLN 2,160.

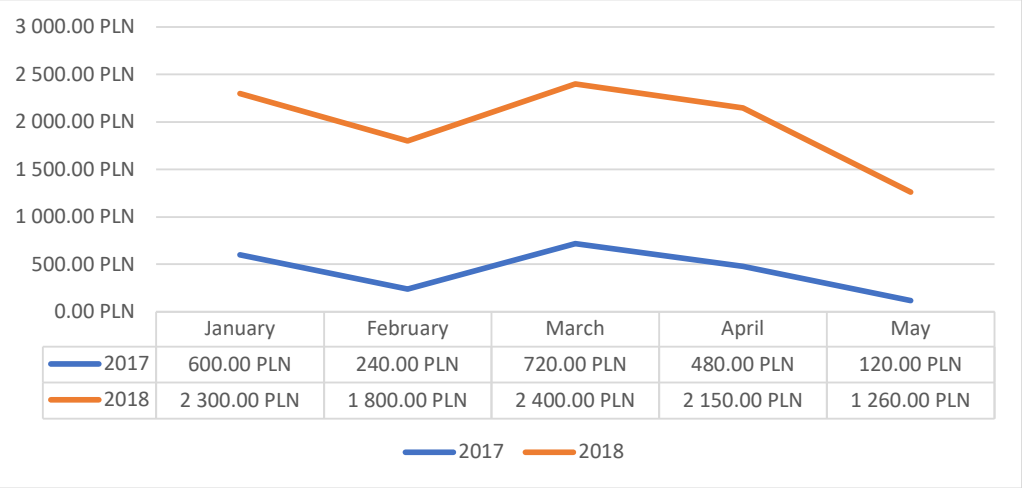

	January	February	March	April	May
2017	600.00 PLN	240.00 PLN	720.00 PLN	480.00 PLN	120.00 PLN
2018	2 300.00 PLN	1 800.00 PLN	2 400.00 PLN	2 150.00 PLN	1 260.00 PLN

Fig. 5. Expenses for occupational medicine doctors and medical care for employees (Own elaboration).

The last element of the OHS team's activities was a detailed review of the occupational health and safety of work rooms and machinery and equipment used by employees. Due to the nature of the activity, health and safety inspectors focused on the technical condition of the car fleet and hand pallet trucks used by employees. The review showed that:

- poor condition of the tires,
- some of the rearview mirrors on vehicles are cracked or damaged,
- there are no current technical inspections on 13 vehicles,
- there are no hands-free kits in some vehicles,
- no inspection of fire extinguishers or their total lack,
- some of the hand pallet trucks have damaged wheel rollers and piston seals are solid.

The report from the OHS review meant that the employer repaired the faulty equipment and equipped part of the fleet with the necessary elements. This situation caused increased expenses for improvement and equipment of vehicles as well as costs in the operation of hand pallet trucks. In 2017, these expenses amounted just to PLN 780 in the analyzed months, and in 2018 as much as PLN 9,580.99.

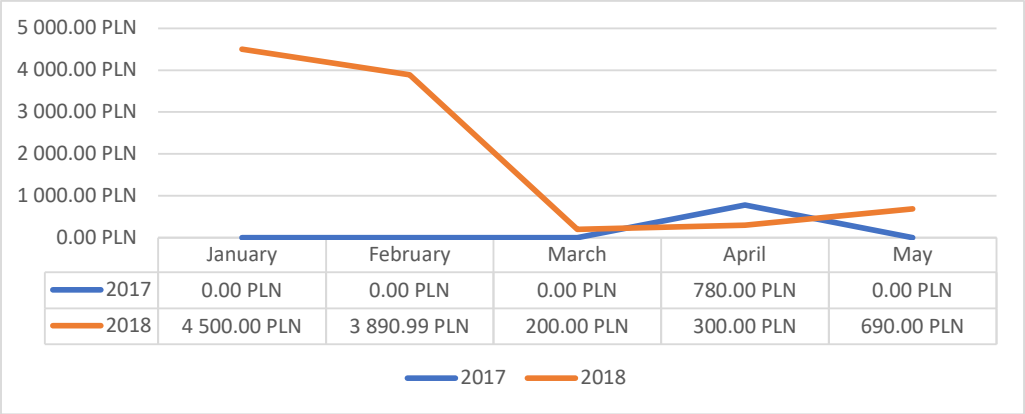

Fig. 6. Expenses for improving and equipping vehicles, including hand pallet trucks (Own elaboration).

The changes introduced by the employer and the OHS team not only improved the working conditions, but actually contributed to reducing the number of accidents at work. It is noteworthy that from 2018 all reported potentially hazardous events (records of adverse events were assumed) that may have an impact on the health and safety at the workplace have been registered. The introduced changes caused the number of accidents to be significantly reduced. In the period January-May 2017, there were 9 accidents at work, and a year later only 2.

Table 2. Number of accidents at work and recorded potentially dangerous events (Own elaboration).

Month	2016		2017	
	Accidents at work	Registered potentially dangerous events	Accidents at work	Registered potentially dangerous events
January	2	Lack of registration	0	12
February	4		0	8
March	0		1	11
April	2		1	4
May	1		0	6

** Only applies to reported accidents and potentially hazardous events*

The analysis of profits and losses related to the change of OHS conditions includes costs resulting from employees' inability to work. The authors of the article took into account absence from work:

- as a result of accidents at work (the employer pays up to 30 days),
- sick leave potentially related to the workplace (overload, tear, degeneration, etc.).

Included costs resulting from:

- sick leave,
- overtime paid, etc., resulting from the implementation of the tasks of employees on redundancies.

The statement of costs incurred by the employer clearly indicates that the changes introduced have resulted in less absence of employees related to accidents or diseases arising from the workplace. The employer's involvement in training, personal protective equipment and equipment modernization meant that the costs of incapacity for work in January-May 2018 amounted to PLN 17,200, and in the

same period in 2017 these costs hovered around PLN 33,000. Thus, there was a nearly 50% decrease in costs incurred by the employer due to the employees' inability to work.

Table 3. Costs as a result of employees' inability to work (Own elaboration)

Month	2016		2017	
	Number of sick leave days	Costs for employer	Number of sick leave days	Costs for employer
January	35	PLN 7,000	20	PLN 4,000
February	47	PLN 9,400	18	PLN 3,600
March	25	PLN 5,000	14	PLN 2,800
April	27	PLN 5,400	21	PLN 4,200
May	31	PLN 6,200	13	PLN 2,600

** An hourly rate of PLN 25 was adopted*

Actions taken by the OHS team from the beginning of 2018 caused that the costs of improving the working environment were PLN 42,885.09. In the corresponding period of 2017, these costs amounted to only PLN 5,918.78. Considering the costs of incapacity for work, it can be seen that the balance of costs associated with raising the safety culture is negative. The authors of the article estimated that the sum of costs related to health and safety at work and due to incapacity for work amounted to PLN 60,085.09 in the months of January-May 2018. In the corresponding period of 2017, these costs amounted to PLN 38,918.78, i.e. almost by over PLN 20,000 less.

Table 4. List of costs incurred for occupational health and safety and for incapacity for work in the surveyed months: January-May 2016-2017 (Own elaboration)

	2016	2017
Costs incurred to improve OHS conditions	PLN 5,918.78	PLN 42,885.09
Costs for incapacity for work	PLN 33,000.00	PLN 17,200.00
Sum of costs	PLN 38,918.78	PLN 60,085.09

The balance of profits and losses in the analyzed months (January-May) is negative and it may seem that the improvement of working conditions, and thus the quality and efficiency of work did not have a positive impact on the management aspect of the enterprise's functioning. However, when estimating the costs that the employer may incur throughout the year, profit is noticeable already in December 2018. The actions proposed by the OHS team in the long run will positively affect the economic aspect of the enterprise.

Table 5. Estimated employer's cost for incapacity for work throughout the year, including health and safety costs (Own elaboration)

	No change	After changes
	Median days of inability to work	
	33	17
June	PLN 6,600.00	PLN 3,400.00
July	PLN 6,600.00	PLN 3,400.00
August	PLN 6,600.00	PLN 3,400.00
September	PLN **6,600.00**	**PLN 3,400.00**
October	PLN 6,600.00	PLN 3,400.00
November	PLN 6,600.00	PLN 3,400.00
December	PLN 6,600.00	PLN 3,400.00
The whole year	PLN 46,200.00	PLN 23,800.00
	PLN 38,918.78	PLN 60,085.09
	PLN 85,118.78	PLN 83,885.09

** Considering the median days of inability to work before and after the shifts, it can be assumed that profit resulting from the improvement of health and safety conditions will be possible as early as January 2019*

Conclusions

Each action taken by the entrepreneur is intended to achieve a specific goal. The list of these goals is related to the company's plans and its financial results. Depending on the development plan, the entrepreneur will take measures to make the most effective use of available resources.

In the case of human resources, it is difficult to optimize costs in relation to the development of the company. The example of the analyzed enterprise shows that increasing expenses on health and safety at work can contribute to better quality and efficiency of work. This is indicated by a significantly lower number of accidents and days of inability to work after the changes. Changes introduced in the company only in the first period generated significant costs. In the perspective of the year, the investment related to the improvement of working conditions should definitely pay off looking solely through the prism of accidents and days of inability to work. This approach to the issue of employee safety should be reflected in the quality and efficiency of employees 'work, which means that greater involvement in employees' work can be expected.

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Compulsory Banks' Restructuring as An Attempt to Ensure Continuity of Bank Functions That Are Key to The Market – Poland's Example

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Abstract

Compulsory banks' restructuring is a relatively new solution introduced onto the ground of national legislation in connection with EU requirements. The mechanism of resolution is also an attempt of a response to the financial crisis that took place in 2007-2008. The basic aim of compulsory restructuring is to ensure continuity of provision of banks' critical functions. Due to the launch in Poland on 15 January 2020 of the first compulsory restructuring of the Podkarpacki Bank Spółdzielczy (PBS) with its registered office in Sanok this issue gained a practical dimension. The purpose of the research is to indicate whether relevant applicable legislation and steps already taken in practice allow the implementation of the basic objective of the resolution process. The research hypothesis was based on an assumption that ensuring continuity of critical functions of a bank that found itself in a bad financial standing is an important element used to stabilize the situation on the banking market. By ensuring critical functions, the requirement launching the payment of guaranteed funds to the depositors will not be met and it will be possible to use solutions which will affect the entire financial market to a smaller degree. The analysis covers currently applicable legislation in the context of mechanisms of compulsory restructuring used in practice. The adopted research methodology was based on the analysis of texts of legal acts that are key to the discussed subject-matter, with reference to selected views expressed in the literature. It needs to be concluded that the method of analysis of applicable law and the case study method were used as the basic research methods.

Keywords: Compulsory Restructuring, Bank, Bridge Institution

Introduction

The mechanism of compulsory restructuring has been in operation in Poland since 2016. Its legal basis is in the Act of June 10, 2016 on the Bank Guarantee Fund, the deposit guarantee scheme and compulsory restructuring (consolidated text: Dz. U. (Journal of Laws) of 2019 item 795 as amended, hereinafter: BGFA), which fully meets EU requirements. The introduced solutions extended the scope of tasks carried out by the Bank Guarantee Fund (BGF) and increase its role in the financial security network on the Polish financial market. Next to tasks involving guaranteeing deposits, the BGF became the organ of resolution.

It needs to be noted that compulsory restructuring is a non-judicial mode that allows making quick changes in the organizational structure of a bank which found itself in a crisis situation (Szczęśniak 2018, p. 2). The legislator prescribed for different instruments of resolution which make it possible to undertake measures adequate to the scale of the phenomenon and best from the point of view of maintaining the continuity of bank's critical tasks. Direct motivation for the conducted research was the BGF's taking a decision on January 15, 2020 to initiate Poland's first compulsory restructuring of the Podkarpacki Bank Spółdzielczy (PBS) with its registered office in Sanok.

Ensuring Continuity of Bank's Core Business as Resolution's Objective

Article 66 BGFA specifies objectives of compulsory restructuring. The most important ones include ensuring continuity of bank's core business, that it guaranteeing continuation of the so-called critical functions performed by the bank. In accordance with the will of the legislator, critical functions need to be understood as bank services, operations or other bank activity cessation of which would lead, in one or a few EU countries, to disturbances in the functioning of the economy, or would threaten financial stability due to the size of the bank, its share in the market, complexity, transnational activity or economic or financial ties. Burzyńska (2014) notices that the term maintaining bank's critical functions should be understood as keeping agreements concluded by banks. BGF's task in such a situation is to strive to limit the loss of value of the banking enterprise with regard to which compulsory restructuring is being implemented. The essence of the achievement of this objective involves maintaining critical functions as active (FSB 2013).

In compulsory restructuring existing owners lose their entitlements to the benefit of BGF (2020b). A need has been observed in Europe to provide bodies responsible for maintaining stability and security on the financial market with appropriate tools necessary to reduce the systemic risk resulting from a bank's bankruptcy at the same time limiting the risk of costs to tax-payers (Davies and Dobler 2011). This leads to a conclusion that under resolution owners and creditors should not suffer losses greater than they would have under regular insolvency proceedings. It needs to be emphasized that resolution is initiated without the consent of the bank or its shareholders, members or creditors and debtors. This means that bank customers (depositors) have no influence over the actions taken. Any consent to apply an adequate measure (instrument) of compulsory restructuring is not required either. Decisions on initiating resolution and on the application of a specific measure of compulsory restructuring are made by the BGF's independent decision. It needs to be taken into consideration that in accordance with the will of the legislator initiating resolution does not cause a launch of the system of payments as part of guaranteed funds (in Poland also by the BGF). Szczęśniak (2018) emphasizes that resolution's aim is to protect public resources. It needs to be noted that in the Polish legal system only a declaration of bankruptcy results in the launch of payment of guaranteed funds for the depositors of the bankrupt operator (i.a. bank). Given the assumption that the amounts of the said payments may exceed the amount of resources gathered for this purpose (in banks' guarantee funds) the possibility to fall bank on the resolution mechanism gains special importance. Initiating it will then fit among BGF's tasks the aim of which is to maintain stability and security on the banking market. Thus, it needs to be expressly stated that BGF's activity strives to protect public interest.

Using a bridge institution in restructuring Podkarpacki Bank Spółdzielczy (PBS) with its registered office in Sanok (Polish example)

On January 15, 2020 BGF issued a decision on initiating compulsory restructuring of Podkarpacki Bank Spółdzielczy with its registered office in Sanok (PBS), on writing down PBS's capital instruments and on applying compulsory restructuring in the form of a bridge institution and appointing an administrator. Thus the BGF took control over PBS. Moreover, the BGF took a decision to suspend temporarily PBS's activity until January 20, 2020, that is for the time necessary for the takeover (BGF, 2020a). The actual launch of the compulsory restructuring took place - in line with statutory provisions - on the date of serving the said decision, that is January 17, 2020 (BGF 2020b). PBS obtained the status of "a company under restructuring".

The BGF began PBS's compulsory restructuring because three conditions, specified by statute, have been met which oblige the BGF to undertake such a solution. They include:

a) threat of PBS's bankruptcy,
b) absence of premises that would point to possible supervisory measures or measures taken up by the PBS itself that would allow removal of the threat of bankruptcy in an appropriate time.
c) initiating PBS's compulsory restructuring was in the public interest.

It may be pointed out that the reason for resolution was PBS's bad capital situation. According to PBS's mid-year report, the bank's balance sheet total at the end of 2019 was approx. PLN 2.8 billion and the Tier 1 capital ratio went down within 12 months from 7.65% to 0.32% where the minimum requirement is 6%. The ratio at this level was without a doubt an instrument demonstrating that PBS was a bank at risk of bankruptcy. It needs to be noted that PBS, contrary to most cooperative banks, was not a member of any Institutional Protection Schemes operating in Poland (that is a special form of protection of "associated" cooperative banks, with the consent of the supervision organ, i.e. the Polish Financial Supervision Authority (KNF)). Before taking the decision on compulsory restructuring, the BGF assessed the value of PBS's assets and liabilities. It is done by an independent company. The assessment demonstrated that PBS's assets are insufficient to cover its liabilities.

As part of its activities, the BGF decided to employ an instrument called a bridge bank and its role was given to Bank Nowy BFG S.A., equipped with the capital of PLN 100 million. A section of PBS including i.a. all deposits of the bank's customers (retail, micro-companies and small and medium-sized enterprises) was transferred to Bank Nowy BFG S.A. PBS's obligations (including all obligations related to PBS's operation, with particular emphasis on obligations resulting from concluded and applicable agreements save certain exceptions) were also transferred to Bank Nowy BFG S.A. Thanks to this the security of deposits stored at the PBS was ensured. It needs to be emphasized that the BGF guarantees PBS's customers' savings under unchanged terms, which is in agreement with the BFG's objects as a deposit guarantor. As a consequence of launching the bridge bank, depositors' bank accounts are still maintained under the previously applicable terms. In the first days of lunching the resolution mechanism, serving PBS's customers was temporarily suspended due to technical requirements associated with transferring the operation to Bank Nowy BFG S.A. The technical break in internet and mobile banking services and in bank branch offices lasted until January 21, 2020 (it included also non-cash transactions performed by means of cards and cash machines). On January 21, 2020 resumption of operation took place under previously applicable terms, with the use of internet and mobile banking.

Searching for an answer to the question of what determined in the case of PBS that the BGF decided to take measures that served to maintain continuity of this bank's core operation, one needs to note that PBS's customers included mostly local government units (LGUs). Due to their role in the local community and the region's economy, the BGF concluded that serving the LGUs is PBS's critical function (mainly given the high value of their deposits). Bearing the above in mind, the BFG assessed that adopting compulsory restructuring towards PBS was necessary in order to ensure continuity of its critical functions. Such a decision was primarily dictated by the fact that funds stored in the bank by LGUs are not covered by a deposit guarantee scheme and thus if PBS's bankruptcy were to be declared, it would lose all its resources (BGF, 2020a). A bridge institution protects the public interest in such a situation. Being under control, the bridge bank gives a warranty of careful operation, aimed at maintaining financial stability (Kerlin 2016).

Conclusions

The global financial crisis has shown inefficiency of deposit guarantee schemes. This is why the solutions at the EU and national level introducing the resolution mechanism were incorporated. It was assumed that ensuring bank's critical functions should not be felt by its customers. This will allow maintaining essential elements of bank's activity (Kerlin 2016).

The risk of PBS's bankruptcy revealed certain deficiencies in the deposit guarantee scheme in Poland, mainly in terms of protection, and strictly speaking its absence, in the context of LGUs' deposits. Forms of activity under resolution allowed by the BFGA made it possible, at least to a great extent, to protect the banking market against negative outcomes of PBS's bankruptcy (that is: LGUs' loss of funds of a high amount). Given the emerged situation of the banking market in Poland, in particular on the cooperative banking market, it needs to be shown that the measures taken are the first attempt to employ resolution, also in protection against bankruptcy and its negative effect on public finances. PBS's compulsory restructuring is performed on the basis of tools prescribed for in the BGFA, including also the use of the banks' compulsory restructuring fund. Finalization of PBS's

compulsory restructuring will allow an assessment whether resources gathered in this fund are adequate to needs.

The analysis carried out for the purpose of this study shows that ensuring continuity of critical functions of a bank which found itself in a bad financial condition is an important element used to stabilize the situation on the banking market. The described case, however, will reveal an important problem and under these circumstances a discussion should be taken up on amending the applicable legislation towards protection of deposits gathered by LGUs.

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New Financing Opportunities on The Block Chain: Regulatory Challenges for Supervisory Authorities, Opportunities for Better Investor and Consumer Protection

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Abstract

The author of the attached article is currently running a phd programme at the Comenius University in Bratislava in Management on the topic "Management systems for better protection of investors and consumers against investment fraud and financial crises. “The motivation for the subsequent publication was based on the fact that in the meantime, for several years now, new financing possibilities have been available on the block chain such as „Initial Coin Offering“, „Initial Exchange Offering“, and „Security Token Offering,“ in which investors and consumers are increasingly given the opportunity to participate. In the meantime, however, it has become apparent that the new investment opportunities for investors have often been associated with high losses or even total loss.
First of all, the article will describe the currently existing financing possibilities of new ones such as Initial Coin Offering, Initial Exchange Offering and the negative development for investors in recent years, then what measures are/were taken by supervisory authorities to better protect investors and finally the new financing instrument of Security Token Offerings with its advantages and disadvantages for investor protection and whether it promises better protection for investors in the future. In order to present the current status in the best possible way, both previously available literature/books on the topic and current research material from the Internet, some of which is even more up-to-date than information in books, should be used.

Keywords: Initial Coin and Initial Exchange Offerings, Security Token Offerings, regulatory challenges, better investor and consumer protection

Introduction

New financing options for companies such as "Initial Coin Offerings" or "Initial Exchange Offerings" are booming.

These new forms of investment based on the block chain involve considerable risks for investors and consumers, including the risk of total loss.

On the basis of the following article, the author will examine which risks have meanwhile become reality for investors when participating in the new financing possibilities, which measures are being taken by international supervisory authorities, e.g. in Germany, to better protect investors and which further financing model on the block chain is currently in the starting blocks and whether investors can expect better protection in the future. This will be discussed in the following article.

New financing possibilities on the block chain such as Initial Coin Offering (ICO) and Initial Exchange Offering (IEO) with considerable risks

Initial Coin Offerings with high risks for investors

Since 2016, the market for the block-chain-based financing model of Initial Coin Offerings had been developing increasingly.

In 2018, ICO issuers worldwide had raised more than 12 billion US dollars.[1]

Within the framework of a so-called "Token Sale Event", an attempt is made to convince as many investors as possible of the financing project and thus to "collect" as much money as possible from investors so that the project can be financed.

In return, the investors then receive so-called "tokens", whereby they hope to achieve high profits with these.

The "tokens" issued within the framework of an ICO are generated by using block chain technology via program codes stored there and initially appear in the form of encrypted data packets which are transferred to other ICOs using an individual key.

These tokens als transferred to persons and acquired and stored by them in electronic purses, so-called "wallets.[2] Investors therefore only need a wallet that can receive the tokens.

Especially for smaller companies or start-ups, an Initial Coin Offering offers various advantages, e.g. in comparison to pure bank financing or financing through crowdfunding, which was often much more difficult to obtain, implement and cost-intensive.

A white paper describes the product to be financed, the process and conditions of an ICO, the use of funds, the team members involved, investors already acquired and other circumstances related to an ICO.[3]

It is controversial whether the information in the so-called "White Paper" is now legally binding or not.[4]

Furthermore, there are often the so-called "Terms and Conditions", in which the legal framework of the respective project and the properties of the token to be issued are described in detail.[5]

In the final analysis, these "Terms and Conditions" are general terms and conditions, which means that it is often necessary to ask whether these general terms and conditions are valid, e.g. according to §§ 307, 309 ff. German Civil Code (BGB).

Subsequently, the so-called "tokens", i.e. virtual money, which investors receive from an ICO, are or were issued as part of the issue.

In general, a distinction is made between "currency tokens", "utility tokens" and "security tokens".[6][7]

The majority of cryptotokens issued within the scope of an ICO were so-called "utility tokens".
Utility tokens are a kind of medium of exchange for a specific purpose. They are also equipped with certain functions and rights (i.e. they exceed the scope of one currency).

It is important for the utility token not to represent a share in a company. It is therefore not a share or a security.[8]

The Utility Token thus embodies the concrete promise that it can be exchanged for a good or service.[9] Therefore, the "utility token" is sometimes seen "similar to a digital voucher or license.[10]
In the meantime it has become apparent that in many cases, however, investors who had participated in these ICOs did not make any profits but, on the contrary, suffered considerable losses up to total loss. Often ICOs failed quickly and investors had lost some of their money. Subsequently, the monthly ICO financing volume from January to December 2018 had also shrunk by about 90%.[11]

Often promises were made to investors here in white papers that could not be kept, or there was often a fraudulent issue from the outset. This was aggravated by the fact that many providers had set up their ICO from abroad, such as Malta or Switzerland, even though they had addressed investors throughout Europe, making it particularly difficult to bring an effective lawsuit or "enforcement".

As a result, as described above, it has become apparent that in various cases investors have now suffered losses or even suffered a total loss when investing in ICOs.

Initial Exchange Offerings with better protection for investors?

As the market for ICOs has now declined sharply, another financing model has evolved from the ICOs, which aims to offer more security, the so-called "Initial Exchange Offerings" (IEOs).

An Initial Exchange Offering is very similar to an ICO, because here, too, the issuers collect money in the form of "crypto tokens", but this is a "token sale event" that takes place on a crypto exchange.

The big difference between an IEO and an ICO is that IEO issuers do not issue the tokens directly via their own platform, but on a crypto-exchange, and thus a third, independent party comes into play with the crypto-exchange.

This issue on a well-known crypto-exchange can build up considerably more trust with the investor, and in addition, it will probably be easier to prevent fraudulent issues from the outset, because renowned crypto-exchanges are themselves concerned about their good reputation, and a possible total loss of the investors could also damage the reputation of the crypto-exchanges.

The monitoring of the issue by an independent third party, the crypto-exchange, thus offers an additional security aspect for the investor.

Furthermore, an IEO is immediately tradable compared to an ICO.

In the meantime, the volume of IEOs is also increasing significantly, as the trading volume of token offerings has been stagnating since mid-2019. The trading volume, which amounted to USD 653 million in the period from January to May 2019, had fallen to just USD 151 million between June and the end of October 2019.[12]

However, the market of IEO's has experienced market growth.

The auditing company PWC writes here in ist 6th market report:

> *"Despite the general stagnation in token-offerings from June to October 2019, the IEO's have significantly increased their relative share. This growth points to their progressive institutionalization and final establishment as a block-chain-based fundraising instrument."*[13]

In the meantime, there has been a significant increase in the number of offers from IEOs, although investors must be aware that an IEO offers somewhat more security than an ICO by involving the third

party, the crypto-exchange, but still involves many risks which, in the worst case, can lead to total loss (more on this below).

What are the supervisory authorities doing to better protect investors?

In the meantime, the authorities are reacting more strongly to the new financing possibilities, politicians and regulatory authorities are working on a stricter set of rules for the cryptocurrency sector and for the new financing possibilities, e.g. with ICOs:

For example, the Swiss federal authorities have now reacted to the ICO wave by setting up a new so-called "Blockchain Task Force".
In China, there has been a general ban on ICO's since 2017.[14]

The German Federal Financial Supervisory Authority (BaFin) also issued a consumer warning as early as 2017 to warn investors of the risks associated with Initial Coin Offerings (ICOs).

Literally, the BaFin wrote:

> *"BaFin points out that the acquisition of coins - also called tokens depending on the structure - within the framework of so-called Initial Coin Offerings (ICOs) involves considerable risks for investors. ICOs are highly speculative investments. Investors should be aware that a total loss of their investment is also possible. As with most current trends, the high public interest in ICOs also attracts fraudsters."*[15]

Felix Hufeld, the President of the German Financial Supervisory Authority BaFin, also said on 28.10.2018 that it would be a question of an appropriate further development of financial regulation.[16] BaFin had already taken action in this regard: In response to a small inquiry, the German government announced that BaFin had already initiated proceedings against issuers of tokens in 13 cases in 2017 on suspicion of illegal transactions.[17]

In four cases the transactions were even prohibited and the prosecution authorities were involved. In 23 cases, proceedings were initiated to decide in cases of doubt.[18]

The BaFin had therefore also decided not to ban the new financing model of the ICOs, but to issue a warning for consumers and investors and also to take action in individual cases against obviously dubious or fraudulent issuers.

In the USA, too, a middle course is being taken here; ICOs are not completely banned, but neither are they completely open.

In the USA, a distinction is made between a utility token and a security token. In the USA, such companies must be registered with the SEC and are then subject to its entire set of rules. This includes, for example, the implementation of standard know-your-customer (KYC) and anti-money laundering practices (AML).[19]

However, since the beginning/mid-2018 ICOs may no longer be advertised on the major social media platforms Facebook and Twitter.

Furthermore, Google has banned advertisements via Google AdSense on ICOs and cryptocurrencies.[20]

In the USA, the US Securities and Exchange Commission (SEC) also issued a warning to investors participating in Initial Exchange Offerings (IEOs) some time ago.

The SEC points out that (these) crypto exchanges are generally not registered. This is a significant regulatory violation, as IEOs lack many of the investor protection provisions for registered and exempted securities offerings. In particular, the SEC also warns against false promises, also by the stock exchanges, which have an interest in selling via a fee model.[21]

Literally, the SEC states the following:

> *„Be cautious if considering an investment in an IEO. Claims of new technologies and financial products, such as those associated with digital asset offerings, and claims that IEOs are vetted by trading platforms, can be used improperly to entice investors with the false promise of high returns in a new investment space. As described below, IEOs may be conducted in violation of the federal securities laws and lack many of the investor protections of registered and exempt securities offerings.“*[22]

In addition, the SEC points out that IEOs are violating US securities laws in various cases.
If IEOs were to be classified as securities, the crypto exchange would have to register separately with the SEC as a national securities exchange. Non-compliance with the federal securities laws means that the IEO and the trading platform may be "operating illegally and the investor protection and remedies provided under those laws may not be available.“[23]

The SEC also points out the following:

> *„Saying something is registered doesn´t make it so. In addition, be careful if the promoter of the IEO or the digial trading platform hosting the IEO states that they are approved or registered with the SEC.*
> *There is no such thing as an SEC-approved IEO. It is common for a fraudster to make false and misleading statements or exaggerated claims about regulatory approvals and oversight to lure potential investors. It pays to indepently investigate these claims for yourself.“*[24]

The SEC therefore suspects that there are also many dubious providers in the area of Initial Exchange Offerings and thus numerous dangers lurk for investors in the case of an investment up to the danger of total loss.
In particular the explanations of the SEC result in that one assumes here that many providers would need a permission, however, do not have this and therefore also many fraudulent offers are on the market.
It is therefore to be feared that there are also considerable risks for investors in the area of the new Initial Exchange Offerings and only the near future will show whether or not a similar "disaster" as with ICOs is threatening investors.

In any case, the above statements show that the supervisory authorities in Germany and internationally have decided not to ban the new financing models on the block chain such as Initial Coin Offering or Initial Exchange Offering completely, but to allow this often unregulated market to continue to exist nevertheless, but to warn investors against dubious and fraudulent offers and to appeal to their sense of personal responsibility, whether they want to participate in an ICO or IEO or not.

This is understandable, because the supervisory authorities do not want to prohibit promising new financing models from the outset, but it shows that investors themselves are much more challenged to obtain sufficient information about the respective offer and, in particular, that they cannot always trust the information provided by the respective issuer.

Security Token Offerings as a new financing model on the Blockchain replace ICOs: Better protection for investors?

Due to the bad experiences for the investor protection with Initial Coin Offerings (and possibly also Initial Exchange Offerings), another new financing model on the block chain, the so-called "Security Token Offerings" or STOs, is increasingly coming into focus. Here, too, interested companies can collect funds within the scope of a so-called "Token Sale Event". Even with an STO, various costs, such as for custody, can be saved through storage on the block chain.

In a Security Token Offering, unlike an ICO, the issued tokens serve not only as subscription rights for coins to be issued later, but also as actual securities.

Security (or similar) tokens (also called "equity tokens," "security tokens," "investment tokens," or "asset tokens") are tokens whose holders have membership rights or contractual claims to assets comparable to those of a shareholder or holder of a debt instrument (e.g., claims to dividend-like payments, co-determination, repayment claims, interest).[25]

Investors thus secure shares in the company through their investment, including ownership control, interest and intermittent returns [26] and thus like an IPO.

As a result, security tokens are to be qualified as securities and this only to the extent that, analogous to the financial instruments listed as examples, they convey some kind of participation right in the profit or yield of a company or a financial claim against the issuer of the security token.[27]
Security tokens therefore basically represent securities within the meaning of the Prospectus Regulation, the Securities Prospectus Act and the Securities Trading Act and are also financial instruments within the meaning of the Banking Act in Germany.[28]

A STO has to comply with higher regulations than an ICO, such as securities law regulations or the preparation of a securities prospectus approved by BaFin.

A Security Token Offering as a new generation of crypto tokenisation offers investors more security, because the securities regulations must be applied, which is why they must first be approved by securities supervisors such as the German BaFin.

The hope is that STOs will thus be suitable for broader groups of investors.
One expert hopes that a moderate degree of regulation and the resulting requirements to be met by STOs will filter out the lion's share of bad projects.

> *"An STO could generate costs in the six figure range. Typically, no windy or inexperienced start-up can afford such a cost pool".*[29]

It is therefore to be hoped that STOs will also be mature enough in terms of investor protection to be suitable for broader investor groups.

However, even an STO is not possible for the investor without risk, as investors should always be aware that an STO is only as good as the underlying security.
Since it is mainly bonds that are to be admitted for tokenisation, investors are therefore exposed to the same risks with an STO as when investing in bonds.
This is above all the issuer risk, i.e. if the issuer goes into insolvency, the investor is also threatened with total loss in this case.
Numerous bankruptcies of issuers of SME bonds which have occurred in recent years, and in which the author of this article represented a number of investors, show that this is not just a theoretical risk.

Conclusion/Summary

In the financial market sector in particular, major changes could be imminent as a result of the block chain and the so-called "tokenisation of assets", although it is crucial that investor protection does not fall by the wayside.

Experience to date in the area of ICOs shows that investors who have participated in an ICO often suffered high losses, even total loss.

It is questionable whether the financing model of Initial Exchange Offerings (IEOs), which can be seen as a further development of the financing model of ICOs, offers significantly more security.

In the past, the supervisory authorities such as the BaFin were caught between the question of not prohibiting a new, promising financing method and investor protection, which in many cases unfortunately led to investors being exposed to considerable risks when investing in a company, up to and including total loss, and unfortunately investor protection was often neglected.

In the interests of investor protection, it is very welcome that the supervisory authorities have now acted and that higher demands are being made on regulation.

However, further efforts are necessary in the opinion of the author, as the new financing models allow investors to be approached not only nationally but even internationally, and international trade is/was often possible across national borders.

This makes it necessary to standardize regulation at least throughout Europe and thus also to give investors the opportunity to successfully enforce their investor rights internationally, if necessary.

With the new "Security Token Offerings", a new financing instrument is available which could and should offer investors significantly more security than the ICO's/IEO's.

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Equity Release Scheme in The Strategy of Solving Problems of The Ageing Polish Society

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Abstract

The phenomenon of dynamic demographic changes involving the ageing of societies is subject to in-depth multidisciplinary research, including research within legal studies. It is especially important to assess whether the existing normative standard of protection of seniors is sufficiently effective or whether changes in the law in this regard are necessary. Looking at this issue from the perspective of Polish law is particularly interesting for at least two reasons. First of all, in the 2050 perspective Poland will be among the oldest societies. Secondly, the equity release market in Poland is in the initial phase of development, similar to the majority of countries of Central and Eastern Europe.
The conducted analyses are a basis for an assumption that on the ground of Polish law changes to the applicable regulations are necessary. Comprehensive regulations need to be introduced which will include not only the loan equity release model, but also the sale model which at the moment is based solely on the provisions of the Civil Code.

Keywords: Equity Release, Ageing Society, Reverse Mortgage, Lifetime Mortgage, Home Reversion

Introduction

The global and irreversible phenomenon of the ageing of societies is more frequently a subject of scholarly examination in a number of fields, especially demography and economy. In-depth research from the point of view of legal studies, which aims to construct a normative basis that guarantees social safety to the elderly also needs to be considered as extremely important. In the light of the concerning prognosis for demographic changes it is a particularly difficult challenge for contemporary legislations. These transformations affect the rise of economic problems of elderly persons, whose old-pension benefits in the majority of cases are insufficient to satisfy their necessary needs. One also needs to conclude that the increasingly noticeable weakening of intergenerational bonds and in consequence the weakening of family's care functions forces seniors to look for additional funds. Foreign financial markets, in particular the American and British market, offer equity release schemes (ERS) dedicated for this social group as a remedy for the elderly's economic problems. They involve "releasing" non-liquid capital accumulated in the real estate they reside in into current financial resources. The Polish financial market of the services in question is at the beginning stage of development, even though according to forecasts Poland will be among the five oldest countries of the European Union in 2050. This makes the analysis of the subject-matter of equity release schemes under the current and postulated state of law from the perspective of a Central and Western European country all the more valuable and desirable.

Equity Release in Poland

The Polish regulation of equity release is not comprehensive. It is a fragmentary regulation since it refers only to the loan model under the Act of 23 October 2014 on reverse mortgage. At the same time, there are no regulations concerning equity release in the sale model, which is increasingly used by the non-banking sector. It needs to be highlighted that at the stage of legislative works a draft bill on life cash performance was being processed at the same time, though unfortunately works on it were discontinued and so far they have not been re-launched. In the course of the six years of applicability

of the said act no bank has introduced reverse mortgage to its offer, which makes it a dead law. Nevertheless, it is worth demonstrating the most essential design elements of a reverse mortgage agreement under the Polish law.

Loan Equity Release Model in Poland

According to the legal definition, under a reverse mortgage agreement the bank undertakes to give to the borrower's disposal for an unspecified period of time a cash amount, the repayment of which will take place after the borrower's death and the borrower undertakes to establish a collateral for the payment of this amount together with due interest and other costs (Article 4(1) of the Act). A form of securing bank's dues may only consist in establishing a mortgage and in entering into the real estate's land and mortgage register a claim for transfer of ownership of the real estate (Article 5(1) of the Act).

One needs to point out that the catalogue of entities entitled to grant reverse mortgage was limited to banks, foreign bank branches, credit institution branches and credit institutions operating a cross-border activity (Article 2(2) of the Act). Walczak (2017) suggests extending these services to insurance companies and operators currently offering equity release services in the sale model, on the condition that certain capital requirements are met by these entities and that their activity becomes subject to state supervision.

One needs to point out that the bank's information obligation boils down only to supplying an information form to the borrower which includes information of the reverse mortgage offer 14 days prior to the conclusion of the agreement (Article 8(1) of the Act). One needs to agree with the voiced postulates of introducing an obligatory, independent consultation with a professional licensed consultant, whose knowledge and experience will ensure protection of seniors at an adequate level (Wieckowska, 2011, p. 35; Willmann, 2016, p. 165). Reliable and comprehensible provision of information in terms of rights and obligations of the parties to the loan agreement and legal consequences of concluding it are extremely important to this particularly vulnerable group of consumers. Due to their age, health status and financial situation, seniors are often helpless and particularly at risk of abuses.

Successors may within 12 months of the death of the borrower pay off the total mortgage amount (Article 21 of the Act) and retain the right to the real estate. Otherwise, the bank's claim towards successors for transferring the ownership to the real estate becomes enforceable. After the contract for transfer of ownership of the real estate is executed the bank is obliged to return the amount that is the difference between the real estate's market value and the total amount due (Article 28(2) of the Act). In a reverse situation, that is should the difference be negative, the sole risk is borne by the lender.

Sale Equity Release Model in Poland

As has already been shown above, Polish law has no separate regulations encompassing equity release in the sale model. Nevertheless, it was noted in the social policy 2030 concerning elderly persons (security-participation-solidarity) prepared by the Council of Ministers that it is necessary to secure the interests of consumers who conclude agreements with operators offering the so-called life-contingent annuity (Polityka społeczna, 2018, p. 39).

Under the current state of law, the life-contingent performances (with the following marketing names: "reverse mortgage", "life annuity", "mortgage annuity") offered by non-banking sector institutions are based on agreements under the civil code. On the basis of the freedom of contract principle they offer products whose basis as a rule involves a life annuity agreement or a paid annuity agreement.

A life annuity agreement involves the real estate acquirer committing to provide the transferor with subsistence for life in exchange for transfer of ownership of real estate. Unless the life annuity agreement provides otherwise, the obligation to provide subsistence for life includes accepting the transferor as a member of one's household, providing him with food, clothing, accommodation, light and fuel, providing him with appropriate help and caring in illness and giving him a funeral in accordance with local custom (Article 908(1) of the Civil Code of 23 April 1964). It is rightly pointed

out that the basis of regulation of the life annuity agreement has the nature of close rations, in particular family relations, which are a certain guarantee of providing the transferor with life performances. This is why these regulations do not sufficiently secure the consumer-financial institution relation, especially at the pre-contract stage (Buzałek, 2019, p. 24; Meluch 2017; Wasylkowska-Michór 2017).

Whereas under an annuity agreement, one party commits to another party to make certain periodical performances in money or in fungibles (Article 903 of the Civil Code). Equity release in the sale model is based on the paid annuity agreement which means that the obligation to make periodic performances for life occurs in exchange for the transfer of ownership of the real estate. The provisions on sale apply accordingly to such an annuity agreement (Article 906(1) of the Civil Code). Moreover, the ownership right of a real estate is encumbered with life right of habitation.

It needs to be noted that upon execution of the life annuity agreement and annuity agreement the ownership right of the real estate is transferred onto the entity obliged to pay life performances or specific periodic performances. The real estate acquirer is entitled to all ownership rights, including the right to transfer the acquired real estate. It needs to be noted that the entities providing equity release services in the sale model are not subject to state inspection implemented in Poland by the Polish Financial Supervision Authority which supervises the financial market in Poland. These entities are not obliged to disclose their financial results. Contrary to their slightly misleading name, they are not subject to the Act of 27 May 2004 on investment funds, neither, as a consequence, are they registered in the funds register (Willmann, 2016, p. 156-167, Lewicka, 2015, p. 107-108). Operation of funds is only subject to *ad hoc* inspection of the Office of Competition and Consumer Protection i.a. in terms of unlawful contract clauses. It needs to be noted that the operator providing equity release services under the provisions of the Civil Code is not obliged to settle any balances with successors (Maj-Waśniowska, Cycoń, 2011, p. 202).

It needs to be pointed out that the absence of regulation in the above scope implicates the emergence of a number of risks. First of all, the risk of inadequate valuation of the real estate and of taking over the ownership of the real estate for a fraction of a market price and lowering the amount of the performances. Secondly, the risk of unfavourable development of rights and obligations of the real estate transferor due to the absence of detailed statutory regulations in this regards, in particular the risk of limited freedom of managing the real estate and the risk of eviction. Thirdly, the risk of insolvency of the financial institution due to the absence of the obligation for it to be capitalised. Fourthly, the risk of excessive security of the institution resulting from the absence of the possibility to foresee the length of life of the service user, changes of interest rates or prices of real estate (Buszko, 2012, p. 60). Provisions of the Civil Code providing the basis for currently offered equity release services in the sale model, and in particular the regulations of the life annuity agreement and the paid annuity agreement, do not sufficiently protect the particularly vulnerable group of consumers - seniors. The consumer's position on the equity release market is demonstratively weaker compared to other markets (Raport z kontroli, 2013, p. 83). Introduction of a regulation aiming to professionalize these services, i.e. due to the fact that elderly persons are a social group most at risk of fraud is key and still awaited (Marciniuk, 2014, pp. 255-256, Raport o hipotece odwróconej, 2018, p. 6). Non-comprehensiveness of the Polish regulation in this scope allowed the emergence of an informal economy of unregulated operators offering annuity agreements based on Civil Code provisions. It is necessary to introduce to the Polish legal system regulations which on the one hand will ensure high security standards, on the other will create conditions for the development of the Polish equity release market. It needs to be noted that society's awareness in terms of opportunities to "release value from the most non-liquid assets of their portfolios" is increasingly growing (Zbrojewski, 2013, p. 10).
New regulations should i.a. take into account the requirement of independent thus objective valuation of the real estate, and moreover, introduce procedures preceding the moment of concluding the agreements in order to ensure full and comprehensive information about the offered equity release product. Undoubtedly, an apt solution in this regard would involve introduction of the obligation to observe a time interval between the first meeting and the date of signing the agreement, and also the obligation for all institutions to provide the same scope of information which makes it easier for the consumer to compare offers of different operators (Wieckowska, 2011, p. 35). Introduction of the obligation of consultation with an independent consultant prior to the execution of the agreement is

also worth considering. The above solutions should also be taken into account in reference to the reverse mortgage agreements in order to maintain full systemic cohesion.

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The Use of Instruments of Econometric Modelling to Identify Factors Determining the Perception of The Ethical Dimension of Business

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Abstract

The study relates to the identification of factors affecting the perception of the ethical dimension of business among entrepreneurs and employees of enterprises operating in Poland – the Silesian Voivodeship, the Poviat of Częstochowa. The formulated research task was performed on the basis of the subject literature and the results of the survey conducted in II and III quarter of 2019 among 456 employees, including 71 foreign workers. The empirical analysis workshop used the instruments of econometric modelling in the form of logit models, in which the determinants belonging to 5 categories were considered. On the basis of the above, 10 logit models (5 full and 5 reduced ones) were built, indicating the relationships between the analyzed variables. The conducted analyses showed that all the estimated models are characterized by the correctness of fit, which is evidenced by the value of the likelihood ratio test. Moreover, the factor affecting the perception of the ethical dimension of business to the largest extent is the position in the company as well as the size of the enterprise. The factor which has no impact is the age of the respondents.

Keywords: business ethics, CSR, norms and values

Introduction

Business management in the 21st century, in the conditions of the constantly changing environment, requires the ability to harmonize a range of activities with the requirements of the market. This is determined by the fact that contemporary organizations, as increasingly complex entities, have become an integral part of the surrounding social, economic and environmental systems (Goel, Ramanathan, 2014). Therefore, as stated by Singh et al. (2019), the contemporary organization should seek to ensure a smooth synergy between business needs and the needs of the society and the natural environment. This is due to the fact that the modern management model is no longer based solely on the implementation of business values, i.e. profit maximization – value for stakeholders or utility maximization (D. Ghosh et al. 2011), and more and more often it takes into account:

- "moral contract" between the company and its (social and environmental) environment (S. Ghoshala et al. 1999),
- responsibility to act towards the society and the environment (De Bakker et al. 2005),
- transparency and ethical behavior (Kotler, Keller 2006, Weber 2012).

In this context, ethical issues in the company, understood as a wide range of problems, from sustainable development of the environment to social justice and human values, and in particular their perception, are growing in importance (Menestrel, Wassenhove 2009).

The objective of the study is to identify factors affecting the perception of ethical business. It is a theoretical and empirical piece of work. Therefore, the theoretical part focused on the theoretical assumptions of ethical business conduct. In turn, the empirical analysis workshop used the instruments of econometric modelling in the form of logit models. In order to develop logit models, the qualitative variables were used, in the form of the empirical material gathered within the framework of the research *Ethical values and attitudes in modern enterprise management.*

Theoretical assumptions of the ethical dimension of business – the outline of the problem

In general, business activity is seen from the perspective of economic success or, in broader terms - praxeological, i.e. efficiency expressed by effectiveness, being a dimension of the assessment of the result of this operation. The dimensions (efficiency and cost-effectiveness) do not exhaust the options of the economic space and their effectiveness, in the opinion of Gasparski (2002), ought to be valued in ethical terms. This is determined by the fact that the ethical dimension of business is a type of the regulator of conduct, constituting the paradigm guiding human behavior. From the point of view of the human being in the enterprise, ethical behavior in economic life is the real dimension of human activities. What, for some employees, in particular managers, appears to be natural and within the limits of moral conduct may be offensive for others and may determine further cooperation of organizations in the market (Łukasik, 2012). In this respect, the ethical dimension of business has become an essential component of the operation of contemporary enterprises, primarily related to (Totaa, Shehua, 2012, Arnaudov, Koseska, 2012):

- developing values and standards in organizations,
- decision-making in accordance with reasonable principles concerning the equity of the operations,
- classifying the mode of decision-making in enterprises,
- operating in accordance with the standards adopted,
- reducing negative actions on the part of managers,
- reducing operations due to the surrounding pressure and financial results achieved,
- creating ethical awareness among employees,
- ethical behavior at each level of the enterprise,
- responsible operations in the market,
- supporting long-term value with ethical conduct,
- reducing the number of conflicts which may arise throughout all business activities,
- withdrawing from wrong decisions,
- determining the applicable ethical principles,
- introducing moral standards in the management strategy,
- formulating sanctions against those violating ethical standards.

Meanwhile, in the real economic space, there are often negative phenomena, the result of which is increased distrust. It can be said that trust, in addition to transparency, is increasingly considered as a valuable asset, the lack of which becomes an obstacle in gaining competitive advantage. Contemporary managers deal with a range of ethical problems on a daily basis and their decisions are rarely deprived of the ethical dimension. Therefore, it can be concluded that ethics is of the key importance for the proper operation of contemporary enterprises (Sroka, Lőrinczy, 2015) reducing the effects of greed or a number of speculations (Goel, Ramanathan, 2014). In general, it can be assumed that business ethics is an ethical reflection on activities of the company and, in particular, the people managing them, affecting the aforementioned economic efficiency (Georgescu, 2012).

Methodological Aspects of The Research

In order to accomplish the objective of the study formulated in the introduction, the instruments of econometric modelling in the form of probit and logit models were used, in practice defined as probability models or Goldberg models (Wiśniewski 2017). These models can be applied when the dependent variable is strictly dichotomous, i.e. when it adopts the value of 1 when the desired event occurs, and the value of 0 when such an event does not occur. In practice, this variable adopts one of the two values, e.g. yes/no, well/badly, implemented/not implemented, while taking the form (Kufel, 2007):

$$y_i^* = \beta_0 + \sum_{j=1}^{k} \beta_j x_{ij} + u_i$$

where:
y_i^* - the latent variable, adopting:

$$y_i = \begin{Bmatrix} 1 \ for \ y_i^* > 0 \\ 0 \ for \ y_i^* \leq 0 \end{Bmatrix}$$

While making an assumption:

- the logit model takes the form of:

$$y_i^* = ln \frac{P_i}{1 - P_i} = \beta_0 + \sum_{j=1}^{k} \beta_j x_{ij} + u_i$$

where:

y_i^*- is called 'logit'
P_i- is defined as the probability of the dependent variable y_t, determined on the basis of logistic distribution

- the probit model equals:

$$P_i = F\left(\beta_0 + \sum_{j=1}^{k} \beta_j x_{ij}\right) = \int_{-\infty}^{\beta_0 + \sum_{j=1}^{k} \beta_j x_{ij}} \frac{1}{\sqrt{2\pi}} e^{\left(-\frac{t^2}{2}\right)} dt$$

Due to minor differences in the obtained results, the presented models are discussed collectively. This is determined by the fact that all the measures of fit to the model are identical (Gruszczyński, 2009). For this reason, for the purposes of this study, in order to analyze the identification of factors determining the perception of the ethical dimension of business, only logit models were used, including only dummy variables coded based on the respondents' responses (456 employees, working in the area of the Silesian Voivodeship, the city of Czestochowa) concerning the selected research problems of the study on *Ethical values and attitudes in modern business management,* conducted in II and III quarter of 2019, using the survey technique (PAPI and CAWI).

Table 1 contains the dependent variables (y) coded based on the respondents' responses to the four questions (research problems) included in the questionnaire, related to the subject matter of the study.

Table 1: The structure of the respondents' responses to the questions on the basis of which the dependent variables y were coded.

Research problems	Percentage of responses	
	Yes	No
In your opinion, is there room for ethics in current realities of conducting business?	72.1	27.9
In your opinion, do modern enterprises implement the ethical dimension of business?	29.4	70.6
In your opinion, is it important for modern enterprises to be guided by ethical values and principles in their activities?	87.5	12.5
In your opinion, do modern enterprises attach great importance to moral values, ethics, corporate social responsibility nowadays?	43.4	56.6
In your opinion, can promoting ethical values become the asset for the modern enterprise?	62.7	37.7

Source: Own study

When analyzing the data in Table 1, it can be observed that, in the opinion of 72.1% of the respondents, there is room for ethical operations in modern business management, but unfortunately, this is not respected in practice (29.4% of responses). Thus, the respondents had a problem to determine if

enterprises attach considerable importance to such actions or not. However, in the opinion of 87.5% of those questioned, it is important that such actions are taken since they may become an asset for their activities (62.7% of responses).

It should be pinpointed that the dependent variables (y) were dependent on the set of independent variables (x), characterizing the people taking part in the research (Table 2).

Table 2. The summary of the independent variables (x)

Respondents' statistical data		Independent variable	Value %
Gender	Female	x_1	60,7
	Male	x_2	39,3*
Age	under 24	x_3	13,2
	25-34 years	x_4	41,0
	35-44 years	x_5	40,3*
	over 45	x_6	5,5
Position	managerial	x_7	27,3*
	non-managerial	x_8	72,7
Size of the company	Micro	x_9	28,5
	Small	x_{10}	48,1
	Medium	x_{11}	16,6
	Large	x_{12}	6,7*
Job seniority	less than1 year	x_{13}	18,4*
	from 1 to 5 years	x_{14}	44,6
	more than 5 years	x_{15}	37,0

** Reference group*
Source: Own calculations

As it can be observed (Table 2), the set of the independent variables (x) contains 5 categories, including 15 independent variables, on the basis of which the research sample can be characterized. The research sample consists of 60.7% of women and 39.3% of men, selected as the reference group.

Taking into account the age groups, the predominant group of the respondents is people aged 25-44 (81.3% of indications), 41% of whom amounts to people aged 25-34 and 40.3% - people aged 35-44 (the reference group). The majority of the respondents are people occupying non-managerial positions, the so-called regular employees – 72.7%. In turn, 27.3% amounts to the group employed in managerial positions (the reference group).

The respondents are people employed primarily in the SME sector, most of whom - in small enterprises, i.e. the ones hiring from 10 to 49 employees (48.1% of indications), followed by those in microenterprises with up to 9 employees (28.5% of indications), and medium ones (16.6% of indications) with 50-249 employees. The reference group in this category of variables is created by large enterprises (6.7% of indications).

The last category of variables was related to seniority. The predominant group in this category amounts to people working for 1 to 5 years (44.6% of indications), followed by those working for more than 5 years (37% of indications). The smallest group is newly-employed people with seniority of less than 12 months – 18.4% of indications (the reference group).

The Model Approach to the Factors Determining the Perception of The Ethical Dimension of Business – The Research Results

While looking for the responses to the research problems included in Table 1, ten logit models were estimated using the Gretl software, two models for each of the considered dependent variables y, of which:

- 5 full models, taking into account all the variables (x),
- 5 reduced models, taking into account only those variables (x) which indicate the characteristics of significance.

The results of the estimation of logit models for the variables $y_1 - y_5$ are presented in Table 3.

Table 3: The results of the estimation of logit models for $y_1 - y_5$

* the observations used 1-456

Variable	Coefficient	Standard deviation	z	p-value	Marginal effect
MODEL 1 Full logit model for y_1					
$const$	1.00345	0.334836	2.997	0.0027	
x_1	0.178776	0.226993	0.7876	0.4309	0.0408819
x_3	−0.341244	0.294679	−1.158	0.2469	−0.0800574
x_4	0.0129771	0.214637	0.06046	0.9518	0.0701794
x_6	0.308852	0.379369	0.8141	0.4156	−0.105449
x_8	−0.486908	0.260627	−1.868	0.0617*	−0.105449
x_9	0.234543	0.257790	0.9098	0.3629	0.0523572
x_{10}	−0.437136	0.229376	−1.906	0.0567*	−0.0996024
x_{11}	−0.499768	0.274225	−1.822	0.0684*	−0.118246
x_{14}	0.0745703	0.220120	0.3388	0.7348	0.0169345
x_{15}	0.223767	0.225488	0.9924	0.3210	0.0504496
MODEL 2 Reduced logit model for y_1					
$const$	1.23504	0.247861	4.983	<0,0001***	
x_8	−0.414057	0.251366	−1.647	0.0995*	−0.0906705
x_{10}	−0.467503	0.198682	−2.353	0.0186**	−0.106787
x_{11}	−0.539628	0.262477	−2.056	0.0398**	−0.128195
MODEL 3 Full logit model for y_2					
$const$	−1.45856	0.355175	−4.107	<0.0001	
x_1	0.000649978	0.229399	0.002833	0.9977	0.0588732
x_3	0.0396074	0.310480	0.1276	0.8985	0.0448954
x_4	0.192153	0.217450	0.8837	0.3769	0.0703771
x_6	−0.0777333	0.253945	−0.3061	0.7595	0.0910902
x_8	0.783026	0.281856	2.778	0.0055***	−0.0911526
x_9	−0.0552677	0.256520	−0.2155	0.8294	0.0691754
x_{10}	0.0363301	0.234182	0.1551	0.8767	−0.00479544
x_{11}	−0.200973	0.294673	−0.6820	0.4952	0.0473400
x_{14}	0.0500954	0.225291	0.2224	0.8240	−0.0439434
x_{15}	−0.0883266	0.229195	−0.3854	0.7000	−0.0178932

MODEL 4 **Reduced logit model for y_2**					
$const$	−1.39872	0.249691	−5.602	<0.0001***	
x_8	0.764164	0.273470	2.794	0.0052***	0.148459
MODEL 5 **Full logit model for y_3**					
$const$	2.33750	0.575780	4.060	<0,0001	
x_1	0.606288	0.320502	1.892	0.0585*	0.0588732
x_3	0.584538	0.478688	1.221	0.2220	0.0448954
x_4	0.805247	0.325076	2.477	0.0132**	0.0703771
x_6	1.00450	1.07225	0.9368	0.3489	0.0910902
x_8	−1.30364	0.497193	−2.622	0.0087***	−0.0911526
x_9	0.885452	0.384578	2.302	0.0213**	0.0691754
x_{10}	−0.0527815	0.332406	−0.1588	0.8738	−0.00479544
x_{11}	0.614579	0.450738	1.363	0.1727	0.0473400
x_{14}	−0.478499	0.322835	−1.482	0.1383	−0.0439434
x_{15}	−0.194063	0.325599	−0.5960	0.5512	−0.0178932
MODEL 6 **Full logit model for y_3**					
$const$	2.31193	0.504795	4.580	<0.0001***	
x_1	0.536207	0.290962	1.843	0.0653*	0.0551406
x_4	0.637366	0.310151	2.055	0.0399**	0.0599307
x_8	−1.27210	0.488295	−2.605	0.0092***	−0.0959400
x_9	0.643916	0.353474	1.822	0.0685*	0.0559668
MODEL 7 **Full logit model for y_4**					
$const$	0.739536	0.318766	2.320	0.0203**	
x_1	−0.240890	0.218582	−1.102	0.2704	−0.0592510
x_3	0.470756	0.292349	1.610	0.1073	0.116825
x_4	0.127997	0.208792	0.6130	0.5399	0.0314233
x_6	−0.393785	0.455505	−0.8645	0.3873	−0.0965775
x_8	−0.816909	0.241226	−3.386	0.0007***	−0.201315
x_9	−0.191109	0.248256	−0.7698	0.4414	−0.0465322
x_{10}	0.0249629	0.224181	0.1114	0.9113	0.00612310
x_{11}	0.0167784	0.279963	0.05993	0.9522	0.00411818
x_{14}	−0.393219	0.214276	−1.835	0.0665*	−0.0960319
x_{15}	−0.250683	0.217769	−1.151	0.2497	−0.0611780
MODEL 8 **Full logit model for y_4**					
$const$	0.542920	0.217611	2.495	0.0126**	
x_8	−0.850393	0.232273	−3.661	0.0003***	−0.209397
x_{14}	−0.315306	0.193834	−1.627	0.1038	−0.0771852
MODEL 9 **Full logit model for y_5**					
$const$	0.510858	0.321490	1.589	0.1121	
x_1	0.324815	0.221405	1.467	0.1424	0.0763128
x_3	−0.00834931	0.294392	−0.02836	0.9774	−0.00194602

x_4	0.166934	0.210518	0.7930	0.4278	0.0387282
x_6	0.209116	0.309268	0.6762	0.4989	0.0487011
x_8	–0.413576	0.252607	–1.637	0.1016	–0.0929406
x_9	–0.232193	0.247312	–0.9389	0.3478	–0.0547494
x_{10}	–0.396196	0.227263	–1.743	0.0813*	–0.0924401
x_{11}	0.173294	0.282987	0.6124	0.5403	0.0396866
x_{14}	0.269846	0.218126	1.237	0.2160	0.0626716
x_{15}	0.372569	0.222575	1.674	0.0941*	0.0856813
MODEL 10 **Full logit model for y_5**					
$const$	0.548989	0.156980	3.497	0.0005	
x_{10}	–0.230965	0.194943	–1.185	0.2361	–0.0540518
x_{15}	0.200713	0.200144	1.003	0.3159	0.0466109

Explanation: The level of significance of the parameters: *** $\alpha = 0.01$, ** $\alpha = 0.05$, * $\alpha = 0.1$
Source: Own study

When looking at the results of the estimation of logit models 1=10, it should be noted that, in each of the estimated models, the age of the respondents was not found a statistically significant factor affecting the probability of perception of the ethical dimension of business in its individual aspects ($y_1 - y_5$).

In turn, taking into account another group, i.e. the gender, statistical significance can be observed only for the variable $y_{3,}$ i.e. the assessment of the significance of being driven by ethical values and principles (the full and reduced models), with the significance level of $\alpha = 0.1$. In other cases, the gender was not found a significant factor affecting the perception of the ethical dimension of business.

In the case of the data analysis in groups isolated in terms of the position, where the reference group was people in managerial positions, it can be observed that this group of factors indicated statistical significance for four out of five variables ($y_{1,}y_{2,}y_3y_4$), which means that this group of factors mostly feels the need for ethical actions. While analyzing the estimated models, it should be noted that, in the case of the variable:

- y_1 (the place of ethics in business), the seniority showed statistical significance at the significance level of $\alpha = 0.1$ (the full and reduced models),
- y_2 (implementation of the ethical dimension of business), y_3 (significance of the implementation of ethical actions), y_4 (attaching importance to ethical actions, including CSR activities), the seniority indicated a very strong statistical significance, i.e. significance at $\alpha = 0.01$ (the full and reduced models).

Taking into account another of the variables considered, i.e. the size of the company, in which the reference group was created by large enterprises, it can be observed that this category of variables x indicated statistical significance in the case of three variables, i.e. y_1, y_3, y_5. While analyzing the estimated models for the variable y_1, it can be stated that, in the case of the full model (model 1), the variables x_{10} and x_{11} indicated statistical significance at $\alpha = 0.1$, whereas, in the case of the reduced model (model 2), the strength of impact of the selected variables increased (significance level $\alpha = 0.05$). The results are slightly different in the case of the variable y_3, where the factor with the largest impact on the perception of the ethical dimension of business is the variable x_9, which indicated statistical significance at $\alpha = 0.05$ in the full model (model 5) and, in the reduced model (model 6), this significance occurred at $\alpha = 0.1$. In the case of the last variable y_5 (ethical business conduct as the asset of the contemporary business), statistical significance can be observed in the case of the variable x_{10} (model 9 – full model) at $\alpha = 0.1$. As it can be noted, this variable did not indicate statistical significance with the reduced model (model 10).
When analyzing the last of the listed variables, i.e. the seniority, it can be noted that this variable is not a statistically significant factor affecting the perception of the ethical dimension of business for four

out of five categories of the variables y. Such relationship can be observed only with model 9 (the full model for the variable y_5) with the significance level of $\alpha = 0.1$, for x_{15}. It should be noted that this variable does not show statistical significance with the reduced model (model 10).

For the purposes of the qualitative assessment of the estimated models, the measures of fit of the data to individual models are presented in Table 4.

Table 4: Measures of fit of the data to the estimation of logit models 1-10

	MODEL 1	**MODEL 3**	**MODEL 5**	**MODEL 7**	**MODEL 9**
FULL MODELS					
Likelihood Ratio Test	18.6344 [0.0452]	10.5317 [0.3951]	27.1666 [0.0025]	25.7097 [0.0042]	11.196 [0.3425]
McFadden's R-squared	0.031403	0.018567		0.041186	0.018588
Adjusted R-squared	-0.005672	-0.020219	0.015036	0.005943	-0.017937
Akaike Information Criterion	596.7529	578.6850	338.4478	620.5228	613.1186
Bayesian Information Criterion	642.1003	624.0324	383.7953	665.8702	658.4660
Hannan-Quinn Information Criterion	614.6162	596.5484	356.3112	638.3861	630.9819
Log likelihood	−287.3764	−278.3425	−158.2239	−299.2614	−295.5593
Number of cases of 'correct prediction'	297 (65.1%)	313 (68.6%)	399 (87.5%)	275 (60.3%)	285 (62.5%)
	MODEL 2	**MODEL 4**	**MODEL 6**	**MODEL 8**	**MODEL 10**
REDUCED MODELS					
Likelihood Ratio Test	13.3182 [0.0040]	8.57225 [0.0034]	18.363 [0.0010]	17.7782 [0.0001]	2.58484 [0.2746]
McFadden's R-squared	0.022444	0.015113	0.053441	0.028480	0.004292
Adjusted R-squared	0.008962	0.008061	0.024338	0.018868	-0.005670
Akaike Information Criterion	588.0691	562.6444	335.2514	612.4544	605.7298
Bayesian Information Criterion	604.5591	570.8894	355.8638	624.8218	618.0973
Hannan-Quinn Information Criterion	594.5649	565.8923	343.3711	617.3262	610.6016
Log likelihood	−290.0346	−279.3222	−162.6257	−303.2272	−299.8649
Number of cases of 'correct prediction'	294 (64.5%)	313 (68.6%)	399 (87.5%)	279 (61.2%)	286 (62.7%)

Source: Own study

When analyzing the measures of fit of the data to logit models, presented in Table 4, it can be stated that models 5 and 7 are characterized by a relatively higher quality of estimates than in the case of the other models. Moreover, the estimated models indicate a relatively high number (more than 60%) of cases of "correct prediction", however, their largest number occurs in the case of models 5 and 6 – 87.5%, whereas the smallest number in the case of model 7 – 60.3%. In spite of the arising discrepancies, all the models showed statistical correctness. On the basis of the above, the null hypothesis about the total insignificance of assessment of the parameters of these models must be rejected.

Conclusions

Summing up the considerations discussed in the study, it should be stated that ethical issues in modern business management are an important aspect of the conducted activity. It might seem that there is no space for ethical behavior in business since the profit is crucial. However, in the current market realities, ethical conduct and compliance with certain standards, norms, values, legal regulations are factors for the growth and stability of markets while constituting a determinant of effective and economic

operation. For this reason, the way of perception of ethicality in business is crucial. Thus, the analyses (estimated logit models 1-10) conducted in the study, indicated that the factors with the largest impact on the perception of the ethical dimension of business are the position in the company and also the size of the enterprise since these two groups of variables showed the largest amount of statistical significance. Therefore, taking into account the position, it should be noted that the need for ethical operations is felt by employees in certain positions within which they are responsible for the tasks performed. In turn, taking into account the size of the company, it should be pinpointed that the ethical dimension of business is seen to the greatest extent in small enterprises, i.e. the ones with 10 to 49 employees. In the case of the other variables, it can be observed that the age has no impact on taking ethical actions as well as the seniority (except for the perception of ethical actions as the asset of management and the distinguishing factor) or the gender (except for assessment of the significance of implementation of ethical activities).

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Cost Accounting Standards in the Practice of Polish Hospitals in 1998-2019

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Abstract

Hospitals in Poland are entities providing healthcare services. They function as independent public healthcare institutions. They represent autonomous and self-financing entities. They receive funds for their activities from the payer i.e. the National Health Fund. These are public resources that must be managed economically and effectively. Therefore, it is essential that hospital costs are controlled and optimised. The costs should be of interest to hospital managers and the founding and financing entities. Since 1998, legal provisions have been published in Poland concerning recommendations on the design of cost accounting for medical entities, including hospitals. The third version of such recommendations is now being developed. This paper presents the implementation by Polish hospitals of the law on company cost accounts in the years 1998-2019.

The aim of the paper is to indicate important factors affecting the acquisition of information on costs in hospitals.

A research hypothesis was proposed: "the hospital's cost account and information about the costs of its activities are determined by the specificity of the healthcare system and depend on the information expectations of the managers and financing entities".

The research tools used in the study included the analysis of literature, legal acts and surveys in selected hospitals.

Keywords: cost accounting standards, hospital costs, hospital, healthcare institution.

Introduction

Among business entities in Poland, hospitals play a particular role as healthcare institutions. Important characteristics of hospitals that distinguish them from other entities include:

a) numerous legal regulations of their activity,
b) providing health services as socially important services,
c) lack of a clear supply and demand in health services,
d) non-sovereign consumer,
e) the fading price mechanism,
f) the lack of profit motivation,
g) limited competition,
h) lack of incentives for efficiency,
i) financing activity from public resources.

With the specific activities of hospitals, the information about the costs of their health services and the use of this information to manage the entity, including the effective use of resources, is critical. The above characteristics also influence the design of cost accounting and cost information even at its lowest levels in hospitals.

The aim of the paper is to indicate important factors affecting the acquisition of information on costs in hospitals. The analysis of the literature on the subject and the observations of management practice in hospitals leads to the formulation of the following research hypothesis: "the hospital's cost account and information about the costs of its activities are determined by the specificity of the healthcare system and depend on the information expectations of the managers and financing entities".

The research tools used in the study were the analysis of the literature on the subject, legal acts and a survey concerning hospital cost account in 2004 and 2019.

Literature Review. Cost Accounting in Hospitals In 1998-2019

Hospitals in Poland keep their accounts in accordance with the Polish balance sheet law contained in the Accounting Act of 29 September 1994. (Act of 24 September 1994) As independent public healthcare institutions, they determine their own accounting policies (principles). The established accounting policy is the responsibility of the head of the entity. Hospital accounting in Poland includes, among other things, the principles of hospital cost accounting. More than twenty years of operation of Polish hospitals as independent and self-financing institutions required the use of a number of legal acts in the accounting system, regulating the principles of determination and implementation of cost accounting. The term cost accounting is understood as "a set of activities and procedures related to the measurement, recording and processing of costs for financial and management accounting purposes" (Sojak, 2019). This definition sets out the tasks for business entities with regard to the appropriate scope of mandatory hospital accounting policy arrangements. Selected cost accounting definitions are presented in Table 1.

Table 1: Selected definitions of cost accounting

Source	Definition of the cost accounting
Hass-Symotiuk, M. (2008)	"...cost accounting is an essential component of the accounting system and covers the measurement and documentation of costs, their recording, settlement according to the places where costs arise, types of products (medical services), determination of unit costs and development of cost information sets."
Świderska, G. K. (2011)	"...the process of identification, collecting, processing, presentation and interpretation of the cost information for the purposes of assessment and decision-making of users of the information."
Jarugowa A., Malc W., Sawicki, K. (1990)	"...examination and transformation, according to the adopted model of information on the entity's operating costs, that helps users assess the situation, make business decisions and control their realization."

Source: author's own study based on literature.

The use of information on the costs of hospital health services has been of interest to scientists since the beginning of their operation as independent public healthcare institutions. The author also conducted research and observations of hospitals as an auditor examining the financial statements of hospitals, from the moment of their transformation from budgetary entities into independent entities, and as a researcher dealing with the hospital accounting, including their cost accounting. The research work resulted in the development of a model for the calculation of the costs of standard healthcare services in hospitals enabling, among other things, the evaluation and control of the costs of the conducted activities. (Chluska, 2008)

In Poland, the research on cost accounting of hospitals (healthcare entities) was conducted by such authors as M. Hass-Symotiuk, G. K. Świderska, M. Cygańska, W. Baran and A. Kister.

Hass-Symotiuk (2010) and her team proposed a reporting concept for the purposes of integrated evaluation of hospital performance for the recipients of information at different levels, especially the managers, founding entities and the Ministry of Health. Świderska (2011) and her team developed a concept of identification, recording and calculation of costs in healthcare institutions, which resulted

in the preparation of a legal act on the recommendations for standards of cost accounting in healthcare providers in 2015. Work on improving the information obtained from the accounting system was conducted by Cygańska (2018). This author developed a concept for the integration of clinical aspects into the hospital accounting systems in order to obtain information useful from the standpoint of operational management of hospitals. The evolution of the cost accounting was also investigated by Baran (2017). In her research, Baran noticed the possibility of using cost accounting to create management information. Kister (2018) also conducted interesting investigations of hospital costs, and developed a model for improving the quality of public hospital management. The analyses included identification of the costs of non-compliance related to improper implementation of the healthcare activities.

In order to fulfil the postulates of the proper functioning of the hospital cost accounting, it is necessary to include, in the entity's principles of designing the cost accounting, legal acts with the nature of laws and regulations. The legal acts containing guidelines for hospital cost accounting published in 1998-2019 included:

a) The Ordinance of the Minister of Health and Social Care as of 22 December 1998 on detailed principles of cost account in public healthcare institutions,
b) The Act of 27 August 2004 on health services financed from public funds,
c) The Ordinance of the Minister of Health as of 8 July 2015 on recommendations concerning the standards of cost accounting in service providers,

The provisions of the 1998 Ordinance were repealed under the Act of 15 April 2011 on medical activities. (Act 2011) Since 2011, hospitals have been keeping cost accounts on a general basis, without using specific provisions. In 2015, the Ordinance of the Minister of Health as of 8 July 2015 was published on recommendations concerning the standards of cost account for service providers. (Ordinance 2015) This was an executive act to the Act of 27 August 2004 on health services financed from public funds. The provisions of the 2015 Ordinance on recommendations for standards of cost accounting in healthcare providers were to come into force obligatorily from 1 January 2020. Legislative work is underway to repeal this obligation.

The level of detail and number of legal provisions indicates that hospital managers responsible for information aspects of company cost accounting, when formulating their accounting policy in this respect, had an important role in providing correct information on operating costs. The review of legal regulations shows that during the analysed period, the regulations were established in such areas as:

a) the details of identification and cost accounting,
b) guidelines for company cost accounting plans,
c) principles for accounting for direct and indirect costs,
d) determination of unit costs of healthcare services,
e) Determination of the subject, object and type of unit cost calculation,
f) elements of the cost of providing health services.

As independent institutions, hospitals, which have been established since 1998, can use the knowledge on the principles of company cost accounting contained the Ordinance of the Minister of Health and Social Welfare of 15 June 1992 on detailed principles of the recording of revenues and costs in public health care institutions. These provisions have been in force since 1993. The above Ordinance was applied by hospitals in the period when they functioned as budgetary entities. Therefore, it can be concluded that hospitals in Poland have had legal provisions on cost accounting rules since the 1990s. The question arises as to how the managers in hospitals have fulfilled their obligations to establish accounting policies in the area of cost accounting. A partial answer to this question is provided by the analysis of selected problems of applying hospital costing, which the author conducted in 2004 and 2019.

Methodology. Costs in Hospital Management in Light of Research

In order to identify the structure and essence of the hospital cost accounting, its use by managers and prospects for its further development, a question about the cost account conditions was asked in 2004 in randomly selected hospitals from all over Poland. Forty-one entities responded to the survey. The survey was addressed to large hospitals, assuming that these organisationally complex entities would provide the most reliable insights into the essence and state of cost accounting. Similar questions were also asked in 2019 i.e. fifteen years later. During this period, hospitals had time to improve their cost accounting and develop their models to provide cost information to managers. The survey in 2019 involved 26 hospitals from all over Poland. It was conducted in various hospitals. In both surveys, the answers to the questions asked were provided by the chief accountants. They directly implement cost accounting policies of the management bodies. As accounting specialists, they often support and consult this policy. The objectives set by the management bodies of the entities are translated into accounting records.

With regard to the questions:

a) which cost records the entity keeps,
b) how the cost records are kept in the accounting department,
c) whether the places where costs are generated were identified,
d) whether the managers see the need for knowing the model values of the costs of healthcare services provided,

the hospitals, both in 2004 and 2019, responded that they all kept full cost records, i.e. in the cost accounts by type and in the cost accounts by place of cost generation, using information technologies and that places of cost generation were identified (100% of responses). All the respondents noticed the need to know the model values of healthcare costs. The remaining replies from surveys conducted by the author in 2004 and 2019 are presented in Table 2.

Table 2: Results of the 2004 and 2019 hospital cost accounting survey

Question	2004	%	2019	%
1) Did the separation of cost centres depend on				
a) only the hospital's cost accounting regulations,				
b) the hospital's cost accounting regulations and information requirements of the entity's managers for management purposes,	41	100	23	88
c) was the result of other principles (Which?)			3	12
2) Are the entity's managers interested in the unit costs of services?				
a) yes,	37	90	19	73
b) no,			3	12
c) occasionally.	4	10	4	15
3) Are budgeting processes carried out in the entity?				
a) yes,	8	20	8	31
b) no,	15	36	13	50
c) preparatory works are in progress.	18	44	5	19
4) Is there a set of procedures in the entity?				
a) yes,	26	63	5	19
b) no,	3	8	15	58
c) (work in progress)	12	29	6	23
5) Have the costs of these procedures been established?				
a) yes,	24	58	3	12

b) no,	6	15	13	50
c) (work in progress)	11	27	10	38
6) What operational records do the entity's organizational units keep?				
a) according to the requirements of the funding bodies (NFZ),	10	24	11	42
b) for the purpose of accounting and financing services, but information requirements of managers are important,	31	76	15	58
c) another one (Which?)				
7) Is there activity planning implemented in the hospital?				
a) yes,	19	46	9	35
b) no,	19	46	17	65
c) Otherwise (How?)	3 (work in progress)	8		
8) Does the entity use medical standards?				
a) yes,	20	49	9	35
b) no,	20	49	16	62
c) Otherwise (How?)	1 (to a limited extent)	2	1 (implementation in progress)	3

Source: Author's own elaboration.

Already the example of such a small group of entities indicates that cost accounting systems were improved in 2004 and it was noticed that these changes were oriented towards hospital management. It is also important that the entities noticed the necessity and ways to rationalise costs.

In 2019, the replies indicated that the improvement of the cost accounting was slowed down. A significant number of hospitals did not use in management processes:

a) budgeting (50%),
b) costs of procedures for which a standard cost was set (58%).

The number of hospitals that declared a lack of planning processes (65%) and a lack of interest in medical standards (62%) increased. Planning processes and information on cost standards improve the control function of cost information in management. These observations indicate a short-term perspective on hospital management.

Two descriptive questions were also asked about the need for rationalization of the hospital's cost accounting. The question "Which cost areas need to be thoroughly analysed and rationalized in the entity?" was asked in the 2004 survey in the following manner:

- employees' working time,
- costs of procedures,
- costs of drugs and reagents,
- employment costs,
- costs of laboratory and imaging diagnostics,
- costs of axillary activities,
- costs of certain medical procedures,
- costs of third party services,
- fixed costs,

- various indirect costs,
- costs of highly specialized medical procedures,
- wear of medical equipment,
- costs of procedures purchased from other entities,
- the cost of patient treatment.

The same question from 2019 allowed for the indication of the problems in areas such as:

- accruals and provisions,
- drug management,
- unused medical equipment and apparatus,
- lack of appropriate personnel,
- salary costs,
- costs of third party services,
- costs of patient treatment,
- costs of consumption of disposable equipment,
- costs of using medicines and other medical materials,
- paying for procedures rather than working time,
- lack of uniform allocation keys for procedure costs, indirect costs.

The question: "What directions do you see for rationalization and improvement of cost accounting in the entity?" was answered in 2004 as follows:

- increasing the responsibility of the managers of the centres for the results,
- full computerization to track patient treatment,
- unambiguously determination of the principles for recording material and financial donations (based on costs or on capital),
- analysis of the purposefulness of incurring costs across individual organizational units,
- introduction of budgeting processes,
- introduction of controlling,
- Rationalization of patient treatment costs,
- more accurate costs calculation per patient,
- the interest of the hospital department heads in the performance of the wards,
- capturing unjustified costs as relevant information for entity's managers,
- cost accounting optimization,
- staff education,
- computerization of the entity, especially in the field of tracking drug management,
- introducing cost planning,
- development of cost standards, e.g. for material consumption,
- deepening the analysis of costs in order to identify them in detail,
- linking salaries to work effects,
- analysis of the profitability of individual wards and elimination of unprofitable ones if possible,
- cooperation in the field of correct valuation of the procedures between accounting and medical departments.

In response to the same question in 2019, the respondents indicated such directions for rationalization and improvement of costs as:

- costs calculation per patient,
- determining the costs of procedures,
- harmonization of cost accounting principles for all medical entities,
- cost monitoring,
- a thorough cost analysis,
- benchmarking,
- improvement of IT systems that support cost accounting.

The inspiration for the author to repeat the research in 2019 was to direct the draft of 12 September 2019 for the Ordinance of the Minister of Health on recommendations concerning the standards of cost accounting in service providers to public discussion. The group preparing the proposals for recommendations performed a pilot study on the cost accounting situation in healthcare entities in 2019. The analysis included 33 questionnaires from the entities surveyed. In the pilot study conducted by the authors of the draft of new recommendations from 2019, the largest group were the entities for which gminas (gminas are principal units of territorial division in Poland) were the founding entities (28%).

The analyses carried out during the pilot study reveal that:

a) 94% of the entities surveyed kept accounting books,
b) 73% of the entities did not implement the 2015 Ordinance,
c) the entities recorded costs by type and place of cost generation,
d) entities divided indirect costs according to different allocation keys,
e) 97% of entities set the normative costs of materials and 94% the normative personnel costs,
f) in 15% of the entities, the cost accounting used enabled full calculation of the unit cost per a patient, and in 16% of the entities, it allowed for the calculation of individual costs of Homogeneous Patient Groups,
g) in 19% of the respondents, computer systems of the entities surveyed were integrated into the grey and white parts, while owning comprehensive integrated computer systems was declared by 15% of the respondents,
h) to a large extent, the audited entities used spreadsheets for the calculation of unit cost.

Comparing the observations from the above-mentioned pilot surveys, it can be concluded that the observed trends and operating conditions of hospitals are similar to those of the author from 2004 and 2019. The research samples were not representative. However, due to similar internal and external conditions of functioning of hospitals in the Polish health care system, the results of these three surveys can be considered characteristic for most hospitals.

Results. Determinants of hospital cost accounting models in practice

For many years, hospitals in Poland have modified and improved their accounting systems, including cost accounting. In 2004, as shown in the survey, hospitals were slowly implementing the legal provisions concerning their cost accounting. Although five years have passed since the 1998 Ordinance was issued, a number of hospitals have declared that they were in the process of implementing the legislation. In 2019, a draft of new recommendations was published as an executive act to the Act of 27 August 2004 (Act of 2004, Article 31Lc). The explanatory memorandum of the draft states that service providers assessed the 2015 regulations as "incomprehensible, ambiguous and too complicated". In its structure, the 2019 draft largely refers to the regulations from 1998.

Analysis of the period of hospital cost accounting reforms in practice reveals the following causes of failure to implement standard solutions:

a) high dynamics of systematic changes, hindering the improvement of accounting systems, including cost accounting,
b) dominance of short-term management decisions,
c) lack of interest of hospital managers in the cost information,
d) lack of financial funds for modern IT solutions supporting cost accounting,
e) separation of places where costs are generated and settlement of costs aimed to meet the needs of the managers and internal needs,
f) numerous obligations in terms of reporting information for the purposes of settlements with the financing entity (National Health Fund) and other entities, absorbing the administrative staff,
g) no planning processes,
h) limited possibilities to control costs.

Hospitals notice the need to know the unit costs and the model values of costs of healthcare services. At the same time, the interest of managers in these costs is decreasing (2004: 90%, 2019: 73%). According to the respondents, many areas of cost accounting need further improvement. The research repeated such areas of potential improvement as:

a) drug management,
b) human resources issues,
c) costs calculation per patient,
d) calculations of procedure costs,
e) coordination of information of the grey (administrative) and white (medical) part of IT systems,
f) the efficiency of the use of medical equipment and apparatus,
g) settlement of remuneration costs in the unit cost calculation,
h) settlement of indirect costs.

This means that since the beginning of the existence of hospitals, unresolved cost accounting problems specific to these entities have existed. This represents a guide for the authors of new recommendations on hospital costing.

Conclusions

Hospitals in Poland record operating costs in detail. Their comparison across different entities is impossible due to different settlement processes, especially those concerning indirect costs. Funding bodies are interested in the unit costs of health services they finance. Over the last twenty years, the attempts to unify cost accounting in hospitals have failed. The causes for these failures include the specificity of hospital operations and the continuous organizational changes in the healthcare system in Poland.

The creation of information on the costs of hospital health services depends on the principles of their cost accounting. According to the respondents' opinion, the form of the cost account depends on the expectations of the basic recipients of this information, i.e. managers and founding and financing entities. The founding entities are interested in the financial condition of hospitals and the possibility of their uninterrupted continuation. Funding bodies expect comparable information on costs of procedures, costs of patient treatment, costs of man-days of health care, costs of Homogeneous Patient Groups. Conclusions resulting from the analysis of opinions on cost accounting principles in the three presented studies allow for positive verification of the research hypothesis.

The changes in the cost account design that hospitals will have to apply once the new recommendations for a cost accounting standard in service providers come into force will definitely address the needs of the entities which finance the contracts of healthcare services. If comparability of data on hospital operating costs is developed, it will also improve the ability of managers to effectively manage costs.

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Life Quality Assessment Among Inhabitants in Two Selected Mountain Municipalities in Poland

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Abstract

The purpose of the studies was to indicate the most perspective directions of development of the municipalities as well as a safety level at work in the agriculture and in the local industry. The key issue was to assess a quality of natural environment in order to attract the tourists to this community. The studies were performed on the sample of 200 randomly selected inhabitants of the municipalities and 100 arrived tourists. The survey consisted of 15 questions (6 open and 9 closed ones). The results of the survey show that among the most developmental directions of economy the inhabitants of both municipalities put first tourist and agritourism. Also the most of tourists have decided that the natural advantages of municipalities encourage to visit both regions. The multi-criteria analysis showed that commune B is characterized by a higher quality of environment and higher landscape values than commune A. Similarly, the natural environment was assessed by the inhabitants of both communes. The greatest problem in both communes is unsatisfactory air quality, while the greatest problem of safety at work was pain in the lumbar spine, around the neck and shoulder line. Despite this only 13% (commune A) and 6,1% (Commune B) of the expenditures constituted financial support for municipal economy and environmental protection and healthcare.
It results from the data analysis that the described municipalities have significant chances for systematic development in spite of numerous current problems, among which the most important one is unemployment.

Keywords: Development, Municipality, Safety, Environment.

Introduction

The economic situation of rural municipalities as the smallest local government units is determined by a number of internal and external factors. The most important ones include: access to natural resources, degree of economic progression, unemployment rate and environmental values. While

defining the term 'local development', it should be emphasised that it is the process of positive changes, both quantitative and qualitative ones, in specific time. Milán-García et al (2019) and Wojtasiewicz (1996) studied the local development when the actions were taken by the local community, local authorities and entities located on the area of the given municipality are characterised by full harmony and regularity while the trend in the conduct of these entities is useful for the municipality through creation of new solutions and improvement of the existing utility values as well as creation of spatial and ecological order. As Amin (1999) mentioned that over the past few years, the concept of local development has evolved by introducing the concept of Sustainable Local Development (SLD). Mebratu (1998) confirmed that the SLD must have the capacity to feedback and maintain itself over time, respecting the limitations of the surrounding natural environment. Additionally, according to Malizia et al (1999) a public administration should support particularly a weak economic growth.

Sztando (2002) and Tuziak (2006) described a special role in economic development of a municipality is assigned to its authorities since it is them that have the funds at their disposal and distribute them for specific purposes, including investment ones. Functioning of the local government authorities comes down to integration and coordination of local development with consideration *inter alia* of the relations and relationships occurring in the development process. Parysek (2001) studied an impressive impact of the authorities on development raises also interest of the local community which is aware of the legitimacy of the performed changes and sees the general social benefits. However, in order for development to be noticeable, proper pools of funds should be invested in realisation of specific objectives. As it results from Herbst (2012) studies in order to improve their material & living situation, the inhabitants of the local communities go abroad in masses, where they often stay for a couple of years. .
Additionally, Marciniuk-Kluska (2010) analyzed a proccess entry of Poland to the structures of the European Union has created a chance for improvement of the conditions of the social and local economy.. The EU membership generates a positive incentive mainly in the context of the generally accepted development of rural regions. Małecki (2009), described a chance for reasonable use of additional funds in relation to implementation of EU programmes.. Reasonable manner of spending of funds by the municipality authorities contributes to initiation of positive economic changes of the region, which is mainly displayed in creation of development, improvement of management profitability and improvement of social sentiments. Broll (2008) noticed that social capital plays a crucial role in every municipality, as to great extent it drives widely-understood development in the given region..

Szlaska (2007) listed numerous functions that should be performed by the municipal local government in local development, there are several ones which are particularly important. It is mainly about: initiation, coordination, supporting and assessment of social & economic development of the municipality. As it results from the studies performed so far, there are a couple of perspective directions of development of mountain municipalities:

a) development of cross-border cooperation,
b) construction of roads within inter-municipal initiatives,
c) development of tourist and health-resort function,
d) increase of investments from outside,
e) possibility of obtaining of more funds for investments from the central level and special-purpose subsidies,
f) development of agrotourism.

In mountain regions tourism takes on very important role as a strategy for local development. Cunha (2005) mentioned, that tourism is a sector that favours local development because it generates jobs, increases the income of workers and stimulates capital investments through new business opportunities. .

The purpose of this article is to analyse the municipal resources and the potential chances for improvement of the social & economic situation of the selected mountain municipalities being similar

in terms of the number of inhabitants and the amount of the annual budget. The results of this analysis will lead to indication of the areas of the economy of the municipality which from the economic point of view seem to be the most perspective, since it is them that will affect further development of the region to the main extent.

Material and Methodology

In order to analyse the chances and prospects for development, a survey was conducted among the inhabitants of the described municipalities. The studies were performed among 200 inhabitants of mountain municipalities, including farmers. A survey consisting in 10 questions (6 open and 4 closed ones) was used in the studies. Additionally, several questions were addressed to 100 tourists coming there during summer holidays, in order for them to assess the level of attractiveness of the region from their own perspective. Assessment of the impact of the natural environment on the quality of life of the inhabitants of that region was performed. In the field of agrotourism and agriculture, assessment of the safety of work on the area of the examined municipalities was performed.

The quality of the environment in the analysed communes was assessed on the basis of an analysis of the land use plan of the communes, ecophysiographic studies and a review of thematic maps, such as soil maps, hydrological maps, climate maps, etc.

In order to compare the quality of the natural environment and landscape values Kukuła (2000) analyzed communes a multidimensional statistical analysis was applied – the Zero Unitarization Method. This method requires that all assessment indicators (diagnostic variables) are given dimensionless numerical values. For this purpose the assessment indicators were divided into two groups: stimulants and destimulants.

A stimulant is such a diagnostic variable the growth of which should be associated with growth, while a decrease with a decrease in the assessment of environmental quality and landscape values. These variables were normalised according to the formula of Kukuła et al (2014):

$$z_{ij} = \frac{x_{ij} - \min x_{ij}}{\max x_{ij} - \min x_{ij}}$$

A destimulant is a diagnostic variable the increase of which should be associated with a decrease, while a decrease with an increase in the assessment of environmental quality and landscape values. Destimulants were normalised according to the formula:

$$z_{ij} = \frac{\max x_{ij} - x_{ij}}{\max x_{ij} - \min x_{ij}}$$

In these formulas:
i – number of the commune,
j – number of the diagnostic variable,
z_{ij} – normalised variable,
x_{ij} – variable prior to normalisation,
max x_{ij} – maximum value of the variable in a given set,
min x_{ij} – minimum value of the variable in a given set.

Table 1 presents the analysed environmental parameters which are the assessment indicators, as well as their division into stimulants and destimulants. These indicators characterise basic elements of the

environment, such as: topography, climate, air, surface and underground waters, soils, animated nature.

Table 1: Indicators for assessing environmental quality and landscape values

Indicator (I)	Stimulant	Destimulant
Topographical diversity - height difference between the highest and lowest points [m]	X	
Length of growing season [days]	X	
Annual average concentration of PM10 [µg/m^3]		X
Number of days during the year with exceeded permissible number of exceedances of the 24-hour average standard in 2018 [-]		X
Annual average SO_2 concentration in the air [µg/m^3]		X
Share of waters in non-forest land [%]	X	
Dominant ecological status of waters [class]	X	
Number of documented mineral water sources [-]	X	
Predominant agricultural land class [class]		X
Afforestation rate [%]	X	
Ratio of the number of cultivated green areas to the commune area [-]	X	
Ratio of the number of legally protected areas, including Natura 2000 areas to the commune area [-]	X	
Ratio of the number of natural monuments to the commune area [-]	X	
Ratio of the number of protected plant species to the commune area [-]	X	
Ratio of the number of protected animal species to the commune area [-]	X	

The analysis assumes that all assessment criteria are equally weighted. Indicators concerning the number of objects subject to protection were compared to the total area of the commune. The sum of values of standardised z_{ij} variables for the communes, referred to as aggregated variable Q, was the basis for selecting the commune with a higher quality of environment and higher landscape values. The higher the value of variable Q, the higher was the environmental quality assessment.

The assessment made on the basis of multi-criteria analysis was compared with the results of the assessment of the impact of the natural environment on the quality of life in the communes obtained in the survey.

The statistical Student t-test was carried out to determine the significance of differences among financial expenditure in both municipalities.

Results

The number of inhabitants of the examined municipalities was around 20 thousand persons. Population density of these municipalities was respectively: 56 persons per 1 km^2 for municipality A and 60 persons for municipality B. The area of the described municipalities includes places with relatively high population rate but also significantly depopulated ones. The drop of the number of population is entailed by the decreasing rate of natural increase as well as by the negative balance of

population migration. The negative demographic phenomena significantly affect the economic situation of the municipalities, preventing their systematic development and increase of the level of living.

Numerous tourists, pedestrian and bicycle routes, including two transit ones, running along the Sudeten Mountains and constituting the main tourist axes of the municipalities, run through their area. This is why the described regions are so significant in social & economic terms. It is also connected with development of tourism and agrotourism, which enhance the attractiveness and image of the municipalities.

For the purposes of the article, the structure of expenditures of the selected municipalities was analysed as well - Table 2. The percentage distribution of the incurred expenditures of municipality A in comparison with rural municipality B was presented. It results from the analysis that the greatest percentage of them was designated for education and upbringing - respectively 22.4% and 35.8%; expenditures on provision of social aid constituted a significant part as well. Almost 1% of the expenditures constituted financial support for health protection in both municipalities.

Table 2: Percentage distribution of expenditure in the budget of the A community and B community

Item	Commune A [%]	Commune B [%]
Agriculture	3,1	4,4
Public administration	10,0	11,8
Education and upbringing	22,4	35,8
Municipal economy and environmental protection	12,2	5,7
Healthcare	0,8	0,4
Culture	7,6	7,6
Social assistance	22,2	14,7
Transport and communication	3,0	5,9
Housing economy	10,0	5,8
Public safety	1,1	3,3
Others	7,6	4,6

Among the surveyed inhabitants, the vast majority of them is convinced about staying in their current place of residence, at the same time caring about development and increase of economic level of their own region mainly through establishment of own business activity. Almost 30% of the inhabitants are uncertain about their future while 10% of the respondents plan to go abroad in the nearest future to look for a better job. The statistical test results showed that the differences in expenditures in both compared communities are not statistically significant (p-value = 0,44).

The role of the municipality authorities, the priority of which should be caring about proper satisfaction of the needs of the population living there in order to limit economic migration to a significant extent, seems to be crucial here. It is displayed mainly in the aspect of activation of the society through granting of tax reliefs for newly-established undertakings. It is worth referring here to the main function of the local social capital which is widely described by Matysiak (1999), namely reduction of uncertainty both in social life and in economic life upon deciding on conducting of business activity as well as cooperation between the local community and the local government authorities. The effects of proper use of the social capital may lead to increase of the trust of the society to the authorities as well as to support of the widely-understood public & private partnership.

Consequently, an effective policy of the authorities of the described municipality may significantly improve its competitiveness. It results from the developed data that agriculture and low level of activity of the inhabitants of the municipality have the weakest impact on improvement of this aspect. The majority of the respondents asked about the strengths of the municipality which they lived in indicated its good geographic location (35%). A bit fewer respondents, i.e. 21%, indicated attractive investment areas as a factor enhancing competitiveness of the municipality. Among the most developmental directions of economy in municipality A, the inhabitants put first tourist and agritourism (41 responses), industrial production (14 persons) and services (24 respondents), as shown in Figure 1. On the other hand, in municipality B the most persons indicated convenient conditions for development of agritourism (39 persons) and agricultural production (20 persons).

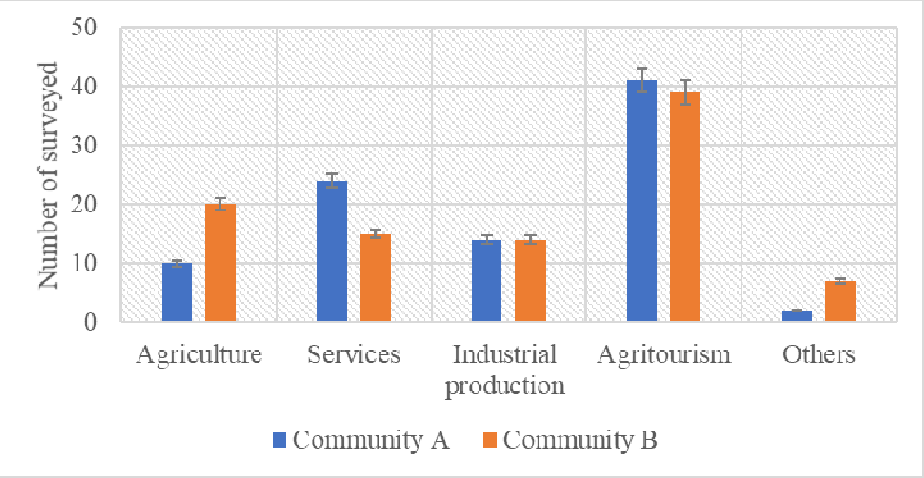

Fig. 1: The most perspective sectors of the economy in community A and community B in assessment of its residents.

Also the work of the local Municipality Offices, labour work and condition of the natural environment were subjected to assessment of the inhabitants. The local community in 65% assesses the functioning labour market as very bad while only 31% of the inhabitants are satisfied with it. The natural environment is assessed very well by 13% of the respondents while the work of the Municipality Office is perceived as good by 64% of the respondents. In municipality B, 40% of the respondents assess the work of the municipal officials as good and 38% perceive the condition of the

natural environment as good. On the other hand, very bad opinions relate to the local labour market as due to lack of jobs in the municipality, the inhabitants travel to work to the near Czech Republic.

During performance of the studies, also the tourists arrived in the municipality were asked a question. In Figure 2, the most important values in the opinion of the tourists, which significantly intensify the tourist traffic of the region, are presented. It results from this data that it is mainly the gastronomic base and the natural values that attract the tourist to municipality A the most.

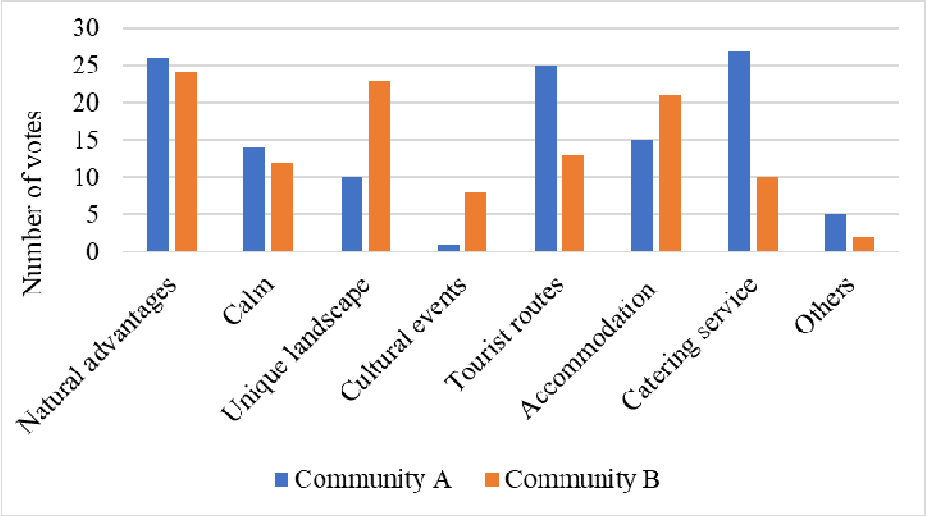

Fig. 2: Distribution of answers to the question: ***What is the most attractive for tourists in researched communities*****?**

For 14 tourists, it is tranquillity that decides on the unique character of the place, while for 26 tourists these are tourist attractions. It is also known that there are cultural events organised in the municipality, yet their impact on promotion of the region is minor. It is similarly in municipality B, where additionally the accommodation facilities and the unique landscape encourage to visit this region.

In the studies, it was attempted to identify the problems faced by the inhabitants of the municipalities. As it turned out, the most important ones include: unemployment (25 inhabitants), damaged roads (17) and lack of proper support for entrepreneurship (35). The obtained results are presented in Figure 3.

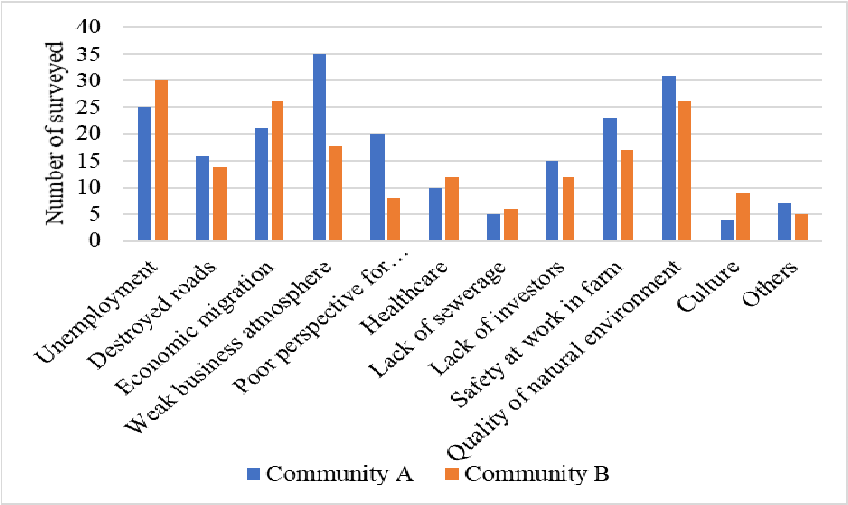

Fig. 3: Current problems identified in the communities according to its residents (number of persons).

Among the problems of the inhabitants determined in Figure 3, the level of natural environment quality and the level of the safety of work were selected for the purposes of assessment of the impact of the specified areas on the level of quality of life of the inhabitants of those municipalities.

Natural Environment Quality

Below it were presented the results of the quality natural environment assessment. Table 3 shows the values of the analysed environmental parameters.

Table 3: Values of the environmental variables considered in the analysis

Indicator (I)	Commune A	Commune B
Topographical diversity - height difference between the highest and lowest points [m]	510.00	970.00
Length of growing season [days]	182.00	214.00
Annual average concentration of PM10 [µg/m^3]	30.00	33.00
Number of days during the year with exceeded permissible number of exceedances of the 24-hour average standard in 2018 [-]	38.00	55.00
Annual average SO_2 concentration in the air [µg/m^3]	25.00	23.40
Share of waters in non-forest land [%]	1.00	6.90
Dominant ecological status of waters [class]	IV	III
Number of documented mineral water sources [-]	0.00	9.00
Predominant agricultural land class	IV	IV
Afforestation rate [%]	32.50	46.0
Ratio of the number of cultivated green areas to the commune area [-]	0.01	0.02

Ratio of the number of legally protected areas, including Natura 2000 areas to the commune area [-]	0.04	0.02
Ratio of the number of natural monuments to the commune area [-]	0.15	0.05
Ratio of the number of protected plant species to the commune area [-]	0.22	0.17
Ratio of the number of protected animal species to the commune area [-]	0.74	0.51

The table 3 shows that commune B is characterised by a more diversified topography, warmer climate, denser hydrographic network, better water quality and higher afforestation rate. In addition, there are mineral water deposits in commune B. Due to this, as well as to specific climatic conditions, spa areas are located in this commune. In comparison with commune A, commune B is characterised by a higher concentration of PM10 and a much higher number of days of exceeding the permissible concentrations. Both communes are dominated by weak soils, belonging to the IV agricultural land class. The number of protected areas and objects in relation to the total area of the communes is also similar.

Table 4 presents the results of the assessment of environmental quality and landscape values in both communes on the basis of multi-criteria analysis.

Table 4. Environmental quality (Q) based on the results of multi-criteria analysis

Commune	Q
A	6.0
B	8.0

The multi-criteria analysis showed that commune B is characterised by a higher quality of environment and higher landscape values than commune A. Similarly, the natural environment was assessed by the inhabitants of both communes. In commune A only 13% of inhabitants rated the quality of the environment as good, while in commune B 38% of inhabitants voted so. This demonstrates a high level of public awareness as regards the environmental protection and the ability to correctly assess the quality of the environment.

Environmental quality and landscape values have a huge impact on the quality of people's lives, as well as on the development of tourism, as evidenced by the results of a survey conducted among tourists visiting both communes. Human beings use the environment and at the same time they interact with it, which has extensive and complex consequences. Anthropo-pressure causes the transformation or contamination of all inanimate elements of the environment, such as air, water and soil, climate change, biological impoverishment, changes in the landscape or a decrease in the productivity of ecosystems. According to Dobrzański et al (2000) these direct effects cause economic losses (e.g. in industry, agriculture, forestry, fishing), worsening of working and leisure conditions, deterioration of health and living comfort, as well as a number of other intangible effects. Environmental threats are associated with diseases, defined as environmental or civilisation-related. These include cancer and cardiovascular diseases, respiratory and nervous system disorders, immune system damage and allergies. It is therefore necessary to take measures to improve the quality of the environment.

Since the greatest problem in both communes is unsatisfactory air quality, especially during the heating season, and unregulated wastewater management, which affects the condition of surface water, these aspects should be included in the communes' action programmes first of all. Both communes are characterised by high natural landscape values and have great potential for tourism

development. It should therefore be supported by investing in tourist infrastructure, increasing the offer of accommodation and catering facilities, as well as promoting the communes.

Safety at work

In the area of the safety of work, assessment of the physical burdens in the musculoskeletal system of the inhabitants of the municipalities was performed. During the studies, the respondents were asked about the intensity and frequency of occurrence of ailments and discomfort in connection with the performed professional work. The results of the studies are presented in Figure 4.

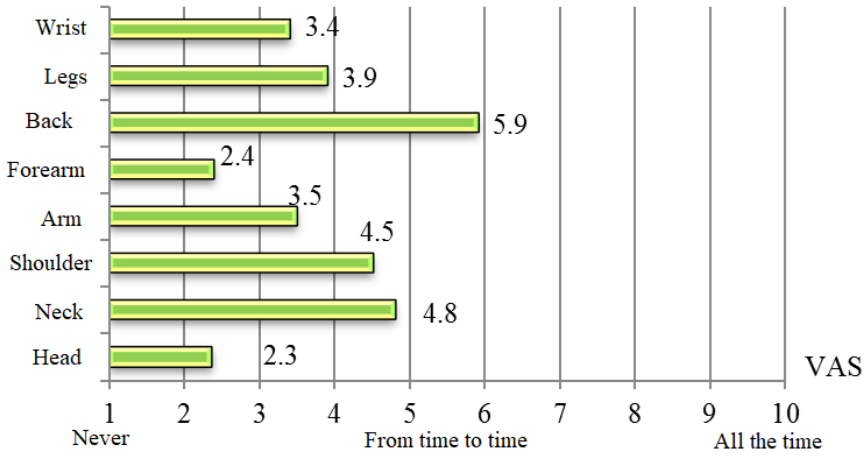

Fig. 4: Pain and discomfort appeared among workers in their musculoskeletal system.

Among the numerous places in the musculoskeletal system, in which the pain centres were reported in the examined group, from time to time (once/twice a week) pain in the lumbar part of the spine, in the neck area and in the shoulder line occurred. Headaches and forearm pain were suffered very sporadically - a couple of times a month and as it was argued, such conditions occurred after long-term engagement of hands, e.g. as a result of accumulation of the performed works. In case of continuous pain suffering, there is a high risk of occurrence of durable ailments, including in particular joint degeneration, limb numbness and greater vulnerability to injuries. Consequently, it leads to absence from work and in extreme cases - to rehabilitation and significant financial outlays on health improvement.

Summary

While analysing the social & economic situation of the described municipalities, it should be emphasised that the condition of the majority of the economic sectors of these units is satisfactory, yet there are some prerequisites for improvement of their condition. Due to orographic conditions, agriculture is not a perspective direction of development, similarly to industry due to lack of mineral raw materials. Both inhabitants and tourists indicate the great tourist potential of both communes, resulting from their location and environmental values. Both municipalities are located in the submontane area, in the macro-region of the Central Sudetes. Diverse terrain relief and relatively large afforestation rate make those areas very attractive. The assessment of the quality of the environment by inhabitants was confirmed by the results of multi-criteria analysis. This demonstrates a high level of public awareness as regards the environmental protection and the ability to correctly assess the quality of the environment. Environmental quality and landscape values have a huge impact on the quality of people's lives, as well as on the development of tourism, especially agritourism. Despite this, in both communes insufficient funds are allocated for environmental

protection and investing in tourist infrastructure, increasing the offer of accommodation and catering facilities, as well as promoting the communes. Investments in these areas would contribute to reducing unemployment, which was recognized as one of the major problems in both municipalities. Actually almost 30% of the surveyed inhabitants are uncertain about their future while 10% of the respondents plan to go abroad to look for a better job.

The development of agritourism is associated with the problem of safety at work on farms. The respondents indicated that this is an important problem in both municipalities. Based on the research, it was found that employees on farms mainly suffer from pain in the lumbar part of the spine, in the neck area and in the shoulder line and the pain of legs. So far only less than 1% of the expenditures constituted financial support for health protection in both municipalities. Therefore, along with the development of agritourism, expenditure on health protection and improvement of working conditions in the agriculture and agritourism sector should be increased.

The development of tourism can also have negative impacts to the environment and health of the local community. It affects a water and air pollution, noise, landscape, invasion of protected areas, etc.

Analysing the economic situation in a cross-sectional way, the occurring developmental barriers but on the other hand the possibilities and the needs to make a lot of infrastructural investments which would contribute to improvement of the social & economic situation should be noticed.

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Analysis of China's International Cooperation on Counter-Terrorism Within the Framework of The United Nations

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Abstract

In the modern world, terrorism has become one of the primary threats to the national security of countries. According to the Global Terrorism Index 2018, the number of victims of terrorist acts in the world fell by 16 thousand people, but the geographical spread of terrorism increased. Over the past 10 years China has repeatedly become a target of terrorist attacks originating from outside the country; the devastating consequences of these acts of violence threaten the integrity of the country and economic interests. This paper analyses China's international cooperation in the fight against terrorism within the framework of the United Nations. Based on the study, it was proved that international cooperation under the auspices of the United Nations is one of the main forms of China's interaction in order to ensure national security and protect its national economic interests abroad. It is concluded that it is necessary to continue to develop international cooperation in the fight against terrorism, expanding the areas of cooperation, and taking into account not only the interests of individual countries, but the world community as a whole.

Keywords: Terrorism, International Cooperation, Conventions, The United Nations, Counter-Terrorism.

Introduction

In the modern world, terrorism is a global danger; it has already become one of the primary threats for the national security of most countries in the world. The internationalization of terrorism, an extensive network of international terrorist organizations, and the mobility of terrorist forces require the world community to take a collective approach and regular interaction in countering the terrorist threat. International cooperation is becoming one of the effective forms of interaction between countries to fight against terrorism.

For China, international counter-terrorism cooperation is relevant for several reasons. First of all, being a multinational country, China has several hotbeds of instability in Xinjiang Uyghur Autonomous Region and Tibet Autonomous Region where the concepts of extremism and separatism receive external financial and ideological support and become widespread among the ethnic population. In the 1990s, a direct threat of separatist sentiments in the northwestern region of China caught the attention of the Chinese government. The growing regional instability was caused by neighbouring countries of Central Asia (Bukreeva and Popova, 2019).

Secondly, at present Syria has already become a haven for Uyghur extremists, where many of them are trained in militant units. Thirdly, in 2013, China launched a large-scale 'one belt, one road'

initiative; one of the problems that can significantly hamper its development is terrorism. According to the US Global Terrorism Database, 60% of countries located along the route of the Belt and Road Initiative are stable and secure, 25% of countries are at risk to be exposed to terrorist attacks, 15% of countries (Iraq, Pakistan, Afghanistan, Syria) are in high-level risk zone, where terrorist activities pose a threat to people's lives inside and outside the country (Xu, 2019).

According to Russian experts, the low protection of the Chinese initiatives from the growth of terrorism and extremism is a weak point of the Chinese side. Chinese resources are obviously insufficient to completely counteract the possible challenges and threats of international terrorism, especially given the penetration of ISIS militants in Afghanistan and potential zones along the Belt and Road (Luzyanin, 2019).

Research material and methods

During the research process, there were used the following research methods: system and comparative analysis, and an interdisciplinary approach. The research information is based on the materials taken from the official website of the Treaty Database of the People's Republic of China.

The research works of the following Chinese scholars cover the issues of China's counter-terrorism cooperation with the United Nations: Zhang L., Ling Shengli, Wang Fan, SongYan and Li Wei.

Research results

Following the outbreak of civil war in Syria, jihadist supporters moved there: 40,000 militants from more than 120 countries went to Syria and Iraq. According to the United Nations forecast, after ending military campaigns in Syria, from 10 to 30% of them will return to their countries, meaning that some countries and entire regions will face the problem of returning jihadists (Li, 2019).

The Chinese government has admitted the fact that an effective fight against such a global threat as terrorism is possible only in coordination with other countries. On December 27, 2015, the Standing Committee of China's National People's Congress (NPC) adopted the Anti-Terrorism Law of the People's Republic of China, which took effect on January 1, 2016 (Zhang Laney, 2016). Chapter 7 of the law is devoted to international cooperation in the fight against terrorism and specifies the following directions of China's interaction with other countries:

- exchange of intelligence information;
- law enforcement cooperation;
- international cooperation in judicial assistance, extradition, and transfer of sentenced offenders in criminal cases relating to terrorist activity;
- assigning forces on counter-terrorism missions;
- use materials acquired through international cooperation on counter-terrorism as evidence of involvement in terrorist activities in administrative and criminal proceedings.

On March 8, 2019, the State Council Information Office of the PRC issued a white paper, titled 'The Fight against Terrorism and Extremism and Human Rights Protection in Xinjiang'. The document consists of 7 main sections. The last section is devoted to international counter-terrorism exchanges and cooperation of China in the field of combating terrorism and extremism. The document declares that 'China opposes any form of terrorism and extremism, opposes the connection of terrorism and extremism with some countries, nations and religions and does not accept 'double standards' in the fight against terrorism; follows a comprehensive policy, aims to eliminate both the symptoms and the root causes of terrorism. The activities are also aimed at stamping out poverty and eradicating the land that engenders terrorism, and advocates for the strengthening of international counter-terrorism and pragmatic cooperation based on mutual respect and equal consultations (Minakova and Bukreeva, 2019).

Consider the features of China's international cooperation in countering terrorism and extremism within the framework of the United Nations created for maintenance of international peace and security.

For the first time in the practice of international relations, China used the terms 'terrorism' and 'counter-terrorism' at the United Nations Assembly meetings. The Chinese researchers from the China Foreign Affairs University Ling Shengli and Wang Fan have distinguished 3 periods of China's participation in the diplomatic discourse on international terrorism; each of these stages reflects China's perception, position and approach to the problem of counter-terrorism.

1. Opening Stage - consider terrorism in relation to the fight against imperialism, colonialism and racism (1972-1978)

The international practice of combating terrorism in China began in October 1971 with the restoration of China's legal right in the UN, including permanent membership in the UN Security Council. The Chinese Representatives to the UN participated in a discussion on international terrorism at the UN General Assembly, the UN Security Council and the UN Sixth Committee and expressed China's position on terrorism. China's first statement on terrorism was made by its representative Chen Chu on September 22, 1972 at the United Nations General Assembly meeting, he proposed to exclude the issue of countering terrorism from the agenda. This approach of 'ignoring' the problem of international terrorism, the Chinese side reasoned that terrorist manifestations are primarily forms of fighting against imperialism, colonialism, racism and other forms of discrimination, so first of all it is necessary to address the root causes of terrorism.

Thus, at this stage, China openly recognized that the masses could use terror to achieve their goals in the revolutionary struggle, but it did not support terrorist activities carried out by small groups, because it did not comply with the principle 'revolution is made by the masses'. According to China, the correct way to launch revolution is a mass mobilization, not fighting alone. Those days China's negative attitude to counter-terrorism related to the use of the term 'terrorism' in regard to national liberation movements. Therefore, on the one hand, China opposed terrorist acts, and on the other - protected the national liberation movement as a form of political struggle to overthrow colonial oppression and gain independence. According to China, Western countries imposed the problem of terrorism in order to legitimately crush the struggle of colonized countries for independence.

2. Selective approach stage to counter-terrorism (1978-1996)

After 1978, China began integration in the system of international relations; this process was followed by certain rethinking the problem of anti-terrorist struggle. However, positive changes toward this issue did not mean fully joining the international community in the fight against terrorism. Therefore, the Chinese researchers highlight the selective approach of China to counter-terrorism at this stage. In general, there were several significant achievements of China in terms of countering terrorism at this period.

– Positive changes occurred in the vision of the country's participation in the international fight against terrorism. China joined the international conventions on terrorism and rejected the ideology of proletarian internationalism as the main principle of anti-terrorist struggle. In the mid-1980s, China at the United Nations General Assembly meeting raised the issue of distinguishing 'international terrorism' from 'national liberation movement', and after 1992, the political discourse in China raised the need to identify the origins of international terrorism and social factors involved in spreading terrorism.

– China expressed readiness to implement cooperation on countering international terrorism. The Chinese leadership not only signed the International Convention against the Taking of Hostages on December 28, 1992 and agreed to support 'reasonable proposals and recommendations that help prevent and suppress international terrorist incidents', but assured the international community of taking effective measures to prevent acts of terrorism within the country, and also recognized the need for unification of international norms on terrorism.

– For the first time, China initiated a discourse on countering state terrorism in the context of Israeli Zionism. In 1983, at a regular UN meeting, Chinese representative Yang Hushan made a condemning statement of 'large-scale acts of international terrorism conducted by governmental authorities, which are manifestations of state terrorism'. It was also opposed using the fight against terrorism as an excuse for military aggression.

– The Chinese Ministry of Foreign Affairs started showing diplomatic reaction to terrorist incidents in the world, decrying the aggression and expressing concern about the victims.

It should be noted that in the early 1990s, the Chinese government was alarmed by the situation in the neighboring countries of Central Asia: the political processes in the former Soviet republics, serious problems in the socio-economic sphere in these countries, and ideological issues in the post-Soviet space. Almost every Central Asian country faced a serious problem of the rise of politicization of Islam, which became a main messenger of the spread of religious extremism and terrorism in the region (Vozzhenikov, 2007). Thus, at this period, China had an internal motivation to participate in the fight against terrorist activity, caused by the increase in ethnic separatism in the country. In general, the contribution of China to international cooperation against terrorism was very limited, so this period can be described in terms of selective approach towards the problem of counter-terrorism.

3. The active period of counter-terrorism (1996 until the present)

American scholars Medeiros and Fravel concluded that in the 1980s China was 'quite suspicious towards multilateralism' believing that the West would use this approach to 'suppress or limit China'. However, after the 1990s, China's attitude changed, and it began to realize that international organizations could 'promote trade and protect its security interests'.

In the mid-1990s, China became an active participant in international relations. Then the Chinese leaders (previously only a representative of the Ministry of Foreign Affairs) began to express condolences to the victims of terrorist acts in the world and called for the strengthening of international counter-terrorism operations. In 1996, the People's Daily newspaper for the first time published the Chinese Prime Minister's (Li Peng) condolences in connection with terrorist attacks in Israel. International involvement in counter-terrorism struggle has made it possible to more effectively combat the terrorist threat within the country.

At that time, China's position on terrorism was as follows:

1. Faced with the destructive manifestations of terrorism within the country, China strongly opposes all forms of terrorism. 2. China complies with international conventions against terrorism and strictly follows the relevant provisions of the UN Security Council. 3. Calls for the fight against terrorism to be conducted on an ongoing basis avoiding double standards. 4. Stands for recognition and support of the UN as the leading organization coordinating the fight against terrorism at the international level.

For the period 1963-2010, the UN adopted 12 conventions regulating the legal efforts against terrorism, China signed 11 conventions; in 2006, China signed the UN Global Counter-Terrorism Strategy, which indicates China complied with the international legal norms.

Nowadays China plays one of the leading roles in the UN in the development of international cooperation in the fight against terrorism.

On September 25, 2019, at the UN Security Council meeting, the Chinese Foreign Minister Wang Yi made a speech outlining the priority problems of countering terrorism and extremism; according to the Chinese side the following issues deserve primary consideration and resolution:

1. To unify approaches to addressing the problems of terrorism. In this aspect, it is especially important to prevent double standards in relation to terrorists, to suppress situations of selective counteraction to terrorism and the use of terrorists to pursue geopolitical goals, and not to associate terrorism with specific countries, nations and religions.
2. To focus efforts on combatting cyber terrorism; this has already become an effective tool for terrorists using the media and the Internet as an information platform for dissemination of extremist ideology and incitement to terrorist acts.

3. To eliminate the root causes of terrorism, as well as the sources of its 'fuel', destroy the prerequisites for the further spread of terrorism, abandoning the argument of the inevitability of a 'clash of civilizations'. In this case, it is necessary to emphasize sustainable development as a fundamental solution to the problem of terrorism.
4. To strengthen interstate cooperation under the auspices of the UN, while each of the member states should make efforts to solve the global problem of terrorism. Move towards centralizing the role of the UN and the UN Security Council in coordinating cooperation at the national, regional and global levels and actively implement the UN global counter-terrorism strategy and relevant UN Security Council resolutions (Song and Wang, 2019).

On February 12, 2016, after the International Syria Support Group meeting in Munich, the Chinese Foreign Minister Wang Yi said in an interview with Reuters that 'China is opposed to terrorism in all its forms, supports international cooperation in the fight against terrorism and promotes international counter-terrorism cooperation under the auspices of the UN'. At the same time, Wang Yi articulated China's position on participation in the anti-terror coalition against the forces of international terrorism: 'In China's diplomacy practice, it has become a tradition not to join any military coalitions, but this does not mean that we are not involved in resolving international anti-terrorism issues. In fact, China has its own ways of participating in international anti-terrorism cooperation'. (Official website of the Ministry of Foreign Affairs, 2016)

This refers to the provision of humanitarian assistance and participation in international peacekeeping. In April 1990, China for the first time sent 5 military observers to the UN Truce Supervision Organization; it was an introduction to China's participation in UN peacekeeping. For 26 years, China sent more than 30 thousand people / times to participate in UN peacekeeping operations with military units, police and civil servants. In particular, 19 Chinese troops died in peacekeeping operations.

In terms of the number of peacekeepers deployed, the top 10 countries includes only one permanent member of the UN Security Council – China, it takes the 9th place (3045 people: 2839 military personnel, 169 police officers, and 37 military experts) (for comparison: Russia – 80 people, the US – 80 people, the UK –290 people , France – 934 people).

The volume of China's contributions to peacekeeping is gradually increasing; it is associated with the growth of GDP per capita, the status of the country in the UN, and the readiness to maintain peace. In recent years, China has reached 10.29% (period: July 2016 - June 2017), i.e. every tenth dollar in the peacekeeping fund is 'Chinese' (China, 2016).

The issue of the Chinese troops' participation in peace enforcement operations remains open. The presence of special units of the Chinese military in Syria has not received official confirmation from the Chinese authorities, although according to the front-line news agency 'ANNA-News', citing its own sources, in 2017 the military forces of the Chinese People's Liberation Army in Syria can reach up to 5 thousand people. They are soldiers from the special forces of the 'Dongbei tigers' and 'Night tigers', aimed at participating in the fight against terrorist and extremist organizations, including terrorists of the East Turkestan Islamic Movement (ETIM). The number of terrorists of the ETIM is about 2.5 thousand people, according to the Syrian intelligence services; they operate as part of other terrorist groups in one of the suburbs of the Syrian capital in Eastern Ghouta (Mukhin, 2017).

Conclusion

For China international cooperation has already become a prerequisite for ensuring national security and protecting its economic interests abroad. Obviously, the fight against terrorists outside their territory, preventing the penetration of terrorist forces deep into the country, is the most preferred way for the development of counter-terrorism strategy for any country. In this regard, China esteems international anti-terrorism cooperation in its various forms as an effective way to counter terrorism. China sees the UN as an organization consolidating the fight against terrorism, but in the future is

determined to develop such anti-terrorism strategy that would avoid intensifying the conflict in a region located in a proximity to China.

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Innovation in Digital Sector and Competition Law: Challenges and Solutions

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Abstract

Innovation is vital to competition, consumer welfare and long-term economic growth. It has great societal benefits which should be promoted and protected. It is understood that innovation consists of several fundamental elements: creativity, risk-taking, value-addition, adoption, and destruction. Combing these elements allows for powerful new technologies to develop and change the way people travel, work and interact. Given this, a question arises as to whether and how competition law can protect and foster innovation in the digital sector. The aim of this article is to identify the challenges posed by innovation to competition law by demonstrating the difficulties of applying competition law to digital markets. The article also seeks to determine the role competition policy plays in ensuring innovation especially in securing access to competitively important data or preventing mergers that eliminate future rivals. Finally, the article suggests how the identified problems can be accurately solved and what has so far been achieved in this respect.

Keywords: Innovation, Digital Sector, Competition Law.

Introduction

This paper looks at the role competition law should play in protecting and fostering innovation in digital sector. As known, innovation is fundamental to competition, consumer welfare and long-term economic growth. It provides considerable societal benefits which should be promoted and protected. It is understood that innovation consists of several fundamental elements: creativity, risk-taking, value-addition, adoption, and destruction. Combing these elements allows for powerful new technologies to develop and change the way people travel, work and interact.

The aim of this article is to point out the challenges posed by innovation to competition law by demonstrating the difficulties of applying competition law to digital markets. The article also seeks to determine the role competition policy plays in ensuring innovation especially in securing access to competitively important data or preventing mergers that eliminate future rivals. Finally, the article suggests how the identified problems can be solved.

The Concept of Innovation

There have been numerous attempts to define innovation. One of them considers innovation to be 'risky, creative endeavours that add value, stand some chance of widespread adoption, and advance the creative destruction that gives vigour to economic life' (Bethell, Baird, Waksman, 2019, p. 8). Innovation processes can be regarded as the search for development and the creation of new knowledge which is so far unknown (Kerber, 2017, p. 9). These processes are largely creative and highly unpredictable and allow for new problem solutions to be tried out (Kline, Rosenberg,1986). Therefore innovation processes are more like those of experimentation, in which the eventual solution is the result of a step-by-step process whose results cannot be foreseen beforehand (Kerber, 2017). An essential characteristic of innovation is uncertainty (Schilling, 2015) and although it is right to expect technology improvements, it cannot be predicted exactly if, when, and how innovation will occur (Costa-Cabral, 2017, p.13).

The challenges posed by innovation to competition law

In general terms it is claimed that the main challenge faced by competition law in promoting innovation refers to striking the right balance between forcefully contesting anticompetitive conduct that restricts competitors freedom to innovate and ensuring innovative products or services offered by the undertaking will not be deemed in breach with competition regulations. For this reason competition authorities should be ready to enforce competition law by reacting to anticompetitive behaviour. This, however, should not be at the cost of impairing innovation. As the Court of Justice pointed out in *Post Danmark* case: 'competition on the merits may, by definition, lead to the departure from the market or the marginalisation of competitors that are less efficient and so less attractive to consumers from the point of view of, among other things, price, choice, quality or innovation.'(Judgment of the Court of Justice of 27 March 2012, *Post Danmark*, C-209/10, EU:C:2012:172, para. 22). It is therefore for the competition authority to remain vigilant and notice whether the market elimination is due to competitors' ineffectiveness or anticompetitive forclosure'. This is not an easy task.

Commentators and scholars indicate three major areas related to innovation which are of great issue to competition law. These areas include: (1) restrictions on access to data; (2) foreclosure of downstream rivals by digital platform owners; and (3) so-called 'killer acquisitions' that eliminate potential future competitors.

Restrictions on access to data

Digital platforms can be defined as 'technology-enabled tools, which facilitate exchanges between multiple groups – for example end users and producers – who do not necessarily know each other' (Geradin, 2018, p. 2). Some instances of such platforms are Google, Twitter or Facebook. Data gathered by undertakings in digital sector can be regarded as a valuable asset. It allows for a better targeting of advertisements, more personalized services and products (Forrester, 2018, p. 8). It is believed that the undertaking possessing the largest database, controls the competition on relevant market because of the sole fact of having access to databases. It is submitted that competition law needs to ensure access to databases to market rivals. Restricting the access to data can stifle innovation by depriving competitors of an indispensable input (Bethell, Baird, Waksman, 2019, p. 12). The challenge for competition law with regard to access to data concerns the degree of regulatory intervention in this respect. On one hand competition law should promote data sharing, but on the other hand this must not take place at the cost of privacy and incentives to innovate (Forrester, 2018, p. 8). A data sharing obligation enforced by a competition authority is therefore not a solution, however, competition law must not remain passive when restrictions on access to data distort competition.

Foreclosure of downstream rivals

Anticompetitive practices pursued by digital platforms have been of great concern to competition law in the past years. Foreclosure of downstream competitors by digital platforms has attracted a great deal of commentary on the directions competition policy should take in digital markets (Geradin, 2018, pp. 2-3). The concern for competition law here is that dominant digital platforms use their rule-setting power to determine the outcome of competition on the relevant market. The rules set up on a marketplace by a dominant platform can discriminate against other businesses causing foreclosure of downstream rivals (Crémer, de Montjoye, Schweitzer, 2019, p. 62). Concerns have been raised with regard to competition law being able to deal effectively with the above foreclosure problems. It is argued that competition proceedings are lengthy and do not concentrate on the facts of particular cases with suitable attention. Moreover the standard of proof which has to be met by competition authority is very often too high to enforce competition law. It is also claimed that once foreclosure is determined, there are no suitable remedies that could restore competition on the market in a swift way. Moreover, the lack of legal protection can deter innovating companies from offering new or enhanced products on the market (Bethell, Baird, Waksman, 2019, p. 13).

Killer Acquisitions

Another challenge to competition law is that digital platforms eliminate or "kill" future competition by buying up small, start-up companies or by widening their dominant position through the purchase of complementary services in neighbouring markets. As a result, rivals of digital platforms are marginalised and barriers to entry become higher (Lécuyer, 2020, p. 1). Given the fact that digital platforms tend to acquire and integrate services that could otherwise have evolved into direct competitors, a question arises as to whether a bought up start-up company would have been better or worse off, had it not been acquired by a digital platform (Bethell, Baird, Waksman, 2019, p.17). So far no clear answer has been provided to the above question. It is said that when a start-up is purchased by the dominant undertaking, the former is going to negotiate a price for the takeover. This price except from compensating the start-up company for the profit it could have made by entering the market directly, could also be higher in accordance with the dominant undertaking's profit after the purchase (Bourreau, de Streel, 2020, p. 9). Regarding innovation after the acquisition, the concern is that the acquiring, dominant undertaking could decide to kill innovation of the overtaken start-up instead of developing it. This is especially the case when innovation is a close substitute to its products or services and the dominant undertaking has little incentive to develop it, because the incremental profit gains will be insignificant. For this reason, it can overtake the innovating start-up to "kill" potential competition and stifle innovation.

Solutions to the challenges posed by innovation to competition law

There are various viewpoints as to how the challenges posed by innovation to competition law can be tackled. The most obvious way of dealing with them is through legal reforms. It is submitted that these reforms should not take place without the participation and contribution form digital platforms themselves. Contribution by digital platforms could mainly result from their knowledge of both, the market and the products. This in turn could vastly impact the conversation about what digital platform operators could improve to foster innovation (Bethell, Baird, Waksman, 2019, p. 21).

With regard to restrictions on access to data, digital platforms such as Microsoft, Twitter, Facebook and Google have taken action to increase data portability through the Data Transfer Project. The project constitutes an attempt to create an open-source, service-to-service framework allowing individual users to easily move their data between online service providers. The Data Transfer Project participants believe that portability of data are crucial to ensuring innovation and facilitating the consumers to choose among services (Mitretodis, Euper, 2019). There are also initiatives undertaken at the EU level with regard to data access restrictions. The Commission has launched a Digital Single Market project within which it seeks to promote data sharing and sharing best practices (European Commission, 2019). Thanks to the dialogue with key stakeholders the Commission has proposed a new regulation aiming at freeing the flow of non-personal data across borders and increasing availability of data for regulatory control among other areas (European Commission, 2019). As pointed out in this year's communication from the Commission on data strategy, the EU can become a leading role model for a society empowered by data to make better decisions –in business and the public sector. To achieve this goal, the EU can build on a strong legal framework and its internal market with competitive companies of all sizes and varied industrial base (European Commission, 2020). In order to prevent or eliminate foreclosure of downstream rivals by digital platform owners it is suggested that a code of conduct for companies whose position means other markets depend on them be set up. This suggestion was made in the Furman Report according to which the principles and rules of the code would be prepared in close consultation with undertakings in digital markets (Digital Competition Expert Panel, 2019). There are two vital aspects of the above solution. First, providing precise guidance could improve legal certainty for all digital sector operators. This is especially the case with practices that are unclear or even regarded as legal (Digital Competition Expert Panel, 2019). Second quick enforcement of the competition rules and principles of the code would contribute to the fast impact on the market. In this regard the competition authorities could make more reliance on remedies such as commitment decisions or interim measures.

With reference to killer acquisitions which eliminate innovation it is submitted that it is necessary to update merger analysis. In this respect agencies and industry participants should cooperate to make sure that authorities have the necessary tools and knowledge to assess mergers in digital markets. The code of conduct could determine a new practice of requesting detailed information about the transaction which could include testimonies of the acquiring undertaking (Bethell, Baird, Waksman, 2019, p. 26), but also provide information about the rationale behind the deal. This could in turn shed more light on the impact the merger will have on the digital market in question and help to assess the probability of the start-up growing into a serious future competitor in the digital market operator.

Conclusion

To sum up, competition law plays an important role in protecting and fostering innovation in the digital sector. Reforms are indispensable given a number of serious problems posed by innovation to competition law. It can be argued that these reforms should not necessarily take form of far-reaching changes in legal duties and standards of proof but rather they happen through cooperation between digital sector participants, competition authorities and policy-makers. Particularly new initiatives are necessary to be undertaken at both, national and EU level. Providing clear guidelines in the form of a code of conduct for digital platforms, engaging by the competition authorities in a more detailed merger analysis enabled by closer cooperation with digital operators as well as promoting data sharing can all make a difference and ensure innovation in the digital sector.

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Forward-Looking Disclosures in Integrated Reporting of Polish Companies

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Abstract

Aim/Purpose – The purpose of the paper is to identify and evaluate forward-looking disclosures in integrated reports published by Polish companies. The article uses the results of literature studies on the subject, the results of previous research, and observations of business practice in the area of integrated reporting. **Design/methodology/approach** – The quantitative and qualitative content analysis of forward-looking disclosures in integrated reporting was performed in order to assess the current status of integrated reports prepared by Polish companies. The analysis covered 33 integrated reports prepared by 20 corporate groups in 2016 and 2017. **Findings –** The results of the research have shown the level of forward-looking disclosures in the examined integrated reports. In addition, the findings proved that most of the items of future disclosures has the nature of qualitative narrations regarding strategy, information on growth opportunities, industry or market risk, environmental risk, while less attention was paid to investment projects, product research and development plans and financial risk. **Research Implications/Limitations –** The findings of the research may provide the basis for proposing the use of a balanced scorecard (BSC) as a tool for the development and presentation of forward-looking dis-closures. **Originality/value/contribution** – The research is aimed at presenting a critical interpretative perspective. The results of the study complement the research gap of current literature on integrated reporting and for-ward-looking disclosures in Polish practice. The research presented in the article contributes to current literature on integrated reporting and future disclosures.

Keywords: Integrated Report, Financial Reporting, Non-Financial Reporting, Forward-Looking Disclosures.

Introduction

The integrated report has undoubtedly become the world's basic form of reporting of non-financial information. However, both the results of practice and literature research indicate a number of problems related to preparing and disclosure of non-financial information. In particular, problems related to lack of compliance of integrated reporting (IR) structure with requirements presented by the International Integrated Reporting Council (IIRC), the absence of external audits of reports, a high degree of similarity with corporate social responsibility (CSR) reports and high convergence with Global Reporting Initiative (GRI), apart from the IIRC principles and lack of forward-looking disclosures are being emphasized. The research emphasizes the board's reluctance to present forward-looking disclosures due to the number of facts:

- accountability towards investors regarding unrealized results;
- fear of lawsuits;
- disclosure of the intentions of the competition;
- failure in obtaining the assumed rates of return.

Therefore, the question may be asked whether the integrated report fulfils its role since it does not add value in comparison to the previously published reports.

In general, the information published in the integrated reports can be divided into two main groups: backward-looking information (retrospective information) and forward-looking (prospective information). Retrospective information refers to past financial results and related disclosures. On the other hand, disclosure of forward-looking information (prospective) refers to current plans and future forecasts that provide information about future perspectives of the company. It should be emphasized that the latter – forward-looking in-formation disclosures – constitute a particular important element of the integrated report content.

As emphasized in the literature on the subject forward-looking disclosures are very important and would be beneficial for all stakeholders, including future forecasts regarding both financial (i.e. future, investment expenditure, income targets, cash flow forecasts and next year's sales) and non-financial items (i.e. risk and uncertainty) (Bravo, 2016).

It should also be emphasized that future orientation is described as one of the key guiding principles of the Integrated Reporting Framework developed by IIRC. Moreover, the Outlook is an important element of the eight content elements described in the IR Frame-work, because it contains forward-looking disclosures and forecasts of the organization's future financial and non-financial performance.

An analysis of voluntary forward-looking disclosures in integrated reporting appears to be necessary to determine whether the integrated report is actually fulfilling its role and facilitating economic decision-making for stakeholders.

The purpose of the paper is to identify and evaluate forward-looking disclosures in integrated reports published by Polish companies. A quantitative and qualitative analysis of forward-looking disclosures was made and a balanced scorecard (BSC) was proposed as a useful tool in the preparation and presentation of such disclosures. The article is based on the results of literature studies, results of previous research, as well as observations of business practice in the area of integrated reporting. The research presented in the article con-tributes to the current literature on integrated reporting and future disclosures in Polish practice.

Forward-looking disclosures as part of IR content

Integrated reporting is the latest approach to organization reporting, the main goal of which is to present a more holistic image of the organization by integrating economic, social and environmental issues in a single report, instead of focusing only on traditional financial statements[i].

The IIRC Framework, published in December 2013, defines IR as “a concise communication about how an organization’s strategy, governance, performance and prospects, in the context of its external environment, lead to the creation of value over the short, medium and long term" (IIRC, 2013, p.7). The presented definition of integrated reporting emphasizes its multidimensional character and the transition from the concept of value for a shareholder to the coherence and connecting the company strategy, corporate governance, business activities and performance as well as forecasts for the future. The IR is a periodic report on the value creation history that provides a measure “to assess the plausibility of what has been reported concerning the present-to-future period [and] in analyzing current capabilities and the quality of management” (IIRC, 2013, p. 17).

It is emphasized that integrated reporting represents the latest stage of development in a long series of initiatives and reporting practices implemented by organizations, including traditional annual reports, as well as sustainable development reports and corporate responsibility reports (Stubbs and Higgins, 2014).

The integrated report is also aimed at presenting the relationship between financial and non-financial performance measures and how these mutual relations create or "destroy" value for shareholders and other stakeholders (Eccles and Armbrester, 2011).

The International <IR> Framework published by IIRC in 2013, the concepts statements (or the framework structure)[ii] of integrated reporting stress that the objective of integrated reporting is a more coherent and effective approach to corporate reporting and to improving the quality of information available to financial capital providers to allow a more efficient allocation of capital.

The integrated report should be useful for all stakeholders interested in the organization's ability to create value, and should present the effects of integrated thinking about the organization. The integrated report's aim is to show the way in which the organization uses its broadly understood capital to create value (IIRC, 2013, p. 4, p. 11-12). The framework structure developed by the IIRC defines six types of capital, namely financial, manufacturing, natural, intellectual, human and, social. The main objective of the integrated report is to increase accountability in relation to these capitals and to provide an understanding of the interrelationships and tradeoffs between them.

In contrast to traditional reporting, integrated reporting is focused on the future and aims to confirm the interrelationships between financial and non-financial performance stimulants (Stubbs and Higgins, 2014). Berg and Jensen (2012) state that through integrated reporting future performance indicators of the organization can be shown. As fundamental concepts of integrated reporting, various resources (capitals) that the organization uses in its activities and value creating processes, i.e. the business model used by the organization are indicated (IIRC 2013, p. 10)

Continuing, the IIRC framework includes eight elements of content including organizational overview and external environment, governance, business model, risks and opportunities, strategy and resource allocation, performance, outlook and basis of preparation and presentation. This requires the company to disclose its future projections, which include future goals, the way these goals will be achieved, and what are the challenges and obstacles in achieving these goals.

The structure of the integrated report proposed in the conceptual assumptions contains seven elements: content elements, organizational overview and external environment, governance, business model, risks and opportunities, strategy and resource allocation, performance, and outlook (IIRC 2013, p. 24.). The conceptual framework published by IIRC also shows the guiding principles (seven basic principles for the preparation of an integrated report), which form the basis for the preparation of the integrated report.

Strategic focus and future orientation is one of the key guiding principles (which form the basis for the preparation of the integrated report). The integrated report should provide insight into the organization's strategy and how it relates to the ability to create value in the short, medium and long-term, as well as its application and impact on capitals (resources).

An integrated report explains how an organization creates value over time. Value is not created only by or within the organization. The created value is influenced by the external environment, and is created through relations with stakeholders and depends on various resources.

The framework structure emphasizes that an integrated report should answer the question: "what challenges and uncertainties is the organization likely to encounter in pursuing its strategy, and what are the potential implications for its business model and future performance?" (IIRC, 2013, p. 28). It is also important to provide information on anticipated changes over time, based on reliable and transparent analysis, concerning the organization's expectations about the external environment that the organization is likely to face in the short, medium and long term, and how the organization is currently prepared to respond to critical challenges and uncertainties that may arise.

Among the other guidelines in the conceptual framework, the following guiding principles were indicated (IIRC, 2013, p.16):

- connectivity of information;
- stakeholder relationships;
- materiality;
- conciseness;
- reliability and completeness;
- consistency and comparability.

Future disclosures are therefore one of the foundations of integrated reporting[iii]. In the literature on the subject, many authors present arguments regarding the advantages of forward-looking information disclosure. First, disclosing forward-looking information mitigates information asymmetry, which arises when some entities possess private information about the firm that is not available to investors and other stakeholders. Further, forward-looking disclosures relative to future operations, plans, strategies and financial targets are useful in estimating expected cash flows and the future value of companies. As backward-looking information is insufficient for investors to forecast possible opportunities and risks, forward-looking information plays a crucial role in their investment decisions (Kılıç and Kuzey 2018; Bravo 2016; Celik et al. 2006). The presentation of forward-looking disclosures in integrated reporting also carries some risks, primarily regarding disclosure of sensitive information to competitors.

On the other hand, entities may hesitate to disclose company specific risks and future perspectives due to concerns about the possible negative impact of such information disclosures on their competitive position (Uyar and Kilic, 2012). It is also important that the future situation is described by uncertain estimates, burdened with risk. The potential inaccuracy of future forecasts reduces incentives for managers to disclose quantitative and forward-looking information due to fear of potential litigation costs (Healy and Palepu, 2001, Oliveira, Rodrigues and Craig, 2011).

To sum up, forward-looking disclosures are a very sensitive area in integrated reporting for both those who draw up integrated reports and also for all interested stakeholders. Risk projections may pose a threat and claims (bringing legal actions) for unrealized returns. In turn, the lack of such information puts into question the future of integrated reporting.

Empirical research on forward-looking disclosures in integrated reporting

Academic research on future-oriented disclosures focus on the relationship between forward-looking disclosures and the volatility of stock returns. For example, Bravo (2016) examined whether forward-looking disclosures and corporate reputation lead to a reduction in stock return volatility. This study measures forward-looking disclosures concerning financial information by analyzing the content of annual reports for a sample of US companies. The results indicate that the forward-looking information disclosed by higher reputation companies has a greater impact on stock return volatility.

Celik, Ecer and Karabacak (2006) investigated the determinants of forward-looking in-formation disclosed by the Turkish companies listed on Istanbul Stock Exchange. The results of these surveys have shown that the total disclosure of forward looking information is positively related with the size and foreign offers, and negatively related with the variables of ownership structure, profitability, the level of foreign investment and the proportion of institutional investors. The study also indicated that the ownership structure and financial performance are determining factors affecting the disclosure of financial forward looking information.

Several other researchers have examined the relationship between corporate governance mechanisms and the level of future disclosures (O'Sullivan, Percy and Stewart, 2008; Wang and Hussainey, 2013).

The results obtained indicate that increasing the effectiveness of corporate governance mechanisms does not improve forward-looking disclosures, which was in line with expectations.

Kiliç and Kuzey (2018), found that most entities tend to provide rather qualitative forward-looking disclosures rather than quantitative ones. What's more, the results showed that gender diversity and company size are positively related to forward-looking disclosures, while financial leverage is negatively related to prospective information disclosures (forward-looking). Contrary to expectations, the authors did not find a significant impact on the future disclosures by the size of the board, structure of the management board, profitability ratio or the industry-type activity.

It should be emphasized that there is a small number of studies on the scope of future disclosures in the integrated reports, while many studies have examined the reporting practices of early IR users[iv].

Research Methodology

The aim of the study was the quantitative and qualitative assessment of future-oriented disclosures in the practice of integrated reporting of Polish companies. Starting from 2013, the number of companies publishing integrated reports has been gradually increasing, and the quality of published reports has also changed. Due to the fact that the objective of the study is to assess the current status, the integrated reports prepared by 20 capital groups in the years 2016-2017 were subject to analysis. Some of the surveyed units prepared their integrated report both in traditional form and in an interactive form, some only in traditional or only interactive form. The research process included the following stages:

- identification of Polish companies preparing integrated reports;
- quantitative and qualitative assessment of future disclosures in integrated reports.

In order to conduct the research, the following research questions were formulated:

1. whether there is a separate part in the integrated reports in the form of outlook?
2. what elements of forward-looking disclosures are most often shown in reports?
3. how the quality of individual elements of forward-looking disclosures is shaped?

For this purpose, the authors defined a list of elements being subject to both quantitative and qualitative assessment. The study evaluated the following areas of future disclosures:

1. marketing;
2. finance;
3. intellectual capital;
4. social responsibility;
5. environmental protection.

The first of these areas (marketing) assesses whether the document presents information on the following issues:

- growth opportunities;
- industry or market risks;
- sales target;
- advertising and publicity plan(s);
- planned products research and development;
- expected market share.

In the area of finances, it was analyzed whether the report contains such information as:

- investment projects;
- capital expenditure plan(s);
- financial risks;
- earnings targets;
- share price;
- expected profitability;
- expected cash flows;
- expected EBITDA.

The next aspect assessed was the disclosure in the field of intellectual capital. In this area, the disclosures about intellectual capital development plans, the elimination of various forms of discrimination, health and safety at work as well as disclosures about the risks associated with human capital were analyzed.

The fourth assessed area concerned the analysis of forward-looking disclosures in the field of social responsibility. In the area of CSR, the presence of such elements as future CSR assumptions and business ethics standards were analyzed in the reports.

The last assessed area concerned environmental protection disclosures referring to the identification of ecological risk and planned pro-ecological activities. In addition, the form of publication of forward-looking disclosures has been quantified. In case of a quantitative assessment, the presence or absence of each proposed variable was assessed. Result 0 was given in the absence of a particular element, while score 1 was assigned if the element was included in the report.

In order to assess the quality of future disclosures, a 6-point Likert scale was adopted, where 5 is the highest rating, and 0 means that the element is absent in the content of the report. The detailed scoring system is as follows:

0 - element not present in the content
1 - element present, but poor description
2 - element present; description based on some quantitative information
3 - element present; balanced description of contents; average quantity of information
4 - element present; good and detailed description
5 - element included in the content, excellent description.

The research sample included 33 integrated reports, prepared by 20 corporate groups, published in 2016-2017. The number of reports in individual years is presented in Table 1.

Table 1: List of reports included in the study

Item	Company	2016	2017
	WIG20		
1	KGHM	+	+
2	LOTOS	+	+
3	LPP		+
4	MBANK		+
5	ORANGEPL	+	+
6	PGE	+	+
7	PGNiG		+
8	PKNORLEN	+	+
9	TAURONPE	+	+

	WIG30		
10	GRUPAAZOTY	+	+
11	INGBSK	+	+
12	PKPCARGO		+
	mWIG40		
13	BOGDANKA	+	+
14	BUDIMEX	+	+
	sWIG80		
15	Śnieżka	+	
	WIG-BUDOW		
16	ERBUD	+	+
	Pozostałe		
17	ANG	+	+
18	GAZ-SYSTEM	+	+
19	Pelion	+	
20	PSE		+
	Total	**15**	**18**

+ Integrated Report
Source: Authors' elaboration.

Research Findings and Discussion

The quantitative and qualitative assessment of forward-looking disclosures in integrated reporting comprised few steps. In the first stage of the analysis, the entire sample of 33 re-ports was assessed in order to obtain a general level of advancement in relation to forward-looking disclosures (tables 2-3). The results of the analysis indicated that the majority of reports do not have a separate outlook part in the structure, only eight reports presented the outlook as an individual chapter. Preparing the forward-looking disclosures, companies use their own individual approach, most often presenting that information as part of the strategy, in the form of description without providing specific data and deadlines. Table 2 presents the level of variables characterizing the examined integrated reports i in the overall sample (20 firms, 33 firm-year observations for year 2016 and 2017). All analyzed reports indicate industry or market risks and future CSR assumptions, health and safety at work are indicated in 88% of reports, and risk related to human capital as well as ecological risk in 85% re-ports. The financial information do not include any data on the forecasted share prices and forecasted cash flows, and to a small extent (only 27%) provide information on dividend policy. In the remaining areas, it can be observed that the majority of reports indicate plans regarding the development of intellectual capital (76%) as well as planned pro-environmental (70%) external activities. A small number of reports (21%) indicate advertising and promotional plans and plans of prevention against various forms of discrimination.

Table 2: Presence of variables characterizing forward-looking disclosures in integrated re-ports in the overall sample

Item		NO	%	YES	%	Total	%
	Variables						
1	Growth opportunities	5	15%	28	85%	33	100%
2	Industry or market risks	-	0%	33	100%	33	100%
3	Sales target	11	33%	22	67%	33	100%
4	Advertising and publicity plan(s)	26	79%	7	21%	33	100%
5	Planned products research and	12	36%	21	64%	33	100%

	development						
6	Expected market share	11	33%	22	67%	33	100%
7	Investment projects	8	24%	25	76%	33	100%
8	Capital expenditure plan(s)	16	48%	17	52%	33	100%
9	Financial risks	7	21%	26	79%	33	100%
10	Earnings targets	24	73%	9	27%	33	100%
11	Share price	33	100%	0	0%	33	100%
12	Expected profitability	19	58%	14	42%	33	100%
13	Expected cash flows	33	100%	0	0%	33	100%
14	Expected EBITDA	18	55%	15	45%	33	100%
15	Intellectual capital development	8	24%	25	76%	33	100%
16	Elimination of various forms of discrimination	26	79%	7	21%	33	100%
17	Health and safety at work	4	12%	29	88%	33	100%
18	Intellectual capital risk	5	15%	28	85%	33	100%
19	Social commitment	18	55%	15	45%	33	100%
20	Future CSR guidelines	-	0%	33	100%	33	100%
21	Standards of business ethics	9	27%	24	73%	33	100%
22	Environmental risks	5	15%	28	85%	33	100%
23	Planned pro-ecological activities	10	30%	23	70%	33	100%
24	Goals and tasks in various areas of activity	-	0%	33	100%	33	100%
25	Outlook as a separate part of IR	25	76%	8	24%	33	100%

Source: Authors' elaboration.

Elements of forward-looking disclosures occurring in the analyzed integrated reports were subsequently assessed in terms of quality (Table 3) in accordance with the proposed scoring system. In the qualitative analysis of the assessed variables, the results may be more subjective than in the quantitative assessment due to the wider scale of scoring.

Table 3: Qualitative assessment* of variables characterizing reports forward-looking disclosures in the overall sample

Variables	Frequencies						Mean	Median	Total
	0	1	2	3	4	5			
Growth opportunities	21%	24%	18%	12%	24%	0%	**1,94**	**2**	33
Industry or market risks	0%	12%	30%	45%	12%	0%	**2,58**	**3**	33
Sales target	39%	15%	30%	12%	3%	0%	**1,24**	**1**	33
Advertising and publicity plan(s)	79%	18%	3%	0%	0%	0%	**0,24**	**0**	33
Planned products research and development	39%	27%	15%	15%	3%	0%	**1,15**	**1**	33
Expected market share	36%	36%	18%	3%	6%	0%	**1,06**	**1**	33
Investment projects	24%	27%	18%	18%	12%	0%	**1,67**	**1**	33
Capital expenditure plan(s)	52%	9%	24%	6%	9%	0%	**1,12**	**0**	33
Financial risks	21%	33%	24%	15%	6%	0%	**1,52**	**1**	33
Earnings targets	73%	15%	12%	0%	0%	0%	**0,39**	**0**	33
Share price	100%	0%	0%	0%	0%	0%	**0,00**	**0**	33
Expected profitability	58%	27%	15%	0%	0%	0%	**0,58**	**0**	33
Expected cash flows	100%	0%	0%	0%	0%	0%	**0,00**	**0**	33

Expected EBITDA	55%	9%	24%	6%	6%	0%	**1,00**	**0**	33
Intellectual capital development	24%	39%	30%	6%	0%	0%	**1,18**	**1**	33
Elimination of various forms of discrimination	79%	18%	3%	0%	0%	0%	**0,24**	**0**	33
Health and safety at work	15%	39%	30%	15%	0%	0%	**1,45**	**1**	33
Intellectual capital risk	15%	45%	30%	9%	0%	0%	**1,33**	**1**	33
Social commitment	55%	30%	12%	3%	0%	0%	**0,64**	**0**	33
Future CSR guidelines	0%	6%	39%	42%	12%	0%	**2,61**	**3**	33
Standards of business ethics	27%	33%	27%	12%	0%	0%	**1,24**	**1**	33
Environmental risks	15%	39%	33%	12%	0%	0%	**1,42**	**1**	33
Planned pro-ecological activities	30%	21%	42%	6%	0%	0%	**1,24**	**1**	33

** 0 - element not present in the content*
1 - element present, but poor description
2 - element present; description based on some quantitative information
3 - element present; balanced description of contents; average quantity of information
4 - element present; good and detailed description
5 - element included in the content, excellent description
Source: Authors' elaboration.

The qualitative assessment shows significant differentiation – only 2 out of 23 items reach the average score higher or equal to 2. The industry and market risks and future CSR assumptions are described in the most detailed and comprehensive way, while advertising and promotional plans are presented in the smallest scope (average rating 0.24), as well as the planned level of dividends (average grade 0.39) (Table 3). These results suggest that the content of future disclosures in integrated reports still needs to be refined, especially regarding financial information.

In the next section of the study, the presence of variables in years 2016 and 2017 was analyzed (table 4). The comparison of the presence of individual variables of forward-looking disclosures over time is difficult due to the different number of published reports, which is why the survey is of an illustrative nature and the relative values expressed by the structure ratios have been compared.

Table 4. The presence of variables characterizing forward-looking disclosures in years 2016 and 2017

	2016 15 reports		**2017 18 reports**	
Variables	Quantity	%	Quantity	%
Growth opportunities	13	87%	15	83%
Industry or market risks	15	100%	18	100%
Sales target	11	73%	11	61%
Advertising and publicity plan(s)	4	27%	3	17%
Planned products research and development	9	60%	12	67%
Expected market share	10	67%	12	67%
Investment projects	12	80%	13	72%
Capital expenditure plan(s)	8	53%	9	50%
Financial risks	13	87%	13	72%
Earnings targets	4	27%	5	28%
Share price	0	-	0	-
Expected profitability	7	47%	7	39%
Expected cash flows	0	-	0	-
Expected EBITDA	8	53%	7	39%
Intellectual capital development	12	80%	13	72%

Elimination of various forms of discrimination	1	7%	6	33%
Health and safety at work	13	87%	16	89%
Intellectual capital risk	12	80%	16	89%
Social commitment	7	47%	8	44%
Future CSR guidelines	15	100%	18	100%
Standards of business ethics	12	80%	12	67%
Environmental risks	13	87%	15	83%
Planned pro-ecological activities	11	73%	12	67%
Goals and tasks in various areas of activity	15	100%	18	100%
Outlook as a separate part of IR	3	20%	5	28%

Source: Authors' elaboration.

The presence of variables characterizing forward-looking disclosures in two analyzed years does not show a significant variation, which indicates the stabilization of the forward-looking disclosures in practice, although this does not mean that the level of disclosures is satisfactory. The growing interest in integrated reports did not translate into a significant increase in the number of reports published by Polish companies in 2017 compared to 2016.

The average scoring of forward-looking disclosures in integrated reports (table 5) indicate that the results for most items (except for the elimination of various forms of discrimination) are at a similar level in 2016 and 2017. Deviations in the level of average scores of the analyzed variables in the majority do not exceed 10%. A significant improvement occurred in the case of such items as capital expenditure plans, planned dividend level, health and safety at work and planned pro-ecological activities.

Table 5: Average scores on the single items characterizing forward-looking disclosures in years 2016 and 2017

Item	Variables	2016	2017	2017/2016 %
1	Growth opportunities	1,93	1,94	101%
2	Industry or market risks	2,47	2,67	108%
3	Sales target	1,47	1,06	72%
4	Advertising and publicity plan(s)	0,33	0,17	50%
5	Planned products research and development	1,27	1,06	83%
6	Expected market share	1,07	1,06	99%
7	Investment projects	1,73	1,61	93%
8	Capital expenditure plan(s)	0,93	1,28	137%
9	Financial risks	1,53	1,50	98%
10	Earnings targets	0,33	0,44	133%
11	Share price	0,00	0,00	-
12	Expected profitability	0,60	0,56	93%
13	Expected cash flows	0,00	0,00	-
14	Expected EBITDA	1,20	0,83	69%
15	Intellectual capital development	1,27	1,11	88%
16	Elimination of various forms of discrimination	0,13	0,33	250%
17	Health and safety at work	1,27	1,61	127%
18	Intellectual capital risk	1,27	1,39	110%
19	Social commitment	0,60	0,67	111%

20	Future CSR guidelines	2,53	2,67	105%
21	Standards of business ethics	1,33	1,17	88%
22	Environmental risks	1,40	1,44	103%
23	Planned pro-ecological activities	1,13	1,33	118%
24	Goals and tasks in various areas of activity	2,40	2,61	109%

Source: Authors' elaboration.

In the light of the research findings, it can be concluded that the quality of forward-looking disclosures is not satisfactory. The companies only briefly present prospective in-formation. Many reports show the lack of reference to achieving the goals of previous periods, in spite of that this is one of the main goals of the IR. Considering the expectations of stakeholders, that information seems to be crucial when making strategic investment decisions. Therefore, the question is whether IR fulfills its role in accordance with the IIRC, or whether it requires the use of other management tools to fulfill its role.

The authors' proposal is to use balanced scorecard to present forward-looking disclosures. BSC as a commonly adopted performance management framework, in the practice of integrated reporting could also be applied to the presentation of forward-looking disclosures and to assess the goals achievement scope. Many researcher have addressed the use of various management accounting tools in integrated reporting such as: value chain analysis, BSC, life cycle analysis. A special role was attributed to a balanced scorecard due to the wide dissemination in practice as well as the integration of various areas being the subject of IR. In authors' opinion, similarly to German-speaking countries, the presentation of the entity's intentions in the form of BSC would enrich the content of the integrated report and meet the expectations of stakeholders. It should be emphasized that the BSC would include both the organization's future goals, as well as measures and methods of implementation. The use of BSC would enable a more clear presentation of future plans. In addition, the adoption of a unified solution would make it easier to check and evaluate the implementation of objectives in subsequent reports and provide important information in accordance with IIRC requirements. At the same time, organizations should refer to the implementation of these goals in subsequent reports, which would make future disclosure more transparent and read-able.

Conclusions

The results of the research have shown that the level of forward-looking information disclosures very significantly in the examined integrated reports. In addition, the author's findings proved that most of the items of forward-looking disclosures had the nature of qualitative narrations regarding strategy, information on growth opportunities, industry or market risk, environmental risk, while less attention was paid to investment projects, product research and development and financial risk. The results also showed that the majority of reports (70%) present a significant amount of quantitative disclosures on environmental issues, such as forecasts of greenhouse gas emissions, reduction of consumption of various energy sources or the use of recycling. Most of the integrated reports do not include forecasted financial information forecasted, e.g. expected cash flows, and opportunities for growth in quantitative terms. The companies also avoided disclosing quantitative and qualitative information about the expected share price. Summing up, according to the authors, the forward-looking disclosures are the weakest element of the companies' integrated reports, which undoubtedly requires improvement so that the integrated report would fulfill its role and would significantly differ from the existing ones. This is a difficult issue to deal with, and companies are reluctant to these disclosures. The limited scope of forward-looking disclosures in integrated reports may be due to the fear that the information is potentially significant to competitors and not revealing it is the source of competitive advantage for the organization. Negative forecasts also raise concerns about the potential reaction of financial markets and stakeholders.

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[i] See: Dragu and Tudor-Tiron (2013); Eccles, Krzus and Tapscott (2010); Saltzman (2011); Climate Change and Sustaina-bility (2011); Frias-Aceituno, Rodríguez-Ariza and García-Sanchez (2013); Krasodomska (2012); Maroun and Solomon (2012); Michalczuk and Mikulska (2014); Rensburg and Botha (2014); Samelak (2013); Stubbs and Higgins (2014); Świderska and Bek-Gaik (2016); Walińska (2015); Bek-Gaik (2015); Bek-Gaik and Rymkiewicz (2015); Bek-Gaik and Rymkiewicz (2016).

[ii] It should be noted that we encounter various translations of The International <IR> Framework in the literature on the subject - for example, such terms as: framework structure, concepts statements, conceptual framework are used.

[iii] It should be emphasized that forward-looking disclosures are related to the signaling theory. The signaling theory suggests that managers reveal a significant level of information in company reports to send specific signals to potential users of these reports.

[iv] See Chersan (2015); Eccles, Krzus and Ribot (2015); Frías-Aceituno, Rodríguez-Ariza and García-Sánchez (2013a); Frías-Aceituno, Rodríguez-Ariza and García-Sánchez (2013b); Garstecki (2015a); Garstecki (2015b); Veltri and Silvestri (2015); Bek-Gaik and Rymkiewicz (2015); Bek-Gaik and Rymkiewicz (2016).

Mediating and Moderating Effects of Job Satisfaction, Organizational Commitment on the Relationship Between Human Resource Management Practices and Organizational Performance in Abu Dhabi Agriculture and Food Safety Authority

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Abstract

The objectives of this paper are to investigate the mediating and moderating effects of job satisfaction and organizational commitment on the relationship between HRM practices and organizational performance in Abu Dhabi agriculture and food safety authority. Cross-sectional survey research design has been used and a structured self-administered survey questionnaire was used to collect from the respondents in Abu Dhabi agriculture and food safety authority. Different statistical measures such as descriptive statistics, Partial Least Square (PLS) were used to explore research observations and statistical verification of findings. Apart from these statistical measures, a single mediation moderating models has been tested to know the mediating and moderating effect of job satisfaction and organizational commitment on the relationship between HRM practices and organizational performance, empirical findings revealed the indirect effect of human resource management practices through organisational commitment on organisation performance are significant with the exception of career planning and performance management practice which are not significant. The human resource management with most significant indirect effect on organisational performance through organisation commitment is selection and procurement, followed by job security, then followed by empowerment, then followed by incentive and rewards, and finally by training and development, the research does not found significant mediation of organisational commitment between career planning and performance management as indicated and respectively. Thus, organisational commitment mediates the relationship between human resource management practices (selection and recruitment, job security, empowerment, incentive and rewards, and training and development) and organisational performance significantly. Job satisfaction significantly moderates the influence of empowerment, job security and incentives and rewards on organisational performance but does not significantly moderate the influence of incentives and rewards, training and development, selection and recruitment, and career planning on organisational performance.

Keywords: Human Resource Management, Job Satisfaction, Organizational Commitment, Organizational Performance.

Introduction

Every organization whether in the public sector or private sector aspires to achieve its goals, objectives, or set targets efficiently and effectively. For these to be achieved, the organization has to focus on best practices in various human resource management practices including recruitment/selection, planning,

reward management, training and development, and quality working life among others. Dhar, Masruki, Mutalib, Rahouma, Sobhani, and Absar, (2018) there is little understanding of mechanisms through which HRM influences performance. Proper management of human resource is critical which can be achieved by proper understanding of the mechanisms through which HRM influences performance.

It may be argued that while there is a growing body of theory and empirical research demonstrating relationships between HRM policies, collective employee attributes, and firm outcomes, additional studies in this area are needed (Jawaad, Amir, Bashir, and Hasan, 2019). Furthermore, although it was accepted that HRM is positively related to organizational performance, there is a great need for additional evidence to support the HRM-performance relationship from different contexts (Stoermer, Hitotsuyanagi-Hansel, and Froese, 2019).

Most Organizations is suffering a lot of bureaucratic departments, that believe in the centrality of the decision and the lack of delegation of authority to subordinates, leads to delays in the completion of the business and to the large number of steps or stages in which the completion of transactions and approvals relating to work and who might have negative consequences at all levels (Aktar and Pangil, 2018). Despite the increase in the perceived necessity of change and attempts at implementing organizational commitment initiatives, it has been estimated that at least two-third (2/3) of organizational commitment efforts do not result in their intended aims nor do they foster sustained change, employee resistance is the most often cited problem encountered by management when trying to implement commitment, yet for an organization to change, it is essential that the employees of that organization are committed to their responsibilities, therefore, employee cooperation with organizational commitment efforts is indisputably connected and related to either the ultimate success or failure of the organization (Kariuki and Kiambati, 2017).

Previous studies on the relationship between HRM practices and organizational performance has concentrated on a single HRM practice, with growing number of research it has been argued for instituting complementary bundles of HRM practices to enhance organizational performance. The problem addressed by the current study stems from observations and experiences developed by the researcher that indicate low interest by Abu Dhabi Agriculture and Food Safety Authority in connecting HRM role with the performance in the (Korff, Biemann and Voelpel, 2017).

In recent years, one of the most devastating problems encountered in Abu Dhabi Agriculture and Food Safety Authority is that employees are not satisfied with their job and the result is high turnover rate. Organizations that have a high level of organizational commitment are more active and efficient. Because the possibility of being late for work, leaving work, engaging in negative behaviors such as absenteeism of these individuals, are lower than those without strong loyalty. Those who adopt goals of organizations and make effort above and beyond to achieve these goals improve the competitiveness of organization. In addition, those who work with high organizational loyalty, express positive opinions to others about the organization, facilitate the organization to appeal qualified personnel (Saridakis, Lai, Muñoz Torres, and Gourlay, 2018).

Similarly, it was found out that there is lack of studies relating to the effects of job satisfaction and organizational commitment on the relationship between human resources management practices and organizational performance especially in Abu Dhabi agriculture and food safety authority, therefore, this research aimed to fill this gap.

Methodology

The methodological framework that was used in attaining the stated aims and objectives of the study is bases on positivist paradigm i.e quantitative research methodology. It shows how the research hypotheses postulated were empirically determined and examined through relevant methodological approaches adopted in the study (Mackey and Bryfonski, 2018). The research design, types and sources of data was examined along with the procedure employed in testing the hypotheses and accomplishing the study objectives. The methodology of this research paper focused on the study populations/sample frame and its characteristics, sampling technique chosen, and a description of the choice of data

collection instruments, questionnaire design, methods of data measurement, analysis and presentation were contained. The methodology employed was quantitative in nature and SPSS and Smart-PLS software were used to analyse data collected from the field.

Analysis and Results

Response Evaluation Criteria

The first research question and objective of this research are descriptive and therefore required descriptive analyses to determine the level. As such, an evaluation criterion is adapted from other studies in order to evaluate the various constructs of the research. A 5-point likert scale was used throughout the research with different constructs having similar or different scale descriptors. However, the difference in descriptors, the construct has uniform mean ranking scale. Accordingly, the ranks were numbered between level one (1) which was lowest level to level five (5), which was highest level. This research adapted the mean score decision interval based on the works of Kasim *et al.* (2013), Hassanain and Iftikhar (2015) and Abdullahi (2017) from which the following interval decisions were deduced. This is shown in table 1 below.

Table 1: Response evaluation criteria

S/N	Level		Mean Interval
1	Very low	Strongly Disagree	1.00-1.80
2	Low	Disagree	1.81-2.60
3	Moderate	Neutral	2.61-3.40
4	High	Agree	3.41-4.20
5	Very high	Strongly Agree	4.21-5.00

Table 1 contains the evaluation criteria used to evaluate the responses to the questionnaire questions. The research objectives require the establish the level of human resource management practices. Thus, a response of strongly disagree, disagree, neutral, agree and strongly agree implies very low, low, moderate, high and very high level respectively. Accordingly, the research constructs are evaluated descriptively using tables and mean ranking as presented in subsections below.

Evaluation of Measurement Models

PLS-SEM requires the measurement models to achieve certain quality criteria prior to assessing the structural model. These quality criteria involve the assessment of reliability of the measurement models through composite reliability, convergent validity and discriminant validity. The reliability assessment is carried out using composite reliability. The composite reliability measures the homogeneousness of a block using *Dillon-Goldstein's (or Joreskog's) rho* (Vinzi et al., 2010). The second step in measurement model's evaluation is assessing validity of the model. Two measures of validity are assessed - convergent validity and discriminant validity (Hair et al., 2014). Assessment of indicators' factor loadings and Average Variance Extracted (AVE) are used to establish convergent validity. The measures shows the measurements models capability of indicators' variance (Wong, 2016). Heterotrait-Monotrait (HTMT) criterion, Fornell and Larcker criterion and the outer models' cross loading are measures used in assessing discriminant validity of the measurement models. The subsection discusses these evaluations.

Reliability Assessment

Reliability refers to the degree to which a scale yields consistent and stable measures over time which applies to reflective items in the measurement model (Lowry & Gaskin, 2014). Reliability is defined as the measure of how the scale is free from random error and measures the degree to which measurement scale responses are consistent across constructs (Pallant, 2011; Creswell, 2014).

Although the most common measure of reliability is the Cronbach's alpha (Awang, 2012), composite reliability is preferable than the Cronbach's alpha when dealing with PLS-SEM (Joe F Hair, Sarstedt, et al., 2011; Memon & Rahman, 2013; Wong, 2016).

Composite reliability is required to be a minimum of 0.7 for measurement model to be reliable (Wong, 2013). However, composite reliability of 0.6 is also regarded as adequate to attain reliability particularly for freshly developed scales (Chin, 1998, Hair et al., 2011, Bagozzi & Yi, 1988). The reliability of the measurement models is presented in table 2 below.

Table 2: Measurement Models Reliability

Constructs	Cronbach's Alpha	rho_A	Composite Reliability
Career planning	0.969	0.970	**0.974**
Employee job satisfaction	0.975	0.976	**0.977**
Empowerment	0.936	0.937	**0.948**
Incentives and rewards	0.947	0.948	**0.958**
Job security	0.967	0.967	**0.974**
Organisational commitment	0.977	0.978	**0.979**
Organisation performance	0.975	0.976	**0.978**
Performance management	0.962	0.963	**0.967**
Selection and recruitment	0.887	0.886	**0.924**
Training and development	0.955	0.956	**0.964**

Table 2 shows the composite reliability of the measurement models. It shows that the composite reliability ranges from 0.924 to 0.979 above the recommended minimum of 0.7. The other measures of reliability Cronbach's alpha and rho_A – are equally above the recommended threshold of 0.7. This indicated that the measurement models are reliable.

Convergent Validity Assessment

Measurement models are required to explain the variance of the manifest items to achieve convergent validity. It is the assessment of how the measurement model is able to accurately predict or explain the variance of the manifest variables (Wong, 2016). Convergent validity is regarded as the extent to which a manifest variable is related with other manifest variables in the same underlying construct (Hair, Hult, Ringle, & Sarstedt, 2014). The explanation of the manifest variables' variance is assessed by evaluating the Average Variance Extracted (AVE) and items factor loadings and their significance level (Lowry & Gaskin, 2014; Memon & Rahman, 2013; Wong, 2016).

Factor loadings for manifest variables are required to be high on their own measurement model than on others. To achieve convergent validity the loadings is required to be a minimum of 0.7 (Hair et al., 2014). However, in exploratory research, factor loadings of 0.6 to 0.7 is considered acceptable (Hair, Ringle, & Sarstedt, 2011). Manifest variables with factor loadings lower than 0.4 are required to be removed from the measurement model. Items with lower loadings are equally recommended to be deleted from the measurement model to improve the Average Variance Extracted (AVE) (Hair et al., 2014). The factor loadings are required to be significant and are required to converge after few iterations less than the maximum 300 iterations (Wong, 2016).

AVE is the mean of the squared loadings of measurement model's manifest variable which represents the communality of the measurement model (Hair et al., 2014). AVE of the measurement models is recommended to be above 0.5 (J F Hair et al., 2014; Jeo F Hair et al., 2014; Joe F Hair, Ringle, et al., 2011; Lowry & Gaskin, 2014; V. E. Vinzi et al., 2010; Wong, 2016). This implies that at least 50

percent of the variance of the outer model should be explained by the manifest variables. The result shows that the factor loadings of the measurement model range from 0.735 to 0.945 which were all significant. Similarly, the Average Variance Extracted (AVE) were 0.823, 0.731, 0.722, 0.793, 0.883, 0.725, 0.784, 0.747, 0.753, 0.713 for CPL, EJP, EMP, IRW, JSC, OCM, OP, PMG, SER, and TDV respectively all above the recommended minimum of 0.5 (Jeo F Hair et al., 2014). Similarly, the measurement models converged after few iterations (Wong, 2013). Therefore, based on these assessments, the measurement models of the research achieved convergent validity.

Discriminant Validity

Discriminant validity measures the extent to which measurement models are distinct from other research constructs. It evaluates how a particular measurement model is unique from other models in the structural model (Memon & Rahman, 2013). Traditionally, discriminant validity is assessed through two criteria – The Fornell and Larker criterion and Cross-loading criterion. Recently, the use of Heterotrait-Monotrait (HTMT) criterion in assessing discriminant validity has gained both theoretical and empirical support (Henseler, Ringle, & Sarstedt, 2015).

Heterotrait-Monotrait ratio (HTMT) is the average of the heterotrait-heteromethod correlations (i.e., the correlations of indicators across constructs measuring different phenomena), relative to the average of the monotrait-heteromethod correlations (i.e., the correlations of indicators within the same construct) (Henseler et al., 2015). Discriminant validity is achieved between measurement models if the Heterotrait-monotrait (HTMT) ratio with other measurement is less than 0.85 or more liberally less than 0.9 (Henseler et al., 2015).

Fornell and Larcker (1981) criterion of assessing discriminant validity requires that the square root of the AVE of each measurement model should be greater than the correlation of the model with any other model in the structural model. Therefore, the square root of the AVE of each outer model should be higher than its correlation with any other construct (Jeo F Hair et al., 2014).

The cross-loading criterion is advocated by Chin (1998). The criteria require that items should load on their underlying constructs higher than their cross-loading on other constructs (Jeo F Hair et al., 2014; Wong, 2016). Thus, this research used all the three mentioned discriminant validity assessment criteria to establish the distinctiveness of each measurement model from one another as presented in tables 3, 4, and 5 respectively.

Table 3: Discriminant Validity using HTMT ratio criterion

	CPL	EJP	EMP	IRW	JSC	OCM	OP	PMG	SER
CPL									
EJP	0.736								
EMP	0.709	0.852							
IRW	0.778	0.742	0.729						
JSC	0.728	0.811	0.836	0.687					
OCM	0.750	0.845	0.732	0.798	0.826				
OP	0.750	0.824	0.798	0.734	0.806	0.840			
PMG	0.652	0.749	0.687	0.739	0.703	0.693	0.751		
SER	0.746	0.835	0.873	0.732	0.791	0.839	0.772	0.656	
TDV	0.644	0.791	0.782	0.705	0.706	0.764	0.807	0.666	0.785

The assessment of discriminant validity using HTMT ratio criterion is presented in table 3 above. The result shows that the highest HTMT ratio among the measurement models is 0.873 between EMP and SER followed by the 0.852 between EJP and EMP which are still below the recommended maximum liberal value of 0.9 (Henseler et al., 2015). The remaining HTMT values are all below the

recommended maximum conservative value of 0.85 (Henseler et al., 2015). Thus, based on this criterion, discriminant validity is achieved.

Table 4: Discriminant Validity using Fornell and Larcker Criterion

	CPL	EJP	EMP	IRW	JSC	OCM	OP	PMG	SER	TDV
CPL	***0.907***									
EJP	0.717	***0.855***								
EMP	0.679	0.816	***0.850***							
IRW	0.746	0.713	0.687	***0.890***						
JSC	0.706	0.788	0.795	0.658	***0.940***					
OCM	0.730	0.824	0.702	0.767	0.803	***0.852***				
OP	0.731	0.806	0.765	0.707	0.785	0.822	***0.886***			
PMG	0.632	0.727	0.653	0.706	0.680	0.672	0.729	***0.864***		
SER	0.693	0.779	0.799	0.675	0.735	0.785	0.721	0.609	***0.868***	
TDV	0.621	0.764	0.741	0.672	0.680	0.740	0.780	0.640	0.725	***0.904***

Table 4 above shows the Fornell and Larcker criterion of assessing discriminant validity. The square root Average Variance Extracted (AVE) is diagonally inserted into the table, bolded, italic and coloured. The values below the diagonal are the correlations among the measurement models. The result indicated that all the square root of AVE of each of the research measurement models are greater than their correlations with all the other measurement models. Thus, the discriminant validity of the research measurement models is also achieved using this criterion.

Evaluation of Structural Model

The second stage in PLS-SEM evaluation criteria is the evaluation of the structural (inner) model (J F Hair et al., 2014). The structural model establish the causal relationships between the measurement models in the structural model (Hair et al., 2014). The specified interrelationships are intended to answer the research questions and to test the research hypotheses. The major objective of structural model evaluation is to assess the model quality based on its ability to predict the endogenous constructs. The structural model is evaluated by assessing the path coefficients and their significance through bootstrapping procedure; the coefficients of determination (R^2) of the endogenous construct; the effect sizes of the exogenous measurement model through Cohen's f^2; the model's predictive relevant using cross-validated redundancy (Q^2); and the global goodness of fit of the model (*GoF*) (Goh, Ali, & Rasli, 2014; J F Hair et al., 2014; Joe F Hair, Ringle, et al., 2011; Lowry & Gaskin, 2014; Memon & Rahman, 2013; V. E. Vinzi et al., 2010; Wong, 2016).

The structural models are presented in figure 1 and figure 2 depicting the model's coefficients and t-statistics respectively below.

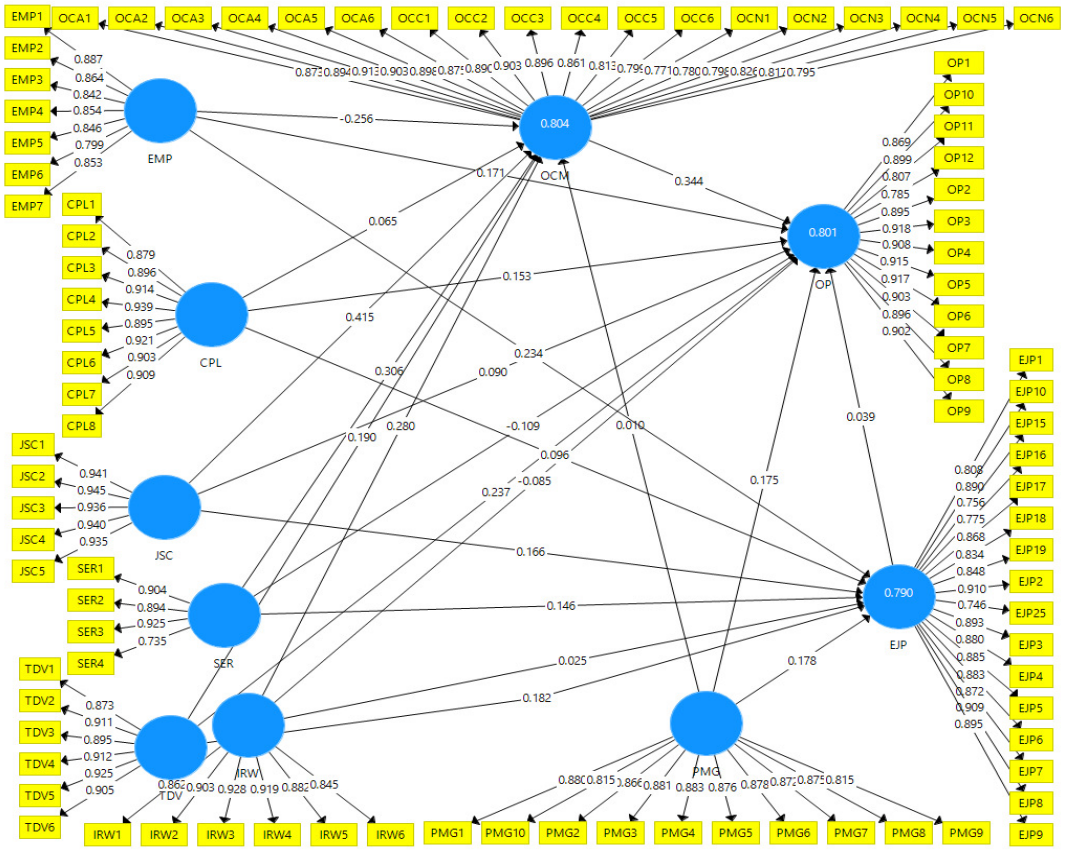

Figure 1: Structural Model without Moderation Effect

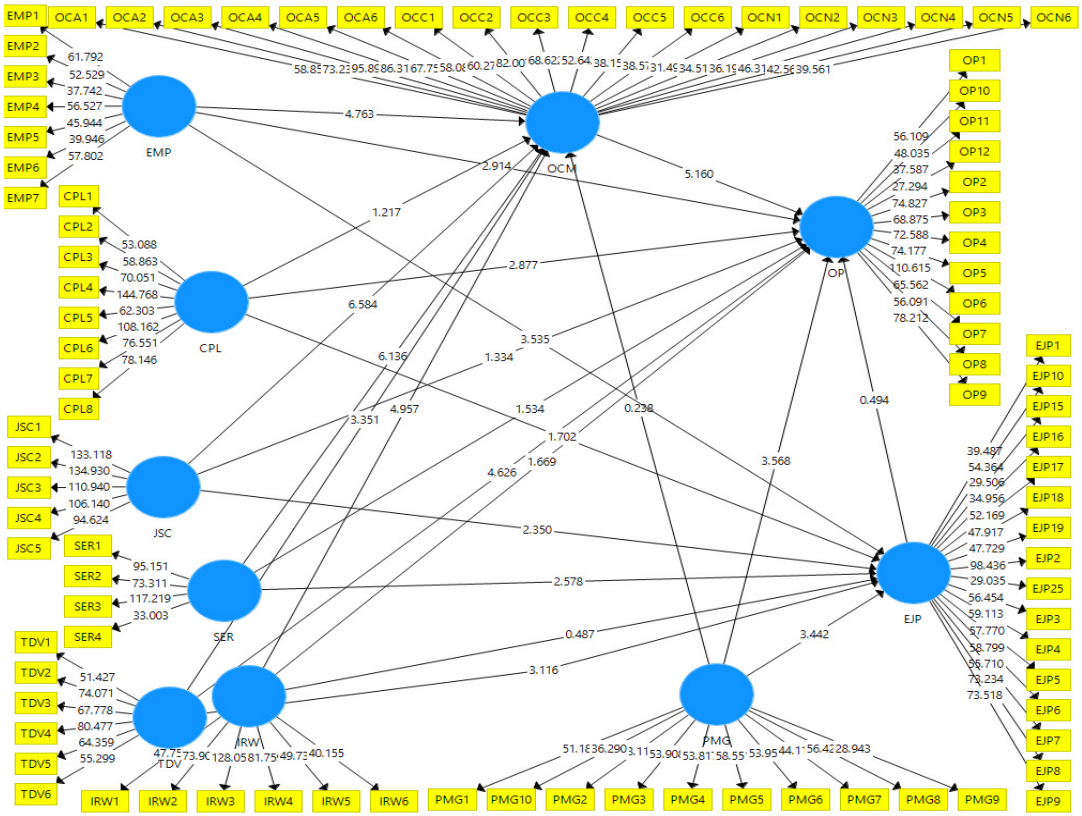

Figure 2: Structural Model without Moderation T-statistics

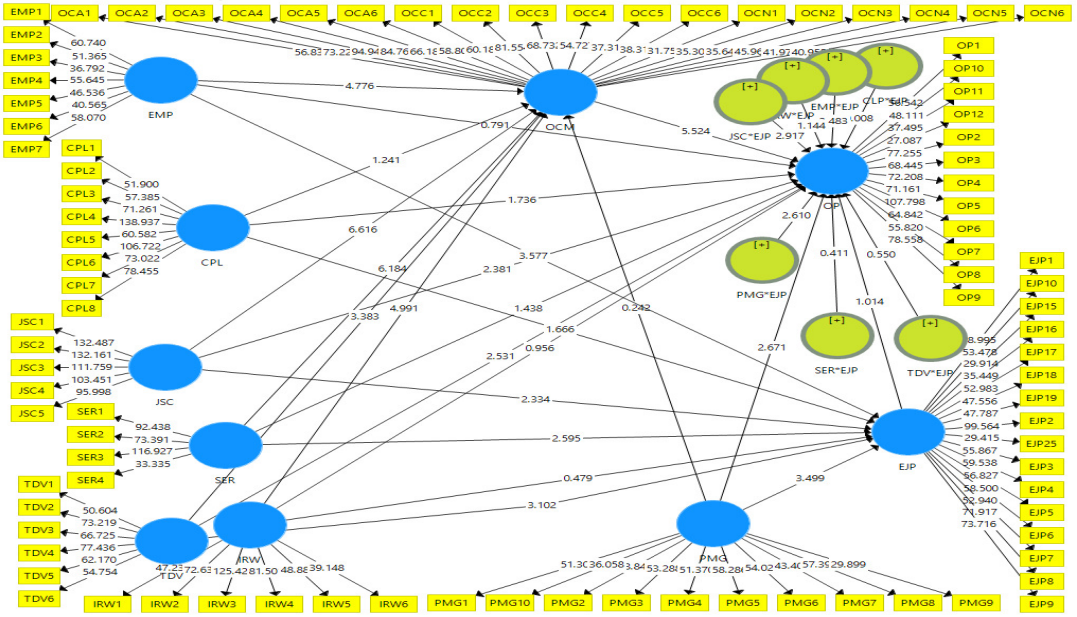

Figure 3: Structural Model with Moderation Effect

Figures 1, 2, and 3 were used to shows the structural models for the research. The first two figures show the models without moderation effect, while the last figure shows the structural model with the added moderation effect. The following subheading presents the result of the structural model and its quality fit.

Path Coefficients Assessment

One of the evaluation criteria for structural model quality is the examination of the path coefficients. The path coefficients represent the strength of a relationship which ranges from -1 to +1 with coefficients closer to +/-1 showing strong relationship (Hair et al., 2014). To ensure quality of the structural model, the path coefficients are required to have significant ones. This research's path coefficients are presented in table 5 below.

Paths	Coefficients	T Statistics	P Values
DIRECT EFFECTS			
CPL -> OP	0.114	1.736	0.083
EJP -> OP	0.083	1.014	0.310
EMP -> OP	0.054	0.791	0.429
IRW -> OP	-0.071	0.956	0.339
JSC -> OP	0.222	2.381	0.017
OCM -> OP	0.381	5.524	0.000
PMG -> OP	0.145	2.671	0.008
SER -> OP	-0.108	1.438	0.151
TDV -> OP	0.171	2.531	0.011
CPL -> OCM	0.065	1.241	0.215
EMP -> OCM	-0.256	4.776	0.000
IRW -> OCM	0.280	4.991	0.000
JSC -> OCM	0.415	6.616	0.000
PMG -> OCM	0.010	0.242	0.809
SER -> OCM	0.306	6.184	0.000
TDV -> OCM	0.190	3.383	0.001
CPL -> EJP	0.096	1.666	0.096
EMP -> EJP	0.234	3.577	0.000
IRW -> EJP	0.025	0.479	0.632
JSC -> EJP	0.166	2.334	0.020
PMG -> EJP	0.178	3.499	0.000
SER -> EJP	0.146	2.595	0.010
TDV -> EJP	0.182	3.102	0.002
SPECIFIC INDIRECT EFFECTS			
CPL -> EJP -> OP	0.008	0.758	0.449
EMP -> EJP -> OP	0.019	0.935	0.350
IRW -> EJP -> OP	0.002	0.336	0.737
JSC -> EJP -> OP	0.014	0.839	0.401
PMG -> EJP -> OP	0.015	0.960	0.337
SER -> EJP -> OP	0.012	0.880	0.379
TDV -> EJP -> OP	0.015	0.917	0.359
CPL -> OCM -> OP	0.025	1.153	0.249
EMP -> OCM -> OP	-0.098	3.834	0.000
IRW -> OCM -> OP	0.107	3.645	0.000
JSC -> OCM -> OP	0.158	4.204	0.000
PMG -> OCM -> OP	0.004	0.235	0.814
SER -> OCM -> OP	0.117	4.472	0.000
TDV -> OCM -> OP	0.072	2.807	0.005
MODERATION EFFECTS			

CLP*EJP -> OP	0.000	0.008	0.994
EMP*EJP -> OP	-0.231	3.483	0.001
IRW*EJP -> OP	0.073	1.144	0.253
JSC*EJP -> OP	0.213	2.917	0.004
PMG*EJP -> OP	-0.107	2.610	0.009
SER*EJP -> OP	0.025	0.411	0.681
TDV*EJP -> OP	0.033	0.550	0.582

The structural model of this research has direct effects, indirect effects and moderation effects. The result indicated that out of the 23 direct path, 14 were significant leaving only 9 insignificant paths. This shows that most of the paths are significant and therefore attest to the quality of the structural model. Similarly, the specific indirect path has 5 significant path all attributed to the mediator. The insignificant paths are mostly the indirect paths to the dependent construct through the moderator variable. Also, the moderation is 3 significant paths with for insignificant. Cumulatively, the significant paths in the structural model exceeds the insignificant paths; the structural model can be said to have good quality.

In the main endogenous construct, four paths coefficients were found to be significant while the remaining were not. Similarly, three out of the six paths leading to AEE were significant. However, none of the paths leading to PRU was found to be significant. Since the major endogenous construct has most of the paths leading to it as significant, the structural model can be said to be good based on the path coefficients.

R^2 Assessment

R^2, also called coefficient of determination, is the measure of how well the dependent construct is explained or predicted by the independent constructs. It measures the predictive accuracy of the inner model by explaining the percentage of constructs variance in the model (Hair et al., 2014; Memon & Rahman, 2013). Although there is no generally acceptable level of R^2 value, (J F Hair et al., 2014) provided a general rule of thumb for evaluating R^2 value. Accordingly, R^2 values of 0.25, 0.50 and 0.75 are considered weak, moderate and substantial respectively. The R^2 of the endogenous constructs of the research are presented in table 6 below.

Table 6: R^2 Assessment

Constructs	R Square
Employee job satisfaction	0.790
Organisational commitment	0.804
Organisational performance	0.801

Table 2.25 shows the R^2 level of the endogenous constructs. The shows that employee job satisfaction, organisational commitment and organisational/employee job performance have R^2 values of 0.790, 0.804, and 0.801 respectively. Based on the evaluation criteria, the R^2 values are within the substantial level. This based on R2 criterion, the model has good fit.

Effect Sizes (F^2) Assessment

Relative contributions of exogenous constructs to R^2 are evaluated by the means of effect size, denoted by f^2. Chin (1998) submitted that effect size displays the relative effect of certain exogenous constructs on endogenous construct(s) through estimating the changes in the R-squared values. The effect size of each construct in the structural model is determined using Cohen's f^2. The formula is based on eliminating a particular construct from the model to note the changes (Hair et al., 2014).

Effect Sizes: $f^2 = \frac{R^2 incl - R^2 excl}{1 - R^2 incl}$

Where:

f^2 = effect sizes
R^2 incl = R^2 inclusive (R^2 with a particular construct included in the model)
R^2 excl = R^2 excluded (R^2 with a particular construct excluded from the model)
1= Constant
Cohen (1988) provided an evaluation criterion based on a rule of thumb such that effect size is considered small, medium and large if the size is 0.02, 0.15, and 0.35 respectively. Based on this criterion, the effect sizes of the study constructs were evaluated as presented in table 7 below.

Table 7: Effect Sizes (F^2)

	EJP	OCM	OP
CPL	0.015	0.007	0.040
EJP			0.001
EMP	0.063	0.080	0.029
IRW	0.001	0.128	0.010
JSC	0.038	0.253	0.009
OCM			0.103
PMG	0.061	0.000	0.059
SER	0.029	0.137	0.015
TDV	0.057	0.066	0.093

Table 4.26 shows the effect sizes of the exogenous constructs on the endogenous constructs. It shows that on EJP, CPL and IRW have small effect sizes as indicated by values of 0.015 and 0.001 respectively. The remaining constructs have medium effect on EJP. Similarly, on OCM, CPL and PMG have weak effects, EMP, IRW, SER, and TDV have medium effect while JSC has large effect on OCM. Finally, EJP, IRW, JSC and SER have small effect sizes on OP while all the remaining constructs have medium effect sizes on the OP. Thus, most of the research exogenous constructs have medium effect sizes on their respective endogenous constructs.

Predictive Relevance (Q^2)

Predictive relevance is assessed using Stone-Geisser's (Q2) which verified that the data points of all indicators in the outer model of endogenous constructs are predicted accurately (Wong, 2016). This method uses cross-validated redundancy based on sample re-use technique which deletes part of the data matrix, estimates the model parameters and predicts the deleted part using the estimates (Hair et al., 2011; Hair et al., 2014) through blindfolding procedure.

Chin (1998) submitted that a model with a Q2 value greater than 0 have good predictive relevance. The predictive relevance of the structural model is assessed using cross-validated redundancy as presented in table 8 below.

Table 8: Predictive Relevance (Q^2)

	SSO	SSE	Q^2 (=1-SSE/SSO)
CPL	3,008.000	3,008.000	
EJP	6,016.000	2,806.789	0.533
EMP	2,632.000	2,632.000	
IRW	2,256.000	2,256.000	
JSC	1,880.000	1,880.000	

OCM	6,768.000	3,105.360	0.541
OP	4,512.000	1,878.953	0.584
PMG	3,760.000	3,760.000	
SER	1,504.000	1,504.000	
TDV	2,256.000	2,256.000	

The cross-validated redundancy of the structural model is presented in table 8 above. The result shows that all the endogenous constructs have Q^2 value above 0 indicating that the structural model of the research has the required predictive relevance.

Goodness-of-Fit (GoF)

Unlike the covariance-based SEM, there is no generally accepted goodness of fit measure for PLS-SEM (Henseler & Sarstedt, 2013; V. E. Vinzi et al., 2010). However, Tenenhaus et al. (2004) proposed a global criterion of goodness of fit called the "GoF" index. The index is the geometric mean of the average communality (AVE) index and the average of the coefficients of determination (R2). It can be determined using the formula below:

$$GoF = \sqrt{\overline{Com}\ X\ \overline{R2}}$$

According to Akter (2011), GoF is considered small, medium and large if the values are 0.1, 0.25 and 0.36 respectively. Thus, the goodness of fit of the structural model is calculated below.

$$GoF = \sqrt{0.7778\ X\ 0.7983}$$

$$GoF = \sqrt{0.6209}$$

$$GoF = 0.788$$

The result of the GoF index produced a value of 0.788 far above the 0.36 value considered large. Therefore, the research structural model is fitted well.

Mediating effects of organizational commitment on the relationship between human resource management practices and organizational performance in Abu Dhabi Agriculture & Food Safety Authority

The first research objective sought to find out the mediating effects of organizational commitment on the relationship between human resource management practices and organizational performance in Abu Dhabi Agriculture & Food Safety Authority. In the conceptual framework, organisational commitment is hypothesized to mediate the relationship between human resource management practices and organisational performance. The essence is to establish the extent of indirect effect of the mediating construct through the direct paths (J F Hair et al., 2014). The main objective of the mediation analysis is not just to expose any significant path coefficients but rather to identify the level of significance and the important indirect effects of the relationship. Various methods of assessing mediation analysis abound in literature. However, recent developments in PLS-SEM advocated the use of specific indirect effect to assess mediation effect (Memon *et al.*, 2018). This study therefore assessed the mediation effect using this method the result of which is presented in table 9 below.

Table 9: Mediation effect of organisational commitment

Paths	Coefficients	T Statistics	P Values	Remark
Specific Indirect Effects				
SER -> OCM -> OP	0.117	4.472	0.000	Supported
JSC -> OCM -> OP	0.158	4.204	0.000	Supported
EMP -> OCM -> OP	-0.098	3.834	0.000	Supported
IRW -> OCM -> OP	0.107	3.645	0.000	Supported
TDV -> OCM -> OP	0.072	2.807	0.005	Supported
CPL -> OCM -> OP	0.025	1.153	0.249	Not Supported
PMG -> OCM -> OP	0.004	0.235	0.814	Not Supported

Table 9 shows the indirect specific effects of organisational commitment. The result showed that the indirect effect of human resource management practices through organisational commitment on organisation performance are significant with the exception of career planning and performance management practice which are not significant. The human resource management with most significant indirect effect on organisational performance through organisation commitment is selection and procurement (β=0.117; t=4.472; p=0.000), followed by job security (β=0.158; t=4.204; p=0.000), then followed by empowerment (β=0.098; t=3.384; p=0.000), then followed by incentive and rewards (β=0.107; t=3.645; p=0.000), and finally by training and development (β=0.072; t=2.807; p=0.005).

However, the research does not found significant mediation of organisational commitment between career planning and performance management as indicated by (β=0.025; t=1.153; p=0.249) and (β=0.004; t=0.235; p=0.814) respectively. Thus, organisational commitment mediates the relationship between human resource management practices (selection and recruitment, job security, empowerment, incentive and rewards, and training and development) and organisational performance significantly.

Moderating effects of job satisfaction on the relationship between human resource management practices and organizational performance in Abu Dhabi Agriculture & Food Safety Authority

The second research objective sought to find out the moderating effects of job satisfaction on the relationship between human resource management practices and organizational performance in Abu Dhabi Agriculture & Food Safety Authority. PLS-SEM is very instrumental in achieving this objective because in addition to estimating linear relationships it also has the ability to incorporate moderator variable which influences the strength or even change the direction of relationship between the independent and the dependent construct in the structural model (Becker, Ringle, & Sarstedt, 2018; Wong, 2016). Moderation refer to the influence of an antecedent that alters that strengthens or alters the relationship between variables in structural model. Thus, a moderator "influences the nature (e.g., magnitude and/or direction) of the effect of an antecedent on an outcome" (Aguinis, Edwards, & Bradley, 2017). Moderation is "where a relationship between an independent variable and a dependent variable changes according to the value of a moderator variable" (Ali Memon et al., 2019).

A moderator variable can be either categorical or continuous depending on the theoretical conceptualisation of the research model (Ali Memon et al., 2019; Hasan, Mohd Saad, & Iteng, 2019; Kee & Rahman, 2017). For categorical moderator, Multi group analysis (MGA) is mostly conducted. For the continuous moderator, three measure methods product-indicator, two-stage, and orthoganalising approaches are used (Ali Memon et al., 2019). The use of either of the methods depends on the nature of the structural model. This research uses two stage methods to test the moderating effect of job satisfaction between human resource management practices and organisational performance. The two-stage approach involves calculating the latent construct scores and saved before subsequently building up the interaction term as element-wise product of the construct scores of the independent construct and the dependent construct. The interaction term is then used as a regresor on the latent

variable scores of the dependent (Ali Memon et al., 2019). The moderation test result is reported in table 10 below.

Table 10: Moderating effect

Paths	Coefficients	T Statistics	P Values	Remark
EMP*EJP -> OP	-0.231	3.483	0.001	Supported
JSC*EJP -> OP	0.213	2.917	0.004	Supported
PMG*EJP -> OP	-0.107	2.610	0.009	Supported
IRW*EJP -> OP	0.073	1.144	0.253	Not Supported
TDV*EJP -> OP	0.033	0.550	0.582	Not Supported
SER*EJP -> OP	0.025	0.411	0.681	Not Supported
CLP*EJP -> OP	0.000	0.008	0.994	Not Supported

The result of moderating effect of job satisfaction on the relationship between human resource practices and organisational performance is presented in table 10. The result found three significant moderating effect. The result found significant moderating effect of job performance on the relationship between empowerment and organisational performance (β=-0.231; t=3.483; p=0.001). Thus, job satisfaction significantly moderates the influence of empowerment on organisational performance.

Similarly, job satisfaction significantly moderates the relationship between job security and organisational performance (β=0.213; t=2.917; p=0.004). Also, the result shows that the relationship between performance management and organisational performance is significantly moderated by the presence of job satisfaction (β=-0.107; t=2.917; p=0.009).

However, job satisfaction does not moderate the influence of incentives and rewards, training and development, selection and recruitment, and career planning on organisational performance as indicated by coefficients values of 0.073, 0.033, 0.025, and 0.000, t-statistics of 1.144, 0.550, 0.411, and 0.008 as well as p-values of 0.253, 0.582, 0.681, and 0.994 respectively.

Thus, it can be concluded that job satisfaction significantly moderates the influence of empowerment, job security and incentives and rewards on organisational performance but does not significantly moderate the influence of incentives and rewards, training and development, selection and recruitment, and career planning on organisational performance.

Conclusions

The current study seeks to establish a mediating and moderating effects of job satisfaction and organizational commitment on the relationship between HRM practices and organizational performance in Abu Dhabi agriculture and food safety authority. All HRM practices are associated with one another. Training and development, discipline and compensation system were significant predictors of secondary school teachers' performance. Job satisfaction played as a mediator on the relation between HRM practice and operational performance. Training & development, discipline and compensation were related to teachers' performance effort through job satisfaction. The association between compensation and performance is spurious in absence of job satisfaction. Again, job satisfaction is not only predicted performance but also mediated the relationship between HR practices and operational performance. The findings revealed that, there is an indirect effect of human resource management practices through organisational commitment on organisation performance are significant with the exception of career planning and performance management practice which are not significant. The human resource management with most significant indirect effect on organisational performance through organisation commitment is selection and procurement, followed by job security, then followed by empowerment, then followed by incentive and rewards, and finally by training and development, the research does not found significant mediation of organisational commitment between career planning and performance management as indicated and respectively. Thus, organisational commitment mediates the relationship between human resource management practices (selection and recruitment, job security, empowerment, incentive and rewards, and training and development) and

organisational performance significantly. Job satisfaction significantly moderates the influence of empowerment, job security and incentives and rewards on organisational performance but does not significantly moderate the influence of incentives and rewards, training and development, selection and recruitment, and career planning on organisational performance.

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Health and Economic Growth in Sub-Saharan Africa[1]

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Abstract

Health status has been adjudged critical in enhancing the efficiency and productivity of human and capital resources, hence necessary for attaining and sustaining welfare and growth in the long-run. This study examines the role of health on economic growth in Sub-Saharan Africa for the period 1990-2015. It adopted the Solow growth model and estimated it using static panel estimation technique. The evidence from the empirical investigation shows that growth responds to the indicators of health (life expectancy and under-five mortality) negatively in the region. This indicates that the state of health in the region mitigates the growth potential which is directly suggestive that the weak healthcare policies and financing in the region has contributively enhanced the burden of diseases. The study recommends that SSA economies and policy makers in the region ensure more financial allocation and commitment to reducing the burden of preventable diseases in the region and strengthen institutions that are charged with implementation and monitoring of health intervention programmes and ensuring equitable access to healthcare.

Keywords*:* Health, Economic Growth, Panel Data Analysis, Sub-Saharan Africa

JEL Classification*:* I15, O47, C23, N37

Introduction

Health is pertinent to human capital which is one of the main inputs for economic growth and development. The World Health Organization (1946) defined health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". "Many factors combine together to affect the health of individuals and communities, whether people are healthy or not, is determined by their circumstances and environment. To a large extent, factors such as where we live, the state of our environment, genetics, our income and educational level, and our relationships with friends and family all have considerable impacts on health whereas the more commonly considered factors such as access and use of health care services often have less of an impact" (WHO, 2013).

According to WHO (2013) the determinants of health include: the social and economic environment, the physical environment, and the person's individual characteristics and behaviour. Health also plays an important role in economic growth, as the saying goes 'Health is Wealth'. Health is a determinant of human capital. According to Barro (1996) health is 'a capital productive asset and an engine of economic growth'. Also, human capital formulation which consists of health and education leads to the

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attainment of economic growth, this is similar to the assertion by Grossman (1972), Bloom and Canning (2000) who posits that individuals who are healthy in terms of assimilating knowledge are more efficient and as a result of this obtain higher productivity (see also Rico, Turrbiates and Hernandez, 2005).

In the past decades, global efforts have geared towards improving health outcomes in Africa; this is reflected in the Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs). Out of the Eight Millennium Development Goals (MDGs) adopted by 189 countries following the signing of the United Nations Millennium Declaration in 2000, MDG 4, 5 and 6 relate directly to health which are: to reduce child mortality by two-thirds between 1990-2015, improve maternal health by three-quarters between 1990 and 2015 and combat HIV/AIDS (HIV means Human Immunodeficiency Virus while AIDS means Acquired Immune Deficiency Syndrome), malaria and other diseases by 2015. According to World Development Indicator (2013) looking at the MDG 4 which is to reduce child mortality in developing countries the under-five mortality rate fell from an average of 95 per 1000 per live births in 1990 to 56 in 2011, but rates in Sub-Saharan Africa and south Asia remain much higher. The introduction of the SDGs is premised on this performance and expected all countries to reduce under-five mortality to at least at low as 25 per 1,000 live births in 2030.

Also most children die from causes that are readily preventable and curable with existing interventions, such as pneumonia (18%), diarrhoea (11%) and malaria (7%). Almost 70% of deaths of children under age 5 occur in the first year of life, and 60% of those in the first month. Preterm birth complications account for 14% of deaths, and complications during birth accounts for another 9% (UN Inter-Agency Group for Child Mortality Estimation, 2012; WDI, 2013). There is need to address the causes of neonatal and infant mortality such as inadequate ante-natal, pre-natal and after birth care, poor sanitation and malnutrition and high vulnerability rate to diseases. This becomes expedient as statistics has rightly showed that lower infant and child mortality rates are, in turn, the largest contributors to higher life expectancy in most countries (World Development Indicators, 2013).

Sub-Saharan Africa remains the centre of the HIV/AIDS epidemic, but the proportion of adults living with AIDS has begun to fall even as the survival rate of those with access to antiretroviral drugs has increased. By the year 2010, 6.5 million people worldwide were receiving antiretroviral drugs and this represented the largest one-year increase in coverage but still fell short of universal access (UN, 2012; World Bank, 2013; Ogundipe, Olurinola and Ogundipe, 2018). Jack and Lewis (2009) in a view to investigate the determinants of health itself, particularly the evidence on the impact of public expenditure point out that in general there appears "to be growing evidence that the public policies only improve health when institutions are of sufficiently high quality, and that good institutions themselves are likely to have a more important direct effect on growth than growth through health".

The role of institutions in healthcare has been adjudged important. The absence of sound institutions undermines health investments and leads to ambiguous evidence supporting the relationship between healthcare services and health status. Accepted indicators of healthcare performance such as hospital infection rates, utilization statistics, or surgery survival rates are rarely collected even when required, for lack of some combination of oversight, regulation, and enforcement. This applies in middle income countries as well as poorer ones. Indirect indicators of poor performance that are increasingly relied on in the absence of more direct measures include provider absenteeism, lack of basic medical supplies and drugs, poor management of purchases, leakage of funds, and under-the-table payments by patients, all of which highlight the nature of the performance lapses that undermine effective service delivery' (Lewis, 2006; Jack and Lewis, 2009). Institutions with regards to health play an important role in achieving growth, where institutions are generally weak or unable to function; public spending on health will not improve health, let alone impacting on growth. Therefore more attention should be paid to upgrading healthcare institutions.

Health has been seen to have effects on economic development as it improves productivity and human capital. Good health improves the ability and capacity to learn and work while chronic illness undermines current productivity and future output outcomes. According to Spring (2005) 'improvements in health have both level and growth effect on per capita income. Level effects from improved health results from increases in effective labour inputs. Improved health contributes to this

in two ways: first by increasing the supply of labour inputs due to less time missed due to disease. Secondly by the increase in the efficiency in labour inputs due to improvements in the quality of labour when individuals are healthier. Growth rate occurs because a lower incidence of disease increases (the private and social) rates of return to human capital investments, which in turn leads to higher rates of economic growth".

The study by Sorkin (1977); Rico et al., (2005) shows the various channels in developing nations through which economic development could be impacted through health. The gains from productivity through the improvement in the hours of work are the first way through which health could impact economic development. Also, the development of previously unsettled regions is made possible. Lastly, this could also be seen through the turnaround in people's attitude through the improvement made in innovation and entrepreneurship. Good health plays an important role in the attainment of economic development. Hence, there is need to establish and implement good health policies aim at improving the health stock if sustainable development is to be attained.

Overview of Health in Sub-Saharan Africa

Available statistics for Sub-Saharan Africa over time shows that between 1990 and 1999 the PPP GNI per capita growth was 17 percent ($1,087 to $1,278) and this increased to 58 percent ($1298 to $2060) between 2000 and 2009. The international development assistance flows to countries in this region to fight HIV and other sexually transmitted diseases increased by 35 percent from 2007 to 2009; there have also been a decrease in the average number of children per woman from 7 to 5 in 1980 and 2009 respectively (Africa Development Indicators Factoids, 2011). According to the Macroeconomics and Health Commission Report (2001) three million people died of AIDS in the year 2000 and about 2.4 million of these deaths were in Sub-Saharan Africa.

Taking cognisance of some facts about Sub-Saharan Africa relative to the world, Sub-Saharan Africa has the second highest malnutrition rate of 42 percent, South Asia is the highest with 47 percent malnutrition rate and the lowest is North America with 4 percent malnutrition rate. The Sub-Saharan Africa prevalence of HIV for people ages 15-49 is 5.4 percent relative to 0.8 percent for the World and this means that it is about 6.5 times the world prevalence. Child mortality rate has declined since 1990 by 33 percent and 28 percent in the world and Sub-Saharan Africa respectively (Ogundipe, Olurinola and Ogundipe 2016). Although the average life expectancy at birth is 52.5 years for Sub-Saharan Africa relative to 71.5 years and 69.2 years for North Africa and the World respectively, the increase has been more (5 percent) in SSA compared to the World (3 percent) between 2000 and 2009. The rate of improvement in access to safe water between 1990 and 2008 in Sub-Saharan Africa has increased by nearly 22 percent compared to the World's 13 percent. Also, during the same period there has been increase in the rate of improvement in access to sanitation in the region by 15 percent while the rate of improvement for the World is 16 percent (Africa Development Indicators Factoids, 2011).

Health is a necessary and sufficient asset in the promotion of an individual's wellbeing as it addresses the essential aspects of life and this can be seen in (WHO, 1946) definition of health as the complete physical, mental and social wellbeing and not only concerned about the presence and absence of diseases. The present state of health in Sub-Saharan Africa has been an issue that has drawn the interest of many researches, institutions and some countries as this not only affects Sub-Saharan countries but is a major global issue. This can also be seen in the UN's MDGs, where out of eight MDGs three were set aside to address the issue of health (reduce child mortality, improve maternal health and combat HIV/AIDS, malaria and other diseases by 2015).

Apart from the fact that health is a global concern, studies and reports have shown that majority of these health inefficiencies are found in this region. SSA region has been found to have the highest maternal mortality rates, according to WHO (2013) more than half of maternal deaths occur in Sub-Saharan Africa and a quarter in South Asia. This region has also been the centre of HIV/AIDS epidemic and characterized with high rate of child mortality. Child vaccination which is proven to safeguard children from been susceptible to these diseases have been stagnated, as the two highest mortality regions which are South Asia and Sub-Saharan Africa have stagnated over the last three years with less

than 80 percent coverage. The SSA region has also been attributed with the lowest response rate and this has contributed to the sluggish development pattern experienced in the region. The SSA economies need to address these health issues, especially by diverting funds and resources to check preventable diseases, if sustainable growth and development is to be actualised.

Review of Related Literature

Health and Economic Growth

The relationship between health and economic growth is one that has drawn the interest of various researchers, institutions and nations as health is an important human capital input and also a determinant of economic growth and development. A main feature of this relationship is the two way causation between health and the economy, as better heath promotes economic growth through an increase in productivity, as a healthy workforce is more efficient. Also economic growth can also encourage more accumulation of health capital (Barro, 2013). In examining some works focusing on the relationship between health and economic growth, there tend to be a general consensus on a positive relationship (see Baker, 1998; Weil, 2006; Canning, 2005; and Rico et al., 2005).

Despite the vast number of literature, obvious gaps persist. One of such is the challenges associated with measurement; most of the empirical studies on the impact of health on economic growth used life expectancy as a proxy variable for health. This choice has some limitations as it does not cover all dimensions of health, it only accounts for mortality while morbidity, disability and comfort are ignored and these are pertinent to the welfare and development of a nation. According to Rico et al. (2005) this becomes a problem despite the reliable link between health, productivity and economic growth. Also, the use of life expectancy negates a major assumption of the pioneering study by Grossman in 1972, whose model opined that human capital depreciates overtime. It thus implies that life expectancy takes into account the lifetime of the stock of human capital with less regards for the quality of the human capital stock. Also, the challenge of endogeneity that exist between health and income needs to be addressed. Luft (1978) and Rico et al. (2005) explained the endogeneity challenge as "a lot of people who otherwise wouldn't be poor are, simply because they are sick; however, few people who otherwise would be healthy are sick because they are poor". Hamondi and Sachs (1999) and Bloom et al. (2001) suggested the use instrumental variables technique to address the problem.

Health is a necessary factor for improvement in productivity as a healthier workforce is more efficient than a non-healthy one; education also promotes productivity as it improves an individual's ability to adapt to modern technology. These two are connected in the sense that they have the same end which is to increase productivity and efficiency which makes them very important focus points for any nation if a self-sustaining growth and development is to be achieved. Therefore, there is need for a simultaneous investment as a nation unilaterally cannot focus on health (education) and not considering education (health). Considering how health leads to income growth via human capital accumulation, Jack and Lewis (2009) identified two pathways; first, healthier and well nourished children are better learners and spend more time at school and this prepares them to earn higher incomes. Second, the human capital accumulation of children are affected by the health status of their parents as dead parents cannot invest in their children and even when these orphans receive support, they are often given less than if their parents where alive.

According to Research Analyst, DSAED (2010) economic development may lead to better health as wealthier countries have a greater chance and capability to invest in healthcare and public health measures. Alternatively, improvements in health can contribute to economic development through a number of path, channel or reasons such as: an increase in productivity, as better health improves or enhances workers productivity because days taken out of work due to illness are lesser and this brings about an increase in output. This can also be applied to a family setting where improved health of family members reduces the direct costs incurred as a result of the time lost to taking care of family members. Another channel is through reduced family size, as this reduces the number of dependants in the country leading to an increase in the workers to dependants' ratio, hence increasing the national savings. According to the Harrod-Domar growth model, this increased savings ought to improve

growth by providing more new investments, the increase in the level of investments is a channel by which health can contribute to economic development and this can be viewed via capital accumulation as healthier individuals tend to save more and increase growth. Also, a healthy environment attracts tourist and this contributes to the Gross Domestic Product (GDP). According to the World Travel and Tourism Council, Tourism's direct contribution to Gross Domestic Product (GDP) in 2012 worldwide was USD2.1 trillion. Well educated or healthier workforce also serves as an incentive for companies to invest.

As the saying goes "prevention is better than cure", reduction in the cost of illness can be seen as a channel as it has been observed that the cost of preventing an illness is lesser than the cost incurred in curing it. This enhances efficiency as it makes available capital for other productive uses in the future in which government can invest in. In all aspects, for any economic agent be it the individual, firm or government prevention is better than cure as it improves welfare and enhances efficiency. Increase in Human capital is another channel through which health could contribute to economic development as healthier children tend to profit more from schooling as they are less absent from school and also proper nutrition in the early stages of childhood enhances the mental ability.

More so, literature has established link between investing in a population's health and the inflow of foreign capital. Bell and Lewis (2004) suggest that the high risk of environments as a result of some communicable disease such as SARS (severe acute respiratory syndrome) reduces the inflow of foreign capital through tourism since it wards off investors and visitors (Jack and Lewis, 2009). Health also increases productivity and success in education as healthy children are able to learn better, have better education, are less absent due to illness and also earn higher as adults. Healthier workers are more energetic and robust in terms of physical and mental terms and this reduces the rate of absenteeism from work due to illness either of themselves or their families and this also makes them productive, earn higher wages and also attract foreign direct investment (Working Group 1 of the Commission on Macroeconomics and Health, 2002).

Healthy workers are more energetic in physical and mental terms and they are more productive and earn more wages because they are less likely to be absent from work due to illness while ill workers don't tend to earn more and this can be seen in most developing countries where hourly wages are being paid in manual labour and this consists a high proportion of the workforce compared to industrial countries (Bloom et al., 2004). Health can enhance workers productivity by increasing their physical capacities which include strength and endurance as well as their mental capacities such as cognitive functioning and reasoning ability (Bloom and Canning, 2005).

A positive relationship is expected between health and productivity for both skilled and unskilled workers as this can be seen at the microeconomic level in the works of (Schultz and Tansel, 1992; Strauss and Thomas, 1998; Savedoff and Schulttz, 2000). Bloom and Canning, (2005), Strauss and Thomas (1998) examine the empirical relationship between health and productivity and found a correlation between physical productivity and some health aspects such as nutrition. Bloom and Canning (2000) and Rico et al., (2005) explains how due to the higher level of physical energy and mental clarity, healthy population tend to be more productive. Health has been a key concern or issue in the world today and should not be overlooked as it is a great determinant for the welfare of nations. Various health institutions, preventive and treatment measures have been developed to address the health challenges in the world today but despite these level of development some nations, particularly developing nations, are still been affected by these challenges. The Sub-Saharan Africa region is not left out in this issue as relative to other regions of the world, evidence has shown that this region has shown low response.

The various health challenges faced by developing countries according to WHO; Todaro and Smith, (2011) include: Absolute poverty, Malnutrition, HIV/AIDS, Malaria, Tuberculosis, Acute lower respiratory infections, Hepatitis B, Ascariasis, Cholera, Dengue, Leprosy (Hansen disease), Dracunculiasis (guinea worm disease), Chagas disease, Leishmaniasis, Lymphatic and filariasis (elephantiasis). Curbing the prevalence of these illnesses cannot happen on its own therefore there is need for a collective effort by both the affected areas and other donors to eradicate this global challenge. It was calculated that if the donor countries were to contribute 0.1 percent of their GNP, that is, one

penny for every $10 of income and coupled with a good increase in the effort within the low income countries, about 8 million deaths per year could be prevented by the end of a decade (Working Group 1 of the Commission on Macroeconomics and Health, 2002). Especially, deaths arising from preventable diseases such as tuberculosis, malaria and HIV/AIDS can be reduced to the best minimum.

A number of studies that empirically established the link between health and growth abounds in the literature using various health indicators (such as life expectancy, adult survival rates and others) and methods.
Barro (1996, 2013) in his empirical work suggested that health status as measured by life expectancy or other similar macro indicators is a better predictor and an important contributor to later growth than initial education. This shows the significance of health in attaining future growth. Also, Barro (1997) also showed that life expectancy is significantly correlated to subsequent economic growth as 1 percent increase in life expectancy could raise economic growth by 0.4 percent yearly (Working Group 1 of the Commission on Macroeconomics and Health, 2002). Similarly, Weil (2001) using a calibration process measured the relationship between health proxy with adult survival rates and labour productivity across countries. His result showed that one percentage point increase in adult survival rates resulted into 1.68 percentage increase in labour productivity and that health differential which accounted for about 17 percent of the variation in output per worker across countries had roughly the same magnitude with respect to the differences accounted by physical capital (18 percent) and education (21 percent). This shows that health is a pertinent form of human capital and requires an equal attention as given to both physical capital and education in the development process (Bloom and Canning, 2005).

Similarly, Bloom and Canning (2005) using a model of conditional convergence in a panel study observed confidence interval of 1.2 to 4.3 percent and this concurred with Weil (2001) though the result is higher and it implies that health plays a larger role in explaining cross-country differences in the level of income per worker than education. Also, in reconciling the micro and macro evidence of health and economic growth they found out that the estimated macroeconomic effects of health are positive and not significantly different from the microeconomic estimates. Bloom *et al.,* (2001) estimated the effect of health on economic growth using a panel data for 1960-1990 and showed that health has a positive and statistically significant effect on economic growth as one year improvement in population's life expectancy contributes a 4 percent increase in output. This makes their result consistent with the theoretical argument and microeconomic evidence. Also, Rico *et al.,* (2005) conducted an empirical study of the impact of health capital on economic growth as it extended its definition to include the four determinants of health (health services, lifestyles, environment and socioeconomics) taking into account the impact of each of them and this is a unique contribution to previous studies. A panel data analysis for the years 1970-1980 and 1980-1990 was used and the result showed that health capital has a significant effect on economic growth and that health services was of greater significance than the rest of the determinants. Apart from the fact that the result concurred to the theoretical argument of health's relationship to growth, the definition of health was also broadened.

Weil (2006) looked at how human capital in the form of health varies among countries using three health indicators which are average height of adult men, the adult survival rate (ASR) for men and the age of menarche (onset of menstruation) for women. Using ASR for men as his standard estimate and a measure of health, he found out that eliminating health gaps among countries would reduce the variance of logged GDP per worker by 9.9 percent and he concluded that health is an important determinant of income variation and that the effect of health on income is economically significant.

Various studies have examined and explained the effect of illness as proxied by malaria on the economies in Africa countries. Gallup and Sachs (2001: 91); Acemoglu and Johnson (2009) argued that Africa's per capita growth rate could increase by as much as 2.6 percent a year if malaria is wiped out in Sub-Saharan Africa and this also explains the consequences that some morbidity issues such as diseases have on an economy and their level of growth. Between 1965 and 1990, an average per capita GDP growth of 0.4% per year and 2.3% per year were experienced by countries with high malaria transmission and other countries respectively and this suggests that malaria plays a significant role in preventing long term economic growth and development (Working Group 1 of the Commission on Macroeconomics and Health, 2002) and this explains one of the significant reasons for the disparities

in growth among countries. In the Abuja declaration of 2002 signed by 53 African heads of state it was noted that the growth in African countries have been slowed down by 1.3% per year as a result of malaria and this made the GDP for African countries to be 37% lower than it would have been if malaria were to be absent (Ashraf, Lester and Weil, 2009).

Some studies have also been done to examine the impact of HIV/AIDS in Africa. As found by studies carried out in Côte d'Ivoire and Rwanda, household consumption expenditures of families affected with AIDS have reduced due to health expenditures also, another study saw that although the population in Botswana may fall by 20%, the government expenditure in 2010 will be cut by 20% due to AIDS (UNAIDS, 2000; Commission on macroeconomics and health, 2002). Young (2005); Acemoglu and Johnson (2009) in evaluating the effect of the recent HIV/AIDS epidemic in Africa using micro estimates and calibration of the neoclassical growth model, notwithstanding the substantial disorder and painful experience caused by HIV/AIDS, a reduction in population as a result of this disease may increase per capita income. This can be attributed to the influence that population has on the per capita income.

Some other studies have looked at the impact of some illness on productivity and income. According to Luft (1999), in Indonesia anaemic men were found to be 20 percent less productive than men who were not anaemic and when these anaemic men were treated with iron, their productivity increased almost to those that were non-anaemic (Working Group 1 of the Commission on Macroeconomics and Health, 2002). Case and Wilson (2001) in examining the relationship between chronic conditions such as heart trouble, stroke, asthma and cancer and income in South Africa found a negative correlation (Working Group 1 of the Commission on Macroeconomics and Health, 2002).

Furthermore, several methodological approaches have been considered on the effect of health on economic growth, this include: Barro (1996) using data from three periods 1965-75, 1975-85 and 1985-95 estimated the effect of health on economic growth using the 3SLS (three stage least squares) using lagged values of some regressions as instruments, period random effects and life expectancy as the proxy for health and his result aligned with theoretical argument that health has a positive and statistically significant relationship with economic growth. Barro and Lee (1994) and Barro and Sala-I-martin (1995) using data from two periods 1965-75 and 1975-85, used the SUR (seemingly unrelated regression) estimator with country random effects and their result was consistent with theory and life expectancy was the proxy for health. Bharagava *et al.,* (2001b) used a 25year panel at 5 intervals covering 1965-90; he estimates the effect of health on economic growth using dynamic random effects estimation. The study used the Adult Survival Rate (ASR) as health variable and found a positive and significant relationship with growth. Bloom *et al.,* (2000) adopted the same data period and life expectancy as the health indicator, the study used the pooled OLS estimator and the result was also consistent with theory.

Consequently, Bloom and Malaney (1998), Bloom and Sachs (1998), Bloom and Williamson (1998), Gallup and Sachs (2000) and Sachs and Warner (1997) used life expectancy as the health variable and a 25 year cross sectional data used the OLS (ordinary least squares) method of estimation and their results concurred with the theoretical argument. This method of estimation can be inconsistent or inappropriate and can also render the estimates of the coefficients unreliable due to the presence of reverse causality which creates a correlation between the explanatory variables and the error term. In this light, Caselli, Esquivel and Lefort (1996) used a 25-year panel at 5 year intervals from 1960-85 and with life expectancy as the health indicator adopted the GMM (generalized method of moments, Arellano bond method) estimator but the results showed that health as indicated by life expectancy had a negative and not significant relationship with economic growth as 1% increase in health will bring about 0.1% decrease in economic growth. This result do not concur with theory therefore there is either an explanation for this result or the there is need to question the methodology used.

From the above works, all the studies that used life expectancy as the health indicator found a positive relationship between health (as indicated by life expectancy) and economic growth which was shown by the positive coefficients except in the work of Caselli *et al.,* (1996) which had a negative coefficient of -0.001. From the literature reviewed it is discovered that health as represented by various indicators

shows a positive relationship with growth, though the possibility of measurement errors should not be overlooked in some of the extant studies due to multidimensional nature of health.

Therefore, the use of single indicator such as life expectancy or adult survival rates are not adequate as they only take account of the mortality aspect of health leaving other aspects such as morbidity, disability and discomfort. Therefore, this study in improving existing works seeks to extend the proxies of health to account for both the mortality and the morbidity aspects of health.

Methodology

The study adopted the Solow neoclassical growth model which implies that economies will conditionally converge to the same level of income if they have the same rates of savings, depreciation, labour force growth and productivity growth. The Solow growth model is a modification of the Harrod-Dormar growth model as it allows for substitution between capital and labour assuming that there are diminishing returns to these inputs.

The aggregate production function, Y= F (K, L) is assumed to be characterized by constant returns to scale and this can be seen in a Cobb-Douglas production function at any time t, below:

$$Y_{(t)} = K_{(t)}{}^{\alpha}\ (A_{(t)}.L_{(t)})^{1-\propto} \qquad 1$$

Where Y is the gross domestic product, K is the stock of capital (which consists of human capital and physical capital), L is labour, and A(t) represents the productivity of labour which grows at an exogenous rate over time.

4.1 Model Specification

This study is based on the Solow neoclassical growth theory and draws from the specification of Bloom *et al.,* (2004). The implicit form of our specification is presented as follows:

$$PCI = f(GCF\ LAB\ SSE\ LFE\ U5M\ HIV\ INST) \qquad 2$$

Where PCI is GDP per capita, GCF is gross fixed capital formation, LAB is Labour force, SSE is secondary school enrolment, LFE is life expectancy, $U5M$ is under-five mortality rate, HIV is prevalence of HIV as a proxy for health taking into account the morbidity aspect and $INST$ is a measure of institutional quality.

The explicit form of the model is illustrated below:

$$PCI = GCF^{\beta_1}\ LAB^{\beta_2}\ e^{\beta_3 SSE+\beta_4 LFE+\beta_5 U5M+\beta_6 HIV+\beta_7 INST} \qquad 3$$

Transforming equation (3) into an econometric log-linear form, the equation becomes

$$logPCI_{it} = \beta_0 + \beta_1 logGCF_{it} + \beta_2 logLAB_{it} + \beta_3 SSE_{it} + \beta_4 LFE_{it} + \beta_5 U5M_{it} + \beta_6 HIV_{it} + \beta_7 INST_{it} + \varepsilon_t \qquad 4$$

The apriori expectation for the relationships between the explanatory variables and the dependent variable of the model based on economic theory as explained below. It is expected that $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$, $\beta_4 > 0$, $\beta_5 < 0$.

Technique of Estimation

The study adopted the static panel data analysis comprising the fixed effect and random effect specifications. The former controls the unique characteristics of the entities and its impact or bias on the predictor variables. This reduces the effect that the time invariant characteristics may have on the predictor variables so that the net effect of the predictors can be seen. On the other hand, random effects assume that the variations across entities are random and do not correlate with the predictor variables in the model. This means that the time invariant variables are included in the model unlike in the fixed model where it is absorbed by the intercept.

To determine which model is suitable and efficient, the Hausman's test was adopted as the selection criterion. It tests whether the unique errors (u_i) are correlated with the regressors or not. Under the

Hausman's test, the null hypothesis is that the model is random effect specification is efficient and reliable while the alternative is that the preferred model is fixed effects.

Other diagnostic tests to be conducted in order to ascertain the reliability of the parameter estimates for the purpose of policy inferences are as follows:

a. The test for multicollinearity which checks whether there is correlation among the explanatory variables and this can be done using either the pair wise correlation (pwcorr) or variance inflation factor (vif).
b. The test for random effects using the Breusch-pagan LM test and this is used to check if there is a difference between the random effect and the pooled OLS.
c. The test for heteroskedasticity as to whether our residuals are normally distributed with a mean of zero and a constant variance.

Data Sources and Measurements

The data used for the empirical analyses were obtained from reputable sources (see Table 1 in Appendix), precisely from the World Development Indicators of World Bank Publication 2016 and World Governance Indicators of World Bank Publication 2016. These variables include GDP per capita, Gross Fixed Capital Formation, Gross Secondary School Enrolment ratio, Life expectancy, under-five mortality rate, prevalence of HIV and institutions. The data spans 1990-2015 for Sub-Saharan African countries.

Discussion of Results

This aspect presents empirical analyses of the study; the results for the static panel analysis were obtained (see Table 3 in the Appendix) and discussed.

Multicollinearity Test

This attempts to ascertain the extent of collinear relationship among the explanatory variable in the model. To achieve this, the Variance Inflation Factor was adopted and shows no evidence of serious collinear relationship among the explanatory variables. The rule of thumb here is that once the VIF is less than five then multicollinearity does not exist (see Table 2 in Appendix).

Having estimated the fixed effect and random effect specification, the Hausman test was conducted for the purpose of ascertaining the most efficient and reliable specification. The test result failed to reject the null hypothesis, thus implying that the random effect specification posed the efficient and reliable estimates. Also, in order to control for heteroskedasticity in random effect specification and check the possibility of inflated variances and standard errors, the robust option was applied on the standard errors for efficiency of parameter estimates.

Table 5 presents the results of the robust random effects, the indicator of capital stock (GFCF) was positive and had a significant influence on the GDP per capita in Sub-Saharan Africa. This outcome aligns with theoretical position and meets the priori expectation, as increase in the stock of accumulated capital translates into future investments which will generate income. The indicator of labour force exerts a negative and significant influence on GDP per capita. The obtained sign fails to meet apriori expectation and this can be attributed to the low contribution of labour force economic productivity in the region. This is due to structural features of most SSA economies; they are heavily dependent on extractive industries (mostly commodity sale) for a larger chuck of their foreign earning. This industries is highly capital intensive, most of which are supplied by expatriates. This couple with the weak human capital development has constantly weakened the contribution of labour force to national output. On the other hand, the inverse relationship between labour and growth could be attributed to high pressure on available resources and high level of morbidity in this region which reduces the level of efficiency and thereby responsible for the weak response of growth to labour force participation in the region.

Also, education exerts a positive significant influence on growth, this conforms to the apriori expectations and consistent with human capital theory as education increases the quality of labour force and enhances economic growth. It increases the ability of the labour force to produce. On the other hand, education increases the knowledge required for proper maintenance of health which tends to improve the level of efficiency of the work force, as a healthier work force has a higher level of productivity than a less healthy one.

Life expectancy which an indicator of the state of health exerts a negative significant influence on the GDP per capita; this implies growth responds inversely to life expectancy in SSA. The evidence suggests that health impacts growth negatively in SSA regions. This negates the apriori expectations and this can be attributed to the generally weak healthcare services in the SSA economies which are evidently visible in low access to healthcare, inadequate healthcare personnel and facilities, weak implementation and monitoring of health intervention programmes and inadequate financing. These have accentuated the rate morbidity and mortality mostly caused by preventable diseases; hence reducing the level of human and capital resources efficiency to stimulate growth. Alternatively, the high level of non-market activities (such as subsistence farming) and the predominance of the informal sector could make length of life or life expectancy not to necessarily lead to an expansion in national growth. This evidence obtained was consistent with Lefort (1996) who found an inverse relationship between life expectancy as health indictor and economic growth. Also, Gallup and Sachs (2001); Case and Wilson (2001) found that morbidity plays a significant role in mitigating long-term economic growth. Similarly, the findings align with Luft (1999) who found that in Indonesia anaemia reduced the efficiency and productivity of men by 20 percent. On the other hand, the result obtained contradicts empirical findings by Baro (1997); Bloom and Canning (2005) and Ogundipe *et al.,* (2016). Also, for the purpose of robustness of parameter estimates and resolving some empirical irregularities, the study adopted under-five mortality as an alternate measure of health. The evidence was similar to life expectancy but the latter (u5mr) shows health status in SSA mitigates growth more than the former (lfe). Precisely, under-five mortality exerts a significant negative variation on growth in the region; with the largest magnitude of about 40% reduction in income due to 100% changes in u5mr; this reflects that health status of the populace is critical to the long-run growth.

The prevalence of HIV in Sub-Saharan Africa does not exert any significant influence on GDP per capita at the 5% traditional significance level. It implies that growth is weakly responsive to HIV prevalence in Africa in terms of significance and magnitude. This can be attributed to the fact that HIV is just a subset of the burden of diseases component in the region. Also, the various concerted efforts of local and global contributions and efforts towards reducing this prevalence are yielding some positive returns to scale. Alternatively, the evidence reveals the effect morbidity could have on growth since the infected individuals do not necessarily die but experience a decrease in efficiency and productivity. The introduction of multiple antiretroviral drugs such as the highly active antiretroviral therapy (HAART) which increases the expected level of efficiency, helps in reducing the burden of the disease, and enhances the functioning of the immune system are capable of reducing the susceptibility of infected person. Hence, this enhances the expected level of productivity and efficiency of the individual which will result in an increase in output, income and economic growth.

Conclusion and Recommendation

This study examines the role of health on economic growth in Sub-Saharan Africa for the period 1990-2015 using the static panel estimation procedure. It submits that health status in the SSA region is critical for attaining and sustaining long-run growth, as it is critical in enhancing the efficiency and productivity of human and capital resources of SSA economies. The study adopted life expectancy and under-five morality as a measure of health status. These duo indicators are considered in order to ascertain the robustness of health parameter and contribute towards resolving empirical irregularities in the extant literature. Similarly, the study attempted the generalized method of moments but the results obtained were similar to the robust random static panel specification, the latter was sustained.

The evidence from the empirical investigation shows that growth responds to the indicator of health (life expectancy and under-five mortality) negatively in the region. This indicates that the state of health in the region mitigates the growth potential which is directly suggestive that the weak healthcare policies and financing in the region has contributively enhanced the burden of diseases in the region. The under-five mortality rate was found to exert more dwindling effect on growth in the region. This might not be unconnected to the fact that children are more likely to die before their fifth birthday in Africa than any other region. This indirectly affect long-run growth and in the short-run reduces the efficiency and productive of parents and care givers, as the opportunity cost of bearing, caring and seeking support for unhealthy children due to diseases infections is completely lost. In the same manner, the HIV prevalence was used to capture the effect of morbidity, the study found that though negatively related with growth but the effect was not as large as life expectancy and under-five mortality. This effect was negligible and could be linked to the popular campaign and introduction of multiple antiretroviral drugs to enhance efficiency and reduce fatality. The study recommends that SSA economies and policy makers in the region ensure more financial allocation and commitment to reducing the burden of preventable diseases in the region and strengthen institutions that charged with implementation and monitoring health intervention programmes and ensure equitable access to healthcare.

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APPENDIX

Table 1: Data Sources and Measurements

VARIABLE	MEASUREMENT	SOURCE
PCI	Gross Domestic Product per capita as a proxy for economic development	World Development Indicators (WDI), World Bank 2016
GCF	Gross Fixed Capital Formation as a proxy for the stock of accumulated capital.	World Development Indicators (WDI), World Bank 2016
LAB	Labour force, total	World Development Indicators (WDI), World Bank 2016
SSE	Secondary school enrollment (% gross)	World Development Indicators (WDI), World Bank 2016
LFE	Life expectancy as a proxy for health taking into account the mortality aspect.	World Development Indicators (WDI), World Bank 2016
HIV	Prevalence of HIV as a proxy for health taking into account the morbidity aspect.	World Development Indicators (WDI), World Bank 2016
U5MR	Rate of probability per 1,000 live births that a new born baby will die before reaching age five	World Development Indicators (WDI), World Bank 2016
INST	Average of the four measures of institutions including: control of corruption, rule of law, regulatory quality and government effectiveness	World Governance Indicators (WDI), World Bank 2016

Source: Compiled by authors

Table 2: VIF (Variance Inflation Factor)

Variable	VIF	1/VIF
lSSE	1.92	0.5213
lLFE	1.85	0.5414
lHIV	1.45	0.6882
lLAB	1.25	0.8007
lGCF	1.25	0.8014
Mean VIF	1.54	

Source: Author's Computation using Stata12.0

Table 3: Table Regression Results

Var.	OLS	RRE	DGMM
l.pci			1.010**
			(0.0202)
lgfcf	2.2140***	0.1779***	0.1037***
	(0.00519)	(0.0707)	(0.0015)
llab	-2.4109**	-0.2450***	-0.2040**
	(0.000771)	(0.492)	(0.000449)
sse	3.1246	0.1868***	0.2091**
	(0.00296)	(0.547)	(0.00143)
lfe	1.0822**	-0.2969***	-1.0034***
	(0.0208)	(0.579)	(0.0173)
u5mr	-3.8101***	-0.4512***	-1.3402***
	(0.00210)	(0.0981)	(0.000538)
hiv_p	-0.1271**	-0.003526*	-0.00651**
	(0.00553)	(0.0911)	(0.00105)
inst	1.0052	0.2317*	0.6711*
	(0.00102)	(0.125)	(0.0201)
constant	3.943**	7.04830***	0.3908**
	(0.0132)	(0.199)	(0.125)
observations	544	544	403
R-squared	0.672		
N	37	37	37
instruments			26
AR(2) P-value			0.175
Hansen P-Value			0.123

*Note: Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1*
Source: Author's Computation using Stata 12.0

Customer Satisfaction Improvement Using Six Sigma in Automotive Service

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Abstract

Customer satisfaction appears important not only in service companies, but in industry where product differentiation is increasingly difficult, too. The product is considered a global package "good & service", services adding value to the product use. The study reveals information about measuring and monitoring business quality indicators in automotive industry. The case study has started from the decrease of the customers' satisfaction. The quality indicators and their evolution over time were monitored. The input data were collected by direct observation, indicators and targets were set, and then the results were compared using different quality instruments. The purpose of this paper is to diagnose after-sale activity undertaken by a service unit through SIX SIGMA concept. Specifically this article will focus on the actions and activities of the service during the warranty period when a customer purchases a new vehicle. A practical solution for scheduling the clients, documented in a procedure, followed by specific training and hiring technical staff has been set in place.

Keywords: Quality, Customer, Customer Satisfaction, Continuous Improvement, Performance Indicators, Process-Based Guidance.

Introduction

Quality requirements applicable in automotive industry appear constantly at higher level and they may different from country to country. In the tough competitiveness of reaching and maintaining expectations of the customers, organizations combine the quality of the product and the quality of the services.

At the Equip' Auto (Paris, 2015)**,** Renault President Carlos Ghosn said: "Services are the most important points of progress in the automotive world. Only the combination of the quality of the product and the quality of the services allows reaching and maintaining a high level of customer satisfaction". The similar ideas had the authors Kwon, Y.I. and Son, J.-K. (2018), Malecskaia-Malevich, E.D. &amp (2018) and Kwon, Y.I. and Son, J.-K. (2018).

The automotive industry in Romania is an important factor in the national security status, being the fourth largest manufacturer in Central and Eastern Europe.

In the continuing struggle to keep customers and attract new ones, organizations are aware that customer satisfaction is an important stake. For car manufacturers and after-sales service providers, the requirements represent quality orientation. The benefits are well documented for the industry and increasingly in the service industry.

The purpose of these requirements is developing of the management quality system which allows continuous improvement and which acts in the same time for the prevention of defects and the reduction of losses.

In this paper we applied the Six Sigma concept for determining and measuring the current performance of a company in a critical situation, closely related to customer satisfaction dropping-off.

Pande P.S., Neuman R. and Cavangh R. (2013) says that "Six Sigma is driven by the use of static facts, information and analysis to understand the needs of the client closely, as well as the special attention given to managing, improving and reshaping the business precession." The similar ideas had the authors Chen, C. and Roth, H. (2005), Maniu, A.I. (2008), Pande, P.S. (2009) and Taghizadegan, S. (2006).

According to Oprean C. and Kifor C.V (2006) in order for the improvement process to be effective, Six Sigma methodology must be carried out according to the steps of the DMAIC method (Define, Measure, Analyze, Improve, keep under Control). The similar ideas had the authors Jasinska, K. and Jasinski, B. (2018), Konnikov, E.A. &amp (2019), Nae, I. and Severin, I. (2018) and Nae, I., Severin, I. and Solomon, Gh. (2016).

Pyzdek T. and Keller P. (2003) said in his work that the main purpose of this approach is to achieve a level of quality and reliability that will meet and even exceed the demands and expectations of today's demanding customers. The similar ideas had the authors Andreeva, T. &amp (2019), Evans, J.R. and Lindsay, W.M. (2006), Fonseca, L.M. and Domingues, J.P. (2017), Malecskaia-Malevich, E.D. &amp (2018) and Mitrache, I.A., Stinga, F. and Severin, I. (2020).

Defining the problem - Process diagnosis through SIX SIGMA concept

This study has been based on the current situation of the Mechanical Department within a company, from the automotive industry, who reported under-target performance indicators. These results are reflected in the difficulty to perform the repair of vehicles in a timely manner and implicitly in the low level of customers' satisfaction.

Following the completion of this study, we aim to improve the activities planning so as to shorten the waiting time and timely delivery of vehicles to customers.

The study's coverage area is defined: Reception, Back-office, Workshop and Storehouse of Department of Mechanics – a company with an annual average of 2000 customers who have cars under warranty. This company is a Romanian investment company established in 2011, which has developed a partnership with Dacia-Renault car brand and which, at present, is one of the most modern concessions. The organization offers car sales services, post-sale maintenance services and damage claims.

The study has been run between January 2019 and April 2019 and the input data was collected from the working processes at all levels performed in service and through direct observation.

Defining

An efficient Six Sigma improvement process should be carried out according to the steps mentioned above. As well as other improvement processes, DMAIC is based on PDCA cycle (Plan –Do-Check-Act).

At national level, there is a network of all Dacia-Renault accredited service units. In order to stimulate the service units to comply with the deadline for handing over vehicle required by law and to avoid sanctions, the manufacturer imposed a series of indicators monitored over 4 months, these being modified three times a year (in January, May and September).

By following these indicators, the correct communication of incidents from technical point of view, the accuracy of encodings and the quality of information transmitted to the manufacturer are desirable. Thus, the manufacturer ensures that the repair units will consistently apply the correct procedures for treating the vehicles under warranty.

It should be noted that each service unit is autonomous in collecting the results. The indicators are monitored in a national base where each measured parameter has limits and the system automatically rejects the indicator when the result is outside the limits.

The Key Performance Indicators and their abbreviations are presented in table 1.

Table 1: Key Performance Indicators

No.	Indicator	Abbreviations	Definitions
1	**Cost of repaired vehicle**	**C.V.R.**	average cost of a repaired vehicle under warranty
2	**Coding quality**	**C.Q.**	percentage of interventions automatically cancelled by the system of all interventions
3	**Failure to perform Special Technical Operations**	**F.S.T.O.**	rate of vehicle affected by red* or blue** special technical operations who went through manufactory and have not been achieved or have achieved after the authorized term
4	**Application indicator of the reactivity process**	**K.P.I. - R.**	ratio between the orders transmitted in real time and the total number of open orders
5	**Deadline for submitting documentation**	**D.S.D.**	time between date of opening the order and sending the request for refund
6	**National Average**	**N.A.**	arithmetic average of the results of each service unit

*Legend: *The vehicle has a manufacturing issue that must be solved urgently as it affects passengers' safety; ** The vehicle has a manufacturing issue that must be solved, but it does not address the passengers' safety;*

- C.V.R. – If this indicator is less than or equal to N.A. it received 1 point. If it is bigger than N.A. it received 0.
- C.Q. – If it is less than or equal to 3% it receives 1 point. If it is bigger than 3% it receives 0.
- F.S.T.O. – If this indicator is equal to 0% it receives 1 point and if it is bigger than 0% it receives 0.
- K.P.I.-R. – If KPI-R value is bigger than or equal to 95% it receives 1 point. If it is less than 95% it receives 0.
- D.S.D. – The objective is that 75% of the postcards to be sent in maximum 5 days. If the indicator value is bigger than or equal to 75% it receives 1 point. If it is less than 75% it receives 0.

The maximum cumulative score that can be obtained is 5. Depending on the score obtained, distribution of results in the general classification is done by colors:

- Red – if the score obtained is equal or less than 2;

- Yellow – if the score obtained is equal to 3;
- Green – if the score obtained is equal or bigger than 4.

Results

Measure

Centralization of the changed parts, number of defective units and number of defects grouped by category are represented in table 2. Indicators' results related to the 4 months for the service unit are presented in table 3.

Table 2: Centralization of the changed parts

Month	Entries	No.	Category	Number of defective units (DU)	Number of defects (DP)
January	247	1	Engine and gearbox assembly (1)	1	1
		2	Load - bearing elements (2)	196	292
		3	Electric (3)	50	7
February	145	1	Engine and gearbox assembly (1)	0	0
		2	Load - bearing elements (2)	80	63
		3	Electric (3)	65	6
March	689	1	Engine and gearbox assembly (1)	4	7
		2	Load - bearing elements (2)	459	148
		3	Electric (3)	226	35
April	571	1	Engine and gearbox assembly (1)	6	15
		2	Load - bearing elements (2)	420	371
		3	Electric (3)	145	19

Table 3: Indicators' results

No.	Indicators	Results		
		Results	Objective	Score
1	C.V.R.	170€	171€	1
2	C.Q.	3.23%	3%	0
3	F.S.T.O.	0%	0%	1
4	K.P.I.-R.	88.1%	95%	0
5	D.S.D.	46.6%	75%	0
			Total score	2

- Share of defective units (DU) – the percentage of defective products in a sample of products;

DU = (number of defective units)/(total number of units) (1);

DU1 = 11/1652 = 0.66% (2);
DU2 = 1155/1652 = 69.92% (3);
DU3 = 486/1652 = 29.42% (4);

- Number of defects per unit (DPU) – the average number of defects of all types relative to the total number of sampled units;

DPU = (number of defects)/(total number of units) (5);

DPU1 = 23/1652 = 1.39% defects per unit (6);
DPU2 = 874/1652 =52.9% defects per unit (7);
DPU3 = 67/1652 =4.05% defects per unit (8);

- Number of defects per occasion (DPO) – weight of defects in the number of occasions in a group of units;

DPO = (number of defects)/(total number of units)* (number of occasion)/(unit for realization of defects) (9);

DPO1 = 23/(11*1652) = 0.00126 (10);
DPO2 = 874/(1155*1652) = 0.00046 (11);
DPO3 = 67/(486*1652) = 0.00008345 (12);

- The number of defects per million occasion of achieving a defect (DPMO) is calculated as:

DPMO = DPO x 1.000.000 (13);

DPMO1 = 0.00126 x 1.000.000 = 1260 (14);
DPMO2 = 0.00046 x 1.000.000 = 460 (15);
DPMO3 = 0.00008345 x 1.000.000 = 83.45 (16);

- Global efficiency (ηgl) – fraction of the total number of units delivered that had no defects;

ηgl = 1- ∑DUi /3 (17);

ηgl1 = 1-0.0066 = 0.9934 = 99.34% (18);
ηgl2 = 1-0.6992 = 0.3008 = 30.08% (19);
ηgl3 = 1-0.2942 =0.7058 = 70.58% (20);
ηgl = 1- (0.9934 + 0.3008 + 0.7058)/3 = 1-0.6667 = 0.33% (21).

Based on this score, the service unit has been under RED color starting with May 2019. In order to solve the situation, the next stages of the DMAIC method should be continued.

Analyze

At the level of Mechanical Department, a brainstorming session took place to determine the causes; the subject was presented and discussed. Based on the developed criteria, ideas were combined and evaluated in a systematic manner. Ideas were processed through the questionnaire method “5 Way” and these ideas are presented in table 4.

In order to plan the improvement phase, understanding the relationship between cause and effect is needed. The causes found after applying the questionnaire “5 Why” were prioritized according to severity and frequency using Pareto Diagram. After tracing Pareto Diagram, AMDEC (Analyse of Failure Modes and their effects) analysis was used. Pareto is represented in figure 1. The AMDEC analysis for the first three vital causes is represented in table 5.

Table 4: The method "5 Way"

Problem	Why 2	Why 3	Why 4	Why 5	Root cause	Preventive action
Unsatisfied customer	High waiting time	Delay in car delivery	Delay in vehicle repair	The mechanic receives several works in the same time	Insufficient employees	Personal hire
	The attitude of receptionist towards the customer	Poor communication	No mood	Fatigue / Loading with repair orders	Lack of an efficient style of organization	Communication training
	High waiting time at reception	Heavy customer takeover	More than one appointment at the same time	Planning performed improperly	Lack of information held by call centre operators	Training
Unfavourable results for indicators	Transmission time of documentation gather than 5 days	Parts un-availability	Delay in repair	The warranty file is not delivered during the required time	Stock shortage of parts	Perform the work on the basis of two commands
	Documentation returned	Index non-consultation	Missing the task and symptom code	Neglect / lack of time of the receptionist	Programs made improperly	The responsible for the warranty verifies in detail the guarantee file
	Rejection of lines of mechanical work	Mechanical work wrong	Improper coding of operations	Incorrect identification of mechanical workmanship	Lack of experience in using the program	Training program use

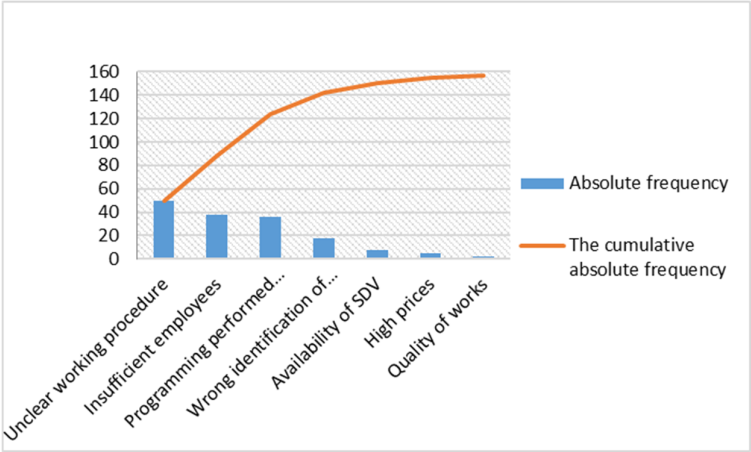

Fig. 1: Pareto Diagram

According to Pareto diagram the first three vital causes were identified, as follows:

- No working procedure between Reception – Back Office – Manufactory – Depot
- Insufficient employees
- Inappropriate appointments

Table 5: AMDEC analysis

Criteria / Problem	Emergency (0.2)	Chronicles (0.3)	Impact (0.2)	Time (0.1)	Costs (0.2)	Total (1)
No working procedure	5	5	5	4	5	4.8
Insufficient employees	4	2	3	3	2	2.8
Inappropriate appointments	4	3	4	2	3	4.2

Improvement

The improvement phase will be carried out following the identification, then the evaluation of alternatives.

Identification of alternatives. Within the same brainstorming session, for each identified cause, three alternatives were proposed. The alternative selection matrix is presented in table 6.

Table 6: Alternative selection matrix

No.	Cause	Alternative 1	Alternative 2	Alternative 3
1	No working procedure between Reception – Back Office – Manufactory – Depot	Analysis of existing procedures in each compartment and their completion	Modification of personnel tasks and implicit procedures	Introducing a working procedure between Reception – Back Office – Manufactory – Depot

2	Insufficient employees	Mechanicals hiring	Selection of personnel from other departments and training	Programming reduction
3	Inappropriate appointments	Introducing predefined repair times into the programmer and scheduling clients at 15 minutes intervals	The appointments will be made only by the back office and front office, without the call centre	Hiring front office advisers

Evaluation of alternatives. Following the evaluation of different improvement alternatives, the team agrees on one alternative that is supposed to promise the most. This matrix can be used to evaluate alternatives in relation to certain evaluation criteria. The following notation is used:

3 – Very favorable impact;
2– Medium favorable impact;
1 – Weak favorable impact.

The evaluation of the alternatives is presented in tables 7, 8 and 9.

Table 7: The evaluation of the alternatives – the first cause

Cause I: No working procedure between Reception – Back Office – Manufactory – Depot			
Selection criteria	**Alternative 1**	**Alternative 2**	**Alternative 3**
Total cost	1	2	3
Impact on the problem	3	2	3
The cost-benefit relationship	3	2	3
Resistance to change	2	1	2
Implementation time	3	1	3
Uncertainty and effectiveness	2	1	3
Health and safety	3	3	3
Score obtained	17	12	20
Solution: Introducing a working procedure between Reception – Back Office – Manufactory – Depot			

Table 8: The evaluation of the alternatives - the second cause

Cause II: Insufficient employees			
Selection criteria	**Alternative 1**	**Alternative 2**	**Alternative 3**
Total cost	3	1	2
Impact on the problem	3	1	2
The cost-benefit relationship	3	1	2
Resistance to change	1	2	1
Implementation time	3	1	1
Uncertainty and effectiveness	3	1	1
Health and safety	3	3	3
Score obtained	19	10	12
Solution: Mechanicals hiring			

Table 9: The evaluation of the alternatives - the third cause

Cause III: Inappropriate appointments			
Selection criteria	**Alternative 1**	**Alternative 2**	**Alternative 3**
Total cost	2	2	1
Impact on the problem	1	1	2
The cost-benefit relationship	2	2	1
Resistance to change	3	3	2
Implementation time	3	3	2
Uncertainty and effectiveness	2	2	3
Health and safety	3	3	3
Score obtained	16	16	14
Solution: Introducing predefined repair times into the programmer and scheduling clients at 15 minutes intervals. The appointments will be made only by the back office and front office, without call centre.			

Comments on Results

In the control phase, the voice of client was reassessed based on data for 100 clients to confirm the significant difference obtained by implementing the solutions in table 9. KPI (Key Performance Indicators) indicators were also evaluated and the results are presented in table 10. The comparison of results before and after applying the DMAIC method is presented in table 11.

Table 10: KPI indicators evaluation – after improvement project

No.	Indicators	Results		
		Results	**Objective**	**Score**
1	C.V.R.	159€	171€	1
2	C.Q.	2.37%	3%	1
3	F.S.T.O.	0%	0%	1
4	K.P.I.-R.	81.5%	95%	0
5	D.S.D.	86.6%	75%	1
			Total score	4

Table 11: KPI results comparison – before and after improvement project

No.	Indicators	Results		
		Initial results	**Current results**	**Objective**
1	C.V.R.	1	1	1
2	C.Q.	0	1	1
3	F.S.T.O.	1	1	1
4	K.P.I.-R.	0	0	1
5	D.S.D.	0	1	1
	Total score	2	4	5

It can be seen that the implementation of the improvement project is positive and the objectives have been reached. The waiting time indicator at reception was not reached; therefore, an action plan will be established, as given in table 12. The control chart summarizes the action plan for this process which is not under control yet.

Table 12: Plan for implementing the improvement actions

No	Causes	Corrective action	Necessary resources	Responsible	Term
1	No working procedure between Reception – Back Office – Manufactory – Depot	Introducing a working procedure between departments	-Time for elaboration -Time for implementation -Responsible for Quality Dep. -Meeting room equipped with electronic equipment	Head of Quality Management service	S21
2	Insufficient employees	Mechanicals hiring	3 mechanicals	H.R. Manager	S17
		Implementation of a periodic training program for employees	-Personal -Documentation - Meeting room equipped with electronic equipment	Technical coordinator	
3	Inappropriate appointments	Introducing predefined repair times into the programmer and scheduling clients at 15 minutes intervals. The appointments will be made only by the back office and front office, without call centre	-2 computer scientists -2 computers with related software -Time for training -Meeting room equipped with electronic equipment	Deputy Director Head of IT department	S18

Changes will be made to the scheduling hours. The interval at which the appointments will be made will be changed from 15 to 30 minutes. The change will be tracked in the programmer by the head of the Quality Management Service. The activity will be monitored in the next thirty days. The audit for the operational use of the closed loop is presented in table 13.

Table 13: Audit results for the operational use of the closed loop

	Category	Result obtained	Maximum results	Realized [%]
I	The principles of the implementation system	54	60	90
II	Planning	52	60	87
III	Execution - Tracking	102	170	60
IV	Reporting - Review	59	130	45.3
V	Improvement program	85	100	85
	Total	336	520	65

Conclusion

Tendency to ignore customer complaints and not looking for their causes had serious consequences for the business. The improvement team estimated that for any complaint received from a client, there are 26 others thinking the same, but does not outsource to the company. Dissatisfied customers will call for less or no company services and that is why it is necessary to emphasize the importance for the organization of applying 6 Sigma.

It was found that the improvement solutions identified and implemented have led to a significant reduction of the waiting time in the service unit in order to carry out repairs.

As a result of this study, the personnel for telephone communication and client programming were trained. Three mechanics were hired, a new working instruction was developed and a weekly training program for mechanics was established. As one may notice, based on the audit result, new problematic areas appear, so as the continuous improvement process turn on regularly.

The study has aimed to evidence the sequence of tools to implement in order to sustainably improve customer satisfaction. Similar logic may be applied for different problematic issues, but depth approach is needed to track and report relevant results.

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Risk Management in An Organization

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Abstract

The risk management process is in a constant development, as organizations have to always be prepared for the unexpected and aware of the stages in the risk management process, since a successful practice contributes to meeting the objectives. In order to achieve this, the risks in the organization and the causes that favored their emergence must be identified, the risk assessment and management identified, following all the six stages of the risk management methodology.
The paper herein aims to highlight the steps in the risk management process within an organization. This is the reason why it is imperative to examine the main risks identified in an organization, while considering the probability of occurrence and their impact upon the company objectives.

Keywords: Risks, Risk Management, Risk Matrix.

Introduction

The purpose of the paper is to diagnose the risks associated to the activity in an organization, to assess and minimize them by using the available resources. To manage the risks, we conducted an analysis of the micro- and macro-environment factors, spotted the risks, made an evaluation, refined the response strategies to risks and conducted the risk monitoring, reporting and control.

According to SR EN ISO 31000:2018 Standard, "The risk management operates on a set of principles and assists in the decision-making processes, in an organized and structured manner." During the first stage of risk management, the organization is studied from both the internal and external environment angles and the company main objectives in terms of risk management are formulated. To establish the context, the organization identifies internal and external parameters and uses them to perform the risk management while stating the risk criteria and the scope.

In compliance with the SR ISO 73:2010 Standard, "Criteria represent reference terms to help estimate the risk significance, as deriving from laws, standards and other requirements and are conditioned by the company objectives and its internal and external environment."

Methodology

Depending on the organization requirements, the context of the risk management process varies and is represented through the following:

1. Identification of the needed resources and detailing the objectives and purpose of the risk management activity;
2. Assigning the responsibilities within the risk management process;
3. Establishing the time and location characteristics for the risk management process;

4. Recognizing the relations between projects, activities or processes;
5. Labeling the risk management assessment methods and the efficiency of their evaluation;
6. Devising and implementing the decisions to be about being made.

1) Establishing the external context

The external context stands for the environment in which the organization aims to meet its objectives and comprises the economic environment at the international, national, regional or local level, financial, technological, social, political, legal, and cultural and the factors leading to the organization objectives and the external relations.

The importance of conducting the analysis of the external context comes from taking into account the objectives of the interested parties in the risk management process.

2) Establishing the internal context

During the first stage of the risk management process, the analysis of the company internal context is performed, along with the environment of its operation, with the purpose to meet the objectives, in line with the company strategy, processes, culture and structure.

The company internal context is shaped by how the risk management is approached and features the following factors:

a) The risk management is influenced by the company internal objectives;
b) The organization objectives has a direct effect on how are established the goals and the criteria of the activities, processes and projects within the company;
c) Inability to recognize the opportunities hinder meeting the company objectives, while affecting the organizational credibility and trust.

The identification of the internal context is an information source regarding:

- structure, management, roles and responsibilities held by the company employees;
- strategies and policies the organization implements to meet the objectives;
- organizational culture;
- information flows and the decision-making processes;
- standards, handbooks and models the company emulates.

The understanding of the internal context is paramount, since it provides the company with data on the organizational structure, policies and strategies being implemented, information systems as well as the standards and handbooks being adopted.

3) Defining the risk criteria

The risk criteria used by organizations to assess the risk importance are influenced by their values, objectives and resources and they are defined at the beginning of each risk management process. Such criteria guide the employees in determining the significance of each risk, based on the impact and the possibility of manifestation. According to SR GHID ISO 73:2010 Standard the risk criteria are closely linked to the organizational policy, are regularly revised and depend on the following main factors:

- nature, types of causes, consequences and manner of their assessment;
- manner of identification for the probability;
- scale of probability and/or consequence;
- manner of identification for the risk;
- the risk acceptance or tolerance threshold;

• manner in which multiple risks are managed.

4) Risks Identification

An essential stage in the risk management process is to identify the risks within the organization. This identification is defined as the process of finding, recognition and description of the risks while examining the source and also their likely negative consequences. This analysis helps us with understanding the nature of the risk and determination of the risk level. Identification is achieved through interviews, surveys, charts, risk lists or meetings.

Pritchard C.L., PMP,PMI-RMP,EVP (2014) said that for an optimum identification of the risks, the risk management plan and the organizational environment have to be clear and assumed by the employees, as these two facilitate the organization and classification of the identified risks, with the purpose to examine and tackle them.

The activity risks identification aims to structure the risks the society is facing with, so the decisions to deal with them are easier to be made.

In the book by Ionescu S.C. (2014) the process of risks identification relies on two key activities:

• determination of the risk-generating sources;
• identification of the incidence risk factors.

The general goal of this process is the identification, both of the pure risks that might negatively affect meeting the company strategic objectives and also of the opportunities with a potential to improve the organization performance.

Following the process of risks identification, the results are collected in the risk register, which includes information related to the risks characteristics and typology.

The risk register is a crucial document to conduct the risk management, since it is filled up with every stage of the process and it provides a complete image of the risk profile within the organization and its time evolution.

Upon identifying the risks, according to SR GHID ISO 73:2010 Standard, they are thus described:

a) Name of the risk;
b) Nature and type of the risk;
c) Occurrence causes for the risk;
d) Risk effects on the company.

The purpose of the identification activity is to compile a full list of risks, which helps the company to devise strategies to eliminate or reduce the risk probability or impact.

5) Risks evaluation

The risk assessment is a global process, through which risks are identified, examined and evaluated, so as to establish the risk level. The information derived is used by the company to take the optimum decisions for the risk management. According to SR BS 31100:2013 Standard, the assessment involves the analysis of the risk occurrence probability and of their impact, thus diagnosing the exposure to risk of the organization.

The purpose of risk assessment is to identify the optimum manner of allocating the resources in the context of certain unfavorable events, prioritizing the investments based on the risk severity, as well as devising strategies so that the organization continues its activity and meet its objectives.

The risks assessment involves:

- definition of the objectives, terminology and methodology in use;
- involvement of the factors of interest;
- transparency and responsibility.

The assessment of the probability of manifesting the risk or the frequency with which the risk might manifest should be based on the knowledge, experience and judgment of the personnel.

Table 1: Evaluation of the probability of risk manifestation (Source: Moldovan, Neamţu (2016))

Risks	Description
High (H)	It is very likely that the risk manifests several times during the activity.
Medium (M)	There is the possibility that the risk may occur occasionally during the course of the activity.
Low (L)	It seems unlikely that the risk will manifest during the course of the activity.

The impact represents the consequence of having the risk materialized, which can be manifest in the organization objectives, tangible assets, human resource, economic resource and environment. For pure risks, the impact is negative in the form of losses whereas the consequences are positive when the risks are speculative.

Upon risks assessment, SR BS 31100:2013 Standard said that the risk scenario can be formulated with the below parameters:

- Name of risk – type of risk, severity and the potential effects of the risk upon the company activity;
- Factors being affected by the risk materialization;
- Frequency/Occurrence probability;
- Risk-generating sources;
- Reference events.

To assess the risks within an organization, an instrument called the risk matrix is used. This matrix is run to evaluate risks depending on their occurrence probability and the impact they have on the organization. The risk matrix contributes to the risks ordering as a function of the risk index, since it is a resultant of the possibility of risk materialization and its impact on the organization.

Moldovan, Neamţu (2016) in their article said that depending on the impact of the risk and the probability of occurrence, the risk matrix can be represented as follows:

	PROBABILITY			
		low	moderate	raised
IMPACT	grave	M	H	H
	moderate	L	M	H
	low	L	L	M

For a good risks management, organization X has to attach a great importance to each stage of the risk management process and to how they interact with one another.

In order to identify the risks and the events with an unfavorable impact that may affect the good operation of the organization, an analysis of the microenvironment and macro environment has been conducted. Following the microenvironment and macro environment analysis, the main categories or risks in the organization X have been labeled as the disaster risks and the financial risks.

The disaster risk is the risk of recording the direct or indirect losses derived from a wide range of factors associated to the processes performed in the organization, to the company staff, infrastructure and technology in use.

The risk of interest rate is the risk due to the exposure of the organization to the unfavorable fluctuations of the interest rate, thus having a direct influence on the income and expenses pertinent to the interest-bearing assets and liabilities, variable or fixed.

SR EN ISO 31000:2018 Standard mentioned that the compliance risk comprises the risk pertinent to KYC procedure (know your client), the fraud risk derived from the source of client funds, the risk of non-compliance with the legislation regarding the personal data processing and the risk coming from the lack of documents required to open the transactional account for the client.

The credit risk is the risk of registering losses or not making profit estimated as a consequence of non-compliance with the contract requirements on the part of the client or a counterpart. The risk to registering losses due to non-compliance with the duties by the debtor can have two causes – a) debtor bankruptcy and b) debtor bad faith.

The risk pertinent to the employees is the risk of registering losses due to the identification of fraud cases. Another source is represented by the employees leaving the organization, thus impeding the meeting of the objectives.

The liquidity risk is the risk when the company faces difficulties in fulfilling its obligations related to the financial debts that are reimbursed in cash or through the transfer of another financial asset.

The market risk is the risk that the price variation in the equity instruments, exchange rate and interest rate affect the company earnings or the value of the financial instruments in possession. The goal of the market risk management is to monitor and control the exposures within certain acceptable parameters and optimize the investment returns.

The currency risk is the risk expressed by the probability to register losses from the international commercial agreements or other economic relations, due to the change in the currency exchange rate between the agreement conclusion date and its maturity date.

The response strategies to risks within organization X are:
Acceptance R12. The currency risk – the organization uses the tolerance strategy since most of the transactions are conducted in the Romanian national currency, hence avoiding conversion into other currencies. **R2.** The risk of employee resignation – the organization uses the tolerance strategy since the low employment offer in the capital market reduces the possibility of the employees to accept a job from the competitor and the payment conditions consolidate the employees' decision not to leave their current job.

Mitigation R6. The risk of non-fulfilling the compliance procedure – to mitigate this risk, the organization will draft a survey to be implemented and add into the process of creating the transactional account by which a client profile will be built when using these data to improve the service being provided. **R8.** The interest rate risk – to mitigate this risk, the organization will shorten the time interval for the repayment schedule; hence, it can avoid the financial losses due to the fluctuations in the interest rate.

Transferring R4. The hazard risk – to manage this risk, the organization uses the strategy of transfer of responsibility by concluding an insurance contract with a relevant company. Moreover, the organization will provide regular courses in security and training so that employees have the knowledge on how to prevent and manage such situations. **R7.** The risk of a cybernetic attack – to manage this risk, the organization uses the strategy of transfer of responsibility by concluding an insurance contract with a relevant company that will assume such risk against an insurance policy. **R9**. The credit risk – to manage this risk, the organization uses the strategy of transfer of

responsibility by concluding an insurance contract with a relevant company. The organization turns to the strategy of transfer since a large part of the financial earnings come from short- or long-term credit granting to third parties. To have a good management of this risk, the organization conducts an analysis of the debtor's capacity to pay off the credit within the term and contract conditions being stipulated.

Avoidance R1. Risk of transactional platform overloading – to manage this risk, the organization will purchase a license for a new transactional platform and improve the equipment and servers required for operating the platform, thus increasing the execution speed for the transactional orders. **R3**. Fraud risk – to manage this risk, the organization will devise a series of procedures to increase transparency within the organization. **R5**. The risk of non-compliance with the legislation regarding the personal data processing – to manage this risk, the organization will implement a new system through which the employees have a restricted access to the clients' personal data; hence confidentiality is at its highest. **R10**. Liquidity risk – to manage this risk, a fund will be created and hold an amount of money as provisions so as to avoid the situation where the organization does not have the cash asked by the clients. **R11**. Market risk – to manage this risk, a team will be gathered within the organization that will analyze the market and thus provide predictions of a better accuracy.

Conclusion

In conclusion, we have identified the risks of a high probability and a very strong impact upon the organization, out of which we have chosen the risk of the transactional platform overloading (R1) in order to make an investment to avoid the risk. The investment project consists in purchasing a license to use a new transactional platform, along with new servers of a larger capacity and a smaller failure probability that will correspond to the present requirements of the clients.

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Social Investment As A Tool of Corporate Social Responsibility Realization in Europe

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Abstract

The article substantiates the role of social investment in the corporate social responsibility development and proves its influence on the investment and economic development of the European Union countries in the context of sustainable development. The purpose of the article is to analyze the directions of social investment in the countries of the European Union for the effective realization of corporate social responsibility in the conditions of sustainable development of the economy of these countries and to determine the possibilities of their implementation in Ukrainian practice. The methodological basis of the research is the data of the rating agencies as Global Sustainable Investment Alliance, CSR Europe, Center for Corporate Social Responsibility Development, Forum Nachhaltige Geldanlagen, data from the United Nations Conference on Trade and Development, European Commission, European Fund and Asset Management Association, Boston College Center for Corporate Citizenship. The article defines the essence of the "social investments" concept, defines their types, analyzes the dynamics of social investment in the countries of the European Union, and defines the main directions of socially responsible corporation development in these countries. The quality index of social investments of the corporations of the leading countries in the field of social responsibility (Denmark, Germany, France, and Sweden) was calculated and a comparative analysis with the Ukrainian leader was carried out, which allowed determining and comparing the effectiveness of the social investment directions implementation, based on the selected indicators. The findings outline ways to develop social investing that will allow companies to formulate an effective corporate social responsibility strategy and increase their financial profitability.

Keywords: Social Investment, Corporate Social Responsibility, Social Investment Index, European Union Countries.

Introduction

Prospects for the economy development depend on the intensity of the investment flow processes in it. The cooperation of investors, governments, NGOs and corporations is vital for realizing a country's investment potential and improving its investment climate in a sustainable development environment.

In the global economy, there is a growing understanding that social investment and responsible investment are a prerequisite for global sustainable development. In the context of the European Union's orientation towards sustainable development, dynamic processes of social investment are a necessary prerequisite for enhancing the corporation competitiveness. Social investment is necessary in order to overcome the current negative trends in the economies of different countries, due to the discrepancy between the short-term economic and financial interests of corporations and the long-term goals of sustainable development of the country's economy as a whole. Responsible investing plays an important role in the implementation of the corporate social responsibility strategy and also influences the investment attractiveness of the country as a whole. The need to justify and search for effective directions of social investing, formation of new approaches to cooperation between stakeholders in the implementation of corporate social responsibility strategy, analysis of qualitative assessment of social investments in companies determines the relevance of the chosen topic for the article.

*Recent research and publications analysis***.** Research on the features of social investment development plays an important role in the research of international organizations, and the performance of business entities in this area is evaluated by leading rating agencies and the World Bank and discussed at international and national economic forums. In the contemporary economic literature, the following scholars have studied the problems of social investment: Benlemlih M, Bitar, M. (Benlemlih, 2018), Neimanns E., Busemeyer M., Garritzmann J. (Neimanns, 2018), Ho A., Dai Zotti M., Hallman L. (Ho, 2018), Hemerijcj A. (Hemerijcj, 2017), Ferrera M. (Ferrera, 2017), Orlova N., Kharlamova A. (Orlova, 2014), Wielki J., Stopochkin A., and Sytnik I. (Wielki, 2019). Some aspects of social investment have been investigated by scientists, ambiguity in the interpretation of the concept of "social investment", the nature of the social investment process, the classification of social investment, the impact of social investment on the economy development. However, a number of key questions regarding the study of social investment and the experience of their use in developed countries and the need to implement its mechanisms in Ukraine remain unresolved.

The purpose of the article is the analysis of social investment trends in the European Union based on calculation social investment index for the effective realization of corporate social responsibility within the conditions of sustainable economic development of the EU countries.

Main part of Research

Social investment is an integrated factor in sustainable economic development. Social investment is a major tool and an important feature of social responsibility at all levels, with the aim of producing a useful social effect in the future (Melnichuk, 2016).

Social investment is the long-term investment of financial resources into social assets aiming at improving people’s quality of life. Such a general definition emphasizes the long term of social investment, which is one of their defining characteristics (Shkura, 2016).

Therefore, social investment is a form of financial or other resource assistance to a corporation for the implementation of long-term and, as a rule, joint partnership programs aimed at reducing social tension in the country and improving the standard of living of various sections of society.

A necessary element of any national economy realization is responsible investment, as a mechanism of the basic directions development of company responsibility. Responsible investing is aimed at incorporating the concept of sustainable development into the practice of investment activity. UN

supported Principles for Responsible Investment (PRI) adopted by more than 1,000 investment institutions with total managed assets exceeding $30 trillion. The US is based on the claim that environmental, social and corporate governance issues can be of practical importance to the financial interests of long-term investors. The future success of FDI investing companies and assets depends on the ability to understand and manage the factors of long-term financial risk and profitability, which include climate change, resource scarcity, global demographic and political change, human capital and social issues in an increasingly complex global chain supplies (CSR Review, 2017).

The list of social investments includes all types of long-term social projects and programs. Social investment is most often attributed to: sponsorship and corporate charity, engagement with the local community, government, and corporate partnership programs (Table 1).

Table 1: Types of social investments

Type of social investment	Description
Company shares	A non-transferable investment in a joint stock company or a beneficial company is withdrawn. This is a form of equity because investors get a share of the organization.
Secured loan	An investment that works as a home mortgage. An investor lends an organization a loan for an asset (often a building or equipment) as a "security". An organization pays back a loan on an agreed basis (for example, regular monthly payments), usually with interest.
Social Investment Tax Relief	Tax relief for individual investors in charitable and social enterprises. Investors receive 30% of their investment value through a subsequent income tax account, so subject to certain conditions. Investors cannot sell their shares or repay the loan for 3 years, although they may receive interest on the loan.
Loan security (including overdraft)	An investment that is not secured by an asset (building or equipment). The investor gives the organization a loan, the organization returns it on the agreed base, usually with the agreed amount of interest.
Social Property Funds	Funds managed by a specialist firm that raises money from investors and then uses the funds to purchase property that can be used by a charitable organization to provide its services. Charity rents property from a social property fund.
Social Impact Bonds (SIB)	It is a pay-as-you-go agreement when social investors pay for an organization to provide the service and the government returns the interest to investors if the service is successful.
Crowd-financed investments	An investment that is raised through an online platform and is not protected against assets (buildings or equipment). The group of individual investors lends (mostly) small amounts to the organization's loan, and the organization returns it on an agreed basis, usually with interest at the top.
Quasi equity	An investment that reflects some of the characteristics of the stock but without providing a stock organization. Instead of paying a set amount on a monthly basis, payments are usually based on the results of the organization's activities such as profit or revenue.
Charity bonds	Trade credit from a group of social investors to a charitable or social enterprise for a fixed period of time with a fixed interest rate.
Blended - part of the grant, part of the loan	A financing package that is a mix of investments which needs to be paid back and a non-repayable grant.

Source: complied by authors on the basis of Hemerijcj, 2017, Orlova, 2014, Wielki, 2019, Melnichuk, 2016, Shkura, 2016, Good Finance, 2019

According to Nachhaltige Geldanlagen Forum, the most popular responsible investment strategy in Germany, Austria and Switzerland is the use of exclusion criteria (for instance, not investing directly to manufacturing and distribution companies). Almost two out of every three dollars - a total of $ 19.8 trillion - was invested this way in 2018 (Swiss Sustainable Finance, 2019).

In Germany and Switzerland, the second most popular method is positive screening. The goal is to invest in those companies that are most effective in sustainability criteria. In Austria, the second place is screening for compliance with specific international standards or norms, such as the Global Compact, International Labor Organization standards. In 2018, the Swiss investment market has increased by 83% to reach 716.6 billion Swiss francs. This indicator covers all registered stable investment funds (an increase of 102%), stable mandates (an increase of 22%) and stable assets of their owners (an increase of 91%) (Swiss Sustainable Finance, 2019). The strong growth of the sustainable investment market is explained by the greater market reach, as well as new sustainable financial market products offered to investors and first-time investment approaches. More and more institutional investors are choosing sound investment strategies, and many asset managers are now also integrating sustainability criteria as a standard into their selection process, addressing environmental, social and management issues in investment decisions.

The effectiveness of responsible investing is first and foremost related to the achievement of its main goal - to realize the possibility of combining financial profit and ethical values of the investor. Social investment involves the following types of effect for the company:
financial efficiency (risk insurance, marketing and sales, reduced operating costs, etc.);
non-financial efficiency (company image and reputation, customer and staff loyalty);
the effectiveness of influencing the situation on the territory of presence.

In today's world, as a guarantee of sustainable economic and social development, improving the quality of life is the socially responsible behavior of all, without exception, subjects of society - the state, business, population.

According to the International Standard on Social Responsibility ISO 26000, social responsibility is the responsibility of the organization for the impact of decisions and actions on society, the environment through transparent and ethical behavior that promotes sustainable development, including public health and well-being; respects the expectations of the stakeholders; complies with applicable law and international standards of behavior; integrated in the activities of the organization and practiced in its relations.

In the international sense, social responsibility is interpreted as the voluntary contribution of business to the development of society in the social, economic and environmental spheres, directly related to its core activities and beyond the statutory minimum. Social responsibility includes: honest business practices, staff development, health and safety, environmental protection, local community development (Maistrenko, 2013).

Socially responsible investing is a way of realizing corporate social responsibility through targeted programs that meet the social needs of the main stakeholder groups - consumers, staff, and local communities. Investments in social responsibility are economically justifiable, that is, ultimately helping to increase companies' profits. According to a study by the Boston College Corporate Citizenship Center, after the introduction of a social responsibility policy, companies increase their financial performance by strengthening the company's reputation (77%); attracting promising employees (55%); responses to public inquiries (35%); increased operational efficiency and reduced costs (34%); increased competitiveness (33%); opening new opportunities for development and enhancing risk management (23%); improving access to capital (4%) (Boston College Center for Corporate Citizenship, 2017).

Results

Research conducted by WalkerInformation agency revealed a direct dependence on the growth of a company's prestige and the performance of its economic activity on social investment. Increasing a company's social potential by 1% boosts its social prestige by 0.55%, while increasing its economic potential improves its economic value by 0.32% (Walker Information, 2019).

That is, a wider introduction of the practice of conducting socially responsible business by companies will help to develop existing and create new markets in the country, solve social and environmental problems, increase access of Ukrainian companies to international markets and increase their capitalization, promote sustainable development of the country as a whole.

Despite the adoption of the new Europe 2020 economic development strategy, it does not include social investment; responsible investment processes have become widespread in developed countries and are substantially supported by international organizations, financial advisers and institutional investors.

In 2017-2018, global socially responsible investments increased by 34% to $30.7 trillion. Climate change has become a major issue for investors in 2018. Investors invest in corporations that integrate environmental, social and governance principles. The investment portfolio of such corporations is about $17.5 trillion that is 69% higher than in 2016. Assets focused on corporate activity and shareholder activism around environmental and social issues have grown to $9.8 trillion in 2018 which is $8.4 trillion more than in 2016 (Chasan, 2019).

Europe remains the largest region for sustainable investors, targeting around $14 trillion, 11% more than in 2016 (Table 2).

Table 2: Global trends in the social investment market development in 2014-2018

Region	2014	2016	2018	Growth Per Period		Compound Annual Growth Rate 2014-2018
				Growth 2014-2018	Growth 2016-2018	
Europe	€9885	€11045	€12306	12%	11%	6%
United States	$6572	$8723	$11995	33%	38%	16%
Canada	$1011	$1506	$2132	49%	42%	21%
Australia / New Zealand	$203	$707	$1033	248%	46%	50%
Japan	¥840	¥57066	¥231952	6692%	307%	308%

Source: complied by authors on the basis of Global Sustainable Investment Alliance, 2019

Almost half of the world's social investment is managed by Europe. From 2016 to 2018, social investment grew at a slow pace, but not as fast as the total pool of professionally managed assets in Europe, which reached a record €25.2 trillion, according to the report of the European Fund and the Asset Management Association for 2018. France and England remain the undisputed leaders of socially responsible investing in Europe. Their share in the European market for responsible investing is 46%, which is almost half.

A European Commission study on the social investment market in Europe has made it clear that most countries have some of their own elements of a social investment approach as far as possible.

According to this study, the European countries are conditionally classified according to the social investment development into three groups. The first group includes countries with a well-established approach to social investment, which supports it and continues to promote good institutional links between different policy areas. These countries include Austria, Belgium, Denmark, Liechtenstein,

Germany, Slovenia, and Sweden. These states also tend to maintain and further develop institutional links between different policy areas, especially when addressing key social problems.

For example, in Austria in general the federal government has shown a commitment to the idea of "social investment", and this trend has recently been growing. However, Austria does not adhere to a truly integrated approach to social investing due to the fact that the respective policy areas are shared between the Federal Republic and the Federal Provinces.

Belgium is a country with a relatively well-developed social investment economy having issues such as differences in access to certain services and the development of different regions.

The UK social investment market is widely recognized as one of the most advanced in the world. In 2018, the social investment market was over £1.5 billion. The Government continues to support the market and is committed to strengthening the social investment market, ensuring that future programs will facilitate access by organizations to relevant investments (Big Society Capital, 2016). UK companies work with investors, fund managers, social enterprises and charities to facilitate the use of social investment. Recently, there has been a rapid increase in investment funds that complement financial goals with social, environmental and ethical factors when selecting and implementing an investment strategy.

Tax benefits are an important government initiative to encourage investment in smaller companies that can innovate in the economy. More than 30,000 businesses can benefit from the Social Investment Tax Relief (SITR) privilege, which offers enormous untapped potential, according to research conducted by Big Society Capital and supported by the Department of Culture, Media and Sports.

The SITR, the youngest of these benefits, was introduced in April 2014 to allow investors who subscribe to qualifying stocks or debt investments in social enterprises that meet SITR requirements to claim 30% of the amount invested in income tax. The SITR recently ranked fourth out of 46 in a pan-European study on the effectiveness of tax incentives to promote social investment (Mills, 2018).

In Denmark, Iceland and Norway there has long been considerable experience in social investing. Liechtenstein does not have a specific “social investment program”, but many ideas of the European Commission's social investment development strategies are reflected in the national government strategy.

In 1997, the Swiss Foundation for Sustainable Development (Ethos) was founded in Switzerland. Ethos aims to promote socially responsible investment, as well as a stable and prosperous socio-economic environment that protects the interests of civil society nowadays and in the future. Ethos analyzes all Swiss companies and all companies in the world indexes. Ethos surveys existing portfolios on the basis of environmental, social and corporate governance (ESG) criteria. Ethos creates a detailed report that provides a consolidated portfolio overview as well as a thorough analysis by region and asset class.

An in-depth sustainability analysis covers all environmental, social and management criteria associated with the company. Environmental and social assessment covers a variety of topics, such as corporate strategy and the environmental management system, human resources, sustainability of products, human rights, suppliers and relations with civil society. The governance parameter includes such topics as transparency, capital structure, composition and functioning of the board, remuneration system, shareholders' rights and business ethics.

The second group of countries is demonstrating increasing awareness of social investment and is using social investment in several specific policy areas. The group includes Spain, Hungary, Ireland, Malta, Poland, which are still developing a clear or prevailing approach to social investment and have applied social investment in several policy areas. For example, in Hungary, social investment is not a central topic of financial policy. However, some investors focus on social investment.

Ireland has elements of a social investment approach, but social investment must compete with other financial products (in some cases, contradictory company strategies).

In Malta, social investment is not a central link in social issues. Social policy aims to increase human and social capital and improve the chances of less stressful situations in the future.

Poland does not have a separate social investment policy agenda, but many of the ideas of the European Commission's social investment package are reflected in the mid-term strategic documents adopted by the government in 2013. For example, the Human Capital Development Strategy for 2020, which aims to develop human capital and help people reach their full potential so that they can fully participate in social, political and economic life at all stages of life.

The third group covers countries where the social investment approach has not yet made many significant achievements in the economic policy process. The third group includes Bulgaria, Croatia, Estonia, Italy, Lithuania, Latvia, Romania, and Turkey.

FDI inflows to Bulgaria maintained a stable course in the early 2000s, reaching $2.05 billion in 2018, from $ 2.6 billion last year. With one of the lowest corporate tax rates in this area (10%) and low labour costs, the country is relatively favourable to foreign investment that is not subject to government review. Bulgarian experts, identifying progress in the country in the field of social investment development, point out that there is a need to improve coordination between different stakeholders and to ensure a holistic and integrated approach to social investment (Import-Export Solutions, 2019).

Having experienced a period of growth in 2005-2008, FDI inflows to Croatia collapsed as a result of the global economic crisis. Since then, foreign direct investment flows have been trying to return to pre-crisis levels. According to UNCTAD, in 2018 the total foreign direct investment inflow reached $1.15 million and slightly decreased compared to last year - $2 million. The sectors receiving most of the foreign direct investment are financial services (29.9%), wholesale (8.6%), real estate (6.7%) and telecommunications (6%). In addition to the unfavourable economic context, Croatia is suffering from a bad image linked to corruption, high taxes and an inefficient judicial system, although reform efforts have been made in recent years. However, the country has quality infrastructure and high tourism potential, a well-educated workforce and strategic position. According to the World Economic Forum, the country ranked the 74th in the Global Competitiveness Index 2017-2018. Croatia ranks 58th out of 190 economies in the World Bank's 2019 Business Report, eight positions down from its previous estimate. In Croatia, social policy is not based on a coherent approach to social investment, or at national, regional, and local levels. Social policy remains largely passive (Import-Export Solutions, 2019).

Estonia is open to foreign direct investment. In 2018, the net inflow of investments into Estonia amounted to $1.3 million, which is a slight decrease compared to last year by $1.7 million. The country is well-advanced in the attractive investment fields of IT, biotechnology and green industries. In Estonia, despite the low costs and small number of participants compared to other European countries, the progress regarding social investment has recently become more remarkable. While active labour market policies were mainly funded by external resources (ESF, EURopean Employment Services) in 2009-2011, most since 2012, resources have come from labour market services and support from the Unemployment Insurance Fund that indicates the sustainability of the current level of funding. In Estonia, although recent developments are more focused on social investment, the overall structure of social spending indicates that Estonia still spends relatively little on health care, natural family benefits, active labour market policies and social exclusion (Import-Export Solutions, 2019).

In Latvia, although social investment is not a central theme of social policy; policy priorities since 2009 are clearly focused on supporting the health and well-being of the nation.

In 2018, foreign direct investment flows to Romania totalled $5.8 billion and increased slightly compared to the previous year ($5.4 billion). In Romania, the political intentions of the incumbent authorities are proposing a change in social policy towards a more favourable, integrated social system focused on increasing access to all social services and quality of service. CSR Romania was initiated in 2006 by the Romanian Foundation Forum of International Communications. The forum was one of the first non-governmental organizations in Romania to focus in detail on the concept of corporate social responsibility through the creation of a dedicated CSR Romania platform in order to offer Romanian companies a space to share knowledge and experience with CSR, to promote CSR in business and to strengthen the dialogue (CSR Europe, 2019, Bouget, 2014).

Methodology for calculating social investment index

The European market for socially responsible investing continues to show steady development. Research has investigated that good investment practice companies improve reputation and image, a stakeholder engagement strategy that leads to better investment opportunities. Table 3 presents the top 10 European best-performing companies with responsible investing practices.

Table 3: Top 10 European best-practice companies with responsible investing practices

Rating	Country	Company name	Weighted score on company's reputation on the market (on a 100-point scale)
1	Denmark	LEGO	69.4
2	Denmark	Novo Nordisk	68.7
3	Germany	BOSCH	68.1
4	France	Michelin	67.6
5	Sweden	IKEA	67.2
6	UK	Rolls-Royce	67.2
7	Germany	BMW	66.9
8	Netherlands	Philips	66.9
9	Germany	Siemens	66.5
10	Germany	SAP	66.4

Source: complied by authors on the basis of CSR Europe, 2019, Bouget, 2014, e-CSR, 2018

In the first place of the rating, the Danish company Lego that is a leader in the field of "transparency" and "social contribution" and had the highest marks in the dimension of "management". Last year's announcement that the company was replacing its plastic sources with vegetable cane plastic was a major and a bold step for the company, showing that Lego products were consistent with its responsibility for social contribution and business transparency.

The second position in the ranking is held by the Danish company Novo Nordisk. The top 10 continue to be represented by companies from countries such as Germany, France, Sweden, the United Kingdom, and the Netherlands. The consolidated rating proves that Danish and German companies pay the most attention to responsible investment and social investment.

The absence of clearly defined norms in responsible investing leads to the fact that each company treats it differently, offering its own proportion of income and social responsibility. Therefore, investors willing to invest in socially responsible companies should independently select the criteria for the company inclusion in this list, as well as independently conduct a comprehensive analysis of the company for its compliance with these criteria. Before investing in an enterprise, European investors take into account the main indicators of the enterprise's activity: compliance with the law, development and well-being of employees, confidentiality and protection of customer data, ethics and integrity, quality and value of services, interaction with local communities and their support, environmental sustainability, innovation and economic performance.

To measure the social investing development within companies, the quality social investment index is applied, which also shows how deeply responsible investing is integrated into the business strategy and its operational activities.

The qualitative social investment index for the i-th company IK (i) means the level of complexity of a company social activity and is calculated as follows:

$$IK(i) = \left(\frac{1}{m} \cdot \sum_{j=1}^{m} X_{ij} \right), \quad (1)$$

where Xij – Boolean variable acquiring value 1 if j-th value is present in i -th company and 0 if this value is absent;
m – the number of features by which the social performance of companies is assessed.

The qualitative social investment index for the j-th value IK (j) is a measure of the presence of that qualitative value in the statistical sample of the respondent companies and is calculated as follows:

$$IK(j) = \left(\frac{1}{n} \cdot \sum_{i=1}^{n} X_{ij} \right), \quad (2)$$

where n – the number of companies participating in the survey, n=5.

The overall qualitative index of social investments IK shows the level of complexity of social activity of the surveyed set of companies and is calculated as follows:

$$IK = \left(\frac{1}{nm} \cdot \sum_{i=1}^{n} \sum_{j=1}^{m} X_{ij} \right), \quad (3)$$

The calculation of the social investment index is carried out on the example of the companies in Europe that have the best practices of responsible investing: LEGO (Denmark), BOSCH (Germany), Michelin (France), IKEA (Sweden). In order to compare the foreign experience of social investment with the domestic, the authors will carry out a comparative analysis of the above-mentioned enterprises with the company PJSC "Myronovsky Hliboproduct" (Ukraine), which is the first in the rating of socially responsible companies of Ukraine.

The overall qualitative index of social investment IK is 0.82, which indicates a sufficiently high level of complexity of social activity of the surveyed set of companies.

The set of features has to be elaborated so that each of them is important for each company. Characteristics of responsible corporate investment: compliance with legislation (1), employee development and well-being (2), confidentiality and protection of customer data (3), ethics and integrity (4), quality and value of services (5), engagement with local communities and their support (6), environmental sustainability (7), innovation (8), economic performance (9), the fight against corruption (10) (taking into account the particularities of the individual European countries development, including Ukraine). Thus m = 10.

It is possible to represent in the form of a matrix the provision of the listed features by corporations, where the object receives a rating of "1" if the feature is present and "0" in its absence (Table 4).

Table 4: Matrix of social activity features in corporations

Feature	LEGO (Denmark)	BOSCH (Germany)	Michelin (France)	IKEA (Sweden)	PJSC "Mironivsky Hliboproduct" (Ukraine)
1	1	1	1	1	1
2	1	1	1	0	1
3	1	0	1	1	0
4	1	1	1	1	0
5	1	1	1	1	0
6	1	1	0	1	1

7	1	1	1	1	1
8	1	1	1	1	1
9	1	1	1	1	0
10	1	1	0	0	1
IK (i)	**1**	**0,9**	**0,8**	**0,8**	**0,6**
IK (j)	**2**	**1,8**	**1,6**	**1,6**	**1,2**

Comparing IK (i) indices for different companies allows identifying leaders and outsiders by the complexity of organizing the social investment process. The results of calculating the level of complexity of the company's social activity show that the complexity level of the social activity of LEGO companies is 1, which confirms the comprehensiveness and effectiveness of the company's responsible business policy. BOSCH is 0.9, 0.1 more than Michelin and IKEA, and 0.3 more than Myronovsky Hliboproduct.

The calculation of the indicator of a qualitative feature presence in the statistical sample of the surveyed companies suggests that the measure of the presence of social investment value in the activities of corporations LEGO (IR (j) = 2), BOSCH (IR (j) = 1,8), Michelin (IR (j) = 1.6), IKEA (IR (j) = 1.6) is significantly higher than this indicator in PJSC Myronovsky Hliboproduct (IR (j) = 1.2), which indicates that social investing and responsible investing in European companies is more effective than responsible investing in Ukraine.

Conclusions

On the basis of the conducted research of social investment development it has been determined that social investment is a tool of effective social responsibility realization for corporations and sustainable development enhancement of economy as a whole. The positive social and economic effects of social investment development include: increasing employment rates, improving health indicators, high scientific and technical potential, improving the quality of education, high housing availability, creating and improving transport infrastructure, improving the environmental situation, increase of investment attractiveness.

Analysis of the world investment market has made it possible to determine that Europe remains the largest region in the social investment market development. The practice of European corporations proves that higher financial performance is characteristic of companies that implement responsible investment projects. The leaders of socially responsible investment in Europe are France and England, whose share in the European social investment market is 46%. The main areas of social investment in these countries are climate change, environmental protection, the social sphere and governance.

Studies of the European experience of social investment development trends have shown that the main indicators of investment object selection for investors are: compliance with legislation, development and well-being of employees, confidentiality and protection of customer data, ethics and integrity, quality and value of services, engagement with local communities and receiving local communities support, environmental sustainability, innovation, economic efficiency. Based on the calculation of social investment index and comparative analysis of social investment development one can conclude the directions of social investment development in Ukrainian companies: increasing transparency of corporations, informing business awareness of social investment development in the national market, ensuring ethics of doing business and adhering to the principles of integrity in the implementation of company development strategies, improving product quality in accordance with international standards.

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Reducing the Value Added Tax (VAT) Gap on the example of ERP software

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Abstract

Member States in the European Union are losing billions of euros in value-added tax (VAT) revenues because of tax fraud and inadequate tax collection systems. The VAT Gap, which is the difference between expected VAT revenues and VAT actually collected, provides an estimate of revenue loss due to tax fraud, tax evasion and tax avoidance, but also due to bankruptcies, financial insolvencies or miscalculations. The purpose of the article is to show how to implement and provide a solution in Polish companies required by Polish government regulations in SAP ERP or S/4HANA systems, which significantly reduces the number of tax frauds.

Keywords: ERP systems, VAT Gap

Introduction

The tax on goods and services is one of the pillars of Poland's budgetary revenue. If this income is reduced, the state struggles to perform its functions.

As the irregularities have increased, reducing budgetary revenue, Poland's VAT gap has been in the political and media spotlight. The concept of the VAT gap is not defined in Polish law. It is an academic term used in reports, analyses and comparative studies. Its scope and how it is measured have been formulated by particular tax administrations and international organisations, such as the OECD and IMF. According to the United States' Internal Revenue Service (2018), the tax gap allows the scale of missing tax returns and unpaid tax to be measured. It is defined as the difference between the tax that should be paid and the amount that reaches the state budget (Małecka-Ziembińska, E., 2017). The Slovak Republic's Institute for Financial Policy of the Ministry of Finance has a more extensive definition: "The tax gap is the difference between the tax paid and the tax that should have been paid if all natural and legal persons declared their actions and transactions correct-ly, in accordance with the spirit and letter of the law (the provisions' wording and the legislator's intention). The tax gap is calculated after taking into account the costs of tax audits by the tax administration" (Institute for Financial Policy 2012).

For many years, organisations measuring the VAT gap warned that it was deepening in Poland, especially after 2008 (CASE, 2016, 2017, 2018), (PwC, 2015, 2017).

From January 1, 2020, an act was introduced in Poland introducing a new list of VAT taxpayers (the so-called "White List").

The list includes NIP (Polish Taxpayer Identification Number) and bank account numbers of VAT payers. If payments are made to an account other than indicated on the list, such expenditure will not

be treated as tax deductible from the PIT / CIT (Personal Income Tax / Corporate Income Tax) point of view. In addition, joint responsibility for the supplier's obligations regarding VAT will be disclosed.

In accordance with the provisions of Article 17 section 2a of the VAT Act, with regards to the exercise of due diligence, it is an obligation of a taxpayer to verify tax activities of their counterparty. Polish companies need to check the NIP (Polish Taxpayer Identification Number) and Bank Account Number against the White List published daily as the file on government websites by the Polish tax authorities. This file allows to verify whether the entity to whom the payment is made is an active VAT taxpayer or an entity exempt from VAT and whether the bank account number to which the transfer is made is registered in the White List database (MF, 2020).

Many Polish companies use the ERP systems. The term ERP abbreviated from "Enterprise Resource Planning", was introduced by the Gartner Group in the early 1990s (Arif, M., Kulonda, D. J., Proctor, M., and Williams, K., 2004) and represent computer and software systems that combine and integrate all related processes of the enterprise, and serve users for the management of all functions within the enterprise (Swartz, D., and Orgill, K., 2001). Researchers referred ERP systems as enterprise system (ES), enterprise resource management (Cobarsí, J., Bernardo, M., and Coenders, G., 2008), and business system respectively (Davenport, T. H., 1998, 2000). (Klaus, H., Rosemann, M., and Gable, G. G., 2000) conceptualized ERP System as comprehensive packaged software solutions of Information System (IS) designed to integrate all business processes and work to present a complete outlook of the business from a singular IT and information architecture (Klaus, H., Rosemann, M., and Gable, G. G., 2000). (Davenport, T. H., 1998) also described ERP an information strategy that merge all information within an organization and create a comprehensive information infrastructure involving all organizational units and functions. (Marnewick, C., and Labuschagne, L., 2005) clarified that ERP system is more than just a product or software and they further conceptualized ERP into four components. The first component is software component (Finance, Human Resources, Supply Chain Management, Supplier Relationship Management, Customer Relationship Management, Business Intelligence), which is the visible part to users and seen as ERP product. The second component is process flow, which deals with the information flow among modules within ERP system. Third is customer mind-set, that define the influence of ERP system on users, team, and organization. And the final component is change management, this component deals with the adoptability of ERP system implementation within the organization, that are user attitude, project changes, business process changes, system changes.

Many Polish large companies use the SAP ERP system. In this article is described an example implementation of functionality needed to check NIP (Polish Taxpayer Identification Number) or EU VAT ID when the user completes the NIP / EU VAT ID field, e.g. in transactions to create/modify supplier's basic data and when completing a one-time supplier's data in a document in the SAP system.

For the second option is to check of the data in the White List when the data of the supplier or recipient is saved in the SAP system. The system verifies in a flat file (White List) provided by Ministry of Finance the correct combination of the NIP number and bank account (MF, 2020).

Description of the solution in the SAP ERP or S4/HANA system

This section is divided into functional description and technical description

Functional Description

The control of NIP (Polish Taxpayer Identification Number) is carried out both for Polish Tax Identification Numbers as well as for tax identification marks in EU countries (EU VAT ID). Polish NIP numbers are verified based on two sources:

- checking only the NIP number.
- Flat file from the Ministry of Finance list: the so-called White List of VAT payers - pair checking: NIP number and bank account (MF, 2020).

For the first option, the control is called automatically when the user completes the NIP field, e.g. in transactions to create/modify supplier's basic data and when completing a one-time supplier's data in a document.

A check of the data in the White List takes place when the data of the supplier or recipient is saved. The system verifies in a flat file (White List) provided by Ministry of Finance the correct combination of the NIP number and bank account. If the system encounters the first inactive bank account, a warning is displayed. If you want the system to skip the checking of an inactive account, you need to enter 'X' in the 'Reference data' field.

Bank Details

Ctry	Bank Key	Bank Account	Acct holder	CK	IBAN	IBANValue	BnkT	Reference details
DE	68390000	1385291				DE03683900000001385291		X

Fig. 1: Bank details of supplier

Accounts marked in this way will also not be taken into account when creating payment proposals in F110 transaction.

In case that payments should be allow on inactive account the “Reference field” should be marked as “Y”.

Vendor 100105 Bären Auggen GmbH Auggen

Bank Details

Ctry	Bank Key	Bank Account	Acct holder	CK	IBAN	IBANValue	BnkT	Reference details
DE	68390000	1385291				DE03683900000001385291		Y

Fig. 2: Bank details of supplier

In other cases, i.e. when creating business documents (invoice, order, sales order, etc.), the control uses a standard SAP mechanism in the form of customer blocking at the business unit level. This status is updated once a day (or less frequently), e.g. at night, with the help of the provided report.

As a result of the control, the mechanism notifies the user with a message:

„NIP 999-999-99-99 inactive” or
„NIP 999-999-99-99 cannot be checked - notify the administrator” or
„NIP 999-999-99-99 is not controlled” (entity exempted from control) or
„NIP 999-999-99-99 active”

In the first two cases, the user's transaction is blocked by an error message (the tool's configuration allows to generate a warning message). In the system it is possible to process such NIP/transaction by a user with special privileges.

Each NIP check is saved in a LOG file, which can be viewed in a report prepared and delivered as part of the solution.

In addition, the solution includes a report that allows for managing supplier/recipient NIPs in the system on a mass basis. As a result of running such a report in real mode, suppliers/recipients with inactive NIP are blocked (test mode does not impose a blockade). Please note that selecting the option of checking the data in a flat file (White List) in real mode results in blocking the supplier or recipient in a situation when at least one of the bank accounts is inactive (accounts marked with an "X" in the Reference data field are omitted during checking).

Technical Description

To check if the Polish company's NIP (Taxpayer Identification Number) is valid, you need to create the SAP Web Service Consumer (Website URL: https://ppuslugi.mf.gov.pl/?link=VAT)

To control the EU VAT ID, you need to create also the SAP Web Service Consumer and verify the number in the VIES database of the European Commission (http://ec.europa.eu/taxation_customs/vies/).

To verify data against the White List, you need to download flat file (White List) from the website (MF, 2020) and store data to the database. There are several steps needed to be developed:

Prepare a data store for the White List content

The content of the White List file contains 3 parts of data for which you need to create database tables:

- **Header data**
  This part of the contains crucial information about the number of times the hash function has to be performed for the specific date of data publication.
- **Hash list**
  This list must be searched for given combination of Date & NIP Number & Bank Account Number. You can consider storing it in the form of 64-byte raw data to keep the key as short as possible. Otherwise, a 128-char long key is needed. The type of the partner can be also stored here.
- **Mask list**
  A list of 26-character long masks, which should be searched for the Bank Account number in case that searching for the explicit Bank Account number is unsuccessful (see the specification of the file (MF, 2020)). You can consider to store it together with a mask directly interpretable using ABAP tools (wildcard form or a regular expression).

Download and store the White List

This process should be scheduled every day based on the time the file is published by the PL Tax Authority.

- **Download the 7-zip file**
  Define a HTTP Connection to External Server in transaction SM59 to the PL Tax Authority server where the files are published.

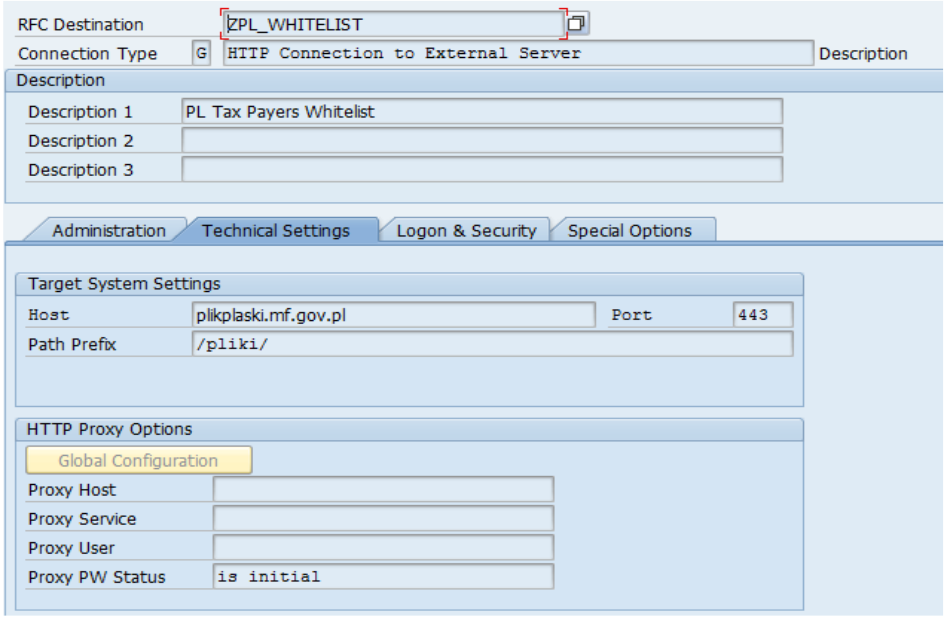

Fig. 3: Transaction SM59

Update the URL with the file name based on current date.
Use class cl_HTTP_Client to get the file and save it on the application server (filename can be specified based on logical file name defined in the transaction FILE).

- **Unpack the content of the file**
  The 7-ZIP format is not supported by SAP, you need to get a 3rd party software to unpack it depending on your OS, i.e. the p7zip package for Linux (Posix OSs) or an .exe program for Windows.
  Define an external OS command (using the transaction SM69) to run the unpacking tool with the appropriate parameter for extracting.
  Run this external command using the function module SXPG_COMMAND_EXECUTE.
  There a possibility to verify the checksum hash of the json file against the second file at this step.
- **Parse the JSON file**
  A data structure according to the JSON file content should be created and then the method Deserialize of the class /ui2/cl_JSON=>Deserialize can be used to parse the file.
- **Store the parsed data in the prepared tables**

Check a specific combination of Date & NIP Number & Bank Account Number

- **Create the search string**
  According to the specification of the White List, create a string consisting of the three attributes.
- **Create the hash**
  Perform the SHA512 function for the number of times specified by the header data for the given date. The method cl_ABAP_Message_Digest=>Calculate_Hash_For_Char can be used for this; be aware that the string must be lowercased in each pass.
- **Check presence of the final hashed string in the Hash list table.**

- **Use the Mask list**
  If the explicit Bank Account number is not found, select all masks from the Mask list table that the Bank Account number fit, mask the Bank Account number according to the PL White List file specification and repeat for it steps.

Then you need to find places in the source code of the SAP system where the veryfication of the NIP number, EU VAT ID and bank account are necessary (eg.: create vendor).

To verify the Polish NIP number we can use so called BTE Enhancements (business transaction events). For Polish NIP numbers is suitable the extension **BTE 00003050.**

To check EU VAT ID you have to implement the extension to **the EU_TAX_NUMBER_CHECK function module.**

To validate of correct combination of the NIP number and bank account you have to implement **BAdI BADI_OVF_PL_WHITELIST.**

At the end you need to create List of Tax Identification Numbers. The program will allow you to check the NIP / EU VAT ID status for selected/all clients. In addition, the program has the ability to block mass vendors/receivers with erroneous NIP / EU VAT ID.

Implementation of the solution in the SAP ERP or S4/HANA system

In this section is showed the source code of the Program for Downloading and Storing of Data from flat file (White List) (MF, 2020) (the most difficult part of the implementation). The program is written in ABAP (programming language in SAP system)

```
REPORT  ZPL_WHITELIST.

CONSTANTS: c_http_destination TYPE rfcdest VALUE 'ZPL_WHITELIST',
           c_uri_suffix       TYPE string VALUE '.7z'.

DATA: lo_http_client TYPE REF TO if_http_client.

PARAMETERS:
  p_valday TYPE sydatum DEFAULT sy-datum,
  p_filen  TYPE localfile DEFAULT '/tmp/PL_Whitelist.7z'.

****************** Download the 7-ZIP archive

CALL METHOD cl_http_client=>create_by_destination
  EXPORTING
    destination              = c_http_destination
  IMPORTING
    client                   = lo_http_client
  EXCEPTIONS
    argument_not_found       = 1
    internal_error           = 2
    plugin_not_active        = 3
    destination_not_found    = 4
    destination_no_authority = 5
    OTHERS                   = 999.

IF sy-subrc <> 0.
  MESSAGE ID sy-msgid TYPE sy-msgty NUMBER sy-msgno WITH sy-msgv1 sy-msgv2 sy-
msgv3 sy-msgv4.
```

```
ENDIF.

lo_http_client->request->set_method( if_http_request=>co_request_method_get ).

DATA(l_uri) = lo_http_client->request->get_header_field( name = '~request_uri' ).
CONCATENATE l_uri p_valday c_uri_suffix INTO l_uri.
lo_http_client->request->set_header_field( name = '~request_uri' value = l_uri ).
l_uri = lo_http_client->request->get_header_field( name = '~request_uri' ).
WRITE: / l_uri.

CALL METHOD lo_http_client->send
  EXCEPTIONS
    http_communication_failure = 1.

IF sy-subrc <> 0.
  MESSAGE ID sy-msgid TYPE sy-msgty NUMBER sy-msgno WITH sy-msgv1 sy-msgv2 sy-
msgv3 sy-msgv4.
ENDIF.

CALL METHOD lo_http_client->receive
  EXCEPTIONS
    http_communication_failure = 1
    http_invalid_state         = 2
    http_processing_failed     = 3
    OTHERS                     = 999.

IF sy-subrc <> 0.
  MESSAGE ID sy-msgid TYPE sy-msgty NUMBER sy-msgno WITH sy-msgv1 sy-msgv2 sy-
msgv3 sy-msgv4.
ENDIF.

DATA(l_answer) = lo_http_client->response->get_data( ).
WRITE: / 'Downloaded file size:', xstrlen( l_answer ).

OPEN DATASET p_filen FOR OUTPUT IN BINARY MODE.
TRANSFER l_answer TO p_filen.
CLOSE DATASET p_filen.
CLEAR l_answer.

****************** Unzip the archive
DATA:
  l_addparam  TYPE btcxpgpar,
  l_status    TYPE btcxpgstat,
  l_exitcode  TYPE btcxpgexit,
  lt_execprot TYPE dba_exec_protocol.

l_addparam = p_filen.
CALL FUNCTION 'SXPG_COMMAND_EXECUTE'
  EXPORTING
    commandname           = '7ZIP'
    additional_parameters = l_addparam
  IMPORTING
    status                = l_status
    exitcode              = l_exitcode
  TABLES
    exec_protocol         = lt_execprot
```

```
  EXCEPTIONS
    OTHERS              = 999.

IF sy-subrc <> 0.
  MESSAGE ID sy-msgid TYPE sy-msgty NUMBER sy-msgno WITH sy-msgv1 sy-msgv2 sy-
msgv3 sy-msgv4.
ENDIF.

WRITE: / 'Unzip: Status:', l_status, 'ExitCode:', l_exitcode.
LOOP AT lt_execprot ASSIGNING FIELD-SYMBOL(<ls_execprot>).
  WRITE: / <ls_execprot>-message.
ENDLOOP.
IF l_exitcode <> 0 OR l_status <> 'O'.
  WRITE: / 'Unzip failed.'.
  DELETE DATASET p_filen.
  EXIT.
ENDIF.

****************** Parse
TYPES: BEGIN OF lts_naglowek,
        datagenerowaniadanych TYPE dats,
        liczbatransformacji   TYPE string,
        schemat               TYPE string,
      END OF lts_naglowek,
      lt_c128(128) TYPE c,
      ltt_list     TYPE STANDARD TABLE OF lt_c128 WITH EMPTY KEY,
      ltt_mask     TYPE STANDARD TABLE OF char26 WITH EMPTY KEY,
      BEGIN OF lts_flatfile,
        naglowek                    TYPE lts_naglowek,
        skrotypodatnikowczynnych    TYPE ltt_list,
        skrotypodatnikowzwolnionych TYPE ltt_list,
        maski                       TYPE ltt_mask,
      END OF lts_flatfile.

DATA:
  l_filecontent  TYPE xstring,
  ls_filecontent TYPE lts_flatfile.

DATA: l_filename TYPE dxfilename.
CONCATENATE p_valday '.json' INTO l_filename.

OPEN DATASET l_filename FOR INPUT IN BINARY MODE.
READ DATASET l_filename INTO l_filecontent.
CLOSE DATASET l_filename.



* Parse the file
CALL METHOD /ui2/cl_json=>deserialize
  EXPORTING
    jsonx = l_filecontent
  CHANGING
    data  = ls_filecontent.
CLEAR l_filecontent.

* Store the data in the database.
DELETE FROM zpl_wl_head WHERE val_day = p_valday.
```

```
DELETE FROM zpl_whitelist WHERE val_day = p_valday.
DELETE FROM zpl_wl_mask WHERE val_day = p_valday.
DATA(ls_head) = VALUE zpl_wl_head( val_day = p_valday hash_cycles = ls_filecontent-
naglowek-liczbatransformacji ).
INSERT zpl_wl_head FROM ls_head.

WRITE: / 'Number of hash rounds:', ls_filecontent-naglowek-liczbatransformacji.
WRITE: / 'Hash "Czynnych" count:', lines( ls_filecontent-skrotypodatnikowczynnych ).
WRITE: / 'Hash "Zwolnionych" count:', lines( ls_filecontent-skrotypodatnikowzwolnionych ).
WRITE: / 'Mask count:', lines( ls_filecontent-maski ).

DATA: ls_hash TYPE zpl_whitelist,
      lt_hash TYPE TABLE OF zpl_whitelist.
ls_hash-val_day = p_valday.

ls_hash-type = 'C'.
LOOP AT ls_filecontent-skrotypodatnikowczynnych ASSIGNING FIELD-SYMBOL(<ls_list>).
  TRANSLATE <ls_list> TO UPPER CASE.
  ls_hash-hash = <ls_list>.
  APPEND ls_hash TO lt_hash.
ENDLOOP.

ls_hash-type = 'Z'.
LOOP AT ls_filecontent-skrotypodatnikowzwolnionych ASSIGNING <ls_list>.
  TRANSLATE <ls_list> TO UPPER CASE.
  ls_hash-hash = <ls_list>.
  APPEND ls_hash TO lt_hash.
ENDLOOP.

INSERT zpl_whitelist FROM TABLE lt_hash.
CLEAR lt_hash.

DATA: lt_masks TYPE TABLE OF zpl_wl_mask.
lt_masks = VALUE #( FOR l_mask IN ls_filecontent-maski ( val_day = p_valday mask = l_mask ) ).
INSERT zpl_wl_mask FROM TABLE lt_masks.
CLEAR lt_masks.

****************** Cleanup
DELETE DATASET l_filename.
CONCATENATE l_filename '.sha512sum' INTO l_filename.
DELETE DATASET l_filename.
DELETE DATASET p_filen.
```

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State of Transport Service in the City of Brno

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Abstract

Transport service is one of the basic requirements that creates the preconditions for the operation of the destination, especially when it comes to the concentration of a large number of people, the seat of industrial and other companies, including shopping centres, along with a number of architectural and tourist sights. It is not different in the second largest city of the Czech Republic with a population of 380,000 inhabitants. This number does not include daily commuting working people, university students and tourism participants, who increase this number by several tens of thousands. More than half a million people move around the city every day. In order for everyone to reach their goals, it is necessary to have a well-functioning transport network in the city. This applies not only to the city of Brno, but also to cooperation throughout the South Moravian Region. Thus, regional carriers (including Czech Railways) must work together to ensure coherent public transport. [1]

Key words: Transport Service, Transport Fleet, Transport Connection, Passengers

Introduction

The transport service of the territory as a public service is provided from the level of the state, region and municipalities. Each of these levels has its specific position and role. It is about ensuring adequate transport on all days of the week for reasons of public interest, especially travel to work, schools, offices, medical facilities, including THE transport back. Therefore, the following principles for ensuring the operation and development of public transport systems had to be divided according to these levels in order to allow their trans-regional integration. [1, 2]

The state is responsible for ensuring public service – transport services of the territory. By delegating this obligation in the form of self-governing powers to regions and municipalities, this obligation is not relieved.

The state obligations must then be assessed in two respects. The first is to ensure transport services of supra-regional importance, and the second is to create the conditions for ensuring transport at regional level, including the creation of conditions for mutual cooperation of regions towards trans-regional integration.

The main objectives of the Transport Policy of the Czech Republic, based on the EU transport policy, include creating conditions for the development of a quality transport system based on the use of technical, economic and technological characteristics of individual modes of transport, competition principles with regard to environment and public health. Brno, the second largest city in the Czech Republic, plays a decisive role in the fulfilment of the transport policy objectives in the Czech Republic and constitutes a significant conurbation.

The aim of the article is to analyze the current state of transport services of the city of Brno and its positive and negative aspects. Based on the analysis, the selected optimization solutions are designed to improve the quality of the detected state.

The article uses results based on publicly available data of the City of Brno, as well as data obtained from the verification of data from the Methodology - Ensuring Operation and Development of Public Transport Systems of Persons Supporting Trans-Regional Integration.

The findings and subsequent proposals are based on the SWOT analysis, which made it possible to define a strategy for the development of transport services in the city of Brno.

Current State of Transport Service in Brno

Public transport on the territory of Brno and its vicinity is provided by Brno Public Transit Co. Inc. The transport is realized by means of trams, buses and trolleybuses and in the summer season by boats. They are numbered 1 to 99, with night lines beginning with 89 and preceded by the letter "N". Out of the 99 lines, 60 are now operated by the public transport company, of which 9 are tram lines, 13 are trolleybuses and 38 are bus and 11 night bus lines and 4 are school lines. There are more than 480 vehicles on these lines daily. [3,4]

Transport fleet, its structure

The fleet of the City of Brno has 837 vehicles. There are 364 trams, 334 buses (of which 160 are CNG-powered) and 139 trolleybuses (of which 10 are partial with batteries). The transport company operates a much differentiated fleet. [5,6]

Number of passengers carried in recent years

According to the annual report of the Brno Public Transit Co. (BPTC) for 2017, we can say that the number of passengers increased by approximately 0.6% compared to 2016.

Table 1: Number of Passengers Carried in 2014-2017 [in thousands of people], Source: BPTC annual reports 2016, 2017

Vehicle	Year/Number of Passengers [in thousands of people]			
	2017	2016	2015	2014
Trams	196 021	193 590	193 647	195 350
Trolleybuses	44 693	46 679	45 448	43 731
Buses	115 612	114 488	115 594	114 859
Boats	245	244	211	175
TOTAL	356 571	355 001	354 900	354 115

The table shows that with each year the total number of passengers increases by hundreds of thousands of people. It is also possible to observe a fall in the number of passengers in trolleybuses by less than 4%. [6,7]

Transport Hubs

Brno has several important transport hubs. They are located very close to the city centre. These are the main railway station, Czech street (Česká), Mendlovo Square/náměstí. Other interchanges, mainly in relation to regional transport, are the stops Stará Osada, Jírova, Osová, Zoological Garden. The Central Bus Station is a separate hub where the bus connections of the Integrated Transport System depart to the entire South Moravian Region.

Frequency of Connections Through Traffic Hubs

With the help of the server Idos.cz a table was created with frequency of connections at larger traffic junctions in the city of Brno. The table is divided into several columns. The first column shows the name of the transfer node, the second shows the number of tram connections, the third shows the number of bus connections providing transport around Brno, the fourth shows the buses of regional lines and the last column shows trolleybus connections. The data was collected 7 February 2019 at 3 p.m. The time range is one hour.

Table 2 : Frequency of Connections through Traffic Hubs in 1 Hour

Frequency of Connections through Traffic Hubs in 1 Hour				
	Tram	Bus public	Bus REGIO	Troll
Main Railway Station	150	73	8	21
Česká	136	3	0	24
Mendlovo náměstí/Square	73	27	7	46
Stará Osada	0	79	15	6
Jírová	24	23	6	0
Osová	48	16	11	10
Zoological garden	60	17	6	9
Královo Pole, Railway Station	17	57	2	9
Bohunice Hospital	0	40	14	24
Central Bus Station	0	12	32	0
Data www.idos.cz/Departures 07.02.2019 3 p.m. * Main Railway Station lockout **Zábrdovický most/bridge lockout				

The table shows that most trams will pass through Hlavní nádraží/Main Railway Station with 150 vehicles, followed by the hubs Česká with 136 tram vehicles and Mendlovo náměstí with 73 rail vehicles. Buses will mostly pass through the Old Town with 79 vehicles, followed by the Main Railway Station with 73 buses and the Královo Pole Railway Station with 57 bus connections. Of course, the most regional connections are faced by the Central Bus Station with 32 connections, followed by Stará Osada with 15 connections and right behind it is the Bohunice Hospital stop with 14 connections. In trolleybus traffic, Mendlovo náměstí with 46 connections leads. The second most frequented trolleybus hub is run by the Česká and Bohunice Hospital stops with 24 connections, followed by Main Railway Station with 21 connections.

Positives and Negatives of The Transport in Brno

Positives

Information to passengers

Traffic information can be found on several platforms, whether in electronic or physical form. The current closures can be found on the Transport Company of Brno website (DpmB) as well as on the Facebook page of the transport company. There is also a Facebook profile "DpmB current", where you can find current specials or news from operation. Furthermore, the mobile application "DpmBinfo" is available for passengers, where you can find essentially the same as on the company's website. These include data about current departure, vehicle location, connection finder, enumeration of exclusions and updates (extraordinary), line diagrams or tariff information including SMS tickets. Throughout the IDS (integrated transport system), passengers can take advantage of the "IDS JMK Poseidon" application, developed by Kordis JMK, JSC.

In cars, a panel for displaying the line, driving direction and stops is standard as well as an acoustic stop announcement. Some cars also have LCD panels to display this information.
The transport company also informs its passengers by means of information leaflets and stands. Flyers and brochures are distributed in the case of closures by DpmB staff (whistle-blowers), who are available at the affected locations of closures or at hubs. Information racks are also located at lockout locations and provide a greater view of lockout content, such as maps or diagrams.

Night Connections

Night traffic around the city is very well thought out. This is provided by special bus lines, so-called delivers. 11 night lines ensure transport in Brno always after the end of daytime service until the early morning of the next day, when the daily lines depart again. These buses start their night ride at about half past eleven in the evening and end at about half past six in the morning (one hour later on non-working days). The specialty of these night connections is that 22 buses start at one time from one point to all directions. The point is Main Station and it usually happens every hour (the night before a non-working day (abbreviation NPD) every half hour) starting at 11 p.m., and then at 23.30, 0.00, and so every hour (with extra connections at 0.30, 1.30 and 4.30 in NPD) until the early morning.

Public Transport Preference

There is a preference for public transport vehicles around the city, which is a modification of the cycle of traffic lights at intersections when a public transport vehicle arrives. This change can be triggered by the vehicle control information system, which sends a request to the traffic light control system (SSZ), which then modifies the signal plan for the smooth passage of the car. The preference works on two principles – without dynamic control or with dynamic control of traffic lights – where without dynamic control SSZ only prolongs the phase (cycle) of the intersection and with dynamic control adjusts the whole control of the cycle as needed. An example would be a delayed tram that arrives at the junction and instead of waiting for the entire SSZ cycle, the tram waits only half a cycle, or the SSZ control system releases it immediately. Another example is stopping car traffic in front of a public transport stop for easier vehicle handling. Such an intersection can be found, for example, at Šilingrovo náměstí/square on Husova Street. [8, 9]

Alternative transport, reinforcement transport

The transport company has a sophisticated system of substitute (backup) transport. In the event of an accident or breakdown of the vehicle, the dispatching centre sends a replacement vehicle, usually a bus, to replace the missing link. These vehicles can be dispatched from the depot, but more frequent use is of stand-by (stand-by) buses standing at junctions, such as Main Railway Station, Mendlovo náměstí/square or Stará Osada. The dispatching centre always tries to remedy the traffic as quickly as possible, which is often secured within a few minutes of reporting an emergency.

According to the observations made, it can be stated that transport is also very well ensured during sporting or cultural events, such as ice hockey matches or the annual Ignis Brunensis fireworks show. For these events there are prepared reinforcement links and after the event distribution of visitors to their homes. [10]

Less air pollution during bus operation

The air around us is increasingly polluted by so-called greenhouse gases, a mixture of carbon dioxide, methane, nitrogen dioxide, hydrogen fluoride and water vapour. These gases contribute to global warming and thus to the destruction of our planet. Therefore, the transport company decided to improve the situation on the territory of Brno and since 2014 the transport company has started to gasify the bus fleet. That year, the first 12 buses for compressed natural gas were delivered and at the same time a filling station was built in the depot of Slatina. The start of delivery of 160 low-floor buses (including articulated buses) to CNG, which was completed in 2018. A total of 4 types of these buses now run around the city. These include the Iveco Citelis 12M CNG, the Iveco Urbanway 12M CNG, the Iveco Urbanway 18M CNG and the SOR NBG 12. [11]

Air conditioning in passenger lounge

Air-conditioned space for passengers was not always obviousness in public transport in Brno. The cars had air conditioning only in the driver‘s cabin, not in the passenger lounge. Since 2018, the Public Transit Company has also started to install passenger air conditioning in its Urbanway 12M CNG buses and by April 2019 all 56 buses of this type should have been air-conditioned. They won‘t be the first cars with air conditioning. The company also owns an additional 60 buses and 11 air-conditioned trolley buses in which the air-conditioning is located.

Negatives

Traffic Jams

Traffic congestion is created on some roads due to higher traffic density. This negatively affects the smoothness of public transport. If the vehicle gets into such a situation, it can take up to several minutes delay. This disrupts the circulation on a given line and creates gaps between individual links, which may affect the continuity of other lines. The worst sections are the city circuits, especially in the vicinity of Zvonařka (Olomoucká - Hladíkova - Zvonařka - Opuštěná), Židenice (Otakara Ševčíka, Gajdošov, Svatoplukova to Provazníkova) and also in Komárova (Hněvkovského and Svatopetrská streets) or in Štýřice in Jihlavská street.

Missing additional reporting in cars

In the case of an ongoing exclusion, information is provided to passengers via leaflets and in electronic form. Awareness would be further improved if the exclusion report was made directly in the car on the lines concerned.

Overcrowded vehicles

During morning and afternoon peak times, or rush hours, on some lines, the capacity of the cars is not sufficient and the connections are overcrowded. Such situations occur mainly on tram lines 1, 4, 8 and 12 and also on bus lines 44, 50, 53, 61, 67 and 84. However, this problem is difficult to solve. In most cases, this can be solved by inserting another joint at a given time. But then it is necessary to solve what to do with the vehicle as soon as the onslaught of passengers fades away so that the car does not run unused (does not run empty). The solution is to transfer the car to another line (so-called crossing) and thus help another line. However, such behaviour is more demanding in terms of planning and must be analysed and evaluated in detail. Another solution is to purchase cars with a higher passenger capacity, but this solution is more expensive.

Based on the above mentioned information, a SWOT analysis was prepared, on which the strategy for transport services of the city of Brno is based.

Table 3: SWOT analysis

SWOT analysis	+	-
Internal factors	• Central management of transport services • Sophisticated alternative transport system • Wide structure of transport routes	• Overcrowded vehicles in peak hours • Delay reports missing in vehicles • Lack o air conditioning in part of vehicles
External factors	• Extending dynamic traffic management • • Reducing environmental pollution • • Purchase of new tram and trolleybus trains • • Tram length adjustment	• High traffic density - congestion • • High prices of new means of transport • • Insufficient length of tram stops • High costs of public transport implementation

From this SWOT analysis a strategy was chosen that counts on the purchase of new means of transport for the city of Brno and completion of public transport stops technically corresponding to newly purchased trams.

Lack of two-way trams

The Brno Transport Company has 38 KT8 type two-way trams in its fleet. Many of them were purchased in 1989 and even though they have been modernized during that time, their end of life is approaching. Modernization means complete renovation and adding a low-floor part to the middle section. A low number of these cars can be considered as a negative. 18 cars are needed daily on the line No. 8, which is the only one not to have a loop at one of its end stations but a deadhead. Other cars are dispatched by the guarantors of low-floor connections on other lines. So, if there is a lockout where double-sided cars are needed, there is a complicated scheduling of the line service.

The solution is to eliminate the problem of lack of double-sided trams. This may be a proposal for the purchase of suitable cars for operation in the Brno environment together with a quantification of the costs of their purchase and maintenance.

By surveying the market for low-floor bidirectional trams, suppliers from the Czech Republic offer the best pricing. Pragoimex, JSC. and Škoda Transportation, JSC.

The required parameters could be met by 4 types of trams, which are Škoda Transportation For City Smart, For City Alfa, For City Plus and Pragoimex Vario LF3 / 2. The cars meet the requirements based on low floor and manoeuvrability to meet current traffic needs.

All cars are on a chassis with a gauge of 1435 mm and a width of 2500 mm. The cars have air conditioning in the passenger lounge and in the driver‘s cabin and a camera system.
It should be noted that the For City Smart and Alfa models are so far only catalogue cars, i.e. they do not run anywhere in normal operation, and therefore some figures may differ during implementation.

Table 4 : Table of technical information of trams, source Škoda catalogue and Pragoimex website.

Model	Vehicle length (in mm)	Number of sections	Number of seats	Maximum occupancy (4 ps/m^2)	Maximum speed (in km/h)	Low-floor
For City Smart	37 140	3	72	313	80	100 %
For City Alfa	41 000	4	62	238	70	100 %
For City Plus	41 360	5	66	339	80	92 %
Vario LF3/2	30 100	3	54	194	65	50 %

The first option is the For City Smart model. The selected variant has 3 sections with a total length of 37,140 mm. It is 100% low-floor and the design speed is up to 80 km/h. Maximum occupancy is up to 313 people (72 of whom are seated).

The second option is the For City Alfa. The selected variant has 4 sections with a total length of 41,000 mm. It is 100% low-floor and design speed is up to 70 km/h. Maximum occupancy is up to 238 passengers (of which 62 are seated).

The third option is the For City Plus. The selected variant has 5 sections with a total length of 41,360 mm. The low floor is 92% and the design speed is up to 75 km/h. Maximum occupancy is up to 339 people (66 of whom are seated).

The last variant is the Vario LF3/2. This version has 3 sections with a total length of 30,100 mm and is the closest to the replacement type KT8. However, the low floor ratio is only 50%. Design speed is up to 65 km/h. Maximum occupancy is up to 194 persons (54 of whom are seated). [13, 14, 15, 16, 17]

The three-section For City Smart model with a total length of 37,140 mm has become the recommended model among the proposed vehicles. This model was chosen on the basis of a good occupancy / length ratio. Estimated price of one vehicle is 55,000,000 CZK without VAT.

Picture 1 : Visualization of a tram - profile, source: Škoda catalogue

Visualization of the tram is not given, but the design can be inspired by a similar order of the Pilsen Transport Company for two-way three-section cars with dimensions up to 33 meters. [18]

Picture 2: Graphic visualization of the Pilsen order, source: PMDP press release

In terms of utilization and coverage of transport needs, it would be optimal to deliver 15 vehicles in the total price of CZK 825,000,000 excluding VAT. The delivery date is unclear, as other fleet renewal orders are planned in the near future. Implementation could be considered between 2022 and 2025. Financing would be provided mainly from the own resources of the transport company with an agreed repayment schedule and would be partly solved by subsidies from the European Union.

Simultaneously with the introduction of new tram sets with a tram length of 37 meters, it will be necessary to extend some tram platforms on the route of line No. 8, where these trams would be dispatched. These are mainly areas in Bohunice and Starý Lískovec. Overall, the transport company would have to adjust 6 stops as follows:

- Dunajská stop (extension to the centre by 4 m, shift from the centre by 5 m forward, shift of the pedestrian crossing by 5 m)
- Švermova stop (extension to the centre by 4 m)
- Běloruská stop (extension to the centre by 4 m)
- Krematorium stop (extension from the centre by 3 m, to the centre by 3 m)
- Bělohorská stop (extension from the centre by 2 m, to the centre by 2 m)
- Mifkova stop (extension by 3 m)

In total, it is an extension of 25 meters of tram stops (sidewalks), one shift of the pedestrian crossing over the rail superstructure and two shifts of stop markers (including cabling to electronic panels). Estimated price of adjustments is up to 200,000 CZK without VAT. [19]

Conclusion

The transport service of the city of Brno represents an important attribute of the life of the inhabitants, but also of all participants of tourism, which represents a very important part of its

activities in the city. Finding ways to improve the current situation and its strategic planning is an important part of the city‘s development.

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Vulnerability Index Analysis For Sustainability of The Upper Citarum Watershed Ecosystem Function

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Abstract

Citarum is the largest and longest river in West Java Province, Indonesia with a watershed area of 6614 km^2 and river length of 297 km. Citarum River plays an important role for socio-economic life, especially in West Java and DKI Jakarta. Citarum is also a major water supplier for industrial activities, however, in the last twenty years, environmental conditions and water quality throughout Citarum have been deteriorated. The impact of deteriorating water quality from the Citarum River is broadly classified into health effects and environmental degradation also impacts the Upper Citarum River Basin. Therefore, vulnerability index analysis is very necessary to assess the condition of the Upper Citarum Watershed. The vulnerability index method is a combination of two indexes, namely the water stress index and adaptive capacity index. Data collection methods used in this research are literature review. The findings of this study can be used for further research, namely the calculation of vulnerability index. This research aims to find out what intervention strategies are appropriate to maintain the sustainability of river ecosystem functions. In this study an appropriate method was analyzed to achieve the sustainability of the function of the Upper Citarum Watershed Watershed by calculating the vulnerability index. After analyzing the vulnerability index, the intervention strategy is carried out to maintain the sustainability of the river ecosystem function. The intervention strategy consists of social inteventions, extended producer responsibility (EPR) and corporate social responsibilty (CSR), and policy interventions, which used to sustain the function of the Citarum River ecosystem.

Keywords: Citarum; River; Vulnerability Index; Intervention Strategy; Sustainability

Introduction

As evidence of damage to water catchment areas, especially rivers in Indonesia, there has been an increase in critical watersheds every year. Water crisis is closely related to the sustainability of river ecosystem functions, especially in the upstream area. In 1984 there were twenty four critical watersheds and then increased to thirty nine critical watersheds in 1992, increased again to fifty nine critical watersheds in 1998, and in 2003 increased to sixty two critical watershed. Of the sixty two critical watersheds as many as twenty six critical watersheds are located in Java (Sudodo and Prastowo, 2005). According to data from Sarana Multi Infrastruktur Persero (2017), it is estimated that the supply of clean water needs in Indonesia is mostly, around 60% done through piped water while the remaining 25% is sourced from springs and 15% from ground water. Demand for water will continue to increase with regional growth and population growth.

Based on data from the Ministry of Public Works, the regions of Java and Bali have the highest level of surface water demand compared to other regions, both for domestic and irrigation needs, as well as for industrial needs. Since the early 1990s, the two islands have experienced water balance deficits in the dry season. This is in line with the population density in Java and Bali which reaches 62% of the total population of Indonesia. Java as an industrial development center also plays a role in the water balance deficit while the potential of water resources in the region is very limited, less than 10% of the total national water availability.

Related to the water availability, quoted from "Analysis of Java Island Water Balance", Nugroho (2007) stated that around 77 percent of districts/cities in Java experienced a water deficit and is expected to increase to 78.4 percent in 2025. Particularly in the Greater Jakarta Area, where water supply is relatively secure, in 2003 around 50 percent of districts and cities experienced a water deficit and is expected to increase to 100 percent by 2025. It is estimated that the water balance deficit throughout Indonesia, especially in the dry season, will increase in 2025 if there is no improvement to the national water infrastructure.

The rate of population growth greatly affects the increasing need for clean water. In accordance with SNI standards in 2002, the domestic water requirement for urban residents is 120/liter/day/capita, while the rural population is 60 liters/day/capita. Projected population growth conducted by the Central Statistics Agency (BPS) shows that Indonesia's population is expected to continue to increase from 238.5 million in 2010 to 305.6 million in 2035. The need for clean water for households in 2010 is estimated reached 7.8 billion cubic meters. It is predicted that household water needs will continue to increase to 11.15 billion cubic meters in 2035.

The need for clean water continues to increase while the availability of clean water decreases causing environmental problems for the community. In 2025, the International Water Institute, mentioned Java and several other islands included in the region of the water crisis. Based on the study of Water Resources Development (1990), in 1990 Java had experienced a water deficit, from the needs of 66.336 million m^3/year it could only provide 43,952 million m^3 /year. Pitono (2003) also assessed that in the dry season of 1993, 75% of Java had experienced drought due to water deficits and it was estimated that 17 water deficits would increase in 2000 to 56%, an alarming number and need to be watched as carefully as possible. This is also caused by the declining quality of the river.

Citarum River is one of the rivers in West Java with an area of watersheds of 6614 km ^{2} and river length of 297 km. The Citarum River crosses 10 districts and 3 cities in West Java. The geographical location of the Citarum River is 106°51'36 "- 107°51' East Longitude and 7°19' - 6°24' South Latitude. Citarum River has 3 large reservoirs that are used to supply water for irrigation, fisheries, and hydropower, namely Saguling, Cirata, and Jatiluhur. Land use around the Citarum watershed is settlement, agriculture and fisheries (Utami, 2019) . The Citarum watershed is divided into three parts namely upstream, middle and downstream (Bappenas, 2018).

The impact of deteriorating water quality from the Citarum River is broadly classified into health effects and environmental degradation. This also impacts on the Upper Citarum (Salim, Triharyanto, & Gunawan, 2005). The Citarum Hulu watershed area from Bandung Regency (29 sub-districts), Cimahi City, Bandung City with 26 sub-districts and part of Sumedang District (Cikeruh, Tanjungsari and Cimanggu Sub-Districts) traversed by the Citarum Hulu DAS. It is part of the regency and city areas in West Java province that are traversed and influenced by the Citarum River Basin. The study area of the Upper Citarum Watershed is an area or region in which there is the capital of West Java Province, Bandung (Wilda, 2018).

Geographically the Upper Citarum Watershed is located between 107º30 '-108º East Latitude and 6º43'LS - 7º15 South Latitude with the following boundaries:

a. North side is bordered by Purwakarta Regency and Subang Regency.
b. West side is bordered by the western part of Bandung Regency.
c. East side is bordered by Sumedang Regency and Garut
d. South side is bordered by Cianjur and Garut Regencies.

Changes in river hydrological conditions greatly affect people's lives at local, regional and global scales. Therefore, since more than 40 years ago, researchers in the field of water have stated the importance of integrating social sciences into hydrology in order to understand the relationship between the community and the water system (Xu, Scrooge, Wheater, & Kajikawa, 2018).

Sustainability of ecological functions Watershed River Upper Citarum threatened, its main function is as a source for drinking water and clean water show was an interruption in the socio-hydrological system in the basin. Human behavior is one of the important factors causing ecological damage and

decreasing water quality in the Citarum River. Good or bad water quality, one of which can be influenced by the presence or absence of water pollution. Therefore, the vulnerability index analysis method is obtained to determine the condition and sustainability of the function of the ecosystem of the Upper Citarum River Basin.

Based on Babel *et al*. (2011), water system vulnerability can also be defined as the ability of water systems consisting of environmental components or physical components and socio-economic components, to continue to function in conditions of change, both socio-economic changes due to development or environmental changes due to climate change. Vulnerability is expressed as a function of water stress and adaptive capacity. Water stress is associated with environmental and socio-economic changes. Adaptive capacity is associated with the capacity of people and ecosystems to deal with pressure.

According to Jaramillo *et al*. (2018), quantitatively, resilience can be reflected as a vulnerability index value . Vulnerability is defined as the potential for a system to experience damage. The two main indicators of vulnerability are water stress and adaptive capacity. Water stress is a variable associated with changes in hydrological conditions and socio-economic changes. Adaptive capacity is a variable associated with community capacity and the ability of ecosystems to deal with pressure. The results of the measurement of vulnerability index in a river basin will be translated as the resilience level of the river's socio-hydrological system. High vulnerability index value can be interpreted as a low level of resilience, and vice versa. Furthermore, the results of resilience analysis can be used as a basis for the formulation of a more appropriate and comprehensive water management system for the sustainability of river ecosystem functions.

In this study an appropriate method was analyzed to achieve the sustainability of the function of the Upper Citarum Watershed Watershed by calculating the vulnerability index. Formulas for calculating vulnerability index will be explained in detail in this article. After analyzing the vulnerability index method, then an intervention strategy is carried out to maintain the sustainability of the river ecosystem function. The intervention strategy consists of social inteventions, extended producer responsibility (EPR) and corporate social responsibilty (CSR), and policy interventions, which used to sustain the function of the Citarum River ecosystem.

Data collection methods used in this research are literature review. The findings of this study can be used for further research, namely the calculation of vulnerability index. The right calculation will affect the sustainability of the function of the Upper Citarum Watershed. In addition to finding the right method, this research aims to find out what intervention strategies are appropriate to maintain the sustainability of river ecosystem functions.

Methode

The method of this research is literature review with output intervention strategies for sustainability assessment function river ecosystem. The study of intervention strategies was carried out using descriptive analysis method. The key literature in this study is Jaramillo *et al*. (2018) and Babel *et al*. (2011). According to Jaramillo *et al*. (2018), vulnerability is defined as the potential for a system to experience damage. So, the vulnerable condition is a condition that is not resilient. The two main indicators of vulnerability are water stress and adaptive capacity. Based on Babel *et al*. (2011), vulnerability is expressed as a function of water stress and adaptive capacity. Water stress is associated with environmental and socio-economic changes. Adaptive capacity is associated with the capacity of people and ecosystems to deal with pressure.

The application of the vulnerability index method has not yet been carried out in the Citarum River in Indonesia, which is why this research has the potential to become a sustainable research.

Discussion

River is channel open that occurs naturally in the earth's surface, not only holds water but also stream it from the upstream toward the downstream and into the estuary (Junaidi, 2014). According to Putra (2014), a river can be interpreted as an open flow with a geometric size (visible latitude, elongated profile and slope of the valley) changing with time, depending on discharge, base material and cliffs,

as well as the amount and type of sediment transported by water. Based on the above opinion it can be concluded that the river is a container or natural or artificial channel in which it not only holds water but also flows from upstream to the estuary.

Changes in river hydrological conditions greatly affect people's lives at local, regional and global scales. Therefore, since more than 40 years ago, researchers in the field of water have stated the importance of integrating social sciences into hydrology in order to understand the relationship between the social with the water system (Xu, Scrooge, Wheater, & Kajikawa, 2018)

The sustainability of the Citarum River's ecological functions is threatened , therefore in this study a socio-hydrological review is needed, the main objective being to analyze and predict dynamics in the hydrological and social systems, and the interrelationships between the two, as a basis for analyzing vulnerability strategies that can encourage the achievement of sustainability functions ecological in water source ecosystems (Sivapalan et al., 2014). It can be said that the socio-hydrological system loses its ability to function is a system vulnerable, which has been declining resilience (Folke, 2006). Biggs et al., 2015 states that resilience is an approach that can also be used to analyze the level of sustainability in the Citarum river ecosystem because a vulnerability index measurement is needed .

According to Jaramillo et al. (2018), quantitatively, resilience can be reflected as a vulnerability index value. Vulnerability is defined as the potential for a system to experience damage. So, the vulnerable condition is a condition that is not resilient. The two main indicators of vulnerability are water stress and adaptive capacity. Water stress is a variable associated with changes in hydrological conditions and socio-economic changes. Adaptive capacity is a variable associated with community capacity and the ability of ecosystems to deal with pressure. The results of the measurement of vulnerability index in a river basin will be translated as the resilience level of the river's socio-hydrological system. High vulnerability index value can be interpreted as a low level of resilience, and vice versa. Furthermore, the results of the vulnerability analysis can be used as a basis for the formulation of a more precise and comprehensive water governance system.

Citarum River is the longest and largest river in West Java. The upstream of the Citarum River starts from Wayang Mountain, Bandung Regency and ends at the mouth of the Java Sea which is located in Muara Gembong, Bekasi Regency. The Citarum River plays an important role as PDAM drinking water, supplying electricity in Java-Bali and providing irrigation rice fields in West Java (Pratiwi, 2018). The Natural Resources Research and Development Center and West Java BPLHD state that the water quality conditions of the Citarum River have not been able to meet water quality standards throughout the year, especially in the dry season based on SK. West Java Governor No. 39/2000. Citarum River is still categorized as a heavily polluted river (BPLHD, 2013).

In addition, pollution of the Citarum river water especially in the upstream areas is increasingly being reported, research shows that river water quality has drastically decreased where 127 km or 47.1% of the Citarum river has been heavily polluted, it is estimated, every day the Citarum River holds 280 tons of waste. In 1992 domestic contributed 55%, industry 40%, agriculture and livestock 50% pollutant burden on the Citarum River. One of the main causes of pollution in the Upper Citarum River is agricultural activities around the watershed. The following is a method of vulnerability index analysis to determine the condition and sustainability of ecosystem functions in the Upper Citarum River Basin.

The Vulnerability Index (VI) method is a combination of two indexes, namely the Water Stress Index (WSI) and the Active Capacity Index (ACI). The combination is formulated to be the ratio of WSI to ACI, so that high water stress will reflect a high vulnerability. Classification of the status of vulnerability in a river basin based on Yohe *et al.* (2006) are as follows:

VI < 1 : no vulnerability or very small vulnerability;
VI = 1-2 : moderate vulnerability;
VI = 2-3 : significant vulnerability;
VI > 3 : extreme vulnerability due to stress levels that have damaged the ability to adapt

Vulnerability Index Formula :

$$Vulnerability\ Index\ (VI) = \frac{Water\ Stress\ Index\ (WSI)}{Adaptive\ Capacity\ (AC)}$$

Water Stress Index Measurement Method

Water stress indicates the pressure on the ecosystem of water sources originating from socio-economic activities and environmental changes. Water stress is also a major parameter of damage to fresh water sources. Water stress is defined into 4 main parameters to reflect these pressures, namely Water Variation (WV), Water Scarcity (WS), Water Explotation (WE) and Water Pollution (WP). These four parameters are normalized on a scale of 0-1 and 1 reflecting the highest level of stress . Water Stress Index (WSI) is the sum of 4 (four) indicators that have been weighted. WSI is calculated as a result of the sum of the four variables that have been weighted (Babel *et al*., 2011).

The WSI formula is as follows:

$$WSI = \sum_{i=1}^{n=4} wiWPi$$

Water Resource Variation (WV) is a parameter used to calculate potential water shortages caused by variability in water sources. Variations in water resources over the years determine the reliability of annual water availability. To reflect variations in water resources over the long term, the coefficient of variation (CV) of rainfall over the past 30 years was calculated, with a setting of 0.30 as a critical level of variation (Huang and Cai, 2008). CV is calculated as the ratio of the standard deviation of the average value of precipitation (rainfall).

Water Resource Variation (WV) formula :

WV= $\frac{CV}{0,3}$, jika CV < 0,3

WV=1 , jika CV ≥ 0,3

Information:

WV = Water Resource Variation,
CV = Coefficient of Variation

Water Scarcity (WS). This parameter connects water resources with population and is defined as the ratio of the Falkenmark threshold value of 1700 m^3/person/year (Falkenmark and Widstrand, 1992) for water stress and the availability of water resources per year per capita, in a river basin. This parameter is designed so that if the value increases, the overall value of water stress will increase, and then the vulnerability will increase. Although the water scarcity threshold can vary by region, community group and social class, it has been established as a constant using the Falkenmark threshold value.

Water Resource Scarcity (WS) formula:

WS = $\frac{1700}{WR\ per\ capita}$,

if WR per capita > 1700 m^3/year

WS = 1, if WR per capita is ≤1700 m^3 / year

Information:

WS = Water Scarcity
WR = Water Resource

Water Resource Exploitation (WE). This parameter shows the level of development of water resources, for example the ratio of water utilization to exploitable water resources, which is also used to show the inability of river areas to carry out healthy renewable processes. A threshold value of 40% is set as a critical threshold (UNCSD, 1997).

$$WE = \frac{\frac{Total\ Penggunaan\ Air}{Ketersediaan\ Sumberdaya\ Air}}{0{,}4}$$

if (Total water use/availability of water resources) <0.40 ,

WE = 1

if (Total water use/availability of water resources) ≥ 0.40

Information:

WE = Water Exploitation (WE)

Water Pollution (WP). The development and use of water, in addition to influencing the cycle and hydrological process, will also produce waste and pollute the ecosystem of water sources. Thus, the contribution of water pollution to water resource vulnerability is represented as the ratio of the volume of liquid waste (WW) to the availability of water resources (WR) in a river basin. The critical level of discharged liquid waste discharged into the river is 15% of the available water resources (Babel and Wahid, 2008).

$$WP = \frac{\frac{WW}{WR}}{0{,}15}, \text{ if } \frac{WW}{WR} < 0.15$$

$$WP = 1, \text{ if } \frac{WW}{WR} \geq 0.15$$

Information:

WP = Water Pollution
WW = Wastewater
WR = Water Resources

Adaptive Capacity Measurement Method

The ability to adapt to water scarcity is very important when the availability of clean water resources becomes a limiting factor to meet the needs of clean water. To strengthen the capacity of adaptation it is very necessary to understand the current capacity and explore the potential to increase the capacity. The overall adaptation capacity of social systems and ecosystems is stated in 4 (four) parameters, namely natural capacity, physical capacity, human resource capacity and economic capacity . These parameters are defined so that they are normalized on a scale of 0-1, where scale 1 shows the highest adaptation capacity limit. In contrast to the water stress parameter where a value of 1 reflects high vulnerability, the adaptive capacity parameter of value 1 means that vulnerability is low or ignored.

Natural Capacity (NC). Removing vegetation from the land will change the hydrological cycle and will contribute to the vulnerability of water source ecosystems. Therefore, the natural capacity parameter is defined as the percentage of vegetation cover (eg forests or wetlands) in a river area.

Natural Capacity Formula:

% vegetation cover

Physical Capacity (PC). This parameter reflects the integrated capacity of all stakeholders ranging from farmers and local communities to local and central government in managing water to meet water needs. The main indicators are the coverage of irrigation services and the coverage of clean water services, each of which is used with appropriate weighting to represent physical capacity . In areas with considerable industrial activity, water use for industry is also used as an indicator. Higher service coverage shows the availability of physical infrastructure and adequate financial resources to treat and utilize water, and reduce the possibility of continuous exploitation of water resources in the future (reducing water stress in the future). These indicators are associated with high adaptive capacity in the system to deal with stress .

Physical Capacity formula:

PC = (w1 X Coverage of Irrigation Services) + (w2 X Coverage of Clean Water and Drinking Water Services)

Information:
PC = Physical Capacity
w1 = Percentage of water use for irrigation against total water use
w2 = percentage of water use for drinking water and clean water for total water use

Human Resources Capacity (HRC). This parameter reflects social resources to adapt and meet other human needs. This parameter also shows how flexible individuals in society can adapt to new conditions or new life patterns that occur due to water stress . This parameter is guided by the idea that the working-age population and the educated population have a greater adaptive capacity to deal with water stress . An aggregation of two indicators, namely the literacy rate and economically active population , with a balanced weighting on both, is used to calculate HRC.

Economic Capacity (EC). This parameter is used to explore the level of access to technology and financial resources that can be used to adapt to water stress . The key indicator of this parameter is people's per capita income. This parameter is expressed as a normalized GDP index on a scale of 0-1. The aggregation of 2 (two) indicators, namely the GDP index and the contribution of non-agricultural income as% of total income, with a balanced weighting in both, is used to estimate the economic capacity of the community to deal with water stress.

Economic Capacity Formula:

$$GDP\ Index = \frac{\log(per\ capita\ income) - \log(min)}{\log(max) - \log(min)}$$

Information:

The maximum and minimum values used are based on the Human Development Index by UNDP (2006), which is 40,000 USD (max) and 100 USD (min).

Furthermore, after analyzing the vulnerability index, intervention strategies can be determined for the sustainability of river ecosystem functions.

Intervention Strategy

According to Winardi (2001), strategy is a group of decisions, about what goals will be achieved, the actions needed, and how to utilize resources to achieve these goals. According to Effendy (2003), strategy is planning and management to achieve goals. Meanwhile, according to Adnanputra (2005), strategy is an integrated part of a plan, where the plan is a product of planning which in the end planning

is a basic function of the management process. Vulnerability intervention strategies consist of social interventions, extended producer responsibility (EPR) and corporate social responsibility (CSR), and policy interventions.

Social Intervention

Social intervention is an action that aims to help individuals or groups or families or communities in the context of their social life (Hardjomarsono, 2014). The implementation of the intervention will involve three sets of values that are held, namely (1) personal values, (2) professional values, and (3) values from the wider community (Morales & Sheafor, 1977). In the process of the growth and development of an individual as a member of an adult society the process of absorption of community values occurs by individuals through the process of socialization (Hardjomarsono, 2014).

Extended Producer Responsibility (EPR) and Corporate Social

Responsibility (CSR)

Extended Producer Responsibility (EPR) according to the Organization for Economic Cooperation and Development (OECD) is a policy approach in which producers are given significant responsibility, financially and/or physically-for the care or disposal of post-consumer products. This in principle can provide incentives to prevent waste at the source, promote product design for the environment and support the achievement of product recycling. According to (Wibisono, 2007), CSR can be defined as: corporate responsibility to stakeholders to act ethically, minimize negative impacts and maximize positive impacts that include aspects of the social economy and environment (triple bottom line).

Policy Intervention

Policy interventions involve any action, program or activity taken or mandated by national or international authorities and non-state actors with regulations. Examples include market-based incentives, information schemes and infrastructure provision. Policy interventions often discuss various steps including technology, processes, practices, and behavior (IIIEE, 2019).

Sustainability of River Ecosystem Functions

The river ecosystem needs to be maintained because it has an important role to play in the survival of humans and living things. The main function of the river is as a carrier of water and sediment. Broadly speaking, the main components of rivers can be divided into two, namely watersheds (DAS) and river systems (Kodoatie & Sjarief, 2010). In its role of channeling water from watersheds to the sea, the role of rivers as an element of the ongoing hydrological cycle plays a very important role, besides that rivers carry deposits of erosion and pollutants and participate in the continuation of erosion cycles. These two roles affect the balance of ecosystems and the sustainability of river ecosystem functions (Herlina, 2011).

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Conclusion

To assess pollution in the Upper Citarum River Basin, a vulnerability index assessment method is needed which is a combination of 2 (two) indexes, namely the water stress index and the adaptive capacity index. Furthermore, the vulnerability index method analysis, carried out intervention strategies to be able to maintain the sustainability of river ecosystem

functions. Vulnerability intervention strategies consist of social interventions, extended producer responsibility (EPR) and corporate social responsibility (CSR), and policy interventions.

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Moderationas A Form of Group Work in The Teaching Process

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Abstract

These theoretical inquiries aim to identify the essence, the significance and the specificity of moderation as a method of group work in the teaching process in higher education settings. The application of moderating solutions affords adults a range of opportunities, including (1) competition, which results in enhancing the effectiveness of their learning processes; (2) participation in open discussions; (3) the creative exploration of solutions, drawing on a range of varied positions; (4) the establishment of partnerships and the development of collaborative capacities. Moderation offers an excellent alternative to the expository methods which are commonly applied in higher education.

Keywords: Moderation, Group Work Form, Teaching Process, Higher Education

As ubiquitously observable today, information society is developing new principles that inform functioning across its various spheres, including social, cultural, economic and political life. Universities and research institutions are not to only actors to introduce new theories, solutions and concepts. Fuelled by globalisation processes, the abrupt development of civilisation has triggered multiple fundamental changes in all spheres of human life. These still ongoing changes have produced enhanced implications for and expectations towards the education sector at all its levels. In this respect, education, perhaps counterintuitively, is by no means a passive object of the changes at hand, but – on the contrary – actively contributes to them (Małecka& Mirecka, 2014, p.196). Responses to the transformations occurring in education include the implementation of an array of innovations, the foundation of alternative schools and the emergence of a new learner category – an adult learner, a HEI student prioritising learning based on innovative methods.

New theories, models and concepts, including those related to the research field of adult education (andragogy), are being devised and implemented in teaching at all levels of education. The specific features of teaching adults are broadly explored and described in the literature.

The teaching process itself can follow a variety of trajectories. In their learning process, some learners need freedom, the individual pursuit of goals, the observance of partnership rules and respect for their autonomy. Others, on the contrary, need control, orders and directives (Pierścieniak, 2005, p. 19).Adult learners form a group which is diversified in terms of age, developmental stage, level of knowledge, experience and type of motivation for learning.The andragogical model of learning proposed by S. M. Knowles fundamentally differs from the assumptions of the entrenched pedagogical model, which was widely embraced by teaching professionals until quite recently(Knowles, Holton, &Swanson,2005, p. 61). Knowles's andragogical model is underpinned by the idea of learners' need and capacity for independent decision-making. The four basic differences between the traditional teaching of children and adolescents and the teaching of adults, as listed by Knowles, are: (1) the different perception of learners and their self-concepts; (2) the experience possessed by learners; (3) learners' readiness to learning; and (4) the learners' orientation to learning(Knowles, Holton, &Swanson, 2005, pp. 64-67).

Motivation is an elementary condition of involvement in educational activity. The level of motivation for learning often depends on the educational offer. For the effectiveness of teaching to increase, the teaching content and the selected methods should be aligned with needs and expectations. In adults, motivation is primarily driven by curiosity, interests, needs and self-interest. This means that every person should know the aim s/he seeks to achieve and that this aim should be of considerable

personal value (Szostkiewicz, 2019, pp.129-130). In the case of adults, internal motivation is dominant, for they learn of their own accord. Another characteristic feature of adult learning is that it is instrumental. As adults are outcome-oriented, they seek to immediately master knowledge and skills which are relevant to and applicable in practice. Knowledge is an individualised structure and the accumulated information is of scientific nature, but adults increasingly frequently are exposed to knowledge coming from life experiences. Experience is a vast source of knowledge both for learners and for other actors involved in the process of learning (Matlakiewicz&Solarczyk-Szwec2005, p. 37). To sum up, it is very important to properly design the teaching process, in particular to plan and apply appropriate methods of didactic work with adults. Moderation is one of the methods of working with adults which, I argue, should be adopted in higher education on a large scale.

The etymology of the notion of moderation is quite complex in itself. The first segment of the word – "me(d)" – means to wander, to cover/measure in steps, to pass, set/demarcate oneself an aim, to measure out and to take measure. Crucial to my argument is the word modus, which primarily denotes measure/manner. This semantic scope encompasses, on the one hand modestus (modest, moderate) and on the other moderare (mitigate/restrain) (Kopaliński, 2007, p. 369)1. Complicated as it is, the very etymology of the term suggests that it refers to a certain manner of guiding and leading from one stage to another (Małecka& Mirecka, 2014, p. 200).

Moderation has also its philosophical underpinnings. Its basic cornerstone is provided by a particular mindset. This mindset is the source of all the techniques used within this method of group work in the didactic process (work in groups, participation in discussion, brainstorming, role-playing, simulations, visualisations of work outcomes, etc.).Emphatically, the method also builds on the resources of several scholarly disciplines: education sciences, sociology, management sciences and psychology. The main principles of moderation include mutual respect, respect for the individual as a member of the group and respecting other members' right to hold their own, different views. Hence, it is crucial to express views in ways that make it possible to use the knowledge and develop the competences and skills of all the group members (Neuland, 2001, pp. 58-59).When applying the moderation method, it is important to abide by certain tenets in working with the group: (1) group work is always supervised by a moderator/moderators; (2) works is planned and purpose-oriented; (3) all the participants are on equal footing in their mutual relations; (3) information is fully shared by the participants; (4) extensive visualisation of work; (5) activities follow the pre-arranged moderation agenda; (6) the course of work is constantly monitored and its effects are controlled; (7) the time of work is pre-defined, and (8) the problems which are the object of moderation must be developed and solved (Łasińsk&Głowicki, 2006, pp. 639-646). Consequently, moderation can be described as a method of group communication the main aim of which is problem-solving. In this method of working with the group, an important role is assigned to the moderator who helps determine the subject, aims and sequence of work, establish the expected outcomes, search for solutions to problems and select heuristic methods and techniques. Additionally, the moderator fosters an appropriate atmosphere, monitors the course of moderation and helps arrive at a consensus or a compromise (Potocki&Łukasik 2014, pp. 21-31).The method of moderation has both advantages and limitations which affect the didactic process.

Table 1: Advantages and limitations of the moderation method in the didactic process

Advantages	Limitations
- highly engaging due to the opportunity to express feelings and emotions; - makes it possible to find out about various points of views, proposals and arguments;	- group size (maximum 15–20 people; most effective in groups of 10–12 people) - time - time-consuming preparation of

[1] This etymological explanation is partly based on "moderation" and "med" entries in the *Online Etymological Dictionary* available at https://www.etymonline.com/ (Accessed 20 March 2020).

- strong identification with the outcomes of work; - promotes mutual support and help; - triggers the synergic effect in relation to the compiled ideas; - promotes the self-reliant determination of the division of work	moderation

Based on G. Łasiński& P. Głowicki (2006, pp. 639–646)

Depending on the selected problem and expected outcomes, the course of moderation in the teaching process can follow various trajectories. Effects which are interesting in terms of the didactic process can often be achieved by combining a theoretical problem with a practical one. The moderator can chose techniques of group work depending on how much time is planned for the activity. Importantly, it is useful to divide the group into smaller subgroups which implement respective parts of moderation (Kowalewski&Głowicki, 2017, p.136).

The Figure below visualises the cycle of moderated group work.

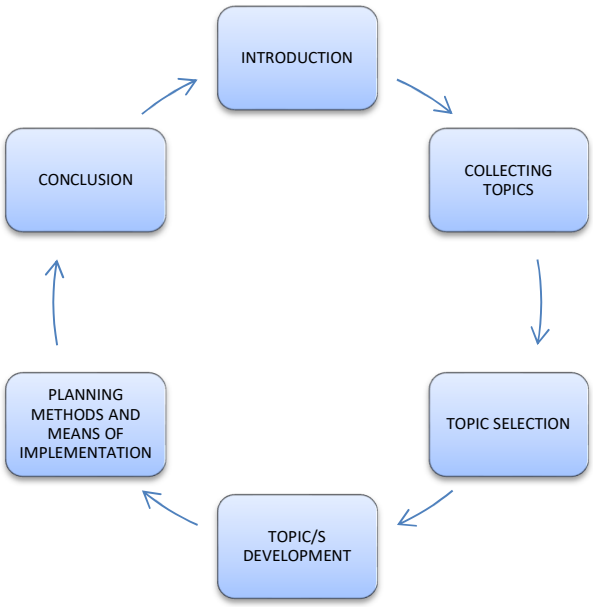

Figure 1: The classical cycle of moderation

Based on G. Łasiński& P. Głowicki (2006, pp. 639–646)

New approaches to higher education insist that it should be student-oriented. This causes the shift of the paradigm from teaching to learning (Malewski, 1998, p. 47), and the central goal is defined as preparing students for living, working and managing the challenges of the quickly transforming reality (Wróblewska,2012, pp. 14-16).Given this, the advantages of relying on moderation in the didactic process lie not only in that it provides support for the commonly used expository methods of teaching, but also in that it affords ample opportunities of improving organisation, self-organisation and self-education in the work and development of students who, while mastering the curricular content, form their attitudes and perfect their competences and skills within university classrooms.

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Interactive learning at Science Centres and Museums

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Abstract

In modern Science Centres and Museums, a number of activities take place including learning according to the principles of constructivist didactics. The article presents a research project on optimal rules for constructing experimental stations. Other research queries relate to conditions that an interactive learning model should meet to initiate a participant′s cognitive change. Interactive learning seems to meet these criteria to a large extent.

Keywords: Interactive learning, Science centres and museums, activity station, developmental cognitive change.

Introduction

The forms of education available today at science museums and centres are considerably diversified, and there is currently no entrenched model of educational practice at these institutions. Hence, a lot depends on the inventiveness and ingenuity of the organisers. Exhibits and activity stations at respective science centres sometimes initiate a lively research process, including the formulation of problem questions, the development and testing of hypotheses and the comparison of possible solutions. However, visitors are often simply asked to read and closely follow the attached instructions, performing experiments step by step to achieve the pre-planned outcome. This represents what is known as the *reactive model* of learning, which constrains the participant's cognitive autonomy. As observable in a typical classroom, the participant's research involvement is diluted and subject to external control. Some exhibits themselves are constructed as instructional pieces and suggest a fixed sequence of activities. However, situations in which neither the course of activities nor the expected didactic effect is prearranged by the organisers are in fact much more desirable and valuable in educational terms. In this approach, only certain input data included in the exposition are provided, while the expected outcome is not defined. In this *inter-active* learning model, the meaning of actions is only established while exploring an exhibit, which makes for the cognitively most valuable form of learning. *Interaction*- based learning is a conscious process that differs from instruction-based and imitative learning, which is, against all appearances, not infrequent at vigorously bustling science centres and museums. The constructivist premises which underlie interaction-based learning also underpin the research project described in this paper.

Justification of the research goal, problem questions and the research strategy

In order to augment knowledge about the specific features of learning at science centres, I have recently embarked on a research project which continues my years-long studies on the strategies employed at science museums and centres. I carried out those investigations at multiple science centres across Europe, including the Museo Nazionale della Scienza e della Tecnologia Leonardo da Vinci (Leonardo da Vinci National Museum of Science and Technology) in Milan, the Museo Tridentino di Scienze Naturali (Tridentine Museum of Natural Science) in Trento, the La Vilette Science Centre in Paris, the Science Museum in London, the Deutsches Museum (German Museum of Science and Technology) in Munich, the Spectrum Science Centre in Berlin and the Phänomenta - Experimentarium in Peenemünde, Germany. As a result of this research, I identified a number of educational strategies implemented by European science centres and museums. My observations and

interviews at these institutions made me realise that neither technologically advanced displays nor imagination- and engagement-stirring collections of exhibits fully guarantee that the goal of initiating an interactive learning cycle will be accomplished. Consequently, I have commenced a comparative research project at Polish science centres in order to expand and supplement my prior insights.

My project is informed by theories of learning which draw on early 20th-century progressive pedagogical movements and the contemporary tenets of psychological constructivism. The idea of learning based on the interactive didactic model has received ample theoretical support. The model originates from the broadly understood active school, whose founders, such as John Dewey, Georg Kerschensteiner, Helen Parkhurst, Célestin Freinet, Ovide Decroly, William Kilpatrick and Carleton Washburne, called for progressive experience-based education, in which learning proceeds "from touch to understanding". The active school model, which was picked up and continued within the constructivist movement, initiated by the works of Jean Piaget (1966), Jerome Bruner (1996), Lev Vygotsky (1989), Michael Tomasello (1999) and later in cognitive sciences Antonio Damasio (2011) and Daniel C. Dennet (2016) in , became the leading approach to museum education in the 20th century and was soon embraced by science centres, as it was far better adaptable to the learning conditions they offered than the traditional school, entangled in the formalised pedagogy of Johann Friedrich Herbart.

Espousing the constructivist paradigm, the contemporary champions of the active school recognise that learning is an activity in which conscious subjects construct their objects of knowledge through intensive exploration. This involves launching operations which serve to identify the resources of meanings, new concepts and relations among them as well as engaging in communication with the co-participants in the research process. Such processes are promoted by properly arranged learning environments. Science centres and museums are ideal sites that foster active learning; observably, however, research processes are not always sparked off as the participants engage in their activities.

In order to operationalise this issue, I will use the example of "colour mixing," an activity station comm only featured at the optics sections of science centres. The item includes a screen and three tubes coloured red, yellow and blue. By projecting the colour from the tubes onto the screen, participants can obtain varied effects, depending on how many colours are mixed and how intense they are. The experiment comes in a wide array of variants. In its very frequent version, the participants are guided by a script, which prevents mistakes, and find out about the theory of colour and colour mixing by testing it in the experiment as described in the manual. This approach precludes genuine experimentation since the entire exercise is pre-set by the organisers, as a result of which the activity boils down to imitating the steps fixed in the instructions to arrive at a predictable outcome. This framework can be described as (reactive); learning by following.

In another version, the exhibit is the same, but learning conditions change, because solely the preliminary data and a general description of colour mixing are provided without any detailed guidelines. The participants have coloured tubes and a screen at their disposal. Additionally, thematically related activity stations may be placed in the same display zone. This represents an organised environment of interaction, in which explorers are encouraged to engage in an experimental activity whose ultimate outcome is not pre-supposed. Since there is only an exhibit amidst an arranged situation, the participants are prompted to search for answers as questions offer themselves. The moments of the participants' engagement and focus on the exhibit in the process of exploration carry the greatest educational value. A cognitively appealing learning environment is indispensable to sustain this attention, and science centres are known to boast enormous possibilities of galvanising the visitors' active involvement. In this context, we may inquire to what degree this involvement will translate into deeper conceptual knowledge, and what conditions are necessary for the experiment-initiated learning process to persist in time beyond the science centre.

Continuing my studies on education at science museums and centres, I currently seek to answer the following questions:

- What conditions should be met by the interactive model of learning at science centres and museums?

- What properties of activity stations and exhibits at science centres and museums contribute to triggering intensive learning founded on independent exploration and experimentation?
- What conditions must be met for a study station to catalyse a developmental cognitive change in participants? What factors hinder the initiation of such a change?
- Which experimentation- and exploration-serving exhibits at science museums and centres stimulate interactive learning? What are its distinctive features?

Consistent with these research questions, the project will rely on visual ethnography as the method of data collection, including observations supported by video recordings and photography, interviews with the staff of science centres and people who arrange expositions, and also short conversations with visitors. The coding and interpretation of research results will be performed based on thus-registered data sets. The obtained categories will be employed to construct a model of interactive didactics. Additionally, the materials compiled when conducting research in the centers listed above, will also be used in the project. For the purposes of comparative analysis, these resources will be complemented with the data collected at Polish science centres and museums: the Copernicus Science Centre in Warsaw, the Hewelianum Science Centre in Gdansk, the Hydropolis in Wroclaw and the Museum of Municipal Engineering in Cracow.

The significance of research into interactive learning at science centres and museums

The interactive model of learning in the conditions offered by science centres generates an explorative attitude which is only possible if the participants' cognitive activity remains unrestrained. Admittedly, these conditions at science centres are not natural, but they offer ample opportunities of discovery and imaginative involvement, whatever the discoverer's specialist knowledge. The organisers of experiment stations activate the participants' inventiveness and facilitate hypothesis-testing, by passing school instruction. That the learners' attention is consistently sustained is caused not by external demands but by an interest which is spawned by the interactive features of the experiment station. Exhibits, so to speak, "call for" the participants' attention and involvement in explorative activities. At this point, we should reflect on the essence and characteristics of the phenomenon of interactive learning which in fact resembles the "trial and error method."As observed by the museum education researchers John Falk and Lynn Dierking (1995) and E.P. Alexander, experiments at the museum characteristically leave the initiative to the learners, who decide on their own what, how and with whom they learn. Such situations can easily involve random choices and superficial learning. For this reason, the educational conception of the exhibition, the structure of the display and the construction of the exhibits should all be carefully devised. When designing experiment stations, one should have in mind possibilities of active exploration in which the impression-registering senses play a dominant role. But the process of exploring and knowing can take another shape, one in which the rules of logic which govern the experiment are applied, and the question "why does this happen?" is a prelude to involvement in the research process. An understanding of the principles of constructivist pedagogy, the methods of eliciting and sustaining attention and the dynamics of cognitive processes is critical to constructing an effective experiment station and avoiding the pitfalls of quasi-interactivity, in which learners engage in sometimes uninformed intensive actions but do not grasp the core of the issue and solve the problem by following a manual, rather than by mobilising their own resourcefulness.

The research project as outlined above has been undertake in response to numerous observations not only revealing the wealth and diversity of stations and exhibits at science centres but also pointing out real difficulties which organisers of interactive exhibitions must confront. Learning at science museums and centres is an unusually valuable activity which furnishes the participants with sensory and observational materials from experimentation. As a consequence of interaction with objects, the learners acquire procedural knowledge, which can become a seedbed for complete representations that form the system of conceptual knowledge. Museum education research which addresses interactivity at science museums and centres may considerably support these processes.

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Challenges of Cruise Companies in Front of Sustainability and Marketing 4.0 In Operations

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Abstract

Recent studies point to the discussion of two relevant topics in cruise companies; sustainability, which is the company's ability to manage its activities and create long-term value, while adding social and environmental benefits to its stakeholders and marketing 4.0, which is the company's ability to insert technologies into its operations, to horizontalize procedures; include emerging consumer markets and share experiences of social recognition. Cruise Tourism becomes one of the most promising segments, as it provides a new way of traveling, combining transportation, accommodation, food and several itineraries, being able to visit more than one city / country. By combining these themes, the object of this research is the company MSC Cruises, which has excelled in the market for innovating its vessels, including sustainable technologies that minimize impacts to the environment, approaching customers and creating products aimed at their needs. Therefore, the objective of this article is to present the challenges that the company MSC Cruises has faced in the face of sustainability and 4.0 marketing in its operations. One wonders, what are the challenges that the company MSC Cruises has faced in the face of sustainability and 4.0 marketing? In this sense, a descriptive research was carried out, with bibliographic basis in books, scientific articles, magazines, newspapers, master's dissertations, doctoral theses and on the MSC Cruzeiros website. It was observed that there is a lack of scientific research on the subject, which brings more originality and value to this article.

Keywords: Sustainability. Marketing 4.0. Cruise Tourism. MSC Cruises.

Introduction

Sustainability arises as a response to the turbulence of globalized economies, in which companies began to orient their priorities towards business and to make commitments related to environmental and social concerns as part of a strategy to create added value to the products and services offered. Therefore, Marketing 4.0 is a natural development and deepening of Marketing 3.0, and its major premise is to adapt to the profound changes in customer behavior in the "era of connectivity and the digital economy" - a more horizontal, inclusive and social era (Sebrae, 2017). Therefore, cruise lines that want this new

client / tourist - inclusive, social and horizontal - will have to invest in a marketing plan that includes actions aimed at aligning their communication with them. With this in mind, the company MSC Cruises forms partnerships with international suppliers, seeks to ensure projects of the highest level of integrity and invests in projects that provide quantifiable benefits to communities, protect the environment and support the UN Sustainable Development Goals. All this while continuing to apply the latest and best sustainable marine environmental technologies to all new ships (and existing ones). And we are increasingly investing in supporting the development of next generation technologies for zero-carbon operations.

The construction of this manuscript is justified, due to the lack of scientific material related to the junction of the sustainability x marketing 4.0 area and sea cruises. Therefore, the general objective of this article is to present the challenges that the company MSC Cruises has faced in terms of sustainability and 4.0 marketing in its operations. One wonders, what are the challenges that the company MSC Cruises has faced in the face of sustainability and 4.0 marketing? The methodology used was the research of a descriptive nature, presenting MSC Cruzeiros as an object of study, with bibliographic basis in books, scientific articles, magazines, newspapers, master's dissertations, doctoral theses and on the MSC Cruzeiros website. It was observed that there is a lack of scientific research on the subject, which brings more originality and value to this article. The theoretical basis was divided into 3 chapters, the first of which was the approach to sustainability. In the second part, it was about marketing 4.0; in the third chapter it focuses on Cruise Tourism showing how they can boost tourist destinations and on MSC Cruises and their challenges in terms of sustainability and marketing 4.0.

Theoretical Background

Sustainability

Concerning about the environment can be seen since the 18th century in Europe, and over time, clearly the proportions of this concern have increased and spread to other regions of the world. This has influenced the holding of conferences to discuss environmental issues, such as the United Nations Conference in Stockholm (Sweden) in 1972, and the “Eco 92” in Rio de Janeiro (Brazil) (Pinto da Silva, Brandão & Sousa, 2019). Despite the complexity, sustainability can also be attributed to tourism, because this activity contributes on preservation, can provide funds to invest in a region and can be a tool for social inclusion. According to Körössy (2008), the systematization of tourism in a sustainable way becomes essential for the good development of the activity, but according to Hanna et. al, (2017) not all forms of tourism are potential to become sustainable, because the most propitious being those that have the environmental issue as a focus (Sousa & Silva, 2019).

Sustainability comes from the Latin “sustentare” which means to sustain, to support, to keep in good condition (Paz & Kipper, 2016). There are several meanings arising from the integration of different intellectual and political currents, such as (Gatto, 1995; Mebratu, 1998; Paehlke, 2005; Ciegis et al., 2009; Feil & Schreiber, 2017): a) defense-oriented biology the correct exploitation of natural resources, which manifests itself in a constant and perpetual income; b) ecology, which is linked to the preservation of individual species in ecosystems subject to human intervention; 3) the economy, which adheres to economic growth without compromising natural resources; and 4) sociology, which is linked to a development that preserves society, maintaining social relations. Then there is the difficulty of finding a unique and comprehensive concept that brings together the different currents.

Sustainability is discussed as a state in which three types of interests (or conflicts) are fulfilled (or resolved), simultaneously: (i) the interest of the current generation in improving their real living conditions (economic sustainability), (ii) the search for an equalization of living conditions between rich and poor (social sustainability), and (iii) the interests of future generations that are not compromised by meeting the needs of the current generation (environmental sustainability) (Horbach, 2005; Sartori, Latrônico & Campos, 2014). Martinet & Reynaud (2004) and Sartori, Latrônico & Campos (2014) contribute to the understanding of the role that organizations can play in society. According to the authors, companies would move between two extremes: a financial extreme and a

sustainable extreme. The financial extreme encourages a short-term horizon, standardizing growth models, which seeks control and submission to formal procedures. The sustainable extreme, as opposed to the financial extreme, aims, in the longer term, to develop internal skills, concern with the social management of employees and concern with the ecological impact given the organization's activities. Furthermore, sustainability can be achieved through an integrated and holistic management of the human environmental system. Jabareen (2008) and Feil & Schreiber, (2017) emphasize that the protection of the environmental, social and economic issues of this system must integrate the process of sustainable development. This protection effort must be carried out through the union of all stakeholders - public, business, social policies, among others - at the international, national and regional levels (Sousa & Rocha, 2019).

Since the term sustainability emerged in the business world, a growing number of companies have realized the importance of sustainability to leverage their business. (Global Reporting Initiative (GRI), 2014; Campos et al., 2013 and Paz & Kipper, 2016). A company to be sustainable and competitive today must seek eco efficiency in all its actions and decisions, produce more and better with less pollution and less use of natural resources, in addition to being socially responsible. Ignoring this reality will cost you sooner or later (Almeida, 2002 and Paz & Kipper, 2016). The search for sustainability must undoubtedly generate organizational innovations, companies need to reformulate products, technologies, processes and often business models that transform the competitive scenario, the author in his studies demonstrates the innovations created by different organizations based on sustainability needs (Nidumolu, Prahalad & Rangaswami, 2009, Wals & Schwarzin, 2012; Silveira, 2013; Paz & Kipper, 2016). This item will be better presented in the next seccion.

Marketing 4.0

Since the beginning of the 20th century, marketing has evolved its direction, starting from an orientation centered on the product, going to a greater focus on the customer and, until then, on an approach that takes into account the human being itself. However, from 2010 to the present, the behavior of individuals has changed, mainly due to the technological revolution caused by smartphones, which have expanded the power of convergence of content, entertainment and experience (Monteiro & Barretto, 2017). The convergence culture provided a new habit for internet users regarding media consumption, because within the same media environment it is possible to consume texts, images, audios and videos, without the need for a different device for each format. The countless pages and websites on the internet have also allowed the user a type of experience where he can acquire information from anywhere on the planet, all in one device (Monteiro & Barretto, 2017). Brands need to offer solutions that help customers save time, in addition to making life easier and bringing more socialization in the exchange of interests. There are several ways to put Marketing 4.0 into action. Storytelling (with the creation of relevant stories), Content Marketing (with the creation of personalized content, aimed at customers), gamification (simulation of games), are strategies that contribute to arouse curiosity about your brand. Advertisements and advertising campaigns give rise to relevant materials that add value to the company's image, as well as the creation of a persona, with behaviors and values (Moreira, 2017).

For Kotler (2017), loyalty needs to be interpreted as the customer's willingness to defend the brand. Therefore, the intention of marketing 4.0 is to provide this. The main transformations of marketing 4.0, were: Traditional vs. digital; focus on the social, ends of hierarchies and horizontalization; humanization of the brand; need for inclusion; change from 4P’s (product, price, place and promotion) to 4C’s (Customer, cost, convenience and conversation); Wow moments (the company goes beyond good service); multichannel experience (multiple channels and technologies to get what you want); mobile experience (access to applications via smartphones); promoting clients (Tardelli, 2018). Marketing 4.0 translates into an approach that combines online and offline interaction between company and customers, between digital and traditional. Based on this reality, the role of marketeers is to accompany the consumer in all its stages, from the attention given to a product / service to the defense of the brand. Marketing 4.0 argues that the AIDA paradigm (attention, interest, desire and action) is already outdated, thus implementing a new one: the five A's model: aware (awareness), appeal (appeal), ask (questioning), act (action) and advocate. These five A's are related to the consumer travel process (Moreira, 2017). In addition, he is an apologist for the fusion of the “connectivity” and

"transparency" aspects that the internet has now reinforced, of brands that reflect friendliness and accessibility, but also vulnerability. The mechanical side of the brands and the obsession with perfect appearance have been intimidating the consumer. The humanization of brands, translated into an assumption of eventual failures on the part of them, in an approach to the customer and in the creation of differentiating experiences, will never disappoint (Kotler, 2017).

Cruise Tourism

Interest in niche markets is not new. The novelty is, however, in the increase in the diversity of markets and in the technologies that allow new approaches to marketing (Dalgic and Leeuw, 1994; Sousa & Simões 2010; Vilas-Boas et al., 2019; Ferreira & Sousa, 2020). In tourism, niche products need further development and commercialization in response to the evolution of world tourist demand, in order to increase per capita tourist revenues (Hall, 1999; Sousa & Simões, 2010). Nautical Tourism is all navigation made by vessels on the water, be it river, sea, ocean or lake. It differs from other types of tourism since the main attraction is the vessel that serves as a means of tourist transport at the same time (Ministério do Turismo do Brasil, 2010; Marques, 2019). Based on this classification, it is possible to include Cruise Tourism and River Tourism in the Nautical Tourism segment. Cruise tourism is the focus of this research. A cruise is a transport vehicle, to which the journey begins at a port of embarkation, which is mostly where it will be the point of disembarkation from it (except for longer journeys such as around the world, where you embark in one country and disembarks in another), with stops, which would be the predetermined scales (Machado & Peluso, 2013).

Sea cruises have become a phenomenon of tourist activity in the world, representing one of its most promising segments, as pointed out by the Cruise Line International Association, an association that represents the world sector (Clia, 2015; Farias & Trigo, 2016). They start to provide a new way of traveling, with packages and closed itineraries, where they did not have to worry about adversities, such as delays, flight cancellations, lost luggage, among others, that can be found on any trip. The combination of transportation, accommodation, food and several itineraries, being able to visit more than one city / country at a closed price, has caused the number of cruisers to increase (Santana, 2017). Teye and Paris (2010) and Marques (2019) state that the ship itself, its characteristics and the goods and services it offers can be a major motivating factor for some tourists to opt for cruises, even arriving (for some) the ship to be considered the tourist destination itself. Another motivating factor is the fact that most cruise vacations are sold in all-inclusive packages, making it an "easy" vacation with almost everything available in one place. The combination of different ports of call instead of a single holiday destination can also be a strong motivation for choosing this type of tourism as it allows passengers to experience multiple destinations, often in different countries or continents, in one trip.

For the cruiser, the main objectives of his trips are based on the desire to relax, get away from daily obligations, learn something, be "pampered" in his needs, have fun and have a new experience (Mancini, 2010; Ramoa & Flores, 2014). About the experiences Perez (2016, p. 49), comments that the brands have the intention "to penetrate our senses and cause pleasant and even affective sensations that lead us to an approximation. The goal is to establish a connection - and if it is emotional, so much the better". What can be observed is that the market for people who want to live "the experiences" has grown in the most diverse sectors and on cruises this is no different. Thinking of meeting the needs of customers / tourists and offering activities that exceed their expectations, cruises have invested part of the money destined for general investments, in the purchase of new ships that cause less damage to the environment, in innovative but also sustainable actions, in tourist itineraries that in addition to adding value to the products that offer to bring customers closer to their brands, providing them with unique experiences.

Therefore, the global cruise market has been divided between four major companies, Carnival with 46.2% of the market, Royal Caribbean Cruises, with 21.8%, Star Cruises with 7.9%, Mediterranean Shipping Cruises (MSC) with 6.0% and the remaining 18.1% distributed among other companies (Clia, 2012; Ramoa & Flores, 2014). When dealing with this global market, an analysis was made to see if the placement in size of these companies, remained the same, and it was perceived that partially yes. In the first place is the Carnival Cruise Line with a fleet of 29 ships, in second place Royal Caribbean Cruises, with a fleet of 26 ships, in third place Princess Cruises, with a fleet of 20 ships, in fourth place

Mediterranean Shipping Cruises (MSC) with a fleet of 19 ships tied with AmaWaterways, but among them, MSC has more popularity, because it provides trips to more continents (Dreamlines, 2020). In the next chapter you will be approached about the MSC cruise company, for having agreed that it has invested in improving its fleets, being considered one of the most luxurious in the world, for being concerned with sustainability, reducing its impacts on the environment, for being in compliance with the requirements of customers in terms of experience offering diversified sustainable routes, and for being attentive to the most different technologies, since the moment has been lived when people in the world consume technology and are connected (online and offline) to search for the brands that best communicate in the most diverse environments with your needs.

MSC Cruises and its challenges in the face of sustainability and marketing 4.0

MSC Cruises is a cruise brand that has achieved a high growth rate compared to other cruise lines in the world. Headquartered in Geneva, Switzerland, MSC Cruises is part of the Cruise Division of the MSC Group, Switzerland's largest logistics and transportation conglomerate (Yoshida, 2019). MSC Cruises' fleet consists of 19 modern and innovative ships and is one of the most environmentally advanced in the sector (Dreamlines, 2020). The company is committed to environmental management and works to minimize and continuously reduce the environmental impact of its fleet at sea and on land, using innovative marine and environmental technologies. (Yoshida, 2019). With an unprecedented investment plan in the sector of 11.6 billion euros, MSC Cruises' fleet will increase to 25 ships by 2027. In addition, the MSC Group's Cruise Division is investing another 2 billion euros in a new luxury cruise brand, including four super yacht ships, launching one per year between 2023 and 2026. (Yoshida, 2019).

Sailing to more than 200 destinations across five continents, MSC Cruises brings together more than 180 nationalities from around the world, offering an enriching and immersive cruise experience, inspired by the company's European heritage. It offers international dining options, world-class entertainment, award-winning programs for families and the latest technology for guests on board. (Yoshida, 2019). The global maritime industry recognized MSC Cruises' sustainability efforts with the 2019 Neptune Award, as “Greenest Shipowner of the Year”. The recognition was presented at the Global Maritime Transport and Sustainable Ports Forum in Copenhagen, Denmark. The award is given annually to a ship company that has demonstrated excellence in reducing the environmental impact of its fleet's daily operation, implementing cutting-edge technologies and practices, boosting the maritime sector's journey towards a sustainable future. (Msc, 2019)

Having embarked on a journey of continuous improvement to achieve a "zero impact" future, MSC Cruises is taking many initiatives to continue minimizing its impact on the environment, through the development and deployment of marine technologies to preserve and protect the environment. throughout its fleet (Msc, 2019). MSC Cruises has, for more than 10 years, equipped its ships with advanced wastewater treatment systems that purify effluents to a quality close to tap water. All ships in its fleet are equipped with modern systems to reduce, recycle and reuse solid waste. An extensive range of single-use plastic items on board has also been eliminated (Msc, 2019). In addition, in its most recent ships, it cared about environmental management technology and received the “Green Star 3 Design” award from the International Classification Society RINA, which specifically recognized that the MSC achieves the highest levels of ecological compatibility, reducing the impact during its operations.

Among the innovative items created specifically for MSC ships include: energy-efficient hull and overall design. The overall design of the ship, the hull, the rudder and the bulbous bow are configured to achieve hydrodynamics, aerodynamics and maximize energy and fuel efficiency (Ambiente Magazine, 2018); Trim optimization, software to monitor ship stability in real time. This technology supports ship officers to reduce fuel consumption and optimize performance; Hull paint on all MSC Cruises ships is coated with special ecological paints that prevent the growth of barnacles, algae and marine organisms in order to significantly reduce resistance (Environment, 2019). Exhaust Gas Cleaning System (EGCS) to minimize sulfur and emissions of specific particles, as an EGCS removes up to 97.1% of sulfur dioxide and greatly reduces particulate emissions. By the end of 2020, 13 of the 19 ships in the MSC Cruises fleet will be equipped with an EGCS; Shore-to-ship energy since 2017,

they are already equipped to receive land energy (also called “cold ironing” - a means of connecting cruise ships in ports to the local power grid). This technology that can potentially help to reduce atmospheric emissions in port areas; Ballast water treatment system: To protect the marine ecosystem in which the ship sails, it meets the standards established by the international body for Ballast Water Management, the International Maritime Organization (IMO) (Ambiente Magazine, 2018).

Other advances regarding environmental issues, specifically designed for MSC ships were: offsetting direct carbon dioxide (CO2) emissions from the fleet's maritime operations through a set of carbon offset projects developed in accordance with the highest standards leading international institutions that take immediate action on greenhouse gas emissions. Blue carbon offsets are a specific focus of the commitment to ensure carbon neutrality with immediate effect, directly benefiting the oceans and communities that live by the sea; State-of-the-art selective catalytic reduction (SCR) that helps reduce nitrogen oxide emissions by 80% through advanced active emission control technology. The nitrogen oxide from engine operations is conducted through a catalyst - a high-density device made of noble metals - and is converted into nitrogen and water, both harmless compounds and started the construction of MSC Europa, the first of five powered ships LNG (liquefied natural gas) and which will enter service between 2022 and 2027.

MSC also thought and adapted its boats for Environmental Management on Board, where every ship in the fleet has an environmental management plan and each ship has a dedicated Environment Officer in order to ensure that this plan is constantly monitored and complied with correctly. This officer also has a duty to instruct and train crew members on board on environmental and waste management; Advanced wastewater treatment that goes well beyond regulatory standards and meets industry high standards. The Wartsilä / Hamworthy system treats wastewater to a very high quality, better than most on-site municipal waste standards worldwide. The ship is also equipped with an electronic tool that helps to fully comply with several other local and regional environmental regulations; for consumption optimization (Ambiente Magazine, 2018).

Finally, regarding the adaptations of ships to environmental sustainability, energy-saving LED lighting was added: MSC use only efficient LED energy and fluorescent lighting; Intelligent heating, ventilation and air conditioning (HVAC) system, this is one of the biggest energy consumers on a cruise ship, but the system on board was created in an intelligent way to reduce energy consumption. It distributes heat and cold intelligently and is configured to recover heat, for example, from the laundry room, which can be used to heat swimming pools or other parts of the ship. (Ambiente Magazine, 2018).

It is observed that all the adaptations made on MSC ships, had the intention of inserting technologies but thinking about sustainability, effective actions to minimize and / or continuously reduce the environmental impact. Regarding the insertion of technologies, modernization of spaces, inclusion of social and sustainable projects, training of staff and awards, they are made available to their clients / passengers through advertisements, blogs, content of materials on numerous pages and website, always approaching the customer / passenger to the brand.

Thinking about the quality of travel and meeting the needs of customers / passengers on board, providing unique experiences, MSC launched a program of sustainable excursions, called Protectours, which initially proposes 22 visits to unique places on the planet, with the guarantee of reduced environmental impact and close contact with nature (Publituris, 2020). These tours mainly serve two purposes: first, they represent an opportunity for MSC to enable its tour partners to diversify their offer to include more sustainable activities and, second, to influence them to operate in their business in a more sustainable, committing to the Global Sustainable Tourism Council certification program by the end of 2020 (Publituris, 2020).

Protectours offer guests the opportunity to enjoy unique insights into the natural world, while preserving its beauty and helping to ensure a greener future. What sets the tours apart is the exceptional service and the element of adventure on land that guests experience with MSC, in different environments around the world. (MSc, 2020)

The 22 (twenty-two) trips created by the Project and the experiences offered are presented below. It is important to mention that all the descriptions of the trips were extracted from the official website of MSC Cruises, since because it is an innovative project, there are still no materials published in other media. Thus, the first description of the trip is the Walk through the forest with dogs rescued by 'Animal Haven', in Montego Bay in Jamaica, offering the experience that allows travelers not only to walk with dogs rescued from 'Montego Bay Animal Haven'. Haven dogs are affectionately nicknamed hooligans. Each of them suffered from hunger, dehydration, injury or abuse (Msc, 2020). It was observed that for the MSC to be closer to the customer, horizontality was inserted, making it possible to create projects of experiences of sustainable experiences in Protectours trips, in the way that their clients / passengers desired, causing the Wow moment, overcoming service. Thus, in the vast opportunities for sustainable travel, customers / passengers have the experience of discovering destinations in a unique way, in addition to making a positive contribution to the planet, through activities designed to protect and preserve it.

Final Considerations and Future Research

Sustainability has become part of the routine of organizations aware of the demands of the planet, however it is still unnoticed in the lives of many people. Adopting sustainable measures goes far beyond the noble choice of protecting the environment, but it can be a means of reducing production costs and the final value of products and, mainly, for strengthening the brand. Therefore, in order to stimulate the implementation of the European Directive on waste on board ships, as well as to create incentives for waste reduction, recycling, reuse and CO2 reduction, MSC Cruises has adopted serious attitudes that impacted economic investments which provided, insertion of sustainable technologies in their vessels, connection to the local electricity grid at the port, reduction of emissions to energy efficiency, management of solid waste and wastewater, more economical lighting, innovative hybrid exhaust gas cleaning systems, modernization fleet, LNG insertion, among other advances that have enabled the company to stand out in terms of reducing the environmental impact of the daily operation of its fleets. In addition, the insertion of marketing 4.0 in the company MSC, enabled profound changes in the behavior of customers in the “era of connectivity and the digital economy”, a more horizontal, inclusive and social era. So to strengthen this contact between company and client, meeting the market needs, MSC Cruises creates twenty-two sustainable travel itineraries called Protectours, strategically designed by the company in order to continue the actions to reduce the environmental impact, to assume its commitment to the 2019 Neptune Prize Award, as “Greenest Shipowner of the Year” and being able to bring unique experiences to customers / passengers. It follows that MSC Cruises has fulfilled its role as a sustainable company, and has continuously taken steps to reduce its impact on the environment, partnering with world-leading certification companies to ensure that all ship operations have no impact on oceans, but also on land, for the benefit of all populations that are affected by operations worldwide. Future studies should continue this work, using a quantitative methodology, as there is a lack of scientific research with more numerical data on sustainability and 4.0 marketing, related to the operations of the ships, which brings more originality and value to this manuscript.

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Effective Development of Consolidated Group of Taxpayers in Russia and Their Fiscal Regulation

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Abstract.

In the Russian Federation, a consolidated group of taxpayers (CGT) appeared relatively recently, while after a few years the government began to impose moratoriums on the creation of new CGT and the expansion of existing ones. At the moment, from 2023 it is planned that the already created CTG will cease to exist in the Russian Federation, despite the fact that in world practice this category of taxpayers is developing quite successfully not only in national economies, but also at the interstate level. The purpose of this article is to assess the activities of tax incidents in the tax aspect, as well as to give the main directions for their development and fiscal regulation based on international experience and their own vision of their development in Russia.

Keywords: Consolidated Group Of Taxpayers, Profit, Tax, Control, Efficiency, Budget, Income

Introduction

The category "consolidated group of taxpayers" in the Russian Federation was introduced only at the end of 2011 (No. 321-FZ dated November 16, 2011) and in 2012 the first taxpayers were formed, however, already in 2018, Federal Law dated 03.08 2018 No. 302 -FZ a ban was introduced on the registration of new CTGs, as well as on joining organizations to the existing one. All registration applications submitted since 2016 were declared unregistered. From this we can conclude that for 6 years the tax authorities received very good reasons for the cancellation of this category of taxpayers.

Nevertheless, we know that in other states (for example, Australia, Japan, the USA, France, the Netherlands, Italy, Germany, Spain, the list of which is not exhaustive), quite successfully there are consolidated groups of taxpayers.

In this article, the author will try to figure out the reasons that influenced the rather quick decision of the fiscal authorities of Russia to abandon CGT, as well as determine the possibility of further development of CGT in Russia and their successful tax administration both technically and economically.

Identifying the reasons for refusal of tax authorities from CGT.

Considering that the decision to "abandon" the CTG was made in 2018, we will assume that the tax authorities were based on the data obtained for 5 years and it took them one year to make the corresponding decision and fix it at the legislative level.

Thus, we turn to statistics and follow the dynamics on the basis of quarterly form No. 5-KGN "Report on the tax base and structure of accruals for corporate income tax for consolidated groups of taxpayers" published by the Federal Tax Service of Russia on website of the Federal Tax Service of the Russian Federation www.nalog.ru. We study the process in the context of the number of created consolidated groups of taxpayers by federal district (table 1).

Table 1: Dynamics of changes in the number of consolidated groups of taxpayers (by the number of participants included in these groups) by federal districts and cities of federal appointments from 2012-2016. (in units)

he number of participants of the CTG	Period					01.01.2017/ 01.01.2013	
	01.01. 2013	01.01. 2014	01.01. 2015	01.01. 2016	01.01. 2017	Deviations, in units	Rates of growth,%
Russian Federation	1497	2048	2190	2294	2401	904	60,39
Central Federal District	365	546	646	613	734	369	101,10
Moscow region	47	64	75	72	80	33	70,21
Moscow city	102	157	206	194	222	120	117,65
Northwestern Federal District	261	403	416	407	429	168	64,37
Leningrad region	35	43	43	43	48	13	37,14
city Saint Petersburg	46	92	106	110	120	74	160,87
North Caucasian Federal District	157	70	66	57	63	-94	-59,87
Southern Federal District	0	203	216	209	221	18	8,87
Volga Federal District	313	413	430	414	495	182	58,15
Ural federal district	145	237	268	264	307	162	111,72
Siberian Federal District	137	239	238	208	247	110	80,29
Far Eastern Federal District	119	140	126	122	126	7	5,88

Thus, the beginning of the period when the category “consolidated group of taxpayers” was introduced in the Tax Code of the Russian Federation, 1,497 groups were created, by districts the largest volume falls on the central district - 365 units (24.38% of the total number of groups), in second place the Volga region - 313 units (20.91%), in third place the northwestern district - 261 units (17.43%). In the remaining districts, the distribution of consolidated taxpayer groups is approximately the same: the Ural Federal District - 9.69%, the Siberian Federal District - 9.15%, the Far Eastern Federal District - 7.95%. An analysis of the number of units of such groups by federal cities allows us to conclude that the largest number of such taxpayers is concentrated in Moscow — 102 units (3.14%), and St. Petersburg — 46 units (3.07%).

An analysis of the dynamics of changes in the number of consolidated groups of taxpayers allows us to note that their number increased by 904 units or by 60.39%, the largest growth was in 2013 - 551 units, in 2014 142 units and then about 100 units each. The growth in the number of groups occurred mainly in the central district - 369 units (including Moscow - 120 units), in the northwestern district - 168 units (including St. Petersburg - 74 units), the Volga Federal District - 182 units, the Ural Federal District - 162 units.

Since a consolidated group of taxpayers is created on a voluntary basis with the aim of calculating and paying corporate income tax, taking into account the total financial result of economic activity, we further analyze the statistical material in two categories: the tax base for corporate profit tax (table 2) and the amount of corporate profit tax (table 3). The study was conducted from the beginning of the functioning of the group in the territory of the Russian Federation until 2016, inclusive.

Table 2: Dynamics of changes in the tax base for income tax of consolidated groups of taxpayers by federal districts and cities of federal designations from 2012-2016. (billion rubles)

Tax base based on share	Period					01.01.2017/ 01.01.2013	
	01.01. 2013	01.01. 2014	01.01. 2015	01.01. 2016	01.01. 2017	Deviations, in units	Rates of growth,%
Russian Federation	2513,675	2310,374	2557,502	2418,826	1479,199	-1034,48	-41,15
Central Federal District	930,9805	637,7503	459,2897	435,4025	427,0737	-503,91	-54,13
Moscow region	46,93832	34,84585	22,62326	21,48922	17,27696	-29,66	-63,19
Moscow city	783,5844	492,4446	298,864	229,8004	291,5552	-492,03	-62,79
Northwestern Federal District	184,1302	304,9194	414,5548	360,0322	175,3362	-8,79	-4,78
Leningrad region	30,82185	58,71951	196,5641	167,1369	36,21859	5,40	17,51
city Saint Petersburg	19,52508	97,28859	24,87522	27,02144	33,62796	14,10	72,23
North Caucasian Federal District	134,3034	31,45643	21,58559	15,22086	16,16569	-118,14	-87,96
Southern Federal District	0	135,6684	124,639	112,5646	72,75103	-62,92	-46,38
Volga Federal District	340,0153	313,3051	273,0449	307,705	258,3541	-81,66	-24,02
Ural federal district	639,0359	557,0831	944,8532	871,9605	271,9523	-367,08	-57,44
Siberian Federal District	147,3717	217,345	180,5059	170,7971	197,9351	50,56	34,31
Far Eastern Federal District	103,6724	112,8461	138,92	145,1427	59,63066	-44,04	-42,48

The results obtained clearly show the trajectory of a decrease in the tax base for consolidated groups of taxpayers.

Consider the amount of calculated income tax of consolidated group taxpayers (table 3).

Table 3: The Dynamics of changes in the amount of the calculated income tax of consolidated groups of taxpayers by federal districts and cities of federal designations from 2012-2016 (billion rubles)

Tax base based on share	Period					01.01.2017/ 01.01.2013	
	01.01. 2013	01.01. 2014	01.01. 2015	01.01. 2016	01.01. 2017	Deviations, in units	Rates of growth,%
Russian Federation	432,0242	397,2384	415,1986	395,4449	262,8043	-169,22	-39,17
Central Federal District	167,5765	114,7951	82,67214	77,27965	76,87328	-90,70	-54,13
Moscow region	8,448897	6,272252	4,072185	3,86968	3,109851	-5,34	-63,19
Moscow city	141,0452	88,64003	53,79552	40,27125	52,47993	-88,57	-62,79
Northwestern Federal District	30,75843	52,33745	63,19005	56,06491	30,07591	-0,68	-2,22
Leningrad region	4,483258	8,737679	27,91366	24,23081	5,373741	0,89	19,86
city Saint Petersburg	3,405667	17,35725	4,477541	4,863862	5,972827	2,57	75,38
North Caucasian Federal District	23,50129	5,607474	3,544687	2,481801	2,846893	-20,65	-87,89
Southern Federal District	0	22,72707	20,77141	19,07109	13,05855	-9,67	-42,54
Volga Federal District	57,54821	53,6322	46,70307	53,2457	45,68348	-11,86	-20,62
Ural federal district	103,8478	90,56251	140,9338	130,4326	48,16303	-55,68	-53,62
Siberian Federal District	24,87365	37,33603	32,49106	30,74348	35,62832	10,75	43,24
Far Eastern Federal District	17,76858	20,24066	24,87281	26,12569	10,47484	-7,29	-41,05

Thus, the dynamics of the amount of calculated corporate income tax for 2012-2016 similar to trends in the tax base.

In conclusion, we analyze the trends in the three indicators discussed above and establish the relationship between the number of registered groups and the volume of calculated corporate income tax:

1. An increase in the number of participants in groups does not lead to an increase in the tax base and corporate income tax. This is confirmed by the following data: the growth in the number of group participants in 2015 compared to 2012 amounted to 153.24%, while the tax base on corporate income tax decreased by 3.77% and, accordingly, the tax amount by 8.47 % At the same time, the lowest growth rates are observed for the calculated amount of corporate income tax. The average

corporate income tax rate paid within the group is: in 2012 - 17.19%, 2013 - 17.19%, 2014 - 16.23%, 2015 - 16.35%, 2017 - 17.77%.

2. Losses in 2012 amounted to 18.79 billion rubles., 2013 - 22.5 billion rubles., 2014 - 25.27 billion rubles, 2015 - 26.08 billion rubles, 2017 - 17.37 billion rubles.

Now we consider the conditions for the creation of CGT in the Russian Federation and the features of functioning. Firstly, the consolidated group of taxpayers is not a legal entity and acts on the basis of an agreement that must be registered at the place of registration of the responsible participant of the CTG.

This group differs from other categories of taxpayers in that this group is characterized by the presence of a management system. At the same time, the control system is linear and this group is led by a responsible member of the group, group members act as subordinates.

It can be noted that the functions of the two entities of the consolidated group of taxpayers are clearly identified and delimited. The nature of relations within the group is medium-term, which is confirmed by article 25.2 p. 7, which states that the group is created for five years (earlier than 2 years, changes were introduced by federal law No. 325-FZ of 11.28.2015), thereby implementing the principle stability, which is the basis for the formation of the tax system of the Russian Federation.

Consider the conditions under which a group can be created. Quantitative and qualitative conditions for creating a group are legally defined:

1. The participants in a consolidated group of taxpayers are interdependent persons (article 25.2 of the Tax Code of the Russian Federation - direct and (or) indirect participation of one organization in the authorized capital of another - at least 90%);

2. Economic indicators should correspond to the following volumes (the calculation is made for the calendar year preceding the year of submission of documents on the creation of the group):

- the total amount of taxes (VAT, mineral extraction tax, excise taxes, corporate income tax), excluding taxes paid in connection with the movement of goods across the customs border of the Customs Union, is at least 10 billion rubles;
- the total revenue from the sale of goods (works, services) is at least 100 billion rubles;
- the total value of assets according to the accounting (financial) statements is at least 300 billion rubles;

3. All members of the group must be Russian organizations and does not apply to organizations that are prohibited from creating such groups, for example, organizations of the financial sector of the economy, organizations that pay the tax on gambling, and the like, on the basis of Article 25.2 p. 6 of the Tax Code.;

4. One organization may be included in only one consolidated group of taxpayers.

From the analysis of the conditions for creating a group, we can draw certain conclusions:

- the responsible member of the group may be the largest taxpayer;
- it is most profitable to create a group for organizations that are taxpayers of mineral extraction tax, this is confirmed by practice, the group was created in such large holdings as Rosneft, Severstal, Gazprom, Lukoil, Novatek and Mechel.

As can be seen from the calculations, the main reason for the refusal of the tax authorities from the CTG was that during the specified period there was a significant reduction in tax revenues. According to the author, this is due to the following factors:

- CGTs participants read out losses against the profits of different organizations in the current tax period, and not in different ones, as this could be done within one organization;
- use of benefits at the tax rate in regions.

All this did not coincide with the global strategy for introducing the CGI institute, it was assumed that the income tax redistribution of large companies would occur and they would go to the budget of the subject of the Russian Federation where the profit is consolidated, and not of the subject where the parent company is located. However, in practice, the tax base is often redistributed to those regions where lower rates of corporate income tax are established, which is done in order to reduce the tax burden on the consolidated group.

The second reason for refusing CGT was the desire to equalize the tax conditions for large and medium-sized businesses in view of the fact that big business is more self-sufficient and does not so much need tax benefits, which, as it turned out, were not supposed to be provided for CGT in Russia.

In a research study by Sidorova E.Yu. and Tikhonova A.V. (2017) during tax reforms, two rules of the systems management theory must be observed: 1. Taxes and taxation is a system, precluding stability and sustainability of its function, and of its elements' interaction. 2. Within taxation system the effect of the feedback loop emerges, which can have both positive and negative impact.

The positive points include:

1. The group's control in the field of transfer pricing is excluded, which allows optimizing taxes (with the exception of transactions the subject of which is extracted minerals);
2. Consolidation of the tax base and reporting of enterprises in the group;
3. Reducing the time for tax control procedures;
4. Getting the opportunity to transfer losses in the tax period of their receipt. The consolidation of the tax base for corporate income tax brings effect on the whole group. However, by far the greatest economic effect is gained by the group members who have a profit at the end of the tax period.

The negative aspects of creating a group include:

1. An increase in tax risk, since there is a high probability of errors in calculating corporate income tax;
2. Possible increase in tax rates for other taxes. For example, in 2015, Article 2 of Federal Law of November 28, 2015 No. 325-FZ changed the formula for determining the base value of a unit of catch fuel, the correction factor increased from 0.15 to 0.2051 points, which affected the participants of a consolidated group of taxpayers carrying out natural gas production (for example, Gazprom).

A comparative analysis of the economic indicators for classifying taxpayers as a consolidated group of taxpayers and the largest taxpayers allows us to conclude that the group has higher rates of economic activity.

International practice of CGT development.

In order to determine the possibility of developing CGT in Russia, and not completely abandoning this category of taxpayers, the main countries with CGT were studied: Germany, Spain, France, Japan, USA, Italy, Netherlands, Australia.

Based on the results of the work done, the parameters of the CTG were determined, as set out in table 4.

Table 4: Differences and similarities between Russian and foreign CGT

General parameters	Excellent parameters
voluntary application of the regimen	the presence of criteria characterizing the size of the group of companies (revenue, assets, taxes paid)
the ability of the parent company to independently determine the circle of participants of the CTG	the inability to include foreign companies in the group
procedure for determining the consolidated tax base	the inability to set off previously received losses and the distribution among the participants of losses incurred during the consolidation period in the event of the participants leaving the group or its liquidation
formation of a single tax return and tax payment by one member of the group	the lack of the possibility of limiting the amount of liability of each participant of the CTG
	in Russian legislation there are no special provisions on taxation of intragroup transactions for CTG, while if there are general rules for the property of parent and subsidiary companies (subparagraph 11 clause 1 of article 251 of the Tax Code of the Russian Federation), then there are no such provisions on income and expenses

In the work of Babenko D.A. (2014) marked the following trends in CGT in world practice:

-development of international tax consolidation;
- simplification of procedures for joining the CTG;
- ensuring the availability of the calculation of the tax base of CGT;
- simplification of fiscal regulation of CGT.

Conclusion

Based on the analytical work on foreign practice and its application to Russian reality, it should be noted that not all principles of the development of CGT are applicable in the Russian Federation in view of the historical development of business and the tax system, as well as the existing mentality.

In the author's opinion, CGTs in Russia can be effective and develop only with more stringent fiscal regulation. Sidorova E.Yu. (2015) mentioned simple methods of analysis are currently ineffective. The author offers the following development parameters of CGT:

1. CGT should include all organizations, for example, having affiliation in accordance with Federal Laws No. 135-FZ dated July 26, 2006 "On Protection of Competition" and No. 948-1 dated March 22, 1991 "On Competition and Limitation of Monopolistic Activities in Commodity Markets ", Or revised art. 105.1 of the Tax Code of the Russian Federation "Interconnected Persons". This will violate the boundaries of the voluntary choice of the CTG participants, but at the same time it will not allow certain legal entities to profit beyond the limits of the CTG.

2. The loss that CGT can account for as a profit can only be associated with investment and innovation activities, such costs can include, in particular, the following costs:

- costs associated with new construction, reconstruction, expansion, technical re-equipment, modernization of fixed assets;
- expenses in the form of interest on loans and credits for investment and innovative purposes;
- expenses for research and development.

In this section, we can separately distinguish separately the costs of investing in the development of green energy (renewable energy sources) and innovative activities in terms of creating clusters. In a research study by Kostygova L.A. and others (2019) was suggested the increase in cluster's membership is proposed to be implemented with increasing a number of majors and commercial organizations operating in cluster's specialization field. Considering that the largest holdings, which are capable of incurring similar costs, have predominantly united in CGT, additional preferences for their investments in renewable energy sources and cluster creation points, within the framework of CGT, can lead to good synergies between the state and business in this direction.

3. A significant reduction in economic indicators in terms of the total tax amount, total revenue and total asset value so that CGT could form a medium-sized business, which, according to the author, will positively affect its development in general and the flow of funds to the budget in particular.

4. The Russian tax system needs to consider the possibility of Russian organizations participating in international CTG. In this case, the business will have more confidence in the domestic tax authorities, the international community will note that Russia has taken another step towards international rules and norms. This step can be very difficult and lengthy in view of the difficult dialogue between foreign and Russian tax authorities, however, with the globalization of business processes, the achievement of tax agreements at the international level under the CTG will be necessary in the future.

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The Methodology for Assessing Innovative Maturity

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Abstract

The article is devoted to the development of theoretical principles and practical recommendations for the formation and development of digital ecosystem based on corporate model of open innovation, which allows adapting an innovative ecosystem to the conditions of global competitive market and integrating it into the global innovation space in order to consolidate competitive advantages and achieve technological superiority. The analysis of Russian and foreign practice of innovative development of technology corporations and companies is performed; practical approaches to managing innovative development of corporations in the context of digitalization are highlighted; methodology for assessing innovative maturity taking into account readiness for digital transformation was developed and tested

Keywords: Digital Ecosystem, Digitalization, Industry, Open Innovations

Introduction

Innovation happens when great ideas, people and challenges intersect. In order to develop breakthrough innovations, companies turn to new management models, such as open innovation (collaboration with external partners), design thinking (developing new solutions focused on people's needs), corporate venture funds and incubators.

By open innovations we mean a model of active interaction of companies with the external environment in the process of innovation with the aim of exchanging technologies, knowledge and competencies, which is realized through the use of the following tools: innovation project competitions, financing of external innovation projects to finalize proposals, corporate accelerators, corporate business incubators, corporate technology parks, corporate venture funds, spin-offs of internal developments, acquisition of companies and others.

Industry is on the verge of radical structural changes. Digital transformation carries both huge potential and serious challenges. The study of Roland Berger “Digital Transformation of Industry", conducted in conjunction with the German Industry Federation (BDI), examined the causes of digitalization and its impact on industry in Germany and other European countries.

The overall economic effect of digitalization was also calculated. In particular, experts found that digitalization of industry until 2025 alone in Germany could create an additional potential for creating value of 425 billion euros. The total figure for Europe is 1.25 trillion euros. If the region fails to turn the transformation into its own advantage, its industry may suffer a total loss in a huge amount of 605 billion euros.

Methods and Materials

The research methodology is based on existing theoretical developments in the field of innovation management and corporate governance. In the research process, the dialectical approach, system analysis methods, economic and mathematical methods of information analysis, strategic management methods, expert assessments, modeling, clustering, system-activity method, value-oriented, cultural-historical methods, methods of social constructivism, functional analysis, were used, as well as the prognostic method, etc., which provides a high degree of validity and reliability of the main conclusions and results of study.

We have analyzed the Russian and foreign practices of innovative development of technology corporations and companies. The main tool of methodological approach was the research program, which includes the following stages: presentation of problem, goals and objectives of study; research project selection; determination of research methods; collection of information; analysis of information collected. To implement methodological approach to classify the tools and practices of corporate governance of open innovation, both desk and field studies were conducted. The sample scope for a survey of company executives ("United Aircraft Corporation" PJSC, "EFKO" group of companies, Rostec) amounted to 30 people. Data collection method – is a questionnaire.

As a result of implementation of methodological approach to classify the tools and practices of corporate governance of open innovation, the tools of corporate open innovation (Table 1) were integrated with the resources for implementing the tool and stages of innovation.

Table 1: corporate open innovation tools

Action	Description	Examples
Events and workshops	Participation in internal and external events and workshops focused on innovation and entrepreneurship	Entrepreneurship SP, Startup Weekend, Minas Startup, Innovation Week, Innovation Show, ANPEI
Executive Forums	Forums where future strategies and innovation are discussed at senior management level	Strategy Review Meeting (RAE) and forums with the participation of specialized consultants
Problem Solutions	Exposure of business and technology problems so that the solution is given by internal and external participants	Hackathons, pitch fights, marathons with internal and external audiences
HR Development	Planning and implementing actions to develop and / or attract highly skilled young talents	Programming Marathons, Mathematical Olympiads, EADs on internal processes of innovation
Market Trials	Experimental service offerings	Connected house, IPTV over Gpon, Music MVNO
Strategic Partnership	Establishment of alliances to develop technologies and / or business models	CPqD, Inatel, Nokia, Universities, URI-Erechin, CERTI Foundation, TeleStax, IBM, 100 Open Startups
Support team	Dedicated structures for planning and developing all innovation processes in the company	IMO (focus on innovation management) and R&D (focus on research and development)
Customer Integration	Usage research, trials and visits to customers' environments	Studies based on customer complaints and use of services, field visits to clients and local authorities and forums with opinion formers
Joint development	Collaboration with objective of reaching a certain public or market	Connected house, IPTV over Gpon, Music MVNO, MDN

The list of tools that corporations can use depends on the stage of innovation and the cost of tools. The largest number of tools is applicable at the stage of searching for ideas, the smallest - at the stage of scaling. If the company doesn't have a significant amount of financial resources, it can use inexpensive tools, for example, events for startups and idea contests. If the company has significant financial resources, it can use tools such as corporate venture fund, laboratories, etc. As promising areas in the innovative development of corporations, it's possible to single out the use of digital platforms, collaboration and others.

3M's ability to keep churning out new innovations is very much dependent on the company's long-standing commitment to open innovation, both internal and external. 3M has developed organically across consumer, electronic, transportation, industrial, safety, security and display, and electronic markets. The entire technical community at 3M includes about 10,000 R&D people in 73 labs around the world. About 15 to 20 percent of those people work in corporate research, which is responsible for developing, transmitting, and supporting technologies throughout the company. The corporate technical operations committee, or CTOC, ensures the development, health, sustainability, and transmission of 3M's tech capabilities across all the businesses, geographies, and industries in which 3M operate.

Airbus makes intersections between great ideas, people and challenges happen by partnering with the outside world to translate innovative ideas into aerospace breakthroughs more quickly than ever before. The way Airbus works with partners is open and agile. This is Airbus approach to accelerating innovation.

Innovations are the part of the EFKO's philosophy, and success of the Company was the result of its implementation: in the processing of raw materials, production of high-tech fats and branded products. The research laboratories and centers of applied research are created in all Company's divisions: in the branded division – Service on the new products development; in Fat&Oil Division – Center for Applied Research and Pilot Facilities, which develops and tests fat products for the lines of healthy food and innovative recipes based on the needs of the food industry manufacturers. In 2013, the company has created Innovation Center "Biruch", and on its basis in 2016 – Innovation Center "Biruch – NT" for solving urgent research problems of existing businesses and for the formation of a reserve of growth drivers. EFKO Group pays special attention to cooperation with leading research institutes, and is actively working with specialized higher education institutions, accelerators of start-up projects and supports the competitions of scientific ideas. EFKO is always looking for new drivers of growth and is interested in supporting of talented professionals with proactive lifestyle, whom it's ready to provide the unique opportunities for self-realization as a developer of new technologies and innovative projects, and future business leaders based on these projects.

In the context of general digitalization of socio-economic processes, the company's readiness to transform all processes, or the so-called "innovative maturity", comes to the forefront, which is reflected in the system of indicators of methodology for assessing the innovative maturity of companies taking into account readiness for digital transformation.

The digitalization indicators of Russian economy show a greater growth potential compared to the level of Internet penetration. For example, access to digital services in Russia and in the European Union according to a number of indicators: the share of electronic commerce in the total retail volume (Russia - 4%, EU - 7%), the share of organizations using CRM systems (Russia - 13%, EU - 26%), the proportion of citizens who made purchases online (Russia - 29%, EU - 57%), the proportion of citizens who received public services via the Internet (Russia - 29%, EU - 48%), the penetration of mobile Internet (Russia - 46% , EU - 63%), smartphone penetration (Russia - 60%, EU - 62%), Internet penetration (Russia - 76%, EU - 84%).

Thus, the Russian Federation has the necessary prerequisites for the active growth of digital economy. State support programs for the development of innovation sector are actively implemented in the Russian Federation. In accordance with Decree of President of the Russian Federation dated May 7, 2018 No. 204, the national program "Digital Economy of Russian Federation" was reformatted by the

government of Russian Federation into a national project and cascaded into six federal projects. The total funding will amount to 522 billion rubles ($ 7.8 billion).

The methodology for assessing innovative maturity is designed to conduct independent diagnostics of the current level of innovative maturity of company, determine development directions and identify suitable recommendations for practical application.

The methodology for assessing innovative maturity taking into account readiness for digital transformation includes four stages: assessment of innovative maturity; strategy development and roadmap development; pilot project; scaling. It is proposed to evaluate innovation maturity in seven areas: strategy and aspiration; processes and practices; culture and people; organizational development; openness to external influences; readiness for rapid changes; readiness for digital transformation. For each direction, system of evaluation criteria is proposed, based on the results of expert evaluation of which it's possible to calculate the integral index of innovative maturity, to determine the level and category of maturity of companies and corporations.

The methodology for calculating the final index of innovation maturity is as follows: companies are evaluated by experts on the proposed criteria on a scale of 1 to 10 points, where 10 - the criterion is strongly pronounced; 0 - the criterion is not pronounced. The average of obtained values is the final score. After that, a rating of all respondents is compiled. All participants in the study are divided into quintiles (champions, innovators, followers, observers, opponents) depending on the overall score.

Results

Testing the methodology for assessing innovation maturity for five companies in 2019 is presented in Table 2.

Table 2: testing the methodology for assessing innovative maturity according to data of companies for 2019

Direction and criteria of assessment	Merkator Kaluga LLC	Orbita CJSC	DIAKONT JSC
1 Strategy and aspiration	8.3	7.3	8.3
1.1 The degree of influence of innovation on the results of company	8	6	8
1.2 Willingness and ability of company to invest in innovation and take risks	8	7	9
1.3 The role of internal customer in innovation	9	9	8
2 Processes and practices	7.8	8.0	7.6
2.1 Organization of innovation management model	7	7	8
2.2 Organization of project management processes	8	10	9
2.3 The process of approval and decision-making	7	7	7
2.4 The process of piloting and implementing projects	9	7	8
2.5 Availability of innovation tools	8	9	6
3 Culture and people	7.8	8.6	7.2
3.1 Coverage of financial motivation	8	9	8
3.2 The proportionality of financial motivation	7	7	6
3.3 System of key performance indicators (KPI)	6	10	7
3.4 Non-financial motivation	9	8	8
3.5 Culture of experimentation and perception of innovation risks	9	9	7
4 Organizational development	7.3	9.3	7.7

Direction and criteria of assessment	Merkator Kaluga LLC	Orbita CJSC	DIAKONT JSC
4.1 Focus on customer	7	9	7
4.2 Leadership and involvement of employees	8	10	8
4.3 Introduction of practice transfer tools	7	9	8
4 Openness to external influences	8.5	8	7.5
4.1 Search for new ideas and projects	8	8	8
4.2 Openness to ideas and new opportunities	9	8	7
5 Readiness for rapid changes	8	9	7.5
5.1 Risk acceptance	7	9	7
5.2 Acceptance of innovation by employees	9	9	8
6 Readiness for digital transformation	9	9	9
INDEX OF INNOVATION MATURITY	**8.1**	**8.5**	**7.8**
Category of innovation maturity	The champion	The champion	The champion

Source: calculated by authors

The first Russian innovative champion Merkator Kaluga specializes in the design and manufacture of road maintenance special machinery and equipment in collaboration with the BUCHER MUNICIPAL Swiss concern. The plant produces multipurpose road maintenance vehicles, vacuum sweepers on a commercial and self-propelled chassis, garbage trucks, as well as various attachments. The equipment produced by Merkator Kaluga is used for winter and summer maintenance of city roads, trunk-lines, sidewalks and other areas with hard surface. In addition to domestic sales, the company's products are exported to the Republic of Kazakhstan. Currently, projects are being realized on selling the Merkator Kaluga machines to such countries of the near abroad as: Kyrgyzstan, Uzbekistan, Azerbaijan, Belarus, Armenia, Moldova.

The second Russian innovative champion Orbita, CJSC is one of the leading manufacturers of regulation and monitoring equipment (RME) for space vehicles and satellite electric power supply (EPS) systems. The enterprise’s team has created the regulation and monitoring equipment for electric power supply (EPS) systems of space stations Salyut, MIR, International Space Station (ISS), as well as converters for the manned and cargo spaceships SOYUZ, Progress, Starliner. The company's products are designed for use in telecommunication and scientifi c space vehicles, orbital stations, manned spaceships and other autonomous objects. The products manufactured by Orbita, CJSC are exported to the USA. Exports are planned to India, Pakistan, Brazil, Angola.

Another Russian innovative champion Diakont group of companies is one of the world’s leading manufacturers and designers of high-tech equipment aimed at improving safety and effi ciency in such fi elds as nuclear energy, oil & gas, industrial manufacturing, housing and public utilities. The company’s product range includes: robotic diagnostics and maintenance systems, radiationresistant television cameras, automated control systems for nuclear power plants, electromechanical drives. A branch in the United States (San Diego) was opened in 2011. A branch in Italy (Arezzo) was opened in 2014. A branch in China was opened in 2019. The company occupies a leading world position in the production of radiation-resistant chambers for nuclear power plants and is actively developing a business in the fi eld of drive technology. At the moment, it successfully sells the high-speed power actuators of its own production. About 20% of all products are manufactured for export.

Conclusion

The conclusions should be based on the assessment of differences between the five quintiles of companies. Additionally, a study of large companies was conducted - champions of innovative maturity, taking into account readiness for digital transformation. Average revenue in 2018: 3.2 billion rubles. Average number of employees in 2018: 663 people. Average age of the company in 2018 году: 19,2 years. Average revenue growth rate over the past five years (CAGR methodology): 24%. Average

share of R&D expenses in revenues for the last three years: 21%. Average share of costs for technological innovation in revenue over the past three years: 30%. Average share of revenue from new products over the past three years: 78%. Average revenue from exports in 2018: $ 456.0 million. The average share of exports in revenue over the past three years: 23%.

Using the recommendations presented, the company can run diagnostics of the current state of innovative maturity and determine the directions for development that will allow it to move to the next level of maturity. Depending on the level of innovation maturity, companies should balance between indicators of “actions” related to building the company's potential in the field of innovation (more for beginners) and “results” (more for innovators).

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Trends and Challenges Related to the Digital Transformation of Industry

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Abstract

The paper examined the content, goals and objectives, principles, main directions, tools and stages of digital transformation of industry. The systemic problems of digital transformation are identified, on the basis of which a general digital transformation scheme and digital business model are proposed. The presented developments will make it possible to comprehensively transform the industry on the basis of transition to new business models, communication channels with customers and suppliers, products, business and production processes, and corporate culture, which are based on fundamentally new approaches to data management using digital technologies, with the aim of significant increase of industrial efficiency and long-term sustainability.

Keywords: Digital Transformation, Digitalization, Industry, Chief Digital Transformation Officer, Digital Business-Model

Introduction

At present, it is becoming apparent that the main trend is the arrival of IT technologies in the industry, which will drastically reduce the cost of production. Not only machines, but also conveyors and entire plants should be integrated into one network. In addition, consumer and industrial goods will also be on the Internet (the so-called technology of “Internet of things”, “industrial Internet of things”).

Industry is on the verge of radical structural changes. Digital transformation carries both huge potential and serious challenges. The study of Roland Berger “Digital Transformation of Industry", conducted in conjunction with the German Industry Federation (BDI), examined the causes of digitalization and its impact on industry in Germany and other European countries.

The overall economic effect of digitalization was also calculated. In particular, experts found that digitalization of industry until 2025 alone in Germany could create an additional potential for creating value of 425 billion euros. The total figure for Europe is 1.25 trillion euros. If the region fails to turn the transformation into its own advantage, its industry may suffer a total loss in a huge amount of 605 billion euros.

Methods and Materials

The research methodology is based on existing theoretical developments in the field of innovation management, corporate governance, competency-based approach.

In the research process, the dialectical approach, system analysis methods, economic and mathematical methods of information analysis, strategic management methods, expert assessments, modeling, clustering, tools of fuzzy production cognitive maps, system-activity method, network analysis methods, value-oriented, cultural historical methods, methods of social constructivism, functional analysis, as well as the prognostic method, etc., which provides a high degree of validity and reliability of the main conclusions and results of study.

Results

The digitalization indicators of Russian economy show a greater growth potential compared to the level of Internet penetration. For example, access to digital services in Russia and in the European Union according to a number of indicators: the share of electronic commerce in the total retail vol. (Russia - 4%, EU - 7%), the share of organizations using CRM systems (Russia - 13%, EU - 26%), the proportion of citizens who made purchases online (Russia - 29%, EU - 57%), the proportion of citizens who received public services via the Internet (Russia - 29%, EU - 48%), the penetration of mobile Internet (Russia - 46% , EU - 63%), smartphone penetration (Russia - 60%, EU - 62%), Internet penetration (Russia - 76%, EU - 84%).

Thus, the Russian Federation has the necessary prerequisites for the active growth of digital economy. State support programs for the development of innovation sector are actively implemented in the Russian Federation. In accordance with Decree of President of the Russian Federation dated May 7, 2018 No. 204, the national program “Digital Economy of Russian Federation” was reformatted by the government of Russian Federation into a national project and cascaded into six federal projects. The total funding will amount to 522 billion rubles ($ 7.8 billion).

Due to the incompleteness of a number of tasks of the previous reforms, the remaining negative management practices at industrial enterprises reduce the opportunities for introducing modern digital technologies.

The purpose of this article is to develop conceptual and methodological aspects of digital transformation of industry, the results of which should be a significant increase in industrial efficiency, as well as achieving long-term sustainability and global competitiveness.

The evolution of digitalization of processes includes three stages: automation → digitalization → digital transformation. Automation is characterized by the introduction of IT solutions that repeat the existing processes. Digitalization improves existing processes by introducing IT; Lean methods for optimizing processes; process reengineering.

Thus, digitalization is “the use of digital technologies to increase the efficiency of company and improve the quality of life of its employees”.

With digital transformation, there is a sharp decrease in transaction costs due to the emergence of new activity models, primarily digital platforms; the combination of technology capabilities and traditional sphere of activity of organization leads to appearance of new products and processes with fundamentally different qualities.

According to R. King, FedEx Corporation's corporate vice president, “when we talk about digital transformation, we’re not just talking about digitalization and automation. We have been doing this for many years. For us, transformation is a real transition from the old style of work to completely new methods”.

For some people, digital transformation is too often used synonym for IT strategy. For PwC, this concept goes beyond the simple use of new technologies. Digital transformation is a new way to solve problems, create a unique experience in interacting with customers and employees, and accelerate business efficiency. It has a huge impact on the human resources of organization.

In the context of general digitalization of socio-economic processes, the company's readiness to transform all processes, or the so-called “innovative maturity”, comes to the forefront, which is reflected in the system of indicators of methodology for assessing the innovative maturity of companies taking into account readiness for digital transformation.

From the point of view of digital transformation, some organizations can be attributed to the category of companies aimed at increasing efficiency, which use digital assets to increase the efficiency and speed of their business; others relate to modernization-oriented companies that are building up new competencies to modernize their business; still others are among the reformers that change their core business models to restructure their business; finally, another category is industry pioneers who enter new markets or develop new industries.

Organizations carry out large-scale initiatives, so for to get a clear idea of the threats and opportunities in advance is a good help for them in making informed decisions that provide a balance between innovation and risk appetite.

The list of tools that corporations can use depends on the stage of innovation and the cost of tools. The largest number of tools is applicable at the stage of searching for ideas, the smallest - at the stage of scaling. If the company doesn’t have a significant amount of financial resources, it can use inexpensive tools, for example, events for startups and idea contests. If the company has significant financial resources, it can use tools such as corporate venture fund, laboratories, etc. As promising areas in the innovative development of corporations, it’s possible to single out the use of digital platforms, collaboration and others.

In order to develop breakthrough innovations, companies turn to new management models, such as open innovation (collaboration with external partners), design thinking (developing new solutions focused on people's needs), corporate venture funds and incubators.
As a result of implementation of methodological approach to classify the tools and practices of corporate governance of open innovation, the tools of corporate open innovation (Table 1) were integrated with the resources for implementing the tool and stages of innovation.

Table 1: corporate open innovation tools

Action	Description	Examples
Events and workshops	Participation in internal and external events and workshops focused on innovation and entrepreneurship	Entrepreneurship SP, Startup Weekend, Minas Startup, Innovation Week, Innovation Show, ANPEI
Executive Forums	Forums where future strategies and innovation are discussed at senior management level	Strategy Review Meeting (RAE) and forums with the participation of specialized consultants
Problem Solutions	Exposure of business and technology problems so that the solution is given by internal and external participants	Hackathons, pitch fights, marathons with internal and external audiences
HR Development	Planning and implementing actions to develop and / or attract highly skilled young talents	Programming Marathons, Mathematical Olympiads, EADs on internal processes of innovation
Market Trials	Experimental service offerings	Connected house, IPTV over Gpon, Music MVNO
Strategic Partnership	Establishment of alliances to develop technologies and / or business models	CPqD, Inatel, Nokia, Universities, URI-Erechin, CERTI Foundation, TeleStax, IBM, 100 Open Startups
Support team	Dedicated structures for planning and developing all innovation processes in the company	IMO (focus on innovation management) and R&D (focus on research and development)
Customer Integration	Usage research, trials and visits to customers' environments	Studies based on customer complaints and use of services, field visits to clients and local authorities and forums with opinion formers
Joint development	Collaboration with objective of reaching a certain public or market	Connected house, IPTV over Gpon, Music MVNO, MDN

Working in the field of high technologies, it is not enough to reach a certain level - Rostec create a system of continuous innovations. It is not enough to be a national leader - Rostec want to act globally. A large number of industries today is not an advantage - a portfolio of "smart" products is needed. Therefore, having completed collection and consolidation of disparate industrial assets in 2014, State Corporation Rostec moved to the stage of active growth which required actualization of the Development Strategy. The main task of the Corporation at the stage of active growth is to reach the scale of the leading global competitors. Going out to the scale is not only a matter of competitiveness but also the task of preserving Russia as a world technological leader.

According to a digital transformation study conducted by PWC in 2018 (in which 1,155 executives of manufacturing companies in 26 countries were surveyed), data were obtained according to which “only 10% of global manufacturing companies are “Digital Champions”, with almost two-thirds who are only at the initial stage or haven’t started their digital path at all.

According to the results of another study conducted by KPMG in 2019, the following eight became the key technologies for digital transformation in Russia:

1 robotization (RPA);
2 Big data analysis and predictive analytics;
3 chat bots;
4 artificial intelligence (AI);
5 virtual and augmented reality VR/AR;
6 Internet of Things (IoT);
7 optical recognition;
8 blockchain.

The primary task within the framework of the beginning of digital transformation of industry is the appointment of CDTO with the assignment of its corresponding functions and powers and the formation of Competence Center.

CDTO – is a conductor of single digital development policy; provides management of implementation of digital transformation projects; coordinates strategic documents and budgets for informational support and digital transformation; coordinates the structural divisions of digital transformation and digital development; organizes data management; forms the Competence Center, performs other tasks.

The functional structure of digital transformation unit includes: a project office for implementation of digital transformation and digital development projects (within the authority, subordinate institutions, and supervised sphere); Process Transformation Office to create digital products/services; data management office; center of competence (it’s possible to use an external center).

The digital transformation of industry is carried out in several successive stages:

1 positioning;
2 planning (formation of ideas);
3 testing (implementation of pilot projects on digital transformation);
4 scaling.

The general scheme of digital transformation is presented in Figure 1.

STRATEGIC VECTORS OF DEVELOPMENT OF INDUSTRIAL ENTERPRISES			
Increase of profit	Growth of market share	Expansion of partner network	The study of demand, consumer needs
Point of sales and distribution channels	Introduction of innovations	Brand recognition	Corporate culture

↓

DIGITAL OPPORTUNITIES			
Ecosystem for customer solutions	Operating ecosystem	Technological ecosystem	Personnel ecosystem

↑

DIGITAL INVESTMENTS	
Digital culture	Realization of innovative potential: operational and systematic implementation of innovations, acceleration of business cycle and the launch of new products on the market

Fig. 1: General scheme of digital transformation of industrial enterprises

Based on the study, we can conclude that the digital transformation of industry is a complex social challenge that requires agreements between key stakeholders: citizens, state and business.

Since digital transformation is a business transformation, the structure of industrial enterprises, infrastructure and corporate culture that existed before its implementation could become barriers to implementation.

The effects of digital transformation are not immediately apparent therefore targets are set for deadlines that take into account not only the direct implementation of digital transformation activities, but also the period for obtaining the result.

Additionally, a study of large companies was conducted - champions of innovative maturity, taking into account readiness for digital transformation.

The share of R&D expenditures in the revenue of champion companies was on average 16% for large (with revenues of more than 2 billion rubles), 12% for medium (revenue from 800 million to 2 billion rubles) and 19% for small companies (revenue up to 800 million rubles). The share of technological innovation costs in revenue amounted to an average of 23% for large, 26% for medium and 25% for small companies. The share of new products in revenue amounted to an average of 53% for large, 53% for medium and 64% for small companies.

Conclusion

Previous attempts to introduce information technologies in industry have led to the creation of disparate information systems and often duplicated, without changing, “paper” processes.

Digital transformation requires a different approach to the development of digital solutions, to processes, to implementation of changes, to culture. The new wave of digitalization should use not only new technical solutions, but first of all management technologies that allow keeping people’s transformations in focus.

Digital transformation at the level of the whole Russian Federation is possible only with a new approach to roles in teams and the emergence of digital transformation teams uniting regions, municipalities, federal authorities, business and citizens.

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Innovative Management Instruments in Polish Local Government – - An Example of Urban Prototyping

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Abstract

The system of local government in Poland has recently been an area of introduction of a number of innovative management instruments and methods. Their aim is i.a. to improve the availability and quality of public services and thus better satisfaction of residents' needs. One of such innovative methods is urban prototyping – an advanced consultation-research-design process. The paper includes a synthetic characteristic and assessment of urban prototyping implemented in the Polish local government.
This method is extraordinarily helpful in transforming public spaces. Urban prototyping actively involves residents who have the opportunity of direct influence on how the transformed space may satisfy their real needs better. Therefore, this process allows local government units - as stakeholders responsible for execution of public tasks for the benefit of residents - to achieve their goals effectively and efficiently.
From the point of view of management in local government the basic value of urban prototyping involves simultaneous achievement of participatory, research and design objectives.

Keywords: Urban Prototyping, Satisfaction of Residents' Needs, Local Government

Introduction

Meeting the needs of self-governing communities is local government's basic aim and task in the Polish organizational conditions. It may be carried out in a number of various ways, and the choice between them is made by the local government itself.

One of the biggest challenges faced by local government units is the following problem: by means of what tools, instruments, methods should local affairs be managed in order to achieve the organization's objectives? How to best satisfy the needs of its residents? This implicates the need of constant search for new solutions, adequate to the changing cultural, economic, social and legal conditions.

One of such innovative instruments (methods) is urban prototyping. The characteristic of urban prototyping requires a multidimensional analysis of i.a. strategic contexts and spatial policy (including planning determinants and spatial planning) and the role and significance of urban prototyping for local democracy and participatory processes (such as citizens' initiatives, collaboration with NGOs, consultation, participatory budgeting). These issues will be the subject of analysis in this study.

Direct motivation to undertake the subject-matter of urban prototyping in the Polish local government involves an analysis (assessment) of basic problems and challenges faced today by local government authorities, including in particular authorities of large Polish cities. To a great extent these are issues common to many (if not majority of) contemporary (not only European) large cities and they include problems of sustainable urban mobility, pro-ecological challenges, encouraging the processes of self-organization of the civic society and many others.

This must be met with an adequate response from self-government authorities. The more it is rooted in values and ideas that underlay local government (such as subsidiarity, participation and citizenship), the better it will meet the expectations of contemporary civic society.

In line with the research hypothesis adopted in the study, the role of urban prototyping in socializing decision-making processes in local government as well as in the process of self-organization of the civic society will increase.

Practical experience also backs up the undertaking of this subject-matter. In 2019, as vice-president of the city of Szczecin, I was responsible for the implementation of one of the largest projects of this type in Poland. Together with Paweł Jaworski, urban planner and philosopher, acting on the basis of his proprietary concept of urban prototyping, we managed such a project - performing activities aimed at changing the function of one of the most important public spaces in the city.

Satisfying the needs of self-governing communities as a primary role of Polish self-government

The analysis must start by outlining the role and objectives of local government in the Polish organizational system.

The territorial regime of the Republic of Poland ensures decentralization of public authority. An extraordinarily significant role in governance falls on local government which is responsible for an essential part of public tasks carried out in the country.

Local government, participating in exercising public authority, acts in its own name and on its own responsibility, and its independence which is a basic and immanent feature of this corporation is subject to court protection. Independence means in particular that when creating public tasks, the legislator must secure a specified scope of freedom in the choice of the manner of local government's implementation of public tasks which meet the needs of its residents.

The Polish legislator used the term "satisfying the needs of self-governing communities" in a specific constitutional norm interpretable from Article 166 section 1 of the Constitution of the Republic of Poland of 2 April 1997. By making "the needs of residents of a local (regional) government" a legal category, the legislator conferred upon it both the relevant rank in the Polish legal order as well as a special status of a determinant for tasks of local government units *in genere.*

One can actually conclude that satisfying society's needs is the basic public objective (interest) (public value) that local government units are obliged to implement (Szydło, p. 42)

Entities whose needs are to be met are self-governing communities created by the residents of local government units. The category of self-governing communities encompasses both individual and collective aspects, including in the subjective scope both individual residents of territorial corporations, groups of residents which can be distinguished due to different criteria (e.g. residence in a part of the territory or community of interest), and the total of residents understood as a community (full community in question) singled out on the basis of the fiction of identity of needs and of integration of the corporations. The object of satisfaction involves human needs (individual, collective). Of the various formulas of understanding needs on the ground of views of Polish administrative law scholars and commentators, their understanding as objective conditions of existence and functioning (i.e. as what is essential or useful in human life (Duniewska, p. 148-163)), as conditions of reaching optimum efficiency in retaining themselves and ensuring their own development (Sowiński, p. 135), was adopted for the analysis.

The needs in question may be ordered e.g. according to Maslow's classification (2013). This involves in particular: physiological, safety, belonging, cognitive, aesthetic or self-actualisation needs. However, it needs to be remembered that when creating his hierarchy of needs which later became known as the "pyramid of needs", Maslow meant individual needs. In the conditions of community life that we are dealing with in local government they must to be supplemented with needs that are an expression of what is indispensable (useful) to the residents in the conditions of community life. Let us call them infrastructural needs (Wacinkiewicz, p. 341-342).

Local government units faced with the task of satisfying self-governing community needs may do so in two basic ways: 1) by providing residents with specific goods that satisfy their needs and 2) by making it possible for them to use specific goods. A far as the first method involves provision to residents of specific goods (material or non-material) that indirectly satisfy their needs, the second one consists in providing the possibility of using specific goods (public things) made available by entities obliged to cater for residents' needs (Wacinkiewicz, p. 342-346).

It is the second way of satisfying the needs of residents that is crucial from the point of view of urban prototyping projects. Public spaces which as a result of the prototyping process we are trying to transform (e.g. town squares, boulevards) are public goods made available for public use (that is to anyone) in all circumstances and access to them does not depend on meeting requirements specified by the law. Through use and enjoyment of them satisfaction of residents' needs takes place, which can be classified e.g. under needs associated with being in fresh air, recreation and relaxation, building interpersonal relations, pursuing one's own ideas and projects or use of a cultural offer (on the basis of entertainment projects for public places). We can find the physiological, belonging or aesthetic needs here without a doubt. Since public spaces made available to residents may serve satisfaction of their certain needs and this in turn is a basic task of local government, it seems obvious that everyone - local authorities as well as residents - should be interested in the best possible use of their potential. Urban prototyping is the method leading to optimization of design decisions resulting from the participation-research process.

The essence of Urban Prototyping

One of such innovative instruments (methods) is urban prototyping. It needs to be defined as an advanced consultation-research-design process as a result of which residents gain decisive influence over how public space is transformed.

The urban prototyping method is based on an approach to shaping public space that is different to the traditional approach. In the model approach to planning an expert discussion takes place, strategic studies and planning regulations are drawn up and on their basis design and implementation takes place. In the case of urban prototyping - thanks to feedback from residents - new elements emerge between architectural design and implementation, which make it possible to avoid the risk of conflict around the re-developed space or the risk of emergence of inadequate solutions. Thus, it can be said that prototyping is a way to solve difficulties inscribed in the traditional model as Jaworski (2017) notices in his Report.

We are dealing here with action called iterative design. Thanks to the iterative structure of the design, errors in the adopted assumptions may be discovered in the course and not at the end of implementation of the project, after extensive resources have been invested. As concluded by Jaworski and Karłowska (2017) this makes it possible for the project to evolve reasonably, allowing avoidance of the problem of lack of comprehensive knowledge.

Three fundamental stages can be identified in urban prototyping as a project (Jaworski, 2017). The first concerns activities preceding the creation of the prototype. Inventory of the current state of the public space that is to be covered with the project takes places, reference data is collected which will be used throughout the process, preliminary analyses are prepared including in particular transport (that is parking) behaviour, a concept of a contemporary change in traffic organization is developed and the prototype itself is built. At this stage first essential informational steps are taken focused on residents. They are also involved in individual actions (a consultation point for residents, distribution of leaflets, talks and meetings) and diagnostic and design workshops with their participation are held. Also at this stages discussions with various public space stakeholders take places - entrepreneurs or NGOs operating there, structures grouping residents engaged in public life (e.g. neighbourhood councils). Through this information is collected which will then serve to create the prototype of changes in the public space. If the design assumes socialized creation of prototype elements (e.g. joint construction of urban furniture, aestheticization of green areas) these actions are also held with direct, physical involvement of residents.

The second stage is associated with establishing the prototype and has fundamental research importance from the point of view of the entire process. Testing the prototype and response takes place here.

Prototyping assumes gradual introduction of changes which may be constantly corrected. Through testing the possibility of physical use of the transformed public space is ensured, making people accustomed to the changes before they become irreversible (e.g. residents may verify what kind of activity in public space revives it best, or find out how safety on the street is influenced by traffic calming). An answer to the question about residents' readiness for modification of their surrounding space is obtained on the basis of their real experience and not on a declarative approval or disapproval, which is particularly important. What is more, residents' needs may be flexibly responded to, improving or modifying the prototype at the testing stage.

At this stage all informational activity is continued, including in particular inclusion of residents in the process involving sharing opinions on the prototype. Research is also carried out on moving about in the area covered by the prototype, on traffic intensity, on the use of parking spaces, etc.

In turn in the third stage, already after the prototype has been liquidated, further informational activity takes place, inclusion of residents in the process of project analysis is continued by means of meetings and workshops closing the process, and also the final report is drawn up and publically presented, which constitutes the summary of the project.

Holistic Approach to Urban Prototyping

Thinking about a certain public space and the urban prototyping process itself cannot be carried out devoid of arrangements for the entire city. Justification of such a holistic approach is provided by an obvious observation resulting also from experience, that it is not possible to solve problems of a specific public space by focusing solely on it. A city does not consist of separated fragments of space, but forms a complex system in which changes introduced in one place (e.g. construction of a parking lot) cause specific implications in the surroundings (e.g. generating enhanced road traffic). What is important, these implications are often difficult to predict - even with having the possibility to use modern simulation and measurement tools. This one relationship alone out of a number of others occurring in contemporary cities is encouragement to a broader and comprehensive look at the interesting fragment of the city's space.

Within the vast scope of issues that should be taken into account in the process of urban prototyping we shall demonstrate three crucial ones. First of all, placing it in the strategic context of the city's activity, secondly, taking into account its role in the implementation of the urban policy of sustainable development, thirdly, the role that urban prototyping may play for participatory processes in the city.

Therefore, referring to the first issue, one needs to begin with an obvious observation that the urban prototyping process must be located in the framework outlined by strategic documents adopted in the local government (including in particular: development strategies or spatial studies containing conditions and directions of spatial development). Strategic goals will be the first essential reference point outlining at the same time the framework within which urban prototyping solutions will be developed. Development strategies adopted at the level of local government should demonstrate where - in the categories of the hierarchy of needs - issues such as quality of life, care for ecology or sustainable mobility are placed. In turn, basic instructions that shape the spatial policy for a given specific area (city fragment) will result from the spatial studies. They will show in particular whether a given area has distinguishing features which include both spaces and valuable objects located there which have historical, ecological, artistic, architectural, ideological, etc. values. In an obvious way they should be protected on the one hand and exposed on the other. Both indicated elements, strategy and spatial studies, outline a basic framework for prototyping activity.

Urban prototyping must be looked at in the context of sustainable mobility in the city - one of the main current development challenges. The strategic documents referred to, especially the spatial study, show special conditions concerning individual spaces in the city as well as instructions concerning transport issues which outline the framework of the sustainable mobility policy.

The fundamental problem of many contemporary cities involves the fact that natural values of urban areas in the course of the last decades have been marginalized as a result of an extremely dynamic increase in

the number of used cars and the resulting domination of individual transport over mass transport. Similar to what is happening in an ever greater number of European cities, including Polish ones, implementation of this policy is to counteract negative effects of the increase of motorization. As a result, public spaces which should mainly serve users-pedestrians have been annexed for transportation and parking needs. This is why recovering public spaces and squares for pedestrians and improving their social and functional quality is one of the fundamental contemporary challenges.

From the management perspective, spending financial resources is rationalized as an effect of urban prototyping. It is because we gain in-depth knowledge on residents' needs and the probability of spending funds on a project (investment) that will not be socially accepted decreases radically. What is more, we are gaining an additional criterion of assessment of validity of spending funds on the project which is "well-tailored" to the needs of the public space users. Good surveying of needs also makes it possible to design infrastructure which will not include unnecessary (and often costly) elements. These measures serve to optimize decisions concerning public spaces taken by self-government authorities. Therefore, urban prototyping allows affective achievement of goals by an organization (local government unit).

Why is urban prototyping so important in local government? Most of all because through discussion on public space it serves a greater goal, that is improving the quality of public debate.

Among many pro-citizens activities that encourage residents' greater involvement in public matters in the local government, urban prototyping stands out due to its character and scope of inclusion of residents. In a number of procedures that are expressions of local democracy (referenda, consultations) residents have the opportunity to choose between certain specific options. In the urban prototyping process, we are dealing with something much deeper than a simple choice between ready-made variants.

The requirement for real and fullest participation in the process involves equipping participants in the greatest knowledge on the prototyped space, its conditions and capabilities. Thanks to this, the "socializing of knowledge" takes place and process participants have the opportunity of fuller participation in the act of creating the prototype by holding crucial necessary information. The weight of this factor needs to be expressly emphasized, given that a frequent reason for lack of residents' engagement with public affairs (e.g. concerning urban planning, architecture) involves a belief that it requires specialist knowledge, often even seen as expert knowledge. An antidote for the "exclusivity of knowledge" perceived in this way involves intuition and solutions based on one's own experiences which are applied in the urban prototyping method and interpretation of which does not require specific competences. From the participatory point of view, the chances for active participation in public life are enhanced by it, also of those persons who by default do not participate in typical consultations due to marginal (in their opinion) force of this path of participation - removing one of the potential access barriers.

The factor of "socializing knowledge" is crucial also from the point of view of responsibility for the project. Thanks to information and knowledge residents are aware of the effects of introduction of such solutions for testing. It is an important element encouraging responsible and multidimensional perception of processes occurring in the urban tissue, their causes and consequences, opportunities and threats. It encourages shaping and reinforcing responsible ways in place of demanding attitudes and requests not justified by needs. For participatory processes, such awareness has a relevant impact on the quality of public debate.

The need for urban prototyping is revealed most fully in a situation that requires facing controversial issues that are not commonly accepted – those that require dialogue in order to find solutions to them. The above-mentioned issues of availability of public space for individual road transport, especially parking, are an exemplification of this problem. However, let us look at them from the perspective of challenges and tasks that must be put before the prototyping process. One may feel that from the perspective of many participants of this process (residents, entrepreneurs) this question is a central issue. Entrepreneurs point to their own needs (e.g. supply) as well as the needs of their customers. Residents of the public space which is to be transformed point out that it is not only public but also "their" terrain. Both expect certain preferences exclusively for themselves. This overlaps with the problem of parking places dedicated to

disabled persons, high-rotation parking places, traffic safety of all traffic participants - including pedestrians and cyclists, limits on movement speed, closing certain areas for road traffic and many others. Domination of this issue pushes issues that are significantly more important to the margin, such as entirely fundamental, development of new functions for public spaces, improving their quality, adaptation to users' needs, etc. This is why, the aim of joint action and arrangements made with the space users (residents, entrepreneurs, activists, non-governmental organizations and institutions), on the basis of conclusions coming from testing, should involve establishing jointly with the residents alternative solutions that will best satisfy their real needs. Under Polish legal circumstances this means in particular discussing instruments such as exemption from the requirement of locating parking places in a specific area by new (e.g. residential) investments, limiting admissible number of parking places, limiting access of cars to certain zones (areas) of the city or introducing high fees that enforce rotation in car parks in a given zone. *Conditio sine qua non* for stopping domination of road traffic consists not only in the indicated organizational and economic instruments, but most of all in priority for public transport and creating competitive conditions for moving within it, which are an integral part of the discussion of transforming public space.

In the urban prototyping process, through dialogue with residents supported by surveys, analyses and testing, we are aiming to be fully aware of the benefits of a change in the surrounding space and of improving its quality - which often requires residents' readiness to self-limitation (even with regard to the said transportation habits).

Conclusion

The system of local government in Poland (covering the local and regional level) has recently been an area of introduction of a number of innovative management instruments and methods. Their aim is i.a. to improve the availability and quality of public services and thus better satisfaction of residents' needs. One of such innovative methods is urban prototyping.

In this process, residents interested in transforming public space participate in designing it jointly by creating a prototype and then testing it. Prototyping assumes gradual introduction of changes which may be constantly revised (e.g. residents may verify what kind of activity in public space revives it best or find out how traffic calming affects safety on the streets). Moreover, comments reported by them in the course of the entire prototyping affect the guidelines (which conclude the process) which in turn are the basis for further action. Therefore, it may be reasonably stated that prototyping occurs in the residents' surroundings and with their direct participation.

From the participatory perspective it is an important instrument of development of the culture of dialogue in local government. In may be treated as a special form of consultation. However, it has a distinguishing feature that it does not boil down to studying preferences or making a choice between ready-made, imposed solutions. It happens through direct contact with residents (in this specific urban context - users of public space), based on numerous meetings, discussions and extensive research.

An undoubted value of methods such as urban prototyping involves building residents' awareness of the conditions of their surrounding reality and anchoring in them a belief in the effective impact that they have on public matters. It is a process in which substantive arguments which convince experts may be juxtaposed with users' arguments. What is more, urban prototyping directs activities on users' real needs, verified as a result of an experiment. From the point of view of management at the communal level, this social project is an optimal interactive synthesis of perception, valorisation, use and co-creation of space, based on an enhanced participatory process.

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Quality Management in Transport Related to Thermal Treatment of PVC Profiles in Windows Production

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Abstract

Polish export of windows made of is one of the biggest in the world. Achieving such level would not be possible without relevant management of the process of preparation of windows construction for their transport. One of the main factors that determine the construction quality is the method and the conditions of the thermal joining of profiles in production. The article describes two methods of thermal joining and then analyses their application in the production process with parallel presentation of strength tests. Strength tests are connected with the implementation of the construction from polyvinyl chloride (PVC) – white and coloured in mass as well as composite structures made from polyvinyl chloride and polymethyl methacrylate (PVC+PMMA). Further on some chosen methods of window construction protection in transport are shown. Generally speaking, the article presents the complex analysis regarding designing aspects of the production process that can be the starting point for setting the future directions of management of the development of companies that produce PVC window profiles.

Keywords: Transport, Technology, Production, Windows PVC.

Introduction

At the present moment Poland is the global window exporter, overtaking such countries as Germany and China. The dynamic development of export has resulted in pressure on high quality requirements concerning production and forms of window protection in transport. One of the most important factors affecting the quality of windows are the thermal conditions in which the windows are produced. The conditions concern kinds of thermal welding methods of PVC and composite profiles and the forms of window quality protection I transport. In 2017 Polish producers exported windows and doors for a total value of 835 million USD. This level of export corresponded with 27,8% share of Polish door and window export in the total world export of doors and windows, due to which Polish producers were 2,5 times ahead of the German and 3,5 times ahead of the Chinese producers. [5,20]

Table 1: Shares of transport of particular countries in total world transport in 2017

number	Country	Percentage share
1	Poland	27,8 %
2	Germany	11,5%
3	China	7,6 %
4	Romania	5,6 %
5	Slovakia	4,6 %
6	USA	4,5 %
7	Czech Republic	4.01 %
8	Turkey	3,5 %
9	Canada	3,1 %
10	Others	27,8 %

Table 2: The level of world trade exchange of doors and windows within the period of 2015 - 2018

Year	Value of world trade exchange in USD milliards
2018	3,5 USD milliards
2017	3,1 USD milliards
2016	2,9 USD milliards
2015	2,8 USD milliards

In 2018 Polish producers denoted father increase of percentage share in the world export of doors and windows up to 34%.[5,20]

Research Problem

The Author of the paper has conducted a thorough simulation research concerning both strength and design aspect of the production process that are to support quality management in transport in relation to thermal joining of PVC profiles.

Simulation research concerned the parameters of efficiency of production lines in two variants. The first one was applied to the production line equipped with the device for thermal joining of profiles and the device for cutting off the excess material. The second variant of production line was based on the application of the milling device preparing the profiles to be joined.

The strength research of thermal joining of profiles concerned the evaluation of strength of profiles joined in case of different components (white PVC profiles, brown PVC profile – coloured in mass, composite profiles PVC+PMMA). The research was carried out for thermally joined profiles in the following temperatures 190°C, 200°C, 210°C, 220°C, 230°C, 240°C, 250°C, 260°C.

The design research was carried out for two ways of corner protection. The solution proposed here is meant to protect thermal connection of profiles in windows from damage during their transport.

In the analyses carried out it was discovered that the weakest point in welded PVC constructions is the corner of the window which is most exposed to damage in the process of production, storage and transport. [5] High requirements concerning the quality of the method used for thermal joining of profiles has an influence on the level of window transport from Poland. The transport may be organized by vans, trucks and ships. The displacement of the structure causes unavoidable strikes to its corner. The weakened (cracked) corner may affect the safety of the user and some window properties such as e.g. thermal permeability of windows, sound insulation and tightness. [11,12]

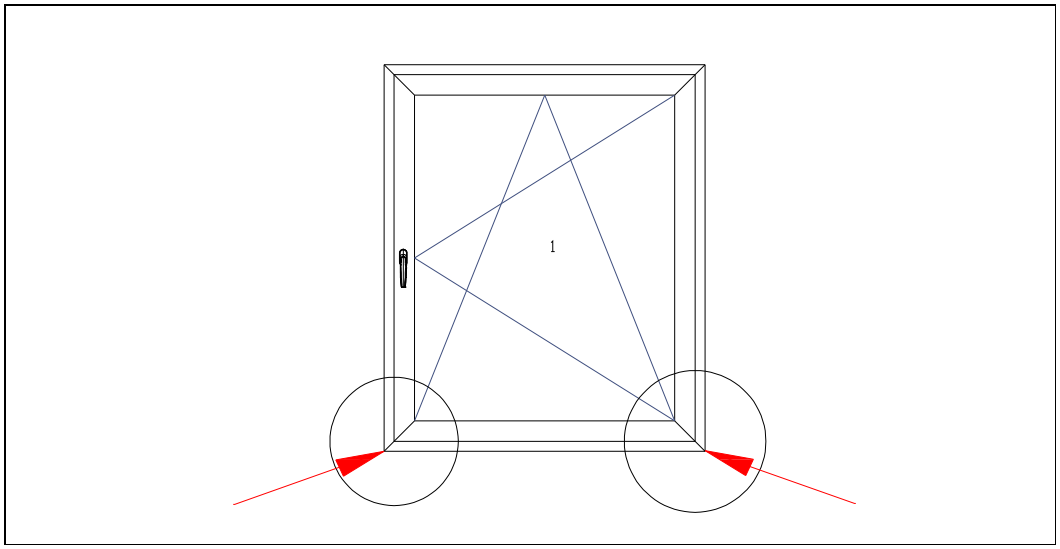

Fig. 1: Most probable places of window damage during transport

Method of Profile Extrusion

The profiles under investigation were produced by extrusion, i.e. after supplying the base material in the form of granulate it is heated up to the temperature of 250 °C, and then – as a result of te screw process – extruded outside. The hot section is cooled mostly by spraying with water. In case of profiles coloured in mass the granulate has modified composition with predominance of brown dye. Another type of technology, in which the profiles may be manufactured is he co-fabrication process. It involves extruding sections on two extruders simultaneously. In the final extrusion stage the profiles pressing systems are connected which makes it possible to produce profiles made of several different materials e.g. polyvinyl chloride and poymethyl methacrylate (PVC+PMMA). [1,2]

All production technologies described in the article may be used by companies depending on whether the profile is to be manufactured in white, brown or composite version (PVC+PMMA). The type of profile production technology used has an impact on the strength of the welded joints that are realized in the process of producing window construction.

Simulation Research of Production Line Efficiency Depending on The Variant of Production Technology

In order to analyze the efficiency of the two types of production line the FlexSim programme was applied. The analysis concerned two variants of production of the construction. [4,8]

Variant I of the thermal connection of profiles

Variant I of profile connection is conducted by the way of heating the surfaces that are to be joint by heaters within the temperature range of (190°C – 260°C) for 30 seconds and then compressing the profiles one to the other during another 30 seconds. The whole process lasts 60 seconds. While the profiles are compressed to each other they are shortened by about 2-3 mm, due to which the excess material flows out of the profile. Then after cooling the joint surface for 60 seconds the excess material is cut for 120 seconds.

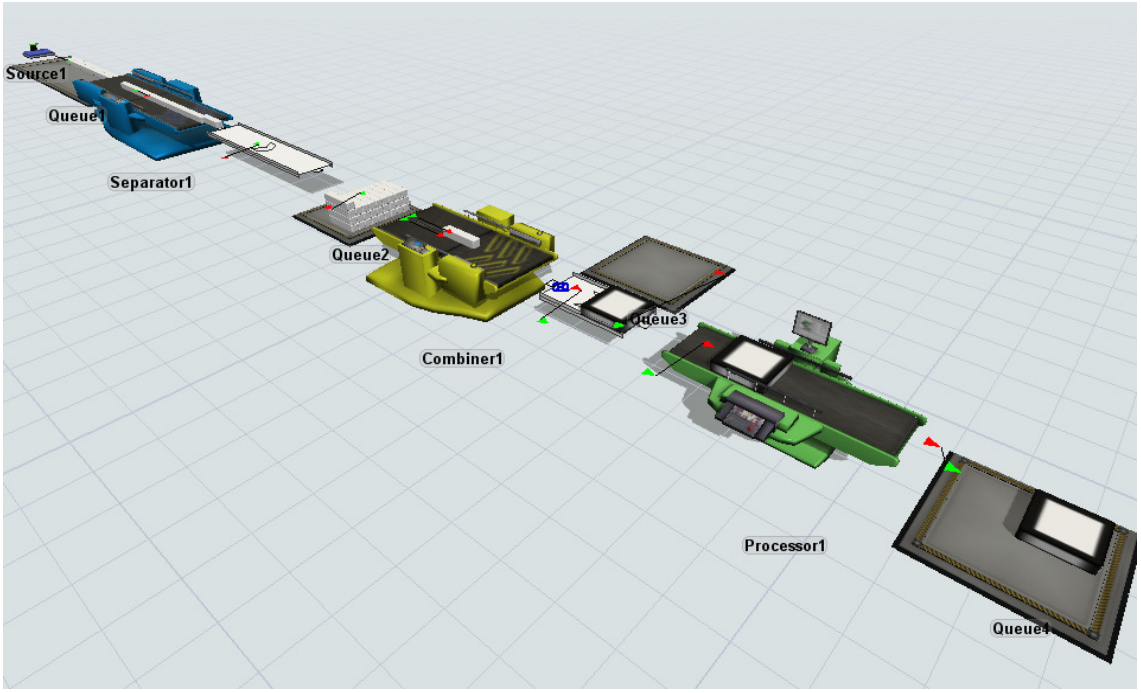

Fig. 2: The scheme of production line obtained by the FlexSim programme application for the variant I of thermal connection

Variant II of the thermal connection of profiles

Variant II of thermal connection of profiles that is implemented in industry is carried out by preparing the profiles in the machine for thermal joining by milling them. The process last 30 seconds. Then the heaters slide out and the material is heated in the temperature range of (190°C – 260°C) for 30 seconds. The final stage is the compression of profiles one to the other for another 30 seconds. The whole process last 90 seconds. The technology in the variant II has the shortened technological line because it does not need any additional cooling or milling of the excess material.

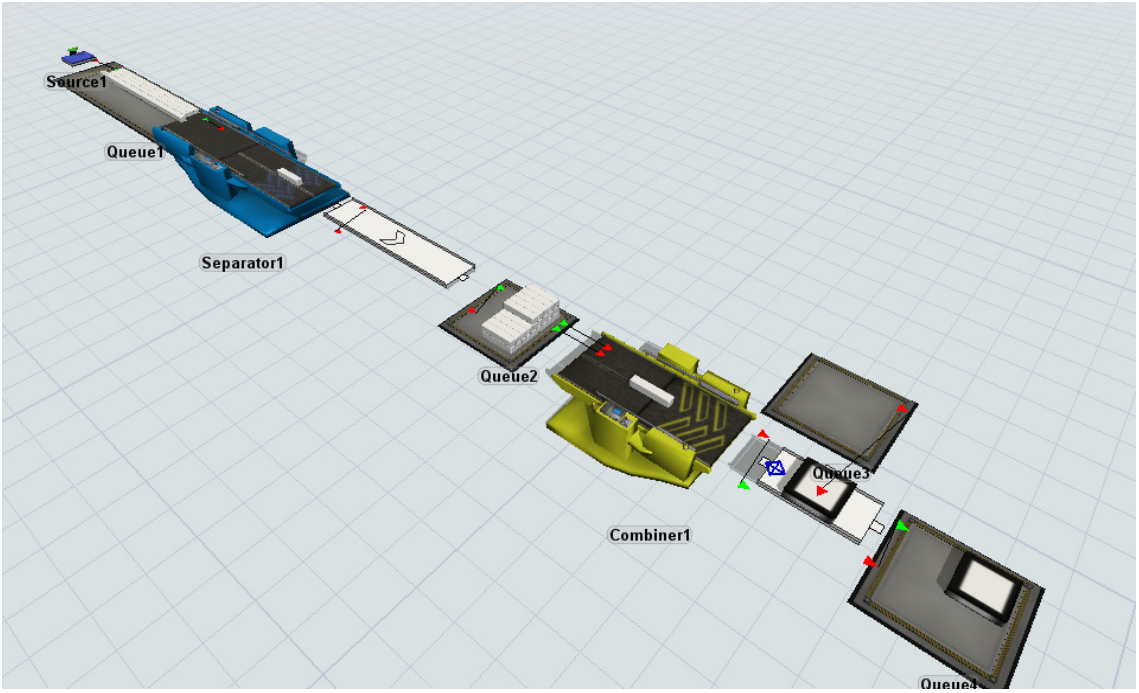

Fig. 3: The scheme of production line obtained by the FlexSim programme application for the variant II of thermal connection

The results of simulation research of production line efficiency for the variant I of profile connection and the variant II of profile connection

As a result of the simulation research concerning technology management the parameter of efficiency of the production line was obtained for each of the two variants of profile connection. The research was based on the time simulation of the production of 15 pieces of melded profiles of the dimensions of 1000 mm x 1000 mm.

Table 3: The list of parameters concerning the management of technology production

Variant of thermal connection of profiles	Profile milling	Profile heating	Profile compressing	Profile cooling	Cutting of excess material	Production line working time	Percentage
Variant I	-	30 s.	30 s.	60 s.	120 s.	1896 s.	100%
Variant II	30 s.	30 s.	30 s.	-	-	1395 s.	73,6 %

The conducted research shows that the production by the application of the variant II of thermal connection of profiles is 25,4% more efficient compared to the variant I.

Strength tests for the variant II of profile connection

In order to carry out the strength tests samples of four cut out corners were taken **(1,2,3,4)**. For this purpose melded profiles of the dimensions of 1000 mm X 1000mm were prepared at a joining temperature (± 1°C) **of 190 °C, 200°C , 210 °C , 220 °C, 230 °C, 240°C, 250°C, 260°C**. The samples were stored for 24 hours before the strength tests. The tests were carried out in testing

machine in which the actuator was applied that caused pressure and determined the maximum force of thermally connected profiles expressed in Newtons (N).

In the research three types of profiles were used.

a. The PVC base profile made in white colour
b. The PVC profile coloured in mass
c. The composite profile PVC+PMMA

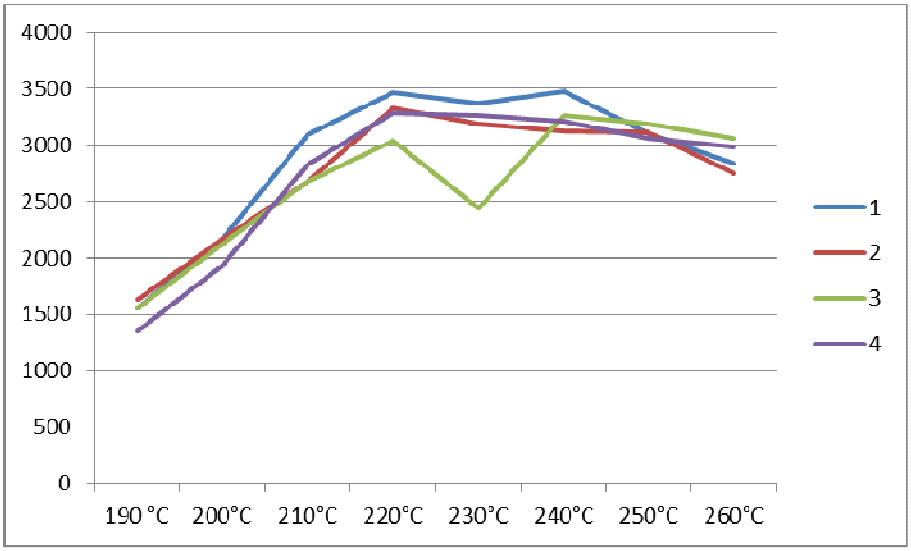

Diagram 1: The results of strength tests of welded by method II (PVC white profiles - a)

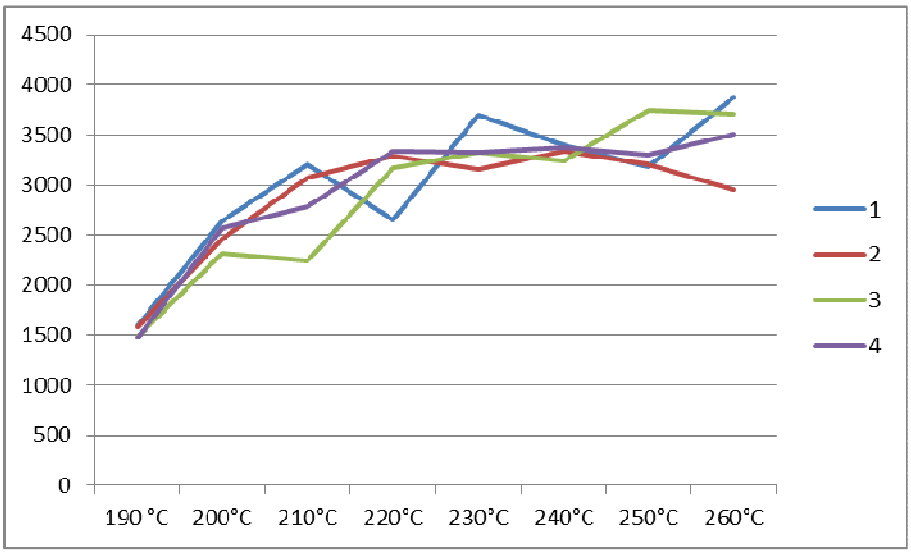

Diagram 2: The results of strength tests of welded by method II (PVC profiles, coloured in mass - b)

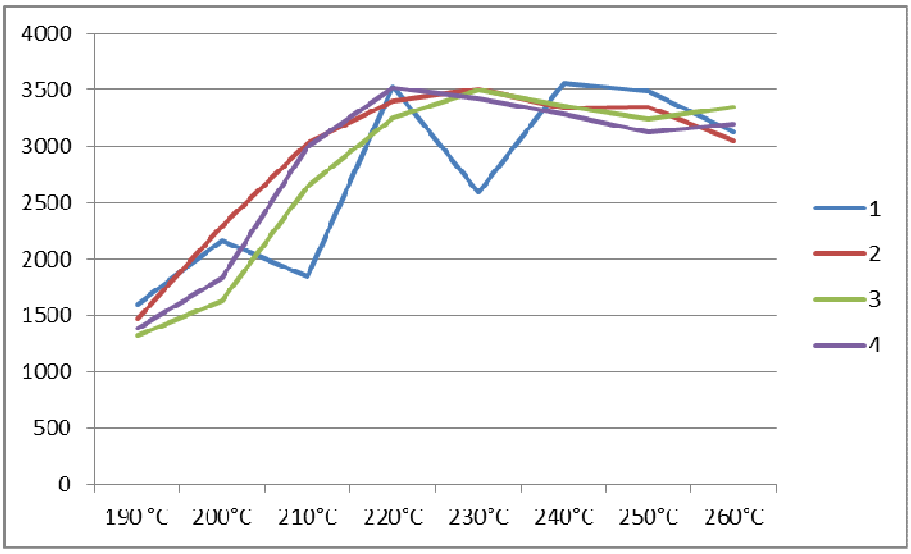

Diagram 3: The results of strength tests of welded by method II (composite profiles – PVC+PMMA - c)

The Results of Strength Tests

As a result of the research carried out in order to determine the strength quality of technological processes of thermal joining of profiles I variant II the optimal values of temperature were estimated accordingly to the type of profiles used.

a. for PVC white profile the optimal temperature is 250 °C.
b. for PVC profile coloured in mass the optima temperature is 240°C.
c. for composite profile – PVC+PMMA – the optimal temperature is 255 °C.

Windows Protection in Transport

In order to achieve proper quality management of thermal connections of windows for long distances two forms of mechanical protection are applied.

- transport strip – it protects the bottom edge of the window from damage caused by windows displacements. The strip screwed to the bottom of the window protects its edges.
- Transport blocks – the elements usually made of wood – are fixed to the edges of the window and are meant to protect the edges from the damage during transport. These elements are mostly used in windows transport to France and Italy because of the profile shapes.

Transport strip	Transport block
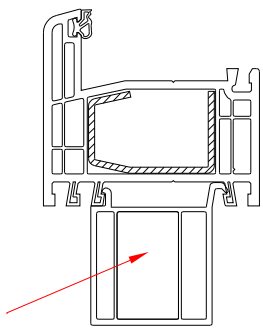	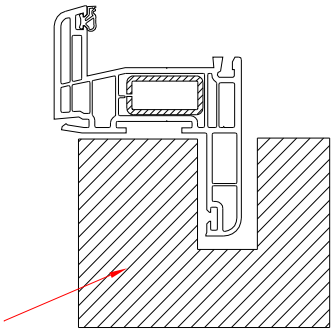

Fig. 4: Methods of windows protection in transport with the application of transport strip and transport blocks

Both methods of window protection in transport May be applied regardless of the method used for thermal joining of profiles.

Summary

The simulation research carried out with the application of the FlexSim algorithm resulted in the choice of the more favourable type of production line for PVC window production regarding their quality. The investigation proved that the production line for 15 pieces of joined profiles equipped with the device for thermal joining of the corners and machines for cutting the excess material (variant I) need 1896 seconds. In case of the variant II, i.e. using the milling machines for thermal joining of profiles the same production level can be reached in 1395 seconds. Furthermore, the simulation research showed that window production realized with the application of the production line arranged according to the variant II is by 26,4% more efficient than the one of the variant I.

The results of the research indicate that there is a necessity to apply appropriate thermal parameters for joining profiles for the materials used in the production process. At present the producers most often use one thermal parameter e.g. 240°C for different materials, which is not proper taking into account all new technologies presently used. The situation in which the thermal parameters are not relevant has negative influence of the strength and quality parameters of windows obtained in the production process.

From the conducted research concerning quality management in transport in relation to thermal treatment of profiles it follows that the method of joining profiles and the type of material influence strength properties of window constructions. Moreover, the research shows that the method of thermal treatment has a significant influence on the management of production technology of windows. The described examples have relevant contexts in the ways of window protection in transport. Optimal parameters of thermal joining of profiles are as follows: for PVC white profiles – the temperature of 250°C, for PVC profiles coloured in mass – the temperature of 240 °C and for the composite profiles PVC+PMMA – the temperature of 255 °C.

The Author also presented the design works of the methods of protection of the joined profiles in windows, that should be used during transport. The security means undertaken to protect windows are very important. The damage or thermal break of the joined profiles in windows decide on the safety of their usage. It follows from the fact that in the place of thermal joining of profiles in the frames the hinges are installed and in thermally joined profiles of window sashes there are heavy

glasses. Moreover, windows protection in transport is important for fulfilling the declared properties of windows such as tightness, thermal permeability or acoustic protection. Damage following from the greak of thermal joining of profiles during transporting the windows from the factory to magazines and then to the place of building permanently destroys the quality of windows.
The paper presents the complex research and the analysis of production and transport of windows. The management goals to be achieved according to the Author are: high level parameters connected with efficiency, quality and transport of windows. The Author suggests that the tasks connected with management are to be realized In interdisciplinary way. The Author claims that the application of different research, simulation and designing methods helps in decision making of strategic character in production companies. In future, the research simulation programmes and designing tools will become the basis for the development of companies of global importance in PVC window production.

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Dual Studies with Psychomotricity as an Innovative Form of Educating Special Educators

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Abstract

The purpose of this article is to present an innovative proposal for training special educators specialising in: "Education and Rehabilitation of the Intellectually Disabled Persons with Psychomotricity." The discussion of the innovative concept is preceded by an introduction on the criticism of special needs education. Next, a number of results of studies on failures in including students with the Down syndrome and the ASD (Autism Spectrum Disorder) are provided as examples that substantiate the presence of special needs education in teaching students with intellectual disability. Legitimacy of changes in special needs education was pointed out. Introduction of the dual studies project as discussed herein — strictly connected with practice, exploring the concept of psychomotricity — is an attempt at reforming special needs education to enable its existence as an alternative to inclusive education and closely combine with it.

Keywords: Special Needs Education, Inclusive Education, Psychomotricity, Concept Of Innovative Dual Studies In Special Needs Education

Introduction

In recent years, the world is discussing the effectiveness of educating people with intellectual disability in line with the idea of inclusive education. The research results referred to in the article show that inclusive education is not the best solution for all students with intellectual disability.

The purpose of this article is to present an innovative proposal for training special educators specialising in: "Education and Rehabilitation of the Intellectually Disabled Persons with Psychomotricity." The discussion of the innovative concept is preceded by an introduction on the criticism of special needs education. Next, a number of results of studies on failures in including students with the Down syndrome and the ASD (Autism Spectrum Disorder) are provided as examples that substantiate the presence of special needs education in teaching students with intellectual disability. Legitimacy of changes in special needs education was pointed out. Introduction of the dual studies project as discussed herein — strictly connected with practice, exploring the concept of psychomotricity — is an attempt at reforming special needs education to enable its existence as an alternative to inclusive education and closely combine with it.

Forms of educating special educators proposed in the project have been described in detail. The author's concept of Psychomotoricity of the Meeting was discussed as a bridge between a typically developing student and a student with I.D. Psychomotoricity of the Meeting was shown as a platform on which a teacher and an SEN teacher meet with children - students with different needs

1. Special education versus inclusive education — implications for the innovative dual studies discussed herein: "Education and Rehabilitation of Intellectually Disabled Persons with Psychomotricity."

Special education stems from the medical model of disability (Rayner, 2007). As such, for many years, it was placed between medical sciences (especially psychiatry) and psychology, where it focused on persons burdened with a deficiency or a dysfunction. It was the type of deficiency that determined the choice of type of special school the person attended. Revealing the deficiency entailed 'labelling', confirmation of a certain inability, disorder, being someone different. This resulted in the needs of the dysfunctional person being marginalised, and, ultimately, lead to social exclusion. Special education

was offered in special kindergartens and schools where specially-trained educators ran special education programs. This pattern was followed in special education until mid-1980s. And it was impossible to continue any longer. The views of postmodern philosophers such as Foucault (1983), the studies of educators — Freire in his "Pedagogy of the Oppressed" (Calves, 2009), the perception of a weaker man in the works of authors such as Levinas (Benaroyo 2016), all facilitated the creation of the social model of disability in the 1990s (Oliver, 2013). The views of critical educators and philosophers demonstrate the value of an intellectually disabled person in confrontation of a healthy person with a less capable one. According to Levi-Strauss (1983), we are only two variants of the form of transformation of a common mind. Levinas (1991) called to the man: "To accept the Other means to give". "Nothing is more important, noble and sacred than the responsibility for the Other". Levinas stressed that there is only one way to discover oneself: by discovering the responsibility for another person as the path to yourself. Experiences related to the cruelties of war, Hitlerism, devaluation of humanity were all significant for the Europeans in the development of the social disability model (cf. Bettelheim, 1967; Levinas, 1997).

Turning towards a weaker person as to one who deserves the same rights to wellbeing and living in a society resulted in the special education beginning to lose its identity, giving way to integrative education and later inclusive education. In 1994, according to the Salamanca Statement, schools with inclusive orientation are the most effective means of combating discriminatory attitudes, building an inclusive society and achieving education for all. Moreover, the Statement suggests that they can offer an effective education to the majority of children and improve the efficiency, and, ultimately the cost-effectiveness of the entire education system (UNESCO, 1994). According to Ainscow (2005), this was probably the most important international document ever published in the field of special educational needs. Many years earlier, in mid 1980s, special education was criticised for being segregative and discriminatory (Lipsky, Gartner, 1987) in which students with special educational needs attending special schools learn very little. As stressed by Kauffman, Anastasiou, or Maag (2017), this ruthless criticism gave rise to the decline of special education. Taylor advised against inclusive education as a radical reaction to exclusion of disabled students due to numerous assumptions and practices within the framework of special education (Taylor, 2006).

Inclusive education developed on the ruins of special education for nearly 30 years. Some countries, such as Italy, completely abandoned special education, while in others, such as Poland, integrative education was an intermediate link. Integrative education is a stage between the separative model and inclusive education (Thomazet, 2009). Shortcomings of integrative education were pointed to in numerous countries. Following the analysis of deficiencies and shortcomings, the inclusive education model was re-analysed. What critical remarks were addressed at integrative education? Integration assumes education of the disabled in schools available to the general public and, on the other hand, the need for special educators in the process of education. We are faced with the theory of two groups: disabled children are taught by a special educator and healthy children are taught by a teacher. Consequently, as in the segregative model, two communities are formed; the difference being they exist within one territory, that is, closer to one another.

The inclusive paradigm assumes that the class teacher is responsible for education of all children. The special educator's role is that of a methodological consultant in diagnosing the sources of problems and seeking solutions to them. Not only does the inclusive model assume change in the principles of financing and organization of the education conditions, but a shift in the centres of gravity as well. While the integrative approach is focused on building individual curricula for disabled students, inclusive education is committed to the development the strategy of holistic education of children in a community such as a class. This assumes relatively unified content introduced with the use of similar methods. The quality of social relations, equality in playing roles and emotional functioning, as well as mastering of school knowledge are taken into account in the inclusive approach. The inclusive thinking and acting is centred around the class at school as a heterogeneous group of students who need both individualised and shared education at the same time. The consequence of inclusive education should be empowerment of disabled adults.

The results of studies on inclusive education conducted all over the world demonstrate the full complexity of the social inclusion process. This complexity could be contemplated in the examples of

inclusion of children with the autism spectrum disorder (ASD) and the Down syndrome (DS) in the stream of generally-available (inclusive) education.

As a result of parents' pressure and legal guarantees, an autistic child or a child with the Down syndrome can be a student in a common school. Meanwhile, studies on inclusion of autistic children (Read, 2012) demonstrate that mainstream-educated children failed to obtain better results in education and social adjustment. On the other hand, children who attended special schools benefited from such form of education. Their behavioural issues were reduced, and their stereotypies and hyperactivity symptoms became minimal. According to other authors discussing the results of the studies conducted in Australia, an autistic child is isolated and estranged in a generally-available school. His or her needs are not recognised and fulfilled. Healthy students abuse an autistic student whose behaviour is beyond their understanding (Liley, 2014). Therefore, various solutions are proposed that could help in securing the developmental needs of an autistic child as early as possible.

In the light of the studies conducted in Netherlands in 2013, 74% of children with the Down syndrome start their education in the generally-available stream, with only 17% of them finishing the primary generally-available school (Van Wouwe et al., 2014). On the basis of other studies conducted by De Graaf, Van Wouve, and Haveman (2014) involving a population of Dutch children, an obvious tendency include children with the Down syndrome in the mainstream education has been observed since mid-1980s. Between 1993 and 2000, 70% learnt at generally-available schools. However, the group of children with the Down syndrome in the public schools decreased as the number of years spent at school increased (higher forms). This means that after 7 years of school education, the number of students decreased by as much as 60%. On the other hand, the studies conducted by these authors also indicate a downward trend in the number of children accepted into inclusive education over the last years. At the same time, after the year 2000, the number of students transferred from publicly-available to special schools started to increase.

Based on the analyses conducted by Giaouri et al. (2010), one could expect that even better-performing children with the Down syndrome will have difficulties in social relations in late childhood and adolescence. The characteristics of the reasoning and thinking deficiencies (and also psychologising-mentalization) have consequences for their ability to interpret complex social situations that are common in interaction between their peers. Similarly, Fidler and Nadel (2007) pointed to the fact that children with the Down syndrome may display difficulties in emotional and social functioning when cognitive aspects (intellectual processing capability) are involved in making decision on such functioning.

Campbell and Gilmore (2003) analysed the place of a child with the Down syndrome amongst their healthy peers in the opinions of the teachers. The study participants were a group of 274 students in teacher-training programs who were surveyed twice during the experiment in their first and second year of studies and in their fourth year of studies. The authors cite studies on teachers' attitudes towards disabled students. They stated that the teachers had tended to accept inclusion of students with mild physical disability in a generally-available school. They were, however, reluctant to inclusion of intellectually disabled students. Such attitudes towards inclusion, as described in American and Australian publications, are also present in Poland in connection with the present trends in perception of a disabled student within the class. It is difficult to tell what the causes of this phenomenon are. The review of papers on research into teachers' opinions on disability, analysed by Campbell and Gilmore (2003), suggests that a negative attitude results in low expectations from a disabled person which, consequently, might lead to limitation of their opportunities to learn. As a result, disabled persons have limited opportunities to act, experience, and learn from mistakes. Consequently, the teachers lower their expectations even further. The child, in turn, loses its motivation to work and take challenges.

How can the presented study results be interpreted?

An important objective of inclusive education is to allow each student to have their place in the common school. However, inclusion is not as important as effective teaching which must be the primary objective of each education. The statement that all disabled students may be educated in the inclusive system is a global issue (Kauffman, Felder, Ahrbeck and others, 2018). Full inclusion is not in the

interests of all disabled students. We are still probably unable to create the conditions to facilitate the implementation of full inclusion concept (Kratochvílová 2015). These shortcomings are also pointed to in various papers included in the work of Lindsay, Dockrell, and Wedell (2020). The paradox is that inclusive education may become the secondary exclusion instrument (Roger, 2018). At that moment, it becomes illusive and superficial, and even deceptive (Gardiner, 2017). It promises benefits, but it brings losses affecting the students with special educational needs (SEN) in the first place and their parents.

It should be admitted that there were also positive aspects of special education despite numerous disadvantages, and, in the first place, failure to respond to the challenges for disabled persons that are created by the society these days. These include:

- Good education and high competences of special educators.
- Transparent special education curriculum carried out on the basis methods adopted to students' capabilities in the institutions equipped with teaching aids necessary for special education.
- Numerous children are unable to learn in generally-available schools and will not cope without systematic support from a special educator.
- Most of all, however, many students learn in a place that provides a feeling of safety and facilitates conditions for success, meeting friends, and learning under the supervision of a friendly teacher. (Unfortunately, the cost of being a special teacher is disproportionate to the assessment of special education. The burnout rate of special school teachers is exceptionally high in comparison with most other professions. 50% of special education teachers give up their work within 5 years. Half of those who stay for 5 years will resign within 10 years. (Dage, 2006).

In the recent years, there have been hardly any works that demonstrate the necessity for special education in schools dominated with inclusive education. We could reference monographs by Kauffman, Hallahan, Pullen, Badar (2018) and Howe, Boelé, Miramontes (2018). Both these books were written many years ago. However, it is evident from the prefaces to the latest editions and re-editions that inclusive education failed to provide a solution in the case of numerous children with special educational needs.

Confronted with the introduction mentioned, our team decided to prepare an innovative dual studies curriculum to train special educators.

We assume that a special educator specialising in "Education and Rehabilitation of Intellectually Disabled Persons with Psychomotricity" will be needed in special education institutions. Special schools should not cease to exist until reasonable solutions are found. Reasonable solutions are actual inclusion. If it appears that special education is more beneficial for the child, then he or she will be allowed to attend such school.

A special educator will be able to work in mainstream kindergartens and schools running classes in a proprietary version of psychomotricity called "Psychomotricity of Meeting". Psychomotor settings can be arranged in an individual or group form. Activities in the form of play creates many opportunities for all children to do things together and help build mutual openness. At the same time, this allows the special educator to check the wellbeing of the entire group and its individual members, provides insight into difficult situations, and the problems experienced.

Why Psychomotricity?

An increasing number of intellectually disabled children learn at integrative and inclusive schools, even in our country. Psychomotricity is a holistic concept of supporting child's development that enables free manifestation of the needs and interests of all children, opening them to joint interactions (Zimmer, 2019). Psychomotricity entails intersection of mental and motoric aspects. In its broad sense, movement is the key to interpretation of various behaviours of the child. Motion is not only perceived as motor acts preceded by motoric planning and related with motional coordination, manipulation, and praxis,

but also as the whole-body language that includes a non-verbal code for conveying information which a child is unable to convey otherwise. However, otherness does not matter to children and when they passionately play together, the activity they are all involved in is important to accomplish the objective of the game. Elements of other known methods can be employed in psychomotricity and included in the created scenarios, since psychomotricity is a holistic child support system. Psychomotricity in the German-speaking regions is more focused on work with a group and in a group of children with various needs, whereas the French psychomotricity will be more useful in individual therapy of a children with deeper and deep disabilities (Rivière 2010),What a deeply disabled child manifests in its incomprehensible behaviour is considered to be a message, or means to convey information: about the way the reality is built, how a problem is solved, on transformations in the relationship between the child and its closest ones. The assumptions of psychomotor observation of playing children are as follows:

- Open up to a child to find out more about them than they could tell us themselves,

- Watch closely during the activity (play) proposed by the child

and in the “room for observation” developed together with the psychomotorist,

- The observation should not be focused on how the children solve the tasks, but on the relationships and interactions that the children create and function in.

- The observation should not be oriented on the standards, but on recognition the children's resources.

We develop our knowledge on the child as we perform activities together with him or her. The child tells us his or her story with his or her behaviour and the messages that we try to receive. We make assumptions as to the nature of his or her problem, we try to give his or her story a meaning. To giving meanings is to make assumptions on his or her problem, on the origins of the problem. This is a dynamic process — every new experience is the starting point for developing the room for mutual relationship, provokes new challenges, changes the present state of psychomotorist's knowledge on the child and on the entire group. Each step in the joint activity (play) is a step closer to fully understand children's needs, his or her strengths and weaknesses; each step opens us up to the meeting with the child.

When we think about persons with deeper and deep intellectual disability, the skills (training) we have mastered is not enough to handle the complex, unclear, multi-layered social reality of our times. It is often impossible to develop the competencies. The subject of our attention needs us as an intermediary, a friend, a teacher of subtle shades of emotion, a helping hand in solving ethical and moral dilemmas. In the psychomotor practice, we are often confronted with persons who will not achieve the level of empowerment that would enable them to be self-sufficient. Such cases require unconventional psychomotor support methods. In these settings, the support should be focused closer to the individual therapy that is fully oriented on developing the fundamental needs. Failure to meet these needs prevents taking the next step.

This is where the Psychomotricity of Meeting plays a crucial role (Kruk-Lasocka, 2016). During the meeting, a man meets the master, his teacher from whom he learns how to be there for another man. One may ask the question: “Who is the teacher and who is the student?” In the psychomotor play, psychomotor meeting, we learn how to follow the other party, to read their messages with attention. The other one teaches us about themself in this way. We try to find meaning in their behaviour. And these are difficult to find, we are often confronted with a person who has built an “empty fortress.” Children who are difficult to understand, adults with multiple intellectual disabilities, cerebral palsy, contorted faces, unable to control their arms, eyes looking away from our eyes, inarticulate sounds coming out of their mouth. Sellin, the mute autistic poet, wrote: “This poem is to my mute sisters and brothers; we should be heard and offered as place, so we can live amongst other all other people in the society” (Sellin, 1995). This justifies the decision to include Psychomotricity of Meeting in the study curriculum.

3. Presentation of the project of dual studies titled “Education and Rehabilitation of Intellectually Disabled Persons with Psychomotricity”

The project was prepared as a submission for a competition organised by The National Centre for Research and Development in 2018. This is the only project in special education amongst 69 projects that successfully completed the call for tenders procedure.

The project was prepared by a team consisting of the coordinator, a subject-matter consultant, a specialty tutor, an internship coordinator.

What are dual studies?

Dual studies are innovative, experimental studies combining special education with inclusive education through psychomotricity.

Dual studies entail alternating education in the form of classes at university and practical training in various institutions of special and inclusive education.

These studies were launched in the field of Special Education with the major field of: Education and Rehabilitation of Intellectually Disabled Persons with Psychomotricity. The execution of the curriculum includes lectures, tutorials, workshops, and work placement, internships, international study tours.

These are 3-year full-time studies concluded with that the award of a bachelor's degree entitling to work as a special educator. The students will have opportunities to obtain certificates attesting to the proficiency in using multiple educational and therapeutic methods.

The objectives of the dual studies are as follows:

- To improve the knowledge, skills, and competences of persons participating in higher education in response to the needs of the economy, labour market, and society in the field of special and integrative or inclusive education.

- To contribute to increase the potential of institutions conducting educational and therapeutic work amongst intellectually disabled persons and acting to the benefit of social integration of disabled persons.

Execution of the curriculum

Execution of the curriculum involves various forms of education which are contained in the following key terms:

Student-discoverer (participation in educational and psychomotor classes conducted in Germany, Poland, France, Austria — discovery of various educational systems in the work with intellectually disabled persons). The student discovers the importance of the profession they are trained for and its prestige. The student learns respect him or herself as to a special educator by observing the work of educators in the forgoing countries.

Student-researcher (participating in the studies conducted at the university involving intellectually disabled persons, writing Bachelor's thesis)The student may become involved in the conducted studies as an assistant to the researcher, an interviewer, a creator of small “case study” projects.

Student-competent judge (assisting in the works verifying the selected tools and their usefulness in conducting studies). The student experiences the process of creating scenarios, psychomotor plays, he or she is at the centre of the process of transformation and development of special education.

Student-attentive observer closely following the client (assistance in the diagnostic and therapeutic activity — Diagnosis and Therapy Centre for children with developmental difficulties operating at our university). The student learns how to recognize the needs in therapy of children requiring additional support and parents looking for therapeutic methods for their children. The student learns how to be

patient and open to the problems of the families he or she meets and assists in conducting therapeutic activities.

Student-holistic therapist (familiar with multiple therapeutic methods described). The student will be able to use them depending on the character of his or her future work and propose additional forms of supporting the child in need of more targeted support, e.g., to relieve excessive tension or improve fine motor skills.

A student-psychomotorist treating his or her work with passion and creativity, able to utilise psychomotor settings and include them in activities that are educational in nature.

First of all, however, this will be a student who is an attentive future teacher, a thoroughly-trained special educator provided with knowledge and competence.

Courses in selected methods included in the Educational Cycle

- Alternative and supportive communication — constitutes the necessary addition extending the special educator's toolset with methods of communicating with a mute student, a student with cerebral palsy, an autistic student, or a student with multiple disabilities.

- Dog-assisted therapy complements the therapeutic methods, especially in work with pre-school children or a student with a deeper intellectual disability. This method helps relieve tensions, channel emotions, teaches a friendly attitude towards animals. It could constitute a bridge between the teacher and a special-care child in situations when the student fails to make contact with other persons and is unwilling to communicate with a group. This could be the starting point for a dialogue between children in an inclusive school.

- Sherborne Developmental Movement — a popular method used in both kindergarten and school. Group activities facilitate work in a diversified group of children in the inclusive education stream teaching mutual tolerance, openness, and group work.

- The hand therapy course — provides a special educator with competences in the field of rehabilitation of children with cerebral palsy, autism, mild sensory integration disorders, fine motor skills, praxis, visual and motor coordination, and motoric planning.

- New technologies in work with children with disabilities — with this course, a special educator will be able to implement elements of education with the use of available multimedia means of communication into the teaching process.

- The holiday camp counsellor course is necessary for the student to be able to work with a special educational needs person in the capacity of an attendant, assistant, or a counsellor during organised rehabilitative stays and also with a group of children participating in various holiday camps in the inclusive stream.

Internships included in regular education at the university, study tours, work placement

During their studies, in addition to lectures, tutorials, and participation in courses, the students are obligated to complete a 3-month internships at various special education institutions: early childhood development support centre, kindergarten, school for children with mild, moderate, and severe disabilities, occupational therapy workshops, a nursing home for adults permanently staying at the institution. To make this possible, the student spends two days in a week at the institution where he or she acts as an assistant to a teacher, counsellor, or therapist working with the clients. This internship facilitates deeper understanding of the issues related to intellectual disability of a child and confrontation with the students on a daily basis.

Study tours are visits to institutions where students broaden their competencies in the work of a psychomotorist, special educator, and educator:

- The students learn various forms of psychomotor interactions and freedom in creating their own psychomotor solutions.

- The tours broaden students' knowledge the education of empowerment and holistically-perceived psychomotricity.

- The tours demonstrate various practices in variety of special and inclusive education institutions.

- Help build an image of a special educator as a sensitive, open, and creative person learning in the complex educational reality.

During the study tours, the students visit psychomotor education institutions:

- The Institute of Psychomotricity in Vienna: the students are familiarised with Austrian psychomotricity based on examples of work with children with special educational needs in a diversified group of kindergarten children and with psychomotricity for elderly people with intellectual disability.
- Pierre and Marie Curie University in Paris — Faculty of Psychomotricity

The students are familiarised with the concept of French psychomotricity perceived as "an attempt at reading the story told in the person's body language." They observe sessions involving persons with deeper intellectual disability on the basis of prof. R. de Lubersac's views and assumptions on psychomotricity.

- At the University in Osnabrück, Germany, students will have an opportunity to experience prof. R. Zimmer's psychomotricity, one of the world's renowned schools of psychomotricity.

Participation in these tours is an essential requirement to obtain a certificate in psychomotricity. Each internship lasts five days.

Study tours to model educational institutions were included in the series of classes within the studies to allow students to make observations and gradually form their own opinions on various systems of education of students with special educational needs.

These are the schools in Germany. The proposed schools conduct proprietary experimental programs aiming at preparation of intellectually disabled students to living in the society. These schools developed their own tools to evaluate the progress made by students. The curriculum enables seamless transition from special to inclusive education. The education concept, is based on the intensive collaboration with the environment and offers perspectives for employment and living on one's own (e.g., assisted living). Observations of lessons at schools might inspire the university students to create a new concept of special education.

Hans-Peter-Ruf-Schule in Schwabach has been participating for many years in international exchange of teachers under the Comenius (presently Erasmus) programme. With this international activity, the school implements the latest, most effective and diversified concepts and projects to support students with intellectual disability, especially innovative, proprietary approaches with the use of the psychomotricity of empowerment.

Rosenberg Schule — this school is an example of good practice. This is a model institution in the local environment. It functions as an element of a model (system) of inclusive education of students with intellectual disability and adults.

Other institutions— these were proposed to allow students to compare organization of the special education institutions to make critical reflections. In two of such facilities, the student has a chance to experience everyday life with persons with moderate and severe intellectual disability by living with the students, helping them at school, with daily chores, and planning their activities.

In addition to the aforementioned forms of education, the student is obligated to complete a total of 310 hours of work placement (over a period of 3 years). Each of these work placements is different in nature and carried out in different special or inclusive education institutions. The work placement is continuous which means that, over its course, the student must come to the institution every day and complete the activities as instructed. The students perform various tasks as part of the work placement which are related to the names of work placement types:

- observational, teaching
- guardianship and tutorage
- teaching in lessons
- therapeutic
- project-based in inclusive education

Education with the use of new technologies

This demonstrates the opportunities of using the developments in computer science, cybernetics, and robotics in the work of a special educator. This module includes:

"New media in rehabilitation of persons with disability" (30 hours)

The "New technologies in the work with children with disabilities" course (30 hours)

In addition, children have an opportunity to experience and use new technologies by means of helping in research on the project: Social Robot in Recognition of Autism Spectrum Conditions in Pre-School Children. Students also participate

in testing the usability of the "Scale for the assessment of the child's interaction with the robot" prepared by the project team members.

Summary

The studies on the empowerment of persons with intellectual disability entail firm continuation of the social model of disability and consistent departure from the biological (medical) model. Research studies and practical solutions are not based on theories of special education embedded in medicine and clinical psychology, but in a broad, historical and cultural context. Therefore, the term of 'research on disability' is proposed, where disability is perceived as a phenomenon construed by social valuation (Kuo, 2015; Vaughn, Swanson, 2015). In this approach, education of a teacher takes a new meaning; his or her personality traits are emphasised: openness, sensitivity, readiness for self-education. An empowered teacher can shape an empowered student (Aloni, 2013). There are no doubts about the development of the social model of disability. This, in fact, is the only reasonable path of education that can lead to coexistence of all citizens in the society. However, this goal does not always have to be achieved through inclusive education. Perhaps the understanding of special education should change, maybe other areas of this education should be emphasised, or the role of special educator should be redefined. The confrontation of theory with practice and flexible adaptation of forms of education to individual needs and abilities of students are the fundaments of the project presented herein. The emphasis was also placed on the training of the special educator: an open and creative person who is aware of the significance of his or her work and its importance for the society, ready to include persons with intellectual disability in the stream of open community. Presumably, implementation of the project presented will facilitate revision of current opinions on minor importance of special education and special educator in educating students with intellectual disability.

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Process Maturity Models as Tools for Organisation Improvement and Development

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Abstract

The development of an organisation is inevitable, especially taking into account the challenges and requirements that contemporary organisations face. Hyper-competition, virtualization, development of new technologies, decreasing life cycles of products and the dynamics of customers' expectations force organisations to search for tools that will enable them to develop in an orderly, balanced way. This is because the acceleration of the pace of development requires that organisations deal with many problems. Undoubtedly, the business models of process maturity can be regarded as a tool for improvement and development of an organization. Such models, apart from describing particular levels of maturity, allow to focus the development of an organisation on better process results on the one hand and on the other hand on increasing the efficiency of entire organisations. The aim of this article is to contribute to the BPM theory by presenting a wider perspective of business process maturity models as a tool for organisational improvement and development, particularly in relation to the functions performed by the models of process maturity and the impact of the use of these models on the development of an organisation.

Keywords: Business Process Orientation (BPO), Process Maturity Of The Organisation, Business Process Maturity Models (BPMM), Organisation Development, Improvement

Introduction

It is inevitable that each organisation undergoes a development process, especially considering both the challenges and requirements that contemporary organisations must face. Hypercompetition, virtualisation, evolution of modern technologies, product lifecycles becoming shorter and shorter as well as the dynamics of customer expectations force organisations to develop continuously. The foregoing applies not only to businesses, but also to public institutions and other organisations.. The growing development momentum forces organisations to tackle a multitude of problems. Consequently, it is recommended that each organisation assumes a specific development pace, which conforms with the concept of increasing the maturity of its processes. Following the idea that an organisation is only as efficient as its processes are (Rummler, Brache, 2000, p. 76), one can claim that the pursuit of process maturity corresponds to the organisation's growth-related needs, while process maturity models may be perceived as process improvement and organisation development tools. There is a number of publications representing the literature of the subject elaborating upon the way in which process maturity models function (Rosemann and de Bruin, 2005; de Bruin 2007, Hammer, 2007; McCormack and Johnson, 2001; Lockamy and McCormack, 2004; OMG, 2008; Zwicker, Fettke and Loos, 2010; Röglinger et al., 2012; Kohlegger et al., 2009), but most of them present the relevant models with reference to the potential for increasing process maturity. However, not all business process maturity models take the broader perspective of an organisation into account, as some of them only make it possible to establish process maturity of a single process or a set of processes used to perform certain functions, instead of that of a set of interlinked processes (Dijkman et al., 2016, p. 720). The criticism towards maturity models often pertains to the fact that they disregard the business results of the processes being improved. Many of models not only describe

individual levels of process maturity, but also constitute records of the knowledge about the way to implement high-performing and efficient processes. They should basically also enable the organisation's development to be oriented towards increased efficiency of processes as well as of entire organisations.

In summary the above elaborations one may arrive at a conclusion that many of the available studies focus on presenting the essence of how business process maturity models are built as well as their characteristics mainly from the perspective of the potential for increasing process maturity, while perceiving process maturity models as tools for organisational development represents a separate approach to the matter of their application. The article was conceived to fill a knowledge gap in this respect, highlighting that the demand for business process maturity models is far more extensive than that which stems from the BPM related needs. The purpose of the article is contribute to the development of the BPM theory by presenting a wider perspective of business process maturity models perceived as tools for organisation improvement and development. In order to fulfil the pre-assumed goals of the publication, the following research objectives were assumed:

1. Interpretation of the notions of process maturity and organisation development.
2. Review of selected business process maturity models from the perspective of their contribution to organisation development.
3. Identification of the relationship between the application of business process maturity models and organisation development.

Individual parts of the publication address the above problems, and the article itself comprises structurally interlinked sections. In the first one, based on the review of the literature of the subject, the notions of process maturity and organisation development have been defined. What follows is an analysis of the problem of business process maturity models, highlighting the functions they perform in terms of developing the business process orientation in organisations. By analysing the opportunities created by their use, the relevant research gap has been identified, and it has been concluded that they can be applied much more extensively than in the BPM sphere only. The research methodology has been described in further paragraphs. The results and discussion section proposes to perceive business process maturity models as organisation development and improvement tools. The article closes with the conclusions stemming from the research in question and the elaborations provided.

Background

According to Kohlbacher and Reijers (2013), the relevant aspects of process maturity comprise process documentation, involvement of the management, process ownership, process measuring and monitoring as well as methods and techniques of continuous process improvement and the organisation's culture and structure.

Increasing process maturity has become one of priorities in the development of numerous organisations. One can also perceive it as a form of development. Both development and improvement of process maturity consist in transition from less desirable states, considered less effective, to more desirable states, considered better and more efficient from the perspective of a pre-defined criterion or set of criteria. Having assumed such an approach, every future state is regarded as better than a past state. On the basic level, it typically corresponds to developing the awareness of processes being implemented within an organisation. On a higher level, process identification and documentation appear. An impulse for further changes is the willingness to control processes and to seek to improve them. With the highest level of process maturity comes the need for defining links and correlations between interfunctional processes as well as for identifying and building relationships with suppliers and customers. In order to enter the level of process optimisation, organisations are required to deploy specific mechanisms for control of entire value chains encompassing business partners and customers. Another level of process maturity should be accompanied by the growing process capacity to accomplish the pre-assumed goals, which is reflected by efficient strategy implementation and improved quality of products and/or services. Entering the higher level of process maturity should trigger improved control of process deliverables,

more accurate forecasting of goals, costs and effectiveness, improved efficiency in pursuing pre-defined goals and increased capability of organisations to plan and implement organisational changes (Lockamy, McCormack, 2004).

Organisations can pursue development by introducing many internal changes which may lead to better economic results, improved customer satisfaction, as well as higher quality of the products and/or services delivered. From the business's point of view, it may apply to either one of its parts or to its entirety, to all or to one of its operating areas, e.g. goals, structure, technology or human resources, but it may also concern the processes being deployed. Many contemporary concepts place emphasis on sustainable development by taking needs of different stakeholders into consideration. Unlike growth, which mainly pertains to quantitative changes, the notion of development also encompasses changes of qualitative nature. Development is not only about increasing the scale of activity, but also about other aspects of operations, including improvement of the quality of products or services delivered.

Development as such is primarily assumed to prevent exclusion from the market and to increase competitiveness, while sometimes it results from the organisation's natural needs. Development should proceed according to pre-established rules and deliver intended effects, typically better than those achieved before. Therefore, the changes one faces in this respect should be intentional in nature. Development is also essentially a long-term phenomenon, as it proceeds gradually and emerges as a result of consecutive changes being introduced. In order to make changes possible, organisations must surmount the strong urge towards stabilisation (Hammer, Champy, 1993, p. 23). There are three distinctive approaches to the research of organisation development addressed in the literature of the subject (McKelvie, Wiklund, 2010, p. 277). The most extensive of these approaches considers development as a dependent variable and research activity as a means to explain the factors conditioning development. Another approach focuses on results of development, and development is perceived as an independent variable. The research activity concentrates on the changes that take place in an organisation as a consequence of its development, and individual stages of development as well as the organisation lifecycles are taken into consideration. In line with this approach, organisations develop gradually, going through different phases. The third approach in question perceives development as a process, stressing the manner in which organisations develop, and particularly what happens to them while they develop.

Business Process Maturity Models (BPMM)

A review of the available literature of the subject implies that there is no single and commonly acceptable definition of a business process maturity models. It may be generally described as a set of recommendations and good practices used in the pursuit of efficiency in implementation of processes. They reflect the evolutionary path of development which enables organisations to move from the condition of having deployed incoherent and non-interlinked processes to processes that are structured, monitored, managed and improved. Pullen (2007, p. 11) suggests that it is also an "organised set of elements which describes the characteristics of efficient processes at different stages of development. It also highlights points which delimit individual stages and indicates methods making it possible to move from one level to another." Business Process Maturity Models (BPMM) can be applied to measure efficiency and maturity of:

- specific business processes, and
- maturity of overall business process management, i.e. of all business processes deployed in the organisation (Rosemann and de Bruin, 2005; de Bruin 2007, Hammer, 2007; McCormack and Johnson, 2001; Lockamy and McCormack, 2004; OMG, 2008; Zwicker, Fettke and Loos, 2010; Röglinger et al. 2012).

M. Kohlegger, R. Maier and S. Thalmann (2009, p. 54) claim that, in conceptual terms, business process maturity models represent qualitative or quantitative stages of growing capacity of the model's components to perform the tasks assigned for purposes of their assessment in pre-defined areas. This definition does not fully reflect the very essence of maturity models, as it only focuses on the diagnosis of the current state of matters, while there are numerous other functions these models

perform as well. An analysis of the available literature implies that one can distinguish between the main functions performed by process maturity models:

1. Diagnostic function which enables identification of the organisation's current weaknesses and comparing them with other parties.
2. Development function which orients organisations towards their further development compared to the pre-assumed improvement plan. With reference to the current level of process maturity, one can establish specific measures aimed at reaching a higher level.
3. Decision-making function which helps in establishing action priorities conditioning the decisions being made.
4. Evaluating function. Models make it possible to evaluate the improvement of the results achieved as time passes, and therefore they can be used as a means to monitor the changes taking place within the organisation, oriented towards the pursuit of excellence.
5. Comparative function. Models enable a comparative analysis to be conducted inside organisations, industries and even countries (Rosemann, de Bruin, 2005, pp. 3-4).

According to P. Cronemyr and M. Danielsson (2013), organisations need business process maturity models because the latter help them reduce the risk of failure in process management and match individual process changes with the time and the budget in disposal, orienting the transition to higher levels of maturity towards an increase in product quality, assuming that more efficient processes ensure higher product quality. What followed the evolution of the process approach was further maturity models.

The very pillar of business process maturity models is the phase model of development and use of information systems conceived by Nolan who created the stages of growth theory in the early 1970's (Nolan, Gibson, 1974). Some inspirations to create these models can also be tracked to Maslow's motivation model (1954) and Kuznets's theory of economic growth created in 1965 (Gabryelczyk, 2016). It is commonly believed that the first properly structured maturity model oriented towards quality maturity of businesses is the Quality Management Maturity Grid developed by Ph. Crosby at the end of the 1970's (Mullaly, 2014). It gave rise to a wave of maturity models being developed in different areas of organisations, including those dedicated to process management. Crosby's concept is considered to be the starting point for preparation of the first process maturity assessment model referred to as the Capability Maturity Model (CMM) by the Carnegie Mellon University Software Engineering Institute (Gibson, Goldenson, Kost, 2006; SEI, 2006). The key maturity models originating from this trend are the Business Process Management Maturity Model (Rosemann, de Bruin, 2005; Rosemann et al., 2006), the Business Process Orientation Maturity Model (McCormack, Johnson, 2001), the Process and Enterprise Maturity Model (Hammer, 2007), the Business Process Maturity Model (OMG, 2008) and the Process Maturity Ladder (Harmon, 2007).

In an attempt to group the existing business process maturity models, the following four sets can be formed (compare Aukszol, Chomuszko 2012, p. 42):

- models based on the Capability Maturity Model (CMM) designed by the Software Engineering Institute. It was originally used for purposes of enterprise computerisation responding to the frequent failures of IT projects in an attempt to satisfy the need for better choice of software providers. Further versions more appropriately adjusted to other organisation areas sprang from this model as time passed. It is now referred to as the CMMI (Capability Maturity Model Integration), and it is integrated in nature;
- Business Process Maturity Model (BPMM), developed in 2002 by the Object Management Group (OMG) association. To a large extent, it is inspired by the CMMI model, however, it is more extensive in terms of the range of applications. According to its authors, the BPMM can be used as the main process structure or as an add-on to other models or sets of good practices, such as COBIT-2000, ITIL, ISO 9000, where it is applied for purposes of maturity assessment and improvement;
- industry-specific models, often inspired by the CMMI or BPMM models, precisely addressing the needs of a specific industry or area of operations. An example of this group is

the IT Architecture Capability Maturity Model which focuses exclusively on objective assessment of all processes related to the architecture of information processing systems;

- more general organisation models comprising certain elements of maturity. One of them is the Information Technology Infrastructure Library (ITIL), containing a separate part connected with process maturity referred to as the Process Maturity Framework (PMF). What one creates in some of these models is a detailed description of a process maturity assessment procedure, which is the case of the Six Sigma method-based model, for instance.

The study of the literature of the subject supports the finding that one of the most highly developed business process maturity models applicable to both process improvement and development of process-oriented organisations is the OMG Business Process Maturity Model (BPMM) developed in 2002 by Object Management Group (Raschke et al. 2010). It describes processes against the context of an entire organisation, assuming that improvement of processes leads to improvement of the whole organisation, and the improved processes cannot be sustained if the organisation is not mature enough to do so. It also presents an evolutionary path of development which allows organisations to make a transition from the level of incoherent and uncoordinated business operations to the level of structured and continuously improved processes. Therefore the BPMM is not only a tool used to determine the process development level, but also a methodology supporting development of organisations in a broader perspective. This model supports learning of organisations, enables innovative improvements and helps them to avoid mistakes in various areas (Röglinger et al., 2012, p. 330).

Compared to other business process maturity models, the one devised by Rummler and Brache (2004) clearly stands out, as it is based on the assumption that every organisation is a system, and that the diverse processes it has implemented span various areas of the organisation. It places special emphasis on the necessity to correlate the actions undertaken across the organisation (coordination of goals and methods for designing and managing on three levels: organisation, process and position) and to eliminate the problems emerging in the sphere of functional interconnections for the sake of improved efficiency of the whole organisation (Rummler, Brache, 2000, p. 46). The process management level assessment conducted under this model uses the Process Performance Index (PPI) (Rummler-Brache Group, 2004). The model comprises 10 success measures which – according to its authors – exert a significant impact on the organisation's capability to implement the process management methodology. A significant advantage of the perspective assumed in the model is that all improving actions are initiated on the basis of a pre-defined strategy, and this solution ensures that development proceeds consistently and in line with the long-term vision of operations. This approach removes the need to optimise a certain area of operations without taking into account the final consequences for the functioning of the entire organisation. The comprehensive approach postulated in the Rummler-Brache model creates an opportunity to assess an organisation more extensively, not only focusing on its inside, but also with regard to its relationships with the environment, the analysis of which provides a premise for launching adaptive actions.

Another model based on the CMM and CMMI concepts is the BPTrends Pyramid proposed by P. Harmon, describing a model organisation featuring mature processes and determining the organisation's capacity to improve processes (bptrends.com). This model pertains to three levels: enterprise, process and implementation. On the enterprise level, strategic goals are matched with those of business processes, performance indicators are defined for the entire organisation, and then they are adjusted to match the value chain and the key processes. Consequently, one may claim that the actions undertaken on the enterprise level include establishing the process management system and planning the ways to recognise all the organisation's needs with regard to implementation of individual processes as well as setting priorities and planning actions intended to enable their improvement.

Although the models addressed in the study were created for purposes of process management, their underlying logic should be applicable in other areas of the operations performed by organisations. An important aspect of the problem should be the use of maturity models in a broader context, namely as an integral part of maturity assessment of entire organisations (Dijkman et al., 2016 p. 719) against

the assumption that the more mature the organisation, the higher the capacity of the processes it has implemented, leading to improved product quality and business results.

BPMM are not free from deficiencies, and they have inherent limitations, such as oversimplification of the reality, an implication that there is but one way to act in all organisations, as well as disregarding the internal and external conditions in which organisations function (compare Röglinger et al., 2012). The use of these models is also exposed to a certain risk of failure which becomes imminent when one rigidly adheres to the model provisions without flexibly adapting to current requirements and the given organisation's practice (Kania, 2011, p. 83). Moreover, there are many cases when consulting companies make an excessive display of the advantages the said models offer as well as the need to apply them, promising the potential benefits overly optimistically. Maturity models prove particularly useful for organisations initiating formalised process management, as they make it easier to identify the current state of matters and ensure sufficient motivation to act, while at the same time they suggest the best practices to be applied. The fact the organisation has implemented one of the models is not always tantamount to its genuine development. Much depends on the model type and the extent to which it is actually utilised. Many of them provide development-related recommendations, which does not automatically mean that they will be put into practice. The concept underlying BPMM is based on the assumption that the more mature the organisation, the higher the capacity of the processes it has implemented in the pursuit of its pre-defined goals, leading to improved product quality and maximised business results.

In conclusion, one may claim that business process maturity models are intended to channel organisation's development towards top process efficiency without compromising results of entire organisations, therefore the perspective of using the models may extend far beyond that of the BPM related needs exclusively, and so that can also find their practical application in the sphere of organisation improvement and development. The above conclusion points at the knowledge gap which consists in the insufficient exploration of the opportunities to make use of business process maturity models for the sake of organisation development.

Research Methods

This publication is essentially an overall review of the problems in question, and consequently the research process primarily consisted in studies of the literature of the subject and proceeded according to the phases summarised in Table 1.

Table 1: Research process

Phase	Activity	Effect
Initial preparation for the literature review	Adoption of search criteria.	Selection of search terms
	Identification of journals, choosing key words	
Conducting the literature review	Searching databases, i.e. Emerald, EBSCO, Google Scholar	Selection of the most relevant publications
	Review of titles and abstracts of selected papers	
	Evaluation of full texts of selected papers	
	Analysis of compact library resources	Selection of publications covered by detailed analysis
Compilation of the text	Critical analysis of selected publications that meet the adopted criteria	Synthesis of the results in the context of the issues raised
		Identification of the gap in knowledge

Source: *Own study*

In the first stage of the research work, specific search criteria were defined and key words selected, including *business process maturity model* and *organisation development*, used to browse through databases. The constraint applied was that the databases were only investigated in search for articles spanning the last 15 years (2003-2018). Analysing titles, abstracts and key words, individual articles were picked as those assumed to be matching the problems in question best, and then they were pre-selected. This step was complemented with an analysis of publications available in libraries and internet resources, including books and other scientific papers. By these efforts, it was possible to select the publications to be analysed in detail, and so among the initially chosen 45 publications, 18 were eventually subject to critical analysis. The papers which had met the assumed criteria were extensively analysed in the pursuit of the knowledge gap. Consequently, the final stage of the research work enabled a synthesis of the results thus obtained, providing sufficient grounds to define the knowledge gap and formulate conclusions with reference to the literature review.

Results and Discussion

The functions performed by business process maturity models, as described in the literature review, confirm their notable impact on the organisation development, and this implies that the models can be used as organisation improvement and development tools.

Business process maturity models form a pattern of gradual evolution of organisations, which is why they are also referred to as “stages of development”, “stage models” or “stage theories” (Plomp, Batenburg, 2010). Using them is, one the one hand, an attempt to tackle the problem of organisational excellence in a holistic manner, and on the other hand, they are tools dedicated to managers and intended for improvement of management (compare Haffer, 2011, p. 37). Once deployed, they enable systematic assessment and improvement of process skills and competencies needed by the organisation to attain high efficiency (Van Looy et al., 2011). This corresponds well with a statement that BPM has become a discipline that can be used to improve the entire range of organisational activities (Harnaus et al., 2016).

Based on literature studies, Dijkman et al. have compared several business process maturity models from the perspective of their relationship with organisational performance. Table 2 provides references to individual studies, the models applied and the researchers who managed to observe the said relationships.

Table 2: Relationship between maturity and organisational performance

Study	Research method	Maturity model	Confirmed relations
Jiang et al. (2004)	Survey (154 respondents)	CMM	Improved learning Improved control Improved product quality and productivity Improved communication Improved flexibility
Lockamy III and McCormack (2004)	Survey (523 respondents)	SCM Maturity	Improved overall performance of the supply chain management (SCM) function
Raschke and Ingraham (2010)	Survey (356 respondents)	BPMM	Improved overall performance of the purchasing and order fulfilment functions
Jung and Goldenson (2003)	Secondary data (752 units)	CMM	Improved ability to meet schedule and budget
Filbeck et al. (2013)	Secondary data (348 units)	CMM	Improved stock performance

Source: *based on Dijkman et al., (2015, p. 721).*

Drawing generalised conclusions from the aforementioned studies, one may claim that there is evidence to support the assumption that using certain business process maturity models generally improves the organisation's efficiency and contributes to its development.

Despite the limitations stemming from the design of the models as well as the fact that, to a large extent, they disregard alternative paths of development, which leads to simplification of the organisational reality, one may claim that they can be successfully used as organisation improvement and development tools. It is so because they are sources of knowledge about the performance and efficiency of process implementation. Using a more efficient method of process management is the means to ensure regularity and repeatability of the actions undertaken. For this reason, it should contribute to improving the organisation's efficiency and development. Implementation of business process maturity models involves the organisation's pursuit of development of its relationships with customers, organisational flexibility as well as development of the coordination system. They allow the organisation to develop in a more structured manner and to introduce changes which will not be incidental. Attaining a certain level of iterativeness is both desirable and reasonable, but in order for such efforts to ensure organisation development, they must be undertaken in the operating as well as the strategic dimension. Therefore, one should seek to improve the functioning of the organisation as a system coexisting in a specific environment. Using business process maturity models cannot be limited to the mere improvement of individual processes without evaluating their impact on other elements. However, it should be stressed that business process maturity models must not be used without reflection and a dose of criticism. What they require of managers is that they use them efficiently, aware of the existing limitations and in combination with other approaches which place more emphasis on elements disregarded in a specific model.

Conclusion

The elaboration provided in the article is based on the assumption that business process maturity models can be used as organisation development tools. The authors have referred not only to selected models, considered relevant for the very reason that they enable a wider perspective of assessment to be adopted and are not limited to the process dimension, but mainly because of their impact on the functioning of entire organisations. The positive correlation between using business process maturity models and organisation development will be more evident if the application of the former stems from firm conviction of top managers and relates to the strategic goals adopted by the organisation. However, it should be emphasised that transformation of strategic goals into development goals, reorienting operations towards an increase of process maturity, requires numerous measures and financial resources to be involved (compare Kihn, 2010).

Upon transition from a lower to a higher level of maturity, one should first expect the improvement to take place in the sphere of the processes themselves, then in the business areas (divisions) where individual processes have been implemented, and finally across the entire organisation. Attaining the above positive results is not unconditional, since the model application itself is no guarantee of success. The model is but a tool which – when used properly – provides the organisation with opportunities to develop. And in order to use it correctly, one must first establish how advanced the process management is as well as keep improving the solutions already deployed. When claiming successive levels, one must not lose sight of sustainable development of the entire organisation as well as synergetic operation which generally ensures optimised effects. The fact that the organisation has advanced to a higher level not always entails sustainable development. Focusing on fragmentation in terms of improvement of the given area without analysing its impact on other elements is a rather risky endeavour which by no means guarantees that positive long-term results will be achieved. Another important realisation concerns the fact that it takes time as well as involvement of the top management to succeed in introducing any change whatsoever.

Limitations

This article has its limitations, which basically boil down to its specific nature as an overall review based on studies of the literature of the subject. Bearing the foregoing in mind, future research should seek to empirically confirm the theoretically confirmed relationship between the use of business process maturity models and the development of an organisation perceived holistically as a system or with regard to its individual elements.

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Model Development and a System of Factors Affecting the Organizational Management Structure

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Abstract

The object of study is a change in the organizational management structure (management system) under the influence of factors of the internal and external environment (concept factors). The subject of the research is the methodology and sequence of logical-linguistic (semantic) modeling to establish a connection between groups of factor concepts and assess their impact on the system of organizational transformations. The applied research methods: constructing a qualitative model of system dynamics in the form of a graphic diagram, a cognitive modeling method for weakly structured systems, a dynamic and static analysis method, a fuzzy mathematics analysis method, a Pearson (r-Pearson) linear correlation coefficient scale, a method for constructing a cognitive map by V.B. Silov (1995), a method for constructing a consonance matrix based on data from logical-linguistic (semantic) modeling. In the process of research, a methodology has been developed for the sequence of constructing a logical-linguistic (semantic) model based on the disclosure and impact of factor concept groups on changing the system of organizational and managerial transformations, with their further consideration in changes in the organizational management structure. The developed methodology allows defining the intensity of the relationship between groups of factors of the external and internal environment that affect the system of organizational transformations.

Key words: Logical-Linguistic (Semantic) Model, Influence/ Impact, Assessment, Linguistic Variable, Organizational Structure, Factor Concept, Cognitive Map

Introduction

The relevance of the research topic is the difficulty of establishing the relationship between the factors of the internal and external environment (factor concepts) impact on the change in the organizational management structures. They are based on several inherent features:

– The difficulty to access the impact of factors of the internal and external environment on the change in organizational management structures due to fuzzy (informal) measurement of descriptive nature;

– The presence of possible multi-factoriality and interconnectedness of factor concepts and occurring processes that lead to the difficulties in establishing and studying them separately. It results in the need to determine the aggregate of the impact of factor concept groups on change in organizational management structures;

– The adequacy in comparing the considered factor concepts about the normatively established properties based on the study of the intensity of their impact on the changes in organizational management structures.

The above arguments lead to the conclusion that there is a poorly structured system that does not allow assessing the degree of change in the organizational management structure using absolute quantitative indicators.

It is necessary to use a cognitive approach associated with the construction of a logical-linguistic (semantic) research model to carry out modeling of this organizational transformation system under the influence of factor concepts. Generally, a logical-linguistic model represents a higher level of cognitive modeling in terms of using the principle of formalization and taking into account the logistical aspects of the simulated system.

Consideration of a variety of interpretations of the fuzzy variable representation included in the logical-linguistic model determines the need to build a semantic model, which allows increasing the efficiency of determining the impact of internal and external factor groups on the changes in organizational management structures.

A model built in this way using logical-linguistic relationships will not only reveal, but also anticipate the impact of many factors on the change in organizational management structures with their further consideration in the changes, as well as determine the intensity of communication between groups of factors of the external and internal environment that affect the change organizational transformations.

Building of a semantic model will make it possible to use elements and methods of the system of a logical-linguistic model constructing and determine not only the strength of the influence of relations between factors, but also establish the degree of their group influence organizational and managerial transformations, under the changes in the internal and external environment.

The need to find a solution to the specified problem. The existing and currently developed methods for constructing logical-linguistic (semantic) models are not fully objective. It occurs under the conditions of considering various interpretations of theoretical and practical studies, which for one or another reason of subjectivity reflect a different research methodology. It is a factor of absence of a complete and uniform approach to the analysis of the object and subject of research. There is no possibility of a study aimed at establishing the impact of external and internal factor groups on changing the organizational management structure. It complicates the process of its adaptation to changing conditions of the business environment in the absence of taking into account this connection.

The degree to which the problem is developed. The main directions of the theoretical development of cognitive modeling and linguistic concepts are represented in the works of the following foreign and domestic scientists and researchers involved in cognitive modeling. They are T. Kun (1956); Ch.Loomis, E. D.Dyer, T. Buzan (1973); R. Axelrod (1976); L.Zade (1976); Ch. Loomis (1977); E.Tolman (1980); K.Saeed (1986); D.I.Pospelov (1986); C.Eden (1988); N. Chomsky (1991); K.Warren (1999); J.Forrester (2003); I.V.Chernov (2004); Hemdy A. Taha (2007); V.P.Strogalev, I.O.Tolkacheva (2008); D.Yu.Katalevsky (2011); G.V.Gorelova G.V. (2012), and others [12, p. 123].

In the process of cognitive modeling concept evolution the development of the system for constructing fuzzy cognitive maps is manifested as a result of the fusion of fuzzy logic and system dynamics. Currently, cognitive modeling is the basis for temporary dynamic modeling systems in finance, politics and business (Igoshev, A.N., 2019, p. 153).

The vastness of the application of cognitive modeling in various areas of socio-economic life of society leads to the need for an individual approach to the development of a methodology for analyzing the system (changing the organizational structure of management) under the influence of factor concepts (factors of the external and internal environment).

Materials and Research Methods

The study applied the methodology for constructing a qualitative model of system dynamics in the form of a graphic diagram that reflects direct and inverse causal relationships. It was based on establishing the mutual influence of factor concepts on each other and the system as a whole.

It is taken into account that positive values express an increase (decrease) in the impact of a factor concept on an increase (decrease) in influence a research system. Negative values express inverse

proportionality: an increase (decrease) in the factor concept leads to a decrease (increase) in the effect on the research system.
The method of cognitive modeling of weakly structured systems is used. It means the study of the analysis of changes in the organizational management structure by constructing a model based on a cognitive map. The use of the building a cognitive map methodology reflects the subjective ideas (individual or collective) of the problem (and) or the situation under study associated with the functioning of a poorly structured system.

The main elements of the cognitive map are concept factors, which allow specifying the influence of changes in the structure of management (system) based on of defining the strength of cause-effect relationships. As a methodology, the method of constructing a fuzzy cognitive map by V.B. Silov was used (Silov, V. B., 1995, p. 61). It is based on fuzzy linguistic variables, representing an extension of the classical concept of a cognitive map with an indicator of the mutual influence intensity of factor concepts on the system under the study.

To analyze and interpret the results obtained, the methodology of dynamic and static analysis is used as trends in the development of the situation in time, taking into account the methodology of fuzzy mathematics analysis.

Formally, when constructing a linear dynamic model based on a cognitive map, a factor is defined as a variable taking values from a certain numerical scale. To establish the degree and intensity of the mutual influence of connections between conceptual factors and the system under the conditions of linguistic variables, the model uses the Pearson linear correlation coefficient (r-Pearson) scale. It allows interpreting the values of linguistic variables into quantitative indicators based on the method of comparisons.

Using this method makes it possible to assess the intensity of the mutual influence of factor concepts and the system in the range from [-1] to – [1] for the further construction of the consonance matrix according to the cognitive map algorithm by V.B. Silov (1995).

A grouping of external and internal factors affecting the change in the organizational management structures will allow assessing the degree of mutual influence of the considered groups of factor concepts and their combined impact on the system when constructing the matrix of mutual influence and the semantic model. This direction provides the possibility of grouping factor concepts, ranking them by degree of importance. It also gives the possibility to identify their most intense impact on changing organizational management structures as a system using a logical-linguistic (semantic) model. The study applies general scientific methods. The data obtained on the factor concepts based on with the application of this research methodology are reliable, based on the tendency of changes in the internal and external environment.

Research Results

The process of establishing and change of organizational management structures is ambiguous. In the course of evolution and globalization of economic systems and relations, a spectrum of factors that affect organizational transformations and changes is formed.

In these conditions, it seems necessary to conduct a study of factors of the internal and external business environment, their grouping and an assessment of their impact on changing the organizational management structure, as part of the cognitive modeling method implementation.

The methodology of cognitive modeling, originally developed by P.Axelrod (1976), is purposed for analysis and decision-making in difficult-structured systems based on cognitive modeling using the expert method. It does not involve any difficulties in its use for poorly structured control systems.

Currently, the methodology of cognitive modeling is developing in the direction of improving the analytical apparatus and situation modeling concerning the dynamics of changes in factors that are inherent in the informal (descriptive, fuzzy) type.

The emergence of the methodology of cognitive modeling and its dissemination in the study of socio-economic, scientific phenomena and processes led to the formation of non-traditional and integrated logical models based on the description and inclusion in the model of formal (clear) and informal (fuzzy) linguistic variables, the analysis system of which is presented in the works of L. Zade (1976) and D.A. Pospelov (1986).

A cognitive map construction according to V.B.Silov's method allows establishing a methodology for creation of a logical-linguistic (semantic) model. It increases the efficiency of defining the impact of internal and external factor groups on changes in the organizational management structure.

The cognitive map will be a causal relationship of the factor impact of the internal and external environment on the change in the organizational management structure in the following form: : $G = \langle E, W \rangle$, where E is the totality of the set of internal and external factor concepts, W is the binary ratio, the intensity of links between factors to be included in the semantic model.

The binary relation, reflecting the intensity and direction of influence between concept-causes and concept-effects, expresses directly or inversely proportional influence of the concept-reason.

When developing a semantic model on the impact of internal and external factor groups on changes in organizational management structures the usage of the methodology for constructing a cognitive map by V.B.Silov (1995) leads to the necessity to establish a fuzzy binary relation W elements of w_{ij}. It characterizes the degree of intensity and direction of influence between concepts $w_{ij} = w(e_i, e_j)$ subject to the following restrictions optimal for this model (Vokueva, T.A., 2012, p.127):

$$\begin{cases} -1 \le w_{ij} \le 1; \\ w_{ij}=0 \text{ when the impact of } e_i \text{ on } e_j \text{ is absent;} \\ w_{ij}=1 \text{ when } e_I \text{ influences } e_j \text{ maximum positively;} \\ w_{ij}=-1 \text{ when } e_I \text{ influences } e_j \text{ maximum negatively;} \\ -1 \le w_{ij} \le 1 \text{ when } e_I \text{ influences } e_j \text{ both positively and negatively} \end{cases}$$

When conducting an analysis of changes in the organizational management structure based on the influence of factors of internal and external effects of constructing a cognitive map, a static task will be solved to study and analyze the interaction of factors in the current situation based on the mathematical analysis of fuzzy graphs.

Static analysis using the methods of constructing a cognitive map by V.B.Silov (1995) will allow determining:

1. The cumulative result of the impact of changes in the organizational structure of management in the interaction of the considered factors;

2. The degree and intensity of the impact of internal and external environment factor combination on the change in the organizational management structure;

3. The degree and intensity of the impact of groups of factor concepts (a group of factors of the internal environment, and a group of factors of the external environment) on the change in the organizational management structure, both through direct and intermediate influence.

Accordingly, a static analysis of the cognitive map is based on a matrix to assess the interactions between factor concepts, between groups of factor concepts, and assess their impact on the system as a whole. The model for constructing a fuzzy cognitive map is presented in Fig. 1.

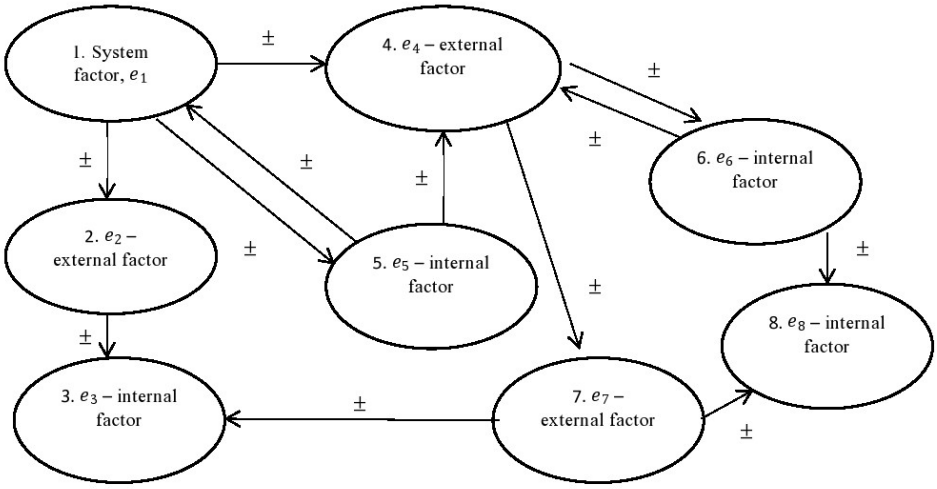

Fig. 1: Building a cognitive map by V.B.Silov on the impact of factor concepts on the organizational management structure changes

To assess linguistic, fuzzy variables in constructing a cognitive map by V.B.Silov (1995) the Pearson linear correlation coefficient (r-Pearson) scale is used. It estimates the intensity of the relationship between the considered factor concepts (Table 1).

Table 1: The proposed assessment of the intensity of the mutual influence of factor concepts in constructing the consonance matrix using the cognitive map algorithm by V.B.Silov

Linguistic fuzzy variable of concept factor	Weak	Moderate	Significant	High	Significantly high
		(average intensity of influence)		(strong intensity of influence)	
Intensity of factor concept influence	$\lvert 0{,}1 - 0{,}3 \rvert$	$\lvert 0{,}3 - 0{,}5 \rvert$	$\lvert 0{,}5 - 0{,}7 \rvert$	$\lvert 0{,}7 - 0{,}9 \rvert$	$\lvert 0{,}9 - 1{,}0 \rvert$

Interpretation of the intensity of factor concept impact based on the construction of a cognitive map is calculated by the combined positive and negative influence of factor concepts. Data are presented in matrix form (see Table 2).

Table 2: Model of the consonance matrix of the cognitive map by V.B. Silov

Factor concept	e_1	…	e_j	Concept impact on the system
e_1	w_1	…	w_{1j}	$c_{ij} = \frac{w_1 + \cdots + w_{1j}}{\lvert w_1 \rvert + \cdots + \lvert w_{1j} \rvert}$
…	…	…	…	…
e_i	w_{i1}	…	w_{ij}	…

In this case c_{ij} − represents the consonance of the impact of factor concept I on factor concept j.
To assess the groups of factor concept impact on the system, it is proposed to use the construction of a grouping of the considered internal and external factors based on the creation of a semantic model in the form of a matrix:

$$\begin{array}{ccc} & e_1 & e_j \\ e_1 & 0 & w_{1j}, \\ e_i & w_{i1} & 0 \end{array}$$

where w_{i1}, w_{1j} are the availability of mutual influence of factor concepts, equal to [-1], [1].

In the process of constructing the matrix, the sum of the values of the assessment intensity of the mutual influence is estimated by the factor concepts, horizontal and vertical rows and columns of the matrix. It leads to the formation of a systematic interaction of external and internal factor concepts in the aggregate.

Further, it is necessary to classify the factor concepts and summarize the obtained values by groups of external and internal influence. It will result in the formation of a holistic value for assessing the interaction of factor concepts based on the sums of causes and sums of the consequences of the dynamism of factor concepts.

Based on the construction of the matrix, according to the influence of factors I on j, and j on I, the ranking of factor concepts is performed in descending order. It significantly affects the change in the organizational management structures.

Thus, the application of the methodology of the sequence of logical-linguistic (semantic) modeling will allow assessing the level of connections, the degree of their interaction and mutual influence by establishing the consonance values of linguistic variables.

Discussion of the Results

When the development of a methodology for creating a logical-linguistic model for assessing the factor impact on changes in organizational management structures, the method of constructing a cognitive map by V.B. Silov was used (Silov, V. B., 1995, p. 92). The transfer of influence intensity parameters of linguistic fuzzy variables based on the Pearson linear correlation scale was conducted (Nazarova, M.G., 2016, p. 87).

The system of the semantic model for the mutual impact of factor concept groups on the management system using a cognitive map allows establishing a relationship between external and internal factors. It has a significant impact on changing organizational management structures. When using logical-linguistic modeling, the opportunity arises to systematize problems into a single structure. It allows analyzing factor concepts in aggregate (Igoshev, A.N., 2019, p. 158).

In this case, manipulating the data of linguistic variables and determining the mutual influence of factor concept groups will directly proportionally determine the type of impact intensity on the change in the system, that is comparable with the studies of A.E. Gorodetskiy (2010).

The higher the intensity of the mutual influences of factors, the higher the impact intensity of the factor group aggregate on the change in the organizational management structure (Fig. 2).

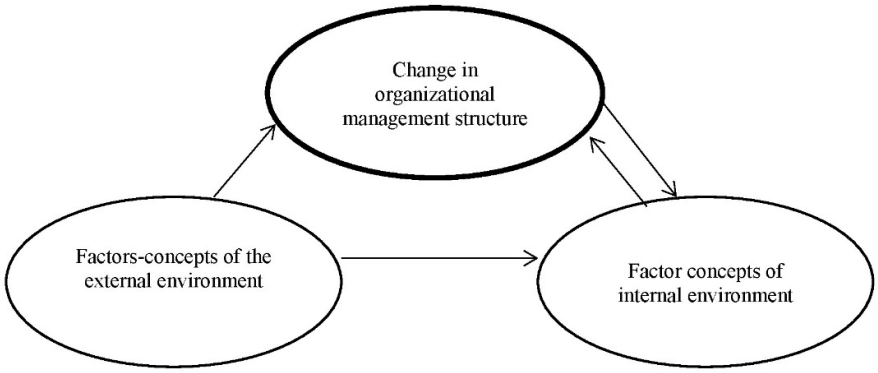

Fig. 2: Aggregate of connections formation and the impact intensity of factor concept groups on change in organizational management structures

Thus, the proposed sequence and methodology of logical-linguistic (semantic) modeling will make it possible to establish the priority of factors that have the most significant effect on the change in the management structure when analyzing the obtained values of consonance by factor concepts.

Further study of the impact of external and internal factors on the change in organizational management structures based on logical-linguistic (semantic) modeling is aimed at establishing weights of the influence of factor concepts by the method of hierarchy analysis. It is purposed to consider the possibility of constructing an integrated model using the significance and intensity of their combined impact on change organizational management structures.

Conclusion

On the research topic, the development of a logical-linguistic (semantic) model on the impact of factors of the external and internal environment on the change in the organizational management structure based on the construction of a cognitive map is proposed. At present, in the course of theoretical studies, there is an absence of a methodological approach to taking into account groups of factor concepts on the considered study, under the conditions of using their mutual influences indirectly from each other. It makes it impossible to identify the relationship between groups of factors and on the studied system of organizational transformations. The methodology represented for the development of a logical-linguistic (semantic) model allows establishing the influence intensity of both the relationships between the factors and the degree of their group impact on organizational and managerial transformations.

The scientific novelty of the study is in building a methodology and sequence for the development of a logical-linguistic (semantic) model based on the disclosure and prediction of factor concepts' impact on the system of organizational changes. It also includes their further influence on the management structure and determining the methodology for assessing the intensity of communication between concept factors groups affecting the system of organizational transformation.

Given methodology for constructing a model based on the elements of logical-linguistic modeling using a semantic model allows establishing the degree of external and internal impact of groups of

factors on organizational and managerial transformations, while achieving the possibility of establishing a connection between the considered groups of factor concepts.

Further research is planned to build an integrated model linking the weight significance of the considered factor concepts and the intensity of their impact on changes in organizational structural transformations.

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Optimization of COVID 19 Deescalation Attempts in Poland – From the Law on Crisis Management to the Law on Emergency States

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Abstract

The considerations contained in the paper constitute a synthetic analysis of Polish legal solutions that can be introduced to prevent, counteract and combat COVID 19. The paper presents results of a research which are of a reflective nature due to the changes that have their origin in a claim that *the legal measures prepared for emergency situations are nowadays of a universal nature*. In addition, the character of these measures becomes more and more a kind of routine nowadays. A systematic literature of open access studies and papers as well as legal acts review was the key method applied in the research. Besides this method, further theoretical methods such as synthesis, comparison, generalization, inference and abstraction were applied as well. Due to the scope of the paper, there are mainly (but not exclusively) studies of Polish authors presented.

Keywords: Threat, Security, Epidemic, Law, Emergency States, Crisis Management, COVID-19

Introduction

Security [1] is the key value which obviously deserved extraordinary protection in democratic countries. The basic factors influencing security level envisage efficient functioning of the state institutions (Marczak, 2004) as well as potential to forecast threats (Zielinski, 2017) and their prejudicial developments which could negatively impact the citizens and the state security [2].

Threats that appear in a security environment are featured by limited predictability of plenty dynamic variabilities. Epidemical outbreak, like the current COVID 19, is a clear example of such specificity in security environment. Maintaining appropriate security level is one of the oldest public tasks which is fully bound with public authority. It surely relates to the legal order being in place, incorporating complete spectrum of the state functioning from normal status, through emergency situations, up to states of emergency.

Method

A systematic review and analysis of literature on law, management and security as well as legal regulations on national security was the key method applied in the research. There are mainly Polish authors' research results referenced due to the specificity of the research problem indicated in the title of this paper. This approach is highly advisable since there is a strong linkage between conditions of Poland's internal security and the system of legal standards which is an elementary determinant of the effectiveness of the security system in Poland. Secondly, a limited time perspective, determined by the appearance of the first cases of COVID19 in Poland, basically influenced admitted as well.

Due to the author's long-standing expertise covering the issues of the state and internal security systems as well as crisis management, the paper contains a broad review of scientific literature relating to the following issues: legal regulations of the state security management in crisis situations, the states of public disorder and natural disaster.

The research also addresses to legal regulations applied in case of the response to the pandemic outbreak which took place this year in Poland. These acts are not a part of the legal regime on crisis management and states of emergency by definition, however, the consequences of their introduction apply similar rigors towards the public as those one which are used for a state of emergency, with an exception on the limitation of human and civil rights and freedoms. Therefore they could be classified as a midterm regulations.

The research allowed to survey the causes and conditions required for application of the legal solutions, to diagnose their first effects and to identify theoretical and practical doubts on this processes.

Crisis Management Law – Legal Status Analysis

The analysis of concepts regarding identification of the crisis management process allows to distinguish two approaches to the problem [3]. One of them reduces the issue of crisis management exclusively to civil protection [4], while the second refers to the issue of specific security management [5].

A subject and an object of crisis management (Sosnowski, 2001) seem to be extremely important for security [6], especially in respect to the internal security considerations due to a constant increase of a threats level [7]. This growth - usually painful - is often approved due to an extraordinary potential of humanity that is being released, both in these who are going through a crisis and in those who try to accompany them on this path [8]. It is some kind of a secret that a crisis is the path of development [9]. These people have to pay a price of suffering if they want to achieve something that really has a value. Unpredictability, uncertainty inherently present in the process of life do not allow us to eliminate the possibility of confrontation with something that in a subjective perception of a person will be interpreted as incomprehensible and overwhelming his or her capacities. An acceptance of this reality leads to a satisfaction of overcoming, passing "to the other side", of the crisis. A satisfaction which probably might not be comparable with anything else [10].

Currently, in the Republic of Poland the crisis management aspects are regulated by a document of statutory rank, namely the Act on *crisis management* issued on the 26 of April 2007, which defines crisis management as the activity of public administration bodies incorporated in the broader management process of the state security system [11]. The legislator assumed that this legal act would be an important element in managing the state security [12]. The explanatory memorandum to the draft of this act states that “it will lead to the improvement of the state of universal security in the scope of both protection of life and health of citizens as well as protection of critical infrastructure through more effective actions of public administration”(Socha, 2011). This legal act primarily "regulates issues related to the principles of organs before, during and after the crisis” [13]. It also defines the structures and scope of logistics, organizational and financial tasks related to crisis management [14].

Crisis management is seen in terms of strategic management [15]. In the context of the above, it should be noted that the provisions functioning in the Polish legal system serve to strengthen the structural and functional capacities of the state in the field of crisis management, mainly due to emerging threats [16]. As a result, the effectiveness level of the internal security system elements [17] as well as the efficiency of institutional and legal resources disposal were increased (Ciekanowski, 2011).

It should be emphasized that crisis management is implemented in the cycle of four phases such as prevention, preparedness, response and recovery [18].

Cause-effect phenomena [19] is the key linkage based on the successive mode between these phases [20]. The essence of the prevention phase is to conduct actions aimed at eliminating or reducing the likelihood and/or impact of adverse events. Preparedness covers such activities as planning processes including developing crisis management procedures, building and maintaining resources which can

be used in crisis situations and so on. The third, response phase is introduced while a crisis phenomenon generates its first negative impacts. The main goal of this phase is to accomplish activities which are aimed at providing an urgent assistance to victims and reducing secondary damages and losses.

Finally, the recovery phase triggers activities which lead to reconstruction of the state organization back to the normal, or even better, status of functioning (build back better rule) (Zwęgliński, Radkowski, 2015). Recovery can be divided into short and long term actions. Short term cover restoration of vital systems to minimum operational standards while long-term are associated with complete reconstruction of the state status, however, they can last for several years after a hit.

Crisis management processes require systematic improvements, including capacity building of all institutions involved (Falecki, 2013), which are facing many serious obstacles (Sowizdraniuk, 2007). For example one of the most important psychological and social barrier is low acceptance of general public for this efforts (Letkiewicz, 2007) .

States of Emergency Diagnose

As an organization, the state naturally undertakes actions and efforts to ensure its continuity [21]. Therefore, it reserves the legal right to introduce a state of emergency which basically is a tool to restore an acceptable level of security in extraordinary conditions [22]. It can be done while normal, constitutional means, are ineffective in realization of the state key function which is security provision (Sagan, 2001). In the Republic of Poland, this applies to three emergency states [23] options such as: the state of public disorder [24], the state of natural disaster (Alexander, 2001) and the state of martial law [25].

To compare, Germany, at least on the federal level, does not have in place uniform statutory solutions relating introducing a state of emergency in case of an epidemic. The states (Länder) are the key administrative units appointed for crisis management and civil protection in case of an epidemic. Their competence is to manage the state of natural disaster, including the executive as well as the legislative aspects. Each state regulates its own law on introducing this type of state of emergency. The first case of introducing the state of natural disaster took place in Bavaria on the basis of the Bavarian Act on Protection against Natural Disasters (Katastrophenschutzgesetz). Then for the first time it applied to the entire state, not - as it had been in the past - only to a part of its territory.

On the federal level there is in place the Act on the Prevention and Control of Infectious Diseases (*Infektionsschutzgesetz,* IfSG) launched on January 1, 2001. It replaced the federal Act on combating late blight and the Act on combating venereal diseases. Furthermore, it is worth to underline that on March 23, 2020, the German government adopted a draft amendment to the Act on the Prevention and Control of Infectious Diseases (Infektionsschutzgesetz), which essentially expands the competence of the federal government, shifting some more power from the Länder up on the federal level (in this case the Federal Minister of Health) in this respect.

In the Republic of Poland the three emergency states can only be introduced in the course of implementing specific legal acts by authorized bodies in a strictly defined manner [26]. It is of greatest importance since a state of emergency results in human [27] and citizen (Siemiński, 1980) rights and freedoms restrictions [28]. In Polish legislation, besides the Constitution, the states of emergency are regulated by statutory acts such as:

- Act *on the state of public disorder* issued on the 21 of June 2002 [29],
- Act *on the state of natural disaster* issued on the 18 of April 2002 [30],
- Act *on the martial law, competences of the Supreme Commander of the Armed Forces and the rules of its subordination to the constitutional organs of the Republic of Poland* issued on the 29 of August 2002 [31].

Analysis of the legal acts provisions, specifically the chapter XI of the Constitution, makes it possible to distinguish certain general principles required to argue introducing a state of emergency (Wołpiuk , 2002). In accordance with article 228 implementation and maintenance of a state of emergency must meet following principles (Paździor 2006):

- uniqueness - implementation of a state of emergency may take place only in a situation of extraordinary threat which leads to a crisis situation not able to be managed in a sufficient way in the regime of ordinary constitutional measures,
- legality – ensures legal mode of a state of emergency implementation, i.e. only on the basis of an appropriate legal act and ordinance which is conditioned by public disclosure,
- proportionality - the authorities decision and the measures undertaken as a result of this decision have to be proportional to the threat against which the decision is taken. This principle enable to use only such measures which are the least burdensome for the general public in the existing reality of the situation. Actions must correspond to the degree of the threat and should aim at restoration of the normal functions of the state as soon as possible,
- purposefulness - actions are aimed only at restoration of the normal functions of the state as soon as possible,
- protection of the democratic legal system foundations - changes in the legal regulations that are fundamental for the democratic political system are forbidden,
- protection of the elective political bodies - changes in the structures of elective bodies during an emergency state is prohibited.

Preliminary analysis of the legal acts on states of emergency allows to conclude that there is a coherent approach to the regulations structure. It could be perceived as a sign of diligence between the initiating and legislative political bodies constructing these regulations.

Characteristics of the state of public disorder and the state of natural disaster

The legal acts on the state of public disorder and the state of natural disaster determine following rules [32]:

- general provisions - implementation and abolition mode, the scope of restrictions on human and citizen freedoms and rights, conditions and the purpose of introducing a state of emergency, duration and the territorial coverage,
- public authorities functioning rules specification - bodies responsible for restoration, state entities participating in direct restoring actions, detailed scope of restrictions on human and citizen freedoms and as well as authorities' competences to enforce these restrictions,
- criminal provisions - criminal proceedings and sanctions to be applied in case of neglecting the provisions.

There are enumerative rationales for the states of emergency implementation, namely for [33]:

- the state of public disorder - a specific threat to the constitutional system of the state, the security of citizens or public order, including events caused by terrorism and/or cyber acts which might not be mitigated in the course of ordinary constitutional measures [34],
- state of natural disaster - aimed at prevention from further development of natural or man-made disasters' or technical failures' consequences (Szwajca , 2011). The relevant legal act defines a *natural disaster* as a natural disaster, *per se*. or technical failure, which impacts life or health of a large number of people, property of large sizes or the environment in large areas, while an assistance and protection can effectively be implemented only by extraordinary measures, in cooperation (Krzyżanowski, 1999) of various bodies and institutions as well as specialized services or forces and formations operating as a uniformed entity (Radkowski, 2011). Furtherly, the act defines a natural

> disaster as an event triggered by natural forces, in particular lightning strikes, seismic shocks, strong winds, heavy atmospheric precipitation, prolonged extreme temperatures, landslides, fires, drought, floods, ice phenomena on rivers and the sea as well as lakes and water reservoirs, mass occurrence of pests, plant or animal diseases or contagious human diseases, etc. [35]

It is worth emphasizing that the state of natural disaster may be introduced by the Council of Ministers on its own or on a request of a province governor. This is slightly different for the state of public disorder which requires a resolution of the Council of Ministers submitted to the President of the Republic of Poland as a form of request to introduce a state of public disorder.

The implementation of states of emergency has significant impact on society in a form of the possible limitations to the rights and freedoms of a citizen (Jasudowicz , 1997). In the area where a state of emergency was imposed, all persons staying there, even temporarily, are forced to accept restrictions on human and citizen freedoms and rights. These restrictions apply accordingly to legal persons and organizational units having their registered office or operating in the area of the state of emergency coverage (Wiśniewski, Socha, Zwęgliński, 2017).

Actions taken to de-escalate COVID 19 – results of indirect measures

It is worth to underline that the gradational approach to the rigors of legal regulations used in emergency situations, on one hand, allows to select appropriate measures to the actual requirements of the given situation, and on the other hand, it withholds the state authorities from the obligation to always resort to the final and most drastic measures or to use emergency measures, disproportionate to the weight and scale of existing threats [36].

In scientific studies, the term "particular threat states" is often used. According to S. Gebethner (1982) this term can be classified by the criteria of a threat to:

- sovereignty, independence and territorial integrity,
- constitutional institutions and functioning of constitutional bodies of the state,
- public and legal order as well as security of citizens which were violated .

Taking into account the nature of the effects of COVID 19 outbreak, on the basis of the Act *on preventing and eradicating infections and infectious diseases of humans,* on the 13 of March 2020 the Minister of Health announced in a form of ordinance a state of epidemic threat in the entire territory of the Republic of Poland. The ordinance states that from March 14, 2020 until further notice there is in force the state of epidemic threat related to SARS-CoV-coronavirus infection-2 (this regulation was amended twice on 14 and 16 March). This provision introduced some restrictions for example:

- prohibition on public gatherings exceeding 50 people,
- closing bars and restaurants, cinemas, theaters, clubs, swimming pools, libraries, museums,
- limitations to trade in shopping centers,
- limitations to transport sector,
- prohibition on exporting respirators and cardio monitors.

An important issue is that the current regulations allow, inter alia:
to limit functioning of specific institutions or workplaces temporarily, to introduce an injunction to provide administrated or owned facilities, to prescribe providing transportation means required for anti-epidemic measures.
It should also be added that the legal act on preventing and eradicating infections and infectious diseases of humans allows to direct people who are medical employees or were contracted for the health service to conduct anti-epidemic works.

Currently, in Poland experts are discussing regarding the existence of a de facto state of emergency, or a state of natural disaster, due to restrictions introduced by an attempt to de-escalate COVID-19, however, not officially in legal procedures confirmed by decision-makers. The arguments given relate to introduced restrictions, i.e. suspension of educational institutions, forced quarantine of persons coming from abroad, or restoration of border controls. Despite the existing regulations, it was decided to introduce the so-called "Special act", i.e. the Act of on *specific solutions related to the prevention, to prevention and counteracting of COVID-19, other contagious diseases and crisis situations caused by them* launched on the 2-nd of March 2020. This law regulates many areas of the state and citizens functioning.

Despite of the existing similarities to acts on states of emergency, e.g. on ad hoc restrictions introduced, regulatory action allows, among others bypassing the rigors of time limits or the need to postpone elections, but also to indicate precisely the areas requiring specific actions. In this respect an example would be the adoption of additional care allowance. In addition, it also allows for relatively quick introduction of additional changes forced by the situation, e.g. as mentioned above suspension of educational facilities.

Conclusions

In the current situation, the scale and dynamic of COVID 19 spread, in most countries of the world, have undoubtedly revised standardized thinking about preparatory phase of crisis management, indicating the need for a necessary update in this respect for the future, but also it revealed a need for revision of resources dedicated to be implemented in response phase in case direct confrontation with an epidemic threat caused by viral agents.

In order to stimulate response efficiency, the state introduces a number of legal and organizational solutions, relating inter alia to crisis management [37]. The characteristic feature of the solutions mentioned above is cooperation [38]. Its universality means that it is not always possible to realize that cooperation takes place (Zwęgliński, Morgado, 2018). Usually, cooperation [39] is discussed in situations of spectacular activities, omitting from the permanent, "ordinary" intermingling activities of various institutions (Prońko, Wiśniewski, 2004).

Joint implementation of tasks requires compliance with the adopted rules and proceedings in accordance to the will of the coordinator of activities (Konieczny, 2001). Cooperation effectiveness depends on the quality of performance of tasks on all levels (Opolski, Modzelewski, 2004). To ensure high quality and efficiency of the cooperation, all negative phenomena in this respect should be minimized [40].

Presented outline of the legal solutions clearly shows that the dynamic materialization of a threat sometimes requires ad hoc new solutions besides those existing legal regulations. Solutions which allows relatively quick adaptation to the situation.

Comprehensive and systematic solutions certainly will not only be the subject of scientific explorations, but beyond that, will also become a challenge for all countries in the world. Uncertainties carried by plenty of different phenomena, including their unpredictable scale, are becoming more and more a routine in the security environment. It obviously reveals a need for revision of existing schematic plans in order to make them upgraded to multi-scenario and modular projects that require regular competence of flexibility from decision-makers.

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Review of Biometric Authentication Methods in Mobile Payment

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Abstract

Mobile payment has become more popular and has a large number of users. This paper enhances the security aspect of M-payment by determining the most appropriate biometric authentication method to authenticate user identity. Evaluation of biometrics to determine the most appropriate one was done based on three factors: user preference, accuracy, and usability with mobile payment. As a result of the evaluation, we recognize that finger printing is the most appropriate authentication method with mobile payment.

Keywords: M-payment, mobile payment, biometrics, authentication, finger print, face recognition

Introduction

With rapid change and increased dependence on technology, it has become important to increase attention on all security aspects, especially in Internet payment processing and online mobile payments (M-payments). One of the important aspects is authenticating user identity. Users can be authenticated using multiple methods, including (a) something one knows (e.g., a password), (b) something one has (e.g., a credit card), (c) somewhere one is (e.g., a home address), and (d) something one is (e.g., biometrics). Each authentication method has advantages and disadvantages.

Something one knows is the most common authentication method because it is the cheapest method, easy to implement, and easy and common for users. On the other hand, this authentication method is the weakest method. Passwords are easy to guess, log, or hack using various attacks such as brute force attacks and password dictionary attacks. Something one knows authentication is effective to use in website accounts. It is usually integrated with other authentication methods such as using a password with a token sent to a mobile number.

Something one has includes credit cards, badges, and one-time password OTP. This method is usually used as multifactor authentication with other authentication methods to ensure user identity and prevent attacks such as replay attacks according to Kambou and Bouabdallah (2019). It is often used for important registration on web sites and social media as a second authentication method in addition to a password.

A relevant location is used to uniquely identify an authorized user by his or her geographic location, and it is commonly used in banking transactions for advanced authentication of user identity. The something one is authentication method (e.g., biometrics) will be the main focus of this paper.

Something one is method means authenticating users using biometrics. Biometric authentication means verifying personal identity by measuring and analyzing unique physical or behavioral characteristics such as fingerprints. This paper will present a review of the most common authentication methods, then will evaluate predefined authentication methods to be used in M-payments and show conclusions and open research topics in this field.

Overview

Biometric authentication means verifying personal identity by measuring and analyzing unique physical or behavioral characteristics. Physical characteristics are related to unique human characteristics, including body shape, and thus vary from person to person. Behavioral characteristics are related to a person's behavior (e.g., a signature) as mentioned in Kodituwakku, (2015). In this section, challenges, working methods, reasons of use, and compatibility in M-payment for most common biometric authentication methods will be presented.

Fingerprints

Fingerprinting is a common method used to authenticate user identity. Fingerprint authentication started in the late 19th century according to Jain, Feng& Nandakumar (2010). There are many reasons why fingerprint authentication is the most common authentication method, but the main reasons are because it has low cost, fingerprints do not change over time, a fingerprint is a unique human characteristic even for twins, it easy to implement, and the availability of compact and relatively inexpensive fingerprint readers Feng & Nandakumar (2010). Fingerprint authentication uses the ridges and valleys (minutiae) found on the surface tips of a human finger to identify an individual as mentioned in Chhabra & Dutta (2016). Fingerprint patterns differ among people. The major fingerprint pattern types are arches, loops, and whorls. Figure 1 from Jain, Feng & Nandakumar (2010) shows these patterns types.

Fingerprint recognition and authentication are normally done in two phases. The first phase is called the enrollment phase, where the reader will capture fingerprint details. This requires capturing fingerprints from many dimensions. Then the capture result will be stored in a database. The second phase is the recognition phase where authentication actually happens by capturing a user's fingerprint then comparing it with the database. Once they are matched, the user is authenticated according to Jo, Jeon, Im & Lee (2016).

Fingerprint authentication has multiple advantages, but it also has weaknesses. One of fingerprint recognition and identification systems' challenges is they are highly dependent on quality of data. Al-Jumeily, Al-Azzawi, Mahdi, & Hind (2017) came up with a new approach that used the swarm intelligence methodology and built a robust rotational and spatially invariant fingerprint recognition and verification model. According to Aithal (2018) , fingerprint authentication systems must have requirements to act with high performance, where components for an ideal authentication system are user friendliness, ideal and consistent input and output, ideal process, and ideal performance evaluation matrices.

Fingerprint authentication methods nowadays are commonly used for smart phones, according to Jo, Jeon, Im, & Lee (2016). The researcher presents vulnerabilities and possible attacks and recommendations to prevent such attacks.

The focus of this review is to determine the feasibility of biometric authentication to be used in M-payment. Fingerprint authentication is applied in various methods in mobile phones as presented in Khalil & Wan (2012). Fingerprint payment is commonly used, according to Priya (2017). It is considered a good and feasible method because it is easier, reliable, and secure Priya (2017).

Face Recognition

Face recognition has several potential application domains, especially for security purposes, such as access control and identification. It can be defined as "the ability of a computer system to recognize a test face in a given image, video frame or database of images" Irhebhude, Celestine & Aget (2019).

Face recognition is one of the most usable authentication methods. It requires no special arrangements and disturbances to the person being identified. In another word, it is a natural and nonintrusive biometric measurement Haq, Shahzad, Mahmood, Shah, Muhamma & Akram (2019).

In general, face recognition approaches are based on deep networks that use a classification layer trained over a set of known face identities and then take an intermediate layer as a representation used to generalize recognition beyond the set of identities used in training Parkhi, Vedaldi & Zisserman. It compares the facial features in two different images to determine whether they are of the same person under constrained conditions, such as different illumination, facial expression, variations in pose, various viewing angles, image resolution, sensor noise, and viewing distance. Face recognition approaches perform in two ways, verification and identification. In general, facial recognition algorithms test many datasets that have been created against each of the aforementioned conditions. Each dataset is designed to test a specific task, such as expression, occlusion, pose, or illumination Haq, Shahzad, Mahmood, Shah, Muhamma & Akram (2019).

Face recognition technology processes the face authentication by first recording the facial features (the positioning of eyes, nose, and mouth and distances between these features) in a database. After that, it normalizes and rescales the face region to a fixed predefined size. Then, it computes and stores the facial metrics in a face template. After that, input image characteristics are compared to the previously stored image database for recognition Kodituwakku (2015).

Despite significant recent advances in the field of face recognition, efficiently implementing face verification and recognition is quite challenging, and the outcome can be influenced by the aforementioned factors (e.g., different illumination) according to Schroff, Kalenichenko & Philbin (2015). To overcome the challenges of face recognition, recent scholarly studies mainly focused on improving approaches to imitate the brain's ability to accurately recognize a face that it has previously seen Irhebhude, Celestine & Aget (2019). Google is one of the Internet giants that has made recent advances in the community. It uses a face recognition method beyond the capabilities of most international research groups, particularly in academia. Google's face recognition method was trained using 200,000,000 images and 8,000,000 unique identities Parkhi, Vedaldi & Zisserman. Even so, illumination, facial expression, variations in pose, various viewing angles, image resolution, sensor noise, and viewing distance are factors that cause variations in appearances, which challenges the recent face recognition approaches and leads to a lack in the public large-scale datasets such as Google's Schroff, Kalenichenko & Philbin (2015). Figure 2 shows an example image from a dataset for six identities with variations in appearances Parkhi, Vedaldi & Zisserman.

Nowadays, face recognition is widespread, especially in M-payment authentication, and in some mobiles, it replaces fingerprint authentication (e.g., iPhone). Despite the considerable interest in face recognition, many people do not have the complete image of the capability of this technique. In M-payments, people still make extravagant claims about this method. People do not consider face recognition a trusted method, especially if it is about their money according to Priya (2017).

Iris Recognition

Iris recognition is a method for authenticating user identity. It can be defined as "the use of the features found in the iris to identify an individual" as mentioned in Chhabra & Dutta (2016). There are many reasons behind using iris recognition for authentication: the iris scan is completely different even for identical twins, it is easy to use since (e.g., like taking a photo), and the iris is and controlled by only two muscles, which makes the iris shape far more predictable according to Chhabra & Dutta (2016). It also has an advantage over fingerprints because an iris can be captured from up to 40 feet away as mentioned in Irshad, & Hassan (2017).

The main advantage of iris recognition is the possibility of iris imaging in on-the-move and at-a-distance scenarios as compared to fixed range imaging in near-infrared light according to Raja, Raghavendra, Vemuri & Busch (2015).

Figure 3 shows an iris scan of an eye taken from Raja, Raghavendra, Vemuri & Busch (2015). Iris scan recognition is done in two steps. First, a special camera captures an eye image, then the features of eyes are determined (e.g., inner and outer edges). After that the noise is removed, then the scanned iris information is stored, and it is impossible to have two persons with the same iris information. The second step is a verification if identity, where the camera will capture a person's iris, identify features, and isolate them from noise, then algorithms will be used to determine the identity verification.

There are challenges of implementing iris scans on mobile phones. One of the challenges was presented in Raja, Raghavendra, Vemuri & Busch (2015). Because approximating the radius of iris and pupil in the unconstrained iris images is a challenge for any of the segmentation methods in visible spectrum, the researchers present a new, high-accuracy algorithm that solves this challenge. Another innovative algorithm was presented by Al-Waisy, Qahwaji, Ipson, Al-Fahdawi, & Nagem (2018). The researcher built deep learning representations for images of both the right and left irises of a person, and this algorithm has high robustness and is fast.

Many researchers have studied the feasibility of using iris recognition for M-payment. Irshad, & Hassan (2017) found iris scanning is effective and reliable for safeguarding against the various kinds of fraud occurring in E-commerce transactions because it prevents identity theft and fake verification and increases customer data safety.

International Biometric Group (2005) and National Physical Laboratory (Mansfield et al., 2001) have assigned accuracy of iris scans as "very high according to Raja, Raghavendra, Vemuri & Busch (2015) did a scan of surveys to determine the scale of user preference for iris scans as "medium."

As a result, iris scanning is a good form of security authentication. It can be implemented for M-payment when a high level of authentication is needed. The problem with iris scanning is that it needs a special camera to perform the authentication process.

Hand Geometry

Hand geometry is an authentication method in multiple authentication systems as presented in Ross, Jain, & Pankati (1999), because the hand shape, thicknesses, length, distance between fingers, and other hand features are different for each person and do not change over age Kodituwakku (2015). Hand geometry is a unique human characteristic used for biometrics authentication, but it is also considered behavior authentication in some cases according to Song, Cai & Zhang (2017).

There are many reasons behind using hand geometry as an authentication method. Selecting hands as an authentication method is suitable because most people have hands, and in case of people with disabilities, hand geometry can be reengineered to be usable for them. Another advantage of hand geometry is that the scanning measurements are easily collected. Hand geometry is also appropriate to integrate with other authentication methods such as passwords and fingerprints based on Jo, Jeon, Im & Lee (2016).

The hand geometry authentication process is done in two steps. First, a hand is captured, noise is removed, and skin color is determined. In the second phase, authentication is done by comparing scanned data to a database to authenticate users Ross, Jain, & Pankati (1999). Figure 4 shows a hand geometry scanner.

Song, Cai & Zhang (2017) presented a solution that solved a problem of behavioral authentication that led to less accurate authentication or poor user experience by using hand geometry and behavioral characteristics recorded in the multitouch traces and used for authentication in mobile phones. In addition, Yassin, Yao, & Han (2016) discussed possible identity-based attacks on remote user authentication methods, and they proposed a solution that overcame these attacks by using hand geometry. They proposed a secure biometric-based remote authentication scheme using biometric characteristics of hand-geometry.

Overall, hand geometry has good accuracy and it is commonly used for authentication to access a certain area. In our case, hand geometry in M-payments is not the best method, because the size of smartphones is not able to scan hands and authenticate users, and the method requires special hardware to be integrated with phones to authenticate users in M-payment processes.

Retina Geometry

The retina is "a thin layer of neural cells located at the back of the eye and it is responsible for human vision" Ong, Xu, Wang & Liu (2015, p. 2720-2724). The retina's blood vessel structure is also called the eye print because of it is complex and unique from one person to another. Retina biometrics has recently attracted more attention for use in high-security applications Ong, Xu, Wang & Liu (2015). [19]. Therefore, the retina is a secure, unforgeable, and reliable source of person recognition because the retinal blood vessel pattern hardly ever changes during a person's life. The retina is located in the back of the eye, which makes it beyond threats posed by the external environment. The retina is stable and has distinctive features that can be extracted from the vascular structure. Retina verification and identification processing times are short due to the small size of the retina's features Ong, Xu, Wang & Liu (2015) Kodituwakku (2015). Figure 5 shows an image of the retina.

The retinal authentication system is based on the unique blood vessel pattern of the retina. This system is performed in three main steps: image acquisition, feature extraction, and feature matching. In image acquisition, the retina is captured using a fundus camera. To capture the eye image, a user must position his or her eye close to the camera. The retinal scanner contains a retinal camera. The retinal scanner uses a low-power infrared laser to scan the retinal image. Then retinal the camera identifies information patterns on retinal blood vessels. At the feature extraction stage, the retina image is analyzed to extract the various features from the blood vessel structure. These features are unique for each individual and stored as a reference pattern. After extracting the retinal image features, they are matched with the prestored template in the database depending on some criteria. If the criteria result in a match, then the person is authenticated Mazumdar & Nirmala (2018).

Despite significant recent advances in the field of retinal recognition, the use of this method is restricted by some challenges (e.g., retinal characteristics can be changed due to certain diseases). On the other hand, retinal scanning technology cannot perfectly read the retinal structure of people wearing glasses or contact lenses. In addition, some people have concerns about putting their eye close to the light source and the high cost of the devices used to capture the retinal images Kodituwakku (2015), Mazumdar & Nirmala (2018).

Retina authentication is an unfavorable method, especially in M-payment. Retinal scanning requires a user to be close to the eye scanner and look into a given point. If the user wears glasses or contact lenses, then he or she has to remove them and get close to the eye scanner. Some people have concerns that this is not practically convenient. On the other hand, retinal recognition devices are expensive, and they are relatively large. This restricts the use of retinal recognition in M-payment according to Priya (2017). However, this method has been replaced by iris scanning Kodituwakku (2015).

Digital Signature

Digital signature is a biometric verification method presented as a signature, which is a "notable variability even between successive realizations" (Galbally, Cabrera, Ferrer, Barrero, Morales & Fierrez , 2015, p. 2921-2934) . It is one of the biometric traits that people learn to produce Galbally, Cabrera, Ferrer, Barrero, Morales & Fierrez (2015). A handwritten signature has a widespread and global use either in business, banking, companies, schools, etc. Patel, Desai, Desai and Damani (2018). Digital signature is an attractive biometric authentication method that has social and legal acceptance Morocho, Morales, Fierrez & Garcia (2017). This acceptance is because people used to use handwritten signatures before the evolution of the technology and due to the ease of acquiring a handwritten signature Galbally, Cabrera, Ferrer, Barrero, Morales & Fierrez (2015). Figure 6 shows two examples of signature comparisons.

Comparing a handwritten signature with its sample previously taken on paper is the traditional way of verifying a signature. This traditional technique is time consuming and error-prone. Nowadays, this method is done by technology. It can be operated in either static or dynamic modes. Static mode is done by recognizing the handwritten signature from paper by an optical scanner or camera. After that the biometric system analyzes and then recognizes the handwritten signature. This mode is also called the off-line mode. On the other hand, dynamic mode is done by the user writing a signature on a tablet device or a Personal Digital Assistant (PDA). After that the recognition system on the digital device (tablet, Personal Digital Assistant (PDA), smartphone, etc.) will recognize the signature. This mode is also called the online mode Patel, Desai, Desai and Damani (2018).

Static and dynamic modes use five steps: preprocessing, feature extraction, matching, verification, and output. In preprocessing, signatures are scanned in gray. This phase aims to standardize and get the signatures ready for feature extraction. Scaling of the signature will be applied as well as background elimination, noise reduction, width normalization, and skeletonization. After preprocessing, the feature extraction phase extracts the inputs of the training phase. These features provide information about specific cases of the signature shape, information about directions of the lines of the signatures, and overall signature appearance information. After the feature extracting phase, the recognition system matches the template image with the input image and finds similarity between them. In the verification and output phases, the recognition system verifies whether the template image and the input image are related to the same person. After that the result is shown on the screen as an output that shows whether the signature is verified Patel, Desai, Desai and Damani (2018).

The digital signature method has relatively slow performance compared to the other authentication methods (e.g., face recognition, iris scanning, and fingerprint recognition). This slow performance has many causes, such as the higher difference among samples of the same individual compared to that of physiological biometric traits that people are born with. With this low performance the accuracy of recognition systems will decrease over time Galbally, Cabrera, Ferrer, Barrero, Morales & Fierrez (2015).

Signature verification is a highly accepted verification method. The reasonable accuracy in operating signature verification devices are an important factor that allows the digital signature to be one of the favorable M-payment methods Priya (2017)

Discussion

This review paper aimed to determine the most appropriate biometric authentication method that can be used with M-payment. In the previous section, we have presented the most common biometric authentication methods, how they work, challenges, and their compatibility with M-payment. This section will discuss the most appropriate biometric authentication method in M-payment.

Many biometric authentication methods can be built and used in mobile devices and M-payments. To compare and determine the most appropriate method, three factors will be considered. The user preference factor is adopted from Chhabra & Dutta (2016), biometric authentication method accuracy is adopted from Ghorbani, Alizadeh, Omran, & Asem (2018) and M-payment usability of this authentication method is based on reading many research papers. Table 1 illustrates how these factors vary for various types of biometrics:

As shown in Table 1, we can recognize that fingerprinting is the most appropriate authentication method with M-payment because it has very high accuracy and is accepted and preferred by users. It is easy use in M-payment because no external special hardware is needed to authenticate users, especially because new smartphones have built-in fingerprint readers.

Face recognition is also considered an appropriate authentication method with M-payment because the authentication can be done with a normal smart phone camera. Iris scan has good security authentication and high accuracy but, in our case, it is not usable with M-payment because it requires a special camera for scanning and authenticating, same as retina geometry.

Despite the user acceptance of this authentication method, it still not a favorable one because of the time consumed in processing signature authentication. This excludes digital signature authentication from the list of the most suitable M-payment authentication methods.

Conclusion and Open Research Topic

The main goal of this paper was to review and present common biometric authentication methods, then determine the most appropriate methods that can be used in M-payment. The evaluation of authentication methods was based on three factors: user preference, accuracy, and usability with M-payment. After evaluation, we recognize that fingerprint scanning is the most appropriate authentication method with M-payment.

Biometric authentication in M-payment is a rich area for research. Combining fingerprint authentication with other biometric authentication methods will provide a good contribution in this area. There is also a gap in hand geometry authentication in M-payment research that can be considered as a topic for future research.

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Table 1: ***How Factors are Vary for Different Types of Biometrics***

Biometrics	User preference	Accuracy		Usability on M-payment
Finger print	High	Very high	99.9%	Very high
Face recognition	Medium	High	95%	High
Iris	Medium	Very high	99.9%	Medium
Hand geometry	Medium	High	95%	Low
Retina geometry	Low	High	99%	Low
Signature	Low	Medium	90%	Low

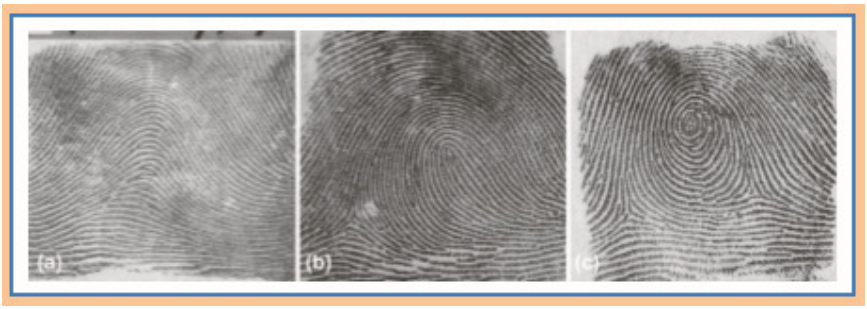

Figure 1: Fingerprint pattern. ***From*** **"Fingerprint Matching,"** ***Feng & Nandakumar (2010), Fingerprint matching,*** **43(2) p.36-44.** ***2010 by IEEE.***

Figure 2: Example images from a dataset for six identities with variations in appearances. ***From "Deep Face Recognition," by Parkhi, Vedaldi & Zisserman 2015,*** **Deep Face Recognition,** ***1.(3), 2015 by PMVC.***

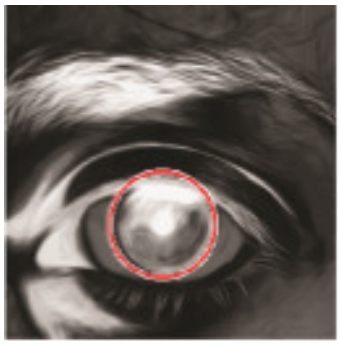

Figure 3: An iris scan of an eye. From "Smartphone Based Visible Iris Recognition Using Deep Sparse Filtering," by Raja, Raghavendra, Vemuri & Busch, Year of 2015, Smartphone Based Visible Iris Recognition Using Deep Sparse Filtering, 57,p. 33-42. 2015 by Pattern Recognition Letters.

Figure 4*:* Hand Geometry Scanner. An Image of the Retina. From "Biometric Authentication: A Review," by Bhattacharyya, Ranjan, Alisherov, & Choi, 2009, *Biometric Authentication: A Review,* 2(3), p.13-28. 2009 by International Journal of u-and e-Service, Science and Technology.

Figure 5: An Image of the Retina. From "Biometric Authentication: A Review," by Bhattacharyya, Ranjan, Alisherov, & Choi, 2009, Biometric Authentication: A Review, 2(3), p.13-28. 2009 by International Journal of u-and e-Service, Science and Technology.

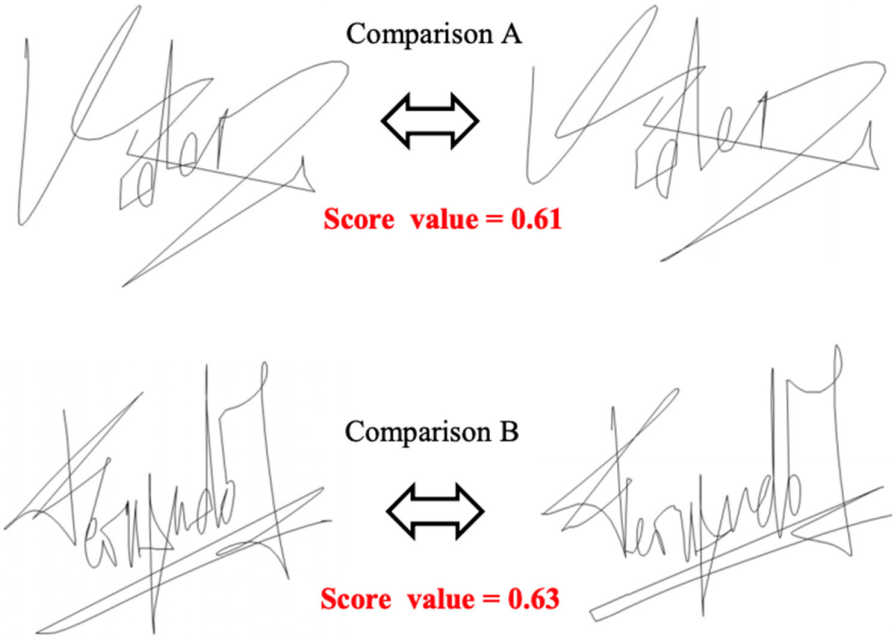

Figure 6: Two Examples of Signature Comparisons. From "Humans in the Loop: Study of Semi-Automatic Signature Recognition Based on Attributes," by Morocho, Morales, Fierrez, & Ortega, 2017, Humans in the Loop: Study of Semi-Automatic Signature Recognition Based on Attributes, Volume No.(Issue No.), p. 1-5 2017 by International Carnahan Conference on Security Technology (ICCST).

Labour Market Integration in An Enlarged European Union

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Abstract

The European economic integration process was both necessary and beneficial for all the actors involved, reshaping for long run the global economic and political landscape. One of the most complex and pressing challenge for the European Union is to maintain an appropriate level of economic, social and territorial cohesion between its Members. In an increasingly interdependent world where it is difficult to maintain the status of global economic actor, the European Union needs more than ever a high level of convergence both between states and regions and within them. As the process of European economic integration has entered a new stage, the variables on which the prosperity-generating process is currently dependent are different. The Member States of the European Union need solidarity, a vital principle of integration that has been increasingly challenged in recent years. Sustainability, vital to any public policy, means economic efficiency, social responsibility and ecological resilience. Real convergence, complementary, but much more complex than the nominal one, depends on many macro and microeconomic variables. In this paper, we have tried to study economic convergence in the European Union by taking into consideration two labour market determinants: labour productivity and labour costs. In this respect, we have compared the evolution of productivity and also calculated the ratio between these two determinants. Our study suggests that the labour productivity surpassed the costs between 2000 and 2018 at aggregate level. However, the analysis of New Member States and Old Member States clusters illustrates divergent trends in the labour market. Our results show that in the upcoming years, the labour costs will increase with a higher pace than productivity, which could also hamper the integration of the labour markets between the Member States.

Keywords: European Union, Central and Eastern Europe, economic convergence, labour market integration, labour costs, labour productivity.

Introduction

In the last decades, the process of economic integration at European level has offered many useful lessons to the international community, but it has also left some societal members expectations unfulfilled. The whole integration process, whether we analyse the deepening component (the evolution from the customs union stage to the one of economic and monetary union) or the enlargement one (increasing the number of Member States from 6 to 28), had as vital macroeconomic prerequisite convergence. The European Union is a synergistic interstate architecture that targets both the unity of the markets of goods (goods and services) and the factors of production (capital and labour) placed in a new societal paradigm. In this new paradigm, analysts have focused not only on income as the main determinant of the economic convergence, but also on other dimensions, including the integration of the labour market variables. The main purpose of this paper is to study convergence between Member States, taking into consideration the integration between the national labour markets. In this respect, we have analysed convergence by taking into consideration three dimensions: a) aggregate – all the Member States; b) cluster – Old Member States (EU 15) and New Member States (EU 13) and c) individual Member States. We have focused our study on two main determinants - labour productivity and costs - and we have analysed the evolution of the ratio between these indicators.

Literature Review

Throughout the entire process of the European economic integration, one of the main objective aimed the convergence of economic performance between countries and regions. Conceived initially almost exclusively on its economic component, the process of increasing the level of convergence has expanded to include the social and ecological components. For this reason, lately the researchers and decision-makers have expanding the scope of real convergence by including the labour market indicators such as the compensation of employees, the labour productivity and costs or the employment rate both at national and regional level. Marelli and Signorelli (2010) considered that in the short term, convergence implies catching up in terms of output or input determinants, while in the long term, it assumes the reduction of the structural differences between economies.

With the accession of the countries from Central and Eastern Europe, analysts started to be interested in studying the evolution of the labour market determinants. Reaching similar levels of labour productivity, costs, wages or unemployment rate is considered nowadays by some voices an important objective of the European Union that may enhance the cohesion between the Member States. Consequently, not only GDP per capita is relevant in the analysis of the economic convergence, but also the integration of the labour market. Some analysts have studied the evolution of individual determinants (Niebuhr and Stiller, 2004; Mora et al., 2005; Martino, 2015; Naz et al, 2017), while other were interested in identifying potential links that may exist between the labour market indicators (Duarte and Restuccia, 2010; Pasimeni, 2018) or between the labour market indicators and other economic variables (e.g. the relationship between nominal criteria and real determinants, including the labour market - Šaroch et al., 2005; Soukiazis and Castro 2005; Tokarski, 2019.

Tokarski (2019) studied nominal and real convergence in three founding Member States - Germany, France, and Italy. In the field of real convergence, the analyst focused on competitiveness, income level and labour market indicators. Tokarski concluded that the rigidity of the labour market has increased the economic divergence between the Member States. From a different point of view, Soukiazis and Castro (2005) were interested in studying the link between the Maastricht criteria and the Stability and Growth Pact and the real convergence within the European Union. Soukiazis and Castro investigated if these measures aiming nominal convergence also affected the real dimension, mainly the productivity, the living standards and the employment. According to the researchers, the criteria regarding inflation was the only variable that negatively influenced the increase in labour productivity. From the perspective of Šaroch et al. (2005), the Maastricht criteria overestimate the importance of monetary and financial indicators, disregarding the real economic determinants.

Mora et al. (2005) studied the convergence of wages, labour productivity and costs between 1981 and 2001. In this respect, analysts have identified that the discrepancies in terms of nominal wages and labour costs decreased, but not in the case of real wages and productivity. According to Mora et al., the process of stagnation, which debuted in 1997, suggests that the introduction of the common currency did not had a crucial role in role in the wage convergence. Naz et al. (2017) was also interested to test the hypothesis of wage convergence, but at regional level. In this respect, analysts have found evidences for wage convergence in all the European regions, which tends to be absolute rather than conditional. The tendency of wages to reach their own equilibrium state can be explained by the restructuring process of the labour market and by the individual characteristics of the local markets (e.g. the role of public institutions).

Martino (2015) studied the evolution of labour productivity during 1991-2007 in the European Union's regions. In this respect, the analyst identified the existence of the absolute convergence process in financial, real estate and business services, which may have been catalysed by the liberalization of the capital markets. In contrast, in the case of the manufacturing sector and of the transport, communications and distribution services, the analysts didn't identified convergence of the labour productivity. The study of Martino suggest that productivity gaps have constantly increased in the last years, mainly between so-called central and peripheral countries.

At the same time, Naz et al. (2017) rejected the hypothesis of wage convergence between border regions. Consequently, the analysts consider that the reduction of physical and administrative borders, often from the "grey area", is not sufficient in order to integrate the labour markets. Similar, Niebuhr and Stiller (2004) studied the catching-up process in terms of income and unemployment rate in the border regions of the European Union. In this respect, the analysts pointed out that although the abolishing of the formal barriers within the internal market should have facilitated the integration of the border regions, informal barriers still obstruct the convergence of labour markets.

Pasimeni (2018) studied if the increasing of labour productivity was accompanied by the growth of productivity for European Union and other developed countries from 1970 to 2017. The analyst identified a strong relationship between labour productivity and compensation in the advanced economics. However, it seems that productivity gains are not always reflected in the increase of wages. In the European Union, an increase of productivity growth with one percentage point was translated into the rise of compensation with 50 – 60%.

From another perspective, Duarte and Restuccia (2010) investigated the link between productivity and structural transformations. The results of the study suggest that structural transformation can lead to a stagnation or slowdown of the economic performances, with the relocation of the labour force from industrial to services sector. The authors identified that the productivity gaps between countries are significant in the case of the primary and tertiary sectors and smaller in the case of the secondary one. Furthermore, Duarte and Restuccia pointed out that productivity catching up in the secondary sector determines aggregate gains between countries of 50%. In contrast, the lack of productivity in the tertiary sector determines a process of regression or decrease of aggregate performances between countries.

Methodology and Results

The main purpose of our paper is to study the integration of the labour markets at Community's level. In this respect, we have studied the labour market determinants from three main perspectives. Firstly, we have compared the aggregate evolution of labour productivity and costs in the European Union between 2000 and 2018. Then, we have focused on the performances of two cluster of countries: a) EU (15) which comprises the founding Member States and the countries that joined the European Union in the 20th century and b) EU (13) which included the New Member States that joined the regional group in 2004, 2007 and 2013. Lastly, our analysis takes into consideration the individual performances of the 28 Member States in 2018. The results of our study are presented below:

Figure 1 compares the evolution of the real labour productivity per person with the nominal labour costs per person between 2000 and 2018, also illustrating the ratio between these two determinants. According to our analysis, the productivity per person at aggregate level surpassed the labour costs between 2000 and 2018 and the ratio varied between 1.07 in 2000 and 1.02 in 2018. However, the values of the labour unit costs tend to increase with a higher pace then labour productivity (with 22% between 2000 and 2018, comparing to 16%), which suggest that the ratio between them could equalize in the upcoming years.

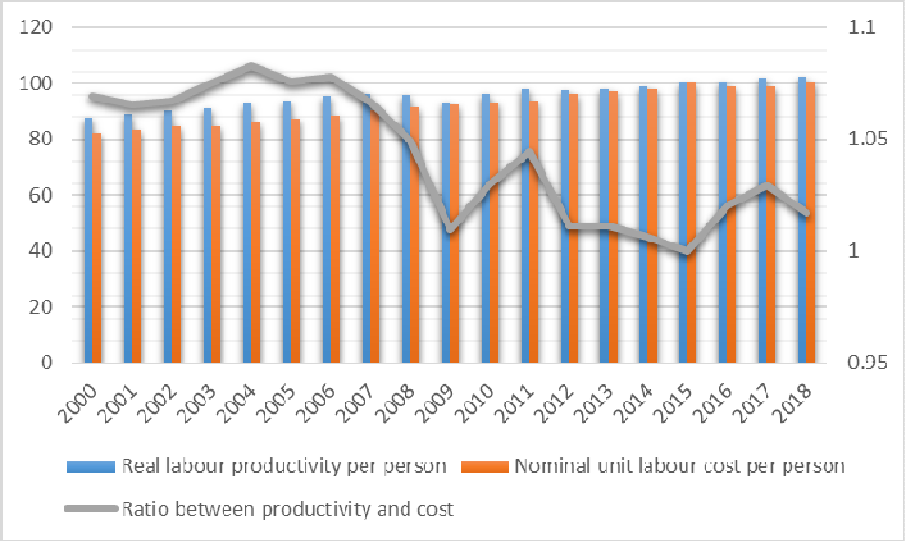

Fig. 1: The evolution of the labour productivity and labour cost per person in the European Union between 2000 and 2018

Source: Authors' processing based on data provided by Eurostat

Another purpose of our paper was to identify if the indicators of the labour market have similar evolutions or by contrast, are diverging. Consequently, in this section, we have tried to compare the evolution of the labour market determinants in the EU (15) – Old Member States, with those experienced by EU (13) – New Member States.

In this respect, Figure 2 illustrates the values of labour productivity and costs and the evolution of the ratio between these two indicators between 2000 and 2018. The labour productivity per person increased with 30% at Community's level, while in the EU (15), the cluster that comprises the Old Member States, only with 13%. According to the data provided by Eurostat, the labour costs almost doubled between the 19-year period at Community's level. In the EU (15) cluster, the labour costs surpassed the productivity as the former increased with 32% and the latter only with 13%. The productivity-cost ratio was until 2008 above par, while since 2009, labour costs have surpassed the labour productivity.

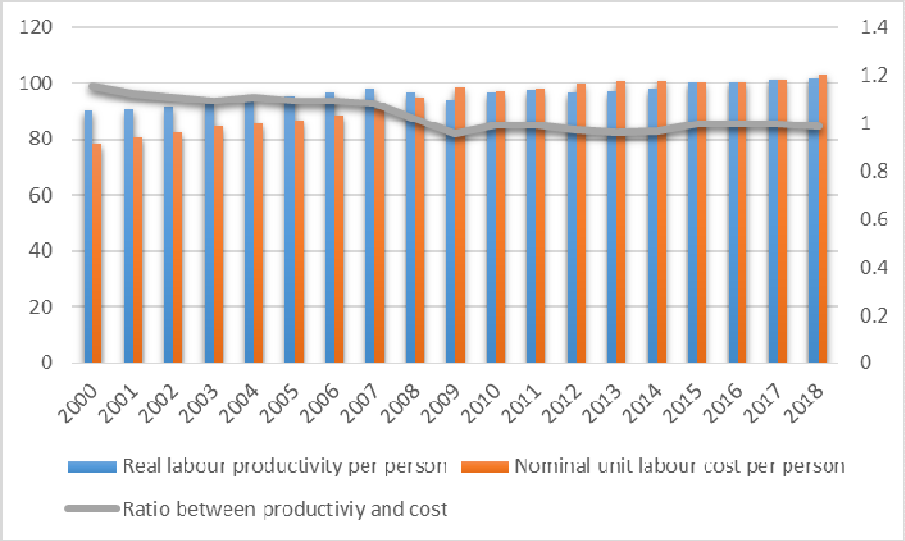

Fig. 2: The evolution of the labour productivity and costs in EU (15) between 2000 and 2018

Source: Authors' processing based on data provided by Eurostat

Figure 3 shows the evolution of the labour productivity and costs in the EU (13), which comprises the New Member States. The EU (13) cluster experienced a significant increase of labour productivity of almost 56%. Consequently, we identified divergences between the two clusters of countries in terms of labour productivity: while the Old Member States recorded a modest increase during the 19-year period, the New Member States improved with more than a half the value of this indicator. However, the increase of labour costs (with 75%), surpassed the growth in productivity. This trend suggests that the labour market at Community's level is still not integrated and convergence of economic performances remains an objective to achieve in the future. Consequently, until the outbreak of the economic and financial crisis, the labour productivity per person was above the labour costs.

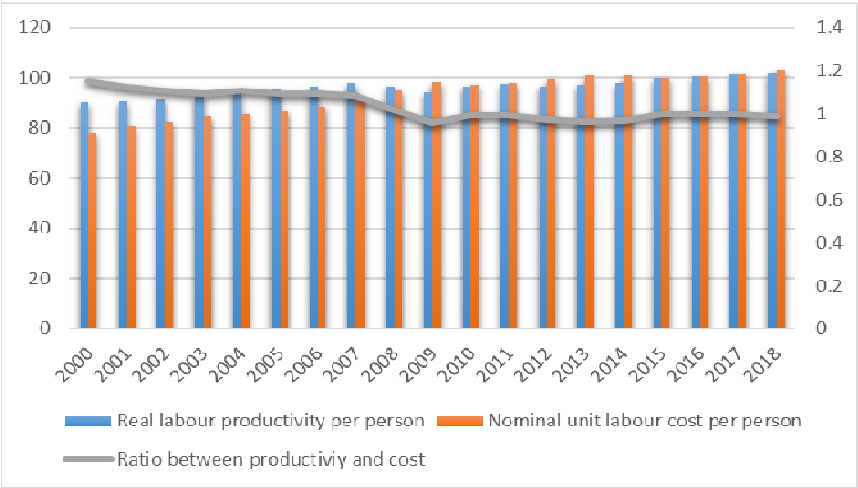

Fig. 3: The evolution of the labour productivity and costs in EU (13) between 2000 and 2018

Source: Authors' processing based on data provided by Eurostat

Figure below illustrates the labour productivity and costs, based on the data provided by Eurostat for the 28 Member States in 2018. The highest values of real labour productivity per person were recorded by Slovenia (115), Greece (110), Ireland and Lithuania (109). By contrast, the smallest rates of productivity were experienced by Hungary (99.3) and Spain (99.5) in 2018. As far as the nominal labour unit cost per person are concerned, the highest values were recorded by Czech Republic (118.3), Luxembourg (116.5) and Ireland (114), while the lowest by Italy (97.2) and Sweden (97.2). The ratio between productivity and costs was equal or above 1 for Greece, Italy, Sweden, Portugal, Belgium, Latvia, Germany, France and Croatia. For the rest of the European Union's Member States, the ratio was below par, which suggest that the labour costs surpassed the labour productivity.

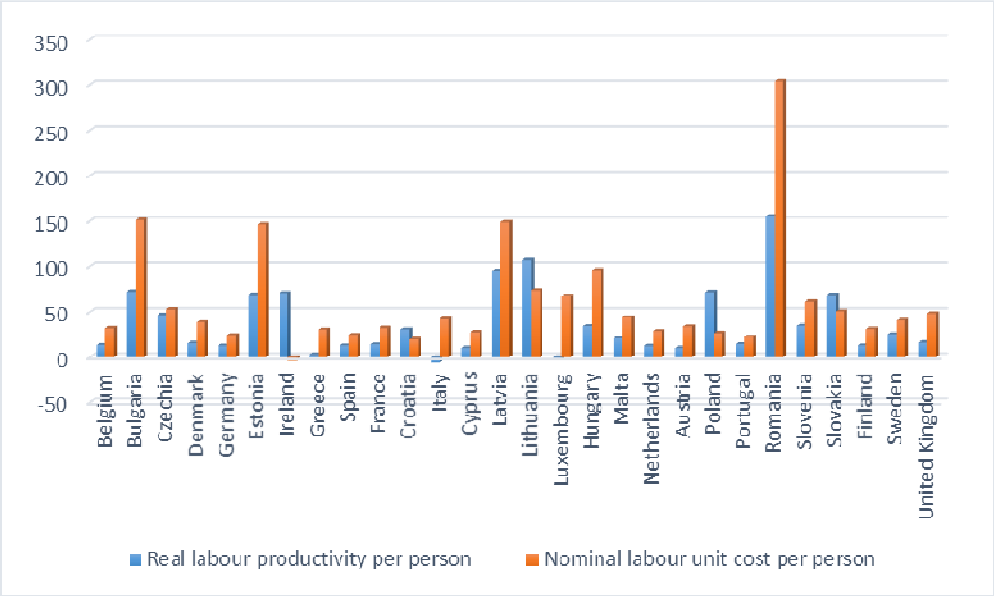

Fig. 4: The evolution of the labour productivity and costs in the Member States in 2018

Source: Authors' processing based on data provided by Eurostat

Conclusions

The main objective of this paper was to study convergence in the European Union, taking into consideration the most relevant labour market determinants. Including in our panel data referring to labour productivity and costs for all the Member States between 2000 and 2018 and measuring the productivity – cost gap for European Union, but also for two cluster of countries: Old Member States and New Member States, the authors obtained a more complete picture of the developments that have taken place in the real convergence plan. In this respect, we have illustrated that although at aggregate level, the labour – cost ratio is still above par, the costs tend to rise at a higher rate than the productivity. Moreover, the cluster analysis suggests that both in the Old Member States and the New Member States group, costs with the labour factor increased faster than productivity. The analysis of the individual Member States in 2018 confirms that for the most of the Member States, the costs have surpassed productivity. This trend could not be sustainable on long term and could pose into question the objective of integration of the labour markets. Consequently, European decision-makers should adopt measures in order to strengthen the cohesion between the national labour markets and the productivity of the labour factor.

Acknowledgment

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Determinant Factors of Citizens' Satisfaction with Municipal Services: the Case of Municipalities on the Island of *São Nicolau*

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Abstract

This study aimed to find out residents' degree of satisfaction with local public services provided by local authorities. It also intended to identify the determinants of citizens' satisfaction. The research adopted a quantitative approach, through the application of a questionnaire survey to residents in the municipalities of *São Nicolau* in Cape Verde. Globally, citizens are satisfied with the municipality where they live. For the variables of Global Satisfaction with the municipality of residence and Global Satisfaction with the financial management of the local authority, there are no differences by the municipality of residence regarding citizens' satisfaction. As both are located on the island of *São Nicolau*, in principle, there should be no discrepancy in their form of action due to characteristics associated with insularity. Citizens' satisfaction is influenced positively by the Image of the Municipality, Quality of Basic Infrastructure and Services and Quality of Life in Leisure, Access to Culture, Environmental Quality and Safety. Quality in Economic Terms, on the other hand, seems to have not influenced the citizen´s satisfaction.

Keywords: Citizens' satisfaction, Local government, Public services, Municipalities.

Introduction

Local authorities, being the entities closest to citizens for service provision, pay increasing attention to matters such as the quality of life and services, citizens' satisfaction, and responding to citizens' demands and expectations. Citizens' level of satisfaction, their experiences and perception of local services and the performance of those in charge affect local authorities' success either positively or negatively.

Local development as a whole can only be considered when a significant improvement in citizens' lives is confirmed. Local Administration must invest in the results, control and assessment of processes, in defining objectives and in satisfying the recipients of public services (Sá, 2003).

The quality of services provided together with the citizens' satisfaction with the situation in Cape Verde has been a great challenge for local leaders.

This research aims to determine residents' satisfaction with their local authority, by analysing a set of aspects that characterise their area of residence and represents an assessment of the work done by town halls in Cape Verde to stimulate, grow and develop their council areas.

The study is extremely relevant in that it can reveal and assess residents' satisfaction with their local authority, analysing several aspects that characterise it, and providing leaders of the councils studied with instruments to discuss and assess local public policies.

Following this introduction, the article presents four more sections. The second presents the theoretical framework on the topic. The following one presents the study domain, the measurement scales and the data-collection instrument. Then the data-collection instrument is characterised, together with the analysis procedures, sample selection and consequent data treatment. Next, the data gathered are presented and analysed, with discussion and interpretation of the results and identification of the determinants of residents' satisfaction. Finally, the last section presents the main conclusions of the study.

Literature Review

Today, citizens have a range of services available to them. However, these are no longer distinguished by their quantity, but rather by their quality and how the services are provided.

A service is public when it has direct or indirect State intervention and is in the public interest.

According to Caupers (2001, p.116), public services are organisational structures responsible for preparing and carrying out the decisions of collective organs operating in Public Administration. The concept of public service, according to Soares (2002), covers institutions, services and systems in which leaders or managers intend to obtain citizen-oriented results, following government policy through harmony with objectives and goals already defined.

Shvoong (in Silva, 2012) defines public service as what Public Administration provides to society and is considered essential for the survival of the social group and the State itself, such as policing and public health services. However, the author also considers that Public Administration provides society with other types of services, either directly or indirectly, following rules or on their orientation, for example, public transport and electricity (Shvoong in Silva, 2012).

The concept of satisfaction is closely linked to the customer, the institution and the service provided. A growing multiplicity of services is available to citizens. However, demanding citizens are no longer interested in the quantity, but rather in the quality of the service and the satisfaction it brings.

Kotler (2000) argues that the consumer's satisfaction or dissatisfaction is characterised by the feeling of pleasure or dislike, resulting from a service received compared to the expectation. Consumers will be dissatisfied if the product/service is far from their expectations, whereas if performance exceeds their expectations, they will be satisfied (Kotler, 2000).

In the case of Public Administration, Carapeto and Fonseca (2005) consider that measurement of users' satisfaction is essential to promote participation in continuous improvement of Public Administration's provisions and determine recipients' perspectives so that the public sector can define techniques that correspond to what citizens expect.

For local authorities to provide their residents with a quality service, they need to know their real needs and expectations, something which is not always easy to determine.

Increasingly active and demanding citizens have made the State's role in the relationship more complicated. Consequently, public service feels obliged to bank on quality with more significant concern about performance and the characteristics of the service provided, making it imperative to transform the culture of Public Administration, and in particular Local Authorities, the level of Administration that is closest to citizens. It must invest in the results, control and assessment of processes, in defining objectives and in satisfying the recipients of public services (Sá, 2003).

Different governments have been creating alternatives for modernisation, implementing measures aiming for a more modern, efficient Public Administration, able to respond to citizens' needs and seeking to satisfy new public management. The modernisation of Public Administration is based primarily on implementing new management practices taken to be international success references, where one of the priorities is the promotion of service quality (Gomes, 2014).

Innovations in Public Administration imply seeking efficiency and quality in public service provision (Gonçalves et al, 2002). Pereira (2000) points out that considering citizens as customers means giving them due attention, respect and attending to their needs.

According to Furtado (2007), local authorities are becoming prominent in configuring Public Administration and the very structuring of the State, playing a fundamentally important role in formulating and implementing development policies with direct impacts on the resident population in their territories.

Fontoura (2013) believes that local governments now act in an increasingly competitive and dynamic environment, which means that local authorities must work with more precision and determination to satisfy residents' needs. The author adds that if this does not happen, residents are forced to seek local authorities with services that meet their needs and provide them with better living conditions (Fontoura, 2013).

Method: Study Scope, Measuring Scales, Data Collection and Sample

The previous study in the field of citizen satisfaction with public services has for example been interested in the relation between trust and satisfaction (e.g., Van Ryzin, 2007, Morgeson and Petrescu, 2011), the role of expectations in the formation of satisfaction (e.g., James, 2007, Morgeson, 2012, Jacobsen, Snyder, and Saultz ,2014), satisfaction with specific services (e.g., Favero and Meier, 2013; Jacobsen, Snyder, and Saultz ,2014), and citizen satisfaction as indicators of service quality (e.g., Giannocarro, et al, 2008).

This study aims to ascertain residents' satisfaction with their local authority, seeking to analyse several aspects characterising that council. Citizens measure the quality of the services provided by local authorities, thereby allowing assessment of the level of satisfaction with services. From the citizen's perspective, it aims to analyse/identify:

- citizens' image of their local authority;
- the quality of necessary infrastructure and services provided by the local authority;
- quality of life, in terms of leisure, access to culture, environmental quality and safety, provided by the local authority;
- citizens' opinion about some aspects related to the cost of living and other economic aspects;
- the factors residents value in assessing their satisfaction with the local authority, including evaluation of the work done by municipal bodies with local authority responsibilities.

This study defines a municipality as the local authority of residence and concerns assessment of the work done by town halls to stimulate, grow and develop their council areas. The subject of study is residents on the island of *São Nicolau* in Cape Verde, in the local authorities of *Ribeira Brava* and *Tarrafal de São Nicolau.*

Considering the objectives defined and the literature review performed, in order to respond to the latent variable (Citizen satisfaction), the following dimensions will be considered: 'Local Authority Image', 'Quality of Basic Municipal Infrastructure and Services', 'Quality of Life in Economic Terms' and 'Quality of Life in Terms of Leisure, Access to Culture, Environmental Quality and Safety'.

When it comes to data collection, it was used a survey based on the questionnaire by Machás in Ralha et al (2015). In order to complete the questionnaire, two criteria were required of the citizen-resident: a) being officially resident in one of the two councils (*Ribeira Brava* and *Tarrafal de São Nicolau*) and being at least 18 years of age.

The first five questions aimed to gain citizens' perception of their local authority's image. In order to measure each item, a five-point Likert-type scale was used, from 1 – Completely disagree (CD) to 5 – Completely agree (CA).

The variable of 'Quality of Basic Municipal Infrastructure and Services' concerns the aspects most related to the quality of necessary infrastructure and services in education, health, sanitation and basic public services and local authority services (in a total of four indicators). Similarly to the previous items, a five-point Likert-type scale to measure each item, from 1 – Completely disagree (CD) to 5 – Completely agree (CA).

To measure the variable of 'Quality of Life in Economic Terms, ' four indicators were defined. Construction of this variable intends to measure residents' opinion of the quality of life in their local authority versus the cost of living there. The objective is also to determine residents' perception of aspects related to the local authority's potential to create jobs and opportunities for them, relevant aspects of the council's attractiveness. A five-point Likert-type scale was used to measure this variable, with 1 meaning 'Very Bad' and 5 meaning 'Very Good' (1 – Very Bad (VB), 2 - Bad (B), 3 - Reasonable (R), 4 - Good (G) and 5 – Very Good (VG)).

The fourth question intends to measure the 'Quality of Life in Terms of Leisure, Access to Culture, Environmental Quality and Safety'. This aspect represents the quality of life in the local authority regarding the environment – environmental quality, access to and provision of cultural or leisure events and provision of other commercial and service activities. Regarding the construction of the variable, five indicators were considered, measured on a five-point Likert-type scale, as in the previous variable. The fifth and sixth questions assess residents' global satisfaction with their local authority in general, and regarding the work done by the council concerning the financial resources available. A five-point Likert-type scale was used to measure each item, from 1 – Very dissatisfied (VD) to 5 – Very satisfied (VS).

The seventh question aims to find out residents' opinion concerning the fulfilment of their expectations of satisfaction with the local authority. The question was measured on a five-point Likert-type scale, presenting the following information:

1 – Very far from ideal and from expectations (VFI),
2 – Far from ideal and from expectations (FI),
3 – N eutral (N),
4 – Close to representing the ideal and meeting almost all expectations (CI) and 5 – Represents the ideal and meeting all expectations (RI).

The fifth, sixth and seventh questions allow construction of the 'Citizen Satisfaction' variable, formed of three indicators:

- Citizens' Global Satisfaction with their local authority in general, as the place of residence;
- Global Satisfaction with local public entities' management, in improving the local authority;
- Local authorities' Fulfilment of Expectations of Satisfaction, considering their financial capacity and resources.

The last set of questions (six in total) are socio-demographic, concerning gender, age, occupation, marital status, educational qualifications and respondents' gross monthly income.

Given the impossibility of studying the whole population resident in the local authorities, it was decided to select a random sample, giving residents equal opportunity to be part of it.

Some questionnaires were applied face-to-face and others were left in public institutions for voluntary completion, between February and May 2018. A total number of 723 questionnaires were applied, approximately 56,4% of the population. In obtaining 723 questionnaires, sample error was 3,55%, assuming a 95% level of significance, making the sample representative of the universe studied. The sample was intended to be representative of the population of the island. In a universe of 12.818 inhabitants, 50,5% of the sample live in *Ribeira Brava* and 49,5% in *Tarrafal de São Nicolau*.

Data analysis and Results

Analysis of Participants' Characteristics

As for the gender variable, of the 721 responses to the questionnaire, 394 (54,5%) were male and 327 (45,2%) female. It was, therefore, concluded that the majority of residents in *Ribeira Brava* and *Tarrafal de São Nicolau* are male. Concerning age, 11,6% of residents are 18, 14,8% between 19 and 24, 27,4% between 25 and 34, 27,2% between 35 and 44, 10,8% between 45 and 54, 4,7% between 55 and 64 and 3,5% are 65 or older. So the largest number of residents of *Ribeira Brava* and *Tarrafal de São Nicolau* is between 25 and 34, followed by the 35 to 44 age-group. Regarding the level of education, 36,2% of residents have completed secondary education (12th year/equivalent), followed by higher education – 15,6% with a degree, basic education – third cycle (9th year) with 13,7% of residents, basic education – second cycle (6th year) with 13,6%, basic education – first cycle (4th year) with 12,9%, higher education – diploma with 6,9%, higher education – master with 1%, and higher education – PhD with 0,1%. As for marital status, most residents in *Ribeira Brava* and *Tarrafal de São Nicolau* are single (60,6%), 31,7% are married or live in a civil partnership, 4,3% are divorced or separated, and 3,5% are widowed. 45,8% of residents in *Ribeira Brava* and *Tarrafal de São Nicolau* are employees, 17,6% are students, 15,1% are self-employed, 12,7% are unemployed, 5,4% are retired, and 3,5% are housewives. In relation to the variable of individual gross monthly income (rather than that of the household), 35,3% of residents in *Ribeira Brava* and *Tarrafal de São Nicolau* have no income, 19,1% have an income between 181,38€ and 362,75€, 15,2% receive between 362,76€ and 498,79€, 10,5% receive between 55.000€ and 770,86€, 10,1% between 104,29€ and 181,37€, 4,6% up to 99,76€, 3,2% between 770,87€ and 906,90€, and 1,9% receive 906,91€ or more.

Perceptions of Citizen Satisfaction

This section makes an exploratory, descriptive analysis (frequency, mean and standard deviation) of groups one to seven on the questionnaire. These groups of questions intended to measure citizens' satisfaction with their local authority (*Ribeira Brava* and *Tarrafal de São Nicolau*). Whenever mean values are above three points, there is a level of agreement with the variable studied; mean values under three points indicate disagreement with that variable.

Regarding the variable of 'Local Authority Image':

- To the statement "It is a local authority with great visibility (it is known in Cape Verde, spoken about on the news, because of its culture, gastronomy, size, tourism)" respondents' answers do not agree with the item (2,89 mean; 0,754 standard deviations).
- To the statement "The local authority has become more modern (i.e., the introduction of more modern services, new cultural activities, technology etc. is noted)", residents have a negative opinion (2,60 mean; 0,784 standard deviations), with 6,8% indicating "Completely disagree" and 37,2% "Disagree".
- Regarding "The local authority is relevant nationally (i.e., it contributes to the country's Gross Domestic Product (GDP), being important for the national economy...)", residents give negative answers (2,64 mean; 0,793 standard deviations), with 8% indicating "Completely disagree" and 30,7% "Disagree".
- The statement of "The local authority has developed (i.e., it has grown in population, the number of houses, tourism,...)" presents little agreement (2,97 mean; 0,816 standard deviations), i.e., 5,9% "completely disagree", 14,7% " Disagree" and 57,5% are "Neutral".
- To the statement of "This is a local authority where people live well (i.e., where citizens/residents have a quality of life)" (3,16 mean; 0,871 standard deviations), residents agree with this item, with 52,4% indicating "Neutral", 27% "Agree" and 5% "Completely agree".

The results obtained for the variable of 'Quality of Basic Infrastructure and Services' show that:

- Residents responded positively to the statement "Teaching: Quality of schools and teaching, young people's access to education (primary, secondary), quality of school facilities" (3,52 mean; 0,802 standard deviations), with 51,3% indicating "Agree" and 6,1% "Completely agree".
- As for "Health: Quality of local Health Centres, access to Hospitals, and health services generally, availability of medical services (appointments, emergencies,...)" (2,36 mean; 0,770 standard deviations), residents have a negative opinion, with 10,9% stating "Completely disagree" and 48,7% "Disagree".
- Residents' answers to "Sanitation and basic public services: Quality of public services (water, sanitation, energy, rubbish collection/treatment,...)" show agreement with the item (3,38 mean; 0,843 standard deviations), with 43,2% indicating "Agree" and 5,4% "Completely agree".
- To the matter of "Municipal services: Quality of municipal service in dealing with residents, good service, professionalism,…, Townhall,…", residents responded positively to this item (3,56 mean; 0,978 standard deviations), i.e., 42,7% "Agree" and 14,7% "Completely agree".

The results obtained reveal that for the variable of "Quality of Basic Infrastructure and Services" the item of "Teaching: Quality of schools and teaching, young people's access to education (primary, secondary), quality of school facilities" registers the highest agreement (51,3%). Concerning the item of "Health", approximately 48,7% of residents show disagreement.

For the variable of 'Quality of Life in Economic Terms', the results obtained can be summarised as follows:

- To the question "How do you assess the quality/cost of living relation in the local authority?", residents did not agree with the item (2,93 mean; 0,716 standard deviations), with 5,5% indicating "Very Bad", 12,2% "Bad" and 67,4% "Reasonable".
- To the matter of "Employability (supply of work – employment), jobs… it creates jobs..., or it is where more job opportunities are generally found", 16,7% considered this "Very Bad" and 47,6% "Bad" (2,23 mean; 0,769 standard deviations), indicating that residents responded negatively to the item on employability.
- Regarding the "Capacity to attract companies to the local authority (attracting important or large companies, creating advantages to attract new companies...)" (2,45 mean; 0,877 standard deviations), residents did not agree with this aspect, with 15,9% considering it "Very Bad" and 32,8% "Bad".
- Regarding the "Capacity to provide housing with a good quality-price relation, the quality housing supply has grown", residents' answers indicate a favourable opinion (3,03 mean; 0,847 standard deviations), with 51,9% indicating "Reasonable", 23,7% "Good" and 3% "Very Good".

In general terms, concerning the dimension of 'Quality of Life in Economic Terms', the capacity to supply housing with an excellent quality-price relation is the item with the highest percentage of classification as reasonable.

Respondents' perceptions of the variable of 'Quality of Life in Terms of Leisure, Access to Culture, Environmental Quality and Safety' reveal the following results:

- Concerning "Quality of cultural events (local traditional festivals, music/concerts, museums, exhibitions...), diversity of cultural events and actions promoting access to culture…" respondents agreed with the item (3,03 mean; 0,840 standard deviations), with 52,7% considering this "Reasonable", 23,5% "Good" and 2,8% "Very Good".
- To the item "Access to and quality of leisure services (e.g., cinema, restaurants, diversity of entertainment)" residents give negative responses (2,35 mean; 0,777 standard deviations), finding that 11,6% answered "Very Bad" and 48,3% "Bad".

- As for the "Quality of public safety services (having good police and surveillance services, security and prevention)", residents agreed with this aspect (3,14 mean; 0,943 standard deviations), 39,8% considering it "Reasonable", 35,1% "Good" and 3,6% "Very Good".
- Regarding "Good air and environmental quality (no pollution, green spaces, parks)" residents consider that the local authority has excellent air and environmental quality (3,72 mean, 0,931 standard deviations), as 46,5% indicate "Good" and 18,7% "Very Good".
- Concerning the "Quality of natural resources in the area: Nature, fish stocks, ..., a local authority standing out for its gastronomy (guava, papaya, *chalupa*, *modje*), ... natural environment and resources of the area…" residents are found to consider that their local authorities have a good quality of natural resources (3,9751 mean, 0,99552 standard deviations), with 39,7% considering it "Good" and 33,9% "Very Good".

The 'Global Satisfaction' variable was analysed through a single item. To "What is your global satisfaction as a resident of the local authority?" residents are found to be satisfied with it (3,43 mean, 0,838 standard deviations), with 49,8% being "Satisfied" and 4,4% "Very Satisfied".
The variable of 'Global Satisfaction with the Work Done by the Local Authority considering the Public Financial Resources available' is also formed of one item. Residents showed agreement with this (3,24 mean, 0,857 standard deviations), with 36,9% indicating "Neither Satisfied/Nor Dissatisfied", 42,3% "Satisfied" and 2,1% "Very Satisfied".

The variable of 'Expectations of Living in the Local Authority' was also analysed through one item. Regarding the question "In your opinion, to what extent does living in the local authority meet your expectations?", residents presented positive results (3,02 mean, 0,811 standard deviations).
50,5% of these indicate "Neutral", 24,3% "Close to representing the ideal, fulfilling almost all expectations" and 1,9% "Represents the ideal, fulfilling all expectations".

Determinants of Citizen Satisfaction

The study went on to analyse identification of the determinants of Citizen Satisfaction, estimating the following multiple linear regression model:

$$SatisfMunicip = \beta_0 + \beta_1 ImageMun + \beta_2 QualInfrast + \beta_3 QualLife + QualLeisure + \varepsilon_i$$

More precisely:
SatisfMunicip (Citizen Satisfaction) represents the dependent variable (global variable formed of three factors);
ImageMun (Local Authority Image), QualInfrast (Quality of Basic Infrastructure and Services), QualLife (Quality of Life in Economic Terms) and QualLeisure (Quality of Life in Terms of Leisure, Access to Culture, Environmental Quality and Safety) represents the independent variables potentially influencing citizen satisfaction;
Finally, ε_i represents the errors estimated.

The coefficients obtained with the estimation of the Ordinary Least Squares model of the variables analysed are presented in Table 1. For each variable, its estimated coefficient is presented and the *t* statistic in the case of the null hypothesis being right and the minimum level of significance from which the null hypothesis is rejected, to determine whether the independent variables are significant in explaining the dependent variable (Citizen Satisfaction).

Table 1: results of the linear regression

Model	Variables[a]	SatisfMunicip[b]				
		Non-standardized coefficients		Standardized coefficients		
		β	*Standard Error*	β	*t*	*Sig.*
1	(Constant)	0,815	0,138	-	5,914	0,000*
	ImageMun	0,345	0,054	0,268	6,335	0,000*
	QualInfrast	0,181	0,051	0,148	3,557	0,000*
	QualLife	0,033	0,071	0,033	0,463	0,644
	QualLeisure	0,231	0,091	0,202	2,545	0,011*
	R	0,560				
	R^2	0,314				
	Adjusted R^2	0,310				
	F	81,987				
		(0,000)*				

a.Independent variables; b. Dependent variable
*Method: Enter; * significant for a 0,05 level of significance.*

The results show that the dependent or explained variable is only influenced significantly by three variables. The model estimated presents a coefficient of determination of 0,310 (AdjustedR^2), which means that the independent variables analysed explain only 31% of the variance observed in the Citizen Satisfaction variable. The model estimated presents weak robustness due to an AdjustedR^2 under 50% (suitable value in social science studies, according to Marôco (2018).

The *F* statistic, with a value of 81,987 associated with a p-value of 0,000 (α=0,05) allows the conclusion that the model is statistically significant. That is, the linear model obtained is suitable to explain the relation between Citizen Satisfaction and the variables considered in the analysis. Citizen Satisfaction is influenced positively by Local Authority Image (ImageMun), Quality of Basic Infrastructure and Services (QualInfrast) and Quality of Life in Terms of Leisure, Access to Culture, Environmental Quality and Safety (QualLeisure). The variable of Quality of Life in Economic Terms (QualLife) does not influence citizens' satisfaction. It is noted that the variable of 'Local Authority Image' (ImageMun) is the one contributing most to the determination coefficient (β=0,268). The regression coefficients are significant for all the variables for a 5% level of significance, α=0,01 (constant: t=5,914, ImageMun: t=6,335, QualInfrast: t=3,557, QualLeisure: t=2,545). Therefore, considering the results obtained, the following regression model is formed:

$$SatisfMunicip = 0,815 + 0,268ImageMun + 01,48QualInfrast + 0,032QualLeisure$$

The next step was to confirm the fulfilment of the assumptions of normality, homoskedasticity and independence of the residuals, to ensure the robustness of the model obtained. The assumption of normality was validated through the exact test of residual distribution – Kolmogorov-Smirnov test with Lilliefors correction. The results obtained show acceptance of the null hypothesis that the non-standardized residuals present normal distribution (p-value>0,05). From the statistic obtained from applying the Durbin-Watson test, the assumption of independence of errors (d=1,426) was validated. The assumptions were confirmed. Also, for a 5% level of significance (p=0,057), the results of a normal distribution of residuals were confirmed, in that most of the points are to some extent above the main diagonal.

The descriptive statistic of residuals indicated the possible existence of outliers and/or influencing cases (Stud. Deleted Residual = 0,050). Similarly, the result of the maximum centred leverage indicates the presence of a multivariate outlier (equal to 0,000). Analysis of the influence of outlier observations on the model's quality of adjustment revealed that the model is not significantly influenced by outliers. So it was decided not to exclude them.

Final Remarks, Implications, Recommendations, Limitations and Future Lines of Research

This research aimed to determine and assess citizens' satisfaction with their local authority, analysing a set of aspects characterising that council area.

Regarding citizens' perceptions of the Local Authority Image, the results reveal that they tend to adopt an impartial stance. Citizens do not consider that image as relevant in contributing to satisfying their needs as residents.

Citizens have a negative opinion of the quality of necessary infrastructure and services concerning health. This aspect seems to be a situation warranting the attention of the local authorities studied.

Citizens also have negative perceptions of the local authorities' quality/cost of living and the capacity to create employment and attract companies to the area. These seem to be another aspect in need of attention by local authorities, to understand what leads to residents' discontent in seeking to increase the level of satisfaction.

Respondents' perceptions of the variable reveal the following results:

"Access to and the quality of leisure services (e.g., cinema, restaurants, variety of entertainment)" seems to be the item among those included in 'Quality of Life in Terms of Leisure, Access to Culture, Environmental Quality and Safety' which residents are least satisfied with.

The results show there are no differences in the local authorities regarding citizen satisfaction. Their geographical location determined the results obtained. As both are situated on the island of *São Nicolau*, at the outset there should be no discrepancy in their actions due to characteristics associated with insularity.

The practical implications of this research lie in providing local leaders with instruments allowing them to assess local public policies, in order to increase residents' satisfaction with their local authority.

Although it is considered that the previously defined objective has been reached, simple application of a questionnaire does not allow a full appraisal of the situation. So in future research, the intention is to extend the data-collection method to include interviews with residents of the local authorities studied. It is believed that interviews could provide higher contrast, analysis and depth of a variety of information.

Acknowledgments

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Knowledge Mapping of Personalized Recommendation System Research in China: A Bibliometric Analysis Using Cite Space

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Abstract

With the rapid development of electronic commerce, the problem of "information overload" leads to the difficulty that user can't search the required goods effectively, personalized recommendation technology has been applied in e-commerce and popularization. With a visualization tool called CiteSpace, this paper investigated the intellectual structure, development, and evolution of personalized recommendation quantitatively to provide a systematic review of the current state of the personalized recommendation literature in China. According to 1999 articles focusing on personalized recommendation, we have identified the most influential authors, institutions, publications and keywords in this field, as well as the hot topics and future trends. Some useful conclusions can be drawn as follows: The annual of published paper is relatively stable in 2009-2013, and began to enter a large-scale development stage in 2014; Recommendation systems, recommendation algorithm, application environment and cold start are the hot topics in the last 10 years; The cooperation between authors and research institutions is weak, and authors' cooperation has a significant geographical limitation. This paper filled the gap in personalized recommendation system research through discovering the exiting themes, hot topics, and potential future research directions.

Keywords: Personalized Recommendation; Knowledge Mapping; CiteSpace; Bibliometric Analysis

Introduction

With the rapid development of e-commerce, the rapid growth of commodity types and the limited ability of customers to select goods have formed a sharp contrast, the emergence of goods "information

overload"(Pessemier, Dhondt, & Martens,2016) leading to customers to accurately select goods, businesses to obtain customer personality needs is steeply difficult. It is not uncommon that searching for information or buying complex products (e.g. digital products) via the Internet are always frustrated (García-Sánchez, Valencia-García, & Martínez-Béjar, 2005). In this regard, customers hope that e-commerce will help them quickly purchase satisfactory products. Businesses hope that e-commerce will help them dynamically and accurately obtain customer demand to improve service quality and visits, customer experience and loyalty (Tewari & Barman, 2018). Personalized recommendation technology is an important method to improve information overload. The personalized recommendation system can create user flies through user behavior and other information, and recommend the most suitable items for users automatically, thus effectively reducing the information overload problem (Chen, 2019).

Although personalized recommendation research is evolving rapidly in both industry and research, there is still much to learn about personalized recommendation research and how it can enhance electronic commerce. So far, some integrated reviews of personalized recommendation system that may help researchers keep abreast of knowledge developments have been presented (Liu, Nie,& Chen, 2007; Lu & Cao, 2016; Shi & Han, 2018; Xie &Li, 2017; Dubey & Nair, 2015). However, few works use visualized and graphical bibliometric analysis to explore the internal relationship among articles, authors and references. This is critical for making a comprehensive evaluation of the area such as personalized recommendation. Thus, this paper concentrates on filling the gap in personalized recommendation system research by carrying out a visualized bibliometric analysis to discover the exiting themes, hot topics, and potential future research directions.

Literature Review

Recommendation systems have been traditionally used by some e-commerce sites to solve the personalization problem by guiding customers to find the products they would like to purchase. A number of recommendation systems have been proposed for different businesses. Traditional recommendation systems mainly include collaborative filtering, content-based recommendation method and hybrid recommendation method (Shrivastava & Rajawat, 2013).

The most classical algorithm is the collaborative filtering approach, which leverages interaction information between users and items based on users' past preferences. However, this method is limited by data sparsity and cold start problem. When dealing with new customers, this type of recommendation systems cannot recommend any product as no historical preference records are available (Shi, Zhao & Shen, 2017). The content-based recommendation approach, on the other hand, uses the items that users have selected to find other similar items for recommendation. However, it is often inhibitive to estimate the preference similarities between various customers (Shu, Shen, & Liu, et al., 2017), because it is difficult to obtain the accurate customer ratings of products especially when special knowledge is needed for rating. The hybrid recommendation method which integrates the multi-source heterogeneous information can alleviate the problem of data sparsity and cold start in the traditional recommendation system (Wang & Wang, 2011). However, due to the complex

characteristics of auxiliary information, such as multimodality, heterogeneous data and uneven distribution, the research of hybrid recommendation method for multi-source heterogeneous data fusion still faces severe challenges.

Although there are many publications related to personalized recommendation system, few people can understand the overall structure of the personalized recommendation knowledge landscape accurately. Therefore, it is necessary to study personalized recommendation system with the help of a quantitative analysis tool CiteSpace. CiteSpace is a Java-based information measurement soft-ware which designed to clarify the knowledge evolution structure and to detect emerging trends and transient patterns in the scientific literature. It has been widely used to identify hot topics in the field of science and technology (Chen, 2006).

Methodology and Data Sources

Methodology

Bibliometric analysis is defined as ‘‘the quantitative analysis of publications in a given field’’. It can be used to analyze article information in regard to keywords, authors, references, journals, institutions, countries, and even directions for future research (Mayr & Scharnhorst, 2015). Through the process of bibliometric analysis, researchers can conduct a longitudinal meta-analysis of a special field to investigate the birth, origin, development, and evolution of this field, as well as the current status and possible trend of such field (Hérubel , 1999).

With the development of information technology, bibliometric analyses can be used to generate network images and therefore providing more visualized information rather than words only (Cao, Huang & Wang, et al., 2012). CiteSpace is one of the most popular software tools for analyzing co-citation networks in bibliometric studies. It allows for analysis of diverse co-occurrence networks including articles, authors, keywords, and even turning points, research front and focus (Chen, 2006). In addition, network maps generated by CiteSpace can facilitate data interpretation.

Data sources

The research data used in this paper come from the general library of academic journal online publication of CNKI (China National Knowledge Infrastructure), which is the world's largest continuous dynamic update of Chinese academic journal full-text database. After entering the database, using CNKI’s advanced retrieval function, the retrieval condition of thematic words is "personalized recommendation" or "recommendation algorithm", with a time span of January 1, 2009 to December 31, 2018. After the retrieval, a total of 2138 documents were obtained, and 1999 valuable research samples were finally obtained after removing the non-academic papers; exporting the basic information of the documents in Refworks format, such as titles, authors, units, abstracts and keywords and so on, naming the exported files according to the requirements of the visualization software

CiteSpace, and finally using the data conversion function of the software to complete the conversion of the data.

Research Results and Analysis

The number of published articles

Through the statistical analysis of the number of articles published, it can be found that the research on personalized recommendation in China is on the rise as a whole. During the period from 2009 to 2014, the growth was relatively slow, fewer scholars worked in this field and the amount of publications is slowly growing. During the period of 2014-2016, the growth rate suddenly increased and the number of published articles increased sharply, which may be attributed to the arrival of the era of big data. In particular, the wide application of information technology, such as e-commerce, social network has made the application background of personalized recommendation more abundant. Growth has fallen since 2016, but it is still rising steadily, which also indicates that the theme of personalized recommendation research has been widely popular in recent years (Fig 1).

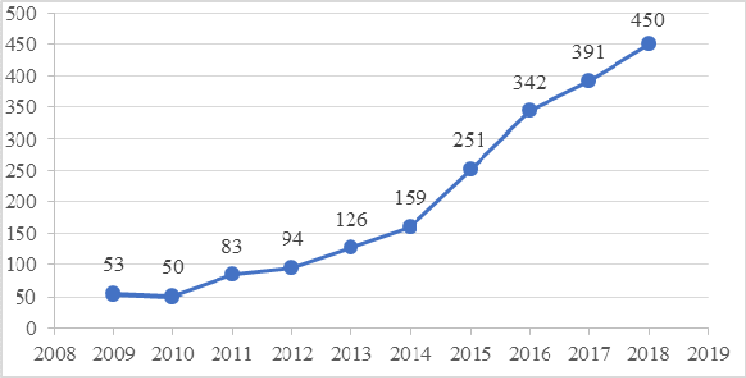

Fig. 1:The number of published articles per year

The research hotspots in personalized recommendation research

The key words are the extraction of the core contents of the literature, so the statistics and analysis of the high-frequency keywords can be used to determine the research hotspot in the field of a certain subject (Duan & Cai, 2016). At the same time, the centrality of the key words derived by the CiteSpace can also reflect the research hotspots. This paper combines the frequency with the centrality of keywords to analyze the hot topics.

By running CiteSpace, a clustering knowledge map can be obtained, in which the cross joint represents the centrality of the keywords, and the size of the node represents the frequency of the keywords. As can be seen from the Fig 2, the term “collaborative filtering”, “recommendation system”, “personalized recommendation”, “recommendation algorithm” and “personalization” are the five keywords with the

highest frequency in turn, which indicates that they are the hot issues of personalized recommendation research in recent 10 years.

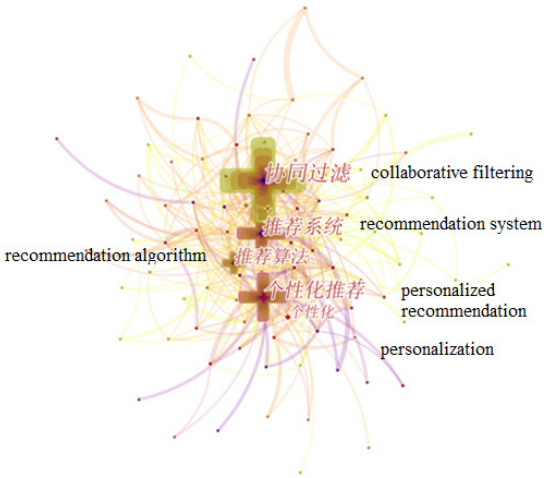

Fig. 2: Co-occurrence analysis of keywords

In addition, the frequency and the betweenness centrality of keywords are derived from CiteSpace. Keywords with a centrality ≥ 0.1 are selected, as shown in Table 1. It can be clearly found that "personalized recommendation", "recommendation system", "personalization", and "data mining" are the most prominent, reflecting hot topics in the field of personalized recommendation.

Table 1: Key words co-occurrence frequency, centrality (≥ 0.1)

No.	Keyword	Frequency	Centrality
1	Collaborative filtering	721	0.06
2	Recommendation system	496	0.24
3	Personalized recommendation	482	0.27
4	Recommendation algorithm	280	0.1
5	Personalization	113	0.15
6	E-commerce	84	0.04
7	Matrix Decomposition	78	0.07
8	Similarity	73	0.11
9	Data Mining	65	0.15
10	Social network	64	0.08
11	Big data	56	0.11
12	Cold start	52	0.11

The research hotspots in the field of personalized recommendation can be classified as four knowledge groups: personalized recommendation system (recommendation system, personalized recommendation), personalized recommendation algorithm (collaborative filtering, recommendation algorithm, personalization, matrix decomposition, similarity, data mining), personalized

recommendation application environment (e-commerce, social network, big data) and the problem of cold start, which represents the hotspots in the research field of the personalized recommendation.

The Evolution of Research Hotspots

By selecting the TimeZone under the visual interface of CiteSpace, the time zone map of keywords can be obtained. Based on CiteSpace visualization analysis, the time zone map can reflect the co-occurrence relationship between time and keywords, thus revealing the evolution process of research in a certain field (Cai, Ma & Yuan, 2019).

According to the emergence of key words in different time quantum, the evolution process of research hotspots in this field can be directly and clearly reflected. When conducting analysis, researchers tend to choose a wide range of words with generality and establish a large research structure. In the later stage, with the increase of research, more problems appear. Researchers may study a specific detail at a deeper level, so as to select more specific keywords. This shows that the research on personalized recommendation has gone through a process from shallow to deep, from extensive to detail in China.

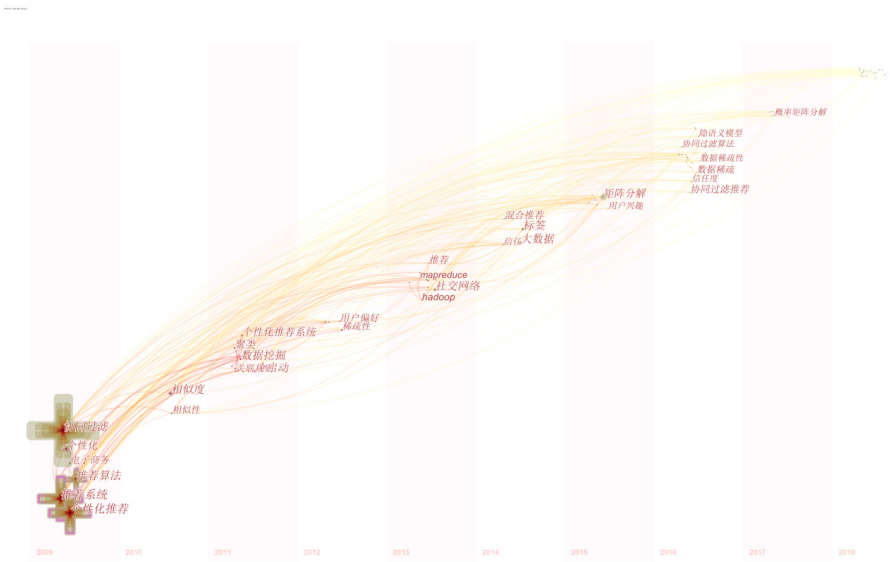

Fig. 3: TimeZone view of research hotspots

Research frontier in personalized recommendation research

Burst keywords refer to words that appear more frequently or are used more frequently in a relatively short time. According to the change of the frequency of burst keywords, the frontier and trend of the research field can be judged. According to the related analysis of , CiteSpace, we get the topic of personalized recommendation, the corresponding emergent rate and cited history curve, as shown in Figure 4., "e-commerce", "personalized recommendation", "personalization", "similarity",

"personalized recommendation system", "digital library", "data mining", "personalized service", "cloud computing", "label", the first three of which are mainly reflected in 2009-2012. "Similarity" is reflected in 2010-2014, "personalized recommendation system" and "data mining" are mainly reflected in 2011-2013.

Top 10 Keywords with the Strongest Citation Bursts

Keywords	Year	Strength	Begin	End	2009 - 2018
电子商务	2009	5.6369	2009	2012	
个性化推荐	2009	14.1516	2009	2012	
个性化	2009	4.0791	2009	2012	
相似性	2009	3.8411	2010	2014	
个性化推荐系统	2009	3.5513	2011	2013	
数字图书馆	2009	3.6492	2011	2012	
数据挖掘	2009	3.1621	2011	2013	
个性化服务	2009	4.1378	2012	2015	
云计算	2009	2.5597	2013	2016	
标签	2009	5.9144	2014	2015	

Fig. 4: Top 10 Keywords with the Strongest Citation Bursts

Analysis of Cooperation Network

Analysis the Institutions Cooperation Network

In order to study the cooperation between different institutions, CiteSpace is used to generate the institutions cooperation map in the field of personalized recommendation, as shown in Fig 5. It can be seen that the institutions with high publication in the field of personalized recommendation research are *School of Information Management, Wuhan University* (20 articles), *School of Information Science and Engineering, Shandong Normal University* (17 articles), and *School of Optoelectronic Information and Computer Engineering, Shanghai University of Technology* (15 articles).

Fig. 5: Analysis of Cooperative Network of institutions

However, the research groups in this field are scattered, and there are fewer links between different institutions. The cooperation or contact between domestic research institutions in the field of personalized recommendation is not frequent with the characteristics of regional proximity. Among them, there are four relatively clear cooperation networks, which are the subgroup between *School of Information Management of Wuhan University* and *Wuhan University Information Resource Center and Computer School of Wuhan University*; the subgroup between *Shandong Normal University* and *New Key Laboratory of Distributed Computer Software of Shandong Province*; the subgroup between *School of Marketing Management* and *School of Business Administration at Liaoning University of Engineering*; and the cooperation subgroup between *School of Computer Science and Technology at Anhui University* and *School of Management at Hefei University of Technology* .It can be found that the cooperation between institutions is limited to the province or even the school, and there is little cross-regional cooperation.

Table 2: The number of documents issued by institutions

No.	Amount of published	The earliest year of publication	Institution
1	20	2011	School of Information Management, Wuhan University
2	17	2015	School of Information Science and Engineering ,Shandong Normal University
3	15	2015	School of Optical-Electrical and Computer Engineering ,USST
4	13	2013	National Digital Switching System Engineering & Technological R&D Center
5	13	2010	College Of information Science and Engineering, Yanshan University

6	13	2013	University of Chinese Academy of Sciences
7	12	2015	School of Computer Science and Technology of Anhui University
8	12	2009	College of Computer Science, Chongqing University
9	11	2015	School of computer, Guangdong University of Technology
10	10	2015	College of Computer Science and Engineering, Nanjing University of Science and Technology
11	10	2013	College of Management and Economy, Tianjin University

Cooperative network of authors with high publication volume

CiteSpace can be used to analyze the cooperative relationship between researchers in a research field. The group of authors with certain academic influence is one of the epitomes of scientific research activities in a certain subject area. Through the high-impact authors and the research on the cooperative network between them, it is helpful to understand the active authors and their scientific research practice in the field of personalized recommendation, and to grasp the trend of development and research in the field of personalized recommendation. We take 1 year as a slice interval, analyze the cooperative network of authors who published the results of research on personalized recommendation from 2009 to 2018, and obtain the cooperative network diagram as shown in Fig 6.

It can be seen from the Fig 6 that the cooperation between the researchers of personalized recommendation field is still relatively large in China. From the cooperation of two people to the cooperation of many people, the connections between the authors are relatively close. As can be seen from Table 3, *Jianguo Liu* has published 11 documents and formed the largest co-operation subgroup network ,in which he's the center. then, *Haiyan Zhao* published 10 documents, and Jian Cao published nine documents, with two of them as the center, and *Qingsheng Chen*, *Ying Wang* formed a relatively small cooperative subgroup network. In addition, most of the scholars conducted their research in an independent way, and they have published a large quantity of articles, such as *Junhao Wen* published eight articles, *Fuzhi Zhang* published six, and so on.

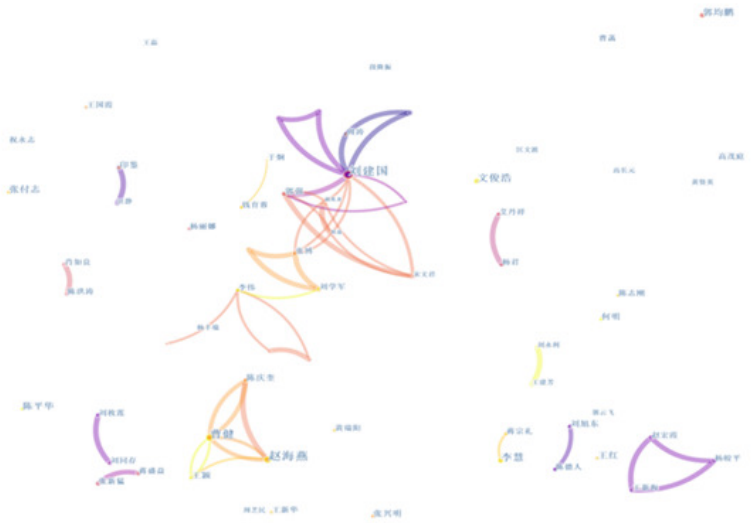

Fig. 6: The cooperation between authors in the field of personalized recommendation

Table 3: Author with high publication volume（>5）

No.	Amount of published articles	Author
1	11	Jianguo Liu
2	10	Haiyan Zhao
3	9	Jian Cao
4	8	JunhaoWen
5	7	Hui Lee
6	6	Fuzhi Zhang
7	6	Hong Wang
8	6	Pinghua Chen
9	6	Jun Peng

Conclusions

Despite the developing industry and research, there is still a limited understanding of the development and evolution of personalized recommendation research. Therefore, we provide a bibliometric analysis on personalized recommendation research using CiteSpace to summarize previous research, provide research trends, and guide new researches. According to 1999 publications from CNKI, we have conducted the network analysis on authors, institutions and keywords, and the key authors, institutions, articles and major topics of this field were identified. Furthermore, we also deduce the hot topics and potential future trends.

As can be seen from the co-occurrence map of keywords, the structure of the co-occurrence network of keywords is relatively loose and its density is not too high, which indicates that researchers are deepening their research's topic, research's content and research's direction, starting to study deeper research problems, and choosing more and more accurate keywords.

From the map of cooperative network of institutions, it can be seen that the institutions involved in the study of personalized recommendation have a wide distribution, but the cooperation between the institutions is less.

From the influential authors and their cooperative networks, several prominent cooperative networks have been formed centered on *Liu Jianguo*, *Zhao Haiyan* and *Cao Jian*. But the strength and extent of the cooperation are still at a low level.

In short, the bibliometric analysis is of great significance for identifying the exiting themes, hot topics, and potential future research directions of personalized recommendation system research. However, it should be pointed out that there are still some limitations in this research. For example, keywords are not comprehensive when searching for data, which can lead to the omission of partial data. In order to verify the accuracy of the research results and broaden the scope, collecting data with from other data source such as Web of Science and SCOPUS, conducting specific research on one or more core journals in this field to do an analysis are expected in further study.

Acknowledgment

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Management by Values and Sustainable HRM: A Comparative Analysis

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Abstract

The article focuses on the comparative analysis of two management strategies – Management by Values and Sustainable HRM. Such an analysis is necessary because of the growing significance of the concept of sustainable development. It becomes important to answer the question of whether Sustainable HRM can be called an element of Management by Values. The first part of the article focuses on a detailed discussion of both concepts, giving practical examples of their use in companies. A positive impact of both strategies on human capital development was found, as well as on the long-term competitiveness of the organizations that implemented them. Then, on the basis of the literature, a comparative analysis was carried out based on 16 criteria constituting the most important features distinguishing both concepts. The identification of many common elements proved that Management by Values and Sustainable HRM are interrelated. At the end of the article, appropriate conclusions and proposals for further research on the subject are presented.

Keywords: Management by Values, Sustainability, Sustainable HRM, Green HRM

Introduction

Over the past few decades, we have witnessed a momentous change in approaches to company management. Until quite recently, we focused on the primary role of financial results, and especially profit, as the priorities guiding company management boards in making any and all decisions. These were the times of Management by Goals, often understood as imposing goals on employees. Over time, an idea developed which focused not only on the interests of the owners, but also on the values that are relevant to other stakeholders as well. According to Lachowski (2012), customer satisfaction, employee satisfaction, sustainable development or activities supporting local communities have gained more importance.

By emphasizing the essence of shared values in building an organization, in 1980 Waterman and Peters created the 7S model, which consists of seven elements forming an organizational chart: strategy, structure, skills, staff, style, system, and shared values that are the focal point for all other elements of the organization (Jacuk, Kolasa). The concept of management by values stems directly from the 7s model. This concept was first used by Blanchard and O'Connor in 1997. According to these authors (Blanchard, O'Connor, 2015), an organization managed by values is a driving force and connects four pillars representing groups of people for whom the company is responsible. Those groups are as follows:

- Customers, for whom the key element is the extraordinary quality of services provided – ultimately they should become brand ambassadors,
- Employees, looking for a motivating environment that increases their quality of life and increases their commitment – they are treated as the most valuable resource,
- Owners, for whom it is necessary that the company generates profits in an ethical and honest manner – they develop organizations that they wish to be proud of, and
- Other important groups, such as suppliers and competitors.

As indicated above, the concept of sustainable development management has recently gained much importance. This idea is described as a process connecting the economic and social areas, while taking into account ecological balance and environmental protection. It had emerged by the 1960s as a response to the rapidly growing population and associated risks, such as the excessive use of natural

resources, environmental pollution, high unemployment, malnutrition, destruction of the Earth's surface (especially forests), etc. The discussion of the global environmental problem was initiated by the "Limits to Growth" report, published by the Roman Club, founded in 1968.

According to Antkowicz and Dyrdoń (2019), the report presented a pessimistic vision of the Earth. The concept gained popularity, in 1987 when, the Brundtland Commission defined sustainability as "development that meets the needs of the present generation, but does not reduce the chances of meeting the needs of future generations" (World Commission on Environment and Development). A holistic approach to sustainable development has been adopted, addressing global issues in the long term, taking into account many stakeholders and adding a social dimension to the environmental and economic spheres (Mazur, 2017). Kwil, Piwowar-Sulej and Krzywonos (2020) concluded, that one can also define sustainability as a complex problem that includes environmental issues, the economy, and health. Moreover, the idea of sustainable development has recently been transferred to the field of human resources management. Sustainable Human Resources Management is defined as "adjusting, over the long term, human resource management strategies and practices that would allow companies to meet financial, social, and environmental goals along with their impact on the enterprise and its environment, while controlling unintended side effects and negative feedback" (Ehnert et al., 2016). This concept is also sometimes referred to as green HRM, socially responsible HRM, or ethical HRM.

The overall aim of the article is to analyse the interrelationships between Management by Values and Sustainable Human Resources Management. A critical analysis of the literature provided an answer to such questions as: "What are the common features of both concepts?", "In what aspects do these ideas differ?", and most importantly: "Can Sustainable Human Resources Management be called an element of Management by Values?" The first part of the article characterizes both concepts. Then, using Polish and foreign literature on the subject, comparisons of the theories were made. Finally, the author of this article presented the conclusions, formulating the thesis that Sustainable Human Resources Management is a targeted form of Management by Values (MBV).

Management by Values

These days, no owner of a company would disagree with the statement that employees are the foundation of the company. It is people who are the deciding factor in the success of an enterprise, regardless of whether we are talking about a start-up or an international corporation. Thanks to company values, employees feel united, become more involved, and as a result – their potential, passions, and talents can be fully utilised. Cameron and Quinn (2003) argue, that the lasting market success of companies is now less directly related to market forces than to the values they profess.

Recently, a direct relationship between MBV and the organization's economic performance has been noticed. A case in point is the survey by the National Tooling & Machine Association, which shows that companies focused on improving quality by adapting their activities to the core values, i.e. reliability, responsibility, and integrity, achieve greater profits than those focused only on quality (Stachowicz-Stanusch, 2007). Therefore, it is not surprising that values are sometimes referred to as profitability generators; it is thanks to them that the company achieves increasingly better financial results.

The achievement of the desired result is determined not by declarative values, but by those that have been truly implemented and which function throughout the entire organization. Therefore, the process of introducing the MBV concept and later efforts to maintain consistency in the relevant activities are crucial here. The larger the organization, the longer it takes to implement Management by Values, but it can be assumed that this process might take about 3 years. In order to ensure genuine functioning of MBV, it must then be implemented in the long term, in all areas of the organization (Blanchard, O'Connor, 2015) – including predominantly as part of Human Resources Management (HRM).

Due to the fact that employees are the company's most important resource, a proper selection of candidates for work is an important element that should be in place from the moment of implementation of Management by Values. Acquiring employees for the organization whose standards and goals coincide with those functioning in the company will significantly contribute to its success. At the same

time, such principles can be used as an attractor for talented candidates adhering to similar values. In fact, values are an increasingly appreciated recruitment tool. And consequently, attracting and choosing the right people, these people will play an important role in the further expansion of the company.

I□successful compa□ies, the example to follow always comes from the top; therefore, strict complia□ce with adopted standards by owners, the board, and managers is a prerequisite for success. To achieve the expected results, as Świątek-Barylska (2010: 574) aptly puts it, "employees must know the values and accept them (identify with them), while the management techniques used in the company should support the declared values, e.g. by including them in the employee assessment system".

In the long run, maintaining values as a compass for company's business is undoubtedly not easy and it requires consistency. Determined and strong leaders are needed – to act as role models as well. In order to check whether leadership through values functions not only at the strategic level, but also at the operational level, a diagnosis should be made that would determine the compatibility between the two levels. It is recommended to focus on indicators which link work to company values. For example, one can check the level of identification with the organization, the existence of an informal structure supporting communication, dignity-based job satisfaction, the type of motivational system, and the emotional relationship with products or services (Ambroziak, 2012).

For the purposes of this article, the values of three companies have been analysed that fit perfectly into both management concepts being discussed, and which simultaneously show their mutual relationships. The first is the American ice cream maker Ben & Jerry's Homemade Inc., whose mission is to create ideal conditions and benefits for anyone who is associated with their business: suppliers, employees, farmers, customers, franchisees and neighbors. The company is managed by the following principles:

- By definition, production generates waste. We strive to minimize our negative impact on the environment.
- We strive to show our deep respect for people inside and outside our organization and the society in which they live.
- We strive to create economic opportunities for those who have not had them before and to introduce new models of economic justice that are sustainable and reproducible.
- We support sustainable and safe food production methods that reduce environmental degradation (Ben & Jerry's).

Another noteworthy company is the Austrian provider of transport and logistical services Gebrüder Weiss GmbH. The company has a strong corporate culture. It's four main values form the pillars that support the international structure, connect people inside the company, and are part of the mission translated into daily activities. One of the pillars is "the orange way of sustainability." It means being aware of the fact that in order to achieve long-term success, it is necessary to remain competitive through investment and innovation. At the same time, there is full awareness of the great responsibility in the area of transport and logistics to develop and implement the latest solutions and systems that are environmentally-friendly and which ensure sustainable development. Prudent use of available resources is a significant aspect. Increasing fuel efficiency and, as a result, reducing greenhouse gases remains the highest priority (Gebrüder Weiss).

An extremely interesting example is the Finnish fuel producer Neste Oyj. Paradoxically, a company that by definition should contribute to significant environmental degradation lists responsibility as its most important value. The organization cares about the well-being and safety of others, ensuring that the activities undertaken by Neste have the minimum possible negative impact on the natural environment and the surrounding society. It supports projects that improve the quality of human life. The idea of this business is to fight climate change. Therefore, Neste provides value in the form of renewable, low-emission fuels, mainly for air, road, and sea transport. Sustainable development is an integral part of the strategy. To create renewable fuel production opportunities, the manufacturer has invested 1.5 billion EUR. Thanks to this, it produces Neste MY diesel fuel, which is made entirely of renewable raw materials, such as used frying oil and animal fat from industrial waste. In comparison to other fuels, this product reduces greenhouse gas emissions by 50 to 90% (Neste).

As can be seen from the analysis of the above values, enterprises with different cultures focus on various principles as they formulate their business strategies. Increasingly often, however, noticing the irreversible changes taking place in the natural environment of our planet, they become more sensitive

to social and climate problems, and thus they prioritise management that, more or less, takes into account sustainable development.

Sustainable HRM

Currently, HRM must remain up-to-date with the business demand directed more and more towards pro-environmental activities. Therefore, companies often employ professionals from the environment protection industry to support the development of the company's strategy in the area of sustainable development. This process, according to Cohen et al. (2010) appears to be irreversible due to:

- progressively strict environmental regulations, which are increasingly frequently and widely implemented in many countries (such as reducing plastic consumption in the European Union) and
- corporations as well as smaller companies demanding that their suppliers provide environmental data as a condition for winning contracts (for example, Microsoft requires its suppliers to provide detailed sustainability reports).

Sustainable development in the field of human resource management, however, goes beyond employing specialists in environmental protection. Stankeviciute and Savaneviciene (2018) have mentioned, that for the organization to survive, it is necessary to treat staff in such a way that provides current and future employees with:

a) the will to work for a given company,
b) the skills needed to perform their duties in a proper manner for a given business, and
c) the opportunity to perform work while maintaining health and work–life balance.

That is why Sustainable HRM focuses on demonstrating integrity towards employees, ensuring a decent work environment, providing good conditions for development and on taking care of employees' physical and psychological well-being. Sustainable HRM is primarily intended to provide businesses with stable access to qualified resources. It promotes increasing employee employability and developing their personal responsibility and a harmonious work–life balance. This approach is beneficial to both parties, both for employees and employers, because satisfaction from meeting individual needs contributes to maintaining the competitiveness of companies. It should be borne in mind that the crucial condition for the implementation of sustainable development by the entire enterprise is the integration of Human Resources Management at the strategic planning stage (Lopez-Cabrales, Valle-Cabrera, 2019). Piwowar-Sulej (2016) states, that in this way sustainable HRM is associated with the concept of Strategic Human Resource Management.

The distinctive features of the Sustainable HRM concept are presented in the literature (Zaugg, Blum, Thom, 2001; Cohe□, Taylor, Muller-Came□, 2010; Eh□ert et al., 2016). First of all, attention is paid to the future. Taking into account the long-term consequences of decisions and actions becomes a priority. The future availability of staff and their needs should be taken into account, while eliminating the approach which prioritizes short-term employment. Ehnert suggests integrating the future with the present – today's managerial decisions should have a positive impact on the future. The recruitment of the right staff is all the more important. The choice of employees should focus on people who will contribute to the long-term development of the company, but who also support it in times of change or economic crisis (Harry, 2014).

Because the human being is at the heart of sustainable development, it is not surprising that caring for employees is another distinguishing feature of the concept of Sustainable HRM. Companies should ensure that a healthy and productive workforce is maintained. Ybema, van Vuuren and van Dam (2017) state, that to this end, attention should be paid to health and safety conditions at work, workload, and work–life balance. As part of Sustainable HRM, employers can introduce pro-environmental programs by subsidizing commuting by public transport or by bicycle, as well as paying for time spent volunteering in non-profit organizations aimed at protecting the environment.

Increasing employability is of particular importance for young people and the disabled. This is because progressive automation and the application of artificial intelligence reduce the demand for their work. Companies that implement Sustainable HRM understand local labor market needs and ethical principles that should ensure job security. Ensuring valuable positions and equally dividing labor in society have gained importance. Creating new jobs on the local market can even become a reason for

establishing a company. This was the case with Sonnentor, the Austrian manufacturer of tea and herbs. Its organizational culture is based on human dignity, cooperation, solidarity, democracy, transparency, and environmentally-friendly sustainable development. With such ethical values as a foundation, it is not surprising that the company is particularly eager to employ employees who have been unemployed for a long time, and many more disabled people than is required by law (Aust, Matthews and Muller-Camen, 2019).

A characteristic feature of Sustainable HRM is also, unsurprisingly, care for the environment. Young people, who are increasingly more aware of environmental issues and environmentally-friendly, force businesses to comply with sustainable development requirements. In some cases, employer branding activities focused on highlighting the environmental responsibility of an organization are carried out in the fight for young talent. Attracting candidates who value the sustainable development of an organization is easier because they are more willing to apply; at the same time, the likelihood that they will want to stay in the company increases in the long run. For some candidates, pro-environmental values may even be more important than earnings or other benefits. Cohen et al. (2010) mentioned it is why some companies promote environmental protection even at the recruitment stage to intentionally draw attention to their values. One example is the outdoor clothing manufacturer, Patagonia, which asks its candidates to be environmentally responsible when preparing application materials.

On the one hand, employers have also begun to reward employees for activities conducive to e□viro□me□tal protectio□; o□ the other ha□d, they themselves undertake such activities as energy saving, printing documents only in justified cases, transferring processes to cloud computing or recycling waste. Conversely, as Savitz and Weber (2013) state, companies that do not care about the environment, or which have a negative impact on the planet because of the nature of their industry, will have more and more problems finding valuable employees. While the level of interest for the environment increases, employees want to be with organizations that are the solution to the problem and not the cause of it

Profitability has always been at the heart of any business. A balanced approach does not negate this i□dispe□sable eleme□t of every e□terprise; however, it is suggested that employees could be included in the distribution of profit, e.g. by paying out performance-based bonuses or by receiving shares in the company.

Employee participation is also an important aspect. It creates conditions for a fruitful social dialogue between the employer, employee, and – possibly – trade unions. Thanks to their participation in the life of the company and decision-making processes, employees begin to be treated as subjects and not as objects. Open, two-way communication is an integral part of Sustainable HRM (Stankeviciute, Savaneviciene, 2018). Unlike limited, patriarchal management models, democratic decision making positively affects the employee's sense of value, dignity, and willingness to share information. A special case here may be a company that does not have a management level, such as one of the largest tomato processing entities, The Morning Star Company. It has a system in which each employee negotiates his scope of responsibility with his own team and makes commitments voluntarily (Aust, Matthews, Muller-Camen, 2019).

In light of this theory, the development of employee competences means that one should focus not only on the currently needed skills, but rather on such sets of competences that the employee will need in the future. This entails treating employees as the most important resource in the organization, while investing in them, according to Becker (2011), is the best possible investment. Many companies - such as Mondi Polska, which specializes in personnel consulting - believe that if resources allow it, it is more important for a company to invest in continuous training and education of staff than in infrastructure or equipment. In the long run, both the employee and the employer gain: the former increases his/her competence, in addition to realising personal ambitions, and the latter achieves success and profit by maintaining competent employees. At the same time, a company offering extensive training and continuous employee development is able to attract the best talent. In this way it sends a clear signal that it is only interested in long-term cooperation, because investing in employees who would be expected to leave the organization soon would be irrational.

The concept of Sustainable HRM places great emphasis on flexibility. It gains particular importance of a time when companies have to respond to adverse changes in their environment. As Carvalho and

Cabral-Cardoso (2008) state, having employees with broad qualifications who are able to adapt and are mobile within the company structure is particularly important. Thanks to such staff, organizations also minimize costs, because – on an as-needed basis – they can involve more or fewer resources for handling key tasks relying only on internal employees. Flexibility also means meeting the needs and expectations of employees. Flexible working hours, work in the home office system, extra days off, and extended holidays are appreciated.

The last two distinctive features of a personnel strategy that takes into account sustainable development are cooperation between employees and equality - justice. The company should internally be one team. Thanks to cooperation in the form of exchange of information and best practices, trust and respect, the quality of work and productivity are increased. Hong and Kim (2019) mentioned, this is particularly important in the case of enterprises with many branches, including foreign ones, and operating in highly competitive markets. At the same time, it should be borne in mind that the principles, rights, and responsibilities should be exactly the same for all employees in the organization (Stankeviciute, Savaneviciene, 2018).

Equality and justice are part of companies' increasingly frequent participation in the fight for human rights. An interesting example is the manufacturer of outdoor and sports clothing, Patagonia, which employs over 2,000 people. The company has developed many HR-related tools to ensure that suppliers implement human rights practices. For example, the rules of conduct for all suppliers say that they may not use human trafficking or modern slavery in recruitment. In order to check compliance with the recommendations, Patagonia checks how its suppliers' employees were recruited, what type of employment contracts were signed, how they are remunerated and whether passports were not taken from them (Aust, Matthews, Muller-Camen, 2019).

The literature also presents the so-called Holistic Model of Sustainable HRM, which is based on four perspectives, enumerated by Mazur (2017):

1. the sociological approach – connecting an employee, employer, and society through such activities as health protection or a pro-family approach,
2. the psychological approach – focusing on employees and their needs, especially their self-development, work–life balance, and autonomy,
3. the strategic perspective – drawing attention to the impact of a balanced approach on traditional HRM (recruitment, selection, rotation, and incentive systems), and
4. the environmental perspective (Green HRM) – focusing on the environmental aspects of the organization's operation, suggesting a pro-environmental approach in employer branding.

An example is Corporate Knights – a magazine published in Canada, describing itself as the "voice of pure capitalism", i.e. focused only on companies that respect a balanced approach to development. Corporate Knights is the first printed magazine in the world to be a "Certified B Corporation", which means it meets stringent standards of social and environmental responsibility and transparency. Interestingly, 100% renewable energy is used to operate their website.

Every year, during the Economic Summit in Davos, the magazine issues the Most Sustainable Corporations in the Word – Global 100 report. It takes into account such factors as productivity, waste management, water use, the fight against poverty, decent working conditions, the use of renewable raw materials, employee turnover, equality, and activities contributing to environmental protection. The winner of the 2019 ranking was the Danish company Chr. Hansen Holding A/S. (Corporate Knights, 2019). The mission of this organization is to develop natural solutions for the food, pharmaceutical, and agricultural industries. Is a supplier of bacterial cultures, probiotics, enzymes, and natural colorants. The company's strategy is Sustainable Development. The company's culture is based on the interaction of the following principles:

- We work to improve the world.
- We operate autonomously.
- We rely on ourselves.
- We deliver results.

The company's mission, strategy, and values fit into the idea of sustainable development. The organization try to improve our environment, simultaneously providing more and more value to investors from year to year, achieving a profit of 340 million EUR in the recent period (Chr. Hansen).

Summing up the factors distinguishing Sustainable HRM, it should be stated that the implementation of this concept definitely contributes to the development of human and social capital within the organization and, in the long run, it positively affects the competitiveness of the company. Wirtenberg et al. (2007) conclude, implementing this idea helps create a more productive and committed team that ultimately contributes to the success of the organization. The company may potentially improve its reputation, productivity, and ability to acquire the best talent from the job market. Moreover, it reduces employee turnover and increases employee involvement while contributing to cost savings or access to capital (Cohen et al. 2010).

MBV vs. Sustainable HRM

There is no doubt that MBV and Sustainable HRM intertwine. As early as 2006, Porter and Kramer noticed that in order to release another wave of innovation and growth, organizations must redefine capitalism through a model of "shared values" that would take into account the social and environmental challenges the society is facing (Porter, Kramer, 2006).

Table 1 summarizes the most important features of both concepts. The following comparison criteria were adopted: idea, time frame, care for the environment, stakeholders, stable access to a qualified workforce, ensuring harmonious work–life balance, promoting personal responsibility, increasing employability, caring for employees, employee sharing in profit, employee participation, employee development, work flexibility, teamwork, equality and justice, and care for the company's image on the job market. For the purposes of the analysis, the theory of both concepts presented in the literature and information from their practical application were used.

Table 1: Comparison of MBV and Sustainable HRM concepts

Criterium	MBV	Sustainable HRM
Idea	basing the management process on values	basing the management process on achieving financial, social, and ecological goals while controlling side effects
Time frame	long-term, but rather limited to a given generation	long-term, covering current and future generations
Care for the environment	potentially one of the values	obligatory
Stakeholders	includes customers, employees, owners, and other significant groups such as suppliers and competitors	broader stakeholder approach covering virtually all inhabitants of the Earth
Permanent access to a qualified work force	yes	yes, one of the basic assumptions
Ensuring a harmonious work–life balance	yes, gaining importance	obligatory
Promoting personal responsibility	yes, gaining importance	obligatory
Increasing employability	not really	yes, much broader social perspective
Care for employees	yes, gaining importance	obligatory
Employee sharing in profit	extremely rare	more frequently
Employee participation	yes, starting from the formulation of shared values	yes
Employee development	definitely yes	definitely yes
Work flexibility	yes, gaining importance	obligatory
Teamwork	definitely yes	definitely yes
Equality and justice	definitely yes	definitely yes
Care for the company's image on the job market	definitely yes	definitely yes

Source: own study

As the analysis of the above table shows, the distinguishing characteristic of Sustainable HRM is, above all, a broader approach to stakeholders. While in MBV we have four groups of stakeholders (employees, customers, owners, and other important ones, such as suppliers or competitors), Sustainable HRM actually affects all of humanity. Therefore, when creating and implementing a strategy, organizations consider the widest possible impact of the effects of their activities.

The second important element that is taken into account in the case of a pro-environmental strategy is the long-term time frame. It focuses on how our present-day actions will affect the lives of future generations, and not just the current generation. This is also reflected in the multi-generational positive impact of actions on the financial results of businesses.

Other elements can be found in both MBV and Sustainable HRM, though with varying degrees of intensity. And, as shown in many examples, caring for the environment can be one of the rules followed by compa□ies; i□the case of a sustainable development strategy, however, this is an obligatory element. The situation is similar with ensuring work–life balance, promoting personal responsibility, attention to employees and their participation in decision-making, or work flexibility. None of these aspects

appear only in one of the analysed management strategies, a fact which only confirms how similar they are to each other.

Conclusions

Increasingly, values are becoming an indispensable tool used in management strategies. The concept of Management by Values has already reached maturity. The relatively younger idea of sustainable development, due to changes occurring on the job market and in nature, is developing extremely rapidly both in the scientific literature and in practice. Organizations are increasingly more and more aware that they □eed to develop sustai□able busi□ess models; by taki□g actio□today, they will □ot □egatively impact the opportunities of future generations.

Therefore, one may be tempted to say that Sustainable HRM is MBV focused on specific values, taking into account future and placing particular emphasis on the environment and related environmental interests of all of humanity. Therefore, Sustainable HRM is not intended to contribute to the total transformation of HR departments, but rather to direct their activities by making values related to sustainable development an indispensable element of the company's personnel policy. As the author showed in this article, sustainable development is one of the values that, by gaining importance, can add a new dimension and impetus to the further development of the concept of Management by Values. Against this background, the fate of the MBV concept comes into question, and the question whether or when Sustainable HRM will replace MBV arises. Research on which values are preferred by people on the job market would undoubtedly help in answering this question. As long as employees are not convinced of the need to implement the idea of sustainability, it is impossible to effectively implement the concept of Sustainable HRM.

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Economic and Non-Economic Determinants of The Return of Polish Labour Migrants (The Example of Lower Silesia)

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Abstract

The Purpose of The Article Is to Identify the Determinants Of Return And To Establish The Role Of Economic Factors Among Them. The Article Consists of the Theoretical Part, Which Uses The Critical Analysis Of The Scientific Literature On Return Migration And The Practical Part, Which Presents The Results Of Surveys Conducted Among Return Migrants In The Lower Silesian Voivodeship. The Main Results of The Conducted Research Showed That Among Emigrants, Decisive For Return Were The Non-Economic Factors, With A Clear Predominance Of Longing For The Family Left In Poland. Economic Considerations, Such As: Achieving the Intended Economic Goal, Decreasing The Subjective Assessment Of The Profitability Of Work Performed Abroad, Finding Work In Poland Or Losing Work Performed Abroad Were Of Less Importance. The Conducted Analysis Is A Preliminary Examination. Although the Information Collected In The Course Of The Research Is Not Representative And Cannot Be Extrapolated To The Entire Group Of Polish Emigrants, In Relation To The Deficiencies Of Polish Migration Statistics, Based Solely On Residence Data, They Allow The Analysis Of The Return Migration Process And Factors Determining Arrivals To Poland From A New Perspective. The Obtained Results Complementary Knowledge In The Area Of Determinants Of Remigration.

Keywords: Return Migration, International Migration, Remigration, Economic Factors Of Migration

Introduction

The Growing Phenomenon Of Population Mobility And The Consequences Associated With It Are Some Of The Most Important Challenges For The Whole World[1].

There Is A Number Of Conditions And Factors That Have Added A New Dimension To Migration Processes In The Modern World, Thus Affecting Their Scale. As Proven By Theories (Ravenstein 1889, Harris And Tadaro 1970, De Haas 2007, Doeringer And Piore 1971, Bohning 1995) And Current Research Carried Out, The Main Factors Of Mobility Are Variations In Diversity, Especially In Pay, In Different Places Around The World. The Disparities Are Particularly Intensified Between Developing Countries (LDC) And Developed Countries (MDC); Intensified In The North-South Divide. In Addition To Income And Social Disparities, An Additional Factor Of Increased Migration Has Become The Strong Demographic Pressure In Ldcs, Caused By A Relatively Larger Birth Rate And Shorter Average Life Expectancy, And Thus Domination Of Young People On The Market, Especially Those Who Are Willing To Change Their Current Place Of Residence (Okólski 2018).

An Equally Important Reason For Increasing People's Mobility Is: The Synergy Of Globalisation With The Flows Of People And Capital Existing Across National Borders; Easy And Cheap Access To Information, As Well As Transport Development. These Factors Not Only Enabled Gathering Of Messages And Comparing Living Conditions, Especially Pay, As Well As Legal And Social Conditions In Various Places Around The Globe, But Also Fast And Relatively Inexpensive Movement Between Areas Of The World (Castles And Miller 2011).

In Polish Conditions, The Intensification Of Poles' External Mobility Is Additionally Influenced By, In Addition To The Above, Other Factors. First Of All, It Is The Country's Accession To The European

Union In 2004 And The Gradual Opening Of Foreign Labour Markets (In 2004: Great Britain, Ireland And Sweden, As Well As New Member Countries; In 2006: Spain, Portugal, Greece, Finland, Iceland And Italy; In 2007: The Netherlands And Luxembourg; In 2008: France; In 2009: Belgium, Denmark And Norway, And In 2011: Germany, Austria And Switzerland). The Free Movement Of Polish Employees Within The European Economic Area Was Synchronised With The Entry Of The Baby Boom Generation In The Labour Market (In The Years 1975-1985, 700,000 People A Year Were Born[2] (Statistics Poland)). The Growing Shortage Of Jobs And, At The Same Time, The Possibility Of Travelling Abroad, Was The Reason For The Increase In The Scale Of Migration. Currently, It Is Estimated That There Are 2.5 Million Residents Outside Poland (This Is The Number Corresponding To The Number Of Births In Poland In The Last Six Years) (Statistics Poland).

The Situation On The Labour Market Caused By Structural And Spatial Mismatch Also Has A Special Impact On The Outgoing Movements From Poland. The General Availability Of Education At Universities Has A Significant Impact On This State. Higher Education, Which Used To Be A Rarity, And Thus Made People Stand Out On The Labour Market, Is Almost A Norm Nowadays. There Are Significant Differences Between The Jobs Offered And The Competences Of Those Who Want And Can Work. As A Result, Difficulties In Finding A Job Increasingly Apply To Educated And Young People. Almost Every Fifth Person Under The Age Of 30 Declares Problems With Finding A Job, While In Higher Age Groups The Difficulty Of Finding Employment Is Reduced By Half. Therefore, Young People, More Often Than In Previous Years, In Search Of Better Living Conditions, Decide To Migrate To A Large Urban Agglomeration Or Abroad.

All This Resulted In A Very Large Increase In Departures, But There Was Also A Large Scale Of Returns, Intensified Especially After The Global Economic Crisis In 2008. The National Census Conducted In 2011 Showed That About 730 Thousand People In Poland Had At Least One Year's Stay Abroad In Their Biography (About 330,000 In The Years 2002-2011). Based On An Earlier Census Of 2002, It Was Found That Between 1989 And 2002, 85,500 People Returned To Poland Permanently. In Turn, According To LFS Data, The Scale Of Return Migration Is Estimated At 580,000 From 2004 To 2008. Almost Half Of These People Returned To Poland In 2007 Alone (Kaczmarczyk Et Al., 2016), Which Corresponds To Two Thirds Of The Number Of Births In Poland During This Period.

Remigration, Although Smaller In Recent Years, Than In 2007, Is Therefore An Important Phenomenon, Whose Economic Effects And Conditions Are Important For The Polish Economy And Its Development Prospects. They Are Of Particular Importance In The Face Of Progressive Depopulation, Intensified Primarily In Smaller Regional Centres. Young People, Who Do Not See Development Prospects In A Polish Province, Leave Regions Characterised By Slower Development Dynamics. Among These People, According To Research, Women Dominate[3] (Jończy 2010a). The Potential For Migration Is Also One Of The Basic Resources That Should Be Considered, Not Only In The Context Of Demographic Load Indicators (In 2008, There Were 41 People In Retirement Age For 100 People Of Post-Working Age. In 2060, According To Official Forecasts, There Will Be 91 People (Team For Analyses And Thematic Studies 2011)), But Also Growing Gaps In The Labour Market, Temporarily Filled With Immigration From Ukraine (Forecasts Show That In 2030, Around 16 Million People Will Work Out Of 20 Million Employees Needed; There Will Be A Shortage Of Both Highly Qualified And Basic Employees (Team For Analyses And Thematic Studies 2016)).

In The Above Context, It Is Important To Gather Information About The Return Determinants Of Those From Abroad. Therefore, The Purpose Of The Study Was To Determine The Role Of Economic Factors Among The Motives For Returning To Poland. The Following Research Question Was Adopted: What Is The Role Of Economic Factors In Remigration Decisions? Because Return Migration And Its Determinants Are A Relatively Poorly Studied Area, This Text Is An Attempt To Provide Knowledge On Possible Ways To Stimulate Return Flows Of Migrants. In Addition, Due To The Difficulty Of Reaching People Who Have Returned To Their Country Of Origin, Most Of The Existing Research Covering The Subject Of Remigration Was Based On Statistical Data; Hence The Originality Of The Empirical Research Presented In The Text Consists In Using The Survey Method To Analyse Return Determinants.

The Structure Of The Text Is As Follows. The First Part Presents Selected Migration Theories. A Synthetic Review Of Contemporary Return Migration To Poland Was Then Carried Out. The Rest Of

The Article Presents The Results Of Empirical Research On The Motives For Returning To The Country.

Theoretical Grounds

There Is No Broad Theoretical Framework In The Literature On The Subject To Analyse Return Migration. Understanding The Size And Dynamics Of Returns To Countries Of Origin Is Possible Thanks To General Theories Of Migration, Which Also Include The Aspect Of Return Migration.

The First Is The Neoclassical Approach, In Which, In The Absence Of A Reduction In The Pay Gap Between The Place Of Origin And The Host, Remigration Should Only Occur If The Migrant's Aspirations For Higher Net Wages Have Not Been Met. The Reason For Not Meeting Expectations May Be The Presence Of Unemployment In The Country Of Migration, Lower Wages Than Expected Or Higher Psychological Costs Of Moving (Constant And Massey 2002; Dumon And Spilgovel 2008). In This Sense, Return Is Seen As A Failure, The Effect Of Not Achieving The Expected Benefits In The Country Of Emigration (De Haas Et Al., 2014). It Should Be Noted Here, That In The Neoclassical Theory, Return Migration Only Applies To People Who Left For Work And Their Experience And Skills Were Not Rewarded As Expected. At The Same Time, As Research Shows, Highly Qualified Migrants Will Be Less Willing To Return From Countries Where There Are Smaller Pay Disparities (Grabowska-Lusińska 2013). What's More, Returns Are Characterised By Negative Selectivity Regarding Success In Terms Of The Expected Amount Of Pay, Employment, As Well As Professional Achievements Gained In The Country Of Migration (Constant And Massey 2002).

The New Economic Theory Of Migration (NELM) Presents A Different View On Return Migration. According To The Assumptions Of This Model, Unlike In The Neoclassical Approach, Return Migration Is Treated As A Success And Is An Inseparable Element Of Emigration. Remigration Is The Result Of A Household Strategy And Is The Logical Consequence Of Successfully Achieving All Migration Goals (Cassarino 2004). According To King, Savings Brought From Abroad, Which Always Accompany Returns, Can Be Used As An Investment (King 2012). The New Economic Theory Of Migration Assumes A Negative Selection Of Return Migration In Terms Of Work Effort/Time (Constant And Massey 2002).

Another Possible Perspective For Analysing Return Migration Is The Structural Approach Proposed In The 1970s And 1980s. It Combines The Features Of Sociological, Geographical, Social And Anthropological Sciences. According To This Theory, The Migration Process And The Return Decision Can Only Be Considered In A More Global Approach, By Identifying All Elements That May Affect Emigration And Return, Namely: The Technological Environment, Economic, As Well As Social (Piche 2013). Thus, In The Structural Approach, Return Is Not Only Analysed In The Context Of Individual Migration Experiences, But Also In Relation To Social And Institutional Factors In The Country Of Origin. Notably, Structuralists Attribute A Greater Impact On The Innovation Potential And Reintegration Of Returnees To Values And Traditions In A Familiar Place, Than To Financial And Human Capital Of Returnees (Cassarino 2004).

In The History Of Polish Return Migrations, Researchers, In Relation To Historical Events Relevant To The Polish Nation, Distinguish Three Phases Of Returns, Namely: Traditional Remigration That Took Place Up To World War II, Migration That Took Place During World War II And Directly After Its Ending, And In The Period Up To 1989, As Well As Returns After 1989. Empirical Research Conducted In This Area Proves That, Depending On The Contextual Framework, The Mechanisms Of Remigration Have Changed, And Thus The Factors Determining The Decision To Return Have Changed And Are Still Changing (Slany And Ślusarczyk 2010).

Polish Studies Of Contemporary Return Migration Are Divided Into Two Phases: Studies On The Transitional Period: 1989-2004 (Iglicka 2002; Jończy 2010b; Heffner And Sołdra-Gwiżdż 1997; Fihel And Górny 2013) And Studies On Post-Accession Remigration, I.E. After 2004. According To The Researchers, In The First Of The Periods Discussed Above, Primarily Entire Families Returned, Among Them Well-Educated People Who Know Languages (Fihel Et Al. 2008). Changing Economic Conditions, Primarily The Freedom To Leave Poland And Return To The Country, Caused The Dominance Of Short-Term Circular Migrations At That Time, Including Incomplete Migration (Jaźwińska And Okólski 2001; Jończy 2010b).

After Poland's Accession To The EU, The Mobility Of The Polish Population Became More Free. The Opening Of Borders, Access To Foreign Labour Markets And Globalisation Have Led To Significant Changes In The Intensity Of Migration And Return Migration. These Phenomena Have Become The Subject Of Not Only Lively Political And Public Debate, But Also An Increasingly Popular Direction Of Scientific Research (Especially Intensified After The Economic Crisis In 2008). Iglicka Made A Significant Contribution To The Study Of Return Migrations. The Author Found That, In The Case Of Three Quarters Of Respondents, A Return Was The Result Of The Adopted Migration Strategy (Iglicka 2010). Subsequent Studies Of This Period Were Focused On The Return Of Poles From Specific Countries, Including Great Britain, USA, Iceland. The Authors Made Arrangements Regarding Factors Determining The Return, Distinguishing, Among Others, Family, Professional And, Less Often, Educational Considerations; Indicating, For The Most Part, The Predominance Of Non-Economic Incentives. At The Same Time, The Market Situation In Poland And The Host Country Was Also Important When Making Decisions On Remigration (Małek 2012; White 2014; Budyta-Budzyńska 2017). In Addition To The Above, Regional Analyses Were Also Carried Out. Research Projects Of This Type Were Most Often Carried Out At The Request Of Voivodeship Labour Offices With Co-Financing Of The European Social Fund (CDS 2010).

Data and Methodology

Due To The Complexity Of Migration Processes And The Fact That They Are Of Interest To Many Scientific Disciplines, Both Researchers And State Institutions Are Facing Difficulties With A Clear Definition. There Are Many Different Definitions Of Return Migrations Available In The Literature, Both General And Clearly Targeted On The Nature Of The Author's Deliberations. In This Study, A Return Migrant (Interchangeably A Remigrant) Refers To A Person Who, After Staying At Least One Year Abroad, Decided To Return To Poland Permanently, And Whose Departure Was For Work Or Educational Purposes.

Using The Multiplied Snowball Method, The Study[4] Covered A Group Of 312 Residents Of The Lower Silesian Voivodeship. Participants Were Recruited In 26 Lower Silesian Poviats And 4 Cities With Poviat Rights (In 2019). An Anonymous Questionnaire Was Used To Collect Empirical Material, In Which Respondents Were Asked To Choose The Factors That Were Relevant When Deciding To Return To Poland And To Indicate The Deciding Factor. Guided By The Results Of The Pilot Study Respondents Were Offered The Most Frequently Appearing Answers; Among Which Were: *"Loss Of Work Performed Abroad, Earnings Abroad Are No Longer Satisfactory, Finding A Job In Poland, Starting A Business In Poland, Achieving The Intended Economic Goal, Starting A Family In Poland, Longing For Family Left In Poland, Illness/Death Of Someone In The Family, Family No Longer Needs Additional Income, Return Of Friends/Relatives With Whom I Stayed Abroad, Obtaining The Right To A Pension, Loss Of Social Benefits Obtained Abroad"*. The Respondents Were Also Allowed To Enter Other Reasons, For Answers Not Provided In The Multiple-Choice Questions. By Comparing The Obtained Empirical Data And Metric Features Of The Respondents, Arrangements Were Made For The Selectivity Of Return Migration Relative To The Determinants That Cause It.

It Should Be Emphasised, That Although The Information Collected In The Course Of The Research Is Not Representative And Cannot Be Extrapolated To The Entire Group Of Polish Remigrants, In Relation To The Deficiencies Of Polish Migration Statistics, Based Solely On Residence Data, They Allow The Analysis Of The Return Migration Process And Factors Determining Arrivals To Poland From A New Perspective.

Table 1 Presents The Characteristics Of Respondents, Including: Gender, Age, Marital Status, Number Of Children, As Well As The Year Of Return.

Table 1: The Research Group Broken Down Into Metric Features: Gender, Age, Marital Status, Number Of Children And Year Of Return

Particulars	*Participation %*
Gender	
Women	49.04%
Men	50.96%
Age	
18-25	6.73%
26-35	40.38%
36-45	25.00%
46-55	6.73%
56-65	5.77%
>65	1.92%
Marital Status	
Single	26.92%
Married	67.31%
Divorced	5.77%
Number Of Children	
0	17.31%
1	27.88%
2	29.81%
3 And More	8.65%
Year Of Return	
2004-2007	4.81%
2008-2010	11.54%
2011-2014	12.50%
2015-2020	70.19%

In The Group Of Respondents, The Share Of Women And Men Is Almost The Same (49% To 51%). Breakdown By Age Shows An Over-Representation Of Persons Under 35 Years Of Age. On The One Hand, This Reflects The Age Structure Of Contemporary Polish Emigrants, Among Which People In The 20-40 Years Age Range Dominate (Jończy 2010a), Which, At The Same Time, Indicates That Young People Are More Likely To Permanently Change Their Current Residence, Having No Professional And Family Obligations. Incidentally, 60% Of People Aged 26-35 Are Women, Which Is Associated With The High Feminisation Of Post-Accession Migration Outflows From Poland.

Notable Is, That In The Sample Over 70% Of Respondents Returned After 2015; Considering The Age Of The Respondents, It Confirms That The Analysed Phenomenon Of Remigration Is, To A Large Extent, A Derivative Of Post-Accession Migrations That Took Place After Poland's Accession To The European Union.

Results

The Factors That Prompted Migrants To Return To Poland Were Associated With An Economic Or Non-Economic Motive (Figure 1). In This Question, The Respondents Could Indicate More Than One Answer.

Fig. 1: Factors For Returning From Abroad

Nearly Two Thirds Of The Respondents Pointed To Their Longing For Family As One Of The Determinants Of Remigration, The Next Important Factors When Deciding To Change Their Current Place Of Residence Were: Achieving The Intended Economic Goal (28.85%), A Decrease In The Subjective Assessment Of The Value Of Earnings Obtained Abroad (23.08%) And Finding A Job In Poland (21.15%). A Clear Advantage Of "Longing" Over Other Answers Loses Importance When The Motives For Returning To Poland Are Divided According To Their Economic Or Non-Economic Nature (Table 2). It Turns Out, That The Share Of Answers In Each Group Is Similar (94% To 94%), Which Makes It Possible To Believe That Economic Factors Are As Important When Making A Decision On Remigration, As Those With Non-Economic Grounds.

Table 2: Economic And Non-Economic Factors

Economic Factors	*% Of Indications*	*Non-Economic Factors*	*% Of Indications*
Achieving The Intended Economic Goal	28.85%	Longing For Family Left In Poland	57.69%
Earnings Abroad Are No Longer Satisfying	23.08%	Starting A Family In Poland	18.27%
Finding A Job In Poland	21.15%	Illness/Death Of Someone In The Family	9.62%
Starting A Business In Poland	10.58%	Return Of Friends/Relatives From Abroad	5.77%
Loss Of Work Performed Abroad	7.69%	Family No Longer Needs Additional Income	2.88%
Obtaining The Right To A Pension	2.88%		
Sum	**94.23%**	**Sum**	**94.23%**

More Accurate Data Is Provided By The Comparison Of Remigration Factors Declared By Respondents With Their Metric Features, Such As Gender And Age. The Year Of Return From Abroad Was Also Taken Into Account In The Analysis (Table 3).

Table 3: Factors For Returning From Abroad, Broken Down By Respondents' Particulars

	Return Factors											
	Family Does Not Need Additional Income	*Starting A Business In Poland*	*Loss Of Work Performed Abroad*	*Illness Or Death Of Someone In The Family*	*Finding A Job In Poland*	*Earnings Abroad Are No Longer Satisfying*	*Starting A Family In Poland*	*Achieving The Intended Economic Goal*	*Longing For Family Left In Poland*	*Return Of Friends Or Relatives With Whom I Stayed Abroad*	*Obtaining The Right To A Pension*	*Other*
Gender												
Women	3.9%	7.8%	5.9%	15.7%	15.7%	21.6%	19.6%	33.3%	**54.9%**	7.8%	3.92%	31.4%
Men	1.9%	13.2%	9.4%	3.8%	26.4%	24.5%	17.0%	24.5%	**60.4%**	3.8%	1.89%	9.4%
Age												
18-25	0.0%	0.0%	14.3%	0.0%	42.9%	28.6%	0.0%	0.0%	**71.4%**	42.9%	0.0%	0.0%
26-35	0.0%	7.1%	4.8%	9.5%	11.9%	16.7%	23.8%	38.1%	**54.8%**	4.8%	0.0%	23.8%
36-45	7.7%	15.4%	15.4%	11.5%	23.1%	26.9%	15.4%	26.9%	**46.2%**	0.0%	0.0%	26.9%
46-55	14.3%	0.00%	0.0%	14.3%	28.6%	42.9%	14.3%	28.6%	**85.7%**	0.0%	0.0%	14.3%
56-65	0.0%	16.7%	16.7%	16.7%	33.3%	33.3%	0.0%	33.3%	**100%**	0.0%	0.0%	0.0%
>65	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	**100%**	0.0%	50%	0.0%
Year Of Return												
2004-2007	0.0%	20.0%	0.0%	0.0%	20.0%	**40.0%**	**40.0%**	20.0%	**40.0%**	0.0%	0.0%	20.0%
2008-2010	0.0%	9.1%	27.3%	9.1%	18.2%	18.2%	9.1%	9.1%	**72.7%**	9.1%	0.0%	0.0%
2011-2014	0.0%	7.7%	7.7%	7.7%	30.8%	30.8%	30.8%	**53.9%**	23.1%	0.0%	0.0%	30.8%
2015-2020	4.2%	11.1%	5.6%	11.1%	20.8%	22.2%	16.7%	27.8%	**65.3%**	6.9%	4.2%	22.2%

The Comparison Of Factors Determining A Return To Poland, Broken Down By Gender, Provides Significant Conclusions. Almost Every Economic Response Is Dominated By Men. The Situation Is Reversed Among Women, Where Non-Economic Factors Were More Often Indicated. This May Not Only Be Evidence Of Polish Cultural Conditions, In Which Women More Often Stay At Home To Look After The Family, But Also Reflect The Relatively Difficult Situation Of Young Women On The Lower Silesian Labour Market. Despite The Decrease In The Unemployment Rate In The Lower Silesian Voivodeship From 13.1% In 2013 To 4.3% In 2019, The Percentage Of Women In The Age Groups Up To 44 Years Old Without Work Is Much Higher Than That Of Men; In 2017: In The Age Group 18-24 – Women Constituted 12.1% [Men: 7.3%], 25-34 Years Old – Women: 32.7% [Men: 16.7%], 35-44% – Women 26.4% [Men: 20.9%] (Lower Silesian Labour Office 2018).

Several Clear Tendencies In The Formation Of Motives For Making A Decision To Return To Poland Can Be Seen By Analysing The Answers Given With The Age Of The Respondents. First, As One Of The Reasons For Making A Decision On Remigration, Occurring Only Among Young People (Up To 35 Years Of Age), Was The Return Of Friends/Relatives From Abroad. In Older Age Categories This Reason Was Not Indicated. Secondly, The Number Of "Starting A Family In Poland" Responses Was More Frequent, The Lower The Age Of The Respondents. Regardless Of The Age Of The Person Asked, The Most Frequently Motivated Return Motive Was Longing For The Family Left In Poland.

The Variety Of Indications Is Also Noticeable In The Division Of Respondents In Respect To Their Year Of Return From Abroad. Among Those, Who Migrated In The Years 2011-2014, The Most

Frequently Occurring Factor That Had An Impact On The Decision To Return Was The Achievement Of The Intended Economic Goal (53.9%), Which Can Be Interpreted As An Advantage In The Study Group In Those Years Of Conservative Returns. In Addition, In The Case Of The Direct Post-Crisis Period (2008-2010), There Is A Noticeable Decrease By 100%, In Relation To 2004-2007, Of The Significance In The Motives For The Migration Of Responses: Starting A Business In Poland – This May Be Directly Related To Macroeconomic Changes In 2007-2008, Caused By Global Economic Crisis.

In-Depth Data Is Provided By The Analysis Of The Answer To The Question About The Decisive Factor In Returning (Figure 2).

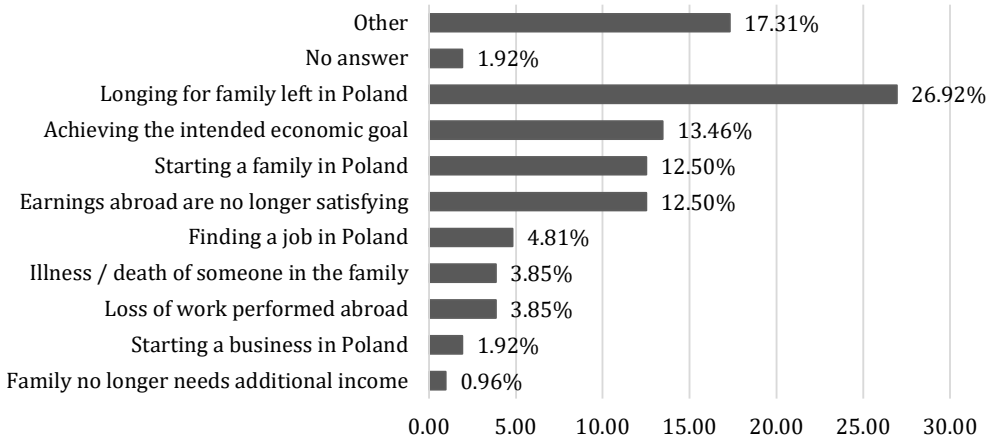

Fig. 2: The Decisive Factor In Returning

Longing For The Family Left In Poland Was The Decisive Motive For The Migration Of Every Third Respondent. Less Important Economic Motives Were Those, Such As: Achieving The Intended Economic Goal (13.46%), A Decrease In Satisfaction With Foreign Earnings (12.50%) Or Finding A Job In Poland (4.81%). These Results Correspond With Earlier Studies Of Contemporary Polish Migrations And Return Migrations, In Which Researchers Have Proved The Advantage Of Economic Incentives Over Those Non-Economic To Leave Their Current Place Of Residence, And That Non-Economic Factors Are More Important (Than In Emigration) When Making A Decision About Return Migration (Jończy 2010; Iglicka 2010; Grabowska-Lusińska And Okólski 2012).

Non-Economic Factors Become Even More Important When The Answers Are Divided Into Two Groups; Economic And Non-Economic Factors (Table 4). Exactly Half Of The Respondents Indicated A Non-Economic Incentive As The Decisive Motive For Return. Economic Factors Were The Most Important Factor When Making A Decision On Remigration For 36.54% Of Respondents. Other People Questioned Did Not Answer This Question Or Pointed To Other Factors.

Table 4: Economic And Non-Economic Factors – A Decisive Factor In Returning

Economic Factors	*% Of Indications*	*Non-Economic Factors*	*% Of Indications*
Achieving The Intended Economic Goal	13.46%	Longing For Family Left In Poland	26.92%
Earnings Abroad Are No Longer Satisfying	12.50%	Starting A Family In Poland	12.50%
Finding A Job In Poland	4.81%	Illness/Death Of Someone In The Family	3.85%
Loss Of Work Performed Abroad	3.85%	Return Of Friends/Relatives From Abroad	5.77%
Starting A Business In Poland	1.92%	Family No Longer Needs Additional Income	0.96%
Sum	**36.54%**	**Sum**	**50.00%**

Interesting Data Is Provided By The Analysis Of The Distribution Of Answers About The Decisive Return Factor With The Year Of Return (Table 5). Namely, The Indication Of Starting A Business In Poland Only Appears In Relation To The Latest Remigration That Took Place After 2015. The Migration Of Almost Every Fifth Respondent Returning In The Period Immediately After The Global Economic Crisis, I.E. After 2008, Was A Return To Disappointment In The Host Country (Loss Of Work Performed Abroad). This Type Of Return Was Less Important In The Case Of People Who Returned In 2011-2014 (7.69%), And Almost Never Occurred Among Remigrants After 2015 (1.39%). A Similar Tendency Is Noticeable When The Subjective Assessment Of The Profitability Of Work Performed Abroad Decreases.

Table 5: Decisive Factor For Return From Abroad, Broken Down By Respondents' Particulars

		Return Factors								
	Family Does Not Need Additional Income	*Starting A Business In Poland*	*Loss Of Work Performed Abroad*	*Illness Or Death Of Someone In The Family*	*Finding A Job In Poland*	*Earnings Abroad Are No Longer Satisfying*	*Starting A Family In Poland*	*Achieving The Intended Economic Goal*	*Longing For Family Left In Poland*	*Other*
Gender										
Women	1.96%	0.00%	1.96%	5.88%	3.92%	7.84%	3.92%	13.73%	13.73%	**25.49%**
Men	0.00%	3.77%	5.66%	1.89%	5.66%	16.98%	13.21%	13.21%	**26.42%**	9.43%
Age										
18-25	0.00%	0.00%	0.00%	0.00%	**28.57%**	**28.57%**	0.00%	0.00%	**28.57%**	0.00%
26-35	2.38%	2.38%	0.00%	2.38%	2.38%	9.52%	14.29%	16.67%	**26.19%**	23.81%
36-45	7.69%	3.85%	3.85%	7.69%	3.85%	11.54%	11.54%	11.57%	**23.08%**	15.38%
46-55	0.00%	0.00%	0.00%	14.29%	0.00%	**28.57%**	14.29%	14.29%	**28.57%**	0.00%
56-65	16.67%	0.00%	0.00%	0.00%	0.00%	0.00%	16.67%	16.67%	**50.00%**	16.67%
>65	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	**100.0%**	0.00%
Year Of Return										
2004-2007	0.00%	0.00%	0.00%	0.00%	0.00%	20.00%	**40.00%**	20.00%	20.00%	0.00%
2008-2010	0.00%	0.00%	18.18%	0.00%	0.00%	18.18%	9.09%	9.09%	**45.45%**	0.00%
2011-2014	0.00%	0.00%	7.69%	0.00%	7.69%	15.38%	7.69%	23.08%	7.69%	**30.77%**
2015-2020	1.39%	2.78%	1.39%	5.56%	5.56%	11.11%	12.50%	11.11%	**29.17%**	19.44%

Diversity In The Most Important Motive Prompting Remigration Is Visible In The Breakdown By Gender Of The Respondents. Male Remigration Was More Often Associated With The Economic Motive, Including With The Start-Up Of A Business In Poland, The Loss Of Work Performed So Far, Finding A Job In Poland Or A Decrease In The Subjective Assessment Of The Profitability Of Work Abroad. For Both Women And Men, The Share Of People Whose Return Was Part Of The Adopted Migration Strategy (Achieving The Intended Goal) Was Comparable (Around 13.5%).

Return Because Of Finding Work In Poland Was The Position Of The Youngest People (18-25 Years). However, Irrespective Of The Age Of The Respondents, Longing For Family Was The Factor That Most Determined The Return To Poland.

Conclusions

Although the Analysis Contained in This Text Is Not Representative, It Allows Drawing Important Conclusions on The Motives for Return. As Demonstrated by Empirical Research Conducted Among Remigrants, Decisive for Return Were the Non-Economic Factors, With A Clear Predominance of Longing for The Family Left in Poland. Economic Considerations, Such As: Achieving the Intended Economic Goal, Decreasing the Subjective Assessment of The Profitability of Work Performed Abroad, Finding Work in Poland Or Losing Work Performed Abroad Were of Less Importance.

Nevertheless, Despite the Fact That Non-Economic Reasons Are Extremely Important in The Remigration Decisions of The Examined Group (97.11% Of Responses), In A Summary of The General Factors Determining the Decision to Return, According to Their Nature, It Turns Out That Economic Motives Are Equally Important (91.35%). This Conclusion Is Extremely Important in Relation to The Problems Poland Is Currently Facing, Including Depopulation, An Ageing Society (With A Simultaneous Decline in The Fertility Rate) And an Increasing Supply Gap in The Labour Market. While It Is Not Possible to Influence the Occurrence of Family Factors Inclining the Return of Migrants, An Attempt to Encourage Remigration to The Country of Origin by Stimulating Economic Pull Factors Seems Possible. First of All, Through Adjustment Measures on The Labour Market, Consisting in Offering Employers Jobs Adequate to The Requirements of Employees, Both in Terms of Pay and Types of Available Vacancies. A Number of Measures to Achieve A Positive Migration Balance Can Also Be Taken by The State, By Stimulating Remigration. The Most Important of Them Include Appropriate Fiscal Policy, As Well As Simplification of Procedures and Reduction of Costs of Starting Business Activity and Employment in Poland.

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[1] Currently, about 3.5% of the world's population lives outside their area of birth (Trends in International Migrant Stock 2019).

[2] For comparison: in 1985-2003, an average of 352,000 children a year were born in Poland, which is half of the baby boom summit 1975-1985 (Statistics Poland).

[3] The feminisation of migration, that has been noticeable in recent years, is caused by the lack of jobs for women in local labour markets

[4] The study was carried out as part of work on the doctoral dissertation.

The Situation on The Local Labour Market as A Determinant of Internal and External Youth Migration – Example of The Lower Silesian Voivodeship

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Abstract

The problem of spatial displacement in the population has an increasingly stronger stigma in the areas it concerns. Today, a particularly important phenomenon in the scope of migration processes is the increased mobility of young people from peripheral areas towards the centres of regions and abroad. The relatively large loss of youth from peripheral areas is a significant problem, because the standard of living in local communities will depend on the activity and quality of actions taken by young people. The aim of the study is to determine the impact of the situation on local labour markets on the level of internal and external migration of young people in the Lower Silesian Voivodeship. The results of the completed research indicate that only about ¼ of respondents prospectively intend to remain in areas with high unemployment rates.

Keywords: Migration, Youth, Labour Market, Unemployment

Introduction

Mobility of the population is constantly increasing and the reasons for this phenomenon should be seen in at least several factors, which include: increasing socio-economic disproportions between countries, as well as within them, especially in the centre-periphery model, manifesting, among others, in a disproportionately faster development of economic activity and the labour market in large regional areas; increasing access to information on living and working conditions in various places, which facilitates the comparison of many potential destinations and makes the decision on migration and choosing its direction easier and easier (Zięba 2008); transport accessibility – development of the transport network, bus and flight connections, which means that the movement of people, both inside the country and abroad, is faster, easier and cheaper (Zając 2012).

The phenomenon of the increase in population mobility also applies to Poland, where it has been further compounded by Poland's accession to the European Union and the opening of Western labour markets (Jończy 2010; Kaczmarczyk 2012; Kaczmarczyk, Okólski 2008), as well as the growing aspirations of young people, which result from almost unlimited and free access to studies, but they cannot be satisfied through offers of local labour markets (Iglicka 2010).

The good economic situation of Poland and the related low unemployment rate (for Poland, the registered unemployment rate according to Statistics Poland at the end of December 2019 was 5.2%[1], while according to Eurostat 3.3%) on the whole indicates a very good situation on the Polish labour market. While, according to Eurostat data, the average unemployment rate for the member states of the European Union at the end of December 2019 was 6.2%, with the highest level being maintained in Greece (16.2%), Spain (13.7%) and Italy (9.8%), while the lowest in the Czech Republic (2.0%), Germany (3.2%) and the Netherlands (3.2%)[2]. Considering such statistics, it can be assumed, that young people in Poland should not have a problem finding a job. However, it should be noted, that such a low unemployment rate is largely influenced by the good situation on the labour market of the agglomerations of the five most economically attractive Polish cities, i.e. Kraków, Poznań, the Tricity, Warsaw and Wrocław, and also (though to a lesser extent) other regional centres. On the other hand, looking deep into individual regions, strong differences can be noticed, especially areas located at a

considerable distance from urban agglomerations are characterised by high levels of unemployment. An additional problem is the structural mismatch in the labour market, the surplus of highly qualified people and the shortage of low-qualified employees.

While data on the labour market can be obtained in a relatively simple way, the availability of migration data is much more limited, and its quality can be easily questioned. In the case of some areas of Poland, characterised by intensive mobility, the scope of actual final migration turn out to be many times larger than those officially registered in the form of de-registrations (Jończy 2010, 2017; Śleszyński 2013), hence public statistics are not a sufficient basis for this type of analysis.

This situation allows to formulate the hypothesis that one of the main factors determining population movements is the situation on the local labour market. Difficulties in finding a job consistent with one's education (more and more often at a higher level), as well as work for which attractive salaries can be obtained, or even any job (especially in the peripheral areas of Poland), means that (especially) young people often make decisions about migration.

In this study, it was decided to verify this hypothesis by analysing the migration preferences of people from low and high unemployment areas. High school graduates were chosen as the research group, because they are the most mobile. It was decided to examine the intentions and not real migrations, because these young people can still be found in their areas of origin and, at the same time, they have plans for the near future quite well defined. In order for the results of the conducted studies to be compared, only general education high school graduates were subjected to the study (in this way it was intended to avoid distorting the results by the answers provided by respondents from profiled schools, who are studying in a direction according to work available/unavailable in their area of residence). In addition, the universality of general secondary schools causes that, in each of the areas selected for research, there will be a large enough group of students (in Poland, persons graduating from general secondary schools constitute almost half of the representatives of individual age groups) that it will be possible to conduct research in the most typologically homogeneous group representing the most common form of upper secondary education.

The Lower Silesian Voivodeship was selected as the research area because it is characterised by significant disparities in the level of socio-economic development between its centre (Wrocław agglomeration) and the majority of the remaining area. The strategic geographical location of the voivodeship also seems to be important, enabling easy access to attractive European cities, which is conducive to migration decisions. Guided by the main purpose of the research, it was decided to carry them out on contrast samples, which consists of taking samples from groups differing from the point of view of a certain variable important for the research. To accurately illustrate the scale of the problem of "youth drain" and to determine to what extent the situation on local labour markets determines youth migration decisions, it was decided to compare two groups of poviats of the Lower Silesian Voivodeship. The unemployment rate in individual poviats of the Lower Silesian Voivodeship became the key criterion for the selection of the sample. As a result, based on the available statistical data, three poviats with the lowest unemployment rate were selected, i.e. the city of Wrocław (unemployment rate 2.2%), the city of Jelenia Góra (unemployment rate 3.3%) and Lubin poviat (unemployment rate 5.1%), and in contrast three of the highest values: Lwówek Śląski (unemployment rate 12.8%), Kłodzko (unemployment rate 12.2%) and Góra (unemployment rate 16.1%) poviats[3]. Based on the two groups of poviats created in this way, an analysis of the results of completed research will be conducted.

Literature Review

By entering the literature review related to the topic, it should be emphasised that research on migration is located on the border of many social sciences, among which sociology, economics and geography should be distinguished. Thus, they are considered to be extremely complex and having an interdisciplinary and multi-faceted dimension. For this reason, it is difficult to expect one comprehensive and fully satisfactory theory explaining the behaviour associated with the mobility of the population. Bearing in mind the subject of this study, the focus was therefore on the economic approach, which was founded by E. G. Ravenstein. Although in his scientific work he represented

geography, and in an article published in 1885 entitled "Rights of migration" presented all the important legal, social, cultural and political factors of human mobility, he concluded with the statement that "none of the migration streams (caused by these factors) can match the stream caused by the natural tendency among (most) people to improve their material situation" (Ravenstein 1889; Brzozowski, Kaczmarczyk 2018). Migration as a means to achieve spatial economic balance is also indicated by the classical theory of migration. Treating migrants as a factor balancing labour markets and assuming that every person intending to migrate aims to maximize their income, having full knowledge of achievable benefits, and all employees have the same qualifications and needs, and at the same there are no barriers to migration (Castles, Miller 2011). Neoclassical theory also plays an important role in research into economic migration. Assuming that potential migrants have full knowledge about the level of earnings and chances to find employment in the target regions and that their migration decisions depend on this factor to the greatest extent possible (Castles, Miller 2011). This theory is based on pull and push factors, i.e. conditions in the place of residence (high unemployment, low earnings – push), which induce the population to move to places where the earnings are higher and the unemployment rate lower (pull) (Massey et al. 1993; Jończy 2010).

Also in the modern world, most of the migrations observed are economic, and living needs come to the fore. Among the reasons for the huge scale of migration, differences in the standard of living, difficulties in finding a job and a lack of prospects for the future are of particular importance. On decisions about migration, the desire to raise one's own standard of living resulting from perceiving one's own financial situation as relatively worse than other members of society is also significant (Kozielska 2014; Danilewicz 2006). Therefore, economic migrations are closely related to the search for a job that allows them to obtain the necessary resources to survive, and the desire to improve living conditions outside the country or region of origin (Makrowski 2008; Korczyńska 2003). And the economic situation of the country and the situation on the labour market often "shape" life strategies of the young generation (Hałaj, Stec 2007).

In the context of this work, the state of knowledge and research on youth migration undertaken as a result of the difficult situation on the local labour market should be indicated. This phenomenon has been affecting the countries of South-West Europe for a long time: Germany, Portugal, Southern Italy, Greece and Spain. In Italy and Spain, this process began in the second half of the last century, when the population left peripheral regions and moved to larger cities (Andrada 1981). Today, this phenomenon is compounded there by the high level of unemployment in local labour markets, as well as discrepancies between the needs of the labour market and the directions of education of young people (Selva et al. 2016), the consequence of which is a large-scale brain drain (Santos 2013). Eastern Germany also has a strong drain of young educated people from peripheral areas, the research conducted there showed that the main factor pushing them out of their current residence are worse career prospects and a significant economic backwardness (Lang et al. 2015). Youth migrations in the periphery-centre system also apply to Central and Eastern Europe, including Lithuania, where population concentration is observed in the Vilnius agglomeration, while peripheral areas, both rural and smaller cities, are depopulating (Ubarevičienė et al. 2016), as well as the Czech Republic, where there is a strong concentration of population in the capital of the country and simultaneous depopulation of the periphery (Vaishar, Pavlů 2018), or peripheral areas and smaller cities of Romania, where the phenomenon of declining job offers and the strong ageing of the population are common (Bănică et al. 2017). Migration of young people from the periphery and into the direction of several major cities is also observed in Russia, where the swelling process of large centres takes place at the expense of rural areas and small and medium-sized cities (Mkrtchuan 2014).

Also in Poland, migrations undertaken by young people are a common phenomenon that is of interest to many researchers. Research in this area is carried out at the Department of Economics and Development Research at Wrocław University of Economics (Jończy et al. 2013; Jończy, Grabowska (ed.) 2013; Dolińska et al. 2020a; Dolińska et al. 2020b). Relevant to this publication, the conclusions of this research boil down to the findings that the main component of current migration movements, which has a decisive impact on depopulation taking place in the spatial system of the country, are youth migrations undertaken after graduating from upper secondary schools, especially people who are pursuing readily available and massively undertaken studies, and after their completion no longer

returning to their areas of origin, which in consequence leads to a weakening of the intellectual potential and social activity of drained areas. The phenomenon of migration of Polish youth is also dealt with by the research centre "Youth Research Center" at the Warsaw University of Social Sciences and Humanities, where one of the research topics undertaken is to determine the role of the place of residence in taking up your first job in Poland or abroad. The negative effects of long-term post-accession migration of Polish youth are pointed out by K. Iglicka, who points to the phenomenon of a potentially dangerous "migration trap loop" when young Poles returning to the country are disappointed with this return and decide to go abroad again (Iglicka 2010). Other research carried out in Poland addresses the issue of youth migration from peripheral areas (villages and small towns) in the direction of European economic centres, where they have the chance to fulfil their professional ambitions. This is a series of studies aimed at verifying the hypothesis about the positive aspect of this type of migration, which may be a better allocation of labour resources, imprisoned there until now (Kaczmarczyk, Okólski 2008; Grabowska-Lusińska, Okólski 2009). In the course of these studies, it was also found that many of these young migrants can return to Poland, rather not to the place from which they left, but to major economic centres where there are better employment prospects.

In the literature on the subject, one can also find publications based on the results of research, the purpose of which was to approximate the image and specificity of migration of young people in the Lower Silesian Voivodeship (Grabowska, Jończy (ed.) 2013, Rokitowska 2017), where, among others, issues of the impact on the level of local development on the scale and directions of migration of secondary school and university graduates are discussed. As well as a study aimed at presenting the nature of the metropolis and its impact on smaller, neighbouring urban centres, with particular emphasis on the phenomenon of youth migration (Kulczyk-Dynowska 2012).

Referring to publications that focus on the phenomenon of youth migration as a key feature of modern society, one can indicate a lot of research that results in the conclusion that migration is attractive to the young generation and is a way to build a life and career path, that has both positive, as well as negative aspects. However, it should also be noted that the research carried out so far has not explicitly analysed the migration intentions of young people from one territorial area and, at the same time, strongly differentiated in terms of the unemployment rate in terms of smaller regional units, which the author of this study attempted.

Research Methodology

A quantitative data acquisition method was used to collect empirical material. The questionnaire was conducted in the form of an auditorium survey, in the period prior to issuing grades and with good attendance and, at the same time, when the vast majority of secondary school graduates already had precise plans for the next stage in life.

To ensure the representativeness of the surveyed secondary school students for the entire population in individual cities, the survey was conducted in such a way, that in smaller centres, where the potential number of respondents did not exceed 200 people, it was decided to examine all of them, while in larger centres quota sampling was used. Due to this method of selecting the respondents, the interpretation of the results was based on participation and not the number of respondents declaring individual answers. The survey was conducted in a total of 17 secondary schools and included 815 graduates.

The questionnaire was developed by a group of people dealing with youth migration issues, including the author of this study. The questionnaire used consisted of 21 questions and an extensive metric data sheet. The questions included in it concerned, among others:

- Intentions of secondary school graduates for the near future,
- Educational plans,
- Professional plans,
- Intentions regarding the place of future residence,
- Causes and directions of migration,

- Opportunities on the domestic labour market,
- Salary requirements in the domestic and foreign labour market,
- The number and structure of households,
- Scale and directions of international migration of household members.

This study presents only a fragment of research results concerning only two of over 20 analysed issues, these are the respondents' answers concerning:

- their intended future residence,
- the main reasons for young people definitively leaving their native land in the opinion of the surveyed youth.

Results

The results of the research were presented in the two groups of poviats discussed earlier, the first of which consists of three poviats with the lowest unemployment rates in the Lower Silesian Voivodeship (poviat of the city of Wrocław, Jelenia Góra and Lubin), while the second includes three poviats with the highest unemployment rates (poviat of Góra, Kłodzko and Lwówek Śląski).

As a result of the research, the intentions of the youth regarding their future place of residence after completion of studies and starting work were determined (Figure 1).

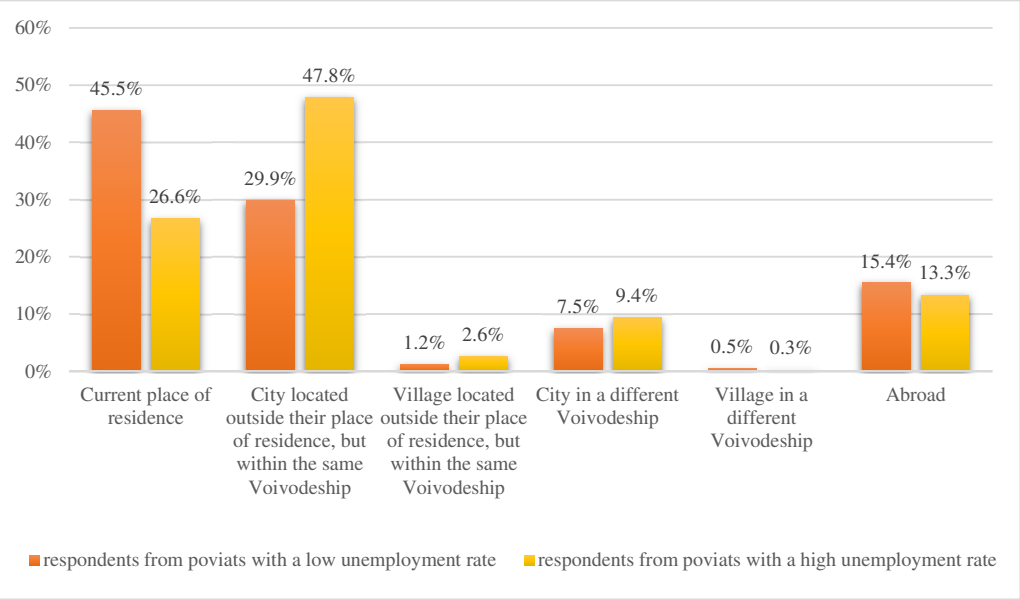

Fig. 1: Declared permanent residence of respondents after completion of studies and starting work

Nearly half (45.5%) of the surveyed youth from poviats with low unemployment rate and only slightly more than a quarter (26.6%) of those surveyed from poviats with high unemployment rate intend to remain in their current place of residence permanently. Almost half (47.8%) of young people from poviats with high levels of unemployment declare that, after completing education and taking up a permanent job, they will live in the city outside their current place of residence, but in the Lower Silesian Voivodeship. In turn, among respondents from poviats characterised by the best situation in the voivodeship on local labour markets, 29.9% of respondents gave such an answer. The unemployment rate on the local labour market does not significantly differentiate the answers of respondents intending to live permanently outside of Poland.

The answers of respondents thus forming provide important information on the scale of potential permanent migration of young people and allow to believe that the situation on the local labour market is significant in migration decisions. Young people who currently live in areas with high unemployment rates are more likely to undertake definitive migrations compared to young people living in poviats with low unemployment rates. It is also worth noting the high proportions of people intending to go abroad in both examined groups. Higher preferences regarding foreign emigration in an area with lower unemployment can be explained in a sense by greater aspirations, but also by limited incentives for internal migration. On the other hand, greater mobility between the area of residence and Wrocław of young people from areas of higher unemployment can be explained in such a way, that such mobility (in their opinion) already gives significant progress.

In order to determine which Lower Silesian city they are definitely going to migrate to, those who chose this option were asked to indicate this city (Figure 2).

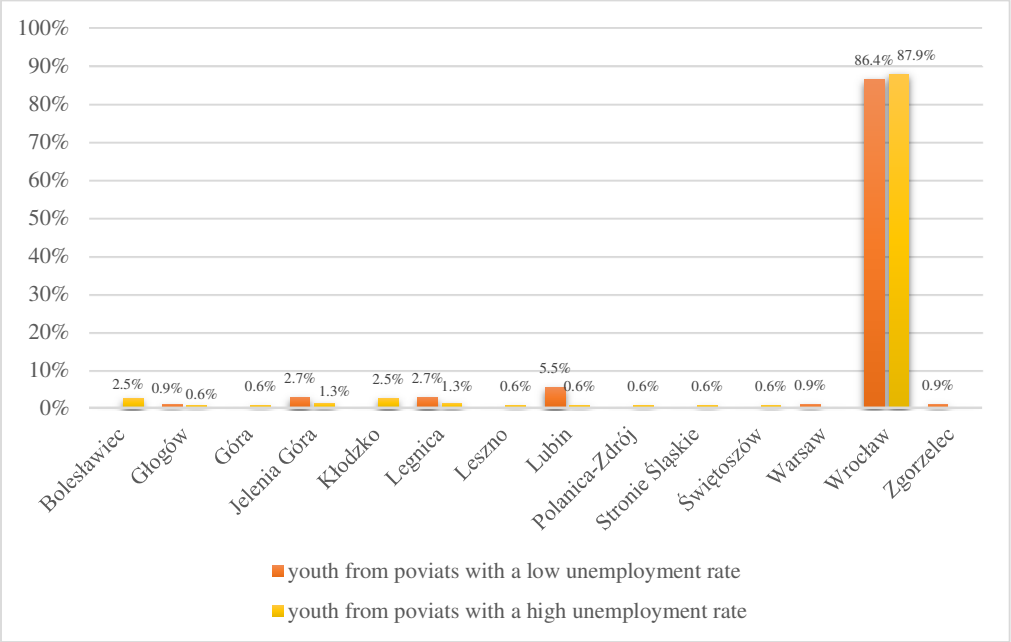

Fig. 2: Declared cities of permanent youth migration within the Lower Silesian Voivodeship

Intentional permanent migrations to "another city in the Lower Silesian Voivodeship" are highly concentrated. Respondents' answers indicate that the direction of permanent migration within the Lower Silesian Voivodeship will be Wrocław, in the case of the vast majority of respondents, which was indicated by 86.4% of respondents from poviats with low unemployment and 87.9% of respondents from poviats with high unemployment rates. It is worth emphasising, at this point, that among 86.4% of respondents from the group of countries with a low unemployment rate there are only people from the poviats of Jelenia Góra and Lubin, since the respondents from the poviat of Wrocław already live there, thus the relative intensity of this migration is even bigger.

The huge scale of intentional permanent migrations within the Lower Silesian Voivodeship, from the perspective of sustainable spatial development, is worrying, because the significant level of youth drain from the areas of the Lower Silesian Voivodeship surveyed, especially in the direction of Wrocław, will lead to depopulation of these areas and their peripheralization. And because the quality of life in local communities depends, to a large extent, on the involvement of young people, this relatively large loss of young people will undoubtedly deepen the problem of developing the areas where they come from.

An important point of the research was to determine the motives of young people leaving their homeland for good (Figure 3).

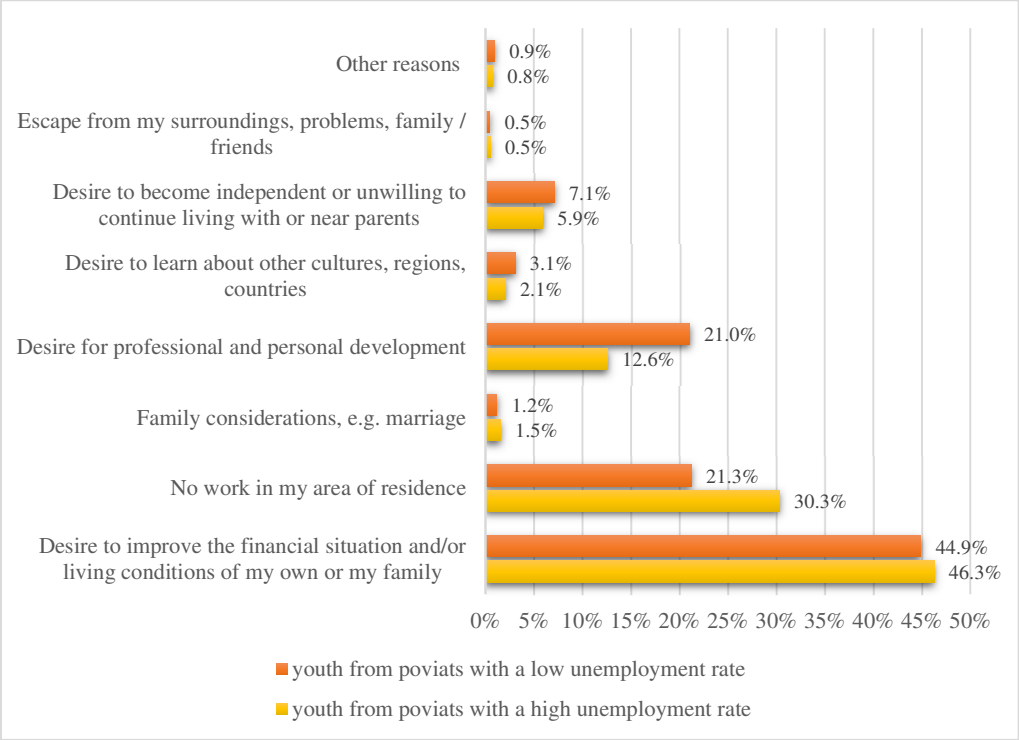

Fig. 3: Main reasons for young people definitively leaving their homeland in the opinion of the surveyed youth

Regardless of the current situation behind the labour market of the areas inhabited by the respondents, the largest percentage of respondents indicated that the most important factor prompting young people to migrate is *the desire to improve the financial situation and/or living conditions of their own or their family*. This motive, as the most important determinant of migration, was indicated by almost half of the respondents from both surveyed groups. The *lack of work in the place of residence*, as the most important factor causing youth migration, was more often indicated by respondents living in poviats with high levels of unemployment (30.3%) than respondents from poviats where the unemployment rate is the lowest in the voivodeship (21.3%). However, this variant was indicated relatively often in both examined groups, so it can be concluded that the lack of work in the place of residence is generally conducive to undertaking migration. The determinant of migration in the form of *the desire for professional and personal development* was more often indicated by people living in poviats with a low unemployment rate (21.0%) than youth from poviats with a difficult situation on the local labour market (12.6%). Other non-economic motives of migration were indicated much less frequently by the surveyed youth, and with similar frequency.

Conclusions

The presented research results (despite the fact that, for methodological reasons, they are based on the declarations of the surveyed youth, not the accomplished states) allow to draw some important conclusions regarding the impact of the situation on local labour markets on youth migration. They show that definitive migrations to a much greater extent concern young people living in areas with a high unemployment rate, where only about a quarter of the respondents intend to live in the future. There is no doubt, therefore, that depopulation related to emigration will be a serious development

problem in their areas of origin, as it will lead to the loss of a huge portion of human capital. Youth coming from areas with high unemployment – much more often than those coming from areas with low unemployment rates – plan to live in the city outside their current place of residence in the future, however in the Lower Silesian Voivodeship, most often in Wrocław, thus showing a high tendency for definitive internal migrations. On the other hand, almost half of young people from areas where the unemployment rate is relatively low intend to stay in their current place of residence (it should be noted that a significant proportion of these respondents live in Wrocław). However, also in this group of respondents, almost one thirds declare their intention to permanently live outside their place of residence, but in cities of the Lower Silesian Voivodeship, indicating the goal of definitive migration as Wrocław in almost 90%.

As a result of the research, the main factors determining why young people leave their places of origin were also identified. At this point, it should be emphasised that, in relation to young people living in areas characterised by a difficult situation on local labour markets, push factors from the places of current residence are more active, especially the lack of employment opportunities. On the other hand, young people from poviats with a relatively low unemployment rate are more strongly affected by factors attracting to new places of residence, manifesting themselves in, for example, opportunities for personal or professional development. However, this does not change the fact that, among the reasons given for migration, in both examined groups, the strictly economic ones dominate, manifested in the desire to get a good job, and thus improve the material situation.

The results of the conducted research prove that the situation on the local labour market effectively determines the process of migration of young people from underdeveloped areas to large regional centres and abroad. On the other hand, the return effect of such a large scale of young people's displacement is the depopulation of Lower Silesian areas with high levels of unemployment, which certainly contributes to the slowdown in development and continuous reduction of the quality of life in the surveyed poviats.

Acknowledgment

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National Identity of International Capital Groups and The Effects of Implementing Income Tax Minimisation Strategies in The Groups' Companies Operating in Poland

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Abstract

International integration and capital concentration made assigning a homogenous national origin to capital groups a very difficult task. The inflow of foreign capital in the form of FDI to Poland became an integral element of the Polish economic reforms commenced in 1989. Three decades of constant presence of foreign investors and methodical increase in employed capital allowed for reducing the shortage in resources (capital), technology and knowledge, but also revealed an entire spectrum of international enterprises' behaviours characteristic for cultures of their home countries. In practice, two key criteria for a capital group's national identity can be identified: the country from which the parent company is derived and the top management's national composition.

There is the question of whether the capital group's national identity affects the implementation of the strategy of minimising the income tax burdening the group's companies. The study was conducted on the group of the biggest 30 companies registered in Poland, belonging to international capital groups. The study demonstrated that:

- effective income tax minimisation in companies belonging to international capital groups is not dependent on their national identity identified by the country of origin,
- similarly, there is a related lack of homogeneity in groups of companies identified by their activity's industry.

Keywords: international capital group, corporate income tax, tax minimisation, national identity.

Introduction

International integration and capital concentration – especially realised by foreign direct investment (FDI) as well as mergers and takeovers – makes assigning a homogenous national origin to capital groups a very difficult, albeit not impossible task. The ambiguity of this relation causes presentation of two opposite positions in literature, both of which are constantly questioned.

The first view contradicts the existence of a national identity in capital groups and points out that the globalisation process features a total loss of the national character of international capital groups, understood as the group's relationship with a specific home country. This conclusion was made mainly based on the capital ownership structure. The growth of international capital markets and legal regulations in the scope of company law favoured and still favour production internationalisation in relation to the simultaneous process of capital transfer in exchange for shares or equity.

The processes concerning takeovers and acquiring new financing sources favour the internationalisation of the share (equity) ownership structure of entities belonging to a capital group.

An individual investor or a group's parent company can currently acquire equity or investment funds virtually from all over the world and can establish the registered seat or place of business anywhere around the world. The location and registration of the parent company's (managing the group) registered seat does not necessarily have to be synonymous with the capital's country of origin or the place of business, or place of affiliate companies' registration. This type of dispersal constitutes one of the main aspects of globalisation, related to the activity of international groups and mobility of capital across borders. Simultaneously, such behaviour of entities constitutes the essence of internationalisation of capital groups forming a structure of affiliated capital companies, the registered seats of which are located in many different countries. In addition, the geographical range of activity conducted by many modern international groups simultaneously in many countries brings them closer to a global dimension.

Companies forming international groups can change their nationality without major constraints by changing the registered seat's country in search of various preferences, e.g. a milder tax regime. Moreover, regardless of the registered seat's location, entities can move production around the world, e.g. in order to optimise the product's manufacturing costs, reduce the distance from the selling market and to maintain effective co-operative relationships between the group's units. Furthermore, wanting to acquire capital in the form of foreign direct investment, countries entice investors with favourable tax solutions for them to conduct their activity within their territory. Liberal legal solutions makes it easy to re-locate the registered seats of parent, subsidiary and affiliated companies from their home countries to any other country. There are companies with seats registered in tax enclaves in the Cayman Islands, Cyprus, Malta, the Channel Islands, which are actually conducting their operating activity in other countries or even other continents, i.e. Africa, China, India, Eastern Europe countries.

Research aim & Literature Review

When searching for theoretical bases to formulate a view on the lack of capital groups' national identity, it is worth recalling the definition established by the OECD and concurrent with the UNCTAD definition. According to these economic organisations, an international capital group (*Transnational Corporation, TNC*) is a structure that encompasses entities located within at least two or more countries, wherein:

- the entities are related in terms of ownership (through shares or stocks) in such a manner that one entity is able to substantially affect the activity of other entities, including especially deciding on the share in knowledge, resources and liability,
- the group functions within a decision-making system allowing for exercising common strategies implemented by the decision-making centre that controls foreign assets.

It is possible to observe that the same condition featured in the phrase "entities located within at least two or more countries" brings a certain belief about a transnational, stateless and entirely independent nature assigned to a capital group as a global economy entity (Zorska A., 2007). A group constituting a single economic entity (in economic terms) is not bound to any country and functions separately from home countries in which the registered seats of particular group companies are located. In other words, an international capital group is a group of entities with various nationalities and locations linked with common ownership bonds and subject to a common management strategy (Geldner M., 1986).

The peculiar statelessness of the biggest international capital groups also lies in their activity's scale and in the economic power manifested in revenues comparable to the gross domestic product (GDP) of a medium-sized developed country. This relation brings forth a certain simplification – since international capital groups are so strong that no country can affect them, it means they are transnational. The ideas of Khan, Server and Galbreith also contributed to specifying capital groups as transnational by treating them as "quasi states" posing a global political and economic threat due to the strength of the capital base. Without a doubt, the phenomenon's increasing scale is possible thanks to the high mobility of capital which became entirely internationalised.

Additionally, the stateless perception of the capital groups is also reinforced by the convergence of stereotypical economic behaviours which have no national features (Ohmae, 1995). Regardless of the registered seat's location, all companies are trying to achieve an analogous overarching objective of maximising profit and increasing the enterprise's value and strive to achieve this objective in a similar way.

The opposite view states that only capital lacks identity, but capital groups still bear the mark of nationality, which makes specifying them as American, French, Germany, Japanese or other groups justified (Doremus P.N., Keller W.W., Pauly L.W., Reich S.,1999). There is the question of the criteria used to identify the nationality of international capital groups acting transnationally.

The criterion of the group companies' location – due to the virtually unlimited possibilities of registering anywhere around the world – is currently purely technical and is not necessarily related to the capital's country of origin or the place of activity. The country of origin effect (Drelich-Skulska B., 2007), based on the fact that the products of specific indrusties became established in collective consciousness as products specific to a given country, can be equally misleading. For example, cars are recognised as German products, while cosmetics – as French products. In consequence, the country of origin effect evokes an association related to the capital group's national identity. It is not an entirely justified conclusion, because product brands are subject to re-sale and the associations formed in collective consciousness can be used for marketing purposes. For example, the Wedel brand (chocolates), which is recognised as a Polish brand, does not actually represent Polish capital, but since 1991 was successively the property of an American group (Pepsi co.), British group (Cadbury), once more an American group (Kraft Foods) and currently a Japanese group (Lotte).

In practice, in order to unify the phenomenon, two key criteria for a capital group's national identity can be identified (Jarczewska-Romaniuk A., 2004):

- the country from which the parent company is derived (place of obtaining legal personality) and in which the control centre or headquarters is located,
- top management's national composition.

Their joint consideration enables avoiding the erroneous interpretation of identity as result of registered seat changes, re-location of the production place related, among others, to fiscal conditions or with acquiring a recognisable product brand.

The parent company's country of origin is mainly recognised as the headquarters' location, where all of the main decision-making, management and control functions are located. It is also obviously the centre in which the corporate governance is conducted over the management personnel, which makes key decisions related to the entire capital group's functioning and development. In the light of the previous considerations, it is possible to deny the existence of a relationship between the headquarters' location and capital's origin, however practice demonstrates that corporate governance is related to the initial capital's or basic capital's origin. This derives from the rights of the share control package owners or majority shareholders, because only investors with substantial share are table to conduct governance. On the contrary, dispersed ownership or minority shareholders are not able to participate in the corporate governance due to its dispersal and slim rights. Therefore, corporate governance (indirectly) links the main capital owners with the parent company's location. We come to a situation where the international capital group's national identity is identified not only through the parent company's location, but also through the identity or place of residence of the owners of the capital constituting the source of rights to govern the group.

This aspect is all the more relevant because the registration documents of the group's companies are public, published and available directly on government websites or via access to online applications redacted by commercial entities (economic information agencies). The registration data often allow for tracking the ownership path of capital in the group's hierarchy – down to the source of origin of the parent company's initial capital. The fact that international capital groups determine their national status themselves on websites created for marketing purposes is not insignificant. In addition, by

publishing information about mergers, takeovers and foreign direct investments, investors disclose the source of origin of the majority capital, thereby giving the capital group a specific national identity.

Insofar as national identity identification by the capital owner's home country can be deemed as questionable in terms of the previous deliberations, in practice this methodology is suffers the smallest error and is easiest to execute.

Another important issue in studying the problems related to the international capital groups' national identity is corporate governance conducted by the parent company. The governance covers all relations between the parent company and the subsidiaries, and can in principle be executed by using code control tools, i.e. by the action of supervisory councils and auditing committees (Mierzejewska W., 2018). However, of crucial importance are the non-code tools resulting from the dominance and dependency relation, which are executed by appointing the management, i.e. appointing the top management and the lower hierarchy by designating various level managers.

The adoption of the top management composition criterion to determine the capital group's national identity is justified in terms of the management theory (Morden T, 2016), because the leaders shape both the measurable and reasonable organisational components (structure, technologies) as well as symbols, ideologies and language (Murdoch A., 1999). Currently, the top management composition, more specifically its national origin can safely be a functional criterion for the national typology attributed to the capital group (Kobrin S.J., 1976). It is important to note that the UNCTAD data (tab. The world's top 100 non-financial MNEs, ranked by foreign assets, 2017) shows that there is a clear correlation between the parent company seat's country and the top management's country of origin.

An analysis of the personal composition of the top management in the biggest corporations points to a far reaching national homogeneity in their compositions, which is naturally accompanied by cultural homogeneity (Welge M.K., Holtbrűgge D., 2006). The share of employment of managers from the subsidiaries' host country decreases along with the increase in the companies' decision-making hierarchy level. The very low share of foreigners in the top managements is contrary to the relatively high share of foreign personnel in the general management composition, which confirms the thesis about the strict relation between the group companies' top management and the parent company's country of origin.

Despite the fact that managers are often perceived as a homogeneous vocational class (Ohmae K. 1995), the observance of management methods, especially of the used incentive systems, points to large differences directly related to the culture of the country of origin. In the case of internationalisation covering various countries, the differences often lead to clashes of cultures with fundamental differences in core values, such as in the case of the Islamic and Western worlds (Barber B. R., 1996). Similar cultural distinctions distinguish managers deriving from European and Asian environments, including Japanese, Korean, Chinese (Rymarczyk J., 2004).

Several determinants designating the business culture built by the companies' management boards are of key significance in this case (Hofstede G., Hofstede G.J., Minkov M., 2011; Hampden-Turner Ch., Trompenaars F., 2002):

- board members' individualism (e.g. the Netherlands) *versus* collective action (e.g. Germany, South Korea),
- quick profit on investment (e.g. USA) *versus* long-term strategies (e.g. Germany, Japan),
- innovative strategies' acceptance *versus* traditionalism,
- varied approach to human resources management,
- large decision-making freedom of subsidiaries' managements *versus* strong subordination to the parent company.

The top management, acting as leaders, also affect organisational culture which strongly differentiates entities in an international scale. In the case of a specific organisation, its set of values and standards of conduct accompanied by certain rituals and aimed at integrating employees around key objectives and performing important integrating functions is usually easily discernible (Aniszewska G., 2004). The cultural values represented by the board members and medium-level managers is the permanent basis of national identity which extends throughout the entire organisation, giving it specificity, but also affects behaviours and competitiveness in times of global rivalry (Hampden-Turner Ch., Trompenaars F., 2002).

The language used by the managers can also be an element that enables specifying the capital group's nationality, because the popularity of the English language in business does not mean that groups acting internationally adopt it automatically as a means of communications. In crisis situations, people with a homogenous national identity act like a compact, psychologically marked group by communicating in their native language (Nigh D., 1997). The choice of language used in managerial relations can be a manifestation of actual authority in the organisation and can be imposed in the communications with the management boards of subsidiaries located in various countries (Welge M. K., Holtbrügge D., 2006)

Aside from the specified cultural implications that shape the capital groups' national identity, it also affects the relations of groups with their home countries. States see the economic interest and political benefits related to the internalisation and expansion of capital, whereas the symbiosis between states and their economic entities operating transnationally is bi-directional.

From the home country's point of view, strong capital groups become a nexus for the economy-stimulating policy in their countries – both in the conditions of growth and crisis, causing them being treated as a national treasure (e.g. the German Volkswagen group). Furthermore, the economic power of international capital groups favours lobbyist action in the political arena of not only their home countries, but also globally, starting with the European Union.

The strong relations between groups and their home countries also translate into numerous benefits for native capital owners, whereas the nature of the offered aid can have many forms. In many countries, especially deriving from collective cultures – such as Japan or Germany – the state protects group companies against undesired or hostile takeovers through legal regulations and rigours on financial instruments. States often use legal and tax solutions that not only support the foreign expansion of native entities, but also ensure a certain protection in case of its failure caused by factors attributable to the third (host) country. Typical tax preferences include favourable settlement of foreign losses in the home country or tax exemption for profits transferred to the home country. In extreme cases, the support is particularly large in terms of financing, e.g. prior to its ultimate downfall, the non-existent Daewoo group (car production) incurred unlimited debts because all liabilities were guaranteed and repaid by the home country government (South Korea).

This way, the legal mechanisms implemented by the home country can substantially improve the group's competitive position in comparison to groups from other countries. It is worth noting that capital groups without a doubt identify their national identity when they address claims concerning systemic aid to the home country government.

The presented argumentation speaks for the conclusion that despite the high spatial mobility of international capital groups, related to the transfer of capital and resources as well as their economic position in the global economy, we do not experience a unification of groups and their detachment from home countries.

At the current globalisation stage, treating the phenomenon of national identity of international capital groups solely as an issue of record does not reflect the actual state of affairs. Identity derives from permanent functional features in the activity of entities, the lineage of which reaches cultural distinctions deeply rooted in the consciousness of people making the decisions on internationalisation and conducting international activity. The diversification of the business running cultures,

organisational cultures and languages used by top management personnel constitutes an additional component of capital groups' national identity. Practice confirms that viewing international capital groups through the lens of their national identity is not an anachronous phenomenon generated on the basis of habits or stereotypes, but derives from an organisation's permanent functional features. The national identity of the analysed entities ultimately translates into benefits for both them and their countries of origin.

As specified above, substantial functional differences between international capital groups – depending on the country of origin – concern corporate governance. The relations formed between owners and managers, institutional structures authorising governance as well as the nature of expectations towards the management have their important national reference (Doremus P.N., Keller W.W., Pauly L.W., Reich S., 1999). Therefore, it should be expected that meeting owner expectations in exercising management will carry the stigma of national distinctiveness. There is the question of whether the capital group's national identity recognised by the top management's national composition affects the implementation of the strategy of minimising the income tax burdening the group's companies. Such research issue can raise doubts concerning the cause and effect relationship, because it refers to two entirely different conceptual categories – to the capital group's national identity, which implies subjective functional associations and to the income tax, which is an objective financial category. However, despite the apparent lack of relationship, the juxtaposition of these two concepts has a deep logical justification.

The basis for this relation are the state tax regulations and the inclination of all economic entities – regardless of the organisation's size and complexity – to search for methods of minimising tax burdens.

Taxes are an objective category, but – in principle – only in the making of law understood as a system of detailed legal and tax regulations. However, in terms of law application, taxes are subject to numerous tax minimisation strategies. Omitting deliberations concerning the acceptability of tax strategies by the tax authorities of various countries, it is in principle possible to distinguish two groups of tax strategies:

- simple strategies based on the statutory right of choice, i.e. use of tax preference mechanisms dedicated to specific companies,
- complex strategies that require taking internal action in the capital group's scale, because they are intended to benefit not only a single company, but the entire group and require the engagement of at least two affiliated companies.

Regardless of the tax minimisation strategy's type and scope, its planning and implementation are tasks of not only the management of a single company belonging to the capital group, but of the entire group's top management. This is derived from several aspects of international capital groups' activity:

- firstly, each company belonging to the group maintains its legal and tax autonomy, which means that each is a separate tax payer and is subject to the tax jurisdiction of the country in which its registered seat is located,
- secondly, despite the legal and tax autonomy of particular companies, the capital group in essence constitutes a single organism in an economic sense, which is managed by a decision-making centre located in the parent company, which means that the tax minimisation strategies are complex as well as are planned and implemented with the participation of the group's top management.

Research Methodology and Study Results

The study was conducted on the group of the biggest 30 companies registered in Poland, belonging to international capital groups, in order to answer the question of what is the impact of national identity on the effective implementation of the income tax minimisation strategy. The study did not include financial companies (banks, investment funds, leasing companies, insurance firms) deemed as conducting a specific and incomparable operating activity. The subject of the study was especially to compare two values demonstrated by each studied company:

- corporate income tax due for 2018, deriving from the annual tax return (according to the tax law),
- total revenue disclosed in the annual financial statement (according to the balance sheet law).

In order to ensure the data's comparability, each case featured the calculation of the corporate income tax due on 1 million revenue disclosed in the annual financial statement (regardless of the adopted currency, the CIT/1 million relation remains the same).

This relations was deemed the most interesting, because the corporate income tax is a result-based tax, which directly lowers the profit on activity and its relation with the generated revenue is more readable than in the case of other taxes. Furthermore, the structure of the Polish income tax is dynamic (analogously for most tax jurisdictions, despite small differences between states) making each decision on revenues, costs, reliefs and deductions affecting the final tax amount. For this reason, this tax title burden is very susceptible to the applied tax strategies.

The tax relief data of the selected tax payers is public and their use does not infringe fiscal secrecy, because from 2012 the Polish public finances minister (currently the Minister of Finances) makes public (https://www.gov.pl/web/finanse/indywidualne-dane-podatnikow-cit) the individual tax payer data included in their annual corporate income tax reliefs (CIT-8. According to Article 27b of the Act of 15 February 1992 on the corporate income tax (Polish Journal of Laws; Dz. U. of 2019, item 865 with amendments), the publishing obligation applies to tax payers with taxable revenues achieved within a fiscal year of more than EUR 50 million. Individual tax payer data cover the tax payer's name, tax identification number (NIP) and the tax relief information, including: achieved revenues, incurred deductible expenses, achieved profit and incurred loss, tax base and due tax amount. According to the data, in 2018, the revenues criterion was met by a total of 2,687 companies.

The tax data was supplemented with the information included in annual financial statements which are published on the website administered by the Polish Ministry of Justice from 2018 (https://ekrs.ms.gov.pl/). The information presented there are public, generally available and its use does not infringe trade secret. The information from the financial statements was collected in several areas:

- National Court Register (KRS) registration number,
- predominant type of economic activity (industry),
- main brand,
- international capital group's home country,
- revenues disclosed in the profit and loss account, calculated jointly for the operating activity, other operating activity and financial activity.

The corporate income tax (CIT) amount was calculated per 1 million of revenues disclosed in the financial statement based on the acquired data.

Table 1: List of 30 Polish joint stock companies with the highest revenues achieved in 2018 (amount in Polish currency – PLN)

	Tax payer name	KRS no.	Industry	Main brand	Country of origin	Revenues on the Profit and Loss Account	Corporate Income Tax CIT 2018	CIT amount per 1 million of revenues
1	POLSKI KONCERN NAFTOWY ORLEN S.A.	28860	fuel industry	ORLEN	Poland	90,703,000,000	866,829,361	9,557
2	JERONIMO MARTINS POLSKA S.A.	222483	food and cosmetics retail trade	BIEDRONKA, HEBE	Portugal	51,037,735,531	510,679,572	10,006
3	GRUPA LOTOS S.A.	106150	fuel industry	LOTOS	Poland	27,154,100,000	196,383,390	7,232

4	LOTOS PALIWA Spółka z o.o.	6312	fuel industry	LOTOS	Poland	23,998,903,000	51,703,245	2,154
5	ORLEN PALIWA Spółka z o.o.	126258	fuel industry	ORLEN	Poland	20,512,086,000	1,794,882	88
6	VOLKSWAGEN POZNAŃ Spółka z o.o.	64417	automotive industry	VW	Germany	18,015,332,000	101,109,266	5,612
7	ARCELOR MITTAL POLAND S.A.	115891	metallurgy	ARCELOR MITTAL	Great Britain	17,326,185,000	168,609,473	9,731
8	FRF-BETEILIGUNGS-GMBH (branch)		food retail trade	LIDL	Germany	16,223,498,739	0	0
9	EUROCASH S.A.	213765	food retail trade	EUROCASH	Portugal	14,913,677,558	58,952,100	3,953
10	VOLKSWAGEN GROUP POLSKA Spółka z o.o.	327143	automotive industry	VW	Germany	14,461,305,539	47,155,198	3,261
11	BP EUROPA SE (branch)		fuel industry	BP	Great Britain	13,915,771,701	99,986,313	7 185
12	FCA POLAND S.A.	19628	automotive industry	FIAT, CHRYSLER	Italy, USA	13,379,821,957	76,360,545	5,707
13	JASTRZĘBSKA SPÓŁKA WĘGLOWA S.A.	72093	coal mining	JSW	Poland	14,410,900,000	198,197,220	13,753
14	HERMES ENERGY GROUP S.A.	507501	gas fuel distribution	HERMES	Poland	12,814,424,457	2,547,633	199
15	ORANGE POLSKA S.A.	10681	telecommunications	ORANGE	France	10,906,000,000	15,491,922	1,420
16	AUCHAN POLSKA Spółka z o.o.	32892	food retail trade	AUCHAN	France	10,760,096,000	0	0
17	TESCO POLSKA Spółka z o.o.	16108	food retail trade	TESCO	Great Britain	10,763,675,000	0	0
18	PHILIP MORRIS POLSKA DISTRIBUTION Spółka z o.o.	289223	tobacco products wholesale trade	MARLBORO L&M	USA	10,594,047,000	196,542,371	18,552
19	T-MOBILE POLSKA S.A.	391193	telecommunications	T-MOBILE	Germany	6,651,747,000	0	0
20	KAUFLAND OST-EUROPA BETEILIGUNGSGESELLSCHAFT GMBH (branch)		food retail trade	KAUFLAND	Germany	10,231,163,872	48,815,561	4,771
21	POLSKIE SIECI ELEKTROENERGETYCZNE S.A.	197596	electricity distribution	PSE	Poland	10,234,389,294	143,625,817	14,034
22	POLSKA GRUPA GÓRNICZA S.A.	709363	coal mining	PGG	Poland	9,543,421,000	2,138,109	224
23	CARREFOUR POLSKA Spółka z o.o.	20710	food retail trade	CARREFOUR	France	8,062,173,000	16,841,100	2,089

24	SAMSUNG ELECTRONICS POLSKA Spółka z o.o.	128080	electronics retail trade	SAMSUNG	South Korea	6,487,414,862	71,087,455	10,958
25	WHIRLPOOL COMPANY POLSKA Spółka z o.o.	23258	household appliances production	WHIRLPOOL	USA	4,650,838,000	9,108,564	1,958
26	LG ELECTRONICS MŁAWA Spółka z o.o.	18583	home electronics production	LG	South Korea	8,090,000,000	23,523,143	2,908
27	ROSSMANN SUPERMARKETY DROGERYJNE POLSKA Sp. z o.o.	48967	cosmetics retail trade	ROSSMANN	Germany	8,321,579,748	237,398,355	28,528
28	P4 Spółka z o.o.	217207	telecommunications	PLAY	Iceland/ Greece	6,965,850,000	234,326,155	33,639
29	NEUCA S.A.	49872	pharmaceutical products wholesale trade	NEUCA	Poland	7,556,375,000	11,088	1
30	POLKOMTEL Spółka z o.o.	419430	telecommunications	POLKOMTEL	Poland	6,337,600,000	140,788,994	22,215

Source: own elaboration based on data presented on public websites: https://www.gov.pl/web/finanse/indywidualne-dane-podatnikow-cit (administered by the Polish Minister of Finances), (https://ekrs.ms.gov.pl/ (administered by the Polish Ministry of Justice)

The results show that the studied companies effectively implement corporate income tax minimisation strategies, because for the biggest 30 companies belonging to capital groups deriving from various home countries, the tax amounted to a maximum of 3.36% of the revenues disclosed in the financial statement in 2018. In relation to PLN (polish currency) 1 million in revenues, this corresponds to amounts from PLN 0 to 33,639, i.e. for the specified 30 companies, the tax amounts to PLN 7,325 on average on revenues of PLN 1 million (identical relation in any other currency), which is objectively low amount.

Someone may ask whether the low tax is a result of tax strategies or whether it is due to the high level of costs in a given branch. Due to the fact that the tax amount is affected – aside from revenues – by costs which can vary for different types of activity, the specified relation for companies listed by industry was studied.

Table 2: List of 30 Polish joint stock companies with the highest revenues achieved in 2018, sorted by industry (amount in Polish currency – PLN)

Industry	Tax payer name	Country of origin	CIT amount per 1 million of revenues
fuel industry, metallurgy, mining	POLSKI KONCERN NAFTOWY ORLEN S.A.	Poland	9,557
	GRUPA LOTOS S.A.	Poland	7,232
	LOTOS PALIWA Spółka z o.o.	Poland	2,154
	ORLEN PALIWA Spółka z o.o.	Poland	88
	BP EUROPA SE (branch)	Great Britain	7 185
	ARCELORMITTAL POLAND S.A.	Great Britain	9,731
	JASTRZĘBSKA SPÓŁKA WĘGLOWA S.A.	Poland	13,753
	POLSKA GRUPA GÓRNICZA S.A.	Poland	224
	HERMES ENERGY GROUP S.A.	Poland	199

fuel and energy distribution	POLSKIE SIECI ELEKTROENERGETYCZNE S.A.	Poland	14,034
food, cosmetics, electronics retail trade	JERONIMO MARTINS POLSKA S.A.	Portugal	10,006
	FRF-BETEILIGUNGS-GMBH (branch)	Germany	0
	EUROCASH S.A.	Portugal	3,953
	AUCHAN POLSKA Spółka z o.o.	France	0
	TESCO (POLSKA) Spółka z o.o.	Great Britain	0
	KAUFLAND OST-EUROPA BETEILIGUNGSGESELLSCHAFT GMBH (branch)	Germany	4,771
	ROSSMANN SUPERMARKETY DROGERYJNE POLSKA Spółka z o.o.	Germany	28,528
	CARREFOUR POLSKA Spółka z o.o.	France	2,089
	SAMSUNG ELECTRONICS POLSKA Spółka z o.o.	South Korea	10,958
automotive industry	VOLKSWAGEN POZNAŃ Spółka z o.o.	Germany	5,612
	VOLKSWAGEN GROUP POLSKA Spółka z o.o.	Germany	3,261
	FCA POLAND S.A.	Italy, USA	5,707
wholesale trade	PHILIP MORRIS POLSKA DISTRIBUTION Spółka z o.o.	USA	18,552
	NEUCA S.A.	Poland	1
Telecommunications	ORANGE POLSKA S.A.	France	1,420
	P4 Spółka z o.o.	Iceland/Greece	33,639
	T-MOBILE POLSKA S.A.	Germany	0
	POLKOMTEL Spółka z o.o.	Poland	22,215
household appliances and electronics production	WHIRLPOOL COMPANY POLSKA Spółka z o.o.	USA	1,958
	LG ELECTRONICS MŁAWA Spółka z o.o.	South Korea	**2,908**

Source: own elaboration based on data presented on public websites: https://www.gov.pl/web/finanse/indywidualne-dane-podatnikow-cit (administered by the Polish Minister of Finances), (https://ekrs.ms.gov.pl/ (administered by the Polish Ministry of Justice)

One would expect that the income tax amount (in relation to 1 million in revenue) will be similar for companies conducting activity in the same industry. The case is not so, however. For example, in the "telecommunications" industry with services with a relatively homogenous nature, the tax amount ranges from zero to PLN 33,639 (in relation to 1 million in revenues). This relation seems to support the hypothesis that companies with the same profile of activity exercise different tax strategies resulting in various fiscal effects of income tax minimisation.

Then, the companies were listed by the home country identified for the international capital group to which the companies belong. The assumption was that the groups' national diversity should be reflected in the diverse action of the top management, which in turn should be translated into various tax effects for companies grouped by national identity.

Table 3: List of 30 Polish joint stock companies with the highest revenues achieved in 2018, sorted by country of origin (amount in Polish currency – PLN)

Country of origin	Tax payer name	Industry	CIT amount per 1 million of revenues
Poland	POLSKI KONCERN NAFTOWY ORLEN S.A.	fuel industry	9,557
	GRUPA LOTOS S.A.	fuel industry	7,232
	LOTOS PALIWA Spółka z o.o.	fuel industry	2,154
	ORLEN PALIWA Spółka z o.o.	fuel industry	88

	JASTRZĘBSKA SPÓŁKA WĘGLOWA S.A.	coal mining	13,753
	HERMES ENERGY GROUP S.A.	gas fuel distribution	199
	POLSKIE SIECI ELEKTROENERGETYCZNE S.A.	electricity distribution	14,034
	POLSKA GRUPA GÓRNICZA S.A.	coal mining	224
	NEUCA S.A.	pharmaceutical products wholesale trade	1
	POLKOMTEL Spółka z o.o.	telecommunications	22,215
Germany	VOLKSWAGEN POZNAŃ Spółka z o.o.	automotive industry	5,612
	FRF-BETEILIGUNGS-GMBH (branch)	food retail trade	0
	VOLKSWAGEN GROUP POLSKA Spółka z o.o.	automotive industry	3,261
	T-MOBILE POLSKA S.A.	telecommunications	0
	KAUFLAND OST-EUROPA BETEILIGUNGSGESELLSCHAFT GMBH (branch)	food retail trade	4,771
	ROSSMANN SUPERMARKETY DROGERYJNE POLSKA Spółka z o.o.	cosmetics retail trade	28,528
Great Britain	ARCELORMITTAL POLAND S.A.	metallurgy	9,731
	BP EUROPA SE (plant)	fuel industry	7 185
	TESCO (POLSKA) Spółka z o.o.	food retail trade	0
Portugal	JERONIMO MARTINS POLSKA S.A.	food and cosmetics retail trade	10,006
	EUROCASH S.A.	food retail trade	3,953
Italy/ USA	FCA POLAND S.A.	automotive industry	5,707
France	ORANGE POLSKA S.A.	telecommunications	1,420
	AUCHAN POLSKA Spółka z o.o.	food retail trade	0
	CARREFOUR POLSKA Spółka z o.o.	food retail trade	2,089
USA	PHILIP MORRIS POLSKA DISTRIBUTION Spółka z o.o.	tobacco products wholesale trade	18,552
	WHIRLPOOL COMPANY POLSKA Spółka z o.o.	household appliances production	1,958
South Korea	SAMSUNG ELECTRONICS POLSKA Spółka z o.o.	electronics retail trade	10,958
	LG ELECTRONICS MŁAWA Spółka z o.o.	home electronics production	2,908
Iceland/ Greece	P4 Spółka z o.o.	telecommunications	33,639

Source: own elaboration based on data presented on public websites: https://www.gov.pl/web/finanse/indywidualne-dane-podatnikow-cit (administered by the Polish Minister of Finances), (https://ekrs.ms.gov.pl/ (administered by the Polish Ministry of Justice)

The listed data shows that companies belonging to various capital groups, but with the same national identity, use tax strategies with varying degree of effectiveness.

Conclusions

The presented study shows that affiliation with the same home country does not translate into homogenous fiscal effects in terms of the use of tax strategies by different capital groups. There is also another conclusion – national identity does not contribute to distinguishing the given country of origin in terms of corporate income tax minimisation effects, because there are no clear differences between sets of companies belonging to groups deriving from various home countries, including companies representing Polish capital.

If that is the case, the reasons for the differences between the fiscal effects – achieved through implementing corporate income tax minimisation strategies – must be sought elsewhere. One of such reasons can be the Polish income tax structure and the Polish tax system's mechanisms available only

for some entities, e.g. tax exemption for companies conducting activity in a special economic zone. Another reason can be the given company's ability to achieve fiscal effects, more specifically it can be the given capital group's general fiscal strategy. It is also necessary to consider the abilities of external counselling entities engaged in exercising the group's tax strategy.

However, this does not change the fact that the due corporate income tax in companies in the presented study group is very low. Without a doubt, the co-authors of the impressive effects in terms of corporate income tax minimisation are the capital groups' top management personnel. This permits the conclusion that contrary to previous consideration the international capital groups' top management personnel takes analogous action for the purpose of tax minimisation. The nationality of the top management or the capital group is of little consequence. The primary determinant is the capital group's ability to achieve a fiscal effect and a tax system structure in countries with affiliated company seats that allows for tax minimisation within legal boundaries.

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IT Reliability as A Moderator of The Relation Between Job Turnover and Job Performance – Empirical Study in Poland

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Abstract

This article is devoted to the analysis of job turnover influence on job performance. It is assumed that the reliability of IT solutions is one of the factors potentially influencing that relation. Empirical research is conducted to verify formulated hypotheses based on results obtained from 263 organizations from Poland to determine whether IT reliability is a moderator of the relation between job turnover and job performance. To verify the moderation effect – a regression analysis with a moderator was used. The results of the research display that IT reliability has a positive impact on job turnover and the job performance of employees. Moreover, IT reliability is a moderator for the relation between job turnover and job performance of employees and has a positive impact on this relation, which means that an increase in the rate of IT reliability reduces the negative impact of job turnover on job performance for employees.

Keywords: IT reliability, Job turnover, Job performance, Management

Introduction

At the turn of the last few decades, there have been changes in Human Resources Management (HRM), which has resulted in a change in approach to the employees in the organization (Kostera, 1994; Listwan, 2010). Until recently, the employees in an organization were treated only as a cost necessary to be covered by the employer (Kostera, 1994). Nowadays, the employees have become the organization's most valuable asset, determining its competitiveness (Kostera, 1994; Listwan, 2010). Therefore, all activities undertaken by the organization in the field of HRM should focus on the effective use of employees' potential (Pocztowski, 2007), because their knowledge, skills and features conducive to performing certain tasks (Bieńkowska and Brol, 2011, p.177) determines the performance of the whole organization.

However, these activities, may be disturbed by the recently observed increased turnover of employees (Adams et al., 2006, Purohit, 2016). Employees who leave the organization take with them all those competencies - knowledge, skills and qualities - that determine their job performance (Listwan, 2010; Ampomah and Cudjor, 2015). Moreover, staff turnover is also often contributes to reducing the morale of employees staying in the organization (Munck, 2001; Coomber and Barriball, 2007; Chambers and Honeycutt, 2009). However, as some research suggests that job turnover has also some positive influences - exchange of blood in the organization and the flow of young blood (Urbancová and Linhartová, 2011; Ampomah and Cudjor, 2015). Nowadays organizations that rely largely on employees knowledge and skills are the leading market players (Blackler, 1995; Bieńkowska and Ignacek-Kuźnicka, 2019). Hence, the job turnover is becoming a rather critical issue in HRM (Adams et al., 2006). Consequently, the main question for HRM professionals is: how to reduce job turnover or how to mitigate the negative impact of job turnover on job performance.

In the times of dynamic high-tech development and the already mentioned domination of knowledge-based organizations on the market, IT support becomes another aspect that determines the competitiveness (Davis, 1989; Tworek, 2019). It is obvious that the use of IT solutions by the organization supports its operations and thus, increases its performance, through its employees (DeLone & McLean, 1992; De Wet et al., 2016). IT solutions can be successfully used for various activities performed in the organization, they can support decision making in the organization, or they can collect, manage, store and share knowledge so important for the organization (Kompaso and Sridevi, 2010). Such IT solutions capabilities may reduce the negative impact of job turnover on job performance, as knowledge in the organization is maintained by them. Moreover, IT solutions increase the comfort of employees' work in the organization, increasing their job satisfaction, which can also effectively reduce turnover (Mitchell et al., 2000; Lambert & Hogan, 2009; Sweis, 2010). IT solutions are significant in the context of maintaining employees in the organization and moreover, their influence on job performance is already confirmed (Bieńkowska et al., 2020). Hence, this article will concern on the reliability of IT as the factor potentially influencing such relation. Considering that research gap, the article aims to examine whether IT reliability affects job turnover and job performance and most importantly, whether it moderates the relation between them.

Literature Review and Hypotheses Development

IT reliability in organization

The reliability of IT in organization is understood as measurable property of IT, useful for its control and management, identifying its quality level and pointing out potential problems (Zahedi, 1987) and it is directly linked to the efficiency of IT components, especially those critical to its proper operations. Therefore, it can be said that IT reliability in organization is a notion build by factors connected to 3 different IT theories. First one is DeLone and McLean success model (DeLone, McLean, 2003), second one is Lyytinen (1987) 4 types of IS failure and third one is TAM model (Davis, 1985). The final model of IT reliability in organization has been developed by Tworek (2019) and verified in various business contexts (Tworek, 2019). The reliability of IT in organization consists of 4 factors: reliability of information included in IT in organization, reliability of support services offered for IS in the organization and reliability of system itself, which also includes the usability of this system. Each factor is built by series of items, listed on Figure 1.

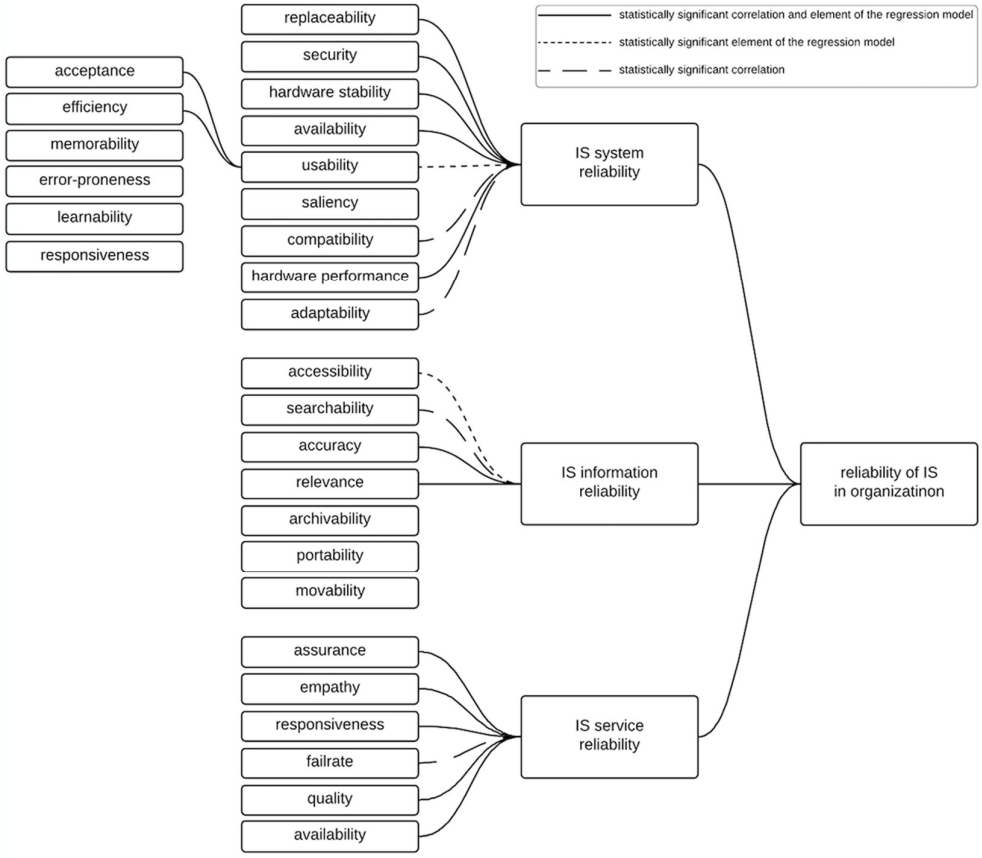

Fig. 1: Model of reliability of IS in organization ***Source: (Tworek, 2018a)***

The essence of Job turnover and its relation with Job performance

Job turnover is an increasingly frequent field of study of contemporary researchers and practitioners (Hom et al., 2017). There are many concepts related to job turnover that depend very often on the turnover model (see e.g. Mobley, 1977; Price and Mueller, 1975; Steers and Mowday, 1981; Allen and Griffeth, 2004). One of the first concepts was put forward by Porter and Steers (1973, p. 153), who focused on "turnover intention" and "intention to leave", which, according to researchers, is defined as "the next logical step after experienced dissatisfaction in the withdrawal process" (Aburumman et al., 2010). Fishbein and Ajzen (1975), who are explaining the factors of turnover, noted that the behavioral intention to leave an organization is a major antecedent of real leaving (Mobley et al., 1978; Coomber and Barriball, 2007).

The turnover intention (or an intention to leave/reside) is considered to be a consequence of the outcome of the various affective variables, and job satisfaction seems to be the most important one (Davis, 2006; Parry, 2008). Therefore, in the context of this article, the job turnover will be understood as an intention to leave an organization caused by job dissatisfaction. There is an ambiguous position of researchers regarding the impact of job turnover on job performance. On the one hand, job turnover brings young blood into the organization (Urbancová and Linhartová, 2011; Ampomah and Cudjor, 2015), on the other hand, employees leaving the organization take with them the knowledge and experience that is important in the context of shaping the organizational performance (Listwan, 2010; Ampomah and Cudjor, 2015) and reduce the morale of those employees who stay in the organization (Munck, 2001; Chambers and Honeycutt, 2009).

Job performance is also considered from various point of view in the literature (see e.g. M. Eysenck, 1998; R. Maathis and J. Jackson, 2000; G. Bohlander, S. Snell and A. Sherman, 2001). Employees' job performance theory is defined as "synonymous with behavior that is something people do and can observe". (Campbell et al., 1993, p.96). Any effect of the work, which is evidence of performance, is associated with a direct result, but Campbell (1993) believes that the effect can also be seen in behavior (June and Mahmood, 2011). Therefore, the effect can be seen as behavior that leads to results (Skowron - Mielnik, 2009), because these behaviors have a significant impact on employees' work (Johari and Yahya, 2012). Borman et al. (1993) also support this concept by defining performance as a set of behaviors that help employees perform their tasks and ensure long-term job performance (Johari and Yahya, 2012). Therefore, in the article, job performance will be defined by behaviors that help to build it permanently.

IT reliability role in shaping the relation between Job turnover and Job performance

In the age of IT development and its key role in shaping the organization's competitiveness, the type of implemented IT solutions, their efficiency and quality, turns out to be an important factor for the proper functioning of the organization (Thomas and Michael, 2001; Shaukat and Zafarullah, 2009).

It is more and more often observed that IT solutions affect the organization as a whole, also through their impact on employees allowing them to easily contact their co-workers, clients and make working hours more flexible (DeLone and McLean, 1992; De Wet et al., 2016). This is because IT solutions in organizations primarily support the functioning of the organization at various levels of management (Sutherland and Canwell, 2004; Van Assen et al., 2009; Potocan and Dabic, 2012). Various solutions are available on the market that ensures integration of all information flows in an organization, from financial and accounting information to human resources management (Umble et al., 2003).

The research conducted by Sweis (2010) proves that the investment in IT solutions incurred by the organization directly translates into growing satisfaction of employees with working conditions and relations with co-workers. Additionally, IT solutions in the organization increase employees' creativity and abilities, as well as have a positive impact on shaping social status (Sweis, 2010), increasing the employees' sense of value. Employees' job satisfaction, which is defined as the positive emotional state created by work experience (Mitchell et al., 2000; Lambert and Hogan, 2009), is an important criterion for deciding to leave the organization. Employees who are dissatisfied with working conditions are more likely to leave the organization than those who feel satisfied (Seta et al., 2000; Ghiselli et al., 2001; AlBattat and Som, 2013).

Another aspect affecting job turnover is the employees' organizational commitment (Meyer and Alen, 1997, Bańka et al., 2002). Shaping an appropriate level of the employees' commitment to the organization influences the employees' behavior, limits their willingness to change work, and thus has a positive impact on the employees' willingness to stay in the organization (Lambert and Hogan, 2009; Ponnu and Chuah, 2010). According to contemporary research, there is a relation between IT-business alignment and organizational commitment (Tworek, 2019). Employees' organizational commitment is built already at the moment of employees' introduction to work (Kompaso and Sridevi, 2010), that the main step, more and more often, is to receive access to all kinds of IT solutions functioning in the organization. The way employees perceive this step may determine their later commitment to the organization (Luftman et al., 2017). IT solutions in an organization improve communication within a group of employees, which contributes to building a positive sense of participation in the life of the organization (Kompaso and Sridevi, 2010). Moreover, IT solutions make it possible to provide employees with training materials to improve their competences, which in turn has a positive impact on their level of commitment (Luftman et al., 2017).

However, it turns out that the users are not only affected by these solutions, but also by their actual use in their daily work, which largely depends on the reliability of the solutions and the information processed by them (Tworek, 2019). Consequently, it is not possible to focus only on the implementation

of IT solutions in the organization, because their reliability turns out to be much more important (Tworek, 2019).

Based on the above considerations, which prove that IT solutions are an important element shaping job satisfaction and organizational commitment, it can be concluded that also their reliability has the potential to shape job turnover (limiting it). This allows to formulate the following hypothesis:

H1: There is a negative relation between IT reliability and Job turnover

Investment in IT solutions in an organization significantly increases the employees' comfort of work in such organization (Sweis, 2010). As mentioned before, the implementation of IT in an organization gives it new possibilities and improves its performance (Thomas and Michael, 2001; Shaukat and Zafarullah, 2009). Many IT solutions can be implemented into an organization with the potential to improve its performance (Umble et al., 2003; Tworek, 2019).

Since the development of IT, researchers have focused on verifying the impact of used IT solutions on user performance and productivity (Yoon and Guimaraes, 1995; Abugabah, 2009). The precursor of research concerning the impact of IT solutions on performance was Davis (Davis, 1989), who stated that it is dependent on many factors, such as system quality, information quality, usage, user satisfaction, individual and organizational impact (Adams et al., 1992).

Other researchers have also highlighted the multidimensional nature of this relation (Igbaria and Tan, 1997; Rai, 2002). Various factors directly related to the functioning of IT solutions influence the user's performance – especially those considered to built IT reliability (Tworek, 2019). Consequently, IT reliability will also significantly influence the job performance of employees, what was already established by Bieńkowska, Tworek and Sałamacha (2020). As known, IT reliability is grounded in the IT success model (DeLone & McLean, 2003), Lyytinen (1987) types of IT failure and Technology Acceptance Model (Davis, 1985; Tworek, 2019). The IT success model indicates that solutions are used to build a positive impact on the organization by influencing individual employees (Tworek, 2019). It was determined that the quality of the solution itself, the quality of information contained in it and the quality of support for the solution's operation affect the level of use of IT solutions and employees' satisfaction with the use of the particular IT solution (Tworek, 2019). Hence, it is clear that it contributes to the increase in their productivity. Based on the above considerations, the following hypothesis can be formulated:

H2: There is a positive relation between IT reliability and Job performance.

Employees' job performance is key in the context of shaping organizational performance. Caring for organizational performance and thus also for the employees' job performance is important to keep a competitive advantage on the market (Liu and Chiu, 2018). When employees leave an organization, they take with them their knowledge, which is defined as a loss of human capital for the organization (Asamoah et al., 2015). In the age of knowledge, competitiveness is determined by the technological capabilities of the organization, which depend primarily on the knowledge and talents of its employees. For this reason, it can be concluded that it is the employees who are the main carrier of competitiveness of the organization on the labor market and important is to effectively manage their knowledge and talents (Smith and Kelly, 1997; Jamal and Saif, 2011). Therefore, it is important to verify the impact of job turnover on job performance, as researchers suggest that job turnover can be problematic regardless of the size of the organization (Ampomah and Cudjor, 2015). It is interesting to know whether the impact of job turnover on job performance will be positive or negative (Durbin, 2000; Ampomah and Cudjor, 2015).

On the one hand, a change of organization by employees create opportunities to develop their competences and career, and every new employee is a so-called "young blood", which introduces a new experience to the organization (Urbancová and Linhartová, 2011; Ampomah and Cudjor, 2015). On the other hand, job turnover is a costly phenomenon the whole organization (Durbin, 2000; Allen and Bryant, 2012). The cost associated with job turnover has also another dimension (Beer, 1981;

Butali, 2013). Specifically, new employees who are accepted to replace those, who have left the organization, are not only performing worse at the beginning but also have less experienced (Armstrong, 2001). Moreover, there is also a decrease in the employees' job performance who train newly adopted candidates to join the organization (Beer, 1981; Butali, 2013). Therefore, this phenomenon reduces the employees' job performance and thus, the performance of the whole organization. Understanding the need to keep employees in the organization and gain benefit from their participation will help to strengthen HRM policy and build a highly productive workforce (Babcock, 2005). Long-term employees generally have higher job performance than any new employee due to their long experience (Armstrong, 2001). The researchers confirmed the negative impact of job turnover on job performance (see e.g. Lee and Whitford 2008; Moynihan and Landuyt 2008; Meier and Hicklin 2008). Although, job turnover is not always a negative phenomenon and as it has been proven - it can be beneficial to the organization, this article focuses on the negative impact of job turnover on job performance. Based on the above considerations, the following hypothesis can be formulated:

H3: There is a negative relation between Job turnover and Job performance.

Nowadays, when technology and innovation are the key values determining the competitiveness of an organization, not only employees, their knowledge and talents have become the strategic value of the organization (Smith and Kelly, 1997; Jamal and Saif, 2011), but also their ability to properly use given IT solutions seem to became especially important (Tworek, 2019).

This impact of IT reliability on job turnover and job performance established above forces to reflect on the possibility of a moderating effect of IT reliability on the relation between those notions. Employees' job performance is reduced due to the departure of human capital, which, as is known, is difficult to replace (Pocztowski, 2007; Jamal and Saif, 2011) and is heavily impacted by the reliability of used IT (Tworek, 2019; Bieńkowska et al., 2020).

Although the organization is increasingly often and effectively dealing with the problem of collecting employees' knowledge, unfortunately, the process of collecting a "tacit knowledge" is still proving problematic. (Johari and Yahya, 2012). Therefore, among others, organizations decide to invest more and more in IT solutions because, as it turns out, IT solutions implemented in the organization are becoming more and more effective in collecting information and employees' knowledge (Bhatt, 2001; Malhotra, 2005; Akram et al., 2011, Tworek, 2019). When employees will me more eager to use those IT solutions (due to their high reliability), the negative effect of job turnover on job performance may be somehow mitigated by the ability to retain such knowledge in the organization. Hence, the reliable IT solutions, thanks to the high quality of knowledge collection, storage and, processing, may prove to be effective in reducing the negative impact of job turnover on the job performance (Shaukat and Zafarullah, 2009; Tworek et al., 2015; Tworek, 2019). As a result, even if a highly qualified employee wants to leave the organization, the knowledge, thanks to reliable IT solutions, will be kept in the organization (Kompaso and Sridevi, 2010).

Moreover, IT reliability will also affect the employees' job satisfaction - much easier access to knowledge and highly developed IT improving functioning in the organization - will positively contribute to employees satisfaction with working condition (Mitchell et al., 2000; Lambert and Hogan, 2009; Sweis, 2010). As a result, the high employees' satisfaction with their working conditions will affect their intention to stay in the organization, and thus the optimal level of job performance will be kept. Based on the above considerations the following hypothesis can be formulated:

H1M: Among organizations with lower IT reliability, the influence of the Job turnover on Job performance is higher than among organization with higher IT reliability. IT reliability is a moderator for the relation between Job turnover and Job performance.

An overview of all formulated hypotheses is presented in Figure 2 and is aligned with the main aim of this article: the verification of IT reliability as a moderator of the relation between Job turnover and Job performance.

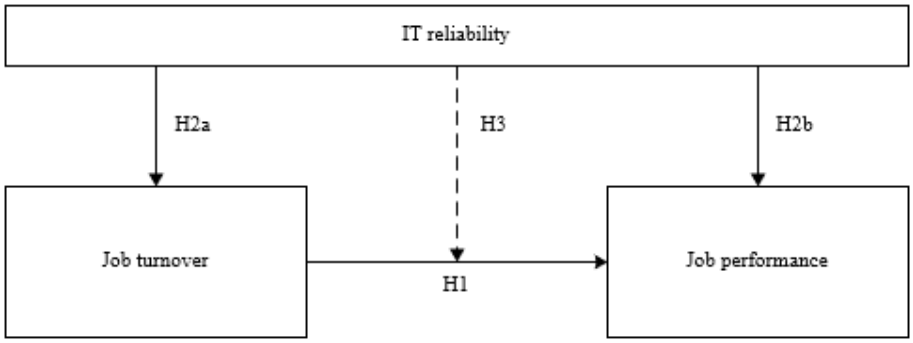

Fig. 2: IT reliability as a moderator of the relation between Job turnover and Job performance.
Source: own research.

Research Methodology and Results

The survey was conducted in order to verify the proposed hypothesis. The main survey was preceded by the pilot survey conducted in the fourth quarter of 2019 among the group of 25 managers (acting as competent judges). According to obtained results, some ambiguous questions were rewritten and it was established that proposed questions are understood by respondents as it was intended by researchers (which is a prerequisite for establishing a questionnaire as a valid measurement method (Czakon, 2019). The main research was conducted using a CAWI method in December 2019, among 263 organizations located in Poland, which was the only condition limiting the sample (organizations were surveyed regardless of size, industry or type of business etc.). The overview of the sample is shown in table 1 and confirms that the sample is sufficiently diversified to form scientific conclusions based on the obtained results.

Table 1: Research sample characteristics

Organization size	Manufacturing organizations	Service organizations	Trade organizations	Total
Micro (below 10 people)	12	11	9	32
Small (11-50 people)	37	15	11	63
Medium (51-250 people)	42	26	24	92
Large (above 250 people)	37	11	28	76
Total	128	63	72	263

Source: own work

Variables Measurement

In order to examine the proposed hypotheses, key variables were defined: *IT reliability*, *Job turnover and Job performance*.

IT reliability was measured taking into consideration all IT solutions used in the organization, basing on the list of four elements of IT reliability and using a Likert scale (from very poor to very good with the middle point: fair), which seems to be an appropriate choice. First of all, reliability of IT in organization is a subjective notion. Employees own perspective and opinion concerning aspects of IT reliability is the best source of knowledge, since their perception matters the most, that is because IT influences the organization mainly through its potential to influence every-day work of the employees. Quantitative methods are commonly used to assess the software and hardware features linked to the

reliability. However, they do not give the information concerning the actual perception of this notion within the organization (Tworek, 2018).

Job turnover was measured Job turnover was measured as a intention to leave the organization by the employees. It is assumed that job satisfaction has a very significant role to shaping the level of job turnover in the organization (Davis, 2006; Parry, 2008). Therefore, if employees are satisfied with their work and works' conditions, they will not feel the willingness to change the organization. The study uses an opposing phrase, assuming that job dissatisfaction will increase the employees' willingness to leave the organization.

Job performance was measured according to the definition by Campbell (1990) and Borman (1993). The scale contains four items referring to the quality, timeliness, efficiency and effectiveness of the employees' tasks at the workplace using and was based on the 5-point Likert scale.

Descriptive statistics and reliability analysis of scales

The reliability of scales of each variable was verified as a first step of the presented research and the results are presented in table 2. The obtained results show that Cronbach's α was high for every variable, which indicates a high internal reliability of the scales and measurements.

Table 2: Defined variables along with the results of the reliability analysis of scales

No.	Variable	No. of scales	Alfa-Cronbacha
1	IT reliability	4	0,797
2	Job turnover	1	--
3	Job performance	4	0,816

Source: own work

Relations between IT reliability, BCM maturity and benefits obtained due to BCM implementation

In order to verify the proposed hypothesis, the correlation analysis was performed between IT reliability, Job rotation and Job performance. This step allows to verify hypotheses H1 and H2. The results show that IT reliability is statistically significantly correlated with Job turnover (r(255)=-0,330, p<0,001), which is the basis for accepting hypothesis H1. Moreover, the correlation between Job turnover and Job performance is also statistically significant and negative (r(255)=0,-403, p<0,001), which allows to accept hypothesis H2.

IT reliability as a moderator for the relation between BCM maturity and benefits obtained due to BCM implementation

The relation between *Job turnover* and *Job performance* was analyzed in the context of *IT reliability.* This step was taken to verify whether IT reliability can be considered as a statistically significant moderator of the analyzed relation. The results of the regression analysis with moderator (which was used to determine that) are presented in table 3. As a first step, new variable – moderator – was introduced, built as a product of two standardized independent variables (*Job turnover* and *IT reliability* as a second independent variable). As a second step, three regression models were built (the analysis was performed using Process macro for IBM SPSS Statistics). The first model was built as a base model for comparison, only independent variables were added as predictors. The second model was built using independent variables (*IT reliability* still as a second independent variable) together with the moderator as predictors to verify whether the moderating influence is occurring in sample. To

confirm that, the third regression model was built using only Job turnover and the moderator as predictors.

Table 3: Regression models' statistics

Model description	*R^2*	*Delta R^2*	*Moderator coeff.*	*Standard error*	*t Stat*	*P Value*
IT reliability, Job turnover, Moderator *dependent v.: Job performance*	0,325	0,027	0,127	0,039	3,186	0,016

Source: own work.

The obtained model clearly shows that IT reliability is a moderator of analyzed relation. The delta R2 is showing a sufficient fit and the model is statistically significant (F (3, 251) = 40,406, p < 0,01). Therefore, obtained results are the basis for accepting the hypotheses H1M confirming that *IT reliability is a moderator for the relation between Job turnover and Job performance.*

Discussion

The article concerns the issue of job turnover and its impact on job performance, looking for factors to reduce the negative effects of this relation. It turns out that the IT solutions, or their reliability, can affect this relation. The performed research confirmed that job turnover has a negative impact on the job performance of employees. The verification of IT reliability as a moderator of the relation between turnover and job performance, mitigating its strength, filled in the research gap in this field to a certain extent.

The results clearly show that IT reliability has a positive impact both on reducing the level of turnover and increasing the level of job performance. It also reduces the negative impact of job turnover on job performance. It provides information to organizations which have a problem with the turnover that the use of IT solutions themselves may not be effective until they ensure the reliability of those solutions (Sweis, 2010; Tworek, 2019). The use of intuitive, reliable IT solutions will affect the comfort of employees and thus, increase their job satisfaction (Igbaria and Tan, 1997; Rai, 2002; Sweis, 2010).

What's more, the results of these research also provide important information for organizations that do not have a problem with employees' turnover, indicating that using reliable IT solutions will contribute to the increase of employees' job performance. This is very important because the job performance of individual employees affects the performance of the whole organization and determines to a large degree the fulfilment of organizational goals (Ali et al., 2016).

Also, even if an organization has a fairly large job turnover and is unable to cope with the constantly decreasing job performance (caused largely by the loss of such valuable human capital), it turns out that the use of reliable IT solutions will mitigate the declining job performance (Shaukat and Zafarullah, 2009; Tworek et al., 2015; Tworek, 2019). When faced with the loss of employees - their capital, knowledge and skills - it seems obvious that organizations should invest in increasing the reliability of IT solutions used for knowledge management (Shaukat and Zafarullah, 2009;). Thanks to such solutions, which collect knowledge, process it and distribute it further, even if some employees leaves the organization, the new employees who replace them will be able to recreate this knowledge quite easily (Bhatt, 2001; Malhotra, 2005; Kompaso and Sridevi, 2010; Akram et al., 2011; Tworek, 2019). The level of knowledge accumulated in the IT solutions depends on their reliability, and the strength of the mitigating impact of IT reliability on the relation between turnover and job performance will depend on it.

Conclusions

The article concerns an important and wide problem of the job turnover negative influence on job performance and establishes that IT reliability is a factor, which can potentially mitigate this influence. The impact of IT reliability on job turnover and job performance has been explained by the obtained results. It has been shown that IT reliability strengthens job performance and also has a positive impact – as a moderator – on the relation between job turnover and job performance, reducing the negative effect of job turnover on job performance. This is a very important conclusion because it shows that IT reliability is important for the contemporary organizations because it increases job performance, reduces job turnover and reduces the negative impact of job turnover on job performance. Therefore, it can be concluded that the identified research gap has been successfully enriched by the performed research, however, it can be filled in further with more extensive empirical data, e.g. additionally include research groups from other countries. Most importantly only a fragment of the phenomenon has been examined. As a consequence, the research does not show how IT reliability can impact on other factors influencing the job performance of employees from various organizations.

However, it does provide the opportunity to further explore the topic and conduct further research in this area. Therefore, the results obtained allow for initial verification of the raised issue. For that reason, no binding theories on IT reliability and its impact on job turnover and job performance can be created, but first step was taken exploring interesting area for further research. Despite research limitations, the indicated aim of the article was achieved by the authors.

These results give a preliminary view to the management of the organizations that IT reliability should be a factor more appreciated by them, mostly among organizations observing a problem with job turnover, but also among organizations that do not have a problem with this phenomenon but want to enhance their job performance.

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Epistemological Proposal on The Concept of Hybridity for Libraries

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Abstract

The Information Science field has discussed different shared specifications of conceptualization which comprises the diversity of support, processes, resources and people by which the library needs to adapt. The question remains about the conceptual identification of the terminology hybrid libraries. The aim is to contribute for the literature in the Information Science field by proposing a concept of hybrid library which comprises the social sphere, in the range of developments existing in the society, in libraries. The study is theoretical and aims at discussing and improving theoretical and conceptual foundations. It is a qualitative and bibliographical research. The method of Discourse Analysis is used to analyze the concepts of hybrid library developed by authors who study the theme. It is noticed that in the hybrid library environment there is a greater flexibility in products and services offered, since it originates from an organizational structure which proposes multiplicity of languages in the institution practices. The epistemological discussion in the construction of a concept of hybrid libraries needs to take into account the impact between the use of technologies and the provision of services that promote the social inclusion of communities in each hybrid environment, considering their culture, values and principles.

Keywords: Hybrid libraries. Concept of hybrid libraries. Epistemological proposal.

Introduction

As this theme is still controversial in the Information Science field, the discussion about the concept of hybridity in libraries for social development is essential so studies in the field can evolve. Therefore, the research herein, currently at the Doctorate level, represents the development of initial discussions regarding a field study initiated in the Master's Degree, which sought to analyze, through a field research, the national (Brazilian) hybrid libraries and the international ones (English and Scottish) and their relationship with the development of communities. The research resulted in an exchange program to Europe, revealing that in countries like England and Scotland, the cultural sphere shows itself as a hybrid factor in informational equipment, involving technologies as tools that help in the development of library activities. Hence, the conception of hybrid libraries given by researchers from such territories: that they are cultural equipment that must integrate technologies in order to help the individual in the community.

Some similarities between libraries in the United Kingdom and Brazil are closely related to the proposal that the role of these libraries is to promote cultural actions in order to create reading and writing opportunities for all groups in their user population. However, the big difference lies on the fact that the former have a strong theoretical basis in the hybrid literature for the development of their practices, while the later are based on the literature on living libraries (Da Silva, 2017). Therefore, it was noticed that the hybrid concept in libraries, both in Brazil and internationally, is still confused and contradictory. In the light of the above, some questions could be raised: “What is a hybrid library?", “Why is it misunderstood by the concept of living libraries? "What is the relationship between them?", “What are the social and technological requirements needed?", “What are the aspects involved?”, “Where do they come from?”, “In what situation?”, “In what context?”, “Why do many libraries claim to be hybrid, but in practice they do not act in the cultural sphere of their community?". Therefore, the problem of this research is related to the divergence of opinions about

the concept of hybrid libraries which, at the same time that they contribute to the discussions about the theme, they can negatively influence the production of content about the theme, as well as the professional performance in informational equipment.

The hypothesis is that, when they are not sure about how they should operate in hybrid environments, librarians may manage the institutions where they work in a way in which they focus their activities only on technological aspects of information, failing to emphasize the cultural sphere and the social inclusion of the community in which they operate. To this end, the proposal is to raise discussions involving experts, librarians and institutions that work with the concept of hybrid libraries in order to analyze them and define the basic characteristics for a hybrid concept in libraries. The following question was intended to be answered: "Taking into account the divergences arising from the opinions of researchers, the different cultural spheres involving hybrid libraries, as well as the need for an epistemological contribution for the development of concepts, what are the basic requirements that underlie the hybrid concept in libraries?". Therefore, this study aims at contributing for the Information Science literature proposing a concept of hybrid library which encompasses the social sphere, within the scope of existing developments in society, in libraries.

The aim was to discuss not only the involvement of technologies in libraries, which seems to be the common sense of hybridity in this respect, but also the way in which the hybrid library can contribute for the development of communities. More specifically, it aimed to: collect concepts from authors of the theme at national and international levels to understand the different opinions about the theme and propose a consensus on the importance of the social sphere to work on hybridity; substantiate the epistemology of institutions considered hybrid; highlight the characteristics and rationale which contextualize the hybrid concept beyond technology; analyze the resources (human, technological and social), as well as the relevant services for building a hybrid concept in libraries which can be accepted in the Information Science literature.

In face of the above, one of the main ways of reporting the importance of contributing to the epistemological discussion about the concept of hybridity for libraries is showing that these environments support diverse users in different cultural circles. Thus, the ultimate aim of this research is for libraries to become spaces for entertainment, communication, social interaction, study, research and extension, that is, to act actively in its cultural sphere.

The method

The research is characterized as theoretical and seeks to discuss and improve theoretical and conceptual foundations. Its nature is qualitative and bibliographic because, based on the analysis of concepts given in the literature and by institutions considered hybrid at national and international levels, it sought to retrieve information about the universe of research, examining a particular concept, using instruments of data collection and analysis. The study uses the method of Discourse Analysis to analyze the concepts of hybrid libraries developed by the authors who study the theme.

Still in development, in the data analysis part, the method of Discourse Analysis will support the ways of understanding the discourses in the texts of those researchers who study about hybrid libraries in the Information Science field, in order to understand why they have acquired such a conception and not the other, thus highlighting the subject-form of the discourse, as well as the discourse-interdiscourse relationship, and encompassing its paraphrase and polysemy, for the construction of an Archeology of Knowledge. For this purpose, the institutions in which the discourse is produced, the historical and social conflicts which define the discourse and the space that each discourse takes within the interdiscourse were designated as forms of analysis. The study intended to develop a discursive analysis of the concept of hybrid libraries at literature, documentation and governance of hybrid libraries and compare different countries' models through that. Some interviews were also developed to hybrid librarians. Regarding to Foucault 1971, the Discourse Analysis provides the development of an Archeology of Knowledge, because no discourse, or materialized text, is autonomous or enough, but it rests on others. The subject of the new discourse is

created to develop an interdiscursive purpose with previous discourses. Thus, the construction of an Archeology of Knowledge is appropriate for the development of the concept of hybrid libraries, because it provides the evolution of the concept of hybridity in libraries.

Firstly, the Discourse Analysis context established was the articles founded in the literature review about hybrid library concept carried out on the following databases: Library and Information Science Abstracts (LISA), *Base de Dados de* Periódicos em Ciência da Informação (BRAPCI), Web of Science, and Scopus. There are founded 37 texts about the concept of hybridity in libraries: (Pinfield et al., 1998a), (Pinfield et al., 1998b), (Pinfield 1998), (Oppenheim et al., 1999), (Leggate, 1999), (Guy, 2000), (De Marcas et al., 2000), (Mlekus, 2000), (Gambles, 2000), (Garrod, 2001), (Pinfield et al., 2001), (Breaks, 2002), (Dent et al., 2001), (Brophy, 2002), (Roberts, 2002), (Casserly, 2002), (Garcez et al., 2002), (Guy, 2003), (Kolloffel et al., 2003), (Hamilton, 2004), (Covi et al., 2004), (Pugh, 2004), (Pugh, 2005), (Carr, 2006), (Orera-Orera, 2007), (Miranda et al., 2007/2008), (Pinto et al., 2012), (Da Silva et al., 2017), (Da Silva et al., 2017), and (Da Silva et al., 2018). These articles will be analyzed from a Fairclough perspective. In a later approach, we intend to go to personally in American hybrid libraries (to be established yet), to analyze their documentation and governance. A brief analysis of the production process showed that the concept of hybrid libraries is being developed in countries like England, Scotland, Wales, Brazil, United States, Denmark, Israel, Slovenia, Australia, India, Africa, Germany, Belgium, Spain, and Colombia. All the authors analyzed reference sources from the United Kingdom, where, historically, the concept was born. Nowadays, the concept of hybrid libraries has been more discussed in countries where the libraries are becoming hybrid (such as developing countries). On the other hand, in countries where most of their libraries are hybrid, such as United States and European countries, the concept of hybrid libraries is discussed in order to understand how the convergence of technologies can contribute to the development of communities.

Development and libraries

Originally, the public sphere was perceived as a forum where public opinion was formed. However, with the development of market strategies and the commercial character of mass media, it started to operate not only as the view of civil society, as opposed to the State, but considering the diverse public in society, being the public sphere in a place of conflict between interest. In the public sphere, libraries are found as institutions which work with conflicts of social interest through the treatment and provision of information to its public. The several types of libraries, including hybrid libraries, offer different types of development to society. For Da Silva et al. (2017), hybrid library is a cultural equipment which integrates aspects of traditional libraries, as well as digital libraries.

In face of that, it is understood that, in addition to the convergence of technologies, hybrid libraries must be a cultural space, adapting to cultural characteristics of each community in which they are operating. According to Habermas (2000), society experiences three major axes of macro development: human, social and economic development. In these types of development, there are underdevelopments, as it is the case of the technological development which, in the current context, faces the development of software, within the perspective of three macro developments. The institutionalized organizational development, as part of the economic and social development, opposes the professional development and, in the context of libraries, the development of collections, in addition to the human development. The cultural development is subsidized by the social development. Finally, all these developments surround the idea of privacy versus accessibility of information, the political development, and the citizen participation in society.

The concept of development, since the Classic Philosophy, with Socrates and Plato, brings the idea of the act power, that is, an action powered by some other action. After the Second World War, with the technological transformations occurred, development came to be seen from the point of view of a relative growth or potential possibilities to transform something or an action. Development is, therefore, situated in specific space and times, capable of creating thought and political actions (Sachs, 1993). In general, development results from the economic growth and from the improvement

in the quality of life, including issues of "poverty, unemployment, inequality, health conditions, nutrition, education and housing" (Vasconcellos et al., 1998). Thus, development needs to be understood as a complex process of economic, human and social changes, being more than growth, but a way to transform and satisfy the diverse needs of human being. In relation to human development, it can be seen under the emphasis of the individual's historical-social process, and the same acquire knowledge and assets by interacting with other individuals in society (Furtado, 1974). With regard to the social development (Shera, 1977), traditionally, the sector includes education and health fields. Smith (2006), when dealing with economic development, highlights that it turns to market laws, that is, to the creation of products and services that generate competitive advantage in economy. In the social sphere, this type of development is manifested in the distributions of revenues, considering its direct and indirect costs.

Concept of hybrid libraries

"The idea behind the label of hybrid library is not new and has been expressed by a number of writers8who recognized early the need to join-up all the available types of information resources in order to come to a fully interlinked information environment" (Breaks, 2002). Therefore, the hybrid library is characterized by being a place that keeps its traditional and digital collection, using the Web as an additional mechanism of delivery, where users can access electronic information as well as relevant physical resources. To this end, the ways hybrid libraries operate aim at integrating a wide variety of traditional and new resources in the most uniform way possible, by means of print and digital meta-information. In this perspective, "The term 'hybrid library' is only a label to help our thinking of how libraries are developing" (Breaks, 2002).

According to Orera-Orera (2007), the hybrid library is "a mixed entity, where traditional documents, digital information and services offered in the facilities of the library coexist with other services offered online". Therefore, those libraries serve in person and remote users, becoming a sum of the real and virtual. Moreover, according to Orera-Orera (2007), some relevant aspects of those libraries are 1) the new role of the librarian, whose importance is increasing due to the large amount of existing information and the need to treat it with defined quality criteria; and 2) the information management, which requires the provision of diversified training to cover the diversity of professionals required in the different roles played by libraries.

Under the changes in libraries due to the arrival of digital medias, López Jiménez et al. (2005) understand hybrid libraries as models of libraries where the user, through a Web interface, pages or computer screens, can access digital resources. Therefore, "the title hybrid library is the most adequate in the transition from the traditional to the virtual, because it goes from the digital to the virtual without abandoning the print documents" (López Jiménez et al., 2005), thus keeping physical and virtual spaces in its structure. That being said, it is understood that in the hybrid library, the information on paper is handled in parallel to the electronic information, requiring the information professional, as a hybrid librarian, to know how to work with the information recorded in different media. Thus, Villa Barajas et al. (2005) claim that "the motivation behind the concept of hybrid library is the need to deal with diversity, which is an important issue when libraries advocate for a world where the information is globalized". Therefore, the information on a large scale is at stake. For that reason, Koltay (2008) considers that hybrid libraries are frequently identified as digital libraries. However, according to Ramírez Céspedes (2006), hybrid library is "an intermediate environment between the traditional and the virtual library, where both formats coexist, and traditional services may exist as well as in digital environment".

In a more social view, Da Silva et al. (2017) understand that, in addition to the convergence of technologies, the hybrid library must be "a cultural space that fosters dialogue, where individuals and technology interact, so that information kept in the library comes to life as it is useful to users and therefore used". Therefore, the environment in these libraries is interactive and stimulating, capable of building a multicultural relationship of data, information and knowledge, with the concept of hybridity present in the promotion of information. In this context, like Vuren et al. (2009), Da Silva et

al. (2017) state that hybrid libraries are only possible when the institutional structure and the professionals working at the institution work together, in order to build access and to use the information wisely. Thus, the idea of hybrid libraries includes the need to better understand the users' requirements and behavior and, therefore, the competence in information, which must be part of the different departments in the library, so that professionals can act in order to recognize the potential of the hybrid library (Edwards et al., 1999). Hence, for the hybrid library environment to be able to serve all users of the institution, cultural differences need to be recognized by these libraries administration, requiring that such locations offer a variety of information sources, creating new ways of communicating and disseminating discoveries, in order to facilitate, among users, the discussion about the information received. It is, therefore, a space of continuous learning, where employees and users need to acquire a variety of skills to deal with the information.

Preliminary Results and Discussions

The term hybrid libraries originates from the combination of the concept of traditional, electronic, digital and living libraries, from the point of view of environments that meet to offer greater access to information and a better understanding of the librarian expertise in contemporary social contexts of innovation. The processes adopted by these libraries have attributes of languages used by each institution, with purposes that meet the informational needs of users in innovative operating environments.

The impact of social development for hybrid libraries lies in the fact that, from the moment the individual becomes more important than the techniques and technologies of information processing for the development of their products and services, those institutions become characteristics of a new concept. Such concept focus on a field of study where hybrid libraries are no longer understood only by the convergence of technologies in the same environment, but by the use of Information and Communication in the process, meeting users' needs and desires.

In this scenario, it is discussed a social institution which values the understanding of human uncertainties, raising resources and procedures to ensure that these uncertainties are eliminated through qualification and participation of the individual in society. In this sense, the technologies, always present in hybrid library tasks, are now characterized as auxiliaries in the library processes, whose main objective is the information access by users, so that they become autonomous individuals in the use of the information accessed. For this reason, hybrid libraries are potential agents for transforming their communities at intellectual and social levels because, in addition to being mediators, they are active entities in accessing education, information and knowledge. Therefore, the hybrid informational equipment must consist of professionals who aim to manage the knowledge existing in society and, in order to do so, they need to understand how the library operates as an organization, as well as the relationships among the people in this organization. In this sense, it is assumed that the hybridity applied to libraries can improve the information management processes and, consequently, the management and organization of people. Hybridity, as a perspective of socio-cultural inclusion, assumes the social development as it directs the work of libraries towards the management of information based on the development of their communities.

It is noticed that in the hybrid library environment there is a greater flexibility of products and services offered, since it originates from an organizational structure that proposed multiplicity of languages in the work of the institution, encompassing not only physical resources, by mainly the human resources for taking decisions. Therefore, hybrid library must be a cultural space that allows the promotion of dialogues under the view that the information registered in site must come to life as they are used. Thus, it can be said that the concept of hybridity in libraries meets the most recent research in Information Science in the world context, involving paradigms that did not exist before.

When observing historical construction of hybrid libraries, it is possible to understand that, when the concept was first considered, it focused on the implementation of digital technologies in the library scope. In this perspective, the aim was to understand how the library management should behave in

relation to the acquisition of information and communication technologies, as well as the expenses, costs and benefits that these new technologies would bring to the library context, emphasizing the economic development for the technology development. Thus, it was necessary to study the costs of acquiring new software and hardware, understanding the benefits and harms of this acquisition for both the institution and the public. The vast majority of studies on this subject, in the late 90s and early 2000s, are linked to the technological development undergone by traditional libraries and to the software development covering data interoperability and library development programs.

With the understanding of the best and most adequate software and hardware necessary for the library routine, in addition to the acquisition and installation of those in the library environment, these institutions faced a technological convergence, however, these technologies would be of no use without professionals trained for their proper use, according to the mission and vision of the organization. In this scenario, in the late 90s and early 2000s, studies on professional development emerge within the human development aspect, that is, the ways in which it would be possible to enable information professionals to make better use/benefit of language convergence provided by these locations.

Along with professional development, understanding the urgency to study the focus of the institution – the users -, a trend was started around the training of these professionals not only on their information needs, but also on their professional desires. Thus, the concept of hybrid libraries comprises the study of users and communities, in order to understand their contexts and develop products and services according to their demands, falling once again on human, social and economic development. In the third stage, in the early 2000s, researches on hybrid libraries focused on the collection development, taking advantage of the great possibilities to access information (in the institution itself or other institutions) brought by electronic and digital technologies. In this view of data exchange, the analysis of the privacy versus accessibility issue was initiated, with the aim at offering a wide variety of information to the users, however, without violating their physical and/or legal rights; it was the counterpart between the traditional and digital environments, from the point of view of institutionalized organizational developments (with purposes not only in the market, but also in the social character of their actions) and social developments, which has an impact on human and economic developments.

In this perspective, the concept of hybrid libraries is seen, in the first instance, from the perspective of social development, emphasizing its political and cultural aspects, since it expanded according to institutional (library) and cultural (employees and external community) policies, including an organization structure approach (internal environment) and the external contexts surrounding them (other institutions, public and private policies, among others). Thus, in a second instance, the institutionalized organizational development of these cultural equipment was emphasized, to the extent that organizational studies would range from initial approaches of understanding the concept of hybridity in libraries (technological and software development) to human, social, economic, collection, political, professional and cultural developments, that is, they would span human, technological and financial resources of these organizations, institutionalized under the law in society. In this penultimate perspective, the focus of the processes of hybrid libraries was at the operational (library performance) and tactical (library management) levels, since it focused on short and mid-term planning, always highlighting the social development when dealing with users and employees of these organizations.

The the mid-2000s, the hybrid library starts to stand out in the medium and long term management, encompassing the strategic, tactical and operational levels. In this context, the concept of hybrid libraries is essentially focused on human and social developments, having an economic impact as it understands that human resources are the most complex to be worked within organizations, as they are subjective beings and that, like technologies, they are constantly renewed. In this scenario, when taking into account that, in order to work on the institutionalized organizational development of hybrid libraries, which generates information products and services that impact their economic development, it is necessary to understand their human and, consequently, social development, which show themselves to be the focus of these libraries.

Preliminary Conclusions

Hybrid organizations must understand that they are largely driven by the access to content in multiple sources, as well as by changes originated from users' needs, which affect the range of services provided by libraries. In this sense, the hybrid library operates in the cultural sphere when its communities operate in the work of the library. The technologies are characterized as tools that assist the development of services offered by libraries, that is, in professional practices within libraries that aim to make users able to interpret the information they receive and, thus, generate and share knowledge in society, which allows a greater participation of these subjects as citizens, in the different contexts in which they find themselves. Thus, the epistemological discussion in the construction of a concept about hybrid libraries that can be applied to different locations in the world , according to their cultural, values and principles (and, for that reason, individuals from each location will internalize a concept according to their characteristics and beliefs) needs to take into account the impact between the use of technologies and the provision of services that promote the social inclusion of communities in each hybrid environment.

Therefore, there is the need to different discussions about fundamental themes in order to have a conceptualization of an object of study, due to the multiplicity of conceptions brought by various subjects. From this point of view, and understanding that the concept of hybrid library results in several possibilities, conceptually standardizing the term is feasible for systemic context of that library, in order to achieve semantic interoperability in the exchange of information.

The study showed that, currently, the main type of development in hybrid library environment is the social development, since, although the technological development is part of the constitution of the concept, these libraries make use of technologies as strategic tools in order to achieve social development. Social development is understood as educational activities performed by hybrid libraries in order to socially include their users. In addition, it is possible to find political, professional, software, organizational, economic, collection, accessibility and cultural development in the hybrid library environment.

For a more didactic reading, we recall that the macro developments investigated in this study for the general context of societies are: human development, social and economic development, which together form the institutionalized organizational development, when it comes to the context of an institution. The underdevelopments provided by hybrid libraries are: technological development, political development, professional development, software development, collection development, privacy versus accessibility development and cultural development. Thus, by encompassing the aspects that constitutes human and social development, it is possible to enter the institutionalized organizational development of hybrid libraries, capable of providing valuable products and services for the society (assets). It works with the means by which this library must plan so that its products and services can meet the informational needs of its users, making them autonomous researchers and able to generate new knowledge. It is not, therefore, about waiting for users to come looking for library services, but about taking the information to them through the development of educational activities and attractive environment, with convergent technologies and services for all the public of the institution (regardless of race, age, gender, etc.), when working with the users' informational and educational desires. It is a complex way of accomplishing the macro developments mentioned in this study, along with their underdevelopments.

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Threat Perceiving in The Environment of a Contemporary Organization – A Concept of Theoretical Approach

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Abstract

The article presents a concept of a theoretical approach to threat monitoring in the environment of a modern organization. The dominance of non-deterministic situations, including the increasing complexity, diversity and dynamics of events and phenomena are all characteristic for this environment. This places increased demands on security systems, including threat monitoring systems. The result of the work is presenting the concept that includes an integrated signal perceiving model, organizational system model, a model for the qualitative evolution of the organizational system, and a spiral model for organizational systems development. The research methods applied include analysis and criticism of literature, analysis and logical construction as well as heuristic approaches: the "new insight" and analogical transfer method. The deductive and enumerative induction method were also applied in tandem.

Keywords: Perciving of warning signals, monitoring of organizational security, organizational system, qualitative evolution of systems, evolution of systems

Introduction

The environment of a modern organization is filled with threats posed in various areas, and are, at the same time, increasingly complex, diverse and extremely dynamic. The scale and scope of these threats is so significant that it proves impossible to exclude or eliminate all of them. Researchers are already talking about a "risk society" (Adam, Beck, & Van Loon 2007; Franklin, 1997). This places increased demands on security systems, including: the ability to preempt so-called consequential threats (Ćwik, 2017a) and to properly assess the situation (Naderpour, Lu, & Zhang, 2016; Panteli & Kirschen, 2015; Neisser & Runkel, 2017), appropriate preparation for potentially dangerous events (Said & Chiang, 2020; Li & Liu, 2020), proper interpretation of risk (Eiser et al., 2012; Xiaowei & Tiezhong, 2020), the ability to properly respond to the risk (Wang, Goh, Ding, & Pretorius, 2019) and resistance to potential consequential threats (Antronico, De Pascale, Coscarelli, & Gull, 2020).

In order to achieve consistency of argument, the author suggests distinguishing the concepts of causal threats, which are different types of interactions (energy or information), and are measurable (quantitative) and constitute the underlying cause for specific consequential threats. In turn, consequential threats present the possibility of creating specific effects, caused by causal threats. An example here is the level of water in a river (causal threat) and the related consequential threat of flooding the surrounding areas (qualitative changes) (Ćwik & Świerszcz, 2018).

The next assumption is that phenomena such as threat or associated risk are individually perceived by each observer, or threat analyst. In his detailed analyses of threat monitoring, the author suggests distinguishing the perception of impressions, which bears the hallmarks of objective processes, from perceiving that combines the objective processes of signal perception with their subjective interpretation, covering the main subjective cognitive processes (Fig. 1).

Another assumption is to adopt a systemic perspective on the perceiving of phenomena in an organization's environment (both internal and external) (Ćwik, 2019). The environment of an organization is dominated by non-deterministic processes, (Ćwik, 2017b) where, on the one hand, the

observer should be aware of such processes, and on the other, be familiar with models that enable the future development of the situation to be assessed (Ćwik, 2017b). The organizational system model is a proposal that meets the above-mentioned requirements for security systems (Fig. 2).

The main objective of this article is to propose a model for assessing the development of a situation in the environment (external or internal) of a modern organization (social, administrative, economic, political, cultural and other), primarily from the point of view of the security of its functioning.

The research methods applied involve the analysis and criticism of literature, including a systematic review of literature in the studied area. The second is the method of logical analysis and construction, and the heuristic methods: the "new look" method, and the analogical transfer method, as applied for creation of models linked with interpretation of the notion of threat. Furthermore, the communication of the results of the author's own studies and observations of people perceiving of different signals relies on deduction and enumerative induction methods. The article is conceptual.

Perceiving Model for Monitored Signals

Theoretical Introduction

The environment monitoring systems of a modern organization must deal with a significant number and variety of sources providing information on potential threats. This monitoring consists in reading the signals that convey information concerning threats. At the same time, the reading of any signal is characteristic of an experience consisting in the recording and identification of a specific graphic symbol, electrical, light, magnetic, sound or other impulse and the specific interpretation associated therewith. The final effect of this experience is an internal decision formed in the mind of the observer, generating and introducing into consciousness specific content, which is a product of detailed processes that can be called processes of signal recognition and identification. The definite – for the given (both temporal and spatial) circumstances – identification and recognition of signal is thus the result of sensual, mental and cognitive processes.

When addressing the issue of signal identification and recognition, we notice that the terms perception and perceiving (noticing, revealing) are treated interchangeably in subject literature (Sussman, Jin, & Mohanty, 2016). It seems that it is more appropriate to use the concept of perceiving, as illustrated by the model from Fig. 1, presenting the integrated signal perceiving model.

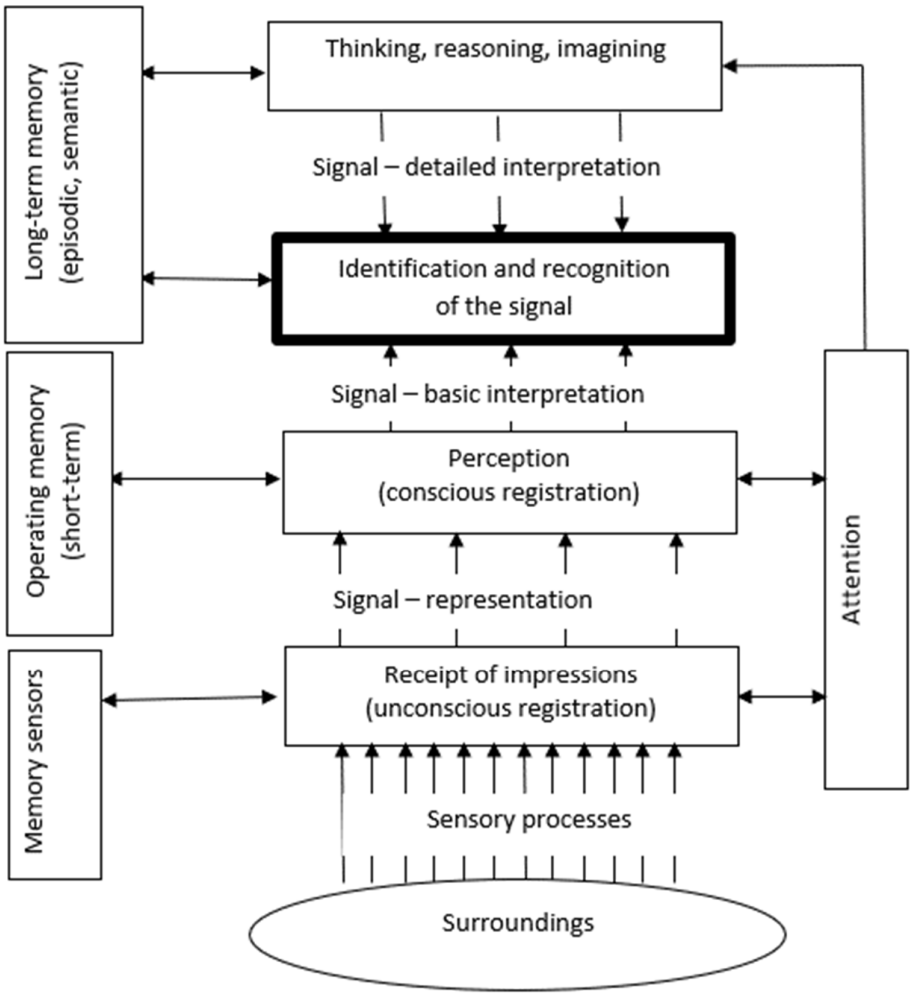

Fig. 1. Model of the integrated signal perceiving process
Source: own work (Ćwik & Świerszcz, 2018)

The model in Fig. 1 presents a perceiving system that integrates the components of the perceiving process of any signal or set of signals. The model captures components of sensory processes, basic mental processes, and higher mental processes (thinking, inference, imagining). As a result, the final identification and recognition of the signal is a result of so-called bottom-up processes from the senses and top-down processes from the mind (Fig. 1).

In this model, the processes of perception are mainly the basic processes of signal transmission encoded in the course of our biological evolution. Their characteristics include the relatively low complexity and relatively low energy expenditure on the implementation of their course. They mainly utilize sensory and operating memory. These processes are repetitive and are percepted identically by their respective observers. The so-called higher mental processes originate from the more advanced areas of brain, and mainly include the higher cognitive and mental processes. These are the so-called top-down processes. Unlike the bottom-up processes, these processes are individual for each respective observer. Their course largely depends on individual experiences and cognitive resources, as well as the current psychophysical condition of the observer. These processes also require greater energy expenditure. The result of the confrontation of bottom-up and top-down processes is the integrated process of signal perceiving.

The model identifies the basic subsystems that affect the effectiveness of identification and recognition of warning signals. One of them is the attention system (Fig. 1.). Attention ensures that only part of the stimuli reaching the senses that monitor signals is actually perceived (Susan et. al., 2016). This is an evolutionarily developed subsystem of perceiving, saving the observer's expenditure of energy, and reducing the excess of incoming information (Manning, 2020). The presence of this subsystem is the result of observer's perceive and cognitive limitations that make him or her able to process only part of the potentially available stimuli from the surroundings.

Attention can be imagined as a condition of specific tension or of readiness of the observer's cognitive structures to identify and recognize a particular object or phenomenon. Researchers distinguish different degrees of attention, stating that attention can be focused on a small number of stimuli only, in the process of so-called intense attention, or there may also be so-called distracted attention that focuses on a large number of stimuli (Neisser & Becklen, 1975; Spelke, Hirst, & Neisser, 1976). Intense attention is accompanied by sharpened awareness of the content falling within the so-called the field of attention, while extensive attention means a weakening of the awareness of what is in its field.

Another important element of the threat perceiving system is the memory system (Fig. 1). In the subject literature, memory is understood as the ability to record, encode, store and retrieve data in the form of sensory impressions, associations, information, where:

- recording is the process of acquiring the incoming data;
- coding is the process of organizing and transforming incoming data that enables its inclusion in memory, wherein it is coded in symbols;
- storage is the process of keeping encoded data in memory;
- retrieving is the process of accessing data stored in memory.

As featured in Fig. 1, the sensory memory, operating memory or long-term memory are basically collections of so-called memory traces. In turn, such traces are well-established neurochemical signal transduction pathways, associated with signal transduction in different areas of the brain (Pignatelli et. al., 2019; Takamiya, Yuki, Hirokawa, Manabe, & Sakurai, 2019).

Discussion

In the model from Fig. 1, the recorded signals are first transformed into stimuli, then into impressions (Zimbardo & Gerrig, 2014). They are further transmitted as part of the bottom-up process, where they are confronted with parallel selection and categorization processes carried out with the participation of memory and thinking, as part of the so-called top-down processes. Their consequence is the recognition and identification of signal content. Perceiving following this path is a process consisting in active reception, analysis and interpretation of sensual phenomena.

A number of constituent mental processes are integrated in the perceiving process, as a result of which a person reflects (creates cognitive representations of) objects of reality currently impacting its receptors and recognizes the significance of these objects – it decodes the incoming information using its representations stored in the brain. Such perceiving processes are supported by attention, memory and thinking processes.

The aforesaid processes of cognitive activity are characterized by the active nature of their course, as a result of which people receive information concerning the world, process this information, integrate the acquired data and integrate it into knowledge systems, and then apply it to make choices, formulate evaluations or judgments, or to make decisions.

The various models included in long-term memory resources should also include, among others, models that enable proper assessment in non-deterministic situations (Fig. 1). It is proposed that the presented model of integrated warning signal perceiving should be included in the activities of early

warning systems analysts, not only those involved in economic, military, crisis warning systems, but others too.

Model of the organizational system

Theoretical Introduction

Ever more frequently the monitoring of surroundings of a contemporary organization occurs in the so-called non-deterministic circumstances (Ćwik, 2017b). What can facilitate perceiving in these situations is the inclusion of a systemic model for universal perceiving of reality surrounding the contemporary organization. This will be a model of the basic element constituting this reality, reflecting the basic features of the surrounding of this reality. The basic features of the environment of a modern organization include: the pursuit of integration, including the creation of holistic structures, pursuit of complexity, growing dynamics of change, and development towards intangible forms.

The working title of this model is the organizational system, as we assume that it will join characteristics of both a system and an organization. When creating such an element, the concept of a system, as understood according to the theory of general systems by Ludwig von Bertalanffy (Von Bertalanffy, 1973), was taken into account as a separate fragment of reality in the form of a set of components and the relations between them, along with the concept of an organization, defined as a whole organizing its internal components to implement a joint action.

It is assumed that any organization as well as the environment within which it functions, shaped by the presence of other organizational systems, can be understood as such an organizational system. The diagram of such a system, functioning in any environment (economic, biological, social, physical), is presented in Fig. 2.

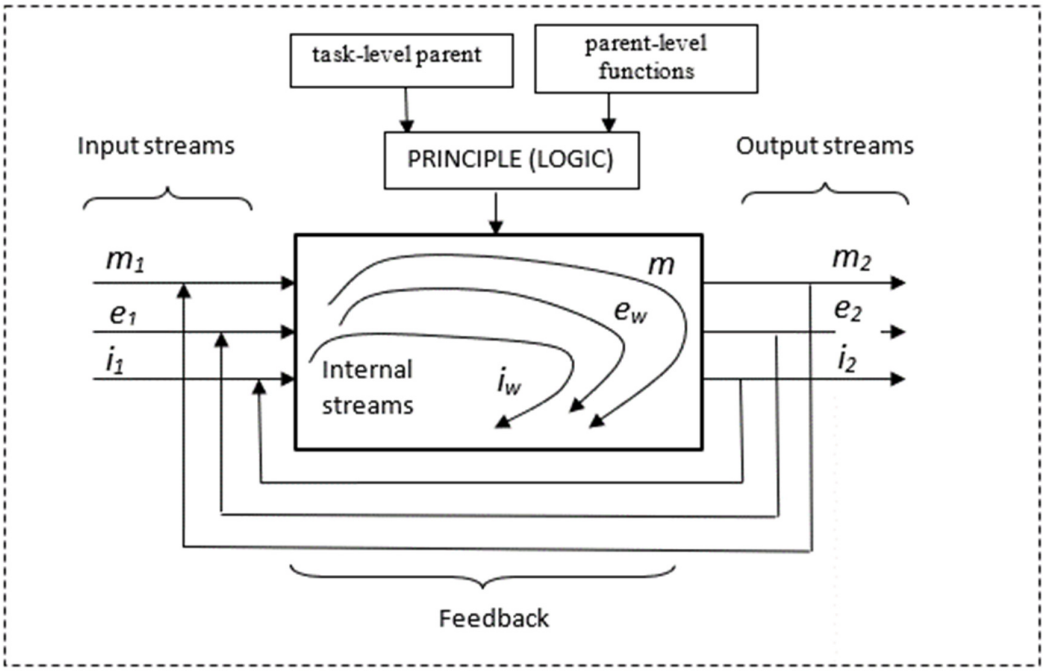

Fig. 2: The model of the organizational system
***m_1, m_2, m_w,* – mass flows; *e_1, e_2, e_w,* – energy flows; *i_1, i_2, i_w,* – information flows**
Source: author's own elaboration

The model of such a system remains an open structure, equipped with a specific infrastructure, organizing the internal and external flows of: mass, energy and information. The organization of these flows is not accidental, but arranged according to a specific principle (logic) that permeates the individual elements of the system. The model is universal (general), and thus applicable to all forms and levels of reality. The essence of individual flows can be interpreted as follows:

- the mass flow includes the part of reality that has mass, the elements of this stream flow into and out of the system, move inside it, and may also undergo transformation;
- Energy flow – it conditions the existence of movement and initiates the mass flows;
- Information stream – it conditions the control, including the optimization of mass and energy flows.

The organizational system formulated in this way has a specific structure defining the location and organization of its components, including the network of couplings between these elements. The structure of an organizational system can be simple, or complex. The structure can be divided into holistic elements as well as sets of constituent elements. Maintaining the structure requires the separation of resources (energy and information), and that all changes in that structure are of qualitative nature.

Organizational systems build or develop infrastructure in their structures to maintain transport, communication and location relations. Elements of the infrastructure are communication channels, enabling the functioning of the information flows, and transport channels, ensuring mass and energy flows inside the system, as well as from the external environment. These types of channels can be seen at every level of contemporary organizational systems: that of single atoms, chemical compounds, biological organisms, symbiotic structures, economic structures, social structures and other networks of organizational systems.

The entirety of the aforelisted elements of the organizational system, structures and relationships constitute a specific "principle" (logic) that determines the behaviour of the respective organizational system. In a digital environment, for example artificial entities in the form of simple computer programs (cellular automata), which, once stored in the computer's operational memory, having the internally encoded "principle", for example, to connect with others based on colour, shape, etc., demonstrate activity, move, combine, resulting in a wide variety of structures. Extensive research on this type of structures has been carried out by, among others, Stephan Wolfram (Wolfram, 2002). In the case of a natural organizational system (social unit, enterprise, eukaryotic cell, organism) this principle is "the logic of universal optimization". This logic is revealed in fact that every operation of the organizational system is implemented in such a way, as to perform it using the least amount of energy.

Discussion

Each organizational system performs functions and tasks from the superior level. Such a system organizes its activities so as to carry out all activities and behaviour in accordance with the "principle", i.e. the logic to which it is subject. Natural organizational systems (physical, chemical, biological, social) are subject to the logic of universal optimization – that is, all of their actions or behaviour are implemented with the least energy input possible. As a result, a falling stone selects the shortest path to earth, water spilled on a slope chooses the path that ensures the lowest loss of flow volume, the movement of electrons around the nucleus of an atom, or the movement of the planets around a star are performed in the most energy-efficient way. In nature, optimization is widespread, and visible in the behaviour of molecules, cells, organisms and societies. Generally speaking, it can be said that within an organizational system every action is subjected to optimization, and all flows are optimized, the structure being optimally designed along with the infrastructure. At this point, one might cite Kenneth J. Arrow who stated that "everyone strives for optimal organization" (Anderson, Arrow, & Pines, 1988), or Henry Bergson: "each of the species through which life permeates has only its own convenience in sight. It pursues what requires the least effort" (Bergson, 2012). Generally speaking we may formulate the thesis that "the universal optimization logic" is the main driving force behind the development and behaviour of organizational systems.

The logic of universal optimization in natural organizational systems is the overriding principle guiding all processes related to the organization of structures and the flows of mass, energy and information. The mechanisms resulting from this logic shape the reality constituting the external surrounding of the contemporary organizational system, encouraging it to integrate, to create scale-free networks, strive for less and less energetic solutions, for cooperation, for the emergence of an increasing number of intangible forms. The use of ever decreasing energy-consuming forms and structures that are ever lighter, less material-consuming, faster and more efficient, more and more effective and successful are all effects of the existence of this logic. A further result is the increasing loosening of relationships, increasing networking, complexity, diversity, immateriality – coding universality, and the universal usage of symbols. The mechanisms arising from the "logic of universal optimization" can explain the concepts of the "selfish gene" and the "blind watchmaker" of Richard Dawkins (Dawkins, 1976; Dawkins, 1982; Dawkins, 1986). The idea of the "logic of universal optimization" is also consistent with Martin Luhmann's concept of social systems (Holmström, 2007; Gonnet, 2015) and the "theory of communication behaviour" by Jurgen Habermas (Ross & Chiasson, 2011), and it also coincides with Henry Bergson's theory of "elan vitae" (Bergson, 2012; Bergson, 1998; Artuso, Roldán, Scolaro, & Carlucci, 2016).

Qualitative Evolution of Organizational Systems

Theoretical Introduction

One of the characteristics of organizational systems is that they are subject to qualitative evolution mechanisms. The essence of the qualitative evolution of organizational systems is its transition to ever higher levels of development, whose subsequent levels are increasingly complex organizational systems resulting from qualitative changes. Such changes are presented in the "Model for qualitative evolution of organizational systems" (Ćwik, 2019). In a simplified form, this model can be presented as in Fig. 3.

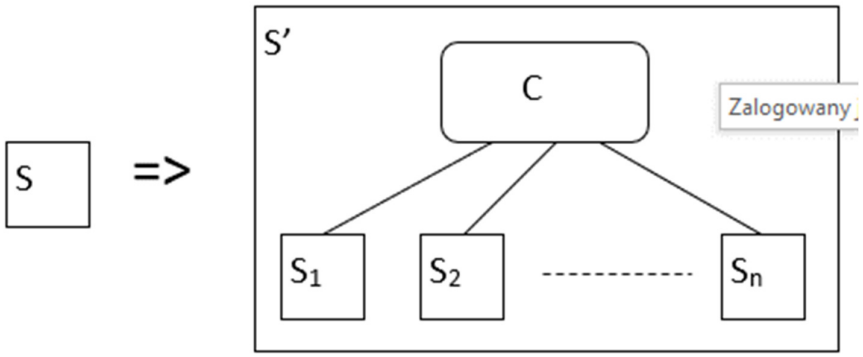

Fig. 3: Model for the qualitative evolution of organizational systems
Source: author's own elaboration based on (Ćwik, 2018).

Let us consider an S organizational system with its internal mass, energy and information flows. This system has mechanisms to produce its copies, which are made with minor variations. These copies constitute the new S' system and become subsystems for it (possessing mass, energy and information flows), creating a new system, building structures, transport relations, communication relations. In doing so, they are guided by the principle of universal optimization. It also creates the appropriate structure and allocates some resources to the infrastructure. To create optimal mass, energy and information flows, each of the subsystems produces transport, energy and information channels to exchange resources with other as efficiently as possible. After a certain degree of complexity is reached, and to provide a solution for worsening problems with the coordination of activities, the S' system produces and expands the C control system. At the same time the individual systems specialize; the transport, energy and information infrastructures are expanded and the network of relations in the S' system becomes more dense. The copies created by the S system are subsystems S1, S2, ... Sn. Each

copy makes subsequent copies, which also feature certain variances. The result is a multi-level structure that requires control and even more complex forms of action and behaviour. It is crucial that out of this complexity a control system evolves to organize the information flows. In the emerging multi-level control system, each level is associated with a certain activity, characteristic for this level. If A is an activity at the respective control level of a certain system, then in the transformation of the organizational system, a new activity will emerge, i.e. a new control system. Let this be activity A. Controlling activity A results in the new activity A', which we can write down as:

Control of A = A'

A classic example here is the qualitative development of a multicellular organism. The S system can then be a single cell, capable of operating independently. Cell reproduction processes and their integration creates the S' organizational system, which is an organism made of millions of cells. At the beginning, the control process, consisting in keeping the cells together is primitive, most frequently based on the laws of nature, and it occurs without any distinct substructure. However, in the subsequent transformation processes of such organizational systems, cell specialization evolves, and the complexity level increases. One can imagine a situation where several cells cooperate in the exchange of mass, energy and information, and so, for proper coordination of this cooperation, it becomes necessary for some cells to specialize in providing information. This is most likely how nerve cells evolved, followed by other types – tissue specialization was born. In the result of these processes, organisms have evolved, in which a multilevel hierarchy developed, and cells were organized in tissues, tissues in organs, and those in the body, and the whole was controlled by the nervous system. What was also developed was an internal infrastructure for securing the superior operation of such a system.

As time passes, the developed structures age, are subject to disorders, distortions, and the flows they facilitate become less and less effective. They may even break up. Biological organizational systems have developed recovery processes, which ensure the operational continuity of these structures. The most effective way to ensure continuity is to be able to replicate – that is, to make their own copies. It should be emphasized that copying is the most optimal way to ensure the continuity of structures, as creating a new structure is always very expensive and time consuming. Therefore, the diversion of some of the resources to structural support, as well as the production of mechanism for their replication, is a common feature of all living organisms.

Within such a developing organizational system, communication and transport tasks are performed. The system builds flow and communication infrastructure – the nervous system, vascular systems, transport and communication networks. At some point in time the system forms, shapes and distinguishes a control system (for regulation, management and coordination). It is becoming more and more logical, increasingly advanced – it builds structures, secures its existence, and builds infrastructure in a broad sense. Guided by the logic of universal optimization, the organizational system constantly looks for benefits, establishes cooperation, or if necessary decides to initiate a conflict. In the course of qualitative evolution, the system begins to use coded strings of symbols to convey information, and looks for increasingly sophisticated coding methods, while at some stage initiating the coding of energy flows as well as the coding of product flows. One result of the presented mechanisms is that humanity invented money to encode the value of goods during their exchange. Another example are the media used for storing and managing information. In the course of emergence, new forms of organizational systems are developed. The systems within the subsequent levels replicate and integrate at increasingly higher levels, creating hierarchies of entities.

Discussion

The evolution of organizational systems brings qualitative diversity and quantity overload, leading to competition and selection. We observe this at all levels of evolution, from bacteria to the political, scientific, artistic and religious movements. Evolution is a continuous process of the emergence of more ordered and complicated systems from simpler ones, based on a series of consecutive phases. Every evolution is a creative and unique movement, following the so-called "time arrow" (Shu-Kun Lin, 1991) – a consequence of the existence of "universal optimization logic". The result of the above is the eternal movement, eternal flow, directed towards increasingly complex forms of systems that

become more and more immaterial, and increasingly impermanent and complex. None of this occurs in a deliberate manner, but as a result of energy and flow activities, implemented as part of Markov chain processes (Karpenkov & van Son, 2020).

For example, the result of the development of biological organizational systems is the development of control systems – the specialization of eukaryotic cells to form nerve cells, and consequently the development of the nervous system and then the brain to manage the body. Further examples are the development of the enterprise management systems, the development of automation and artificial intelligence (mobile management, cargo route tracking systems, process automation in all areas of logistics, the widespread presence of IT systems, the universality of mobile computer systems, on-line systems, ubiquitous and persuasive systems).

The Development Spiral of Organizational Systems

Theoretical introduction

The development of organizational systems, considered as a result of the qualitative evolution of these systems, can be illustrated in the form of a "development spiral" model. The considerations include the concept of universal evolution of systems and Karl R. Popper's Three Worlds. The Three Worlds divide reality into the world of matter, the world of mental phenomena and the world of abstract objects (Popper, 1972). A spiral designed in this manner presents the model for the development of organizational systems, considered in two directions at the same time – i.e. vertical and horizontal. In each of these dimensions we can distinguish further two dimensions. Vertical dimensions are: a dimension including the objective systems and processes, i.e. the ones objectively existing, and a dimension including subjective systems and processes, i.e. those existing in the mind and consciousness of human being. In contrast, the dimensions in the horizontal direction are: the dimension covering individual systems and processes (existing or considered as a whole) and the dimension including collective systems and processes (existing or considered as sets of individual elements). Therefore we end up with four bi-dimensional areas through which the theory of development (evolution) of organizational systems passes. Achieving the appropriate level of development in a given area, as expressed by a certain level of complexity, as well as the ability to create holistic structures, results in transition to the next area. These areas, which can be interpreted, as long as we remember the previous considerations, as follows:

- The "upper right" (UR) area consists of objectively existing wholes (individual elements, organized holistic structures, including holons or network nodes) that cover objectively existing entities, ranging from the simplest physical elements, through the simple biological forms, to the increasingly complex holistic structures of organisms and societies.
- The "upper left" (UL) are includes the psyche of individuals, their minds and their consciousness. For the evolution to reach this area it requires prior development of appropriate individual forms and structures (e.g. nervous system, brain), forming part of the UR area.
- The lower left (LL) area covers collective awareness (of a company, group of people, society, etc.). It concerns the population of people and its intersubjective states of consciousness and states of mind. What is prerequisite for reaching this area of evolution is the prior creation of advanced forms of information transfer (gestures, speech, writing) and an appropriate level of development in the UL area.
- The "lower right" (LR) area includes objectively existing communities (systems of networks), collections of matter, collections of biological organisms, individual forms for shaping of social systems. Our current stage of development includes complex economic (market), technological and social systems. What is prerequisite for the transition to the respective development level in this area is the achievement of appropriate levels in the remaining areas.

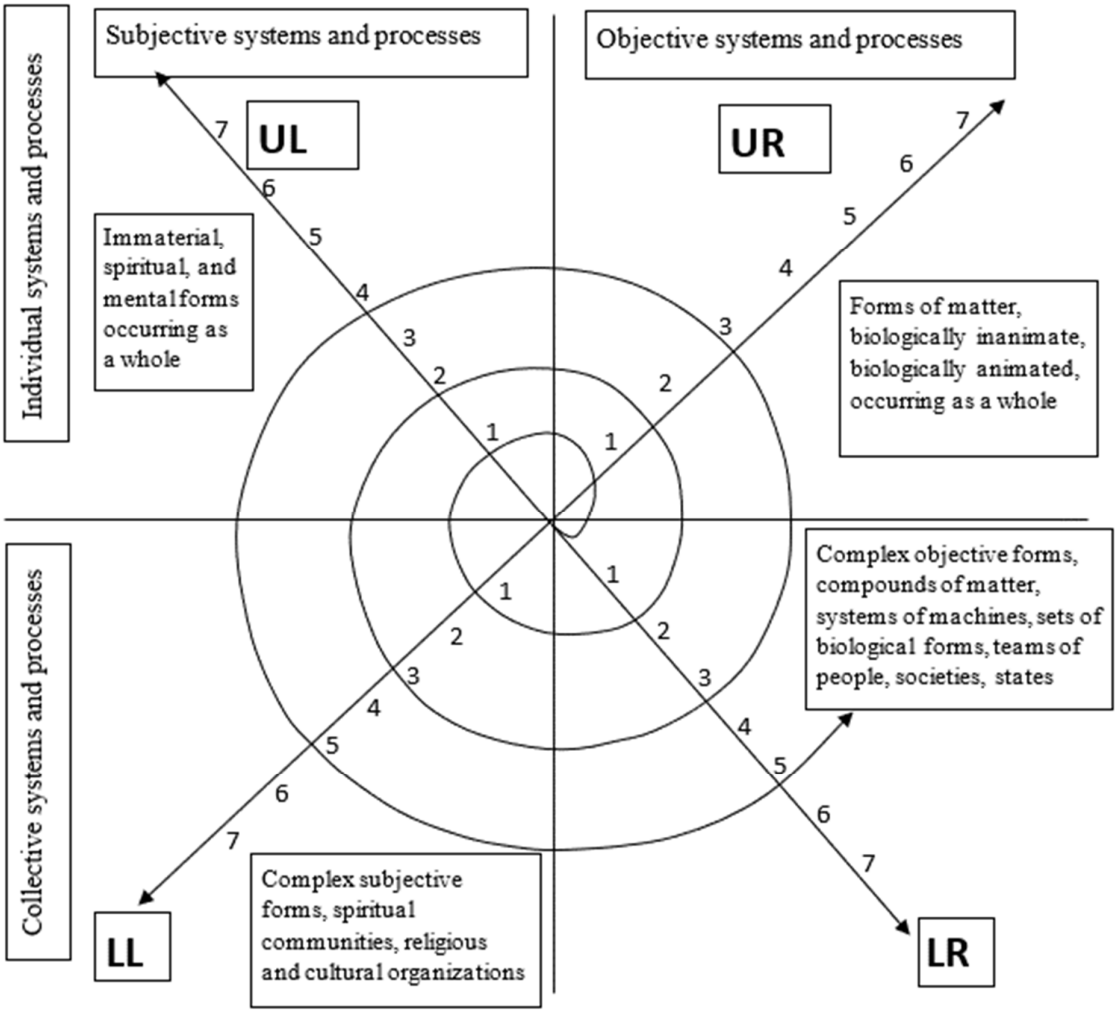

Fig. 4: The development spiral of organizational systems

Source: author's own elaboration

The development spiral of organizational systems can be represented in a 4-dimensional space. This spiral rises to higher and higher levels, attaining an increasingly complex structure. Individual forms transform in the ever more complex forms. This occurs simultaneously for the material and spiritual forms as well as abstract forms (as separate entities). All changes are constantly controlled by the logic of universal optimization.

Discussion

The presented development spiral of organizational systems presents a model of transition to ever higher levels of development, taking into account the various dimensions of this development. So, for example, in this model a company is the result of individual awareness development processes (UL area), level of culture and collective awareness (LL area), as well as the development levels of science, technology, institutions, and market mechanisms, which all belong to the LR area.

Looking at the development spiral vertically, it can be observed that the "left" areas represent the development of subjective (internal) forms and structures related to consciousness, emotions, subjective phenomena (both individual and collective), while the "right" areas relate to objective (external) reality, organizational structure, scientific knowledge and other items. Whereas, when we consider the development spiral horizontally, it can be seen that the "upper" areas refer to individuals, their internal and external structure, while the "lower" areas relate to the community and its subjective and objective characteristics.

In the presented spiral the development includes the emergence of the subsequent grades of organizational systems, linked with their respective levels of information carriers, as well as specific levels of energy.

Results

The work presents an integrated model for the perceiving of a warning signal. This model captures the basic factors affecting the efficiency of perceiving, and presents components of the perceiving process. Effectiveness is significantly influenced by the course of higher mental processes (top-down processes), wherein the cognitive processes play the crucial role.

The work formulates a suggestion to introduce, in addition to the model of integrated perceiving of the warning signal, the model of the organizational system, the model of qualitative evolution of organizational systems and the model of the spiral of organizational systems development, which should be included in the cognitive resources of the threat signal monitoring observer.

It should allow us to increase the perceiving (perception) effectiveness of warning signals in non-deterministic situations, or in conditions of uncertainty, when there is a large number of unknowns. The migration of people from the southern hemisphere to Europe, where large differences in income and standard of living exceeded the boundaries of mental energy (motivation) required to initiate the migration is just one example that can be predicted with the said approach. The creation of communication channels, mobile telephones and the Internet coincided with this, as well as the reduction of the transport barrier through the Sahara and the creation of transport channels through the Mediterranean.

Final Conclusions

The presented models – the model of the integrated process of signal perception, the model of the organizational system, the model of the qualitative evolution of organizational systems and the model of the development spiral of organizational systems – can be applied to interpret various aspects of reality constituting the external environment of a contemporary organization. As a result of the qualitative evolution of organizational systems and their quantitative development, continuous creative processes are ongoing in this environment, with parallel copying processes that are relatively slow in biology, lasting millions of years, yet much faster in the case of social processes. The evolution of organizational systems continues in all of Karl R. Popper's Three Worlds. At present, transformation processes have achieved such a pace that biological evolution is lagging behind social, economic, and technical evolution, and the evolution of systems of symbols. Continuous improvement, the search for the lowest costs, the cheapest solutions, resulting from the logic of the universal optimization of organizational systems, are the driving force behind evolutionary processes. Evolutionary processes can be imposed at some stage on purposefulness and course of action, which is only possible when the processes can be controlled. However, at some stage of development, the "control threshold" is exceeded, where complexity causes a return to universal mechanisms, where the resultant of intentional actions of many individuals is spontaneous, creative, unknown and uncertain activity. Furthermore under such conditions the sole item that can be included in predicting or forecasting is the universal perspective for the perception of organizational systems, based on the models listed in the present work.

It is suggested that the models presented in this study should be taken into account by the manager or employee of an organization, whenever faced with the need to decide on a direction of development of

an unknown, or relatively unfamiliar issue, related to its current activities, to manage, plan, rationally and effectively design possible scenarios for the development of such a situation. Consideration of the above models should also improve the effectiveness of contemporary security systems.

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Mediation in Collective Dispute and Its Role in Industrial Relation System – Case of Poland

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Abstract

The presented paper focuses on the resolution of collective disputes, i.e. conflicts between trade unions and employers. A collective dispute is the main form of institutionalisation of a conflict between an employer and employees in the Polish legislation. The act regulating this type of conflict was introduced in the period of system transformation in 1991. It allows for control over the course of industrial conflicts, setting a procedure to resolve them, where an integral part is mediation between the parties to the dispute. This paper consists of two parts. The first one is devoted to the place of the collective dispute and mediation in the system of industrial relations. The second part presents an empirical study based on a case study analysis, which was used to present an analysis of mediation in a collective dispute in an enterprise.

Keywords: Collective Disputes, Industrial Relations, Organizational Conflict Management, Mediations, Trade Unions

Introduction

The presented paper focuses on the process of resolving a collective dispute with special attention paid to the mediation stage, understood as a process of seeking an agreement between the representatives of conflicted parties - employers and employees, with the participation of a third party, the mediator.
The collective dispute process is presented from the mediator's perspective. The main research problem is: which actions should the mediator take in order to reach an agreement? On which factors should such choice depend on and which actions are the most efficient? The cognitive goal of the paper is to examine the role of mediation in the resolution of collective disputes as an instrument for managing an organisational conflict.
The application goal of the paper is to prepare a model of effective mediation which could be used by mediators in their work during collective dispute resolution.

Research Background

Collective labour relations are regulated by the collective labour law. There is no legal definition of collective labour relations. In most general terms, they refer to collective and not to individual representation of employee interests. The entities of collective labour law are primarily trade unions and employers. In both cases, the entities are legal persons and not natural persons, even if the employer is a specific person who is, e.g., a company owner.

What is the object of collective labour law? First of all, it regulates the operation of trade unions and rights of the workplace personnel. This law also regulates the operation of employers' organisations, collective dispute resolution and establishment of autonomous labour law standards such as, e.g., collective labour agreements, remuneration regulations, labour regulations, etc. These standards are called autonomous, as they are not created by legislative state authorities, but directly by parties of a labour relation, whose interests are represented collectively (Cichobłaziński and Soares Filho 2018).
The overall idea of collective labour law is collective representation of employee interests. This primarily results from the fact that a workplace is a social system and multiple aspects of its operation are of collective nature; secondly, the bargaining position of the employer vis-à-vis an individual

employee is usually much stronger. This imbalance is reduced by collective representation of employee interests and the trade unions are vested with relevant rights in this respect.

Collective Dispute Resolution

In a further part of the discussion, one aspect of collective labour relationships will be analysed, i.e. collective dispute resolution. The problems discussed to-date have been analysed primarily from the legal perspective; however, from the management perspective, the manner in which conflict resolution between trade unions and employers affects the key decision making in an organisation is essential. Conflicts between employers and employees are a natural element of industrial relations. Their course and resolution is regulated by one of the main players of market economy, i.e. the state. Relevant legal provisions are used to this aim, which civilise the process of determining interests between the major actors of industrial relations in market economy (Cichobłaziński, 2015).

Initially, it must be emphasised that the collective dispute institution is strongly rooted in the Polish legislation, as it is referred to in the Polish Constitution. "In the Polish legislation, the Constitution of the Republic of Poland of 2 April 1997 makes a direct reference to the issue of negotiations with trade unions. Based on the interpretation of Art. 59(3) of the Constitution of the Republic of Poland, trade unions and employees and their organisations are authorised to participate in a collective dispute resolution at the stage of negotiations. (...) Art. 59(2) of the Constitution of the Republic of Poland refers to the concept of a collective dispute. As opposed to the collective labour agreements and other agreements, it does not specify that the trade unions, employers and their organisations are vested with a right to initiate and to conduct collective disputes, but that they only have a right to negotiations, <in particular to resolve collective disputes>." (Jarota 2014)

Various solutions are applied in the European Union in this respect. The major differences refer to the level on which the collective disputes are solved. The Anglo-Saxon approach may be distinguished, where the theatre of a collective dispute is a company and an approach which may be encountered for example in Germany, where collective disputes are solved on the industry level. In Poland, the first solution was adopted as part of which the parties to a collective dispute may be an employer in a specific company and trade unions operating in such company. Each of these solutions has its advantages and disadvantages. The industry level is more advantageous for the trade unions, as in the industry scale they have a much greater bargaining power; apart from it, the conflict is taken outside of the company. On the other hand, such conflicts most often cover the whole country and are deeply rooted, which is sometimes manifested in great demonstrations taking place in several locations at the same time. The Anglo-Saxon solution atomises the conflict and reduces it to one company or an institution. In such situation, the conflict does not have a national dimension, but often the actual decision-maker is outside of the company, for example in the headquarters of a concern operating in another country, or it is the owner authority (e.g. local government) in the case of public institutions (Kloc, 2012).

Definition of Collective Dispute

Włodzimierz Broński and Maciej Jarota provide one of the simplest definitions of a collective dispute: "(...) a collective dispute is a conflict between the employees and the employer" (Broński and Jarota, 2015). Another issue worth discussing is the object of a dispute. It is defined in very general terms. "Pursuant to the Polish Act on solving collective labour disputes, the object of a collective dispute may be exercise of employees' interests in the aspect of work conditions, as well as the content of employment relationships, i.e. not only the circumstances of labour provision, but also in a broader aspect - all factors determining directly and indirectly the content of an employment relationship." (Broński and Jarota 2015, p. 35) The Act also stipulates that the object of the dispute may include: work conditions, conditions of wages or social benefits and trade union rights and freedoms of the employees and other groups (who are vested with the right to form trade unions).

In practice, the catalogue of the most frequent causes of initiation of a collective dispute is as follows (Męcina, 2009, p. 147 - 148):

- violation by the employer of obligations resulting from the provisions of the collective labour agreement;
- reorganisation of the company, its development, ownership transformations; company management;
- failure to commence negotiations; refusal to conclude a collective agreement;
- current economic and social policy of the company;
- work or interests of a group/ specialisation of employees;
- tariffication of employment and pay;
- pay raises;
- organisational and legal transformations and outsourcing;
- employment guarantees;
- unjustified termination of labour relationships as part of collective redundancies.

In line with the Act, a collective dispute has the following stages:

1. Presentation of a list of demands of the trade unions to the employer. The demands may exclusively refer to the issues listed in the Act and are as follows:
wages and work terms, social benefits and trade union rights and freedoms. From the point of view of the conflict dynamics, the regulation only vesting the employees with a right to initiate a dispute is very important – the employer is not vested with such a right. Thus, the initiative in a collective dispute always belongs to the employees, whereas the role and the position of the employer in a collective dispute is, in principle, defensive.
2. The employer's response. Further course of the dispute depends on the employer's reaction. It may be dual:
a) positive: all demands are fulfilled;
b) negative: at least one demand has not been fulfilled.
3. If the employer's response was negative, a collective dispute is initiated within the meaning specified in the Act, which the employer is required to report to the District Labour Inspectorate.
4. Negotiations: bilateral talks of the employer and trade unions aimed at resolving the disputable issues. Four stages of negotiations may be distinguished:
- commencement of negotiations (the parties learn each other's standpoints, terms and climate of negotiations);
- consolidation: a thorough discussion about the essence of the conflict;
- finalisation: an agreement is reached or its failure;
- formalisation: a protocol of understanding or a protocol of divergence is signed. It must be emphasised that "(...) the employer is required to immediately commence the negotiations with the aim of concluding an agreement. (...) The time of negotiations is not regulated in legal provisions. However, it may be assumed that collective negotiations should be conducted as long as there is a chance for reaching an agreement."

5. Mediation: if the negotiations resolved the conflict, the collective dispute is ended. If the negotiations did not lead to an agreement, the next obligatory stage is mediation, which forms a separate institution and consists of several stages. Their type and number depends on the path selected by the parties of the dispute, as the Act offers them certain freedom in this respect.

A) selection of a mediator. A mediator may be a person from a list kept by the Ministry of Family, Labour and Social Policy (a mediator can also be any other person not included in the list). Then, the trade unions send an application to the Social Dialogue Department to appoint a mediator, accompanied by a protocol of divergence. If its content differs from the conditions of collective dispute initiation specified in the Act, the Ministry refuses to appoint a mediator. The parties may also elect a mediator without the agency of the Ministry, both when such mediator is from the list or outside of it. Irrespective of the mode of electing a mediator, both parties have to agree to him/ her. If the parties fail to reach an agreement on election of a mediator, then at the request of one of them, the mediator is designated by the minister from the list of mediators.

One of the conditions for designating a mediator is preparation of a protocol of divergence. Parties are not always able to present such report in the Social Dialogue Department. This mainly happens due to the employer who, not wishing to commence the mediations, avoids signing such document. However, the employer has to respond in written form to the trade union's demands, thereby detailing its standpoint in the collective dispute. In such situation, the Social Dialogue Department may acknowledge the standpoints of parties presented in separate documents as the basis to appoint a mediator pursuant to the binding Act.

B) The appointed mediator (after prior approval for the commencement of the mediation mission) reads the content of the protocol of divergence, which he/ she received from the Ministry or directly from one of the parties and contacts the representatives of the employer and the trade unions to set the date for initiation of mediation. Given the fact that in line with the law, a collective dispute may only be initiated by trade unions, they most frequently suggest the candidacy of a mediator, as well as report it to the Ministry. Less frequently, a mediator is proposed by an employer, yet such cases also take place (Antolak-Szymanski 2018).

C) First contact with the parties to the dispute. It usually takes place in the company's premises. There are also exceptions from this rule. During this stage, the mediator learns the justifications of the parties' positions, which were detailed in the protocol of divergence. The mediator also agrees the amount of his remuneration; the Regulation of the Minister of Family, Labour and Social Policy only specifies the bottom threshold of the remuneration, and signs a mediation agreement with the parties. These last circumstances do not form the essence of the dispute, yet they basically affect the initiation of the process of mediation and, as such, they will be an object of analysis.

D) Tripartite talks. After initial clarifications, the mediator may invite the parties for direct talks or may suggest talks without direct contact, conducted exclusively via the mediator. The mediator also has an indirect strategy at his disposal, which consists of both "face to face" talks, as well as talks carried out with the use of a "single text" technique. Irrespective of the selected form of mediation, at this stage of mediation the mediator informs the parties about the essence of the mediation procedure and his role in it.

E) reaching an agreement, in reference literature on negotiations known as "striking a bargain." At this stage, the mediator's key task is to identify an area of a possible agreement, as well as to capture a moment when the parties are ready to approve it. The task is quite difficult as the parties most frequently are only partially satisfied with the mediation and are still hoping that they could accomplish more. The mediator should, on the one hand, suggest that the parties accept the terms which he considers best that can be accomplished in specific conditions on the basis of his own knowledge and on the other, he should remember that the parties themselves decide about accepting or rejecting an understanding and they are fully liable for it. A good tool which the mediator may use at this stage is BATNA. The use of BATNA consists in presenting the parties with a best alternative to a negotiated agreement, i.e. the end of the mediation with a protocol of divergence which gives the trade unions the right to reach for to the arbitration procedure or a strike. Even if trade unions do not intend to use such possibilities, the dispute remains open and will have to be solved at a later date. Most frequently, the employer is well aware of the atmosphere among the employees and may, with greater or smaller probability, estimate the danger of a strike, whereas the trade unions are also usually aware of it.

Yet another solution for which the mediator may reach at this stage of mediation is suspension of mediation. It is justified when the parties expect that at the time of suspension of talks new circumstances emerge, which may affect a change in the terms of the agreement. In this case, these may be such circumstances as: an independent legal opinion, emergence of additional resources for distribution which may result in the fact that distribution type negotiations will be reformulated into integration type negotiations, and all types of terms independent from the parties of the conflict such as, e.g., expected new legal regulations. Then, suspension of mediation may play a positive role both in reference to the essence of the dispute, as well as in reference to inter-personal relations. Time has decisive impact on the perception of the opponent, as well as reduction in the level of emotions.

When suspending the mediation, the parties may prepare a note which forms a report from the first part of the negotiations or may do it only on the basis of an oral agreement. The mediator should communicate both these possibilities to the parties. The stage known as "striking a bargain" may also include writing down a protocol of understanding (if the parties overcame all the differences between them) or a protocol of divergence (if at least one point of the report prepared before the mediations has not been agreed on). In principle, there is no third option. Every protocol of divergence, including at least one minor issue, gives the trade unions a right to start a strike. However, there are cases when parties of the dispute write down a "protocol ending the mediation" which is partially composed of an agreement and partially of divergences. Such solution allows both parties to "save face" in the conflict and may be used, in spite of the fact that the Act does not stipulate it *expressis verbis.* Nevertheless, it does not seem to contradict the intentions of the Act. Preparation of a protocol at the end of mediation is rarely a mere formality.

It happens that after detailing the arrangements in written form, the parties become aware that earlier they understood them differently and the negotiations focus on individual provisions, which are, in some cases, very detailed. In some cases, mere preparation of the protocol of divergence is a success, as it is difficult for the parties to agree on any provision under which they could sign their names together. It is difficult for them to decide about things that they do not agree on. At this stage, the mediator's job is to find compromise provisions, as well as to eliminate from the content of the protocol any type of justifications of standpoints, which only leads to the auctioning of one's arguments. Sole standpoints, without justification, are fully sufficient to write down a protocol ending the mediation, irrespective of the fact if it ends with an agreement or absence of it.

6. Arbitration. This is another non-obligatory stage of a collective dispute. The trade union may file a request for solving a conflict to the Social Arbitration Board operating by a competent District Court.
7. Strike. If the mediation ends with no agreement, the trade union has a right to commence a legal strike. However, it is conditioned by a referendum carried out among the employees on this issue.

8. The mediator may also take up a "good will mission" which usually happens when the conflict is solved in omission of the procedure foreseen in the Act, e.g. when the mediation already took place and ended with signing a protocol of divergence, but the trade union does not intend to move to one of the next stages of the dispute foreseen in the law, namely arbitration or strike. Another situation may take place when the parties wish to solve a conflict without initiating a collective dispute in the legal sense. In both cases, the mediator may take up the "good will mission." Such institution is not, in principle, foreseen in the provisions of the Act, but it is neither contradictory to it. Therefore, as evidenced by the mediation stages discussed above, the context in which a collective dispute takes place has a significant impact on the course of mediation; the dispute has its own dynamics and conditions pertaining to such issues as the essence of the conflict, deadlines, modes of moving to next stages, also the ones that may take place after the mediation ended with lack of understanding. Sole mediation is one of several elements of the collective dispute institution even though - which must be emphasised - a very important one, as it primarily helps prevent escalation of the conflict to a form in which would get completely out-of-control (2004).

Methodology

The empirical part of the paper will rely on the case study method. Mediation in a collective dispute in which the author took part as a mediator is going to be analysed. The mediator, as a third party in the negotiations, is meant to manage them in a mode that allows the parties to reach an agreement. It is possible to list the conditions of effective mediation. Listing them is the object of this paper.

Results – Case Study

The conflict emerged in a hard coal mine in the southern part of Poland. The mediator was notified and appointed by the Ministry of Family, Labour and Social Policy. The problem that caused the conflict was distribution of the social fund. The social fund is a part of the company's budget intended for the

employees, yet it is not paid directly to them. Set off from the employees' wages, it may be distributed in the form of loans for house or apartment renovation, funds for holiday trips or subsidies (funds transferred to the employees without the necessity of return). The company's president and representatives of all trade unions decide how to distribute the fund.

In this case, an agreement was already reached, but one of the trade unions rejected it and decided to re-negotiate. The problem consisted in the fact whether the money assigned for loans could be disbursed and distributed among employees. If the funds were given to the employees not as a loan, but in the form of distribution, they would not have to be returned. The trade union carried out a referendum among the employees, where the employees supported its proposal.

The first meeting was held with the company's president who invited a legal counsel and a deputy president for financial affairs to take part in the talks. They decided that the conflict was initiated by the smallest and, simultaneously, the least influential trade union out of all six trade unions in the company. The company's president dubbed the referendum illegal and conducted in a mode that the voters gave answers expected by the trade union. Together with the team, the employer called the methods which were used by the trade union tactical; in consequence of them, the trade union became popular and influential among the employees. This seemed a typical trade union strategy: an attempt at challenging the employer's credibility.

Justifying rejection of the trade unions' demands, the employer stated that "the earlier agreement was reached in cooperation with all trade unions."

Next, the mediator met with the trade unions who were invited by the employer via telephone. The meeting took place in a large conference room which could accommodate approx. one hundred persons, and was also used as a place for rescue operations.

The representatives of trade unions listed two arguments for which the social fund should be re-negotiated. First of all, the referendum showed that this was what the employees wanted. Secondly, the old agreement was unjust and was not in the employees' best interest. Money from the loan fund would have to be returned, and the company made use of interest charged on loans. What is more, the fund was used exclusively by persons renovating their apartments or houses. The trade union believed that the fund should be divided equally among all employees of the company, without the necessity of its return.

The mediator asked the trade unions the following questions:

1. The agreement was reached among all trade unions of the company. Why did only one trade union object to it?
   Answer: we do not know why; besides, we are not interested in it. We are not interested in what happens in other trade unions. Results of the referendum are the most important for us.
2. How do you respond to the employer's objection who claims that the referendum was not carried out in compliance with the law?

   Answer: It is always possible to find a reason to criticise us.

Tripartite Session

The session took place in the same conference room. The tables were set in the shape of letter "U." The parties sat opposite each other. The mediator was asked to take the seat at the top of the table, where the management board usually sits, also during rescue operations. This position was a clear sign that the parties to the conflict agreed for the mediator's participation in the talks. The mediator started with explaining his role and presented the basic principles of mediation. Then, both parties presented their standpoints. After a long discussion and exchange of opinions, the mediator decided that the position

presented by the board had better justification. In spite of it, the trade unions did not change their standpoint.

The mediator asked the parties for a short break and the parties agreed to it. During the break, the representatives of the trade union remained in the conference room, whereas the representatives of the management board went to the president's office. The mediator moved from one place to the other and talked to the parties. Representatives of the trade union talked to the company's lawyer. During an informal meeting, the lawyer found common language with the trade union members and convinced them to agree to the company's standpoint.

After the break, the atmosphere of negotiations definitely improved and the parties quickly reached an agreement. The trade union members realised two basic issues: first of all, the funds that they were fighting for were not real money (they understood it during the break); secondly, the agreement could not have been changed without the participation of other trade unions. It was necessary to wait with the potential changes in distribution of the social fund until the meeting with other trade unions. The last point was included in the protocol of understanding prepared after the mediation session was closed.
This was a classic example of a solution which allowed one party of the conflict to save face, in this case the trade union. The total mediation time amounted to approx. 6 hours.

Discussion

Summing up, the following questions should be asked:

1. What was the actual cause of the conflict?
2. Why were the parties unable to prevent the conflict earlier?
3. What was the mediator needed for?
4. How did the conflict escalate to the proportions of a "collective dispute"?

Answers:

1. Insufficient understanding of economic issues by the trade unions.
2. The official cause of the dispute notified by the trade unions was distribution of the social fund, but in reality it was lack of familiarity with its functioning.
3. The mediator created conditions for understanding, which the parties reached independently, without the mediator's direct participation.
4. Weak communication between the management board and the trade unions.
5. Other remarks. Every time the members of the trade unions did not understand the questions asked to them, they responded negatively.

This is one of the few examples of mediation which does not directly refer to pay-related issues. Yet indirectly, the trade unions tried to gain "live cash" which would increase their wages.

Conclusion

The collective dispute procedure presented above was introduced in 1991 and thus it is over a quarter of a century old. It was prepared for the period of transformation and was meant to protect the process from excessive claims of trade unions. However, Polish economy today is, in principle, fully market and consultations are carried out with respect to changes in the act. One of the examples of proposed changes is the definition of the employer. This change seems to be necessary on account of the mode of functioning of international corporations where basic decisions referring to issues which form the realm of a collective dispute are made far outside of an enterprise operating in Poland, whose management is the employer within the meaning of the current act. This is only one example, as the entire issue lies beyond the scope of this paper.

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Enterprise Architecture of The Blockchain Platform

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Abstract

The main purpose of the paper is to discuss the nature of enterprise architecture of the blockchain platform (EAoBP). Authors highlighted as well how main technology challenges for enterprises are addressed through the proposed solution. The paper consists of the introduction and 3 chapters. Chapter 2nd presents related works about blockchain technology and defines platform concept as such. Architecture layers which are required to build enterprise blockchain platforms are described in 3th chapter. 4th chapter constitutes implementation aspects of the EAoBP. Permissioned blockchain systems leverage cross-organizational collaboration model, what constitutes cooperation within the network without 3rd party authorities. Open source character of implementation technology and clear guidance of the scope of each layer clarified in the article should help with business applicability of the concept.

Keywords: Blockchain, enterprise architecture of the blockchain platform (EAoBP), Distributed Ledger Technology (DLT), platform, Hyperledger Fabric, architecture layers

Introduction

The blockchain concept constitutes new opportunities for enterprises and enterprise networks nowadays. The first blockchain network created by Satoshi Nakomoto in 2008 is dedicated and limited to manage transactions behind BITCOIN cryptocurrency (Nakamoto, 2008). Open character of the network and anonymous character of peers causes that business usability of blockchain technology was questionable. Despite of business weaknesses the concept was so promising that many of authorities concluded it as disruptive for business models and processes nowadays (Risius 2017; Beck et al. 2017). Seeing huge commercial potential industry like Amazon, IBM, Microsoft Azure, Hewlett Packard, Oracle and SAP (Onik et al. 2019) started working on the new technology. In short time blockchain has been generalized to the distributed ledger systems that process all types of transactions within the network far beyond cryptocurrencies (Swan 2015, Sitarska-Buba 2018, Wörner et al. 2016, Hofmann 2018).

Blockchain is not a completely new technology, rather it is just new mechanism utilising existing multifaceted technologies together – such as distributed ledger technology (DLT), mathematical hashing, distributed networks, asymmetric encryption techniques, digital signatures and programming (Onik et al. 2019, Badr et at. 2018). Blockchain technology brigs the possibility to embed cross-organizational collaboration model (Norta 2016) joining entities that already cooperate into chains eliminating redundancy of transactions storage through common distributed ledger.

The goal of the article is to present enterprise architecture of blockchain platform and highlight how main technology challenges for enterprises are addressed through the proposed solution. Chapter 2nd presents related works about blockchain technology and defines platform concept as such. Architecture layers which are required to build enterprise blockchain platforms are described in 3th chapter. 4th chapter describes implementation aspects of the EAoBP.

Blockchain technology and platform concept

The first generation of blockchains, which were public (permissionless), consists of distributed nodes working together in a peer-to-peer model (e.g. Bitcoin, Ethereum). Anyone at any time can join and leave the public blockchain ecosystem enjoying full access to read and write (Onik et al. 2019). Blockchain systems operates under governance model to build trust between participants on a shared network (Wu 2019). Each participant's (node) has equal rights in approving the transaction. The transaction is an elementary component of the Blockchain system. This model rejects the creation of a central authority needed to approve the transaction. Authentication is processing within the network by each node. The transaction is asymmetrically encrypted and marked with a one-way hash function, which is collision-resistant and irreversible (the transaction cannot be played back, knowing only its shortcut).

The new transaction is transmitted into the blockchain network, what means that each node receives information about adding a new entry at the same time, in order to either confirm or reject it. The decision to add a new block should be made autonomously by each of the nodes based on the accepted consensus mechanism (e.g. Proof of Work (PoW), Practical Byzantine Fault Tolerance (PBFT)). If consensus is reached, the new block is added to the current system. A newly added block will store the hash of the previous block, which allows to keep the data structure in the system.

Introduction of smart contracts starts the second generation of blockchain systems (Blockchain 2.0). Smart contracts (Omohundro 2014) were introduced as semi-autonomous programs running on the blockchain. Consensus is implemented in the form of smart contracts, which are programmable rules/codes allowing transactions to result from the execution of user-defined programs (Rimba et al. 2018). Moreover, smart contracts are responsible for ensuring that all new transactions are complaint with agreed consensus (Tschorsch et al. 2016). It allows even parties who do not fully trust each other to conduct and reliably control mutual transactions without relying on the services of any trusted middlemen (Rimba et al. 2018) Smart contracts cover agreed within the network business rules and business agreements and are used to build trust within the network.

Only smart contracts implementation enabled the embedding of cross-organization collaboration models that was executed through private (permissioned) and federated (hybrid/consortium) blockchains. In the private blockchain the access is restricted, read and write access are controlled based on the roles of the nodes or other restrictions as defined by the protocol (Onik et al. 2019). Federated blockchain is moderated accordingly to the consortium need, access can be restricted, or reading/writing rights will be limited and defined a priori. The flexibility proposes by federated blockchains create the optimal environment to build cross-organization collaboration models addressing real business needs.

Synergy effect of usage well known technologies like DLT, mathematical hashing, distributed networks, asymmetric encryption techniques, digital signatures and programming make possible to create new generation of IT systems characterized by features like **immutability (**resistance towards the modification of data) and **non-repudiation**. Systems are also **forgery resistant**, certain researchers believe that even quantum computers are not able to change transactions (process the fraud) within so distributed network (Singhal 2018). Public blockchain systems are fully **democratic**, what is partially limited in permissioned or federated systems, which allow to create Regulator role or build internal channels to limit transaction exchange within (HF01 2020). The way data structure is defined, and data are stored, blockchain systems are **double-spent resistant**. Other very important feature of the blockchain technology is **consistent state of the ledger** achieved through implementation of the proper consensus mechanism (Singhal 2018). If the ledger is consistent and immutable the whole system is

auditable, because all transactions (historical and current) are stored. Peer-to-peer processing makes blockchain systems resilient. Even if a single node will be lost the security and consistency is not threaten because the same ledger copy is store by all other nodes.

On the top of features described above blockchain technology enable **digital tokens** to be distributed around the network participants. In the Blockchain world, tokens have emerged as the artefact of choice to represent assets, utility or a claim on something inherent to a specific blockchain project. Tokens exist due to their usefulness of representing something digitally (Pilkington 2015, Oliveira et al, 2018). Researchers identify tree main types of tokens: **cryptocurrency**, **utility tokens** (use as internal payment method, reward for reaching a consensus, workload performance reward, voting right confirmation or as a digital asset) and **tokenised security** (equity or funding tokens). Equity token confers to its holder a right to equity-related earnings, such as profit-sharing, application rents or platform fees and funding tokens are defined in the initial coin offerings (ICOs) process to perceive as a long-term investment from the holder's perspective, and as a financing vehicle for the project's team (Oliveira et al, 2018). Cryptocurrency and utility tokens are mostly used in permissionless blockchains, where the lack of trust nudges them towards the platform's distributed consensus (Lewis 2015). In opposite to that permissioned blockchain lacks the need of issuing tokens outside of mere choice or pure funding aspirations (BlockchainHub 2017, Lewis 2015). Before any implementation of tokens will be processed within commercial (permissioned) blockchain systems their usage and business values should be discussed first.

There are several limits identified for the blockchain technology that have to be addressed during business implementation. According to the authors most critical are transaction throughput and transaction latency. For bitcoin the average **transaction throughput** (number of transactions processed per second) is between 3.3 and 4.8 TPS (Blockchain 2020, Croman et al. 2016, @wandererli 2019). Comparing to the payment systems like Visa where there is around 2 000 TPS rate (Croman et al. 2016) it is clear that bitcoin will not replace payment transaction systems. **Transaction latency** can be understood as time needed to add new transaction within the system. The latency time is dependent on the consensus mechanism implemented in the network. In Bitcoin chain, where PoW consensus is implemented, 10 min are needed to add new block to the system. Blocks are relatively small around 1MB (@wandererli 2019). So huge latency is not acceptable for transaction systems, what meant that the scalability of the system is questionable according to the business usage.

Technology itself will not help developers to build blockchain based systems, scientists emphasize that industry should also provide a **platform**, that is considered as the development framework to create multiple applications (Pillai et al. 2017). Developers should be able to write their own application code using specific components of the platform. Not only technical challenges like security, performance, data integrity, privacy and scalability (Yli-Huumo et al. 2016) should be addressed but also quality aspects like usability for developers and suitability for integration within the network (Pillai et al. 2017).

Enterprise architecture of the blockchain platform (EAoBP)

This section proposes enterprise architecture of blockchain platform in details, presenting all required layers.

Limits of the blockchain systems, described in the previous chapter, cause that the pure architecture was not implementable in the enterprise environment. Based on the research the following requirements need to be considered for enterprise implementation of a Blockchain network:

- **Participants must be identified/identifiable** – enterprise usage of the Blockchain platform requires from the participants to be fully identifiable to keep the trust into a real transaction without 3rd party authorisation.
- **Networks need to be permissioned** – in the business reality the network is not open for everyone. It is limited to identified participants who were invited to be part of it. The permission mechanism should be easily implementable.

- **High transaction throughput performance** - one of the weaknesses of the public networks is transaction execution time, which can be even up to 10 min to processed single transaction (@wandererli 2019). It is must have condition to implement acceptable transaction execution time.
- **Low latency of transaction confirmation** – each transaction should be confirmed within the blockchain network as soon as possible, delays or too high latency causes low efficiency of the network and participants lost the trust.
- **Privacy and confidentiality of transactions and data pertaining to business transactions** – enterprise networks will not share their data worldwide, they will require to keep privacy and confidentiality of their data within the network and outside of the network.
  (IBM 2020, Forrester 2018, HF02 2020).

Authors defined enterprise architecture of the Blockchain platform that meet business requirements and trays to address constrains and limits of the public blockchain network (Fig. 1).

Authors Panda, Dhameja and Singhal proposed the Blockchain 2.0 system architecture, which consists of five layers. Each layer plays different role and is responsible for execution of specific functionality that determines Blockchain 2.0 as a whole (Singhal 2018). Authors agree that application, execution, semantic, propagation and consensus layers are critical to build blockchain platform.

The **application layer** is responsible for communication with end-users, providing them with specific business functions and IT services, allowing them to process transactions in accordance with business rules defined. Because of the peer-to-peer processing model the recommended development/programming frameworks are those which allow to create applications hosted on web servers, where new features are developed at the server level and communication with users is managed through API. Moreover, applications should support proper identity management and workflow management.

The **execution layer** is responsible for executing the instructions that are called by the application layer. The same set of instructions must have to be executed by each node independently to claim new transaction. By instructions we understand single scripts, algorithms or programs such as smart contracts. Deterministic execution of a specific instruction on the same input dataset and under the same restrictive conditions always provides the same output dataset for all nodes. This features of the blockchain technology ensure data consistency, **immutability** and **trust** within the distributed ledger.

The **semantic layer** defines the logical structure of the blockchain system. Each transaction, correct or not, is processed at the execution layer. Semantic layer is responsible for the validation and consequently approval or rejection of the transaction in the system. Semantic layer constitutes definition of transaction's validation rules, data models and data structure. In general, blockchain structure is a timestamped list of blocks, where blocks are connected through hash function (Wörner et al. 2016). It means that data are hash pointers that encrypt transactions of a given block. Each block stores its hash function and remembers the hash function of its predecessor up to the generic block (Drescher 2017). At the semantic layer, system developers implement smart contracts, which are autonomous algorithms or mini-programs performing additional operations written in their code during transaction execution (Klinger et al. 2017). The extensive use of smart contracts allows for the creation of new virtual goods that constitute business value in a specific Blockchain system.

The **propagation layer** is responsible for the definition of communication and synchronization within the blockchain platform. Per design the blockchain network is a peer-to-peer network, where each node is autonomous and there is no central authority approving transactions. For the public chain it is necessary to ensure the visibility of all nodes in the chain and the rules for adding new nodes so that they become equivalent members of the network. Next step is to agree the synchronization process between nodes. In Bitcoin blockchain when the new block is generated, it is immediately validated within entire network. If this block passes the correct validation, it is synchronized throughout the network. Transaction throughput and latency are most critical weaknesses of the public chain that make a business value of the whole solution questionable.

For example, this issue has been addressed in Hyperledger Fabric by dividing workload of the nodes between endorsing and committing peers and transaction ordering nodes, more about in chapter 4 (HP01 2020).

Other positive deviation in private chains is the possibility to create a role of central authority (regulator), whose approval will confirm creation of new transaction in the network. There are business models, especially in government area where regulator is needed but all other blockchain features can be used to create added value for the network participants.

The **consensus layer** is the most important and basic layer to meet general assumption of the blockchain technology. This layer defines the consensus on the basis of which transactions or blocks within the entire network are approved. The basic goal of each blockchain network is to achieve consistent state of the ledger. Each blockchain system may implement and execute a different consensus algorithm, but as to the assumption, the result is to validate one common version of the registry within the network without the participation of central authority. The security, trust, and immutability of a given network is determined by the effectiveness of the consensus algorithm.

For commercial usage of blockchain systems that very often require implementation of shared business processes, additional aspects affecting the architecture must be considered. Authors propose to extend the traditional list of layers through permission, data privacy and integration layers. The enterprise architecture of the Blockchain platform is presented on the figure 1.

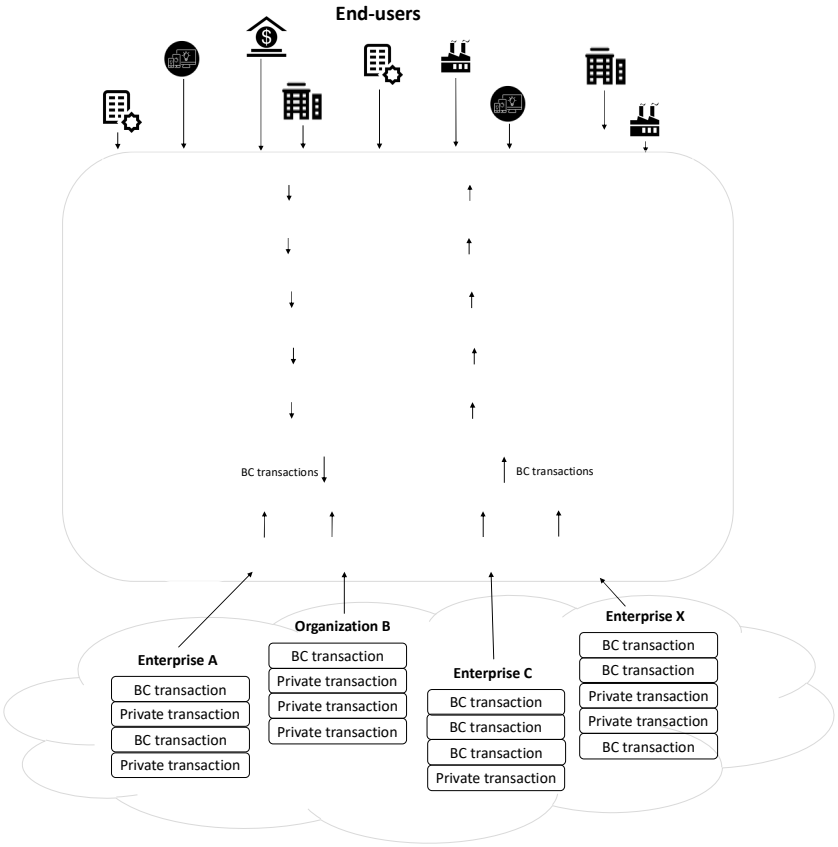

Fig. 1: Enterprise architecture of the Blockchain platform (EAoBP)
Source: own research, based on (Sitarska-Buba 2018)

EAoBP will be mostly dedicated to participants of the business networks that already cooperates. They have a need to create distributed transaction ledger and share their business results within the network. To meet this request authors defined **permission layer** that is responsible for the definition of the access rules for network participants. The business entity will be allowed to access the blockchain network only when other participants agree or only based on the invitation. How the permission layer will be automated is up to the business agreements between current participants. There are examples of Blockchain implementation where networks are fully private like two polish cases: Durable Medium, KIR and e-Voting, KDPW. Those examples, described in more details in next chapter, confirmed the need of permission layer definition. The implementation of the permission layer can be executed in traditional contracts signed between individual companies or implemented in a blockchain code.

Permission layer has been highlighted at the end-user level as well. It is natural consequence of the closed access for nodes that is further distributed for application users as well. If the blockchain platform is private, access for the users is private as well. The access could be granted based on the invitation that has to be confirmed by the authority within the chain or by the network itself. In the second case invitation code could use consensus mechanism already implemented and manage each access as a specific type of the transaction.

Going deeper into blockchain platform layers authors identified **data privacy layer** that provides to participants the possibility to identify and limit transactions that will be processed within the blockchain system (on-chain and off-chain distribution) (Xiwei et al. 2016, Xiwei et al. 2017). This requirement is not only related to data privacy regulation defined by European Union (GDPR). This layer was created to ensure the flexibility for participants to define access level for specific type of transactions exchange between nodes. For example, Hyperledger Fabic v.2.0 provides private data collection mechanism which allows to exchange specific data only between a priori defined nodes. Still peer-to-peer data distribution is used but nodes send transactions only to the organization that is authorized to see them (HF01 2020).

Enterprises that decided to create blockchain platform usually build them above other IT systems and platforms that already exists in their organization. Different backend systems, frontend platforms and data hosting environments have contributed to define **integration layer.** The layer is responsible to workout common technology platform where notes will be hosted and maintain. Within this layer nodes will create integration code responsible for transaction extract from internal IT systems, translate them into blockchain transaction and based on the data privacy protocol distribute around the network.

Implementation of the EAoBP based on the IBM Blockchain platform

Authors decided to present implementation example of the EAoBP based on the IBM Blockchain platform and Hyperledger Fabric v2.0, which is an open source blockchain framework designed for business.

The main reason for this choice was that Research Everest Group assessed IBM Blockchain Services as Leader in a field of 30 service providers in the Blockchain Services PEAK Matrix Assessment 2020. Everest specifically noted IBM's strength in integrated services and solutions, global delivery footprint and vast network of partners across industries, and ability to enable consortia cooperation and governance (Doshi et al. 2019). Figure 2 presents PEAK Matrix graph.

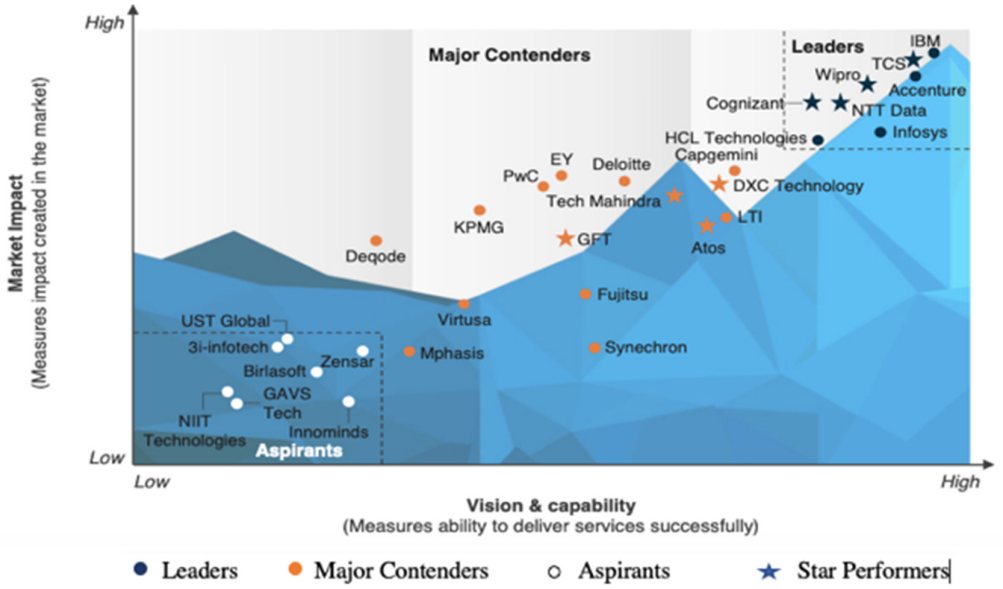

Fig. 2: Everest Group Enterprise Blockchain Services PEAK Matrix™ Assessment 2020
Source: (Doshi et al. 2019)

IBM Blockchain platform is integrated with Hyperledger Fabric framework. Hyperledger or the Hyperledger project started in December 2015 is an open source collaborative effort created to advance cross-industry blockchain technologies. It is a global collaboration, hosted by the Linux Foundation, including leaders in finance, banking, Internet of Things, supply chains, manufacturing, and Technology. Hyperledger Fabric was first of the Hyperledger projects. Cooperation between IBM and Linux Foundation was so efficient because Hyperledger Fabric enterprise-grade permissioned distributed ledger technology (DLT) platform, designed for use in enterprise contexts (HF02 2020). **The permission layer** is an integrated part of the solution, where all participants are well known and authorized to be part of the consortium. Entities that are part of the network having common business goal, cannot trust each other, therefore consensus mechanism like crash fault tolerant (CFT) or byzantine fault tolerant (BFT) are provided.

RAFT is a crash fault tolerant (CFT) ordering service based on an implementation of Raft protocol. Raft follows a "leader and follower" model, where a leader node is elected (per channel) and its decisions are replicated by the followers (HF03 2020). RAFT consensus is highly recommended by Hyperledger Fabric those days.

Data Privacy layer is provided by Hyperledger Fabric through channel architecture and private data feature mentioned in the previous chapter. Using channels, participants of the network can establish a sub-network (private data collection) where members can see selected set of transactions. Private data collection allows data exchange between selected members of a channel, providing the same protection as channels without the need of creating and maintaining a separate channel (HF02 2020).

Consensus, semantic, propagation and execution layers are constituted by smart contract's implementation and execute-order-validate approach. Chaincode (smart contracts) are processed according to new sequence (HF02 2020):

- **execute a transaction** and check its correctness, thereby endorsing it,
- **order transactions** via a consensus protocol, and
- **validate transactions** against an application-specific endorsement policy before committing them to the ledger.

Predefined endorsement policy specifies how many nodes is needed to meet the consensus or how many is needed to vouch for the correct execution of a given smart contract. Endorsement policy is defined for each specific blockchain network, what means that channel architecture, channel leader election rules and regulator role are established separately. This rule brings us to the position that each transaction need only be executed (endorsed) by the subset of the peer nodes necessary to satisfy the transaction's endorsement policy. This allows for parallel execution increasing overall performance and scale of the system (HF02 2020).

New way of transaction processing significantly increases overall performance of the platform. Based on the newest results published by (Gorenflo et al. 2019) the platform is able to support up to 20 000 transactions per second (TPS).

Hyperledger Fabric is ready to use development framework that provides implementable modules for each blockchain solution like:

- **ordering service** establishes consensus on the order of transactions and then broadcasts blocks to peers,
- **membership service provider** is responsible for associating entities in the network with cryptographic identities,
- An optional peer-to-peer **gossip service** disseminates the blocks output by ordering service to other peers,
- **smart contracts** ("chaincode") run within a container environment (e.g. Docker) for isolation,
- The ledger can be configured to support a variety of DBMSs,
- **endorsement and validation policy** enforcement that can be independently configured per application (HF02 2020),

what is the perfect example of the EAoBP application layer.

IBM creating new blockchain solution provides integration layer that help to integrate data transformation and business services within cloud, on-prem or hybrid environments.
To create effective blockchain solution for business there are at least three must have conditions defined by IBM. First of all, the group of enterprises should have **real business problem** that can be addressed only through blockchain based system. The Blockchain ecosystem requires to build a network of organizations that are interested to resolve this business problem. The last condition is a need of trust that has to be created by blockchain system. Taking into consideration above conditions IBM successfully implement blockchain solution in different business areas proving efficiency and future of the technology.

Food Trust is one of the most successful blockchain projects from IBM. It is a food supply chain based on blockchain technology. Designed as a private, permissioned blockchain network for monitoring food supply from farm to consumer basket. As early as 2016, Big Blue and Walmart began testing blockchain to reduce the time to track goods. A proof of concept done with the Tsinghua University of Beijing focused on China's massive pork market, reduced the time taken from days to minutes. The result is a customizable suite of solutions that can optimize process of distribution, monitor food safety and freshness, minimize waist or health risk, trace exact provenience of the food and securely store required certifications. Walmart issued a mandate to all its suppliers of leafy greens stating that they had to get on to the blockchain by a deadline of the end of September 2019. Food Trust application is also a source of crucial information for consumer itself who can finally learn about his food from secure source which is blockchain based immutable record. Other leaders and competitors in food sector are currently joining the solution and testing the application for their needs. The system is also very attractive for restaurant and all others for whom the credible information on their food are important.

KIR, infrastructure institution of the Polish banking sector, and IBM created a platform prototype (Reliable Documents Sharing) for a durable medium deliberately based on a generally available, open source blockchain technology solution (KIR 2020). KIR chose as the basis for its platform the Hyperledger Fabric 1.1 framework from the Linux Foundation and an electronic stamp tool that it

developed itself (IBM2, 2020). The prototype durable data carrier has been designed to help banks adapt their internal systems to the requirements of the EU Directive 2007/64 / EC on payment services in the internal market in the field of customer communication, by digitizing publication, approval and search processes. KIR has built a prototype platform for the entire banking sector in Poland, whose task is to provide an online service aimed at verifying the existence and originality of documents, both public and private, published by banks for users.

KIR's durable medium blockchain solution acts as a secure database for banks and their customers that is not controlled by any single party. The platform provides a proof-of-existence service that enables users to register and verify documents through timestamped operations stored on a distributed ledger (IBM2, 2020). This ensures that every exchange of information receives an electronic timestamp and a unique cryptographic signature, which means that any subsequent changes to the information entered are immediately visible to the relevant users of the blockchain. This means that the entire lifecycle of documents issued and exchanged by banks and their clients can be traced and audited by all parties with access to the blockchain platform (IBM2, 2020). The above features indicate that all blockchain technology assumptions have been met by that implementation.

The Central Bank of the Republic of Azerbaijan and IBM developed a **Digital Identification System** based on Hyperledger Fabric, to verify the reliability of the documents related to both individuals and legal entities for use with banks, credit providers and similar organizations. The system will simplify and automate the "Know Your Customer" validation process and will be used by both clients and credit organizations serving citizens of Azerbaijan.

IBM designed for KDPW, National Depository for Securities in Poland **eVoting** platform for the Capital Market. It supports general meetings of public companies, including voting using digital devices. The eVoting application is integrated with the KDPW application used for providing issuers with lists of persons entitled to participate in general meetings (KDPW 2020).

Conclusion

The main idea this paper discussed is enterprise architecture of blockchain platform. Authors identified 8 layers that define the architecture, highlighting that permission, data privacy and integration layers are required in the business implementation of blockchain solutions. Those layers constitute the permissioned blockchain platform that is implementable at the execution level.

Applicability of the platform was verified based on the IBM Blockchain platform and Hyperledger Fabric. New approach of transaction processing (execute-order-validate) available in current Hyperledger Fabric code significantly increase solution scalability up to 20.000 TPS. The achieved result establishes the position of blockchain systems within the enterprise solutions, implementing effectively cross-organizational collaboration model.

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Cyber Security Threats in Russia in the Context of Digital Economy

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Abstract

The article focuses on the problem of promoting economic security in the emerging digital economy. The main emphasis is placed on solving the problems of preventing threats and cybersecurity risks in the era of rapidly developing digital technologies. The basic approaches are related to the construction of an infrastructure to combat cybercrime: formation, technological improvement of IT software and hardware, regulation, the use of finance and insurance, support for the media and the development of a safety culture. The results of this study can be applied to the design of information security systems at all levels.

Keywords: Digital economy, competitiveness, sustainable development, cybercrime, cyber threats, IT-technologies, information security, outsourcing, innovations, blockchain.

Introduction

Today's world witnesses the rapid emergence of digital economy, which refers to a part of the economic relations in production, distribution, exchange and consumption, mediated by the network organization, the Internet, mobile communications, digital and IT technologies. New technologies combined with the development of telecommunication, computer, banking, and other networks, provide the opportunities for the rapid movement of information and money resources around the world, regardless of distance and time. The Internet is becoming a key economic infrastructure and serves as a platform for innovation; it creates a virtual space into where manufacturers and consumers are actively moving. Technology is reshaping the way people live by providing more choice of digital goods and services, lower prices, more complete information, more distribution channels, and promoting the emergence of information-oriented transactions for market players (e-commerce, online health care, distance education, online banking, etc.)

Digital technologies are transforming the socio-economic paradigm of human life. This is a new foundation for developing public administration systems, economy, business, social sphere, and a society as a whole. In the G20 Leaders' Declaration (on June 29, 2019, the final document of the G20 meeting was signed - "Osaka G20 Leaders' Declaration"), the section "Innovations: Digitalization, Free Data Flow with Trust" is of greatest interest from the perspective of the immediate future of humankind. In fact, it speaks of a new social formation, the concept of which is shared and welcomed by all G20 members. Japan is promoting this system and called it - Society 5.0. Society 5.0 combines technologies such as the Internet of Things (IoT), robotics, artificial intelligence (AI) and big data to make fundamental changes in industry, social and economic spheres. In Society 5.0, people, things and systems are interconnected in cyberspace, and the results obtained with the help of AI, exceeding human capabilities, "return" to the physical space. Society 5.0 is supposed to eliminate all barriers related to regions, age, gender, and language. Sustainable Development Goals (SDGs) - are "plans for international cooperation". This global project is also called "Transforming Our World: the 2030

Agenda for Sustainable Development". "The main goal of the new society is to make human life as comfortable, high-quality and safe as possible," the G20 Leader's Declaration says.

At the same time, the theory of the digital economy describes the new nature of rapid succession of boom and bust, increasing cyclic recurrence, and greater expectations. The changes are based on increasing velocity, volume, complexity of relationships and transactions, which intensify volatility, create uncertainty and reduce predictability. The development of a modern economy relying on the use of the state-of-the-art digital technologies, the creation of new materials, the analysis of big data, and the development of new management systems leads to a change in the principles of competitive relations. Competition is taking place not only for redistributing existing market shares in the "red ocean", but more for the formation of new markets for goods, services, technologies in the "blue ocean", competition for control systems based on new digital platforms. In such a situation, the digital economy is changing the concept and essence of the economic security of a nation, region, business, individuals, and poses new threats and risks for actors in economic processes and relations.

Review of relevant studies and problem statement

Since the end of the last century, researchers have been considering post-industrial development as a problem of the information society formation. In their works, they describe the theoretical models of the information society based on an analysis of trends in the global society development, international politics, socio-economic processes and other aspects [Bell, 1980; Beniger, J. R., 1986; Toffler, 1981]. Information confrontation and information security were dealt with by such scientists as Pipkin (2000), Gordon, (2002), Cherdantseva (2013). Their theoretical research was about the potential impact of information on political, economic, military and cultural processes in modern international relations. We can say that the emergence and scientific elaboration of the "information security" concept is directly related to the comprehension of the informatization phenomenon and the study of the information society formation. Information Security refers to a set of methods, technologies and processes designed to protect the networks integrity, programs and data from digital attacks, that is, it provides protection against cyber threats [Andress, 2014].

A cyber threat is the illegal intrusion or threat of malicious intrusion into virtual space to achieve political, social or other goals [Khandpur et. al., 2017]. A cyber threat can affect the computer information space, in which data is located, and where the materials of a physical or virtual device are stored. An attack typically affects a storage medium specifically designed to store, process, and transmit user personal information [Sapienza et. al., 2017; Okutan et al., 2018].

Today we can say that cyberthreats affect economic and political processes to a greater extent than ever before. Accordingly, the issue of the information society development and analysis of the problems associated with this, are still relevant, but is becoming increasingly significant, while the issues of predicting cyber threats come to the fore. The study of ways to distinguish malicious events from ordinary ones we see in the works by Zhang et al. (2008) и Li et al. (2012). The development of correlation systems for cyber threat warning based on models built on previous experience was addressed by Yang et al. (2009) and Xu et al. (2011), this issue was further researched in studies by Shadi et al. 2017). Companies rely on a huge amount of digital data for reliable incident detection [Bhatt et al., 2014]. Digital data is an integral part of our modern life. In fact, we live in the era of the digital economy, therefore, we consider it important to dwell on the definition of what the "digital economy" is, since this is important for the purposes of our study.

To date, there is no unified interpretation of what the "digital economy" is. For example, the World Bank gives this definition: "A new economic structure is based on knowledge and digital technologies, within the framework of which new digital skills and opportunities are being developed for society, business and the nation" [World Bank, 2016]. The following definition was given by the European Parliament: "The digital economy is a complex structure consisting of several levels / layers interconnected by an almost infinite and ever-growing number of nodes" [European Parliament, 2015] The European Commission defines the digital economy as "the economy dependent on digital technologies" [European Commission, 2014], and it takes the view that "The

digital economy is the main source of growth. It will inspire competition, investment and innovation, which will lead to an improvement in the quality of services, broader choice for consumers, and the new jobs creation" [European Commission, 2018]. According to the audit company Deloitte, digital economy is the economic activity that results from billions of everyday online connections among people, businesses, devices, data, and processes. The backbone of the digital economy is hyperconnectivity which means growing interconnectedness of people, organisations, and machines that results from the Internet, mobile technology and the internet of things (IoT). [Deloitte, 2019].

Such a number of interpretations leads to the conclusion that, in international practice, a harmonized definition of the digital economy has not yet developed. In the majority of studies, when describing the digital economy, the emphasis is on technologies and related changes in the ways of interaction between economic agents. In so doing, either specific types of technologies or one or another form of change in economic processes may be mentioned in them.

With the growing popularity of Internet technologies, the field of cybercrime is also expanding. Here we can conclude that the main threat to the emerging digital economy may be the loss of confidence in technology due to cyber threats.

Information security is based on data protection and sees the fight against cyber threats as its mission. Attacks take place more often and become more sophisticated. The number of intruders is growing. As a result of digital transformation and the introduction of new technologies, companies face new threats.

Research Methodology

The purpose of the study is to consider the main approaches to ensuring the economic security in the country and regions, solving the problem of preventing threats and risks of cybercrime in the era of rapidly developing digital technologies.

Based on the purpose, the following tasks are solved:

- to demonstrate the competition of control systems based on new digital platforms;
- to investigate cybercrime as a new threat to the security of the nation and business;
- to consider the basic methods of eliminating threats and risks for the digital economy.

Of great importance in the development of the digital economy in order to restructure and increase competitiveness is not only the development of a clear strategy, its focus on the formation of progressive technological structures, but also the ability to use the whole arsenal of instruments of direct and indirect state regulation.

The emergence of a new type of crime - organized cybercrime - forces economic agents and the state to single out the main tasks to prevent cyber threats in the following areas:

- personal data protection.
- security of commercial information systems.
- security of government institutions' information systems.
- protection of production environment, technologies and instruments.

The main research methods used are institutional, systemic, structural-functional and statistical approaches.

Results and Discussion

The expansion of the digital service, the individualization of many types of services increases the risk of fraud while reducing the control by users or providers. The risk of data leak requires better protection of e-systems. Currently, cyberthreats and damage from cybercriminals come immediately

after technological disasters in the world [Monakhova, 2016]. In the media, we constantly see data confirming these trends:

- 6.4 billion fake emails are sent daily around the world [Dark Reading, 2018a];
- 550 million phishing emails were sent as part of a single attack in the first quarter of 2018 [Dark Reading, 2018b];
- 50% of local authorities in England use unsupported software for their servers [Computing, 2018];
- 1,464 public servants of one state used Password123 [The Washington Post, 2018];
- 2 million stolen accounts were used to falsify the results of the American study of network neutrality [Naked Security, 2018];
- $ 729,000 was stolen from one businessman using the simultaneous use of fake accounts on social networks and directed phishing [SC Media, 2017];
- $ 3.62 million is the average damage from data privacy violations over the past year [Ponemon Institute, 2017].

A survey of 1,440 respondents conducted in the framework of the "International EY study in the field of information security, 2018-2019" showed that 39% of the companies surveyed reported that less than 2% of all IT services specialists work exclusively on cybersecurity projects. Among the companies surveyed, more than half (55%) do not include cybersecurity issues in their strategy. This problem unexpectedly turned out to be more relevant for larger companies, but not for smaller ones (58% and 54%, respectively).

According to Richard Watson, EY Asia-Pacific Cybersecurity Risk Advisory Leader, more and more companies are beginning to see the magnitude of the threat. Over the past 12 months, there has been one important change for the better, partly due to a series of major cyber attacks at the global level - now almost everyone realizes that information security is necessary not only to maintain data confidentiality, but also to ensure business continuity. The study indicates that 53% of the respondents increased spending on cybersecurity this year and 65% plan to increase spending next year (Table 1).

Table 1: Forecast of corporate cybersecurity spendings for the next 12 months [E&Y, 2019a]

Corporate cybersecurity spendings	During the current year.	Next year
Will increase by more than 25%	12%	15%
Will increase by 15-25%	16%	22%
Will increase by 5-15%	25%	28%
Will remain at approximately the same level (from + 5% to -5%)	40%	31%
Will decrease by 5-15%	4%	2%
Will decrease by 15-25%	1%	1%
Will decrease by more than 25%	1%	1%

An interesting fact is that the vast majority of companies (77%) are still at the very beginning of the path to ensuring cybersecurity and resistance to attacks. Organizations sometimes do not even have a full understanding of what information and assets are critical to them and where they are stored, to say nothing of their effective protection.

Therefore, many companies need to continue allocating resources to achieve a basic level of cybersecurity. First of all, it is necessary to identify key data and intellectual property objects, then analyze the available opportunities for ensuring cybersecurity, access control processes and other means of protection, and only then develop measures to strengthen the perimeter to fend off cyber attacks.

The effectiveness of cybersecurity activities depends on understanding, which information is the most valuable. Obviously, it is customer and financial information, as well as strategic plans, that the

company should protect on the first priority basis. Then it is followed by top management information and customer passwords. Information on suppliers is last on the list of top ten, and this indicates that the concept of joint protection throughout the supply chain is not made sufficiently well known. The ranking of the top 10 most valuable data types for cybercriminals [E&Y, 2019b] is shown in Fig. 1.

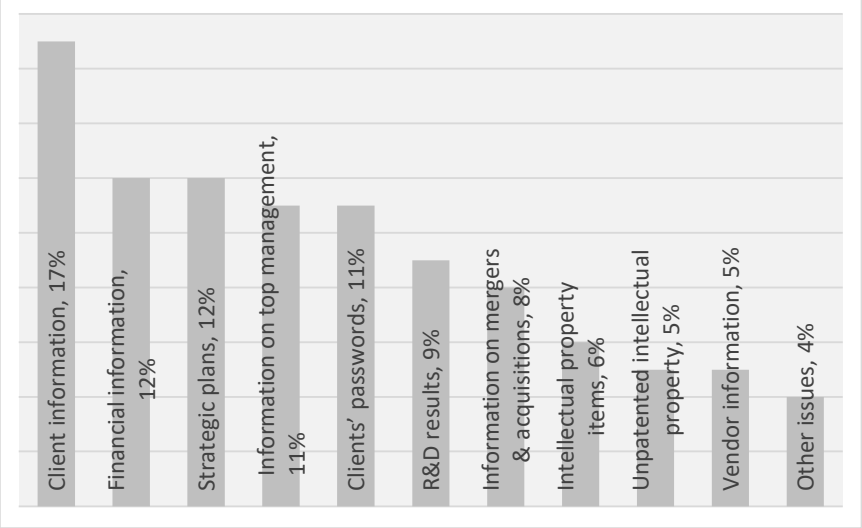

Figure 1: Ranking data types according to their value for the company

The second component that affects the effectiveness of a company's cybersecurity policy is understanding which cyber threats are the most relevant for the company. The most successful cyber attacks began with phishing and / or the deployment of malware. This is followed by attacks aimed at disorganizing activities and embezzlement of funds. Despite an active discussion of attacks by their own personnel and state-sponsored hacker groups, the threat of hacking from within occupies the eighth line on the list, while espionage - the last. The ranking of types of cyberthreats according to their hazard level is shown in Fig. 2.

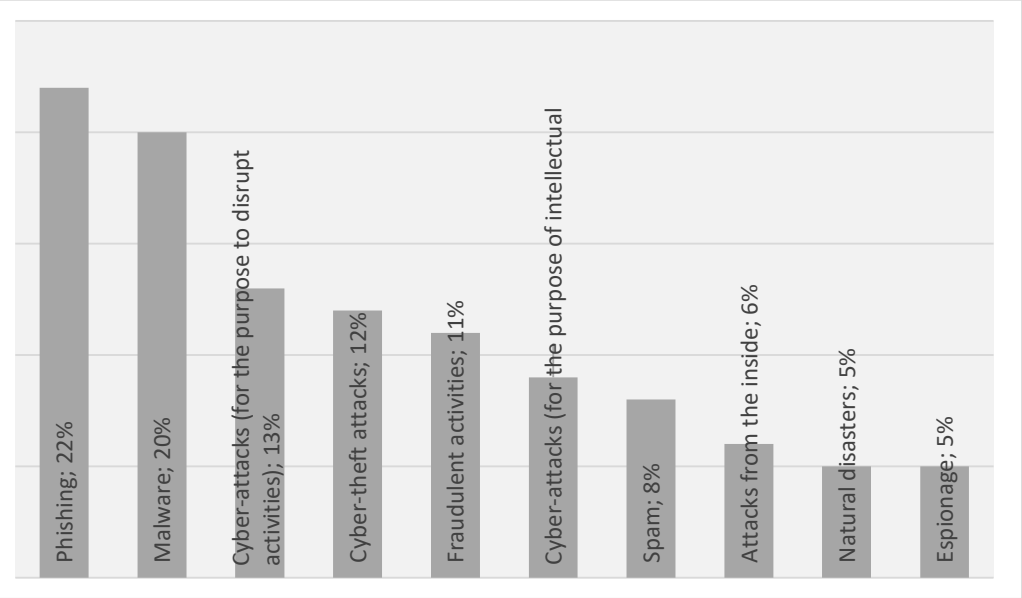

Figure 2: Ranking of types of cyberthreats according to their hazard level

One of the underlying problems is the lack of personnel. It is estimated that over five years the deficiencies in information security specialists will reach 1.8 million people [E&Y, 2019b]. Even in properly resourced sectors, companies often cannot find employees with the right skills.

Speaking about Russian reality, it should also be noted that cybercrime in Russia is growing faster than any other types of crime.

From January to September 2018, 121247 crimes committed using ICTs or in the field of computer information were recorded in Russia. As the Prosecutor General notes, in comparison with the same indicator for 2017, the number of such crimes has almost doubled.

In the first eight months of 2019, 180153 cybercrimes were recorded in Russia. This is 66.8% more than in the same period of the previous year, the Prosecutor General's Office reports on its website. These are crimes committed using ICT or in the field of computer information. The Prosecutor General's Office of the Russian Federation characterizes the growth of cybercrime as "very significant". When compared with the data that the agency provides for other types of crimes, the growth rate in this segment is the highest.

According to PJSC Sberbank, the losses of the Russian economy from the hackers' activities in 2019 amounted to about 2.5 trillion rubles. In 2020, this figure may increase to 3.5-3.6 trillion rubles due to the projected increase in the number of cyber fraud by 40%. At the same time, in 2018, the loss amounted to 1.5 trillion rubles, PJSC Sberbank reported on January 28, 2020.

The retreat of crime into virtual reality, according to experts, can be a serious blow to business, regardless of the industry in which the company operates. Experts record the interest of cyber fraudsters not only in their traditional banking, financial and IT organizations, but also, as follows from the report of the IS company Positive Technologies, in the industrial sector, and the number of successful cyberattacks in Russia in 2018 is growing at the rate of 27 %. In 49% of cases, hackers attacked the infrastructure, in 26% - companies' web resources. In 30% of cases, criminals stole personal data, in 24% - account data, in 14% - payment data. In general, the number of attacks aimed at data theft demonstrates growth.

In April 2019, the management of Rostelecom reported that by the end of 2018, the number of cyber attacks in Russia had doubled, while the income of hackers exceeded 2 billion rubles. Over 2018, experts at the Rostelecom Solar JSOC established for monitoring, investigation and response to cyber attacks recorded 765,259 incidents - 89% more than in 2017. Credit and financial organizations, as well as e-commerce and gaming enterprises, were victims of 75% of cyber attacks.

Recently, due to the lowering in the threshold for this activity, organized cybercrime is aimed at personal data theft through mobile devices and financial mobile applications.

In 2019, Microsoft and TAdviser conducted a study. The results are presented in the report "Assessment of the cyber security in Russian business". The study was conducted on a survey of respondents - heads of IT departments, heads of information security offices, heads of functional departments, as well as other persons who influence decision-making in the field of IT and information security. The study revealed the main protection equipment that are used in companies (Fig. 3).

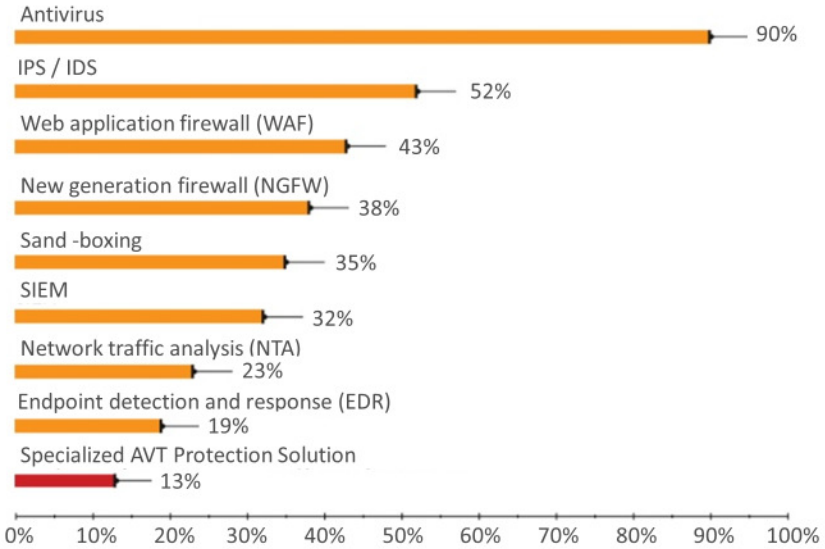

Figure 3: Technical protective equipment used by Russian companies in 2018

Companies are accustomed to working with typical security solutions that have been implemented in organizations for many years: antiviruses, firewalls, IPS / IDS. We see that following the growth of information security threats, companies are starting to use new technologies for protection: sandboxing, network traffic analysis systems, solutions to detecting, investigating and responding to complex cyber threats (endpoint detection and response), as well as specialized APT protection solutions (advanced persistent threat).

Since January 1, 2017, the new standard of the Bank of Russia STO BR IBBS-1.3-2016 has been in force in the Russian Federation, the document establishes information security requirements in financial organizations and operating payment systems, which should help preserve the security of the banking system. The development and control of information security of the banking system, interaction with the security services of commercial banks is carried out by the cybersecurity center of the Central Bank of the Russian Federation.

Massive DDoS attacks aimed not only at banks, but also at ICOs of new cryptocurrencies and their infrastructure facilities, increased by an order of magnitude. The reason for this is the insufficient amount of necessary protective equipment, software and capacities, the lack of special services, in addition, many hybrid protection solutions do not completely solve the security problem; it requires a transition to combined, cloud and operator information protection technologies. The Central Bank of the Russian Federation in 2018 recorded almost 700 cyberattacks against banks, but hackers' incomes are declining. The main methods of attacks on Russian banks are presented in Fig. 4 (according to Positive Technologies and FinCERT).

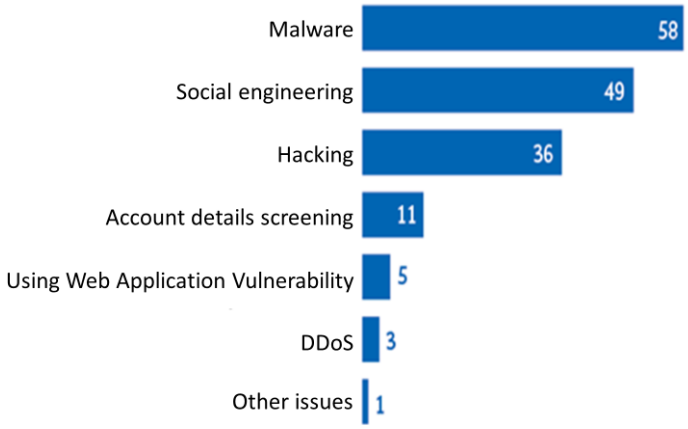

Figure 4: Main methods of attacks on Russian banks in 2018

Group-IB forensics laboratory experts concluded that in 2018 hacker activity against the financial sector accounted for about 70% of all. At the same time, 74% of banks were unprepared for attacks as Group-IB notes: more than half of the banks showed traces of attacks in the past, they could not centrally manage the network to localize the attack, and they spent more than four hours on coordinating work to eliminate the attack.

Group-IB experts also analyzed attacks on bank customers: more than 80% of cases of money theft were committed using social engineering methods. Fraudsters call victims and pretend to be bank employees, offering services, or representatives of the security service, who allegedly detected suspicious activity. In 2018, banks monthly faced an average of 3,000 attacks using such methods. The dynamics of unauthorized Russian cards transactions according to the Central Bank of the Russian Federation is shown in Fig. 5.

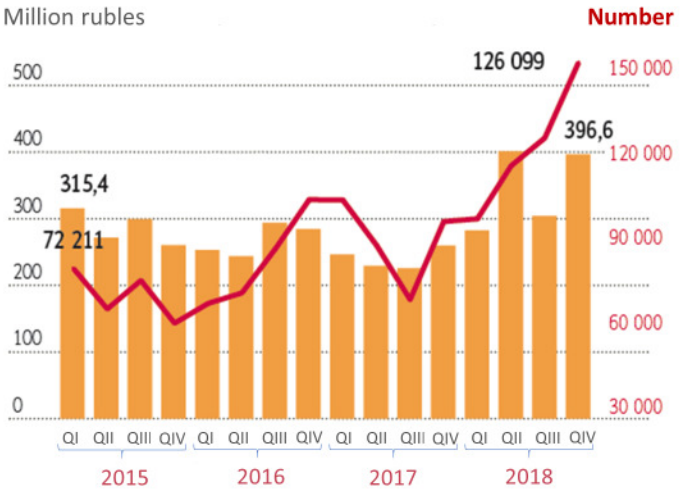

Figure 5: Unauthorized Card Transactions

In 2018, fraudsters managed to steal almost 1.5 times more money from Russian cards - 1.4 billion rubles, according to the Central Bank, this is 44% more than a year earlier. Prior to this, fraudsters income has been declining for three years in a row.

Despite the fact that information security is the basis of the competitiveness of modern business, according to a survey of 248 Russian firms by PwC in 2017, it turned out that 40% of Russian companies do not have an information security strategy, while 50% do not have a plan for responding to information incidents security, while 48% of companies do not have employee training programs aimed at improving business information security.

Such an attitude to cybersecurity leads to great damage and economic losses, to violation of data confidentiality, disclosure of trade secrets, the possibility of industrial espionage, breach of business standards, unforeseen problems of business processes, intellectual piracy, lower quality of products and services, and creates conditions for the appearance of a threat people's lives. But, recently, investment in cybersecurity by enterprises has begun to increase dramatically. According to Canalys analysts' data released March 28, 2019, the dynamics of total global spending on cybersecurity is shown in Fig. 6.

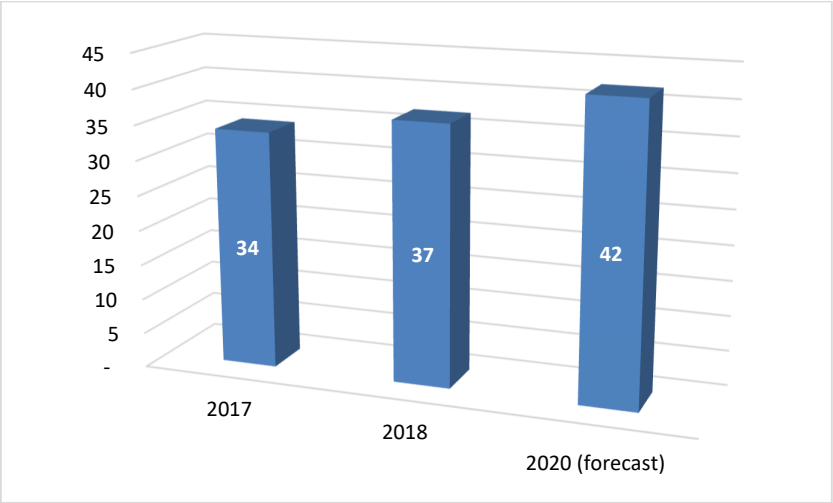

Figure 6: Cybersecurity costs, US $ billion

The diagram shows that in 2018, sales of equipment, software and services designed for information security reached $ 37 billion, an increase of 9% from a previous year ($ 34 billion). Despite the fact that many companies prioritize the protection of their assets, data, endpoints, networks, employees and customers, cybersecurity accounted for only 2% of total IT spending in 2018. However, there are more and more new threats, they are becoming more complicated and frequent, which provides manufacturers of information security solutions with new opportunities for growth. In 2020, total cybersecurity costs are expected to exceed $ 42 billion.

According to Accenture's September 2019 assessment, the cybersecurity services market is growing at a rate similar to Digital and IT market. Accenture predicts that by 2021 the global market for information security will have increased by 66% to $ 202 billion. The largest manufacturers of information security products according to Canalys (cybersecurity analysis) are shown in Table. 1.

Table 1: Worldwide: top five cybersecurity vendors

#	Vendor	Q4 2917 share	Q4 2018 share	Growth rate
1	CISCO	8.7%	9.6%	22.5%
2	PALOALTO	5.9%	6.9%	28.7%
3	Check Point	6.4%	6.3%	8.0%
4	FORTINET	5.5%	6.1%	21.5%
5	IBM	5.5%	5.8%	15.7
Others		68%	65.3%	6.3%
Total revenue (US$)		9.1 billion	10.1 billion	10.5 billion

Source: Canalys estimates, March 2019

In total, the five largest manufacturers account for more than 30% of the proceeds from the sale of information security products.

An innovative, digital way of life, the implementation of new information programs and technologies, the tasks of big data analysis (BigData), the change of the technological era, the advent of Blockchain technology, the Internet of things (IoT), force companies to feel rather different about their own human resources, knowledge, and knowledge assets that have their own specifics, as they are not yet evaluated from the standpoint of their scarcity and depletion. The use of the state-of-the-art digital technologies, the requirements for the new competition conditions makes companies change their attitude to the selection, training, retraining and retention of specialists. Digital companies need digital advisors who possess not only computer technology knowledge, but also high emotional intelligence, carry out extensive missionary activities to motivate team members, and are able to aggressively and confidently pursue innovative policies in the context of digital globalization. In the rapidly developing Russian companies Yandex and X5 Retail Group, in 2017, former HR managers took CEO positions.

Significant costs to eliminate threats to economic security are borne by the power and manufacturing industries of the Russian Federation, since power plants, infrastructure, and factories were built during the Soviet era and most of them do not meet modern information security requirements. The digital transformation of business processes and technologies increases the cost of information security and infrastructure. A study by Qrator and Wallarm “Information Security in the Financial Sector” showed that in 2016 out of 150 Russian banks, the expenses on information security increased in 32% of banks and in 39% of banks remained at the same level, which increases overall prime cost of financial services and loans. According to the Information Security Association (BISA), the main consequences of information security incidents, in market participants’ view, are financial risks (32%), reputation risks (38%) and license revocation risks (24%). Recently, financial institutions and payment systems have begun to use third-party solutions to protect against threats of DDos attacks, many banks initially pass information traffic through an external server, thereby increasing the ability to counter unauthorized access to the main server [Monakhova, 2017]. The global trend in the development of the theory and practice of cybersecurity is that information security departments should not be a superstructure over the company's business processes or government, but become an integral part of a single mechanism, fit into the overall development strategy.

External challenges, deep digital import dependence of the economy, dictate to Russian companies the task of participating in intense international competition for creating added value in the cyber environment, which requires finding ways to commercialize and protect intellectual property, legislative addressing the issues related to the digital technologies and software turnover, and ensure information security when launching digital platforms and technologies. To do this, it is necessary to ensure the security of the main tools of the digital economy - the protection of electronic signatures and payments, tokens, SIM cards, online services, the protection of information in electronic clouds, databases, the development of cryptography and identity authentication technologies, the protection of electronic document management systems, transmission channels, servers, commercial and public electronic trading platforms, and scientific laboratories. A separate task is to protect against cyber

attacks against artificial intelligence, robots, unmanned aerial vehicles and transport, the latest Blockchain technologies, and the Internet of Things (IoT) [Shcherbik, 2015].

The main threats to the information security of the digital economy today are encryption viruses, for example "cryptolocker" which penetrate not only personal computers, but also into networks of strategic objects and can cause technological disasters. Losses and damage from such penetrations are estimated in the world by hundreds of millions of dollars. A serious threat is posed by attacks on initial public offerings of shares (ICOs) of companies in the blockchain space with the aim of stealing assets or destroying platforms (for reference: the Telegram messenger's ICO volume in 2018 is more than $ 1.2 billion), attacks on cryptocurrency infrastructure and services, theft of electronic wallets, passwords, attacks on banks, etc. According to Group-IB, over the past three years, the number of cyber incidents in Russia has increased by 72%, and the damage from them by 200% with a forecast of a triple increase.

New digital technologies provide new opportunities for the analysis of big data, computer vision allows you to automatically process a huge number of images, photographs, find the desired object, which helps in the search for attackers and terrorists. The danger of new technologies is that the visualization of information flows forms a new subculture of the Internet, sometimes negatively affecting the psyche of people with its minimalism, "aesthetics of gray concrete", and hopelessness, which carries with it the threat of criminals exploiting suicide and death, especially among young people. Instagram has become the new mainstream of mass culture, where you can create an illusion and "edit" ideas about your own life, while being forced to be influenced by the imposition algorithms created by search engine robots [Mamayeva, 2016].

In 2017, more than 3 thousand addressees, 250 companies in 12 countries received phishing emails with infected files from the Cobalt hacker group, and three weeks later a cyber attack occurred with an average check of $ 100 million, from which not everyone could defend themselves. Among many cybercriminals, the most famous organized hacker groups who have committed cybercrime where the amount involved is equal to hundreds of millions of dollars around the world are Lurk, Buhtrap, Lazarus, Carbanak, Cobalt. The damage from their criminal activity is estimated not only at the amount of stolen, caused harm and destroyed infrastructure, but also at inflicting invaluable moral damage to the injured citizens and firms, harming the global economy by the fact that many organized cybercriminals recruited, involved in criminal plans and actions the best minds of cyberspace, young people passionate about digital technology, who have not found their place in the legal economy. A separate issue is the establishment and development of specialized public electronic departments and the unleashing of invisible computer wars over the spheres of influence both in the economy and in politics. There are already many examples of such computer wars and conflicts, starting with attacks on the infrastructure facilities of Iran's nuclear program and ending with alleged claims about "interfering" in the US presidential election. The creation by countries of "troll factories" that distribute fake news has marked the beginning of a new era in which imaginary information becomes a custom-made product and can bring down a stock quote or a policy-maker rating in a matter of minutes [Shcherbik, 2015].

In Russia, to date, the electronic databases of various ministries and departments are so fragmented that there is no single database, there is no single electronic signature of a citizen, and an electronic signature issued in one department is not accepted in another. The accelerated reshaping of the Russian economy into a digital environment depends on the access to patents and inventions. our country can use the experience of the Bell Labs laboratory (AT&T), which in order to accelerate technological progress in 1948 provided access to information on the invention of the transistor, in 1958 to integrated microcircuits; in 1971 it published data on the microprocessor, and in early 2000 on prototypes of DNA machines.

Conclusions

In the era of the rapid development of digital technologies, the main goals of maintaining the economic security in Russia and solutions to the threats and risks of cybercrime are as follows:

- Constant data communication on information incidents and protection technologies among companies and public organizations at the international level. Implementation of round-the-clock response to cyber incidents at the facilities to identify, analyze and prevent cyberthreats.
- Improving the information security competencies of IT-specialists, employed in all services of companies and government agencies, organizing the interaction between business units, IT specialists and economic security departments.
- Further work of the RF CB Cybersecurity Center to improve the banking system security and payment systems.
- Constant media coverage of the impact of the struggle with cybercrime.
- The propagation of digital "hygiene" right out of high school, the organization of school programs, and cyber literacy lessons.
- Improvement of the technical support for systems information security, constant update of antiviruses, installing firewalls, prevention of leak protection, the use of telemetering services and routers, protection of automated process control systems from malicious software.
- Legislative regulation of cyberspace, cryptocurrencies and blockchain technologies.
- Financing cyber intelligence programs to search for cybercriminals and destroy a criminal business.
- Early completion and implementation of the program “Digital Economy of Russia”.
- Launch of new cyber threat insurance products and programs.
- Initiation by the Russian Federation of activity aimed at adopting the United Nations moratorium on the use of cyber weapons.

Applying new digital technologies, short parsing of big data allows producing a realistic economic projection. The goal of matching individual consumer preferences leads to the fact that competition between manufacturers develops in the direction of the struggle for information about the preferences and dreams of the buyer, for a database of his lifestyle, health, and hobbies, which increases the risk of unauthorized access and theft of personal data.

The international struggle for political and economic influence in the context of the digital economy development poses a new threat to economic security. The prevention and elimination of threats and risks to the digital economy and ensuring the security of the IT environment have become today the basis of competitiveness for people, businesses and the states. The prevention and elimination of threats and risks to the digital economy and ensuring the security of the IT environment have become today the basis of competitiveness for people, businesses and the states.

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Insurance of Real Investment Objects Using Real Options on The Example of Metallurgical Companies

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Abstract

Research Motivation: a subject of research in article is process of assessment of efficiency of insurance of projects with use of real options on the example of the metallurgical companies. The purpose - specification of a formula of calculation of the expected effect of implementation of the project with use of real options. The research hypothesis - application of more objective formula of calculation will allow to increase efficiency of insurance of projects and to use the additional opportunities which are contained in them. ***Research Methodology***: systematization of main types of real options allows to expand the range of application of management decisions. Application of more objective formula of calculation of the expected effect of implementation of the project with use of real options (at restriction – only for real assets as basic) confirms the made hypothesis. ***Main Findings***: the direction of future researches - formalization of a pricing model when calculating the price of the option contract for the real option.

Keywords: Real Option, Metallurgical Company.

Introduction

Classical analysis methods involving the use of an action template (passive management) laid down at the initial stage of the project implementation do not take into account the possible occurrence of synergistic positive effects, underestimate investment opportunities and ignore the fact that the manager can change the decision based on new information. Such an opportunity must be predicted. The discounted cash flow method (DCF) assumes (indirectly) that the organization does not account for real options that can be embedded in real assets and which can be used to gain a competitive advantage. That is, the DCF is static and "conservatively" analyzes the investment situation, not taking into account the possibility of changing investment and managerial decisions depending on the project's scenario. This makes it difficult to change the actions planned in the business plan of the project in the direction of obtaining new opportunities for more effective development of the organization through its implementation. Scenario analysis using conventional approaches also does not solve the problem of taking into account dynamic changes in real investment objects (RIO) and uncertainty in the external environment - as a result, an averaged version is accepted, taking into account the uncertainty of the project implementation in accordance with the established assumptions.

An organization usually uses (consciously or unconsciously) real options as the main approach for acquiring competitive advantages in the face of uncertainty and achieving its strategic goals (maximizing the value of the company or the welfare of the owners). Using real options changes the function of the company's offer and the range of products it produces. Therefore, the analysis from the point of view of the concept of real options is a search for additional opportunities for the development of the organization through the implementation of the project.

Theory

A real option is a derivative tool[1] that provides the ability to change previously made investment and management decisions in the face of risk and environmental uncertainty, the management of which and its value depend on the underlying process, characterized by the uncertainty of the course, and the real (non-financial) asset (enterprises, oil reserves, projects, equipment, industrial investments, etc.).

The concept of real options distinguishes two groups of additional features contained in the project: 1) changes in project parameters over time: refusal to implement it (its reduction / expansion) after receiving additional information, changing sources of raw materials, etc.; 2) the implementation of one project makes it possible to implement another.

"Opportunity" can have its own value, and the more "opportunities" the project contains, the greater the cost. This concept allows you to quantify, using the same indicators as the classical theory, the opportunities available in the project and take them into account when calculating its cost, which plays a key role in making investment decisions: if additional opportunities are evaluated only qualitatively, at best, they serve as an additional positive factor for the project when comparing its quantitative parameters ceteris paribus.

Materials and Methods

In practice (in conditions of risk and uncertainty of the state of the external environment and many internal parameters of the project), different cash flow options can be implemented and, accordingly, various estimates of efficiency can be obtained, which complicates the process of formation and justification of investment and management decisions by traditional methods. The real options approach (RIO) (embedded, hidden) - a quantitative method for assessing the attractiveness of an investment project as the value of an exchange option, based on the transfer of option pricing techniques to the management of the investment portfolio of real options approach from the point of view of hedging it allows you to take into account the possibility of changes of these decisions.

This method is widely used in assessing large (strategic) projects, including analysis of the probabilities of their scenarios, forecasting the whole range of positive and negative effects, especially in conditions of significant uncertainty in the development of market conditions. Unlike the DCF, the use of ROA allows you to evaluate in monetary terms also the risks that arise during the implementation of projects and the organization's opportunities for more efficient use of limited investment resources. Although uncertainty remains, management has the ability to adapt over time to a changing situation and make more effective investment and management decisions when additional information is received.

At the same time, as a result of the project implementation, there are more opportunities to obtain "breakthrough" technical solutions, larger economic benefits or means of compensation for damage in the form of a set of real project options, to increase the efficiency of the RIO portfolio being formed. The use of real options when managing an organization allows reducing the value of making costly "most accurate" forecasts, directing more funds and efforts to identifying possible alternative ways of its development and increasing managers the value of their company, expanding opportunities for it or reducing losses.

[1] These are mostly simple options, but there can be exotic ones, for example, a composite "call to call to project", etc.

Results and Discussion

Let us analyze the main types of real options (Fig. 1) on the example of projects of metallurgical companies.

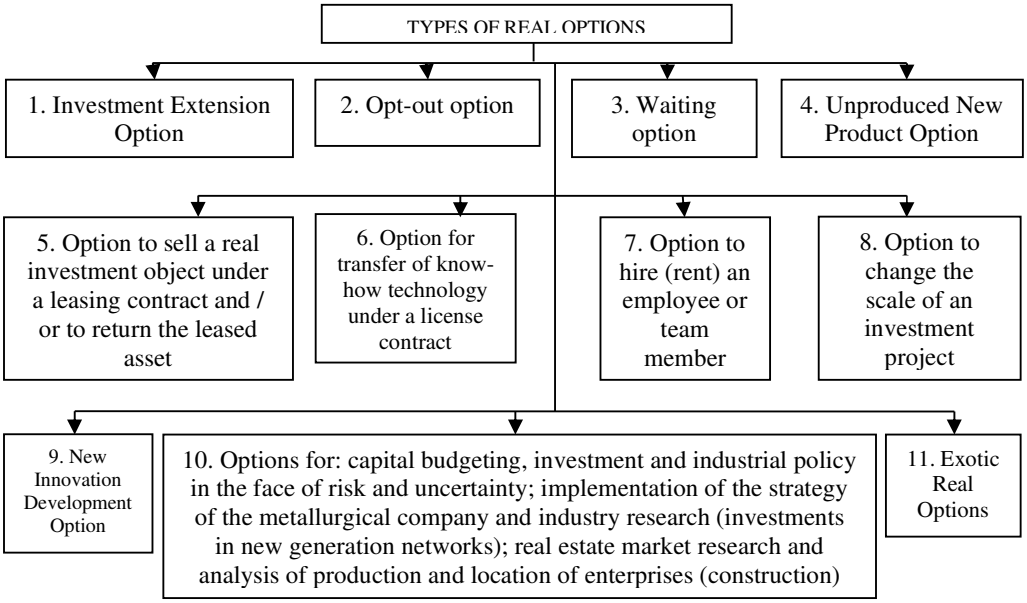

Fig. 1: Types of real options for projects

A real option to continue investing (abandonment of a project (exit from it) can be represented as a "put" option with a strike price equal to the value of the assets of a real project in case of their sale or more profitable use This option insures to a certain extent against the failure of its implementation and is applied if a metallurgical company, for example, operating in the field of high technologies, implements projects that do not provide the minimum required profitability or even with negative net present value (NPV), justifying this with their strategic importance, for example, the ability to take a place in the market and be able to conclude a contract for the production of other products (services) in the implementation of another next project.

The opportunity to invest in project no. 2 is a real option "call". Given the objective uncertainty of the future, investments in project no. 2 may not bring / bring income, which ensures the strategic value of this option for continued investment, allowing you to abandon project no. 2 if the investment does not bring income, or invest in it if it provides the required profitability (Fig. 2).

The value of this option takes into account the market niche occupied by the metallurgical company. In turn, the implementation of project no. 2 will give a real option for project no. 3, etc., and the implementation of projects no. 2, 3 will compensate for the shortfall in income from project no. 1. That is, it is necessary to take into account and evaluate the value of a real option for continued investment, showing how profitable with a high degree of uncertainty and fast growth of the market of products (services) the possibility of subsequent investment.

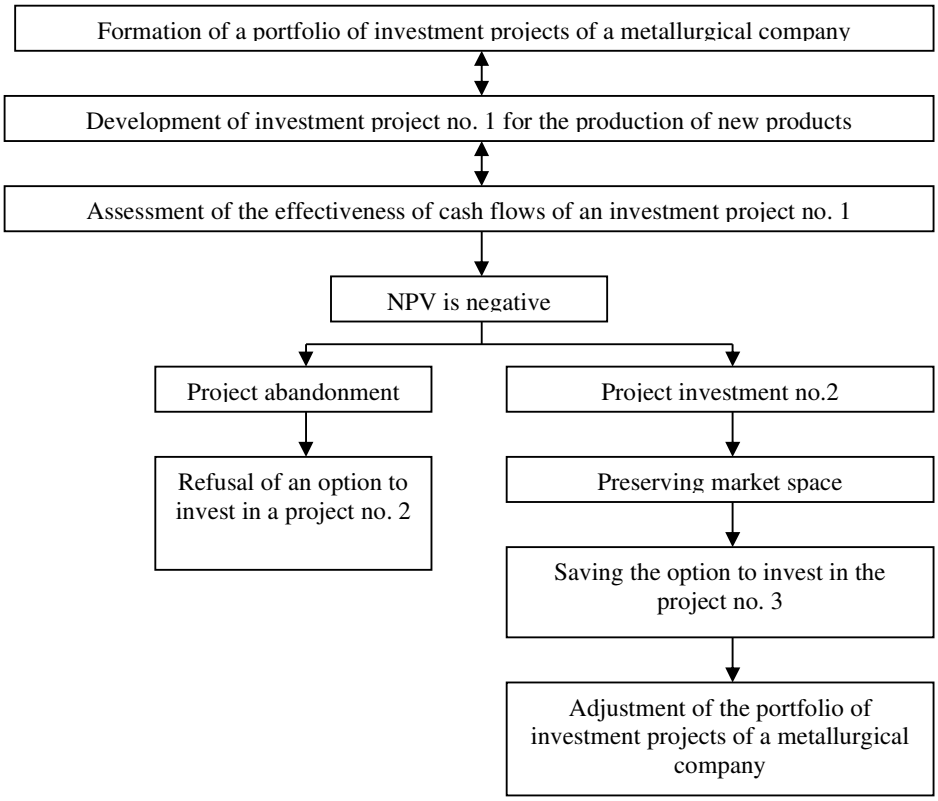

Fig. 2: Accounting for a real option for continued investment in the formation of the investment portfolio of a metallurgical company

An example of this option is the Tata Steel ltd steel plant construction project. in the city of Kalinganagar (India). At the 1st stage, it was planned to build a plant with a design production capacity of 6 million tons of steel / year with investments in the construction of industrial infrastructure ≈ 3.5 billion dollars. However, the implementation of the 1st stage would allow the company to reach the breakeven point only, but would not have formed an added value for shareholders, therefore the 2nd stage involved the expansion of production to 8 million tons of steel / year with less (compared with the 1st stage) investment.

This option allows the metallurgical company to exit the project with a sharp deterioration in the market situation, for example, by recovering part of its losses by selling assets or using them for other, more efficient investments. A venture fund can exit the project if it is successfully implemented through the stock market mechanism, and use the funds received as payment for the services of its managers, owners' income and investments in other projects. This option was not taken into account by POSCO in the implementation of its project to build a plant with a capacity of 12 million tons of steel / year in the state of Odisha (India) with a total value of 12 billion dollars. The company in 2005 concluded a memorandum of understanding and construction with the state government, but until 2012 it was not able to obtain the necessary permits for construction (mainly due to the resistance of local residents and environmentalists) and was forced to stop investing in 2017 and return the land acquired for construction.

An example of an analysis of the stages of making managerial decisions and calculating a real option to abandon a project for the release of new products sold by a metallurgical company with the aim of

expanding the sales market, reducing the cost of goods sold and optimizing the product range is shown in Fig. 3.

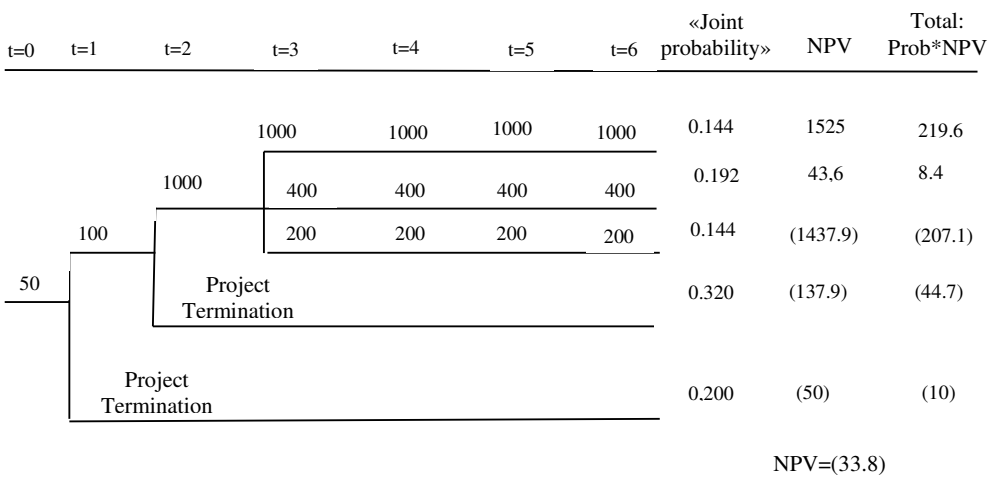

Fig. 3: Stage investment decision for a real option to abandon the project

It is assumed that at the end of each year, the metallurgical company makes the next investment decision. Each "branching" means the adoption of such a decision or the next stage. The number in parentheses is a net investment. In the interval from the 3rd to the 6th years (t = 3-6) the cash flows generated by the project are shown. Investments in this project are made in 3 stages:

1) if the metallurgical company decides to implement the project at the point t = 0, it should spend 50 thousand dollars to conduct marketing research. Her managers estimated the probability of a favorable result about the market potential at 80 %. If the project is stopped at this stage, the company's costs will amount to 50 thousand dollars;
2) if, according to the results of marketing research, the metallurgical company comes to the conclusion that the project will continue, then at time t = 1 it is necessary to invest 100 thousand dollars to produce an experimental version of the new product. The managers of the metallurgical company estimate the probability of a positive outcome at 60 %;
3) if new products are satisfied with potential consumers and design experts, the metallurgical company at the time t = 2 should invest 1 million dollars. to purchase production equipment and start production of new products. Metallurgical company managers estimate the likelihood that potential customers and design experts are satisfied with new products at 60 %. If a metallurgical company starts production of new products, then, according to managers, operating cash flows will be generated within 4 years of the project's life, the magnitude of which will depend on how well the new products will be "accepted" by the market: the probability that inflows cash will be ≈ 1 million dollars / year – 30 %, ≈ 400 – 40 % and ≈ 200 thousand dollars / year – 30 %.

Joint probability characterizes the expected probability of each result. Upon completion of the project NPV = 1525 thousand dollars. with a probability of 0.144 (Fig. 3). In turn, the costs of rejecting the project are significantly reduced to 50 thousand dollars. with a probability of 0.2 and 137.9 thousand dollars. with a probability of 0.32 (Fig. 3). If, in this example, the metallurgical company had an alternative to using the equipment of this project, for example, to produce a fundamentally different type of product, the project could be terminated with lower losses and the risk of its implementation would be less.

A real waiting option (the possibility of deferring investment in a project with a positive NPV, for example, to study the situation in order to have the right to choose[2], thereby reducing project risks) can be represented as a call option on a project executed when a metallurgical company starts to implement it. At the same time, the company must possess assets (patents for inventions, know-how, unique technologies, etc.), ensuring that others do not occupy its market niche. Delaying the implementation of the project is most attractive in conditions of: a) high risk and uncertainty, and b) when the cash flows lost or delayed during the period of such a temporary delay are small during project implementation, its financial results depend largely on management decisions and management is able to make "flexible" decision data when new information appears that affects the implementation of the project (Fig. 4).

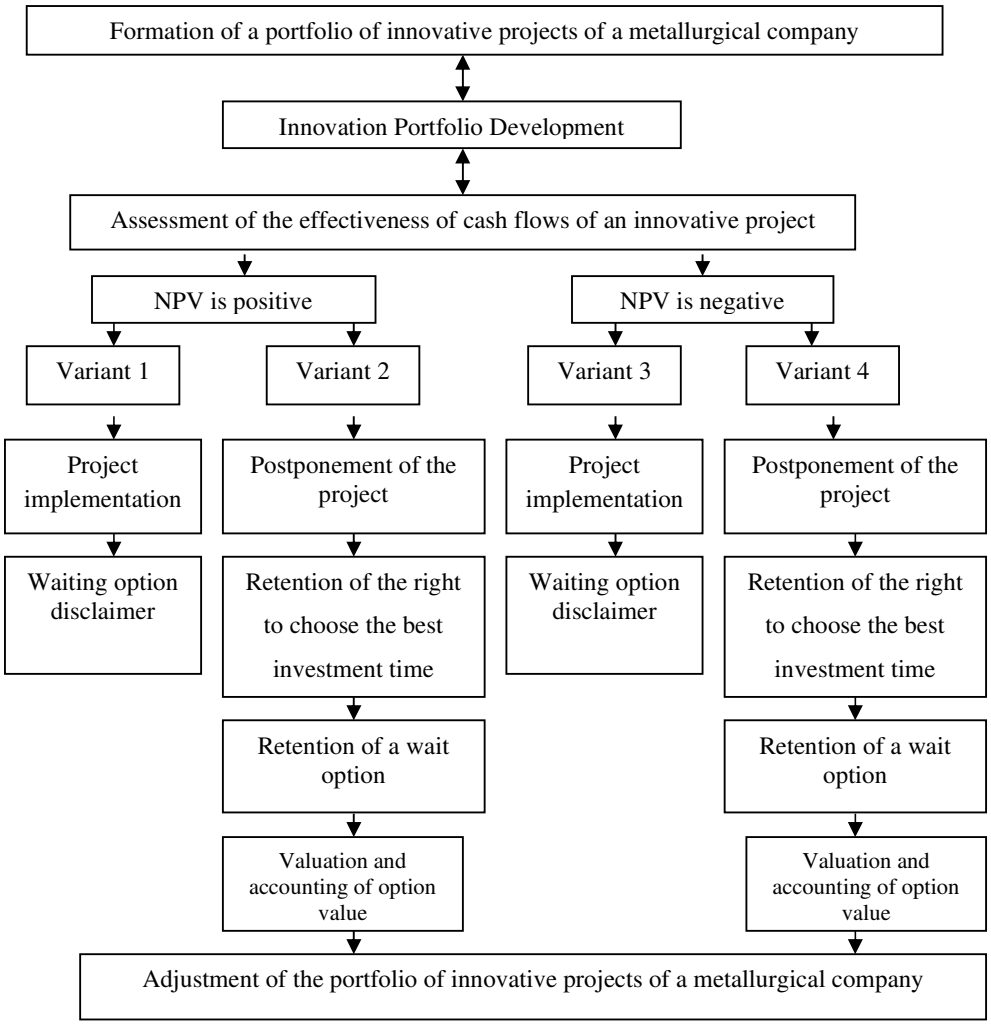

Fig. 4: Consideration of a real option for waiting time for investment in the formation and implementation of the investment portfolio of a metallurgical company

A classic example of the implementation of this option is the Simandou project of Rio Tinto in Guinea, which received in 1997 the right to develop the largest (2 billion tons) iron ore deposits in the world worth 21 billion dollars. After receiving the first ore in 2015, production was suspended due to

[2] The real option and choice are not identical. If the metallurgical company does not have the opportunity to carry out the project in stages or exit it before the project is completed, minimizing losses, it is faced with a choice that does not contain real options: invest or not "now".

a deterioration in the price situation on the iron ore market (during 2017 its cost (62 % of the market, the port of Tianjin (PRC)) decreased from 160 dollars / ton to 60 dollars / r) so as not to create "pressure" on prices in the market with an additional offer.

A real (technological) **option to develop new innovations** depending on the effect in the form of products of intellectual activity. This option is divided into: a) positional (involves small investments simultaneously in several technological areas to insure if the main direction chosen by the company does not justify itself), b) intelligence (used if the company can develop the technology, but does not know, in to what extent the market will perceive it) and c) "bridge" (short-term and small investments in unknown market niches to use the experience gained when creating "breakthrough" technologies in the company or in prospective x market niches). An example of the first is PJSC Severstal's investment in IMBS South Africa (a 25.6 % stake in its shares) developing Fine smelt technology (extraction of iron ore concentrate from low ore or spent tailings of iron ore deposits). At the 1st stage, it is supposed to identify the possibility of its use for obtaining iron ore concentrate with a commercially reasonable cost and construction of a demonstration plant), in the future - the global scaling of this technology at other sites.

When evaluating this method, the amount ($\boldsymbol{i}$) paid for the right to own a technological option represents an investment in a R&D project to improve and refine existing products and launch new generations of technological products in which the company has a strong image and position. The cost of further investments necessary for the implementation of this project is the price $\boldsymbol{P}_0$ that the investor determined at time $\boldsymbol{t}$, $\boldsymbol{P}_1$ is the sum of the conditional profit from the project that the investor will receive at time $\boldsymbol{T}$. If $\boldsymbol{P}_1 \leq (\boldsymbol{P}_0 + \boldsymbol{i})$ it is sometimes advisable for the investor to exercise the option to partially cover the initial costs of R&D. This option is useless if the R&D project is not associated with high risk.

The option for not produced new products allows the metallurgical company to receive an interest-free loan, while the buyer-broker makes a partial prepayment. The trading methodology, which provides for the possibility of putting up for sale a section of options for a new but not yet produced product, suggests that the buyer, having paid 20-40 % of the cost of the entire batch, receives the right to distribute it as it is produced. Payment of the remaining 60-80 % of the cost is carried out as new goods are delivered. The contract stipulates that in case of refusal by the metallurgical company to supply, the interest-free loan turns into a commercial one with a rate not lower than commercial bank loans, the conditions of a possible reduction or growth (redistribution of income from the sale of products between the manufacturer and the buyer) of the current prices are also stipulated.

Using **a real option as part of a leasing contract** allows you to plan and invest production. An example of this strategy when forming an ARI portfolio is the situation when a lessor, under a contract with a lessee, enters into a put option with a third party (a real option to sell an object (for example, equipment) for a metallurgical company project.

The sellers of this option may be stock speculators, counting on the unclaimed need of the option right by the lessor to receive profit under the option contract in the form of an option premium, or potential buyers wishing to purchase this ARI at a price known to be lower than the market price. This allows the lessor to sell the equipment to the seller of the real option at the price specified in the contract (strike price) during the agreed period of the option contract, and the option gives its buyer only the right to sell, and not an obligation (the fulfillment / non-fulfillment of the option contract depends entirely on the lessor). The strike price is set based on the market value of the leased asset at the time the real option expires, taking into account its physical and moral depreciation, and remains unchanged for the entire term of the real option. That is, the lessor is insured in case of default by the lessee by selling the seized leased asset at a fixed price. In this case, the premium paid to the seller of the real option may be included in the lease payments as the insurance amount in the lessor's investments. The lessor, as the buyer of a real option, expects that the strike price will be higher than the market value of the seized leased asset. Therefore, when acquiring a real option, he should be guided by the forecast of the market value of the used ARI.

Operational (operative) leasing may also be a real option for the lessee, which implies the possibility of early return by the lessee of the leased asset.

A real option for the transfer of know-how under a licensing agreement during the implementation of the project. One of the important points in concluding a license agreement is to familiarize specialists of a potential buyer (metallurgical company) with the technical solution intended for commercial implementation, and to demonstrate its operation. However, having familiarized himself with the know-how, the licensee may refuse to conclude an agreement and begin to use it free of charge without any liability before the owner. Therefore, on the one hand, in the process of demonstration, the essence of know-how should not be disclosed, on the other hand, a potential licensee wants to get acquainted with the know-how and evaluate it before signing a license agreement.

To solve this problem, it is envisaged to conclude a preliminary option agreement at the negotiation stage in order to keep a potential licensee secret and to prevent unfair use of the know-how by paying the advance payment to the seller for acquaintance with the know-how transferred on deposit to the licensor's account, according to which the licensor undertakes to familiarize the potential licensee with the know-how. If the latter, having read the know-how, does not sign a license agreement, he does not have the right to disclose, transfer to third parties the information received from the seller and use it industrially. If the licensee signs a license agreement, then the advance payment is made against future payments under the license agreement. All information requested in writing can also be transmitted only after the conclusion of an option agreement or license agreement containing a confidentiality clause.

A real hiring option implies the possibility of extending, after an agreed period of time, a contract with an employee of a metallurgical company or a member of its sports team for their hiring (rent) for a period specified in the contract, for example, according to the "1 + 3" scheme (after 1 year for another 3 years) or the possibility of refusing to renew the contract after 1 year.

A real option for the possibility of changing the scale of the project. In a favorable situation (increased demand for products, the number of customers, etc.), additional investments may be made, in case of deterioration, a part is withdrawn. This real option is advisable to apply in cyclic production.

Real options on RIO, encountered in practice, are usually more complicated than those considered. For example, you can refuse to implement a project not only in a single case, but at any time. The price for refusing to implement the project may change over time and, as a rule, is not known in advance. In addition, even abandoning the implementation of the project, it is possible to return to its implementation in the event of more favorable circumstances for investment. It is also possible to use exotic real options for RIO insurance.

Variability for holders of real options creates upward potential, while the option contract limits losses. On the other hand, the metallurgical company, while the project has a positive NPV, seeks to exercise a real option in order to receive cash inflows. If the cash flows are high enough, the metallurgical company will exercise the call option ahead of schedule.

Model

Calculation and accounting of the value of real options for projects is an important mechanism for increasing the efficiency of forming the investment portfolio of a metallurgical company. Valuation of investment projects using the real options method is based on the assumption that any investment opportunity can be considered as the right to create or acquire (sell, return) an asset for a certain time. The well-known formula for calculating the value of a project using real options does not take into account a number of long-term costs associated with the use of real options. Therefore, the authors provide an updated formula for calculating the expected net present value of an $\overline{NPV}$ project under conditions of risk and uncertainty using real options

$$\overline{NPV} = \sum_{i=1}^{n} NPV_i \cdot P_i,$$

where P_i is the probability of the implementation of the i-th scenario of the project when $i = 1, ..., n$; NPV_i is the discounted net income of each project implementation scenario, defined as

$$NPV_i = \sum_{t=0}^{T} \frac{CF_t}{(1+E)^t} - \frac{\text{CPO}}{(1+E)^t} - \frac{\text{DACAURO}}{(1+E)^t}$$
$$= \sum_{t=0}^{T} \frac{R_t - C_t^{-I_t}}{(1+E)^t} - \sum_{t=0}^{T} \frac{I_t}{(1+E)^t} - \frac{\text{CPO}}{(1+E)^t} - \frac{\text{DACAURO}}{(1+E)^t},$$

where in the period $\boldsymbol{t}$ of the project implementation $\boldsymbol{CF_t}$ is cash flow; $\boldsymbol{R_t}$ is current results in monetary terms; $\boldsymbol{C_t^{-I_t}}$ is current costs excluding investments $\boldsymbol{I_t}$ in monetary terms; $\boldsymbol{T}$ is the calculation horizon when evaluating the project; SRO is the cost of real options available to the metallurgical company or built into the project; DACAURO is discounted additional costs associated with the use of real options; $\boldsymbol{E}$ is the general economic discount rate determined by the Fisher formula

$$1 + E = (1 + i) \text{ x } (1 + \alpha) \text{ x } (1 + r), \quad (1)$$

where $\boldsymbol{I}$ is the nominal (percentage) rate on short-term 3-month government bonds; $\boldsymbol{\alpha}$ is the average rate of inflation; $\boldsymbol{r}$ is correction for the unsystematic component of the overall risk of a particular project.

That is, the $\overline{NPV}$ of the project is the sum of the expected net present income from it without the possibility of adapting it to changing conditions of implementation (risk and uncertainty), the cost of real options available to the metallurgical company or built-in options for the project, and the discounted long-term costs associated with it using real options, namely: 1) a change in the company's approaches to doing business and organizational culture; 2) revision of business plans and, as a result, a possible loss of strategic guidelines due to excessive "flexibility" in making management and investment decisions; 3) accounting: a) the price that will have to be paid for the rejection of the project, which is usually not known in advance and may change over time; b) opportunity costs of investment, the value of which is comparable to the value of a real option; c) the possibility of transforming investment costs into irretrievable costs (for advertising, hiring / firing and training employees, special products of equipment and services), which will make investment irreversible. Therefore, investors usually do not start investing until the income substantially exceeds the long-term average costs, taking into account the fact that these processes can be postponed without starting.

The risk of the project and, as a consequence, the discount rate taken into account in formula (1) when using real options will be less.

When analyzing real options, it is often impossible to apply the calculation formulas derived for financial options, since options that have real assets as the underlying ones differ significantly from financial options. The difference between financial and real options is related to the risk-free interest rate used for them. In the first case, the yield of the least-at-risk asset default asset is used - short-term 3-month government bonds. For the second, a similar interest rate is usually determined individually for each project, or, for example, this is the average return on investment in the industry or the refinancing rate of state central banks for the least risky projects.

Conclusion

Economically developed countries with regulated market economies widely use real options for RIO. For Russia and Kazakhstan, this is also very important, in particular, for projects in conditions of investors having a psychological distrust of long-term and large volumes of private investment. On the other hand, the cost of creating a real option may not be justified, for example, the ability to increase output (investment in additional production capacity) may not be provided by an increase in demand for it.

Systematization of the main types of real options makes it possible to expand the range of application of these decisions for people making managerial and investment decisions, while the use of exotic real options should also suggest the development of a method for their application.

When evaluating the effectiveness of each project included in the investment portfolio and the portfolio as a whole, it is necessary to take into account and evaluate the real options embedded in them. The use of a more objective formula for calculating the expected effect of the project using real

options allows you to increase the effectiveness of RIO insurance through real options in conditions of risk and uncertainty and use the additional opportunities contained in the projects for more efficient development of metallurgical companies.

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Human Resources as A Key Determinant of Success in An Expedition Project

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Abstract

The purpose of this article is to demonstrate the key role of human resources in achieving success in an expedition project. The author defines the concept of an expedition project and presents a set of features that should be perfectly matched by a team. At the same time, the unusually important role of the leader was presented and the criteria described in detail, the fulfillment of which defines the success of the expedition project. The impact of the human factor on the success of an expedition project is conditioned by a properly selected team managed by a leader who builds partner relationships and motivates subordinates accordingly.

Keywords: Expedition Project, Human Resources, Leadership

Introduction

World markets never sleep. The flow of people, goods and money lasts around the clock. Societies in the 21st century are overworked. In the little spare time they have, they want adrenaline. Holidays on a Greek island, a rest on a luxury yacht or a visit to Stonehenge are not enough. The demand for more active rest has increased. A new market segment has been created, offering holiday experiences in conditions which, until recently, have been reserved only for people involved in competitive sports or people professionally working in the industry. More and more companies offer spending a week in the African jungle (survival), on Mt. Blanc (mountaineering) or hiking in the Sahara (extreme rally). The result of this trend is the creation of specialized agencies, which, in addition to providing tourists with the desired adventure, also organize and supervise projects implemented by scientific/research and government units.

In the literature on the subject and in the publications of societies which associate professionals in project management, so far no aspects of design analysis have been implemented in the provision of services in the sector of professional expedition tourism (extreme).

Expedition Project

The author has created a definition of an enterprise that combines all the previously cited elements. The expedition project is an organized expedition aimed at carrying out set tasks using project solutions. This is a specific undertaking, not only unique in the sense of the planned goal, but also in terms of organizational and interpersonal complexity and the level of participants' security. Individual stages of the project take place not only in the comfort of offices and conference rooms and with the support of the latest software. It is often a struggle against the elements, our own weaknesses. It is a dynamically changing scene of events where planning of individual operations is not always possible beforehand. Decisions there, are often made quickly, at the project site, in extreme conditions.

The Definition of Success

In the case of business projects, the adoption of a certain type of success evaluation criterion does not pose many difficulties, as the exponent becomes, for example, the achievement of specific profits through the sale of a new product, the successful introduction of innovative technology or the construction of a new warehouse to facilitate distribution. The expedition project requires a different

approach. Achieving success by a scientific expedition is reaching, collecting samples, measurements and tests carried out by the team as a whole. An extremely opposite example is the mountaineering expedition, where summiting of at least one participant is the success of the whole expedition. The organizer's financial profit and customer satisfaction on the other hand are important factors, but it is equivalent to define a limit, exceeding which means not only failure in the substantive sense, but above all it can pose direct threats to project participants (Lock, 2007, 17-19). Defining the success of the project depends on the adopted evaluation criterion, which is determined by the assessor (Young, 2016, 14-15). In the case of an expedition project, the customer (primary criterion) comes first, followed by the organizer (secondary criterion).

Basic criteria:

- degree of goal / goals achievement
- safety (including health) of participants
- duration not exceeded (with due tolerance - depending on the nature of the project)
- assumed budget not exceeded
- an adequate level of service quality maintained

Secondary criteria:

- financial success (the project generates a surplus of revenues over costs)
- obtaining further orders by the organizer
- sustention / reputation growth of the organizer.

The success of the project is determined by effective management of information flow, timely perception and proper assessment of emerging threats and opportunities, as well as quick communication of ideas between project organizers, the project team and the client - the recipient of the project. The manager (leader) has a great impact on the success of the expedition project, whose indispensable feature is creativity, but understood not so much as coming up with new ideas, but creativity as the ability to combine facts, analyze their connections and create new solutions based on them that better respond to current needs of the project.

The project has a good chance of success when:

- the competences of the project implementer will be professional and pro-social
- there will be proper promotion of the project and effective recruitment of clients
- skillfully selected partners and staff
- expected results will be achieved
- there will be effective project management

Only then can you talk about effective goal-oriented project management.

Does meeting only some of the presented criteria (primary and secondary) mean a lack of success? The implementation of an expedition project should never be evaluated in terms of binary categories. For example, if the schedule and costs are exceeded, but the goal is achieved - the expedition reaches, for example, an alpine peak, it will mean that the final result is positive. A different case may be in the sports-scientific expedition, which did not achieve the sports goal (e.g. climbing a new route), but collected the planned samples for analysis from a distant corner of the globe. The assessment of success then depends on the importance of individual goals.

Expedition project of a mountaineering character

A great example of an expedition project is a mountaineering expedition. The specificity of this type of projects, especially in the context of planned goals, best illustrates the overall activities that, when properly combined and coordinated, create maximum opportunities for success.

The expedition project has negligible chances of success without prior precise determination and analysis of parameters shaping individual organizational phases. These parameters are interdependent and form a kind of system that must remain in balance for the success of the project (Michalski, 2010, 101-106). Those are:

- **The scope** defines the project boundaries, defines the activities that must be performed at each stage of the project. This does not mean, however, that the scope of the undertaking will not change during the project duration. Appropriate management allows for ongoing adaptation of activities to changes (Wysocki and McGary, 2003, 23-24)
- **The substantive purpose** of the intended expedition determines the direction of preparation of appropriate logistics facilities. Each mountaineering expedition project is specific in its own way and requires a different approach.
  For example, the goal could be:
  - the summit is reached by the simplest climbing route possible
  - the summit reached by a new climbing route
  - climbing a new route without reaching the top
  - reaching the maiden peak
- **Quality** for an expedition project can be considered in two categories:
  - quality of service - the key factor for the customer is the satisfaction of the expedition, both in terms of achieving the goal as well as the organizational level and the level of safety during the project (PMBOK Guide, 2017, 275)
  - quality of expedition project management - is an important element of the undertaking's success. This means the need to constantly control the quality of management and to find ways to improve it. The basic control tools are a reliable team of experienced professionals and an appropriate communication system.
- **Time management** allows for planning the date and the duration of the expedition..
  - the date depends on the geographical location of the project objective, and so it depends on the time of year when the expedition may take place
  - project duration is defined by a schedule consisting of basic elements such as: starting date of expedition, duration of individual stages, time needed to reach intermediate goals and the main goal, deadline for project completion
- **Project costs** include setting the expedition budget, allocating funds for the implementation of individual project phases, and attempting to estimate the increase in costs over the duration of the project, which often has the effect of limiting or abandoning some of the intended objectives.
- **The resources of the expedition project** are divided into human and equipment (capital):
  - human resources are an essential element forming the enterprise team. The manager - coordinator is the person who is the most experienced both from the technical side of the specific project as well as from the organizational and logistics field.
  - equipment (capital) resources depend on the choice of project implementation location (climate zone), nature of the expedition (sports, commercial) and the purpose of the project (reaching the summit, establishing a new climbing route).

Human resources management in an expedition project

No expedition project, regardless of profile, purpose and scope, can be implemented without the appropriate staff coordinating all activities during individual phases of the project. Project team members should be selected in such a way that specialists of each of the relevant parts of the project are included in it. The concept of the expedition project team is perfectly characterized by Kezsbom and Edward (2001, 455), describing the team as a set of people who must rely on the cumulative knowledge, skills and talents of each of the interdependent team members. Each team is a group, but not every group is a team. A team is a special term given to a group of people who are aware of the essential nature of their dependent roles and the skills and talents each of them has. These, in turn, complement their efforts and guarantee achievement of goals. The effect of team work can best be explained using the concept of synergy. Thanks to effective joint work, the team can generate

solutions to problems that are much better than those that could be created by each team member individually.

The importance of leadership in an expedition project - project leader

Leader's predispositions should include the ability to motivate subordinates, look at current events and independence in the assessment of facts, and in the organizational context of the project - negotiating skills, vital interest and concern for the success of the enterprise, focusing on achieving the set goals and thinking in terms of the project as a whole. Regardless of the size and purpose of the project, what counts is the ability to make decisions in conditions of limited information availability and the ability to implement a style of targeting both tasks (the need to obtain the required project implementation parameters in the system: scope, time, costs) and people (the ability to create and maintain an atmosphere of creative involvement of team members). An extremely valuable feature, and often underestimated, is openness to non-standard working methods and skillful ways of communicating within the team and that of the team with the environment, by creating a favorable atmosphere for the free flow of information in the team. The leader of the expedition project should have high professional qualifications, i.e. the ability to estimate costs and anticipate the time to complete the tasks, the ability to plan and predict possible types of risk, events and the planning of adequate actions in advance, as well as to be reasonably proficient in a foreign language of the region where the project is implemented (Meredith and Mantel, 2009, 111-112).

There is a very large group of features and skills that a good expedition leader should have, but it should be noted that none of them can replace a partnership approach. A partnership approach means managing in such a manner that the created team works together more effectively than the sum of the units participating in it. The synergy of the team's operation is a feature that is very difficult to achieve. Gathering the best specialists, but not forming a team, does nothing more than the sum of their individual actions. The leader will gather people, but if he cannot approach them like a partner, he will not succeed. Understanding habits, preferences, and justification are the features of a partner who is also a leader in the project. The partner does not treat people as his or her inferiors but puts him or herself in their place and tries to understand their behavior. Those behaviors, when combined and summed, create more than individual activities. The team created in this way could be compared to a network. A network, skillfully connected and cooperating, whose links pursue one goal. One of these links is also a leader. He or she created it and allocated tasks, but they do not stay outside. For someone on the outside, he or she are one of the links, not at all visually different from other links. The differences remain only in the possessed and used competences - leadership and partnership.

Managing an expedition project in the mountains is more difficult than managing ordinary projects. In the case of expedition projects, the work form is more casual and changes occur more often. The associates (partners) do not know each other at first, many things are different and they change more frequently. Also, the future is not always obvious, making management a bigger and more complicated challenge.

The style of management (leadership) during expedition projects falls within the area of so-called integrative style. The degree of intensity of the features of this style - focus on people and tasks - can be different depending on the specifics of the undertaking and the form of its implementation.

The ability to manage people means linking leadership with a partnership approach. Most of the leaders, selected from a group desired for each expedition project, have come to their positions through numerous successfully completed projects. Each of them was a subordinate of a different leader. He used valuable remarks and carried out orders, but he wanted to be treated like a human being. Relations between the manager and employee or, in the case of an expedition project, the leader and a team member should be carried out on a partnership basis, but everyone should know the scope of their tasks and be responsible for them. A well-managed team is a team of partners pursuing a common goal under the guidance of a phenomenal leader - a leader with character.

Selection of Team Members

In the literature on the subject several types of selection methods can be found. The most common are:

- biographical information analysis,
- references,
- interview,
- tests

The selection of members of the expedition project team is based on a method that uses some elements of the listed types of selection depending on the profile of the project. The circles from which climbers are recruited constitute a relatively closed environment in which classical selection methods do not apply. Recruitment for a specific expedition project is not made by placing an advertisement in the press, but through informal contacts. The next stage, after gathering a group of people interested in the project, is to analyze the achievements of candidates in terms of experience in a given climbing specialty. The next very important element of selection is collecting opinions, i.e. information from third parties about the personal nature of the candidate (information from persons who together with the candidate took part in other expedition ventures). The last stage is a conversation about the expectations and responsibilities of the candidate for a team member. In the case of people with an established position in a given environment and their extensive experience - the stage of collecting opinions is unnecessary, therefore it is often overlooked. There are two critical stages throughout the entire selection cycle, the analysis of which allows selection of the right candidate. These are the experience analysis and the interview stages. These two elements complement each other and on that basis it becomes possible to directly verify a potential participant in an expedition project.

The influence of the human factor on the success of an expedition project

Since the beginning of time, people have united and joined groups to achieve individual and collective goals through joint efforts, because such cooperation was easier than working on their own initiative. Nowadays, this is still the case, only the terminology and terminology has changed.

Climbing the summit is the culmination of many months of preparation, of fighting the elements of nature, of conquering your own body and mind. Achieving this goal is usually not possible without teamwork. This means that the success of a mountain expedition project, to a large extent, depends on the characteristics of the team that implements the project. Each trip is concerned with different purposes, various technical assumptions and diverse geographical area. This means that the selection of human resources must be very precise each time, which, in turn means that the set of features of a potential team, matching each expedition project, is very narrow:

- **a common goal** - the group needs a common task, or a common goal that all members of the group know and accept. They can focus around this goal and it will point them in the direction of the project activities
- **rules of behavior** - no group can exist without specifying game rules or norms, i.e. rules of behavior that are accepted and applied by group members. They are defined by the group's goals and can be divided into formal and informal rules. By applying these rules, many conflicts within the group can be avoided and managing your team will be more effective.
- **understanding of dependencies in a group** - this feature relates to the knowledge of mutual relations that team members have and to the significance they attach to these relationships. The interdependence results from the scope of joint actions of team members that are necessary to achieve the goal (Pinto and Kharabanda, 1995, 226-230).
- **sense of community** - arises in a team when they perform common tasks as part of an expedition project, which promotes an atmosphere of unity and has a positive effect on personal relationships within the group

- **integrating personal and group goals** - one of the tasks of an effective team leader is to integrate personal goals and team goals. In order for the team as a whole to achieve its goals, its members must first be able to achieve their personal goals within the overarching goal structure of the whole team. Motivation is maximum when team members see the opportunity for self-development while working on a project
- **level of trust** - within the project team it is a very important factor determining the well-being of a group member. In other words, it means a sense of being comfortable and of working in a team, which translates to the willingness and ability of members to honestly express different opinions, values and relationships, and to treat them appropriately. A high level of trust in the team minimizes the risk of conflict on a scale that may affect the success of the venture.
- **commitment** - during the expedition project the team is often exposed to sleepless nights, exhausting physical exertion, stress and even life threatening situations. It is imperative that all physical and mental forces be focused on the goal. In other words, the team members must be fully involved (and therefore convinced) in what they do.
- **personal diversification** - team members come, in principle, from different environments and professional groups and are specialists in various fields. In addition to differences in professional skills, team members differ, also in principle in, their ability to solve decision-making problems, as well as, in team collaboration skills. The right mix of skills and viewing perspectives represented by team members allows for creating solutions to difficult and diverse problems by using the right people at the right time. An effective team also needs members with diverse personalities.
- **the level of integration** - determines the coherence of the team, and, in practice, of the achievement of a balanced degree of integration, in accordance with the principle "no extreme is good". On the one hand, there is a risk of a complete lack of team integration, which means complete disagreement between members and complete breakdown of decision-making processes, on the other hand, full team integration, which may result in uncritical acceptance or conformity to dominant points of view, as well as aversion to creativity or individual responsibility

  - **the size of the project team** - depends on the specificity of the expedition project (Soles and Powers, 2003, 43-45). These can be large national expeditions (12-15 people), milieu expeditions (4-8 people) or projects organized by small, mobile teams climbing in a fast and light style (2-4 people).

Conclusions

Creating an expedition team is a kind of art and there is no ready recipe (Orr, 2004, 91-92). It is based on the skills of proper selection of participants and the ability to work with them so that, in a short time, a group of people transforms into a team. The project leader must demonstrate knowledge and ability to use firm methods of approach and techniques of project management in practice. An ideal situation arises when there is an optimal, well-motivated project team involved in the task.

Human resources are key to realizing the pursued goal in an expedition project. Factors that, during the planning and implementation phases, affect the project, constantly create threats that lead to failure, not only in the substantive sense (lack of success), but may lead to the loss of health or life of the participants. They are related to the elements connected to the planning of mountaineering expeditions (e.g. definition of the target, budgeting, official activities) as well as to the dynamic implementation phase (e.g. logistics of reaching the foot of the mountain, climbing action schedule, supply). Individual team members are responsible for specific areas and stages of the project, and the whole operation is coordinated by the leader. Cooperation during a mountain expedition is based on the goal. The team has a common, overarching goal, and everyone knows precisely what they are responsible for. It is important for team members with hidden individual goals to be able to surrender them for the group. If this can be determined much earlier, then there is a chance of success. Motivation is also extremely important. At all stages of the expedition project under extreme conditions, the body refuses to obey. In addition to short moments of rest at the Base Camp at the foot of the mountain, climbers are constantly struggling, physically and mentally with the surroundings (difficulty of climbing route, ice crevasses, weather conditions) and threats - lack of

oxygen causing altitude sickness, avalanches, frostbites and others. To overcome these adversities and convincing yourself of a seemingly lost fight, both individual (built long before the expedition) and team (mutual between team members) motivations are needed.

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Innovative Technologies for Continuing Education in The Organization

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Abstract

Research Motivation: when organizations switch to an innovative type of development to staff training, new requirements are put forward: constant updating, expansion and deepening of existing knowledge of workers, specialists and managers at all levels. This article offers a solution to the problem of increasing motivation and efficiency of employees in the organization through the use of a system of continuous training and innovative technologies for obtaining continuing education. The hypothesis of this study: in organizations that use methods of continuous learning and innovative technologies for obtaining continuing education, employees are more effective and have greater potential within the organization. **Research Methodology:** quantitative-Kettel's Questionnaire (16-PF) and Rean's questionnaire "motivation for success and fear of failure" (MSF). The concept of "continuing education", its main characteristics and tasks are analyzed. The relationship between the use of the continuous learning system and innovative technologies of continuous education in the organization and the motivation and performance of employees is revealed. An empirical study of the impact of the continuous learning system and innovative technologies for continuing education on the effectiveness of employees of the organization. **Main findings:** it is concluded that the system of continuous training and innovative technologies for obtaining continuous education positively affects the motivation and efficiency of activities in the organization, as well as the personal characteristics of employees.

Keywords: Innovations, Education, Lifelong Learning.

Introduction

Relevance of the research. The development of innovative technologies for continuing education in the organization is necessary to the development of innovative technologies of continuing education in the organization and insufficient theoretical study of this problem and social need of the society, organizations and their employees in a harmonious and effective integration of innovative technologies, continuing education in your organization's operational processes and insufficient integration.

Theory

Innovative technologies for continuing education in the organization.
Definitions of continuing education is education with the next characteristics: 1) lifelong learning (LLL); 2) adults; 3) continuous and professional.

The central idea of continuing education is the development of a person as a person, subject of activity and communication throughout his life.

Continuing professional education includes: basic professional education (including second and third higher education); professional development (and professional retraining); professional self-education.

Continuing education promotes three main objectives: 1) the preparation of man for inclusion in the system of modern public and professional relations; 2) improving human development, is already included in social production, with a view to its timely adaptation to constantly changing conditions; 3) comprehensive development of personality, formation of its Outlook, moral, aesthetic, physical and other qualities, interests, needs, General culture.

Elements of the system of continuous education in the organization: testing; onboarding; basic training program; foreign language training; formation of a staff reserve.

The functioning of continuing education is based on the principles that define its specifics: 1) humanism (testifies to the appeal of education to the person, the freedom of choice by the individual of forms, terms, types of training, professional development, self-education); 2) democracy (assumes the availability of education at any age in accordance with the capabilities and needs of each person); 3) mobility (expressed in the diversity of the means, methods, organizational forms of system of continuous education, their flexibility and readiness for rapid restructuring in accordance with the changing needs of industry, society, person); 4) timing (based on scientific forecasting requires faster and more flexible development, restructuring schools, the use of new forms and methods of the continuous education system towards the needs of public practice, mobile updates of their activities); 5) openness (obliges educational institutions to work with different age groups and groups of the population that differ in the level of education and professional training, increased potential in professional activities, attitude to education in terms of its orientation to professional orientation, positive life aspirations).

Continuity is a sequential chain of educational tasks throughout the educational process, passing into each other and ensuring the progress of students in each of the time periods.

Continuity in this point of view means the continuity at the borders of different stages or forms of education, the unified organization of these stages or forms within an indivisible system of education. In relation to the educational process, innovation means the introduction of new goals, content, methods and forms of education, the organization of joint activities of the teacher and students.

Innovative technologies are sets of methods and tools that support the stages of implementation of innovation that provides innovative activity, and are focused on the formation of systematic, creative, technical, innovative thinking and outlook, and, as a result, the ability to generate non-standard technical ideas when solving creative, production tasks.

The emergence of new information technologies associated with the development of computer tools and telecommunications networks, made it possible to create a qualitatively new information and educational environment as a basis for improving the quality of pedagogic process, enable strategic development management methods of training in information and communication environment, economic and organizational aspects of informatization of the system of continuous education and, as a consequence, the development and improvement of the continuous education system as a whole.

The main goal of innovative educational technologies is to prepare people for life in a constantly changing world, in the case of organizations – in the labor market. The goal of innovation is to make a qualitative change in the student's personality in comparison with the traditional system.

Characteristics of innovative educational technologies are: activity-based, providing active involvement in learning, problem-based (developing the ability to act in various problem situations)

and system-based (reflecting the specifics of a multi-variant professional activity); reflexivity (the ability to understand not only the content, but also the process of activity, to combine management and self-management), adaptability (focusing on needs, motives, individual opportunities); dialogic (ability to organize a system of multi-level contacts between teachers, students and employers).

Materials and Methods

The study sample was 40 respondents – employees of HR departments of the 2 companies (20 people – employees of company "A", which introduced the system of continuous education and innovative technology continuing education for the last 10 years, 20 employees of organization "B", in which it is not). The minimum age of the Respondent is 22 years, and the maximum age is 50 years. The median age was 34 years. Among them, 26 (65 %) are women and 14 men. All study participants live in Moscow (70 %) and the Moscow region (Table 1).

Table 1: Distribution of respondents by gender and age

Age / Gender	Men	Women	Total
22-30	5	9	14
30-40	5	11	16
40-50	4	6	10
Total	14	26	40

The company "A" uses the following methods of innovative training: personal-oriented (self-development program: each employee has quarterly and annually prescribed goals that they must achieve during this period, the results of which are further discussed with the Manager); problem-based (regularly held forums, heuristic training, brainstorming, debates, Socratic dialogue, business basket, forum, discussion in a low voice, "think and listen"; panel discussion, where the goals and results of the team are discussed, as well as global issues to work on); block-modular (test forms of final control of knowledge (decision tree, business and role-playing games: used during various trainings for employees of companies – on working with customers, leadership); remote (online courses on stress management, staff performance assessment, recruitment, cybersecurity, etc.).
This study uses qualitative and quantitative methods to evaluate the effectiveness of staff performance, depending on the presence or absence of a system of continuous innovative education in the organization.

Quality performance management (PM) method. The results, methods and competencies of employees are evaluated, areas of development are identified, and the employee's career is planned: employee training and career development plans are drawn up. All categories and positions of the company take part. The emphasis is placed on the feedback of the Manager with the subordinate in the form of regular contacts once a year (formally) and more often (as needed, informally). Task-setting interviews and final interviews are held once a year, where the employee is provided with feedback on their work and developed directions for the development of their success and quality of work. These interviews are conducted jointly by the manager and subordinate.

Quantitative methods (the Kettel test (16-PF) and the MSF Rean questionnaire) were used on employees of both companies to test the hypothesis about the relationship between innovative training in the company and employee performance. The first one examines factors: the General level of intelligence, the level of imagination development, susceptibility to new radicalism, emotional stability, the degree of anxiety, the presence of internal tensions, the level of self — control development, the degree of social normalization and organization, openness, isolation, courage, attitude to people, the degree of dominance-subordination, dependence on the group, dynamism. The second diagnoses positive motivation (hopes for success) and negative (fear of failure), primarily in educational activities.

In the first test, the Respondent had to choose one of three answers to 187 questions in the questionnaire, and in the second questionnaire, they had to agree or deny 20 statements.

Results and Discussion

The Kettell test is a 16 – factor test, some of which are combined to form additional factors. The following characteristics were studied: leadership qualities (dominance (E) + independence (Q2)), motivation and anxiety (anxiety (O) + ego-tension (Q4)), flexibility (diplomacy (N), receptivity to the new (Q1)).
For this purpose, the average value of these 6 factors for both organizations was calculated for employees of organizations "A" and "B" in each age range for men and women separately (tables 2-4).

Table 2: Factors of dominance and independence in «A» and «B» companies

Age/ Gender	«A» Company		«B» Company	
	Men	Women	Men	Women
22-30	7; 9	10; 8	7; 7	8; 6
30-40	10; 8	7; 7	8; 7	7; 7
40-50	7; 6	5; 8	6; 5	6; 6

Table 3: Factors of anxiety and ego-tension in «A» and «B» companies

Age/ Gender	«A» Company		«B» Company	
	Men	Women	Men	Women
22-30	5; 3	6; 4	2; 5	3; 5
30-40	2; 1	2; 4	5; 5	4; 6
40-50	2; 4	3; 3	6; 5	5; 4

Table 4: Factors diplomacy and receptivity to the new in «A» and «B» companies

Age/ Gender	«A» Company		«B» Company	
	Men	Women	Men	Women
22-30	3; 1	2; 3	8; 6	8; 5
30-40	2; 4	3; 3	7; 3	9; 4
40-50	2; 3	1; 4	5; 4	6; 3

Analyzing the results, we can see that the employees of the organization "A", where the system of continuous training and innovative technologies for continuing education are used, have higher leadership potential, flexibility, efficiency of thinking and anxiety than the respondents from the "B" company. Interestingly, women of all ages are more independent and dominant than men, as well as anxious and ego-unstable. Men, on the other hand, have shown themselves to be more flexible and diplomatic employees. The biggest difference in average age between companies "A" and "B" is in the factors of "diplomacy" and "receptivity" to the new. Respondents of all ages from company "B", where there is no continuous training system, are cautious about innovations, and are used to using already "known schemes".

Results processing and evaluation criteria for the MSF Rean questionnaire.

For each match of the response with the key from the questionnaire, the respondent is given "1" point. The total number of points scored is calculated. If the number "1" to "7", it is diagnosed the motivation to fail (fear of failure), if the number from "14" to "20", it is diagnosed the motivation to

succeed if number is "8" or "9", there is a definite trend of motivation to fail, and if the number of points "12" or "13", there is a certain trend motivation for success.

Motivation for "success" refers to positive motivation, when an employee, starting a business, assumes that as a result of achieving something constructive, positive. At the heart of human activity is the hope for success and the need to achieve success. Such employees are usually self-confident, responsible, proactive and active. They are distinguished by perseverance in achieving the goal, purposefulness. The motivation for the "failure" refers to a negative motivation. This motivation is based on the idea of avoidance (human activity is associated with the need to avoid failure, blame, punishment, failure) and the idea of negative expectations. Starting a business, a person is already afraid of possible failure in advance, thinking about ways to avoid this hypothetical failure, and not about ways to achieve success. People who are motivated to "fail" are usually characterized by increased anxiety, low confidence in their abilities, try to avoid responsible tasks, and when it is necessary to solve super-responsible tasks, their situational anxiety in these cases becomes extremely high. However, this can be combined with a very responsible attitude to business.

The text of the MSF Rean questionnaire is: 1) starting the work, as a rule, optimistic hope for success; 2) active; 3) is prone to creativity; 4) to perform critical tasks trying to find the reasons for rejection; 5) often choose the extremes: either low light job, or unrealistically high in difficulties; 6) when meeting with obstacles, as a rule, do not back down, and looking for ways to overcome them; 7) with the alternation of successes and failures tend to re-evaluate its success; 8) productivity depends mainly on my own determination, rather than on external control; 9) when performing fairly difficult tasks, under time constraints, the effectiveness of my activities deteriorates; 10) I tend to be persistent in achieving the goal; 11) I tend to plan my future for a fairly long term; 12) if I take risks, it is more likely with intelligence, rather than recklessly; 13) I usually do not; 14) I prefer to set myself average difficulty or slightly inflated, but achievable goals than unrealistically high; 15) in the case of failure in the performance of any task, its appeal is usually reduced; 16) when alternating success and failure tend to overestimate their failures; 17) I prefer to plan my future only for the near future; 18) when working under time constraints, the effectiveness of my activities usually improves, even if the task is difficult enough; 19) in case of failure in the performance of something, I usually do not give up the goal; 20) if the task has chosen itself, then in case of failure, its attractiveness increases even more.

When answering the questionnaire, you must choose from the answers "Yes" or "No". If you are at a loss for an answer, remember that "Yes" combines both an explicit "Yes" and "rather Yes than No"; the answer "No" combines an explicit "No" and "rather No than Yes". The respondent should answer questions quickly, without thinking for a long time (the first answer that comes to mind is usually the most correct).

Key to the questionnaire is: answer is "Yes": 1, 2, 3, 6, 8, 10, 11, 12, 14, 16, 18, 19, 20; answer is "No": 4, 5, 7, 9, 13, 15, 17.

The MSF Rean questionnaire calculated the average motivation rate for employees of organizations "A" and "B" in each age range for men and women separately (Table 5).

Table 5: Motivation in «A» and «B» companies

Age/ Gender	«A» Company		«B» Company	
	Men	**Women**	**Men**	**Women**
22-30	16	15	14	14
30-40	16	14	10	8
40-50	11	12	7	5

The average score of employees of «B» company, where there is no system of lifelong learning is lower than that of employees of "A" company, which uses a system of continuous learning and innovative technologies continuing education (the motivational pole is not bright sized of 10, and the

motivation for success is 16). The lowest score in «A» company is 11 and the highest score is 16, while in «B» company the lowest score is 5 and the highest score is 14. Interestingly, that in «A» company, which uses a continuous learning system and innovative technologies for continuing education, the average indicators of motivation for success are higher or equal to the average, while in «B» company, the motivation for "failure" begins to prevail with age growing. In other words, the employees of «A» company are more self-confident, responsible and proactive, while the employees of «B» company try to avoid the responsibility, which can lead to a state of anxiety. Also, you can see that with the growing age, the motivation begins to decline, especially this is shown in «B» company, where there is no system of continuous training.

Conclusion

1. The employees of «A» company have higher motivation for effective work, than the employees of "B" company. Male respondents showed higher scores on the scales of flexibility, leadership traits, while women showed greater anxiety, motivation was about the same for both sexes. The age group from 40 to 50 has reduced indicators for many factors in comparison with the age group from 22 to 30, which is more actively using innovative education technologies. As the result, the hypothesis about the relationship between the innovation of continuing education within the organization and the effectiveness of employees is confirmed.

2. The organization's motivation is strongly influenced by the organization's use of the continuous learning system and innovative technologies for continuing education for employee training. Regular innovations and innovative teaching methods increase employee loyalty to education within the organization, their flexibility and ability to adapt, and, as a result, affect their motivation and efficiency.

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The Influence Of Price And Services On Customer Satisfaction In Postal Services In Slovakia

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Abstract

Various EU member states have employed various techniques to measure consumer preferences in postal markets that link senders and recipients. This is a challenging task that needs careful consideration of technical, economic and social environment evolution of postal consumer needs. The aim of this paper is to use a discrete choice modelling methodology for measuring consumer preferences for postal services in Slovakia. The analysis examines how these consumer preferences vary across 260 residential consumers, specifically focusing on differences between vulnerable (70) and non-vulnerable (190) consumers. The valuations of letter services are measured relative to the price of a stamp, and the total WTP for these services indicates that consumers value the speed of delivery and are willing to pay the higher price of a stamp when deliveries are made earlier about one day. Morning time of delivery was not important for residential consumers, while they value later deliveries higher in general. Residential consumers valued higher to have postal service delivery to their work or home place. We observe that residential consumers were satisfied with the current state of the postal offices' network coverage. They were not highly valued the opportunity to increase or decrease the number of delivery days, and they preferred the status quo in this attribute.

Keywords: Consumer preferences. Decision theory. Discrete Choice Experiment. Postal services.

Introduction

The objective of this study was to develop recommendations for the future development of the universal postal service in Slovakia in the context of the postal market best practices especially in the European Union. The definition of the postal services is based on the Act 324/2011 on postal services, which was amended by the Act 547/2011. The wider context is based on the First Postal Directive 97/67/ES from 15. December 1997, Second Postal Directive 2002/39/ES from 10. June 2002 and Third Postal Directive 2008/6/ES from 20. February 2008.

The specific conditions of the provision of the universal service in Slovakia are defined in the Decision of the Postal Regulatory Office 815/001/2012 on the Granting of Postal license to the company Slovenská pošta, a.s. for the period 1.1.2013 to 31.12.2022 for the provision of universal postal service and the obligation to provide the postal payment service. The Postal license 815/001/2012 was amended by the Decision 599/ORPS/2014, which came into effect on 1. January 2015, but this change did not have impact on this study. The quality requirements on the conditions of the universal service are stated in the relevant decisions of the Postal Regulatory Office issued in 2012.

The overall aim of this study was decomposed into several sub-tasks. The first one was to analyse the current state of the universal postal service in Slovakia and its benchmarking against the other EU member states. The second step was to develop methodological framework to measure the customer requirements and preferences of the users of postal services. This approach was than tested on the pilot

sample and the methodological framework was updated to reflect the feedback from the pilot project. The final stage consisted of the nation-wide data collection and final evaluation of the project results.

Literature Review

Now postal services are a large and still growing sector of most economies (Boronico, 1997) in the world. The major issue that postal services must consider involves consumer satisfaction and consumer preferences. Service quality is at the root of consumers' satisfaction and is linked to such behavioural outcomes as word-of-mouth. At present, new digital technologies have a strong impact on the provision of postal services (Otsetova and Dudin, 2018) worldwide. Customer satisfaction with postal services largely depends on their ability to meet their needs. The importance of segmentation in the current market environment is important (Štarchoň and Tóth, 2012). According to Edum et al. (2019), the demand for postal services is currently increasing due to the increasing need to meet their needs through online shopping in various e-shops. Brand origin country can be essential in slovak consumers preferences (Smolková and Štarchoň, 2013).

Several authors have addressed customer satisfaction in postal services in their research (Boronico, 1997), for example in Bulgaria (Otsetova and Dudin, 2018), Turkey (Yavas, 2000), Serbia (Ratković et al., 2017; Pavlović et al., 2018; Unterberger et al., 2018), in Malaysia (Edum et al., 2019; Isa and Kiumarsi, 2019; Kiumarsi et al. 2015), Indonesia (Manalu, 2019; Khanooja and Prathabhan, 2019), Ireland (Cahill and Palcic, 2018), Denmark (Kristensen et al., 2000) or in the United States (Crew and Kleindorfer, 2008). According to vigorous studies, a trend has emerged in recent years the creation of new services in the postal sector, which is subject to requirements and preferences customers (Ratkovic et al., 2017; Otsetova and Dudin, 2018). Corporate identity gives the company a face (Vilčeková, 2006). It plays an important role in the customer's preference competitiveness of postal companies. In a competitive environment, postal service providers must identify the determinants of the success of their distribution channels in terms of service quality and their impact on satisfaction and customer loyalty (Águila-Obra et al., 2013). Currently, postal operators are largely limited in their ability to adapt to consumers if they are obliged to provide universal postal service and are regulated in terms of tariffs and quality of service (Cahill and Palcic, 2018). Postal services that are extremely important worldwide suggests that emphasis should be placed on the implementation of timely and reliable services (Ratković et al., 2017; Otsetova and Dudin, 2018) and competitive prices. (Boronico, 1997).

Research Methodology

Our approach was based on the "Study on appropriate Methodologies to Better Measure Consumer Preferences for Postal Services" by Rand Europe developed for the European Commission. This study recommends conducting the surveys by using the Stated preference discrete choice experiment (SPDCE).

Discrete Choice Experiment

Discrete Choice Experiment (DCE) method describes, explains and forecasts selection among two or more independent alternatives. It is used in various fields from economy, through environmental management, urban planning to transport and telecommunications. It is often used when analysing the consumer buying behaviour. It aims to understand and predict the behaviour of consumer, when he selects from multiple options. The method identifies factors influencing the decisioning process and provides understanding of the value, which consumers assign to individual products and services. From the scientific perspective it is based on the analysis of the microeconomic theory of demand and consumer behaviour. It is considered relatively precise method of estimating the consumer preferences. As opposed to the standard consumer models, where the key question is "how much", the DCE is focused on the question "which". The theory states, that the individual from the utility perspective values specific attribute/characteristic of the product and not the product itself and therefore selects the alternative, which maximizes the highest possible benefit among the offered options. The basis of the DCE approach is to determine, why individual prefers specific alternative compared to other option by comparing one to other.

DCE was initially developed by Louviere and Hensher (1982) and Louviere and Woodworth (1983). Since then, many authors has used discrete choice experiments in their studies, e.g. environmental decision making (Hoyos, 2010), smoking cessation behaviour (Goto et al., 2007), willingness to pay (Meenakshi et al., 2010; Schlereth, 2012) and many other.

DCE is widely used for the surveys in the public sector as it allows to measure the value of the public services from the citizen perspective. Therefore, it is also suitable in the postal sector to determine the customer priorities in the context of market and demographic changes.

Attributes Selection

In the experiment design phase, the first step consists of identification of the all relevant attributes. As the number of attributes, which can be researched is limited, it cannot cover all attributes of the postal services, but they need to be prioritized. The common practice is to limit number of factors to maximum 15 to avoid the overload of the respondents and their confusion. As the survey was also covering the specific segments of vulnerable persons (people older than 65 years, disabled people or people with low income) this aspect was very important. The selection of the relevant attributes has been consulted with the representatives of the relevant ministry and the Postal Regulatory Office. The following step was to involve price as the evaluation factor, which would allow the quantitative analysis of the results. The price was considered the monetary/numerical variable.

Questionnaire Definition

The questionnaire consisted of three main parts:

- **Classification and descriptive questions** – this part ensured that the sample surveyed is statistically representative and provided additional information to cluster our findings.
- **Discreet choice experiment section for the letters** – this part measured relative importance of the individual attributes of the universal service letters. We offered respondents various combinations of the different levels of letters service at the given price points and they were selecting, which one they prefer.
- **Additional services** – we allowed customers to provide ideas about new services, which they would welcome from the universal service provider.

Evaluation Methodology

We have used statistical system to evaluate the results of the survey. We have followed the 5 steps approach.

Attributes selection and questionnaire

Each attribute was represented by 2 or 3 levels, where 1 level was considered to be the reference level. Reference level was set based on the current legislative requirements. Independent variables very classified as:

1. Nonmonetary variables,
2. Monetary (category) variables.

Nonmonetary variables represent reduction or increase in the quality of service compared to current level. For example, for the delivery speed the Next day delivery is better service than the current D+2 level and on contrary the D+4 is the reduction in the level of service. The monetary variable, the price of service, cannot be evaluated independently, because its value is derived from the other qualitative parameters.

The basis for the setting of the levels of the attributes analysed was the current level of the universal service in Slovakia. For the definition of the level of increment/reduction of the individual attributes

we have followed the recommendations of the Rand Europe study. These values were than tested on the pilot sample and minor adjustment very made to reflect the learnings from the pilot survey.

Table 1: The individual attributes and their values

Attribute	**Levels**		
Speed of delivery	D + 4	D + 2	Next day delivery
Delivery frequency	Monday, Wednesday, Friday	Monday - Friday	Monday - Saturday
Time of delivery	Delivery by 9:00 AM	Delivery by 5:00 PM	
Place of delivery	To the post office	To the home	To delivery box
Price	EUR 0,23	EUR 0,45	EUR 0,68

Speed of delivery is measured by the maximum allowed number of days from the day of collection (D) to the delivery day. Currently the letters are delivered within two working days (D+2).

Delivery frequency defines the days on which the items are being delivered. Currently it is every working day.

Time of delivery defines the latest time, when the items are delivered on the last day of the delivery period. Currently all items are delivered by 5:00 PM.

Place of delivery defines, if the items are delivered to the address, or some other place. The delivery box is a place created by the service provider less than 1 km from the delivery address.

Each respondent after filling in classification and descriptive questions in questionnaire was introduced into the context of the survey by short explanatory text. After that he was presented several hypothetical scenarios among which he was required to select his preferred option. Each combination contained product description consisting of various levels of individual attributes. The offered options were pushing respondent to compromise between individual attributes of the product, thus revealing his preferences. For each discreet choice experiment we provided 6 selection steps, while in each step the respondent was required to select one from two options provided. Based on the recommendation from the Rand Europe study we did not allowed the respondent to reject both options.

Table 2: Questionnaire section product description example

Selection #3 - Letters	Alternative A	Alternative B
Place of delivery	Delivery home	Delivery box
Delivery days	Monday, Wednesday, Friday	Monday - Saturday
Time of delivery	By 9:00 AM	By 5:00 PM
Delivery frequency	D+2	D+4
Price	EUR 0.45	EUR 0.23
Selected option	□	□

Each respondent expressed his preferences by making 6 selections from the combinations provided. There were different variants of the questionnaires used. For the sample of 350 respondents we have therefore collected 2100 answers. Towards the end of the questionnaire each respondent was requested to state the importance of the individual attributes of the service. This question was used for the quality control purposes.

Attributes Evaluation

The basic principle of the DCE method is the maximization of utility. The respondents are selecting the option, which maximizes his utility. The evaluation model is described by the formula bellow:

$$
\begin{aligned}
RES = {} & b_{RDL_1D}\ RDL_1D \\
& + b_{RDL_4D}\ RDL_4D \\
& + b_{PDD_PSP}\ PDD_PSP \\
& + b_{PDD_PS}\ PDD_PS \\
& + b_{CD_9}\ CD_9 \\
& + b_{MD_Post}\ MD_Post \\
& + b_{MD_DS}\ MD_DS \\
& + b_{Price}\ Price
\end{aligned}
$$

Independent variables are represented by following proxy variables:

- Next day delivery (RDL_1D)
- D+4 delivery (RDL_4D)
- Delivery days – Monday, Wednesday, Friday (PDP_PSP)
- Delivery days – Monday – Saturday (PDD_PS)
- Delivery time by 9:00 AM (CD_9)
- Place of delivery – post office (MD_Post)
- Place of delivery – delivery box (MD_DS)
- Price – numerical variable

Dummy variables are most often used for the quantification of qualitative variables (e.g. gender, education, qualification, buying preferences). The approach of dummy variables uses only two levels – 0 (the attribute is not represented in the selected alternative) or 1 (the attribute is represented in the selected alternative).

For example, RDL_1D represents the proxy variable for the Next day delivery option. If respondent is interested in the improvement in the delivery frequency than RDL_1D = 1, otherwise RDL_1D = 0. The same approach is used for other proxy variables for all other attributes in the survey. The abbreviation of the proxy variable consists of the abbreviation of the attribute and abbreviation of the corresponding level.

Regression Model Estimation

We have used the conditional logit model to estimate the regression model to predict, which alternative the respondent will select. The conditional logit model has been selected due to the fact that the attributes are defined. If the model evaluation would be done without ex-ante defined attributes it would be required to use unconditional logit model.

The logit model was supplemented by the adding stratum variable, which was matching the specific respondent to his answers, which allowed model evaluation for specific categories of respondents. Regression coefficients (marked as coefficients b) represented respondents stated preferences, therefore they were indicating the respondent's attitude towards the potential increase/decrease in the quality of service in comparison to the reference level.

Model Evaluation

For the residential customers the model evaluated 3120 inputs, which were represented by 1560 different questions with two possible alternatives (260 respondents, where each answered 6 questions by selecting from 2 alternatives). For the corporate respondents the model analysed 1620 inputs (90 respondents, where each answered 6 questions by selecting from 2 alternatives).

Table 3: The explanation of model results for residential customers

	Coefficient b	Statistical error	Value z
RDL_1D	0.880***	0.11052	7.965
RDL_4D	-0.905***	0.13669	-6.624
PDD_PSP	-1.022***	0.12393	-8.253
PDD_PS	-0.035	0.09839	-0.361
CD_9	-0.316**	0.10378	-3.043
MD_Post	-0.772***	0.14197	-5.435
MD_DS	-0.466**	0.17572	-2.654
Price	-1.957***	0.28393	-6.895

Table 4: The explanation of model results for corporate customers

	Coefficient b	Statistical error	Value z
RDL_1D	0.797***	0.195	4.096
RDL_4D	-1.003***	0.236	-4.258
PDD_PSP	-0.841***	0.205	-4.101
PDD_PS	0.003	0.170	0.018
CD_9	-0.054	0.180	-0.303
MD_Post	-1.288***	0.270	-4.770
MD_DS	-0.692*	0.300	-2.304
Price	-1.833***	0.531	-3.452

In the first column the coefficient b demonstrates respondents' attitude towards potential increase or decrease in the quality of the given attribute compared to the current level. Stars indicate statistical importance of the given coefficient for the model. The importance factor is calculated from the value z. Importance factor shows the quality of given attribute. If the coefficient does not have any stars attached it means, that the impact of the given level does not have significant impact on the overall result.

The second column shows the statistical error of the estimate of the given coefficient represented by the standard deviation, which is caused by the fact that results are only statistical prediction. Its size does not impact results and is dependent on the size of the sample surveyed. The third column provides the value of the tested statistics z, which is used to test the significance of the estimated coefficient b and is calculated on the basis of the statistical error. As the model predicts respondents' behaviors and the results are probability estimates, the value z would change if the model is recalculated, however the difference should minimal.

Calculation of the marginal willingness to pay

Marginal willingness to pay (MWTP) indicates the value, the respondents are willing to give up in order to purchase the additional unit of the product, service or to avoid unpleasant event. MWTP is calculated by multiplying coefficient b of the nonmonetary variable and the coefficient b of the monetary variable -1. For example, the Next day delivery for the letters' discreet choice experiment the MWTP can be calculated from the following formula:

MWTP = (bRDL1D* RDL1D)/(bRDL* Price)

Table 5: MWTP calculation for residential customers

	MWTP	0,025	0,975
RDL_1D	0.4496	0.2956	0.7003
RDL_4D	-0.4625	-0.7192	-0.2913
PDD_PSP	-0.5225	-0.8061	-0.3478
PDD_PS	-0.0182	-0.1309	0.0774
CD_9	-0.1613	-0.3126	-0.0525
MD_Post	-0.3941	-0.5236	-0.2802
MD_DS	-0.2382	-0.4052	-0.0730

Table 6: MWTP calculation for corporate customers

	MWTP	0,025	0,975
RDL_1D	0.4348	0.1913	1.1373
RDL_4D	-0.5473	-1.4313	-0.2330
PDD_PSP	-0.4590	-1.2803	-0.1812
PDD_PS	0.0017	-0.2573	0.1901
CD_9	-0.0297	-0.3442	0.1554
MD_Post	-0.7027	-1.2418	-0.4807
MD_DS	-0.3777	-0.8090	-0.0783

First column displays MWTP, for example for the RDL_1D respondents are willing to give up maximum of 0,4348 units to speed up delivery by one day. Next two columns are showing interval, which defines minimum and maximum values, which attribute can contain in the case of repeated estimates.

Conclusion

The coefficients b for the letters survey are provided in the table below:

Table 7: Coefficients b for Residential and Corporate and Corporate Respondents

	Residential	Corporate
Price	-1.958	-1.833
Delivery days (Mo, We, Fr)	-1.023	-0.841
Delivery speed (D+4)	-0.905	-1.003
Delivery place (post office)	-0.771	-1.288
Delivery place (delivery box)	-0.466	-0.692
Time of delivery (by 9:00 AM)	-0.316	-0.054
Delivery days (Mo-Sa)	-0.036	0.003
Delivery speed (Next day)	0.880	0.797

Overall there were minimal differences between the results for the residential and corporate customers. The only difference was the desire of the residential customers to extend the delivery days by Saturday, even if the price of the service is increased. For the corporate respondents, the coefficient b was also positive, but very close to zero. It is not significant from the statistical point of view. As most of the businesses are open only during the working days, the delivery on Saturday, would not be relevant to them. Both residential and corporate respondents would welcome an increase in the delivery speed to the Next day delivery, on the other hand, delivery in 4 days was the least preferred option. From the table, we can see that the most preferred option for a delivery place is home address and not post office or delivery box. These two disliked options were more disliked by corporate customers than residential customers. In the attribute time of delivery was the more preferred option by 5 PM which is the current

state, then by 9 AM. Negative coefficient b for price indicates that customers have a preference for cheaper postal services.

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Expeditionary Risk Management Concept

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Abstract

The purpose of the article is to present sources and methods of risk management in the area of expedition projects. The specificity of this type of projects requires a modified approach to risk management compared to classic ventures. Risk not only affects the success / failure of an expedition project, but can also have a negative impact on the health and life of participants. This is due to the uniqueness of the planned goal, but also to the organizational and interpersonal complexity as well as the dynamically changing event scene. Planning individual operations is not always possible beforehand, and often decisions are made instantly, at the project site in extreme circumstances. In such conditions, proper identification, minimization of effects and monitoring of potential threats is difficult and requires the use of appropriately selected tools.

Keywords: Expedition Project, Risk Management, Project Management

Introduction

Risk is one of the most popular concepts appearing in many scientific disciplines, such as economics, sociology, psychology, law, medicine, technical sciences. Observing the development of man and his environment, it is easy to see that risk has always existed. There have not been and there are no human activities that are not associated with risk.

Risk management in the area of expedition projects (organized extreme expeditions aimed at carrying out the tasks outlined using project solutions) has an even deeper meaning, because it directly affects not only the success / failure of the project, but can also affect the health and life of participants. Expedition projects form an integral part of the global trend of project management and constitute an extremely important extension of this field into an area not yet included in these categories. Expedition ventures can be found not only when conducting research in remote corners of the globe, carrying out travel expeditions or high-mountain expeditions. Team building trips within the corporation, kayaking on rivers or ski-touring in the Alps have the hallmarks of the expedition project. This means that the field of project management has gone beyond the boundaries of offices and construction sites. It concerns not only classic projects implemented within enterprises, but has spread to other areas of life. The development of expedition projects is inevitable.

Expedition projects are a specific group of projects under which activities are carried out to reach the designated place, which is often associated with the extreme use of human resources, where the risk increases with each stage of implementation. The expedition project risk management is a system of methods and activities aimed at identifying, assessing and responding to threats appearing throughout the entire project life cycle with the effect that the project goals are achieved while maintaining the highest safety standards.

Sources of risk in an expedition project

When analyzing the sources of risk in the context of an expedition project, two areas of origin can be seen – mutually interpenetrating. On the one hand, there is the well-known risk, typical of classic projects implemented within the organization, on the other, we are dealing with no less significant risk occurring only in expedition ventures, but having an equally large impact on the success of the

venture. This is an expeditionary risk to which project participants are directly exposed. Four categories can be considered (Fig.1):

- external risk (unpredictable) – this group includes risks that are beyond the control of the manager (leader), team and participants involved in the project. These types of risk can be defined but cannot be assigned to a specific expedition project. The origin of this type of risk is, for example, force majeur, wildlife attack or altitude sickness (pulmonary or brain edema).
  Minimizing this type of risk is very difficult, because it is impossible to predict all possible threats. Based on experience from the implementation of previous expedition projects, analyzing the conditions under which the next project will be carried out and maintaining far-reaching care for safety, allows for certain chances for immediate protective actions in the event of an emergency.
- external risk (foreseeable but uncertain) (Nokes and Kelly, 2007, 276) – this group includes risks that are beyond the control of the manager (leader), team and participants involved in the venture, however it can be predicted that they will affect a given expedition project, although it is difficult to determine to what extent. This risk group is estimated on the basis of data available from various sources (previous projects, experts, media). This allows for a definition of a certain norm of occurrence of phenomena affecting the project, which unfortunately may differ from the actual conditions during the project duration (higher or lower level). This type of risk should be considered in terms of objective risk, i.e. independent of the participants, but predictable to some extent. This could be a snow avalanche or an ice crevice, ethnic riots or an increase in the cost of hiring porters.
- internal technical risk – which results from internal solutions applied to implementing the undertaking from the technical side of matters (Watt, 2014, 177-178). This type of risk remains under the full control of the project manager. Depending on the specifics of the expedition project, the risk relates to personal equipment, means of transport and communication, as well as other technical devices necessary to achieve the goal.
  Internal technical risk often results from the lack of experience of the expedition (team) project manager. Complete evasion or significant risk minimization is highly dependent on proper project preparation in the planning phase, both in terms of equipment and of logistics.
- non-technical internal risk – results from organizational errors at all stages of the project duration, with particular emphasis on human, material and financial resources management (Chong and Brown, 2000, 41-42). This type of risk remains under the full control of the project manager and the persons responsible for the individual stages of the project
- legal risk – there are two aspects to consider:

  – risk related to issues associated with the location of the expedition project - for example, mountain expeditions buy a climbing permit to conduct mountain activities on a given mountain or in a given region, exploration of tropical forests in Brazil requires a special permit by local authorities, and a polar expedition cannot stay on the Antarctic continent without first informing the relevant international institutions. In all these cases, there is a risk of not receiving a permission/consent or it being withdrawn during the project.
    These types of legal risks, to some extent (especially permit issues), remain under the control of the project leader.
  – risk related to issues arising from contractual provisions between participants and project organizers (between legal entities and individuals).

When planning the implementation of an expedition project, you should pay attention to all the factors described above, while defining a set of specific procedures (depending on the nature of the project) which determine success, and in the extreme case, minimize failure, e.g.

- precise determination of the scope of the project
- making quick and decisive decisions and their consistent implementation
- continuous risk control
- providing the best staff for the project
- clearly defined roles of team members (organizer and client)

- motivating project participants (clients)
- good communication in all phases of the project
- training of participants (behavior in specific conditions, operation of professional equipment and devices, first aid)
- developing a contingency plan for specific types of risk

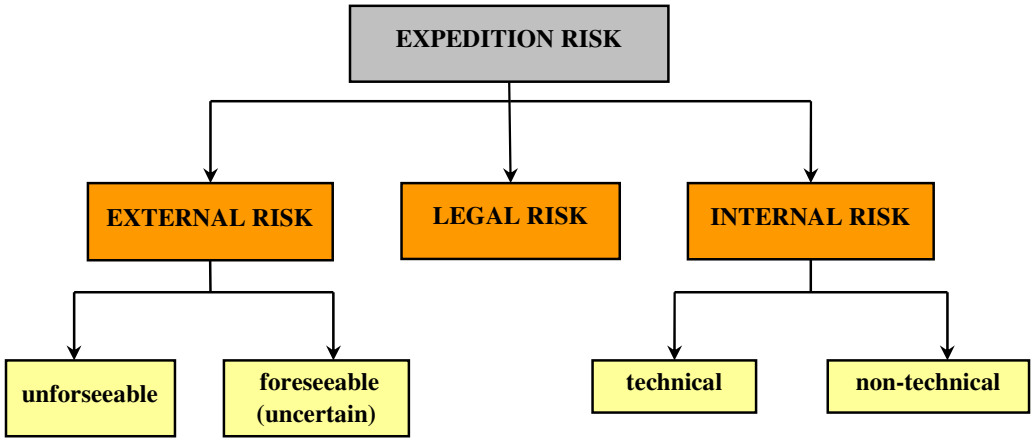

Fig. 1: Expeditionary risk categories

Source: own data

Expeditionary Risk Management

From the project point of view, the risk referred to as expeditionary means a smaller or larger occurrence of unexpected circumstances causing delays in the project, lack of implementation of a certain scope of the project or an increase in costs related to the course of the expedition. This means that as part of project management, it is necessary to take into account events that may disrupt the project, analyze the probability of their occurrence, predict their impact and define appropriate responses.

Risk management is a management method focused on identifying and controlling areas or events that can lead to unwanted changes. It is simply an integral element of management (Pritchard, 2014, 23-24]. Proper risk management will not lead to the disappearance of threats, but only to their minimization. In the case of an expedition project, this is a systematic and regular study of the risk that threatens people and their activities in achieving goals and developing and implementing policies to control this risk.

Expeditionary risk management boils down to having practical knowledge on how to eliminate the risk of failure at the level of the entire course of the project. Risk in the venture mainly comes from the inability to eliminate the uncertainty associated with future events at each stage of the project resulting from the dynamics of the schedule, variable team performance, incorrect planning and external environment factors. At the expedition planning stage, it is worth carrying out a simplified expeditionary risk analysis consisting of three stages:

- risk identification - the correct and complete identification of all threats is a strategic task (Harrin, 2007, 69-70). These are activities aimed at detecting sources of risk and then systematizing them according to accepted categories, which constitute groups into which all adverse events that may occur during the planning and implementation of the project can be qualified. The introduction of categories (less often called profiles) enables the systematization of all risks occurring in the

expedition project. It is important that the adopted categories are correctly selected depending on the specifics of the expedition and thus correspond to typical sources of risk for the given conditions or area in which the project is carried out. The most common risk categories are: technical risk, project management risk, organizational risk and external risk.

The risk identification process can be supported by many tools and techniques. This seems obvious, because predicting what events can significantly affect the failure to complete planned project tasks is a difficult and not always fully feasible activity. The most important techniques include:

- documentation review – the first step in the risk identification process. The management team analyzes project plans and assumptions to identify potential threats
- techniques for gathering information on sources of threats – which include: brainstorming, Delphi technique, surveys and analysis of strengths, weaknesses, opportunities and threats (SWOT)
- check lists (Frame, 2003, 50-54) – can be created on the basis of archival data and knowledge accumulated in similar projects implemented in the past, as well as on the basis of other sources of information. The lowest level in the risk-sharing structure can also be treated as a checklist. Although checklists speed up and simplify risk identification, it is impossible to create a list containing all risks. It is therefore necessary to examine the risks that do not appear on the list. As part of the project closure, a risk checklist should be reviewed to improve it for future projects (PMBOK Guide, 2017, 450)
- analysis of project assumptions – aims to identify risk resulting from inaccuracy, inconsistency or incompleteness of assumptions
- techniques based on diagrams – they allow for easy identification of risk symptoms and transparent arrangement of cost and effect patterns. Popular diagram techniques include: cause-and-effect diagrams (e.g., Ishikawa diagrams, fish bone diagrams), system block diagrams, influence diagrams (Murray, Grantham and Damle, 2011)

Underestimating or ignoring one of the threats may result in irreversible impact on the future of the project. Depending on the needs, participants in the risk identification process include, among others: project manager, team members, non-team experts, and even clients. The most important thing is that these people have experience in coordinating the expedition, knowledge of the environment at the place of implementation of the project and the scientific or sports field which is the scope of activities.

- describing the risk - presenting the features of specific threats in a way that allows them to be compared and balanced. Performing this task properly, minimizing the occurrence of an error, causes potential threats to change their risk status.
- risk assessment - allows to estimate what is uncertain, what to fear in the internal factors of the venture (e.g. physical condition, skills, likes and dislikes of the participants) and external factors (e.g. the area of activity) as well as what phases of the expedition project are most vulnerable to failure. Two key parameters should be considered in the risk assessment. The first is the probability of occurrence of the event causing the risk, and the second is the size of the potential loss (Wysocki, 2009, 183-184). Risk assessment gives the opportunity to determine priorities in the treatment of individual risks.

Having the above data, but taking into account the dynamics of the expedition and factors affecting it, it is important to verify the risk map on an ongoing basis, thus providing the venture with the maximum chances of success.

Conclusions

Expedition Project Risk Management includes processes related to carrying out risk management planning, risk identification and analysis, risk response, and project monitoring and control. Most of these processes are updated during the duration of the project (Khamooshi, 2004). The goal of project

risk management is to increase the likelihood and effects of favorable risk and to reduce the likelihood and effects of adverse risk to the project.

The types of risk occurring in an expedition project require verification of the classic approach to risk management, both in terms of their source and perception. The expedition venture, with all the features of a project implemented in an organization, differs in the way it is interpreted in the context of the impact of the types of risk on the entire project.

Sources of risk occurring in the expedition venture are determined by the nature (goal) of the project, place (environment) of implementation and degree of difficulty. In contrast to the risks in classic projects, the required response time must be much shorter, often immediate, in order to prevent failure and, in extreme cases, to avert dangers to the participants.

Expedition projects, based on proper planning and use of resources, under constant supervision and control, have the greatest chance of success. However, the most important thing is the ability to detect risk that will always accompany projects.

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Does Being Part Of A Capital Group Provide An Opportunity To Generate Additional Cash Benefits?

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Abstract

The aim of the article was to examine whether being part of a capital group brings cash benefits to the participant. For this purpose, two indicators were used: the ratio of the holding company's cash flows to the corporate group's total cash flows (CF) and the holding company's operating cash flows to the corporate group's total operating cash flows (CFO). This article follows on from the research carried out in 2013 by expanding it to include more capital groups and a longer study period. Eighty-five consolidated and individual financial statements for 2009-2018 of the capital groups listed on the Warsaw Stock Exchange were used to verify the research question of whether being part of a capital group generates any additional benefits to the participant. The research results do not unequivocally indicate that capital groups generate additional cash or total and operating flows, which means that belonging to capital groups does not generate additional benefits to the participants. The results of the analysis show that the hypothesis of the research has been verified negatively. There are no indications that additional benefits can be gained through functioning in a capital group such as additional cash generated by the capital group as an entity accumulating surpluses from all group members.

Keywords: Transfer Pricing, Cash Pooling, Thin Capitalization

Introduction

The purpose of the present study was to examine whether participating in capital groups brings benefits to their members. The synergy effect that boosts performance through cost reductions is the most frequent motive for merging into corporate groups. As research indicates, however, at least over the first several years the efficiency of operations carried out in groups decreases rather than increases, while the market value of the holding company falls. The questions that arise, therefore, are: why do companies merge into corporate groups in the first place? and does that generate any additional benefits? One of the motives behind such a choice is to transfer profits and assets from the holding company to its subsidiaries in order to generate intra-group cash flows which drive the company's value. Mergers into corporate groups give rise to an internal capital market, thus creating added value for such groups. An intra-group financial market is created as a result of using tax and balance-sheet policy tools. The identification, analysis, and evaluation of both internal and external cash flows related to the functioning of the internal market in affiliated entities will enable a correct evaluation of the financial condition of the corporate group (Kee-Hong, Jun-Koo, Jin-Mo, 2002).

The following research thesis is explored in the paper: certain determinants of a corporate group's financial policy affect its consolidated cash flows and generate additional benefits. The structure of the paper follows the three below-listed research phases aimed at verifying the thesis:

1) presentation of selected aspects affecting cash flows in a corporate group: transfer prices, 'thin capitalization' and cash management, and legal regulations in Poland;
2) an attempt to analyze the impact of these factors on cash flows in a corporate group based on the example of a selected corporate group;
3) lastly, presentation of research results.

The objective of our analysis of the above-mentioned factors was to verify the proposed hypothesis and the research question of whether being part of capital groups generates additional benefits to the participants.

Literature Review — determinants of cash flows in corporate groups

The factors shaping cash flows stem from one of the three spheres: the macro-environment, the market, and the corporate group itself. The first two groups of determinants are known as external factors that have an indirect impact on the cash flows in a corporate group. However, every corporate group is affected by internal factors, as well, resulting from the conditions and forces being an inherent part of each organization. There are several types of the macroeconomic environment, whereas their classification is based on their economic, technological, socio-cultural, legal, political and international aspects. The market, also known as the competitive or sectoral environment, emphasizes the subjects – the microenvironmental actors – instead, and particularly identifies the owners, competitors, customers, suppliers, trade unions and strategic allies. Internal factors may be of either a qualitative or quantitative nature. The first group mostly includes (Siemińska, 2002): the quality of management processes, the quality of staff at every level of management, the quality of information systems, information asymmetry, shareholders' ability to control the company and the efficiency of such control, the quality of the organization's assets – particularly the long-term ones, the organization's market position, and the organizational culture. The list of qualitative factors is long and diverse. What they all have in common, however, is that they affect to a lesser or greater extent the financial condition of the organization. They drive certain types of costs or sales, thus defining the efficiency of financial and investment decisions undertaken by managers, which in turn translates into cash flows in the company.

In this paper, the focus is exclusively on factors stemming from the quality of the information system allowing for the functioning of corporate groups, such as the balance-sheet or tax policies. Such policies are widely used by corporate groups, while their application in a corporate group is expressed in the adopted transfer prices, thin capitalization and cash management.

Transfer Prices

Transfer prices play a significant role in the operation of corporate groups, mostly those whose members are all involved in the operating activity, or those where the holding company is only a 'manager' of the whole group. Transfer prices enable a hidden transfer of benefits among the group members. The level of transfer prices exerts an influence on the transfer of profits between group members. The transfer of profits, in turn, may have a huge impact on the financial performance of the group through reducing taxes and other duties. Two main activities within this dimension can be identified (M. Trocki, 2004):

1) the transfer of profits following the direction of the transfer of goods: by setting prices below their market levels,
2) the transfer of profits in the opposite direction than the transfer of goods: by setting prices above their market levels.

Transactions between affiliated entities based on transfer prices are a relatively common practice in business. Owing to the relations between the organizations involved, these prices may favor or be beneficial to one of these organizations. The level of transfer prices exerts a direct influence on the level of profits achieved by both parties thus affecting their tax burden (Pagan, Wilkie, 1993).

Thin Capitalization

Undercapitalisation (or thin capitalization) is a term describing a situation where shareholders contribute a minimum amount of share capital and the operations are financed with loans instead. In other words, it is a certain misuse of debt by shareholders, as the behavior poses a threat to the balance between the company's liability towards its shareholders and the amount of its share capital (Forodyńska and Partyka A. 2009).. This issue is of relevance if viewed in terms of the fiscal policy of the state, since currently where a loan is provided by shareholders the interest on that loan is deducted from the tax base. The situation is especially disadvantageous to the State Treasury Moreover in the case of loans from foreign entities where, pursuant to the principle of the avoidance of double taxation, the interest is not subject to taxation at the source, i.e. in Poland. Furthermore, if the company uses a

debt to a minimum capital share contributed by shareholders, the situation of the creditors is impacted negatively; it is much easier to repay loans granted by shareholders than return their capital contributions. Bearing in mind the above arguments in particular, the Polish legislature introduced new tax law regulations that limit the allowed extent of thin capitalization (Art. 16 sec.1 points 60 and 61 of the Act on Corporate Income Tax). Thin capitalization can be approached in tax law from either broad or a narrow perspective (Forodyńska and Partyka A. 2009). Both meanings were used in the OECD report of 1987. Thin capitalization sensu largo refers to a company financing its operations mostly using loans granted by its shareholders. In this case, the loans are in fact hidden capital contributions aimed at replacing share capital with loans/credits only for the purposes of securing tax benefits. Thin capitalization sensu stricto, in turn, defines an unfavorable ratio of the company's debt in the form of loans granted by shareholders to the total share capital. It is measured by way of the debt to equity ratio that serves as an indicator of the safe level of liability towards shareholders. Wherever the ratio's limit as set in law is exceeded, thin capitalization is implied and the implementation of thin capitalization rules becomes justified.

On January 1, 2018, Polish regulations on thin capitalization were amended, which saw the removal from the Corporate Income Tax Act of the two former methods for calculating non-deductible interest on financing (mostly loans). Instead, the Polish legislature introduced a new thin capitalization regime to the country's tax system, which is based, in principle, on the EU ATAD Directive dated July 12, 2016 (No. 2016/1164). According to the current amendment to the CIT Act, the new limit is to be calculated according to 30% EBITDA. The new method is applicable not only to loans received from affiliated parties, but also to financing (in a wider sense, including also specific cases of lease) coming from third parties (Banasiewicz, 2017).

Thin capitalization enables corporate groups to reach and implement investment decisions that exceed the potential of a given subsidiary acting on its own. The resources required to finance these needs are provided by shareholders as credits or loans. The profits made by these companies are used mostly to repay the loans (credits) granted by the shareholders, including any relevant interest. If interest is paid to owners based in countries that have an agreement on the avoidance of double taxation with Poland, such money is exempt from tax. The interest is taxable, yet it may be included in the cost of revenues. If such is the case, the resources are transferred from subsidiaries to the holding company much faster than dividends are, since dividends cannot be paid out until the financial year is over and the ordinary shareholders' meeting has reached relevant decisions (Trocki, 2004).

If the holding company grants a loan to its subsidiary, more benefits related to using debt as a source of financing are to be enjoyed. The positive impact of debt on financial performance is universally known as leverage, which is understood as the ability to raise the return on equity by using debt. Another benefit related to loans provided by holding companies, i.e. as part of thin capitalization, is the increased profit of the lenders resulting from the "double" return on the invested capital taking the form of interest on the loan and the dividend from the capital contributed to the subsidiary. The subsidiary, in turn, obtains access to a loan the granting of which does not require an investigation of creditworthiness. Furthermore, it wins extra net profit by decreasing its income tax through generating higher costs of revenues in the form of interest and – possibly – depreciation, should the loan be spent on investment. Owing to a higher net profit, the additional depreciation together with the loan drive the subsidiary's cash flow, which constitutes a double contribution to improving the company's liquidity. The above-presented procedure related to internal financing – thin capitalization within a corporate group – is clear evidence that a holding company in a corporate group may enjoy serious benefits such as higher financial cash flows within the group (Mioduchowska-Jaroszewicz, 2010a).

Cash Management System

Cash management systems aim at ensuring sufficient liquidity for the company, a condition which is essential to its existence. Cash management is responsible for handling short-term cash flows and cash reserves. It serves mostly as a guarantee of the ability to pay, minimizing the cost related to maintaining liquidity and maximizing the profit from excess liquidity (Szumielewicz, 2009, p. 62.). Of all of its aspects, cash pooling and netting play the most important part as instruments used for balancing internal liquidity in corporate groups. Cash pooling involves the consolidation of liquidity from the companies'

operating accounts into one pooling account in order to reduce excess liquidity. The pooling account represents the net balance of the group's liquidity. Cash pooling results in the centralization of cash and cash equivalents in the group, making it easier for the group to plan and manage its liquidity and minimize the losses on holding cash. The excess cash may be invested as profitable deposits (such as overnight deposits) (Trocki, 2004). Cash pooling is a non-standard form of financial management used by members of corporate groups or entities with multi-departmental organizational structures. This form ensures optimization of the interest-related effects by compensating balances in bank accounts of corporate groups or multi-departmental corporations. This outcome is achieved through shifting excess cash accumulated in individual bank accounts (subaccounts) of entities reporting surpluses to accounts (subaccounts) of entities reporting overdrafts (Dłubek, 2006). Cash pooling offers several advantages to an entity operating as a corporate group, such as:

1) interest-related benefits,
2) financial collaboration based on more efficient and standard procedures,
3) better liquidity of the group as a whole.

Interest-related benefits are derived from consolidating the surpluses and overdrafts from group members' individual accounts in a single account. Credit facilities in current accounts of some group members are compensated with bank deposits held by other group members on their own accounts. Financial collaboration based on more efficient and standard procedures is a consequence of the fact that cash pooling requires standard procedures that define the scope of bank services, and employs standard (and optimum) bank fees – due to the economies of scale – and interest rates offered to all the members of the corporate group. The overall liquidity of a corporate group may be improved by means of an extensive system of analysis of the structure of deposits and credits which become the basis for central management of cash of corporate group members.

Methodology

Two indicators were used to verify the research hypothesis. The impact of qualitative factors strictly related to being part of a corporate group is reflected in the number of cash flows generated by the group. The author argues that an investigation of the relationship between operating cash flows of the individual corporate group members and the operating cash flows of the corporate group as a whole, as well as the relationship between the total cash flows generated by the individual enterprises and the cash flows of the group as a whole, allows the evaluation of the impact that factors such as transfer prices, thin capitalization and cash management have on the increase in cash flows of the corporate group. To support her thesis, the author defined two indicators (Mioduchowska-Jaroszewicz, 2013a):

1) the ratio of the holding company's cash flows to the corporate group's total cash flows (CF), calculated using the formula:

$$CF = \frac{CF_{PD}}{CF_{GK}}$$

2) the ratio of the holding company's operating cash flows to the corporate group's total operating cash flows of the (CFO), calculated using the formula:

$$CFO = \frac{CFO_{PD}}{CFO_{GK}}$$

where:

CFPD — cash flows of the holding company,

CFGK – cash flows of the corporate group,

CFOPD – operating cash flows of the holding company,

CFOGK – operating cash flows of the corporate group.

CF and CFO ratios with values below 1 provide evidence to support the thesis that corporate groups generate higher cash flows than their individual group members do. The following conclusions can be drawn for WCF and WCFO estimates:

For CF and CFO < 1 – the corporate group is a cash generator, i.e. the factors shaping its operations generate added value.

For CF and CFO > 1 – the holding company generates a higher amount of cash than the corporate group as a whole, which means that the factors affecting the corporate group have a negative impact on the consolidated cash flows and are detrimental to value.

Empirical Results

The indicators were formulated in order to verify the research hypothesis proposed in the present study. These ratios were used to analyze 85 listed corporate groups in Poland over a study period from 2009 to 2018, and the results are presented in the appendix. For the analysis, 85 financial statements of consolidated capital groups and individual units of the parent company for 10 reporting periods were used. This brought about 1,700 results (the values of the indicators are listed in the table in the appendix) indicating that it cannot be unequivocally stated that the entities operating within a capital group will always generate additional value of cash, even despite the availability of a number of balance sheet and tax policy tools enabling such groups to create and increase its cash opportunities. Although the very idea of merging into a capital group with greater capital, technological and resource capabilities appears to be beneficial, parent companies are frequently observed to demonstrate higher levels of operating flows and/or total cash flows than capital groups. The research results indicate that capital groups consist of members that are either cash generators or cash absorbers. Table 1 presents results of a descriptive statistical evaluation of the ratios.

Table 1: Descriptive statistics

Ratio	Obs.	Mean	Median	Std.Dev.	Min.	Max.
CF	763	5.33	0.95	11.69	-5.6	25
CFO	764	1.4	1.25	0.85	0.5	2.6

** All the results summarized in the table were based on the calculated indicators presented in the Appendix.*
CF — the ratio of the holding company's cash flows to the corporate group's total cash flows
CFO — the ratio of the holding company's operating cash flows to the corporate group's total operating cash flows

The CFO and CF indicator statistics shown in Table 1 differ significantly in value. The mean and median for the CF index are very different. The CFO indicator is closer to the normal distribution, while its median and mean values differ only slightly. Finally, the value of the mean CFO is greater than that of its standard deviation, implicating that the indicator is characterized by a much lower variability than CF, the latter demonstrating a contrary behavior. The values of the descriptive statistics indicate that CFO is more useful than CF.

The values of the CF and CFO ratios (in the attachment) the examined capital groups were assessed, in order to indicate whether functioning in such a structure gives the possibility of generating additional cash or on the contrary the cash generated by the capital group is being destroyed. The results are shown in Table 2.

Table 2: CF and CFO values

Type	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
CF>1	23	30	35	31	36	37	35	31	33	37
CF<1	39	43	41	45	44	45	48	50	40	37
CFO>1	25	26	32	29	32	31	35	31	33	37
CFO<1	37	57	44	47	48	51	48	58	53	48
CF>1	37%	41%	46%	41%	45%	45%	42%	38%	45%	50%
CF<1	63%	59%	54%	59%	55%	55%	58%	62%	55%	50%
N	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
CFO>1	40%	31%	42%	38%	40%	38%	42%	35%	38%	44%
CFO<1	60%	69%	58%	62%	60%	62%	58%	65%	62%	56%
N	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

An analysis of the results presented in Table 2 indicates that the majority of the capital groups studied were cash generators in terms of cash from operating activities and overall activity. In each year of the study period, the number cash generators prevailed among the capital groups. The capital groups generated far more operating cash flows than the parent companies. Consequently, CFO <1 was found in 56% to 69% of the capital groups, and CF <1 was found in 50% to 63% of them. However, the results failed to fully verify the research hypothesis, and hence no generalization can be made claiming that every capital group will generate additional financial benefits through its structure.

Conclusions

The aim of the article was to indicate that operating within capital groups generates additional cash benefits. In the first part of the study, the factors influencing the generation of additional cash benefits were classified and described. It was indicated that the most popular financial motives for merging into a capital group are transfer prices, thin capitalization and cash management. This article follows on from the research undertaken in 2013 (Mioduchowska-Jaroszewicz., 2013a), which was an attempt to measure cash benefits resulting from being part of a capital group. The value of this research is in its verification of the relevance of two indicators: CFO, which is the ratio of the holding company's operating flows to consolidated operating flows, and CF, which is the ratio of the holding company's total cash flows to consolidated cash flows. The adequacy of the indicators was verified to assess cash benefits resulting from operating within a capital group. It was assumed that if the values of both the ratios were below one the capital group would generate additional cash value, but if the values were greater than one the capital group members would 'destroy' the value, or conversely the value of cash generated by the parent undertaking would exceed the cash generated by the capital group itself. The range of research periods and capital groups from the previous 2013 study (Mioduchowska-Jaroszewicz, 2013a) was expanded here in order to raise the cognitive value of the indicators. However, it remains impossible to confirm that every merger of entities into capital groups is bound to yield a synergy effect, at least when measured based on external cash flows. Therefore, the scope of research into this area should be widened to include internal cash flows, as well. Further research is required that will significantly expand the ability to verify the claim that merging into and operating within capital groups yields certain financial benefits, the latter being clearly the most important business objective for any undertaking. Nevertheless, there are serious research limitations regarding the availability of data on cash flows between members of capital groups, since such information is not public knowledge. However, the author's familiarity with information from the financial statements concerning events occurring in affiliated entities allowed her to create a scheme for calculating internal cash flows (Mioduchowska-Jaroszewicz, 2013b). Research which will follow up on this foundation will represent a significant expansion of the research sample to include other capital groups and subsequent periods of study, where internal cash flows in such capital groups will be calculated and evaluated.

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- **APPENDIX**

Table 1: Ratios of the holding company's cash flows to the corporate group's total cash flows (CF), and of the holding company's operating cash flows to the corporate group's total operating cash flows (CFO) in 2009-2018 for the analyzed group of enterprises

Name capital groups	2009		2010		2011		2012		2013		2014		2015		2016		2017		2018	
	CF	CFO	CF	CFO	CF	CFO	CF	CFO	CF	CFO	CF	CFO	CF	CFO	CF	CFO	CF	CFO	CF	CFO
ABM SOLID	0.9	2.3	-0.1	-0.5	0.0	1.5	0.4	-0.2	-0.2	5.7	0.7	0.7	-1.4	3.8	0.3	-1.3	1.0	1.0	0.9	-3.4
Alchemia	0.7	0.1	1.3	-0.4	0.3	0.2	1.3	-0.4	0.1	0.5	2.8	0.8	0.3	0.6	0.2	0.6	0.3	0.7	0.6	0.6
Alma Market	3.5	0.8	0.1	1.2	-0.1	0.3	0.3	-5.9	-0.6	0.4	3.2	0.7	0.1	4.8	0.1	-2.0		nd	nd	nd
Alumetal	nd	nd	nd	nd	nd	nd	nd	nd	-4.5	0.3	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	1.0	0.0	0.5
Amica Wronki	2.6	0.7	0.8	1.0	0.8	0.7	1.1	1.0	1.3	0.2	0.6	1.6	-1.3	0.8	0.3	0.7	-0.1	0.4	-1.7	0.2
ATM	0.1	0.8	0.5	0.7	1.0	1.0	-0.6	0.6	-0.1	1.1	-0.2	5.0	1.1	0.4	-0.7	0.7	nd	nd	nd	nd
ATREM	-0.4	9.1	-0.2	0.4	0.7	-0.3	-0.1	0.1	-1.4	6.2	0.2	0.3	0.5	0.4	-0.2	-2.0	0.0	-0.7	1.7	1.7
AWBUD	nd	nd	1.8	0.5	1.1	2.1	0.7	-1.3	1.4	1.2	1.0	19.3	1.2	1.2	0.9	1.8	1.4	0.9	0.9	0.9
Budimex	0.9	1.0	1.0	0.7	1.5	0.7	1.2	3.7	0.2	0.5	2.1	0.9	1.3	1.1	0.9	0.9	-1.1	0.5	0.7	0.9
Boryszew	0.2	0.1	0.3	-1.6	-1.0	0.6	0.1	0.1	0.8	0.0	0.4	0.4	-0.1	0.3	0.7	0.3	-1.8	0.3	0.1	0.2
CCC	1.0	1.0	0.8	1.0	0.9	2.3	0.8	0.8	-0.4	0.5	-1.4	-1.1	0.7	1.1	0.7	0.9	0.7	-0.2	-1.4	0.4
BYTOM	3.0	-1.3	0.9	-0.9	0.6	1.0	nd	nd	nd	nd	nd	nd	1.0	1.0	1.0	1.0	0.4	1.0	nd	nd
CDRL	nd	nd	nd	nd	nd	nd	nd	nd	-9.4	1.1	0.8	1.2	1.1	0.7	0.8	0.7	0.9	0.6	1.0	0.8
Ceramika NG	0.2	0.6	0.3	0.6	0.4	0.5	0.0	0.7	-12.1	0.7	0.7	0.7	1.3	0.3	1.1	0.7	1.2	0.1	0.7	1.4
Cognor	3.2	1.1	-1.6	2.4	0.2	-0.3	0.0	0.0	0.5	0.3	-0.1	0.0	0.0	0.0	0.0	0.0	0.5	0.0	40.2	-0.1
Comarch	-1.6	0.7	1.4	0.8	-0.3	1.1	0.8	0.9	1.0	1.1	0.7	0.8	1.0	1.0	3.0	1.0	1.2	1.4	-0.5	0.3
Czerwona Torebka	nd	nd	nd	nd	0.0	-0.1	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.5	0.0	-0.7	-6.0	1.5
Decora	1.5	-0.6	-0.6	-0.3	-2.3	0.2	0.0	2.3	-0.6	1.1	0.5	0.8	1.2	1.0	1.0	1.0	0.4	1.0	0.0	0.9
Dekpol	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.0	1.0	1.0	0.9	1.4	-0.1	-3.4	1.0	-2.0	0.9
Delko	0.9	19.7	0.9	0.8	1.4	1.0	0.5	0.5	-0.2	-0.6	0.4	0.6	-0.2	0.7	0.0	0.5	0.0	0.0	0.0	0.2
Drop	0.9	1.0	0.3	0.7	-0.4	1.7	0.3	-0.9	0.5	2.6	0.6	-2.3	-0.1	-0.1	0.0	0.0	0.1	-0.2	-0.1	-1.1
Drozapol	nd	nd	nd	nd	1.0	-1.0	1.7	0.9	24.1	1.0	1.0	1.0	0.9	1.0	0.9	1.2	1.1	-0.8	0.9	0.9
Escotic&Henderson	nd	nd	nd	nd	nd	nd	nd	nd	0.1	1.8	-1.1	1.1	0.8	-1.6	0.4	10.3	-0.9	0.9	0.7	1.6

Elektrobudowa	1.4	1.0	1.1	0.7	0.0	0.9	0.4	0.9	0.9	0.9	0.9	1.0	0.9	0.9	1.1	1.0	0.7	1.0	1.0	-1.1
Elektrotim	0.0	0.8	-0.1	0.0	1.4	-0.8	1.5	0.0	1.8	1.3	0.9	0.7	-0.8	0.1	0.7	0.4	-5.6	1.8	1.0	1.1
Energoinstal	1.3	0.7	1.5	0.7	-3.0	104.2	3.0	0.9	0.9	0.9	1.0	1.2	1.0	1.1	0.6	0.7	-2.3	0.8	0.1	-4.0
Erbud	1.3	0.8	0.9	1.1	-0.1	0.9	0.8	0.9	1.2	1.7	0.8	0.6	-0.6	-2.4	1.4	0.3	0.9	0.8	2.1	1.1
Es - System	1.0	0.8	1.1	0.6	0.8	0.7	-6.9	0.6	0.2	0.3	0.7	0.5	1.5	0.5	0.1	0.6	1.2	0.5	-17.2	0.2
FAM	0.1	-0.2	0.1	0.3	0.2	0.9	0.7	0.8	1.0	1.0	1.0	1.0	1.0	1.0	nd	nd	nd	nd	nd	nd
Famur	-0.9	-1.2	0.0	0.5	1.9	2.6	0.3	0.2	-1.7	1.3	0.1	0.8	1.0	1.0	1.0	1.0	0.6	0.6	0.7	0.9
Farmacol	2.0	1.2	2.4	1.2	0.0	0.5	0.8	0.9	-0.6	0.8	0.5	0.5	0.0	2.5	nd	0.0	nd	nd	nd	nd
Ferro	0.5	0.8	1.0	1.0	2.4	0.5	-3.1	0.1	1.4	0.7	0.8	-2.0	0.0	0.3	-0.4	0.2	1.1	0.6	-0.9	-2.1
Ferrum	-0.6	1.0	0.9	1.0	1.0	0.4	1.0	0.8	1.9	0.7	1.0	1.3	-0.3	3.8	1.0	-0.2	1.0	0.7	0.7	0.2
Forte	0.0	0.0	0.0	0.0	0.8	0.9	1.7	1.1	0.9	0.9	1.0	0.8	3.2	0.9	0.2	0.9	0.5	0.9	-0.3	0.4
Fota	2.7	0.9	0.6	0.7	1.7	0.0	1.0	-4.7	1.7	0.9	0.9	0.8	1.0	1.1	nd	nd	nd	nd	nd	nd
Gino Rossi	1.0	-0.1	-13.9	0.4	2.2	0.5	-0.3	1.0	0.7	-0.8	0.7	1.2	1.0	0.5	1.1	1.0	1.2	1.1	-0.1	0.5
Groclin	0.8	1.0	1.0	-2.8	0.8	0.9	0.5	0.8	0.1	0.1	1.4	3.4	0.2	-0.2	-0.2	1.0	0.4	0.6	0.1	-2.1
Harper	nd	nd	1.1	0.4	0.0	1.0	0.9	1.0	1.0	1.0	-9.4	1.0	1.1	1.0	1.1	0.9	0.7	1.1	nd	nd
Herkules	nd	nd	nd	nd	1.0	1.0	0.8	1.0	1.0	-1.0	1.2	1.0	1.1	1.0	1.1	0.9	1.6	0.9	2.8	0.8
Hutmen	0.8	-0.2	0.1	0.4	0.6	-0.4	0.5	2.0	0.2	0.7	0.1	-0.2	0.2	1.0	0.1	-0.1	nd	nd	nd	nd
Impel	-1.2	0.0	0.1	-0.1	0.0	-0.3	1.4	-0.6	0.6	0.3	-0.3	0.1	-0.1	0.0	-6.9	-0.3	-0.1	0.3	0.0	0.0
Impexmetal	0.4	0.4	-0.2	0.3	0.2	0.6	-0.4	0.5	36.2	0.5	0.0	0.4	0.0	0.6	0.2	1.0	-0.1	0.6	0.0	0.4
Instal Kraków	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.0	1.0	1.0	0.9
Interbud Lublin	nd	nd	nd	nd	1.0	1.0	0.9	6.0	1.0	0.3	0.9	-0.6	-1.2	1.3	0.4	1.4	8.6	2.1	0.0	0.0
Introl	1.4	0.2	0.6	-0.6	-1.8	-2.7	2.8	-0.3	8.2	0.3	0.4	-0.1	-0.3	-0.5	1.3	0.4	13.3	0.2	-1.8	-0.1
KND Dom	0.0	5.1	0.0	0.0	0.0	-2.1	0.0	0.8	0.0	-0.3	0.0	0.5	0.0	-0.7	0.0	0.0	-0.5	0.1	0.0	-0.2
Koegeneracja	0.0	0.3	-0.8	0.5	0.1	0.4	0.0	0.3	0.0	0.4	0.0	3.8	0.9	0.5	0.0	0.5	0.4	0.2	2.5	0.1
Komputronik	0.3	-1.1	0.2	1.2	0.8	0.1	-2.2	3.0	0.1	2.3	1.1	1.6	1.1	1.0	0.8	0.6	0.9	0.3	1.5	0.0
Libet	nd	nd	1.0	1.0	1.0	0.9	1.0	0.9	0.9	0.8	3.4	0.8	0.8	0.7	1.1	0.7	1.1	0.7	1.3	0.7
Lotos	0.6	0.0	1.0	0.3	-0.3	0.2	0.6	0.3	0.8	0.5	-0.2	0.4	0.4	0.4	1.3	0.6	0.2	0.6	60.0	0.4
Marvipol	0.0	0.5	0.8	0.9	0.4	-0.1	0.5	1.7	0.6	0.3	0.4	0.7	0.7	0.6	-0.5	0.3	2.1	-0.1	1.0	0.7
MDI Energa	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.1	-0.1	0.0	-0.1	nd	nd	nd	nd	nd	nd
Mennica	0.8	1.0	-0.6	1.4	0.1	1.6	0.4	-2.3	0.5	0.0	0.5	0.0	-1.4	0.2	3.4	0.7	1.1	0.0	1.3	0.2
Mercor	nd	nd	0.8	0.9	0.3	0.9	-0.1	0.3	1.0	4.9	1.0	0.4	0.2	0.7	0.0	0.5	-0.1	0.6	-0.8	0.3

Mirbud	0.8	-1.4	-0.3	0.3	0.7	-1.8	-0.5	1.0	1.1	-0.2	2.0	0.9	-35.4	1.3	-0.4	-0.1	1.1	0.5	1.9	1.5
Mo-Bruk	nd	nd	1.0	1.0	1.0	0.9	1.0	0.9	1.0	0.9	1.0	1.0	5.0	0.9	1.0	0.9	3.0	0.9	0.9	0.9
Monarii	nd	nd	nd	nd	nd	nd	nd	nd	1.7	1.1	0.6	0.9	0.1	2.1	1.4	0.1	-0.8	0.8	-0.5	2.4
Mostostal W-wa	0.9	0.9	0.9	0.7	0.9	1.0	1.1	1.1	0.7	1.1	0.9	0.7	0.6	0.6	0.7	0.6	0.6	0.7	0.4	-0.4
Mostostal Zabrze	1.6	0.5	1.7	1.1	3.0	1.6	0.4	0.2	-0.4	0.9	0.2	0.6	-10.5	0.2	0.2	1.4	-0.2	1.2	0.1	1.6
Netmedia	0.1	0.8	9.7	0.1	1.0	1.0	1.0	1.0	-0.1	1.2	-0.1	20.0	0.9	-0.9	0.7	-0.1	0.1	-0.1	1.3	0.0
Neuca	0.3	0.8	0.2	-0.1	-2.5	0.6	0.4	0.5	0.5	-2.2	0.9	0.1	0.0	0.9	5.9	0.4	0.1	1.0	-0.2	0.4
NTT	0.9	1.2	1.0	0.1	nd	nd	nd	nd	nd	nd	1.0	1.0	0.1	0.5	0.1	0.4	1.5	-0.1	-1.2	21.0
Pamapol	0.0	0.1	0.0	0.2	0.3	0.0	0.3	0.0	0.2	-0.1	-0.1	0.2	0.9	0.2	0.1	0.1	-0.4	-0.1	0.3	0.0
Patentus	nd	nd	1.0	1.0	1.0	0.8	1.0	1.3	0.9	1.4	1.3	1.0	0.2	6.3	25	1.0	1.0	1.0	1.0	1.2
Pepees	nd	nd	1.0	1.0	1.0	-0.7	0.9	1.1	1.0	1.1	1.1	0.7	1.0	1.0	0.9	0.9	0.4	0.8	0.4	0.9
PGNiG	-1.0	0.1	12.0	0.4	2.8	0.3	0.2	0.2	0.7	0.6	-0.1	0.6	1.0	0.3	-1.6	0.4	1.0	0.2	2.3	0.5
PMP	0.4	-1.2	0.1	1.3	-1.3	1.5	-1.1	0.7	0.9	0.3	0.8	0.8	0.9	0.9	0.3	1.0	1.3	1.0	1.8	0.5
PGO	nd	nd	0.0	0.3	0.0	0.0	2.2	0.0	-0.3	0.0	0.0	-0.8	0.0	0.7	0.0	0.1	0.0	0.3	0.0	0.1
Redan	0.1	-0.4	0.6	-0.3	-0.1	1.1	-0.2	4.3	0.2	0.2	2.7	2.0	1.0	2.1	0.4	0.0	0.4	-1.3	0.2	0.2
Rokita	nd	nd	-0.3	1.0	0.8	0.7	0.2	0.9	1.3	1.0	1.0	1.0	0.9	1.0	0.7	0.9	0.9	1.0	1.2	1.0
Selena	0.0	-0.3	0.6	-0.7	2.3	1.5	4.4	0.6	0.8	0.4	1.5	-0.4	-0.1	-0.5	0.1	0.6	-2.1	10.5	1.1	-0.2
Skyline	-0.3	1.1	1.0	0.6	1.1	0.2	1.2	1.9	1.1	4.7	1.0	0.8	1.1	1.3	1.1	1.4	-6.2	-23.8	-35.9	-2.5
Tarczyński	nd	nd	nd	nd	nd	nd	1.1	0.8	1.0	0.8	1.0	0.9	1.1	0.8	1.0	0.8	1.4	0.9	1.0	1.0
Tesgas	1.0	1.0	0.7	0.6	0.7	0.2	1.1	1.0	1.6	0.9	1.0	0.8	1.0	1.0	1.0	1.2	0.9	1.3	1.1	4.4
Trans Polonia	nd	nd	nd	nd	1.0	1.0	1.2	1.0	7.1	0.7	-0.4	1.0	-0.4	1.2	0.0	0.2	-0.4	0.2	1.0	0.2
Triton	0.0	0.0	-0.2	0.0	-0.3	-0.1	0.7	-0.2	-0.1	0.0	-8.9	0.0	0.2	0.0	0.1	0.2	0.8	0.1	-1.1	0.0
Unima	1.5	1.4	1.5	0.7	1.1	1.2	1.0	1.1	1.4	1.0	-10.8	3.8	2.3	1.0	-1.4	0.1	1.6	1.3	0.2	0.7
Vindexus	nd	nd	1.0	1.0	0.4	0.8	18.5	2.4	0.0	1.4	0.1	0.2	0.0	0.9	0.5	-0.7	1.0	0.9	1.2	0.4
Wandalex	0.3	0.8	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	nd	nd	nd	nd
Wasko	-2.4	-0.5	-2.5	-0.8	0.5	0.3	0.3	0.7	-0.2	-8.9	-6.8	-0.9	-0.1	-0.5	-2.1	-20.5	-0.2	-8.8	-0.1	-0.5
Wilbo	1.0	1.0	0.2	0.5	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Wistil	nd	nd	2.5	0.4	0.2	-0.7	0.0	-0.2	-3.9	0.0	nd	nd	nd	nd	0.4	0.1	8.3	0.2	nd	nd
WOJAS	1.8	-0.3	1.1	0.7	1.0	-15.2	1.0	0.3	1.0	0.3	-70.6	0.8	1.8	1.7	-4.1	0.0	9.2	1.2	0.9	20.3
ZPUE	-1.0	0.9	1.0	1.2	1.0	1.0	3.9	0.9	1.0	1.2	1.1	0.6	0.5	0.9	0.1	0.9	1.0	0.8	1.1	1.0
ZUE	1.0	1.0	0.0	0.9	-1.0	1.0	1.0	1.0	1.0	1.2	1.0	1.1	1.0	1.1	1.0	0.9	1.0	0.9	1.0	1.0

Żywiec	0.5	1.0	-4.3	0.7	1.0	1.0	1.0	1.0	0.6	0.9	-2.6	1.3	0.6	0.7	0.1	0.3	36.8	0.9	1.4	0.9

*nd - no date

Source: developed by the author based on the financial data of the corporate groups from www.gpw.pl

Prospects for Rural and Social Development After 2020

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Abstract

At EU level, there are a number of concerns among specialists to promote and create some specific information to support sustainable revitalization of rural areas as a place of work and work. We note that it is necessary to start a new regional policy, to increase rural prosperity and the viability of rural areas, given that there can be a balanced territory to ensure socio-economic and environmental sustainability. For agriculture and rural growth, the new regional policy aims to better mobilize all local and regional actors for investigations in the distribution and transport network. In our study, we aim to follow the way of achieving the objectives of the new policy, to target the intelligent villages for 2020, to take care as a starting point of definition and to apply "intelligent tools" based on the reality of the area under consideration, Chiscani Commune, Braila county. In order to be able to use functional, efficient and sustainable tools, it is not desirable to realize or analyze the reality of Chiscani Commune, Brăila county, if the role of local and regional authorities can be applied in the application of a policy framework, knowing the concept of "intelligent villages" such as and the notion of "smart rural area" and include initiatives in the local rural agenda so that synergies can be encouraged and created and spread in small communes, in smart rural areas.

Keywords: Smart Village, Smart Rural Areas, Smart Cities.

Introduction

Bottom-up approaches to local development, such as LEADER and, more recently, through community-led local development (CLLD), believe that innovation brokers should play a catalyst role for the potential of rural areas.

Innovation brokers are those who identify the strengths and opportunities of the village / rural area concerned and bring together the relevant institutions (third level, local authorities, funding sources, etc.), to coordinate present and future activities and potential sources of financing. It is their responsibility to involve and inform the community and to get its support to develop a vision, take responsibility and share the benefits.

These innovation brokers can stimulate product development by small businesses and can help remove obstacles to the functioning of the internal market, encouraging proximity consumption and short supply chains with agri-food products. Local and regional authorities are in the ideal position to perform this function; In some cases, they already play such a role, through development councils, business support offices, public procurement procedures, etc. it is essential to have access to funding for small-scale projects, accessible to local authorities. It should also include support for innovative projects and initiatives that can be tailored to the specific needs of rural communities across the EU, including in outlying regions.

Chiscani City Hall and Braila County Prefecture can be a real facilitator by integrating a "smart" approach in the planning and spatial planning strategies. Such strategies may include the assessment of regional resources and capabilities, the identification of sites that offer the possibility of grouping services and the adoption of economic policies that facilitate this approach.

Materials and Methods

The starting point of our analysis is the Cork Declaration, which defines ten guidelines that strongly support the European policy and which we want to identify in Chiscani Commune, Braila County, as follows:

- What is the situation of the investments in the connection to the broadband networks in Brăila and Galați counties? There are measures planned to overcome the digital divide through fast and reliable broadband investments. Thus, ICT infrastructure is proving to be a determining factor for the potential of Union regions in the area of area development. We refer here to the lack of access to the most important public services.
- Are there any measures in the Local Development Plan to combat long-term depopulation? Revitalizing rural areas through actions that encourage and support sustainability, renewal of generations and the ability of rural areas to attract newcomers is a vital goal.
- Are the initiatives of the local authorities known to take simple, easily reproducible and accessible actions even for very small communes, which do not have intelligent actions?
- What are the challenges facing peripheral rural regions, which, in addition to the problems related to broadband infrastructure, are facing major difficulties in terms of connectivity in the field of transport and energy, knowing the concept of "testing in rural areas" and integration into the initiative for smart rural areas, for the development of general initiatives, with implications for rural areas;
- Peripheral border regions are facing increasing difficulties and the need to strengthen opportunities and programs for cross-border cooperation to address these challenges.

Results and Discussions

We consider that the starting point in the existence of the smart village is related to the provision of Internet networks, more precisely, the access of the individual households in the rural area, a computer connected to the Internet (Fig.2. and 3).

The expansion of broadband networks in rural areas and the challenge of connecting up to the last kilometer are directly linked to the dominant position on the market and the role of traditional providers. It has succeeded in giving it local speed in agriculture to create a time- resolved problem that will allow the rule to stimulate the introduction of alternative operators for general access to generations and encourage innovative investment for the initiative. local actors. In Fig. 1, it is shown that 51.9% of the number of rural households have access to a home computer in 2017, up 14.4% from 2013 [2]. This growth is much faster than the urban average. Given the location of the study in Chiscani Commune, Braila, where agricultural activities are a priority, we believe that farmers and the agricultural sector as a whole should be the main beneficiaries of the digital training measures, in order to facilitate the implementation and development of digital tools and methods in this sector [2].

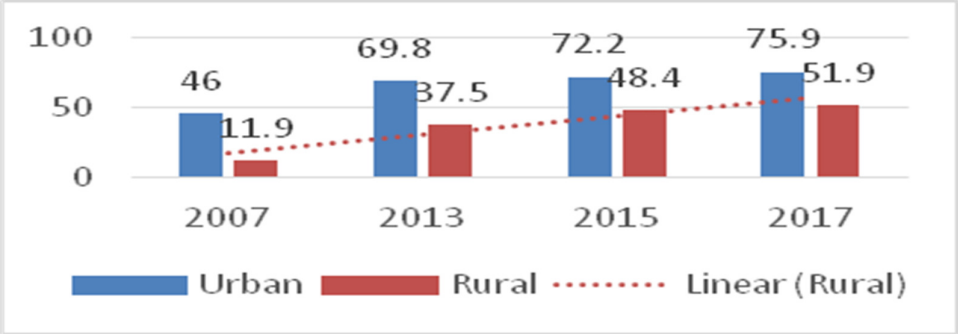

Fig.1: The share of households that have access to a computer at home, between 2007-2017
Source: own processing based on statistical data, NIS, 2020.

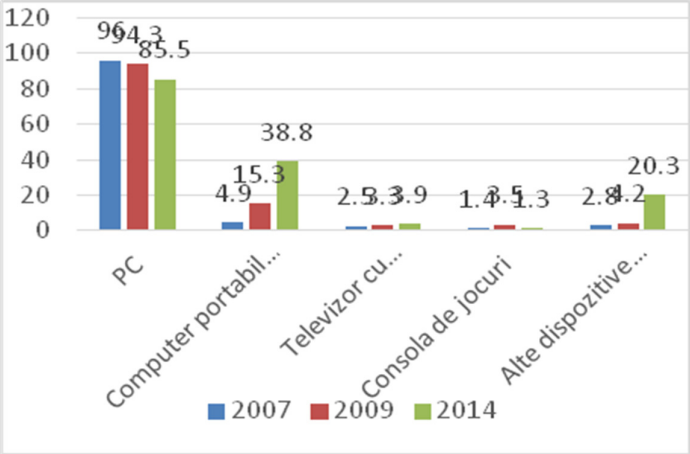

Fig. 2: Evolution of the number of households that have access to the Internet at home, in the rural area during 2007- 2014
Source: own processing based on statistical data, NIS, 2020

The emergence of the new Wifi4EU program, meant to improve internet connectivity in local communities, but we note that the projects were selected on the basis of the "first come, first served" principle, and did not have the expected effects. In our localization, the project selection process should take into account more of the additional obstacles that the local rural authority faces, because it does not have financial resources such as the urban authorities, when we talk about co-financing.

Although urbanization leading to the emptying of rural areas is a general phenomenon in Europe, the trend is also dramatic in Romania. The territory of Romania has a population density of 84.5 inhabitants/km^2, one of the lowest in Western Europe, as well as Spain, Greece, Cyprus[2].

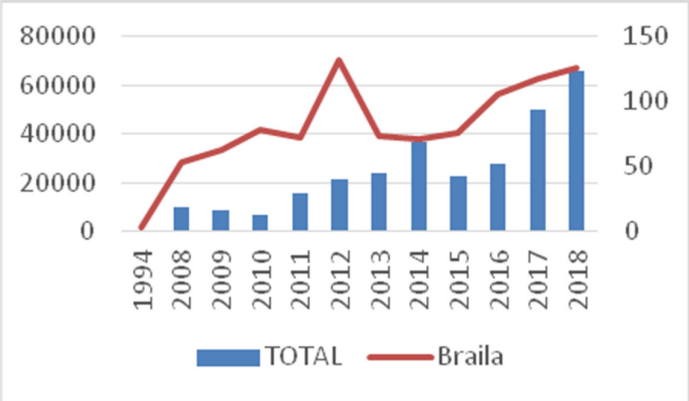

Fig. 3: Evolution of the number of immigrants in the 2008-2018 session, in Braila county
Source: own processing based on statistical data, NIS, 2020

The lack of young people means that the population does not recover, and the regions lose entrepreneurs who could generate jobs and stimulate the local economy. Measures in Spain have recently been proposed by reducing taxes for areas with less than 8 inhabitants/km^2.

Countries where governments have supported entrepreneurship by improving business infrastructures and facilitating access to loans to finance investments have the best economies.

The successful economic model in Europe is characterized by a dynamic private sector, which promotes entrepreneurship and social responsibility, and is supported by a simple and efficient regulatory framework.
It promotes profit-oriented economic activity, along with social and environmental responsibility. The 2000s promoted the European social model and became the official project of the European Union, reiterated in the Lisbon Agenda as a solution for the development and growth of employment in Europe.

In our study, the Chiscani City Hall, in the survey we carried out in 2019, showed that it does not have a development plan oriented to family businesses with simple actions, accessible to future entrepreneurs even for very small companies, which do not have smart actions.

We consider that the future Local Development Plan of the Chiscani Commune should include objectives with short-term results, namely [7]:

(a) Supporting immigration is the key to repopulating the area, creating layer-ups and increasing jobs. Entrepreneurs and family businesses need an economic environment in which they can thrive, and this entrepreneurship should be rewarded (Fig. 4).

(b) Providing support for honest entrepreneurs who have failed to quickly get a second chance;
(c)Applying the rules according to the Think small principle;
(d) Adaptation of public instruments to the needs of SMEs: facilitating the participation of SMEs in public procurement and the more judicious exploitation of the possibilities offered to SMEs to benefit from state aid
(e) Encouraging and supporting SMEs to take advantage of the growth of global markets.

Among other examples of opportunities for the rural environment, it refers to the production of wind, solar, as well as biomass and biogas for electricity production, the role of biomass (for example wood) and / or biogas for heating. We emphasize here the need to give local and regional authorities the power to initiate and manage targeted environmental measures and to allow them to introduce territorial contracts, jointly signed with the rural fuel / electricity suppliers of local origin. We present in Fig. 5, the evolution of the different types of energy at national level. We observe the increase of the importance of the different energy, wind and solar after 2013.

An explanation would be the simplification of the access procedures to the sources of financing, it is necessary in the current period of rural development, because there is a considerable gap between the number of requests for expression of interest and the much smaller number of complete applications, which is due difficulties in meeting the requirements of such an approach.

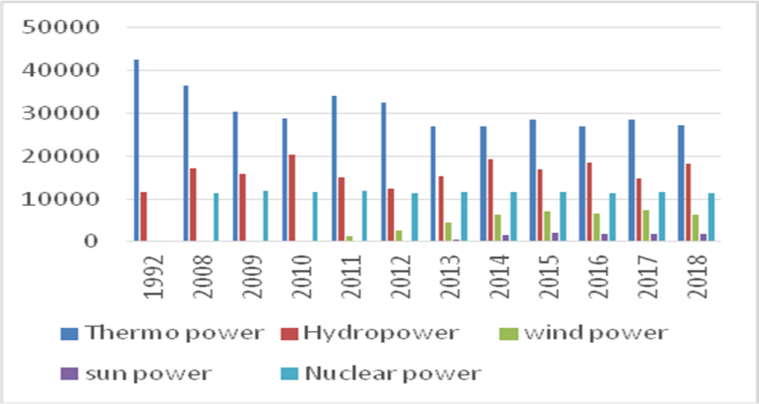

Fig. 4: Connectivity to different types of energy in the period 1992-2018 in Romania (KW/h) Source: own processing based on statistical data, NIS, 2020

At European level, there is a digital platform, when high-speed broadband connections are available in every home in the rural area, generally available in the specialized center. A number of benefits and care centers, care cannot solve the digital divide, but it does require a role to play in situations, revitalizing a satellite to centers, providing jobs and training opportunities for rural residents.

We do not intend to present a model of functions for a digital platform, as a point of care for electronic services, such as: electronic health (online consultations), electronic legal advice (legal advice), electronic governance (electronic vote, tax declaration) online, applications for social benefits), e-commerce (online banking, agricultural products sales, etc.) specific to the analyzed rural area (Fig. 5).

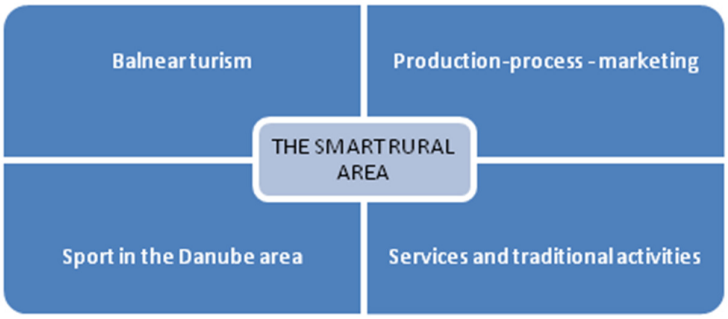

Fig.5: Connection to the smart rural area
Source: own processing based on statistical data, NIS, 2020.

According to the model of smart cities, one can consider the smart rural area that must adopt a comprehensive country approach and an innovation, which should take care to include all dimensions of the family.

We mention that this configuration is based on the results of the survey carried out in 2019, conducted at the level of a focus group, with representatives of local companies and the local community but also of the conclusions of the swot analysis in 2019.

The concepts of "smart city", respectively "smart rural area / smart village" should not be viewed as contradictory, but should be viewed as complementary, each supporting and enhancing the success of the other.

Strategically, a rural area does not end at its administrative border, but interacts with neighboring, rural or urban entities and plans its development in harmony with its environment. Consideration should be given to establishing mutually beneficial relationships between the rural and urban population, without the rural environment becoming a mere service provider for urban areas.

A housing system, to be considered as a whole, will not be viable without ensuring the viability of all its elements, from large cities to small villages.

The smart cities model can rely on a large number of actors to promote and carry out different initiatives, while this is not valid in rural areas, where the level of human and administrative resources is generally more limited. These differences should be reflected in the elaboration of the future policy framework and funding possibilities.
The European Innovation Partnership (IEP) Program on "Smart Cities and Communities", which seeks to promote and consolidate experiences in smart areas of the EU, but regretted, so far, rural areas have not been included as well. before activating these activities.

The connection and existence of sustainable transport networks are the most important essential to be able to connect the digital figure, to be able to provoke care indications that can be confronted in the area on the point of seeing the dispersed population and the higher costs.

The European Smart Satellite Documentation mentions the provision of Europe's Interconnection Mechanisms (MIEs) which may allow an opportunity to extend to the EU to provide an office and request more details on how to handle these finances and can be used for a connection support to rural areas, especially for the more famous remote rural areas.

There are a number of economic, social and ecological opportunities of local energy production (electricity and heat), as well as the possibility of creating synergies with the help of regional and rural regions and with the CAP (pillon 2 principle).

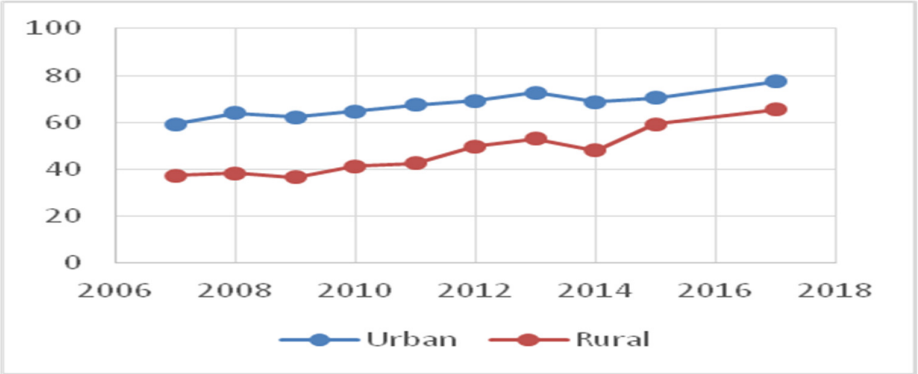

Fig. 6: Evolution of the number of people (16-74 years) who used the computer, by residence environment, on the frequency of its use
Source: own processing based on statistical data, NIS, 2020

There should be no time gap between urban and rural in terms of using a PC, especially if we are talking about accessing a financing program, in order to maintain an upward dynamic and the current level of development.

Specialists believe that in order to be successful, funding applications must encourage networking and clusters and participation in them, as well as cooperation - these issues are usually needed in smart rural areas to enable the expansion of activities and learning.

Conclusions

Smart areas could be based on their socio-cultural heritage to develop and manifest a well- defined sense of belonging to the entire infrastructure, especially the general services needed to carry out an economic activity, and to attract the relocation of urban enterprises.

A challenge for local and regional authorities is the need to stay informed about and have access to funding opportunities. An important role in sharing information, supporting networks and providing examples of good practices, including through the work of the European Commission's Broadband Platform, is provided by educational institutions, training and education centers.

For a mobilization in accessing the financing programs, we propose the establishment of an annual award recognizing the achievements of the smart village or the most successful smart zone in the EU. Existing networks such as the European Enterprise Network (EEN) and their local partners in the Member States could also be used to provide up-to-date information on a range of topics relevant to entrepreneurs in villages and rural areas.

Progress is still unsatisfactory and uneven, with disparities still remaining, especially between urban (Braila) and rural (Chiscani). The dimension of the challenge is demonstrated by the fact that in 2019, many of the households in Braila county did not yet have a fixed broadband network, and 90% of them were in rural areas. In our opinion, efforts are needed to guarantee the same capacity of the high-speed telecommunications network throughout the region, as a prerequisite for then competitiveness and economic growth of rural areas.

At EU level, the goal is to have connections faster than 30 MB/s by 2020, throughout Europe, including in rural and remote areas. This is, however, only an average value at EU level, with considerable variations between different states and areas, especially in rural areas and in the most remote regions, where speeds of 10 MB / s are encountered quite often, even in more economically developed member states.

10 MB/s is the usual speed for a typical household, in order to benefit from the most popular online

services. The lack of broadband connections fast enough represents a serious challenge for territorial cohesion at present.

At European level, efforts will be intensified to develop high-speed internet in rural areas, recognizing internet access as a public interest service by setting acceptable minimum standards for broadband connections, which, beyond reliable Internet access [5].

in Switzerland and Finland, where access is guaranteed up to the "last kilometer". In any case, this should be considered at least as an ex ante conditionality for any kind of financing for smart villages.

Based on the obtained results, the following recommendations are made:

A first recommendation would be to encourage collaborations between local public administrations and companies and to reuse the developed solutions, while facilitating their interoperability. Support the provision of training courses for different age categories on how to use digital technologies and adapt teaching to target groups, given the digitization of certain public services at local or other levels (form requests, tax returns, electronic invoices, traceability, CAP, etc.). It is currently discussing the concept of digital literacy, which will allow all citizens to have access to these training courses in order to carry out elementary tasks in the new digital environment, and calls for them to benefit from funding through structural funds and funding. European investments;
Testing in rural areas. For the local authority, testing in rural areas means evaluating policy options, in order to be sure that the most equitable solutions for rural areas are adopted.

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Competition between the USA and China in the Geoeconomic Space

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Abstract

The growing importance of economic factors in the foreign policy of states and the transfer of rivalry from the military to the economic plane has shaped a new category known as geoeconomics.
The geoeconomic approach, without giving up such elements as: geography, history, political science, sociology, cultural studies, draws attention to the dominant role of the economy in the modern world and the related need to move to the geoeconomic model of describing the spatial diversity of the modern world. The purpose of the study is to present the category of geoeconomics in relation to the theory and practice of contemporary international relations and make a geoeconomic assessment of the US and China as well as mutual economic relations between these countries. These assessments will be prepared using methods of analysis using statistical tools, including descriptive statistics, and analysis of available scientific studies and substantive sources of information.

Keywords: Geoeconomics, International Relations, Security, Economic Security

Introduction

The power of modern countries is determined not only by their military potential, but also by their economy, which means that currently, one of the most important strategies of a country is its economic policy, which by its nature influences foreign policy, affecting the position of the state on the international arena. The increasing importance of economic factors in foreign policy and the transfer of rivalry from the military plane to the economic sphere have shaped a new category – geoeconomics. The geoeconomic approach includes elements such as geography, history, political science, sociology as well as cultural studies. It emphasises the dominant role of the economy in the modern world and the related necessity to transition to the geoeconomic model of describing the spatial diversity of the modern world.

Geoeconomic rivalry is currently the main form of competition between the biggest countries. The wall formerly separating politics from economics collapsed, which is why the current political conflicts occur via the system organising the global economy (Leonard, 2016, p. 15). The most important instruments of this fight have not been limited to the economic war or economic sanctions for a long time. Countries are increasingly using more sophisticated methods, which enable them to compete in the geoeconomic space. The key factors include persuasion, problem coalition, convincing and effective competition, as well as organising promotional campaigns for investment.

At the turn of the 1980s and 1990s, enormous changes took place in the international architecture. The Union of Soviet Socialist Republics collapsed, the Cold War ended, and the United States took over the role of a superpower dictating the world order. This manifested itself in the participation of this country in the democratic changes in Europe, the Middle East as well as Asia, making the US the world leader in the political, economic and military spheres. This advantage was reduced by the attack of the 11th of September 2001, introducing another enemy i.e., broadly understood terrorism. Upon these changes, China emerged as a new competitor to the US, which somewhat in the background, has built its political empire potential based on economic development and expansion.

The aim of the current study is to present the category of geoeconomics in relation to the theory and practice of contemporary international relations, with particular emphasis on the rivalry between the USA and China. The selection of these particular countries as well as the analysis of their biopolarism was determined by the effect of power distribution, as a result of which these empires

accumulated material potential measured by the universal GDP index many times greater than that of other powers e.g., Russia, Japan or India.

The concept of Geoeconomics

Ray H. Whitbeck is often considered as a forerunner of geoeconomics. In 1929, he published an article titled *A science of geoeconomics*, in which he emphasised that the existing economic laws should take into account the local and regional geographical context, for which the economic geography creates an empirical basis. On the other hand, geoeconomics formulates the economic principles and laws of action in given geographical conditions (Whitbeck, 1929, p. 117).

The contemporary ancestry of the *geoeconomics* category is derived from the article written by Edward Luttwak titled *From geopolitics to geo-economy* (Luttwak, 1990), which was published in 1990 in the National Interest. The article was subsequently presented in the book titled *The Endangered American Dream; How to stop the United States from becoming a third world country and how to win the geo-economic struggle for industrial supremacy* (Luttwak, 1993), which was published by the same author in 1993. In 1998, the article was also presented in the work titled *Turbo-capitalism. Winners and losers in the global economy* (Luttwak, 1998 and 1999). E. Luttwak opposed geoeconomics to geopolitics. In his considerations, he noticed and emphasised that after the end of the Cold War, rivalry in the economic field noticeably intensified and the situation changed. Americans, Europeans and Japanese, who were no longer forced to maintain solidarity resulting from the fear of the Soviet Union, began numerous new conflicts, termed "strategic", which related to the trade rules and leadership in various sectors of the economy – from aviation and space flights to television series. Smaller countries did not take part in these battles, but pursued their own goals in the economic development, aiming to improve the chances of some sectors in the global competition, which threatened small and economically vulnerable groups with liquidation.

In Edward Luttwak's opinion, in geopolitics, the role, rank and size of a country are determined by the military potential and natural resources, whereas in geoeconomics, these aspects are determined by the country's economic efficiency and strength. Thus, the era of geoeconomics came, in which the military power was replaced by the economic power as the key instrument influencing the international environment and securing the status of an empire. E. Luttwak argues that currently, there is a transition from the politics of power to geoeconomics. Traditional power politics utilised means such as the army, diplomacy, propaganda and new types of weapons. The goals of power politics included territorial security, expansion, impact on other countries and prestige. Power politics was the predominant method of operation in the international environment; however, it is currently limited to underdeveloped areas remaining on the periphery of the world system. States engage in geo-economic competition through both through assisting or directing domestic private entities, or through direct action opposing foreign commercial interests:

- states assist private entities through supporting high-risk research and development, initiating overseas market-penetrating investments, and through production over-investment for market-share forcing;

- more directly, states impose taxes and quotas on foreign products, bolster regulatory or covert impediments to imports, engage in discounted export financing, initiate national technology programs, and collect economic and technical intelligence.

According to Luttwak, offensive weapons are more important in geo-economics, as they are in war. Moreover, state-sponsored research and development is the most important of these weapons. "Just as in war the artillery conquers territory by fire, which the infantry can then occupy, the aim here is to conquer industries of the future by achieving technological superiority" (Luttwak, 1999, p. 154). The "infantry" in this analogy corresponds to commercial production, which can also be supported by the state through various forms of subsidies. Yet another geo-economic weapon is predatory finance. If operation subsidies are insufficient to allow domestic exporters to overcome strong competitors, states can offer loans at below-market interest rates. The United States' Export-Import, for example,

provides loan guarantees to finance exports, and equivalent institutions exist across all major industrial countries. "Thus foreigners routinely pay lower interest rates than local borrowers, whose taxes pay for the very concessions that foreigners receive. That already amounts to hunting for exports with low-interest ammunition, but the accusation of predatory finance is reserved for cases where interest rates are suddenly reduced in the course of a fought-over sale. Naturally, the chief trading states have promised to each other that they will do no such thing. Naturally, they frequently break that promise (Luttwak, 1999, p. 156).

The goal of geoeconomics is to obtain (or defend) an important position in "strategic" industries characterised by high added value (telecommunications, IT, biotechnology, aviation and space travel, modern components for the automotive industry). The winners play key financial, creative, control and high-level management functions. The losers can be content with the assembly line (Luttwak, 1999, p. 160-161). According to Luttwak, the reorientation towards geoeconomics will not change the nature of international relations. The international system will still be organised on the basis of the rule of anarchy, states will remain functionally undifferentiated, forced to ensure security(Waltz, 2010, 156). The logic of the conflict and the game of either/or will not disappear either. Only the forms and means of this rivalry will change. Luttwak also pointed out that the transition to the geoeconomic competition would proceed across the world unevenly. Certain regions of the world, in particular the Euro-Atlantic circle, will be more likely to use the geoeconomic strategies (Szymanowski, 2016, p. 323). According to this researcher, the economic success is the most essential in the modern world, and for highly developed countries, the old-fashioned territorial wars have lost their significance (Luttwak 1998, p. 152-153).

World Pensions Council economist M. Nicolas J. Firzli has argued that “adhering to the laws of geo-economic gravity” including financial self-sufficiency and the existence of advanced, diversified transportation infrastructure are now essential to ensure the effective sovereignty of a state. From that perspective, investment attractiveness and the capacity to project soft power across considerable distance as China has done through its Belt and Road Initiative are also viewed as a key determinants of geo-economic strength (Firzli, Nicolas, 2017, p. 45). Here, large private sector asset owners such as pension funds are expected to play an increasingly important part, alongside US and Chinese state actors. Even the self-absorbed, thrifty ‘America first’ policy makers in the White House eventually realized they couldn’t ignore these fateful geo-economic developments. In November 2018, vice-president Mike Pence travelled to Asia to promote President Trump’s ‘Indo-Pacific Vision’, an ambitious plan backed by tens of billions of dollars in new loans and credit-enhancement mechanisms to encourage “private investment in regional infrastructure assets”, insisting that “business, not bureaucrats will facilitate our efforts”. The new great game has just started, and pension investors will be courted assiduously by both Washington and Beijing in the coming years – not a bad position to be in in the ‘age of geoeconomics” (Firzli, 2019, p. 82).

Geoeconomics is the analysis of the economic order strategies, in particular the commercial ones, which are decided by countries in relation to policies striving to protect the national economy or other issues closely related to the economy, to achieve control over key technologies or to gain certain sectors on the global market associated with the production and distribution of a certain product or a range of relevant products, the possession or control of which gives the owner i.e., a state or a state-owned enterprise, an element of power and impact on the global economy, and contributes to the economic and social strengthening (Lorot, 1995, p. 71). The essence of the geoeconomic strategy of a state is determined by prioritising economic goals, which are treated as independent variables. At the same time, the modern concept of geoeconomics in international relations refers primarily to the international activity of states, the purpose of which is to create a geoeconomic space. It is a higher order space due to the features of the internal structure determined by technological, commercial, production and financial relations. It is the creation and opening of international markets, economic zones, integration groups, preferential agreements and currency zones. In other words, it is believed that the great game played by the strongest powers, which was foreseen in various geopolitical doctrines, is currently in full swing. However, the character of the game has changed, because instead of increasing their military arsenals, the players prefer to use their economic potential (Blackwill, Harris, 2015, p. 41).

Geoeconomic Space Creators

The analysis of the nature of the modern global economy reveals that the development of a post-industrial society has led to tremendous changes in the management system. Powerful economic forces are currently transnational and defy state control. Economic governance is shifting to a regional, supranational or global level, as the state level is no longer able to guarantee the effectiveness and efficiency of numerous economic activities. The global economy is regulated by a distributed decision system consisting of various geopolitical and geoeconomic actors (Jean, 2003, p. 210).

It is assumed that in the modern world, three centres of economic regional integration exist:

- Europe with the key role of the European Union;
- America with the predominant role of the USA and NAFTA structures;
- The Asia-Pacific region with a dominant role of China or Japan with the APEC structures.

The dynamics of international relations will be determined by the economic relations between the "triad" involving the EU, NAFTA and the Asian "yen-bloc" (Jesop, 1997, 35). However, Russia's superpower aspirations should not be overlooked, mainly due to its potential, centralised nature of the state and the role of the state intervention in the economy.

The extensive network of commercial and investment connections, integration processes as well as the flow of production factors and technologies between these centres create a new economic world order. It should be noted that new market participants as well as emergence of new technologies significantly alter both the structure of foreign trade and the mechanisms governing it. In particular, the widespread use of information technology allows for the introduction of goods and services on the market, which were previously excluded from it. Over the past 20 years, the value of trade between countries has grown tremendously, reaching unprecedented levels. Currently, the global economy is highly integrated, and traditional trade in finished goods has been largely replaced by global supply chains.

At present, the largest and most technologically advanced economy in the world is the US economy. It accounts for 24.5% of the nominal global GDP and 17% of the global GDP calculated according to purchasing power parity. In 2017, the US GDP amounted to USD 19.390 billion (IMF 2018). Moreover, the GDP per capita is USD 62,606 (MFW 2019). The private sector sphere (generating over 87% of the GDP) is dominant.

The USA is the headquarters for many global corporations and financial institutions. American companies constitute the key players in numerous fields of activity of many industries, including new materials, electronics, telecommunications, IT, conquest of space, energy, nanotechnology, biotechnology, medicine, bioinformatics, genetics and chemistry. However, the roots of the American economy are found in agriculture, which was its fundamental strength until the mid-twentieth century (to date, the United States is the world's largest food producer). Later on, intensive development of the industry (mainly automotive, oil and steel) took place, and the rich and diverse raw material base, highly qualified workforce and the socio-economic system (market economy) developed its versatility and modernity. America quickly turned to finance, electronics and new technologies. The vast area of the country enables the extraction of raw materials on a large scale. The country is the world leader in mining many of them. The basis for the development of energy is hard coal (2nd place in the world in extraction, 1st in the export) as well as crude oil (from 2018 – 1st place in the world) and natural gas (2nd place in the world). Metal ore deposits, such as iron, zinc, lead, copper, bauxites, vanadium and tungsten ores are mined on a large scale. In addition, chemical raw materials are also exploited: phosphates, potassium, salt and sulphur (1st place in the world). Gold is mined in Alaska and California (the largest resources in the world).

From a geoeconomic point of view, the possibility of massive oil extraction by the US plays a significant role. In 2018, the USA was ahead of Saudi Arabia in terms of the oil extraction volume, followed by Russia, and became the largest oil producer in the world. This is mainly due to the discovery of rich shale deposits in Texas and the possibility of oil extraction by means of hydraulic fracturing (*i.e. fracking*). These opportunities resulted in the US not being dependent on the oil

supply from the Middle East. Of course, it should not be forgotten that due to the enormous needs of the American petrochemical industry, the US is also a large importer of this raw material. The rich resource deposits are accompanied by huge energy production. The USA is the second largest producer of electricity in the world. For decades, the country has also invested in the automotive industry (corporations such as General Motors and Ford were created here) and aviation. The USA is the largest producer of weapons and armaments in the world. Moreover, the budget is heavily funded by tourism revenues – the USA is one of the three most-visited countries in the world (next to France and Spain). The world's largest industrial corporations are located in the US: General Motors, Ford Motor, Chrysler (automotive industry), IBM, General Electric (electronic and energy). The value of private investment abroad, mostly in Western Europe, Canada and Latin America, is estimated at USD 260 billion. Mines and factories are privately owned. Most enterprises merge into monopolies (capitalist associations influencing the level of production), which decide on prices and conduct economic policy aimed at obtaining the highest possible income. In addition to large metropolises, small enterprises, which employ less than 50 people, also operate.

The United States is the third exporter in the world. The value of US exports equates to USD 1.024 trillion. The export mainly consists of: machinery and equipment, computers, aeroplanes, equipment for industrial facilities (thermal, hydro and nuclear power plants, refineries, smelters, factories) and for cars, cars, weapons, artificial materials, pharmaceuticals, crops, tobacco. Furthermore, the US is the largest importer in the world. The value of goods imported into the US amounted to USD 1,869 billion. Imports mainly include passenger cars, ships, computers and electronic equipment, mineral resources, fuels, sugar, fruit, tea, coffee, clothing, footwear, wood.

America has a great influence on various international financial institutions, such as the International Monetary Fund and the International Bank for Reconstruction and Development, as it is the largest net payer to the budgets of these organisations. The US dollar is probably the most important means of payment and the most convertible currency in the world.

Nevertheless, the most dynamically developing economy in the world is the Chinese economy. Over the past 30 years, it has achieved an average growth rate of 10% per year (MFW 2020). China's economy is classified as the second (after US) global economy. It is also the largest exporter in the world. Its GDP for 2017 amounted to USD 12,015 billion (IMF 2017).

China belongs to developing countries with a centrally controlled economy. Agriculture plays a major role in the Chinese economy. Despite the small amount of arable land per capita as well as frequent damage caused by floods and droughts, agriculture generates over 20% of the country's national income. China is at the forefront of cultivation of many crops. In the harvest of rice, wheat, sweet potatoes, common potatoes, cotton, flax, rapeseed, peanuts, tobacco and apples, China occupies the first place in the world. It holds the second place in the cultivation of corn, millet, hemp, sesame, tea and tomatoes. In addition, it is in the third place in the cultivation of sorghum, sugar cane and soybeans. The variety of fruit grown in China is also enormous.

China is one of the world's most resource-rich countries. The country holds the 1st place in the world in the mining of hard coal, as well as in the extraction of tungsten, antimony, tin and iron ores. The largest coal opencast mine in the world is located in the Fushun province. The extraction of crude oil and natural gas also plays an important role in the domestic energy. On the other hand, heavy industry predominates in China's manufacturing industry (approximately 40% of the industrial production value). The main branches of the processing industry include metallurgy and engineering. In the means of transport industry, rolling stock production, shipbuilding and tractor production are the most developed. The car industry is primarily focused on the production of trucks. The main centre for the production of passenger cars is Beijing. The chemical industry is also growing rapidly, an example of which is the production of fertilisers. China ranks 1st in the world in the production of nitrogen fertilisers and is one of the frontrunners in the production of phosphate fertilisers. The role of plastic production is growing. Additionally, the refining industry is developing as a consequence of the growing oil production. The electronics industry is also developing intensively and typically involves cooperation with Japanese companies. Traditionally, the textile industry is of great importance, especially the cotton industry, which accounts for 95% of the entire industrial textile production. The food industry, including the sugar, fat, milling, meat, tobacco, tea, wine and spirits industries is also of significance.

For many years, China is the world leader in terms of the value of trade turnover. In 2003, it amounted to USD 850.9 billion. The value of exports in 2003 was USD 438.1 billion and the value of imports was equal to USD 412.8 billion. In the following years, these values grew at a tremendous rate and in 2017, China became the world's largest exporter. The export of this country reached USD 2.157 billion (TWF 2019). In addition, from a geoeconomic point of view, it is also important that China has become the second largest exporter of production capital (after the USA) and the owner of various production assets abroad. Machines and equipment constitute the most exported goods. Then there are textiles and clothing, footwear, toys, sports equipment and fuel. China exports to countries such as USA (21.1%), Hong Kong (17.4%), Japan (13.6%), South Korea (4.6%), Germany (4%). On the other hand, China imports machinery, electronic equipment, fuel, plastic, iron, steel and chemicals. The partners of the Chinese import include Japan (18%), Taiwan (11.9%), South Korea (10.4%), USA (8.2%), Germany (5.9%).

Economic aspects of the rivalry between the US and China

The word "rivalry" is derived from the Latin *rivalis*, which originally indicated a person competing with someone else for access to water from the stream (*rivus*) (Sondel 1997, p. 847). According to the definition found in the *Oxford Advanced Learner's Dictionary of Current English*, competition is "a state, in which two people, companies, states compete for the same thing" (Oxford 2000).

According to Robert E. Kuenne, an important feature of competition is the *non-anonymity* of its participants. In competitive relations, opponents are aware that their actions are likely to affect their rival, who in turn acts to protect themselves and their own interests (Kuenne 1989, p. 555).

There are two key elements, the existence of which allows for a relationship to be considered as rivalry: conflict of interest and mutual recognition as a rival. However, there are a number of examples, where countries do not want to clearly identify themselves as rivals (Rasler, Thompson 2000, p. 513). One of the reasons for this reluctance may be the interdependency, in which modern international relations abound. States can compete with each other in one sphere, e.g. the economic sphere, or in one of the regions, while having common interests in another sphere, e.g. the military sphere or in another part of the world. Although competition can be the cause of conflicts, it is not necessary for their emergence. Competition should also not be equated with the arms race, which may or may not be associated with it (Goertz, Diehl 1993, p. 55–156). It can be one of the aspects of (military) rivalry taking place on many levels. The Cold War between two superpowers – the USSR and the US – was one of the manifestations of the multifaceted competition between them. It should be noted that the arms race rarely occurs outside of rivalry (McGinnis, Williams 1989, p. 82). Today, warfare between rivals is relatively rare. This is, among others, a consequence of the rivalry being transferred from the military-strategic dimension to the economic sphere. While wars and disputes usually end in a truce or peace treaty, competition can last for hundreds of years, without formally announcing its beginning and end. The slowing down of competition in general, or in one sphere, is often a result of a change in the international order, or the emergence of a common threat from another country or a coalition of countries. The global crisis, or the so-called international terrorism, includes threats unrelated to a particular country; however, it also often slows down the rivalry between competing actors. The signing of an agreement relating to one of the spheres of competition is not synonymous with the termination of other ones, if they exist (Włodkowska-Bagan, 2015, p. 248).

Currently, one can notice pragmatics of the US departing from multilateral agreements and building the concept of Western unity, which until now was a strategy in both basic political directions – Atlantic and Pacific. China is successfully taking advantage of this situation. The uniqueness of China's contemporary policy lies in the country's lack of involvement in wars as well as political confrontations provoked as a result of them. However, China does not combine this absence with the economic factor, making it an economic superpower. A sensible choice of international strategy many years ago, manifesting in the preferential treatment of the economic goals, while abandoning the arms race, is a structural premise for China referring to geoeconomics, which is understood as the creation of a geoeconomic space utilising appropriate instruments of geoeconomic action (Haliżak 2017, 92). Other countries are not afraid of the Chinese military power, but of the fact that modern China has great opportunities to use trade and investment for its own political purposes. This is

confirmed, for example, by the fact that China is also increasingly displaying its aspiration to lead APEC (*Asia-Pacific Economic Cooperation*), which is a supranational institution created for economic needs. Although APEC does not have the status of an international organisation and operates on the principles of an integration agreement, it is important in resolving economic disputes and creates a forum for discussing economic issues, which are strategic for its members. Its creation has accelerated the trade and investment flow both on a regional and global scale. The most important tasks of the Cooperation include liberalising trade by streamlining customs procedures, promoting economic integration, carrying out works on establishing technological agreements, creating free trade zones and influencing economic growth, while maintaining sustainable development. APEC also reacts to political and economic changes; therefore, in 2002, one of the organisation's goals also involved the fight against terrorism, which poses a threat to the development of free trade.

2018 is considered as the beginning of the escalation of rivalry between the US and China, and the event that symbolically confirmed this state was the speech of the US Vice President Mike Pence at the Hudson Institute on the 4th of October 2018, which was indisputably anti-Chinese in nature, and which claimed that the US was opposed to China's own vision of international order (Pence, 2018). That year also saw the first threats of the US appealing to the economic war in the relations with China, primarily in the sphere of trade. These geoeconomic activities were reflected by new regulations introduced by the EU and the United States, hindering the takeover by China of technologically advanced small and medium-sized enterprises by merger and acquisition. Such activities were also manifested by the US initiating a trade war with China aimed at eliminating approximately USD 325 billion (2018) in trade deficit by imposing an additional 25% customs duty on Chinese imports. It was the geoeconomic aspirations of both powers that led to the situation that for the first time in history, the Asia-Pacific Economic Community Summit (APEC) held in Papua New Guinea in 2018, ended without a joint communication from the leaders of the member states. The dispute primarily concerned commercial issues. The two largest economies in the world are currently in conflict, which the Chinese ministry identified as the largest trade war in the economic history. Washington has already imposed criminal duty on goods imported from China, which are worth USD 250 billion annually. In turn, Beijing responded with tariffs on the American products worth USD 110 billion annually (TVN 24, 2020). Both sides suffered losses in this trade war. However, they have had an asymmetrical character, because the losses on the Chinese side were much greater. In the face of economic losses, during the G20 Summit in Buenos Aires on the 1st of December 2018, the leaders of both countries announced a 90-day truce and proposed solutions to the problems through trade negotiations. From a geoeconomic point of view, trade war also has a negative impact on the growth rate of the Chinese economy as well as on the trade with some countries. Many goods produced in China are a result of globalisation processes and relationships within the global supply chains. Components, especially in sectors such as computers and electronics, electrical devices and machines, come from various countries. Hence, the effects of trade wars will be felt in these countries. Moreover, the introduced duty rates force reconfigurations in the supply chain. One of the reasons for the trade war is China's dissatisfaction with the current institutionalised system of the global economy, which was created by the West and gives this part of the world pertinent privileges. Despite its economic empire and power (15% in the global product), China is marginalised in this respect (it is estimated at 6% of the decision-making calculated by the International Monetary Fund). During his speech at the 2019 World Economic Forum in Davos, George Soros said that although China is not the only "authoritarian regime" in the world, it is the richest, strongest and the most technologically advanced state. This makes President Xi Jinping the "most dangerous opponent" of the Western, open society.

There seems to be a real fear that if China shapes the international order, influences various countries and regions in the economic, social and political spheres, it will do so in its own image. The attitude of other countries towards this developing conflict is also noteworthy. One may be tempted to argue that the countries of the region do not perceive the new superpower bipolarity as a threat, but as an opportunity to obtain political and economic benefits, often balancing between the two forces, putting stability and the willingness to develop above competition.

Summary

Currently, a reorientation of the goals of various countries is noticeable in the international environment. In the new approach, these goals are increasingly focused on economic prosperity rather than on the more narrowly understood and rarely perceived national security. In addition, many countries try to base their security on the economic potential and transnational economic cooperation. This creates a network of interdependence of the world economy, which overlaps with the traditional division of international relations. Military strength is no longer the main domain in the hierarchical building of the architecture of the modern world; however, it should not be forgotten that it is still present and can be used in specific situations, especially that the expenditure on armaments by China has become a factor of growing importance in the 21st-century American-Chinese relations. Washington's legitimate concern about the military investments in China (also in the context of purchasing advanced Russian weapons) is associated with both US commitments to its Asian allies, including Taiwan, and the American international burdens, including the war against terrorism.

The opportunities and threats for European countries are also important in this battle. In the face of the great Chinese-American rivalry, Europe will have to choose a side. This will not be easy to achieve. To neutralise the European Union, China is trying to divide it and make it dependent on it. In turn, the position of the Trump administration regarding Europe is inconsistent. It seems that European nations are capable of playing a key role in the decisive battle of the 21st century – between China and America. On the other hand, the conflict can allow Europe to be reduced to a weak, divided region, which will fight for influence. Undoubtedly, Europe has the potential to be an effective and strategic player; however, it needs to demonstrate greater coherence to be able to do so.

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FMEA Risk Analysis of Virtual Suppy Chains

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Abstract

The article is part of a series of publications on virtual supply chains. The first section characterizes determinants defining virtual supply chains. Nine areas affecting virtual supply chains have been identified. The next stage of research concerned the isolation of risk factors affecting virtual supply chains. Presented findings are supplemented by FMEA risk analysis for virtual supply chains. The research was conducted at the turn of 2019 and 2020. The objective of the research paper is to present aspects (areas) where the risk related to virtual supply chains is the most significant.

Keywords: virtual supply chain, FMEA risk analysis, supply chain, risk, risk factors,

Introduction

In the era of digitization and computerization, there is a continuous transformation of supply chains. The digital age creates new opportunities in this area. The development of information technologies creates the possibility of creating a digital logistics network which goal is to concentrate as many processes as possible in the virtual sphere. The digitization of logistics processes and supply networks is supposed to help to achieve huge savings and competitive advantage by supporting new thinking and management methods. Supply chains are shifting to the internet. Data and information processing in the cloud computing enables greater freedom and mobility of supply chain management. The use of cloud computing makes it possible to cope with the growing speed of change in unstable economic and political conditions. The virtual sphere not only allows for easier, faster and more precise management of the growing amount of data and information, but also creates digital supply chains. The most important element of managing digital supply chains or the physical flow of goods and services using IT solutions is cooperation with each link in the supply chain in real time. Optimization and digitization of logistic and economic processes can help business entities to achieve significant savings and competitive advantage. The efficiency of the entire supply chain is also increasing, and the use of enterprise resources is improving. Storage and processing of data and information in the cloud helps to remove physical restrictions on access to data, supports quality and leads to improved communication within the supply chain. Faster, more efficient and qualitatively better communication contributes to the possibility of conducting analyzes at every stage of the flow of goods, which may contribute to equitable decisions (online.norwich.edu, 2019; Saniuk, Saniuk, pp. 212-216, 2018; Kulińska, Dendera-Gruszka, pp. 113-117, 2019).

FMEA risk analysis

The subject of the article is risk analysis for virtual supply chains. Conducted research has been focused on identifying determinants characterizing virtual supply chains for which risk factors have been developed. Based on this analysis, an FMEA risk analysis was carried out, which is presented in Table 1. The FMEA analysis aims to show potential disadvantages and threats in the functioning of virtual supply chains and factors affecting them, as well as to draw attention to the greatest disadvantages and threats.

The FMEA (Failure Mode and Effects Analysis) method is designed to detect defects at the earliest stages of the process. The FMEA method consists in the analysis of factors that may affect the analyzed process and which relate to process methods, instrumentation, environmental impact along with determination of control measures (Folejewska, 2010; Pałubicki, Kukiełka pp. 90-96, 2017).

The first stage of the FMEA method is to select operations that should be analyzed, followed by designation of the scope of the analysis. The number of parts and levels of the method depends on the complexity of the process.

The second stage involves specifying the activities related to the FMEA analysis. Firstly, there shall be defined potential defects that may occur in the analyzed case. After determining the sequence of events: cause - defect - effect, each defect should be assessed with an integer ranging from 1 to 10, considering three criteria: risk - possibility of defect - cause.

The last stage of risk analysis using FMEA method describes the elements in which changes should be made in order to reduce the risk of defects (Wyrębek, pp. 151-165, 2012, Dendera – Gruszka, Kulińska, pp. 1968-1978, 2018).

Fig. 1. FMEA Sheet

Area	Potential type of defect	Potential effect of the defect	Meaning	Potential causes of the defect	Occurence	Preventive measures	Detection	RPN
Technology	Lack of current system updates	Outdated software	9	No investment in software update	9	Software update	2	162
				No system support	9	Purchase of system licenses. IT support	1	81
				Loss of license	8			72
				Lack of technical and personnel support in updating the systems	8			
				Lack of resources	7	Investment in adequate equipment	2	112
	Lack of adequate technical equipment	No hardware performance	8					
		Longer data processing time	9	Lack of adequate equipment	7			112
				No access to new technologies	6	Participation in trade fairs and training in order to be up to date with new technologies	3	162
	Lack of adequate software	No possibility of cooperation with other entities in the supply chain	10	Failure to fulfill assumed functions. Purchase of unverified software. Dynamic changes on the IT market. High costs of implementing new technologies. Dynamic changes on the IT market.	4	Adjusting the software to other entities in the supply chain	4	160
		Inability to function in the virtual world	8		3	Implementation of additional systems	4	96
		Inability to settle administrative matters	5		2	Introduction of a unified IT system in the supply chain	4	40
	No access to the telephone network	Lack of communication and no access to the Internet	10	No possibility of cooperation with other entities in the supply chain	2	Change of location of the enterprise	3	60
	No synchronization of telephone network with IT systems	Limited cooperation opportunities	8	Lack of adequate technical facilities	6	Introduction of ICT investments	6	288
				Lack of funds for ICT	5			240
				No desire to develop technical facilities	6			288
	No access to fast internet network	Lack of timely response to customer inquiries	7	Wrong location	7	Change of location of the enterprise	5	245
		Longer data transmission time						

				High costs of implementing a high-speed Internet network	7		4	196
	Unfair competition	Loss of customers	5	Intrusion into information systems. Patent refusal	7	Closer analysis of entities involved in the supply chain	7	245
		Theft of know how	9		6		8	432
		Theft of technological knowledge	9		6	Additional system security	5	270
	No access to new technologies	Lack of technological development of the organization	5	No rights to use individual technologies. No interest in new technologies. Poor decision-making in area of new technologies. Lack of suitably qualified workforce responsible for implementing new technologies.	5	----	2	50
		Loss of market attractiveness	6				3	90
		Loss of customers and contractors	6		5		2	60
	Barriers present on a given market			Geographical distance. Time zones. Internet access. Differences in software. No connectivity		Change of location f the enterprise	4	120
		No possibility of establishing cooperation	4		3	Systems synchronization	4	0
	Poor information flow	Loss of customers and contractors	7	No access to information	7	A more detailed analysis of information. Securing of data carriers. Information security.	6	72
				No access to public information	4		3	84
				No access to documents	3		2	42
				Disruption of information flow	8		2	112
				Informational noise	4		4	112
				Lack of information flow model and procedures	10		3	210
				Loss of information carriers	7		3	147
				Loss of information	7		2	98
				Excess or lack of information	9		1	63
				No current information	9		2	126
				Lack of credibility of information	9		2	126
				No link between information and the given environment	7			98
	Intrusion into a computer or Internet network	Data theft. Loss of information. Loss of customers and contractors	9	Poor cyberspace security	9	Securing a computer or Internet network	3	243

	Intrusion into the telecommunications network		8	Previewing and eavesdropping on conversations, video conferences and audiovisual broadcasts	4	Securing telecommunications network	3	96
	Dependence on interactive media	Sharing too much information using interactive media	7	Fashion	9	Careful sharing of information on the network	3	189
		Inability to verify all interactive media users					2	126
		Ease of data and information loss					2	126
		No control over the transmission of information using interactive media					5	315
	Database corruption	Loss of data	10	Virus	8	Aktualny program antywirusowy w pełnej wersji	2	160
				Data theft	7	Data encryption	4	280
				Database intrusion	6		2	120
				Sale of data	5		2	100
				Public data sharing	2		3	60
				Hacker attack	5		2	100
	Unauthorized physical access to an important room with processed data			Unfair competition	5		1	50
				Downloading data from foreign portals	8		2	160
				IT crimes	6		2	120
				Breach of personal data processing rules	3		2	60
	The possibility of a sudden change of business model by cloud service providers	Possibility of occurence of single points of failure	5	Insufficient authentication methods. Lack of continuity of service. Link failure. Low quality of services offered	6	Service provider verification	3	90
		Loss of data confidentiality	9		6	Additional database security	4	216
		Disclosure of data to third parties					2	108
		Deleted company data can still be stored in the cloud					2	108
		Inability to audit the service					3	162
		Phishing					6	324
		Unconscious or accidental sharing of					3	162

		information						
	Illegal downloading of source code from a file server	Loss of data	10	Cyberterrorism. Criminal networks. URL Control Vulnerability	7	Systems update	3	210
		Information and data manipulation				System configuration	2	140
	Threats from other systems on which our resource is based	The ability to install spyware	8	High security costs. Use of pirated software/pirated content within the organization, administrator absence. Cyberintrusion. Operator errors.	7	Not opening messages from unknown senders. Not downloading files from an unknown source. Not opening insecure websites.	6	336
		Hacker attacks					5	280
		Interference					5	280
		User manipulation					4	224
		Disclousure of confidential data					3	168
	IT systems failures	Taking control over systems by unauthorised persons	10	Bad data protection on digital carriers. Lack of interest and funds for innovation. Increase in investment expenditure on the latest technologies, servicization and digitization of entities	7	----	7	490
		Loss of data						
		Errors in entering data						
	Cabling failure	Delays in realisation implementation plans	6	Lack of adequate infrastructure	7	Regular checks of the technical condition of the infrastructure	8	336
	Hacking into online banking	Loss of funds on bank accounts	10	Insufficient electronic bank account protection	6	Logging into online banking only from trusted websites	2	120
		Incurring financial obligations by third parties in user accounts				Not sharing access passwords with third parties	2	120
Time	Emerging markets expansion	Wzrost konkurencji	7	No possibility to catch up in terms of costs and time to eastern markets	5	Getting new customers. Increasing the number of suppliers	2	70
		Loss of customers					1	35
	Lagging behind technological, technical and IT advances	Using outdated systems and software	6	No investment in technical infrastructure	5	Market research. Participation in industry fairs. Hiring an IT specialist	3	90
		Labor disturbance						
		Taking too much time						
		Delays in the flow of information						

	Too late response or no response to customer queries and wishes	Loss of customer	6	Distraction of employees. Insufficient employee involvement. Employee overload. Hiring employees with insufficient qualifications and experience	6	Staff training. Incentive awards. Acquiring employees from abroad	1	36
Location	Reduction of spatial barriers	Increased competition	4	Accession of the country to the economic union	6	Extension of sales and purchases offer to other countries	3	72
				Internet accessibility	6		4	96
				Globalization	6		4	96
				Transferr of production to Asian markets	7		9	252
				Changes in economic conditions on international markets	9		2	72
	Transport network	Lack of adequate transport or communication network	2	Location of the plant in economically underdeveloped areas	8	Change of location of the enterprise. Cooperation with enterprises active in the virtual sphere	3	48
	Technical network	Lack of appropriately synchronized information network	3	Cooperation of entities at various levels of technological advancement	8	Technical network synchronization	3	72
	Lack of integration of ports with the customs systems	Need to settle administrative matters personally	4	Lack of coordination of the ministry of transport operations, industrial development, communication and finance	5	Access to administrative portals. Trusted Profile. Electronic signature	4	80
	Port automation							
Economic	Unconventional forms of employment	Overtime	3	No contact with the employer. Lack of supervision over employees. Addiction to technical means. Secondment of employees. Outsourcing of professional duties to third parties	9	Control over assigned tasks	2	54
		Distruption of faily life	4		8		3	96
		Limiting social and professional contacts	4		8		3	96
		Lack of control over the flow of information	7		9		5	315
	Impact of the virtual world on global stock exchanges	Employment drop	3	Workforce suppression by modern technologies	6	----	5	90
		Staff shortages	7	Too high requirements for candidates. Unemployment. Migration of population. High level of emigration. Aging of the society. Lack of labor force in working age.	9		2	126
		Lack of human capital	7		7		2	98
		Lack of qualified labor force	5		6		3	90
	Situation of global markets	Financial Crisis	5	International economic situation. Conflicts between countries	4	----	6	120

	Volume of currency turnover	Loss of potential shareholders	5	The crisis on the global stock markets. Company bankruptcy. Speculative bubble	4	----	4	80
	Turmoil in the energy markets	Energy crisis	8		6		7	336
	Exchange rate changes	Fall in the value of shares	9		5		6	270
		The inflow of external capital	7		6		5	210
		Inflation	5		5		5	125
	Cryptocurrency quotes	Fall in the value of cryptocurrency	10	Cyberaatcks Political attacks	7	----	4	280
	E-services	More services dedicated to the virtual sphere	4	Lower demand for traditional services	3	----	4	48
	Digital economy	Underestimation of GDP	4	Digital services that are challenging to conceptualize	3	----	2	24
		Overstating the level of inflation	4		5			40
Political and legal	No regulations on digitization, computerization and virtualization	The increase in internet crime	6	Ineffectiveness of law enforcement agencies in tracking and enforcing crimes in the virtual sphere	7	----	2	84
	No cyber security strategy on the national and international arena							
	Inability to respond to cyber crimes							
	Lack of information exchange in the international law enforcement environment		6	Lack of properly trained specialists in knowledge of internet crimes	7	Hiring specialists from the IT industry. Appropriate remuneration for specialists and consultants.	2	84
	There are no law enforcement agencies operating only in the virtual world							
	Lack of structures for cyber resilience, cybercrime and defense activities							
	No exchange of information between the private sector and government entities		4	Reluctance of the private sector to share research results with public administration entities and centers	8	----	3	96
	Changes in legal regulations	Unfavorable and complicated legal regulations	4	Professional groups strikes. Transfer investment to other regions. Social policy of the state.	6	----	2	48
	Changes in legal and social relations	Unfavorable legal and social relations	5		6	----	4	120

	No assistance received from public funds	Lack of funds for enterprise development	2	No public funds for the area. Lack of classification of the entity to obtain assistance from public funds. Insufficient pool of public funds. Insufficient argumentation in application for assistance. No proper support program available	5	Acquiring new contractors, new production orders	3	30
		Rejection of the application for investment co-financing	1		7		2	14
		Insufficient funds for the investment	1		9		5	45
	Changes in economic conditions	Lack of creditworthiness	4	Other credit obligations. Loss of production orders. Enterprise debt	6		7	168
		Inability to repay the credit	3		2		8	48
		The need to introduce foreign capital	1		1		2	2
	Unfavorable government policy towards enterprises	No help from public administration	1	Lack of understanding of the situation by state administration offices. Rigi and predetermined procedures	8	Joining the business association	2	16
		Complicated and time-consuming administrative procedures	2		9		2	36
	Export Value	Lack of international competitiveness	8	Difficulties in getting international customers. Not attractive company offer for foreign contractors	7	Searching for new markets	6	336
Economic	Low economy innovation	Lack of support from government institutions for scientific research and production development	4	Low attractiveness of enterprises abroad	6	Starting cooperation with new suppliers	3	72
	Degree of concentration of production	Increased competition	3	100% of production realization in one place	4	Use of outsourcing. Signing a contract with a subcontractor	7	84
	Export Rate	Low export rate	6	Sales regress	4	---	1	24
	The level of strategic transaction execution	No strategic transactions carried out	2	Directing production only to one specific type of product and cooperation with only one final customer	2	Acquiring strategic investment and implementing smaller production orders	3	12
	Costs increase	Low level of profitability of production	9	Increase in prices of energy, raw materials, labor costs	10	---	4	360
	Competitiveness policy	Unfair commercial practices	4	Competition development, globalization	7	Brach of cooperation	3	84
	Business relations with clients	Loss of customer	4	Disregarding the customer, improper customer service, lack of developed and implemented customer service standards	8	Developing customer service standards. Hiring the right people to contact customers. Staff training	3	96
	The quality of communication	Loss of employees	7	Lack of communication between	7	Analyzing projects with department	2	98

				management and the lowest level employees		managers and production employees		
	The quality of information flow	Poor quality of information flow	6	Interference during the information flow	7	Improving the information flow process	3	126
	Customer insolvency	No payment within the prescribed period	3	Providing too much trade credit	5	Confirmation of payment and economic credibility of the customer	3	45
		Counterparty's bankruptcy					4	45
		High level of organization debt						45
		Long payment terms						45
	The quality of purchased goods and services	Breaking relations with the supplier	3	Poor quality of purchased goods and services	4	Checking the quality of delivered goods. Change of supplier	3	36
		No source of supply						
	The quality of sold goods and services	Loss of customer	7	Poor quality of goods and services sold	3	Control of manufactured products	5	105
	The value of international investment	No participation in international investments	6	The impact of globalization, a decrease in the share of international investments, the long-term nature of investments, changes in international economic conditions	7	---	2	84
	Relationship with stakeholders	Loss of production orders	3	Too much trust. No loyalty. Business fraud	1	---	6	18
		Loss of a key customer					5	15
		Loss of subcontractor					8	24
	The impact of globalization	Transfer of production to Asian markets	6	Global steel overproduction. The inflow of raw material from Asian markets. Low price level. Low quality	10	---	2	120
	Low level of innovation of business entities	Price/wage gap	3	Backwardness of the economy	5	Starting cooperation with new suppliers	3	45
				Decline or low economic growth	6		5	90
	Lack of coordinated supply chain strategies	Delays in the implementation of logistics processes	9	Bad management	8	Introducing a unified supply chain management strategy	4	288

	System incompatibility between entities	High service costs	3	The need to implement more than one IT system. Duplication of data and information	7	Introduction of a uniform management system	4	84
	Reluctance to share information	Unfair competition	5	High costs of information flow	6	Careful sharing of information	3	90
	Business complexity of entities	Lack of cooperation between entities	4	Lack of economic confidence	6		5	120
Social	Global socjety	Social exclusion. Decline in the prestige of traditional social forms. Commercialization of social relations. Depleting cultural diversity. Commercialization of consumer culture	4	Social disintegration. Changing social structures. Change of social functions	3	---	6	72
	Automation and robotics society							
	Constant supervision and control over society							
	Conditions for exceptional social competition							
	Minimum wage	Increase in labour costs	6	Loss of price attractiveness on the international and national arena. Increase in prices of manufactured products	7	---	2	84
	No control over content posted on the internet	Access to unverified and false information	5	General internet access	9	---	2	90
	Lack of foreign language skills	Inability to manage cyberspace	8	Lack of willingness to raise qualifications	6	Learning foreign languages	2	96
	Change of existing authorities	Social manipulation	1	The pursuit of society to exist only in the virtual world. Addiction to modern technologies.	7	Restricting access to modern technologies. Verification of content viewed on the internet.	3	21
	Digitization as the basis for the functioning of every family and institution		3					63
	Impacts of the virtual world on socio-educational activities		5					105
	The impact of technology on social relations		4					84
Globalization	Flow of knowledge and information	Lack of information flow	9	Too late reaction. Unchecked information. Information overload.	7	Information verification	3	189
						Installing programs for analyzing and processing information	2	126

	No turning back from digitization	Progressing digitization	5	The pursuit of artificial intelligence	9	----	4	180
	The growing role of non-state, non-elective and undemocratic centers of economic power	Lack of control over non-state power centers. No person responsible for non-state organization	9	Progressing digitization	9	----	5	405
	No control over cyberspace		10		10		6	600
	Social threats and terrorism	Cyberterrorism	8	Social manipulation. Intrusion into information systems	8	----	5	320
Environmental	Ecological disasters	Data loss. Equipment destruction	7	Environmental degradation. Weather anomalies	6	Securing data and information on virtual carriers	3	126
	Natural disasters							

Source: *Self-reported data*

Table 1 presents all aspects that may affect virtual supply chains. In the table above, individual areas of activity of business entities involved in the flow of services in the virtual world have been analyzed. The potential type of defect was defined along with its effect. The severity of occurrence of a defect is determined on a scale of 1 to 10. The value of 1 is assigned to an improbable (insignificant) situation, while 10 - to a very probable situation. The details of the value assignment are given in Table 2.

Fig. 2. Determining the severity of a defect

R	Severity	FMEA service/construction
1	Improbable (insignificant)	An imperceptible impact on the service
2–3	Minor	The defect is small and has a small impact on customer satisfaction
4–6	Average importance	ustomer dissatisfaction is observable
7–8	Important	The defect happens cyclically and has a big impact on customer dissatisfaction
9–10	Extrely important	An extremely important defect, which affects further work, safety and is contrary to the law

Source: *Self-designed scale*

The next step is to determine the cause of the defect along with determining its value. Also, in this case, the cause of the defect is determined on a scale of 1 to 10. The value of 1 is assigned to an improbable situation, and 10 to a very probable situation. The details of the value assignment are set out in Table 3.

Fig. 3. Determining the probability of occurrence of a defect

W	Probability of occurrence of a defect	FMEA service/construction/process
1	Improbable	No possibility of defects
2	Very low	Very low probability of occurrence of a defect. Defects occur individually and very rarely
3	Low	Low probability of single defects
4–6	Average	Defects occur randomly in small quantities
7–8	High	Disadvantages occur very often
9–10	Very high	Very high probability of a defect

Source: *Self-designed scale*

In the next step is to specify preventive measures and estimate the detection parameters determined on the basis of Table 4.

Fig. 4. Determining the probability of detection

D	Detection	FMEA service/construction/process
1–2	Very high	Certain defect detection
3–4	High	The chances of detecting a defect are high, a test or functionality check is used
5–6	Average	Control leads to average defect detection
7–8	Low	Obstacles in defects detection
9–10	Very low	Detection of a defect is difficult or impossible

Source: *Self-designed scale*

The final stage of FMEA analysis is the assignment of the RPN parameter. Assigning the above parameters to the FMEA spreadsheet allows to specify the priority number of RPN risk, which is calculated according to the following formula:

RPN = Severity (S) * Occurrence (P) * Detection (D)

RPN makes it possible to determine which threats carry the highest risk and the hierarchy in which order preventive actions should start.

FMEA analysis is a method of identifying and preventing problems related to the analyzed process before its implementation. It focuses on preventing process or product defects, increasing process security, financial security of the project, work safety and environmental protection. FMEA analysis is carried out at the design stage of the process or product to avoid the biggest threats and flaws in the implementation phase. This is an important technique for identifying and eliminating potential defects and errors in processes and products.

The study aimed to demonstrate the relationship between the determinants and the sources of risk in virtual supply chains. During the analysis, RPN = 100 was determined, below which the impact of factors on virtual supply chains is insignificant. For the examined supply chain, technological aspects have the greatest impact, primarily related to the lack of adequate equipment, loss of data and information, and theft of know-how. Further aspects affecting virtual supply chains include an increase in energy prices, no control over information transmission, or a decline in cryptocurrencies.

Summary

Access to the internet and ubiquitous digitization enables fast and flexible flow of goods and services. Currently, to become competitive in a given market, speed of response to customer inquiry and flexibility are becoming the paramount features. Without access to the Internet and the use of specialized computer software, achieving a market leadership position would be impossible. However, virtual supply chains, which are primarily oriented on the Internet, carry some danger and risk. Risk factors that have been highlighted in tab. 1, are the first stage to analyze the risk of virtual supply chains.

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The Role of Trade Unions in the Attainment of Educational Goals in Nigeria

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Abstract

The study focused on ascertaining the roles of trade unions in the attainment of the educational goals in Nigeria. Survey research design formed the design of the study. The population of the study comprised of 380 respondents which were drawn from the teaching and non-teaching staff of Adeniran Ogunsanya College of Education, Otto/Ijanikin, Lagos State, Nigeria. Data for the study was collected through the use of a structured questionnaire, which was distributed to the 380 sampled population of the study. The data obtained were analysed using descriptive statistics. Based on the result obtained from the data analysed, the study found out among others that trade unions play a significant role in ensuring that educational goals are accomplished. The study also revealed that issues relating to the conditions of service, depleted states of infrastructure, underfunding of the tertiary institution, and non-payment of arrears and entitlement are the major factors promoting disagreement between the Management of Adeniran Ogunsanya College of Education, Otto/Ijanikin, Lagos State, Nigeria and the Unions. Thus, the study recommended, among others, that labour dispute management committees in the College of Education should be set up to deal internally with all union issues in order to further increase productivity. A tripartite committee of the Government, the National Industrial Court and the Trade Union should be set up to recommend the review regularly.

Keywords: College of Education, Educational Goals, Nigeria, Roles, Trade Union

Introduction

Globally, education is seen as a key agent of change, which is concerned with the renewing, remoulding and transformation of the human mind, with focus on exposing man to diverse and innovative ways of doing things to bring about change in all dimensions of the society. Today, the benefits inherent in education have been widely acknowledged by governments of both developed and developing nations. Thus, to take due advantage of the educational processes, many countries in the world have resorted to stratifying education into stages, which learners are expected to progress from to gain proper mastery of the educational phenomenon. Hence, today, we have the elementary level down to the tertiary level (Uko and Nnaji, 2015, Abasilim, Eyo, Adah. and Popoola, 2016).

World over, Tertiary education is seen as the third stage of education. It is an umbrella name used to give identity to institutions of higher learning such as Universities, Colleges of Education, Polytechnics and Monotechnics as the case may be (Bamiro, 2012). Tertiary institutions as the third

tier of education are widely perceived as the bank of excellence where knowledge is dispersed and acquired by those who seek such knowledge. In the view of Ogunlade, Ekundayo and Omodan (2015), a tertiary institution can be seen as an academic community occupied by such intellectuals as teaching and non-teaching staff cum administrators in charge of teaching and non-teaching activities of the system. To this effect, it implies that for these diverse strata of intellectuals who comprised of the academic community will bring to bear their philosophies and outlook to things, which of course may not align with the aspirations of the other strata of the community cum the broader community which entails government, and management. Thus, to solve the problems which may emanate from the academic environments, the various strata of the members of the academic community may decide to come together as a body which reflects the combined aspirations of these members of the academic community. These bodies formed are generally called Trade Unions.

The emergence of trade unions in the tertiary education system in Nigeria was necessitated by the need to address issues affecting the stakeholders in the education system as well as the future of education in Nigeria. It has been noted that though conflicts are essential features of any human organisation, conflicts in the tertiary institution system are, however, more complicated and challenging to resolve. That is because the parties involved operate at a higher level of intellectual orbit. Moreover, they are very much familiar with their inalienable rights as humans as well as legal provisions already put in place on matters at hand. Thus, they frown at being outwitted, especially when in loggerhead with persons or groups outside the higher education system such as government (Foluso, 2010).

There is, therefore, no doubt that the effective and efficient functioning of the tertiary education system is a function of collaborative efforts put in place by the various stakeholders in the tertiary education community. It is against this background that this paper focused on ascertaining the roles of trade unions in the attainment of the educational goals in Adeniran Ogunsanya College of Education, Otto/ Ijanikin Lagos State, Nigeria.

Literature Review

The Concept of Trade Union

The meaning of trade union varies significantly from country to country and is influenced by the perception of workers and the legal meaning accorded to it by the laws guiding the activities of labour unions in such a country. Trade Unionism is seen as a broad term which is used to identify a community of people who are related by their occupation and are bound together by a common shared goal. It is the organisation of the labour force within an organisation which is an essential element in the process of production. It is the total of people who render services by using their capabilities or skills, with focus on earning a living, as well as to develop themselves and the economy at large (Fakunle, 2017).

From the definition above, it can be deduced that the principal roles of the members of trade unions to their members include adopting strategies towards promoting the economic, social, welfare, political, psychological benefits of its members, as well as to create the opportunity for its members to get involved in managerial functions in the organisation. This is perceived as the most fundamental roles of trade unions. Though trade unions alss promote the attainment of organisational goals, its principal concern is to advance the common interest of its members. To do so, they often engage the management of the organisation to promote policies which could foster the growth and total wellbeing of its members. Trade unions are also co-partners of management as relating to the maintenance of industrial relations in the organization (Pemede, 2007).

Broadly, the roles of trade union in tertiary institution include promoting work relations between employees and management as well as employees to employees; to enforce the attainment of the educational goals at institutional levels. The role of academic trade unions also entails securing structures with purposive leadership which allow for the advancement of knowledge through scientific research. Hence, these unions also advocate for the disbursement of fund for the provision

of physical structures for learning as well as the establishment of laboratories which promotes learning and research. They are also concerned with the education of her members as well as pursuing professional excellence (Uzoh and Anigbogu, 2013; Oyewunmi and Oyewunmi, 2018; Abasilim, Gberevbie and Osibanjo, 2019).

Types of Trade Unions

Basically, Trade Unions are often comprised of people of similar or related works of life who are pursuing same or related goals. Thus, the typology of trade unions is influenced by such factors as trade specialization, the management agreement of union as well as the membership of the union. According to Oyewunmi and Oyewunmi (2014), the widely known forms of trade unions include the following;

Crafts Union: the membership of this union is predominantly traders and craftsmen such as electricians, iron workers, machinists, printers, plumbers, bricklayers and carpenters, among others. In a nutshell, a craft union is a union whose organization is done in a way that people of same trade or craft are grouped together as members of a union. Just like every other Trade Union, Craft Unions are also concerned with improving the wage levels of her members as well as to secure better working conditions for its members. Examples of crafts union include the Aircraft Mechanics Fraternal Association in the United States, the Navigators Union in India, and the Nigeria Union of Teachers and many others.

General Unions: Just as the name implies, membership of general unions are comprised of people from various works of life. General Unions are often concerned with sustaining the solidarity of the working-class examples of general unions which include the Nigeria Labour Congress, Nigeria Workers Council. General unions serve as the representatives of all workers/labours within a given region or country.

Industrial Union: This is otherwise known as vertical unions whose membership is comprised of labourers/workers of various levels, that is, both skilled and unskilled who are engaged in the same industry. Examples of such unions include the National Union of Petroleum and Natural Gas Workers, National Union of Healthcare Workers, and the Nigerian Bar Association among many others. The emphasis in Industrial Union is not on the level of skill, sex, grade or even position of individuals; rather, it is on the industry in which these individuals are engaged in.

Staff Union: This is closely related to industrial unions. Staff union, as the name implies, are often comprised of people engaged in the same industry, executing similar functions within a given country. Staff unions are often concerned with securing uniformity in a condition of service and wages of members employed within the industry, in various locations in a given country. These unions serve as representatives of each member, and thus, their advocate is always based on the welfare of all members. Staff unions may have branches in different states. However, their various conducts is governed by the rules and regulation guiding all other members in the country. Examples of staff unions include the Academic Staff Unions of Universities (ASUU), College of Education Academic Staff Unions (COEASU), Academic Staff Union of Polytechnics (ASUP), Non-Academic Staff Union of Universities (NASU) and many more others.

Objectives of Trade Unions

What a trade union is created to achieve is influenced by the circumstances surrounding its creation, especially as trade union mostly exist to serve its members. Below is a summary of some trade unions in Nigeria, and their objectives as contained in their charter:

Nigeria Labour Congress (NLC): As the parent union of all other trade unions in Nigeria, the objectives of the Nigeria Labour Congress include the following:

1. By strengthening collective bargaining in all sectors of the Nigerian Economy, the NLC seeks to promote and sustain good industrial relation practices in Nigeria;

2. To secure equity for women, as relating to their status and condition of service within the corporate community and the society at large;
3. To advance the welfare of the Nigerian workers, as well as to safeguard their economic, political and social rights;
4. To make a meaningful contribution to the industrial growth of Nigeria as well as to fight for the protection of jobs, as well as the work environment;
5. To encourage the actuality of one trade union and/or one federation of trade unions in every industry; as well as the creation of a central labour organization in Nigeria;

Academic Staff Union of Universities (ASUU): As the umbrella union for all teaching staff within the University community, the objectives of ASUU according to the ASUU constitution of 1978, amended in 1984 are summarized as follows:

1. To safeguard and promote the socio-economic and cultural interest of the Nigerian Nation.
2. To secure and sustain a just and appropriate condition of service for academic staff engaged in the university community.
3. To interface between academic staff and university management/government
4. To advance the place of education in Nigeria through the creation and sustenance of a high standard of academic performance as well as professional practice.
5. To improve the quality of its members through education and training.

College of Education Academic Staff Union (COEASU): Very similar to ASUU, the objectives of COEASU is summarized thus;

1. To negotiate for better working conditions for its members.
2. To interface between academic staff and university management/government.
3. To foster teaching effectiveness through the promotion of professionalism.
4. To promote the development of research facilities within the college community.

Academic Staff Union of Polytechnic (ASUP): ASUP is an umbrella name union which represents all the teaching staff engaged in government-owned Polytechnics in Nigeria. The objectives of ASUP is summarized thus;

1. To employ the principles of good governance in the achievement of the Nigerian educational goals at Polytechnic/Monotechnic levels through an active partnership with the Federal and State Governments.
2. To advance the place of education in Nigeria through the creation and sustenance of high academic performance as well as professional and technological practice.
3. To stimulate the increased involvement of its members in the advancement of technical education and commerce in Nigeria.
4. To interface between academic staff and Polytechnic/Monotechnic management/government
5. To improve the quality of its members through education and training.
6. To secure and sustain an appropriate condition of service for its members.

Historical Antecedents of Adeniran Ogunsanya College of Education, Otto/Ijanikin, Lagos State, Nigeria

The establishment of Adeniran Ogunsanya College of Education,Otto/Ijanikin, Lagos State, Nigeria can be traced back to the year 1958 which saw the emergence of the institution as a Grade III Teacher Training College, which took off with a total number of ninety students in its first year. The institution continued to make progress in terms of the number of students matriculated each year. However; in the year 1982, the institution encountered some challenges which were influenced by the absence of basic infrastructures, and modern facilities crucial in meeting up with the increase in population, thus; the institution was moved from its pioneer location Surulere to Otto-Ijanikin, Lagos State, Nigeria which is its present site.

Over the years, the institution has undergone a change in nomenclature from Lagos State College of Education, to Adeniran Ogunsanya College of Education as we know today. The institution has also

expended her scope by moving from a Grade III Teacher Training College to a fully-fledged college comprising of 6 schools, which includes the School of Arts and Social Science, School of Science, School of Education, School of Vocational and Technical Education, School of Early Childhood and Primary Education and School of Languages. However; all this would not have been possible without the relentless effort of COEASU, which is the representative of academic staff in the institution and that of the other unions in the college. COEASU performs the following roles within the college community:

Maintenance of peace and stability in the institution: The union, through its regular interface with management/government on behalf of its members, has contributed to the peace and stability of the institution immensely. Peace and stability are important conditions that need to be met by a nation, organizations and even families for any meaningful progress to be made. Communication is the life wire of any organization because the daily operation of the institution is dependent on the flow of communication from management to employees. When there is a breakdown on information which may lead to a repressed feeling, feeling of injustice or other forms of intimidation, such an organisation runs the risk of seeing productivity level go downwards, and in worst-case scenario unrest. COEASU, prevents the onset of this development in Adeniran Ogunsanya College of Education, Otto/Ijanikin, Lagos State by interfacing between members and management, communicating the concerns of members to management in a manner that maintains peace and orderliness as well as communicate the concern of management to members (David, 2013).

Creation and sustenance of high standard of academic performance as well as professional practice: A fruit cannot fall far from its tree. This means that it takes quality to create quality. Hence, the union encourages the professional and personal development of its members, through training, participation in seminars, conferences and workshops (Djastuti, 2010). Through this practice, the union is able to produce a quality-oriented workforce which in turn transmits the quality to students at Adeniran Ogunsanya College of Education.

Contribution to the increased availability of physical, technological and research infrastructures within the college community through advocacy: The need for the increased availability of these aforementioned infrastructures has been among the core demands of the union. It is important to note that the little development enjoyed in the tertiary community today came to be through the struggles and doggedness of trade unions. COEASU, through its advocacy, is able to attract intervention projects worth over hundreds of thousands of naira from bodies like TETFUND, ETF among others. These intervention projects contribute to creating a conducive environment for learning to occur by building and renovating old structures. It also increases learning facilities and promotes by providing up to date laboratory equipment, library, IT and ICT infrastructures and as well provides funds for research and continuous upgrading of the teaching staff (Tony, 2014). All of this is channeled towards enabling the education institution and her products to measure up to their counterparts in other parts of the world.

Notably, COEASU as any other organisation comprised of humans is liable to some pitfalls. Due to a breakdown in communication between the Union and Management, the Union has embarked on a series of industrial actions which has interfered with its mandate in the college community. The decision to opt to strike as a last resort by the union has generated lots of criticism from students, who are the casualty of any industrial action as well as parents who are imposed an untold hardship of taking financial responsibility for the extra academic years for their children due to strike. One of such instances is the strike action of 2013 ran for a period of 8 months (Abayomi and Arenyeka, 2013).

This has been followed by series of strikes and other forms of industrial action. In 2014, two unions in the college which are Colleges of Education Academic Staff Union (COEASU) and the Senior Staff Union of Colleges of Education Nigeria (SSUCOEN), embarked on a protest, in which movement to and fro of the college was halted. As a way of expressing their displeasure to the failure of the college management to pay its members' salary arrears, the union locked the entrance to the institution, thus preventing students and even the Provost of the college from gaining entrance into

the college, except for GCE examination takers who were granted access into the college. This approach by the union truncated activities in the college, and thus was tagged selfish and inconsiderate. Specifically, Mr. Bashorun O. Wasiu, the Provost of the institution as at that time, expressing his displeasure was quoted as saying "the issues raised were not new and that we expected the union leaders to adopt a collaborative approach in dealing with them".

In 2019, the academic activities were crippled following the strike action of COEASU, over issues relating to the payment of arrears, payment of ₦350 million bailout; constant power supply, as well as IGR schemes. In reaction, the government of Lagos State made a payment of ₦210 million out of ₦250 million that was agreed upon. This response from the government did not go well with the union. The refusal of the union to shift grounds, however, earned her so much criticism even from the members of the college community. Specifically, Mr. Muhideen Sheu , the Registrar of the college, was quoted as saying "the unions could never be pleased because their agitations were always unpredictable" (Punch, 2019). Hence, the major pitfall of trade unions in Adeniran Ogunsanya College of Education, Otto/Ijanikin, Lagos State, Nigeria lies in their strategic approach to issues, which indirectly places the quality and standard of education obtainable in the institution in jeopardy.

Theoretical Review

For this study, the General System Theory (GST) is adopted for analysis. The General System Theory was birthed through the efforts of Ludwig von Bertalanffy in the year 1940. Ludwig von Bertalanffy, in his theory, concerned himself with the exploration of laws that can be generalized across various systems. A system, according to the theory entails an arrangement which is constituted by two or more elements/ parties, sharing a given degree of interdependency in the sense that the actions, decisions, cum behaviour of one element/party asserts influence on the behaviour of other elements/parties involved in the arrangement. Thus, the behaviour and the effect of such behaviour of each element on the whole system are interdependent; and while subgroups of the elements all affect the behaviour of the whole, none has an independent effect on it (Skyttner, 1996). Also, the General System Theory proposes the existence of an intertwined relationship between various groups and subgroups in a given organisation.

According to the theory, this intertwined relationship is so delicate in the sense that the action of any subgroup or group affects the whole system. For instance, in an organization, the decision of the manager may affect the whole organizational procedures. Thus, Morgan (2009) has noted that "organizations contain individuals (which are systems themselves) who belong to groups or sections that also belong to larger organizational divisions, and so forth. Towing this line, the Polytechnic here is referred to as a system, and the academic staff, non-academic staff, the management staff and the students are the elements that make up the system. None of these elements is independent as they all work together; the actions influence each other".

The General System Theory finds its applicability in this study in the sense that it tries to highlight the intricate nature of the relationship existing between various stakeholders in organisations, with focus on emphasizing how the various actions of each element/stakeholders in the system affect all other stakeholders and the organisation at large. On a more specific note, in the tertiary institutions, the management, the teaching staff, the non-teaching staff, government as well as students are the core elements that make up the tertiary institution.

Applying the General System Theory, it can be said that the behaviour of each element in the set will greatly determine the actions and response of every other element. This is exemplified in the events of disagreement between government/management with the teaching and non-teaching trade unions in the tertiary education community, which in most cases, leads to the disgruntled union striking. The onset of strike automatically affects every other aspect of the institutions as academic and administrative functions are suspended as the case may be, which the students are sent back home unplanned. The general effect on the institution is seen in a setback in the attainment of a given academic calendar and the crippling of the overall functioning of the institution.

Methodology

This study employs a survey research design. This design finds its suitability in this study because of its ability to describe events /things that have occurred and examine the relationship between them without any manipulation of conditions that are experienced. The population of the study comprised of a sample of 380 participants which were drawn from the parent population of 7,298, through the use of Taro Yamane sampling techniques. To ensure even distribution, simple random sampling was used to pick representatives from each group of participants. Thus 5% of the study population was drawn from the teaching staff at various cadre, 30% from non-teaching staff with a focus on principal officers in the college, while the remaining 35% was distributed evenly among the students in the six (6) schools, which includes the School of Arts and Social Science, School of Science, School of Education, School of Vocational and Technical Education, School of Early Childhood and Primary Education and School of Languages.

Data for the study was collected through the use of questionnaires which were administered and collected on the spot by the Researcher. The data obtained from the study participants were analyzed using a relevant statistical method such as frequency count, mean and standard deviation.

Data Presentation and Analyses

Table 1 : What are the roles of trade unions in the attainment of the educational goals of Adeniran Ogunsanya College of Education, Otto/Ijanikin, Lagos State, Nigeria?

ITEMS	N	Mean	Std. Deviation
Engaging government/management so as to mitigate the numerous challenges impeding the attainment of effective teaching and learning	369	3.95	0.941
Promoting research and scholarship	369	4.30	0.745
Sharing the task of maintaining industrial relations with management	369	3.82	0.884
Interfacing with the government/ management on behalf of its members	369	3.45	0.843
Securing infrastructural development through its advocacy	369	4.15	0.739
Valid N (listwise)	369		

Source: Field Survey, 2019.

Table 1 above shows the roles of trade unions in the attainment of the educational goals of Adeniran Ogunsanya College of Education, Otto/Ijanikin, Lagos State, Nigeria. The table reveals that, on average, the survey respondents agree with all the statements in the table. Furthermore, respondents pointed out that there are some roles and activities of the trade union that needs to be reviewed and redefined so that the union can attain their educational goals. The respondents noted that there is a need for the union to keep organising seminars and workshops in order to be redefining and restating the goals of the union. The study also found that it is necessary for the union to fine-tune their medium of communication as the respondents noted that the communication channel seems to be poor and to contribute more to lack of the accomplishment of the union's goal. This is because it was noted that bad communication channel creates a form of wrong information which end up as a wrong perspective and mindset of the union. The union also needs to create a good welfare package for its members while developing a platform which allows for the greater participation of the members of the trade union in the management decision making processes.

Table2: To what extent does the management of Adeniran Ogunsanya College of Education, Otto/Ijanikin, Lagos State, Nigeria promote peaceful coexistence between trade unions and management?

Descriptive Statistics			
ITEMS	N	Mean	Std. Deviation
Adopting transformative leadership	369	3.94	0.943
Imbibing integrity in all its dealings with the trade unions	369	4.31	0.750
Creating a good and comfortable work environment for the members of the trade unions	369	3.73	0.898
Providing good welfare packages of the members of the trade union	369	3.33	0.808
Creating a platform which allows for the greater participation of the members of the trade union in the management decision-making processes	369	4.16	0.750
Valid N (listwise)	369		

Source: Field Survey, 2019.

Table 2 above reveals the mean scores of the respondents' responses on the extent to which the management of Adeniran Ogunsanya College of Education promotes peaceful coexistence between trade unions and management. The mean shows that, on the average, the survey respondents agree with the statements. The responses show that the management adopts a transformative kind of leadership; imbibes integrity in all its dealings with the trade union; creates a good and comfortable work environment for the members of the trade union; provide good welfare packages of the members of the trade union; and create a platform which allows for the greater participation of the members of the trade union in the management decision-making processes. All these enable a smooth and cordial relationship between the management of the institution and trade union in the college.

Table 3: What are the factors promoting disagreement between the management of Adeniran Ogunsanya College of Education, Otto/Ijanikin, Lagos State, Nigeria and trade unions in the institutions?

ITEMS	**N**	**Mean**	**Std. Deviation**
Issues relating to the condition of service	369	4.02	0.912
Underfunding of the tertiary institution	369	4.31	0.704
Non-payment of salaries	369	4.01	0.780
Depleted states of infrastructure	369	3.82	0.834
Non-payment of arrears and entitlement	369	4.12	0.698
Valid N (listwise)	369		

Source: Field Survey, 2019.

Table 3 shows the responses on factors that promote disagreement between the two parties in the college. While the table shows that the respondents, on the average, agree to all the factors listed in the table, the respondents further note that the union end up electing immature personnel to the various crucial positions in the union, which leads to improper handling of the activities of the union as well as taking a decision on several issues as may arise in the operations of the union. They also noted that the union also needs to get rid of individuals of unquestionable character occupying various positions in the union. They stated that some of the leaders of the union do not maintain integrity required of them, hence, denting the image of the union. The respondents went further to state that mature individuals who have integrity and are proactive should be elected to union leadership in the interest of the progress of the union.

Table 4: How can the identified problems of trade union grievances in Adeniran Ogunsanya College of Education, Otto/Ijanikin, Lagos State, Nigeria be resolved?

Descriptive Statistics			
ITEMS	**N**	**Mean**	**Std. Deviation**
Collective bargaining	369	4.05	0.888
Dialogue	369	4.31	0.701
Granting autonomy to the tertiary education system	369	3.93	0.818
Systematic need assessment of the tertiary institution	369	3.75	0.848
Increased compliance on the part of the government to honour agreements reached upon by the two bargaining parties	369	4.19	0.694
Valid N (listwise)	369		

Source: Field Survey, 2019.

Table 4 reveals respondents' suggested solutions to the identified problems. The respondents, on the average, agree to all the items in the table. Moreover, the respondents also noted that for a union to realize its goals and objectives, there is the need to maintain a cordial relationship with the management of the school. The respondents noted that in the face of disagreements between the union, or possible industrial action, there is the need to realise when to retreat and get back to the negotiation table to avoid straining the relationship that exists between the pair. It was pointed out that in the face of disagreement, especially in the wake of industrial action, there is dwindling of the institutions internally generated revenue, which subsequently affect both parties in the long run. There is also the need for the union to use their platform to call on their members to maintain the professional ethics and they need to monitor the activities of their members and mete appropriate punishment for those that err, to serve as a caution to others.

Conclusion

This paper was aimed at ascertaining the roles of trade unions in the attainment of educational goals in Adeniran Ogunsanya College of Education, Otto/Ijanikin, Lagos State, Nigeria. Based on the findings it is imperative to note that in order to reposition educational institutions in Nigeria, the continued existence and efforts of the Union are essential. Meaning that trade union remains relevant to the extent that the educational institution requires members of the union to achieve corporate goals. Once the continuing relevance of those driving the system's principles is disconnected, it will undoubtedly call for some level of introspection. In general, it should be noted that the trade union structure also needs specific transitional steps to promote negotiations with the government, which in effect translates into improved terms and conditions of employment for its members.

Recommendations

The recommendations below are based on the findings and the conclusion reached in this study:

i. Although the right to association is a fundamental one, Adeniran Ogunsanya College of Education, Otto/Ijanikin, Lagos State, Nigeria must continue to accept employee organizations, but the demands of such unions must be met through dialogue to prevent incessant strike actions because it is now clear that ramified interference and the absence of a systematic regulatory mechanism for industrial relations and guidelines for membership in the activities of unions, associations, clubs and societies have weakened the ability of successive public university administrations in Nigeria to define and enforce responsibilities, rights and privileges in relation to each other.
ii. All laws that are subject to collective agreements freely entered into by unions and management should be reviewed for approval by the Labour Minister. In order to ensure speedy arbitration with a premium on ease of access, affordable cost and consistency and legitimacy of award / outcome, there must be a continuous campaign for improvements in the administration of labour law.

iii. Labour dispute management committees in Adeniran Ogunsanya College of Education, Otto/Ijanikin, Lagos State, Nigeria should be set up to deal internally with all union issues in order to further increase productivity. A tripartite committee of the Government, the National Industrial Court and the Trade Union should be set up to recommend the review constantly.

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Microtools Based on The Relational Data Model for Improvement of Information Processes – Multiplicity of Relationships, and Mandatory Nature of Relationships and Attributes

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Abstract

Spreadsheets are very popular among a multitude of different contemporary organisations. They can be used in practice to provide a platform for building one's own tools that support and automate information processes. Independently developed, the tools created in spreadsheets may be consistent with the author's signature concept of Microtools Based on the Relational Data Model. In order to create them, one must apply adequate solutions enabling representation of entities, ensuring data integrity, and acquisition of the reports and collations assumed to be generated. In this article, the author has proposed and discussed three solutions supporting data integrity assurance in the scope of verification of the assumed multiplicity of entities, as well as one solution which supports data integrity assurance in the scope of verification of the mandatory nature of relationships and attributes. In accordance with the concept in question, the solutions proposed in the paper make use of standard spreadsheet features and components, without involving any additional code created in any programming language.

Keywords: Spreadsheet, Database, Business Process Improvement, Information Process

Introduction and Literature Review

In order to function properly, every contemporary organisation is required to collect and process massive amounts of information. All processes which involve such activities are referred to as information processes (Oleński, 2001; Oleński, 2002). In a decided majority of cases, implementing and performing information processes is inextricably linked with using adequate IT tools. Even though numerous advanced integrated solutions are in use, it is relatively frequent that one still comes across processes which require sufficient tools to be created quickly and independently to support them. What proves to provide a great platform enabling such tools to be built is spreadsheets, popular and commonly used in organisations. This group of tools can be applied in very diverse functional spheres of organisations. Numerous publications have proposed to use spreadsheets for purposes of quality management (Knight, 2006; Szczęśniak, 2010b; Szczęśniak and Molenda, 2013), financial management (Jackson and Stauton, 2013; Wilczewski and Wrzód, 2008), cost analysis (Gabler at al, 2000), sales and marketing (Carlberg, 2009; Winston, 2011), or knowledge management (Dohn at al, 2013). Further interesting concepts are those which imply to combine spreadsheets, the relational data model, and the SQL language (Cunha at al, 2009; Witkowski, 2003; Witkowski, 2005). In most cases, they pertain to making use of various extensions. There are also concepts based on the assumption that spreadsheets can be used without extensions as an environment in which data describing a structure conforming with the relational data model can be successfully stored and processed. The year 2010 saw the publication of a concept according to which the spreadsheet would be used as a relational database engine (Tyszkiewicz, 2010). The paper in question demonstrated the possibility to perform the actions intended for the relational data model by means of solutions based on standard spreadsheet features. This concept was later complemented with a proposal to implement a recurrent sorting algorithm in the spreadsheet (Sroka at al, 2015), as discussed in the literature of the subject in 2015. Roughly at the same time, i.e. in 2010, a tool designed to support the timetable preparation process for a special education school was discussed in another paper (Szczęśniak, 2010a). This tool was built on the basis of a relational data model dedicated to the problem analysed, and all of its assumed functionality was acquired by means of standard spreadsheet functions as well

as such features as conditional formatting, data validation, and name manager. The tool description highlights its three main aspects, namely the manner of representation of the model's entities in the spreadsheet, the problem of ensuring integrity of the data stored, and the problem of producing all the required collations and reports based on the data thus stored. This solution gave rise to an approach which was used multiple times in the years to come while creating various spreadsheet tools intended to support analyses (Szczęśniak and Molenda, 2013) or managing processes in an organisation (Szczęśniak and Wolniak, 2016; Zasadzień at al, 2017). In 2016 (Szczęśniak, 2016), the concept of creating tools such as these received the official name of Microtools Based on the Relational Data Model, abbreviated to MiRel.

The relevance of the possibility to use the relational data model for purposes of data analysis in spreadsheets was also recognised by developers of this type of software. Starting from the 2013 version, the most popular spreadsheet, which undoubtedly is MS Excel, enables defining a data model by identifying tables and the relationships between them. However, insofar as the MiRel concept envisages building tools to be used for processing of sets of continuously acquired data, the data model embedded in MS Excel can only be used to put them in order for purposes of the reports and analyses being created. Its capabilities are considerably limited in terms of defining and executing the assumed data integrity constraints. Despite these limitations, when combined with the pivot tables and charts created on the basis of the said model, the latter may provide a very convenient extension to the tools designed in accordance with the MiRel concept.

The solutions proposed under the MiRel concept pertain to the three aforementioned aspects. The papers concerning this concept published to date have discussed the aspects of entity representation (Szczęśniak, 2017), the transition from type II to type I of entity representation (Szczęśniak, 2018a), and data integrity assurance vis-à-vis ensuring conformity between the values of foreign keys and the values of primary keys (Szczęśniak, 2018b). The content provided further on in this paper supplements the previous publications, and it pertains to the problems of data integrity perceived from the perspective of the multiplicity and mandatory nature of relationships between entities, as well as the mandatory nature of individual attributes. The solutions proposed in this respect have been provided in the subsequent two sections.

Solutions used to ensure the required multiplicity of relationships between entities

The first of the cases examined is an arrangement where every value of the primary key of the parent entity must occur at least once in the linked child entity. A model arrangement of entities for this case has been illustrated in Figure 1.

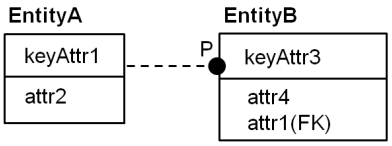

Fig. 1: Arrangement of entities in the first case

In the tool created in line with the MiRel concept, one should signal a situation where the values of attribute "KeyAttr1" entered in the table representing entity "EntityA" never exist as the values of attribute "Attr1" in the table representing entity "EntityB". The manner in which this is signalled should enable easy identification of the problematic values of attribute "KeyAttr1", making it possible to quickly correct an erroneous data arrangement. In accordance with the MiRel concept, tables representing both entities are placed in separate worksheets. The problem at hand can only be identified in the worksheet containing the table representing entity "EntityA". A solution which allows for quick identification of incorrect values in this case is based on the conditional formatting mechanism. This solution has been schematically illustrated in Figure 2. It has been assumed that –

similarly to all the other solutions discussed further on in this paper – the range in which data can be entered comprises 10 successive rows, starting from row 2. Such a range of rows is taken into account in the cell addresses in the formulas provided. The formula which occurs in the given range (column or group of columns) is presented for the top left cell of the range, and its form in other cells of this range results from standard rules of formula copying in spreadsheets.

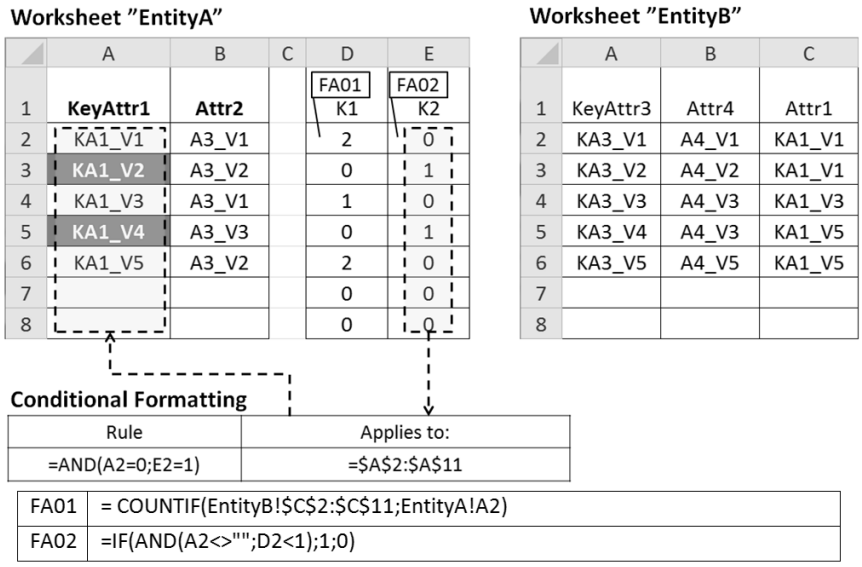

Fig. 2: Schematic representation of the solution proposed for the first case

This solution entails adding two auxiliary columns "K1" and "K2" in worksheet "EntityA". What is defined in column "K1" is the number of occurrences of the current value of attribute "KeyAttr1" among the values of attribute "Attr1" in worksheet "EntityB". In column "K2", the value of "1" is used to mark the rows in which the values of attribute "KeyAttr1" should be highlighted by conditional formatting.

The second case subject to analysis corresponds to a situation in which each value of the parent entity's primary key can occur as the value of the linked child entity's foreign key one time at the most. Such an arrangement has been illustrated in Figure 3.

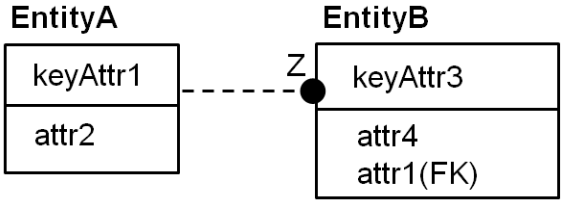

Fig. 3: Arrangement of entities in the second case

In the tool created in line with the MiRel concept, one should signal a situation where any of the values of attribute "KeyAttr1" from the table representing entity "EntityA" will occur several times among the values of attribute "Attr1" in the table representing entity "EntityB". Where this is the case, the problem at hand can be signalled both in the worksheet containing the representation of entity "EntityA" as well as in the worksheet containing the representation of entity "EntityB". Figure 4 provides a schematic diagram of the solution intended for this case.

Two auxiliary columns have been added to worksheet “EntityA”. In column “K2”, the number of occurrences of attribute “KeyAttr1” among the values of attribute “Attr1” in worksheet “EntityB” is verified. In column “K2”, the value of “2” is used to mark the cases in which the current attribute occurs more than once. The values from column “K2” constitute the basis for applying conditional formatting in range “A2:A11”. In worksheet “EntityB”, auxiliary columns “K3” and “K4” have been added. What one defines in the first of those two is the number of occurrences of the current value of attribute “Attr1” among all the values of this attribute. In the second one, the value of “2” is used to mark the attributes which occur more than once. This column is used by applying conditional formatting to range “C2:C11”. The solution in question allows to tool user to identify – both in worksheet “EntityA” and in worksheet “EntityB” – the values which violate the pre-assumed relationship multiplicity principle.

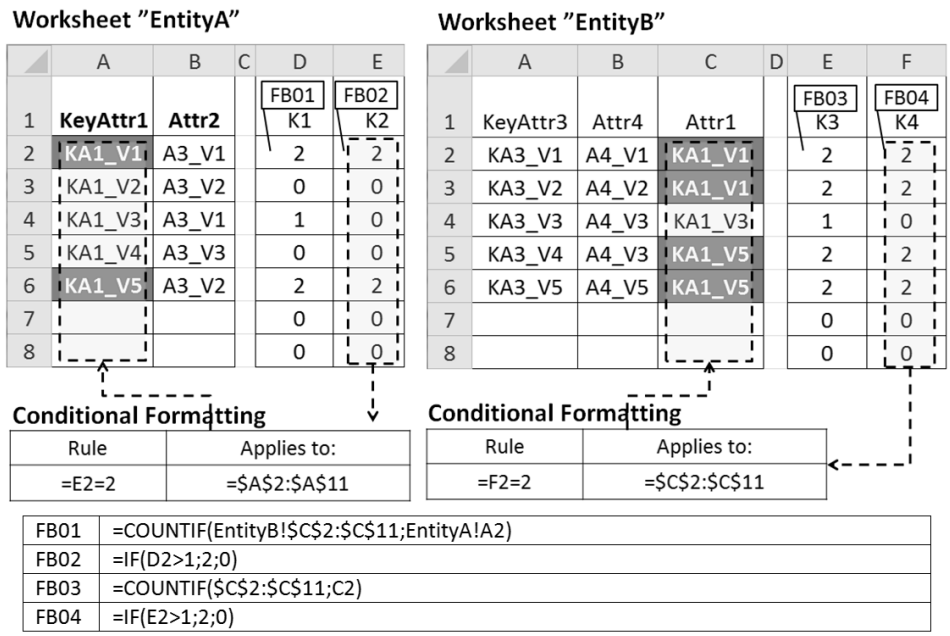

Fig. 4: Schematic representation of the solution used in the second case

The third of the cases analysed represents a situation in which each value of the parent entity’s primary key should exist from “n” to “m” times as the value of the corresponding child entity’s foreign key. Such a case has been illustrated in Figure 5.

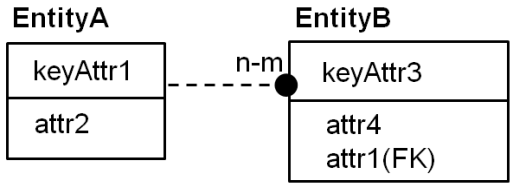

Fig. 5: Arrangement of entities in the third case

In the tool created in line with the MiRel concept, one should signal both a situation in which any value of attribute “keyAttr1” from worksheet “EntityA” exists as the value of attribute “attr1” in worksheet “EntityB” less than “n” times or does not exist at all, and a situation where this value

exists more than “m” times. The problem at hand can be signalled both in worksheet “EntityB” and in worksheet “EntityA”. The solution which announces a problem in the case discussed has been schematically depicted in Figure 6.

In line with this solution, two cells “KeyAttr1 Min” and “KeyAttr1 Max” have been added in worksheet “EntityA” representing the parent entity, and in these cells, one enters the values of “n” and “m”, respectively, to define the multiplicity of the relationship. Additionally, two auxiliary columns “K1” and “K2” have been added in the same worksheet. Formula “FC01” in column “K1” determines the number of occurrences of the current value of attribute “KeyAttr1” among the values of attribute “Attr1” in worksheet “EntityB”. Formula “FC02” to be found in column “K2” returns the value of “2” if there are too many occurrences, or “1” in the event that the occurrences are too few. With reference to the values in column “K2”, making use of the conditional formatting mechanism, the values of attribute “KeyAttr1” with too few or too many occurrences are highlighted by means of pre-defined and clearly distinctive formats. At the child entity, i.e. in worksheet “EntityB”, two auxiliary columns have also been added. Formula “FC03” in column “K3” determines the number of occurrences of the current value of attribute “Attr1” among all the values of this attribute. Formula “FC04” in column “K4” returns the values of “1” and “2” in the event that the number of occurrences is too small or too large, respectively. This column is used by the conditional formatting mechanism to highlight the values of attribute “Attr1” accordingly.

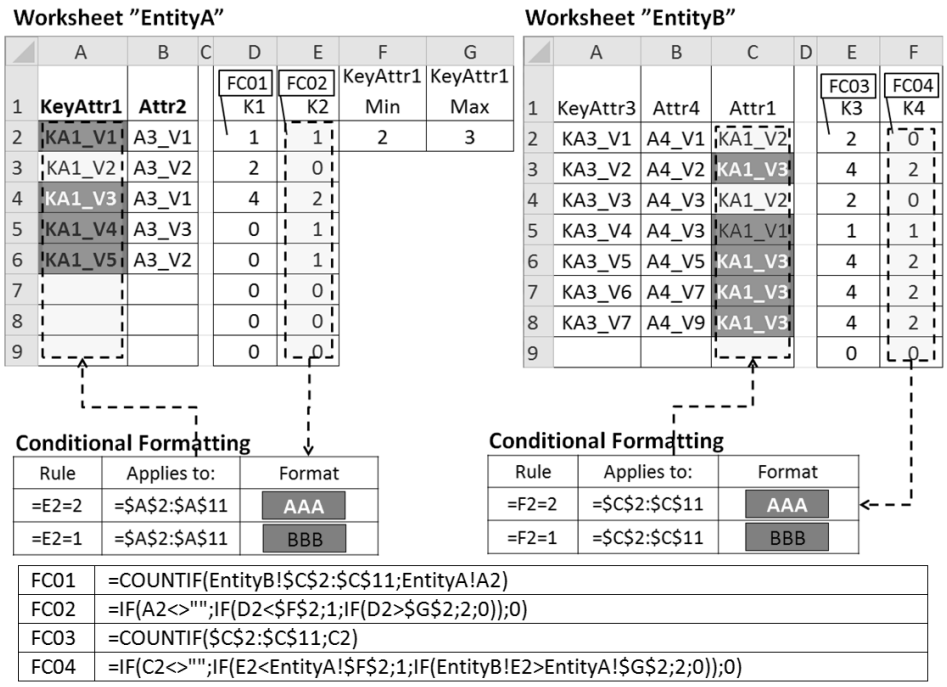

Rule	Applies to:	Format
=E2=2	=$A$2:$A$11	AAA
=E2=1	=$A$2:$A$11	BBB

Rule	Applies to:	Format
=F2=2	=$C$2:$C$11	AAA
=F2=1	=$C$2:$C$11	BBB

FC01	=COUNTIF(EntityB!$C$2:$C$11;EntityA!A2)
FC02	=IF(A2<>"";IF(D2<$F$2;1;IF(D2>$G$2;2;0));0)
FC03	=COUNTIF($C$2:$C$11;C2)
FC04	=IF(C2<>"";IF(E2<EntityA!$F$2;1;IF(EntityB!E2>EntityA!$G$2;2;0));0)

Fig. 6: Schematic representation of the solution used in the third case

Mandatory nature of relationships and attributes

The problem related to this aspect consists in the necessity to identify situations in which the values of mandatory attributes have not been entered for the entity’s occurrences which have been entered. What one establishes as mandatory attributes is all attributes without pre-defined optionality as well as foreign keys linked with mandatory relationships. For the arrangement shown in Figure 7, in entity “EntityA”, the optional attributes are “Attr4” and “Attr3”, while the mandatory attributes are “KeyAttr1”, “Attr2”, and “Attr5”.

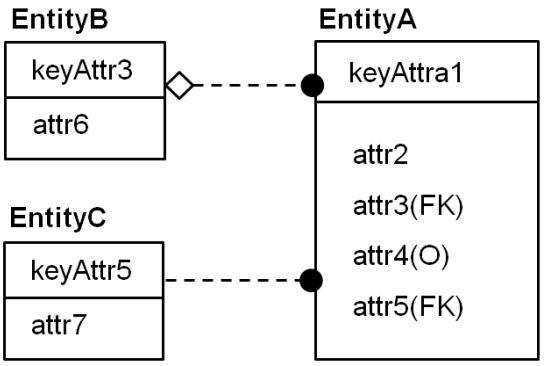

Fig. 7: Arrangement of entities with mandatory and optional attributes

In the tool created in line with the MiRel concept, one should signal a situation in which, in any row of the table representing entity "EntityA", there is an entered value of at least one of the attributes "KeyAttr1", "Attr2", "Attr3", "Attr4", or "Attr5", while at the same time, there is no value of any of the attributes "KeyAttr1", "Attr2", or "Attr5". Figure 8 provides a schematic diagram of the solution proposed for this case, in which an auxiliary column has been added in worksheet "EntityA". Every column of this table is linked with the corresponding column in the table representing entity "EntityA". Values "R" or "O" have been entered in the headers of individual auxiliary table columns, depending on whether or not the attribute corresponding to the given value is mandatory or optional, respectively. The uniform formula "FD01" entered in the entire table uses the value of "1" to mark the cases in which the corresponding cell of the table representing entity "EntityA" remains empty even though it should contain some value.

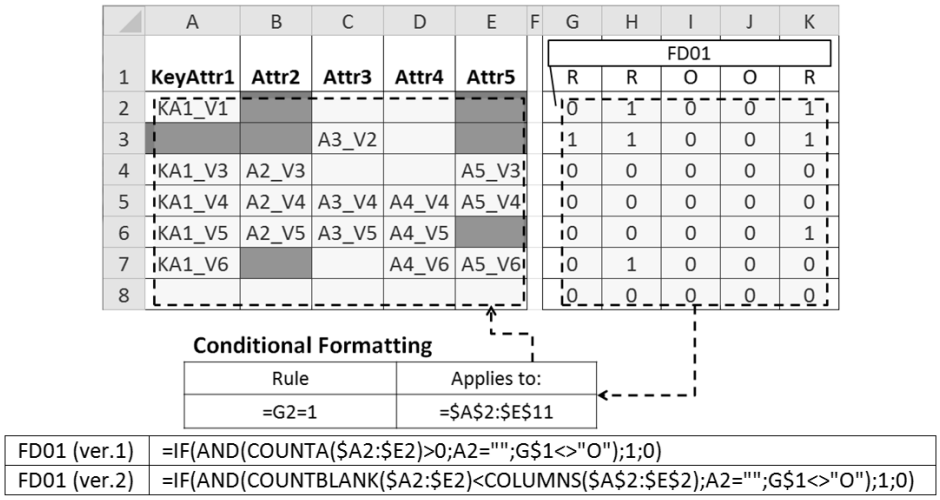

	A	B	C	D	E	F	G	H	I	J	K
							FD01				
1	KeyAttr1	Attr2	Attr3	Attr4	Attr5		R	R	O	O	R
2	KA1_V1						0	1	0	0	1
3			A3_V2				1	1	0	0	1
4	KA1_V3	A2_V3			A5_V3		0	0	0	0	0
5	KA1_V4	A2_V4	A3_V4	A4_V4	A5_V4		0	0	0	0	0
6	KA1_V5	A2_V5	A3_V5	A4_V5			0	0	0	0	1
7	KA1_V6			A4_V6	A5_V6		0	1	0	0	0
8							0	0	0	0	0

Conditional Formatting

Rule	Applies to:
=G2=1	=$A$2:$E$11

FD01 (ver.1)	=IF(AND(COUNTA($A2:$E2)>0;A2="";G$1<>"O");1;0)
FD01 (ver.2)	=IF(AND(COUNTBLANK($A2:$E2)<COLUMNS($A$2:$E$2);A2="";G$1<>"O");1;0)

Fig. 8: Schematic representation of a solution which identifies the missing values of attributes.

This formula has been presented in two versions. Version one, being less complex, can only be applied in the event that all attribute values are manually keyed in. Version two is more universal. It can also be used in the case when it is possible that values of certain attributes are entered by formulas. The values in the auxiliary table provide the basis for the conditional formatting mechanism which highlights the cells containing the missing attribute values.

Conclusions

With regard to the problem of ensuring the pre-assumed multiplicity of relationships between entities in a tool created in line with the MiRel concept, the following three cases have been analysed:

1. The least complex case, where each instance of the parent entity must be linked with at least one instance of the child entity;
2. The case where each instance of the parent entity can be linked with one instance of the child entity at the most;
3. The most complex case, where the number of instances of the child entity, with which every instance of the parent entity must be linked, is defined by the n–m range.

For each of the aforementioned cases, a distinctive solution has been proposed and discussed as a means to support data integrity assurance. Furthermore, another solution which has been proposed is to support verification of the assumptions pertaining to the mandatory nature of individual attributes and relationships of entities. All the solutions proposed in the paper make use of a relatively limited set of built-in spreadsheet components and features, including the conditional formatting mechanism as well as functions such as IF(), COUNTA(), COUNTBLANK(), COLUMNS(), AND(), and COUNTIF(). It has been demonstrated that the problem of data integrity assurance analysed from the perspective of the multiplicity of entity relationships and the mandatory nature of relationships and attributes can be solved in a relatively simple manner without having to use a code written in any of the programming languages. The solutions proposed by the author as the means to ensure conformity of primary keys in parent entities with foreign keys in child entities, along with those discussed previously in the literature of the subject, represent the set of solutions to the problem of data integrity assurance proposed under the MiRel concept.

Acknowledgements

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Analysis of the Routing Stage for an Oversize Vehicle in Poland from the Traffic Safety Viewpoint

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Abstract

The article discusses the routing stage for an oversize vehicle as a component of the process of planning the carriage of oversized cargo. As part of this concept, based on the analysis of Polish and foreign literature as well as normative documents, the main factors determining the route were presented in a synthetic way: vehicle parameters, maximum single axle weight, gross vehicle weight and atmospheric conditions. Their multitude generates a negative impact on both the infrastructure and other traffic participants, and any negligence in the area of their analysis may have fatal consequences. The author aimed at determining the requirements set by planners, as well as confronting the needs of the oversize transport market with both Polish and EU regulations being currently in force. In addition, the article cites actual examples covering elements of infrastructure that do not meet technical requirements, requirements of traffic participants as well as legal aspects.

Keywords: Oversize Transport, Traffic Safety, Route Planning

Introduction

Along with the economic growth and development of the industrial sector, and consequently the sectors encompassing mining, energy generation, construction and metallurgy, the demand for special transport services necessitated by cargo dimensions has increased. Thus, oversize transport was born, strictly correlated with the implementation of large public investments. The transport market for oversize cargo enforces an individual approach to each order, appropriate logistic preparation, obtaining appropriate permits and the use of specialised equipment, including both the vehicle fleet and transhipment machinery. On the other hand, these orders also require specialised staff possessing proficient analytical skills. Transported cargo may reach dimensions requiring complete closure of some road sections, conducting detailed expertise, rebuilding infrastructure elements as well as detailed planning which sometimes might even last from a few to several months. These aspects cause the oversize transport to be termed an “elite” one.

Planning oversize transport is a multi-stage process and a tedious one at the same time, considering the degree of impact on the infrastructure and other traffic participants. Its duration generates costs which are associated with administrative activities, specialised equipment, a significant amount of work from the persons involved and interference with the existing road infrastructure. The requirements set for the modern oversize transport enforce, among others, continuous updating of data on traffic incidents and the state of infrastructure. In the report by Polish Central Statistical Office (2017), the amount of transported cargo significantly increases year by year, which, taking into account the increase in the number of traffic participants and the lower road capacity, further complicates implementation of travel.

The purpose of the article is to analyse the routing stage for an oversize vehicle along with an indication of the key components which are necessary to be included in the planning process.

The research problems were defined in the form of questions:

1) *What aspects does the stage of oversize vehicle routing include?*
2) *How should specific components be considered so that the planned route will guarantee safety during the execution of a transport task?*

The following research methods were used in the article: quantitative analysis and synthesis, deduction and inference.

The stage of routing as a component of the planning process

Oversize transport is an activity which requires both comprehensive service of transport and forwarding service and is associated with increased requirements for road infrastructure, i.e. a set of elements having specific technical parameters. This is related to the need for transporting cargo, whose specificity implies an individual approach to the transport process. Since an oversize vehicle is a means of transport exceeding the parameters specified in road traffic regulations, i.e. weight, maximum axle weight, height, width or length, it has a greater degree of impact on the transport system. Table 1 shows the dimensions which determine the said vehicle.

Table 1: Parameters defining an oversize vehicle

Parameter	The length of the semi-trailer combination	The length of the combination with a trailer	Width	Height	Gross vehicle weight
Value [m, t]	16.5	18.5	2.55	4	40

Source: *Traffic Law Act.*

On account of exceeding the presented dimensions, undertaking carriage with this type of vehicles requires a lot of work, both for the transport organisation staff and operators or drivers performing the carriage. This type of transport is usually associated with a problematic cargo which generates a specific logistics task (Jóźwiak & Kawa 2009). All these components contribute to the oversize transport being an elite and niche segment of the transport services market (Juściński 2017). The process of planning the movement of vehicles exceeding the permissible dimensions set forth in road traffic regulations therefore encompasses a number of activities aimed at the efficient and safe transport of cargo to the destination. In the article by R. Barcik (2015) an analysis of the planning process in a selected enterprise was made, and the types of planning and organisational activities relating to routing stage with their duration were specified as shown in Table 2.

Table 2: Activities carried out as part of the oversize transport planning process (routing stage)

Type of activity	Duration [weeks]	Description
Routing	3	Initial determination of the optimal route
Trial journey	2	A journey along the determined route in order to evaluate its parameters and potential problems during transport
Determining alternative routes and journeys along them	6	Determining alternative routes which skip the sections of the original route on which problems occurred
Final route selection	4	Analysis of alternative routes in terms of time, distance and cost of travel, route selection and submission to the General Directorate for National Roads and Motorways (GDDKiA)

Source: Barcik (2015)

When analysing Table 2, it should be emphasised that several carriage routes should be taken into consideration when planning the journey with an oversized load. This is due to the changeable road situation; thus, an optimal solution is sought, and many transports are planned well in advance. That was, among others, the case for the transport nominated for the ESTA Awards 2017, conducted by MTD Skuratowicz, which had to evaluate the capacity of transporting the reactor along the Klaipeda – Grodno route three years in advance.

The main factors determining the course of the carriage route

The process of planning an oversize vehicle movement consists of key activities, at the stage of which the difficulty of the transport task is finally determined. Determining the initial route, and then alternative routes, allows one to perform a real calculation of the cost, which consists mostly of permissions obtained and dismantling works performed along the route. Determining the optimal route is a task which requires the analysis of many parameters closely related to road infrastructure and parameters of the travelling vehicle.

Vehicle Height

The height of the cargo brings about a number of difficulties that have to be foreseen at the planning stage. Data from transport companies shows that cargo may be as high as 5.8 m. The regulation of the Minister of Transportation and Marine Economy on technical conditions to be met by public roads and their location (1999) specifies that the clearance gauge is, respectively:

- 4.70 m - over the A, S or GP class road;
- 4.60 m - over the G or Z class road;
- 4.50 m - above the L or D class road.

According to the experience of transport companies, the type of cargo transported may exceed the technical parameters of the engineering objects located on the roads, even in the case of the highest class of roads. The *Regulation* cited earlier indicates that *the linear infrastructure running transversely over the road must not violate the clearance gauge of the road*. In fact, there are many places where the clearance gauge deviates significantly from the value specified in the regulation. Figure 1 shows the railway overpass along the provincial road 631, which is classified as class G road in the town of Nieporęt. The location of the object and its clearance forced the road administrator to introduce a limitation of the clearance gauge of the passing vehicles to 3.7 m. It should be emphasised that the above-mentioned restrictions must be respected not only by companies operating oversize transport, but also by other carriers whose vehicles' height along with the cargo may oscillate around 4m, without forcing them to obtain permissions.

Fig. 1: Railway overpass in Nieporęt on route No. 631

Source: www.googlemaps.com.

The functioning of the facilities that do not meet the requirements imposed by the regulations, as well as the prolonged process of their modernisation, stipulates additional analysis of the transport route. An additional obstacle in the transport of oversized cargo is the location of overhead power lines or other elements of linear infrastructure, at a distance from the ground. The analysis of the dynamic envelope along the transport route should take into account the possibility of temporary increase of its value, by lifting the overhead power lines with special poles. On the other hand, it is also necessary to specify areas where the linear infrastructure, i.e. heating pipelines, prevents non-standard vehicles from passing through. In this case, options such as the passage of the truck combination after unloading the cargo (wheeled vehicles), or passage with partially deflated tyres should be considered.

Vehicle width

Oversized cargo may pose danger to other traffic participants, both during the manoeuvre of overtaking and passing from the opposite direction. In addition, a moving vehicle may damage elements such as: traffic signs, lampposts, road signs, advertisements or other elements located within the route area (Barcik 2015). The possibility of transporting cargo, whose width may be even more than 8 meters, depends on the width of the roadway, which consists of both lanes (including emergency lanes) and hard shoulder. The lane width in Poland varies and depends on the road class. The lane width should be (Journal of Laws 1999 No. 43, item 430):

- for A-class roads - 3.75m,
- for S-class roads - 3.75m or 3.50m (depending on the number of roadways),
- for GP and G-class roads - 3.50m,
- for Z-class roads - 3.00m,
- for L-class roads - 2.75m,
- for D-class roads - 2.50m.

In many cases the roadway width, which results from the regulation, is not sufficient to occupy one lane. Although problematic oversize transport usually takes place at night and requires piloting team, in many cases partial disassembly of the elements located near the road is necessary. In addition, it is necessary to ensure safety and the possibility of travel for other road users. The possibility of passage for an oversize vehicle with a wide cargo is also affected by elements located directly in the axis of the road, such as refuge islands. Although the cargo is usually located more than 50 cm above the ground, and the traffic signs can be dismantled, running over the island's curb with a semitrailer tyre of the standard size 205/65R17.5 usually results in its damage. It should also be emphasised that such a manoeuvre may result in the loss of stability.

The experience of transport companies shows (Loos 2017) that in normal conditions an oversize vehicle moving at night covers on average 100 - 200 km per day. Therefore, when planning the route, care must be taken to identify rest areas for the crew. In the case of a wide vehicle, it is important as stopping such a vehicle on the side of the road for longer than required may lead to the paralysis of local road traffic. The stopover place for such a vehicle is usually a truck parking lot located at filling stations, or motorway rest and service areas (RSA), as they usually have sufficient space.

Vehicle Length

Vehicles with long oversized cargo cause a number of difficulties, requiring analysis at the planning stage. In general, road infrastructure with a linear character offers a considerable capacity for transporting long loads. The problem in their transport, however, is posed by any significant change in the direction of travel. While top-class road curves offer great manoeuvrability, it is often the case that some segments of G-class roads cannot be negotiated due to the length of the travelling vehicle combination. It follows from the Regulation of the Minister of Transport and Maritime Economy on the technical conditions that should be met by public roads and their location (1999) that the radius of a circular road curve depends on the road class, speed limit of this segment and the road grade.

Table 3 shows the values of these parameters together with the relationships between them for G-class roads and higher class roads.

Table 3: The values of the circular arc radius depend on the predicted speed on a road section in the light of applicable regulations

Operating speed (km/h)	**Circular arc radius in the plane (m) with transverse roadway slope[1)]**						
	as on a straight section	2% do 2.5%	3%	4%	5%	6%[2)]	7%[2)]
130	≥4000	≥3500	2500	1800	1400	1100	≤900
120	≥3500	≥3000	2000	1500	1200	900	≤750
110	≥2800	≥2500	1800	1400	1000	800	≤600
100	>2200	≥2000	1400	1000	800	600	≤500
90	≥1600	≥1500	1000	750	600	500	≤400
80	≥1200	≥1100	800	600	450	350	≤300
70	≥1000	≥800	600	400	300	250	≤200
60	≥600	≥500	350	250	200	150	≤125
50	≥450	≥350	250	175	125	100	≤80

[1]) The transverse slope of the roadway for a radius with an intermediate value should be interpolated and rounded to 0.5%.
[2]) Application at the operating speed above 90 km/h requires justification.

Table 3 shows that for the lowest vehicle speed, the arc radius should be over 450m in the absence of a roadway slope and up to 80m in the case of 7% roadway slope. As the road infrastructure in Poland has been underinvested for many years, and a large part of the road sections requires thorough modernisation, planning the route of an oversize vehicle with a long load requires the knowledge of some arc radii. Important points that require proper analysis are road junctions, intersections (especially in urban areas) or unconventional large angle bends. An example would be a bend of more than 90 degrees near Grodzisk Mazowiecki Interchange on regional road no. 579, which belongs to G - class roads, shown in Figure 2. In this case, the transport capacity is also reduced by the fact that there are acoustic screens along the aforementioned bend, which prevents the load from being carried with the help of a semi-trailer equipped with a turntable.

Fig. 2: Satellite image of route No. 579
Source: www.googlemaps.com.

The existence of such solutions as those shown in Figure 2 requires a more detailed analysis of the potential route, bearing in mind, that there are some solutions that do not meet the requirements imposed by the *Regulation (...)*.

Another aspect related to the length of the vehicle is the occurrence of vertical curves, resulting from a diverse terrain relief, including both convex and concave landforms. The line of the intersection of the vertical plane passing through the road axis with the road surface is called the gradeline and its profile determines the possibility of the passage of a vehicle with a long load. Figure 3 shows the diagram of a gradeline and its components.

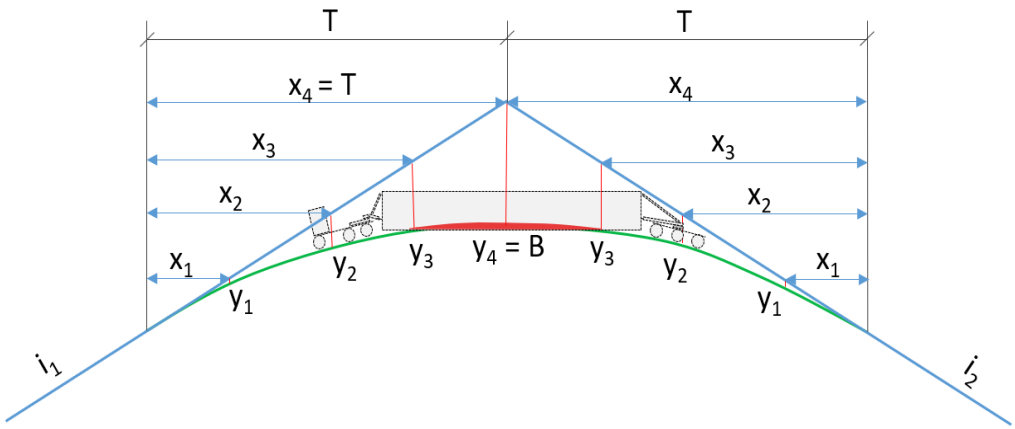

Fig. 3: Diagram of a gradeline relative to a long vehicle

Source: the author's own elaboration

The gradelines are designed according to different conditions, i.e. visibility allowing proper braking distance, overtaking or travel comfort. In figure 3, T marks the tangents to arcs, $x_{1,2,3,4}$ specifies the horizontal distance from the beginning or from the end of the arc ,$y_{1,2,3,4}$ values represent the vertical offset of the arc from the tangent at a distance of x, while $i_{1,2}$ are the absolute value of the slope of straight sections. The capability of traversing a vertical curve by a vehicle with a long load can be determined from the following dependencies:

$$T = R\frac{i_1 \pm i_2}{2} \qquad (1) \qquad\qquad y_i = \frac{x_i^2}{2R} \qquad (2)$$

where:

T – arc tangent,
R – arc radius,
$i_{1.2}$ – straight sections sloping (absolute values),
y_i – vertical offset of the arc to the tangent at a distance of x,
x_i - horizontal distance from the beginning or end of the arc.

The dependencies presented above are helpful in determining the capability of traversing a hill for a long vehicle. It is important to keep in mind that it may not be possible to obtain adequate ground clearance when transporting tanks. M. Ptaszynski (2016) emphasised in his work, based on materials from the company Siemens, that the minimum vertical arc radius for vehicles transporting wind farm elements should be from 300 to 500 m, and the slope from 11 to 15 percent for the carrying vehicles and 4 - 8 percent when moving backwards (the span depends on the equipment used and the road condition).

Another problem in long load transport is the occurrence of intersections, in particular those, that have a roundabout form, i.e. intersections with circular traffic. Such solutions include a central island around which vehicles move and which effectively reduces the capability of passage for a vehicle with an oversized cargo. Despite the fact that roundabouts are treated as the major barrier to the movement of oversized loads, a marked increase in their number can be observed especially in

urbanised areas. In this way, the need for traffic lights to control the movement of vehicles is eliminated and the traffic volume is smoothly discharged. A study in the United States showed that a roundabout reduced traffic delays by 89% and the number of accidents decreased by approx. 37 – 80% (WSDOT 2011). Unfortunately, in many cases the construction of a roundabout limits or even prevents the passage of an oversize vehicle. In addition to building up the internal zone of the roundabout, its capacity is also influenced by diameter values – both of the central island and of the outside perimeter of the roundabout. Table 4 shows roundabout dimensions and their scope of application depending on the road class.

Table 4: Roundabout parameters depending on the place of occurrence

Roundabout type	Middle island diameter [m]	Outside diameter of roundabout [m]	Scope of application
mini	3 – 5	less than 22	Housing estates
small	10(5) – 28(33,5)	26(22) – 40(45)	GP -, Z -, L - class roads: approach roads to cities, suburban areas, urban housing estates, outside built-up areas
medium	28 – 50	41 – 65	GP - and G - class roads: outside a built-up area, approach roads to cities, suburban areas
large	greater than 50	greater than 65	S -, GP -, G - class roads: outside a built-up area

Source: Journal of Laws 1999 No. 43, item 430

The diameters specified in Table 4 are in many cases insufficient in the context of vehicles transporting long loads. Moreover, in many cases there occur high curbs on them, which may result in serious damage to the travelling vehicle combination. Analysing a typical roundabout, the author distinguished several crucial zones regarding its throughput capacity. They are presented in Figure 4 and described using the radius value calculated from the geometric centre of the roundabout.

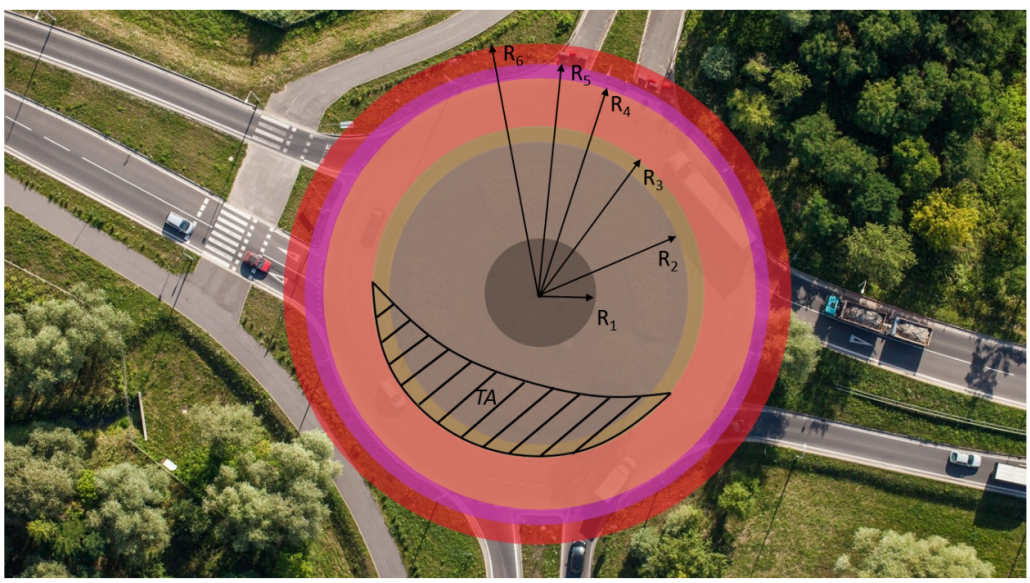

Fig. 4: Identification of roundabout zones with regard to its capacity

Source: the author's own elaboration.

The innermost zone is the central *internal zone of static limit*, which usually takes the form of an earthen embankment, but it can be even a building structure in some cases. None of the manoeuvring vehicle points can be found within the outline of this zone. Its radius R_1 defines the furthest

protruding element/segment limiting the horizontal dynamic envelope, counting from the centre of the roundabout. The zone with the border defined by the radius R_2 is the *zone of non-invasive internal off-tracking of the vehicle*, which was delineating from the obstacle limiting the horizontal dynamic envelope, which is located on the inner island, to the internal curb of the roadway, or the beginning of the *truck apron* zone. In this zone, the points which are located near the centre of the left side of the semi-trailer moving straight ahead, turning back or turning left, move most often. The *truck apron* zone, with an outer radius R_3, may occur between the road and the middle island and it increases the space for the manoeuvring vehicle along with the lowering of the internal curb. If it does not occur, it means that we only deal with a *driving zone*, marked between the roundabout curbs, which constitutes the zone within which the wheels of the vehicle move. Its outer edge is marked with the radius R_4. Crossing this zone by both the tractor and semi-trailer may cause damage to the tyres and disturbance of the vehicle's stability. The next zone is the *zone of non-invasive external vehicle offtracking* with the border radius R_5, which was delineated from the outer curb of the roundabout to an element of the infrastructure which is possible to remove and then restore to its original state. Most often such obstacles are road signs, lanterns, or posts/gates separating the pedestrian area from the roadway. In this zone, the points of the offtracking semi-trailer move most often and, as a rule, its radius should be at least 1.4m larger than the outer radius of the roundabout. The outermost zone is the *outer static limit zone*. The boundary of this zone was delineated from the centre of the roundabout to the furthest, irremovable R_6 element, constituting the horizontal limit, the removal of which is impossible or economically unfeasible. The zone is important when transporting particularly long cargo with the help of modular semi-trailers forcing the cargo to be moved above the ground, even a few meters outside the road outline. The *TA* zone is the corridor marked by the inner part of the roundabout, used for driving straight ahead. It can take the form of a widened *truck apron* for easier manoeuvring of the vehicle or constitute a hardened culvert through the central part of the roundabout.

Foreign literature already recognises the need to build roundabouts with the so-called unconventional geometry, characterised by a variable width of the middle roadway. These types of solutions aim at narrowing the width of the road in places where the fastest trajectories of passage occur and widening it in places where the radius of the arc is larger. Figure 5 presents a comparison of a traditional roundabout with a roundabout having a variable-width road and a smaller central island.

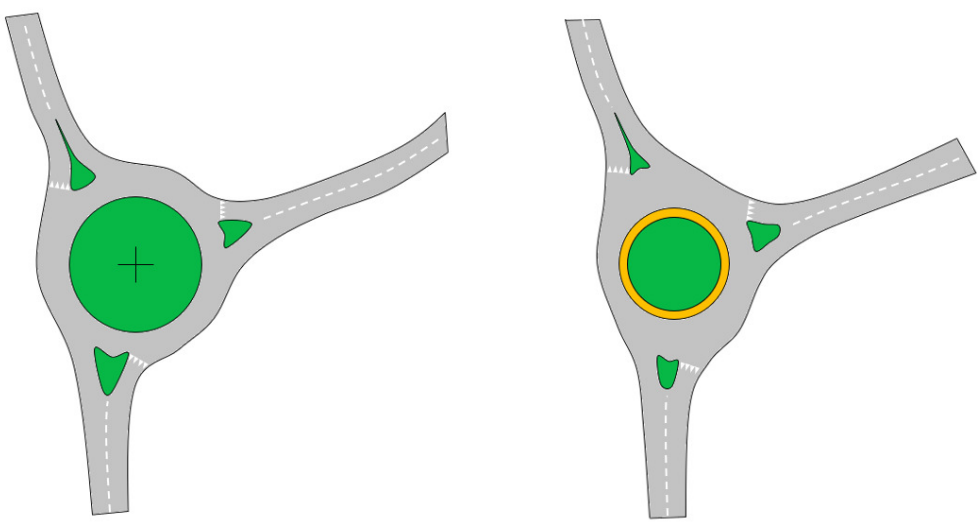

Fig. 5: A juxtaposition of a traditional roundabout and a two-geometry roundabout
Source: the author's own elaboration.

Analysing both examples, the greater possibility for turning right is clearly visible, as is the possibility of driving straight ahead for an oversize vehicle in the case of a two-geometry roundabout. This is due to both the smaller diameter of the central island and the widening of the road with

trajectories having larger arc angles. The key factor in this case is also the use of the *truck apron* zone, intended for heavy goods vehicles, occurring between the central island and the roadway, characterised by a low degree of inclination and the lack of a curb or the use of a low one (maximum 8 cm) (Gazzarri A., Pratelli A., Souleyrette R.R. & Russell E.R. 2014). Another solution is to adapt the central island to straight-ahead driving by building a driving lane across it, which is normally out of service. These types of infrastructure elements can be found in Denmark, where straight-ahead travel is possible after using a chip card, which on the one hand opens the barrier enabling passage, and on the other one gives the possibility of recording the use of roundabouts by transport companies. Separation of the central drive-through part may also take place through the installation of traffic signs, i.e. U-3 embedded in RS sockets, so that they can be easily dismantled if necessary. This way of installing road signs should be used within the entire roundabout, allowing greater manoeuvrability for the passing oversize vehicle without the need for invasive removal of traffic signs.

Maximum single axle weight

Maximum axle weights – in the light of Polish regulations, individual permissible values of the pressure exerted by a single driving axle of a vehicle on the road surface are linked with the road class and amount to, respectively (Journal of Laws 1999 No. 43, item 430):

- A, S and GP class roads - 115 kN;
- G and Z class roads - from 100 kN to 115 kN, depending on the type of traffic structure;
- L and D class roads - from 80 kN to 115 kN, depending on the type of traffic structure;

In fact, however, the provisions of the Directive 96/53/EC of the Council of the European Union forced Poland to adapt the roads on which heavy goods vehicles travel in international traffic to the maximum weight required by said legal act up to 11.5 tonnes per driving axle and 10 tonnes per non-driving axle within a period not exceeding 31 December 2010 (Council Directive 96/53/EC). After the end of the transitional period, tens of thousands of overloaded vehicles were detained as a result of the actions taken by Road Transport Inspectorate, and the total fines imposed on carriers amounted to over 60 million, and it should be emphasised that many of them were imposed contrary to EU regulations. After referring the case to the European Commission, the Main Inspectorate of Road Transport (GITD) in the letter No. GGI.012.39.2015.003 of 30 October 2015 specified that it was necessary to waive the imposition of fines on carriers if the following conditions were met:

- the vehicle does not exceed the GVW (gross vehicle weight);
- the weight determined during the measurement exceeds the limit values for the road, but does not exceed 11.5;
- the carriage route along the road with lower parameters is associated with unloading or loading of goods which are subject to international transport;
- there was no alternative road allowing a single axle weight up to 11.5 t leading to the place of unloading or loading;
- the carriage route minimised the use of the non-modernised section of the secondary road network;
- the entity performing the transport has a Community license or other authorisation to perform international road transport.

While the ruling of the Court of Justice of the European Union in the case C-127/17 quite unequivocally resolves the problem of the axle weight in international transport in Poland, the clarity of provisions applicable to domestic carriers is questionable. Considering the Annex XII to the Accession Treaty and Chapter 8, which deals with the transport policy, it should be emphasised that all road investments made from Community funds should take into account the capacity to transfer permissible pressure exerted by up to 11.5 tonnes. In addition, by adopting the principles of non-discrimination and equality, access to all other roads for loading or unloading should be enabled for national carriers provided that the single axle weight does not exceed 11.5 tonnes. In fact, when planning the movement of oversize vehicles, both Polish legal acts and EU directives should be taken into account, taking all possible steps to avoid financial liability for the transport. An important factor

affecting the values of the pressure exerted by individual axles of a vehicle lies in the design limits determining the permissible load capacity, taking into account the type of potential cargo, and, on this basis, adjusting the appropriate number of axles to them. Nevertheless, sometimes the permissible axle weights are exceeded due to the wrong choice of the means of transport or the wrong location of the cargo in relation to the cargo space (May 2017). Overloading a vehicle or improper distribution of the cargo results in reduced vehicle handling, extended braking distance and, above all, it has an adverse impact on the road surface. This in turn leads to lowering the so-called load capacity limit state and suitability for use, which falls between 20 and 30 years depending on the road class and surface type. Taking into account the regulations governing maximum axle weight is essential because, on the one hand, it may result in high fines and, in extreme cases, the loss of a transport license. The applicable regulations also specify that the transport entrepreneurs bear full responsibility for any irregularities concerning permissible weights. However, if the contract between the carrier and the consignor/consignee provides otherwise, the transport company may be released from liability, as provided for in Art. 43 of the *Transport Law Act*.

Gross Vehicle Weight

Gross vehicle weight – pursuant to the *Traffic Law Act*, it is a component of the vehicle weight, including all equipment as well as cargo and people present therein. It plays the key role when a vehicle passes through or over engineering facilities, which include all types of bridges and road overpasses. Each bridge is assigned to the so-called load class, which is the largest movable normative load from a given standard which meets all strength conditions for a given structure. In the case of transporting oversized cargo, it often happens that the gross weight of the vehicle exceeds the permissible load of the bridge which can appear without any limitations. The passage of this type of vehicle is then possible only if the structure is checked for strength and after determining the route in the cross-section of the facility. If the internal forces caused by the load do not exceed the forces caused by a given load class assigned to the facility, such load may be permitted. This is performed as part of obtaining the permission from the road administrator to travel along a given section. The transport of heavy cargo may also occur on a mass scale and may be crucial as far as the defence of the Country is concerned. Owing to the operations of the Polish Armed Forces and allied forces translocating with equipment whose weight is often over 100 tons (sometimes moving in a column), the Minister of Infrastructure issued an ordinance regarding the establishment of the MLC class (*Military Load Classification*) for all the facilities located within the Basic Network of Public Roads (PSDP). The MLC class is a military load classification which applies to both bridge structures and military vehicles. The STANAG 2021 agreement provides for 16 load classes in the MLC4 - MLC150 range, to which 16 hypothetical wheeled vehicles and 16 tracked vehicles are assigned and their mass is expressed in US imperial tons (1 t_{USA} = 2000 lbs = 907.2 kg = 0.907 t) (Łopatka & Zelkowski 2009). An object holding a given MLC class can transfer a load of column moving in one direction, or two columns moving in two directions if the MLC class of these vehicles is equal to or lower than the MLC class of that object. For example, an MLC 80/100 bridge can be passed in one direction by a column of MLC100 class vehicles, or in both directions by a column of MLC80 class vehicles. The introduction of these classes was the result of the NATO STANAG 2021 standardization agreement, which stipulated both the establishment of classes for existing facilities and including the requirements in the facilities being designed. Under these regulations, each bridge with a roadway having at least two lanes possesses four MLC load classes:

- two for tracked vehicles passing in one (one column) or two directions of movement (two columns),
- two for wheeled vehicles passing in one or both directions.

Determining the MLC load class is possible owing to the following general dependency (Ratajczak 2018):

$$\max\left[F_{(MLC)}\right] \leq F_{(N)} + \frac{F_{(p)}}{\phi} \tag{3}$$

where:

$max\ [F_{(MLC)}]$ - internal forces in the most strained element of the structure from the highest MLC class calculated for a wheeled vehicle or a tracked vehicle moving in one column and separately in two columns,
$F_{(N)}$ - internal forces in the most strained element (in the same $F_{(MLC))}$ as determined from the standard load for which the bridge structure was designed,
$F_{(p)}$ - internal forces from the service load of the pavement,
ϕ - dynamic coefficient.

If the above dependency is not met, the tension conditions should be checked, due to the fact that the structure has a load capacity reserve of several percentage points. Only these calculations constitute the final criterion for assessing the MLC class.
Similarly, as for high vehicles, when transporting heavy loads with a concentrated mass, it is allowed to drive separately both a vehicle and a load, while stopping traffic on the site. In this way, among others, bridges are crossed by low-loader vehicle combinations carrying MBTs such as Challenger 2 and M1 Abrams. The tracks of the vehicle are then secured with rubber pads so that they will not damage the road surface.

Weather Conditions

Meteorological factors associated with rapid weather changes are crucial in a situation where, despite maintaining safety conditions by drivers who reduce speed, the loss of traction on the wheels cannot be avoided. Such phenomena include, first and foremost, strong crosswind gusts. According to police statistics, the impact of wind was the cause of about 300 traffic incidents in 2017, resulting in 30 deaths and nearly 400 injuries. For high profile vehicles, wind gusts play a definitely vital role in road safety. A typical truck has a large side surface of the semi-trailer, which is on average 40m^2 (MEGA semi-trailer). Such a large surface, often connected with too high a centre of gravity, is prone to losing stability. Such vehicle's behaviour is influenced by the lateral force on the road wheel tires, resulting in a change of the travel path. A truck moving in a rectilinear motion, under the pressure of the lateral force generated by the wind, spontaneously transits into a curvilinear motion. In this case, the travel path is calculated from the dependency (Prochowski & Kozioł 2011):

$$R \cong \frac{L}{tg_{\delta}+(\alpha_2-\alpha_1)} \tag{4}$$

where:

R – transient radius of the travel path,
δ – average value of wheel turn angle,
α_1, α_2 – value of the thrust angle for the wheels of the front and rear axles.

Figure 6 shows three possible travel paths of the *C* vehicle's centre of mass, moving in a rectilinear motion at the speed *V*, which is affected by wind pressure with the resultant F_Y force, depending on the dynamic properties of the truck.

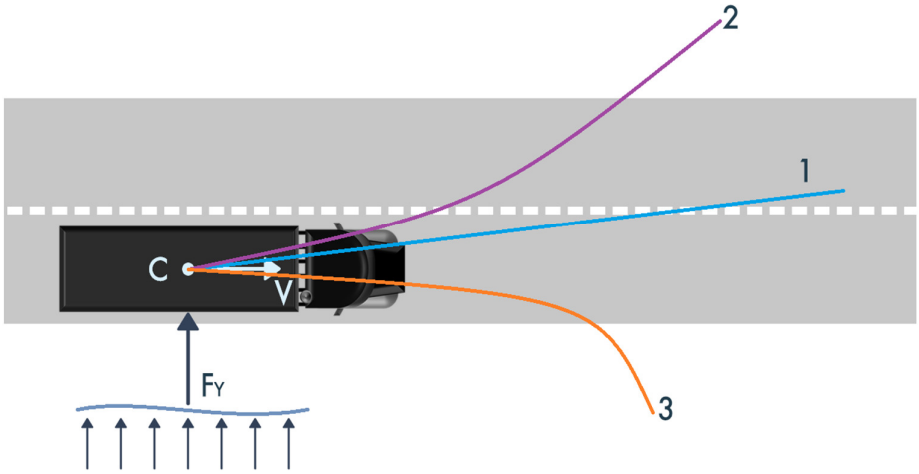

Fig. 6. Possible travel paths of the vehicle's centre of mass under the influence of crosswind thrust

Source: (Prochowski L. & Kozioł S. 2011)

The way the vehicle behaves under the influence of F_Y lateral force depends on the location of three points: the vehicle's centre of mass, the centre of the lateral wind thrust and the vehicle's centre of lateral drift (the point where the conventional application of F_Y lateral force causes equal thrust angles on the wheels of both axles) . The close location of these three points relative to each other reduces the value of the resultant wind thrust force and thus has lesser impact on the vehicle's stability. C. J. Baker in his work (1986) distinguishes three typical behaviours of a vehicle exposed to the impact of crosswind:

- overturning,
- sideslip;
- rotation around the vertical axis by a certain angle.

M. Batista and M. Perkovič, in one of their articles (2014), set out the following criteria allowing one to determine the type of vehicle behaviour due to a sudden crosswind:

- the wheel contact force drops to zero,
- all wheels reach the friction limit,
- one wheel reaches the friction limit.

Vehicle behaviour is determined by the occurrence of forces and moments of force whose individual values affect the type and intensity of a particular event. There are three forces and three moments of force that should be considered when analysing the impact of wind on a moving vehicle:

$$F_D = C_D A \frac{\rho V_A^2}{2} F_S = C_S A \frac{\rho V_A^2}{2} F_L = C_L A \frac{\rho V_A^2}{2} \quad (5)$$

$$M_R = C_R A h \frac{\rho V_A^2}{2} M_P = C_P A h \frac{\rho V_A^2}{2} M_Y = C_Y A \frac{\rho V_A^2}{2} \quad (6)$$

where: $C_D, C_S, C_L, C_R, C_P, C_Y$ - dimensionless aerodynamic coefficients,
A – frontal area of the vehicle,
h – height of mass centre,
V_A – apparent wind speed,
$F_{D,S,L}$ – forces (drag, side, lift),

$M_{R,\,P,\,Y}$ – moments of force (rolling, pitching, yawing),
ρ – air density.

To accurately calculate the values of forces and moments of force (5) and (6), it is necessary to know the aerodynamic coefficients, which can be calculated based on vehicle tests in the wind tunnel. To accurately calculate the values of forces and moments of force (5) and (6), it is necessary to know the aerodynamic coefficients, which can be calculated based on vehicle tests in the wind tunnel. Based on many studies, the general relationship between the value of aerodynamic coefficients and the angle ψ between the vehicle speed vector and the apparent wind vector was determined. In his work *High Sided Articulated Road Vehicles In Strong Cross Wind* from 1988, CJ Baker defined the generalized values of each coefficient for a truck depending on the angle mentioned earlier ψ. Based on his publications, M. Batista and M. Perkovič (2014) conducted the analysis of a moving vehicle exposed to crosswind. On this basis, they derived equations enabling the calculation of the apparent wind limit value for which a specific stability loss event occurs. The need to eliminate the effect of crosswind on the vehicle is noticed by car manufacturers who are developing a technology called *crosswind assist.* Car models like Mercedes Sprinter or Ford Transit are equipped with this type of solutions. The operation of the mentioned system is based on the ESP (*Electronic Stability Program*) system, which brakes the wheels on the windward side of the car, which results in no need to correct the travel path, and thus significantly improves the level of safety.

Conclusions

The issue of transporting oversized loads forces continuous improvement of structural solutions including an increase of the axle turning radius, hydraulic height adjustment, increasing the strength of the structure while reducing its weight. All these aspects will result in increased transport capacity and less harmful impact on the elements of the transport system. There is also a need to access infrastructure data collected by road managers. The knowledge of the exact parameters of engineering facilities by private carriers may improve the planning process and avoid significant errors because accidents occur as a result of choosing wrong routes. Usually, they are expensive for both the carrier and the local community. Due to the location of Poland, which constitutes a corridor for trade exchange, being both an intra-Community one between Western European countries and the Baltic States, as well as between the European Union and Russia or Ukraine, both the functioning infrastructure and project plans must take into account the needs of the oversize transport segment to a greater extent. On the other hand, the current stance of the European Union forces most countries to change their energy policy, and statistics (Eurostat 2019) show that in the renewable energy segment, the total value of the energy generated by wind turbines doubled over 2007-2017. It should be expected that the consequence of this fact will be a further increase in the quantity of long load transportation. The article also recognizes the need to allow the possibility of straight-ahead driving across roundabouts, as well as the reconstruction of engineering facilities that do not meet the requirements of applicable regulations. In addition, the need to build appropriate Information Communications Technology (ICT) systems, which synergize the data of private carriers and the information collected by road administrators, should be highlighted. Furthermore, systems supporting the driver's work in adverse weather conditions, as well as improving safety during manoeuvring, should be further improved.

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Russian Retail Market: Analysis and Trends

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Abstract

The article presents the historical development process, analysis and forecast of the Russian retail market for the short term. The largest mergers and acquisitions deals for 2018 and 2019 are analyzed, a review of the activities of the largest market companies is carried out, key trends and restrictions on the development of this market are considered. The authors also analyze the Russian Internet trading market. The theoretical basis of the study was the work of foreign and domestic scientists on the study of the competitiveness of retail companies. As research methods, the method of synthesis, analysis, generalization and grouping of scientific data was used. The study showed that the main changes in the traditional retail sector are associated with the expansion of the geography of networks. In addition, there has been an increase in online trading, the development of new payment methods, the share of sales of retail stores in discounter format is growing.

Keywords: retail market, Russian retail companies, digital economy, mergers and acquisitions.

Introduction

Retail is a large part of society. Trade is a necessary element of the national economy, which provides a link between the sphere of production and consumption (Panfilov and Chernovolov, 2006). With the accelerating pace of scientific and technological progress, the development of the Internet, the appearance of digital technology, the retail sector is undergoing significant changes. The purpose of this study is to study the characteristics of the development of the Russian retail market, highlight the main stages, determine the prospects for retail trade in the M&A sector and make a forecast for the development of the Russian retail market, in particular, the Internet retail market.

Methods

The theoretical and methodological base of the research was composed by the works of Russian and foreign scientists, including A. Smith, M. Porter, T. Danko, Z.A. Vasiliev, O.M. Khotasheva, Y.V. Trofimova et al.

The research information base includes analytical reviews of leading consulting companies, in particular, Deloitte, PwC, McKinsey, as well as annual reports of the largest companies in the industry.

As research methods, methods of generalizing scientific data, synthesis, analysis and grouping were used.

Four key stages can be distinguished in the development of the Russian retail market. At the first stage (1994 - 1998), food markets began to develop actively despite a decline in living standards and a decrease in retail trade turnover. At this stage, there was a transition from wholesale to retail. The development of network trade began, namely, the first Russian companies began to open, including “Lenta”, “Sedmoy Kontinent”, “Paterson”, etc. In addition, the first foreign Ramstore network (Turkey) entered the Russian retail market. As a result of the 1998 financial crisis, stores began to

appear in the format of "discounters" instead of the previously popular expensive supermarkets. The "discounter" format was based on five key benefits for consumers: low prices, convenient location, optimal product mix, quality assurance and professional service. Existence in the format of discounters is ensured by reducing the cost of delivery or pre-sale preparation. Retail has taken hard hit by this crisis. On the one hand, the country's population sought to buy a large amount of goods with light money. On the other hand, most retailers did not have time to adjust prices and were forced to purchase new lots at prices already increased several times. In this context, it is important to emphasize that at the time of the crisis, many companies in the industry did not have an established accounting system and were not able to calculate losses, debtors, etc. It was in 1998 and 1999 that most modern retail companies began to open their first stores, while some of them shifted from wholesale to retail. Thus, many large retailers emerged as a result of diversification of the business of distribution and wholesale companies. At the second stage (1998-2000), there is an increase in domestic production and, as a result, a reduction in food imports. Retailers are beginning to expand their product range and are striving to lower their margins. The format of "discounters" (Pyaterochka, Dixie, Magnit), designed for the population with middle and low incomes, continues to gain popularity. At the same time, the number of regional retail chains is increasing both due to regional expansion, and due to the appearance of local retail companies. At the third stage (2000-2005), competition began to intensify to a greater extent due to the emergence of multinational corporations on the Russian market, as well as the massive entry of foreign networks, including Ikea and Metro Cash & Carry. The revitalization of foreign retail chains has led to the active development of federal chains in the regions. There has been a rapid increase in the number of mergers and acquisitions, in particular in the regions. New formats began to emerge, including "hypermarkets" and stores in the "cash & carry" format. It is at this stage that conflicts arise between retailers and manufacturers. The fourth stage began in 2005, when large groups of retail companies began to appear with a turnover exceeding $ 1 billion. Retail companies began to actively attract external sources of financing, in particular, bank loans, bond loans, investment funds, etc. Moreover, during this period, the number of trading floors increased due to the construction of shopping malls and shopping centers (Fetisova, 2009; Hayrapetyan and Kondenkova, 2013).

Retail prospects in the M&A sector

The regional expansion and the entry of companies into the stock market prompted the retail sector to increase mergers and acquisitions deals. Back in 2004, the mergers and acquisitions market was valued at $ 22.8 billion, and trade accounted for only 1.6%. In 2017, this indicator reached 7.8%, and the number of transactions in the retail sector increased to 71. Table 1 shows the largest transactions in the Russian retail market for 2017 and 2018.

Table 1: Largest mergers and acquisitions deals in the Russian retail market (2017-2019)

Subject	Consumer	Seller	Acquired share (%)	Transaction amount (mln. USD)
Holland & Barrett International	LetterOne Group (Mikhail Fridmann)	The Nature's Bounty Co, The Carlyle Group LP	100%	2 250
"Magnit"	Private and institutional investors	Sergei Galitskii	7,5%	734
GK "Detskii Mir"	Private and institutional investors	JSFC "Sistema", Russian-Chinese Investment Fund, private shareholders	30,5%	325
"M.Video"	Group "Safmar"	Public investors	24,7%	310
"M.Video"	Information on investors is not disclosed	Group "Safmar"	24,7%	300

Note: The table is based on KMPG's information (KPMG in Russia and the CIS, 2018)

Thus, Holland & Barret International, acquired by LetterOne Group, comes first in terms of the transaction amount. The Russian Investment Fund has acquired the largest European chain of health food stores. The subject of the transaction was more than 1,000 stores in China, the UK, India, the UAE and the Netherlands. Over the past seven years, the network has opened more than 300 outlets and has managed to enter new markets. Definitely, Holland & Barrett is a leader in the market of healthy eating in the UK and has attractive growth prospects in other markets of the world. In addition, it is important to note that interest in the company was shown by the private investment firm Sycamore Partners, the American KKR, as well as the Hong Kong company AS Watson.

The second largest transaction was the sale of a 7.5% share of "Magnit" retail chain. The founder of the network sold part of its share to VTB. "Magnit" ranks 11th in the ranking of the fastest growing retailers in the world (Deloitte, 2018). The retail sector has long been deprived of the presence of the state as a business player. However, after the sale of "Magnit", the situation has changed significantly. If you look at quotes of "Magnit" at the time of its sale, we can conclude that the initial attitude of investors to this event was negative. This judgment is supported by a 4% fall in retail chain shares. It is still difficult to judge why VTB needs this deal and whether it will stop or continue to consolidate the retail industry. To date, VTB has another 4% share in "Lenta". In this context, it will be interesting whether VTB will strengthen the competitive advantages of "Magnit" or will lobby the interests of the entire industry as a whole. No doubts that Russian retailers can significantly strengthen their competitive positions with the support of large government agencies. There are prospects for a qualitative transformation of the business, namely the development of channels in the online segment. However, there are concerns regarding whether the state will increase its influence on retail prices through a large retail network.

The third largest transaction is the sale of Detskii Mir, the largest Russian children's goods store. Fundamental agreements on the sale of a controlling interest in Detskii Mir were reached only in November 2018. Thus, the transaction itself can take place either at the end of 2018, or at the beginning of 2019. In early September 2018, 12 potential buyers of the company were announced, and subsequently their number was reduced to three. The successive increase in interest in this asset is clearly seen. The company's shares can be considered attractive for several reasons: the double-digit rate of increase in revenue, the high rate of increase in the number of retail space. So, in the third quarter of 2018, the company's revenue increased by more than 15% in annual terms. The company continues to expand actively, in particular in the CIS countries. In addition, it should be noted that there is a risk of further postponement of the terms of sale or even cancellation of the transaction due to a drop in personal income.

In the fourth and fifth positions of the rating, the subject of transactions is the retail network "M.Video". In both cases, the "Safmar" Group appears: first as a buyer, and in the second case as a seller. First, the leadership of "Safmar" acquired the shares of "M.Video", as well as another retail company engaged in the sale of equipment and electronics, "Eldorado", with the aim of creating "Safmar Retail". Despite the fact that during the sale the share of "Safmar" will decrease, the controlling interest will still belong to this group.

It should be noted that active consolidation in the retail sector began in 2004. Prior to this, companies preferred an organic growth strategy, and starting in 2005, the number and amount of transactions began to grow steadily. Despite the fact that at the moment the Russian market of mergers and acquisitions is at the stage of growth, sanctions impose certain restrictions. One of the distinguishing features of the Russian market of mergers and acquisitions is the increased participation of the state not only as a regulator, but also as a buyer. In part, this process is associated with the government's desire to control the retail market even more.

In the foreseeable future, there are no opportunities for conducting M&A transactions among the largest companies in the market. Pricing in the retail sector is currently low, which means it is unlikely that asset owners will be willing to sell them. Most likely, leading Russian retailers will seek organic growth in parallel with complementary acquisitions. Priority for retail chains will be

operational efficiency to ensure high return on investment in an increasingly competitive environment. In addition, until 2019, a significant increase in consumer spending is not expected, which means that pressure on the market from the demand side will continue.

Overview of the Russian retail market

The dynamics of the retail market reflects the fact that the crisis of 2015 and 2016 has strongly affected the sectors that are associated with consumption. During these two crisis years, retail sales declined by about 15% (Borovikov, 2017). Thus, after three years of stable growth, in 2015, retail trade turnover fell to the level observed in 2010 (Figure 1).

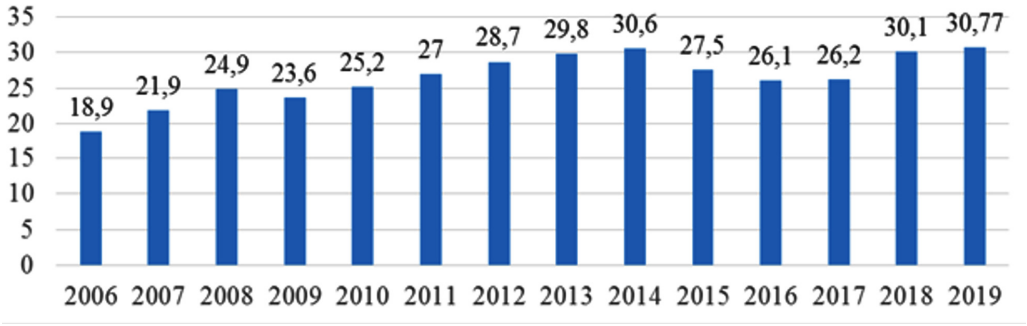

Fig. 1: Retail turnover (trillion roubles)
(Source: 'The dynamics of retail sales since 2012', 2018)

Despite a slight increase in 2017, the Russian retail market has not yet been able to achieve pre-crisis performance. According to the forecasts constructed by the author, the retail industry will reach pre-crisis levels in 2019. In this context, it is necessary to pay attention to the decline in real incomes of the population, which could not but affect the development of retail trade. The negative trend continues for the third year and significantly changes consumer behavior. At present, Russian buyers have begun to pay much more attention to promotions, the demand for goods sold under the brands of retail companies has grown significantly, and the consumption of more expensive products has decreased. Many suppliers are faced with a situation in which goods began to be sold only if they are subject to a discount. For such items as household chemicals, alcohol, coffee and confectionery products, the presence of discounts is reflected even more. The reason lies in the desire of Russian consumers to save despite the growth in purchasing power. In addition, consumers began to pay more attention to products manufactured under the brands of retail companies. Retail companies have ceased to regard the creation of their own brands as an instrument of price struggle, as well as strengthening their positions in relations with suppliers. Companies began to focus not only on low prices, but also on increasing the quality of their products and, as a result, there was an increase in consumer interest. As part of this, many large companies in the industry are rebranding their own brands, introducing new lines, and also significantly expanding the range. So, "Lenta" launched its own brand Bonvida, "Auchan" is constantly expanding its product range, in particular, recently introduced premium chocolate. In turn, the X5 Retail Group, instead of manufacturing goods, prefers to enter into strategic partnerships with manufacturers. In particular, together with one of its suppliers, it owns "Sarafanovo" dairy product brands. The conclusion of such agreements with manufacturers of semi-finished products and groceries is in short-term plans of the company. The company management does not see the advisability of building its own plants and the potential for vertical integration in the retail sector.

Among other things, there is a tendency to reduce the average bill in real terms, as well as reduce the number of customers. In such a market environment, large retailers operate most efficiently despite pressure from the Federal Antimonopoly Service and some legislative restrictions. The rating of the five largest Russian retail chains includes X5 Retail Group, "Magnit", "Lenta", "Auchan" and "Dixie". At the same time, in terms of revenue, X5 Retail Group and "Magnit" significantly outperform their competitors. In 2019, X5 Retail Group will slow down the pace of opening new stores. For the coming year, the company plans to open about 2 thousand of new stores, of which more than 1.5 thousand stores will fall on the "Pyaterochka" chain, since it occupies a significantly larger share in the company's revenue structure. The slowdown in the opening of stores is associated with the desire to improve their quality, as well as focus on attractive segments in terms of profitability and return on investment. The closest competitor of X5 Retail Group, "Magnit", also plans to open about 2 thousand stores for 2019. In addition, the network seeks to expand its geographical boundaries and increase the number of regions in which it presents. "Magnit" plans to launch online trading projects. In this context, most likely we are talking not only about the online store, but also about omnichannel offers of various kinds. The company seeks to create an ecosystem in which customers can also participate in resolving assortment formation issues. Digitalization allows the optimization of the work of "Magnet". For example, updating forecasting systems can significantly increase turnover and reduce inventory. "Magnit" has a sufficient database to analyze many trends in consumer behavior. Like many retail companies and chains, "Magnit" is moving more and more towards personalization.

The rating of the five largest retail chains in the Russian market includes the "Auchan" foreign network. In 2019, a major French retail chain plans to begin a radical transformation of its stores in Russia. Back in 2018, the company introduced the new "Odastor" concept, within the framework of which a new design and color scheme of the chain stores, as well as an updated range were identified. "Auchan" tops the ranking of the largest foreign companies in terms of revenue in Russia. Moreover, Groupe Auchan owns Decathlon sporting goods stores, as well as Leroy Merlin home and construction products.

An analysis of the activities of the largest Russian retail companies allows us to draw a conclusion about the main directions of development of industry companies: geographical expansion of networks, the intensification of the introduction of digital technologies, personalization, as well as an increase in the share of network companies.

Past data is taken from market research conducted by RBC (Figure 2). The author extrapolated using the linear prediction function. Thus, the share of the 10 largest chain retailers will increase to 37.8% by 2022. In addition, it is noteworthy that the revenue of large chains grew more due to the opening of stores in formats such as "neighborhood shops" and "discounter". Supermarkets and hypermarkets grew at a much lower rate.

Considering key retail trends for 2018 and 2019, one should mention government initiatives, in particular, issues of labeling and control of the circulation of goods. Until 2024, Russia plans to launch a unified system for marking goods with control marks. Such a system allows you to fully control the circulation of all goods (continuous traceability system). This initiative is managed by five departments together with "Rostec" Group of Companies. The marking of goods will be carried out in the same way as the marking of drugs using QR codes and cash registers of new generation. As part of this, a conceptual and legislative framework will be prepared, and Russia, in turn, may become the first country in the world to fully control all merchandise operations. It should be noted that such a measure will significantly reduce the share of the shadow sector in the country's GDP.

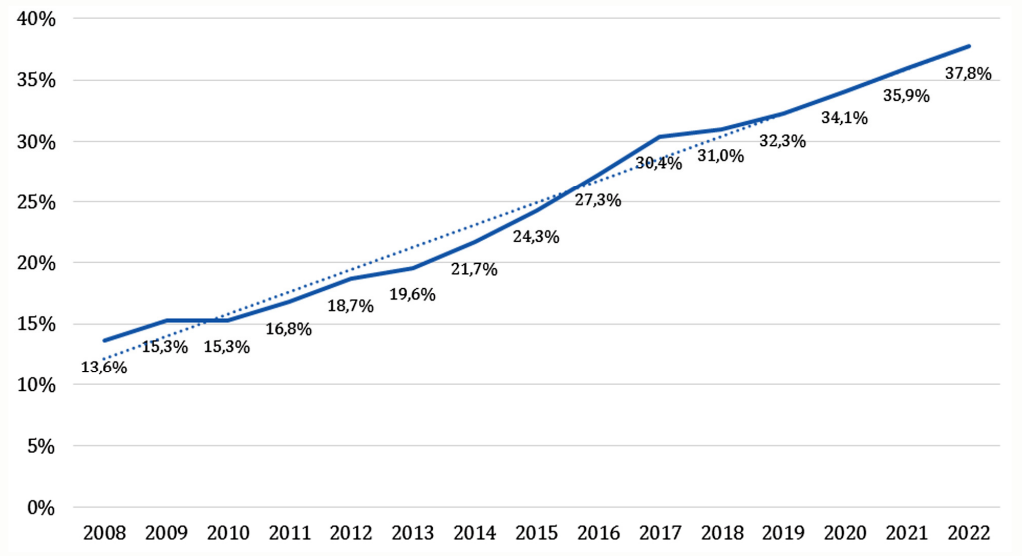

Fig. 2: Share of the 10 largest retail companies in the market turnover
(Source: Borovikov, 2017)

If we talk about trends related to the activities of the retail companies themselves, then this is omnichannel, increased customer loyalty, strengthened position of loyalty programs, noticeable advertising and self-service. Even now, the leaders of retail companies are coming to an understanding of the need to bring the business to the online segment. In this regard, there is a trend of omnichannel, namely the integration of online and offline sales channels into a single system. This term was first used in the USA in 2011 (Aliyev, 2017) and replaced the phenomenon of multichanneling. We can say that the omnichannel model evolved from multichannel and took into account its key shortcomings. Despite the fact that the essence of omnichannel and multichannel lies in the use of digital and traditional distribution channels, the difference lies in how exactly the customer interacts with these channels. With the omni-channel approach, two channels are integrated and do not operate independently. Thus, omnichannel allows you to create a single customer service, covering several points of consumer interaction with the company at once: traditional shops, online resources, mobile application, social networks, chat rooms, etc. At the same time, the company analyzes and tracks information from all channels. This approach allows us to provide the so-called seamless consumer experience (Verhoef *et al.*, 2009). In the multi-channel model, there is a risk that the channels may begin to compete due to different price offers, independent logistics and storage capacities, etc. In turn, omnichannel provides a flexible, client-oriented and personalized approach. Since an important role in the development of this model is digital transformation, one of the main obstacles to the implementation of an omnichannel model is the inability to work with modern digital solutions, in particular, “big data” technology. The main asset of this approach is a knowledge base that allows you to achieve the so-called personal communication effect, implement strategies more efficiently and analyze results faster. Solutions that are analyzed using the technology of “big data” make it possible to segment consumers into a large number of groups and change tactics responsively. In addition, the technology of “big data” gives companies additional competitive advantages and increases their value in the market (Bradlow *et al.*, 2017; Grewal, Roggeveen and Nordfält, 2017). Despite the fact that it is too early to talk about the complete automation of marketing processes in Russian companies, today digitalization allows you to combine several tools at once. There are many examples of integrating a CRM system with e-mail marketing platforms. Obviously, such solutions can significantly reduce and simplify work with the customer database. In the future, more and more communication channels will be integrated into a single fully automated system.

In addition, retailers are interested in increasing customer loyalty, as attracting new customers is much more expensive for companies. It is about strengthening individual work with customers and compiling individualized offers thanking to technologies such as Wi-Fi tracking, CRM marketing, *etc*. (Chang, Park and Chaiy, 2010). Along with this, the introduction of bonus and discount programs, the creation of their own mobile applications, etc. The self-service trend, as a rule, develops in large chain stores. Self-service systems can effectively save space, and also increase customer loyalty. For example, two traditional cash registers can be replaced by six self-service cash registers. Such a system is most relevant during peak hours, as it allows you to speed up the process of making a purchase and reduce queues in stores. Another relevant trend of 2018-2019 is the so-called noticeable advertising aimed at ultimate delivery of advertising and informational messages of the store. Sales areas are equipped with digital advertising panels, which are installed either on a display case or at the cash desk.

Special attention should be paid to trends related directly to personalization. Firstly, it is the marketing of micro moments. An example of micromoment marketing action is a technology such as iBeacon, which allows companies to send an advertisement to the phones of passing by people. Due to the development of push notification mailing services, this trend is starting to reveal itself in a new way in the online space. Such a channel allows delivering contextual offers as efficiently as possible. Secondly, this is a high degree of personalization based on elements of artificial intelligence. Machine learning and artificial intelligence form the core of all modern personalization platforms. Technologies allow not only collecting data about consumers, but also using them effectively and constantly modifying recommendation algorithms. Thus, AI-marketing has become a leading trend today and can significantly increase the competitiveness of retail companies in the long term, in particular, due to a better understanding of potential consumers and increased loyalty to their audience. The system can monitor customer purchases and identify patterns. After that, the system begins to predict the time when the buyer wants to purchase this or that product again, then the system notifies the buyer of interesting promotions and offers related to its shopping cart. This trend will be relevant for many years to come. Thirdly, it is client-oriented marketing. At the present stage of development, it is the consumers who build the marketing strategies of retail companies.

Russian web-based market

Competition in the retail market is now moving into a radically new stage. Russian consumers have become more trusted when doing online shopping. Given the growing share of consumers representing generations Y and Z, consumers will increasingly resort to shopping for goods over the Internet. The growth dynamics of online sales is observed in almost all segments. So, for example, online coffee sales grew by more than 25% in real terms, while no sales growth was observed in the offline segment. Convenience and time saving fuel the continued growth of the online retail segment. In turn, retail companies are constantly improving the conditions for online shopping. Despite the fact that in Russia the e-commerce market accounts for only 4% of all retail trade (in developed countries - 10-15%), the desire of Russian companies to increase their presence in the online segment, as well as pressure from foreign Internet resources significantly accelerates the development of this direction. (Ishchenko, 2018). In 2017, Russian consumers spent almost 400 billion roubles. in international online stores, which is 25% more than the previous year. Thus, there is an increase in the presence of foreign online stores in the Russian market. Most foreign online purchases came from China, the European Union and the United States. In monetary terms, orders from Chinese online stores accounted for 53%, from the European Union - 22%, and from the USA - 12% (Habibrahimov, 2018).

Among the key trends of this market, it should be noted that high rates of growth in the number of orders have been maintained, in contrast to the traditional retail market, slightly pronounced negative dynamics of the average check, as well as market growth in money terms (approximately + 18%).

While maintaining growth rates at 18%, online sales in 2019 will reach 1.3 trillion rubles (Figure 3).

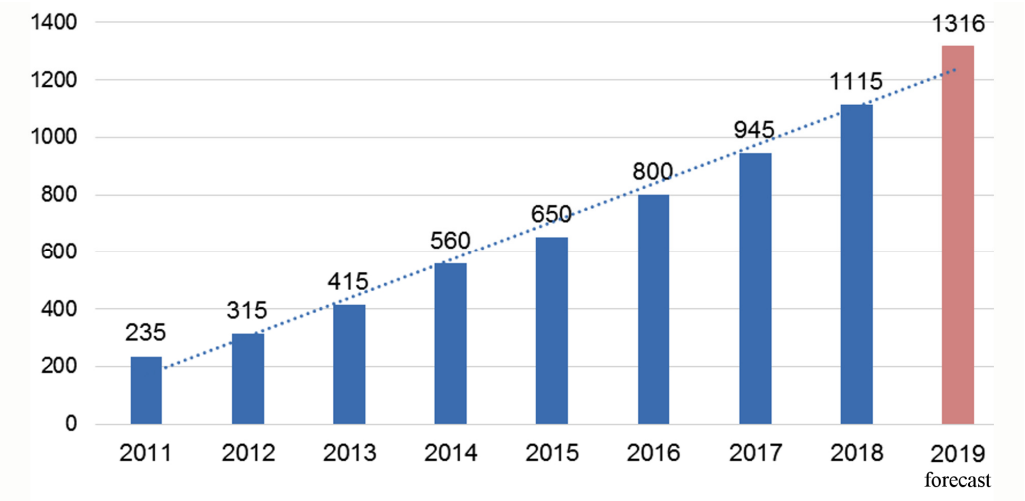

Fig. 3: Online sales in 2018 (billion rubles)
(Source: Virin and Ovchinnikov, 2018)

While the FMCG segment dominates in the traditional retail sector, categories such as electronics and appliances, clothing, shoes and accessories, as well as home and repair goods. At the end of 2018, electronics and equipment were most purchased through the Internet resource dns-shop.ru, and clothes, shoes and accessories through wildberries.ru. However, the leader in online trading is the Alibaba Chinese store. Of the Russian online stores one should distinguish "Ulmart" and Ozon. Traditional Russian retail stores are also starting to enter the online market and sell their products on the Internet. Not so long ago, X5 Retail Group launched its online store based on "Perekrestok" supermarkets. The opening of an online store is one of the new directions of "Perekrestok" and is designed to satisfy the needs of those customers who prefer to make purchases in the online space. For customers of the online store, the entire assortment range is available, which has more than 13 thousand items. The collection and delivery service is organized in a hybrid store, which was specially built to launch this project. The hybrid store includes a regular supermarket chain, as well as a specially organized warehouse. This scheme is designed to provide high performance. In addition, X5 Retail Group plans further development in the field of electronic commerce. For 2019, the company plans to launch the issuance of online orders in "Pyaterochka" stores under the Click & Collect scheme. In addition, the company plans to establish automated pick points for issuing online orders inside traditional stores.

Separately, it is important to mention such a thing as m-commerce. The volume of the Russian mobile commerce market began to develop dynamically due to the growth of the mobile Internet audience, as well as the growth of the non-cash payment instruments market. In Russia, one in three people actively uses the Internet through mobile devices ('In 2017, the volume of the Russian m-commerce market will exceed 2.5 trillion rubles', 2014). Russia in the global m-commerce market lags significantly behind the USA and European countries, however, it is ahead of many developing countries, in particular Brazil. Among the key trends in this market, we should note the shifting from Internet sites towards applications. Due to its convenience and speed, applications can become one of the most effective sales channels. In addition, often mobile platforms have the ability to pay directly from mobile wallets, which greatly simplifies the purchase process. However, attention should be paid to the fact that many consumers around the world are not yet ready to fully switch to mobile payments due to mistrust of this technology and fears of hacking (Leu, Huang and Wang, 2015).

Results and Discussion

Already, the Russian retail market is approximately on a level with the UK market and is one of the three leaders in the European market, second only to the German and French markets. However, sanctions and the so-called "trade wars" affect consumer demands. Despite the fact that customers are partially limited in their choice of products, retailers adapt to the modern realities and requirements of their customers. So, for example, in 2018-2023, a significant increase in sales of locally produced goods is expected. It is safe to say that sanctions by the US and the EU will be in effect for the next 2-3 years. Although these restrictions do not significantly affect the consumer goods market, they provoked the development of the production of Russian goods, including retail chains. Most likely, this trend will continue until 2023.

Key changes in the traditional retail segment will be associated with the expansion of the geography of networks. There is an increasing trend in the development of retail chains not only within large cities, but also in remote areas and small cities. Not so long ago, "Magnit" entered into an agreement with the Russian Post and in the near future will be able to use the logistics of the Post. This agreement is cost-effective for the distribution network.

In turn, online trading will continue to grow, and to a greater extent due to those online stores that sell goods at the lowest prices. Over the next few years, Alibaba will continue to dominate the online segment. A promising direction for online trading is the development of new payment methods that facilitate the purchase process, in particular, Apple Pay, Samsung Pay Pal, etc. A possible direction of development is payment with bitcoins. It is noteworthy that such an opportunity appeared in September 2017 at "Ulmart".

Conclusion

Thus, the overall outlook for both the traditional retail market and online trading is positive. This market will experience moderate growth.

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Problem Aspects of the Auditing Regulation in View of Legislative Innovations

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Abstract

The article is devoted to the audit activity reformation considering innovations in its development. In the framework of this article, the main stages of the audit formation in the Russian Federation are identified. Over the past few years, attention has been focused on the activities of participants in the audit services market, provoked by the mass cessation of organizations activities belonging to the category of socially significant, obliged to undergo an audit procedure annually. In accordance with the requirements of the legislation of the Russian Federation, an organization acquires the right to provide audit services after inclusion in the register of a self-regulatory organization of auditors, which systematically monitors its members of auditors and audit organizations. The authors, analyzing the opinions of scientific economists by the method of analysis and comparison, guided by relevant information about the state of the market for audit services and self-regulation of the audit industry, conduct independent research in this area.

Keywords: Audit Activity, Check-Up, Self-Regulation, Licensing.

Introduction

The purpose of the study is to reveal the competitiveness problems of medium and small audit companies and develop recommendations to strengthen their position in the audit services market in order to avoid monopolization of the audit market.

The purpose of the study is to show flaws in the legislation of the Russian Federation in the field of audit as the main factor in the provision of low-quality audit services.

The research relevance. The issues of implementation quality of the audit activities are currently gaining high relevance, which is mainly associated with the mass cessation of socially significant organizations that received a positive audit report confirming the accuracy of the information

reflected in the financial statements of the company. In connection with the fact that the mechanism for regulating audit activities is changing, it is necessary to focus on the main aspects of regulating the activities of audit services in Russia, the specifics of the current state of the audit market, as well as the prospects for regulating auditing in Russia, which are based on the main trends in reforming the control of audit organizations, auditing business entities belonging to the category of socially significant.

The key basis in the article is the interaction analysis of the state control body and self-regulatory organizations of auditors in relation to audit organizations. In addition to considering the main aspects of control activities to market entities of audit organizations, the author studies the role of self-regulation and the possibility of applying control activities results carried out by self-regulatory organizations of auditors in the course of state control over the activities of audit organizations.

Methods

The research methodology is based on the use of general scientific and specific methods of cognition. As part of the study, a systematic and active monitoring of the development of the audit activity regulation was carried out in the light of legislative innovations in the Russian Federation. As part of an empirical study, the authors uncovered, analyzed and generalized the problems of providing quality audit services. In the course of solving these problems, the opinions of economists on the issue were summarized. An analysis of audit relations allowed us to propose measures to strengthen the position of small and medium-sized audit companies, which are not able to compete with the giants of the market. The synthesis of theoretical material and the results of empirical research made it possible to develop an integrated approach to achieving the goal.

Results

At present, the market for audit services is going through a difficult period because it is regulated by the state and self-regulatory organizations, which requires the timely adoption of such measures as:

- it is necessary to introduce compliance with financial responsibility;
- tightening state oversight;
- increasing the professionalism of auditors;
- taking measures and developing assistance programs for medium and small audit companies.

The last-mentioned measure should become a priority, since at present small newly-formed audit firms are not able to compete with market giants that have been established in the market for decades.

The support measures consist of:

subsidizing and sponsoring projects aimed at improving the specialization of audit entities;
the possibility of benefits when participating in tenders;
the provision of tax benefits.

Discussion

Domestic scientists study the audit activities regulation in a number of works. However, it should be noted that audit regulation issues are not covered in sufficient detail in scientific works, and a number of sources, due to repeated regulatory and organizational changes in the audit services market, have lost their force. This article accumulates modern requirements for audit regulation in Russia based on the relevant provisions of regulatory legal and methodological documents, and reflects the results of control activities in relation to subjects of audit services market (Zizekalova, 2019).

In modern economic conditions, the importance of audit activity is growing because the audit company report on the reliability of the audited entity that can be a decisive argument for attracting investor funds.

There are several stages of the audit development in Russia.

1. The origin of Russian audit activity dates back to 1987-1993. The joint-stock company named 'Inaudit' was created back then in the USSR. It provided audit services to Soviet and foreign companies (Bychkova and Itygilova, 2017).

2. The period of from 1993 to 2001. At this stage, the Interim Audit Rules are established, common audit standards are developed, auditors are certified and licensing for audit activities is issued.

3. Legislation of governing audit activities saw its development in the period from 2001 to 2008. The Federal Law #307 'On Auditing' was enacted (The State Duma, 2017), and the Federal Auditing Standards were approved.

4. Audit activity was transformed into self-regulatory in the period from 2009 to 2014. At this stage, audit regulation became liberalized, self-regulatory audit companies were created, a new tax code was enacted to regulate the audit activities of these companies, and 'The rules for the Independence of Auditors and Audit Companies were introduced' (Asfandiyarova and Rafikova, 2017).

5. The application of international audit standards since 2018. This stage of development is determined by a change in Federal Law #307 by the Russian Ministry of Finance, in which the federal audit standards were eliminated and the International audit standards were approved (*Ministry of Finance of the Russian Federation*, n.d.).

At present, the audit activities quality issues, and the issues of audit regulation, are becoming particularly relevant because many objects of a mandatory audit, shortly after receiving an audit positive opinion on the reliability of the audited statements, cease their activities because of bankruptcy or regulatory deprivation of a license.

This industry's draft legislation is one of the most important events in the audit. The project was developed by the Central Bank and was finalized jointly with the Russian Ministry of Finance. Enactment of the law means a change of the regulator and supervision among auditors, the number of employees' requirements, the external quality control procedure and the revision of entities, which are subjected to audit will change as well (Budunova, 2018).

The idea of transferring powers to supervise and regulate audit from the Ministry of Finance to the Central Bank has been under discussion since 2016. In May 2017, the Central Bank prepared a draft legislation, coordinated it with the Ministry of Finance over the summer, later the document was submitted to the State Duma and adopted in the first reading. However, after this, the Ministry of Finance prepared its own version of the reform and introduced the Central Bank on November 26. It took the parties more than a year to reduce their positions; only on January 24, a new version of the bill of the Ministry of Finance appeared, approved by Central Bank (Ministry of Finance of the Russian Federation, 2018).

The most important innovation of the document is a change of the regulator and supervisor in the industry. Currently, the Ministry of Finance is such a regulator, and the Federal Treasury exercises external control over the quality of auditors work, that is, supervision. However, after the law comes into force, the Central Bank will take on the role of the Ministry of Finance and the Federal Treasury (Arskaya *et al.*, 2017).

The idea of changing the regulator in the audit market was not approved by everyone. Many auditors opposed, while severely criticizing it. They expressed the view that the regulator should be a state

body, unlike the Central Bank. However, many of the bank auditors were in favor of a regulator change.

The enactment of the above-mentioned project is associated with the inevitable reduction in the number of entities falling under the mandatory audit. Currently, organizations, which are to be audited, are the ones whose revenue exceeds 400 million rubles or whose assets amount to more than 60 million rubles. However, in view of the newly adopted law these criteria were increased, i.e. the revenue should be from 800 million rubles, and total value of assets from 400 million rubles.

At the same time, three registers of audit organizations and socially significant organizations, which will be maintained by the Ministry of Finance, as well as a register of auditors of socially significant organizations of the financial market, which will be maintained by the Central Bank, will appear. Currently, there are two self-regulatory organizations in the audit market, the Russian Union of Auditors and the Commonwealth Audit Association.

The reform threatened the market not only with a work reduction, but also put forward new requirements for the number of auditors in companies. Auditors of socially significant organizations will have seven auditors at their main place of work from 2023 up to 12; auditors of other socially significant organizations will have three auditors at their main place of work, from 2023 up to 5). The remaining audit organizations should have at least three auditors at their main place of work. However, many organizations note that in Russia there are regions in which so many auditors with a certificate are not recruited. Representatives of the Russian Union of Auditors are afraid that auditors from Moscow and St. Petersburg will be involved in the verification of regional companies (Kalutskaya and Terekhovskaya, 2015).

According to official statistics of the Russian Federation Ministry of Finance, as of January 1, 2018, only 4,800 entities have the right to engage in audit activities, which is 300 less than the relative ones on January 1, 2016 and 200, relative to the statistics of 2017; 4,200 entities are audit organizations. It is worth noting that the number of such organizations decreased from January 1 to December 31, 2018 by 100 units. The number of individual auditors has not changed since 2017 and amounts to 600 people (Expert RA, 2020).

The total number of auditors as of January 1, 2018 was 19,600, of which only 4,000 passed the qualification exam for a single certificate. Every year, the number of qualified specialists is growing, and already by December 31, 2018, it reached the mark of 4,300 people.

The largest share of Russian auditors (49%) for 2018 was recorded in the Central Federal District. The second largest number of registered subjects of audit activity is the Volga region, there are 2,700 subjects. The smallest number of auditors in the years of 2017 and 2018 was registered in the North Caucasus Federal District in 2018; their number was 300 entities, which is approximately 1% of Russian audit firms (*The Federal Security Service of the Russian Federation. Official statistics*, n.d.). The territorial distribution structure of audit organizations for 2018 is presented in Figure 1.

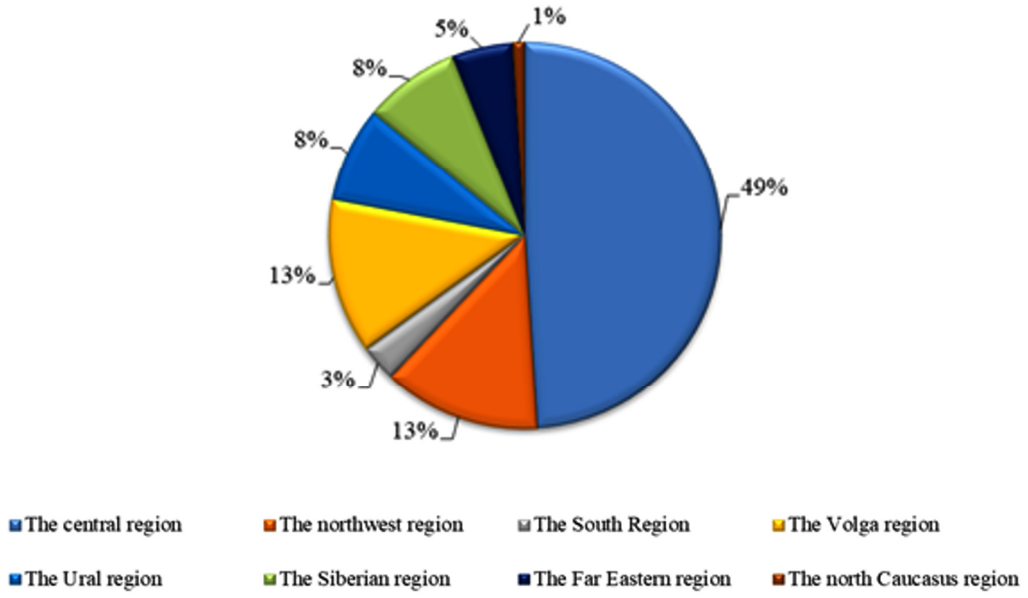

Fig. 1. The territorial structure of audit organizations distribution in Russia in 2018
(***The Federal Security Service of the Russian Federation. Official statistics*, n.d.**)

If we talk about the duration statistics of audit activities, in 2018 the share of entities conducting audit activities for more than 5 years amounted to 78%.

In the audit services market, 90% of organizations are small, but large audit firms account for the largest share in the total volume of services rendered. The system of audit organizations by the volume of work and the volume of services rendered is graphically presented in Figure 2.

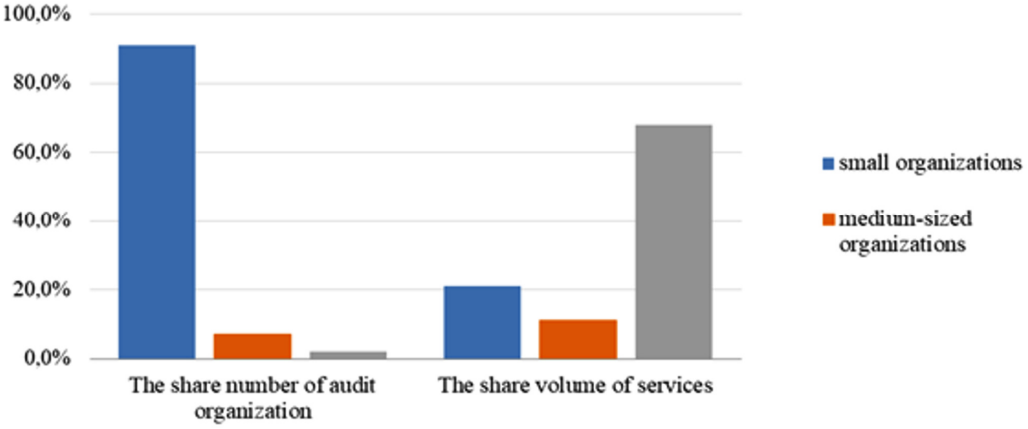

Fig. 2. Audit firms differentiation in terms of scope and size of audit services provided in 2018
(***The Federal Security Service of the Russian Federation. Official statistics*, n.d.**)

The audit market is saturated with small enterprises that are not able to compete with large companies in the audit market. Large companies in the audit services market care about the qualifications of

their employees, namely, they give their wards the opportunity to take specialized advanced training courses, provide the opportunity to study foreign languages for cooperation with international companies, conduct training courses to improve the service, that is, intensively engage in the development of skills and professional knowledge of their wards. Such market giants include 'KPMG', 'Ernst & Young', 'Deloitte and Touche CIS' and 'PricewaterhouseCoopers Audit' (RAEX Analytics, 2018).

Table 1 reviews the list of leading organizations engaged in audit activities, based on the results of 2018.

Table 1: Leading organizations engaged in auditing (Expert RA, 2020)

Performance position 2018	Auditing companies	Organization profitability, RUR
1	KPMG	10 668 524
2	Ernst & Young	6 977 116
3	Deloitte & Touche CIS	5 611 112
4	PricewaterhouseCoopes Audit	5 505 617
5	BDO Unicon	1 690 865
6	Fbk	1 199 580
7	Crow Expertise	407 348
8	FinExpertiza	402 157
9	Crow Rusaudit	398 352
10	MEF-Audit	350 269

It can be concluded that the audit sector is monopolized. There is a need to develop programs to support small Russian companies. Using methods of system analysis, the main indicators of the audit services market are considered, according to which in recent years there has been a decrease in the number of audit activity subjects.

The number of audit organizations from 2016 to 2019 decreased by 0.3 thousand and amounted to 4.1 thousand. However, the number of individual auditors over the course of three years has remained at the same level of 0.6 thousand. The number of auditors also decreased from 2016 by 2 thousand people (Sheremet, 2017).

As mentioned above, the new reform will lead to a reduction in auditors and audit organizations. The fact that the new bill could undermine a large number of auditors in the regions, several experts suggested at once.

As for the Belgorod region, the number of audit organizations in the region as of October 2019 is 39; the number of auditors is 132 people. The regulation of auditing in the Russian Federation has a long history, but in July 1, 2009, the history of this profession received a new twist.

The New Federal Law #307 'Auditing' has replaced the licensing rule with the standard for admission to a self-regulatory organization.

In accordance with the will of the legislator, organizations and individuals began to join in non-profit partnerships. The number of auditors and audit organizations by self-regulatory organizations of auditors as of January 16, 2020 is shown in Figure 3. According to the Control copy of auditors and audit organizations register.

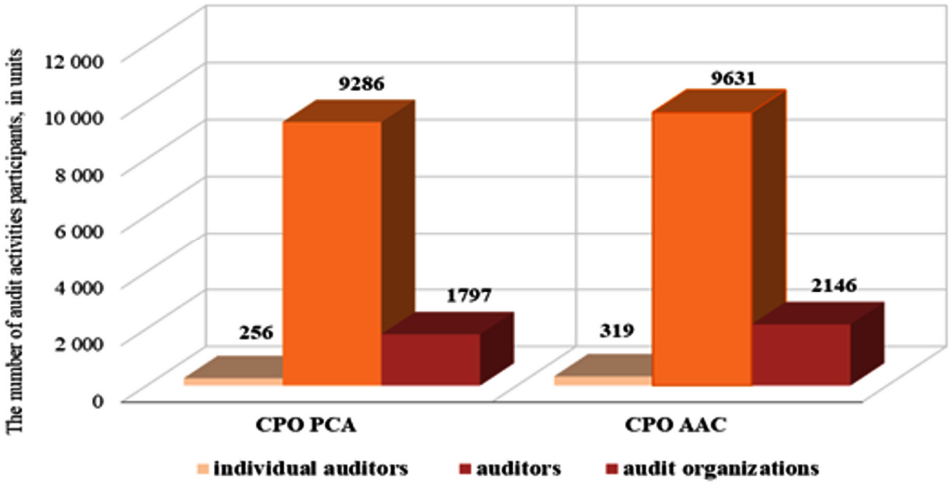

Fig. 3. The number of auditors and self-regulatory organizations of auditors as of January 16, 2020 (*The Federal Security Service of the Russian Federation. Official statistics*, n.d.)

Two self-regulatory audit organizations decided to unite, i.e. the Russian Union of Auditors and the Association of Auditors 'The Commonwealth'.

Thus, one self-regulating organization of auditors reminds that the licensing, which was earlier, made the financial burden much less. With the activity of one self-regulatory organization, the financial burden may increase. For example, now the procedure for acquiring a single certificate of an auditor is unreasonably expensive, the percentage of completion is very small, and therefore there is no influx of young specialists into the audit profession.

One self-regulatory organization is clearly a decrease in competition. According to the Big Four, a self-regulatory organization will have to take the costs of auditors and this is not only membership fees, but also, quality control payments, which periodically conducts self-regulatory organizations in relation to audit organizations and, accordingly, a number of 'small' audit firms cannot financially exist.

Thus, audit activity is an integral part of the economy as a whole. By conducting a mandatory audit of organizations, potential investors can make decisions about supporting the enterprise. Since the market for audit services is in the process of significant changes, the professional community and the government need to develop methodological and organizational approaches to address the existing problems.

Conclusion

Regulation audit measures should be mainly aimed at improving the professional climate in the market of audit services, since it is the audit activity that affects public and state interests. It is necessary for the audit profession development to implement a set of measures that will attract young professionals and will motivate existing participants in the audit market to continue their professional activities. The state and self-regulatory audit organizations influence the current situation of the audit market subjects quite largely. Since the issuance of a false audit report will adversely affect the business reputation of self-regulatory audit organizations and lead to the risk of its existence, it is necessary to review the system of penalties by self-regulatory audit organizations and their members, which will stimulate the subjects of audit activity to conscientiously and efficiently render audit services.

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Organizational and Pedagogical Aspects in The System of Professional Training of Future Managers: Innovative Forms, Methods and Tools of Health-Preserving Study

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Abstract

The problem of creating a health-oriented system of professional training of future managers is highlighted in the article. The aim was to ground the organizational and pedagogical aspects (innovative forms, methods and tools of health-preserving study) in the system of professional training of future managers with the help of the following methods: theoretical analysis; synthesis of philosophical, psychological, pedagogical, educational, methodical and professional scientific literature, legal documents on education and healthcare; analysis of Internet resources; pedagogical observation; surveys, questionnaires; methods of mathematical statistics. The analysis of the level of employers' interest (top level management) in the hiring to work managers with health-oriented management skills is presented. The basic principles and approaches in the process of studying students-managers of health-oriented management are allocated. The essence of the content of the program of author's special workshop "Basic notions of health-preserving for future managers" is revealed. Effective organizational and pedagogical aspects of formation the health-oriented management skills of future managers are revealed. It is stated that the organizational and pedagogical aspects in the content of the professional training of students-managers are crucial for the implementation of a health-oriented concept of the content of their professional training. The organization of training of students-managers on the basis of such a concept ensures the integrity of their perception of the organization's environment and embraces health-oriented planning of all sides of the workforce.

Keywords: Health-Oriented Managerial Skills, Health-Preserving Study, Students- Future Managers, System of Professional Education of Future Managers.

Introduction

The 21st century requires new approaches to management sphere, namely: flexibility and dynamism; using of the modern analytical systems, information technologies; understanding the sense and importance of human development and health capital; application the mechanisms of economic enrichment of companies on the basis of social protection of working people. All of these points to the neediness of improving the professional training system of future managers. Analysis of curricula, programs, qualification requirements, necessary competences of students, which studying specialty 073 "Management" allows us to generalize what future manager should know and be able to do. Unfortunately, everything comes down to the economic component and doesn't take into account the necessary of man-centred management. In general, the essence of future managers' studying consist: development the skills of search, assessment of market opportunities and the formation of business ideas; promotion the ability to develop business plans, to create new projects and business products;

mastering the technique of financial planning and forecasting; realization the assessment of investment projects in different investment and financing conditions. Although the work of a manager in fact primarily involves managing people. The fate of people, their health and, consequently, the implementation of all economic projects in organization depend on the quality of such a management. Today, any successful university that prepares managers must be strong with its advanced methods of forming future graduates' readiness to create a health-preserving microclimate in the business structures in order to increase the health capital of working people. Since human development, the formation of human potential depends on the health capital, the issue of studying the effective health-oriented management of labor resources are urgent, relevant and practically significant (Zavydivska N. & Zavydivska O., 2015).

Given the foregoing, it is obvious that modern Ukrainian universities, where students-future managers are studying, need to develop modern organizational and pedagogical aspects, namely, the introduction of innovative forms, methods and tools of study. In our opinion, using of new approaches in the systems of professional education of students-managers, will allow them to create the competencies which they need in real work for doing HR-management in the conditions of a shortage of time.

Material and Methods

Scientists from all over the world are studying the problems of effective management, in particular M. Nebava, M. Meskon, L. Yakokka, D. Grayson, V. Hoyer, P. Druker etc. The philosophical, theoretical and applied principles of management were studied by G. Osovska, A. Gerasimchuk, Z. Tymoshenko, S. Sheiko, O. Kuzmin, O. Melnyk and others. Improving the quality of management through the development of individual managerial skills discussed in scientific papers of V. Novak, Y. Symonenko and others. The development of human and intellectual capital through effective management has become as a subject of research for O. Koshulko, O. Yermolenko and others. To study the competence of the manager, human resources management and self-management as the social technologies of realizing the manager's personal potential devoted works of V. Shepel, M. Lukashevich, M. Burmaka and others. Strategies of professional development of individuality, the issues of psycho-diagnostics in the manager profession, the issue of improving the quality of personnel management were learning by O. Sergeyenkova, G. Besiedin, V. Kompaniets etc.

Scientific developments the problems of modernization of modern education are devoted to I. Zyazjun, O. Padalko, O. Pyehota, A. Nisimchuk; the means of improvement of educational activity and psychological and pedagogical influences are disclosed in publications of V. Molyako, V. Davydov, D. Mazoh, V. Bezpalko; the questions of health preserving study discussed in scientific papers of O. Dubogay, E. Vilchkovskyi, D. Davydenko, Y. Prystupa, M. Nosko, N. Zavydivska, B. Shyyan etc.

Based on the above, the problem of improving the content of education is devoted to numerous studies. But in most of them, the problem of improving the professional training of students - future managers through improving the organizational and pedagogical aspects of the system of professional training, namely, the introduction of innovative forms, methods and tools of health-preserving study concerns only a few issues.

The research (qualifying experiment) was conducted during 2016-2018 years. Lviv institute of SHEI "Banking University", Lviv State University of Physical Culture, National University "Chernihiv Collegium" named after T.G. Shevchenko server as an experimental basis. The survey of top level management workers (heads of enterprises, companies, banking institutions) was held in Lviv and Lviv region (Ukraine). In total, 184 people participated in experimental work.

The aim of this work is to substantiate organizational and pedagogical aspects (innovative forms, methods and means of health-preserving study) in the system of professional training of future managers. To achieve the aim we have solved the following **tasks**:

1. to analyze the level of employers' interest (top level management) in the hiring to work managers with health-oriented management skills;
2. to highlight the basic principles and approaches in the process of teaching students-managers of health-oriented management;
3. to reveal the essence of the content of the program of author's special workshop "Basic notions of health-preserving for future managers";
4. to identify the effective organizational and pedagogical aspects of formation the health-oriented management skills of future managers.

To achieve the tasks the following research **methods** were applied: theoretical analysis and synthesis of philosophical, psychological, pedagogical, educational, methodical and professional scientific literature, legal documents on education and healthcare, analysis of Internet resources, pedagogical observation, surveys, questionnaires, and methods of mathematical statistics.

Results

Effectiveness of future managers' studying of health-oriented management depends on many factors; the most important is the right choice of methodology, technology and teaching methods, focused on the needs of nowadays labor market in the field of management. We see the solution of the problem of improving the professional education system of future managers in such directions: through fundamentalization, universalization and integration of the content of professional disciplines; creation of such a system of interdisciplinary connections, which will promote the professional education of students-managers to be more focused on social demands in management sphere; creation of a modern complex of educational and methodological support and using the modern forms, methods and tools of conducting classes (Zavydivska N. & Zavydivska O., 2015).

The separation of health-oriented concept from the content of professional disciplines in a methodological plan is a rather complicated process. The uniqueness of such a concept is related to the multidisciplinary character of the system of professional studying of future managers, which forms their system competence in health questions. The organization of students-managers' study on the basis of such a concept ensures the integrity of their perception of organization's environment and embraces health-oriented planning of all sides of the workforce. To do this, in the process of teaching the specialized disciplines, it is necessary to implement a systemic (interdisciplinary) approach, as opposed to an academic (disciplinary) approach, based on the allocation of narrow functional disciplines (vertical type) in curriculums and their in-depth study. These are such disciplines like macroeconomics, microeconomics, marketing, labor economics, financial management, etc. During practical implementation of professional training of students-managers, there is a need for the integration and systematic using of diverse methods, approaches and technologies that are developed not only by previous mentioned, but also by others disciplines. The difficultness for both students and teachers is in neediness to unify not only certain aspects, but also the interconnection in content of all disciplines, which can substantially serve as a tool for the formation of future managers' readiness to health-oriented management activities. On the one hand, it should be taken into account that any introduced pedagogical innovation can serve for creation another one, more perfect and effective. On the other hand, one must understand that the best pedagogical result can be obtained from the special combination of the simultaneous using of several techniques and technologies (Zavydivska N. & Zavydivska O., 2014).

The results of our express-researches at the stage of the qualifying experiment showed that formation of future managerial skills in health-oriented management causes employers' (top level management) a practical interest, which is primarily connected with the neediness of their ability to create a healthy climate in the company. The surveys conducted by us during three years show that each year the number of employers (top level management) which, during hiring managers to work, pay attention on level of their readiness to introduce health-preserving measures in the conditions of labor processes is growing. This indicator grew from 16.70% in 2016 to 56.90% in 2018 (Figure 1).

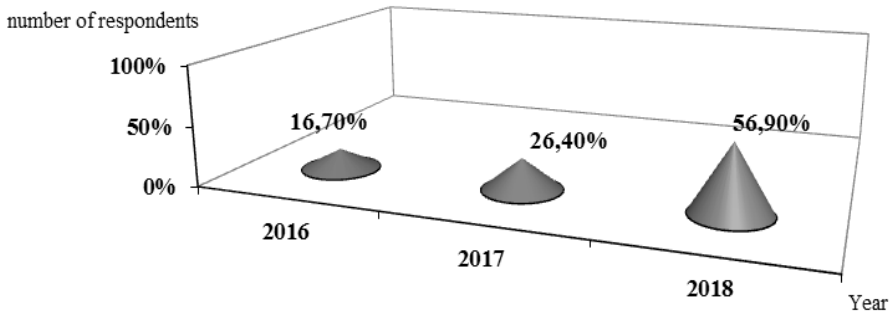

Fig. 1: Results of surveys on the interest of employers (top level management) in hiring to the work managers with health-oriented management skills, (%)

The results that we received after analyzing respondents' responses in the age-old context show us that the largest numbers of such top-managers who are interested in managers with ability to create health-oriented environment in organization are young people aged 25-30 (21.4%).

The obtained data suggests that top managers in senior age are less thinking about problems of creating a health-oriented organization environment. This is probably caused by fact that young people are more likely to get known foreign experience of organizing health-oriented management. Moreover, it's not unfortunate, but this fact - our young people know English and other languages and this knowledge allows them to study the advanced foreign experience on the issues of introducing advanced health-preserving technologies into the production processes of companies (Figure 2).

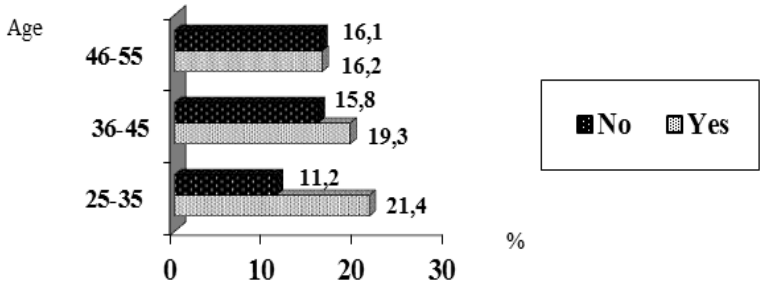

Fig. 2: Analysis of respondents' responses in the age-old context regarding to the interest of employers (top level management) in hiring to work managers with the ability to create a health-oriented organization environment

The results of the qualifying experiment and our own pedagogical observations suggest admitting that the organizational and pedagogical aspects in the content of the professional training of students-managers are crucial for the implementation of a health-oriented concept in the content of their professional training.

The analysis of curricula and training programs of future managers' education gave us an opportunity to eliminate several key problems that exist today on the way of creation the health-oriented system of their professional training. In our opinion, these problems are in the neediness to identify complementary aspects of theoretical, methodological and practical concepts:

- the problem of understanding the nature and positioning of disciplines in the curriculum, which are able to make influence on the formation of health-preserving managerial skills of among students-managers. The theoretical study of student-managers should be based on the strong ideological foundations of human-centeredness approach, and the multidisciplinary nature of the content and the systematic approach will provide a synergistic effect during the formation of their

ability to health-oriented management. We should understand that these aspects affect on the successfully formation of theoretical readiness for health-oriented management activities of future managers;

- the problem of combining theoretical and practical components of learning. Practical-oriented, technological nature of pedagogical technology should ensure the mastering of tools for creating a health-oriented environment. It is about using information technologies, understanding of analytical systems, modelling ways of realization of business projects through improving health, increasing productivity and working capacity of employees people;
- the methodical aspect in the problem of professional training of future managers is in the fact that the theoretical, abstract teaching of the theory of health-oriented management doesn't cause internal motivation without which it is impossible to rely on good knowledge. Practice in the process of health-oriented study can generate motivation, but without a good theoretical and methodological foundation will not provide all the depth of generalized experience and as a consequence the practical possibility of applying acquired health-oriented managerial skills in the future.

Many years of educational and research work with students-managers allowed us to develop own vision of the conceptual organizational and pedagogical principles of a dynamic model of active training for health-oriented management teaching, as well as to formulate basic principles, approaches and methods of it. The proposed concept has a clear target setting on the formation future managers' competence in the questions of organization of health-oriented environment in the conditions of labor processes. The essence of this concept is in the fact that the central figure in management is a person, his/her needs and interests. The basic principle of management – to focus on the neediness to prolong the healthy life of working people. It is common known that knowledge is constantly changing and quickly becoming obsolete. Because of this, the essence of training the future managers of health-oriented management involves not only knowledge transfer, but also updating, obtaining and assimilating of knowledge (Zavydivska O., Zavydivska N., Khanikiants & Rymar, 2017). Self-education and self-training in a system of health-oriented professional training of future managers represent a process where trainees (teachers) and those who are studying (students) are involved in the joint activity of learning something new, but not just involved in the process of knowledge sharing. In our opinion, the basic principles and approaches in the process of health-oriented management studying of students-managers are follows:

- the principle of problem-oriented learning. It involves the transition of training aimed at transfer of knowledge and past experience to the training aimed at creating and obtaining knowledge, managerial decisions which are based on the practice of health-preservation. This principle is aimed at eliminating the gap between training and current problems of management sphere;
- the principle "learning in action". It involves the transition from training through the transfer of knowledge to the orientation of making training in action (formation of health-preserving skills and competencies). The implementation of this principle involves the predominant using of teaching through activities and own practice experience. Execution of this principle, for example, is carried out during students-managers' analysis and solving tasks connected with development of various projects of the health-oriented environment in organization;
- the principle of project training. Provides a transition from the orientation, aimed at the learning process, to the orientation focused on the result. This allows teachers to motivate students for creative work and receiving completely new results, as well as using such elements as design and modelling;
- systemic approach in studying. Often, the system approach is declared, but not implement in the educational process as well as in the creation of curricula. Application of the system approach requires teachers to have a system of health-oriented thinking, which should be used during the development stage and stage of implementation of the curriculum;
- simulation as an opportunity of creative improvisation. This is an important conceptual tool that must be used during teaching the professional disciplines for the development of future managers' creative imagination about health-oriented environment in the organization. For simulation, students need to find answers on important questions and be creative in approaching the creation of a model that promotes the emergence of an integrated set of managerial decisions.

For the improving pedagogical method of forming student-managers' readiness to create a health-oriented environment in the organization we have revealed a special workshop "Basic notions of health-preserving for future managers", which was used as an active pedagogical factor. The program and the content are composed in such a way that both the teacher and the student had the opportunity to make changes and to update the content, thus covering more and more notions. The program is used as:

- a tool for studying ready-made terms and notions: the teacher can provide an interpretation and definition;
- a tool for student's self-study on certain topics: the teacher can post there exclusively such terms that the student should describe at home;
- a tool for the development of creativity among students: the student can itself complement the data presented there, which had not previously been.

This approach allowed the using of the program as a mechanism for communication between teachers and students, and, at the same time, to accumulate conceptual notions and means for the formation of knowledge about health-preservation problems. The advantages of created program, despite it is easy to use it, are: there is the possibility of hosting such a program in the network, which allows conducting web-lessons, and, if necessary, you can add and modify the content.

Today, in the system of professional education of future managers educators (Davydenko & Shklyarenko, 2006; Petrov, 2003; Zavydivska O., Zavydivska N., Khanikiants & Rymar, 2017; Zavydivska O., Zavydivska N., Kovalchuk & Khanikiants, 2018) use a lot of organizational and pedagogical forms, methods and tools as traditional as interesting, innovative. The most traditional are lectures, seminars, practical and individual classes. However, we would like to focus on those that as we think are the most effective for the possibility of exacerbating and solving problems associated with the formation of future managers' health-oriented managerial skills.

Situational method is based on the possibility of reaching an understanding of the neediness of health-oriented management through the consideration, learning and discussion of various specific situations. The method of T-groups (training-groups) involves the division of students during classes on T-groups for getting the possibility of implementing various organizational aspects up to the using of elements of psychotherapy. Such training lessons don't provide a rigid planning and structuring, since it is considered that the process is more important than content. *Syndicates* – training based on one group of several subgroups for the simultaneous solution of the task, or for solving various problems which are interrelated. Syndicates are used as a motivation tool to attract as many students as possible to the learning process. *Case-methods* are a group-based solution of problems illustrating the practical effects of approaches and concepts. This is a kind of study during the training lessons the situations (usually from real life, but can be fictional) to study with the help of material analysis and the definition the ways to solve the problems encountered in the case. *Business games* involve the study by student-managers the information, while taking the decision and playing the situation. Thus, a sequence of different situations is being studied in order to make a single, correct management decision. In our opinion, in the process of forming the readiness of future managers to create a health-oriented environment, take place such a verbal teaching method as the *storytelling.* The effectiveness of such a method in the content of the professional training of students-managers is increasing today. The bottom line is that the teacher should to tell stories about the effectiveness of health-preserving technologies in the content of professional disciplines. ***T****he Delphi method* (expert evaluation method) is carried out by writing questionnaire (survey) of a group of students who become as experts on the subject under discussion. The main prerogative of this method is not such a sense of answers, but the ability for students to discuss the results and predict various managerial actions and situations. *The labyrinth of actions* – is another effective way of learning which, in our opinion, will contribute to the intensification of the process of formation the readiness of students-managers to create a health-oriented environment. Students are given the opportunity to study a particular situation and show as many alternative management actions and solutions as are possible, that is, to pass a certain maze in the process of learning health-oriented management skills. *Brainstorming* – is a way of activation the creative health-oriented thinking. This technology allows involving to the discussion even the most

closed and shies students, create a creative atmosphere and evaluate the way of making managerial decisions. *Buber Dialogues* – searching of compromise solutions in the studying process on the basis of dialogue between students. Such an approach is necessary for future managers, because it allows them to focus on the possibilities of cooperation and teach the ways to avoid conflict situations. The creative dialogue allows the teacher to pass control over the discussion questions to the students. Teacher should ask questions, controversial statements, but exclusively for the discussion. It stimulates students to open, creative discussions of various tasks and teaches them to take responsibility for the management decisions they made. A focused conversation between the teacher and the students outside the university contributes to informal communication between them on various topics on health preservation. Take place a sincere discussion of situations, however, the effectiveness depends on the teacher's skills to manage such a conversation. Educational technology of creative projects about health-oriented management activities involves students to perform their respective tasks and presenting their ideas to the whole group. *Coaching* – is a method that combines the principles of consultancy and training, but not in the classical form. The difference is that in coaching the main place belongs not to the edification, but to the motivation of students to solve training tasks. If the teacher becomes a coach, then he/she will never give any strict recommendations to the students. The purpose of coaching is in the improving health-oriented managerial skills, to increase the effectiveness of study. *Learning in action* – is the creation, a kind of simulation of situations which future managers can get; this will contribute to the development of health-oriented managerial thinking. Most important, that learning by action (in action) allows to form future managers' beliefs in the neediness to learn and improve throughout their lives.

Discussion

According to the basic provisions of scientific works (Apanasenko, 2007; Davydenko & Shklyarenko, 2006; Dubogay, Alyoshyna & Lavrynyuk, 2011), the uniqueness of the content of health pedagogy in the system of professional training of future managers is in that it teaches how to develop of intellectual health. Our researches confirmed the opinion of Nebava M. (Nebava & Zayukov, 2014) that the future profession of student-managers is connected with insufficient of information as well as excess of information, which leads to information overload. That is why intellectual health is an impetus for free-targeting in the information space, searching and selection of relevant information. It should be noted that during the study of health-oriented managerial skills by student-managers it is necessary to maintain a balance between creativity and analytics. This means that the creative approaches of future managers for creating a health-oriented environment in organization should be backed up by analytical information. In view of this, organizational and pedagogical conditions of learning should combine rational, intuitive and creative approaches. Health-oriented management, in our opinion, is an intellectual activity, which on the one hand depends on the level of already formed health culture of managers, and on the other – determines the level of this culture. Scientists (Dementiy, 2005; Kizyan, Nebava & Adler, 2014) argue that social factors play a leading role in the provision of public health. But the health culture is a much more complex and ambiguous phenomenon than influences which take place during studying process of managers, for example, economic and political factors. Health culture of different nations and generations reflects the accumulated for years set of habits and behavior of people. The future manager through cross-cultural management must be able to identify the unifying factors of interaction between working people. Science confirms the general unity of people in trying to be healthy. Using of cross-cultural management in modern companies determines the health culture as an organizational and unifying resource of management. In the system of HR-management, cultural features become as one of the reserves of the organization's development, which objectively necessitates the consideration of this range of problems not only at the applied level, but also in the theoretical aspect.

Based on the learning of modern trends and innovations in education (Osovska, Osovskyj & Maslovska, 2015; Petrov, 2003), we discovered that using of new information technologies helps teachers create real conditions for the development of additional health-oriented management skills and strategies of students-managers; traditional tools are no longer capable. Nowadays web technologies are one of the most relevant forms of professional training of future managers. Under

such conditions, students-managers have the opportunity to keep in touch with everyday life, everywhere and at any moment widely use the usual for them sources of information, that is, the Internet. Our analysis of scientific and pedagogical literature, special and informational sources, as well as Internet resources allows us to talk about the availability of information about health-preserving technologies. Of course, the Internet today is such resource that allows future managers to study on their own, but there are not enough methodological guidelines and recommendations regarding the using of such forms of health-preserving lesson as the Web-lesson. In the context of our research under the web-lesson we mean specially organized learning through the using of web technologies at various stages. In our opinion, implementation of such method of teaching special disciplines in the context of health-oriented aspect needs to determine the structure of the lesson and the methodology of realization in the system of professional training of future managers. The main advantage, in our opinion, is that such classes are available at any time. This enables the teacher to intensify the work of students not only during classroom lessons, but also during doing their individual homework. Moreover, there is an opportunity for a closer relationship between a teacher and a student outside the institution, which is an extremely important argument for the formation of future managers' health-oriented management skills. In order to successfully and efficiently conducting of web-lessons the teacher should have a special tool that will allow creating and managing web resources. Nowadays, there are many systems which allow to management electronic resources, but one of the most common and easy in using are programs which developed specially for more thorough assimilation one or another discipline. Such programs enhance the ability of student-managers to learn health-oriented knowledge and, at the same time, let to save time during the teaching of professional disciplines.

Conclusions

Speaking about the development of management system in our state, we observe two interrelated aspects: on the one hand, managers should strive for self-development, expansion of managerial skills, and on the other – any organization is interested in highly skilled managers. Ideally, these factors must coincide, not contradict each other, which should be understood during creation the basic technology of health-oriented professional education of future managers.

Having read Alan Mumford's work, we want to indicate that in the system of professional education of future managers, it is necessary to combine random (informal), planned (formal) and integrated (make influence on the studying) technologies. Such a combination will be ineffective if any technology is poorly thought out by the teacher and incomprehensible for the students. The implementation of teacher's idea should be focused on students and take into account existing health-oriented managerial experience. The potential of studying also depends on other factors, for example, on the environment where specialization classes are taking place. We mean organizational culture, the microclimate in a group, the level of health culture of students, the ability to learn management skills. An important condition in this sense is not just the development of motivation, but enthusiasm, courage and flexibility. Teachers need to remember that all students who will subsequently hold positions of managers, have different abilities, learning experience, abilities to transfer own knowledge to their future work, features of behavior and the desire to introduce in future health-oriented technologies for improving health of working people. The content of the professional competences of student-managers should include social characteristics.

Modern educators share the idea that studying should be concentrated on the student. The student is a key figure in the educational process. It's about the fact that student is the centre of efforts for the teacher, and the teacher is a coach for creating the optimal content and conditions for learning. We are talking about the fact that student also should manage the system of professional education, the process of learning in some way, not only teacher. The choice of training methods should correspond to the types of individual preferences of students who have chosen a managerial profession. Didactic training courses, courses with active participation, conferences, exhibitions, games, video films, psychometrics, extreme-trainings, open and distance learning, e-learning, etc. – all these should take place during the formation health-oriented management skills of future managers.

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Identity Expressed in Organizational Missions and Communication Of Sponsorship (On the Example of The Largest Polish Enterprises)

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Abstract

Care for the social environment is becoming an important value in the activities of today's enterprises. It is internalized so deeply that it becomes part of the company's ethical identity. This identity can be communicated, among others, in organizational missions. The aim of the article was to: determine the types of values appearing in missions of the largest Polish enterprises (as part of their organizational identity); identify sponsorship areas in the largest Polish enterprises; identify the relationship between the presentation by the largest Polish enterprises of particular types of values in their missions and the posting by these organizations of information about sponsorship areas on corporate websites. The analysis of the content of websites (including information contained in reports or similar documents) was used. The collected data were subjected to qualitative and quantitative analysis. IRAMUTEQ software was used as well as Microsoft Excel and Statistica. The Mann-Whitney U test was performed to test the validity of formulated hypotheses. It was found that the largest Polish enterprises that shared their missions on corporate websites informed the public about more sponsorship areas compared to those that did not. In many cases, the type of values in missions also differentiated the study population in terms of the universality of information on sponsorship areas. Enterprises presenting development values in their missions informed about the sponsorship of the largest number of areas. Organizations that declared identity related to CSR *sensu stricto* were not, as might have been presumed, those that reported about the largest number of sponsorship areas.

Keywords*:* Organizational Identity, Mission, Values, Sponsorship, Communication

Introduction

In the traditional paradigm, commercial enterprises used to be perceived as entities that should focus on development, competition, and on making profits. Over the past decades, however, this view has been reevaluated. The very functioning of enterprises has also changed towards active, civic commitment to the local environment. An example of this is the development of corporate social responsibility (CSR) programs. Initially, as argued by Carroll (1991), commercial organizations had an economic and legal responsibility, i.e. they were obliged to produce goods and services and to comply with legal regulations. Over time, other categories of responsibility gained importance, namely ethical and philanthropic (Carroll, 1991; cf. Carroll and Shabana, 2010; Pinkston and Carroll, 1996). Organizations, thus, would start to engage in activities that went beyond legislative standards but which embodied the standards and expectations of stakeholders that were considered by them as moral. Not only that, they would also launch initiatives that strive to improve the conditions of human existence.

The changes so far have been profound, and in a sense, they concern the essence of what enterprises and the people who create them are all about – that is, their identities. Gray and Balmer (1998, as cited in: Fukukawa et al., 2007) introduced the concept of 'corporate ethical identity' to describe transformations taking place in the area of corporate identity, ethics and CSR. Corporate ethical identity can be defined as 'the set of behaviors, communications, and stances that are representative of an organization's ethical attitudes and beliefs' (Berrone et al., 2007, p. 2) and includes its ethical values, behaviors and communication concerning ethical commitment that can improve business performance.
Fukukawa et al. (2007) referred to the creating of ethical identity as the process of 'ethicalization' which is made up of four aspects. The first (foundations, triggers, and motives) concerns motives and factors of ethical ethos adaptation. The process of shaping ethical identity is prompted by one of the

following three forces: (a) the altruistic beliefs of the leader; (b) strategic alternatives to gain a competitive advantage in the face of global competition; and c) external forces, e.g. changes in social legislation/norms. The second aspect (management) focuses on managing ethical identity. The decision to increase a company's social reactivity is associated with the need to introduce changes, including reformulation of the goals (and thus the overarching goal - that is, the mission - including determining the values that will be exposed in it), principles and procedures of operation, defining tasks and responsibilities as well as methods of monitoring and review. The third aspect of ethics (action and communication) exposes the relationship between communication and demonstrated activities in the area of CSR, corporate identity and ethics (sponsorship of different areas of social engagement can be one of such activities). Identity (who we really are) and communication (what we say about who we are) should be mutually consistent. This is what we refer to as *authentic identity*. Otherwise, the organization presents a false image. The fourth aspect of ethicalization (image and stakeholder perception) takes into account the importance of enterprise perception among the stakeholders' customers who may, nonetheless, have different expectations and ideas about the organization.

According to Gray and Balmer (1998), image management in an organization requires the creation of a coherent identity communication system using various types of media. This involves, among others, the formation of coherent links regarding the reference in the organization's mission and values to the issues of responsibility for the local environment with real actions undertaken in this area, as well as with their subsequent communication. For this reason, organizations that want to successfully build their ethical identity should not only take care of their interests, but also engage in activities benefiting the social community. An example of such initiatives is financial support lent to activities in the field of culture and art, sport, education, health care, social and humanitarian causes, etc. Depending on the company's motives, it may opt for either commercial or philanthropic sponsorship (Meenaghan, 1991; cf. Lii and Lee, 2012; Walliser, 2003). At the strategic level, enterprises can integrate sponsorship with organizational culture programs and use it to build organizational identity, employee identification, engagement and performance (Cunningham et al., 2009; Farrelly and Greyser, 2007, 2012; Garry et al., 2008; Grimes and Meenagham, 1998). The use of sponsorship also allows organizations to shape their external image. Last but not least, feedback communication with external stakeholders both reinforces and reaffirms the identity of the organization (Cunningham et al., 2009).

Organizations communicate with stakeholders either directly or indirectly. Nowadays, the importance of proprietary, modern corporate media, including websites, is on the rise. Due to the growing number of Internet users, companies invest in graphic design to increase their visibility among stakeholders. This forms part of the online corporate communications strategy and completes the mix of digital media (Garcia Garcia et al., 2017, p. 140).

No research has been identified in Poland on the relationship between the identity of an organization expressed in missions and communication of sponsorship. Therefore, own study in this area was undertaken. The purpose of the research was to: (1) determine the types of values appearing in the missions of the largest Polish enterprises (as part of their organizational identity); (2) identify sponsorship areas in which the largest Polish enterprises most willingly engage; and (3) identify the relationship between the presentation by the largest Polish enterprises of particular types of values in their missions and the posting by these organizations of information about sponsorship areas on corporate websites. The article is divided into sections, which are: introduction, literature review, methods, results and conclusions.

Organizational identity and image

The theoretical construct described in the literature as 'organizational identity' originates from studies on organizational behavior and has a clear relationship with psychological and sociological understanding of identity. Scholars in this field began to consider how staff develop a common understanding of the organization they create. The key question in this case was 'Who are we?'. According to Albert and Whetten (1985), organizational identity is formulated around the central, permanent and distinctive elements of the organization. It refers to what its members perceive, feel and think about their organization (Hatch and Schultz, 1997). For the needs of their membership identification model, Dutton et

al. (1994) further divided it into 'perceived organizational identity' and 'construed external image'. Perceived organizational identity is all those features of the organization that its members consider to be basic, distinctive, and permanent. Meanwhile, construed external image is about members interpreting how the main attributes of the organization are perceived by others.

Some researchers exploring the identity of formalized secondary groups focused on the issue of how organizations present themselves to employees and customers. This construct is known as 'corporate identity' and is closer to the marketing approach.

Melewar and Karaosmanoglu (2006) termed identity as presenting the organization to each stakeholder. They argue that identity consists of what makes the company unique among others in terms of organizational communication, design, culture, structure, employee behavior, and strategy. Identity is understood as a planned demonstration of the organization's image. In the early works of this research trend, the term 'identity' was used interchangeably with the term 'image' (Simones et al., 2005), meaning the image that appears in the audience's mind when they hear the name of the organization or see its logo (Gray and Balmer, 1998). In other words, it is the impression that the organization makes on others. Also noteworthy here is the conceptual relationship between organizational identity and personality that can be found in the literature. Organizational personality is often synonymized with specificity, uniqueness. In this context, Berenstein (1984) argued that each enterprise has its own uniqueness, individuality and personality. Personality is the sum of all the organization's features. Accordingly, identity can be seen as a mechanism by which the personality of the enterprise is conveyed to a broader audience (Simones et al., 2005).

When defining identity, authors often list its constituent elements. In Gray and Balmer (1998; cf. Balmer and Soenen, 1999), for example, identity is the reality and uniqueness of the organization, which consists of its strategy, philosophy, culture and design. Many researchers (Cunningham, et al., 2009; Gray and Balmer, 1998; Martinez et al., 2014; Stuart, 1999) emphasize the importance of mission as an element of identity. A mission is the source of expression of business philosophy (Collins and Porras, 1991; cf. Bartkus and Glassman, 2008). In a concise form, it clearly expresses corporate identity, corporate purpose and strategic intent (Hirota et al., 2010). Also interesting from the perspective of this study is the fact that mission can be a tool for articulating beliefs regarding, among others, the significance of social responsibility in the activities of an organization (Hirota et al., 2010)[1].

Organizations today strive to consciously communicate the identity to the public and thus shape their external image. Balmer and Soenen (1999; cf. Balmer and Greyser, 2002) distinguished four types of identity, among them communicated identity, which includes information provided to stakeholders, both in a controlled and uncontrolled manner. The main media through which organizations can communicate in a controlled manner with the public are electronic media, including corporate websites. They provide a space for sharing not only basic information about the organization, but also that about activities confirming its identity, including ethical identity. One of such activities is sponsorship. Such initiatives can help to position the company's image among external and internal stakeholders by communicating its desired identity (Martinez et al., 2014).

Methods

The conducted research consisted of the following stages[2]: formulation of questions, goals and hypotheses, determination of units of analysis, identification of texts, preparation of the coding scheme, testing it, purifying and/or detailing, collecting, coding and analysis of data.

Answers to the following research questions were sought: Q_1: What categories of values are included in the missions of the largest Polish enterprises? Q_2: What sponsorship areas do the largest Polish companies communicate on their corporate websites? Q_3: What relationships exist between the presentation by the largest Polish companies of information about sponsorship areas on corporate websites and the types of values contained in their missions?

Subsequently, two research hypotheses were put forward: H_1: Posting a mission by the largest Polish enterprises is irrelevant to presenting by them information on specific sponsorship areas[3] on corporate websites. H_2: The type of values contained in a mission of Polish largest enterprises is irrelevant to presenting by them information on sponsorship areas on corporate websites.

To test the H_2 hypothesis, the mission typology proposed by Cardona and Rey (2008) was used. Four categories of values were included in the missions (and the fifth distinguishing type - CSR *sensu stricto*). 40 partial hypotheses related to 5 value types and 8 analyzed sponsorship areas were formulated.

The research included companies from the ranking of the 200 Largest Polish Companies published by the weekly 'Wprost', which was based on the revenues, profits, assets and equity of several hundred Polish companies with predominantly Polish capital ('200 Największych Polskich Firm 2018' / '200 Largest Polish Companies 2018'. [Online], https://rankingi.wprost.pl/ 200-largest-companies/2018, retrieved: February 24, 2019). A total of 198 out of 200 entities listed in the ranking were analyzed[4]. They differed in terms of sector (Table 1), size and geographical location. Capital groups (groups of companies) constituted over half of them (64.6%). Production enterprises (30.3%), as well as those dealing in wholesale and/or retail trade (29.29%) were the most numerous.

Table 1: Analyzed enterprises by sector

Sector	**Number of analyzed enterprises [N]**	**Share [%]**
Industry (mining, food, chemical, wood, metal, etc.)	60	30,3
Wholesale and/or retail trade	58	29,3
Construction and building materials	22	11,1
Services (finance and banking, logistics, security, job placement, etc.)	17	9,7
Energy	7	3,5
Transport	7	3,5
IT	6	3,0
Media	4	2,0
Machinery, devices, tools	3	1,5
Automotive	3	1,5
Other	11	5,6
Total	198	100

Source: own study based on: '200 Największych Polskich Firm 2018' ('200 Largest Polish Companies 2018'. [Online], https://rankingi.wprost.pl/200-najwiekszych-firm/2018 (Retrieved: February 24, 2019)

It was assumed that, since the companies from the 'Wprost' list were financially successful, they probably have their own, easily accessible website containing information sought in this study. It was also assumed that such companies have sufficiently large marketing budgets to conduct social activities and inform about them through their corporate websites.

In the second quarter of 2019, proper research was conducted, consisting of the analysis of the websites content. If it was not possible to locate the sought information via a link, the 'Search ...' tool was used instead. Not only the text contained on the site was taken into account, but also that from any additional documents included on the website - reports, strategies, ethical codes, etc. Whenever the relevant information could not be found, further investigation of the site was abandoned.
In the first stage of the research, the missions of the organizations on the 'Wprost' list were identified. When coding the values they contained, the taxonomy of Cardona and Rey (2008, p. 94) was used, who distinguish the following categories: 1. 'Business values: values relating to the company's business and profit-making activity. Examples include perseverance, efficiency, professionalism or results orientation. 2. Relational values: values that Foster quality in interpersonal relations. They include, for

example, communication, team work or respect for people. 3. Development values: values aimed at differentiating and continuously improving the company. Examples include innovation, creativity, learning or continuous improvement. 4. Contribution values: values aimed at doing more for stakeholders than strictly required by the business relationship. They include, for example, customer satisfaction, interest in people, social responsibility'. Since the last of these categories takes into account the satisfaction of various stakeholder groups, including clients or shareholders, we decided to add an extra category related to CSR *sensu stricto*.

During the research, not only specific words and phrases contained in the missions were searched, but also their synonyms. The context in which they were used as well as the links between the most common terms were also considered (using to this end the IRAMUTEQ software[5]). In the next stage, data on social activities implemented by the analyzed enterprises was identified (e.g. areas and forms of engagement, beneficiaries). After that, we examined how these entities presented information on sponsorship areas on their corporate websites.The collected data was quantified, which allowed for its further statistical processing (cf. Babbie, 2008; Silverman, 2009). Thus, both qualitative and quantitative approaches were combined in the content analysis. Statistical analyses were conducted using Microsoft Excel and Statistica, allowing calculating arithmetic means, medians, standard deviation, coefficients of variation. The Mann-Whitney U test was also performed to test the validity of the formulated hypotheses.

Categories of values included in the missions of the largest Polish enterprises

In the course of the research, it was found that over two-thirds of the analyzed companies (133, i.e. 67.17%) posted their missions on corporate websites. The remaining companies either did not have them formulated or decided not to make them available online.

The analysis of the content of identified missions was supported by the IRAMUTEQ software, among other tools. Due to the fact that it does not contain a Polish dictionary, it was necessary to translate the missions into English. To this end, the text was prepared in accordance with the program requirements, and conjunctions, prepositions, most particles, etc. were removed. The software's automatic lemmatization feature enabled reducing 'various inflectional forms found in the analyzed text to the basic form of the word, as well as identifying what part of speech they are' (Glińska-Neweś and Escher, 2018, p. 86). The words that appeared at least ten times in the missions' content were qualified for further analysis. The number of individual words is shown in Fig 1.

Fig 1. Word cloud formed of the words most often found in the missions of the largest Polish companies *Source: own study*

Based on the analysis of the identified missions, it can be synthetically said that the customer was at the center of interest of the analyzed companies (this term or its synonyms appeared in almost half of the missions - 48.1%), to whom high-quality products and services were provided. Every fourth mission (25.6%) emphasized the importance of business development, while every fifth (21.1%) - safety,

including a safe environment (14.3%). Common good was included in the missions of 16 enterprises (12%) (Fig 2).

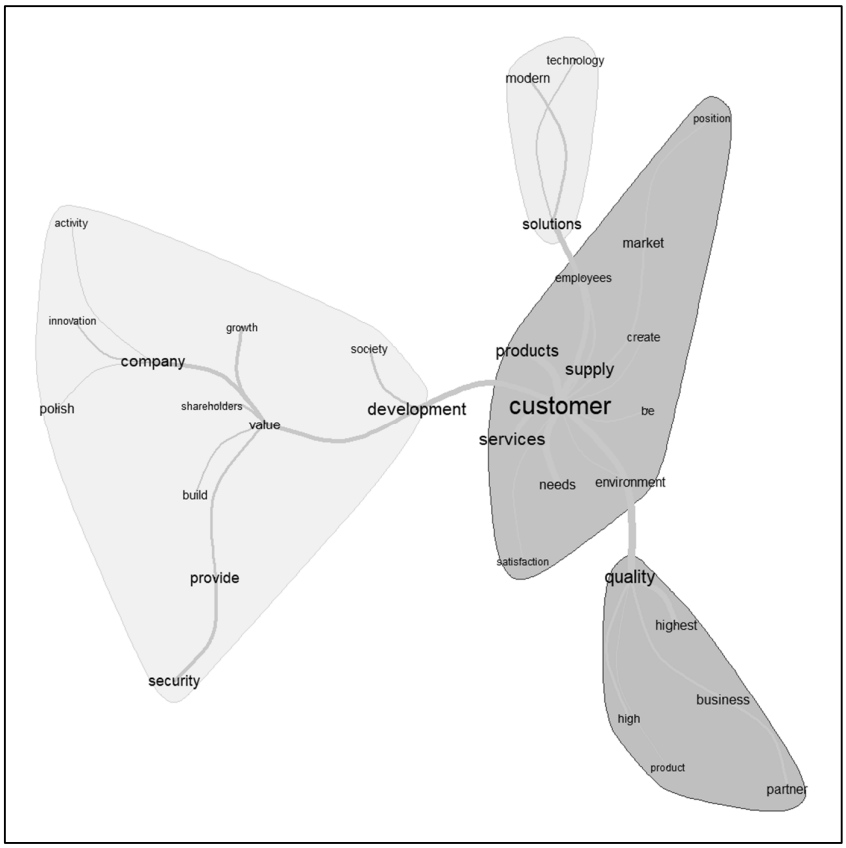

Fig. 2: Relationships between the most common words used in the missions of the analyzed Polish enterprises

Source: own study

Let us recall that, when coding the values contained in the missions of the studied Polish enterprises, the taxonomy of Cardona and Rey (2008) was used, and the fifth additional type was distinguished, namely CSR *sensu stricto*. The analyzed categories appeared in missions on a standalone basis (creating the so-called 'pure' types) or more often - in different constellations, i.e. when the missions contained at least two categories of values (creating the so-called 'mixed' types) (Table 2)

Table 2: Categories of values in the missions of the largest Polish enterprises

Categories of values in missions	'Pure' mission types		'Mixed' mission types	
	N	%	N	%
Contribution	23	11,62	117	59,91
Business	10	5,05	102	51,52
Development	2	1,01	48	24,24
Relational	1	0,51	10	5,05
CSR *sensu stricto*	0	0,00	37	18,69

Source: own study

The analysis showed that both among enterprises which included only one category of values in their missions and among those which included several of them, the ones in which attention was focused on meeting the needs of people not related to the enterprise (customers, the public, etc.) were predominant - thus, contribution values were exposed (11.62% and 59.91%, respectively). Subsequently, the missions most often included business values (5.05% and 51.52%, respectively) and development values (1.01% and 24.24%, respectively). On the other hand, reference was least frequently made to relational values (0.51% and 5.05%, respectively). Let us add that in every fifth mission representing the "mixed' type, values associated with CSR *sensu stricto* were exposed (18.69%; no mission was identified that focused solely on CSR). As a consequence of the relatively small number of 'pure' mission types, most further analyses were carried out for the mixed types.

Sponsorship areas in the largest Polish enterprises – results of the analysis of messages posted on corporate websites

The prevalence of information posted on corporate websites regarding the sponsorship of various areas of social activity implemented by both public institutions, non-governmental organizations and natural persons was analyzed as part of the research. This included: 1. culture and art, 2. sport, 3. education, 4. social assistance, 5. safety, 6. social community, 7. environment protection, 8. health care[6].

More than half of the analyzed enterprises reported on their corporate websites that they (co-)financed social community (55.05%), sports (54.4%) and/or social assistance projects (51.52%). Almost every second (49.49%) said that they sponsored education. Nearly as many reported that they supported culture and art (44.44%) and/or health care (40.91%). Among the analyzed companies were also those that declared their contribution to financing activities related to environmental protection (33.33%) and/or safety (21.72%).

Differences were found in the number of areas sponsored by companies that presented their missions and by those that did not. The latter reported smaller numbers of such activities (Me=1,0; $\bar{n}$ = 1,95, Mo=0). Data dispersion for both analyzed groups was very significant[7], especially for the companies that did not post their missions online (Table 3). It should be noted that, based on the analysis of the collected material, it was not possible to determine either the number of social initiatives pursued by companies or the value of financial resources that they allocated for that purpose.

Table 3: Number of sponsorship areas in the largest Polish enterprises and the presentation of missions - messages posted on corporate websites

Enterprises	Number of enterprises *N*	Number of sponsorship areas						
		Min	Max	Arithmetic mean $\bar{n}$	Median Me	Mode Mo	Standard deviation SD	Coefficient of variation V [%]
Presenting missions on corporate websites	133	0	8	4,26	5,0	0	2,90	67,95
Not presenting missions on corporate websites	65	0	8	1,95	1,0	0	2,66	136,15
Total	198	0	8	3,51	4,0	0	3,02	86,08

Source: own study

Due to the differences identified, further analysis was carried out with reference to the relationship between the categories of values contained in the missions and the sponsorship areas.

Categories of values in missions and sponsorship areas – based on messages posted on corporate websites

Companies presenting development values in their missions (Me=6,0; $\bar{n}$=5,25; Mo=8) informed about the sponsorship of the largest number of areas. On the other hand, the number of those areas was the smallest in the case of companies exhibiting relational values (Me=4.0; $\bar{n}$=4.00; Mo=4)[8]. It is worth noting that organizations indicating in their missions CSR *sensu stricto* were also keen on communicating sponsorship in many areas (Me=6,0; $\bar{n}$ = 4,65, Mo= 7), albeit not as frequently as companies focused on development. Data dispersion for each of the analyzed groups was very significant. The highest value of the coefficient of variation was recorded for business values and contribution values, while the smallest – for relational and development values (Table 4).

Table 4: Number of sponsorship areas in the largest Polish enterprises and the categories of values in missions - messages posted on corporate websites

Categories of values in missions ('mixed' types)	Number of enterprises N	Number of sponsorship areas						
		Min	Max	Arithmetic mean $\bar{n}$	Median Me	Mode Mo	Standard deviation SD	Coefficient of variation V [%]
Business	102	0	8	4,15	4,5	0	2,84	68,49
Relational	10	0	8	4,00	4,0	4	2,45	61,24
Development	48	0	8	5,25	6,0	8	2,66	50,70
Contribution	117	0	8	4,42	5,0	7	2,80	63,40
CSR *sensu stricto*	37	0	8	4,65	6,0	7	2,81	60,47

Source: own study

A nonparametric test for independent random samples, the Mann-Whitney U test (with continuity correction), was used to test the hypotheses[9]. This helped determine, among other things, whether posting missions is important for presenting information on the sponsorship of individual areas on corporate websites. The obtained results are shown in Table 5. On their basis, it can be concluded that the distributions of the analyzed variables in each case differed from each other. There were therefore grounds for rejecting the H_1 hypothesis.

Table 5: Mann-Whitney U test results (with continuity correction) (presenting the mission and communicating sponsorship areas)

Variable	Mann-Whitney U test (with continuity correction) (presenting the mission and communicating sponsorship areas)								
	Rank sum – Group 1	Rank sum – Group 2	U	Z	P	Z adjusted	P	N valid - Group 1	N valid - Group 2
Presenting the mission	**Culture and art**								
	7480,000	12221,00	3564,000	-3,18351	0,001455	-3,91402	0,000091	88	110
	Sport								
	11847,00	7854,000	3668,000	2,986295	0,002824	3,671549	0,000241	107	91
	Education								
	11352,00	8349,000	3299,000	3,970148	0,000072	4,881162	0,000001	98	100
	Social assistance								
	11385,00	8316,000	3660,000	3,065993	0,002170	3,769534	0,000164	102	96
	Safety								
	4950,000	14751,00	2505,000	2,337490	0,019414	2,873865	0,004055	42	156
	Social community								
	12474,00	7227,000	3132,000	4,302779	0,000017	5,290120	0,000000	108	90

	Environment protection								
	7524,000	12177,00	3399,000	2,516461	0,011855	3,093903	0,001976	66	132
	Health care								
	10494,00	9207,000	3591,000	-2,89329	0,003813	-3,55720	0,000375	117	81

Source: own study

** U - Mann-Whitney test value used for small numbers <20*
**Z - Mann-Whitney test value used when number of both groups is greater than 20*
**P - significance level for the test for the Z test value*
** Z adjusted – test value adjusted for combined weights*
**p - significance level for Z adjusted*
**N valid – numerical amount of groups*
- highlighted results significant at p<,05000

Using the Mann-Whitney U test, we also analyzed whether declaring specific categories of values (business, relational, development, contribution; CSR *sensu stricto*) in corporate missions is related with presenting information on the sponsorship of particular areas on corporate websites. The obtained results are shown in Table 6.

Table 6: Results of testing partial hypotheses regarding categories of values in missions and sponsorship areas

Sponsorship areas	**Categories of values in missions**				
	Business	**Relational**	**Development**	**Contribution**	**CSR *sensu stricto***
Culture and art	H_{2a}: Reasons for rejection found	H_{2i}: **No** reasons for rejection found	H_{2r}: Reasons for rejection found	H_{2z}: Reasons for rejection found	H_{2ah}: Reasons for rejection found
Sport	H_{2b}: Reasons for rejection found	H_{2j}: **No** reasons for rejection found	H_{2s}: Reasons for rejection found	H_{2aa}: Reasons for rejection found	H_{2ai}: **No** reasons for rejection found
Education	H_{2c}: **No** reasons for rejection found	H_{2k}: **No** reasons for rejection found	H_{2t}: Reasons for rejection found	H_{2ab}: Reasons for rejection found	H_{2aj}: Reasons for rejection found
Social assistance	H_{2d}: **No** reasons for rejection found	H_{2l}: **No** reasons for rejection found	H_{2u}: Reasons for rejection found	H_{2ac}: Reasons for rejection found	H_{2ak}: **No** reasons for rejection found
Safety	H_{2e}: **No** reasons for rejection found	H_{2m}: **No** reasons for rejection found	H_{2v}: Reasons for rejection found	H_{2ad}: Reasons for rejection found	H_{2al}: **No** reasons for rejection found
Social community	H_{2f}: Reasons for rejection found	H_{2n}: **No** reasons for rejection found	H_{2w}: Reasons for rejection found	H_{2ae}: Reasons for rejection found	H_{2m}: Reasons for rejection found
Environment protection	H_{2g}: **No** reasons for rejection found	H_{2o}: **No** reasons for rejection found	H_{2x}: Reasons for rejection found	H_{2af}: Reasons for rejection found	H_{2an}: **No** reasons for rejection found

Health care	H_{2h}: **No** reasons for rejection found	H_{2p}: **No** reasons for rejection found	H_{2y}: Reasons for rejection found	H_{2ag}: Reasons for rejection found	H_{2ao}: Reasons for rejection found

Source: own study

Grounds were found for rejecting the majority of the partial hypotheses (23, i.e. 57.5%) (detailing the main assumption H_2) regarding equality in the distribution of the analyzed samples (Table 6). In the case of development and contribution values, it can be considered that these distributions differ from each other, which means that we have reasons to reject the partial hypotheses H_{2r}-H_{2y}, as well as H_{2z}-H_{2ag}[10]. Analyzing the relationship between relational values and sponsorship areas, the opposite was observed – i.e. no grounds for rejecting the partial hypotheses H_{2i}-H_{2p} (regarding equal distribution) were found. In the case of business values and CSR *sensu stricto*, only some of the partial hypotheses were rejected. Further analysis was then carried out, the results of which are shown in Table 7. It contains information about individual types of enterprises in terms of the values they declare in their missions in connection with the messages they communicate about the sponsorship of different areas.

Table 7: Categories of values included in the missions of the analyzed enterprises ('mixed' types) and the content of messages posted on corporate websites regarding sponsorship areas

Categories of values in missions	Number of enterprises presenting categories of values	Content of messages about sponsorship areas	Number of enterprises presenting messages about the sponsorship of different areas	Share [%]	Coefficient of variation V [%]
Business	102	Social community	70	68,63	68,49
		Education	64	62,75	
		Sport	62	60,78	
		Social assistance	59	57,84	
		Culture and art	55	53,92	
		Health care	48	47,06	
		Environment protection	40	39,22	
		Safety	25	24,51	
Relational	10	Social community	7	70,00	61,24
		Health care	7	70,00	
		Sport	6	60,00	
		Education	6	60,00	
		Culture and art	5	50,00	
		Social assistance	5	50,00	
		Environment protection	3	30,00	
		Safety	1	10,00	
Development	48	Social community	39	81,25	50,70
		Sport	38	79,17	
		Social assistance	34	70,83	
		Culture and art	33	68,75	
		Education	33	68,75	
		Health care	32	66,67	
		Environment protection	25	52,08	
		Safety	18	37,50	
Contribution	117	Social community	84	71,79	63,40
		Sport	76	64,96	
		Education	75	64,10	
		Social assistance	75	64,10	
		Culture and art	66	56,41	

Categories of values in missions	Number of enterprises presenting categories of values	Content of messages about sponsorship areas	Number of enterprises presenting messages about the sponsorship of different areas	Share [%]	Coefficient of variation V [%]
		Health care	61	52,14	
		Environment protection	47	40,17	
		Safety	33	28,21	
CSR *sensu stricto*	37	Social community	28	75,68	60,47
		Education	26	70,27	
		Culture and art	24	64,86	
		Social assistance	24	64,86	
		Sport	22	59,46	
		Health care	21	56,76	
		Environment protection	17	45,95	
		Safety	10	27,03	
No mission	65	Sport	23	35,38	136,15
		Social assistance	21	32,31	
		Social community	18	27,69	
		Culture and art	16	24,62	
		Education	16	24,62	
		Health care	15	23,08	
		Environment protection	12	18,46	
		Safety	6	9,23	

Source: own study

The most diverse population (in terms of the universality of presenting sponsorship content) were those enterprises that did not post missions on corporate websites. However, the most homogeneous group, but still strongly diversified, were companies that declared development values in their missions.

Enterprises presenting their mission on corporate websites most often communicated to the public the financing of activities for social community - regardless of the displayed category of value (in the majority of these categories, the percentage share of organizations that posted such messages was at least 70%). Companies that did not post missions online also reported about their support for such activities (although they more often emphasized their commitment to sport and social assistance). On the other hand, the least frequently communicated was the provision of assistance in two areas: environmental protection and safety - also regardless of the category of values contained in the mission.

In companies in which business values were declared in missions, the information concerned the support of education (62.75%) or sport (60.78%). Organizations geared towards interpersonal relations in their missions focused on the sponsorship of health care (70%), sport and education (60% each). Development-oriented enterprises relatively often reported about supporting sport (79.17%), social assistance (70.83%), and less often culture and art (68.75%), education (68.75%) and/or health care (66.67%). Companies declaring contribution values most often communicated about the financing of sports (64.96%), education (64.10%) or social assistance (64.10%) initiatives.

Finally, let us point out that organizations displaying CSR activities *sensu stricto* most often shared on their websites messages about the sponsorship of education (70.27%), culture and art, and/or social assistance (64.86% each).

Conclusion

The mission and its values constitute the organization's credo, a declaration of its philosophy, and inform about the reasons for its existence, including its functions in relation to the social community. In other words, they are part of the organization's identity. This identity should in turn be credited by

undertaking consistent actions, which will then be communicated to the public. The analysis conducted in this study aimed at determining the relationships, among others between the presentation by the largest Polish enterprises of particular types of values in their missions and the posting by these organizations of information about sponsorship areas on corporate websites.

In the course of the research, answers to the formulated research questions were determined, and the hypotheses were tested. It was found that, among the values contained in the missions of the analyzed Polish companies, contribution values (including customers, the public) were predominant (reported in nearly 60% of the missions). The number of organizations that declared CSR values in the strict sense in their missions was three times smaller. It was also established that almost half of the analyzed enterprises had the customer at the center of their interest, who - according to the declarations from the enterprises - was provided with high-quality products and services. Much less often (in every tenth case) care for common good was a factor.

The analyzed enterprises most often reported on their corporate websites about the financing of activities related to social community, sport, social assistance, and education. It was found that those companies that shared their mission on corporate websites were more likely to inform the audience about more sponsorship areas compared to those that did not. In many cases, the type of values in missions differentiated the studied population in terms of the universality of information on sponsorship areas on websites. Enterprises presenting development values in their missions informed about the sponsorship of the largest number of areas. It was also the most homogeneous group in terms of the universality of posting sponsorship content.

It is worth emphasizing that the organizations that declared their identity related to CSR *sensu stricto* were not, as might have been presumed, those that reported about the largest number of sponsorship areas. Instead, it was the organizations that identified with values such as innovation, creativity and continuous improvement (most of them also declared values associated with contribution to others). Such companies could perceive issues associated with CSR and communication with the social community through modern media as a manifestation of modern company management. So, did the declaration of innovation, development etc. to some extent replace declarations of social responsibility in the analyzed Polish enterprises? The answer to this question requires further research.

We are aware that the research methods we used were not without their limitations. During the study, the content communicated by enterprises through corporate websites was analyzed. As a consequence: (a) only company declarations on those websites were checked, (b) information gaps could arise due to the fact that enterprises do not always inform the public about their activities, (c) only some manifestations of organizational identity (missions, values) were considered, and (d) motives for using sponsorship were not analyzed (i.e. whether it was commercial or philanthropic). Let us add that the research was carried out among the largest Polish enterprises, which is why it had a specific cultural context. In the future, it is worth conducting comparative studies in enterprises of a different size, as well as among companies from other countries. Such studies could be in-depth and they could use the techniques requiring direct contact, interviews, observations, surveys, case studies, etc.

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[1] In the context of Central and Eastern Europe (CEE), the issue of mission was analysed by, e.g. Biloslavo and Lynn (2007), Dvorský and Slintak (2019), Gavric et al. (2018) and Papulova (2014).

[2] Inspired by the research scheme proposed by Insch et al. (1997).

[3] Based on the data available on corporate websites, it was not possible to identify the motives for sponsorship. Since we could not determine whether the companies engaged in philanthropic or commercial sponsorship, we used a general term – sponsorship.

[4] The website of one of the enterprises did not load, while the other excluded company was transformed in 2018 by the owners (both in terms of the scope of activity and the name of the organization).

[5] IRAMUTEQ is used for 'extracting data from text materials, their structuring by searching for key words, phrases, sentences, and coding them in the form of numerical variables, as well as their subsequent statistical processing to discover (and often also to visualize) the existing relationships between

them' (Glińska-Neweś and Escher, 2018, p. 85; see more: Camargo and Justo, 2013; Loubčre and Ratinaud, 2014).

[6] Over half of the enterprises communicated the supporting of NGOs (52.53%) and/or public organizations (50.51%), while every fourth (24.75%) – of individuals.

[7] When interpreting the coefficient of variation, it was assumed that: 0-20% means a slight variation in the value of the variable, the group is relatively homogeneous, the arithmetic mean is an adequate measure characterizing the group; 20-40% - a moderate variation in the value of the variable, the arithmetic mean is an acceptable measure for a given variable; 40-60% - a strong variation in the value of the variable - the dispersion of the variable is significant, the arithmetic mean has low cognitive value; 60% or more – a very strong variation in the value of the variable, the group is heterogeneous, the arithmetic mean has no cognitive value (Zając, 1988, p. 209; cf. Marcisz, 2013).

[8] However, let us remind that the group of enterprises that presented relational values in missions was also the smallest.

[9] It is used when the data is measurable but its distribution is abnormal and when the variables are of the ordinal type (cf. Blalock and Blalock, 1971; see more: Nachar, 2008) [or when the variables are measured on a dichotomous scale (i.e. 0-1), as is the case of the nominal variable, which is also an ordinal variable; http://www.naukowiec.org/wiedza/statystyka/test-u-manna-whitneya_755.html]. These conditions were met. The null hypothesis assumes in the Mann-Whitney U test that the types of distribution of the analyzed samples do not differ significantly from each other, while the alternative - that they differ significantly from each other (see more: Field, 2013; Rabiej, 2012; Rovai et al., 2013). If the p-value is below the adopted threshold of significance, there are reasons to reject the null hypothesis (Moczko, 2014).

[10] It was found that out of the 48 companies declaring development values, 43 (approx. 90%) also declared values related to contribution to others. These groups overlapped to a large extent, which means that the discussed identity elements were interrelated in the analyzed enterprises. Interestingly, there were only 15 development-oriented companies organizations from among those with CSR *sensu stricto* values in their mission (31%). This confirmed the presumed isolation of this separate category of values in corporate missions.

State Policy in Land Relations Sphere in Terms of Ukraine's Agrarian Reform

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Abstract

The article outlines the main stages of land relations formation in the process of agrarian reform implementation in Ukraine and their impact on the socio - economic component of rural territory living standards. The results of the agricultural land denationalization have been considered and the transformation of the relationship between the owner, the manager of the land resources and their user has been analyzed. The need to develop a comprehensive approach to ensure the free ownership and disposal of land resources, taking into account the needs of society and the historical traditions of the Ukrainian peasantry, has been emphasized.

Keywords: State Regulation, Land Market, Land Relations, Agrarian Reform.

Introduction

Developing a country's management strategy is the basis for developing its economic system. The strategic goal of the country's socio-economic development substantiates the choice of the course for the economic growth of the main macro indicators. Integrating into the world community, it is important for Ukraine to take into account current trends and make maximum use of its own natural, labor, and financial resources, which allow to take care of the country's food security, economic growth, and hence its sovereignty. Ukraine, which has strong land potential, has every opportunity to become one of the leading players in the global agricultural market, where demand for food is growing.

Sustainable development of the economy agrarian sector largely depends on the available production resource potential, one of the key aspects of which is the agricultural land, which serves both as a means of production and as economic object of property relations, rent in particular. The development of market relations in the agrarian sector of the Ukrainian economy, the introduction of

private land ownership, the formation of a real owner, user of land and economic structures of market type, necessitate the substantiation of qualitatively new methodological approaches to the agricultural land use organization in order to provide an effective mechanism for their rational use and protection. The structural land relations restructuring in the countryside, which in the process of land reform and collective agricultural enterprises reform during the 90s of the 20th century, was the spur for the formation and development of lease land relations in agricultural production. Despite the world's highest level of land resources involvement in economic circulation, high soil fertility, diversity of land and resource potential, it was not possible during the Ukraine's independence period to realize the main task of land reform, that is the transfer of land in possession of effective landowners and transforming these lands into a key determinant of economic growth.

The analysis of recent research and publications

The problems of land relations reforming and establishing, as a component of socio-economic relations, have always been in the focus of domestic agricultural scientists. A significant contribution to their solution, as well as research on the development specifics at the present stage, has been made by the following scientists: P.I. Gaidutsky, S.I. Demianenko, T.G. Dudar, P.M. Makarenko, P.E. Matkovsky, V.Ya. Messel-Veseliak, L.Ya. Novakovsky, O.M. Onyshchenko, P.T. Sabluk, A.M. Tretiak, V.V. Yurchyshyn and others. The research they conducted provided a basis for reforming and developing land relations in Ukraine. Scientific development of scientists is of great theoretical and practical importance in terms of land relations transformation process. At the same time, the development of the economy agrarian sector at the state level in the direction of the European integration requires the justification of the algorithm of land reform completion in Ukraine in terms of agricultural land market introduction, which determines the urgency of conducting in-depth scientific studies concerning land relations development in rural business.

The aim of the article

The purpose of the article is to analyze the stages of land reform development in Ukraine, to determine the land relations formation in connection with agricultural land denationalization, and the creation of new forms of farming in agricultural production based on private and private – lease ownership. It is also necessary to generalize scientific approaches to defining the content of the categories "agricultural land market" and "agricultural land turnover" as economic categories at the stage of market land relations forming and defining the basic calculations of the land reform institutionalization.

The Main Material Statement

Land is the leading natural resource in the world. At all stages of social development, man has been inextricably connected to land. In the process of transition to a sedentary lifestyle, land resources began to function as both objects and means of work, serving as the basis for the production of food and raw materials for various industries. The agricultural land availability is one of the components of each country's population economic and social well-being. During Ukraine's centuries-old historical development, the peasantry has traditionally occupied a significant place as an ancient community, directly related to agriculture. The peasantry's labour activity plays a significant role in the sustainable creation of food resources to meet the needs of the country's population, to guarantee its food security at the world market.

Land resources play a leading role in Ukraine's economy as they are a working tool for the production programs implementation for the formation of food and raw materials for the processing industry. The total area of agricultural land in Ukraine is about 70% of the country's entire territory and is 42.7 million hectares, 32.5 million hectares of which is arable land. The presence of such a category of land resources defines the agrarian sector of Ukraine as one of the key segments of its economy, where within 60% of the consumption fund is formed and more than 10% of gross domestic product is created. At the same time, the incompleteness of agrarian reform, limited market operations with agricultural land, lack of a consistent state policy on land use, disposal and ownership

impedes investment into the agricultural sector, causing negative socio-economic consequences of the rural economy.

Speaking about the role of the agrarian economy, it should be noted first of all that this industry is the main resource potential in creating jobs for the rural population, and at the same time, it provides jobs in a number of other sectors of the domestic economy – food and processing industry, trade, transport and etc. Therefore, agricultural production functioning and development in rural areas directly affects the level of unemployment, labor migration, socio-economic component of living standards of rural areas. At the same time, no development of agricultural production can exist without the basic means of production, that is without land. After all, the development of society, in the process of its evolution, at all stages is directly connected with land.

The Constitution of Ukraine determines that land in Ukraine is a major national wealth and is under special state protection, since land resources occupy a special place in the country's economy. According to Article 13 of the Constitution of Ukraine, land is the object of property rights of the Ukrainian people. On behalf of the Ukrainian people, the rights of the owner are exercised by state authorities and local self-government bodies within the limits defined by the Basic Law of Ukraine. Ukraine's desire to restructure land relations in agriculture and to develop them in accordance with world standards, objectively led to the formation of an adequate system of land relations, primarily focused on the formation of a full-time land owner in the countryside.

Private ownership of land is one of the most important and inseparable elements of protection of the civil rights system, state guarantees of business and investment activity, and according to V.K. Zbarskyi, economic freedom is "the foundation and integral part of civil society freedoms" (Zbarskyi, 2004). According to the French philosopher François-Marie Arue (Voltaire), "private property is the key financial guarantee of the individual's personal freedom" (Voltaire, 2005). Taking into account the fact that a person is a social being, having one's own private property allows one to feel independent and to be more self-confident within society.

The reform of the agrarian sector of Ukraine's economy took place in stages. One of the main stages was land reform, initiated after the resolution of the Verkhovna Rada of Ukrainian SSR "On Land Reform" of December 18, 1990, which helped organize the search for an effective user of agricultural land. According to this statutory document, the redistribution of lands with simultaneous granting of them to permanent hereditary possession of citizens, to permanent possession of collective farms, state farms and other enterprises, organizations, institutions was envisaged. That is, agricultural land was provided only for indefinite use, while the monopoly of the state on land ownership was preserved. The land leasing into permanent possession gave the right to use it at own reasoning without instructions, but did not allow to dispose of it, i.e. did not give the right to sell and lease. The laws of Ukraine: "On the Peasant Farming", "On the Collective Agricultural Enterprise", "On the Form of Land Ownership", Land Code of Ukraine, adopted in 1992 played an important role in the formation and improvement of legislation on land reform.

The land relations were reformed and the collective farms were reorganized into collective agricultural enterprises, to which the state transferred the agricultural land to the collective ownership for free. Motivated by socio-economic aspects, most domestic scientists in the early 90's purposefully argued that the land should be brought closer to the producer, that a system of land relations, which functions only on state land ownership, prevents the formation of conditions for more efficient use of land, labor as well as financial resources.

According to the Decree of the President of Ukraine of August 8, 1995 No. 720/95 "On the order of lands partition transferred to collective ownership of agricultural enterprises and organizations", the partition of agricultural lands between members of collective agricultural enterprises was conducted. In fact, newly established collective farms were no different from the collective farm model, the only difference was the transition from the state form of land ownership to the collective one, with the subsequent division into land shares to which private property rights were acquired. The lack of ecological and economic justification for the redistribution of land resources led to the crushing of

27 million hectares of agricultural land (65% of the country's agricultural land) between 6.9 million citizens. In other words 46.4% of the rural population acquired the land shares which were given to them into private property. The average size of the land share in Ukraine was 3.9 hectares. Depending on the available agricultural resources and people – members of collective agricultural enterprises in the regions of Ukraine, the average size of the land share varies from 1.1 hectare to 8.8 hectares.

The peasants became the owners of land certificates, which confirmed their right to land shares, while land shares were not allocated in kind in the area. There was no significant change in agricultural production, the establishment of collective farms continued to operate on the principles of collective farms, that is, collective ownership, and therefore the peasants did not feel much difference from the reform of the collective farms. Agricultural production in Ukraine continued to develop extensively, which inevitably deepened the crisis situation of the industry. In 2000, the production of gross agricultural products in the country decreased by 46.6% or by UAH 131752 million compared to 1990 production.

Presidential Decree No. 1529 of December 3, 1999, "On Immediate Measures to Accelerate the Reform of the Economy Agricultural Sector" encouraged the creation of agro-formations with the involvement of private equity-based investment flows. Business societies, private enterprises and other forms of economic structures, leased peasants' land shares with the aim of developing their own agricultural production and the main purpose - profit.

The limited financial resources of land owners (shares), and sometimes their complete absence have become decisive factors in the choice of lease relations according to the land lease for newly created agro-formations. Almost 99% of the share owners in the early 2000s have leased their land shares completely. The same tendency remains today. Within 97% of agricultural lands, private, communal, and state-owned, are rented by different organizational forms of agro-formations (Table 1).

Table 1: Comparative characteristics of land use in European countries and Ukraine for 2019*

Indicator name	Ukraine	European countries	EU countries
Land area, million hectares	60,4	1015,6	437,4
Area of black earth, million hectares	28	84	18
Area of agricultural land, million hectares	42,7	474,8	177,7
The share of agricultural land in the total area, percent	70,7	46,8	40,6
Area of arable land, million hectares	32,5	277,8	115,7
Percentage of leased agricultural land, percent	97	62	53
Investment cost, thousand USD US / hectares	1,0	4,0	5,5

** Source: formed by the authors*

At this stage of land transformation in the Ukrainian countryside, the development of leasehold land relations is extremely important in terms of land owner's income generation, which he receives in the amount of rent and the corresponding tax revenues to the budgets of different levels from the rent received. In fact, after the Presidential Decree No. 1529 of December 3, 1999, "On Immediate Measures to Accelerate the Reform of the Economy Agrarian Sector", the stage of forming a lease relationship began between peasants who acquired the right to land share and newly created agro-formations on the basis of reformed collective agricultural enterprises (CAE).

As a result of collective agricultural enterprises reform 10833 in 2000, 14241 agricultural enterprises were created with a new legal status on the basis of private, privately-leased property. The largest

share of newly formed agricultural companies was occupied by companies, mainly limited liability companies (6761), which made up 47.5%. These companies were based on the private property of individuals. In turn, the company used the land and property shares of former members of the reformed CAE on the basis of lease deals. In addition, 2,901 private enterprises were created (20.4%). Collective form of management still remained attractive, but different from the CAE. Agricultural production cooperatives based on the shareholding of former members of the reformed CAE also turned into CAE. They contributed their shares to the authorized capital of the production cooperative, and leased land shares to the enterprise created by them. According to this form of management, 3325 (23.3%) of agricultural production cooperatives were created during 2000. 1254 farms were created on the basis of reformed CAE (8.8%). It should be noted that most of the newly established leasehold enterprises continued to use the land of the former CAE with the only difference being that up to 80% of the used agricultural land was leased from land shares owners and 20% was state-owned land.

The introduction of a moratorium on the agricultural land alienation since 2002 outlined the use of leased land as an important legal form of land circulation. Most entities that use agricultural land, namely land shares, operate through the development of lease relations, which have become the main way of land areas forming by agricultural producers.

Agricultural rent is one of the indicators that reflect the state of land relations development. The amount of rent should increase with the increase of agrarian production efficiency and tenants' economic status, since the main criterion of land ownership is the income that can be obtained from it.

Thanks to the formation of highly competitive environment for arable land use, especially in the last ten years, there is an increase in the average rental rate at which land owners transfer their land to use. So, if in 2000 the amount of rent for the land share was equal to one percent of the rented land share value determined in accordance with the law, Presidential Decree No. 92 of February 2, 2002 "On additional measures for social protection of peasants – land owners and land shares" as amended by Decree No. 725 of August 19, 2008, stimulated an increase in the rent to 3% of the value of the land share. If in the beginning of the 2000s the lease term for agricultural land generally did not exceed the five-year term with 1- 1.5% of the normative value of leased land, from 2015 the percentage of lease deals with a term longer than five years increased, the rent increased in average from 7% to 12% of the monetary land valuation (Table 2).

Table 2: Duration of land shares lease deals in Ukraine, %*

The term of the contracts	2000	2005	2010	2015	2019
1-3 years	45,7	26,2	10,0	3,1	-
4-5 years	41,2	61,4	49,0	35,5	22,4
6-10 years	11,3	10,2	30,6	46,4	57,5
From 10 years	1,8	2,2	10,4	15,0	20,1
The average rent in % of the land value	1%	1,5%	3%	4,5%	8%

** Source: prepared by the authors in accordance with the State Land Registry*

Increasing the minimum lease term is a positive step, as short-term lease of land is a way of earning income with minimal cost to preserve soil fertility. Therefore, in most developed countries, long-term lease deals (90% of them) are generally concluded for a term of 9-10 years or more. The laws of these countries set a minimum lease term for land. The laws of these countries set a minimum lease land term. For example, in the Netherlands, it is between six and twelve years, in France nine years, and in Belgium between nine and twelve years.

Agricultural land is the main means of agricultural production, and given that the agricultural sector is a priority direction for the state economy development and in recent years confirms its leading position, the farmers' interest in expanding the agricultural land use contributes to increasing demand

for land lease, which in turn causes the increase of the rent for the leased peasants' land. At the same time, the absence of a legally defined land market, the inability to legally exercise their rights to alienate a land share (give, sell, put as subject of mortgage) determines almost only one direction for land share owners – that is the land lease. The protracted nature of the moratorium on the agricultural land alienation leads to widespread debate and speculation in political circles on the Ukraine's legislative acts introduction, which would definitively define mechanisms of land circulation.

Table 3: Preconditions for the agricultural land market formation in EU countries and Ukraine*

Country	The start of land reform	Particle of agriculture in the country's GDP,%	Particle of agricultural land, %	Opportunity agricultural land sale to foreigners	Price per 1 hectare of agricultural land, thousand dollars USA
Bulgary	1990	6,7	60,4	limited	4,6
Estonia	1990	4,3	22,3	allowed	5,2
Latvia	1991	4,1	29,2	limited	1,2
Lithuania	1991	4,0	44,8	allowed	1,4
Poland	1990	4,2	48,6	limited	10,3
Romania	1990	6,4	32,1	allowed	6,1
Hungary	1989	4,1	59,0	forbidden	4,2
Ukraine	1991	11,9	71,3	forbidden	-

** Source: formed by the authors*

The issue of the state-owned agricultural land use is acute. At the beginning of the agricultural land moratorium introduction in Ukraine, there were 12 million hectares, as of 01.01.2020 there were 10.4 million hectares. The dynamics of state-owned agricultural land utilization is presented in figure 1.

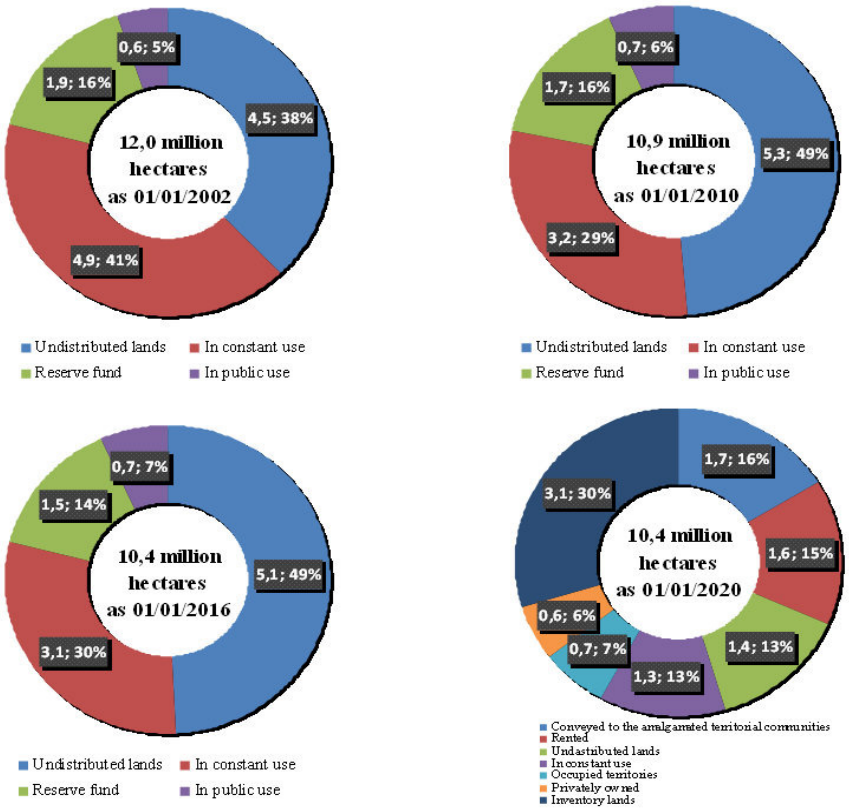

Fig.1: Analysis of the state-owned agricultural land use in Ukraine*

Source: formed by the authors

The results of the conducted studies of organizational and economic foundations of land tenure and land use transformation processes make it possible to state that in historical retrospect these issues have occupied and still occupy a central place in the country's development economy as a subject of debate for many generations. The diversity of theoretical and practical ways and methods of solving the problem differ diametrically. At the same time, the current state of agricultural land use, rural development trends, and the ongoing dissatisfaction of a part of the population with the system of land relations indicate the incompleteness of institutional transformations, the presence of unresolved questions that need to be answered irrespective of the political system, economic structure or each individual's consciousness.

Conclusions

The study of land relations development in Ukraine substantiates that the economy agricultural sector reform involves the transformation of land relations to a market type, the final stage of which should be the formation of the agricultural land market and the provision of the right to dispose of these lands to land owners.

Despite the fact that land relations are one of the debated and politicized issues of Ukraine's agrarian policy, within which disputes have been going on for two decades, there is no unanimity about the mechanism of market circulation formation. Views on this problem solution are different - from the formation exclusively of the land lease market to the removal of any restrictions on the agricultural land transfer to ownership. At the same time, it is undisputed that the actual realization of ownership, use and disposal rights is possible only in the conditions of land market functioning with appropriate infrastructure and institutional support. Lack of private land ownership reduces its efficient use and slows down the intensification of production in the agricultural sector.

Despite the implementation of a number of important organizational, economic and legal measures related to the transition to private land ownership, the Ukrainian peasantry expects a positive settlement of the next stage of land reform, which should provide the legal foundations for the land market formation, without any sharp conflicts in the villages and in society.

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Determining the Effects of Reputational Risks on The Performance of The Domestic and International Banking System

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Abstract

This article analyze how reputational risks affect the long-term performance of banks, which should include the antecedent conditions of the experience of the persons involved in the decision-making process in identifying the causes of their occurrence, to understand how they can be prevented and for identify the best action solutions. Using a fuzzy-set qualitative comparative analysis (fsQCA), this study looks at how mechanisms for pre-dealing with sanctions imposed by national and international bodies can be identified, if any financial losses are passed on to the reputation, if the banks communicate in a transparent way financial results and if there are early warning mechanisms of any elements that may generate risks that may affect the bank's reputation. It analyses the factors involved in the decision-making process at the level of banks in terms of reputation management, proposes the conceptual framework focused on a configurational approach to find out if there is a link between the reputational risk and the performances of the banks, starting from the opinions of the specialist in the field. The QCA value for this current research is based on the existence of conditions that are sufficient (but not necessary) to determine the outcome. Using coherence (analogous to correlation) and coverage (a value of effect size), QCA explains how causal configurations lead to a certain outcome. Banks have sought to identify the best ways to create a structure that is as efficient as possible for managing reputational risk. This trend is likely to accelerate, as more managers understand that, while the compliance function tends to become routine, the risk function needs to become strategic, with one eye for identification and the other for risk management, with the purpose of adapting banking strategies.

Keywords: Reputation, Risks, Banks, Compliance

Introduction

The purpose of this study is on the one hand to understand whether reputational risks affect the long-term performance of a bank and, on the other hand, to identify the best solutions to prevent their occurrence.

Using a qualitative comparative analysis of the unclear set (fsQCA), this study analyzes the interdependence between reputational risks and bank performance.

The possible financial losses communicated transparently do not directly and immediately affect the reputation of banks, but the main problem identified seems to be to find early warning mechanisms of the occurrence of reputational risks and to apply the best methods of counteracting the effects.

A strategy configuration framework is proposed to be applied by key banks, on the one hand to prevent reputational risks and on the other, to find the best strategies to act to limit financial losses in the case of their occurrence.

Theoretical Background

The relevant body of knowledge in the reputation management outlines the factors involved in the decision-making process at the level of banks in terms of reputation management.

Banks are struggling with anticipating, mitigating and managing reputational risk, "Establishing a reputational risk management framework is difficult when there are questions about its definition and which department should be responsible," says Thomas Kaiser (2014) in the study or regarding current practices in reputational risk management.

The management of reputational risk in banks has become an important concern for the management of banks, due to the complexity and dynamism of the business environment, as well as the positioning of the regulatory bodies (Maghyereh and Awartani, 2014). In the last two decades, significant progress has been made at international level to improve risk management practices in financial institutions (Chortareas et al., 2011). To this end, the Basel Committee on Banking Supervision has established an internationally recognized set of principles to deal with the various risks, officially called the Basel Agreement (Basel I, Basel II and Basel III). Central banks and other regulatory authorities in different countries have taken rigorous measures, in order to implement the Basel agreements in the banking sectors, in order to strengthen their coherent risk management systems (Masood and Fry, 2012).

There is a close correlation between a bank's reputation and its credibility. Credibility is directly linked to performance - it can be defined as the belief that the bank will achieve its strategic and / or operational objectives. "Credibility is defined as the degree to which the public believes that there has been a change in policy, when indeed such a change has occurred. In general, it seems that the reputation derives from that amount of credibility. A bank with a good reputation is , therefore, a credible bank "(Eskenazi 2015).

In this study, we will try to identify the best means of efficiently managing reputational risks. Even if the idea that reputational risk management is an attribute of bank management is unanimously accepted, there are other actors who play an important role in this process (Risk,
Compliance, Communication).

We believe that the manager area, the risk and the communication have key roles; the communication department ensures that the appropriate channels and methods are used so that the message is brought to the attention of the interested parties.

Research Method

Qualitative comparative analysis (QCA) is a research technique that aims to eliminate the gaps between qualitative and quantitative analyzes (Rihoux și Ragin, 2009). Unlike quantitative research, QCA creates the opportunity to analyze how multiple causal configurations affect an outcome (Ragin, 2014). The QCA value for this current research is based on the existence of conditions that are sufficient (but not necessary) to determine the outcome.

Using coherence (analogous to correlation) and coverage (a value of effect size), QCA explains how causal configurations lead to a certain outcome (Woodside, 2010). Qualitative comparative analysis (QCA) really introduces the concept of "equifinality", based on the idea that more ways can coexist to a desired result in a configurational research design (Fiss, 2007). he research process aims to highlight the significant contribution of the QCA in identifying concrete ways of action in case a potential reputational risk is identified, in order to limit any immediate or medium and long term financial losses.

This study explores how the **causal configurations of the antecedent conditions** associated with the research model (the existence of mechanisms by which sanctions can be prevented; the influence of

financial losses on banks' reputation; transparent communication of results by banks; use of early warning mechanisms) have a significant impact on the **expected result**: the interdependence between a bank's ability to manage its reputational risks and its long-term performance. The research model (Figure 1) reflects the expected result as a linear function whose arguments are the four antecedent conditions.

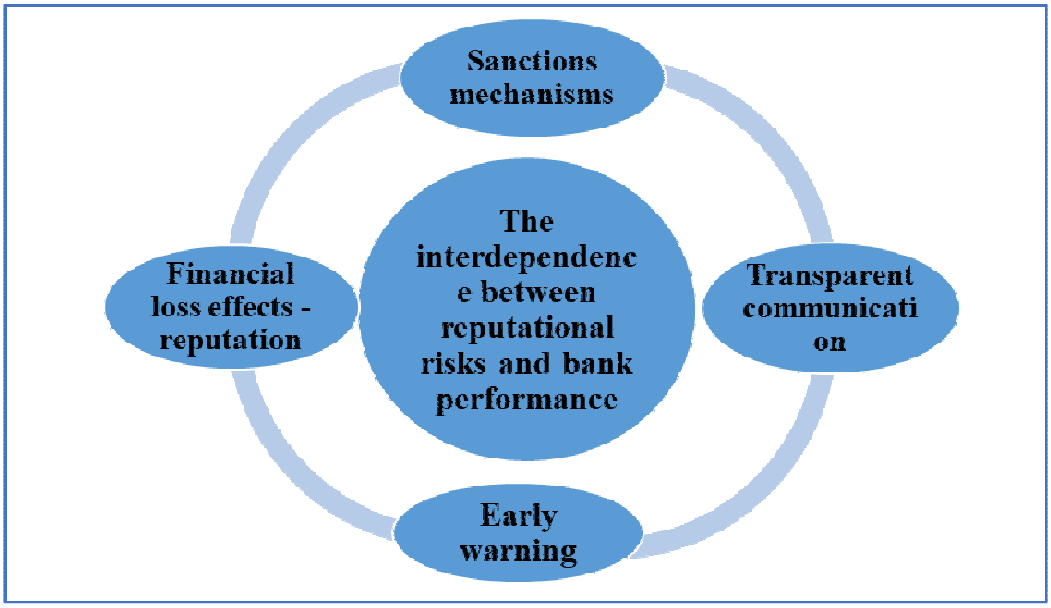

Fig. 1 - The conceptual model of the research

The design framework exposes the causal configurations of the occurrence of the reputational risks (sanctions applied by international and national bodies, the non-transparent communication of the financial results, the lack of early warning mechanisms of the occurrence of the reputational risks and the direct effects of any financial losses on the reputation) and emphasizes the interdependence between the risks reputation and performance of Banks. The research approach uses a convenient sample (10 employees in the top 5 banks in Romania - in terms of assets), which hold positions only in the fields of Compliance, Management and Risk, because a significant degree of expertise is required for the configurational design of research – Fig. 2.

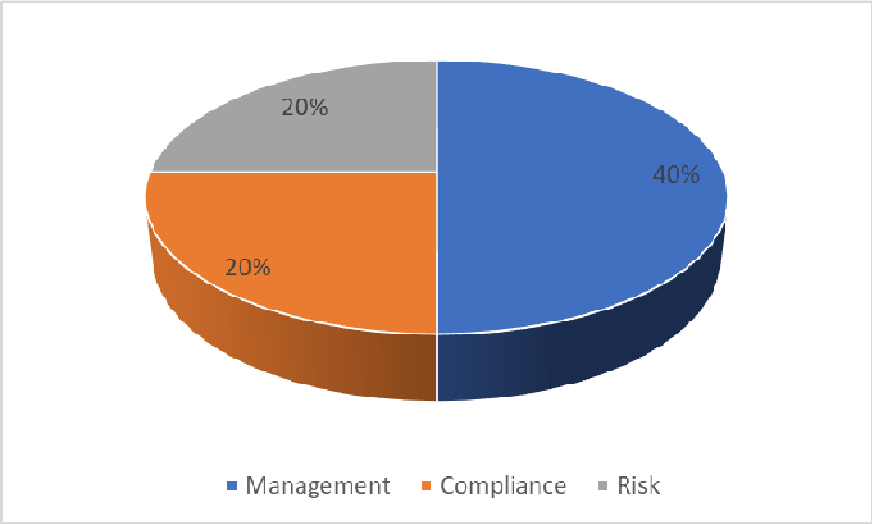

Fig. 2 : Categories of respondents

The 5-item questionnaire was designed and posted online on Google Forms (https://goo.gl/forms/V4slJ6z14PS8GsJt2), but it was also transmitted directly to key persons, with experience in the 3 targeted areas. The distribution of respondents from the point of view of their experience is presented in Fig. 3.

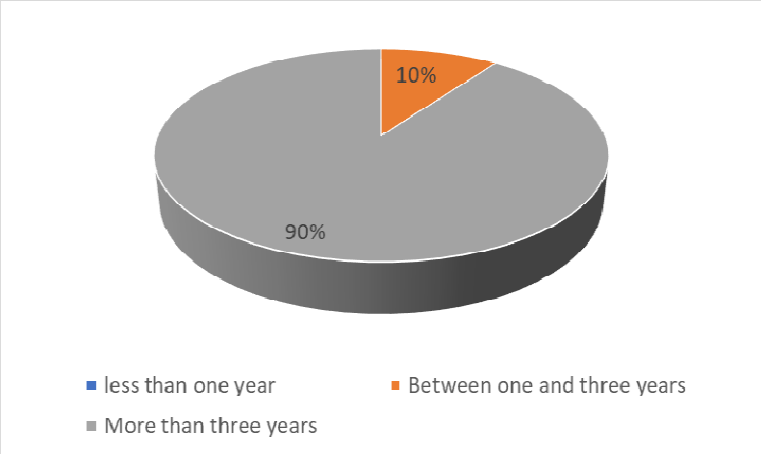

Figure 3: Experience of respondents

Findings

The questionnaire was divided into two sections, depending on the need for a configurational approach. The first four items of the questionnaire reflect the antecedent conditions, being interpreted as strategies applied or observed by the respondents in the banks where they work. These are evaluated using a five-point Likert scale (1 – Strongly Disagree … 5 – Strongly Agree). The fifth item highlights the outcome: the interdependence between reputational risks and bank performance, being evaluated on a five-point scale: (1- Certainly not … 5 - Very likely)

1. The bank you work for has mechanisms through which it can prevent the sanctions imposed by national and international bodies in order to defend its reputation?

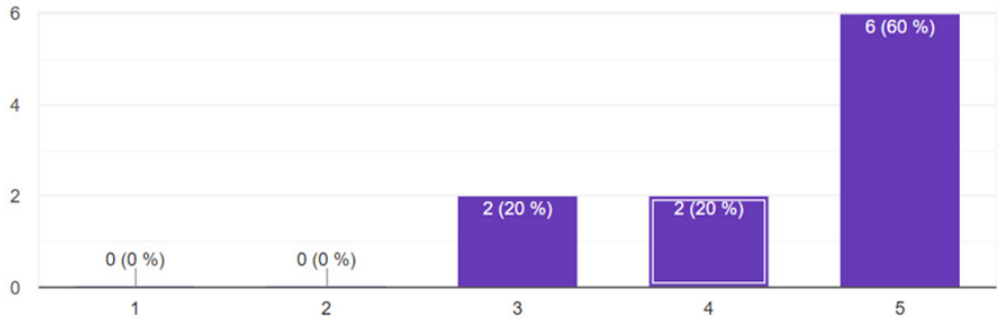

Fig. 4: Distribution of answers received at question no. 1 from the questionnaire

On this item, 60% of the respondents considered that the bank they work in has mechanisms that can prevent the sanctions imposed by national and international bodies. This answer has 2 components:

- Banks carefully comply with all international regulations regarding E&S (Embargoes and Sanctions), as well as national legislative regulations.
- In key areas of the bank there are employed specialists who have the experience and the training necessary to act professionally and to make the best decisions.

2. The periods in which the Bank registers financial losses shall have an impact on its reputation?

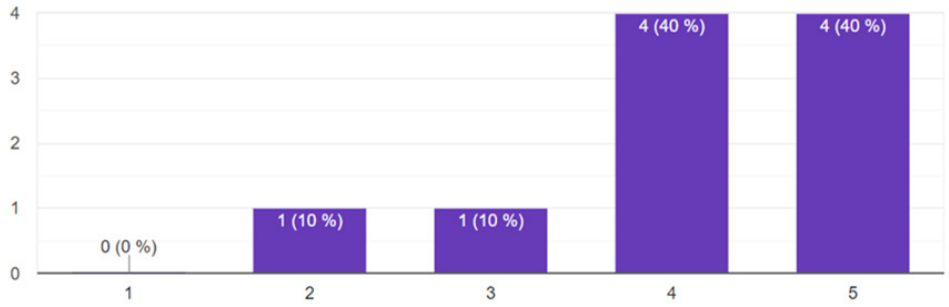

Fig. 5: Distribution of answers received at question no. 2 from the questionnaire

If on the first question the opinions of the respondents were clear, on the second question the opinions seem to be different. The banking system is quite influenced by the economic environment, and in times of recession, the performance of banks decreases.

The opinion of the specialists doesn't reveal a direct link between financial losses and reputation. This subject will have to be analyzed in a further study, since the source of financial losses will have to be established:

If it is a "natural" loss - generated by the economic environment, impacted throughout the banking system;
If it is a loss caused by an operational risk - internal or external;

If it is a loss caused by a legislative change.

3. The bank you work in uses appropriate methods to communicate financially in a transparent manner to strengthen the reputation?

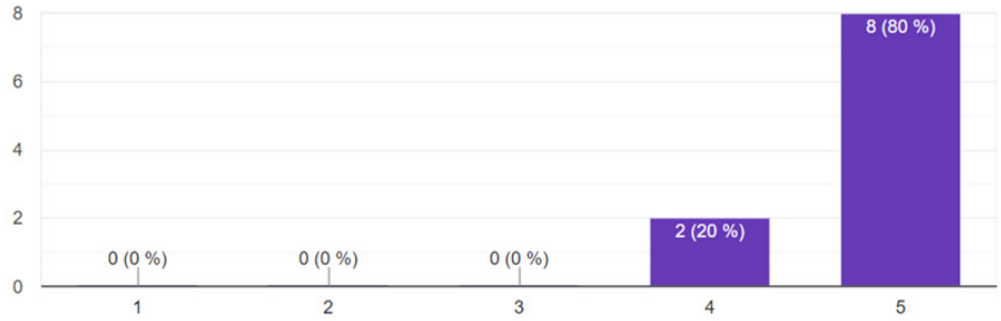

Fig. 6: Distribution of answers received at question no. 3 from the questionnaire

Of the four topics discussed in this questionnaire, this seems to be the strength of the banks. From the point of view of the specialists who answered the questionnaire, the bank where they work uses appropriate methods to communicate financial results transparently. Transparency strengthens the reputation of banks and ensures a fair working environment. It is worth noting that two of the five banks in which the respondents of this questionnaire work are listed on the Bucharest Stock Exchange, where clear, periodic communications are required.

A clear, correct communication of the financial results, ensures:

- For the situation where the results are positive - the reputation of that bank is strengthened and a "trust capital" is accumulated, which will be useful in the event that in the future various negative events may occur;
- For the situation in which the results are negative, the bank management assumes the result, identifying the causes and identifying an action plan for recovery; It also shows to clients and investors that the situation is kept under control and that the necessary measures have been taken or will be taken to recover the financial situation.

4. The bank you work with has the ability to use effective early warning mechanisms to manage reputational risks?

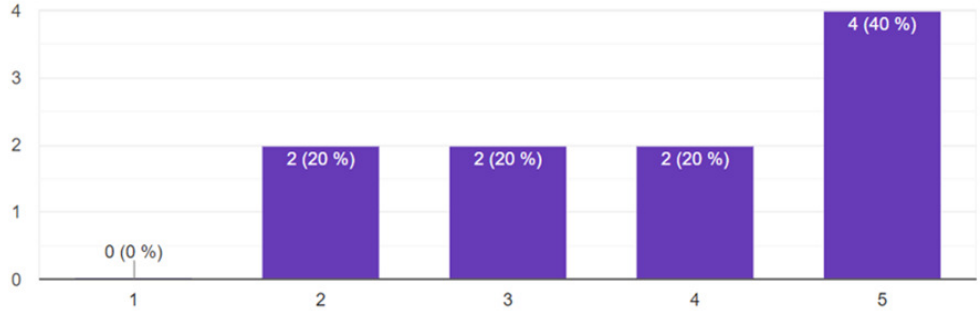

Fig. 7 : Distribution of answers received at question no. 4 from the questionnaire

This item shows the most sensitive point identified - prevention area.
In an uncertain, unpredictable economic environment, a bank must identify risk scenarios to quickly find solutions to counteract the causes and limit the effects produced by reputational risks.
The area of early warning could be the key to effective management in managing reputational risks in the banking field. Only 40% of respondents say that the banks they work in use early warning mechanisms to manage reputational risks. Most of the time, these mechanisms are empirical and are based on some subjective perceptions of the specialists - especially from the fields of activity of the respondents to this questionnaire (Management, Compliance and Risk).
However, it is important to manage the alerts that may come from the technical area of the bank (financial, non-performing loans, etc.), but also from the commercial area, when an appetite decrease is identified in certain periods for the bank's products.

5. Reputational risks affect the performance of the bank in which you work?

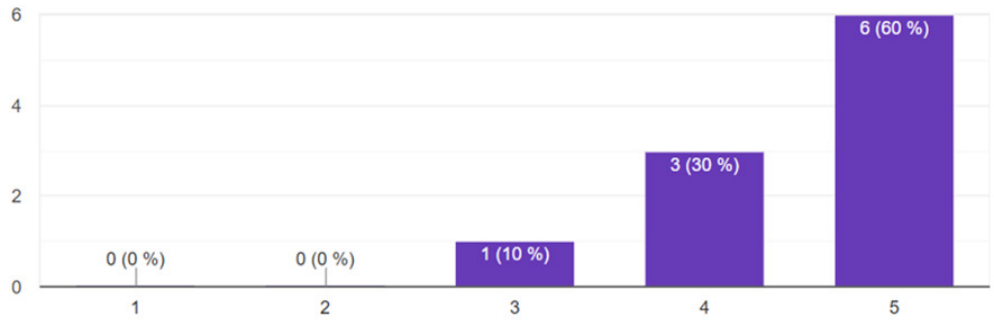

Fig. 8 : Distribution of answers received at question no. 5 from the questionnaire

60% of the respondents of this questionnaire, specialists in the field and people who actually work in this area, strongly affirm that the reputational risks affect the performance of the bank in which they work. The answer to this fifth item is actually the final conclusion of this questionnaire - that there is a clear interdependence between the reputational risks and the performance of a bank.

We will analyze in the next chapter and from a technical point of view, through the fsQCA analysis, how these multiple causal configurations affect the obtained result and whether this result is relevant and validated.

Calibration Process

The research project focuses on the assumption that the relationships between the antecedent conditions used in this study are asymmetrical, because the causes of the risks are different. Therefore, alternative combinations of causal conditions may result.

We have transformed the values for the causal conditions (sanction mechanisms, the effects of loss of reputation, early warning and transparent communication) and the result (interdependence between reputational risks and bank performance) into scores of the fuzzy sets from 0 (categorically no) to 1.00 (categorically yes).

Table 1 reflects the calibration of the causal conditions and the result, taking into account their values from the specific evaluation scale.

Table 1 : Calibration of the scale

The point of the scale	Fuzzy-set value	Membership
Completely agree / Very likely	1	Full agreement
Agree / Probably	0.75	Rather in agreement, than in disagreement
I do not approve or disapprove / Possible	0.5	somewhere in the middle (neither agree nor disagree)
I don't agree / Probably not	0.25	More disagreement than agreement
Completely disagree / Definitely not	0	Completely disagree

Ragin, C. C. (2014). The comparative method: Moving beyond qualitative and quantitative strategies. Berkely and Los Angeles, USA: University of California Press.

The definition of the values of the fuzzy sets for the antecedent conditions is in accordance with the same rule for the calibration of the result, reflecting the logic of the constructions in approaching the configuration design.

We defined a new MPMA variable as a result of calculating the values of the fuzzy sets of the antecedents of the conceptual model (sanction mechanisms (mecs), the effects of loss of reputation (pfin), early warning (avertimp) and transparent communication (metcom)) using the fsQCA software:
MPMA = fuzzyand(mecs, pfin, metcom, avertimp)

Table 2: Distribution of fuzzy-set values

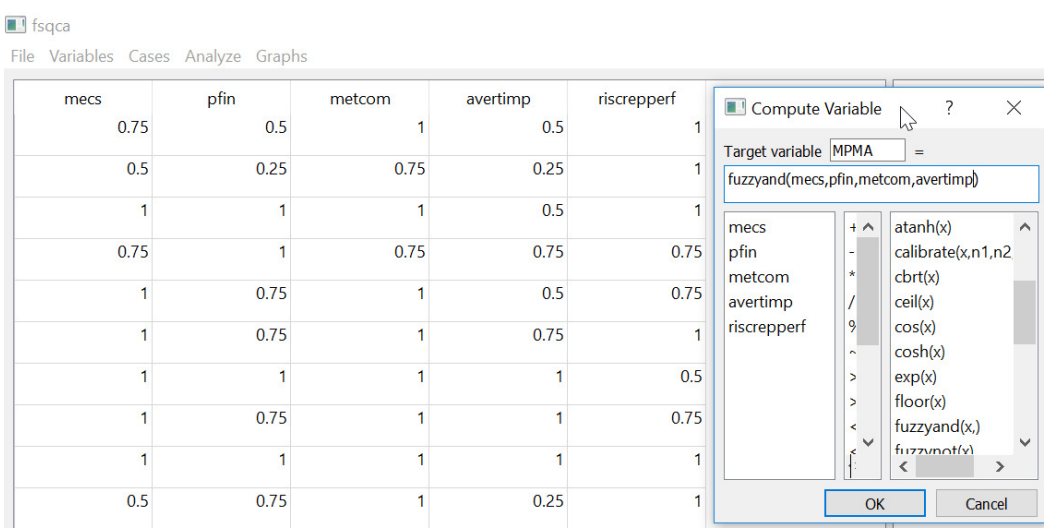

mecs	pfin	metcom	avertimp	riscrepperf
0.75	0.5	1	0.5	1
0.5	0.25	0.75	0.25	1
1	1	1	0.5	1
0.75	1	0.75	0.75	0.75
1	0.75	1	0.5	0.75
1	0.75	1	0.75	1
1	1	1	1	0.5
1	0.75	1	1	0.75
1	1	1	1	1
0.5	0.75	1	0.25	1

Source: fsQCA software

Table 3 : Computed variable MPMA

fsqca

File Variables Cases Analyze Graphs

mecs	pfin	metcom	avertimp	riscrepperf	MPMA
0.75	0.5	1	0.5	1	0.50
0.5	0.25	0.75	0.25	1	0.25
1	1	1	0.5	1	0.50
0.75	1	0.75	0.75	0.75	0.75
1	0.75	1	0.5	0.75	0.50
1	0.75	1	0.75	1	0.75
1	1	1	1	0.5	1.00
1	0.75	1	1	0.75	0.75
1	1	1	1	1	1.00
0.5	0.75	1	0.25	1	0.25

The FsQCA allows flexibility in the evaluation of cases by calibration. As mentioned above, each case is assigned membership scores for important causal conditions, such as the impact of the MPMA on the riscrepperf.

Results of FsQCA analysis

The first stage of the analysis aims to combine the conditions that are sufficient to obtain the result. This examines whether a causal prescription of conditions is always present when the result is present.

We continued the analysis of consistency and coverage scores on the XY plot of the fuzzy sets (Fig. 9). The visual representation of the cases on the XY graph shows that the antecedent conditions are sufficient to obtain the result, due to the positioning of the majority of the cases above the diagonal of the graph.

The plan XY shows whether a specific condition is necessary or sufficient to obtain the result, emphasizing how consistent a given condition is, with the assertion that it is a necessary or sufficient condition. In addition, the XY plan provides graphical information on how empirically relevant the research proposal is.
The consistency score (the extent to which a combination of causality results in a result) is 0.92, while the coverage score (how many cases result is a particular causal condition) is 0.657143. These scores imply that the distribution of the fuzzy sets is consistent with the claim that MPMA is a subset of the result (risrepperf). We can also say that the MPMA coverage of the result (risrepperf) is 92%.

The high consistency value reported by the XY plan indicates that the condition is sufficient to obtain the result. Although the values of consistency and coverage range suggest causality in this research project, determining causality requires interpreting the configurations using the truth table analyzes.

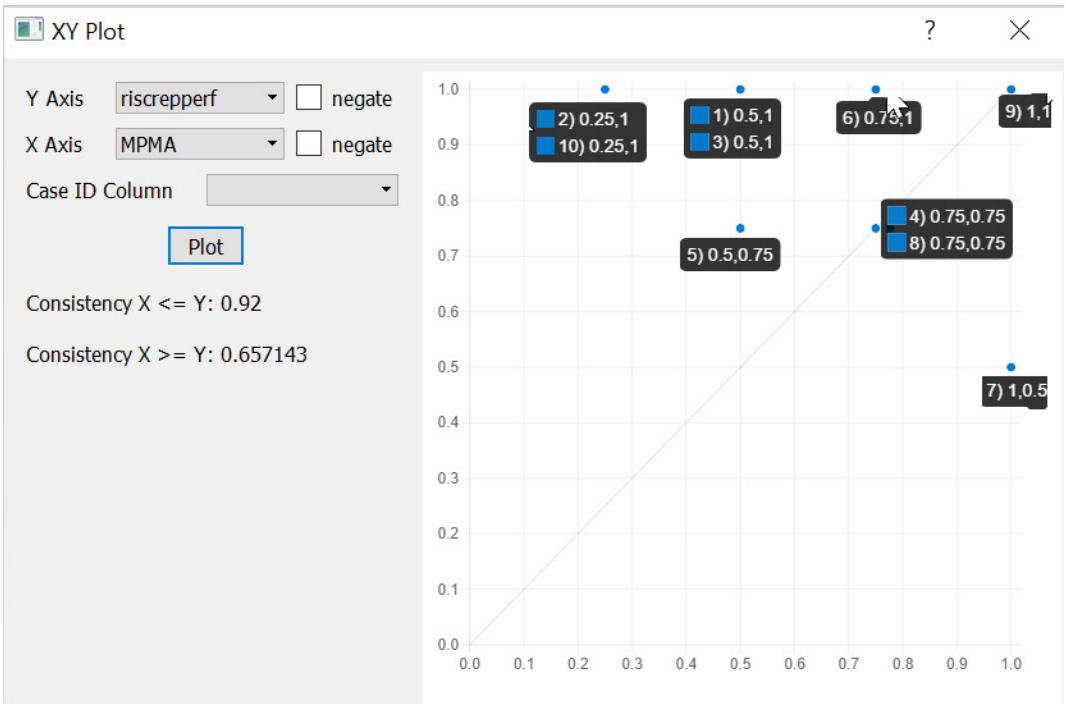

Fig. 9: Graphical distribution of cases on XY Plot

Source (fsQCA) software

The complex solution provided by Quine-McCluskey algorithm reveals one combination of antecedents conditions leading to the outcome; thus, the principle of equifinality (multiple paths lead to the same outcome) is not supported.

```
Model: riscrepperf = f(mecs, pfin, metcom, avertimp)
Algorithm: Quine-McCluskey

--- COMPLEX SOLUTION ---
frequency cutoff: 5
consistency cutoff: 0.92
                                  raw        unique
                                coverage    coverage    consistency
                               ----------  ----------  ----------
mecs*pfin*metcom*avertimp      0.657143    0.657143    0.92
solution coverage: 0.657143
solution consistency: 0.92
```

Fig. 1: Complex solution provided by Quine-McCluskey algorithm

Performing the analyzes to find the complex solution implies compliance with the condition: a consistency limit of 0.92, which means that the membership score of the result (interdependence between reputational risks and bank performance) is consistently higher than the membership score of the causal configurations (sanction mechanisms, the effects of loss of reputation, early warning and transparent communication).

Conclusions, limitations and Future Research

The major benefits of this first study are twofold.
First, it is one of the first QCA studies specifically targeting the interdependence between reputational risks and bank performance.

Secondly, this study shows the elements that directly influence the reputational risk. Efficient communication of financial results, on the one hand prevents the emergence of reputational risks, and on the other hand it consolidates the existing reputation. At the same time, avoiding sanctions applied by national and international bodies, is equally important in the management of reputational risks.

The study also showed that :

There is no such strong connection between the weaker financial performances reported by banks in certain periods and their reputation; unfavorable financial results do not directly affect the reputation;
There is no such strong connection between the weaker financial performances reported by banks in certain periods and their reputation; unfavorable financial results do not directly affect the reputation.

This study used the fsQCA to identify sufficient conditions in order to understand what are the causes of the emergence of reputational risks seen through the eyes of decision makers in banks.

From the perspective of managerial implications, the causal recipes in this study provide valuable information on how to prevent the occurrence of reputational risks, above the reaction capacity.

The limitations of this study are as follows:

First, the data were collected only for 10 employees from the activity areas with an impact on reputation (Management, Compliance and Risk);
Second, this study examines only four antecedents of the outcome, which could be challenged by other researchers and practitioners for their relevance.

Last but not least, the current study could be extended in the future by including banks from other countries or by comparing banks in Romania with mother banks in Western Europe, to obtain more diversified results. It may also be useful to understand the management systems for the reputational risks of banks in different countries or continents. Using a similar methodology, we can expect to obtain interesting and diverse results.

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Differential Indicator of the Level of Development of the Mortgage System of the Region

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Abstract

The article shows that the modern Russian system of mortgage housing lening is characterized by a low level of development, which is exacerbated by huge imbalances in the development of mortgage lending in the regions. Under these conditions, a massive and effective solution of the housing problem of the population is a strategic task of the state. This study is devoted to the development of a differential indicator and the ranking of local mortgage markets to form an address mechanism for state support of mortgage lending in the Russian Federation. To achieve this goal, the article conducted a comprehensive statistical analysis of the main factors in the development of mortgage systems in the regions based on the methods of factor analysis. The following scientific results were obtained:

- a model of a differential indicator characterizing the level of development of the region's mortgage lending system is justified;
- a graphic model of a differential indicator for assessing the development level of a regional mortgage system is proposed;
- the method of system ranking of regions of the Russian Federation on the basis of the differential criterion characterizing the level of mortgage development of Russian subjects is developed.

Methods of system analysis, statistical multivariate factor analysis and methods of graphic modeling were used as methodological tools of the research.

Keywords: Mortgage Market, Region, Differential Indicator, Factor Analysis

Introduction

The current stage of the development of the mortgage housing lending (MHL) system in the Russian Federation is characterized by an extremely low level. According to the main indicator of mortgage lending development - "total outstanding residential loans to GDP ratio", Russia is at the level of states with emerging economies such as India, Albania, Cambodia, Nicaragua. As shown in figure 1, at the end of 2018, the total debt on residential mortgage loans in Russia as a percentage of GDP was only 6.2%.

For comparison, in Albania, this figure was estimated at 6.87%, in Cambodia-6.28%, India-5.42%, while in the developed states, which are the leaders in the development of mortgage lending, in Sweden and Denmark-87.5% and 84.6%, respectively. Simple comparisons show that the level of development of mortgage lending in Russia is 14 times lower than in Sweden and 8.5 times lower than in the USA, where after the crisis of "liquidity" in 2008-2009 by 2018, the trend has changed to reduce the mortgage portfolio.

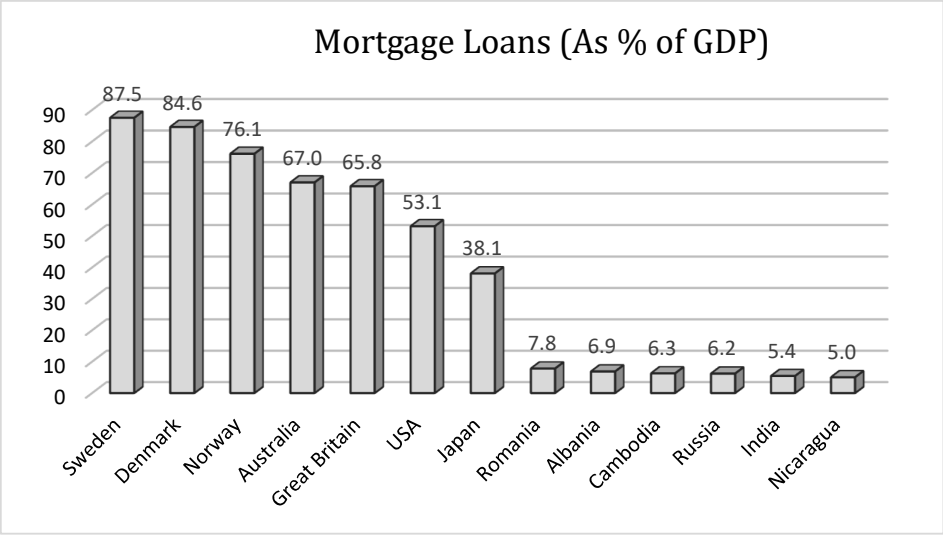

Fig. 1: Total Outstanding Residential Loans to GDP Ratio as of 01.01.2019

(*compiled by the authors on the basis of data EMF Hypostat 2019, Central Bank of the Russian Federation, Federal Reserve System, Helgilibrary)*

In addition to the overall low volume of mortgage lending in the Russian Federation, the level of development of mortgage instruments in some regions is still much lower. For example, (see Fig. 2), the share of the Chechen Republic in the total mortgage loans of Russia as of November 1, 2019 was only 0.06%, the share of the Republic of Ingushetia - 0.02%, while the share of Moscow was 11,06%. The variation of values across the subjects of the Federation is more than three orders of magnitude, which indicates a deep regional disproportion in the development of mortgage lending systems in the Russian Federation.

There is also significant variation in another important indicator - total outstanding residential loans per capita. So, if the total outstanding residential loans per capita of the region in the Yamalo-Nenets and Khanty-Mansi Autonomous Districts is according to the latest data 138.2 and 124.6 thousand rubles, respectively, in the same Chechen Republic and the Republic of Ingushetia it is less than 3 thousand rubles per person.

Such imbalances in the development of mortgage lending in the regions of the Russian Federation are due to the huge geographic extent of the country, the historical and national specifics of individual regions, peculiarities of development of the economy, social and banking sectors of Russian entities.

The uneven socio-economic development of the regions amid the low level of mortgage development in the country as a whole necessitates the development of new approaches to solving the problem of mortgage inequality. It is necessary to develop a strategic program of action at the state level, aimed at solving problems in two directions. The first one is related to the development of criteria for assessing the level of mortgage development in the regions of the Russian Federation. The second one is related to the development of a program to reduce and eliminate regional mortgage inequality, based on the provision of "targeted" state support to the regions of Russia.

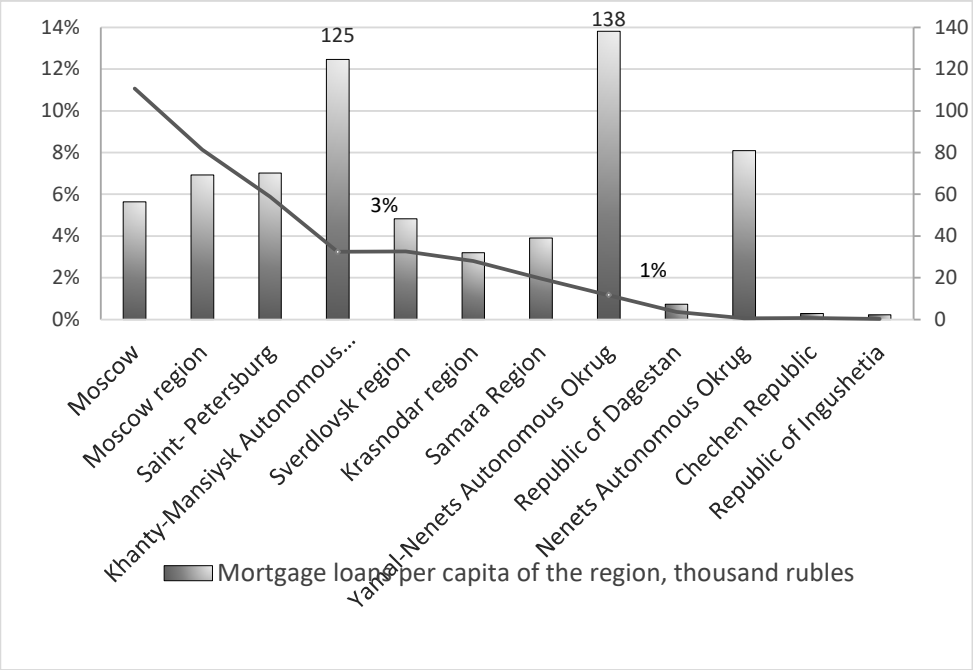

Fig. 2: Comparison of the indicators "The share of the region's mortgage debt in total outstanding residential loans of Russia, %" and "Mortgage loans per capita of the region, rubles" in the regional context as of November 1, 2019
(compiled by the authors based on the data of the Central Bank of the Russian Federation and Rosstat)

This study is devoted to the development of a differential indicator and the ranking of local mortgage markets for the formation of a targeted mechanism for state support of mortgage lending in the Russian Federation.

Review of literature and sources

The heterogeneity of the socio-economic development of the Russian regions dictates the need to solve the problem of increasing the efficiency of regional development management based on existing theoretical and methodological approaches in the regional economy. At different times, a large number of Russian and foreign scientists who proposed author's methods for solving the scientific problem dealt with the issues of smoothing the imbalances in the socio-economic development of the regions. At the same time, the most diverse goals have been set and continue to be set.

For example, Murias et al (2009, 2010, 2012) proposed a methodology for analyzing the economic welfare of regions and regional economic imbalances based on the calculation of the synthetic index of regional economic welfare using the DEA (Data Envelopment Analysis) methodology. Bertin et al (2016) developed a methodology for measuring quality of life at the regional level. The authors calculated the synthetic index of regional economic welfare based on the methods of the decision tree, nominal groups, as well as the method of maximizing the Choquet integral. Crescenzi (2009) proposed a methodology for analyzing the European policy for the distribution of structural funds by EU regions, based on the principal component method. Golejewska (2016) recommended an approach aimed at comparative analysis of the socio-economic potential and regional differentiations in the regions of Poland, and the research methodology is based on multivariate comparative analysis methods, namely the Hellwig's method, Spearman's rank correlation and some others. Bronisz et al (2008) assessed of the competitiveness of the regions of Poland. The authors ranked the regions of Poland on the basis of creating a general index of regional competitiveness using the approach of the Huggins

Institute (2003), based on factor analysis. Using the latter approach Zitek and Klimova built a competitiveness index of the Czech regions (2015). The proposed composite index is based on the British Huggins three-factor model (2003, 2016) and includes 14 partial indicators that are divided into three groups - input factors (for example, level of economic activity, etc.), output factors (for example, level employment, etc.) and result factors (for example, average wages, etc.).

The problem of differentiation of regions according to the level of socio-economic development on the basis of assessments based on various criteria has also been thoroughly studied by Russian scientists. Recent research in this area belong Baranov and Skufina (2008), Karelina (2016), Shabunova and Gruzdeva (2016), Nizhegorodtsev et al (2017), Rakhmangulov and Kopylova (2014), Tsapenko (2015).

The results of the review show that there are many approaches to assessing various aspects of the socio-economic development of regions, while the choice of a particular solution method is not obvious, the set of considered indicators of socio-economic development varies depending on the views of the authors and the availability of statistical data. At the same time, despite a fairly wide range of tasks to be solved on the basis of the formation of various kinds of criteria for socio-economic development, the problem of regional mortgage inequality at present has not received proper coverage in the scientific literature. At the same time, this problem is very relevant for Russia, as well as many developed and developing countries of the world, in particular the USA, England, Spain, Greece, India, China and many others. However, the analysis of foreign literature shows that most of the research is focused on regional analysis of the real estate market and a very small part of the research is focused specifically on mortgage loans, which are a key element of housing demand. The latter, in particular, is the study of Patatouka (2014), where disproportions of the development of housing and mortgage markets in the regions of Greece are identified, their simplified assessment is carried out. An interesting study is Aranaz and Marquez (2013), where the authors compare the features of retrospective development and assess regional differences in the Spanish mortgage market using the sheaf methodology. In the United States, unique to the vast role that mortgage plays in the national economy, the problem of regional inequality in the mortgage market is most often investigated to assess the impact of regional economic conditions on the level of local mortgage rates. For example, the papers of Ozdemir and Altinoz (2013), Hurst et al (2015) are devoted to this subject.

In Russia, despite the significance of the existing problem, research on the problem of regional mortgage inequality is limited to a relatively small number of publications, among which the works of Gritsenko et al (2017), Ivashkov (2011). At the same time, only in a few works, in particular in studies by Grezina (2011), the task is set not only to determine the level of development of mortgage lending in certain regions, but also to develop a differentiated policy for mortgage lending in constituent entities of the Russian Federation.

The lack of elaboration of this problem determines the theoretical and practical significance of this study, in which it is planned to develop a method of system ranking of subjects of the Russian Federation on the basis of a differential indicator that characterizes the level of development of mortgage systems in Russian regions. In turn, the appropriateness of the formation of such a criterion was proved in the early publications of the authors of this study (2014, 2018).

Data and Methods

The results of the study are based on the methods of system analysis of the features and problems of the functioning of regional systems of mortgage housing lending. Based on the results of the analysis of information about the structure and parameters of regional systems of mortgage housing lending, assumptions are made about the composition of local criteria for the effectiveness of regional mortgage markets.

It is proposed to use a system of indicators, including 23 indicators, united by 4 functional blocks.

At the same time, three of the four functional blocks responsible for assessing the economic, housing and socio-demographic subsystems of the regions are identified based on the analysis of Russian and foreign experience in forming criteria for socio-economic development. The fourth block includes indicators characterizing the development of the mortgage system in the region. The composition of the functional blocks of indicators is also due to the need to take into account the complex of interconnections of the elements of the MHL system, namely, the set of subjects and objects of mortgage lending that interact on the mortgage market and the residential real estate market.

The following variables are included in the function blocks:

1) economic indicators (5 indicators):
- Var1 - GRP per capita, rubles;
- Var2 - average per capita cash income of the population, rubles;
- Var3 - the number of economically active population, thousand people;
- Var4 – average per capita nominal accrued salary of employees of organizations, rubles;
- Var5 - the share of expenses for the purchase of real estate in the cash expenses of the population,%;

2) housing indicators (5 indicators):
- Var6 - the total area of residential premises, accounting for an average of per capita, sq. m;
- Var7 - commissioning of residential buildings per 1000 people, sq. m. total area;
- Var8 - commissioning of apartments per 1000 population, units;
- Var9 - registered housing mortgages, units;
- Var10 - housing affordability coefficient;

3) socio-demographic indicators (2 indicators):
- Var11 - the number of active social mortgage programs (by categories of recipients), %;
- Var12 - the number of births per 1000 population, persons;

4) indicators of the mortgage market (11 indicators):
- Var13 - the volume of mortgage housing loans issued according to the Central Bank of the Russian Federation (in rubles and foreign currency), thousand rubles;
- Var14 - the number of mortgage housing loans issued according to the Central Bank of the Russian Federation (in rubles and foreign currency), pcs.;
- Var15 - weighted average interest rate on mortgage housing loans granted in rubles, %;
- Var16 - total outstanding residential loans according to the Central Bank of the Russian Federation (in rubles and foreign currency), thousand rubles;
- Var17 - the number of credit organizations issuing mortgage housing loans, pcs.;
- Var18 - the number of credit organizations attracting refinancing in the secondary market of mortgage lending, pcs.;
- Var19 - refinancing of mortgage housing loans with the sale of a pool of mortgage housing loans (rights of claim for MHLs) without the formation of an additional financial instrument, million rubles;
- Var20 - refinancing of mortgage housing loans with the sale of a pool of mortgage housing loans (rights of claim for MHLs) with a further issue of mortgage-backed securities, million rubles;
- Var21 - the amount of overdue debts on MHLs, million rubles;
- Var22 - the volume of prematurely repaid mortgage housing loans in the reporting period, million rubles;
- Var23 - the percentage of families who are available to purchase a home with a mortgage, %.

The housing indicators (the second functional unit) did not include the cost per square meter of housing because the corresponding parameter is the basis for calculating the housing affordability coefficient (Var10).

The information base on a set of indicators is based on statistics from the Federal State Statistics Service and the Central Bank of the Russian Federation, materials from the RIA Rating information and analytical portal, as well as the All About Mortgage information portal. Initial data sets were formed

for 85 subjects of the Russian Federation (including the Republic of Crimea and Sevastopol) for 2014-2018.

The proposed methodology for system ranking of the regions of the Russian Federation by the level of development of the mortgage system includes the following steps:

1. Identification of the main factors in the development of regional mortgage systems based on the use of statistical methods of factor analysis.
2. Interpretation of the results and construction of a graphic model of the main factors in the development of the mortgage system in the region.
3. The formation of a differential indicator of the level of development of the regional MHL system, which determines the comparative composition of the research results, the differentiation of regions according to the identified factors.

Using methods of statistical factor analysis provides the possibility of reducing the dimension of the array of source data and eliminating the multicollinearity of primary indicators with an acceptable level of reduction in the amount of information. The result of its application is the identification of the main factors explaining 60-75% of the change in group dispersion.

The use of the method of graphical modeling is due to the need of interpreting the results of statistical factor analysis data and create structural models of the major factors in the development of a regional MHL system.

The use of multicriteria scaling methods allows us to synthesize a differential indicator based on the identified factors and a graphical model of their relationships. Its development is due to the need to classify regional MHL systems according to identified development imbalances.

Model

To conduct a comprehensive analysis of the state of mortgage lending systems in Russian entities, an indicator "The level of development of the regional system of mortgage lending" is introduced. This is a differential indicator reflecting the realized demand for a mortgage loan, as well as the size of the mortgage lending market and its characteristics. Using this indicator, we can distinguish groups of regions with similar characteristics of mortgage lending.

The differential indicator can formally be represented by the following formula:

$$k_i = \varphi\,(F1_i;\ F2_i;\ F3_i), \qquad (1)$$

where k_i–differential indicator of the development level of mortgage lending in the i-th region;
$F1_i$–the value of the first factor;;
$F2_i$–the value of the second factor;;
$F3_i$–the value of the third factor;;
i – the region number.

A graphical interpretation of the differential indicator is shown in Figure 3.

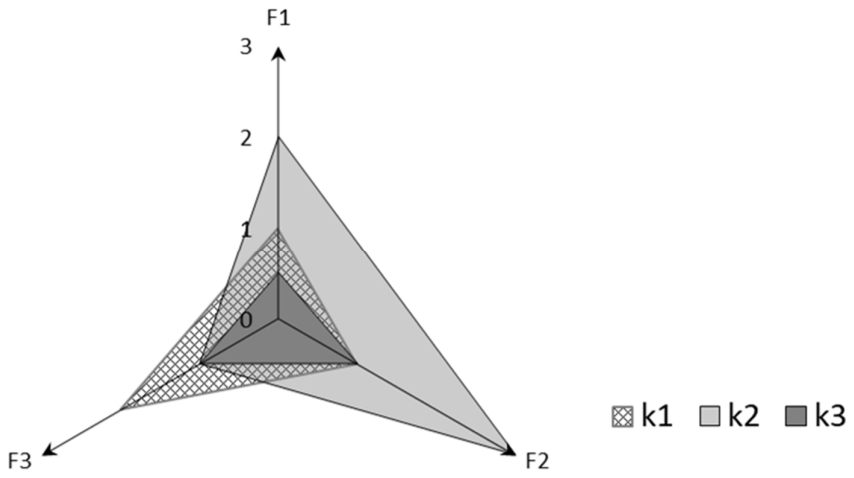

Fig. 3: A graphical model of a differential indicator

(developed by the authors)

Note that the practical use of differential indicator (1) for the system ranking of regional mortgage systems involves the subsequent development of discrete scales for each of the main components laid down in the differential indicator. The result of the implementation of the obtained model of the differential indicator (Fig. 3) in practice will be at least a three-dimensional matrix for assessing the mortgage potential of the region, including 27 or more possible combinations of coordinates in the space of alternatives. The combination of possible coordinates will allow us to create a strategic choice space for regional authorities and will become a clear tool for moving from one position to another for moving to one or another alternative, which will create conditions for the strategic management of the region's mortgage system based on the principles of continuity and operational change management.

Results

All data arrays formed over a five-year study period were processed using the ***Statistica*** software package. The results obtained are summarized in table 1.

As follows from the above results, for all periods of the study, the share of the explained group dispersion for the first three factors is higher than 70%. The factor number is determined by the fraction of the explained group variance of the source variables.

The calculation results also demonstrate the stability of the structure of primary variables in the identified factors.

Comparable results and a rather high proportion of the explained variance for the study periods justify the admissibility of the formation of a three-factor model.

Table 1: Results of processing data arrays for 2014-2018
(*Calculated by the authors using the Statistica software package)*

Factor	Eigenvalue	The share of the explained variance	Accumulated share of the explained variance
Data array 2014			
F1	9,7	48,67	48,67
F2	3,05	15,26	63,93
F3	2,25	11,27	**75,2**

Data array 2015			
F1	9,61	45,78	45,78
F2	3,19	15,2	60,99
F3	2,83	13,46	**74,45**
Data array 2016			
F1	9,47	45,10	45,10
F2	3,13	14,89	59,98
F3	2,9	13,80	**73,78**
Data array 2017			
F1	9,45	42,95	42,95
F2	3,76	17,08	60,03
F3	2,90	13,18	**73,21**
Data array 2018			
F1	9,52	48,83	48,83
F2	3,85	14,41	63,24
F3	3,06	11,47	**74,71**

The results of the study show that the first factor with a share of the explained variance of 48.8% is formed by 10 initial variables. Nine of them (Var13, Var14, Var16, Var17, Var18, Var19, Var20, Var 21, Var22) belong to the functional block of mortgage market indicators and only one, the number of economically active population (Var3), belongs to the composition of economic indicators.

The second factor (F2) with a share of the explained variance of 14.4% is formed by five initial variables, three of which (Var1, Var2 and Var4) belong to the functional block of economic indicators, and two to the blocks of housing (Var10) and mortgage indicators (Var23), respectively.

The third selected factor (F3) with a share of the explained variance of 11.5% is closely related to two initial variables belonging to the block of housing indicators, namely, the indicators - commissioning of residential buildings (Var7) and commissioning of apartments (Var8).

The given set of variables allows us to explain the meaningful meaning of the selected factors:

F1 - an indicator of the effectiveness of the functioning of the regional mortgage market;
F2 - an indicator of the availability of housing mortgage lending in the region, in turn,
F3 - an indicator of business activity in the field of housing.

Factors F1 - F3 make up the multicriteria structure of the differential indicator of the level of development of the mortgage system in the region. Each factor acts as a formally independent driver for the development of the mortgage system in the region, as the method of their selection involves reducing the statistical dependence between the selected factors to eliminate the multicollinearity of the primary variables.

To reduce the number of combinations of estimates in the classification of objects according to selected factors, it is advisable to use a discrete scale of values with an uneven step. Note that for the first factor, where the greatest scatter of the obtained values is observed, it is advisable to use a more accurate scale, for example, with a range of 10 divisions, while values from 1 and higher fall into the "high" category, and values less than -1 fall into the "low" category.

For F2 and F3, scales with a range of 5 divisions with a similar distribution of levels are selected. Other options for constructing a scale of criteria are possible.

As a result of the proposed systematization, we obtain a three-dimensional matrix for assessing the mortgage potential of the regions, including 27 coordinate combinations.

As an example, Table 2 presents the results of assessing the state of regional mortgage systems in some regions in 2018.

Table 2: The results of assessing the level of development of regional mortgage systems by differential indicator

i	Region	Differential indicator value			
		k_i	F_{1i}	F_{2i}	F_{3i}
c29	St. Petersburg	(2; 1; 2)	high	high	high
c18	Moscow	(9; 0;-2)	high	average	low
c10	Moscow region	(3; 0; 3)	high	average	high
c58	Sverdlovsk region	(1; 0; 0)	high	average	average
c32	Krasnodar region	(1;-1; 1)	high	low	high
c25	Leningrad region	(0; 0; 2)	average	average	high
c59	Khanty-Mansi Autonomous Okrug - Ugra	(0; 2; 0)	average	high	average
c54	Samara region	(0; 0; 0)	average	average	average
c60	Yamal-Nenets Autonomous Okrug	(0; 3; 0)	average	high	average
c46	Republic of Tatarstan	(1; 0; 1)	high	average	high
c21	Nenets Autonomous Okrug	(-1; 3; 0)	low	high	average
c83	Chukotka Autonomous Okrug	(-1; 2;-1)	low	high	low
c66	The Republic of Khakassia	(-1; 0; 0)	low	average	average
c5	Ivanovo region	(0;-1;-1)	average	low	low
c41	Chechen Republic	(0;-1;-1)	average	low	low
c63	Altai Republic	(-1;-1;-1)	low	low	low

(*Compiled by the author)*

Conclusion

Based on the study, the following results were obtained:

1. The need for a systematic ranking of regional mortgage markets is justified.
2. A methodology for systematic ranking of the regions of the Russian Federation by the level of development of the mortgage system based on the developed differential indicator is proposed.
3. A systematic ranking of regional mortgage markets was carried out according to the main criteria for the development of housing mortgage lending systems. The matrix for assessing the mortgage potential of the region has been formed.

In general, the study proves that the state regional mortgage policy should be targeted in nature, exerting its direct influence, first of all, on those components that received their "low" rating in the calculation of the differential indicator. State support measures should be much wider than traditionally offered to the population social mortgage programs. It should be noted that state support programs existing in Russia undoubtedly have a significant impact on the increase in demand for mortgages from certain target groups of the population, especially young families and families with children, but are not able to solve the problem of developing mortgages globally. This is evidenced by the fact that the weighted average interest rate and the number of existing social programs were not included in any of the main components for the entire five-year study period. The practical implementation of the methodology for assessing the level of development of regional systems of Mortgage Housing Lending on the basis of a differential indicator and the development of a targeted regional state mortgage policy on its basis can contribute to solving the problem at the state level. The practical implementation of the proposed approach can not only smooth out imbalances in the development of regional mortgage systems, but also raise the level of mortgage development in Russia to a qualitatively new stage in its development.

In this regard, the objectives of future research are:

- development of a model of state support for regional mortgage markets based on the differential indicator obtained by the authors. Its fundamental difference from existing analogues will be the "targeted" nature of state assistance to local mortgage markets, due to the wide range of possible values of the differential indicator (27 or more) in the space of alternatives;
- simplification of the proposed methodology for calculating the differential indicator to facilitate the procedures for its practical application.

Acknowledgment

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Aroma Marketing in Business – How Fragrance Affects Customers and Employees

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Abstract

The subject of the article is sensory marketing and its application in business on the example of fragrance marketing. It describes how fragrances affect the mood, well-being and behaviour of customers and employees. It also explains how olfactory stimuli affect the brain. The article is based on the literature review.

Keywords: Neuromarketing, Sensory Marketing, Aroma Marketing, Essential Oils, Behavioural Economics, Neuroeconomics

Aroma marketing constitutes one of the forms of sensory marketing, based on the use of stimuli received by an individual's sense of smell exerting the influence on the behaviour of a person, including their consumer decisions. In sensory marketing, particular messages are oriented to other senses as well, namely eyesight, hearing, taste, and touch. With the support of sensory marketing, one can increase brand awareness in the minds of patrons and develop its image (Hulten, Broweus, van Dijk, 2011). The strong impact aroma exerts on the mood and well-being of the patrons of commercial premises and hotels was established as long as over a dozen years ago (Spence, 2003). According to the researchers, about 95% of thoughts, emotions and cognitive processes occur beyond human consciousness (Zaltman, 2003). The reception of olfactory stimuli plays a special role in the process. Although the majority of sensations are based on visual and auditory stimuli, 75% of emotions that accompany us on a day-to-day basis, M. Lindstrom argues, have been triggered by smell. Thus, it is this sensual channel, strongly associated with emotions, that offers a chance to build an effective marketing strategy.

Fragrance information is decoded differently from the remaining sensations (e.g. the visual ones) and goes directly to the limbic system responsible for controlling human emotions. The nerve pathway conducting olfactory impulses is very short, which is why it is the fastest-stimulated type of sense and constitutes the oldest form of communication in nature. For the most part, the human brain responds to olfactory stimuli unconsciously (Chebet & Michon, 2005). Fragrances strongly affect one's emotions, memory, and well-being. The conditions they may cause include tachycardia (rapid heartbeat), drowsiness, tearing or nausea, as well as plenty of other sensations that affect human reactions and yet remain unperceived.

Behavioural economics is an interdisciplinary discipline bordering on psychology and economics; it has developed thanks to the commitment and work of two outstanding researchers: Daniel Kahneman and Amos Tversky. This discipline enables understanding of the irregularities occurring in market participants in the course of the decision-making process that remain unexplained based on the assumptions of the rationality of choices. In 2002, Daniel Kahneman received the Nobel Prize in Economics for his work on the theory of perspective, a notion he developed together with Amos Tversky, who had passed several years prior. The theory of perspective explains many economic

anomalies, i.e. behaviours incompatible with economically understood rationality. In their actions, people frequently follow "a bird in the hand is worth two in the bush" principle. It also turns out that they are reluctant to risk in the sphere of profits, but often a risk in the field of losses –to avoid a smaller loss, they risk incurring a larger one, for instance, when they engage in a confrontation with a police officer to avoid a ticket. The researchers also noted that sadness due to the loss of a certain amount of money, e.g. PLN 200, seems to be more than twice as strong as the joy of receiving PLN 200, a phenomenon called loss aversion. On this ground, it is known that people are reluctant to part with their money and, for example, an increase in a price may cause just such an aversion, which will translate directly into a reluctance to make a purchase (Kahneman & Tversky, 1979). This theory assumes that when making decisions, people take some point of reference and evaluate results as profit or loss. In 1979, Kahneman and Tversky conducted a study in Israel, Stockholm, and Michigan, with approximately 100 students and university staff as participants. The study consisted in choosing one of the proposals put forward in the survey, linking profit or loss with a certain probability. The results obtained in all three locations were the same. On their basis, Kahneman and Tversky distinguished the following effects:

- the certainty effect, which means that people will choose a positive profit over an uncertain benefit, even if it is greater than a positive profit;
- the rebound effect, which occurs when people given a choice solely in the sphere of losses choose the risk and reverse the certainty effect;
- the isolation effect, which occurs when there is a complicated problem, people simplify it and focus on what stands out, and omit the connecting elements. Therefore, the method of formulating the variant becomes significant as it influences decision making (Makarowski, Leszczyńska, Lozach, Makarowski, 2012).

Making choices in the circumstances of risk and uncertainty has remained within the realm of interest in neuroeconomics, a disciplinary science on the borderline of psychology, economics, and neurology. Its core interest is researching the causes and forecasting the future human behaviour in the sphere of broadly understood economics. In the research, non-invasive technologies are employed to study the activity of the human brain. Monitoring neuronal responses in the consumers' brains allows to forecast and understand how purchasing decisions are made. In one experiment, for instance, the researchers used magnetic resonance imaging (MRI) to compare the brain image while one is paying with cash with the brain image when one is experiencing an unpleasant electrical impulse. The research has shown that the parts of the brain that activate when paying in cash partially overlap those that activate responding to an electrical impulse (Mažar, Plassmann, Robitaille, Lindner, 2017). It turns out that based on observing brain activity, one can accurately predict a purchasing decision of the person examined, when the pain of paying rises, the likelihood of buying decreases.

Moreover, the predictions based on the observation of neuroimaging results overlap with the purchase intentions of the examined persons. Based on other studies, it has been established that with the increase or decrease of activity in particular brain structures, the likelihood of making a purchase increases (Zaleśkiewicz, 2011). The collected data determined that:

- an increase in activity in the nucleus accumbens area is associated with the anticipation of something pleasant;
- an increase in activity in the medial prefrontal cortex is involved in the calculation of profits and losses;
- a decrease in activation in the area of the insular cortex, which is active when experiencing something unpleasant.

These changes in the activity of particular brain areas were associated with a greater probability of purchase by the person examined. They may also be associated with the use of aroma marketing. The ingredients of essential oils affect the receptors of gamma-aminobutyric acid (GABA), a neurotransmitter that inhibits the central nervous system. Consequently, the use of most oils has a calming and anti-stress effect. The dysfunction or deficiencies in GABAergic transmission

are associated with reactions to pain and anxiety (Wang et al., 2018). As mentioned above, when reimbursing for goods or services with cash, the areas of the brain that become activated area similar to those activated while experiencing an unpleasant impulse; these are areas associated with pain processing. Then the use of aroma marketing can be associated with pleasant experiences that evoke positive feelings in the brains of patrons, thus paving the way for shopping responses.

The orbitofrontal cortex is associated with the ability to attribute emotional value to individual options, which has a significant impact on decision making. Here, the information from various brain areas, including the olfactory cortex and the reward system, is integrated (Rolls, 2004). Therefore, a scent can affect and indeed affects, for instance, the decision on how much one is willing to pay for a given product by assessing its price. An apt illustration would be an experiment in which the test persons were to review and value a pair of running shoes. Identical shoes were displayed in two separate but alike rooms. A delicate floral aroma was sprayed in one of the rooms, while the other remained without any scent modifications. It turned out that 84% of the respondents preferred trainers from a fragrant room.

What is more, they valued them at about $ 10 more than a pair from a scent untampered room. It can be assumed that these individuals were willing to spend more money on a pair of shoes, simply because they were surrounded by a pleasing smell (Lindstrom, 2009). The conclusion: the fragrant sneakers are rated as more luxurious. Correspondingly, the conclusions reached in another research indicate that people who have been affected by agreeable aromas were more extravagant. A similar situation applies to gambling. The conclusions following an experiment carried out in a casino revealed that after a nice smell was sprayed in the vicinity of the slot machines, the game stakes increased by 45% in comparison to the instances when the procedure did not occur. The first establishment to employ aromas in their casino was The Mirage, a high-class inn in Las Vegas (Dooley, 2015). In the 1990s, fragrance marketing began to be employed in the United States and Australia on a broader scale. In Poland, aroma marketing was used for the first time in movie theaters during the premiere of Jan Jakub Kolski's *Jasminum* (Lindstrom, 2009).

Aromatising the places affects the subjective sense of time as well. The customers who spent 40 minutes in a queue in the "fragrant" Lafayette shopping mall in Paris, were under the impression that the waiting time was only 25 minutes, unlike the patrons who visited the store before spraying the aroma (Lindstrom, 2009). Interestingly, the reverse effect can be observed as well; namely, the customers of stores lacking the aromatisation had the impression that the time they spent there was much longer than the period spent in the premises in which such a solution was used.

Hesitant customers are more prone to smells, and a vast majority, as many as about 80% of purchase decisions are made at the point of sale. Therefore, it is important to create such an atmosphere at the shopping spot so that a customer finds it comfortable and entertaining, which increases the chance of profit. Consistent with research, the use of fragrances in business is associated with:

- improving the positive attitude of consumers towards a product, service or spot;
- improving the feelings and mood that the patrons experience;
- increasing in the inclination towards purchases, which translates into an increase in sales;
- prolonging the time spent inside a store.

When the scent of baked bread is employed, the sales in a bakery can increase by 30% (Stasiak, 2005). According to one study, the aroma increases the time spent in a given place by 16%, which increases the efficiency of shopping. Further, the pleasant scent has a positive effect on other factors shaping the purchasing decisions, such as the assessment of staff proficiency, the quality of the presented goods or the assessment of the interior design. A store selling household goods started spraying the aroma of mown grass. It turned out that since the air indoors became scent-enhanced, as many as 49% of the surveyed patrons declared that the staff seemed to more competent (Michalska-Dudek, 2009). Dunkin' broadcast a radio commercial on Seoul buses simultaneously releasing a delicate coffee aroma. It was to remind the passengers of the experience the brand conveys. Over 350

thousand people "experienced" the radio commercial. Its outcome was a 29% increase in sales and a 16% increase in the number of visitors to Dunkin' (Skowronek, 2014).

Undoubtedly, the smell is strongly correlated with making shopping decisions, especially among indecisive people, as well as influences the willingness to spend money. The impact that particular scents have on increasing motivation and enthusiasm for work as well as minimizing faults and increasing creativity or focusing one's attention remains an extremely pertinent issue related to aromatherapy in business as well. One study examined the effect that the aroma of petitgrain (*Citrus Aurantium*) has on improving work efficiency and reducing workplace stress. The participants were divided into two groups: the experimental group was exposed to the petitgrain essential oil, while the control group was exposed to the neutral almond oil. In both groups, the participants asked to perform a computer task on a specific website. The results obtained indicate that the participants in the experimental group completed the task related to the website 2.28 minutes faster than the participants from the control group. The researchers elucidate that the results were obtained by restoring the autonomous balance of the sympathetic and parasympathetic nervous system through the unified effect of petitgrain essential oil. The outcome of exposure to this fragrance may be the improvement of the mental and emotional state by combining a decrease in the level of stress and an increase in the level of stimulation among the participants in terms of mindfulness and alertness (Huang, Capdevila, 2017).

One of the countries that promote an innovative approach to aromatherapy in business is Japan. Special places, i.e. fragrance-serving clubs, have been established there. In those places, the employees can take advantage of thirty minutes of aromatherapy. These clubs are popular among both white-collar and blue-collar workers who are happy to enjoy the served aromas, which include rosemary or lemon. Japan is also the country in which the discovery that spraying the lemon scent in office spaces by 54% reduces the number of computer errors made by employees occurred. In addition, it has been observed that jasmine stimulates the brain functions, while lavender calms the brain's electrical activity (Rudzewicz, 2010). These findings have been confirmed by the studies carried out with the participation of nurses. The use of the lavender essential oil (*Lavandula Angustifolia*) to reduce work-related stress has a positive influence on the overall assessment of the work environment and increases the satisfaction among the nurses (Johnson et al., 2017). The studies conducted on a group of healthy volunteers showed that the group exposed to the aroma of rosemary (*Rosmariunus Officinalis*) demonstrated a significant increase in the performance of overall memory quality and alertness as compared to the group exposed to the lavender aroma. Nevertheless, both scents improved the mood of the persons tested when compared to the control group that were exposed to no aroma (Moss, Cook, Wesens, Duckett, 2003).

The research indicates that not only the employees but also the patrons appreciate the enjoyable scents that contribute to the overall image of a given brand for them. As many as 90% of the respondents admitted that an unpleasant smell could prompt them to leave premises sooner or entirely abandon their plans to visit a store or hotel[1]. Agreeable aromas, in turn, encourage them to visit a store or service location. The assessment of the attractiveness and the analysis of information regarding commercial establishments and their surroundings relies predominantly on the sense of sight, followed by the sense of smell. An appealing fragrance in the surroundings is an important factor informing, for instance, about the prestige of a facility, its cleanliness, appropriate aesthetics or welcoming atmosphere (Grzybowska-Brzezińska, Rudzewicz 2013).

Where Can One Apply Fragrance Marketing?

Aromatic tones can be used wherever shopping decisions are taken, where sales or broadly understood customer service takes place. Popular locations in which fragrance marketing is employed include:

[1] Research: Aroma marketing: Impact of fragrance on business]
http://www.aromacorp.pl/wpcontent/uploads/2016/04/raport.pdf

- hotels,
- travel agencies,
- SPA & wellness centers,
- premises providing catering services (restaurants, pubs, cafes, and so forth),
- discos;
- medical and dental practices,
- waiting areas,
- galleries and shopping centers,
- stockists (e.g. offering upscale clothing; jewelry; timepieces, cosmetics; electronics/household appliance stores),
- banks.

One of the pioneers in the field of fragrance marketing was Westin Hotels & Resorts, an international hotel chain, incorporated in 1998 to Starwood, with over 120 hotels in 24 countries, which have developed and use for aromatising the hotel rooms, the letterhead as well as printed promotional materials a fragrance based on the aroma of white tea.

Singapore Airlines can serve as a case in point taken from the tourism industry. For their business activities, they use the smell of freshly cooked rice, which gives the customers a sense of security and peace. This fragrance is recognisable to the customers who define it as a light, exotically Asian, and feminine scent. This specially composed and patented bouquet, called *Stefan Floridian Waters,* is not only sprayed on the planes but also used in the form of perfume by female flight attendants. Additionally, the hot towels offered onboard at the beginning of the flight are soaked with it to generate pleasant associations and memories of a comfortable journey (Lindstrom, 2009).

Fragrance marketing has been employed successfully in the real estate industry, as well. Estate agents frequently spray the scent of vanilla, freshly brewed coffee or cake before the viewing by potential owners. The outcome evokes a positive frame of mind putting forward the affectionate family household, which can immensely facilitate making purchasing decisions. Suddenly, the estate becomes much more appealing for the eyes or rather the nose of the potential buyers.

Fragrance marketing helps the business in the following ways:

- it increases the number of visitors by encouraging the customers to visit the store;
- it extends the customer's stay in the store by improving his or her well-being and comfort, which encourages them to spend a longer time in the store and increases the likelihood of making a purchase;
- it reinforces the brand's message by stimulating the perception of customers in a pleasant, fragrant environment that triggers positive associations with the brand;
- it strengthens customer loyalty by consolidating their brand loyalty; an original fragrance is easily remembered and deepens the emotional bond between the company and its client.

How to select a fragrance for a business? While choosing a company fragrance, the following guidelines are worth considering:

- defining the target group: who they are, what they care about, what they expect from the company;
- developing the fragrances that are impeccably suited to the customer base; this requires vision and revision (for instance testing);
- taking into account the attributes of the brand;
- analysing the message one wants to convey to the patrons.

The companies that want to implement aromatherapy into business ought to clearly define the goal that the selected fragrance is to accomplish, namely whether it is to eliminate the disagreeable smells, improve the overall ambiance or consolidate the brand recognition and customer loyalty, to name but a few purposes.

Fragrance marketing has been increasingly adopted on the market. As the research brought forward illustrates, it has vast application in business, because it affects not only the purchasing decisions but also the mental functioning and well-being of both the employees and patrons. It can be assumed that fragrance marketing will play an increasingly important role in the activities oriented towards the business sector.

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Competences of State Authorities Related to Public Management in The Area of Defense. International Comparative Analysis

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Abstract

The purpose of the article is to analyze the authorities' competences in the field of defense - in legal acts - in regions neighboring the Republic of Poland. The comparative method was used in the assessment. The following criteria were adopted for the purpose of comparison of the competences of the authorities: understanding of the term "defense" in the different countries, directing the national defense, organization of the state defense, and planning of the state defense.

Keywords: State authority, competences in the area of defense, directing the state defense, organization of the state defense, planning of the state defense.

Introduction

Methodology

Defense is an area of national security that is aimed at countering external political and military threats using all available forces and means (Dictionary of National Security Terms 2008). This is due to one of the three functions of the state, namely the defense and compulsion function, which is related to ensuring the protection of fundamental social values. A state authority is a deliberately organized and clearly defined group of people and resources, established and operating under the applicable laws, which performs certain tasks on behalf of the state and is able to use the state's means of power and coercion to perform them. The notion of a state authority is linked to the notion of competence, function, and form of action. Competence is based on the legislation in force; it is the ability of a state authority to apply legally defined measures to carry out its tasks (The American Heritage Dictionary of the English Language 2020; Collins English Dictionary 2014). Competence is not only a power that can be exercised by an authority, but it imposes an obligation to take certain actions in situations provided for by law. The competence of a state authority cannot be presumed; it should always be based on a constitutional or statutory norm (Banaszak 2017).

In order to achieve the objective, legal acts were selected, the tasks and competences of state authorities in the field of defense were divided, and the criterion comparison was selected. The approach presented herein uses the comparative method, which is often called comparative analysis and concerns a broadly understood research perspective applied in social sciences (Tokarczyk 2008; Collier 1993; Harvey 2012-20). Taking into account the above, an informed choice of procedure was made in order to achieve the intended objective, which comprised the following stages: stage one - identification of the studied group (i.e. the authorities responsible for state defense matters); stage two - selection of the legal acts describing the state authorities' defense competences; stage three - selection of the comparison criterion; stage four - analysis of the materials and evaluation of the results of the comparison.

The research has taken into account the concept of separation of powers, where three groups of authorities were distinguished: legislative, executive, and judicial (Muszyński 2007; Banaszak 2017). Due to the significant scope and area of the subject matter covered by the study, it was limited to

legislative authorities (parliament) and executive authorities (president, council of ministers, and ministers). The condition for separation of the aforementioned groups of state authorities was their scope of competence concerning state defense.

In the second stage, the study was based on legal acts of the seven countries neighboring Poland: Republic of Belarus (Belarus), Czech Republic, Republic of Lithuania (Lithuania), Federal Republic of Germany (Germany), Republic of Ukraine (Ukraine), Russian Federation (Russia), and Slovak Republic (Slovakia). In order to achieve the desired objective, the method of examination of documents was mainly used, which enabled collection, selection, description, and scientific interpretation of legal acts applicable to the area of defense.

Due to the fact that the legislation determined the course and outcome of the research process, the methodological basis in the third stage was the choice of the comparison criterion (the concept of "defense," directing the national defense, organization of the state defense, and planning of the state defense).

Description and evaluation of the results of the comparison

The Term "Defense"

When considering the term "state defense," it should be noted that most often the translations of this term are found in the acts on defense of individual states. In countries such as Belarus, Russia, and Ukraine, the laws define this term in a similar manner. The term "defense" is translated as "a system of political, economic, social, military, scientific and technical, informational, legal, organizational, and other state measures in preparation for armed defense and protection of the state in the event of an aggression or an armed conflict" (Act of the Republic of Belarus "On Defense" 1992, Federal Act of the Russian Federation "On Defense" 1996, Act on Defense of Ukraine 1992). In two other countries, Czech Republic and Slovakia, there is a similar understanding of the term "defense": "defense of the state is a set of measures to ensure sovereignty, territorial integrity, democratic principles, and the rule of law, and to protect people's lives and property from external aggression" (Defense Act of the Czech Republic 1999) and "national defense is a set of measures by which the Slovak Republic maintains peace, security, sovereignty, territorial integrity, and inviolability of borders, and fulfils the obligations under international agreements on joint defense" (Act on Defense of the Slovak Republic 2002). However, there are some differences in the above approaches. The Defense Act of the Slovak Republic makes reference to international obligations and, later in the act, national defense is also related to cybersecurity and the fight against terrorism.

Two other approaches to the definition of the term (national) "defense" are present in the laws of the of Lithuania and Germany. The Act on National Security of Lithuania states that "defense of Lithuania is universal and total (unconditional), it is also coordinated with NATO principles of collective defense" (Act on National Security of the Republic of Lithuania 1996). The universality of defense means that Lithuania is defended by the armed forces of the state and the armed forces of NATO allies. Total defense means that both the entire nation and every citizen is obliged to oppose the aggressor, the occupant, and anyone who violates the sovereignty, territorial integrity, and constitutional order of the Lithuanian State through aggression. In the Germany, the concept of national defense has a slightly different meaning than in other countries. The term "defense" is understood to mean direct military defense carried out by the armed forces to defend the territory of the State and to protect its citizens, and the use of the armed forces results from Articles 87a and 115a of the Basic Law of the Federal Republic of Germany (Konzeption der Bundeswehr 2018). Thus, the defense of the state and its citizens is one of the basic tasks of the armed forces, and the Basic Law gives this term a constitutional status. The basic tasks of a state are to protect its population and to defend its territory against aggression. Defense (military) and civil defense (protection of the population) are organizationally autonomous (independent), but are permanently linked (Defense Policy Guidelines 2003; General Defense Guidelines 1989). It is also pointed out that the term "defense" also refers to the allied defense within the North Atlantic Treaty Alliance and stems from the Bundeswehr's tasks (Szubart 2016).

Directing the State Defense

According to the criterion of a territorial system of government, the countries neighboring Poland can be divided into two groups: federal states (Germany and Russia) and unitary states (other countries). In both cases, defense matters are given priority. In federal states, on the other hand, defense matters are the exclusive legislative competence at the federal level. With regard to the competences of the different authorities, attention should be paid to the distribution of the defense powers of the parliament, the president, and the government. The first concerns states of emergency: deciding on the imposition of martial law or approval of presidential decrees on the imposition of martial law. There are some differences in this respect. In the Czech Republic, the decision to impose martial law is made by the parliament at the request of the government, while in the Germany the decision to impose a state of defense is made by the Bundestag with the consent of the Bundesrat at the request of the Federal Government (or a determination of such state is made by the Joint Committee). In countries such as the Russia and the Ukraine, the constitution gives the president the exclusive right to impose martial law. The federal constitutional act "On martial law" provides that in the event of aggression against the Russian Federation or a direct threat of aggression, the President imposes martial law in the territory of the Russian Federation or in its individual parts and immediately notifies the Federation Council and the State Duma. Similarly, the Presidents of: Slovakia, Lithuania and Ukraine decide on defense against armed aggression, declare martial law. The competences of presidents concerning defense in the analyzed countries vary. In countries such as Russia, Belarus, and Ukraine, the president's powers related to defense are broad, while in Germany the president's powers in this matter are limited. In countries such as the Czech Republic, Slovakia and Lithuania, the presidents of these countries are commanders-in-chief of the armed forces, and their creative powers are similar.

In terms of defense, the government has a particularly important role to play, as this area of activity remains at the interface between the competences of the president and of the respective defense ministers, who often report to the president. The defense competences of individual governments are basically similar and related to the planning and implementation of the state's defense preparations to ensure its functioning in the event of an external threat to state security and during a war. In view of the issues under discussion, an important place in the government is held by the minister of defense who is responsible for directing the entire activity of the armed forces in peacetime, even though he or she acts only as an intermediary in the exercise of supreme authority over the armed forces, a function which is usually performed by the president of a given country (with the exception of the Federal Republic of Germany).

Organization of state defense

As has been mentioned earlier, in the Republic of Belarus, the powers of the President of the Republic in the area of defense are very broad and concern, among other things, defining tasks for state administration bodies in the field of organization of defense. The Council of Ministers of the Republic of Belarus organizes and develops the state defense system, equips the armed forces, other troops, and military formations with weapons, military equipment, and other materials, and determines the amount of material resources and budgetary funds for defense (act of the Republic of Belarus "On Defense" 1992). The Ministry of Defense of the Republic of Belarus is responsible for the coordination of actions of state authorities and other organizations in defense matters (the Defense Act of the Republic of Belarus 1992).

The second part of the Defense Act of the Czech Republic provides that “the management and organization of the defense of the state includes formation, preparation, and management of the armed forces, operational preparation of the territory of the state, planning of the defense of the state and measures in the national economy and in all public sectors to ensure the defense of the state.” The government of the republic is responsible for preparation and ensuring the defense of the state. The ministry of defense suggests to the government the necessary measures for the preparation and organization of national defense (Defense Act of the Czech Republic 1999). Similarly, in the Slovak

Republic, the government decides on preparations for the defense of the state and approves the concepts of the security system and the defense system of the state. To this end, it manages the activities of the ministries and other state administration bodies, the local government, and higher authorities in preparation for national defense (Constitution of the Slovak Republic 1999).

In turn, in the Republic of Lithuania, the most important issues related to the defense of the state are discussed and coordinated by the State Defense Council, composed of the President of the Republic (chairman), the Prime Minister, the Speaker of the Seimas, the Minister of National Defense, and the Head of Defense. The organization, development, and armament needs of the armed forces are determined by the Seimas. The government, the minister of defense, and the commander of the armed forces who are responsible for managing and directing the armed forces before the parliament (Act on national security of the Republic of Lithuania 1996).

In Germany, defense matters are governed by federal legislation. The Chancellor of the Federal Republic of Germany defines government policy guidelines and is responsible for them. In the event of a state of defense, the command of the armed forces is transferred to the Federal Chancellor (Basic Law of the Federal Republic of Germany 1949). At the federal level, the defense matters are entrusted to the Federal Ministry of Defense. In peacetime, the Minister of Defense settles all matters concerning the armed forces. He or she is responsible to the Parliament and the Chancellor for the achievement of military policy objectives.

The defense of Ukraine is based on the preparedness and ability of the state authorities, all elements of the security and defense sector of Ukraine, the local government authorities, the civil defense system, and the national economy to repel armed aggression (or to prevent an armed conflict). Preparation of the state for defense in time of peace includes forecasting and assessing the military threat and conducting intelligence, as well as informational and analytical activities to prepare the state for defense (Law on Defense of Ukraine 1992). In order to organize the defense of the state, the President of Ukraine, upon a request of the Cabinet of Ministers of Ukraine, approves the defense plan and the military-administrative division of the territory of Ukraine. The President of Ukraine exercises the powers of the commander-in-chief of the armed forces of Ukraine and issues decrees in the area of defense. The National Security and Defense Council of Ukraine coordinates and controls the activities of the executive authorities in the field of defense (Act on the National Security and Defense Council of Ukraine 1998). The Minister of Defense of Ukraine, as the central executive authority, ensures implementation of the state policy in the area of defense, defense and mobilization readiness, combat capability, and preparation of the armed forces to perform their functions and tasks (Act on Defense of Ukraine 1992).

The Act of the Russian Federation on defense provides that “Defense is organized and conducted in accordance with the Constitution of the Russian Federation, the federal constitutional laws, this federal law, the laws of the Russian Federation, and other statutory acts.” The Act gives the President of the Russian Federation the right to define the main directions of the Federation's military policy and leadership over the armed forces, which means that, with regard to organization of defense, the President has the right to approve decisions on the concept and development plans of the armed forces and to approve a number of undertakings in the field of state defense. In the area of defense, the Government of the Russia takes steps to ensure defense and is responsible for the state of the armed forces. Within its powers, the government organizes the equipment of and supplies to the armed forces, develops and implements the state armament program, organizes the development of mobilization plans (Federal Act “On Defense” 1992).

State Defense Planning

The defense plan of the Republic of Belarus includes a collection of mutually agreed military planning documents, the development of which takes place in accordance with the regulation on military planning, approved by the President of the Republic of Belarus and developed by the General Staff of the Belarusian Armed Forces (Act of the Republic of Belarus “On Defense” 1992). Therefore, it is the President who approves the defense plan of the Republic of Belarus, and many

other documents concerning the defense organization, which include plans for the formation, development, and use of the armed forces, the civil defense plan, and the regulations concerning territorial defense (Act on the President of the Republic of Belarus 1995). The President is also responsible for approving the mobilization plans and the plan to accumulate material reserves for mobilization purposes, which the Council of Ministers submits to the President for approval (Act on the Council of Ministers of the Republic of Belarus 2008). Proposals concerning the organization of strategic state defense planning, the use of the armed forces, are presented by the General Staff. The Ministry of Defense is a governmental body which, within the scope of its competence, participates in the development of long-term state programs in the interest of defense and the state armaments program (Presidential Decree on the Ministry of Defense 2006, Act of the Republic of Belarus "On Defense" 1992).

Defense planning in the Czech Republic means a set of forces and measures anticipated to ensure sovereignty, territorial integrity, democratic principles, and the rule of law, to protect the lives of people and their property from an external attack, and to fulfil commitments for joint defense, including the participation of the armed forces in international organizations for peace. State defense plans include defense planning, operation planning, mobilization planning, and state defense readiness planning. As in the Republic of Belarus, the President of the Czech Republic is the commander-in-chief of the armed forces; however, the planning of the state defense is the responsibility of the Government of the Czech Republic. (Constitution of the Czech Republic 1992). The government manages the process of state defense planning and defines the content of individual defense plans and the time frame (stages) for their preparation. The ministry is also responsible for planning and ensuring the operational preparation of the national territory, supplementation of the armed forces, and mobilization. To this end, it coordinates the cooperation of relevant ministries, local and regional authorities, and other administrative bodies and local government units (Act on defense of the Czech Republic 1999). The Department of Defense Capability Planning is an organizational unit of the Ministry of Defense, which is responsible for development of the Defense Strategy of the Czech Republic and managing the defense planning tasks (government regulation on state defense planning 2017).

The Act of the Russian Federation “On defense” provides that in order to plan and implement measures in the area of defense, a defense plan of the Russian Federation is developed, which contains a set of associated military planning documents. Preparation of the documents contained in the Russian Federation's defense plan is carried out in accordance with the ordinance on military planning (federal act of the Russian Federation "On defense" 1996; presidential decree "On the defense plan of the Russian Federation" 2015). The defense plan of the Russian Federation is submitted to the President by the Minister of Defense, together with other plans (and concepts) that he or she is responsible for the preparation of(presidential decree on the "Ministry of Defense of the Russian Federation" 2004). The implementation of the defense plan of the Russian Federation is approved by a presidential decree. It can be clearly concluded that the planning powers of the President of the Russian Federation are very broad, which is due to his position in the system of state authorities.

In the Republic of Lithuania, organization, development, armament needs, and division of the armed forces are approved by the Seimas. Defense planning is carried out as a part of long-term programs of foundations of national security. The Government submits to the Seimas a draft plan for the preparation of long-term programs for the foundations of national security, in agreement with the President of the Republic of Lithuania (National defense system development program 2006-07-04). National security programs are implemented through strategic planning documents and the implementation of the programs is coordinated by the government. The minister of defense is responsible for strategic planning concerning development of the defense system and the defense capabilities of the armed forces, preparation of the armed forces and other institutions of the defense system (Act on national security of the Republic of Lithuania 1996). In the ministry of defense, planning tasks are carried out by the Defense Planning Department (Act of the Republic of Lithuania on the organization of the national defense system and military service 1998; Strategic action plan 2020-2022).

Defense planning in the Slovak Republic is a set of actions through which the competent state authorities create short-term (1-2 years), medium-term (3-6 years), and long-term (10-15 years) plans (Act on defense of the Slovak Republic 2002). The government of the Slovak Republic manages the process of defense planning and approves the guidelines for defense planning, approves the concepts of the state defense system, submits to the National Council of the Slovak Republic the drafts of the state security and defense concepts (Constitutional act on state security in time of war and emergency 2002). All activities related to defense preparations are coordinated by the ministry of Defense. An important role in the defense planning process, as an advisory body, is played by the Security Council, which comprises the Defense Planning Committee and the Civil Planning Committee. (Act on the functioning of the Security Council of the Slovak Republic in peacetime 2004).

The Act "On national security of Ukraine" provides that defense planning is an integral part of the state's strategic planning system. National security and defense planning is divided into long-term (over five years), medium-term (up to five years), and short-term (up to three years) planning. The Defense plan of Ukraine is an integral part of the defense planning and contains a set of documents that specify the content of the procedure and other state measures necessary for preparation for and conduct of armed defense. The procedure for developing the defense plan for Ukraine is defined by the Cabinet of Ministers of Ukraine and the President approves the Ukrainian Defense plan. The Ministry of Defense of Ukraine is the body that ensures the creation and implementation of the state policy on national security in the military sphere. The General Staff of the Armed Forces of Ukraine is the main military body responsible for planning of state defense and for coordination and control of implementation of defense tasks by executive authorities and local government bodies (Act on defense of Ukraine 1992).

Conclusions

In conclusion, each of the countries analyzed herein pays particular attention to defense matters and the powers of the authorities in the field of defense are defined in the sources of law. However, there are noticeable differences in the powers of the legislative and executive branches of the government, with three different positions. In Russia, Belarus, and Ukraine, it is the president who has considerable powers related to the defense of the state and the armed forces. In Slovakia, the Czech Republic, and Lithuania, defense powers are divided between the parliament, the president, and the government. In Germany, on the other hand, the defense and armed forces matters fall within the competence of the parliament and the federal government.

When considering the term "national defense," it should be noted that most often the translations of this term are found in the acts on defense of individual states. Nevertheless, there are noticeable differences. In Belarus, Russia, and Ukraine, the laws define this term similarly, referring to the system of state resources in preparation for armed defense and protection of the state in the event of aggression or armed conflict. In two other countries - the Czech Republic and Slovakia - there is a similar understanding of the term "defense," as a set of measures, but referring to the assurance of certain values: the international law, the conditions of state security, and the system of government of the state. Two other approaches are present in the laws of Lithuania and of Germany. The understanding of this concept in the Lithuania - similarly - refers to the above-mentioned values, but it also defines the nature of the defense as universal and total. In Germany, the term "defense" covers more than the traditional defense against aggression. It also covers conflict and crisis prevention, crisis management, and joint actions in crisis situations.

Directing the defense of the state is understood as a process carried out in peacetime in a continuous, multidimensional way, which involves the state authorities, the armed forces, the administrative structures, and the economy. In countries, the parliaments have a scope of competences that, in principle, is limited to the adoption of legal norms and concern the defense of the state. The competences of presidents concerning defense in the analyzed countries vary. In countries such as Russia, Belarus, and Ukraine, the president's powers related to defense are broad, while in the Federal Republic of Germany the president's powers in this matter are limited. In turn, in the Czech Republic, Slovakia and Lithuania the president's powers are similar. In terms of organization and planning of

state defense, the governments of different countries have a particularly important role to play, as this area of activity remains at the interface between the competences of the president and of the respective defense ministers, who often report to the president. The defense competences of individual governments are basically similar and related to the planning and implementation of the state's defense preparations to ensure its functioning in the event of an external threat to state security and during a war.

To sum up, the powers presented herein of the authorities and the administration bodies in the area of defense in the countries neighboring Poland are aimed at ensuring efficient functioning of the defense system, and thus guaranteeing the security and effective defense of the state.

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The Impact of Declaring A "State of Epidemic" On Fiscal Sustainability in Poland

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Abstract

Poland's current economic situation is changing dynamically which is affected i.a. by political decisions associated with the introduction of extraordinary measures and the already announced state of epidemic. In the Polish legal order constitutional extraordinary measures include martial law, a state of emergency and a state of a natural disaster. Introduction of one of the above constitutional measures affects the application of government debt brake mechanisms, but in a manner established by statute. The state of epidemic is not a constitutionally defined state. Nevertheless, announcing it measurably affects public expenditure and revenue. The impact of the state of epidemic is definitely unfavourable also from the point of view of the 60% government debt-to-GDP ratio. On the basis of statistical data, the author will demonstrate the dynamics of state public debt (SPD) and its relation to the GDP in 2015-2019. This will make it possible to establish to what degree the introduction of the state of epidemic may affect the security of the public finance sector in the context of the government debt limit in subsequent financial years. The issues analyzed carry exploratory importance and gravity. Various research methods are employed in the study: examination of applicable laws, analysis, legal comparison. Research methodology is based not only on the analysis of the Polish and EU legal order, but also on the views of legal scholars and commentators and data published in official documents of the Minister of Finance. Adopting a different research methodology would make the assessment not comprehensive.

Keywords: State of Epidemic, Extraordinary Measures, Government Debt.

Introduction

The universal proverb, allegedly coined by Hippocrates, which reads: *morbum evitare quam curare facilius est* („an ounce of prevention is worth a pound of cure") captures important principles of rational action based on thorough analysis of circumstances and assessment of possible negative consequences of belated actions. It is thus a proverb or a principle that should be in the minds of public authorities when they take financial decisions, in particular in the current, highly challenging economic and political situation. Polish public finance has been profoundly affected by the Corovid-19 pandemic. The prudential and remedial measures implemented in the Polish legal order aimed at containing the pandemic contribute to economic slowdown (GDP dynamics), the plummeting of state revenue (in particular slump in tax revenues, government levies and social security contributions), and the simultaneous increase of general government expenditure. At the moment, Poland's fiscal sustainability is being threatened, and it seems that the budget balance planned for 2020 will not be achieved for the first time in the history of free Poland, that is post-1989.

Today, when the coronavirus pandemic is sweeping the world, public authorities should do put their best efforts to use the existing public funds in a way that produces best possible outcomes. Therefore, financial and legal instruments tied with fiscal rules should be treated pragmatically. By embedding the EU debt-to-GDP ratio in the Constitution, the Polish legislator has introduced a stricter budget discipline and increased compliance with the fiscal rules of the EU legal order.

Public finance stability and sustainability is safeguarded by a constitutional provision expressed in art. 216(5) of the Constitution of the Republic of Poland (Constitution). However, the rule does not apply fully in a state of exception, i.a. when extraordinary measure are implemented in the country as

stipulated in Poland's basic law. However, a pandemic does not fall into the definition of any of the aforementioned states. Consequently, from the formal point of view, public debt brake mechanisms should not be in any way suspended. Poland's public debt exceeds 1 trillion PLN, and the biggest chunk of it is state treasury debt(Table 1). It should be noted that most actions and measures taken amidst what was declared as the state of epidemic in Poland will be financed by government budget, which will significantly affect the budget balance in 2020.

Constitutional state of exception and public finance stability

Pursuant to the rule expressed in art.216(5) of the Constitution of the Republic of Poland of 2 April 1997 (Journal of Laws 1997, No 78, item 483 as amended (Constitution)), it is not permissible to contract loans or provide financial guarantees in result of which government debt would exceed 3/5 of annual GDP. Importance of this constitutional rule is proven by the fact that the breaching of it – as an absolute, normative solution – is tantamount to violation of the basic law, which in turn shall result in a judicial investigation into the responsibility of relevant high officials whose decisions have led to violation of the threshold (Dębowska-Romanowska, 2010, p.118-119). In the case law of the Constitutional Tribunal (CT), a line of interpretation has formed which can be narrowed down to the opinion that the legislator treats the maintenance of budget balance and public finance stability as constitutionally protected values (CT judgment, 5. 1/2012; Ofiarski, 2010, p. 199-200). Counteracting excessive government debt is yet another value protected by the Constitution (CT judgment, case K. 40/2002). Each of the aforementioned ranks very high in the hierarchy of constitutional values. The state's capacity to act and solve its problems depends on the implementation of these values in public life (Chojna-Duch, 2012, p. 79; CT judgment, case K, SK 36/2007). However, this does not mean that this general rule is not subject to certain limitations embedded also in the Constitution. Art. 228(1) of the Constitution provides that in situations of particular danger, when ordinary constitutional measures are inadequate, any of the extraordinary measures may be introduced, i.e. martial law, a state of emergency or a state of natural disaster. The purpose of introducing any of the above measures is to restore the state's normal functioning as swiftly as possible. It should be mentioned here that both the rules governing the functioning of public authorities and the scope in which citizen and human freedoms and rights can be limited during any of the aforementioned states of emergency, as stipulated by the act (Ofiarski, 2010a, p. 63).

Extraordinary measures, i.e. states of exception are defined in more details in acts of ordinary legislation. These include, i.a. the Act of 29 August 2002 on the Martial Law and competence of the Commander-in-Chief and his subordination to the constitutional authorities of the Republic of Poland (Journal of Laws 2017, item 1932), Act of 21 June 2002 on the State of Emergency (Journal of Laws 2017, item 1928) and the Act of 18 April 2002 on the State of Natural Disaster (Journal of Laws 2017, item 1897).

The first state of exception enumerated in art.228(1) of the Constitution is martial law which is introduced in the event of external threat to the state. The threat may be caused by terrorist activity, any cyber attack and an armed invasion on the territory of Poland, or else, the state is obliged by international agreements to join in common defense against aggression. Martial law can be introduced in part or across the entire territory of a country. In contrast, a state of emergency should be introduced in the event of an exceptional threat to the constitutional system of the country, the safety of its citizens or the public order (including threats caused by acts of terrorism or acts of cyber war which cannot be removed by ordinary constitutional measures). The last extraordinary measure is a state of natural disaster which is introduced to remedy the impacts of natural disasters or technical breakdowns that trigger similar effects, and to remove their source.

To recapitulate, it must be emphasized that extraordinary measures are exceptional, and should be regarded as states of exception. The legislator provided for rules governing emergency declarations and their consequences, i.e. the principle of legality, purposefulness, proportionality, protection of the foundations of the legal system and protection of representative bodies (Prokop, 2005, p. 17-18). These principles are to be unconditionally followed when declaring any of the three aforementioned states of exception. In the financial and legal literature on the subject, extraordinary measures are

defined as institutions of internal law which impose limitations on the freedoms and rights of an individual and empower the government to dissent from the way power is exercised as set out in the Constitution. It is legitimized by the occurrence of exceptional threat and the necessity to counteract it (Banaszak, 2009, p. 976).

The state of epidemic from the legal and financial perspective

From the normative perspective, the „state of epidemic" as declared in Poland on 20 March 2020 should be understood as a special legal order implemented within a certain territory in response to the epidemic outbreak and with the objective to take specific preventive and anti-epidemic measures to minimize the impact of the epidemic. This state of epidemic should not be equated with the state of epidemic threat, as the latter is defined as a special legal order implemented in a certain territory in response to the risk of epidemic with the aim to take specific preventive measures.

In the event of a state of epidemic being declared, decisions that will have significant financial consequences need to be taken. The list of ways in which public funds can be spent (not only from the government budget) to contain and counteract an epidemic is long. To illustrate it, just one act, that is the Act of 5 December 2008 on preventing and combating human infections and infectious diseases (Journal of Laws 2019, item 1239) enumerates the following spending:

1) costs of programs related to the prevention and control of specific contagions or contagious diseases (art. 4(2)),
2) costs of epidemiological tests (art. 8(1)),
3) costs of verification of laboratory tests for the purposes of epidemiological supervision (art. 9(4)),
4) costs of conducting mandatory vaccinations, medical qualification examinations and specialist consultations (art. 18 (2)(3)(7)),
5) costs of purchase of medical supplies, e.g. vaccinations and other immunological medications applied in the event of epidemic threat or epidemic (art. 18a(3)),
6) costs of conducting recommended vaccinations, medical qualification examinations and specialist consultations of citizens with state health insurance coverage (art. 19(3)),
7) costs of participation in the Sentinel Surveillance System (art. 29a(3)),
8) costs of health services provided in order to combat infections and infectious diseases and costs of health services that arose in result of these infections and infectious diseases (art. 38(1)),
9) costs of safeguarding products, appliances, equipment or apparatus (art. 46d(7)),
10) costs of transportation of e.g. medications, dietary food supplies, medical goods and personal hygiene goods (art. 46e(2)),
11) costs of health benefits provided by the state in result of the epidemic (art.47(12)).

Except acts of ordinary legislation, executive acts also address various issues related to the state of epidemic (Regulation of the Minister of Health of 13 March 2020 on the state of epidemic threat, Journal of Laws 2020, item 433 as amended, Regulation of the Minister of Health of 16 September 2010 on recommended vaccinations and the manner in which vaccinations required under international medical regulations should be funded and documented, Journal of Laws 2010, No 180, item 1215). These executive acts prove that the state of epidemic needs to be approached in a comprehensive way as many of the statutory regulations have been clarified and pinpointed more precisely in executive acts, a fact that may affect total public spending related to the state of epidemic.

The condition of Poland's public finance is presented in Table 1. As the Table shows, government debt was rising over the study period (excluding 2016-2017), and the largest part of the debt was State Treasury debt. It should be borne in mind that state budget will cover spending related to the declaration of a state of epidemic as outlined hereinabove, which will definitely increase government debt in 2020. Considering the SPD to GDP ratio in 2018, it can be projected that the constitutional debt limit in 2019 will not be crossed, however, the actual effects of the poor economic situation and the SPD dynamics will be evident only in 2020.

Table 1: Public finance sector debt-to- GDP and State Treasury debt in the 2015-2019 (3rd quarter) period

year	public finance sector debt (in billion PLN)	State Treasury debt	Share of State Treasury debt in public debt	SPD/GDP (in %)
2015	877,3	834,6	95,13%	49
2016	965,2	928,7	96,22%	52,1
2017	961,8	928,5	96,54%	48,5
2018	984,3	954,3	96,95%	46,5
2019*	1001,2	987,6	98,64%	no data

** as of the end of the 3rd quarter of 2019.*

Source: own study based on: Quarterly report on public finance in the 4th quarter of 2015 and the whole of 2015, no 2/2016, Quarterly report on public finance in the 4th quarter of 2016 and the whole of 2016, no 2/2017, Quarterly report on public finance in the 4th quarter of 2017 and the whole of 2017 r., no 2/2018, Quarterly report on public finance in the 4th quarter of 2018 and the whole of 2018, no 2/2019, Quarterly report on public finance in the 3rd quarter of 2019, no 1/2020, https://www.gov.pl/web/finanse (access: 24.03.2020).

Conclusion

Rational management of public funds is a priority of public authorities since fiscal sustainability related to the revenue to expenditure ratio attracts potential investors and enhances economic stability of Poland.

Nonetheless, fiscal sustainability is not an absolute overriding good in the hierarchy of values protected by the Constitution. There is the need to "harmoniously reconcile" all constitutional values (CT judgment, case K 2/00). Therefore, although fiscal sustainability and the condition of public finance are constitutionally protected values, this protection is not absolute and it is not overriding in relation to other constitutional values (CT judgment, case K 47/01). For example, art. 88 of Act of 27 August 2009 on Public Finance (Journal of Laws 2019, item 869 as amended, PFA) provides that the prudential and remedial procedures shall not be applied in the event one of the three extraordinary measures is introduced. Implementation of the aforementioned measures is fully justified by the concern to adhere to constitutional values such as, i.a. country's autonomy, territorial integrity, human and citizen freedom and rights, citizens' safety. The provisions of art. 86 PFA are stringent and it would be difficult to reconcile them with the obligation to apply limitations imposed under each of the three extraordinary measures (Misiąg, 2019, Legalis thesis 2) since additional public funds would have to be employed. Similarly, implementation of the state of epidemic, though it has not been classified as a constitutional state of exception, will trigger increased public spending, and thus, increased foreign borrowings which in turn will translate into increased SPD level in the future, which, given the economic development slowdown, may negatively affect the debt-to-GDP ratio.

The preventive measures in form of fiscal rules implemented by the Polish legislator in Polish legal order must be deemed a wise solution. Undoubtedly, absence of cost saving measures would threaten the stability and security of public finance.

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COVID-19 Threats Evaluation of Countries via Fuzzy Interface Systems

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Abstract

The paper deals with the evaluation of a new type of coronavirus, called WHO as COVID-19, by means of soft computing. Specifically, the fuzzy logic supported by neural networks is chosen, which serves to create a knowledge base of rules on the basis of which the model is evaluated. For analysis, European countries have been selected, to which the coronavirus has spread from the Wuhan epicenter in China, where a further outbreak of infection has subsequently emerged. Input variables such as area, population, density and tourism are chosen for the model. The output of the model is a normalized number of infected persons. Based on the output of the fuzzy model, we can say whether the country is high, medium and low threats country.

Keywords: 2019-Ncov, ANFIS, Coronavirus, COVID-19, Coronavirus Disease 2019, Evaluation, Fuzzy Logic, Soft Computing

Introduction

The new coronavirus caused an outbreak of viral pneumonia in Wuhan, China in December 2019 by Chan et al. (2020). The World Health Organization (WHO) has now named Coronavirus Disease 2019 (COVID-19). Most patients worked at the local Huanan seafood wholesale market or lived there where live animals were also sold. In the early stages of this pneumonia, severe symptoms of acute respiratory infection occurred. Patients have clinical manifestations including fever, cough, dyspnoea, muscle pain, confusion, headache, sore throat, nasal discharge, chest pain, diarrhea and nausea and vomiting according to Hui et al. (2020). On 25 March 2020, a total of 375 498 confirmed cases, 16 362 currently deaths and affected are a total of 195 countries, areas or territories reported by the WHO. Transmission risk assessment and the epidemic trend of COVID-19 are very important as they can alert vigilance policy makers, healthcare professionals and society as a whole, so that sufficient resources can be mobilized quickly and efficiently for both control and treatment.

In recent decades, two other new coronaviruses (CoVs) have emerged as major global epidemics; in 2002, severe acute respiratory syndrome coronavirus (SARS-CoV) spread to 37 countries, causing more than 8000 cases and nearly 800 deaths, and in 2012 coronavirus respiratory syndrome in the Middle East spread to 27 countries, causing 2,494 cases and 858 deaths worldwide to date. These CoVs are zoonotic and have low potential for sustained community transmission. However, larger clusters involving supernatural events were observed for SARS in 2003 and MERS in 2014-17 according to Wu et al. (2020). Symptomatic cases of both viruses usually occur with moderate to severe respiratory symptoms, which often progress to severe pneumonia. A remarkable common feature of both SARS-CoV and MERS-CoV is that they have low potential for sustained intra-community transmission. The most worrying aspect, however, is the ability of viruses to cause unusually large bursts of cases through excessive spread, which can exceed 100 individuals and is apparently deployed in a single index case.

As COVID-19 is no longer included in Wuhan, other major Chinese cities are likely to maintain localized outbreaks. Large overseas cities with close transport links with China have also become an

epicenter of the outbreak, especially Italy. An independent stand-alone epidemic in major cities around the world could become inevitable due to the considerable export of presymptomatic cases and in the absence of widespread public health interventions, as Wu et al. (2020).

Theoretical Background

Human history is full of wars and pandemics, but death and fear caused by some pandemics cannot be matched by any war. The one with the highest death rate in recent human history, the Spanish influenza caused by the H1N1 influenza A virus, infected 500 million people (nearly 1/3 of the world's population in 1918 (Taubenberger and Morens, 2006) and killed 25 to 50 million people. In the 21st century, human epidemics caused by viruses still appear in public. Among them, new infectious diseases caused by infections of wild animal coronaviruses in humans have attracted the most attention, reminding us that people should be fully prepared to respond to a larger pandemic that may occur at any time in the future.

Coronaviruses of wild animal origin have caused 3 serious infectious diseases in humans in less than 20 years. The first infectious disease was reported in November 2002 in Guangdong province in China according to Ahmad et al. (2009). Although the source of the virus has not yet been identified, the disease has spread rapidly and has infected many healthcare professionals. On 21 February 2003, an infected doctor from Guangdong traveled to Hong Kong, leading to the worldwide spread of the virus (Tsang et al., 2005). Only on 15 March, after the World Health Organization (WHO) received reports of cases from Guangdong, Hong Kong and Hanoi, was there a worldwide warning about the disease, officially named "Severe Acute Respiratory Syndrome (SARS)". The pathogen originated from bats (Wang et al., 2006) and the transient host was a masked palm tree (Hu et al., 2017). At the beginning of the epidemic, the international community had no experience of reducing this type of outbreak and the disease was not officially diagnosed. within 146 days after the first case occurred (Fouchier et al., 2003). From April to May 2003, the Chinese government set up a comprehensive prevention network, allocated 2 billion yuan to prevent epidemics, built a temporary Xiaotangshan hospital and actively treated patients. Given the low coverage of modern communication networks, there was difficulty in transmitting information. However, the epidemic response was generally satisfactory (Pang et al., 2003). the first outbreak of SARS (November 2002 to July 2003) was successfully halted thanks to worldwide cooperation (Parashar and Anderson, 2004), the worldwide spread of SARS (SARS-CoV) coronavirus still caused 8447 cases and 774 deaths in 32 countries, according to Pan et al. (2020).

The second infectious disease was MERS-CoV in 2012. It occurred in Saudi Arabia and spread to other countries including the United States, England, France and South Korea. The mortality rate was up to 34.4 %. By the end of November 2019, a total of 2468 people were infected worldwide. Research suggests that this coronavirus originates from bats and has been transmitted to humans through an intermediate host, the camel (Memish et al., 2013).

On December 31, 2019, China reported cases of unknown etiology of pneumonia (unknown cause) found in Wuhan, Hubei Province, China. A new type of coronavirus has been identified by the Chinese authorities and was isolated on 7 January 2020. Since 20 January 2020, 282 confirmed cases of 2019-nCoV have been reported from four countries including China, Thailand, Japan and the Republic of Korea. Since January 23, 2020, cases infected in China have been exported to other countries in the world. The initial 2019-nCoV source still remains unknown. WHO is proposing '2019-nCoV' as an interim name of the virus. On 12 February 2020 excluding China, there are 24 countries reporting cases of COVID-19. Among these 24 countries, 23 report cases with exposure in China. In addition, 11 of these 23 countries report cases attributed to local transmission within the reporting country. Four of the 24 countries report cases where likely exposure occurred outside the reporting country and outside China. Among these four reporting countries most likely countries where exposure occurred were France, Germany, Japan and Singapore. All transmissions occurred within known defined clusters. As of 27 February 2020, 41 States Parties have provided WHO official reports on additional health measures that significantly interfere with international traffic under Article 43 of the International Health Regulations. Most of these measures are related to the refusal of entry for travelers originating in China or from countries reporting on ongoing COVID-19 transmission. 11 March 2020 WHO therefore have made the assessment that COVID-19 can be considered as a pandemic. However,

evidence to date suggests that two groups of people are more at risk of serious COVID-19. They are older people; and those with underlying medical conditions. Europe has now become the epicenter of the pandemic, with more reported cases and deaths than the rest of the world combined, apart from China.16 March 2020 the total number of cases and deaths outside China has overtaken the total number of cases in China. More cases are now reported each day than reported in China at the height of the epidemic. (WHO, 2020)

Adaptive Neuro-Fuzzy Inference Systém

Adaptive neuro-fuzzy inference system (ANFIS) is a combination of artificial neural network (ANN) and fuzzy inference system (FIS). Thanks to its design, ANFIS can benefit from both soft computing techniques, but also overcome their shortcomings. Compared to ANN, the ANFIS model is more transparent to users and causes fewer errors in remembering. As a result, there are several advantages of ANFIS, including adaptive ability, nonlinear ability and rapid learning capability. Neural networks can easily learn from data. However, it is difficult to interpret the acquired knowledge as a meaning associated with every neuron and every mass that is quite difficult to understand. In contrast, as described by Mathur et al. (2016), fuzzy logic itself cannot learn from the data. However, fuzzy models are easy to understand because they use linguistic terms rather than numeric and IF-THEN rules structure. Language variables are defined as variables whose values are words or sentences in natural language with associated degrees of membership. The fuzzy set to which the linguistic variables belong is an extension of the crisp set where the element can have full or no membership. However, fuzzy sets also allow for partial membership, which means that an element may partially belong to more than one set see Janková (2019).

ANFIS constructs a fuzzy inference system (FIS), whose parameters of membership function are derived from training examples. The most commonly used fuzzy inference systems are Mamdani and Sugeno. The main difference between Mamdani and Sugeno is that the output function of the Sugeno membership is either linear or constant (Arkhipov et al., 2008). However, the output functions of the Mamdani membership may be triangular, Gaussian, etc. In this study, the Sugeno type fuzzy inference system was used because the Sugeno system is more computationally efficient than the Mamdani type. Mamdani is more dependent on expertise. However, the Sugeno type is trained with real data, as it adds Şahin, Erol (2017).

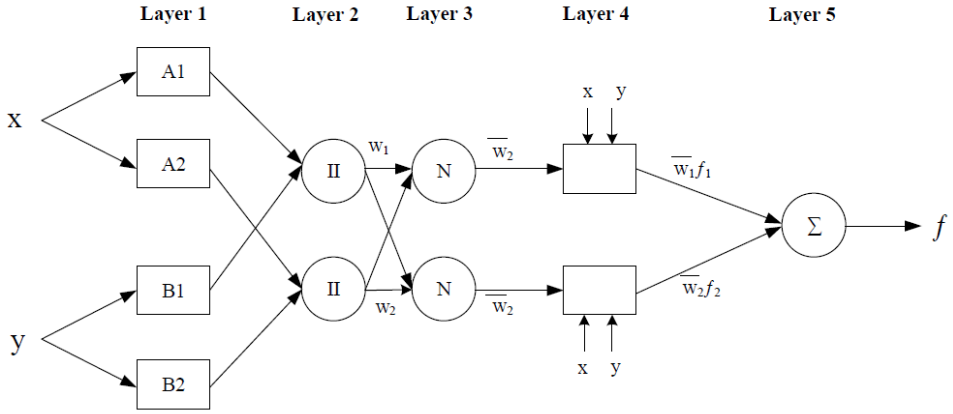

Fig. 1: Basic structure of ANFIS.

Mathur et al. (2016) describe the ANFIS model. In ANFIS, the crisp input signal is converted to fuzzy inputs using the membership function. The fuzzy input together with the membership function are then fed to the neural network block. A neural network block consists of a rule base that is connected to an inference engine. Back propagation algorithm is used to train the inference engine to select the right rule base. After training, appropriate rules can be generated and omitted from the neural network block

to provide optimal output. The language output from the neural network block is then converted to a crisp output by means of a decryption unit. The structure of the neuro-fuzzy model consists of different adaptive layers. Each of these layers has nodes with an associated network of transfer functions through which the fuzzy inputs are processed. The output from these nodes are then merged to give a single crisp output, since the ANFIS configuration allows only one model output. This crisp output is feedback as an input to the model and compared to the set value. If any deviation occurs, the error signal thus generated becomes an input to ANFIS, maintaining stability in the system.

Yilmaz (2003) describes the ANFIS structure as follows: A neural network consists of 5 layers in addition to the input layer (Layer 0).

Layer 0: The input layer has *n* nodes, where *n* is the number of inputs to the system.

Layer 1: A fuzzification layer in which each node represents a value of membership to a linguistic concept represented by a mean value membership function:

$$\mu Ai(x) = \frac{1}{1 + \left[\frac{x - ci}{ai}\right]^{2bi}} \tag{1}$$

where ai, bi, ci are the parameters of the membership function. These are adaptive parameters. Their values are adjusted through the back propagation algorithm during the learning phase.

Layer 2: The rule layer provides rule strength for each node using a multiplication operator. Performing min (AND) operations. Represented values of the membership $\mu Ai(x_0)$ and $\mu Bi(x_1)$ are multiplied to find the rule power, where the variable x_0 has the linguistic value Ai, and x_i has the linguistic value Bi in the antecedent portion of rule *i*. There are p^n nodes indicating the number of rules in layer 2. Each node represents an antecedent part (if part of and if-then rule) of the rule. Here *n* is the number of input variables and *p* is the number of membership functions.

$$wi = \mu Ai(x_0) * \mu Bi(x_1) \tag{2}$$

Layer 3: Is a normalization layer that normalizes the strength of all rules according to the following equation:

$$\overline{w_i} = \frac{wi}{\sum_{j=1}^{R} wj} \tag{3}$$

where wi is the force i^{th} of the rule that was calculated in layer 2. The node *i* calculates the ratio of the force of this rule to the sum of all the rules. In this layer there are nodes p^n.

Layer 4: Is a layer of adaptive nodes. Each node in this layer calculates a linear function where the coefficients are adjusted using a multi-layer feed-forward neural network.

$$\overline{w_{ifi}} = \overline{w_i}(p_0 x_0 + p_1 x_1 + p_2) \tag{4}$$

p_i's are parameters where $i = n + 1$ and *n* is the number of inputs to the system (i.e. the number of nodes in layer 0). This equation was given for two inputs. Finally $\overline{w_i}$ s output from layer 3. These parameters are updated by the learning step. The least squares approximation is used in ANFIS. In the temporal model, back-propagation algorithm is used for training.

Layer 5: Output layer whose function is the sum of the net outputs of nodes in layer 4. The output is calculated according to:

$$\sum_i \overline{w_{ifi}} = \frac{\sum_i wifi}{\sum_i wi} \tag{5}$$

where $\overline{w_{ifi}}$ is the output of node i in layer 4. This indicates the consequent part of rule i. The overall output of the neuro-fuzzy system is a summary of rule consequents.

Among the advantages of ANFIS is the robustness of the results generated by the model. ANFIS, like neural networks, is capable of generalization. Also, ANFIS is able to take crisp output and represent it in the form of membership and fuzzy rule functions, from which it generates crisp output. It is a very promising tool that needs to be explored in solving various non-linear and complex problems. However, as further described by Salleh et al. (2017) ANFIS computational costs are high due to complex structure and gradient learning. This is a significant problem especially for large input applications. In general, constraints are: a) type and number of membership functions, b) location of membership function, c) the curse of dimensionality. In addition, a compromise between interpretability and accuracy is considered a major problem with this system. In the context of ANFIS's interpretability with grid partitioning, it creates a large number of rules that model users may not understand easily and easily. Interpretability is therefore compromised, although a large number of rules contribute to improving model accuracy. As the authors further state, ANFIS works well when there are no more than five inputs.

Research Methods

The aim of this paper is to create a fuzzy model for evaluation of a new type of coronavirus called COVID-19 in European countries. The created fuzzy model is supported by neural networks, according to the procedure above, which sets the rules to evaluate the fuzzy model. Variables and parameters that can potentially detect the numbers infected in each country are chosen for the model. Specifically, input variables such as country size, population, population density - as coronavirus spreads from person to person and tourism - in particular the number of tourists per year and the number of non-European passengers per year visiting a particular country are selected. The spread of coronavirus in such a massive way is mainly attributed to the free movement of persons and easy transfer across continents.

Examined Set

A fuzzy inference system is used to evaluate a new type of WHO named coronavirus as COVID-19. The affected European countries are chosen for the fuzzy model.

Table 1: Examined Set

Country	Area (km^2 x 10^3)	Population (number x 10^6)	Density	Tourists (mil.)	Passengers (mil.)
Italy	301	58.1	193	211	153
Germany	357	82.3	231	83	222
Czech Republic	79	10.5	133	26	18
Austria	84	8.2	98	86	31
Belgium	30	10.4	347	19	34
Netherlands	41	16.7	407	44	80
France	547	62.1	114	134	162
Spain	505	40.5	80	306	220
Poland	313	38.5	123	16.7	44
Slovakia	49	5.5	112	5.3	3
Hungary	93	9.9	106	14.9	15

Specifically, 11 European countries such as Italy, Germany, Czech Republic, Austria, Belgium, Netherlands, France, Spain, Poland, Slovakia and Hungary are selected. A total of five input variables are selected for the fuzzy model, as shown in Table 1. These are the size of the country in km^2, the total population, density per km^2, the number of tourists visiting that country per year, and the number of passengers visits the country from outside Europe.

Figure 2 shows the current situation (as of March 25, 2020) of the COVID-19 infection worldwide. It is apparent that after China, which is referred to as an epicenter, the dangerous virus spread substantially to European countries where it has developed a pandemic and the epicenter has moved. To date, Italy has recorded 69,176 infected, followed by Spain with confirmed cases of 39, 673, Germany 31, 554 and France 22,025. In other European countries, the epidemic has so far not exceeded more than 6, 000 infected people.

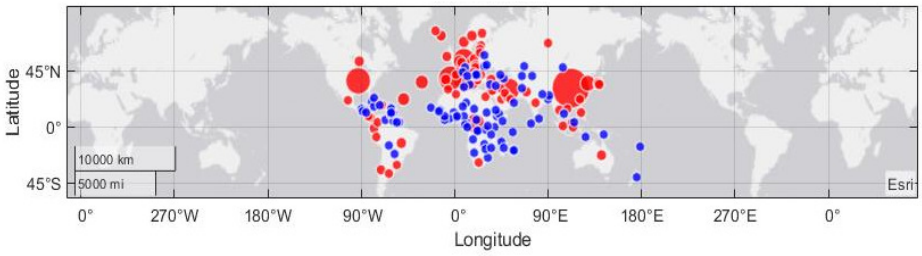

Fig. 2: COVID-19 Confirmed Cases with 100+ cases highlighted in red.

Figure 3 shows the development of the number of infected in the analyzed countries. It is clear that Italy was first hit, followed by Spain, Germany and other countries. The enlargement between European countries was mainly due to the free movement of persons. Especially thanks to travelers and people returning from their stay skiing in mountains.

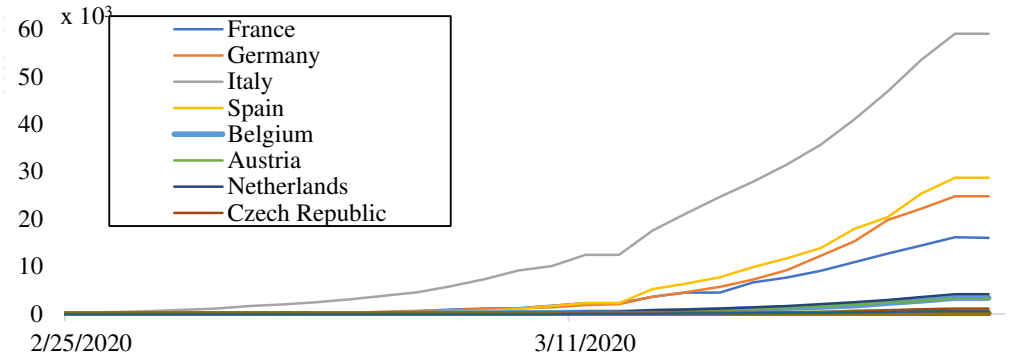

Fig. 3: COVID-19 Confirmed Cases by Country.

Proposed Model

A fuzzy inference system (FIS) type Takagi-Sugeno is created with five input variables and one output variable predicting normalized number of infected people in European countries. Gaussian membership functions are the best fit for their nature. Created FIS is divided into three attributes (LOW, MEDIUM, HIGH). The FIS is based on the above procedure using the Takagi-Sugeno type:

- Input 1 = Area
- Input 2 = Population
- Input 3 = Density

• Input 4 = Tourists
• Input 5 = Passengers

• Output = Number of infected people

From the description of the fuzzy sets we can see that the annual area in km^2 x 10^3 (input 1) of Italy belongs to the membership function with the attribute medium to high. For this reason, we can trap the linguistic term medium and high for Italy in fuzzy proximity relation. The situation is different for Czech Republic. In terms of area, this country belongs to the fuzzy set small, but also to the fuzzy medium set, as the area of the Czech Republic is, according to available information, 79 thousand km^2. Similarly, for example, density (input 3). For Italy, the population density according to the fuzzy attributes of the Gaussian function of membership is at the medium level, since the size of this variable for the country is 193 people per km^2. By contrast, Hungary shows the population density according to the fuzzy set and the set attributes small. For Spain, the number of travelers from ex-EU countries per year (input 5) is high, according to the available information, since the number of passengers per year in this country is 220 million. from countries outside the EU only 44 million a year, which means that this country belongs to the fuzzy attribute small. Fuzzy proximity relation is defined in Table 3. Now all attributes are ready to extract fuzzy functional dependencies and their language interpretation.

Table 2: Fuzzy proximity relation

Country	Area (km^2 x 10^3)	Population (number x 10^6)	Density	Tourists (mil.)	Passengers (mil.)
Italy	{medium, high}	{medium, high}	{medium}	{medium, high}	{medium, high}
Germany	{medium, high}	{high}	{medium}	{medium}	{high}
Czech Republic	{small, medium}	{small}	{small, medium}	{small}	{small}
Austria	{small, medium}	{small}	{small}	{small,medium}	{small}
Belgium	{small}	{small}	{high}	{small}	{small}
Netherlands	{small}	{small, medium}	{high}	{small,medium}	{medium}
France	{high}	{high}	{small}	{medium, high}	{medium, high}
Spain	{high}	{medium, high}	{small}	{high}	{high}
Poland	{medium, high}	{medium, high}	{small, medium}	{small}	{small, medium}
Slovakia	{small}	{small}	{small}	{small}	{small}
Hungary	{small}	{small}	{small}	{small}	{small}

The proposed model uses Takagi-Sugeno rules in the form of IF-THEN, which are generated by the adaptive neuro-fuzzy inference system. ANFIS created a total of 243 rules. Output values are represented by normalized number of infected people in selected countries.

The created ANFIS model uses the hybrid learning (training) algorithm. This learning algorithm, as reported by Loganathan, Girija (2013), combines the least-squares estimator and gradient descent method. Initially, each fuzzification neuron is assigned initial functions in the form of Gaussian distribution with certain parameters. During the training process, the training data set is presented to the ANFIS cyclically. Each cycle through all the training examples is called an epoch. In the ANFIS learning algorithm, each epoch comprises of a forward pass and a backward pass. The purpose of the forward pass is to form and adjust the consequent parameters, while that of the backward pass is to adjust the parameters of the activation functions. For this model, the number of training epochs is 30 and training error tolerance is set to zero. Setting the training error tolerance to zero is recommended in specialized literature such as Azar (2010) or Bohra, Bhatia (2012) and many others because of the uncertainty of behavioral error in training. The training process stops whenever the maximum epoch number is reached or the training error goal is achieved.

The Figure 4 shows that the ANFIS model is almost perfectly trained on the selected training data set. The crosses indicate the values generated by the ANFIS model. The circles then indicate the actual stock index values adjusted according to normalized procedures. It can be seen that most of the training values are close to or equal to the actual values.

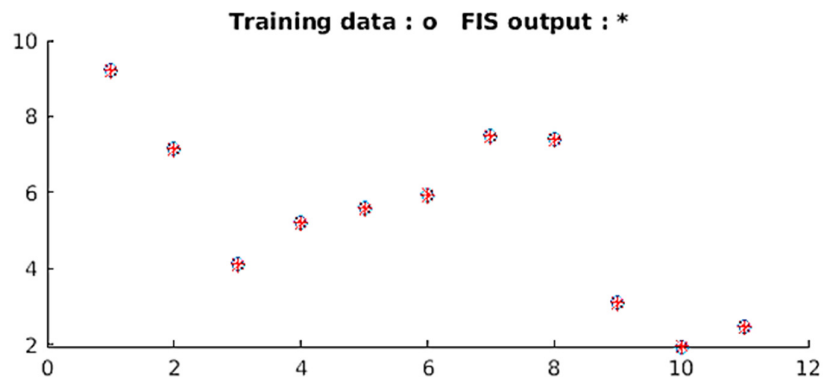

Fig. 4: ANFIS training process.

To test the predictive capability of the model we developed, the model is first "trained" on one set of data and then "tested" on previously invisible data that we collected independently. Finally, the results are compared in terms of their accuracy. For this purpose, the RMSE is used, which compares the original data and the data obtained from the output of the model. The mathematical notation of the RMSE pointer is as follows:

$$RMSE = \sqrt{\frac{1}{n}\sum_{t=1}^{n}(y_t - \dot{y}_t)^2} \tag{6}$$

The root mean average error of the training and test data for infected people in European countries is 0.000093.

The graphs generated from the created ANFIS model are used to perform sensitivity analysis. Figure 5 shows the surface created by the number of tourists and the number of passengers. As shown in the figure, the output of the model responds very strongly to the high values of the inputs of these variables, while to the low values of the number of tourists or passengers (around 50 million) the output is almost insensitive and equal to zero.

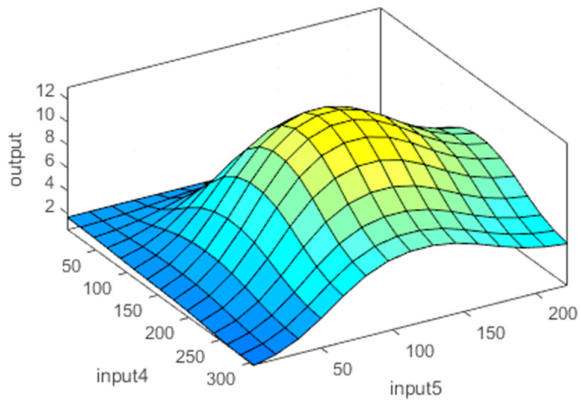

Fig. 5: Fuzzy Surface view of tourists and number of passengers.

A different view of the relationship between the input variables is shown graphically in Fig. 6 -9. Figure 6 illustrates the relationship between area and population. Figure 7 presents the relationship between the fundamental area and density of countries. Figure 8 shows the relationship between area and number of tourists. Figure 9 illustrates the relationship between area and number of passengers.

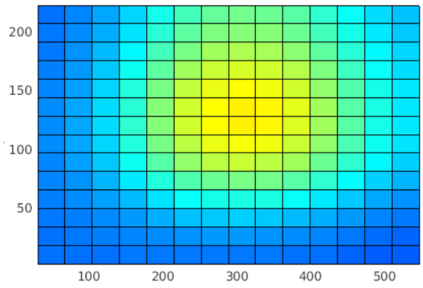

Fig 6. Graphs of area and population.

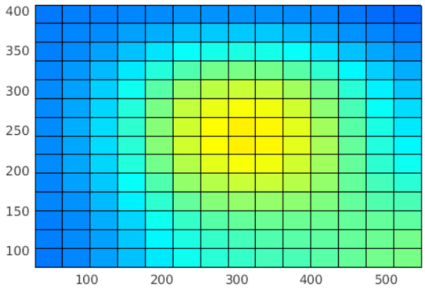

Fig 7. Graphs of area and density.

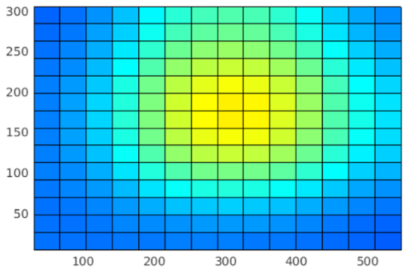

Fig 8. Graphs of area and tourists.

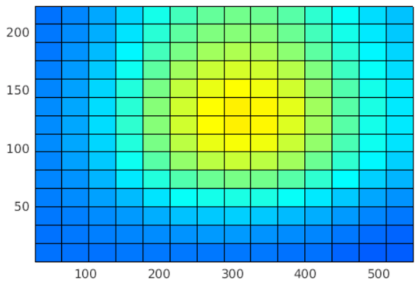

Fig 9. Graphs of area and passengers.

The results of the fuzzy model defuzzification are shown in Table 3. Based on the output, we can say if the country has an area of 206,000 km^2, a population of 46,100,000, a density of 244 km^2, a number of tourists per year of 118,000,000 and a number of travelers of ex-EU countries per year 46,300,000, then the output of the model is 4.21. This value represents the normalized number of infected people. On the contrary, a country that shows the values of input variables in terms of area 63,700 km^2, population 31,700,000, density 267 per km^2, number of tourists per year 140,000,000 and number of travelers from ex-EU countries per year 101,000,000. Such a country shows the output of fuzzy model

2.28, which is a normalized number of infected persons. Other result values with different input parameters are entered in Table 3.

Table 3: Fuzzy Model Output.

Area (km^2 x 10^3)	Population (number x 10^6)	Density	Tourists (10^6)	Number of passengers (10^6)	Result
206	46.1	244	118	46.3	4.21
41.2	37.2	244	198	121	1.74
101	60.6	158	255	150	1.54
446	36.1	334	162	104	2.93
318	75.1	149	25.2	169	2.18
116	39.4	149	25.2	169	1.02
244	59.5	220	87.1	10.8	1.33
63.7	31.7	267	140	101	2.28

Conclusion

The paper deals with the evaluation of a new type of coronavirus, called WHO as COVID-19, in selected European countries. For evaluation is chosen the method of soft computing, specifically fuzzy logic supported by neural networks, which are used to set expert rules based on which the knowledge base of the fuzzy model is determined and the number of infected persons is evaluated. Input parameters such as the size of the state, population, population density - as coronavirus spreads from person to person and tourism - specifically the number of tourists per year and the number of non-European passengers per year visiting a particular country are chosen. The spread of coronavirus in such a massive way is mainly attributed to the free movement of persons and easy transfer across continents. For this reason, the authors believe that these variables can provide a more accurate fuzzy model. The output of the model is a normalized number of infected people in the country according to the set parameters. Based on the output of the fuzzy model, we can say whether the country is high, medium and low threats country.

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The Development of The Youth's Leadership Character in The Digital Era: Case Study of Rumah Kepemimpinan

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Abstract

The ease of information in the digital age has effects on forming millennial generation. This study aims to analyze the development of youth leadership character. Qualitative methods were selected with in-depth interviews and observation of a case study of Leadership House (RK). It applies the concept of Prophetic Leadership in building the character of leaders of the millennial generation. The developed values were in the form of humbleness, open-mindedness, objectiveness, moderate, and achievement-contributing. The contemporary Islamic studies program, Tahfidz Al-Qur'an, National Leadership Camp, Community Development, and daily coaching programs, have an impact on the formation of youth leader character.

Keywords: Character Building; Leadership; Leadership House; Youth.

Introduction

In recent years, youth are one of the consumers of digital products. Their character has been influenced by the technological developments (Abbitt, 2011). The openness to access information promotes freedom for the community in creating new information (Hazell & Worthy, 2010). The ability to manage information and leverage technological advances affects the perception of youth who can change their character and role in the community (Thackeray & Hunter, 2010). According to law No. 40 of 2009, youth become a moral force, social control, and agents of change in national development (Kemenkumham RI, 2009). Youth as part of the transition from biological and social with a sturdy, strong, and productive self-image that makes the youth have many opportunities in revolutionary projects and become innovators for both society, organization, nation and country (Berzin, Singer, & Hokanson, 2014; Irwin, 2013).

Indonesia's number of youth was a quarter of the total population of Indonesia, or about 63.82 million people (BPS, 2018). History has reflected that the youth are capable to took and executed major roles in the important momentum of the Indonesian nation. In fact, nowadays, we may encounter a lot of behaviors that violate norms, values, and laws committed by leaders to be one of the indicators of the leadership crisis experienced. Indonesia Youth Development Index (YDI) is under Myanmar, Thailand, Malaysia, Brunei, and far below Singapore (ASEAN, 2017).

Researches on building characters of leadership have been widely conducted, such as the development of leadership characters in youth (Lerner, 2018), building leadership characters in the organization (Jiang, 2012; Sarti, 2014; Wu & Wang, 2012), and digital age leadership ((Dimitrov, 2018). This study seeks to elaborate on the leadership, youth, and digital age characteristics of the RK case study.

Methods

The study utilized qualitative descriptive methods through literary, observational, and interview techniques. The primary data is obtained through direct observation and interviews. Live observation and interviews were conducted to get data with direct observation of how activities being organized in the RK. Secondary Data is obtained through literary studies using the literature or documents in accordance with the research interests. Furthermore, data analysis was established that lasts continuously until complete and saturated. The activity on data analysis, namely data reduction, data display, and conclusion drawing/verification (Creswell & Creswell, 2017).

Result and Discussion

The combination of impacts arising from technological developments, with efforts made to build leadership characters, has felt like a challenge for the institution of the RK. The foundation aims to produce Indonesia's future youth leaders. Current leadership crises occur in Indonesia (Emmers, 2014; Irawanto, Ramsey, & Ryan, 2011; von Luebke, 2010). RK is an institution that is open, non-profit, non-partisan, and professional. RK was founded in 2002 with a vision to be the development center that generates the leader with integrity, acceptability, and professionalism to contribute to the transformation of Indonesia.

RK provides a scholarship program for students with two years of character development to score Indonesia's future youth leaders. These scholarship recipients are second and fourth-semester students from a selected college in Indonesia. This program designed to generates leaders with the concept of Prophetic Leadership. The prophetic leadership has been developed based on Islamic values with the prophet Muhammad as the role model (El Syam, 2017). Coaching in spiritual, mental, strengthening integrity and credibility, global competitiveness, have a soul of caring, character, and personality that mature, moderate, and efforts to build the nation into its foundation (Rumah Kepemimpinan, 2018).

Some of RK's projects became innovations in the digital era and were committed to eliminating the adverse effects of the digital era itself while utilizing digital products to mitigate the impact. The project namely:

1. POPCORN (Protect Our Peers from Consuming Pornography), the activity provides opportunities for the participants to promote anti-pornography campaigns to fellow students through talk shows and seminars. Aside from organizing seminars, the participants must also be able to become counselors to his friends who are addicted to pornography as the impact of the technology abuse in this digital era. Not only directly, but this activity also utilizes online media to reach certain areas.
2. GREACTION (Go Green in Action), is an online campaign activity to deal with waste problems and climate change. The activity provides discussions, and participatory activities are also conducted by involving community communities that exist in some areas.
3. Lembar Impian, is one of the projects promoted by the Association of RK, which utilizes social media to provide motivation and information to fellow young generation to build a dream, by doing a discredit online.
4. Other programs. Include Leadership Talks, and Inspiring Young Leadership Forum. These programs are annual agendas that also become one of the techniques of leadership character development by presenting national leaders who were discussing social and religious issues so that participants can think critically in the presence of problems. In this program, participants were forced to socialize and contribute to the community. Socialization is an important feature of leaders. Socializing leaders are friendly, polite, thoughtful, and diplomatic (Northouse, 2018). Such leaders demonstrate concern for the welfare and fulfillment of the needs of the crowd. By familiarizing the participants participating in a community and socializing in a forum or group makes participants have a good interpersonal so that it will easily create a cooperative relationship with people.

The concept of prophetic leadership as a concept in the RK becomes a spiritual source that provides insight into who they are, to find meaning in the purpose of life, the vision of creating a life that has

an impact, and significance contributions they make. As a person's leadership character is built with the ability of critical thinking and has an open mind, thinking globally to understanding the environment of the organization and its community (Caligiuri & Tarique, 2012) Interpersonal relationships with two-way communication (Resick et al., 2011).

The creation of leadership characters is not only influenced by the internal aspects of individuals but also external aspects. It is also realized by RK builders so that the programs formed to cover not only internal aspects but also external aspects. The National Leadership Camp is a supply agenda for scholarship recipients annually, where the created environment provides an opportunity to develop social potential. The agenda also becomes an introductory event for the participants. Thus, honing social skills in participants. Other programs, such as Community Development and Leadership Project, are designed to make participants more responsive to the problems that occur in the environment Around and able to provide ideas that can be implemented to be a solution to the negative impacts that occur.

RK programs are quite an answer to the challenges for the digital era leadership. Some of RK's alumni, such as Agis Aulia (agro social entrepreneur), establishing Jawara Farm that provides many benefits, one of them grows the economy and farming. Another example is Faldo Maldini as the founder of pulangkampuang.com, a digital platform initiated to be the nomads of the Minang origin to contribute to the building and prosperity of their home region. There is also Achmad Zaky as the founder and CEO of Bukalapak, which is one of the biggest e-commerce in Indonesia.

Conclusion

RK efforts to produce young people with the concept of Prophetic Leadership has been conducted by integrating a combination of prophetic values in each coaching program. Efforts to build the character of youth leadership in this digital age by conducting coaching that forms the concept of a prophetic leadership and emphasizes on humble, open mind, moderate, objective, prestigious-contributive. The programs in RK, namely; (1) Contemporary Islamic Studies, (2) Tahsin and Tahfidz Al-Qur'an, (3) Daily Coaching, (4) National Leadership Camp, (5) Community Development, (6) Leadership Project, (7) Leadership Talks, and (8) Inspiring Young Leadership programs. These RK's programs are solutions in the development of youth leadership.

The coaching programs have been produced by participants and alumni who have achievements and the ability to build community as a manifestation of their leadership character. It is also an indicator of the success of this program, although there are still some obstacles faced by the RK in running the program, including the lack of human resources, financial problems, and the impact of technological development as a cause that changes the behavior of current generations.

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Standardized Procedures of Applying for Admission to Higher Education Institutes as a Component of Accessibility of the Higher Education: Russian and Foreign Experience

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Abstract

Unified State Examination (USE) is a major project in Russian education. On the one part it affects the interests of millions of schoolchildren, entrants and their parents and on the other part it is an important component of continuity between school and higher education. Advancement of accessibility of the higher education is named as the main achievement of this assessment procedure as long as every school graduate, even from remote and hard-to-reach areas of Russia, can enter the best higher education institutions of the country without leaving his place of residence. The study is intended to comprehensively analyze organizing and holding of the USE as a form of the state final attestation in secondary school and of the entering examination in the higher education institutions. The research notifies achievements of the USE modernization, the experience of increasing objectivity and transparency of the examination procedure, sets out the opposing arguments of this form of assessment. A number of conclusions were made by the authors based on analysis of the USE scores and monitoring of the pathways chosen by school graduates from one of the Russian regions, the Chuvash Republic. Recommendations are made on the further improvement of legal regulation of the entering to higher education institutes with a view to extension of accessibility.

Keywords: Unified State Examination (USE), higher education, accessibility of education, format for educational assessment, pathways for school graduates, entrants.

Introduction

Standardized examinations for school graduates are a fairly common approach in the whole world. For example, the state examinations in China named “gao cao” are organizationally similar to the USE in Russia. The examination is administered centrally through the whole country under video surveillance. Examinations in the Chinese language, foreign language, mathematics and literature are obligatory for the Chinese students.

Centralized school leaving qualification in England is held in secondary education (GCSE). In order to gain entry to the higher education it is necessary to prolong the education for two more years and pass 2-3 advanced level examinations. University entrance is based on the successful pass of the advanced examinations.

Best known and most commonly held examinations in the USA are SAT (Scholastic Achievement Test) and ACT (American College Testing), which could be accepted for entering the higher education. They are elaborated by the Educational Testing Service, College Board the American College Testing Program which administers the tests. The results of SAT and ACT are part of the application for admission to four-year colleges and universities. College board and Advanced

Placement also carry out other exams such as Achievement Tests (ACH Tests) and Advanced Placement (AP) which are also accepted for entering the higher education.

In some countries, e.g. France and Germany, the examinations have a dual role and are simultaneously used for a high school graduating qualification and for defining the grade of the high school certificate which is the ground for entering a university. As a rule, public authorities control contents of the university entry exams by using various instruments (recommendations on composing the tests, discussions, expertise, etc.).

ESU in Russia has a history of almost two decades and underwent numerous changes. Nevertheless discussions upon the requirement of this form for assessment of students' knowledge still continue. Close attention to the USE is attributed to a number of causes. The examination is not only a form of the state school leaving qualification which allows to receive the high school certificate in case of successful passing, but also a form of entrance examination for baccalaureate and specialist degree programs.

According to the Federal Act №273 of 29 December 2012 "On Education in the Russian Federation" the Ministry of Education in association with the Federal Service for Supervision in Education and Science establish the standard procedure, schedule and duration of the examinations in each subject of the school curriculum. For all the regions of Russia versions of the assessment tasks are developed on the federal level and they are unified in terms of specification (layout, types and wording of tasks, thematic scope, evaluation criteria).

Accordingly, all over the country, in May and June, on the dates determined by the unified schedule high school graduates pass the examinations, which results have a direct impact on their successful graduation from school and admission to the Higher Education Institutions. Many specialists fairly name the USE an examination "with high stakes".

It should be noted that in view of its importance and magnitude the USE have a tremendous impact on the whole system of education in Russia and undoubtedly needs further development and enhancement of efficiency. On the other side the USE should not be blamed for all the problems in education. After all this evaluation procedure is only one of the measurements and gauges only certain attributes of the quality of education.

Methodological Framework

Methodological framework of the research is formed by the principles of objectivity and comprehensive study which require specific survey of public phenomena and processes in their development and change; comprehensive analysis of links and interrelationships between the elements allow to realize significant aspects as well as consider and analyze positive and negative aspects of the process.

Universal and specific scientific research methods provide the methodological basis for this research. Noteworthy among them is the method of dialectical materialism which allows to study the subject in development, interrelation of its certain displays, its interaction with related phenomena, to substantiate advantages and disadvantages of various approaches to the issue.

Such methods of formal logic as description, comparison, analysis and synthesis ensure that organizational, law, technological and other aspects of accessibility of higher education provided with introduction of ESU will be developed and thoroughly described.

Specific research methods such as comparative legal, technical, statistical, structural-functional methods ensured that the study took into consideration linkages and dependencies of the issue, revealed certain tendencies and provided generalization and conclusion.

Discussions

The issue of accessibility of higher education received significant coverage in researches. Problems of equal chances for entrants with different levels of income, as well as racial, ethnical and other aspects are highlighted by G. Psacharopoulos, G. Papakonstantinou (2005), Su-Je Cho, C. Hudley, S. Lee, L. Barry, M. Kelly (2008) and others. The matter of social inequality in the system of Russian higher education was studied in the works of D.L. Konstanntinovskiy, V.G. Nemirovskiy, V.Ya. Nechaev, I.A. Plokhova (2010), I. Prakhov, M. Yudkevich (2012) etc.
Kha Van Khoang, V.V. Fursova point out that advancement of accessibility of higher education is connected with differentiating in possibilities for various social groups when solving three following problems: choosing profession and educational institution based on developed network and organizational forms of such agencies; preparation for admission to higher education; the gap between the school curriculum and entrance examinations.

Correlation between entrance examinations (SAT and ACT in the USA) and academic productivity was analyzed in works of J.L. Kobrin, E.J. Shaw, S.M. Barbuti, B.F. Patterson, K.D. Mattern (2012), J.M. Rothstein (2004), T. Khavenson, A. Solovyeva (2014). Reformation of the procedure of entering the higher education were reflected in studies made by R.M. Blackburn, J. Jarman (1994), H. Turbatinazhod (2011), P.A. Pathak, T. Sönmez (2013), A.D. Verbitskiy, A.A. Fridman (2016), Yu.R. Vishnevskiy, S.Yu. Vishnevskiy, D.Yu. Narkhov (2018) and others.

Development prospects of the digital educational system in the context of accessibility of higher education was measured in the works of Ya.S. Mitrofanova, A.A. Sherstobitova, O.A. Filippova (2019), A.Yu. Aleksandrov, S.B. Vereshchak, O.A. Ivanova (2019). V.A. Bolotov, S.S. Kravtsov (2016), M.M. Potashkin, M.L. Agranovich, A.L. Leybovich, G.S. Kovaleva are focused on establishing a unified national Russian system to measure the quality of education. Organizational and operational issues of the USE, composing of assessment tasks are described in the works of S.S. Kravtsov, A.A. Muzaeva, O.A. Reshetnikova, Yu.S. Egorova, I.K. Kruglinskiy, Yu.S. Zahir, L.V. Karavaeva (2007) etc.

The researches of N.V. Kolacheva, N.N. Kosheleva, A.Ya Pardal (2017) fully evidently revealed that even in a region with obvious economical and socio-demographic problems the interested part of the society came to understand the USE helps to maintain the quality of education simultaneously making it more accessible.

G.V. Andrushchak, T.V. Natkhov (2012) made a research based conclusion that implementation of USE initiated significant changes in the strategies of choosing the higher education institute and preparing for the entering. At present relatively high number of families choose to apply for admission to several HSI and less of them are oriented towards one university. The results are sustainable in circumstances of various family income, demographic factors, place of residence. Moreover the most significant changes in preferences and strategy of preparation could be seen in families with low incomes. Children from such families advanced self estimation of their knowledge at school as well as in comparison with other students of USE preparation courses.

At the same time I. Prakhov, M. Yudkevich (2012) analyzed dependence of the accessibility of higher education on social and economic differentiation after implementation of USE and pointed out that this form of assessment is not able to equalize chances for admission. Entrants from wealthier families keep benefits even in conditions of standardized requirements as long as they can bear more expenses on preparation for USE.

Analysis of the findings show that problems of education accessibility, including the context of USE, need further research.

Results

Since the introduction as an ambitious experiment in 2001 to the full implementation in 2009 the USE as a format for educational assessment changed significantly. The main principles of the USE remained immutable: independent assessment of the quality of education, cumulation of school graduating and higher education entering examinations, using of unified assessment tasks and unified schedule of examinations all over the country.

We can make a conclusion that the USE made a long way from copying international experience and foreign practice to realization of the goals of Russian general education and finding its own identity (Kravtsov, 2016).

For the recent years the USE has been developing in two main directions:

1. Elaboration of assessment tasks, i.e. complex of tasks completed in standardized form, which allows to ascertain the school graduates' level acquisition of the federal educational standard. Multiple choice tasks were completely excluded (so-called "guessing game"). At present bigger part of the task consists of creative assignments, which require a full response with supporting arguments from the student, for example solving practical problems, writing a full composition or essay etc.
2. Transparency and objectivity of the examination. Unprecedented measures have been taken in the direction since 2015.

a) optimization of the examination holding venues' network. USE is only conducted in specially equipped venues, usually these are so called base schools, where graduates from several schools are assigned to come for passing the exam.

b) on-live video surveillance which covers the preparation and holding of the examination, evaluation and grading of the results, consideration of protests on grades given at USE. All the premises where any activity connected with USE is carried out are equipped with on-live video surveillance systems. Signals from all the cameras around the country are displayed at a special platform smotriege.ru. Situation and information centers were established in all the regions and the federal center with a view of live surveillance over preparation and holding of the examination and off-line reviewing of footage for revealing violations of the procedure for conducting the USE.

Particular attention is paid to this aspect of the exams organization. Thus if the broadcast is unavailable or the recording is terminated the examination could be stopped and the results canceled. Unfortunately, such measures have been practiced before.

It should be noted that not only the process of passing the examination is leave streamed, but also handling, evaluation and grading of the exam materials. The task answers given by the participants of the examination are redirected via secure communication channels from the exam holding venues to the data centers established in every region of Russia. In these regional centers the exam materials are handled, fully detailed responses checked and evaluated and later protests on grades are considered. All the procedures are conducted on line.

c) prohibition on carrying and using communication facilities, electronic, photo, audio and video gadgets, reference materials, written notes, other means of storage and transferring information for participants and administrators of the examination

d) use of metal detectors. Stationary metal detectors are installed at the entrances to the USE venues, and/or a special locations for the use of handheld detectors are set.

e) equipping of the USE venues with facilities for suppression of mobile communications.

f) application of modern information technologies, cryptographic means of information protection. Examination materials are received in the USE venues via secure communication channels 30 minutes before the examination starts. At 10.00 a.m. local time in every auditorium the materials are printed in presence of the participants. When the exam is finished paper forms with answers are scanned and forwarded to the regional data handling centers. In that way transparency and efficiency of the procedure are implemented.

It should mentioned that sorting of the participants inside the venues is also automated. Participants and administrators are provided with numbers of auditoria they will be located at only on the day the examination is held.

g) establishing the institute of public observers. Every concerned citizen may become a public observer and personally supervise adherence to objectivity on the spot in any region of the country at any USE venue.

h) cross check of the full written responses part of the USE by the regional curriculum subjects committees. The measure demanded creation of new mechanisms for developing unified approach to grading the part of USE with full responses, additional training of the subjects committees' experts. Each work is checked by two experts independently of one another. In case of wide disagreement the third expert is applied to assess the work.

The measures we mentioned are laid down in Procedure of the State Final Attestation on Secondary School Education Programs approved by joint decree number 190/1512 of the Ministry of Education and the Federal Service for Supervision in Education and Science dated 7 November 2018 (registered in the Ministry of Justice on 10 December 2018 under number 52952). Violation of the Procedure may entail cancelation of the examination results. Additionally it will be penalized in accordance with part 4 article 19.30 of the Code of Administrative Offences of Russia. The violation entails imposition of an administrative fine on citizens in the amount of 3000 to 5000 rubles, on officials in the amount of 20000 to 40000 rubles and on legal entities in the amount of 50000 to 200000 rubles.

The most important achievement of implementation of USE in recent years is a high level of objectivity. All graduates pass the examination in equal conditions in line with pre-arranged and announced rules, which strictly regulate the actions of all the participants of the procedure. All the regulations and alterations are announced before the academic year (Kravtsov, 2016). It guarantees enforcement of the constitutional right to higher education for every person applying for admission.

Nevertheless USE is still criticized. A.D. Verbetskiy, A.A. Fridman (2016) notify that standardization is a disadvantage of every test system designed to cover a considerable part of the population. Consequently there is a possibility to advance the test grade by practicing at the certain type of tasks. Therefore learning is substituted by coaching for the test and leads to reducing of the entrants' skills andabilities while admission points formally rise.

As mentioned above, the role of USE in increasing of the accessibility of higher education is questioned. Here we will analyze pathways for school graduates in the Chuvash Republic. The diagram reflecting the increasing share of graduates from the schools in Chuvashia who were admitted to higher education institutes is given in figure 1. It shows the growth from 55% in 2003 to 80 % in 2017-2019. The upward trend of choosing higher education as a pathway is evident. The index growth is also noticeable relative to 2009 level, when USE was fully implemented on regular base (the Chuvash Republic participated in the experiment since 2001).

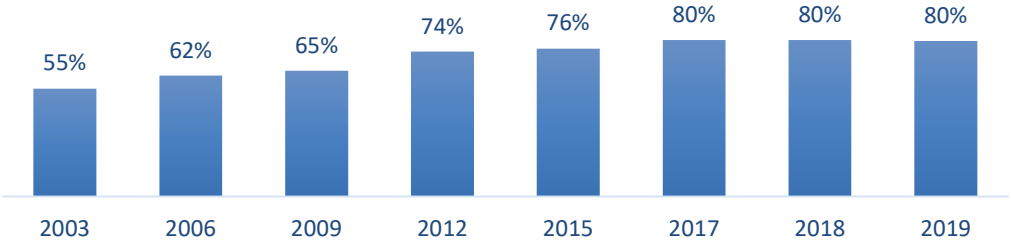

Fig. 1: Share of the school graduates in the Chuvash Republic admitted to higher education institutes.

Addressing the geography of the pathways the graduates choose we see that in 2006 only 86% of school graduates from the Chuvash Republic who were accepted to the higher education opted for the local institutes, and by 2019 the share decreased to 54%.

Having the USE passed at school the graduate automatically becomes an entrant with wide possibilities. Nowadays there's no need to come to the university to file the documents for appliance. It is enough to send electronic copies and wait till the entrants ranking to be published at the web sites of the chosen institutes. The geographical range of higher education institutions choice made by the schools graduates in the Chuvash Republic is presented in figure 2. It should be mentioned that in 2019 20% of graduates chose to apply for metropolitan institutes and universities, 12% - to Kazan, 4% - to Saint Petersburg, 6% - other Russian cities and foreign countries. In recent years higher education institutes of the Defence Ministry, the Federal Security Service, the Ministry of Internal Affairs and The Ministry of the Russian Federation for Civil Defence, Emergencies and Elimination of Consequences of Natural Disasters situated in different parts of the country are very popular.

	2006	2009	2012	2015	2018	2019
Chuvash Republic	86%	78%	72%	62%	56%	54%
Moscow	8%	11%	13%	17%	19%	20%
Kazan	3%	4%	6%	10%	12%	12%
Saint Petersburg	1%	2%	3%	3%	4%	4%
Nizhny Novgorod	1%	3%	3%	3%	4%	4%
Other regions	1%	2%	3%	5%	5%	6%

Fig.2: Geographical range of the HEI chosen by school graduates in the Chuvash Republic

Analyzing the USE scores received by the graduates who chose to continue their education outside the Chuvash Republic we should point out the problem of the talented young population exodus. In the educational system of Russia regional higher education institution should be given a specific role of training human resources for the related entity of the Federation.

It should be noted that in some cases USE becomes a barrier to the higher education. In our opinion, the previous years' graduates are in position of inequality, they practically disabled from implementation of their constitutional right to higher education by virtue of the major modification in procedures of the state final attestation. In practice a paradoxical situation has emerged whereby people who had received their high school certificate before 1 January 2009 are compelled to undergo USE procedures in order to execute their right to education, whereas the core arrangements of the state final attestation for this category of entrants were completely different. Urgency of the problem is also attributed to the necessity of a life-long learning education. For the graduates who did not pass USE at school and received their high school certificates under different regulations applying for acceptance to the higher education through USE becomes a serious challenge (lack of information awareness, test sophistication, etc.). We believe that such graduates should be granted a possibility to enter the higher education institutes through internal examinations.

Conclusion and Recommendations

Drafters of USE suggested equal initial capacities for school graduates in applying for higher education, reduction of expenses through combining graduating and entering examinations, independent expertise, unification of tasks as main advantages of this form of assessment. In recent years significant steps have been taken to enhance the public credibility to the procedure. Sociological studies confirm the tendency. Geographical range of the school graduates' pathways widened.

Unfortunately, not all targets were met. For example, the practice of tutoring and coaching for the test was not abandoned, the graduates remain under high psychological pressure of the family and school. We should not forget that not only USE influences the accessibility of higher education. Creating appropriate social and economic conditions (scholarship, habitation, transport) is an important contributing factor.

In order to enhance accessibility of the higher education and to address the abovementioned issues the following measures could be proposed:

- creating of independent centers for assessment of the quality of education and year-round conducting of USE, providing a possibility for passing USE several times throughout a year;
- amending of part 6 article 70 the Federal Act №273 of 29 December 2012 "On Education in the Russian Federation" to grant the previous years' graduates who received their high school certificates before 1 September 2013 (when the act came into force) with a right to apply for acceptance to the higher education institutes through internal examinations;
- taking a number of steps to grant regional higher education institution with a specific role of training human resources for the related entity of the Federation;
- further changing of the assessment tasks with a view to encourage studying the school subjects with sufficient depth.

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Diagnosis of Value Appropriation Processes in Strategic Areas of Enterprise Management

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Abstract

This article constitutes a contribution to the research on the multidimensional value appropriation processes. By focusing on connecting two key indicators, profitability of the conducted activity and effectiveness of using the enterprise's intellectual capital, value appropriation processes in strategic areas of the enterprise's management, such as: profitability of the equity, profitability of assets and profitability of sales, were diagnosed. The first, theoretical part of the article presents the essence of value appropriation. The second part of the article presents results of empirical research conducted on the grounds of a case study. The publication improves the understanding of correlations between the enterprise's effectiveness and the effectiveness of using the intellectual capital. The conclusions suggest that the value appropriation processes allow assessing transmission of the value for the customer into effectiveness of the conducted activity. However, implementation of this process requires the enterprise to have the capacity to transform the intellectual capital into the proposition of new value for the customer. The article contributes to the discussion conducted by management theoreticians and practitioners on the effectiveness of enterprise management, searching for the tools of increasing the enterprise's effectiveness, as well as the ways and methods of competing.

Keywords: Management, Value Appropriation.

Introduction

In the subject literature a lot of attention is paid to the issue of creating value. The complexity of the category of value and various approaches to value management results in transferring the focus from value creation processes to value appropriation processes, which is observed in the management practice. Meanwhile, appropriation processes have not been recognised in detail and the subject literature in this scope is scattered and fragmented. The current state of knowledge is characterised with the methodological plurality and differences in theoretical bases. The research in the area of identification and diagnosis of the value appropriation process seem to be much less recognised than the value creation processes. Furthermore, competition in changing conditions of conducting business requires selection of relevant tools to assess value appropriation processes. Therefore, the information on the economic effectiveness of enterprise management should be supplemented with data regarding effectiveness of value appropriation processes with the consideration of the use of intellectual capital in the enterprise. In this context, the aim of the study is to diagnose value appropriation processes in strategic areas of enterprise management. Research methods used to achieve this aim include: literature studies, case study, Pearson linear correlation coefficient calculated in three strategic areas of enterprise management.

The essence of value appropriation

In the subject literature the appropriated value is described as the surplus generated over alternative costs, which is divided between stakeholders and the enterprise (García-Castro et al., 2013). Which means that the value appropriation processes are a mirror reflection of creation thereof (Hurmelinna-Laukkanen and Puumalainen, 2007). Value appropriation is defined in several different approaches. The first approach is based on the sector conception of M.E. Porter (2006) and assumes that value

appropriation depends on the external conditions concentrated on the bargaining power of suppliers and purchasers (Coff, 2010). The second approach is based on the resource recognition, which uses value categories as the key element (Lieberman et al., 2013).The third approach is based on the intentional formation of rules of value appropriation from the point of view of market structures (MacDonald and Ryall, 2004). The fourth approach is based on the recognition of network cooperation of enterprises (Browman and Ambrosini, 2000).

While considering the value appropriation process from the sector point of view, two main elements of competitive advantage are distinguished: value creation and appropriation processes. Therefore, threats of these processes should be recognised and defensive mechanisms, referred to as isolation mechanisms, should be implemented (Soo et al., 2002). In the area of value creation, main threats of value creation and appropriation processes include imitations and substitutes launched by innovation imitators, which leads to the destruction of value generated by the innovator. In order to protect value the innovator introduces isolation mechanisms, such as property rights control, costs reduction, establishing entry barriers or developing standards (Browman and Swart, 2007). Created value protection mechanisms only postpone the unavoidable occurrence of imitations or substitutes. Therefore, enterprises should focus not only on the value creation processes, but also on the value appropriation processes vested in them due to launching an innovation. Thus, it is important to recognise threats of value appropriation. Two strongest threats of the value appropriation process include: excessive dependence on other market participants and low quality of management (Lieberman et al., 2013), presented in picture no. 1.

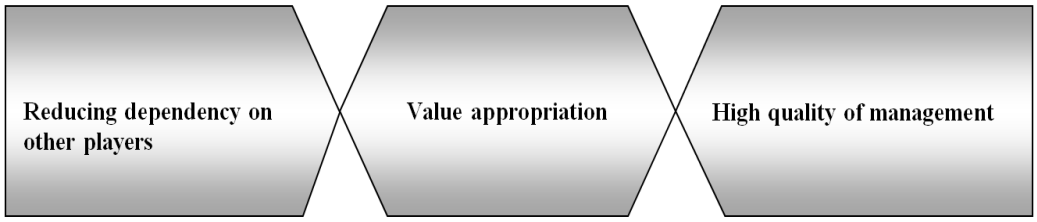

Picture 1: Elements of value appropriation

Source: C. Browman, V. Ambrosini, (2000), Value Creation Versus Value capture. Towards a coherent definition of value in Strategy, British journal of Management, Vol. 11, no. 1, pp. 1-15.

Protection against dependency on other market participants is a threat of an external character and can be executed, among others, by long-term contracts including high costs of termination thereof. Dependency on other market participants can be reduced through the agency of forward and backward integration and developing cooperation networks. Personalisation of the cooperation based on trust, intellectual capital (Edvinsson and Malone, 2001) and establishing alliances and covenants also reduces the dependency on other market participants, yet, those mechanisms are burdened with high risk in case partners do not follow the rules (Harrison et al., 2010). An important mechanism of protection against dependency on other market participants constitutes decreasing the peculiarity of assets, which enables the enterprise to quickly and flexibly adjust to new types of activities, new types of products and services or cooperation with new partners (Lepak et al., 2007; Stępień, 2019). Flexible cooperation mechanisms decrease partners' proneness to appropriate "not their" part of the economic rent.

The value appropriation process should also be secured against internal threats resulting from the low quality of management. Taking wrong decisions can lead to the destruction of created value and prevent value appropriation. The high quality of management means such a configuration of the most valuable resources, which maximises use thereof and allows to protect both, the created and appropriated value (Hamel, 2002).

To sum up, it should be stated that the identification of value appropriation techniques allows grasping the dynamics of the value appropriation process. Considerations regarding value

appropriation from the sector point of view in strategic areas of enterprise management are based on the assumption that there is a positive relation between the profitability of conducted business expressed with a set of profitability indicators and the effectiveness level of using the enterprise's intellectual capital expressed with the relation between market and book value of the enterprise. Therefore, it becomes sensible to determine value appropriation indicators in strategic areas of enterprise's management.

Research Methodology

In order to diagnose the value appropriation processes in strategic areas of enterprise's management, it is necessary to purposefully and selectively choose research methodology. A comprehensive description of studied phenomena can be obtained with the use of complementary and alternative methods (Eisenhardt and Graebner, 2007).

The research procedure adjusted to the diagnosis of value appropriation processes in strategic areas of enterprise's management should include determination of value appropriation indicators. In this aspect indicators shall act as intersections providing information on important phenomena and relations connected with appropriated value protection in the enterprise. The following instruments apply to the identification of value appropriation indicators: a set of profitability indicators in the area of the enterprise's profitability (Return on equity ROE = net income/shareholder equity; Return on assets ROA = net income/total assets; Return on sales ROS = operating profit/net sales), which reflect three strategic areas in enterprise's management and Thomas Stewart ratio in the area of effectiveness of intellectual capital management in the enterprise (Thomas Stewart MV/BV ratio = market value / book value (Market-to-Book Value)). The first instrument, that is, a set of profitability indicators, allows assessment of indicators influencing the effectiveness of the surveyed enterprise's activity with the consideration of the quantity of sold products and goods' assortment structure in a specific period of time. The other, that is, Thomas Stewart ratio expressing the relation between the enterprise's market and book value (Stewart, 1999), allows to assess the intellectual capital's market value transmission process in the context of effectiveness of taking decisions in the enterprise. The diagnostic procedure in the scope of value appropriation processes identification conducted through the agency of presented instruments should allow analysis, assessment and conclusions with a consideration of relations between used instruments. Assessment of the ability to appropriate value will be conducted on the grounds of the results of the analysis of the strength and direction of the Pearson linear correlation in three areas (ROE, ROA, ROS relation to MV/BV) in compliance with the following criteria:

- between 0 and 0.30 – the enterprise does not have the capacity to appropriate value, if at least in one of the studied areas (ROE, ROA, ROS relation to MV/BV) there is a little positive correlative connection or a negative relation;
- between 0.31 and 0.50 – the enterprise has weak capacity to appropriate value, if at least in one of the studied areas (ROE, ROA, ROS relation to MV/BV) there is an average correlative connection;
- between 0.51 and 0.70 – the enterprise has the capacity to appropriate value provided that in all three research areas (ROE, ROA, ROS relation to MV/BV) there is a strong correlative connection;
- between 0.71 and 1.00 – the enterprise has significant capacity to appropriate value provided that in all three research areas (ROE, ROA, ROS relation to MV/BV) there is a very strong correlative connection.

The presented methodology enables identification and assessment of value appropriation indicators by enterprises competing for a customer in a given industry.

The Characteristics of The Surveyed Company

The surveyed company is Amica, which is included in the electro-machinery industry. Amica has been quoted on the Warsaw Stock Exchange since 1997. The surveyed enterprise generates over 65% of its profit on sales from fifty foreign markets. The countries where the brand is the most popular are: Great Britain, Germany and Scandinavia. The basic group of products include cookers, ovens, gas hobs, refrigerators, dishwashers, washing machines, microwaves, hoods and small kitchen articles. Amica employs approximately 2,500 persons. Recognition of Amica is confirmed with prestigious awards given by international institutions. The research period covers the years between 2008 and 2018.

Conducting the research process with the use of a case study allows presenting an accurate and in-depth image of studied phenomena and relations. However, one should remember the limited (probabilistic) possibility of scientific cognition with the use of the case study method (Gibbert et al., 2008). Case study limitations include: low representativeness of results, intuitiveness and subjectivity of judgements, high time consumption and high costs of conducted research.

Research Results

The research conducted in the scope of the diagnosis of value appropriation processes in strategic areas of management for the surveyed enterprise of the electro-machinery industry implies that there is a very strong positive correlation between the return on equity (ROE) and Thomas Stewart ratio (MV/BV), which reflects effectiveness of the intellectual capital management (table no. 1). On the grounds of the results obtained through the agency of Pearson linear correlation coefficient, it has been observed in the surveyed enterprise that the increase in capital profitability is accompanied by the increase in effectiveness of the intellectual capital management. While interpreting the obtained data, it can be stated that in the surveyed enterprise there are very strong correlations between effectiveness of the decision in the area of using the equity and capacity to generate profit from the invested capital as well as effectiveness of the intellectual capital management.

Table 1: Relations between effectiveness of management and intellectual capital

Correlation between the profitability indicators and Thomas Stewart ratio	
Pearson correlation coefficient between MV/BV and ROE	0.9992
Pearson correlation coefficient between MV/BV and ROA	0.9966
Pearson correlation coefficient between MV/BV and ROS	0.8691

Source: Own calculations.

While researching the relations between the level of the return on assets (ROA) and Thomas Stewart ratio (MV/BV) in a given enterprise, a strong correlation between studied variables is noticed. It means that the process of taking decisions in a given enterprise in the scope of managing assets and increasing effectiveness of administration maintains a strong relation with effectiveness of the intellectual capital management.

While considering the research results obtained through the agency of Pearson linear correlation coefficient calculated for a given enterprise, a strong correlation between the return on sales (ROS) and Thomas Stewart ratio (MV/BV) is noticed. It proves that the increase in sales profitability is accompanied with the increase in effectiveness of intellectual capital management in this enterprise.

Discussion and Conclusions

While considering the results of conducted empirical research in the scope of diagnosing value appropriation indicators in strategic areas of enterprise's management, it can be indicated that they allow presenting an accurate and in-depth image of studied phenomena and relations. On the grounds of theoretical framework and empirical research it can be concluded that the object of the analysis of

value appropriation processes consists in the enterprise and its material and non-material resources. Furthermore, various measures characterising material and non-material areas of the enterprise's strategic activity can be used to measure appropriation processes. The role of value appropriation indicators providing information on significant relations occurring in strategic areas of enterprise management is played by selected profitability indicators and intellectual capital management's effectiveness indicators. The conducted research imply that there are strong correlations between profitability indicators of equity and assets and the effectiveness indicator of intellectual capital management, which suggests that enterprises included in the research concentrate their operations on providing the required rate of return for owners of the invested capital, which provides conceptual grounds for pro-value paradigm of enterprise management. Therefore, in enterprises' practice the approach directed at creating value for owners is prevailing. The case study supports the current view that the effectiveness of value protection mechanisms should be expressed in balancing value appropriation processes between various groups of stakeholders.

The advantage of applying the presented value appropriation indicators is the fact that the presented methodology of measuring may serve as a tool of comparison with other enterprises. Another advantage thereof is the possibility of monitoring the trend of shaping studied correlations from the point of view of a specific period. Furthermore, applied measures have high cognitive value and the ease and speed of calculations and legible interpretation of obtained results increase usefulness of application thereof. However, it should be noticed that the conducted studies are burdened with certain limitations. First of all, doubts can arise with regard to the use of Thomas Stewart ratio (MV/BV) to the assessment of effectiveness of the enterprise's intellectual capital management. Diagnosis of the intellectual capital on the basis of the relation of market value to book value is related to both, taking into consideration the meaning of mood in financial markets for execution of decisions taken in the surveyed enterprise, as well as adopted accounting policy. Secondly, the use of profitability indicators, which are contractual in nature and are expressed in percentage, may generate problems in interpretation regarding the area of adopted relations between streams and resources. Thirdly, the use of the correlation informs solely of the existence of the relation and does not allow proving the causal link which provides grounds for studied relations.

Summary and Conclusions

While summarising the results of conducted empirical research in the scope of diagnosing value appropriation processes in strategic areas of enterprise management, it should be stated that describing and analysing important, current and multi-dimensional relations of value appropriation contributes to the existing literature due to connecting two key dimensions, profitability of conducted activity and effectiveness of using the enterprise's intellectual capital. Obtained results allow taking a position that both of the aforementioned dimensions are required to diagnose value appropriation processes in strategic areas of enterprise management. A clear implication from theoretical assumptions and empirical research is that the intellectual capital has particular significance in shaping value appropriation processes, since it enables creating the enterprise's value. Thus, managers of the surveyed enterprise should concentrate their activities on implementation of economic results by increasing effectiveness of the intellectual capital. Due to the fact that the subject literature in the scope of value appropriation is referred to mainly in research on: resource-related competitive advantage, transactional and relational opportunism, innovativeness and management in cross-organisational networks, it becomes sensible to conduct further research on value appropriation processes with a consideration of identification of multiple network coordination mechanisms.

Obtained data provides grounds for concluding that the surveyed enterprise concentrates its activities on providing the required return rate for the owners of invested capital, which is confirmed with strong correlations between the profitability indicators of the equity and assets and the effectiveness indicator of the intellectual capital management. This in-depth understanding of value appropriation processes can be used by managers to balance value appropriation processes between various groups of stakeholders.

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Environmental Disclosure and Financial Performance of the Russian Retailers

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Abstract

Corporate social and environmental responsibility initiatives provide benefits and competitive advantages to a company. It is still not clear, however, whether corporate social and environmental responsibility could ultimately improve a company's financial performance. The hypothesis of this paper is that there is a direct correlation between the environmental disclosure and financial performance of the Russian retailers. The authors analyzed the relationship between the environmental disclosure index and EBIT (earnings before interest and taxes), ROS (return on sales), ROE (return on equity), and ROA (return on assets) of the Russian retailers. The hypothesis was disproved for all the indicators as a result.

Keywords: Environmental Responsibility, Environmental Disclosure, Corporate Social Responsibility, Financial Performance, Retail Trade.

Introduction

Activities of businesses which focus on both social and environmental impacts have increased as an integral part of core business operations and management (Yevdokimova *et al.*, 2018; Balashov, 2019; Efimova and Rozhnova, 2019). Corporate social and environmental responsibility provides benefits for businesses. By satisfying the expectations and needs of stakeholders, the company improves its business reputation, strengthens the loyalty of the employees and customers, reduces reputational, legal, and environmental risks, establishes relationships with government agencies, public organizations, and the media, and becomes more sustainable overall. It is still not clear, however, whether corporate social responsibility could ultimately improve the company's financial performance. Cherian *et al.* (2019), Kobo and Ngwakwe (2017), Maksum and Tamba (2017), etc. have studied this in various contexts.

In this paper, we consider the relationship between disclosing environmental aspects of corporate social responsibility initiatives and financial performance of the Russian retailers. The environmental aspects are currently highly important in any business area (Semenova *et al.*, 2019; Bunakov *et al.*, 2019; Zaitseva *et al.*, 2019). Trade, including retail trade, is a leading sector of the Russian economy and performs important social functions (Bragin *et al.*, 2019; Kornilova and Karashchuk, 2017; Mayorova *et al.*, 2019). The improvement of financial performance is the aim of the implementation of most of the strategies (Zaitseva *et al.*, 2016).

The hypothesis is that there is a direct correlation between the environmental disclosure and financial performance of the Russian retailers.

Data and Methods

We used the index proposed by Bragin *et al.* (2018) to evaluate the environmental disclosure of the Russian retailers. In this paper, it is referred to as the Environmental Disclosure Index (EDI). The financial performance indicators include EBIT (earnings before interest and taxes), ROS (return on sales), ROE (return on equity), and ROA (return on assets). First, we analyzed the relationship between the Environmental Disclosure Index and financial performance indicators in the same period. Secondly, we assumed that the environmental disclosure impacts financial performance indicators in later periods rather than immediately. We used the Pearson correlation coefficient to assess the relationship between the Environmental Disclosure Index and financial performance indicators. The results were interpreted using the Cheddock scale. We constructed scatter plots for individual indicators and analyzed nonlinear dependencies. The initial data for calculating the Environmental Disclosure Index were the annual reports of six retail chains from Russia's Top 10 by revenue (see Fig. 1), which disclose their environmental responsibility initiatives. The financial indicators of the retailers were obtained from the Audit-it portal at www.audit-it.ru. The data series for each indicator included thirty values for the period from 2014 to 2018.

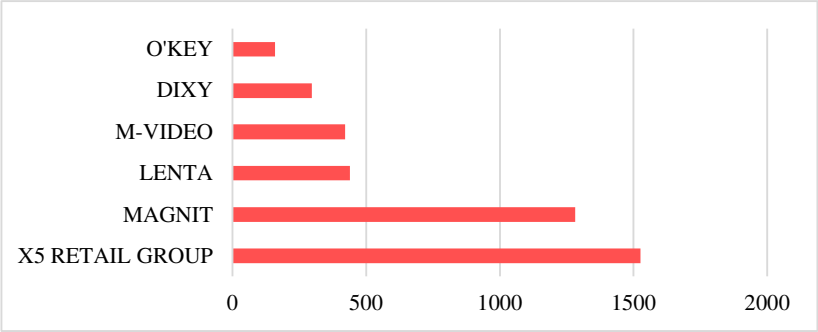

Fig. 1: Revenue of Russian retail chains in 2018, billion RUB.

Source: MMF (www.moneymakerfactory.ru)

Results

The correlation analysis did not confirm the hypothesized direct relationship between the environmental disclosure and the financial performance of the Russian retailers. An inverse relationship identified between individual indicators was not significant, as all correlation coefficients were less than 0.7 (Fig. 2).

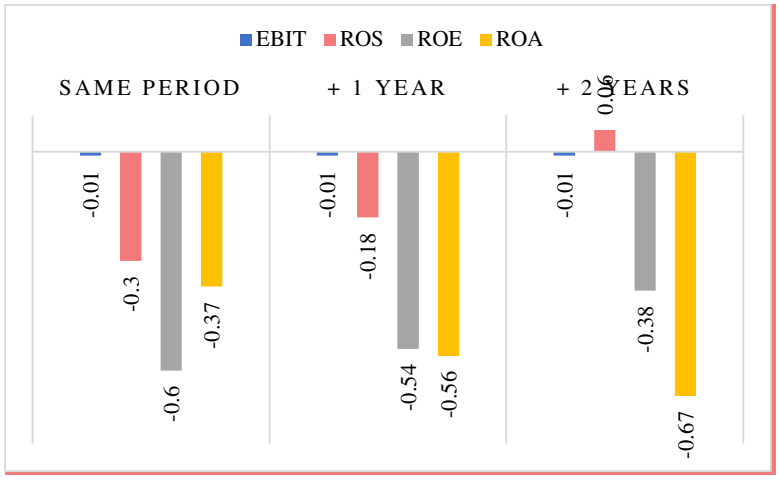

Fig. 2: The correlation coefficients between the environmental disclosure index and the financial performance indicators of the Russian retailers

Source: constructed by the authors based on their own calculation results

There is no correlation between the Environmental Disclosure Index and EBIT both in the same period and after one or two years. The correlation between the Environmental Disclosure Index and ROS is either absent or weak. At the same time, there is a trend towards an increasing correlation coefficient. A noticeable inverse relationship is observed between the Environmental Disclosure Index and ROE/ROA. Over time, the inverse relationship decreases for ROE, while increasing for ROA (Table 1).

Table 1: The correlation coefficients between the environmental disclosure index and the financial performance indicators of the Russian retailers

Indicators	Financial performance indicators				
	Period	EBIT	ROS	ROE	ROA
Environmental Disclosure Index (EDI)	The same period	-0.01	-0.30	-0.60	-0.37
	+ 1 year	-0.01	-0.18	-0.54	-0.56
	+ 2 years	-0.01	0.06	-0.38	-0.67

Source: calculated by the authors according to data from Audit-it, including annual reports of retailers for 2014–2018

The calculated coefficients describe a linear relationship between the considered indicators. Fig. 3 illustrates a non-linear relationship between the Environmental Disclosure Index and the indicators for which such a relationship is most pronounced. Nonetheless, the nature of this trend also evidently does not confirm a direct dependence of financial results on the environmental disclosure.

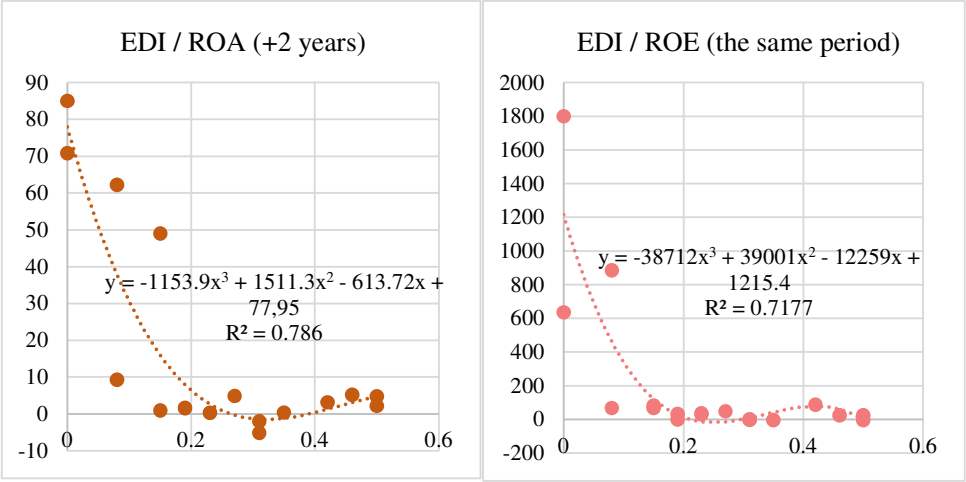

Fig. 3: Scatter plots for the environmental disclosure index and the financial performance indicators of the Russian retailers

Source: constructed by the authors according to data from Audit-it, including annual reports of retailers for 2014–2018

Conclusion

The hypothesis was rejected. There is no direct relationship between the environmental disclosure and the financial performance of the Russian retailers in the same period or in the subsequent periods. Moreover, there is a noticeable inverse relationship between the Environmental Disclosure Index and ROE/ROA. For ROA, the inverse relationship actually strengthens in the subsequent periods. The environmental and corporate social responsibility in general is a fairly new area for Russian retailers. As a result, only limited input is available. Moreover, companies still do not have enough experience in the environmental and corporate social responsibility management. Thus they are not yet able to act as effectively as possible, including in improving financial performance.

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The Influence of the Results of Neuromarketing Research on Transaction Costs in the Process of Making Purchase Decisions

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Abstract

Neuromarketing research has been gaining popularity in the recent years. Along with the development of neurosciences, trading companies are reaching for neuroimaging more and more frequently in order to find the answer to the question how to influence the purchaser to minimalize costs and maximise profits. Results of neuromarketing research point to the fact that by means of an appropriately formulated message, authors of a message are capable of reaching a potential customer efficiently and reduce the costs of sale. The EEG test described in the article indicates differences in the obtained results depending on the construction of a presented message.

Keywords: Transaction Costs, Neuromarketing, Processing

Introduction

Thanks to the latest achievements of neurosciences, more is known about the techniques of creating a marketing message, which gravitates the purchaser toward making a positive purchase decision quickly and effectively. In this context a question arises whether further development of neuroimaging techniques will contribute to the reduction of transaction costs as regards the seller with their simultaneous increase with regard to the purchaser. This article constitutes an attempt to answer the aforementioned question. In its first part, the authors present the issue of transaction costs. In the next part, the phenomenon of neuromarketing is described with particular attention drawn to a message and the depth of processing. Thereafter, the authors focus on their own research presenting the results of neuromarketing research conducted with the use of EEG. The main objective of the research was to assess how the properly formulated advertising message affects the sphere of unconscious decisions made under the influence of an impulse and the sphere of decisions subjected to deep analysis. The hypothesis was verified: the properly formulated advertising message influences the process of unconscious choice in the same way as the process of conscious choice.

Transaction Costs

Transaction costs accompany each exchange and constitute additional burden for the parties to a transaction. Aristotle noticed their presence as early as in his *Politics*, in which he discussed the issue of speculation based on a change of prices (2003). Considerations given to the conflict of interests between merchants and buyers can also be found in Adam Smith's *An Inquiry into the Nature and Causes of the Wealth of Nations.* A seller, when establishing a price which for a buyer constitutes a cost exceeding his abilities to pay, when harvest is poor, forces more careful management of resources. Smith also underlines, when discussing the issue of an export bonus, that costs incurred by population have their consequences. They among others reduce the ability to self-finance education or reduce the number of births (Smith, 2007). Together with the discussion on costs arising from concluding transactions, in sociology by works of Herbert Spencer, the concept of an Institution appeared (Stankiewicz, 2012). Institutions constitute both legal regulations and moral habits or norms binding in a society. Their objective is among others to lower transaction costs. For instance, the Act of 30th May 2014 on Consumer Rights regulates the legal issues in connection with a consumer's

rights by specifying among others the duties of an entrepreneur concluding transactions with a consumer, or specifying the rules and procedures of concluding distance contracts.

Ronald Harry Coase is considered to be the father of the theory of transaction costs (Zygan, 2014). In the article *The Nature of the Firm*, he analyses functioning of firms and the reasonableness of their existence on the market. In his considerations, he introduced the concept of costs connected with making a decision, including costs in connection with gaining information. He also highlighted the costs of negotiations characterising the moment proceeding concluding an agreement and the costs of a contract appearing at the moment of concluding an agreement and when the provisions of a contract are enforced (Coase, 1937). The term transaction costs was used in the economic literature for the first time in 1940 in the article *A Study of Interest and Capital* (Scitovsky, 1940).

The economics of transaction costs is characterised by a multidisciplinary approach to both costs and attempts to reduce them. Transaction costs are often treated as a friction phenomenon (Williamson, 1998). Friction means slowing down, and sometimes, considering high costs, preventing a transaction. Interdisciplinarity was underlined as early as by Coase, who indicated the fact that some costs were generated by external factors, that is market mechanisms, and some by internal conditioning, that is processes happening in a company (Coase, 1937). Moving away from firms, the essence of transaction costs can be examined illustrated with the example of a purchasing individual. The amount of transaction costs will be influenced on the one hand by market mechanisms, on the other hand by individual qualities of an individual. It is impossible not to mention here limitations resulting from an individual's cognitive processes, from limited rationality and from opportunistic behaviours. The latter may be connected with using by one or both parties to a transaction deceptions, fraud ad lies (Williamson, 1998). Such types of behaviour are fostered by situations in which one of the parties has a worse access to information than the other party to a transaction (Karpacz and Podkówka-Sędek, 2014).

Information asymmetry along with moral hazard and adverse selection constitute elements of Frederic Stanley Mishkin's triad. Information asymmetry, caused by unequal access to information, manifests itself when at least one party to a transaction does not have enough information to make the right decision. Following this, one of the parties gets involved in a risky situation or on the contrary – refrains from a transaction even when it is not risky. Moreover, the lack to access to information causes moral hazard (Mishkin, 1992). The triad model, which refers to the issues of world crises, explains downturn in economic activity (Ostaszewski, 2013).

Neuromarketing

The process of making purchase decisions is contingent on numerous factors. Ontogenetic conditionings, next to economic factors, play an essential role among them. Also emotions as an important element influence consumers' decisions. In the economic theory, for a long time, consumers were thought to make rational decisions. Moreover, it was believed that consumers tried to be objective when forecasting the future. In making investment decisions, the theory of rationality based on a formalised analysis and unchanging market laws, which assumed rationality of buyers' conduct, was the most useful. According to this theory, a rational consumer interprets information from the environment correctly and on its basis estimates the probability of future events. The financial theory says that a rational customer follows two principles. He is willing to take a risk, if additional benefits can be obtained thanks to it, and takes choices in order to maximise expected usefulness. It was not until a behavioural element with systems, the first one (emotional one) and the second one (rational one), was introduced that interest in the psychological aspects of making purchase decisions aroused showing one-sidedness characterised by a strictly economic approach to the issue of making purchase decisions by consumers. Recently, primarily due to the development of neurosciences together with the methods of neuroimaging of processes taking place in the brain, the certainty regarding an irrational way of making decisions by customers has been maintained and deepened (Kahneman, 2011).

The irrationality of making decisions by a consumer results primarily from marketing communication, which, through implementing the discoveries made by neurosciences in the field of marketing, manipulates purchase decisions of a customer more precisely. Looking from the angle of

specialised form of reaching a customer, it must be underlined that a customer's finances are not safe because a consumer, when making the decision to spend a specific amount of money, does not act autonomously. Therefore, what is the science which benefits from the achievements of marketing and the latest discoveries of neurosciences at the same time?

Neuromarketing constitutes a multidisciplinary approach to neurophysiological attitudes of consumers and the impact of marketing tools on behaviours and decisions of entities (Dooley, 2015). Only by using methods of brain imaging was it possible to redefine the traditional tools used in marketing, which allowed their more effective use. The idea to use the knowledge of the way a human being thinks in marketing is nothing new. The concepts like the psychology of advertising or the psychology of selling have grown in significance in the last years. Moreover, the development of contemporary neurology has significantly influenced the appearance of neurosciences, from which marketing or economics have started to take handfuls of benefits. The traditional psychology treated the brain like any other organ. More complex models of thought processes based on observations, experiments and deduction. The willingness to understand neurological processes was ignored completely. Contemporary neurology has come up with tools thanks to which it is able to have an insight into the mind. A functional nuclear magnetic resonance has enabled observing the reaction of the brain to an exorbitant price, and an electroencephalograph may be used for optimisation of advertisements and products.

Thanks to direct observations of the electrical activity of the brain (EEG), more specific information can be obtained. During an examination with the use of electrodes, the electric potentials of the brain are measured. One of the methods of using EEG is the analysis of reaction to demonstrated stimuli called an analysis of evoked potentials appearing in a split second after a stimulus is showed. In comparison with the neuroimaging techniques, it is cheap and easy to use (Lindstrom, 2009).

It is difficult to define clearly the phenomenon of neuromarketing. Some researchers use this term only with regard to the marketing analysis of magnetic resonance of the brain. Others view this concept in the wider framework, they also accept the use of biometrics (breath and pulse measurements) or following eye movements. Neuromarketing research aims at answering the question what the brain does with information about a brand, how a human really reacts to a stimulus at a level deeper than a conscious reflection, how subconsciousness can influence behaviour of a consumer, who usually behaves conversely to his declarations (Pradeep, 2011). The importance of neuromarketing is growing, because the traditional methods of marketing research are slowly becoming obsolete. Market research or focus groups say little about what consumers really think. Unreasonable human minds depend on structuring them cultural stereotypes. They are formed by tradition, the way of upbringing and by other factors. That is the reason why the results of marketing research, quantitative ones consisting in conducting surveys concerning for example a product concept or packaging, and qualitative ones – basing on focus groups, often bear no relation to real reactions of consumers to a product. Focus groups and surveys are nowhere near as good as the facts neuroimaging helps to discover.

In Martin Lindstrom's (2009) opinion, finance and economic research cannot go any further. Researchers should look inside the brain to find out why consumers make the decisions they make. Market research and economic models base on the assumption that purchasers behave in a rational, therefore predictable way. They could not be more mistaken. The discoveries of neurosciences make it possible to see what a significant influence emotions exert on a purchase decision. Thanks to neuroimaging tools, researchers have gained an insight into how emotions impact economic decisions. Martin Lindstrom (2009) concluded it accurately claiming that the brain is dominated by automatic processes and not by target thinking. Therefore, most of the processes taking place in the brain are emotional and not cognitive.

Gerald Zaltman (2008) proves that 95% of thoughts, emotions and learning processes take place outside human consciousness. Neurologists unanimously agree that the majority of thought processes occur under the surface of human consciousness (in subconsciousness, unconsciousness or in preconscious). The whole discipline of neuromarketing bases on the assumption that subconsciousness determines a significant part of consumers' behaviours. A conscious and rational cognitive process has a slight impact on purchasers' decisions. Customers' emotions and

subconscious needs constitute the main area of the interest of neuromarketing. Through the study of neuromarketing indicators, neuromarketers are able to determine precisely whether a given product or advertisement attracts recipients' attention. Moreover, researchers can specify whether a given product stirs consumers' emotions and generates memories. Further study referring to indicators of derivatives can show whether a given product is effective, that is whether it generates willingness to buy, whether it is seen as original and whether a product along with surrounding marketing strategy are perceived by a consumer's brain as clear and understandable, thus effective. Attention constitutes one of the basic forms of brain functioning and it manifest itself in the form of characteristic brainwave structures (Zurawicki, 2010). Only by using a gauge basing on brain activity is it possible to indicate the element of a message that drew a consumer's attention. Emotional involvement in turn is nothing else but the tendency of the brain and the nervous system to a stronger or weaker reaction to stimuli. It is emotions of that kind that become a motivator of consumers' intentions, decisions and actions. Apart from attention and emotions, being retained in memory constitutes one of the most crucial factors leading to a positive purchase decision. If something cannot be remembered, it will have no impact whatsoever on making the decision to buy something. Similarly to the case of attention or emotions, the processes of retaining memories generate constant and measurable brainwave structures. An emotionally involved brain will preserve memories connected with a given product under the influence of a marketing message. Originality is another indicator of derivatives. The brain prefers novelties, therefore it values originality, which is a value intensifying interest, surprise and fascination. Another indicator answers the question whether the recipients of a marketing message interpret the content of a message correctly, whether a message is clear and precise.

A Message and Processing

During the conducted research, the participants were showed two videos concerning marketing showing characteristic places of two cities, Boston and Bydgoszcz. The used videos differed significantly. The narration describing Bydgoszcz was characterised by a coherent structure with a clear beginning, development and ending. The protagonist is introduced at the very beginning. He also appeared on numerous occasions when the plot continued. However, his presence was the most visible at the beginning and at the end of the video. The narration presenting Bydgoszcz was characterised an unusual dynamics of the image and of subsequent plots. The vivid and dynamic action was intensified by a dynamic way of operating a camera as well as varied perspectives, sometimes with close-up shots, sometimes from the air. In the visual aspect, the frames offered warm colours harmonising with the dynamic image sequence showing the attractions of the city. Through introducing characters and involving them in individual frames in life situations requiring a reaction, the effect of stirring the message recipient's emotions was achieved. The message is addressed to a wide spectrum of recipients, to families with children, young people, students and mature people and business people visiting Bydgoszcz for occupational purposes.

The narration describing Boston constitutes a total contrast to the video about Bydgoszcz. The film is characterised by a lack of the leading character or supporting characters, which significantly diminished the effectiveness of the information processing. No dynamics or colours seen in the message about Bydgoszcz can be seen here. The film about Boston creates the impression of being cold and distanced. The impression is additionally underlined by the monumentality of the buildings and anonymity of the presented objects and places. The message recipient is a person strongly motivated to gain information about the centre of Boston.

Monitored with EEG stimulation or settling down of brainwaves emerging from processing the frames of the films showed that the respondents initially interested in Boston changed their minds choosing Bydgoszcz. It is highly possible that it happened in view of the construction of the two showed marketing messages, of which one met the requirements of neurosciences in terms of the effectiveness of message processing. Taking the requirements of neurosciences regarding message construction and current knowledge of the depth of processing into consideration, the fact concerning the communication of human beings should be emphasised. It is no coincidence that people use messages with a characteristic and repetitive construction. The method of constructing stories, the emotional and practical dimensions of a narration contribute to increasing recipient's efficiency of

absorbing information provided in a story. Through stories and using appropriate constructions and making use of images, unambiguously decodable in their semantic structure, it is possible to guarantee an effective exchange of information, which happens basically unnoticeably, allowing interlocutors to gain new and permanent knowledge subconsciously and discreetly. Apart from a characteristic construction of communication, it is emotions evoked by narrations in a group of recipients that have an energizing influence on relevant areas in the brain responsible for processing information. A well-constructed message is retained in memory, it activates not only peripheral consciousness, but also intellective perception, which is emphasised by dynamically developing neurosciences, which underline the importance of narration in an effectively programmed message. Only narrations possess the power to activate mirror neurons, which are responsible for among others deep processing of a message and the process of mentalization. The marketing message concerning Bydgoszcz, in addition to taking account of the key requirements of neurosciences (the protagonist on his way to reach a goal), also introduces emotional elements such as a joke, joy of fulfilment and of people-to-people relations, satisfaction, or relax. Thus depicted emotions activate mirror neurons of the recipient of the message evoking emotional states identical with those of the protagonists. Therefore, narrations have the power of involving recipients enabling them during receiving a story to engage the areas of the brain that are responsible for instance for movement. Studies show that while absorbing information which is not included into a narrative structure, only two areas of the brain, that is Broca's area and Wernicke's area, are active (Vetulani, 2014). Exactly those areas are responsible for processing language. This fact is of upmost importance for the depth of information processing. While cold facts are processed, the human brain is engaged in order to sort out the meaning of words from their collection. The situation is different in the case of processing a narration. During communicating by means of a story, the brain areas that are active are the same ones that would be active if communicating people realistically experienced the events presented in a story. All this is possible thanks to the presence of mirror neurons in the brain (Vetulani, 2014), which create a particular arrangement of neurons. This arrangement implements a motor program, which encodes observed activities slightly stimulating relevant neurons. However, it does not cause any real movement of an observer.

Emotional engagement and a coherent form of narration introducing the protagonist guarantee transmitting information to deeper levels of message processing, thus leaving a memory trace in a recipient's brain. A memory trace is a side effect of a stimulus analysis, and its durability depends on the type and depth of processing (Nęcka, Orzechowski i Szymura, 2006). If it is to be transported to a client's memory and consciousness, a message he receives needs to include information which will find its way to the deep levels of processing. The levels of processing theory, unlike the block approach to memory models, views memory as a uniform system. Craik and Lockhart in their theory divide the levels of processing into shallow processing, which is connected with an analysis of physical qualities. The other levels are called deep processing involving a more meaningful analysis, which is characterised by bigger complexity. It should be emphasised that in each of the abovementioned levels, an unspecified number of sub-levels can be found. A message is retained in a recipient's memory only when it reaches deeper levels of processing, where processing itself means searching for and assigning meanings. The deeper the level of processing of given information, the more efficient its absorption by the brain. The increase in the complexity of operations of processing information reaching the system results in the increase in the intensity of processing a message by the brain (Sikorski, 2015). From the point of view of neurosciences, the levels of information processing are consistent with the levels determined by Craik and Lockhart. The first level is the most shallow one, at which a sensory analysis of data is conducted. The results of information processing at this level are short-lasting and susceptible to disruptions. At the next level a semantic interpretation of a received signal occurs. It is through processing information at this level that the meaning of words and sentences is recognised. At the third level of information processing, an activation of previous knowledge takes place. The brain uses various kinds of associations, also at this stage knowledge is reorganised. New information can complete what was already known. Previous information can help to understand new information. It can also be transformed into new structures joining older and new information. Information processing at the deeper levels influences remembering of information. The way Bydgoszcz was presented resembles a story. The main character arrives in Bydgoszcz on business. On his way to his destination, he stops at places important for the story, which are also the attractions of Bydgoszcz. After sorting out his business, the hero leaves the city. The circle closes and

the information the marketing message provides is processed at the deep levels and is retained in memory because attention was drawn to it effectively.

Our Own Research

The research was conducted from March 2017 to March 2018.
It consisted of two stages:

I. Examination with the use of electroencephalography (EEG)
   - √ Similar conditions were provided for all respondents (the time of the day, the distance from a monitor, the seat position, the light).
   - √ A basic examination lasting about 20 minutes
   - √ An examination with the use of a presentation
   - √ An exclusion of disturbing variables

II. Surveys

The characteristics of the group in terms of socio-demographic features is presented in table 1.

Table 1: Characteristics of the examined group – socio-demographic features

variable	specification	number	%
Sex	woman	10	50
	man	10	50
Age Group	30 – 35	7	35
	36 – 40	13	65
Education	secondary or vocational education	8	40
	higher	12	60
Residence	village or town of up to 20,000	3	15
	town of 20,000 – 100,000	1	5
	town of over 100,000	16	80
Marital Status	single	7	35
	married	8	40
	divorced	3	15
	in an informal relationship	2	10

Source: own study based on the conducted surveys

Women accounted for half of the group, men accounted for the other half. The age of the respondents due to the specificity of the research (the changes in the brain occurring throughout life) was narrowed so that all the respondents were between 30 and 40 (the age span was 10 years).

Table 2 presents average amplitudes of β waves in the frontal lobe observed while the respondents were watching the film about Bydgoszcz, and table 3 while they were watching the film about Boston.

Table 2: Average results of amplitude of waves (β) in the frontal lobe (Bydgoszcz)

side	waves	N	Average	SD	Trust (-) 95.0%	Trust (+) 95.0%	min	max.	Q25	median	Q75
right (R)	B1	20	19.9	5.089	17.5	22.2	11.0	30.0	16.8	19.3	23.8
	B2	19	21.2	6.336	18.1	24.2	10.0	30.0	15.5	21.0	27.0
left (L)	B1	20	21.3	4.447	19.2	23.4	14.5	29.0	18.8	20.0	25.5
	B2	19	20.0	4.947	17.6	22.4	11.0	29.0	16.0	20.0	24.0

Source: own study based on the conducted research

A higher average amplitude of β2 waves was noted on the right side – 21.2 Uv. β1 waves on the right side were noted in the cases of all the respondents. A higher amplitude of β1 waves was noted on the left side – 21.3 Uv. β1 waves on the left side were also noted in the cases of all the respondents.

Table 3: Average results of amplitude of waves (β) in the frontal lobe (Boston)

side	waves	N	Average	SD	Trust (-) 95,0%	Trust (+) 95,0%	min	max.	Q25	median	Q75
right (R)	B1	20	19.5	3.642	17.7	21.2	14.0	26.0	17.0	19.3	22.0
	B2	20	19.3	5.777	16.6	22.0	10.5	35.0	14.5	18.3	23.0
left (L)	B1	20	19.1	3.895	17.3	20.9	13.0	28.0	15.3	20.8	21.5
	B2	18	20.4	4.949	17.9	22.8	13.5	30.5	17.0	20.0	22.0

Source: own study based on the conducted research

A higher average amplitude of β1 waves was noted on the right side – 19.5 Uv. β1 waves and β2 waves on the right side were noted in the cases of all the respondents. A higher amplitude of β2 waves was noted on the left side – 20.4 Uv. β1 waves on the left side were also noted in the cases of all the respondents.

The second part of the survey was a survey in which the respondents were to indicate the elements remembered from the viewed materials promoting the cities of Bydgoszcz and Boston and to justify their choice of the place they would like to visit. Table 4 presents the results obtained.

Table 4: The most frequently indicated terms of Bydgoszcz and Boston

Specification	The terms most frequently indicated by the respondents	
	Bydgoszcz	**Boston**
The respondents who showed a desire to visit Boston	airport, river, music, sports, university, canoeing, trams, bridge, opera	greenery, order, modernity, city I do not know, interesting city, space, university, beach, ships, Harvard, architecture
The respondents who showed a desire to visit Bydgoszcz	people (young people) and places, mill island, opera, Bydgoszcz-canal, PESA, interesting city, many attractions, Flood-fountain, library, sun, emotions, greenery	boring city, just buildings, pitch

Source: own study based on the conducted surveys

The qualitative analysis of the answers provided indicates that the respondents who decided to visit the city of Bydgoszcz used more terms in comparison to those who decided to visit Boston. Moreover, these terms were characterized by a positive emotional colouring. From the observations made while completing the questionnaires, it can be concluded that the material about Bydgoszcz aroused positive emotions in the respondents. The narration used in the description of the city of Bydgoszcz was saturated with dynamism, a changing perspective. It preserved the consistency of the story told, it had an engaging effect on the recipient of the message because it presented people as the heroes of the narrative.

The respondents who decided to visit the city of Boston used words emphasizing unknown space with interesting architecture. The message describing the city did not engage the viewer enough to arouse intense interest despite the attractiveness of the city itself. This fact should be explained by the structure of the narrative about Boston. The description of the city was factual and economical in form. It showed the city from a distance. It was focused on buildings and streets. There were no references to people in the narrative. The narrative did not have a protagonist who would show the audience the streets of Boston showing the most attractive corners of the city.

Conclusions

As can be seen from the data in Table 2 and Table 3, for the city of Bydgoszcz an average amplitude of β2 wave noted on the right side of the frontal lobe and the average amplitude of β1 wave noted on the level side of the frontal lobe were higher than for the city of Boston. The left hemisphere is responsible for logical thinking and verbal processes, the right one for holistic thinking and intuitive thinking. β1 wave characterises concentration and attention directed outside, β2 wave is characteristic for emotional agitation (Markiewicz, 2017). Although an in-depth analysis due to the statistical significance ($p>0.05$) indicated a lack of statistically important differences between the examined groups in terms of the results of the amplitude of β waves, the obtained results can indicate a bigger interest, both volitional and emotional, evoked by the presented promotional material for the city of Bydgoszcz. Additional confirmation of the obtained results and preliminary conclusions are the data obtained in the process of analysis of the respondents' statements. Both the form and the selection of words used in the descriptions by the respondents indicate the emotional reception of the city of Bydgoszcz and the lack of interest in Boston in 75% of the respondents. As a result, it could cause in unconscious choice (EEG results) and conscious choice (questionnaire) choosing Bydgoszcz as the city the respondents wanted to see. Out of 20 respondents, 15 of them chose Bydgoszcz after seeing the material, 5 people decided to visit the city of Boston.

Discussion

On the one hand, the cost of the neuromarketing research for one respondent is considerable higher than the cost of conducting a survey, on the other hand, the required number of the people examined with the use of specialised equipment is significantly smaller than in the case of the questionnaires. Moreover, the results obtained in examination with the use of an electroencephalograph or a functional nuclear magnetic resonance come from data uncontrolled by a respondent, but in the case of questionnaires intentional or unintentional data distortion can be expected. Consequently, the transaction cost incurred by an entrepreneur can be lowered. Also, assuming that as a result of neuromarketing research an entrepreneur (e.g. a trading enterprise) will gain information about the most effective stimuli bringing an expected result, that is a decision to buy, higher revenue from sale should also be expected. A customer is found on the other side of the purchasing process. In the case of using neurolinguistic knowledge by a trading company, a customer unaware of this fact can purchase uncontrollably more often, as a consequence of which a customer may be forced to pay additional costs, e.g. the costs of transport when he wants to take the purchased goods back to a shop, elongation of the stage of gaining information. However, it may also be assumed that when customers' preferences and not only stimuli provoking the willingness to buy are known, an entrepreneur (a trading company) will present an offer tailored to a customer's requirements. Consequently, transaction costs paid by a customer will be lowered.

The research discussed proves that an advertising message constructed in accordance with the guidelines of neuroscience is processed more efficiently reaching deeper levels of attention and memory, which has a direct impact on the intensity of the potential customer's interest in purchasing a given consumer good, and this significantly shortens the path from noticing the good to making a decision to buy it. What is more, the decision-maker makes a conscious decision based on the available but unconsciously obtained information. Hence, choices based on analysis often coincide with choices made emotionally. Undoubtedly, this fact has an impact on lowering transaction costs on the seller's side, while on the buyer's side it often contributes to increasing costs accompanying the purchase process.

These studies have been piloted. The aim was to verify the correctness of the test method used, including the possibility of using the EEG and the usefulness of the information obtained in the test. Due to the small size of the sample and the lack of representativeness of the results obtained, it is not possible to generalize the sample to the whole population. However, they are a valuable study for analysis and a determinant of relevant studies. With the development of neurosciences and measuring instruments, the areas accessible so far only on the way of questionnaires and introspective research gain a new quality. However, errors can be found in the process. It should be emphasised that the authors are planning further in-depth research concerning making purchase decisions through appropriately composed messages, and the above research is treated as an introduction to detailed research aiming at providing understanding how the brain buys and what has the greatest impact on it.

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Innovation and Intelligent Systems in Experimental Optimization of Fused Deposition Modeling Process Parameters: A Taguchi Process Approach for Dimension and Tolerance Control

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Abstract

Additive manufacturing (AM) or 3D printing is an industrial revolution, challenging traditional manufacturing models, but is still in the development phase after more than 30 years of discrete existence in prototyping labs. AM is an advanced manufacturing technology that fabricates parts layer by layer from one from a digital model (CAO) that manages a digital stereolithography (STL) file. From standard NF ISO 17296-2, there are 7 families of the most used processes, such as FDM (Fused Deposition Modeling) was developed by S. Scott Crump, unction by the temperature setting of the machine (around 200 ° C), necessary for the melting of the material and deposited by a thin-layer nozzle that can range from 0.08 to 3 mm thick. Due to the nature of the FDM process many benefits appear but making functional parts using FDM has proved to be a difficult task. The difficulty comes from the influence of processing parameters such as: Platform temperature, Extruder temperature, Layer thickness, Number of shells, Infill density, print speed, Infill pattern and Number of solid layers on the final characteristics of the pieces. Our work presented provides an experimental study to analyze the effect of each processing parameter on the dimensional accuracy and time of manufacture of FDM parts. In general, 18 test samples were made using various treatment parameters. In order to analyze dimensional tolerances of these samples they were measured and compared to a 3D CAD model.

Keywords: Additive manufacturing; Fused Deposition Modeling; Optimization of Processing Parameters; Taguchi method; dimensional tolerances.

Introduction

The engineering profession constantly reinvents itself through innovations and technologies so the world changes the industry also to meet the new expectations of consumers. It focuses on personalization and responsiveness. Additive manufacturing [1] is an industrial revolution that challenges traditional manufacturing models and disrupts the relationship between the manufacturer and the consumer. This process of shaping by adding material is a real economic and environmental opportunity.

Additive manufacturing or 3D printing the most popular term with the public is still in the development phase after more than 30 years of discreet existence in prototyping laboratories. The

first technology was invented in France and the patent was filed on July 16, 1984 under the name "device to realize a model of industrial part" [2], based on the same technic, the Americans also deposited theirs on August 8, 1984 [3]. So additive manufacturing is not a new technology, manufacturers have been using it for more than 30 years mainly for prototyping [4,5].

Today, the 3D printing market offers different types of machines. So not so easy to locate, especially as each device has its own technology to make the object in volume. But whatever the used method, the volume object is always a layer-by-layer succession from a numerical model (CAD) [6] which manages a digital stereolithography (STL) file [7]. Based on the standard NF ISO 17296-2 [8], there are seven families of processes to use the most. The FDM [9] " fuse deposition Modeling " is the most popular method. It builds parts layer by layer ranging from 0.08 to 3mm thick, heating a thermoplastic filament (PLA, ABS) [12]] at over 200 °C and extruding it through a small nozzle of diameters (0.4mm, 0.6mm, 0.8mm, 1.00mm and 1.20mm) by 3D CAD model usually in STL format as shown in Figure 1. The filament usually has a circular section with specific diameters for each FDM system. The most used diameters are either 3.0mm or 1.75mm. After which the platform goes down and the printer proceeds in the same way for the following layers. The second machine works a little differently SLA [2,3] or stereolithography apparatus is the first AM technique ever invented. The third method of AM is polyjet technology [10], it works on photopolymerization and looks like a lot our major conventional inkjet. In the end the SLS technology "Selective Laser Sintering" [11] placed in a tank, a thin layer of powder material will agglomerate in the heat of a powerful laser pointed at specific locations. The fused powder assembles is solidified. It is called sintering.

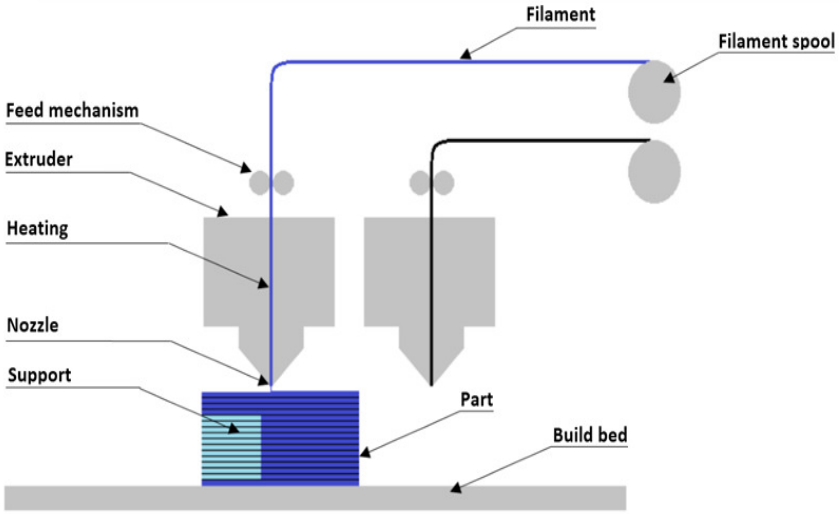

Figure 1: FDM process schematic.

From this revolution of the AM there are still limitations and many problems of 3D printing; the most common are problems of FDM technology.

In this paper, we will optimize one from these problems. This problem is created from the parameterization of the printing that can involve the time of the printing, the consumption of the raw material and the deviations of the dimensional tolerance of the manufactured parts. These parameters are requiring the availability of the reference to ensure that the processed additive manufacturing parts conform to the required design features, in particular geometric design features.

Material and Methods

Experimental Work

The FDM printer used to make the samples is 3DP WORKBENCH, from 3DP Platform Industries, using 1.75 mm diameter PLA filaments and a 0.6 mm diameter nozzle. This FDM printer has a print volume measuring 1000 x 1000 x 500 mm with a positioning accuracy of 0.07 mm. The components are printed in the XYZ orientation at the center of the construction platform.

The samples used in this study to evaluate print time, raw material consumption and dimensional accuracy [18-19], they are modeled on the basis of ASTM D5418-07 [13] and 35mm length width 12.5 and height 3.5 as shown in figure 2. The sample used was drawn using SolidWorks 2016 and exported as an STL file. The STL file was prepared in FDM Simplify3d [14] to define all process parameters on all samples and generate the G code that created the toolpath.

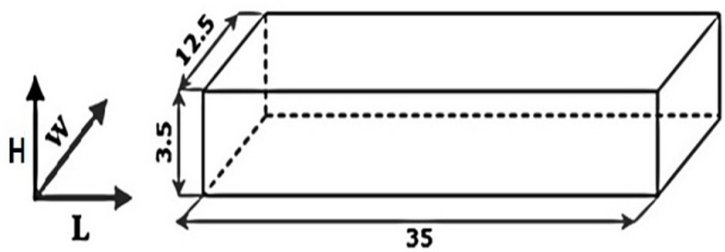

Figure 2: Created specimens' CAD model (in mm)

Experimental Design

To understand the influence of the modification of the processing parameters on the printing time, the consumption of the raw material and the dimensional accuracy of a printed part. An evaluation of optimization the control parameters that can influence the dimensional accuracy of the reference component has been completed. In this research, the treatment parameters studied are: Platform temperature, Extruder temperature, Layer thickness, Number of shells, Infill density, Print speed, Number of solid layers, and Infill pattern which was presented in Figure 3. Each of the parameters considered was assigned to only three levels Platform temperature that assigned two levels of control as shown in Table I. Some research work focuses on a single parameter, such as the building direction [20], while others focus on 3 or 4 treatment parameters at the same time. Effects as in [21], [22] and [23] where the effect of building direction, layer height, raster angle and other parameters are analyzed at the same time.

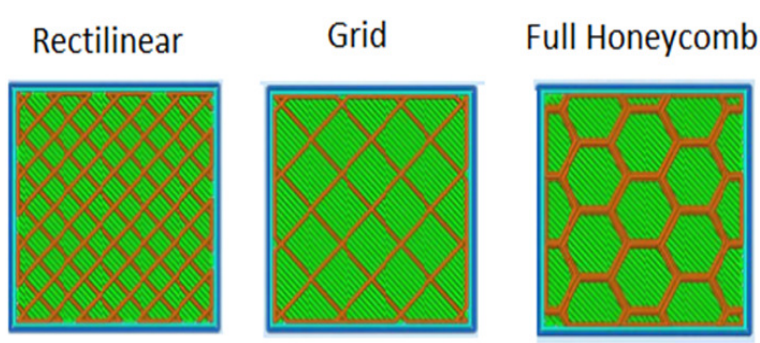

Figure 3: Infill patterns shape schematic

Table 1: Parameters and levels of varying Processing Parameters

Symbols	factors	Units	Levels
A	Platform temperature	°C	70 80
B	Extruder temperature	°C	190 200 210
C	Layer thickness	mm	0.15 0.3 0.5
D	Number of shells	--	1 2 3
E	Infill density	%	25 50 75
F	print speed mm/s	mm/s	50 65 80
G	Infill pattern 'H=1 D=2 L=3'	--	H D L
H	Number of solid layers 'U/L'	--	2 3 4

The values of the processing parameters that were used in Table 1 to establish a Taguchi's experience plan that were widely used in process optimization and product design studies [15-16] .Table 2 shows the values of treatment parameters that were used to establish a total of 18 samples. Thus, only one value was changed at a time in each printed sample.

The samples were measured using a three-dimensional measuring machine (MMT) that was programmed to perform the measurements automatically to avoid errors during the measurement process that may occur when measured manually. For the location of the samples in the MMT table were used a fixture to fix the reference components in place to allow for repeatability and ease of measurement.

Table 2: L18 Orthogonal array, Sample processing parameters specification

essai	A	B	C	D	E	F	G	H
1	70	190	0.15	1	25	50	1	2
2	70	190	0.3	2	50	65	2	3
3	70	190	0.5	3	75	80	3	4
4	70	200	0.15	1	50	65	3	4
5	70	200	0.3	2	75	80	1	2
6	70	200	0.5	3	25	50	2	3
7	70	210	0.15	2	25	80	2	4
8	70	210	0.3	3	50	50	3	2
9	70	210	0.5	1	75	65	1	3
10	80	190	0.15	3	75	65	2	2
11	80	190	0.3	1	25	80	3	3
12	80	190	0.5	2	50	50	1	4
13	80	200	0.15	2	75	50	3	3
14	80	200	0.3	3	25	65	1	4
15	80	200	0.5	1	50	80	2	2
16	80	210	0.15	3	50	80	1	3
17	80	210	0.3	1	75	50	2	4
18	80	210	0.5	2	25	65	3	2

Results and Analysis

Experimental results for dimensional accuracy, time of printing and material consumption were recorded and analyzed

Dimensional Accuracy and Repeatability

The dimensional deviation of length L that was calculated represents the dimensional accuracy achievable by the FDM process. The average dimension, the measuring range and the deviation for each characteristic are shown in Table 3. This table shows the measurement results taken for the 18 samples.

Table 3: Samples measurements length results (in mm)

essai	LA	LB	Average	error
1	34,896	34,865	34,880	0,120
2	34,7975	34,719	34,758	0,242
3	34,707	34,671	34,689	0,311
4	34,782	34,809	34,795	0,205
5	34,752	34,809	34,780	0,220
6	34,757	34,807	34,782	0,218
7	34,845	34,832	34,839	0,162
8	34,881	34,834	34,857	0,143
9	34,910	34,772	34,841	0,159
10	34,878	34,772	34,825	0,176
11	34,699	34,692	34,695	0,305
12	34,755	34,728	34,742	0,258
13	34,712	34,779	34,746	0,255
14	34,764	34,723	34,743	0,257
15	34,934	34,890	34,912	0,089
16	34,805	34,724	34,764	0,236
17	35,118	35,057	35,087	-0,087
18	34,720	34,714	34,717	0,283

The width measurement W were averaged into a single width value for each sample achievable by the FDM process. The results of these measurements are presented in Table 4.

Table 4: Samples measurements width results (in mm)

Essai	WA	WB	Average	error
1	12,434	12,381	12,408	0,092
2	12,372	12,357	12,365	0,135
3	12,224	12,210	12,217	0,283
4	12,324	12,310	12,317	0,183
5	12,365	12,361	12,363	0,137

6	12,342	12,362	12,352	0,148
7	12,316	12,319	12,318	0,183
8	12,371	12,340	12,356	0,145
9	12,451	12,323	12,387	0,113
10	12,203	12,209	12,206	0,294
11	12,290	12,252	12,271	0,229
12	12,342	12,279	12,311	0,189
13	12,245	12,240	12,243	0,258
14	12,366	12,355	12,360	0,140
15	12,486	12,448	12,467	0,033
16	12,401	12,284	12,343	0,157
17	12,553	12,479	12,516	-0,016
18	12,300	12,344	12,322	0,178

The dimensional difference of the height H that was calculated shows the dimensional accuracy achievable by the FDM process. Which have been averaged into a single height value for each sample. The results of these measurements are presented in Table 5.

Table 5: Samples measurements height results (in mm)

essai	HA	HB	Average	error
1	3,338	3,464	3,401	0,099
2	3,404	3,412	3,408	0,092
3	3,263	3,250	3,256	0,244
4	3,247	3,234	3,240	0,260
5	3,335	3,363	3,349	0,151
6	3,261	3,232	3,247	0,253
7	3,251	3,255	3,253	0,247
8	3,401	3,409	3,405	0,095
9	3,220	3,155	3,187	0,313
10	3,420	3,424	3,422	0,078
11	3,426	3,426	3,426	0,074
12	3,368	3,302	3,335	0,165
13	3,240	3,243	3,241	0,259
14	3,396	3,404	3,400	0,100
15	3,307	3,325	3,316	0,184
16	3,255	3,285	3,270	0,230
17	3,332	3,327	3,329	0,171
18	3,171	3,203	3,187	0,313

The first note for all results is that all errors have positive values, which shows that the machine tends to create larger objects than expected. Platform temperature has little or no influence on dimensional error, as shown in Figure 4-a. From Figure 4-b, it is clear that Extruder temperature has a significant effect on dimensional accuracy; when the extrusion temperature increases, the error increases for the height and the opposite for the width and length. In the figure 4-C, we can see that a more average layer height generally gives lower results. In addition to that, we can that when the layer height was 0.3 mm, the error was small in thickness even if the height of the layer is relatively large or small, which is explained by H = 3.50 mm an integer multiple of 0.3 mm. This explains the jump of error when the layer is slightly decreased to 0.15 mm or increased to 0.50 mm. All that shows the importance of the height of the layer on the dimensional accuracy [17]. Infill density and print speed has little influence on dimensional geometry in a margin of 0.05mm in length and 0.025mm in width and height, as shown in Figures 4-e and 4-f. it can be seen that when using a single shell it gives weaker results which was presented in Figure 4-d. In addition, we can see that when we increase the number of shells the error remains a little stable. The use of Infill pattern rectilinear has a significant influence on the dimensional geometer compared to Infill pattern grid which has a small dimensional error, as shown in Figure 4-g. Number of solid layers that have been shown in Figure 4-h has a great influence on length and height compared to width and when we increase the number of solid layers the error increases.

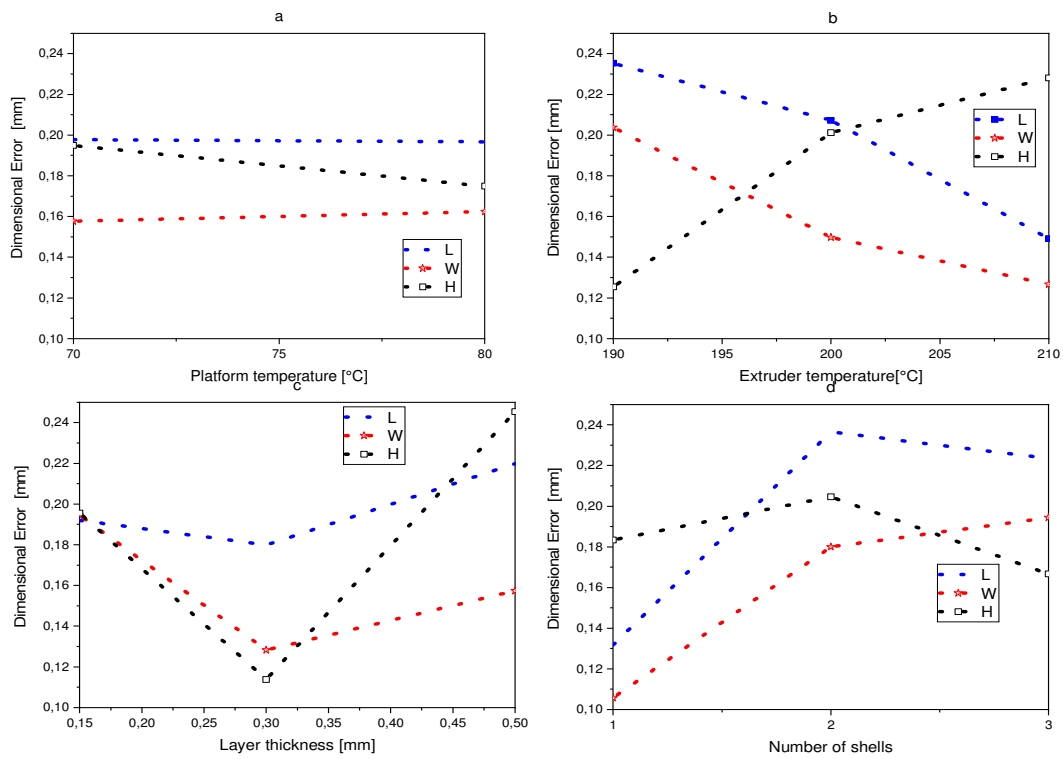

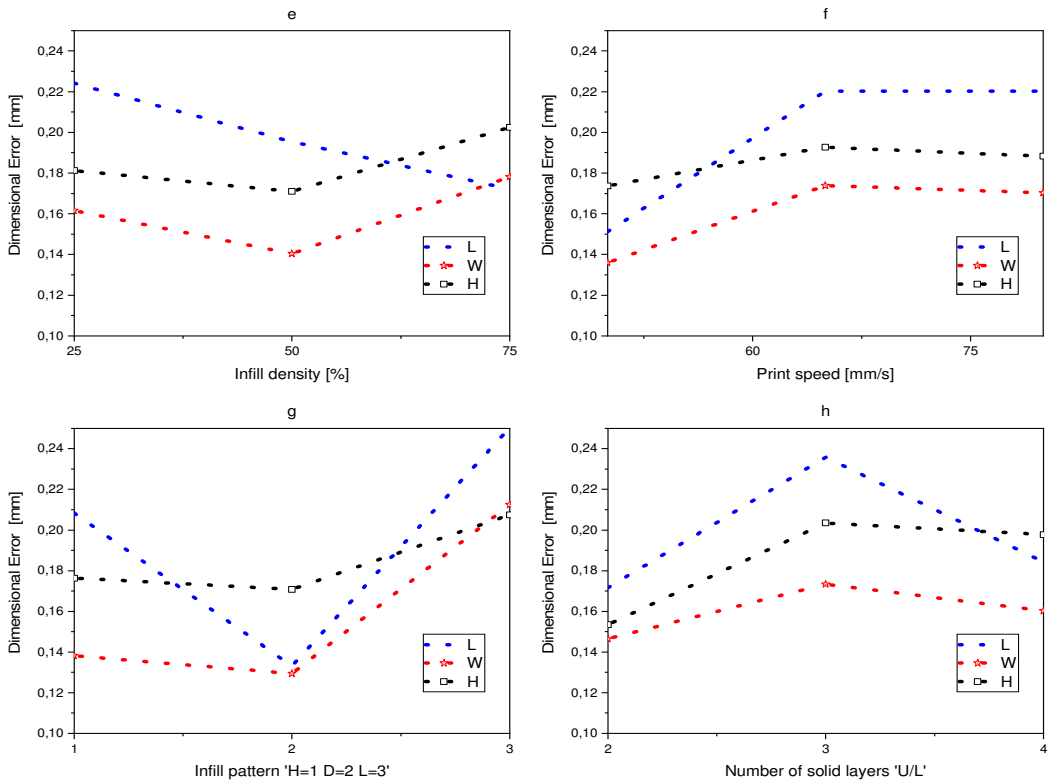

Figure 4: The dimensional error [mm] caused by (a) Platform temperature, (b) extrusion temperature, (c) layer height, (d) Number of shells, (e) infill precentage, (f) printing speed, (g) infill patterns and (h) Number of solid layers

Conclusion

This paper examines the effect of FDM processing parameters on the final geometry of printed parts, material. The study examines the influence of eight processing parameters which are: Platform temperature, Extruder temperature, Layer thickness, Number of shells, Infill density, Print speed, Infill pattern and Number of solid layers. Using Taguchi's experimental design method is a new approach developed to model and optimize print parts by FDM. The 18 reference components were constructed based on the experimental design and measurements that were made on the samples.

Generally, to improve the dimensional accuracy we need a higher Extruder temperature, higher Infill density, average Layer thickness, lower print speed, low number of shells, low number of solid layers and Infill pattern grid which less dimensional error. The dimensions may be preferable when comparing several dimensions at the same time, so that the error in the width and its changes is a little negligible compared to the errors of the other dimensions if the error has been described as a percentage error.

Future work in the field of research on the FDM process, the process of additive manufacturing shows a maximum of knowledge in making engineering applications with high quality parts, accuracy and high properties with low consumption and reduced printing time.

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Innovative Intelligent Systems in Unmanned Aircraft (UAS - DRONE): A State of Knowledge Review

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Abstract

Unmanned Aircraft Systems (UAS) is an emerging technology with an enormous potential to revolutionize the world and enable new technological applications. It is part of future integral applications, urban, civil and military. The technological maturity is enough to be integrated into civil society. The importance of UAS in scientific applications has been demonstrated extensively in recent years. Whatever the type of selected missions is, their number and their use will increase significantly in the future. UAS are playing a growing role in many public missions such as monitoring borders, wildlife surveys, military training, real-time monitoring and enforcement of local law. Challenges such as the lack of an onboard pilot to see and avoid other aircrafts and the large variety of missions and capabilities of unmanned aircraft must be addressed in order to fully integrate UAS operations in the context of the next generation. Drones are better suited to difficult or dangerous missions than manned aircraft. Information and monitoring services use drones primarily for intelligence, surveillance and reconnaissance, border security, the insurgency against the attack and strike, identification and target designation, the relay communication, electronic attack, mapping and meteorology.The Unmanned Aircraft (AU) which is plane without a pilot on board, can be a remote controlled aircraft (for example, controlled by a driver to a ground control station) or may fly autonomously on preprogrammed flight plans according to a path in the XY plane or in the orthonormal X, Y, Z or more complex dynamic automation systems. It can carry a lethal or non-lethal payload, which can be high- and low-resolution video cameras, day reconnaissance equipment and night, crop-spraying system, 3D scanner for mapping, weapons of war and generally any equipment necessary for the mission for whom the drone is designed.

Keywords : Drone, Innovation, System, UAS.

Aircraft System Unmanned UAS

Unmanned Aircraft Systems (UAS), also known as unmanned aerial systems, are defined as a system whose internal components work in a way that carry no human operator but that fly autonomously or remotely piloted. UAS must be considered in a systemic context including the command, control and communication and the necessary staff to control the aircraft away. The UAS has recently been used on a wider scale in both military and civilian applications. Its importance and advantages reside in search and rescue, surveillance, reconnaissance, traffic monitoring, inspection of hazardous sites and Range Extender. It is even recently used in the field of agriculture. In addition (1), UAS describes the whole system that includes civil aircraft, control stations and even links data. More profoundly, the system is much more complex in its organization based on the following elements that will prove to deploy an UAS which must provide all logistics:

- Mission Planning Station
- Launch Station and recovery.
- Connecting devices
- Ground Control Shelter
- Data Terminals ground
- Remote Video Terminals
- Payload modules
- Air Data Relay
- Miscellaneous equipment launch, recovery and ground support.

The Drone System

A drone is a system consisting of:

- **Control Station**

The control station is the operation control center, the man-machine interface. From the control station, the operator sends the drone commands via the uplink communication system to direct its flight profile and use the different types of "payload" mission it carries. Likewise, via the downlink communication, the plane returns information and operator pictures. The control station allows to find information on the state of Embedded subsystems (data management) and position information. The launch and recovery of the drone can be controlled from the main station or from a satellite control station (subsidiary). The control station can also accommodate the communication systems of payload.

- Payload
- ✓ The type and payload performance depends on the needs of the operational task. These can range from:
- ✓ Subsystems relatively simple having a non-stabilized video camera with a fixed lens with a mass as small as 200 g.
- ✓ A gyro-stabilized video system with a larger bearing capacity with probable weight of 3 to 4 kg,
- ✓ A high power radar with a mass, with its power, of up to 1 000 kg.
- ✓ etc...

Some more sophisticated drones carry a combination of different types of sensors in the payload. Data from these sensors can be processed and integrated to provide enhanced information.

- **The air vehicle**

The type and the air vehicle performance is mainly determined by the needs of the operational mission. The task of the UAV is mainly to transport the payload of the mission to its point of application, but it must also carry the subsystems necessary for its operation. The subsystems include the communication link, the stabilization and control equipment, the power plant and / or the fuel, the power supply and the basic structure of the cell and the necessary mechanisms for the launched drone to carry out its mission.

Other determinants are important in the design configuration of the drone, such as:

- ✓ the operating range.
- ✓ airspeed.
- ✓ endurance demanded by mission requirements.
- ✓ The requirement for endurance and autonomy.

The requirement of the mission (speed, endurance, altitude ...) more fundamentally determine the propulsion system and the right choice of adequate energy source for optimal configuration of the drone.

- **The Navigation System**

The system allows operators to know at any time the exact position of the drone in space in real time and enables the "back to basics" mode in case of poor performance or failures without any communication between the station and the air vehicle control with a navigation equipment called the drone. This is achieved through a radio tracking device or through the recognition of geographical features.

Today, a global positioning system (GPS) that accesses the location information of a terrestrial satellite system is available. Accuracy is further enhanced by the use of differential GPS (DGPS).

For a non autonomous operation, that is to say when the communication between the UAV and the control station is virtually continuous, or when there is a risk of blockage of GPS, other navigation options are possible as fallback options. These methods include:

- ✓ (A) radar monitoring.
- ✓ (B) Radio Monitoring.
- ✓ (C) Direct Computation of velocity vectors and the elapsed time.

- Equipment launch and recovery of the drone.
- Start the equipment. This will be necessary for aircrafts that do not have the opportunity to fly vertically or to have access to an area of track and of appropriate length for the flight. This usually takes the form of a ramp to which the aircraft is accelerated on a carriage powered by a rubber sandows system by compressed air or by rocket until the UAV reaches a given rate of acceleration to continue the flight(2).
- Recovery Equipment. This will also be required for drones that have no vertical flight capacity. It usually takes the form of a parachute, installed inside the aircraft, which is deployed at an appropriate altitude above the landing area. In addition, a way to absorb the impact energy is required as airbags or replaceable frangible material.

- **The communications**

Being the main requirement, the communication system is to provide data links between the control station and the UAV. The support of most use in the field of air transmissions is radio frequency, but today one finds other possible useful alternatives such as transmitter / 4G receiver which will be able to transmit data on the theory 4G network and therefore over the internet or a light solution in the form of a laser beam or via optical fibers.

- **Interfaces**

All these elements (subsystems) work together to achieve the optimum performance of the entire system. However, some of them can function as an “autonomous” system managed by an interface.

- **Environmental System Capacity**

From the beginning of the system design, it is important to know the impact that the environment plays on the design of all elements of the UAV system, including the provision of a working environment. A system that has been designed takes into account not only low conditions but also the necessary elements to design a anther system that respects the rules of a normalized environment. So you have to carefully examine all these aspects from the beginning of the design to the end.

Classification of unmanned aircrafts

A powered vehicle that carries no human operator can operate autonomously or remotely recoverable, and can carry a deadly and non-lethal payload.

Ballistic or semi-ballistic vehicles, cruise missiles, artillery projectiles, torpedoes, mines, satellites and unattended sensors are not considered as unmanned vehicles. *

Recently, there is a growing use of UAS in intelligence, military, civil and others for special purpose tasks. A considerable effort has been devoted to increasing endurance flight and payload of the AU, which has resulted in various UAV configurations of different sizes, the level of endurance, and capacity. Here, one can classify drones depending on their characteristics (aerodynamic configuration, size, etc.) (3.)

Fixed Wing: It refers to an unmanned aircraft with wings which requires a takeoff / landing or a catapult to launch and parachute for landing. This drone category generally has a long endurance at high cruising speeds.

Rotorcraft: It is also called UAVs (Unmanned aircraft vehicle) rotorcraft or vertical takeoff and landing (VTOL), which have the advantages of a rollover capacity and maneuverability. These capabilities are useful for many robotic missions, particularly in civil applications such as:

- ✓ Audiovisual: It remains today the sector that has the largest number of professionals of the drone. The uses are varied from picture / video private events to the live broadcast of major events.
- ✓ Industry: It is the real growth potential for the professional sector of civilian drone. Industrial applications can be divided into several categories:
- Corridor mapping - Long Distance.
- Conditional maintenance, security
- inspection work
- Repository infrastructure.

- ✓ Agriculture: Agriculture is also a rapidly expanding market for UAV industry. Mapping the treatment of cultures through their diagnosis, drones have particularly proved effective in precision agriculture.

UAV rotorcraft may have different configurations, with the main and tail rotors (conventional helicopter), coaxial rotors, tandem rotor, multi-rotor, etc.

Tethered balloons and airships: An aerostat manoeuvrable is able to propel itself into the air. Its features are lightweight, long endurance, low acceleration and large.

Flapping-wing AU: It is flexible and has morphing small wings inspired from birds and flying insects. There are also other hybrid configurations or convertible configurations, which can take off vertically and tilt their rotors or their bodies and fly like airplanes.

Tableau 1 : Current Aircraft Category and Regulatory Basis Supporting Type Certification , (Ref4)

Aircraft Category	Aircraft Use and Notable Limitations	Applicable Airworthiness Standards for Type Design
Acrobatic	Use: acrobatics Notable limitations: weight ≤ 12,500 lbs. seats ≤ 9, excluding pilot seats, (14CFR23.3)	Part 23, with regulations specific to acrobatic category airplanes No acrobatic rotorcraft
Normal	Use: Normal flying (nonutility, nonaerobatic, or noncommuter operations) Notable limitations: weight ≤ 12,500 lbs. (airplanes) ≤ 7000 lbs. (rotorcraft) seats ≤ 9, excluding pilot seats (14CFR23.3)	Part 23 for airplanes Part 27 for rotorcraft
Utility	Use: Normal + limited acrobatics allowed; e.g., spins (14 CFR 23.3) Notable limitations: weight ≤ 12,500 lbs. seats ≤ 9, excluding pilot seats	Part 23 for airplanes No utility rotorcraft
Commuter	Use: commuter operations (scheduled operation with at least 5 round trips/week on at least one route between two or more points according to the published flight schedules (14 CFR 110.2) Notable limitations: weight ≤ 19,000 lbs. seats ≤ 19, excluding pilot seats (14 CFR 23.3)	Part 23 for airplanes No commuter rotorcraft
Transport	Use: multi-engine aircraft intended for the regular public transport of passengers and/or cargo for hire or reward Notable limitations: weight: > 19,000 lbs. (jets & props), 7,000 lbs. (rotorcraft) seats ≥ 10 (jets), seats > 19 (props and rotorcraft)	Part 25 for airplanes Part 29 for rotorcraft
Restricted	Use: special purpose operations (as defined in 14CFR21.25, including agriculture and aerial surveying) Notable limitations: no operation over densely populated areas, in a congested airway, or near a busy airport (14CFR91.313)	Requirements of some other category or an aircraft meeting the requirements and accepted for use by the US military with exemptions and operating limitations specific to the special purpose (14CFR21.25)

Control Type

There are three forms of control that an operator can exert on the drone:

- Piloting the ground or remote control;
- Semi-autonomous;
- Standalone.

Ground control or remote control: AU controlled ground known as remotely piloted vehicles are radio-controlled drones that use the same basic techniques that are familiar to the lover of R / C. There are very few modern AU which are controlled remotely. In the 1980s and early 1990s, systems such as Point and Sky Owl began using both programmable guide remote control technologies and systems as an autonomous fundamental form.

Semi-autonomous: The use of the semi-autonomous flight control system assumes that the operator must take full control of the aircraft during the pre-flight, take-off, landing, and operation near the base. When the automatic steering function is activated, the drone will automatically follow the set of pre-programmed points. Yet, it prevents the operator from being constantly responsible for the mission and the drone itself throughout the operation.

Fully autonomous: The fully autonomous capability requires no human input to achieve a goal after takeoff decision. An autonomous drone is able to monitor and assess its performance, status and configuration.

The program is called allowing the drone to "fly" on the programmed flight paths without any human intervention for almost the entire mission. The operator merely monitors its systems. Control sensors are done by an onboard computer rather than a human being. This can be divided into three broad categories:

- ✓ A) Orientation;
- ✓ B) Navigation;
- ✓ C) Control.

Application of UAS (UAV)

Currently, the main applications of UAVs are related to the field of defense. The main investments are driven by future military scenarios. Most unmanned military aircrafts are mainly used for round intelligence, surveillance and reconnaissance. It is also used for detecting chemical, biological, radiological, nuclear, or just deemed too dangerous or politically difficult tasks for manned aircrafts to undertake. RSUs are preferred to manned aircrafts, not only because of the risk of downsizing, but also because unmanned vehicles have better vigilance during operation in addition to many other technological factors.

The transfer of drones to the civilian sector, which has to imagine a significant number of civil applications, opens up considerable potential growth in varied and innovative sectors. With many different aerial data capture that drones can perform, applications in the civilian sector is very diverse, with potential applications in markets.

Drones are better suited to do the following

Operational exploration: Operations requiring more than 30 or 40 flight hours are best performed using UAS with a low workload, only requiring human monitoring rather than direct and continuous control. There is a long list of tasks that could be included in this category, such as: the type of supervisory tasks on fixed sites, acting as a communications relay. However, some of these tasks can themselves generate more complex or sensitive tasks (such as the identification of a target) that may not be easily prosecuted by a simple single task platform.

Application security: UAVs are capable of performing a variety of missions in support of surveillance and military missions. The list below shows some applications:

- Monitoring the recognition and targeted acquisition.
- Marine Operations (naval fire support, targeting the horizon, missile defense, ship classification);
- Meteorological missions;
- Setting the indirect and air support fire;
- Damage Assessment;
- Radio relay and data;
- Monitoring of biological or chemical contamination;
- Electronic Intelligence;
- Designation and monitoring of targets.

Civil applications: Today, civil UAV market is still emerging. However, expectations for growth of civil and commercial UAV market are very high. Potential civilian applications drones are:

- Police Functions
- Traffic Detection
- Fisheries Protection
- Pipelines Survey
- Sporting events coverage Film
- Agricultural exploitation
- Survey on power lines
- Air Photo
- Border Patrol
- Monitoring of road traffic, etc.
- Search and rescue in disaster and crisis management.
- Environmental monitoring.
- Agriculture and Forestry.
- Fight against fires.
- Aerial mapping and meteorology.
- Search university laboratories.
- And many other applications.

Conclusion

we aim, in future scientific work, to propose a system of positive use of this innovation, in the context of health and education for example.

In this article, we tried to clarify the increasing roles of this trend and show that UAVs have an enormous potential capable of revolutionizing human life in several multipurpose sectors.

The overall architecture and the aforementioned UAS data will be useful for achieving positive results in the field of scientific and technological research at the end of the design and performance improvements. This will definitely contribute to the aerospace industry.

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Administrative (Management) Services in The Field of Education

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Abstract

The Constitution of the Russian Federation (Constitution of the Russian Federation, 2015) as well as the democratization of Russian society, which have established new development trends of the state have required fundamental changes in the structure of Executive power and other administrative and legal relations. This also implies a positive improvement in the legal regulation of relations in the field of administrative governance.Currently, the purposes of administrative and legal regulation are to improve the forms and methods of governance, establish and regulate relationships between citizens and state institutions in wich each person should be guaranteed real respect for rights and freedoms, as well as effective protection of these rights and freedoms in cases of violations.The provision of administrative (public) services by Executive authorities is a promising trend for improving public administration in the new conditions. The main advantage of this function is its multipurposeness, which contains both a regulatory and law enforcement aspect; significant potential for contractual regulation of public relations in the context of state power reform; ensuring the processes of possible convergence of public and private law principles in modern public administration; the possibility of a real guarantee of the protection of constitutional human rights of citizens, etc.It should also be taken into account that membership in many international organizations imposes to Russia certain obligations in the field of ensuring the rights of citizens and developing strategies for state policy in various spheres of public life (Vorontsov A.L., Vorontsova E.V., 2016). At the same time, the involvement of all state Executive bodies in the provision of administrative services, as well as setting tasks for them to reveal, prevent and suppress various types of violations in this area, provides for strengthening the role of these bodies as a managemental part of the state mechanism. It should be noted that providing administrative (management services) is considered by scholars as one of the main and permanent functions of the state. Therefore the importance of developing this issue requires significant efforts from both authorities and scientists who investigate managerial issues in order to improve the mechanism for providing administrative services.Thus in our opinion management services should be considered as the activity of Executive authorities to provide the necessary conditions for citizens and other subjects of administrative legal relations to fully realize their rights and freedoms in the sphere of activities of Executive authorities.During the discussion of administrative services in the field of education usually it is suggested to include in this group, for example, the creation, reorganization, liquidation, accreditation of educational institutions, registration and licensing of educational services. In this part we feel that it is more appropriate to talk about the category of state and municipal services provided directly by state authorities. Thus, we support the scientists who think that services in the sphere of activity of Executive authorities should be divided into these types mentioned above.It should also be recognized that today the problems of administrative services are constantly under the attention of both scholars and practicing lawyers, since they have not sufficiently studied in the legal literature yet .

Keywords: Administrative Services, Management Services, Public Services, Education, Educational Sphere.

Introduction

In the conditions of rapid development of the Russian Federation in all spheres of public life, it is vitally important to improve the main functions of the state. One of the leading functions is to ensure effective interaction of the interests of all subjects of law. This can be achieved by establishing the principle of the rule of law, which implies the creation of a system of public order based on the taking into account the interests of various segments of the population, their consent and compromise.

The Constitution of the Russian Federation (Constitution of the Russian Federation, 2015) says that the state recognizes the principle of the rule of law. In other words this principle is a priority one for the legal state and important way of its development. The content of this principle, first of all, means the correlation in society of law and the state (authorities, officials and other persons), i.e. the priority of law and subordination of the state and its institutions to law. Moreover, the principle of the rule of law means the correlation of law and various spheres of life such as politics, economics and others. This correlation consists in the priority of law for these spheres. The rule of law is guaranteed through the development of legislation and mechanisms for its implementation. However, besides the characterization of the process of applying legal acts adopted by the authorities, it is necessary to take a broader approach to the concept of legal regulation in the field of public relations, in terms of providing administrative services by executive authorities. First of all, this means the development of basic theoretical principles regarding the concept and legal nature of administrative (management) services as a universal tool for ensuring a democratic legal regime in the state.Nowadays, the scientific community is discussing the question of defining and adopting to the legal circulation the concept of administrative (managerial) or public services. The term was proposed as one of the functions of the Executive power to emphasize the existence of responsibilities of these authorities to individuals and legal entities.It should be noted that the term "public services" is used along with the term "administrative and management services", and in practice there is no significant boundary between them. Recently, the term "administrative services" has become more widely used, since it is rightly considered that the category of management services already has its own meaning in Economics. The adjective "administrative" is also more appropriate because it refers to the entity that provides such services – the administration, administrative authorities. In addition, the term "administrative" describes the regulatory and public nature of the activities for the provision of these services.When using the term "services", the main focus is on the legal aspects and particularly on the administrative procedure. This can be explained by the fact that first of all the main ideologists of the introduction of the theory of services are representatives of the science of administrative law.Not all administrative actions by state Executive bodies can be considered as "management services", because some types of such administrative actions do not fall under the term "services" by their nature and legal consequences. For example there are actions to take limiting or aggravating decisions against individuals, including the administrative and government measures to them. These actions cannot be qualified as "services".

The other actions can be classified as the sphere of "services" provided by authorized bodies and officials. This sphere includes a huge array of administrative actions of Executive authorities: from the issuance of a birth certificate, passport – to the consideration by the authorized body or official of any other individual's request to satisfy his or her legitimate interests on a specific issue. Taking this into account, it is proposed to define the types of activities of Executive authorities as "administrative services" because as some scholars says that the "services" provided by Executive authorities is primarily the performance of certain duties to the population (Averyanov, V.B., 2002).

There is also an opinion that it is more correct to divide services on state ones provided by Executive authorities, state institutions and organizations, and municipal ones provided by local governments and municipal institutions and organizations.

At the same time, the general criterion for state and municipal services is their public nature, i.e. they can be called public services, and them we can divide on administrative services (provided by Executive authorities, local self-government bodies) and services provided by state and municipal institutions and organizations (i.e. "non-public administrative services") (Koliushko, I., 2001).

In the scientific literature there are the following features of admenistrative services: providing only because of the request of individuals and legal entities; the need (and the opportunity) of obtaining the particular administrative services are directly provided by the law; the law gives powers to provide the administrative services to the relevant Executive authority or local authority; individuals and legal entities must meet certain requirements defined by law to get administrative services.

Consequently, administrative services are activities by the Executive authorities and local authorities (constituent territories authorized by state) aimed at providing statutory rights and interests of individuals and legal entites who took the initiative in their implementation.

Thus, the service is the result of the activities of an administrative authority, carried out at the request of an individual or legal entity, on the legal registration of conditions for the implementation of rights, freedoms and legitimate interests. Perhaps this is an even better definition of this term that draws attention to the result, and therefore to the integrity of the administrative service. However, the use of such a basis for providing administrative services as "legitimate interests" is debatable, because in this case the person does not have the right to claim (Koliushko I., 2001).

The legal regulation of the provision of administrative (management) services exist in most countries where there are codified acts devoted to the detailed regulation of procedures in the activities of the authorities in terms of their relations with individuals and legal entites.

The authors suggest the following list of administrative services to understand their essence:

- authorization (for example, engaging in certain types of individual business activities; to conduct meetings, demonstrations; for advertising; for purchase, storage, carrying and transportation of weapons; etc), including accreditation, certification (e.g. accreditation of higher education institutions, health care institutions, certification of businesses and jobs; certification of goods, works and services);
- maintenance the registers (for example, registration of acts of civil status, business entities, vehicles), including legalization of law subjects (e.g., legalization of associations of citizens);
- legalization of documents (for example, consular legalization of documents), nostrification (recognition of diplomas issued in other countries) and verification (establishing the validity of certificates of origin of goods from Russia);
- social administrative services (e.g., subsidies, pensions).

Thus, the administrative services should be considered as activities of Executive authorities in providing the necessary conditions for realization by citizens and other entities their rights and freedoms in the sphere of activities of Executive authorities.

If we consider educational services, we should include in this group the creation, reorganization, liquidation, accreditation of educational institutions, registration and licensing of educational services, in our opinion, it is more appropriate to talk about the category of state and municipal services provided directly by state authorities. Thus, we support the opinion of scientists that services in the sphere of activity of Executive authorities should be divided into these types (Raksha N.S., 2018).

Thus, licensing of educational services is a procedure for conducting a license examination, making decisions, registering them, issuing, reissuing licenses, issuing their duplicates, as well as making decisions on restricting the activities of subjects in the field of education (Lihachyov, S.V., 2015, Vorontsov, A.L., Vorontsova, E.V., 2015).

For example, the activities of the Ministry of Education and Science of the Russian Federation in licensing higher education should be classified as administrative (state services), and the activities of educational authorities of regional state administrations in licensing preschool education as municipal services.

Conclusion

Among the main directions of state reform there is the creation of a new legal framework for public administration, scientific and information support of its system. The priority of legislative regulation of the activities, functions, powers and procedures of Executive authorities, establishing the responsibility of these authorities and their officials for their decisions, actions or omissions, as well as full and high-quality provision of administrative services based on legislation, are of key importance among the fundamental principles of the functioning of the Executive power in a legal state.

During considering the essence of administrative services in the field of education, we note that it is the activity of Executive authorities on rendering educational services, which should be attributed to the category of services in connection with the presence of features common to all management services: the provision of public services is always preceded by the treatment (application) a individual or legal entity in the administrative authority; the need (and the opportunity) of receiving specific public services directly provided by the law; the law gives the power to provide each public service to the appropriate Executive or local authority; a person in accordance with the law has the right to require the authority to consider an application for the provision of services; in order to receive public services, individuals and legal entities must meet certain requirements defined by law (i.e., the established procedure for providing the relevant service must be observed.

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The Development Efficiency of The Dairy Subcomplex of The Agro-Industrial Complex is The Basis of Food Security

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Abstract

The annual reduction in the number of cattle, including the number of cows, actualizes the problem of providing the population with dairy products and milk. The purpose of the article is to consider the main indicators of milk production and consumption in the Sverdlovsk region. The authors highlight the main reasons for not reaching the threshold values indicated in the Doctrine of Food Security for Milk and Dairy Products. The article uses the economic and statistical method. The empirical basis of the article is a case study of the development of the dairy subcomplex of the agro-industrial complex.

Keywords: Food Security, Self-Sufficiency in Food, Agriculture, Dairy Production.

Introduction

In a rapidly changing economy, an increase in the world's population, more and more attention has been paid to the problems of providing the population with food, as well as self-sufficiency in food due to limited resources. Unfortunately, at the beginning of 2020, the Russian Federation did not reach the thresholds set by the Food Security Doctrine for self-sufficiency in milk and milk products, thus we can talk about the loss of food independence. The threshold values (target values) for the main food products are presented in Figure 1.

Provision of basic foodstuffs to the population

Milk production is one of the main directions of ensuring the «national security of the country» [9.3]. The Food Security Doctrine, approved in 2020, approved changes to the methodology for calculating food independence indicators. Namely, an indicator of self-sufficiency in food has been introduced.

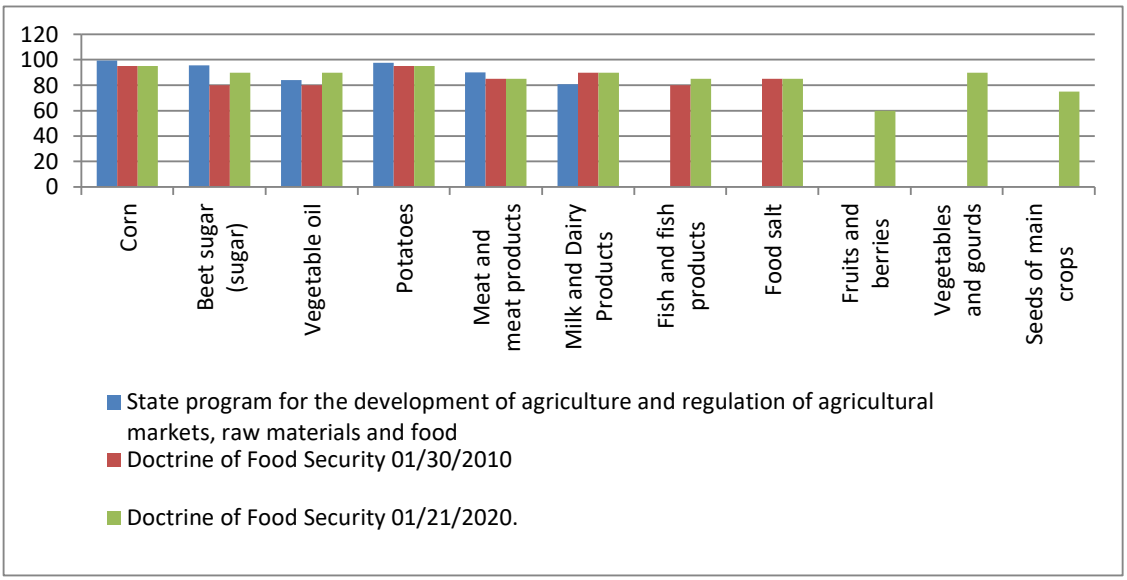

Fig. 1: Target indicators of the State program for the development of agriculture and regulation of agricultural products, raw materials and food markets for 2013-2020; thresholds set by the Food Security Doctrine in 2010 and 2020.

Analyzing the indicators of the "Doctrine of Food Security" and the State Program for the Development of Agriculture and the regulation of markets for agricultural products, raw materials and food, we note that they practically coincide. Moreover, the targets of the State Program exceed the threshold values of the Doctrine of Food Security, for example, by 4.3% for grain; sugar - 5.5%; potatoes - 2.6; meat and meat products - 5.2%.

Self-sufficiency indicators for salt and milk have not been achieved. Thus, according to the Doctrine [1,2], threshold values for domestic salt are set at least 85% in the domestic market, and its only 63.6%, and milk - at least 90%, but it is produced 82.4% of the total volume of domestic consumption, i.e. below the indicator set by the Food Security Doctrine by 7.5 pp.

Table 1: Production of marketable milk in the Russian Federation, million tons for 2013 – 2018

Manufacturers of commercial milk	2013	2014	2015	2016	2017	2018	Rates of growth, %
Agricultural organizations	13,0	13,5	13,8	14,2	14,8	15,4	118,46
Peasant (farm) enterprises and individual entrepreneurs	1,2	1,3	1,4	1,5	1,7	1,8	150,00
Households	4,5	4,7	4,5	4,5	4,3	4,3	95,55
Total	18,7	19,4	19,6	20,3	21,0	21,5	114,97

Compiled by the authors on: https://agrovesti.net/lib/industries/dairy-farming/rossijskij-rynok-moloka-i-molochnykh-produktov.html

These tables reflect an increase in production of marketable milk by 114.97%, which is associated with an increase in milk productivity mainly by agricultural organizations. Moreover, the average annual growth ranged from 1.03% to 3.74%.

In recent years, there has been a decrease in the number of livestock cows due to the replacement of inefficient livestock by breeding animals. Thus, the total number of cows in the Russian Federation decreased over the same period by 5.8%, and milk production increased by 13.9%.

The level of milk consumption is also reduced from 248 kilograms per capita in 2013 «to 229 kg in 2018» [6]. At the rate recommended by the Ministry of Health of the Russian Federation - 325 kg per year per capita. Thus, «per capita consumption of milk and dairy products» [5.7] is 29.5% lower than the established norms. This is due primarily to rising prices for milk and dairy products while reducing real incomes of the population.

Consider the indicators of production and consumption of milk and dairy products in the Sverdlovsk region, table 2.

Table 2: Indicators of development of dairy cattle breeding in the Sverdlovsk region in 2015-2018

Index	**2015**	**2016**	**2017**	**2018**	**growth rate / decrease,%**
«Profit (loss) before tax» [2], thousand rubles	5344249	4604971	3847391	4764824	89,16
Net profit, thousand rubles	5238405	4451700	3784553	4613394	88,07
Total farms	264	271	245	246	93,18
Livestock, heads	192182	193033	191205	190541	99,15
including cows	82638	82304	82134	81477	98,59
Milk yield per 1 forage cow	6393	6616	7143	7473	116,42
The cost of producing 1 centner of milk, people / hour.	1,94	1,88	1,69	1,56	-0,38
«The cost of feed for the production of 1 centner of milk» [6], feed units	1,0	0,99	0,95	0,96	-0,04

Compiled by the authors at: https: //mcxso.midural.ru/

An analysis of the data in the Sverdlovsk region regarding the development of dairy cattle breeding indicates an annual decrease in the number of livestock for 1641 cattle during the four years under study, including a decrease in the number of cows for the same period - 1161 animals. “The effectiveness and efficiency of milk production is characterized by a system of natural and cost indicators” [6.8]. So the main indicators of the efficiency of the production process can be: productivity, labor intensity, level of production costs. Milk production in 2018 compared with 2017 increased by 104, 4%; the production cost of milk, over the same period, changed by 102.3%; and the increase in the commercial (full) cost of milk occurred by 101.47%; milk sales volume changed by 103.8%. At the same time, we note that the level of profitability (excluding subsidies) decreased by 11.1%; taking into account subsidies by 8.5%, which is associated with a decrease in selling prices. Every year, with the support of the regional budget, new farms are modernized, reconstructed and built. Agricultural producers, including using state support funds, in 2018 purchased more than 1,100 units of livestock equipment and machinery.

Consider the influence of factors on the «cost of one centner of milk» [4,6], table 3.

Table 3: Factors affecting the cost of milk in the Sverdlovsk region

PPeriod	«Production cost of 1 centner of milk»		«The milk yield per 1 forage cow per year»		«Labor costs per 1 cent. milk, people / hour.»	The cost of feed for the production of 1 centner of milk, feed units	Cost of feed unit, rub.
	rub.	growth relative to the previous period,%	kg	growth relative to the previous period,%			
2013	1492	-	5874	-	2,26	0,99	642,8
2014	1567	5,03	6361	8,29	2,0	0,97	705,4
2015	1761	12,38	6393	0,50	1,94	1,0	791,3
2016	1927	9,43	6616	3,49	1,88	0,99	882,5
2017	1956	1,50	7143	7,97	1,69	0,95	926,0
2018	2001	2,25	7473	4,62	1,56	0,96	945,3

The data in the table indicate an increase in the production cost of milk in the study period by 134.05%. Positive dynamics is observed in terms of «milk yield per feed cow» - 127.22%, which is associated with an increase in breeding stock; «Labor costs per centner of milk» decreased by 30.97%, which is associated with the mechanization and automation of the industry; “The cost of feed units” increased by 147.06%, which is associated with an increase in the cost of purchasing imported feed.

Description of the dairy industry of the Sverdlovsk region.

At the end of 2019, the production of raw milk increased in the Sverdlovsk region by 22.9 thousand tons. In order to increase the competitiveness of agricultural producers in the territory of the Sverdlovsk region, the state program «Five-Year Plan for the Development of the Sverdlovsk Region» is underway, within the framework of which the "Ural milk to every house" direction is being implemented.

The main producers of milk and dairy products in the Sverdlovsk Region are: Alapaevsky Dairy Plant; Serov Dairy Plant; Krasnoufimsky dairy factory; Irbit Dairy Plant; dairy factory “Milk grace; Slobodoturinsky milk factory "Hope"; dairy plants "UMMC-AGRO". For example, milk processing at the largest plants in the Sverdlovsk region has changed as follows. Alapaevsky Plant increased processing volumes from 20162 tons in 2015 to 27375 tons with a production capacity of 25,000 tons; Irbit Dairy Plant increased processing volumes from 109095 tons to 167371 tons (production capacities are calculated on 226177 tons). In table 4, we consider the dynamics of milk production.

Table 4: Milk production by organizations of the Sverdlovsk region for 2015-2019, tons (fragment)

Milk producers	2015	2016	2017	2018	2019	Rates of growth, %
Kilachevsky	28444	29569	31314	34049	34049	119,71
Kamenskoe	21415	22517	24483	24557	24557	114,67
Ural collective farm	17228	18048	18048	22116	22116	128,37
Agrofirm Irbitskaya	13212	13212	13212	17710	17710	134,04
Nekrasovo-1	9637	10792	10792	15857	15857	164,54
Collective farm named after Chapaev	н/д	12339	12339	14287	14287	115,79*
Agrofirm Patrushi	12347	11015	11700	13020	13020	105,45

** The calculation was made to the level of 2016.*
Compiled by the authors at: https://www.dairynews.ru/

The increase in milk production is increasing annually in all organizations under consideration, which is a positive trend. At the same time, the price level of agricultural producers remains low (25.3 rubles per liter in 2019 against 24.4 rubles in 2018). Retail prices are several times higher, which undoubtedly restrains the growth of milk production by both large agricultural organizations and households. Along with price disparity, there are shortcomings in building relationships between agricultural producers and retail retail chains, which have a significantly larger share in the total income from the sale of dairy products.

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Managing Edible Garden at Postgraduate Urban Campus in Jakarta, Indonesia

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Abstract

Urban campuses have a role in educating future generations and empowering society to live sustainably. Campuses' gardens usually functioned as an aesthetic aspect of a campus area. Gardens have a much positive impact on society and environmentally. With the rise of environmental issues such as increased carbon gas emissions from food-producing activities, land-use change, the idea of implementing an edible garden has been around for the last decade. There are few studies about the implementation of edible gardens in Indonesia's urban campus, especially postgraduate urban campus. This paper discussed what the university thinks about the concept of the edible garden and how to manage it properly. A qualitative method was used for this research by conducting an in-depth interview and literature studies. The results of this study are that the university was interested in implementing an edible garden at the urban campus, and one of the problems in managing the gardens were lacking gardening skills and human resources. This study indicates that the concept of an edible garden is reasonable and can add the university's sustainable campus program.

Keywords: Edible garden, urban campus, sustainable society, sustainable campus program

Background

Universities have a role in educating a better generation and future leaders to create a sustainable future (Fu *et al.*, 2018; Geng *et al.*, 2013). Strong commitment and support from the academic community, which consists of the faculty members, staff, and students, can create an environmentally friendly education infrastructure for a more sustainable campus (Anis *et al.*, 2018). Urban campuses are designed differently compared to rural campuses. Rural campuses often have large green open spaces with broad spaces between each building. Some urban campuses have to reduce their open spaces to fulfill their dwellings. Some campus designs are focused on reducing energy, waste, and making a greener infrastructure. Meanwhile, there is little research about the campus garden, which is one of the identities and images of a university because it is the first area visited by campus residents or guests (Hanan, 2013; Speake *et al.,* 2013). Besides identities and images, the campus garden has a much positive impact socially and psychologically (Fu *et al.*, 2018; Lumber *et al.*, 2017; Schebella *et al.*, 2017; Soga, Gaston, & Yamaura, 2017). To achieve campus sustainability programs, some universities implemented the idea of community gardens by involving their students (Young, Scheuer, and Roush, 2016). Community gardens, as part of urban agriculture, are one of the possible solutions for urban food security and maximizing land uses in urban areas (Banderas *et al.*, 2019). According to Philips (2013), some local organizations usually provide resources and training for novice urban farmers. The initial process is assisting for the first two years with a soil test in the park to be used. Urban farmers

are encouraged to share what they have learned with family and friends and become mentors in the first year of the program.

Not all urban campus is suitable for community gardens due to the limitation of space, and postgraduates student spent a smaller amount of time in the campus garden compared to secondary and undergraduate school. Most campuses in Jakarta, Indonesia, have limited spaces and green areas. Therefore, edible landscaping or edible garden, which is a smaller scale of the community garden and an innovative concept by planting vegetables, herbs, and fruit trees with the ornamental plants, might be a solution for a more sustainable campus (Tayobong *et al.*, 2013). The plants that were chosen to be in the edible garden have an aesthetic value, such as bright-colored fruits and flowers. There has not much research focusing on managing edible gardens in postgraduate campuses in urban areas, especially in Indonesia. This article focuses on why the concept of the edible garden is suitable for urban campuses in extension to Tayobong *et al.* (2013) study and how to manage the campus edible garden. This study is necessary because there are few studies about urban campus gardens, especially in Southeast Asian countries, and edible gardens could be one of the solutions in urban areas.

In designing campuses, universities are putting many efforts in creating a comfortable environment for their dwellings. It is essential to build a comfortable environment because campus residents spend most of their time on campus area than any other place (Gulwadi *et al.*, 2019; Lee, Chou, & Huang, 2019). This intention was to decrease burnouts (Stigsdotter and Grahn, 2003) and to improve occupant's productivity (Gray and Birrell, 2014). An urban campus often imagined as a small urban ecosystem that can provide its needs socially or naturally sustainably due to its size (Lauder *et al.*, 2015). Liprini and Coetzee (2017) found that more than half of the students choose classes with garden views and prefer to spend time in the garden than rooms. Environmentally, gardens in urban areas can create a small ecosystem and act as a public space, which is a significant component of sustainable city development(Wai *et al.*, 2018).

McFarland, Waliczek, and Zajicek's (2008) study said that students who used the campus garden more often have a higher quality of life than passive users. Users will use the garden if the garden is well-maintained and appealing. Most gardens are in European style, which uses ornamental plants. The ornamental plants do not maximize the potential of land use and adjust users' needs (Uren, Dzidic and Bishop, 2015). Highly manicured gardens are perceived as unnatural and make the garden unattractive(Speake, Edmondson and Nawaz, 2013). Most campus gardens in urban areas used ornamental plants because it is easier to maintain, but ornamental plants create an unnatural look, which perceived negatively by the users. The aesthetic value and attraction of campus gardens rely on the diversity of species and how designers design the layout of the plants (Salama, 2008; Lau and Yang, 2009). The maintenance of the garden relies on garden caretaker's skill and garden management. Personal knowledge, social norms, garden rules, and security also some factors that can make an impact on the garden's condition (Preko, 2017; Sawitri *et al.*, 2015). Besides the caretaker's skill, information regarding garden rules should be socialized from the management team to garden users, which are students and other staff. In maintaining the garden, it is essential to socialize garden rules to keep the garden conditions at its prime. These external factors can influence people's behavior toward the use of space according to social cognitive theory (Sawitri, Hadiyanto, and Hadi, 2015; Preko, 2017).

When it comes to planning campus landscapes, campus residents, including students and garden caretakers, are less involved in the process. The lack of communication between the caretakers and the administrators can lead to abandonment and ungroomed landscape on campuses (Philips, 2013). The edible garden is a concept of smaller urban agriculture that is operated by a group of people from the local community, and it could be implemented in open spaces, both public and private (Conway, 2016). The local community can produce some portion of their food while engaging social participation and increase social inclusion (Scharf *et al.*, 2019). Besides social benefits, the edible garden also increases biodiversity and integrating humans with nature and their food (Philips, 2013). With the combination of edible and ornamental plants, aesthetically, the garden still looks as beautiful as a conventional garden (Sima *et al.*, 2010). In Indonesia, some primary and secondary schools have their TOGA gardens, which are herb gardens, as one of the requirements for entering the Adiwiyata Program

(Adawiah, 2019). However, there is not much research about the implementation of the edible garden in Indonesia's universities.

Universitas Indonesia (UI) is one of the oldest, prestigious, and greenest universities in Indonesia (Anis *et al.*, 2018). It has two campuses, one of them is the oldest campus in Salemba, Jakarta, the capital city of Indonesia. Campuses space in Jakarta is often limited, including Universitas Indonesia in Salemba. UI Salemba was selected for this study because UI was the founder of UI GreenMetric and had intriguing features. The campus is for postgraduate students, and located in a dense urban area with small gardens or Lau and Yang (2009) called pocket gardens. Previous research about Universitas Indonesia was conducted in Depok, not in Salemba. The first objective of this paper is to know the campus staff's opinion about current garden management. The second objective is to know their opinion about the idea of an edible garden in the campus area. This research aims to create a more sustainable campus garden management in UI Salemba.

Methods

Interview

The population of both garden management staff and garden user were unknown numerically. Snowball sampling method was used to obtain the garden caretaker and campus staff, who conduct activities in planning and manage the garden. In total, there were two categories of the interviewees, which were the university staff and the garden caretaker. Three university staff were interviewed, which consist of one staff who manage a part of UI Salemba's garden, one staff from the planning division, and one staff from Occupational Health and Safety (OHS), both located in UI Depok. There were only two garden caretakers in one of UI Salemba garden areas that were recommended by the staff.

Purposive sampling method was used to determine the number of garden users, in this case, were the postgraduate students. The criteria of this category were to have been in the campus area for more than a month, used campus garden at least more than three times per week (Holt *et al.*, 2019), spent more than 15-20 minutes on the garden (Domae, 2017; Holt *et al.*, 2019). All of the criteria means that the postgraduate students were an active garden user, by assuming they knew the condition of the garden policy and current problems. The researcher also asked what kind of garden they had in mind and what kind of activity they do in the garden. Four postgraduate students were interviewed. The researchers observed the garden users and caretakers in order to know their activities. A participative observation was done between, on average 8 a.m. to 5 p.m.

Methodology

The research study used a comparative method by using a small face-to-face semi-structured interview consisted of; the concept of current garden design, information about the university's garden policy, current garden management, current problems related to garden management, and opinion about the concept of an edible garden. The interviews lasted about 20 minutes to 30 minutes. The researchers took notes on the interviewee's answers and conduct content analysis to identify the interviewee's experiences in managing the gardens. When the answer to the interviewee was less relevant to the research goals, the researchers asked some questions to get back to the main topic. Triangulation was used to compare the answers and to strengthen the validity of the interviews.

Results and Discussions

The Concept of Current Garden Design

Based on Lau and Yang’s (2009) studies found that the campus garden users use the garden for a place to releases stress. The results of the interviews with four postgraduate students and based on the researchers’ observation, the users used the garden to gather and chat, relax, and to reconnect with

nature. Through the semi-structured interview, all postgraduate students thought that the campus garden was supposed to be a recreational area where they can release their stress. These results aligned with Salama (2008) and Domae's (2017) study about the usage of campus gardens as a social space. According to Lau and Yang's (2009) research, the garden users used the garden as a place to relax and reconnect with nature. As expected, most interviewees agree they preferred a well-maintained garden with greeneries. One of the interviewees liked a garden that has a lot of colorful flowers. Our study shows that attractiveness and aesthetic value, seating, and meeting areas are essential for the users, and they attract users to use the gardens. This finding is consistent with Lau & Yang (2009) and Salama (2008) 's studies.

Universitas Indonesia uses UI GreenMetric for its green campus program (Anis *et al.*, 2018), especially in UI Depok. The results of our interviews with one of the staff from the Management and Service Facilities Department (DPPF) there was no clear concept applied to UI Salemba yet. The OHS staff mentioned UI Depok applied forrest campus concept. The current concept was an ornamental garden. The OHS staff said that UI Salemba also applied some of the same concepts as UI Depok, but they did have some trouble on-site because of the limitation of green open space in Salemba. They were trying to create some vertical gardens to meet the criteria from UI GreenMetric. The staff in UI Salemba also said that he was still searching what kind of concept is suitable for UI Salemba, and he had an idea of planting some edible plants. All three statements mentioned by the staff were aligned.

The Information About the University's Garden Policy

When the researchers asked the staff in UI Salemba about any policy regarding the garden, he answered:

> *"Not much policy was given or known; all I knew that it is prohibited change the structure of the building and appearance of the building."*

The staff from DPPF also stated that it was unclear if the university had a policy specifically for the garden. The staff did not know precisely regarding the campus garden's policy because it came from a different department. He mentioned that the design of campus gardens was from the planning department. The researchers interviewed four postgraduate students, who were active garden users concerning the socialization of the campus garden's policy. All of them knew there were signs of smoking prohibition, but nothing more than that information. The continuity of campus care depends on the relationship between students, faculty members, designers, and staff (Fu *et al.*, 2018). Student B also proposed it for proper signage. Socialization might improve the garden's quality and user's knowledge of maintaining the garden.

Current Garden Management

The garden maintenance came from the DPPF, and they did inform how to take care of the garden to the employees at UI Salemba. According to our interview with UI Salemba's staff, there were seven janitors, and two of them were assigned to take care of the garden. The university staff, both in UI Salemba and Depok, and the caretakers said that the janitors' main job was to clean the buildings. Maintaining the garden was not a priority. All of them never been trained or educated by the university and the outsourcing for gardening. They spent two to three hours in the garden. However, sometimes, if the garden caretakers had no time to take care of the garden due to their other jobs, their colleagues would help them. Two caretakers also mentioned this statement; one of them worked in Salemba for ten years said:

> *"We did not get any training before we work on the garden area. Luckily, I'm interested in gardening, but it would be better if they give us some instructions or training. I want to grow my gardening skill."*

While the second caretaker said that he was a farmer before he worked in UI Salemba:

> *"I was a farmer; I planted corn, beans, cassava, and many more. No, we did not get any training."*

Through interviews, all interviewees mention that cleanliness was one of the main problems. The UI Salemba staff explained:

> *"It is hard to keep the garden fully clean and green because not all caretakers understand about plants. They do not have the skills to take care of the plants properly. They did try to plants some chilies and took great care of them. Unfortunately, the chief, who came from Depok, did not like the appearance of it since it looks untidy."*

The older caretaker said that they tried to keep the garden clean, but the users could not maintain the garden properly. He suggested:

> *"Someone should scold them (people who litter) face-to-face, so they are embarrassed."*

Discussion

In order to validate these statements, we conducted a participative observation and found three factors that made the garden unclean. First, the users did not maintain the garden' cleanliness, and then there was not much action taken when someone litter. Lastly, the janitors were only being seen at a certain time due to their other duty. These findings are aligned with (Sawitri *et al.* (2015) and Preko's (2017) studies on which external factors could affect other people's behavior. The communication between the garden users, staff, and caretakers need to deepen in order to aim for a more sustainable garden management.

The last part of this study was to know the interviewee's opinion about the edible garden. The idea of an edible garden was taken positively by all interviewees, mainly the caretakers and UI Salemba's staff. The caretakers were enthusiastic about the idea of the edible garden. Their background, both as farmers made them excited to plant edible plants, and the older caretaker said:

> *"We can get something for planting edible plants. I prefer edible plants more than ornamental plants. I can taste my labor."*

However, to have a sustainable edible garden, the garden caretakers need to be trained and educated so they can keep the garden's condition at its prime. The caretakers were chosen to be the ones who maintain the edible garden because it was their job to tend the plants, and the postgraduate students did not have any time to look after the garden. The university could collaborate with some local urban farmers to give the caretakers or maybe the janitors about taking care of an edible garden, as suggested by Philips (2013). There should be a dialogue between the users, staff, and garden caretakers to maximized the campus garden's condition. The image of the university will rise, and the users can enjoy the garden if the condition of it is at it is best.

Conclusion

This study aimed to know the current concept, management, problems in the campus garden, and the opinion of the concept of an edible garden. This study shows that the concept of an edible garden is reasonable in an urban campus. An edible garden could motivate the caretakers and increases the image of the university. It maximalized the usage of green space, especially in urban areas, which have some limited space. To have an edible garden, all stakeholder needs to work together. The universities can expand their relationships with local urban farmers and added a campus sustainability program for making the edible garden program. This research contributed to the ongoing development of environmental science and urban edible garden. We recommend more research done in other universities, education stages, or other building typology. However, our study has some limitations that

need to be taken carefully. Our research cannot be generalized because of the restricted research area and limited interviewees.

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State Regulation in The Sphere of Nature Management and Environmental Protection in The Russian Federation: Problems and Prospects of Development

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Abstract

This article deals with the theoretical and legal foundations, current status and problems of public administration in the field of environmental protection and nature management in the Russian Federation. Special attention is paid to the importance of state policy measures in the environmental sphere. The authors identify the difficulties of interaction between the Federal and regional authorities in implementing a unified environmental policy, and propose measures to improve their integration and strengthen vertical cooperation between the center and the subjects. Also, the authors pay attention to the problems of insufficient economic incentives for environmental protection. The article suggests the possibility of borrowing foreign experience of forms of economic incentives in the field of environmental protection, which have proven their effectiveness. The conclusion is made about the need to improve the legislative regulation of the environmental sphere of the Russian Federation. The authors have developed prospects for the improving of environmental policy of the Russian Federation in the coming years. During the research there were used such methods as analysis, synthesis, classification, comparison, and forecasting.

Keywords: Environment, Environmental Management, Environmental Legislation, Public Administration, Economic Incentives, Taxes, Resource Conservation, Environmental Policy.

Introduction

One of the priorities of the internal policy of the Russian Federation, which each year raises concerns both in academic and political circles and among the public, is the activity on the protection and ensuring of environmental quality. Economic changes in recent decades, is characteristic practically for all countries of the world, forced to pay special attention to the issues of nature management. An important role is played by measures of state control in the sphere of environmental protection, because the effectiveness of the policies implemented by the government in this sphere has an effect on the ecological security of not only individuals, but society as a whole (Vorontsov, A.L., Vorontsova, E.V., 2017, 2018).

In modern science the environmental management is described as the process of using the natural environment to be undertaken in order to meet the needs of the individual and society while respecting the restrictions imposed by environmental legislation (Ryzhenkov, A.YA, 2014) The

importance of clever nature management and the need for its consolidation at the legislative level are that any exploitation of natural resources of the environment requires a judicious use of natural wealth and scientifically substantiated, a thorough examination and consideration of the laws of nature.

Today, the authority for state management of environmental protection includes a range of measures for the enforcement of applicable environmental laws, which are represented by a number of normative legal acts. Among them there are codified as (Land, Water, Forest, etc. codes) and uncodified documents (Federal laws "On environmental protection", "On ecological expertise", "On specially protected natural territories", etc.). In addition, the Russian legislation also establishes the legal (administrative, criminal) liability for failure to comply with these standards. In this case, the law is one of the major preventive mechanism to alert the commission of environmental offences, which can lead to irreversible changes and cause a natural disaster.

However, in practice there are often problems with environmental law enforcement and law-abiding behavior in the field of environmental protection. Unfortunately, Russia is on the list of countries with the worst ecological situation in the world. As noted by the Chairman of the Russian environmental movement (RED) R.R. Nurgaliyev, the ecological map of Russia has more than 300 points of high environmental hazard, and the country according to international studies is recognized as one of the most polluted ones in the world.

Of course, the environmental policy of any state, including Russia, presupposes the active engagement of various participants: public authorities and institutions, law enforcement agencies, public associations and organizations, media, voluntary associations, etc. However, first and foremost, nature management is the scope of public interests, for this reason the fundamental priority role in environmental protection should be played by the state that has the greatest resources and mechanisms. The state has the powers of possession, use and disposal of natural resources, and may also establish legal restrictions in this area, therefore special attention should be focused on measures of state management in the environmental field. Today they include such areas as management of natural resources, the formation of efficient use and reproduction of natural resources, preservation and restoration of the favourable status of the environment (German, T.L., Kuruzov M.V., 2017).

In the present conditions the activity of state management of the use of natural resources and environment protection is carried out by various state authorities with relevant competence and functioning at different levels of government.According to the article 72 of the Constitution the issues related to environmental management, environmental protection and ensuring environmental security, as well as with protected areas, are joint competence of the Russian Federation and its constituent territories.

So, in Russia at the Federal level the state control in the environmental field being implemented by the Ministry of natural resources and ecology of the Russian Federation and subordinated to it of Federal services, agencies and organizations. Also, an important role is played by the Ministry of agriculture of the Russian Federation and its subordinate Federal agencies. This authorities carry out on the state level the formulation of environmental policy, normative legal regulation, control and oversight in this area.

With regards to the regional level, it should be noted that in state management of environmental protection an important role is assigned to constituent territories of the Russian Federation, which are almost completely vested with the authority of the Russian Federation in the field of water, forest resources and hunting. The regions are actively engaged in the management of subsoil areas of local importance, the protection of existing and creation of new regional protected areas (Popov, N.V. Radchenko S.YU., 2013). Laying on the subjects of a number of such important tasks due to the fact that they are experiencing the strongest negative impact from the breach of the condition of the natural environment, and also possess the necessary information to monitor the situation and take adequate management decisions.

It is logical to assume that regions by giving of timely "signals" to the Federal center, providing information about the ecological status of territories, will greatly help the implementation of the environmental policy of the Russian Federation as a whole and cause it to move in the right direction. It will facilitate the need for appropriate legal and organizational measures. At the same time, Russia still has not established the procedure for interaction between the centre and regions in the sphere of environmental protection. We believe that our country needs this mechanism in connection with the similarity of the ecological situation in a number of subjects of the Russian Federation and the need for joint protection of the environment. For example, a set of ecological problems of the Central Chernozem Region of the Russian Federation is associated with the development of the steel industry, which pollutes groundwater, while the Northern Caucasus actively fighting for the salvation of the Azov and Black sea basin and the unique recreational resources of the Black sea coast. In turn, coastal cities such as Novorossiysk, Yeysk, Tuapse suffer from severe pollution of the coastline caused by the high intensity of transportation of oil and other goods (Eliseeva, A.V., 2015).

The Federal centre and regions should strengthen vertical coordination between them that will help to develop the integration ties and to direct their joint efforts towards meeting the vital environmental needs of regions and ensuring ecological safety of the population (Vorontsov, A.L., Vorontsova, E.V., 2018). In turn, the Federal centre will carry out the summarize and analyze of information derived from regions and in addition to developing the General environmental course shall focus on particular problems of nature management of the region or group of regions.

If we speak about the practical measures it should be noted the urgent need for formation of a special coordinating authority that includes representatives of various regions of the Russian Federation. The purpose of the creation of this authority is carefully designed at the national level the concept of state policy in the field of nature, which will be implemented, taking full account of regional environmental problems and interests. One of the promising directions of work of this authority is seen to develop at the Federal level, specific regulations (for the Far East, Volga, North Caucasian and other groups of regions), which should be focused on current problems in the sphere of environmental protection. We believe that this practice will have a positive impact on the environment of the regions, will improve the quality of life and reduce the threat of environmental disaster, as relevant to each territories of the Russian Federation.

The most important problem of state environmental management in Russia, may be attributed to lack of economic incentive measures in this field. In the conditions of active development of market economy, maintaining high economic growth is impossible without carrying out of appropriate environmental measures. Otherwise, the reverse side of economic prosperity can become a huge damage caused to the environment, depletion of natural resources and the actual reduction in level of national income. In this question it is necessary to agree with I.C. Ryabokon, who claims that in the Russian Federation is currently almost no forms of economic stimulation of rational nature management. The amount of payment for negative impact on the environment and the mechanism of its charges do not stimulate enterprises to implement environmental technologies (Ryabokon, I.S., 2015).

Certainly, the increasing independence of economic activity of subjects exacerbates the problem of insufficient efficiency of existing economic and management tools capable to interest managers of various levels in addressing environmental problems of a region. It is important to note that the measures of economic stimulation of rational nature management are given priority in some foreign countries with developed legal systems. So, many European countries have adopted a range of tools and methods for motivation of resource-saving and environmental protection. In addition to the introduction of various "environmental" taxes (a tax on carbon emissions in Italy, France, the Netherlands, the tax on waste disposal in Germany, the excise tax on fuel and petroleum products in Australia) tax policy of most countries applying the active stimulation of environmental activities, provides for tax credits and incentives for manufacturers and consumers of more environmentally friendly products. The income that the government receives from "environmental" taxes, as a rule, invested in the development of technologies that increase resource efficiency and reduce

environmental pollution as well as in state support for the environment. For example, in the UK and Japan state environmental programs are financing by this income (Sedash, T.N., 2015).

The current status of financial and economic incentives in the field of environmental protection provides an opportunity to specify that a significant part of the economic instruments of environmental management set out in Russian legislation still does not apply or applies in a very limited scale. In this regard a promising direction for further development of the environmental sector of the Russian Federation is the adoption of foreign experience and implementation of ecological-economic incentives as one of the leading forms of state control in the sphere of environmental protection. The list of measures in this sphere is rather wide and includes the preferential taxation and crediting, the establishment of special pricing on the production of environmentally friendly products, accelerated depreciation, funding of environmental programmes etc.

In our opinion special attention in the environmental policy in the tax field should be given to the the concept of "double win" that uses in number of developed countries. The essence of this concept is that economic incentives for resource conservation through the establishment of "environmental" taxes should be carried out together with the proportional reduction of the tax burden associated with social benefits. This scheme brings effective results, allows to stimulate employment growth and support the competitiveness of domestic producers that is demonstrating by foreign experience (Kolotyrin, K.P., 2009).

We believe that the effectiveness of the proposed measures in the field of environmental protection will be achieved only in the case when the state will take under its control all the above mechanisms, comprehensively using existing powers. An important element of the policy considered in this article must also be suitable legal support. Unfortunately, the existing legislation, despite its variety, is characterized with insufficient detail and lack of consistency. For example, the Law of the Russian Federation "On environmental protection", sets only the basics of the state policy in the field of environmental protection to conserve biological diversity, natural resources, environmental security (Borenstein, A.L., Pozdnyakova, E.V., 2019). However, until now there is no legal act associated with the direct provision of the protection of environment and regulation economic incentive of environmental protection. We believe that the adoption of these legal instruments should be the first step towards the formation of a qualitatively new approach to the ecological policy of the Russian Federation as a whole.

Conclusion. Thus, the modern Russian state problems in the field of nature management and environmental protection and resolving them are needed a unified state policy. However, measures of the state control undertaken in this field do not reasonable and consistent. So, there are serious shortcomings in relations between the Federal center and the regions in the field of regulation of the environment protection. In addition, there are no effective economic instruments stimulating the use of natural resources. Today one of the most important directions of social - political activity of the state is the organization of nature management, which will ensure a relationship of economic and ecological well-being.

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Legal Aspect of The Regulation of Migration Processes

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Abstract

The problem of national and public security acquires increasingly relevance in the modern world. And migration politics of the state plays an iImportant role in it it. Today this problem is an especialy accute because of the rapid development of international relations and intensity migration processes, and as a result – sharp increase in number migrants both in the Russian Federation and beyond. In this regard, there is the need of improvements of legal regulation of the migration policy of the world community. Today, along with rapid development of international relations there is a dramatically groth of the intensity migration processes, and as a result – number migrants. Because of obligations adopted by Russian Federation assotiated with compliance of human rights there is a need to ensure the rights of the individual to freedom of residence and freedom of movement. This is leading to the process of formation of updated outlook, wherein any human disorder spur him to find the best share. One of the consequences this disorder is migration which help people to find the best life for meet various levels of requirements, ranging from physiological (required for survival) to needs in self-knowledge (implementation potential opportunities). There are several main directions of migration policy. This is development of legislation in the field of migration to ensure rights of the individual to freedom of residence and movement; its adaptation of international standards; regulation of migration processes into account the interests of national security, socio-economic and demographic situation in regions and state as a whole. The authors come to the conclusion that current legal status of migrants does not full compare with the international experience and modern content of migration relations and its insufficient legal regulation leads to the illigal migration, which has a destructive impact on political, social and cultural life, as well as negative effect on the security in the country and around the world.

Keywords: Migration, Migration Policy, Legal Support, Human Rights, Improvement.

Introduction

Because of obligations adopted by Russian Federation assotiated with compliance of human rights there is a need to ensure the rights of the individual to freedom of residence and freedom of movement. This is leading to the process of formation of updated outlook, wherein any human disorder spur him to find the best share. One of the consequences this disorder is migration which help people to find the best life for meet various levels of requirements, ranging from physiological (required for survival) to needs in self recognition (Arkov, S.V., 2018, Zemskova, A.V., 2007, Tumaev, A.K., 2016, Chekhovich, S.B., 2011).

According to legislation of the Russian Federation citizens of the Russian Federation, foreigners and stateless persons who are lawfully site in Russia can leave the territory of the Russian Federation freely and citizens of Russia – to come back. The Constitution of the russian federation says that foreigners and stateless persons who are lawfully site in Russia have same rights and freedoms and also bear same responsibilities as citizens of Russia with the exceptions established by the Constitution, laws or international contracts of the Russian Federation.

Foreigners and stateless persons have the opportunity to protect their rigts by treatment in court or other state authorities, and national legislation sets that they have the same procedure rights as citizens of the Russian Federation (Alekhin, A.P., 2012).

The Constitution also secured provisions concerning the certain categories of migrants by providing the right for persons seeking for havense to get it in order established law. Legislation also provide development and implementation state return programmes of deported peoples. It should be noed that this is a significant step forward in legal recognition of this problem as problem of state importance.

This way The Constitution reflects various aspects of the migration processes, provides the foundations of their regulation, the rights of the individual to freedom of residence and freedom of movement.

Since legislative rules that governing migration processes has not codified in a separate Migration code of the Russian Federation, we need to examine the system of main laws in this area of public relations and supposed our vision of the problem situation.

Migration legislation of Russia is presented by system of several current Federal laws. The main of them are "On the order of departure from Russia and entry in Russia" 15.08.1996, No. 114-FZ; "On the legal satus of foreiners" from 25.07.2002, No. 115-FZ; "On refugees" 19.02.1993, No. 4528-1; "On citizenship Russian Federation" from 31.05.2002. No. 62-FZ etc.

It should be noted that the law, as any other legal act, has a limit to its implementation. This limit is defined in three aspects (dimensions): time; territorial applicability and the set of persons to which it applies.

The migration laws of the Russian Federation by set of persons are devided on general laws - apply to the entire population of the country; special laws - apply to a separate setof persons, namely, foreign citizens, stateless persons, and refugees.

So this differentiation allows to differ migration laws on two groups. The first one includes Federal law "On citizenship of the Russian Federation" from 31.05.2002, No. 62-FZ, "On the right of citizens of the Russian Federation to freedom of residence and freedom of movement within the Russian Federation" from 25.06.1993 No. 5242-1.

The second group of laws includes: Federal law "On the order of departure from Russia and entry in Russia" from 15.081996, No. 114-FZ, Federal law "On the legal status of foreigners" 25.07.2002, № 115-FZ, Federal law "On refugees" from 19.02.1993 No. 4528-1 etc.

According scientific literature the appropriate transformation constantly take place in Federa law "On the legal status of foreigners". On the basis of its name and the subject of legal regulation this Federal law should define various categories of foreign citizens and stateless persons in the Russian Federation. At the same time this act is a basic for the extensive entire system of migration legislation. It is dominant in this system and provides consolidation of all other regulatory legal acts in the field of migration in a single system. However, the permanent changes of its content leads to destruction of the system properties and approaches to development of migration legislation as a whole (Prudnikova, A.S., Sandugey A.N., 2018).

The right of citizenship is an essential human right. No one can be deprived of citizenship or the right to change citizenship. In Russia there is single citizenship – citizenship of the Russian Federation. For this reason, the Federal law "On citizenship of the Russian Federation" adopted in accordance with the requirements of international legal acts (ConventionsI on the reduction statelessness, August 30, 1961.).

This law consideres life conditions and interests not only immigrants but persons without the status of immigrants in the Russian Federation. Consequently it is possible to classify persons by grounds for acquiring legal status of immigrants. Some of them are connected with the Russian Federation by territorial origin or previous permanent residence on its territory, as well as their descendants. And others previously had no ties with the Russian Federation or who have been granted refugee status in the Russian Federation.

The connection between the implementation of the provisions of the Federal law "On citizenship of the Russian Federation" and migration can be traced through such an important aspect as the acquisition of Russian citizenship by territorial origin, i.e. by people who was born in the Russian Federation, including persons previously deported outside the territory (Chekhovich, S.B., 2011).

It should also be noted that the link between the institution of Russian citizenship and migration processes is also reflected in the principle of preserving Russian citizenship regardless of the place of residence of a Russian citizen. Citizenship is an important element of the constitutional and legal status of an individual. At the same time, this is one of the essential elements of the domestic and foreign policy of a country.

Federal legislation providing for the registration of individuals is designed to ensure the implementation of the constitutional right to collect, store, use information about an individual (personal information) and meet the needs of society in relation to the processing of such information, as well as in accordance with international obligations of the Russian Federation..

The legislation defines the legal and organizational basis for the implementation of the unified system of state identification, registration and accounting of individuals, aimed at introducing a system of registration of individuals at their chosen place of permanent or temporary residence; processing and use of personal information by public and local authorities, organizations, institutions and enterprises of all forms of ownership, as well as individuals who perform the relevant professional duties. This effects the settlement of migration processes and ensuring the national security of Russia (Lihachyov, S.V., 2015).

Legal documents also establish the list and requirements for documents identifying of an individual, and regulate questions about documents identifying of Russian citizens and foreigners in the Russian Federation.

Thus, registration is necessary to citizens of the Russian Federation, as well as foreign citizens and stateless persons who permanently or temporarily reside on the territory of the Russian Federation on legal grounds. It allows:

- to protect the rights of individuals to freedom of movement and residence within the Russian Federation;
- to create conditions for permanent communication between an individual permanently residing in the territory of the Russian Federation and the state for the exercise of mutual rights and performance of mutual obligations;
- to regulate relations associated with the accumulation of personal information and ensuring its intended use in the interests of protecting human rights and national security of the state.

As the primary step in the chain solve migration problems is the implementation of the Concept of migration policy of the Russian Federation for the period up to 2025 (approved by the decree of the President of the Russian Federation from June 13, 2012), as a component of the Concept of national

security of the Russian Federation, its main provisions are intended to ensure a uniform methodological approach to develop a vision of the migration process in Russia to determine the role and place of migration in socio-economic and political life of the state, identify the directions of the mechanism for regulating migration and outline the main possible positions for its implementation.

It should be noted that Russian legislation considers the state policy as a set of measures implemented by the state to regulate migration processes, create conditions for the realization of the intellectual and labor potential of migrants, build a democratic legal society, ensure proper socio-economic and demographic development, and observe the principles of protecting national interests, security and territorial integrity of the Russian Federation (Raksha, N.S., 2018, Vorontsov, A.L., Vorontsova, E.V., 2018). Legal documents define the main directions of migration policy:

- development of the legislation of the Russian Federation in the field of migration in order to ensure human rights to freedom residence and movement and adapting it to international standards;
- ensuring the regulation of migration processes taking into account the interests of national security (Lihachyov, S.V., Goncharov S.P, 2016, Sandugey, A.N., 2016) the socio-economic and demographic situation in the regions and the state as a whole, effective management of these processes and migration control by strengthening the interaction of state authorities and education;
- creation of favorable socio-economic conditions for stimulating internal labor migration as an alternative to external labor migration;
- creating conditions for the integration of migrants from among foreigners or stateless persons into Russian society, their adaptation, as well as socio-economic conditions for investment in the Russian economy of funds of Russian citizens who work abroad;
- prevention of mass unregulated migration processes, combating illegal migration and illigal labor of migrants, human trafficking and other criminal manifestations in this sphere;
- creation of effective mechanisms to support the free-will return of refugees, persons seeking or receiving asylum in the Russian Federation, forced migrants to their States, permanent residence or other safe countries;
- development of research and educational activities in the field of migration, conducting awareness-raising activities aimed at preventing discrimination and xenophobia against migrants;
- international cooperation in the field of migration.

The next fundamental law in the field of migration is the Federal law "On the legal status of foreigners" (25.07.2002 No. 115-FZ), which defines the legal status of foreign citizens and stateless persons in the Russian Federation, establishes the basic rights, freedoms and duties of foreign citizens and stateless persons who reside or in the Russian Federation, as well as the procedure for resolving issues related to their entry into or exit from the Russian Federation.

An important element of the formation of migration legislation is the definition of the conditions and procedure for immigration to the Russian Federation of foreigners and stateless persons. Immigration to the Russian Federation is carried out in accordance with certain quotas established by the Government of the Russian Federation for each calendar year. It also provides for the granting of permits for immigration outside quotas, regulates the issues of departure and expulsion from the Russian Federation of persons in connection with the cancellation of an immigration permit, appeals against decisions on immigration issues, actions or inactivity of state authorities or officials (Polyakova, N.V., 2016).

Federal law of the Russian Federation "On refugees" of 19.02.1993 No. 4528-1 establishes the procedure for granting and revoking refugee status, appealing against decisions regarding refugees, the rights and obligations of refugees, and the powers of Executive authorities that decide issues concerning persons applying for refugee status, with a view to cooperating with international organizations in the field of refugee protection.

In the legislation the term "refugee" means a person who is not a citizen of the Russian Federation and owing to well-founded fear may become a victim of persecution for racial, religion, nationality, citizenship, membership of a particular social group or political opinion. This person is outside the

country of his nationality and can not enjoy the protection of their country or unwilling to use it, or has no citizenship and is located outside the country of his previous permanent residence, is unable or unwilling to return.

Migration issues are also regulated by a number of resolutions of the State Duma of the Russian Federation, which include the main directions of state policy in the field of migration rights. For example, it is the strengthening the reality of the right to freedom of movement and residence in the Russian Federation; humanization and effective implementation of legislation on refugees and internally displaced persons; promotion of the system of non-judicial protection of human rights and freedoms; support of public organizations in the field of human rights protection.

Conclusion

The effectiveness of the state migration policy is closely related to improving the coordination of actions of authorities that are responsible for implementing the state migration policy; establishing internal and external information links that meet international standards; improving the management of migration policy in the field of forecasting, organization and control, as well as creating a modern legal framework. Today the legal support of migration processes is regulated by numerous laws, acts and international agreements, which often contradict each other.

In this regard, there is an urgent need to systematize migration legislation and adopt the Migration Code of the Russian Federation, which will contribute to the effective regulation of migration issues in Russia.

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Conceptual Foundations of The Administrative Process as A Component of Public Administration

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Abstract

In the process of building a democratic, social and legal state, there is a corresponding change of opinion on some fundamental political and legal values and realities of practice. Moreover, it is not only about the so-called change of accents, but about fundamental changes and absolutely new approaches and ideas about established phenomena and traditions. The search in this direction is urgently necessary within the administrative law reform, implemented not only in the Russian Federation, but also in many countries of the world. The consequences of the reform depend crucially on what kind of administrative models will be implemented, what understanding of the base principles and the goal of state management we will adhere to. For the formation of modern scientific, methodological and legal foundations of administrative reform, we need a corresponding study of the essence and features of the administrative process in modern conditions from the perspective of public administration. We can perform this task by considering this concept at the conceptual level, through the ratio and definition of categories, with the help of which it is possible to transmit the content of administrative and procedural activities. The questions of defining the essence of the administrative process, highlighting its features, its tasks and principles have always attracted the attention of scientists. So its understanding reflects the dominant ideas about the essence and purpose of administrative law. The issues of proper regulation of the conditions and procedure for the implementation of laws and bylaws, as well as comprehensive and effective protection of rights and freedoms of citizens, within the administrative and procedural activities, are becoming particularly acute in modern conditions. Currently, during the public administration reform, there are a corresponding changes in the views on a number of fundamental political and legal values and realities of practice, which include the administrative process and, accordingly, administrative and procedural activities. Therefore, for the formation of modern scientific, methodological and legal bases for reform in the administrative sphere there is the need of appropriate scientific research of a wide range of issues that cover the problems of administrative procedural activity.

Keywords: Administrative Law, Administrative Process, Public Administration, Principles, Proceeding, Stages, Legal Process.

Introduction

The process in the legal sense generates and forms a set of administrative and procedural relations, which are an independent type of legal relations. There are four elements that are necessary for the emergence of any procedural relations: the norm of substantive law, the norm of procedural law, legal personality and legal fact (Bityak, Yu.P., Zuy, V.V., 1999).

D. N. Bahrah (Bahrah, D.N., 1996) defines the essence of the legal process as the power activity of authorized entities aimed at solving specific legal cases and sufficiently fully regulated by procedural norms.

We will point out that legal processes are a kind of social processes. In the literature, the following features are distinguished: it is a conscious, purposeful activity; it is associated with the exercise of power by subjects of power; it is programmed to achieve certain legal results, aimed at solving legal cases; intermediate and final results of the process are fixed in official documents; full (or mostly) regulation of activities by legal procedural norms.

The author mentioned above defines the main features of the legal process:

1) this is an activity in which authority is exercised. Both citizens and organizations participate in relations, but the leading role belongs to the bearers of public power. Authority distinguishes the process from various procedures (conclusion of contracts, organization of press conferences, registration, etc);

2) the result of procedural activity is the resolution of legal cases (adoption of a normative act, admission to citizenship, application of sanctions, etc.). Therefore, it is issued with official documents, both interim and final);

3) procedural activity is regulated by procedural norms that define the participants in the process, their rights and obligations, jurisdiction, sequence and timing of actions, rules for processing documents, making, appealing, and executing decisions (Bahrah, D.N., 1996).

The modern administrative process in should be focused not only on the consideration of cases of violations. The main thing in the administrative process is that it is the procedure for citizens and legal entities to implement their statuses in the administrative sphere. This leads to a number of important conclusions concerning not only individual issues, but also the most essential principles of administrative law, the problems of administrative proceedings as a whole.

The concepts of formation (reform) and development of administrative procedure legislation develop from the emphasis on understanding the essence of the administrative process. It should identify sub-sectors (Executive authorities; civil service; administrative and legal regimes; administrative process and lawfulness in management, etc.), within which it is possible to consider and adopt laws that contribute to the stabilization and strengthening of the rule of law in the country.

Modern political and legal realities that are developing in the Russian Federation, cause the gradual overcoming of the old concept of administrative law. In the current conditions, administrative and legal support should be designed to implement the interests of society, the state, social communities and citizens. Therefore, the modern concept of administrative law cannot limit its horizon to issues of public administration. In this regard, the areas of administrative and legal regulation, “participation” and “protection " are expanding, as points out Yu. A. Tihomirov (Tihomirov, Yu. A., 2001).

The range of administrative and legal methods bythe degree of ensuring, expanding and narrowing the behavior of object is very wide – turnouting, regulatory, departmental, registration, licensing, administrative, contractual, prohibiting, etc.

In this regard, it is appropriate to emphasize the unique fundamental role of administrative law for the entire complex of branches of common law. It serves as the primary basis for them in the form of subjects - authorities and imperative legal norms that have both areas of independent manifestation and development, and areas in which they operate as in other branches (financial, environmental law (Vorontsov, A.L., Vorontsova, E.V. and others, 2017).

Without exaggeration, administrative law can be considered as a basic branch in the legal system with a powerful imperative and regulatory potential for the functioning of the Executive power and ensuring public interests in many areas of state and public life.

All elements of the procedural mechanism have a complex structure. So, its normative link is also complex. Of course, the objective law of any legal branch, not only procedural, but also material, consists of various legal norms and other elements. However, this is not what is meant here. In particular, the legal process arising in a certain case is not served by separate rules, which is typical for legal relations in the substantive legal branches, but in each case, almost the entire branch of procedural law comes into effect and creates a complex and integral regulatory framework for the functioning of this legal process. This specific feature of procedural law has been noted in procedural theory.

Thus, M. A. Gurvich wrote that the procedural law is applied in each case, as a rule, in full and establishes a complete abstract form for the process (Gurvich, M.A., 1972).

Administrative actions related to the implementation of permits, registration, preparation of legal acts, and execution of administrative acts of a law enforcement nature are considered procedural. Here we are talking about a variety of administrative procedures and corresponding administrative and procedural rules. In such a situation, as well as taking into account the dualistic role of the administrative process, there are sufficient grounds for considering the administrative process itself in two aspects.

In the first case (administrative and jurisdictional aspect), the activity focuses on the implementation of law enforcement functions by Executive authorities (officials) through the commission of legal actions in their traditional sense.

In the second case (administrative and procedural manifestation), the activity is represented by administrative actions of Executive authorities (officials) to implement administrative and legal procedures that are not related to jurisdiction. This is the implementation of licensing, registration, and other functions and powers.

In any understanding of administrative-procedural activity, actions performed by Executive authorities (officials) result in the issuance of non-normative (i.e. individual) legal acts, through which administrative-legal norms are applied to specific circumstances or to individuals.

This solves various cases in the field of public administration. The implementation or disposition (procedure) or sanction (jurisdiction) of the relevant rule of substantive administrative law depends on the nature of such cases.

Therefore, the subject of administrative and procedural activity is individual cases. An individual administrative case is understood as an issue related to the application of administrative and legal norms that arises in the sphere of public administration and requires administrative (operational and Executive) actions of authorized Executive authorities (officials) in order to solve it (Kolpakov, V.K., 1999).

Provisions of the legal norms almost are implemented in the individual action of certain authorities on the facts of an individual nature (for example, the fact of an administrative, disciplinary offence, upon the issuance of a permit to exercise a certain activity, upon appeals against unlawful actions of officials, etc.). The resolution of such cases is the basis of the administrative process.

The procedural status of a citizen is expressed in the fact that it has established procedural rights and obligations and the actual ability to implement them in the course of consideration and resolution of individual administrative cases. A citizen can initiate the jurisdictional process by their respective actions (for example, filing a complaint, application, etc.), demand that the authorities and officials to familiarize with the case materials, provide evidence, give explanations, etc. (Raksha, N.S., Utkina, O.V. 2016).

Traditionally, they distinguish the following specific features of the administrative process:

a) the administrative process is related to public administration and its legal forms, which are implemented in legal forms;

b) the administrative process is related to the substantive rules of administrative law; this ties is manifested in the fact that in the course of implementing the tasks of administrative law, individual cases are resolved in public administration and the rules of substantive law are effectively applied;

c) the application of substantive law is carried out in a legal order regulated by administrative and procedural rules;

d) the administrative process is not only the application of the norms of substantive law, but also the corresponding activity, as a result of which there are social relations regulated by the norms of administrative procedure law.

These features of the administrative process are successfully reflected in the following definition of its purpose. The purpose of the administrative process is pre-planned results, which can be achieved using appropriate methods and tools (Bityak Yu.P., 2000, Lihachyov, S.V. 2016).

Consequently, administrative and procedural rules are intended to regulate the exercise of jurisdictional powers in the procedural order mainly of Executive authorities (officials). This goal is achieved by establishing legal rules for administrative or judicial review of individual administrative cases of various contents.

The definition structure administrative and jurisdictional activities (for example, stage), the exercise of the relevant procedural action, order management process decision-making individual cases and their implementation are also very important.

A big role for understanding content administrative procedure norms has mechanism of procedure guarantees for citizens participants jurisdictional production. Thus, there is a legal form of protection the identity of the citizen from violations of his legal and administrative status, system legal and administrative guarantees the rights and legitimate interests.

Procedure principles of administrative rights are sustainable the basis on which is development and implementation of specific norms. Principles point to the orientation of current right, they are the embodiment of social values. The principle – fundamental theoretical knowledge that does not require evidence. It is clear that the principles are not something incomprehensible and metaphysical. They are the product and generalization of diverse social practices.

M.I. Baytin (Baytin, M.I., 2000) points out by determining the fundamental value of the principles of law, that this principles are the “base of formation and action of the right as a democratic or totalitarian. Principles of law express the main and most important in the law, trends of its development, on what right must be focused”. The principles are primary in relation to rules and more sustainable. At the same time during rapid transformations you may experience the gap existing rules from the new understanding social relations, purpose and functions of law.

Principles provide reality of law when considering and resolution of administrative cases, using of administrative measures and also in procedural production.

Among the basic principles of administrative proceedings allocate the legality, transparency, competence principle, the principle of safeguarding the interests of the state and the individual, the principle of immediacy, the principle of rapidity and efficiency of the process, the principle of the material truth, the principle of availability, the principle of responsibility of officials for the proper and efficient conduct of the process for identifying bureaucracy in the processing of complaints, etc.

Thus, the administrative process is carried out in accordance with the principles used in public administration, and in this regard, the principles are also an element of the structural and content characteristics of the administrative process. At the same time, these principles get specific features, shades, and generate new principles.

In structural terms, the administrative process consists of two parts that are equally regulated by the rules of administrative process law: firstly, the activities of public administration authorities to resolve specific cases, and, secondly, the relations between the participants of this activity. Therefore, an administrative process is an appropriate procedure that takes place within the procedural legal norms.

The structure of the administrative process, in terms of its dynamics, is relatively stable in the scientific literature. The following stages are common to the administrative process:

1) preliminary analysis of the situation (in different proceedings it may be called differently: administrative investigation, verification of a complaint, discussion of a legal act, etc.), during which information about real facts is collected and studied. This information is recorded on physical media in the form of protocols, references, diagrams, reports, etc.;

2) making a decision (order, resolution, instruction), which fixes the will of the subject of power. A decision is a conscious and volitional act of choosing one of the existing possibilities. It contains new information created by the subject of power. As an administrative act, it is usually mandatory and obliges, prohibits, authorizes, deprives or terminates something;

3) appeal against the decision and its review (optional);

4) implementation of the decision, which means the materialization of orders, their transformation into real actions, rights, relationships, processes, goods.

In law-making processes, the final stage is the publication of the act, bringing it to the attention (Tihomirov, Yu. A., 2001).

In some cases, it is advisable to complicate the procedure for the Executive power to make decisions on certain categories of cases, and to establish additional stages. So, a number of proceedings (on complaints, etc.) are supplemented with stages of initiation of the case, in the proceedings on administrative offenses, of revision of decisions (Raksha, N.S., 2016).

Most stages of proceeding can be divided into steps– a set of actions aimed at achieving a certain intermediate goal. For example, in the second stage of proceedings in cases of administrative offenses, there are such steps: preparation for consideration of the case, analysis of available data, adoption of a decision, bringing the decision to the attention of the offender, the victim, and organizations. Thus, a specific proceeding has a four-level structure: actions-steps-stages-proceeding.

From the point of view of the content, nature and specifics of individual cases, the administrative process is a set of administrative proceedings, the difference between which is determined by the subject of the proceedings (Lihachyov, S.V., Avdeeva, S., 2016).
Administrative proceeding is a legally regulated procedure for performing actions that ensure legal and objective consideration and resolution of administrative cases. The concept of administrative proceedings are covered the order of consideration of citizens complaints, the licensing and application of administrative coercive measures, etc. – all these types of administrative proceedings.

The species diversity of administrative proceedings can be reduced in accordance with the classification of administrative and procedural activities into two generalized groups:a) jurisdictional proceedings; b) procedural proceedings.

Both groups of administrative proceedings have some common features: mainly non-judicial procedure for the consideration of cases; legal and power bases; regulation of administrative procedural rules; administrative-procedural relations and principles, etc.

It should be noted that in the administrative and legal literature, the problem of understanding the structure of the administrative process, i.e. the allocation of specific proceedings, has always been debatable. Moreover, disputes are not only about the name of a particular proceeding, but also about their total number.

So, there are the following types of proceedings: for the development and adoption of normal acts; for the adoption of individual acts of governance; the application of administrative preventive measures of administrative punishment; on affairs about administrative violations; in cases of misconduct (disciplinary proceedings); registration and permitting; regulatory (made for the implementation of control and supervisory powers); on petitions; on land, pension, tax, fiscal affairs, etc.

Conclusion

Administrative-processual activity is regulated by procedural norms of administrative law and is implemented in administrative-procedural relations. Outside of legal norms, the administrative process does not exist as a phenomenon of legal reality. The boundaries of administrative-procedural activity are defined in such a way that not all cases are resolved within the administrative process, but only those that are subject to the procedural order established by administrative-procedural norms.

The administrative process can be defined as the activity of executive authorities (officials) regulated by administrative and procedural norms, the content of which is the consideration and resolution of individual administrative cases arising in the sphere of public administration, in order to implement the tasks and functions of the executive power. The qualitative essence of the administrative process is that it is a legitimate procedure for citizens and legal entities to implement their statuses in the administrative sphere.

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Managers' Perception of Spaces in Organization-Qualitative Research Report

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Abstract

The paper presented to Readers is a study reporting on a preliminary results of qualitative research conducted among a managerial staff of enterprises. The area of research was an analysis of a perception of space in organizations. The results of the research indicate a significance of an inner workspace (microspaces), its image (light in space) and an importance of a common canteen, a place of rest in a company (shared space). The results of the research are part of the stream of interpretation of space as materiality of organizational space.

Keywords: Organization, Space Model, Operationalization, Managerial Staff.

Introduction

This paper presents the results of qualitative research related to the analysis of the perception of space by managers in organizations. The presented survey report is related to the implementation of a research project devoted to the analysis of various dimensions of space in the organization's activities. In recent years, there has been a progressive interest in space, understood as a part of the analysis of the materiality of an organization (Ropo et al. 2015). This position can be traced back to the opposition to the social and constructivist approach to the analysis of an organization that has been dominant in recent decades. Space understood as distance are concepts related to economics, economic geography. In the management sciences of, it is worth pointing out, for example, the issues of designing workstations (open space, hot-desking mode of office work), theories of location, the advantages of agglomeration, logistics, new managerial roles (Pachura, 2019). At the same time, the recent period related to the rising importance of globalization and network economics and knowledge in the organization has resulted in greater interest in the issue of space. As T. Hernes notes in one of the first extensive studies devoted to the issues of space, space has not been so far the subject of systematic scientific research in connection with the functioning of the organization (2004). The aim of the article is to present the results of qualitative research performed in a group of managers of various organizations. The scientific goal was an attempt to answer the question about the way the managerial staff perceives the organization's space. The research was conducted on the basis of theoretical assumptions of the conceptual model.

Applied Methodology

Individual In-depth Interviews is one of the most widespread and elementary techniques of data collection among the set of qualitative research. This technique can be understood as form of conversation which is structured, yet at the same time, endowed with purpose, realized during interaction determinated by researcher (Pachura, 2019a). On epistemological level it is assumed that valuable knowledge about social world can be discovered, understood and interpreted during human interactions. Since the dawn of time, conversation was a method of gaining information and knowledge. In the following research project it was also decided to apply high-degree standardization interview. Also, the process of its analysis had oriented and troublesome character, as well as the procedure of meticulous encoding of full research material was dropped. Abundance of selected cases in qualitive research and its characteristics are not determinated rigidly – as in quantitative research – as well as there is lack of strictly formulated absolute procedures and rules. In source literature, pragmatic tactics of reaching optimal number of interviews is estimated by so-called theoretical

saturation of cases, which is based on observation of succeeding individuals in a way, that previous research determinates it. As a result of such a sequential action, the theorical data saturation is reached, so the situation in which incoming information in next samples duplicate those gathered so far and do not enrich already collected research data materially. Interviews took place in office space, on neutral ground, in discreet conditions, without third parties and other distracting incentives. Interviews were recorded entirely, which was agreed with interviewees (each time documented). Interviews were realized with businessmen, who worked in small and medium-sized companies with people on executive and independent positions. This article presents and analyses ten selected interviews, representative of the entire sample analyzed in the course of the research.

Operationalization of Conceptual Model of Spaces

During casual interviews respondents were evaluating aspects connected with functioning of organization in direct/physical space; glocal space, cultural, social and political space, cyberspace.

The researchers used number of methods characteristic for qualitative research. In the first place there was counterfactual measurement. The measure was connected with problem of causality, which is based on logic derived from counterfactual framework. This conception can be characterized as statement "what would happen if ?". In conducted interview's questionnaire for objective research purposes, the counterfactual measurement was applied to diagnose ideal states in all of organization's performance. Innovative and enriching procedure for research questionnaire is application of questions in form of metaphors, which were intended to characterize organization's structure and organization itself. Respondent's choice will therefore be illustration of way of thinking about organization and perception of their nearest working environment. Another procedure, which found using in organization's structure research is projective questions**,** which involve personification of various roles in organization. In research reference point for respondent were social roles in family. The metaphor of the family, as basic unit of society enables diagnosis of distance on the line managers-employees, as well as determination of the organization's hierarchization degree.

Structure of Space Model

On the basis of earlier proposed division, the preparation of conceptual research model (Fig.1) should be initiated with outlining five aspects which characterize organization's space:

1. Physical space of organization (1);
2. Glocal space (global and local space of organization), (2);
3. Cultural, social and political space (context space), (3);
4. Cyberspace (4);

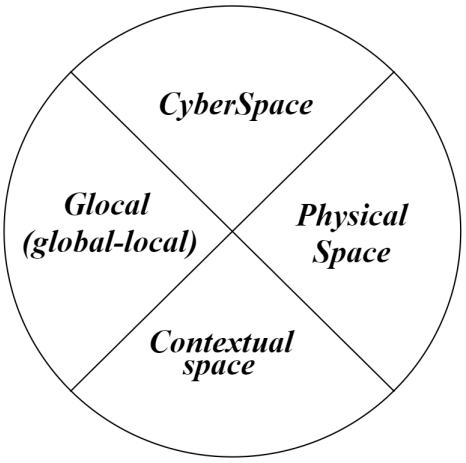

Fig. 1: Elements of space model (source: autor)

Questions concerning internal space (1) of organization allowed to locate aspects of organization's functioning connected to the concept of company's arrangement and internal space. Next questions were used to assess internal space surroundings – structural aspect, transfers and dynamics of organization's development. Measurement of attitudes towards organization's external space was based on triad of questions concerning exterior objects, which were located close to the company. These questions were seemingly questions about facts. This type of questions is only assessed qualitatively. In this case counterfactual questions were applied, which allowed respondent to present their own concept of organization's structure. Global and local space (2) are two aspects, which add up to glocal space. In this case, once again the triad of counterfactual questions was used, both open and closed. During research factors connected to the structure of company's functioning were rated. Dominance of the open questions gave better field of analysis for tested individuals, as well as the possibility to take in holistically certain aspects of organization's functioning. This part of research was focused on structure of the organization and confirmation of predictor for quantitative research. Another field of research is analysis of the contextual aspects (3) of organization's functioning. In this aspect, in field of researcher's interests included cultural, social and political dimension of organization's functioning. The basic dimension of analysis in this case was employers activity, which reflects cultural level of organization. Qualitative research concerning this aspect left a lot to do for test individuals – narrative open questions and focused on establishment of the factors, which affect taking activity in above shown dimensions. In the age of widespread virtualization important aspect of organization's functioning is their presence in cyberspace (4). Rating this aspect of the organization's operation at the stage of qualitative research, the crucial part was to establish condition of the possession of the ICT devices and the terms of using them. Next examined issue during narrative interview was additional services associated with equipment and method of servicing IT. Second task connected with aspect of cyberspace applied to activity in global network. Open questions were focused in the first place on order of company's activity channels on the web (e.g. managing fanpage, micro-blog), followed by assessment of the company's innovation level in this range.

Results of Qualitative Research

Organizational Physical Inner Space

One of the crucial questions in the scenario was an application of the counterfactual measurement, which enabled respondent's concept concerning ideal arrangement of the organization. This question allowed to obtain not only knowledge about in what conditions respondents would like to work, but also in what conditions they are working currently. It can be noticed from the respondent's answers,

that they rarely analyze their everyday work surroundings. Majority of the interviewees accepted current space in their organizations. Allowing for casual conversations during research gave respondent's a second to think about the aspects, which they would like to change, but also to notice elements, which work for their company's. Counterfactual questions enabled to reach not only to arrangement of the ideal space, but also to get to know present state. It is worth noting, that asked questions created difficulties among respondents concerning determination of their needs. Majority of the questioned interviewees did not have excessive needs about arrangement of the company, as well as their own workplace. Analyzing respondent's answers of all in-depth individual interviews it can be noticed, that the most important element for interviewees in interior space of the organization was:

A) Image (perception of space around)

Almost all of the interviewees emphasized important role of the light in the space. In respondent's opinion, it is the key to good functioning in office. Big windows, not only illuminate the space, but also give the possibility to distract them from work. The view, which is supposed to be connected with natural environment, for example park or square is also important for interviewees (quotes from interviews are in italics). *Big window, I can sit backwards to the window to have a light, I can sit sideways to the window and know what is going on there after all, because you cannot stare the monitor all day. You have to be able to look further." – IDI 2*;*"Windows, for example big and possibility to look. […] Preferably on some nature. Although it can be park or forest, whatever. It would be the best if it was not some loud street" – IDI 9.*

B) Microspaces (e.g. space between desks)

Space which enables freedom of movement and gives certain "intimacy". *"First of all place for work with office space not too tight. So, I don't know how much is there – one and a half or two meters of freedom while by the desk, have a space to spread your things, of course laptop there." – IDI 8*; *"To not have those desks attached, to have some own space, so you can calmly… have ability to get away from desk, put your things." – IDI 2.*

C) Shared space (relaxation room, separate space where employees can rest)

Another important room is creating a place suitable for making and eating meals. Respondent's often said, that even though this kind of place is functioning in their company, it usually is small adapted room, not comfortable and friendly. Preferably for interviewees, it should be space, which allows several people being in the same time simultaneously with comfortable dining room away from office space. From among collected interviews respondents say that what is the most missing in their offices is space for relax and rest from office work. They have seen this space as 20-30 square meters room, arranged as living room with couches or seats. This room enables rest for example by possibility to play foosball, darts. *"I have a concept, I have seen this kind of room in one company, I liked it a lot, 20-some square meters, there was a big sofa there, foosball, I think even darts, also some peaceful space, pastel colors, big windows. Even musical instruments were there. I am not that into this, they could not be there, but only some couch and something to read. Not necessarily electronic media. This room is supposed to be place to rest." – IDI 10*; *"Place where you can sit, set up, I have heard they have this in Google headquarters, the room, where they have some cool pouffes, they can stretch themselves out, relax."- IDI 3*; *"However, I like open spaces due to greater freedom and better contact with coworkers." – IDI 1*

Perfect arrangement of workplace

Respondents did not have any special requirements concerning their place of work. Vast majority of the interviewees chose the desk with essential stuff needed for the professional purposes such as laptop and a landline phone, preferably wireless. Respondents emphasized in their statements importance of comfortable seat and ability to being mobile. Mobility is here understood as freedom

of work also in different rooms or going out to park while working. *"I think, that I wouldn't like to do the conversion, but I think that… current office should be definitely bigger when it comes to the space, because there is actually a lot of us here. The rooms are not big and yet when in such a small works 6 people, especially now when it is so hot it is not enabling environment. Oh yes, when it comes to structure of seating chart it is OK for sure"- IDI 2.* In ideal workplace space interviewees also paid attention to the use of the greenery. In majority of the interviews respondents reminded that especially flowers are good element, which causes friendly atmosphere in nearest surrounding. Also, big windows, which give natural light encourage work effectivity. After analysis of the conversations it can be concluded that, the most important aspects for employees is the need of distraction from office work and change office space into more natural and homelike. Interestingly, majority of the respondents does not have the need to bring into workspace elements from private life. *"I could have photo of my husband, but to be honest, I don't really like sharing my personal life with people I work with." – IDI 3.*

Local, Surrounding Space

In next part of scenario respondents were asked to point out the places and objects, which are located near their organization. As the analysis shows, respondents rarely paid attention to the surrounding of their organization, especially when it was located in developed area for example city center. The biggest amount of flaws, was recognized by people, whose companies where located in the suburbs without complex of shops. Questions of a metaphor character were used to characterize organization's structure and profile. Next question addressed to respondents was to determine company in local context. This question had closed character on a principle of sematic differential. Question was used to investigate local space on determined scale. Respondent rated given phenomenon on the contrast basis, defining their statement between two maximally different positions, where answer in the middle was intermediate value. Local context also interested us during interview. Respondents were also asked if their company can be important in local community in some way. Majority of the respondents thought, that their company is not meaningful in local context, does not play any important part or influence significantly residents.

Global Space

Respondents were asked how do they see their organization in global context. This question showed huge differences between small companies employing up to 50 people and huge companies especially, those which has connections with foreign businesses. Globality, in the respondent's meaning was mainly rich network of foreign connections, creation of companies' branches or sale of their products to foreign markets. Small companies had problems with perceiving their companies as global. It was connected with their lack of foreign contacts. The exception of the rule are companies, which are managing from above by foreign people. Globality in this case is understood as another approach to business. *"The fact that our boss is Belgian, already does its job. Yes, it's different work culture, considering the fact, that he is not Polish, so he came from another work culture, so he introduces otherness aspect. But what kind? First of all, integration of employees, for them to have ability to talk to each other." – IDI 2.* In contrast, big companies do not have problems with locating their organization in global context. Respondents, who work in those companies also spot the minuses. *"It is global company. Offices around the world, which are connected with involved net, various things network…The structure is powerful. I once had a chance to see whole, worldwide structure. "The firm is located in majority of countries in the world, has its own representation, offices, employ hundreds of thousands people around the world*." *– IDI 8.*

Contextual space (cultural, social space)

Closed question with sematic differential was used in this part of the quantitative research. It was a base, which showed organizational and cultural context in companies. This part of interview has enabled knowing the activity-making by coworkers, which is reflected in culture level of the organization. Analysis of interviews with respondents shows, that majority of companies, regardless

of the size of organization, has formalized rules concerning organization's culture. However, deepening of interviewees' statements shows, that those are not strict rules and in majority of positions, which respondents represented, there are informal norms and rules are determined verbally not in writing. *"I don't think so. It is all about dress code. It is pretty obvious for business meetings. In fact, I think it is the only requirement of the company." – IDI 9*; *"There is no formalized form." – IDI 10*; *"We don't have dedicated codex, the procedure code in document form. We have a collection of practice, which we are respecting, but in my opinion it is another point, yes, 'following established rules." – IDI 4.* In this part of the qualitative research respondents were asked to imagine themselves their company as forest, in which besides employees there are also other participants as deliverers, contractors, indirect clients, cooperating companies, authorities and competition. Next, they were supposed to specify what kind of forest animals listed elements were. This question had projective form *(brand part game),* involving personification of involving roles in the organization. It was often misunderstood and problematical for respondents. *"Yes, definitely. When it comes to internal work, hamster. When it comes to customer work, owl." – IDI 2.* The purpose of the interviews was also investigating the relations between coworkers and learning about their possible activities outside workplace. Majority of the relations is based solely and exclusively on the interactions in the inner space of the organization. Respondents notice that it is very rare to meet with coworkers outside workplace. It is cause mainly by lack of time and excess of work. *"Maybe some groups are forming, but all in the office. It means, that in the office over coffee, or in office space we all talk to each other willingly, outside work, sometimes there is meeting, that is to say working, which means everyone is meeting, but for individual meetings, I haven't heard about this, I don't have time and I don't know if others are meeting." – IDI 7*; *"In matters of "work-life balance". There is an issue, that everyone has their own life, it is not necessary to meet so often. There is no need for that." – IDI 10; "Oh dear, there is no need, because we don't have time. We have so much work that, there is simply no time." – IDI 2*. As demonstrated by results of research, relations in organizations are rather moderate both in organization and outside it. People, who were interviewed, because of the type of their job, have not much time for contacts with coworkers.

Cyberspace

The importance of the access to the IT infrastructure was indicated by majority of the interviewees. Almost half of them declares, that company, where they work is sufficiently modern in terms of equipment. *"I think, that we are equipped modernly. Maybe it is not hi-tech equipment, because it is well known, that computer hardware is something, what today is state-of-the-art and tomorrow is outdated. I think, that for now, we are equipped up-to-date." – IDI 7.* In some organizations huge focus on cyberspace development can be observed, especially in trade. Respondents emphasize that, it is important and nowadays necessary aspect of companies' functioning. And this space will be developing. *"Yes, we work on social media. We are on Instagram, on Facebook. We are working on launching new website, online shop. Also, we are going to reach areas like self-help books, tutorials. With some tips. So, there is planed focus on social media." – IDI 1.* Qualitative research shows, that space in the organization is seen in narrow sense. Interviews with respondents revealed that space of the organization is not the subject of reflection on the daily basis. Questions of the qualitative research, were a surprise for respondents and not every one of them was properly understood.

Discussion and Conclusion

Space as an element or dimension of materiality is also analyzed in the context of classical organizational science. However, the sources of this cognitive perspective should be sought in economics and philosophy of materialism. Research on the materiality of organizations in the context of physical space has been developing dynamically for several years, especially in British, French and Scandinavian environments. It is worth noting that this current of research is clearly related to the "materialistic turn" with its roots in Marxist concepts. For example, T. Peltonen examines the significance of materiality in the context of the perception of organizational space in terms of physical space (2012). Similar research is conducted by K. Dale and G. Burrell (2008) or H. Lefebvre (1991), placing it in the broad context of the social concept of *production of space*. The assumptions of this approach are based on an analysis of how material objects manifest themselves,

shape space and why a given space is shaped in this way and not another. It seems that similar results were achieved during the research presented in this article. Qualitative research showed that organizational space in the awareness of managerial and executive positions focuses on the nearest environment. The most important aspect for respondents is direct physical space concerning the organization of the own workplace (Fig 2). It is considered in broad categories of the principle of closed and opened space. In this dichotomous division for majority of interviewees closed space in the most comfortable one (several-people, separate room). Separate office and own desk give personal space, bigger freedom of work, intimacy and ability to focus on tasks. Closed space in preferred especially by people, who work independently. Space of organization is what the center part of the model. Only on the second level of respondent's perception the idea of the whole organization's internal space is outlined, which shows that research is accepted by the respondents, the way it is. Respondents do not have issues with adapting to the conditions in their organization. However, in the perfect type there is an idea of the open company, which offers relaxation space to their employees (Fig. 2). Important aspect, in respondents' perspective is connecting workspace with relaxation space, which is minimal in current conditions. Respondent's opinions demonstrate that the most neglected and uncomfortable interiors in companies are social spaces. It can be observed especially in small companies. The boundaries of the companies are usually agreed on frames of the inner space, which does not have particular influence on the respondents' perception. The interior is the place, where majority of interactions between employees, clients, suppliers happens.

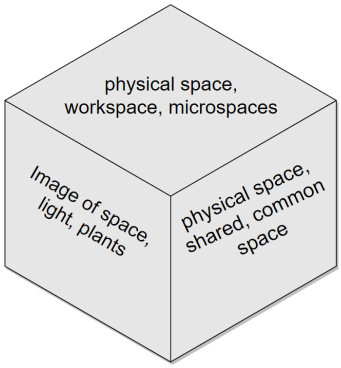

Fig. 2: Materiality of organizational space (source: author)

One of the main conclusions of the research, worth noticing, is the shared space: relaxation and rest space – mentioned by the majority of the respondents. Interviewees referring to the ideal space of the organization put up this aspect to the foreground. It is an interesting observation, which shows that interior space of the organization, in respondents perspective, is not only workspace, but also place to rest or at least they would like it to be. The least important aspect of the space in this research turned out to be glocal space. In the interviewees' awareness it is functioning to the lesser extent. Globality is understood by respondents as well-developed collaboration with foreign clients or organization's belongingness to the foreign owner or global partner. That's why small and medium-sized firms usually do not identify with global companies. Their actions are mainly based on local and regional relations. In qualitative research context space shows, that integrational activity undertook in companies is various and not always connected to the size of the organization. However, the conversations with respondents showed, that regardless if there are team-building meetings, trainings for employees etc. it does not influence significantly the undertaking activities by coworkers outside the workplace. Informal relations, which appear among employees are rather conservative and are limited to the individual people. In conclusion, the qualitative study shows, that the most important aspect of the organization's space is interior "material" space of the company (Fig. 2), but especially assigned place of work (microspaces).

Acknowledgment

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How the Change of Values Leads to a New Corporate Culture – *Post-Modernism, Generation Y and the Digital Revolution: Innovative Structures as an Answer to the Needs of Future Economy*

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Abstract

The change of values in society has been a talked about phenomenon for almost 50 years, starting in the 1970s. Its reality has never been as apparent as it is today due to a change in generations: the so-called 'Generation Y' has grown into taking over the lead in society and thus also in economy with a new set of values which on the one hand are the most defined manifestation of the process mentioned above, and on the other are interwoven in major paradigm-shifts in society as it has been moving from the Modern into the Post-Modern, both directed and driven by the Digital Revolution and the new forms of social life and economy which it has brought forth. This article sums up the meaning of these changes and their consequences for organizations; it explains why it is vital to take part in the social discourse on which they are based and shows how enterprises can use the change of values and the shift of generations to create a stable and sustainable position for themselves in future markets.

Keywords: Generation Y, Digitalization, Change of Values, Innovation

Introduction

Ethical values as a foundation of behaviour and social action determine the coexistence of people within society. Whoever had his doubts about that in the past may have changed his mind recently because of the media presence given to the 'Fridays for Future' movement and the discourse about protection of the environment and climate-change to which they have contributed substantially. Today's change of values in society which has built up momentum due to the phenomena of Digital Revolution and Globalization has an impact on society as a whole. To understand the significance of values in general and of the recent change of values in particular is the prerequisite for sustainable self-assertion within this process, which has been caused by people and can only be directed by people. That applies to every person as well as to every organization, no matter how big or small, no matter to which branch they belong. The pandemic caused by the Coronavirus and its long-term impact on the economy may (rightfully) overshadow such basic but vital truths: still, it will not change them. In fact, they may be even more important once the situation returns to normal.

Values and The Foundation of Economic Enterprises

Each enterprise grows out of an idea of producing certain goods or offering certain services. One of the first steps to reach that goal is to establish a business, which means to give it a legal form, to constitute it according to the law. There is a variety of such forms from which to choose, and whatever the choice may be in the end, it also includes a statement about this enterprise's values. For each legal form is linked to different responsibilities towards the state, society as a whole and groups of stakeholders within. The legal functioning of a co-operation differs from that of a private limited company, and thus it implies a different set of regulations, rules and expectations. Therefore, the choice of a certain legal form for an enterprise also holds a social dimension which to some extend reveals its values and thus can be seen as an act of ethical self-disclosure. This gives a foundation to

the Corporate Identity of a business or an organization, and a framework to its Normative Management which is a prerequisite to the Strategic Management[1]. The Strategic Management sets goals, standards and rules for all activities of and within an organization, and thereby shapes its Corporate Culture. But even if the management does not consciously and deliberately work on establishing common ways of communication, interaction and collaboration, a Corporate Culture will grow based on the shared values of people working together. "Values serve as a mediator between the individual and society, and work is a formative category for the relationship between these people"[2].
In modern society this is not just about 'classic' ethical values like morals, but also ideological values, such as our relation to our environment and its protection, which can manifest in different ways, e.g. recycling efforts, or the use of renewable energies or Carbon-Neutrality.[3] Ideally organizations will pick up on these issues as a part of the social discourse, to point out their own convictions reflected in their Corporate Identity. "An approvable Corporate Identity bears the potential of an extensive influence on the staff."[4] Thus, it can contribute to the creation of a Corporate Culture.

Legality and Legitimacy

The interaction of people and organizations within a society is organized by its laws in which ethical concepts are reflected. They constitute a legal system that provides citizens with security for their co-existence. The values forming the intellectual and moral background of this system derive from and remain an issue of, social discourse[5]; which means that apart from clearly defined laws there is a second level of social affairs, acting as a measurement and reflecting the recent state of social discourse: legitimacy[6]: it is the result of that discourse and it is independent of legality. An issue or an action may be legal but can be seen as illegitimate - it can be understood as legitimate without being legal[7]. Being a part of society, organizations automatically are involved in its social discourse. If enterprises decline to actively take their part in the public discussion about values, they will lose their grip on legitimacy and thus will fail to reach their target groups.

Keeping an organization's doings within the framework of the laws (i.e. on the right side of legality) is expected by the state as the guarantor of order. The expectations of the public exceed that: they not only want an organization to respect the laws given by the state, but to also conform to the ethical standards of the state's sovereign, i.e. its citizens. This attitude is reasonable. It has been nourished by growing global interdependencies of the economies, that have been creating a market, saturated with a multitude of identical products and services, in which international competitors fight for the consumers' attention and money. Since there are often no distinctions of material or quality between various offers of any kind, producers and providers must engage in different ways to position themselves. Thus, organizations portray themselves in the way that individuals do, turning into Corporate Citizens, becoming neighbours of their target groups, taking a stand in discussing important matters, accepting their role as members of social discourse.

The implementation of this role belongs to the tasks of strategic management, for that is how "[...] in general actions are called which relate to the development of potentials for success"[8].
This happens by inclusion, and under provision of all internal management tools, in co-ordination and/or collaboration with, external partners such as "[...] politics and administrations, the media, schools and research institutes, churches, non-governmental organizations […]"[9]. Thus, Strategic Management comprises both a formal as well as a content level, both of which are inseparably linked. Their common base is an organization's self-definition - the Corporate Identity; it is the foundation for the personnel's identification with their employer[10]. On the outside it keeps up the organization's reputation towards all different groups of stakeholders and thus confers faith in its actions. Ideally these tasks are embedded in a co-ordinating concept of 'Integrated Corporate Communication' – a consistent and congruent communication with all internal and external stakeholders[11].

Values and change

The connection between cherished values in society and the formation of, and orientation towards values within the economy becomes apparent whenever there is a change of values. Its effect on organization is even stronger if they haven't been positioning themselves within the process which has brought forth the latest change[12]. These changes are part of a continuous and repeating process that manifests itself in different intensities[13]. Its results are most obviously revealed when and where they cause cracks which form more or less distinct borderlines between 'before and after'.

From an economic point of view such a crack concerning the most recent change of values has appeared within the first half of the 1970s[14]. From a general socio-cultural position it happened within the 1980s[15] and regarded from a scientific position (here: Social Sciences and Economics) it has been the 1990s when this change became visible for the first time[16]. This illustrates well a central mechanism of the change of values. It is not a revolutionary act which wipes away present conditions at a stroke, but an evolution which varies its pace in different social contexts.

When in the first half of the 1970s former economic dynamics steadily came to a halt and thus the predominant paradigm of unlimited growth had to be reviewed, this has been regarded as a structural break[17]. Though this process foremost was seen as being linked to economic change[18], it had an impact on society as a whole (due to the interconnectedness which has been explained above[19]). Following the 1990s interpretation of this event, the break it had brought about had emerged from a situation of material saturation for the majority of people in Western societies and from the sudden realisation of how vulnerable material collateral can become in a crisis - both of which resulted in a return to immaterial values[20]. So much for the theory of the rise of 'post-material' values. It has been made popular by the work of American political scientist Ronald Inglehart[21]: his main hypothesis is based on the model of human needs and their hierarchy which had been depicted by the American psychologist Abraham Maslow in 1954[22]. According to him, human action is directed by the subconscious strife to satisfy certain basic needs, which he divides into those that are necessary for survival and those that grant an individual a chance of personal growth by self-expression. The latter will not manifest before people feel that their most basic demands for (material and social) survival are met.

Inglehart claimed that in Western industrial countries the majority of people had reached an amount of prosperity which had given them material and social security. Thus, they opened up to 'post-material' quests looking for personal fulfilment outside material measures. The decline of economies in the 1970s, so his reasoning went, hadn't stopped this process.

Narrowing down the focus to the economic development disregards the social evolution starting in the late 1960s, which – at least for some, especially younger people – had been formative concerning consumer expectations and behaviour as well as concerning the general attitude towards the capitalist economy[23].

Beck identifies that shift in people's perception of society as evidence for entering a new phase of 'the Modern' which he called 'Second Modern' or 'Reflexive Modern'. While the 'first' Modern had been marked by individualization, to him the 'Second Modern' is defined by pluralism and a dissolution of structures, which does not happen because of a socio-economical change but in spite of it[24].

Uniting both perspectives, the economy based on Inglehart and the socio-cultural approach of Beck, allows for a clearer and more realistic view on the causes and mechanisms of the change of values: socio-cultural aspects naturally get included into the working life and thus into the section of economy whose immanent developments effect people in both their roles as members of the workforce and as consumers, thus influencing their private-lives as well.

The Modern and the Post-Modern

In the 1980s, actuated by the beginning of the Digital Revolution in this decade which started the evolution of today's information and knowledge society, the theory of the Post-Modern as a new era with changing values had been formulated and has remained a matter of discussion ever since.

The 'Post-Modern'[25] (as a label for this period of social change) and its attributed change of paradigms and values has started at different times in different areas of social and cultural life. Its characteristics are best explained in relation to its predecessor, the 'Modern': where the Modern had been defining and substantiating, the Post-Modern has been deconstructing, fragmenting and pluralizing. This perspective coincides with Beck's theory of the 'Modernization of the Modern', a phenomenon born out of the 'Second Modern'.

The targets of post-modern deconstruction are formalities (e.g. social conventions) as well as contents. What had been understood as natural for centuries, e.g. the definition of sexes and gender-roles[26], has been redefined as issues of social construction to leave them to the discretion of deconstruction. And the same applies to the economy.

The Post-Modern's economic doctrine is Neo-Liberalism, whose core is unassailable faith in the self-regulating powers of markets that therefore have to be protected – which is the main goal of its political manifestation[27]. In order to reach this goal, the security of social backing measures by the state (acquisitions of the Modern) is deconstructed as well, becoming replaced by the requirement of people taking care of their wellbeing and personal security by themselves. Citizens in a post-modern, neo-liberal state are turned into 'managers of themselves', becoming both their own product and its marketer[28]. Individual freedom is accompanied by a need of (repeated) self-definition[29]. The downside of a multitude of choices for self-definition is the urge to use them in adaption to constant changes. The expectations and norms of peer groups, the 'chosen families' which one meets on social networks, role-models from the media and statistics provide a more or less reliable framework for facing this daily challenge. The results are 'multiple' or 'fluid identities'[30].

New mechanisms and grades of belonging have been replacing former systems and sources of reference like the class-system[31], family, religion or codes of conduct and other conventions. Everything has become fluid, social communication uses quotations and symbols (including the images of people or brands). Between variant groups and milieus the social discourse about values and assignments of meaning differentiates. The results are common values which form a conjunctive footing for the great social dialogue which – at the same time – alters them. Today's and tomorrow's consumers find themselves the focus of politics', economy's and the media's interest because of their active participation in social life, their purchasing power and their communication habits.

Right now, the population group which is in the centre of this attention are the so-called 'Generation Y' or 'Millennials', born between 1980 and the turn of the Millennium[32]. Their influence on the social discourse of values has been steadily growing with their influence on society[33]. Dietz concludes: "The assumption suggests itself that the recently stated transitions, which have been called 'Generation Y's change of values', are a continuation of the process that has been started in the 1970s"[34].

A Shift of Generations and The Change of Values

Today's younger generations have been brought up in a world in which the perception of the working life (as a factor in the construction of a person's identity) has undergone a major change compared with the last decades of the 20th century. Innovations in information/data technology and communication caused by the Digital Revolution have contributed to the fact that a value like 'plurality', which is linked to personal freedom while at the same time it is demanding of the individual to be flexible in adapting to constant changes, has been turned into a basic requirement for social survival, as which it is promoted now[35].

What distinguishes 'Generation Y' from their predecessors though is not just their socialization between information overload and digital adventure worlds, but their different attitude towards knowledge and its use[36], as well as the fact that they are the first defined generation who grew up with all the various applications of digital technology (and therefore are also called 'Digital Natives'). That grants them acceptance and expertise for this side of post-modern life, touching the corporate world as well as leisure times, and both of these fields have undergone noticeable changes due to that touch. On the one hand a stronger hedonistic streak of the younger generation manifests in the idea that their work, whatever it may be, should be fun. On the other hand, modern communication technology has been starting to wear away the borders between working and private life[37] since the same digital gadgets and tools are used in both of them, and by using them, former spatial and temporal limitations have been erased[38].

Members of ‚Generation Y' are willing to accept demands like constant accessibility and other claims of today's New Economy – provided that the job is worth it and is granting them a chance for self-determination[39]. Which means that what they are looking for, is work that just makes sense to them and their needs (including their requirements concerning communication, learning and personal growth)

> "The compatibility of private life, family and professional activities can be generally improved by flexible forms of work. Here mobile working and the so-called alternating screen-work can noticeably improve compatibility. Access to faster and mobile internet-connections and video-telephony enables more and more professions to be flexible in the choice of their working-space."[40]

A thought which had already been introduced to the discourse about the change of values in the 1990s, stating that "[...] in principal values allow for functioning in a state of cognitive uncertainty, they can 'bridge' missing knowledge and close the gap between skills, practical experience and action [...]"[41], is more relevant today than ever before. The pressure on the individual in society to act in an 'agile and fluid' way has reduced the stability of identities and has led to growing feelings of uncertainty. To compensate for that, stable values are needed. They serve as orientation guides for the task of self-definition, which on the outside is dealt with by using the means of consumerism (e.g. using labels and brands as signs in communication with peer groups). Values represent the lowest common denominator of the various groups within society and therefore allow the individual to adapt, still leaving all options for further self-expression.

At this point within the development of post-modern life, 'Generation Y' are the agents of the recent change of values. Because of their qualities, the members of this age-group have become most interesting to economy. The 'Digital Natives' visibly have gained more influence as customers, marketers and as a growing part of the workforce[42], as managers and decision makers, as innovators, as architects and engineers of future progress. Their values, attitudes and demands determine their behaviour in all social contexts, in the corporate world, in consumption, in education and culture. This includes the wish to get attention and feedback, the longing for self-development and for working in teams[43] according to the ideas and standards of 'New Work'[44] and 'Easy Economy'[45] which include an even greater need for communication and information management.

As a result of a non-representative survey including 101 managers from German banks, carried out by the author between August and November 2019, the importance of 'Generation Y' behind the change of values was confirmed for this segment of the Economy. It could be shown that the banks, being among the leaders of adapting to new standards of digital services within the German economy, have already taken measures to create and implement future-orientated, sustainable forms of organization and collaboration. However, this far efforts have mostly been focussed on singular and mostly structural areas, and have been partly in line with the younger generation's interest. But from the perspective of the 'Millennials' they haven't been sufficient, and for 'Generation X' (still being just as strong and important protagonists within the economy) they have been too far removed from their needs – thus failing to raise motivation significantly as they had been designed to do.

Comparisons with international studies have corroborated the trends and results of this national study: 'Generation Y' is ready (and in general as willing as able) to take on responsibility for the future development of economy[46] and their members are quite diverse in their needs and demands[47]. In general, they call for an agile Corporate Culture with lean management to face future challenges[48]. Its implementation will require a change of paradigms and strategies, which only can be induced and mastered based on a plausible commitment of the top management[49], investments in Human Relations and training as well as in technology.[50]

In organizations the change of value is the natural result of a shift of generations[51] which has to be balanced by the Corporate Culture. This implies transferring of all required knowledge, accepting discrepancies in perceptions and assessments, and in thinking and doing, as an expression of diversity and using them constructively. The most productive way to get there is the implementation of an innovative and creative culture, in which change is regarded as one of the basic principles of growth. This mindset allows for preventing conflicts and – when they do appear – for dealing with them in a much more positive and relaxed manner; it also allows for turning competition into collaboration. At the same time, employees of all generations will find a chance to use their unique resources and skills to contribute to common success and thus to their personal success as well. A Corporate Culture based on a congruently holistic approach[52] (including a view on individuality and diversity as major qualities) transcends the borders of generations and overcomes unwanted discriminations[53].

Therefore, one side-effect of the change of values and its effects on organizations is the need to create a sustainable Corporate Culture. What is required to get there successfully is an adequate management of knowledge. An agile culture asks for permanent education and learning[54]: i.e. learning together, from each other and/or initiated by knowledge-interventions from outside. The less tech-savvy members of staff have to be motivated to open up to the Digital Revolution and its chances. The younger generation(s) for whom this is no challenge at all have to learn why and how to appreciate the knowledge and the experience of older colleagues, how to take them onboard and make them integral parts of present and future strategies. In this context, managers are taking on the roles of relays for the transfer and transmission of knowledge - which requires the will and the chance of permanent increase of knowledge on their side as well.

Naim and Lenka point out that a Corporate Culture based on these principals is creating a positive learning environment which will support the progression of the personnel as a whole. It will add especially to their general functional skills, their decision-making and social competence, their team development, their managing skills and their professional initiative, the recognition of chances, and their sense for networking[55].

Summary

An organization's base of values is its most important strategic asset. It is the normative power behind the Corporate Identity and thus defines the principles of its strategy. It serves as an immaterial unique selling point to position an organization within the markets, and it offers identification to the staff and orientation to applicants.

Since internal as well as external stakeholders are participants in the social discourse which causes the change of values, organizations have to use their own chances for participating in these processes as well, otherwise they may risk their relation to the living environment of employees and customers, business partners and shareholders – which will result in losing the connection to the markets.

The recent change of values is linked to a shift of generations. It has been manifesting ideas and ideals which go back to the 1970s and which now – in the second and third generation – have transcended all of society. The shift between 'Generation Y' and their predecessors ushers in a socio-cultural change which therefore also affects Corporate Cultures.

Post-modern society creates fluid structures and thus demands agile organizations. Its young agents are establishing a framework for new products and services by using digital technologies, while their personal values have been altered from the material to the immaterial.

The Corporate Culture of agile, sustainable organizations which strive for identifying their resources and potentials to use them most successfully generates an understanding of management beyond classic two-dimensional definitions between tasks and relationships[56]. What is needed now is an exchange between the generations, ideally within an agile Corporate Culture of creativity and innovation with flexible conditions for teams committed to collaboration.

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[1] Breuer/Lüdeke-Freund 2017, pp. 40-41.
[2] „Werte bilden die Vermittlungsinstanz zwischen Individuum und Gesellschaft, und Arbeit ist eine prägende Kategorie für das Verhältnis der Menschen dieser Gesellschaft zueinander“ (Krobath, H. T., 2011, p. 19)
[3] Deimling 2016, p. 197
[4] „Eine anschlussfähige Unternehmensphilosophie birgt das Potenzial, weitreichenden Einfluss auf die Mitarbeiter zu nehmen“ (Ibid. p. 169)
[5] Lischek 2018, p. 51
[6] Burkatzki 2011, p. 160
[7] Ibid
[8] „[…] allgemein jene Handlungen bezeichnet, die sich auf die Entwicklung von Erfolgspotenzialen beziehen“
(Bamberger/Wrona 2012, p. 5)
[9] „[…] Politik und Behörden, Medien, Schulen und Forschungseinrichtungen, Kirchen, Non Governmental Organizations […]“ (Gelbmann, U./Baumgartner R.J., 2015, p. 433)
[10] Schönborn 2014, p. 78
[11] Jagoda 2015, pp. 105-106
[12] Hähnel/Kopp 2011, p. 53
[13] Fischer 2019, p. 241
[14] Ambrosius/Kaelble 1973, p. 9
[15] Lenz 2010, p. 955
[16] Dietz/Neuheiser 2017, p. 11
[17] Ibid. p. 8
[18] Ibid
[19] Ibid
[20] Dietz/Neuheiser 2017, p. 9-10
[21] Inglehart 1997
[22] Oechsler 2011, pp. 334-335
[23] Sackmann 2017, p. 176
[24] Eisewicht et al. 2018, p. 177
[25] Apart from the concept of the ‚Post-Modern‘ there are others as well which recite on the idea of a new era but are based on a different view of its relation to the Modern (Dietz/Neuheiser 2017, p. 9).
[26] This is the origin of the gender-discussion which had been followed by Judith Butler’s theory of ‚Queer Studies’ (Babka/Posselt 2016, p. 15)
[27] Ptak 2014, p. 34
[28] The definition of citizens within a neoliberal system as a ‚managers of themselves’ is based on Michel Foucault’s theory of ‘*gouvernementalité’* in which he defines the connection between the ‘self-government’ of the individual and the state’s claim to power (Foucault 2012)

[29] The challenge of constantly re-inventing oneself as a means of social positioning and adapting to social changes leads to ‚fluid identities‘ – which proof freedom and self-determination as well as they cause insecurity and (as a result of this) fear. (Noack Napoles 2019, p. 147)
[30] Porschen-Hueck/Weihrich/Huchler 2018, p. 239
[31] These models prove to one-dimensional and rigid to allow for the dynamics of the post-modern society. Today people have the chance to define themselves by their ways of life in recourse to their habits as consumers and communicators. Thus, the term 'social milieu' has been coined to describe recent social concepts of identification and identity. (Renn 2014, pp. 292-294)
[32] Rodeck 2014, p. 3
[33] Popp points out most justly that the idea of generations as homogeneous units has to be met with caution. Without a show of a doubt each defined age cohort will show a similar social and cultural diversity, still there will be common ideals, demands and values which can be generalized and which will differ them from their predecessors and their successors (Popp 2019, p. 63)
[34] Dietz 2016, p. 21
[35] „Die Vermutung liegt nahe, dass es sich bei den aktuell konstatierten Veränderungen, die als Wertewandel der Generation Y bezeichnet werden, um eine Fortsetzung der Prozesse der 1970er Jahre handelt“ (Ibid. p. 25)
[36] Dietz 2016, p. 18
[37] ‚Work-life-balance‘, the qualitative equalization of working and private life, is replaced by 'work-life-blending' – work and leisure time melting into one (Purgal 2015, p. 28)
[38] Eichhorst/Buhlmann 2015, p. 12
[39] Purgal 2015, p. 29
[40] „Die Vereinbarkeit von Privatleben, Familie und beruflicher Tätigkeit lässt sich durch flexible Arbeitsformen im Hinblick auf Ort und Zeit prinzipiell verbessern. Hier können mobiles Arbeiten und etwa die so genannte alternierende Telearbeit Vereinbarkeitsprobleme deutlich entspannen. Zunehmend wird es für einige Berufsgruppen durch die Verfügbarkeit von schnellem, mobilen Internet und Videotelefonie möglich, den Arbeitsort flexibel zu wählen.“ (Eichhorst/Buhlmann 2015, p. 12)
[41] „[…] Werte grundsätzlich ein Handeln unter kognitiver Unsicherheit ermöglichen, fehlende Kenntnisse ‚überbrücken‘ und die Lücke zwischen Kenntnissen, praktischen Erfahrungen und Handeln schließen […]“ (Heyse/Erpenbeck 1994, p. 221)
[42] In 2020 ‚Generation Y‘ will represent 50% of the workforce worldwide (Admane 2018, p. 1672)
[43] Kovarik 2013, p. 48
[44] Lindner 2019, p. 24
[45] Kovarik 2013, pp. 29-31
[46] Bughin et al. 2018, p.41; Lippold 2019, p. 29
[47] e-fellows.net/McKinsey 2015; Capitalheads/Kienbaum Institut @ ISM 2018; Albert/Hurrelmann/Quenzel 2019
[48] PowermanGroup 2016, pp.7-9
[49] Schütte 2019, p. 20
[50] Stoisiek 2015, p. 365
[51] Sackmann 2017, p. 175
[52] Eichhorst/Buhlmann 2015, p. 13
[53] Ibid, p. 1
[54] Ibid
[55] Naim/Lenka 2015, p. 1705
[56] Lippold 2019, p. 4

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Violin Plots in Churn Telecommunications Business

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Abstract

Telecommunications is an important tool for the business world. This sector has a strong effect on our economic activities. The telecommunications sector represents 5.9% of Romania's GDP (in 2019). The telecommunications industry is a dynamic one, constantly developing and changing on a stable market. Thus, in order to reduce and prevent the loss of customers, most of the top companies in this sector use performance analysis that treats the churn behavior as a central topic. The purpose of this paper is to identify through an analytical method easy to visualize and interpret, the peculiarities and defining characteristics of churn clients and non-churn clients within the postpaid subscription segment. The analysis was performed on a data set of a large telecommunications company in Romania. To determine the profiles of the two types of clients we used an EDA (Exploratory Data Analysis) technique, called Violin Plot. In our study, this method identified the non-churn client's situation as defined by the lower values of the invoice and an additional cost as close to zero. A specific feature of the churn class is related to the number of national minutes received outside the network and the sum of the minutes received.

Keywords: violin plot, business, Romanian telecommunications, churn customer profile

Introduction

The telecommunications industry is an indispensable sector. This sector is the life element of our society, which has made it possible to connect people globally. The importance of telecommunications has made its mark on all spheres of life. Due to call handling techniques, businesses can easily handle incoming calls. With the help of telecommunications, employees working from home or from remote locations can communicate effectively with the rest, even when it is not possible for all team members to be physically present (web conferences), team members from around the world can participate seamlessly.

Using annual data from 192 countries from 1990-2007, the impact of mobile telecommunications on economic growth was assessed and it was found that this impact is lower for countries with lower mobile penetration. While in low-income countries, the contribution of mobile telecommunications to the annual GDP growth is 0.11%, for high-income countries it is 0.20%. Increasing returns from mobile adoption also appear when evaluating the impact on productivity growth.

Telecommunication service providers (fixed and mobile) understand that they must bring in new smart services both to attract new customers and to retain existing ones and to increase revenues. The challenges and objectives in this regard are as follows: determining the necessary services; introducing more services in a faster way and at lower costs; providing innovative services. These objectives could

not be achieved with the traditional infrastructure. New services require a much greater degree of flexibility, performance and scalability of the system, as well as open standards.

The telecommunications industry is a dynamic one, constantly developing and changing according to the needs of the client. Nowadays, telephone companies are facing increasing competition and a growing risk of churn. All these powerful trends force the telecommunications companies to respond through offers, packages and price reductions more competitively to succeed first and foremost to keep their current customers and then to increase their number.

The use of the latest analytical techniques allows telecommunications operators to apply advanced algorithms, but also predictive models. These algorithms can identify previously hidden variables and combinations of variables that predict customer behaviors. Companies can then analyze the reasons behind these behaviors to come up with solutions later.

The full value of data analytics can only be achieved when companies can customize the pricing of a specific group of customers with the greatest inclination to migrate to the competition. Such an approach requires granular micro-segmentation of the customer base, which is then adapted to a large, well-ranked library of offers. A leading operator, for example, developed a library of over 50 offers and then created a mechanism for the rapid launch and measurement of related campaigns. As a result, the company was able to reduce the churn by 10-15% over the next 18 months.

While data analytics can predict customer behavior, churn risk elimination is only performed when operators are able to change that behavior.

The problem of the churn phenomenon or the loss of a customer is a problem that is faced by almost every company in any industry. This phenomenon is a major source of financial losses, as it is generally more expensive to attract new customers than to keep existing ones. Therefore, customer management power is very important, especially in industries characterized by strong competition and saturated markets, such as the telecommunications industry. The first step in managing the phenomenon in question is to identify the particularities of customers with a high tendency for churn. There are not many published works in the field of churn modeling due to the commercially sensitive nature of the problem.

On the telecommunications market in Romania we find 2 types of telephony services, postpaid (representing customers with subscriptions) and prepaid (card users). The clients who benefit from the postpaid service have a contract that specifies a limit or an allocation of minutes, text messages, etc., and the client will be billed at a flat rate for any use equal to or lower than that quota. Any use beyond this limit incurs additional charges. Theoretically, a user in this situation has no limit to the use of mobile services and, consequently, to unlimited credit. This service is recommended for people with a constant income.

The main purpose of this paper is to identify the particularities and defining characteristics of the churn clients in the telecommunications sector through a graphical method that is easy to visualize and interpret. We will approach as I study and analyze a sample from the postpaid segment. Violin Plot is a simple method of numerical data planning. It is similar to a box plot, with the addition of a density plot of the rotated core on each side. The violin graphics are similar to the box plot, except that they show the probability density of the data.

A violin plot shows the presence of the different peaks, their position and relative amplitude. A violin type chart can have several layers. For example, the outer form represents all possible outcomes. The next layer inside may represent values that appear 95% of the time. The next layer (if any) inside may represent values that appear 50% of the time. Although violin plots are much richer in information than box plots, they are less popular. Because of their rarity, their meaning may be more difficult to understand for many readers who are not familiar with the representation of the violin type graph. Violin plots are available as extensions to a range of software packages, including R packages vioplot, wvioplot, UseR, Python libraries and more.

Literature Review

Of all the other areas, over the years telecommunications has experienced the highest annual rate of churn from 20% to 40% (JaeHyeon A. et al., 2006). This has financial implications for the company, as it costs 5 to 10 times more to add a new customer than keeping an old customer with the company (Junxiang Lu, 2003). The telecommunications field has achieved one of the most important positions in the list of fastest growing industries, covering 90% of its population (Rajanish Dass and Rumit Jain, 2011).

The risk of churn within the telecommunications companies is a major problem, the competition is extremely fierce. Abdelrahim K. A. et al. (2019), in their research, aimed at building a model that would predict the churn of the customers of the telecommunications company SyriaTel. They have developed a model that uses machine learning techniques on large data platforms. They also determined a way to select variables that help companies forecast the risk of churn. The data set used contains all the customer information over 9 months and was used to train, test and evaluate the model from SyriaTel. Some variables such as contract ID, phone number and other unique customer variables have been removed. They are not used in data processing, because they have a direct correlation with the target production.

The churn risk is an intense topic debated nowadays. Also in 2019, Yasser Khan et al. they studied this topic by building an efficient model on several attributes, such as: demographics, billing information of a telecommunications company in Pakistan. The results clearly indicate the measures needed to eliminate the risk of churn. In this article, in order to reach the presented conclusions, all variables were analyzed such as: age, duration of the call, filing of complaints, duration of the call, education, monthly incomes, low call rate and occupation.

In order to survive in a dynamic sector, it is essential to maintain an up-to-date relationship with customers through a management system. This system plays an essential role in developing customer satisfaction, loyalty and the main interface with which customers interact (Hung Chihli and Chih-Fong Tsai, 2018). The management system could revolutionize the entire system by providing real time information provision.
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In order to survive in extreme competition in the telecommunications market, companies must adapt to external changes. Determining the determining factors in the churn problem improves the sales process, increases customer loyalty and advertising (Berry M. JA et al., 2013).

The revenue of companies facing the churn problem in the telecom industry can be increased by improving the quality of services, customer satisfaction and remedying customer problems. For all this, it is necessary to identify the variables that act as drivers in support of business decision making. In their study, Khodakarami Farnoosh and Yolande Chan (2015) used a data set based on information related to monthly income, call rates, education level, monthly invoiced amount, complaints, unpaid invoices, call duration, internet, voice services used , total calls, occupation and age.

In order to have a clearer picture of the results of the studies, the graphical methods are the most used, these being easy to interpret and understand. Tracey L. Weissgerber et al. (2017) presented in their work some of the most important graphical methods: boxplot, scatterplot, violin plot and bar graphs. According to them, the Violin poles are very effective in showing the shape of the data distribution in medium or large samples. These are the best option for very small samples, as summary statistics from other charts are significant only when sufficient data is available. These charts can also provide valuable information for larger samples. A violin plot graph includes all the data that is in a box plot with the mention that the violin plot is more informative than a box plot. While a box plot shows only summary statistics, such as mean, median, and interquartile range, the violin plot shows the complete distribution of data.

Methodology

The information in this paper focuses on identifying the specific characteristics of churn customers in the postpaid segment (clients with postpaid subscriptions). Even if this type of customer is contract-bound, which makes the task of churn prediction a little less difficult, the revenue that is typically generated in this segment is much higher than in the prepaid subscription segment. Moreover, the use of postpaid customer services is much higher compared to the prepaid segment, therefore, they would be more likely to face network issues or align with market offers, which can lead to churn.

To identify and analyze the particularities of the two classes, churn and non-churn on the postpaid segment will be used as a graphical methodology, Violin Plot. This is applied on a sample of 10.000 observations, which contains 14 indicators. The indicator found under the name of CHURN is used as the reference variable. In the graphic representations of the violin type in the figures below, the two classes are vertically aligned.

Due to the existing contractual link in the postpaid subscription sector, the data set has several categories of information. Thus, the variables studied can be classified into four major categories: demographic data, details about the customer's life cycle in the company, data regarding the financial power of each customer and information on the interaction of the subscribers with the customers of the competing networks.

As for data processing, the graphical representation with Violin Plot and non-numeric variables was tried, so for all qualitative variables, the One Hot Encoding method was applied: for each value of the non-numeric variable, a new column was created with the value of the initial column, repeating- so for each value of the initial column. For example, the Contract variable was transformed by One Hot Encoding into: Contract_ACQ = 1, where Contract = ACQ, otherwise Contract_ACQ = 0 and Contract_RET = 1 where Contract = RET, otherwise, Contract_RET = 0. This trick was made in order to use the entire dataset in the analysis. One Hot Encoding is a new data processing technique that allows the transformation of non-numeric indicators into numerical ones.

Results and Discussions

The first step in building the analysis of the client's churn and non-churn profile on the postpaid segment is the construction of the data set. In Table 1 all the indicators used are listed and described.

Table 1: Indicators from the post-paid subscriptions segment used in the comparative analysis of churn and non-churn behavior

No. of indicator	Variable name	Description	No. of figure Violin Plot
I1	Age	customer age (years)	Figure 1
I2	Tenure	represents the age of the subscriber in the company (expressed in months)	Figure 2
I3	Area_rural	shows whether the client lives (1) or not (0) in the rural area	Figure 3
I4	Area_urban	indicate information about the environment: whether the client lives (1) or not (0) in the urban environment	Figure 4
I5	Contract_acq	indicates whether the client has a purchase contract (1) or not (0)	Figure 5
I6	Contract_ret	shows whether the client has a retention contract (1) or not (0)	Figure 6

I7	Gender_F	indicates whether consumers are female (1) or not (0)	Figure 7
I8	Gender_M	shows whether consumers are male (1) or not (0)	Figure 8
I9	Extracost	represents the value of the additional cost (euros)	Figure 8
I10	Invoice	payment invoice (expressed in euros)	Figure 10
I11	MonthsC	the number of months after the customer request by telesales to modify the subscription offer for another type of service - change of the current contract	Figure 11
I12	MonthsO	the number of months since the last offer was changed on the account	Figure 12
I13	MinC	the sum of the national minutes made (outside the network)	Figure 13
I14	MinR	the sum of the national minutes received (from outside the network)	Figure 14

In the construction of the analysis of the behavior of the clients who activate in the sector of postpaid subscriptions, the particularities of the two classes (churn versus active clients) will be identified through the violin type chart, Violin Plot, as in the case of the analysis of the clients with prepaid subscriptions presented in the previous chapter. Each of the fourteen indicators are graphically represented in the figures below, divided into the 2 groups: churn and non-churn in order to remark in a visual way as easily as possible the defining particularity of the behavior of a postpaid (subscription) client who has made churn in front of a customer still active.

As can be seen from the following figures, the behavior of the customer with a postpaid subscription that did not churn is defined by the lower values of the invoice and an additional cost as close to zero, once the extra cost is equal to zero, the individuals are classified as non-churn, almost the entire class being concentrated around this value (Figure 9).

Regarding the age of the client, the graph shows a similar distribution in the two classes. In the case of the non-churn class, the representative figure (Figure 1) shows an extra limb, slightly highlighted, which shows that there is an age for which there was no churn. This extremity juggles around the range of 45-50 years and signifies that the values inside it are unlikely to churn.

We also note that among the non-churn consumer population periodic contact with customers is very important, stimulating their behavior towards stability. Most non-couriers (Figure 11) are concentrated around 0, which means that the regular telephone connection with the customers does not migrate to other competing companies.

A feature of the churn class, according to the distributions below, is related to the amount of national minutes received from outside the network (Figure 14). The churn class has a large variant and has a flat distribution, similar to the one of the non-churn class, the difference making it the values of the indicator greater than 100. In this case, if the sum of the minutes received, on average is greater than 100, then the individual is classified as a churn client. In the case of the minutes consumed we observe very similar distributions, which results that the indicator I13 cannot be considered a discriminating factor.

Another discriminating factor in the specific behavior of the churn client is the number of months since the last offer change in the account (I12). The graphic representation in the form of its Violin Plot has somewhat different oriented ends, one towards the left, the other towards the right. From here it can be concluded that churn individuals have high values, that is, the aging of the offer or the subscription causes the customers to look for new offers elsewhere (Figure 12).

Churn clients can also be characterized by their home environment, type of contract or even sex. Thus, from the images below referring to these three characteristics it can be stated that individuals with contracts or offers of retention type (Figure 6, usually in this case the offers are some very low in price compared to the market, just to convince the client to remain active in the company), from the urban area (Figure 4) and from the masculine gender (Figure 8) have a predisposition to churn greater than for the clients with purchase contracts (Figure 5), from the rural area (Figure 3), where the non-churn class or the female gender predominates (Figure 7), women show greater fidelity to the company, they tend not to make churn.

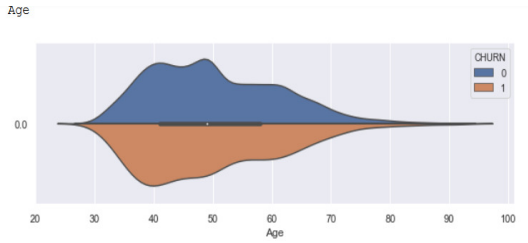

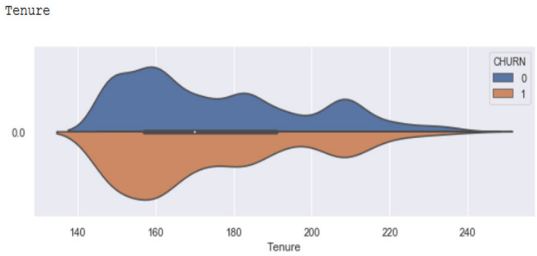

Figure 1. Violin Plot of I1

Figure 2. Violin Plot of I2

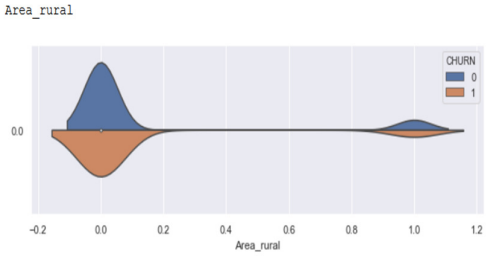

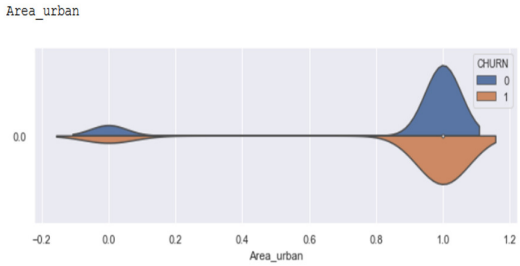

Figure 3. Violin Plot of I3

Figure 4. Violin Plot of I4

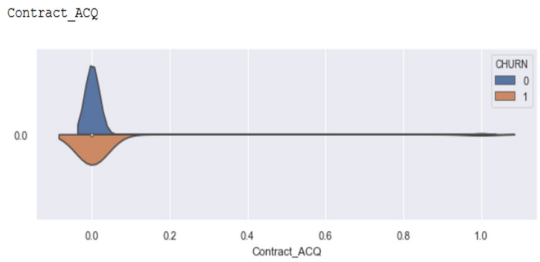

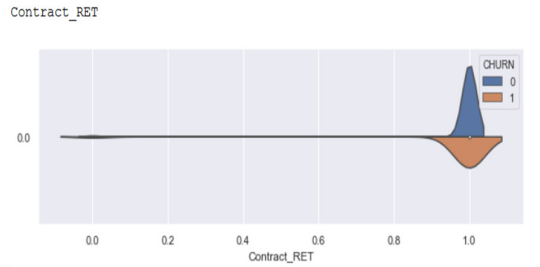

Figure 5. Violin Plot of I5 **Figure 6. Violin Plot of I6**

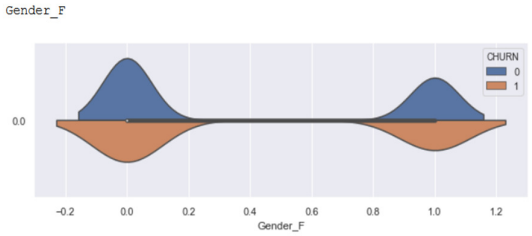

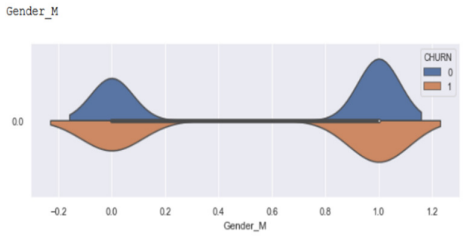

Figure 7. Violin Plot of I7 **Figure 8. Violin Plot of I8**

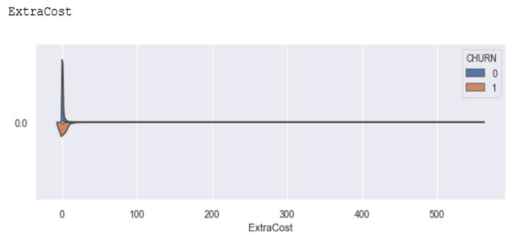

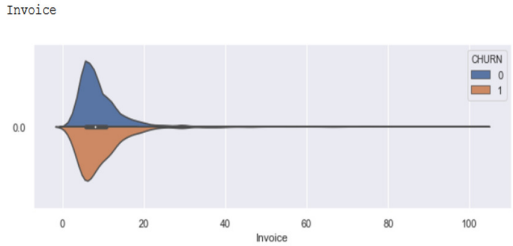

Figure 9. Violin Plot of I9

Figure 10. Violin Plot of I10

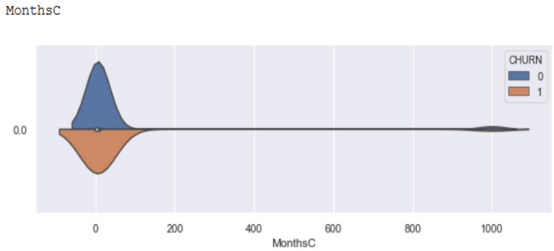

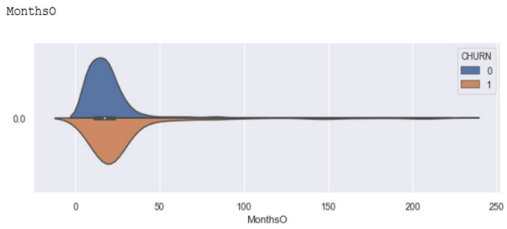

Figure 11. Violin Plot of I11

Figure 12. Violin Plot of I12

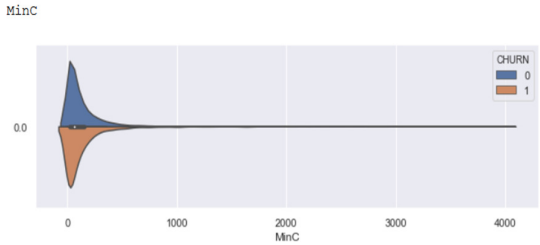

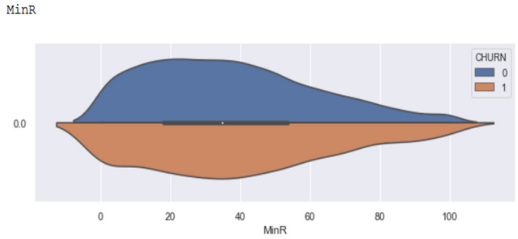

Figure 13. Violin Plot of I13 **Figure 14. Violin Plot of I14**

Conclusions

The telecommunications industry is a dynamic one, constantly developing and changing according to the needs of the client. Companies in this sector are facing increasing competition and a growing risk of churn. In order to determine and identify the particularities and defining characteristics of the churn clients who use the postpaid subscription service, we used an easy-to-view and interpreted graphic method, Violin Plot.

As has been shown in other studies, the use of analytical techniques allows easy identification of drivers in the analyzed action. Thus, the main discriminating factors of the class of churn customers in the studied data set are: the number of months since the last offer change in the account, the aging of the offer or the subscription causes the individuals to look for new offers elsewhere, the amount of minutes received, the average home, type of contract or even sex. In a future paper, other technical methods will be tested and analyzed, and the set of indicators will be expanded.

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Development of The Economic Analysis Method for Wholesale Generating Companies (WGC) In Russia

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Abstract

Research Motivation: the energy companies' effectiveness evaluation includes a set of tools, instruments and measures to provide the acquisition and relevant interpretation of the indicators set of the energy companies condition. The practice of financial and economic activities of the various companies determines a set of criteria parameters and ranges of values, assessing the effectiveness of the various industry-specific companies. It is necessary to determine the indicators composition to assess the energy companies' effectiveness following the fundamental restructuring of the energy sector. **Research Methodology**: the analysis database of the Russian generating companies financial and economic condition for 2013 and 2014 is used, also statistical methods are used. **Main Findings**: the set of indicators and their criteria values is developed; it allows an objective comparative analysis of the generating companies. **Implications:** the developed effectiveness indicators and criteria (reference) values of these indicators allow to make informed investment decisions.

Keywords: Energy Company, Effectiveness Indicators.

Introduction

In modern Russian conditions, within the operation of such a big power engineering company as WGC, a strong analytical work at every plant acquires a particular matter connected with analyses and forecast of its financial situation. To function and develop steadily, an energy company first and foremost needs stable influx of revenues enough to pay off suppliers, creditors, employees and government. After payments and liabilities there must be sufficient volume of profit to provide expanded reproduction and self-financing of current company`s operations.

WGC`s market stability indicator is its ability to develop successfully in the changing internal and external environment which makes a compound financial analysis of WGC necessary.

The financial situation is a complex notion and characterized by the system of indicators reflecting availability and allocation of funds, their volume and structure, real and potential financial opportunities. The data for analysis of the company`s finance are included in accounting statements, which in market economy become the main source of communication and a primary element of information support of financial work.

Results and Discussion

Let`s characterize some criteria of company`s financial security. One of such measures is the probability of bankruptcy. Different indicators must be taken into account to evaluate it. Inflation rate, the period of financial cycle, the specifics of production (capitalization ratio, energy and labor intensity), workforce productivity and "tax climate" – all of them influence the dynamics of this probability. Since a company has a certain measure of financial security beyond its lower limits, the possibility of bankruptcy exists. It should be mentioned that this limit is determined by solvency, liquidity and creditworthiness of the company, since to maintain stability, the cash flows should at least provide an opportunity to meet the requirements of suppliers, creditors and government.

Solvency is considered to be a criterion and the basis for financial security. This requirement means that a company must have a capacity to pay for its industrial demands and obligations, therefore the index of stability is *regulated balance of cash flows*. It is determined primarily by the dynamic of the relation between influxes and expenses in the course of time. The necessary condition for acceptable minimum level of financial stability is the excess of inflows over costs and payments. The disequilibrium of cash flows of power engineering company (especially WGC) may become one of the main reasons for financial instability.

Factors, characterizing financial stability and solvency of a power engineering company, can be divided into internal and external ones.

The external factors include, above all, economic (economic stability in the country as a whole, industrial production in the country), political (political stability of society, legal regulation of economic activities, state tax policy), as well as the level of scientific and technical development progress (innovative technologies, the volume of capital investments in modernization and knowledge-intensive production), etc.

The solvency of a power engineering organization can be measured by means of the structure evaluation and the ratio between accounts receivable and accounts payable. Insolvency may surface up due to the impact of major factor – insolvency of energy consumers, as well as other internal and external reasons.

Internal factors of insolvency of organizations generally result from an inadequate qualification of executives and inefficient management. The stable position of a company largely depends on employees` potential and its correspondence to goals and objectives of a power engineering company. Among external factors of an emergence of insolvency there are ones which could be eliminated by successful joint work of bookkeeping and management of an energy company. They are shortage of working capital, the growth of accounts receivable and accounts payable and poor contract discipline.

Thus, solvency of a power engineering company that is ability to make payments in due periods, which depends on both inflow of money from debtors, customers and clients, and outflow to fulfill obligations to government, suppliers and other creditors, realization of investment programs – is a key factor of its financial stability. It is particularly important for the management of a company to conduct regular analysis to prevent emergence of shortage of working capital (use the calendar of payments) and a timely liquidation of crisis situation.

When estimating solvency, it is necessary first of all to evaluate how much current assets exceed the existing short-term debt (*current liquidity ratio*), and to what degree it can be paid out without involving of current assets, in other words with the help of money, short-term financial investments and cash on operating account (*intermediate liquidity ratio*), and finally how much of short-term debt can be paid out by the most liquid assets – money and , short-term financial investments (*absolute liquidity ratio*).
But financial stability does not only mean solvency. To achieve and maintain financial profit volume in relation to own capital and revenue is more important than the absolute size of profit.

The growth of revenue and earnings, which cause profitability increase, growth of financial security, decrease of bankruptcy probability, has limited efficiently until acts with raised risks provide profitability.

Detailed analysis of financial and operational activities is a substantial stage of creating and implementing a complex economic approach to providing financial stability and development of a power engineering company. It is a necessary condition of correct management, planning, forecasting and rational use of financial resources.

The aim of financial and operational activities analysis of WGC is to obtain reliable and authentic information about its financial situation, solvency and profit-making capacity, find additional money for more efficient and rational management company`s operation. The procedure of such analysis should include the following stages:

1. Analysis of business environment of the company. Collection of necessary reliable information about the impact of internal and external factors, characterizing the company`s operation: emerging tendencies of environment, features of market and stock conjuncture, financial situation of the company.
2. Express-analysis of financial accounts to reveal weaknesses in the company`s operation, assessment of their dynamic and determination of the ways for more detailed investigation
3. Analysis of financial accounts concerning liquidity, net worth sufficiency and solvency.
4. Parametric detailed analysis based on the system of financial indexes. Subsequent joining of final coefficients into generalizing indicators; implementation of experts` evaluation.
5. Analysis of business activity: return on used resources, profitability and market activity. Forecasting of financial situation with the help of estimate of bankruptcy probability and rating.
6. Determination of optimal ratio between fixed and variable costs in the structure of production costs, selection of rational composition of capital in the context of own and debt capital ratio.
7. Analysis of financial stability of a power engineering company with the help of factor model of assessment of economic stability
8. Creating the company financial statement and recommendations of activities to increase the effectiveness and financial stability of WGC.

It should be mentioned that the efficiency of such analysis increases if the company has in an organization a well-established system of financial accounting and reporting, complex automatic budgeting and conducts profound analytical work.

The analysis of financial reporting of a power engineering company helps identify interconnections and interdependencies between various indexes of its operation. The results of analysis allow stakeholders to make decisions based on current financial situation and operation of the company in previous years and its potential opportunities for future period.

WGC performance assessment its market place amidst similar companies can be done by means of horizontal, vertical and trend analyzes.

While examining of relationships between variables, both in analysis of different branches of industry and of only one branch, regression analysis can be used. The resulting equation of regression may be employed to create the sales forecast. Though a multidimensional equation of regression, including some independent variables or factors (multiple regression) is more common.

Financial ratios help to esteem the financial situation quickly and easily. Their advantage is the opportunity to eliminate the impact of inflation, which is especially significant during long-term analysis. Financial ratios are the basis for evaluation of company`s operation by interest groups, first of all shareholders and creditors.

All financial indicators can be grouped in the following way:

- liquidity ratios;
- economic activity indicators;
- solvency;
- profitability;
- market activity.

It is important to note that these indexes have some disadvantages:

1. Static character – the named indicators are calculated by specific date thus they are simultaneous and hence there is a need to analyze their dynamic for several periods (horizontal, vertical and trend analyzes)
2. There is the probability of distortion of indexes due to inclusion "dead" expense items in the composition of current asserts, for instance, surplus stock of good-material assets.
3. Incorrect accounting in terms of "illiquid" receivables that are unlikely to be recovered (it may never be repaid). In this case, the amount of customer debt increases in the balance due to low payment discipline, not because of the growing business activity of the enterprise. However, such a fictitious increase in accounts receivable will have a favorable effect on the value of the indicators under consideration.
4. Insufficient accounting of the funds turnover rate and its impact on the financial position of the company. Liquidity and solvency, directly depend on how quickly the funds invested in assets, are converted into cash. This effect is explained by the fact that the speed of assets` turnover is connected with minimum required amount of advanced capital and the associated cash payments (interest on loans, dividend payments, etc.), the need for additional sources of financing, the amount of costs, the amount of tax deductions, etc.
5. The multiplicity and diversity of indicators make it difficult to obtain definite conclusions and prediction of events

These deficiencies listed largely characterize the possible directions of improving the system of indicators for assessing the financial sustainability of an enterprise. For effective financial management it is important to have information about the availability of payment funds, optimal ratios of own and borrowed capital, a satisfactory rate of capital turnover, and finally, financial stability ratios, presented in visual and accessible form, i.e. the financial stability ratio should determine the numerical (quantitative) value of financial sustainability.
The formulated conditions clarify the requirements to areas of improvement of the system of indicators and the design of a generalized indicator of the financial sustainability of the power engineering company.

Table 1: Assessment of property potential

№	Indicator	Company				Average value	Maximum	Minimum
		WGC-2	WGC 4	WGC 5	Inter RAO			
1	The amount of funds controlled by the company, thousand rubles.	173385755	125359211	112691000	253015439	166112851	253015439	112691000
2	The value of net assets (NA), thousand rubles	113664360	120005686	68003000	210156333	127957345	210156333	68003000
3	The share of fixed assets in the assets of the company, the share	0.72	0.77	0.78	0.83	0.773	0.826	0.716
4	The share of the active part of fixed assets, share	0.57	0.41	0.00	0.13	0.279	0.572	0,000

5	The depreciation ratio of fixed assets, share	0.06	0.06	0.05	0.05	0.05592852	0.062934357	0.048685203
6	The depreciation ratio of the active part of fixed assets, share	0.08	0.09	0.00	0.02	0.048214179	0.09345649	0
7	The coefficient of renewal, share	0.05	0.05	0.05	0.05	0.05	0.05	0.05

Conclusion

The calculations allow us to draw the following conclusion: for energy companies with a similar asset structure (in particular, OGK and TGK), the volatility of indicators is much lower, i.e. it is necessary to conduct a comparative rating analysis of these enterprises within separate sets of indicators and ranges of optimal values opinions.

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Interfirm Relationship Development: In Search of Relationship Life-Cycle Model for Project-Based Organizations

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Abstract

Purpose. The goal of this paper is to present the results of literature study on interfirm relationship development and to propose the revised model of relationship life-cycle for project-based organizations. The framework helps to understand the relationship dynamics in organizations based on temporary and discontinuous cooperation. **Design/Methodology/Approach**. The method that have been used in the study is the systematic literature review. **Findings**. The review of the literature shows a variety of relationship life-cycle models with many similarities and differences among them. Studied models seems to be insufficient to examine relationship development in project-based organizations, and the revised model with two loops and six phases was developed and presented.
Research implications and directions. The paper develops a framework for examining relationship development in project-oriented organizations. The future research concern testing the model, identifying changes in the intensity of relationship features in particular phases, and searching for the ways how to increase the effectiveness of cooperation in the short-term perspective. **Originality/Value/Contribution**. The findings contribute to relationship development literature exposing the new research perspective. The study focuses on project-based organizations and short-term project partnering in contrary to previous studies which focused only on long-term perspective and strategic cooperation.

Keywords: Relationship Development, Relationship Life-Cycle, RLC Model, Project-Based Organizations, Systematic Literature Review.

Introduction

The research on interfirm relationship development (RD) resulted in the development of many interesting frameworks and models of relationship life-cycle (RLC) (e.g.: Dwyer *et al*., 1987; Ferreira *et al*., 2017; Ford, 1980; Ring & Van de Ven, 1994). The interest of relationship development results from the fact that the stable long-term interfirm relationships are seen as a source of competitive advantage for years (Dyer & Singh, 1998; Morgan & Hunt, 1999; Woodruff, 1997).

The studies on interfirm relationships development help to understand their complexity and dynamics (Dwyer *et al*., 1987; Ford, 1980; Hansen *et al*., 2013; Jap & Anderson, 2007; Palmatier *et al*., 2013), but our knowledge in this area is still limited (Biggemann, 2012). Moreover, most scholars focus attention on relationships in a long-term perspective, assuming continuous cooperation between partners (Dwyer *et al*., 1987; Sharma *et al.*, 2015), while much little attention has been paid to short-term relationships in organizations where the cooperation is temporary and discontinuous from the definition. Taking into account the specificity and temporary nature of project-oriented organizations, an interesting research gap can be observed in the field.

Consequently, the goal of this paper is to search for relationship life-cycle model for project-based organizations (PBOs). The study is based on the systematic literature review on RD and RLC. Using search criteria in three leading databases 547 papers were selected to abstract reading, of which 61 papers were selected to full reading and classified as strictly topic related. The study contributes to the inter-organizational relationship literature by comparing existing RLC models, and proposing the revised model, which combines short-term project partnering with long-term strategic cooperation.
The paper is organized as follows. In the first section the literature on relationship development and relationship life-cycles is reviewed, and the specificity of project-based organizations is presented.

The second section presents the research method. In the next sections the revised RLC model for project-based organization is presented and discussed. Finally, research limitations and directions of further research are highlighted.

Theoretical background

Relationship development – state of art

Interfirm relationships development and RLC models have been the interest of researchers for decades and many studies were conducted, examining the development of various types of interfirm relationships e.g. buyer-seller relationships (Ferreira *et al*. 2017; Restuccia & Legoux, 2019; Sharma *et al*., 2015), strategic alliances (Davis & Love, 2011; Wong *et al*., 2005), and franchising relationships (Blut *et al*. 2011; Varotto & Parente, 2016), in various sectors, e.g.: the mining industry (Baptista, 2013), construction (Davis & Love, 2011; Meng, 2010), electronic (Eng, 2009; Fynes *et al*., 2005; Lee & Johnsen, 2012; Mandják *et al*., 2015), aerospace (Ferreira *et al*., 2017), IT software (de Almeida Moraes *et al*., 2017) higher education (Heffernan & Poole 2004; Plewa *et al*. 2013; Slavtchev, 2013) or agriculture (Kam & Lai 2018). The body of research on RLC developed in marketing and strategic management provide the strong basis for theory building, however our knowledge in this area is limited in terms of the reality of project-based organizations.

2.2. A review of relationship life-cycle models

The three leading theories are the basis of existing RLC models, i.e.: the "stages" theory, the "states" theory, and the joinings approach (Batonda & Perry, 2003). The "stages" theory describes the relationship development as an orderly progression of phases over time, with predictable and sequential stages, characterized by the increase of commitment, trust and interdependence (Dwyer *et al*., 1987; Ford, 1980; Wilson, 1995). The "states" theory shows the RD as unpredictable process with the non-linear nature of relationship evolution (Abosag & Lee, 2013; Batonda & Perry, 2003; Davis & Love, 2011; Meng, 2010). The positioning theory refers to processes of entering, positioning, and repositioning within inter-organizational networks (Thorelli, 1986). As a result of taking the three mentioned perspectives, different relationship life-cycle models were developed in the literature. The most important and interesting models have been analyzed and are described in the Table 1.

Table 1: A comparison of the analyzed relationship life-cycle models

Ford (1980)	Dwyer et al. (1987)	Wilson (1995)	Ring & Van de Ven (1994)	Batonda & Perry (2003)
Linear, time-dependent, based on conceptual basics	Linear, built on conceptual foundations and corresponding theories of martial, bargaining, power	Linear, time-dependent, focused on the buyer-seller relationship	Cyclical (iterative), 3 phases, focused on the role of individuals.	Non-linear, 7 phases/states, based on literature and qualitative studies
Pre-relationship Stage -evaluation of a potential suppliers conditioned by experience, uncertainty and distance -there is no contact, exchange and commitment yet at this stage	**Awareness** -recognition of potential partners -interaction between parties has not transpired in this phase -positioning and posturing to enhance attractiveness may take place	**Search and Selection** -finding and assessing potential partners -initial contact and interactions are made	**Emergence of IOR** -congruent purposes, values, and expectations are achieved -small, informal deals are made at the beginning -transactions are repeated through time, and if they meet efficiency and equity norms, parties feel more secure in committing more of their available resources and	**Searching processes** -recognition of purpose and need -searching potential partners and finding more information about partners' competence -evaluation and selection of potential partners
Early Stage -initiation of contact between parties -negotiations of future conditions -sample delivery	**Exploration** -partners consider obligations, benefits and the possibility of exchange -dyadic interaction	**Defining Purpose** -defining mutual goals -basis for common		**Starting processes** -initial contact is made -resenting the purpose/opportunity -testing of personalities and compatibility of

- high uncertainty and distance between partners -low level of commitment	occurs, and trail purchases and tests are done -investments and commitment are low	understanding and sanctioning of the relationship are developed -limited commitment between parties yet	expectations in subsequent cycles	partners -testing of goals and compatibility
Development Stage -increasing experience due to thetincrease of deliveries - decreasing uncertainty as the partners know each other -social, cultural, and technological distance is reduced by experience -commitment is high	**Expansion** -continual increase of benefits and interdependence -commitment is high, and the motivation to maintain the relationship increases -trust and joint satisfaction lead to increased risk taking -perception of goal congruence and cooperativeness lead to increase in the scope of interaction	**Setting Boundaries** -defining informal rules concerning use of resources -commitment of resources and people to complete tasks -adaptation of process and product or services to accommodate partners	**Evolution of IOR** -institutionalization of relationships is observable in terms of personal relationships, psychological contract, and informal understandings -trust and commitment increase due to repetitive social interactions -partners' behaviours are repetitive and more and more predictable	**Development processes** -developing personal relationship and mutual trust between partners -common planning of activities, responsibilities and relationships -direct involvement, regular contacts and socialisation -little commitment to each other and business ideas, trial trading activities
Long-term Stage -mutual importance to each other due to large-scale deliveries of continuously purchased products -institutionalised cooperation occurs in terms of standards and procedures -low level of uncertainty, and increase of trust	**Commitment** -implicit or explicit pledge of relational continuity between exchange partners -most advanced phase of relationship with the high level of commitment (input, durability, and consistency), mutual trust and satisfaction	**Value Creation** -creation of value through synergistic combination of partners' resources and strengths -sharing of created value -power and influence acquire greater importance		**Maintenance processes** -increased commitment of resources to network -development of inter-organisational and member adaptations -ongoing trading activities -testing of personalities and trial small projects
The Final Stage -the stage is reached in stable markets over a long period of time -extension of the institutionalisation process to a point where the conduct of business is based on industry codes of practice	**Dissolution** -the factors affecting withdrawal or disengagement become stronger -the costs of continuation or modification outweigh the benefits -termination of relationship causes stress and problems, and strategies of leaving relationship are prepared	**Maintenance / Hybrid Stability** -increase of trust, performance, satisfaction, and commitment -stable relationships result from partners' active involvement	**Dissolution of IOR** -various exogenous and endogenous factors influence on IOR and the balance between formal and informal processes testing the strength of relationships -interpersonal sentiments, norms, and commitments among parties may lead to group thinking and inefficiency -unfulfilled needs lead to relationship termination	**Termination processes** -weighing cost and benefits of staying in or exiting -dissolution of trading relationship due to outside and inside forces -exiting through various strategies
				Dormant (and re-activation) Processes -relationship goes into inactive state due to change in business -re-activation of relationship due to the resumption of business activity

Source: based on (Ford, 1980; Dwyer et al., 1987; Wilson, 1995; Ring & Van de Ven, 1994; Batonda & Perry, 2003)

The models represent different approaches and theories, differ in terms of number of phases and terminology used, and all contribute to RD literature in a different way. However, many similarities can be observed and all the presented models treated as complementary ones, constitute the theoretical background for the development of the relationship life-cycle model for project-based organizations. Simultaneously, it is worth noting that many other interesting life-cycle models were inspiring for author's considerations and modelling processes, e.g.: Blut *et al.* (2011), Jap and

Ganesan (2000), Lee and Johnsen (2012); Plewa (2013) or Zineldin (2002). However, due to the limited volume of the paper, there is no possibility to present and discuss them all.

Project-based organizations and their specificity

It has been observed the continuous development of projects in business activities (Lundin *et al*., 2015; Maylor & Turkulainen, 2019; Sydow *et al*., 2004). When business activities are implemented and managed around temporary projects, it results in the transformation of organizations from traditional into project-based or project-oriented ones (Miterev *et al*., 2017; Stephenson, 2009). Thanks to many advantages, PBOs are widespread in different industries e.g.: aerospace, telecommunication, IT software, professional services, consulting, construction, shipbuilding, automotive or engineering, and are seen as highly effective in high velocity sectors and high value products and systems (Hobday, 2000; Sydow *et al*., 2004). The main feature distinguishing project-based organizations from the traditional ones is their temporary nature and instability (see: Stephenson, 2009; Turner & Miterev, 2019). Consequently, interfirm cooperation in project-based organizations is also temporary and discontinuous, what is challenging in terms of developing and maintaining relationships with business partners (Bygballe *et al*., 2010; Polonsky *et al*., 2010). As the time frames of projects are strictly defined, there is limited time for building cooperative relationships, gaining trust, commitment, expected outcomes, etc. Concluding, existing relationship life-cycle models are insufficient to explain relationship development in project based-organizations and the new perspective is needed.

Research Method

The research method used in the study is the systematic literature review. Using the source databases: Ebsco, JSTOR and Scopus, and search criteria: “relationship life”, “relationship development”, “relationship cycle”, “relationship dynamics”, “relationship evolution”, “relationship stages” and “relationship life-cycle” (title, abstract, key words) over ten thousand articles were identified. Taking into account the additional inclusion criteria (English language, articles and proceedings, areas: business, management, organization studies, and marketing), 547 papers were found to abstract reading, and then 108 papers were selected to the full reading process. Finally, 61 papers were classified as concerning strictly the RLC topic. The literature review was conducted by the team of four researchers using the same procedures and tools.

Results: Preposition of The Revised Model

As some researchers argue a project partnering can be the first step towards a more mature and stable strategic partnering (Ellison & Miller, 1995; Thompson & Sanders, 1998; Cheng *et al*., 2000). The revised model combines the short-term project cooperation (the small loop), and long-term strategic cooperation (the big loop) – see Figure 1.

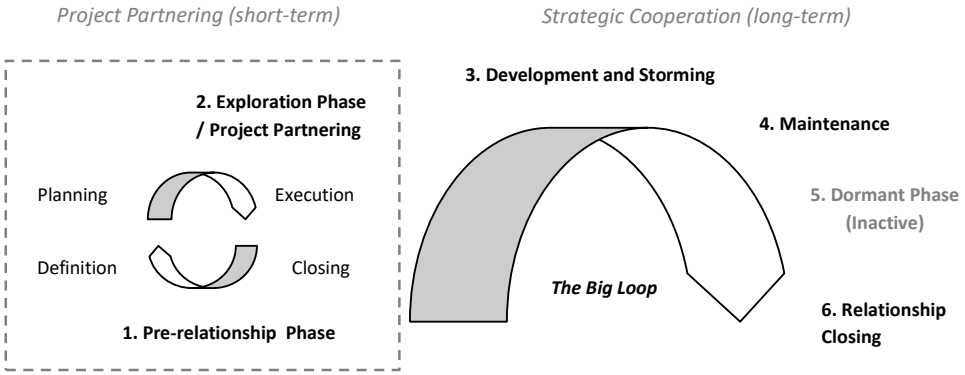

Fig. 1: The revised model of inter-firm cooperation for project-based organizations
Source: author's own

The small loop includes two main phases: the pre-relationship phase and the exploration phase (project partnering). The first phase includes processes preceding the formal constitution of a relationship, i.e. defining needs, and searching and evaluating potential partners. Then, in the exploration phase the initial contact is made and the relationship is established in terms of formal issues (contract), and the stages of project initiation and planning take place. As the project goes through the project execution phase, the relationship between partners emerge and grow. Communication and the exchange of resources lead to the increase of interdependence, commitment, trust and satisfaction (or not if expectations are not met). Thus, the cooperation goes to the project closing stage and has been dissolved after completing a project. The small loop is closed then.

The big loop concerns strategic cooperation, including the later phases of cooperative relationship development, similar to the stages identified by Ford (1980) and Dwyer *et al*. (1998). However, the cooperation between partners conducting projects is discontinuous and iterative, and determined by a cyclical course of subsequent projects' life-cycle what is close to the approach taken by Ring and Van de Ven (1994), Polonsky *et al*. (2010), and Batonda and Perry (2003). In the models based on the "stage" theory the expansion phase is seen as a mild and smooth process of increasing the cooperation, interdependence, commitment, trust and satisfaction. However, some authors noticed tensions and conflicts at this stage (Andersen & Kumar, 2006; Lee & Johnsen, 2012), or underline the role of conflict resolution mechanisms (Claycomb & Frankwick, 2004). In the project-oriented companies tensions and conflicts are the immanent part of their functioning, and due to the vital role of social aspects also dynamic group processes described by Tuckman and Jensen (1977) come into play. Taking it into consideration the phase has been named as the "development and storming phase" in the revised model.

If the conflicts and problems are solved the relationship moves towards the maintenance phase, described by standardization of communication and exchange processes. Regardless of the distance and differences between cooperating companies, they try to develop and use common standards, procedures and routines to execute new projects, exchange knowledge, resolve problems and conflicts, etc. Then, in the line with Batonda and Perry (2003) and Polonsky *et al*. (2010) the "dormant (and re-activation)" phase was distinguished. In this phase the relationship goes into an inactive state due to project completion, and can re-activated when new projects are initiated. The last two phases are optional in the model. The processes and relationship features in particular phases are described in the Table 2.

Tab. 2: The description of phases in the revised model

Phase (processes)	Main activities and sub-stages		
1. Pre-relationship Phase (Searching processes)	-searching for potential partners to project cooperation (for single or multiple projects) -evaluation of potential project partners based on economic aspects (prices, conditions of delivery, etc.) and quality (experience, reputation) -no commitment, trust or satisfaction at this stage, as the dyad do not exist yet	The small loop of project partnering	The big loop of strategic cooperation
2. Exploration Phase / Project partnering (Starting processes / single project execution)	Sub-stage: Project Initiation/Definition -defining the project purpose, analysing conditions, identifying project stakeholders and risks -establishing rules and conditions of future cooperation among project partners, taking into account their potential, resources, project portfolio, etc.		
	Sub-stage: Project Planning -preparing feasibility study, project timeline and budget, including the tasks and constraints -synchronizing project activities taking into account partners' resources availability and conditions of exchange		
	Sub-stage: Project Execution -monitoring tasks progress and groups performance, managing project budget -communicating, exchanging knowledge, and cooperating on the implementation of the project tasks -increase of interdependence and commitment		
	Sub-stage: Project closing -conducting a final analysis, interfirm settlements and conclusion of the project -allocating remaining resources for next projects -deciding about relationship development taking into account future needs, project outcomes, lessons learned, and satisfaction		
3. Development and Storming Phase (Expanding and adjusting processes)	-increase of volume and scope of cooperation, new projects initiation and development -increase of interdependence, trust, benefits, and satisfaction through new projects -value creation due to the combination of partners' resources and unified commitment -tensions and conflicts may appear due to mixing of resources or group dynamics -cooperating organizations and individuals may fight for position and power		
4. Maintenance Phase (Stabilizing processes)	-development of inter-organisational and member adaptations through standardization -integration of operations and strategies -increase of commitment, trust, satisfaction, and conflict resolution strategies (if needed) -conceptualizing new projects, co-development of tools and techniques		
5. Dormant Phase (Inactive maintenance)	-relationship goes into inactive state due to projects completion -no commitment in terms of resources, communication is occasional to maintain the relationship -re-activation of network relationship due to the emergence of new projects		
6. Relationship Closing Phase (Termination processes)	-termination based on analysis of continuing or leaving the relationship -developing strategies to dissolve the relationship -conducting the final interfirm settlements		

Source: author's own

The revised model shows the interfirm relationship development in project-based organizations as an evolution of hardly predictable phases, and cyclical sub-stages adjusted to projects life-cycle, not an

ordered progression of stages over time. In the PBOs the process is complex, iterative and non-linear due to the temporary nature of projects and the dynamic nature of interpersonal relationships.

Discussion and conclusions

Basing on the presented study it can be stated that all the previous concepts in their "pure" form are insufficient to examine and describe interfirm relationship development in project-based organizations. The models based on the "stages" theory, e.g. Dwyer *et al*. (1987) or Ford (1980), describe the development of interfirm relationship development in relatively stable conditions, i.e. long-term goals, continuous cooperation, etc. Later concepts, e.g. Batonda and Perry (2003), Ferreira *et al*. (2017), Jap and Ganesan (2000) or Plewa *et al*. (2013), contribute to relationship literature by underlining the role of unpredictable changes and breaking events in relationship evolution. They show discontinuity of cooperation, and iterative nature of the relationship development process. The revised model adopts both mentioned perspectives, and additionally combines the small loop of project partnering with the big loop of strategic cooperation. This combination helps to understand the cyclical path, and unpredictability of relationship development in project-based organizations.

Comparing the revised model with the previous frameworks it is worth to underline its specificity. First, the model joins the short-term project partnering with the long-term strategic cooperation, as the interfirm cooperation in project-based organizations can be intentionally both temporary and long-term. Second, the model includes the dormant phase in which the relationship is inactive but still exist. The research contributes to the relationship development literature by showing a new perspective which includes intentional temporality and disruptiveness of interfirm cooperation. Presented model can be useful especially in organizations operating in high-velocity and high-technology sectors, clusters and networks, etc. The study has limitations as well, as it is based on extensive literature studies only, and there is a lack of empirical evidence concerning the model yet[1]. The model needs to be verified in the practice of project-based organizations, and exemplified by evolution of different types of cooperative (or coopetitive) dyads in PBOs. The multiple case study research design is planned as the next step in the research project conducted.

The study reveals also some new fields of exploration and shows further research directions. First, the most interesting research questions that arise are as follows: How to replace the high level of trust and commitment characteristic for the later stages in the traditional long-term approach to achieve expected quality of relationship and its outcomes? And how to increase the effectiveness of interfirm cooperation in the short-term perspective? These questions show the call for the further studies of the topic, both qualitative, and quantitative ones.

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Strategic and Operational Marketing Mix

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Abstract

The subject matter of this article is the presentation of the framework structure of a marketing mix, taking into account the strategic and operational dimension of market impact instruments. The aforementioned marketing instrument composition exhibits the complexity surrounding the issues of implementing the principle of integrated impact on the market. The basic premise behind an attempt at building such a framework structure is the often-superficial approach to the interpretation of the "marketing – mix" concept as a benchmark structural model of a set of instruments for influencing the market that is visible, in particular, in marketing literature. This is evidenced by several factors, including abstraction from the diversity of the nature of individual groups of marketing instruments from the standpoint of strategic and operational management requirements, which is particularly difficult to accept.

Keywords: Marketing – Mix, Strategic Marketing, Operational Marketing.

Introduction

Subject matter literature on marketing offers its readers a multitude of guidelines, principles and rules concerning marketing conduct, including two, which are of key importance for the identification of marketing activities. These include the principle of deliberate selection and shaping of the company's market, and the integrated market impact principle. Their essence is expressed in key marketing categories: "target market" and "marketing – mix". Their importance stems from the apparent relationships between variables determining marketing effectiveness and efficiency, where the former depends on the accuracy of identifying and defining the target market as a potential source of future revenue, while the actual efficiency of this source depends primarily on the proper use of available instruments to influence the market, as well as their proper structural composition.

Market Impact Instruments

The principle of integrated market impact dictates that a specific, tailored mix of all available tools, adapted to the situation at hand should be used, instead of using all tools separately. The idea behind this principle is to create a synergy effect thanks to the coordination of the various tools, resulting in the final effect of the total impact of the marketing composition being much greater than the sum of the effects that could be achieved through the independent use of individual instruments. The diversity and variety of marketing tools and instruments serve as natural grounds for their classification, as well as attempts at building normative models of their configurations, which may prove useful in marketing planning. Before we move on to their critical review, let us pay some attention to the marketing instruments.

In the broadest sense of the term, marketing instruments encompass all the means by which tasks and activities are performed in the subsequent stages of marketing activity – not only in the direct market impact phase, but also in the preceding preparatory activities concerning market research, analyses and marketing planning. On the other hand, in the narrower sense of the concept, it covers only means of influence used by the entrepreneur deliberately to influence the attitudes and behaviours of persons and organisations as consumers and buyers. In this narrow sense, the diverse marketing instruments constitute a set of elements, which enable building integrated compositions of tools, with the aim of exerting influence on a given target market.

To understand the essence of instruments used to influence the market, it is important to point out their deliberate use. Factors such as quality and assortment of the product, its price, place and form of sale all tend to influence the decisions made by buyers; however, we may refer to them as instruments only if they were given a deliberate shape, taking into consideration the expected reactions of buyers and users (Lehman, 2004). The aim of marketing is to ensure that this response is as controlled as possible, in line with the company's objectives – it should not be random, allowing only for recording the obtained results, without offering any opportunities for actively shaping them in any way. This can be illustrated by typical situational examples. A new product, which was developed as a result of its designer's technical innovation may only be a passive object of sale. A technical concept of a product or service becomes a product and a marketing instrument only when it undergoes a commercialisation phase, which entails shaping the characteristics of the product to increase its value for potential buyers. Likewise, when it comes to the price, it may only be considered a tool for settlement between the seller and the buyer if it is based solely on cost calculations and expected profits. It only becomes a marketing tool when it is set on the basis on the assessment of the expected market reaction when confronted with the perceived value of the product and the prices of substitute (competing) products.

Here, it is also important to point out the difference between the names of the different kinds of instruments and the specific instruments, which constitute the substance of all marketing plans and the subject of actual marketing operations. Usually, in theoretical considerations, authors tend to use generic names (such as product, price, brand), whereas marketing plans tend to include trademarks of specific product models, their proper prices, specific trademarks, logos and so on, which are used as marketing instruments.

Referring to what has been stated previously, the multitude and diversity of marketing instruments at the disposal of a marketing manager responsible for building a marketing plan suggests making their task easier by building a kind of an organiser with a certain number of compartments, in order to make it easier for them to find their way around this extensive toolbox. This, of course, requires a specific classification of the lot. The basic scheme used for classifying marketing instruments is based on the marketing-mix model suggested by E.J. McCarthy in the form of the so-called Four Ps (Product, Price, Place, Promotion) (McCarthy, 1960), also referred to as 4P. Accordingly, the classification of marketing instruments includes a number of subsets, namely:

- Product – which contains all the tools, which can be directly linked to shaping the company's offer in terms of the value offered to buyers;
- Price – which contains all the elements of the offer that the buyer takes into account as determinants of the total cost of the product;
- Place – encompasses all the tools, which enable shaping the course of transactions and logistic processes, leading up to the transfer of product and ownership from the place of manufacture to the final recipient;
- Promotion – contains various instruments, which enable the seller to get in touch with prospective buyers, communicate and try to highlight their own offer among the competition.

Marketing – Mix

This classification of marketing instruments – or the 4P model – should not be conflated with marketing-mix from the operational standpoint. As an element of a given marketing plan, the marketing-mix is a creative composition of tools, chosen deliberately from a known and available set of instruments in such a way as to obtain a synergy effect in the process of influencing the market (Gujral et al., 2016). This leads us to the need to find answers to the following key questions (Niestrój, 1998):

- What does the company intend to offer the buyer and how is it going to distinguish its product among competing offers?
- On what financial terms can the product be purchased by the buyer?

- Where and when will the product be offered to the final customer and how will it be delivered there?
- How does the company intend to inform the buyer about its offer and convince them to accept it?

Taking into account the variety of instruments classified in particular subsets, it quickly becomes necessary to shape a marketing composition characterised by a hierarchical structure, made up of four sub-compositions, in line with the presented model. These are:

- product sub-composition (basic characteristics of products and their assortment varieties, which make up a given composition, along with branding, packaging, product-related services, etc.),
- price sub-composition (basic price, discounts, rebates, payment terms, credit, etc.),
- distribution sub-composition (distribution channels, logistic solutions),
- promotion sub-composition (direct sales, advertising, sales activation measures, public relations instruments).

Depending on the scope and the diversity of specific instruments, in specific situations, the various elements of sub-compositions listed above may be developed and further expanded into lower-level sub-compositions (such as advertising media sub-composition, as well as alternative distribution channels sub-composition).

A set of marketing instruments is not closed by any means. The development of technologies and growing creativity of marketers, the marketing toolbox keeps expanding, revealing the shortcomings of the simple 4P model (Shaw, 2012), which owes its popularity mostly to its educational qualities, namely due to its effective acronym, which is easy to remember. Interestingly, the popularity of the one-letter 4P acronym gave rise to further concepts created in the same vein, including 7P, 4C and many others; However, like in the case of the original 4P, these acronyms rarely reflect the substantive nature of the presented categories. In the case of the 4P acronym, the use of the third and fourth Ps – "place" and "promotion" – leads to significant narrowing down of the meaning of these groups of instruments, compared to the actual meaning of these words, namely "distribution" and "communication." In order for the acronym to conform with the meaning, it should be "PPDC," however, 4P was deemed more effective. At the same time, one would be hard-pressed to find actual and unambiguous classification criteria in the case of the 4P model. Approaching this model from a practical point of view reveals a number of significant drawbacks and issues; chief of which are:

- artificial separation of the price and the offered product, which in reality constitutes its integral part and cannot be considered separately from product quality;
- too narrow a definition of the fourth element ("promotion"), which disregards the significance of communicating with the market in its broadest sense, thus making it difficult to distinguish the terms "promotion" (in the broad sense) and "sales promotion";
- too narrow an approach to the sales promotion instruments, which makes it difficult to explore and understand their relationships with the remaining elements of marketing-mix (such as promotional prices, promotional packaging, etc.);
- unclear stance on direct sales, which is more closely related to distribution, rather than promotion (especially in the case of door to door sales and the so-called direct marketing techniques).

Some of the various drawbacks of the 4P model were eliminated by three-part models, which gained significant popularity in German literature. Such models present the marketing-mix as a coordinated set of instruments, generated in three instrumental marketing areas (Becker, 2006):

- supply policy (product, product range, price);
- distribution policy (distribution channels, direct sales, physical distribution);
- market communication policy (advertising, sales promotion, public relations).

Thanks to this division, the offer sub-composition makes up a concise list of products offered to buyers, with full information about their performance, prices and financial terms of the transaction. The distribution sub-composition includes a complete design of distribution channels and logistics solutions, including direct sales. In turn, the communication instruments sub-composition focuses on instruments of communication and information exchange, encompassing the use of appropriately selected media.

Despite its apparent advantages, the approach presented above does not eliminate all the doubts concerning categorisation of individual sales promotion instruments – it does not provide answers to the problems of promotional packaging and price promotions, and where they should be included in that hierarchy – in the communications design or as part of the offer? In other words, a question arises whether the priority should be given to the generic or functional criteria from the point of view of marketing management. This has been a long-standing issue in the history of marketing, yet the concept for its resolution has not gained significant popularity in marketing textbooks. In 1992, W. Waterschoot and C. Van der Bulte presented a practical way of solving this issue. Starting with the classification of marketing functions, they divided all instruments as follows (Waterschoot and Van den Bulte, 1992):

- Basic mix, which encompasses:
    - basic product mix,
    - basic price mix,
    - basic distribution mix, and
    - basic communications mix, in which they distinguish: mass communications mix, personal communications mix , as well as publicity mix.
- Promotion mix, which consists of:
    - product promotion mix (e.g. economic product packaging),
    - price promotion mix (e.g. discounted goods, extended payment deadlines),
    - distribution promotion mix (e.g. occasional points of sales – fairs),
    - mass communication promotion mix (e.g. shows, presentations),
    - personal communication promotion mix (e.g. contests for sales staff),
    - publicity promotion mix (e.g. any and all sales promotion activities that create a positive company or product image).

Thus, the model outlined above eliminates all kinds of dilemmas concerning the categorisation of marketing sales promotion instruments, which make up a separate group, forming a sort of second (lower) tier of the marketing mix. This modified concept of the marketing-mix structure provokes us to ask another question – is the promotional function the best – or sufficient – criterion for distinguishing the second level of the mix?

Flexible Instruments and Inflexible Marketing Instruments

Promotional instruments serve as a typical example of operational marketing tools – they are launched as needed, depending on the current marketing policy. The basic mix, on the other hand, encompasses tools that mainly make up the important factors that determine a marketing strategy. This duality was originally pointed out by H. Meffert (1986), who distinguished diversified ranges of strategic and operational impact of specific instrument groups within the classic 4P model. Decisions concerning specific instrument groups vary in terms of significance. For example, the author indicates that the product sub-composition (with the exception of services) is subject to decisions, which are mainly strategic in nature, while sales promotion and marketing logistics are considered amongst operational decisions. However, the chart makes it difficult to establish what constitutes the criterion for distinguishing the strategic and operational scope of marketing instruments – the division, whose importance is paramount from the standpoint of marketing management organisation, in particular for the location of competences and decision-making powers at individual management levels. In this case, in addition to the scale of the resources involved, the magnitude and sustainability of the impact of the decisions taken is crucial. Decisions concerning the use of instruments involving even relatively small resources, which result in long-term impact, should be considered strategic

decisions (Drummond, 2007, Hunt, 2015). Others, regardless of cost – as long as they remain within the established marketing budget – may be considered operational decisions (Notta and Vlachvei, 2015, Kanagal, 2017).

The presented examples show that apart from a functional differentiation, another important rationale for classifying marketing instruments in a given category is their differentiation from the point of view of their susceptibility to ad-hoc modifications and the sustainability of their impact. On this basis, two types of instruments can be distinguished (Meffert, 1986). These are:

- flexible instruments, which can be modified and changed within relatively short timespans (such as sales promotion instruments, discounts, complementary services, transport routes, etc.), as well as
- inflexible instruments, whose changes require long-term planning and considerable workload (e.g. distribution channels, products).

Some instruments may seem flexible due to the fact that they might be technically easy to modify; yet in reality they might not be such, due to the slow reaction of the buyers (Kerin and Peterson, 2004, Dadzie et al., 2017, Wróblewski, 2017). The brand (company) is often cited as a typical example of such a case, as it is relatively easy to come up with a new name and logo, yet such changes are carefully considered and relatively rare. This results from the long and gruelling process of brand positioning among prospective customers. Another key element of the marketing-mix – the product (design, model) – can also be the subject of a strategic decision, in particular if it is an important source of income and has a relatively long-life cycle. Changes in the layout of distribution and supply channels are another example of such decisions. Long-term relationships and partnerships based on mutual trust make up an important component of marketing assets, a strategic asset of sorts, which significantly affects its performance and market value. In other words, low flexibility and longevity of the impact of some instruments make the related decisions strategic in nature. On the other hand, decisions concerning flexible instruments with a short-term impact belong to the realm of operational marketing.

The above considerations show that the current application of marketing mix should combine these earlier solutions, as these eliminate the limitations and inconsistencies stemming from the generic nature of the 4P model. Such conditions are met by a model that is based on a three-part classification of the various elements of the mix (Table. 1.). This framework divides the marketing composition into three functional sub mixes that are constructed on two levels – strategic and operational. These are: offer mix, communication mix and distribution mix.

A correctly constructed offer constitutes the basic component of the mix of tools used to influence the market (Varadarajan, 2015). From the standpoint of marketing, the offer encompasses a list of products offered for sale (as well as rental, leasing, etc.), addressed to a target market or a specific potential buyer identified in the marketing strategy of a given company. With the exception of cases where a single piece or instance of a given product is offered for sale, this list usually includes products defined as specific designs (models) and includes their basic characteristics (names, trademarks, quantitative data, etc.), including the price and any other relevant terms of sale (or another process), as well as terms of payment.

The comprehensive commercial offer reflects the company's offer policy, which is made up of three decision-making areas – product development policy, product programme policy, and pricing policy. At the operational level, the offer is modified as needed using various sales promotion instruments, such as promotional product sets, discounts, rebates, payment terms, product samples, and many more. The assessment of the attractiveness of the offer from the buyer's point of view is an indicator of the company's competitive standing when confronted with the assessment of the attractiveness of offers extended by competitors.

Table 1: Framework of strategic and operational marketing mixes

Sub mix		**Strategic mix**	**Operational mix**
Offer mix	Product	Utility, Quality, Brand	Additional services
	Program	Width and depth of the assortment	Promotional packages
	Prices	Level and rules differentiated prices	Discounts, Bonuses
Communication mix	Mass communication	Corporate identify, Creative and media advertising strategy	Advertising campaigns
	Public relations	PR strategy	Events, Competitions, Briefings
	Personal communication	Strategic sponsorship, Sales representatives	Personal selling
Distribution mix	Distribution channels	Main channels, Network relations	
	Operating systems	Forms of sales	Merchandising
	Delivery logistics	Delivery organization	Delivery schedules

Source: own work.

Distribution policy encompasses key decisions concerning the shape of distribution channels, concerning both their vertical section (long – short), as well as the horizontal one (wide – narrow), the course of marketing streams, the degree of integration of distribution channels and logistics solutions. They form a relatively stable distribution system, which constitutes an important component of the company's marketing assets, which impacts the assessment of its competitive position on the market. At the operational level, the distribution system is complemented by various specific solutions, depending on the needs and tasks at hand, which are used to fine-tune the capacity and efficiency of the distribution system to changing market circumstances. These include emergency deliveries, seasonally launched distribution channels, organisation of events conducive to demand activation, etc.

Communication policy encompasses decisions concerning the shape of relatively constant and unchanging elements of the marketing communication system, such as trademarks and brands, as well as other elements of corporate identity, creative and media advertising strategies, main on-line communication channels and basic instruments used to implement public relations activities. At the operational level, these include various ad-hoc promotional activities aimed at garnering the interest of buyers – some of these include bonus sales, contests, shows, tastings, etc., as well as mobilising collaborators within distribution channels using bonuses, contests, training courses, conferences, etc. (Jenkins, 2006).

Conclusion

The framework marketing mix outlined in this paper serves as an attempt to take a structured approach to the decision-making process related to the practical implementation of the integrated market impact principle. Given the onslaught of the never-ending variety of new marketing concepts, it may seem that classical marketing principles are becoming a thing of the past; however, this is not the case. Regardless of the currently promoted marketing concepts, no reasonable marketer would disregard the analyses and decisions concerning the identification of the target market, nor will they refrain from agreeing on the applicable marketing instruments from the point of view of the

consistency of their impact on the market. It seems that the framework structure for the composition of marketing instruments proposed above may bring us closer to better understanding of the complexity of this issue and thus facilitate finding the best solution in a given situation.

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How Does Digitalization Affect Performance of Croatian Largest Firms?

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Abstract

The main goal of this paper is to analyse how digitalization affects performance of 100 largest companies that operated during the 2014 – 2018 period in Croatia. For this purpose, a regression analysis is employed. Various firm-specific variables including digitalization, size of the firm, leverage, age and liquidity serve as independent variables whereas net profit margin (NPM) is employed as dependent variable. The results of the analysis revealed that performance of Croatian largest firms is influenced by digitalization, leverage and liquidity. Specifically, digitalization positively impacts performance as well as liquidity whereas leverage of the firm has negative impact on performance.

Keywords: Digitalization; Firm's Success; Croatian Largest Companies

Introduction

Despite the fact that there are numerous papers dealing with the issue of determining factors that influence firm's success, this field of research continues to occupy scientists with regard to the ever-changing environment in which businesses operate and the challenges they face. Digitalization, which is often described as the increasing use of ICT technologies in every area of life (Vuori, Helander, and Okkonen, 2019), has become an emerging trend. Therefore, we want to find out whether the use of digital technologies changes firms' businesses in a way of enhancing their performance. Since the existing literature that empirically investigates this topic is scarce or almost non-existent, the authors want to fill the gap by providing new evidence on effects of digitalization on firm's performance on the sample of largest Croatian non-financial cross-sector companies. In that sense, the primary aim of the authors is to analyse the influence of digitalization on performance of 100 largest Croatian companies that operated in 2014 – 2018 period. These are selected based on total assets, total sales and number of employees, criteria defined by Accounting Act (Official Gazette 78/15, 134/15, 120/16 and 116/18) using Infobiz database available through FINA (Croatian Financial Agency). However, after adjusting for companies with incomplete data the final sample consists of 70 companies that operated in at least two consecutive years making a total of 299 observations. For the purpose of this analysis performance is measured with accounting–based measure of performance, i.e. net profit margin. Besides digitalization that serves as independent variable, several control variables are introduced in the research in order to capture some other aspects of firm's performance. These are size of the company, leverage, age and liquidity.

The rest of the paper is structured as follows. After introductory part giving the background on the topic, investigated literature review follows. Description of variables is provided in the third part of the manuscript. In this part a rationale for potential influence of firm-specific variables on performance is given. The fourth section provides results of the empirical analysis while the fifth part concludes.

Literature Review

Although digitalization and its effects have been quite popular in research papers in recent years, most of them deal with this issue from the theoretical perspective whereas literature on quantitative research papers is relatively scarce.

Wroblewski (2018) analyses how digitalization affects firm performance. The author employs the portfolio analysis and risk factor models to find out the influence of digitalization on stock returns as well as the dynamic panel model in order to see how digital maturity affects operating performance. The proxy for digital maturity comprises digital marketing, product experience, e-commerce, e-customer relationship management and social media. The analysis is conducted on the sample of 24 Swedish companies belonging to different sectors that were listed in the period 2010 – 2016. The author does not find support for the hypothesis that digitally mature companies perform better.

On the other hand, Bughin, Catlin, Hall, and Zeebroeck (2017) use the sample of about 250 companies across the world and industries to see how digital intelligence influences financial performance. Their findings reveal that digital intelligence is positively correlated with revenues, earnings before interest and taxes as well as on company's growth.

Falentina, Resosudarmo, Darmawan, and Sulistyaningrum (2019) investigate how digitalization seen as internet utilization affects corporate performance on the sample of 576 micro and small firms in Indonesia in 2018. Results reveal that internet usage has enhanced labour productivity as well as exports.

It is also worth citing Abbasi and Weigand (2017) who present literature review on papers dealing with the influence of digital financial services on company's performance in the banking sector. This literature review covers 39 papers with majority of studies, specifically 82% of them, finding positive influence of digital financial services on bank's performance.

Tohanean, Sorin-George, and Dumitru (2018) support the view that digitalization enhances corporate performance on the case of German company. Furthermore, on the sample of 452 companies that operated in the period 1998 – 2003 Mithas, Tafti, Bardhan, and Goh (2012) find that IT investments positively affect revenues. Van Ark (2015) explores effects of digital economy on economic growth of European and US economy finding its positive effects on productivity. In paper by Eremina, Lace, and Bistrova (2019) the authors apply specially developed assessment methodology relating to a digital maturity. Using the sample of listed Baltic companies, the authors find positive relationship between digital maturity and financial performance measured with sales growth and ROE.

On the other hand, theoretical papers consistently emphasize the benefits of digitalization. For instance, Kotarba (2017) analyses metrics that are being used to quantify digitalization activities while Neumeier, Wolf, and Oesterle (2017) list digital benefits and emphasize its value drivers. Lenka, Parida, and Wincent (2017) describe how three subcomponents of digitalization capabilities facilitate value co-creation in a B2B setting with customers through perceptive and responsive mechanisms.

Description of Variables

In order of analysing how digitalization influences performance of Croatian largest firms, a number of company-specific variables are used in the research. As a dependent variable an accounting-based performance measure, calculated as net profit to total sales i.e. net profit margin (**NPM)** is used. A large number of studies dealing with determinants of firm's performance use NPM as a performance measure (e.g. Liargovas and Skandalis, 2010; Waelchli and Zeller, 2013).

Since the main goal of this research is to see how digitalization observed as investments in ICT technologies influences on firm's profitability, we employ digitalization as an independent variable (**DIG**). Unfortunately, companies' balance sheet lacks the precise data on ICT investments. Although

the notes to financial statements of the companies should indicate what items and amounts are involved, this is rarely done. Thus, we proxy it with logarithmic value of intangible assets item named "concessions, patents, licences, trademarks, software and other rights" which refers to a large extent to the software the companies use. Similar approach is employed by papers whose object of analysis are insurance companies. Specifically, Łyskawa, Kędra, Klapkiv, and Klapkiv (2019) obtain the data on ICT expenses from notes to financial statements whereas Pavic Kramaric (2020) proxies this variable by using "other intangible assets" or "software etc." while investigating its impact on performance of listed companies in Croatia. Positive impact of digitalization on corporate performance is expected based on the rationale that digitalization observed as investments in ITC technology enhances quality of products or services offered as well as firm's business operations, decision making processes, strategic positioning etc. leading to better performance.

Size variable is chosen based on the existing literature which regularly uses this variable as a potential determinant of firm's success. This variable is calculated as a logarithm value of firm's total assets (**SIZE**). The findings of numerous studies suggest that the impact of company size on performance could be positive or negative. The rationale for positive effect of firm size on performance can be found in Serrasqueiro and Nunes (2008) stating that larger companies may exploit scale economies, have greater strategic diversification as well as better position to negotiate with customers and suppliers. On the other hand, smaller companies may take advantage of easily modified organizational structures and greater possibility to detect profitable investments easily as compared to larger companies as stated in Pattitoni, Petracci, and Spisni (2014).

Leverage variable (**LEV**) is included in the analysis as a control variable and it is calculated as total liabilities to total assets ratio. Since higher indebtedness implies interest rate payments resulting in reduced levels of profits, a negative influence of this variable might be expected. However, as stated in Agiomirgianakis, Magoutas, and Sfakianakis (2013), sometimes companies need additional financial funds in order to finance new profitable investments. The same authors also cite the value-maximization theory according to which there is an optimal level of indebtedness defined by the trade-offs between the advantages of borrowing funds and the associated risks. Therefore, the influence of this variable is also unclear.

Another control variable is liquidity ratio (**LIQ**) which is calculated as current assets to short-term liabilities. It is often employed in empirical literature on determinants of company's profitability (e.g. Goddard, Tavakoli, and Wilson, 2005; Serrasqueiro and Nunes 2008; Škuflić, Mlinarić and Družić, 2016). It represents current ratio indicating the speed at which a company reacts to sudden changes in its business environment as stated in Goddard, Tavakoli, and Wilson (2005). Higher levels of liquidity reduce exposure to the risk of not being able to repay short-term liabilities. In this sense positive influence of liquidity on performance is expected as found by Goddard, Tavakoli, and Wilson (2005) who investigate factors determining performance on the sample of Belgian, French, Italian and UK manufacturers and service sector firms. However, some authors confirm negative impact of liquidity on firm's performance such as in Škuflić, Mlinarić, and Družić (2016) and Eljelly (2004), whereas some find no statistically significant influence of liquidity on performance (e.g. Pratheepan, 2014 and Pervan, Pervan, and Ćurak, 2019). Having in mind all stated above, the effect of liquidity on firm's performance is ambiguous.

We employ variable age of the firm (**AGE**) in order to see how it affects performance of the Croatian largest firms. This variable is calculated following Yasuda (2005) approach who investigates factors that determine firm growth on the sample of Japanese manufacturing firms. Specifically, we subtract the year when the company is established from the year of the analysis, and add 1. Regarding the influence of firm's age on its performance there are mixed results in the empirical literature. Durand and Coeurderoy (2001) use the sample of 582 French manufacturing firms in order to investigate how age, order of entry, strategic orientations and industry conditions affect firm's performance and find that younger firms perform better. They explain the negative influence of firm age on performance stating that "older firms suffer from ossification of their routines, non-learning processes, blindness, and conservatism, which cause poor performance and decline". Negative influence of this variable on performance is also found in Majumdar (1997) while investigating productivity and profitability of

1020 Indian firms, Pervan, Pervan, and Ćurak (2017) and in Akben-Selcuk (2016) to name a few. On the other hand, some research papers suggest that older firms exhibit superior performance (e.g. Ghafoorifard, Sheykh, Shakibaee, and Joshaghan, 2014; Osunsan, Nowak, Mabonga, Pule, Kibirige, and Baliruno, 2015). Positive influence of age on company's performance may be found in the fact that age enhances experience or, as stated in Das (1995), a firm's reputation increases with age. Moreover, Boeker (1997) finds no significant effect of firm age on performance. Therefore, the expected sign of this variable is unclear.

Results of the Regression Analysis

Descriptive statistics of variables that are used in the analysis is presented in Table 1 from which can be perceived quite variation in variables. The largest standard deviations are found in variables leverage and NPM, indicating quite dispersion of the data. According to the data, average value of NPM is 2.9%, while a mean value of variable age shows that, on average, firms operate 24 years in the market. Average size of the firm (measured in terms of total assets) amounts 2 billions of HRK (cca. 266 millions of euro), while the mean value of liquidity amounts 1.5%. The span of logarithm value for the variable digitalization lies between 9.1 and 22.1.

Table 1: Descriptive Statistics

	Minimum	***Maximum***	***Mean***	***Standard Deviation***
NPM	-63.544	42.253	2.850	11.667
DIG	9.067	22.112	15.859	2.352
SIZE	18.042	24.690	21.416	1.151
LEV	4.544	96.624	47.061	20.302
AGE	4	48	23.95	9.294
LIQ	0.0487	14.540	1.5263	1.430

Source: Author's calculations

In order to preliminary detect the relationship between analysed variables, a correlation analysis is performed. According to Table 2 the strongest relationship is identified between digitalization and firm's size. At the same time, firm's performance, presented with NPM, is most closely related to liquidity.

Table 2: Correlation Analysis

	NPM	***DIG***	***SIZE***	***LEV***	***AGE***	***LIQ***
NPM	1					
DIG	0.180**	1				
SIZE	0.174**	0.605**	1			
LEV	-0.287**	-0.174**	-0.273**	1		
AGE	0.004	0.034	-0.163**	0.066	1	
LIQ	0.370**	0.106	0.058	-0.373**	0.211**	1

*** Correlation is significant at the 0.01 level (2-tailed)*
Source: Author's calculations

However, since the influence of one variable (independent) on the other variable (dependent) can be enhanced when several independent variables are combined and observed together, we decide to examine the influence of digitalization on firm's profitability with the application of the regression analysis. As a dependent variable, a NPM is applied, while all other variables i.e. digitalization, size, leverage, age and liquidity are used as independent variables.

In order to be sure that multiple regression analysis provided valid results, we test for the presence of autocorrelation in the residuals with a Durbin–Watson (DW) test. The obtained value of DW test is around 2 (i.e. 1.96) indicating that residuals are free of autocorrelation. In addition, the test for

multicollinearity shows that VIF (variance inflation factor) factors are lower than 5, verifying no presence of multicollinearity.

Table 3 provides the R^2 and adjusted R^2 which show us how well a regression model fits the data. Value of 0.460 indicates satisfactory level of prediction. At the same time, from the value of 0.197 (coefficient of determination) we can conclude that independent variables (digitalization, size, leverage, age and liquidity) explain 19.7% of the variability of firm's profitability.

Table 3: Model Summary

R	*R Square*	*Adjusted R Square*	*Std. Error of the Estimate*	*Durbin-Watson*
0.460[a]	0.211	0.197	10.5926	1.963

[a]*Predictors: (Constant), Liquidity, Digitalization, Leverage, Age, Size*
Dependent Variable: NPM
Source: Author's calculations

In Table 4, the F-ratio is presented and according to its value and significance ($p<0.001$) it is possible to conclude that overall regression model is a good fit for the data.

Table 4: ANOVA[a]

Model		*Sum of Squares*	*df*	*Mean Square*	*F*	Sig.
1	Regression	8080.881	5	1616.176	14.404	0.000[b]
	Residual	30182.809	269	112.204		
	Total	38263.691	274			

[a]*Dependent Variable: NPM*
[b]*Predictors: (Constant). Liquidity, Digitalization, Leverage, Age, Size*
Source: Author's calculations

After all diagnostics are presented and briefly explained, we can turn to the interpretation of regression coefficients (Table 5).

Table 5: Results of the Regression Analysis

Model		***Unstandardized Coefficients***			**Collinearity Statistics**
		B	***Std. Error***	***Sig.***	**VIF**
1	(Constant)	-15.401	14.876	0.301	
	DIG	0.616	0.346	0.076	1.546
	SIZE	0.465	0.756	0.539	1.704
	LEV	-0.113	0.037	0.003	1.312
	AGE	0.001	0.074	0.988	1.118
	LIQ	2.386	0.485	0.000	1.259

Dependent variable: NPM
Source: Author's calculations

Conducted analysis reveals that digitalization, leverage and liquidity play significant role in determining corporate performance of Croatian largest companies. Specifically, positive influence of digitalization suggests that Croatian largest companies take advantage of benefits offered by digitalization. Our study confirms the assumption that digitalization enhances quality of products or services offered as well as firm's business operations, decision making processes, strategic positioning etc. leading to improved performance.

The obtained results are similar to those of Chen and Srinivasan (2019) who find positive impact of digital activity (identified as digital term in the companies' disclosures) on the firm's performance measured with assets turnover. Likewise, Łyskawa, Kędra, Klapkiv, and Klapkiv (2019) show strong and positive correlation between software and gross written premiums in the case of two European insurance groups. Moreover, on the sample consisting of non-publicly traded hospitals Kohli, Devaraj and Ow (2012) find that IT investments positively influence performance when it is measured with market values. Chen, Lin, and Liu (2018) report that software and database expenses positively influence performance when it is measured with profit and revenue to cost ratio while Scott, Van Reenen, and Zachariadis (2017) find positive relationship of digital innovation observed as adoption of swift on bank's performance.

According to the obtained results, leverage has statistically significant and negative influence on firm's profitability measured with NPM implying that the costs of borrowing are higher than the potential advantages of debt. Negative influence of this variable can be explained by the fact that higher levels of profitability increase the possibility of accumulating adequate levels of earnings reducing in that way the need for debt (González, 2013). Statistically significant and negative influence of leverage on performance is also found by Asimakopoulos, Samitas, and Papadogonas (2009); Agiomirgianakis, Magoutas, and Sfakianakis (2013) and Al-Jafari, and Samman (2015).

Firm's liquidity significantly influences on firm's success. Positive influence of current ratio on performance is also found in Goddard, Tavakoli, and Wilson (2005). This positive influence can be explained through the fact that higher levels of liquidity allow firms to take greater advantage of good investment opportunities as stated in Goddard, Tavakoli, and Wilson (2005).

Variables age and firm's size have no statistical influence on firm's performance.

Conclusion

With this research the authors want to shed a light on the role that digitalization plays in determining corporate performance. For this purpose, a sample of 70 largest non-financial cross-sector Croatian companies that operated in 2014 - 2018 is chosen for the analysis. After conducting regression analysis, the results suggest significant influence of digitalization, liquidity and leverage on performance whereas age as well as the size of the company show no statistically significant influence on performance.

The fact that this research confirms the significant role of digitalization in corporate performance reinforces its importance and it is definitely becoming an integral part of business activities in many corporations. However, in the future research it might be useful to encompass other performance measures as well as introduce new control variables in order to see in which direction they influence firm's performance.

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The Phenomenon of Digital Influencers in Light of Empirical Research on Heavy Internet Users Belonging to Generation Z

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Abstract

The aim of this paper is to determine the function, position and significance of digital influencers in the entire online advertising and promotion system, and to state how the concept of influencer marketing fosters its further development. For the purpose of this paper, the literature was reviewed regarding the following: the origin, scale and causes of the phenomenon of digital influencers and its influence on the digital advertising and promotion system. Following this stage, surveys were conducted on the group of Internet users to obtain primary data. The results clearly indicate a high potential of activities involving the participation of digital influencers. This is mainly due to the following factors: information on the product or service is communicated effectively, brand awareness is increase d and the level of sales of products and services offered by companies is raised. Based on the research results, initial recommendations along with the statement of risks arising from the concept were formulated.

Keywords: Influencer Marketing, Social Media, Digital Promotion, Electronic Space.

Introduction

Expenditure on online advertising and promotional activities is growing rapidly. This is, inter alia, because of a steady increase in expenditure on digital advertising and a decline in expenditure on traditional media. According to the Statista portal, in 2020, expenditure will amount to more than USD 365 billion (Statista, 2020). eMarketer's forecasts are even more optimistic. According to its report, expenditure is expected to reach 384.96 billion USD in 2020. At the same time, digital advertising expenditure accounted for 50.1% of global advertising expenditure in 2019, and in 2023, it is expected to reach 60.5% (eMarketer, 2019). In this respect, the increase in spending on social media advertising is a clear trend. In 2017, it amounted to over 62 billion USD, and in 2023, it is expected to reach a level twice as high, i.e. 125 billion USD (Statista, 2020).

However, with the increasing expenditure on broadly understood digital advertising and promotion goes the decreasing effectiveness of activities in e-space (Wielki, 2007; Wielki and Grabara, 2018). This is because a number of reasons. What is clearly visible is that consumers are less and less vulnerable to online advertising and promotional activities used so far. They are dissatisfied with the way organizations communicate with them, e.g. various forms of digital advertising. They feel that digital advertising is excessive and increasingly intrusive. As a result, they more and more often ignore (TapInfluence, 2019a) or block digital advertising, the scale of the latter rapidly growing (Bhat, 2017; Essex, 2017; Wielki and Grabara, 2018).

The changes happening on the market are largely reflected by the growing voice of Generation Z which constitutes an expanding group of consumers. Members of Generation Z behave completely different and focus on completely different issues compared to other generations of consumers (Cone Communications, 2017). For them, organizations have to adopt a completely different marketing approach. They spend a lot of time in social media (GlobalWebIndex, 2019) and like to observe and follow some people present in social media who seem interesting to them for various reasons and whom they trust (Fromm, 2018).

In a dynamically changing market situation, where advertising and promoting products, services or brands are more difficult than ever before, organizations started to look for alternative ways of

influencing consumers. In this regard, the concept of digital influencers and influencer marketing in the processes of communication between organizations and their customers became the main course of action (Forbes Communications Council, 2018; Roose, 2019). This approach is the fastest growing trend in the field which changes the way specific industries work (Chief Marketer, 2019; Finley, 2016).

Given the growing importance of digital influencers in the processes of communication between organizations and their consumers, the main aim of this paper is to determine the function, position and significance of digital influencers with respect to the entire online advertising and promotion system and related changes. The paper is based on data from reports on digital influencers and own research conducted on individual Internet users.

Digital influencers: definition, scale and reasons for the development of the concept of influencer marketing

Definition and typology of a digital influencer

Contrary to appearances, the idea of using various types of well-known characters for the purpose of broadly understood recommendation marketing activities is not new as it dates back to the 18th century (Górecka-Butora, Strykowski, and Biegun, 2019). Its modern version is closely related to the development of social media and the use of social media in the processes of online marketing communication in organizations. With a growing popularity of social media, some people started to use them to gather around groups of followers, in some cases amounting to even more than one hundred million people (Hopper, 2019).

Handayani et al. provide the following definition of digital influencers: "The digital influencers are influential social media users with a large follower base" (Handayani et al., 2019). According to Górecka-Butora et al., "the influencer is an opinion leader, popular in a wider or higher group of regular recipients, who with their credible actions, currently conducted increasingly often on the Internet, inspires trust, engages and convinces their recipients to make specific choices, e.g. on shopping, nutrition or worldview" (Górecka-Butora, Strykowski, and Biegun, 2019). Due to their use of social media, they are often also called social media influencers. According to Influencer Marketing Hub, social media influencers "are people who have built a reputation for their knowledge and expertise on a specific topic. They make regular posts about that topic on their preferred social media channels and generate large followings of enthusiastic, engaged people who pay close attention to their views" (Influencer Marketing Hub, 2020). According to Pixlee's marketing platform, "a social media influencer is a user on social media who has established credibility in a specific industry. A social media influencer has access to a large audience and can persuade others by virtue of their authenticity and reach" (Pixlee, 2020).

The taxonomy of digital influencers can base on a number of distinguishing features. The number of followers is the most obvious criterion. In this respect, the following categories can be distinguished: celebrities (more than 5 million followers), mega-influencers (1–5 million), top influencers (more than 500 thousand), macro-influencers (100–500 thousand), medium influencers (20–100 thousand), micro-influencers (less than 20 thousand) and nano-influencers (1–10 thousand) (Mediakix Team, 2017; Mediakix Team, 2019; Górecka-Butora, Strykowski, and Biegun, 2019). Another criterion is the motivation to act. This includes the following categories: idols, experts, lifestylers, activists and artists. Idols are people who are widely recognized and hugely popular. In their message, they focus primarily on themselves with some reference to political or social issues and current events. Experts are people considered to be authorities in a given field due to their knowledge or skills. This category includes industry specialists, advisors, reviewers and testers. Lifestylers raise issues around lifestyle and leisure activities. They often focus on the following areas: fashion, beauty, interior design, health, cooking and travel. Activists pay much attention to their worldview. They often concentrate on minority rights, environmental matters and feminism. Artists focus on high aesthetics and visual appeal of the content they create when they use the Internet. They usually run various photoblogs and

Instagram profiles. They address issues around nature, travel, people and architecture (Górecka-Butora, Strykowski, and Biegun, 2019; Jones, 2016; TapInfluence, 2019a). The third criterion is a communication platform used by digital influencers. This category includes bloggers, YouTubers, Facebookers, Instagrammers, Twiterrers and Snapchaters (Górecka-Butora, Strykowski, and Biegun, 2019).

Key benefits from the participation of digital influencers in advertising and promotional activities

The literature shows a number of benefits from the participation of digital influencers in the marketing activities of organizations. Key benefits are as follows:

- The message is not anonymous;
- The message reaches out to precisely selected groups of recipients;
- Digital influencers have an impact on product sales;
- The costs are highly efficient.

Lack of anonymity of the message and the link between the message and a specific person is the most common point raised in studies on the participation of digital influencers in the marketing activities. It inspires trust and helps establish relations with recipients (Chief Marketer, 2019; Górecka-Butora, Strykowski, and Biegun, 2019; TapInfluence, 2019). In today's market conditions with a clear decline in trust in intrusive and anonymous digital advertising this factor is extremely important (TapInfluence, 2018). Activities of influencers result in brand humanization (Huff, 2017). The fact that the message reaches out to precisely selected groups of recipients is another important factor. The message is addressed to a specific group of Internet users who follow a person with clearly defined interests or beliefs (Chief Marketer, 2019; Górecka-Butora, Strykowski, and Biegun, 2019).

The impact of digital influencers on the product sales is another important factor as evidenced in a number of studies. According to a study by Nielsen Catalina Solutions, people affected by digital influencers bought significantly more than the control group (TapInfluence, 2017a). These results are also confirmed by global consumer research carried out by Rakuten Marketing at the turn of 2018 and 2019. The research shows that 80% of the respondents purchased a product recommended by the influencer "by clicking on the link or image" (Rakuten Marketing, 2019).

High cost efficiency of digital influencers is the fourth key benefit. The results of the research show different levels of cost efficiency. Nevertheless, this factor is undoubtedly very favorable to organizations. According to the "Influencer Marketing Benchmarking Report: 2019," a return in the range from 5.20 to even 18 USD for each dollar spent on digital influencer activities may be expected (Influencer Marketing Hub, 2019a). The research conducted by TapInfluence and Nielsen Catalina Solutions indicate even higher level of return, i.e. 23 USD. It is not possible to attain this level with banner ads as the return from banner ads amounts to 2.15–4.30 USD (TapInfluence, 2017).

Prospects for the use of influencer marketing and related expenditure

With respect to the prospects for the use of digital influencers in organizations, the reports of companies which examine this phenomenon clearly indicate a growing interest in this form of marketing activities. The "Influencer Marketing Benchmarking Report: 2019" shows that 86% of the surveyed companies intended to allocate part of their budgets for digital influencer activities in 2019 (as compared to 37% in 2017). In addition, more than 60% of the surveyed organizations declared an increase in expenditure on influencer marketing activities in the following year (Influencer Marketing Hub, 2019a).

This tendency is also confirmed by the results of eMarketer's global research conducted among the Chief Marketing Officers. In this research, more than 30% of respondents indicated on "increasing their focus on influencer marketing as an element of the advertising media mix" (eMarketer, 2019a).

Due to the growing interest in the participation of digital influencers in marketing activities of organizations, the value of the entire influencer marketing industry obviously keeps growing. Influencer Marketing Hub forecasts a rapid increase in the value of this industry between 2016 and 2019 from USD 1.7 billion to USD 6.5 billion (Fig. 1).

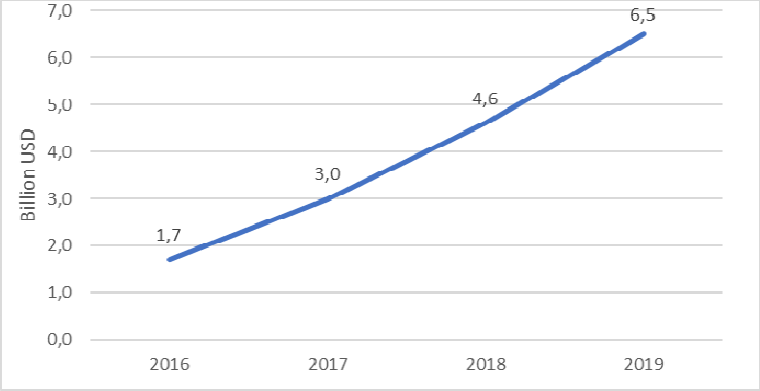

Fig. 1: Growth of the value of the influencer marketing industry between 2016 and 2019 *(source: Influencer Marketing Hub, 2019a).*

The report of Business Insider Intelligence predicts even more dynamic growth, i.e. from 8 billion USD (2019) to 15 billion USD (2022) (Fig. 2).

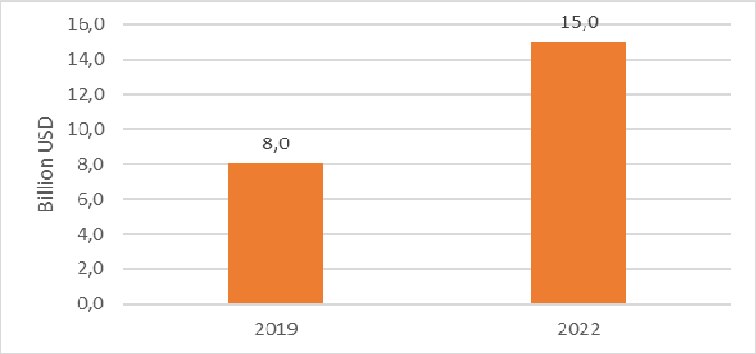

Fig. 2: Expected growth of the value of the influencer marketing industry between 2019 and 2023 (source: Business Insider, 2019).

The phenomenon of digital influencers in light of author's own research

Based on the broadly understood literature review on digital influencers and influencer marketing tendencies, the primary research on a specific group of Internet users was conducted. The selection of the group was based on two criteria. Firstly, respondents had to be intensive Internet users with the extensive use of social media. Literature and previous own research clearly indicate that students fall within this criterion (Wielki, 2017, Wielki, 2018). Secondly, respondents had to be members of Generation Z. To meet those two criteria, first and second cycle full-time students were selected.

The survey was conducted between January and May 2019 with the use of Google Forms. The survey was attended by 612 students covering all six local faculties of the Opole University of Technology. First cycle students accounted for 77% of the total number of students while second cycle students 23%.

The survey focused on the following issues:

1. Intensity of Internet use;
2. Use of social media;
3. Knowledge of the concept of a digital influencer;
4. Evaluation and criteria of the effectiveness of digital influencer activities;
5. Evaluation of the effects of activities taken by digital influencers;
6. Evaluation of the prospects for the digital influencer activities.

As regards the intensity of Internet use, the assumptions have been confirmed. Respondents are very intensive Internet users. More than two thirds of respondents are permanently connected to the Internet (always-on) (Fig. 3 and 4).

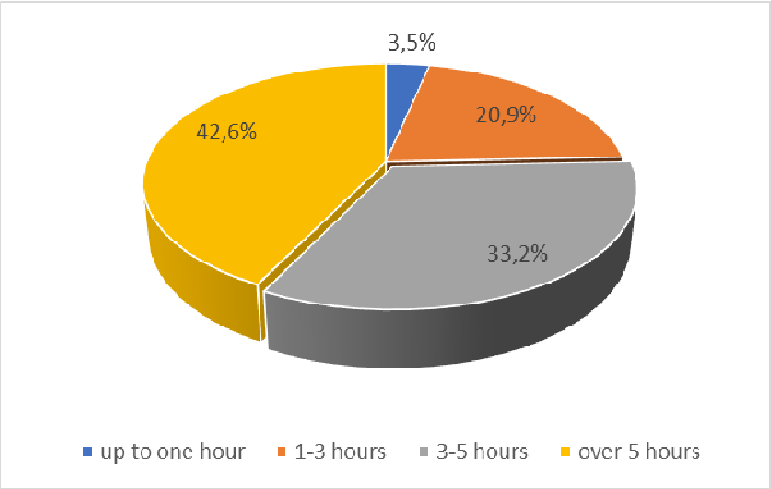

Fig. 3: Intensity of Internet use (source: own source).

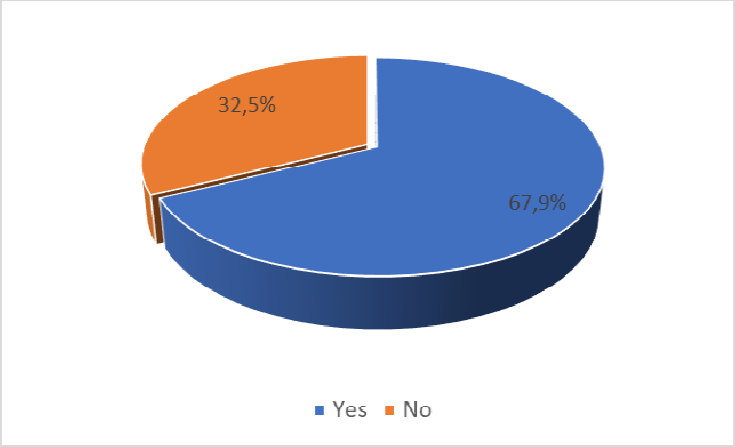

Fig. 4: Respondents permanently connected to the Internet (source: own source).

Social media are used by most respondents, with Facebook (92.9%), YouTube (90.6%) and Instagram (56.3%) being most popular. The vast majority of the respondents are familiar with the concept of a digital influencer (Fig. 5).

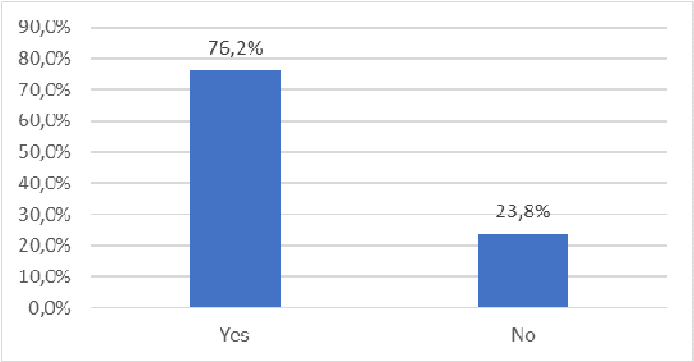

Fig. 5: Knowledge of the concept of a digital influencer (source: own source).

The vast majority of respondents claim that digital influencer activities are much more effective than digital advertising, including the best personalized advertising activities (Fig. 6).

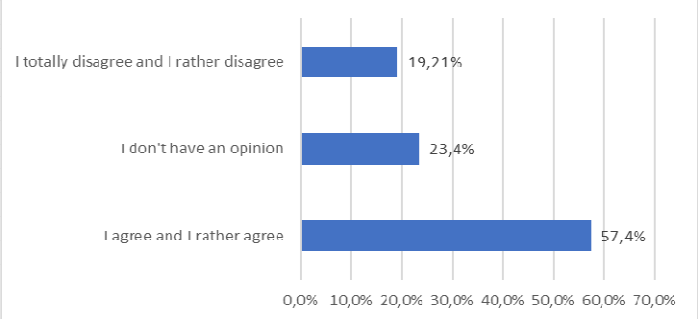

Fig. 6: Evaluation of the effectiveness of digital influencer activities (source: own source).

The key criteria of effectiveness are trust in the influencer being an authority (33.9%), credibility of the message (27.6%) and link between the message and a specific person (23.3%). According to the respondents, the key effects of digital influencer activities include providing information about the product/service, increasing brand awareness and convincing one to make a purchase (Fig. 7).

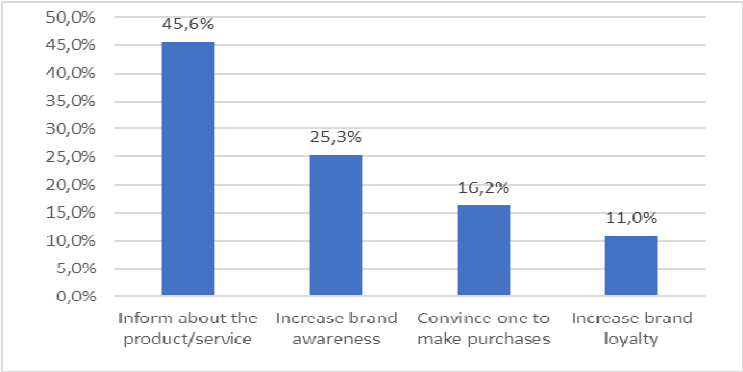

Fig. 7: Key effects of digital influencer activities (source: own source).

In the last point of the survey, the respondents were asked to evaluate the prospects for the development of digital influencer activities. As shown in Fig. 8, the vast majority of respondents agree with the statement that digital influencer activities will develop in the near future at the expense of digital advertising.

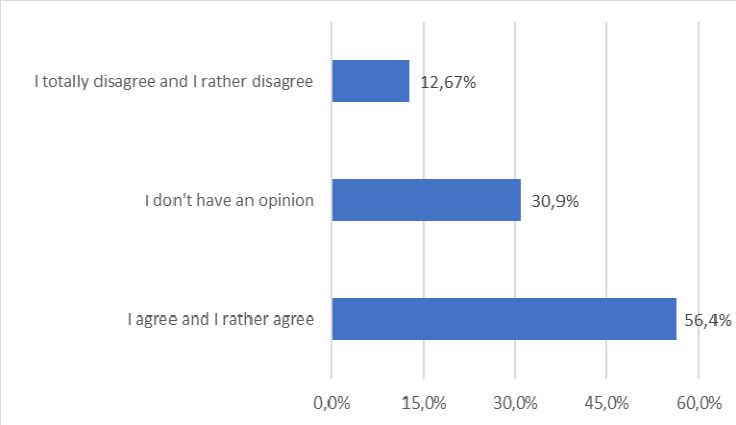

Fig. 8: Evaluation of the prospects for the development of digital influencer activities (source: own source).

Challenges arising from the participation of digital influencers in the marketing activities of organizations

As evidenced by the primary and secondary research, the idea of participation of digital influencers in e-space advertising and promotional activities of organizations has a huge potential, more and more widely recognized in organizations. However, there are also, more clearly visible, challenges and threats arising from the use of the concept of influencer marketing in companies. Such challenges may be:

- internal (related to the organization),
- external (related to the organization's environment).

The managers responsible for the adoption of the concept of influencer marketing who attended "2019 Influencer Marketing Survey" identified the eleven key challenges are related to digital influencer activities. The first six are as follows (Mediakix, 2019):

1. Spotting fake followers (50%);
2. Social algorithm changes (49%);
3. Building an always-on strategy (41%);
4. Rising influencer costs (38%);
5. Keeping up with social media trends to stay relevant (33%);
6. Building a strong creative strategy (33%).

Influencer fraud is regarded as the key challenge. Some accounts or profiles following influencers do not belong to real people as they are fake bot accounts (Influencer Marketing Hub, 2019). As a result, some funds spent on influencer marketing activities are wasted (O'Malley, 2019). Social algorithm changes constitute the second key challenge. Algorithms "control" the content sent to users on social platforms and make the influencer's message less visible for target groups. The third key challenge refers to building an always-on strategy. This refers to the ability to create an influencer marketing strategy that does not turn off, instead of launching sporadic, short-term campaigns. Another challenge is the rising influencer costs. This results directly from to the growing interest in the concept of influencer marketing. The fifth challenge refers to the rapidly changing dynamics of interest in particular social media and the ability to choose the right social media for specific target groups. The last challenge is the ability to build a creative strategy to stand out from hundreds or thousands of others (Mediakix, 2019).

Of the analyzed points, the first, second and fourth challenges are external in nature, while the remaining three internal.

Conclusion

In recent years, growing expenditures of organizations on advertising and promotional online activities are observed. On the other hand, consumers are more and more dissatisfied with the ways used by companies to communicate with them in e-space. This is mainly because online advertising is excessive and increasingly intrusive. As a result, ad-blocking and similar phenomena occur and this significantly reduces the effectiveness of advertising and promotional activities. This is why organizations search for alternative ways of influencing consumers. The concept of influencer marketing is one of the most important trends in this respect.

The secondary and primary data analyzed in this paper clearly show a high potential of digital influencer activities. This is extremely important for organizations in view of a significant decrease in effectiveness of online advertising and promotional activities used so far. There are several factors that determine the growing popularity of influencer marketing activities. They include the continuous development of social media along with the increased activity of Internet users in social media, high effectiveness of digital influencer activities, and the increasingly common tendency to ignore digital advertising, including those best personalized. The potential of advertising and promotional activities results mainly from the following factors: information on the product or service is communicated effectively, brand awareness is increased and the level of sales of products and services offered by companies is raised.

However, to make digital influencer campaigns truly effective and to use their potential, one has to review and prepare them properly taking into account the character of the organization, its industry and potential challenges mentioned above. It is extremely important that the right influencers are selected and properly managed, ROI (return on investment) of the influencer marketing program is clearly defined and digital influencer activities are properly incorporated into the advertising media mix of the organization. Such a rational approach will significantly help organizations to achieve success in influencer marketing activities and meet their goals.

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Tractor Transport in Agrarian Logistics System

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Abstract

The paper is aimed at considering tractor transport to be an important component of agricultural logistics. It has been established that expediency of using tractors in transport operations is determined by features adversely affecting transportation of goods in agriculture, in particular, field conditions; characteristics of agricultural production technology, for example, the need to carry out transport and technological operations along with transportation; organizational and economic reasons (a large volume of on farm transportation with short distances of goods movement and a large proportion of down time during loading and unloading); the need for more complete utilization of tractors throughout the year, reducing the cost of tractor operations due to redistribution of the annual amount of amortization expenses. Requirements for tractor transport in the agriculture have been defined including the performance of goods transportation on scheduled time; compliance of tractor trailers with characteristics of goods; prevention of goods losses during loading and unloading as well as transportation; optimal performance of tractor transport units; ensuring cost effectiveness of transportation; technical excellence of tractors and trailers. The level of tractor provision with trailers in agricultural enterprises of Ukraine has been analyzed. It has been established that medium-power tractors (having engine power from 60 to 100 kilowatts) and more powerful tractors (having engine power over 100 kilowatts) are most in demand in the agriculture. It has been determined that the growth trend of average engine power is typical for agricultural enterprises, which positively affects the increase in tractor transport productivity. The system of operational and economic indicators of tractors utilization for agricultural goods transportation has been improved. It has been proposed to introduce to the estimated performance indicators of tractor transport as follows: the index of free time for tractor-transport operations, the index of tractor application in transport operations, the productivity of tractor transport units per one ton of carrying capacity of tractor trailers. The methodological basis for determining the standard of tractor utilization in transport operations has been given scientific credence.

Keywords: Agrarian Logistics, Tractor Transport.

Introduction

Under the current economic conditions, the logistical activity of economic entities is one of the important components of successful doing business, including agrarian. This has already become a mandatory practice in developing business strategies in developed countries.

In a broad sense, we consider that any processes related to transportation, storage and sale of products are logistical. It should be noted that in the agrarian sphere, logistic activities are rather complicated, since it combines the processes of harvesting, inventory planning, storage, warehousing operations, provision of resources, transportation, order planning, supply and sale, creating new production, economic and commercial connections as well as receiving and collecting data, communication and more. A prominent place here is occupied by transport logistics, which is a set of processes for organization of delivery, namely, movement of material objects and substances (machinery, spare parts, protection products, fertilizers, agricultural products) and others from one point to another on the optimal route. Therefore, it is crucial to examine and search for possible ways to develop transport logistics in the agricultural business of Ukraine.

A brief over view of publications on the topic

As a science, logistics studies management of material flows and those which are related to them in the procurement of material resources, their processing and sale of products. These processes are closely linked to transportation of goods. In general, a transport and logistics systems are a set of objects and entities of transport and logistics infrastructure, combined with material, financial and information flows between them, which performs the functions of transportation, storage, distribution of goods, as well as information and legal support of goods flows.

Given the economic and social role of the industry in the national economy of the country, agrarian logistics, which studies the material flows and stocks in the production and marketing of agricultural raw materials and food, is an important component of logistics.

Issues of the researched topics have been under consideration in the works of such scientists as: Lyson Kenneth, Gillingham, Michael, 2003; Leenders, Michiel, Fearon, Harold E., Flynn Anna, Johnson P. Fraser, 2001; Stock, James, Lambert, Douglas, 2000; Waters, Donald, 2009, Hoskinson R.E., 2009, Moller C., 2004; Velychko O., 2014, 2017; Velychko O.,Velychko L., Butko M. and Khalatur S., 2019.

In the book “Sustainable Logistics – An Introduction to the Concept and Case Studies from Germany. Deutsche Gesellschaftfür Internationale Zusammenarbeit (GIZ) GmbH”, emphasis is made on the relevance of development of sustainable logistics, namely, of transport and transport infrastructure (Roth, J.-J., Bernecker, T., Lohre, D., Grandjot, H.-H., &Poerschke, V., 2015).

Topical issues of agricultural transport logistics have been considered by such researchers as Wampfler, B., 2004., Szpon, I., 2005; Perebyynis V..I., Perebyynis O.V., 2005; Perebyynis V.I., Pomaz O.M., 2011; Gutorov O.I., Prozorova N.V., 2011; Velychko O., 2015; Kolodiichuk V., 2016, 2017; Kravtsiv V., Kolodiichuk V., Kolodiichuk I., 2018; Kolodiichuk V., Dubnevych Y., 2019.
The need to improve the efficiency of tractor utilization in agriculture determines expediency of clarifying the corresponding system of operational and economic indicators, resource support for goods transportation, etc., which has been highlighted in the published works by Wampfler, B., 2004; Szpon, I., 2005; Perebyynis V.I., Perebyynis O.V., 2005; Perebyynis V.I., Pomaz O.M., 2011; Gutorov O.I., Prozorova N.V., 2011;Yermakov O.Yu., Trush N.I., 2012 and others.

Thus, the Encyclopedia of Transportation (2014) draws attention to the need of taking into account the specific conditions of tractor transport utilization in different sectors of the economy. Tractors with trailers are widely used for agricultural machinery transportation within certain regions, which is important for timely field work in the crops industry. Information on tractor transport is provided on

websites as follows: in the United Kingdom (Tractor transport services, 2020), in the USA (Specializing in Agriculture and Farming Machinery & Equipment. Tractor transport, 2020), in Australia (Tractor and Mobile Machinery Transport Quotes, 2020).

The economic issues of goods transportation by tractors with trailers are described in the work by Perebyynis V.I., Malysh M.N., 1999.

The need to improve the efficiency of tractor utilization agriculture as a constituent of agrarian logistics determines expediency of:

a) substantiation of the organizational and economic reasons of tractor utilization in transport operations;
b) clarification of requirements for goods transportation by tractor transport;
c) improvement of the corresponding system of operational and economic indicators of tractor utilization for agricultural goods transportation;
d) development of methods for planning tractor utilization in transport operations.

Purpose of the paper is analysis of scientific and practical principles of agrarian logistics development in Ukraine in the context of economically feasible use of tractor transport by agricultural enterprises.

Materials and Methods

In the course of the study, general scientific and special economic methods have been used, namely: the dialectical method, the methods of analysis and synthesis, the method of historical-logical analysis and the method of system analysis.

The Main Material Presenting

As a science, agrarian logistics studies movement of material flows in agriculture. In transport logistics (as a component of general logistics), material flows take a form of goods flows. In agricultural enterprises, goods movement is carried out, as a rule, by road and tractor transport.

Research results of the enhancement of economic efficiency of goods transportation by tractors with trailers have been described in the work by Perebyynis V.I. and Malysh M.N. (1999). The scientists Janulevičius A. and Pupinis G. (2013) have found that the efficiency of the utilization of tractors with trailers depends on the level of use of engine power, which is influenced by a number of features of the tractor design.

Tractors used for the carriage of goods are subject to specific requirements. In particular, a number of regulatory requirements have been in force in the UK since 2017(Guidance Tractors and regulatory requirements: a brief guide, September 2017). Thus, a ‘tractor’ (or a ‘category T tractor’) is defined in EU Regulation 167/2013. It essentially covers vehicles that a layman would think of as a tractor, being a motor vehicle designed to ‘pull, push, carry and actuate’ equipment to perform agricultural or forestry work. An ‘agricultural trailer’ is trailer used only for agriculture, horticulture or forestry. The mentioned requirements imply that the majority of tractors may travel at up to 40 km/h (approximately 25 mph). However, some tractors built to higher specifications are permitted to be driven at up to 40 mph (around 65 km/h). The higher speed limit applies to tractors that have (among other requirements) all-wheel suspension, braking efficiency of 50%, pneumatic tires, a speedometer and a horn. The exact requirements are contained in the Construction and Use Regulations 1986 (as amended) (The Road Vehicles (Construction and Use) (Amendment) Regulations, 1986).

Moreover, some tractors, for instance, if used for commercial non-agricultural haulage, may require use of a tachograph and have maximum limits on driving time and minimum requirements for breaks and rest periods, set out in EU drivers’ hours rules (Regulation (EC) 561/2006) (Drivers' hours, 2020). Tractors require a tachograph if they are used to haul goods on the road, the maximum

authorized mass exceeds 3.5 tones and they do not fit one (or more) of the available exemptions. According to the information (Agricultural vehicles, 2020), operators or drivers of agricultural vehicles, or operators transporting agricultural vehicles, in South Australia are required to comply with the applicable exemption (permit or notice) available from the NHVR's website (Notices and permit-based schemes, 2020). In particular, this applies to the requirements for the dimensions (width) of tractor vehicles.

The main reasons determining the expediency of using tractors in transport operations can be divided into several groups. Firstly, these are reasons caused by features adversely affecting goods transportation in terms of agriculture. They include difficult road conditions (especially during winter impassability of roads as well as autumn and spring thaws) when transportation on natural roads and across fields is difficult and often impossible. When driving in such conditions, the main advantage of a motor vehicle - its high speed on direct gear - is not used.

Secondly, the expediency of using tractors for goods transportation is determined by peculiarities of the agricultural production technology. Along with transport operations, it is also necessary to carry out transport and technological operations. They include maintenance of various harvesting machines, transportation and dosed distribution of feed, transportation and application of mineral and organic fertilizers, etc.

Thirdly, the need to use transport arises from reasons of organizational and economic character. They include a large amount of on-farm traffic characterized with a short distance of goods movement, a large proportion of downtime during loading and unloading operations, inability to develop a high speed of movement of vehicles. As a rule, here tractor transport is more efficient than road transport. It is important to load the tractor fleet more fully throughout the year, reduce the production cost of tractor operations due to redistribution of an annual amount of depreciation deductions.

Fourthly, the expediency of using tractor vehicles for goods transportation can be attributed to technical reasons. Wheeled tractors with trailers are more adapted for field work than cars. A number of tractor trailer models matches with low bulk goods transportation.

Agriculture places demands on goods transportation by tractor transport within the time limits set, on compliance of tractor trailers with characteristics of goods, on prevention of goods losses during loading and unloading operations as well as transportation, on performance of tractor transport units, on ensuring economic efficiency of transportation, on technical excellence of tractors and trailers.

An indicator of a number of trailers per tractor is important to assess the performance potential of tractors in transportation (Table 1).

According to the data in Table 1, the number of trailers per tractor in the study period has been reduced. It derives from both reducing the number of trailers and increasing the number of tractors. In particular, for the studied three years the number of roller tractors increased by 2,768units and the number of tractor trailers decreased by 3,138units at the agricultural enterprises of Ukraine.

Table 1: Endowment of tractor trailers at agricultural enterprises in Ukraine in 2016-2018(at the beginning of year)

Index	2016	2017	2018	2018 in % on 2016
Roller tractors	118,178	123,439	120,939	102,3
Tractor trailers	49,004	48,546	45,866	93,6
Number of tractor trailers per roller tractor	0.41	0.39	0.38	92,7

(Source: own elaboration based on: [www 1])

Despite the increase in their domestic production of tractor trailers– respectively, in 2016, 2.700agriculturaltrailersandsemi-trailersweremanufacturedbyUkrainianplants, in 2017 – 3,800andin 2018 – 4,500), as well as the purchase of imported trailers.

Universal mono-trailers and mono-semitrailers are especially popular. This type of trailers for transportation of various agricultural bulk materials are produced by such enterprises as Umanfermmash, Rivnesilmash (Ukraine), Bobruiskselmash (Belarus), Strjco-agro (Denmark), Dezeure (Belgium), etc. (Yasenetskyi, Derevianko, Chornoshkur, Kovpak and Paniotova, 2016).

Tractor transport units carry a significant amount of straw, hay, silage and hay mass, green fodder and other goods belonging to classes III and IV. At the same time, the load-carrying capacity of universal tractor trailers due to their insufficient adaptability to the above-mentioned goods transportation is not fully utilized which causes the need for specialized trailers. Currently, in the market of transport equipment, there are, in particular, tractor trailers for transporting bales and rolls of straw and hay produced by ZavodKobzarenko (Ukraine), Bobruiskselmash (Belarus), ZDT, STS (the Czech Republic), Fliegl (Germany) etc. In agriculture, tractor trailers and semitrailers used for transporting animals (cattle, horses, sheep, swine, poultry) are produced by ZDT (Czech Republic), etc. (Yasenetskyi, Derevianko, Chornoshkur, Kovpak and Paniotova, 2016).

Crops and feed production processes are characterized by the presence of harvesting, mixing and distribution operations performed simultaneously with transport processes by the same technical means. Along with tractor transport units of general use, this makes it necessary to have special purpose rolling stock - trailers equipped with working tools to perform certain technological operations.

Among them, there are tractor trailers and semitrailers with interchangeable extensions and non-removable chassis. For example, semitrailers of the Mega series produced by ZDT (the Czech Republic) consist of an irremovable chassis and interchangeable extensions (a body, manure spreader, tanks for liquid materials, grain reloaders). Tractor trailers and semitrailers produced by Fliegl (Germany) consist of a universal chassis and interchangeable extensions (a body for bulk materials and grain loader). Annaburger (Germany) manufactures Multiland Plus trailers containing a universal chassis and interchangeable superstructures (tanks for liquid fertilizers, a body for crushed grass, organic fertilizer spreader, dump truck superstructure) (Yasenetskyi, Derevianko, Chornoshkur, Kovpak and Paniotova, 2016).

The proliferation of progressive harvesting technologies for agricultural crops leads to a significant increase in a number of goods loaded into tractor trailers using harvesting machines. Therefore, pick-up trailers are of interest. In particular, in Ukraine, such companies as Pottinger (Austria), Knore, Straumann (Germany) are represented on the markets of such equipment.

Management decisions to improve the operation of technical equipment in agriculture should be made taking into account the results of the analysis. The indicators for assessing tractor application used at enterprises take into account factors affecting the machines productivity, degree of use of the tractor fleet operation time, its load, level of operating costs. They include as follows: tractor utilization, shift factor, availability factor, shift, daily and annual output, production costs of a conventional reference hectare of mechanized operations.

The specific features of tractor application in transport operations make it necessary to substantiate the relevant indicators. In particular, in the estimated performance of tractor transport, it is necessary to enter: the index of free time for performance of tractor and transport operations; the index of tractor application in transport operations; the performance of tractor transport units per ton of tractor trailer capacity and some others.

Theentiresetofoperationalandeconomicindicatorsoftractorapplicationintransportoperations can be at tri but the following groups.

Into the first group, it is expedient to include tractor unit utilization indicators: the shift index, the tractor utilization index, the index of free time for performance of tractor and transport operations, the index of tractor application in transport operations.

The shift index α_s characterizes duration of tractor fleet application during a working day.

The tractor utilization index α_i is usually determined as the ratio of the operating time of tractors T_e to the inventory time T_i (hereinafter, work time, downtime, etc. is determined in machine-shifts).
If tractors are constantly on the farm, then

$$T_i = 365 \cdot \alpha_s \qquad (1)$$

then

$$\alpha_i = \frac{T_e}{365\alpha_s}. \qquad (2)$$

The index of free time for performance of tractor and transport operationsα_p is determined by the formula (3):

$$\alpha_P = \frac{T_{TT}}{T_I-(T_1+T_2+T_3+T_4)}, \qquad (3)$$

where T_{TT} – is operation time of tractors during transport operations; T_1 – is tractor application time during field and stationary operations; T_2 – is the time spent on maintenance and repairs; T_3 – is downtime due to technical faults, meteorological conditions, organizational and other reasons; T_4 – is downtime of a tractor due to a tractor driver's rest on weekends, public holidays and during vacations, illnesses, etc.

Substituting the value of T_i from the formula (1) into the formula (3) and taking $T_4 = 0$ (which means a possibility of replacing the main tractor driver at the time of his absence with another), we obtain the value of α_P:

$$\alpha_P = \frac{T_{TT}}{365\alpha_s-(T_1+T_2+T_3)}, \qquad (4)$$

The index of tractor application in transport operations α_{TT} is determined by the formula (5):

$$\alpha_{TT} = \frac{T_{TT}}{T_e}, \qquad (5)$$

The second group of indicators reflecting tractor trailer train application is represented by the index of utilization of the mileage β, the index of utilization of the carrying capacity of tractor trailers γ, the average transportation distance l_s, the average operating speed V_e.

Indicators of the production of tractor vehicles characterizing the amount of transport operations performed by them are included in the third group. This may comprise performance of tractor transport units in tons of P_T and ton-kilometers of $P_{T\text{KM}}$ per 1 ton of capacity of a tractor trailer per year (a tractor trailer train performance per load capacity), which are determined by the formulas (6, 7):

$$P_T = \frac{8T_e\beta\gamma\alpha_s V_e}{l_s}, \qquad (6)$$

$$P_T = 8T_e\beta\gamma\alpha_s V_e, \qquad (7)$$

where 8 – is duration of a work shift, hour.

The fourth group which includes operating cost indicators revealing the cost-effectiveness of using tractor vehicles is represented by indicators such as lab our costs for performing one ton-kilometer of transport operations, the production cost of one ton-kilometer.

The cost-effectiveness of using vehicles is also characterized by the amount of goods transported per unit of time, specific investments and reduced costs.

When planning tractor application for goods transportation, there is a need to know the standard for the expedient tractor utilization in transport operations T_{TTn}. This indicator can be determined by the formula (8):

$$T_{mmn} = \alpha_{mmn} \cdot T_e, \quad (8)$$

where α_{TTn} – is the standard value of the index of tractor application in transport operations, determined by the formula (9)

$$\alpha_{TTn} = \frac{T_e - T_1}{T_e}. \quad (9)$$

We should also note that:

$$T_e = T_i - T_2 - T_3, \quad (10)$$

The time spent on maintenance and repairs T_2 is equal to:

$$T_2 = K_2 \cdot T_e, \quad (11)$$

where K_2 – is the index of time spent on maintenance and repairs.

Downtime T_3 consists of downtime by fault T_5, due to weather conditions T_6, organizational and other downtime T_7:

$$T_3 = T_5 + T_6 + T_7; \quad (12)$$

$$T_3 = K_3 \cdot T_e + K_4 \cdot T_i + K_5 \cdot T_e \quad (13)$$

where K_3, K_4, K_5arethe indexes taking into account, respectively, downtime by fault, due to weather conditions, organizational and other reasons.

Substituting the corresponding values from the formulas (11) and (13) into the formula (10) and performing transformations, we obtain:

$$T_e = \frac{T_5(1-K_4)}{1+K_2+K_3+K_5}. \quad (14)$$

Substituting the value of $T_э$ from the formula (1.14) into the formula (1.9), we obtain:

$$\alpha_{TTN} = 1 - \frac{T_1}{T_i}\left(\frac{1+K_2+K_3+K_5}{1-K_4}\right). \quad (15)$$

Since the index of time spent by a tractor to perform field and stationary operationsK_1can be determined as

$$K_1 = \frac{T_1}{T_i} \quad (16)$$

Taking $K_5 = 0$, then

$$\alpha_{TTN} = 1 - K_1\left(\frac{1+K_2+K_3}{1-K_4}\right). \quad (17)$$

The index K_4 is determined by the formula (18):

$$K_4 = 1 - K_4^1, \quad (18)$$

where K_4^1 – ss the index of time use based on weather conditions.

For Poltava region (Ukraine), annual average $K_4^1 = 0.91$ (Grigorieva, A.S., Kogan, Y.A. and Vostryakov, N.A., 1975, p. 66).

Then, the formula takes the form:

$$\alpha_{mmn} = 1 - 1{,}1\, K_1(1+K_2+K_3) \quad (19)$$

The valuesof K_2 and $K_3$are presented in Table 2.

Table 2: The values of the indexes $K_н$ and $K_{то}$ for roller tractors

Tractor capacity, kilowatt	K_2	K_3
200-250	0.42	0.16
100-150	0.32	0.10
50-75	0.23	0.05
30-35	0.22	0.04
15-20	0.17	0.02

Substituting the values of K_2 and K_3into the formula (19), we obtain the values α_{TTn} shown in Table3.

Table 3: The standard value of tractor utilization in transport operations α_{TTn}

Tractor capacity, kilowatt	Value of K_1						
	0.1	0.2	0.3	0.4	0.5	0.6	0.7
200-250	0.83	0.65	0.48	0.30	0.13	-	-
100-150	0.84	0.69	0.53	0.38	0.22	0.06	-
50-75	0.86	0.72	0.56	0.44	0.30	0.15	0.01
30-35	0.86	0.72	0.59	0.45	0.31	0.17	0.03
15-20	0.87	0.74	0.61	0.48	0.35	0.21	0.08

(Source: author's own work)

The operating time of tractors throughout the year is determined by the formula (20) which is derived from the value of T_e (the formula 14) and the fact that K_5 is assumed to be zero:

$$T_e = 365\alpha_s \frac{1-K_4}{1+K_2+K_3}. \qquad (20)$$

Substituting the values of the indexes into the formula (20), we obtain the value of T_e (Table4).

Table4: Values of tractor operating time throughout the year T_e

Tractor capacity, Kilowatt	Shift index α_s						
	1.0	1.1	1.2	1.3	1.4	1.5	1.6
200-250	210	231	252	273	294	315	336
100-150	234	257	281	304	328	351	374
50-75	259	285	311	337	362	388	414
30-35	264	291	317	344	370	397	423
15-20	279	306	334	362	390	418	446

(Source: author's ownwork)

To determine the tractor utilization rate in transport operations, it is necessary:

1. Based on the specific tractor utilization in field and stationary operations T_1 and the shift index α_s according to the formula (21), it is necessary to determine the value of K_1:

$$K_1 = \frac{T_1}{365\alpha_s}. \qquad (21)$$

2. Using the found value of the index K_1 in table 1.2, it is necessary to determine the value of the index α_{TTn}.

3. For a given value of the index α_s in Table 5, we should determine the value of T_e.

4. The required value of the expedient tractor utilization standard in transport operations is determined by multiplying α_{TTn} by T_e according to the formula (8).
In the case, when the index α_s is the same for all types of tractor operations, the value of T_{TTn} can be calculated as the difference of the value of T_e (which can be determined from Table 6) and the specified T_1.

Conclusion

It has been established that the expediency of tractor utilization in transport operations is determined by the following main reasons: features of agriculture adversely affecting motor-traction; features of agricultural production technologies; the need for more complete tractor utilization throughout the year. It has been substantiated that agriculture places demands on goods transportation by tractor transport within the time limits set, on compliance of tractor trailers with goods characteristics, on

prevention of goods losses during loading, on transportation and unloading. Requirements for productivity of tractor transport units, ensuring cost effectiveness of transportation, technical excellence of tractors and trailers have also been defined. The scientific novelty of the research results is as follows: the improvement of operational and economic indicators of tractor utilization for agricultural goods transportation, as well as the development of methodological basis for determining the standard of tractor utilization in transport operations.

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Economic-Statistical Analysis of selected Criteria of Tourist Industry in the Czech Republic

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Abstract

The article deals with the analysis of a number of guests and a number of overnight lodgings in four- and five-star hotels in the Czech Republic, sorted by residents and non-residents within the time series 2012 – 2018. Further it studies a dependence of a gross domestic product on a number of guests and a number of overnight lodgings. Through the regression and correlation analysis there were find out high values of correlation coefficients of the studied dependences; correlation coefficient value was 0.995 for a number of guests and gross domestic product, and 0.986 for a number of overnight lodgings and gross domestic product, which shows an evidence of almost perfect dependence. Furthermore, using the triple classification analysis of variance at the significance level $\alpha = 0.05$ there were found statistically conclusive differences for the variable "number of guests" in all classification criteria (year, hotel category, type of guest). For the variable "number of overnight lodgings" the F-test was provable only for the criterion "hotel category". Detailed evaluation of the analysis of variance by the Tukey's method shows statistically conclusive difference between a number of guests and a numbers of overnight lodgings in respect of the hotel category. Both the number of guests and number of overnight lodgings in the four-star hotels provably differs from those in the five-star hotels.

Keywords: Tourist Industry, Time Series, Regression and Correlation, Analysis of Variance

Introduction

The tourist industry in the Czech Republic represents an intensively developing branch of the national economy. This process is related immediately to the development in demand for accommodation services in the Czech Republic, both by non-residents and residents, as domestic tourist industry is also experiencing unprecedented development.

The tourist industry belongs among important component parts of any national economy as it brings financial sources not only from the domestic tourists, but mostly from the foreign visitors in the Czech Republic. Among the best crowd-pullers of the Czech tourist industry belong the historical monuments, monuments signed up in the UNESCO cultural heritage list, spas, winter sport activities centres and natural monuments. The tourist industry as itself governs further branches of industry, such as accommodation and catering services, culture, sports and commerce. And of course, accommodation immediately relates to the statistics on the mass accommodation facilities, where the research of a number of guests and a number of overnight lodgings in the time series 2012 – 2018 offers a new context relating to the economic development of the state, especially to the growth of the gross domestic product.

According to the Global Peace Index (GPI), published by the British Institute for Economics and Peace (IEP) the Czech Republic is ranked amongst the most peaceful and safe countries in the world. It is the seventh best from among 163 countries assessed. The index reflects the crime rate, ease of access to weapons, army size and armament, contributions to the OSN peace missions, relations to

the neighbouring countries, peacefulness of demonstrations, rate of enforcement of the political system towards the citizens, or involvement in foreign conflicts.

In terms of incomes from the international tourist industry (in milliards USD, without the traffic), where the Czech Republic ranks the 36th place and it also shows an above-average increase of a number of nights spent by guests in accommodation facilities.

V the time series 2012 – 2018 there were studied numbers of guests and numbers of overnight lodgings in the four- and five-star hotels, where the data unambiguously result that the demand for accommodation services in these categories of the mass accommodation facilities in the Czech Republic systematically grows, both in the light of non-residents and residents. The article deals with an economic impact of the studied factors in hotel-keeping in the Czech Republic on the gross domestic product.

With usage of the triple classification analysis of variance there were identified conclusive differences of variables "number of guests" and "number of overnight lodgings" in light of three classification criteria – year (2012 – 2019), hotel category (four- and five-star hotel) and type of guest (resident, non-resident).

Methodology

For the analysis of the time series of the number of guests and number of overnight lodgings there were used the data of the Czech Statistical Bureau (ČSÚ, 2020). For the data concerning the gross domestic product there was used the portal Kurzy.cz (Kurzy.cz, 2020).

For processing the data there was used a linear regression and correlation analysis. There was used a classical linear trend of the time series $T_t = \beta_0 + \beta_1.t$. For calculation of the parameters of the trend function there was used the method of least squares offering the best non-deviated estimations (Hindls, 2007). The close dependence was rated by the correlation coefficient (Novák, 2015). Further, there was applied the method of the triple classification analysis of variance, based in evaluation of the F-test (Sanderson E. et Windmeijer, 2016). Significance level was set on $\alpha = 0.05$. For more detailed evaluation there was chosen the Tukey's method (Svatošová, 2004; Joong, 2006). The data were processed with usage of the computer program Statgraphics 4.0.

Methodology of the time series analyses is taken into account by for example Arlt et Arltová (2009), where the economic time series are characteristic by the trend reflecting the changes in the average conduct of the time series. Ordinary visualisation of the indicator conduct is enabled especially by graphs, as a graphical representation enables to recognise a long-term tendency in the course of the time series or another periodically repeated development change (Marek, 2007; Perugia, Hsu, 1993).

The analysis has been carried out for the four-star hotels which are – regarding a number of guests – the most visited in the Czech Republic (ČSÚ, 2019) and for the five-star hotels which are considered as the most luxurious

Results

In the last 7 years there occurs a linear increase in a number of guests and a number of overnight lodgings in four- and five-star hotels (graphs in Figures 1 and 2).

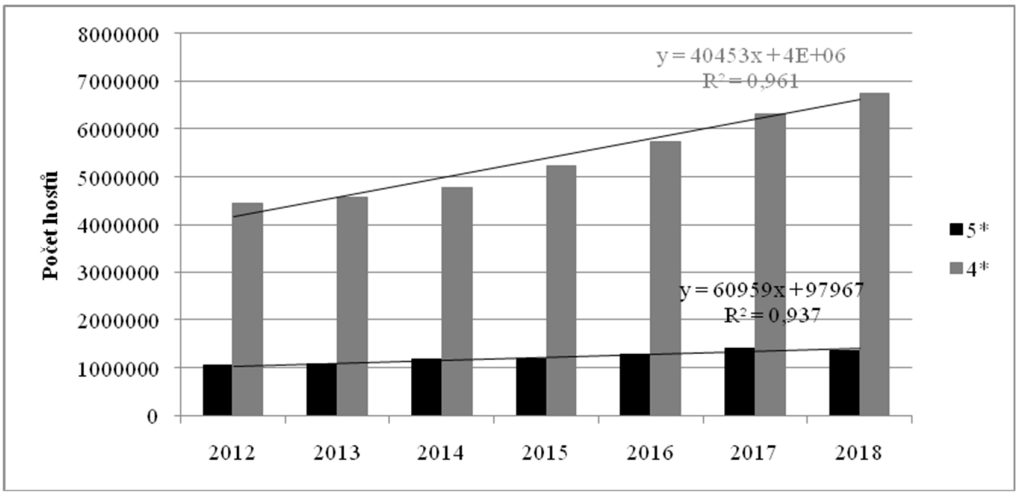

Fig. 1: Trend of Number of Guests in Four- and Five-Star Hotels (Source: ČSÚ 2019, self-processed)

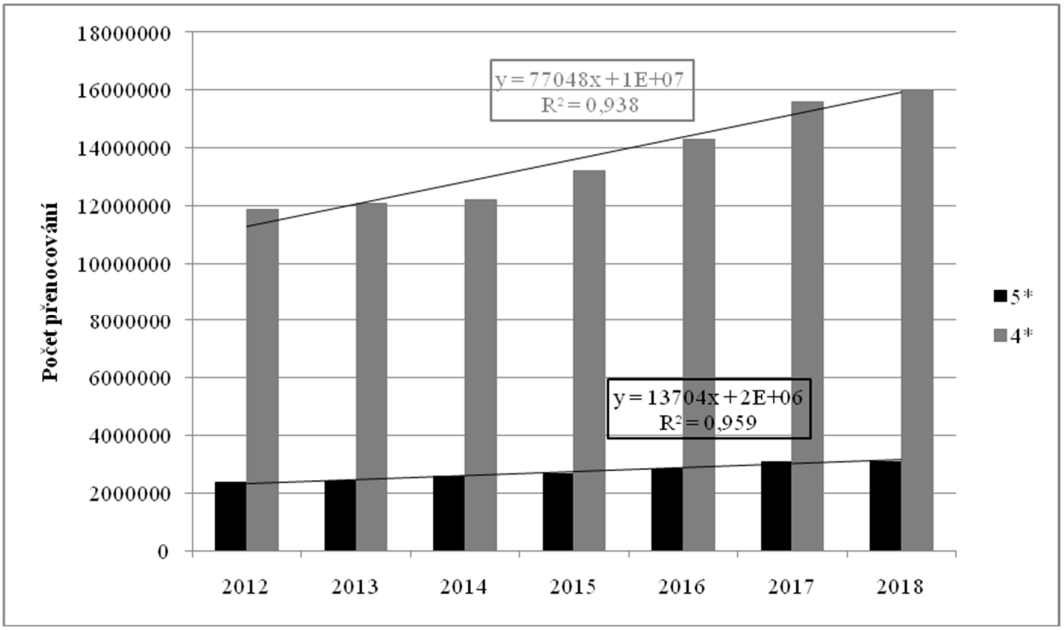

Fig. 2: Trend of Number of Overnight Lodgings in Four- and Five-Star Hotels (*Source: ČSÚ 2019, self-processed)*

Reliability of all the assessed linear trends was represented by the determination index R^2 higher than 93% which shows very quality regression models. Thus it can be claimed that interest in accommodation in the Czech Republic in the time series 2012 – 2018 shows a linearly raising trend; this increase of number of guests and overnight lodgings in both hotel categories evidently projected in the gross domestic product. In the time series there was found very strong correlation, almost perfect dependence between the GDP increase and both variables (correlation coefficient for the number of guests and gross domestic product was 0.995 and for the number of overnight lodgings and GDP was 0.986.

In the time series 2012 – 2019 the increase of the gross domestic product is shown in the graph in the Figure 3.

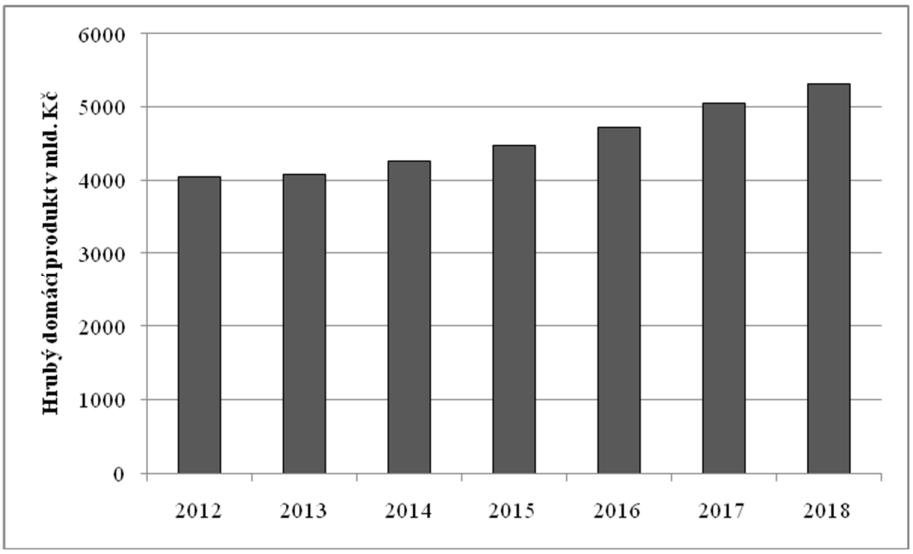

Fig. 3: Increase of Gross Domestic Product in 2012 – 2018 (Source: ČSÚ 2019, self-processed)

Thus it is unambiguous that the steadily developing Czech tourist industry, accompanied by the linear increase of a number of guest and a number of overnight lodgings, projects itself in strengthening the whole economy of our country. The whole spectrum of influences over domestic economy is described e.g. by Petříček (2015), but it is sure that the tourist industry increase projects itself in the GDP increase as well. This fact is also confirmed by almost stable proportion of the tourist industry in GDP, ranging between 2.7% and 2.9% in 2012 – 2019; standard deviation was 0.082%, also in despite of a quite intensive increase of GDP (e.g. 4.5% in 2017).

All the F-tests of the classification criteria (year, type of guest, hotel category) for the variable „number of guest“, were conclusive at the significance level $\alpha = 0.05$ (Figure 4).

Analysis of Variance for HOTEL.hoste

Source of variation	Sum of Squares	d.f.	Mean square	F-ratio	Sig. level
MAIN EFFECTS	5.4457E0013	8	6.8071E0012	1000.000	.0000
HOTEL.rok	1.5289E0012	6	2.5482E0011	57.341	.0000
HOTEL.typhot	3.0440E0013	1	3.0440E0013	1000.000	.0000
HOTEL.typosobz	2.2487E0013	1	2.2487E0013	1000.000	.0000
2-FACTOR INTERACTIONS	5.0368E0012	13	3.8744E0011	87.187	.0000
HOTEL.rok HOTEL.typh	9.0045E0011	6	1.5008E0011	33.771	.0002
HOTEL.rok HOTEL.typo	1.6276E0011	6	2.7126E0010	6.104	.0223
HOTEL.typhHOTEL.typo	3.9736E0012	1	3.9736E0012	894.175	.0000
RESIDUAL	2.6663E0010	6	4.4438E0009		
TOTAL (CORR.)	5.9520E0013	27			

Fig. 4: F-test for Variable Number of Guests (Source: self-processed)

Tables 1 to 3 show the more detailed evaluation of the Tukey's method at the significance level α = 0.05.

Tab. 1: Analysis of Variance of Number of Guests for Classification Criterion „Year"

Year	Average	Homogeneous Groups
2012	1375954.3	*
2013	1437372.3	**
2014	1486118.5	**
2015	1605051.8	**
2016	1759241.3	**
2017	1933198.0	**
2018	2026388.8	*

Source: self-processed

Tab. 2: Analysis of Variance of Number of Guests for Classification Criterion „Hotel Category"

Hotel Category	Average	Homogeneous Groups
Five-Star	617808.5	*
Four-Star	2703141.4	*

Source: self-processed

Tab. 3: Analysis of Variance of Number of Guests for Classification Criterion „Type of Guest"

Type of Guest	Average	Homogeneous Groups
Residents	764303.3	*
Non-Residents	2552246.6	*

Source: self-processed

As for a number of guests there is a statistically conclusive difference between residents and non-residents, as well as a number of guests accommodated in four-star hotels differs from a number of those in five-star hotels. The source data show there are – of course – less domestic guests that foreigners. Furthermore, that the guests prefer four-star hotels where the reason can be more favourable proportion of price and quality, in contrast to the luxurious five-star hotels which assumedly only smaller yet wealthier clientele can afford. Differences between years are not crucial but we can claim that at the significance level α = 0.05 in the last year of the time series – the year 2018 – statistically conclusively differs from 2016 – 2012.

The analysis of variance for the classification criterion "number of overnight lodgings" shows that only the category of four-star hotels conclusively differs from the five-stars, where the F-test was conclusive at the significance level $\alpha = 0.05$ (Figure 5).

Analysis of Variance for HOTEL.prenoc

Source of variation	Sum of Squares	d.f.	Mean square	F-ratio	Sig. level
MAIN EFFECTS	4.9730E0014	8	6.2163E0013	4.090	.0515
HOTEL.rok	7.5526E0013	6	1.2588E0013	.828	.5875
HOTEL.typhot	3.3386E0014	1	3.3386E0014	21.969	.0034
HOTEL.typosobz	8.7912E0013	1	8.7912E0013	5.785	.0529
2-FACTOR INTERACTIONS	1.8658E0014	13	1.4352E0013	.944	.5663
HOTEL.rok HOTEL.typh	7.9533E0013	6	1.3255E0013	.872	.5638
HOTEL.rok HOTEL.typo	9.8075E0013	6	1.6346E0013	1.076	.4659
HOTEL.typhHOTEL.typo	8.9678E0012	1	8.9678E0012	.590	.4794
RESIDUAL	9.1182E0013	6	1.5197E0013		
TOTAL (CORR.)	7.7506E0014	27			

Fig. 5: F-test for Variable "Number of Overnight Lodgings" (Source: self-processed)

More detailed Tukey's method at the significance level $\alpha = 0.05$ is shown in the Table 4.

Tab 4: Analysis of Variance of Number of Overnight Lodgings for Classification Criterion "Hotel Category"

Hotel Category	Average	Homogeneous Groups
Five-Stars	1368311.4	*
Four-Stars	8274448.1	*

Source: self-processed

There were not found any inter-annual differences for this variable, as well as there was not found any statistically conclusive difference for the classification criterion "type of guest". Such a result for "overnight lodging" can relate to decreasing trend of a length of overnight lodging in four-star hotels, as confirmed also by the Czech Statistical Bureau data (ČSÚ, 2019-1). Five-star hotels noted an increase of overnight lodgings in the last year, however, the trend cannot be described (Figure 5).

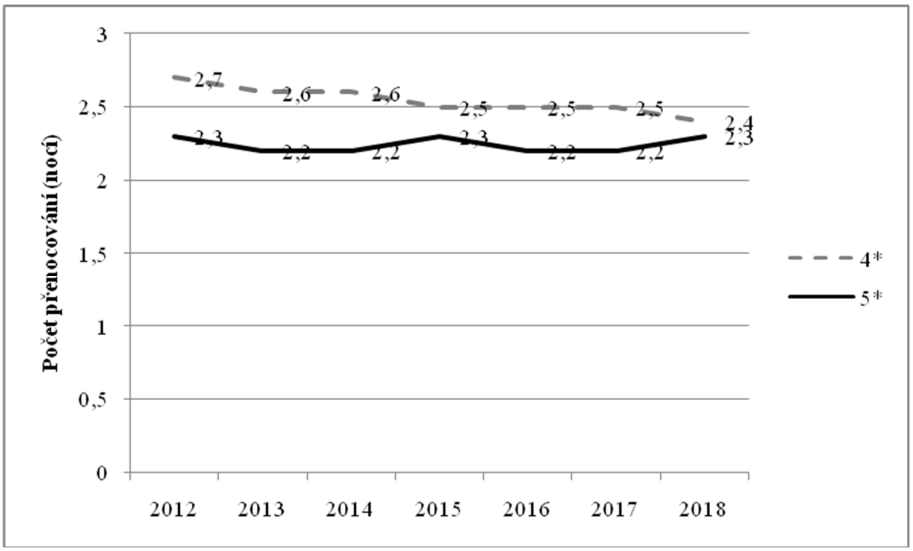

Fig. 5: Number of Overnight Lodgings in Four- and Five-Star Hotels (Source: Self-processed ČSÚ, 2019: Návštěvnost HUZ podle kategorie-územní srovnání)

On the grounds of the above stated statistical analyses we can claim that the development of an efficiency of accommodation services largely reflects the overall development of the economy in the Czech Republic in the monitored period. Tourist industry as a whole almost precisely copied the increase of efficiency of the national economy. Characteristic for the monitored period is a stable proportion of the tourist industry in the gross domestic product of the country. In 2012 – 2017 the proportion of the tourist industry in GDP oscillated between 2.7% (2012) and 2.9% (2017) the standard deviation was only 0.082% which can be considered as very low moderate oscillation around an arithmetical average, namely in condition of the increase of GDP almost in the whole monitored period (excepting 2012 and 2013 where an inter-annual decrease was 0.8%, resp. 0.9%). It moved from 2% (2014) to 4.6% (2017). The increase of efficiency of the tourist industry had to correspond with the GDP growth rate in individual years.

Within the branch of accommodation services there is an evident increase of a number of guests either in four- and five-star hotels. More intensive increase of a number of the accommodated can be seen within the four-star hotels. The reason is probably a higher elasticity of demand for services of this hotel category.

Further years development of a length of overnight lodgings in both monitored categories can be problematic. In the monitored period the trend of previous years continued, when the length of an overnight lodging continuously shortens (Máče, 2012). Again, this trend is more distinctive in the category of four-star hotels. The probable reason is again higher sensibility of a demand in a branch of four-star hotels. This long-term negative trend is being corrected to a certain extent. Despite decreasing number of days spent overnight this value does not have any negative impact on the main indicators of the tourist industry at present. The reason is continuously increasing both a visit rate and a number of guest in accommodation facilities.

Conclusion

The tourist industry represents a stable part of the economy of the Czech Republic. Its proportion in total efficiency of the national economy is well-balanced in the long term. In the branch of accommodation services in four- and five-star hotels there occurs an increase of both a number of accommodated persons and a number of overnight lodgings. This trend is more significant in four-

star hotel category. Together with it there is an evident long-term trend of decrease of duration of accommodation. Also this trend is more significant in four-star hotel category. It can be a reason of significant problems at the moment, when a current increase of the national economy turns and the economy falls in recession. We can assume that in such a case there would occur a total decrease of demand for accommodation services, as it happened between 2008 and 2012, and subsequently a decrease of both a number of guests and a number of overnight lodgings. Together with decreasing length of the stay duration it can lead to significant problems of the entire branch of accommodation services. However, it is probable that the category of four-star hotels, displaying a higher correlation of demand with the economic development, would be affected more perceivably.

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Management Problems from Paradox Perspective: A Preliminary State of The Art

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Abstract

Today's organizations face the necessity of dealing with a growing number of various tension and risk factors-generators. As stressed many researchers, management studies referring to paradox theory offer new and important sights on an array of organizational tensionsand management issues. The authors took into account the wide range of international scientific literature in which paradoxes in various areas of the economy are widely studied. The aim of this paper is to indication and theoretically refer to the problems of paradoxes in selected areas of management. The paper indicated the contradictions emerging in the areas such as: risk management, demography, real estate market and innovation,

Keywords: Demographic Processes, Innovation, Real Estate Market, Management Problems, Paradoxes, Risk Management.

Introduction

At the end of the 1980s, the first research appeared on the problems of organizational tensions and accompanying paradoxes of various areas of the economy (Quinn, Cameron, 1988). There are many different types of paradoxes found in the literature and that may be found at different levels within an organisation. For example, the following paradoxes can be pointed out: namely, the paradoxes of organizing, performing, belonging and learning (Jarzabkowski et al., 2013; Lewis, 2000; Lim et al. 2017). They contribute to the creation of innovation, both at the time of the release of tensions and of limiting them. They may relate to conflicting purposes may apply to the conflicting objectives, activities and processes, as well as to the significant restrictions. The settlement and the decision require a prior solution that would help maintain the balance between the contradictions and the intention of achieving an objective.

In the field of strategic management, the need to shape the tension between two opposites is indicated.(De Wit, Meyer 2010). These opposites include: logic and creativity, deliberateness and spontaneity, revolution and evolution, markets and resources, reflex and synergy, competition and cooperation, subordination and free choice, control and chaos, globalization and regionalization, as well as profitability and accountability. Those behaviors and features that maximize the likelihood of a company's major success also maximize the likelihood of a total disaster. Raynor (2007) points out that this peculiar paradox of strategy can be resolved by separating the management of permanent choices from the uncertainty management.

The phenomena are occurring in the enterprises environment are very important, especially in the context of aging and shrinking of potential labour force. The demographic paradox refers to the proposition that there is an inverse relation between the number of children that people in the

developed countries, but also the in the developing and emerging countries, actually have and could afford to have in view of their constantly rising real income. The term paradox results from the notion that greater means would necessitate the production of more offspring as pointed out by Thomas Malthus (Wail, 2009).The conclusion is that nations or subpopulations with higher GDP per capita are observed to have fewer children, even though a richer population can support more children.

In the real estate sector, however, it is still possible to see contradictions and paradoxes in adopted strategies and management (Sitek 2015). They concern government strategies and decisions, e.g. within the framework of housing programmers', prices, mortgages, financial resources, and even in terms of meeting the needs of the purchasers i.e. family (Tosics 2018; Donner 2000; Holmans et al. 2002). The threats and paradoxes in the real estate market point to the need to search for new strategies and management methods and ways of analyzing this market using new tools.

Criticism of risk management as a result the global financial crisis and contradictions in this area (by academics and practitioners point of view) became the foundation of research from the paradox theory perspective (Power 2011, Mikes 2009).

The aim of the paper was to theoretically refer to the problems of paradoxes in selected areas of management. The authors indicated the contradictions emerging in the areas such as: innovation, risk management, demography and real estate market (fig. 1).

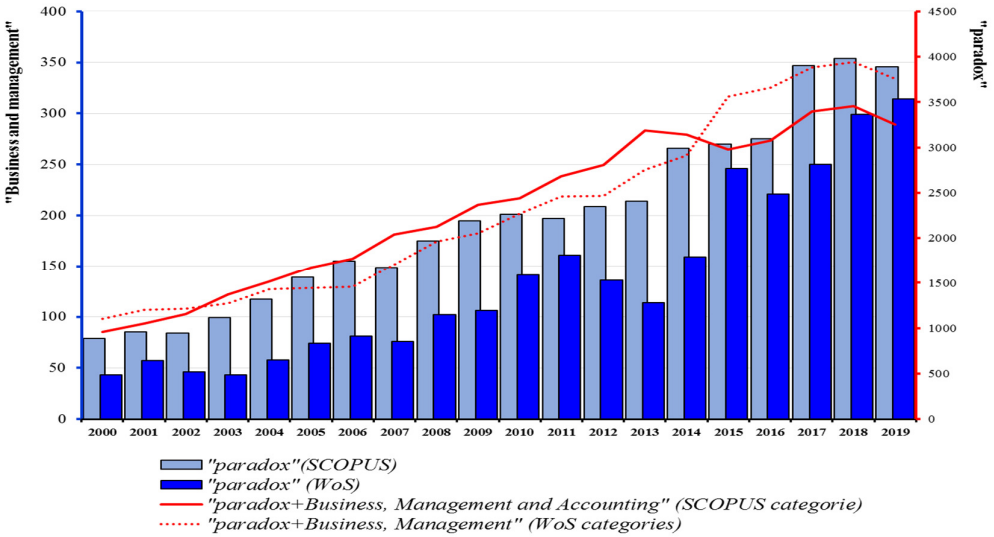

Figure 1: Number of academic literature in paradoxes

Source: own study based on Web of Science and Scopus databased

The remainder of this paper is organised as follows. Building on the existing literature, in first section we illustrate current trends in risk management research from the tension perspective. The next sections reviews the literature on paradox in innovations, demography and on the real estate market. Discussion of our key findings and a conclusion complete the paper.

Methodology of Research

The inspiration for the analysis of organizational problems is the need to counteract the growing number of factors that generate tension and risk in organizations. The aim of the study is, by referring to the problems of paradoxes in different areas, to indication and theoretically refer to the problems of paradoxes in selected areas of management.

National and international literature (covering the period since the 1990s), related to this problem and secondary data, was used to achieve the purpose of the work. Therefor in the paper the analysis of national and international literature as well as the Web of Science and Scopus data base in the context of paradoxes were conducted. The methodology and literature research adopted in the work enabled the presentation of the most common contradictions and paradoxes increasing the effectiveness of undertaken actions and indicated the need for continuous control selected management areas.

Same Management Problems from Paradox Perspective

Management of risk from paradox perspective

The issues of paradoxes in management of risk is a study subject addressed by many researchers (Power 2011; Mikes 2009; Gorzeń-Mitka 2015, 2016, 2017 and others). Most of researchers define paradox as contradictory yet interrelated elements that exist simultaneously and persist over time (Lewis, 2000; Smith and Lewis, 2011; Jarzabkowski et al. 2013). Describing the concept of paradoxes in risk management, researchers highlight its specificity and complexity, which are inherent characteristics of the process itself (e.g. Gorzeń-Mitka, 2016, 2017; Lim et al. 2017). Studies of the nature of paradoxes pay attention, among others, on organising paradox, performing paradox, belonging paradox, and learning paradox. It is important to stress that all four forms of paradox may coexist, interact and cascade down through an organisation - from the organisational level, through to functional and individual levels (Smith, Lewis 2011; Jarzabkowski et al. 2013).

Although various aspects of paradoxes have been analysed in recent years, nowadays research on contradiction in management is one of intensively developed area. It is confirmed by, among other things, the number of scientific works that analyse problems in this area. In leading databases covering management literature (Web of Science, SCOPUS, Emerald, Elsevier, Google Scholar) there is an increase in the number of publications addressing issues concerning management and risk in tension context. For instance, the number of papers on the subject discussed included in the Scopus and Web of Science database increased almost fivefold between 2000 and 2019 (Figure 2).

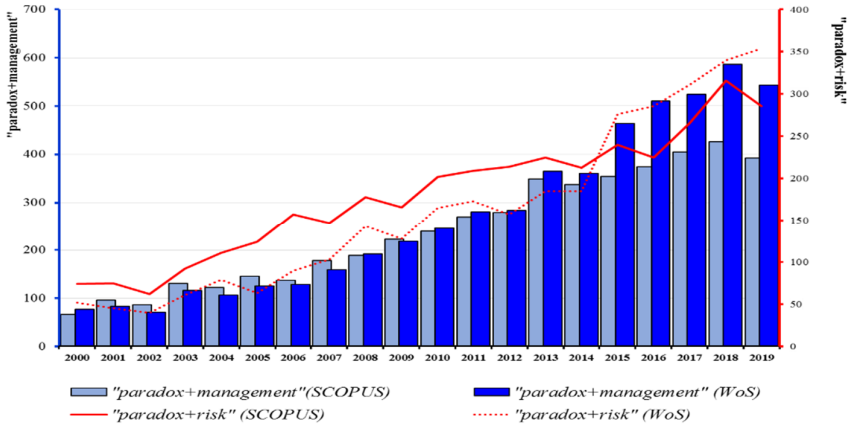

Figure 2: Number of academic research on risk and management in paradox context
Source: own work based on Science Direct journal database

Analysis (Figure 2) showed dissection of the number of publications depending on the adopted combination analysed words. According to the search words "paradox + risk" an almost twofold the number of publications than in the case of search "paradox + management". The last combination provides the lowest number of publications. This indicates, on the one hand, considerable interest in the issues of paradox and risk in other areas than management, on the other hand, this matter on the basis of management science is in the initial phase of the interest of researchers.

It should be stressed that in the period there has been a fivefold increase in the number of publications in the analysed area. Paradox perspective in the risk management occurs most often in conjunction with the analysis of problems in economics, business and social sciences. Leading issues identifying paradoxes regarding risk and management context discussed in the scientific literature include e.g. paradoxical nature of risk management systems in the banking sector, corporate social responsibility, contextual variability of risk management practice, organizational stretch goals, relational network approach to partner selections and network behaviour and others.

Lim, Woods Humprey and Seow (2017) examine the operational dynamics and paradoxical nature of risk management systems in the banking sector. They postulate viewing the risk management systems as a series of connected paradoxes not as a set of assured, robust practices. They indicate that risk management requires a fundamental switch in emphasis away from a normative, standards-based approach to one which gives greater recognition to its behavioural dimensions.

In turn, work by Kingma (2015) points toward a paradox of risk management and corporate social responsibility (CSR). He draws special attention to the role of knowledge production and science play in the construction and evaluation of gambling risks and indicate that despite all the efforts put in the risk-management strategies, a significant part of the problem CSR cannot be addressed at all.

Important comments on the nature of paradoxes in risk management are presented by Besner and Hobbs (2012). They investigate the interplay between risk management and uncertainty and the contextual variability of risk management practice (relation between the extent of use of risk management and the level of project uncertainty) and show that the use of risk management practices and tools is negatively related to the degree of project uncertainty.

In turn, Sitkin, See, Miller, Lawless, and Carton (2011) investigate the organizational pursuit of seemingly impossible goals (knows as stretch goals). They conclude that stretch goals are, paradoxically, most seductive for organizations that can least afford the risks associated with them.

In summaries, it can be said that the context of paradoxes in management of risk most often appears in connection with the analysis of such problems as an organizational culture especially risk culture (Gorzeń-Mitka 2015, 2017), heterogeneity of management system or environment.

Paradoxes in Demographic Processes

The widespread opinion that demography is lacking in theory is based in part on a particular view of the nature of scientific theory, generally known as logical empiricism or positivism (Burch 2003).

Theories that explain the shaping of demographic processes, for example: the fertility decline theory by Caldwell, Easterlin's theory and hypothesis and the economic theory of human behavior by G.S. Becker or numerous theories of migration have become the inspiration for researches (Bodvarsson et al. 2015). Therefore, the paradoxes in demographic processes can be found innumerous scientific researches in this scope (Skibiński 2018, Bloom et al. 2010). Figure 3 is included the number of scientific publications on the paradoxes in demography estimated based on the leading database.

The data from Fig. 3 indicate that the number of publications related to paradoxes in demography has been steadily increasing over the years. The results of the study support the existence of the demographic and economic paradox, which is described that nations or subpopulations with higher GDP per capita are observed to have fewer children, even though a richer population can support more children (Balan, 2015).There are many ways in which fertility inversely impacts economic outcomes. In the international literature Brander and Dowrick (1994) exanimated the effects of population growth and fertility on economic growth for 107 countries covering 1960-1985 periods. They concluded, that high birth rates cause the reduction of economic growth by means of investment effects and capital dilution.

In turn Li and Zhang (2007) examined the impact of birth rate on economic growth using a panel data set of 28 provinces in China for the period 1978-1998.Using the generalized method of moments estimator, the empirical findings of Li and Zhang (2007)'s study showed that the birth rate has a negative impact on economic growth. This finding is interpreted by the authors in the waythat it supports the view of Malthus and China`s birth control policy is indeed growth enhancing. According

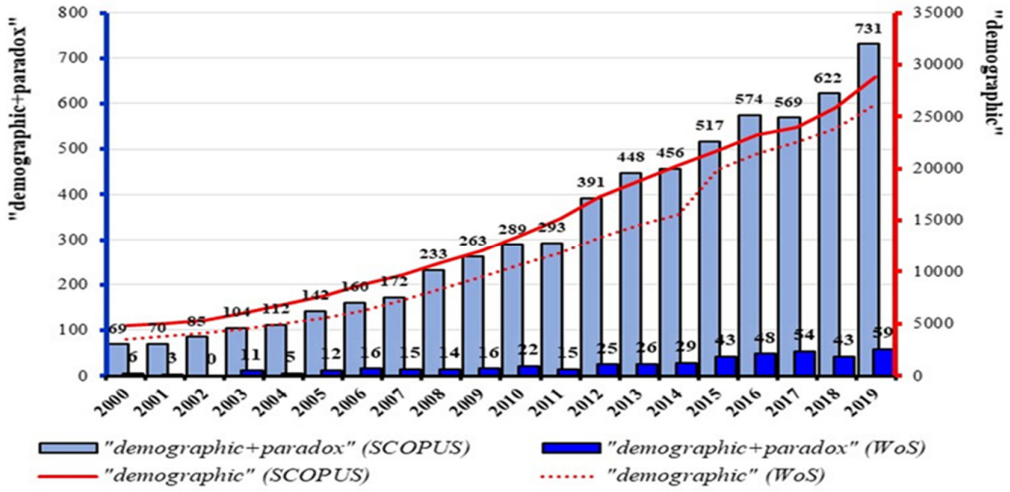

Figure 3: Number of scientific studies including paradoxes in demography

Source: own study based on: Science Direct journals database

to Luci and Thevenon (2010) investigated whether there is a convex relationship between economic development and fertility for 30 OECD countries over the period 1960-2007. They found an inverse J-shaped pattern of fertility along the process of economic development. They concluded that there is a clear shift in the relationship between the two variables from negative to positive. Whereas Somayeh et al. (2013) examined the effects of total fertility rate, life expectancy at birth, mortality rate and capital stock on the economic growth in 16 developed countries and 14 developing countries using panel data analysis over the period 1990-2010. Their researches show that capital stock and life expectancy have a statistically significant positive effect on economic growth, while mortality rate has a statistically significant negative effect on economic growth in both groups of countries. The influence of fertility rate on economic growth differs for developing and developed countries. For example, to developed countries, fertility rate has a statistically positive effect on economic growth, while it has a statistically negative effect for developing countries. Social and economical transformations have recently stimulated political debates and policies on the integration of migrants in most Western and East European countries. While transnational migration studies have documented migrants' cross-border activities there have been few empirically grounded efforts to theories these developments in the framework of integration and status theory. Nieswand (2011) indicates based on a case study of Ghanaian migrants, integration processes and develops a theorem of the status paradox of migration, which explores the interaction between migrants' integration into the receiving country and the maintained inclusion into the sending society. It describes a characteristic problem for a large class of labour migrants from the global south who gain status in the sending countries by simultaneously losing it in the receiving countries of migration. This transnational dynamic of status attainment, which goes along with specifically national forms of status inconsistency, is what is called the status paradox of migration. By bringing together two modes of national status incorporation within one framework, the status paradox provides an innovative perspective on migration processes and demonstrates the usefulness of a trans nationalist integration theory (Nieswand 2011). Silva et al. (2006) discuss the so-called paradox of ageing process, with respect to the members of the age group 55-64 years of age. This generation is currently too young to retire, despite the length of their working lives for some in excess of forty years and high earnings, yet is too old to continue working, since employers prefer to hire younger, more flexible and less expensive workers. Furthermore, official statistics show that the longevity of this

generation is higher than its predecessors, an evolution that would apparently call for a gradual increase in the retirement age. To sum up, it can be concluded that the knowledge about paradoxes in demographic processes are becoming more important for each organization especially in the face of population ageing.

Paradoxes in the Real Estate Market

To date, contradictions and paradoxes in the real estate market can still be observed in the management of resources in this market and in the strategies adopted for its requirements and the implementation of government housing programmes. However, the topic of paradoxes on the real estate market is rarely chosen by the authors. As shown by the Web of Science and Scopus databases, the number of scientific articles on this subject is not significant but is systematically growing from year to year. This is shown in Figure 4.

The situation of the price paradox concerning enormous differences in property prices reflecting uneven the level of development of individual regions of the country is well-known.

In Poland, in 2019, a package of government declarations of social transfers appeared, combined with a strategy of the minimum wage growth path which means the achievement of gross PLN 4,000

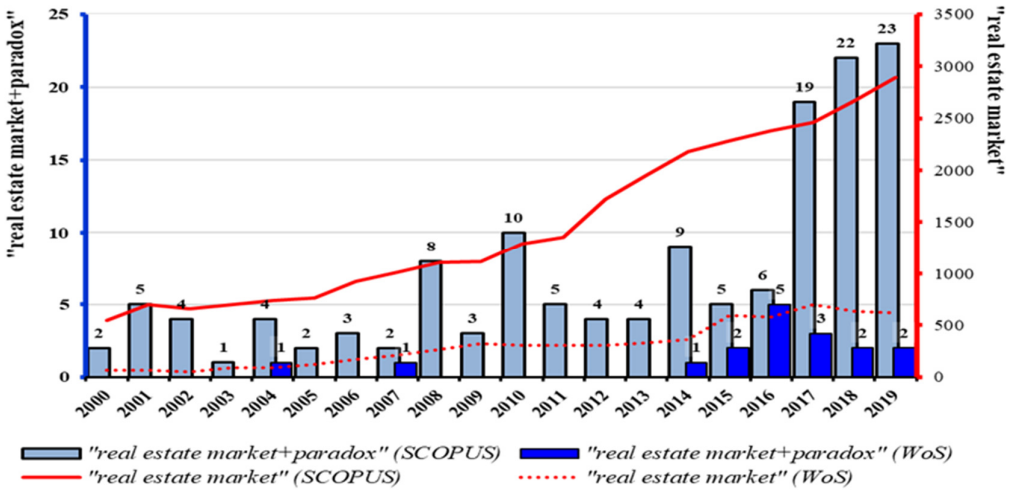

Figure 4: Number of academic research on real estate market in paradox context
Source: own study based on: Science Direct journals database

by 2024. Since the demand for real estate is sensitive to changes in incomes, a significant increase in incomes has resulted in a large rise in demand for already expensive apartments, with a significant increase in their prices observed especially in large urban agglomerations.

The housing paradox was discussed by Ivan Tosics (2018). Financing of housing investments fosters the gentrification of parts of the cities (most often a residential district) into a zone dominated by residents with a relatively high material status, causing resettlement and evictions on an unprecedented scale (United States, Spain, Portugal). To counteract this, governments are introducing progressive legislation to confirm the social function of housing and to facilitate the temporary expropriation of vacant housing units, while prohibiting mortgage foreclosure and evictions leading to homelessness and limiting the opportunities for foreign investors to purchase residential property. The state supports the development of social housing not only with its own housing programmes but also by promoting market mechanisms (Donner 2001, p. 29; Sitek 2015).

With the current housing situation in Poland, a credit paradox, i.e. "higher own contribution may mean more expensive credit", represents quite important information. In some banks, the credit recipients with 45% own contribution pay a higher margin than those who borrow 80% of the value of the property. The reasons for this paradox should be seen in the design of bank margins. With a large own contribution, the interest rates will be higher, although the risk for the bank will be lower (BiuroPrasowe Bankier.pl 2017).

Paradoxes related to the purchase of real estate and housing loans are perceived in a fairly similar way. Stopka (2009) enumerated such paradoxes as buying real estate and loans in banks. This author noted that when real estate prices rise sharply, the highest number of transactions to buy them is observed. However, after the collapse of real estate prices, the number of buyers is relatively low. In the case of a credit paradox, banks are very keen to lend at very low margins at a time of optimistic GDP forecasts. In a period of economic slowdown and at very high margins, banks are wary of granting new loans. This represents a mortgage loan paradox.

The analysis of the presented paradoxes in the real estate market shows the necessity of constant monitoring of three aspects: access to flats, the level of housing expenditure and allocation of financial resources which is strictly related to this expenditure (Holmans et al. 2002; Sitek, 2015).

Management of Innovation from Paradox Perspective

Paradoxes also appear in the area of innovation management and result mainly from the complexity of reality (Hall and Smith). Interest in these issues is seen, among others, in the growing number of scientific publications addressing this topic, especially in recent years. They analyses the Scopus and Web of Science databases, a significant increase in the number of publications in the field of innovation management can be seen since year 2000 (nine-fold and eight-fold increase). In the case of publications also taking into account the problem of paradoxes, the numbers are definitely smaller. In the analyzed period, there are 444 publications in the Scopus database and only 24 publications in the WoS database. This may indicate the initial phase of researchers' interest in contradictions in the area of innovation management. (Figure 5)

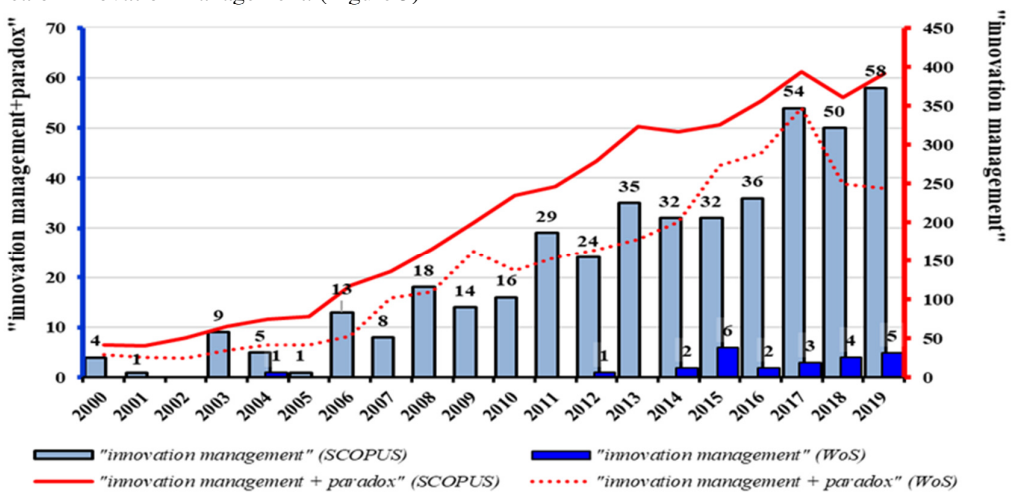

Figure 5: Number of academic research on innovation management in paradox context
Source: own study based on Science Direct journals database

In the case of innovation management, paradoxes can be found in various areas and on many levels. According to Deloitte (2005), the innovation paradox is the reluctance (inability) of manufacturing firms to take actions that build the operational capabilities (as part of a strategy) necessary to create innovation. It has been noticed that in the manufacturing industry there is a significant profit barrier resulting from the failure of introducing most new products and services to the market. This paradox

is the result of several important reasons, including: the capabilities of suppliers; insufficient information on customer needs; inconsistent approach to innovation in the area of activities related to products, customers and the supply chain, as well as unwillingness to allocate additional expenses for research and development activities.

Francisco (2010) also notes the contradiction between present-day innovations and the innovation process. He uses the term "innovation paradox" to define the negative looping of phenomena related to the non-reflective pursuit of digitization, streamlining, increasing the efficiency and consumption that contribute to less interest in the development of knowledge and creativity. As a result, we can see the process of going away from human experiences, behaviors and values that are a source of innovation. Innovations are a result of “a feedback between the technical capabilities and needs, as well as the interaction between technology, science and the implementation actions within a company”.

Innovation management is associated with long-term planning, high costs and a high risk of failure (Kay 1996, p. 26-30; Gorzeń-Mitka2007, p. 15). The paradox in innovation management is particularly seen when managers perform many tasks to introduce innovations, some of which seem to conflict with each other or with the leadership style adopted by them. A contradiction appears here in terms of priorities important for the development of a company and for the stakeholders, who most often expect immediate effects–that look forward no further than 2 years (Davidson 2011,Wang et al. 2019) Unfortunately, the effects of efforts made in this area are not immediately visible. To be stressed that just having a formulated innovation strategy is not a guarantee of success. Successful implementation is greatly dependent on the degree of business preparedness, and in particular, on the appropriate engagement of the management team (entrepreneurism, managers) (Sipa, Skibiński, 2015; Brondoni, 2013).

Referring to the problems of contemporary organization structures and leadership styles, Buekens (2013) points to such paradoxes of innovation as: flexibility paradox; the paradox of failure; the paradox of business success; knowledge paradox; the paradox of strategic alignment.

In the conditions of globalization, introducing groundbreaking innovations that give a long-lasting advantage over competitors seems to be more and more difficult to achieve. Therefore we should also mention the paradox related to imitation and innovation. According to Krzakiewicz and Cyfert (2016), imitation and innovation are not mutually exclusive phenomena, but they create an integrated system related to mutually complementing features and a synergistic effect, which means that imitation should not be seen as an obstacle, but as a driver of a properly organized innovation process. Tremendous technological leaps and using newer technology, allow imitators to outdistance innovators. Creative imitations focus on generating imitative products, but with new functions. These imitative products include benchmarking, strategic alliances and significant investment in research and development. Drucker (2001) emphasizes that the benefits of increased productivity are related not to the original innovations, but rather to the improvements that follow them. Imitators can provide the recipients with both an improved product and a product which is much cheaper.

Contradictions can also be seen when we look at the issue of encouraging employees by managers to be open to new and unknown things; motivating for the efficient flow of knowledge and rewarding the best ideas; providing employees with the freedom of creativity while maintaining control in this regard. They also have to promote innovation, while not exposing a company to loss in profitability and losing the position on the market. (Hall, Smith; Leonardbarton 1992).

Conclusion

Paradoxes may be found in various fields and they have become the subject of descriptions and discussions in terms of many scientific research and by learning and researching various types of paradoxes, we may better understand the behaviours of various business entities.

Undoubtedly, paradox in risk management context is a notion that resists clear classification. With respect to the conducted analyses, one should emphasize the fact that this problem has not been sufficiently explored in management sciences but we observe a growth of interest in this concept.
In the area of real estate market for a high attention deserves the fact that the government programs of subsidies of mortgage loans for young people paradoxically were more expensive in the whole period of the credit, which directs very important need of changing the management of subsidising this type of activity.

The results of research presented in this study may provide a basis for further work in this area.
Contemporary organizations may be efficiently managed when managers understand the dynamics of social-cultural processes in terms of business. Also solve problems in accordance with the algorithm: identification of paradoxes – analysis of conflict, and consistently searching for synthesis – a new paradigm – new goals and strategies – new ways of solving problems.

Therefore, identifying and getting to know these paradoxes helps to manage them, increasing the efficiency of the undertaken actions, and the need to control selected management areas.

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Análisis De Los Principales Factores Para La Configuración De Puertos Verdes En Colombia

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Resumen

Este estudio analiza los factores que afectan la configuración y consolidación de los puertos verdes en Colombia. Para este propósito, se realiza un estudio de caso de los puertos de carga marítima de Cartagena, Barranquilla y Santa Marta abordando entrevistas semiestructuradas para identificar los factores que contribuyen a la consolidación de los puertos verdes y los factores que guían la gestión de la sostenibilidad en los puertos que no se han certificado aún como puertos verdes. Los resultados muestran que las regulaciones ambientales son un punto de partida, pero no son el factor clave para consolidarse como un puerto verde. Factores como la inversión en tecnologías limpias, la integración con grupos de interés, y la evaluación y monitoreo de indicadores ambientales relevantes se han convertido en los factores diferenciales que permiten que el puerto de Santa Marta haya sido certificado y reconocido como un puerto verde. Como conclusión, la conversión de los puertos colombianos a puertos verdes no debe limitarse al logro de certificaciones, como la certificación EcoPorts, sino que debe garantizar la contribución al desarrollo sostenible a través de dimensiones económicas, sociales y ambientales, y a través del logro de los ODS.

Palabras clave: Puertos verdes, regulación ambiental, puerto de carga marítima, desarrollo sostenible, certificación EcoPorts

Introducción

Un puerto verde de define como un puerto que desempeña sus actividades causando daños mínimos al medio ambiente y a la sociedad, proporcionando medidas de mejora y control de calidad del aire, el agua, el ruido y los desechos (Chen et al., 2019; Fahdi, Elkhechafi, & Hachimi, 2019; Zis, 2019). Esto alinea la iniciativa de puertos verdes con la agenda de política internacional sobre desarrollo sostenible, contribuyendo al logro de varios objetivos de desarrollo sostenible (ODS), expresados en la Agenda 2030 de la ONU (Londoño, 2015; Londoño & Baena, 2017; Londoño & Cruz, 2019).

La designación de puerto verde se otorga a través de una certificación otorgada por la Organización Europea de Puertos Marítimos (*European Sea Ports Organization* - ESPO) que a su vez promueve el estándar de Sistemas de Revisión Ambiental Portuaria (*Port Environmental Review Systems* - PERS), que es el único estándar de gestión ambiental específico para el sector portuario, cuyo cumplimiento está certificado a través de la firma *Lloyd's Register Quality Assurance* (EcoPorts, 2019). Entre las ventajas generadas por EcoPorts está la promoción del comercio seguro y la eficiencia en las operaciones portuarias, la entrada a la cadena logística de compañías que solo invierten y hacen negocios con puertos certificados, la atracción de nuevos clientes, la minimización de los impactos adversos en la comunidad y el medio ambiente, y la mejora de la imagen corporativa en la sociedad (Serna et al., 2020; Akgul, 2017; Satir & Doğan-Sağlamtimur, 2018).

Colombia fue el primer país fuera de la Unión Europea en tener un EcoPort, que se otorgó al puerto de Santa Marta por primera vez en 2013, debido principalmente al transporte de carbón, ya que la actividad

minera no puede concebirse sin tener una obligación y responsabilidad con la comunidad y el medio ambiente (Moore, 2008; Todd, 2000; Zeng, Liu, He, Ma, & Wu, 2018). Este logro se debe, en gran medida, a las capacidades de emprendimiento internacional del equipo directivo de la Sociedad Portuaria de Santa Marta en relación con la orientación al cliente, la proactividad y la creación de valor para las partes interesadas o *stakeholders* (Causado & Londoño, 2015; Londoño, 2014; Tabares, Alvarez, & Urbano, 2015), quienes han contribuido a reflejar en su misión y visión el compromiso con la sostenibilidad.

Igualmente, debe tenerse en cuenta que las políticas ambientales tienen un impacto directo en la regulación ambiental establecida por los puertos (Tsai et al., 2018; Woo, Moon, & Lam, 2018), y estas políticas deben explicar las sanciones, los incentivos fiscales y recompensas para aquellos puertos que promuevan prácticas sostenibles a nivel ambiental (Arbelaez, 2015; Sheu, Hu, & Lin, 2013; Londoño, 2018). Por lo tanto, se requiere un equilibrio entre las demandas de los puertos hacia los operadores marítimos y los incentivos que permiten a dichos operadores mantener la rentabilidad de las operaciones, asegurando la armonización entre la regulación ambiental y el apalancamiento económico (Tseng & Pilcher, 2019; Wan, Zhang, Yan, & Yang, 2018; Vargas & Díaz, 2016). Todo esto traerá una alta competitividad y mejorará la sostenibilidad de las cadenas de suministro que utilicen puertos verdes, y a su vez incrementará la ventaja competitiva de los productos finales de dichas cadenas (Cano et al., 2015).

Caso de Estudio

En esta investigación, se sigue un estudio de caso de estudio múltiple integrado (Yin, 2013), ya que las unidades de análisis son los tres principales puertos de la costa atlántica colombiana (Cartagena, Barranquilla y Santa Marta), y las variables a analizar son institucionales, asociadas con la política ambiental y la actitud del equipo de gestión del puerto hacia el emprendimiento. La información del estudio se recopiló a través de una entrevista semiestructurada aplicada a los gerentes estratégicos de los puertos, cuyas preguntas se presentan en la Tabla 1.

Tabla 1: Preguntas de la entrevista semiestructurada aplicadas a los gerentes de los puertos

Factores	Preguntas
Factores legislativos	¿Cuál es el impacto de la política ambiental y la legislación ambiental en Colombia en el logro de la certificación EcoPorts?
	¿Cómo afectan la política ambiental y la legislación ambiental en Colombia a la configuración de un puerto verde?
Factores internos	¿Cómo han influido los factores asociados con la capacidad del equipo de gestión en la obtención de la certificación EcoPorts?
	¿Cómo contribuyen los factores asociados con la capacidad del equipo de gestión a la configuración de un puerto verde?
Certificación EcoPorts	¿El puerto tiene certificación EcoPorts?

En los estudios de caso abordados en esta investigación, prevalece la relevancia de los casos en lugar de un criterio de representatividad estadística (Gibbert & Ruigrok, 2010; Yin, 2013), que se asocia con la importancia de las unidades de análisis seleccionadas. Por lo tanto, los puertos seleccionados son los más importantes de la costa atlántica de Colombia en términos de infraestructura, tránsito, volumen de mercancías y capacidad de almacenamiento.

Resultados

A continuación se presenta la síntesis de las respuestas obtenidas para cada puerto.

Puerto de Cartagena

La política ambiental y la legislación ambiental sirven como guía para que los puertos sean sostenibles a nivel ambiental. Este puerto cumple con las obligaciones legales ambientales y avanza hacia la gestión ambiental, y esto se corrobora con la disminución en el consumo de diésel y energía, lo que resulta en menores emisiones de CO2 por año. Incluso, el puerto de Cartagena ha sido nominado por la ESPO como la instalación portuaria que más ha salvaguardado y contribuido a la naturaleza y al ecosistema en su área de influencia. Por lo tanto, este puerto no está lejos de convertirse en un puerto verde, ya que existen prácticas ambientales que incluso van más allá del cumplimiento de la ley, sin embargo, es necesario seguir las fases de esta nueva iniciativa, y especialmente involucrar a los diferentes interesados en este proceso.

Puerto de Barranquilla

Las obligaciones legales indicadas en las políticas ambientales representan el punto de partida tomado por el puerto, sin embargo, requiere una gestión ambiental centrada en la configuración de un puerto verde. Aunque el puerto de Barranquilla no está certificado como puerto verde, realiza acciones dirigidas a la gestión ambiental, tales como tener un permiso de emisiones al aire otorgado por la autoridad ambiental local, lo que implica la realización de estudios anuales de calidad del aire. Además, los vehículos que ingresan al puerto deben tener certificaciones técnico-mecánicas vigentes. Del mismo modo, el puerto tiene permisos de vertimiento de líquidos, cuenta con un programa de gestión de residuos sólidos que se difunde a todo el grupo empresarial y a los contratistas que ingresan a las instalaciones del puerto. Se han intervenido diferentes aspectos ambientales en el puerto, pero se requieren altas inversiones en tecnologías limpias para lograr una transformación efectiva hacia un puerto verde.

Puerto de Santa Marta

La legislación ambiental es el punto de partida para una certificación de puerto verde y el proceso de planificación ambiental se coordina con el Sistema Nacional Ambiental (SINA), además, el decreto 3083 de 2007 de Colombia proporciona algunas pautas con respecto a la carga directa de carbón en los puertos que exportan este mineral. Sin embargo, no existe una legislación específica en Colombia respecto a los puertos verdes, ya que la ESPO promueve el único estándar de gestión ambiental específico para el sector portuario (PERS). Sin embargo, la legislación ambiental en Colombia promueve buenas prácticas ambientales, lo que resulta en la obtención de este tipo de certificación. Algunos de los factores que se evalúan, supervisan y han sido cruciales para que el puerto de Santa Marta obtenga una certificación EcoPorts son: la eficiencia en el uso del agua para los procesos portuarios, iniciativas como la carga directa de carbón, el control de la calidad del aire, la sustitución de equipos de gasolina por equipos eléctricos, la presencia y protección del último relicto de coral sobre la bahía de Santa Marta en los muelles de operación, así como el trabajo social realizado por la Fundación de la Sociedad Portuaria de Santa Marta. Por lo tanto, la certificación de puertos verdes no está limitada al cumplimiento de los requisitos legislativos, sino que también requiere de inversión financiera para la gestión ambiental, y especialmente requiere del trabajo integrador de los *stakeholders* afectados por la operación del puerto y de la capacitación continua del personal del puerto.

En resumen, el puerto de Cartagena está enfocado en la integración de los *stakeholders*, el puerto de Barranquilla está enfocado en altas inversiones en tecnologías limpias, y el puerto de Santa Marta destaca que los factores que contribuyen a obtener la certificación EcoPorts están relacionados con la inversión en tecnología, orientación hacia los *stakeholders*, capacitación del personal del puerto en sostenibilidad, y monitoreo estricto de los indicadores ambientales.

Conclusión

En los puertos abordados en este estudio, se destaca la importancia de las regulaciones y políticas ambientales para crear un marco institucional que promueva la protección ambiental y la sostenibilidad, sin embargo, si no hay compromiso y actitud proactiva por parte del equipo de gestión de las sociedades portuarias, el marco regulatorio será insuficiente. Debido a que no existe una política específica para los puertos verdes en Colombia, es necesario centrarse en factores más importantes, como la integración de los *stakeholders*, las inversiones en tecnologías limpias, la capacitación del personal del puerto en sostenibilidad, y el monitoreo de los indicadores ambientales. Como consecuencia, estos factores permitieron certificar algunos puertos como puertos verdes y recibir nominaciones y permisos que demuestran buenas prácticas ambientales.

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Desafíos De La Regulación MARPOL Anexo VI Para Reducir Las Emisiones De Azufre En Los Fabricantes De Buques De Carga Y Compañías Navieras

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Resumen

El requisito de fabricar nuevos buques de carga utilizando nuevas tecnologías de reducción de emisiones de azufre es una de las implicaciones del Anexo VI del Convenio Internacional para la Prevención de la Contaminación por los Buques (MARPOL). Por lo tanto, el propósito de este artículo es analizar a través de una búsqueda especializada en la literatura, los desafíos para la adopción de depuradores y combustibles con bajo contenido de azufre en los fabricantes de barcos y compañías navieras. Los principales hallazgos muestran que los fabricantes de buques, bajo un escenario de sanción y penalización derivado de las regulaciones internacionales de transporte marítimo, deben financiar su capital de trabajo y sus costos operativos, lo que implica un aumento en los precios de los buques que aplican estas nuevas tecnologías. Por otro lado, las compañías navieras deben elegir qué tecnología es la más apropiada de acuerdo con las áreas donde navegan los barcos, las economías de escala de las rutas comerciales, y el análisis de costo-beneficio de la modernización de los barcos.

Palabras clave: Reducción de emisiones de azufre, depuradores, combustibles con bajo contenido de azufre, fabricantes de barcos, navieras

Introducción

El transporte marítimo es aquel que genera menos emisiones de CO2 por tonelada-milla en comparación con otros medios de transporte tales como el transporte ferroviario, terrestre y aéreo (Lister, Poulsen, & Ponte, 2015). Sin embargo, desde la década de 1960, los efectos ambientales negativos generados por factores operativos y accidentales en el transporte marítimo han aumentado junto con el rápido crecimiento y el movimiento anual de mercancías (Ochoa, 2015)(Grant & Elliott, 2018). Algunos de estos efectos negativos se relacionan con las emisiones de óxidos de azufre (SOx) y óxidos de nitrógeno (NOx), contaminación del aire, contaminación de los mares, muertes de especies acuáticas y plancton debido a derrames de petróleo y productos químicos, basura y sedimentos (House, 2004; Koski, Stedmon, & Trapp, 2017; Sato, 2018; Winther et al., 2014; Woodyard, 2004).

Esta situación condujo a la adopción de la Convención Internacional para la Prevención de la Contaminación por Buques (MARPOL) en 1973. Esta es la principal convención relacionada con la protección del medio ambiente relacionada con el transporte marítimo y desde entonces ha sido modificada continuamente de acuerdo con el realidades del comercio internacional y el impacto en el medio ambiente (Lister et al., 2015; Walker et al., 2019). Por esta razón, el Anexo VI de MARPOL limitó el contenido máximo de azufre de los combustibles marinos en las Áreas de Control de Emisiones de Azufre (Sulfur Emission Control Areas - SECA) a 0.1% desde 2015 y 0.5% en 2020 para aquellas áreas fuera del SECA (Antturi et al., 2016; Nikopoulou, 2017; Olaniyi, Atari, & Prause, 2018; van Hassel, Meersman, de Voorde, & Vanelslander, 2016). El SECA comprende el Mar del Norte, el

Mar Báltico, el Mar Caribe alrededor de Puerto Rico, las Islas Vírgenes y algunas millas náuticas de Canadá y los Estados Unidos.

Esta situación implica un compromiso ambiental y una inversión en tecnologías para reducir las emisiones de azufre de los buques basadas en sistemas de limpieza de gases de escape (depuradores o scrubbers) y/o la incorporación de combustibles con bajo contenido de azufre (Endres et al., 2018; Gu & Wallace, 2017; Han, 2010; Scott, 2017; Zheng & Chen, 2018), lo que lleva a una serie de efectos financieros para los fabricantes de barcos y las compañías navieras que alquilan dichos barcos (Allal, Mansouri, Youssfi, & Qbadou, 2019; Solakivi, Laari, Kiiski, Töyli, & Ojala, 2019). De esta forma, se espera aumentar la competitividad y sostenibildiad de cadenas de suministro que empleen buques equipados con depuradores o que funciones a base de combustibles bajos en azufre (Cano et al., 2015).

Metodología

Para la revisión de la literatura, se consultaron las bases de datos de Scopus, Wos y Science Direct utilizando la ecuación de búsqueda *("Shipowners" or "Shipping Companies") and ("Scrubbers" or "Low Sulfur Fuel")*. Esta búsqueda proporcionó 43 documentos que abordan los métodos de reducción de emisiones de azufre en el sector marítimo, que consisten en 34 artículos de revistas, 5 *conference proceedings* y 4 capítulos de libros. La Figura 1 muestra el número de documentos publicados por año, identificando que el 79% de los documentos fueron publicados entre 2015 y 2019, indicando que las tecnologías y soluciones que permiten el cumplimiento de las propuestas en el capítulo VI de MARPOL por parte de compañías navieras, dueños de barcos y fabricantes de barcos son un tema actual en la literatura.

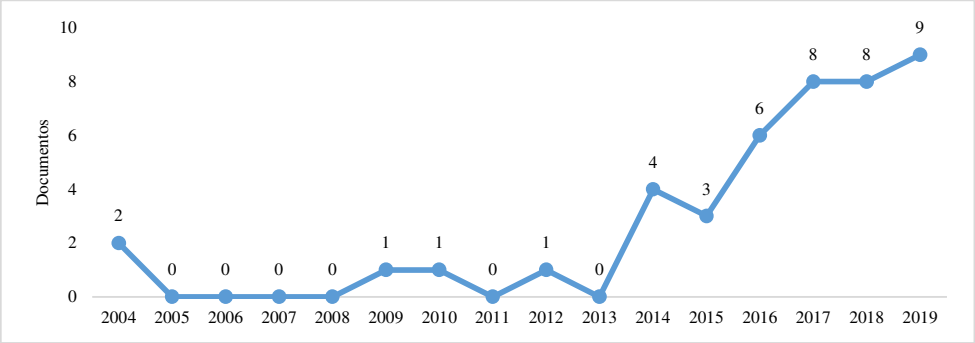

Figura 1: Documentos por año

También se identifica que la revista *Transportation Research Part D: Transport and Environment* concentra el mayor número de documentos publicados sobre el tema de este estudio, publicando el 18% de los documentos analizados (8 documentos). Los autores con el mayor número de publicaciones sobre este tema son Thierry Vanelslander, Christa Sys, Kevin Cullinane y Edwin van Hassel.

Resultados

Los estudios de (Armellini, Daniotti, Pinamonti, & Reini, 2018; Solakivi et al., 2019; Stevens, Sys, Vanelslander, & van Hassel, 2015; Zhu, Li, Shi, & Lam, 2017) argumentan que el uso de depuradores y filtros de partículas diésel representa la mejor forma de reducir las emisiones de azufre en los barcos, especialmente para las compañías navieras que presentan mucho tráfico a través de la SECA, ya que los combustibles con bajo contenido de azufre suelen ser más caros (Gu & Wallace, 2017; Han, 2010; van Biert, Godjevac, Visser, & Aravind, 2016; Zheng & Chen, 2018). Por otro lado, el uso de combustibles con bajo contenido de azufre es más adecuado para las compañías navieras que operan en un número reducido de puertos en la SECA o que operan fuera de la SECA (Acciaro, 2014; Calderón, Illing, & Veiga, 2016; Halff, Younes, & Boersma, 2019; Rehmatulla, Calleya, & Smith,

2017; Svanberg, Ellis, Lundgren, & Landälv, 2018; Theocharis, Rodrigues, Pettit, & Haider, 2019; Vierth, Karlsson, & Mellin, 2015). Otros factores como el consumo anual de combustible, los precios del combustible y la regulación ambiental también influyen en la decisión de elegir la mejor alternativa para reducir las emisiones de azufre (Rehn, Haugsdal, & Erikstad, 2016).

Del mismo modo, los fabricantes de barcos enfrentan grandes desafíos asociados con los altos costos de capital y la falta de leyes integrales sobre la contaminación del aire, ya que requieren el compromiso de actores como puertos, gobiernos, mercados financieros y compradores, vendedores y arrendatarios de barcos (Animah, Addy-Lamptey, Korsah, & Sackey, 2018; Cullinane & Bergqvist, 2014; Schinas & Stefanakos, 2012). Además, se destaca la necesidad de mejorar la infraestructura portuaria, especialmente para la aplicación de tecnologías basadas en combustibles con bajo contenido de azufre, ya que hay muy pocos puertos en el mundo que tengan la infraestructura adecuada para proporcionar este servicio (Cullinane & Cullinane, 2019; Holmgren, Nikopoulou, Ramstedt, & Woxenius, 2014; Kim & Seo, 2019; Notteboom & Vernimmen, 2009; Sheng, Meng, & Li, 2019) (Sanabria, Acosta, & Rodríguez, 2015).

Respecto a la viabilidad económica de los depuradores y los combustibles con bajo contenido de azufre, varios análisis de los flujos de caja a largo plazo muestran que los costos de ambos tipos de tecnologías superan los beneficios bajo la regulación marítima actual (Panasiuk and Turkina, 2015) (Antturi et al., 2016), lo que significa que el Anexo VI de MARPOL corre el riesgo de incumplimiento. Como consecuencia, la literatura muestra la necesidad de proporcionar soluciones que trasciendan la naturaleza coercitiva (representada en multas, sanciones), ya que esto puede afectar tanto los costos de transporte como el dinamismo del comercio internacional; y por otro lado, se requieren acuerdos y compromisos entre los diferentes miembros de la cadena de comercio marítimo para reducir conjuntamente las emisiones de azufre y contribuir a la sostenibilidad del transporte marítimo (Adland, Fonnes, Jia, Lampe, & Strandenes, 2017; Lähteenmäki-Uutela, Repka, Haukioja, & Pohjola, 2017; Zis, 2019).

Conclusión

La principal preocupación de los fabricantes de barcos está relacionada con las sanciones que se les pueden imponer si no adoptan tecnologías para reducir las emisiones de azufre, lo que les obliga a realizar grandes inversiones para cumplir con los requisitos normativos, e implica un aumento en el precio de venta de embarcaciones equipadas con nuevas tecnologías. En las compañías navieras se destaca el uso de análisis de costos de oportunidad relacionados con la compra o alquiler de barcos con depuradores o combustibles con bajo contenido de azufre. Estas decisiones dependen principalmente de factores como las áreas de navegación de los buques, las economías de escala de las rutas comerciales y el análisis de costo-beneficio de la modernización de los buques. Futuras investigaciones pueden enfocarse en proponer diferentes formas de mejorar la relación y los acuerdos entre los propietarios y los arrendatarios de buques para reducir las emisiones de azufre de manera rentable y económica.

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Ponderación De Indicadores Para El Desarrollo Sostenible A Nivel Subnacional A Través Del AHP

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Resumen

Este artículo tiene como objetivo presentar un método de ponderación de indicadores para la construcción de índices compuestos con el fin de evaluar el desarrollo sostenible a nivel subnacional. Para ello, se utiliza un proceso analítico jerárquico (AHP) de comparaciones por pares, que se considera relevante para este tema ya que permite establecer vínculos entre los indicadores que conforman los diferentes objetivos de desarrollo sostenible (ODS). Este estudio, se basa en 28 indicadores definidos por un grupo de expertos para evaluar el progreso hacia el desarrollo sostenible de la subregión del Valle de Aburrá, ubicada en Antioquia, Colombia. Los resultados muestran que los indicadores relacionados con la salud, el empleo, y la educación obtuvieron mayores ponderaciones, mientras que los indicadores relacionados con asuntos ambientales presentaron las ponderaciones más bajas. Del mismo modo, se demuestra que el modelo es consistente utilizando un índice de consistencia, lo cual genera la posibilidad de replicar este modelo en diferentes niveles subnacionales.

Palabras clave: Ponderación de indicadores, proceso analítico jerárquico, marco de referencia intertemático, objetivos de desarrollo sostenible

Introducción

Trabajos recientes utilizan los objetivos de desarrollo sostenible (ODS) como una guía para evaluar el desarrollo sostenible debido a que la Agenda de los ODS sigue en vigencia hasta el año 2030, y desde allí una línea de base de 17 ODS, 169 metas y 232 indicadores sirven como guía para evaluación del desarrollo sostenible (Londoño & Cruz, 2019; Londoño, 2015). En consecuencia, el método más común para evaluar el desarrollo sostenible ha sido el de la construcción de índices agregados o compuestos (Boggia & Cortina, 2010) debido a que apoya la evaluación de fenómenos complejos y facilita los procesos de toma de decisiones cuando se formulan políticas públicas (Becker, Saisana, Paruolo, & Vandecasteele, 2017; KEI, 2005). Asimismo, los índices agregados o compuestos parten de un modelo conceptual y resumen un concepto multidimensional en un índice unidimensional (Baena, Cano, & Campo, 2018; Cano, Campo, & Gómez, 2017; Cano, Vergara, & Puerta, 2017; Londoño, 2014).

Por lo tanto, la evaluación del desarrollo sostenible por medio de índices agregados requiere, en general, las siguientes etapas: desarrollo de un marco conceptual, selección de indicadores, imputación de datos faltantes, análisis multivariado, estandarización de datos, ponderación y agregación de indicadores, y análisis de sensibilidad (Ciommi, Gigliarano, Emili, Taralli, & Chelli, 2017). En este sentido, el AHP se usa para priorizar o determinar los pesos de varios factores y subfactores, considerando múltiples criterios y múltiples grupos de partes interesadas (*stakeholders*) para problemas complejos, y capturando medidas de evaluación subjetivas y objetivas que son fáciles de usar y son escalables (Zhang, Chen, & Sun, 2019; Causado & Londoño, 2015). Actualmente, los estudios de sostenibilidad en diferentes niveles territoriales están aumentando, incluidas las regiones

subnacionales, ciudades, municipios, microrregiones e incluso grupos de vecindarios (Londoño & Cruz, 2019; Schneider, Jenny, & Longet, 2018; Londoño & Baena, 2017), lo que demuestra la necesidad de evaluar el desarrollo sostenible en las diferentes unidades de planificación y gestión (Londoño, 2018; Serna, Czerny, Pineda, & Rojas, 2015). Por lo tanto, este documento presenta un método de ponderación de indicadores para construir índices agregados con el fin de evaluar el desarrollo sostenible a nivel subnacional, utilizando el AHP y una técnica de comparación por pares.

Ponderación de indicadores para el desarrollo sostenible

Para aplicar un método de ponderación de indicadores con el fin de evaluar el desarrollo sostenible a nivel subnacional, este estudio se centra en la subregión del Valle de Aburrá que pertenece al departamento de Antioquia (Colombia). El Valle de Aburrá es una subregión que representa la entidad político-administrativa del departamento de Antioquia, y tiene un centro de información llamado Observatorio Metropolitano de Información (OMI) que se encarga de presentar el análisis, el procesamiento y la interpretación de los indicadores que respaldan la gestión institucional y la planificación regional, centrándose en temas como planificación y territorio, medio ambiente, movilidad, calidad de vida e instituciones (Área Metropolitana del Valle de Aburrá, 2019). Por lo tanto, estas condiciones facilitan el diseño y la implementación de métodos de evaluación del desarrollo sostenible a nivel subnacional.

Dado que la Agenda 2030 propone 232 indicadores para evaluar el desarrollo sostenible, es muy difícil encontrar esta amplia información disponible a nivel de país, y mucho más difícil a nivel de subregión. Por lo tanto, la selección de indicadores para evaluar el desarrollo sostenible se basa en la información del MIO y las directrices de la Agenda 2030. Los objetivos e indicadores que se podrían utilizar para evaluar el desarrollo sostenible se tomaron de la Agenda 2030, y en el OMI se enumeran los indicadores disponibles que pueden medir los ODS. Luego, a través de criterios expertos, se seleccionaron indicadores del OMI que miden efectivamente cada uno de los ODS establecidos en la Agenda 2030. Como resultado del criterio de expertos, la Tabla 1 muestra los 28 indicadores seleccionados para evaluar el desarrollo sostenible en el Valle de Aburrá. Debe tenerse en cuenta que los indicadores para los ODS 9, 13 y 14 no se muestran en la Tabla 1 porque los indicadores propuestos para estos ODS no están disponibles en el OMI para el Valle de Aburrá.

Tabla 1: Indicadores para la evaluación del desarrollo sostenible

ODS	Indicadores	Código	ODS	Indicadores	Código
ODS_1	Porcentaje de hogares con al menos una necesidad básica insatisfecha (Pobreza)	X_1	ODS_7	Cobertura energética	X_{15}
	Porcentaje de hogares con dos o más necesidades básicas insatisfechas (Miseria)	X_2		Cobertura de la conexión de gas	X_{16}
ODS_2	Porcentaje de hogares con inseguridad alimentaria.	X_3	ODS_8	Tasa de desempleo	X_{17}
	Índice de mortalidad materna	X_4		Tasa de subempleo	X_{18}
ODS_3	Tasa de mortalidad en menores de 5 años.	X_5		coeficiente de solvencia	X_{19}
	Tasa de mortalidad por VIH-SIDA	X_6	ODS_{10}	Índice de endeudamiento	X_{20}
	Tasa de asistencia escolar en primaria	X_7		Cobertura de internet	X_{21}
	Tasa de asistencia a la escuela secundaria	X_8	ODS_{11}	Porcentaje de tierra rural	X_{22}
ODS_4	Tasa de escolaridad en educación superior	X_9		Concentración de material particulado PM2,5	X_{23}
	Tasa de analfabetismo de 10 a 14 años	X_{10}	ODS_{12}	Porcentaje de protección del suelo.	X_{24}
	Tasa de analfabetismo en mayores de 15 años	X_{11}	ODS_{15}	Percentage of soil protection	X_{25}
ODS_5	Porcentaje de mujeres en los consejos municipales	X_{12}	ODS_{16}	Tasa de homicidios	X_{26}

ODS_6	Cobertura de acueducto	X_{13}		Tarifas de secuestros	X_{27}
	Cobertura de alcantarillado	X_{14}	ODS_{17}	Tasa de penetración de internet	X_{28}

Los resultados de la encuesta de percepción ciudadana (EPC) realizada por la empresa encuestadora Ipsos Napoleón Franco se utilizaron para apoyar el proceso de asignación de preferencias (Medellín Cómo Vamos, 2017). De acuerdo con los resultados de la EPC, se priorizaron los problemas de calidad de vida más importantes para los ciudadanos del Valle de Aburrá, indicando que los temas más importantes son salud, empleo, educación, vivienda, seguridad, alimentación y otros (igualdad de género, medio ambiente, e ingresos). Una vez que se obtiene la priorización de los indicadores de CPS y el desempeño de los indicadores del MIO, a través del criterio de expertos se define la importancia de los indicadores utilizando la escala de preferencias original de Saatty (Saaty, 1980) que tiene 9 calificaciones y ha sido ampliamente utilizada por varios autores (Kamaruzzaman, Lou, Wong, Wood, & Che-Ani, 2018; Kurka, 2013). Esta escala de preferencias permite indicar qué indicador es más importante que otro, y así asignar pesos a cada indicador a través del AHP.

Cuando se realizan comparaciones pareadas para N variables, se forma la matriz de juicio (A), en la que cada entrada a_{ij} en la matriz se crea comparando los elementos de la fila A_i con los elementos correspondientes de la columna A_j (Kamaruzzaman et al., 2018; Kurka, 2013), de modo que A = (a_{ij}), donde $i = 1, 2, \ldots, N$ y $j = 1, 2, \ldots, N$ representan el número de criterios. Al comparar la misma variable, la calificación será 1, por lo que la diagonal principal de A es igual a 1 ($a_{ii}=1$ o $a_{jj}=1$). Debajo de la diagonal principal están las calificaciones inversas de las que aparecen encima, y en este caso, la matriz de juicio contiene valores del 1 al 9 y sus valores inversos correspondientes. Para obtener los pesos para cada indicador, se debe normalizar primero la matriz de juicio. Para hacer esto, cada valor de la matriz se divide sobre el total de la columna a la que pertenece. Luego, las filas de todos los valores estandarizados (sa_{ij}) se suman y se dividen por el número de indicadores (en este caso 28), obteniendo la ponderación de cada indicador.

Para verificar la consistencia del AHP, es necesario calcular el radio de consistencia (CR) propuesto por (Saaty, 1990), que se basa en un índice de consistencia (IC) y un índice aleatorio (RI). Si CR<0.10, la consistencia es razonable; mientras que si el CR>0.10 el modelo de análisis jerárquico es inconsistente, y la asignación de preferencias y comparaciones por pares debe hacerse nuevamente para obtener un modelo de ponderación de indicadores confiable.

Resultados

Como resultado del método AHP, la Figura 1 muestra las ponderaciones de los 28 indicadores analizados y las ponderaciones agregadas de los ODS que conforman el modelo de evaluación del desarrollo sostenible para el Valle de Aburrá. Por su parte, el índice de consistencia es de 0.033 y el índice aleatorio es de 1.838, obteniendo un radio de consistencia de 0.018. Como CR<0.10, el modelo de ponderación de indicadores propuesto es consistente y confiable.

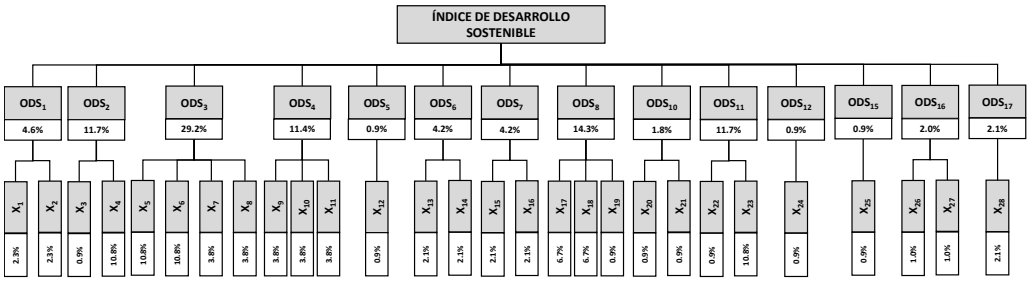

Figura 1: Índice de desarrollo sostenible basado en ponderación de indicadores

La Figura 1 también indica que los indicadores asociados con las dimensiones de salud (X_4, X_5 y X_6), empleo (X_{17} y X_{18}) y educación (X X_7, X_8, X_9, X_{10}, X_{11}) fueron los que obtuvieron mayores pesos, mientras que los indicadores relacionados con las dimensiones ambientales y los que pertenecen al ODS_{11}, ODS_{12}, y ODS_{15} (X_{22}, X_{24}, X_{25}) presentaron los pesos más bajos. La única excepción fue el indicador X_{23} (concentración de material particulado - PM 2.5), cuyo peso fue mayor porque en los últimos años el Valle de Aburrá ha presentado varias contingencias ambientales, y esta afecta directamente la salud humana. Por lo tanto, debido a las características de la subregión del Valle de Aburrá, los indicadores más importantes fueron los relacionados con la salud, el empleo y la educación.

Conclusión

Este estudio presentó un método de ponderación de indicadores para evaluar el desarrollo sostenible a nivel subnacional, utilizando un AHP respaldado por criterios expertos. Un grupo de expertos asignó preferencias basadas en comparaciones por pares respaldadas por la Agenda 2030, la información local del Observatorio Metropolitano de Información, y la encuesta de percepción ciudadana del Valle de Aburrá. Las comparaciones por pares se definieron de acuerdo con los problemas de la subregión del Valle de Aburrá, por lo tanto, es coherente que se obtuvieran los mayores pesos para los indicadores asociados con la salud, el empleo y la educación. Asimismo, el modelo de ponderación de indicadores propuesto para el Valle de Aburrá es consistente, lo que genera la posibilidad de replicar dicho modelo en diferentes niveles subnacionales.

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The Impact of The Coherence of The Advancement Levels of HRM Subfunctions On the Financial Performance Results of MNCs

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Abstract

The main goal of the paper is to determine in what way the coherence of the advancement levels of HRM subfunctions may influence on the performance financial results of MNCs. The research problem covered the identification and analysis of the relationships between the advancement levels of HRM subfunctions (independent variables) and the financial performance results of local subsidiaries of MNCs (dependent variable). The HRM subfunctions considered in the research were: employee resourcing, employee retention, engagement & satisfaction, performance appraisal, career development, talent management, competency management, development of leadership, employer branding. The research sample covered 200 headquarters (HQs) of MNCs and their local subsidiaries. The empirical research results show that there are some identifiable and statistically significant correlations between dependent and independent variables. Excluding employer branding, what has been found is that the higher the advancements level of HRM subfunctions and the stronger the associations between the advancement levels of these HRM subfunctions - the better the financial performance results of foreign subsidiaries of MNCs. Our study, therefore, represents an original effort at examining all these relationships.

Keywords: HRM, Subfunctions, Advancement Level, Coherence, Performance Results, Multinational Company, Central Europe

Introduction

This section should follow keywords. This section should provide background of the study and highlight research motivation. We are living in times, as presumably all organizations and their managers are aware, in which maintaining a profitable business becomes more and more complicated task. This is mostly because they have to operate in a highly competitive and rapidly changing environment. The companies understand that it is essential to identify effective ways to manage their employees and they build more or less advanced human resources management (HRM) systems to support their business performance.

There are numerous publications in which the authors present empirical research findings on the relationship between the HRM advancement level and organizational performance results. Some of them focus on the overall human resources management (HRM) advancement level or significance to the company's results, whereas others consider individual contribution of particular HRM subfunctions to the organizational performance results (Ginevičius *et al.* 2010). However

there are also those who study internal coherence of HRM subfunctions and their synergistic impact on company's success (Ridder et al, 2012). Anyway, the problem is much more complicated in multinational companies (MNCs) than in those operating on a single home market.

So far only a few studies have focused on some of the above mentioned phenomena from the perspective nested in economies such as Central and Eastern Europe (Farndale et al., 2017:1630). In most cases the research on MNCs has covered the companies deriving from developed countries (usually from the West Europe and the USA) whose foreign direct investment (FDI) was located in less developed countries (e.g. Brewster, 2007; Morley et al., 2009; Wilkinson and Wood, 2017). No specific research of this scope has been performed in MNCs headquartered in economies in transition or just after-the-transition, like those in Central and Eastern Europe (Festing, Sahakiants, 2013; Haromszeki 2014; Stor and Kupczyk 2017). Then, the more complex and interrelated ties between the HRM advancement level and organizational performance in such organizations stay rather unknown what makes a clear research gap. In this context the main goal of the paper is to determine in what way the coherence of the advancement levels of HRM subfunctions may influence on the performance financial results of MNCs headquartered in Central Europe.

In consequence, the paper is structured as follows. After this short introduction the authors discuss the theoretical background of the study based on a literature review. This results in formulation of two research hypotheses. Furthermore, the focus is on the research methodology, sample and measures. The empirical research findings and discussion over them come next. The article ends with a research summary and final conclusions.

The theoretical background of the study

The advancement level of HRM and company's performance results

Over the past few decades there has been a considerable scientific interest in investigating the relationship between HRM and different indicators of organizational performance (*c.f.* Kazlauskaite, Buciuniene, 2010) as well as in the impact strength of the HRM practices and systems themselves on the overall organizational performance (Kapondoro et al., 2015). Different perspectives (*c.f.* Stor, 2018) and different paradigms (*c.f.* Kaufman, 2015) have been taken to determine such associations.

In the literature there are various classification of company's performance results which the researchers have proved to be correlated with HRM practices. In most cases they refer to such four general categories of performance results as: organizational, behavioral, financial, and managerial. In this paper we are interested in the two last categories. In short, the financial results cover financial liquidity, profits, market share, sales, company's goodwill, share price, and firm value (Richey, Wally, 1998; Pfeffer, Veiga 1999; Arthur 1994; MacDuffie 1995; Huselid 1995; Becker, Gerhart 1996; Combs et al., 2006). The managerial results refer to research on interrelations and levels of coherence between business strategies and particular subfunctions of HRM with company's performance results (Beer et al., 1984; Schuler, Jackson 1987; Wright and Snell 1991; 1995; Guest, 1997; Chanda and Shen, 2009; Guest et al., 2011; Stor, Suchodolski 2016; Stor, Haromszeki 2019).

All in all, there is a vast array of various approaches to the relationships between the HRM advancement level and organizational performance results. Anyhow, being interested in both managerial and financial results, all this leads us to our first research hypothesis:

H_1: The higher the advancement level of HRM subfunctions the better the financial performance results of foreign subsidiaries of MNCs.

The internal coherence of HRM and company's performance results

Theorists adopting the configurational approach posit that internal coherence among individual HRM subfunctions is a key of success (Huff, Schüssler, 2016), and that – assuming that these subfunctions are internally consistent – combinations of HRM subfunctions are likely to have larger effects on organizational outcomes than the sum of the component effects due to individual practices (Bamberger et al., 2014). That is, the contribution of HRM to performance is explained through "the synergic integration of the elements that build it" (Martin-Alcazar et al., 2005, p. 637).

Crucial to the configurational perspective, is the argument that the impact of HRM on organizational performance is dependent on the adoption of an effective combination of HRM practices (Villajos et al., 2019), often referred to as HRM bundles (Gooderham, et al., 2008; Pocztowski, 2018). Thus the configurational approach has as its basis that maximizing firm performance is dependent not on the HRM subfunctions implemented in isolation but on the bundling together of interrelated elements of HRM practices in an internally consistent manner (Urlich, Brockbank, 2005:171-172; Ridder et al, 2012). Configurational theories propose that the relationship between HRM and company's performance involves complex interactions between bundles of HRM activities and outcomes (Arthur 1994; MacDuffie 1995). Such bundles of complementary and congruent practices are held to produce substantially greater performance effects than individual HRM practices or subfunctions (MacDuffie 1995;; Ichniowski, et al., 1997; Perry-Smith, Blum, 2000; Vergurg et al., 2007). Configurations represent recurring patterns of how key organizational variables fit together to form an identifiable whole (Walker, et al., 2015, p. 41). When applied in the research conducted in MNCs, the configurational perspective with its equifinality effect has revealed that such an approach captures more aspects of the complexity surrounding MNCs' examination and evaluation of their foreign subsidiaries (Dikova et al., 2017:406). In some more advanced studies on strategic management, the researchers have even developed special models of hierarchical relationships among different HRM strategies and substrategies in MNCs (e.g. Stor, 2007).

On the whole, research results suggest significant organizational benefits from effective and efficient management of coherent HRM subfunctions. Accordingly, our second hypothesis is formulated in the following way:

H_2: The stronger the internal associations between the advancement levels of HRM subfunctions the better the financial performance results of foreign subsidiaries of MNCs.

The Empirical Research Methodology

Our research problem covered the identification and analysis of the relationships between the advancement levels of HRM subfunctions and the financial performance results of local subsidiaries of MNCs. In a result of theoretical studies, we have formulated two hypotheses which were presented in the previous section.

The company's financial performance results make a dependent variable. HRM and its subfunctions are treated as an independent variables. Their advancement level was measured with comparison to the general worldwide trends based on the best practices. Basing on the literature review the authors have selected 9 subfunctions of HRM that are the most popular or valuable in business organizations. The subfunctions, measures and scales used to the particular variables incorporated in the tested hypotheses are presented in Table 1.

The research data has been gathered in two ways: CAWI (computer aided Web interview) and CATI (computer aided telephone interview). All the questions were asked in the context of the last

two fiscal years and this time framework was reminded by the interviewer several times during the interview survey. This procedure was to assert that the respondents were considering a specific period of time in which they were able to logically assess the interconnections between HRM and business phenomena under study. The survey was conducted in January 2018. The collected data were analyzed both within descriptive and correlational statistics. All calculations were performed by means of Statistica v. 12.5 - an advanced analytics software package with the level of significance set to alpha = 0.05. Kolmogorov–Smirnow test was performed to determine the normality of data distribution. To assess the questionnaire reliability Cronbach's alpha as a measure was used. The relationships between the quantitative variables were examined by the means of Pearson correlation coefficient (referred to as Pearson's r).

The research sample covered 200 headquarters of MNCs deriving from a Central European country (Poland). They were nonfinancial economic entities, existing on the market no less than two years, with a dominant share of the Polish capital, which possessed at least one foreign subsidiary, and this subsidiary was an effect of a foreign direct investment (FDI). The reference base for the number of business entities was the last report drawn by the Polish Central Statistical Office. The report indicated that there were 1760 Polish economic entities which confirmed possessing 4086 subsidiaries in 150 countries in 2015 (*Activities of Enterprises...,* 2017). Hence, we assumed that the size of a sample composed of 200 entities is sufficient to conduct the research because when the confidence coefficient stays at the level of 0.95 the maximum measurement error amounts to 0.065.

The sampling was of the purposive type to fulfill the requirements specified above. The structure of the research sample was diverse in terms of the companies' business profiles - according to the European Classification of Business Activity (ECBA) - although not all of the sectors of the economy were represented; length of operation in years; size of organizations (as measured by number of employees); type of FDI investment; and the ownership share of the HQs in their foreign subsidiaries. Furthermore, the MNCs under research differed in the number of total and foreign entities they controlled, number of host countries in which their subsidiaries were located, and level of country's development in which their most representative subsidiary operated. An average MNC operated on the market longer than 11 years, was rather a large organization, had about 13 entities, about 8 of them were foreign subsidiaries, located in 4 countries, established as greenfield investment with a majority ownership share belonging to the Polish HQ.

We assumed that some specific parameters, for example, an industrial area, size of the company, its legal form or country's economic development could influence the performance of businesses in the sample. However, the results of statistical testing did not demonstrate the impact of these parameters on business performance.

The Empirical Research Findings

Descriptive statistics and internal consistency

The basic descriptive statistics for the variables connected with the main research problem are presented in Table 1. On average, the financial performance results of MNCs, when compared to their main competitors, are somewhere between "similar to others" and "above average" ($\bar{x} = 3{,}74$). So, their financial standing on average is good. The advancement levels of particular HRM subfunction are relatively high. The means calculated for each of them ranges from $\bar{x}\,min = 3{,}70$ to $\bar{x}\,max = 3{,}81$. The *min scale value* is reached by employee resourcing ($min = 1{,}71$) and the highest by employer branding ($max = 4{,}93$).

Table 1: Basic descriptive statistics for the main variables under study: HRM subfunctions and MNCs'performance financial results

VARIABLES		Valid N	Mean	Median	Min	Max	SD
Financial performance results		200,00	3,74	4,00	2,00	5,00	0,51
The advancement level of HRM subfunctions	**Employee resourcing**	200,00	3,76	3,86	1,71	4,71	0,48
	Employee retention	200,00	3,70	3,80	2,40	4,80	0,38
	Engagement & satisfaction	200,00	3,70	3,73	2,91	4,64	0,30
	Performance appraisal	200,00	3,76	3,75	2,25	4,50	0,34
	Career development	200,00	3,81	3,83	2,50	4,50	0,36
	Talent management	200,00	3,70	3,83	2,00	4,50	0,46
	Competency management	200,00	3,71	3,75	2,50	4,63	0,37
	Development of leadership	200,00	3,70	3,75	2,00	4,38	0,39
	Employer branding	200,00	3,74	3,71	2,36	4,93	0,36

Scales:
- Performance results: comparison to the main competitors: 1 - poor, 2 – below average, 3 – similar to others, 4 – above average, 5 – very good;
- Advancement level: comparison to the general trends based on the best worldwide practices: 1 - very low, 2— low, 3— average, 4—high, 5—very high;

Source: own research data

The research findings show that among 9 HRM subfunctions being analyzed the highest advancement level belongs to career development ($\bar{x} = 3{,}81$). The second position is occupied *ex aequo* by performance appraisal and employee resourcing ($\bar{x} = 3{,}76$). The full ranking list is depicted in Graph 1.

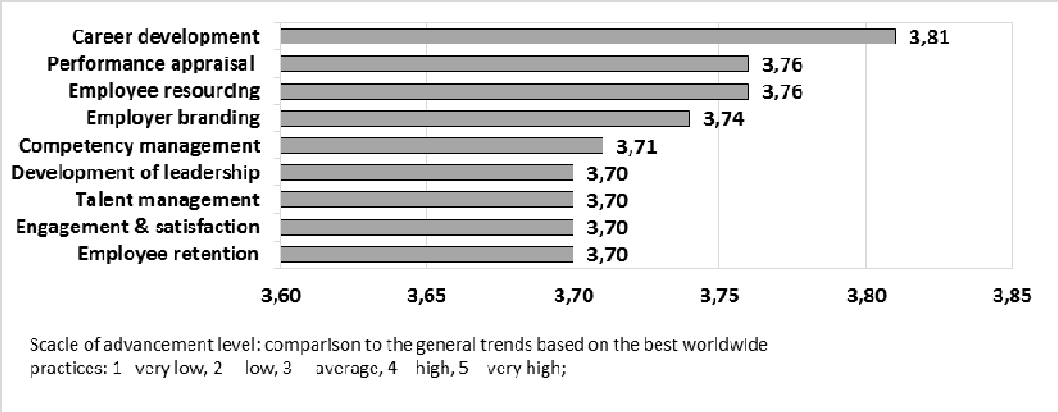

Graph 1: The ranking of the mean values of the advancement level of HRM subfunctions
Source: own research data

Before proceeding further in the analysis, Cronbach's alpha coefficient was computed to check for the internal consistency within the questionnaire (see table 2). The reliability analysis covered 9

five-point scale items (HRM subfunctions). Cronbach's alpha showed the questionnaire to reach high reliability, α = 0.906. All items appeared to be worthy of retention, resulting in a decrease in the alpha if deleted.

Table 2: Reliability and item-total statistics

Variable	Summary for scale: Mean=33,5794; Std. Dv.=2,62692; Valid N:200 Cronbach alpha: ,**906023;** Standardized alfa: ,908333 Average inter-item corr.: ,531908				
	Mean if deleted	**Var. if deleted**	**StDv. if deleted**	**Itm. Totl. Correl**	**Alpha if deleted**
Employee resourcing	29,8208	5,1670	2,2731	0,6816	0,8972
Employee retention	29,8794	5,5509	2,3560	0,6461	0,8980
Engagement & satisfaction	29,8749	5,8536	2,4194	0,6291	0,8998
Performance appraisal	29,8238	5,6941	2,3862	0,6460	0,8981
Career development	29,7705	5,3969	2,3231	0,7993	0,8874
Talent management	29,8778	5,1702	2,2738	0,7188	0,8933
Competency management	29,8657	5,4510	2,3347	0,7453	0,8910
Development of leadership	29,8838	5,3007	2,3023	0,7894	0,8873
Employer branding	29,8387	5,8153	2,4115	0,5279	0,9059

Source: own research data

Correlation Analysis

The results of the correlation tests (at $p<.05$) for the main research variables are presented in Table 3. Apart from the advancement level of employer branding, all the other advancement levels of HRM subfunctions are positively correlated with the financial performance results of MNCs. The range of values for the correlation coefficient of these variables is in the interval between $r=.15$ and $r=.35$, where the lowest value is gained by employee retention and the highest by talent management.

All this means that our hypothesis **H_1** can be partially accepted because - with the exception of the advancement level of employer branding - the other 8 advancement levels of HRM subfunctions are positively correlated with the financial performance results of MNCs.

Table 3: The results of a correlation test for the advancement levels of HRM subfunctions and the financial performance results of MNCs

VARIABLES	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	$\overline{xHRM(1-9)}$
6.Employee resourcing	1,00	**0,48***	**0,44***	**0,36***	**0,47***	**0,45***	**0,44***	**0,53***	**0,30***	**0,22***	**0,43***
2.Employee retention	**0,48***	1,00	**0,50***	**0,42***	**0,52***	**0,35***	**0,37***	**0,36***	**0,39***	**0,15***	**0,42***
3.Engagement & satisfaction	**0,44***	**0,50***	1,00	**0,42***	**0,50***	**0,38***	**0,47***	**0,47***	**0,48***	**0,18***	**0,46***
4.Performance appraisal	**0,36***	**0,42***	**0,42***	1,00	**0,54***	**0,54***	**0,57***	**0,48***	**0,34***	**0,18***	**0,46***
5.Career development	**0,47***	**0,52***	**0,50***	**0,54***	1,00	**0,53***	**0,54***	**0,52***	**0,37***	**0,22***	**0,50***
6.Talent management	**0,45***	**0,35***	**0,38***	**0,54***	**0,53***	1,00	**0,58***	**0,63***	**0,27***	**0,35***	**0,46***
7.Competency management	**0,44***	**0,37***	**0,47***	**0,57***	**0,54***	**0,58***	1,00	**0,63***	**0,41***	**0,28***	**0,50***

8.Development of leadership	**0,53***	**0,36***	**0,47***	**0,48***	**0,52***	**0,63***	**0,63***	1,00	**0,40***	**0,28***	**0,50***
9.Employer branding	**0,30***	**0,39***	**0,48***	**0,34***	**0,37***	**0,27***	**0,41***	**0,40***	1,00	0,03	**0,37***
60. Financial performance results	**0,22***	**0,15***	**0,18***	**0,18***	**0,22***	**0,35***	**0,28***	**0,28***	0,03	1,00	**0,23***
* Pearson's r significant at p < ,05000;											

Source: own research data

In our analysis we have also calculated the means of internal correlations between 9 HRM subfunctions ($\overline{xHRM(1:9)}$). Three variables, i.e. career development, competency management, and development of leadership are *ex aequo* on the first place because they take the highest mean ($\overline{x(r)} - .50$). Three other variables are *ex aequo* on the second position (with $\overline{x(r)} - .46$). They are: talent management, performance appraisal, and engagement & satisfaction. The remaining HRM subfunctions in a descending order are: employee resourcing ($\overline{x(r)} = .43$), employee retention ($x(r) = .42$), and employer branding ($x(r) = .37$). Then we have juxtaposed all these means with the values of correlations between each of HRM subfunctions and the performance financial results of foreign subsidiaries of MNCs. The curves representing these two sets of values are depicted in Graph 2. They provide visible relationship between the sets under study.

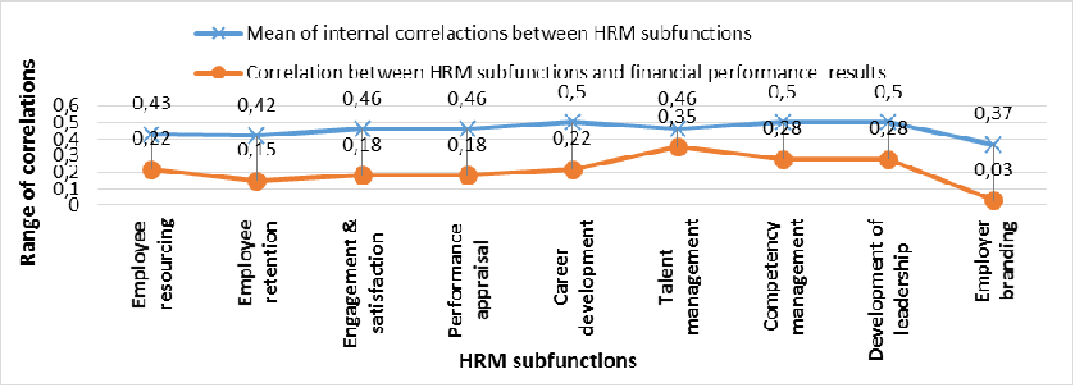

Graph. 2: The coherence of HRM subfunctions and company's performance financial results

Source: own research data

Finally, the correlation test conducted for the mean of internal relationships between advancement levels of HRM subfunctions and the financial performance results of foreign subsidiaries of MNCs reveals statistically significant and strong correlation *r*=.71. Hence, our last analysis leads us to the confirmation of hypothesis **H₂**. As shown in Table 4, the stronger the internal associations between the advancement levels of HRM subfunctions the better the financial performance results of foreign subsidiaries of MNCs.

Table 4: The results of a correlation test for the mean of internal associations between advancement levels of HRM subfunctions and the financial performance results of MNCs

VARIABLES	Mean of internal correlations between HRM subfunctions Σ(1;9)	Correlation between HRM subfunctions and performance financial results
Mean of internal correlations between HRM subfunctions $\overline{(xHRM(1:9)}$	1,00	**0,71***
Correlation between HRM subfunctions and performance financial results	**0,71***	1,00
* Pearson's r significant at p < ,05000;		

Source: own research data

Research summary

In our research we were particularly interested in the identification and analysis of the relationships between the advancement levels of HRM subfunctions and the financial performance results of local subsidiaries of MNCs. Successfully, we have identified some regularities within the scope of the selected variables and the analysis of the empirical research findings leads to the conclusion that the higher the advancements level of HRM subfunctions and the stronger the associations between the advancement levels of these HRM subfunctions - the better the financial performance results of foreign subsidiaries of MNCs. This does not include employer branding which makes an exception. Namely, no statistically significant correlation has been found in this scope. The possible reason is that it's difficult or even impossible to identify a straightforward relationship between the advancement level of employer branding and the financial performance results of company because there may be a mediating variable that intermediates the casual relationship between the dependent and independent variables. In our study we have applied some simplified statistical correlational analysis which is not dedicated to such type of investigation. Hence, as about the future research we would recommend to look for some mediating variable(s) that may explain in details or discover new ties between the variables under study.

Final Conclusions

Our final conclusion based on the analysis of the empirical research findings suggests that there is a clear, identifiable impact that the coherence of the advancement levels of HRM subfunctions may exert on the financial performance results of MNCs. It means that by manipulation of the HRM advancement level we may influence on the company's financial results in such a manner that raising the HRM advancement level we can expect an increase in company's financial outcomes. However, it is important to emphasize that individual HRM subfunctions show much weaker correlations with the financial outcomes than the internally coherent HRM. We believe that this final conclusion authorizes us to state that the goal of our paper has been achieved. We have successfully determined in what way the coherence of the advancement levels of HRM subfunctions may influence on the performance financial results of MNCs.

Notwithstanding this accomplishment, there are some limitations of our research. For example, the final conclusions can't be extended on the whole population of MNCs worldwide because the research sample, even though deliberatively selected, was composed only of those MNCs that were headquartered in one Central European country. Additionally, although it was diverse in terms of the companies' business profiles, not all sectors of economy were represented. Some other flaws are also noticeable in the measurement scales or the calculations based exclusively on

the mean values. Yet the other reservations may concern asking the informants the general questions about the company's financial performance results instead of using hard performance indicators. This practice is not at odd within this type of research, however it may undermine the subjectivity of evaluation.

Despite all these constraints, our study contributes to the scientific discipline of management. On one side, as said above, MNCs headquartered only in Central Europe make a limit to the research, but on the other side they provide a unique perspective. To our best knowledge, it's been the first research of this type. We have confirmed the phenomena - identified also by other researchers as mentioned in the introductory part of the paper - referring to the positive relations between HRM and organizational performance results, and in our case in MNCs. Our study has also some novelty value which consists in the identification of a statistically significant associations between the internal coherence of the advancement levels of HRM subfunctions and the financial performance results of MNCs.

In the above context it's worth noticing that the relationships between the advancement levels of HRM subfunctions and the financial performance results of MNCs headquartered in Central Europe seem to be similar within their strength to those identified in the companies in Western Europe (*cf.* Stavrou, Brewster, 2005). They only seem to be similar because when the particular researchers use different measures and classifications of HRM subfunctions (also called bundles) in their studies (*cf.* Verburg et al., 2007) their research results are hardly comparable (Boon et al., 2019). Anyway, to the best knowledge of the authors of this article none of the published papers so far has addressed to the impact of the internal coherence of HRM on MNC's financial outcomes in such a comprehensive way as it has been done in this work.

As for the practical implications of the research results, they mostly rely on indicating that if there is so strong positive relationship between the associations among the advancement levels of HRM subfunctions and the financial performance results, then there is huge potential and opportunity in using HRM subfunctions in more effective and efficient way that will lead to higher financial outcomes. Of course, it's necessary to remember that HRM is only one of the factors that determine such outcomes. There many others, as to mention economic growth, production technology, market competition, prices for components, service or product demand etc. Anyway, the presented research findings may help the managers of MNCs uncover some hidden opportunities existing in the management practices of their regional businesses and inspire them to create such ties between HRM subfunctions which can successfully impact their business performance.

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The Effectiveness of HRM in Competition on Human Factor in MNC – the Empirical Research Findings

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Abstract

The main goal of the paper is to determine in what way the degree of HRM contribution to the MNC's performance results influences on the perceived value of human factor as a competitive differentiator on the market. The research problem covered the identification and analysis of the relationships between the degree of HRM and its subfunctions' contributions to the MNC's performance results (independent variables) and the perceived value of human factor as a competitive factor (dependent variable). The research sample covered 200 headquarters (HQs) of MNCs and their local subsidiaries. The empirical research findings show that there is a clear, identifiable relationship between the degree of HRM contribution to the MNC's performance results and the perceived value of human factor as a competitive differentiator on the market. This relationship is true when considered from the global perspective, when the MNCs evaluate their worldwide HRM practices and the impact of these practices on the worldwide competitive value of their human factor. There are some exceptions and differences when the overall HRM contribution or its particular HRM subfunctions' contribution are juxtaposed with the overall human factor or its two subfactors at the local subsidiaries level.

Keywords: HRM, subfunctions, contribution, performance results, multinational company, synergy effect

Introduction

The role of human resources management (HRM) in competition on human factor is not a new topic in management literature and practice. It may even sound as a *cliché* to say that to maintain a profitable business and gain competitive advantage it is essential to identify the effective ways to manage employees and build such HRM systems that contribute to business performance.

There are numerous publications in which the authors present theoretical conceptions and empirical research findings on the relationship between HRM and organizational performance results. Some of them focus on the overall HRM significance (or contribution) to the company's performance results (Ginevičius *et al.* 2010), whereas others consider individual contributions of particular HRM subfunctions (Ridder et al, 2012). Similarly, the role of associations between HRM practices and human factor in organizational performance has been studied in many ways and in different geographical regions. On the whole, the research results suggest the positive role both of the quality of human factor (Chen 2014) and HRM outcomes towards organizational performance results (Katou, Budhwar 2010). It becomes obvious that knowledge assets and employee competencies are becoming significantly important for a firm's performance and competitiveness. And because the entirety of human capital is held by employees it is the aim of management is to pass human capital in the form of employees' special skills on to a network of many people, where it is fertilized and transferred to the ownership of the company (Gomezelj, Antončič 2015). What is more, the

knowledge and experience of senior managers and the workforce are seen as valuable assets which are costly to replace or to rebuild (Brauer 2013).

However, the contribution to company's performance results through such HRM practices that make human factor a competitive differentiator on the market is much more complicated in multinational companies (MNCs) than in home organizations (Arora et al., 2018). The geographical spread of their foreign subsidiaries, their internationalization index, different local environment (economic, legal, political, technological, social etc.) (Bartelsman et al., 2019) with comparison the environment of the headquarter (HQ) are only a few examples showing the complexity in which MNCs have to operate (Kiselakova *et al.*2019; Díez-Esteban, 2019). For the MNCs understanding local environmental demands is of crucial importance in order to properly evaluate which kind of organizational practices their subsidiaries need to develop into high-performance entities. That is why they can find some of their human factor features and HRM practices remarkably important to their local performance success and in consequence impose some different policies (Berchtold 2010).

So far only a few studies have focused on the above mentioned phenomena in the MNCs headquartered in economies in transition or just after-the-transition, like those in Central and Eastern Europe (Festing, Sahakiants, 2013; Haromszeki 2014; Stor and Kupczyk 2015; Farndale et al., 2017). In most cases the research on MNCs has covered the companies deriving from developed countries (Albulescu et al., 2018; Cieślik, 2019) whose foreign direct investment (FDI) was located in less developed countries (e.g. Brewster, 2007; Morley et al., 2009; Wilkinson and Wood, 2017). In our research we are interested in such MNCs and in this context the main goal of the paper is to determine in what way the degree of HRM contribution to the MNC's performance results influences on the perceived value of human factor as a competitive differentiator on the market.

In consequence the paper is structured as follows. After this short introduction the authors discuss the theoretical background of the study based on a literature review. This results in building an empirical research model and formulation of the research hypotheses. Furthermore, the focus is on the research methodology, sample and measures. The empirical research findings and discussion over them come next. The article ends with a research summary and final conclusions.

The theoretical background of the study

The human factor as a competitive differentiator on the market

The companies may compete on different factors, as to mention quality of design or manufacturing, features and quality of service, price for each sale, profit margin, technology, reputation and of course human resources (Nasab et al. 2013; Karaszewski, 2013). However, it is human resources that are of the fundamental importance to business success and its ability to gain competitive advantage (Katou, Budhwar, 2010; Kearns, 2010) and which can be perceived as an extraordinary competitive factor of a company. This view has been developed within the resource-based theory for nearly 30 years (Barney, 1991; Dyer, 1993; Wright et al., 1993; Becker et al., 2001, Ingham, 2007; Huselid, Becker, 2011; Mayo, 2012; Juchnowicz, 2014).

Human resources can be grouped into various categories and usually this categorization refers to their owners, meaning employees (Kazlauskaitė et al, 2010) who possess different abilities, skills, knowledge, needs, professional backgrounds, etc. and thus may have varying responses to HRM practices. In the research and business practice human resources as a human competitive factor are usually disaggregated into two subfactors: non-managerial employees and managerial staff (Patel, Hamlin, 2012; Yoon, 2016) because of the different qualifications and competencies required from them (Sienkiewicz, 2014; Stor, 2014; Kupczyk, Stor, 2017; Doornich, 2018), a different range of responsibilities formulated toward these two groups and a different scale of consequences that their behaviors and decisions may bring to a company (Karaszewski, 2013; Haromszeki, 2014; Stor, Suchodolski, 2016; Anzengruber, 2017; Stor, Haromszeki 2019). So, it leads to a conclusion, which is taken for granted in the HRM literature, that the value of the human factor as a competitive factor is a resultant of the HRM practices they have experienced in the organizations. But the relationship can be reciprocal. A company may invest in HRM depending on how it perceives its contribution to

the company's success. And as the research on the MNCs' practice shows this may look differently depending which organizational level is considered. So far, we know that some significant differences within this scope have been identified between the HQs of MNCs and their foreign subsidiaries (Andersen, 1993; Stor, 2011; Latusek-Jurczak D. 2014; Żarnik-Żuławska, 2016; Delery, Roumpi, 2017).

The contribution of HRM to company's performance results

Empirical studies on the relationship between the HRM contributive practices and the company's performance results usually fall into one of the following categories: financial, organizational, managerial, and behavioral. The researchers use a vast array of various measures within each of them. The financial results can be presented, for example, as profits, sales, market share, financial liquidity, company's goodwill, share price, and firm value (Richey, Wally, 1998; Pfeffer, Veiga 1999; Arthur 1994; MacDuffie 1995; Huselid 1995; Becker, Gerhart 1996; Beatty et al., 2003; Combs et al., 2006). The organizational results may cover productivity, quality of products/services, efficiency, innovativeness, competitive advantage (Arthur, 1994; Huselid, 1995; Becker, Gerhart 1996; Huselid et al., 1997; Pfeffer, Veiga 1999; Birdi et al., 2008; Ferguson, Reio 2010; Sparrow et al., 2016; Paawe, Ferndale, 2017). The managerial results mostly refer to the interrelations and levels of coherence between business strategies and particular subfunctions of HRM with company's performance results (Beer et al., 1984; Schuler, Jackson 1987; Wright, Snell 1991; Guest, 1997; Chanda, Shen, 2009; Guest et al., 2011; Stor, Suchodolski 2016). The behavioral results include employee attitudes, employee engagement and satisfaction, employee and/ or managerial interpersonal relations, employee competency development, leadership (Nagy, 2002; Rich et al., 2010; Ferguson, Reio, 2010; Juchnowicz, 2014; Sparrow et al., 2016; Stor, Haromszeki 2019).

Furthermore, as it was mentioned in the introduction, some of authors focus on the overall HRM contribution to the company's performance results (Ginevičius *et al.* 2010), whereas others consider individual contributions of particular HRM subfunctions (Ridder et al, 2012). Additionally, some researchers are interested in the overall HRM practices directed to the overall human factor, while others consider only managerial staff. It is because managerial competencies differ from the competencies of other employees in a significant way (Haromszeki, 2013; Raziq, et al., 2020) and the companies dedicate some of their HRM subfunctions exclusively to their current or potential managers. It's worth emphasizing that the research has revealed that priority given to managers significantly affects organizational performance (Mabey, Thomson, 2000; Garavan, Heraty, 2001). Moreover, due to the linear association between managerial competencies and firm performance (Hughes & Rog, 2008), investment in managerial competencies is desirable, especially as their role in company's strategy creation and implementation is invaluable (Zakrzewska-Bielawska, 2019).

The assumption taken in the research model

The literature review and accompanying theoretical considerations have resulted in the empirical research model presented in Figure 1.

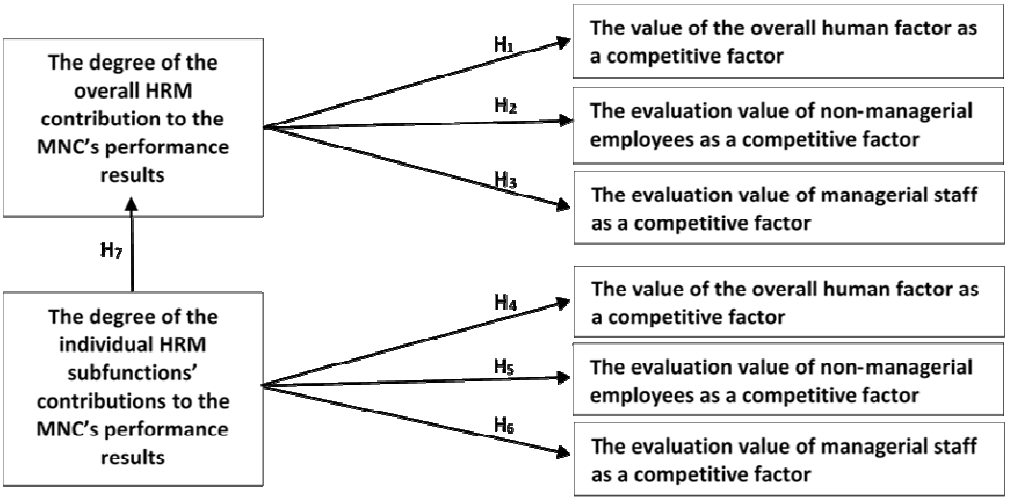

Fig.1: The empirical research model of relationships between contributive HRM and competitive human factor

Source: own concept

Accordingly, seven research hypotheses, that describe the relationships between the variables in the model, have been developed. They are as follows:

H_1: The higher the degree of the overall HRM contribution to the MNC's performance results, the higher the value of the overall human factor as a competitive factor.

H_2: The higher the degree of the overall HRM contribution to the MNC's performance results, the higher the evaluation value of non-managerial employees as a competitive factor.

H_3: The higher the degree of the overall HRM contribution to the MNC's performance results, the higher the evaluation value of managerial staff as a competitive factor.

H_4: The higher the degree of the individual HRM subfunctions' contributions to the MNC's performance results, the higher the value of the overall human factor as a competitive factor.

H_5: The higher the degree of the individual HRM subfunctions' contributions to the MNC's performance results, the higher the evaluation value of non-managerial employees as a competitive factor.

H_6: The higher the degree of the individual HRM subfunctions' contributions to the MNC's performance results, the higher the evaluation value of managerial staff as a competitive factor.

H_7: The higher the degree of the individual HRM subfunctions' contributions to the MNC's performance, the higher the degree of the overall HRM contribution to the MNC's performance results.

The Empirical Research Methodology

The research problem covered the identification and analysis of the relationships between the degree of HRM and its subfunctions' contributions to the MNC's performance results (independent variables) and the perceived value of human factor as a competitive factor (dependent variable). In the result of theoretical studies, we have built the empirical research model and formulated seven research hypotheses to be verified in the empirical research - presented in the previous section.

Dependent and independent variables have been considered in the context of the companies' financial performance results. Basing on the literature review 9 subfunctions of HRM have been selected as the most popular or valuable in business organizations. The appraisal of human factor as a company's competitive factor was split into two other subfactors: (1) non-managerial employees' skills and knowledge and (2) managerial staff's competencies. In the research we took a twofold perspective: 1) the global HQ's perspective in which the MNCs evaluate their worldwide (overall) HRM practices and overall human factor and 2) the perspective of their foreign subsidiaries in which they evaluate the particular HRM subfunctions and particular subfactors of human factor. The subfunctions, subfactors, measures and scales used to the particular variables incorporated in the tested hypotheses are presented in Table 1.

We have used two methods to collect the research data: CATI (computer aided telephone interview) and CAWI (computer aided Web interview). The questions were resided in the context of the last two fiscal years and the interviewer reminded the respondents of this context several times during the interview survey. The goal of this procedure was to ensure that the respondents were referring to a precisely outlined period of time in which they were able to logically assess the interconnections between HRM and business phenomena under study. The survey was conducted in January 2018. All calculations were made with the aid of Statistica v. 12.5 - an advanced analytics software package with the level of significance set to alpha = 0.05. To determine the normality of data distribution we used Kolmogorov–Smirnow test. To analyze the collected data both descriptive and correlational statistical methods were used. The relationships between the quantitative variables were tested by the means of Pearson correlation coefficient (referred i.e. Pearson's r).

The research sample was comprised of 200 headquarters of MNCs originating from a Central European country (Poland). They were nonfinancial economic entities, existing on the market no less than two years, with a dominant share of the Polish capital, which possessed at least one foreign subsidiary, and this subsidiary was an effect of a foreign direct investment (FDI). The reference base for the number of such organizations was the last report elaborated by the Polish Central Statistical Office. The report said that there were 1760 Polish companies which registered 4086 business entities in 150 countries in 2015 (*Activities of Enterprises...,* 2017). In consequence it was assumed that the size of a sample mentioned above is sufficient to conduct the research because when the confidence coefficient stays at the level of 0.95 the maximum measurement error amounts to 0.065.

The sampling was of the purposive type to meet the specified requirements. The structure of the research sample was diverse in terms of the companies' business profiles - according to the European Classification of Business Activity (ECBA) - although not all of the sectors of the economy were represented; length of operation in years; size of organizations (as measured by number of employees); type of FDI investment; and the ownership share of the HQs in their foreign subsidiaries. Furthermore, the MNCs under research differed in the number of total and foreign entities they controlled, number of host countries in which their subsidiaries were located, and level of country's development in which their most representative subsidiary operated. An average MNC operated on the market longer than 11 years, was rather a large organization, had about 13 entities, about 8 of them were foreign subsidiaries, located in 4 countries, established as greenfield investment with a majority ownership share belonging to the Polish HQ.

We assumed that some specific parameters, for example, an industrial area, size of the company, its legal form or country's economic development could influence the performance of businesses in the sample. However, the results of statistical testing did not demonstrate the impact of these parameters on business performance.

The Empirical Research Findings

Descriptive Statistics

The basic descriptive statistics for the variables connected with the main research problem are presented in Table 1. On average, the financial performance results of MNCs, when compared to their main competitors, are somewhere between "similar to others" and "above average" ($\bar{x} = 3{,}74$). So, their financial standing on average is good. The mean value of the overall human factor as a competitive factor is between "similar to an average" and "rather high" ($\bar{x} = 3{,}56$) with a $\bar{x}\,min = 2{,}74$ and $\bar{x}\,max = 4{,}44$. When this factor is analyzed by its two components their mean values are lower. The evaluation value of non-managerial employees is $\bar{x} = 3{,}38$ and of managerial staff is $\bar{x} = 3{,}39$. It's necessary to remind that the value of the overall human factor is not calculated as a mean of its two subfactors but with regard to the assumed perspective: global vs local subsidiaries. Anyway, the means calculated for each of them ranges from $\bar{x}\,min = 2{,}00$ to $\bar{x}\,max = 5{,}00$.

Table 1: Basic descriptive statistics for the main variables under study: contribution of HRM subfunctions to companies' performance results and human factor

VARIABLES		Valid N	Mean	Median	Min	Max	SD
Financial performance results		200,00	3,74	4,00	2,00	5,00	0,51
The overall human factor		200,00	3,56	3,61	2,78	4,44	0,35
Competitive factors	**1. Non-managerial employees**	200,00	3,38	3,00	2,00	5,00	0,67
	2. Managerial staff	200,00	3,39	3,00	2,00	5,00	0,62
The overall HRM contribution		200,00	3,56	3,56	2,78	4,78	0,36
The significance of HRM subfunctions	**1. Employee resourcing**	200,00	3,90	4,00	2,00	5,00	0,52
	2. Employee retention	200,00	3,53	3,00	3,00	5,00	0,67
	3. Engagement & satisfaction	200,00	3,32	3,00	2,00	5,00	0,61
	4. Performance appraisal	200,00	3,43	3,00	2,00	5,00	0,61
	5. Career development	200,00	3,55	4,00	2,00	5,00	0,57
	6. Talent management	200,00	3,53	4,00	1,00	5,00	0,62
	7. Competency management	200,00	3,57	4,00	2,00	5,00	0,61
	8. Development of leadership	200,00	3,45	3,00	1,00	5,00	0,61
	9. Employer branding	200,00	3,80	4,00	2,00	5,00	0,67

Scales:
- Performance results: comparison to the main competitors: 1 - poor, 2 – below average, 3 – similar to others, 4 – above average, 5 – very good;
- Competitive factor: with comparison to the main competitors: 1 - strongly lower, 2—rather lower, 3—similar to an average, 4—rather higher, 5—strongly higher;
- Significance (contribution) of HRM to performance results: 1 - not important, 2 – slightly important, 3 – moderately important, 4 – important, and 5 – very important;

Source: own research data

The degree of the overall HRM contribution to the company's performance results reaches the mean of $\bar{x}\,min = 3{,}56$. It means it's closer to "important" than to "moderately important". The means calculated for each of the individual HRM subfunctions' contributions range from $\bar{x}\,min = 3{,}32$ to $\bar{x}\,max = 3{,}90$. The *max scale value* is reached by all of them ($max = 5{,}00$), whereas the lowest by two, i.e. talent management and development of leadership ($min = 1{,}00$).

The research findings show that among 9 HRM subfunctions being analyzed the highest degree of contribution is ascribed to employee resourcing ($\bar{x} = 3{,}90$). The second position is occupied by employer branding ($\bar{x} = 3{,}80$) and third by competency management ($\bar{x} = 3{,}55$).The full ranking list is depicted in Graph 1.

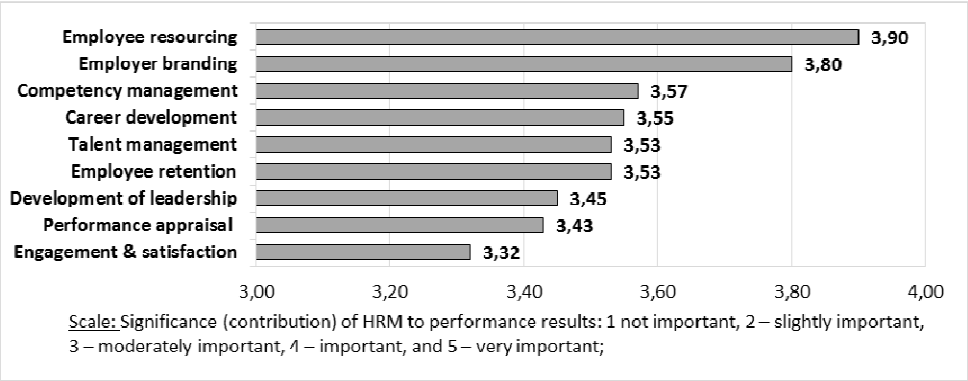

Fig.1: The ranking of the mean values of the contribution of HRM subfunctions to companies' performance results

Source: own research data

Correlation Analysis

The results of the correlation tests (at $p<.05$) for the main research variables are presented in Table 2 and 3 respectively. The analysis proves that the degree of the overall HRM contribution is positively correlated with the value of the overall human factor as a competitive factor (r=.71), and with the evaluation values both of non-managerial employees (r=.22) and managerial staff (r=.35) as competitive factors. All this confirms three of our hypotheses, i.e. $\mathbf{H_1}$, $\mathbf{H_2}$ and $\mathbf{H_3}$.

As far as the degrees of the individual HRM subfunctions' contributions to the MNC's performance results are considered, apart from employee resourcing, all the other degrees of particular HRM subfunctions are positively correlated with the value of the overall human factor as a competitive factor. The range of values for the correlation coefficient of these variables is in the interval between r=.24 and r=.50, where the lowest value is gained by employee retention and the highest by development of leadership. So, our hypothesis $\mathbf{H_4}$ can be partially accepted.

In the case of the degrees of the individual HRM subfunctions' contributions to the MNC's performance results and their associations with the evaluation value of non-managerial employees as a competitive factor, five subfunctions reveal such statistically significant correlations, whereas four don't. Those correlated are: employee retention (r=.15), engagement & satisfaction (r=.24), performance appraisal (r=.22), career development (r=.14), and employer branding (r=.29). Interestingly, within those uncorrelated, there is employee resourcing again. Hence, our $\mathbf{H_5}$ can't be fully accepted. The range of its confirmation is even smaller than in the hypothesis $\mathbf{H_4}$.

Analyzing the relationships within the hypothesis $\mathbf{H_6}$ we observe that similarly to the relationships within the hypothesis $\mathbf{H_4}$, apart from employee resourcing, all the other degrees of particular HRM subfunctions are positively correlated with the evaluation values of managerial staff as a competitive factor. Here the range of values for the correlation coefficient of these variables is in the interval between r=.18 and r=.37, where the lowest value belongs to development of leadership and the highest to employer branding. Then, our hypothesis $\mathbf{H_6}$ can be accepted only to some extent as well.

Table 2: The results of a correlation test for the contribution of HRM subfunctions to companies' performance results and human factor

VARIABLES		The overall human factor	Competitive factors	
			1. Non-managerial employees	2. Managerial staff
The overall HRM contribution		**0,71***	**0,22***	**0,35***
The significance of HRM subfunctions	**1. Employee resourcing**	0,09	-0,05	-0,07
	2. Employee retention	**0,24***	**0,15***	**0,26***
	3. Engagement & satisfaction	**0,37***	**0,24***	**0,31***
	4. Performance appraisal	**0,48***	**0,22***	**0,15***
	5. Career development	**0,47***	**0,14***	**0,20***
	6. Talent management	**0,46***	0,14	**0,25***
	7. Competency management	**0,40***	0,07	**0,18***
	8. Development of leadership	**0,50***	0,06	**0,18***
	9. Employer branding	**0,47***	**0,29***	**0,37***
* Pearson's r significant at p < ,05000;				

Source: own research data

Finally, the correlation test conducted for the degree of the individual HRM subfunctions' contributions to the MNC's performance and the degree of such contributions of particular HRM subfunctions (see Table 3) shows all correlations being statistically significant. The weakest association at r=.24 concerns employee resourcing and the range of values for the correlation coefficient of the other subfunctions is in the interval between r=.51 and r=.64, where the lowest value is gained by employee retention and the highest by performance appraisal. Hence, our last analysis leads us to the confirmation of hypothesis $\mathbf{H_7}$.

Table 3: The results of a correlation test for the overall HRM contribution and its individual subfunctions to companies' performance results

VARIABLES	Subfunctions of HRM								
	1.	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**	**9.**
	Employee resourcing	**Employee retention**	**Engagement & satisfaction**	**Performance appraisal**	**Career development**	**Talent management**	**Competency management**	**Development of leadership**	**Employer branding**
The overall HRM contribution	**0,24***	**0,51***	**0,63***	**0,64***	**0,65***	**0,52***	**0,62***	**0,57***	**0,62***
* Pearson's r significant at p < ,05000;									

Source: own research data

Research Summary

In our research problem we were particularly interested in the identification and analysis of the relationships between the degree of HRM and its subfunctions' contributions to the MNC's performance results (independent variables) and the perceived value of human factor as a competitive factor (dependent variable). The visual juxtaposition of these two variable is depicted in graph 2.

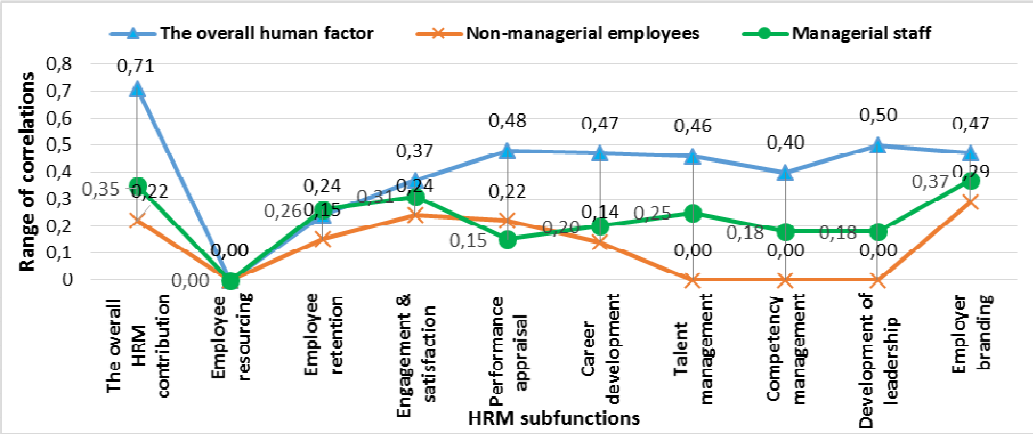

Graph 2: The juxtaposition of human factor with relation to HRM and its subfunctions' contributions to company's performance result

Source: own research data

In summary it can be said that we have successfully identified some regularities within the scope of the selected variables and the analysis of the empirical research findings leads to the conclusion that the higher the degree of the overall HRM contribution to the MNC's performance results, the higher the value of the overall human factor as a competitive factor and the higher the evaluation values of its both subfactors, i.e. non-managerial employees and managerial staff. Additionally, what we've found is that the higher the degree of the individual HRM subfunctions' contributions to the MNC's performance, the higher the degree of the overall HRM contribution to the MNC's performance results. These relationships are true when considered from the global perspective, i.e. when the MNCs evaluate their worldwide HRM practices and the impact of these practices on the worldwide competitive value of their human factor as differentiator on the market.

However, when the associations are considered from the perspective of particular local subsidiaries and when HRM is disaggregated into its individual subfunctions, some different phenomena are observable. Firstly, employee resourcing is a subfunction that has no statistically significant correlations either with the overall human factor or with its two subfactors: non-managerial and managerial. The probable reason is that it is such a subfunction toward which it is difficult to indicate simple direct relationships between its contributive role in the company's performance results and then with its impact on the competitiveness of human factor. Even though the best people with the best qualifications and competencies are employed through a highly advanced selection process, it takes time to evaluate if their exhibit competitive attributes in business practice. Moreover, the value of their competitive attributes, if any at all, may be the resultant of other HRM subfunctions, not selection itself. This raises a question if employee selection should be evaluated for its contribution to company's performance at all, and if so, it seems to be questionable to evaluate it in the same way as other HRM subfunctions.

Excluding employee resourcing from the analysis, the other interesting phenomena appears in the juxtaposition of the correlations between the particular HRM subfunctions' contributions and two subfactors of human factor. The positive relationships between the degree of the subfunctions' contributions and both the value of the overall human factor as well as the evaluation values of managerial staff are visible, whereas in the case of non-managerial employees not all of their evaluation values correspond with HRM subfunctions. Because this refers to talent management, competency management and development of leadership, the possible reason may come from the fact that in business reality these three subfunctions may be dedicated rather to the managerial staff than

to other employees. Although in their nature and assumptions they should cover not only current but also potential managers, meaning ordinary employees, they may be not adjusted enough to the real employees' needs. It means that at the intentional level, which is formulated at the HQ of MNC, it looks much better than when it is considered at the implementative and resultative level of local subsidiaries. Hence, the effectiveness of these three HRM subfunctions in competition on non-managerial employees on the market is doubtful. It seems that intentions deviate from the practice. But it also suggests that there may be a mediating variable or even a few variables that intermediate the casual relationship between the dependent and independent variables. In our study we have applied some simplified statistical correlational analysis which is not dedicated to such type of investigation. Hence, as about the future research we would recommend to look for some mediating variable(s) that may explain in details or discover new ties between the variables under study.

Final Conclusions

Our final conclusion based on the analysis of the empirical research findings suggests that there is a clear, identifiable relationship between the degree of HRM contribution to the MNC's performance results and the perceived value of human factor as a competitive differentiator on the market. Of course, there are some exceptions or differences when the overall HRM contribution or its particular HRM subfunctions' contributions are juxtaposed with the overall human factor or its two subfactors, but it leads to another important conclusion. Namely, the organizational level of measurement, whether it is the HQ's or local subsidiary's – changes both the degree of HRM and its subfunctions' contributions as well as the perception of the value of human factor and its two main components. We believe that all this authorizes us to state that the goal of our paper has been achieved. We have successfully determined in what way the degree of HRM contribution to the MNC's performance results influences on the perceived value of human factor as a competitive differentiator on the market.

We think our research results are a kind of accomplishment but it is not devoid of some limits. Primarily, the final conclusions can't be extended on the whole population of MNCs worldwide because the research sample, even though deliberatively selected, was composed only of those MNCs that were headquartered in one Central European country. Furthermore, although the sample was diverse in terms of the companies' business profiles, not all sectors of economy were represented. Some other imperfections are also noticeable in the measurement scales or the calculations based exclusively on the mean values. Yet the other reservations may concern asking the informants the general questions about the HRM contribution to the company's performance results or about the competitive value of human factor instead of using hard performance indicators. This practice is not at odd within this type of research, however it may undermine the subjectivity of evaluation.

However, all in all our study contributes to the scientific discipline of management. On one side, as said above, MNCs headquartered only in Central Europe make a limit to the generalizations, but on the other side they provide a unique perspective. To our best knowledge, it's been the first research of this type. We have also confirmed the phenomena - identified by other researchers as mentioned in the introductory part of the paper - that there is a positive relationship between the dependent and independent variables under study.

As for the practical implications of the research results, they mostly rely on indicating that if there is a strong positive relationship between the HRM contribution (including its subfunctions) to company's performance and the value ascribed to the human factor (including both managerial and non-managerial employees), then we can expect that the effectiveness of HRM practices is high and they bring desired results. Then, there is a huge potential and opportunity in using HRM subfunctions in more effective and efficient way that will lead to better company's outcomes, having of course in mind that that HRM is only one of the factors that determine such outcomes. Anyway, the presented research findings may help the managers of MNCs and their local subsidiaries uncover some hidden opportunities existing in the management practices at different organizational levels and inspire them to create such subfunctional ties between HRM and company's performance which can successfully impact their managerial and non-managerial employees' competitive advantage.

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Changes in The Length of Financial Statements Prepared According to The International Accounting Standards By the Largest Capital Groups in Poland

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Abstract

In recent years, a significant increase in the length of financial statements has been observed. It is caused by numerous changes in accounting standards regarding the disclosure of information that occurs as a result of dynamic changes taking place in the global economy. The aim of this paper is to present the results of the own study on changes in the length of financial statements prepared according to the International Accounting Standards and by the largest capital groups listed on the Warsaw Stock Exchange in the period 2012-2018. In the quantitative analysis, techniques of descriptive statistics and statistical tests of significance were used. The obtained results allowed for positive verification of research hypotheses posed in the study concerning the increase in the number of pages of financial statements in the period 2012-2018 and the dependence of the length of the financial statements on the size of the entity preparing it.

Keywords: Financial Statement, Accounting Regulations, IAS/IFRS.

Introduction

Financial statements constitute a basic form of communication between an entity and its environment, and they are the main source of information about an entity's operations. Those statements become more and more extensive as a result of dynamic changes observed currently in today's economic reality and leading to among others the emergence of particularly complex forms of conducting activity or concluding more and more complex transactions by entities. It is also a consequence of the changes in the financial reporting standards regulating the rules of their preparation. The standards adapting to the changes in the economic reality require presenting and disclosing a bigger amount of information.

The aim of this paper is to present the results of a study concerned with the changes in the length of financial statements of the biggest capital groups listed on the Warsaw Stock Exchange (WSE) prepared in accordance with the solutions found in the International Accounting Standards (IAS) and International Financial Reporting Standards (IFRS). For the purpose of the conducted study, the two following study hypotheses were formulated:

H1: The length of the financial statements of the biggest capital groups listed on the WSE increased in the years 2012-2018.
H2: The length of the financial statements depends on the size of a capital group which prepares it.

The set goal was achieved by analysing the available source literature and the results of international studies conducted in this field. The verification of the formulated study hypotheses was based on a quantitative analysis of the information included in the financial statements of the biggest capital groups listed on the Warsaw Stock Exchange, i.e. of its two main indices: WIG20 and mWIG40. In the quantitative analysis of the achieved information, the methods of descriptive statistics and statistical tests of significance were used.

The study consists of two parts. The first presents the most significant aspects concerning the increased extensiveness of financial statements prepared in line with the international financial

reporting standards. In the second part, the results of the conducted study concerning the change in the number of pages of financial statements and verifying the formulated study hypotheses are presented

The extensiveness of financial reports – the theoretical and practical background

The rules of preparing and presenting financial information were regulated in detail in the IAS 1 *Presentation of Financial Statements*, which was adopted in August 1997 for the first time and replaced three other standards, i.e. the previous IAS 1, IAS 5 and IAS 13 (Lis 2014). In accordance with paragraph 10 of IAS 1, a complete set of an entity's financial statement consists of two parts. The first one includes basic components, i.e. a statement of the financial position, a statement of profit or loss and other comprehensive income, a statement of changes in equity, and a statement of cash flows, which synthetically present information concerning an entity's assets and the sources of their financing, income and costs or proceeds and expenses. Understanding of the figures included in the basic components requires their more detailed presentation and discussion. They can be found in the additional information, which constitutes the second, particularly important and also the most extensive part of each financial statement, which results from the fact that the additional information is supposed to provide information necessary for the understanding of the statement. Therefore, they are not only explanatory notes for the entries included in the basic components, but also a detailed presentation of the rules of preparing a financial statement used by an entity defined as an accounting policy.

The fact that the additional information constitutes the longest part of a financial statement arises from the detailedness and extensiveness of the information that needs to be disclosed. It is also the factor determining the number of pages of the whole document. The reports prepared regularly by the international consulting company Deloitte (2013-2019) and concerning business reports of British listed companies show that from 2012 to 2016, an average number of pages of a financial statement increased by 13%, i.e. from 56 to 61 pages, and to 2018 it increased by as much as 22.2%, i.e. from 54 to 66 pages. An average number of pages of an annual report, which apart from a financial statement included additional, also non-financial information, increased by as much as 60.7%, from 107 to 172 pages. The results obtained by Deloitte are confirmed by a study conducted by another international network of audit and advisory company – KPMG (2014,2016). In 2016, an average number of pages of a financial statement determined on the basis of data from 270 entities from all over the world increased when compared with 2014 by 16.2%, i.e. from 74 to 82 pages. An average length of an annual report increased in the same period by 23.6% (from 165 to 204 pages). A steady increase in the extensiveness of financial reports is also confirmed by international scientific studies. It was demonstrated by among others M. Lang and L. Stice-Lawrence (2015) when analysing the number of words in 15,000 financial statements of companies from 42 countries from all over the world for the period from 1998 to 2011. The median of the number of words increased in the studied period by 114%, i.e. from 11,611 in 1998 to 24,860 in 2011. T. Dyer, M. Lang and L. Stice-Lawrence (2017) received very similar results analysing the text of annual reports required by the US Securities and Exchange Commission (SEC) for the period from 1996 to 2013. The analysis indicated an increase in the number of words in the median of the studied companies by 113%, i.e. from about 23,000 in 1996 to almost 50,000 in 2013.

Increased requirements as regards the disclosure of information are considered to be the main reason for the increase. It results from a constant introduction of new or a modification of existing international accounting standards owing to the changing and more and more complex economic reality. This is confirmed by the results of international studies. The impact of using international accounting standards on the increase of the length of financial statements was indicated by among others M. Morunga and M. E. Bradbury (2013) and M. Lang and L. Stice-Lawrence (2015).

It should be emphasised, however, that the increased length of financial statements following the necessity to disclose the information in connection with all the financial reporting standards does not have to lead to the increase of its usefulness. Such an opinion was given by among others H.

Hoogevorst, who, in June 2013 at a conference in Amsterdam, said the following: *Financial statements swell up like balloons; however, the amount of useful information does not grow just as fast* (Turulska, Wambier, Żyliński 2017). Users find it more difficult to locate appropriate information in a longer and longer financial statement, and the less important information can distort the important information. What is more, as A. Jurewicz (2011) emphasized, the disadvantage of too detailed disclosures is extensive additional information, which requires a knowledge of finance and accounting, also time to draw conclusions regarding the evaluation of an entity's financial situation from a user.

The abovementioned problems concerning the increase in the length of financial statements became a stimulus for conducting a study verifying whether they also referred to the capital groups listed on the Warsaw Stock Exchange. The methodology of the study and the obtained results are presented further in the study.

The study methodology and characteristics of studied group

The study covered 60 biggest capital groups listed on the Warsaw Stock Exchange, i.e. those that on 1st July 2019 comprised the two main indices: WIG20 and mWIG40. The analysis, however, covered only those entities which prepared financial statements in accordance with the IAS/IFRS during the whole examined period of time, i.e. from 2012 to 2018. 55 met this condition. The other five (all comprising mWIG40) in 2012 were not listed on the Warsaw Stock Exchange yet or did not prepare financial statements in line with IAS/IFRS, but in accordance with the national financial reporting standards, i.e. the Accounting Law. The comparative analysis took into account only the consolidated statements prepared for operations in 2018 financial year or a financial year finished in 2018, and consolidated statements for year 2012 or finished in 2012 if the balance-sheet date was other than 31st December. The capital groups included in the study represented different sectors, which is presented in detail in table 1.

In the studied group, the entities representing the financial sector (banks and insurance companies) constituted the biggest part – 22%, those from the chemical industry (including the fuel sector) and the Information Technology industry – 9% each. The "Others" category includes capital groups representing the hotel, media, transport and other service industries.

Table 1: Studied capital groups by the type of conducted activity

Sector	Number of companies	Share
Automotive	2	3.6%
Chemical and Fuel	5	9.1%
Construction	4	7.3%
Electromechanical	3	5.5%
Energy	4	7.3%
Financial services	12	21.8%
Food	2	3.6%
Information Technology	5	9.1%
Metal	3	5.5%
Mining	3	5.5%
Retail and wholesale	4	7.3%
Telecommunication	2	3.6%
Other	6	10.9%
Total	**55**	**100.0%**

Source: own work.

The Results of The Conducted Study

The study started with establishing whether the number of pages of financial statements prepared by the studied capital groups grew following the trend presented above[1]. The obtained results show that an average number of pages of a financial statement prepared for the year 2018 amounted to 104.8 with a standard deviation of 43.8. It was increased by 13.4 pages (14.7%) when compared with the year 2012, when it amounted to 91.3 with a standard deviation of 32.8 Therefore, the obtained results confirm the hypothesis formulated in the introduction concerning the number of pages of financial statements. For the statistical verification of the formulated hypothesis one-tailed test of significance of two means for dependent variables was conducted – the same studied group but the data come from two different periods of time. When constructing assumptions for the test, H_0 hypothesis was formulated and it proposed an equal average number of pages in the year 2018 (m_1) and 2012 (m_2) ($m_1 = m_2$), and H_1 hypothesis was formulated proposing that the mean from the year 2018 was bigger ($m_1 > m_2$). The verification of the formulated hypothesis was conducted with the use of Student's *t*-test. The calculated value of the t-statistic amounting to 3.175 led to rejecting H_0 hypothesis in favour of H_1 with the level of significance of $p<0.002$. It means that an average number of pages of financial statements prepared in 2018 is significantly statistically higher than in the year 2012.

The number of pages of financial statements was also analysed taking into account the size of the studied capital groups measured with regard to which index they belong to – to WIG20 (the biggest capital groups) or to mWIG40 (the smaller ones). In the year 2018, an average number of pages of the capital groups of WIG20 amounted to 121.7 and was increased by almost 17 pages when compared with the year 2012, when it amounted to 104.8. For the smaller groups, it increased from 83.6 in the year 2012 to 95.1 in 2018, that is by 11.5 pages. An average number of pages of financial statements of the big groups increased by 16.5%, and the smaller ones by 13.5%. The increase appeared to be statistically important, which was confirmed by the one-tailed tests of significance of two means constructed similarly to the test conducted earlier for the whole studied group. The value of the Student's *t*-statistic amounted to 1.77 for the entities from the WIG20 index and 2.83 for those from the mWIG40 index. The statistical significance was therefore confirmed with the level $p<0.05$ for the groups from the WIG20 index and $p<0.004$ for those from the mWIG40 index. The conducted tests of significance for the whole studied group and for the bigger and smaller groups separately confirmed that an average number of pages of financial statements prepared in the year 2018 was significantly statistically bigger, which allowed a positive verification of H1 hypothesis formulated in the introduction of the study.

When analysing the number of pages of financial statements of the studied groups, it should be underlined that the difference between them was significant. In the year 2018, the most extensive statement was prepared by the PKO BP bank and it consisted of as many as 225 pages. The least extensive was, however, a statement of the Livechat Group, and it had only 34 pages. For comparison, in 2012 the most extensive financial statement was presented by ING BŚ (188 pages), and the shortest of only 30 pages, was prepared by the Sanok Group. Therefore, the difference between the longest and the shortest financial statement in 2018 amounted to as many as 191 pages, and in the year 2012 – 152 pages. The existence of significant differences in the length of financial statements of the studied entities confirms the high standard deviation calculated earlier for the data from the two periods of time.

The conducted analysis also included comparing an average number of pages calculated for the big groups from the WIG20 index and the smaller ones from the mWIG40 index separately. In the year 2018, an average number of pages of financial statements of the big groups amounted to 121.7 and therefore it was by 26.6 pages higher than those from the mWIG40 index. It means that the financial statements of the big capital groups were longer by 28% on average. In the year 2012, the difference was slightly smaller. It amounted to 21.2 pages, that is the financial statements of the big groups were longer by a quarter (25.4%). For the statistical verification of the obtained results, two one-tailed tests of significance of two means for independent variables were conducted for the year 2018 and 2012 separately. When constructing the test statistical test confirming the difference in the number of pages of the statements of the capital groups from WIG20 and mWIG40, hypothesis H_0 was formulated

proposing equal means ($m_1 = m_2$), and H_1 hypothesis proposing a higher mean for the WIG20 groups ($m_1 > m_2$). The verification of the formulated hypothesis was conducted with the use of Z-test, and additionally, for the purpose of comparing the results, also with Student's *t*-test. The obtained results of the relevant statistics and their statistical significance are presented in table 2.

Table 2: The results of the tests of significance concerning the differences of an average number of pages of financial statements between the capital groups from the WIG20 and mWIG40 indices

Value of	2018	2012
Z-statistic	2.068	2.470
p <	0.019	0.007
t-student statistic	2.032	2.451
p <	0.024	0.009

Source: own work.

The results presented in table 2 allowed rejecting H_0 hypothesis in favour of H_1 in both studied periods of time, which confirms that a statistically significant difference can be observed between the number of pages of financial statements of the groups of the WIG20 and mWIG40 indices. The presented results, therefore, confirmed the H2 hypothesis formulated in the introduction of the study proposing the influence of the size of an entity on the length of a prepared financial statement.

The observed changes in an average number of pages of financial statements taking into account the size of an entity encouraged a more detailed analysis. Its objective was to verify whether all the studied entities lengthened their financial statements in the analysed period, or whether there were those whose financial statements shortened. The obtained results presented in graph 1 demonstrate that the length of the financial statements of all the entities changed but an increase was not seen in all the cases.

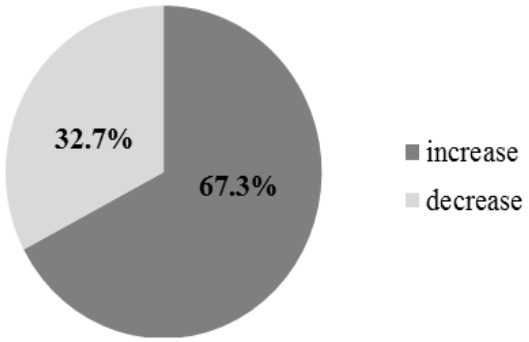

Figure 1: The change in the number of pages of financial statements of the studied capital groups.

Source: own work.

Figure 1 demonstrates that in the financial statements of the two thirds of the studied groups (67.3%),the number of pages increased and 32.7% it decreased. The increase in the number of pages concerned 65% of the big groups of WIG20, the decrease concerned 45%. In the case of the smaller groups, for those from the mWIG40 index it was 68.6% (an increase) and 31.4% (a decrease) respectively. The most significant absolute increase in the number of pages was observed in the financial statement of the PKO BP Capital Group – as many as by 100 pages (from 125 to 225), and the biggest decrease concerned the PKP Cargo Capital Group, whose consolidated financial statement shortened by 39 pages (from 105 to 66). As far as relative changes are concerned, the most significant increase in the number of pages was seen in the financial statement of the Bogdanka Capital Group –

by as much as 177.4% (from 46 to 100 pages), and the biggest relative decrease concerned also the PKP Cargo Capital Group – by 37.1%.

Due to the fact that the change in the number of pages of particular financial statements was different, the studied entities were divided into four groups. The first group included those whose financial statements changed (lengthened or shortened) insignificantly, i.e. by up to 10%, in the studied period. The second group comprised the entities whose statements changed in the number of pages by from 10 to 25%, the third one included those for which the change amounted from 25 to 50%. The entities for which the change in the number of pages was the most significant, i.e. over 50%, belonged to the last group. Then the quantities established for the individual groups were changed into proportions and the obtained results are presented in table 3.

Table 3: The proportions of the studied capital groups taking into account the change in the number of pages of their financial statements

change of number of pages	groups from WIG20		groups from WIG40		Total	
	N	%	N	%	N	%
up to 10.0%	4	20.0%	5	14.3%	9	16.4%
10.01% - 25.0%	5	25.0%	11	31.4%	16	29.1%
25.01% - 50.0%	7	35.0%	15	42.9%	22	40.00%
above 50.0%	4	20.0%	4	11.4%	8	14.5%
Total	**20**	**100.0%**	**35**	**100.0%**	**55**	**100.0%**

Source: own work.

The obtained results indicate a significant variability of the changeability in the number of pages of financial statements both for the whole group and taking into account the big and smaller entities separately. The obtained results are confirmed by the high standard deviation presented earlier. In the studied period of time, the number of pages of financial statements changed the most often, i.e. in 40.0% of the cases from 25 to 50%. The share of the capital groups with a small change – by up to 10% and with a big change – by over 50% was similar and amounted to about 15%. Attention should be drawn to the fact that in the case of the big groups of the WIG20 index, the changes in the number of pages were similar to those of the mWIG40 index. For about 55% of the entities in each of the groups, financial statements changed their length by about a quarter, and in the case of the other 45%, the change was not higher than 25%. It is worth pointing out that the changes in the number of pages spread more evenly among the groups from the WIG20 index than among those from the mWIG40 index. The presented results show that although an average number of pages of financial statements increased in the studied period by 14.7%, the length of individual statements changed much more dynamically. It can indicate that an average number is not the best reflexion of the changes in the length of financial statements.

An analysis was also conducted taking into account the groups whose statements were shortened or lengthened separately. In the first group (a decreased number of pages), a decrease in the number of pages of a financial statement was noted in the range between 25 and 50% the most often (44.4% of the cases), and it was 57.1% of those from WIG20 and 36.4% from mWIG40 respectively. No case with a decrease in the number of pages of over 50% was noted.

In the other group (an increase in the number of pages), an increased number of pages in the range between 25 and 50% was also observed the most often (37.9%). The financial statements which increased their length by up to 10% constituted only 10.8%, but as much as 21.6% of the studied entities lengthened their financial statements by over 50%. Such a situation concerned 30.8% of those from WIG20 and 16.7% of those from mWIG40.

Conclusion

The results of the quantitative analysis of the length of financial statements of the biggest capital groups listed on the Warsaw Stock Exchange in the period of time from 2012 to 2018 presented in the study led to a positive verification of the two study hypotheses formulated in the introduction. An average number of pages of financial statements prepared for the year 2018 was significantly statistically higher than that of the same groups prepared for the year 2012. Identical results were obtained taking into consideration all the studied capital groups and conducting a separate analysis taking into account their size measured by their belonging to the WIG20 index or mWIG40 index. Therefore, the obtained results confirmed the results of the international studies conducted in this field. Similarly, the financial statements of the bigger groups (from the WIG20 index) proved to be significantly statistically longer than those of the smaller groups (from the mWIG40 index) in both of the studied periods. In the year 2018 the difference in an average number of pages between the studied groups amounted to as much as 28%, and in 2012 – 25%.

It is also worth emphasising that although an average number of the pages of financial statements increased, the increase did not concern all the analysed capital groups. In the case of one third of them, the number of pages was decreased. It can indicate that an average number is not the best reflexion of the changes in the length of financial statements. Moreover, the length of individual financial statements changed quite dynamically, which is confirmed by the high standard deviation. The changes were observed in the range from 25 to 50% the most often.

Due to the fact that the study covered only the biggest capital groups listed on the Warsaw Stock Exchange, which represented different sectors, an analysis of the changes in the length of financial statements taking into account the conducted activity was not possible. However, answering the question whether a correlation between the number of pages of financial statements and the type of activity exists would be an important aspect from the point of view of a complete assessment of changes in the length of financial statements. Such an analysis shall be conducted in a separate study.

Footnotes

[1] The analysis was conducted on the basis of the actual number of pages of a financial statement without taking into consideration the typesetting, i.e. the font size, the type space between lines or the number of lines.

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Evaluation of the military Integrated Multi-level Information System supporting the management of logistics in the Polish Armed Forces as the determinant of the country's military security

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Abstract

According to experts in the field of military security, effective management and leadership of a large organisation, which is undoubtedly the Ministry of National Defence (MND), is not possible today without a well-functioning information system, especially a logistical one, which includes IT tools supporting the management of military resources. The recognition that the state of computerisation of MND in the area of logistics, human resources and finance is archaic and the growing need to ensure military security in the new geopolitical conditions contributed to the development, implementation and exploitation of the Integrated Multi-level Information System (IMLIS) of the Polish Armed Forces. The paper presents the genesis of implementation, the current state of work on IMLIS and prospects for development of this system. The article describes, among other things, the organization of the implementation process, basic functionalities of the system, as well as the prospects of development of new functionalities as of 2019. According to the author, a particularly important value of the article are the results of research related to the evaluation of the IMLIS information system in terms of the impact on the quality of the military logistics system management and related to the evaluation of its functionality from the point of view of employees (users) operating the system.

Keywords: Military Security, Management of The Military Logistics System, Logistic Information Systems.

Introduction

The progress in the field of computerisation of contemporary economic processes in the 21st century forced the necessity to implement significant changes in the field of information technology support for the logistic system in organizational units of the Ministry of National Defence. The IT systems used in the 20th century to support the management of personal and material resources have become inefficient and their adaptation to contemporary realities became physically and economically unjustified and often even impossible. Efficient management of the possessed potential and resources, which was managed and was at the disposal of MBUs (Military Budget Units) required modern support solutions by implementing a unified IT system.

At that time, the freedom to implement specific IT solutions led to the occurrence of various material resources management systems (IT SYSTEM MAG-MAT, IT SYSTEM “LOGIS”) or human resources management systems (IT SYSTEM “ETAT”, IT SYSTEM “WAKAT”, IT SYSTEM “SPIRALA”), which often were duplicating the same activities and processes, and at the same time were mutually exclusive (Byłeń, 2016). These software applications (named the domain software applications) were not integrated with each other, which often resulted in the presentation of disparate data, particularly in terms of establishing the true states of resources and means, and led to the duplication of functions of the systems themselves, through various interpretations of the data entered. As a result, instead of providing IT support to the processes for effective logistics and financial management by the managerial staff, including above all the commanders and administrators of these resources, disinformation and unreliability in the interpretation of the presented states in registers of personnel and material resources, especially inconsistencies in the field of appropriate systematization in terms of classification and availability, was occurring. The registers kept this way resulted in

unreliable accounting and reporting, which resulted in incorrect material and financial planning at various levels and inefficient management of resources.

Genesis of implementation and general characteristics of the Integrated Multi-level Information System

In order to meet the needs of computerization in the Polish Armed Forces, a decision was made to build and implement a centralized, integrated and unified IT system supporting the management of logistics, finances and human resources. The objective defined within the works was primarily to provide a tool supporting the entire process of managing the resources of the Ministry of National Defence, regardless of the level of execution of individual tasks. The specific objectives of implementation are to:

- provide reliable and up-to-date information on the resources of the Polish Armed Forces;
- provide IT support for the processes of management and logistics management of the Polish Armed Forces;
- replace old systems in order to improve logistics, human resources and financial processes (new technologies, integration);
- ensure confidentiality and security when accessing data.

The following assumptions of the IMLIS system should be considered crucial:

- standardization of processes within the whole ministry,
- one integrated register of resources.
- integration of resource management processes (economic events are registered by the persons performing them, one-time data entry).
- on-line reporting.
- reduction of the number of reports, data transferred between cells and units.
- simplification of activities performed in resource management processes.

The target solution was also to ensure data exchange between IMLIS and C4ISR systems used in the Polish Armed Forces and within NATO and EU. In addition, the system should ensure communication with national systems (e.g. with the systems of Tax Offices, Social Insurance Institution, etc.). The role of the integrated logistics system in the Polish Armed Forces and the possibilities of cooperation with IT systems of the non-military system of the state and IT systems of NATO and the European Union are presented in Figure 1.

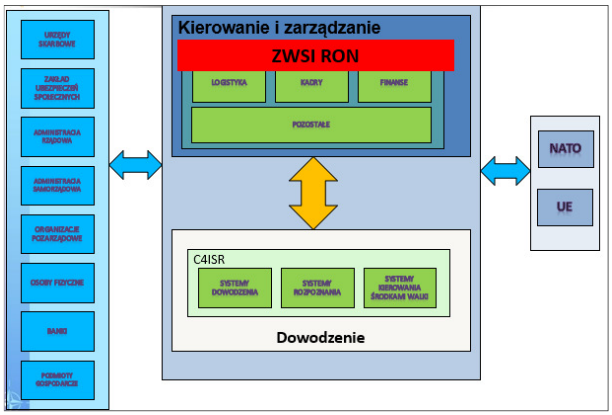

Fig. 1: Role of the system and scope of collaboration of IMLIS system with other IT systems of the Polish Armed Forces

Source: (MND 2017).

Whereas, within the framework of cooperation with domain IT systems in logistics, finance and human resources, the IMLIS system currently cooperates with IT systems exploited in the Polish Armed Forces, which are presented in Figure 2.

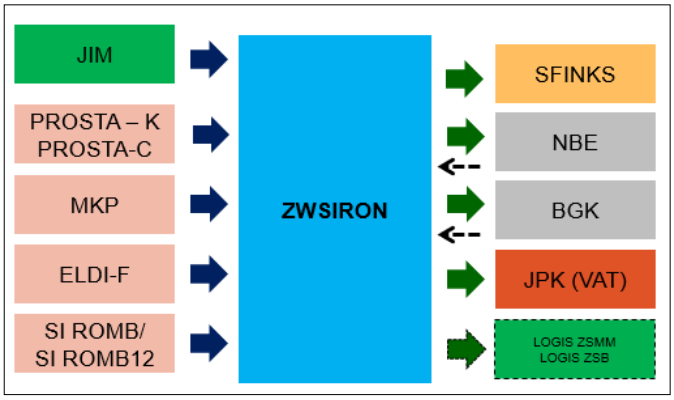

Fig. 2 :Environment and cooperation of the IMLIS system with the domain systems of the Polish Armed Forces

Source: Materials of the IT Inspectorate, (MND, 2017).

The IMLIS system is built on the basis of solutions offered by SAP (Auksztol, Balwierz, Chomuszko 2012), namely SAP ERP (Enterprise Resource Planning) version 6.0, which, as part of its basic functionality, includes a comprehensive package of IT solutions for management in business enterprises (Fig. 3).

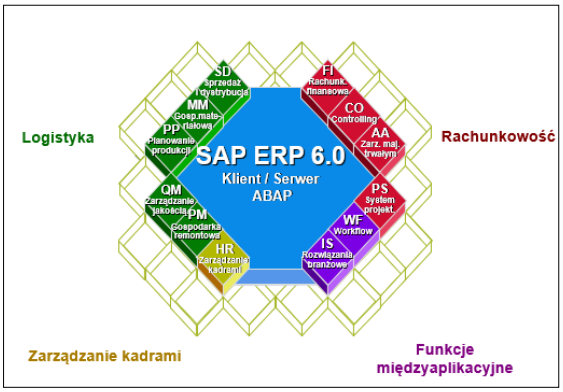

Fig. 3: Integrated Multi-level Information System implementation technology

Source: (MND, 2017).

Legend: Logistyka (Logistics), Rachunkowość (Finances), Zarządzanie kadrami (Human Resources Management), Funkcje międzyaplikacyjne (Inter-aplication functions).

SAP ERP is a software package that contains a full spectrum of IT solutions, i.e. both the transaction system (SAP R/3 or SAP ECC), in which all operations are carried out, as well as the data warehouse, portal, mobile devices support (palmtops, radio terminals) and integration and programming tools (ABAP, JAVA) (Bogusz, Ślęzak, 2015, p. 49). The architecture of the system allows for a flexible modification and the incorporation of new modules depending on the requirements - its creation for specific MBUs needs.

The SAP R/3 system has a modular structure. Each module provides support in a specific area of the organization's activity. The implementation of the SAP R/3 system can take place in stages, during which the functionalities concerning individual modules are activated. There is a strong emphasis on

inter-module integration, which provides an integrated and comprehensive approach to the functioning of large economic organisations. Among all the modules, the key modules implemented in the first place should be distinguished, such as FI "Financial Accountancy", MM "Materials Management" and HR "Human Resources Management". For the purposes of implementations requiring modification or extension of the standard software, the ABAP Workbench application development environment is prepared (Fig. 4).

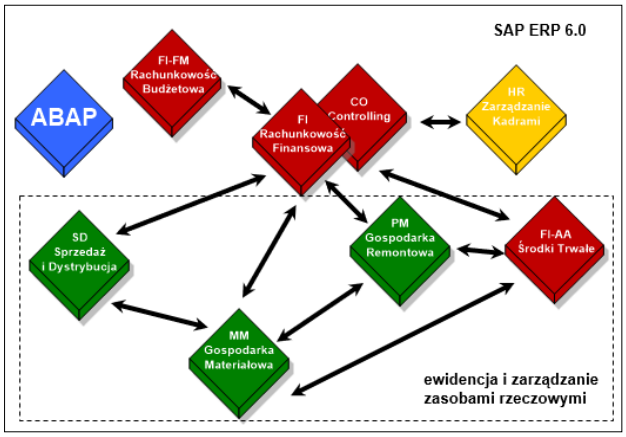

Fig. 4:Functional architecture of the Integrated Multi-level Information System
Source: (Ścięgosz, 2017.

The basic functionality of the IMLIS system includes processes supported by the following modules: FI (Financial Accounting), FIFM (Budgetary Accounting), FI-AA (Fixed Assets), CO (Controlling), MM (Materials Management) (FM 2014). Subsequent modules will be used as the IMLIS MND System develops and do not have to be incorporated simultaneously at all locations where the system operates (MND 2018).

In addition to process analysis, the modules of IMLIS MND System are based on previously identified basic data (MND 2007a and 2007b):

- Uniform Material Index, i.e. an ordered way to describe products used in the Ministry of National Defence;
- Single Company Account Plan, containing a list of synthetic accounts common for the entire MND and the accounting schemes of economic operations;
- dictionary data on human resources management (by military specialities).

Inspection, verification and evaluation of the Integrated Multi-level Information System based on survey results

The objective of the research was to determine the degree of influence of the military logistics IT system on the quality of logistics management on the scale of the Polish Armed Forces and its impact on the integration of logistics processes with financial and human resources. The practical objective was:

- to study the impact of IMLIS MND System on the efficiency of the work of the system users;
- to identify the strengths and weaknesses of the IMLIS MND System (assessment of the functionalities);
- to verify the assessment of the training system of system operators (examination and assessment of the quality of training of system users (persons operating the system) and meeting their expectations regarding the organization of trainings of system operators;
- to find directions for the development of the system, so that the occurring information flows can support the processes of managing the army's logistics system as effectively as possible.

Due to the issues raised and the methodology adopted in the study, it was decided to obtain data by means of a diagnostic survey carried out by means of a survey technique. The research covered users of the IMLIS MND System with the 2RBLog and 3 RBLog systems. The survey was attended by 565 respondents, of which 74% were women (420 persons) and 26% men (145 persons). Fig. 5 shows the division of respondents by gender.

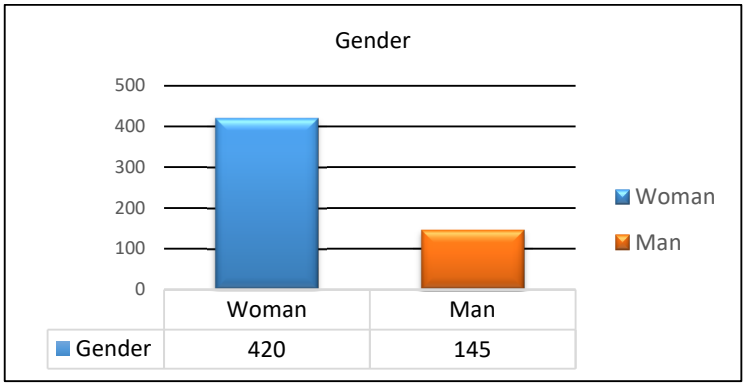

Fig. 5: Division of respondents by gender

Source: own analyses.

The way the research was conducted was important from the point of view how to select the right test sample. The sampling methodology for empirical research indicates which methods are most effective and how to calculate the minimal sample size so that the research can be representative. To calculate the necessary sample size (nb), the following data are needed: the size of the population that is of interest to the researcher (N), a statistically calculated indicator (Z), which is taken as a default value of 1.96 for significance level p = 0.05 and an error rate of maximum 4%. In the author's opinion, the adopted sample size seems to be even oversized. Table 1 shows the number of active accounts of IMLIS MND System by location of workstations together with the number of surveyed account users.

Table 1: Number of active user accounts of the Integrated Multi-level Information System

No.	User of IMLIS MND IT system	Number of active accounts	
		RLB X	RLB Y
1.	Chief Accountant's Division	41	40
2.	Inventorisation Section	5	2
3.	Materials Department	32	34
4.	Technical Department	32	40
5.	Transport and Military Movement and HNS Departments	4	6
6.	Medical Department	2	3
7.	Infrastructure Department	7	7
8.	Audit	1	18
9.	Securing Team	35	38
10.	HR Section	1	5
11.	Telecommunications Section	3	5
12.	Upbringing Section	2	3
Total	Military Base Command	165	201
Total	Depots and workshops	527	422

No.	User of IMLIS MND IT system	Number of active accounts	
		RLB X	RLB Y
Active accounts in total		692	623
Respondents [persons] in total		127	438
Respondents [%] in total		18.3	70.3

The in-house elaboration.
Legend: RLB – Regional Logistics Base.

The summary presented in Table 1 shows that out of 1315 active accounts in Regional Logistics Base X and Regional Logistics Base Y of the IMLIS MND system, almost 43% of users (565 people) were surveyed. According to the division into workplaces of the respondents, most people work in military economic entities (air bases or war port commands) 425 (75.0%), followed by soldiers and employees of regional logistics bases 105 (19.0%). Division of respondents by place of work (Figure 6).

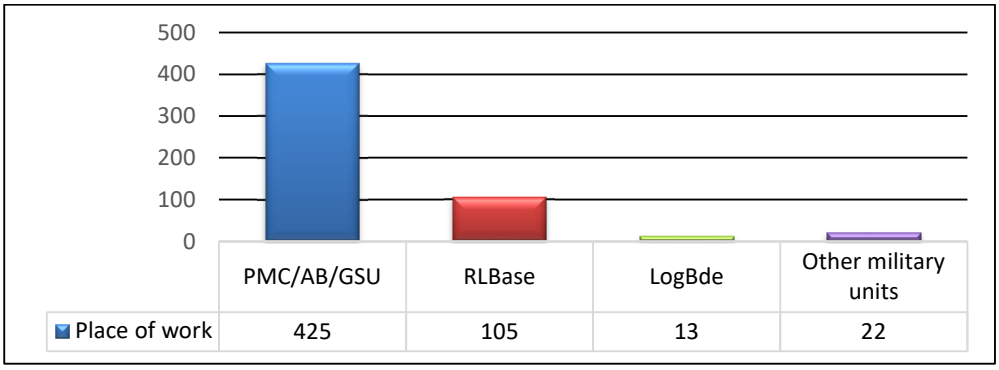

Fig. 6: Division of respondents by place of work

Source: own analyses.

Legend: PMC (Port Military Command), AB (Air Base), GSU (Garrison Support Unit), RLBase (Regional Logictics Base), LogBde (Logistic Brigade).

Among the users expressing their opinions, 206 people (36%) are IMLIS MND users over 6 years, 108 people (19%) 4-6 years, 182 people (32%) work with the system for 1-3 years, 70 people (13%) work under one year. Division of respondents by the duration of using IMLIS MND system (Fig. 7).

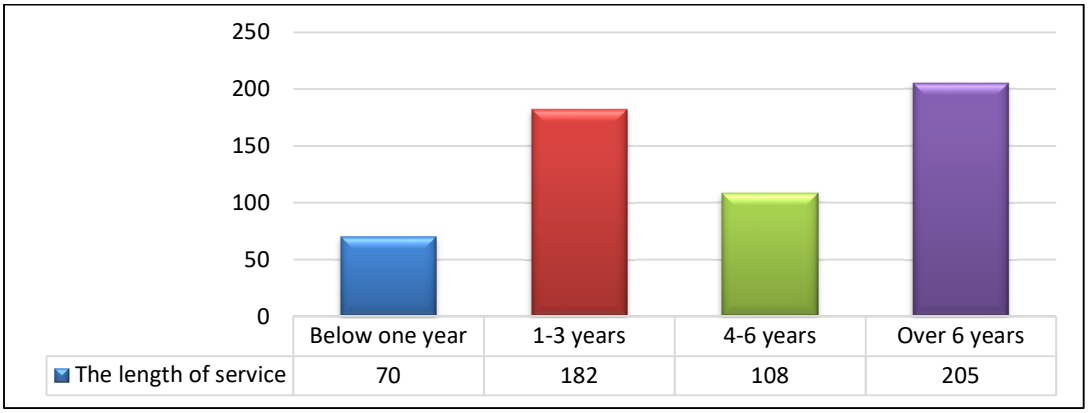

Fig. 7: Division of respondents by length of service

Source: own analyses.

The most numerous group among the participants of the survey were 205 people working over 6 years (36%), followed by 182 people working from one to three years (32%), 108 people working 4-6 years (19%) and 70 respondents working under one year (13%). From the above list, there is a high degree of stability in the positions held, and consequently high competence and great skills in handling IMLIS MND. The next question concerned the division of respondents by their position in the military unit (Fig. 8).

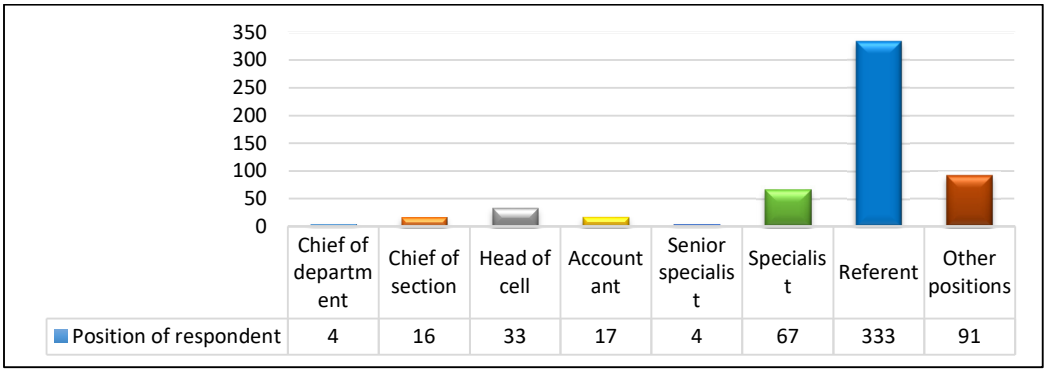

Fig. 8: Division of respondents by their position in the Polish Armed Forces
Source: own analyses.

Another criterion for the selection of respondents concerns the division of respondents into personnel groups (Fig. 9).

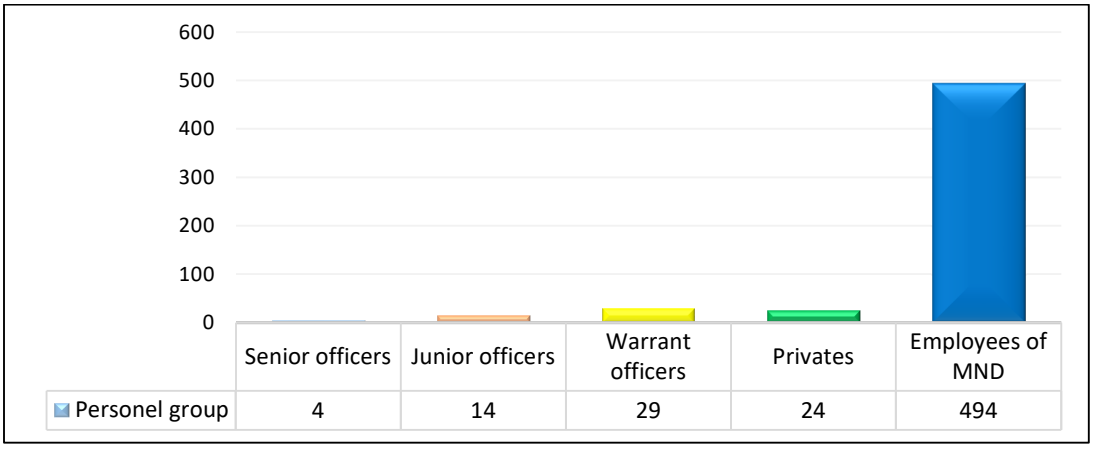

Fig. 9: Division of respondents by their membership in the military and labour force group
Source: own analyses.

From the diagram presented in Figure 9 it follows that the basic group of people serving the IMLIS IT system are civilian employees of the army (the official name is the employees of Ministry of National Defence).

Apart from the 7 metric questions, related to getting to know basic information about the research group, the survey defined primarily 10 substantive questions. They are presented in Table 2.

Table 2: The list of subject matter questions concerning the evaluation of the Multi-level Information System

Question No.	Question	Expanded question
1.	Please assess the impact of IMLIS on the quality of logistics information management in the army.	Will it positively influence the quality of accounting and planning of army resources?
2.	Please evaluate IMLIS capability to ensure data security in the system.	It is concerned with database protection, availability of system resources, availability of network, shared information, certificates, etc.).
3.	Please evaluate the user-friendliness of data entry into the IMLIS.	Does the IMLIS have sufficient and clear instructions and manuals for operating and entering data into the system?
4.	Please evaluate the technical support of the IMLIS.	How does the IMLIS "Helpdesk" support system work?
5.	Please evaluate the process of indexation of tangible products in favour of implementing the IMLIS.	Has the assignment of the Uniform Material Index to defence products in the MND had a positive impact on the implementation of the IMLIS MND?
6.	Please evaluate the overall suitability of IMLIS.	Refers to the degree of suitability of IMLIS for electronic accounting and military resources.
7.	Please evaluate the reliability of IMLIS.	Is the System characterized by high failure rate? Does the system allow for assistance with regard to reported errors?
8.	Please evaluate the performance of the IMLIS.	Refers to the response time of the system to an entered command, data transfer, labour consumption of data entry and validation).
9.	Please evaluate the usefulness of the IMLIS.	It refers to ease of use, ease of navigation in the system, speed of switching to other options, comprehensibility of entered data, etc.
10.	Please evaluate the functionality of the IMLIS.	Are all real subsystems and functional areas of military logistics represented in the system?

The in-house elaboration.

The survey form was developed using closed and semi-open questions. The first type is characterized by the fact that the respondent made the right choice from specified answers. The questions are aimed at answering the questions concerning the main research issues. In addition, some of them have been supplemented with an option of own response of the respondent. Such questions have had an option of presenting own evaluations, due to no possibility to list all possible solutions. It was decided to develop design survey form in such way owing to the complexity of the surveyed issues. It was not possible to create an easy to understand form containing all possible options at once. Thanks to such design, the survey is universal by nature and each respondent could be treated individually. The intention of such design of survey form was to obtain information on the evaluation of the implementation and exploitation of the IMLIS MND System used by the Polish Armed Forces. In the article, due to its scope, the results of the research are limited to answering mainly questions 1 and 10 and to assessing the quality of training of the IMLIS system users.

The research shows that the majority of respondents positively assess the impact of implementing the IMLIS system (answers to questions 1, 3, 4, 5) on the quality of management and directing the logistics system (Fig. 10).

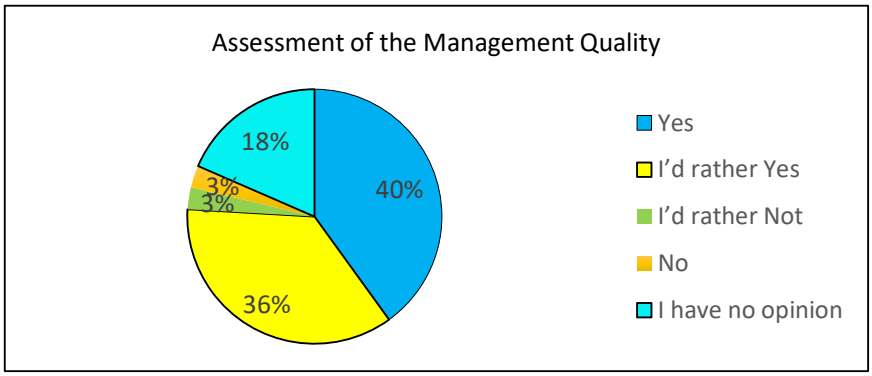

Fig. 10: Evaluation of the impact of the implementation of the IMLIS system on the management of logistics information in the Polish Armed Forces
Source: own analyses.

The answers presented in the figure (Fig. 10) show that the respondents evaluate positively the implementation of the system and its impact on the management of logistic information in the armed forces, 76% positive answers (40% YES, 36% RATHER YES). At the same time, a large percentage of people (18%), who do not have an opinion on the impact of the implementation of the system on the quality of management (directing) of the logistics system, seems to be wondering.

The second area covered by the survey was the evaluation of functionality of Integrated Multi-level Information System (Fig. 11).

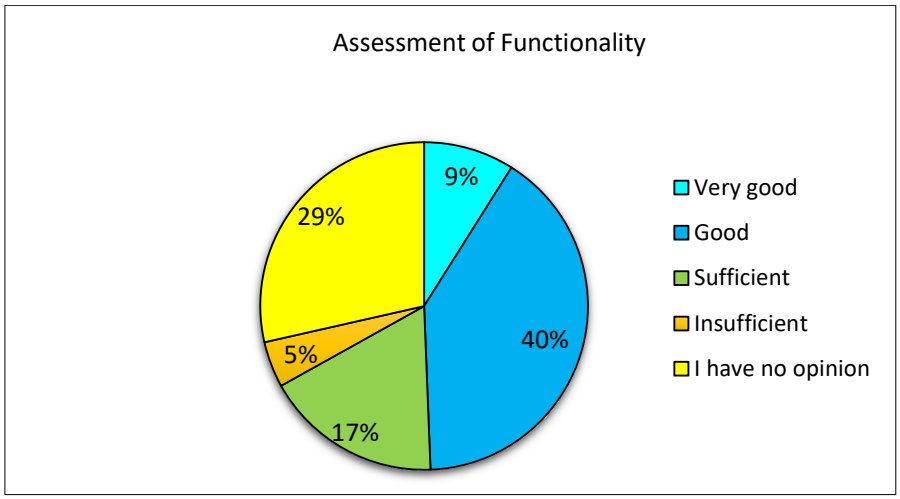

Fig. 11: Assessment of the functionality of the Integrated Multi-level Information System
Source: own analyses.

The functionality of the system was considered in terms of its simplicity, ease of use, consistency, flexibility, ability to interact with other systems and expanding the ability to connect subsequent modules. The results of the research presented in the graph show a positive evaluation of the IMLIS System by the respondents (49%), including a very good evaluation by 9% of the respondents and a good evaluation by 40% of the respondents. This is all the more important as only 5% of the users among them have a negative opinion of its functionality.

However, comparing the answers to questions 1 and 10, concerning the assessment of the impact of the implementation of the IMLIS MND on the quality of management of the military logistics system with the assessment of the functionality of the IMLIS system, one can notice significant differences in the answers (Fig. 12). Logically, it seems difficult to explain. However, after an in-depth analysis, significant differences in terms of questions can be identified. The first question concerns a group of general questions, not directly related to the evaluation of the system, and the second question belongs to the group of specific questions, directly related to the experience of operating the system and the existing deficiencies during its operation.

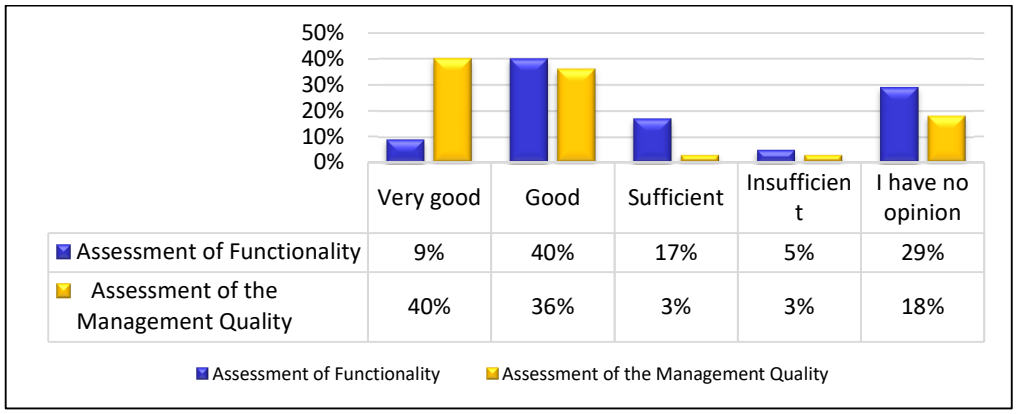

Fig. 12: General assessment of the suitability of IMLIS MND for the evaluation of two basic qualitative and functional characteristics

Source: own analyses.

From the above list it follows that there is a particularly large difference in the answers "very good" (31%) for the impact of the system implementation on the quality of management in relation to the system functionality. The total difference between "very good" and "good" answers was 27%. Negative answers ("sufficient" and "unsufficient") make 20% of the answers as regards the functional assessment and 10% of the answers concerning the management quality assessment. This demonstrates the need to intensify efforts to implement further functional modules into the IMLIS MND, which are currently not present in the system, or the IMLIS MND does not have the capacity to interact with other IT systems implemented in the MND.

Another area of research was the evaluation of the scope and manner of conducting trainings as regard exploatation of the IMLIS (Fig. 13).

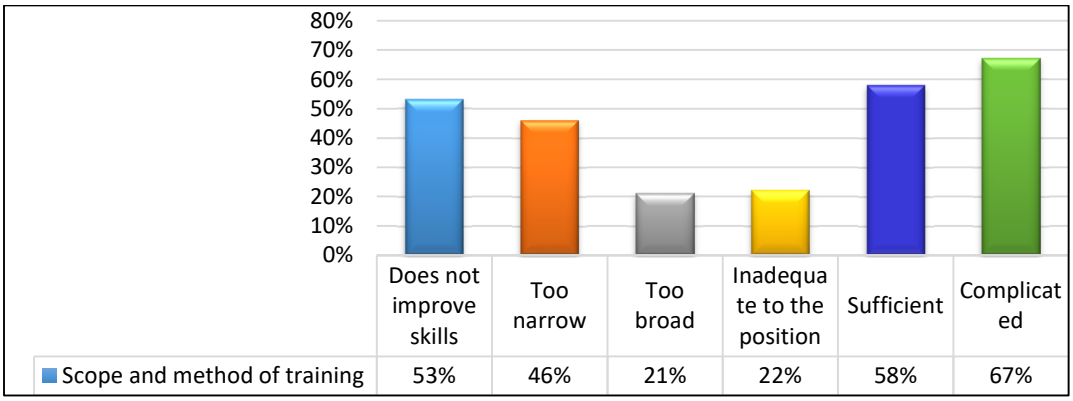

Fig. 13: Evaluation of the quality of the system operation trainings of Integrated Multi-level Information System users

Source: own analyses.

The results of the survey conducted among 70 employees of the Administrative Department of the Ministry of National Defence (Supreme Audit Office 2016) presented in Figure 13 show that users of IMLIS MND System have a particularly negative opinion of the complex operation of the system (67% of responses) and point out that the training courses do not meet the expectations of improving their operation skills (53%). Next among the training negatives is the evaluation of the level of training 58% (sufficient) and 22% (inadequate) of the training programme, due to the fact that the training programme was not adapted to the needs of the position held. A significant percentage of negative evaluations relate to the scope of trainings. In the opinion of 46% of the respondents, the scope is too narrow and in the opinion of 21% of responders the scope is too wide. The other area of research was the assessment of the organization of trainings on exploitation of the IMLIS MND (Fig. 14).

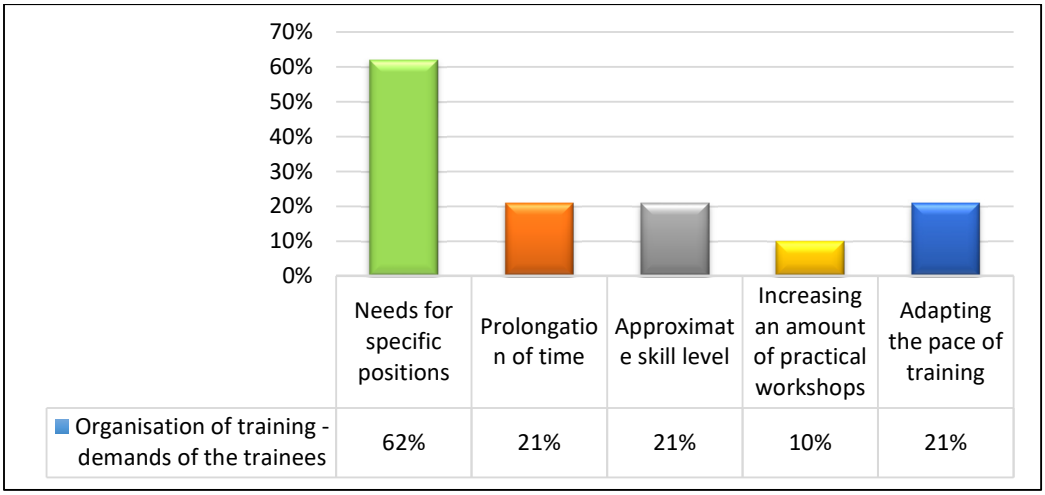

Fig. 14: Evaluation of the quality of the system operation trainings of IMLIS MND users
Source: own analyses.

On the basis of the answers received, the respondents postulate to include, when organizing future trainings for the IMLIS system users, such aspects as: adapting training programs to the needs of users at a given position 62% of the answers, extending the training time 21%, the need to direct people having similar skills in the program operation to a given training - also 21%. In addition, 10% of the respondents pointed the need to increase the number of training hours (practical training) and 21% mentioned the need for training providers to stop rushing. After training in the operation of the system and a year's work in the IMLIS system, 54% of the respondents indicated that they were able to efficiently navigate in the System. In turn, 24% of the respondents stated that they had mastered the system on a poor level.

Benefits and directions of development of the Integrated Multi-level Information System

For the first time in the Polish Armed Forces the solution, which is fully integrated, was implemented. The implementation of the IMLIS system has brought many benefits, which should be considered not only in terms of technological advancement. Undoubtedly, the replacement of technology, which has not been developed for many years, with modern solutions is a quantum leap forward in the field of computerization of the ministry. However, this implementation should not only be seen as a change of tool, but also as a stage of optimisation of management processes at all levels of management and command.

The benefits of the system implementation are (MND 2013a and 2013b):

- having one central database of resources;
- unified resource management processes;
- having logistical information available on line and on demand;
- a single data entry into the system (avoiding duplication of economic events);łe
- universal access to information on resources;
- the main source of knowledge (data) about the resources held by the ministry;
- consistency of the technology platform;
- integration of functional divisions of the Ministry of National Defence.

However, an unsolved problem remains the insufficient number of analysts, designers and programmers of IT systems. This problem exists because specialists in this field are required to have interdisciplinary knowledge: knowledge of technology, knowledge of the implementation of integrated solutions, knowledge of the so-called business, i.e. the way the ministry functions and knowledge of the course of processes at all levels in a computerised environment (Cirulis, Ginters 2013; Kisielnicki, Sroka 2005; Klimek 2005).

The experience gained during several years of implementation of IMLIS system is an invaluable guide for many cells responsible for functioning of the computerization system not only for military logistics, but for the entire ministry. Among the most frequently mentioned problems that have been encountered so far, one should mention:

- lack of standardisation of processes within the whole ministry;
- unordered data in the "old" logistics register systems;
- significant delays in preparing data to be migrated;
- the lengthy process of comparing data on resources possessed;
- lack of sufficient reliability of the registers kept;
- lack of effective and efficient supervision over the course of system implementation.

Discussions and Conclusions

The implementation of IMLIS system in logistics provides real-time information management, automation of processes in the areas of planning, acquisition, recording, operation and monitoring of logistics resources and enables the exchange of information for the needs of the logistics management subsystem in the Polish Armed Forces (MND 2014).

Once fully operational, the IMLIS system will undoubtedly be the irreplaceable tool for a professional army, especially the tool supporting the processes of military logistics management and logistical information management. In the future, once the IMLIS system has reached its full potential, military commanders will be provided with a powerful tool that will enhance the process of making key decisions. Military commanders will be equipped with knowledge of capabilities they have at their disposal, soldiers, their weaponry and their ability to act. Moreover, military commanders will also be able to accurately estimate the costs of the planned operation. This is the purpose of the integrated multi-level IT system of the Ministry of National Defence IMLIS system, which has been being built in the army over the last decade.

Conclusion and recommendations to improve the functionality of the system IMLIS, resulting from the study:

1. The modules in the sphere of financial and budgetary accounting, i.e. in the chief accountant's division, are fully functional.
2. The new modules in the logistics division are at the final phase of implementation.
3. The biggest backlog is in the implementation of human resources modules, which in the future are intended to cover the whole issue of the human resources division.

4. The challenge in achieving full system capacity is undoubtedly the aspect of connecting (cooperating) various IT systems being currently outside the IMLIS system, which were created in the past, but their ability to have compatibility was not taken into account.
5. The process of training system operators should be improved by including in the organization of future training of system users such aspects as:

   - adaptation of training programs to the needs of users in a given position;
   - extension of training time;
   - referring to training people with similar skills in operating the program;
   - increasing the number of training hours (practical training);
   - not hurrying by trainers.

Now all the units, which perform the functions of economic entities, work in this system (Wróbel 2017). Currently, according to the data presented by the IT Inspectorate, every day between 2,000 and 2,500 users work with the logistics modules of the system and they input new business events to IMLIS system.

According to military security experts, it is important to look at the future of IT systems supporting the management of military logistics and logistical information in MND not through the prism of technological solutions but by ensuring the security of data and information about the resources held by limiting access to the system to outsiders and unauthorised persons.

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Educational Technologies Development for Wildfire Risk Management

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Abstract

In paper, we consider the development results of educational technologies at university level for wildfire risk management while climate change as part of environmental economics. While studies, we used methods of data bases constructing within digital educational platforms, web-technologies and virtual reality tools. Now, we see digital transformation of university education, due to new concepts of obtaining and presenting educational materials. We use digital educational platforms, which integrate heterogeneous hardware and software resources with the use of web-technologies in distributed networks and wide application of cloud services. As digital educational platforms, we propose to use Google Classroom. Widely, we use remote sensing databases for educational purposes within wildfire risk management. We consider the issues of digital content creation within university education, essentially in practical training. We present the enlarged groups of practical works in this area. For data exchange and preliminary discussion while research, we used platform https://www.researchgate.net/profile/Valery_Abramov2/.

Keywords: educational technologies, wildfire, risk management, environmental economics

Introduction

Last time, a digital transformation, named Industry 4.0, extends in the global economy, during which a lot of enterprises plan and implement wide spectrum of information technologies (Baikov, 2019), (Bidenko, 2019), (Drabenko, 2019), (Frolova, 2019), (Lukyanov, 2019). This leads to serious technological changes in natural risk management (Berboushi, 2014), (Ershova, 2018), (Garcia, 2018), (Isaev, 2015), (Istomin, 2018), (Shilin, 2019), including wildfire (Targino, 2019), which requires the development of new educational technologies, especially for university level (Popov, 2019).

In the article, the authors describe the development results of digital transformation technologies for university practical learning (UPL) in geo-information management area (Burlov, 2018), (Fokicheva, 2016), (Fokicheva, 2015), (Istomin, 2015), (Lednova, 2014), (Malakhova, 2014), in large environmental projects (Mandryka, 2019), (Popov, 2014), (Popova, 2019), (Rumyantseva, 2017), (Zhigulsky, 2018) within environmental economics (Chusov, 2019), (Golosovskaya, 2014), (Karlin, 2014), (Karlin, 2009), (Popov, 2016). Significant attention in the implementation of such industrial projects should be paid to geo-information support of natural risk management in the context of climate change (Mikheev, 2019), (Bournashov, 2014), (Gogoberidze, 2014), including the issues of information collection and processing (Fokicheva, 2019), (Khaimina, 2014), (Popova, 2019), (Tatarnikova, 2019), (Ya, 2019). The educational technologies, discussed in this article, take these factors into account.

Methods and data

In research, we used: methods of data bases (DB) constructing in case of digital educational platforms (DEP), web-technologies (WT), big data technologies (Novikov, 2019), (Sokolov, 2019), geo-information technologies (Veretennikov, 2019), (Yaily, 2019) and virtual reality (VR) tools. Also, we used Foresight technologies, theory of decision making under uncertainties (Palkin, 2019), risk management approach. From the point of view of geo-information management, we structured geo-space to allocate the interconnected components of the solution space (Istomin, 2015). While study, we used data bases and tools of digital online platform EOS (DOP EOS) eos.com, which contains space images from the Landsat-8 and Sentinel-2 satellite systems.

Results

While our research, we developed digital educational technologies (DET) for implementing university practical learning (UPL) in the field of wildfire risk management. We gave preference to the use of digital educational platforms (DEP) that integrate heterogeneous hardware and software resources with the use of web-technologies in distributed networks and wide application of cloud services (Popov, 2019). As DEP in our work, we used Google Classroom. Its main advantages are ease of use, universal access, flexible feedback system and its free of charge. This DEP usage eliminates a system administrator because of Google servers implementing, and also a content Manager because each teacher is responsible for the content of his course (Popov, 2019).

While development of digital content within UPL in the field of wildfire risk management while climate changes we used the decomposition as a technique in the preparation of the methodological basis. On Fig. 1, we present the enlarged groups of practical works in the field of wildfire risk management:

1) problem statement in wildfire management;
2) field works on data collection for wildfire risk management;
3) processing and analysis of the data for wildfire risk management;
4) preparation of geographical information system (GIS) layers and creating digital maps within wildfire management;
5) decision-making in the framework of geo-information support of wildfire risk management.

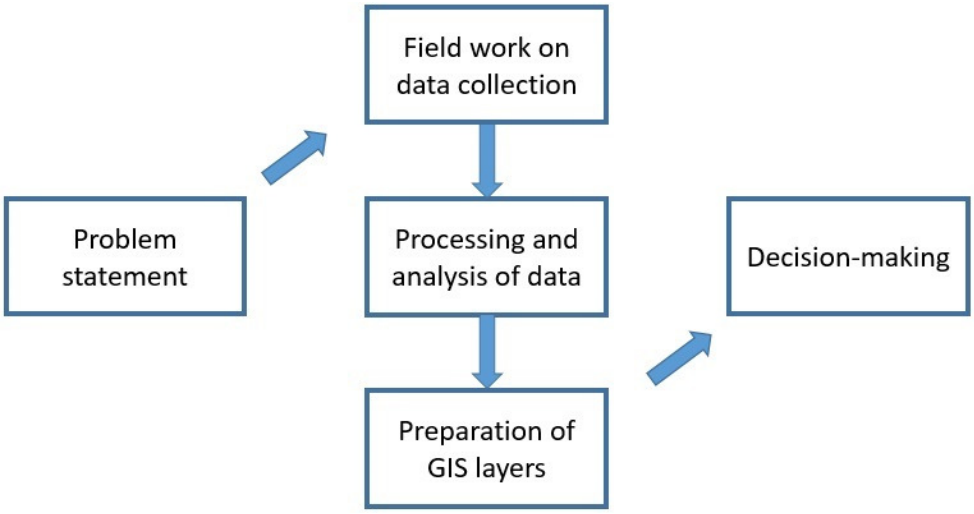

Figure 1: Enlarged groups of practical works within UPL in the field of wildfire risk management while climate changes

While our work, we developed digital content of practical works within UPL in the field of wildfire risk management while climate changes for all above-mentioned groups (fig.1), using freely distributed recording program CamStudio, a microphone and a camera to record the lecturer's explaining the individual sections.

As essential DEP in the field of wildfire risk management while climate changes, we propose to use DOP EOS eos.com, that provides efficient tools for searching, processing, and analyzing large amounts of satellite data from the Landsat-8 and Sentinel-2 satellite systems. Usage of DOP EOS allows to find and use satellite images of forest areas with wildfires zones for training purposes, to determine the location of these fires and to assess their main spatial characteristics (linear and area dimensions), which are the main initial parameters for conducting wildfire struggle measures within wildfire management while contemporary climate change era. Let's go to example. In figures 2-4, we show the sequential training operations performed for the largest wildfires in Australia in the fall of 2019 with using of DOP EOS. Date of space images is 3rd September 2019, region Australia. For Australia's wildfire period in 2019, we analyzed images of Landsat 8 and Sentinel-2 satellite systems, using DOP IOS. We obtained the pictures in the figures 2-4, using DOP EOS's data bases and tools, and combining on one image the first and second mid-infrared (1566-1651 nm and 2107-2294 nm, respectively) and red (636-673 nm) channels, which allowed to identify the wildfires zones on combined space image as reddish colored areas on greening plane.

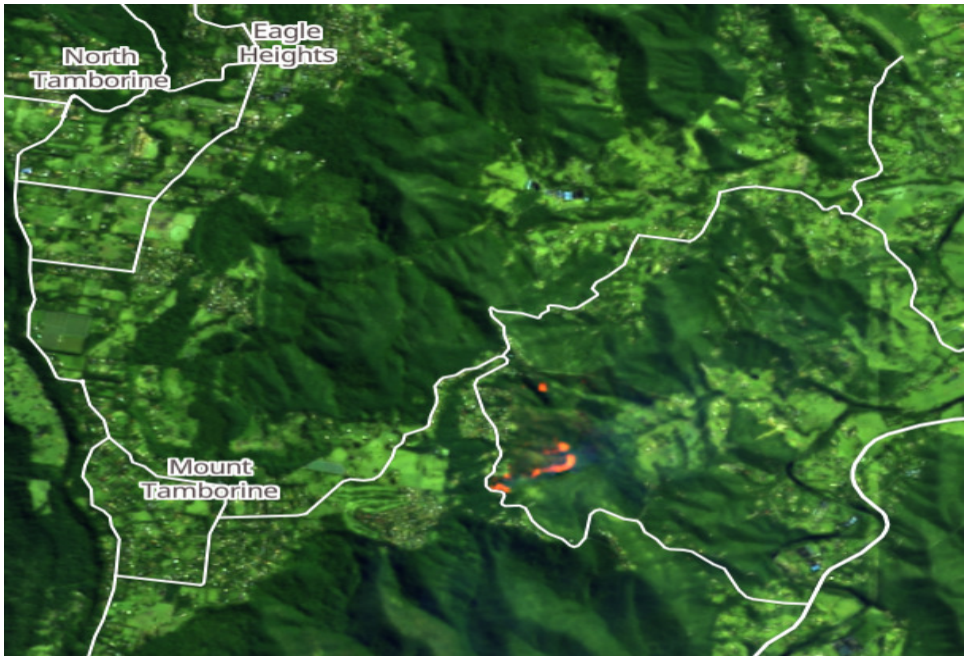

Figure 2: Combine space image with wildfire zones (reddish colored areas), general view by DOP EOS (Australia region, 3rd September 2019)

Figure 3: Enlarge image of wildfire area and measuring its characteristics

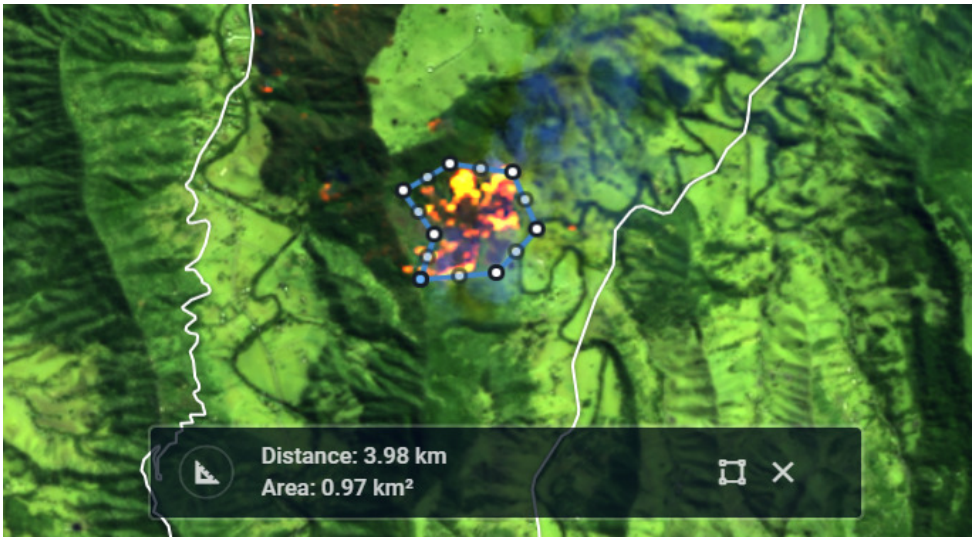

Figure 4: Enlarge image of other wildfire area and measuring its characteristics

As essential result, we propose the usage of DOP EOS tools to estimate the linear size of wildfires zones and their areas for training purposes.

Discussion

The essential task of university practical learning (UPL) in the field of wildfire risk management is to teach students the practical aspects of work with DOP EOS tools, which requires a developed learning base in special geo-information systems (GIS) laboratory. In some cases, real practical work in special GIS laboratory can be undergoes with virtual reality (VR) technologies (Popov, 2019), that can reduce total cost of learning process.

Results of study can be useful for goals of geo-information management to large space-distributed projects, including forestry and emergency management, within the environmental economy while climate change.

Conclusion

In the article, we present the results of digital transformation technologies development for We present the results of digital transformation technologies development for UPL in the field of wildfire management with using the DOP EOS eos.com. We paid the main attention to the UPL, which are useful for goals of geo-information management to large space distributed projects, including forestry emergency management, within the environmental economy while climate change. When choosing a digital educational platform (DEP), we prefer Google Classroom. Widely, we use remote sensing databases for educational purposes within wildfire risk management. We consider the issues of digital content creation within university education, essentially in practical training. We present the enlarged groups of practical works in this area. We point out that the application of the developed UPL technologies will significantly reduce the cost of training of technical specialists, partially replacing the expensive stages of training with virtual reality simulation. The right combination of virtual reality simulation and usual practical training activities will improve the teaching quality and the training level for university students. Results of study can be used for learning purposes in forestry and emergency management within the environmental economy while climate change.

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Creating Types of Innovation by Modern Enterprises – Selected Research Results

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Abstract

The article is devoted to the analysis of types of innovations created by modern enterprises. The first part of the article includes selected theoretical aspects relating to the concept of innovation and types of innovation defined in the literature. Around the various definitions and concepts of innovation, the most common definitions of innovation appearing in the literature are indicated. Although the issue of innovations and types of innovations are areas of research interest for both scientists and practitioners, a research gap in identifying types of innovations created by modern enterprises has been noticed. This area became the leading theme of the empirical study presented in the second part of the article. The aim of the study was to identify the types of innovations created by the selected enterprises. For this purpose, innovations were divided, according to their typology, adopted in the literature into: product, technology, market and organizational. The field of research interest was not only social innovations related to changes in motivational techniques. To achieve this goal, we ask the following research questions: What types of innovations do the selected enterprises most often implement? What is the scope of implemented innovations in the selected enterprises? Key results from the study are presented in the second part of the article.

Keywords: Innovation, Businesses, Types Of Innovation

Introduction

Contemporary enterprises that strive to be competitive show "the ability to efficiently achieve goals on the market arena of competition" (Stankiewicz, 2002). Only enterprises that can create and distribute innovations have such ability (Haffer, 2008). The level of enterprise innovation determines the level of its competitiveness. It can be concluded that in the modern global economy one of the main driving forces of competitive enterprises and developing countries is innovation.

The essence of Innovation - A General Theoretical Framework

Literature on innovation is both extensive and diverse. Zalewski (2007) emphasizes that it includes the work of authors who present different approaches and have different professional experience, thus shaping the wealth of definitions. However, it is worth quoting the approach of J. A. Schumpeter (1912), whose work had a significant impact on the theory of innovation. On the basis of economic sciences, he formulated 5 cases in which new combinations of various natural elements and human productive power, i.e. innovation, appear. He distinguished types of innovations such as (Schumpeter, 1960):

- creating a new product or placing on the market goods with new properties, i.e. one with which customers are not yet familiar, or a new type of good;

- the introduction of a new production method, i.e. a method that has practically not yet been tried in a given branch of industry, and this method may not rely on a new scientific invention, e.g. a new sales method of dealing with a given good;
- the opening of a new outlet, i.e. a market in which a given branch of industry from a given country has not been introduced before, regardless of whether the given market previously existed or not;
- acquiring a new source of raw materials or semi-finished products, regardless of whether the source previously existed or was just created;
- carrying out a new organization for some industry, e.g. the creation or liquidation of a monopoly.

Innovation in J. A. Schumptere's reasoning is treated very widely. It covers not only technical activities but also economic undertakings, e.g. gaining new markets, changing organization. It is worth noting, however, that J. A. Schumpeter's theory arose at the beginning of the 20th century and referred to the capitalist economy typical of that period. At that time, elements such as land, capital and production were of fundamental importance. Information and knowledge were less significant in the functioning of companies. The end of the 20th century, in turn, introduced changes in this approach. Factors such as intellectual work, knowledge and information have gained more importance. Even now they decide on the development of a given organization, its competitive position. Nowadays, innovations are the practical implementation of ideas, knowledge or discoveries that are based on both business abilities and ingenuity.

Similar views to J. A. Schumpeter are shared, among others, by I.A. Allena, E.M. Rogers and P.R. Whitfield (2003, 1979). According to I.A. Allen (1996) is an innovation that introduces new products, processes or practices to widespread use. Everett M. Rogers (2003) recognizes that innovation is an idea, practice or object that is perceived as new by the person or other host entity. In addition, Rogers emphasizes that it does not matter when it comes to human behavior, whether the idea is objectively new, measured by the passage of time from the first use or discovery. The cognitive novelty of the individual's idea determines the response to it. If the idea seems new to the individual, it is an innovation. Percy R. Whitfield (1979) defines innovation as a series of complicated solutions to solve problems, resulting in a comprehensive, completely developed novelty.

Currently, the development of knowledge, science and technology tends to increase complexity. It results in the fact that the introduced innovations are more and more complex and thus more difficult to define. According to the approach of P. Drucker (1992) and A. Pomykalski (2001), they are a multi-dimensional and complex process in which various fields of science and technology are involved. T. Sierotowicz (2007) claims that on the one hand, a single innovation affects various branches of the economy, and on the other, the use of many fields of knowledge and techniques in one innovation increases.

Contemporary enterprises strive to become or remain innovative in an increasingly complex market environment (Crossan, Apaydin, 2010). To this end, they are developing new approaches and tools that combine many aspects of the innovation ecosystem. New business models indicate that modern organizations should create, integrate and develop knowledge in the innovation process not only in internal structures, but also in cooperation with the external environment (Ritala, Hurmelinna-Laukkanen, 2013). Nowadays, knowledge as a source of competitive advantage has become dispersed and available in new forms of information and communication technologies (ICT).

Typology of innovation in the OECD methodology

There are many typologies of innovation in literature, but the most frequently cited is the classification according to the Oslo Manual developed by the OECD and Eurostat (2005). Innovations are seen as an evolving process in which new or significantly improved products or processes replace existing ones. Therefore, this theoretical approach distinguishes four types of innovation, they are:

- product innovation,

- process innovations,
- organizational innovations,
- marketing innovations.

Product innovations refer to changes in products and services. We are talking here not only about creating a completely new product or service, but also about introducing significant improvements in existing products or services. Product innovation is considered to be "the development of a new application for a product with only minor changes in its technical specification" (OECD, 2005). Therefore, changes within product innovations concern functions that a product or service provides to customers. These include the creation of completely new products but also the improvement of those currently used. In the literature, the terms product innovation and product innovation are used interchangeably, hence these two terms are also used in this paper.

There are several definitions in the literature related to product innovations. The first is that product innovation is the implementation of a product or service that is new or significantly improved in relation to its features and applications. We are talking about significant improvements in technical terms, materials and components, as well as ease of use, embedded software, or other functional features. All these changes lead to the company being able to better meet the clients' needs. Therefore, product innovations refer to changes in the way a given product or service affects the customer (Bogdanienko, 2004). An example of product innovation is the introduction of "breathable fabrics". In this case, the changes consisted in the use of new materials that improved the performance of the existing product (i.e. clothing).

A comprehensive approach to defining **process innovations** is presented in the OECD Handbook (2005). Accordingly, process innovations also known as process innovations relate to the introduction of a new or significantly improved production or delivery method. These include changes that affect technology, software or devices. By introducing process innovations, companies can reduce unit costs of production, increase production, quality or provide new or significantly improved products. It is emphasized that process innovations relate to changes in methods and the production process in such a way as to achieve greater efficiency, faster processing, higher throughput, while reducing costs.

Innovations within processes can also include:

- changes in delivery methods (relating to the company's logistics and covering devices, techniques and software that is used to obtain production means, deliver finished goods or allocate resources);
- new or significantly improved methods of creating and providing services (consisting of changes in the scope of software and hardware that is used in service companies, or changes in the techniques and / or procedures used to provide services);
- new or significantly improved techniques, software, and organization of ancillary activities of an enterprise such as accounting or IT**.**

The use of a new, organizational method, which has not been used in the organization so far and which is the result of strategic actions taken by management, is referred to as **organizational innovation**. The implementation of the new organizational method can refer to both the principles of operation adopted by the company, to the company's relations with the environment, and to the organization of the workplace (OECD, 2005). From this definition it follows that there are three basic categories of organizational innovations, they are:

1) organizational innovations regarding the general organization of the company (in the scope of operating principles adopted by the company),
2) organizational innovations regarding the organization of the workplace,
3) organizational innovations regarding relations with the external environment.

Marketing innovations are "the introduction of a new marketing method involving significant changes in product design / construction or in packaging, distribution, promotion or price strategy" (OECD,

2005). A change in the design / construction means any change in the appearance and form of the product that does not affect its functional or usable features. Also includes product packaging changes. In turn, new marketing methods for product distribution are mainly based on the implementation of new sales channels in the company. With the exception of logistics methods, such as storage, transport or handling. Marketing innovations in product distribution also include the introduction of new ways of displaying products. On the other hand, changes in product promotion include the use of new ways to promote products or services.

Innovations Created By Modern Companies – Selected Results Of Empirical Research

Methodology

The study of the types of innovations created by enterprises began literature studies, which allowed to isolate the main types of innovations created in enterprises. The results of this stage of work allowed the development of a research tool, which was a questionnaire. The survey among 150 companies was preceded by a pilot study carried out in order to justify the choice of proposed research methods and control of designed research tools.

The survey of enterprises was started in early August 2018 and covered 1000 enterprises. The sampling procedure combined elements of simple random selection with elements of targeted selection. The questionnaire was posted on the website. Access to the questionnaire was sent by email to representatives of the companies surveyed. The final maneuverability of the questionnaires after the study was completed was 15%, in the number of 150 correctly completed questionnaires. The analysis of enterprise research results was made using the Microsoft Excel 2016 spreadsheet. In turn, special computer software (CATI Support) was used to draw individual units selected for the study.

Bearing in mind the need to adapt to editorial requirements, selected empirical material illustrating the activity of enterprises in individual areas of innovation covered by the research was presented in various configurations.

Key Test Results

Product Innovations

The product innovations implemented in the last five years concerned products previously manufactured, completely new products and products that are patented inventions or contain them. The structure of innovative activity in this respect in the studied time period is shown by the data summarized in Table 1.

Table 1: Business product innovations in the last five years

Variable	n	%
Introduction of absolutely (absolutely) new products	54	36
Modernization of products previously manufactured	64	42,7
Technological modification of previously manufactured products	36	24
Introduction of new products imitating competitors' products	15	10
Patenting inventions	3	2

Source: own study based on the study.

Declarations of enterprises that their product innovations concerned products previously offered by them definitely prevailed. Significantly more often, these products were modernized (42.7% of indications) than technologically modernized (24.0%). In this case, we can talk about a certain conservatism in the innovation policy of the surveyed companies, in which a greater emphasis on discounting already proven solutions, but given in a "new package" rather than on the search for new challenges brought by technological changes.

Significantly less frequently studied enterprises have introduced new products to the market in the past five years. This group of product innovations includes the activities of introducing absolutely new products (36.0%) and introducing new products that are imitations of products manufactured by competitors (10.0%).

The structure of product innovations of the surveyed enterprises in the last five years was also analyzed, as signaled earlier, also due to their industry membership is presented in Table 2.

Table 2: The business industry of the company, and the introduction of innovation over the last 5 years

Variable	Enterprise business											
	Other service activities		Industrial processing		Accommodation activities		Professional and scientific activities		Wholesale and retail trade		Information and communication	
	n	%	n	%	n	%	n	%	n	%	n	%
Introduction of absolutely (absolutely) new products	18	38,3	15	38,5	5	29,4	5	31,3	5	55,6	3	37,5
Modernization of products previously manufactured	13	27,7	24	61,5	7	41,2	9	56,3	2	22,2	4	50
Technological modification of previously manufactured products	7	14,9	11	28,2	4	23,5	7	43,8	1	11,1	2	25
Introduction of new products imitating competitors' products	2	4,3	7	17,9	0	0	2	12,5	2	22,2	1	12,5
Patenting inventions	2	4,3	0	0	0	0	0	0	0	0	1	12,5

Source: own study based on the study.

In terms of product innovations, the surveyed companies prefer improved versions of previously manufactured products, it can be seen that this regularity applies to the greatest extent to the industrial processing industry: modernization of previously manufactured products - 61.5%, but only 28.2% of innovations consisting in their technological modification).

Innovations consisting in the modernization of existing products concerned 50.0% of product innovations declared by enterprises in this industry, while those involving technological modifications - 25.0%. The average of both indicators amounted to 37.5% and was significantly lower than for the industries discussed above.

The least innovative in terms of product innovations consisting in the improvement of existing products turned out to be enterprises conducting other service activities as well as wholesale and retail trade enterprises.

The highest rate of implementation of absolutely new products was recorded in the wholesale and retail trade - 55.6% of the total declared innovations of this type in this industry. Implementations of products imitating competitive products were twice lower in this industry, and their indicators amounted to 22.1%.

Technological Innovations

Technological innovations have been conceptualized just like product ones. Hence, similarly to the latter, innovations related to the implementation of new technologies (own or imitation used by competitors), related to the modernization of previously used technologies and related to obtaining patents for them can be distinguished. Empirical data on product innovations are summarized in Table 3.

The surveyed enterprises, regardless of belonging to a criterion group and the frequency of choosing a given option, most often pointed to innovations related to the modernization of previously used technologies.

The technological innovation most preferred by the surveyed enterprises in the last five years was the modernization of previously used technologies. Technological innovations consisting in obtaining patents for own technologies played a marginal role in this respect.

Table 3: Technological innovations introduced by the company over the last 5 years

Variable	n	%
Introduction of absolutely (absolutely) new technologies	36	24
Modernising previously used technologies	100	66,7
Introduction of new technologies imitating technologies used by competitors	19	12,7
Patenting technology	6	4

Source: own study based on the study.

Empirical material related to product innovations ordered according to the industry criterion of the surveyed enterprises is presented in Table 4.

The surveyed enterprises, regardless of the industry, preferred technological innovations in the past five years, consisting in improving previously used technologies. To the greatest extent this concerned enterprises from the information and communication industry - 87.5%. The activity rate for enterprises conducting professional and scientific activity was not much lower - 81.3%.

In the past five years, the surveyed enterprises were showing significantly less activity in implementing technological innovations consisting in introducing new technologies imitating competition solutions.

On the other hand, enterprises operating in the field of accommodation - 11.8% and the information and communication industry - 11.1%.

Table 4: The company's business industry and the introduction of technological innovations over the last 5 years

Variable	Enterprise business											
	Other service activities		**Industrial processing**		**Accommodation activities**		**Professional and scientific activities**		**Wholesale and retail trade**		**Information and communication**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Introduction of absolutely (absolutely) new products	17	36,2	6	15,4	5	29,4	1	6,3	3	33,3	1	12,5
Modernising previously used technologies	31	66	28	71,8	9	52,9	13	81,3	4	44,4	7	87,5
Introduction of new technologies imitating technologies used by competitors	2	4,3	7	17,9	1	5,9	4	25	2	22,2	0	0
Patenting technology	2	4,3	1	2,6	2	11,8	0	0	1	11,1	0	0

Source: own study based on the study.

The surveyed enterprises, regardless of the industry, preferred technological innovations in the past five years, consisting in improving previously used technologies. To the greatest extent this concerned enterprises from the information and communication industry - 87.5%. The activity rate for enterprises conducting professional and scientific activity was not much lower - 81.3%.

In the past five years, the surveyed enterprises were showing significantly less activity in implementing technological innovations consisting in introducing new technologies imitating competition solutions.

On the other hand, enterprises operating in the field of accommodation - 11.8% and the information and communication industry - 11.1% showed the most active in implementing patented technologies.

The empirical material obtained during the research regarding technological innovations was also analyzed due to the territorial scope of the surveyed enterprises. Data related to this issue are summarized in Table 5.

Table 5: Territorial scope of the company's activities and the introduction of technological innovations over the last 5 years

Variable	Territorial scope of the company's activities							
	European market		**Domestic market**		**Local market**		**Global market**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Introduction of absolutely (absolutely) new technologies	6	40	12	15,1	15	33,3	2	50
Modernising previously used technologies	12	80	62	72,1	23	51,1	3	75

Introduction of new technologies imitating technologies used by competitors	2	13,3	10	11,6	7	15,6	0	0
Patenting technology	0	0	2	2,3	4	8,9	0	0

Source: own study based on the study.

Enterprises operating on the Global (50%) and European (40%) markets are more often implementing absolutely new technologies than those operating on the Local markets (33.3%) and Domestic (15.1%). Less frequently studied enterprises have implemented innovations in the past five years consisting in the introduction of new technologies, but imitating competitive technologies.

However, the most preferred technological innovations in the past five years were, as in the previous case, innovations consisting in the modernization of previously used technologies. To the greatest extent this concerned enterprises operating on the European market (80%), and in slightly smaller enterprises operating on the Global (75,)% and Domestic (72.1%) markets. Significantly less often such innovations were used by enterprises operating on the Local market (51.1%).

Market Innovations

Market innovations, generally speaking, are related to the enterprise's activity directed at the target market, the one where it is already present and new, including new segments of the current market on which it intends to enter. Empirical material illustrating the material scope and scale of activity of the surveyed enterprises related to given innovations is presented in Table 6.

Table 6: Market innovations introduced by the company over the last 5 years

No.	Variable	n	%
1	Creation of new product brands	29	19,3
2	Creation of new after-sales services	33	22
3	Development of new price policy instruments	35	23,3
4	Creating new distribution channels	24	16
5	Entering new market segments	44	29,3
6	Entering new markets geographically	12	8
7	Development of new forms of promotion	58	38,7
8	Creating new packaging	14	9,3
9	Creating new market needs	25	16,7
10	Gaining access to new raw materials, components, cooperative elements, etc.	6	4

Source: own study based on the study.

In the past five years, the most frequently surveyed enterprises reached for innovations consisting in the implementation of new forms of promotion - 38.7%, and significantly less - 29.3% - for innovations aimed at entering the new market segments on which they were already present.

The surveyed enterprises showed by far the least activity in the area of market innovation in the last five years in activities aimed at gaining access to new production components, raw materials or components - 4%.

Table 7: The industry branch of the enterprise and the introduction of market innovations in the last 5 years

Variable	The branch of business activity											
	Other service activities		**Industrial processing**		**Accommodation activities**		**Professional and scientific activities**		**Wholesale and retail trade**		**Information and communication**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Creation of new product brands	12	25,5	10	25,6	1	5,9	2	12,5	1	11,1	1	12,5
Creation of new after-sales services	10	21,3	5	12,8	2	11,8	9	56,3	4	44,4	0	0
Development of new pricing policy instruments	8	17	6	15,4	6	35,3	8	50	2	22,2	2	25
Creating new distribution channels	4	8,5	10	25,6	3	17,6	5	31,3	0	0	1	12,5
Entry into new market segments	9	19,1	17	43,6	3	17,6	4	25	4	44,4	5	62,5
Entry into geographically new markets	2	4,3	8	20,5	0	0	0	0	0	0	0	0
Development of new forms of promotion	19	40,4	5	12,8	12	70,6	12	75	2	22,2	5	62,5
Creation of new packaging	0	0	12	30,8	1	5,9	0	0	0	0	1	12,5
Creating new needs on the market	8	17	9	23,1	3	17,6	2	12,5	1	11,1	1	12,5
Gain access to new raw materials, components, co-op components, etc.	1	2,1	1	2,6	1	5,9	0	0	1	11,1	0	0

Source: own study based on the study.

The above data allow to speak about a kind of specialization of the surveyed enterprises in the area of market innovations depending on the industry. The surveyed companies belonging to various industries introduced market innovations consisting in the creation of new after-sales services. The professional and scientific industry has not created after-sales services in the past five years. None of the industries, except for other service and manufacturing activities, implemented innovations aimed at increasing the geographical scope of their activities. New packaging was introduced only by industrial enterprises - 30.8%, information and communication - 12.5% and to a significantly smaller extent - enterprises whose activity is related to accommodation - 5.9%. Innovations consisting in gaining access to new production components were not undertaken at all by enterprises conducting professional and scientific activities as well as the information and communication industry. Others showed little activity in this respect, the largest wholesale and retail enterprises - 11.1%.

To sum up, it can be stated that in the past five years, the surveyed enterprises introduced various market innovations, but they were not preferred to an equal degree. Innovations aimed at increasing the range of market presence were not focused on gaining new geographic markets.

Organizational Innovations

Organizational innovations declared by the surveyed enterprises were quite few and consisted primarily of changes in the organizational structure. Significantly less often innovations concerned other aspects of business organization. Data related to this issue is provided in Table 8.

Table 8: Organisational innovations introduced by the company over the last 5 years

Variable	n	%
Making changes in the organizational structure	83	55,3
Transfer of the performed function to other enterprises	10	6,7
Retreat of unprofitable activities	19	12,7
Implementation of a quality system	24	16
Implementation of an IT system	31	20,7
Implementing a resource planning system	8	5,3
Implementation of the logistics system	15	10
Implementation of a modern cost accounting system	33	22
Implementation of the performance measurement system	5	3,3
Change of company location	8	5,3
The strategic alliance is turning back	9	6
Merging or taking over a competitor, internationalization of the business	3	2
Acquiring a domestic strategic investor	14	9,3
Acquiring a foreign strategic investor	4	2,7

Source: own study based on the study.

Table 9: Territorial coverage of the company's activities and the introduction of organisational innovations over the last 5 years

Variable	Territorial scope of the company's activities							
	European market		**Domestic market**		**Local market**		**Global market**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Make changes to the organizational structure	6	40	46	53,5	29	64,4	2	50
Transfer of the function to other companies	3	20	7	8,1	0	0	0	0
Withdrawal of unprofitable fields of activity	3	20	10	11,6	6	13,3	0	0
Implementation of the quality system	2	13,3	18	20,9	2	4,4	2	50
Wdrożenie systemu informatycznego	4	26,7	18	20,9	9	20	0	0
Deploy a resource planning system	1	6,7	6	7	1	2,2	0	0

Implementation of the logistics system	5	33,3	7	8,1	2	4,4	1	25
Implementation of a modern cost accounting system	1	6,7	19	22,1	13	28,9	0	0
Implementation of a performance measurement system	1	6,7	4	4,7	0	0	0	0
Change your business location	0	0	7	8,1	0	0	1	25
The alliance's strategic	3	20	5	5,8	1	2,2	0	0
Merger or acquisition of a competitor, internationalisation of activities	1	6,7	1	1,2	1	2,2	0	0
Acquiring a national strategic investor	2	13,3	12	14	0	0	0	0
Acquisition of a foreign strategic investor	2	13,3	2	2,3	0	0	0	0

Source: own study based on the study.

Analyzing empirical data (Table 9), the most preferred organizational innovation consisting in changing the organizational structure most often in the past five years was most often used by enterprises operating on the Local market - 64.4%, significantly less frequently enterprises operating on the Domestic market - 53.5%, with a similar frequency like the last companies operating on the Global market - 50%, and the least frequently operating on the European market - 40%.

Conclusions

The surveyed enterprises in the past five years have expressed a high degree of activity in implementing product, technological, market and organizational innovations, although the diversity of these innovations should be considered quite limited. Product innovations of the surveyed enterprises were based to a small extent on patents and inventions. This means that the new products were not innovative, but were the result of a new look at products previously manufactured by companies.

In the case of technological innovations, the situation was slightly different than in the case of product innovations: a slight, though visible advantage of innovations consisting in modernizing previously used technologies, own technologies or competition. The most active in this respect turned out to be, usually associated with innovation, enterprises in the professional and scientific industry as well as information and communication.

The market innovations of the surveyed enterprises in the past five years were focused primarily on increasing the attractiveness of the products offered and increasing the range of their sales, but without determined efforts to reach new markets in geographical terms. The most active in implementing market innovations were companies operating on the European market and operating in the professional and scientific activities as well as information and communication industries.

The catalog of organizational innovations declared by the surveyed enterprises was, compared to the previously discussed groups, quite long, but above all they implemented those consisting in introducing changes in the organizational structure (over half of the indications), while others were significantly less frequent. Most often, innovations were used by enterprises operating on the European market, and internalized by industry: conducting professional and scientific activities. Organizational innovations requiring the use of modern ICT and modern methods and management techniques were also characteristic of the latter.

Summary

Modern enterprises face many new challenges that relate to various areas of their activity. Growing technological progress, social changes and constantly changing market trends mean that modern market

models should constitute an integrated system combining all these changes. The solution for companies is to implement innovation as a response to changes in the market environment. Innovations are the driving force for those enterprises that want to build new management standards, and focus their activities on generating ideas that affect further development (Białoń, 2010). Such organizations gain the name of modern and competitive, finding recognition among customers, which in turn translates into building a competitive advantage. J. Schumpeter emphasized this by claiming that entrepreneurs will strive for innovation in order to gain a strategic advantage (Schumpeter, 1995).

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Marketing Strategy vs Implementation of Innovative Solutions in an Enterprise – Case Study of a Company in the Construction Sector

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Abstract

This paper discusses the issue of executing a marketing strategy within the context of implementation of innovative solutions. All presented considerations are divided into two principal parts – theoretical and empirical. The first part of this paper presents the essence of formation of the company's marketing strategy taking into account the role of innovation as an instrument of executing the strategy. The second part of the paper presents the results of empirical studies conducted on the basis of a case study. This publication allows better understanding of the attributes of the adopted marketing strategy in the context of assessing the level of engagement of sales in generating profit in the analysed company. This article contributes to the discussion on the identification of opportunities and threats related with the execution of marketing strategies of companies. The issue of executing a marketing strategy is important and valid due to its influence on the decision-making processes in terms of effectiveness of sales, in particular if this goal is achieved via implementation of innovative solutions.

Keywords: Marketing Strategy, Innovative Solutions.

Introduction

Implementation of innovation in a company, which functions in conditions of hyper-competition forces competitors to undertake immediate decisions to maintain or obtain advantage on the market (Kotler, Caslione, 2009). A substantial component of the structure of the company's innovative and competitive potential is a strategy, which should serve to achieve set goals (Prahalad, Krishnan, 2010). This means that innovation becomes a strategic imperative of the development of modern enterprises (Chan Kim, Mauborgne, 2007), which allows creating a proposal of value based on innovation. Thus, innovation should take into account product, service, market, marketing as well as technical and technological areas, executed in micro and macro scales (De Wit, Meyer, 2007). Implementation of innovation may become the stimulus that triggers development (Itami, Nishino, 2010).
The uncertainty about the conditions of conducting business activity hinders creating effective marketing strategies. Therefore, companies, in particular those functioning on developing markets, expect innovative model solutions in the area of exemplification of business ideas (Brzóska, 2009), in comparison to companies functioning in highly developed economies. Although the theme of innovation is more frequently discussed in source literature, still a gap was noticed in the area of assessing the level of realization of marketing strategies in the context of implementation of innovative execution solutions (Stępień, 2019). Therefore, a study question was defined: is the application of innovative solutions in the process of executing a marketing strategy reflected in the increased engagement of sales to generate profit? In consequence of this question, the aim of this paper is to recognize the attributes of the adopted marketing strategy, assess the level of engagement of sales in generating profit in the analysed company, as well as identify opportunities and risks in the execution of the marketing strategy in the analysed company. Research methods applied to achieve this goal included literature studies, a case study, a descriptive analysis as well as an analysis of the trend related with the sales profitability coefficient. Empirical studies were conducted on the basis of data provided by a company in the construction sector, which conducts business on the global market.

Formation of a marketing strategy in enterprises

Contemporary markets are generally characterized by a high level of competition, which means that maintaining the market position in these conditions becomes an extremely difficult task for the management. Therefore, to maintain and increase competitive advantage, companies should develop a long-term concept of efficient operation on the market, which will allow to effectively use the company's attributes and opportunities created in the environment.

The preparation of a long-term concept of efficient operation on the market consists in formulating a marketing strategy, which defines the steps that should be taken to effectively satisfy identified needs of the market. This means that the formation of a marketing strategy is a decision-making process, which consists of formulating the main problems and selecting optimum solutions from the perspective of selected goals and conditions of their execution (Morris, Kuratko, 2002). In the source literature, a marketing strategy is defined as a long-term action plan relating to product planning and development, selection of product range, positioning the product on the market, selecting the target market, price and distribution policy, communicating with the market as well as building a positive company image – organized to satisfy clients and ensure profit for the company (Urbanowska-Sojkin, 2011). Assumptions of a marketing strategy as a market-oriented strategy concentrate on three principal stages. The first stage is the identification of the market and the consumer (buyer) on this market, along with their current and future needs, which become the starting point for activities undertaken within the scope of this marketing strategy (Liebl, Schwarz, 2010). The second stage is preparation of activities, and it is based on extended research. The third stage consists in using a wide range of instruments and tasks, which influence buyers in the process of executing the adopted marketing strategy (Bratnicka, Dyduch, 2014). The process of formulating the company's marketing strategy is presented in diagram 1.

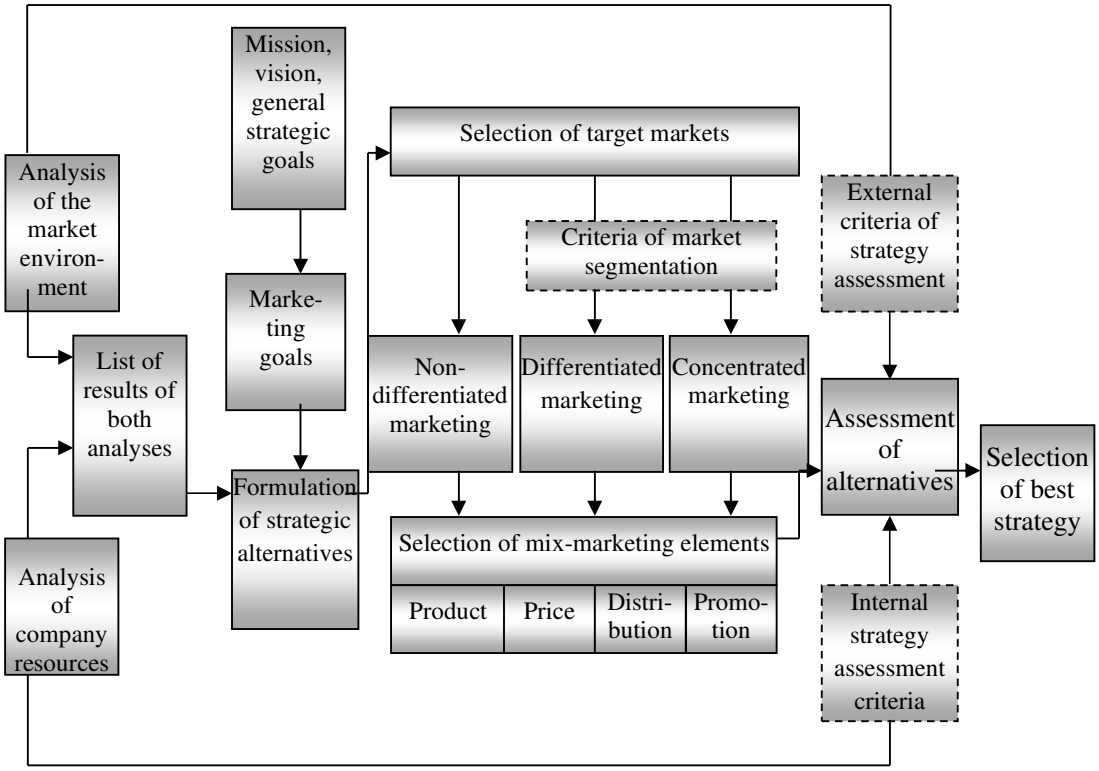

Diagram 1: Process of formulating the company's marketing strategy

Source: I. Penc-Pietrzak, 2015, p. 54.

A marketing strategy consists in several instrumental strategies, meaning product strategy, price, promotion and distribution, and simultaneously constitutes one of the many functional strategies (Drucker, 2010). Therefore, the selection of instruments for the execution of the marketing strategy should be adjusted to individual attributes and conditions of functioning of the given company. In selecting various combinations of elements of a marketing strategy the management should take into account the criterion of the internal cohesion of instruments and subordination to executed goals (Chen, 2008). The set of instruments to execute a marketing strategy may be related with the product, its equipment and price, product distribution as well as support for product sales processes (Garbarski, I. Rutkowski , 2001).

It should be underlined that a marketing strategy cannot be agreed without accounting for company goals in the following functional areas: production, finance, research and development, HR policy (Ansoff, 1991). It must interact with other strategies implemented in the company, to ensure cohesion in all areas of operation. What's more, the process of formulating marketing strategies should be consistent with the rules of formulating the company's global strategy; this is most noticeable in the structure of the company's goals and the manners of achieving these goals (Holm, Kumar, Rohde, 2012). Hence, the company's goals determine the borders of formulating the goals of marketing activity as well as alternative manners of achieving these goals.

An important element of a marketing strategy is taking into account the goals and needs in regard to the measures used by individual Strategic Business Units. They constitute an intentionally formed area of the company's interests - a relatively uniform area from the perspective of conducting effective strategic management (Kumar, Rahman, Kazmi, 2013). Strategic Business Unitsmay operate on completely different markets, which require the application of various mix-marketing instruments (Penc-Pietrzak, 2015). This means that the formation of a marketing strategy occurs on two levels: the company as a whole, and Strategic Business Units (Ansoff, 1987; Ansoff, Sullivan, 1993). It is worth noting that the form of the marketing strategy is indirectly affected by the company's mission and vision, which ensure consistent development and building a competitive advantage (Dutton, Duncan, 1987), thanks to directing activities and outlining the future position in the environment. The process of shaping a marketing strategy comprises an analysis of the market surroundings as well as an analysis of the company's resources. A specification of the results of the surroundings and company resources analyses allows formulating strategic alternatives covering specification of marketing goals, selection of target markets, as well as selection of proper marketing-mix instruments, which are subject to evaluation and allow the selection of the best variant (Holopainen, Toivonen, 2012).

Summing up, it is worth noting that formulating a marketing strategy, meaning a strategy of operating on the market constitutes an essential element of marketing management in every enterprise. A properly developed marketing strategy allows for an optimum use of the company's strengths and measures in accordance with the market situation; therefore it enables to satisfy needs of clients in the best possible manner.

Innovation as a tool for execution of the marketing strategy

In general terms, a strategy reflects a holistic approach to company management. It means that marketing strategies should take into account an integration of the selected sources of innovation opportunities with the company's potential and resources (Inauen, Schenker-Wicki, 2011) as well as seek various instruments and tools to develop identified development opportunities (West, Gallagher, 2006). Therefore, marketing innovation is an effect of decisions made in the area of selecting the company's operation policy, selecting assets used by the company, as well as selecting the model of corporate governance, which defines the manner in which the company will use these resources (Casadesus-Masanell, Ricart, 2011). Thus, these elements become a guarantor of generating the value spiral, and allow creating the feedback loop.

Marketing innovation in companies may be introduced in the new value proposal area, new operational activities, and in the area of value capture. Defining the new value proposal may be

conducted through expanding the product offer by complimentary services and maintenance, engagement of external partners in the process of outsourcing a part of sales, or through creating unique product purchase experiences. An example of an innovative solution is supporting the value proposal with new operational activities such as: development of a cooperation platform to ensure complex services for clients, redefining interactions with customers through conducting training for employees to revive their engagement in customer service, or reorganizational of internal processes. A marketing innovation in the area of a change in the value capture would be making the offer more attractive and reducing the prices of products in order to win new customers, provide gratuitous services, and obtaining benefits from advertisements, as well as separating strategic parts of activity based on a new costs and work model (Lindgardt, Hendren, 2017).

Marketing innovations should take into account the types of the company's activity, which determine the selection of customers, the scope of operation, the ability to capture value, and strategic control (Slywotzky, Morrison, Andelman, 2000). Innovations in these areas allow adjusting the scope of marketing activities to the customer's priorities, thanks to which enterprises ensure profitability through entering the so-called profit zone (Reeves, Love, Tillmanns, 2012). This means that marketing innovations should be based on both strategic knowledge of the customer's needs and priorities, and knowledge of the market on which the enterprise functions.

Summarizing the above analysis, it may indicate that marketing innovations should relate not only to the product, because currently it is not the main source of value for the customer. An important area of initiating marketing innovations is creating unique purchasing experiences for customers, because these experiences may be directly translated to an increase in sales. Therefore, applying traditional marketing instruments is not a sufficient value generator for the customer, and they should be supplemented by a completely new set of tools exercised in the company's operational activity. When new competition appears on the market, companies should modify not only sales processes, but also identify factors that ensure the company's entry and maintenance on the market as well as long-term profitability.

Methodology of Research

The research procedure applied to achieve the goal in the area of identifying the attributes of the adopted marketing strategy is a case study. The application of a case study to achieve the planned goal allows presenting a detailed picture of studied circumstances (Yin, 1984). However, a case study is a method with a probabilistic possibility of scientific cognition. This means that a case study has certain limitations (Gibbert, Ruigrok, Wicki, 2008). These limitations included intuitiveness and subjectivity of judgment and small representativeness of results. However, a substantial advance of a case study is presentation of an in-depth picture of analysed relations. A research tool applied in the assessment of the level of engagement of sales to generate profit is the net sales profitability ratio. The analysis of the trend of this ratio enables obtaining information about a change in the sales effectiveness in the analysed company. Empirical studies were conducted on the basis of data from financial statements of the analyse company. Additionally, opportunities and risks of executing the marketing strategy in the analysed company based on macroeconomic data were identified.

Recognizing the attributes of the adopted marketing strategy in the analysed company

The analysed company is a global organization dealing with production and sales of cement, concrete and aggregate. Global challenges require executing the company mission, which consists of meeting global needs of customers and creating added value for partners; this will allow the company to become an enterprise offering most efficient and profitable construction solutions in the world.

The marketing strategy of the analysed company is based on an assumption pursuant to which production and sales of offered products is a solution that may result in an increased standard of living and allows overcoming barriers, linking societies and creating the basis for development in the

country. The analysed company is distinguished amongst competition by the need of continuous development and innovation. The attribute, which differentiates the analysed company, is the need for change and for modern solutions, which enables meeting customer expectations and providing customers with innovative construction solutions.

Executing the adopted assumptions, the company focuses on expectations of customers. Therefore, it treats all customers with priority. Since quality and availability of products, as well as small distance are very important for customers, the company organized its commercial network in a manner that ensures meeting the needs of customers in the best way possible.

Satisfying the needs of customers takes account of the implementation of newest technological solutions. The company uses modern technological solutions not only to satisfy the needs of customers, but also to raise knowledge and qualifications of its employees, and to effectively operate in various market segments. For this purpose, the company introduced an IT platform and normalization of processes, which contribute to easy and consistent identification of best solutions and their subsequent implementation in the global network of the company's facilities. Thanks to introducing innovative solutions, the company increased the level of customer service and the level of safety of information flow, which contributed to an increase in productivity and performance of the analysed company, and to strengthening the brand in the global scale.

An important attribute of a marketing strategy of the analysed company is engagement in social responsibility. The realization of the assumptions of social responsibility is reflected not only in the economic context consisting in reduction of costs. The analysed company reduces the energy consumption by implementing environment-friendly solutions through developing a new fuel structure, within the scope of which almost 80% of the total cost of fuel is based on sources with low price variability; additionally, the enterprise uses alternative fuels. The philosophy of social responsibility sets the strategy of a balanced development of the analysed company, which consists in conducting efficient and profitable activity simultaneously caring for the needs of the environment and the society.

One of the attributes of the marketing strategy are the employees, who constitute an important element of the social responsibility philosophy of the analysed company. Firstly, the human resources policy consists in improving the safety of employees. Preventing accidents at work is deemed to constitute the foundation of the social responsibility philosophy of the analysed company, because high safety standards improve the performance of executed tasks.

To build a universal organization, the analysed company expects from employees both highest qualifications and high mobility. Employees in the analysed company are able to work in any location on the globe. To execute the employees' mobility policy, the company implemented well developed personnel planning and development tools, which include: succession planning, development, or evaluation of potential. Therefore, the company provides its employees with training, international exchanges, and work, which may the fulfilment of expectations for professionals.

The Level of Engagement of Sales in Generating Profit in The Analysed Company

The effectiveness of marketing innovations is reflected in the results generated by the company. Therefore, empirical studies in the area of evaluation of the level of engagement of sales in generating profit were conducted on the basis of a case study regarding financial data of the analysed company. The company was selected for the analysis (due to availability of data essential to conduct empirical studies). The scope of empirical studies covers the period 2016-2019. The applied research tool, which enabled conducting an evaluation of the engagement of sales in generating profit, is the sales profitability ratio. This ratio reflects the level of engagement of sales in generating profit in the analysed company. Conducting the research process with the use of the case study enabled presenting a precise and in-depth image of analysed circumstances and relations.

The sales profitability ratio allows obtaining information serving for the analysis of decision-making processes in the area of the sales return rate; this also enables assessing the effectiveness of marketing activities. The analysis of setting the sales profitability ratio also provides information about decision aiming at ensuring the effectiveness of operations in the analysed company. The share of net profit in sales in the years 2016-2019 in the analysed company demonstrated an increasing tendency (Diagram 2).

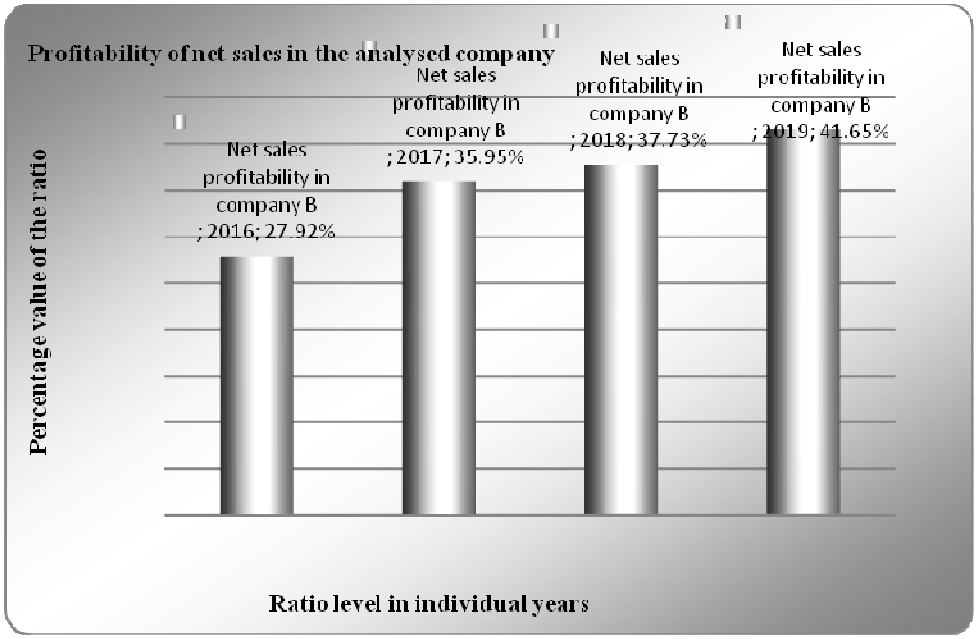

Diagram 2: Setting the net sales profitability level in the analysed company

Source: Own elaboration.

The upward trend of the net sales profitability ratio demonstrates the effective sales policy and appropriate decisions in terms of price and marketing policy. In the assessment of the setting of the net sales profitability ratio in the analysed company from the perspective of the execution of the marketing strategy information was obtained on the relation of net value to the net sales value. However, it should be noted that the decision-making process in the sales area in the analysed company depends, amongst others, on the structure of the product range, costs of production, and the price and marketing policy of the entire group of companies, not only companies with their seat in individual countries. Therefore, global decisions are sometimes inconsistent with decisions made in the given country. This results from the fact the process of execution of a global marketing strategy of a group of companies often does not take account of the economic situation and the scale of transfers between subsidiaries, or the tax policy, which directly affect the setting of the net sales profitability ratio in individual branches of a company operating on the global market.

Identification of opportunities and risks of the execution of a marketing strategy in the analysed company

The conducted studies with the use of the net sales profitability ratio enable assessing the level of engagement of sales in generating profit in the analysed company. However, the presented ratio is related with limited fields of perception, therefore it is justified to obtain a complete evaluation by examining opportunities and risks in the execution of a marketing strategy of the analysed company in the coming years.

Based on the analysis of the macroeconomic situation on markets, on which the analysed company is operating, opportunities and risks were identified with regard to the execution of the adopted marketing strategy for the years 2020 – 2025. Identified opportunities include the upward trend of economic indicators in the construction industry, although the assessment of their setting requires the application of the rule of prudence. The improvement of the condition of the construction sector in the conditions of a moderate downturn contributes to the stabilization of the prices of materials, services, and salaries on the construction market. Opportunities include an improvement of the financial situation of construction-related companies, which may be translated to timeliness in execution of liabilities. Important areas in the process of seeking opportunities to execute the adopted marketing strategy are the high qualifications of employees and the trend of continuous development of professional qualifications.

Analysing the risks in the execution of the adopted marketing strategy, the decrease in the number of self-government investments should be emphasized; in connection with the downturn in the segment of transport infrastructure and the decrease in the dynamics of government investments, this constitutes an important element, which may prevent achieving intended goals. In addition, weak results of road contractors and high price competition between contractors may become the factors, which reduce the level of planned revenue.

Discussion

Attempting to assess the effectiveness of the applied marketing strategy in the analysed company, which operates on the global market, it may be concluded that the implementation of marketing innovations is reflected in the increase of sales during the analysed period. The setting of the line of the sales profitability ratio line is the basis to assume that the priority for the analysed company is building the position of the leader in the analysed market segment. The analysis of development opportunities of the analysed company suggests opportunities to execute the adopted marketing strategy. Initiating new methods of external and internal communication, implementation of modern technologies and expanding cooperation in the area of using the Internet as an internal communications carrier should allow maintaining high operational effectiveness of sales. However, the identified risks and the variability of economic circumstances in the surroundings of the analysed company require skills to select appropriate modern marketing tools in order to execute the adopted marketing strategy. Therefore, maintaining the competitive advantage should be carried out in account of solutions aimed at activities focused on creating special value for the customer, which may be obtained through the value of offered products and foreseeing market trends.

Summary

Making the decision about the form of execution of a marketing strategy in the operation of a company is individual for every enterprise. The effectiveness of the marketing strategy depends on factors such as: the market, on which the company operates, the number and quality of activities undertaken by the competition or demand for produced goods. Therefore, enterprises must adjust the scope of the applied marketing strategy to the conditions of the endogenous and exogenous environment.

In response to the question – will the application of innovative solutions in the execution of a marketing strategy be reflected in an increase of engagement of sales in generating profit? It should be concluded that companies operating on global markets should implement innovative solutions in the execution of their marketing strategy because, on the one hand, it allows achieving a growth of sales profitability, and on the other hand it enables conducting business on various markets. The purpose of this paper was to recognize the attributes of the adopted marketing strategy, assess the level of engagement of sales in generating profit in the analysed company, and identify opportunities and risks to the execution of the marketing strategy in the analysed company.

The conducted empirical studies suggest that implementation of modern technological solutions, mainly in the IT area, constitutes an important attribute of the adopted marketing strategy in the

analysed company. Coherent and comprehensive information to assess sales effectiveness was obtained through an assessment of the level of engagement of sales to generated profit using the net sales profitability ratio in the analyzed company. The conducted identification of opportunities and risks in the execution of the marketing strategy in the analyzed company constitutes the basis for forecasting the future directions of the company's development. This research approach allowed achieving the set goal.

The main contribution of this article is in-depth knowledge of the relations between a marketing strategy and implementing innovative solutions to execute this strategy, as well as the possible influence of the marketing strategy on the increased sales profitability. What's more, enterprises operating on global markets, characterized by a high pace of changes must skillfully select the instruments to execute the adopted marketing strategy. The application of marketing innovations should consist of implementing pioneering solutions in the area of influence on the target market.

Therefore, it may be recommended for the analyzed company to expand the structure of its offer of products and services, introduce an electronic channel and applications allowing to use mobile devices, apply expanded reality solutions in the area of warehouse management and in processes of sales and communication with customers, as well as brand positioning. To achieve the goal of this article, the author mainly conducted literature studies and a case study, an analysis of the trend of the net sales profitability ratio, and a descriptive analysis. The multispectral nature of the execution of a marketing strategy and implementation of innovative solutions meant that certain considerations in this article were presented in a general manner; on the one hand, this allowed presenting the complexity of the discussed issue, and on the other hand it inspires to further research.

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Division and Options of Rational Substitution of Foodstuffs Within Basic Groups as A Guarantee of The Safety of Soldiers of The Land Forces During the Execution of Official Tasks

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Abstract

The overriding theme of the paper is to secure for the soldiers of the Land Forces the conditions for the safe performance of their duties by indicating the optimal conditions for their nutrition. Foodstuffs were grouped and characterised. The groups are for use in individual nutrition of soldiers of the Polish Armed Forces serving in peacetime, in situations when they do not have the right to free mass catering. The principles and opportunities for product substitution have been identified where more expensive products need to be substituted by cheaper ones, due to their hampered availability or seasonality. The principles of rational human nutrition were also presented. The considerations allowed us to conclude that a social group with an increased energy expenditure, performing a specific job to which the soldiers of the Land Forces were assigned, should apply the principles of proper nutrition, taking into account an option of foodstuff substitution. Otherwise, soldier's physical capacity, may be reduced, his concentration span may decline, responsiveness may be reduced and an option of intense physical effort during the performance of official tasks.

Keywords: Foodstuffs, Nutrition, Product Categories, Soldiers' Nutrition

Introduction

One of the prerequisites for the soldiers to carry out their tasks effectively is a proper diet , with an energy balance in equilibrium. Rational nutrition can guarantee not only the effective implementation of the assigned mission, but also its safe accomplishment. Each nutrient has its own range in the food ration supply. Consumption of too much or too little food ration may cause upset health condition. The optimal scope of nutrient absorption is individual for each human being. It depends on age, nature of work, gender and health condition. The food ration used in soldiers' nutrition must meet their energy requirement for the training process and provide all the nutrients in appropriate quantities and proportions.

General Principles of Proper Nutrition of Soldiers

One of the conditions for ensuring good health condition and a healthy body is the proper frequency of meal consumption in land forces nutrition. The percentage breakdown of energy according to the standard into specific meals served during the entire day is shown in Appendix No. 1. A soldier should have meals 3-5 times a day with breaks every 3-4 hours in order to perform the tasks set before him in order to perform the tasks set before him. Too long breaks between meals result in a drop of glucose level in blood, causing a feeling of hunger. Hunger and dehydration make the soldier feel worse and reduce the well-being of the soldier, reduces his concentration, alertness, psychophysical activity and increase his irritability. This may adversely affect the daily functioning of the body and result in standstills in the performance of official tasks.

It should be noted that the energy value of meals consumed during the daily cycle should be equal to 100% of the energy standard, e.g. for breakfast 30%, for lunch 40% and for dinner 30% of energy when eating 3 meals a day.

Referring to the *Recommended Dietary Allowance for the Polish population*, it is recommended for an adult to consume not less than 45 - 65% energy from carbohydrates, 20 - 35% energy from fats and 10 - 20% energy from protein (Jarosz, M. 2017).

The specific nature of the job performed determines the diet of adults, including soldiers. The work performed can be divided in terms of gravity into light sitting, moderate, heavy and very heavy physical jobs. If a soldier does most of the work being seated (seating jobs in the armed forced represent marginal percentage), he should consume low energy foodstuffs. His diet should be easily digestible. The basis should represent foodstuffs with a lower fat content (cheese, milk, lean meat) and products rich in fibre (dark bread), fruits and vegetables. The diet of people dealing with hard physical labour, which applies to the majority of the soldier population, should be enriched with high-energy foodstuffs such as: fish, meat, groats, legume seeds, pasta (Army Doctrine Publication. 2017) . With growing consumption of carbohydrates, the need to supplement B vitamins increases.

Since 2010, since the introduction of the Polish army's professionalisation, soldiers in peacetime feed themselves on their own. Under exceptional circumstances, soldiers may be entitled to free meals, e.g. during training on the training grounds, attending various courses, on Navy ships, during flights performed by the Air Force flying personnel and in other situations specified in applicable legislation. The candidates for professional soldiers in the training period as well as those on duty are also fed free of charge. The rules of organizing nutrition and standards of feeding the soldiers of the Polish Armed Forces are regulated by the secondary legislation and decisions of the Minister of National Defence. Currently, the soldiers serving in Polish Armed Forces units at the time when they should be fed following the principles of mass catering, pursuant to the Food Service Activity Regulations DD/4.21.1.(A) of 2016, implemented by virtue of the Decision No. 399/MON, and the Regulation of the Minister of National Defence of 27 April 2018 on free catering for professional soldiers and soldiers serving as candidates.

Through continuous research on energy expenditure and nutritional patterns of different social groups, at different ages, and with different severity of work performed, the knowledge about foodstuffs and individual human nutrition continues to be updated. In order to facilitate the illustration of the hierarchy of individual food categories, a pyramid of proper nutrition was created, which corresponds to the modern model of proper human nutrition. It presents the idea of nutrition, which is intended to give a chance for healthy life, maintaining physical and mental fitness into old age. It shows the proportions of essential food categories in the daily diet. The higher the pyramid level, the lower the frequency and amount of food consumed from the selected food category.

It should be emphasized that this pyramid is mainly used for feeding a healthy person. Depending on age, religion, susceptibility to allergies, applied diet, work performed and physical effort taken, it needs to be modified. The pyramid is developed and updated by the experts from the Food and Nutrition Institute. The pyramid shown in Figure 2 below is designed for a healthy adult.

Fig. 1 : Adult healthy eating and physical activity pyramid

Source: Jarosz M., Normy żywienia dla populacji Polski, Food and Nutrition Institute, Warsaw 2017, p. 269.

Breakdown of Primary Food Products into Categories and Their Characteristics

Foodstuffs may be categorized by their origin, ingredients or characteristics, depending on their nutritional value and composition. Taking into account the needs or the purpose of the social group covered by the survey, foodstuffs may be broken down into different basic categories. When assessing the quality of food, it is important to first pay attention to the requirements that foodstuffs have to meet and the control of compliance with such requirements. These are basic components of the recommended dietary allowance that aim to protect consumers.

In order to plan the daily ration in connection with the rational nutrition principles, fewer categories are used, with as much variety as possible when selecting foodstuffs within the category. Meanwhile it is advisable to divide the ration, i.e. the recommended dietary allowance, into a larger number of categories. For the purposes of the conditions assumed in the publication, foodstuffs were divided into 9 categories. They are categorized by similar nutritional values and chemical composition (Kunachowicz, 2007).

Fruits and vegetables

Foodstuffs from this category are characterized by high nutritional value and low energy value. They represent a potential source of vitamins, organic acids, fiber, antioxidants, minerals and essential oils. They contain a certain amount of protein, simple carbohydrates, and have protective and regulating functions for the human body. Fruits and vegetables, thanks to their smell, taste, colour and consistency, are a pleasure to eat by humans. They show an alkaline effect. Their protective role against tumours should be emphasized. The correct consumption should reach 800g/person/day. In many countries, especially highly developed ones, the statistical consumption of fruits and vegetables per capita is relatively higher than in Poland.

It is advisable to increase the consumption of fruits and vegetables. When developing a diet, it is necessary to plan the consumption of fruits and vegetables in the form of juices, frozen and canned fruits and vegetables, certainly if we do not have access to fresh produce, so that their daily consumption is not lower than 600 grams. Care should be taken to ensure that each meal contains fruits or vegetables, boiled or raw. People who take care of their body structure should largely base their diet on them.

Potatoes are a special vegetable, due to their starch content (approx. 18%) and protein content (1.5 - 2.5%), which are of high biological value. They are a source of certain amounts of dietary fiber. Iron, potassium, phosphorus, sodium, magnesium are the main minerals in potatoes. Thanks to the high concentration of potassium, the potatoes have alkaline properties and contain numerous B and C vitamins. The content of vitamin C is determined from 10 to 40 mg/100g (Kunachowicz et al., 2007, pp. 138-139). An important aspect is the storage of potatoes and their culinary treatment. Improper use of potatoes may reduce the value of the vitamins they contain. Therefore, the healthiest thing to do is to eat boiled potatoes. In Poland, some people treat potatoes as a separate group of foodstuffs, mainly because of their high consumption volume.

Vitamin C is the most widely recognized antioxidant. It aims at strengthening of the immune system and blood vessels. The category characterized by a large amount of vitamin C includes the following vegetables: tomatoes, parsley, kale, pepper, brassicas: savoy cabbages, red cabbages, Brussels sprouts, white cabbages, cauliflower. The fruit category, which is the most valuable in terms of vitamin C content, comprises: strawberries, wild strawberries, raspberries, rosehip, elderberry, red, black and white currants, gooseberry, blueberries, and citrus fruits: oranges, grapefruits, lemons.

Beta-carotene, in addition to assisting in the process of vision, is responsible for the immune system, cell and tissue formation, and for skin appearance. It shows anti-cancer properties due to its antioxidant properties. The fruits and vegetables and fruits belonging to this category include: carrots, tomatoes, Chinese cabbage, lettuce, chicory, red pepper, pumpkin, kale, dill, broccoli, asparagus, parsley, beans, spinach, chives and sorrel, as well as fruits such as melons, papayas, peaches, nectarines, oranges, apricots or mangoes.

Vegetables recommended for consumption: fresh, frozen and appertized, vegetableslightly salted soups with little fat; baked or cooked potatoes, deep-fried vegetables, vegetable juices, pickled vegetables;

from fruits: fresh, frozen, compotes, jams, juices and other preserves.

Cereal Products

This product category is mainly represented by rice, flours, groats, flakes, etc., as well as products made from them (including but not limited to noodles, bread, pasta). Nutritional values depend mainly on the technological processing applied and on the type of grain used. These products are rich in complex carbohydrates, mostly starch, minerals such as magnesium, iron, B vitamins and dietary fiber. Meanwhile they contain a negligible amount of fats and calcium. The most valuable nutrients are found on the outer part of the grain, so products that are poorly “purified" are richer in nutrients. Flour-based dishes are applied in nutrition universally, because they are cheap and have a relatively high nutritional value. Cereal products are the basis of nutrition and should be consumed at every meal, but in moderation specific to individual needs.

The products recommended for use are: whole-grain bread and cereals, rusks, pancakes, doughnuts, biscuits, buns, tortillas, pasta, rice, groats or noodles. As a supplement - processed crackers, sweetened cereals.

Dry Legume Seeds

The products belonging to this category are to a certain extent similar to the categories of cereal products and vegetables. However, they are distinguished in a separate category due to their specific nutritional properties. This category comprises soya beans, broad beans, lentils, beans and peas. Their protein content has a high biological value, especially soybean - 35-40%, while in beans, peas and lentils it is over 20%. Legume seeds are also rich in B and C vitamins, carotene and carbohydrates, as well as being a source of fat with a significant content of EFAs (soybean). Dry and fresh legume seeds spread the necessary minerals such as copper, fibre, potassium, iron, sulphur, calcium and magnesium throughout the body.

Before consumption, it is recommended to boil and soak the seeds, since this has a positive effect on process of their digestion and minimizes flatulence and other hardship in the digestive process. They exhibit an alkaline effect. In order to enrich the diet with vegetable protein, increased amounts of legume seeds should be consumed. Their energy value is significantly high and a variety of dishes can be composed using beans, soya or lentils. On the Polish market you can find ready-made dishes with these seeds.

Products recommended for use are as follows: cooked seeds in any form, soups, canned seeds.

Meat and Fish

This category is a particular source of protein, vitamins A and B, iron and copper. Depending on the size, age and species of the animal, the percentage of fat (2 - 30%) and protein (15 - 20%) is determined. Meat from animals for slaughter is otherwise known as 'red' meat, as opposed to poultry meat, referred to as 'white' meat. Poultry meat has a lower fat content than red meat. It is therefore advisable from a nutritional perspective to consume more poultry meat in parallel to the reduction of red meat consumption. The recommended weekly dose of meat per adult is 0.5 kg.

Fish contains more minerals than meat. They are a good source of iodine and fluorine. Fish meat is characterized by such nutrients as: protein, magnesium, Omega-3 acids, potassium, phosphorus, iodine, vitamins A and D. Fish consumed with the bones are a source of calcium. Especially marine fish are recommended because of the high content of omega-3 polyunsaturated fatty acids.

The products that should dominate the diet of this group of people include: lean processed meat, lean cured meat, fish in any form 2 - 3 times a week, crustaceans, skinless poultry, liver at least once a month. Rarely fried or fatty meat, fried poultry or poultry with skin, etc.

Milk and Dairy Products

Milk is used to make numerous products such as kefirs, buttermilk, yoghurt and many varieties of cheese. Dairy products and milk are the most valuable food products. Their ingredients are necessary for the proper functioning of the body. From this product category we obtain such nutrients as calcium, protein, fats, milk sugars (lactose), fat-soluble vitamins A, B, D. They contain only a trace amount of iron. Meanwhile milk and dairy products do not contain vitamin C or fibre. Protein is a building block component of the human body, so dairy products play an important role in every phase of human life, especially for children and pregnant women. It is impossible to replace milk with another food product (Gawęcki, 2010, pp. 342-343). Dairy products have alkalising properties and should therefore be used in the best possible manner, as ingredients in a variety of dishes in order to enrich their nutritional value.

Milk, kefirs, yoghurt are recommended for use from this category.

Butter and cream

Butter is a relatively easily digestible fat with significant organoleptic properties. It should contain 82-84% fat. Due to the high cholesterol content, its consumption should be restricted. Butter is also characterized by a large quantity of short-chain saturated acids. It is crucial that the butter contains vitamins A and D, so it is best to eat them raw as they do not lose their nutritional value. High temperature causes the formation of harmful compounds (carcinogenic, e.g. acrolein), resulting from the thermal depreciation of butter. For people having problems with high cholesterol level, mixed products containing butter and margarine or oils are suitable.

The source of fat, but also vitamin A, soluble in fats, similarly to butter, is cream. Enriched with small amounts of minerals and protein, it plays an important role in bringing variety to everyday diet, but is easily replaced by other products with lower fat content, e.g. natural yoghurt (Kunachowicz et al., 2007, p.133).

The products recommended for use are butter with a fat content of more than 82% and cream soups with a dash of cream added.

Eggs

The basic product of this category are hen eggs. They are the safest for human health, and their sales is most common in the marketplace. Hen's egg white is considered to be of the highest nutritional value and is fully absorbable by the human body. Egg yolk contains iron, vitamins A and D and fatty compounds (about 250 mg cholesterol in 1 egg yolk). Because of these compounds, too much yolk should not be consumed. Eggs are acid-forming products. Nevertheless, they are a valuable product not only because they contain significant nutritional values, but also have valuable organoleptic values and special physical and chemical properties. Eggs have thickening, emulsifying, binding and raising properties. Their small amount gives the food its proper consistence (Gawęcki, 2010, pp. 349-350). There are few products that would have such a wide array of culinary applications. Eggs are the basic ingredient of many dishes. Eggs are subject to heat treatment, and eating them raw can cause food-borne poisoning.

The recommended intake is 3 to 5 eggs per week.

Fats

In this product category, fats can be divided into fats of animal and vegetable origin. Back fat and lard are the main representatives of animal fats. They mainly provide energy (630 - 900 kcal/100 g), cholesterol and saturated fatty acids, as well as vitamins A and D. The atherosclerotic effect of animal fats causes cardiovascular diseases, obesity and cancers when their intake exceeds the recommended dietary intake. Therefore, their intake from the daily diet should be reduced in favour of vegetable fats, which contain polyunsaturated fatty acids, beta-carotene, tocopherols and, above all, are cholesterol-free. Vegetable fats have an antiatherosclerotic activity proven by epidemiological studies. In the Mediterranean countries, olive oil is mainly consumed, resulting in a rare occurrence of atherosclerosis and ischaemic heart disease. In the domestic market, available vegetable fats with the highest content of essential unsaturated fatty acids (EFA – essential fatty acid) (Bojarowicz, Woźniak, 2008, p. 471) is vegetable butter, sunflower oil, soybean oil and enriched margarines. They should be eaten raw (as a salad dressing, directly on bread) because unsaturated fatty acids are sensitive to high temperatures. Rapeseed oil and olive oil are used in a variety of dishes, and also for frying. Oils that are cold-pressed are not refined, which results in their specific organoleptic characteristics. Their colour is slightly green because of the chlorophyll they contain. In combination with refined oils they contain more vitamins.

It is recommended to use the following items from the Fats category: rapeseed oil, mayonnaise or salad dressing (made with oil), avocado, olives. In addition: margarine made from hydrogenated or saturated fats, coconut or palm oil. Hydrogenated vegetable fat, bacon, lard, grease added to dishes, sauces.

Sugar and Confectionery

This category comprises confectionery, jams, cakes, chocolate and marmalades. This group is characterised by a high sucrose content of up to 99% and energy properties (300 - 600 kcal/ They mainly supply the energy, which is commonly dubbed "empty calories". Their sugar content ranges from 40-99%. Depending on the product composition, they provide partial values for fat, minerals, protein and organic acids. It should be noted that this category comprises bee honey, whose main ingredients include monosaccharides and substances preventing microbial development.

Excessive consumption of confectionery products and sugar promotes obesity and tooth decay, but also has a beneficial effect on the functioning of neurotransmitters in the brain. Unfortunately, confectionery products and sugars have an acidifying effect on the body, so they should be consumed occasionally.

From this product category bee honey is recommended.

One of the components influencing human welfare according to the World Health Organization (WHO) is proper and healthy nutrition, which is sometimes, due to lack of time or covetousness, satisfied incorrectly. As a result of the presented description of product categories, it can be concluded that there is no food product that can contain all the necessary nutrients for humans, especially in quantities that ensure proper functioning of the body. That is why it is so important to consume products from different food groups, taking care to diversify your meals.

Substitution of Foodstuffs - Principles and Opportunities

When planning a menu, more than often food rations have to be modified. This may be driven by necessity to substitute more expensive products with cheaper ones, because of the constrained availability of certain foodstuffs or seasonality.

Foodstuffs from the presented 9 categories may be substituted as follows:

Fruits and vegetables

Basic product - 100 g fresh fruits and vegetables.

Substitute products: With vitamin C: 100 g peppers, Savoy cabbages, tomatoes, Brussels sprouts, broccoli, 90 g fruits and vegetables from the category providing vitamin C, 60 g drinking juices.
With carotene: 90 g vegetables and fruits from the group providing carotene, 20 g tomato concentrate 20% / 30%,
Other: 100 g Savoy cabbages, broccoli, chives, Brussels sprouts and other products providing vitamin C and carotene, 90 g frozen vegetables and fruits, 60 g drinking juices, 20 g dried fruits

Cereal Products

Basic product – 100g flour.
Substitute products: 135 g rolls or bread and semi-confectionery products, 100 g beans, pasta, peas.

Dry Legume Seeds

Main product - 100 g dry legume seeds.
Substitute products: 135 g bread and rolls, 100 g groats, flour and pasta.

Meat and fish

Main products - 100 g bone-in meat and gutted fish.
Substitute products: 400g liquid milk, 200g homogenised cheese, 200g ungutted fish and herring, 120g eviscerated poultry, 100g offals, fish fillets, eggs, cottage cheese, 70g ham, sirloin, sausage, gammon, 60g melted cheese.

Milk and Dairy Products

Main product - 100 ml milk.
Substitute products: 100 ml kefir or yoghurt, 10 g cheese spreads, 15 g cottage cheese, 30 g homogenised cheese, 50 g concentrated milk

Butter and Cream

Main product - 100 g butter.

Substitute products: 280 g 30% whipping cream, 450 g 18% cream, 700 g 12% cream

Eggs

Main product - 100 g eggs (2 pcs.).
Substitute products: 400 g of liquid milk, 200 g of homogenised cheese, 100 g of cottage cheese, canned fish, offals, fish fillets, 80 g of de-boned meat, 60 g of ham, tenderloin, 50 g of powdered milk.

Fats

Main product - 100 g of lard.
Substitute products: 120 g margarines, lard, 100 g hydrogenated fats.

Sugars and confectionery products

Main product - 100 g of sugar.
Substitute products: 125 g of natural or artificial honey, 150 g of jam, fruit syrups, 200 g of jam and marmalade.

Knowing the values and composition of individual foodstuffs, one product can be substituted for another, but the principle of substitution within the same product category should be mainly followed. If not possible, products from other categories may be used, but the content of the main nutrients should be taken into account. When substituting e.g. poultry meat, we take into account the similar protein content that products from other categories contain. Poultry meat substitution options are shown in Figure 1.

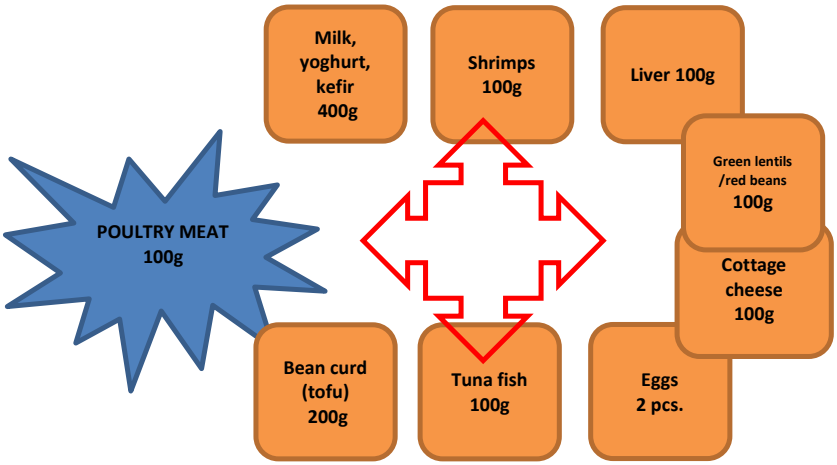

Fig. 1: Substitution of 100 g of poultry meat with other foodstuffs.
Source: Own elaboration

Summary

Foodstuffs contain essential nutrients in various quantities and proportions. Food ration of soldiers of the Land Forces should supplement the loss of energy, provide the building blocks for the reconstruction of the tissues that are being used up, and contain the necessary number of components that regulate the metabolism (Kler, Bertrandt, 2017, pp. 397-402). It should be born in mind that

there is no food product that contains all the nutrients in quantities that are optimal for the human body. Therefore, it is recommended to diversify the food ration as much as possible.

Diseases of civilisation such as obesity, etc., which in the 21st century inevitably accompany the majority of social groups, are the result of widespread eating habits of adult consumers, which unfortunately deviate from the health-oriented nutrition model. The soldiers of the Land Forces are not the only exception here. As research shows (Kler, Bertrandt, 2018), soldiers often make fundamental mistakes when they feed themselves, drawing knowledge about the principles of proper nutrition from friends or from the Internet.. Incorrect application of dietary guidelines may bring them to the situation where they feed themselves using unbalanced diets, which may reduce their physical performance, reduce their concentration span, responsiveness and an option of intense physical effort while performing official tasks. Insufficient nutritional awareness can affect the quality and safety of performed official duties. It can be curtailed through the application of the following principles:

- To add to the daily menu the products from all categories: cereal products, fruits and vegetables, milk and dairy products, products providing complete protein. The principle of bringing variety should apply to all meals.
- To reduce the intake of fats, particularly of animal origin, and to replace them with fats of vegetable origin.
- To increase significantly the consumption of fruits and vegetables and fruit as well as dry legume seeds.
- To reduce the consumption of red meat and its processed products in favour of white meat, fish, legumes, quark.
- To increase significantly the consumption of fish and fish products.
- To increase the consumption of milk and dairy products with reduced fat content.
- To reduce the consumption of table salt.
- To enhance physical activity level continuously.
- To reduce continuously sugar and confectionery products consumption.
- To increase moderately the consumption of cereals and potatoes.
- To reduce egg consumption to 2–3 eggs per week.
- To eliminate products not recommended for the body - spirits and all kinds of stimulants.

When substituting products we should mainly follow the following dietary recommendations:

- the substitution should be the best applied within the same product category - e.g. substitution of animal fats with vegetable fats,
- within other categories, products may be substituted, however, making calculation following the principle that the amounts of basic nutrients and energy values are similar
- the substitution as a whole must not affect the nutritional value of the prepared meals, butter can to some extent be exchanged for cream, because both products contain vitamin A and fat,
- in certain cases, combined substitutions may be applied, e.g. meat dishes may be substituted by dishes made from dry legume seeds supplemented with small quantities of meat, sausage, poultry or grated hard cheese.
- fruits and vegetables rich in vitamin and carotene should not be substituted in the long term with other fruits and vegetables in small quantities.
- the product being substituted should have a similar composition - e.g. a product that is a source of vitamin C should be substituted by a product with similar properties.

When eliminating a food product for health reasons, it is important to remember that the products to be substituted should be of similar nutritional value and that the proportions of substitution should be maintained.

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Appendix 1.

Percentage breakdown of energy value by specific meals throughout the day

Type of meal	No. of meals per day (%)		
	3	4	5
Breakfast	**30 – 35**	**25 – 30**	**25 – 30**
Lunch	**-**	**5 – 10**	**5 – 10**
dinner	**35 – 40**	**35 – 40**	**35 – 40**
Afternoon snack		**-**	**5 – 10**
Supper	**25 – 30**	**25 – 30**	**10 – 20**

Source: Kunachowicz H., Czarnowska-Misztal E., Turlejska H., Zasady żywienia człowieka, WSiP, Warsaw 2007, p. 146.

Spatial Distribution of Illegal Dumping Sites Using GIS-Based Spatial Analysis for Urban Waste Management

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Abstract

Waste management must be able to serve all waste generation. This is needed to avoid the potential environmental impact of residual waste that is not transported. However, in the 2017 Sukmajaya District, Depok City has a level of waste collection and transport rates only 47% are served. Sukmajaya District had 4 types of waste transportation services, physical legal landfill, non-physical legal landfill, door to door services, and trade in services. This research aims to identify the pattern of illegal landfills for the improvement of waste management. Data collection in this study was carried out using secondary data from government agencies, interviews, and field surveys. This research was conducted using one of the spatial analysis tool namely distance analysis tools such as buffer analysis and Euclidean distance analysis. The results showed that the Sukmajaya district had 4 legal landfill sites and 123 illegal landfill sites. Illegal landfills found to exist near secondary and tertiary, near river and shrub class of land use, and area with a low-density population.

Keywords: GIS, Spatial Analysis, Waste Management, Waste Collection Transport

Background

Waste management is one of the big problems faced by many countries in the world (Chaudhary, Nidhi, & Rawal, 2019). Especially in a developing country that always had their priority on the development and economic growth then put less priority on waste management even waste generation positively associated with economic growth (Wilson et al., 2015). There are two of the five stages in urban solid waste management that need to be focused, namely the collection and transportation stage (Chaudhary et al., 2019; Kaza, Yao, Bhada-Tata, & Woerden, 2018). This stage of urban solid waste management is a major concern because it used 60-80% of the total urban solid waste management budget (Chaudhary et al., 2019). In low-income countries, urban solid waste that is not collected will be disposed of in the open, burned, or some will be composted (Kaza et al., 2018). The direct combustion process (Kaza et al., 2018) and emissions from transport carriers used can increase greenhouse gases in the atmosphere (Chaudhary et al., 2019).

Management of municipal solid waste that is not optimal can directly or indirectly affect the environment (Wilson et al., 2015). Indirect influence on the environment one of which arises when urban solid waste is dumped in the open or the edge as a result of the lack of available facilities (Tadesse et al., 2008). Illegal disposal of municipal solid waste will directly pollute surface water, seawater also groundwater can be polluted in the long run. (Wilson et al., 2015). In addition to illegal disposal, the process of burning urban solid waste that is not done with the right technology can be a pollutant for a local air and accelerate the phenomenon of climate change (Kaza et al., 2018; Wilson et al., 2015).

Urban solid waste management has a direct impact when it comes to the stage of collection, transportation, and removal of urban solid waste. poor transportation and collection of rubbish have an impact on vehicle gas emissions. On the other hand, good urban solid waste management can contribute to reducing greenhouse gas emissions by 15-20% (Wilson et al., 2015).

Depok City with increasing waste generation has a transportation rate of rubbish far below 100%. Waste transported in Depok City is only 21-56% of the total solid waste generation (Kristanto, Gusniani & Ratna, 2015; Paramita, Murtilaksono, & Manuwato, 2018; Sukarmawati, 2012). This value is not yet proportional to the costs allocated for the waste collection and transportation stage, which is 72% of the total budget for waste management which in 2008 was Rp. 9,588,734,350 (Sukarmawati, 2012). Waste management consists of three stages, namely collection, transportation, and waste management. Currently, most research focuses on the initial stages of generation or the final stage of waste management in the landfill. The second stage, namely transportation, is the stage that consumes the biggest budget cost of the three stages, so optimization at the transportation stage that is supported by the intervention at the collection stage needs to be done. The more important role is owned by the waste collection stage because it is directly related to the sustainable use of resources, saving on the waste management system, and reducing the negative impact on nature (Pires et al., 2018). Illegal landfills do not arise randomly (Glanville and Chang, 2015; Jakiel et al., 2018), bad solid waste management is one of many factors that could trigger the emerging of Illegal landfills. The emergence of illegal landfill locations is affected complexly by economic, environmental, and social factors (Glanville and Chang, 2015). In detail, the factors that influence the distribution of illegal landfills (Glanville and Chang, 2015) are demographics (for example population density, unemployment rate, per capita income), availability of waste facilities or services, ability to service facilities or solid waste services, the effectiveness of law enforcement, access location (distance to the road), acceptance of community culture towards illegal landfills.

The correlation between illegal landfill locations and distance to settlements shows a negative relationship in Lucendo-monedero, Jordá-borrell, & Ruiz-Rodríguez's (2015) research. However, research that had been conducted in Japan showing positive results between illegal landfill locations and distance to settlements (Ichinose and Yamamoto, 2011). Garbage that is placed illegally can have risks to the economy, environment, and social (Glanville and Chang, 2015). The quality of the environment can decrease due to special concentrations of waste such as iron, hydrocarbons, nitrogen, and gasoline (Glanville and Chang, 2015). Besides, the illegal landfills environment has an impact on public health, statistically, the existence of illegal landfills contributes significantly to the number of kidney and lung sufferers in the same area (Glanville and Chang, 2015). The area's topography features determine the dangerous level of the distribution of existing illegal landfills. The results of research by Jakiel et al. (2018) shows that illegal landfills have arisen in many valley areas adjacent to water bodies. In addition to the research location, Jakiel et al. (2018) is an area with karst rock types, so pollutants from the illegal landfills can be easily infiltrated to groundwater. The category that a location is said to be illegal landfills is if the existing rubbish heap is greater than 1 m^2 (Jakiel et al., 2018). The variables used to analyze the distribution of illegal landfills are the size of the illegal landfill location, solid waste composition, regional topographic features, and age (Jakiel et al., 2018). The size of this illegal landfill location in the research of Jakiel et al. (2018) is measured in m^2.

Methods

Survey

This research using secondary data owned by the government and taking primary data from field surveys. Spatial data such as rivers and population density are secondary data obtained from the government, for road networks in this research using OpenStreetMap Indonesia data. Waste management facilities both transport routes and legal landfill locations are obtained from interviews and interviews with the government. Primary data such as illegal landfill locations were obtained by tracking all roads in the study area. The primary survey is carried out with the help of a mobile application to provide location coordinates, record images, and survey forms.

Methodology

The field survey that was conducted focused on mapping the distribution of illegal landfill locations by crossing the entire road network in the study area. The survey form is prepared digitally to obtain detailed information regarding the illegal location of the landfills encountered. Detailed information on illegal landfills regarding the type of land cover at that point, the extent and volume of illegal landfills, and documentation. Regional physical data, waste management services, and illegal landfill locations are analyzed using spatial buffer analysis, euclidean distance and simple statistics to determine the relationship between variables.

Results And Discussions

General Figures

Based on the field survey, 123 illegal landfills were found in Sukmajaya District, Depok City. In Tirtajaya subdistrict with the lowest population density at 6,171 people / km^2 has the highest number of illegal landfills was found, 41 locations (33%). Cisalak subdistrict has a population density that is not much different from Tirtajaya Subdistrict, which is 6,731 people / km^2 but the number of illegal landfills is at least 7 location points. Sukmajaya Subdistrict with the third-lowest density found 20 locations (16%) illegal landfills. Slightly different from Sukmajaya Subdistrict, Baktijaya Subdistrict found 19 illegal landfill locations (15%) with a much higher population density than Sukmajaya Subdistrict which was 19,939 person/km^2. Abadijaya Subdistrict, which is the most populated found 23 illegal landfills (19%), then Mekarjaya Subdistrict has 13 illegal landfills locations (11%).

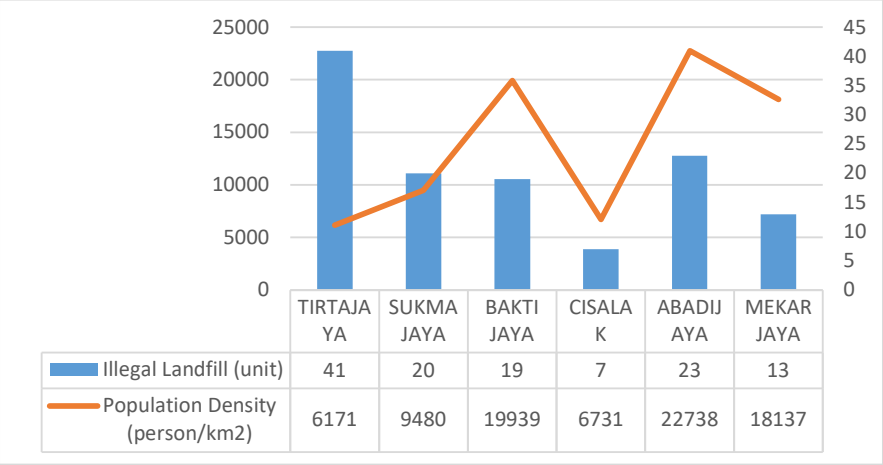

Sukmajaya Subdistrict has 3 population density categories namely less than10,000 person/km^2 in 3 Subdistrict namely Sukmajaya, Tirtajaya, and Cisalak. In the Mekarjaya and Baktijaya Subdistrict are in the population density of 10,000-20,000 people / km^2. Abadijaya Subdistrict has the highest population density with 22,738 people / km^2 and belongs to the population density of more than 20,000 people / m3.

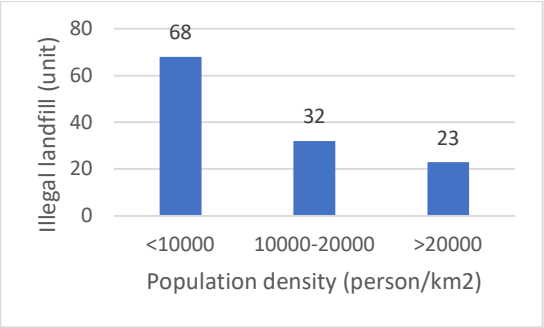

The lowest population density category has the highest number of illegal polling stations with 68 location points. In areas, with a population density of 10,000-20,000 person/km^2 32 illegal landfill locations were found, with at least 23 illegal landfills found in the densest areas with a category more than 20,000 person/km^2. The survey results show that the number of illegal landfills with population density has an inversely related relationship, the higher the population density, the less the number of illegal landfills found.

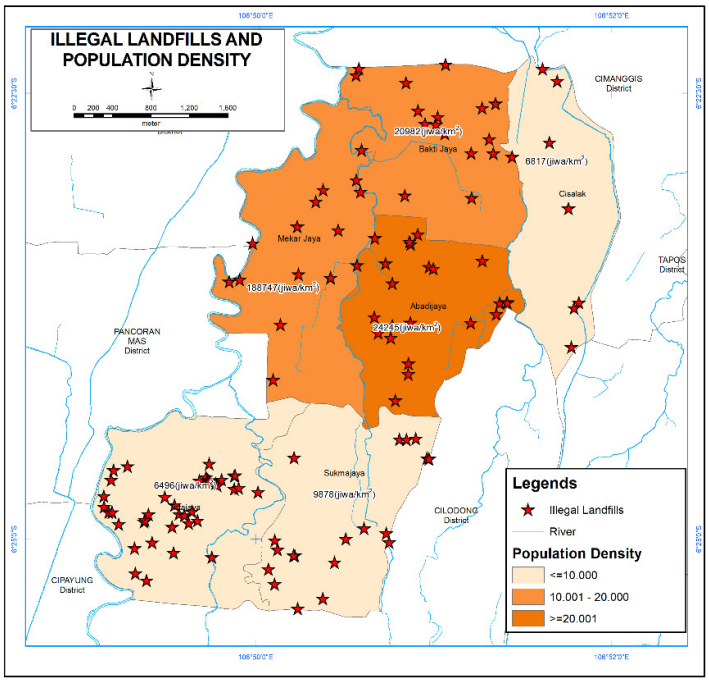

Relation Illegal Landfills and Geophysics

Geophysical elements used in this research are based on the type of land cover, distance from the road and distance from the river. The type of land cover surveyed consists of seven types, namely settlement, roadside, vacant land, riverside, park, paddy field/field/garden and drainage side. The survey results show that illegal landfills locations are spread over 4 types of land cover, namely vacant land, riverside, roadside, and settlement. The distribution of illegal landfills is mostly found on the type of vacant land, namely 68 locations, while the least is on the riverside with 2 locations.

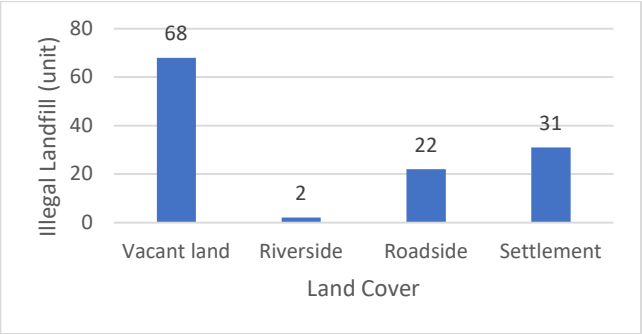

In the type of roadside, there are 22 illegal landfill locations and 31 illegal landfill locations in settlement types. The survey results show that illegal landfills are more commonly found in built areas such as settlements or vacant land. Based on previous research, the allegation of garbage disposal in this type is nearby residents. In contrast to illegal landfills that are on the roadside or riverside, the alleged garbage dumpers in this type are private vehicle drivers.

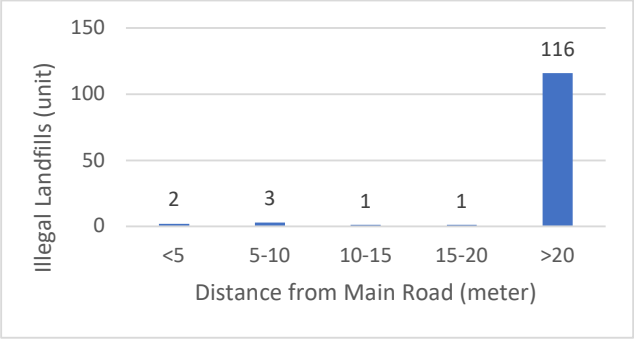

On the main road, 116 illegal landfill locations are found that are more than 20 meters from the main road, while very few are found at closer distances. Two illegal landfill location points are less than 5m, there are 3 illegal landfills location points between 5 m-10 m. In the range of 10 m-15 m and 15 m-20 m, each found only 1 illegal landfill location. This shows that the existence of the main road has a negative relationship or is inversely related to the location of the illegal landfill location, further away from the main road the more illegal locations are found.

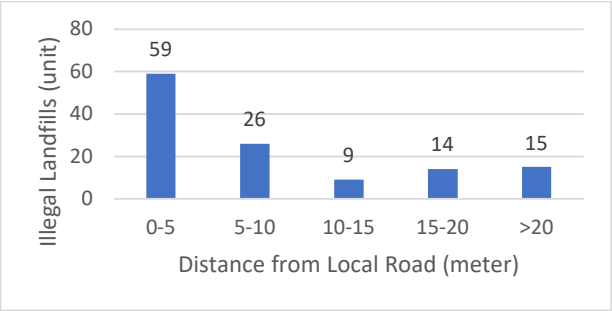

The relationship between the location of illegal landfills and local roads is divided into 5 categories starting from the closest distance less than 5 m, 5 m-10 m, 10 m-15 m, 15 m-20 m, and more than 20 m. The pattern of distribution of illegal landfill locations found on the main road is different from the distribution pattern on local roads which shows the opposite. At most local roads there were 59 illegal landfill locations at 0 m-5 m category. The second most is at 5 m-10 m category, with a total of 26 illegal landfill points. But in the next range of 10 m-15 m, there were found at least illegal landfill

points, 9 locations. Increased again at 15 m-20 m category with 14 points illegal landfills and 15 points illegal landfills at more than 20 m categories. Findings from the results of this survey show that distance to local roads has a positive relationship with the presence of illegal landfills points. The closer a location is to a local road, the higher the possibility of the emergence of illegal landfills at that location.

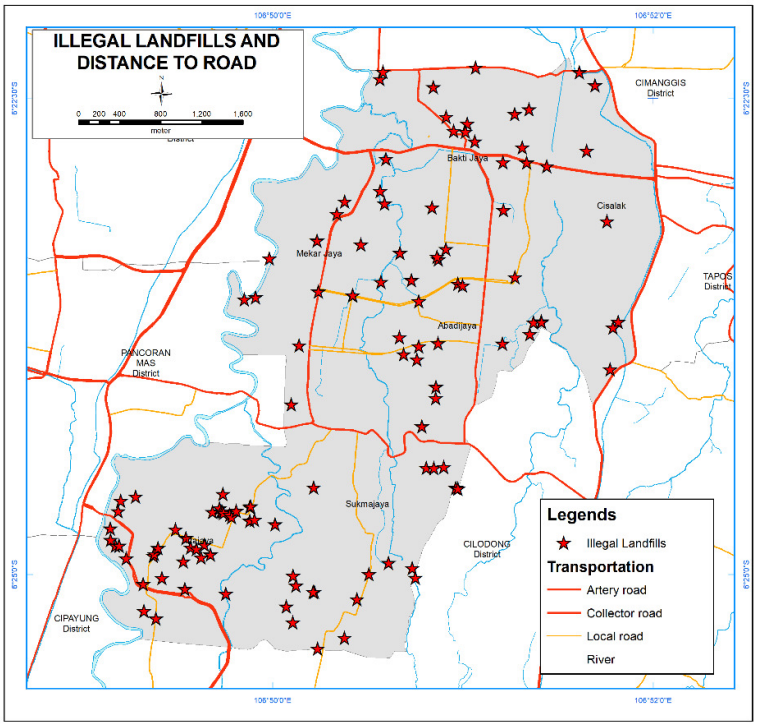

The relationship between the location of illegal landfills and the river is divided into 5 categories, starting from the closest distance of less than 100 m, 100 m-200 m, 200 m-300 m, 300 m-400 m, and more than 400 m. Illegal landfills distribution pattern with the distance to the river evenly from the closest to the farthest.

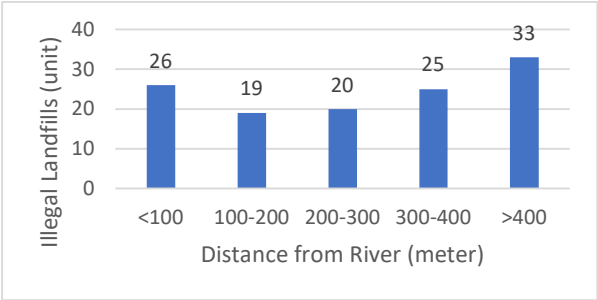

The survey results show that the most illegal landfill locations were found at more than 400 m category by 33 location points. However, the second most is at less than 100 m category by 26 points. The third-largest is at 300 m-400 m category from the river by 25 points. Categories 200 m-300 m from the river found 20 illegal landfill locations and at least 18 illegal landfill locations found in the distance of 100 m-200 m from the river. The survey results show that the location of illegal landfills has a negative relationship with the distance to the river, the further from the river, the more points found illegal landfills location. This shows that the people of Sukmajaya Subdistrict already have an awareness not to throw garbage in the river.

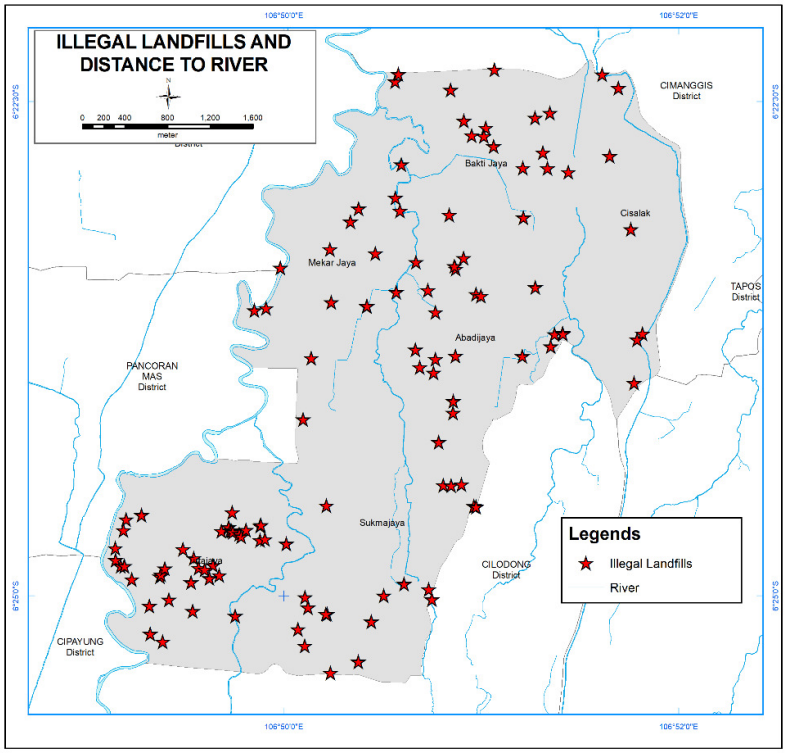

Relation of Illegal Landfills and Waste Management Service

In this research, investigate the relationship between the distribution of illegal landfills with waste management services that already exist in the Sukmajaya District. The waste management service consists of the service area which is seen from the distance to the existing legal landfills, both constructed or not. Waste management services apart from the service area are also seen from the service route.

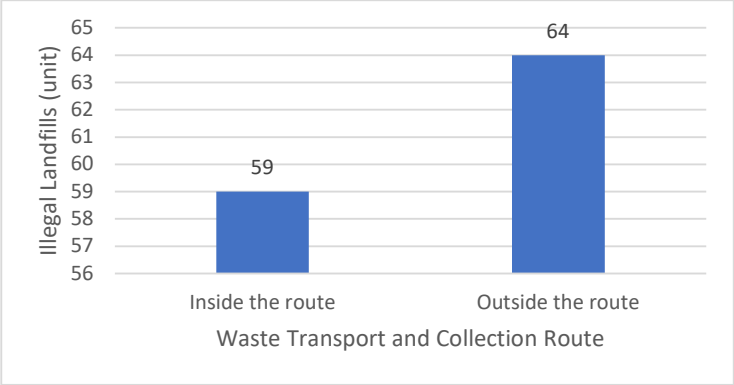

The relationship between illegal landfills location and waste management service route is categorized into 2, namely the area inside the collection route and the area outside the collection route. The survey results show that the number of illegal landfills outside the route is more than the illegal landfills inside the collection route. The number of illegal landfills inside the collection route is 59 locations while the number of illegal landfills outside the collection route is 64 locations.

The relationship between the location of illegal landfills and the official landfills is divided into 5 categories, starting from the closest distance of less than 100 m, 100 m-200 m, 200 m-300 m, 300 m-400 m, and more than 400 m. The survey results show that illegal landfills were found in 90% or 111 locations in the category of distances of more than 400 m from the official landfills. This result shows that one of the reasons for the emergence of illegal landfills is because there are still many areas that have not been served by official waste management facilities.

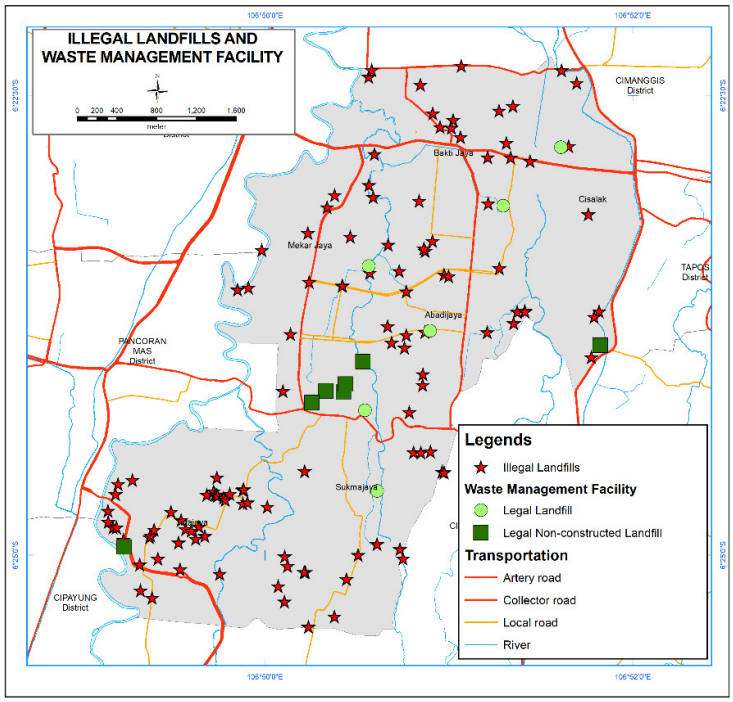

The relationship between the location of illegal landfills and the official non-constructed landfills is divided into 5 categories, starting from the closest distance less than 100 m, 100 m-200 m, 200 m-300 m, 300 m-400 m and more than 400 m. Survey results show that illegal landfills were found at 87% or 107 locations in the category of distances of more than 400 m from the official non-constructed landfills. This result shows that one of the reasons for the emergence of illegal landfills is because there are still many areas that have not been served by official waste management facilities.

Discussion

Using statistic and spatial analysis as described in the result section, the most influential factor is population density and availability of a waste management facility. According to the result shows that illegal landfills are more commonly found in built areas such as settlements or vacant land. This result agrees with the research that had been conducted in Japan by Ichinose and Yamamoto (2011), but at the same time disagree with Lucendo-monedero, Jordá-borrell, & Ruiz-Rodríguez (2015). This result could be affected by the culture of the country because Indonesia and Japan are Asian countries. Another finding shows that the location of illegal landfills has a negative relationship with the distance to the river, the further from the river, the more points found illegal landfills location. These findings were different from the results of research by Jakiel et al. (2018). That research shows that illegal landfills have arisen in many valley areas adjacent to water bodies.

Conclusion

This research aims to identify the pattern of illegal landfills for the improvement of waste management. The result shows that illegal landfills have a positive relation with population density and distance to the local road. Illegal landfills also have a negative relation with distance to the primary road, distance to the river, and distance to waste management facility. Sukmajaya District had the most influential factor is population density and availability of waste management facility.

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Health Education and Health Literacy Correlation: The Case of the Factors affecting Breast Cancer Screening

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Abstract

Nowadays, cancer remains a serious disease, associated with heavy treatment costs and long-term sequelae that represent high costs of care. However, earlier diagnosis means better chances of cure and less extensive treatment. This work highlights the socio-demographic and medical factors of patients with breast cancer admitted into the 'reproductive health referral center' RHRC of Tetouan, and their impact on the various waiting-times, from onset of symptoms to access to histological diagnosis.
This is a retrospective descriptive study conducted on the breast cancer in the RHRC of Tetouan. We used accessible data from 81 women with breast cancer on registers, ranging from 46 women in 2017 to 35 women in the first half of 2018. In this study, the average consultation time is 260±345 days. As for the patients, 21% were between 18 and 39 years old, almost half 46.9% had a very low socioeconomic level and almost 33.3% were illiterate. Delay attributable to the patient or the health system delays diagnosis. Patient socioeconomic level was significantly (p=0.004) associated with health system delay, and education was significantly associated with consultation delay (p=0.020) and total time to diagnosis (p=0.026). To improve the quality of access to breast cancer care, it is necessary to make more efforts by adopting a policy whose main actions tend to minimize the factors which accentuate the length of these delays and instill health education in the Moroccan teaching curriculum in order to increase the level of literacy among Moroccan citizens.

Keywords: Breast Cancer, Consultation Delay, Diagnosis Delay, Waiting-Times, Literacy, Morocco

Introduction

Nowadays, breast cancer remains a serious disease, associated with heavy treatments and long-term consequences that represent high management costs (Delaloge *et al.*, 2016; Maghous *et al.*, 2016).

As a result, systematic screening and improved treatment and management have been required to reduce breast cancer mortality over the past 20 years (Park, Anderson and Gail, 2015; Basu *et al.*, 2018). However, the role of screening is currently controversial in terms of improving treatment (Gøtzsche and Jørgensen, 2013).

The prognosis of breast cancer is strongly linked to biology (hormonal receptors, Her2, proliferation, immune infiltrate...), but also to its stage at diagnosis.

An earlier diagnosis is synonymous with a better chance of cure, but also with less burdensome treatments (Mandelblatt *et al.*, 2016).

While early diagnosis improves the prognosis and is a decisive step in the process of breast cancer management, the current state of breast cancer care in Morocco is marred by a number of observations that may constitute obstacles to improving the quality of its management (Mimouni *et al.*, 2018).

Indeed, several studies have shown that delay in diagnosis and access to treatment remains a major problem (Rutqvist, 2006; Chintamani *et al.*, 2011; Hansen *et al.*, 2011), which has led to an awareness of the lengthy delays in access to care (Maghous *et al.*, 2016).

These waiting times depend both on the patient himself and on the health system in general. They may vary by country, region, patient characteristics, type of cancer and management strategy (Pourcel *et al.*, 2013). As a result, timeliness of care and access to care services has become a priority in public health policy at the international (Revaux *et al.*, 2014) and national (Basu *et al.*, 2018) levels, and is an important component of quality and continuity of care. It is also an indicator of healthcare system performance and a tracer of inequalities in access to healthcare (Molinié *et al.*, 2013). Some countries have committed themselves to the evaluation and quantified reduction of the time taken to treat cancers and have made this an objective of their cancer plans (Pourcel *et al.*, 2013).

As for Morocco, to date there is very little data available on the various consultation, diagnosis and treatment access times (Mimouni *et al.*, 2018).

Hence the objective of this retrospective epidemiological study spread over one and a half years (starting in 2017) was to determine the consultation, referral and histological diagnosis times of women with breast cancer admitted to the Reference and Reproductive Health center of Tetouan (RRHT) and to analyze the factors likely to influence duration.

The present study targeted a Moroccan sample of women with breast cancer at Tetouan reference center. The aims of this study were to

1) Analyze the most common causes of delays
2) Determine the delay time in the diagnosis of breast cancer in a sample of Moroccan women

Subjects and Methods

Study Population

The study is a retrospective study where the sample was based on the medical files of admitted patients for breast cancer at a reference center in Tetouan during the period from January 2017 until the first semester of 2018. Reference and reproductive health center of Tetouan (RRHT) is a Basic Health Care Facility (BHCF). The center is composed of two physicians, a head nurse, an administrator and two midwives.

The inclusion criteria's included all patients diagnosed with breast cancer and admitted to the Tetouan reference center during this period.

Data Collection

Different documents (e.g. patient records, reference center daily records, quarterly activity reports, breast cancer registry, mammographic examination reports, and pathology and extension examinations) were used in order to collect sociodemographic and clinical variables of included patients. We have received prior authorization for the collection of data, so we would like to thank the managers and the entire team of the reference centre for their cooperation.

Sociodemographic variables were analyzed including age, socioeconomic status, place of residency, and education. Other variables, related to the patient or the health system, were selected to assess their relationship to the different time frames described above. They have been categorized based on data from the literature (Benbakhta *et al.*, 2015; Mimouni *et al.*, 2018). The socio-economic level was

defined on the basis of the monthly income per household published by the High Commissioner's Office for Planning with moderation:

-Very low economic level: with a monthly income below 2000DH/household
-Low economic level: to monthly income between 2000DH and 3000 DH/household.
-Medium economic level: Monthly income between 3000 and 10 000 DH/household. While clinical variables included the referee (person who referred the patient to the reference center), history of tumor in the family, tumor characteristics (tumor size, size as measured at X-ray examination, lymph nodes involvement, Bi-RADS "Breast Imaging Reporting and Data System" mammographic classification of ACR (American College Radiology)), and diagnosis motif of reference (nodule, nipple discharge, other motifs included swarming and extreme fatigue). Moreover, the criterion for different delays were analyzed including patients delay, reference delay, histological diagnosis delay, and total diagnostic delay. Patients delay refers to the time elapsed from the first symptoms to the first medical consultation; reference delay refers to the apse of time from the first medical consultation to when patients access the reference center, while histological diagnosis delay refers to interval of time from the first medical consultation until the diagnosis based on the histopathology exams. Finally, total diagnostic delay included interval of time between the apparition of first symptoms and the date of histologic diagnosis.

Statistical Analysis

Basic characteristics were calculated by use of descriptive statistics including means, medians, standard deviation, effectives, and percentage. Violation of the normality assumption was revealed by Shapiro-Wilk test in the delays data. Consequently non-parametric test were performed. The comparison of the different delays according to socio-demographic and clinical variables was ensured using Kruskal-Wallis H and Mann-Whitney U tests. The delays were presented in the form of means and medians. All statistical analysis were conducted by use of SPSS V 21 with significance set at 5%.

Results

After the notification of the first symptoms within the breast area, 8.6% of women were able to see a doctor within 7 days. Another 19.8% of patients visited a doctor within the period of 8 to 30 days. 23.5% had a medical visit between 1 to 3 months. While 16% had an appointment between 3 to 6 months. 32.1% of the patients had medical appointment not before 6 months (Table 1).

Table 1: Distribution of patients on different delay times for the diagnosis of breast cancer

Patients delay						
Time	7 days and less	From 8 to 30 days	Over 1 to 3 months	Over 3 to 6 months	Over 6 months	Total
N	7	16	19	13	26	81
%	8.6	19.8	23.5	16	32.1	100
Reference delay						
Time	7 days and less	From 8 to 30 days	Over 1 to 3 months	Over 3 to 6 months	Over 6 months	Total
N	50	19	6	6	-	81
%	61.7	23.5	7.4	7.4	-	100
Histological diagnosis delay						
Time	7 days and less	From 8 to 30 days	Over 1 to 3 months	Over 3 to 6 months	Over 6 months	Total
N	36	31	13	1	-	81
%	44.4	38.3	16.0	1.2	-	100
Total diagnostic delay						
Time	7 days and less	From 8 to 30 days	Over 1 to 3 months	Over 3 to 6 months	Over 6 months	Total
N	-	10	17	16	38	81
%	-	12.3	21	19.8	46.9	100

After visiting a specialist physician, women were asked to perform medical tests. The results revealed that the mean time for a patient to visit a doctor after the apparition of first symptoms that could indicate breast cancer to the first medical visit was 260.8 days. However, the average time from the first medical consultation to patient access to reference center was only 22.5 days; while the average time from the first medical visit until histological test completion counted for 21.6 days. Finally, the time from the first symptom that could indicate breast cancer to histological test completion was 305 days (Table 2).

Table 2: The mean waiting time of women during breast cancer diagnosis

	Mean ± SD	Min	Max	Median	N
Patients delay	260.8 ± 345	3	1440	90	81
Reference delay	22.5 ± 40.5	0	180	3	81
histological diagnosis delay	21.6 ± 26.6	0	150	10	81
Total diagnostic delay	305 ± 349.7	10	1777	157	81

Table 3: Different delay times with regard age, place of residency and socioeconomic status

	Age range				Place of residency			Socioeconomic status			
	18-39	40-69	≥ 70	Sig	Village	Town	Sig	Very low	Low	Medium	Sig
Patients delay	**316.47**	**219.57**	**501.67**	**.05**	**287.42**	**237.28**	**.23**	**226.21**	**255.75**	**321.52**	**.172**
Reference delay	**11.18**	**25.28**	**28.17**	**.587**	**12.08**	**31.77**	**.115**	**29.79**	**12.15**	**19.57**	**.463**
histological diagnosis delay	**11.76**	**24.19**	**25**	**.054**	**14.92**	**27.58**	**.607**	**26.5[a]**	**10.25[a]**	**23.52**	**.004**
Total diagnostic delay	**339.41**	**269.03**	**554.83**	**.153**	**314.42**	**296.63**	**.784**	**283.00**	**278.15**	**364.61**	**.520**

[a] *Mann–Whitney U Test (N= 58, U= 181.500, p = .001).*

Table 3 displays the comparison between the different delays and sociodemographic variables assured by Kruskal Wallis and Mann–Whitney U Tests. The comparisons revealed a significant difference in terms of socioeconomic status of patients with breast cancer for the health system delay. The mean time for the very low socioeconomic status group 26.4 days; this was significantly ($p < .01$) higher than the patients with a low socioeconomic status (N= 58, U= 181.500, $p = .001$).

Table 4: Different delay times with respect to level of education and the referent

	Level of education					Referent				
	No qualification	Primary school	Secondary school	Higher education	Sig	The patient	Hospital	Health staff	Association	Sig
Patients delay	**390.74[a]**	**168.16[a,b]**	**217.29**	**300[b]**	**.020**	**291**	**259.82**	**292.04**	**224.42**	**.669**
Reference delay	**22.52**	**19.25**	**31.35**	**13.6**	**.867**	**16.2**	**22.39**	**19.75**	**26.79**	**.998**
Histological diagnosis delay	**19.41**	**25.47**	**21.76**	**8.8**	**.343**	**0[e,f,g]**	**19[e]**	**27.04[f]**	**23.83[g]**	**.014**
Total diagnostic delay	**432.67[c]**	**212.88[c,d]**	**270.41**	**322.4[d]**	**.026**	**307.20**	**301.21**	**338.83**	**275.04**	**.907**

[a] Mann–Whitney U Test *(N= 59, U= 267.500, p = .012).*
[b] Mann–Whitney U Test *(N= 37, U= 28.000, p = .019).*
[c] Mann–Whitney U Test *(N= 58, U= 260.500, p = .009).*
[d] Mann–Whitney U Test *(N= 37, U= 32.000, p = .032).*
[e] Mann–Whitney U Test *(N= 33, U= 17.500, p = .006).*
[f] Mann–Whitney U Test *(N= 29, U= 5.000, p= .001).*
[g] Mann–Whitney U Test *(N= 29, U= 10.000, p= .003).*

The comparison in terms of patients delay time and total diagnostic delay with education level revealed a significant difference between the four groups (*e.g.* no qualification, primary school, secondary school, higher education) ($p < .05$). Mann–Whitney U Test revealed significant higher average time for the group with absence of any qualifications (390.74 days) when compared to those who reported primary school level (168.16 days) *(N= 59, U= 267.500, p = .012)*. Similarly, total diagnostic delay for those with no qualifications (432.67 days) was higher when compared to the other education level groups and significantly higher than those who reported primary school level (212.88 days) (N= 58, U= 260.500, $p = .009$). With respect to the person who referred the patient, health system delay was significantly lower (0 days) when the patient refers oneself compared to the hospital (19 days), health staff (27.04 days), or an association (23.83 days) (Table 4).

Table 5: Different delay times with respect to the motif of reference and tumor size

	Motif of reference				**Tumor size**		
	Nodule	**Nipple discharge**	**Other motifs**	**Sig**	**Less than 3 cm**	**More than 3 cm**	**Sig**
Patients delay	362	313.6	68	.174	198.69	252.55	.160
Reference delay	26.7	50.4	23.9	611	19.77[c]	30.39c	.022
Histological diagnosis delay	18.95	24.8	21.5	.972	31.85	23.42	.584
Total diagnostic delay	407.65[a]	388.80[b]	113.40[a,b]	.047	250.31	306.36	.222

[a] *Mann–Whitney U Test (N= 30, U= 53.500, p = .041).*
[b] *Mann–Whitney U Test (N= 15, U= 6.000, p = .020).*
[c] *Mann–Whitney U Test (N= 59, U= 282.000, p = .022).*

The group who had nodule and nipple discharge as a motif of reference displayed the significant highest time average (407.65 and 388.8 days; *(N= 30, U= 53.500, p = .041 & N= 15, U= 6.000, p = .020;* respectively) for the total diagnostic delay when compared to other motifs (such as swarming, intense fatigue...). While those who had a tumor size of more than 3cm had significantly higher reference delay (30.39 days) when compared to those with lower tumor size (19.77 days) *(N= 59, U= 282.000, p = .022)* (Table 5).

Discussion

This work has several scientific and methodological advantages, since it allowed us to draw up an inventory of the delays in breast cancer management at the Reference and Reproductive Health center of Tetouan (RRHT) and it is the first study of this type in our region.

It highlights the medical, educational and socioeconomic factors of admitted breast cancer patients (RPHT) and their impact on the various delays, from the onset of symptoms to access to histological diagnosis by these subjects.

We were interested in the measurement of delays in access to diagnosis since they are part of the different care times, which appear as performance indicators of the health care system (Maghous *et al*., 2016). A quality healthcare system must continually measure and evaluate its delays in order to minimize them, because the longer the delay, the more the patient loses confidence in the healthcare system, and the illness may worsen and may go from an early stage of cancer to a high, even incurable, stage (Li, 2013).

In the present study, the average consultation time was 260±345 days with a median time of 90 days, which is higher than that of a national study (Benbakhta *et al*., 2015), which was 65 days. This is higher than the one reported in some European countries. Such as Italy (Montella, Crispo and Aiuto, 2001), France (Latrache *et al*., 2004), Great Britain and Germany (Nosarti *et al*., 2000), which had median delays of 31, 28, 13 and 21 days respectively, but this delay remains lower than that recorded in Tunisia (Landolsi *et al*., 2010), Libya (Eramah *et al*., 2012) and Iran (Montazeri, Ebrahimi and Mehrdad, 2003).

With regard to the reference time (time taken from the local health Centre to the Reference and Reproductive Health Centre), the average was 22.5±40.5 days, with a median of 3 days, with a maximum of 180 days and a minimum of 0 days. In our research, we decided to study it because of its importance in order to evaluate the quality of the reference circuit in this region and to compare it with other research at a national and international level.

For the time of histological diagnosis, the mean was 21.6±26.6 days, with a median of 10 days, which is lower than those found in two national studies (Benbakhta *et al*., 2015; Mimouni *et al*., 2018); which were respectively 20 days and 29.5 days, inferior to that in Tunisia (Limam, 2015) which was 15 days and that of a study in France (INCA, 2013) which was 13 days. As for the total time to diagnosis, the mean is 305±349.7 days, with a median of 157 days, which is higher than that of a national study, which was 20 days (Benbakhta *et al*., 2015).

With regard to socio-demographic factors, the time to visit (time a patient takes from the onset of symptoms to the day she visits), shows a significant association with age groups; where the young age group [18-39] shows a significantly shorter delay compared with the old age group +70. This was confirmed by other studies, where age was considered a risk factor for both cancer development and long delay [15-49]. Therefore, any education and intervention program should target older women in particular (Grunfeld *et al.*, 2002).

The socioeconomic level of patients was significantly (p=0.004) associated with the time to histological diagnosis, with women with very low economic status being diagnosed late, a result similar to other studies (Benbakhta *et al*., 2015).

Education level is significantly associated with the time to consultation and with the total time to diagnosis. In fact, the time to consultation of patients with primary school education is lower than that of illiterate patients, similar to other research where education influenced the time to diagnosis (Khan *et al*., 2018). However, in our study, women with higher levels of education lagged behind those with only one level of education, which may be because their higher education level did not positively influence their literacy or because their education system lacked specialized education about breast cancer prevention and early detection.

Time to referral was significantly associated with tumor size greater than 3cm (p=0.02), a result similar to other studies (Benbakhta *et al*., 2015). We find that the longer patients wait, the worse their disease gets.

Mammographic classification did not show significant differences in the different time frames.

Patients who present nodules as a reason for referral have a significantly higher total time to diagnosis than those with other symptoms (intense fatigue, tingling, etc.); the lack of knowledge about breast cancer symptoms probably explains this. However, women need to be educated about the different types of breast cancer symptoms.

Finally, in order to better understand the factors influencing the delay of diagnosis and treatment of breast cancer patients, studies are needed to investigate these associations, particularly in Morocco.

Limitations

The duration of the study was only 1.5 year, which gives it an aspect of exemplarity and not representativeness. We focused only on the time taken for consultations, referrals and diagnoses since they are the only time periods accessible in the documents. We did not deal with the time taken to access treatment since it is not one of the missions of the reference Centre, but there is still a significant time period and we suggest that other studies look at this time period; this could make the work more comparative at the national and international level.

Despite these limitations, we have made significant efforts to highlight those findings that could be useful and serve as a basis for further research and the development of recommendations to promote quality management of breast cancer patients in this country.

Conclusion

Through this work, although it was only exemplary, we demonstrated that both patient-attributable and health system delays play a role in delaying access to diagnosis and later access to treatment for breast cancer patients in our region.

We have highlighted some factors that impede their referral pathway such as the academic and socioeconomic level of the subjects.

In fact, these patients most often consult late after the onset of symptoms. It is important to bring these patients to consult at an early stage and this, by several complementary measures: by sensitizing them, by reinforcing the patient's circuit, by providing the oncology health structures with sufficient human and material resources.

Earlier diagnosis means a better chance of cure, but also less burdensome treatment. Therefore, we suggest making greater efforts to improve the quality of access to breast cancer care by adopting a policy whose main actions tend to minimize the factors that increase the length of these delays and to inculcate health education in the Moroccan educational curriculum in order to increase the level of literacy among Moroccan citizens.

As for the tests currently used for the diagnosis of breast cancer in Morocco: mammography, biopsy and MRI; they remain important, but we recommend developing research on epigenetic biomarkers and the detection of tumor-induced mutations in circulating DNA in order to carry out tests that diagnose cancer very early or even predict it (pre-cancer).

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Leadership in Sports Teams in The Light of Research on Organizational Culture (Ice Hockey Trainers in Poland)

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Abstract

The purpose of the article was to show the issues of leadership in sports teams on the example of ice hockey. The undertaken research focused attention on the issues of current and desired leadership style in ice hockey team's management. The OCAI Cameron and Quinn questionnaire was used. In the light of the research results obtained, it can be stated that the ice hockey coaching staff, centered at OSHL, perceives the current features of the work environment, which are characterized by hierarchical culture. The formalization of interpersonal relationships dominates, in which hierarchy applies and strict procedures apply. Leaders are coordinators focused on efficiency, which in the case of sport is expressed by the result of the game. Efficiency is ensured by formal rules and regulations. On the other hand, they believe that the organizational culture of the coaching work environment should undergo a metamorphosis. Clan culture creates a friendly workplace in which people willingly interact with each other. Reminiscent of a big family. Bosses and supervisors assume the role of advisors, teachers and even parents. The organization continues thanks to employee loyalty and commitment to tradition. A high degree of involvement is observed. The organization emphasizes the long-term benefits of personal development and attaches great importance to consistency and morale. The measure of success is the development of human resources and concern for employees. The organization highly values teamwork, participation and consensus.

Keywords: Organizational Culture, Sport Leadership, Ice Hockey

Introduction

Ice hockey as a discipline of team sports game bases its functioning on the organizational and legal principles of the Polish Ice Hockey Association (PIHA, org. PZHL). In terms of training and functionality (training, sports games, HR processes, etc.), it is based on the functioning of Ice Hockey Training Centers (IHTC, org. OSHL) and the work of managing managers (trainers) who manage the players' activities. The relationship between managing managers, ice hockey trainers, and executive employees (ice hockey players) is a case study, by analogy with other work environments, types of organizations and sectors of the economy. As an organization, it creates a specific organizational culture in the ideal (goals, values, strategy), normative (norms, rules, regulations, statutes and regulations) and physical and material (physical, communication and behavioral artifacts).

This specific sports environment (ethos, physical structure, dress code, proxemics of the rules of the game, etc.) has a specific vision of methods and techniques of managing people, ice hockey players, which in their operational work is expressed and applied by managing managers, ice hockey trainers. An environment of very hard and permanent competition can become a case study and an example for other sports organizations and disciplines, as well as other sectors of the economy in which fierce struggle and competition take place. One of the most important aspects of organizational culture is the dominant management style and it has just been analyzed as part of this research process. The middle level of management, line managers, implement the strategic arrangements of the highest

level of management, therefore, organizational culture managers, trainers and managers were subjected to research in organizational culture.

The issue of leadership is currently of great interest to both scientists and management practitioners participating in various sectors of the economy. One of the most popular and arousing public interest is sport, although in general it is not directly associated with management and science. This sector of the national economy has enormous image, investment and economic potential, which puts it at the forefront of other economic sectors.

Apart from the indisputable social values of sport, it also has its economic value and constitutes a significant part of the national economy. Information on employment and the share of the sports sector in both state revenues as well as in public and private sector expenditure are necessary to create strategies in the field of sport and to plan future activities that are part of the implementation of the state's economic policy. Macroeconomic values related to sporting activities can also be used to plan tasks with a broader regional or EU scope (GUS, 2010:6).

The impact of sport on the economy is almost PLN 10 billion. In 2018, the sport industry generated a total of PLN 9.63 billion in value added. This amount would al-low each Polish citizen to finance two tickets for the qualifying matches of the European Championships. At the same time, it generated a total of nearly PLN 3 billion in remuneration. This amount is equivalent to the sum that each year the newly-weds receive as wedding gifts. In 2018, the sport industry also contributed to maintaining a total of nearly 109 thousand. jobs. Such a number of jobs would make it possible to find employment for every eighth unemployed person in Poland (Polish Economic Institute, 2019:4).

Sport, which is primarily associated with active leisure, or sports competition, is also an important branch of industry. It is part of the national economy and generates revenues for the state budget. On the other hand, sport is related to the expenses of the state budget, budgets of local governments, private enterprises and house-holds (GUS, 2010:7).

Therefore, it seems justified that issues related to leadership, so important for the economy, both on a microeconomic and macroeconomic scale, should be the subject of scientific analysis in relation to the sports sector. However, the article is not devoted to the issues of sport economics, but to one of the factors that contribute to the formation of the mentioned multiplier, namely the culture of leadership.

Leadership as an interpersonal process between a leader and a team is particularly expressive and specific in relations of a military, rescue and sport nature. In sport, however, the relationship between the leader - trainer and player - student is interesting. Coaching activity in team sports becomes particularly important.

As a consequence of the above justification, the author of the presented article set himself the goal of presenting the results of leadership tests in the environment of ice hockey coaches. As a niche discipline, he does not enjoy equal interest in foot-ball, but due to the fact that ice hockey is a highly contact discipline and it causes strong emotions, leadership plays a particularly important role in it. Together with the competitive environment, sports and functional and functional infrastructure, rules of the sport discipline and the procedures of its training and playing, it creates an ice hockey culture, i.e. a specific type of organizational culture.

Despite some differences in the definition of culture, their authors generally do not show a significant polarization of views. They see it as a general term, which includes social behavior and standards in force in human communities, as well as knowledge, beliefs, art, law, customs, habits, habits and all forms of communication as well as motivational and cognitive processes that characterize their members. Leadership is an important element of culture and together with it creates a basis for the existence of various types of human communities, including socio-professional groups such as sports team coaches.

Culture in The Interpersonal and Organizational Dimension

Culture theorists seeking to systematize this concept have developed a typology for its definition, reflecting various aspects of cultural phenomena: descriptive and enumerating, historical, normative, psychological, structural, genetic and general description (Czaja, 2013:63).

Normative definitions of culture explain the basics of people's behavior in moral and cultural categories, emphasizing the importance of values and norms in shaping social structures and interpersonal processes. Stoner, Freeman and Gilbert write about it, defining culture as a set of important concepts, such as norms, values, attitudes and beliefs common to members of the organization (Stoner, Freeman, Gilbert, 2011:20).

Psychological definitions refer to psychic mechanisms that are the source of human cognition, including the process of learning, motivation, attitudes, creating habits, abilities and processes of interpersonal communication. Sikorski defined culture as: „a system of thinking patterns and actions that are well-established in the social environment of the organization and are relevant to the implementation of its for-mal goals" (Sikorski, 2002:4).

Structural definitions focus on the holistic nature of individual cultures and their internal specificity. Definitions of this type are attempts to define subject cultures, e.g. classes and social groups, professional groups etc. Piwowar-Sulej writes that culture: „is a model of basic assumptions that a given group discovered, invented or developed during confrontation with internal problems of this group or environ-mental problems. These assumptions have proved themselves, so they were considered binding and are passed on to new members of the group as an appropriate way of perception"(Piwowar-Sulej, 2014:143).

General descriptions are formulated for practical purposes, for the needs of institutions dealing with culture, as well as for teaching purposes. They contain a compendial set of cultural features, describe the methodology of its creation and development. The encyclopedic definition defines it as: the whole of the material and spiritual achievements of humanity, accumulated, preserved and enriched throughout its history, passed down from generation to generation. The culture understood in this way includes not only material products and social institutions, but also the principles of social coexistence, procedures, patterns, criteria of aesthetic and moral assessments adopted in a given community and determining applicable behavior.

The social and professional environment in which a particular professional group operates operates based on an organizational and legal structure, which is a type of formal organization, e.g. institutions, enterprises, associations, associations, etc. It generates various social and economic phenomena and processes that include the above-mentioned aspects of culture definition relating to a relatively specific organizational entity. It has a relatively mature, coherent and expressive organizational culture, in other words, the culture of a given socio-technical system.

Organizational culture is a practical methodology for the perception, identification and evaluation of an organization and its environment in the light of their mutual interactions and the context of these feedback, it is the result of laboriously acquired in-depth knowledge, as well as systematically achieved rich experience, acquired through social processes through an optimally configured personality decision-maker (...) on which they build groups, teams and organizations formed on the basis of developed standards " (Mrozowicz, 2010:13-29).

The presented article uses the theory and methodology for assessing the type of organizational culture by K. Cameron and R. Quinn, who define it as: „all the fundamental assumptions that a given group came up with, discovered or created, learning to adapt to the environment and internal integration. Unwritten, often sub-consciously followed rules that bridge the gap between what is written and what

is actually happening. Culture is about shared views, ideologies, values, beliefs, expectations and norms" (Cameron, Quinn, 2015:28-59).

Leadership in organizational culture

In the literature on the subject, there are many attempts to define the leadership process, which is one of the leading elements constituting culture, including organizational culture.

R. W. Griffin defines them as: using non-compulsory influence to shape the goals of the group or organization, motivating behaviors focused on achieving those goals and helping to determine the culture of the group or organization (Griffin, 2004:544). The author of the definition draws attention to the use of motivational influence to shape the group's goal in such a way that the group itself feels the desire to follow the leader, regardless of his formal position in the structure of the organization. The formal position of a leader strengthens the influence of leadership, the synergy of both types of power, formal and informal, acts as a catalyst, reinforcing the effect of leadership influence.

A. Kożuch believes that „leadership can be defined as a process of managing and influencing task-related group activities" (Kożuch, 2008:73). As in the previous definition, the lea-der influences the activities of the group, but omits the cause of the influence of in-formal power. Some leadership influences are discreet, camouflaged, unofficial and sometimes even confidential.

Coaching-oriented definition is cited by J. Stoner, who defines leadership as a process of managing and influencing the activities of group members related to its tasks (Stoner, 1997:453). In this approach, the formal authority of the leader is very strongly emphasized, while his optics of his actions focuses on goals rather than people. This kind of approach may prove useful during technique and motor skills training, where repetitions of activities and actions play the most important role until the complete automation of optimally effective behavior (eupraxia).

J. Deja and Z. Śliwa refer the concept of leadership to authority. „The leader is a human-age who refers mainly to his own substantive and moral authority. His actions are aimed at expanding and strengthening these types of authority. This does not mean disregarding formal authority. An effective leader bases his leadership on all his types and, depending on the situation, he emphasizes the one who meets the requirements of a given situation" (Deja, Śliwa, 2002:7) . An important role in leadership is played by, for example, one's own and authority, which, if they are based on their knowledge and skills, form the basis of trust, commitment and loyalty among subordinates. In the case of athletes, it is an absolute condition, because didactics and coaching practice should be based on authentic own resources. This does not mean that every good trainer should have masterful sports achievements, but should have the skills and knowledge to manage individual and team work.

The original vision of leadership is formulated by J. Woroniecki, writing: „no social cell can be included in its regulations in such strict notches that it functions like an automaton at the push of a button. It would be far from the ideal of human society, composed of rational and free individuals, whose spontaneous activities con-tribute to the common good. This superordinate activity of the subordinates is to be directed by the superior by means of orders and reminders, and it is now necessary to consider how he should do it" (Woroniecki, 2016:12). The originality of the above approach is based on the fact that its author placed the main emphasis on the ethical aspect of exerting managerial influence. Unfortunately, the whole of the thought cannot be considered an appropriate and universal leadership imperative. While conscious emission of leadership actions, leading to the achievement of some social good by a person, a team or organization, is a desirable phenomenon, the choice of management style based on formal instruments of power can be an ineffective means of influence which is to lead to this goal. In the repertoire of a good leader, apart from commands and reprimands, incentives, praise and rewards should take an important place.

The cited opinion of a well-known theologian and religious may be surprising given the nature of the social role he plays. It turns out that also in such a specific social environment, the issue of leadership is very important.

In summary, it should be emphasized that: ,,management is a continuous transfer of multidimensional interpersonal relations between the supervisor and subordinates, the leader and subordinates. Managing people enables the progression of work efficiency by shaping the individual and interpersonal competences of team members. Coordination activities belong to endogenous determinants, but their formation is conditioned by the influence of exogenous and situational factors" (Nagody-Mrozowicz, 2015:450). Issue of management actions in the form of exerting formal influence, delegation of decision-making powers, various forms of vertical communication, legal use of motivational reinforcements in the form of prizes and penalties, as well as shaping strategies and operational activities in creating and implementing the vision of organizational culture is a legalistic complement to power.

Sports team as a social system

A team is a set of people who have a common, specific goal and complementary skills (Kmiotek, Pecuch, 2012:150-170) . The team is treated as a specific, coherent group of people with clearly defined roles, norms and group responsibilities (Rutka, Wróbel, 2012:74-81). There is a sense of mutual responsibility in the team, a willingness to take actions and belonging together. The team, as an element of the organization, has both formal and informal connections, strives to perform specific tasks in order to achieve material and non-material gratification (Kożusznik, 2002:103-109). It is assumed that the team achieves better results than employees ac-ting individually, due to the synergy mechanism, based on resource transactions be-tween team members based on communication channels and interpersonal relations (Ćwik, 2013:2-10).

A sports group, like any group, creates a system - a set of interrelated ,,elements" that interact and are more than just a simple sum of their parts. The system has its structure, it is characterized by diversity, dynamism and ability to develop. Regardless of whether we consider a group of young athletes or older, the development stages of such a group are similar (Grzesik, 2020).

In today's sports reality, we are dealing with transfers almost virtually all the time and very rarely there are situations when a team at the senior level in the same statement plays for more than one season. There are smaller or larger rotations in the composition, both in terms of players and coaches. Bands are created from scratch. Every season, therefore, a group of strangers or only partially known to each other meets during the preparatory period. These units are to form a real team and achieve their goals. For some teams it will be the medal of the Polish champions-hips, for others it will be promoted to the higher class, while others will aim to stay in the league (Grzesik, 2020).

Polish Hockey League

The professional sports game of ice hockey teams is based on league games. On April 26, 2013, the Polish Ice Hockey Association (PZHL) set up a limited company, which aims to organize and manage the highest-level league games in Poland (thus becoming a professional league), while PZHL became the sole shareholder of the company. Up to and including the 2012/2013 season, the highest competition class in Poland operated under the name Polish Hockey League (PLH), and earlier as the first league. In June 2013, the HC GKS Katowice, Zagłębie Sosnowiec and Polonia Bytom clubs signed the contract with the Polish Hockey League (PHL). On July 15, 2013, the "Wild cards" declared 1928 KTH and MMKS Podhale Nowy Targ, entitling to play in the league provided that the licensing requirements are met. On July 25, 2013, three clubs were licensed: Polonia Bytom, JKH GKS Jastrzębie and MMKS Podhale Nowy Targ.

The essence of ice hockey tactics

Ice hockey is a very dynamic team sport game full of temperament and emotions, played on the ice pane with the use of specific sports equipment. Its characteristic feature is the constant, full of bustle and psychophysical advancement fight of two teams, interspersed with an alternating attack and defense (Gabryś, Rutkowski, 2002:12). The antagonized goals of stakeholders of both organizations - rival teams - cause permanent emotional tensions, dynamics and speed of offensive or defensive play, fast physical exhaustion with a properly selected system of changes, conditions of potential collisions and resulting injuries of the motor apparatus. During the offensive game, the main task of the competitor is to lead the puck, free himself from the defense player, assume the optimal shooting position and shoot at the opponent's goal (Mruk, 2000a). In a defensive game, the defender's task is to attack and block the opponent's body, try to take the puck and block shots (Mruk, 2000b). Ice hockey is a game in full physical contact, where the rules of the game tolerate violation of personal space to the limits of al-most physical aggression. A visual assessment of the hockey teams' struggle implies the unique confrontationality of ice hockey compared to other team sports. In basketball and handball, for example, there is also full body contact between players of opposing teams, but the technique and tactics of the game direct the player's attention to the elimination, reduction or minimization of contact (Grage, 2002; Neumann, 2003).

T. Gabryś and T. Rutkowski distinguish several so-called Hockey schools (Gabryś, Rutkowski, 2002:13), which, regardless of their type, require fast and perfect skating:

- Canadian, in which individual and brutal duels in full contact are a characteristic feature. The essence of the game is an individualized attack full of personal virtuosity, the whole team is involved in the defense, the goal of the game is its demonstration;

- Russian, in which the emphasis is on excellent physical preparation and high pace of the whole team. The emphasis is on the individual technique of driving and playing with a stick, as well as subordinating all competitors to the goal of the whole team. Collectivism is supported by a very large number of applications;

- Czech, which is based on a perfectly organized defense game of the whole team, which is the starting point for a fast and coordinated attack. In the defense game specific tactical tasks are carried out, in the offensive game individual predispositions and skills are used.

Ice hockey theorists and trainers point out the characteristic characterological and psychomotor features of players in this sport discipline (Kostka, Bukac, Safrik, 1986). The subjectification of pre-selection and recruitment assessments during recruitment for the first stage and in subsequent training cycles and phases is emphasized (Kostka, McDonald, 2002).

According to the trainers, the characteristics of an optimal ice hockey player are: motor speed, character hardness, resistance to brutal physical contact, creativity, the ability to soberly assess the situation, the ability to maintain emotional balance under the influence of intense sports competition. Playing technique and motor preparation are a sine qua non condition and only a starting point in shaping the result of a sports team (Gabryś, Rutkowski, 2002:15).

Characteristics of organizational cultures according to Cameron & Quinn

Culture programs the mind of its participant. It is a learning methodology that in a non-invasive and imperceptible way shapes the mind of an individual almost irretrievably (Mrozowicz, 2010:13-19). From now on, from the moment of initiation, that is, the first moments of learning, she becomes a member of the community and begins to count as much as it is worth the place she fell in the evolutionary flow of phylogeny. Mystically oriented fatigues will call this process karma, and statisticians will see in it the rules of normal distribution, the man of science should perceive it as a

result of the social orientation of human existence, based primarily on multiple forms of inter-personal communication.

G. Hofstede & G. J. Hofstede write: „culture is always a social phenomenon, because it is to some extent common to people living in a given social environment. Particularly noteworthy is the authors' digression that: Culture is an unwritten set of social game rules. It is a collective mind programming that distinguishes members of one group or category of people from another" (Hofstede G., Hofstede, 2007:17). Probabilistic features of culture are emphasized by comparing it to a game in which the account of probability rules, and the final states are merely equivalent. Culture is potential because it is created by libertarian oriented people who go beyond geometrically constructed patterns.

P. Bordieu perceived the collective programming of the mind on the basis of the statement that: „specific living conditions form a" habitus ", i.e. a system of constant and transmitted tendencies. Habitus is the basis of practice and ideas that interact without external control" (Bordieu, 1980:88-89). So the impact of the cybernetic super-system is not necessary for the internal organization of the part, which confirms the thesis about self-organization of the system and relative autonomy, according to L. von Bertalanffy (Bertalanffy, 1984).

According to the concept of organizational culture understood in this way, its theorists K. Cameron & R. Quinn created a typology of cultures and specified their axial features (Cameron, Quinn, 2015).

Clan culture is a friendly workplace in which people willingly cooperate with each other. Reminiscent of a big family. Bosses and supervisors assume the role of advisors, teachers and even parents. The organization continues thanks to employee loyalty and commitment to tradition. A high degree of involvement is observed. The organization emphasizes the long-term benefits of personal development and attaches great importance to consistency and morale. The measure of success is the development of human resources and care for employees. The organization highly values teamwork, participation and consensus.

Dynamics, entrepreneurship and creativity reign in the organization of adhocratic culture. People are not afraid of risk. Leaders are considered innovators and visionaries. What ensures organization consistency is the desire to experiment and intro-duce new products. It is important to lead the way in your field. In the long run, the organization puts emphasis on growth, taking challenges and acquiring new resources. Success is identified with offering unique products or services. The organization is seeking a leadership position in the field of products or services. The organization encourages freedom and initiative.

The hierarchical culture is dominated by formalization of the workplace in which strict hierarchy applies. Everything people do is governed by procedures. Leaders pride themselves on being good coordinators and organizers focused on efficiency. The most important is the efficient functioning of the organization. Its formal rules and regulations ensure consistency. The strategic perspective is about stability, per-formance and smooth operation. The measures of success are: reliability of deliveries, adherence to schedules and low costs. Employee management focuses on job security, ensuring stability and predictability.

In the market culture, the organization is primarily about results, the main concern is the implementation of tasks. People are very ambitious and focused on achieving goals. The leader is a supervisor focused on competitiveness and production. He is ruthless and demanding. Coherence of the organization ensures its expansiveness and willingness to win. Reputation and success are the main concerns. In the long run, what counts is competitiveness and achieving measurable goals. The measure of success is market share and continuous expansion of the market and gaining new ones. Competitive prices and market leadership are important goals. The style of management is based on the promotion of fierce competition.

Methodology of own research

In the methodological dimension of the presented research results, their interpretation and application aspects, the following issues will be discussed: research goals and questions, characteristics of the study group and description of the research tool.

Research goals and questions

In terms of research objectives, the following were distinguished:

- theoretical goal: presentation of organizational culture issues and ice hockey features, which due to the rules, strategy and features of this team game discipline, has a specific organizational culture;

- research goal: empirical identification of the dominant management style in ice hockey in the current (operational - "how is?") And future (strategic - "how should it be?") In the opinion of the management (hockey trainers / trainers on boats);

- application purpose: showing the relationship between the characteristics of a sport discipline and the management style preferred by managers as a case study for other sport disciplines and task teams of another type of organization.

The objectives of the research were achieved by verifying the answers to the following research questions:

- What type of organizational culture currently exists in the ice hockey coaching environment?

- What type of management style is currently used in the ice hockey coaching environment?

- What are the perceptions of organizational culture and leadership in the future (e.g. in the strategic dimension of 5 years)?

- What is the reason for the dissonance between the real and the potential situation, in other words between the perception of the current state and the anticipation of the future state?

Study Group

Ice hockey as a discipline of team sports game bases its functioning on the organizational and legal principles of the Polish Ice Hockey Association (PZHL). In terms of training and functionality (training, sports games, HR processes, etc.), it is based on the functioning of Ice Hockey Training Centers (OSHL) and the work of managing managers (trainers) who manage the activities of the players.

The sample was taken from the general population (GP) of OSHL trainers (GP = 53). The study group (GB) finally included 40 randomly selected ice hockey coaches from four Polish cities: Katowice, Oświęcim, Nowy Targ and Toruń. The sample has high representativeness in terms of quantity (75% GP) and distribution of respondents (all OSHL sets).

Research Tool

The purpose of the OCAI questionnaire for assessing the culture of the organization is to identify six basic dimensions of culture. The completed questionnaire is information on how the organization works and what values characterize it.

OCAI consists of 6 aspects, which are expressed in the form of question sentences:

1. What is the general characteristics of the organization? 2. What is the leadership style of the organization? 3. What is the style of employee management? 4. What ensures the consistency of the organization? 5. What is the most emphasized? 6. What are the criteria for the success of the organization? (Table 1).

The undertaken research focused attention on the issues of the current and desired leadership style in ice hockey teams management.

Each question has four answers, between which 100 points should be distributed in a way that reflects the situation of the organization. The closest answer to the truth will be the more assigned points. The current status is a type of culture in the pre-sent situation, while the desirable status is one that in the respondents' opinion should present the functioning of the organization in five years.

The results are obtained by adding up the points obtained, which have been allocated to the answer A in the current state column, after which this sum of points should be divided by six. The arithmetic mean of the points is obtained. Similarly, the remaining answers B, C, D. are followed. In the next step, answers about the de-sired state are calculated in an identical manner (Cameron, Quinn, 2015:15). All results are obtained in the form of arithmetic means that add up to 100 points. The highest point result is the dominant aspect of organizational culture and the dominant desired state.

These four aspects, which were expressed in the questionnaire by upper case letters: A, B, C and D, represent the types of organizational cultures that Cameron & Quinn described in their classification, presented earlier in this article. The letter A refers to clan culture, the letter B corresponds to adhocultural culture, the letter C is related to the market culture, and the letter D expresses the hierarchical culture

Tabel 1: ***Aspect of organizational culture: "What is the style of leadership in an organization?" based on the theory of K. Cameron and R. Quinn. Source: Cameron K., Quinn R. Organizational culture - diagnosis and change: a model of competing values. Wolters Kluwer. Warsaw 2015***

What is the leadership style in the organization?		**Current status**	**Desired status**
A.	Leadership in an organization is commonly identified with providing advice and help as well as providing care		
B.	Organizational leadership is commonly identified with entrepreneurship, innovation and risk-taking		
C.	Leadership in the organization is commonly identified with firmness, expansiveness and result orientation		
D.	Leadership in organization is commonly identified with coordination, efficient organization, and creation of harmonious conditions for achieving good results		
Total (in points)		100 points	100 points

Research results

As a result of the tests, it was found that:

 leadership in the study group is commonly identified with coordination, efficient organization, and creation of harmonious conditions for achieving good results - that is, with autocratic management style common in hierarchical cultures (28 points, Table 2);

 the study group would like to change the current style of leadership, based on hierarchical relations to a style that characterizes clan cultures, which is identified with providing advice and help and providing care for subordinates (29.6 points, Table 2).

Tabel 2: ***Aspect of organizational culture: "What is the style of leadership in an organization?" based on the theory of K. Cameron and R. Quinn. Source: Cameron K., Quinn R. Organizational culture - diagnosis and change: a model of competing values. Wolters Kluwer. Warsaw 2015***

What is the leadership style in the organization?		Current status	Desired status
A.	Leadership in an organization is commonly identified with providing advice and help as well as providing care	24,9	29,6
B.	Organizational leadership is commonly identified with entrepreneurship, innovation and risk-taking	21,0	24,3
C.	Leadership in the organization is commonly identified with firmness, expansiveness and result orientation	26,1	23,0
D.	Leadership in organization is commonly identified with coordination, efficient organization, and creation of harmonious conditions for achieving good results	28,0	23,1
Total (in points)		100 points	100 points

Conclusions

In the light of the obtained research results, it can be stated that the ice hockey coaching staff, concentrated in OSHL, perceives the current features of the work environment, which are characterized by hierarchical culture. The formalization of interpersonal relationships dominates, in which hierarchy applies and strict procedures apply. Leaders are coordinators focused on efficiency, which in the case of sport is expressed by the result of the game. Efficiency is ensured by formal rules and regulations.

On the other hand, they believe that the organizational culture of the coaching work environment should undergo a metamorphosis.

Clan culture creates a friendly workplace in which people willingly interact with each other. Reminiscent of a big family. Bosses and supervisors assume the role of advisors, teachers and even parents. The organization continues thanks to employee loyalty and commitment to tradition. A high degree of involvement is observed. The organization emphasizes the long-term benefits of personal development and attaches great importance to consistency and morale. The measure of success is the development of human resources and concern for employees. The organization highly values teamwork, participation and consensus.

It follows that ice hockey trainers in Poland appreciate the benefits of a style of managing people that corresponds to clan culture, but currently the culture that prevails in this work environment is interpersonal relationships based on hierarchy and autocratic style of management.

The conclusion can be concluded on the basis of the above research results and arguments that there is no process of conscious and committed leadership among the studied professional group, and the players must adapt to the influence of trainers.

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National Culture in Quality Management Research

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Abstract

Ever since Geert Hofstede first introduced the value dimensions model, national culture has been one of the most important research topics in business research altogether, and the same goes for quality management research. Implementation of quality management systems and principles in an organization is dependent on the environmental context and dominant cultural values. However, changes in international markets and trends, such as globalization, have acted as drivers of both organizational and national isomorphism. This has led to questions being asked about the relevance of national culture in contemporary quality management research. In order to answer these questions this paper provides a review of literature on national culture in quality management research. The aim of the paper is to analyze different models of national culture and key research topics in the field of quality management and national culture. To provide a more meaningful insight the paper also discusses critiques of national culture construct and offers new directions for future research of the role national culture plays in quality management research.

Keywords: National Culture, Quality Management, Value Dimension Models.

Introduction

Peter Drucker defined culture as a master variable that has an effect on all aspects of an organization. The same can be said about culture in societies as well. National culture can be seen as an invisible link between individuals coming from the same societies that influences everything that they do and the way they do it. Importance of national culture has been recognized in business research quite some time ago. Kirkman et al. (2017) state that early national culture scholars such as Kroeber & Kluckholn (1952) have already shown that cultural values have a significant influence on workplace behavior and attitudes and thus indirectly influence other organizational outcomes as well. Differences in national culture also dictate the way multinational corporations enter foreign markets as well as their business strategies altogether.

National culture refers to how members of a culture generally behave, regardless of the environment in which they are. On the other hand, it is clear that it will have a significant impact on the behavior of individuals in organizations, and indirectly on the results of organizational processes and their acceptance or rejection by individuals. Gerhart (2009) explains how two conflicting management theories, institutional theory and resource theory, give completely different conclusions about the potential impact of national culture on organizational outcomes. According to institutional theory, organizations will adapt to the environment, while according to resource theory, the key to sustaining an organization's viability and survival is "looking inside" and differentiating from others by possessing an idiosyncratic combination of resources which competitors cannot copy, regardless of the environment. Oliver (1991) integrates these two views, explaining that an organization will have a number of different strategic responses to institutional pressures and adapt its behavior to the context and situation in such a way that it will resist depending on the economic gain from adaptation or resisting. The impact of national culture on the implementation of quality management in organizations should also be analyzed in this context.

The widespread attention national culture received over the years has resulted in an impressive body of literature. However, as it often happens the literature streams have become somewhat entangled and the literature itself disparate. Therefore, the aim of this paper is to bring together different parts of the literature and help establish connections between different research streams. In order to do so we will explain the construct of national culture and the national culture value dimensions models as well as more recent approaches to national culture. The paper will also offer a comprehensive review of the field and give recommendations for future research as well as an overview of critiques of dominant national culture research in the context of quality management.

Literature Review

National culture was first mentioned in the theories of cultural anthropology. According to the anthropologists, culture is learned and absorbed through behaviors that are transferred through generations and strengthened through various socializing agents such as family, parents or social leaders. Taras et al. (2009) claim more that socializing agents and experiences individuals within a particular collective share, the greater the chance they will share a similar cultural lens through which they view the world and from which they derive values and attitudes toward particular behaviors. National culture can be viewed as a key informal institution of a country (Berry et al., 2010). At its core, national culture contains the responses of individuals within a society to certain problems they encounter on a daily basis. Inkeles and Levison (1969) were among the first to hypothesize that national culture can be seen as a set of values that explain how people cope with authority, gender roles in society, and ways to resolve conflict. Given the great interest of scholars from almost all parts of the social sciences, a large number of different definitions of national culture can be found in the literature. All definitions at least partly define national culture as a shared characteristic of a particular group of people, and state values are the basis of national culture. In this paper, we define national culture as “a complex, multi-level construct with values in its core, and outwardly manifested through practices, symbols and artifacts. It is shared by individuals who belong to a group or society. It forms over a long time and is relatively stable over time” (Schein, 1983; Hofstede et al., 2010).

National culture was often treated as an exogenous variable in business research. Impact of national culture was recognized but not quantified. This changed in the mid-1980s when Dutch scientist Geert Hofstede (1983) introduced his national culture value dimensions model. The model measured four dimensions of national culture: power distance, individualism vs. collectivism, uncertainty avoidance and masculinity vs. femininity. The dimensions were a reflection of four anthropological problem areas that were handled in different ways in different societies. Two more dimensions were added in the model later (long term vs. short term orientation and indulgence vs. restraint). Following Hofstede, a number of scientists developed their own models of national culture value dimensions. Schwartz (1994) analyzed differences and similarities of culture at national and individual level and defined three types of problems that people in all societies had to deal with: relationship between an individual and the group, ensuring socially responsible behavior and the relationship between society and nature. Another value dimensions model was introduced in the GLOBE study (House et al., 2002). This model analyzes social practices as well as social values. Practices are defined as "the way something is really done" in a society, and values are defined as "the way we think something should be done." In the GLOBE study, authors measured culture at the level of society, industry and organization, concluding that there are more dimensions of culture than those identified by Hofstede. Schwartz's model of dimensions of national culture as well as the GLOBE model of practices and values of national culture are widespread and used in quality management literature. However, all of the models in question can be observed as a conceptual breakdown of existing national culture value dimensions first found in the Hofstede model, and not really as brand-new models that are better at describing national culture (Taras et al., 2009).

A number of critiques of the Hofstede’s model can be found in the literature. Taras et al. (2016) believe there is a lot of cultural variation within a single national culture and that geographical division of national culture does not take into account what really affects differences within the

country's culture. They also state there are far fewer cultural groups than there are countries, and that demographic and environmental characteristics are far more important than political boundaries for defining the dimensions of national culture. Tellis et al. (2009) argue that various modernization agents such as the increase in international exchange, disappearance of national borders and internationalization of higher education have led to the distinction between countries with their specific cultures being blurred, making national culture no longer a relevant construct. Some authors have also suggested alternative ways of measuring national culture. Gelfand et al. (2006) measure the characteristics of national culture by how strict they are in the form of the existence of strict norms and hierarchies in society, or loose in the form of greater tolerance of deviant behavior and heterogeneous norms. Gelfand et al. (2006) take the view that norms form a visible part of the national culture and significantly influence the behavior of individuals, and therefore their behavior in organizations, which would mean that norms will have a much greater impact on a society. Swidler (1986) takes a similar view and argues that culture does not so much shape an individual's behavior on the basis of values but above all through social norms. Alternative models of observing national culture can also be found in the works of Inglehart & Baker (2000) and Myers & Tan (2002) who believe societies can be divided into traditional and secularly rational ones, oriented towards survival or expression of oneself. In doing so, societies with traditional values emphasize the importance of religion, the connection between parents and children, and respect for authority and family values, and such societies generally record higher levels of national pride. The secular - rational set of values is the opposite of the traditional one. Survival-oriented societies emphasize economic and physical security and have relatively low levels of trust and tolerance for diversity, while societies inclined to express themselves attach great importance to environmental protection, diversity tolerance, and participation in economic and political life. Ronen & Shenkar (2013), however, believe that it is not necessary to speak of national culture at the level of nation-states, but of national cultural clusters. Kostova (1997) came to a similar conclusion in her work on institutional profiles of countries, explaining that there are only a few dominant institutional profiles of states, although many more states exist. We can conclude that national culture is a complex and multidimensional construct which is difficult to quantify. The Hofstede model serves as an approximation of the aggregated value dimensions that exist in all social groups in the world, and the values that are assigned to different dimensions make this model easy to use for quantitative analysis which can explain its wide use.

The use of national culture in quality management research is interesting since quality management principles and values are usually seen as “universal remedies” that should be applicable in all organizations and lead to improved organizational performance. However, Newman & Nollen (1996) argue that viewing quality management as an “universal remedy” is not necessarily good since values, attitudes and behaviors vary across national cultures, which will also lead to variations in the results of applying "universal remedies" in an organization. Following this argument, Sousa & Voss (2008) explain that quality management models and systems, as well as the way they are implemented in organizations, are generally prescribed and universal, but their success will largely depend on the local context. Prasad & Tata (2003) state quality management implementation will be influenced by cultural, political, legal, economic and educational factors. The cultural dimension is shaped by attitudes towards management, perceptions of authority, inter-organizational cooperation, attitudes towards business, wealth and material things in general, beliefs about foreigners and the scope of nationalism. These factors are very similar to descriptions of Hofstede's dimensions of national culture. Zhang & Wu (2014) state that differences in cultural factors will influence differences in the performance of quality management practices in an organization while Wang et al. (2012) conclude that cultural environment acts as a moderator between quality management practices and firm performance. Therefore, we can conclude that there is a widespread consensus in the literature regarding the influence of national culture on different quality management initiatives in organizations.

Nakata & Sivakumar (1996) were among the first to explain that different national cultures often mean different outcomes for individual quality initiatives in organizations. They take the introduction of the "quality function deployment" in American companies as an example. The method has been very successful in Japan, while it never came to life in US companies due to the overwhelming

resistance of workers who did not accept this new form of organizing daily practices and routines within their organizations. There are a number of authors which analyzed the influence of national culture value dimensions on quality management in an organization. According to Lin (2009), the impact of national culture on quality management is highest when there is a high level of uncertainty avoidance and low power distance in a country. Naor et al. (2010) state that power distance, future orientation, and performance orientation within organizations themselves differ greatly between Western and Asian countries. They explain this by the fact that these dimensions will be significantly influenced by organizational structure and strategic policy. Power distance will depend largely on the hierarchy and bureaucracy in the organization. Moreover, management initiatives and rewards will affect the performance orientation of the organization, while technological capabilities and executive planning will affect the differences in future orientation. Kull & Wacker (2010) analyzed the impact of GLOBE cultural dimensions on the effectiveness of quality management practices in Asian countries. The analysis was conducted using secondary data, and the authors concluded that national culture influences the acceptance of quality management values and indirectly the effectiveness of quality management practices as well. In this paper, the authors conclude that uncertainty avoidance and masculinity, have the most significant influence on quality management practices, while other cultural dimensions have had a minor impact. Noronha (2003) analyzed the impact of Chinese national culture on total quality management practices in organizations. In doing so, he used Parsons's (1956) sociological perspective according to which the values of the subordinate value system would be defined by the superior value system. In this case, organizational culture should be defined by the influence of national culture in which it is embedded. Noronha (2003) defined four dimensions of quality: quality climate in the organization, quality processes, quality methods and quality results, and concluded that quality climate serves as a mediator of the impact of national culture values on the application of quality practices in the organization. Wiengarten et al. (2015) analyzed the impact of collectivism at the national and organizational levels on the relationship between LEAN management practices and organizational operational performance, concluding that higher level of collectivism at both the national and organizational levels have a positive effect on operational performance and LEAN management practices. In their earlier paper, Wiengarten et al. (2011) similarly analyzed how dimensions of national culture moderate the relationship between investment in quality practices and production performance, and concluded that dimensions of individualism-collectivism, masculinity, and uncertainty avoidance significantly moderate this relationship.

Discussion

The majority of papers analyzing national culture in the context of quality management are using Hofstede's value dimensions model. It is important to state that Hofestede's model can serve solely for the comparison of social groups, not for the analysis of individual differences. Thus, despite all criticisms of the model, it can be concluded that it remains a valid and good instrument for assessing the value dimensions that prevail in a particular national culture. In doing so, these values will not be equally valid for each individual within the society, nor can they be assessed at the individual level, but they allow comparisons to be made between different countries without distorting the conditions necessary to carry out quality scientific analysis. In carrying out the analysis, it is important to take into account the strenght of the effect of national culture, since the question is not whether national culture influences different processes within a country or organization, but to what extent that influence is significant and how it can be measured and analyzed (Kirkman et al., 2017). The question remains as to was this done in the existing research.

As stated earlier, quality management practices are defined as "universal remedies" that should not be too dependent on the organizational environment. This has led to two different approaches in the literature. According to the convergence theory, organizations can avoid the influence of national culture on their practices and organizational values through organizational practices (Tellis et al., 2009). The emergence of these organizational practices will then be defined by different technological, institutional and economic motives and not dependent on dominant national culture values. On the other hand, Ralston et al. (1997), according to the divergence theory, consider that national culture will have a dominant influence on organizational values and practices in any case,

and that its influence will vary depending on national specificities, but will not be overcome by other factors. The divergence theory is closer to the arguments that can be found in institutional, population-environmental and contingency theories of management. These three theories state that organizations must adapt to their environment due to environmental pressures, and these pressures are largely manifested through the practices and values of the environment, that is, the society within which an organization operates. Reconciling the two conflicting views, Nelson & Gopalan (2003) claim some organizations within countries follow the contours of national culture quite consistently, while others systematically reject national values. An explanation for organizations that reject national values can be partially found in the work of Taras et al. (2016), who find that technological and economic forces increase homogeneity in the practices of organizations from different countries and reduce cultural differences between countries over time. In this context, quality management can be seen as one of the factors that should reduce differences in practices across organizations in different countries. On the other hand, it is to be expected that businesses, which for various reasons are more woven into the local context, will continue to follow the contours of their national culture, no matter what requirements are put in front of them and what adjustments they have to make.

In this context, it is important to note that papers that view quality management principles as universally applicable were usually conducted in multinational companies competing in dynamic international markets and often operating in high-tech sectors. As a rule, these companies retain their competitive advantage due to the ability to use economies of scale, which require highly uniform and detailed business processes that all employees are familiar with. In addition, these organizations are not woven into the local context and bring with them certain behavioral patterns and organizational processes, and most often have a diverse human resources structure that does not necessarily have to be made up exclusively of the native population. In order to shed more light on these understudied issues, a number of authors indicate that more cross-cultural research on the specifics of practices and the value of quality management in different countries is needed in order to provide a clear answer to the question under which conditions is quality management universally applicable and to what extent (Prasad & Babbar, 2000; Metters, 2008; Naor et al., 2010).

Conclusion

Based on the above, a few conclusions can be drawn. The first is that certain dimensions of national culture show a significant influence on the relationship between quality management practices and different organizational outcomes. Among them are the dimensions of individualism-collectivism and power distance. The way these dimensions work is manifested primarily through an organizational climate that partly reflects the values of national culture (Naranho, 2003). It is also apparent that a relatively small number of papers have analyzed this relationship solely in the context of SMEs. It can be expected that these organizations are more embedded into the local cultural context, and for this reason the influence of national culture on them could be more manifested. The investigation of the relationship between national culture and quality management in SME's could be an interesting avenue for future research.

Most studies that have analyzed the impact of the environment on the implementation of quality management practices have shown that there is some influence of national factors on quality management practices and their outcomes in organizations. However, these studies have focused on organizational outcomes in the form of operational or financial performance of the company. Very few studies have considered other organizational variables. Future studies should try to investigate other organizational outcomes that could be influenced by the differences in national culture.

Regarding national culture itself, future research of national culture and quality management should also try to broaden the view on national culture past Hofstede's value dimensions model. Gelfand et al.'s (2006) framework of strict and loose societies could be an interesting avenue of future research since previous work has already shown that collectivism has an influence on the way quality management is implemented in an organization, and strict and loose societies are somewhat correlated to levels of individualism vs. collectivism in a society. Leung et al. (2005) propose that

qualitative and experimental research could also provide new insight into the role national culture plays in different organizational processes, and this could be investigated in the context of quality management as well.

It is very important to note that national culture is only one of the factors that will influence the application of quality management in an organization. Formal institutions, customer pressure and the macroeconomic environment also have significant impact on an organization. Therefore, while it can be argued that differences in the way quality management is implemented in an organization will be somewhat culture dependent it cannot be said that these differences will depend solely on cultural factors. Therefore, more research on the influence of other external factors that act in alignment with national culture and influence quality management in an organization should be conducted.

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Corporate Social Responsibility Strategy and Costs of Its Implementation - Case Study

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Abstract

The problem of identification and evaluation of costs incurred for the implementation of the corporate social responsibility strategy was addressed in the study. The study was divided into two main parts, theoretical and empirical. The theoretical part of the study presents a strategic perspective on the idea of corporate social responsibility based on literature studies. The considerations presented in the empirical part include the results of research conducted in a production company operating in Poland. The aim of the study was to identify the costs incurred for the implementation of the corporate social responsibility strategy and to assess the possibility of optimising these costs. The research methods used to achieve the goal are: a method of literature analysis and criticism, a method of descriptive analysis and a case study. The issue of identification and assessment of costs incurred in the implementation of the corporate social responsibility strategy is important and current due to its impact on maintaining the competitive position of the enterprise on the market.

Keywords: Social Responsibility Strategy, Costs Of Social Responsibility Strategy Implementation.

Introduction

The changes in the environment and growing competition are leading companies to seek new ways to gain market advantage (Dess and Beard, 1984). At the same time, the needs reported by external and internal stakeholders, as well as the increase of environmental awareness of the society, have contributed to the fact that managers of enterprises have started to focus on the social and environmental aspect of their activities (Hamel and Valikangas, 2003). It is now believed that by protecting the environment and gaining the trust of their stakeholders, companies can achieve a competitive advantage and thus maximise profits (McGahan and Porter, 1989). This assumption has shaped the concept of corporate social responsibility, which is now the basis for developing the strategy of many enterprises.

The enterprise and the strategy it implements, considered from the perspective of the idea of corporate social responsibility, is the result of establishing inter-organizational relations in order to meet the needs reported by the stakeholders (Pearce and Robinson, 1989). Understanding the essence of these relationships, the ways in which they become special and how effective companies choose and manage their resources leads to better organization management (Kay, 1996; Łobejko and Pierścionek, 2011).

Therefore, the main source of competitive advantage of enterprises implementing corporate social responsibility solutions becomes a way to provide customers with the expected value, which is the awareness that the enterprise combines environmental, social and economic solutions.

The strategy identifies areas where the company has specific competencies that give it an advantage over its competitors. An area of outstanding competence is what an organization does particularly well (Griffin, 1999). This distinction from the competition gives the right strategic advantage. The basis for building an effective business strategy is a business approach that generates favourable

economic results and simultaneously achieves environmental and social objectives (Macharzina and Wolf, 2008; Gabler et al., 2006). This corporate approach combines CSR-oriented management and the achievement of economic objectives. In this context, the aim of the study was to identify the costs incurred for the implementation of the corporate social responsibility strategy and to assess the possibility of optimising these costs in accordance with current Polish balance sheet regulations.

A strategic perspective on the idea of corporate social responsibility

The growing interest in the idea of corporate social responsibility has become the main element of the strategy of modern enterprises. The basic assumption of the concept of Corporate Social Responsibility is that companies not only strive to maximize profits, but also fulfil a number of obligations towards their stakeholders (Kotler and Lee, 2005). This assumption has shaped the approach of enterprises to the implementation of the concept of corporate social responsibility, which currently plays an important role in the management processes of enterprises, both local and global.
The idea of corporate social responsibility encourages the active assumption of responsibility for society and the environment by engaging in activities that benefit both the company and society or the environment (Dyllick and Hockerts, 2002). These circumstances improve the company's reputation, which translates into its financial results as customers have a positive perception of its social activities (Gustafson, 2007).

The concept of Corporate Social Responsibility is derived from American corporate business. According to the definition proposed by the European Commission, Corporate Social Responsibility is a concept whereby companies help create a better society and a cleaner environment (Green Paper, 2001). This means that, in line with the concept of Corporate Social Responsibility, enterprises voluntarily include social and environmental aspects in the costs of their activities and contacts with stakeholders (Lindgreen and Swaen, 2009). The provisions of the Green Paper indicate that the activities of companies should be carried out in two dimensions: internal and external (Guthey and Lange, 2016). The first covers socially responsible practices in human resource management, health and safety at work and adaptability to change. The external dimension relates to the local community, business partners, suppliers, customers and human rights issues.

Both internally and externally, the document indicates socially responsible activities in the area of broadly understood environmental protection (Crane and Matten, 2004). These actions aim both to systematically reduce the negative environmental impact of the company (L'Etang, 1994) and to draw attention to global environmental problems. Therefore it can be said that social responsibility is the mutual cooperation between the external and internal dimensions (Porter and Kramer, 2006). What is more, the concept of corporate social responsibility includes many activities in the field of human capital, shaping appropriate relations between employees, taking care of business cooperation (Łęgoik-Świącik, 2019) with local government organizations, local community and non-governmental organizations, as well as protection of the natural environment (Łęgoik-Małolepsza, 2019), which in turn contributes to increase the competitiveness of the company and shaping the conditions for sustainable social and economic development.

Research Methodology

The research methods used to achieve the set research goal are: the method of analysis and criticism of literature, the method of descriptive analysis and the method of case study. In the first part of the study the method of analysis and criticism of literature was used. The method of analysis and criticism of the literature is used to identify the new approach and to justify the purpose of the study. Therefore, the application of this research method makes it possible to present the achievements of science in a given field and to point to a research presentation existing in the studied area. The applied research method allows to indicate the topicality and innovativeness of the studied problem in relation to the current state of knowledge in the studied area (Coombs et al., 2009). Moreover, the analysis and criticism of the literature allows us to signal differences and existing dependencies and important features of previous scientific research.

In the second part of the study, the research method used is descriptive analysis. It is applied to the description of the research methodology used in the conducted research. The descriptive analysis method was used to characterise the identified generic costs and activities undertaken to implement the corporate social responsibility strategy in the surveyed company, which allowed to formulate conclusions. Conclusions were formulated on the basis of observations, abstractions and generalisations of the observed compounds. This research method made it possible to identify the relationships observed and the gap in perception of the problem under investigation.

In the third part, empirical, the broadcasting method used is a case study. It allows to present an accurate and deepened picture of the studied phenomena and relations (Gibbert et al., 2008). However, it should be noted that case study is a method with probabilistic possibility of scientific cognition (Eisenhardt and Graebner, 2007) resulting from intuitive and subjective judgements, low representativeness of results, high time and cost effectiveness of conducted research. Nevertheless, the main advantage of conducting the research process with the use of case studies is the desire to develop the concept of the studied phenomenon and to interpret it in depth.

The characteristics of the surveyed company

Empirical research was conducted based on a case study. The company investigated was selected on the basis of a targeted selection. The basic selection criterion was the availability of separate financial statements on an annual basis, in accordance with the assumption that the company is separated on the basis of the organizational and legal criterion, is economically independent and remains in competitive relations. Additionally, as a selection criterion, the unit management implementation was used, taking into account corporate social responsibility.

The surveyed entity is a manufacturing company, its head office is located in Poland and it is classified as a medium-sized enterprise sector. Conducting the research process with the use of a case study allows to present an accurate and in-depth picture of the examined phenomena and relations. However, one should remember about the probabilistic possibility of scientific cognition using the case study method (Czakon, 2015).

The company produces a wide range of accessories for window decoration, such as curtain rods, blinds, pleats. It sells its products in Poland, Germany, the Czech Republic, Romania, Lithuania, Latvia, Russia and Hungary. The investigated company mainly supplies network customers. It also cooperates with many smaller businesses that sell finishing materials and provide interior design services. The research period is 2015-2019. It is worth mentioning that the company is ISO 9001: 2001 certified and the quality of its products has been awarded by consumers with the "Customer Laurel".

Research Results

The aim of the study is to identify the costs incurred in the implementation of the corporate social responsibility strategy and to assess the possibility of optimising these costs in accordance with the current regulations of balance sheet law in Poland. In the first stage of the research procedure in the surveyed company, costs were distinguished, guided by the criterion of their identification in order to implement the assumptions of the corporate social responsibility strategy and improve the management of key areas of the company's operations. Shaping the trend of costs incurred for the implementation of the assumptions of the corporate social responsibility strategy in the surveyed company is presented in Fig. 1

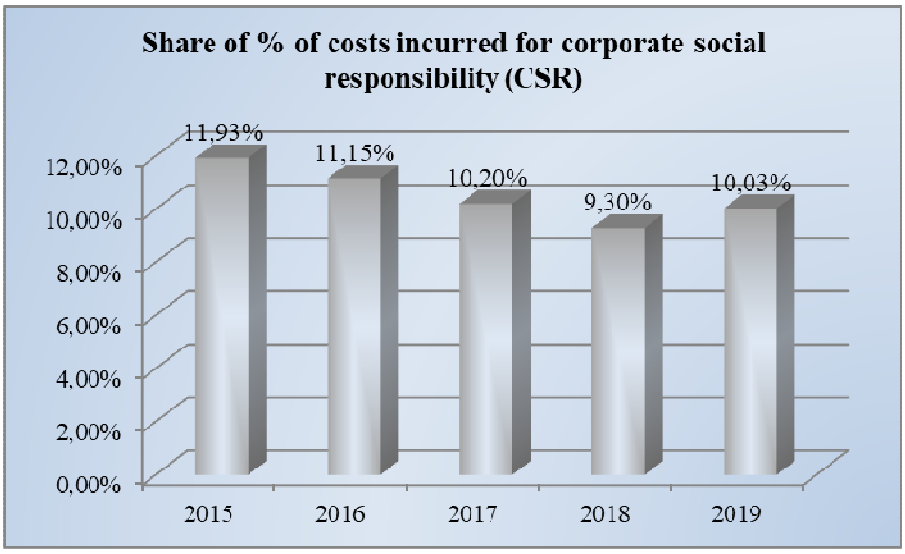

Fig. 1: Share of % of costs incurred for corporate social responsibility (CSR)
Source: Own calculations

They analyse the level of costs incurred for the implementation of the corporate social responsibility strategy in the surveyed company. It should be noted that they constitute an element of costs by type. On the basis of the conducted research, it is noted that in the surveyed company a significant part of costs incurred in the implementation of the corporate social responsibility strategy is an important cost management instrument. The level of these costs is being reduced from 11. 93% of costs in 2015 to 9. 30% of costs in 2018. In 2019, an increase in the level of the analysed costs is observed, which was influenced by, on the one hand, an increase in the level of production and sales, on the other hand, this increase was caused by inflation factors in Poland.

In the second stage of the examination procedure in the investigated company, overheads were distinguished, which were divided analytically into types characterizing the costs incurred. In the company covered by the survey, costs by type were grouped, guided by the criterion of their identification to improve the management of strategic areas of the company's operations, taking into account the principles of social responsibility. The criterion adopted resulted in the analytical separation of costs by type due to their incurrence and calculation costs reflecting the places where costs arise in the company. With regard to the costs incurred in the implementation of the corporate social responsibility strategy in the surveyed company, six types of costs were specified, which characterize the actions taken (Fig. 2): car depreciation, electric energy usage, fuel consumption, costs of used packaging, waste management costs, training costs for employees.

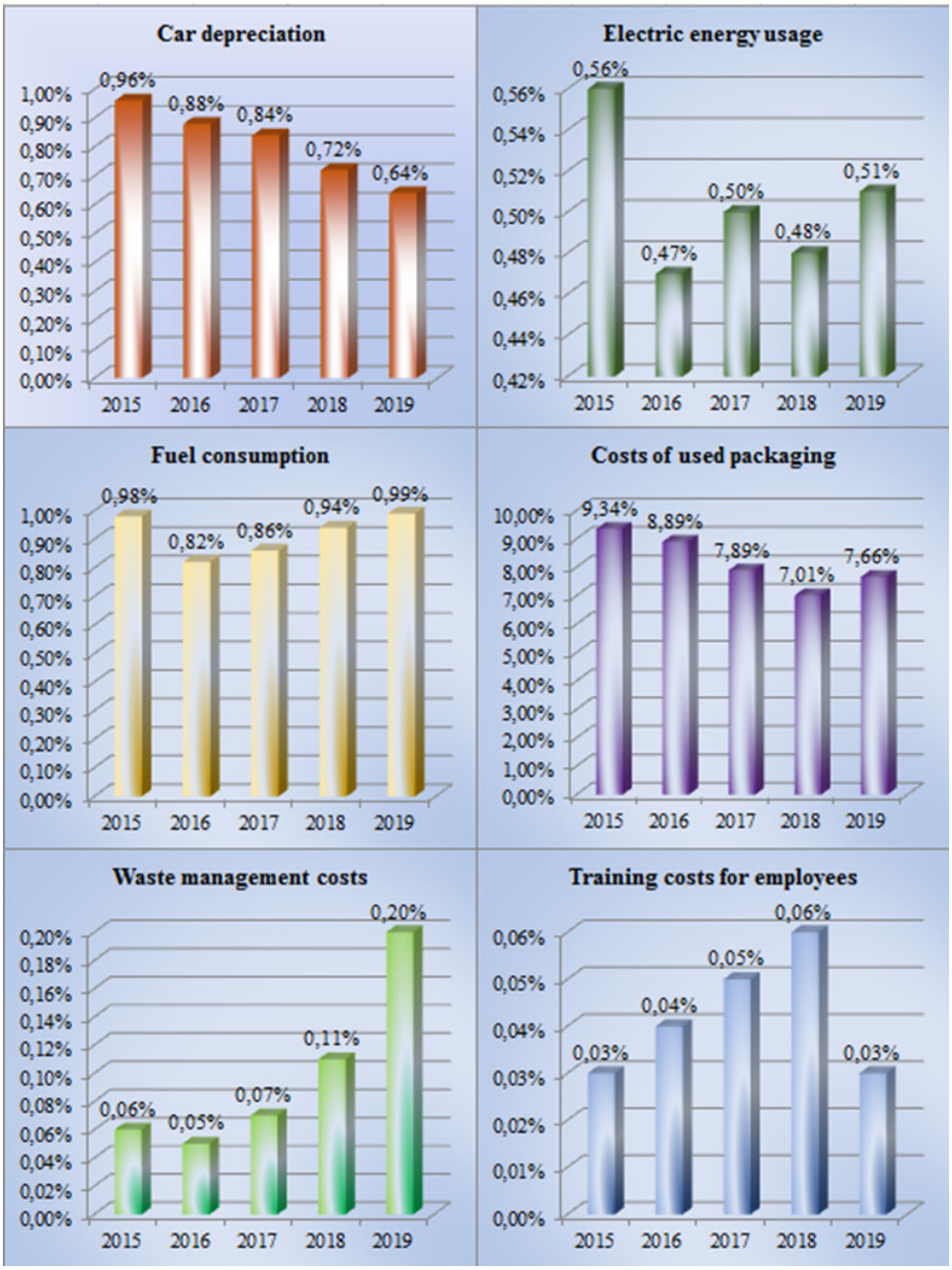

Fig. 2: Costs by type incurred for the implementation of the corporate social responsibility strategy

Source: Own calculations

Considering the results of the research carried out in the field of identification of generic costs incurred for the implementation of the corporate social responsibility strategy in the surveyed company, it is noted that in the field of car depreciation there is a reduction in the costs incurred. This is an effect of actions taken to replace the car fleet with vehicles with significantly reduced emissions, which was reflected not only in the environmental but also economic benefits obtained.

During the research period, energy consumption was reduced by replacing lighting with led lighting, which resulted in a significant decrease in the level of discussed costs in 2016. In addition, air-conditioning equipment and ducts have been upgraded to reduce energy consumption while increasing efficiency. The increase in production in the following years caused fluctuations in the level of costs related to energy consumption, however, the efficiency of led lighting makes it bring economic and environmental benefits in the long term.

When examining the level of fuel consumption costs, it was noted that a significant reduction in expenditure related to the purchase of fuels resulted in a decrease in the level of the costs in question. However, the increase in fuel prices in Poland caused an increase in fuel consumption costs in subsequent years.

When analysing the level of costs incurred for packaging, it should be noted that in the investigated company, packaging management was rationalised by organizing the selection of packaging for cardboard packaging and foil, which are then resold to recycling companies. This has led to a decrease in packaging costs between 2015 and 2018. The increase in costs for packaging in 2019 was caused by both price increases and production increases.

As far as third-party services are concerned, the effectiveness of cooperation with waste disposal service providers has been improved. A very important activity undertaken in the scope of implementation of the corporate social responsibility strategy in the examined company is the education of employees. They analyze the costs incurred for the education of employees. It was noted that the training was provided to employees responsible for organizing pro-ecological activities. This is due to the fact that the key assumption of the adopted corporate social responsibility strategy in the surveyed company is the implementation of the concept of sustainable development, and this results in costs in the surveyed area.

Discussion and Conclusions

While making an attempt to assess the possibility of optimizing the costs incurred for the implementation of the corporate social responsibility strategy in the surveyed enterprise, it should be pointed out that the costs identified as costs of the implementation of the corporate social responsibility strategy are an element of the enterprise's typical costs. The company in question shows a significant share of the costs of benefits incurred for the implementation of the corporate social responsibility strategy, which means that their identification, recording and observation is an important instrument for managing and optimizing the company's costs.

The research shows that the surveyed company bears the burden of waste management and fulfils information obligations related to the implementation of the concept of sustainable development. However, it is noted that there is a lack of recording solutions for homogenous identification of costs incurred for solutions implementing the corporate social responsibility strategy in the surveyed company. Therefore, the recommendation for the surveyed enterprise is to implement solutions in the area of research of costs not incurred, which are related to expenses occurring in the sphere of implementation of the corporate social responsibility strategy.

Summary and Conclusions

The aim of the study was to identify the costs incurred for the implementation of the corporate social responsibility strategy and to assess the possibility of optimising these costs in accordance with the current Polish regulations of the balance sheet law. The conducted research shows that in the surveyed company there is a need for more and more detailed separation of analytical items of costs concerning activities related to the implementation of corporate social responsibility strategy. A clear implication of the theoretical and empirical assumptions of the conducted case study is that companies expect up-to-date information about the diversity, structure and level of costs incurred for the implementation of the corporate social responsibility strategy, especially in the field of pro-ecological solutions.

The main contribution of the article is an in-depth understanding of the coexistence of the corporate social responsibility strategy and the accompanying costs incurred in its implementation. The study supports the current view that companies operating in a competitive environment are forced to seek new market advantages. One of the important areas of creating a competitive advantage may be the costs incurred for the implementation of the corporate social responsibility strategy, and their optimization and effective management may have a positive impact on the operating environment of the enterprise, contributing to the creation of competitive market advantages.

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Communication Strategies to Combat the Negative Effects of Covid-19 On Tourism

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Abstract

One of the most used means of communication by tourist destinations today is social networks. Regardless of the part of the world you are in, the information provided is monitored in real time and by anyone. In a moment of public health crisis (e.g. pandemic), a communication plan is created and these same resources are used and disseminated quickly. At the same time, the development of a country's tourist activity is globally recognized as a generator of revenue and provides more employment and a greater contribution to the economy. However, tourism is a sector of activity quite sensitive to market changes, economic crises, climatic effects, epidemics / pandemics, which cause many fluctuations. Therefore, it is relevant to mention the negative impacts that tourism is suffering in the face of the Covid-19 pandemic. Thus, in order to combat the negative effects of Covid-19 on tourism, some destinations started to use motivational communication strategies / campaigns, presenting their beauty, encouraging the visitation of tourists / travelers after the crisis. The general objective of this study is to present the communication strategies used to combat the negative effects of Covid-19 on tourism, presenting good practices of advertising campaigns (in Portugal and Brazil) available on social networks. It is asked, what are the communication strategies used to combat the negative effects of covid-19 on tourism? In this sense, a descriptive research and a preliminary study with analysis of social networks were carried out. Future studies should make it possible to deepen this problem, using in-depth interviews and elaborating a focus group with tourists and residents (in Portugal and Brazil).

Keywords: Communication strategies, Covid-19, tourism, epidemics, crisis

Introduction

Tourism is an activity that encompasses several areas and services, so it can be considered a sector that is very sensitive to changes in consumer income; the constant economic, political, social and environmental crises; epidemics and pandemics, among others; which can have serious long-term impacts on local communities, threatening the image of destinations, the inflow of foreign exchange, tourism resources and employability. The advancement of technology has changed consumer behavior. In an era marked by information and knowledge, it is imperative to create value and differentiate (Ferreira & Sousa, 2020) Thus, it is necessary to think about communication plans that are effective and capable of taking information to the tourist / traveler in times of crisis, regardless of the continent they are on. Therefore, social networks are used as excellent resources in this context.

The COVID-19 name given by the World Health Organization, to the disease caused by the new coronavirus SARS-COV-2, which can cause severe respiratory infection such as pneumonia, first identified in humans, in late 2019 in the Chinese city of Wuhan, Hubei province, has spread to several countries / continents being considered one of the pandemics that has most killed people and disrupted world markets. In view of this reality, many destinations that lived off the provision of services for tourist activity, had to close their borders to not receive tourists / travelers, further compromising local economies. In order to communicate assertively with tourists / travelers, the destinations launched campaigns, which encourage people to stay at home at this time, but to plan themselves in the future for visits when the destinations are free of the risk of spreading the disease.

The general objective of this article is to present the communication strategies used to combat the negative effects of Covid-19 in tourism, presenting 04 advertising campaigns, 02 in Brazil and 02 in Portugal, available on social networks. The research problem involves asking, what are the communication strategies used to combat the negative effects of covid-19 on tourism? The methodology of this study is exploratory in nature, an analysis of social networks and good communication management practices in crisis scenarios. Future studies should, however, deepen the results obtained in the first phase of the investigation. The theoretical framework was divided into 5 sections, the first being the introduction, the second describing the communication strategies adopted for times of crisis; in the third chapter, the relevant data on tourist activity in Brazil and Portugal were covered; in the fourth chapter, it dealt with epidemics / pandemics and the impacts on tourist activity; and finally, in the fifth chapter, the Communication strategies used by the tourist destinations Portugal and Brazil were pointed out, to combat the negative effects Covid-19 by reading the advertising campaigns in these countries.

Communication Strategies in Tourism Crisis Contexts

Communicating is the human being's ability to interact with others through signals (verbal or non-verbal), and involves exchanging information between two or more interlocutors. Derived from the word "communicare", it refers to the act of "sharing, participating in something, making it common" (Deetz, 2010; Moderno, 2017; Neiva, 2019; Kunsch, 2018; Silva, Sousa & Fernandes, 2019) Facing the transformations that have been occurring continuously and the great global uncertainties present in the contemporary world, there is no more space for a merely instrumental, technical and tactical communication (Kunsch, 2018). In view of this, the development of the means of communication caused human communication to change profoundly and restructured relations between people in a spontaneous way, moving from face-to-face communication to computer-mediated communication (Corazza, 2015).

Assuming that crisis communication is one of the prime areas of public relations management, it was interesting to deepen theories on the subject. It begins by defining a crisis “understood as a situation or event that requires immediate action to prevent a potential negative impact on an organization or its interlocutors” (Norsa, 2003, p. 20; Diegues, 2011) To better analyze the concept crisis, crises were divided into unpredictable and predictable situations, respectively. The first are those that can cause the most damage to an organization's image due to its unpredictability, for example, natural disasters, accidents, sabotage, epidemics / pandemics. Predictable crises result from actions that the organization is aware of and, therefore, can prepare itself to face them and manage them in the most appropriate way. This is the case, for example, with physiological changes, pregnancy, retirement, dismissals, death (Caetano, Vasconcelos & Vasconcelos, 2006; Lampreia, 2007; Diegues, 2011). It is about unforeseen situations, the focus of this research.

Within the communication area, managing a crisis is the biggest challenge that the professional can face. The company must be prepared to react by communicating to any emergency: either through a preventive communication plan to deal with foreseeable crises, or through a combative communication plan to extinguish the unpredictable crises. (Neiva, 2019).

Proposing a strategy, therefore, means following a method to carry out business communication and disseminating it to the public of interest, whether formed by the employees themselves or by customers and other stakeholders (all parties directly or indirectly interested in the business) (Neilpatel , 2020).

Within the communication strategy, social networks have been used more frequently to initiate relationships with potential customers and to approach partners in the market; e-mail marketing since most people have an e-mail, indoor media broadcast in closed and busy spaces of stores and subway stations and SMS marketing is a sure idea to be able to inform and at the same time increase engagement and relate to the target audience (Alves, Sousa & Machado, 2020).

In strategic communication, in a time of crisis, it must be based on two perspectives: "first, the alignment of communication with the organization's objectives and its contribution to the achievement of results" and second, "the role of social actors in what concerns respect to organizational decisions" (Oliveira & Paula, 2007). As stated earlier, communication must always be planned in order for the organization to achieve its objectives. The information transmitted must be weighed from a functionalist and striking perspective, assertiveness in outlining objectives and the way in which they are proposed to be achieved. The message must contain information that is part of the company's context and that, in some way, makes sense to its audiences (Neiva, 2019). In tourism, communication should be assertive to seek potential customers for tourist destinations.

Tourism: Relevant Data

Tourism is one of the most important and current engines of growth for an economy, marked by dynamism, diversity of supply and constant growth (Sousa & Rodrigues, 2019). As tourism is one of the sectors whose degree of involvement is necessary for its success, the diversification of tourism products and services becomes a requirement capable of leading to increased demand for new types of tourism needs (Macedo & Sousa, 2019). The management of a tourist destination requires its positioning, given that the image transmitted is an influential and determinant aspect in the purchase decision (Sousa & Simões, 2012).

In 2016, Portugal reached record numbers in tourism, with special emphasis on expanding the activity to less traditional months, with two thirds of the growth occurring in the so-called low season; decrease in the seasonality index from 37 to 35%; 14.2% increase in employment in tourism; 1.5 million increase in air capacity; diversification of markets, with significant growth in the American, Polish and Brazilian markets; 5% growth in the domestic market; 1,500 new companies linked to tourist entertainment (ET, 2017). According to the World Travel & Tourism Council (WTTC) report, tourism grew 8.1% in 2018, achieving the highest rate among the countries of the European Union (EU) and also one of the highest among all European countries (Observer, 2019). These results demonstrated the capacity of tourism to generate more income, more jobs and to expand more and more the activity throughout the year and the territory. (ET, 2017)

In Brazil, the direct participation of tourism in the economy was US $ 56.8 billion in 2016, equivalent to 3.2% of GDP. The total contribution of the sector was US $ 152.2 billion, 8.5% of the National GDP. (Brazil, 2018). According to data from the Ministry of Tourism of Brazil, for the year 2017, 6.6 million tourists from the world entered the country, generating foreign exchange revenue of 6 billion US dollars, according to data from the World Tourism Organization (OMT). In all, more than ten million international landings were made at Brazilian airports in 2017. Tourism injected US $ 163 billion into Brazil in 2017. According to the World Travel and Tourism Council (WTTC), Tourism's contribution to national GDP was 7.9% of the national GDP and is responsible for 6.59 million jobs. These figures demonstrate that tourism can contribute to economic, social, cultural and environmental development. (Oliveira, 2019)

Contemporary tourism comes in the most varied forms and for the most diverse audiences, aiming to meet all types of demand and satisfy the desires and needs of tourists / visitors by offering a variety of tourist products and services (Pinto da Silva et al., 2019). The world is increasingly interdependent and interconnected, so that small-scale crises in one part of the world could have a significant impact on the other side of the world (Gonçalves, 2012). Thus, one can understand the complexity of this phenomenon, since it is an activity that proposes to work and move various types of services present in the world market, being considered a sector very sensitive to the impacts of some phenomena such as variations in consumer income, negative climatic effects, political and social instability, price

fluctuations in the market, inflation, exchange rates, economic crises, epidemics and pandemics (Sousa & Alves, 2019). On the phenomena called epidemics and pandemics, we have the focus of this article.

Epidemics / Pandemics and The Impacts on Tourist Activity

Major epidemics have shaped the history of mankind, even with the improvement of the population's socioeconomic conditions and the advent of vaccines and antimicrobials throughout the 20th century, infectious diseases are responsible annually for around 10 million deaths worldwide and are among the main causes of lost years of life (WHO, 2008; Moura & Rocha, 2012).

Epidemics represent the occurrence of an injury above the historical average (or median) of its occurrence. The disease that causes an epidemic generally appears suddenly and spreads for a certain period of time in a specific geographic area, often affecting a high number of people (Moura & Rocha, 2012). It is no longer possible to understand epidemics without covering the speed of population displacements, which must be taken into account in the speed of the control measures implemented, that is, in the surveillance of communicable diseases. Leaving this reality open when emphasizing the spread and geographical mobility of epidemics through infected individuals: local epidemics become pandemics, geographically generalized (Ujvari, 2011; Magalhães & Machado, 2014).

The modern concept of a pandemic is that of an epidemic of major proportions, with the aggravation of having rapid circulation, over more than one continent. An example is the "Spanish flu", which followed from World War I, in the years 1918-1919, and caused the death of about 20 million people worldwide (Chien, 1983; Rezende, 1998).

Influenza or influenza is considered to be an infection is an acute disease of the respiratory system, caused by the Influenza virus, having a high capacity for transmission and global distribution. (Costa & Merchan-Hamann, 2016). Among the various pandemics that occurred in the 20th and 21st century, which caused crises in the world, we can mention: Spanish Flu, between 1918 and 1920; the Asian Flu, between 1957 and 1960; Hong Kong Flu, between 1968 and 1969, Between the years 2003 and 2004, highly pathogenic avian influenza - A (H5N1), Pandemic Influenza A in 2009 (Xu et al, 2004; Ellis et al, 2003; Brazil, 2010; Costa & Merchan-Hamann, 2016).

In 2020, the World Health Organization declares that the "COVID-19 epidemic" is a "pandemic". The announcement comes when there are more than 120 countries with reported cases of infection (RTP, 2020). The world balance of deaths, due to the pandemic of the new coronavirus, surpassed on March 25, 2020, the 20 thousand victims. Worldwide, the number also broke another barrier: 460 thousand confirmed cases (Martim, 2020). The Wellcome Trust called the coronavirus “a significant and urgent threat to global health” 1 and called on “researchers, journals and funders to ensure that research results and data relevant to this outbreak were shared quickly and openly to inform the response to public health and help save lives (Larivière, Shu & Sugimoto, 2020; Carr, 2020).

Inside or outside the Earth's orbit, tourism generates business opportunities for both large conglomerates (airlines, hotel chains, cruise lines) as well as small businesses, whether local travel agencies, inns, restaurants or tour guides who work in their communities (Masson, 2020). With regard to global tourist activity, the coronavirus pandemic has been analyzed for offering great negative economic impact, greater than the influenza A pandemic in 2009 (Opção, 2020). Thus, when analyzing the sector, it is observed that it loses one million jobs in the world daily due to the effects of the new coronavirus pandemic, according to data revealed by the World Travel and Tourism Council (WTTC). According to the Council's latest investigation, the sector generates 10.4% of the world's Gross Domestic Product (GDP) and one in 10 of the world's jobs. The sheer volume of hotel closures, the suspension of most flights, the interruption of cruise lines and the increase in global travel bans are having a catastrophic 'domino effect' affecting a large number of service providers across the world. world (Check it out, 2020).

Trade fairs, congresses and business conventions concentrate the largest budgets of business tourism. Serial cancellations generate losses much more significant than those caused by individual dropouts from leisure travelers. The problem gets worse when both types of tourists give up traveling. IATA,

the International Air Transport Association, which represents the 290 largest companies in the sector, projects a loss of revenue of nearly $ 29.3 billion this year. Also according to the organization, some companies claim that up to 50% of passengers have stopped flying - and most want to be compensated for the cancellation (Masson, 2020). In the midst of the pandemic, deaths, economic crises, social isolation, the destinations still need to think about communication strategies with their tourists / travelers, taking the message visit them later, stimulating post-pandemic tourism.

Communication strategies for tourist destinations in Portugal and Brazil (covid-19)

The emergence of the Internet has introduced profound changes in society. With this new means of communication, it unfolds in a symbolic environment of interfaces, of multiple images and sounds that make virtuality a reality. In this way, the information that is made available through the internet, represents the main element for the social organization of humanity (Castells, 1999). With the Internet, geographic distance has lost its power of separation as people from different and remote parts of the planet can communicate instantly, and it becomes more valuable instruments of diffusion and information exchange, due to its capacity to establish fast communications, regardless of the geographic location of their users (Borges, 2001, Marujo, 2008)

In the minds of potential tourists, the image of the “tourist destination” may be susceptible to changes over time. One way to establish this image is to use the communication channels and the internet comes to help (Prata, 2014). Crisis communication plays a very important role. It aims to reduce potential damage, protect the value of the organization and minimize impacts on its reputation (Ipdt, 2020)

Tourism is experiencing a moment of crisis, which was initiated by the spread of the Covid-19 virus. In the midst of this pandemic, tourist destinations needed to organize themselves, in order to take information about the closings of cities, airports to receive tourists / travelers. A serious decision that has not only negatively impacted the economy of destinations, but has also put employability at risk, as well as their image. The decision was to protect people, reducing contacts and consequently the proliferation of the virus. In this pandemic moment of the new coronavirus, many tourist promotion campaigns have adopted an exceptional tone: they remember that the doors of destinations are open to travelers, but only after the crisis of the covid-19 has passed. Until then, they encourage everyone to stay in their homes (Maia, 2020).

Given this fact, (02) two campaigns created in Portugal and (02) two in Brazil will be presented, where the objective of both is to show the natural beauty of their destinations, but to encourage visits by tourists / visitors after Coronavirus. The campaigns were made available by official bodies, on various social media, but this is the reading of Facebook, Instagran and YouTube. On Facebook, the number of likes in the post (video) is positive and negative, the number of people who viewed the video and the number of comments. YouTube sees the number of views, the number of positive and negative likes. On Instagram, you can see the number of followers, the number of views and the number of comments below the post (video). All data were extracted on 29/03/2020 at 2: 20h.

Portugal Campaigns

The Madeira Promotion Association launches a social media campaign to appeal to stay at home in this moment of greatest world fragility. Stay home now. Dream online. Visit us later 'is the campaign launched by the Madeira Promotion Association. This is the motto of the most recent awareness campaign launched on social networks in Portuguese, Spanish, French and German on @visitmadeira and www.madeiraallyear.com. The campaign's main platforms are video and images on social networks (Radio, 2020). In addition, the campaign also stresses that, even with the physical borders closed, the digital ones remain open and ready to make passengers experience, through online tools, the attractions of the Madeira Archipelago, such as levadas, cliffs, belvederes , among other options (Portal, 2020).

As for the reactions of people on social networks, there is: Facebook, the campaign had 1,900 likes and the reactions were diverse: 1,600 people said ok, 255 people a love, 1 a scare, 5 cries , 1 person angry,

in addition 57 people commented and 573 people shared the video. On YouTube, the video had 11,689 views, 116 positive and 4 negative likes and on Instagram with 192 thousand followers, with 19,652 views, you can see 91 comments.

Turismo Centro de Portugal launched the “Haverá Tempo!” Campaign, in which it points out ways for the near future, post-pandemic COVID-19. The campaign calls on the Portuguese to stay at home, noting that "there will be time" to get to know or return to the Center of Portugal, which will be waiting for you when the disease is resolved. The campaign has as main platforms a video and images on social networks, accompanied by the hashtag # haveratempo # turismocentrodeportugal (Publituris, 2020)

As for the reactions of people on social networks, there is: Facebook, the campaign had 1.8 thousand likes and the reactions were diverse: 1.4 thousand people said ok, 420 people a love, 5 cries, 1 person angry , in addition 155 people commented and 3114 people shared the video. On YouTube, the video had 14,628 views, 196 positive likes and 1 negative, and on Instagram with 10,900 followers, 3,069 views, you can see 48 comments.

Brazilian Campaigns

In Brazil, one of the main tourist destinations, Salvador launched the campaign with the hashtag #visitedepois to encourage travelers to keep alive the desire to go up and down the slopes of Pelourinho, eat acarajés in Rio Vermelho and watch the sunset at Farol da Barra when the routine returns to normal. The campaign aired over the weekend, with a video on Youtube, with versions in English and Spanish. The text recalls that "the city that has always had its doors open needs to retreat" and that "we want you to come, but not now". (Maia, 2020)

As for the reactions of people on social networks, there is: Facebook, the campaign had 7,400 likes and the reactions were diverse: 6,800 people said ok, 611 people a love, 44 cries, 1 scared person , in addition 688 people commented and 2,877 people shared the video. On YouTube, the video had 871 views, 30 positive likes and 1 negative, and on Instagram with 272 thousand followers, 72,514 views, 1710 comments can be seen.

CVC Operadora Brasil launched a campaign that encourages people to postpone their travels. The video brings images of some of the main destinations in the country and highlights the campaign's motto: Stay at Home, Travel Later. The objective is to encourage customers to remain in quarantine, but taking advantage of this time to plan their next trip after the coronavirus crisis, which is damaging the tourism sector globally (Hotelnews, 2020).

As for the reactions of people on social networks, there is: Facebook, the campaign had 444 likes and the reactions were diverse: 336 people said ok, 104 people love, 4 people angry, in addition 207 people commented on something and 317 people shared the video. On YouTube, the video had 30,416 views, 1.1 positive likes and 17 negative likes and on Instagram with 2,100 followers, 53,316 views, you can see 532 comments.

Final Considerations and Future Research

Although tourism was the lever for economic and social development in many countries, since 2019, some fluctuations in the generation of foreign exchange have been perceived, given the economic pressures that have been experienced in many countries and their interdependence, where small-scale crises in one part of the world dramatically impact the pattern of travel to other parts. It was observed in this article the economic dependence of Brazil and Portugal regarding the dividends that the tourist activity brings. In view of the volatility of tourism activity vis-à-vis foreign markets, the impact that a crisis situation can have on these destinations is worrying. Nowadays, specifically in the first half of 2020, with the WHO decree on the Covid-19 pandemide, a disease caused by the new coronavirus, it affected the economic structure of all countries. With or without registered cases, the blockages and restrictions on the fleets of tourist destinations imposed to contain the advances of the disease are directly reflecting on the economy.

Therefore, several tourist destinations reacted with their communication plans to decree a state of emergency, for all those people (tourists / travelers). They created motivational campaigns that deny tourism at this time, and encourage tourist flows after the Covid-19 pandemic outbreak. We identified 04 advertising campaigns, 02 of which were carried out in Brazil and 02 in Portugal, made available on social networks (Facebook, YouTube and Instagram) that:

In Portugal, people do not use social networks as often, since the greatest impact of viewing in the Stay at Home / Madeira video was 19,652 people on Instagram; The video "Haverá Tempo / Portugal", on the other hand, had the largest viewing impact of 14,628 people on YouTube. There is little access to facebook in both campaigns.

In Brazil, on the other hand, people use social networks very often, since the greatest impact of viewing in the video "Visite Depois - Salvador" was through Instagram, totaling 72,514 people. In the CVC video Stay at home, Travel later, had the greatest viewing impact of 53,316 people. Which means that people have been using Instagram a lot, leaving aside other social networks.

It is concluded that in view of the existing communication strategies, social networks were chosen to viralize the advertising campaigns described above, in order to combat the negative effects of Covid-19 on tourism. We have the vision that the tourist destinations Portugal and Brazil, will need to reinvent themselves, with creative ideas for the reuse of tourist spaces after the Covid-19 outbreak, since they are highly affected when the economy and employability in the service provision sectors. In this sense, a descriptive research and a preliminary study with analysis of social networks were carried out. Future studies should make it possible to deepen this problem, using in-depth interviews and elaborating a focus group with tourists and residents (in Portugal and Brazil).

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Strategy of Political Marketing in Affecting Voter's Decision in Governor Election of East Java Province in 2018

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Abstract

This research aimed to analyze the strategy of political marketing in affecting the factors which become electors' decision in Governor Election of East Java Province in 2018. This research used a quantitative survey approach using factor analysis techniques using SPSS. The research site was in Madura, East Java Province of Indonesia. The number of respondents was 101 people who were selected purposively. The theoretical basis used was the political marketing product theory which included 3 (three) products as follows; the credibility of the candidate, the candidate's work program, and the identity of political parties. In addition to the three political marketing products, in this research, the researcher included elements of pesantren politics as a form of local politics derived from local wisdom politics. This was a marketing strategy in the region. These four political marketing products were reduced to several indicators according to their respective operational definitions. The results of data processing in factor analysis using SPSS showed that there were 7 (seven) factors which affect voter decisions in the 2018 East Java Governor Election, which were, pesantren politics, the identity of political parties, support of various parties, the candidate's work program, the credibility of the candidate, communication style, and attractiveness. This research contributed to reformulating the winning strategy in the election of regional heads to provide input in the formulation of the winning strategy for the Election of the Governor of East Java Province in 2023.

Keywords: Political Marketing, Governor Election, Pesantren Politics

Background

Pesantren (Islamic Boarding School) and politics are usually considered as two opposing entities. This dichotomy can't be separated from the assumption that politics is dirty and pesantren are the opposite. In fact, in the theory of the relation between religion and state (politics), Din Syamsuddin (1993) explains that one of the patterns of religious and state relations is in the form of a symbiotic, this is reciprocal and interdependent. In the context of Indonesia which implements a democratic system, the relation between religion and the state is mutually complementary and influential, as evidenced by the first principle of Pancasila which places the Godhead as an inseparable element. It means that political voluntarily in Indonesia gives the widest possible space for religious groups, religious institutions, including pesantren to get involved in politics. The emergence of Abdurrahman Wahid or Gus Dur as the 4th President of RI is a clear proof that the involvement of political actors from pesantren can't be ignored.

In Pierre Bourdieu's modality theory (1986), the position of pesantren is considered to have complete capital to be used as a goal in gaining significant votes in elections, either in economic, cultural, social, and political capital. In economic calculations, pesantren has capital in the form of several students and alumni resources Culturally, the culture in pesantren is still very patronage, in which the direction and *fatwa* of the Kiai/scholar is an obligation that must be obeyed. Michael Rush and Althof (1990) states this patronage relationship to be a fairly effective and well-established method of influencing the exercise of political power through various levels of supervision.

Also, socially, the existence of pesantren in a region usually has a very strong influence in society. Politically, the *Kiai* is still an important actor who has an electrical effect in political contestation because it can't be separated from his figure and also his extensive political network with many parties. In carrying out his political leadership, *Kiai* uses his authority based on his charismatic authority, which according to Max Weber is a special ability which is in a person and a gift from God (Turner, 1982:36).

At the local political level, the political influence of pesantren was very clear in the East Java (East Java) Governor Election (Pilgub) in 2018, in which both the Saifullah-Puti and the Khofifah-Emil received direct support from the pesantren leaders. The leadership of the pesantren or Kiai is the key to maximizing the mobilization of Nahdlatul Ulama (NU) residents who are 'barn' of the votes in East Java. The final results of the vote recapitulation released by the East Java Provincial KPU resulted in the Khofifah-Emil winning, with details of Khofifah-Emil receiving 53.55% with 10,465,218 votes, while Saifullah-Puti gained 46.45% with 9,076 .014 votes (See figure 1). From 38 districts/cities in East Java, Khofifah-Emil was superior in 27 districts/cities, while the Saifullah-Puti pair is only superior in 11 districts/cities (*www.kpujatim.go.id*).

The winning of Khofifah-Emil was very visible in Madura. Based on data from the East Java Provincial KPU (General Election Commissions), the Khofifah-Emil was superior in 3 (three) districts which were Pamekasan, Sumenep, and Sampang. Whereas the Saifullah-Puti only excelled in the Bangkalan district. Madura has always been a battle for votes for politicians during elections. This is reasonable Madura Madura has a strong pesantren mass base, including for the two candidates at the 2018 East Java Governor election. The four districts in Madura are known as the city of students/santri, that have hundreds of Pesantren.

Based on the background above, this research aims to analyze the strategy of political marketing in affecting the factors which became the voter's decision in the East Java Province Election (Pilgub) in 2018.

Literature Reviews

The previous researches about pesantren politics have been conducted, such as research by Sansan Hasanudin (2017) titled Religio-Political Mechanism of Pesantren: Mobilization of Hamida Network in Electoral Politics in Tasikmalaya. The results of this research indicated that political power can originate from informal networks that are integrated with formal networks manifested in the political power of the pesantren social network called the Miftahul Huda Alumni Association (Hamida). Secondly, a research conducted by Kun Wazis (2015) with the title Political Strategy Gaining Mass Support for Pesantren: A Case Study of the Form of Political Communication of Candidates for Legislative Candidates of the Republic of Indonesia in Jember and Lumajang Elections in the 2014 Legislative Elections. from the research, it can be concluded that political strategies used by the candidates to obtain support for the mass vote of Pesantren in different ways, including using forms of political communication in the form of political rhetoric, political public relations, political campaigns, political lobbying, and political action, both in Jember and Lumajang by characteristics and political attitudes of the respective Islamic boarding schools. The third study conducted by Merlia Indah Prastiwi (2015) entitled Politicization of Pesantren and Shifting Functions of Pesantren in Madura. The result of the research concludes that in general, the response of the Madurese people supports the involvement of the Kiai in politics because the Madurese people still position the Kiai as the main figure and role model. Therefore, the involvement of the Kiai in politics is expected to change the political bad image.

Theoretical Framework

The theoretical basis used in this research referred to political marketing product theory in Akbiyik and Eroglu (2014), entitled *The Impact of Local Political Applications on Voter Choices.* This political marketing concept aims to influence voters by using several political marketing products, which include the candidate's credibility, the candidate's work program, and the identity of political parties. In addition to the three political marketing products, in this research, the researcher included elements of pesantren politics as a form of local politics derived from local wisdom politics. This was a marketing strategy in the region. These four political marketing products became the bargaining power of candidates who competed in the 2018 East Java Governor election in Madura.

The indicators of these variables will be developed into statement items as outlined in the questionnaire. The operational definitions of the variables and indicators are as follows:

1. The Credibility of Candidate

According to Hovland, Jannis, and Kelly (1953) in the theory of source credibility state that people are more likely to be persuaded when the source of communication shows her/himself as a credible person. It means that an individual who has expertise, trustworthiness, and attractiveness. Thus, the credibility of a candidate is the ability of a candidate leader in influencing or convincing others because it is supported by several components which are expertise, trustworthiness, and attractiveness.

2. The Work Program of Candidate

Based on Korten (1984) defines the program as a collection of related projects which have been designed to carry out harmonious and integrated activities to achieve the overall policy objectives. The requirements for the program to be implemented according to Korten (1984), it has to meet three aspects which are the suitability of the program with the issues or problems faced by the community, the suitability of the program with the target group or program beneficiaries, and the suitability of the program with the implementing organization. Therefore, a candidate's work program is a collection of work of a candidate leader to achieve targets or goals which have been determined. The target will be achieved if supported by several components which are the suitability of the issue, the suitability of the target group, and the suitability of the implementing organization.

3. The Identity of Politic Party

Based on Waterman's (1982) identity means having a clear self-image covering several goals to be achieved, values, and beliefs chosen by the individual. The political party according to Budiardjo (1998: 16) is a political party is an organized group, whose members have the same orientation, values, and ideals. So, the identity of a political party is a clear self-image of a political group that concerns party orientation, values, and ideals.

4. Pesantren Politics

According to Dhofier (1994) pesantren is a traditional Islamic educational institution to study, understand, appreciate, and practice Islamic teachings by emphasizing the importance of religious morals as guidelines for daily behavior. So, the politics of pesantren is a political activity involving pesantren actors, such as santri/student and Kiai for certain political interests. Pesantren complete capital to achieve these interests, including social capital, economic capital, and cultural capital.

Table 1: Operational Definition

Factor	Operational Definition	Indicator
The credibility of the candidate	The ability of a prospective leader in affecting or convincing others is supported by several components which are expertise, trustworthiness, and attractiveness.	1. Expertise
		2. Trustworthiness
		3. Attractiveness
Work Program of Candidate	The set of the work of a prospective leader to achieve targets or goals that have been determined. The target will be achieved if supported by several components which are the suitability of the issue, the suitability of the target group, and the suitability of the implementing organization.	1. The suitability of the issue
		2. The suitability of the target group
		3. The suitability of the implementing organization.
Identity of Political Party	A clear self-image of a political group which concerns party orientation, values, and ideals.	1. Party orientation
		2. Values of party
		3. Ideals/ goals of the party
Pesantren politics	It is Political activities involving pesantren actors, such as santri and Kiai for certain political interests. Islamic boarding schools/Pesantren has complete capital to achieve these interests, including social capital, economic capital, and cultural capital.	1. Social capital
		2. Economic capital
		3. Cultural capital

Source: Processed from some experts' opinion

Research Method

This research used a quantitative survey approach by using research data analysis techniques using factor analysis methods. Factor analysis in this research was used to process data on the factors which affected voters in deciding the 2018 East Java Governor election in Madura. The data processing used SPSS.

The data collection method used was the questionnaire method (questionnaire). The questionnaire assessment used a Likert scale, in which the range of scores used was one to five. A score of five signified that the respondent believed strongly agree with the item statement. A score of one indicated that the respondent believed strongly disagree with the questionnaire statement.

This research was conducted in four districts in Madura, East Java province, which were Bangkalan, Pamekasan, Sumenep, and Sampang. The population in this research were all voter in Madura who had voted for the East Java Governor election in 2018. The total number of voters in Madura based on data from the East Java Provincial KPU was 3,510,637 people, with details based on each district below:

Table 2: Total of Voter in Madura for Governor Election of East Java Province in 2018

No	District	Total of Voter
1	Sampang	904.715
2	Pamekasan	869.777
3	Sumenep	868.763
4	Bangkalan	867.382
Total		**3.510.637**

Source: KPU of East Java Province, 2018

The total sample in this research was determined based on the Slovin formula. The specified margin of error was 10% or 0.1.

$$n = \frac{N}{1 + Ne^2}$$

n: total of minimum sample
N: population
e: margin of error

Thus, number of sample obtained were:
n = N / (1 + (N x e²))
n = 3.510.637 / (1 + (3.510.637 x 0,1²))
n = 3.510.637 / (1 + (3.510.637 x 0,01))
n = 3.510.637 / (1 + 35106,37)
n = 3.510.637 / 35107,37
n = 99,9971516 (rounded to 100)

Samples were taken which were based on each district was determined by the formula below:

$$nh = \frac{\text{Voter population}}{\text{Total of all population}} \times \text{Total of determined sample}$$

Thus, it was obtained a total of sample from each district as follow

Table 3: Total of sample in each district

District	Population	Sample
Sampang	904.715	26
Pamekasan	869.777	25
Sumenep	868.763	25
Bangkalan	867.382	25
Total	**3.510.637**	**101**

Source: Processed from KPU of East Java Province, 2018

To determine respondent and respondents location in each district, it is chosen in purposive. This purposive sampling method was deliberately chosen because of the consideration of the homogeneity of the Madurese people. The majority of Madurese are Muslim, pesantren culture, and formalized as NU. While the data collection method used in this research was to use a closed and open questionnaire.

Result and Analysis

East Java Pilgub 2018 was followed by two pairs of candidates, namely the first pair of Khofifah Indar Parawansa and Emil Elistianto Dardak (Khofifah-Emil) who was carried by a coalition of the parties of Partai Demokrat (PD), Partai Nasional Demokrasi (Nasdem), Partai Persatuan Pembangunan (PPP), Partai Hanura, Partai Golongan Karya (Golkar), Partai Amanat Nasonal (PAN), dan Partai Gerakan Indonesia Raya (Gerindra). Second, the pair of Saifullah Yusuf and Puti Guntur Soekarno (Gus Ipul-Puti) were carried by the Partai Kebangkitan Bangsa (PKB), Partai Demokrasi Indonesia Perjuangan (PDI P), dan Partai Keadilan Sejahtera (PKS).

The two actors not only have network and funding strength, but also support from local pesantren-based elites. This pesantren-based local elite has a high bargaining value in influencing someone in determining their political preferences. There is two great Kiai and pesantren NU in Each Java Pilgub 2018. First, the Tebuireng axis, that refers to the Jombang Tebuireng Ponpes led by KH Salahuddin Wahid (Gus Solah) and KH Asep Syaifuddin Halim (Caretakers of Amanatul Ummah Mojokerto and Surabaya Ponpes). This shaft supports the Khofifah-Emil. Second, the Lirboyo axis refers to the Pesantren Lirboyo Kediri. This axis supported the Saifullah-Puti pair (Rohim and Mahardika, 2018:60-78).

Data from the East Java Province KPU showed that the final results of the 2018 East Java Governor Election were won by the Khofifah-Emil of 10,465,218 votes or 53.55 percent. While the Saifullah-Puti won 9,076,014 votes or 46.5 percent (*www.kpujatim.go.id*). This means that there is a difference of about one million votes or nearly seven percent. The number of incoming votes was 20,323,259 total votes from 38 districts/cities in East Java. 19,541,232 were considered valid, while 782,027 were declared invalid.

In fact, the victory of the Khofifah-Emil is very clear in Madura. Based on data from the East Java Provincial KPU, the Khofifah-Emil was superior in 3 (three) districts, which were Pamekasan, Sumenep, and Sampang. Whereas the Saifullah-Puti only excelled in Bangkalan district.

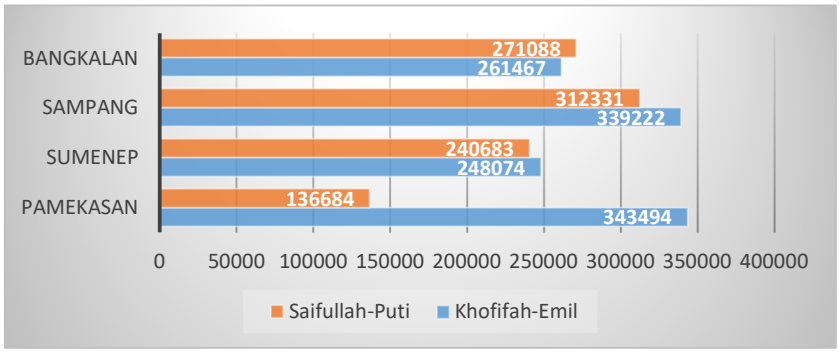

Figure 1: vote acquisition of both candidate pair in Madura

The winning of the Khofifah-Emil in Madura was inseparable from the typology of the Madurese community. In general, Madura people have very religious characteristics and hold a strong patron culture, in which the position of a religious leader or Kiai is highly respected. They appreciate and respect Kiai by glorifying him.

Result of Factor Analysis

To obtain valid and reliable questions, To obtain items that are valid and reliable statements, the researcher first tested the validity and reliability of 36 statement items toward 30 respondents randomly with a margin of error of 5%. The result, out of 36 statement items, only 27 items passed the validity and reliability test. In the validity test (See Corrected Item-Total Correlation in Table 4) with a margin

of error of 5% for 30 respondents, the r value was 0.333. It means that statement items with a Corrected Item value less than <0.333 needed to be excluded or deleted. Item statements X1.1, X1.2, X1.5, X1.6, X2.8, X2.9, X3.3, X3.9 and X4.7 were less than 0.333. Thus, they must be issued in the statement list (See table 4).

Whereas the result of Cronbach's Alpha showed a reliability test value of 0.876 more than (>) 0.7 (See table 5). It showed that each item questionnaire statement was reliable, so data analysis could be continued.

Table 4: Result of Questionnaire Validity Test

Item-Total Statistics				
	Scale Mean if Item	Scale Variance if Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item
X1.1	1.385.000	165.845	.152	.877
X1.2	1.396.667	161.471	.236	.877
X1.3	1.391.333	159.982	.335	.874
X1.4	1.381.333	164.947	.377	.875
X1.5	1.382.333	165.357	.260	.875
X1.6	1.381.667	165.385	.296	.875
X1.7	1.402.667	158.823	.404	.873
X1.8	1.390.000	162.621	.300	.875
X1.9	1.408.000	160.166	.398	.873
X2.1	1.385.000	156.603	.616	.869
X2.2	1.382.333	160.944	.564	.872
X2.3	1.383.000	163.252	.415	.874
X2.4	1.388.333	159.454	.417	.873
X2.5	1.387.667	159.013	.451	.872
X2.6	1.384.333	160.185	.495	.872
X2.7	1.389.667	160.999	.378	.873
X2.8	1.390.667	167.582	.000	.881
X2.9	1.390.333	165.068	.104	.879
X3.1	1.386.667	159.816	.419	.873
X3.2	1.384.333	159.771	.441	.872
X3.3	1.386.667	161.609	.284	.875
X3.4	1.393.667	151.413	.605	.868
X3.5	1.383.333	163.057	.362	.874
X3.6	1.384.000	159.283	.557	.871
X3.7	1.382.667	162.823	.400	.874
X3.8	1.383.000	161.114	.516	.872
X3.9	1.414.000	172.317	.168	.889
X4.1	1.391.000	157.197	.365	.874
X4.2	1.396.333	155.895	.386	.874
X4.3	1.396.000	151.972	.543	.869
X4.4	1.393.333	147.057	.760	.863
X4.5	1.397.667	151.289	.651	.867
X4.6	1.394.667	151.775	.606	.868
X4.7	1.393.667	159.206	.289	.876
X4.8	1.396.667	157.402	.515	.871
X4.9	1.392.000	150.303	.675	.866

Source: Result of processed data using SPSS

Table 5: Result of Questionnaire Reliability Test

Reliability Statistics	
Cronbach's Alpha	N of Items
.876	36

Source: Result of data processed using SPSS

Twenty items of question would be the items of the questionnaire as research material in the field. After distributing the questionnaire, the next step was to carry out a factor analysis of the results of the questionnaire distribution. Factor analysis is an analysis that aimed to find the main factor or component that best explains the variable.

Table 6: KMO and Bartlet's Test

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.725
Bartlett's Test of Sphericity	Approx. Chi-Square	1.359E3
	df	351
	Sig.	.000

Source: Result of data processed using SPSS

In the table of KMO and Bartlet's Test above, it is seen the KMO Measure of Sampling Adequacy (MSA) value was 0.725. since the value 0.725> 0.5, this shows the adequacy of the sample. The KMO and Barlett's test values (which appear on the Chi-Square value) were1.359E3 with a significance value of 0.000. It indicated that there was a correlation between variables and it was feasible for further processing.

Furthermore, to find out which variables can be further processed and which are issued, it can be seen in table 7 (Anti Image Correlation). MSA value of each variable> 0.5, then all variables can be processed further, except the variable X2.7 (0.425) because <0.5. Variables with MSA value <0.5 are reprocessed from the beginning by removing the variable. From27 variables, 26 variables qualified for further processing.

Table 7: Magnitude of MSA Anti Image Correlation

X1.1	X1.2	X1.3	X1.4	X1.5	X2.1	X2.2	X2.3	X2.4	X2.5	X2.6	X2.7	X3.1	X3.2
.623	.783	.593	.560	.508	.737	.749	.692	.632	.616	.671	.425	.735	.703
X3.3	X3.4	X3.5	X3.6	X3.7	X4.1	X4.2	X4.3	X4.4	X4.5	X4.6	X4.7	X4.8	
.779	.734	.833	.697	.714	.857	.831	.787	.745	.770	.806	.666	.654	

Source: Result of data processed using SPSS

In table 8 (*Total Variance Explained*), it shows that there are 7 (seven) factors formed from 26 variables entered. Each eigenvalue factor > 1. Factor 1 eigenvalue was 5,961 with variance (22,926), Factor 2 eigenvalue was 3,645 with variance (14,018), Factor 3 eigenvalue was 2,710 with variance (10,422), Factor 4 eigenvalue was 1,833 with variance (7,049)), Factor 5 eigenvalue was 1,584 with variance

(6,092), Factor 6 eigenvalue was 1,090 with variance (4,194), and Factor 7 eigenvalue was 1,047 with variance (4,026). The total variance of 26 variables extracted into 7 factors are as follow:

22,926 + 14,018 + 10,422 + 7,049 + 6,092 + 4,194 + 4,026 = 68,727

The amount of variance which could be explained by the new factors formed was 68.727 while the remaining 31.273 were explained by other factors that were not examined.

To find out the magnitude of the correlation between factors formed with variables, we must find the value of loading factors for each variable. For the factor loading values of each variable, see table 9. After grouping based on the highest factor loading values in each variable, 7 (seven) factors were formed, then name the seven factors. If the factor loading value of the seven factors is < 0.5, it must be excluded. The indicators that must be excluded because < 0.5 are X1.1, X1.2, X3.1, X3.3, and X3.5. While the indicators that qualify for entry into 7 (seven) factors are shown in table 10. So, the results of the factor analysis in this research indicated that there were 7 (seven) factors that influenced voter decisions in the 2018 East Java Governor Election in Madura.

Table 8: Total Variance Explained

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.961	22.926	22.926	5.961	22.926	22.926
2	3.645	14.018	36.944	3.645	14.018	36.944
3	2.710	10.422	47.366	2.710	10.422	47.366
4	1.833	7.049	54.414	1.833	7.049	54.414
5	1.584	6.092	60.506	1.584	6.092	60.506
6	1.090	4.194	64.700	1.090	4.194	64.700
7	1.047	4.026	68.726	1.047	4.026	68.726
8	.958	3.684	72.409			
9	.860	3.308	75.717			
10	.829	3.188	78.905			
11	.687	2.644	81.549			
12	.637	2.449	83.999			
13	.602	2.315	86.314			
14	.510	1.960	88.274			
15	.412	1.584	89.857			
16	.386	1.486	91.343			
17	.365	1.402	92.745			
18	.329	1.266	94.011			
19	.289	1.112	95.123			
20	.248	.953	96.075			
21	.235	.904	96.979			
22	.216	.831	97.810			
23	.187	.719	98.529			
24	.151	.579	99.108			
25	.127	.488	99.596			
26	.105	.404	100.000			

Extraction Method: Principal Component Analysis.

Source: Result of data processed using SPSS

The result of processed data in factor analysis using SPSS with 26 items of statement for 101 respondents showed that Pesantren politics is the biggest factor contributing to the decision of voters in the 2018 East Java Province Governor Election in Madura. The amount of contribution was seen from the highest number of indicators and factor loading values (See table 10).

Table 9: Rotated Component Matrix

Rotated Component Matrix[a]

	Component						
	1	2	3	4	5	6	7
X1.1	.075	.260	.137	-.277	.484	-.064	.339
X1.2	-.072	.472	.326	.221	-.033	-.432	.099
X1.3	.304	.120	-.200	-.044	.416	.328	-.504
X1.4	.112	.176	.229	.139	.123	.762	-.019
X1.5	-.062	-.146	-.029	.006	.839	.134	-.056
X2.1	-.076	.769	-.164	.034	.068	.037	-.131
X2.2	.056	.765	.151	.171	-.072	.012	.032
X2.3	.017	.763	.048	.038	-.081	.090	.050
X2.4	.259	.212	-.048	.519	-.379	.236	.074
X2.5	.081	.064	.009	.841	-.032	.140	-.030
X2.6	.115	.131	.121	.813	-.050	-.098	-.049
X2.7	.244	-.042	-.017	-.073	.057	.032	.811
X3.1	.478	.337	.186	-.423	-.098	.063	-.078
X3.2	.364	.426	.194	-.522	-.073	-.035	.047
X3.3	.160	.136	.494	-.189	.147	-.358	-.384
X3.4	.097	.794	.036	-.262	.005	-.033	-.131
X3.5	.151	.496	.431	.302	-.033	-.293	.071
X3.6	.058	.505	.614	.209	.173	-.002	.021
X3.7	-.046	.484	.592	.087	.114	.187	.096
X4.1	.731	.125	.321	.129	-.055	.079	.063
X4.2	.802	-.167	.170	.153	-.039	.026	-.091
X4.3	.884	-.149	.119	.054	.033	.038	-.006
X4.4	.808	.108	-.089	.029	-.072	-.053	.226
X4.5	.836	.097	.018	-.014	.136	.087	.107
X4.6	.504	.247	.228	-.149	-.068	-.346	-.214
X4.7	.425	.007	.628	-.197	-.128	.216	-.180
X4.8	.344	-.241	.761	-.040	-.126	.002	.134

Source: Result of data processed using SPSS

Table 10: Grouping 7 Factors

FACTOR 1 : Pesantren Politics	
X4.1	Supported by Pesantren whose Kiai is populist (0.731)
X4.2	Supported by Pesantren which have many santri/students (0,802)
X4.3	Supported by Pesantren which have many alumni (0,884)
X4.4	Supported by economic-independent Pesantren(0,808)
X4.5	Supported by Pesantren that recruits many employees (0,836)
X4.6	Supported by Pesantren that often donates to society (0,504)
X4.7	Dupported by modern pesantren (0,628)
FACTOR 2 : Identity of Political Party	
X2.1	Having the program related to the problems (0,769)
X2.2	Having a work program which becomes the solution to the problem (0,765)
X2.3	Supported by political parties who uphold Nationalism (0,763)
X3.4	Carried by Political Parties Who Uphold the ordinary people (0,794)
FACTOR 3 : Support from Several parties	
X3.6	Supported by Anti-Corruption Political Parties (0,614)
X3.7	Supported by Political Parties Who Enforce Justice for All (0.592)
X4.8	Supported byPesantren that combines Modern Salaf (0.761)
FACTOR 4 : Work Program of The Candidate	
X2.4	Having a work program for Millennial (0.519)

X2.5	Having a Work Program Plan for Low Educated people (0.841)
X2.6	Having Work Program Plans for Rural Communities (0.813)
X3.2	Supported by Political Parties Aimed to Build HR (0.522)
FAKTOR 5 : Credibility of Candidate	
X1.5	Honorable Family (0.839)
FAKTOR 6 : Style of Communication	
X1.4	Convincing Communication Style (0,762)
FAKTOR 7 : Attractiveness	
X1.3	Attractive (0,504)
X2.7	Have Work Plan which can be executed by Regional Apparatus Work Uni/ SKPD (0,811)

Source: Result of data processed using SPSS

Factor Analysis of Pesantren Politics

Political factors of pesantren became the biggest contributing factor in determining voter decisions in the East Java Province Governor Election in 2018 in Madura. The magnitude of the political electoral contribution of this pesantren was because it was supported by 7 (seven) indicators and its high factor loading value.

The seven indicators were candidates supported by pesantren with many alumni (with a factor loading value of 0.884), candidates supported by boarding schools that recruited many employees (0.836), candidates supported by pesantren that are independent in the economy (0.808), candidates supported by pesantren with many students (0.802), candidates supported by pesantren whose Kiai were populist (0.731), candidates supported by Modern Pesantren (0.628), and candidates supported by Pesantren that contributes to the community (0.504) (See table 10).

From the seven indicators, for respondents the candidate factor supported by the pesantren with the most alumni was the factor with the greatest contribution in pesantren politics. It is seen from the highest loading factor. The magnitude of the electrical contribution of the alumni network was in line with research conducted by Hasanudin (2017) regarding the mobilization of the Hamida network in electoral politics in Tasikmalaya. The results of this research conclude that political power can come from informal networks that integrate with formal networks manifested in the political power of the pesantren social network called the Miftahul Huda Alumni Association (Hamida).

On the other hand, in addition to pesantren political factors, the factors affecting voter decisions in 2018 East Java Governor election in Madura were also determined by 6 (six) other factors which were the identity of political parties, support of various parties, candidate work programs, candidate credibility, communication style, and attractiveness.

Factor Analysis of The identity of the Supporting Political Party

Factor identity of supporting political party was determined by 4 (four) indicators, which were candidates who had a work program plan that fit the problem (with a loading factor value of 0.769), candidates who had a work program plan that is a solution to the problem (0.765), candidates who were supported by political parties that uphold nationalism (0.763), and candidates promoted by political parties that uphold ordinary people (0.794) (see table 10).

From four indicators, for respondents, the candidate factor promoted by the political party that upholds the common people was the biggest factor contributing to the supporting political party factor. It can be seen from the highest loading factor. Ordinary people or poor people are the main base of voters in East Java, especially Madura. So, political parties that carry a close platform or pro ordinary people will be easier to touch the psychological condition of the people of Madura. Almost all political parties

imaged themselves close to the people, even the Indonesian Democratic Party of Struggle (PDI-P) specifically carried out the jargon of the underprivileged party as the party's identity. This has become one of the party's strategies in obtaining people support.

Factor Analysis of Support from Several Parties

Factor of support from some parties was determined by 3 (three) indicators which were candidates supported by anti-corruption political parties (with a factor loading value of 0.614), candidates carried by political parties that uphold justice for all (0.592), and candidates supported by pesantren that combine *salaf* and modern traditions (0.761).

From three indicators, for respondents, the candidate factor supported by the pesantren which combined the salaf and modern traditions was the factor with the greatest contribution in the support factor of various parties. It was seen from the highest loading factor. Pesantren support always contributes a large electoral to candidates who compete in elections. Both pesantren still maintained the salaf tradition and modern pesantren. Both pesantren typologies had a large mass base.

Factor Analysis of the Candidate's Work Program

Factor of candidate's work program was determined by 4 (four) indicators which were candidates who had a work plan for millennial (with a factor loading value of 0.519), candidates who had a work plan for a low-educated people (0.841), candidates who had a work plan for a rural society (0.813), and candidates who were promoted by political parties which aims to develop Human Resources (HR) (0.522) (See table 10).

From four indicators, for respondents, the candidate factor that had a work program for people with low education was the factor with the greatest contribution in the candidate work program factor. It can be seen from the highest loading factor. Work programs aimed at people with low education are closely related to economic factors. Research conducted by Fitriyah, et al (2014) related to the determinants of candidate victory in the 2011 Batang local election concluded that economic factors, referring to the program carried by the candidate, played an important role in influencing voter choice because the people of Batang district wanted their regions to change to become more advanced and the chosen candidate is the one who is most valued to advance the area.

Factor Analysis of Candidate's Credibility

The candidate's credibility factor was determined by 1 (one) indicator, which was candidates from respected/honorable families (with a factor loading value of 0.839) (See table 10). Candidates from respected families will be more easily recognized and respected by voters. Research conducted by Purwaningsih (2015) related to kinship politics and the quality of candidates in South Sulawesi confirmed this conclusion. Network inheritance and family names will affect public support to candidates.

Factor Analysis of Communication Style

The factor of communication style was determined by 1 (one) indicator which was candidates who had a convincing communication style (with a factor loading value of 0.762) (See table 10). One candidate's success in the general election was determined by a good communication strategy. Research conducted by Jaya, et al (2015) related to the success and failure of the campaign communication strategies of the candidates in the struggle for the legislative seat of Barru regency in the 2014-2019 period, showed that the campaign strategies carried out by successful legislative candidates and failed legislative candidates were generally the same about political communication. It included the determination of campaigners, the use of campaign media, the preparation of unique messages, and the same target audience.

Factor Analysis of Attractiveness

The factor of attractiveness was determined by 2 (two) indicators which were attractive candidates (with a factor loading value of 0.504) and candidates who had work programs that could be executed by the Regional Government Work Unit (SKPD) (0.811) (See table 10).

from two indicators, for respondents, the candidate factor that had a work program that could be executed by the SKPD is the factor with the greatest contribution in the Attractiveness factor. The candidate's work program factor will always be an attraction for all voters. Candidates who had work programs that were more realistic and could be implemented by parties related to their fields will be more attractive to be chosen than candidates who only offer work programs without involving these parties, in this case related to SKPD.

From these data, it can be concluded that pesantren politics was a dominant factor in influencing voters in Madura. People in East Java, especially Madura, are a pesantren culture that still position Kiai as political teachers, the two candidates for the East Java Governor 2018 who fought together came from the largest religious organization in East Java, it was NU.

Conclusion

This research results in the findings that there are 7 (seven) factors which affect the voter decision at the 2018 East Java governor election, which are pesantren politics, identity of the supporting political parties, support of various parties, candidates' work programs, candidate credibility, communication style, and attractiveness. From the seven factors, pesantren politics is the biggest contributing factor. The amount of contribution is seen from the highest number of indicators and factor loading values. The politics of pesantren has a loading factor value of 0.844, the identity of the supporting political party of0.794, the support of various parties of 0.761, the candidate's work program of 0.841, the credibility of the candidate of 0.839, the communication style of 0.762, and the attractiveness of 0.811.

Political factors of pesantren which have the biggest contribution in influencing voter decisions in the 2018 East Java governor election in Madura are also caused by several things, which are, the majority of respondents consider pesantren to be involved in politics, although for them the involvement of pesantren in politics will shift its role as a religious institution. On the other hand, the majority of respondents do not know whether there are material benefits to be gained by pesantren who support certain regional head candidates. For them, the support given by the pesantren will have an electoral influence on the vote acquisition of regional head candidates, even though they consider that the Kiai's political choice is not necessarily followed by the santri/students or alumni. Furthermore, the support between the pesantren's Kiai for regional head candidates can be different from one another. The difference in support between Kiai pesantren is due to the diverse mass base of pesantren of each candidate, it is also because each pesantren has certain considerations in supporting one candidate.

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The Problem of Millennials' Openness to Services Offered by FinTech in Poland

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Abstract

The purpose of this article is to determine the level of millennials' openness to innovative services offered by FinTech in Poland against the background of financial behaviours displayed in this area by the millennials in the USA. During the analysis of the level of openness to FinTech services of the examined generation, the value of FinTech adoption index for the millennials was determined and the authors developed five-step scales of openness in terms of FinTech service type (objective approach) and the number of FinTech entities (subjective approach). The authors formulated the following research hypothesis: the degree of the millennials' openness to innovative services offered by FinTech in Poland does not differ significantly from the financial behaviours displayed in this area by the millennials in USA. In order to verify the hypothesis, we used the methods of scientific description, review and critical analysis of analytical reports on the FinTech phenomenon, statistical methods and the CAWI method. The necessary empirical data of qualitative and quantitative nature were collected through a survey conducted on a representative sample of 1236 Polish millennials in December 2019. The study results have demonstrated that both in the USA and in Poland, a high level of openness of the millennial generation to FinTech services is observed. FinTech Adoption Index for US millennials was 59% in 2017, while the value of this ratio in Poland in 2019 was around 75%. The analysis of financial behaviours of the examined generation proves that in Poland, just like in the USA, payment services were the most popular.

Keywords: FinTech adoption index, millennials, scale of openness, FinTech, innovative financial services

Introduction

The FinTech issue is an important and topical issue. As J. Harasim and K. Mitręga-Niestrój (2018) indicated, 'FinTech is destroying the established setup of the financial sector and drives changes to the paradigm of financial intermediation model, which makes investigation of this phenomenon an urgent issue'. As M. Swacha-Lech (2017) emphasizes, the appearance of FinTechs constitutes a serious challenge to the competitiveness of traditional financial intermediaries, including banks. Undoubtedly, the competitiveness of modern banks is and will be affected by the emergence of FinTech companies. In the opinion of many authors, the banks' capability of fast and innovative moves is significantly limited, which may hinder their capacity for keeping pace with the trends set by FinTech companies.

At the same time, it should be emphasized that the extremely important changes in the environment of modern financial institutions are brought home by new generations:

- the Y Generation – otherwise known as the millennials, people born between 1980 and 1995;
- the Z Generation – otherwise known as the iGen, people born in the 1996-2010 period.

Regarding the world of finance, the new generations of customers show expectations and attitudes different from those of previous generations. Therefore, recognition of the characteristics of new generations and observation of the mechanisms of financial decision-making employed by these new clients of financial institutions appear to be of crucial importance for the survival and development of modern financial intermediaries.

The youngest members of the Z Generation were just nine years old at the end of 2019, while the oldest were 23 years old; hence it seems legitimate now to conduct an analysis of financial behaviours for the millennials only. Currently, for financial institutions, millennials are an extremely important group – due to both their numbers and their high demand for various financial services (they are people just entering their adult life).

The purpose of this article is to determine the level of millennials' openness to innovative services offered by FinTech in Poland against the background of financial behaviours displayed in this area by the millennials in the United States. During the analysis of the level of openness to FinTech services of the examined generation, the value of FinTech adoption index for the millennials was determined and the authors developed five-step scales of openness in terms of FinTech service type (objective approach) and the number of FinTech entities (subjective approach).

To achieve the stated objective, the authors formulated the following research points:

1) What percentages of millennials use innovative FinTech services in Poland and in the USA?
2) What types of FinTech services are most often used by millennials in Poland?
3) Which FinTech companies are the most popular among millennials in Poland (in terms of both actual use and recognition)?
4) What is the level of millennials' readiness to embrace FinTech services on a five-step scale in terms of subject and object?

Upon review of subject literature, the authors formulated the following research hypothesis: *the degree of the millennials' openness to innovative services offered by FinTech in Poland does not differ significantly from the financial behaviours displayed in this area by the millennials in USA*. In order to verify the research hypothesis thus formulated and to answer the research questions posed, we used the methods of scientific description, review and critical analysis of analytical reports on the FinTech phenomenon, statistical methods and the CAWI method. The necessary empirical data of qualitative and quantitative nature were collected through a survey conducted on a representative sample of 1236 Polish millennials in December 2019. The sample was selected in a random and quota-based manner. The sample structure was corrected with an analytical weight to match the population structure of the Polish millennials in terms of key features related to the study subject. The weight construction process took into account such socio-demographic variables as gender, age, education level, and size of the town of residence.

Use of FinTech services by millennials in the USA

The term 'millennials', already well established both in scientific literature and in colloquial language, refers to people born in the years 1980-1995, whose childhood fell at the turn of the millennium. They are also referred to as the Y Generation and are the first generation for whom wireless communication and Internet constitute their 'natural environment'. According to the GFK study (2020), Millennials constitute a significant group in the social structure of both countries: in the US they make approx. 20% of the population, in Germany - approx. 15%, and there are countries where they make up to 25%. Considering the share of millennials in the adult population, globally they constitute approx. 46%, but in regional terms these data are much more diverse, e.g. in the USA it is 36%, in Europe approx. 32%, in the Middle East - approx. 52% (Fundstrat, 2018). In accordance with Rocznik Demograficzny 2019 (GUS, 2019) in Poland, as at 31 December 2018, millennials constituted approx. 22.49% of the total population, which means 8,638,256 persons.

As estimated by Fundstrat (2018), in the United States only over the next decade (by 2030) millennials will become the richest social group, as their disposable income will increase fivefold, which with 96 million citizens (potential consumers) will constitute a significant target group for many types of enterprises - including the financial sector entities. As Sachdev (2019) claims, this trend is global, as by the beginnings of the third decade of the 21st century millennials have already become a social group that earns more than the previous generations, quickly increases their purchasing power and is the most influential consumer group in the world. As adolescents, they saw the emergence of modern technological powers – Facebook, Amazon, Google, Apple and others, which made them accustomed to all kinds of technological and digital innovations. They are also the first generation, which stays permanently online, using social media daily for both private and professional communication. Surveys conducted in 2019 by Vogels (2019) in the USA demonstrated that 93% of the millennials own and actively use smartphones, and 86% use various types of social media in everyday life (including 84% who use Facebook). Nearly 100% of this group uses the Internet, with 19% of them using only a smartphone for this purpose. As a generation open to new challenges, they easily drive the FinTech revolution (FinTech services are usually provided via the Internet), radically changing the approach to traditional financial institutions and their services.

In accordance with the Ernst&Young (2017) FinTech Adoption Index report, for the US millennials, the rate of FinTech adoption was 59%, while the global index was then 48%. The value in 2019 for 27 selected countries is presented in Table 1.

Table 1: Users of FinTech services as a percentage of the digitally active population in 27 selected countries in 2019.

Country	Percentage
China	87%
India	87%
Russia	82%
South Africa	82%
Colombia	76%
Peru	75%
Netherlands	73%
Mexico	72%
Ireland	71%
UK	71%
Argentina	67%
Hong Kong	67%
Singapore	67%
South Korea	67%
Chile	66%
Brazil	64%
Germany	64%
Sweden	64%
Switzerland	64%
Australia	58%
Spain	56%
Italy	51%
Canada	50%
USA	46%
Bel & Lux	42%
France	35%
Japan	34%
Average of 27 markets	**64%**

Source: Ernst & Young (2019).

It is extremely significant that the adoption rate of FinTech innovations increases dynamically. To compare the six largest markets (Australia, Canada, Hong Kong, Singapore, United Kingdom and the USA), it increased from 16% in 2015 to 31% in 2017 and 60% in 2019, with the largest increase taking place in the UK - 14% in 2015 against 71% in 2019.

Considering the types of services offered by FinTech companies, it should be noted that payment services are particularly popular among the millennials. In 2018, more than one in ten respondents in the US used his digital wallet with every purchase - especially paying for food, rent or Uber. According to CB Insights (2019), among the millennials, 63% of them make transactions with their smartphones, and 41% use a mobile device to finalize a transaction at a store. As Crypto Valley Journal (2019) says, among millennials whose individual or household income exceeds 100,000 USD, 25% of them own and use cryptocurrencies, and further 31% are interested in this solution. In accordance with Torpey (2019), fifty-nine per cent of millennials positively assess bitcoin as a technological innovation in the world of finance.

The US millennials also take advantage of the investment opportunities offered by FinTech companies. In 2018, 83% of millennials expressed their open attitude to alternative investment strategies using FinTech services. About 67% of the generation surveyed make use of robo-consulting and micro-investment (purchases of stocks and shares on equity crowdfunding platforms). Bitcoin investments are also popular among the millennials. According to CB Insights (2019), 20% of them own bitcoins and treat them as investments. Analyzing the US millennials' readiness to embrace such investments, Torpey emphasizes that:

- 27% of millennials prefer investing in bitcoin over stock,
- 30% prefer investing in bitcoin over government bonds,
- 24% prefer investing in bitcoin over real estate,
- 22% prefer investing in bitcoin over gold.

As many as 68% of millennials are considering alternative forms of managing their assets, including termination of traditional bank accounts and transition to an innovative technology company, such as Facebook, Google, Apple or Amazon (Fundstrat, 2018).

The millennials in USA also willingly use FinTech services to contract loans. According to CB Insights (2019), typical millennial's debt amounts to $ 42,000. Mesa (2019) emphasizes that almost 35% of millennials borrowed via FinTech platforms and companies, while only 25% borrowed from traditional financial institutions.

Insurance is another area where representatives of the surveyed generation used the services offered by FinTech companies. When analyzing the behaviour of US millennials, it should be highlighted that, in accordance with the report of Liberty Mutual Insurance/Safeco Insurance (2019), in 2019 36% of them bought car insurance online, and one in every three bought home insurance via the Internet. It is also interesting that 28% of millennials prefer to use social media for insurance.

Own Research - Description of The Research Sample

The study, based on the CAWI method, was conducted in December 2019 by a research agency called SW Research on a representative sample of 1236 millennials in Poland, aged between 25 and 40. The research sample was selected in a mixed, random and quota manner. The sample structure was corrected using an analytical weight to match the structure of millennials in Poland in terms of key features related to the study subject. The weight structure took into account socio-demographic variables such as gender, age, education and size of the municipality of residence.

By gender, the structure of research sample was as follows: 58.18% were women and 41.82% – men. A majority of respondents belonged to the 25-30 age group (see Fig. 1).

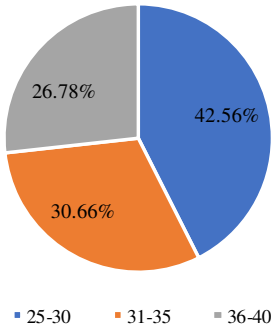

Fig. 1: Sample structure by age (in %)

Source: own study.

Taking into account the level of education, it should be emphasized that a majority (55.18%) of respondents indicated their higher education, and the smallest number (8.50%) of respondents belonged to the group with primary, lower secondary or vocational education. Those with secondary education constituted 36.32% of the sample.

Fig. 2 shows the research sample structure in terms of the size of municipality of residence. The largest number of respondents were inhabitants of rural areas (23.14%) or cities of over 500,000 residents (17.23%).

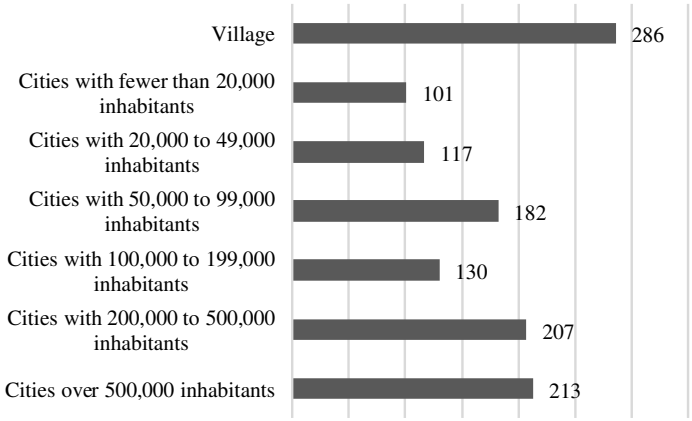

Fig. 2: Breakdown of the respondent group by population of their place of residence

Source: own study.

Taking into account the family situation, 54.94% of respondents were married or couples with dependent children, while only 0.89% were married or couples with adult/independent children. In turn, marriages or couples without children account for 14.80% of all respondents. About 15% of the surveyed population of Polish millennials were young people cohabiting with their parents, while 9.22% of them described their situation as living independently.

Another criterion taken into account in the analysis of research sample was the monthly net income achieved by the respondent (see Fig. 3).

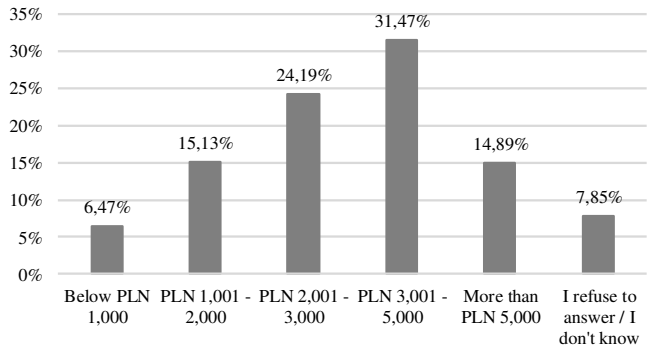

Fig. 3: Breakdown of the respondent group by net income

Source: own study.

Most respondents indicated a monthly net income in the range of PLN 3001-5000 (389 persons). Almost a quarter of millennials surveyed (299 people) declared that they generated net income of PLN 2001-3000. Definitely the fewest respondents indicated the range below PLN 1,000 (80 people).

Own Research Results and Discussion

The study results show that a vast majority of Polish millennials surveyed (924 out of 1236 respondents) have already used FinTech services (Fig. 4).

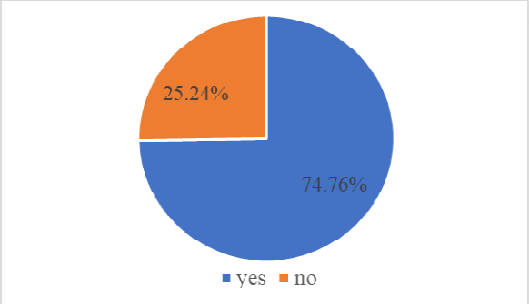

Fig. 4: Polish millennials who have already used FinTech services

Source: own study.

Through an in-depth analysis of the responses of Polish millennials who have already used FinTech services, this article attempts to determine the level of their readiness to embrace FinTech services. To this end, the authors created two five-step scales of openness levels:

- objective approach - this approach refers to analysis of the issue examined by the types of FinTech services which millennials have used so far;
- subjective approach – this approach refers to analysis of the openness of the generation studied to FinTech services by the number of FinTech companies that millennials have used so far.

In order to determine the level of Polish millennials' openness to innovative services offered by FinTech taking an objective approach, we performed an analysis of responses to the question where respondents were asked to indicate all types of FinTech services they had used so far.

On the basis of literature review (Folwarski 2019; BCBS 2018; Szpringer 2017; Dorfleitner et al. 2017; PwC 2016), the authors distinguished five types of FinTech services:

1) payment services – e.g. money transfer, payments, mobile wallet, currencies, cryptocurrencies;

2) investment services – e.g. crowdfunding (as investors), robo-advising;
3) loans and credits – e.g. crowdfunding (as capital seekers), social lending (as borrowers), loan companies;
4) insurance services – insurtech;
5) others – e.g. companies providing cyber security and using blockchain technology.

Structure of millennials' responses to the question about the types of services offered by FinTechs that they have already used are presented in the table below 2.

Table 2: Popularity of FinTech services which millennials in Poland have used so far – objective approach (n = 924)

Type of service offered by FinTech	Response quantity	Percentage
1. Payment services	638	69.05
2. Investment services	226	24.46
3. Loans & credits	190	20.56
4. Insurance services	277	29.98
5. Others	48	5.19

Source: own study.

Similarly to the regularities observed in the USA, FinTech payment services enjoyed the greatest popularity in Poland and were used by 69.05% of millennials. It is surprising, however, that in Poland insurance services came second (in the USA, the second most popular group among FinTech services was investment). One in every four respondents declared that he had already used FinTech investment services. Just a bit fewer Polish millennials already have experience with loan and credit services provided by FinTech (20.56%). It is not surprising that other FinTech services, such as companies providing cyber security or using blockchain technology, appear to be the least popular.

By further analyzing the results obtained from the point of view of individual types of FinTech services (objective approach), the authors built a five-step scale of Polish millennials' openness in terms of FinTech service type (see Fig. 5). The first level has been assigned to people who have so far used only one type of FinTech services, and the fifth one to people who have so far used all the five distinguished types.

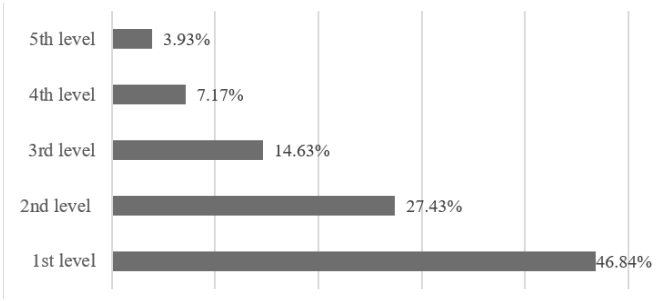

Fig. 5: Levels of millennials' openness to FinTech services in Poland – objective approach (n = 924 of millennials who have already used FinTech services)

Source: own study.

The highest level of such openness (fifth) was observed only in 28 examined millennials (3.93%). Persons who were classified as representing the 1st and 2nd level of openness to FinTech services, i.e. those who had already used one or two types of FinTech services, respectively, accounted for a total of 74.27% of the group. It should also be emphasized that the biggest difference was seen between the 1st and 2nd level of openness – in comparison to respondents who have already used two types of FinTech services, the group declaring that they have used just one type of service was larger by 19.41

pp. It is also interesting that in the group of 924 millennials, each of them used nearly two (1.94) types of services on average.

The subsequent part of the study was analysis of openness of the generation studied to FinTech services by the number of FinTech companies that millennials have used so far (subjective approach). To this aim, the respondents were presented with a group of 15 FinTech companies, the structure of which corresponded to the types of FinTech services identified in Table 2. The respondents' task was to indicate all FinTech companies whose services they had used so far. The popularity of 15 selected FinTech companies operating in Poland, both in the context of their brand recognition and services use, is presented in Fig. 6.

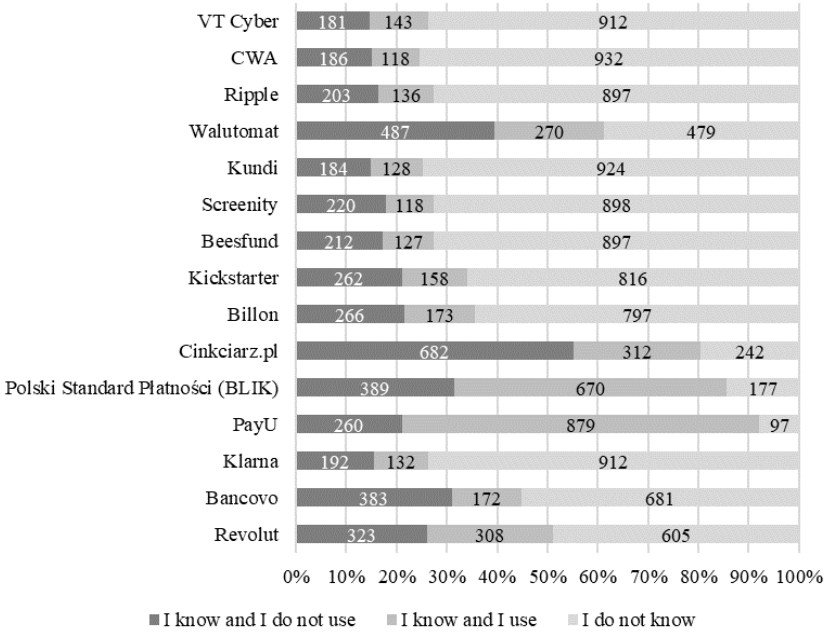

Fig. 6: Responses to the question: "Mark the companies in the list which you know and/or have dealt with" - by number of indications (N = 1236).

Source: own study.

Upon analyzing the popularity of FinTech companies presented in the chart - both in the context of their brand recognition and their services use – PayU (2020) comes to the fore. This FinTech company was established in 2006 as an online payment provider who offers the opportunity to make and receive payments via the Internet between persons identified by their e-mail address. It also provides the option of paying by credit card or bank transfer. The payment recipient does not need to have a bank account to receive money online. According to M. Solarz (2017) PayU is entity that coordinates from Poland the development of the group's payment business in the region of Central and Eastern Europe. A vast majority (92.15%) of the survey sample declared their awareness of this brand and as many as 71.12% of Polish millennials have already used PayU services.

In terms of this criterion, the Polish Payment Standard (Polski Standard Płatności, 2020) is not much behind PayU. This FinTech company was created in 2015. It allows smartphone users to make payments at stationary and online stores, withdraw and deposit cash at ATMs, as well as make instant interbank transfers and generate checks with a 9-digit code. February 2020 was the five-years' anniversary of operations of BLIK mobile payments system, established by the Polish Payment Standard. Since that time, BLIK has become widely available and massively used. Its users carried out a total of 353 million transactions worth PLN 47 billion. BLIK is the payment system most popular among the users of Polish internet, where in 2019 it overtook card payments. In 2019, BLIK had nearly 9 million users. Only 14.32% of surveyed millennials declared that they are not recognize

of this FinTech brand, and as many as 54.21% of them have already used the services of the Polish Payment Standard.

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Cinkciarz.pl (2020) occupied the third place in terms of popularity among the respondents. It was created in 2010 as a Polish portal providing such financial services as money transfers, currency exchange, online payments, multi-currency loans and Forex transactions. The portal also offers mobile applications, the economic analysis service and access to current exchange rates and cryptocurrencies. It is worth mentioning that among the 15 companies we listed, it is the FinTech brand enjoying the highest level of millennials' brand recognition – 55.18% of respondents indicated that they know the company but do not use its services.

The least recognizable FinTech brands were, respectively: CWA, Kundi, VT Cyber and Klarna. CWA, created in 2007, is a brand of comprehensive training services provided to the customer along with supporting tools, which is the market leader of training services offered to public administration and of tailored workshops for the B2B sector. According to money.pl (2020), recently, the company has also been involved in the provision of comprehensive FinTech solutions (activities related to the platforms of SNIPAY and prostagielda.pl). Activities related to the FinTech industry are intended to become an increasingly important source of revenue for the CWA SA Capital Group. Among the 15 entities we listed, this company has the lowest level of brand recognition - 75.40%.

In the ranking of the FinTech brands least known to the surveyed millennials, it was followed by Kundi, an insurance recommendation platform created in 2016. According to the information posted on the website Kundi.pl (2020) it is a mobile application of peer-to-peer insurance. As emphasizes information from cashless.pl (2020), the concept of the solution assumes the creation of customer groups, insuring e.g. electronic equipment of similar value. The insurance policies are expected to be cheaper thanks to group purchases. Accordance with bankier.pl (2020) it should be highlighted that policyholders are intended to know each other, which is supposed to discourage extortion of claims and additionally lower the cost of insurance. As Kurek (2019) notes, a part of the premiums paid by customers is put aside to create a reserve fund for the payment of damages, and the money not thus spent would go back to customers. Only 10.36% of millennials in Poland have used the company's offer (see Fig. 6).

VT Cyber was founded in 2012. The FinTech's activity is focused on preparing organizations for the changing needs of IT and OT departments, both in the area of infrastructure and application security and that of legal regulations e.g. related to personal data protection or critical infrastructure security. The mission of VT Cyber (2020) is to increase security and resistance to cyber-attacks directed at IT and OT infrastructure and at services provided by a given company. This brand was known only to 26.21% of millennials in Poland and merely 11.57% of them had already used its services.

A Swedish FinTech called Klarna has exactly the same percentage as VT Cyber of respondents who are not aware of the brand - i.e. 74.79%. According to the information posted on the website 300gospodarka.pl (2020) Klarna was founded in 2005 and is one of the leading European providers of online payment methods. The scope of its activities depends on the country. In Poland, it is currently limited to brokering online payments, which does not have a significant impact on consumer experience. Stores can choose the company as a provider of instant transfer service within

which a customer is transferred to his bank's website to log in and confirm the payment. [i] As bussinessinsider.pl (2020) highlights, interesting is that in 2019 this company was indicated as the most expensive start-up within the FinTech sector in Europe.

In order to determine the level of Polish millennials' openness to FinTech services, taking an subjective approach, the authors built a five-step scale. The fifth level was assigned to people who have used the services of all the 15 FinTech companies mentioned in the question (see Fig. 6), while the first level was assigned to people who have so far used only one FinTech. The results obtained are presented in Fig. 7.

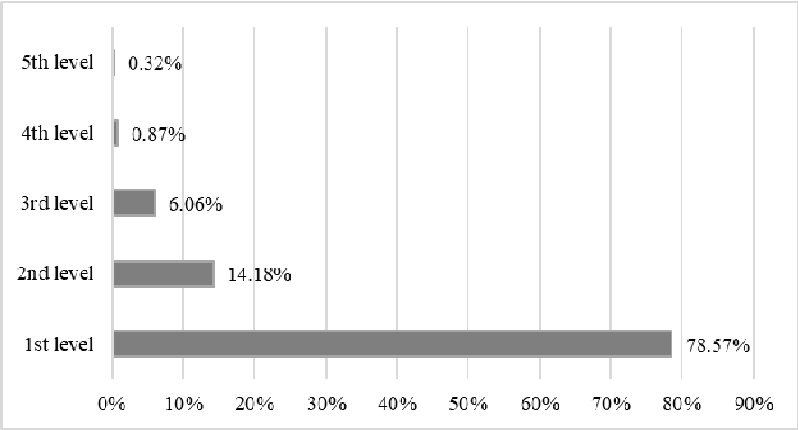

Fig. 7: Levels of Polish millennials' openness to FinTech services in Poland – subjective approach (n = 924 millennials who have already used FinTech services)
Source: own study.

Although millennials; readiness to embrace FinTech services is high, much in line with the authors' expectations, most of the respondents using FinTech services are limited to one or two companies. Only 3 millennials out of 1236 respondents have used the services of all the 15 FinTech companies listed in the survey (5th level of openness) and only 8 people have used 13 or 14 companies (4th level of openness). Fifty-six respondents declared using the offer of 9-12 FinTech companies, thus creating a group of millennials representing 3rd level of openness. On the other hand, the number of respondents representing 2nd level of openness, i.e. those who had used the services of 5-8 FinTech companies mentioned in the question, was more than a double of that.

Definitely, most millennials (726) were assigned to 1st level of openness (people who have so far used the services of 1-4 FinTechs listed in the survey). Within this group, most people declared the use of 2 FinTechs (269). Additionally, 255 millennials indicated that they have so far used the services of only one company. Among the respondents, 129 people stated that they were clients of three FinTech companies, while 73 millennials were clients of four companies.

It is interesting that given the list of 15 selected FinTech companies, within the group of 924 respondents who have already used FinTech services in Poland, on average each of them used the services of four companies (4.16, to be precise). This means, that using the subjective approach to the Polish millennials' readiness to embrace innovative FinTech services, the average FinTech service user of the Y Generation represents the first, i.e. the lowest, level of openness.

Conclusion

As a result of the study conducted, the research hypothesis formulated in the introduction of the article to read: *the degree of the millennials' openness to innovative services offered by FinTech in Poland does not differ significantly from the financial behaviours displayed in this area by the*

millennials in USA has been confirmed. Both in the USA and in Poland, a high level of openness of the millennial generation to FinTech services is observed. FinTech Adoption Index for US millennials was 59% in 2017, while the value of this ratio in Poland in 2019 was around 75%. The analysis of financial behaviours of the examined generation also proves that in Poland, just like in the USA, payment services were the most popular.

Millennials' openness to FinTech services is also demonstrated by the number of FinTech entities they use. In order to analyse the popularity of FinTechs in Poland, in the context of both their brand recognition and services use, the respondents were presented with a list of 15 FinTech companies, the composition of which corresponded to the types of FinTech services identified in the article. In this context, PayU emerges as the unquestionable leader. A vast majority (92.15%) of the surveyed group declared their awareness of this brand and as many as 71.12% of Polish millennials have already used PayU services.

The five-step scales, created by the authors for the purpose of determining the millennials' openness to innovative FinTech services, were applied to determine the level of adoption of FinTechs, using objective and subjective approach. In both cases, most respondents represent the first, lowest level of openness - 46.84% of millennials used only one type of FinTech service, and 78.57% used the offer of 1-4 FinTech companies. Both using objective and subjective approach, the group of respondents with the highest level of openness was the least numerous. Only 3.93% of millennials took advantage of all the types of FinTech services mentioned and only 0.32% of them have so far used the offer of all the FinTech companies listed in the survey (5th level of openness).

An in-depth analysis of the financial behaviours of the Y Generation in the area of study allowed determining the degree of openness of an average millennial in Poland. He uses nearly two (1.94) types of FinTech services and the offer of four (4.16) FinTech companies.

To sum up the study results presented in the article, it can be stated that the overall level of openness millennials to FinTechs in Poland is high, even if they use a small number of types of services, choosing a limited number of providers.

In the authors' opinion, this market will develop dynamically in the coming years. Research conducted by the authors shows that among the 312 millennials who have not yet used FinTech services in Poland, 97 respondents (31.09%) intend to use FinTech services within 6 months and as many as 131 respondents (41.99%) declared their intention to use them in further future.

The most frequently selected responses to the question about the reasons why Polish millennials have not used FinTech services include: "I have never heard the term FinTech before" and "I don't know which companies belong to the FinTech sector" (Table 3).

Table 3: Reasons why Polish millennials have not used FinTech services

Why don't you use FinTech services? (a multiple choice question)	Response rate (n = 312)
1. I have never heard the term FinTech before	39.62
2. I don't know which companies belong to the FinTech sector	28.19
3. I do not trust such companies	20.76
4. I trust traditional financial institutions (e.g. banks) much more	19.43
5. The risk of using such companies is significantly higher (they are not covered by the Banking Guarantee Fund or Insurance Guarantee Fund, nor by the supervision of Financial Supervision Authority)	11.62
6. Using modern financial services causes an additional risk because of operations on the web and new technologies (e.g. data theft)	12.19

7. I do not like to use technological innovations	5.52
8. I can't use modern technological solutions and I avoid them	8.57
9. I see no sense in using FinTech services	15.62

Source: own study.

While comparing the study results obtained with the results presented in the Ernst & Young's report, *FinTech adoption index-Germany (2016)*, it should be emphasized that in both cases the lack of awareness was given as the most important reason of not using FinTech services (67.81% for millennials in Poland vs. 53.2% globally for 7 countries). Another important reason indicated by the respondents in both studies is the low level or even lack of trust in this type of modern institutions. This is the second most frequently selected response from Polish millennials (40.19%) and the fifth one in the study conducted by E&Y (11.2%). The third most important reason, according to Polish millennials, was the lack of need to use FinTech services (15.62%), while globally it is the second most frequent response (32.3%), in the light of E&Y's study.

The authors intend to conduct further research on the issue of millennials using innovative financial intermediation services - FinTech. One of more interesting research issue seems to be the identification of expectations of the Y Generation towards financial services in Poland. Another area of interest is the identification of determinants of their selection of financial services by millennials.

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Acceptance of People with Different Types of Disabilities in The Workplace - Diversity of Opinions

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Abstract

The perception and acceptance of people with different types of disabilities in the workplace are key to their full inclusion and the use of the potential they represent for the development of modern societies. The aim of this article is to try to answer the question whether demographic factors such as gender, age and education have an impact on the acceptance of disability in the workplace. The article presents the results of research conducted in 2019 among Internet users from eight European countries using computer-assisted interviews (CAWI).

Keywords: People with Disabilities in The Open Labour Market, Acceptance of Different Types of Disabilities, Statistical Analysis of Survey Results.

Introduction

On the one hand, processes such as the aging of societies or the development of modern technologies cause the percentage of people with disabilities in Europeans countries to grow constantly - one can notice that different disabilities occur more often in the group of older people. On the other hand, it is easier to overcome the barriers to full participation of this group in social and professional life. However, despite increasingly modern technical solutions that facilitate the inclusion of people with disabilities, the phenomenon of their significantly lower professional activity compared to the able-bodied part of society is still visible in most European Union countries. One of the reasons for the low interest of employers in potential employees from the group of people with disabilities is the low social acceptance of different types of disabilities. This social acceptance depends on many different factors, among which one should mention macroeconomic and social factors creating the framework for the functioning of a given community, as well as individual ones. Macroeconomic and social factors include primarily the policy of the government towards employing people with disabilities, the disability model that prevails in a given community, or the openness of society to diversity. They are of great differential importance, and the results of the research conducted in selected European Union countries revealed significant differences between countries when it comes to the acceptance of different types of disabilities in the workplace (Kwiatkowska-Ciotucha, Załuska, Grześkowiak, 2020). It should be noted that acceptance strongly depends on the level of individual knowledge about disability, and appears to be different for people with various demographic characteristics, such as gender, age or education. In the research carried out on representative samples of Polish respondents, significant differences were noted primarily due to age and gender (Kwiatkowska-Ciotucha, Załuska, Grześkowiak, 2020). In this article one attempts to check whether such differences resulting from demographic characteristics also occur in the international sample.

Theoretical background

High significance of the subject of acceptance of people with disabilities in the workplace has been confirmed by the literature research carried out as part of publications indexed in two databases: Web of Science and Scopus (compare Table 1). The authors of the publications present the results of research on the attitudes towards people with disabilities, factors determining these attitudes, openness to various types of disabilities and related opportunities for adaptation and full inclusion of people with disabilities in the workplace.

Table 1: Quantitative summary of search results concerning scientific articles from 2017-2019 in the databases of Web of Science and Scopus

Phrase	WoS	Scopus
Disabilities in the workplace	40	112
Employee acceptance, relationship, reaction, response, attitude	122	437
Employees with disabilities	116	176
Workplace diversity	2	185

A lot of attention is devoted to attitudes towards people with disabilities and ways of measuring them (Palad et al., 2016; Antonak, Livneh, 2000). The results of many scientific studies confirm that the attitude of employers and able-bodied co-workers is crucial for the successful adaptation of people with disabilities in the workplace (Giermanowska 2016; Chan, Strauser, Gervey, Lee, 2010; Dunstan, Maceache, 2014). A multifaceted evaluation of attitudes towards people with disabilities in the workplace was presented, among others, by Stone and Coella (Stone and Coella, 1996), distinguishing such conditioning factors as personal characteristics of people, the environment and rules prevailing in the organization. In the case of many disabilities, the main barrier to their acceptance in the workplace is the lack of knowledge about them, primarily regarding the possibilities and competences of people with intellectual disabilities (Vornholt, Uitdewilligen, Nijhui, 2013). In the above mentioned study, the significance of demographic and professional characteristics on the perception of disability was also checked. The results indicate that men have more discriminatory attitudes towards people with disabilities than women. Additionally, more educated and younger people display a more positive attitude towards people with disabilities than those who are older and less educated. Diversity related to gender was also confirmed by the study discussed by Popovich et al. (Popovich et al., 2003), where greater openness was found in women's attitudes. Diverse attitudes of employers towards different types of disabilities has been confirmed, among others, by the results obtained by Swedish researchers (e.g. Strindlund, Abrandt-Dahlgren, Ståhl, 2018).

Research Methods and Research Sample

The results presented in this article are based on the data obtained as part of the research conducted in October-December 2019 among Internet users from eight European countries using computer-assisted interviews (CAWI). In total, the research covered 4209 people from the age of 18 to the official retirement age from Belgium, Bulgaria, Greece, Spain, Germany, Poland, Sweden and the United Kingdom. The share of respondents from individual countries was comparable and ranged from 12% to 13% (over 500 people in each country, compare Figure 1). The research sample was representative at country level for features such as gender, age, education and regions. The structure of the sample within the first three features is presented in Figure 1. The share of respondents according to categories distinguished for gender and age groups was comparable (around 50% and 33% respectively). When it comes to education level, the majority of respondents were people with secondary education (43%), followed by higher education (35%) and lower than secondary education (22%). The respondents were also diverse in terms of the following characteristics: place of residence (villages and cities of various sizes), professional situation (students, self-employed, working for someone else, unemployed, professionally inactive, pensioners), type of work performed (blue-collar work, white-collar work,

mixed) and decision-making in the field of employing people (the main decision maker, co-decision maker, a person with little or no influence).

The questions asked to the respondents concerned the perception of people with disabilities in general and in the work environment, the acceptance of various types of disabilities in the workplace displayed by co-workers, the evaluation of the government policy, the knowledge of employers, special privileges for people with disabilities at work and work atmosphere concerning the employment of people with disabilities. In this article one focuses on the question concerning the acceptance of different types of disabilities in the workplace by co-workers. The respondents answered it by choosing one of the options on the 5-point Likert scale, where 1 meant "completely disagree", whereas 5 – "completely agree".

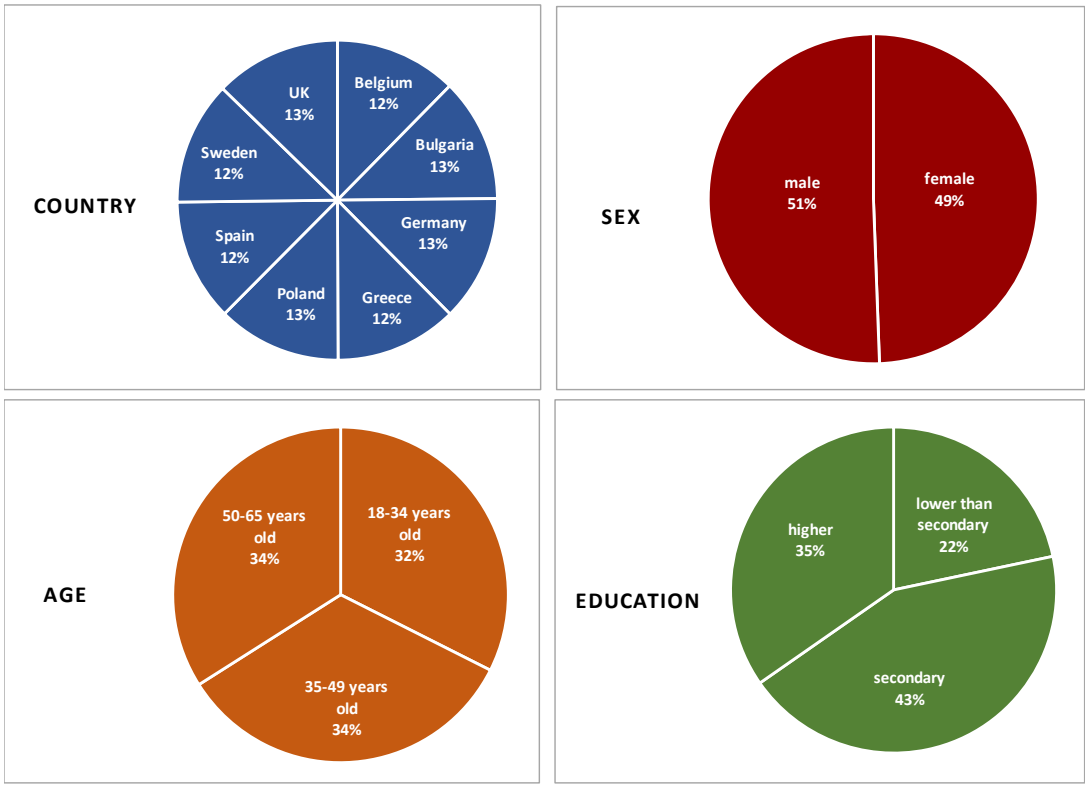

Fig. 1: Sample structure, N = 4209.

The research was focused on assessing differences in the perception of different types of disability depending on demographic and social characteristics. In the case of factors taken into account in the research (gender, age, education level), one has distinguished two or three categories of respondents. In order to assess the differences between the two groups, one used Student's t-test based on comparing the means for two independent samples. The null hypothesis of the test assumes that the observed differences are the result of the difference in sampling distribution (Munro, 2005, p. 138). The adoption of an alternative hypothesis leads to the conclusion that there are significant differences between the analysed groups. The evaluation of differences between the three groups of respondents was carried out using the analysis of variance (ANOVA), which is a generalization of the t-test for any number of groups, allowing comparison of means in relation to many categories of the independent variable (Warner, 2008, p. 215). In the case of significant differences between the groups, post-hoc tests are used to interpret the detected patterns (see Cardinal & Aitken, 2006). For multiple comparisons, one used Tukey honestly significant difference (Tukey HSD) test. For all the tests carried out, one assumed the significance level of 0.05.

Results Discussion

First, one evaluated the overall acceptance of various types of disabilities in the workplace by co-workers. The results are presented in Figure 2, together with percentage of responses that indicated the acceptance of a given type of disability (answer 4 or 5).

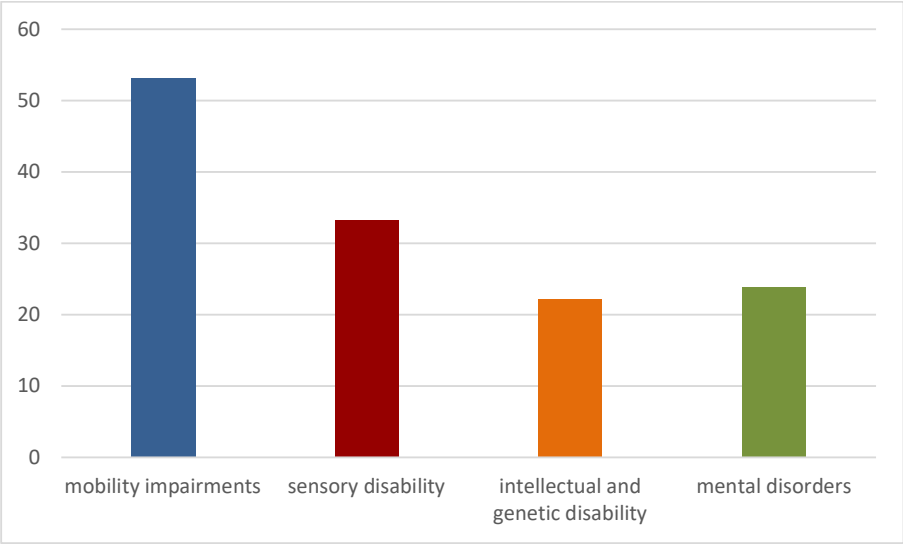

Fig. 2: Acceptance of different types of disabilities in the workplace

The analysis of Figure 2 clearly indicates the disproportion between the acceptance of different types of disabilities. It appears that co-workers display the most positive attitude towards people with mobility impairments. In this case, over 50% of respondents indicated that it is acceptable or fully acceptable. The second place in terms of the number of indications took sensory disability, that is, related to vision, hearing or speech problems. At this point, the option concerning acceptance or full acceptance was indicated by 1/3 of respondents. However, the situation looked much worse in the case of disability resulting from mental disorders and intellectual disability resulting from genetic issues (e.g. Down syndrome). The percentage of responses indicating the acceptance of this type of disability is below 25%, which means that in the opinion of more than ¾ of respondents, these disabilities are not accepted by colleagues or potential co-workers of people who suffer from them. According to previous analyses, the situation varies in different countries covered by the CAWI research, but the overall evaluation is not optimistic in the context of inclusion of people with different types of disabilities in the labour market.

Based on the collected data, one analysed differences in the assessment of acceptance of different types of disabilities in the workplace depending on such demographic and social characteristics as gender, age and education. While analysing the differences according to the gender variable in two categories, one used the Student's t-test, whereas for factors such as gender and education level having more categories, one used ANOVA. The results of the tests are presented in Table 2.

Table 2: Assessment of differences in the acceptance of different types of disability according to demographic and social characteristics

Mobility impairments			
Factor	t statistics or F statistics	p-value	Conclusion
Gender	t = 0.303	0.762	no difference
Age	F = 13.823	0.000	differences exist
Education	F = 13.321	0.000	differences exist
Sensory disability			
Factor	t statistics or F statistics	p-value	Conclusion
Gender	t = -3.443	0.001	difference exists
Age	F = 7.815	0.000	differences exist
Education	F = 4.345	0.013	differences exist
Intellectual and genetic disability			
Factor	t statistics or F statistics	p-value	Conclusion
Gender	t = -3,014	0.003	difference exists
Age	F = 0.522	0.594	no differences
Education	F = 2.203	0.111	no differences
Mental disorders			
Factor	t statistics or F statistics	p-value	Conclusion
Gender	t = -2.006	0.045	difference exists
Age	F = 22.924	0.000	differences exist
Education	F = 1.137	0.321	no differences

The results from Table 2 indicate that there is no clear dependency of connections between demographic and social characteristics and the evaluation of the degree of acceptance of particular types of disability in the workplace. Only in the case of sensory disability did significant differences occur in reference to all three considered characteristics. The acceptance of mobility impairments is similar among men and women, but it varies between age groups and people with different levels of education. In the case of acceptance of intellectual and genetic disability, gender is the only polarizing factor. The approach towards mental disorders was assessed differently by men and women and by people from different age groups. There were no significant differences in the perception of such dysfunctions by the representatives of groups with different levels of education.

When noting differences in opinions according to age and education level with the use of ANOVA, it was necessary to make the analysis more detailed in order to identify the differences between the various categories of these variables. To this end, Tukey's post hoc test was used, the results of which are shown in Table 3.

Table 3: Results of post hoc (Tukey's) tests for age and education in the ANOVA analysis

Mobility impairments			
Comparison		p-value	Conclusion
Age	18-34 years – 35-49 years	0.196	no difference
	35-49 years – 50-65 years	0.002	difference exists
	18-34 years – 50-65 years	0.000	difference exists
Education	Lower than secondary – secondary education	0.177	no difference
	Lower than secondary – higher education	0.000	difference exists
	Secondary – higher education	0.000	difference exists
Sensory disability			
Comparison		p-value	Conclusion
Age	18-34 years – 35-49 years	0.460	no difference
	35-49 years – 50-65 years	0.020	difference exists
	18-34 years – 50-65 years	0.000	difference exists
Education	Lower than secondary – secondary education	0.923	no difference
	Lower than secondary – higher education	0.035	difference exists
	Secondary – higher education	0.029	difference exists
Mental disorders			
Comparison		p-value	Conclusion
Age	18-34 years – 35-49 years	0.000	difference exists
	35-49 years – 50-65 years	0.179	no difference
	18-34 years – 50-65 years	0.000	difference exists

The analysis of the results from Tables 2 and 3 and average values in specific groups leads to the following conclusions:

- men assess the acceptance of sensory, intellectual and genetic disabilities as well as dysfunctions related to mental disorders in the professional context better than women,
- women and men express similar acceptance of mobility impairments,
- respondents from the oldest age group (50-65 years old) display much more acceptance of motor and sensory disabilities in the workplace than representatives of younger groups,
- respondents from the youngest age group (18-34 years) perceive the acceptance of mental disorders in a clearly better way than older respondents,
- respondents with the highest level of education assessed the acceptance of mobility and sensory disabilities in the workplace better than people with secondary or lower education.

Conclusions and future study

The research results confirmed the existence of significant differences in the perception of various types of disability not only due to the different situations in different countries or macroeconomic and social factors, but also due to the demographic characteristics of respondents. Age appeared to be the most differentiating characteristic, and the biggest differences were observed between the oldest (range

50 - 65 years) and younger groups. It is worth noting that the opinions were more diverse in the case of more acceptable disabilities. Importantly, all types of disabilities received all assessment values, that is, from 1 (totally no) to 5 (completely yes), which proves that the opinions on the perception and acceptance of disabilities are diverse. The importance of the subject justifies the necessity of conducting further research and answering the question whether differences related to demographic characteristics occur in other countries. What is more, it is important to find out whether the place of residence – villages and cities with a different number of residents – also represents a differentiating characteristic.

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Economic Prerequisites for Accelerated Innovative Development of Russia

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Abstract

The article explores the issues of ensuring accelerated innovative development of Russia. In particular, issues of the implementation of a number of state programs, national and federal projects in the field of supporting the creation of new technological solutions and innovations were considered. Special attention is paid to the structure of national projects, including goals, objectives and targets. Attention is drawn to the features of the functioning of the economic complex of Russia, which in turn are considered as the main economic prerequisites for the accelerated technological development of the country. Among them: historical, sociocultural, resource, territorial, geopolitical. A detailed description of these prerequisites is presented, with emphasis on the country's potential for further fundamental and applied research, allowing Russia to make a significant contribution to the formation of a new technological structure. Also emphasized is the possibility of organizing balanced production throughout the country, taking into account the rational specialization of regional production complexes and their simultaneous mutually beneficial coordination.

Keywords: Innovative Development, Technological Development, State Participation, National Project, Economic Growth.

Introduction

Modern conditions for the functioning of the world economy, including a high level of competition for technology, which can significantly increase labor productivity, optimize production costs, bring business to a fundamentally new level of goals in relevant development strategies and programs, require special attention from the state and business entities , scientists and society as a whole on the acquisition and implementation of such technologies.

The problems of accelerated innovative and technological development are investigated in the works Kharchenko Ye.V., Shirokova L.V., Alpeyeva Ye.A. (2015), Ruban D.A. (2018), Bannikov S.A., Khvostova N.V. (2018), Ganichev N.A., Koshovets O.B. (2019), Yermakov A.S., Liman I.A. (2019), Komkov N.I. (2019), interconnection and mutual influence of innovative safety and quality of life of the population - in work A.A. Kuklin, A.V. Bagaryakov, N.L. Nikulina (2013), the impact of fiscal mechanisms on the innovative development of the country – Sevriukova, L. V., & Trusova N. C. (2014), Tkacheva T.Yu., Sevryukova L.V. and Afanasyeva L.V. (2016), Tkacheva T.Yu., Afanasjeva L.V., Goncharenko L.Iv., Sevrukova L.V., Panskov V.G. (2019), the impact of regional foreign economic activity on economic growth – Polozhentseva Y.S., Zhukov P.V., Bayanduryan G.L., Borisova A.A., Vasiliev V.P. (2017) etc.

Results and Discussion

In practice, technological development, the dissemination of advanced scientific solutions has a tremendous impact on the pace of development of states. At the same time, developments are more

and more intersectoral in nature, allow research and significant scientific results at the junction of different technological approaches (digital, manufacturing technologies, robotic systems, big data processing systems, artificial intelligence, etc.).

Currently, the fundamental documents reflecting the goals, objectives and tools for the development of the innovative component of the Russian economy are strategic planning documents (table 1).

Table 1: The system of basic documents of strategic planning for the development of the innovative component of the Russian economy

Type of documents	Title of the document
Strategies	1. The national security of the Russian Federation. 2. The innovative development of the Russian Federation. 3. The spatial development of the Russian Federation. 4. Economic security of the Russian Federation. 5. The development of the information society in the Russian Federation. 6. Scientific and technological development of the Russian Federation.
Government programs	1. Scientific and technological development of the Russian Federation. 2. Economic development and innovative economy. 3. The development of industry and increasing its competitiveness. 4. The information society.

Source: compiled by the authors based on an analysis of the current legislation (http://government.ru/ – official website of the Government of the Russian Federation, http://programs.gov.ru/Portal/ – official portal of state programs of the Russian Federation).

Moreover, indicators of the innovative component of the development of the domestic economy are reflected in the strategic documents of the country (Table 2).

Table 2: Indicators of the innovative component of the development of the Russian economy, reflected in the relevant strategic documents

Nature of the document	**Indicators**
1. The concept of long-term socio-economic development	- the proportion of industrial enterprises engaged in technological innovation; - the share of innovative products in the total output; - the share of the knowledge economy and the high-tech sector in gross domestic product; - internal costs of research and development; - expenses on education and health care from public and private sources.
2. National Security Strategy	- the share of expenses in gross domestic product for the development of science, technology and education.
3. Economic Security Strategy	- the share of investment in fixed assets in gross domestic product; - the degree of depreciation of fixed assets; - industrial production index; - the share of investment in machinery, equipment and vehicles in the total investment in fixed assets; - the share of innovative goods, works, services in the total volume of goods, works, services shipped; - the share of high-tech and high-tech products in the gross domestic product; - the proportion of organizations engaged in technological innovation; - the share of innovative goods, works, services in the total volume of exports of goods, works, services of industrial enterprises.
4. Innovation	I. Formation of competencies of innovative activity (8 indicators);

Development Strategy	II. Innovative business (12 indicators); III. Effective science (6 indicators); IV. Innovation State (7 indicators); V. Innovation infrastructure (2 indicators); VI. Participation in the global innovation system (4 indicators); VII. Territories of innovation (2 indicators); Viii. Financial support (4 indicators).
5. Information Society Development Strategy	The list of indicators for the implementation of the strategy and the values of these indicators reflect: - an assessment of the development of information and communication technologies in the Russian Federation; - an assessment of the development of the information society in the Russian Federation; - the parameters of the formation of the digital economy, an assessment of its impact on the growth rate of the gross domestic product of the Russian Federation; - the state of the transition to the use of high technology by organizations.

Source: compiled by the authors based on an analysis of the provisions of the current legislation (http://government.ru/ – official website of the Government of the Russian Federation)

The results of the analysis of the indicators presented in Table 2 indicate that there are currently opportunities to increase the level of interconnection and structural unity of these indicators to provide a comprehensive and comprehensive assessment of the participation of innovative factors in the development of the Russian economy.

The theoretical substantiation of economic development prospects requires raising the question of what quantitative and qualitative indicators to measure the development of the corresponding innovative component.

According to the results of the study of the Global Innovation Index of 2019, Russia took 46th place, having risen two steps since 2015 (Table 3).

Table 3: the Dynamics of the positions of the Russian Federation in the Global Innovation Index in 2015-2019.

Indicators	2015	2016	2017	2018	2019
Global Innovation Index	48	43	45	46	46
Innovation resources	52	44	43	43	41
Innovation Results	49	47	51	56	59

Source: compiled by the authors based on the Global Innovation Index Reports 2015-2019 (The Global Innovation Index [Electronic resource]. URL: https://www.globalinnovationindex.org/Home)

The data in Table 3 show that there is a steady improvement in the situation regarding the subindex of innovation resources, but the country's position has declined in terms of the impact of the results of innovation on the economy and society.

In 2018, a number of national goals and strategic objectives of the country's development for the period up to 2024 were designated at the state level in Russia. Among them - Russia's entry into the five largest economies of the world, acceleration of technological development, growth in the number of organizations implementing technological innovations (Decree of the President of the Russian Federation of May 7, 2018 No. 204 "On national goals and strategic objectives of the development of the Russian Federation for the period until 2024").

To achieve these goals, from the end of 2018 to the present, several national projects and a national program are being implemented, the activities of which are described in more detail in the content of the corresponding federal projects that are part of them.

In particular, we are talking about the national projects “Labor Productivity and Employment Support”, “Science”, “International Cooperation and Export”, “Small and Medium-Sized Enterprises and the Support of Individual Entrepreneurship Initiatives”, as well as the national program “Digital Economy”. These documents, in addition to the narrative, also contain target values (http://government.ru/ – official website of the Government of the Russian Federation).

For example, the national project “Labor Productivity and Employment Support” is aimed, inter alia, at stimulating the introduction of advanced management, organizational and technological solutions into the work of domestic enterprises. As a result of the project, annual productivity growth should be ensured in medium and large enterprises of the basic non-resource sectors of the economy (http://government.ru/ – official website of the Government of the Russian Federation).

National project "Science" - to create advanced scientific and innovative infrastructure; updating the instrument base of leading organizations carrying out research and development (special attention is paid, according to the Ministry of Education and Science of Russia, to the construction of installations through which fundamentally new technologies are developed); the creation of world-class scientific and research and educational centers; formation of a holistic system of training and professional growth of scientific and scientific-pedagogical personnel (http://government.ru/ – official website of the Government of the Russian Federation).

As a result, it is necessary to achieve Russia's presence among the five leading countries of the world that carry out research and development in areas determined by the priorities of scientific and technological development (according to the Russian Ministry of Education and Science, an increase in the number of articles in leading international databases and patents is expected

2 times, financing of research and development - by 50%); to ensure the attractiveness of work in Russia for domestic and foreign leading scientists and young promising researchers; outstripping increase in domestic spending on research and development from all sources compared with the growth of the country's gross domestic product (http://government.ru/ – official website of the Government of the Russian Federation).

It should be noted that a lot of work to support the development of promising industries in Russia (quantum technologies, artificial intelligence, robotics, biotechnology, etc.), scientific and innovative projects are already carried out by the Competence Centers as part of the national program of measures "National Technological Initiative", the Russian Fund for Fundamental Research, Russian Science Foundation and other authorized organizations. Also, a fairly large innovative scientific and technological center “Sirius” will soon begin work (Decree of the Government of the Russian Federation of November 8, 2019 No. 1428 “On the establishment of an innovative scientific and technological center“ Innovative scientific and technological center “Sirius”).

The national project “International Cooperation and Export” presupposes, among other things, the orientation of state policy towards achieving the international competitiveness of Russian goods, as well as the development of financial instruments to support export activities (http://government.ru/ – official website of the Government of the Russian Federation).

As a result, it is planned to form globally competitive non-primary sectors in the manufacturing industry, agriculture, and services, the total share of export of goods (work, services) of which will be at least 20 percent of the country's gross domestic product.

The national project “Small and Medium-sized Enterprises and the Support of Individual Entrepreneurship Initiatives” is aimed, inter alia, at improving the conditions for doing business, improving the procurement system carried out by major customers from small and medium-sized enterprises, simplifying access to preferential financing, creating a digital platform, focused on supporting the production and marketing activities of small and medium-sized enterprises (http://government.ru/ – official website of the Government of the Russian Federation), Ruban D.A. (2018).

As a result of the project, an increase in the number of employees in the field of small and medium-sized enterprises is expected. It must be emphasized that world practice indicates the success of using the experience of small innovative enterprises in the framework of the development of new technological solutions. The national program “Digital Economy” is focused on creating a system of legal regulation of the digital economy, based on a flexible approach in each area, creating a global competitive transmission, processing infrastructure and data storage, as well as end-to-end digital technologies; transformation of priority sectors of the economy and social sphere through the introduction of digital technologies and platform solutions (http://government.ru/ - the official website of the Government of the Russian Federation).

As a result, it is planned to create a stable and secure information and telecommunications infrastructure for high-speed transmission, processing and storage of large amounts of data, accessible to all organizations and households.

At the same time, the implementation of the state program "Scientific and technological development of the Russian Federation" for the period until 2030 (stage I - 2019-2024, stage II - 2024-2030) in accordance with the provisions of the Strategy for Scientific and Technological Development of the Russian Federation affects issues of national intellectual capital, conducting fundamental scientific research, implementing comprehensive scientific and technical programs, improving the infrastructure of scientific, scientific, technical and innovative activities, ensuring globally the competitiveness of Russian higher education and others. At the same time, the values of the target indicators of this state program and the financial support of the relevant events are interrelated with the content of national projects (Decree of the President of the Russian Federation of December 1, 2016 No. 642 “On Approving the Strategy for Scientific and Technological Development of the Russian Federation”, decree of the Government of the Russian Federation of March 29 2019 No. 377 “On approval of the state program“ Scientific and technological development of the Russian Federation ”for the period until 2030”)

Conclusion

Today we can talk about a certain level of integration of national projects into the existing tools of federal targeted, state programs, both from an organizational and financial point of view. At the same time, national projects made it possible, among other things, to strengthen the prioritization of the distribution of various resources at all levels of government, to identify promising areas for the implementation of the socio-economic potential accumulated over recent years in various sectors, and to ensure the rhythm of the process of transferring budget allocations to the regional level.

An analysis of the preliminary results of the implementation of the above national projects and relevant programs indicates that in 2019, more attention was paid at the state level to the creation of a normative and organizational-methodological basis for the implementation of relevant measures, including for the subsequent acceleration of the country's innovative and technological development.

In this regard, judgments about the effectiveness of solving the problems of implementing national projects are still preliminary. At the same time, it seems that at the federal level there are currently economic prerequisites and the necessary conditions have been created for intensifying the processes of technological development of Russia.

Taking into account the historical, sociocultural, resource, territorial, geopolitical and other features of the functioning of the economic complex of Russia, we note that all these features may well serve as the main economic prerequisites for the accelerated technological development of Russia. Moreover, this development implies the formation of incentives for the accelerated introduction of innovative solutions by domestic business, the government’s assistance in attracting investment in the scientific, technical and innovative sectors of the economy, the development of technology transfer mechanisms, scientific and technological cooperation and the building up of high-tech export of international cooperation, etc.

So, for example, the personnel and intellectual potential historically accumulated in the country, the experience of successful implementation of breakthrough scientific and technical projects, creates the basis for further fundamental and applied scientific research that allows Russia to make a significant

contribution to the formation of a new technological structure, improving domestic production in terms of increasing labor productivity, increase their competitiveness, and generally offer the world market demanded and competitive the innovative solutions, to form new high-tech markets through the use of modern technological solutions (Bannikov S.A., Khvostova N.V. (2018)).

This is facilitated by the sociocultural characteristics of the country, the specificity of the national mentality, which allows domestic scientists and practitioners to implement ambitious projects as soon as possible in conditions of limited resources.

Russia's resource capabilities (climatic, financial, human, informational and other) that determine the country's general socio-economic potential and directions for its effective implementation at different levels (including international) also create significant prerequisites for accelerated technological development of the state, ensuring effective activity of development institutions, objects of innovative and scientific and technical infrastructure (for example, the development of innovative scientific and technological centers and innovation territorial clusters).

At the same time, a significant differentiation of the country's regions both in terms of resources, the current level of innovative development, and the existing prospects for socio-economic development, on the one hand, requires close attention of the state in terms of scientific substantiation of the directions of the most efficient use of available resources. On the other hand, it creates additional economic prerequisites for accelerated innovative development of regions and various industries, including high-tech sectors of the economy, for specialization and creation of modern technological solutions, which may have no world analogues. That is, it implies the possibility of organizing balanced production throughout the country, taking into account the rational specialization of production complexes in the regions and their simultaneous mutually beneficial coordination.

Of great importance for the technological development of Russia, the growth of high-tech exports are the country's foreign economic relations and various partnerships with foreign countries in the implementation of joint innovative projects, regardless of their scale and investment. Of course, today, taking into account the developing geopolitical situation in the world, participation in the international division of labor, pooling of countries' resources for the benefit of the development of world markets and the economy as a whole are of great importance, including for ensuring the innovative development of national economies. Of course, when creating large-scale developments and conducting research, it is important to form international teams, project teams, and develop scientific and technological cooperation.

Thus, the economic prerequisites for accelerated technological development of the country identified during the study are characterized by a variety of manifestations and testify to the significant potential of Russia not only in improving the industrial structure and territorial configuration of the national production complex, but also in developing technologies at the international level, including the formation of the foundations of a new technological structure.

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Information Activity as a Tool for Cooperation Management in Conditions of Tourism Cluster Development

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Abstract

The goal is to determine models for organizing the structure of the tourist information system as a tool for forming a tourist cluster. The reliability of the research results is ensured by applying an integrated approach to the use of scientific methods, methodology and tools, i.e. statistical methods, system-integrated, system-structural, system-resource methods, methods of monitoring, forecasting, qualitative analysis and expert estimates. The authors rely on the study results conducted in 2018 and 2019; about 1000 people acted as respondents. The authors propose a tourist information center model that satisfies the needs of tourists to the greatest extent, ensures a rich interaction between the tourist information center and the tourist, while optimizing the costs of maintaining tourist information offices and call centers. The tourist information center can play the role of an interaction generator between tourism market entities. The horizontal and vertical links formation based on the tourist information center can stimulate the growth of cooperation in order to develop tourism and the increase in the number of economic entities working in the tourism sector.

Keywords: Tourism, Tourist Cluster, Tourist And Recreational System, Tourist Information Activity, Tourist Information Center.

JEL Classification: Z32.

Introduction

The tourist and recreational system of a region with limited tourist resources is able to form a cluster only with a certain state of its subsystems. The main condition for the emergence of a tourist cluster is the synergistic effect of the interaction in the field of tourism of geographically close enterprises of various industries. Even as old reasons for clustering have diminished in importance with globalization, new influences of clusters on competition have taken on growing importance in an increasingly complex, knowledge-based, and dynamic economy (Porter, 2000). Organizational and management subsystems are of particular importance, which include territorial tourism management agencies, tour operators, tourist information centers, public organizations, non-profit associations in the field of tourism and scientific institutions. In achieving a synergistic effect, the tourism and information component of this subsystem is extremely important. The role of information in tourism is considered in various aspects, i.e. its place in the tourism system (also, including in the tourist-recreational system of the region). N. Leiper considers tourist information service as an industrial element of tourist destinations (1979). Goeldner C.R. and Ritchie J.R.B. consider information as an element of the 'tourism environment' (2009).

At the end of 20th century, tourist information centers firmly entered into the structure of territorial tourist and recreational systems. In Russia, this process began only in the 21st century. This activity is aimed at tourism development in the Russian Federation regions. Currently, there are several associations in the Russian Federation that unite tourist information centers, the largest association operating at the federal level is the non-profit partnership 'National Association of Tourist Information Organizations', which includes 164 organizations (at the beginning of 2020) that provide information support for tourism in regions, according to some estimates, their number is larger

(*Nonprofit Partnership 'National Association of Tourist Information Organizations'*, 2020), but these data refer to 2016-17. In the system of tourism cluster development, the tourist information center should be considered as a structural element of the cluster core. Consequently, the model of organizing the activities of the tourist information center should be built taking into account the specifics of cluster processes.

The practice of organizing information activities in tourist regions is very diverse. Studies of modern information management practices as an instrument of territorial tourism management are presented in the works of several scientists such as R. Pierdicca et al., who offer an innovative information and communication technology infrastructure specifically designed and optimized for the tourism sector of municipalities (Pierdicca, Paolanti and Frontoni, 2019). Other authors consider the information as 'connecting capital', uniting the most diverse enterprises of the tourism cluster among themselves, they recognize the importance of information exchange between enterprises and research centers (universities) (Martínez-Pérez *et al.*, 2018). Many authors (Amaro, Duarte and Henriques, 2016) note the importance of information support for tourism clusters. It is noted that one of the most important areas of interaction in the cluster is the exchange of knowledge and information between stakeholders interested in cooperation (Kładź-Postolska and Biegajło, 2018).

The management of tourist information is determined by the features of the regional tourism development strategy, resources and the management system of the tourist and recreational system of the region.

In Russian studies, the issues of the tourist information centers activity are considered in various aspects. The problems of creating and the activity of tourist information centers in Russia (Zhdanchikov, 2015; Kiryanova, Kim and Yumatov, 2016; Kormishova, 2017b), the variety of legal forms of tourist information centers operating in the Russian Federation (Zhdanchikov, 2015; Kormishova, 2017a); the authors attempt to systematize the goals and objectives of the creation and functioning of tourist information centers (Kormishova, 2017a), the ways of their transformation are considered (Akimova, 2007; Kiryanova, Kim and Yumatov, 2016; Kormishova, 2017b). Most Russian authors consider the tourist information centers of the Russian Federation as 'one of the key elements of the tourist destinations marketing system' (Kiryanova, Kim and Yumatov, 2016). Several authors comprehensively study the functioning of tourist information centers in a cluster of tourism development. The results obtained show the place of the tourist information center in the cluster processes of the tourism sector by the example of the municipality 'Tourist information centers should be recognized as an important participant in any tourist cluster' (Karpova, Pesotskaya and Tkachev, 2017).

Methods

The main objective of this study is to determine a model of the tourist information center, which will contribute to the formation of intra-cluster relations and the development of the tourist cluster. When modeling the activities of the tourist information center, we relied on the results of studies conducted in 2018 and 2019. The study used methods developed based on expert assessment methods, sociological studies (about 1000 people were respondents).

The research reliability results is ensured by the use of an integrated approach in scientific methods, techniques and tools, i.e. statistical methods, system-integrated, system-structural, system-resource methods, monitoring methods, forecasting, qualitative analysis and expert estimates.

Results

Based on the collected materials, we saw that two vectors determine the goals of the tourist information centers: information support of the territorial sphere of tourism (formation of the internal information environment of the tourist cluster) and promotion of the territory on the tourism market (formation of the external information environment of the cluster). Achieving each of the goals is

associated with solving a number of tasks that can be considered as the basis for determining the structure of the practical activities of the tourist information center (Fig. 1).

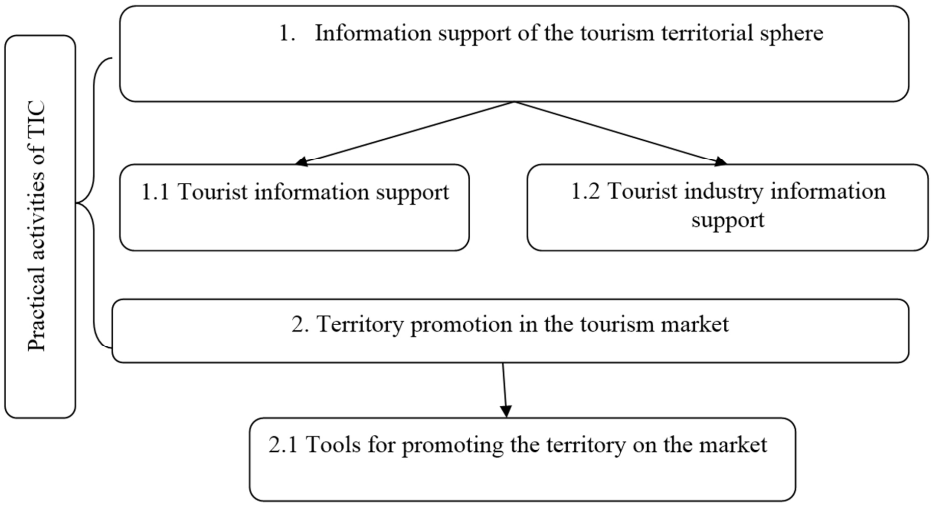

Fig. 1: The practical activities structure of the tourist information center

The traditional model of organizing tourist information support includes an information portal, social media accounts, an office of a tourist information center in the place (s) of tourist arrivals and most visited places. The results of tourist surveys and expert interviews show that the tourist information centers value is falling, i.e. the attendance is decreasing, the maintenance of offices is too expensive (rental costs, utilities, etc.). The number of online requests, on social networks, by phone, is increasing. The interaction of tourists with the offices of tourist information centers is very diverse. All tourists (100%) who took part in the survey noted that they visited the local tourism portal; 63% of them viewed information on the pages of tourist information centers on social networks, 24% purchased souvenirs in the offices of tourist information centers; 19% booked tours; 63% received some consultations (i.e. a request on the portal, correspondence on a social network, by phone, in person). With a clear preference for virtual forms of obtaining information at the place of stay, tourists note that they would like to be able to receive personal consultations at the places of stay, i.e. a large number of offices where they could get information of interest (72%). Some tourists consider the offices of tourist information centers as a form of interaction with the local community, the opportunity to immerse themselves in culture and get impressions (38%).

According to surveys, a wide range of enterprises is interested in attracting amateur tourists, who might consider tourism as an additional area of activity. We are talking about both potential tourists and those, who are already in the tourist center. A survey of 123 owners and managers of enterprises of various fields was carried out in the territory of the Lipetsk Region, 52% expressed a desire to inform tourists about their goods and services. The ones that were interested in informing tourists were folk arts and crafts enterprises, farmers, food producers, medical centers, spa centers, beauty salons, etc.

Discussion

These results make us think about a model of the tourist information center that best meets the needs of tourists, ensures the richness of the interaction between the tourist information center and the tourist, while optimizing the cost of maintaining tourist information offices and cool centers. We offer a model of a tourist information center, for which the presence of a cool center as a subdivision of a city tourist information center is optional. Information for tourists is placed in public spaces, offices, buildings and other structures of enterprises and organizations that in one way or another

interact with city guests, i.e. hotels, catering establishments, souvenir shops, folk art enterprises, theaters, cinemas, museums, shopping and entertainment, wellness centers, etc. The layout of the 'infokiosks' is displayed on the tourist information center portal, Yandex maps, Google maps, as well as in infographics on enterprises facades they are located at. A prerequisite for ensuring the work of 'information kiosks' is their inclusion in the enterprises corporate culture that hosted them. The staff should be aware of the importance of providing tourists with information both for the city as a whole and for their company. Employees of enterprises working in the contact area should receive additional competencies to advise tourists. Obtaining such competencies is provided by continuing education. Thus, the scientific and educational center is included in the interaction system. The basic model of organizing the network structure of the tourist information system of the municipality is presented in Fig. 2.

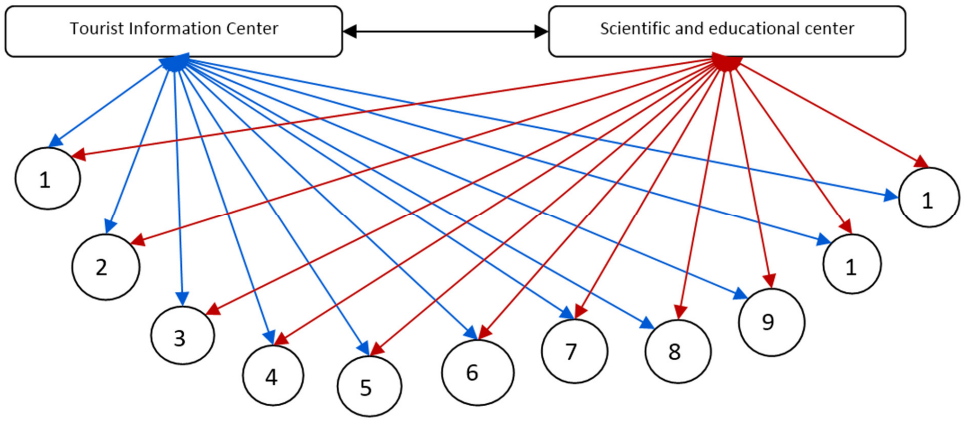

Fig. 2: The municipal network model of the tourist information system

Information kiosks can be placed in places like accommodation enterprises, catering enterprises, business centers, health institutions, manufacturers and sellers of souvenir products, folk art crafts enterprises, shopping and entertainment centers, museums, entertainment centers, theaters and cinemas, other leisure ones, including sports enterprises and institutions. Interaction with enterprises is dictated by the tourist specialization of the territory (both existing and prospective).

Conclusion

Thus, the tourists' need in information and the interest of enterprises in information interaction with tourists are realized to the greatest extent. This model of activity is relevant in the context of tourism cluster development. The tourist information center can be a generator of interaction between tourism market entities. The formation of horizontal and vertical links based on the tourist information center can stimulate the growth of cooperation in order to develop tourism and the increase in the number of economic entities working in the tourism sector.

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System of Administrating the Labor Safety: Russian and German Experience

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Abstract

Under present-day conditions it is necessary to develop a new concept model of legal regulation of occupational safety. The current acting system of the labor safety evolved as a separate direction in the second half of 1990s and the beginning of 2000s. It is based on the so-called reactive approach, which implicates formulation of detailed safety requirements, compliance monitoring, applying measures of response to detected violations and occurrence of adverse effects. Shift of attitudes to the administration of the occupational safety is essential to rise the efficiency and prevent industrial injuries and occupational morbidity, to improve safety and health in the workplace, to reduce administrative burden for employers and to involve the employees in administrating of the labor safety by increasing their awareness. The changes proposed by the authors in the area of occupation safety would contribute to maintain the positive dynamics of decreasing mortality and traumatism caused by industrial accident and work-related diseases, they would also resolve conflicts and eliminate gaps of the Russian labor legislation, put a new impetus to improve working conditions.

Keywords: occupational safety, labor safety, Ministry of Labor and Social Protection of the Russian Federation, improvement of legal regulation, public administration, levels of administration of the occupational safety, industrial accident, industrial injuries, industrial traumatism, causes of employment-related accidents, State Labor Inspectorate.

Introduction

Market-based organization of economy in Russia changed relationship between employers and employees. The facts show that in many enterprises, especially small and medium-sized working conditions do not meet up industrial safety and hygiene standards, which compromises workers' health and often threatens their lives. In many respects it is caused by the employers' pursuit to get the biggest profit out of it and with the least investment. Owners of enterprises, institutions and organizations take advantage of the employment deficit and workers' unawareness in matters of labor safety and pay little attention or completely ignore occupational safety requirements.

Meanwhile, in particular poor state of labor safety is a heavy burden on the economy of enterprises, organizations and state in general. Comfortable and safe working environment is one of the major factors effecting not only the safety but productivity and efficiency of labor.

At present development of a new concept model of legal regulation of occupational safety is a long-felt need. The current acting system of the labor safety evolved as a separate direction in the second half of 1990s and the beginning of 2000s. It is based on the so-called reactive approach (plan-perform-control-promote), which implicates formulation of detailed safety requirements, compliance monitoring, applying measures of response to detected violations and occurrence of adverse effects [The Ministry of Labour of Russia came up with an initiative to implement the concept of zero injuries and to record micromuscular injuries of workers, 2019]. Shift of attitudes to the administration of the occupational safety is essential to

rise the efficiency and prevent industrial injuries and occupational morbidity, to improve safety and health in the workplace, to reduce administrative burden for employers and to involve the employees in administrating of the labor safety by increasing their awareness.

Public administration is implemented through practical activities of government bodies targeting for application of state policies. Features of national and territorial organization in Russia as well as fundamental nature of ownership and management of property resulted in coexisting of several basic levels of administration, i.e. nationwide (federal), regional (federal entity), local (municipal), private (corporate).

Public management uses various forms and methods of exposure (arrangement) on working, social, spiritual activities of human beings in the territory of the state. Essential forms of influence are administrative command and economical (market) instruments. Despite the distinction in kind both are operate (or at least supposed to) fully in the applicable law framework.

German system of the labor safety are primarily of precautionary nature and not repressive one. Initial inspections of economic entities resemble audit rather than supervisory activities as they are understood in Russia. The inspected organization or enterprise is provided with a list of violations to be rectified. Sanctions are imposed on case of the orders being disregarded.

Public administration of the occupational safety in Germany is exercised on two levels. Federal Ministry of Labor and Social Affairs is in charge of the state supervision over compliance and enforcement labor safety legislation on national level. Implementation of labor legislation is administered and controlled on the regional level in federal states. Trade unions are also involved in the system management of occupational safety as well as the network of professional unions. The latter are associations of employers organized according to regional and sectoral characteristics. They are legally entrusted with the function of employers' liability insurance against industrial injuries and work-related diseases. The associations are funded by means of membership dues insurance premiums of business.

Methodological Framework

The empirical framework of the research is formed by Russian laws and regulations in the field of labor safety and legislation of the countries which have experience in the area of interest for the research. It also includes monographs and essays on the system of administration of occupational safety. Economical and law studies on the matter are taken into consideration. IN order to substantiate our position on the issues we used the statistics provided by law enforcement agencies in charge of inspection and supervision over compliance and enforcement labor and particularly labor safety legislation.

The research is based on interdisciplinary approach, which implies considering the system of labor safety management from the viewpoint of various sciences: administrative and civil law, management, marketing, sociology.

System concept directs the work towards revealing the system integrity in administration of labor safety and structural items of the system, showing their interaction and final consolidation of all these elements into a coherent vision.

Universal and specific scientific research methods provide the methodological basis for this research. The approaches were chosen in view of particular purposes of the study. The method of dialectical materialism allows to study the subject in development, interrelation of its certain displays, its interaction with related phenomena, to substantiate advantages and disadvantages of various approaches to the issue.

Such methods of formal logic as description, comparison, analysis and synthesis ensure that law, mental and ethical, other aspects of occupational safety will be developed and thoroughly described. Specific research methods such as comparative legal, technical, statistical, structural-functional methods were used.

Comparative legal method allows to disclose and compare different approaches to development and implementation of the national policy in the field of labor safety, to assessment of its efficiency on the ground of Russian ad German legislation and public opinion.

Technical method helps to draw up recommendations on the ways to advance conceptual and normative instruments in the considered area of knowledge.

Statistical method is supposed to be used for consolidating and compiling of data on importance and consequences of the labor safety management system reformation. The reforms are necessary given to the shifted approaches to administration of labor safety and assessment performance of results from points of employer and employee as well as supervising agencies.

The inner structure of the labor safety administration is defined through the structural-functional method, it also distinguishes elements if the system, gives their functional characteristics, analyzes their interconnections.

Implementation of the abovementioned methods ensured that the study took into consideration linkages and dependencies of the issue, revealed certain tendencies and provided generalization and conclusion. They also allow to compare Russian and foreign experience of application of labor safety administration systems and reveal efficient practice with a view establishing new approaches to the policy concept of labor safety in Russia.

Results

In Russia the system of labor safety administration is represented by the following basic levels: nationwide (federal), regional (federal entity), local (municipal), private (corporate).

The framework of the government administration of the occupational safety is laid down in art. 214 of the Russian Labor Code. It stipulates that the government administration is provided directly by the Government of Russian Federation or under its delegation by a federal executive body in charge for the development of state labor policy and the regulatory framework and other federal executive bodies within their authority.

Federal executive bodies which have been granted the right to perform certain functions of regulatory authority, specific permissive, supervisory and monitoring functions in the field of labor safety, have a responsibility to coordinate their decisions on the matter with the federal body in charge for the development the labor regulation framework.

Ministry of Health and Social Development is the federal executive body in charge for the development of state labor policy and the labor safety regulation framework

There are essentially two critical tasks and functional responsibilities of administrating labor safety on the federal level: 1) developing a legal framework for the activities of all authorities and business entities of the law on the occupation safety 2) long-term (economic) and operational (administrative) management of all these activities. From this point the federal level of administration differs not only has a different place in the management pyramid but operates through the different type of control. In our opinion this type is defined by universality, real power and (relative) independence of the managerial decisions taken.

Although the issue of specific powers and functions at the regional level of governance is fundamental to the practice, the legislator did not decipher it in detail on the reasonable assumption that this is a matter for the constituent entities of the Russian Federation. They have both the authority and the means of regional budgets to do so.

There is a number of critical tasks and functional responsibilities on the regional level of labor safety administration:

1) enforcement organization and adaptation of the labor safety legislation in conformity with regional specific;

2) coordination of activities of the territorial branches of federal executive authorities, including agencies in charge of inspection and supervision, with regional governance structures in the sphere of labor and operational safety administration;

3) organizing of innovation, and education and information infrastructure of the corporate labor safety management (development and regulation of the labor protection services market);

4) operational (administrative) management of all these activities in the territory of the region.

State authorities of the constituent entities of the Russian Federation adopt laws and other labor regulatory legal acts on issues not under the jurisdiction of federal government bodies or not regulated by federal laws and other regulatory legal acts of the Russian Federation.

Specific powers for public administration could be could be transferred to local community governments in the manner and on terms determined by federal laws and the laws of the constituent entities of the Russian Federation.

Main tasks on local (municipal) level of administration are:

- ensuring the implementation of the Labor Code and other labor safety regulatory legal acts of the Russian Federation in the territories of municipal areas and urban districts;
- improvement of legal labor safety regulation and policy;
- ensuring the organization and conduct of activities of municipal programs aimed at improving working conditions, safety and health;
- ensuring coordination of activities of local government bodies, state control and supervision bodies, enterprises and organizations in addressing issues related to improvement of labor conditions and safety;
- development of social partnership in the field of labor protection;
- improvement and coordination of occupational health and safety services;
- organization of continuous training on occupational health and safety for managers and specialists of organizations, verification of knowledge;
- providing practical and methodological assistance in the area of occupational safety to employers;
- strengthening cooperation between local government bodies and government control and supervision bodies in preventing industrial injuries and morbidity;
- increasing the interest and responsibility of employers for working conditions and occupational health and safety, and ensuring occupational health and safety of employees at work.

Social and labour relations, including in the area of occupational safety, are regulated at the private (corporate) level through collective agreements and contracts. The efficiency of corporate governance in the area of occupational health and safety is conditioned by the fact that when entering into collective agreements and contracts, not only the balance of interests of the parties to the labor process is achieved, but also a consensus is established on the issues of financing measures to improve working conditions and labor safety. All this leads to a real increase in the level of social guarantees for employees. For example, in 2015 collective agreements were concluded in 192 municipal companies of the Chuvash Republic [Official report on the state of labor conditions and occupational safety in the Chuvash Republic in 2015, 2016].

Insufficient legal framework and weak economic capacity of local government bodies, unfortunately, lead to their frequent actual self-removal from the real process of labor protection management. And only where the size of the territory and economic potential are significant, local governments can and in most cases make occupation safety management at the municipal level real and realistic. We believe that future development of the municipal level of labor protection management is connected with the possibilities of regulation of corporate labor protection management during registration and licensing of the activity of subjects of law.

The German occupational health and safety system is clearly structured and divided into two areas: state and trade union. In parallel, the two areas have different functions as laid down in labor and social legislation. This structure is headed by the German Ministry of Labor and Social Affairs. Its main task is to draft laws and create laws and all kinds of instructions on occupational safety and health. In addition,

the Ministry initiates research work in this area, advises the State Office for Occupational Safety and Health and supervises the federal states' labor safety authorities. In Germany there are 16 federal states, each has its own labor ministry, state supervisory agencies for every industry and occupational health and safety authorities. All of these institutions are responsible for enforcing and monitoring laws and regulations of the Federal Ministry.

The state system of occupational safety is primarily aimed at preventing industrial accidents. Measures are taken to create favorable working conditions in which the risk of an accident tends to zero, as well as measures to explain to employees and employers the standards of safe production and occupational safety. At the same time, employees exercise self-control over their workplaces and must independently enforce their rights under the contract.

Trade union management system of labor safety in Germany is based on a professional insurance scheme. According to the law, all entrepreneurs in Germany are united into professional communities (Berufsgenossenschaft), which are organized according to the territorial and industry criteria (professional communities of mining, woodworking, health care, metallurgy, mechanical engineering, construction).

The main function of professional communities, assigned to them by the legislation, is to insure the liability of entrepreneurs for cases of industrial injuries or occupational diseases. The professional communities are financed exclusively from the membership or insurance fees of enterprises. The amount of insurance premiums depends on the following factors: the class of danger of the enterprise as a whole or its individual productions, wage fund, the level of industrial traumatism and occupational illnesses. The system of insurance premiums encourages employers to pursue a targeted policy to ensure occupational safety and health of employees.

In implementing the legislatively adopted concept of labor safety, aimed primarily at preventing occupational injuries and occupational illnesses, professional communities are working in the following areas:

- technical supervision over occupational health and safety at enterprises;
- training of different categories of insured;
- insurance protection;
- medical support;
- social assistance;
- research work in all areas related to health and safety at work.

By their legal form, professional communities are corporations of public law, they are non-profit, self-regulating organizations, and the state does not take any part in their activities, including financial contribution. All activities of the communities, including medical care and social assistance, are financed by insurance contributions. The State's role is limited to legal oversight. Since professional communities have no right to receive income, they can only set the amount of contributions that ensure that they fulfill the tasks assigned to them by law.

In general, the German occupational safety management system can be presented as a well-functioning mechanism: at the entrance - company insurance premiums, at the exit - increasing life expectancy, improving quality of life, ensuring social peace in enterprises and in society, improving the economic performance of companies.

Monitoring of labor conditions and safety in Russia confirms the thesis about the necessity to reform the current model of labor protection management. According to information contained in the Federal State Information System for Accounting for the Results of the Special Labor Conditions Assessment in the Russian Federation, the assessment was conducted in 423,300 employers for 20.8 million workplaces for 27.8 million employees between 1 January 2014 and 31 December 2018.

According to the report on the results of monitoring and occupational safety conditions in the Russian Federation in 2015, a special assessment of working conditions was carried out at 4,977,257 workplaces with 6,939,858 employees [Report on State supervision of compliance with labour legislation and other normative legal acts containing labour law standards and supervision in the area of social protection in 2018,

Moscow, 2019], in 2018 at 1 343 169 workplaces with 3 232 981 employees [Report on the activities of the Federal Labor and Employment Service for 2018, Moscow, 2019]. In 2015 working conditions at 76% of workplaces were found to be optimal or acceptable [Report on State supervision of compliance with labour legislation and other normative legal acts containing labour law standards and supervision in the area of social protection in 2018, p. 40], in 2018 at 78,6% of workplaces. In Chuvashia in 2015, a special assessment of working conditions was conducted for 55 566 workplaces [Official report on the state of labor conditions and occupational safety in the Chuvash Republic in 2015].

In 2015, the Federal Service for Labor and Employment found more than 21 000 violations of the established procedure for assessing working conditions at workplaces during control and supervision activities. (in 2014 - about 23 000 violations), in 2018 - 705 cases of violations [Report on the activities of the Federal Labor and Employment Service for 2018]. These figures in the Chuvash Republic are as follows: 2288 violations in 2014 [Official report on the state of labor conditions and occupational safety in the Chuvash Republic in 2014], 2451 in 2015 [Official report on the state of labor conditions and occupational safety in the Chuvash Republic in 2015], 42 in 2016, 48 in 2017, 85 in 2018 [Report on State supervision of compliance with labour legislation and other normative legal acts containing labour law standards and supervision in the area of social protection in 2018].

Table 1: Activities carried out in the Russian Federation on special assessment of working conditions

Indicators	2014	2015	2016	2017	2018
Number of workplaces with special assessment of working conditions	505 774	4 977 257	1 246 142	1 227 983	1 343 169
Number of enterprises that have carried out a special assessment of working conditions	18 620	161251	-	-	-
Number of occupational health and safety trainees	31103	26 726	39 246	34 726	41 084

According to the data of the Russian Ministry of Labor, the tendency to decrease the level of industrial injuries has been continuing for the last three years. Thus, in 2017 there were 6240 occupational accidents with severe consequences, in 2018 their number decreased to 6160. At the same time, despite the decline, the number of deaths at work remains high: 1,722 in 2017 and 1,323 in 2018. If we consider the number of deaths due to industrial accidents in terms of the main economic activities, in 2018 the highest death tolls were in construction - 282 people and in manufacturing - 230 people, while the mining is least affected with 101 fatalities. Main causes of accidents are the human factor and the organization of an employee's workplace not meeting safety requirements [Results of monitoring labor conditions and safety in the Russian Federation in 2018, Moscow, 2019].

The analysis of activities of the Federal Service for Labor and Employment (Rostrud) shows that the most frequently identified violations are still those related to various occupational health and safety issues. At the same time, according to the data of the Russian Ministry of Labor, there is a situation of decline in cases of industrial injuries (the level of industrial injuries remains high only in manufacturing production). Thus, over the past 10 years the number of occupational accidents with severe consequences in the Russian Federation has more than halved: from 13,722 cases in 2007 to 6,240 in 2017 and 6160 in 2018 [Report on State supervision of compliance with labour legislation and other normative legal acts containing labour law standards and supervision in the area of social protection in 2018].

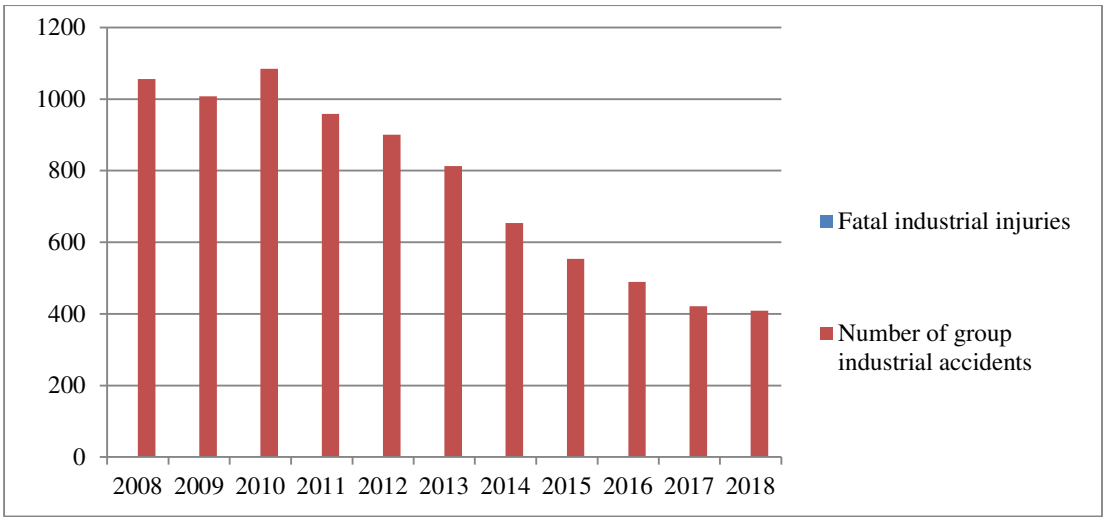

Fig. 1: Occupational injury dynamics in the Russian Federation

Similar positive dynamics are also observed in the Chuvash Republic. According to the State Labor Inspectorate of the Chuvash Republic in the first nine months of 2018, a total of 1879 violations of labor legislation were detected, of which 39.7 % were violations of occupational safety issues, 3849 violations were detected in 2017, 49.1% of them of labor safety regulations [Report on State supervision of compliance with labour legislation and other normative legal acts containing labour law standards and supervision in the area of social protection in 2018]. At the same time the number of registered accidents at work in the third quarter of 2017 was 58, at the end of 2017 - 76, and for nine months of 2018 - 43 accidents (i.e. 25.8% less).

Therefore, the data from the monitoring of working conditions and occupational safety in Russia confirm the expediency of implementing the German experience in the field of occupational safety when reforming the national system of labor safety management.

Discussions

A steady interest in the organizational and legal support and implementation of the principles of occupational safety management system from foreign and national researchers was revealed in the course of our research.

Occupational health and safety has always received a lot of attention. Candidate's dissertations, monographic works, scientific articles of Russian and foreign authors are devoted to the consideration of various aspects of labor protection. The following authors should be mentioned: A.V. Mikhailova (2013), E.V. Kryazheva (1997), A.S. Neverova (2014), S.I. Saydakhmedova (2009), O.V. Kuznetsova (2015), Martina Gogolová (2015), S.S. Kudryavtsev, P.V. Yemelin, N.K. Yemelina (2018), Maureen F. Dollard, Daniel Y. Neser (2013), Veikko Rouhiainen (2018), Ioannis Anyfantis, Georgios Boustras, Alexandros Karageorgiou (2018). The problems of the occupational safety management system development keeping pace with modern international trends in this area are revealed in the works of G.Z. Fainburg (2016), E.A. Kuznetsova (2017), S.N. Kudryashova (2015), A.Ya. Petrov (2016). The authors share the position of some scientists, with some polemize, on the basis of others make their own conclusions.

The research «The Development of Higher Education in Occupational Health and Safety in Estonia and Selected EU Countries» by Karin Reinhold, Virve Siirak, Piia Tint (2014) presents the experience of educational institutions of foreign countries in the organization of training in the field of labor safety, and the inclusion of all specialties (both technical and socio-economic) as a mandatory subject in the curriculum.

Such researchers as E.V. Maslennikova (2018), S.V. Voronkova (2017, 2018) deal with the efficiency problems of state labor protection management. The studies of E.I. Dobrolyubova (2016), D.V. Chernyaev (2017), A.N. Pozdnyakov (2018) are devoted to the study of international experience in labor protection management. Their work is of interest to researchers as a source of experience of states with similar public-law systems and mentality.

Conclusion and Recommendations

In course of the study, the authors confirmed positive dynamics in the field of labor safety in Russia. At the same time, necessaty to improve the existing model of occupational health and safety management in Russia has been justified. In particular, the study of German experience confirms the need to shift the focus from reactive mechanisms to mechanisms for preventing the negative consequences that may be associated with working conditions.

The analysis of a condition and reasons of an industrial traumatism in Russia shows that primarily they are caused by lacks of organizational character and consequence of inefficiency of operating control systems of a labor safety, insufficient attention and exactingness of heads to work on prevention of an industrial traumatism. The main causes of accidents at work include the following: violation of safety requirements during operation of machines and units, including vehicles, non-application of personal protective equipment by an employee, shortcomings in organization and conduct of training of employees on labor protection, constructive defects and insufficient reliability of machines, mechanisms and equipment, unsatisfactory maintenance and shortcomings in organization of workplaces.

The labor safety management system should be preventative, not repressive. Employers should be interested in meeting the requirements for safe working conditions. The concept of occupational health and safety, which is primarily aimed at preventing occupational injuries and diseases, requires further legislative strengthening. In Germany, this is ensured by the labor safety insurance system, which encourages employers to pursue a targeted policy to ensure occupational health and safety at work. The presented experience could be applied in Russia.

Scientific and practical importance of the work is determined by its relevance, scientific novelty, general theoretical and practical conclusions will contribute to further development of theoretical and empirical studies of topical issues in labor protection management systems. The materials of the research can be used in the work on reforming the Russian legislation on labor protection, in the implementation of international cooperation, in the elaboration of a common direction of development in the sphere of safe labor to achieve competitiveness in the regional and world arenas.

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Critical Human Resources Factors for the Efficient Implementation of the HACCP Standard in the Catering Industry

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Abstract

Human resources management is an important function in the hospitality sector, taking into consideration the fact that organizations within this sector, such as hotels, tourist agencies, hospitality objects, restaurants and resorts, depend on their employees as a source of competitive advantage. Therefore, the processes and human resources management philosophy in the hospitality sector must be applied well in order to ensure the commercial sustainability of organizations in this sector. Human resources are usually the first contact between companies and their clients; therefore, the efficient management of human resources is crucial for the success of the companies operating in the tourism and hospitality fields. The paper explores the precise specificity of human resources management in the tourism and hospitality fields, i.e. the employee training and development processes with a focus on the importance of human resources for the success of the companies operating within the service sector. The paper includes a research study based on the 142 respondents employed in different positions in the catering industry in the municipalities of the City of Belgrade, the Republic of Serbia. The research goal is to identify the needs for employee training and development that have appeared with the introduction of the Hazard Analysis Critical Control Points Standard (HACCP standard) to the facilities included in the research sample.

Keywords: Tourism, Hospitality, Catering Industry, Human Resources, Human Resource Management, Service Sector, HACCP Standard

Introduction

Efficient human resources management is one of the main sources for the competitive advantages of organizations in every activity in modern business conditions. Tourism and hospitality are the industries in which human resources have a special meaning, especially so due to the fact that they are in constant and direct contact with the users of their services. In the paper, a special focus (accent) is on the analysis of the specificities of human resources management in tourism and hospitality, with the goal to point out its importance and (a large number of elements) the numerous factors that are specific for this industry and which must be taken into consideration while managing organizations in tourism and hospitality.

The subject matter of the research published in the paper is human resources management in tourism and hospitality, while a special accent is placed on human resources management specificities in all these activities. Beside the theoretical analysis of the research subject matter carried out in the paper, research in the employees' attitudes towards changes in the organization (employee training and development) was done on the example of the Hazard Analysis Critical Control Points Standard introduction (HACCP Standard).

The research was conducted from 27th October to 13th November 2019. It is based on the answers of 142 respondents in the municipalities of the City of Belgrade, the Republic of Serbia. The research samples included different organizations which provide hospitality services, starting from fast food stands and bakeries all the way to hotel restaurants, all operating in the catering industry. Taking into account the fact that a large number of respondents participated in the research, there were a total of 29 facilities included in the research study. The research goal was to identify the needs for employee training and development that appeared with the HACCP standard introduction to the facilities in the research sample.

Tourism and Hospitality as Economic Activities

Industry Description

Tourism and hospitality are the industries that have a big impact on countries' economies and are ever-increasing in modern business conditions. The term "tourism market" implies the relationship between the offer of and demand for the products and service whose goal is to satisfy certain tourist needs (Cavlek, et al. 2011). As the key elements of the tourism market and tourism as an industry, the following can be highlighted (Galičić & Laškarin, 2016):

- tourist supply,
- demand for tourist services, and
- the organizations that provide different types of tourist and hospitality services.

The tourist offer is a very significant segment of tourism as an industry and can be defined as a segment of the tourism market in which certain services and products are offered according to specific prices for the purpose of satisfying tourist needs (Cavlek et al., 2011). With the help of tourist demand, it represents the total number of the persons who use or want to use tourist services in a future period and are able to pay for it (Martinovic & Tanaskovic, 2014). There are a large number of organizations on the tourism and hospitality market(s) rendering services and selling products to the potential users, i.e. persons interested in such services and such products.

Hospitality is one of the industries directly connected with tourism and has an important role in the process of providing tourist services. Heterogeneity is one of the most significant characteristics of tourism as an industry, which has as a consequence the need for the synchronization of services provided to tourists in order to ensure an equal and appropriate quality of tourist products or services.

Tourism and hospitality are the industries where employees are extremely important for a business success. A huge number of research studies indicate the fact that employees' attitudes towards the customers of tourist and hospitality services in the service industries directly have a high influence on their quality and their satisfaction with and readiness to use a particular service again (Chesser, 2016). The results of these research studies are one of the most significant indicators of the importance of human resources management in tourism and hospitality.

The importance of employees and human resources management in tourism and hospitality is additionally enhanced by the fact that the quality of these services is interpreted in different ways, both by their providers and by their users (Kulic & Markovic, 2011). The users' perception of the quality of a service is entirely subjective and subject to a variety of influences, such as the user's previous experience, education, emotional state at that moment and so forth. The perception of the identical tourist services provided to the same users at different moments may be different, primarily as a consequence of the influence of certain subjective factors existent at the moment of their use of such service.

Tourism and hospitality are interconnected to a great extent, whereby a great number of authors assert that hospitality is the basic and the most important element that has an influence on tourism

development (Chesser, 2016). The term hospitality implies service provision modalities in the accommodation and food industries implemented in hospitality facilities and in facilities for other purposes. The applicable law in the tourism industry (Law on Tourism, 2019) in the Republic of Serbia defines that hospitality implies the services related to providing accommodation, the preparation and serving of food and drinks, as well as the preparation of food and food delivery to users who may be consumers of the same in different locations.

The focus of the activity pertaining to human resources management must be on the creation of the preconditions necessary for employees in every segment of their work in order to create the maximum possible value for service users (Nickson, 2007). An additional factor which has an impact on the complexity of human resources management in hospitality is the fact that, in this industry, a plethora of possible, different and interconnected services are most commonly delivered. Human resources management creates the necessary preconditions for its employees willing to create the maximum possible value for service users (Nickson, 2007).

Human Resources in Tourism and Hospitality

In modern business conditions, characterized by permanent changes in the environments in which tourism and hospitality companies do business, it is necessary for managers to have a wide range of multidisciplinary knowledge. The placement of modern time services assumes respecting not only all business partners – business entities, but also the users for whom a service is ultimately provided. A contemporary approach to services implies adequate competitiveness, which has to establish long-term relationships with services users in terms of a clear differentiation *versus* competition (Popovic Sevic, 2019).

There are a large number of the factors that influence human resources in tourism and hospitality, the most significant amongst them being (Boella & Goss-Turner, 2019):

- the greatest number of tourist and hospitality services are provided in direct contact with users,
- the significant dependence of human work, which cannot be efficiently automated and replaced with technical means, especially not so in the service provision segment,
- user's needs for tourist and hospitality services constantly change; therefore, service companies' offers continuously adapt to these changes on the market, and
- organizations providing tourist and hospitality services must create and maintain a high-quality level of their business, with a special accent on the quality of the services they render to their users.

Human resources, together with material, make up the assets of the companies operating in the tourism and hospitality fields. In modern business conditions, employees' knowledge, experience, creativity, capability and motivation are the basic preconditions for the work efficiency and competitiveness of all companies operating in the tourism and hospitality fields. In the industries such as tourism and hospitality, in which employees are highly significant in the business doing of those companies, human resources management is very complex and requires an overall approach to all the segments of the business relationships with employees.

The development of modern information and communication technologies and the globalization of business activities have led to significant changes in human resources' needs in tourism and hospitality and in their structure. For example, the development of the Internet has led to essential changes in the ways tourist and hospitality services are sold, measured by a very high growth of direct sales, primarily for those made through online channels. These changes have led to the needs of the persons with an adequate knowledge of the information technologies field, as well as online sales and marketing. It is considered that, in the 21st century, services will take place in a shorter period of time, so communication with service users will exclusively be performed with the help of artificial intelligence and through other modern technologies (Sing et al., 2018). Thanks to the support of sales digitalization and marketing activities, service providers will be in a more interactive position *versus* users than it is the case now, mainly through different digital reports and procedural records. The management of the relationship with service users will fundamentally be based on the user's experience prior to, during and after using a service it (Homburg et al., 2017).

Human resources play an important role in ensuring the successful business doing of the companies they represent in the tourism and hospitality sectors. In modern business doing conditions, almost all the resources necessary for a company's operations are easily accessible, except for human resources, which are becoming more and more deficient, due to which fact they are one of the most important resources (Galicic and Laskarin, 2016).

The modern business environment in which service companies in the tourism and hospitality fields operate demands that significant attention should be dedicated to human resources and that they should be centrally positioned in business activities. The mission of human resources management is to responsibly organize all the activities carried out by companies because of their work and select an appropriate person for every workplace. Besides, human resources management must also provide conditions for the advanced training for and progress of all employees. Human resources management needs to provide all the preconditions necessary for employees' motivation and the creation of an awarding system which will make employees invest their maximum effort to accomplish the task assigned to them (Boella & Goss- Turner, 2019).

In the references dealing with tourism and hospitality, there are a large number of research studies dealing with different human resources management practices in these industries. The practice of human resources management in tourism and hospitality is based on the use of the two basic approaches the one being *hard* and the other being *soft*, which significantly differ from one another (Galicic & Laskarin, 2016).

The *hard* approach to the practice of human resources management is based upon emphasizing the activities connected with the management of human resources. The *hard* approach to human resources management in tourism and hospitality uses to a great extent the control system that can be more simply integrated into organizational strategies in comparison with the *soft* approach.

Within the framework of the *soft* approach to human resources management in tourism and hospitality, less attention is dedicated to the control system and their integration into organizational strategies. *Soft* approaches are based on ensuring the high levels of the independence of human resources management and in practice they have proven to be very efficient in the fields based on the provision of services, such as the tourism and hospitality fields, and employees' direct contact with users.

In the practice of human resources management in tourism and hospitality, the conceptual frame based on the three activities of human resources management (i.e. employee training, surveillance and practical training) is often used. In practice, this approach has proven to be a very efficient way to increase the business satisfaction level in employees and decrease the number of those leaving the company (Chesser, 2016). Tourism and hospitality belong to the industries in which business satisfaction has a very significant impact on employees' decisions to leave the company.

Modern business conditions in tourism and hospitality are characterized by an ever-increasing emphasis on the improvement of the quality of the services rendered to users (Boella & Goss- Turner, 2019). Efficient human resources management practice in tourism and hospitality may create an environment which encourages and motivates a positive employee behavior within the framework of the services of a higher quality which are provided.

Human resources management in tourism and hospitality is a very complex set of activities whose purpose is to enable the accomplishment of long-term competitive advantages and the conducting of everyday activities carried out by companies in their performing their business operations. Tourism and hospitality represent the service industries in which the quality of an employee's work and his/her efficiency to a great extent influence a company's success and (customer) satisfaction. Human resources management in tourism and hospitality is a complex process, within which the following activities are carried out (Ilic, 2018):

- human resources planning,
- analysis and business design,
- human resources recruitment,
- human resources selection and their socialization,
- human resources training and their career development,
- the evaluation of employees' individual performances,

- human resources' employee salaries and rewarding,
- managing employment and collective bargaining,
- employee security and protection activities,
- leaving the organization.

The complexity of human resources management and their significance in modern business conditions require all the activities connected with human resources to be carefully planned in full detail (Chesser, 2016). All human resources plan created in tourism and hospitality companies must be aligned with their organizational strategies and directed towards accomplishment and preservation in order to gain long-term competitive advantages.

Employees' career development is a process which continuously takes place and implies a person's formal development, work experience and relationships with other employees, and the evaluation of the capabilities and personalities, i.e. all those elements that allow a person to be prepared for future business (Noe, et al. 2007). This process is future-oriented, necessarily including studying, whereby not being connected with the jobs currently performed by the employee.

Research, Human Resources and the HACCP Standard Introduction

Methodology

The conducted survey was aimed at gaining an insight into the attitude of the employed in the hospitality industry towards the introduction of the changes that significantly affect the ways in which they do their work or provide services. The HACCP is a food safety system based on the rules and procedures that provide for the analysis and control of all potential biological/microbiological, chemical and physical hazards to which raw materials are exposed, possible hazards in the handling, manufacturing, distribution and consumption of the end product (www.eurostandard.rs, 2019)

The application of the HACCP is based on the use of well-defined guidelines and standard operating procedures, which have the task to reduce the levels of risk to the food used in human consumption.

By applying the HACCP (www.eurostandard.rs, 2019):

● identify, evaluate and control any potential hazards that could have adverse effects on food safety,

● food quality and safety management are ensured, with an emphasis on prevention activities, and

● it is ensured that all employees are aware of what they must do, how, when and why they must do that in order to prevent food-related risks, as well as their own responsibility, to enable end-users to consume the foods that are healthy and safe.

In modern conditions, the application of the HACCP standard is one of the basic and the most important preconditions for the successful business doing of all catering organizations. This standard is a hygienic practice, with the help of monitoring the status of the entire food production chain from primary production to the finished product. The application of the HACCP standard prevents food contamination and ensures adequate handling. In addition to being mandatory by law, its application in the hospitality industry is significant because it prevents the occurrence of food accidents, which could have significant negative effects on the image of organizations.

The survey was being conducted on the sample of 142 respondents that which included Belgrade City municipalities from 27th October to 13th November 2019. The survey sample included various catering organizations, ranging from fast food kiosks and bakeries to hotel restaurants. Taking into consideration the fact that the fact that a number of the respondents who participated in the survey came from some catering establishments, the total number of the facilities covered by the survey was 29. The aim of the research was to identify the training and development needs of employees that arose during the introduction of the HACCP standards to the facilities included in the sample.

The research consisted of a total of 17 survey questions, the 13 of which were closed-ended, with a greater number of the answers offered, while 4 were open-ended. Three open-ended questions relate to the basic information about the respondent and the age of the hospitality facility in which he/she works, whereas one question aimed to gather information about the HACCP problems encountered by the respondents not covered by the survey. In addition to the basic information about the respondents, the

questions asked in the survey were intended to provide the information related to the application of the HACCP standards in the catering establishments where the respondents are employed.

Results

Of the total number of the respondents, 75 (52.8%) were female, while 67 where male (47.2%) respondents. The survey participants' average age was 38 years and 5 months. In order to make the results more transparent, the respondents' answers regarding their age were divided into the age categories: "20-30 years old", "30-40 years old", "40-50 years old" and "over 50 years old". The majority of the respondents, i.e. 47 of them (33.1%), worked as chefs; 26 respondents (18.3%) were head chefs, while 22 respondents (15.5%) were restaurant managers. The remaining respondents worked in other workplaces. The result that the two-thirds of the respondents worked as chefs, head chefs and restaurant managers indicates that the sample provides credible information about the employees' attitude towards the introduction of the HACCP standard. The average work experience of the respondents employed in the hospitality industry was 13 years and 9 months, which also confirms the fact that the sample included in the survey provides credible information about the introduction and implementation of the HACCP standards.

The fifth question was about the type of the catering facility in which the respondent works, and as many as ten possible answers were offered within it so as to ensure the maximum possible level of precision in collecting this information, which is very important for the whole research study. When asked "What is the type of restaurant you work for?" the respondents were offered the answers "a restaurant", "a specialty restaurant", "a café", "a bar", "a pizzeria", "a roaster", "a grill", "a beerhouse/a winery", "a coffee-shop" and "a buffet". The majority of the respondents worked in restaurants, i.e. a total of 61 of them (43%), 35 worked in grills (24.6%), and 18 (12.7%) worked in pizzerias. A total of 5% of the respondents said they worked in all other types of facilities. Based on the collected data, it can be concluded that the sample fairly accurately reflects the structure of the hospitality establishments on the market.

The sixth question was "What year was the year when the facility you work for was established?"; the files were collected based on the data about the period of the business operations of the facility collected. In order to facilitate data analysis and their increased visibility, the answers to this question are listed as the age of the catering facility, not as the years they were established in. The average age of the facilities significantly affected the fact that even 8 of the respondents worked at a hotel established in 1908, which resulted in a situation that the average age of the facilities increased by six years in relation to the case in which the hotel was excluded from the sample. The average age of the facilities was 27 years and 3 months, where they were classified into the categories "below 10 years", "from 10 to 20 years", "20 to 30 years" and "over 30 years".

The remaining 11 issues were tasked so as to provide information about the implementation of the HACCP in the catering facilities and the respondents' attitudes towards it, or their attitudes towards the changes the HACCP has led to. All the questions from 7 to 16 were closed-ended, and the four answers were offered: "I don't agree at all", "I generally disagree", "I generally agree" and "I completely agree".

Regarding the question "To what extent do you consider you are familiar with the HACCP requirements?", the largest number of the respondents, i.e. a total of 53 of them (37.3%), replied that they completely agreed with the assertion that they were familiar with the requirements of the HACCP. A total of 39 respondents (27.5%) answered that they were not familiar with the HACCP requirements at all; a total of 29 respondents (20.4%) said that they were familiar with the requirements to a large extent, whereas a total of 21 respondents (14.8%) were familiar with the HACCP requirements to a lesser extent. The answers to the question "To what extent do you consider you are familiar with the HACCP demands?" are shown in Chart 1.

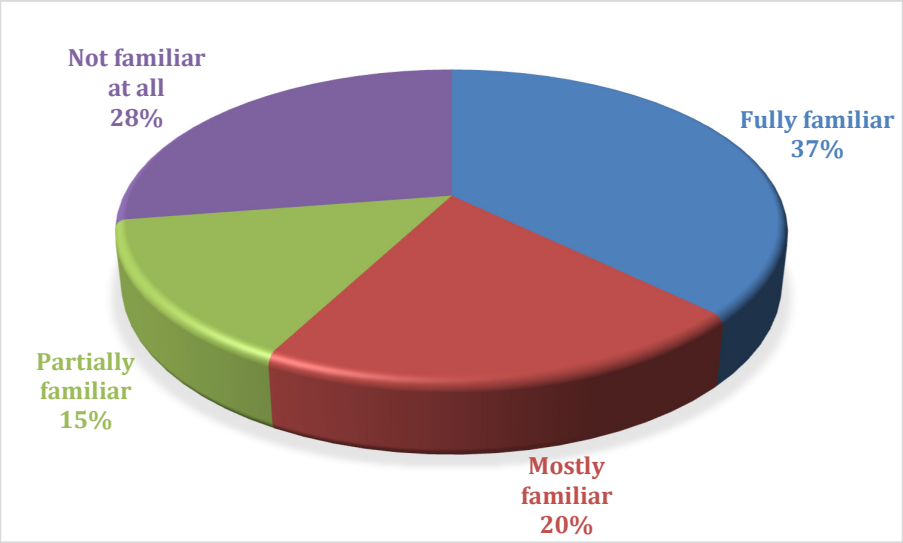

Chart 1: The respondents' answers to the question "To what extent do you consider you are familiar with the HACCP requirements?"

Next question was "To what extent do you agree with the assertion that an adequate implementation of the HACCP is significantly contributing to an increase in food safety?" More than one-half of the respondents, i.e. 78 of them (54.9%), answered they fully agreed with this assertion, while a total of 43 respondents (30.2%) said they agreed with the assertion to a great extent, indicating that employees working at the catering facilities were familiar with the advantages of the HACCP to a great extent, saying it made it easier for them to accept the changes it brought with itself (shown at Chart 2).

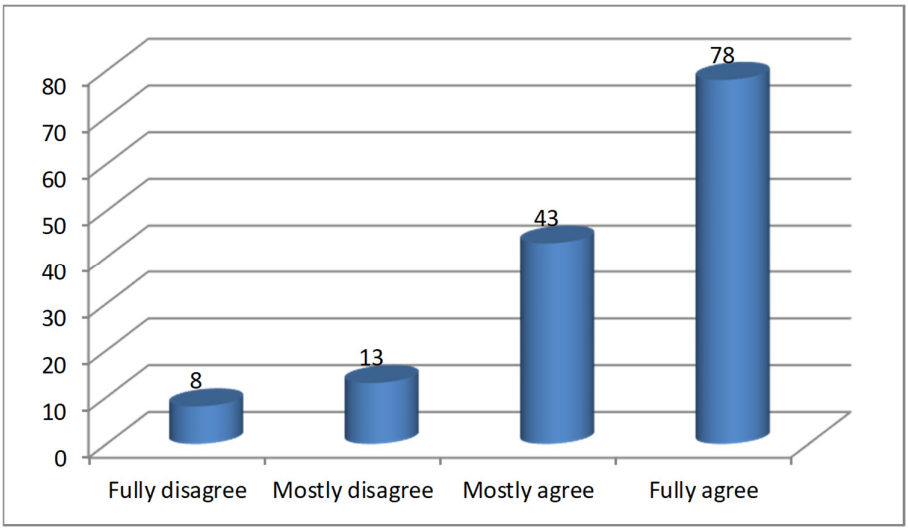

Chart 2: The respondents' answers to the question "To what extent do you agree with the assertion that an adequate implementation of the HACCP is significantly contributing to an increase in food safety?"

The ninth question was "To what extent do you agree with the assertion that the catering facility in which you work meets all the requirements of the HACCP?" The majority of the respondents, i.e. 77 of them (54.2%), answered they agreed to a great extent with the assertion that the facility they were employed in met the requirements of the HACCP, whereas a total of 35 respondents (24.6%) fully agreed, indicating the fact that, according to the respondents, the HACCP was adequately implemented in the catering facilities in which they work (shown at Chart 3).

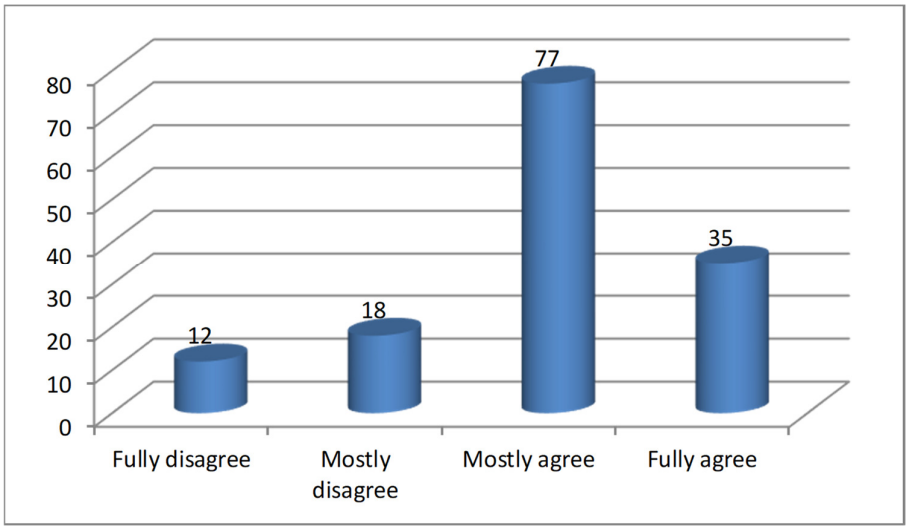

Chart 3: The respondents' answers to the question "To what extent do you agree with the assertion that the catering facility in which you work meets all the requirements of the HACCP?"

Question: "Was a lack of employee education and training a problem in implementing the HACCP?", was asked to determine how the catering facilities were prepared for the implementation of significant changes in business doing due to the HACCP standards. The answers to this question indicate a polarization in the approach to employee education during the introduction of the HACCP. The research study participants who worked in big and well-known catering facilities (hotel restaurants and high-price restaurants) had a lot more training than the respondents who worked in smaller facilities. This difference resulted in the fact that, with respect to the other questions, the respondents who came from different categories of catering facilities indicated that the HACCP was introduced more efficiently to the facilities that had invested efforts in employee education and training (shown at Chart 4).

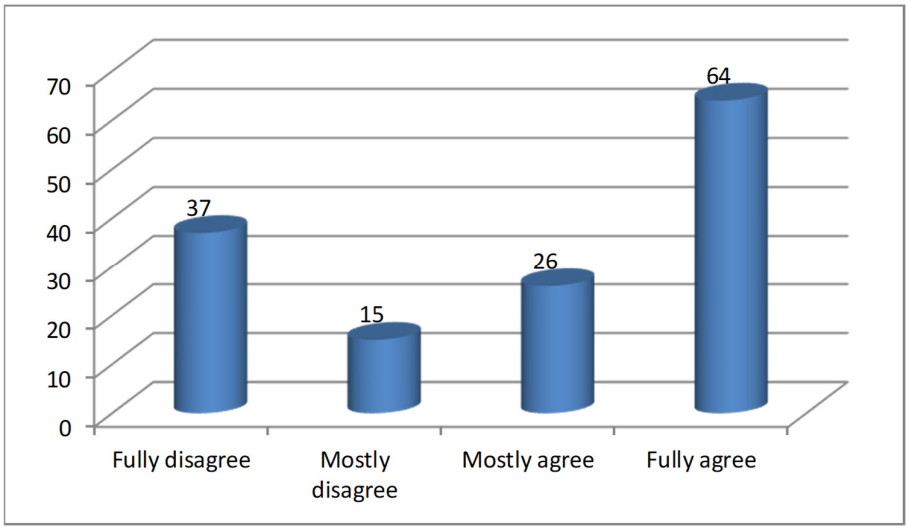

Chart 4: The respondents' answers to the question "Was a lack of employee education and training a problem in implementing the HACCP?"

The question, "Were complicated documents and bureaucracy a problem in implementing the HACCP?", also pointed to the significant differences between hotel restaurants and higher-price restaurants when the application of the HACCP and other catering facilities are concerned. In the majority of the cases, the respondents from higher-price hotel and restaurants agreed that they did not agree to a great extent with the assertion that a complicated documentation and bureaucracy were a problem in implementing the HACCP, as opposed to the respondents from small dining facilities. After the subsequent interviews with the respondents working in higher-price class hotels and restaurants it became clear that, in those facilities, administrative affairs were connected with the introduction of the HACCP, which was usually performed by the administrative services, as opposed to smaller facilities, where those activities were performed by the employees involved in the research study (shown at Chart 5).

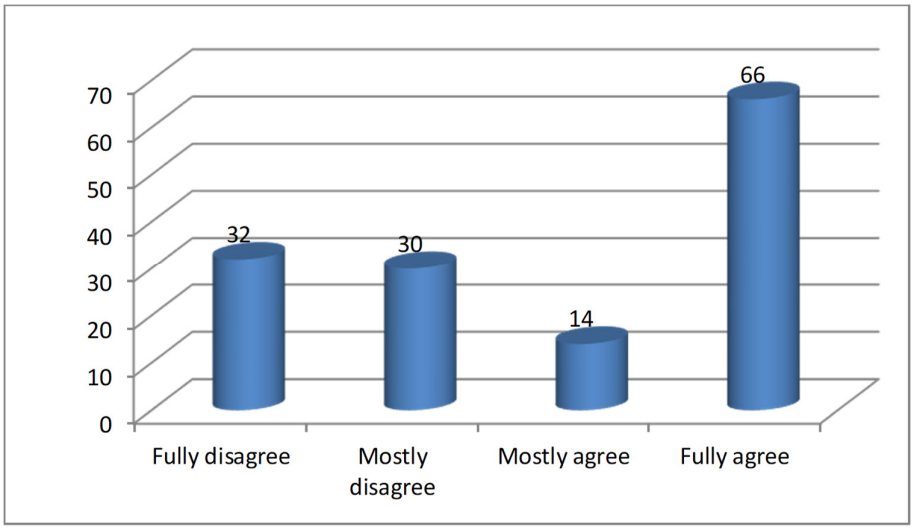

Chart 5: The respondents' answers to the question "Were complicated documents and bureaucracy a problem in implementing the HACCP?"

The twelfth question was intended to indicate whether the catering facilities where the respondents were employed had the appropriate physical characteristics of the establishments in which the HACCP needed to be introduced. The question was, "Was a lack of an appropriate infrastructure (the physical characteristics of the facility) a problem in implementing the HACCP?" The answers to this question also indicated a polarization between the persons employed in higher-price class hotels and restaurants, on the one hand, and those employed in the other catering facilities, on the other. The respondents from the higher-price hotels and restaurants answered as a rule that they did not have those types of problems, or that those problems were smaller, while the respondents employed in the other catering facilities were to a great extent responsible for the significant amount of infrastructural problems in introducing the HACCP (shown at Chart 6).

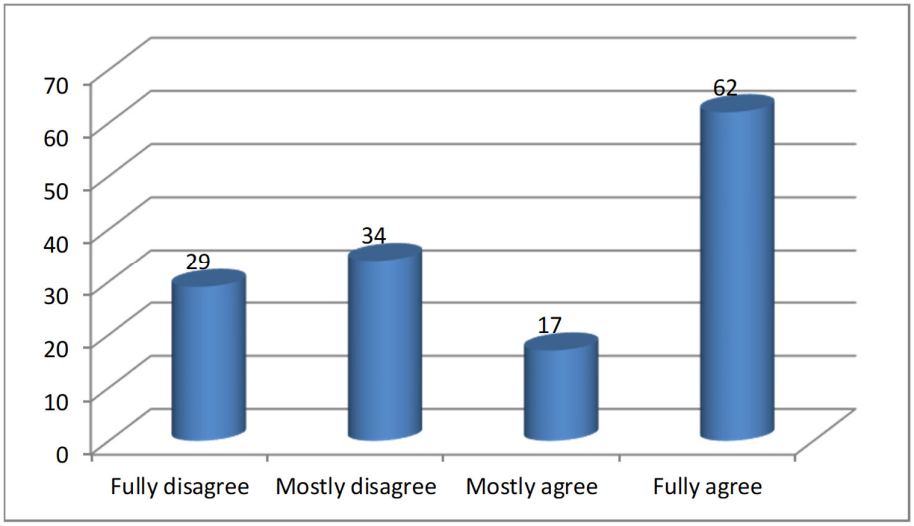

Chart 6: The respondents' answers to the question "Was a lack of an appropriate infrastructure (the physical characteristics of the facility) a problem in implementing the HACCP?"

One more question that deals with the infrastructure needed to introduce the HACCP, referred to the availability of equipment, reading as follows: "Was a lack of appropriate equipment a problem in implementing the HACCP?" The respondents' answers to the aforementioned question significantly corresponded to the answers to the previous question, indicating that the catering facilities that had problems with the infrastructure most frequently faced the problems connected with the equipment necessary for the introduction of the HACCP. Chart 7 shows the answers obtained from the respondents to the question, "Was a lack of appropriate equipment a problem in implementing the HACCP?"

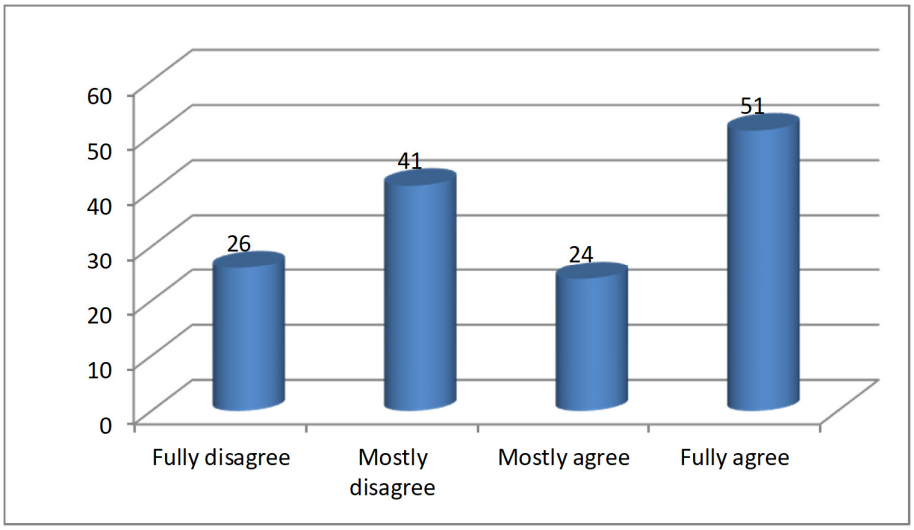

Chart 7: The respondents' answers to the question "Was a lack of appropriate equipment a problem in implementing the HACCP?"

The fourteenth question was aimed at highlighting the impact of changes in the employee structure on the HACCP implementation process. The question was, "Was the employee fluctuation a problem in implementing the HACCP?" The answers to this question pointed to the fact that the fluctuation of employees did not constitute a significant problem during the application of the HACCP in the catering facilities, where it was present to a slightly greater extent in comparison with the smaller facilities, mostly grillers and coffee confectionaries (shown at Chart 8).

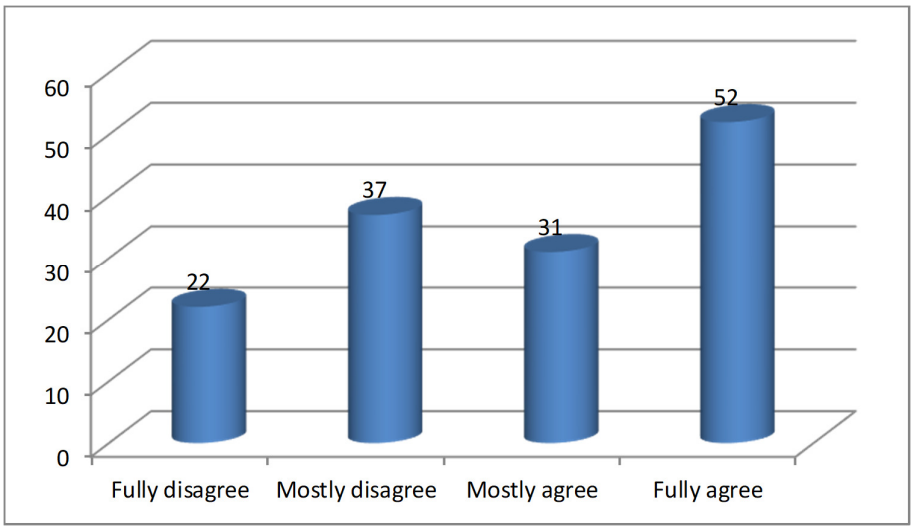

Chart 8: The respondents' answers to the question "Was the employee fluctuation a problem in implementing the HACCP?"

Question "Was the insufficient commitment of the leadership a problem in implementing the HACCP?" were asked upon respondents. There are two types of approaches which managers and owners of the catering facilities had towards the implementation of the HACCP that may be identified in the answers to this question. The first group consists of catering facilities (to a great extent high-price hotel restaurant, bars and restaurants) in which there the leadership were highly dedicated to the

implementation of the HACCP. In these catering facilities, the management as a rule gave their open support to all the activities related to the implementation of the HACCP. The smaller catering facilities were characterized by the significantly lower dedication on the part of the management to the implementation of the HACCP, which in a large number of the cases was observed by the managers of those facilities as an unnecessary cost and a burden in the business operations (shown at Chart 9).

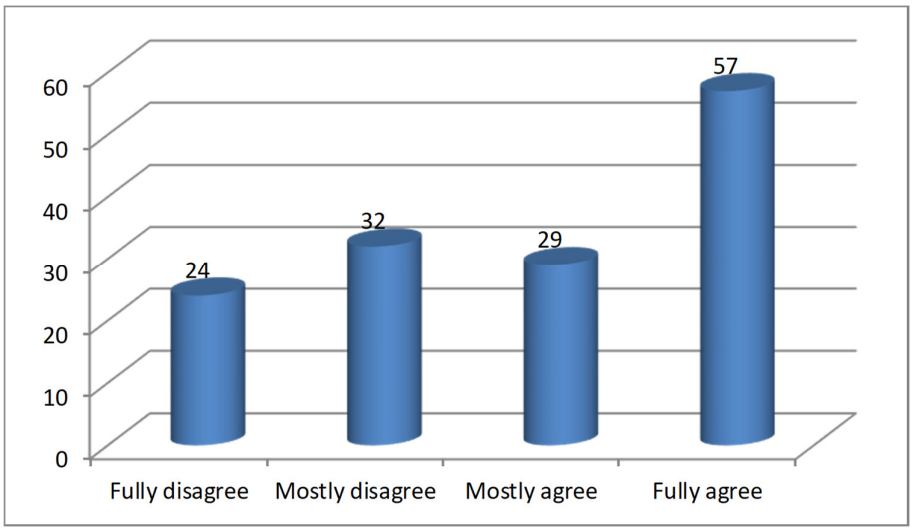

Chart 9: The respondents' answers to the question "Was the insufficient commitment of the leadership a problem in implementing the HACCP?"

The sixteenth question was, "Is there insufficient awareness among the employees of the risk of food safety problems in implementing the HACCP?". The answer to this question clearly points to the importance of reducing the number of employees in the implementation of changes, such as the introduction of the HACCP. Almost all the respondents who answered to the previous question said that the lack of commitment on the management's part was a problem in the implementation of the HACCP; the authorities pointed to the fact that, in their catering facilities, the level of the employee awareness and food safety were a problem in introducing the HACCP (shown at Chart 10).

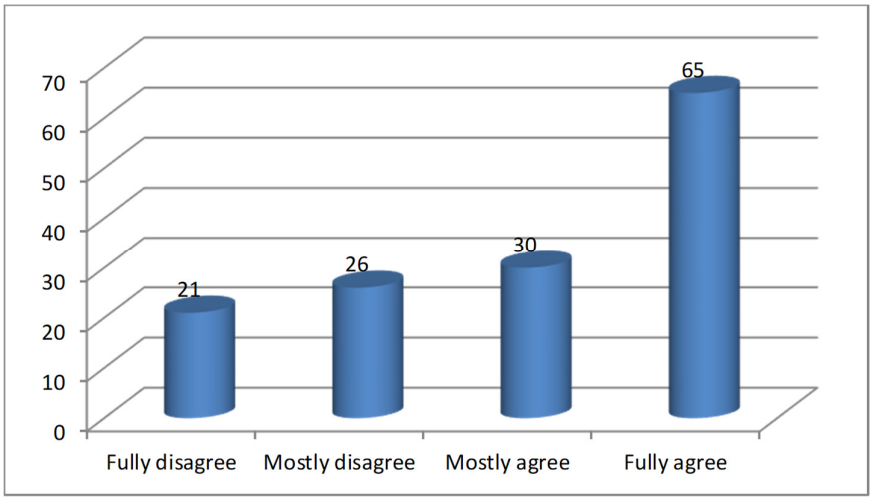

Chart 10: The respondents' answers to the question "Is there insufficient awareness among the employees of the risk of food safety problems in implementing the HACCP?"

The seventeenth question was aimed at enabling the identification of the problems that appeared during the implementation of the HACCP that, however, were not covered by the survey. Less than one-half of the respondents answered the question, "Is there another problem with the application of the HACCP you have noticed, which is not included in the survey??" Most of the suggestions that the respondents gave in their answers to this question can be classified into the framework of one of the questions involved in the survey. The only suggestion not included in the survey concerned a lack of candidates in the labor market, especially for a chef's jobs.

Conclusive Considerations

In modern business-doing conditions, human resources management is one of the most significant segments of the business doing of all the companies operating in tourism and hospitality. Quality human resources management often represents the main difference between successful and unsuccessful tourism and hospitality companies. The specificity of human resources management in tourism and hospitality can be seen in the fact that companies' business operations can be controlled and their image influenced to a great extent with the help of human resources management.

A large number of employees in tourism and hospitality in the Republic of Serbia have jobs with minimum or slightly higher than minimum salaries; therefore, their motivation for work is very low. Precisely this fact is one of the most important factors exerting an influence on the high rate of employees' abandoning workplaces, which is characteristic of tourism and hospitality. A great number of employees, especially the ones with less-paid jobs, do not plan to work in tourism and hospitality throughout their careers, for which reason they only work in this industry until they receive an offer for a better-paid job another employer. These hiring specificities in tourism and hospitality complicate the implementation of activities within human resources management to a great extent.

The significant specificities of human resources management in tourism and hospitality are all the elements pertaining to employees' progress and their promotion. In this segment of business doing, efficient human resources management has an important role in accomplishing long-term sustainable competitive advantages and increasing the efficiency of the implementation of business activities. Companies in the fields of tourism and hospitality provide clear guidelines for their employees on their progress and provide employee training courses, with a purpose to enable them to master the knowledge and skills required for their current workplaces and a further improvement, thus recording a much higher level of the satisfaction and motivation of their employees, as well as a much lower rate of employee abandoning the company.

Based on information presented in the paper and the practical examples, it can be concluded that human resources management plays an important role in tourism and hospitality. The employees who work in tourism and hospitality have possibilities of creating a positive or negative image of their company in the eyes of their customers through their personal behavior and attitude to work, and to do that to an extent significantly higher than in other industries. It is exactly in this fact that we may notice one of the most important specificities of human resources management in tourism and hospitality.

The influence which human resources management has on the results achieved by the companies operating in tourism and hospitality was the subject matter of many research studies carried out in a recent past. Almost every research study has shown the existence of a positive correlation between the manners of the practical use of human resources management, on the one hand, and the results companies have generated through their business doing. Achieving adequate effects with the use of human resources management in tourism and hospitality can exclusively be ensured in the situations which take into consideration all the specificities connected with the practice applied in this field.

The research results clearly indicate the differences existing among the different types of hospitality facilities when the practices applied in human resources management are in question. Big hospitality facilities, as well as those with longer traditions, dedicate significantly higher attention to human resources management than small hospitality facilities do.

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Digital Trends in the Marketing Healthcare System

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Abstract

Healthcare represents a dynamic domain that constantly compells creativity, passion and faithfulness. Medical marketing represents the process of creating and providing information and interventions valid in health, by using strategies base on science and consumer-oriented in order to promote a better healthcare assistance. Through interactions with patients and consumers, the healthcare organization can get ideas on how to improve their healthcare services. When executed well, the right health marketing strategy should help improve the connection with more clients. A large patient database is equivalent to higher profits for the organization.

Keywords: Digital Trends, Marketing, Healthcare System.

Introduction

Marketing in healthcare incorporates a variety of tactics, integrating them in several channels, designed to gain a certain demographic population in what regards the patients. The success of a healthcare marketing campaign is measured by specific measurable metrics that are appropriate to the medical organization's objectives. Among the healthcare marketing benefits we mention**:**

- Identifying potential patients via specific objectives
- Generating higher incomes due to more qualified data
- The patients' involvement rate remains high due to the relevant timely activities
- Improving loyalty
- Connections with more patient's channels
- Productivity assessments and re-alignment of strategies, as needed, with the analyses performed

Healthcare will always typify an industry that is in permanent change and development. In the past, medical assistance was based on volume, nowadays, it is based on value and in this way, healthcare marketing represents an access gate to the previously mentioned assistance based on value.

Four major technology platforms are needed for health professionals to achieve full success in medical marketing.

- Healthcare customer relationship management (HCRM) - a healthcare customer management system that integrates patient data from a number of sources for launching, optimizing and measuring health marketing campaigns.
- Content management system (CMS) - this platform simplifies, as well as classifies the content of marketing for health. It integrates with the management of client relationships in the

health field to ensure a content aligned with the branding guidelines of the medical organization. Also, CMS offers the opportunity to establish a plan to help efficiently distribute the content.

- Marketing Automation - allows healthcare marketers to distribute the right content to the right patient at the right time. This platform has the ability to mobilize the data provided via HCRM to ensure that the content is aligned with the individual journey of the buyer.

These platforms allow healthcare professionals to purchase, care for and retain more patients by providing professional, personalized and timely content. This also generates considerable revenue growth.

There is a myriad of data available on healthcare consumers. Medical organizations can influence this and target certain groups of patients to convey the right message to them. This process is completed by a center where health data is centralized, similar to the previously mentioned platforms. It integrates all the necessary data: demographic, behavioral, social, etc., to inform the organization about the preferred communication method of the patient.

Healthcare Marketing Trends

Investing in the content marketing

It's been a long time since placing a pop-up ad could produce brand awareness in the medical industry. More and more internet users are using software that prevents pop-up ads, and some browsers are pre-installed with such applications. The orientation towards marketing should be based on the trend with what is popular in today's society, namely content marketing.

Content marketing is a form of marketing focused on creating and sharing content for a well-defined online target audience. It is based on anticipating and meeting the needs of existing customers, as opposed to creating the demand for a new need.

Organizations are increasingly using content marketing strategies to:

- Draw attention
- Expand their customer base
- Generate or increase sales in the online environment
- Increases brand awareness or credibility
- Involve an online community
- Provide valuable customer information
- Increase loyalty

Digital content marketing is a management process that uses electronic channels to identify, forecast and meet audience content requirements. It is imperative that the information is constantly updated and added to influence customer behavior.

Creating a mobile-friendly website to take advantage of new advertising opportunities

In 2019 more than half of the online traffic came from mobile, and if the website of the medical organization was not mobile-friendly, it probably did not receive organic traffic. In 2018, Google launched a new algorithm for mobile search results. Basically, Google has decided that it will only display search results based on the mobile version of the web page instead of the desktop version. Therefore, any non-responsive mobile site will be displayed only for keywords such as the name of the medical organization.

Mobile sites are specifically designed for mobile devices - no one wants to browse from their smartphone on a desktop site. Research on the degree of use of mobile sites shows that mobile-

optimized websites significantly improve user experience and satisfaction, which creates a positive brand impression.

Mobile sites are also designed to provide optimal download speed, which means less waiting time and more time for browsing. A mobile site can be accessed from anywhere, anytime. This level of constant connectivity provides an unprecedented opportunity for the medical organization to connect with the target audience in new ways, wherever they are.

In terms of integration with offline environments, mobile devices are unique in their ability to immediately cover the gap between online and offline environments by using QR codes. QR codes can be displayed in print format and then scanned with a smartphone, translated into electronic messages, such as a website URL, an email address or an SMS message. This means that ads, posters - even panels - can contain QR codes that will direct users to mobile landing pages that contain far more information and interactivity than can be offered on the printed page. This integration between print and web via the smartphone adds a new dimension of communication to any advertising or mobilization effort.

A mobile site is generally a much less restrictive way to build a mobile presence compared to application development. First of all, application development requires the production of different applications for different platforms and sending to an application store, which makes applications more fragmented and more expensive. Most importantly, an app requires users to download the app before it can be accessed. On the other hand, a mobile site is universal for all current smartphone browsers, giving it flexibility and cost efficiency, with fewer barriers between the organization and the target audience.

As for new advertising opportunities, mobile advertising is growing at a rapid pace and presents many new opportunities to reach a target audience with precision. If a medical organization uses Google AdWords / PPC, there is a good chance that the ads will also appear on mobile device listings (depending on the account settings).

Video Marketing to attract new patients

Video marketing is no longer an "up-and-coming" content strategy. This is an increasingly powerful way of communicating the brand story, explaining the value proposition of the medical organization, and building customer relationships.

In terms of engagement, no other form of media can truly rival a video. This is why YouTube ads are becoming more popular compared to other forms of advertising. A lesser known fact is that YouTube is not just a video site, but also a search engine owned by Google. With over 4 billion searches a month, YouTube is actually bigger than Yahoo, Bing, AOL and Ask combined. Given these aspects, as a healthcare marketing professional, you should consider that video marketing is a cornerstone of future marketing efforts.

Providing quality content in a video format can contribute to influencing the consumer selection process and will demonstrate the added value of a private healthcare experience.

Online video content opens up opportunities for physicians to showcase their personalities and professionalism through a video, less formal to show their passion for healthcare and specialty areas. Thus, these videos can help humanize the organization for potential patients, while influencing their decisions.

A Google study found that of the 700 surveyed healthcare administrators, each client reported watching videos to view product demonstrations. After watching, 79% continued browsing the site and 63% communicated with other people about the information they learned. Therefore, video landing pages tend to lead to higher conversion rates, as users can find information from the first touchpoint.(Da

Cuna, 2019) 5 billion videos are watched on YouTube every day, 4.6 billion video ads are watched every year,(Ahmad, 2017) 1200% more video-generated actions than text and images combined, (Templeman, 2017) videos on a landing page increase conversion by 80 %, and 80% of users remember a video ad they saw online last month.

Videos have a compelling way to encourage involvement, generating results such as clicks and sales. It is indeed one of the best tactics to bring more exposure to the medical brand. (*https://www.socialmediatoday.com*)

A major importance has the length of a video, the shorter the length, the greater the attention of the person (more than 80% of people watched a video with a duration of less than 30 seconds).(*https://www.wordstream.com*) Thus, it is essential to introduce as short a content as possible in the video in order to reach the best degree of involvement from those who watch it.

Investing in online reputation and Multi-Channel Initiatives

The medical organization must be active on social media. Facebook, Twitter and Google are some platforms on which the organization should activate. After creating an account on social media, the account must be linked to the blog / site of the medical organization. This represents a huge potential for improving the organization's reputation. It must regularly update its activity to provide the best information to potential customers.

The presence of a blog can prevent negative advertising. If the damage already exists, it is advisable for the organization to hire an ORM (Online Reputation Management) consultant, so that it can contact the site owner who generates content responsible for the negative reputation and request deletion of defamatory content. If he refuses, the organization can always have the right to make a legal move.

In today's digital world, clients seek information about medical organizations by reading and analyzing reviews about them. Reviews play an important role in bringing customers to the organization and can also drive them away.

In many organizations, customers face situations where their feedback is not received by these, despite their contact efforts. Such problems cause the client to lose interest in the organization and leave a wrong review, which is read again by other (potential) customers. The organization must keep track of the latest customer reviews and provide appropriate feedback.

Among the most sought after by patients in the virtual environment are:

- Detailed medical profiles
- Detailed information on medical procedures
- Testimonies of patients

Potential patients increasingly seek out physicians who specialize in the procedure they should have, before scheduling a consultation with them. Before putting their health in the hands of a doctor, patients want to know them, so that they get a sense of confidence beforehand.

Before the advent of the Internet, a company's reputation was almost entirely based on recommendations, various surveys and consumer data, but in the digital age, all of these take place online in the form of reviews.

According to SocialMediaToday, 92% of consumers read online reviews to learn more about the brand, 80% of consumers have changed their mind about purchasing a product after online reviews, and 40% of consumers form an opinion about the organization after they read 1-3 reviews. (Ahmad, 2017)

Networking

Through interactions with patients and consumers, the healthcare organization can get ideas on how to improve their healthcare services. When executed well, the right health marketing strategy should help improve the connection with more clients. A large patient database is equivalent to higher profits for the organization.

Multi-channel marketing campaigns mimic consumer behavior, which, according to a Forbes report, tends to use multiple platforms to research and interact with organizations before buying. (Forbes, 2016)

Multi-channel marketing in healthcare ensures clients experience without interruptions, connections, personalized interactions with healthcare systems, regardless of the method of communication. Multi-channel health marketing has many benefits, including:

- **Improving the brand awareness**

Brand awareness is crucial; strong medical brands inspire consumer confidence and increase revenue. Since it takes five to seven impressions on average for a customer to remember their brand, the more points of contact they need. (https://brandbuddha.com) Multi-channel marketing is an effective method of creating contact points, stimulating impressions and building a strong brand awareness.

- **Customized experience for the patient**

Switching between platforms and devices is common customer behavior, and leveraging multi-channel marketing creates a seamless journey for them, linking interactions to ease the transition from one stage to another.

- **Greater patient involvement**

Increasing patient involvement not only increases the number of purchases and retention, but also creates more patients, healthier. Multi-channel marketing contributes to increasing patient involvement by providing personalized and proactive interactions throughout the patient's life cycle.

- **Increased income**

In the vast majority of industries, 90% of traders make higher profits and sales when using multi-channel strategies, and 52% say they "usually" or "always" reached their financial goals. In the medical sector, in particular, health systems reported an improvement of conversions by over 40% when using multi-channel marketing.

According to Frost & Sullivan's Transformational Health's *"Multi Channel Marketing Global Voice of the Customer - A Digital Perspective"* study, regarding the preferences and needs of healthcare professionals for online and offline channels, the following (Frost & Sullivan, 2017) is noted:

- Independent medical sites, followed by other sites such as Wikipedia, medical applications, e-mails and virtual events, are the most important digital channels for HCPs.
- Channels associated with independent medical organizations are evaluated more, as compared to those offered by pharmaceutical companies.

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Recycling in Russia And Abroad: A Model of Circular Economy

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Abstract

The growth in population and consumption has led to a multiple increase for disposal. In Russia, traditionally, waste management is carried out by placing it at landfills, as well as authorized and illegal landfills. However, this method leads to significant negative consequences for the environment, the economy and public health. This study is aimed at analyzing current recycling practices in Russia and foreign countries. Theoretical and empirical methods were used such as analysis of statistical data, study and analysis of scientific and business literature, systematization, generalization, comparative analysis. The author draws a conclusion that in order to solve the problem of waste management in Russia, it is necessary to ensure a transition to the 'circular economy' model, but this requires a complete restructuring of existing business models, a change in the mentality of the population and the formation of socially and environmentally responsible behavior among citizens.

Keywords: Waste Management, Recycling, Circular Economy, Waste Separate Collection, Joint Consumption Economics.

Introduction

Exponential population growth, combined with rapid industrialization and urbanization, has led to the same increase for waste disposal. According to World Bank, in 2025 the annual production of municipal solid waste in urban settlements should be approximately 2.6 million tons. No less alarming is the situation in rural areas, where, in addition to municipal solid waste, which is typical for cities and consists mainly of paper, glass and plastic, there is about 750 million cubic meters of livestock enterprises and poultry farms waste. One of the directions for the disposal of this waste is to use it as fertilizers, but today only 25% of the generated manure is used. Its improper processing leads to pollution of not only groundwater, but also pressure water, and accumulation leads to inefficient use of agricultural land (Trubilin, et al, 2019).

The cost of waste disposal is constantly growing. Today it is around $205.4 per ton. It is predicted that by 2025-2030 a five-fold increase in this amount is expected (Subhasish, et al., 2019, p. 658).

According to 'Rostekh' the state corporation in Russia, the total mass of waste is 3-4 billion tons per year. Extraction of fuel and energy minerals make 54% of waste, 17% is waste from non-ferrous metallurgy, ferrous metallurgy makes 16%of waste and 12 % is the waste from other industries, including municipal solid waste. Up to 400 kg (or 1.5 cubic meters) of municipal solid waste per year are per capita in Russia. The total mass of municipal solid waste is 55-60 million tons per year. The recycling level is 5–7% (long-term plans include bringing municipal solid waste to 60% in 2024), most of the waste goes to open landfills (Glukhov and Movchan, 2019, p. 160). So landfills occupy an area of more than 4.2 million ha and about 400 thousand ha added each year. (The garbage problem in Russia: scary statistics!. n.d.) The largest landfills are located in the Perm Territory, Moscow, Chelyabinsk, Tomsk, Sverdlovsk and Volgograd regions (The largest landfills, n.d.). Despite the fact that only about five percent of the Russian population live in the Moscow region, the waste generated by them is twenty percent of the country's total waste.

In addition, waste production is inextricably linked to air, soil and water pollution through the continuous discharge of metals and other toxic components. At the same time, municipal solid waste landfills do their most harm to the environment, where the permeability of heavy metals such as lead, chromium and cadmium is much higher than, for example, during incineration. In addition, accelerated rates of solid waste generation lead to an increase in greenhouse gas emissions, especially methane and carbon dioxide. Municipal solid waste landfills occupy third place and account for about 14% of global methane emissions (United States environmental protection agency, 2016); they emit about 800 tons of carbon dioxide annually.

All this leads to an increase in the health negative impact. Residents of houses located in the immediate vicinity of landfills, suffer from diseases such as malaria, dermatitis, gastrointestinal disorders, bronchitis and asthma, and even cancer.

It should be noted that all problems are recognized by the Government of the Russian Federation and are reflected in strategic and program documents in the field of ecology. So, even in the Fundamentals of state policy in the environmental development of the Russian Federation for the period up to 2030 (approved by the President of the Russian Federation on April 30, 2012), the need to ensure environmentally sound waste management was noted, in particular, by reducing the level of waste, its involvement in re-economic turnover through processing, regeneration, recovery and recycling, the infrastructure creation for the environmental disposal of waste; as well as introducing a ban on the waste disposal that has not been sorted, mechanically and chemically treated, as well as waste that can be used as secondary raw materials, and the environmental restoration of waste disposal territories.

Then, similar formulations were included in the Comprehensive Strategy for the Treatment of Municipal Solid Waste, approved by the Ministry of Natural Resources of Russia in 2013. However, the situation in the field of municipal solid waste has not changed much since then.

The purpose of this study is to analyze waste management practices in Russia and the world, to identify the main problems that impede efficient waste management, taking into account the practice of other countries.

Recycling Model in Russia

The most common way to dispose of waste is still the special landfills or illegal dumps. According to the Federal Service for Supervision of Natural Resources Management in Russia, there are a total of 1399 landfills, 7158 authorized landfills and 17498 unauthorized ones (Waste Country, n.d.) (for comparison, in the leading European countries the share of waste involved in reuse is 80 - 87%). At the same time, no protection or control regarding what is brought and dumped on such territories is carried out, as stated Putin V.V. the President of the Russian Federation,in the Message to the Federal Assembly of the Russian Federation in 2019. As a result, there is a real threat of landfills and unauthorized landfills that are not declared and not considered in official statistics of hazardous waste. The scale and volume of illegal I - II hazard classes waste disposal, under the existing system of state control, accounting and regulation, cannot be fully estimated (Decree of the Government of the Russian Federation No. 84-p).

At the same time, in developed countries, an improved type of disposal is called‘sanitary waste disposal’. A sanitary landfill is a modern waste disposal technology that ensures the optimal use of municipal solid waste with minimal risk of pollution. It consists of four layers isolated from the surrounding area with a special primer to prevent odors and pathogens from leaking out of the landfill.

However, in order to ensure sustainable development in the field of ecology, the priority should be the transition from traditional landfills of waste hazardous to the environment to appropriate waste management systems that conserve useful resources in the economy. So, despite the presence of valuable waste fractions in municipal solid waste, at least 9 million tons of waste paper, 2 million tons of polymeric materials and 0.5 million tons of glass are irretrievably lost annually during their burial (Decree of the Government of the Russian Federation No. 84-p). This requires the

development and implementation at the state level of fundamentally new strategies, such as the development of a circular economy (or closed-loop economy), which is aimed at a complete 'restructuring of capital' aimed at expanding the flow of goods and services by revising business models in accordance with three main principles:

1) preservation and strengthening of natural capital by controlling end stocks and balancing the flows of renewable resources;

2) optimization of resource yield by ensuring the circulation of components and materials of the product at the highest possible level of utility;

3) increasing the efficiency of the system by reducing externalities.

In so many words, a circular economy is a continuous positive development cycle that preserves and strengthens natural capital, optimizes resource returns, and minimizes systemic risks by managing end stocks and renewable flows.

With regard to municipal solid waste management, the implementation of the circular economy model means that waste is a source of cost-effective, high-quality secondary materials, the introduction of which into economic activity reduces the cost of primary materials production, on the one hand, and waste disposal, on the other. This, in turn, entails the creation of new enterprises, and hence new jobs. However, this requires the business to develop new cost-effective waste management strategies with priority for reduction, recycling and efficient recovery of materials. Moreover, the state should encourage new investments in the sector to create the necessary infrastructure.

In general, the creation of this infrastructure is an extremely costly project and is not always economically feasible in terms of profitability, especially at the initial stage, when in fact it is not just about conquering the market, but about the need to break long-established business models based on the principle of minimizing costs, often due to the use of illegal dumps.

Analyzing the current state of recycling shows that there are no industrial complex facilities for processing and waste disposal in many constituent entities of the Russian Federation. No attention paid to this problem neitherwhile forming the regional environmental policy nor in the territorial schemes of municipal solid waste treatment. At the federal level, there is practically no interregional and intersectoral cooperation in the field of placement and construction of industrial facilities for the treatment, utilization and disposal of waste. The increase in the share of disposed waste is also constrained by an insufficiently functioning system of state and industrial control in the field of waste management, which is a key condition for the efficient organization of subsequent processes for recycling as well as insufficient market development and low demand for products manufactured using raw materials obtained from waste (Decree of the Government of the Russian Federation No. 84-p).

In this regard, it is obvious that the key role in introducing the model of circular economy should be played by the authorities, and not at the local, but at least, at the regional level. The authorities act as a driving force in the policy implementation of introducing a circular economy. They must formulate strategies, implement measures of economic incentives and / or administrative coercion, and mediate in the creation of new markets through the commercialization of reclaimed waste. The practice of stimulating the reuse of resources derived from waste through the public procurement system is already quite widespread. For example, in France, the Law on Energy Transition 2015 established that the minimum percentage of recycled paper in office supplies purchased by government departments should be 25% by 2017, and 40% by 2020 (Fratini, C., Susse, G., Jørgensen, M., 2019, p. 983).

At the same time, it is important that when developing and implementing a policy in the field of municipal solid waste management, the ultimate beneficiary must be a resident who should receive benefits from both the environmental situation being improved and the creation of new job places as well as the emergence of new services (for example, as part of joint consumption projects).

In this regard, it should be noted that neither the strategic documents mentioned above nor the Russian legislation do not pay attention to the role of the country's inhabitants themselves in introducing new approaches to waste management. Thus, the Integrated Strategy contains only a few references ‘of the population’ in the context of minimizing the harm caused to theenvironment. As one of the strategic principlesthe ‘participation of each citizen and the entire population in organizing activities to minimize the amount of municipal solid waste’ is provided for the main lines of action to solve problems in the field of municipal solid waste management including‘encouraging the population active participation in utilization of municipal solid waste’, as well as‘a resource-saving relationship development among young people when consuming goods, including material resources saving’ (Order of the Ministry of Natural Resources and Ecology of the Russian Federation No. 298).

At the same time, it is obvious that today there are no specific mechanisms for involving the population in solving this extremely urgent problem. As many researchers note, in order for municipal solid waste processing to become economically viable, it is extremely important to ensure the creation of a system for separating waste components into different fractions. To implement this, there are two approaches. The first is the construction of modern multifunctional processing complexes that provide sorting of incoming waste. Such sorting can be done either manually or using robotics and artificial intelligence. The first option is associated with huge labor costs;moreover, such work is dangerous. The second option is based on intelligent recycling technologies such as robotic machines that use artificial intelligence to recognize garbage components and can accurately identify specific waste components in a mixed heap to sort them with their arachnid hands. For example, a plastic packaging material and a water bottle may look the same when examined with an infrared camera, because they consist of the same material. Therefore, manual sorting in this case will be ineffective. In contrast, computer vision systems installed in a robotic sorter are effective for detecting exact differences between materials (O'Connor, 2017). However, this option requires significant investment, which today is far from being economically feasible (due to the lack of sufficient amount of waste to ensure 100% capacity utilization, since it is more profitable for operators of municipal solid waste to work according to established business models, i.e., taking waste to landfills; and also, due to the lack of a developed market for recyclables). Accordingly, without state support, the implementation of the first approach is extremely difficult.

The second approach is a method of dividing municipal solid waste into separate components. This approach is widely used in developed countries. Ideally, the public or employees of the waste generating facilities should share the waste. However, for this, the necessary conditions must be created in the form of special containers or recycling points. However, even more important, is the socially responsible attitude of the residents, consciously taking responsibility for the environmental safety of their hometown. For example, in Paris, local authorities carried out a targeted policy to form environmentally responsible behaviors, which was based on the idea of territorial awareness of belonging to one community and responsibility for its sustainable development.

Without changing the mentality of the population, it is also impossible to implement such elements of a circular economy as the economy of joint consumption or a deliberate reduction in consumption by extending the life cycle of goods.

The success of any waste management strategy is impossible without an effective system for monitoring their generation and movement, as well as accuracy in predicting their quantity. Significant problems in organizing industrial processing and waste disposal are associated with a lack of information, including waste’s composition, resource value, possibilities for producing goods and other information from it. At the same time, for the economic justification of any municipal solid waste processing projects, it is extremely important to determine the composition of waste so that each fraction can be expressed as a percentage if the gross weights of all fractions are known. Seeing this,it is necessary to separate all the waste into biodegradable and non-biodegradable fractions. The non-biodegradable fraction is usually divided into various subcategories, such as plastics, glass and construction waste. At the same time, two main issues are the toxic effects and reactivity of a particular waste fraction. Only having the specified information, as well as data on the volume of the market for recyclable materials, you can calculate the economic model of a business fora particular fractionprocessing, or for the integrated wasteprocessingforfurther reuse.

The territorial schemes developed in the constituent entities of the Russian Federation in the field of waste management made it possible in most cases to carry out a quantitative assessment of the existing volumes of waste, as well as to conduct an inventory of authorized and illegal disposal sites. However, the creation and future development of waste treatment, utilization and disposal complexes, minimizing incoming waste for disposal, the formation and economic feasibility of regional integrated waste management systems, financial and managerial models for the effective functioning of such systems are not reflected in these documents.

At the present time, Russia does not systematize data on the wastemovement in economic sectors by constituent entities of the Russian Federation, economic regions, and industrial clusters (Decree of the Government of the Russian Federation No. 84-p). At the same time, in the modern world, waste monitoring plays a vital role in the development of the urban economy. To improve monitoring and control efficiency, modern traceability technologies, such as radio frequency identification, ultrasonic sensors, geographic information systems and GSM / GPRS systems, have been developed and implemented. So, radio frequency identification is used in European countries for garbage collection, municipal solid waste and their disposal. In Germany, 20% of the collection is managed using radio frequency identification, which allows web-based monitoring of waste collection systems by administrators and citizens in real time, which improves the quality of management decisions and transparency for society (Subhasish, et al., 2019, p. 668). It seems that the introduction of such systems in Russia could have a positive impact on the sphere of municipal solid waste management. For example, the statutory requirement for the mandatory equipping of vehicles transporting waste with GPRS or GLONASS systems, as well as the mandatory requirement for labeling waste of hazard classes I - II, would exclude cases where municipal solid waste is simply dumped at the sidelines and hazardous waste falls into general landfills.

There is also no data on waste treatment, nordisposal enterprises, noron their territorial location. The Federal Law adopted in July 2019, which introduced amendments to the Federal Law 'Production and Consumption Wastes', aimed at improving the waste management system, is dedicated to solving these problems. In addition, a number of short stories are aimed at improving the mechanism of waste management of I - II hazard classes.

It should be noted that the implementation of urgent measures to organize a safe handling system in accordance with environmental, sanitary-hygienic and other requirements, norms, rules, standards is extremely relevant for waste of hazard classes I - II. Despite the existence of a wide range of effective methods and the best available technologies for wastedisposal of hazard classes I - II that are successfully used in world practice, their level of use at Russian industrial enterprises is extremely low due to high capital investments and operating costs, and also due to the lack of a market for the consumption of end products of waste management. Thus, mercury processing enterprises operate only in a number of regions of the country: in the Northwestern Federal District - 4 enterprises, in the Southern Federal District - 3 enterprises, in the Central and Volga Federal Districts - 2 enterprises each. The business in the collection and disposal of lead-containing waste of hazard class II has recently intensified with respect to the collection and disposal of car batteries due to the high content of lead scrap in them. Utilization of other wastes containing highly hazardous lead and its compounds does not develop due to economic inexpediency (Decree of the Government of the Russian Federation No. 84-p). Obviously, without a sound government policy stimulating the creation of appropriate processing enterprises, this problem cannot be solved. It should be noted that the implementation of urgent measures to organize a safe handling system in accordance with environmental, sanitary and hygienic and other requirements, norms, rules, standards and norms extremely relevant for waste of I - II hazard classes. Despite the existence of a wide enough range of effective methods and the best available technologies for the disposal and disposal of the main waste groups of hazard classes I - II that are successfully used in world practice, their level of use at Russian industrial enterprises is extremely low due to high capital investments and operating costs, and also due to the lack of a market for the consumption of end products of waste management. Thus, mercury-processing enterprises operate only in a number of regions of the country. They are the Northwestern Federal District where there are four enterprises, the Southern Federal District runs three enterprises, and the Central and Volga Federal Districts have enterprises each. The collection and disposal of lead-containing waste of hazard class II has recently intensified with respect to car

batteries due to the high content of lead in them. Utilization of other wastes containing highly hazardous lead and its compounds does not develop due to economic inexpediency (Decree of the Government of the Russian Federation No. 84-p). Obviously, without a well-thought-out state policy stimulating the creation of appropriate processing enterprises, a solution to this problem is impossible.

The 'circular economy' model as the basis for solving the waste management problem

Thus, it is important to understand that the introduction of circular economy approaches in regard to municipal solid waste is not only technological (i.e. associated with the development of effective technologies for processing waste into products suitable for further use, for example, in the energy sector, agriculture, etc.) or economic (i.e. related to the creation of effective business models) task. In many ways, this political and social task requires the active participation of authorities and the formation of fundamentally new behavioral patterns among residents. The circular model of municipal solid waste management economics is based on several key points.

Firstly, municipal solid waste is a valuable resource which, when properly processed, gains new economic value.

So, recycling, as well as regeneration (or return to the production cycle after appropriate preparation) and technologies aimed at the reuse of biodegradable materials that prevail in municipal solid waste cities (such as food, paper, textiles, etc.) are becoming more widespread, accounting for 2/3 of all waste. This might be composting or recovery.

Cheaper composting technologies have greater potential for use. Therefore, the experience of the Indian village of Mavlinnong, located in Meghalai, is of great interest. Residents of the village collect garbage in bamboo bins and compost it in a pit on a daily basis. The prepared compost is then used to grow flowers and vegetables in home gardens.

Composting can be defined as the microbiological decomposition of organic waste to produce humus-rich manure. Composting technologies can be classified as traditional pitting composting (i.e. aerobic / anaerobic), traditional heap composting (i.e. aerated), and composting using modern technologies (i.e. composting in vessels, composting in rolls, effective rapid composting based on microorganisms). Only biodegradable waste should be recycled this way.

However, the potential of municipal solid waste composting technology varies greatly depending on the different types of composting. The use of so-called aerated (or rotated) composting reduces greenhouse gas emissions by 47%; small-scale composting technologies, such as 'in-tank composting', reduce greenhouse gas emissions by about 4.5%, and vermicomposting in Germany reduced sulfur dioxide emissions by 60.8%. The main advantages of this system are economy, minimal maintenance, detoxification over time, highly nutritious end product and environmentally friendly agricultural use.

Thus, composting technologies are quite cost-effective. They significantly reduce greenhouse gas emissions, and provide organic manure for soil fertility and productivity.

Recuperation is the use of biodegradable waste in energy production. Global population growth and energy shortages are two closely related phenomena. According to the report of the International Energy Agency in 2016, global energy demand is growing rapidly, with a gradual decrease in oil and gas demand with an increase in the use of renewable energy sources, the most common and effective of which is bioenergy.

There are two types of waste into energy conversion, i.e. the thermochemical conversion and the biochemical conversion.

The first one is technologies such as combustion, gasification and pyrolysis.

The burning occurs with sufficient oxygen supply, which leads to thermal energy and ash residues. As a rule, 65-80% of thermal energy can be obtained from the burning of solid waste (Abramov, et al., 2018, p. 738). This method shows high-energy efficiency, however, it releases toxic substances and dioxides into the atmosphere, and valuable municipal solid waste components that could be reused, are destroyed.

Unlike combustion, pyrolysis is the thermal decomposition of organic materials at relatively high temperatures in a low oxygen environment. The process results in a mixture of highly flammable gases, pyrolysis oil and coal. As a result, air pollution is much lower than burning. Pyrolysis plants are widely used in developed countries. For example, an ordinary UK pyrolysis plant can convert 50-250 tons of municipal solid waste per day, producing about 64% of pyrolysis oil and 2% of coal. However, the operational cost of such a plant is 4680-14040 US dollars per day, which makes this technology too expensive (Subhasish, et al., 2019, p. 663).

Gasification is the process of thermal decomposition of waste in an environment with a limited amount of oxygen, resulting in a mixture of both combustible and non-combustible gases. Gasification gives gas as the main product and glassy slag (used in road construction) as a by-product. Currently, there are 686 gasification plants in the world with a total energy output of 83 MWh. (Subhasish, et al., 2019, p. 671). In addition, gasification is an effective way to utilize agricultural waste, and by-products of their processing can be used as safe organic fertilizer, helping to increase crop yields (Trubilin, et al., 2019). However, gasification requires a significant amount of coal; in addition, it results in toxic polyhalogenated organic compounds.

Biochemical conversion is a process based on enzymatic / microbiological denaturation of waste. Two main technologies of this kind are anaerobic digestion and fermentation. These conversion processes are mainly used for those solid wastes that contain a high putrefactive fraction and moisture content that contribute to microbiological activity. However, these methods are not as widespread at present as thermochemical methods.

Secondly, it is important to extend the life of goods, both by designing them with a view to longer terms of use, and by repair. Both options, however, require active state regulation, expressed, for example, in stimulating the opening of a wide network of repair centers for household appliances, as well as in creating financial instruments to stimulate the introduction of products with longer service life on the market.

Another way to extend the life cycle of household goods is, for example, to sell lower-priced used goods or products with expiring dates that would otherwise not be available to the poor.

For example, in France, a legislation was enacted in 2015 requiring large supermarkets not to throw away expired products, but donate them to charity or turn them into dog food or compost. For failure to fulfill this obligation, a fine could reach as high as 75 thousand euros (Fratini, Susse, Jørgensen, 2019, p. 983).

The third basic element of the circular economy is the economy of shared consumption. The scientific literature notes that sharing initiatives can have a positive impact on the environment, as they significantly reduce consumption (for example, Borawski, et al., 2019; Cherry and Pidgeon, 2018; Fratini, Susse, Jørgensen, 2019), which in itself is the fourth pillar of the circular economy. However, here again we need to emphasize how little attention is paid to the issues of the formation of socially and environmentally responsible behavior of the residents themselves in matters of municipal solid waste, while it is impossible to achieve the formation of these basic elements of a circular economy without revising the existing patterns of consumption. This requires a wide educational program. In addition, attention should be paid to the advertising industry, aimed at the formation of mass consumption models and encouraging buying more, even if the advertised goods are not necessary for everyday life.

Conclusion

Thus, the recycling problem is quite complex and requires the introduction of fundamentally new economic models based on the principles of 'circular economy'. This means the need to create an industry for the collection, sorting and processing of waste, which would make it possible to maximize their involvement in the economic turnover either as a secondary raw material or as a renewable energy source. However, the solution to this problem is possible only if the state implements active measures aimed at stimulating and supporting businesses, implementing public-private partnership projects, and changing existing waste collection and disposal schemes. However, the transition to the model of a 'circular economy' is impossible without involving the population and the formation of socially responsible behaviors aimed, firstly, at building separate waste collection schemes, and secondly, at reducing consumption by extending the life of goods and moving to the sharing consumption models.

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Determinants of The Z Generation Entering the Labour Market from The Perspective of Vocational Education Graduates

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Abstract

The article presents an analysis of the conditions of professional initiation characteristic of the youngest generation against the background of the results of empirical research of professional expectations of a representative group of students from the last grades of technical and business schools in one of the poviats of the Pomeranian voivodeship. It is a population that is characterized by high declarative mobility, a low degree of further improvement, but strives to emphasize the hallmarks of entrepreneurship in their professional attitudes, and above all they want to take a job that is supposed to meet – often unrealistic expectations associated with moving their interests to the work environment, their projection of attitudes raised from hobbies. The results analysed in the text show the basic conditions that employers will have to prepare for in the coming years, wanting to develop this youth cluster entering the labour market, performing simple but specialized work, and sometimes, as research by the Labour Market Barometer shows – quite niche. On this basis, the implications for current challenges of human capital management are presented. The article is based on the analysis of expectations related to entering the labour market of this group of young people. This provides the basis for formulating the main challenges in the next few years that the changes in the personnel function are to face in relation to this not fully appreciated professional group, which is nonetheless necessary for the smooth functioning of many organizations – performing simple work, but operationally necessary.

Keywords: Human Resources Management, Labour Market, Generation Z, Vocational Education,

Introduction

Young people finishing their education in technical and business schools in 2020 are a specific socio-professional group that will enter the labour market in the coming years in the field of executive, implementation, professional, work and auxiliary work. It is a group that constitutes the fundamental foundation of the current base for the development of the Polish labour market and economy. Young people educated in technical and professional professions today constitute a very scarce range of professions, which supply shortages have been supplemented by immigration for many years, e.g. from Ukraine (UDSC, 2020). Many of the professions that are indicated in the current Labour Market Barometer research, which entrepreneurs have been searching for many years – are professions shaped on the basis of vocational school curriculum. Therefore, a very important confession of modern HRM practice is recognizing the conditions for the professional initiation of this specific professional group. The generation of the youngest employees, which will determine the development of our native economy, has a key responsibility for the direction of entrepreneurship development, organization growth and social well-being of the country (Parment, 2011). In order for employers to prepare for this challenge, they should be prepared for employment and management of this specific human capital. It should be emphasized that many authors point out that this is not the generation that can be entirely and clearly defined (e.g. Kmiotek 2012; Aniszewska 2015; Żarczyńska-Dobiesz, Chomątowska, 2014 ; Smolbik-Jęczmień, 2017; Lipka, Waszczak, 2017). They can be jointly defined as the *generation of a new economy* shaped by turbulent and dynamic changes of the environment, which were not present in our civilization before (Kawka, 2014, Rogozińska-Pawełczyk 2014; Wiktorowicz et al., 2016). The literature on the basis of research considers the weakness of this generation, among others, the so-called soft competences (e.g. verbal communication, empathy, intergenerational cooperation), or strong

resistance to adapt to the organizational culture and acceptance of the hierarchy in the organization (Gursoy, Maier, Chi 2008). It is definitely a generation that exhibits hallmarks of attitudes and behaviours in the work process that require redefining human resource management processes. The current methods of team management, shaping involvement or managing internal communication – they face a significant problem of the need to change them. Therefore, since the key recipient of the personnel function, the client of these interactions – is noticeably changing, one should ask the question whether current solutions in the area of *HRM* are still effective, tailored and adequate to the requirements, possibilities and expectations of this generation, e.g. by implementing the *Job Crafting* approach (Wojtczuk-Turek, 2017). Such a course of reflection gives a new perspective to strategic planning for the development of human capital. The first step to finding answers to such questions is to try to recognize the expectations and perspectives of the self-generation of the new economy in the field of vocational training.

Therefore, this article presents the results of empirical research on the expectations and professional preferences of the Z generation among graduates of technical and business schools, which in the coming years will enter especially the local labour market, most often in the family, small and medium-sized enterprises (Wiśniewski, 2013). Such knowledge about meeting new generations is key to building tailored HRM methods, and there are many myths and prejudices that are unconfirmed by empirical research and create stereotypes that are unnecessarily demotivating and limit employment opportunities for this generation (White, 2011).

Vocational and education training (VET) of the Z generation

Vocational Education and Training (VET) has been the focus of change for some last years in most of developed countries. Many nations have developed VET systems with long-term strategies that benefit their economies, including co-ordinating economic, industrial and VET policies and achieving consensus among major stakeholders in the system (Finlay, Niven, Young , 2005; Oliveira, Rumble 2013). As many international research show, VET should be about enlarging peoples' opportunities to live a flourishing life, rather than simply being about narrow employability and productivity. It argues that human development approaches, while acknowledging the importance of work in its broadest sense, offer a better way of bringing together VET and development than the current human capital-inspired orthodoxy (Cruel, Shneider, Leile 2012; Powell, McGrath, 2019). A lot of studies in this area shown in plenty countries clearly indicate that behaviours and attitudes of this "Z" generation in terms of VET and the impact on labour market are very similar regardless the origin country of such young generation. (e.g. Pilz, Berger, Canning, 2012; Flude, Sieminski, 2013; Finlay, Niven S.Young S, 2005)

This is the first generation that seems to be quite homogenous in their attitudes regardless of the level of education and environmental origin (Kawka, 2019, Walsh, 2016;). Therefore, effective professional education of this generation can play an important role in creating better job market prospects for young people. The key success factors are effective practical classes at the workplace and the role of social partners in defining and organizing curricula. Since vocational training can also provide opportunities for people with low qualifications, students should be provided with basic and comprehensive skills enabling continuous learning and adaptation to changing technological needs and the labour market. It is necessary to ensure an appropriate level of education combined with internships in the workplace.

It is worth emphasizing that the moment when young people leave school and enter the labour market in today's turbulent and virtual-network conditions is not simple and clear to define. It is getting harder and harder to determine when exactly a modern teenager finishes his education and takes up his first stable job, and thus begins to experience adulthood in regular employment. The sequential order of experiences related to education and work – i.e. graduating from school and then starting work – is no longer ordered only according to this logic (Tomaszowska-Lipiec, 2018). The more so that the *Z generation* through virtualization and networking of their behaviour can enter into professional relations in a manner parallel to the period of education. The transfer of the youngest generation of employees begins to rely on a series of different, intersecting activities in the domains of "education" and "the world of work", which overlap with the youth years and early adulthood. As researchers proof, such trend related to VET seems to be very likely in today's, all over the world (Pliz, 2012; Cantor

2017). It seems that due to the specificity of vocational education, which requires strong integration with practice from the beginning of the education process (, in order to optimally ensure the right conditions for the transition from education to professional life, the following steps should be ensured (Bańka 2007, Lettmayr, Nehls 2012):

- good organization of school education and vocational training paths,
- combining school and work;
- creating secure relationships between the school and labour market entities.

Thus, it can be argued that graduates of vocational schools with a specificity of their generation, which is focused on experiencing their sensations in a world outside the real world – are more predisposed and prepared to enter the real labour market than high school graduates.

However, to ensure the potentially high efficiency of technical school graduates entering the labour market, it is worth taking measures in the field of vocational education oriented towards (Gerlach 2018, Bunning 2006):

• preparation for life and work in the conditions of competitions on the domestic market and international competition;
• developing basic skills useful both in professional work in various positions and in non-professional life;
• preparation for flexible forms of employment and work;
• diversifying educational offers and thus creating choices and enabling the use of various sources of knowledge;
• giving a "second chance" to all those who did not obtain education in their youth and thus aiming at limiting the phenomenon of exclusion;
• retraining people who are unemployed and threatened with unemployment;
Summing up this part of the discussion, it is worth saying that as part of the vocational education model at the level of simple and executive competences, we cannot ignore the assumptions of the human capital model (Listwan, 2010). According to R. Gerlach, especially these candidates for employees should be prepared to being a subjective, open to people and relations partner, and not a "thoughtless workforce". In addition to knowledge and skills, traits such as responsibility, loyalty or identification with work and company are important. They will be forced to assimilate their personal development ability, learn to preserve energy and mental performance throughout their employment (Gerlach, op. cit.).

Empirical Study in a context polish determinants - results of research on the professional expectations of the Z generation in the vocational education profile in Poland

There are a lot surveys related to professional expectations of the young people in the vocational education profile and impact for labour market across Europe (e.g. Cruel, Shneider, Leile 2012, Lettmayr, Nehls 2012, Bunning 2006). The main conclusions we can draw from them is that a some kind of gap various expectations (employee and candidates) have been occurring since last decade. Based on the sources, cited in this part of text, it can be taken into account the assumption, about the global trend and then homogenize these changes. The origin of the country does not differentiate this phenomenon much, especially in the EU. Generation Z has no desire and does not fully understand the work ethos and the need to increase their effort to quickly and professionally enter the labour market in the field of vocational and technical education. This can be manifested, e.g. by the high percentage of these young people among the NEET group (OECD, 2016).

In this context, I would like to propose a sample of the research that I carried out regarding the expectations of Polish youth of the Z generation entering the labour market in terms of vocational and technical education.

The research was conducted in 2019 on the entire population of students of the last grades of technical secondary schools and business schools of the first degree in all schools in one of the poviats of the Pomeranian voivodeship. The examined sample amounted to 310 students, of which 63% were students of the last grade of technical secondary schools, and 37% were students finishing their education at the level of first-degree business school (BSI). The main purpose of the research was to diagnose the awareness and possibilities of own professional and educational plans of the generation of technical education graduates. Therefore, the preferences of directions and perception of employment opportunities were assessed, especially in the realities of the local labour market by the abovementioned youth group, which belongs to the so-called Generation Z. The research ends with an analysis of awareness and perception by this group of young people regarding the professional success in the modern labour market.

Educational preferences after graduation

Slightly more than half of all surveyed students (52%) want to continue their education after leaving school and they are the vast majority of students in technical schools. Only (23%) of surveyed trade class students consider continuing their education. The diagnosis indicates that (22%) of all surveyed students do not intend to develop further in the direction of education growth. However, less than (30%) of the surveyed students were undecided at the time of the survey, and these were mainly technical school graduates. This indicates a fairly low level of motivation for further development through the formal education path, as well as a relatively significant percentage of students who have no further idea of their role in the labour market.

All data are based on sources from the own descripted here study.

The most important point of the analysis in this regard is the fact that in their plans after school only (15%) of the surveyed students strongly expressed their willingness to take up work immediately after completing education in the poviat. They are mostly students from business schools. In addition, a larger group – (20%) of the surveyed graduates declared motivation to take up work, but already in the Tri-City. In turn, nearly (25%) of the respondents plan economic or educational migration abroad. In addition, studies have shown that every tenth student in the last grade of technical school or BSI simply plans to do nothing, rest, and (6%) have no knowledge or plans for their future at all.

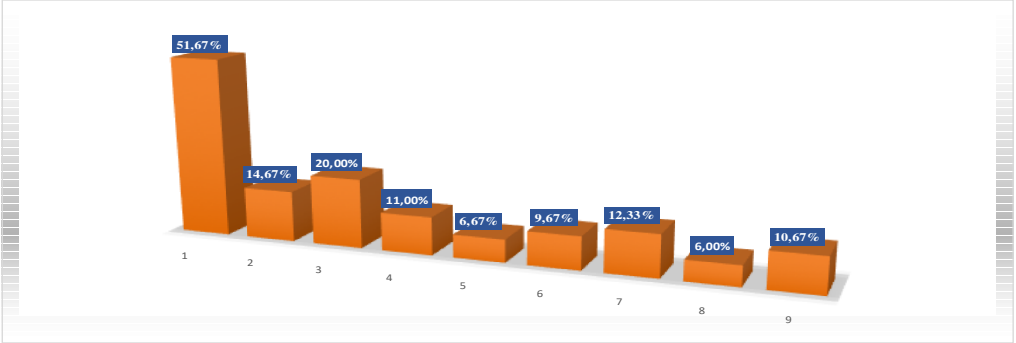

Fig. 1: What are your educational and professional plans next year after finishing your current school? (classes of technical and business schools)

Answers:

1. Continue the education
2. Take up work in the area
3. Take up work in the Tri-City
4. Change your place of residence
5. Travel
6. Go abroad to work there
7. Go abroad to study there

8. I do not have specific plans as for today
9. Rest and do nothing

Summing up this part of research, it should be pointed out that this is a group quite polarizes as to their educational preferences. In the half of the young population of vocational school graduates, the desire to continue their education prevails (and these are definitely mainly technical schools). On the other hand, the other half of the surveyed students are divided into those who plan to either take up a job, but unfortunately a very small share relates to declarations of taking up a job in the poviat, or it is a group of young people who want to travel or do nothing at all. The group of surveyed technical school students who expressed their desire to continue their education at the university level, in a very small percentage as at the end of the school year – (24%) knew which university they want to go to.

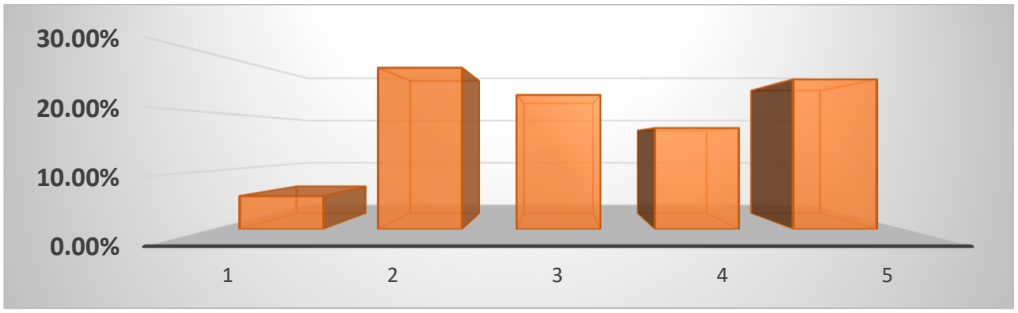

Fig. 2: Do you plan to work in the poviat in the future
Answers: 1. definitely yes **2. rather yes** 3. rather no 4. definitely no **5. hard to say**

In turn, in the case of the most important criteria for choosing further education, about which this group was asked, the following should be included in the first place: further deepening of their specialization, i.e. selection in line with the professional preference offered by the given school – almost half of the respondents pointed to this factor. In addition, it was also noted that it is the percentage of approx. (20%) of the surveyed students that paying attention to the prestige and opinions of the school, as well as the proximity to the place of residence, are important in choosing a university.

One of the potential, but quite likely consequences of this approach to further development, which is illustrated by the low percentage of BSI students who want to continue their education (every fifth student declares their willingness to continue learning) – is the problem with the motivation for further institutional development of this professional group. The above analysis may lead to a certain problem, e.g. the potential difficulties of recruitment to the second-degree Business schools (BSII) from September 1, 2020, from the BSI school graduates group. A small but noticeable part of the surveyed (over 20%) students may be in line with the very natural tendency for the studied generation Z, i.e. entering the so-called disturbing sub-generation called NEET (*Not in Employment, Education, and Training*), i.e. a group that does not want to do anything in life, has no social and professional goals and ambitions. It is a group whose attitudes are quite dangerous for the development of entrepreneurship and activity on the local labour market.

Labour market preferences after graduation

In the surveyed group of graduates, approx. (33%) of students declared in the future that they wanted to work on the local labour market, of which only (5%) was definitely convinced of this opinion. On this basis it should be noted that over (40%) accepts employment outside the poviat region in their professional development plan. They are mainly technical graduates who plan to continue their schooling in higher education. Based on these answers, it should be pointed out that about half of the surveyed students (49%) – say, however, that there are attractive and interesting employers in the region and its surroundings, and over (33%) have no opinion on this subject.

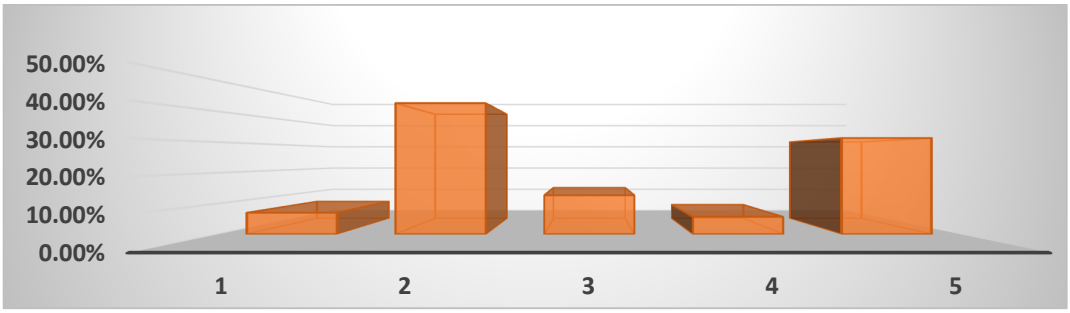

Fig. 3: In your opinion, are there any attractive employers in your area who offer the chance of taking up an interesting job? (T and B)

Answers: 1. definitely yes **2 rather yes** 3 rather no 4 definitely no 5 hard to say

Therefore, it can be concluded that the motive binding this generation's declarations to work on the local labour market is not the real offer resulting from the benefits offered by local employers.

This is the generation that is looking for employment among such employers who realize their motivational preferences through friendly content of work, by matching their interests and hobbies. As other studies of the Z generation on the labour market show, this is a quite unrealistic postulate for today.

In addition, the high level of declared mobility and willingness to leave the home region may also affect the distribution of results that only every third technical school graduate will want to stay on the local labour market.

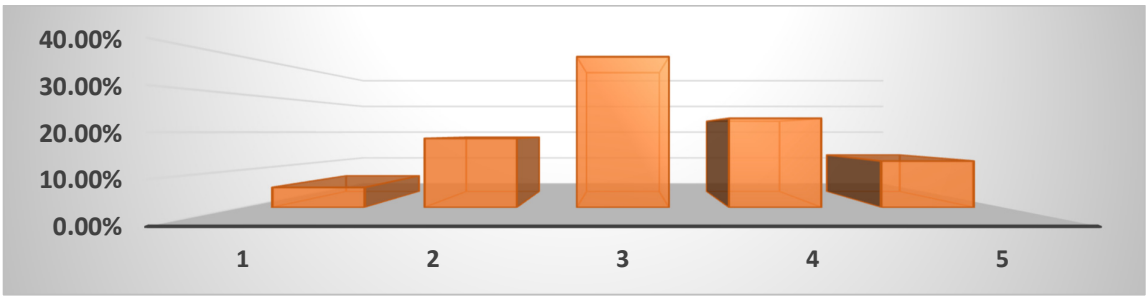

Fig. 4: Would leaving the place of residence permanently to take up work be a problem for you? (T and B)

Answers: 1. definitely yes 2 rather yes 3 **rather no** 4 definitely no 5 hard to say

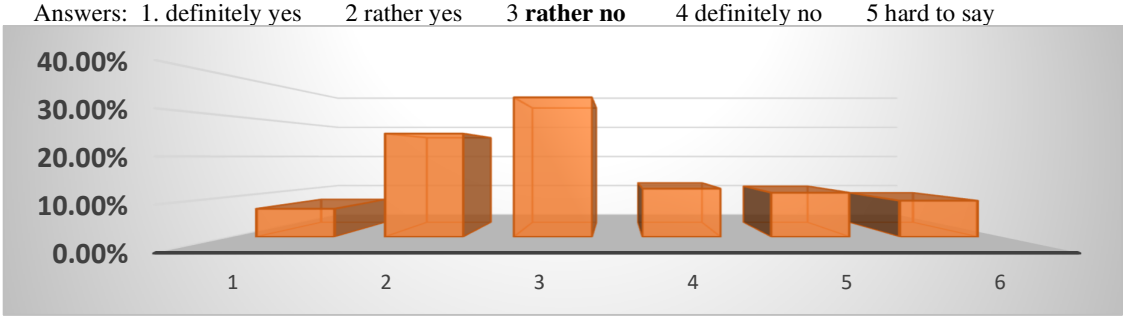

Fig. 5: In your opinion, how does education at school prepare you to take up work? (T and B)

Answers: 1. very good 2. good 3. **average** 4. bad 5.very bad 6. I have no opinion

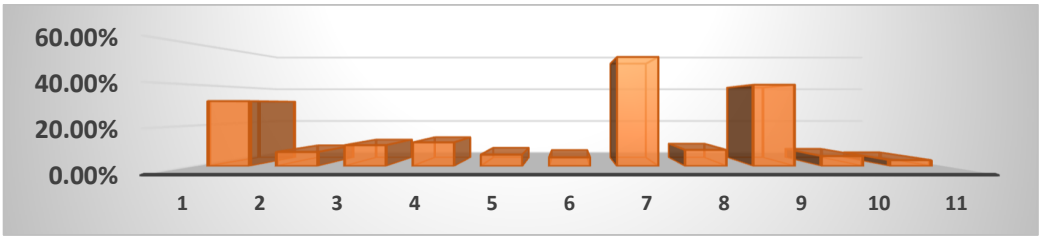

Fig. 6: When making a decision about your professional future, will you be guided by (T and B)
Answers:

1. **work in the profession learned at school**
2. advice from colleagues
3. advice from parents
4. ease of education in this profession
5. fashion for a given profession
6. examples from the family home
7. **your interests**
8. Information gained on the Internet (e.g. YouTube, Facebook, etc.)
9. wages
10. I don't know what I should be guided by

The conclusion from this part of the research may suggest that despite the indirect positive assessment of the possibility of undertaking interesting work in the region created by employers, a significant part of the surveyed students is not interested at this stage of development in work on the local labour market. In addition, the above assumptions are justified by the analysis of the results, which show that about (63%) of the surveyed students declare that they could easily decide to quickly change their place of residence from their current one, right after finishing their education in the poviat. This may additionally affect as a threat factor in the gradual outflow from the local labour market educated in technical and vocational matters in the youth region. On the other hand, it should also be stated that over (25%) of the graduates surveyed finishing their education at the level of secondary school, do not yet have any opinion on their future and role in the labour market. It is also a factor that could potentially have a negative impact in the future on the conscious taking up of jobs by the examined group of students, e.g. adopting the attitude of the already mentioned NEET generation. Over (30%) of the surveyed students claim that the previous education in the specialties selected by them is adequate for taking up a job. In contrast, 1/3 of respondents claim that this preparation is at an average level. What is worrying is the fact that almost ¼ of graduates declare that their school prepares them badly or very badly for entering the labour market. The surveyed students are divided into fairly three equal groups: those who are convinced that the educational offer in poviat schools is helpful in looking for a job, those who have an average evaluation in this area, and those who assess the school's orientation to start their professional career very negatively.

Awareness of labour market mechanisms

As for the type of preferences and interests of the surveyed students in the context of their future work, it should be noted that there are no significantly different fields in which the graduates would like to work. The obtained results of professional preferences basically coincide in most of the surveyed students with belonging to the class profile with specializations that the given classes offer to their students. Students could choose up to 4 indications, so groups of more numerous preferences naturally appeared, but as indicated, they are not strongly dominant.

It can be said that there are no major deviations in this respect when it comes to the "mismatch" of the class profile (whether it is technical school or business school) in terms of assessing the preferences of the course. The learned specialization to a large extent gives professional preference, which is due to the fact that the largest group of surveyed students indicates that they want to work in the learned profession, and this is 1/3 of the studied youth population.

However, it is possible to indicate the most popular directions obtained in this part of the study and the most frequently mentioned preferences for taking a job in a given direction include:

For technical schools:

- ***performing work as a technician in a learned profession (30%)***
- ***starting own business (24%)***
- ***working in commerce (24%)***

However, a similar analysis for the results of students from business schools showed the following distribution of the most common job preferences:

work in industry or business in a learned profession (39%)
work in gastronomy (25%)
work in transport and logistics (21%)
starting your own business (19%)

In the case of answers that received the lowest indication of preferences of interest to take up work after finishing school, in the case of technical schools the following were rated the lowest: work in consultancy and agriculture, while in the case of BSI students – work in budget administration and state institutions.

Table 1: What kind of preferences and interests do you have in the context of future work - Technical schools

1. **work in industry as a technician in a learned profession – 30%**
2. **own business - 24%**
3. **work in commerce – 24%**
4. work in education -23%
5. work in media – 20%
6. work in gastronomy – 19%
7. work in the IT sector -18%
8. work in direct services for the population – 14%
9. work in uniformed services -16%
10. social work -15%
11. work in the tourism sector – 14%
12. work in transport and logistics -15%
13. work in budget administration and state institutions -14%
14. work in the maritime sector – 13%
15. work in agriculture -11%

Table 2: What kind of preferences and interests do you have in the context of your future job - Business schools

1. **work in industry/business in a learned profession – 39%**
2. **work in gastronomy – 25%**
3. **work in transport and logistics – 21%**
4. work in direct services for the population – 19%
5. own business – 19%
6. work in the IT sector – 17%
7. work in commerce – 15%
8. work in the tourist sector – 12%
9. work in the maritime sector – 10%
10. work in agriculture – 10%
11. work in the uniformed services – 9%
12. social work – 8%
13. work in budget administration and state institutions – 7%

Summing up this part of the research, it can be stated that the basic direction of students' preferences is usually to work in a learned direction, most often in trade, gastronomy or logistics, or alternatively – setting up their own business (very family and socially well-established in the region).

An important part of research assessing the preparation for the challenges of the labour market of young students at the technical and industry education level was to diagnose their awareness and subjective perspective of their perception of the local labour market.

By asking the question to the above-mentioned group of students about the jobs most needed in their region that should generate jobs, the following answers were obtained.

In the case of the perception of the labour market by technical school students, the following professions have been identified as key to the labour market:

- **electrician / energy technician (24%)**
- **port and terminal operation technician (23%)**
- **IT / ICT technician (20%)**
- **waiter technician (18%)**

These are clearly professions that are and can be developed by a very flexible and wide range of enterprises and companies in various branches of industry and business.

Occupations which, in their perception, have no future on the local labour market include:

lifting equipment technician (1%) – there may be "cannibalization" of this speciality in favour of the competence and content of work related to the port operation technician
tourist service technician (2%) – and this is quite a surprising answer due to the region's very strong potential and tourism possibilities.
- economist technician (3.5%) – this is probably an unattractive form of the title of profession, where the economist is associated more with higher education, or is usually assigned to secondary school education.

In the case of similar studies for graduates of industry schools, the following results were obtained for the most-developing occupations in the region in their perception of the labour market:

- **seller / trader (33%),**
- **electrician (29%),**
- **chef (21%),**
- **electro-mechanic (18%)**

These are indications which, apart from the dominant role of the seller, which logically results from the desire to take up work in trade, as such, which in their perception does not set too high competence thresholds, to a large extent these are results that generally coincide with the perception of labour market development by graduates of technical classes.

Occupations which, in the perception of students of the last BSI grade, do not give the opportunity to generate jobs include: **locksmith (4%), mechatronic fitter (4%), varnish worker (4%), machine and equipment fitter (7%).**

Such results may be a consequence of the fact that these are professions that closely match the organizational structures of industrial enterprises, which are not represented in large numbers in the poviat. The above results should be interpreted quite cautiously from the perspective of the potential lack of in-depth knowledge of the studied group of young people about the real needs of the labour market, but they are quite important premises indicating indirect preferences and interest of the examined group of young people in employment opportunities on the labour market.

At the end of the research, internal factors, elements of features and competences were diagnosed, which in the opinion of the young generation can give them an advantage in the labour market. On a 5-point scale (*1 – does not matter, 5 – is of key importance)*, the surveyed graduates of technical and business classes together rated the following determinants of their success on the labour market the highest:

Table 3: Assessment of the importance of professional success factors for graduates of technical and business schools

Factors of professional success	Average indications obtained
Thoroughness, diligence, reliability	**4.02**
Knowledge of foreign languages	**3.95**
Professional experience	**3.94**
Personal contacts and good friendships	**3.72**
Acquiring specialized knowledge	**3.71**
Mental resilience and feistiness	**3.62**
Education	**3.51**
Place of residence	**2.67**
Finishing a prestigious school	**2.66**
Searching for a job outside the place of residence	**2.62**
Family traditions in a given profession	**1.89**

Source: own study

At the end of the research, internal factors, elements of features and competences were diagnosed, which in the opinion of the young generation can give them an advantage in the labour market. On a 5-point scale (*1 – does not matter, 5 – is of key importance)*, the surveyed graduates of technical and business classes assessed the following determinants of their success on the labour market the highest: An interesting interpretation of the above results is the fact that, apart from knowledge of foreign languages, which is rather unlikely for BSI students, these are rather competences that describe the normative image of a young graduate of technical school to a small extent. It follows that at this stage of development, they do not yet have well-established factors enabling them to succeed at work. All the more so because they decided that, while knowledge about specialization has an average impact (3.71 p.), they themselves also declare for the most part that the school is unlikely to prepare them for the labour market. The further consistent indication of the lack of influence of family traditions in a given profession as a factor giving the opportunity to succeed at work is interesting and puzzling (1.89 p.).

Conclusions

The above research results are in line with the current characteristic of the ***Z generation***. Generations that in their emotions and attitudes are based on a very façade social communication, based on superficial patterns taken from the Internet, and largely negatively assessing the further need for institutional education, on average appreciate the usefulness of education, and they do not see the role and impact of family professional traditions on their decisions as the basic pattern of professional development. As the analysis showed, no other features of the studied population differentiated the results obtained - especially in terms of gender, origin or level of school grades. Age and belonging to the category of generation Z as the whole population is the only determinant affecting the attitudes, behaviours and expectations of this group towards the labour market. In addition, the surveyed student population declares motivation to independently run their own business in the future. However, numerous studies in the area of the Z generation characteristics indicate that this is a very dependent and reluctant generation to overcome difficulties, which may affect the low quality of running their own business. This indicates a certain lack of professional and social awareness on what running your own business may actually involve. In the general feeling of the surveyed generation, work is to be primarily pleasant, it is to result from their interests, in the work process young people want to feel satisfaction with what they do, and it does not necessarily have to work consistent with the formal education they have obtained in the course of their education. They are rather negative towards the further stages of professional development through formal education. In addition, earnings are not a fundamental value of taking up work, and they also declare that they are very mobile and can take up work away from their place of residence. It can be argued that this is a professional group that will be

difficult to motivate to increased commitment to work that will not be compatible with their profile of interest.

Based on the conclusions described in this article, potential further steps and research directions can be briefly outlined. It would be worth thinking about deepening the scope of the Polish Qualification Framework being introduced as a tool ordering the effective adjustment of the expectations of the Z generation to the current practices of the personal function (HRM) in the field of occupational positions and simple workers' classes.

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Identification of The Level of Professional Satisfaction of The Hotel Industry Employees on The Example of Hotels in The Tri-City

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Abstract

The main aim of the article is to present the results of surveys measuring the sense of professional satisfaction and analysis of the attributes that create it among hotel industry employees on the example of a deliberately selected sample of hotels in the Tri-City. Organizing work in specific conditions of hotel services requires appropriate quality of work, commitment and motivation to act on the part of employees in this industry. That is why it seems so important to ensure the efficiency of the business model of hotel services, based on employee behaviour, which is to be stimulated by motivational tools that trigger a high level of professional satisfaction. Therefore, the article focuses on understanding the mechanisms, conditions and factors that can shape satisfaction with the work performed in this industry. The research was carried out using the proprietary P.A.S.Z. methodology. The results clearly show that a high level of satisfaction is dependent on the high quality of human resource management practices in the surveyed organizations and is not necessarily dependent only on material motivating factors. The most critical attributes limiting the satisfaction of hotel industry employees include the possibility of promotion and professional development in the structures of their organizations. The factors that increase a high level of satisfaction include the importance of tasks performed by an employee, as well as the level of individual responsibility for results and the way of working. The average level of satisfaction in the Tri-City hotels surveyed was over [+60 p.], which can be interpreted as a high score, even when compared to other industries and professions examined by the author of this paper.

Keywords: Job Satisfaction, Motivation, Human Resources Management, Hotel Industry,

Introduction

Hotel services are one of the key and most dynamizing parts of the development of the tourist industry of a given country (Sala, 2019, Turkowski, 2010). Tourism is one of the most important economic sectors in the EU. It creates jobs, develops exports and generates many activities in other industries and sectors (transport, entertainment, food industry). According to calculations by the *World Travel & Tourism Council* (Turner, 2019) last year, its total turnover on the European scale amounted to USD 2.2 trillion, which is about 10% of the GDP of the countries of the community. The coastal region of the Tri-City due to its tourist and business values (Gdynia, Gdańsk, Sopot) is one of the more competitive regions in Poland in the scope of hotel services. Organizing work in specific conditions of hotel services requires appropriate quality of work, commitment and motivation to act on the part of employees in this industry. Building friendly relationships with clients who purchase specific hotel services creates a strong bond between the hotel brand, the standard and quality of services in a given hotel. That is why it seems so important to ensure the effectiveness of the business model of hotel services, based on employee behaviour such as high motivation or a positive level of professional satisfaction. Therefore, this article focuses on learning the determinants that can affect the satisfaction of the work performed in this industry. It can be said that today, a modern employee, especially in the *"b2b"* industry, like hotel services, spends almost half his time in work processes. We are also witnessing the implementation of new concepts for organizing human work, which undoubtedly leads to blurring the boundaries between work and personal life. It is an industry that offers its clients 24-hour availability of its services, supported by online tools. An important issue in this regard is configuring the human resource management model in the sphere of services, where there may be a

problem with the *Work Life Balance* concept. Due to the above specificity, the provision of services is becoming a very important challenge, which can be a factor that permanently reduces the sense of job satisfaction (Kawka, 2014).

The essence of a sense of professional satisfaction

These relationships cause that job satisfaction has become an extremely important topic, which is a very vital component of quality of life, but also affects the efficiency and optimization of human resource management processes (Spector, 1997; Stride, Wall, Catley, 2007; Juchnowicz, 2014). Therefore, in the field of management sciences, many researchers have been trying for many decades to interpret the concept of satisfaction and to distinguish factors that shape the sense of feeling this positive emotion accompanying the work process (e.g. Furåker, Håkansson, Karlsson, 2016;Bentley, Coates, Dobson, Goedegebuure, Meek, 2013; Osbourne, 2015; Trower, 2012). To quote the basic canon, but still relevant in this field of world management literature, professional satisfaction can be defined as:

- Pleasant or positive emotional state resulting from the evaluation of one's work experiences (Locke, 1976)
- A positive, emotional, affective reaction to the work performed, which results from comparing the actual working conditions with the conditions desired by the employee (Wanous, Lawler, 1972)
- Implementation of one's own values in a work environment accompanied by a pleasant emotional state (Locke, Henne, 1986)
- Feeling about work performed as a difference between the values achieved and the values that the employee expects (Porter, Lawler, Hackman, 1975)

Analysing the above definitions, it can be assumed that professional satisfaction is related to the difference between the needs and expectations of the employee and the actual level of their satisfaction on the part of the organization through the material and non-material motivation system. Thus, assuming the above postulation, and taking into account the assumptions, e.g. of F. Herzberg's two-factor model in the context of features of the working environment in the hotel industry (Lundberg, Gudmundson, Andersson, 2009), we can distinguish three states of feeling satisfaction in the work process:

a) lack of professional satisfaction, - the employee's expectations regarding his emotions and needs related to the work environment are not met to a large extent by the possibilities of the incentives offered in the employer's human resources management system – it can be conventionally assumed that they are negative in any measurement scale, definitely less than zero,
b) neutral (zero) satisfaction, - there is a minimal difference between the employee's expectations regarding his emotions and needs related to the work environment, and the incentives offered in the employer's human resources management system, - it can be assumed that in any measurement scale these are values oscillating around zero,
c) professional satisfaction, - there is commitment, activity and loyalty, as a result of a significant fulfilment of the employee's expectations regarding his emotions and needs related to the work environment through the offer of incentives in the employer's human resources management system – it can be assumed that in any measurement scale they are positive values, definitely greater than zero.

Considering the above concept, it can be stated that the variables building the sense of satisfaction concern many aspects related to the organization and model of human capital management, as well as individual characteristics of the employee. This classification can be made by grouping satisfaction factors into two basic groups: objective and subjective attributes of creating a sense of satisfaction (Borooah, 2009). The first category concerns determinants that are derived from the work environment and relate to both the **attributes of the work itself**: fair pay, not too much pressure, safety, prestige of work, convenient working hours, opportunities for initiative, rest opportunities, opportunity for achievements and promotion, responsible and interesting work that uses abilities and the possibilities of the employee work climate, being in a group and social contacts, **characteristics of the work**

performed: perceived degree of job security, income received, and perception by the employee of the type of work he does or the level and quality of relationships with other employees. The second group of factors is a kind of subjective catalyst for individual feelings and concerns such issues as **socio-demographic conditions**: gender, age, marital status, stage of professional development, seniority, family and material situation, origin or level of education. On the basis of the above considerations, an original, proprietary research tool was built in the form of a questionnaire under the working name P.A.S.Z (acronym of the words Measurement of Attributes of Professional Satisfaction)

A tool for measuring the sense of satisfaction attributes P.A.S.Z.

One of the most important assumptions of the proposed model is to organize the factors of professional satisfaction into **objective and subjective attributes.** A detailed description of the following methodology is described in, e.g., this position of the authors (Borowska-Pietrzak, 2013). The criterion for the division into the above-mentioned factors results from the assumption that the variables shaping the individual sense of satisfaction are divided into determinants objectively creating, regardless of man, his level of **external underlying, potential satisfaction** (e.g. offer of the remuneration system), and those that **depending on his specific individual characteristics differentiate the perception of this aspect** (e.g. social and income status of a person). Objective factors are, therefore, those components that are designed by the organization for the entire employed population by creating appropriate HRM practices. Therefore, it can be concluded that the organization is directly responsible for shaping the factors determining the sense of professional satisfaction. On the other hand, subjective determinants of employee satisfaction are such employee properties and attributes that are individualized specific "catalysts" for perceiving and assessing the usefulness and purposefulness of tools used to motivate employees. In other words, subjective attributes are variables that differentiate the primary intensity of the impact of objective attributes on employee satisfaction. **Subjective factors therefore differentiate for each individual person employed in the organization the strength of the impact of unified objective factors, which in turn constitute the foundation for the level of satisfaction for the entire organization.**

Based on this assumption, a proprietary measurement tool was designed in the form of a survey questionnaire diagnosing both the perception of subjective and objective factors. Hence, the P.A.S.Z. questionnaire consists of two parts, A and B, in which you assess your perception of satisfaction by valuing the level of subjective and objective attributes, respectively. Objective attributes have been recognized as those factors on which the organization has a direct impact and shapes its motivation system offers. On the other hand, the measurement of subjective attributes was designed in such a way that objective factors potentially offered by the employer are assessed on a subjective scale of importance in the hierarchy of values regardless of the place of employment. In the model presented below, the level of sense of professional satisfaction results from the interaction of objective and subjective attributes.

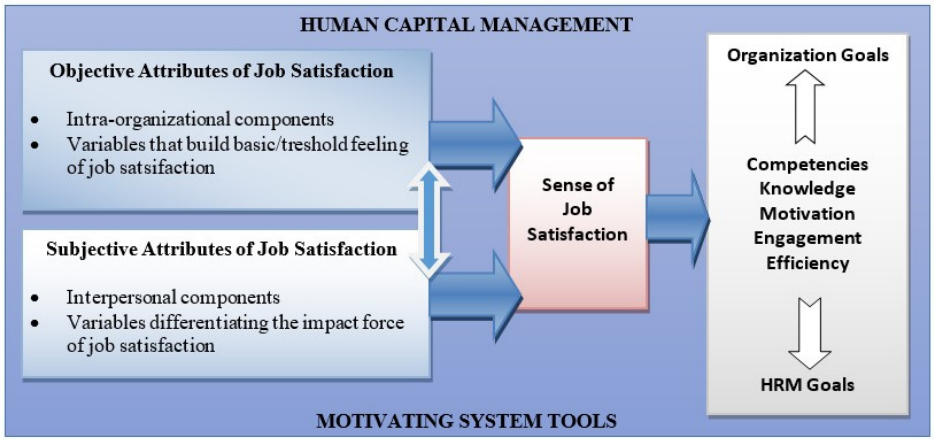

Fig.1: Model of shaping the sense of job satisfaction

Source: own study

The questionnaire is based on a two-step assessment of the same 23 factors potentially affecting the sense of job satisfaction. The indicated answers should take into account the individual, subjective assessment in two areas:

- **Part A)** The significance of a given factor of professional satisfaction in the life of an employee is assessed, which corresponds to the overall importance of a given factor at a given stage of his/her personal life. In this part, questions are asked about what is important in the life of an employee from the perspective of the given cafeteria of potential attributes. The scale of assessment in this part of the survey is the assessment of the importance of the factor in life: [0 – *does not matter*, 1 – *has low, very low significance*, 2- *has an important, but not decisive significance*, 3, *has a very large, crucial significance, is the most important thing in my life for me;*
- **Part B)** The level of employee assessment of currently offered satisfaction factors by a specific employer is diagnosed. An assessment of current satisfaction with the level of feeling the impact of a given factor in everyday work is indicated. The scale of assessment in this part of the survey is the assessment of the importance of the factor offered by the employer *[-3: unacceptable level; -2: very low level; -1: low level, 0: no opinion, +1: average level, +2: good level, +3: very high level];*

Based on the indicated theoretical and conceptual foundations, a set of disjoint and holistic attributes shaping employee satisfaction was built. The following harmonized attributes of employee professional satisfaction, which are assessed in parts A and B of the P.A.S.Z. questionnaire (Borowska-Pietrzak, 2014):

1) The level of income obtained from the work performed,
2) Adequacy of remuneration for the work performed and position held,
3) Clear and open communication of the rules and criteria for the payment and remuneration,
4) Additional non-wage bonuses obtained on the position,
5) Expressing recognition to the employee by superiors and organizations,
6) The supervisor's management style (the way he works),
7) Organization of work in the employee's cell,
8) Degree of organization of work of the whole organization,
9) The role and significance of the employee's profession compared to others in the company (its importance and prestige),
10) Promoted values, norms and rules of employee behaviour in the organization,
11) Personal direct relations with your superior,
12) Personal direct relations with your colleagues (subordinates – for the manger),
13) Diversity of tasks performed as an employee,
14) Sensibility of tasks performed as an employee,
15) The validity of tasks performed as an employee,
16) The level of individual responsibility for employee results and work method,
17) Form of setting goals and tasks for an employee,
18) Form and scope of delegating tasks to an employee,
19) The level of independence and autonomy in the employee's work process,
20) Method of control and evaluation of the employee by the organization (supervisor),
21) Promotion opportunities in the organization structure,
22) Possibility of professional development and raising one's competences,
23) Achievements and professional successes in the position so far,

Below there are the rating scales for individual parts of the P.A.S.Z. tool divided into parts A and B. As a result of answering both parts (A and B), the product of common points in the nominal range is calculated [-207 p. ; +207 p.]. Based on the results of the author's many years of research with this tool (Alfa-Cronbach coefficient for P.A.S.Z. is = 0.92), it can be assumed that the following tool diagnoses the following ranges of a **S**ense of **J**ob **S**atisfaction in the context of all attributes of its perception (**SoJS**):

SoJS >0: an employee does not negatively assess the sense of professional satisfaction,

SoJS>>0: an employee does not negatively assess the sense of professional satisfaction,
SoJS =<0: an employee positively assesses the sense of professional satisfaction,
SoJS <<0: an employee strongly evaluates the sense of professional satisfaction,

Working environment in the hotel industry

Hotels are a service industry that is part of the new economy based on knowledge and human capital. The basic factor shaping the added value in this service sector is the human capital in the form of commitment, motivation and loyalty, which work value is of great importance in the quality of the offer (Hoque, 2002). The basing of the hotel management business model on the human resources model should affect the achievement of market advantage. It should be remembered that this is a very competitive market and it is necessary to stand out from the entities operating in this industry, and to ensure a special position in the minds of customers. A significant number of studies in contemporary world literature on the subject puts the issue of satisfaction as the research area in the assessment of HRM practices in the hotel industry in the second place (the first place is occupied by the causes of fluctuations) (Sharma, 2019). Material resources of hotel enterprises can easily be imitated by competitors, while the knowledge, skills and attitude of employees in servicing hotel guests can be an important factor of competitiveness on the market. Due to the constantly increasing level of servicization of the economy (Kawka, 2014), the importance of the role of human capital in the process of creating and offering services, including hotel services, is growing. Throughout the world, traditional elements of competitiveness are losing their significance, while the role of human capital is increasing, especially in service enterprises. This is due to the fact that in the service sector, including in the hotel industry, employees should be more strongly involved in creating and delivering customer value than in manufacturing companies. In this type of services, employees' knowledge and skills are a key element determining the competitive advantage of an enterprise (Tokarz, 2009). Without competent employees, it is difficult to improve and maintain the quality of services, or to provide good service to both regular and new customers, who are still increasing, because the demand for hotel services is still growing. This increase is also caused by the increasing mobility of people to Poland, which is also possible due to the development of land and air transport connections. In 2018, Polish airports served over 40 million passengers, an increase of 17.5 percent, compared to the previous year. For comparison, in 2011, it was 21.7 million people, so this number has almost doubled in six years (ULC, 2007). The indicated increase is particularly related to the Tri-City area, i.e. the accommodation facilities of Gdańsk, Sopot and Gdynia. Not without significance in the statistics of people using hotel services in this region are also business stays of such a vibrant and dynamically developing region. Over the first three months of 2018, over 5 million tourists spent the night, of which almost 1.2 million guests from abroad, mainly Germans, Ukrainians, Russians and British. In response to these needs, it is estimated that over the next few years, the number of rooms available to hotel guests will increase by about a third (Emmerson, 2018)

It is not easy to attract new employees and keep existing ones (decreasing unemployment and raising wages), employment costs are rising. More than half of the hotel staff are people in lower positions (room service, waiters, reception). These are the groups that are the most difficult to acquire and maintain. For many of them, working in a hotel thanks to the shift system is an additional occupation performed only while studying. This means that most hotels are constantly looking for employees. The CSO data shows that slightly more than 140,000 people worked in the hotel and catering industry in the third quarter of 2017, and the average salary was over PLN 3280 gross. There will have to be an increase in wages in the industry. Employees, especially younger generations, are looking for professions that offer development opportunities. Therefore, the hotel industry as an industry must change quickly, redefine HRM strategies, build career paths, improve its processes, make work in the hotel easier and bring satisfaction. An additional risk is the ongoing investment boom. Its consequence will be increased competition, which will aggravate the problems of finding and retaining employees. The type of hotel in which an employee works may also affect the perception of the level of satisfaction. A large part of these facilities operate in the segment of tourist hotels located in holiday resorts. In such locations, we find Polish local facilities more often and they are small and medium-sized enterprises, where the level of quality of the personnel function is not very high (Pocztowski, Pauli, 2013). On the other hand, global brands and international networks usually manage business hotels in large cities.

They operate mainly in the markets of the largest agglomerations because they are able to obtain the most reliable return on investment there. Research indicates that these are potentially organizations with a higher standard of implementing personnel practices (Emmerson, 2018)

Empirical Results: Professional satisfaction measurement in the selected Tri-City hotels

Five hotels were deliberately selected for the job satisfaction survey (2 small local ones, 2 regional medium ones and 1 large foreign network one). The choice of a sample constructed in this way largely reflects the share and nature of the size of hotels both in the region and in Poland (BIG, 2018). The study was conducted at the beginning of 2020. 162 employees took part in the presented study. Among 35% of respondents, these were both junior and senior management positions, 12% of respondents occupied specialist positions, 44% were executive positions, and less than 10% dealt with the auxiliary function in the examined hotels. Employees of the surveyed hotels are characterized by a relatively low age, and the largest group -37% were employees aged 20-28 and 29-35 – 24%. The percentage of employees over 45 is very small – 11%, including only 3% over 55 years of age. This indicates a high share in the employment of employees of generation Y, who are characterized by a very low level of loyalty and stability of employment (Kawka, 2019, pp. 69-72). This data is confirmed by the fact that more than half of the respondents (55%) are a group of employees with less than 7 years of service, and in addition, as many as 22% of the respondents working in the hotel for not more than a year are in the surveyed set. Only about 6% of employees were diagnosed in the group of people working for more than 16 years. This indicates a very high level of fluctuation and turnover of employees in recent years, which is very characteristic for the industry and the above-mentioned generational group. The vast majority of respondents (65%) are women.

The average result of perceived satisfaction (PSZ) in the examined hotels was **+53.9 p.** on the potential scale [-207p.; + 207p.]. It is a result that is significantly different from 0, i.e. rather indicating a positive feeling of satisfaction (**SoJS>>0**). Below is a summary of the results of professional satisfaction for all surveyed hotels.

Table 1: Results of professional satisfaction in the examined hotels in the Tri-City

	Medium level of satisfaction (p.)	**Intensity of variability of results dispersion (p.)** $\frac{Standard\ deviation}{Mean}$	**Max/Min (p.)**
ALL HOTELS	**53,90**	**88%**	***-72p./+199 p***
Medium Hotel 1	**62,33**	*72%*	*-18 p./+110 p.*
Medium Hotel 1	**58,92**	*71%*	*-22p./+142p.*
Large Hotel	**63,33**	*87%*	*-72p./+199 p.*
Small Hotel 2	**30,5**	*120%*	*-24p/+98p.*
Small Hotel 2	**54,42**	*90%*	*-49.p/+139 p.*

Source: own study

The data indicate that these are results showing an average high level of satisfaction within the surveyed hotels. As you can see, the size of the hotel increases the value of the sense of satisfaction with work. This could indicate the occurrence of the relationship indicated in the earlier part of the text between employee satisfaction and the size and organizational structure, and indirectly the activity of implemented HR practices in the daily management of these facilities. Nevertheless, it should be assumed that this is an image indicating a definitely positive image of a sense of satisfaction in the studied industry. The justification for adopting this assumptions is the fact that only 10% of negative results were obtained in the examined group of employees. Interestingly, only 50% of negative

indications were the share of executive employees, and 25% of negative responses were indicated by both specialists and managers. The lowest result was obtained at the level of **(-72p.).** In addition, as much as 47% of the surveyed employees were above the average **(+53,9p.)** of satisfaction felt, with quite high results, where the highest result was achieved **(+199p.).**

The intensity of variability of results dispersion (IVRD) was also calculated, which was 88% for the examined sample. ***IVRD*** is interpreter as how much the employees differ in perceived satisfaction against the background of the incentive system offered by the hotel. The achieved result of 88% - this is an average high result, and indicates a rather average differentiation in the perception of your level of satisfaction with working in a hotel. However, it should be pointed out that in previous studies one of the most stable in terms of diversity. For example, the diversity indicator for employees of cultural institutions was 400%, which is an extreme result.

In addition, what is worth referring to as a benchmark, compared to other professional groups examined so far, the result for the Tri-City hotels falls within one of the highest satisfaction levels examined. For comparison, the table below presents the results of the author's research diagnosed in organizations over the past 5 years.

Table 2: Summary of the results of achieved satisfaction levels in a various branches

	Medium level of satisfaction (p.)	**Strengthening attributes (no. in the questionnaire)**	**Limiting attributes (no. in the questionnaire)**	**Intensity of variability of results dispersion (p.)**	**Max/Min (p.)**
Financial services	60	n.12, n. 19	n.2. n.8	78%	+175/-69
Chemical production	92	n. 8, n. 19	n. 4, n. 5	36%	+160/+8
Law firm	47	n. 14, n. 16	n. 2, n. 4	95%	+150/-53
Trade company	53	n. 14, n. 16	n. 4, n. 21	92%	+170/-168
Municipal company of services	45	n. 13, n.15	n. 5, n. 21	95%	+183/-63
University	49	n. 19, n. 23	n.1, n.2	93%	+150/-53
Institution of culture	13	n. 6, n. 12	n.2, n. 4	400%	+119/-113
Secondary education school	38	n. 11, n. 19	n. 8, n. 21	81%	+132/-44
Self-government office	60	n.11, n. 12	n. 4, n. 21	40%	+147/-10

Source: own study

An important scope of research on the attributes of professional satisfaction in Tri-City hotels was to identify which specific attributes have a supporting and dysfunctional effect on the level of job satisfaction. The following are the calculations of the average product of parts A and B of the questionnaire for all 162 employees: The following factors were included in the lowest-rated employee attributes, on the [-9; +9] scale:

- **Attribute 21**: *promotion opportunity in the organization structure*, average **+0.2p.,**

- **Attribute 22**: *opportunity for professional development and raising one's competences* – average **+ 0.7p.,**
- **Attribute 4**: *additional non-wage bonuses obtained in the position* – average **+ 0.8p.,**

These are the factors that most significantly reduce the sense of satisfaction in the sample of Tri-City hotels. These are dimensions that, due to the model and organizational structure, will limit, especially small hotels, as an objective reducer of job satisfaction.
However, the highest rated attributes were diagnosed:

- **Attribute 16**: *individual responsibility for employee results and working method* - average **+ 3.85 p**.,
- **Attribute 15:** *validity of tasks performed as an employee* **+ 3.80p**.
- **Attribute 12:** *personal direct relationships with your colleagues* **+3.51p**.

These are the factors that in most of the examined hotels were recognized as the most valuable in terms of their positive impact on the sense of satisfaction.

Discussion & Conclusion

the role of satisfaction against the background of the personnel function in the examined hotels

An interesting background for interpretation instead of the traditional summary of the results obtained was to assess the relationship between the level of satisfaction and the key goals of the personnel function (Listwan, 2010). Therefore, the level of assessment of three important aspects of HRM was additionally diagnosed according to numerous literature on the subject (Borowska-Pietrzak, 2013) having a strong relationship with creating a sense of professional satisfaction. The surveyed employees were asked to assess their subjective perception of A) the current commitment to work, B) the adequacy of wages received for their professional role and C) the assessment of satisfaction with the implementation of their stage of professional development. The following results were obtained:

A) **4.72** (average high) commitment of the surveyed employees, these were grades on a shortened 6-point Likert scale;
B) **3.01** (average result) assessing the adequacy of their wages for the role performed, these were grades on a shortened 5-point scales;
C) **3.10** (average result) assessing the adequacy of the employee development stage assessment, these were grades on a shortened 5-point scales;

To answer the question whether there is a correlation in the studied population, the Pearson correlation coefficient between the above-mentioned three variables, and the level of professional satisfaction, which was $r_{S/A}$**= +0.41** for factor A; $r_{S/B}$**= +0.43** for factor B; and $r_{S/C}$**= +0.44** for factor C, respectively, was calculated. Therefore, it can be assumed that the studied population was diagnosed with the occurrence of a motivational mechanism described in the literature on the subject with a strong coexisting relationship between an increase in the sense of satisfaction and the rationality of the implementation of the human capital model (strong commitment, adequate wages, and acceptable development by employees). In addition, the range of questions in which employees' expectations were diagnosed is a very valuable context for further interpretation of the results obtained. They were asked whether they would soon expect the following in their organization: D) promotion, E) raise F) and whether they plan to leave/stay with their current employer. In this regard, the following results were obtained:

Table 3: Distribution of expectation results of the surveyed hotel employees

Answer	D) Do you expect a promotion	E) Do you expect a raise	F) Do you plan to stay at work
Yes	27.8%	65.4%	66.7%
No	72.2%	34.6%	33.3%

A very interesting result for interpretation is the calculation for the above-mentioned individual categories of average level of professional satisfaction. The following average levels of satisfaction were obtained for employees declaring:

- D_{YES}: promotion in the near future amounted to **+59.8 p.**
- D_{NO}: no promotion in the near future amounted to **+4.6 p.**
- E_{YES}: receiving a raise in the near future amounted to **+57.6 p**.
- E_{NO}: not receiving a raise in the near future amounted to +**57.04 p.**
- F_{YES} : change of job in the near future amounted to **+36.2 p.**
- F_{NO} : remaining at work in the near future amounted to **+65.7 p.**

Regarding to E_{NO} results, this is one of the most interesting results obtained in these studies, perfectly fits the assumptions of F. Herzberg's Two-factor Theory, which assumes that salaries are a hygiene factor and cannot be a determinant that permanently increases employee satisfaction.

Summarizing the above analysis, we can with some caution divide the surveyed employees into two groups, potentially satisfied, i.e. those who said YES and those who are potentially dissatisfied, i.e. they belong to the NO set. Interestingly, these are relatively equal groups, respectively 53% and 47% of the surveyed employees. The average sense of satisfaction was calculated for such groups of surveyed employees:

- "**YES group".** (expect a promotion, a pay rise and declare staying at the hotel), PSZ = **+61p**.,
- **"NO group"** (do not expect a promotion nor a pay rise and declare leaving the hotel), PSZ = **+32.5p.**

Rational implementation of HRM solutions based on the human capital model can lead to a positive effect of attitudes and behaviours, such as in the "Yes Group". The results presented above may therefore be further evidence that the approach to people in the organization as a human capital is strongly correlated with a higher potential level of professional satisfaction. Research conducted in a selected sample of Tri-City hotels showed this relationship.

In the summary of the described research, it can be stated that in the area of hotel services management – the higher the level of effective HR policy, the higher and lasting sense of professional satisfaction of employees employed in these enterprises is potentially formed. And this undoubtedly builds lasting added value for all stakeholders in this industry.

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Social Dimension of The EB Based on The Example of TOP 500 Enterprises

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Abstract

In the changing labour market, where the position of employees is visibly growing, employers look for new Human Recourse (HR) tools to attract and keep new employees. One of such tools is Employer Branding (EB), which means various measures undertaken by organisations in order to create a positive employer brand. Such measures may be undertaken both within and outside an organisation. Regardless of their focus, an important element of such activities is the Employee Value Proposition (EVP), which is a description of the properties and attractiveness of jobs offered by a given employer. An increasingly frequent element of such proposition are social aspects highlighting a personal approach to employees and the organisation's attentiveness and sensitivity to social problems and the growing importance of social needs. The purpose of this paper is to present the opinions of Polish employers from the TOP 500 list concerning the importance of the social elements of EB communication. The list includes organisations that achieved the biggest market and financial success in 2018 according to the methodology adopted by the Polish Rzeczpostpolita newspaper portal. The following tests were used for the purpose of data analysis in the STATISTICA program: the Kruskal-Wallis ANOVA on ranks test, the Mann-Whitney test, the median test and the Pearson's chi-square test. The strength of correlations between the variables was evaluated by means of the Spearman's rank correlation coefficient. Unfortunately, the results of the research show that the responding organisations have little understanding of the new trends in the labour market and the need to work on the image of the organisation as a friendly employer.

Keywords: Employer Branding, Human Recourse

Introduction

Until recently in Poland, given the dominant employer market and rather high unemployment, it was quite easy to hire an employee at a relatively low cost. However, the conditions of today's employee market are different: it is more difficult for an organisation to acquire and, more importantly, to retain an employee. The costs of the recruitment process are also higher. Thus, every measure that helps reduce those costs is important. The HRM Institute research conducted in 2018 (http://www.hrminstitute.pl/raport-employer-branding, 2018) among employers in the Polish labour market showed that the factors that will be the most strongly influencing the completion of business goals in the coming years will be the need to implement new technologies and talent shortage in the labour market. In the light of the above, the importance of recruitment measures, in the broad meaning of the term, as a factor contributing to the success of an organisation is growing. Any negligence at this stage of the HR process (Zavyalova et al., 2011; Listwan, 2005, p.79) results in increased expenditure, not only in the recruitment area but, more importantly, in the area of optimising employee skills and motivation to enable effective task completion. Some HR specialists (Zavyalova et al., 2011) even suggest that expenditure on training will never translate to effectiveness so much as expenditure on acquiring individuals who are tailored to the organisation in terms of their values and who contribute high potential, knowledge, skills or unique abilities to the organisation.

The literature also shows that the goal of both recruitment and selection is to hire an employee with the required competencies corresponding to the employer's needs (Searle 2009, p.151-168). Here, recruitment means mainly that an organisation attracts a sufficient number of candidates to enable

rational selection. Thus, employers are highly creative in communicating with candidates and simplifying application procedures. This involves shortening as much as possible the application and selection process, thereby reducing the number of candidates who resign from applying, discouraged by prolonged decision-making on employment (Gojtowska 2019, p. 217-236). The traditional forms of communicating with candidate employees are no longer sufficient, especially in the case of the youngest generation of potential employees (Decker, 2016, p. 770). Companies attending university job fairs, an increasing number of Facebook fanpages, special smartphone applications to apply for a job, corporate movies featuring employees, chatbots, using VR (Virtual Reality), so-called ambassador programmes, an extensive training offering and social and professional adaptation programmes (onboarding) are but a few examples of measures covered by the new HR trend that has been increasingly popular over the last decade, namely the EB.

The purpose of this paper is to present the opinions of Polish employers from the TOP 500 list concerning the importance of the social elements of EB communication.

EB – introduction to the problem

The number of publications on the EB, both scholarly and practical, has significantly increased in recent years. This is the effect of changes taking place in the labour market (a growing position of employees and a decreasing supply of employees in the labour market) as well as of the necessity to apply new technological solutions associated with the revolution 4.0 (Erro-Garcés A., 2019) and the consequent need to acquire and retain employees that have unique competencies valuable for an organisation. This has also been the case in Poland over the last five years. However, the term EB was mentioned in scholarly literature much earlier than that. Its progenitors and popularisers were Ambler and Barrow (1996). In their paper, "The employer brand", they defined EB as "the package of functional, economic, and psychological benefits provided by employment, and identified with the employing company" (Ambler and Barrow, 1996). Other authors (Ambler, 2003; Berthon et al., 2005, Barrow and Mosley, 2006, p. xvi) highlight that it is the undeveloped concept of internal marketing, internal branding and corporate brand. Kozłowski (2012, p. 14) defines EB more broadly as "all measures undertaken by an organisation, addressed to its existing and potential employees in order to build the image of the organisation as an attractive employer and also supporting its strategic business objectives".

According to many authors (Berthon et al., 2005; Cable and Judge, 1996; Eisenberg et al., 2001; Frook, 2001; Lievens and Highhouse, 2003), the idea of the EB is based on the assumption that a company, as an employer, is treated as a product that needs to be sold. This is a marketing-based approach to the functioning of an organisation and it means specific and regular measures aimed at satisfying the current and future needs of customers. Kucherov and Zavyalova (2012) suggest that the EB is an important element of the HRD (Human Recourse Development). Authors such as Gojtowska (2019) or Mosley (2007) claim that the EB has its rational and emotional attributes. The importance of emotions in recruitment processes and in building Candidate Experience (CE) is also emphasised by Polish reports developed by the HRM Institute (EB Book 2018).

The EB may be divided into the internal EB – focusing on the company employees and external EB – focusing on persons potentially interested in working for a given organisation (Backhaus and Tikoo, 2004). The superior goal of the internal EB is to increase employee efficiency by initiatives aimed at improving working conditions and social environment at work and presenting the advantages of working for a given company (Sartain, 2007; Kozłowski, 2012, Gojtowska 2019). The HR tools that help implement the internal EB are: internal communication, career paths, training, periodic employee evaluation system, satisfaction surveys, wage and non-wage incentives, employee integration projects, organisational value system, work-life balance (WLB) or Corporate Social Responsibility (CSR) measures targeting the employees. Meanwhile, the external EB is addressed to potential company employees. Its effect are all kinds of information and opinions that a potential candidate may hear about the company. Two categories may be identified within the external EB: image-related and recruitment-related. The purpose of image-related measures is to increase the target group's awareness of the enterprise and the advantages of working for that enterprise. Such

measures are usually conducted on a large scale and their goal is to reach as many recipients as possible. Meanwhile, recruitment-related measures are associated with ongoing recruitment processes. Their goal is to reach valuable candidates and to persuade them to apply for a specific job. Recruitment-related measures are usually conducted on a smaller scale and are supposed to reach a specific target group. It is also worth noting that image-related and recruitment-related measures are interconnected. It is important that all measures undertaken within the framework of the external and internal EB are consistent and based on a common strategy (Andreassen and Lanseng, 2010).

EB in Poland

An analysis of 2012-2018 reports made by the HRM Institute (https://www.hrminstitute.pl/raporty-eb/) shows a growing importance of the EB in HR policies in enterprises. Early reports clearly show lack of an EB strategy in the organisations that participated in the research and their inability to link the EB area with the personal function of the organisation. EB measures were mostly undertaken by units or personnel responsible for marketing operations and mainly focused on propaganda. It is currently observed that organisations spend the same amount of time and energy on employer brand as on consumer brand. With their brands, companies influence not only their customers but also potential candidates – regardless of whether or not they control how it happens. It is not only about increasing the number of applications for advertised vacancies but also about attracting appropriate high-quality employees who may strengthen the company's competitive position (EB Book, 2020). Although the early editions of the reports clearly showed that employers were ambivalent about the EB, now, most of them are aware that it is not an optional measure but a must in our times. According to the 2018 report, more than 50% of companies have a more or less structured employer branding strategy, including a strategy to support the employer brand within the organisation. 42% of the organisations participating in the research declared that the EB measures were mainly implemented by HR departments and 11% of them even had specialist EB departments. Even though most of the responding organisations still report major problems in implementing EB measures, they definitely appreciate their importance and significance for the HRD (Human Resource Development). In recent research conducted by the HRM Institute, respondents highlight the importance of not so much employee satisfaction but the joy they get from work and from being in their place of work (the 2018 Fun at Work Report), and are increasingly aware of the need for material and non-material appreciation of their employees and for creating a sense of work (Raport Index Doceniania, 2019).

Methodology

The research results presented in the paper are a part of the Polish quantitative research of enterprises under the project: "Innovative trends in human resource management in large enterprises". The research was conducted in 2019 at the Faculty of Management at the Częstochowa University of Technology in collaboration with the specialist outsourced company MRW Market Research World.

The research was conducted using quantitative survey methods with mixed techniques: the Computer Assisted Web Interview (CAWI) and the Computer Assisted Telephone Interview (CATI). The combination of the two quantitative methods helped increase the response data coefficient. The research population were the top 500 Polish companies (according to the Rzeczpospolita portal 2018 ranking). Random sampling was used by the company conducting the research. Questions concerning the organisations under review were answered by representatives of senior managerial personnel (HR departments) or employees delegated by the employer. Following the sampling, the representative sample was examined based on the following parameters: the size of the general population 500, the estimation error 6%, the level of trust 95%.

The paper uses a fragment of the research concerning the EB in the examined enterprises. The questions are original and they were formulated by the members of the research team of the Faculty of Management of the Częstochowa University of Technology.

The following problem was formulated in the research: What are the opinions in the examined enterprises from the TOP 500 list concerning the attractiveness of selected EB elements for job candidates. These opinions were correlated with the organisation's evaluation of its own market position and data concerning the organisation, such as the type of activity (TA) , revenue (AR) or size of the organization (NE). The structure of organisations in terms of the latter parameters is presented in Table 1.

Table 1: Parameters of the organisations under review

Characteristics of the organisations	Number	Percentage
Number of employees/size of the enterprise (NE)		
201 – 500 employees	131	73.18
More than 500 employees	48	26.81
Total	179	100.00
Annual revenue (AR)		
Revenue between 51 and 200 million PLN	122	68.15
Revenue above 200 million PL	25	13.96
Revenue from 5 to 50 million PLN	32	17.87
Total	179	100.00
Type of activity (TA)		
Manufacture	75	41.89
Manufacture and services	26	14.52
Services	49	27.37
Commerce	15	8.37
Manufacture and commerce	14	7.82
Total	179	100.00

Source: Own elaboration.

The significance of differences with respect to the abovementioned independent variables and correlations between the other variables were examined and described using the STATISTICA program. The significance of differences was tested using the Kruskal-Wallis ANOVA on ranks test, the Mann-Whitney test, the median test and the Pearson's chi-square test. The strength of correlations between the variables was evaluated by means of the Spearman's rank correlation coefficient.

Results of the Research

The research tool was a standard questionnaire with closed-ended and semi-open-ended questions. The questionnaire contained both questions and statements. The questions contained responses in the five-level Likert scale, where the respondents could respond to the respective statements by selecting one of the answers (1 - I strongly disagree, 2 - I partly disagree, 3 - I neither agree nor disagree, 4 - I partly agree, 5 - I strongly agree).

To evaluate the opinions of the organisations under review on the attractiveness of selected EVP elements for job candidates, the following social EB indicators were selected: environmental protection projects of the organisation (V1), employee volunteering (V2), relations with the local community (V3), prosumer programmes (V4), onboarding programmes (V5) and the WLB (V6).

The first observation shows that the most frequent response to all EB-related questions of the social nature was "I neither agree nor disagree" (the percentage distribution of this category of responses to the respective questions ranged from 34.6% (V6) to 41,3% (V4)). Concerning the opinions of representatives of the organisations under review on whether the fact that the organisation undertakes measures in V1 is important for candidates, 46.9% of the respondents said this was not vital for the applicants and only 14.5% thought that it was an important element of EB communication. Measures in V2 constituted an important element of EB communication according to 15% of the respondents, and 49.7% of them believed it was not relevant for candidates looking for employment. Somewhat better was the situation with measures in V3 – 36.8% of the respondents thought they were not an essential element of the employer's image, while 25.1% believed them to be an important element of EB communication for the candidate. The distribution of responses concerning the importance of V4 is interesting. Here, the largest percentage of respondents chose a neutral response, but at the same time almost the same percentage of organisations (40.7%) thought this factor to be irrelevant and 17.8% agreed that it was important in building a positive image. It seems that the importance of V5 was evaluated more positively: only 27.4% of the respondents thought it was an irrelevant element of the EB, while 35.7% believed it to be an important indicator of employer attractiveness for the candidate. By far, the most attractive element for potential candidates, in the opinion of employers, was V6. As many as 41.3% of the organisations agreed that it was an important factor of EB communication, and only 24% thought it to be of little relevance.

When analysing the impact of independent variable, such TA, using the Pearson's chi-square, a statistically significant difference was reported only in the distribution of responses concerning the indicators V4 and TA (Table 2). Manufacturing companies and manufacturing and service providing companies were sceptical about the importance of V4 in developing the EB image more often than other organisations. Meanwhile, service providing companies were most often neutral or rather positive about this particular element.

Table 2: Type of activity vs the importance of prosumer programmes for the EB

Statistics	Statistics: V4 x TA		
	Chi-square	df	p
Pearson's Chi^2	27.71549	df=16	p=.03418
Chi^2 NW	26.78096	df=16	p=.04398

Source: Own elaboration based on research results.

The research concerning significance of differences using the Kruskal-Wallis ANOVA on ranks test, the Mann-Whitney U test and the median test did not reveal any significant relationships for the level $p < 0.05$ between the other indicators of the perception of the EB and variables such as NE, AR.

Representatives of the organisations under review were also asked to evaluate the market position, financial position and level of innovation of their respective enterprises. These statements were correlated with the assumed EB indicators by means of the Spearman's rank correlation coefficient R. Numerous statistical hypotheses were made concerning those relationships (the H0 hypothesis of no relationship and the alternative H1 hypothesis assuming that there existed correlation between the variables). The statistical analyses conducted confirmed a statistically significant relationship only in a few hypotheses, which will be discussed further on in the paper.

The breakdown of the R correlation indicator with respect to the selected variables presented in table 3 makes it possible to reject hypothesis H0 and assume alternative hypotheses concerning the relationship between them.

Table 3: Spearman's rank-order correlation for *p<0.05, **p<0.001, ***p<0.0005

Situation of the enterprise	EB indicator					
	V1	V2	V3	V4	V5	V6
Net profit increase	-	-	0.16992*	-	-	-
Releasing new products	-	0.15020*	-	-	-	
Implementing new technologies	-	-	-	-	-	0.19782**
Growing resources of the enterprise	0.18431*	-	0.16504*	-	0.22218**	0.27033***
Growing customer portfolio	-	-0.16650*	-	-	-	-
New outelts	-	-	-	-	-	0.14972*

Source: Own elaboration based on research results.

The values of the above R-indicators are not high, which suggests that the relationship between the variables is rather weak, however, in the case of three relationships, the p-level of significance is very low, suggesting a statistically highly significant regularity of correlation.

Discussion

An analysis of the statistical results led to a number of general conclusions. More than one third of the respondents representing the organisations under review were neutral about all the indicators of the social factors that significantly affect the employer's image in the eyes of candidates. According to the respondents, most of the indicators had little relevance to shaping the image and only the WLB was considered by them to be important for potential employees. Considering the fact that the organisations under review had a very good position in the market (they were ranked among top 500 organisations in 2018), this is a surprising result, to say the least. It seems that those organisations do not consider social indicators of EB communication to be important for attracting new employees. This is striking given the significant economic growth and development of companies in Poland in 2018 and 2019 and the resulting increasing problems with attracting and retaining employees. According to Eurostat data, the unemployment rate in Poland by the end of 2019 was 3.3% (https://www.gov.pl/web/rodzina/eurostat-polska-wciaz-w-czolowce-krajow-z-najnizszym-bezrobociem). In this situation, many EB reports as well as HR practitioners emphasised the need for changes in the means and content of EB communication, focusing on its social aspects, which are particularly important to retain employees in an organisation. In the light of the above, the attitude of the examined employers reveals their fossilised, traditional perception of the EB, which, until recently, focused mainly on the material and financial benefits of working. A strong market and economic positions seems to release an organisation from the obligation to attract an employee and offer unique and specific benefits corresponding to his or her contemporary sensitivity to social aspects. The only exception are WLB programmes that have been a fixed element of the HR strategy, especially targeting working women, for almost two decades now. It should be noted however, that some employers believed women rights provided for in the Labour Code, associated with the need to reconcile the role of a mother and an employee, to be an element of the WLB. There were some significant changes in this regard only in the last few years in Poland. First of all, the WLB measures were extended to include the other employee groups, in recognition of their subjectivity and right to satisfy their needs outside work. Secondly, organisations developed a range of benefits available under WLB programmes to meet the various needs of employees.

It was also determined in the research that increase in net profit was linked only with the opinions of the representatives of the organisations under review concerning the importance of efforts to build a relationship with the local community for candidates looking for jobs. Due to lack of a relationship between increasing profitability of the organisations under review and their size, type of activity or

annual income, it is hard to conclude on what type of organisations they are. Thus, an attempt was made to associate the parameter of growing profit with other indicators of the financial and market situation of an enterprise. By applying the Spearman's rank correlation coefficient for the level $p<0.001$, it was determined that net profit growth in the year under review was related to: profit growth in the year preceding the year under review, revenue growth in the year under review, asset growth, productivity growth and increased market activity. In the light of the above, it should be supposed that growing market activity stimulated by very good financial condition could lead to increased local activity of an enterprise and its strong promotion to attract employees from its most immediate environment.

A similar conclusion may be drawn with respect to another indicator, namely acquiring new outlets, which correlates with the conviction that job candidates are interested in whether an organisation implements WLB programmes. This also applies to the indicator of implementing new technologies. Here, the same as in the case of the former indicator, it was difficult to define the type of organisations we were dealing with. Interestingly, there is no such relationship with respect to releasing new products by an organisation. Meanwhile, the latter indicator correlated with the conviction that employee volunteering measures were important for the strength of EB communication.

Focus on social aspects was the most visible in enterprises that reported a growth in resources. This indicator very strongly correlated with almost every element of the social communication of the EB. It should be noted, however, that growth in the resources of an organisation was related to growing demand for personnel, as a result of which those organisations were forced to implement new EB strategies to attract employees using social elements that promoted the organisation as an institution that cared both for its employees and for the local community and environment.

Another interesting conclusion of the research is that none of the indicators of the market situation, financial situation or innovation level correlated with the conviction that it was important for a candidate looking for an employer whether an organisation implemented prosumer programmes. It is an evident signal that the examined organisations do not notice that currently, the employer brand is strongly linked with the product brand and the market brand of an enterprise. Numerous publications (Heffernan 2015, Gojtowksa 2019, Machnicka 2020) emphasise the fact that, for a contemporary candidate, especially a candidate representing the younger generation, those are almost identical brands. Any bad experiences they might have with the products of a company will have a significant impact on their perception of an organisation as an employer and vice versa. Any negative experiences associated with recruitment or employment will cause rejection of products. This relationship may also be due to the fact that the examined organisations do not implement any prosumer programmes, which is also a negative signal. This means that the organisations cannot or do not want to open to cooperation with consumers and encourage them to engage in processes that streamline organisational processes.

Since the research asked about measures in the area of the social elements of the EB undertaken by organisations, it turned out, by the way, that, unfortunately, most organisations do not undertake any such measures. Thus, the existing employees of the examined organisations, who do not benefit from any such measures, cannot be reliable ambassadors of the employer brand. Meanwhile, EB guidebooks addressed to HR specialists emphasize the important role of employees who, using generally available social media, may contribute to strengthening the employer brand through "whisper marketing". Thus, it could be concluded that, unfortunately, the examined organisations do not implement a conscious and reliable policy of either external or internal EB.

Conclusion

The general conclusion of an analysis of the research material is, unfortunately, that the strongest Polish organisations still do not understand or notice the changes taking place in the Polish labour market. Persisting in their market hegemon position, they do not think it is necessary to create any

special EB communication highlighting the image of a candidate-friendly employer. They anachronistically assume that a market leader automatically becomes a labour market leader.

When analysing information from HR reports, it seems that the EB will remain important for job candidates, especially from the younger generations of employees, even though forecasts about the labour market after the COVID-19 epidemics are not optimistic. Economic analysts suggest a likely growth in the unemployment rate, which will be followed by changing attitudes of employers who have enjoyed a strong position in the labour market so far. It seems that the EB will remain important, but preferences concerning the EVP will change. Until now, there has been a tendency for self-employment and freelancing, which give a sense of independence and do not require a relationship based on loyalty to the employer. Where such solutions were applicable, both the employers and employees seemed to be satisfied. The current problems associated with COVID-19 show that Poland needs reorganisation of labour processes so that it is possible to work remotely in crisis situations (engaging new IT solutions) and at the same time that the situation of workers who do not have an employment contract is very bad. It seems that in the future, the form of employment and the possibility to work remotely will constitute an important element of the EVP. Also the way that organisations deal or try to deal with the current epidemiologic crisis will constitute an important element of the narrative concerning the description of the employer brand in the future. This factor will illustrate the actual rather than the declared attitude to the social and ethical elements of HR management. Undoubtedly, post-COVID-19 EB research will constitute an important element of an analysis of changing relationships in the labour market.

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The Institutional Environment and New Venture Creation In A Transition Economy: Evidence from Poland

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Abstract

This paper uses data from Poland to present evidence of factors influencing new venture creation in a transition economy. Specifically, the focus is on the institutional environment. Using data combined from multiple sources, a country-level dataset for the period 2006–2017 was created to study the extent to which the institutional environment impacts new firm entry in Poland. The hypothesis was tested with the Ordinary Least Squared estimation with robust standard errors. This paper contributes to the literature on venture creation, which is largely absent of transition economies studies, by providing evidence that incentives to start a firm in a transition economy are dependent on the quality of formal institutions (rule of law, government size, regulatory efficiency, open markets), control of corruption, and the perception of safety. The findings may be useful for formulating strategies and public policies that reinforce creation of new venture in a transition economy.

Keywords: Venture Creation, Transition Economy, Institutional Environment, Entrepreneurship, Formal Institutions, Informal Institutions

Introduction

Firms have been found meaningful in fostering innovation and economy development (Aidis et al., 2012). While it has been argued that entry into entrepreneurship depends on heterogeneous dimensions (e.g. Urbano et al., 2019), a great deal of interest has been devoted in recent years to the institutional environment, as it appears to play an important role in determining whether entrepreneurial initiative arises. More specifically, the institutional environment seems to have a significant influence on decisions to go into informal entrepreneurship (Autio and Fu, 2015), opportunity driven entrepreneurship (Aparicio et al., 2016), and the way entrepreneurship impacts the growth of economy (Estrin and Mickiewicz, 2010).

The issue of factors encouraging entrepreneurship seems to be particularly important in a transition economy, since creation, survival and growth of firms have been found especially pivotal for successful move from a centrally planned to a market economy (Jackson et al., 1999; McMillan and Woodruff, 2002). Although growing entrepreneurship literature devotes substantial attention to recognise how the institutional environment may relate to entry into entrepreneurship (e.g. Anokhin and Schulze, 2009), still little is known how the process of institutional change in transition economies affects firm creation. It may be attributed, at least partially, to the different paths of transition to a market economy which is followed in such economies, leading to the ambiguity in the recognition of factors influencing entry into entrepreneurship. Hence, there is limited understanding of the role that institutions play in encouraging entrepreneurship in these economies. The goal of the paper is to fill this gap by referring the extent to which the institutional environment impacts new firm entry in Poland. The influence of institutions on new venture creation was tested with the Ordinary Least Squared estimation with robust standard errors.

The article adds to the literature on the institutional environment and entrepreneurship in transition economies by investigating the consequence of formal and informal institutions for the incentives to start a new firm in Poland. This issue is relatively less studied but more important, since Poland is regarded as one of the most successful economies among these that underwent transition from a centrally planned to a market economy (Jackson et al., 1999; McDermott, 2004). Hence, focusing on

Poland may provide valuable insights into how the institutional environment may alter the incentives to be entrepreneurial in a transition economy.

The paper proceeds as follows. First section provides theoretical background and hypothesis development. Section two describes the research method, and is followed by the description of the sample and variables. Then findings are presented. Last section concludes.

Theoretical background and Hypothesis Development

A previous body of work documented that firms' creation and growth are dependent on multiple factors, especially innovation and R&D (e.g., Zygmunt, A., 2018a; Zygmunt, A., 2018b; Zygmunt, J., 2018), human capital (e.g., Klemens, 2018; Maj, 2018; Rokita-Poskart and Mach, 2019; Zygmunt J., 2019), and the institutional environment (e.g., Álvarez and Urbano 2011; Klapper et al., 2006).

The institutional environment refers to constraints, such as regulations, norms and values which are designed to shape interactions between people (North, 1990). According to Autio and Fu (2015), institutions exert an influence of whether entry into entrepreneurship and, if so, how each stage of the entrepreneurial process should be accomplished. Hence, the quality of the institutional environment may be associated with the variance in the impact of entrepreneurship on growth across regions and countries (Urbano et al., 2019). Subsequently, the extent to which the entry into entrepreneurship is dependent on the institutional environment may rely on the type of institutional factors. Formal institutions pertain to e.g., entry regulations, property right, rule of law, access to external capital (Krasniqi and Desai, 2016), while informal institutions regard to e.g., attitudes towards entrepreneurship, entrepreneurial and business skills, perception of corruption (Aparicio et al., 2016). Different dynamics between these type of institutions have been observed, with informal institutions considered as more likely to change slower that formal institutions (Estrin and Mickiewicz, 2010), and having a stronger influence on opportunity entrepreneurship (Aparicio et al., 2016).

In transition economies, the move from a centrally planned to a market economy involves the creation or rebuilding the institutional environment. At the beginning of the transition, when the entrepreneurial activity is no longer suppressed, the institutional environment mostly lacks stability and predictability which may lead to the constraints in pursuing new born entrepreneurial opportunities (Welter and Smallbone, 2011). With predominance of state-run firms and public ownership (Krasniqi and Desai, 2016), and high level of distrust (Estrin and Mickiewicz, 2010), the radical change in institutions is necessary. With growing complexity of firms' activities in a transition economy, the need for changes in formal institutions escalates (McMillan and Woodruff, 2002). This may result, in most cases, in economic liberalization reform (Peev, 2015) and, consequently, in a sharp increase of private businesses (Welter and Smallbone, 2011). However, the rate of new ventures creation may be handicapped by the volatility in formal institutions (e.g. frequent changes of regulations). That may cause confusion and uncertainty of the conditions to run a firm which, as claimed by Krasniqi and Desai (2016), may encourage firms "to "play it safe" and take fewer risk" (p. 1079). While changes in formal institutions in a transition economy may be rapid (McMillan and Woodruff, 2002), changes in informal institutions are largely less dynamic. It seems obvious since changes in informal institutions are dependent on the shift in attitudes, norms, and values (Aparicio et al., 2016) and need more time to occur. However, in a transition economy such changes may be collaterally inhibited by deeply rooted distrust and values which may not be conducive to entrepreneurship (Estrin and Mickiewicz, 2010). This suggests the following hypothesis:

(H1): New venture creation in Poland tends to grow when the institutional quality improves.

Research Method

To test the research hypothesis, the Ordinary Least Squared regression with heteroscedasticity-consistent robust standard errors was used. The model was specified as follows:

$$New\ Venture\ Creation_i = \beta_0 + Quality\ of\ Institutions_i\beta_1 + Procedures\ for\ Starting\ a\ New\ Venture_i\beta_2 + Control\ of\ Corruption_i\beta_3 + Perception\ of\ Safety_i\beta_4 + GDP\ per\ capita_i\beta_5 + FDI_i\beta_6 + \varepsilon_i \quad (1)$$

The statistical significance of the model was verified with F-test. To check for autocorrelation, the Breusch-Godfrey LM test was employed. To control for the high level of collinearity among explanatory variables, Pearson's correlation coefficient was used.

Sample and Variables

The dataset used in this paper covers a period from 2006 to 2017. In line with McDermott (2004), the country-level approach was employed. Data were combined from multiple sources: the Statistics Poland, the Wall Street Journal and Heritage Foundation, Transparency International, Eurostat, and the World Bank.

Dependent variable is *new venture creation*. While there are various ways to conceptualise a new firm birth (for more discussion see: Reynolds, 2017), *new venture creation* was measured on the basis of initial registration in the National Official Business REGON as the number of new venture recorded in the REGON per 10 thousand population. These data were taken from the Statistics Poland.

The explanatory variables are *quality of institutions*, *procedures for starting a new venture*, *control of corruption*, and a *perception of safety*.

The *quality of institutions* represents formal institutions and comprises four dimensions (rule of law (property rights, judicial effectiveness, government integrity), government size (tax burden, government spending, fiscal health), regulatory efficiency (business freedom, labour freedom, monetary freedom), and open markets (trade freedom, investment freedom, financial freedom)). In line with Autio and Fu (2015), the *quality of institutions* was measured by the Index of Economic Freedom composed by the Wall Street Journal and Heritage Foundation. This index ranges on a scale of 0 to 1, with 1 signifying the highest quality of institutions. It is expected that the *quality of institutions* correlates positively with *new venture creation*. Another variable for formal institutions is *procedures for starting a business.* As it was observed by e.g. Aparicio et al. (2016), capacity of regulations might have an impact on the incentives to start a business. Such capacity might concern the number of procedures, cost, paid-in minimal capital, time to start a new venture. As it was noticed by e.g. Alvarez and Urbano (2011), together with an increase in the number of procedures the incentives to start a new venture diminish. In this paper, *procedures for starting a new venture* is proxied by a vector of four variables: *the number of procedures to start a new venture, cost to start a new venture, paid-in minimal capital to start a new venture,* and *time to start a new venture*. It is expected that when the procedures for starting a new firm increase, the number of new firms tends to be lower. Data for *procedures for starting a business* were taken from Doing Business developed by the World Bank.

The *control of corruption* and a *perception of safety* embody informal institutions. The *control of corruption* was measured by the Corruption Perceptions Index composed by the Transparency International. This index shows perceptions conveyed by business people and country experts of the level of corruption in the public sector, and ranges between 0 and 100 (with 100 indicating an economy very clean from corruption). It is expected that a rising *control of corruption* is followed by an increasing number of new firms. A *perception of safety* is a proxy for cultural-cognitive dimension, such as e.g., required skills and risk taking. A relevant issue with measuring this

dimension is that such data for Poland are mostly not available at the country level to allow for a longitudinal study (e.g., Global Entrepreneurship Monitor, from which such data as e.g., perceived skills and knowledge to start a business, or fear of failure might be sourced, provides periodically annual country-level data for Poland starting just from 2011). Only the Statistics Poland appears to provide some scant country-level longitudinal data that might serve as a proxy for cultural-cognitive dimension. One of them is a *perception of safety* measured by a percentage of persons who believe that Poland is a safe place to live. It was assumed that an increasing perception of safety enhances confidence which transfers to greater incentives for starting a new firm. Hence, a positive relationship between a *perception of safety* and the number of new venture is expected.

Since it has been observed that the creation of new venture might be affected by the economic growth (e.g. Urbano et al., 2019), in line with Estrin and Mickiewicz (2010) a control variable is logarithm of real G*ross Domestic Product (GDP) per capita* (in euro). It is assumed that an economy with an increasing level of GDP per capita demonstrates a growing number of new firms. Another control variable is *foreign direct investments (FDI).* While the impact of FDI on entrepreneurship is still not entirely recognised, some studies provide evidence that FDI might influence entrepreneurial activity (e.g. Wach and Wojciechowski, 2016) by affecting the accumulation of technological and human capital (Anokhin and Schulze, 2009). Hence, a positive relationship between *FDI* and *new venture creation* is expected. *FDI* was measured by a direct investment (flows) as a percentage of GDP. Data for *GDP per capita* and *FDI* were taken from the Eurostat.

Descriptive statistics of variables are shown in table 1.

Table 1: Descriptive statistics of variables

Variable	Min	Max	SD	Mean
new venture creation (per 10 thousand population)	77.000	104.000	7.608	90.333
quality of institutions (Index of Economic Freedom)	0.581	0.693	0.039	0.641
procedures for starting a new venture				
number of procedures (number)	4.000	10.000	2.417	6.250
cost (% of income per capita)	12.000	21.400	3.468	16.000
paid-in minimal capital (% of income per capita)	10.700	204.400	80.567	57.075
time (days)	30.000	37.000	2.429	32.083
control of corruption (Corruption Perceptions Index)	37.000	63.000	8.512	53.917
perception of safety (%)	43.000	89.000	11.741	67.750
GPD per capita (ln, in euro)	8.985	9.377	0.117	9.191
FDI (%)	0.200	6.200	1.644	3.300

Source: Own estimation based on data sourced from the Statistics Poland, the Wall Street Journal and Heritage Foundation, Transparency International, Eurostat, and the World Bank.

Findings

Since the explanatory variables capture different aspects of the institutional environment, it is not surprising that they are highly collinear. Similar observation has been indentified in prior research (e.g. Aidis et al., 2012), and leads to some variables exclusion. Hence, the variables: *the number of procedures to start a new venture, cost to start a new venture,* and *paid-in minimal capital to start a*

new venture were excluded as highly correlated, leaving *time to start a new venture* as the representative for the *procedures for starting a new venture.* The issue of multicollinearity in other institutional variables was addressed by entering each of these variables into a separate regression. That approach allows avoiding an arbitrary exclusion of variables and is in line with previous studies (e.g. Klapper et al., 2006). However, since *time to start a new venture* shows no multicollinearity with the other explanatory variables (except for the *perception of safety*), this variable was included in first two estimated models (which did not count for the *perception of safety*). In controls, *GPD per capita* was excluded as highly correlated with most explanatory variables.

Results of estimation are reported in Table 2.

Table 2: Estimation results

	Model 1 *quality of institutions*	**Model 2** *control of corruption*	**Model 3** *perception of safety*
const	43.3836*	65.2641***	78.3874***
	(20.9789)	(11.6899)	(6.5892)
quality of institutions	88.5794** (29.4674)		
time to start a new venture	0.1247 (0.2414)	0.0525 (0.2221)	
control of corruption		0.5507*** (0.1204)	
perception of safety			0.2639** (0.0917)
FDI	1.7555**	0.8905	1.7992***
	(0.5590)	(0.5052)	(0.4760)
R^2	0.4986	0.5663	0.4777
p-value for test F	0.014866	0.001609	0.000604

*Heteroscedasticity and autocorrelation consistent. Standard errors in parenthesis. Level of statistical significance: ***$p \leq 0.01$; **$p \leq 0.05$; *$p \leq 0.10$. Source: Own estimation based on data sourced from the Statistics Poland, the Wall Street Journal and Heritage Foundation, Transparency International, Eurostat, and the World Bank.*

In Model 1, the impact of *quality of institutions* on the *new venture creation* was tested. As it was assumed, the results show that the effect of the raising quality of institutions on the number of new venture recorded in the REGON per 10 thousand population in Poland is positive and statistically significant. The Hypothesis 1 is supported. Interestingly, *time to start a new venture* shows no relevancy for new venture creation, which is contrary to the research expectations. The results for the control variable are consistent with the research assumptions, as the positive, statistically significant relationship between FDI and the firm birth has been found.

As Model 2 (in which the relationship between *control of corruption* and the *new venture creation* was tested) reveals and as expected, together with the growing freedom from corruption the number of new born venture increases. The Hypothesis 1 is supported. The results for the *time to start a new venture* are the same as in Model 1 – they are not significant. Contrary to Model 1, the results for the control variable, while showing expected sign, are not statistically significant.

The results for Model 3, in which the influence of *perception of safety* on the *new venture creation* was tested, provide support for Hypothesis 1. As expected, the *perception of safety* relates positively to the number of new venture recorded in the REGON per 10 thousand population in Poland. The results for FDI are consistent with the research assumptions and found statistically significant.

The findings provide mixed support for the assumption about the relationship between the institutional environment and new venture creation in Poland. While the role of formal and informal institutions in driving firms creation seems to be uncontested when *quality of institutions, control of corruption*, and a *perception of safety* are regarded, the findings indicate that time needed to register a firm has not a direct significant influence on starting a new firm. This observation does not confirm prior research in which the impact of capacity of regulations (such as the number of procedures or time needed to start a new firm) on the incentives to start a business has been identified (e.g. Aparicio et al., 2016). However, with most of previous research not focusing on transition economies, a possible explanation of this lack of consistency could lie in the mediating role of other factors, most likely human capital, that might explicate the insignificance of time needed to register a firm to persons who are exposed to meet formal regulations when starting a firm in a transition economy. The findings also show that the improvement of the quality of institutions has a direct effect on the incentives to start a new firm and may increase the entry into entrepreneurship in Poland. This observation is in line with the previous studies which documented the relationship between the efficiency of the regulatory processes and the entry rates of new firms (e.g. Autio and Fu, 2015).

The findings also suggest that informal institutions could play a significant role in entry into entrepreneurship in Poland. More specifically, it has been demonstrated that when the freedom from corruption rises in a transition economy, the incentives to start a new firm grow. This view is consistent with other studies on the institutional environment in transition economies (e.g. Estrin and Mickiewicz, 2010), providing evidence on the positive relationship between the control of corruption and new venture creation. It has been also confirmed that cognitive aspects are principal in decisions for starting a new firm in a transition economy. Increasing perception of safety could provide the foundation for the incentives to be entrepreneurial. These findings support the view that informal institutions are important in driving entrepreneurship in transition economies (e.g. Krasniqi and Desai, 2016).

Conclusions

In this paper the effect of the institutional environment of new venture creation in Poland has been investigated. Multiple data sources were combined to create a country-level dataset. The paper provides evidence that the quality of the institutional framework built (or rebuilt) after the collapse of a centrally planned economy matters in entry into entrepreneurship. In particular, this paper contributes to the literature by confirming that the motivation to create new venture in Poland is heavily dependent on the following aspects of the institutional environment: quality of formal institutions (rule of law, government size, regulatory efficiency, open markets), control of corruption, and the perception of safety. However, the findings note that, interestingly, such relationship is not as intuitive as it might be anticipated. Specifically, although prior research indicates that time needed to register a firm has influence on the motivation for starting a firm, this link seems to not be evident if Polish economy is considered.

This study has several implications for practice. The findings may be useful for formulating strategies and public policies that reinforce creation of new venture in a transition economy. In order to develop effective and appropriate economic growth strategies, the policymakers should be conscious of those institutional factors which seem to be fundamental to generate and increase the incentives for starting a new venture. Focusing policy on creating a more beneficial institutional environment mostly by reducing the burden imposed by formal institutions, and by encouraging and supporting entrepreneurial attitudes, might account for economic development of a transition economy.

Some limitations of this study should be acknowledged. First, a cultural-cognitive dimension was assessed by measuring the perception of safety. While it seems legitimate since, as it has been observed in previous studies, the level of security might weight to the creation of new firms (e.g. Audretsch and Belitski, 2015), it does not allow to capture the other informal institutions in Poland (business skills and leadership in particular) which are likely to affect the entrepreneurial process. Further research would benefit from examining the extent to which entrepreneurial skills and

knowledge in a transition economy apply to the entry into entrepreneurship. Second, the paper focuses on new venture creation regardless of the form of entrepreneurship. While it enables to investigate the overall significance of the institutional environment, additional research would benefit from focusing on opportunity and necessity driven entrepreneurial activity.

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Socio-economic Determinants of Saving for Old Age in Europe: Is Profession an Important Factor? The case of Poland

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Abstract

Numerous factors have an impact on old-age savings. Among them, we may distinguish the key ones, such as gender, income, education and age. Those major factors include pensions guaranteed by the state, i.e. the 'generosity' of pension systems. The correlation between old-age savings and state-guaranteed pensions varies depending on the country. The paper points out the fact that, when seeking to equalise their lifetime income, professionally active persons tend to adjust the value of additional voluntary old-age savings to the level of state-guaranteed social security benefits. Thus, there is a correlation between lifetime income and old-age savings. The research presented in the article is part of two representative surveys: 1) 'Household Finance and Consumption Survey' (2nd wave, carried out in 18 Eurozone countries as well as in Poland and Hungary) and 2) 'Social Diagnosis' (conducted in Poland). The paper uses a logistic regression model to analyse the determinants of old-age savings.

Keywords: Pension Privileges, Social Security, Savings, Income.

Introduction

Many factors affect saving for old age. At the beginning, let us mention having children – a factor that has historically been perceived as a form of this saving (Haber, Gratton, 1993). The fact of having children negatively affects saving for old age, as children can be a way of ensuring old-age security that is alternative to making savings (Hammer, 1986). Education and financial awareness are the next factors which influence saving. Education, just like possessing other financial products, has a positive effect on saving for old age (Tavor and Garyn-Tal, 2016).

The level of saving is also related to gender and age (Pieńkowska-Kamieniecka, Walczak, Bera, 2019). Men, along with the elderly, are more likely to save for old age. In the case of elderly people, it is worth noticing that the increased amount of old-age savings is related to the reduction of other savings, such as, for instance, those made by purchasing durable goods (Fernández-López, 2015). Furthermore, Burney and Khan (1992) raise the question of different saving forms practised by residents of villages and cities.

As far as another variable, 'income', is concerned, a link can be found between income and the level of savings. Persons earning better tend to save more (Burney and Khan, 1992). However, when analysing the level of savings, it is equally important to refer to the subjective criterion of satisfying household needs. Income growth is accompanied by an increase in consumption, which means that an increase in the available income is not directly related to increased savings (Jappelli and Pistaferri 2010). Therefore, answering the question analysed in a further section of this work – 'Is the current level of income sufficient for the current level of consumption?' – may provide exhaustive information with regard to the financial situation of the household (Walczak, Pieńkowska-Kamieniecka, 2018).

According to the existing research, pension beneficiaries display various approaches to their social protection and apply different strategies when it comes to saving for old age. Kokrda, Sheran and Cramer (1996) indicated that profession plays an important role in the case of old-age savings. The authors observed that when the tax rates go down, these kinds of savings tend to rise. This is not solely due to the possibility of spending more money on saving, but also results from the predictions that future public benefits to be obtained from the pension scheme will probably be lower. Euwals (2000)

also pointed out to the relationship occurring between the pension scheme and pension savings. According to the author, pension rights negatively affect old-age savings. Similar evidence was provided by Galasso et al. (2009), who stressed the fact that the level of the state-guaranteed retirement insurance (related to the profession performed) negatively affects pension savings, e.g., individual savings for old age. However, Feldstein (1976) indicated a dual impact (indeterminate effect) of the public pension scheme on private savings. Hence, financial behaviour, including savings, depends on the generosity of pension systems (Lusardi, Mitchell, 2011).

This paper presents the generosity of the pension systems in Poland. This generosity also results from pension privileges, which are an essential part of each pension system (Armeanu, 2010; Inglot, 2016), mainly in post-Soviet states (Gugushvili, 2015). According to the World Bank, for financial and transparency reasons, these privileges should be eliminated (World Bank, 2005). In many European countries, such as the Czech Republic, Lithuania and Slovenia, privileges have already been limited (Armeanu, 2010; Barbu, 2016; Guardiancich, 2013).

Unfortunately, in Poland numerous privileges still persist (Jedynak, 2017). Persons working on employment contracts or civil law contracts are covered by the general pension system. However, within this system, some professional groups have obtained special privileges and thus can be referred to as 'privileged' (Armeanu, 2010). These groups include, for example, miners (they receive higher, than in general pension system, pension benefits and can retire after 25 years of work) or persons performing work in particularly difficult conditions who may receive the so-called 'bridging pensions'. The privileged system also includes parallel systems which function alongside the general system: the provision pension system and the agricultural pension system. Uniformed services, as well as judges and prosecutors, share a non-contributory provision pension system in Poland. Farmers as well as persons supporting them in farm works belong to a separate system – the agricultural pension system. Each of these privileges comes down to gaining more favourable terms with regard to retirement age, the amount of pension contributions paid, and the rules applied for calculating retirement benefits.

Given all the information provided in this section, the objective of this paper is to determine the social-economic determinants of savings for old age in Europe and to present the level of savings for old age of the beneficiaries of the pension privileges in Poland.

Thus, the following hypotheses were assumed:

H1: Social-economic determinants have an impact on old-age saving decisions.
H2: Savings for old age are dependent on the level of social security benefits which results from the profession performed.

Old-age savings in Europe. Data and Methodology

This paper was based on data provided by the 'Eurosystem Household Finance and Consumption Survey' (HFCS). This research (2nd wave) was carried out in 18 Eurozone countries, as well as in Poland and Hungary. More than 84,000 households were surveyed (the least from Malta – 999, the most from France – 12,035, and 3,455 in Poland), including over 200,000 individual household members. Household interviews were carried out between the end of 2011 and mid-2015, and, as stated by the European Central Bank, "all HFCS country surveys have a probabilistic sample design. This means that each household in the target population has an ex ante defined non-zero probability of being part of the sample". The aim of the study was to collect household financial statements (household finances, assets and liabilities) about households in Europe, coming from the main household respondent, who is called the financially knowledgeable person, and from members of these households (for more details, cf. ECB 2016). We studied the question connected with old-age savings, phrased as 'Do you have voluntary pension scheme?'.

The analyses of the presented data were made using a logistic regression model (Cramer, 2013), which allowed us to determine the impact of the individual characteristics of households (or of heads of those households) on their chances to save. The dependent variable used in the model, which was having a

voluntary (personal) pension scheme, was a dichotomous (i.e., a binary) variable and took the following form: 1 if a person has voluntary pension scheme and 0 if otherwise.

All data was analysed with the use of the IBM SPSS Statistics 24 software. Based on the data provided by HFCS, nine independent variables were analysed in this work (Table 1). A backward stepwise selection method was used to eliminate the insignificant variables (table 2). Among the analysed variables were values characterizing households (e.g. 'Income') as well as those concerning the financially knowledgeable person (e.g. ‘Education’, ‘Marital status’ or ‘Gender’). The majority of the variables (such as ‘Gender’, ‘Age’, ‘Marital status’ or ‘Education’) do not require explanation as their nature is evident. The variable of 'Income' needs a more detailed description. In this case, the annual gross income of a household from the last 12 months (in EUR) was analysed. This variable was divided into 4 income groups on the basis of the quartiles.

Table 1: Descriptive statistics for the independent variables

Variable	Variable description	Nature of the variables	N	M
Job (number)	More than one job	0 = Yes	4,096	0.95
		1 = No	78,829	
Job (description)	Job according to ISCO codes	0 = Armed Forces Occupations	792	4.29
		1 = Managers	8,112	
		2 = Professionals	16,638	
		3 = Technicians and Associate Professionals	12,687	
		4 = Clerical support workers	7,610	
		5 = Services and sales workers	12,427	
		6 = Skilled agricultural, forestry and fishery workers	3,495	
		7 = Craft and related trades workers	8,573	
		8 = Plant and machine operators and assemblers	5,230	
		9 = Elementary occupations	6,246	
Contract	Type of contract (refers to the main job)	0 = Permanent position	5,0584	0.14
		1 = Temporary contract	8,512	
Retire	At what age expect to retire	years	62,312	58.4
Education	Highest level of education completed	1 = Primary education	22,822	2.84
		2 = Lower secondary or second stage of basic education	31,366	
		3 = Upper secondary	70,130	
		4 = First stage tertiary	49,420	
Marital status	Marital status	1 = Single/never married	50,392	2.06
		2 = Married	98,450	
		3 = Consensual union on a legal basis	2,403	
		4 = Widowed	12,623	
		5 = Divorced	11,373	
Gender	Gender	0 = Woman	107,284	0.48
		1 = Man	102,451	

Age	Age (group)	1 = 18–24	15,835	3.48
		2 = 25–36	22,059	
		3 = 36–50	39,169	
		4 = 51–60	29,598	
		5 = 61–	50,475	
Income	The total gross amount over (last 12 months / last calendar year) – in Euros	1 = 0 – 7,817	20,129	2.49
		2 = 7,817.1 – 17,699	20,131	
		3 = 17,699.1 – 32,300	20,149	
		4 = 32,300.1 –	20,111	

Source: own study based on the data: 'Eurosystem Household Finance and Consumption Survey' (HFCS) ("This paper uses data from the Eurosystem Household Finance and Consumption Survey. The results published and the related observations and analysis may not correspond to results or analysis of the data producers.").

Old-age savings in Europe: results and discussion

While analysing ownership of voluntary pension schemes in Europe, all independent variables indicated in the model were significant (table 2). As concluded in the previous research, older persons and persons obtaining higher income are more likely to save for old age. For instance, the chances for owning savings by people aged 36-50 are higher by as much as 83.2% when compared to people aged 18-24. Income growth in households greatly increases the chances for owning savings for old age. In households where the income falls into the second quartile, the chances for owning savings are higher by 47.4% than in households with lower earnings. A similar positive impact on savings can be observed for education. However, in this case the differences are visible while comparing people having completed the first stage of third-cycle education with those who only have primary education. As for marital status, married people tend save more often. Their chances for owning savings are higher by 21.2% in comparison to single persons.

Work-related factors also have a positive impact on savings. The chances for owning old-age savings by persons who have one job, as compared to those who have more than one, are lower by 36.8% (cf. 'Job (number)'). On the other hand, the chances for having savings in the case of people employed on fixed-period contracts are lower by 21.2%, compared to persons having indefinite time contracts (cf. 'Contract'). As for profession, in accordance with the ISCO classification, we can see that one statistically significant category of professions (Technicians and Associate Professionals) saves evidently more often than the base category, i.e. the Armed Forces Occupations. In this case, the insignificance of the majority of categories makes it impossible to perform a comprehensive analysis of the impact of the profession factor and the generosity of the system associated with it. The base category (the Armed Forces Occupations) is entitled to some form of pension privileges in almost all countries. Hence, making reference to this category would allow us to determine whether security for old age guaranteed by the state has an impact on old-age savings. Unfortunately, the insignificance of the variables does not allow drawing far-reaching conclusions (the pension generosity factor will be further analysed on the basis of the 'Social Diagnosis' in Poland).

The presented in table 2 values are characteristic for the 20 countries studied. It would be interesting to present the models and results for particular countries as well as to analyse the impact of certain factors on savings. Such analysis could be performed based on the HFCS research or based on a more representative study on a larger group of respondent in each country. Hence, the following sections of this paper will present an example of such study, i.e. the 'Social Diagnosis'.

Table 2: Estimates of the parameters of logistic regression models for variable 'having voluntary pension scheme'

Specification		The significance level	S.E.	Exp(B)
Job (number)		0.000***	0.06	0.632
Job description	0 = Armed Forces Occupations (base)	0.000***		
	1 = Managers	0.121	0.174	1.309
	2 = Professionals	0.164	0.170	1.267
	3 = Technicians and Associate Professionals	0.028*	0.170	1.454
	4 = Clerical support workers	0.09	0.172	1.339
	5 = Services and sales workers	0.349	0.173	1.176
	6 = Skilled agricultural, forestry and fishery workers	0.947	0.238	0.984
	7 = Craft and related trades workers	0.707	0.175	0.936
	8 = Plant and machine operators and assemblers	0.458	0.180	0.875
	9 = Elementary occupations	0.198	0.181	0.792
Contract		0.000***	0.058	0.788
Retire		0.000***	0.001	1.006
Education	1 = Primary education (base)	0.000***		
	2 = Lower secondary or second stage of basic education	0.085	0.089	0.858
	3 = Upper secondary	0.023*	0.077	0.839
	4 = First stage tertiary	0.004**	0.082	1.267
Marital status	1 = Single/never married (base)	0.000***		
	2 = Married	0.000***	0.042	1.212
	3 = Consensual union on a legal basis	0.719	0.105	1.038
	4 = Widowed	0.378	0.122	1.114
	5 = Divorced	0.661	0.064	0.972
Gender		0.000***	0.032	0.857
Age	1 = 18–24 (base)	0.000***		
	2 = 25–36	0.009**	0.110	1.332
	3 = 36–50	0.000***	0.110	1.832
	4 = 51–60	0.000***	0.112	2.072
	5 = 61–	0.000***	0.128	1.883
Income	1 = 0 – 7,817 (base)	0.000***		
	2 = 7,817.1 – 17,699	0.000***	0.051	1.474
	3 = 17,699.1 – 32,300	0.000***	0.051	2.149
	4 = 32,300.1 –	0.000***	0.053	3.828
Const.		0.000***	0.231	0.054
Cox-Snell's R-squared		0.075		

Nagelkerke's R-squared	0.124
Hosmer-Lemeshow (p-value)	11.634 (0.168)
Log likelihood	30,068.317
Chi-square (p-value)	2,754.051 (0.000)
N	35,440

*Notes: Statistical significance at the: *** p<0.001; ** p<0.01; * p<0.05;* the model was re-estimated *by using backward stepwise selection method.*
Source: as in the table 1.

Old-age savings in Poland. Data and Methodology

The research presented in the article is part of a representative survey conducted in Poland in 2015, called 'Social Diagnosis' (Social Diagnosis, 2015). It is a panel study. The study has been conducted on a regular basis since 2000, and starting from 2003, the analysis is done every two years. In 2015, the study examined 11,740 households and 22,208 individual members of those households. The research was conducted in March and April by professional interviewers of the Central Statistical Office. Additionally, the results were appropriately weighted in order to preserve their representative character, both nationwise and when applied to each Polish province and the different categories of place of residence (for more information about the research method, cf. Czapiński and Panek, 2015). In order to extend the interpretive capacity of the study, the household data was compared to data concerning heads of household.

As in the case of data excerpted from the 'Eurosystem Household Finance and Consumption Survey', the analysis of the impact of privileges on saving in Poland is based on a logistic model. Two logistic regression models were used, one dependent variable being 'having savings for old age', and the second one, 'having any savings'.

Based on the data provided by the 'Social Diagnosis', eight independent variables were analysed in this work (Table 3). A backward stepwise selection method was used to eliminate the insignificant variables (Table 4). Respondents (heads of households) were divided into four professional groups. This was done in order to present the results of the study in reference to each of the privileged groups. The classification was based on the profession criterion (current profession, or previous profession, in case of persons who are no longer professionally active) and included the following:

1) miners (N=493),
2) persons covered by the provision pension system (firefighters, policemen, military personnel, etc., as well as judges and prosecutors) (N=375),
3) persons covered by the agricultural pension system (farmers, etc.) (N=1,539),
4) other persons covered by the study (N=9,317).

Table 3: Descriptive statistics for the independent variables

Variable	Variable description	Nature of the variables	N	M
Professional	Professional group	0 = Others	9,317	0.49
		1 = Miners	493	
		2 = Provision system (Uniformed services, judges and public prosecutors)	375	
		3 = Agricultural system (Farmers)	1,539	
Income	With your net income currently obtained, is	1 = With great difficulty	1,459	2.94
		2 = With difficulty	2,004	

	your household able to make ends meet?	3 = With some difficulty	4,202	
		4 = Rather easily	2,915	
		5 = Easily	692	
Residence	Place of residence	1 = Cities > 500k	982	4.49
		2 = Cities 200-500k	1,013	
		3 = Cities 100-200k	839	
		4 = Towns 20-100k	2,332	
		5 = Towns < 20k	1,495	
		6 = Rural areas	5,045	
Gender	Gender	0 = Woman	4,117	0.64
		1 = Man	7,604	
Age	Age of households' head	age	11,724	57.37
Child	Do you have a dependent child (or children)?	0 = No	6,128	0.36
		1 = Yes	3,559	
Insurance	Do you have any insurance?	0 = No	3,504	0.63
		1 = Yes	6,131	
Education	Years of education	years	11,710	11.84

Source: own study based on (Social Diagnosis, 2015).

Old-age savings in Poland confronted with the generosity of pension systems: results and discussion

The uniformed services, as well as judges and prosecutors do not make savings for old age, which probably stems from the fact that those professionals do not feel the need to save for this purpose, as their pension insurance is already (more than) sufficient. It confirms the hypothesis presented in the introduction, which concerned the impact of old-age security guaranteed by the state on savings. People tend to compensate the level of income in their lives, and in this case they do not need to do it. When they retire, both the uniformed services officers and judges and prosecutors are guaranteed a level of income which is not only above the minimum wage, but also at a level comparable to the income previously earned Farmers save for old age for the opposite reason, since this group receive pensions which are even a few times lower than those received, for instance, by judges.

A better assessment of one's financial situation has a positive effect on increasing their savings. As we will show for other variables, income has a greater impact on having savings in general, than on making savings specifically for old age. The financial situation of a family primarily affects the decision whether to save at all, rather than deciding on a specific form of saving, in this case saving for old age. Similar to other countries, men in Poland are more inclined to save for old age than women. Gender, just like income, has a greater impact on having savings in general than on saving only for old age. Also, the place of residence determines the level of savings. The chances for owning old-age savings for rural areas residents are about 36.7% lower than for those living in large urban areas. With regard to owning any savings, these chances are about 31.8% lower. While analysing the 'Age' variable, it can be stated that the amount of savings depends on the age of the head of the household. The chances of owning old-age savings increase by 3.3% with each year of age, and the figures are slightly lower (2%) in the case of owning any savings.

The study also shows that the fact of having children, just like having pension privileges, reduces the chances to possess additional voluntary retirement savings. People who possess some insurance also tend to have more and more savings, as they are more aware of everyday risks affecting everybody (which the insurance may protect them against). It is also probably related to the fact that savings are consistent with other financial products (Tavor and Garyn-Tal, 2016).

In Poland risk (including financial risk) has a positive impact on savings. In households having insurance, the chances of having savings are higher by as much as 45.2%. However, this relationship does not occur with regard to saving for old age. In this case, the need to save is not determined by possessing additional financial knowledge. Savings for old age, as opposed to 'Any savings', do not increase in the more financially aware households. This is also partly confirmed by the 'Education' variable. According to previous studies, education plays a significant role in saving in Poland. Our study shows that every single year of education increases the chances of having savings by as much as 11.8%. However, in the case of saving for old age, this variable plays a less significant role. Each subsequent year of education increases the chances of having these savings by an overall of 5.1%.

Table 4: Estimates of the parameters of logistic regression models

Specification		Having savings for old-age			Having any savings		
		The significance level	S.E.	Exp(B)	The significance level	S.E.	Exp(B)
Profession	0 = Others (base)	0,000***			0.010*		
	1 = Miners	0.087	0.134	1.258	0.097	0.117	1.214
	2 = Provision system (Uniformed services and judges and public prosecutors)	0.043*	0.164	0.717	0.195	0.130	0.845
	3 = Agricultural system (Farmers)	0.000***	0.103	1.635	0.009*	0.077	1.222
Income	1= With great difficulty (base)	0.000***			0.000***		
	2 = With difficulty	0.003**	0.185	1.720	0.000***	0.109	2.188
	3 = With some difficulty	0.000***	0.171	2.200	0.000***	0.099	4.564
	4 = Rather easily	0.000***	0.172	3.927	0.000***	0.103	9.725
	5 = Easily	0.000***	0.191	5.077	0.000***	0.139	13.336
Residence	1 = Cities > 500k (base)	0.000***			0.000***		
	2 = Cities 200-500k	0.961	0.128	1.006	0.534	0.115	0.931
	3 = Cities 100-200k	0.436	0.136	0.899	0.001***	0.120	0.668
	4 = Towns 20-100k	0,036*	0.114	0.788	0.007**	0.099	0.767
	5 = Towns < 20k	0.017*	0.125	0.741	0.016*	0.107	0.774
	6 = Rural areas	0,000***	0.113	0.633	0.000***	0.096	0.682
Gender		0.009**	0.066	1.189	0.000***	0.052	1.267
Age		0.000***	0.003	1.033	0.000***	0,002	1.017
Insurance		-	-	-	0.000***	0.054	1.452
Child		0.01**	0.075	0.744	-	-	-
Education		0.000***	0.010	1.051	0.000***	0.009	1.118
Const.		0.001***	0.309	0.017	0.000***	0.221	0.015
Cox–Snell's R-squared		0.096			0.184		
Nagelkerke's R-squared		0.134			0.247		

Hosmer-Lemeshow (p-value)	14.265 (0.075)	4.881 (0.770)
Log likelihood	6,743.843	10,705.347
Chi-square (p-value)	590.616 (0.000)	1873.522 (0.000)
N	5,856	9,193

*Note: Statistical significance at the: *** p<0.001; ** p<0.01; * p<0.05; ;* the model was re-estimated *by using backward stepwise selection method.*
Source: as in the table 3.

Conclusions

In both Europe as a whole and in Poland, many variables influence old-age savings, which supports the hypothesis (H1), stating that social-economic determinants have an impact on old-age saving decisions.

This work shows that age (both in Europe and in Poland) and education (education level in Europe, the number of schooling years in Poland) increase the chances to save for old age. In both studies, income plays a significant and powerful role for this type of savings. Yet, as indicated in our study, a subjectively estimated financial situation has an evidently greater impact on old-age savings than the income declared in a given currency. Income growth does not necessarily lead to an increase of wealth, as increased income is always accompanied by increased consumption. Taking into account all aspects of this variable, it may be observed that income growth has an impact on the frequency of saving for old age (the case of Europe), but the sense of financial security turns out to be much more important (the case of Poland).

Depending on the generosity of the system, being entitled to privileges affects saving for old age in Poland. Those who benefit from privileges related to the retirement age and the pension amount, i.e., the uniformed services, judges and prosecutors, are less likely to save for their retirement than 'ordinary' working people. Meanwhile, farmers who are considered to benefit from pension privileges, save for old age much more than the rest of the population. Their privilege comes down to the low contribution they pay, and small benefits motivate them to take individual precautions.

The results of our study may indicate that Poles are rational while planning their income over a lifetime, at least if we take into consideration the impact of profession and the generosity of the system on making pension decisions. Persons who are better protected by the state in the scope of pensions can make less individual savings, and, in fact, do save less for old age. Persons granted a weaker protection within the pension system need to save more for old age and they actually do. Those who decide whether to invest in additional protection for old age take into account the level of future benefits guaranteed by the state. So, the research results support the hypothesis (H2), stating that savings for old age are dependent on the level of social security benefits related to the profession performed.

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This paper uses data from the ‘Eurosystem Household Finance and Consumption Survey’. The results published and the related observations and analysis may not correspond to results or analysis of the data producers.

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Assessment of The Creative Culture and Level of Innovation in A Company- Case Study

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Abstract

This study presents a method of assessing the creative culture in a company. The aim of the concept is to support managers in building a creative workplace. The study uses a non-standard research methodology involving a creative culture questionnaire and an innovation questionnaire. The methodology is universal and can be applied in innovative companies.

Keywords: Hierarchy of Needs, Pro-Creative Culture, Level of Innovation.

Introduction

Subject literature on motivation includes various concepts of and empirical evidence for employee motivation as a key determinant of a company's success and development (Hunter, Schmidt 1996). An innovative company should encourage its employees to be creative, as creativity plays an important role in corporate processes and stimulates the company's development. Combined with knowledge and social competences, creativity is the first step in the establishment of innovation (Luecke 2003, Tomczak-Horyń, Knosala 2017). Consequently, managers should take care to build an appropriate organizational culture that stimulates creativity among the employees and improves their engagement in designing innovative solutions. Such a culture should encourage every employee to express his or her opinion freely, experiment, take risks, and admit to making mistakes without fear of punishment (Dyer, Gregersen, Christensen 2011). Organizational culture is also affected by factors such as safety, support for innovation, clearly-defined goals, and task orientation (West 1997). It is important to determine the foundations of creative culture in the company in order to assess the current level of creative culture and determine the areas that need strengthening to obtain the highest possible level.

To help assess the creative culture in a company, a hierarchy of needs was designed based on A. Maslow's hierarchy of needs. According to Maslow, human beings have various needs that can be divided into groups according to their importance: physiological needs, safety needs, love and belonging, esteem, and self-actualization (Maslow 1948, 2017). Needs are our primary motivational force (Uysal, Genc 2017). Maslow's theory states that a human being will only reach for a higher group of needs once the lower needs have been fulfilled (Maslow 1948, 2017). From the viewpoint of an enterprise, physiological needs correspond to appropriate pay and environmental working conditions. Safety needs correspond to the continuity of employment and good employee benefits. Love and belonging concerns social processes; it is the need to form attachments to and be accepted by co-workers. In a company, employees must have a sense of belonging to a team. Esteem corresponds to self-respect and a positive image of oneself and the need to be respected by others. Managers can help to fulfill this need by ensuring that the employees are appropriately motivated and given ambitious tasks that provide a feeling of success. The final category, self-actualization, involves self-development through working towards a promotion (Griffin 2012, Tomczak-Horyń 2020).

The hierarchy of needs according to creative culture contains microfoundations, such as creative working conditions, support from management staff, a positive group of co-workers, rewards for creative actions, and challenges.

Hierarchy of needs from the perspective of creative culture in a company

The first stage of determining the hierarchy of needs related to a creative culture was to analyze the component categories of a creative climate described in a study by Knosala, Tomczak-Horyń, and Wasilewska (2019). The characteristics of creative culture were divided into categories corresponding to levels in a hierarchy of needs. Each level was assessed using appropriate questions included in a creative culture questionnaire (Figure 1).

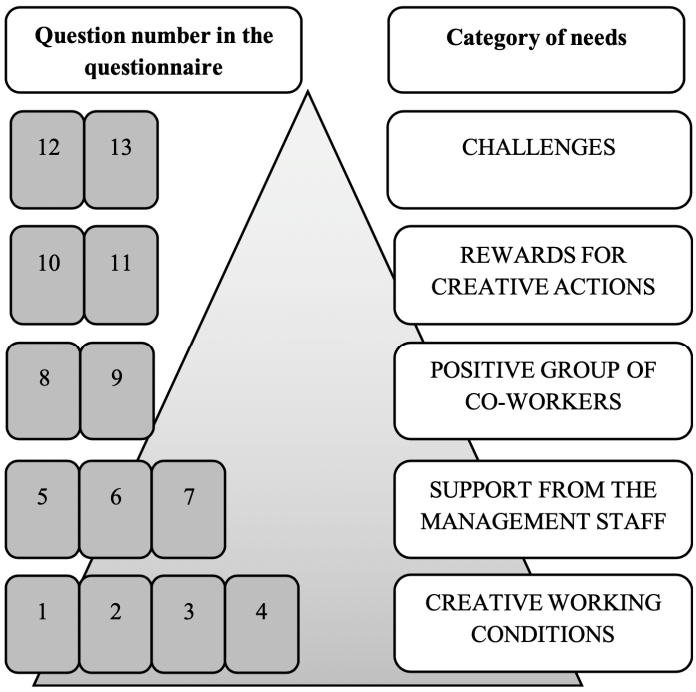

Fig. 1:Hierarchy of needs within the creative culture of a company

The first level encompasses the basic working conditions that stimulate creativity. These include establishing an appropriate post, allowing the employees to carry out their tasks freely, providing training in creativity and innovation, and establishing the goals and expectations related to creative processes in the company (Tomczak-Horyń 2020).

The second level encompasses support from the management staff. Steps should be taken to make sure that the managers acknowledge and strengthen creativity. Communication between managers and subordinates should be open and effective (Hunter, Bedell, Mumford 2007, p. 105).

The third level is related to a positive group of co-workers that focuses on teamwork (Tomczak-Horyń 2020). Such a group should be supportive, intellectually stimulating, trustworthy and open-minded, and have a good sense of humor and good communication skills. The members of the team should feel well-integrated with the company (Hunter, Bedell, Mumford 2007, p. 105).

The fourth level concerns rewarding creative initiatives by designing a system of motivations for creativity.

The final level of the pyramid of needs encompasses challenges. Each employee should be given tasks that are interesting and challenging, and that support his or her self-development (Tomczak-Horyń, Knosala 2019b).

Creative Culture Questionnaire

A questionnaire was designed based on the hierarchy of needs related to creative culture (Tomczak-Horyń 2020). The questionnaire contains 13 questions concerning each microfoundation of creative culture (Table 1). In questions 9 and 11, the respondents can choose from a selection of types and forms.

Table 1: Questions included in the creative culture questionnaire

Category of needs	No.	Question
CREATIVE WORKING CONDITIONS	1	Are the employees able to allocate some of their work time for creative actions?
	2	Can the employees carry out their tasks freely?
	3	Have any goals or expectations concerning creative processes in the company been set?
	4	Does the company have a break room for the employees?
SUPPORT FROM THE MANAGEMENT STAFF	5	Does the company conduct training in creativity and innovation?
	6	Do the employees submit their ideas for improvement?
	7	Does the company have an idea box or an IT system for managing ideas?
POSITIVE GROUP OF CO-WORKERS	8	Are there dedicated work teams for specific tasks?
	9	Does the company make use of creative problem-solving methods?
		If so, what methods are used most often (brainstorming, crushing, De Bono Six Thinking Hats, analogies, etc.)?
REWARDS FOR CREATIVE ACTIONS	10	Are there competitions held for the best idea or improvements for the company?
	11	Are the employees rewarded for implementing the ideas they submit within the company?
		If so, what types of rewards are given (bonuses, vouchers, integration trips, in-kind prizes, etc.)?
CHALLENGES	12	Does the company offer development programs and individual career paths for employees?
	13	Is there in-house staff responsible for mentoring and coaching the employees?

The level of creative culture and innovation is assessed on a five-point scale, where 1 denotes a very low level and 5 denotes a very high level (Table 2). One point can be scored for each question in the creative culture questionnaire.

Table 2: Indicators of creative culture and innovation in a company

Level		Points
V	very high	12-13
IV	high	9-11
III	average	6-8
II	low	3-5
I	very low	1-2

A score between 12 and 13 points indicates a very high level of creative culture in the company.

Innovation Questionnaire

The innovation questionnaire consists of 13 questions (Table 3) divided into four categories:

1. Company development and investments (questions 1–3);
2. Innovations implemented in the company and forms of funding innovations (questions 4–6);
3. Company initiatives related to the implementation of innovative solutions (questions 7–8);
4. Methods and techniques of lean production (questions 9–10).

Both closed-ended and semi-open questions are used. In questions 4, 9, and 13, respondents can choose more than one answer. Innovation in a company is assessed by means of a semi-structured interview (Blandford 2013) in the form of a personal conversation. Additional questions not included in the interview plan may arise during the interview.

The level of innovation is also assessed on a five-point scale. Four points can be scored for question 4 and one point can be scored in each of the other questions.

Table 3: Questions included in the innovation questionnaire

Category	No.	Question	Answers				
Development and investments	1	Has the company's economic situation improved?	yes	no			
		How would you evaluate the company's economic condition?	greatly improved	improved	unstable, changing	gradually worsening	rapidly worsening, endangering the company's operation
	2	In recent years, employment in the company has...	increased	remained the same	decreased		
	3	Has the company made any investments within the last three years?	yes (please specify)	no			
Innovations and forms of financing innovations	4	What type of innovations did the company introduce between 2016 and 2019?	product-related	process-related	organizational	marketing	none
	5	Did the innovations introduced between 2016 and 2019 have a novelty value on the market?	yes	no			
	6	Does the company allocate funds exclusively for innovative activity?	yes	no			
		What forms of financing does the company use?					
Plans related to innovative activity	7	Is the company planning to carry out innovative processes between 2020 and 2023?	yes (please specify)	no			
		What are the company's plans regarding innovative activity?	increase	no change	decrease		
	8	Are there any barriers to innovative activity in the company?	yes	no			
		What is the most significant factor that discourages the company from making innovative decisions?	high operational costs	difficult access to market information	insufficient technical knowledge	high risk of failure	other
Methods and techniques of lean production	9	Does the company conduct training in the improvement of production processes and system?	yes	no			
	10	Does the company implement methods and techniques of lean production?	yes	no			
		What methods and techniques of lean production are used in the company?	Quality Function Deployment	Total Quality Management	continuous development (Kaizen)	Lean Six Sigma	Total Productive Maintenance
			5S	Single Minute Exchange of Die	Just in Time	other	

Assessment of Creative Culture in A Large Construction Company

Creative culture and innovation were assessed in a large construction company specializing in the production of security and access control systems. The assessment was conducted among nine high-ranking employees, including the Information Flow Leader, Head of the IT Department, Lean Specialist, Health and Safety Specialist, Logistics Specialist, Constructor, Technologist, and Manufacturing Engineer. A semi-structured interview was conducted with the Information Flow Leader. The other employees completed electronic versions of the innovation questionnaire (Tomczak-Horyń, Knosala 2019) and the creative culture questionnaire. The average time to complete the questionnaire was 10 minutes.

The company scored 10 points in terms of innovation, which indicated a high level of innovation. In recent years, the company's financial situation has improved while the number of employees has remained the same. Lately, the company purchased a machinery park. Between 2016 and 2019, the company introduced innovations related to products, processes, and organization. However, they did not have a novelty value on the market. The company allocates some funds exclusively for innovation. Among the factors that had a negative impact on innovative decision making in the company, the respondents listed high operational costs, difficult access to market information, high risk of failure, and limited means of promoting a new product. The company is considering introducing innovative processes and increasing innovative activity between 2020 and 2023. Currently, the company is conducting training on the improvement of products and systems. It also applies lean production methods and techniques, including Total Quality Management, continuous improvement (Kaizen), Lean Six Sigma, Total Productive Maintenance, 5S, Single Minute Exchange of Die, and Just in Time.

Next, creative culture in the company was assessed based on the aforementioned hierarchy of needs. Most of the categories of needs related to creative culture were fulfilled. The first category concerns working conditions that support creativity. The employees of the company are able to dedicate some of their work time to creative actions, and are free to carry out their tasks the way they want. On the other hand, no goals or expectations related to creative processes in the company have been set. Furthermore, the company does not have a break room for the employees.

The second category of needs concerns support from the management staff. Currently, the company does not organize training in creativity or innovation. However, the employees are showing initiative in introducing innovative solutions and submitting their ideas for improvement. A system for supporting idea management has also been implemented.

The third category of needs concerns a positive group of co-workers that focuses on teamwork. The company forms work teams and applies creative problem-solving methods, primarily brainstorming and analogies.

The fourth category concerns rewards for creative behavior. The company holds competitions for the best ideas for improvement. If an idea is implemented, the employee who suggested it is rewarded with a bonus and vouchers. The company also arranges trips and organizational meetings.

The fifth category of needs is challenges. The company does not take any action in this respect.

Each level of the pyramid of needs related to creative culture has its own characteristic factors, which correspond to the questions included in the creative culture questionnaire. In Figure 2, the microfoundations that need improvement in order to achieve a high level of creative culture are marked in white.

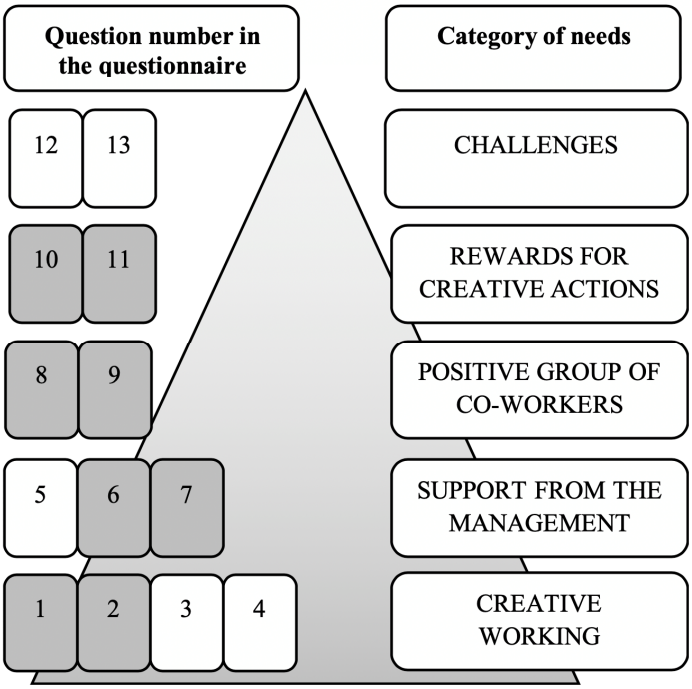

Fig. 2: Creative culture of a large construction company

The company scored 8 points in the assessment of creative culture. According to the scale used, this indicates a moderate level of creative culture. Most of the categories of needs have not been fulfilled. The company should establish goals and expectations related to creative processes and create a break room for the employees. The company also should organize training in creativity and innovation. The final category of needs has not been fulfilled. The company does not offer its employees any individual development plans or career paths. Furthermore, there is no staff responsible for coaching and mentoring the employees.

Summary

This study used a research methodology involving questionnaires. The methodology is universal and can be applied in innovative companies. The level of innovation was assessed using an appropriate questionnaire. The article also presents a method of assessing creative culture in a company. The method uses a pyramid of needs composed of the microfoundations that make up a creative culture. The creative culture questionnaire was designed based on this pyramid.

Creative culture was assessed in a large construction company specializing in the production of security and access control systems. The assessment indicated the areas that the company needs to strengthen in order to obtain the highest possible level of creative culture.

Research on creative culture in companies will be continued. Selected manufacturing and services companies of different sizes will be assessed. The research will primarily include innovative enterprises that introduced innovations related to processes, products, organization, or marketing between 2016 and 2019. The aim of the research will be to validate the assumption that introducing innovative solutions in a company is impossible without an established creative culture. The results of the research will be provided in future publications. Currently, another study is ongoing to validate this assumption. Its results will be provided in future publications.

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Analysis of The Main Policy Tools of Regional Social and Economic Development

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Abstract

State regional policy in all countries is aimed at ensuring balanced territorial development. In this connection, the main vector often comprises of the equalization of levels of social and economic development, a decrease in differentiation, which is achieved using various economic and administrative tools.

Keywords: Regional Development, Equalization, State Regional Policy.

Introduction

Almost all nations of the globe, regardless of the size of the territory, are faced with regional differentiation issues. The uneven development of territories leads to an increase in migration flows towards more prosperous ones as well as to increase in social strain in less developed regions and their further degradation. Considering the above, the authorities of all countries of the world note the problems of leveling the levels of social and economic development as a threat to economic and national security.

Main part

The development of each state is associated with building relationships between central authorities and regional governments. In federal states and integration associations, the authorities are faced with the issue of ensuring the uniform development (as far as possible) of the entire territory. Thus, the challenge arises of ensuring balanced regional development.

The main tools of state stimulation of regional development and equalization of the corresponding social and economic levels can be divided into two main types that are used in symbiosis: administrative and economic ones (some authors also distinguish social and psychological) (Timofeeva O.G., Kovarda V.V., 2019). Mechanisms and tools are built on the basis of the principles of regional development policy and mechanisms for their implementation (Khodachek A.M., 2016).

In Russia, the state regional policy evolved through a number of stages, and the functions of governing bodies of the constituent entities of the Russian Federation also transformed. Currently, the main tools for stimulating regional development are transfers and territories with special legal status, which can be attributed to economic mechanisms, while they are combined with administrative tools.

In general, foreign and domestic experience proves that the state regulation of economic and social development and regional economic policy often give a much greater effect than a centralized impact.

The most successful option is a coordinated combination of centralized and regional impact on business entities, in which the centralized impact plays a strategic, guiding role, and most economic and social tasks are implemented at the regional level through a specific social and economic policy of the regions (Sidorenko O.V., Bondarenko T.N., 2014). Sustainable and balanced development of the national economy can be achieved only with the creation of the necessary conditions and prerequisites for the development of regional economic systems through the activation of endogenous factors (Uskova T.V., Voroshilov N.V., 2015). The above requirements are implemented through the use of a set of instruments of state influence on the regional social and economic system.

There are many options for classifying instruments of state regulation of regional development, the main of which can be represented as Figure 1.

METHODS AND TOOLS OF STATE REGULATION OF REGIONAL DEVELOPMENT				
Classification feature	*By tools (areas) of impact*	Forecasting, planning, development programming	Fiscal system	Use of various regulatory tools, creation of special zones and territories
	By the nature of impact	Direct and indirect	Active and passive	Stimulating and limiting
	By management level	Macroeconomic policy tools	Mesoeconomic policy tools	Microeconomic policy tools

Fig. 1: Methods and tools of state regulation of regional development

Some authors draw attention to the advisability of grouping all tools and methods of state regulation of regional development into two groups: economic and administrative; in this case, the classification can be represented as Figure 2.

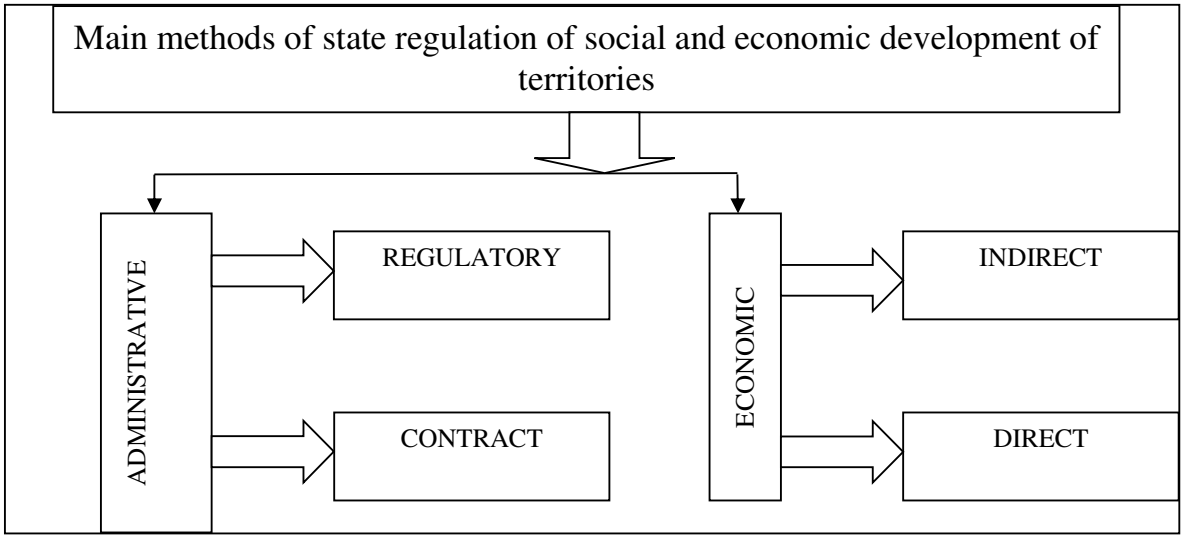

Fig. 2: Classification of tools and methods of state regulation of regional development into two groups

Others note that the content of the state regional policy consists of the coordinated implementation of two independent policies: regional and selective. The regional policy is aimed at creating common prerequisites for regional development, selective regional policy is an independent type of regional economic policy, and it is formed on the basis of public goals and priorities outlined in the concept of territorial development of the country, which sets strategic guidelines for spatial development (Figure 3) (Kovarda V., Laptev R., 2018).

The selective regional policy is the conscious activity of government bodies, consisting in the selective influence on certain territories, in order to achieve an effective and/or even distribution of economic activity across the country (Kovarda V.V., Laptev R.A., Nekhoroshikh I.N., 2019).

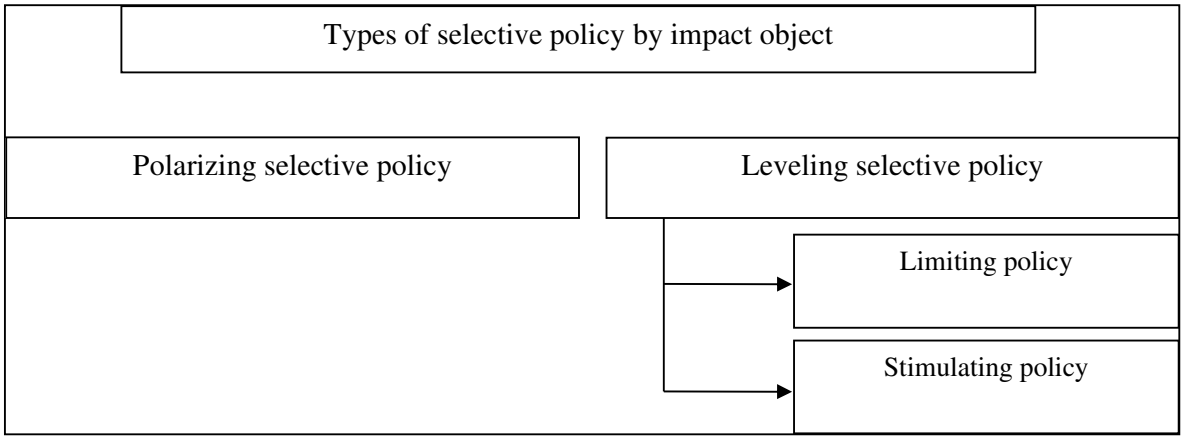

Fig. 3: Main types of selective regional policy

The stimulating regional policy is primarily implemented in economically developed countries in relation to depressed industrial and agricultural territories, and limiting policy is implemented in relation to overpopulated urban areas.

Polarizing selective policy is aimed at stimulating regions with the greatest economic development potential in order to maximize national income (these regions are considered as "locomotives of economic growth" or "growth poles"), and it is used primarily in economically developing countries (Kovarda V., Laptev R., 2018).

Some authors distinguish differentiated approach to the regulation of regional development, considering the elements of a certain set as independent objects of management (Shevyakin A., 2018). An important aspect of the differentiated approach of the state's regional policy is the typology of regions, i.e. their classification by a certain feature.

Within the framework of selective economic policy and differentiated approach, the state uses a system of administrative and economic tools at all management levels. In modern conditions, it is the combination of mechanisms of state regional policy, their timeliness and focus that the effectiveness of the measures implemented depends on.

An important tool for implementing the goals of regional and local policies is the full development of local self-government and its equitable and constructive interaction with regional authorities (Chaplygina M.A., Dobrinova T.V., Bolycheva E.A., 2019).

In general, the government of each state pursues a regional policy based on relevant laws and regulations, state strategies, programs and investment projects aimed at narrowing the gap between the levels of socio-economic development of regions. Ways to solve regional problems vary in different countries, but some common features can be identified. In many countries, the main functions of state regulation of regional development are performed by one or more authorized central agencies. E.g., in Germany these are the ministries of transport, construction and housing, in Italy these are the ministries for regional affairs, and in the Netherlands these are the ministries of housing, physical planning and environmental protection. In the United States, the development and implementation of regional policies are distributed between the Department of Commerce, the Office of Policy Development and the Office of Management and Budget under the President of the United States, as well as the Federal Advisory Council, the Commission on International Trade and the President of the United States, which is entitled to establish rules for the development and consideration of federal programs and projects that have a significant impact on the economic development of certain regions (Sidorenko O.V., Bondarenko T.N., 2014).

The supreme legislative bodies of most countries have special committees on regional policy, and the upper chambers of bicameral higher legislative bodies are often chambers of regional representatives.

In general, state regional policy in all countries is aimed at ensuring balanced territorial development. In this connection, the main vector often comprises of the equalization of levels of social and economic development, a decrease in differentiation, which is achieved by direct-acting economic tools (transfers, subsidies, etc.). Many economically developed states apply elements of a leveling selective limiting policy that is implemented by administrative measures (for example, "industrial production certificates" in the UK, or a decree of 1955 prohibiting the construction of new industrial facilities in Paris) (Kovarda V., Laptev R., 2018).

In addition to the aforementioned, the policy of supporting cluster formations and the unification of regions into integration associations (for example, the macro-region) got widespread use. So, in China, state regional policy includes the formation of macro-regions using the principle of combining "economically strong" and "economically weak" regions. The main goal is the unification and/or redistribution of human and social, industrial, agricultural, environmental, recreational capital. As a result, more urbanized industrialized regions get the opportunity to create recreational areas and reduce anthropogenic pressure on the environment. Less economically developed regions within the macro-region get the opportunity to exchange experiences, increase employment, expand production, i.e. there is a deepening of economic development, expansion of specialization.

It should be noted that the state policy of regional development of most countries seeks to enhance the internal advantages of specific territories.

The policy of ensuring the balanced development of territories of integration associations is of particular interest. Thus, the European Union policy in the field of stimulating regional development is gradually transforming towards the activation of endogenous growth factors and increasing the competitiveness of territories. However, overall, an equalization strategy still prevails, despite significant changes. Since 2014, three groups of regions have been allocated for the distribution of credits from the EU structural funds responsible for cohesion policy.

Within the framework of regional policy, the countries of Latin America were guided by the experience of economically developed countries. In recent decades - since the 1980s - you can find a lot in common in the Latin American and Russian features and problems of regional policies.

In Japan, the state regional policy in the 1970s was aimed at the territorial deconcentrating of science and production — the transfer from Tokyo to neighboring (including specially built) cities. In the 1980s, this vector of regional policy continued to be implemented (technopolises began to be created).

South Korea initially followed a polarizing selective policy, however in the 1990s the emphasis was on balanced development.

In general, it should be noted that all the instruments of state regulation of regional development and the provision of balanced growth, used in different countries, have their own advantages and disadvantages, and are quite well known to the scientific community. The effectiveness of applying this or that method of implementing regional state policy is determined by many factors, and the modern economy uses combined system of tools, which forms a set of mechanisms for the influence of central authorities on territorial development of the territory.

Conclusion

In conclusion, it can be noted that the methods and tools of state stimulation of regional development and ensuring balance (overcoming differentiation) are essentially the same in all countries, however the number of used tools and their combination in each country are individual.

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On the Need for Transformation of State Policy of Regional Development on The Basis of Determining Perspective Specializations of Constituent Entities of The Russian Federation

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Abstract

The article analyzes the prospects for the spatial development of Russia on the basis of stimulating the specializations of each region (according to Federal State Statistics Service). We study the specific weight of each region in the all-Russian values of social and economic indicators, which allows us to determine the most developed industries in the studied territories. As a result, it was possible to distribute the constituent entities of the Russian Federation by relative specialization, e.g. the Kursk and Belgorod regions make the largest contribution to the Russian economy through the production of agricultural products, others have a pronounced character in mining (Khanty-Mansiysk Autonomous Region - Ugra), and the third are multilaterally developed (Moscow region). Cities of federal significance play a special part in the Russian economy due to the concentration of scientific and industrial capital. It is proposed to create and implement the state policy of spatial development considering specializations of each constituent entity of the Russian Federation. In this case, the formation of macro-regions using the PRC as example is of certain scientific and practical interest. China tries to redistribute the load on its constituent entities via the creation of macro-regions. In Russia, macro-regions are legislatively described in the Spatial Development Strategy of the Russian Federation, however, due to the short period of validity of this document, significant effects have not yet been obtained. In the future, it is advisable to develop strategies for the development of endogenous factors of economic growth of territories.

Keywords: Region, State Policy, Regional Specialization, Spatial Development, State Regulation Tools

Modern Russia is characterized by significant differentiation in the levels of social and economic development of the constituent entities, which is noted in the Economic Security Strategy of the Russian Federation (Decree of the President of Russia No. 208). At the same time, federal executive and legislative authorities constantly strive to equalize the regions according to the degree of development, by exercising managerial influences in a direct and indirect way (direct financing (including transfers, subsidies, etc. (Budget Code of the Russian Federation No. 145-FZ)), creating favorable conditions for entrepreneurial activity (Kovarda V., Laptev R., 2018)) (Fig. 1). Also, grants are allocated to the regions that show the highest growth.

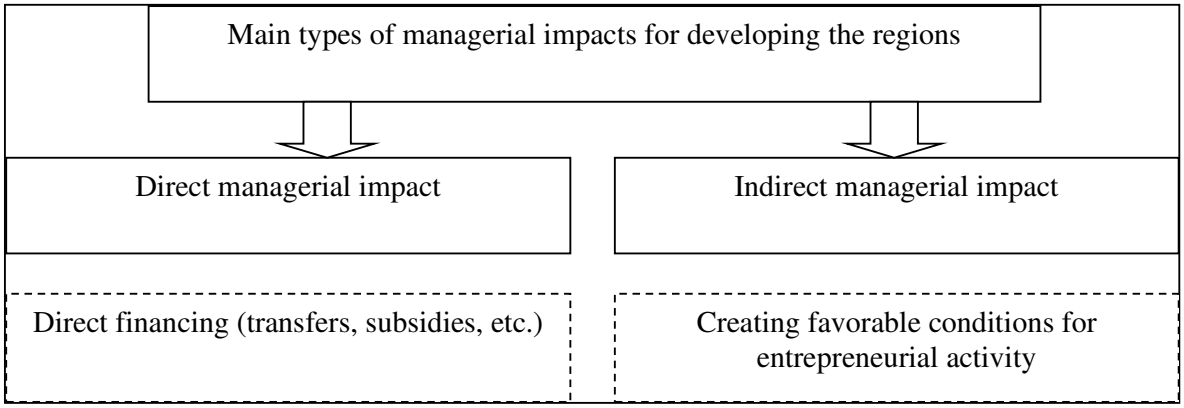

Fig. 1: Main types of managerial impacts for developing the regions

Thus, within the framework of regional development, a system of tools and mechanisms of state stimulation is used, combining direct impact, indirect promotion of economic growth, as well as the creation of a competitive environment between territories.

However, it is necessary to note that the systematic approach is insufficient for the formation of the state policy for regional development due to the lack of single goal-setting, i.e. there is no systematic and long-term unambiguous understanding of the desired position. Some experts look with favor on the adoption of the Strategy for Spatial Development of the Russian Federation until 2025, in which promising economic specializations of each constituent entity of the Russian Federation are noted (Order of the Government of the Russian Federation No. 207-R). At the same time, the phased (gradual) development of these specializations seems important.

As a result, we can conclude that the spatial development of Russia must be carried out through regionalization, the development of existing specialization and involvement in regional, national and international value chains, as well as the effective use of the potentials of the regions.

In connection with the foregoing, the study set the goal of analyzing the degree of difference in the specializations of the regions of the Russian Federation and exploring the main directions of improving the state policy of regional development by identifying promising specializations of constituent entities of the Russian Federation.

Regulatory documents within the ConsultantPlus reference system, data from Federal State Statistics Service, government information materials, as well as researches carried out by the authors and other Russian scientists were sources for this article.

It is revealed that, at present, each region of Russia has a certain specialization, which can be traced by proportion of a specific indicator in all-Russian values. Moreover, many constituent entities of the Russian Federation are characterized by low values despite the presence of growth potential, while others, on the contrary, are characterized by significant values. E.g., Moscow in 2016 occupied the first place in Russia in terms of GRP with a value of 20.6% (i.e., a fifth of the country's GDP was formed in Moscow). A similar situation applies to such an indicator as “mining”, which amounted to 9.14% in 2016. In fact, it is due to the fact that many large companies operating in other constituent entities of the Russian Federation are registered in Moscow and pay a significant portion of taxes there (13.9% of all-Russian value in 2017) (Regions of Russia. Social and economic parameters).

According to the share of the constituent entity of the Russian Federation in the all-Russian values of indicators, it is possible to identify its primary specialization. For example, in the Kursk region, agriculture (2.6% in 2017) and electricity production (1.12%) predominate, which is understandable

and is associated with the region's potential - black soils (crop production - 2.9%) and a nuclear power plant. In the Belgorod region, agriculture predominates (4.4%), as well as manufacturing (1.62%). At the same time, mining predominates in the Khanty-Mansiysk Autonomous District - Ugra (21.44% of the all-Russian value), while manufacturing amounted to 1.38% in 2017, electricity, steam and gas production amounted to 4.01%, and agriculture wasn't developed due to the geographical and climatic features of the region. At the same time, this constituent entity of the Russian Federation provided 21.7% of all tax revenues to the federal budget of the Russian Federation in 2017 (i.e., more than 1/5 of the total).

Thus, according to the results of the analysis, it is possible to suggest further development of agriculture and processing industry in the Kursk and Belgorod regions in order to supply more northern constituent entities of the Russian Federation, such as the Tver and Vologda regions, the Khanty-Mansi Autonomous District - Ugra, and St. Petersburg. In turn, some of the above regions have specialization in the manufacturing industry, which causes the need to stimulate the development of these areas in order to supply other regions. Thus, at this stage, it is necessary to consider specialization through the prism of geographical location and the existing structure of the regional economic system.

It is necessary then to analyze the potential opportunities of each region within the imperative of the development of new areas of activity (both separately and through the prism of all-Russian significance). For example, the Kursk region has transit potential (the Moscow-Simferopol section of the highway passes through the region, as well as a highway to Kiev) (Tikhomirov M.E., 2018), with prospects for the development of agriculture and processing of agricultural raw materials, as well as integrating enterprises and organizations in regional, national and international value chains.

In this aspect, it is necessary to stimulate the development of the business climate using two complementary vectors (Fig. 2).

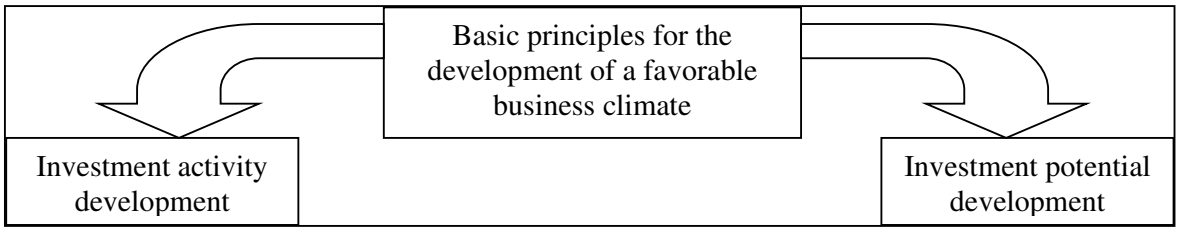

Fig. 2: Basic principles for the development of a favorable business climate

Thus, the development of the region's investment potential through the activation of endogenous growth factors should be supported by sufficient investment activity. In this case, it is possible to use the mechanism of public-private partnership (PPP) in order to expand the investment attractiveness of the constituent entity of the Russian Federation.

In this context, overcoming significant differentiation in the levels of social and economic development of regions in PRC is of particular interest. In 2015, the main provisions of the synergetic development of the Beijing-Tianjin-Hebei region (a kind of macro-region) were approved, including decentralization of Beijing, integration of transport infrastructure, environmental protection, modernization of industry and other key sectors (Ilyin V.A., Shabunova A.A., Gulin K.A., Mao Zh., 2017). As a result, regions with different levels of economic development and urbanization should achieve a balanced state.

In Russia, such projects are not implemented by administrative measures, however the relative influence of more economically developed constituent entities of the Russian Federation on relatively less developed ones can be observed. Moscow and neighboring territories can be used as example

(List of special economic zones).

Thus, when forming regional strategies for social and economic growth, it is necessary to consider the spatial development strategy of Russia, and, accordingly, authorities should develop and implement incentive methods and tools. At the same time, investment strategies should be divided into two complementary and interacting areas: the development of existing potential and the production of "new" (for the region) products (Fig. 3).

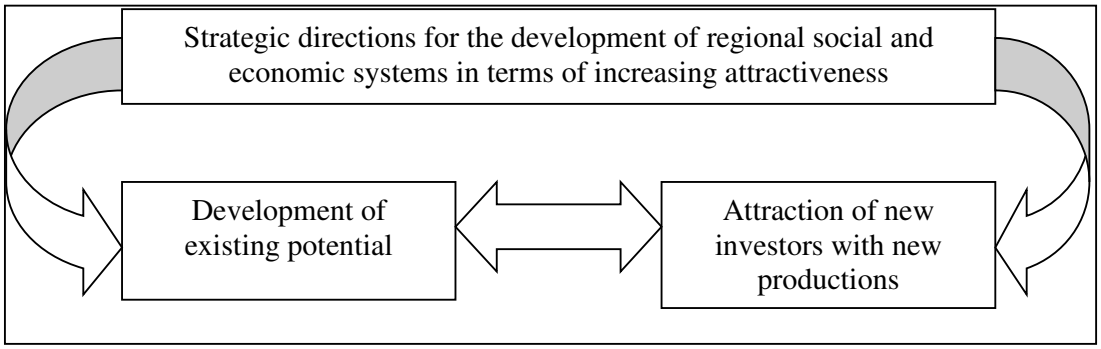

Fig. 3: Strategic directions for the development of regional social and economic systems in terms of increasing attractiveness

In this case, the algorithm of actions is aimed at integrating each constituent entity of the Russian Federation into the all-Russian spatial map by identifying areas of activity in which the region uses existing resources in a more efficient manner. If the territory does not have a pronounced specialization, then its potential is considered, which can be unlocked in the first place. Otherwise, the areas of activity initially develop in accordance with specialization, and the potential in the form of endogenous factors is gradually included in the functioning of the territorial social and economic system.

Ultimately, the implementation of the state policy for regional development should be coordinated with the Strategy for Spatial Development and carried out in two main directions: expanding existing specializations and activating the potential capabilities of constituent entities of the Russian Federation (Fig. 4).

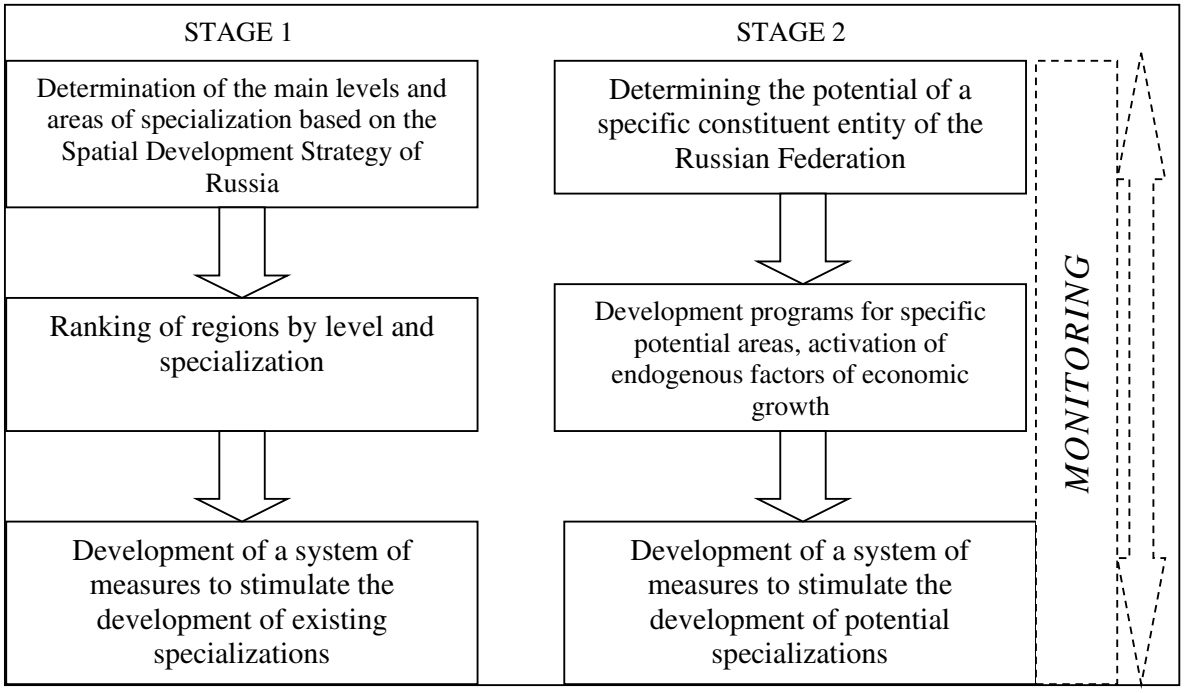

Fig. 4: The main stages of the implementation of the spatial development strategy of Russia within the vector of stimulating the development of specializations

It should be noted that these stages can be carried out in parallel or sequentially. At the first stage, the formation of a system of specializations of the regions of the Russian Federation is carried out, and priority directions of development are identified by specific indicators in all-Russian values (or by the range of exported products to neighboring regions of Russia or abroad). In this case, the principle of balanced spatial development must be observed, as well as key guidelines in the field of import substitution. The next step is the development and implementation of a system of measures and tools to stimulate specialization industries.

At the second stage, an analysis of the potential of a particular constituent entity of the Russian Federation is carried out, endogenous growth factors (for example, transit potential, recreational, etc.) are identified, based on which a spatial map of the distribution of promising industries and sectors is developed (planning element). Then, a system of measures should be formed to stimulate the development of potential specializations.

An important component of the given scheme is the establishment and development of interregional cooperation. As a result, there will be a gradual change in the structure of the economy in the direction of production of highly processed products and high-tech industries.

Conclusion

There is the need to direct efforts towards the formation of regional specializations within the framework of the spatial development strategy of Russia. At the same time, it is advisable to pay special attention not only to established specializations, but also to promising ones (based on the potential of a particular region and cooperative ties), which will entail a change in the structure of the economy and evolution from resource-based economy to high-tech industries and services.

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The Industry 4.0 Development and Influence on Labour Migration in The VISEGRAD Group Countries

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Abstract

This study analyses changes in the labour markets in the Visegrad Group countries (V4) under the influence of the fourth industrial revolution (Industry 4.0) with regard to labour immigration. Industrial production in the countries concerned accounts for a significant part of GDP, and most vacancies in the individual markets concern unskilled positions requiring secondary education. The low level of citizens' interest in such positions results in employment of workers from other countries. The changes taking place in the industrial sector, caused to a large extent by automation and robotization of processes, lead to gradual replacement of the workforce with machines. This study focuses on an analysis of the relationship between the immigrant workforce with selected characteristics and macroeconomic indicators reflecting the impact of the industrial revolution in V4 countries. The analysis was based on basic and publicly available statistical measures taken from Eurostat and European Commission databases.

Keywords: industry 4.0, Visegrad Group countries, labour market, migration

Introduction

A new factor emerging in the context of industrial revolution 4.0 is dynamic development of breakthrough technologies, which have very quickly and fundamentally started to outperform previously used technologies (Autor, 2015; Rajiani, Ismail, 2019). Industry 4.0 is created by "smart factories", where the machine is an intelligent device with a level of automation that enables it to function independently. This is possible thanks to the use of, among others, the "Internet of Things", the "cloud" technology and big data (Frey, Osborne, 20015) which are integrated in a joint system and which can function independently thanks to applied algorithms based on artificial intelligence (Graetz, Michaels, 2018).

However, the abovementioned solutions are being implemented too abruptly. According to Mokyr et al. (2015), in terms of processes, this is a revolution preceded by an evolutionary phase characterised by gradual and continuous development (Ślusarczyk, 2018). In case of too rapid development, companies are not prepared for such dynamic changes, therefore, the fourth industrial revolution involves not only technological changes, but also changes at the administrative or service level, and the effects can be observed in the whole society (Nordhaus, 2015).

Initially, the changes will be visible in the labour market as a decline in unemployment in developed countries, with a declining nominal wage growth and declining gross domestic product (GDP), whose level as a key macroeconomic factor indicates a weakening position of labour with regard to state capital and higher labour hire costs (Gregory et al. 2015; Ungerman et al. 2018).

The International Labour Organisation (ILO) has been tasked with identifying the factors which form the basis of development, such as technological progress, trade globalisation, financial development and declining significance of trade unions. The ILO states that the most important development factor is financialisation, i.e. increasing the impact of the financial sector on the economy (Pilloni, 2018). In

turn, the OECD claims that it is technological changes and capital accumulation (OECD, 2019). How may this affect the labour market?

The World Trade Organization estimates that by 2020 about 7 million jobs could disappear (Ślusarczyk et al. 2019). McKinsey claims that by 2030 the labour market will reduce the number of jobs by about 400-800 million (WTO, 2019). PwC forecasts that in the United States alone, 60 million jobs will have to be cut by the same year (PwC, 2018). In turn, the International Federation of Robotics focuses on jobs emerging in response to the ongoing processes and optimistically estimates that 3.5 million new jobs will be created by 2021 (OECD, 2019). The OECD evaluates its geographical area, where, according to studies, 9% of jobs will be closed in the coming years (Frey, Osborne, 2017).

To sum up, all breakthrough technologies and innovations implemented in enterprises constitute a revolutionary change in broadly-defined processes and are referred to as Industry 4.0 (Bazzi, 2017; Nagy et al. 2018). Despite the positive effects of this change, it also represents a threat to the labour market. Research specialists in this field agree that Industry 4.0 can have many different consequences and there may be various ways of solving them (Rodič, 2017; Durana et al. 2019). Being at the beginning of this change, it is impossible to accurately predict the consequences of the processes taking place. These forecasts pay little attention to the population's demographic structure and development in the context of the industrial revolution or varying stages of development in individual countries, or to the social and cultural environment of the population in those countries. In this study, special attention is paid to changes taking place in the labour markets in the Visegrad Group countries in connection with Industry 4.0 in the context of economic immigration.

Objective and Methodology

The aim of this study is an attempt to answer the question of how the labour market will change as a result of the changes brought about by the introduction of the Industry 4.0 concept and whether it will affect employment resulting from migration movement in the Visegrad Group countries.

The changes currently observed in economic and social development discussed in the concept of Industry 4.0 affect the volume of production and are related to the labour market, namely the nature and intensity of work and the structure of the proposed positions. It is a well-known fact that labour migration is a factor that has a significant impact on the labour market, which is why the study focuses on determining whether the Industry 4.0 concept will affect this movement and, if so, how it will affect the labour market.

The study was carried out on the basis of selected labour market indicators and is based on basic statistical measures taken from *Eurostat* databases and European Commission data. For data analysis purposes, a licensed *STATISTICA v.7.1 PL StatSoft* package was used.

Publicly available statistical methods were used in the study: correlation analysis using r-Pearson correlation coefficients, which provided the basis for examining the correlation between macroeconomic indicators and Industry 4.0 indicators, and the intensity and scope of labour migration in different countries. The focus was on compiling, analysing and comparing the collected results.

First of all, the study showed how factors such as:

- human resources,
- attractiveness of research systems,
- innovation-friendly environment,
- funding and support,
- business investments,
- innovators,
- connections,
- intellectual assets,

- impact on employment and sales,

affect the innovation index in V4 countries. The next step was to analyse the correlation between immigration and selected indicators. The selected indicators in this case were:

- immigrants,
- GDP,
- employment,
- level of unemployment,
- income,
- vacancies,
- innovation index,
- human resources.

Results and Discussion

The Polish innovation index was the lowest within the V4 countries in the analysed period, but its growth over the years was the fastest. In 2018 it reached 61.10%, i.e. almost 8 percentage points more than in 2011. On the basis of the results included in Table 1 it can be concluded that in the case of Poland all the factors under the innovation index are characterised by constant growth, except for funding and support, innovators and connections. A significant increase was noted for the "innovation-friendly environment" factor. This may result from a particular emphasis on support and creation of innovation by human resources (a factor with stable growth) and promotion of the attractiveness of research systems in the country.

Table 1 : Polish Innovation Index 2011-2018 (in %)

Indicator		2011	2012	2013	2014	2015	2016	2017	2018
0. Summary Innovation Index		53,27	50,25	52,22	50,24	51,38	54,01	56,62	61,10
1.1	**Human resources**	67,86	67,86	70,37	70,45	69,76	70,78	71,84	70,37
1.2	**Attractive research systems**	17,24	17,82	19,88	22,17	24,63	28,34	31,53	34,62
1.3	**Innovation-friendly**								
	environment	42,12	42,12	42,00	49,24	58,51	83,49	137,53	197,85
2.1	**Finance and support**	50,88	51,97	56,25	45,35	46,52	48,82	30,00	39,09
2.2	**Firm investments**	71,56	65,20	68,30	68,04	73,99	81,26	87,90	87,31
3.1	**Innovators**	29,39	20,77	20,77	13,36	13,36	7,71	7,71	14,95
3.2	**Linkages**	46,67	41,11	43,26	36,96	36,90	36,22	37,38	32,39
3.3	**Intellectual assets**	51,64	54,77	58,21	66,99	73,30	74,60	73,28	67,41
4.1	**Employment impacts**	91,06	92,14	94,83	94,29	81,90	86,57	90,28	96,52
4.2	**Sales impacts**	66,94	59,10	59,55	54,17	55,15	56,46	56,28	56,10

Source: European Commission

The innovation index of the Czech Republic (Table 2) in the analysed period was the highest among V4 countries in each year. In the case of the Czech Republic, there was a decrease compared to the base year for the following factors: funding and support, innovators and impact on sales. However, there was an increase in human resources, attractiveness of research systems and creation of an innovation-friendly environment, which undoubtedly had a positive impact on employment.

Table 2: Czech Republic Innovation Index 2011-2018 (in %)

Indicator		2011	2012	2013	2014	2015	2016	2017	2018
0. Summary Innovation Index		85,86	81,36	82,71	83,14	84,53	82,72	86,07	89,40
1.1	**Human resources**	73,37	78,38	83,39	80,78	84,38	85,21	88,88	91,69
1.2	**Attractive research systems**	48,79	53,39	53,55	59,08	64,44	68,01	71,06	73,60
1.3	**Innovation-friendly**								
	environment	84,30	84,30	90,41	96,14	91,64	100,64	114,15	118,65
2.1	**Finance and support**	84,57	66,50	68,98	75,49	74,68	74,06	49,97	51,12
2.2	**Firm investments**	104,59	94,25	97,08	102,92	102,77	109,23	112,93	112,58
3.1	**Innovators**	105,40	91,21	91,21	79,29	79,29	75,18	75,18	88,02
3.2	**Linkages**	71,45	69,67	67,01	76,73	79,04	75,96	81,11	87,35
3.3	**Intellectual assets**	50,69	58,40	59,21	54,07	55,22	52,18	62,41	62,08
4.1	**Employment impacts**	114,60	114,60	116,75	118,36	124,47	91,57	114,49	123,65
4.2	**Sales impacts**	105,39	96,06	96,58	93,83	94,00	97,91	99,72	95,79

Source: European Commission

The innovation index of the Slovak Republic reached its highest value for the analysed period in 2018 at 69.1% (Table 3). Its decrease year to year was found between 2013-2014 and 2016-2017. Taking the base year 2011 as a starting point, human resources and innovators saw the most significant decrease. These factors are interrelated. If a country does not have adequate human capital and does not innovate, innovators refrain from creating new businesses or jobs. Investment in research and development of innovation is only valid if there are specialised and trained staff available for that purpose. Business investments create new jobs and thus affect employment.

Table 3: Slovak Republic Innovation Index 2011-2018 (in %)

Indicator		2011	2012	2013	2014	2015	2016	2017	2018
0. Summary Innovation Index		63,28	67,13	68,92	65,26	67,04	69,3	66,51	69,10
1.1	**Human resources**	101,04	68,46	77,99	77,76	84,54	83,37	83,65	86,10
1.2	**Attractive research systems**	28,71	31,91	30,62	37,91	39,94	41,51	44,31	46,74
1.3	**Innovation-friendly**								
	environment	63,39	63,39	61,28	64,70	73,17	68,67	84,72	90,91
2.1	**Finance and support**	21,39	28,33	32,72	29,19	42,29	73,87	27,16	26,07
2.2	**Firm investments**	84,92	81,74	84,00	74,34	76,91	72,48	68,07	79,74
3.1	**Innovators**	44,07	60,70	60,70	40,04	40,04	32,95	32,95	37,85
3.2	**Linkages**	51,06	62,31	65,39	64,35	52,10	72,58	70,63	60,12
3.3	**Intellectual assets**	28,23	31,46	32,47	35,10	35,32	31,62	36,00	38,69
4.1	**Employment impacts**	117,74	117,74	116,12	113,43	115,05	108,82	115,29	113,33
4.2	**Sales impacts**	92,18	108,44	110,30	108,09	109,70	108,72	107,69	114,50

Source: European Commission

Hungary is ahead of Poland, but lags behind Slovakia in terms of the observed innovation index (Table 4). The index decreased slightly compared to the base year. Factors such as human resources, connections and impact on employment also showed a decline. On the other hand, however, the factors concerning creation of an investment-friendly environment and attractiveness of research systems increased significantly, which was reflected in an increase in business investments and development of

innovation centres. On that basis, it can be concluded that putting emphasis on the growth of innovation can have a very positive impact on the development of the country.

Table 4: Hungarian Innovation Index 2011-2018 (in %)

	Indicator	2011	2012	2013	2014	2015	2016	2017	2018
0.	**Summary Innovation Index**	66,23	63,13	62,80	63,92	65,14	66,44	68,11	69,03
1.1	**Human resources**	56,98	56,98	59,48	57,11	59,38	56,49	54,58	53,66
1.2	**Attractive research systems**	37,06	41,52	40,91	46,72	42,68	42,97	51,82	55,93
1.3	**Innovation-friendly environment**	68,75	68,75	61,38	62,82	81,18	99,81	127,03	144,69
2.1	**Finance and support**	36,48	38,99	40,76	45,79	48,53	50,66	42,92	46,15
2.2	**Firm investments**	74,31	60,31	62,85	84,80	85,09	87,83	88,98	98,00
3.1	**Innovators**	28,87	25,79	25,79	26,36	26,36	19,41	19,41	30,88
3.2	**Linkages**	81,60	79,15	74,31	66,50	65,11	63,51	62,77	57,06
3.3	**Intellectual assets**	36,58	34,17	36,98	38,04	38,13	39,02	40,58	40,12
4.1	**Employment impacts**	127,05	128,67	125,98	128,13	127,95	124,8	127,41	124,19
4.2	**Sales impacts**	111,14	100,97	100,46	89,38	91,51	100,61	99,18	84,08

Source: European Commission

In order to determine the correlation of the country's innovation index reflecting the degree of development of industry 4.0, GDP was taken into account as the main macroeconomic indicator (quantity of goods and services produced in the country per annum). Development of this indicator over time shows the state of the country's economy. Employment, unemployment and vacancies were considered to assess the state of the labour market.

According to economic theories, the unemployment rate and the number of available jobs in a given country are important factors when choosing a country for potential economic emigration. Labour supply and demand determine the level of wages, which is another factor that may help make that decision. Empirical studies show that the most important motivation for individual migration to work abroad is the wage level (Hariharasudan, 2018; Ślusarczyk, ul Haque, 2019). The presented macroeconomic indicators were correlated with each other in order to determine the most important factors influencing the volume of migration in V4 countries.

Table 5: Mutual correlation between immigration and selected indicators for Poland*

	Immigrants	GDP	Employment	Unemploy--ment	Earnings	Vacancies	Innovation indicator	Human resources
Immigrants	x							
GDP	0,90138	x						
Employment	0,84261	0,96639	x					
Unemployment	-0,72970	-0,90217	-0,95857	x				
Earnings	0,92627	0,99077	0,94818	-0,85815	x			
Vacancies	-0,02599	0,82605	0,85707	-0,81040	0,55317	x		
Innovation indicator	0,32354	0,84796	0,75384	-0,78281	0,48953	0,90494	x	
Human resources	0,48444	0,68940	0,77582	-0,72648	0,81602	0,59965	0,41873	x

*Source: Own calculations based on Eurostat data (*statistical significance level of α = 0.05)*

In Poland, as shown in Table 5, there is an almost ideal correlation between the number of immigrants and GDP generated in the country. This reflects the fact that a large number of immigrants from third countries enter Poland. Immigrants significantly affect the level of employment. This is due to the growing tendency among Poles to emigrate for work, which causes an even greater mismatch between the market and needs. As regards the innovation indicator, the correlation is moderately negative, but the human resources factor is moderately positive. This means that among individuals coming to Poland there are also employees, especially from third countries, motivated by higher earnings.

Table 6: Mutual correlation between immigration and selected indicators for the Czech Republic*

	Immigrants	GDP	Employment	Unemploy--ment	Earnings	Vacancies	Innovation indicator	Human resources
Immigrants	x							
GDP	0,93177	x						
Employment	0,65245	0,81177	x					
Unemployment	-0,68336	-0,86484	-0,90351	x				
Earnings	0,90281	0,97238	0,83941	-0,80166	x			
Vacancies	0,89597	0,94814	0,87967	-0,94858	0,73607	x		
Innovation indicator	-0,01597	0,73331	0,58039	-0,69173	0,32419	0,78604	x	
Human resources	0,61557	0,86128	0,93813	-0,85494	0,87890	0,86977	0,49463	x

*Source: Own calculations based on Eurostat data (*statistical significance level of α = 0.05)*

In the Czech Republic the development of the correlation is completely different than in Poland (Table 6). Labour market indicators show a moderate correlation between immigrants and GDP, national income and filling vacancies - especially in jobs that are not of interest to the citizens. The result is an increase in GDP, which in turn creates new jobs and increases wage levels. This is a factor that attracts labour immigration to the country. However, no significant correlation can be observed for the innovation index. The "Human Resources" indicator reflects the inflow of highly qualified labour and human resources to the Czech Republic to improve their living conditions, especially from the Slovak Republic and to a lesser extent from Poland and Hungary. The Czech Republic has also become a destination for scientists and researchers working on international projects.

Table 7: Mutual correlation between immigration and selected indicators for Slovakia*

	Immigrants	GDP	Employment	Unemploy--ment	Earnings	Vacancies	Innovation indicator	Human resources
Immigrants	x							
GDP	0,96499	x						
Employment	0,81772	0,86009	x					
Unemployment	-0,76371	-0,87062	-0,95128	x				
Earnings	0,97679	0,98753	-0,77367	-0,77367	x			
Vacancies	0,44165	0,61879	0,84226	-0,91323	0,34746	x		
Innovation indicator	0,33621	0,52427	0,47817	-0,43608	0,38672	0,29301	x	
Human resources	0,02049	0,07737	0,12702	-0,18004	-0,07647	0,12346	-0,46021	x

*Source: Own calculations based on Eurostat data (*statistical significance level of α = 0.05)*

The correlations of selected indicators and immigration for the Slovak Republic in the years under review, compiled in Table 7, show an increasing positive correlation between immigration and

employment and vacancies, and a negative correlation with unemployment, which in general terms translates into decreasing unemployment figures. The correlation between immigrants and the innovation index is 0.33621, which is a medium correlation. This is not a satisfactory result, given the extensive human resources available in the country. However, this is a reflection of the situation prevailing in this country in recent years, where the number of foreigners has increased, mainly with regard to individuals with secondary education. Direct foreign investments in the country are decreasing and the share of immigrants from the European Union (EU)/European Economic Area (EEA) is gradually decreasing. The result may be worsening conditions for science and research in Slovakia, which in turn explains the decline in innovation.

Table 8: Mutual correlation between immigration and selected indicators for Hungary*

	Immigrants	GDP	Employment	Unemploy--ment	Earnings	Vacancies	Innovation indicator	Human resources
Immigrants	x							
GDP	0,79745	x						
Employment	0,91644	0,91644	x					
Unemployment	-0,33223	-0,33223	-0,33223	x				
Earnings	0,83595	0,83595	0,83595	0,83595	x			
Vacancies	0,83954	0,85300	0,83954	0,83954	0,83954	x		
Innovation indicator	0,52132	0,86537	0,71934	-0,73412	0,62470	0,85296	x	
Human resources	-0,32051	-0,71238	-0,56545	0,56384	-0,37802	-0,74756	-0,80933	x

*Source: Own calculations based on Eurostat data (*statistical significance level of α = 0.05)*

In the case of Hungary, there is an almost ideal correlation between the number of immigrants and employment and only a moderate negative correlation with unemployment. The level of income and number of vacancies are factors encouraging people to move to this country. The innovation index is at an moderately satisfactory level. The country also faces a shortage of human resources, as shown by the negative correlation coefficient.

Conclusions

Due to their history and cultural and political issues, the Visegrad Group countries are characterised by an anti-immigration attitude. In order to mitigate or change this attitude, integration processes have been carried out, but this did not have the intended effect. The easing of migration policy was only due to economic growth in recent years, as reflected in GDP and employment growth and decreasing unemployment.

Incompetent human resources management and changes in the methodology of job development have led to a lack of interest in labour positions by the citizens, but these positions are gladly taken up by immigrants.

This labour market mismatch in the V4 countries has encouraged politicians to exert pressure in favour of partial liberalisation and relaxation of labour markets, in particular for economic migrants and vacancies that prove difficult to fill. Better economic opportunities in the analysed countries proved to be an effective factor in attracting potential immigrants from Southern and Eastern Europe, who, being members of the European Union, enjoyed a much easier access.

It is important to examine the established trend with regard to breakthrough innovations, which is connected to the level of the fourth industrial revolution. Therefore, in this study it is shown at the level of the innovation index of V4 countries saturated with particular factors. The results show that the country with the highest innovation index is the Czech Republic, while Poland is the country where the innovation index was at the lowest level. In Hungary, the correlation between immigrants and

innovation is the highest among the analysed countries, at 0.51219. There is a moderate correlation between the indicators in Poland and Slovakia. In the Czech Republic the human resources and immigrants factors show a high correlation with each other, while in Poland this is a moderate value. The presented results reflect the economic conditions in the individual Visegrad Group countries. The Czech Republic is the country with the most stable economic growth, the highest share of GDP invested in science and innovative research and a high share of people with higher education, and it is known for supporting higher education of foreigners.

The situation in Poland is completely different. Although the country achieves significant economic growth, it relies mainly on low value added industrial production. Poland has long been struggling with relatively high unemployment. At present, there are many vacancies in the economy that cannot be filled with domestic resources. Poland has eased administrative barriers to employment of foreigners, especially those coming from Ukraine. However, it is mainly a low skilled and unspecialised workforce. The demand for highly skilled workers and human resources remains at the same level. Poland also needs support in creating highly qualified and innovation-generating employees. Innovation is the starting point for maintaining economic growth under the conditions of Industry 4.0, which forces both low-skilled and skilled workers to give up industrial production and routine administrative work.

To sum up, the concept of Industry 4.0 brings many benefits and modern solutions, but by its nature, i.e. the speed of the changes it introduces, it is also likely to create a lot of negative effects, especially for unskilled workers in the labour market. It is therefore important to monitor the situation and respond appropriately to the changes. By comparing the information received as part of the conducted research, it is possible to understandably determine the changes taking place on the labour markets of the Visegrad Group countries in the context of the development of the Industry 4.0 concept. However, comprehensive research should carefully analyse the risks associated with its implementation.

Furthermore, the carried out examination does not exhaust the subject and will be elaborated on in the future together with the performance of a more detailed analysis.

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Transformatica As A Doctrinal and Strategic Tool of Governance in A Crisis

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Abstract

This article deals with the problems of development of administrative legal transformatic as innovative directions in the state regulation of crisis situations. The emergence of this term is the result of updating of relations of livelihood in Russia, Western Europe and other countries. Historically, this development passes a number of stages, from legal cameralistics, then the police and administrative law. The author notes that a variety of transformationaly law relations of ownership and all economic, socio-cultural and administrative-political life have felt the need for scientific management of a variety of interconnected, vital to the economic and legal phenomenas. Executive authorities of different levels have to consider this phenomenas which are reflected in administrative-legal science. The results of the study concluded that the management of the protection of constitutionality, safety, and welfare of the country in a crisis is represented by the impact of the system of state and municipal management based on the knowledge and use of doctrinal-strategic patterns inherent in the administrative system of transformational in order to optimize operation, development and achieving goals.

Keywords: Administrative and Legal Transformation, Crisis Situation, Life Values, Guarantees of Rights and Freedoms.

Introduction

Managing the life support based on of constitutionality, safety and welfare of humanitarian change in the modern world is one of the largest cross-national, national and supranational problems, which are solved by measures of administrative-legal transformation.

Administrative and legal laws, the relations, the need for new reforms, incentives and experiments in the field of life of the people are means, on which the Executive authorities of all levels rest on. The unfolding global and then national economic crisis, geopolitical complexity, sanctions and various restrictions had a negative impact not only on the development and cooperation of these authorities, but also on the economic and legal thinking, on the field of interaction of law, economics, culture, administration and government. The latter ones create the base of the newest cameralistical system life-supporting relationships, which is distinguished by the anti-corruption direction of legal and administrative transformation in the livelihood of the people. Modern Executive power unthinkable without effective legal complex of life support and desire to develop and influence it. It is necessary to raise the quality of welfare; directions and priorities of management of protection of the constitutional order, security and well-being of citizens.

Transformation of Executive is an outstanding managerial multi-faceted phenomenon which affects to overcome the gap, first of all on the level of productivity. Neither centralized administrative economy with absolute dominance of the state, nor subsequent inertial-raw model had not reduced this backlog, although the gap in the level of welfare over the last 10-15 years had definitely decreased (Medvedev D.A., 2015).

All of this allows to speak about the diverse universal phenomenon of Executive power that is deserves a special study to highlight the separate area of knowledge – the administrative legal transformatic of subsistence as science. This science embraces progressive administrative and legal

movement of relations of constitutionality, safety and welfare of Russia and subsistence of people. Here we are talking about humanitarian changes in Russia and foreign countries.

Legal and administrative transformation of subsistence through the enriching of authorities and officials of governance, emanating primarily from the economic, socio-cultural, and anti-corruption interests of all people should send legal funds to meet the needs, requirements and demands for different segments of the population.

In the context of administrative-legal transformation of life support, beginning with the administration of the process of improving welfare of the population, the state should implement of the legal regulation of new market relations, provision of economic, social and other support to industries and individual enterprises of public importance. This is achieved by providing soft loans, tax reduction and financial support for small businesses and ensure competition producers. Through implementation of the investment policy authorities should achieve a uniform and sustainable development of economy, culture, regions and municipalities. Funds derived from taxation, investment and other income should used by the Executive authorities to support the population, including its socially vulnerable layers with implementing and pursuing appropriate economic, financial and fiscal policy.

Transformational legal process of realization of Executive power and life support and safety of the citizens have to some influence on the behavior of other people. If this influence wisely and initially pursues transformational goals, it can be called life supporting management. Consequently, not every authority is such a management as not every authority is life-affirming and legal. The main thing here is to learn to be better and faster in the process of transformation. If managers do not consider that it is necessary to comply with this requirement, but act in each case at its own discretion, their rights are replaced by arbitrariness. Discussions arising from this often relate to the extent and nature of modernization of the legal content of the process of forming a new social state.

The ensurence of unity and differentiation of administrative-legal regulation is of great importance in the economic, socio-cultural, administrative-political spheres, where the Executive authorities are often associated with the legal, economic and moral incentives. We are constantly faced with unjustified differentiation, disunity, fragmentation of management and legal regulation by departmental mark in the transformation process of life support of the people.

Such differentiation of legal regulation of Executive authorities only on a departmental basis leads to inconsistent, unjustified differentiation of the norms contained in law. All this has a negative, inhibitory affect on the development of the social sphere, which determines the quality of human capital and directly depends on import substitution and competitiveness in the country.

The conditions have riped for enshrined in legislation of major new provisions in the sphere of regulation of import substitution and its innovative nature. Administrative legal transformatic of life support can become a relevant new and very perspective direction, allowing to avoid the transformation of Executive authorities in the administrative-command structure, dealing with the replacement of foreign products by the domestic ones. It represents a legal regulation, the purpose of which stems from the ideas and traditions of old, new and latest transformatic. Of course, there are special areas and specific types of products, when it is necessary to substitute the imports by any means, except of course, corruption ones.

However, the best import substitution is the creation of domestic products competitive both domestically and in foreign markets. It is this substitution that is supported by the state with all legal means.

This direction in the law of the national economy unites norms applicable in various spheres of the Executive, including the administrative law, its Specific part. Firstly, it regulates the macroeconomic of country, mainly solving such large problems like prices, foreign trade, credit and finance, competition, employment of the working population. Secondly, one of the major concerns of the

Executive agencies is the preservation of a balance of all factors of well-being, life support and security (economic, legal, socio-cultural, administrative-political).

With the aim of improving life support and corruption control the Executive authorities regulate relations in the economy, socio-cultural, political and administrative development (Vorontsov A.L., 2015).

This is achieved in particular by public contracts and agreements with enterprises and institutions. This measure is regulated by the administrative legislation, especially in the public sector of the economy, socio-cultural and administrative-political development that constitute the basis of the administrative legal transformation. Therefore, the primary object of regulating relations of life support is state-owned enterprises and institutions of education, culture, health, etc. It is not only about the development of laws and regulations in these areas, but monitoring their application, the resolution of administrative-legal conflicts of interest.

Administrative legal transformation of the regulatory authorities promote competition in the areas of security and life support. This transformation is aimed to the eradication of formal and informal existing in these authorities of so called "ticket quota system" that usually lead to actions contraring to reason.

The obligatory conditions for an effective administrative legal transformation are the development of adaptive environment for laid-off workers, their retraining, new forms of employment, the flexibilization of the labour market. This is require the highly developed social infrastructure.

It should be noted that up to the present time in the Russian ecological law science questions as well as questions associated with the administrative legal transformation of the mechanism of protection of environmental security have been studying with the general theoretical positions (Vorontsov A.L., 2018), the standpoint of comparative legal analysis of the development of environmental legislation, and also in the context of the assessment of environmental security as a global and domestic issues. However, as a holistic and self-issue the administrative legal transformation of the mechanism studied in this article has never become the subject of scientific analysis.

Conclusion

The system of administrative-legal transformation of relations of sustenance and security needs the state protection of rights, economic freedom, creative freedom, rights and liberty as a whole, which is a crucial component of administrative legal transformatic of life support. Executive bodies, their officials should try to improve the lives and security of the people. As the property is the basis of economic power, it also should be the basis for administrative legal transformation.

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The State Apparatus of Administrative and Legal Transformation in The Management Mechanism at The Stage of Overcoming the Consequences of The Economic Crisis

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Abstract

The authors by taking into account the theory of administrative-legal transformation of management protection of the constitutional order, security and prosperity of Russia, determine the legislative regulation of anti-crisis relations as the process of defining impact on this relations by the apparatus of administrative-legal transformation of the system of legal regulatory institution, acting primarily in the interests of human life support and liquidation of the consequences of economic crises.

The article notes that the aggravation of problems in the management of rights protection issues by the state at the stage of post-crisis development of Russia clearly reveals some contradictions that cannot be presented only as imperfection of state regulation of economic and social processes or explained by mistakes of heads of ministries and departments.

The results of the study concluded that the main reason is the contradictory development of the economy that assotiated with its systemic and structural crises, causing acute and long-term problems which can be overcome only in the conditions of ensuring the stable development of management mechanism of legal protective system (complex) of the Russian Federation.

Keywords: Administrative and Legal Transformation, Management Problems, Crisis Situation, Life Support.

Introduction

Any Federation that, due to the economic crisis and its internal contradictions, when entering a period of declining economic growth and worsening social conflicts, makes new demands, first of all, on the apparatus of transformation of administrative law-making as the most important state-legal regulator of relations in the field of managing the protection of the constitutional system, security and well-being of Russia. This is written by scientists and publicists in a very critical tone, although many problems are overly dramatized and reduced to calls to abandon the management of not only state and municipal property, but also state regulation of the economy as a whole. Therefore, the understanding and assessment of modern phenomena in the legal regulation of state and economic development, and above all in the state apparatus of administrative and legal transformation, requires a versatile and balanced approach based on the doctrine of the state and law, analysis of the current management system for the protection of the constitutional system, security and well-being of the Russian Federation.

Now this is the moment of realization that the state-legal regulation of relations of management of the constitutional system protection, security and well-being of Russia is at the stage of overcoming the consequences of the economic crisis. All this is necessary in order that the legislation does not unilaterally focus only on private interests, which must be combined with the public legal interests of the mechanism for managing the legal and protective structure of the state.

The combination of public and private principles is particularly evident in the crisis conditions of the state, its authorities and economic structures, when the problems of administrative and legal regulation of socio-economic relations are particularly clearly manifested in the activities of the

system of public administration, which becomes dual in nature. On the one hand, they are forced to maneuver, creating conditions for achieving state and market goals, while simultaneously supporting the anti-crisis interests of the population of the Federal subjects and municipalities. On the other hand, the development of a system of state-legal administration of protection of the constitutional order, security and prosperity to Russia is considered from the standpoint of the national security strategy, formation of jural state and the anti-crisis protection of the population (employment, unemployment, training and retraining, suspension of growth in the number of citizens trapped in poverty due to the "liberalization" of prices, etc.).

Among the functions of this mechanism for managing legal protection, it is also necessary to note the activities of authorities for the rational use of multi-purpose resources: land, water, and air basin. There is a tense situation in many regions of Russia. The scale of resources is extremely limited, and the number of entities claiming resources is constantly growing. In this regard, based on the interests of market development of the territories administrative regulator defines priorities and limits on the use of resources to regulate the business partnership between the regions, their management and production structures, which are based on the principles of economic feasibility, expediency and competitiveness (Pashin A.L., 2003).

At the same time in our opinion state and municipal regulation of market relations will act as an element of marketing support from government authorities, affecting national economic structures through contracts, legal norms, regulations, etc. The greater the degree of decentralization in economic units, the greater the need for market infrastructures independent of the center and the less the scope of functions in the sphere of direct state management. In parallel, there is a redistribution of functions from the Federation to its subjects, based on the experience of strengthening federalism, and not on a mechanical reduction in the number of levels of the human rights complex management apparatus.

In fact, the current attempts at market reforms reflect the desire to transform the entire legal, economic, and socio-political way of life, not only in the Russian Federation, but also in a number of other countries.

One of the areas of activity whose management has undergone the most notable transformation in recent years is education. This was repeatedly indicated in studies of Russian authors. These are mainly works devoted to modern trends in the development of Russian education (Vorontsov A.L., Vorontsova E.V., 2015), the integration of educational systems in Russia and Europe (Vorontsov A.L., Vorontsova E.V., 2016), the formation of a new educational paradigm (Vorontsov A.L., Vorontsova E.V., 2016), etc.

Such a reform cannot be implemented without the theory and practice of administrative and legal transformation of Russian federalism in the interests of improving the administrative and legal transformation of the mechanism for managing the protection of the constitutional order, security and well-being of Russia (Porfirev A., 2009).

This means that the protection of the constitutional order, security and well-being of Russia within the borders of the constituent territories of the Russian Federation is managed in accordance with the principle of federalism within the state administration of the Russian Federation as a whole.

The administrative and legal regulation of the human rights system (complex) takes into account the national and territorial features of the Far North, the North Caucasus, the Volga region, the territories of all subjects of the Russian Federation, along with zones of environmental disaster, emergency, etc. The large therritory of Russia, the diversity of its national and socio-economic structure, climate and other factors require a flexible combination of Federal and various regional interests. On this basis, the Institute of territories of advanced socio-economic development has emerged.

Organizational support for the management of the protection of the constitutional order, security and well-being by strengthening the ties of the Federal government with regions and their economy is

possible in various ways. These may include: the creation of authorities specializing in the national economic direction of these relations; the formation of divisions for these purposes gathering together the interested authorities; the assignment of appropriate tasks and functions for participation in the management of legal protection to a certain authority or its division. Here we can include the formation of a group of representatives of Federal and regional authorities to develop coordinated anti-crisis solutions, creation in regions of the Russian Federation, its own regional authorities wich will interacte with the Federal agencies concerned in the management of the protection of the constitutional order, security and well-being of Russia from the economic crisis.

The significant potential of Russian federalism for integrating Federal interests into the regional differenciation of labor can be found in the program-target regulation and anti-crisis strategic planning. But while using the territorial and program-target principles of strategic planning we should avoid extremes. Indeed, at various stages of the study of the consequences of the economic crisis, many authors give preference only to these principles. They see in the strengthening of regional governance the main, almost the only direction of development of administrative and legal theory (Sidorenko A.V., 2009).

But we should remember that parochialism is no better than narrow institutional interests and therefore according to the theory and practice of development of federalism it is poorly fit into the system of relations of administrative-legal transformation management protection of the constitutional order, security and well-being of Russia. Symptoms of monopolism (bans on export of products outside the region, closing of sales markets, administrative resources, etc.) can provide dangerous consequences for the Russian Federation and the existing system if they are not promptly transformed into a redevelopment of the management of the structural and functional system on an innovative legal basis.

A powerful and unified Russian state is possible only upon condition of real independence which is characterized the correct balance of international, Federal and regional interests in managing the protection of the constitutional order, security and well-being of Russia.

Conclusion

For the successful operation of federalism in administrative law theory of the transformation of the transition from the cyclicality to the reconstruction of management of the protection of the constitutional order, security and wel-being of Russia we should proceed from the fact that the theory of administrative-legal transformation of management excludes the replacement of market relationships by scientifically unfounded command ones neither in the legal nor in the economic life of the Russian Federation. There is a state regulatory apparatus that performs administrative and legal transformation functions to manage the protection of the constitutional order, security and well-being of Russia. Namely:

- preparation of forecast and plans (indicative plans) and state programs that define the main scales, proportions and goals in anti-crisis strategic planning;
- development of decision making and the adoption of regulations that directly effect the structure and management of the protection of important infrastructure, security of constitutional order and the related allocation of centralized investment and other state-controlled resources;
- application of the system of state regulators, such as taxes, subsidies, compensation, pricing, tax and credit benefits, customs rules, taking into account the views of the relevant state and local authorities;
- state support for the development of science in the field of administrative and legal transformation of the management of the structural and functional system.

These functions of the state apparatus of transformation should ensure a balance of human rights relations in this system based on the market and Russian law. The corelation between these functions should be variable and depending on the specific situation. At the same time, the administrative and legal theory of transformation is designed to facilitate the implementation of these functions, ensuring

the state impact of power on the economy, purposefully investigating methods and forms, the legal status and activities of public administration.

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Digital Platform Model For E-Contracts

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Abstract

The development of the world economy has involved a corresponding intensification of trade, causing the total traffic of the ports of the world to increase, now reaching the order of tens and hundreds of millions of tons per year. Therefore, this industry becomes extremely important, being necessary the digitization of processes, the use of artificial intelligence and the latest technologies to evolve and facilitate the access / use of data. The authors propose a digital web platform model for e-contracts used in maritime transport. The platform wants to offer contract models that can be completed online, digitally signed and accessed from anywhere as long as users have an account.

Keywords: E-Contracts, Digital Signature, Process Digitalization

Introduction

Culture / digital revolution deeply affects our economic, political, social and cultural life, marked by a rapid and continuous technological change, as people are increasingly connected and inclined to suppress the paradigms of the past. It also has the potential to change power structures and relationships, allowing for switching from rigid, pyramidal power structures to more fluid and transverse power systems.

The expansion of the digital space not only facilitates the economy and global exchanges, but also allows for an unprecedented interconnection of people; in addition, it has the potential - and it already plays - to change its ways of doing, thinking, relating between them in regards to information, knowledge and learning. Increased interconnection and mobility - whether for work, pleasure or for economic and political reasons - bring more and more people in physical and virtual contact closer to each other.

The platform was designed for legal or natural persons, for whom the time and financial resources allocated to obtaining an enforceable title should not be a risk but a standardized and predictable procedure. The only requirement is to have a qualified certificate for the electronic signature issued by a Service Provider of qualified European level trust. The platform offers time savings and financial resources by securing legal relationships, consolidating debts, minimizing the legal risk by digitally democratizing the judicial procedures for obtaining an enforceable title and implementing it.

State of The Art

Alharby (2017) does a research regarding all the scientific information related to smart contracts taking into consideration only the technical part. He also identifies contract applications that use this type of contracts. There are gaps that must be fulfilled as a conclusion.

Smart contracts are used mainly in a process of transferring money under some rules. More and more platforms which use smart contract were proposed and implemented. Bartoletti (2017) analyzes the significance of smart contracts in some of the platforms and the patterns.

Online platforms are suited to explain all the requirements of contracts, Carvalho (2020). He gives a better look to the idea of that companies that receive service from another one are mostly online and he researches through specialized literature to provide an overview of the European framework regime designated to them.

Kruijff (2017) remarks that there is no unified ontology for smart contracts. Through his research it is used enterprise ontology and architectures that are model driven to get the essence of smart contracts. The paper is introducing the concept of commitment in smart contracts that can be seen like a business exchange.

Lauslahti (2017) studies the binding rights and obligations of parties when used smart contracts. His results show that for smart contracts formation is best to use a vending machine that performs contractual obligations.

Lauslahti (2018) analyzes the mechanism for general contract law principles in the context of smart contracts and shows that it can be created a bound between rights and obligations of the parties.

According to Wang (2019) is stating that smart contracts are still at the beginning, therefore there are still a lot of issues regarding security and privacy. He proposes a framework having a six-layer architecture for smart contracts and also presents future trends.

As e-commerce is expanding, Wang (2019) identifies the need of digital contracts. An important aspect is treated by him and it consists in the framework of the platforms and the legal landscape.

Business processes are reshaped by smart contracts. Contractual terms can be enforced automatically, without the participation of a third party. Zheng (2020) displays the challenges of this contracts and their lately evolution. In his article is also made a comparison of two contract platforms through examples.

Business Digital Environment

Every year, the European Commission publishes the DESI report - the degree of digitization of the economy and society (Digital Economy and Society Index). According to it, Romania ranks in the last positions of the European Union in terms of digitization.

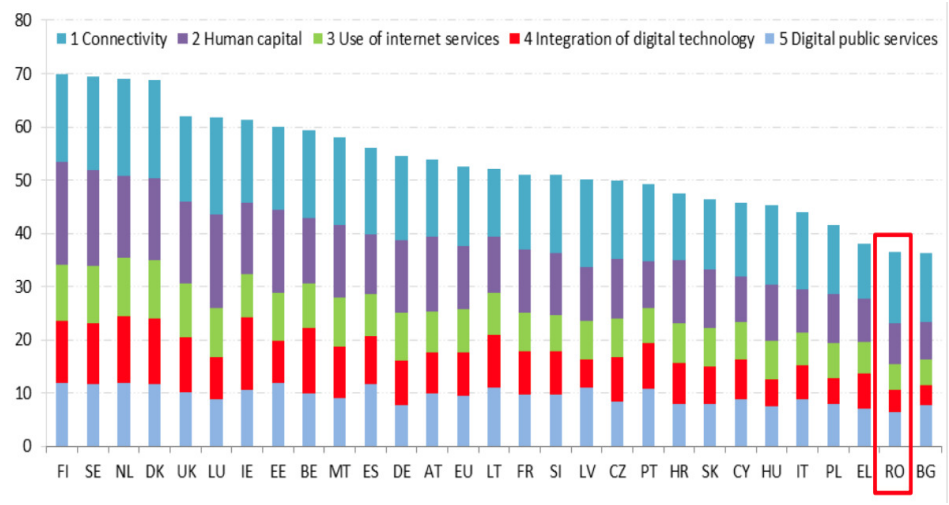

Fig. 1: Digital Economy and Society Index rank – 2019 (www. https://ec.europa.eu/, accessed at 15 march, 2020)

The DESI index is calculated for each of the countries of the European Union, taking into account 5 aspects:

1. Connectivity - fixed broadband, mobile broadband and prices
2. Human Capital - use of the Internet, basic and advanced digital skills (for example, number of IT employees, number of IT faculty graduates)
3. How to use the Internet - citizens' use of content, communication and transactions
4. Integration of digital technology - digitalization in business and e-commerce
5. Digital public services - e-government and e-health solutions

The European Commission Digital Economy and Society Index (DESI) 2019 situates Romania on place 27/28 compared to the other EU Member States. Even though the total progress was slow, Romania's rank remained stable. The best index of Romania is represented by the Connectivity due to the broadband capacity of the networks. Despite this fact, the digital economy is not keeping up because there is still a lack of basic digital skills among Romanian citizens. When it comes to e-government services, Romania is last on the rank.

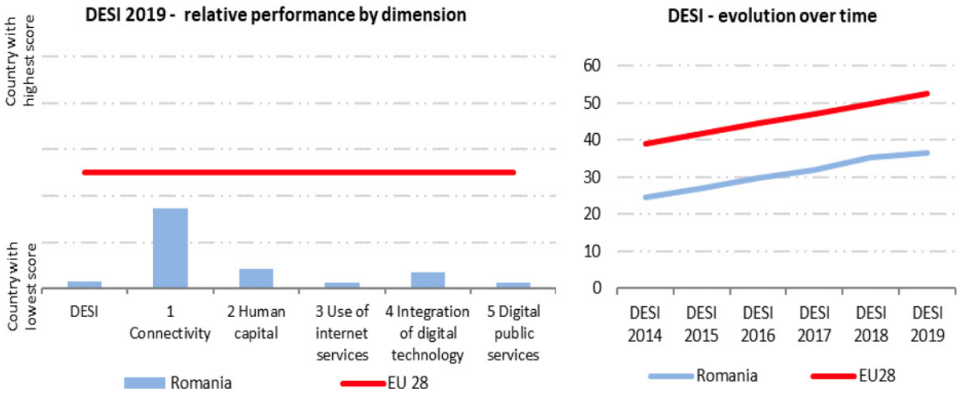

Fig. 2: Romania's evolution over the last 6 years (www. https://ec.europa.eu/, accessed at 15 march, 2020)

Digital Model of Maritime Agreement

In order for this process of agreement between the two parties to have a faster flow, the authors propose a model of web platform. Its purpose is to provide pre-established types of contracts, which can be signed by both parties through a digital signature. The process thus becomes digitized, and the information is organized systematically, and can be accessed from anywhere. The role and satisfaction of a client is also described by Barbu (2018).

Any person can use the web platform to make legally assisted contracts in the online environment using digital signature. The platform differs as an interface for a user requesting an executory title over that of a lawyer, which is simplified. The last one only reviews the contract and sends it for approval to the persons involved, i.e. X and Y.

The platform includes payment methods of the operations performed by card. The process consists of the following steps:

1. A person which holds an account accesses the web page. He/She authenticates with the required credentials: username and password being redirect to the homepage.
2. A person who does not have an account accesses the website. He/She creates a new account, filling in the data fields and selecting whether he/she is a legal entity or not. If they are a legal entity, a new page holding fields for the company data is opened. An email notification which validates the created account is sent to the person.
3. On the homepage there are displayed all the documents of a person, as well as the possibility of creating a new contract. It can be selected from a list of predefined contracts or upload an existing one from the personal computer. If there is a new contract that must be signed, the person is notified immediately after logging in.
4. After a new contract is added, it is filled with the data of the person initiating that contract and those of the person participating in it. An email notification is sent to the lawyer for approval and modification, if applicable.
5. After the lawyer validates the contract, a notification is sent to X and Y to give their final agreement. They sign the document using their digital signature.
6. The payment is made by withdrawing the related amount of money from the card saved in the platform and transferred to the lawyer.
7. The contract remains saved on the homepage of the platform, the most recent ones being on the top of the page. Contracts can also be identified by using the Search field. Documents can be viewed at any time and downloaded locally.

This platform can be used through web browsers on any smart device. Data security is ensured by protocols, but also by GDPR. This comes to the aid of the people by organizing and including the contracts in one place, as well as their access in an online environment through a few clicks, all being legal. The existence of predefined contract models is a plus of the application, due to the multitude of different examples found over the Internet, which can be incomplete or outdated. The ones offered by the platform will be in conformity with the new laws and provisions.

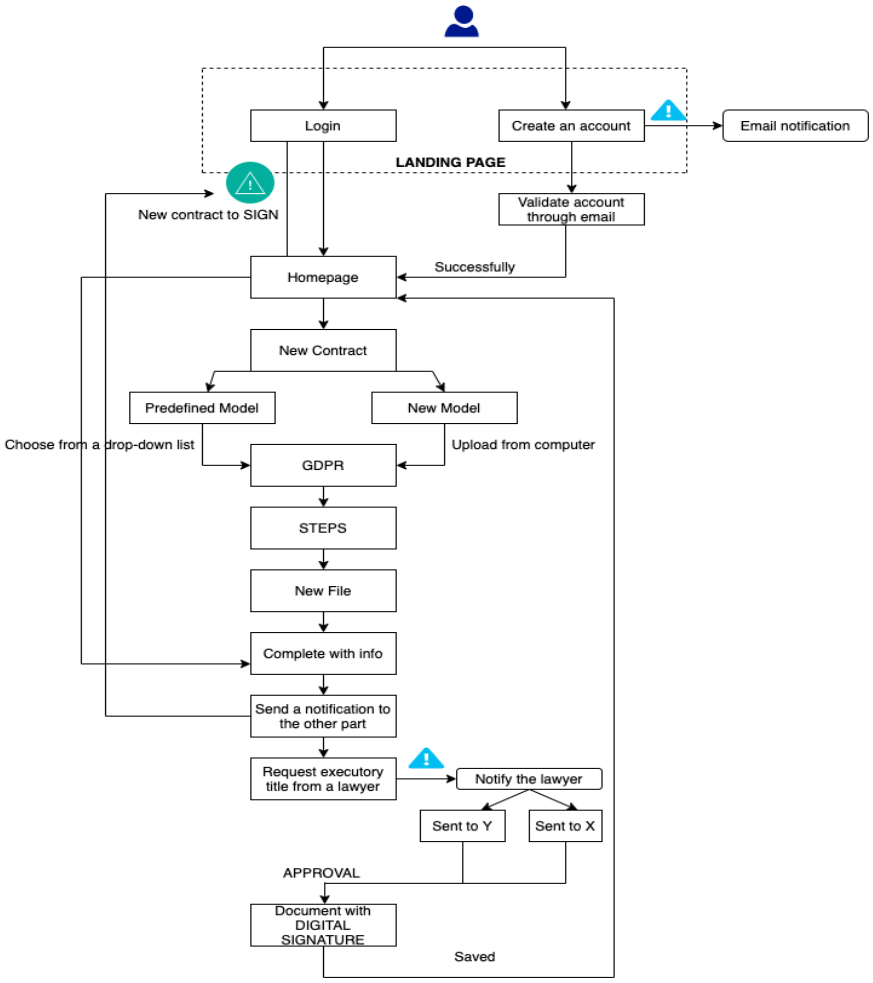

Fig. 3: Workflow of model for e-contracting

Conclusions

Digitalization is already part of the life of companies and brings, not only new business models, but also efficiency in business processes, from those in the production and operational departments, to those in marketing and sales.

The authors have proposed in this article a model for a web platform to obtain the following advantages:

- Organization of contracts
- Accessing contracts in real time
- Wide range of contract models
- Online completion of contracts
- Status of the contract completion process
- Maintaining contracts within the platform

- Digital payment
- Digital signature

The platform can only be used if the users are registered. By owning an account, a full access to the platform facilities is given and all the contracts are stored on it online. Therefore, the platform may contribute to the digitalization of the contract signing process.

Acknowledgement

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Safety of Institutional Facilities in The Light of Deficiencies in Project Final Acceptance

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Abstract

The article discusses issues related to actions taken by individuals (or organizations) whose scope of authorization and responsibility includes acceptance of projects consisting in construction or expansion of institutional facilities. Diligent performance of a public contract or due execution of a commission given outside the public contract awarding procedure requires not only choosing the bid in accordance with expectations, but also following a process of reliable acceptance of the performed scope of work. An analysis of adjudications on cases concerning structural collapses and less significant events has shown that the causes of such events were not faulty designs, but a process of accepting completed work during which the identified irregularities were not revealed. In many cases, individuals responsible for preparing work acceptance protocols take incorrect actions because they are venal and willing to attest false information in exchange for a financial advantage. Presently, most of the entities responsible for work related to construction or repairs of institutional facilities (including critical infrastructure) only declare their readiness to participate in the development of a system for informing on irregularities, without taking any actual action.

Keywords: Public Contracts, Commercial Partnerships And Companies, Corruption, Whistleblower, Security.

Introduction

The safety of institutions and critical infrastructure facilities is seen mainly as an issue of technical and personal security. The following discussion of the research problem pertaining to the safety of such facilities is an innovative analysis of the undisturbed functioning of the society and of the state economy. Designing safe facilities consists in creating conditions that enable elimination or minimization of hazards to people that may emerge during the use of the facility (as a result of adopted design solutions or impact of the environment), as well as elimination or minimization of hazards to the surroundings of the facility. Preventing hazards to the functioning of a facility consists in taking actions both in the construction and in the operation stage (Baryłka 2015, pp. 10-12). The subject matter of the research covers the facility creation (construction) time, particularly the stage consisting in evaluation and acceptance of the implemented project.

As a result of the discourse on the safety of institutional facilities and critical infrastructure, many papers have been published which discuss the issues of securing the functioning of such facilities against acts of terrorism, as well as the issues of fire and technical safety. Technical safety is defined as ‘a state impacted by the manner of fulfilling obligations that consist in maintaining due technical and aesthetic condition of the facility, in accordance with the principles of engineering knowledge, while ensuring, amongst others, fulfilment of basic requirements concerning safety of structure and its use, and suitable sanitary and health-preserving conditions’ (Supreme Chamber of Control, 2013). Although the deliberations proposed by the author of this article fall within the scope of technical safety, they do not concern the safety of an existing facility or issues related to its design. They pertain to the relations occurring in the process of work acceptance between the contractor and the contracting authority or the customer, which are or are not in conformity with the adopted design conditions.
This manuscript has been prepared with the use of an empirical method. It consisted in an analysis of the contents of statements on projects involving institutional facilities and critical infrastructure made

by individuals responsible for preparation of statements of work (SoW) and of terms of reference (ToR) in the area of public contracts, or for preparation of documents related to offerer selection by commercial partnerships and companies, and by representatives of the mentioned entities who had taken part in the process of accepting the completed work (Bil 2019). Additionally, contents of open sources of information have been analysed, with a reference to the monitoring of legal and organizational solutions regarding the methods of limiting deficiencies occurring at the time of acceptance of completed project for the purpose of ensuring safety of institutional facilities and critical infrastructure. The article analyzes three cases related to the catastrophe caused by human error.

Circumstances pertaining to improper acceptance of a completed project

Corruption (caused by receiving money for accepting a project with defects) in the public sector increases the likelihood of technological disasters. It can therefore be argued that the higher the level of corruption in the public sector, the greater the risk of industrial, transport or other accidents. Technical disasters are less common than road accidents, but they cause greater economic and social losses (Yamamura, 2013).

Choosing the most advantageous offer for carrying out work, providing a service or supplying a specific product is an undertaking that is extraordinarily complex in terms of its organization. The most popular criterion for bid selection remains (in the public contracts area) its price, based on which the contractor is chosen (the so-called most advantageous offer that provides the best balance of the price or costs and other criteria pertaining to the contract subject). It is obvious that the contractor must meet the requirements specified in the statement of work and subsequently in the terms of reference. As regards the functioning of commercial partnerships and companies, which are not obliged to observe the Public Procurement Law of 29 January 2004, the selection of the contractor consists first of all in an evaluation of the essential aspects of the presented offer, and then in an evaluation of its commercial aspects (that is price). It seems that the selection of an offer based on its merits and not price is a decision that proves that the offer was correctly prepared. Since the offer selection criterion is not the subject of this analysis, it is not discussed further here. The selection criterion is important when a contract is awarded to an entity that uses subcontractors. It must be stated here that in the relations between the contracting authority/customer and the actual contractor (subcontractor) the general contractor remains present, which has tools for verifying and accepting particular stages of work. An executed contract for carrying out specific work determines conditions of acceptance of particular items of work, and of project completion in terms of the scope of such acceptance and the parties involved therein. A correct procedure for accepting completed work enables revealing workmanship defects or use of unsuitable materials. Of course, the said errors are not present in each implemented project. The author aims to draw the reader's attention to the fact that individuals responsible for accepting work may fail to fulfil their obligation by means of knowingly authorizing the use of facilities where different than designed technological solutions have been used or replacement materials have been incorporated. The attitudes of such individuals are not necessarily a result of corruption. It many cases they may be (or actually are) a consequence of an intention to meet the work completion deadline, or of a decision made by superiors.

From time to time information is published in the media on structural collapses or defects of technical infrastructure facilities. The General Office of Building Control (Główny Urząd Nadzoru Budowlanego, GUNB) has informed that there are several hundreds structural collapses in Poland every year (a structural collapse means an unintended, violent destruction of a civil engineering structure or a part thereof, or of structural components of scaffoldings, components of forming equipment, sheet piling and excavation support systems - Article 73 (1) of the Building Law of 7 July 1994 (Dz.U. {Journal of Laws} of 1994 No. 89 item 414)). In most of the disclosed cases no lives were lost. However, it must be stressed that there were collapses that resulted in deaths or in environmental pollution. The most significant structural collapses of institutional facilities or critical infrastructure in Poland include: Katowice International Fair (Międzynarodowe Targi Katowickie, MTK) building roof collapse in 2006, gas explosion at the PKO Rotunda office in Warsaw in 1979, high-rise building collapse in Gdańsk in 1995, tenement house collapse in Świebodzice in 2017 (Murator Plus 2018),

breakdown at the wastewater lifting station in Gdańsk in 2018 (Wójtowicz, 2019), and collapse of the sewer main under the Vistula river (Chełmiński 2019).

Pursuant to the Regulation of the Minister of Infrastructure of 19 November 2001 on the types of civil structures whose construction requires appointment of an owner's representative (Dz.U. 2001 No. 138 item 1554) an owner's representative must be appointed if certain civil structures are built. Such civil structures include critical infrastructure and institutional facilities. The responsibilities of an owner's representative include, amongst others, checking and inspecting temporary work and work to be covered up, taking part in tests and pre-operational inspections of systems, technical equipment and chimney flues, as well as preparing and taking part in completion inspections and commissioning of civil structures. If, during inspections, the owner's representative finds errors, he/she indicates such departures from the design, which are classified as either minor or major ones. Minor departures do not require obtaining a decision on amendments to the building permit. On the other hand, major departures from the approved building plans and specifications or from other requirements of the building permit can be accepted only when a decision on amendments to the building permit has been obtained. It has been noted, however, that owner's representatives sometimes commit serious offences, which may shake the foundations of safety. Such offences include careless inspections of the quality of construction work and of materials used for carrying out such work, absence of the owner's representative in the course of testing and acceptances of temporary work or work to be covered up, absence during the tests and pre-operational inspections of systems, and failures to confirm the actually completed work (Lenarcik, 2016).

Analyses of court cases concerning the causes of public building collapses have shown that they include negligence on the part of individuals responsible for supervision, including amongst others failures to discharge their duties. An example can be a verdict by the District Court in Warsaw concerning the MTK building roof collapse with which the Court convicted not only the designer and members of the management board, but also a building control inspector.

There are many reasons for such behaviours. The first group of problems identified by the author are behaviours caused by the need to meet deadlines for accepting or settling a project. This concerns particularly projects financed from aid resources. Here the identified deficiencies are not disclosed, as it is believed that the losses that may be caused by such deficiencies are "potentially smaller" than financial losses including, amongst others, the need to return the funds received for project implementation if work is not completed on time. Superiors of the inspectors have knowledge on the identified deficiencies. The inspector's willingness to report major problems is perceived as their disloyalty to the superiors. Another separate group includes behaviours of individuals responsible for work acceptances, which consist in accepting work even though problems have been found, such as departures from the design or incorporation of unsuitable materials. Both in the first case, and in this situation an offence is committed, which consists in attestation of false information and obtaining a financial advantage by the contractor. This is also acting to the detriment of the customer. The third group of problems includes corruption, where the individual responsible for accepting work finds problems with the quality of workmanship or of the used materials, and demands or accepts financial benefits from the contractors in return for refraining from taking actions that would result in performing the commissioned tasks again, this time correctly. At the same time it must be assumed that if a structural collapse occurs, such individuals will bear criminal responsibility for having caused an occurrence threatening the lives or health of many individuals or resulting in a large-size loss of property. It also needs to be stressed that criminal responsibility for a structural collapse resulting in death of an individual or in serious injuries suffered by many people is stricter (Criminal Code of 6 June 1997).

Mechanisms for preventing occurrences that may threat the operations of institutional and critical infrastructure facilities as a consequence of offences committed by individuals responsible for work acceptances.

Insufficient supervision over coordination and implementation activities at the levelthe operational process is a threat to the correct implementation of the project. Providing training is also an important factorand selection of appropriate staff and contractors (Celik, Er, 2007).

The causative behaviours discussed above are penalized under the criminal law with imprisonment, personal restraint or other penalties. Other sanctions include penalties under professional responsibility. It needs to be considered, however, whether penalizing such behaviours is the only countermeasure against such misdeeds. Probably not. Projects which promote reacting to such misconducts have been appearing in business culture and in social responsibility awareness. It is extremely difficult to inform about irregularities in an environment where whistleblowing is seen as something negative. According to deep-rooted beliefs, informing about identified cases of acting contrary to the adopted law or norms is denouncing and is disapproved by the society. Solutions limiting the occurrence of the discussed pathologies in the economic and social life should be adopted on the basis of organizational achievements of companies that have been operating in free market conditions since their inception, and on the foundation of values promoting attitudes that are characteristic of civic society. For about five years more and more voices have been be heard in the Polish public space that the institution of a whistleblower should be introduced and recognized. Currently, Polish law does not contain any legal solutions that would provide legal protection to an individual informing about an activity that is contrary to the adopted legal standards. It needs to be stressed however that more and more companies of both private and public sectors have been introducing anti-corruption policies that include instruments for protecting whistleblowers at such organizations. It is whistleblowers who are a kind of an instrument for revealing irregularities in, for example, acceptances of work carried out as a part of construction of institutional and critical infrastructure facilities. Implemented anti-corruption systems based on, amongst others, the recommendations contained in ISO 37001, which is an international standard on anti-bribery management system, or in the adopted recently (on 25 September 2019) Directive of the European Parliament and of the Council on the protection of persons who report breaches of Union law, can be used as a foundation for developing mechanisms that will facilitate identification of undesirable actions which might undermine the safety of institutional and critical infrastructure facilities. Unless such regulations are introduced and observed, informing on cases of coercing individuals into accepting deficiencies or on identified defects in workmanship will be much more difficult.

Acknowledgement

The safety of public utility buildings and efficient operation of institutional facilities depend on the quality of their construction. As regards contractors carrying out work on such types of structures and installations, cases of accepting and commissioning facilities that do not meet the assumptions agreed upon in the design stage have also been identified. Breaches related to the performance of work and consisting in departures from the planned technological solutions, and in negligent carrying out of particular stages of work with the use of materials not specified in the design documentation may result in a structural collapse or in environmental pollution jeopardizing the health and lives of people. The adopted legal solutions provide for penalizing the perpetrators (officials) for committing torts consisting in a failure to discharge one's obligations or in giving or accepting bribes. It must be stressed however, that they will not enable initiating behaviours that would result in informing about identified deficiencies. The burden of introducing mechanisms that will encourage taking social responsibility and protect whistleblowers should be borne both by the state, and by entrepreneurs which perform tasks aimed at proper functioning of institutional facilities and critical infrastructure. The examples of structural collapses referred to in this article are single events of the type. Nevertheless, it must be remembered that the consequences of negligence related to faulty workmanship and commissioning of defective facilities are disclosed during investigations conducted after the occurrence of events threatening state security.

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What Are the Determinants of Expenditure by Functions in Local Authorities? A Multivariate Analysis

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Abstract

Increasingly, local authorities have to satisfy a great variety of citizens' needs efficiently, resulting from the transfer of competences from Central Administration. However, the scarcity of public resources often requires an increased tax burden, as a way to gather income to finance public expenditure. This can be of various types (general, social, economic and other functions) and determined by various factors (institutional, economic, budgetary and political, among others). There is a clear need for politicians/public managers to have mechanisms to control and inspect public expenditure, in order to avoid an increased tax burden or debt. In this context, this study aims to identify public expenditure by functions in Portuguese local authorities, so as to help politicians/public managers to control this. The results obtained reveal that the illiteracy rate, size, purchasing power index and the form of governance are determinants of some types of expenditure by municipal functions.

Keywords: Public expenditure, Functional expenditure, Public Administration, Municipalities.

Introduction

In fulfilling its functions and responsibilities, the State incurs public expenditure, according to law, this being identified and authorised annually in the State Budget. For Sousa Franco (2015) public expenditure consists of public entities spending money or using goods to create or acquire goods or provide services that can satisfy public needs.

Nowadays, the State assumes functions of a more classic nature, related to health, education, justice, social assistance, etc., but also others of a more economic character, which puts great pressure on public expenditure. This situation is not always accompanied by increased public income which could finance the increased expenditure, leading to an increase in public deficits, and consequently, debt. This is often due to the situation of increased public income not being innocuous regarding citizens/electors' perception, which leads politicians/managers to prefer debt to increasing the tax burden.

In establishing an efficient budget policy, the need arises therefore to ensure that public expenditure adheres to legal rulings but at the same time fulfils the requirements of the economy, efficiency and effectiveness.

In this context, it is essential for politicians/managers, as well as external controlling bodies to have thorough knowledge about the factors influencing public expenditure, to be able, pro-actively, to control and manage this, which will contribute to better spending.

In a situation of increasing decentralization, Local Administration has more competences delegated by Central Administration and faces the same problem, aggravated by that fact that it has no capacity to create taxes, i.e., to increase its income. So it is fundamental to control its spending, but without putting efficient satisfaction of residents' collective needs at risk.

This study aims to identify the determinant factors of expenditure, specifically by functions, namely general, social, economic and other functions, for the year 2016, and focusing on Portuguese local authorities.

To this end, the study is structured in five sections, following this introduction. The second contains a review of the literature on the determinants of public expenditure. The third presents the methodology, namely the objectives, research hypotheses and variables and the data treatment technique. The results are presented in the fourth section, followed by their discussion. Finally, the main conclusions are presented.

Determinants of Public Expenditure

Studies about the determinants of public expenditure by functions are still scarce. Various authors have studied these determinants, associating them with different factors of analysis. Specifically, Sanz and Velázquez (2002), Ollé (2005), Balmas (2015), Alcalde and Martín (2015) and Martins and Correia (2015) studied the determinants of public expenditure, with all of them raising different questions and topics associated with these determinants. Sanz and Valázquez (2001), questioned spending needs or fiscal capacity. Alcalde and Martín (2015) questioned the responsibility of the financing system in relation to the inequality of spending. Ollé (2015) addressed the same topic, associating the study with the influence of the expenditure's composition on the distribution of expenditure by functions. Balmas (2015) made a comparison of local government in Poland and Spain, aiming to find out what determines the distribution of public expenditure in each country. In the same line, Martins and Correia (2015) also studied the determinants of public expenditure, associating them with deviations from budget in Portuguese local authorities.

Table 1 describes the different approaches adopted in studies related to the determinants of public expenditure.

Table 1: Studies about the determinants of public expenditure

Author(s)	Approach
Balmas (2015)	Determinants of public expenditure at a sub-national level: comparison of governments in Poland and Spain.
Alcalde and Martín (2015)	Determinants of autonomy spending: is autonomous regions' financing system responsible for unequal spending?
Pérez and Cucarella (2016)	Needs and spending of autonomous regions.
Ollé (2005)	Determinants of local public expenditure: Spending needs or fiscal capacity?
Sanz and Velázquez (2002)	Determinants of the composition of government expenditure by functions.
Amaral and Oliveira (2010)	Composition of public expenditure and economic growth.
Saraiva (2017)	Efficiency of expenditure by municipal functions: an assessment of Data Envelopment Analysis.

Nogueira, Saraiva and Silva (2017)	Analysis of public expenditure by functions in Portuguese local authorities.
Ferreira (2014)	Functional structure of public expenditure and economic growth.
Martins and Correia (2015)	Determinants of budget deviations in Portuguese local authorities.
Mourão (2004)	Determinants of public expenditure in Portugal – an econometric assessment.
Sanz and Velásquez (2001)	Evolution and convergence of the composition of government expenditure in OECD countries: an analysis of functional distribution.
Aragão, Sobral, Melo and Melo (2012)	Impact of public expenditure by function on growth and the economy in Brazil.

Mourão (2004), Amaral and Oliveira (2010), Ferreira (2014), Nogueira, Saraiva and Silva (2017) and Saraiva (2017) carried out their studies on topics associated with public expenditure, although their main approaches are not directly related to this subject. Amaral and Oliveira (2010) and Ferreira (2014) studied the composition/structure of public expenditure, associating it with economic growth. Mourão (2004) analysed public spending in Portugal, considering its evolution over time. Finally, Nogueira, Saraiva and Silva (2017) and Saraiva (2017) carried out research on public expenditure by functions, the former analysing only Portuguese local authorities and the latter analysing public expenditure, with an emphasis on financial efficiency. So in recent years, study of the determinants of public expenditure has grown significantly, more in the international than in the national sphere, since the determinants of public expenditure and its distribution are considered as appropriate bases to assess and indicate the quality of that expenditure (Amaral and Oliveira, 2010).

Table 2 presents the authors' subjects and objectives in carrying out their research.

Analysis of Table 2 reveals that countries or local authorities were subject to study, with some of these samples being collected over several years, which allowed the authors to use different methodologies, emphasizing the time factor.

Table 3 presents the dependent and independent variables used by the different authors, to respond to the respective research questions.

The authors are found to use diverse variables, both to explain (explanatory or independent variables) and to justify the results obtained (explained or dependent variables), noting a great variety of variables. That variety, directly or indirectly, represents variables of a general, social and economic nature.

Table 2: Subject and objectives of research

Author(s)	Subject	Objective
Sanz and Velásquez (2001)	OECD countries in the period 1970 to 1997.	Verify the existence of convergence in relation to the structure of public expenditure by functions of activity.
Sanz and Velázquez (2002)	OECD countries in the period 1970 to 1997.	Analyse the determinants of functional distribution of public expenditure.
Mourão (2004)	Portuguese public expenditure between 1947 and 2002.	Describe the behaviour of public spending and indicate the determinants explaining the long-term behaviour of public expenditure.
Ollé (2005)	Local authorities in the province of Barcelona with more than 5000 inhabitants for the year 1996.	Determine the influence of municipal public spending needs according to the different levels of public expenditure.
Amaral and Oliveira (2010)	Member states of the European Union between 1998 and 2008.	Analyse tendencies in the evolution of public expenditure by functions in the European Union.
Aragão, Sobral, Melo and Melo (2012)	Expenditure by function in Brazil between 1980 and 2010.	Determine the effect of public expenditure on economic growth.
Ferreira (2014)	European Union countries.	Understand the importance of reallocating public expenditure as a factor stimulating economic growth in the short and long term.

Balmas (2015)	Spain: 1344 local authorities Poland: 307 local authorities.	Investigate the difference between the Polish and Spanish governments concerning the impact of political, geographical and socio-demographic factors in terms of public expenditure.
Alcalde and Martín (2015)	17 autonomous regions from 2002 to 2012.	Study the determinant socio-economic factors in the provision of basic public services.
Martins and Correia (2015)	278 local authorities in mainland Portugal between 2010 and 2012.	Determine and understand in what way budget deviations influence Portuguese local authorities.
Pérez and Cucarella (2016)	Autonomous regions from 2012 to 2017.	Analyse the sufficiency and distribution of expenditure among autonomous regions.
Saraiva (2017), Nogueira, Saraiva and Silva (2017)	308 Portuguese local authorities.	Analyse the efficiency of expenditure by functions in Portuguese local authorities.

The variables most used by researchers are expenditure on health, education (Pérez and Cucarella, 2016), infrastructure (Balmas, 2015) and social services (Alcalde and Martín, 2015). Besides using the variables already mentioned, Amaral and Oliveira (2010) also apply expenditure on transport and communications, economic matters, policing, leisure activities, general public services and defence.

As well as the variables described, other authors use fiscal, socio-demographic, geographical, institutional and economic variables (Balmas, 2015; Alcalde and Martín, 2015; Nogueira, Saraiva and Silva, 2017). Others again use variables related to economic growth (Mourão 2004; Amaral and Oliveira, 2010) and GDP (Aragão, Sobral, Melo and Melo, 2012; Ferreira, 2014).

Summarising, the variables used by the authors are seen to differ according to the nature and specific objective of each study. It stands out that the most relevant variables for the study in question are those of a more general (public administration's general services, public safety and order), social (education, health, safety and social action, housing and collective services, cultural, leisure and religious services) and economic (agriculture, stock-raising, forestry, hunting and fishing, industry and energy, transport and communications, commerce and tourism, other economic functions) nature, and other functions. Fiscal, geographical, institutional and economic variables are also considered.

Table 3: Dependent and independent variables

Author(s)	**Variables**	
	Dependent	**Independent**
Sanz and Velázquez (2002)	Convergence of expenditure.	Health; public services; education; defence; transport and communication.
Mourão (2004)	Growth of public expenditure.	Real GDP; nº of unemployed; nº of Central Administration employees; rate of openness of the Portuguese economy; current transfers.
Amaral and Oliveira (2010)	Economic growth.	Transport and communications; education; economic matters; health; policing; leisure activities; public services; defence; housing.
Aragão, Sobral, Melo and Melo (2012)	GDP per capita.	Administration and planning; social welfare; public safety; education; culture; agriculture and industry.
Ferreira (2014)	Real rate of growth of GDP per capita.	Health; education; policing; economic matters; general services of public administration.
Balmas (2015)	Total expenditure; health; education; culture; infrastructure.	Fiscal, socio-demographic, geographical and political variables, and rate of fiscal decentralization.

Alcalde and Martín (2015)	Health; education; social services.	Demographic, geographical, political-institutional, economic and financial indicators.
Martins and Correia (2015)	Deviations from income and expenditure; debt.	Economic, political, institutional and other variables.
Pérez and Cucarella (2016)	Health and education.	Size of population; standardized spending needs; adjusted spending needs; price index; weight of salaries.
Saraiva (2017)	Public Administration's general services; education; housing; cultural, leisure and religious services; transport and communications.	All licences granted; total electricity consumption; new buildings; nº of pupils in nursery schools; nº of pupil in 1st, 2nd and 3rd cycles; buildings; waste channels produced; urban waste collected; cinemas.
Nogueira, Saraiva and Silva (2017)	Public Administration's general services; education; housing and collective services; cultural, leisure and religious services; transport and communication.	Location; degree of isolation.

Ollé (2005) concludes that local authorities' expenditure needs are explained in 44% by resident spending, 38% by fiscal capacity, 9% by political and institutional factors and 9% by the interdependence existing between nearby governments. Alcalde and Martín (2015) find that demographic factors are relevant in determining public expenditure. This fact explains that public services present scale economies and budget restrictions that influence levels of spending per inhabitant. Alcalde and Martín (2015) also conclude that the government's regional political ideology has a direct influence on the amount of public expenditure and that the government financing system has no significant repercussions on the distribution of social expenditure.

Balmas (2015) finds the existence of political cycles in both Spanish and Polish local authorities, with increased public spending on public goods and services functions in pre-election periods. The author also concludes that excessive manipulation of fiscal aggregates can create debt in local government, and consequently prevent the growth of regional economies. Martins and Correia (2015) conclude that in 2012, of the 278 Portuguese local authorities, 191 present an amount of expenditure greater than the amount of income received. In a year of a general election, the budget balance is greater, whereas deviations from expenditure are less, meaning that political power has a direct influence on public expenditure. They also conclude that the greater local authorities' purchasing power, the less out of line are income forecasts and, in turn, the expenditure made is greater.

Briefly, all the authors present some similarities, since they seek to understand the determinants of public expenditure. Although the topics of the studies are the same, the authors use different explanatory variables, methodologies and data treatment, according to the aims they propose to achieve. In most cases, depending on the case studied, the authors use social spending, spending on education and spending on health as dependent variables and demographic, fiscal and political factors as independent variables. Regarding the methodology chosen, considering that in all the work analysed the time factor is relevant according to the sample, the most commonly used methodology, in these cases, includes panel data analysis, estimation of elasticities and hypothesis testing.

Methodology

Objectives, Research Hypotheses and Variables

The basic issue in this study is related to the increasing need to find out the determinant factors of public expenditure, in the specific case of local authorities. The intention is to contribute to local authority managers, as well as external controlling bodies, having mechanisms allowing them to manage and control expenditure.

Therefore, the aim is to identify the determinant factors of spending by functions, namely general, social, economic and other functions, for the year 2016. This year is studied due to a great many Portuguese local authorities not publishing their accountability documents or when they do so, a considerable period of time has passed since the year they should have been published.

The study is classed as quantitative research, considering the need to resort to instruments of statistical analysis to validate the hypotheses defined (Pardal and Correia, 1995).

The research is exploratory, since it will analyse a sample of 79 local authorities, of the total 308, obtained according to the availability of data on expenditure by functions on their websites, through consulting accounting documents. The intention is not to extrapolate the results to all Portuguese local authorities, but the results could be a starting point for future research.

According to the literature review, an adaptation is made, so as to define a group of hypotheses, aiming to contribute to solving the problem studied. It is considered that the determinants of expenditure by functions in local authorities could be fundamentally related to institutional and political factors.

The research hypotheses to be tested are now presented. It should be noted that the choice, besides being related to the literature review, is related to access to reliable municipal data.

H_1 - Location (coastal/inland) influences municipal expenditure by functions.

H_2 – Size influences municipal expenditure by functions

H_3 – The resident population under fifteen years old influences municipal expenditure by functions.

H_4 – The resident population over sixty-five years old influences municipal expenditure by functions.

H_5 – The resident population's rate of illiteracy influences municipal expenditure by functions.

H_6 – The purchasing power index influences municipal expenditure by functions.

H_7 – Unemployment influences municipal expenditure by functions.

H_8 – Financial independence influences municipal expenditure by functions.

H_9 – The form of governance influences municipal expenditure by functions.

H_{10} – The ideology of the governing party influences municipal expenditure by functions.

Table 4 presents the independent variables associated with each hypothesis, how they are constructed/calculated, and the source of information used.

The dependent variable is the value of expenditure by functions (general sovereign functions (GSF), social functions (SF), economic functions (EF) and other functions (OF)) referring to the year 2016. To standardize the variable, the total amount of expenditure will be divided by the number of inhabitants in the local authority, and so expenditure by functions per capita will be used.

Table 4: Independent variables

Hypothesis	Variable	Form of calculation	Source
H_1	Location (LOC)	Value of 1 for local authorities on the coast	National Programme for Territorial Cohesion
		Value of 0 for inland local authorities	
H_2	Size (DIM)	Number of inhabitants	National Statistics Institute
H_3	Population under 15 years of age (POP<15)	Percentage of population under 15 years of age	National Statistics Institute
H_4	Population over 65 years of age (POP>65)	Percentage of population over 65 years of age	National Statistics Institute
H_5	Illiteracy (ILLIT)	Rate of illiteracy	National Statistics Institute
H_6	Purchasing power index (PPI)	Purchasing power index	National Statistics Institute
H_7	Unemployment (UNEMP)	Number of unemployed	Employment and Occupational Training Institute
H_8	Financial independence (FININD)	Own income/Total income	Local authority portal
H_9	Form of governance (FORGOV)	Value of 1 if the local authority is governed by a majority	National Election Commission
		Value of 0 if the local authority is governed by a minority	
H_{10}	Political ideology (IDEOL)	Value of 1 if the local authority is governed by a right-wing party	National Election Commission
		Value of 0 if the local authority is governed by a left-wing party	

Statistical Data Treatment

The hypotheses formulated are studied through multivariate analysis. This analysis resorts to the linear regression model, in order to assess if the independent variables, as a whole, explain municipal expenditure by functions, and in what way. The multiple linear regression model by the Ordinary Least Squares method is used, considering that several (independent) variables explain expenditure by functions.

Estimation of the linear regression model requires fulfilment of some assumptions (Marôco, 2010), with various tests being necessary to carry out this analysis. For the multi-collinearity analysis, the Variance Inflation Factor was used. According to this author, if VIF values are above 10, the assumption is violated, and multiple linear regression cannot be applied. Heteroskedasticity is tested through the White test. Error auto-correlation is examined through the Durbin-Watson test.

A multiple linear regression model was defined, based on the hypotheses formulated, for the expenditure of the four major groups GSF, SF, EF and OF, which will be the dependent variable. Therefore, the model to test will be as follows:

$$\mathbf{GSF}, \mathbf{SF}, \mathbf{EF}\ \&\ \mathbf{OF} = \alpha + \beta_1 \mathrm{LOC} + \beta_2 \mathrm{DIM} + \beta_3 \mathrm{POP} < 15 + \beta_4 > 65 + \beta_5 \mathrm{ILLIT} + \beta_6 \mathrm{PPI} + \beta_7 \mathrm{UNEMP} + \beta_8 \mathrm{FININD} + \beta_9 \mathrm{FORGOV} + \beta_{10} \mathrm{IDEOL}$$

Findings

The results of estimating the different models are presented, beginning with the study of multi-collinearity. Table 5 reveals that no variable presents a VIF value above 10, and so there is no violation of the assumption. In addition, the tolerance values (1/VIF) are not close to zero, which means, as stated by Marôco (2010), that the regression coefficients are stable in magnitude and sign.

Table 5: VIF of the Multiple Linear Regression Model – General sovereign functions

Variable	VIF	1/VIF
LOC	2.32	0.4315
DIM	4.71	0.2122
POP<15	2.15	0.4662
POP>65	3.61	0.2771
ILLIT	5.65	0.1771
PPI	3.58	0.2795
UNEMP	3.68	0.2714
FININD	1.91	0.5231
FORGOV	1.22	0.8163
IDEOL	1.07	0.9323

In relation to heteroskedasticity, the results of applying the White test demonstrate that the assumption is violated. Therefore, as suggested by Veloso and Bornhold (2016), estimation was performed using the robust (vce) tool of STATA, to resolve the problem.

The results of the F test confirm that, for a 1% level of significance, there is significant statistical evidence, confirming that regressors present values other than zero and explain, as a whole and satisfactorily, the variations found in GSF and SF expenditure. No significant statistical evidence was obtained for the models of EF and OF, and so only analysis of the results obtained for GSF and SF is presented

The results of estimating the model of the determinants of GSF present a relatively low R^2 of 0.11, and so the independent variables explain only 11% of the variations found in GSF expenditure.

For a maximum level of significance of 5%, the variables of DIM and ILLIT are found to be statistically significant. In relation to ILLIT, this presents statistical significance through estimation of the model using OLS. Therefore, the results allow the conclusions that:

- Larger local authorities present lower expenditure on GSF;

- The illiteracy rate has a positive influence on municipal expenditure on GSF.

It is noted that significant statistical evidence was not obtained in relation to LOC, POP<15, POP>65, PPI, UNEMP, FININD, FORGOV and IDEOL.

The model of the determinants of SF expenditure shows an R^2 of 0.19, revealing therefore that the independent variables explain 19% of the variations occurring in expenditure in these functions.

Table 6: Results of the Multiple Linear Regression Model

Variable	GSF	SF	EF	OF
	(1)	(2)	(3)	(4)
LOC	24.80	4.20	-0.64	-2.54
	(1.45)	(0.07)	(-0.01)	(-0.12)
DIM	-0.0005***	-0.0006	0.0001	-0.0004
	(-2.82)	(-0.91)	(0.31)	(-0.86)
POP<15	-18.71	353.20	1091.00	881.00
	(-0.06)	(0.23)	(1.15)	(1.51)
POP>65	-187.90	-650.5	-393.10	370.70
	(-0.83)	(-0.96)	(-0.85)	(1.31)
ILLIT	8.82**	27.63***	23.89**	2.06
	(2.44)	(2.84)	(2.27)	(0.37)
PPI	0.57	2.33**	0.82	0.14
	(0.80)	(2.15)	(1.02)	(0.18)
UNEMP	0.003	0.002	-0.002	0.001
	(0.44)	(0.16)	(-0.22)	(0.13)
FININD	18.46	-27.24	-22.65	22.68
	(0.76)	(-0.66)	(-0.84)	(0.89)
FORGOV	-5.90	73.27**	12.76	-55.92
	(-0.17)	(2.42)	(0.56)	(-1.21)
IDEOL	2.84	2.92	18.77	-26.03
	(0.19)	(0.10)	(0.82)	(-1.32)
_cons	-11.22	-164.20	-222.20	-100.90
	(-0.18)	(-0.73)	(-1.53)	(-0.92)
F	3.306***	4.625***	1.187	1.194
R^2	0.11	0.19	0.23	0.16
N	79	79	79	79
* p<0.10, ** p<0.05, *** p<0.01				

For a 5% level of significance, the variables of ILLIT, PPI and FORGOV are seen to present statistical significance. So in relation to estimation of the model:

- The illiteracy rate has a positive influence on municipal expenditure on SF;
- Local authorities with a higher purchasing power index present greater expenditure on SF;
- Local authorities governed by a majority present greater expenditure on SF.

Concerning the variables of LOC, DIM, UNEMP and FININD, they do not present statistical significance, and so the results of the relations found in the bi-variate analysis are not validated.

Discussion of the Hypotheses

Discussion of the results can contribute to improving the way expenditure is allocated in local authorities, considering that those responsible will have information about its determinants, by functions.

Table 7 presents the results related to each hypothesis. The hypothesis is validated whenever there is significant statistical evidence in at least one of the functions.

Table 7: Determinants of expenditure by functions

Variable	GSF	SF
LOC		
DIM	(-)	
POP<15		
POP>65		
ILLITL	(+)	(+)
PPI		(+)
UNEMP		
FININD		
FORGOV		(+)
IDEOL		

Concerning size, the results allow **validation of H_2**, and so the larger the local authority, the lower the expenditure on GSF. This finding seems to show that larger local authorities manage to obtain some synergies when carrying out expenditure. The results do not allow validation of the hypothesis for SF expenditure.

The hypothesis related to ILLIT is corroborated for two groups of expenditure, GSF and SF, **validating H_5**. This result confirms that local authorities with higher rates of illiteracy have a greater need for general and social expenditure.

In relation to **H_6**, this is only **validated** for SF expenditure. Here, the greater the PPI the greater the social expenditure, which may show that residents' higher income leads to greater social inequalities. These inequalities may lead to a greater need for municipal expenditure in the attempt to remedy them.

The results also allow **validation of H_9** for SF expenditure, and so there seems to be evidence that local authorities governed by a majority present greater social concern, shown in the amount of expenditure of this nature.

Conclusion

Local authorities have limited resources, meaning they must manage their expenditure efficiently and avoid excessive debt. Considering their various competences, local authority managers are expected to make decisions on the type of expenditure to be made, with the aim of satisfying residents' collective needs. In this context, it is extremely important for them to know the determinants of public expenditure on the different functions, to be able to decide pro-actively.

Discussion of the results could contribute to improving how municipal expenditure is carried out, considering that those responsible will have information about its determinants, by functions.

This study aimed to identify the determinant factors of expenditure by functions, namely, general, social, economic and other functions in Portuguese local authorities, for the year 2016.

The results reveal that, regarding expenditure on general sovereign functions:

- Larger local authorities present lower expenditure;

- Local authorities with higher illiteracy rates present greater expenditure.

Regarding expenditure on social functions:

- Local authorities governed by a majority are more likely to have greater social expenditure;
- Local authorities with a higher purchasing power index present higher amounts of social expenditure;
- Local authorities with higher illiteracy rates present higher amounts of social expenditure.

As for the limitations of the study, various problems arose regarding both data collection and the quality of the data. Firstly, the difficulty in collecting indicators from the local authorities. Some do not publish annual accountability reports as requested by the Court of Auditors. Some of the data published are illegible due to the documents' lack of quality. So these factors limited this study, considering that the sample does not represent the country as expected.

Future research could extend the study to a longer period of time, including explanatory variables related to other dimensions, which would allow the application of more robust statistical methods. It will also be important to extend the study to all Portuguese local authorities so as to achieve more significant results regarding the distribution of public expenditure.

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Estimation of The Impact of Attributes On the Value of Real Estate Based On Prices and Value of Real Estate

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Abstract

U The article presents statistical methods that can be used to determine the impact of attributes on the valuation of real estate. The influence of attributes will be determined in two ways: on the basis of valuations of property valuers and on the basis of transaction prices of real estate. The empirical part of the research (based on the data obtained from the land estate market in Szczecin) will be aimed at verifying the hypothesis on the usefulness of the proposed statistical methods for determining the weights of attributes and the influence of individual states of attributes in the mass valuation of real estate value.

Keywords: Mass Valuation, Statistical Methods, Weights of Attributes, Real Estate.

Introduction

The value of the property is estimated based on the features (attributes) of the property. In the process of property valuation, there can be taken into account: surface, technical condition, neighborhood, environment, transport access, location, soil and water conditions, and many more features of a property. The catalog of attributes that can affect the value of a property is an open catalog, and the choice of features depends on the type of property being valued and the availability of information. There are several ways to consider the impact of individual attributes on the value of a property. The degree of attributes influence on a real property value can be defined depending on the condition of a market, taking into account:

1. the results of the data analysis concerning the market prices and characteristics of similar real properties being the subject of real estate trade in a real estate market specified for the needs of an appraisal;

2. the analogy to the local markets similar in terms of their type and area;

3. the examination and/or observation of the preferences of potential real property buyers;

4. another reliable manner.

Real property appraisers typically employ the second or the third method, while the first one raises the greatest doubts, since it involves conducting a statistical analysis in accordance with the assumption of quantitative studies.

The article presents the use of the dependency coefficient to determine the impact of individual attributes on the value of real estate. When choosing the appropriate coefficient, the description of individual attributes should be taken into account - usually these are the features presented on the ordinal scale. In addition, there is no linear relationship between the examined features. The specific characteristics of the attributes describing the properties affect the selection of the appropriate

measure of dependence. The development of the conducted research was the estimation of dependency coefficients based on data from two sources: a database on real estate values and a database on real estate prices. In both databases, real estate has been described by the same set of attributes. Selected properties were valued twice, in the same way - using the Szczecin Mass Real Estate Valuation Algorithm (SAMWN), using relationships estimated based on real estate values or prices. The comparison of the usefulness of both databases was based on the measures of matching estimated property values with property values valued by property appraisers in an individual valuation.

Two research goals have been formulated: to present the use of correlation coefficients to determine the influence of attributes of the property on its value and to compare the results of the valuation based on the database on the value and price land properties.

Mass Appraisal of Real Estate

Mass property valuation (Jahanshiri et al 2011) is discussed when the following conditions are simultaneously met (Hozer et al 2002; Telega et al 2002; Kuryj 2007)

- the subject of valuation is a large number of properties of one type,
- the valuation is to be carried out using a uniform approach, resulting in comparable results,
- all properties to be measured are valued 'at one time', using the same dates of inclusion and price levels.

Organizational mass valuation, in general, takes place in two stages: collecting all necessary information and data concerning all the properties being valued and the relevant market, and performing calculations of the value of all the properties being valued using an appropriate algorithm. Whether a given valuation is a mass appraisal is not determined by the purpose of the valuation or formal considerations, but the subject matter, scope, nature of work and the way they are organized.

The following should be regarded as characteristic areas of usefulness of mass valuation (Hozer et al 1999):

- property valuation for the purpose of updating annual perpetual usufruct fees,
- property valuation for the purpose of estimating the economic effects of adopting or amending local spatial development plans,
- monitoring of the value of the property sets constituting collateral for the bank's credit exposures in order to calculate LtV for the bank's credit portfolio (Cho and Megbolugbe 1996; Korteweg and Sorensen 2016; Tzioumis 2017),
- common real estate taxation (Bradbury et al 2001),
- in certain situations other purposes, such as sale of dwellings from municipal resources, expropriation for linear investments, etc.

The large number of properties being valued and the appropriate sequence of analytical activities entail the necessity to standardize the whole process, including the standardization of the set of market characteristics, their variants (classes, states) and the relatively objective method of their measurement. Organization of the mass valuation process and standardization of market features makes it susceptible to algorithmization.

Concepts for the use of mass valuation models have emerged worldwide with the development of new technologies and informatization (McCluskey et al 2013), but these methods have flourished as a result of constantly improving availability of large databases, information processing techniques and the ability to visualize results. Real estate markets, which consist of thousands or even millions of individual properties, have naturally become an interesting area of research and scientific exploration. The need to explore the unknown also concerned real estate market analyzes in the context of rapid (automated) real estate valuations, including mass valuations (Clapp 2003).

An attempt to classify quantitative methods useful in the mass valuation process is presented in a book edited by Kauko and d'Amato (2008). Mass valuation methods were divided into four groups: modeling-based methods, data-based methods, machine-based methods and expert methods. The study provides an overview of mass valuation techniques used worldwide. According to the authors, price surveys should aim, on the one hand, at spatial tools and, on the other hand, at pragmatic tools (satisfactory from the point of view of estimation accuracy). The balance between sophisticated econometric techniques and practical aspects of valuation accuracy and the possibilities of applying valuation algorithms in practice remains an important aspect (which would also allow the use of tools such as computer simulations, artificial intelligence or machine learning methods).

Jahanshiri et al (2011) also reviewed the models of mass property valuation. The authors pointed out that the real challenge for those applying mass valuation methods are two aspects: the first one concerns the accuracy and consistency of valuations, and the second the speed with which the valuation process can take place. It is also a requirement that the property is regularly revalued so that the taxes calculated based on them are accurate and fair. Automated valuation models use databases of property values and property characteristics and current information about transactions in the markets concerned. The second important part of automated valuation models are statistical methods of property value estimation. The third part is the output information and a graphical interface for communication and visualization of modelling results.

An outline of Automated Valuation Models (AVM), which can also be useful in mass valuations, was presented by d'Amato (2017). In the article he also described other methods (MRA, spatial models) and their evolution in recent decades, he also discussed standards resulting from AVM.

A general overview of quantitative methods used in mass valuation can also be found in Pagourtzi, Assimakopoulos, Hatzichristos and French (2003). Here, the methods are divided into traditional (MRA – regression models, step regression models, methods based on the following approaches: comparative, cost, income, investment) and advanced, such as ANN (artificial neural networks), hedonic valuation methods, spatial analysis methods, fuzzy logic and ARIMA models.

An interesting comparison of modern approaches in mass valuation is presented in McCluskey et al (2013). The study compared the effectiveness of such modelling approaches as MRA, SAR, GWR, ANN. Many useful proposals concerning the accuracy of valuations were also given. The authors emphasize that traditional hedonic models, popular in the early 1960s, were subsequently subject to criticism, which resulted from errors in specification and problems arising, among others, from non-linearity of compounds. Currently, the research focuses rather on the applications of non-parametric (geostatic) regression and artificial neural networks.

Currently, groups of methods using machine learning are often used. This group of methods includes Artificial Neural Networks (ANN), rough-set theory, fuzzy logic, genetic algorithms, etc. An interesting application of machine learning methods was reported by Zurada, Levitan and Guan (2011). In the article they presented a comparative study, in which several methods of regression and artificial intelligence are used in property valuation. The results indicate that non-traditional methods lead to more accurate valuations.

In the literature, mass valuation methods based on modeling include mainly: econometric models (MRA), hedonic regression models and spatial econometric models. The bibliography regarding the possibility of using econometric methods in valuation is quite extensive (Isakson 1998; Benjamin et al 2004; Zyga 2004; Pawlukowicz 2006, 2007; Parzych and Czaja 2015; Dell 2017; Doszyń 2018). Dell (2017) emphasizes that regression and other parametric tools can be very useful in valuation, but in practical applications they often do not bring satisfactory results. He also states that data science and big data as well as a statistical approach can be the future of the mass valuation process.

Also in Poland regression models have been explored for years, this phenomenon was favoured by the legislation in force, which already allowed the use of statistical analysis methods of the real estate market, i.e. as part of a comparative approach: the method of statistical market analysis. At the turn of

the 20th and 21st century in Poland many attempts were made to apply econometric models (most often linear regression models) to model real estate prices or values (Czaja and Żak 1993; Sawiłow 1995; Cellmer 1999; Dacko 2000a; 2000b; Lipieta 2000; Źróbek and Bełej 2000; Pawlukowicz 2001; Zadumińska and Sztaudynger 2001; Źróbek 2002; Lis 2005; Renigier-Biłozor 2008; Zbyrowski 2010; Doszyń 2012; Walkowiak and Zydroń 2012; Doszyń and Gnat 2016; Gdakowicz and Putek-Szeląg 2018). In these models, real estate prices were described by various features, e.g. purpose in the local zoning plan, utilities, transport accessibility, area, development, shape of the plot, year of construction, quality of the land, land configuration. Examples of numerous incorrect valuations and poor application of econometric models in practice and described in the literature are summarized in Prystupa (2016).

A non-classical approach to mass real estate valuation under the market statistical method is the Szczecin Mass Real Estate Valuation Algorithm (SAMWN), detailed and for the first time described in the work of Hozer et al (1999). Initially, the algorithm was used to assess the economic effects of changes in the spatial development plan for the city of Szczecin, and then - to update the fees for perpetual usufruct of land (also in this city). Practical application of this model several times and analysis of the obtained results confirmed its high predictive qualities of real estate values (Hozer and Kokot 2002).

Using SAMWN, it is necessary to determine the influence of individual attributes on the value of the property. This can be estimated based on an econometric (Doszyń 2018), statistical (Dmytrów et al 2019; 2020) or expert (Dmytrów and Gnat 2019) approach. The statistical approach is based on the study of the interdependence between the property value of 1 m^2 and the attribute values describing the real estate. The way in which such a correlation can be studied depends to the greatest extent on which scales the values are measured. The value of 1 m^2 of property is measured on the strongest, quotient scale. In turn, the values of attributes are measured on a much weaker, orderly scale. If one wants to carry out any actions on variables measured on different scales, one should convert them to the weakest scale (Walesiak 1996). The influence of attributes on the value of 1 m2 of property can be estimated using correlation coefficients. When studying the correlation between the attributes in the real estate market and the value of 1 m2 the following problems are encountered (Dmytrów et al. 2019):

- the attributes describing the properties being valued are very often of a qualitative nature - they are measured on an orderly scale (Walesiak 1996),
- the differences between successive values of attributes measured on an ordinal scale are not necessarily constant (changes are not linear),
- when examining correlations between the value of 1 m^2 and individual attributes, the influence of the remaining attributes, which may significantly disturb the examined correlation, should be eliminated.

Considering the above, rank-based correlation coefficients should be used to describe the interdependence of such characteristics. The use of correlation coefficients for qualitative variables in the real estate market was proposed (Barańska 2009; Kulczycki and Ligas 2014; Doszyń 2017; Babatunde 2018; Dmytrów et al. 2019; 2020). The best known are the correlation coefficient of Spearman's rank ς and Kendall's τ coefficient (Aczel 2005). Although both coefficients are based on ranks, both have a different philosophy of calculation. Spearman's ς coefficient is calculated on the basis of differences between the ranks of both variables, and Kendall's τ coefficient is based on the ratio of superiority between the observation pairs of both variables – hence the use of Kendall's τ coefficient is much more justified. This coefficient occurs in several varieties: τ_A, τ_B and τ_C. Coefficient τ_A is calculated assuming, that there are no bound ranks. The factor τ_B assumes, that there are bound ranks, while the factor τ_C is the most suitable for data in the form of contingency table. In the case of data used in the study, where the number of observations is much higher than the number of varieties of tested attributes, bound ranks will certainly occur. Therefore Kendall's τ_B factor was applied.

The dependency coefficients were estimated twice as:

- the relationship between the value of the property estimated in the individual valuation by property appraisers and the attributes of these properties;
- the relationship between the price of the property (transaction price) and the attributes of the property sold.

Therefore, empirical data came from various sources. In the first case, it was a specified area of the city of Szczecin, with identified land properties. The properties were described by a set of attributes, and then valued in an individual approach by authorized property appraisers. In the second case, the analysis used real estate that was the subject of purchase and sale in Szczecin. Also these properties were described with the same set of attributes. Data obtained from the Register of Real Estate Prices and Values (RREPV) maintained by the Municipal Surveying and Cartographic Documentation Center in Szczecin.

RREPV is the public register kept by a starost (county chief) which include data on real estate prices given in notarial deeds and (sometimes) real estate values given by real estate appraisers in appraisal reports which extracts are provided to the register of land and buildings. RREPV is defined by The Order of Ministry of Regional Development and Buildings (RDB). The following data are recorded in RREPV: real estate's price and value, real estate's address, numbers of parcel being estate's components, estate's type, estate's area, the date of authenticated deed signing or the date of real estate valuation, other data concerning real estates. Register of Real Estate Prices and Values is a register to which all land ownership change transactions are mandatory, and buy-sell transactions are also recorded there.

Research Methodology

An algorithm for mass valuation of real estate that meets the assumptions of such a procedure is the Szczecin SAMWN mass valuation algorithm. Property valuation is based on the form algorithm:

$$w_{ji} = wwr_j \cdot pow_i \cdot w_{baz} \cdot \prod_{k=1}^{K} \prod_{p=1}^{k_p} (1 + A_{kpi}) \tag{1}$$

where:

w_{ji} – market value (or cadastral value) of i- th property in j- th location attractiveness zone,
wwr_j – market value ratio in j- th location attractiveness zone (j = 1, 2, …, J),
J – number of the location attractiveness zones,
pow_i – the area of i- the property,
w_{baz} – the estimated value of 1 m^2 of the property with the worst attribute states in the worst location attractiveness zone,
A_{kpi} – the influence of p- th category of k- th attribute for i- th property (k = 1, 2, …, K; p = 1, 2, …, k_p),
K – the number of attributes,
k_p – the number of k- th attribute category,
N – number of properties being valued (i = 1, 2, …, N),
R – number of representatives (r = 1, 2, …, R).

The algorithm determines the market or cadastral value of the property, not the price. The reference point for determining the value is the base value, i.e. the value of 1 m^2 of the property with the worst state of attributes, in the worst zone of location attractiveness. The base value is multiplied in the algorithm by the influence of attribute states of the property being valued.

The impact of attribute states (A_{kpi}) can be determined by quantitative methods, for example by statistical methods. The value of a property depends not only on its attributes. The value is also influenced by factors on the demand side. Two properties that are very similar in terms of their

attributes can have different values if they are located in different location attractiveness zones (SAL). In the algorithm the influence of such factors is taken into account by market value factors (wwr_j). These coefficients are determined for each location's attractiveness zone and show the location's influence. The market value coefficient for the *j*- th location attractiveness zone can be determined as:

$$wwr_j = \sqrt[n_j]{\prod_{i=1}^{n_j} \frac{w_{ji}^{rz}}{w_{ji}^{h}}} \tag{2}$$

where:

w_{ji}^{rz} – the value of *i* – th property in *j*- th location attractiveness zone determined by a property appraiser,
w_{ji}^{h} – the hypothetical value of *i*- th property in *j*- th location attractiveness area,
n_j – the number of representative properties in *j*- th location attractiveness zone.

The market value coefficients are on the basis of representative real estate valuations carried out by property valuers. Appraisers value representative real estate on an individual basis, which results in real property values (w_{ji}^{rz}). On the other hand, hypothetical values (w_{ji}^{h}) are calculated on the basis of (1), but excluding market value coefficients:

$$w_{ji}^{h} = pow_i \cdot w_{baz} \cdot \prod_{k=1}^{K} \prod_{p=1}^{k_p} \left(1 + A_{kpi}\right) \tag{3}$$

If the values of randomly selected or appropriately selected representative properties are known (w_{ji}^{rz}), attribute states, influence of attribute states, base value (w_{baz}) and surfaces, then for each zone of location attractiveness it is possible to estimate market value coefficients by calculating the geometric mean from the quotients of real values and hypothetical real estate. Knowing the market value coefficients for individual location attractiveness zones, it is possible to estimate the market (cadastral) value of each property located in it, taking into account the property attribute states.

When estimating the influence of the state of attributes on the value of real estate, Kendall coefficients and partial values of these coefficients (Parker et al 2011; Han and Zhu 2008). In the case of the data used in this research, where the number of observations is substantially higher than the number of varieties of the examined attributes, tied ranks are certain to occur. Which is why, τ_B Kendall coefficient was applied and computed as follows:

$$\tau_B = \frac{n_c - n_d}{\sqrt{(n_0 - n_1)(n_0 - n_2)}} \tag{4}$$

where:

$n_1 = \frac{\sum_i t_i(t_i - 1)}{2}$, $n_2 = \frac{\sum_j u_j(u_j - 1)}{2}$,
t_i – number of observations in a sample featuring the same *i*- th rank value of *x* property,
u_j – number of observations in a sample featuring the same *j*- th rank value of *y* property.

In order to eliminate the impact of the remaining attributes during the correlation test between a given attribute and the value of 1 m^2 partial correlation coefficients were calculated:

$$\tau_{yx.z} = -\frac{R_{yx}}{\sqrt{R_{yy} \cdot R_{xx}}} \tag{5}$$

where:

y – vector of the explained variable value,
x – vector of the explaining variable value,
z – vector (or matrix) of the remaining variables,
R_{yx} – determinant of a matrix cofactor obtained by removing the row corresponding to y variable and the column corresponding to x variable,
R_{yy} – determinant of a matrix cofactor obtained by removing the row and column corresponding to y variable,
R_{xx} – determinant of a matrix cofactor obtained by removing the row and column corresponding to x variable.

On the basis of these partial coefficients, weights were determined, i.e. the influence of particular attributes on the value of 1 m^2 of property. The weights were determined as a percentage share of individual coefficients in the sum of all coefficients:

$$w_k = \frac{\tau_{yx_k.z}}{\sum_{k=1}^{K} \tau_{yx_k.z}} \cdot 100\% \tag{6}$$

where:

k – number of an analysed attribute,
K – number of attributes.

The greater the share of the value of a partial correlation coefficient of a given attribute is in the sum of the values of all attributes coefficients, the greater the weight ought to be assigned to a given attribute.

Additionally, it was assumed that due to the scaling of attribute levels (a higher attribute level means a higher value of 1 m^2 of real estate) all correlation coefficients should have a positive value. If the value of the coefficient is lower than 0 then a negligible impact of this attribute on the value of the property is assumed, and in further calculations, zero is assumed. To determine the impact of each attribute state in the SAMWN the formula was used (Doszyń and Dmytrów 2019):

$$1 + \alpha_{kp} = e^{\ln\left(\frac{w_{max}}{w_{baz}}\right) \cdot u_{kp}} \tag{7}$$

where:

w_{max} – the theoretical, maximum property value for the best attribute states, in the most expensive location attractiveness zone,
w_{baz} – the base value,
u_{kp} – the state p of the attribute k is calculated as follows:

$$u_{kp} = \frac{w_k}{k_p - 1}(p - 1) \tag{8}$$

where:

w_k – weight of k- th attribute, $p = 1, 2, \ldots, k_p$.

The procedure for estimating the impact of individual attributes on the value of real estate was carried out twice. First, the relationship between the property value estimated in the individual approach by property appraisers and individual property attributes was calculated. The second case involved examining the relationship between real estate transaction prices and individual real estate attributes. The dependency coefficients obtained in two approaches were used as a basis for calculating the impact of individual attributes on the value of the property (formula 6). Then the same group of real estate was valued twice using SAMWN and two cases of calculating the impact of attributes (based

on real estate values and prices). The obtained valuation results were compared by determining the error between the values of 1 m^2 of real estate estimated by property appraisers and the values estimated by the algorithm. For this purpose, the mean absolute percentage error *MAPE* (Mean Absolute Percentage Error) was used:

$$MAPE = \frac{100\%}{n} \sum_{i=1}^{n} \frac{|w_i - w_{t,i}|}{w_i} \tag{9}$$

where:

w_i – the value of 1 m^2 of property estimated by a real estate appraiser,
$w_{t,i}$ – the value of 1 m^2 of property estimated by SAMWN.

An error (9) at a low level will indicate a good adjustment of the algorithm to real data – valuations obtained on the basis of the algorithm will be at a level similar to individual valuations. A high *MAPE* error rate will indicate the divergence from the actual valuations algorithm. The first situation is desirable - convergence of individual valuations with SAMWN algorithm valuations. The *MAPE* error was counted twice for the two methodological approaches using SAMWN.

Empirical Study

Data

Valuation of SAMWN was performed on 118 land properties located in the northern part of Szczecin (fig. 1). The properties were grouped into 17 location attractive zones. These properties have been valued by property appraisers (fig. 2).

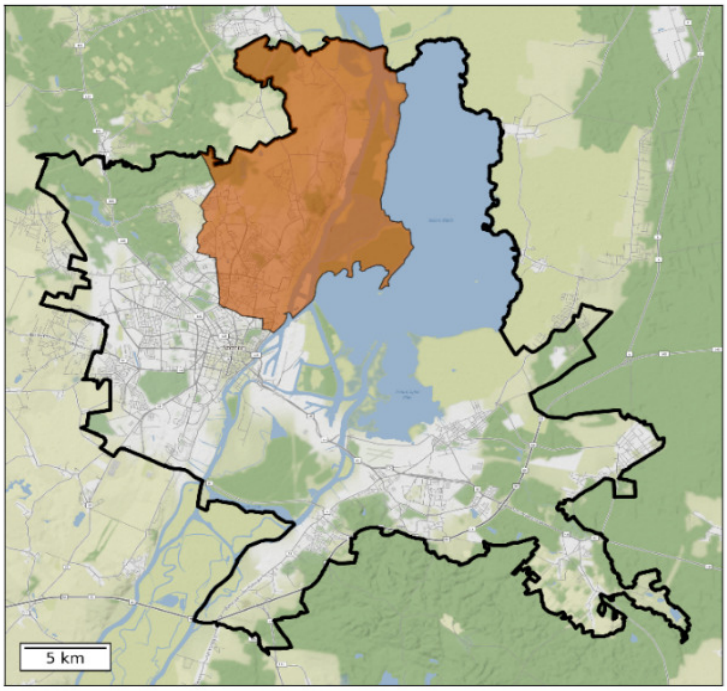

Fig. 1: The northern region of Szczecin

Source: authors own study.

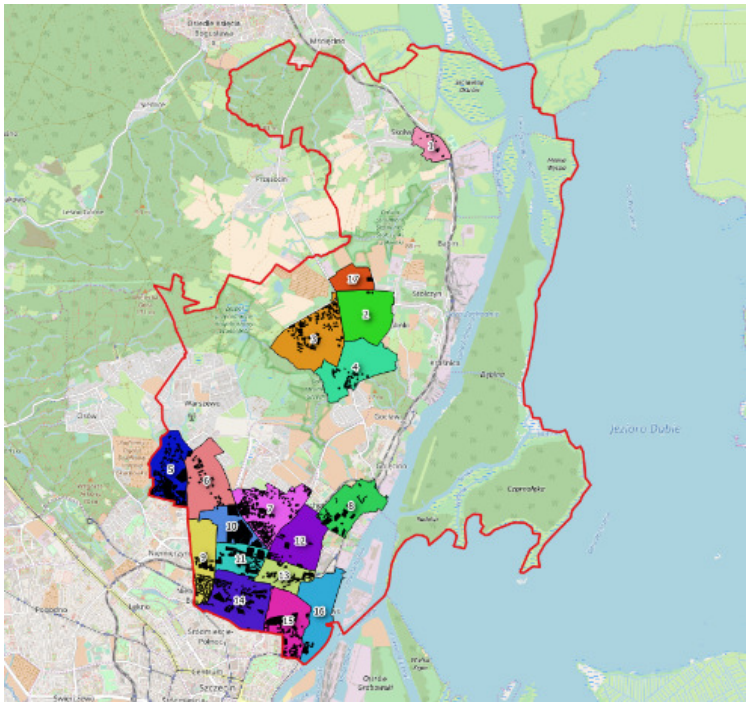

Fig. 2: Szczecin area with marked local attractiveness zones
Source: authors own study.

A set of features (attributes) has been defined for each property:

- Area: 1 – large, 2 – average, 3 – small;
- Technical infrastructure: 1 – none, 2 – partial, 3 – complete;
- Neighbourhood: 1 – troublesome, 2 – unfavourable, 3 – average, 4 – favourable;
- Access: 1 – unfavourable, 2 – average, 3 – favourable;
- Physical properties: 1 – unfavourable, 2 – average, 3 – favourable.

Number 1 is assigned to the least favourable state and the largest to the most favourable state.

The real estate value estimation by SAMWN

For the selected properties Kendall dependence coefficients B (formula 4) and partial coefficients (5) were calculated. Coefficients have been calculated for the relations between the value of 1 m^2 and the attributes of the property (Table 1) and between the price of 1m^2 and the attributes of the property (Table 2).

Table 1: Kendall's τ_B coefficients and $\tau_{yx.z}$ partial correlation coefficients the value of 1 m^2 versus the value of the property attributes

Coefficient	Area	Technical infrastructure	Access	Neighbourhood	Physical properties
τ_B	-0.009	-0.005	**0.306**	0.093	-0.007
$\tau_{yx.z}$	0.055	0.059	**0.315**	0.099	-0.036

Bold marked statistically significant dependencies.
Source: authors own study.

Table 2: Kendall's τ_B coefficients and $\tau_{yx.z}$ partial correlation coefficients the price of 1 m^2 versus the value of the property attributes

Coefficient	Area	Technical infrastructure	Access	Neighbourhood	Physical properties
τ_B	0.220	0.218	0.150	0.164	0.253
$\tau_{yx.z}$	0.178	0.167	0.062	0.047	0.185

Source: authors own study.

In the first case (table 1) Kendall's correlation coefficient generally indicate a lack of correlation between the value of 1 m^2 and the levels of attributes. Only the relationship between the value of 1 m^2 and access is relevant, although the strength of the relationship is quite weak. In addition, most of the coefficients have a negative value, which should not be the case. For the partial coefficients, the results improved significantly. In each case, the strength of the relation is greater and in addition, the coefficients in most cases are positive. Only for physical properties coefficient is negative, but very weak and statistically insignificant, so this attribute is omitted.

In the second case (table 2) Kendall's correlation coefficients indicate significant positive relationships. The strongest correlation was between the price and physical properties, the weakest between the price and access – that is quite contrary to the previous case. Lower values of partial correlation coefficients were recorded for all attributes. Additionally, two of them stopped indicating a significant correlation. Such a disproportion between partial and coefficients indicates the collinearity of features. Such differences between the values of correlation coefficients in both cases may result from different identification of the impact of particular features on the real estate market.

Based on the above partial dependency coefficients, the impact of individual attributes on the property value was calculated (formula 6). The results are summarized in Table 3.

Table 3: weights to individual attributes the value and the price of 1 m^2 versus the value of the property attributes (%)

Attributes	Area	Technical infrastructure	Access	Neighbourhood	Physical properties
Value	0.220	0.218	0.150	0.164	0.253
Price	0.178	0.167	0.062	0.047	0.185

Source: authors own study.

In the first case (table 3) the bigger influence on the property value had access (almost 60%), neighborhood (19%) and technical infrastructure (11%). The relation between the value of 1 m^2 of real estate and physical features was negative, therefore the weight assigned to physical features was equal to 0%. For the price the bigger impact had physical properties (almost 30%), area (28%) and technical infrastructure (26%). All attributes affected the price.

Attribute weights (from table 3) were used to calculate the impact of the individual attribute levels on the property value and price (according to formula 7).

Table 4: attribute influence vector in SAMWN

Attributes	Level of attribute	Value	Price
		$1 + \alpha_{kp}$	
Area	Large – 1 Average – 2 Small – 3	1 1.014 1.029	1 1.039 1.079
Technical infrastructure	None – 1 Partial – 2 Complete – 3	1 1.015 1.031	1 1.131 1.262
Access	Unfavourable – 1 Average – 2 Favourable – 3	1 1.085 1.178	1 1.047 1.098
Neighbourhood	Troublesome – 1 Unfavourable – 2 Average – 3 Favourable – 4	1 1.017 1.035 1.053	1 1.024 1.049 1.073
Physical properties	Unfavourable – 1 Average – 2 Favourable – 3	1 1 1	1 1.145 1.290

Source: authors own study.

The weight for the attribute of the physical properties was set at 0, so for each level the influence is equal to 1. The successive transitions between the attribute levels increased the value of the property the most for access (the weight of this attribute was the greatest). For the first case – values of 1 m^2 – a property with average access was worth 8.5% more than a property with unfavourable access. On the other hand, the favourable access attribute increased the value of 1 m^2, the property was worth 17.8% more than the unfavourable access (table 4). In the second case – prices – the value of real estate was increased the most by the improvement of physical attributes – almost 30% and technical infrastructure – 26%.

Using the obtained results of correlation coefficients, the values of selected land properties were estimated using SAMWN (formula1). Theoretical values were compared with property values estimated by property appraisers (this is called true values). The algorithm was used twice – once for the coefficients calculated between the value and the attribute level, the second time for the coefficients calculated between the price and the attribute level. On the figure 3 there are plots of 3 property value distributions. Two of them are property values estimated by an algorithm and both are very similar.

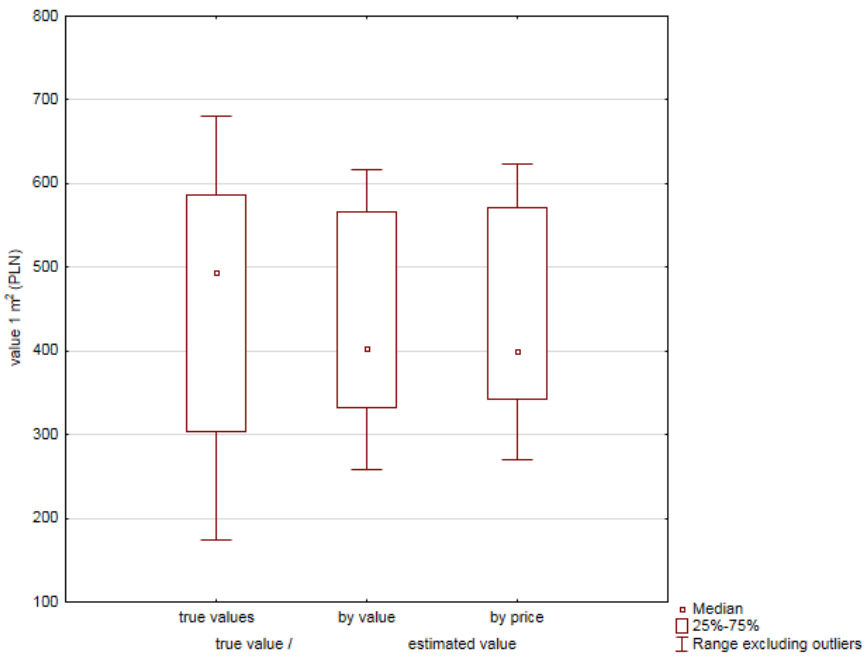

Fig. 3: Comparison of estimated real estate values (by SAMWN) with true values
Source: authors own study.

The values of the properties estimated by SAMWN were less volatile (in both cases) than the actual values (fig. 3). The medians of the estimated values are below the median of the true values.

In the next step, measures were calculated to investigate the differences between the real values and the property values estimated by SAMWN. The mean absolute percentage error (MAPE) (formula 9) was used:

$$MAPE_{value} = 14.24\% \qquad MAPE_{price} = 14.97\%.$$

The application of property values or purchase prices of real estate in the process of valuation does not have a significant impact on the results of errors. Valuation errors in both cases are at a similar level.

Summary

Property valuation is becoming increasingly important on a massive scale. In models that enable mass property valuation, it is important that the valuation process is standardized and limits the share of the human factor to a minimum. The Szczecin algorithm of mass real estate valuation is such a model. Additionally, the applied statistical approach ensures objectivity of obtained results. However, the question may arise on the basis of which information to determine the influence of particular attributes on the value of the property: whether on the basis of relations observed on the buy-sell market or on the basis of expert knowledge of property appraisers. Both approaches have their advantages and disadvantages.

The advantage of using the first approach is a direct reference to the relations observed on the market. As customer preferences change, dependencies will change. It is also a relatively cheap solution, because information on the sale and purchase of real estate is placed in the public Register of Price and Value (in some cases a small fee is required). The use of statistical methods in the analysis of dependencies requires that the database on the basis of which the calculations are made should be of

adequate size. Thus, in local markets, where there are not enough buy and sell transactions, the use of data from the Price and Value Register can be problematic, which is a disadvantage of the proposed method of calculating the impact of attributes on the value of real estate.

In the case of the second approach - the use of individual valuations - the advantage is the possibility of valuing the necessary number of properties, regardless of market size. Even in underdeveloped markets, it is possible to value an appropriate number of properties. The disadvantages of this approach include the necessary time and financial expenditure. Since an individual valuation must be prepared for a sufficiently large community, appraisers must have time to prepare it. Each individual valuation involves an individual payment for the work done. This significantly increases the cost of the mass valuation process.

The article presents the possibilities of using statistical methods in Szczecin's mass valuation algorithm. The choice of statistical method should take into account the specificity of the attributes (e.g. the type of scale – ordinal). The correlation coefficients necessary to estimate the vector of influence of attributes may be calculated on the basis of the value or price of the property. The use of property value requires individual valuations by property appraisers – the right time and money is needed. The use of transaction prices is faster and cheaper, but a sufficient number of transactions is necessary. For small, local markets it will be more convenient to use the value of the property, for large, developed markets – prices.

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Support of European Regional Development Funds for NUTS2 And NUTS3 Regions In Romania

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Abstract

The article deals with the significant contribution of the European structural and investment funds to the economic and social progress of Romania and its counties. The motivation for choosing such a theme is that lately I have dealt with the economic and social development of the NUTS2 and NUTS3 regions in Romania and the convergence of their development level with that of corresponding regions in other European Union member states. The methodology used is that of the comparative analysis between different entities (countries, counties) of some relevant indicators regarding the absorption of the European structural and investment funds and their effects on the development of the compared entities. The very large differences between the Romania's counties regarding the absorption of European funds are highlighted, the main cause of the low degree of absorption being the reduced administrative capacity of the regional and local authorities to create the conditions necessary to access these funds to a greater extent. The achievements registered in the implementation of the national programs financed from European funds, although presented only partially, are convincing through their contribution to the economic and social development of the country and its counties. The conclusion is that the support of European funds is particularly beneficial for Romania and its counties, constituting a strong spring for their development

Keywords: European Funds; Absorption Rate; Project of Regional Policy; Priority Axe

Introduction

The regional policy of the European Union is based on two pillars: the application of the political principle, according to which the most developed countries and regions must be in solidarity with the least developed ones; the application of the economic principle, from the perspective of which the levels of economic development of some less developed member countries and regions and those where the unemployment rate is high determine the reduction of the economic development potential of the whole Union.

The consistent application of these two principles aims, in essence, at reducing the economic and social differences between the member countries and regions of the Union, which continue to be significant, with regional and sectoral investments being made mainly in infrastructures and intangible assets (education and training, transfer of know-how, professional services) in less developed regions and sectors of activities in difficulty. These investments means the financial solidarity of the member countries, i.e. the allocation of an appreciable part of the Community budget, to which all Member States contribute, to regions and social groups with developmental deficits.

For the period 2014-2020 the objectives of the European Union's regional policy correspond to the coordinates of the Europe 2020 Strategy for smart, sustainable and inclusive growth in the EU and are as follows: 1. Supporting R&D and innovation activities; 2. Supporting the digital economy, information and communication technology (ICT); 3. Increasing the competitiveness of SMEs; 4. Supporting the shift towards "low carbon economy".

The instrumental side of the European Union's regional policy consists of a range of funds intended to help member countries to achieve the mentioned objectives: Structural Funds (European Regional Development Fund - ERDF, European Social Fund - ESF); Cohesion Fund (which aims to develop and improve transport networks, environmental protection by promoting the expansion of the "green economy", connectivity and accessibility to the broadband infrastructure at regional level); The EU Solidarity Fund – EUSF (to respond to major natural disasters and express European solidarity to disaster-stricken regions within Europe)

The paper presents as novelty elements the critical analysis of the low absorption of European funds in Romania and its counties compared to other countries in Central and Eastern Europe, as well as the main causes of poor absorption so far. These elements can be found in the paper dealing with: how the European Union differentiates the support provided according to the level of development of the regions; absorption of European structural and investment funds at the level of Romania and its counties; the beneficial effects of Community funding of national projects; the main aspects resulting from the critical analysis achieved.

Differentiation of community support depending on economic situation of the regions

The coverage of all regions of the Union by its regional policy is differentiated, depending on the level of regional GDP / inhabitant relative to the average on the Union as a whole: regions considered less developed, where the mentioned level is less than 75% of the Union average; regions considered in transition, where the mentioned level is between 75% and 90% of the Union average; regions considered more developed, where the mentioned level is over 90% of the Union average.

The highest share of the structural funds is allocated to support the economic and social development of the less developed regions through regional policy projects funded by the ERDF and ESF, as well as the Cohesion Fund.

The regions considered less developed are numerous and scattered throughout the Union as follows (these are NUTS2 regions): all regions of the former communist member countries - Bulgaria, Croatia, Czech Republic, Estonia, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia, Hungary - with the exception of a region that usually includes the capital of the country, in Bulgaria, the Czech Republic, Croatia, Poland, Romania, Slovakia, Slovenia, Hungary; France - 4 regions (from overseas territories); Greece - 6 regions; Italy - 5 regions in the south of the country; Portugal - 4 regions; Spain - a region.

The regions in transition receive funding through the mentioned funds lower than that destined to the regions considered less developed. It should be noted that the significant enlargement of the European Union by the admission of new member countries in 2004 and 2007 has led to a reduction of the average level of GDP / capita, which has made some regions of the old member countries to exceed the threshold mentioned by their GDP / capita of 75%; as a result, the support granted to these regions was a transitional one, phasing-out in the 2007-2013 budgetary exercise; the regions that exceeded the threshold of 75% and before the enlargement mentioned, so during the period of the existence of the EU15, were progressively supported (phasing-in) through the 'Increasing the regional competitiveness and the use of the labor force' objective. The regions in this category in the financial year mentioned were scattered as follows: Austria - 1; Belgium - 4; Denmark - 1; France - 10; Germany – 8; Italy – 3; Malte – all; Portugal - 1; Spain - 5.

The more developed regions, which receive the smallest funds as a whole, are supported to improve their business climate and increase their attractiveness for investors; under these conditions financing projects aimed at supporting universities and scientific research institutions, micro, small and medium-sized enterprises, business and job creation, training and professional capacity improvement. The distribution of these regions in the member countries was as follows: Austria - all but one in transition; Belgium – 7; Cyprus - all; Czech Republic - 1 (Capital); Denmark - all; Finland - all; France - 13; Germany - 31; Greece - 1; Hungary – 1; Ireland - 3; Italy - 13; Luxembourg - all;

Poland - 1; Portugal - 2; Romania - 1 (Capital); Slovakia - 1 (Capital); Slovenia - 1; Spain - 13; Sweden - all; The Nederlands – all.

The picture of the development regions of the European Union, most of them in the NUTS2 category, is highly diversified on the scale of the community as a whole and that of both developed and less developed member countries. Despite this diversification, several main aspects can be highlighted: all the former communist countries have, in overwhelming proportion, less developed regions; the Nordic countries - Denmark, Finland, Sweden, the Netherlands, - have only developed regions; the countries with the highest economic and commercial potential in the Union - Germany, France, Italy, Spain - include regions from all three groups shown; in most former communist countries, the developed regions are those that comprise the capital.

The presented division of the regions of the European Union is, unfortunately, not relevant for the NUTS3 regions as the disparities between them, components of the NUTS2 regions, are in many cases greater than between the latter, as the inter-regional disparities within each member countries are larger than those between countries. In addition, the overwhelming majority of studies and analyzes of economic development disparities within the European Union focused on NUTS2 member countries and regions within them, without extending to NUTS3 regions, the main cause being the lack of detailed statistical data regarding the last category of regions.

The absorption of European structural and investment funds at county and national level

Through the effects of applying the regional development policy of the European Union evaluated at the end of the last budgetary exercise, the respective policy has proved its appreciable role in the faster development of the regions lagging behind and, implicitly, in reducing inter- and intra- regional disparities.

In the EU budget 2014-2020, the European Union regional development policy is in fact transposed through a series of operational programs that continue those of the previous EU budget 2007-2013, of which we are particularly interested in the OPRD - Operational Program for Regional Development; through this program, managed by the Ministry of Regional Development and Public Administration as Managing Authority, Romania can access the structural and investment funds from the ERDF.

The general objective of the OPRD is to increase the economic competitiveness and to improve the living conditions of the regional and local communities. The objective was detailed in 11 priority axes of action, for which the initial allocation of funds was € 8.25 billion, of which € 6.7 billion is the European Union support through the ERDF and € 1.5 billion the national contribution.

Of the 11 priority axes, the ones with the most significant impact on the regional development are the following: PA1. Promoting the technological transfer (206.51 million of euro); PA2. Improving the competitiveness of SMEs (877.11 million of euro); PA3. Supporting the transition to a low carbon economy (2375.56 million of euro); PA4. Supporting sustainable urban development (1386.86 million of euro); PA6. Improvement of road infrastructure at national level (1068.36 million of euro); PA10. Improvement of the educational infrastructure (352.19 million of euro).

The experience of Romania's access to European funds has demonstrated the existence of numerous chronic deficiencies that have resulted in a reduced absorption rate, lower than that achieved by most other Central and Eastern European countries.

At the level of counties, the value of the attracted European funds varies widely from one county to another, regardless of the extent of their economic and social development, as shown by the figures in the following table.

Table 1 : Ranking of counties according to the value of contracts signed for projects financed from European funds, 07/07/2019 (million of euro)

County	Value	County	Value	County	Value
Ilfov	**2159.4**	**Brașov**	**235.4**	**Suceava**	**160.0**
București	**1445.7**	**Bacău**	**213.1**	**Neamț**	**155.1**
Constanța	**1251.6**	**Timiș**	**212.5**	**Arad**	**148.2**
Cluj	**959.3**	**Satu Mare**	**209.1**	**Sălaj**	**140.1**
Bihor	**500.8**	**Botoșani**	**195.2**	**Gorj**	**136.1**
Vrancea	**383.3**	**Mureș**	**183.3**	**Buzău**	**135.3**
Galați	**355.0**	**Dâmbovița**	**180.1**	**Olt**	**119.0**
Alba	**316.9**	**Prahova**	**179.1**	**Brăila**	**111.5**
Iași	**315.0**	**Vaslui**	**172.7**	**Harghita**	**94.2**
Bistrița Năsăud	**298.9**	**Sibiu**	**170.0**	**Călărași**	**87.6**
Maramureș	**267.8**	**Argeș**	**169.8**	**Covasna**	**78.1**
Hunedoara	**263.9**	**Tulcea**	**167.6**	**Giurgiu**	**53.3**
Dolj	**263.1**	**Caraș- Severin**	**162.3**	**Ialomița**	**52.3**
Vâlcea	**245.5**	**Mehedinți**	**160.0**	**Teleorman**	**42.1**

Source: *Ziarul Financiar – reproduction: Government of Romania, Ministry of European Funds, Communication Department. Contracts signed for projects financed from European money, 2014-2020, Bucharest, July 7, 2019*

The NUTS3 units that managed to attract the largest European funds were, in decreasing order of funds value, Ilfov, Bucharest, Constanta, Cluj and Bihor, that is three of the most developed counties; at the opposite pole, the counties with the lowest performances in attracting European funds were, in increasing order of funds value, Teleorman, Ialomița, Giurgiu, Covasna and Călărași, all counties less developed, with the GDP / inhabitant level well below the national average.

From the point of view of the European funds attracted, it cannot be considered that there are differences between the developed and the least developed counties since, for example, counties in the first category such as Brașov and Sibiu attracted significantly smaller funds than Dolj or Vâlcea in the second category. The explanation of this situation lies, in our opinion, to the different extent of the involvement of local authorities in ensuring the preparation, elaboration and support of projects financed from European funds at the qualitative level required by the community bodies with responsibilities in the field. Such involvement implies the creation at local level of a body of specialists with expertise in the elaboration, endorsement and support of projects submitted for financing from structural and investment funds, able to effectively support the efforts of potential beneficiaries of funds.

At the same time, the potential differences between counties in attracting European funds also reflect the interest and actions of the local authorities in: improving the business environment; ensuring transparency; stimulating communication between local institutions of different profiles in order to correlate the plans and programs established on these profiles; intensifying the involvement of action groups and associations set up locally to improve these plans and programs; stimulation of collaboration with neighboring counties and outside the development region for exchanges of experience and the higher capitalization of available resources.

The difference of involvement of local authorities in accelerating regional development and modernizing economic activities in counties based on the progressive building of the digital economy with the help of European funds is also illustrated by the large disparities between counties regarding the absorption of the funds allocated to digitization, presented in the following table.

Table 2: Ranking of counties according to the amounts absorbed until November 2019 from European funds dedicated to digitization for the period 2014-2020 (million of euro, amounts paid)

County	Value	County	Value	County	Value
Ilfov	87.8	**Arad**	1.8	**Brașov**	0.3
București	62.8	**Maramureș**	1.6	**Teleorman**	0.2
Cluj	27.9	**Brăila**	1.3	**Alba**	0.2
Iași	19.9	**Vâlcea**	1.2	**Covasna**	0.1
Sibiu	9.7	**Tulcea**	1.2	**Vaslui**	0.08
Prahova	8.4	**Constanța**	1.1	**Neamț**	0.06
Mureș	7.6	**Ialomița**	0.9	**Bistrița-Năsăud**	0.04
Dolj	7.4	**Bihor**	0.9	**Botoșani**	0
Olt	6.2	**Gorj**	0.8	**Hunedoara**	0
Giurgiu	5.1	**Suceava**	0.8	**Mehedinți**	0
Dâmbovița	4.9	**Argeș**	0.5	**Sălaj**	0
Galați	3.3	**Vrancea**	0.4	**Bacău**	0
Timiș	3.3	**Buzău**	0.4	**Caraș-Severin**	0
Călărași	1.8	**Harghita**	0.3	**Satu Mare**	0

Source: *Government of Romania, Ministry of European Funds, Competitiveness Operational Program. November 2019 Report*

The hierarchy of counties established according to the level of this indicator is dominated by Ilfov county and Bucharest, followed closely by Cluj and Iași counties, strongly committed to digitizing the economy and society thanks to the university centers, research institutions and private IT services units they have. Other developed counties such as Sibiu, Timiș or Brașov have attracted much smaller European funds for this purpose, which is surprising given that they also have a wide range of mentioned institutions.

Under these conditions it is worth highlighting the performance of counties with a lower level of development - Dolj, Giurgiu -, which have managed to attract European funds in notable amounts for digitizing their activities, a realization all the more remarkable since the last county lacks the university and academic institutional framework which many other counties are endowed with.

The existence of seven counties that did not attract European funds at all for the digitization of their activities and many others that spent derisory amounts for this purpose denotes the widespread lack of awareness by some local authorities and companies in the private and public environment of the considerable benefits the digitization generate in increasing the competitiveness of the county economies, reducing bureaucracy, improving the living conditions of the local communities. At the same time, the figures in the table above highlight that the notable progress at national level, although still limited, is largely due to some top NUTS3 regions - the four mentioned above -, which were detached, by their performances, from most of the other counties with much more modest or even zero results.

The so varied involvement of the local authorities in the counties is also one of the main explanations of the low rate of access to European funds achieved by Romania, significantly lower compared to that of the other countries of Central and Eastern Europe.

At the national level, the rate of absorption of the European funds was, at the end of 2019, 36%, the total financing being € 11,045 billion out of € 30,883 billion allocated in the EU budget 2014-2020. Reaching this level has been progressively and relatively slow, as shown in the figures in the following table.

Table 3 : Total payments from EU structural and investment funds for Romania, 2015.... 2020 (billion of euro /%)

	2015		2016		2017		2018		2019		2020	
	Val.	**%**	**Val.**	**%**	**Val.**	**%**	**Val.**	**%**	**Val.**	**%**	**Val.**	**%**
Initial pre-financing	0,915	3	1,180	4	1,180	4	1,180	4	1,180	4	1,180	4
Annual pre-financing	-	-	0,427	1	0,561	2	0,589	2	0,793	3	0,793	3
Interim payments	-	-	0,524	2	3,194	10	6,124	20	9,073	29	9,725	31
Total EU allocation	30,84	100	30,838	100	30,883	100	30,883	100	30,883	100	30,883	100
Total EU payments	0,915	3	2,131	7	4,934	16	7,893	26	11,045	36	11,697	38

Source: *European Commission. Structural and Investment Funds. Country data for: Romania, 2020*

The total absorption rate of the European Union's structural and investment funds registered by Romania at the end of 2019 is the penultimate (last - Slovakia) and equal to that achieved by Bulgaria in the hierarchy of countries of Central and Eastern Europe established according to the level of this indicator ((see table below). The countries of Central and Eastern Europe were chosen for comparison on the basis that they belong to the group that went through the difficult process of transition from the centralized economy to the competitive market model, have relatively close characteristics and levels of economic and social development significantly lower than Western member countries and, as a result, receive more substantial funding from European funds.

Table 4 : Total absorption rate of the EU structural and investment funds, achieved by Central and Eastern European countries at the end of 2019 (%)

Country	%
Bulgaria	36
Csech Republic	40
Estonia	49
Latvia	44
Lithuania	41
Poland	42
Romania	36
Slovakia	33
Slovenia	40
Hungary	42

Source: *European Commission. European Structural and Investment Funds. Country data for: diverse countries*

The rate of absorption of European funds by Romania means the loss of a considerable amount (at an absorption rate of 42% as recorded, for example, by Hungary, the value increase would have been € 1.84 billion, which would substantially have contributed to achieving objectives corresponding to the priority axes mentioned above. The low absorption rate of European funds registered by Romania is

explained by the many existing deficiencies in this regard: the lack at the level of regional and local authorities of expertise and administrative capacity to support applicants in their efforts to prepare files according to Community rules; the lack of the necessary transparency in the dissemination of information on support funds and the detailed conditions for accessing them; corruption at regional and local level that sometimes thwarts the efforts of fair applicants.

Achievements within the national programs financed from European funds in the period 2014-2020

The appreciable contribution of the European funds to the development of the NUTS2 and NUTS3 regions in Romania is demonstrated by the results recorded in the implementation of the programs ensuring the financing and aimed at resolving the malfunctions, non-conformities with the community standards and the delays existing at regional level. It is obvious that the results would have been much better if the absorption of the European structural and investment funds allocated to Romania would have been more intense in all the development regions and counties, especially those highlighted above as having modest or even zero performances in this regard.

The data on the achievements registered by Romania in the application of the eight national programs financed by the European structural and investment funds, published by the European Commission, are numerous and their full presentation would occupy a much too extensive space in this paper. As a result, we will limit ourselves to highlighting, for example, some achievements relevant to regional development recorded in the period 2015-2018, underlining that the figures are at national level and are not detailed by development regions or counties.

Table 5 : Achievements in the implementation of the programs funded by ESIF, 2015.... 2018

Indicators		2015		2016		2017		2018	
		Value	%	Value	%	Value	%	Value	%
Number of companies receiving support	Planned	2982	100	4542	100	4542	100	12588	100
	Decided	0	0	5050	111	3561	78	9462	75
	Implemented	0	0	0	0	426	9	2049	16
Number of companies receiving grants	Planned	1100	100	1345	100	1345	100	2566	100
	Decided	0	0	0	0	552	41	2659	104
	Implemented	0	0	0	0	4	0	396	15
Number of new businesses supported (*startups supported*)	Planned	100	100	100	100	100	100	100	100
	Decided	0	0	35	35	72	72	93	93
	Implemented	0	0	0	0	1	1	39	39
Length of reconstructed or modernized railway lines (km.)	Planned	640	100	640	100	640	100	390	100
	Decided	0	0	0	0	320,9	50	318,11	82
	Implemented	0	0	0	0	0	0	2,72	1
Length of new roads built (km.)	Planned	389	100	389	100	389	100	389	100
	Decided	0	0	0	0	592,48	152	861,69	222
	Implemented	0	0	0	0	67,94	17	156,87	40
Number of new researchers in supported	Planned	437	100	437	100	437	100	437	100
	Decided	0	0	570	131	630	144	727	166
	Implemented	0	0	0	0	8	2	129	30

entities									
Private investments in the level of public support in R&D projects (€ million)	**Planned**	141,1	100	141,1	100	141,1	100	141,1	100
	Decided	0	0	36,0	25	51,5	37	100,4	71
	Implemented	0	0	0	0	4,1	3	11,8	8
Capacity of renovated schools (number of persons)	**Planned**	137750	100	145250	100	145250	100	51927	100
	Decided	0	0	0	0	0	0	36760	71
	Implemented	0	0	0	0	0	0	11591	22
Number of persons participating in training programs	**Planned**	184430	100	184430	100	184430	100	184430	100
	Decided	0	0	0	0	0	0	NaN	0
	Implemented	0	0	0	0	0	0	2849	2

Note: *data updated on 13/01/2020. Meanings for:* ***Decided*** *- the values of the selected projects;* ***Implemented –*** *values of the projects fully implemented*
Source: *European Commission. European Structural and Investment Funds. Country data for: Romania. Achievements, 2020*

The achievements of the few objectives outlined in the table are modest or derisory even in 2018, so two years before the end of the budgetary exercise, their level is so low that has determined, during the period analyzed, in most cases, the reduction of the target targets initially set. This situation was generated by the very heavy start of the project implementation actions at the beginning of the EU budget 2014-2020, in 2015 and 2016 with zero project implementations.

Even projects whose implementation did not involve very complex and difficult actions such as, for example, the organization of training programs in which a significant number of people participate, resulted in 2018 with profoundly disappointing outcomes.

Conclusions

The main conclusions that can be drawn from the analysis are presented below.

- According to the provisions of the regional policy of the European Union, the Community support granted to the NUTS2 and NUTS3 regions is differentiated according to the regional GDP / inhabitant compared to the Union average; in the category of regions considered less developed, which receive the most substantial support, are included all the regions of the former communist member countries, except those that comprise the Capital;
- In Romania, the rate of absorption of European funds is among the lowest among the countries of Central and Eastern Europe, reaching the level recorded at the end of 2019 of 36% being made at a slow pace during the EU Budget 2014-2020;
- The counties and the Capital of the country have registered extremely varied levels of the absorption rate of European structural and investment funds, a reality confirmed both by the value of contracts signed for projects financed from this source and by the value of funds absorbed / paid for projects of digitization the activity of companies and the public system;
- The substantial contribution of Community support to the overall development of the country and its counties is convincingly highlighted by the appreciable results obtained in the implementation of the programs financed by the European structural and investment funds. These results are expressed in concrete terms such as the number of companies that received support, number of companies which received grants, number of supported start-ups, length of reconstructed and modernized railways and roads rebuilt, number of people who benefited from modernized schools, number of people who participated in training programs, etc .;

- The large differences between the counties regarding the access to these funds highlight, among others but with a main role, the very varied interest and efficiency of the regional and local authorities in order to capitalize on this considerable source of economic growth and prosperity;
- Accessing and spending efficiently the European Union's structural and investment funds is a complex, laborious and difficult endeavour for applicants for funds, for specialists who endorse the projects to be financed from European funds, and for the staff of management agencies in the field. The gains from accessing and absorbind European funds are, obviously, appreciable and constitute a powerful source of economic and social development of the beneficiary territorial units.

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Integration in Global Production and Sales Chains: The Role of Multinational, Small and Medium-Sized Enterprises

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Abstract

International trade, production, investment are increasingly organized within the global value chains (or GVCs), in which the different stages of the production process are located in various countries. Companies are restructuring their activities at the international level, optimizing their production processes and placing stages of production at different sites due to the globalization.
The article analyzes the features of global value chains formation and provides quantitative estimates of countries participation in GVCs. The study of GVCs involves both an assessment of the extent to which countries are involved in the global economy, and an analysis of factors that influence the integration of country enterprises in value chains. The latter is of particular interest in connection with the need to improve industrial and trade policy instruments in order to create conditions for increasing the competitiveness of enterprises in the world market - to ensure growth based on non-resource exports and the development of industries and services.

Keywords: integration, global value chains, international trade, medium-sized enterprises.

Introduction

Nowadays, integration and globalization issues are important elements that determine the development of world economic relations. An urgent aspect characterizing the change in the world reproductive value chains is the growing role of new industrial countries, such as South Korea, Brazil, South Africa, China etc.). According to some authors (Streltsov, Yakovlev and Bulavko, 2019, pp. 32–46) it is extremely important to find new segments of potential growth found, primarily in developing countries, growth rates production in which they began to exceed similar indicators of developed countries (Kondrat'ev, 2018, p. 5).

International production, trade and investment are organized within the framework of global value chains (or Global Value Chains - GVC), in which the production of goods and services is carried out in different countries in order to optimize and redistribute financial, labor, and technical resources.

GVCs are a complex network structure of goods flows, services, capital and technology, which predetermines the development of world trade and the global economic system.

Traditionally, all production stages take place in one country; therefore, the entire value of the product is attributed to one state, i.e. the final exporter. In connection with the spread of the outsourcing practice and production transfer to other countries, different stages of value creation can occur in different parts of the world.

With the GVCs advent, there has been a structural shift in the international division of labor. Global transformations in the field of information and communication technologies (or ICT) and transport, combined with the development of increasingly complex types of products, have enabled firms to create complex and efficient chains distributed around the world. Currently, GVCs have become a driving force for global economic growth; they have transformed the conditions under which trade is conducted, i.e. instead of producing the entire product domestically, they specialize in specific tasks that allow them to integrate into the value chain and achieve large-scale production.

The main participants in GVCs are MNEs (or Multinational Enterprises - MNE), which form global production processes at various geographical points through a complex network of branches, as well as through outsourcing. Cross-border trade between MNEs and their affiliates accounts for a significant share of modern international trade. According to data on the volume of export-import operations, a limited number of large, often multinational, companies carries out exports. For example, Mayer and Ottaviano show that 1, 5 and 10% of companies account for at least 40.70 and 80% of total exports in Europe, respectively (Mayer and Ottaviano, 2008, pp. 135–148). Similar results were obtained in the USA (Bernard et al., 2007, p. 105), as well as for low-income countries (Cebeci et al., 2012).

SMEs (or Small and medium-sized enterprises) are a necessary attribute of the implementation of all economic processes, both in developed and developing countries. The policy priority for the G20 countries is to strengthen the integration of SMEs into the global markets for goods, services, investments and knowledge (Cadestin et al., 2018). At the same time, it is the export that plays an important role in improving all economic indicators of enterprises and developing the economy. Empirical studies show that firms that are connected to the global economy through export, foreign direct investment or FDI or as suppliers to exporters are generally more productive than firms serving only the domestic market.

In countries with high export intensities, workers in firms and sectors typically receive significant wage increases and demonstrate higher than average labor productivity (Cusolito, Safadi and Taglioni, 2016).

A more open domestic market is a source of competitive strength, especially when complemented by a number of other policies aimed at ensuring sustainable economic growth and diversification. (Baldwin and Gu, 2003, p.634–657).

The separation of tasks and business functions specific to value chains expands opportunities for participation in global markets without the need for off-the-shelf product development. The policies of developing countries with the fastest growing participation in GVCs are aimed at a comprehensive solution to the problems of investment in the supply and expansion of trade, have a growth rate of gross domestic product per capita of 2% above average.

Many low-income countries are becoming increasingly involved in GVCs, and their participation brings economic benefits in the form of increased productivity, increased complexity and diversification of exports (*Participation of Developing Countries in Global Value Chains*, 2015). There has been a clear trend indicating increased participation in GVCs since the early 2000s, especially in low-income countries.

The study objective is to analyze the global value chains formation characteristics, give a qualitative assessment of the countries participation in GVCs and assess the involvement extent of different countries in the global economy.

Problem Statement

MNEs have many ways to enter foreign markets; in addition to trade and local sales by affiliates, they are increasingly using other methods, such as franchising, licensing and other forms of partnership.

The powerful growth of global value chains (or GVCs) in recent decades has challenged the existing economic perceptions and political globalization implications. Production organization in international networks that extend across numerous borders has led to an increase in interconnectedness between countries, which has a significant impact on a wide range of national and international strategies (*Mapping Global Value Chains*, 2013; OECD, 2015). Therefore, for example, if we conduct a retrospective analysis, we can conclude that in the period from 2000 to 2014, the global gross output of foreign branches increased from 7 to 20 trillion. US $ Continuous growth in foreign production fell sharply during the economic crisis (in 2009). The average annual growth rate after the crisis from 2010 to 2014, i.e. 5% less than half of the pre-crisis from growth 2000 to 2008.

MNEs play an important role in the modern global economy, accounting for about a third of world production and global GDP, as well as half of world exports.

MNEs are an important driver of international production fragmentation within GVCs (Baldwin and Gu, 2003, pp. 634–657). Theories of MNEs traditionally distinguish between horizontal and vertical MNEs. Horizontal MNEs are distinguished by their desire to place production close to consumers and avoid trading costs, while realizing economies of scale. These are multi-factory firms that produce similar products both in their own countries and in the host countries, which allows saving on export costs. Vertical MNEs go through various stages of production in different countries and are of particular importance in GVCs after reducing transaction costs of cross-border production (MNEs focused on increasing efficiency). Production in one country serves as the starting material for production activities in other countries, and the location of the various stages depends on where the production factors that they intensively use are relatively less expensive (i.e. cost advantage is often achieved by economies of scale or access to knowledge).

The relationship between international trade and investment has traditionally been a widely debated political theme, and the growing importance of MNEs has only strengthened it. Initially, prior to GVCs, trade and investment were usually seen as substitutes directly related to the tradeoff between proximity and concentration, i.e. when trade barriers are high, it is more profitable for firms to directly produce products in the consumer market through FDI.

In the modern global economy, MNEs are increasingly functioning as networks within the international production networks of GVCs, sometimes the boundaries and structure of GVCs will intersect with the boundaries and structure of MNEs, but in many cases, they will not completely coincide. Creating such a network across multiple boundaries provides MNEs with a greater degree of strategic and operational flexibility.

MNEs are currently among the most important actors in the global economy. A growing number of companies are creating branches abroad to serve local markets and capitalize on favorable placement factors (i.e. natural resources, low labor costs, specialized knowledge, etc.). However, despite their generally accepted significance in the modern global economy, empirical evidence on MNEs is not widely available and largely incomplete.

Research Questions

The Role of MNEs in the Global Economy

Between 2000 and 2014, the global gross output of branches opened by many companies increased from 7 to 20 trillion. US $ Foreign production growth stopped during the economic crisis in 2009, as world trade and FDI declined sharply during this period. The production of MNEs abroad returned to the pre-crisis level of 2007, but the average annual growth rate after the crisis in the years from 2010 to 2014 of 5% is less than half of the pre-crisis, i.e. from 2000 to 2008, the growth of 13%.

Because of the crisis, the production share of foreign branches decreased by 4 percentage points between 2007 and 2010, which indicates that foreign branches were more affected by the global crisis than domestic companies were. This can be explained by the fact that foreign affiliates are actively

involved in GVCs, and as a result, their production is very sensitive to final demand (Altomonte, 2012).

At the global level, MNEs and their overseas subsidiaries are estimated to produce 33% of global output. While foreign affiliates account for 12% of gross output, the headquarters of MNEs and domestic plants in the home country account for another 21% of global production.

The EU is by far the largest recipient of foreign partnerships, which accounts for 7.5 trillion dollars. The activity of foreign affiliates has grown, most strongly in the BRICS (Brazil, Russia, India, China, South Africa) countries, especially after the economic crisis with an average annual growth rate of 9% (from 2010 to 2014).

The activities of foreign affiliates in the Organization for Economic Co-operation and Development countries have been severely affected by the global crisis. In particular, foreign firms in the EU recovered to their pre-crisis level only in 2014, which was mainly due to the recession in the Eurozone. In contrast, foreign affiliates in the United States have already recovered to their pre-crisis level.

The position and role of foreign affiliates vary by country and region. Foreign affiliates account for 15% of gross output in Organization for Economic Co-operation and Development countries. In the EU, foreign companies account for almost one fifth of production compared to 12% of foreign affiliates in the NAFTA (or North American Free Trade Agreement) region. Due to the creation of a single market, the production of foreign affiliates in Europe between 2000 and 2014 grew annually by 9%, i.e., doubled the growth rate of foreign companies in the United States.

In BRICS countries, foreign affiliates produced 8% of production, which reflected the presence of large domestic markets in these countries. The value of foreign affiliates has declined in the rest of the world, which reflects the significant growth of (some) national economies in this group of countries. In general, these changes reflect the growing globalization of economic activity and a change in the structure of MNE investment flows.

At the country level, most of the exported production is controlled by a small group of advanced economies (i.e. the United States, Germany, Japan, France, the United Kingdom, the Netherlands and Switzerland), which control almost 70% of the global production of foreign affiliates. In particular, US affiliates account for the majority of products in most countries.

In general, the presence of foreign affiliates has increased in most countries, with the exception of some countries with emerging economies, such as Brazil, India, Indonesia and Russia, as well as some high-income countries such as Australia, Canada, Ireland and South Korea. At the country level, the presence of foreign companies can be significant compared to the size of the host economy.

It is not surprising that the production volumes of foreign affiliates differ not only in home countries and host countries, but also in industries. In the primary sector, foreign affiliates account for less than 1% of total agricultural production, while in ‘construction’ the presence of foreign affiliates is about 3%. On the other hand, the share of foreign branches in the output of products is high (from 20 to 30%) in the production of ‘chemicals’, ‘base metals’, ‘electrical equipment’, transport equipment and ‘financial intermediation’. The general trend is that foreign affiliates have increased their presence in the manufacturing and services sectors, with the exception of ‘mining and mining’, ‘chemical industry’ and ‘transportation equipment’.

Foreign affiliates in the BRICS countries specialize in manufacturing, which account for one fifth of the global output of foreign affiliates in the manufacturing sector. In particular, more than 50% of foreign subsidiaries in the sectors ‘textiles and clothing’ and ‘electrical equipment’ are located in emerging economies. At the country level, China is the main recipient of foreign affiliates in the manufacturing industry and in 2014, it accounted for 20% of global production by foreign affiliates. On the other hand, in 2014, the Organization for Economic Cooperation and Development countries

accepted almost 80% of foreign branches in the services sector, of which 50% are in the European Union.

Purpose of the Study

It is necessary to rely on the existing theoretical basis while describing the level and depth of scientific and practical development of the contemporary problems of global value chains.

Modern characterization of GVCs has received a thorough theoretical and practice-oriented description in the scientific works of such authors as Gereffi, G. & Lee, J. (2016, pp. 25–38), Strange, R. & Zucchella, A. (2017, pp. 174–184), Lee, J. & Gereffi, G. (2015, pp. 319–339), Amador, J. & Cabral, S. (2016. pp. 278–301), Alfaro, L., Antràs, P., Chor, D., Conconi, P. (2019, pp. 508–559), etc.

Methods

In the study process, methods of stochastic, retrospective and comparative analysis were applied. The article used empirical research methods, as well as methods of analogy, interpretation, comparison and generalization. The applied statistical methods helped to obtain quantitative characteristics, allowing rejecting minor deviations in the research process.

Results

Cross-regional differences are very significant in how countries integrate into GVCs around the world. Southeast Asia is a region in which the most comprehensive and deepest agreements on regional integration can be found, has the highest average participation rate of intra-regional GVCs. East and South Africa, Latin America and the Caribbean demonstrate a higher level of regional integration than Central and West Africa, the Middle East and North Africa and South Asia. In the period from 1995 to 2008, the increase in the share of value added in the export of these countries was due to low-income countries.

GVCs affect trade and investment ties between low-income countries. Emerging economies are currently important sources of FDI exports. For example, the volume of foreign direct investment by BRICS companies like Brazil, Russia, India, China and South Africa increased from $7 billion in 2000 to $145 billion in 2012 and $200 billion in 2013, accounting for almost a third of global FDIs.

SMEs are the backbone of the economies of several developing countries. SMEs account for more than half of all formal jobs in the world. A cross-country study of 49,370 firms in 104 countries showed that although SMEs (<100 employees) have a comparable share of total employment, as do large firms, small firms (<20 employees) have the largest share of job creation and the highest sales (Ayyagari, Demirguc-Kunt and Maksimovic, 2014, pp. 75–99). These findings are also common in countries of the Organization for Economic Co-operation and Development (OECD), where 75% of new jobs are created by SMEs. However, over the past few years, additional studies show that size is not a relevant indicator, but rather the age of the firm determines its contribution to the net creation of jobs. Data for Colombia (Eslava et al., 2013, pp. 135–158), Morocco and Tunisia (Cebeci et al., 2012), USA (Haltiwanger, Jarmin and Miranda, 2013, pp. 347–361) show that there is no systematic relationship between firm size and job creation, emphasizing the role of startups and young firms in promoting job creation.

High growth potential SMEs can grow over time and become leading firms in GVCs. Participants and connections in GVCs can evolve as competitive (smaller) firms streamline their operations and strengthen their position. High growth potential SMEs may open up new business opportunities abroad. Those SMEs whose competitive advantage is mainly cost-based or that specialize in certain types of services requiring direct interaction are more likely to participate in GVCs as domestic suppliers to the export sector.

Meanwhile, as a rule, it is SMEs that are at the forefront of technology or that manufacture parts and components with high benefit that are directly internationalized (Farole and Winkler, 2014). The supply base of the automotive industry or the aerospace industry, for example, is a two-tier one, with large firms in leading positions, but also includes many small specialized (and smaller) global suppliers (that is, suppliers of the second or even first level), which often produce very specialized and individual parts and components.

Production fragmentation, combined with advances in ICTs, also creates new entrepreneurial opportunities for SMEs in terms of accessing markets abroad, creating a new category of so-called micro-multinational companies, which are small firms that have been developing global activities since their inception. The Internet and new business models enable these small companies to enter foreign markets at the lowest cost (Mettler and Williams, 2011).

However, the existence of GVCs poses certain problems for SMEs. First, the leading role played by large MNEs has led some to suggest that the emergence of GVCs could pose a threat to the development of small firms as a whole. MNEs, which often have their own know-how and technology and many potential sources of supply, can dictate contract terms to their smaller suppliers.

Secondly, meeting stringent requirements regarding standards and product quality for GVCs can be difficult for smaller and younger firms, and market failures that inhibit their development are different from those faced by large firms. Smaller firms face specific difficulties limiting their growth, ranging from limited access to credit and insufficient scale to support the costs of special research and development and training, to a lack of lobbying power compared to larger firms and a limited ability to diversify and absorb local and global turmoil.

In addition, smaller production SMEs typically extend the recovery period for any fixed investment or information costs, and a smaller 'pool' of workers limits the ability to redistribute labor between different or new tasks compared to larger firms. Young, innovative, and entrepreneurial SMEs may encounter additional problems, such as lack of access to risk capital or poorly adapted entry and exit rules that prevent firms from experimenting with new technologies or business models (OECD, 2015) and which may prevent them from reaching sufficient scale to enter global markets.

In general, the ability of SMEs and firms in low-income countries to succeed in GVCs (to quickly introduce new technologies, learn from practice, innovate and optimize their production) is more dependent on the framework conditions and external factors related to the operating environment. We are talking about a wide variety of public goods and external factors, i.e. from world-class logistics to open markets, the business environment, the education and training system, the existence of a well-functioning innovative infrastructure and effective forms of financing.

Conclusion

Modern production systems are complex business models with multilevel international networks of suppliers and rapidly developing, based on technologies that increasingly allow developing cross-border economic activity. Modern global value chains (or GVCs) require a high level of precise coordination. More unified global production systems and markets provide countries with greater opportunities to specialize in specific aspects or stages of development and production of goods and services where comparative advantages exist. Instead of developing and managing the entire complex manufacturing process independently, GVCs provide opportunities for small and medium-sized enterprises and firms in low-income countries. The problems of manufacturing products to world standards, as required by GVCs, can be difficult to solve for small and young firms, and market failures that inhibit their development are more serious than those faced by large firms. In the future, the implemented systems and business models can give an economic effect, improve the innovation and investment activities of global companies, and increase their image in the international arena.

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Assessment of Innovative Potential of Organizations: Process-Product Approach

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Abstract

In the modern Russian economy, which is focused on the innovative way of development, the effective functioning of economic entities is due to their ability to implement progressive changes based on the achievements of scientific and technological progress, market methods of management and management. Competitive advantages are achieved at the expense of knowledge, information, and innovation. Each country, region, economic entity has a certain aggregate potential: scientific, technical, resource, raw material, economic, production, etc.. Recently, innovation potential has also become one of the components of the overall (aggregate) potential. The solution to the problems of methods for assessing the innovative potential of economic entities should, of course, be based on a serious theoretical Foundation. Research of the best practices of using innovative potential, methods of its analysis and evaluation determined the purpose of this article, which is to assess the innovative potential of organizations using a process-product approach. The proposed assessment includes the calculation of indices, criteria and indicators that form a matrix for positioning the organization's innovative potential, characterized by the use of a relatively small amount of primary information, and ease of use.

Keywords: Innovation, Innovative Enterprises, Human Potential.

Introduction

The country's development is impossible without innovations based on intellectual resources, knowledge-intensive and information technologies, effective use and qualitative improvement of all factors of production.

Each country has a certain innovative potential, which is one of the most important elements that determines its future competitiveness.

Comparison of Russia with the leading countries allows us to draw a conclusion about the significant lag of domestic enterprises in the development and implementation of scientific and technical

achievements. A large number of enterprises prefer to adapt already invented goods, services and technologies to create their own innovative developments (Stepanova, Yu.N., 2019). The structure of implemented innovations is dominated by technological innovations, mainly related to the purchase of machinery and equipment. In this regard, the literature pays much attention to the formation and use of innovative potential of enterprises (Morkovina, S.S., 2015). The innovative potential of an enterprise in the most General sense is interpreted as a set of various types of enterprise resources necessary for the implementation of innovative activities (Volosatov, V.D., 2010). This approach is described in the literature as a resource approach (Vertakova, Y., 2013). Quite widely in the literature, the effective approach is considered, which is expressed in the form of avant-garde knowledge and their application in practice when evaluating the innovation potential (Bendikov, M.A., 2007).

The formation of innovative potential is influenced by a set of conditions and factors, ranging from research and development to mass production of a product or the use of innovative technology (Drapalyuk, M.V., 2014). To assess the innovative potential of enterprises, many methods are used, both official (Oslo, etc.) and developed in the framework of scientific research by separate groups of scientists (OECD 2019 Eurostat).

Following the Oslo Guidelines, the minimum requirement for innovation is that the product, process, marketing method, or organizational method must be new or significantly improved for organizations. This includes products, processes, and methods that organizations are the first to develop, as well as those that have been adopted by other organizations. The initial point of evaluating the innovative potential, according to researchers of this issue, is to determine the current internal capabilities of the organization in the innovation sphere using economic criteria (Morkovina, S.S., 2018). Czech researcher M.Špaček suggests calculating a comprehensive innovation index to assess the organization's innovation potential (Špaček, M., 2019).

Dziallas, M. And Blind, K. in their review article, they analyze scientific publications on indicators of innovation created between 1980 and 2015. In their research, they identify enterprise-specific indicators for assessing innovation potential, which are important for preliminary and current assessment. 82 unique indicators for evaluating innovation were identified, including 26 indicators for evaluating the innovation of the offer (Dziallas, M. and Blind, K., 2019).

Over the past two decades a significant number of methods for evaluating innovative potential have appeared in Russian science adapted to Russian conditions (Vertakova, Y.,2016). However, at the moment the problem is the lack of comprehensive research to assess the innovative potential of regional enterprises and the effectiveness of its use in creating process and product innovations. The purpose of the research is to develop a methodology for assessing the innovative potential of enterprises based on the study of best practices for analyzing and using the innovative potential of organizations in Russia.

Theoretical, Informational, Empirical, and Methodological Grounds of the Research

The initial point of assessing the innovation potential is to determine the internal capabilities of the enterprise in the innovation sphere using economic criteria.

In the course of the research, we used methods of comparison and generalization to reveal the essence of innovative potential, identify cause-and-effect relationships and patterns between innovative potential and innovative activity of enterprises, as well as to substantiate the initial concept for solving the problem determined by the purpose of the study.

12 official and unofficial methods of assessing innovation potential used in Russia and abroad were analyzed. The analysis of methods for assessing innovation potential has been used to study tools for

evaluating innovation potential, indicators, including algorithms for calculating them, for evaluating the innovative potential of organizations.

The information base necessary for analyzing the innovative potential of enterprises, as well as the advantages and disadvantages of existing methods, was studied.

This made it possible to take into account many factors, such as the information base for assessing the innovative potential of organizations, the size of enterprises, specialization, human and scientific and technical potential, and others.

Results

The proposed methodology for assessing the innovative potential of organizations is based on the process-product approach. The main tools of the assessment methodology are indexes, criteria and indicators, and a square matrix of innovation potential. The main quantitative technique for analyzing the results of evaluating innovation potential is comparison.

The assessment of innovation potential is based on two indices: the economic and technological index, which evaluates innovation as a product, and the ability to innovate index, which evaluates innovation as a process.

Each index is decomposed into ten (10) criteria that reflect the human resources, scientific and technical, production and technological, organizational and managerial potential, ability and readiness of the organization to innovate.

This assessment is made by comparing the criteria of the reporting period and the previous one, which allows you to assess the trends in the development of the organization's potential.

The dynamics of the criterion is set for each organization with a gradation:

- positive (having positive dynamics – 1 point);
- stable (having dynamics equal to-0 points);
- negative (having negative dynamics – 0 points).

The level of the economic and technological index and the ability to innovate index is assessed in points, on a 10-point scale.

The assessment of innovative potential is carried out in accordance with the following order:

1. selecting source data from an information database;
2. the calculation of the evaluation criteria according to certain algorithms;
3. calculation of the growth (decline) rate of criteria;
4. evaluation of changes in the criteria on the evaluation scale;
5. positioning the company within the matrix;
6. forming an analytical conclusion based on the evaluation results.

To position the organization and determine the level of innovation potential, a square matrix is used, which includes three columns containing the values of the economic and technological index score arranged as they increase, and three rows containing the values of the innovation ability index score as they increase.

Each economic and technological index and ability to innovate index corresponds to one of the zones of the organization's innovation potential (green, yellow, red), as shown in figure 1.

Based on the organization's positioning within the matrix innovation potential is assigned the status:
- "Innovative leader", high level of innovative potential (matrix: IP1, IP2, IP3, IP4);

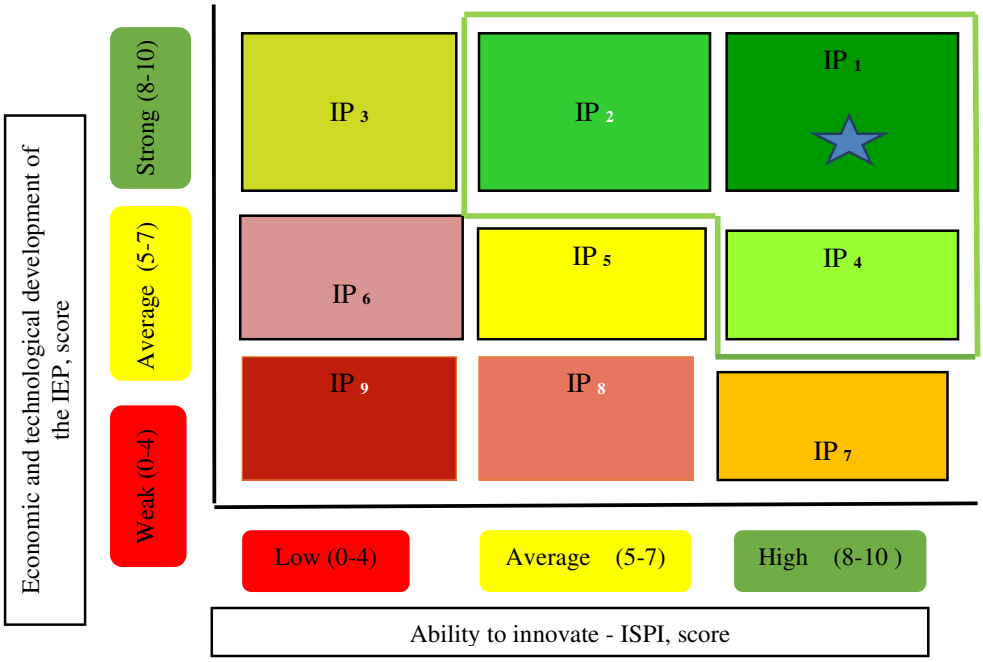

Fig. 1:Matrix for positioning an organization's innovative potential (green, yellow, red zone)

- "Moderate leader", average (satisfactory) level of innovation potential (matrix: IP5, IP6, IP7);
- "Modest innovator", low level of innovation potential (matrix: IP8, IP9).

Conclusions and recommendations

This method was tested on ten organizations, and based on the results of the assessment of their innovative potential, they were given a conclusion about their innovative activity, table 1.

Table 1: Results of assessment of innovative potential of organizations

Name of the organization	Place in the matrix	Type of innovation potential
JSC ZRM Bobrovsky	IP_6	A moderate traditionalist
LLC Plant for the production of heavy mechanical presses	IP_8	A moderate innovator
Logus-agro LLC	IP_7	A moderate traditionalist- a successful innovator
Kosmos-Neft-Gas LLC	IP_1	The absolute innovation leader
JSC NVP PROTEK	IP_4	Innovation leader-innovation integrator
JSC BTEK	IP_9	A modest innovator-traditionalist
NGO Energosvyaz'proekt	IP_9	A modest innovator-traditionalist
CBM BTS	IP_6	A moderate traditionalist
BTMK LLC	IP_6	A moderate traditionalist
JSC Buturlinovka	IP_9	A modest innovator-traditionalist

Based on the results of the assessment of the innovative potential, we will draw the following conclusions.

Kosmos-Neft-Gas LLC (EP_1) is an absolute innovation leader by type of innovative potential. The organization has received the highest rating of the IET and ISPI indices, therefore it has a high innovative potential. This organization is a leading market player, implements the strategy of "leadership in competition", which contributes to improving the efficiency of innovation, in particular, reducing the period from the moment of development to the practical implementation of innovations.

JSC NVP PROTEK (EP_4) is an innovative leader - integrator of innovations by type of innovative potential. The organization received an average rating of the I et index and a high rating of the ISPI index. Therefore, it has an innovative potential for active growth, in which it is possible to quickly increase competitive advantages, primarily due to intellectual and scientific potential. The innovation potential of this type is characterized by a positive dynamics of indicators for assessing its level of development and the implementation of the strategy of "following the leader" and"innovation growth". The organization is focused on creating innovations.

CJSC ZRM Bobrovsky, CBM BTS, BTMK LLC (EP_6) by type of innovative potential are moderate traditionalists. Organizations received an average rating of the IET index and a low rating of the ISPI index. Consequently, these organizations have a low-growth innovation potential, where it is possible to increase it at the expense of the existing economic potential. Innovative potential of this type, on the one hand, does not currently provide competitive advantages of organizations, but, on the other hand, when changing the policy of business owners, it can be considered as an important element of the organization's innovative development strategy, the practical implementation of which will help to strengthen the competitive position of the organization in the market. The organization is focused on the acquisition and copying of innovation.

Logus-agro LLC (EP_7) is a moderate traditionalist - a successful innovator by type of innovative potential. The organization received a low rating of the IET index and a high rating of the ISPI index. Innovation potential of moderate growth, where it is possible to increase it due to high scientific and intellectual potential. The synergistic effect of interaction of structural elements of innovative potential with an emphasis on economic resources allows ensuring the stability of the level of innovative development. The organization is focused on creating innovations, developing R & d and adapting the successful experience of the leader.

LLC Plant for the production of heavy mechanical presses (EP_8) by type of innovation potential is a moderate innovator. The organization received an average rating of the ISPI index and a low rating of The IET index. Innovation potential of low growth, in which it is possible to increase it through the development of research activities. Innovative potential of this type, on the one hand, does not currently provide competitive advantages of the organization, but, on the other hand, when changing the policy of business owners, it can be considered as an important element of the organization's innovative development strategy, the practical implementation of which will help to strengthen the competitive position of the organization in the market. The organization is focused on the creation of innovations, reproduction and innovation.

JSC BTEK, NGO Energosvyaz'proekt, JSC Buturlinovka (EP_9) by the type of innovative potential is a modest innovator-traditionalist. The organization received the minimum rating of the IET and ISPI indices. An extremely low level of innovation potential is typical for this organization, it does not pay due attention to innovation, but focuses on achieving short-term goals and objectives, i.e., making a profit in the current period. Drastic measures are needed to develop the innovative component of the organization's activities, which will be an essential part of long-term goals aimed at improving competitiveness

The methodological basis for the development of the author's assessment of the innovative potential of the organization based on the process-product approach was the research of implemented methods that take place in practice.

In General, the proposed assessment of innovation potential is a monitoring of the components of innovation potential in order to compare its actual level at a certain moment with existing ideas about this level. The level of innovation potential remains in constant dynamics, which can be either positive or negative.

Based on the results of the assessment of the innovative potential of organizations, it can be seen that it meets the following requirements:

- provides systematic analysis of results;
- simplicity and transparency in the assessment;
- provides comprehensive analysis of innovation activities;
- reflects the specifics of the industry;
- based on a retrospective analysis;
- allows you to make a forecast of innovative development, and form reliable recommendations.

This assessment of the innovative potential of organizations is complex based on the fact that (Stepanova, Yu.N., 2019):

1. the system of evaluation indicators provides a comprehensive characteristic of innovation processes, including all its main stages and gives a real result.
2. The set of indicators is flexible, i.e. it reflects all changes taking place in the innovation sphere of the region and characterizes all aspects of innovation activity.
3. The number of indicators is limited and is associated with the peculiarities of obtaining information.

The implementation of these requirements allowed us to quantify and qualitatively assess the innovative potential of organizations, which will allow us to make scientifically-based management decisions on the formation, use and development of innovative potential of organizations.

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Analysis and Prediction of Security Factors In Public Passenger Transport Using Artificial Neural Networks

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Abstract

Analysis and prediction of selected security factors in public passenger transport based on the example of the capital city of Warsaw were made. Then, the most common criteria for assessing public passenger transport found in the literature are presented. For public passenger transport safety, as well as the criteria suggested by other authors listed in the first part of the paper, the factors were selected for analysis. Data used for the purposes of this paper were collected on the basis of a statistical guide kept by the Public Transport Authority in Warsaw. The time range of the study covers the period from January 2017 to December 2019. Artificial neural networks (time series) ANN were used for predictions. The purpose of time series analysis using ANN is to predict future values of a variable or variables, based on previous values of the same or another variable or variables (dependent variable values may go beyond the data range). The range was set for 12 months. A total of 320 network designs were trained for 8 selected factors, of which 5 best were selected for each factor and a prediction was made for a period of 12 months. The quality of the neural network learning process was obtained at >80%. On this basis, the development trends for selected factors in the near future were demonstrated.

Keywords: Security, Public Passenger Transport, Artificial Neural Networks

Introduction

The development of technology brings about changes in other sectors of the economy. Over the last several years, a dynamic increase has been observed in the number of available applications, being both universal technological solutions dedicated to all market segments, as well as individual, tailor-made solutions. The common denominator for all these efforts is security, both collective and individual, but also security of information, data transmission or transaction security.

This also includes security in transport, including public passenger transport. There is an increase in the use of public transport in large metropolitan areas. The reasons for this are, among others, traffic congestion, shorter travel times offered by public transport, or quality of services offered. Quality is understood, among others, as accessibility, efficiency and security. There has also been a noticeable increase in access to public transport information and services through mobile applications, in the number of ticket vending machines, including mobile ticket machines. Further, the scope of the service has been dynamically changing, if only through CCTV (Closed-Circuit television) monitoring of public passenger transport means, voice and LCD (Liquid Crystal Display) screen-communicated information, as well as care for the surroundings through the environment impact of transport. All these fall within the scope of public passenger transport security. This applies to the use of the means of transport as such, passengers, drivers, as well as all the facilities offered. In addition, in-service operational analyses of vehicles, including buses, most often address the minimization of costs associated with their use and the ways to ensure a maximum reliability of the transport system, as well

as the environmental impact of the use of vehicles, or the security aspect. Therefore, public passenger transport is assessed using various criteria and methods.

The authors of this paper focus on the criterion of security in public passenger transport. This criterion was decided to be the starting point for further analysis and research. Without a sense of security among those actually using public transport services, no other facilities can convince passengers to use public transport.

In view of the above, in this paper the authors set out to analyze and predict selected security factors in public passenger transport based on the example of the capital city of Warsaw.

Research methods used in the study included deduction, analysis and systematic synthesis, induction, correlation analysis and neural modeling. The deduction method was used to assess insights and facts in public passenger transport. The methods of analysis and systematic synthesis enabled the identification of security factors. The induction method was used to propose conclusions based on the collected assessment facts. Correlation analysis was used to identify relationships between selected factors. The neural modeling method using artificial intelligence algorithms was used to predict the size of selected factors.

State of the Art

Public passenger transport is one of the most critical components of the entire logistics system. The need to develop and accelerate means for the movement of people makes it necessary to take into account multiple variables, which may include:

- society's mobility, which grows year by year, necessitating ways for ever faster movement and use of more and more advanced equipment or machines,
- growing expectations of urban transport users, which do not arise only from the basic needs, but those created and instilled as prerequisite, resulting from the technological and technical progress,
- increase in the quality and reliability of the means of transport, which is key to competitiveness of carriers,
- increase in popular demand for tourist and recreation services,
- rapid development of management systems for transport infrastructure, both linear and point-based.

The quality of public transport services comprises a set of criteria which, in accordance with the standard PN-EN 13816:2004P Transportation. Logistics and services. Public passenger transport. Service quality definition, targeting and measurement, Polish Committee of Standardization, Warsaw 2004, were divided into the following 8 categories :

- availability: coverage of public transport service offered in geographical, time, frequency and transport type units,
- accessibility: access to the public transport system, including connections with other modes of transport,
- information: regular provision of knowledge about the public transport system to help in travel planning and execution,
- time: time-related aspects of travel planning and execution,
- customer care: aspects of the service to meet passenger requirements,
- comfort: aspects of the service to provide travellers with relaxation and rest options,
- security: a sense of personal safety of passengers.
- environmental impact: environmental impact resulting from the provision of the service.

From the point of view of public passenger transport indicators by which passengers evaluate public transport include:

- attractiveness;
- performance;
- security.

There are many definitions of the term security in the literature on the subject. These definitions differ in the assumed perspectives on selected issues. From the point of view of public passenger transport, security should be understood as both the security of passengers and the security of drivers of public transport vehicles. The driver's profession can be stressful; it is important that the driver responds in time to the changing road situation, emerging hazards and correctly reads road signs and intentions of other drivers. Vehicles that have broken down or have had a road accident need repair. Costs incurred for the repair and maintenance of vehicles are an important parameter of the entire transport system. The sense of security in public transport is also affected by the crowding of means of transport. Passengers in an overcrowded vehicle experience discomfort, anxiety and even fear that they will not reach their destination on time because off too many of those getting on and off. The Sense of security and general trust in others, or strangers, influence the choice of public transport as a way of getting around.

Passenger transport services are a type of transport services that are characterized by:

- complexity - the transport service consists of a very large number of components and relationships between these components;
- probabilism - it is impossible to predict all states and events,
- dynamism - interventions are made in the transport service process both in real time and in space.

Therefore, various criteria for assessing public passenger transport can be found in the literature. The standard defines the criteria by which the quality of public passenger transport can be analyzed; in addition, the standard defines the measures of customer satisfaction and the calculation measures. Table 1: presents examples of performance and customer satisfaction measurements used in public passenger transport for the security criterion.

Table 1:Examples of performance and customer satisfaction measurements used in public passenger transport for the security criterion

Criteria	Customer satisfaction measure	Performance measure
7. Security 7.1 Safety from crime	CSS - Feeling safe*	Target score: Providing a safe and reliable service for passengers Performance measure: DPM - Indicators of reported offences against passengers DPM - Indicators of reported offences against employees
7.2 Safety in terms of accidents	CSS - Sense of safety*	Target score: Safety of customers and road users Performance measure: Recorded accidents and/or rates of injuries
* An example of a more detailed definition is given in Table C.2. CSS - Customer Satisfaction Survey MSS - Mystery Shopper Survey DPM - Direct Performance Measures		

In order to identify trends, the level of customer satisfaction is surveyed on the ongoing basis. Another important factor follows from this requirement, namely the regular and timely reporting and monitoring of public passenger transport. The standard provides for CCTV monitoring, among others, for the security criterion: safety from crime. CCTV monitoring can be a useful tool especially for the driver, as they he can use cameras to detect passengers behind the bus, □ and have the surroundings under a better control. The prevalence of CCVT monitoring in buses and trams of the capital city of Warsaw in the years 2017-2019 is presented in Fig. 1.

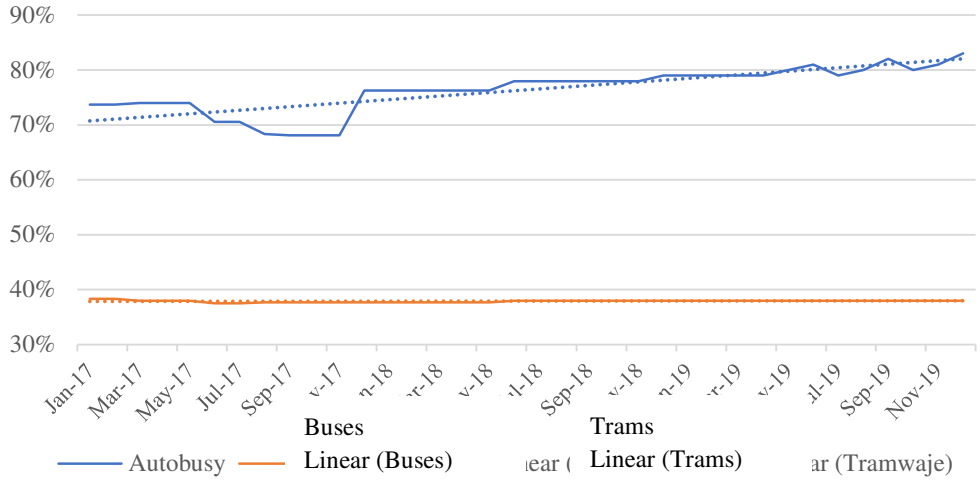

Fig. 1. Prevalence of CCVT monitoring in buses and trams of the capital city of Warsaw in the years 2017-2019 □

The graph shows that the number of buses equipped with CCTV monitoring steadily increased year by year and is currently at the level of 83%. Compared with January 2017 (74%), with a simultaneous increase in the overall number of buses from 1709 in January 2017 to 1851 in December 2019, the number of buses equipped with CCTV monitoring increased by 105 buses. Based on the above, it can be concluded that all new buses are purchased with the CCTV option. The number of trams equipped with CCTV monitoring is at a constant level (38% of the rolling stock).

One of the aspects in the development of public passenger transport security may be environmental protection and the deployment of transport means that are safe for the environment. It is therefore reasonable to introduce electric vehicles. The deployment of electric buses in the municipal transport system □, or the use of buses equipped with internal combustion engines that meet the highest EURO emission standards is a good example. The number of public passenger transport buses operating in the capital city of Warsaw in 2017-2019 with a breakdown by EURO emission standards and electric buses is shown in Fig. 2

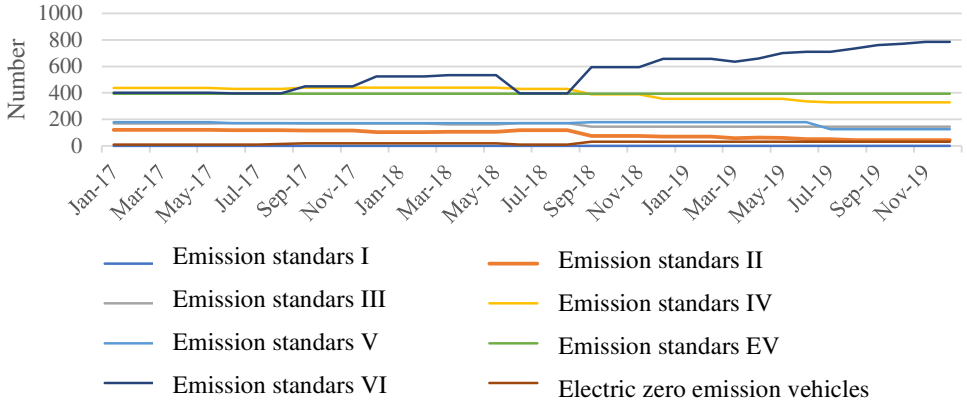

Fig. 2. Number of public passenger transport buses operating in the capital city of Warsaw in 2017-2019 in breakdown by EURO emission standards and electric buses

The graph shows that the number of buses meeting the highest Euro VI emission standards grew systematically and currently accounts for approximately 42% of all buses. One should also note the high number of buses meeting the Euro EEV standard (Enhanced Environmentally Friendly Vehicles; the standard between Euro V and Euro VI, which can only be achieved by engines powered by compressed natural gas (CNG), which account for approximately 21% of the fleet. At the same time, a negligible share of buses meeting the oldest emission standards - Euro I, Euro II and Euro III can be observed.

Methods for Measuring Security in Public Passenger Transport

One of the methods for studying security in public passenger transport may be the indirect measurement method of sample-based surveys. Professional public transport drivers were surveyed using a special questionnaire. They answered questions related to their experience as professional drivers, their age, working hours, timetables and traffic incidents and accidents. The results confirmed that stress and workload affect the safety of work of professional drivers. The use of the binomial random-effects and conditional autoregressive models in public passenger transport security studies in Melbourne has shown that a greater use of public transport instead of individual transport results in fewer accidents. The technical condition of vehicles and their systems plays an important role in safety. One of the most important systems is the braking system; statistical analysis was used in the studies on brake fluid. The results have shown that monitoring the levels of this operating fluid and observing the exchange dates have an impact on the condition of the entire vehicle. Another method for studying road safety can be the multi-criteria method of analytical hierarchy process (AHP). By this method, individual factors can be ranked in various ways. Delphi methods can also be used to assess security. These methods have demonstrated the components that can significantly improve safety in and on buses. The results show that it is important to introduce the systems of automatic door opening, braking assistance and CCTV monitoring in the vehicle and its surroundings.

For many years, linear modeling has been the most common mathematical technique used to describe processes and objects (for the purposes of their assessment). However, wherever there is no basis for linear approximation of phenomena and processes, linear models did not work well, sometimes leading to incorrect opinions on the total inability to mathematically describe such or other systems. In these cases, when solving difficult and troublesome issues, the quickest and most convenient way to solve the problem may be to fall back on neural networks (i.e. models that map non-linear relationships).

Artificial neural networks operate more or less in the same way as the human brain. The range of applications of the method is wide; it has been used, among others, in problems related to mechanics to analyze the results of cylinder pressure tests. A created network learns itself, by analyzing the examples fed into it and using the trial and error method to seek a solution to a problem, without any

specific method of operation imposed on it. Medical research can be another example of a field for use of ANN. Based on the heuristic capabilities of the method, it can help healthcare professionals make decisions when in uncertainty. Other uses of artificial intelligence include, for example, the assessment of the quality assurance of transport means, risk assessment, route optimization, evaluation of logistics systems.

In view of the above, a conclusion can be made that artificial neural networks fit well in the research area as a method to achieve the assumed objective, to enable predictions for selected factors.

Research Method and Object

On the basis of the literature review and available data, selected security factors in public passenger transport were collected based on the example of the capital city of Warsaw. Taking into account the standard quality guidelines, including for public passenger transport safety, as well as the criteria suggested by other authors listed in the first part of the paper, the factors were selected for analysis. The set of factors used for modeling is presented in Table 2:.

Table 2:Set of factors used for modeling

No.	Factor designation	Factor name	Factor value
1.	A_p	Vehicle failures	Number
2.	Z_p	Devastated vehicles	Number
3.	N_{ptp}	Violence offences in public passenger transport	Number
4.	W	Accidents	Number
5.	K	Collisions	Number
6.	Z_r	Traffic stoppages (for other reasons)	Number
7.	S_k	Complaints received by PTA	Number
8.	O_{ma}	CCTV monitoring in buses	%
9.	O_{mt}	CCTV monitoring in trams	%
10.	P_r	Persons injured in accidents	Number
11.	P_s	Fatalities in accidents	Number
12.	L_a	Buses	Number
13.	L_t	Trams	Number

Data used for the purposes of this paper were collected on the basis of a statistical guide kept by the Public Transport Authority in Warsaw. The time range of the study covers the period from January 2017 to December 2019. Collected study data for the city of Warsaw in the form of a graph are presented in Fig. 3.

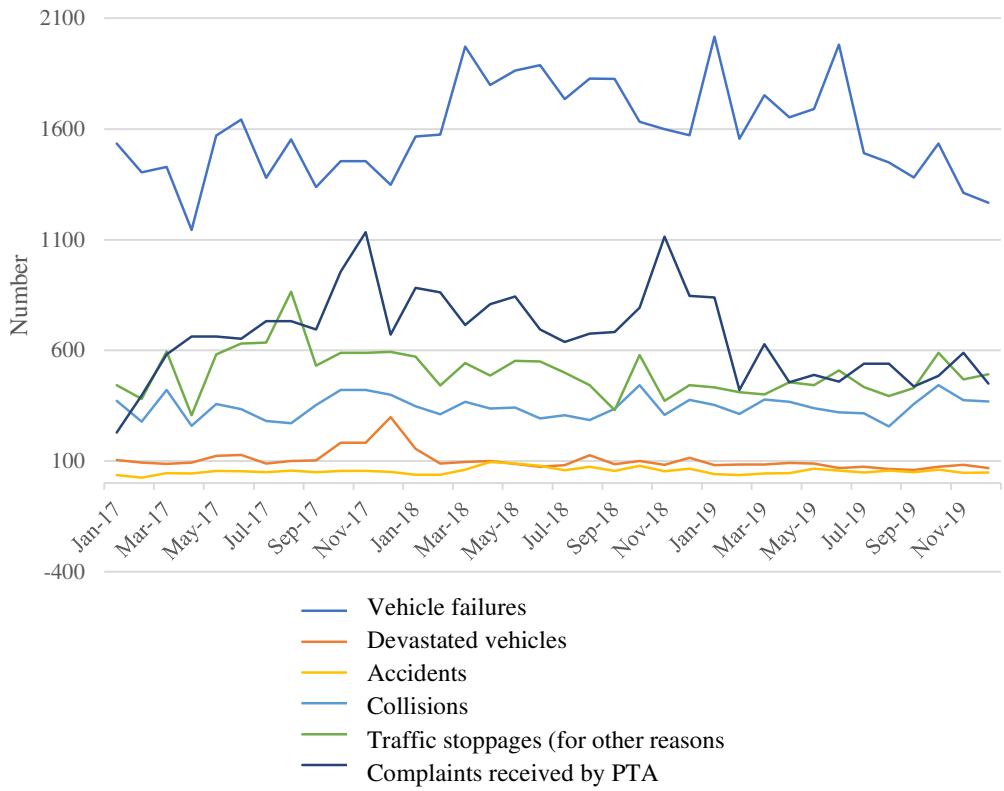

Fig. 3. Collected study data covering the period 2017-2019 for the capital city of Warsaw

The graph shows that especially in the winter time, the PTA receives a larger number of complaints than in other seasons. This may be attributable to delays due to road conditions. The failure rate of vehicles increased during the periods under consideration, with a decrease at the end of 2019. The number of accidents, collisions and traffic stoppages resulting from factors other than those listed above remains more or less stable, and thus may not contribute to changes in the sense of security among passengers.

Based on a reference to the standard and the collected factors, a conclusion can be made that the Public Transport Authority in Warsaw monitors the level of quality of public passenger transport services in accordance with the guidelines contained in the standard.
In addition, correlation analysis of selected factors was made (Table 3:).

Table 3:Correlation analysis of selected factors

	A_p	Z_p	N_{ptp}	W	K	Z_r	S_k	O_{ma}	O_{mt}	P_r	P_s	L_a	L_t
A_p	1.00												
Z_p	-0.21	1.00											
N_{ptp}	-0.14	0.07	1.00										
W	0.45	-0.01	-0.20	1.00									
K	-0.05	0.34	-0.10	0.09	1.00								
Z_r	-0.01	0.33	0.34	0.24	0.24	1.00							
S_k	0.14	0.36	0.12	0.32	0.11	0.22	1.00						

O_{ma}	0.24	-0.43	-0.43	0.09	0.00	-0.53	-0.38	1.00					
O_{mt}	-0.01	-0.39	-0.04	-0.27	-0.04	-0.58	-0.56	0.49	1.00				
P_r	0.23	0.29	0.07	0.64	0.03	0.37	0.56	-0.47	-0.41	1.00			
P_s	0.16	0.19	-0.04	0.19	0.08	0.11	0.18	-0.08	-0.15	0.25	1.00		
L_a	0.32	-0.15	-0.29	0.22	0.12	-0.24	-0.02	0.74	0.15	-0.34	0.11	1.00	
L_t	-0.28	0.35	0.52	-0.15	-0.08	0.43	0.21	-0.91	-0.29	0.48	0.02	-0.86	1.00

The table above shows which factors are strongly correlated with each other (positive and negative correlations). The number of persons injured strongly correlates with the number of buses and trams. As the number of buses increases, the number of injured increases, and as the number of trams increases, the number of injured decreases. This relationship is mainly due to the fact that rail transport is characterized by higher safety than road transport. A strong correlation can also be seen between the presence of CCTV monitoring in buses and the number of violence offences in public passenger transport. As the former indicator increases, the latter decreases, which has a significant impact on the perceived sense of security.

Neural Modeling

Among the many types of neural network models, the study used Multilayer Perceptron, a neural network with radial base functions (RBF). It was decided to choose these types of networks due to the fact that they solve linear and non-linear problems, achieve efficiency results at the level of >80%; further, they have also proved to be sufficient to solve the problem. The following learning algorithms were used: steepest descent method, conjugate gradient method; BFGS method (*Broyden - Fletcher - Goldfarb - Shanno)*.

The purpose of time series analysis using ANN is to predict future values of a variable or variables, based on previous values of the same or another variable or variables (dependent variable values may go beyond the data range).
Data are presented on a monthly basis. Sample data inputs for predicting selected factors are presented in Table 4:.

Table 4:Sample data inputs for predicting selected factors

Period	A_p	Z_p	N_{ptp}	W	K	Z_r	S_k	O_{ma}	O_{mt}	P_r	P_s	L_a	L_t
Dec 19	1267	68	3	48	369	492	450	83%	38%	18	1	1851	726
Nov 19	1312	83	3	46	375	469	588	81%	38%	18	1	1851	726
Oct 19	1534	73	0	62	442	588	484	80%	38%	22	1	1838	726
Sep 19	1381	60	0	49	358	430	437	82%	38%	18	1	1827	726
Aug 19	1448	64	1	56	256	393	540	80%	38%	19	1	1801	726
Jul 19	1491	73	1	48	316	434	539	79%	38%	18	1	1783	726
Jun 19	1980	68	1	56	319	508	458	81%	38%	19	1	1843	726
May 19	1690	88	1	65	339	442	490	80%	38%	17	1	1862	726
Apr 19	1652	91	0	45	367	456	455	79%	38%	19	1	1827	726
Mar 19	1751	84	0	43	378	401	628	79%	38%	19	1	1795	726
Feb 19	1556	85	0	35	313	410	421	79%	38%	19	1	1831	726
Jan 19	2016	80	4	41	354	432	839	79%	38%	20	1	1831	728
Dec 18	1571	114	0	65	377	443	845	79%	38%	60	5	1831	727
Nov 18	1600	83	0	53	307	371	1113	78%	38%	64	0	1809	727
Oct 18	1632	100	2	78	442	578	792	78%	38%	96	2	1809	727

Using Statistica 13.3 software, predictions were made for selected factors. Then the basic network parameters were specified, i.e.

- network type (multilayer perceptron - MLP),
- minimum number of hidden neurons,
- maximum number of hidden neurons,
- number of learning networks,
- number of networks preserved,
- activation function of hidden neurons,
- activation function of output neurons,
- weight reduction values for the hidden layer and the output layer.

Along with defining the input data, the size of the training set was defined. It was determined that:

- 70% of the data will be a training set used to modify weights,
- 15% of the data will be a test set for ongoing monitoring of the learning process,
- 15% of the data will be a validation set for assessing the quality of the network after learning.

Six selected factors were analyzed, each of them individually. For each factor, a number of learning networks of 40 was determined, and the top 5 neural network designs for individual factors were preserved and shown in the graphs. The number of delayed values equal to 12 was assumed for the neural network learning process. Due to the fact that the data were collected for a period of 3 years, the natural period for one year to detect trends in the data is the number of 12 months. This means that the first 12 data collected will serve as a model in the learning process.

Further in the analysis, it was determined that the prediction starts from the 30th period (from the 30th month) and the prediction horizon was determined at 18 periods. In view of the fact that 36 data periods were collected, the prediction using neural networks was defined for 12 periods (12 months).

To sum up the study assumptions, a total of 240 network designs were trained for 6 selected factors, of which 5 best were selected for each factor and a prediction was made for a period of 12 months. The broader the time horizon, the less accurate the prediction and the more varied behaviour of individual networks. This is influenced among others by the number of data and the data sample, which was randomly assigned to individual ANN sets. The prediction of ANN designs for selected factors for time horizon 18 is presented in figures 4-9.

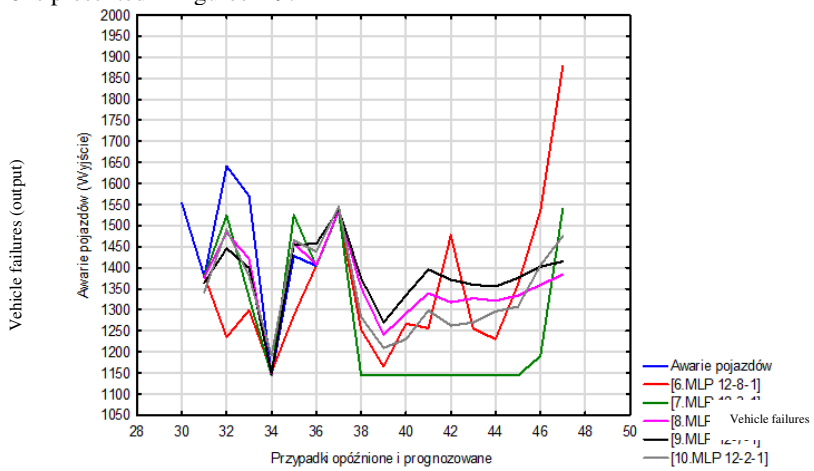

Fig. 4. Prediction of 5 ANN designs for factor A_p - vehicle failures for the time horizon 18

In the analyzed case, 3 out of 5 at a similar level. On this basis, it can be argued that the number of vehicle failures will increase slowly but steadily. Based on the correlation

analysis, a conclusion can be made that this is related to, among others, the ever growing number of buses.

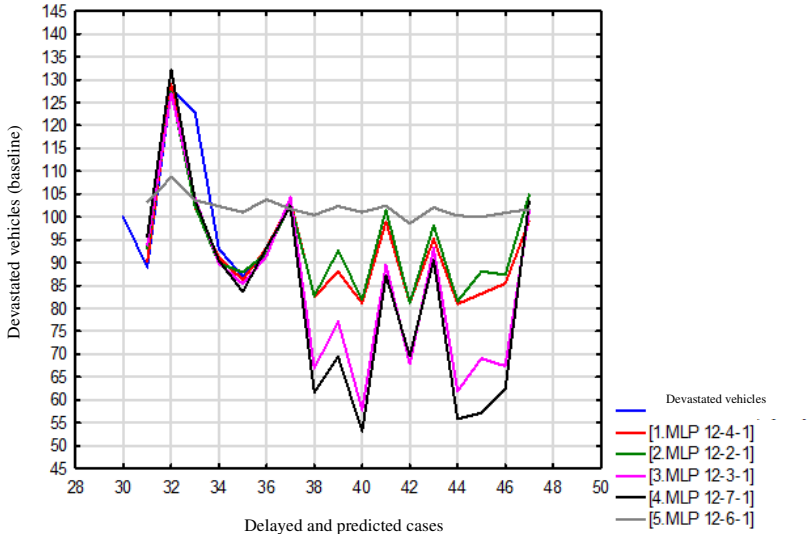

Fig. 5. Prediction of 5 ANN designs for factor Z_p - devastated vehicles for the time horizon 18

In the analyzed case, 4 out of 5 neural networks predict data at a similar level. One neural network (MLP 12-6-1) completely differs from the others, so it should not be included in further analyses. Based on the graph, a conclusion can be made that the number of devastated vehicles will decrease. Correlation analysis shows that this is related to, among others, the growing number of public transport vehicles that are equipped with CCTV monitoring.

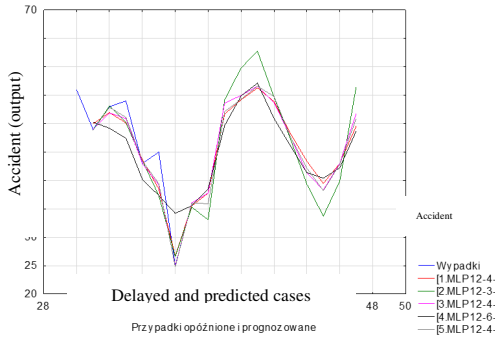

Fig. 6. Prediction of 5 ANN designs for factor *W* - accidents for the time horizon 18

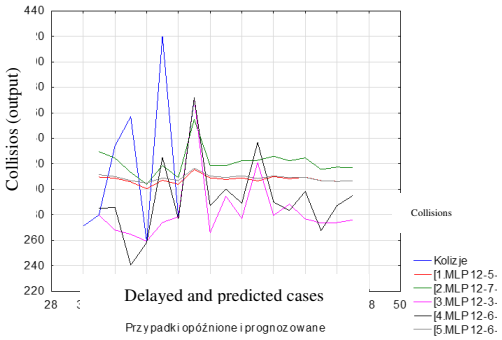

Fig. 7. Prediction of 5 ANN designs for factor *K* - collisions for the time horizon 18

In the analyzed cases, all 5 neural networks predict data at a similar level. The collected data show that the number of accidents and collisions remains at a similar level, and their cyclical nature may be due to the current season, among others. In the spring and autumn, a higher number of accidents are recorded, hence the neural network prediction with a clear indication of cyclicality.

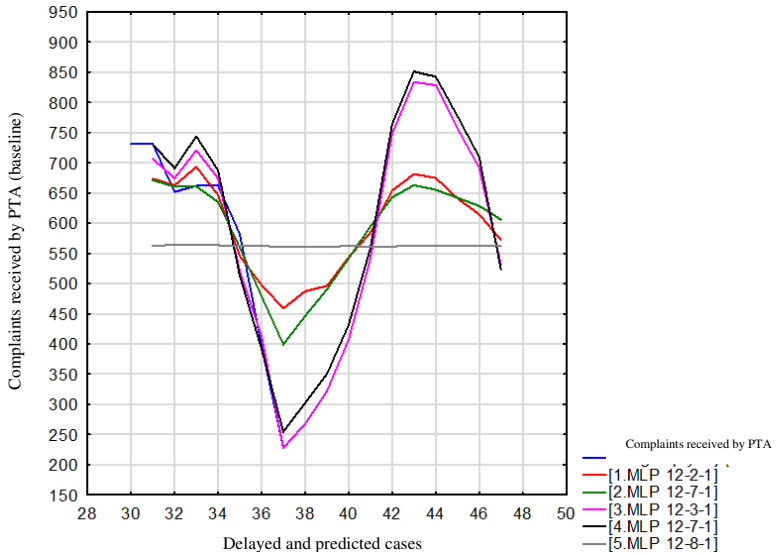

Fig. 8. Prediction of 5 ANN designs for factor S_k - *complaints received by PTA* for the time horizon 18

In the analyzed case, 4 out of 5 neural networks predict data at a similar level. Data collected for analysis, as well as data predicted by neural networks, strongly indicate the seasonality of the number of complaints. The largest number of complaints received by PTA falls in the autumn period. A conclusion can be made that weather conditions strongly affect the level of transport service, as well as the level of perceptions among passengers.

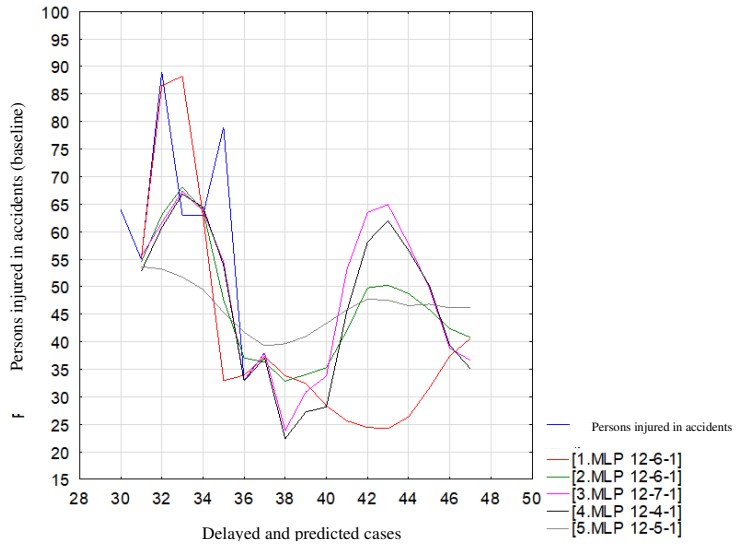

Fig. 9. Prediction of 5 ANN designs for factor P_r - persons injured in accidents for the time horizon 18

In the analyzed case, all 5 neural networks predict data at a similar level. The prediction and the collected data show that this number steadily decreases despite the increase in the number of buses and people using public passenger transport. This factor also strongly correlates with the number of accidents (Fig. 6).

Conclusions

The study covered an analysis of selected security factors in public passenger transport. The object of the research are transport services provided in the capital city of Warsaw by the Public Transport Authority. It has been shown that security and the sense of security are among the most important expectations that should be guaranteed, while their perceptions vary widely. This paper set out to analyze and predict selected security factors in public passenger transport based on the example of the capital city of Warsaw. The following conclusions can be made based on the study carried out:

- PTA as the organizer of public passenger transport in the capital city of Warsaw, through its efforts, ensures security in public transport;
- the bus fleet is systematically replaced with newer vehicles that offer higher quality;
- buses are adapted to meet the applicable Euro standards of exhaust emissions, which translates into their less negative environmental impact;
- the number of means of transport equipped with CCTV monitoring grows constantly, thus reducing the number of devastated vehicles or the number of complaints received by PTA;
- despite the dynamic increase in the number of buses, the failure rates decrease, which also demonstrates the quality and security of public passenger transport;
- the number of injured in accidents decreases dynamically, which results from the use of a more advanced and safer fleet of transport vehicles and the use of driver assistance systems;
- predictions of individual factors made using MLP neural networks - time series have shown the forecast number of events that may occur in the future for the analyzed factors;

Further research in the subject of this paper may relate to the analysis of other security assessment criteria in public passenger transport using other assessment and prediction methods.

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Business Information Technologies Development for Decision Support within Geo-Information Management

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Abstract

We consider the results of business information technologies development for decision support within geo-information management. While studies, we used methods of data bases constructing in case of distributed information platform, web-technologies and virtual reality tools. Also, we used Foresight technologies, theory of decision making under uncertainties, risk management approach. While study, we used a structural model of a geo-information distributed platform (GIDP) containing heterogeneous databases in the format of a multi-level architecture "data - processing - interface". We suggest to use a mechanism for preprocessing heterogeneous data, which includes a virtual data processor and a data preparation unit. Then, there is no need to convert data to the format used by the system, they remain in the original form. While research, we used platform https://www.researchgate.net/profile/Valery_Abramov2/ for data exchange and preliminary discussion.

Keywords: Business Information Technologies, Decision Support, Geo-Information Management

Introduction

Recently, a digital transformation, named Industry 4.0, extends in the global economy, during which a lot of enterprises and infrastructure-intensive companies (Borremans, 2018) plan and implement wide spectrum of information technologies (Baikov, 2019), (Bidenko, 2019), (Drabenko, 2019), (Frolova, 2019), (Lukyanov, 2019). This leads to serious business information technological changes in decision support within geo-information management (Kirsanov, 2014), especially in natural risk management (Gogoberidze, 2014), (Ershova, 2018), (Garcia, 2018), (Isaev, 2015), (Istomin, 2018), (Shilin, 2019).

In the article, the authors describe the results of business technologies development in geo-information management area (Burlov, 2018), (Fokicheva, 2016), (Fokicheva, 2015), (Istomin, 2015), (Kirsanov, 2014), (Lednova, 2014), (Malakhova, 2014), in large environmental projects (Mandryka, 2019), (Popov, 2014), (Popova, 2019), (Rumyantseva, 2017), (Zhigulsky, 2018) within environmental economics (Chusov, 2019), (Golosovskaya, 2014), (Karlin, 2014), (Karlin, 2009), (Popov, 2016). Significant attention in the implementation of such business information projects should be paid to geo-information support of natural risk management (Fokicheva, 2018) in the context of climate change (Mikheev, 2019), (Bournashov, 2014), (Gogoberidze, 2014), including the issues of information collection and processing (Fokicheva, 2019), (Khaimina, 2014), (Popova, 2019).

Methods and data

While research, we used: methods of data bases (DB) constructing in case of distributed information platform (DIP), web-technologies (WT), big data technologies (Novikov, 2019), (Sokolov, 2019), geo-information technologies (Veretennikov, 2019), (Yaily, 2019) and virtual reality (VR) tools. Also, we used Foresight technologies, theory of decision making under uncertainties (Palkin, 2019), risk management approach. From the point of view of geo-information management, we structured geo-space to allocate the interconnected components of the solution space (Istomin, 2015).

Results

While study, we considered a structural model of a geo-information distributed platform (GIDP) containing heterogeneous databases in the format of a multi-level architecture. Proposing GIDP contains three levels of data representation: "data - processing - interface". The advantages of such representation are the independence of the system from the number of software components included in each level and its own set of protocols and application interfaces for each level, which defines its own architecture. Note that the client-server connection model, based on the principles of structural programming and separation of input-output and computational processing, has recently failed to cope with the growing needs of developers in the field of reliability and performance of systems. Then, we propose to form a flow model, based on the selected structural model, which represents the structure of information data flow in GIDP (figure 1).

To avoid the difficulties of multi-user access to data, we suggest to use a mechanism for preprocessing heterogeneous data, which includes a virtual data processor (VDP) and a data preparation unit (DPU). A VDP is a software module that allows uniform access to all system data via standard interfaces (protocols), while hiding the features of data placement, data structures and formats. A DPU aims at collecting and first processing the data requested by the user from the system. When using this mechanism, there is no need to convert data to the format used by the system, they remain in the original view and can be used locally by their applications.

The VDP in more detail, you can say that it is a virtual data bank (VDB), which consists of a set of non-specified virtual databases, a virtual data bank (figure 2). Information sources of actual state databases are the actual cycle of functioning of organizational subsystems of a complex management object, when considering the geo-information system as a system for making managerial decisions.

The information sources of the databases of planned States and regulatory States can be input documents, virtual results of management decision-making, as well as the results of solving regulated tasks.

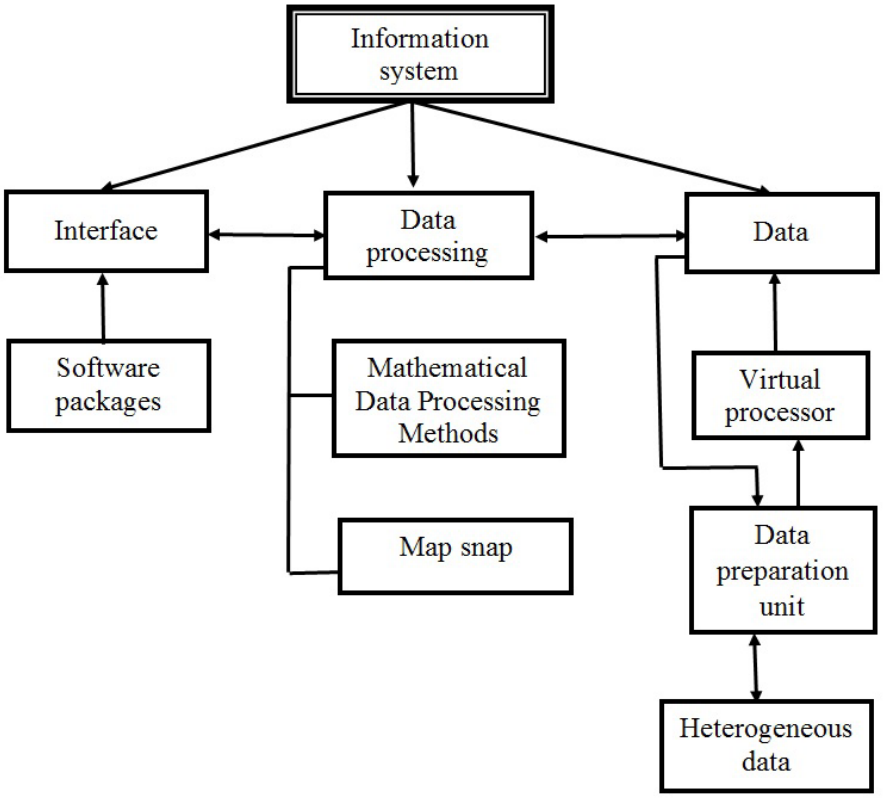

Figure 1 - Flow model of a GIDP based on heterogeneous databases

To solve the problems of decision support within geo-information management or in non-regulated management situations, it is necessary to create personal databases for an individual user of this system based on a VDB and results of processing situations. Accordingly, the location of the decision-maker (DM) will be the criterion for creating a personal database and accessing the nearest pre-processor data preparation mechanism.

After the user takes appropriate actions to solve the necessary tasks and generates requests for specific data, data from different local databases is determined for inconsistency. If there is one, databases of mismatched states are formed. They mostly contain data from heterogeneous local databases, after which they go through complex reconciliation procedures and end up in consistent states databases (CSDB), where data from identical, mostly relational databases can be found. From CSDB, data is written to the appropriate database of routine, normative or probabilistic States. It should be noted that the virtual personal databases form the basis of a geo-information management.

In addition to various state databases, it is necessary to introduce an integrated database into VDP mechanism, where data about the objects under study are merged and transformed. With this approach, it is still possible to use a single database management technology. From all the above types of databases, in accordance with the time parameters of the technology for creating a virtual

personal database, you can create a dependency diagram between the modules of subsystems represented in VDP.

It should be noted, all data control and transformation procedures in the data subsystem are performed by an intelligent system for analysis, control and transformation of information. This system can be considered as a superstructure to traditional data management systems.

All the above reasoning is especially important when there is a need to consider systems management as a set of interrelated subsystems in the network view, with fixed spheres of competence in the decision-making of the whole system. In these conditions, it becomes an urgent task to ensure coordination and interaction when solving individual subtasks that are solved in the network subsystems.

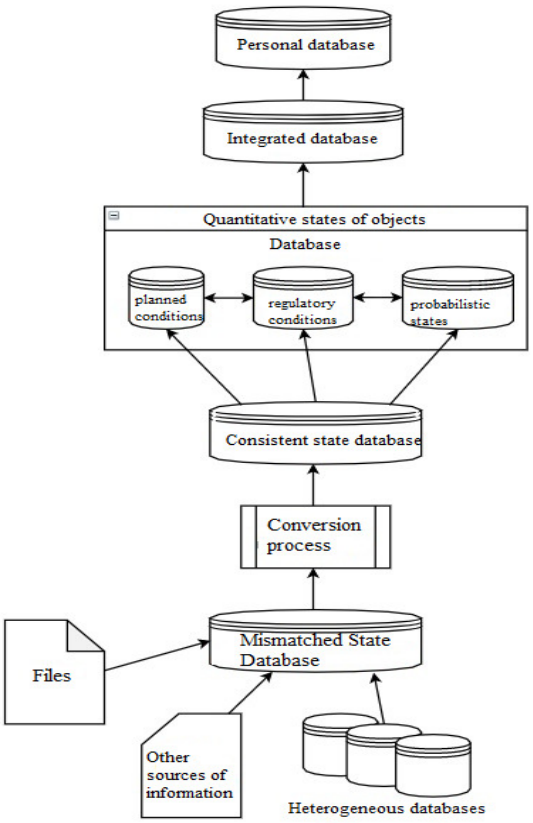

Figure 2: General diagram of dependencies between data subsystem modules in VDP

Note, the set of drivers in the data preparation block for the virtual data processor and its other components can be expanded if necessary without any significant restrictions and problems. The most important thing in extensions is to ensure continuity of software interfaces (protocols).

Discussion

In GIPD, there must be a condition for the autonomy of integrated databases. To maintain this condition, a Protocol for managing modifying global transactions is required. We propose to use global serializability, as the correctness criterion. Such Protocol should have the following characteristics:

- each local database management system (DBMS) must guarantee local serializability and non-cascading histories;
- local transaction execution histories should be without dead ends.

The use of this transaction management Protocol provides a specific model for managing GIPD, which ensures the integration of disparate databases into a single information space (figure 3).

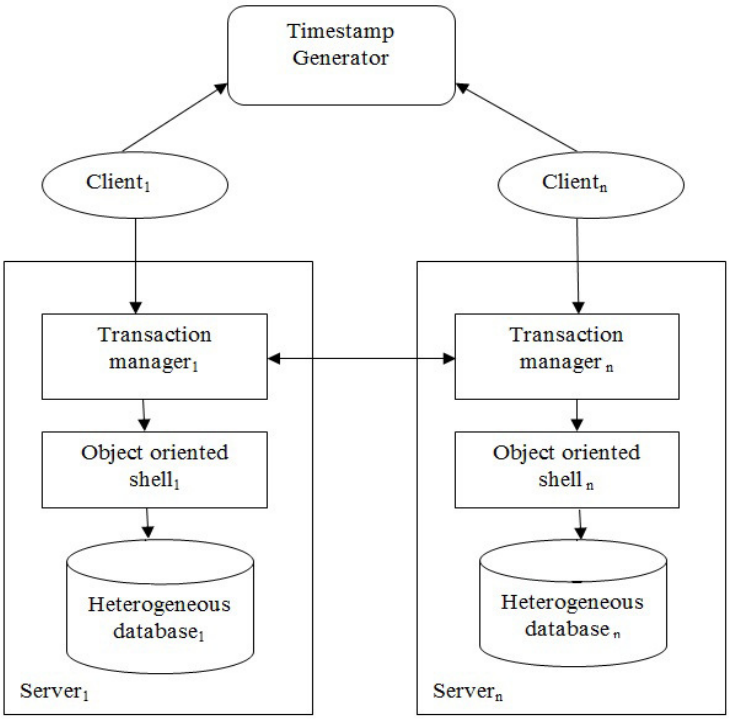

Figure 3: Model of GIDP based on heterogeneous databases

In figure 3, we actually show a model for the GRID architecture consisting of heterogeneous separate databases, each of which can be accessed using the same access methods in multi-user mode.

Conclusion

We present the results of business information technologies development for decision support within geo-information management. We used methods of data bases constructing in case of distributed information platform, web-technologies and virtual reality tools. Also, we used Foresight technologies, theory of decision making under uncertainties, risk management approach. While study, we used a structural model of a geo-information distributed platform (GIDP) containing heterogeneous databases in the format of a multi-level architecture "data - processing - interface". We try to avoid the difficulties of multi-user access to data and we suggest to use a mechanism for preprocessing heterogeneous data, which includes a virtual data processor (VDP) and a data preparation unit (DPU). A VDP is a software module that allows uniform access to all system data via standard interfaces (protocols), while hiding the features of data placement, data structures and formats. A DPU aims at collecting and first processing the data requested by the user from the system. When using this mechanism, there is no need to convert data to the format used by the system, they remain in the original view and can be used locally by their applications. In GIPD, there

must be a condition for the autonomy of integrated databases. To maintain this condition, a Protocol for managing modifying global transactions is required. We propose to use global serializability, as the correctness criterion. Transaction management Protocol provides a specific model for managing GIPD, which ensures the integration of disparate databases into a single information space.

Acknowledgment

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Place of Clusters and Cluster Policy in Economic Policy in Germany And Poland

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Abstract

In the global economy, more and more emphasis is placed on cooperation between various entities. Networking has become the basis for understanding the international business, in which enterprises achieve better results being a part of a more extensive network covering an increasing number of countries. One of the types of regional networks are clusters that bring many benefits to associated entities and regions in which they operate, and it is the basis for creating and conducting cluster policy in many countries, or for including clusters in broadly understood economic policy. The authorities saw the potential, especially in the field of creating innovation, raising the level of competitiveness and stimulating entrepreneurship. Therefore, clusters have become a pillar of economic development in many national economies. The article aims to present the place of clusters in the economic policy of two selected European countries - Germany and Poland. These countries are at different levels of economic development, and hence the development of cluster policy and clusters is varied. The methods used in the article are a critical analysis of the literature and a comparative method that allows examining the similarities and differences in the approach to clusters in the studied countries.

Keywords: Clusters, Cluster Policy, Economic Policy, Germany, Poland.

Introduction

Clusters are interconnected companies and local institutions (or national as well), aiming to increase competitiveness, increase innovation, and new working places. Clusters, by the specificity of their character, combine regular business operations, local government agencies and scientific entities, thus contributing to the rapid growth of local economies. They also allow many small and medium-sized companies operating locally to start international activities. Therefore they constitute the right business environment, which drives economic growth. The clusters are present in most national economies, but they reach various stages of development in different economic conditions.

The shape of the clusters is affected by several factors connected with the location and nature of associated companies. Therefore it is not possible to create two identical clusters. Even a group created by the same corporation in different markets will never be the same. Cooperation and competition at the same time give the possibility of shaping the company competitiveness, raising its level through the continued development and improvement of processes in the units. The cluster can increase the attractiveness of an investment location, which leads to a better competitive position among the regions. Cluster help to increase the innovation of the associated units, to create new products, new companies and new jobs. The clusters combining the activities of entrepreneurs, local government institutions and research units contribute to the dynamic growth of local economies.

One of the more common definitions of clusters is that formulated by Porter, according to which clusters are "geographic concentrations of interconnected companies and institutions in a particular field, linked by commonalities and complementarities". Clusters include linked industries and other entities (suppliers), distribution channels and customers (demand), related institutions (research organization, universities, training entities, etc.) (Porter, 2001). A cluster is a set of interdependent organizations that contribute to the realization of innovations in an economic sector or industry (Preissl 2003). In the UNIDO context, a cluster is understood to refer to a sectoral and geographical concentration of enterprises and/or individual producers that produce a similar range of goods or services and face similar threats and opportunities (What are clusters…).

By simplifying the definition of clusters it can be assumed that (1) a cluster is a group of affiliated companies operating in the same geographic region; (2) there are market and non-market relationships between companies, as well as formal and informal ones; (3) cluster development is closely related to the competitiveness of the enterprise and the region in which it operates.

Due to its dynamic nature, there are many types of clusters, divided according to different criteria. According to Enright (2000), there are five different types of clusters:

- working clusters – associated companies utilize a critical mass of expertise, local knowledge, human resources and resources arising from the location to compete with other firms outside the cluster. Between companies of the cluster comes to different interactions and quantitatively compared to firms outside the cluster. They attract investors, resources and skilled workers to the region;

- latent clusters – existing critical mass is sufficient to reap the partial benefit of belonging to a cluster. However, there is no developed interaction and flow of information among its participants, which are necessary for the extensive use of the location and operation of the group of companies. This situation is often caused by the lack of knowledge of other participants in the cluster, the lack of common purpose and vision, and the absence of mutual trust between entities. In this case, individuals do not think of themselves as participants in the cluster and consequently do not use the opportunities offered by cooperation;

- potential clusters – in this type of connection, it is reasonable and possible to develop the cluster, but it must be deepened and extended to the efficient use of the location. There are often gaps in the contacts and exchange of information, which is essential for the development of the cluster. There is no awareness of the hidden function of the cluster, but factors are demonstrating the presence of connections;

- policy-driven clusters –governments choose a cluster to support and develop, but there is no critical mass and conditions favourable to economic development. However, clusters are created by political decisions and are financed by the government. It is based on the assumption that the government can create a cluster on any terrain, regardless of the economic analysis;

- wishful thinking clusters – there is a lack of all the factors of cluster development; there is no critical mass and no benefits for economic development.

An interesting classification of clusters was made by Ketels, who divided the clusters into industry groups (e.g. pharmaceutical, automotive etc.) but also drew attention to the perceived location of the market and dependence on the model of business. Ketels distinguished:

- local industries - clusters associated with a local recipient, whose location is determined by geographical proximity to major customers of companies associated in clusters. This type of clustering caters only to the needs of local markets. Clusters of this type are created to improve the competitiveness of products, but have a little effect on the business localization patterns in the region;

- natural resource-dependent industries - clusters associated with the local resources, which attach the company to a specific location. It meets the needs of the global market, but due to the nature of the region, companies are forced to function in the cluster;

- traded industries - clusters focused on trade, in which the companies are free to form units that produce goods for the international market. In these clusters, the location does not matter, and the creation of them in a specific region is a decision of business community and cluster initiatives. High stability characterizes this type of cluster and their presence is a crucial aspect of the attractiveness of the location (Ketels, 2003).

Activities of clusters are visible in the region in which they are located. The following effects can be indicated: the creation of new jobs; attraction of foreign direct investment; structural changes in the region; economic development of the region; emergence and development of specific factors of production, both in the electronic and automotive industry; creation of innovation culture and development of entrepreneurship in the region; development of large-scale production network consisting of specialized suppliers and subcontractors; creation of an attractive labour market, attracting skilled workers, changes in the local labour market; increasing in the share of exports from the region..

Cluster Policy – Theoretical Approach

Cluster policy can be understood as a set of instruments supporting the creation of strong bonds between enterprises, science and local institutions occurring in a given territory. It is usually an element of innovation policy, but also of industrial policy and a broad development or economic policy. Foster linkages between cluster stakeholders can see the role of cluster policy; build relationships between companies and institutions; facilitate joint programs building; encourage trust-building and support the cluster's institutional network. Policies supporting clusters can be divided into three categories based on motivations and policy objectives. The first type is the most horizontal model concerns "facilitating policies". In this case, the local government is focused on creating favourable microeconomic business conditions for growth and innovation that indirectly, stimulate the cluster growth. A second type is connected more with "traditional framework policies" like industry policy, research and innovation policy and regional policy. The last category is "development policies" aiming at creating, mobilising or strengthening a particular cluster and sectoral cluster initiatives and this type of policy can be named as a pure cluster policy (The Concept of Clusters).

A cluster policy character can be described by:

- Cluster development policies directed at creating, mobilizing, or strengthening a particular cluster, e.g. a national funding competition for the best life science cluster strategies.

- Cluster leveraging policies that use a cluster lens to increase the efficiency of a specific instrument, e.g. an R&D subsidy provided only to companies in regional clusters where the subsidy is likely to incur spill-over effects beyond the recipient firm.

- Cluster facilitating policies directed the elements of the microeconomic business environment to increase the likelihood of clusters to emerge, e.g. regional or competition policies that remove barriers for competition between locations (Cluster policy in Europe).

The models of the cluster policy can be classified according to the different levels of economic development of the country in which the model exists. The type of the cluster support activities depends on the political structure, size and resources of a country (Boekholt P., Thuriaux B., 1999). The difference in models, depending on the level of development, may apply to various aspects of such a policy (Uyarra E., 2014): understanding the role of the clusters and the clusters themselves (cluster definition); the scope of the policy and level of policy formulation (national, regional or local policy); policy objectives (subjects) (industrial areas, industries, specific groups of companies); principles of identification and selection of clusters to be

supported; institutional forms of cluster operation; instruments used for support, and the moment or period of cluster support.

There is a different approach to cluster policy implemented in various countries (see figure 1). In some countries, it can be noticed that the government offers a dedicated support program for the cluster as a part of its policy to create stronger linkages between units. This situation can be seen in Korea, Catalonia, Mexico and Poland. On the other side, there are countries with strategic cluster-based policy, where they use clusters and networks as organizational infrastructure for policy action. In this group, Germany, France, Basque can be found.

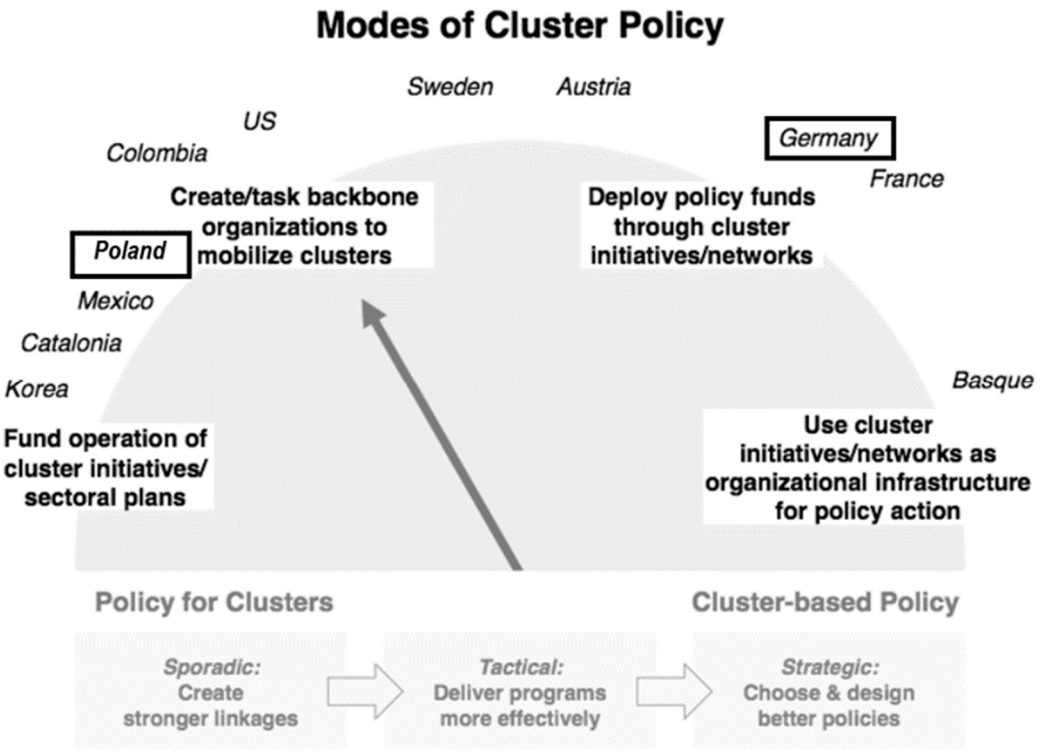

Figure 1: Various models of cluster policy

Source: Ketels Ch. (2016) in: M. D. Nielsen, Supporting Clusters Interregional Collaboration-Status And Moving Ahead, www.clusterexcellencedenmark.dk [access 15.12.2019]

Clusters and cluster policy in Germany

Relying on the German data from Federal Ministry for Economic Affairs and Energy in Germany there were 90 clusters (as of March 2020, see figure 2), which were characterized by a formal character and efficiently worked for their members and recipients.

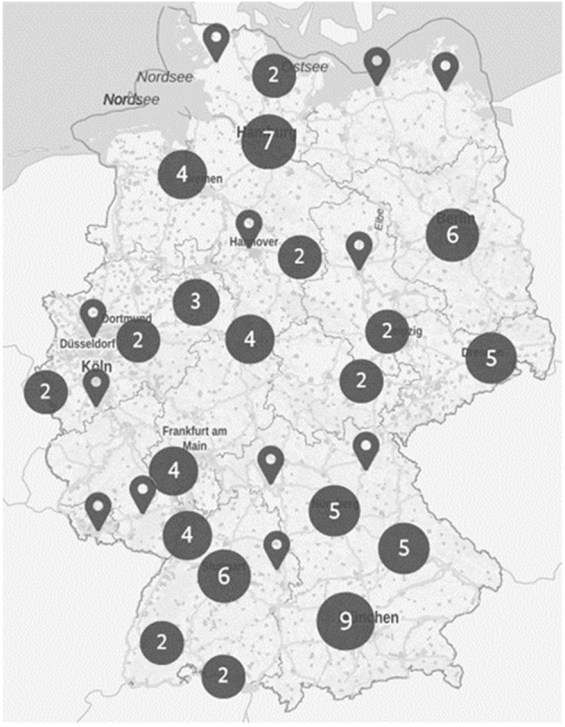

Figure 2: Clusters in Germany

Source: Clusterplattform Deutschland, Federal Ministry for Economic Affairs and Energy, https://www.clusterplattform.de/CLUSTER/Navigation/Karte/SiteGlobals/Forms/Formulare/EN/karte-formular.html [access 10.02.2020]

According to the European Cluster Excellence Initiative, there were 19 Bronze Label clusters in Germany, 46 Silver Label certified clusters and 11 Gold Label clusters. German clusters have been around for many years, and their average age is much longer than in other countries, especially Eastern European and Asian. It can also be noted that German clusters are less numerous than other such connections because the key is the degree of involvement of cluster entities. In essence, companies can be treated as cluster actors only when they commit to co-create the cluster (often such an obligation has a written form in which the company undertakes to pay membership fees, which allows the elimination of artificial clusters). A characteristic feature is also the broad geographical coverage of German clusters, which include entities located in various, often distant regions. In German clusters, more than half of the entities are companies from the SME sector, and the share of research and development units is about 15%. Clusters have a high degree of formalization of tasks divided between participants, and their operation is formalized and based on association agreements (Meier zu Köcker, Garnatz, 2012).

Clusters in Germany can be combined with development, innovation and technology policies. They are monitored because they are perceived as driving elements of the local economy.

In Germany, the first public grant program focuses on the clusters support, and to strengthening it, 25 regional developments were established in 1995 followed by general nationwide programs to support businesses. Cluster policy in Germany has a rather central character and aims to build a bridge between business and science to achieve economic growth and a higher level of innovativeness. The primary instrument is the financial support (e.g. 1.2 billion EUR worth support combined of public and private funding in the cluster program called Leading-Edge Cluster competition). However, the main idea, and at the same time quite innovatory, is to support the connection between not only different industries but

various companies if we look at the size of firms (connect huge, transnational corporations with freshly established starts-up).

Cluster support activities take place at two levels in Germany - at the national and federal level (federal states). A comprehensive strategy has been developed at the federal level to cover clusters under the "high-tech strategy". The assumptions included both activities targeted at SMEs and modular activities on a local scale, taking into account new technological solutions and promoting the most efficient clusters. The essential initiatives supporting clusters at the federal level in Germany:

- Cluster Competition- the Federal Ministry of Education and Research (BMBF),
- "Network management" module as part of the Central Innovation Program
- The „go-cluster" programme provides a stimulus to improve cluster management and help turn German clusters into highly effective international clusters. This program aims to support the transformation of the most efficient national innovation clusters into global clusters of excellence; promote new cluster services to stimulate cluster managers to offer new services; increase the international visibility of participating innovation clusters and analyse trends of international cluster policy to work out recommendations for the German perspective (The German programme).

The federal states, on the other hand, have various ways to support networks and clusters. They can direct their help to specific industries and fields of technology. The local authority can determine the relationship with the economic support provided by a given Land, as well as to engage in activities of entities from outside the given Land (Meier zu Köcker, Garnatz, 2012). All of 16 federal states have launched numerous measures to support the development of efficient clusters – across technology, business or innovation. The cluster support at the federal level provides financial help for cluster management, innovation projects, educational activities and joint public relations initiatives (Clusterplattform).

Clusters and cluster policy in Poland

It is challenging to provide the number of clusters in Poland because some of the registered clusters do not meet the definition conditions and do not function daily. It can be assumed that there are about 150 clusters and cluster initiatives, of which about 50 are operational. According to the European Cluster Excellence Initiative in Poland (as of 18.03.2020) there are 6 clusters labelled Bronze Label, only one was qualified to the Silver Label group. In contrast, no cluster received the Golden Label (one Polish Silesian Aviation Cluster cluster was in this group until February 15, 2020).

Clusters found themselves as one of the pillars of the Polish economic development plan, which was named Responsible Development Plan and was announced in 2016 (see figure 3). The objectives of the government for 2020 (extended till 2030) include an increase in investment to over 25% of the GDP; increase in the share of R&D expenditure to 2% of the GDP; increase in the number of medium-sized and large enterprises to over 22 000; more Polish foreign direct investment (increase by 70%); growth of industrial production exceeding the GDP growth; GDP per capita of Poland at the level of 79% of the EU average (Responsible Development Plan). Clusters, together with industrial valleys, are in the target audience called reindustrialization. According to the plan's assumptions industry is a natural environment for innovation and the core of expenditure for research and development. Innovative companies create necessary cooperation chains and high-quality jobs. The challenge for the next years is to support the existing and develop new competitive advantages and specialisations. Clusters are therefore in the centre of interest of national authorities because they combine both the process of creating innovation through close cooperation of companies and create jobs through an increased degree of industry concentration in a given region.

Figure 3: Five pillars of the economic development of Poland

Source: Responsible Development Plan, https://www.gov.pl/web/fundusze-regiony/plan-na-rzecz-odpowiedzialnego-rozwoju [access 7.03.2020]

Cluster policy in Poland results in away from European policy and is carried out in similar time horizons, which is most often the result of the functioning of EU budgets. Assumptions for current activities have been included in such documents as National Development Strategy until 2020, Enterprise Development Program for 2020 and Directions and assumptions of cluster policy in Poland by 2020. In the National Development Strategy until 2020, clusters are perceived as a factor improving the country's competitiveness and deepening regional specialization. In this document and many others, clusters are to constitute an essential lever for the development of Polish exports, both in traditional and modern industries, such as ICT or automotive. The task of active cluster policy will be, inter alia, to support the most innovative and showing the highest potential for the development of Polish clusters that are able to create highly-competitive products and services constituting Polish and European export specialities (Jankowiak, 2019).

The principal aim of the Polish cluster policy is to strengthen the innovativeness and competitiveness of Polish economy through intensified cooperation, interactions and knowledge transfer (that is through providing support for existing and newly created clusters) as well as through supporting the development of vital economic specializations (that means selecting critical national and regional clusters and focusing part of public support on them).

The achievement of the principal aim involves the fulfilment of the following specific goals (Lindqvist, Ketels, Sölvell, 2013):

- stimulation of internal interactions, knowledge transfer and cooperation as well as the creation of necessary social capital;
- expansion of the external networking of clusters and entities operating within them, especially in a cross-sector and international dimension,
- strengthening of joint and integrated strategic planning processes within clusters,

- increase of the number of innovative goods and services offered on domestic and international markets by companies and entities operating within clusters, which should lead, among other things, to the growth of export,
- mobilization of private investment in clusters, including the creation of new companies and inflow of foreign investment as well as increasing private spending on R&D and innovation-oriented activities,
- the development of the ecosystem of supporting institutions (e.g. education and research institutes, technological parks and technology transfer centres, etc.) and better customization of their offer and activities to the needs of companies operating within the clusters,
- boosted the effectiveness of using public funds by their concentration and obtaining synergy between different policies and support instruments (e.g. concerning infrastructure development, human capital, R&D, promotion, internationalization, etc.).

According to the assumptions adopted by the Working Group on Cluster Policy, the main goal of cluster policy should be to strengthen the innovation and competitiveness of the Polish economy. It should be done based on the intensification of cooperation, interaction and knowledge flows within clusters and supporting the development of strategic economic specializations (Key National Cluster). Key National Cluster in Poland is a cluster of significant importance for the national economy and high international competitiveness. Key National Cluster is identified at the federal level, including based on criteria regarding critical mass, development and innovation potential, past and planned cooperation as well as statement and potential of the coordinator. In Poland, there are currently 16 vital national clusters that have been selected in the national competition. The Organizer of the Competition for the status of the Key National Cluster (KNC) is the Ministry of Development, which runs the Competition in cooperation with the Polish Agency for Enterprise Development (Jankowiak, 2019).

Comparison and Conclusions

Comparing both clusters and cluster policies in Germany and Poland, many differences can be pointed out. It can be assumed that the development of clusters in Germany and, consequently, the implementation of cluster policy is a process started much earlier than in Poland. Hence the experience and achievements of both countries are varied. Although the number of clusters in Germany is smaller than in Poland, they are characterized by a higher degree of formalization, which can be assumed that the number of actually operating clusters in Germany is higher than in Poland. It is also shown by the European Cluster Excellence Initiative (table 1), which awarded more distinctions to German clusters than Polish ones. This may mean that German clusters are at a more mature stage of their development.

Table 1: European Cluster Excellence Initiative in Germany and Poland

	Germany	Poland
Bronze Label	19	6
Silver Label	46	1
Gold Label	11	0

Source: Author's work based on The European Secretariat for Cluster Analysis (ESCA), available at https://www.cluster-analysis.org/ [date of entry 20.03.2020]

Cluster policy in Germany was created in the 1990s, i.e. a decade earlier than cluster policy in Poland, hence it is at a different level of development (Table 2). In both countries, there are units dedicated to cluster policy, but this is not their only task - only one of the areas of activity. On the one hand, this is the right thing to do, as in both cases cluster policy is part of broad innovation policy, but the lack of specialized cluster units can lead to a reduction in the scale of cluster policy. In Germany, most cluster support programs operate at the national level, and only two are regional programs. The opposite situation occurs in Poland,

where local programs dominate (22 programs). It can be interpreted that in Poland clusters are more local initiatives while in Germany are seen as a national instrument. However, regional cluster support programs in Poland are not financed from regional sources, but national and European sources. In Germany, on the other hand, funding for regional programs is funded through regional sources.

The cases of cluster policy in Germany and Poland examined in the article show that there are no significant differences in the assumptions and implementation of these policies in both countries. It can be assumed that due to the long-term nature of the clustering process in Germany, German cluster policy can serve as a model and starting point for cluster policy in Poland.

Table 2: Cluster policy in Germany and Poland

	Germany	**Poland**
Since when has cluster policy been used?	1990-95	2000-05
Main ministries responsible for implementing cluster policy	• Finance/ Economy • Science/ Research • Other	• Finance/ Economy • Science/ Research • Other
Key agencies responsible for implementing cluster policy	The initiative Kompetenznetze Deutschland, Project Management Agency Jülich (PTJ), German Research Society (DFG), German Aerospace Centre (DLR), Wissenschaftsrat	Polish Agency for Enterprise Development (PARP), Industry Development Agency
Is cluster policy their only task?	Yes/No	No
Are there any national cluster programmes?	YES	YES
Number of programmes	6	4
Are there any regional cluster programmes?	YES	YES
Number of programmes	2	22
Source of financing		
National programmes	National ministries EU structural fund Regional budget	National ministries EU structural fund
Regional programmes	EU structural fund Regional budget	National ministries EU structural fund Regional budget Business
Importance of cluster policy		
National level	High	High
Regional level	High	High
Policy papers on a national level	Yes	Yes

Cluster development related to a particular person/organization?	No	No
Is there a cluster or competitive council?	A general council exists	No
Degree of obstacles when building cluster policy	Important	Important
General assessments of competitiveness?	Yes	Yes
Role of clusters as a framework in policy areas		
Business network policy	Low	Low
FDI attraction policy	Medium	
Export promotion policy	Low	
Sectoral industry policy	Low	Low
Science and education policy	Low	Low
Competition and market integration	Low	
Successful cluster programmes	BioRegio, InnoRegio	Training Program on Clustering, Support for Cluster

Source: based on Europe INNOVA Cluster Mapping Project, Germany, Poland, http://www.clusterobservatory.eu/ [access 10.03.2020]

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"Mindtoyness: Elements for Sense Development and For Experiences" As an Innovative Method of Fostering Cognitive Mindfulness in Children and Adults with Disabilities

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Abstract

In recent years, considerable attention has been devoted to the exigency of sustaining the attentiveness of children and adult learners in formal school settings and in informal educational environments. The research project described in this paper aims to present the pedagogical opportunities offered by including *Mindtoyness* teaching sets in the educational work with children and adults. The *Mindtoyness* collection is informed by the idea that, for such work with children and adults to be effective, learning environments should combine elements of play, collaboration, and the development of mindfulness, resourcefulness, and sensitivity. The inclusion of play and free exploration in didactic interventions for children and adults with disabilities is expected to support and naturally sustain their involvement and cognitive activity.

Keywords: Interactive Didactics, The Polarization of Attention, Didactic Methods, Didactic Toys

Introduction

The idea of the *Mindtoyness* collection grew out of our fascination with laboratory work with children in the field of early education. The project was also inspired by the thought of Maria Montessori (1913, p. 40) and her dedication to arranging settings furnished with developmental aids. The central role in such settings was ascribed to the developmental aids which promoted play and helped alternate activity and contemplation. This unique concept of in-depth learning was grounded on Montessori's discovery of what she called the polarization of attention. Modern research on the learner's mind has shown that the Italian physician's insights were correct. The key component of the theoretical underpinnings behind the idea of *Mindtoyness* lies in creating conditions conducive to concentration (the polarization of attention), which catalyzes the process of normalization as a factor in the individual's developmental growth. Today, educators underscore the importance of a similar phenomenon which has come to be known as mindfulness, i.e., heightened attentiveness and, more profoundly, a type of secular meditation. As defined by Jon Kabat Zinn (2016, p. 9), mindfulness is awareness which involves paying close attention to every experience through which we go, which helps us arrive at an improved self-knowledge and make changes in our lives. Mindfulness can be cultivated through a range of practices at various levels: as a strategy for coping with everyday difficulties, by somatic and breathing exercises, and, ultimately, in the form of deeper spiritual practices leading to what Montessori viewed as normalization. Modern educational studies offer information on the methods of fostering mindfulness in the cognitive sphere. Our aim is to transplant the issues of mindfulness and concentration training on to education and identify the didactic and developmental benefits occasioned by the cultivation of this practice. Etymologically evoking

mindfulness, the *Mindtoyness* collection as framed in our research project may provide teachers with tools for working both with children and with adults with disabilities.

The Theoretical Justification of The Project

Given the contemporary the polarization of attention by Maria Montessori (1913), cultural context and the changes in theoretical perspective which it triggers, our framework seeks to integrate the principles of *interactive didactics* (Author, 2012) into the interventions using the *Mindtoyness* collection. We understand interactive didactics as an approach to cognitive processes which combines interactions in environments organized so as to stimulate extensive information sharing among the participants with exercises for heightened concentration.

Equally importantly, the premises of our project also come from observations of experimental practices in laboratories which have revealed that insight and intervention in the studied phenomenon are the prevalent characteristics of such experimentation. Following Ian Hacking's (1985, p. 135) imperative finding "Don't just peer: Interfere", if this idea is applied to educational realities, we can construe it as encouraging a learner's inner activity, which involves exploring, constructing, producing representations of knowledge, collecting perceptual data, and transforming them into procedural knowledge. Self-reliance and team collaboration which are triggered in laboratory conditions are equally valuable.

It is our intent that didactic methods involving *Mindtoyness* should bring together play, manual manipulation skills, and readiness for sensory integration, while implementing varied methodological ideas which use the collection. For this purpose, it is necessary to create conditions for concentration, which is prerequisite for heightened cognitive activity when studying and manipulating the components of *Mindtoyness*. This assumption is aligned with modern psychological justifications of the pedagogical practices in which the learner's concentration level and duration determine the phases of his/her cognitive activity from exploration to understanding. It is of particular relevance in the case of children and adults with disabilities, especially for improving their outcomes in the capability to sustain attention when involved in a longer cognitive activity. Our assumption is that, by performing manipulations when using the *Mindtoyness* kits, learners naturally maintain their activity (waiting for the final effect of the game or play), while cognitive processes – of analysis and synthesis, categorization, and other formal operations – are constantly unfolding in the background and communicative competences are also being developed (Bruner, 1978; Wygotski, 1989; Tomasello, 1999). These outcomes can be achieved as, so to speak, "by-products" of play, an activity which is all too rarely appreciated enough in relation to adults (Tartakovsky, 2012).

The Object and Strategy of Research

As our research project aims to establish **what are the developmental, cognitive and social effects of working with the *Mindotyness* collection**, and **what is the specificity of cognitive mindfulness manifesting in** we chose to rely on the research strategy founded on good communication and inclusion of all participants. The collection is supposed to support the competences defined in the instructions, but their list continues to be extended and corrected by the members of this community. Adopted by us in the project, the **action research** strategy made it possible to negotiate the direction of actions launched at the educational facility and to modify particular stages and the activities of the participants, if suggested by their interpretation of their insights and perceptions (Elliot, 2010).To this purpose, at the first stage of the project, we launched collaborations with educational facilities, and teaching professionals began to use *Mindtoyness* sets in their work. The practitioners had earlier had the *Mindtoyness* work protocols explained to them and received manuals for all the kits, complete with their descriptions. The significance of **independent initiative-taking** both by the professionals and by the learning and playing children and adults was emphatically highlighted. All the participants in the project were asked for feedback both as verbal opinions articulated in group discussions and as written assessments of the sets in evaluation forms. When collecting data now, we primarily concentrate on the most important aspects related to cognitive mindfulness: (the level and span of) focused attention, analysis, synthesis, comparison, generalization, abstraction, categorization and the construction of cognitive representations, as complex processes involved in passing from concrete

operations to formal ones. The techniques applied in the collection of data include observation supported by visual recording and focus group interviews with the participants (with additional questionnaires to be filled in by the staff).

Mindtoyness Sets: A Description

In the first phase of the project, three sets were developed in two Montessori preschool facilities and in two institutions dedicated to adults with disabilities as the initial kit of *Mindtoyness.* All are suitable for playing in pairs and for individual work:

A. *Dominoes*–a set of elements arranged in sequences, as is the case in the regular dominoes, but according to the features determined by the participants. Any set of ***Dominoes*** consists of colored blocks of different shapes, colors, and markings (a dot or no dot). The basic aim of using ***Dominoes*** is to develop proficiency in composing sequences of pieces based on the previously defined characteristics. The domino sequences are usually arranged in pairs, but individual or group work is also possible. By playing dominoes, the participants can develop the following dispositions:

- cognitive mindfulness;
- skills of analysis, synthesis, comparison, abstraction, and categorization.

B. 3D *Tic-tac-toe* is a set of blocks of various colors which are planted on rods and can be spatially arranged in the semblance of the tic-tac-toe game. ***Tic-tac-toe*** is suitable both for children and for adults, and can be employed by educators in an array of exercises or be individually used by the participants when playing in pairs. While the rules generally resemble those of the traditional tic-tac-toe game, the three elements can be spatially arranged in thee dimension – horizontally, vertically and diagonally. Besides, the players have pieces of various shapes and colors at their disposal. This is helpful in fostering the development of the following dispositions:

- cognitive mindfulness and anticipation capacity;

- composing and re-modeling of spatial arrangements when needed;

- skills of analysis, synthesis, comparison, generalization, and abstraction.

C. *Black-and-white* ***Balltoyness***– is a set of black and white balls held within a frame which can be arranged in various patterns and used to play a game similar to the Chinese game of Go. By means of the toy, we can compose black images against the white background and the other way round. The form of *Balltoyness* is adjusted to both children's and adults' capabilities of manual manipulation. *Balltoyness* facilitates grasping, developing, and/or understanding:

- cognitive mindfulness;

- theory of the mind through playing in pairs;

- skills of analysis and synthesis;

- shapes of letters, numbers, figures;

- reproduction of shapes;

- numbers and simple arithmetical operations;

- notions of mirror reflection and raster, together with their application.

Expected outcomes

We realize that the introduction of *Mindtoyness* into didactic practice is merely an initial step in the assessment of the utility of the kits. At this moment, the observational material we have compiled is not extensive enough to corroborate any comprehensive reflection on the collection. Nonetheless, at the currents stage, the insights we have already obtained from the first facility for adults with disabilities have proved surprising, as they suggest an image which we did not take into account when formulating our research questions. Specifically, the clients take over the initiative far more often than we expected them to, and they search for and come up with their own, inventive applications and solutions using the *Mindtoyness* kits. Whether similar developments will take place in preschools with which we collaborate remains yet to be seen.

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Comparison of Forecasting Models for Dwellings Granted Building Permissions in Poland

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Abstract

The present paper presents a possibility to apply forecasting methods based on autoregressive modeling and annual periodicity profile do determine an anticipated future number of granted building permissions for new dwellings in Poland. Additional value of this research lies in the possibility for utilitarian comparison of applied models that base their autoregressive side on the following structures: AR, ARX, ARMAX, ARI, ARIX, as well as ARIMAX. The research confirmed the possibility to elaborate a predictive model characterized by good qualitative parameters. Modeling quality was verified, inter alia, by determination coefficient and residue distribution characteristics. Forecasts elaborated by means of predictive models showed how the forecasted phenomenon takes shape in the future.

Keywords: Forecasting, Building Permissions, Autoregressive Models, Annual Profile Identification.

The paper presents the personal opinions of the authors and does not necessarily reflect the official position of the Narodowy Bank Polski or the Warsaw School of Economics or the Opole University of Technology or the Angelus Silesius University of Applied Sciences in Wałbrzych

Introduction

In market economy, real estate is one of the fundamental resources that influence financial and macroeconomic stability of any country (Liu & Molise, 2019)(Bisht & Kumar, 2016)(Cesa-Bianchi & Rebucci, 2017)(Crowe et al., 2013). Parameters of the real estate market, especially in the domain of market analyses, directly reflect the state of the economy and allow it to be placed in the business cycle. Mapping of the state of the economy and identification of the business cycle phases make it possible to decrease the decision-making risk with regards to allocating investment resources both on the supply and demand side of this market (Shahzad et al., 2019)(Lee et al., 2019). After conducting analyses of the real estate market, should it be possible to conclude that the state of the economy as a whole is good, it is

likely that it will cause increase in investment activity on this market. If, however, the economy is in recession, it will also reflect in inhibiting investment in the dwellings market. Further, since the real estate market condition influences the condition of the entire economy, and such condition implicates decisions on many dimensions of real sector management, the question of which determinants of the construction process directly translate onto the situation of the market of dwellings seems key. Considering stages of the dwellings construction process, its first component is the number of building permissions granted for the construction of new dwellings. The number of granted building permissions may form a significant barometer that reveals the condition of the market of dwellings and the economy as a whole. We assume that when the number of granted building permissions increases, investors who operate on the market of dwellings expect that the macroeconomic and financial situation is stable and will continue developing for a minimum of the upcoming 2-3 years. Assumption that the economic situation will not change or will develop further for the next 2-3 years results from the length of time required from the moment of obtaining the dwellings construction permission to their completion and introduction to the market. The same is true in the opposite situation, namely when the number of granted building permissions decreases. The decrease reflects the situation when investors identify unacceptable investment risk and introduce prudent behaviors. One of the explanations for real estate investors' protective behaviors lies in a possibility that some factors of market downturn or even recession appear in near future. In summary of the above, it becomes crucial to examine implementation of a number granted building permissions over time and to identify the time-frequency components of this number. This will make it possible to perform an analysis of the course over time of the number of granted building permissions and to construct predictive models. Assuming that obtained predictive models will be characterized by satisfactory quality, it will become possible to use them to forecast the way the examined phenomenon shapes in the future. Information obtained on the basis of predictive models as well as forecasts determined with their use will be useful in decision-making processes both on the supply and demand sides of the real estate market. It will be useful, because it will make it possible to predict, with acceptable precision, the crisis phenomena that might possibly take place. All analyses of the number of granted building permissions refer to Poland.

Validity of Forecasting Market Phenomena - Literature Review

This literature review presents the latest examples of applying various forecasting methods in corporate activities. These investigations will show practicality of various forecasting methods on the one hand and the possibility of constructing combinational models in the process of constructing a forecasting model. The purpose of the presented review of the latest forecasting literature is to reveal its applicability in daily business activity. The fact of the existence of annual forecasting M-Competitions proves how important theoretical and practical forecasting is. The purpose of these competitions is to constantly perfect forecasting methods; they form an opportunity for experts who use forecasting methods in theory and practice to meet annually. The various challenges faced by participants in the fourth edition of the competition can be found in the following works (Agathangelou et al., 2019; Ferbar Tratar, 2015; Ha et al., 2018; Hasni et al., 2019; Hyndman, 2019; Jaganathan & Prakash, 2019; Januschowski et al., 2019; Makridakis et al., 2019; Moon et al., 2013; Petropoulos & Svetunkov, 2019; Spiliotis et al., 2019). It is also important to mention the importance of using and perfecting forecasting methods in the domain of supply chain. Much research in this domain examines the issue of electing an appropriate forecasting method in global supply chain, where forecasting is indeed an important indicator of operational efficiency. The paper by (Acar & Gardner, 2012) examines a case study that selected a forecasting method for a global manufacture of lubricants and fuel additives. Another paper describes demand forecasting methods in a supply chain that applied smoothing and denoising. Exponential smoothing is a widely used method in supply chain models. In order to improve cost effectiveness of supply chains, the studies introduce signal theory analysis. Wavelet denoising is a way to apply this method in forecasting. Results obtained with the use of exponential smoothing are then compared against results obtained by means of wavelet denoising. Two different methods were tested and the results show that wavelet denoising is superior to exponential smoothing in terms of costs (Ferbar et al., 2009). The work by

(Tascikaraoglu, 2018) is an interesting example of time-space application of forecasting methods. The author assessed time-space forecasting methods in managing an intelligent city. The topic is very current and important, because the issue of growing urban populations brings about difficulties in managing information necessary for managing urban processes. Advanced measurement and telecom technologies require applying more and more complex predictive methods in order to render it possible to determine event forecasting and social activities in large cities. Another paper describes application of tide forecasting method based on dynamic weight distribution for operational evaluation. Using this approach, forecasting prediction and stability were proven (Qiu et al., 2009). Two other forecasting methods that proved effective are short-term load forecasting method based on fuzzy time series, seasonality and long memory process (Sadaei et al., 2017) as well as fuzzy time series forecasting method based on hesitant fuzzy sets (Bisht & Kumar, 2016). Other interesting studies presented complex assessment of macroeconomic forecasting methods. Using a dataset of seven developed economies, the authors examined forecasting usefulness of the following four classes of multidimensional models: Factor models, BVAR models, MIDAS models and DSGE models (Carriero et al., 2019).

Another set of studies concerns forecasting in the domain of demand. One of the papers presented the Bayesian forecasting approach (Bergman et al., 2017). Forecasting demand is a fundamental component of a series of industrial issues (e.g. managing stock or equipment conservation). Forecasts are of crucial significance for precise assessment of demand for spare parts in order to determine stock. The studies presented an interesting approach to forecasting demand that uses the Bayesian method to improve precision. When validating, effectiveness of the proposed Bayesian method was compared against traditional forecasting methods in terms of forecasting precision and overall efficiency of stock fill indicator. Analyses showed that in particular situations the Bayesian forecasting approach more precisely forecasts the demand for parts, hence influencing their availability (fill indicator) and stock costs. Other studies into demand management are about forecasting demand for spare parts for consumption goods in the context of post-production; ways to predict a required number o spare parts that will be necessary in future (Kim et al., 2017). Other studies showed usefulness of forecasting in tourism; the authors reviewed key papers published between 1968 and 2018 in order to better understand how methods of forecasting demand for tourism evolved over time. Key conclusions drawn from comparisons of efficiency profile methods over time show that forecasting models became more diverse, more combined, and more precise. Considering the complexity of determining demand for tourism, no single method is verifiable in all situations and forecasting methods continue to evolve (Song et al., 2019). Other analyses present modified Grey Model (GM) in order to forecast increase in the number of air transport passengers. Such forecasting methods as Holt-Winters, autoregressive models, exponential smoothing, neural network, fuzzy logic, GM model calculated very high increase in this domain. The GM model was modified to suppress calculation of trends over time. Results of this simulation show that the modified GM model decreases the increase in exponential estimations of the model; it makes it possible for the GM model to forecast reasonable passenger demand values in long-term forecasts (Carmona Benítez et al., 2013).

The domain of energy widely uses forecasting method results in analyses. An interesting study forecasts electricity prices on day-ahead energy markets with the use of a mixed data model and a hybrid forecasting method. The hybrid method is composed of cascading forecasts made up of a neuron network (NN) and evolutionary algorithms (EA) (Amjady & Keynia, 2008). In the domain of energy, the studies also examined forecasting methods of wind speeds with the use of nonlinear set of time series and extreme optimization. In this paper, a novel method called EnsemLSTM is proposed by using nonlinear-learning ensemble of deep learning time series prediction based on LSTMs (Long Short Term Memory neural networks), SVRM (support vector regression machine) and EO (extremal optimization algorithm). The proposed EnsemLSTM is applied on two case studies data collected from a wind farm in Inner Mongolia, China, to perform ten-minute ahead utmost short term wind speed forecasting and one-hour ahead short term wind speed forecasting. Statistical tests of experimental results compared with other popular prediction models demonstrated the proposed EnsemLSTM can achieve better forecasting performance (J. Chen et al., 2018). Another application of forecasting methods is described in a paper

that presents short-term power load probability density forecasting method using kernel-based support vector quantile regression and Copula theory (He et al., 2017). Methods of forecasting probability density may effectively quantify forecasting uncertainty of power loads. The paper proposes using the probability density forecasting method for short-term loads using kernel-based support vector quantile regression (KSVQR) and Copula theory. Because the kernel function may influence forecasting efficiency, the paper also compares three kernel functions in order to select the best one for learning. The authors assessed precision of predictive intervals considering two criteria: prediction interval coverage probability (PICP) and prediction interval normalized average width (PINAW). The factors of uncertainty and explanatory variable correlation are of great significance for load forecasting precision. Another paper presents forecasting methods in energy planning models that analyzes forecasting methods in terms of precision. Fifty different forecasting methods were identified. The most frequently used artificial neuron network (ANN) is applied in 40% of all studies. Other popular methods, in descending order, are as follows: support vector machine (SVM), autoregressive integrated moving average (ARIMA), fuzzy logic (FL), linear regression (LR), genetic algorithm (GA), particle swarm optimization (PSO), grey forecast method (GM), as well as autoregressive moving average (ARMA). In order to fully integrate benefits of a number of forecasting models and improve precision of load forecasting results, the studies presented application of integrated forecasting method to forecast loads on the electricity grid. Evolutionary programming and fuzzy methods of complex assessment were used. Utilitarian benefits were examined with the use of two methods and tested in terms of feasibility and effectiveness (G. J. Chen et al., 2001). In this vast research area of energy, it is also important to pay attention to studies that assess forecasting of the efficiency of photovoltaic systems (Litjens et al., 2018) as well as studies that present the widely used adaptive method of short-term forecasting of customer thermal load. This method used a linear regression method (Nigitz & Gölles, 2019). A paper by (Wang et al., 2018) presents an interesting approach to forecasting. It showed an improved grey model optimized by multi-objective ant lion optimization algorithm for annual electricity consumption forecasting. Another forecasting method is described as a monthly electricity consumption forecasting method based on vector error correction model and self-adaptive screening method (Guo et al., 2018). At the end of this literature review, it is important to cite studies into the use of an integrated forecasting method that includes ARIMA, GARCH, as well as Bootstrap (Nieto & Carmona-Benítez, 2018), as well as studies into the improvement of concrete creep prediction with probabilistic forecasting method under model uncertainty (Jin et al., 2018) and studies into probabilistic forecasting of wave heights for the maintenance of offshore wind turbines (Taylor & Jeon, 2018).

The presented examples of theoretical and practical applications of select forecasting methods, identified in most recent scholarly studies show how diverse forecasting modeling is. Presentation of forecasting literature confirms the importance of this topic in supporting corporate activity.

Identification and Validation Data

The goals of the present studies is to perform comparative analysis of select forecasting methods. We verified usefulness of described methods basing on data that represented one of the stages of a building process. In order to conduct the comparison procedure of those select forecasting methods, we collected data about permissions granted for building new dwellings. The data used to construct predictive models and forecasts are characterized by a monthly measurement interval for the years of 2005-2018. Overall dataset was divided into two clusters: data for 2005-2017 are clustered into the learning dataset and data for 2017-2018 are clustered into a validation dataset.

In the first step of the analysis, we created graphic visualization of the run of the phenomenon under study. Additionally, for analytical needs, we separated development tendency and periodical components from the non-transformed entry data (see Figure 1). It is important to note that we subtracted a trend from non-transformed time series and as a result we obtained the run of the G_{pv} variable component ($G_{pv}=G_p-G_{pt}$). The upper graph (see Figure 1) presents the original run of the measurement for the years of 2005-2017. The middle graph presented in Figure 1 is a run of the separated G_{pt} trend, mapped out with the use

of Savitzky-Golay filter with averaging time of 37 months; the filter used first-degree polynomial. Then, we subtracted the trend from the original run and as a result we obtained the run of the G_{pv} variable component. In the end, the analyses adopted the following designations: G_p - Granted permissions, G_{pv} – Granted permissions variable component (detrended value), G_{pt} – Granted permissions trend (low frequenecy component). As stated above, the trend was calculated using the Savitzky-Golay filter with a 37-month range. Basing on the characteristics of the run of the time and decomposed series, we noted that this run is characterized by clear annual periodicity and that the run of the variable component does not have a trend and is located around the zero mean.

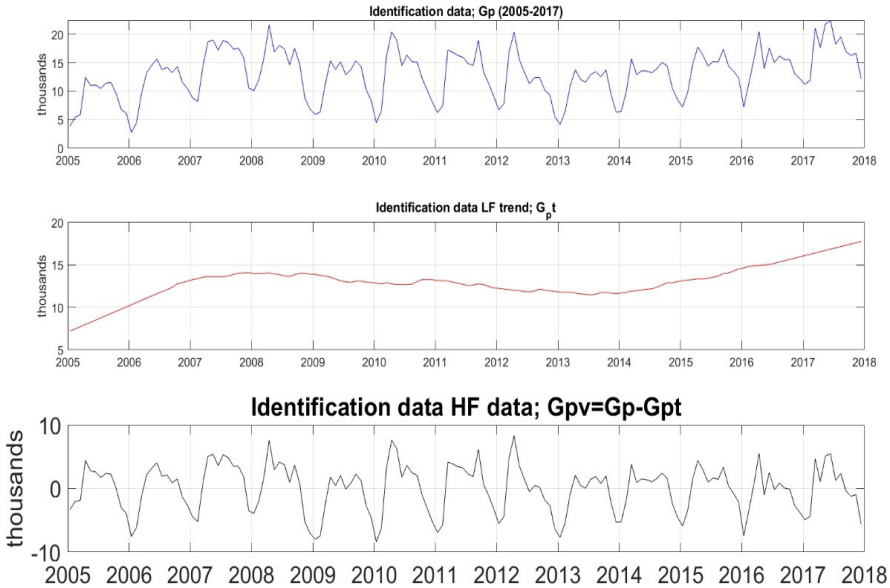

Fig. 1: Structure of types of rented premises (entire house vs. private room). Source: own study

Figure 2 illustrates the run of the validation sequence that includes the period starting from the beginning of 2018 and ending at the fourth quarter (Q4) of 2019. These data will be used to verify quality of constructed predictive models. The data were divided into learning and testing sequences because the assumption is that the learning sequence is used to identify models and the test sequence is used to validate these models. Validation data are not used to learn, and the learning data are not used to verify the model's quality.

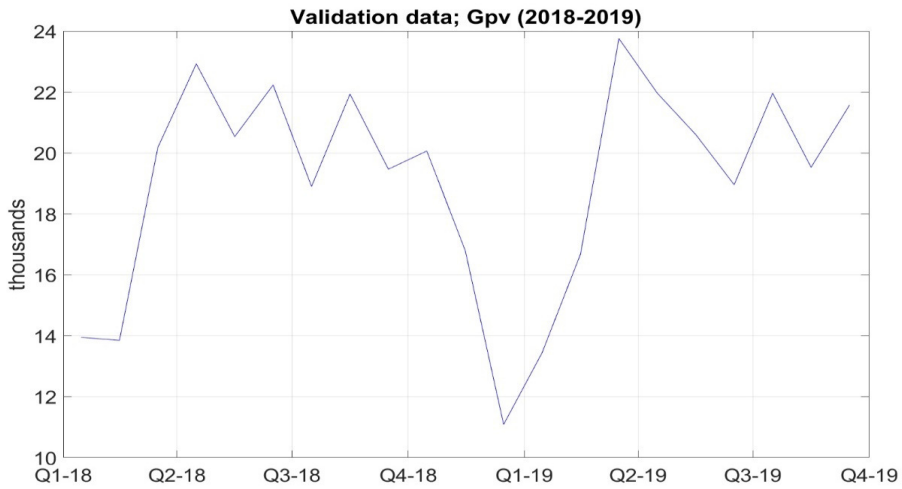

Fig. 2: Validation data (2018-2019)

Figure 3 illustrates the way the original G_p run was decomposed into the G_{pt} trend signal and the G_{pv} variable component.

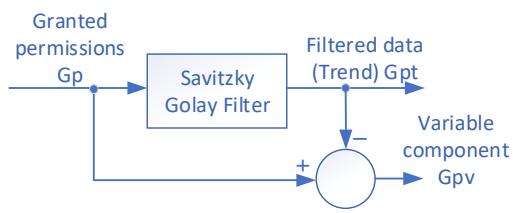

Fig. 3: Estimation of variable component of Granted permissions

With an identified trend signal and variable component (constant level of the forecast variable), we ran a procedures of identifying an annual profile of the variable under study. The profile will be useful, because identification of a predictive model is conducted by means od separating and then adding the following components:

- trend signal modeled with the use of a linear autoregressive model and
- signal of the variable component modeled with the use of the identified annual profile.

Figure 4 shows the process of estimating the annual profile of the variable component of granted permissions.

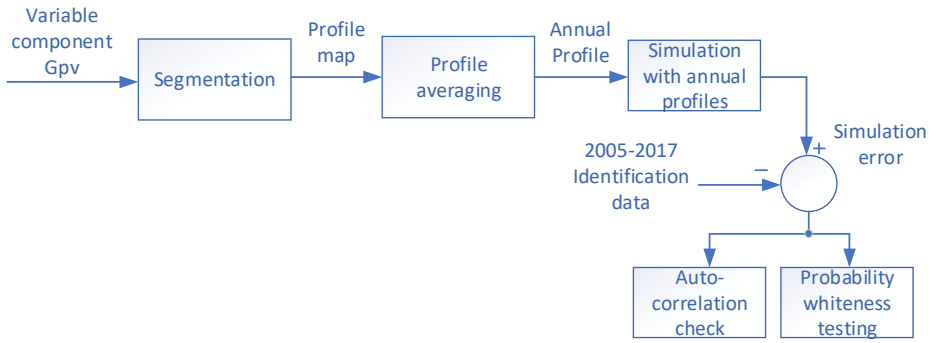

Fig. 4: Estimation of annual profile of variable component of granted permissions

The G_{pv} variable was decomposed into a set of 18 segments for the years ranging from 2005 to 2017. The decomposition was performed for individual 12-month periods. As a result of this segmentation, we created a profile map. Then, we calculated mean profile values for each 12-month period basing on the 18 individual annual profiles. After averaging, we obtained an annual profile, which Figure 5 illustrates.

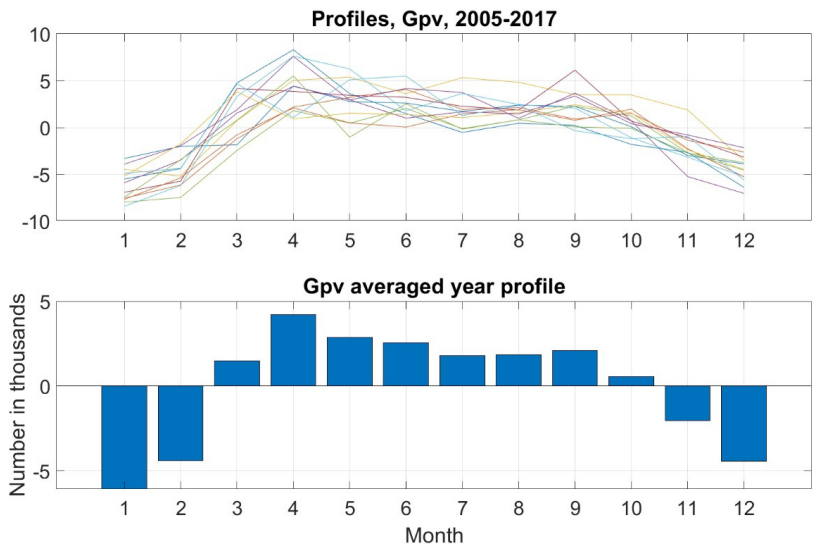

Fig. 5: Estimated annual profile of variable component of granted permissions, according to identification data.

Describing the characteristic of the annual profile, we noted that the extreme value appears in April, whereas the smallest value appears in January. Considering the profile's annual characteristic, we note that generally, from spring to fall the values obtained for the profile are greater than those in winter months. This characteristic reflects specificity of the building market, whereby construction is more intensive from early spring to late fall. Having identified the annual profile, we performed its initial validation by means of the model's output simulation for 2005-2017 and then verified the model's quality with the use of the ARX4 method. Figure 6 presents the set of measurement data and model output.

We assumed that the quality of the model hence obtained will be proved by determination coefficient, which amounted to 0.76. We may assume, therefore, that the constructed predictive model is characterized by acceptable quality. The next step was to determine model residues that aimed at

verifying their distributive characteristics. To identify the model's residues, we subtracted theoretical from empirical values. Figure 7 illustrates the run of the residues. Basing on the model's residues, we examined the process of shaping the probability density distribution of the residues with the use of the Gauss model, residue randomness, and autocorrelation attributes, in order to confirm correctness of the model and possibility of its utilitarian application.

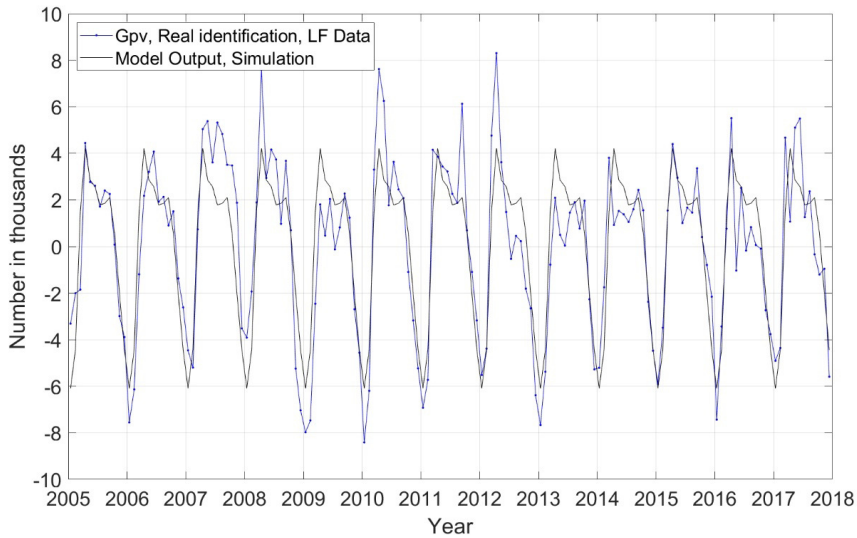

Figure 6: Simulation of Annual profiler model output for the G_{pv} variable component

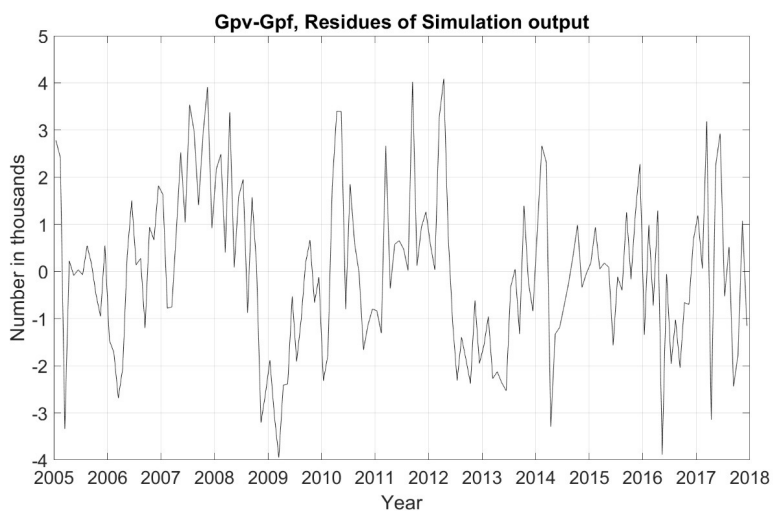

Fig. 7: Residues of simulation output model

Residue distribution is symmetrical in shape and is similar to normal distribution, which is confirmed by applied statistical tests (see Figure 8). In order to verify randomness of the residues, we determined their autocorrelation functions. At zero, the residues have high values when compared with deterministic components, which indicates high share of the random component in the run of the model's residues. This attribute is a positive characteristic that process good quality of the model. It is also important to note that

a value for 48 delay exists and exceeds noise whiteness, which indicates that the model has limited application for long-term time periods. this characteristic results from the averaging constant of the Savitzky-Golay filter (see Figure 9). In summary, considering the above, we may assume that the variable component model is characterized by good quality and may be used to determine the forecasting values with regards to the number of granted building permissions.

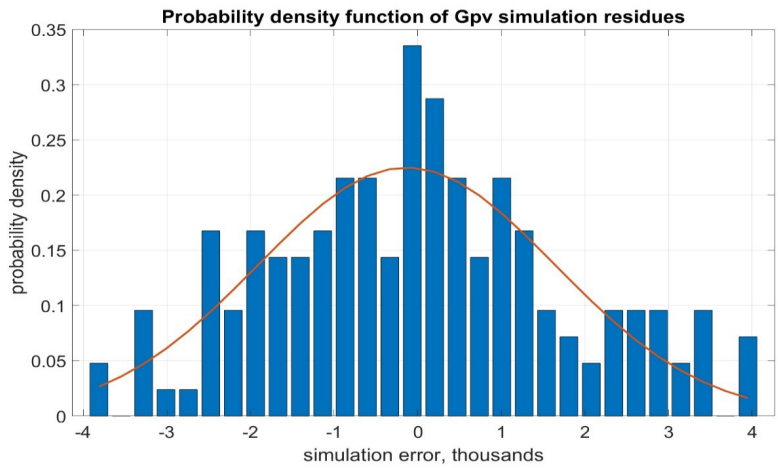

Fig. 8: Test of gaussianity of probability density of simulation residues (model output errors)

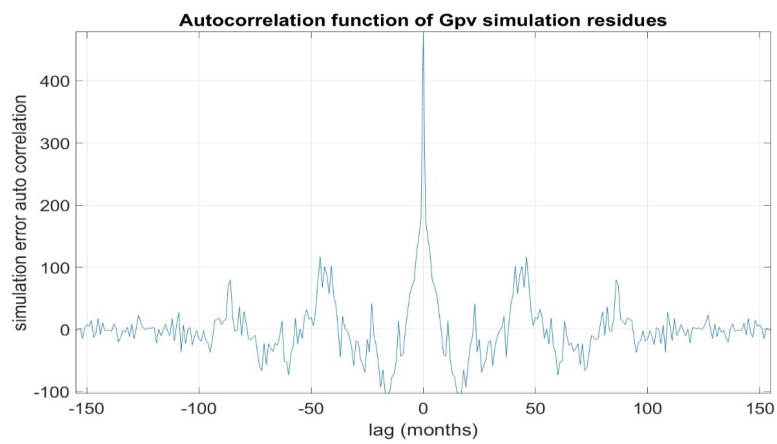

Fig. 9: Auto correlation of model output for checking the whiteness of residue noise

Forecasting of granted permissions in Poland

Determination of the forecast values for the number of permits issued for the construction of new dwellings in Poland is the step that follows construction of the predictive model (see Section 3 above). The forecasts were determined in keeping with the so-called forecasting procedure. Figure 10 illustrates its outline.

In order to determine the forecasting values, we first modeled the slow trend with the use of autoregressive models. Figure 11 shows the model's realization structure. In the second step, we applied the identified annual profile. The end value of forecasts is a composite of two components described above, namely slow trend and annual profile.

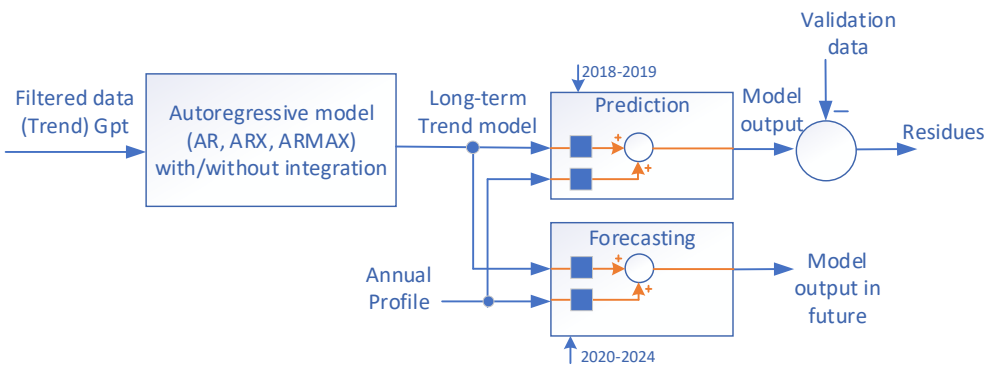

Fig. 10: Forecasting procedure

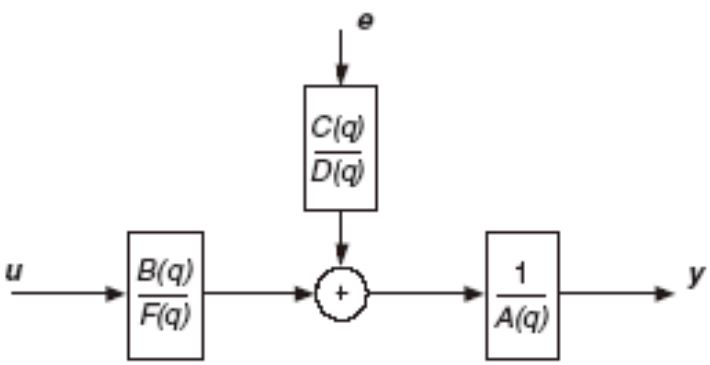

Fig. 11: General-Linear Model Structure

Considering the fact that trend changes are small in comparison with the G_{pv} component, it is possible to use low-order autoregressive model to determine forecasting values. The slow trend does not have periodical components and we cannot identify within it any significant seasonalities. With the use of the trend we can only indicate a general developmental tendency of the examined phenomenon, which represents a drift of changes in the number of permissions granted for building new dwellings. This drift is an indirect derivative of a macroeconomic situation. If the tendency of changes is of an increasing character, it indicates a good economic situation and if that character is decreasing, it may prove that the country's economic situation is not so good. In summary, in the present study, the above autoregressive model is used to make a prediction and forecast of the long-term slow trend component. Adding an annual model here makes it possible to equip the forecasting model with an attribute of seasonal (monthly) variation predictions.

Validation is the next stage in the process of forecasting. The present study assumes the validation to be conducted on a set of data for ranging from the beginning of 2018 to the 4th quarter of 2019. While validating, we conducted model output prediction with the use of autoregressive model and prediction with the use of annual profiles, and the end result of the model output is an additive composition of these two components. Figure 12 illustrates the results of the validation. As stated above, it can be read for the data range of 2018 to 4th quarter of 2019. It is worth to note that the forecast based on validation data correctly reflects actual changes in empirical time series. The process of determining and validating forecasts for the years 2002-2024 was conducted on the basis of a composition of the ARX4 model and annual profile. Basing on obtained results, it is possible to state that the trend model anticipates small growth of the slow trend component, the effect of which is raising the end result.

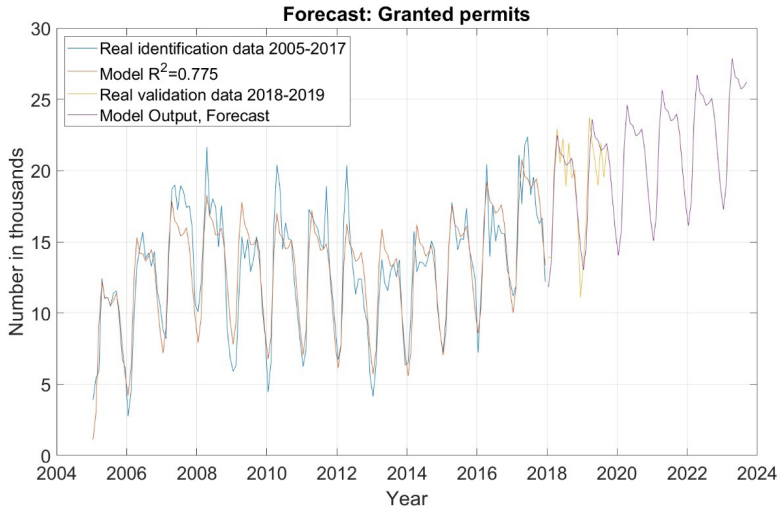

Fig. 12: Forecasting of granted permissions with identification data, model output, model prediction and forecast using annual profile and ARX4 - autoregressive model.

The final stage of our examinations was to verify the behavior of the proposed predictive model of the different autoregressive models. The forecasting procedure was divided into three stages. The first one verified significance of delay orders in order to determine the order's proper value. The second stage identified the following structures of autoregressive models: AR2, ARX2, and ARMA22. On the third stage, we determined the forecasts for integrated models characterized by the following structures: ARI2, ARIX2, and ARIMAX22.

We then identified the values of significant delay. Figure 13 shows results of forecasts for delays 1, 2, and 8. The results show that the delay range for the ARX model does not significantly influence obtained simulations.

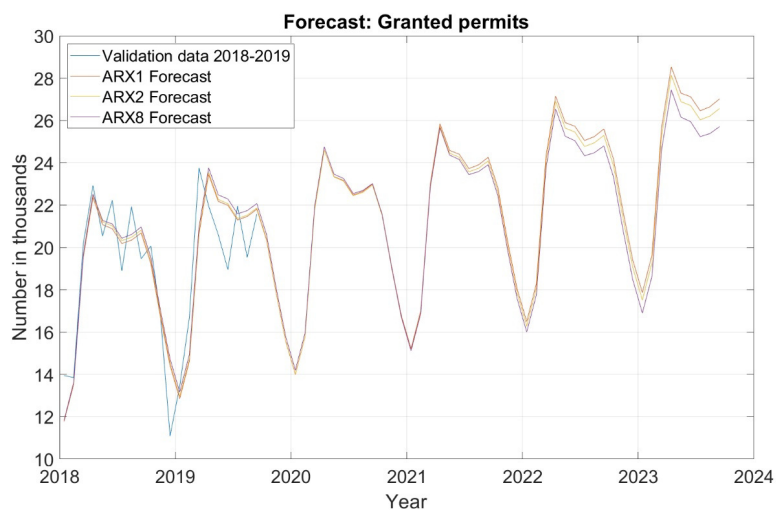

Fig. 13: Comparison of ARX model order for forecasting results

In step two, we verified the different structures of the autoregressive models, especially the AR, ARX, and ARMAX models. For each model, we adopted second-order delays. Figure 14 shows comparisons of obtained results. We determined that the AR model does not predict trend increase, but models with exogenous input (the "X" parameter) do predict the increase.

In step three, we conducted the last stage of testing the autoregressive models, including noise integration (the "I" parameter). We tested the ARI, ARIX, and ARIMAX models and ran calculations for the delay amounting to 2. Figure 15 illustrates the results.

Results obtained for the models with noise integration are characterized by trend stability for forecasted periods as well as by the fact that each of the three applied models obtained similar forecasting results.

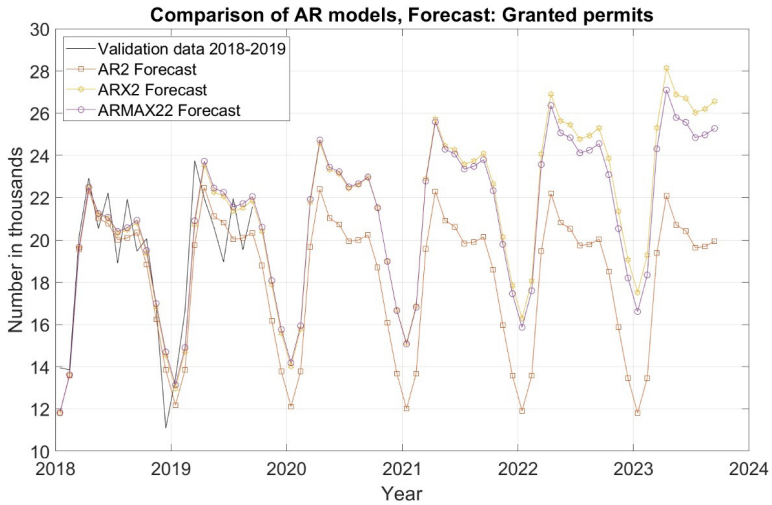

Fig. 14: Comparison of autoregressive model type (AR, ARX, ARMAX)

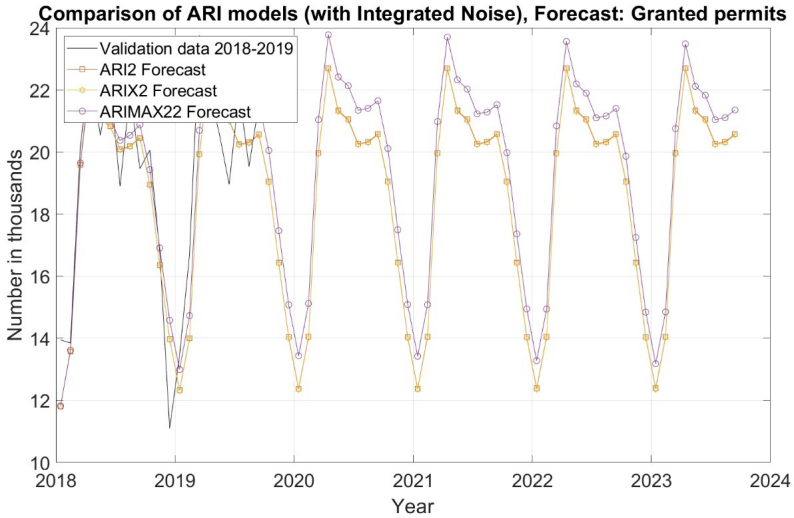

Fig.15: Comparison of autoregressive model with noise integration (ARIMA, ARIX, ARI)

Conclusion

The goal of the above studies was to verify the possibility for a utilitarian application of forecasts determined for various autoregressive models corrected with the annual profile of the phenomenon under investigation. The analysis was conducted on the basis of data representing the number of permissions granted for building new dwellings. Data measurement interval amounted to one month and data used to construct the predictive model was collected for the period ranging from 2005 until the 4th quarter of 2019 r. The investigation was conducted in a number of stages. In the first one, we conducted a literature review of the phenomenon in the domain of forecasting. Basing on research examples, the literature review revealed a need to apply forecasting methods in various situations that characterize the market. It also showed that applying forecasting methods renders it possible to decrease the decision-making risk. On the second stage, we conducted a two-level procedure of identifying forecasts with the use of autoregressive modeling. On the first level, we identified data used to construct the predictive model and ran a validation process basing on proposed model. Considering positive validation results for the proposed model, we ran the second level of investigations, namely comparison of different autoregressive models with an aim of creating a forecast of a number of permissions granted for building new dwellings in Poland. The studies confirmed usefulness of examined forecasting methods. Using the obtained forecasts in terms of the number of permissions granted for building new dwellings may be helpful for companies operating on the market of dwellings to make accurate (meaning with the lowest possible decision-making error) investment decisions.

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Identification of Harmonic Models Based on Fourier Transforms as A Tool for Parameterization of The Dwelling Construction Market

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Abstract

The research reported in this paper explores the applicability of harmonic models based on Fourier transforms for the purposes of parameterization of the dwelling construction market. Throughout the present study, the structural parameters of a single, dual and triple harmonic models were evaluated, the last of which was found to demonstrate the best degree of empirical data fit. The resulting models provide a manner in which the identification of phenomena occurring in this market can be performed effectively in terms of the results for number of building permits issued, number of dwellings under construction and the number of new dwellings completed. The adequate determination of the phenomena in the housing market can help reduce the information gap, thus minimizing the likelihood of a failure during housing investments. Such decision-making mistakes apply with regard to both the development of the finance and macro-precautionary principle on the macroeconomic scale of the nation–state, as well as investors operating on the housing market.

Keywords: prediction model, Fourier transform, harmonic model, housing, macro-precautionary principle, financial stability.

The paper presents the personal opinions of the authors and does not necessarily reflect the official position of the Narodowy Bank Polski or the Warsaw School of Economics or the Opole University of Technology or the Angelus Silesius University of Applied Sciences in Wałbrzych

Introduction

Dwelling construction forms one of the branches of the economy that have a significant effect on the financial and macroeconomic stability in the sphere of the management (Wang et al. 2019), (Carmichael and Coën 2019), (Mach 2019), (Ouyang and Guo 2019), (Cesa-Bianchi and Rebucci 2017). The significance role of the housing market on economic parameters means that the adequate identification of phenomena occurring on it forms a pre-requisite for development and

implementation of economic programs. The identification of the phenomena occurring on the housing market can be accomplished by parameterizing this market, and this can be carried out by application of one of its three components. This identification can provide the data for the analysis of the time-frequency waveforms that represent the implementation of the number of building permits issued, the number of flats under construction and the number of flats completed. When an attempt is made to analyze the components of the construction process, it is necessary to examine whether the phenomena occurring in the market are characterized by systematic nature in terms of annual changes and over successive years. The identification of annual and long-term variability of the processes can provide insight into the seasonal and periodic fluctuations occurring on the housing market. The parameterization of fluctuations plays an important role in the process of implementing macro-precautionary principle and ensuring financial stability, since the analysis of the slow and fast changeable variations can provide means for the optimal implementation of economic policy. One of the possibilities of the analysis involves the use of predictive modeling which is based on harmonic models. In such models, the spectra of individual peaks with harmonic frequencies can be derived by application of the Fourier transform. As a result of the use of the Fourier transform it will be possible to identify the value of the amplitude fluctuation of the components and the phase shift. The process of the analysis concerned with the adequate identification of the phenomena occurring in the subsequent stages of the housing construction process, i.e. the number of building permits issued, the number of dwellings under construction and the number of completed dwellings, undertaken in this paper has been concerned with various harmonic model structures. The tested structures will provide an answer two basic questions. What is the nature of harmonic variability in terms of seasonality and periodicity of the investigated components of the construction process? What parameters of the harmonic model can be applied to most adequately describe the construction market in terms of the adopted criteria? As a consequence of gaining answers to such questions, we will be able to undoubtedly provide an support in the decision-making process, both on the macro- and micro-economic scale.

Influence of housing market on financial and macroeconomic stability

Analysis of housing market has two main tasks. The first ones is concerned with placing an emphasis on the importance of the financial stability policy as well as macroeconomic policy on the condition and development of the potential of the housing market. The first task is designed to indicate the indirect correlation between macro-precautionary principle in the economic policy and finance and the parameters characterized by the housing market. These parameters can be expressed by means of the time-frequency waveforms representing variables that affect this market. The second task adopted in the literature analysis involves the identification of selected analyses that adopt time series in the research on housing market. The purpose of this analysis is to provide a report on current research in the issue undertaken in this paper.

The important role of financial and macroeconomic stability has been recognized in a variety of scientific studies. In this context, we should mention the close relation between financial stability and its direct effect on the price of flat on the real estate market (Liu et al. 2020) and on the level of increases or decreases in total prices on this market (Kirchner 2018). The residential prices growth and the change in the CPI level have a significant effect on the potential of the housing market. The second significant dimension is associated with macro-precautionary principle in the economy. An adequately implemented macro-precautionary principle is aimed at reducing the vulnerability of the economic system to threats, and the adequate selection, calibration and adjusting its instruments should ensure stability on the housing market (Claessens, Ghosh, and Mihet 2013) as well as in the area directly related to the housing market, i.e. the area of mortgages and loans (Calem, Correa, and Lee 2019) (Lyons 2018). The detailed and comprehensive analysis of the housing market makes it possible to contribute to the effective decision making for both the business sector and to the development of the domestic macroeconomic and market policy in the area of housing. The development of a relation between the potential of the housing market and the financial and macro-precautionary principle in the specific market conditions can be performed by means of technical analysis that applies time-frequency parameterization of the phenomena occurring on the housing market. An in-depth analysis of the time course of phenomena occurring in the housing market can

offer provide the means for the detection of unusual conditions that occur on this market (Kauškale and Geipele 2017). Some papers report the results of studies concerned with a framework applied for monitoring vulnerability in the residential market. This framework provides intuitive and transparent early warning guidelines by aggregating data from three dimensions, i.e. housing valuation, household debt and the credit cycle (Bengtsson, Grothe, and Lepers 2018). Further, the state of economic stability is directly affected by a healthy housing market, which should be characterized by relative stability, which is reflected in reasonable fluctuations in housing prices (He and Xia 2019).

Throughout the second stage, an attempt was made to discuss the state-of-art in the area, with particular emphasis on the time-frequency analysis of factors responsible for the conditions in the housing market. This analysis was conducted by describing the time-frequency fluctuations of the residential market, in particular by discussing issues related to investing in dwellings and the risks associated with it. Among research, the first area of focus includes the issues related to investing in the housing market. Badarinza and Ramadorai (2018) attempt to assess whether foreign capital is responsible for changes in residential property prices. The research applied large record of transactions in the housing market for this analysis. The conclusion is that international risk strongly affects house prices. The effects are long-term and are associated with both the effects of secure investment in real estate and immigration, which in global cities has a significant impact on the price of housing resources (Badarinza and Ramadorai 2018). The study reported by Taderera and Akinsomi (2020) undertakes an attempt to answer the question regarding investments in the commercial real estate as a tangible form of securing from inflation. Using the vector error correction model (VEC) for coordinated time series, long-term dependence between return rate on housing property and inflation was investigated. Another issue involved the question inflation increases the rate of return on housing investments. The second group of research deal with broadly understood risk. An important decision-making issue is associated with estimating credit risk and finance risk of investing in the housing market. The study in the work of Bessler et al. (2015) discusses issues regarding the claim that throughout the period of stagnation, credit risk and the risk of finance associated with investing housing investment increase significantly and they often harmful to the business. Another risk analysis involves the estimation of both in the process of investing in the housing market, as well as in private and public sector real estate. This study uses an asset valuation approach to assess the exposure of private real estate funds to risk factors in both the private and public markets. The analysis involves creating specific performance indicators and applying methods to address some of the inherent problems of private property fund data, such as the high degree of series correlation of returns (Farrelly and Stevenson 2019). Another analysis of the issues related to the area of risk assessment involves the examination of the occurrence of crisis situations in conjunction with the circumstances marked by political changes. This paper presents wavelet analysis including the minimax threshold. Wavelet analysis with the minimax threshold provides a comprehensive and powerful approach to the analysis of data in the housing market (Hui et al. 2016). Other studies concerned with the analysis of time series and the housing market deal with the detection of sudden change points using empirical distributions and demonstrate how they impact on the economy (Lam et al. 2016), examine the effect of the location of an investment on the price of real estate (Fernandez, Mukherjee, and Scott 2018) and report the results of a study into the relations between the real estate cycle and the number of population (by means of a dynamic model) (Fernández, Marrón, and Rodríguez 2016). Another study shows the multidimensional aspects of variation of yield and prices of housing to the NASDAQ composite index (Leone and de Medeiros 2015). The main purpose of another study involved the determination of the side effect of property regulatory policies issued by major cities on surrounding cities in large urban agglomerations, derived on the basis of regional dependencies that are specific to the Chinese housing market within the area of research applying time series analysis, there are also studies conducted with the aim of aimed describing the development of land values (McAllister, Shepherd, and Wyatt 2018) and indicating determinants of urban development in terms of housing market development (Zhang and Su 2016).

Harmonic Models

When an attempt is made to develop time runs representing variables that describe the stages of the housing construction process, harmonic models based on Fourier transform were applied. The starting point involved the adaptation of Fourier transform designed with the purpose of extracting from the spectrum single peaks with harmonic frequencies (Equation 1).

$$H(k) = \alpha_k \sin(k\omega t + \varphi_k) \tag{1}$$

We can note that the single harmonic component is characterized by two parameters. Parameter α_k represents the amplitude of the component, whereas parameter φ_k represents the phase shift, i.e. the shift of the periodic component over time. The reverse of one year was taken as the basic frequency (Equation 2).

$$\omega = \frac{2\pi}{12}\frac{rad}{months} \tag{2}$$

Taking into account the above assumptions, the general equation of the model was expressed by the dependence in 3 and contains the total of several periodic harmonics components of different amplitudes.

$$M = \sum_{k=1}^{N} H(k) = \sum_{k=1}^{N} \alpha_k \sin(k\omega t + \varphi_k) \tag{3}$$

The analysis of the harmonic characteristics representing the phenomena investigated in this paper involved the testing of six harmonic models with the structures whose summary can be found in Table 1. The designs of these models applied analogy in detailed markings, i.e. the model designated as H1 assumes value 1 in its parameters ω, and similarly, model H2 applies 2ω, etc. Taking into account the above assumptions, Table 1 contains the list of the parameters applied in the detailed structures for models H1, H1+H2, H1+H3, H1+H4, H1+H2+H4 and H1+H3+H4.

Table 1: Harmonic models used in analysis

Model name	Model structure	Model Equation
M1	H1	$\alpha_1 \sin(\omega t + \varphi_1)$
M2	H1+H2	$\alpha_1 \sin(\omega t + \varphi_1) + \alpha_2 \sin(2\omega t + \varphi_2)$
M3	H1+H3	$\alpha_1 \sin(\omega t + \varphi_1) + \alpha_3 \sin(3\omega t + \varphi_3)$
M4	H1+H4	$\alpha_1 \sin(\omega t + \varphi_1) + \alpha_4 \sin(4\omega t + \varphi_4)$
M5	H1+H2+H4	$\alpha_1 \sin(\omega t + \varphi_1) + \alpha_2 \sin(2\omega t + \varphi_2) + \alpha_4 \sin(4\omega t + \varphi_4)$
M6	H1+H3+H4	$\alpha_1 \sin(\omega t + \varphi_1) + \alpha_3 \sin(3\omega t + \varphi_3) + \alpha_4 \sin(4\omega t + \varphi_4)$

The models presented in Table 1 were applied to develop prediction models and to check their quality. The quality of the resulting models will provide the basis for decision-making in terms of their applicability in modeling variability that occurs at individual stages of housing development, i.e. in the phase of gaining building permits, flats under construction and new flats completed. In Figure 1 procedure of model parameter's estimation is presented.

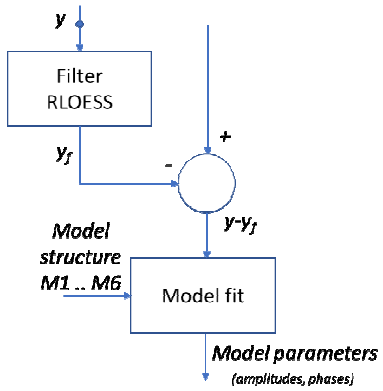

Fig.1: Model parameters estimation procedure

Data Preparing

When the research aimed at building predictive models is carried out on the basis of the model structures presented in Table 1, the procedure aimed at removing the developmental trend line representing the investigated relations was first implemented, followed by the selection of an optimal window width for RLOESS filtration, and the subsequent identification of the leading harmonic parameters for the analyzed phenomena. For the purposes of this research, monthly data for granted permits, construction began and construction completed was used. Data was collected for Poland from Q1 2005 to Q4 2019.

Procedure of trend removal by application of RLOESS filter

The procedure of decomposition of the resulting time series was carried out taking into account the data collected for the number of issued building permits, the number of dwellings under construction and the number of dwellings completed. The process of identifying the trend components was executed by application of the RLOESS model (locally estimated robust quadratic regression) . The effect of the transformations takes the form of a variable component comprising three sets of data: granted permits, construction began and construction completed. A graphical presentation with the implementation of time series waveforms for untransformed variables, the characteristics of the trend function and the time series waveform corresponding to a constant level of the analyzed variable are presented in Figs. 2,3,4, respectively.

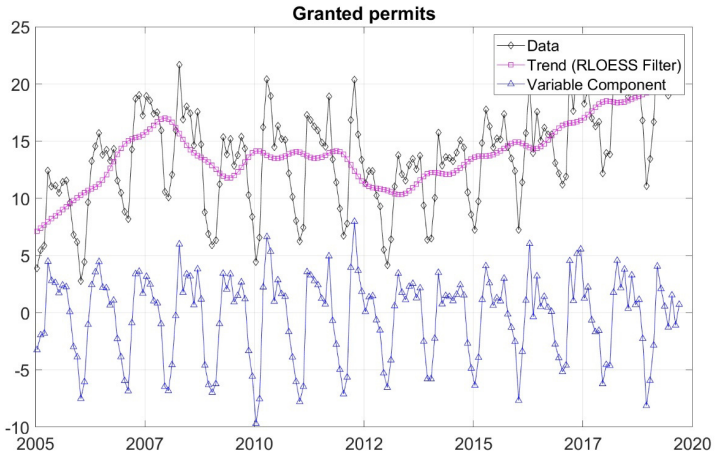

Fig. 2: Granted permits, original data and data with trend removed using RLOESS filter

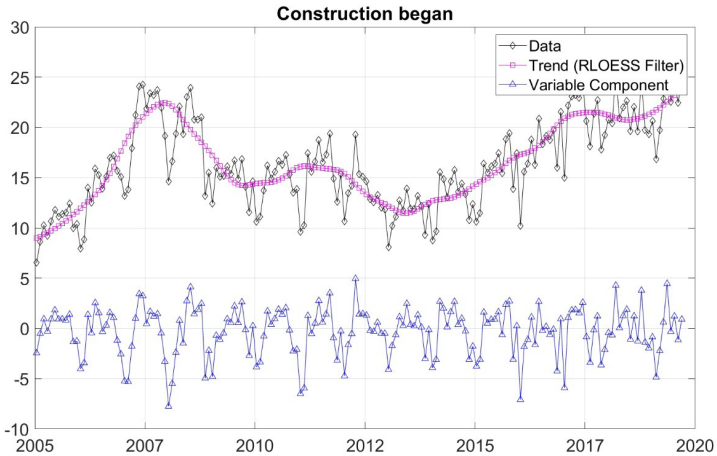

Fig. 3: Construction began, original data and data with trend removed using RLOESS filter

When a preliminary analysis of the received time-frequency waveforms is performed, we can see that in each of the examined series there is an annual periodicity in which annual seasonal trend is followed in each respective year. By consideration of the above, already at this stage of research we can put an initial research hypothesis regarding the number of building permits issued, the number of dwellings under construction and the number of new dwellings completed. These hypotheses can form a relevant but general indication of the characteristics of the relations that have been developed. They play an important role in the view of the demand and supply in the housing market. We can also note that this knowledge can also play a practical role in the assessment of both the macroeconomic and financial stability of the economy as a whole.

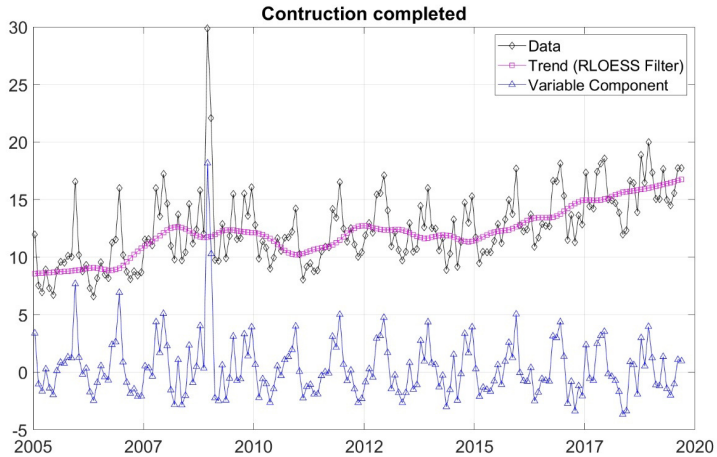

Fig. 4: Construction completed, original data and data with trend removed using RLOESS filter

Selection of the window length in RLOESS filter

The following research step was aimed at indicating the mean constant that should be adopted in the process of decomposition of the investigated time series. The averaging time of RLOESS models was selected in two parallel stages, i.e. RLOESS models with various averaging window lengths were determined and the determination coefficient was verified in each for each. As a result, the waveforms were developed for three investigated relations (granted permits, construction began data, construction completed data) with regard to an example model with the H1+H2 characteristic, as presented in Figs. 5,6,7.

In the summary of the simulations carried out for different averaging window lengths, we can see that in each case the optimum value of the averaging window width was in the range from 30 to 40 months, with the extreme located around 36 months. In conclusion, the three-year value of the RLOESS filter parameter was used.

Selection of harmonic parameters in the analytical model

When a selection is made with regard to the harmonic parameters to be applied with regard to three investigated phenomena, the housing construction process applied data for Welch averaged spectrum density. The resulting spectra have components with different lengths for various harmonic frequencies. The highest values of H1 harmonic component were obtained in each of the analyzed models. H2, H3 and H4 components for the number of building permits issued, for the number of dwellings under construction and for the number of new dwellings completed are considerably different. The characteristics of spectral densities for analyzed data are illustrated in Fig. 8. We can note at this point that the power density spectrum has discrete peaks for subsequent harmonic values, which confirms and justifies the application of this harmonic model. For example, for granted permits spectrum density, the value H2 is greater than H3 and H4, while for construction began spectrum H4 is higher than H2 and H3.

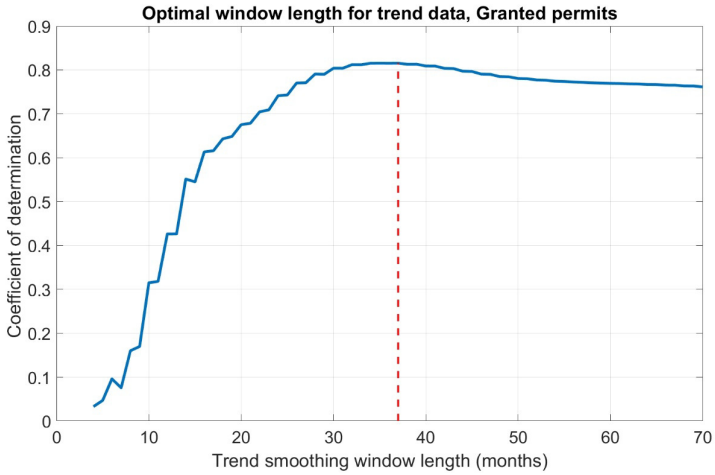

Fig.5: Optimal RLOESS filter window length for model H1+H2, granted permits data

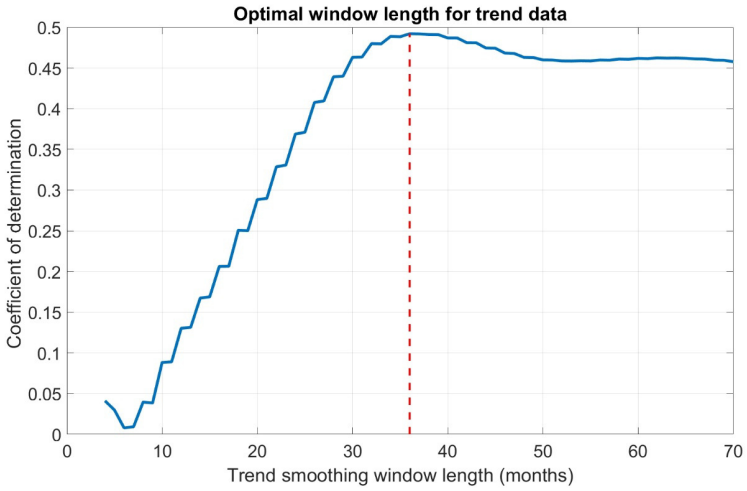

Fig.6: Optimal RLOESS filter window length for model H1+H2, construction began data

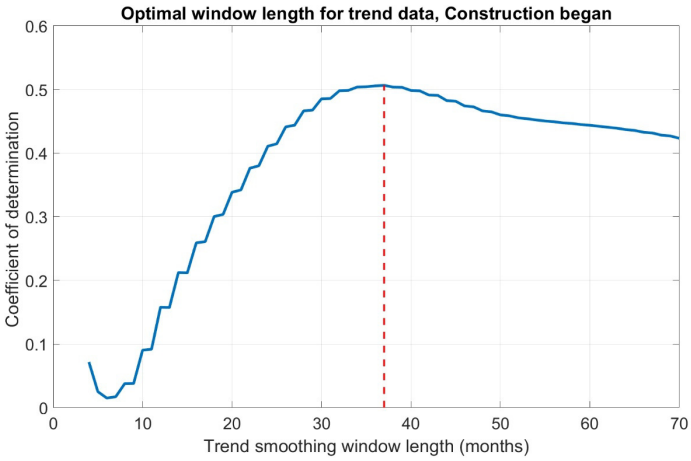

Fig.7: Optimal RLOESS filter window length for model H1+H2, construction completed data

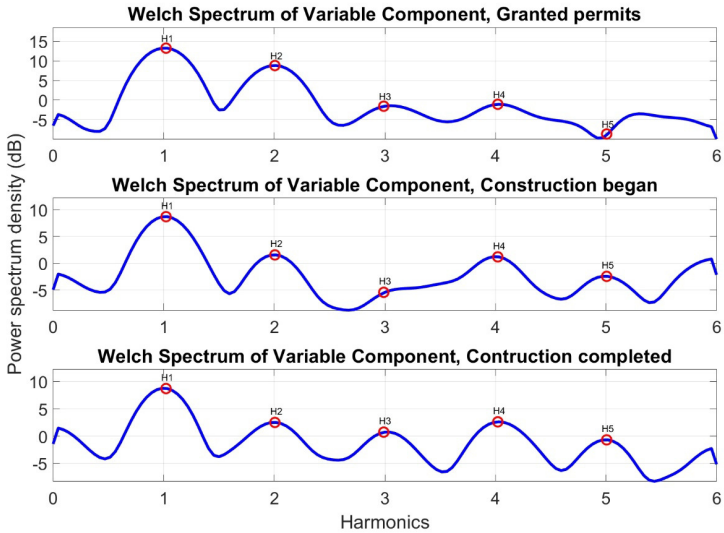

Fig. 8: Spectral densities for analysed data (Welch averaged spectra). H1-H5 are harmonics that correspond to consecutive years (H1 – 1 year, H2 – 2 years …).

The obtained results of spectral densities provide an answer the question regarding the selection of the harmonic characteristics that are crucial in terms of identifying the parameters of the developed predictive models.

Analysis of harmonic models for defining variables to describe the implementation of housing development model

The following harmonic structures were applied throughout the research process designed for purposes of verifying the feasibility of harmonic models for the development of utilitarian prediction models (models are marked by Mi, where i – model number):

M1: H1 model with a single harmonic
M2: H1+H2 dual harmonic models including a single harmonic and an odd harmonic H2
M3: H1+H3 dual harmonic models including the first odd harmonics
M4: H1+H4 dual harmonic models including a single harmonic and harmonic H4
M5: H1+H2+H4 triple harmonic model with even harmonics
M6: H1+H3+H4 triple harmonic model including harmonics H3 and H4

The optimization of the values of model parameters from number 2 to 6 applied Levensberg-Marquard method. Models were determined and analyzed for all stages of dwelling construction process (building permits, flats under construction, new flats completed).

Analysis of Harmonic Models for Granted Permits Data

In the first stage, the modeling process of model parameters M1–M6 was carried out with regarding to data concerned with the number of building permits issued. Figs. 9–14 contain the waveforms representing the results obtained for individual harmonic structures. This presentation is intended to check the applicability of the resulting models. Fig. 9 presents the results of calculations for the single harmonic model. The determination coefficient $R^2 = 0.611$. Taking into account the resulting value of the R^2, we can assume that the degree of the fit of the model is at an acceptable level. However, we can note that the analyzed model gives an inaccurate representation of the peaks

occurring for negatively declining data waveforms and is characterized by too much generalization in representing changes in housing that occur in the summer period.

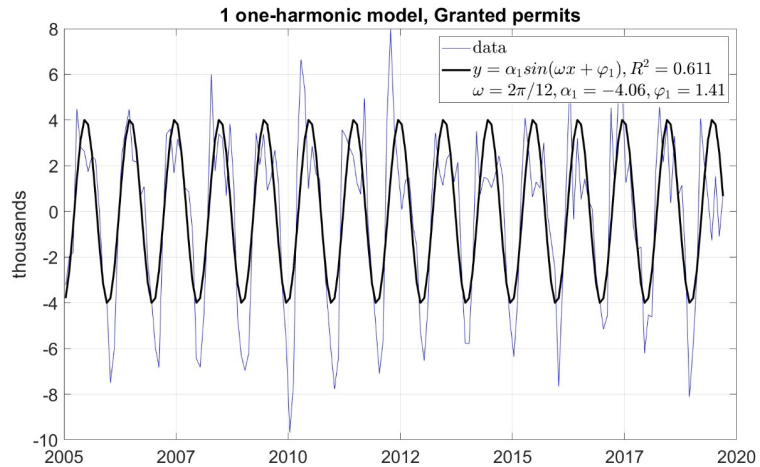

Fig. 9: Harmonic model with one sinusoidal component (H1) for granted permits variable component data

Figs. 10–12 present the results of calculations derived for the two harmonic models. We should note that among the structures of the described two harmonics models, the best matching factor was obtained by the M2 model: H1+H2, for which the calculated coefficient of determination $R^2 = 0.815$. The relatively high value of the R^2 coefficient indicates a very high fit of the model to the empirical data. M2 model can be applied to faithfully represent the negative peaks of the variable component of granted permission and also correctly shows the increase of permission data in April each year (see Fig. 10).

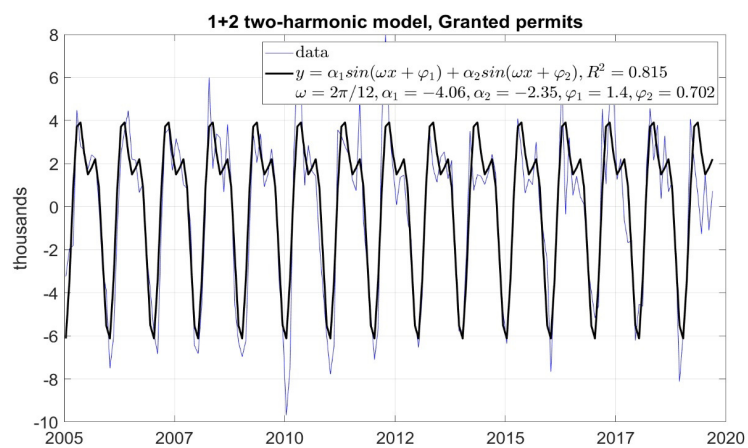

Fig.10: H1+H2 harmonic model with two sinusoidal components for granted permits variable component data

The second dual harmonic model with odd harmonics is formed by the M3 model: H1+H3 (cf. Fig. 11). When we analyze the results, we can see that the M3 model relatively poorly represents the data for the number of building permits issued in the winter season. Similarly, the model M4: H1+H4, for which time series are presented in Fig. 12, poorly performs in terms of the number of construction permits issued for the colder months of the calendar year. In this case, the determination coefficient $R^2 = 0.621$.

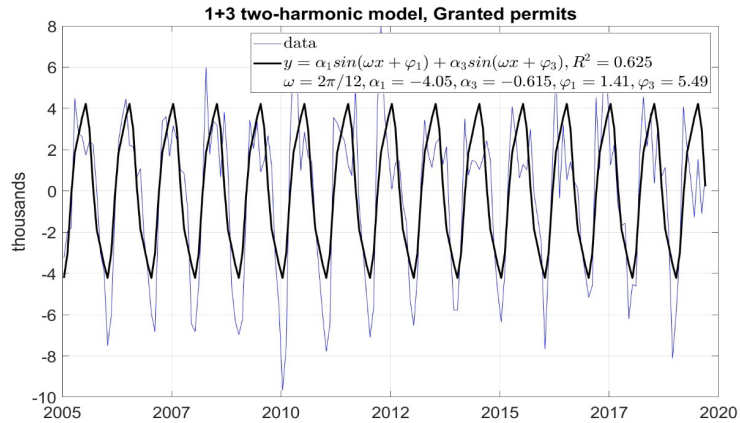

Fig.11: H1+H3 harmonic model with two sinusoidal components for granted permits variable component

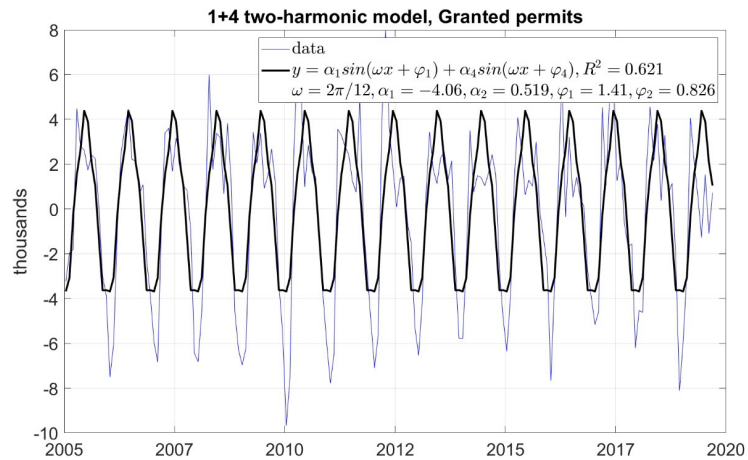

Fig.12: H1+H4 harmonic model with two sinusoidal components for granted permits variable component

On the basis of the analysis of the M5 and M6 models (cf. Fig. 13 and Fig. 14), we can conclude that both models with the harmonic structures H1+H2+H4 and H1+H3+H4 perform well. However, we can note that as a result of using the model M5: H1+H2+H4, the highest value of the determination coefficient R^2 equal to 0.825 is obtained. This model correctly represents the variability in the data for granted permission data in the winter months, as well as for the increase in the spring months and the slight increase in the autumn months of each year, as well as to adequately represent the slight decrease in granted permission throughout the middle of the year.

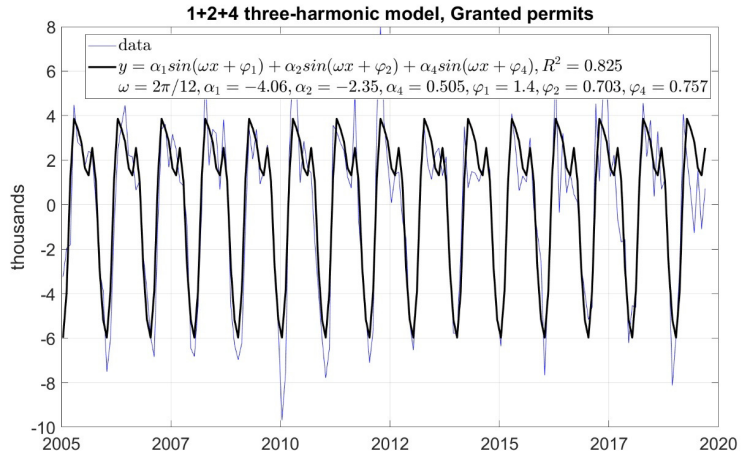

Fig.13: H1+H2+H4 triple harmonic model for granted permission VC data

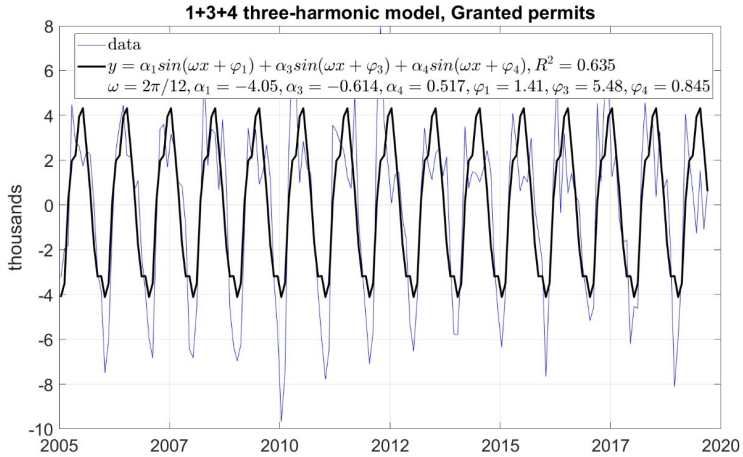

Fig.14: H1+H3+H4 triple harmonic model for granted permission VC data

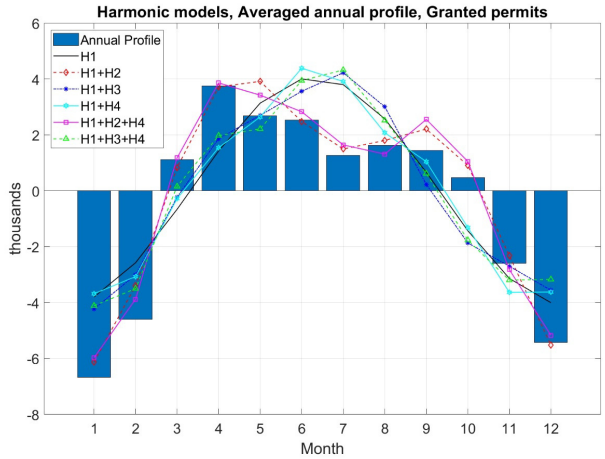

Fig.15: Comparison of harmonic model for granted permission variable component data

In the summary of the research regarding six harmonic structures represented by M1–M6 models, taking into account the variable component defining the number of building permits issued, Fig. 15 was compiled. This chart contains the graphical representation of the fit of the data to the annual profile determined by the median values for individual months throughout the period Q1 2005 to Q4 2019.

Analysis of harmonic models for construction started data

The following stage of the research involved the process of modeling parameters of the models M1–M6 for data regarding construction started. Figs. 16–22 present the results derived for individual harmonic structures. Fig. 16 presents the results of calculations for the single harmonic model. IN this case, the determination coefficient was $R^2 = 0.413$. When the value of the R^2 coefficient representing the investigated phenomenon is analyzed, we can conclude that the single harmonic model is characterized by poor degree of fit. In addition, the analyzed model can neither be applied to accurately represent peaks for negative data slopes nor provide correct representation of the characteristics of changes in the investigated phenomenon throughout the middle months of the year.

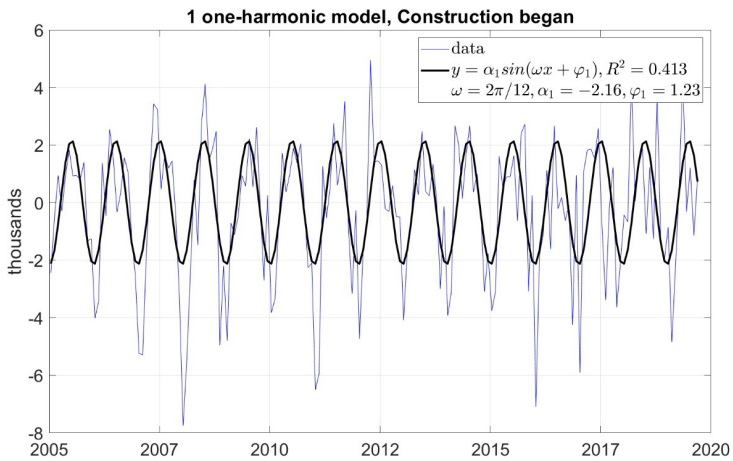

Fig. 16: Harmonic model with one sinusoidal component (H1) for construction started variable component data

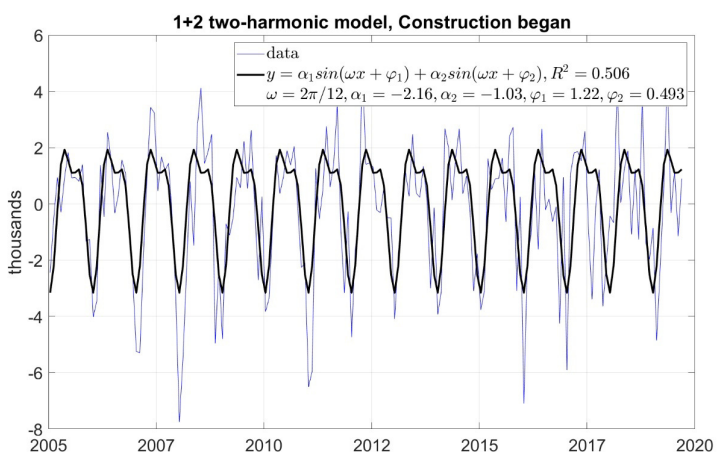

Fig.17: H1+H2 harmonic model with two sinusoidal components for construction started variable component data

Figs. 17–19 contain the results of calculations obtained for the two harmonic models. We should note that among the structures of the described two harmonics models, the best level of the fit was obtained in the M2 model: H1+H2, for which the calculated $R^2 = 0.506$. The mean value of the R^2 indicates at it most the average degree of the fit of the model to real data. The M2 model underestimates the negative and positive peaks of the construction started variable component data, whereas it can be applied to adequately represent the characteristics of changes in the investigated variable in summer periods (see Fig. 17).

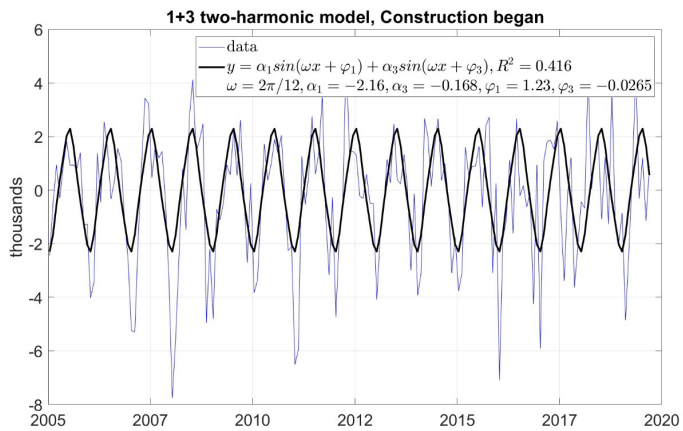

Fig.18: H1+H3 harmonic model with two sinusoidal components for construction started variable component

The M3 model: H1+H3 (cf. Fig. 18) forms another two-harmonic model with odd harmonics that was tested for data collected with regard to data for housing under construction. When the results are analyzed, we can see that the M3 model poorly represents positive and negative peaks, and equally poorly demonstrates the variable characteristics of the investigated variable in the summer months. The determination coefficient (R^2) for this model is equal to 0.416. M4 model forms the third of the investigated harmonic models, and the values derived from simulations are presented in Fig. 19. On the basis of the results, we can conclude that this model has no ability to either represent the positive or negative outlier data. Nevertheless, this model can be applied to well represent the trends of change in the summer period.

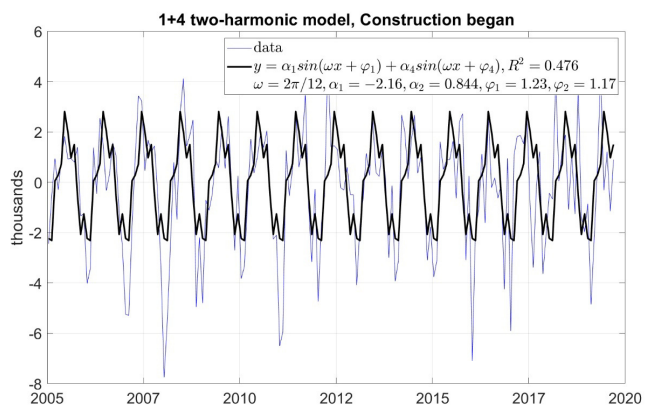

Fig.19: H1+H4 harmonic model with two sinusoidal components for construction started variable component

When we carry out an analysis of M5 and M6 models (see Fig. 20 and Fig. 21), we can note that both models with harmonic components H1+H2 +H4 and H1+H3+H4 demonstrate a moderate level of the fit to the actual data. None of the triple harmonic models has the ability to correctly realize the values for outliers. Both discussed models, the values gained by application of the M5 and M6 models can be considered as moderate and even poor.

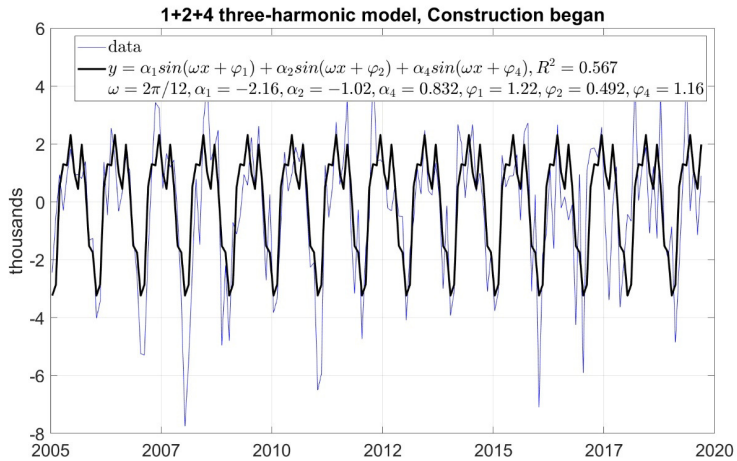

Fig.20: H1+H2+H4 triple harmonic model for construction started VC data

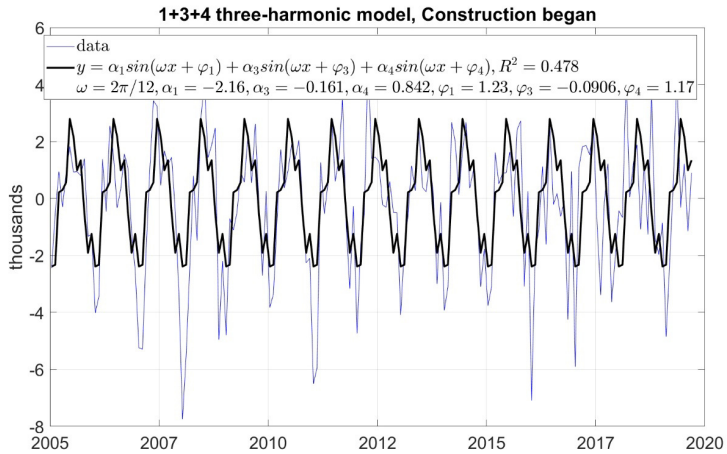

Fig.21: H1+H3+H4 triple harmonic model for construction started VC data

Fig. 22 was complied with the purpose of summarizing the research carried out for the six harmonic structures represented by M1–M6 models, taking into account the variable expressed by the number of dwellings under construction. This figure contains a graphical presentation of degree of the fit of the data to the annual profile determined as the median values for individual months from Q1 2005 to Q4 2019.

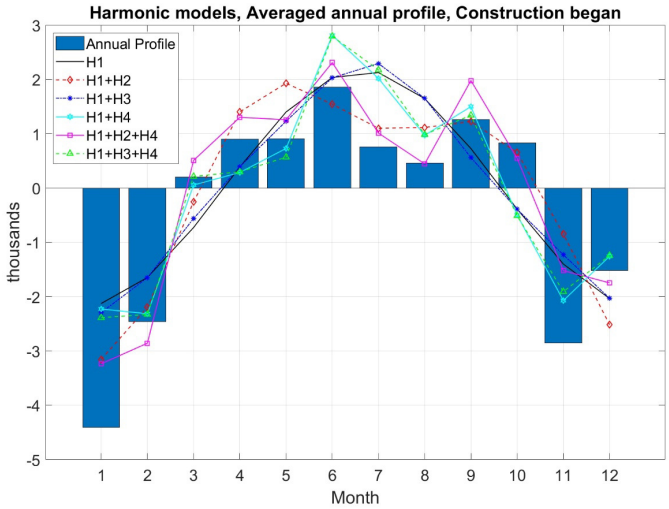

Fig.22: Comparison of harmonic model for started construction variable component data

Analysis of harmonic model for construction completed data

The last and third phase of the research was concerned with the process of modeling parameters of the M1–M6 models with regard to data regarding completed dwellings. Figs. 23–28 contain the results derived for individual harmonic structures. Fig. 23 presents the data gained from the calculations applying a single harmonic model. In this case, the coefficient of determination was R^2 = 0.421. By consideration of the resulting value represented by R^2, we can assume that the single harmonic model is characterized by poor degree of fit. The poor value of the determination coefficient stems from the unusual phenomenon that occurred in the investigated phenomenon. The outlier, which took place at the end of 2008, is associated with the specific circumstances that occurred at that time in Poland. In Poland, legal regulations have been implemented since January 2009 that stipulate the requirement to perform energy certificates in newly erected residential buildings. This fact led to the acceleration of construction works and an unusual market condition, in which non-standard values of the number of completed dwellings, was encountered. In addition, the analyzed model inaccurately represents the peaks occurring for positive data slopes and does not provide an adequate representation of the characteristics of the changes occurring in the examined phenomenon in the middle months of the year.

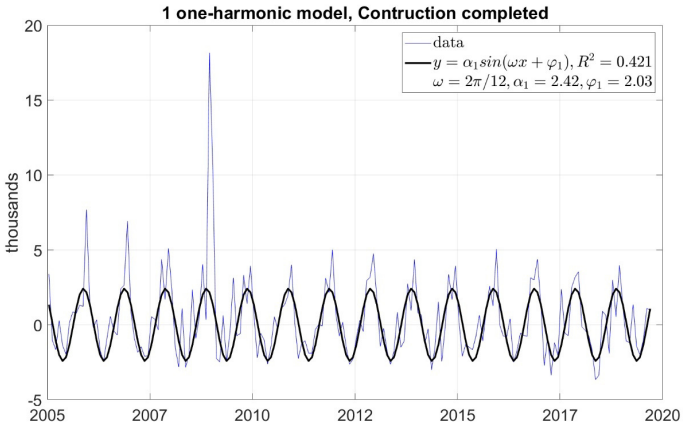

Fig. 23: Harmonic model with one sinusoidal component (H1) for construction complete variable component data

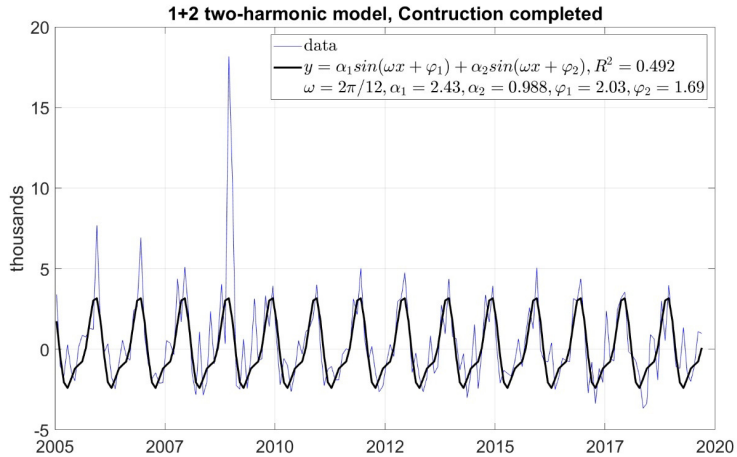

Fig.24: H1+H2 harmonic model with two sinusoidal components for construction complete variable component data

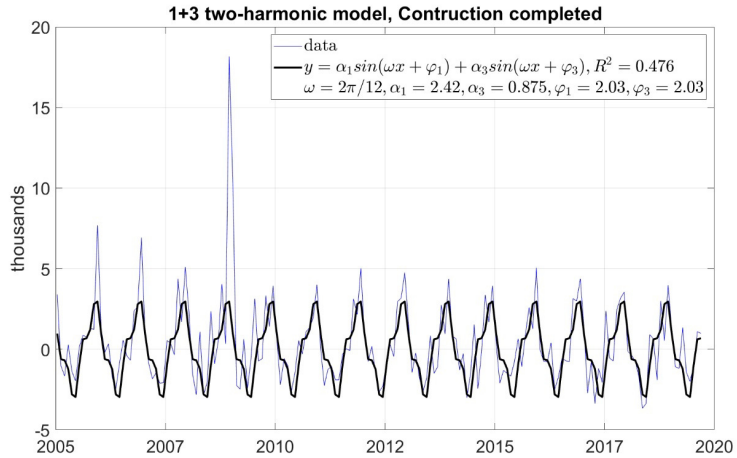

Fig.25: H1+H3 harmonic model with two sinusoidal components for construction complete variable component

Figs. 24 – 26 contain the results of calculations derived for the dual harmonic models. We can note that among the structures of the dual harmonics models discussed here, the total of the values representing the coefficient of the model fit demonstrate approximate values. For the model M2: H1+H2, the coefficient of determination R^2 assumed a value of 0.492, for model M3: H1+H3, the value R^2 was equal to 0.476 and for model M5: H1+H4, the value of R^2 was equal to 0.490, respectively. The mean value of the R^2 coefficient demonstrates an average fit of the model to actual data from the housing market. We can again emphasize at this point that the values of the resulting coefficient of determination are to a considerable extent decreased by the occurrence of a value that significantly deviates from the standard result characteristic for the investigated time series.

When an analysis is carried out with regard to subsequent harmonic models for data that describes the number of new completed dwellings, i.e. M5 and M6 (see Fig. 26 and Fig. 27), we can note that the application of both models with the harmonic structure H1+H2+H4 and H1+H3+H4 yielded only satisfactory levels of the fit between the data from the model and actual one. None of the triple harmonic models provided the opportunity to adequately represent the values gained for outliers. In terms of the values of the coefficients of determination, both investigated models (M5, M6) should be

considered to be of moderate quality. However, we can also note that the above models can be applied to accurately represent the negative values recorded in the form of the courses.

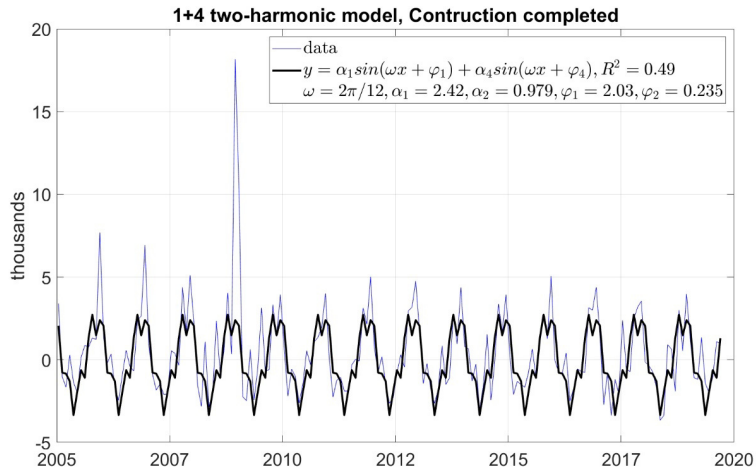

Fig.26: H1+H4 harmonic model with two sinusoidal components for construction complete variable component

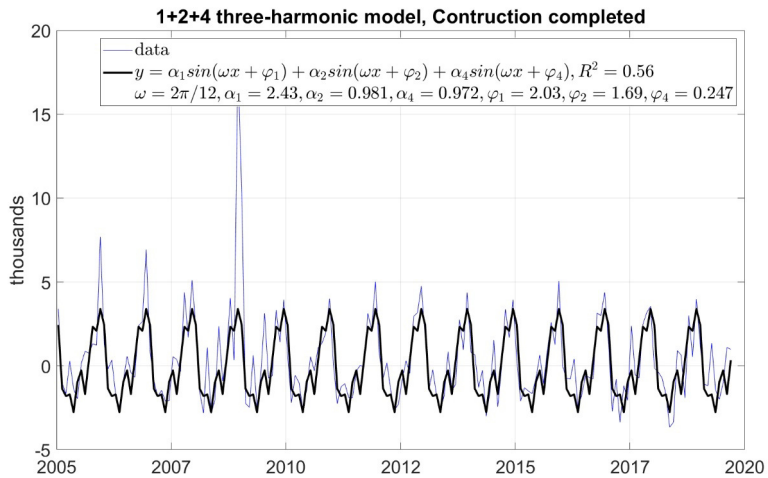

Fig.27: H1+H2+H4 triple harmonic model for construction complete VC data

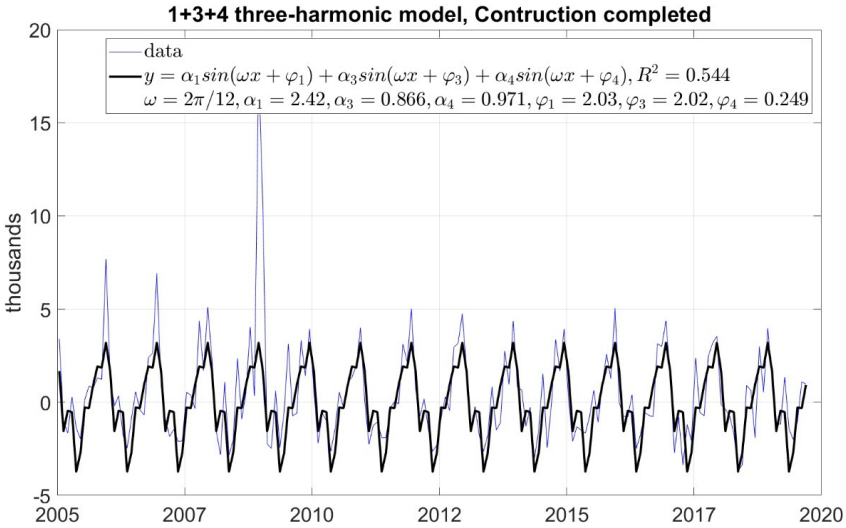

Fig.28: H1+H3+H4 triple harmonic model for construction complete VC data

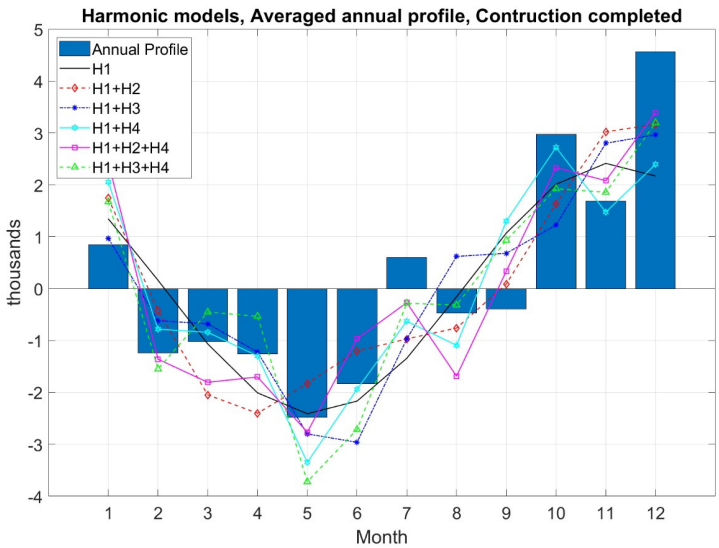

Fig.29: Comparison of harmonic model for construction complete variable component data

Fig. 29 was developed to provide a summary of the research performed with regard to 6 harmonic structures representing M1–M6 models taking into account the variable describing the number of completed dwellings. This figure contains a graphical presentation of the fit of the results to the annual profile determined as the median for individual months in the period Q1 2005 until Q4 2019.

Summary

In the summary the results of the present study, Tables 1–3 contain the parameters of all harmonic models. Table 2 summarizes the results with regard to six harmonic models developed for data regarding the number of building permits issued. In Table 3, the results for the models developed with regard to the data on the number of dwellings under construction, while in Table 4 for the data gained with regard to the number of dwellings completed.

Table 2: Harmonic model coefficients for granted permission VC data

Model	R^2	α_1	α_2	α_3	α_4	φ_1	φ_2	φ_3	φ_4
H1	0.611	-4.06	0	0	0	1.41	0	0	0
H1+H2	0.815	-4.06	-2.35	0	0	1.4	0.702	0	0
H1+H3	0.625	-4.05	0	-0.615	0	1.41	0	5.49	0
H1+H4	0.621	-4.06	0	0	0.519	1.41	0	0	0.826
H1+H2+H4	0.825	-4.06	-2.35	0	0.505	1.4	0.703	0	0.757
H1+H3+H4	0.635	-4.05	0	-0.614	0.517	1.41	0	5.48	0.845

Table3: Harmonic model coefficients for construction started VC data

Model	R^2	α_1	α_2	α_3	α_4	φ_1	φ_2	φ_3	φ_4
H1	0.413	-2.16	0	0	0	1.23	0	0	0
H1+H2	0.506	-2.16	-1.03	0	0	1.22	0.493	0	0
H1+H3	0.416	-2.16	0	-0.168	0	1.23	0	-0.026	0
H1+H4	0.476	-2.16	0	0	0.844	1.23	0	0	1.17
H1+H2+H4	0.567	-2.16	-1.02	0	0.832	1.22	0.492	0	1.16
H1+H3+H4	0.478	-2.16	0	-0.161	0.842	1.23	0	-0.091	1.17

Table 4: Harmonic model coefficients for construction completed VC data

Model	R^2	α_1	α_2	α_3	α_4	φ_1	φ_2	φ_3	φ_4
H1	0.421	2.42	0	0	0	2.03	0	0	0
H1+H2	0.492	2.43	0.988	0	0	2.03	1.69	0	0
H1+H3	0.476	2.42	0	0.875	0	2.03	0	2.03	0
H1+H4	0.49	2.42	0	0	0.979	2.03	0	0	0.235
H1+H2+H4	0.56	2.43	0.981	0	0.972	2.03	1.69	0	0.247
H1+H3+H4	0.544	2.42	0	0.866	0.971	2.03	0	2.02	0.249

On the basis of the results, we can conclude that the model with a single harmonic performed poorly. This model could be employed in practical applications, under the assumption of the use of a simple model that is computationally stable. However, the best quality parameters were established to occur with regard the triple harmonic model with the structure H1+H2+H4. This model demonstrates the best results in each of the research stages, i.e. for each investigated variable. In the summary of the above, if the criterion for model selection is based with the best value for the fir of the model to empirical data, we should apply the model with even harmonics to apply to data on the construction started, completed and granted permissions. The disadvantage of this model is associated with the need to determine the extremums of the function of six variables, which requires complex calculations. The intermediate model i.e. the model comprising dual harmonics has four parameters and poses an easier task in terms of determination of the results in comparison to the model with six parameters. This model has always outperformed H1 model but also always worse than the model with 3 harmonics. However, we should note that in many cases it has very similar results to the model H1+H2+H4. If there is a need to use relatively simple models, it is recommended to use H1+H2 model with dual harmonics, which proved to perform better in each than H1+H3 and H1+H4 models.

Conclusion

This study involved the development of a procedure applied to develop and verify the performance parameters of six harmonic models. The research confirmed the applicability of predictive modeling based on the Fourier transform for the purposes of analyzing the variability of phenomena, such as:

building permits issued, dwellings under construction and new dwellings completed. The ability to adequately represent the above phenomena can provide the measure for parameterization of data in the area of housing development. Assuming that housing construction forms one of the key determinants affecting the condition of the economy in general, the insights in the area of the developments in the housing market can reduce the information gap in the decision-making processes in this field. In the macroeconomic terms, this will provide a measure to develop responsible financial and implement macro-precautionary principle in the economy. However, from the point of view of microeconomic activities, it will help decision makers operating on the market to take the right decisions. Such decisions are taken on both the demand and supply sides of this market. When the summary of computational engineering was carried out, it should be emphasized that among the tested models comprising a single, double and triple harmonics, the best performance parameters were recorded for the case of the model with three harmonics.

The resulting harmonic prediction models have demonstrated utilitarian value. This provides the foundation for the potential to apply such models in the estimation of structural parameters to develop scenarios for the analysis of the investigated phenomena in the future.

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The Role and Position of Digital Marketing in Republic of Serbia in Area of Public Advertisement, Transversal Studies with Empirical Character

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Abstract

Marketing represents the ability of company's operations to initiate different activities for business success. Marketing research as part of marketing activities will determine the marketing requirements which could be achieved with business activities. The marketing tools should recognize the results of business activities to keep the level of competition and business success of organization as well. The marketing's main goal is to enable all requiriments keeping in mind the existing environment as well as technologies in order to achieve maximum results from the business activities. Digital communication are is ordinary daily basis communication present in the office and back home as well. Today is not posible to have any business activity or subject without use of digital technologies. There are certain jobs and business activities which could be achieved and executed only electronicaly. The specific progres in the society have been made with mobile techologies. The time line and space do not have importancy as before due to information avialibilty to everyone at the same real time. Traditional aproach is more replaced with modern one based on the information technologies.
The paper subject is about digital marketing in order to improve marketing activities. It is specificaly related to development of certain quality related to promotions and activities in function of media advertisment.

Keywords: Marketing, Digital Marketing, Media Advertisement, Social Networks

Introduction

The aims of marketing concept in business organizations are modern and innovative promotion as well distribution on the new markets in order to accomplish the customer's needs, volume sale and profit. The modern company marketing and business concept is channelled to accomplish the customers' requirements according with varieties, quality, quantity and prices including successful business.

It should be kept in mind that the best sailed products are the one required or demanded by customers and clients. If they do not know where to get or find some products or services, the organization will

be out of profit and customers will choose their competition which has found modalities to introduce the customers with their offer and products on the market.

The paper's subject is to introduce the various communications through digital channels and their activities in the marketing area. There will be efforts to establish the differences in use of digital marketing within different organizations (differences related to capacity as well as level and length of business).

Theoretical- Methodological Framework

Paper's Subject

Marketing presents the systematically specific and functional business approach in micro as well macro level of business activities focused on the effective accomplishments for individual or social needs related to products and services based on rational business with available resources.

The importance of scientific research conducted in this paper is based on the fact that successful management of marketing strategy requires the service providers to seek accurate, reliable and timely feedback from the customers. (Radnovic, 2015)

The paper's subject is a digital marketing, it's role and position in the area of media advertisement which is the part of modern promotion methodology enabling to overcome the space as well as time barriers in order to provide sufficient answers at the same moment when the question come up.

The company's business and economy today completely relay on information technologies and database. The influence of information technologies initiating development of new business activities which are directing human resources and their knowledge for collecting a new information's. (Filipovic, Kostic, 2003). The computerization and global trends in the last two decades had a crucial influence on expansion and perspectives of business development. According to Murphy and thanks to new trends the world market became much smaller and all actors independent as well. (Murphy, 1991) Before it was not possible to monitor the business activities in all parts of the world at the same time, but with computer technologies it became possible to get trade despite on the seller or customer location. The customer has a many offers and options to trade. From that reason the business companies must fight with competition using appropriate as well unique approach utilizing internet technologies.

Good marketing is one of the conditions for success on the marketing competition game. The modern media advertisement is mandatory requirement in order to achieve adequate marketing position and recognition as well. Based on the researched results it is possible to find out the current status using of digital marketing and suggestions for the future corrective measures as well.

Mr. Kotler in modern book referring to marketing delivery as customer satisfaction obtaining at the same time profit as well. Practically, marketing is profitable satisfaction and full filled the customer needs. The marketing roll is the most important in the business of any organization, public, government or voluntary based.

Digital marketing presenting the promotion of products and brands, using one of more electronic medias for it. The digital campaign begins with creation of appropriate web page and context, including selection of platforms as well public presentation strategies with choice of adequate graphic and textual tools to make a brand recognizable to the customer in Google research. (or some other browser). After the solution, the context will be presented as well with measurement of the company results and public presentation.

Using the tools of directive marketing through the social networks and the other ways of Communications it is possible to connect with potential clients and users, for example through the advertisement on social networks Facebook, LinkedIn, Twitter, etc. Further with email campaigns, AdWords creating positive brand presentation, what will call users action.

The internet marketing is unique stakeholder for all types of network marketing. It concludes all marketing activities, which are using internet as channel of marketing communication. The internet marketing has a stronghold in traditional phases of marketing process: situational analysis, marketing planning and implementation. (Reedy, et al 2000)

Mobile marketing presenting the use of wireless media, first mobile phones and PDA- Personal Digital Assistant as a for integrated context delivery as well direct answers as a part of multimedia marketing program. The modern devices in use are smart, such as smart phones and tablets (Dushinshi, 2009)

The main purpose of business web page is to promote and sell products/services. The example of web site page use in business activities includes research of products through online catalogue, its sale within online shops, getting specific services through the internet and etc.

Regarding the social medias and connection with digital marketing, Mr. Hollensen stating that social media currently includes wild spectre of online word-of-mouth forum, friendly sites, blogs, chat rooms, customer's emails, internet discussions, groups and forums which comprise digital, audio, photo and video clips.

The basic characteristic of Twitter is to overcome complexity of the other social medias. Simply, there is the field for 140 text characters which will enable customer connection with the other users of Twitter network. Therefore, it is the question of simple infrastructure. Most of the subjects presented on Twitter network are people life events, news, and etc. The users also could exchange photos as well links with the other users. Currently, the Twitter is progressing due to the users who are famous in public (Treadaway, Smith, 2010).

Paper's Goal

Research goal was to determine digital marketing presence in media advertising as modern shape of presenting an organization in the market. The goal was to obtain data about current usage of certain digital marketing instruments based on samples, and that according to results establish current state, development directions and improvements.

Scientific goal was to find adequate solutions for performance on the market, through digital medias which will be available to target group and contribute to final organization's success. Scientific goal is stated in contribution of theoretical knowledge in marketing science, digital marketing and digital communications.

Practical goal are suggestions for digital marketing improvement, as well as methods for quality increase of organization's presentations in digital world. No matter how quality product/service an organization have, successful organized management within organization and competitive price, without adequate information placement about products/services and their advantages, business success will fail, and organization's market position will be violated.

Research Hypotheses

In the paper a starting hypothesis was situated: Modern business methods and digitalization in each social segment influence on increasing the digital marketing role in area of media advertising, in the way that big number of information's can be available to wide auditorium in the same time period.

Besides starting hypothesis in the paper were situated three auxiliary hypotheses:

H 1 – Organizations are increasingly casting off traditional advertising methods, and turn to modern advertising through digital marketing
H 2 – Organizations do not use enough possibilities of digital marketing
H 3 – Differences in organizations (size, business level and length of business) only partially effect on differences in quality and frequency of marketing activities.

Work Methodology

The paper consists three parts, by which are given the basics of empirical research. In theoretical part is used bibliographic- speculative method. This method implies gathering, analysis and interpretation of data overwhelmingly by theoretical- contemplative method. Basic source of data are relevant bibliographic units (books, textbooks, magazines etc.), as well as modern electronic sources of data.
In the paper were used following methods:

- Analysis - scientific method which consists from complex knowledge form to its simpler parts,
- Synthesis - thoughtful assemblage of simpler parts to logical entities,
- Induction - cognition process in which conclusion flow is from special and individual to general,
- Deduction - cognition process of conclusion from general to individual,
- Classification - editing (non)related terms into one logical system in which every term will have its place and roll.

Research was conducted as transverse study empirical character. Sample of 50 organizations in Republic of Serbia was included in period from June till October 2019. Results were collected by personally sharing the questionnaire, as well as sending the questionnaire through email. For collecting data special questionnaire was made.

Questionnaire consisted following independent variables:

- How many employee's organizations have?
- Organization's business market
- Organization's business length
- Does organization have web page
- Does organization have Facebook page

Besides independent variables, questionnaire also consisted following dependent variables:

- Web page quality grade
- Organization's Facebook page quality grade
- Organization's You Tube movies quality grade
- Frequent performance of marketing activities within organization grade
- Frequent planning marketing activities through digital media grade
- Organization's promotion through TV channels grade
- Organization's promotion through radio stations grade

All collected data was processed in applicative SPSS system by descriptive and comparative statistics (ANOVA and χ^2 test).

Research Results

Research results will be presented through descriptive and comparative statistics. First will be describes the sample with descriptive statistics, then the result of all dependent variables will be presented.

Sample Description

In observed sample of micro organizations (which have up to 9 employees) is 10, small organizations which have 10 to 49 employees is 9, middle organizations which have from 50 to 249 employees is 22 and organizations which have over 250 employees is 9. Percentage review of included organizations according to its size is shown on figure 1.

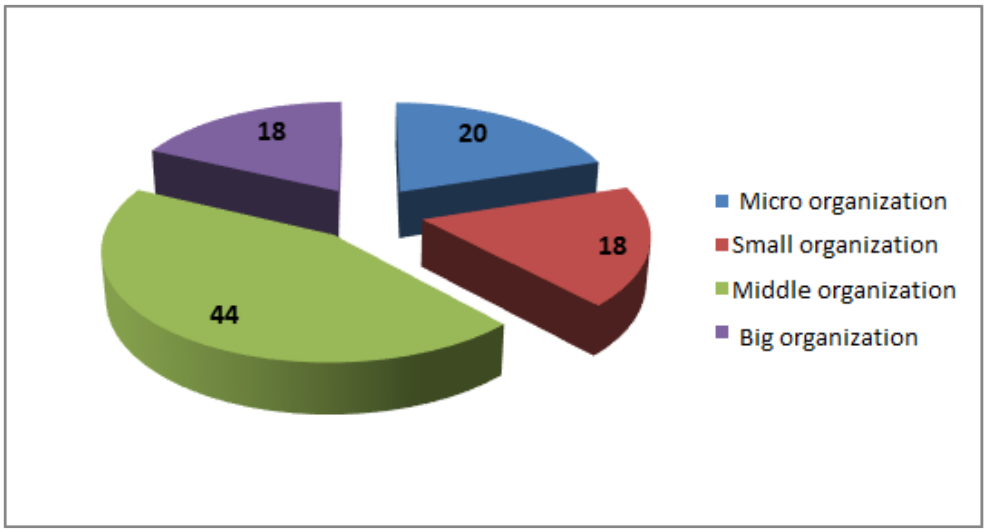

Figure 1: Percentage review of organizations according to its size

In observed sample 21 organization operates on local level, 15 organizations operate on national, 9 on regional and 5 on international level. Percentage review of organizations according to operation level is presented with figure 2.

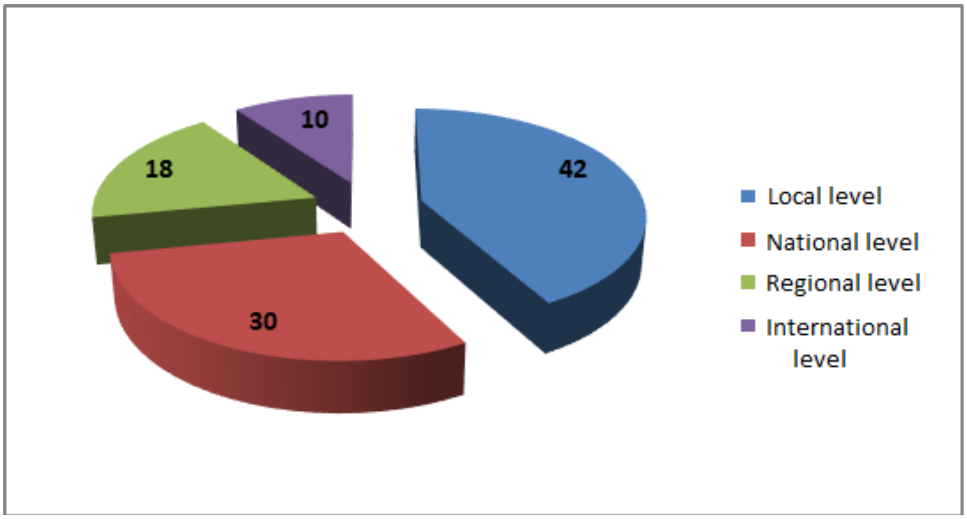

Figure 2: Percentage review of organizations according to operation level

In observed sample two organizations operate till 3rd year, also 2 organizations operate from 4 to 7 years, eleven organizations operate from 8 to 15 years, while over 15 years operate 35 organizations from the sample. Percentage review of organizations according to operation length is shown with figure 3.

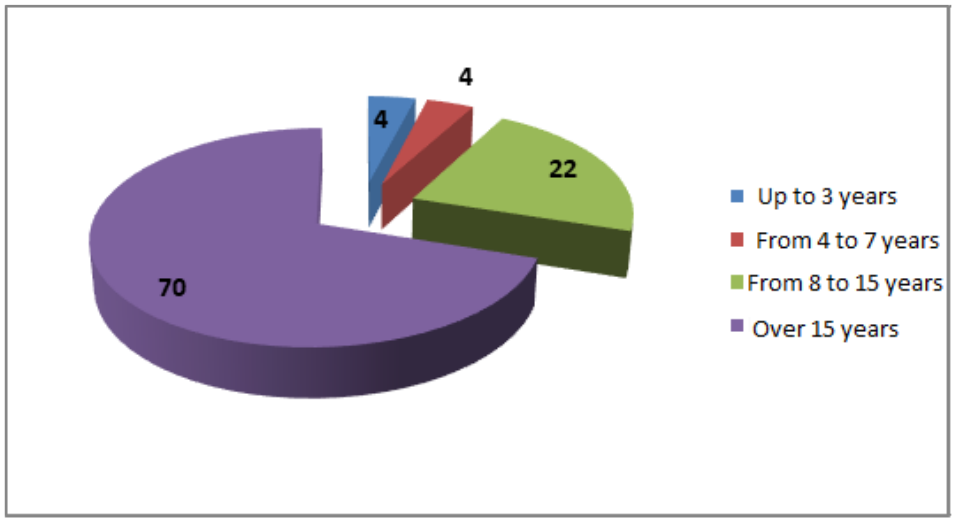

Figure 3: Percentage review of organizations according to operation length

In observed sample 42 organizations have a web page (84%), while 8 (16%) does not have a web page.

In observed sample 23 organizations have Facebook (46%), while 25 organizations (52%) does not have Facebook, and in 2 organizations (2%) did not know if they have Facebook.

In observed sample 9 organizations have twitter account (18%), 39 does not have (78%), while in 2 organizations did not know if they have twitter account (4%).

Presentation Quality Through Digital Path

Research results have shown that quality of web pages in highest number have organizations which are included in the sample is rated as good (46%), as extremely good quality of web pages was rated in 28% of organizations, and in 8% of organizations was rated as average, while in 18% of organizations doesn't have a web page. (Table 1)

Table 1: Quality of web pages in organizations

Web Page Quality	Absolute Frequencies	Relevant Frequencies (Percentages)
Don't have web page	9	18.0
Bad	0	0
Average	4	8.0
Good	23	46.0
Extremely good	14	28.0
TOTAL	**50**	**100.0**

Table 2 shows Facebook page quality for observed organizations. In 58% organizations Facebook does not exist, while in 18% organizations it was rated as good and extremely good, and average quality was rated in 6% organizations.

Table 2: Quality of Facebook page

Facebook Page Quality	Absolute Frequencies	Relevant Frequencies (Percentages)
Don't have Facebook page	29	58.0
Bad	0	0
Average	3	6.0
Good	9	18.0
Extremely good	9	18.0
TOTAL	**50**	**100.0**

In Table 3. Quality of YouTube movies in organizations is presented from the sample. We can see that 78% organizations do not have YouTube movies, in 10% quality is good, in 6% is average, in 4% extremely good and only one organization has rated quality of YouTube movies as bad.

Table 3: Quality of YouTube movies

Quality of Youtube Movies	Absolute Frequencies	Relevant Frequencies (Percentage)
Don't have YouTube movies	39	78.0
Bad	1	2.0
Average	3	6.0
Good	5	10.0
Extremely good	2	4.0
TOTAL	**50**	**100.0**

Marketing Activities in Organizations

In observed sample highest percentage of organizations (34%) marketing activities are done from time to time, 26% organizations perform frequently marketing activities, 22% mostly does, 12% mostly do not, while 6% organizations do not perform any marketing activities (Table 4.).

Table 4: Frequency of performing marketing activities in organizations

Frequency of performing marketing activities in organizations	Absolute Frequencies	Relative Frequencies (Percentage)
Marketing activities are never performed	3	6.0
Marketing activities are mostly not performed	6	12.0
Marketing activities are performed from time to time	17	34.0
Marketing activities are mostly performed	11	22.0
Marketing activities are frequently performed	13	26.0
TOTAL	**50**	**100.0**

In table 5. is presented frequency of planning marketing activities through digital medias. In highest percentage of organizations (28%) marketing activities are monthly not planned, in 26% organizations are planned from time to time, in 16% marketing activities are frequently planned, and in the same percentage in organizations was responded that marketing activities are never planned, while in 14% organizations marketing activities are mostly planned.

Table 5: frequency of planning marketing activities through digital medias in organizations

Frequency of planning marketing activities through digital medias	Absolute Frequencies	Relative Frequencies (Percentage)
Marketing activities are never planned	8	16.0
Marketing activities are mostly not planned	14	28.0
Marketing activities are planned from time to time	13	26.0
Marketing activities are mostly planned	7	14.0
Marketing activities are frequently planned	8	16.0
TOTAL	**50**	**100.0**

Highest percentage of organizations (64%) don't promote themselves at all through TV channels, in 20% organizations promotions through TV channel is primary, in 6% promotions through TV channels is very rare or is done from time to time, while in 4% organizations was responded that they promote mostly through TV channels, which is presented in table 6.

Table 6: Promotions of organizations through TV channels

Promotions of organizations through TV channels	Absolute Frequencies	Relative Frequencies (Percentage)
Don't promote through TV channels	32	64.0
Promote very rare through TV channels	3	6.0
Promote from time to time	3	6.0
Promote mostly through TV channels	2	4.0
Primary promotion is through TV channels	10	20.0
TOTAL	**50**	**100.0**

In table 7. is presented organization's promotion through radio stations. It can be seen that biggest percentage of organizations (68%) doesn't promote at all through radio stations, for 12% of organizations promotion through radio stations is primary, 10% of organizations promotes from time to time, 6% mostly promotes through radio stations, while 4% of organizations this type of promotion use rarely.

Table 7: Radio station promotions

Radio station promotions	Absolute Frequencies	Relative Frequencies (Percentage)
Don't promote at all through radio stations	34	68.0
Promote rarely through radio stations	2	4.0
Promote from time to time through radio stations	5	10.0
Promote mostly through radio stations	3	6.0
Primary promotion is through radio stations	6	12.0
Total	**50**	**100.0**

Differences in existence of web page, Facebook and Twitter account in different characteristics organizations

Differences in existence of web page, Facebook and Twitter account in different characteristics organizations (size, business level and length) are determined by using χ^2 (Chi-Square) test. For difference existence was taken the value 0,05 (for all values ≤ 0,05 exists meaningful difference).

Differences in existence of web page in organizations with different characteristics

If we look graph 4. the biggest number of middle size organizations have web page, while biggest number of micro organizations do not.

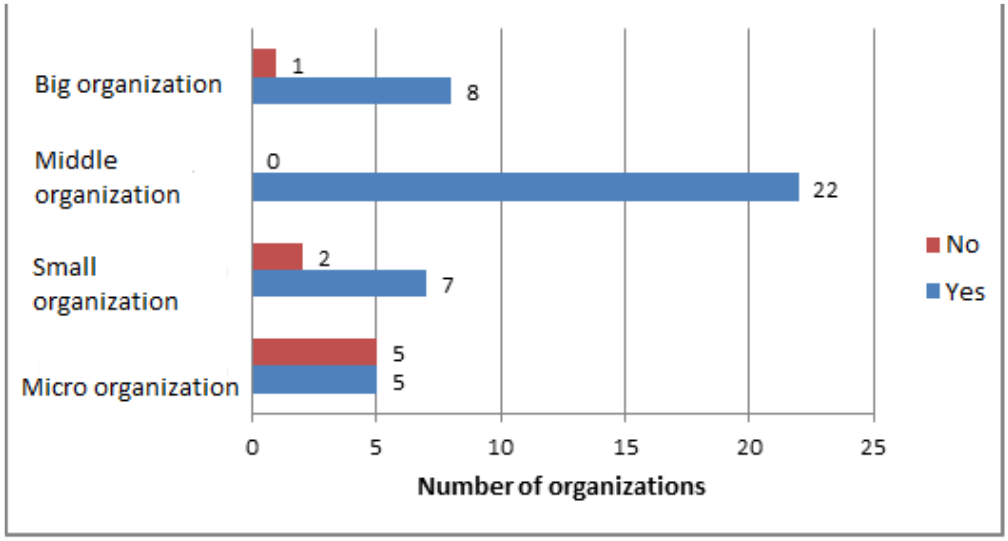

Figure 4: Differences in existence of web page in different sizes organizations

In the table we can see differences significance in existence of web page in different sizes organizations. Namely in column Sig for Pearson Chi-Square there is value 0,004, which is less than 0,005, so it is concluded that organization's size significantly effects on differences in existence of web page.

Table 8: Differences significance in existence of web page in different sizes organizations

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.211(a)	3	.004*
Likelihood Ratio	14.290	3	.003
Linear-by-Linear Association	8.873	1	.003
N of Valid Cases	50		

With Figure 5. are presented differences in different business level organizations in terms of web page existence. In highest number organizations which perform on local level web page exists, and also on local level operates the highest number of organizations which do not have web page.

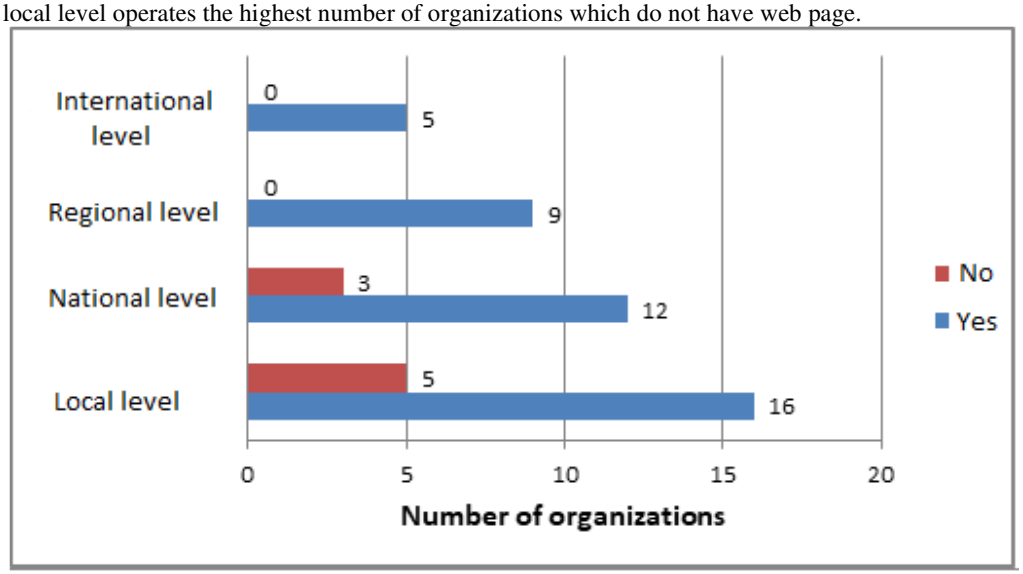

Figure 5: Differences of web page existence in different business level organizations

With Table 9. was presented significance of differences in terms of web page existence in different business level organizations. We can see that Sig.=0,284>0,05, so it is concluded that level of performance does not significantly effects on differences of web page existence.

Table 9: significance of differences in terms of web page existence in different business level organizations

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.798(a)	3	.284
Likelihood Ratio	5.902	3	.116
Linear-by-Linear Association	3.199	1	.074
N of Valid Cases	50		

With figure 6 are presented differences in existence of web page in organizations which perform in different time period. Highest number organizations which perform over 15 years have web page, and also there are the most of those which do not have web page, and they perform over 15 years.

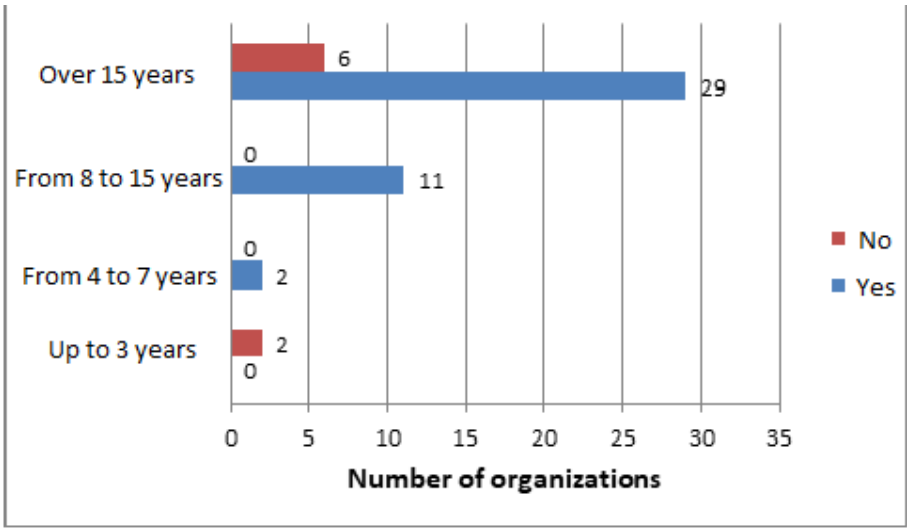

Figure 6: Differences in existence of web page in organizations which perform in different time period

With Table 10. was presented significance of differences of web page existence in organizations which perform in different time period. Sig.=0,005<0,05, so it is concluded that length of business significantly effects on differences of web page existence.

Table 10: Significance of differences of web page existence in organizations which perform in different time period

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.010(a)	3	.005*
Likelihood Ratio	11.897	3	.008
Linear-by-Linear Association	1.803	1	.179
N of Valid Cases	50		

Differences of Facebook page existence in Different Characteristics Organizations

With figure 7. are shown difference in Facebook page existence in different size organizations. We can see that in the most middle size organizations there is Facebook page, and highest number of middle size organizations do not have Facebook page.

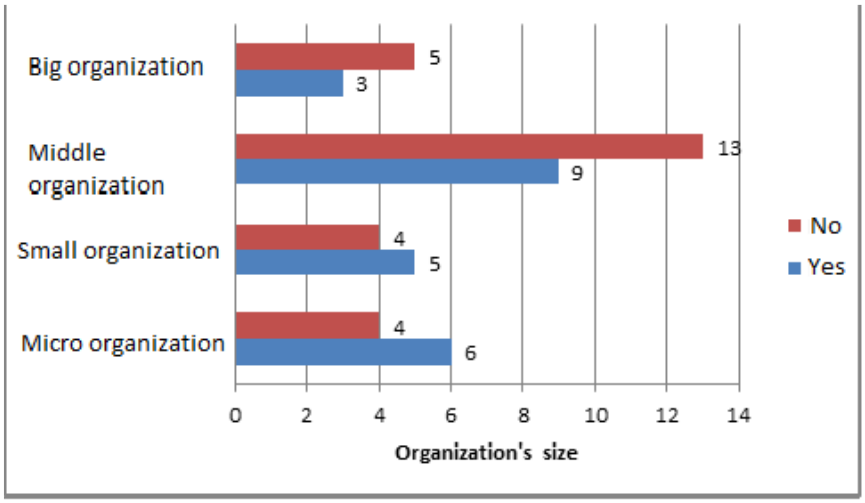

Figure 7: Difference in Facebook page existence in different size organizations

Table 11 is presented significance of difference in Facebook page existence in different size organizations. We can see that Sig=0,400>0,05, so it can be concluded that most of organizations affects significantly on differences in Facebook page existence.

Table 11: Significance of difference in Facebook page existence in different size organizations

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.208(a)	6	.400
Likelihood Ratio	5.092	6	.532
Linear-by-Linear Association	2.631	1	.105
N of Valid Cases	50		

In figure 8 can be seen differences in Facebook page existence in organizations of different business level. We could see that organizations on local level do not have Facebook page, and on the same business level are also those organizations which do not have Facebook page.

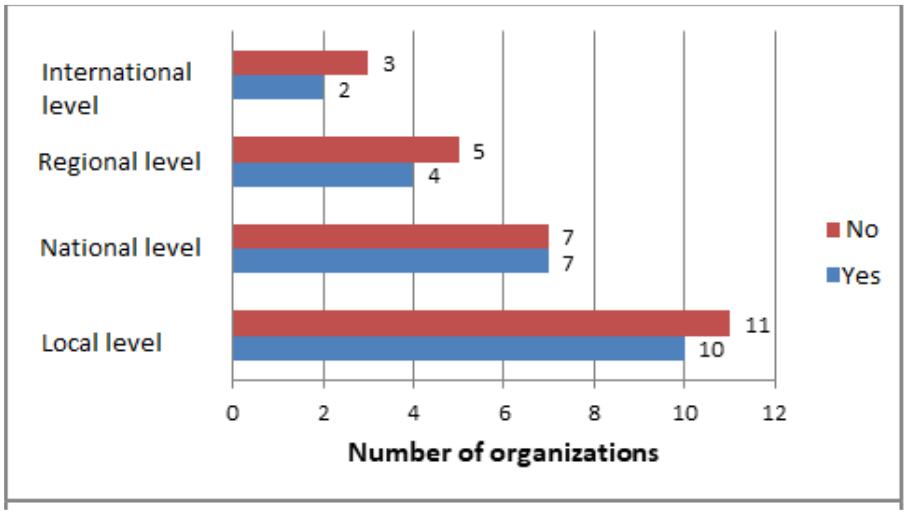

Figure 8: Differences in Facebook page existence in organizations of different business level

In Table 12. is presented significance of differences in Facebook page existence within organization of different business level. Sig =0,862>0,05, so it is concluded that business level significantly effects on differences in Facebook page existence.

Table 12: Significance of differences in Facebook page existence within organization of different business level

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.557(a)	6	.862
Likelihood Ratio	2.633	6	.853
Linear-by-Linear Association	.086	1	.769
N of Valid Cases	50		

With figure 9. are presented differences in Facebook page existence within organizations which perform in different time period. It is shown that the biggest number of organizations which perform over 15 years (same number) are ones which have and do not have Facebook page.

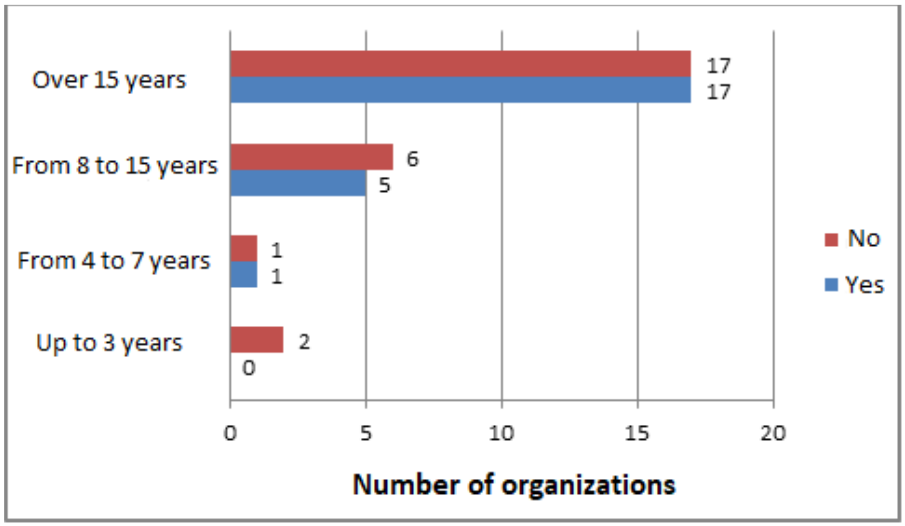

Figure 9: Differences in Facebook page existence within organizations which perform in different time period

In Table 13. is presented significance of differences in Facebook page existence within organizations which perform in different time period. It can be seen that Sig=0,881>0,05, so it is concluded that business length doesn't significantly effects on differences in Facebook page existence.

Table 13: Significance of differences in Facebook page existence within organizations which perform in different time period

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.387(a)	6	.881
Likelihood Ratio	3.402	6	.757
Linear-by-Linear Association	.609	1	.435
N of Valid Cases	50		

Organizations Twitter Account Differences

If we take a look at figure 10. we can see that the biggest number of middle size organizations do not have Twitter account, and also the biggest number of middle organizations have Twitter account.

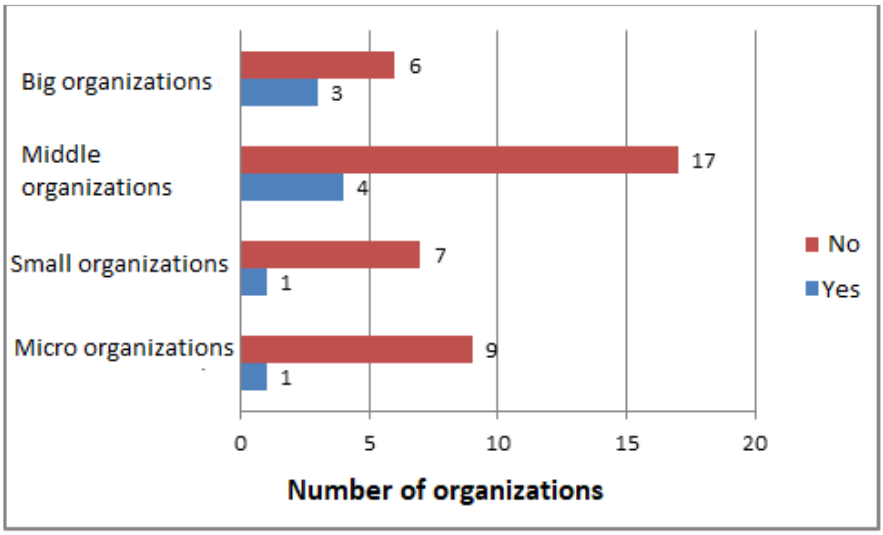

Figure 10: Organizations Twitter account differences

With table 14. is presented significance of differences in Twitter account existence within different size organizations. It can be seen that Sig=0,674>0,05, so it is concluded that organization's size does not affect significantly on Twitter account existence.

Table 14: Significance of differences in Twitter account existence within different size organizations

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.017(a)	6	.674
Likelihood Ratio	4.269	6	.640
Linear-by-Linear Association	1.412	1	.235
N of Valid Cases	50		

In figure 11. are presented differences in Twitter account existence in organizations with different business level. It is shown that the biggest number of organizations which perform on local level do not have Twitter account, while the biggest number of organizations which perform on local level have Twitter account.

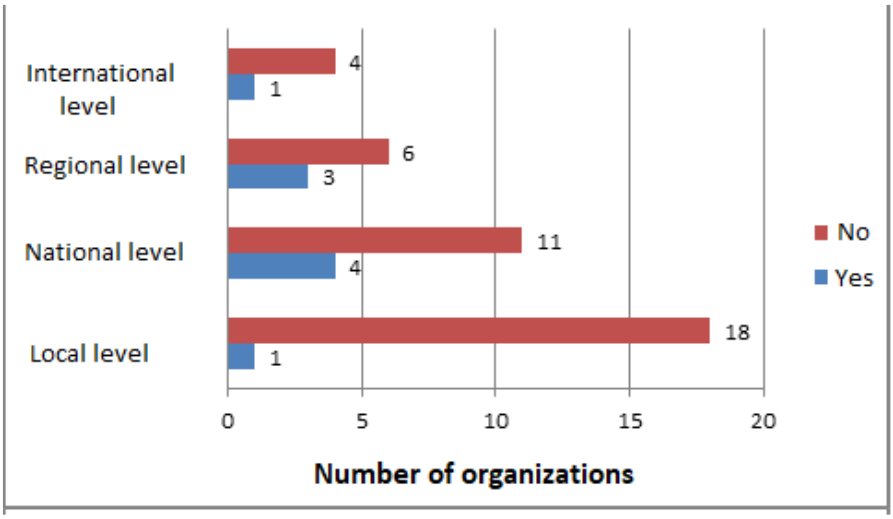

Figure 11: Differences in Twitter account existence in organizations with different business level

In table 15. is shown significance of differences in Twitter account existence in organizations on different business level. It can be seen that Sig=0,323>0,05, so we can conclude that level of business does not affect significantly on Twitter account existence.

Table. Significance of differences in Twitter account existence in organizations on different business level

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.972(a)	6	.323
Likelihood Ratio	8.219	6	.222
Linear-by-Linear Association	3.863	1	.049
N of Valid Cases	50		

With figure 12. are presented differences in Twitter account existence within organizations that perform in different time period. It can be seen that Twitter account mostly do not have organizations which perform over 15 years, and also that organizations which perform more than 15 years in biggest number have Twitter account.

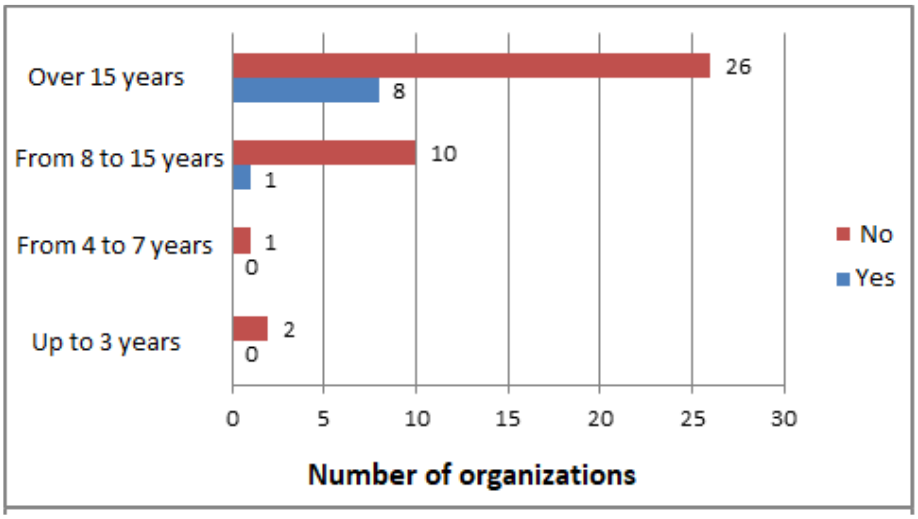

Figure 12: Differences in Twitter account existence within organizations that perform in different time period

If we look at table 16. it can be seen that significance of differences in Twitter account existence in organizations which perform in different time period. Results have shown that Sig = 0,036<0,05, so it is concluded that business length significantly effects on Twitter account existence.

Table 16: Significance of differences in Twitter account existence in organizations which perform in different time period

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.500(a)	6	.036*
Likelihood Ratio	7.465	6	.280
Linear-by-Linear Association	2.694	1	.101
N of Valid Cases	50		

Impact of organizations differences on quality and frequency of marketing activities

Impact of organization's size on quality and frequency of marketing activities was confirmed by ANOVA test, with significance level 0,05 (for all values Sig. ≤0,05, exists significant difference).

Impact of organization's size on quality and frequency of marketing activities

In table 17. it can be seen that Sig., only for web page quality is different in organizations of different sizes (micro, small, middle and big). Namely, Sig=0,011<0,05, so it is concluded that organization's quality significantly depends on organization's size. On the other hand, no matter organization's size

Facebook page quality, You Tube movies, promotions through TV channels and radio stations is not different.

Table 17: Impact of organization's size on differences in quality and frequencies of marketing activities

Organization's size		Sum of Squares	df	Mean Square	F	Sig.
Webpage quality	Between Groups	19.992	3	6.664	4.186	.011*
	Within Groups	73.228	46	1.592		
	Total	93.220	49			
Facebook page quality	Between Groups	4.107	3	1.369	.457	.713
	Within Groups	137.673	46	2.993		
	Total	141.780	49			
Quality of You Tube movies	Between Groups	2.182	3	.727	.479	.698
	Within Groups	69.818	46	1.518		
	Total	72.000	49			
Frequencies of performing marketing activities in organizations (market research, promotions, PR etc.)	Between Groups	2.116	3	.705	.489	.692
	Within Groups	66.384	46	1.443		
	Total	68.500	49			
Frequencies of planning marketing activities through digital media (and not only engaging according to need)	Between Groups	5.410	3	1.803	1.055	.377
	Within Groups	78.610	46	1.709		
	Total	84.020	49			
TV channel promotions	Between Groups	7.737	3	2.579	.951	.424
	Within Groups	124.763	46	2.712		
	Total	132.500	49			
Radio station promotions	Between Groups	3.490	3	1.163	.530	.664
	Within Groups	101.010	46	2.196		
	Total	104.500	49			

Relation of web page rates in different size organizations was presented in graph 13. where it can be seen that highest number of middle size organizations has rated web page as good or extremely good.

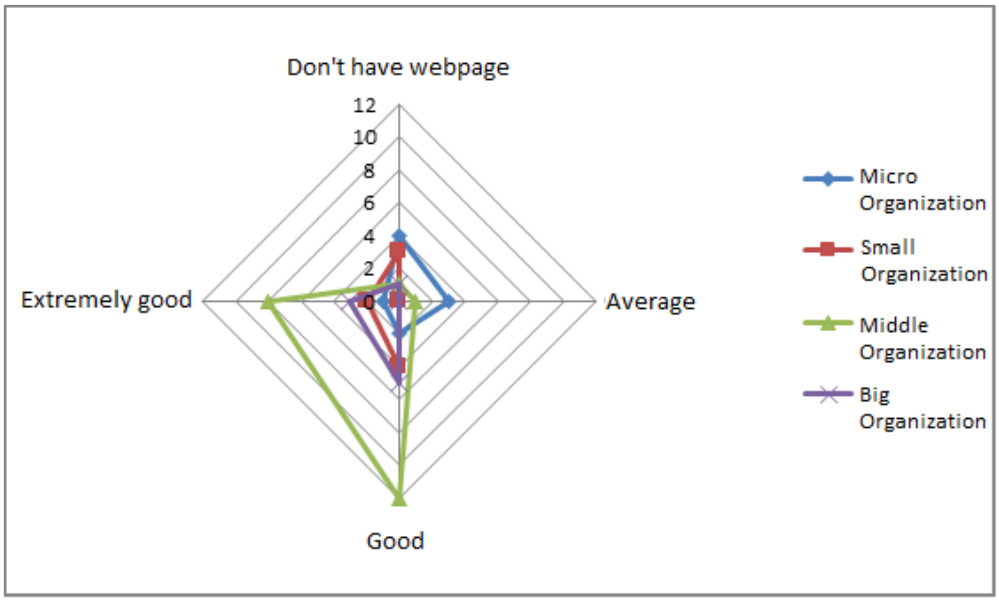

Figure 13: Web page quality of different size organizations

Since the difference in web page quality was observed in different size organizations, additional Turkey test was determined between which organizations difference exists. Significant difference in web page quality exists especially between micro and middle organizations (Sig=0,010<0,05), which is presented in table 18.

Table 18:Differences in web page quality in different size organizations

WEB PAGE QUALITY		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
(I) Organization's size	(J) Organization's size	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound
Micro organization	Small organization	-.622	.580	.707	-2.17	.92
	Middle organization	-1.582(*)	.481	.010	-2.86	-.30
	Big organization	-1.400	.580	.088	-2.95	.15
Small organization	Micro organization	.622	.580	.707	-.92	2.17
	Middle organization	-.960	.499	.233	-2.29	.37
	Big organization	-.778	.595	.563	-2.36	.81
Middle organization	Micro organization	1.582(*)	.481	.010	.30	2.86
	Small organization	.960	.499	.233	-.37	2.29

	Big organization	.182	.499	.983	-1.15	1.51
Big organization	Micro organization	1.400	.580	.088	-.15	2.95
	Small organization	.778	.595	.563	-.81	2.36
	Middle organization	-.182	.499	.983	-1.51	1.15

Impact of business level to quality and frequency of marketing activities

In table 19. are presented differences in quality and frequency of marketing activities in different business level organizations. Differences are only appeared in terms of web page quality (Sig=0,027<0,05). Results show that business level does not affect significantly on differences in Facebook page quality, You Tube movies, frequencies in performing marketing activities, planning marketing activities through digital media, promotions through TV and radio channels.

Table 19: Differences in quality and frequency of marketing activities in different business level organizations

Business level		Sum of Squares	df	Mean Square	F	Sig.
Webpage quality	Between Groups	16.655	3	5.552	3.335	.027*
	Within Groups	76.565	46	1.664		
	Total	93.220	49			
Facebook page quality	Between Groups	.739	3	.246	.080	.970
	Within Groups	141.041	46	3.066		
	Total	141.780	49			
Quality of You Tube movies	Between Groups	5.168	3	1.723	1.186	.326
	Within Groups	66.832	46	1.453		
	Total	72.000	49			
Frequencies of performing marketing activities in organizations (market research, promotions, PR etc.)	Between Groups	3.268	3	1.089	.768	.518
	Within Groups	65.232	46	1.418		
	Total	68.500	49			
Frequencies of planning marketing activities through digital media (and not only engaging according to need)	Between Groups	2.064	3	.688	.386	.763
	Within Groups	81.956	46	1.782		
	Total	84.020	49			
TV channel promotions	Between Groups	13.173	3	4.391	1.693	.182
	Within Groups	119.327	46	2.594		
	Total	132.500	49			
Radio station promotions	Between Groups	5.440	3	1.813	.842	.478

	Within Groups	99.060	46	2.153		
	Total	104.500	49			

In figure 14. are presented web page rates of different business level, where it can be seen that organizations on regional level in highest number have rated quality as extremely good, while organizations which perform on national and local level rated as good quality of web page.

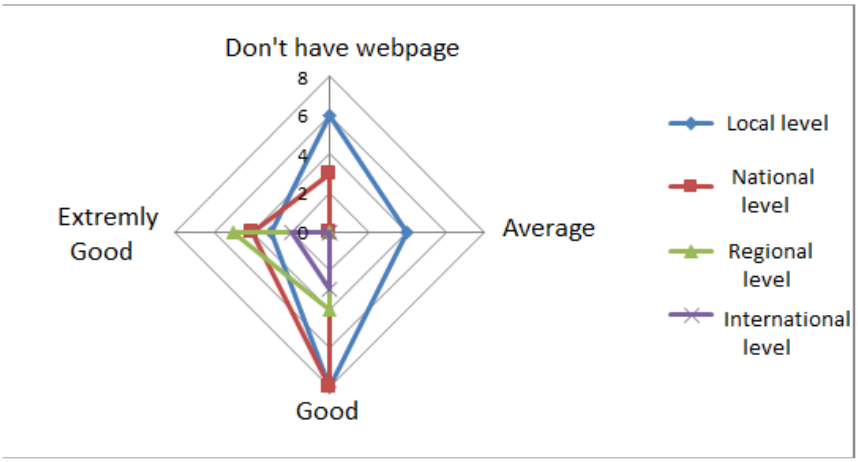

Figure 14: Web page quality of different business level organizations

Difference was spotted in web page quality within organizations of different business level, so with additional Turkey test was determined between which organizations difference exists. Significant difference in web page quality exists especially between organizations which perform on local and regional level (Sig=0,033<0,05), which is shown in table 20.

Table 20: Differences in web page quality within organizations that perform on different level

WEB PAGE QUALITY		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
(I) Business level	(J) Business level	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound
Local level	National level	-.571	.436	.561	-1.73	.59
	Regional level	-1.460(*)	.514	.033	-2.83	-.09
	International level	-1.305	.642	.191	-3.02	.41
National level	Local level	.571	.436	.561	-.59	1.73
	Regional level	-.889	.544	.370	-2.34	.56
	International level	-.733	.666	.691	-2.51	1.04
Regional level	Local level	1.460(*)	.514	.033	.09	2.83
	National level	.889	.544	.370	-.56	2.34

	International level	.156	.720	.996	-1.76	2.07
International level	Local level	1.305	.642	.191	-.41	3.02
	National level	.733	.666	.691	-1.04	2.51
	Regional level	-.156	.720	.996	-2.07	1.76

Impact of business length to quality and frequency of marketing activities

In table 21 is presented an impact of organization's business length to quality and frequency of marketing activities. Based on results differences are spotted only in terms of web page quality (Sig=0,004 < 0,05), and business length doesn't affect significantly on differences in Facebook page quality, You Tube movies, frequencies in performing marketing activities, planning marketing activities through digital media, promotions through TV and radio channels, which is presented in table 21.

Table 21: Differences in quality and frequency of marketing activities in organizations that perform in different time period

Business length		Sum of Squares	df	Mean Square	F	Sig.
Webpage quality	Between Groups	22.898	3	7.633	4.993	.004*
	Within Groups	70.322	46	1.529		
	Total	93.220	49			
Facebook page quality	Between Groups	9.027	3	3.009	1.043	.383
	Within Groups	132.753	46	2.886		
	Total	141.780	49			
Quality of You Tube movies	Between Groups	3.647	3	1.216	.818	.491
	Within Groups	68.353	46	1.486		
	Total	72.000	49			
Frequencies of performing marketing activities in organizations (market research, promotions, PR etc.)	Between Groups	2.212	3	.737	.512	.676
	Within Groups	66.288	46	1.441		
	Total	68.500	49			
Frequencies of planning marketing activities through digital media (and not only engaging according to need)	Between Groups	5.821	3	1.940	1.141	.342
	Within Groups	78.199	46	1.700		
	Total	84.020	49			
TV channel promotions	Between Groups	12.069	3	4.023	1.537	.218
	Within Groups	120.431	46	2.618		
	Total	132.500	49			
Radio station promotions	Between Groups	6.483	3	2.161	1.014	.395
	Within Groups	98.017	46	2.131		
	Total	104.500	49			

In figure. are presented web page rates of organizations that perform in different time period. Organizations which perform over 15 years, have rated the best web page quality.

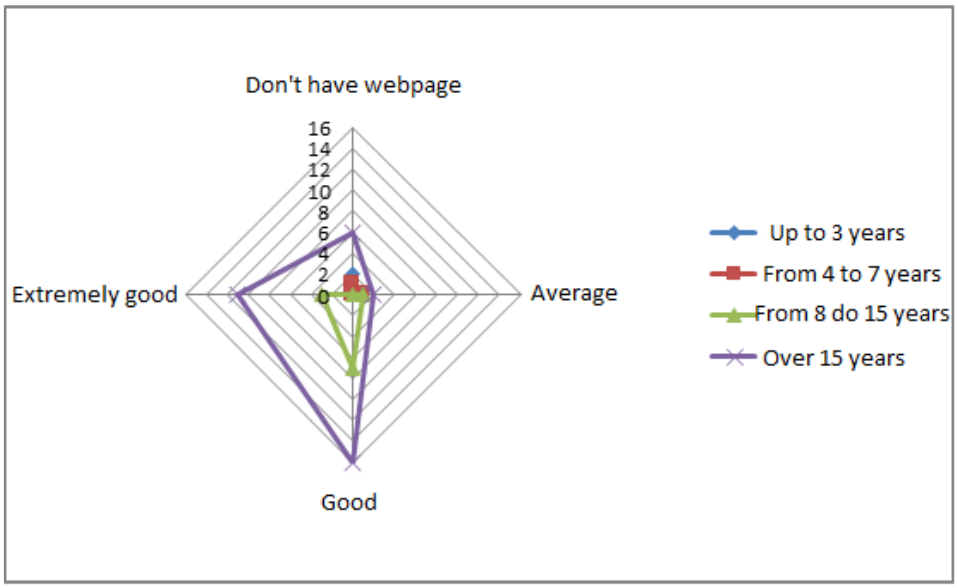

Figure 15: Web page quality of organizations that perform in different time period

Since the difference in web page quality was spotted in organizations that perform in different time period, with additional Turkey test it was determined that difference especially exists between organizations that perform up to 3 years and the ones which perform from 8 to 15 years (Sig=0,009<0,05), as well as with organizations that perform up to 3 years and the ones that perform over 15 years (Sig=0,019<0,05), which is shown in table 22.

Table 22: Differences in web page quality within organizations that perform in different time period

WEB PAGE QUALITY		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
(I) Business length	(J) Business length	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound
Up to 3 years	From 4 to 7 years	-1.000	1.236	.850	-4.30	2.30
	From 8 to 15 years	-3.182(*)	.950	.009	-5.72	-.65
	Over 15 years	-2.743(*)	.899	.019	-5.14	-.35
From 4 to 7 years	Up to 3 years	1.000	1.236	.850	-2.30	4.30
	From 8 to 15 years	-2.182	.950	.114	-4.72	.35
	Over 15 years	-1.743	.899	.226	-4.14	.65

From 8 to 15 years	Up to 3 years	3.182(*)	.950	.009	.65	5.72
	From 4 to 7 years	2.182	.950	.114	-.35	4.72
	Over 15 years	.439	.427	.735	-.70	1.58
More than 15 years	Up to 3 years	2.743(*)	.899	.019	.35	5.14
	From 4 to 7 years	1.743	.899	.226	-.65	4.14
	From 8 to 15 years	-.439	.427	.735	-1.58	.70

Conclusion

The research which was conducted within 50 organizations in highest percentage has included middle size organizations, which perform mostly on local and national level and operate for more than 15 years. Highest percentage of organizations (84%) have web page, while more than half do not have Facebook page (52%). Also, more than half organizations which were included (78%) do not have Twitter account.

Results show that organizations use web page as presentation of themselves through internet, but it is not their primary way of presenting. They do not use enough more aggressive strategies in reaching customers through social networks and getting feedbacks about accepting organization and its activities from social networks visitors.

For highest percentage of organizations web page quality was rated as good, while Facebook page (ones that have it) in same per cent (18%) was rated as good and extremely good. Big percentage of organizations do not post You Tube movies (78%), and ones that do post have rated the quality in highest percentage as good.

Highest percent of organizations marketing activities perform from time to time (34%), while 22% perform them mostly frequently, and always frequently 26% of organizations. Planning marketing activities which are done through digital media mostly do not perform (28%), or plan from time to time (26%).

Results refer that organizations do not plan enough marketing activities, especially one through digital media, which indicated to still insufficient understanding the importance of this promotion type within organizations.

More than half organizations (64%) do not promote themselves through TV channels at all, and it is even higher percentage of those which do not promote themselves at all through radio stations (68%). *The conclusion is that traditional ways of promotion have been left, and further research should answer why is that, is it because of pricing, more usage of digital media, due to deficit in financing, customers disinterest or some other reason.*

Results show that differences in web page existence appears in different size organizations and business length. Differences in Facebook page existence do not exist regardless to characteristics of organizations itself. Namely, descriptive statistic has shown that more than half do not even have Facebook page, which is only confirmed in relation to organizations differences. Differences in Twitter account existence appear only in organizations which perform in different time period.

Results show that quality and frequency of marketing activities is different only in terms of web page quality and in organizations same size, level and business length. Other indicators refer that differences in organization's characteristics do not significantly affect to observed variables.

Based on theoretically and empirically research it's been accepted starting hypothesis according to which modern business ways and digitalization in each social segment effects on incensement of digital marketing role in media advertising, in a way that big number of information can be accessible to wide auditorium in the same time period.

Besides this auxiliary hypothesis are confirmed. It was proven that increasingly organizations are leaving traditional advertising methods (results showed exceedingly small percentage of organizations which promote themselves through TV channels and radio stations), and they turn to modern. Nevertheless, other hypothesis was proven, thus was shown that organizations in highest percentage have web page, but they do not use enough other advertising methods, such as social networks. Also, it was proven that different characteristic organizations are different only in terms of web page quality, while they are not different regarding other quality indicators and frequencies of marketing activities, by which third hypothesis was confirmed.

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Recognition of Identifiable Intangible Assets in Business Combinations. The Case of Poland

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Abstract

The aim of this paper is to investigate the initial recognition of identifiable intangible assets (IIAs) disclosed by classes in purchase price allocation process. As disclosures related to IIAs constitute significant value in the financial reports prepared after business combinations, the research question is: what is the scope of IIAs recognized by Polish companies? Our study provides empirical evidence on the initial recognition of IIAs while other studies mainly concentrate on subsequent measurement. The empirical approach was based on a manual qualitative analysis of 100 consolidated financial reports published by Polish companies between 2012 and 2016. All companies chosen for the research are the publicly traded firms listed on the Warsaw Stock Exchange and indexed in WIG 20.Our study shows that the most frequent groups of IIAs are customer-related and marketing-related classes. Contrary to other research, we observed very few technology-based intangible assets. Although the frequency of IIAs disclosed by classes in our sample is relatively low, it is justified by the materiality of disclosures.

Keywords: Identified Intangible Assets, Purchase Price Allocation, Business Combinations, Financial Reports, Consolidated Financial Reports

Introduction

In the era of knowledge economy intangibles are becoming more important than tangible assets (Deloitte, 2017; Ernst and Young, 2018; Giuliani and Brännström, 2011; Grant Thornton 2013; Grobel and Forbes, 2008; KPMG, 2010; Wyatt, 2008).Many studies emphasize the growing role of intangibles in the evaluation of performance and in the number of total assets (Bauman and Shaw, 2018; Wyatt et al.,2001; Zeghal and Maaloul, 2011). However, intangible assets are difficult for outsiders to observe and monitor (Wyatt, 2005), their economic substance is all the more complicated and the recognition of intangibles is problematic (Penman, 2009; Skinner, 2008).

Business combinations (hereinafter BCs) are transactions with intangibles playing a crucial role, as they are value drivers for acquirees, assurance for future synergy effects and strategy determinants of the joint entity. This creates the expectation that accounting for BCs provides information about the effects of transactions, such as details about the nature and amounts of certain economic resources with no physical substance. During purchase price allocation it is allowed to recognize new identified intangible assets (hereinafter IIAs) although the acquiree had not disclosed them in the financial report prior to the acquisition.

Recent literature reveals that management has discretion to recognize separately identified intangible assets and aggregate goodwill (Wyatt, 2005; X. I. Zhang and Zhang, 2017), whereas the capitalization of intangibles (separate from goodwill) signals the intellectual investments made by the firm (Wyatt, 2008). Furthermore, previous studies show higher analyst following and more accurate earnings forecasts (Matolcsy and Wyatt, 2006; Ritter and Wells, 2006), value relevance of research and development, as well as human reporting (Ahmed and Falk, 2006; Lajili and Zeghal, 2006). The allocation decision has important accounting consequences, because goodwill is usually capitalized without amortization. Managers are given broad discretion to capitalize unidentified intangible assets (called goodwill) without amortization as most IIAs.

Since managers have more comprehensive information than other stakeholders, their discretion to allocate some value to IIAs becomes of crucial importance. Moreover, to reduce the information asymmetry more effectively, managers should describe in details classes of acquired IIAs. The high scope of disclosures in financial statement is also consistent with the legitimization theory (Łada and Kozarkiewicz, 2013). According to the legitimization theory, reporting as an information channel between the company and the society is a factor enabling social acceptance. Achieving social acceptance is possible by publishing reliable and transparent reports.

This paper investigates the initial recognition of identifiable intangible assets disclosed by classes in purchase price allocation. Detailed information about acquired IIAs is crucial for deep understanding the economic nature of business combination, especially considering managerial discretion in purchase price allocation and information asymmetry between managers and financial statements' users. The research method adapted for this study is qualitative analysis of 100 consolidated financial reports published by Polish largest companies between 2012 and 2016.

The remainder of the paper is structured as follows: first section reviews prior related literature. The subsequent sections describe the design of the study followed by the presentation and discussion of results. The paper ends with conclusions and suggestions for future research.

Literature Review

The IASB defines an intangible asset as 'an identifiable non-monetary asset without physical substance' (IAS 38, 2004). An intangible asset is identifiable if it meets either the separability criterion (is capable of being separated from the entity and sold, licensed etc.) or the contractual-legal criterion (it arises from contractual or other legal rights).Based on the definition of asset and accounting problem with the notion of 'control' of an asset, standard setters limited categories of intangibles to two groups: internally generated intangibles and externally generated ones. Externally generated intangibles are regulated as the price paid for the intangible serves for the measurement purposes. In this context, goodwill represents aggregated figure encompassing several dimensions and facets of intangibles externally generated and purchased in a business combination. As distinct from these unidentified intangible value-drivers, an entity shall recognize separately intangible assets that meet the criterion of identification.

One of the first studies about intangibles separated from goodwill evidenced that British firms voluntary recognized acquired brands (Muller, 1999). Muller finds out that a limited number of firms recognized and measured the value of acquired brand names separately from goodwill due to the fact that brands were not amortized at that time in the UK. Firms' decisions to separate brand names were influenced by the impact of goodwill direct write-off to equity upon acquisition and its impact on the increase of firms' reported leverage ratios.

Jeny et al.(2016) assume that the amount of recognised goodwill may convey a different signal to investors compared to IIAs. Both the amounts of purchased goodwill and separately presented IIAs are value-relevant for market participants in the sense that they are positively associated with market value of equity. Although the value relevance of separated IIAs seems to be stronger than the value relevance of goodwill, the authors cannot provide strong evidence that it is statistically significant difference.

Kimbrough (2007) provides empirical evidence that decomposition of the purchase price yields useful information to investors and that the separate recognition of intangible assets apart from goodwill is value relevant. He finds out that investors appear to respond most strongly to purchase price allocation where the proportion of total assets allocated to IIAs apart from goodwill is greater that the industry average.

Eales and Abbey (2009) highlight that recognition of differentiated intangibles is difficult and not always possible. Also Carvalho et.al. (2016) investigated the magnitude of goodwill recognised in Portuguese BCs. Further, Rupo and Sidoti (2014) examined the level of disclosure of intangible assets, especially goodwill, resulting from BCs in Italy in years 2008-2011. The large amount of intangibles arising from BCs is often found in the balance sheet under the heading of unallocated goodwill, rather than under specific items of intangible assets. This negatively affects the reliability of financial statements and compromises the true and fair view of financial performance.

The other studies focused on subsequent measurement of IIA (Bepari et.al. 2014; Huikku et.al., 2017; Lapointe-Antunes et.al. 2009; Li and Shroff, 2011; Schultze, 2005; Seetharaman et.al. 2004; Seetharaman et.al. 2006).This study is concentrated on the recognition of identifiable intangible assets as a result of BCs.

Economic determinants of intangible assets recognition were subject to Wyatt's research (Wyatt, 2005). She examines the extent to which management made accounting choices to record intangible assets based on their insights into the underlying economics of their firm. Her result suggests that limiting managements' choices to record intangible assets tends to reduce, rather than improve, the quality of the balance sheet and investors' information set.

Another stream of research examines the classification of intangible assets with consideration also given to goodwill and other identifiable assets. Blair and Wallman (2000) proposed three major categories of intangibles, pointing out the control concern (Blair and Wallman, 2000): intangibles for which property rights are relatively clear and for which a market exists, intangibles that are controlled by the firm but for which well-defined and legally-protected rights may not exist and markets are weak or non-existent, and intangibles for which the firm has few, if any, control rights and a market does not exist, and which are tied to the people who work for the firm.

Studies with the aim of examining the quality of disclosure of intangibles also reveal the classification of intangibles. Garcia-Meca and Martinez (2005) conducted their research on disclosure quality based on the classification of intangibles into six different groups: human capital, customers, processes, technology, innovation with R&D and strategy. Unlike Garcia-Meca and Martinez (2005), Wyatt (2008) classifies intangibles as follows: technology resources, human resources and production resources. The above three categories of intangibles relate to three broad types of the firm's resources: technology, human and production wealth. Although these three categories are not exhaustive and overlap, Wyatt's classification covers internally and externally generated intangibles.

In the most recent study, Sacui and Szatmary (2015) considered five categories of intangible assets that meet the criteria for recognition as assets (apart from goodwill) in accordance with IFRS 3. They suggest that there are intangible assets specific to a number of industries while others might be called common (or well-accepted). Trademarks, research and development, and patents are among the common intangibles disclosed regardless of the industry.

Table 1: The classification of intangible assets

Authors	Classification
Blair and Wallman (2000)	Intangibles for which property rights are relatively clear and for which a market exists (e.g., patents, copyrights and trade names)
	Intangibles that are controlled by the firm but for which well-defined and legally-protected rights may not exist and markets are weak or non-existent
	Intangibles for which the firm has few, if any, control rights, a market does not exist and which are tied to the people who work for the firm, for example, human assets, organizational assets, relational assets encompassing intellectual capital
Garcia-Meca and Martinez (2005)	Human capital (that relates to the skills and knowledge of employees and managers)
	Customers (relations with customers)
	Processes (organizational processes)
	Technology
	Innovation, research and development (relates to a firm's ability to innovate, research and tackle new projects)
	Strategy (culture, firm ethics, environmental investments, leadership)
Wyatt (2008)	Technology resources (including research and development and related intellectual property)
	Human resources (human capital)
	Production resources encompassing: advertising, brands and related intellectual property, customer loyalty, competitive advantage, goodwill
Sacui and Szatmary (2015) based on IFRS 3	Technology-based intangible assets
	Contract-based intangible assets
	Customer-related intangible assets
	Marketing-related intangible assets
	Artistic-related intangible assets

Source: Own elaboration

The above classifications show that it is a complicated process encompassing adequate grouping and proper valuation of each specified class that might be defined dissimilarly depending on the entity's sector, historical systematization or management's consideration. The complexity of intangible assets recognition process was also confirmed by studies conducted among Polish entities. Janowicz (2016a; 2016b) in her studies clearly indicates that financial reports narrowly disclose information about the economic underpinnings of business combinations (including old as well as newly recognized intangibles), while Grzybek suggests that intangibles are used as discretionary accounting policy choices (Grzybek, 2015). Further, previous studies suggest (Grzybek and Maruszewska, 2016; Luty,

2018) that goodwill and other intangibles disclosure often lacks economic underpinnings and thus they are sensitive to manipulations. Overall, accounting for intangibles, especially in BCs, is much more than a technical implementation of sophisticated standards (Maruszewska and Strojek-Filus, 2016).

Research Sample

In our research we have analyzed the content of the consolidated financial reports of companies listed on the Warsaw Stock Exchange, one of the largest stock markets in Central-Eastern Europe. All firms chosen for the analysis were included in the WIG 20 Index that comprises the largest publicly traded companies in Poland. Our final sample comprised 125 BCs revealed in 100 financial reports prepared in accordance with IFRS for the period 2012 - 2016. The analysis focused on the quantitative and narrative information disclosed in financial reports publicly available on firms' websites. Table 2 presents descriptive statistics for the whole research period.

Table 2: Descriptive statistics

	Acquisition cost (mln PLN)	IIAs (mln PLN)	IIAs / acquisition cost	IIAs disclosed by classes (mln PLN)	IIAs disclosed by classes / IIAs
Mean	487	109	0,74	391	0,84
Median	29	3	0,11	50	0,94
Range	13 279	7 759	55	7 755	1
SD	1 654	710	4,89	1 419	0,23
Skewness	5,54	10,33	11,00	5,18	-1,79

Source: Own elaboration

The above descriptive statistics show that on average IIAs disclosed constitute big portion of acquisition cost (0,74) as well as IIAs disclosed by classes constitute in total IIAs (0,74). Few transactions were characterized by high amounts and the distribution is strongly right-hand.

Figure 1 presents a summary of analysis of the average amounts allocated to IIAs and the share of IIAs in the acquisition cost over the research period.

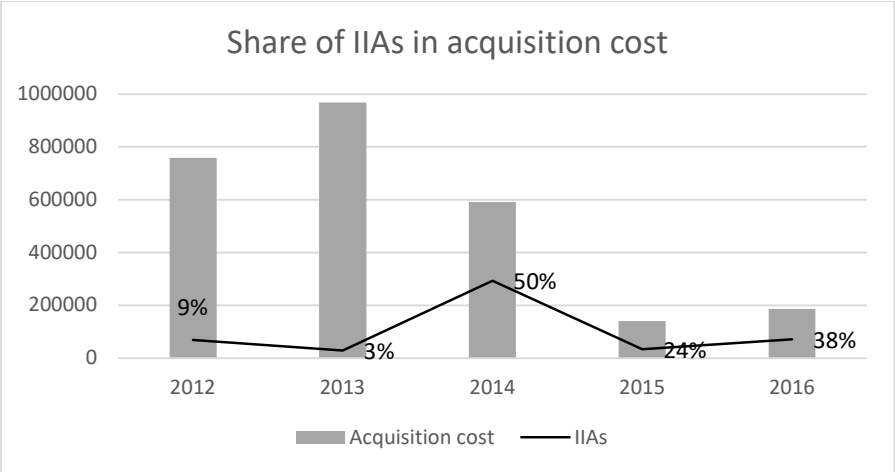

Fig. 1: Share of IIAs in acquisition cost

Source: Own elaboration

On average, more than a fifth of the purchase price is allocated to IIAs (22%). The highest proportion of the acquisition cost was allocated to IIAs in 2014 (50%), followed by 2016 with 38% and 2015 with

24%. High amounts allocated to IIAs confirm that intangible assets are key value - drivers in business combinations. This share was significantly lower in 2012 and in 2013 as the relatively high average acquisition cost was hardly allocated to IIAs. In contrary, from 2014 to 2016 although the declining trend in the amount of acquisition cost can be observed, the share of IIAs in average acquisition cost is much bigger. Thus, the share does not correspond with changes in the amounts of IIAs.

Results and Discussion

In the following section we examine in detail IIAs disclosed by class in the purchase price allocation. In particular, we investigate their frequency and materiality as two complementary dimensions of analysis. Then we analyze the types of IIAs to identify which are commonly recognized in purchase price allocation process and which are unique and specific to an entity.

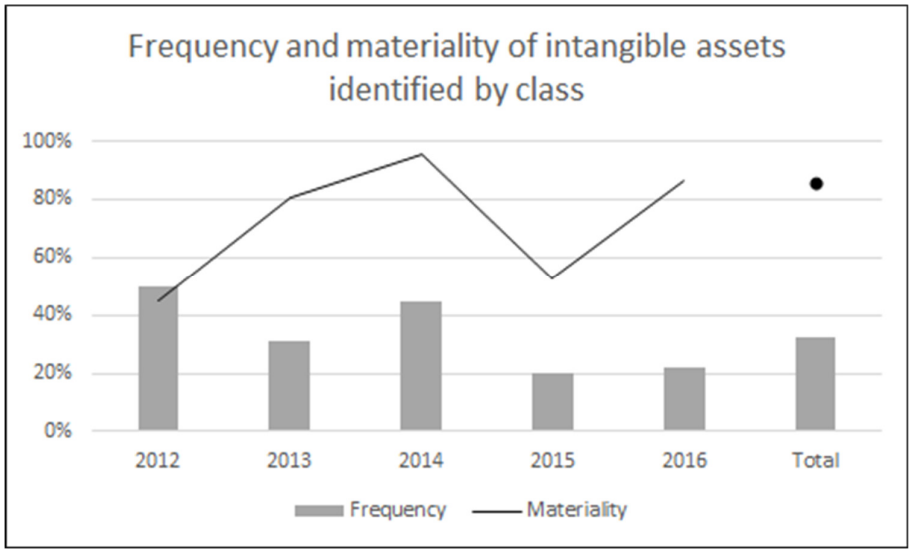

Fig. 2: Frequency and materiality of intangible assets identified by class
Source: Own elaboration

Most often BCs are related to acquiring some intangible assets that meet the criteria of identification - 74% of BCs assigned some value to the recognized IIAs. But only in one third of those BCs there were IIAs disclosed by class, representing only 24% of all analyzed BCs. It indicates that companies may not be eager to disclose detailed information about purchase price allocation. This finding is consistent with previous research (Janowicz, 2016b).

Nevertheless, we must consider not only the frequency but materiality of disclosed amounts as well. When we consider the amount of IIAs disclosed by class, we can observe that a great part of IIAs are disclosed by category (86% on average). Altogether it suggests that Polish companies identified intangible assets quite often and they disclosed detailed information if it could be useful for financial statement's users.

The frequency of recognizing IIAs in BCs in our sample (74%) is similar to other findings in prior studies (77% Eales and Abbey, 2009; 75% Jeny et al., 2016). Comparing our results with those of KPMG for 56 transactions in Poland in previous years (2008 to 2010), the frequency of IIA recognition is higher in later years (74% for the years 2012 to 2016 and 53% for 2008 to 2010; KPGM Report, 2011). Moreover, according to KPMG, only 17% of BCs were transactions with IIAs disclosed by classes, whereas this proportion is 24% in our sample, suggesting positive changes.

A comparison of our results with the findings of Carvalho et al. (2016) confirms that the largest Polish companies make a great effort during BC presentation as well as preparing financial reports in the

context of IIAs. Although the frequency of IIAs disclosed by class is relatively low, it is justified by the materiality of disclosures. In our sample, 22% of the acquisition cost was allocated to IIAs, in which more than 19% of the acquisition cost was allocated to IIAs disclosed by class, in comparison to only 4% to 5% in Portugal.

Recognition and fair value measurement of the acquiree's assets on the date of acquisition is among the key elements of the acquisition method required by IFRS 3. In practice however, detecting or 'finding' IIAs in particular may be a complex matter that requires intensive research into the acquired business. According to accounting standards, one can distinguish between IIAs, unidentifiable intangible assets or goodwill. IIAs can be grouped into five categories: technology-based intangible assets, contract-based intangible assets, customer-related intangible assets, marketing-related intangible assets and artistic-related intangible assets (IFRS 3, Illustrative examples IE16-IE44). Table 3 presents the IIAs recognized in our research sample.

Table 3: Identifiable intangible assets specific to different companies

Types of IIAs	Company-specific IIAs
Technology-based	– Software and licenses
Contract-based	– Concessions (x2) – Carbon emission allowances, coal purchase agreements, electricity sales agreements, agreements for the sale of certificates of origin – Licenses conferring the right to undertake the production of oil from deposits in the territory of Lithuania
Customer-related	– Customer relations (x11) – Present value of future profits (x3) – Broker relations (x2) – Customer relations and client base – Customer relationships in the area of deposits – Favourable contract – Intangible assets due to signed services sales contracts – Orders backlog – Revaluation of the acquired deposits of individual and business customers as well as customer relationships – Revaluation of the insurance agreements
Marketing-related	– Trademark (x6) – Brand (x3)
Artistic-related	– Programming assets
Other	– Software developed by the acquired company and its customer relations (x2) – Other (x2) – Customer relations and internally generated software – Capitalized expenditures for the development of products – Goodwill – Intellectual property – Intangible assets in realization and prepayments

Source: Own elaboration

The most frequent group of IIAs are customer-related intangible assets encompassing for example: customer relationships, customer lists, favorable contracts, broker relations, etc. It is also worth mentioning that, across Table 3, there are many specific IIAs for particular industries such as carbon

emission allowances, coal purchase agreements, electricity sales agreements or licenses conferring the right to undertake production. In the presented table, 'other intangible assets' have been added, which covers assets that are impossible to assign to one particular group because of insufficient descriptions or the situation in which the disclosed amount could be assigned to two or more groups. The above shows inconsistency in labelling different classes of IIAs. Moreover, it has been observed that in the case of one company, goodwill has been qualified among the 'other intangible assets' group, which is incorrect.

The next step of the analysis was assessing the frequency of different classes of IIAs together with the materiality of their amounts. Frequency was calculated as the number of BCs with a particular class of IIAs to the total number of BCs with intangible assets identified by classes (30 transactions). Materiality is understood as the amount assigned to a particular class to the total amount of IIAs disclosed by class. Figure 3 presents the results.

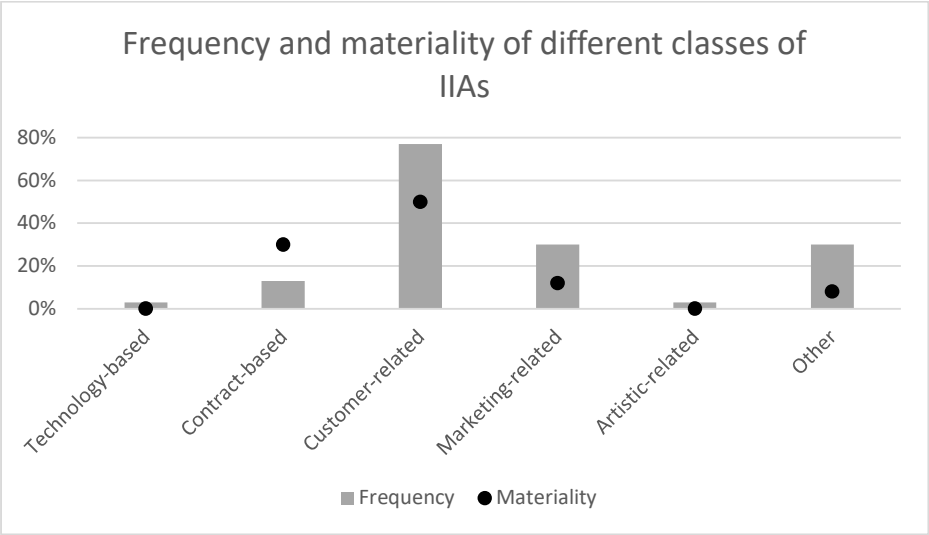

Fig. 3: Frequency and materiality of different classes of IIAs
Source: Own elaboration

Customer related intangible assets have been identified in 23 BCs constituting 50% of the amount of intangible assets – it was the most material group in our sample. The class 'Other intangible assets' was also identified as relatively frequent. This group was identified in nine BCs, but its magnitude is relatively low – only 8% of the amount of intangible assets identified by class were assigned to this position. Another frequently occurring class is marketing-related intangible assets with the frequency of 30%. However, when including the combined value of all intangibles from this group, it only constitutes 12% of the total amount, which appears to be relatively low.

The findings of Giffin et al. (2017) and DeLuke et al. (2018) for US companies confirm that brands (in our case, marketing-related intangible assets) are one of the most frequently identified intangibles, but their amounts are rather insignificant. Our findings in this area are also similar to the results of Eales and Abbey (2009), in which the most frequently recognized classes of intangible assets were customer relationships and brands. In their survey, customer-related assets were disclosed separately in 44% of BCs followed by brands with 31% and technology with 20%. The FRC (2010) confirms these findings for UK companies.

It is also worth mentioning that the least numerous groups among IIAs were artistic-related intangible assets and technology-based intangible assets. The latter were only disclosed in BCs in 2016 – the last year of the research period (one recorded case). This result may be surprising considering the very

rapid development of modern technologies. It may be the basis for continuing the research in the future and examining whether this value increases in subsequent years.

Conclusions

Intangibles are increasingly important for entities conducting business operations based on knowledge and cutting-edge technologies. The particular instance of their recognition and disclosure in the financial statement is a purchase price allocation in BCs.This study adds knowledge to the debate about the practice of purchase price allocation in Poland. As there is a small amount of research on this subject in Central and Eastern Europe countries, the results of this study are worth emphasizing.

We described different classes of IIAs recognized during the purchase price allocation. The most frequent groups of IIAs are customer-related and marketing-related intangible assets. Customer relationships, brands and trademarks are the most common intangible assets recognized in BCs. Although it is one of the most frequent identified classes, the amounts of marketing-related intangible assets are quite insignificant. Our findings on this issue are consistent with previous research. Some other studies also indicate that technology-based intangible assets are also commonly disclosed. Nonetheless, this was not found in our research. Moreover, we observed that the share of IIAs disclosed by classes is relatively high for years with a great part of acquisition cost allocated to intangible assets overall, while it is relatively low for the years when intangible assets represent only a small part of the acquisition cost. This suggests that Polish companies make an effort to prepare detailed and useful information, at least as far as materiality is concerned.

Previous studies conducted worldwide proved that recognition of differentiated intangibles is difficult if not always possible (Eales and Abbey, 2009). Empirical evidence on the allocation of purchase price in emerging markets is limited. This study contributes to the ongoing debate on purchase price allocation by showing how Polish firms translate accounting standards into practice in regards with allocation of purchase price to identifiable intangible assets. We investigate types of IIAs to show what are commonly recognized in purchase price allocation process and whether specific IIA exists in relation to certain types of entities. Our study provides empirical evidence on the initial recognition while other studies mainly concentrate on subsequent measurement (Bepari et.al. 2014; Huikku et.al. 2017; Lapointe-Antunes et.al. 2009; Li and Shroff, 2011; Schultze, 2005; Seetharaman et.al., 2004; Seetharaman et.al. 2006).

The above findings shall be interpreted with respect to the limitations of the study. The main limitation refers to one country where study was conducted and manual collection of data. The second limitation is connected with quite a significant number of BCs ending with bargain purchase that is rather unusual when compared to past research.

Although our study is limited somehow, it suggests future paths of research. One possibility is to broaden the group of entities encompassing other publicly traded companies from past communist countries located in Central and Eastern Europe or diverging the subjects based on an industry sector either macroeconomic situation when BC was accounted for. Another interesting research might investigate to what extend the disclosed IIAs represent knowledge and/or intellectual capital acquired with purchased business. Further, economic phenomena standing behind each category of intangibles as well as their relations between financial position of the entity or discretional accounting policy choices might be investigated in deep.

List of abbreviations

BCs- Business combinations
IIAs- Identified intangible assets

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Tax Administration in the Conditions of Development of IT-Sphere and Digitalization of Economy

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Abstract

The article considers the role of modern information technologies in the process of transformation of tax authorities activity. The author analyzes the online services of tax organizations in several countries, discloses current trends in the development of tax administration in accordance with the requirements of the digital economy. Modern information technologies allowed, according to the author of the article, not only to ensure the electronic interaction of tax authorities with taxpayers, but also to provide a service-oriented model in their activities. This way of development of tax authorities creates the conditions for streamlining and simplifying tax procedures, forms and methods of tax administration. The purpose of this article is to review the established practice of electronic interaction between tax authorities and taxpayers and to identify the areas of digitalization of tax administration. Based on the use of general research methods, the process of digitalization of tax authorities in modern conditions is distinguished by the author.

Keywords: Tax Authorities, Tax Administration, Taxpayers, Online Services, Digital Economy.

Introduction

As noted in the Digital Economy 2019 Report presented at the United Nations Conference on Trade and Development in 2019, the digital economy continues to grow at an incredible speed due to its ability to collect, use and analyze huge amounts of machine-sensible information (digital data) in practice about everything. Over the past decade, many digital platforms have appeared in the world that use business models based on data and transforming many sectors of the economy. In connection with the development of the digital economy, the tax landscape is changing, which forces state authorities to actively act and seek adequate solutions to tax issues in the new conditions for the functioning of the economy. The digital economy requires a wide variety of new knowledge and skills, fundamentally new approaches to the regulation of the economy by the state and its fiscal policy (United Nations Conference on Trade and Development, 2019).

Currently, tax authorities in developed countries have come a long way, having come to the automation of most of their processes and the formation of a wide range of online services in cooperation with different categories of taxpayers. With the help of them, taxpayers, among other things, gain the ability to easily and quickly pay certain taxes, submit documents (information) to the tax services in non-eligible form, quickly receive results on the services of tax authorities. The tax administrations themselves increase the efficiency of their functions, including, on the accuracy of calculation, completeness and timeliness of taxes and fees in the relevant budget, on the identification of unscrupulous taxpayers (Nascimento *et al.*, 2009; Efremova and Efremova, 2015; Kashin and Ponomareva, 2018; University of Tyumen (Tyumen, Russian Federation) and Ogorodnikova, 2019; Boboshko, 2020).

The purpose of the study is to identify the main changes in tax administration in the conditions of informatization of society and digitalization of the economy, as well as the vector of development of tax authorities in the 21st century.

Methods

For our study, in accordance with its purpose, a sample was formed on the online services of the tax administrations of Germany, Denmark, Australia and Russia. In the work, special attention is paid to the successes of the tax authority of Russia in familiarizing with modern challenges and risks. In the course of work, theoretical research methods were used, including: analysis of documents and materials, their generalization and systematization.

Digital Tax Administration

Now, as practice shows, already in all developed countries, the tax returns from taxpayers are collected through electronic communication channels. Computers are processing this returns (primary - almost without human intervention), tax inspectors check taxpayer reporting with extensive use of data base. The tax refund is already written out by the computers themselves. Moreover, now in a number of tax administrations, in particular, in some Scandinavian countries, using available and constantly updated data base, independent tax returns are prepared for taxpayers. The tax authorities in many countries are now less and less based on compulsion and more and more on providing citizens with various kinds of information services, among which the maintenance of tax payments remains the main, but not the only thing (Kashin and Ponomareva, 2018, p. 306, 307).

Note that, for example, the tax department of the German Federal Ministry of Finance applies various forms of online interaction with taxpayers. The Ministry offers a range of digital services for citizens, from social networks (communicating via Twitter, Instagram) to special applications (for example, to determine the amount of transport tax per year for a personal car) and tax calculators (for example, to calculate the amount of payroll tax fee). The ministry also has its own YouTube channel. The development of online services by the government of the country made it possible in 2019 to ensure that the number of people who submitted their tax returns electronically in Germany reached 23.8 million (almost a third of the country's population) (Bundesministerium der Finanzen, 2020; Statista, 2020).

One of the most successful countries in the world in digital tax administration is Denmark. Back in the 1970s, it began to use the first digital solutions to automate the process of paying citizens income tax. In 1995, the online technology TastSelv was launched in Denmark, which minimized manual and routine data entry work and, thus, allowed the authorities to concentrate significant resources for new tasks, such as analysis, control and development of the service. The information systems being implemented further were crucial both for collecting taxes and for ensuring confidence in the tax system of the country and financing public expenditures.

In addition, the modern challenges and errors in the operation of existing electronic tax administration systems have led to the decision in 2018 to start preparing measures for the modernization and replacement of these systems. Modernization and replacement of systems is planned to be carried out systematically and taking into account the recommendations of experts. This means, among other things, that conversions relate first to systems that are of the least importance and have the least complex connections with other systems, while at the same time forming the necessary idea of the possibilities of extending the life time and subsequent modernization of more complex IT systems. In accordance with the Finance Act for 2019, 612 million Danish krone were allocated for these purposes in Denmark. In general, it is expected that the project will be implemented over the next 15 years, and is expected to cost several billion (Skatteministeriet, 2019).

Registered taxpayers (individuals, self-employed entrepreneurs, companies, tax agents) in Australia also get access to a wide range of online services that allow you to receive tax, information and other services in electronic form in one place, including filing a tax return and tax reports activities, as well as information on tax liabilities. It is convenient, safe and accessible at any time. In addition, the tax administration presents special mobile applications, by downloading which it is possible to obtain tax services, relevant tax information at any time and place. A number of developed tools and calculators

available for the country's business, for example, allow you to calculate the amount of your taxes, deductions, determine tax benefits, etc. In addition, due to access to more information, the Australian tax administration has increased tax compliance by large corporate groups operating in the country (Australian Taxation Office, 2019, 2020).

The Federal Tax Service of Russia is also continuously improving online services on its website and is actively introducing the practice of electronic interaction with taxpayers via telecommunication channels. It has long been customary for Russians to provide tax reporting via the Internet, receive electronic services from the Federal Tax Service of Russia (hereinafter referred to as the Federal Tax Service of Russia) (information on tax arrears to the budget, information from the Unified State Register of Legal Entities, etc.). (Efremova and Efremova, 2015, p. 460). The country's tax service has introduced an automated information system (AIS 'Nalog-3') to consumers, which is a unified information system of the Federal Tax Service of the Russian Federation (Federal Tax Service of Russia, 2019) in order to automate the activities of the Federal Tax Service of Russia for all functions performed, including receiving, processing, providing data and analyzing information, generating information resources of tax authorities, statistical data, information necessary to provide support for making managerial decisions in the field of its powers and providing external information .The situation was fundamentally changed in terms of unfair tax competition in the business environment as a result of the introduction of an automated system for monitoring the reimbursement of value added tax (ASK-NDS). According to the Federal Tax Service of Russia, using the ASK NDS-2 system, it was possible to reduce the proportion of doubtful operations to 0.47%, which demonstrates a high result of the system (Federal Tax Service of Russia, 2020a).

Thus, all these measures implemented by the tax authorities are aimed at transforming them into a more service structure that would be focused on the interests of all taxpayers. The expected results of changes in tax authorities will be not only an expansion of the range of services they provide to taxpayers, an improvement in informing the public and business about tax legislation and, and, as a result, an increase in the share of taxpayers who positively assess the quality of tax administration, but also ensuring the stability and security of the economy (Efremova and Efremova, 2015, p. 460).

Digital services are the trend line in the development of tax administrations of the modern 21st century

Today, in the context of the development of the digital economy, the activities of companies and organizations are associated with conducting an increasing number of business operations in the virtual space of the Internet. With the help of modern information and communication technologies, automated information systems and developments in software, it is possible to remotely open and conduct a business, negotiate with contractors and customers, receive orders from them, and conduct cashless payments with them, as well as to provide many services in an interactive form. Globalization, the development of the electronic services market and the spread of blockchain technologies, the emergence and active use of electronic wallets, digital currencies (cryptocurrencies), the introduction of digital technologies have contributed not only to the growth of economic activity of the population, the emergence of new types of businesses, the increase of information exponentially, 'virtualization' of more and more of people's life-sustaining activity, but also the development of the 'shadow' sector of the economy, conducting business operations and settlements on them outside the control of the government. The latter opens up the opportunity not only for illegal enrichment of people, their commission of illegal transactions and other illegal actions of a fraudulent nature, the sale of prohibited goods and services, but also for terrorist activities, which is a threat to national and international security.

Nowadays, the quality, reliability and convenience of Internet services are coming to the fore, despite these negative aspects, which are opening up in the new conditions of society development, which all countries of the world are actively fighting today, including through the joint implementation of international projects to counter these negative trends. 'Internet services' are services (e-mail, Internet Relay Chat, File Transfer Protocol, etc.) that are provided on the Internet to users, programs, systems, levels, and functional blocks. Some of the services can be developed for users of a specific

subject area, in particular, used by subjects of tax relations (Evstigneev and Viktorova, 2016, p. 233). Today, in our opinion, there is a shift from 'Internet services' to a wider sector of services – 'digital services'. According to the Order of the Ministry of Communications of Russia d.d. August 1st, 2018 No. 428, a digital service is understood as 'an integrated solution based on digital products aimed at significantly improvement or acceleration of vital processes, organizational or business processes, including production processes' (Ministry of Digital Development, Communications and Mass Media of the Russian Federation, 2018). In the new conditions, it is very important, on the one hand, that state authorities keep pace with the changes, introducing and developing modern and safe online services for interacting with the country's population, and on the other, quickly respond to digital risks and threats. In these conditions, illustrative examples are the processes of informatization of tax authorities.

Note that already in 2014, 190 member states (according to the UN) introduced automated financial management, with 179 countries using such systems for customs clearance, and 159 for tax administration. One form or another of digital identification has been introduced in 148 countries. The use of a variety of information systems, cloud technologies and computer algorithms for data processing has already been recognized and evaluated by tax administrations of many developed countries as an effective tool for tax administration. In Russia, state regulatory authorities are also actively improving information technologies and introducing new digital systems during monitoring activities (University of Tyumen (Tyumen, Russian Federation) and Ogorodnikova, 2019).

'The digitalization of tax administration has made it possible to practically abandon the traditional forms of inspections, and create the conditions when tax evasion becomes unprofitable. All transactions with tax risk automatically fall into the attention of the tax authorities through remote monitoring and predictive analytics tools with a clear gradation of taxpayers by risk zone '(from a speech at the meeting of the All-Russian Tax Forum in 2019, of the head of the Federal Tax Service of Russia M. Mishustin). The result of the joint work of the state, business and self-employed citizens was the introduction of a tax on professional income. Using the My Tax mobile application, the self-employed were able to register as taxpayers and legalize their activities in a couple of clicks and interact with the Federal Tax Service of Russia online in the 24/7 mode (Federal Tax Service of Russia, 2020b).

It should be noted that at present, personal accounts created in Russia for all categories of taxpayers enable contactless communication with tax authorities from anywhere in the 24/7 mode. By the end of 2019, 29.2 million people registered in their personal account for individuals, every second entrepreneur also registered a personal account and uses it. 'In the near future, this service will be updated,' according to the Federal Tax Service of Russia, 'individual entrepreneurs will be able to pay taxes online as well as individuals' (Federal Tax Service of Russia, 2020a).

Conclusion

In general, tax administrations today are subject to the rapid transformation of their systems as a result of the digitalization of the economy. So according to the data presented in September 2019 at the global forum on tax administration (FTA - Forum tax administration) in the eighth issue of the 'OECD (Organization for Economic Co-operation and Development) Tax Administration Series', there are quite clear trends in the states, of which the following:

- firstly, the expansion of electronic administration, which is accompanied by: expanding the possibilities of filing online declarations, as well as making online payments, growing digital communication channels (via online services), using or planning to use artificial intelligence (in more than 40 tax administrations);

- secondly, an increase in the use of information about taxpayer behavior, which is accompanied by: the development of the use of behavioral representations and analytics of data on taxpayer actions as an instrument of tax control, research on the behavior of taxpayers and the use of this data (in more than 35 administrations) for tax purposes control.

Consequently, the main vector of the development of tax administration in the digital economy is electronic administration and the use of a number of technological tools. New sources of data and analytics, developing tax monitoring and expanding international cooperation allow tax authorities to improve the quality of tax administration in accordance with current trends, national interests and international requirements (Orlova, 2019, p. 30, 31; OECD, 2019).

Thus, 'digitalization' has led to a change in economic processes and economic business management, to the expansion of people's opportunities for self-realization and entrepreneurship. The authorities in response to these changes 'digitized' their methods and instruments of regulation, as well as the state apparatus: the creation of electronic government; an increase in the number of services provided by authorities in electronic form; active implementation of the concept of 'open data'. Tax administrations, as one of the important state authorities and one of the few structures with which almost the entire population interacts to one degree or another, strive in the new conditions to meet the needs of people in a modern and efficient digital service. Thus, they conduct effective and efficient tax control, monitoring (invisible, without harm and pressure on responsible taxpayers) when people pay taxes, fill in various reporting documents and applications for certificates and other information, etc.

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The Role of Interbudgetary Relations in Ensuring the Balance of the Budgets of the Russian Federation Subjects

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Abstract

The work reveals the essence of intergovernmental relations explores the mechanism of legal regulation of intergovernmental relations, assesses the principles of their construction in the existing legal system of the country. In this publication, the author specifies the role of intergovernmental relations in balancing the budgets of the constituent entities of the Russian Federation.

Keywords: Intergovernmental Relations, Balanced Budgets, Principles of Intergovernmental Relations, Fiscal Federalism.

Introduction

The main aspect in the development and functioning of the state is the budget structure, which implies the organization and principles of the country's budget system, its structure, and the relationship between individual links. The local budget is an element in the state's budget system. The local budget is intended to provide financial support for the tasks and functions of local self -government. Despite the independence of budgets, there are relations between them, which are called inter- budgetary relations.

Results

The study of the role of inter-budgetary relations in ensuring the balance of budgets of the subjects of the Russian Federation should begin with the consideration of the essence of such a concept as " inter – budgetary relations". The essence of inter- budgetary relations is revealed in the scientific research of a large number of authors, both in the field of legal disciplines and in the field of budget and financial sphere. The concept of inter- budgetary relations is very multifaceted and includes a number of essential characteristics. Let's consider the interpretation of the essence of inter-budgetary relations from the position of various authors, namely:

1) I.A. Avetisyan (2018) believes that inter- budget relations are a system of relations between authorities that are aimed at establishing and delineating rights and responsibilities in the field of organizing the budget process and budget regulation. The key definition is the mechanism for establishing and delineating budget rights and responsibilities;

2) D.V. Bakharev and G.R. Yartik (2018) believe that inter- budgetary relations are a mechanism of interaction between state authorities of the Russian Federation at various levels of management within the organization of processes of formation and execution of budgets of a particular level. The key definition is building a system of state regulation of budget processes;

3) D.V. Krasnobryzhiy and V.A. Okolelova (2017) tell us that inter-budgetary relations are a generalized model of financial and legal interaction between public administration bodies at various levels of the budget and financial system within the framework of the budget process. The key definition is the model of financial and legal interaction between public legal entities in the Russian Federation;

4) M.N. Smagina and G.T. Mukenge (2017) believe that inter- budgetary relations are the organization of procedures for allocating budget resources in order to achieve a balanced budget at a certain level. The key definition is a tool for achieving balanced budgets at different levels.

Thus, we can conclude that there is no unambiguous unity in the scientific literature regarding the essence of the concept of "inter -budgetary relations". Each of the authors considered in this paper tries to reveal the essence of inter- budgetary relations through the prism of their vision of this issue.

The essence of inter-budgetary relations is also revealed in legal acts, the most relevant of which in this aspect is the Budget code of the Russian Federation. Taking into account the provisions of the Budget code of the Russian Federation, it can be concluded that inter-budget relations are a complex of legal and financial and economic relations between public legal entities at various levels of government in Russia within the framework of building a system of regulating budget legal relations and quality organization of the budget process.

When considering the essence of inter-budgetary relations, it is important to determine the main target that is used in their construction and formation. Most authors agree that the main goal of building inter-budgetary relations is to achieve the necessary level of balance of the country's budget system as a whole and the specific budget of a certain level of public administration, in particular. According to Yu.G. Shvetsov (2017), the achievement of this goal is carried out with the help of inter-budget transfers, which are aimed at replenishing the revenue part of the budget of a particular level. Due to the use of inter-budget transfers, the revenue part of the budget increases approximately to the level of its expenditure part, which ultimately leads to a balance in the overall budget size. The amount and procedure for implementing inter-budget transfers are determined based on the budget position in the country's budget system and on the projected size of the budget deficit.

The main features that characterize the essence of inter- budgetary relations in the Russian Federation:

1) Aimed at establishing budget rights and responsibilities;

2) The main goal is to achieve a balanced budget system;

3) Form the basis for building the budget process;

4) Include procedures for the allocation and use of budgetary resources;

5) Aimed at optimizing budget execution processes at different levels;

6) Carried out within the framework of relations between public legal entities.

The list of presented features in the most General form reveals the essence of building and forming inter-budgetary relations in the Russian Federation.

A significant discussion issue that characterizes the specifics of inter-budgetary relations is the problem of substantiating their subjective composition. M.A. Aseeva et al. (2016) consider the debatable nature of determining the subjective composition of inter-budgetary relations in his monograph. The author notes the fact that there are several main points of discussion on this issue:

- within the framework of the first direction, it can be noted that its representatives include state authorities of the Russian Federation, subjects of the Russian Federation and local self-government among the subjects of inter- budgetary relations;

- as part of the second line of research on this issue, its supporters include all participants in the budget process who take part in all stages of its implementation as representatives of inter-budgetary relations;

- the third area of research in this area includes the budgets of all levels of the budget system represented by their authorized bodies as subjects of inter budgetary relations;

- in the legislation of the Russian Federation, in particular, the provisions of the Budget code also describe the subjects of inter -budgetary relations.

In the interpretation of the legislator, representatives of subjects of inter-budgetary relations include public legal entities.

From the position of most authors and in our opinion, the most relevant is the last interpretation of the essence of the subjective composition of inter-budgetary relations.

As noted earlier, the main goal of implementing inter-budgetary relations in the budget system of our country is to achieve the necessary level of balance of a particular budget. In addition to this General goal of implementing inter-budgetary relations, L.B. Mokhnatkina (2019) in the materials of her scientific article identifies a number of tasks that need to be solved in the process of implementing this type of relationship. Based on the materials of this author's publication, it is possible to identify the main tasks that are solved in the process of implementing inter-budgetary relations:

- formation and consolidation of powers in the field of budget revenues and expenditures between separate parts of the country's budget system;

- building a mechanism for delegating spending authority from a higher budget to a lower budget;

- differentiation of regulatory revenues on a permanent or temporary basis;

- accumulation of financial resources to cover the amount of certain expenses;

- providing free or paid financial assistance and support to other entities of the country's budget system in order to achieve the necessary level of balance;

- organization of control over the implementation of current legislation in the formation of revenue and expenditure powers of lower-level budgets.

Disclosure of the essence of inter-budgetary relations requires consideration of their main types.

Classification of the main types of inter-budgetary relations:

1) In content:

- material;

- organizational;

2) In the direction of the flow of budget funds:

- ascending;

- outbox;

- horizontal;

3) By the level of state power:

- federal;

- regional;

- local;

4) On repayment of funds:

- onerous;

- unpaid.

Among the many classification features of inter-budgetary relations, we will highlight the most relevant of them. In The publication of I.U. Davydov et al. (2017), the main feature of the classification of inter-budgetary relations is the feature of their content. According to the content, inter-budgetary relations can be divided into material and organizational ones. Material inter-budgetary relations are directly related to the distribution of financial resources between different parts of the country's budget system. Organizational inter- budgetary relations include issues of their regulatory and legal regulation and organization of control over the movement of financial flows.

G.Yu. Tsaregorodtseva (2016) recommends classifying inter-budgetary relations based on the criterion of the direction of the flow of budget funds. Based on this criterion, it is advisable to distinguish three main types of inter-budgetary relations:

- Ascending-represent inter – budgetary relations that are related to the formation of the necessary amount of Federal budget revenues;

- Top-down-characterize inter – budget relations, in which financial resources are distributed among lower budgets to achieve the necessary level of balance;

- Horizontal – relations are inter-budgetary relations in which certain tasks are solved at a particular level of the country's budget system.

In the normative legal acts of the Russian Federation, budget relations are primarily classified by levels of state power:

- Federal, which characterize inter-budgetary relations between the Federal budget and other lower-level budgets of the country's financial system;

- Regional, which characterize inter-budgetary relations between the regional budget and the Federal budget, as well as between regional budgets and budgets of lower levels of the country's financial system;

- Local, which are based on inter-budgetary relations between local budgets and budgets of other levels of the country's financial system.

Inter-budgetary relations in the course of their functioning within the country's financial system perform a certain list of functions.

The main functions of inter- budgetary relations:

1) Foundation;

2) Stimulating;

3) Distribution;

4) Leveling;

5) Regulatory;

6) Compensation;

Let's take a closer look at the content of inter-budgetary relations in the country's financial system. The implementation of the Fund-forming function of inter-budgetary relations is primarily aimed at creating a certain Fund of financial resources necessary for solving socio-economic problems at a particular level of the country's budget system. The amount of the revenue part of these funds must correspond to the size of the expenditure part. If there is a lack of own revenue resources of the budget of a certain level to cover the amount of expenditure obligations on the basis of inter budgetary relations its level is leveled in order to achieve the necessary balance.

The essence of the stimulating function of inter-budgetary relations is to create a certain incentive for regional and local authorities to increase the tax potential and increase the revenue part of the budget of a particular level of the country's financial system.

The leveling function is one of the main functions of inter-budgetary relations, which is aimed at achieving their main goal. Through the implementation of the leveling function, the necessary level of budget balance is achieved by replenishing its revenue part from the higher-level budget.

The distribution function is in some ways similar to the leveling function of inter-budget relations. The main goal of implementing the distribution function of inter-budgetary relations is also to achieve a balanced budget for a particular level of the country's financial system. The implementation of this goal is carried out within the framework of the distribution of financial resources between the links of the financial system.

The compensation function of inter-budgetary relations is related to the implementation of procedures for compensating lower budgets from higher budgets for expenditures on the organization of public administration and solving socio-economic problems.

The regulatory function of inter-budgetary relations is at the heart of the implementation of the policy of budget alignment for the qualitative solution of socio-economic problems in a particular territory of the country.

Conclusion

Thus, we can conclude that inter-budgetary relations are a key tool for achieving the necessary level of balance of budgets at different levels of the country's financial system, including the regional budget. The concept of budget balance is a key concept in the overall budget process management system at any level. The formation of a balanced budget is the main goal of the government's activities at the Federal, regional and local levels. The principle of budget balance is the main principle of the country's budget system, since if this principle is not observed, the entire mechanism of budget management is fictitious. Achieving the necessary level of budget balance is essential for the normal and stable functioning of all authorities at various levels of government. In the most General form, inter-budgetary relations are a generalized model of financial and legal interaction between public administration bodies at various levels of the budget and financial system within the framework of the budget process. The main goal of building inter-budgetary relations is to achieve the necessary level of balance of the country's budget system as a whole and the specific budget of a certain level of public administration,

in particular. Achieving this goal is carried out with the help of inter-budget transfers, which are aimed at replenishing the revenue part of the budget of a particular level.

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Reforming the Organization of Internal Financial Audit in the Russian Federation at the Regional Level: Problems of Theory and Practice

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Abstract

This article is devoted to the study of a new form of state financial control – internal financial audit and the practice of its implementation at the level of constituent entities of the Russian Federation. The article analyzes the changes made to article 160.2-1 «Budgetary powers of individual participants in the budget process to organize and implement internal financial audit» and came into force on January 1, 2020. The article draws conclusions and defines three main models for organizing an internal financial audit in the constituent entities of the Russian Federation: in the form of empowering one or more (two to three) officials of an executive authority, a subdivision of an executive authority (department, management) and in the form of a transfer of authority to conduct an internal financial audit to one of the subordinate institutions.

Keywords: Budget, Budget Legislation, Financial Control, Public Audit, Internal Financial Audit.

Introduction

From January 1, 2020 article 160.2-1 of the Budget Code of the Russian Federation (hereinafter BC of the Russian Federation) «Budgetary powers of individual participants of the budget process to organize and implement internal financial audit» came into force all changes adopted in 2019 [2]. It should also be noted that in 2019, section IX of the BC of the Russian Federation, devoted to state and municipal financial control, was significantly changed.

Results

One can agree with the view of I.I. Kucherov, N.A. Povetkin, and N.E. Abramova (2016), that at present «the main obstacle to the development of domestic financial control in Russia to date has been the imperfections of the legal and regulatory framework. First of all, there was no clear legislative distinction between the concepts of internal and external public audit, internal financial audit and internal control, as well as a link between departmental financial control and internal control».

It should be noted that the internal financial audit (hereinafter VFA) appeared in the BC of the Russian Federation as early as 2013 together with the adoption of the new federal law «On the accounting chamber of the Russian Federation», but only in 2019 the regulatory legal acts clarifying its implementation, which entered into force on January 1, 2020, were developed and adopted. These normative legal acts were adopted in accordance with the Program of development of federal standards of internal financial audit for 2018-2020 in the Ministry of finance of the Russian Federation approved in 2018 (approved by the Ministry of finance of the Russian Federation on 14.11.2018).

According to this program, 9 Federal standards of internal financial audit should start working in 2020: «Definitions, principles and tasks of internal financial audit»; «Grounds and procedure for organizing internal financial audit»; «Rights and obligations of officials and employees in the implementation of internal financial audit»; «Planning, determining the scope of work and forming an audit program»; «Conducting internal financial audit»; «Implementation of the results of internal financial audit»; « Confirmation of the reliability of budget reporting»; «Preparation of proposals to improve the economy and efficiency of the use of budget funds»; «Procedure for transferring authority to perform internal financial audit».

At the time of preparation of this article, the following federal standards of VFA – «Definitions, principles and tasks of internal financial audit» were approved (The order of the Ministry of Finance of the Russian Federation of 21.11.2019 № 196n «About the approval of the federal standard of internal financial audit «Definitions, the principles and tasks of internal financial audit»); «Grounds and Procedure of Organization, Cases and Procedure of Transfer of Authority for Internal Financial Audit» (The order of the Ministry of Finance of the Russian Federation of 18.12.2019 № 237n «About the approval of the federal standard of internal financial audit "The bases and an order of the organization, cases and an order of delegation of power on implementation of internal financial audit»); «Rights and obligations of officials (employees) in carrying out internal financial audit» (The order of the Ministry of Finance of the Russian Federation of 21.11.2019 № 195n «About the approval of the federal standard of internal financial audit «The rights and duties of officials (workers) at implementation of internal financial audit»).

Thus, in accordance with article 160.2-1 of the Budget Code of the Russian Federation dated 31.07.1998 № 145-FL, the VFA is a special activity to form and provide management with the necessary information on the results of the assessment of the performance of budgetary powers, Including conclusions on the reliability of budget reporting, as well as proposals to improve the quality of financial management, Including on improving efficiency and cost-effectiveness in the use of budgetary resources, Conclusions on the results of execution of decisions aimed at improving the quality of financial management.

That is, if the system of internal financial audit is created in the structure of the executive authority of the subject of the Russian Federation, being a participant in the budgetary process, the official, unit or agency, Which are empowered to carry out an internal financial audit, shall provide the head of the executive authority with information on the work of the structures of the authority, responsible for the implementation of budgetary powers, to analyze the organization of mechanisms for the implementation of these powers and to submit proposals to the head to improve the budgetary activities of the executive power body of the subject of the Russian Federation.

In this regard, it is important to emphasize that the requirement for the compulsory organization and implementation of the WFA does not consider the peculiarities and capabilities of individual executive bodies (their structure, staffing, existence or absence of subordinate institutions, etc.).

So, who can within the structure of the executive branch be empowered to implement the VFA.

First, the power to exercise the VFA may be vested in an individual official of the executive branch (or several officials who, by order or order, report to him).

Questions that may arise in this regard: what level should this official be (from among the leadership or non-leadership of the executive body (the leader or one of his deputies). An important requirement for such an official should be that he/she should not be given powers related to budgetary and other financial relations, such as approval of the state assignment by subordinate institutions and/or acceptance of reports on the execution of the state assignment, etc. Otherwise, the said official will analyze his/her own activities in the framework of the internal financial audit. However, it should be noted that in certain executive bodies of the constituent entities of the Russian Federation there is one deputy acting as head in case of his absence. If the VFA is carried out by the manager himself, who will carry it out by the VFA if he is absent. In any case, it is necessary to amend the job descriptions of

the relevant officials to indicate the authority to implement the VFA. Moreover, it is necessary to identify officials who will issue documents on VFA (action plan, reports and acts on the results of these measures).

Secondly, a division of the executive authority (referred to as a subject of the VFA and approved by an order or order of the executive authority) may be empowered to implement the VFA. As a rule, in many executive bodies, the decision to give anyone the power to implement the VFA is made according to the principle, If it is a financial audit, it should be implemented by entities performing financial functions, which is fundamentally not true, as it is these structures that are directly involved in financial and economic activities and, first of all, their work will be included in the subject of the VFA study. This is the financial management specified in clause 2 of article 160.2-1 of the BC of the Russian Federation, which was introduced by Federal Law №199-FL of 26.07.2019.

Third, powers may be transferred by an executive authority to one of the subordinate institutions and another entity, which must also be issued by an order or order of the executive authority or other regional normative legal act. In this regard, there may also be an error in which such a body is a central accounting office, which is involved in the execution of the budget and the verification of its activities is also within the framework of the WFA and reports to whom it will check within the framework of the WFA. The law also provides that the budget administrator has the right to transfer the authority to implement the VFA to the chief budget administrator under his authority, or to another budget administrator under the authority of this chief budget administrator, in accordance with the federal VFA standards. The VFA Standard «Grounds and procedure of organization, cases and procedure of transfer of powers to carry out internal financial audit» defines the conditions for transfer of these powers, such as: there is no possibility or necessity to form a subject of VFA; there is no possibility to conduct VFA in a simplified manner.

It is important to note that article 160.2-1 in paragraph 3 establishes the principle of functional independence of structural subdivisions or in cases provided for by federal standards of the VFA, authorized officials (workers) of the chief manager of budgetary funds, the administrator of budgetary funds, the given authority on implementation of internal financial audit, and in cases of transfer of powers to them on implementation of VFA - structural divisions or authorized officials (workers) of the chief manager of budgetary funds (the administrator of budgetary funds) to whom the specified powers are delegated. Moreover, it is necessary to consider anti-corruption legislation in the organization of the WFA.

Also, the standard of the VFA «Grounds and procedure of organization, cases and procedure of transfer of powers for implementation of internal financial audit», which was approved by order of the Ministry of Finance of the Russian Federation No. 237n of 18.12.2019, provides for the possibility of implementing the VFA in a simplified form in case: there is no possibility to create a subject of the V; Transfer power to implement the VFA; head of budget chief administrator (s) performs operations (actions) to implement budget procedures; There are no subordinate budget administrators; there are no subordinated budgetary, autonomous institutions and state unitary enterprise (municipal unitary enterprise).

Conclusion

In general, in summary, it can be concluded that at present Russia is only forming the main approaches to the organization of internal financial audit in the executive authorities, both at the federal and regional levels of government. At the same time, it is important to understand that in relation to the regions, even the proposed model cannot be fully implemented due to the lack of conditions in all executive bodies of the constituent entities of the Russian Federation for the implementation of an effective model of internal financial audit. The options proposed in the standard for a simplified system of internal financial audit organization can only be temporary, as they do not allow to build a normal methodology of work.

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Developing E-Business Competences A Challenge for Economic Universities in Poland

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Abstract

Higher education institutions, especially those with an economic profile, not only in Poland, but also worldwide, are currently facing a huge challenge, which is to make changes in the curricula in response to the labour market needs. The dynamic development of the e-economy causes that there is, currently and in the future, a constant increase in market demand for employees with e-business competences. The development of these competences will allow for equipping university graduates with skills and knowledge which will be their advantage on the labour market. With the above in mind, this article makes e-business competences, which should become a part of curricula at universities, the subject of research. The authors of the article presented the results of theoretical and empirical research, which allowed to identify key competences of e-business. By referring to domestic, foreign reports, such as the results of own research using the method of diagnostic survey, it was confirmed that the key competences in the field of e-business include building websites and e-shop by using, among others, WordPress, as well as many other modules used for complex construction and administration of websites.

Keywords: E-Business, Digital Competence, Universities, CMS, Wordpress, Management

Introduction

The e-economy is nowadays considered to be the fastest growing market sector. Digitalisation of business activity connected with technological development, change of customers' purchase preferences, accessibility to the Internet and possibilities offered by the use of modern technologies is becoming a driving force for modifications, including changes in the labour market and educational challenges, connected with the necessity of both anticipating future competence requirements and the dynamics of these needs and possibilities of meeting them, which is confirmed, among others, by Daniel E. Hecker emphasising that *Electronic business both stimulates and dampens employment in many occupations and industries* (Hecker, 2001:3).

The professional competences of the future are a constant object of interest for both theoreticians and management practitioners, including representatives of sociological, pedagogical and psychological sciences. The challenges to be faced in the labour market in the future have, or at least should have a significant impact on the fields of study offered by universities. The adaptation of educational programmes to the needs of the labour market must result from the recognition of future market transformations and changes, not only the technological ones, but above all changes in the competences which should be available to young people after completing their education – the graduates who will be looking for their place on the national, European or global labour market. It can therefore be considered that the challenge of universities, especially those with an economic profile, is to prepare educational programmes (including the use of on-line learning) in such a way as to respond to the labour market needs of the future (Mehall, 2019). Some students do not improve those competences which would allow them to adapt to the requirements of the labour market more quickly. Therefore, the change of educational programmes is a challenge that not only Polish, but also foreign universities have to face.

With the above in mind, the aim of the conducted research was to identify e-business competences, which, due to the requirements of the future labour market, should be developed by students. The main research problem was formulated as a question: What e-business competences should become the subject of education at universities of economic profile in order to prepare students to meet the requirements of the future labour market? The research hypothesis took the form of the following assumption: in the process of education at universities, students should develop their digital competences necessary in e-business, such as: building websites and e-shop on one of the most popular CMS, which is WordPress, as well as many other modules used for complex website building and administration.

In order to respond to the main and detailed research problems, theoretical (including analysis of university curricula in Poland, e-commerce market research reports, etc.) and empirical methods were used. Among the group of empirical methods used, the method of diagnostic poll carried out using the survey technique is notable. The research was conducted in 2020 on a sample of 98 students. The results of the research were analysed with the use of Microsoft Excel, which enabled extensive data scrutiny.

Professional competences, competence mismatch and the labour market

Over the years, philosophers, psychologists, sociologists, as well as representatives of the management sciences have been paying attention to competence issues. The very term competence originates from the ancient Rome, deriving from the word *competentia*, meaning: compliance, suitability, readiness for something. Etymologically, the word is related to the English *compete – to struggle, to fight.* A competent person was considered to be someone who was ready to carry out certain activities, including the decision-making process (Filipowicz, 2014). The issue of competence was transferred by R. Meyer from the sphere of philosophy to the sphere of practical considerations in his 1782 work on the competence of entrepreneurs and traders (Meyer, 1782). The key work in the area of competence, however, was the article by D. McClelland from 1973 entitled *Testing for competence rather than for intelligence*, in which the author emphasised that it is competence that determines the quality of an employee and her/his functioning on the labour market (McClelland, 1973). R. Boyatzis also paid special attention to the issue of competence; he is known, among others, for distinguishing three levels of competence: a relatively stable level of motives and personality traits, a modified level of social roles and the fastest modified level of skills (Boyatzis, 1982). R. Boyatzis' model is described in detail in his publication *Competence at work*:*The model for Superior Performance* was presented by L. M. and S. M. Spencer. This publication is considered by many scientists as a key work on competences (Spencer and Spencer, 1993).

However, particular interest in the issue of competence does not translate into the definition of homogeneity of the term under consideration (Rozhkov et al. 2017), which results in the possibility of identifying, among others, supporters of identifying competence with the skills or abilities necessary to perform tasks in a given organisation (Filipowicz, 2004), combining competence with personal qualities (including motives, attitudes, values), knowledge and procedural (Sidor-Rządkowska, 2006) skills and showing competence as a result of permanent internal predispositions, as well as features acquired during human life (Filipowicz, 2004).

In this article, the term competence has been adopted after R. Boyatzis, who emphasises that it is: *an underlying characteristic of an individual, which is causally related to effective or superior performance in a job' and as 'a motive, trait, skill, aspect of one's self image or social role, or a body of knowledge which he or she uses* (Boyatzis, 1982:23).

The main reason for identifying competences is considered to be, inter alia, the determination of standards of behaviour in the workplace (Yonghak, 2009) resulting from the possession of specific competences (Crowl, 2007), as well as the indication of competence requirements resulting from the education and training of employees. The issue of competence requirements of employees – prospective graduates should be given special attention by universities, whose faculties should be modified taking into account market changes, dynamics of development of particular sectors of the

economy, and thus also competence needs. The unfavourable situation from the perspective of the labour market is the situation in which employees with a competence mismatch operate on the market, which in turn affects labour productivity and wages (Badillo-Amador and Vila, 2013; Sam, 2018; Gambin et al., 2016; Montt, 2015).

The E-Economy and the Labour Market

One of the most dynamically developing sectors of the economy is the electronic economy. The e-economy is a term that has become widely used, together with the terms e-business and e-commerce. E-economy is defined by A. Hartman as a virtual arena where business is conducted (Hartman, 2001). On the one hand, it is an alternative market to the traditional one, while others consider it a complement to the traditional one. Within the e-economy, it is worth paying special attention to e-business defined as electronic business, i.e. business based on the use and adaptation of modern technological solutions to the needs of market practice (Deshmukh, 2019). One of the processes carried out in the e-space is e-commerce, defined as e-commerce. The relation between the indicated terms can be presented as follows: e-commerce < e-business < e-economy (Gregor and Stawiszyński, 2002) however, in the American literature e-commerce and e-business are used interchangeably and this approach is also presented by the authors of the article. The development of the e-economy has a huge impact on the whole market by transferring some or all of its activities to the virtual world, including activities encompassing: presentation of products and services (and thus brand building), order processing, product service delivery, payments, promotions, settlement of mutual transactions, contacts with customers, suppliers and issuing invoices.

Information about the size and value of the e-commerce market in the world can be found in eCommerce Report 2020, at statista.com. According to the report: revenue in the e-commerce market amounts to US$2,237,959m in 2020 and is expected to show an annual growth rate (CAGR 2020-2024) of 7.6%, resulting in a market volume of US$3,004,191m by 2024. The value of the market in Poland is estimated at US$11,249,4m (eCommerce Raport 2020). However, taking into account both current data and forecasts for the coming years, it should be noted that with the development of the e-market, there are also significant changes in the competence requirements, which must be at the disposal of both the employees who want to relate their future to the indicated industry, as well as entrepreneurs themselves, who face the need to digitalise their business (which is related to, for example, the choice of an e-commerce platform supplier, the ability to use the potential of marketing automation, creating their own website, knowledge of ERP, CRM, cloud applications, or B2B, B2C, B2G e-commerce models, etc.).

Supporting the traditional form of sales by means of, for example, a website, using social media in the process of brand building, applying interactive forms of communication to create personalised products, using the potential of mobile payments, popularising Voice Commerce solutions, as well as increasing the awareness of both organisations and customers of the dangers associated with e-business, are challenges faced by the modern e-economy, and at the same time a great opportunity for many entrepreneurs.

E-business competences as competences of the future

The willingness to use modern information technologies forces organisations to look for employees with specialist competencies on the labour market. Therefore, dynamic changes taking place on the market translate into the competence needs of modern and future organisations, which is shown in many reports such as: *Future Work Skills 2020* and *The work of the future: Shaping Technology and Institutions.*

The Future Work Skills 2020 report was prepared by the Institute for the Future for the Phoenix University Research Institute. According to the report, the competence needs of the future are a result of, among others, the following extreme longevity, rise of small machines and systems, computational word, new media ecology, the rise of superstructed organisations and globally connected world (Future Work Skills 2020). The willingness to maintain competitiveness therefore

requires looking for employees on the market with such competences as: sense-making, social intelligence, novel &adaptive thinking, cross-cultural competency, computational thinking, new-media literacy, transdisciplinarity, design mindset, cognitive load management and virtual collaboration (Future Work Skills 2020).

In turn, according to the report *The work of the future:Shaping Technology and Institutions*, it is worth noting that: New technologies often enable or require new tasks that demand human expertise, judgement, and creativity (The work of the future...). The authors of the report, referring to the publication of David H, however, emphasise that new technologies do not affect the changes to the same extent in organisations, especially with regard to jobs located lower in the organisational structure, as well as those related to broadly defined services. Ironically, digitalization has had the smallest impact on the tasks of workers in low-paid manual and service jobs. Those positions demand physical dexterity, visual recognition, face-to-face communications, and situational adaptability. Such abilities remain largely out of reach of current hardware and software but are readily accomplished by adults with moderate levels of education (The work of the future...; Autor, 2015). However, the development and increasing use of automation, robotics, and artificial intelligence influences changes in competence requirements. Despite the common view that robotisation will radically reduce the number of workstations, it is worth pointing out that currently man and robots/systems complement each other, while the increase in the scope of robotisation, automation of AI use entails the necessity of including digital competences in competence profiles.

The importance of digital competences in the future is also stressed in the report *Competences of the Future. How to shape them in a flexible educational system?* E. Włoch and K. Śledziewska (2019) point out that in the conditions of the digital transformation, in addition to cognitive competences and social, digital and technical competences are also becoming important. From the research shown The report, carried out in 2018 and 2019 in seven Polish cities on a sample of 1062 students and graduates, shows that in the opinion of nearly half of the surveyed universities allow to acquire the skills of using digital programmes and tools only at a basic level, and one in three respondents was of the opinion that they do not teach these competences at all. The above results in the context of needs and challenges of the 2030 market related to automation and robotisation, including the intensification of implementations using Artificial Intelligence (AI) will cause that: *In the perspective of 2030, success in the professional career of employees will be strongly conditioned by the level of their digital competences. A low level will be associated with the risk of a weak position on the labour market and low wages. The high level will be a guarantee of competitiveness on the labour market, employment security and the highest salaries* (Głomb and Kniaź, 2019:26-27).

Within the framework of key digital competences, special attention needs to be paid to: planning, implementation, use and evaluation of effectiveness of digital solutions in business applications, programming and development of systems/tools used in e-commerce, application of national and EU law in the area of digital solutions, as well as use and development of the potential of existing IT tools, including social media in the implementation of professional tasks. Future will bring an increased labour market demand for jobs such as: e-Commerce Manager, Key Account Manager, Digital Marketing Manager, CRM Manager, Digital Brand Manager, CRM analyst, SEO specialist, SEM specialist, having competences in: social marketing, content marketing or e-mail marketing.

Previous e-business education at universities in Poland

The popularity of e-business and the increasingly dynamic growth of companies of this type (A big overview of E-commerce…) make the aforementioned professions already popular. Poland is the fastest growing European country in e-commerce (Bartczak, 2016). Pure IT or managerial competences are becoming insufficient for future employers. The combination of these two directions in the era of broadband Internet and 5G communication is in a way an obligatory element of the employee's profile. In order to meet the requirements of the market, universities are somehow forced to adapt their curricula in this area, create new subjects or even entire fields of study or areas of expertise (such as Business Informatics, E-commerce, E-business). This does not mean, however, that these curricula, apart from the name of the subject, have adapted their teaching content and thematic

range to the competences actually needed in the labour market. The greatest challenge is faced by universities with an economic profile, which while teaching management or related subjects (such as management and production engineering, management and marketing, etc.), seem not to see the need to teach the practical dimension of such a dynamically developing branch of the economy.

The above observation is the result of research conducted for the purposes of this article, which consisted in the analysis of curricula at 22 faculties of economic universities related to e-business (i.e. University of Science and Technology in Bydgoszcz [UTP], University of Rzeszów, Częstochowa University of Technology, Maria Curie-Skłodowska University in Lublin, University of Warsaw, Krakow University, Collegium Civitas, University of Szczecin, Warsaw University of Technology, University of Gdańsk, University of Łódź, Nicolaus Copernicus University in Toruń, University of Economics in Wrocław, The University of Science and Technology in Wrocław, University of Science and Technology [AGH], University of Zielona Góra, University of Warmia and Mazury in Olsztyn [UWM], University of Social Sciences in Łódź [SAN], University of Economics in Katowice, Warsaw School of Economics), as well as getting to know students' opinions on the programme implemented at the University of Science and Technology in Bydgoszcz as regards its usefulness for future work and the skills acquired.

According to the research into syllabuses, e-commerce/e-business is quite a popular subject in economics studies at both public and non-public universities in Poland, but one can also find such a subject in fields related to information technology (e.g. Krakow University), and even typical humanities such as journalism (University of Warsaw, CMS and sites navigation). Recently, one can also make use of special, dedicated e-business courses (e.g. Warsaw School of Economics, University of Economics in Katowice). However, the popularity of the subject, major or course does not translate into a practical dimension of teaching, which from the point of view of e-commerce becomes a key competence for future work. Out of 19 universities (22 fields of study), only about half (53%) conduct classes in the form of labs (computer work), of which 6 universities work on the currently most popular CMS market – WordPress (Netcraft). However, from this list of universities, IT faculties need to be subtracted, as a result of which only 2 schools (UTP in Bydgoszcz and Collegium Civitas – an optional subject after gathering an appropriate number of applicants) teach practical e-business (building websites and Internet shops) to students of economics. Some universities use HTML language to transfer knowledge, which, however, is too difficult for management students and does not give the opportunity to learn how to create an extensive website, especially within 30 or 15 teaching hours. The results also indicate that universities do not have the knowledge about the popularity of WordPress in the world and the number of websites built on it, or the possibility to work in an attractive profession with new competences.

Doubts about the content of learning also arise from the fact that 21% of the surveyed entities (e.g. University of Szczecin, Gdańsk or Łódź) devote 15 lesson hours to lab classes (which significantly reduces the amount and quality of knowledge transferred), during which students do not have classes in the form that would indicate the name of the laboratory (Jak wyglądają…)[i] During them, they have case studies to solve, make PowerPoint presentations on e-business or small group projects. Even universities, which allocate 30 hours each to laboratories (e.g. UWM in Olsztyn) often do not use the time given to them for comprehensive, practical learning of e-business.

However, the number of approaches to teaching e-business is much higher. For example, universities such as the Nicolaus Copernicus University in Toruń or Wrocław University of Economics have given up all the forms of exercises or laboratories whatsoever and the subject is conducted only as a 30-hour lecture. On several occasions, the syllabuses also included an information that during the classes the students carry out a theoretical project of creating a company operating in the e-commerce sector, build a business plan, prepare and analyse company documentation. According to the syllabuses, it is also possible to conduct 30 hours of e-commerce in the form of auditory exercises (subject "management in e-business", AGH), although the authors cannot imagine what such a form of classes has in common with computers, the Internet and e-shops. Several universities try to use Customer Development methodology[ii]. This concept, however, mainly refers to building start-up

companies. The authors of the syllabus (e.g. AGH) had to assume that e-business is every start-up that is created, which seems to be an exaggerated hypothesis.

Therefore, it should be borne in mind that the specificity of organisations operating in the network is different from traditional companies. Also, the multitude of projects based on business plans or analyses of the functioning of companies through all the years of studies in economics cause that the e-business classes conducted using one of the above methods do not stand out from other management classes and do not contribute to the acquisition of new skills useful in future work.

Changes in The Profiles Of E-Business Education at Economic Universities

A poll conducted in January 2020 (using a survey questionnaire technique) on a group of 98 students[iii] of the Faculty of Management of UTP in Bydgoszcz[iv] (including 41 women and 53 men) confirmed that new professions, such as digital manager, are now needed in the labour market and students are already aware of this. 25 people from each group (women and men) admitted that this profession is highly sought after by employers. Only 3 people (2 women and 1 man) considered that it is not a future-oriented occupation (Fig. 1).

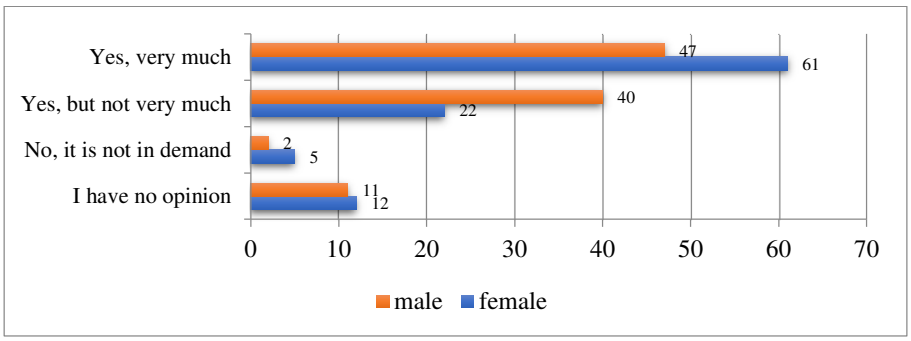

Fig. 1: The answer to the question whether the profession of digital manager is sought after on the labour market (in %)

In each profession it is possible to define a competence profile. In the case of positions such as the above-mentioned digital manager or e-commerce front-end developer, digital marketing consultant, e-commerce country manager, the ability to build a website and e-shop becomes one of the basic skills. However, we are still talking about the manager, i.e. the person in charge, and not the IT specialist who runs a website using typical technical skills. Particularly, in companies from the SME and micro-businesses sector, it can be seen that an employee should know not only how the website, slider or any marketing element should look like, but most of all, he or she must be able to create and modify it according to the needs. Organisations expect their employees to be independent in their actions and not to involve a staff of people to help (in this case computer scientists, graphic designers, etc.) in some aspects of their work. That is why economic universities should prepare for this type of work. Not every graduate will join the ranks of a corporation with more possibilities of technical support in everyday work. Therefore, the research asked whether practical classes based on CMS WordPress should take place at universities with economic profiles at all. According to the survey, as much as 79% of the respondents are of the opinion that they need such classes and they should be present not only in IT studies, but also in management studies. 15% are indecisive, while only 6% of respondents believe that they do not need such a subject.

During the classes at the University of Science and Technology in Bydgoszcz, students learned not only the general structure of the site, but also its individual elements (the list of all modules is shown in Fig. 2).

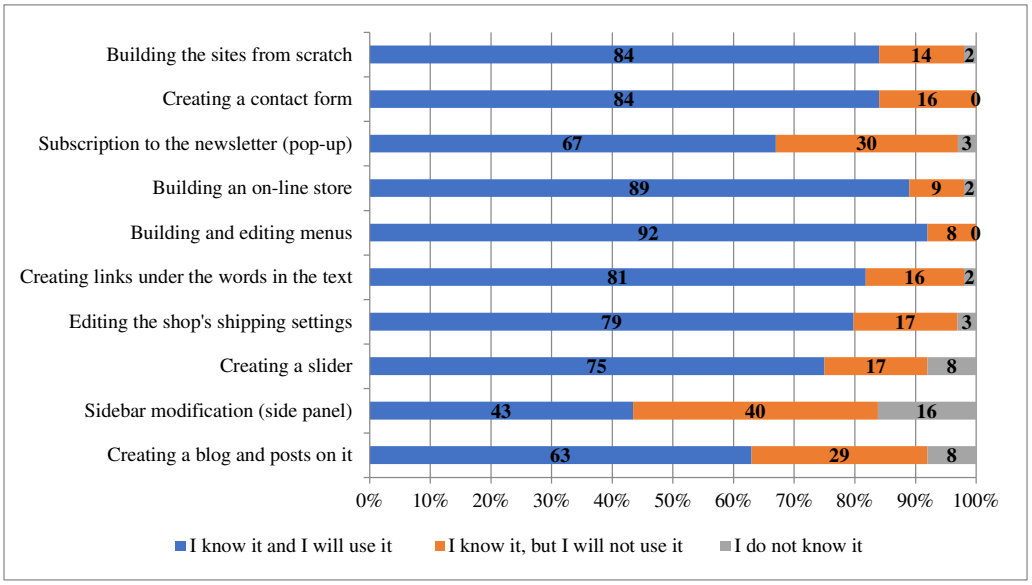

Fig. 2: Which of the listed WordPress tools you know and can easily use

The results indicate that such detailed, thirty-hour laboratories have resulted in a comprehensive knowledge and ability to independently reconstruct each taught component of the site and shop. The results on a scale of 80-90% of the knowledge of a given module also allow us to deduce the level of involvement in the classes (both the teacher and the participants, as shown in Fig. 3). The greatest difficulty (40% of respondents) was caused only by the modification of the sidebar, which was due to the fact that this issue was only partially addressed when modifying the footer. Apart from the skills listed below, the students received a majority of other, practical tips and learned how to optimise the pages for SEO, which was not included in the survey.

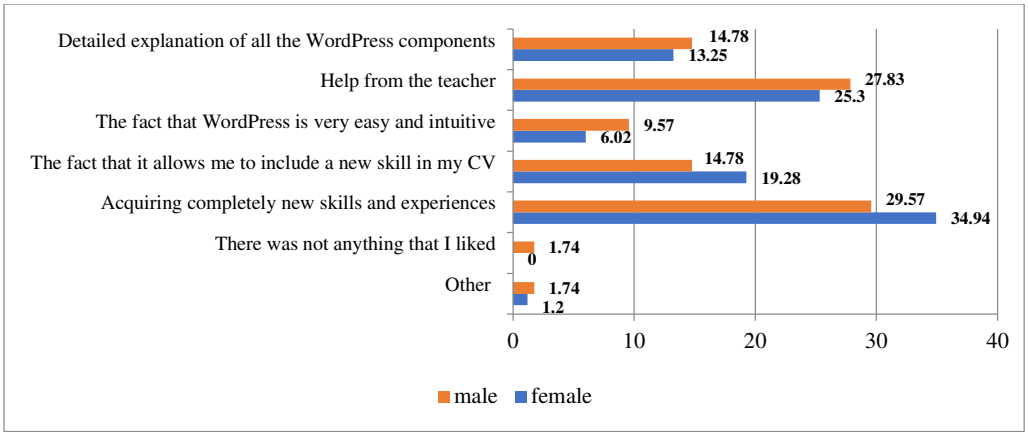

Fig. 3: Aspects of practical e-business activities positively assessed by the respondents (in %)

During the research, students were also asked what they liked the most during the classes (Figure 3). The respondents indicated, among other things, the possibility of gaining completely new skills and experiences (31.8% of the respondents). The fact that it is possible to later include the acquired competences in the CV, and thus make the employee's profile more attractive, did not escape the attention.

The acquisition of new competences already during classes at the university also broadened students' thinking horizons regarding their future work and generally gave them the opportunity to participate

in the recruitment process for positions they did not know about or which they thought were "reserved" for IT graduates. Figure 4 shows that although 56% of the respondents do not yet know whether they will use their knowledge in the future, as many as 19% (including as many as 12 women and 6 men) declared that this is something they would like to do in the future. In turn, 20% of the respondents will use the acquired skills at the moment when they decide to start their own business.

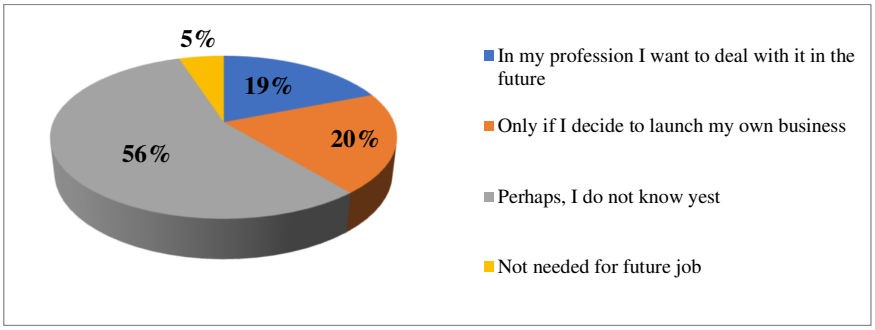

Fig. 4: Usefulness of the ability to build websites on WordPress and their administration in future work in the opinion of the respondents

Summarising the presentation of research results, it can be seen that the development of key e-business competences for the modern labour market by economic universities significantly affects the development, experience and skills of the students. It also gives a chance to take up employment in new professions sought after by companies, such as digital manager.

Conclusion

Taking into account the results of theoretical and empirical research, it can be unequivocally stated that the research hypothesis put forward has been verified in its entirety positively. Digital competences do not have to, and should not even be a purely IT domain, but should primarily concern managers who, thanks to the skills already acquired during studies, will be better prepared for their work. Due to its specificity, e-business must be considered in a completely new way. It results from the way the company is managed, its structures, information transfer models, communication when using advanced IT systems. All these elements make these organisations significantly different from traditional companies. Therefore, it is also impossible to teach about e-commerce in an equally traditional way. Since the activity of the whole company is based on the Internet, it seems logical that universities should educate on the basis of this network, as well as prepare the future employee to the requirements and expectations of the market. Only in this way they will give the opportunity to take up employment in new, sought-after professions or run their own business (reduction of initial costs).

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[i] A laboratory is a form of didactic classes conducted as IT lesson and assumes working with a computer. They are similar to exercises and differ in the use of equipment.

[ii] More information about the method can be found here: http://www.strateger.pl/customer-development-c-11.html (accessed on 19.03.2020).

[iii]Of which 4 questionnaires were rejected due to formal deficiencies – e.g. empty, completely unfilled survey pages.

[iv] Persons who in the winter semester 2019/2020 attended the subject of e-commerce and e-business and Information and Communication Technologies in Commerce (both syllabuses assumed the practical learning of building a website and an e-shop based on WordPress), which accounts for 88% of the total population (111 persons in total).

Turquoise Management Model - Teal Organizations

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Abstract

The article is devoted to new concepts and management methods. In this paper, the management of the turquoise management model has been analysed. Modern management methods in companies promote self-organization, trust, strong teams and a departure from the directive management method. Therefore, this article examines the management of the turquoise management model. Management colors were discussed according to Frederic Laloux, creator of the turquoise management model. The next part of the article analyzes new ways of communication between people and ways of organizing enterprises. What's more, the role of self-discipline in the implementation of turquoise in the organization was emphasized and the basic differences in organizational structure were compared to traditional structures. Turquoise Management Model can be the future of management. It is not easy to implement it to organisation that already exists, but it is possible.

Keywords: Colourful Management Models, Teal Organizations, Turquoise Management Style, Self-Management

"Could we invent a more powerful, more soulful,
more meaningful way to work together,
if only we change our belief system?"
Frederic Laloux

Introduction

The new organizational model is a result of a new way of cooperation. The approach to the world has changed over the centuries and both moral and cognitive and mental abilities among employees and managers have changed (Sus and Organa, 2019). This resulted in new cooperation and, what follows, a new organizational model. Next to the perception of the business ecosystem and there was a change in coexistence with a natural environment and shift from brown to the green economy (Sulich, 2018). The democratic attitude and shared vision and strategy are visible in each economic sector worldwide – among then it is possible to indicate both a new style or type of management (Sulich, 2019).

Currently, traditional management methods are becoming inadequate for the conditions in which enterprises operate. What is more, traditionally managed companies usually talk about the so-called "carrot and stick" method, i.e. a remuneration system based on bonuses and commissions (Stańczyk-Hugiet and Niemczyk, 2012). Striving for development and what to do to increase our goals and success, acting consciously and not blindly has become a priority. Then a new management model has been developed. It is a so-called turquoise organization.

The turquoise color applied refers to the nomenclature used in the integral theory of the American sociologist Ken Wilber (Wilber, 1999). He is associated with the theory of satisfying needs (Pietrzyk, 2016). There is no hierarchy of power in this type of management style. What is more, the place where the commands are issued takes independent decisions. This is done according to the following rule: everyone can take any decision if he takes responsibility for it and nobody reports a firm veto

(Eichelberger, 2017). As wrote Ziębicki *"A turquoise organization is a broad concept of creating an organization based on self-management in which, thanks to values, trust, cooperation, partnership, and the creation of self-fulfillment opportunities, we succeed in achieving effects that were not achieved with the traditional, hierarchical management model*" (Ziębiecki, 2017).

Turquoise is the name that describes the Seventh Level of Consciousness, the so-called free unit. If a man has reached this level of consciousness, he means that (Dębowski,2016):

- His worldview is open, tolerant and expects the world, including the company, partnership, and work-life balance.
- He wants to work to develop himself and pursue his passions. He wants to be flexible, overcome different challenges, exchange with other tasks.
- Money does not count for him, but self-fulfillment, honesty, authenticity.

In a turquoise organization, a well-developed system of motivating employees is the result of partnership and cooperation. Let's take a closer look at him.

Stages of Development of Colourful Organisations

Laloux used the theories of such thinkers as Robert Egan and Ken Wilber to study companies and use colors to designate different types of organizations (Web-1). In his book titled "To Work Differently", Frederic Laloux describes the development of an organization from the point of view of the development of human consciousness (Fig. 1). Management colors range from red, amber, orange, green to turquoise.

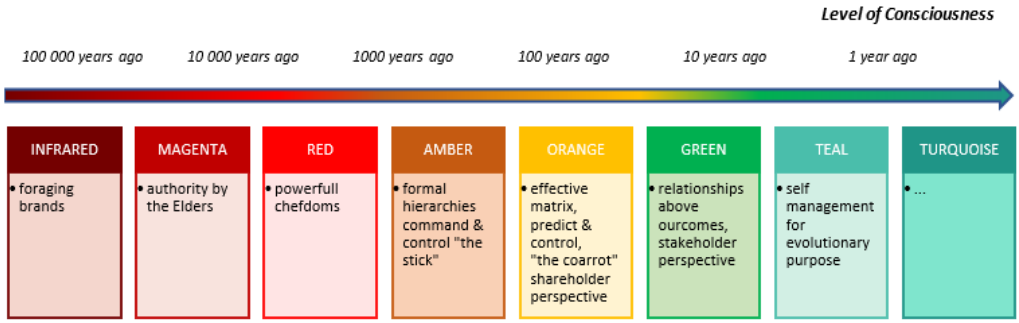

Fig. 1: Frederic Laloux and the colors of the organization (Based on: Web-6)

The characteristics of each of these management models are presented below (more in: Laloux. F., 2014):

- Red color - this style dominated in Antiquity. Currently, it is an anachronistic style and it is rejected by most managers. this style is characterized by forcing obedience. Punishment and fear are the foundation of this style.
- Amber color - the basic features of this style of management are the hierarchy and subordination and compliance of employees with precisely described procedures. The form of motivation in such a management culture is the so-called the "carrot and stich" model.
- Orange color - this style is characterized by a hierarchical structure that remains open to promotions and all other autonomous forms of organization. In addition, the management of the organization makes sure that all goals are effectively implemented by the lower levels of the organization.

- Green color - this style focuses on maintaining harmony and a sense of community within the organization. What's more, the hierarchy in the company is preserved, although many decisions are made at lower levels.
- Turquoise (Teal Organizations) **-** the most modern management style. It is a holistic concept of perceiving a man with all his needs. What matters here are not only professional needs, but also private needs. What's more, the work must on the one hand provide for life and be a stay to be proud of, on the other. Frederic Laloux characterizes this style as follows: "When we act in deep honesty and respond positively to the vocation we feel in us, the universe does everything to help us."

It should be emphasized that the last hierarchical style is green. The four management styles are governed by democratic decision-making rules, and the leading values are equality, freedom and justice. Turquoise organizations are destroying the current model of the world and reversing the order of things (Web-8).

Now is also the time to start promoting values, ideas and business models from a different level of consciousness on a wider scale. Turquoise is a term describing the 7th level of consciousness, a so called 'Free Individual'. If someone achieves that level, it means that their worldview is open, tolerant and expects partnership and work-life balance from the world and/or the company he works for. What is important, therefore, is personal fulfillment, honesty and authenticity. This approach guarantees high flexibility of action and a fast rate of change that leads to efficiency (Web-9).

This awakening, in turn, creates a new, fuller vision of the world. It begins to take the place of our lasting over five hundred years of preoccupation with the problems of survival and making life more comfortable. Although this technological approach was an important step in the development of civilization, it is only a spiritual awakening to coincidence that opens us to understanding the real purpose of human life on this planet and the true nature of the universe (Redfield, 2009).

The basis for the functioning of the turquoise organization is the belief that employees are willingly involved in various tasks, and the roles they assign themselves are connected to their individual skills. They choose work in a given organization because they feel good in it. Turquoise organization does not have a job stand but functions. The change of function takes place as a result of the evolution of the ability or is a result of the will to try something new. When we look at management it this kind of organisation we need to be aware of the difference between self-management and self-organization.

Self-management is associated with issuing orders by the manager and controlling their performance. In turquoise organizations we are dealing with team-making decisions on the division of tasks, not with team-issuing commands, so it is rather "self-organization" than "self-management" (Blikle, 2016).

Taking the above into consideration, the key differences between colours have been shown in Figure 2.

Guiding methaphor	Key breakthroughs	examples
	RED	
Wolf pack	Division of labor Command authority	Street gangs Tribal militias
	AMBER	
Army	Formal roles Stable, replicable process	Military Catholic Church goverment
	ORANGE	
Machine	Innovation Accountability	Multinational companies Investment banks
	GREEN	
Family	Emprovement Stakeholder model	Businesses known as idealistic practices
	TEAL	
Living organism	Self-management Evolutionary purpouse	A few pioneering organisations

Figure 2: Key differences between colours (Based on: Web-7)

Organisation without a boss

In the traditional approach of the enterprise, the main responsibility for the functioning of the organization lies with the manager/leader, that is characterized by several attributes as creativity, responsibility, charisma, openness, ability to cope with difficult situations, and a kind of stubbornness in pursuing goals. Nowadays a leader (or CEO) should have also emotional intelligence as it can ensure effectiveness (Azouzi,2003).

Traditional management methodologies place a strong emphasis primarily on planning and controlling the implementation of the plan. Modern approach focus on the relationships between team members, dynamic planning, continuous value delivery to the client, actual measurement of work progress and value elements produced. Good communication requires a strong emphasis on personal elements and understanding of organizational roles (Kopczyński, 2014). In the literature there are different classifications of managerial roles. Szczepanik (2009) distinguished the most commonly accepted managerial roles: firefighter (extinguishing fires and doing everything at once), democrat (supporter of collective decision-making), bureaucrat (caring for rules, regulations and order), autocrat (independently deciding and manager) and an advocate of participation and delegation.

The best way to manage modern society is through developing a “systems thinking” capability, as organizations operate in a zone between stability and predictability on the one hand, and chaos and unpredictability on the other (Van der Merwe., 2007). Additionally in modern organization each person must have the skills to work as a team member, solve problems and make decisions, be creative and, above all, communicate effectively with others (Gillen, 2002).

As regards project management, it was stated that teamwork is one of the basic design characteristics. It protects the project from being identified only with one person. It causes that in one place and for one purpose different personalities, ideas, goals, skills, and sometimes nationalities meet. The project team must be selected so that it can deal with different types of situations and tasks. The project team must be effective in its operations (Haffer, 2009). Often, however, teamwork forces the eager manager through insistence and pressure, which do not take into account the realities that come into play (Morgan, 2001). However, this is not a good approach. It is a dislike for teamwork. The role of the manager / leader is therefore undermined.

At a time when team work is necessary, many managers forget about the importance of time spent alone with each of their employees (Buckingham, 2001), hence there is a need to change not only the style of management but also thinking.

The concept of turquoise organization (teal organizations) is based on the assumption that the effectiveness of activities is possible without a formal hierarchy, without a formal incentive system, thus self-regulation and self-management (Powichrowska, 2018). The basis for self-management is

the independence of employees, their autonomy. So where is the gap for such enterprises? Mainly in companies focused on dynamic development, operating in risk conditions, those in which flexibility and commitment are key success factors (Ziębicki 2017). However, there are many doubts, like (Powichrowska, 2018):

- Are people prepared for functioning in self-governing organizations?
- Are they characterized by self-discipline?
- Are modern managers prepared to act as leaders?

In traditional organizations, leaders are at the head of the teams (very large teams are divided into smaller ones - also with the leaders at the forefront). Leaders of smaller teams form a higher-level task team. Of course, such a hierarchy can have many levels. In the case of turquoise, there is no hierarchy or order. Connections occur between the units actually cooperating with each other, and the graphic presentation of such a structure may look almost chaotically (Fig. 3). One of the differences between such a structure is, above all, variability in time, because in the case of a classic structure - changes occur sporadically, and in the case of a turquoise organization – dynamically (Blikle, 2016).

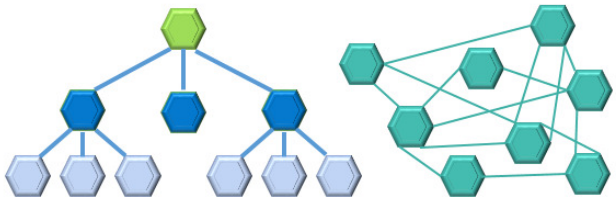

Figure 3: Traditional (left) and turquoise (right) structure (Blikle, 2016, pp. 43)

Self-management can appear as an easy process, but it is not. It requires a set of interlocking structures and practices. The decision rights and power flow to any individual who has the expertise, interest, or willingness to step in to oversee a situation. The replacement of traditional hierarchy requires specific training. People should truly be themselves, and for some it is necessary to learn how to do it at work (Laloux, 2015).

Ryan and Edward L. Deci and Julius Kuhl (2017) and the team have drawn attention to the difference between self-regulation and self-control. Self-control was defined by them as a negative, authoritarian type of action control, based on coercion and pressure, with a repressive nature. Self-regulation, on the other hand, means democratic control. Traditional management concepts have focused on self-control processes related to coercion and commitment to take a specific action. Self-regulation refers to an activity that is consistent with internal standards (a system of values, preferences, needs), where one of the driving forces for the operation of individuals is the interest or value and importance of the goal (Ryan, 2017).

The turquoise organization achieves its effects thanks to: values, trust, cooperation, partnership, and the creation of opportunities for self-realization. The most important rules for creating turquoise organizations are (Blikle, 2016):

- implementation of important goals contributing to the change of the environment for the better;
- basing the organization on trust, responsibility and partnership;
- cooperation instead of competition,
- motivating through self-realization, identifying with the goals of the organization and participation;
- self-management based on autonomous teams instead of traditional prescriptive-control management;
- network process structures, instead of hierarchical systems.

Creation of a turquoise organization and self-management carries many risks, such as chaos, bureaucracy, fuzzy responsibility, instability, lack of a coherent vision of development, multiple roles and fragmentation of work or inadequacy of remuneration for the value of work.

But the most important advantages are: flexibility, reliability, commitment and motivation, sense of community, creativity, quick decisions, development of individual competences, efficient communication, process approach, results orientation (Ziębicki, 2017).

Teal Management in Poland

Turquoise organizations (teal organizations) can also be found in Poland (more can be found in Web-3). The first of them are companies from the IT industry, packaging manufacturers, kindergartens, producers of mineral waters, and internet portals dealing with booking doctor visits and others. It is easy to notice that each of the listed companies operates in a different industry. Therefore, whether the company is turquoise is not determined by the industries but by need. As entrepreneurs point out, employees engage in believing in company missions and the deeper meaning of their own work. It is due to the fact that the employees no longer feel like a part of a large machine but become the operator of this machine (Web-3).

A positive phenomenon is also the fact that entrepreneurs see the need for change, which results not only from the needs of the market but also from the needs of employees who need to be appreciated. The trust that such an employee should get is connected with power. Nevertheless, building such trust continues. It is necessary to be open and ready to admit an error. However, when the parties trust each other - teamwork is not only more efficient, but time and money are also saved (Web-4).

Turquoise organizations are still new in Poland. Not every company will be able to call itself turquoise, and those who will attempt to change the way of management needs a change in mentality. It will be surprising for employees that there is no bonus in the teal organization. There is, however, unlimited access to information. Everyone is responsible for raising their own competences and bearing the consequences of their own deeds. An obstacle in introducing turquoise into an organization may be a basic document such as a contract of employment which stipulates strictly a position according to the law, not a function and defines the scope of duties (Web-5).

Conclusions

By meeting the foregoing, the following conclusions shall be presented:

- There is no one good management style. What's more, you cannot say that one style of management is better than the other. Each style of management is well adapted to certain contexts and can deal with certain complexities.
- In order to change something and develop it is necessary to build a new model that will make the currently inactive model become obsolete.
- It is necessary to break the old management paradigm and adjust to modern needs.

Teal management is a challenge for the economies of the future. The idea is to remove aberrations in various types of organizations. It is obvious that turquoise structures cannot be implemented in every organization, but it is worth considering changing the rules when other measures to achieve success fail.

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Monitoring as An Important CRM System Management Process for An Internal Client in An Organization

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Abstract

The goal of this article is to present how to carry out processes of deployment CRM systems in internal client way. Monitoring is an important part of management principals. Managing of CRM systems requires continuous process of monitoring for most important system's parameters. In multi-org CRM systems implementing of monitoring tool is a crucial part of proper management process. There are repeatable parameters in all CRMs like licenses, limits, critical updates, test environments variables that should be aggregated in one place. Monitoring tool allows to use text, tables, graphs, diagrams to create dashboards alerting administrators and stakeholders in case of need. That helps to automate, eliminate human errors and optimize management processes in the system. Every preparation of monitoring tool is a project where the aim is automatizing and increasing quality of control processes. Monitoring tool should be developed, implemented on UAT – User Acceptance Testing – environment and then placed in production environment and improved with next releases. Most of IT projects focus on external client to deliver expected value. Aspects of managing and monitoring processes with internal client as important as processes with external customer and should be measure. Authors suggest a simple way to monitoring processes tied with CRM deployment and define important areas of measurement during such activities.

Keywords: CRM, System, Management, Monitoring

Introduction

Information systems support the most important processes occurring in enterprises. They are divided into classes: from basic accounting and transaction systems, through systems supporting material management, manufacturing processes, logistics, to integrated, complex information systems that support all the processes occurring in the enterprise [1]. One of those systems is CRM – Customer Relationship Management. The system reflects the CRM marketing concept, which puts the external and internal customer at the center of the company's marketing activities. The starting point in every process is the customer and customer information. It is gathered in databases. Information on an external client usually regards their shopping preferences, the frequency of placing orders, the time of delivery. Based on that information the system processes data in order to obtain information that allows to make a decision – be it marketing, business or strategic [2]. Nevertheless, CRM systems are mostly useful for all internal clients of the organization, who work on the collected data with the help of the system's interface. Data in the CRM system should be uniform and standardized, which means that good management practices of the CRM IT system should be used [3]. One of them is monitoring. Monitoring is one of the basic functions of management [2]. CRM management has developed specific methods for monitoring system performance in enterprises.

CRM System Elements Monitoring

Monitoring of the CRM system is especially useful for multi-org organizations in which more than one production environment used by end-users is managed. Monitoring can also be used in the case of sandbox test environments, on which functional development tests and so-called UAT – User Acceptance Tests are carried out before implementation. With the use of monitoring, system elements that should be subject to control depending on their parameter value are distinguished. Therefore one tool can allow to control aspects such as: the frequency of system users logging in correctly or errors resulting from single-sign-on (SSO) settings in organizations in which you can use many applications in many environments with uniform login data. Monitoring tools allow you to set alarms that, by e-mail communication or various visualizations, automate alert processes in the event of a potential system error or exceeding the set limit. The table presents the elements of the CRM system and the ways in which they can be monitored when collecting relevant data for the database.

Table 1: Monitoring of CRM system elements

CRM system elements	A way of monitoring
User login	Alarms are set, by which system administrators are informed about errors in logging - no access to the environment. The environment should be configured so that there is a clearly defined point (e.g. number of login attempts, time of no access) of the alarm.
Test environments	Data on test environments are downloaded - most often including the frequency and refresh time, type of environment, its instance number.
User licenses	Information related to user licenses in the environment is defined - license types, permission sets, features. Data on free licenses and their expiration dates is collected.
Limits	Alerts are applied regarding restrictions of individual system elements, e.g. remaining numbers of external users having access to the system module. When the limit is exceeded, administrators automatically receive a warning.
Environment Variables	Each CRM system has Environment Variables, such as storage usage, daily usage of API values (Application Programming Interface), the number of custom settings, validation rules, remaining data batches, license expiration dates. Each variable can be monitored in real time.
Critical updates	A multi-environmental CRM system should be provided with critical updates along with their dates. Critical updates include data migrations, changes to environmental instances, introducing new releases, improvements.

CRM Monitoring Tools

An enterprise with over 10,000 end users and 20 production environments depending on the region and the specifics of operation in a given environment was examined. The company's activity mainly concerns sales. The implemented monitoring tool uses visualizations of specific limits, which allow tracking of specific parameters by system administrators and action when these are not within the scope tolerated by the organization. The following tools, possible to obtain in a form of a so called monitoring dashboard, were used:

1. Tabular summaries – data has been collected using tabular summaries, mainly for collecting information on values that do not change often in environments. Types of test environments, administrative information, instances, quantities and types of licenses as well as critical updates were determined.
2. Bar gauge graphs – using the bar gauge graphs the variables for user licenses are presented. In case of a specified number of other licenses, the graphs turn red, an alarm is sent to administrators. Information about the number of remaining licenses is visible.
3. Active bar graphs – for data with 1-0 values (true-false, active-inactive) navigation visualizations of a green color were chosen when the system parameter is active, and of red – when it is inactive. A change in the parameter determines sending the alarm.
4. Single stats graphs – this statistics were used when examining licenses and their expiration times. Licenses in the examined environment expire on the first day of the calendar year, so the color of the statistics changes when the license is expired or the last year of its availability lasts. There is alert implemented too.
5. Traffic lights graphs - visualizations allow to track especially environment variables with frequent changes in value. They allow to specify 3 levels synonymous to traffic lights (green, yellow, red). Depending on exceeding a given threshold, a message is sent to the system administrator and people authorized to view the dashboard can see the changes.
6. Time series graphs - a type of visualization that allows you to track changes over time, especially useful when monitoring the possibility of logging into a particular environment. Trend lines allow you to observe deviations, it is possible to set a time limit for an alarm determined by a potential system or user error.

Access to the dashboard should be given to its administrator and developers, as well as the CRM system administrator and key stakeholders. Dashboards allow management in the organization to clearly track key changes from the internal client side. This affects the efficiency of the CRM system and one of the management processes in the organization. The implementation of the monitoring process in an organization with a CRM system (especially multi-org) should be treated as a project. It is crucial to remember about the improvements that monitoring development allows – testing new variables, introducing better tools and alarms. A team should be created, that will work on preparing the monitoring plan, choosing the scope to be subject to it and the variables that should be tracked. Due to an efficient implementation of monitoring dashboards, CRM system administrators can optimize their work by automating operations. Key stakeholders can have access to any statistics of their choice at any time without logging in to the system or several of its environments at once. The response time to a system error is shortened due to the fact that if the set limit is exceeded, the information is sent via an alarm the moment it happens. The surveyed organization also noticed an increase in the quality of control processes through a uniform and standardized way of using data. Human errors have been eliminated, as well as the lack of possibility to check the history of changes in limits, critical updates, environment variables. The dashboard presents the system status in real time with the possibility of refreshing and tracking changes up to a year back. All data can be collected and stored as archival, and used for subsequent research. Monitoring of CRM system variables is important for the internal client of the organization - especially the system administrator, managers of individual departments, as well as end users, for whom system efficiency is the basis of properly performed work.

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The Present State of Safety of Road Transportation of Dangerous Goods in Poland Based on Empirical Research

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Abstract

The article presents the results of research on the safety of transportation of dangerous goods in Poland. The volume of the goods transported by roads is constantly growing, and this fact also causes an increase in the number of threats. The road transportation system in Poland, despite the adoption of legal regulations, does not function properly. To prevent this fact, the road transportation system should operate in an efficient and effective manner. Its objective is to ensure a smooth and safe transportation process. The purpose of paper is to evaluation of present state of safety of road transport of dangerous goods, in Poland, taking into account legal and organizational requirements as well as current and future threats.The research problem of the article is formulated as follows: What does the safety of the dangerous goods road transport system in Poland depend on, in the context of current and future threats?Referring to the aforementioned problem, the research hypothesis was formulated: The road transport safety system for dangerous goods should function reliably to ensure safe and effective transport of dangerous goods in an unimpeded manner. It depends mainly on the professional competence of the staff, moreover from technical condition of the rolling stock, organization and monitoring of transport, minimizing the effects of hazards.
The following research methods were used to solve the research problem: theoretical methods and empirical methods: diagnostic survey, expert interview.

Keywords: Safety, Security, Dangerous Goods, Threats, Empirical Researches.

Introduction

The basic legal act regulating this issue is the European Agreement concerning the International Carriage of Dangerous Goods by Road, ADR (1957). Dangerous goods means such materials and objects whose international carriage by road is prohibited or permitted under certain conditions laid down in Attachments A and B of the Agreement. The transport of dangerous goods imposes specific obligations on all participants in the transportation process: manufacturer, sender, carrier, recipient and inspection services, according to Directive 217 (2018) and 1846 (2018), Act (2011, 2017), Ordinance (2019). Kopczewski et al (2017) mentioned that everyone must act in such a way that transportation safety is maintained at an appropriate level, including monitoring of vehicles and cargo. Poland has ratified this ADR Convention in 1975.

In 2018, 187.3 million tons of dangerous goods were transported in Poland (Small Statistical Yearbook, 2019) and in 2017 174.7 million tons (Small Statistical Yearbook, 2018). This volume of transported goods per year (2018) gives the result of 513 thousand tons per day, i.e. the need for 28,508 18-tonne trucks per day. In a research study by Gendek (2018) in Poland, 72% of the goods transported are liquid fuels, about 19% are liquefied gases, and about 3% are toxic and corrosive substances.

Kubicka-Żach (2018) mentioned, that The Supreme Audit Office alerts that there is inadequate control and poor monitoring of the transportation of dangerous goods in Poland.

In the years 2012–2017 8,592 incidents involving vehicles transporting dangerous goods took place on Polish roads, and their number increased by 50% during that time. According to NIK (2018) and Asystent BHP (2018) in these events 5,982 people were affected, 188 of whom were killed Every year the State Fire Service eliminated the effects of events (spills, collisions) involving about 500 various materials, 30% of the events concerned particularly dangerous substances.

Madej and Pająk (2019) mentioned that road transport of dangerous goods should include the risk analysis, it means the societal risk for communities living or staying within a radius of six kilometres from all national roads in Poland, employed the GIS software. The possibility of assessing the risk level associated with this kind of transport is one of the components affecting the level of public safety. The risk level may vary significantly for the same area.

The United Nations has developed mechanisms for the harmonization of hazard classification criteria and communication tools, and for transport conditions for all modes for transport. UNECE also administers regional agreements for effective implementation of these mechanisms for road transport of dangerous goods.

The Committee adopted a set of amendments to the Model Regulations concerning, *inter alia*, electric storage systems (including lithium batteries installed in cargo transport units and defective batteries), explosives, infectious waste of Category A, waste gas cartridges, harmonization with the 2018 Edition of IAEA's Regulations for the Safe Transport of Radioactive Material, listing of dangerous goods, update of LC_{50} values for some toxic gases and use of *in vitro* skin corrosion methods for classification.

In light of the current situation related to the coronavirus (COVID-19), some ADR contracting parties coordinated their efforts to prepare a multilateral agreement: M324 (2020), M325 (2020), M326 (2020) and M326 (2020).

The purpose of the M324 contract is to prevent the expiry of the drivers' ADR certificates and training certificates for the advisers on the safety by introducing a derogation consisting in extending the validity of these certificates and these certificates by 30 November 2020.

M325 agreement is aimed at preventing the expiry of validity certificates of admission of vehicles for the carriage of certain dangerous goods by introducing a derogation consisting in extending the validity of these certificates by law until 31 August 2020.

The M326 agreement applies to periodic inspections and tests of pressure vessels for the transport of class 2 gases. It is valid until August 31, 2020 in the case of transportation within the territory of the countries that signed it.

The M 327 multilateral agreement concerns periodic or indirect testing of portable tanks and multi-element gas containers. The all periodic or indirect testing of portable tanks and multi-component gas containers (MEGCs), shall remain valid until August 31, 2020.

Empirical Research Results

The purpose of paper is to evaluation of present state of safety of road transport of dangerous goods, in Poland, taking into account legal and organizational requirements as well as current and future threats.
The research problem of the article is formulated as follows: What does the safety of the dangerous goods road transport system in Poland depend on, in the context of current and future threats?

Referring to the aforementioned problem, the research hypothesis was formulated: The road transport safety system for dangerous goods should function reliably to ensure safe and effective transport of

dangerous goods in an unimpeded manner. Achieving this state means overcoming many obstacles: technical, legal, organizational and depends mainly on the professional competence of the staff, moreover from technical condition of the rolling stock, organization and monitoring of transport, minimizing the effects of hazards.

In order to solve the main research problem and verify the research hypothesis, qualitative and quantitative research methods were used:

- system analysis, enabled the solution of the complex problem of the road transport safety system for dangerous goods,
- analogy, it was used to formulate a research hypothesis and for similarities between some issues,
- statistical method, allowed for the acquisition, presentation and analysis of data describing incidents in the transport of dangerous goods,
- the analytical method, allowed for the consideration of the organization of dangerous goods transport,
- a comparative method, on the basis of which basic mechanisms of safety implementation in the field of transport of dangerous goods were examined and analyzed,
- behavioral method, which made it possible to recognize and explain by observing the behavior of persons responsible for the transport of dangerous goods,
- empirical methods: diagnostic survey, expert interview.

Within the adopted research methodology, an independent variable was distinguished: *the road transport environment in the Republic of Poland* and a dependent variable*: the safety state of dangerous goods transport.*

Empirical research was conducted on an expert sample (109 people) in the following institutions: Ministry of Infrastructure, Inspectorate of Road Transport, Government Security Centre, Provincial Crisis Management Centres, Police, State Fire Service, National Atomic Energy Agency, Technical Inspection of Transportation, Environmental Protection Inspection, transportation companies, teaching staff of transportation faculties in polytechnics.
The respondents were asked the following 21 questions.

Question No 1: Have you benefited from training on dangerous goods? If so, what was this training about?

Table 1: results of people's responses on the Health and Safety of Work (HSW) training (as applicable)

Categories of responses	the number of responders	%
1. ADR, RID	28	25.7
2. Health and Safety of Work (HSW), road traffic safety for drivers	24	22.0
3. None	**57**	**52.3**

Most of the respondents (52.3%) did not participate in the training. 25% of the respondents participated in the ADR and RID training, and 22% in HSW training.

Question No 2: What is your assessment of your training on provisions regarding the health and safety at work? (please mark X in the selected column in <u>each</u> row).

Table 2: the results of the responses to the question No 2

The possible responses	the number of responders	%
1. No response	8	7.3
2. Insufficient	2	1.8
3. Sufficient	34	31.2
4. Good	**47**	**43.1**
5. Very good	18	16.5

Most of the respondents positively assessed the level of the training provided (43% as good and 16.5% as very good). Nevertheless, 31.2% of respondents assessed the level of training as only sufficient.

Question No 3. How do you assess the impact of staff competence on the safety of dangerous goods transport? (please mark X in the selected column in each row, 5 - highest rating, 1 - lowest rating).
Most of the respondents (53%) assessed the impact of competence as high, 40.4% as very high.

Table 3: the results of the responses to the question on competence

The possible responses	the number of responders	%
5. Very high	44	40.4
4. High	**58**	**53.2**
3. Sufficient	5	4.6
2. Low	2	1.8
1. No opinion	-	-

Question No 4. How do you assess the technical condition of roads in Poland?

Table 4: the results of the responses to the question No 4

The possible responses	the number of responders	%
1. Very good	1	0.9
2. Good	44	40.7
3. Sufficient	48	44.4
4. Insufficient	15	13.9

The results of question 4 show that there is a minimum percentage (1%) of respondents who think that the technical condition is very good, while 14% of them think that it is insufficient. 44.4% of the respondents believe that the roads in Poland are of sufficient quality, as there are many infrastructure elements that need to be improved. The elements that need improvement the most are presented in the next question.

Question No 5. Which elements do you think should be improved in the road infrastructure to improve the safety of the transportation of dangerous goods? (please indicate up to 3 elements of the road infrastructure).

Table 1: the results of the responses to the question No 5

The possible responses	The number of responders	%
1. Length of highways and expressways	53	48.6
2. The number of ring roads	69	63.3
3. Number of guarded car parks	33	30.3
4. Technical condition of roads	72	66.1
5. Road traffic signs	26	23.9
6. Intelligent Transportation Systems	24	22.0
7. Loading/unloading areas	11	10.1

The majority of respondents chose the technical condition of roads in the first place (66.1%). Definitely a large number of people chose the number of ring roads (63.3%) and the length of highways and expressways (48.6%). It is worth noting that 22% of respondents chose Intelligent Transportation Systems as an under-invested element of road infrastructure. It must certainly be said that the use of modern technologies, which will be a very important part of the concept of road safety of dangerous goods, together with the improvement of road infrastructure, will reduce potential threats and increase the quality of the entire transportation process.

Question No 6. What is the impact of the length of highways and expressways on the level of safety when transporting dangerous goods? (Please mark X in the selected column of each row).

Table 6: the results of the responses to the question No 6

The possible responses	the number of responders	%
1. No impact	6	5.5
2. Low impact	38	34.9
3. High impact	44	40.4
4. Very high impact	17	15.6
5. No response	4	3.7

40.4% of the respondents believe that the length of highways and expressways has a high impact on the level of safety, while 15.6% of the respondents believe that it has a very high impact. Statistical data on Poland show that there are the fewest accidents on highways and expressways in Poland, so this factor is very important. In 2017, the length of expressways was 1,768 km, and highways - 1,637 km (Small Statistical Yearbook, 2018). In 2019 the length of highways was 1,696.2 km, expressways 2,450.3 km (GDDKA, 2019). The network of highways and expressways in the Republic of Poland is to be about 7,980 km, including about 2,100 km of highways (the Ordinance by the Government, 2019).

Question No 7. What is the influence of the modern technologies on the level of safety when transporting dangerous goods? (Please mark X in the selected column of each row).

Table 2: the results of the responses to the question No 7

The possible responses	the number of responders	%
1. No impact	3	2.8
2. Sufficient impact	41	37.6
3. High impact	**51**	**46.8**
4. Very high impact	8	7.3
5. No response	6	5.5

46.8% of the respondents believe that modern technologies have a high impact on the level of safety, while 37% believe that they have a sufficient impact.

Question No 8. What is the influence of the modern technologies on the level of safety when transporting dangerous goods? (Please mark X in the selected column of each row).
39.4% of respondents believe that Intelligent Transportation Systems has a high impact on the detection of threats, while 24.8% believe that it has a very high impact.

Table 3: the results of the responses to the question No 8 (detection of threats)

The possible responses	the number of responders	%
1. No impact	9	8.3
2. Sufficient impact	25	22.9
3. High impact	**43**	**39.4**
4. Very high impact	27	24.8
5. No response	5	4.6

Question No 9. What is the influence of the Intelligent Transportation Systems on the localisation of vehicles and on a level of safety when transporting dangerous goods? (Please mark X in the selected column of each row).

Table 9: the results of the responses to the question No 9 (the monitoring of vehicles)

The possible responses	the number of responders	%
1. No impact	3	2.8
2. Sufficient impact	33	30.3
3. High impact	**49**	**45.0**
4. Very high impact	**20**	**18.3**
5. No response	4	3.7

63.3% of the respondents believe that the monitoring of vehicles by using Intelligent Transportation Systems has a high impact on safety levels, while 30.3% believe it has a sufficient impact. Studies show that the benefits of ITS are very large (Njord & others, 2006), including: increase in transport infrastructure capacity by 22.5% on average, improvement in road safety (reduction of accidents by 60% in the undeveloped area and 50% in the built-up area), significant reduction in travel times and energy consumption (by nearly 60%), reduction of exhaust emissions by 40% on average, improvement of travel comfort and traffic conditions for drivers, reduction of costs of fleet management, reduction of costs related to maintenance and renovation of road surfaces, even by 30-35%.

Question No 10. What is the impact of emergency rescue on the level of safety during transportation of dangerous goods? (please mark X in the selected column of each row).

Table 4: the results of the responses to the question No 10

The possible responses	the number of responders	%
1. No impact	11	10.1
2. Sufficient impact	30	27.5
3. High impact	30	27.5
4. Very high impact	24	22.0
5. No response	14	12.8

Analysing the results of the question in more detail, it should be noted that the respondents (50%) rated that the emergency rescue has a high impact on safety.

Question No 11. Can the signage of the vehicle carrying dangerous goods be visible? If you chose the responses 3 and 4, what would you do to improve visibility.

Table 11: the results of the responses to the question No 11

The possible responses	the number of responders	%
1. Perfectly visible	11	10.1
2. Visible	**77**	**70.6**
3. Poorly visible	16	14.7
4. Not visible	4	3.7

It is worrying that only one in ten of those surveyed is of the opinion that the signage of such safety-sensitive dangerous goods is perfectly visible and 15 % think it is poorly visible. The vast majority say the signage is visible (70.6%).

Question No 12. What do you think is the organization of transport of dangerous goods in Poland? (please mark one response!).

Table 15: the results of the responses to the question No 12

The possible responses	the number of responders	%
1. Very good	4	3.7
2. Rather good	**51**	**46.8**
3. Average (such as itself)	38	34.9
4. Bad	4	3.7
5. Very bad	1	0.9
6. It's hard to say	11	10.2
7. No response	4	3.7

The level of organization of dangerous goods transportation in Poland was assessed positively by 46.8% of respondents, as average by 35%. Although people who have chosen to say that the organization is bad or very bad, then the result of this question is satisfactory, because only 5% say it is bad. By contrast, 10% of those surveyed had no opinion on the subject, and this may indicate a lack of direct contact with the dangerous goods or lack of knowledge about them.

Question No 13. What do you think may be the biggest organizational problem in the transportation of dangerous goods? (please mark one response!).

Table 13: the results of the responses to the question No 13

The possible responses	the number of responders	%
1. Lack of appropriate vehicles	11	10.2
2. The securing of loads	26	24.1
3. Legal provisions	8	7.4
4. Incompetence of employees	39	36.1
5. Poor work organisation	15	13.9
6. The monitoring of loads	9	8.3
7. Other problems (like what?)*	3	2.8

The research shows that 39 respondents (36.1%) have the opinion that the main organizational problem is employees' incompetence. The problem also turns out to be the securing of loads (24.1%). When verifying the results of the questionnaires, the organizational problem also turns out to be the inadequate organization of work, which may be due to the lack of competence of employees.

Question No 14. How do you rate the safety control of transported dangerous goods? (please choose one response!).

Analysing the evaluation of the control of dangerous goods it should be considered positive, more than half (53.3%) of the respondents believe that these activities are carried out good, while 5.6% believe that they are very good. However, it is important to stress that only 3% of the respondents believe that controls are not carried out adequately. On the other hand, 38.3% of those surveyed assessed that the controls are carried out in a sufficient manner.

Table 6: the results of the responses to the question No 14

The possible responses	the number of responders	%
1. I rate the control very good (is strict, efficient, accurate)	6	5.6
2. I rate the control good (is rather strict, quite efficient, accurate)	57	53.3
3. I rate the control sufficient (not too restrictive, too long, not too accurate)	41	38.3
4. I rate the control insufficient (not efficient, not accurate)	3	2.8

This may be due to the fact that in Poland, the number of inspections in relation to the number of vehicles driven is not large, but the officers have more and more modern equipment, they undergo a number of trainings (more and more competences) and are restrictive.

Question No 15. Do you think that the law on the transportation of dangerous goods is satisfactory in Poland?

Table 15: the results of the responses to the question No 15

The possible responses	the number of responders	%
1. Yes	**68**	**63.0**
2. None	40	37.0

63% of respondents responded that the law is satisfactory in Poland, while 37% considered it unsatisfactory.

Question No 16. If the law is not satisfactory, what are the biggest problems in law? (please mark the responses). Question 11a. - Multiple response question (data does not add up to 100%).

Table 16: the results of the responses to the question No 16

The possible responses (to mark)	the number of responders	%
1. It's complicated	23	21.1
2. The rules are mutually exclusive, the law is inconsistent	6	5.5
3. The law is not adapted to practice	28	25.7
4. The law does not take into account European regulations	4	3.7

Apart from the fact that the second part of the question was to be responded by people who were not satisfied by the law, then 62 people responded the second part of the question.
The vast majority of the respondents who responded this question had the opinion that the law was not adapted to practice (28 people), while 23 people were had opinion that the law was complicated.

Question No 17. Do you think the security system and alarm system is sufficient? (please choose one response!).

As regards the alarm system and security system, the majority of respondents said it was good (56%), while 12% thought it was rather bad. However, 26.6% did not have an opinion on this issue, which may indicate that they had no direct contact with the security of dangerous goods or that they have no knowledge about it. When examining this area, it should be stressed that only one person believes that these systems are very good.

Table 17: the results of the responses to the question No 17

The possible responses	the number of responders	%
1. Very good	1	0.9
2. Rather good	**61**	**56.0**
3. Rather bad	13	11.9
4. Bad	4	3.7
5. I don’t know, it’s hard to say	29	26.6

Question No 18. Do you think that cooperation between institutions dealing with the safety of transportation of dangerous goods is appropriate? (Please choose one response!).

Table 18: the results of the responses to the question No 18

The possible responses	the number of responders	%
1. Very good	1	0.9
2. Rather good	**62**	**56.9**
3. Rather bad	19	17.4
4. Bad	3	2.8
5. I don’t know, it’s hard to say	24	22.0

The results of the research show that the majority of the respondents (56.9%) assess the cooperation between institutions well, which is very positive in the context of the manifestation of threats in the transportation of dangerous goods, as the proper functioning of institutions and their cooperation contributes to an increase in safety levels. 22% of respondents do not have an opinion on the subject, which may be due to their occupation or seniority, these respondents do not have experience and knowledge of cooperation between national authorities.

Question No 19. How do you think the rescue services in Poland react during a dangerous incident involving the transportation of dangerous goods? (please choose one response!).

Every fifth respondent has the opinion that public services react very well, and 57.8% that they react well, which may be reflected not only in their competences but also in their organisation. Analysing the answers in this respect, it should be pointed out that the number of conducted rescue operations in Poland is increasing. In addition, there are indications that the number of threats will continue to increase due to the increasing amount of dangerous goods transported, and moreover, the result of the study is important and satisfactory as rescue services operate effectively and efficiently in the event of an emergency, as confirmed by the respondents.

Table 19: the results of the responses to the question No 19

The possible responses	the number of responders	%
1. Very good (professionally)	22	20.2
2. Rather good	**63**	**57.8**
3. Rather bad	10	9.2
4. Very bad (unprofessional)	1	0.9
5. I don't know, it's hard to say	13	11.9

Question No 20. What measures would improve the safety of transportation of dangerous goods? (please choose one response!).

As far as safety measures are concerned, the analysis of the surveys in this context clearly shows that the competences of employees and their continuous improvement are rated highest, with 72.5% of respondents indicating this point. It should be stressed that no question has received such a percentage score. 13.8% of respondents believe that the monitoring of dangerous goods is important and action should be taken to ensure that such a monitoring system is established. No one indicated the answer "other", which is undoubtedly due to the fact that it is, however, the competence of the staff that is the most crucial element that can improve safety in the transportation of dangerous goods.

Table 7: the results of the responses to the question No 20

The possible responses	The number of responders	%
1. New procedures	7	6.4
2. Continuous improvement of employee competence	**79**	**72.5**
3. The monitoring of dangerous goods	15	13.8
4. Technological innovations	8	7.3
5. Others, like what?	-	-

Question No 21. What effects can be brought by the road transportation system of dangerous goods enabling the real time monitoring (please choose any number of responses!).

Table 21: the results of the responses to the question No 21

The possible responses	the number of responders	%
1. Improvement of transportation safety	**70**	**64.2**
2. Traceability	55	50.5
3. Appropriate route selection/the updating of routes	52	47.1
4. Detection of threats	46	42.2
5. Improving cooperation between carriers and rescue services	45	41.3
6. Quality of transportation performance	29	26.6
7. Effective and fast communication between an enterprise and a driver	27	24.8
8. The selection of parking spaces	27	24.8
9. Others.	1	0.9

In question 21, the respondents could choose any number of statements, so the data does not add up to 100%. 64.2% of respondents indicated that real-time monitoring would improve transportation safety. More than half of those surveyed (50.5%) claim that such a system would allow for continuous tracking of vehicles, which is important during a potential accident or incident. Only 25% of respondents believe that such a system would make it possible to improve the selection of parking spaces. This may be due to the fact that only 6% of the respondents work as drivers, and they are the ones who have a direct problem to choose places to stop safely.

Summary

The research problem of paper was solved on the basis of theoretical and empirical research and the hypothesis adopted by the authors has been positively confirmed in full.

The safety of the transportation of dangerous goods depends mainly on: the professional competence of the staff, in addition on the technical condition of vehicles, the organisation and the monitoring of the transportation and on the minimisation of the consequences of threats.

The professional competence of the staff (carriers, drivers, control services, emergency services) is a key element of the safety of the transportation of dangerous goods by road, and relates to knowledge, experience and training of the staff, operational supervision and quality control being a part of their tasks.

The development of new technologies (including ITS) requires the selection, commensurate with the risk analysis, of means of transportation of dangerous goods, which should be kept in good technical condition.

The organisation and monitoring of transportation is based on meeting legal and organisational requirements, controlling the movement of vehicles, detecting and updating risks, procedures should be based on an integrated approach to risk and the use of Intelligent Transportation Systems.

Minimising the effects of threats is about coordinating the actions of all those responsible for the transportation safety and for preventing and effectively eliminating the effects of threats, as well as conducting rescue operations.

The conducted research showed that in relation to current and future threats in the studied area, there are technical and procedural conditions to reduce the risk of their occurrence. But it should be made clear that at present it is not possible to create a system that would meet security conditions in a uniform manner in relation to all the requirements discussed. Nevertheless, on the basis of the information collected, it can be emphasized that taking into account chemical, biological, ecological or radioactive hazards, there is a necessity for continuous analysis of the studied area. More

specifically, it is impossible to fully protect the transport of dangerous goods by road, but most of the potential risks can be significantly reduced so that there are as few as possible in the future.

Many elements affecting the proper operation of the system are negatively assessed. Respondents are of the opinion (most of them) that the condition of road infrastructure in Poland is unsatisfactory, which should be definitely improved, while the organization of transport of dangerous goods is assessed positively. However, the biggest problem in organizing the above process is low competence of the staff, which should be described as a negative phenomenon.

Some aspects considered in this paper require further, more detailed research. Nevertheless, the authors hope that the research and conclusions drawn will become an inspiration or contribute to the discussion on increasing the safety of road transport of dangerous goods.

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The Development of Corporate Governance in the UAE

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Abstract

Corporate governance is the process or structure used to direct and manage the business and financial matters to enhance business and corporate accountability with the ultimate aim of acquiring shareholders ' long-term value, as well as taking into account the interests of other stakeholders. The effective corporate governance system will maximize the shareholders ' return. Therefore, it is important to have a good corporate governance practice in order to control the relationship between other stakeholders, the Board and the management of an organization. Corporate governance can prevent the misuse of its power and interest and the imprudent and non-risk behavior of the employees, as well as to resolve conflicts of interest between the management and the committees of the Board. In addition, corporate governance for the financial sector has important implications for the strength of the entire economy. The UAE has accomplished various extraordinary triumphs authorize by key worldwide reports and markers. The Country positioned 23rd universally in the Corruptions Perceptions Index issued by Transparency International in 2015 though it positioned 35th in 2008, which mirrors the incredible accomplishment in this regard.

Keywords*:* Corporate Strategy, Abu Dhabi Accountability, and Authority, Corporate Governance, Organizational Culture

Introduction

Corporate governance mechanisms are used by the organization in order to resolve problems related to governance. The purpose of the system is to control the managers in relation to the conflicts of interest (dart, 2013:63). However, Weimer and Pape, 1999 cited in the Muftah Otman, 2014 pointed out that the mechanism will very much depend on the internal and external systems. Dart than further explained that corporate governance mechanisms could be divided into two; internal and external mechanisms. For the internal mechanisms it will encourage the managers to maxims the company which includes the board of Directors, Audit Committee, auditors, ownership structure, co-monitoring and supervisory board. Meanwhile the purpose of the external mechanism is to avoid the conflict that may arise between shareholders and managers. As a whole corporate governance mechanism, whether it is internal or external, plays an important role in assisting the company in providing quality audit reports (Fan, Lau & Wu, 2002, Al-Janadi et.al 2013). Corporate governance is the process or structure used to direct and manage the business and financial matters to enhance business and corporate accountability with the ultimate aim of acquiring shareholders ' long-term value, as well as taking into account the interests of other stakeholders. The effective corporate governance system will be maximizing the shareholders ' return. Therefore, it is important to have a good corporate governance practice in order to control the relationship between other stakeholders, the Board and the management of an organization. Corporate governance is able to prevent the misuse of its own power and interest and the imprudent and non-risk

behavior of the employees, as well as to resolve conflicts of interest between the management and the committees of the Board. In addition, corporate governance for the financial sector has an important implication on the strength of the entire economy

Literature Review

Corporate governance can be referred to as trust, ethical, moral value and confidence, which is referred to as the community, namely, the stakeholders, including the government, the public, professionals, service providers and the private sector (Aras & Crowther, 2008). Here, corporate governance is important in enhancing transparency, accountability and business integrity. However, the implementation of corporate governance impact will be a benefit in the long term for the organization.

Allocation of Resources

The allocation of resources is closely related to the corporate strategy of a business to ensure that resources are allocated in a timely and it should be sufficient to ensure that the organization can meet the targeted objectives and goals. The importance of creating resource allocation controls is to ensure that the company is able to manage in the business in accordance with the laws and ethical values of good business. The good control element is able to strengthen the Board's roles and responsibilities in ensuring competitive profits in addition to effective risk management made (Maritan and Lee 2017:2412). According to NCHRP (2010), the private sector does not have a universal agreement on whether or how to associate the target achievement with the distribution of resources.

Organizational Design

Byran and Joyce (2007) from McKinsey Consulting take a more nuanced stance by positing that "organizational design should be about developing and implementing corporate strategy." Woren (2018) in Organization Design: Simplifying complex systems, observes that managers face organizational design challenges on an almost daily basis coupled with empirical research confirms the potential impact of organizational design on the functioning and performance of organizations, but yet business schools have placed little emphasis on organization designs. Business schools are not the only ones avoiding the centrality of organizational designs to corporate strategy. Furthermore, Byran and Joyce (2007) have stridently argued that multinational organizations in the 21st Century have become massive, talent-driven and suffers from organizational inertia; added to the hard work and time-consuming nature of organizational design, it is not surprising that many CEOs typical have opted for ad hoc structural, big acquisition, coupled with a focus on where to and how to compete. They further elaborate that good corporate governance is an important feature to attract investments into e companies and create an efficient financial market.

Portfolio Management

From the perusal of literature portfolio management has evolved over the last few decades as one of the most quintessential developments in management theory and practice. The portfolio management process is the process taken by the investors to assist in the investment objectives (Fraser 2017). Portfolio management is an action to establish and maintain an investment account, while financial planning is the process of developing financial goals and creating a plan of action to achieve it. In other words, the portfolio management involves investing in various types of assets: securities, bank deposits, properties, art, jewelry, intellectual property, and more. In the easiest sense and spirit, the portfolio means investing free funds in assets that do not require spending time or money, but at the same time bringing a steady income (Trivedi 2013:2). Drawing the voluminous scholarly literature on asset management and portfolio management Kevin (2015: 2) concludes that portfolio management is fundamentally about the constitutive processes involved in the creation and maintenance of investment

portfolios. He goes to compartmentalize the process into phases. Accordingly Kevin (2015) identifies and lists the phases within the process Figure 1.

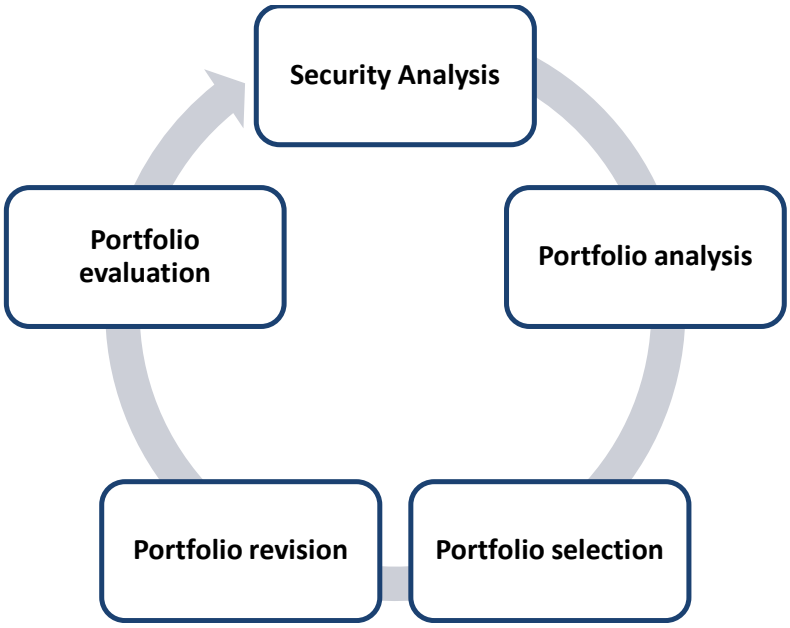

Source: Kevin (2015)

Figure 1: Portfolio Management Process

This five phone typology by Kevin (2015) finds expression with Fraser (2017) who notes that portfolio management reinforces the need for an effective and efficient process that includes a disciplined process for identifying, prioritizing and selecting the most attractive investment opportunities.

UAE Economic Development

UAE is not left behind in the formulate policy in relation to implementing good corporate governance in line with the development at the international level. The ongoing effort is part of the movement by the government to develop a corporate governance policy that is able to create new opportunities and economic growth. UAE has realized the impact and role of the world's major economic challenges. For this, it has made proactive efforts to strengthen its advanced position among countries in the world to ensure economic stability. The UAE government continues to study and evaluate the ever-changing and social landscape, economy and politics to increase its ability to respond to unprecedented speeds on any challenges by developing and implementing new economic policies and regulations. This section examines the economy, investment, and the financial sector in the UAE.

Strengthening the National Economy in the UAE

Dubai is the capital of the United Dubai (Emirate of Dubai), one of the seven states which form the country of the United Arab Emirates (United Arab Emirates-UAE). Six other United-formed UAE is Abu Dhabi, Ajman, Ras Al Khaimah, Fujairah, Umm quwwine and Sharjah, each having the same capital name as the name of all the United Nations. From all the above, the United Abu Dhabi is the largest united in terms of geographic areas than the others. Due to its geographical size and also the

wealth of petroleum and gas owned by Abu Dhabi, UAE's political power is based in Abu Dhabi, where the president of UAE now being held by the Abu Dhabi ruler, Sheikh Khalifa bin Zayed Al Nahyan.

The main economic indicators of the UAE in 2018 confirm its ability to adapt to financial crises and to social and economic changes:

Table 1: UAE Main Indicator (KPI)

Indicators	2014	2015	2016	2017	2018
GDP (billions USD)	401.96	370.30	371.35	407.21	435.70
GDP (Annual % Change)	3.1	3.8	2.7	1.5	4.4
GDP per Capital (USD)	43,213e	38,650e	37,678e	40,162	41,772
General Government Gross Debt	15.6	18.10	19.30e	19.1	19.0
Inflation Rate (%)	2.3	4.1e	1.8e	2.8	3.7
Current Account (billion USD)	40.33	12.31	8.78	14.37	16.97
Current Account (in % of GDP)	10.0	3.3e	2.4e	3.5	3.9

Note: (e) Estimated Data
Source: IMF – World Economic Outlook Database, December 2018

Generally, almost all the united in UAE depends on the national income from petroleum as a source of the economy but Dubai is an exception. Due to the greater efforts of the Dubai ruler, the visionary to diversify its economy based on the smaller oil reserves, compared to Abu Dhabi, Dubai is not entirely dependent on oil products as the main source of its economy where 85 percent of UAE's economic source is derived from oil exports (Askari & Jaber, 1999).

Table 2: The UAE Ranking on Various Global Economic

Indicators	Rank
Economic Openness	3rd
Business Environment, Infrastructure & Technological Advancement	4th
Global Readiness Index	5th
Change Readiness Index	5th
World Competitiveness Index	15th

***Source**: National Centre for UAE Statistics, December 2018*

The above table shows that there is a success that has been done by the UAE government in its efforts to mitigate economic activities and to reduce dependence on oil during the economic-financial crisis facing the world economy. In 2008, the nominal GDP for the UAE grow high at an annual rate of 27.4 percent to 253.2 billion USD as compared to the year 2007, the growth rate was 16.8 percent to 198.8 billion USD. This is due to strong growth from the oil sector, non-hydrocarbon sector activities and non-oil sectors contributing to the economic organization. The GDP grew at 7.4 percent (2008) from the annual 2007 of 5.2 percent. Between the GCC countries, UAE is the second-highest country for per capita earnings after Qatar. The income per story increased by 35 percent from 2005 (35056.7 USD) until 2008 (53,996.7 USD).

UAE has emerged as the number one destination in the Arab world due to its strong infrastructure, framework, energy supply, quality education, and business facilities. UAE administrators want to be comparable to London and New York, the world's leading business center. With significant events such as the World Expo, 2020 is expected to attract 22 million tourists, and the report shows a healthy pipeline project worth $705 billion which is scheduled in the next 10 years, the country's economy UAE is on the right track for a consistent growth

Organizational Culture

Importantly all organizations have their unique organizational culture. Thus, in thinking deeper about the concept conjures up the question of what is organizational culture. Alvesson (2013: 3) explains how a "quick glance of literature or scholarly works the use the term organizational culture will reveal enormous variations in definitions of this and even more in the use of the term culture." This is precisely why Schabracq (2009) noted that as a concept, organizational culture is simply hard to define. Notwithstanding the multiplicity of definitions, Reddey (2017:7) noted the despite the "various definitions and connotations about organizational culture, however most researchers have developed a shared understanding of culture." As an umbrella term, Alvesson (2013) takes organizational culture to mean or include values and assumptions about the social reality of an organization. Ahmadi et al. (2017) in their well-developed scholarly publication titled, Relationship between Organizational Culture and Strategy Implementation: Typologies and Dimensions briefly outlined the historicity of research on organizational culture, by noting that "researches on the subject of "organizational culture and its effect on other organizational variables became widespread during the 1980s" (2012:287). The pervasiveness of research of the said topic is indicative of what Alvesson (2012:2) regards the "significant way of understanding organizational life in all its richness and variations." Klien (2011) cited in Reddy (2017:20) suggests that organizational culture can be regarded as both an internal resource and a dynamic capability." From the perspective of approaches, the organizational culture exists within that variants at multiple- levels within an organization, and it is most pronounced in global corporations, that have operations across different markets. Kokina and Ostrovska (2013: 366) illustrates how "there are three basic approaches to organizational culture: symbolic, when the organization is examined as a system with an indefinite internal environment; cognitive, when the organization is examined as a multitude of knowledge, beliefs and regulations which the organization members have comprehended; and systematic which, at creating the organization climate, functions as the basic determinant of culture which is being formed under the influence of organization's objective qualities and is characterized by the situation of a psychological environment."

Corporate Governance and Organizational Culture

The organizations in the Global Economy of the twenty-first century undergo a drastic change, due to competing within the industry, to gain economic advantages. The changes in how to do the next activity in a better way, over the competitors in the industry are observed. The phenomenon of how to do or know-how is the corporate governance that is involved in many aspects of the government sectors. The work environment of many persons is transformed into critical activities in the organization (Austin, 2012). The transformation in critical activities to face the challenges requires empowering the persons and enabling them to realize it. From the previous studies it is understood that superior paybacks will be obtained by allocating more funds in corporate governance implementations (Reus et al., 2009). In the substance of corporate governance changes, a significant feature is whether the implementation of corporate governance principles and organizational culture has a positive impact on corporate strategy. The literature analysis of the relationship between different corporate governance principals and organizational culture is wide-ranging. Over time, a lot of corporate governance's principals were studied in relation to corporate strategy.

Aoki (2017) in article Corporate Governance Affects Corporate Strategy on the Japanese Stewardship Code, which was released in 2014 as a code of conduct and the amendment of the Companies Act; cautiously reflects on how the need to need to strengthen corporate governance structures within

Japanese companies in order to protect institutional investors has impacted positively on the corporate strategy.

Corporate Strategy and Governance Principles in UAE

The term corporate strategy is some of those over-used terminologies by scholars and business practitioners alike. Thus, it is imperative to contextualize the isolated meaning of both terms. Al-Azzam, Al-Qura'an and Al-Mohameed observers that "in its simplest form a corporation is defined as an organization having its own legal entity separate from its owners thereby having its own rights, responsibilities, and obligations. They operate for a profit motive, capitalizing on their expertise, resources and networks" (2015:58), taken together corporate strategy refers to a strategy pertains to the entire company, which covers all business units (Saee 2007:9; Ahmad et al., 2009).

Corporate governance involves the manner in which the business and affairs of banks are governed by their boards of directors and senior management, which affects how they: set corporate objectives; operate the bank's business on a day-to-day basis; meet the obligation of accountability to their shareholders and take into account the interests of other recognized stakeholders; align corporate activities and behavior with the expectation that banks will operate in a safe and sound manner, and in compliance with applicable laws and regulations, and protect the interests of depositors" (p.4). Moreover, no doubt there is no single standard definition or statement of corporate governance (Du Plessis et al., 2010). Evidence suggests that most of these definitions. Finally, no doubt there is no single standard definition or statement of corporate governance (Du Plessis et al., 2010). Evidence suggests that most of these definitions represent points of view comprising different frameworks such as: management; organizational behavior; accounting; legal structure; social responsibility; and politics

Corporate governance is the system by which business corporations are directed and controlled. The corporate governance structure specifies the distribution of rights and responsibilities among different participants in the corporation, such as, the board, managers, shareholders and other stakeholders, and spells out the rules and procedures for making decisions on corporate affairs. By doing this, it also provides the structure through which the company objectives are set and the means of attaining those objectives and monitoring performance" (OECD, 1999). In summary, based on the constitutive elements of this aforementioned framework Furrer (2011) believes that a corporate strategy creates value as a system when its' five elements fit together as a system.

In the globalized business, organizations need key reasoning and just by developing great corporate strategy would they be able to end up deliberately focused. Abu Dhabi public organizations need these types of study as most of the corporate strategy is done in private sectors and there is no such type of study was done in Abu Dhabi Emirate. To be specific, Abu Dhabi Accountability Authority (ADAA) that affirms the commitment to the highest standards of transparency and accountability as adopted by the UAE, ADAA in Emirate of Abu Dhabi plays an important role in public and private organizations in the Emirate. These organizations attract many resources such as human resources, financial management, and equipment and counterpart the efforts of public organizations in providing services in the Abu Dhabi Accountability Authority (ADAA). This is why the corporate strategy and performance of these organizations has continued to attract attention from many stakeholders, including development partners, government and the public sectors.

Conclusion

The UAE has accomplished various extraordinary triumphs authorize by key worldwide reports and markers. The Country positioned 23rd universally in the Corruptions Perceptions Index issued by Transparency International in 2015 though it positioned 35th in 2008, which mirrors the incredible accomplishment in this regard. The UAE achieved the top four positionings in various markers in the Global Competitiveness Report issued by the World Economic Forum. The UAE has likewise positioned the most joyful Arab Country and the twentieth internationally in the World Happiness

report distributed by the United Nations. Further, the Country was positioned first locally in the "Simplicity of working together" classification as indicated by a report issued by the World Bank.

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Improving Technologies for Geo-information and Geo-Ecological Support while Territory Development

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Abstract

In paper, we present results of improving technologies in geo-information and geo-ecological support for territory development within environmental economics while climate change. While studies, we used methods of data bases constructing within digital platforms, web-technologies and virtual reality tools. We make statement that territory development is to be carried out in the environmental economics paradigm as related set of large natural-industrial projects within common space area and time period. We present a block model that combines the investment objectives of such project set with cost of adequate geo-information and geo-ecological support, including natural risks management goals and tasks. We suggest to use geo-information distributed online platforms as the main technological tools in the tasks of geo-information and geo-ecological support while the development of territories. In study, we used platform https://www.researchgate.net/profile/Valery_Abramov2/ for data exchange and preliminary discussion.

Keywords: Information Technologies, Geo-Information Support, Geo-Ecological Support, Risk Management, Environmental Economics

Introduction

Recently, digital transformation, named Industry 4.0, extends in the global economy, during which a lot of enterprises and infrastructure-intensive companies plan and implement wide spectrum of information technologies (Baikov, 2019), (Bidenko, 2019), (Drabenko, 2019), (Grachev, 2017), (Frolova, 2019), (Lukyanov, 2019). This leads to serious information technological changes in decision support while territory development within geo-information management (Kirsanov, 2014), especially in natural risk management (Berboushi, 2014), (Ershova, 2018), (Garcia, 2018), (Isaev, 2015), (Istomin, 2018), (Shilin, 2019).

In the article, we describe the results of improving technologies in geo-information and geo-ecological support for territory development in geo-information management area (Burlov, 2018), (Fokicheva, 2016), (Fokicheva, 2015), (Istomin, 2015), (Kirsanov, 2014), (Lednova, 2014), (Malakhova, 2014), in large environmental projects (Mandryka, 2019), (Popov, 2014), (Popova, 2019), (Rumyantseva, 2017), (Zhigulsky, 2018) within environmental economics (Chusov, 2019), (Golosovskaya, 2014), (Karlin, 2014), (Karlin, 2009), (Popov, 2016). Significant attention should be paid to geo-information support of natural risk management (Fokicheva, 2018) in the context of climate change (Mikheev, 2019), (Bournashov, 2014), (Gogoberidze, 2014), including the issues of information collection and processing (Fokicheva, 2019), (Khaimina, 2014), (Popova, 2019).

Methods and data

In research, we used: methods of data bases constructing in case of digital online platforms, web-technologies, big data technologies (Novikov, 2019), (Sokolov, 2019), geo-information technologies (Veretennikov, 2019), (Yaily, 2019) and virtual reality tools. Also, we used Foresight technologies, theory of decision making under uncertainties (Palkin, 2019), risk management approach while territory development (TD). From the point of view of geo-information management, we structured geo-space to allocate the interconnected components of the solution space (Istomin, 2015).

Results

We make statement from the point of view of geo-information management (GIM), that territory development (TD) in recent stage is to be carried out in the environmental economics paradigm as related set of large natural-industrial projects (NIPs) within common space area and time period. In fig.1, we present a block model of investment structure while TD that combines the investment objectives of such NIPs (blocks 1-5) with cost of adequate geo-information and geo-ecological support (blocks 6-8), including natural risks management goals and tasks (block 7). Our analysis shows that the largest part of the cost of geo-information and geo-ecological support is the environmental monitoring (block 8), the essence of which is determined by the content of block 7. Significant part of the cost in block 8 is hardware and software, the cost of which varies significantly.

On basement of above mentioned model, we proposed to develop the geo-information and geo-ecological support system (GIGESS) with combined structure for access, storage and analysis of information from open geo-spatial data sources, including archives and operative mode web tools. Reducing the cost of GIGESS is an important direction of TD.

As a result of the research performed using foresight technologies, the authors suggest to use geo-information distributed online platforms (GIDOP) with cloud technologies (OT) as the main technological solutions for GIGESS while territory development. We give preference to open platforms such as Google Earth. Also, we recommend to use GIDOP EOS eos.com, which allows to operate with space images from the Landsat-8 and Sentinel-2 satellite systems with limited open access.

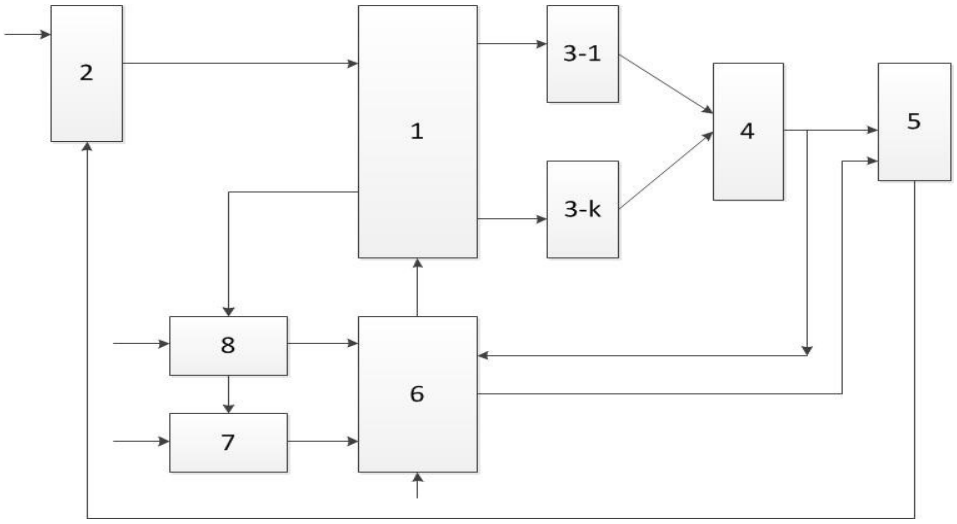

Figure 1 :Block model for investment structure while territory development: 1 – block of distribution of resources; 2 – block of formation of resources; 3 - block of formation of private income; 4 - block of formation of total income; 5 – block of formation of the investment share of resources; 6 - block of comparison with the permissible level of risk; 7-block of formation changing in time set of natural risks, including climate risks; 8 – block of environmental monitoring

In this research, essential was block of environmental monitoring. Reducing the cost of GIGESS is an important question for TD. we proposed to use GIDOP EOS eos.com as basement for low-cost GIGESS while territory development. In figure 1-4, we present imagery of developing territory on north-east part of Saint-Petersburg, Russia, taken freely from EOS eos.com for 25th May 2017 and 18th June 2018. The pictures obtained with EOS's agriculture tools https://eos.com/agriculture-band/, that combining satellite bands SWIR, NIR, Blue. In figures, bare ground has magenta color, vegetation has green color, roads and buildings appear as bluish objects.

Figure 1: Image of developing territory for 25th May 2017

Figure 2 : Image of developing territory for 18th June 2018

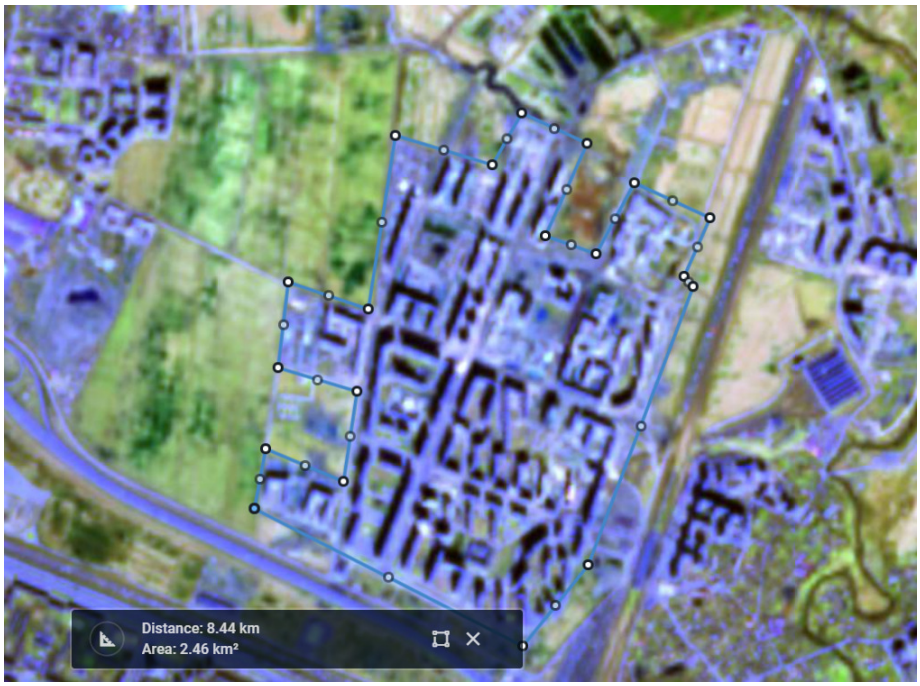

Figure 3 : Image of developing territory with its measuring characteristics for 25th May 2017

Figure 4 : Image of developing territory with its measuring characteristics for 18th June 2018

Comparing the images in figures 1 - 4 allows you to clearly see the changes that have occurred in the developed area for almost a year. Using EOS's tools, you can fast and simply determine the linear and area characteristics of selected objects and see their dynamics over time (figures 3 and 4). A detailed analysis of above mentioned changes is not the purpose of this article.

As essential result, we propose to use GIDOP EOS eos.com as basement for low-cost GIGESS while territory development.

Discussion

As basement for low-cost GIGESS while territory development, GIDOP EOS eos.com can be used in educational and training purposes. The essential task of university practical learning (UPL) in the field of territory development is to teach students the practical aspects of work with GIDOP EOS tools, which requires a developed learning base within special geo-information systems (GIS) laboratory. In some cases, real practical work in special GIS laboratory can be undergoes with virtual reality (VR) technologies (Popov, 2019), that can reduce total cost of learning process.

Conclusion

We consider results of improving technologies in geo-information and geo-ecological support for territory development within environmental economics while climate change. In research, we used methods of data bases constructing within digital educational platforms, web-technologies and virtual reality tools. We make statement that territory development (TD) is to be carried out in the environmental economics paradigm as related set of large natural-industrial projects within common space area and time period. We present a block model that combines the investment objectives of such projects set with cost of adequate geo-information and geo-ecological support, including natural risks management goals and tasks. We suggest to use geo-information distributed online platforms as the main technological tools in the tasks of geo-information and geo-ecological support while the

development of territories. As essential result, we propose to use GIDOP EOS eos.com as basement for low-cost GIGESS while territory development, including educational and training purposes.

Acknowledgment

While study, associate professor Nikolay Popov, head of geo-information systems laboratory in Arctic and Subarctic Institute at the Russian State Hydrometeorological University, gave us very useful consulting. The platform https://www.researchgate.net/profile/Valery_Abramov2/ gave us excellent opportunities for preliminary discussion and data exchange while this research.

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Using The ISO 9001:2015 Standard As An Organization Tool When Figthing Against Coronavirus In The Context Of Increasing The Level Of Organization Safety - Outline The Problem

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Abstract

The aim of the paper is to analyze the possibility of using the quality management tool, i.e. ISO 9001:2015, to fight against the disease, which is spreading among people from all continents, and to introduce systemic solutions which could be the first barrier to protect employees of a given organization, and thus their families.

Keywords: ISO 9001:2015 Standard, Safety And Security, Coronavirus Pandemic, Risk, Epdemiological Threat

Introduction

The attempt to address the global problem of the threat to human health and life caused by the coronavirus pandemic is a fundamental problem, the solution to which spends the sleep of probably every conscious inhabitant of our planet. Every day, people all over the world are following the disease statistics and, unfortunately, the increasing number of deaths with great concern. The lack of a drug and vaccine makes the time for reaction shrink more and more and more frustrating. No one doubts that we have sailed into unknown waters and do not see the shore to which we can safely reach. The European Union is not taking any systemic and effective action, which is lacking because no one has made a risk analysis taking into account this type of event. Of course you can insure yourself against various types of cataclysms, but no one has done so. There was a lack of unanimity to take the same steps to increase the level of security of the members of the European Union. The reactions of national governments have shown how they were trying to do something in the dark. Each country applied its own scenario for dealing with the pandemic, although it was already possible to build on the experience of the countries that were the first to fight the pandemic. The aim of this article is not to assess the adopted solutions and consider what economic effects the pandemic will bring in the near future, but an attempt to analyse whether something can be done at the stage of an organization which has a quality management system implemented based on ISO 9001:2015.

An Organisation As A Guarantor Of Its Welfare And The Environment In Which It Operates

If we look at the organization with the quality management system implemented and try to compare it to something, we can see an efficient system, which consists of a number of interconnected elements. Each of these elements pursues its own goals, which, as you know, serve to achieve the success of the whole. At this point, we're already wiser to make a pandemic a fact. Therefore, it is enough to place this element as a risk, which is and properly classify it, additionally assessing what impact it will have on the activity of our organization, but first of all it is necessary to develop a whole set of measures that will allow to secure employees (meeting the requirements of point 6.1 of this international standard ISO 9001:2015). If each of us took part in a fire training at least once, he understands the meaning of this action and can quickly evacuate. It is therefore worth thinking about applying certain routine actions to protect one's health in the event of an epidemic. This will certainly make sense not only if such threats occur in the future, but will also help to solve other problems more quickly. Here, we can cite the example of one of the Spanish companies in Poland, which

recommended the use of disinfectants and masks to its employees and trained them in how to act at work and outside of work, making recommendations on how to move to and from work. In addition, a ban was introduced on employees and their families leaving their place of residence while on holiday. Such guidelines have also been extended to workers' family members, which has had an additional positive impact on the extension of the group of people who have been trained and made aware of it. These rules of conduct were established much earlier than it was done in Poland as part of the introduction of subsequent stages of restrictions related to the spreading epidemic. This example shows how positive solutions adopted by the organization have an impact on its environment. The effectiveness of such simple solutions is undoubtedly the best safety barrier. If we make the assumption that most people spend more time at work and on the way to work (at least until now), the sense of safety and security created by our organization is of great importance to every employee. And that translates into his immediate surroundings. This is how you build a sense of safety and security. We're dealing with the phenomenon of connected vessels, so why don't you fight for it.

Inserting protective solutions in the content of ISO 9001:2015

A very good place to place new ISO 9001:2015 normative solutions to increase the level of organization safety is certainly item 7 the Support. With regard to the order of the individual subsections, attention should be paid to the possibility of including new solutions in them. Starting with 7.1 the Resources (Polish Committee for Standardization: PN-EN ISO 9001:2015), a new procedure or instruction for supplementing internal resources with additional personal protective equipment in the event of an epidemiological emergency can be introduced in a very simple way and with little effort, and can even be extended to include the provision of such protective equipment for all customers of the organisation. No one is surprised to find that there are people in the organisation who are directly responsible for the whole of its operation. Therefore, nothing stands in the way of thinking about hiring or establishing permanent cooperation with a person who will operate the process of training, awareness of the epidemiological safety rules for all workers (7.1.2. of this standard). In addition, it can be ensured that all regulations and legal requirements in this respect are met. Each organisation shall have infrastructure to the extent necessary for its operation (7.1.3 of this Standard). The examples of grassroots initiatives observed in the media show how some organisations are able to quickly switch their production to other tracks and produce, for example, respirators. Similar examples can be found in the chemical industry of PKN ORLEN - a Polish oil industry corporation started to produce disinfectants very quickly. The President of the United States even called on General Motors and Ford to produce respirators. Both General Motors and Ford, each company separately, have announced their collaboration with other companies to manufacture respirators (Trump wants car companies to start producing respirators 2020). General Motors has announced that it will produce the equipment at its plant in Kokomo, Indiana and will deliver it in April. Suddenly, all the countries affected by the pandemic lacked literally all the necessary protection measures. The crisis affecting each country has led to a situation where fear for one's own security has prevented mutual supply assistance. Dependence on a single producer on a global scale has resulted in a situation where an interruption of the supply chain has led to disaster. Fortunately, this is a temporary collapse, from which we manage to get out slowly. If appropriate system solutions were introduced at the level of the organization's operation in accordance with the requirements of the standard, the situation would certainly be easier to control. With reference to section 7.1.4 (Polish Committee for Standardization: PN-EN ISO 9001:2015), which defines the process environment, the very fact of having additional safeguards by the organization has an impact on the emotional protection of employees and their families, and this in turn increases the sense of security. The importance of the goal of protecting human health and life requires that such activities of the organization and processes that are necessary for the effectiveness of management systems be recorded in the form of documented information (7.5 of this standard). It is important that such documents contain a description of people's competences and the scope of their responsibility for the implementation of individual processes.

Conclusion

Every day we are more and more aware and learn how to act in a new reality. It is worth sharing knowledge and helping each other at every stage of the pandemic's development, the more experience we gather, the better we will be able to defend ourselves against other dangers. We can see many examples of the actions taken by the medical community to share knowledge about, for example, treatment methods and drugs used. The names of the medications used are officially published in the mass media, may be difficult to understand for the average citizen to understand, but for professionals these are concrete guidelines for action. Many Chinese physicians have written guides to the experience gained in Wuhan and have sent them out to medical practitioners around the world. This kind of behaviour is very valuable and shows not only social but also international solidarity. Every day we learn how to protect ourselves against an invisible enemy more and more effectively. Before our very eyes a great transformation and renewal is taking place, mechanisms of solidarity and social responsibility are emerging. Every day a pandemic attacks our safety and destroys our sense of security. Taking into account the fact that important reasons guide the decisions of the leaders of all countries in the world, all of whose attention is focused on countering the threat of a pandemic, it is worth doing everything to protect humanity from this kind of threat and to include in this kind of action all possible means at our disposal. One such tool is the use of ISO 9001:2015. It is therefore to be hoped that the Technical Committee of ISO/TC 176 "Quality Management and Quality Assurance" will take some constructive action on this issue. Assuming that our lives will change radically, it is possible to significantly increase the intellectual potential of any organization in which a quality management system has been implemented through a small amount of work. Awareness-building for workers (7.3 of this standard) is a process that seems difficult at first, given the attitude of all participants in this process. Most of them are afraid of the new challenges and the changes they will bring, and they take a defensive attitude. However, we must do everything we can to protect ourselves from this kind of situation in the future and reduce the pandemic of fear which is now starting to paralyze everyone and everything.

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Foreign Banks, Economic Growth and The Private Sector: An Empirical Analysis on Romania, Hungary And Bulgaria

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Abstract

Proponents of foreign direct investment (FDI) argue that FDI can be a major trigger for the growth of the real economy in the host country; however, they are not as keen-edged when it comes to FDI in the financial-banking sector, and numerous examples from Central and Eastern European (CEE) countries from the last decades more than prove these contradictions in the ways of thinking concerning FDI. Researches has identified a number of positive aspects brought by foreign banks, such as: better risk-management, improved knowledge transfer, products and management techniques, innovative ways to increase financial intermediation, improved resource allocation, institutional development, employment opportunities, attracting additional FDI. In the same time, we acknowledge that the effects of FDI on the domestic financial institutions and the increase of competition that will ultimately lead novel and cheaper financial services for consumers are ambiguous, and identifying of possible long-term effects upon developing economies is difficult. This papers aims to examine the impact concerning the presence of foreign banks in several countries in CEE (Romania, Hungary and Bulgaria), to understand whether and how foreign participation in the banking sector of these countries has or has not had an effect upon the economic growth, and, respectively, to identify and understand the effects upon the availability and costs associated with the crediting of the private sector. We are interested in and concerned with finding out whether there are any particularities and associated developments, varying and differing from country to country, and whether events such as the recent economic and financial crisis or reaching a dominant threshold of a foreign presence in their domestic banking systems have conclusively changed the behavior of foreign banks in relation to the economic evolution and the private sector from these countries.

Keywords: Foreign Banks Assets; CEE Countries; Macroeconomics Indicators.

Introduction

The relationship between the entry of foreign banks onto the domestic markets and the macroeconomic stability of these markets is more than often associated with the effects that this entry has upon the financing of the real economy. Political and economic decision-makers alike, as well as the beneficiaries of financing activities, are worried regarding the fact that foreign banks will affect and influence the competition and the functioning of the domestic banks, aggravating, in times of crisis, the existing problems (Badulescu & Petria, 2011). In this paper we are interested in analyzing this fear that foreign banks will have a “cherry picking” behavior, meaning that foreign banks will be able to select the best debtors, while neglecting other market segments such as small and medium-sized enterprises (SMEs) and whether this behavior will weaken the power of domestic banks,

drastically diminishing the overall availability of financing sources for SMEs that heavily rely on bank loans for debt financing and development (investments).

Literature review regarding the foreign banks' entry and the financing of the real economy

Ever since the 1980's, considerable evidence and studies have shown that in several developed countries, larger banks devote a smaller proportion of their total loans to SMEs, as compared to other small (and domestic) banks. By default, the merger or takeover of small domestic banks in a developing country by larger foreign banks may thus imply a reduction in loans for small domestic businesses, although there are other conditions and influences, namely the type of entities that merge or which are purchased, the policy of the corporate/parent bank, the internal conditions and regulations, the possibilities of expanding upon profitable market niches, etc. (Peek & Rosengren, 1996), (Strahan & Weston, 1998), (Berger, et al., 2000), (Clarke, et al., 2003), (Badulescu and Simut, 2012), (Onder and Ozyildirim, 2016) that could impact this availability.

What is more, literature has shown that the process of corporate consolidation (through mergers and acquisitions of domestic banks) can also have a strong "external effect". Banks that are not in the process of consolidation can respond to the decrease of some types of loans from large institutions (which are in the process of being acquired and/or expansion) by increasing their credit offers aimed at those area not considered any more by larger foreign banks. Berger et al. (2000) note, however, that although the external effect completely compensates for the effects of corporate consolidation in terms of the amounts of loans, some firms are still affected given they have transaction costs (searching for new sources of financing, as a result of the disruption of the initial situation) and may have less favorable lending conditions from the new financing providers, this until a mutual relations matures.

In undesirable terms, regarding concerns generated by the entry of foreign banks onto the domestic banking systems of the emerging or developing countries, we can acknowledge the fact that, in general, foreign banks seem to allocate higher shares of their lending portfolios to large, consolidated, commercial and industrial customers. Peek et al (1999) warn that foreign banks tend to buy domestic banks which are underperforming, and that their restructuring has the potential to reduce (at least temporarily) the loan granted to industrial clients, by modifying, on the short term, lending policies, especially with regard to small businesses. This situation could partly explain the large and constant disparities that exist between the structure of the loan portfolio of foreign banks and domestic banks, this situation being as similar and as noticeable in developing countries as it is in already developed countries. There is substantial evidence that large banks, but not necessarily of foreign banks, lend a small share of their portfolio to SMEs, as compared to smaller banks (Berger & Udell, 1995), (Peek & Rosengren, 1996), (Strahan & Weston, 1998). According Focarelli and Pozzolo (2000) the majority of international banks tend to be larger in size; what is more, they can be discouraged by diseconomies of scale and by the difficulties imposed by the management, organization and control of the process of granting loans to SMEs, which tends to be inefficient in nature, as opposed to the efficiency of corporate services (structural lending, consultancy services, capital markets operations). Even when they grant small sized loans, large banks must make use of standardized credit-worthiness evaluation methods, by using available information, and both hard (information from financial statements) and soft (relational information) (Berger & Udell, 1995), (Berger & Udell, 2002). The latter is not easily quantifiable and proves to be some-what inaccessible to large banks, this type of information being relationally and physically local in nature. Soft information tends to be flexible to a certain extent, and it is this flexibility that facilitates the setting up and development of a relationship between small banks and small debtors (Badulescu et al, 2014).

An essential area of concern for economic and financial banking policies refers to competition. If the competition stemming from newly entered banks (mostly foreign) forces several small domestic banks to leave the market upon which they are already present, the supply of loans and credit lines headed towards small and informationally opaque enterprises will decrease. Even so, the evidence

supporting this is indirect in nature, and is not sufficiently convincing. It is possible that, given that pressure will be aimed at reforming and increasing the profitability of domestic banks, this will have as a result the fact SMEs with mediocre financial statements and opaque or unconvincing information will not receive loans, regardless of the characteristics of the existing banks (big or small, domestic or foreign) (Clarke, et al., 2003).

Love et al. (2013) have examined the impact that the credit increase in CEE and Latin America has had upon banks, both before and during the economic crisis of 2008. They note that the increase in the volume of loans granted by foreign banks was higher/larger before the crisis only in CEE, and that the loans granted by foreign banks have decreased more than the loans granted by domestic banks in these countries during the crisis period, largely due to an excessive decrease of the number of credited companies. Similarly, De Haas and van Lelyveld (2014) have reported that during the global crisis of 2007-2009, the decrease growth rate of loans from the subsidiaries of multinational banks was almost three times faster than that of domestic banks. What is more, some studies investigating the behavior of banks during the financial crisis of 2007-2009 (Claessens & Van Horren, 2013) show that global banks, given the unfavorable financing shocks, have diminished the weight and importance of lending done through their local branches.

Nevertheless, there are opinions that also point to the positive effects accompanied by the entry of international/foreign banks upon crediting of the private (non-banking) sector. Navaretti et al. (2010) consider that loans granted by the subsidiaries of foreign banks throughout ECE aimed both towards corporations and also to the retail sector (SMEs and the households), have been stable and have even witnessed a slight increase between 2007 and 2009. Berger and Mester (1997) point to the fact that the entry of large banks into developing countries is likely to coincide with the larger restructuring and consolidation of the banking sector in the host countries. If the economies of scale associated with this consolidation would generate more electronic banking, this in turn could improve the accessibility to some types of financial services, even for small customers. Technological advancements and market openness provide SMEs with new opportunities for receiving financing (often non-bank financing), which until recently were only accessible to large companies (Clarke, et al., 2003). These factors could make it less necessary for a bank to have a physical presence in all the geographic areas in which it operates (Petersen & Rajan, 2002) and could help large foreign banks overcome fears of diseconomies of scale and difficulties of lending to small debtors. There is enough evidence, from 1980's to 2010's (from Latin America, and from CEE countries) that, although foreign banks, as opposed to domestic banks, have allocated a smaller share of their loan portfolio to SMEs, these foreign banks have managed to direct almost half of the total credit to SMEs, meaning that, even though it is a gradual process, foreign banks do not discriminate against SMEs in their lending policy (Badulescu, 2011), (Morutan & Badulescu, 2016).

Clarke et al. (2001) have used a survey of more than 4,000 businesses throughout 38 developing and transition economies in order to study whether borrowers' perceptions concerning interest rates and long-term loan access are positively correlated to the presence of foreign banks. Their results support the claim that the penetration of foreign banks onto the domestic market improves firms' access to credit, by providing lower interest rates and increased access to long-term loans. Moreover, the advantages of high levels of penetration of foreign banks do not seem to benefit only large companies, the authors finding strong arguments that small businesses are also presented with benefits in some respects and there is no consistent evidence that small companies would be negatively affected by inflow of capital from foreign banks.

Methodology

In this paper, for the analyzed countries, i.e. Romania, Hungary and Bulgaria, we have made use of a series of macroeconomic and financial indicators. Their purpose is to create an evolving image of several economic aspects that took place during the analyzed period and to show if there is a connection between these variables and to determine what results have generated these influences. The variable used in this present paper are: *assets of foreign banks* – as an exogenous/independent

variable, and, as dependent variable: *Economic Growth* – the rate of change of real Gross Domestic Product (GDP), and two financial/banking indicators - *Interest rates on bank credit to the private sector*, and *Bank credit to the private sector* (as a percentage of GDP). We will make use of annual data to the 1996-2016 time period (see the evolution of these indicators in Table 1 – Appendix). All variables have been measured in percentage points and the information has been collected from World Bank and BERD databases (TheGlobalEconomy.com, 2018). In our study we will analyze the relationship between the presence of foreign banks and the above mentioned indicators, for the selected countries, by using two regression models.

Therefore, the first model, used to determine the impact that the percentage of foreign banks' assets in total foreign banks has on the indicators presented above is the following (Model I):

$$ln(Y)_t = \alpha + \beta ln(X)_t + \sum_{i=1}^{2} \gamma_i \left(ln(X)_t * D_i \right) + \varepsilon_t$$

where:

Y_t represents the dependent variable (macro-economic and financial indicators)
α - intercept
ß – the parameter of the *Foreign Bank Assets* dependent variable
ln –natural logarithm
γ_i – the parameter of the dummy variable *i* multiplied with independent variable *Foreign Bank Assets*
D_i – dummy variables for the time period in which the assets of foreign banks register less than 60%, respectively over 60% until the pre-crisis period, thus Di = 1 the time period *i* and 0 otherwise.

Because 50% foreign presence is not a certainty of/for dominance in the medium and long term, we have considered the 60% percentage as being relevant for indicating the threshold from which foreign banks have achieved majority in the total assets of the banking system in the respective country.

In order to determine whether the relationship between the presence of foreign banks and the previously mentioned has changed in the crisis years and throughout our sample, we have proposed the following model (Model II):

$$ln(Y)_t = \alpha + \beta ln(X)_t + \sum_{i=3}^{9} \gamma_i \left(ln(X)_t * D_i \right) + \varepsilon_t ,$$

Where:

D_i – annual dummy variables for the pre-crisis, crisis, and after-crisis time periods, where $D_i = 1$ for year i and 0 otherwise.

The dummy variables indicate:
- The pre economic crisis time period – i = 3 (year 2007 - D_{2007}),
- The time period during the economic crisis – i = 4 (year 2008 - D_{2008}), i = 5 (year 2009 - D_{2009}) and
- The time period after the economic crisis – i = 6 (year 2010 - D_{2010}), i = 7 (year 2011 - D_{2011}), i = 8 (year 2012 - D_{2012}), i = 9 (year 2013 - D_{2013}).

Results and Discussion

The following tables present the estimated coefficients for model I and II, by explaining the relationship between Foreign banks assets and macro-economic indicators (GDP), and also financial

indicators, namely interest rate of bank loans granted to the private sector and bank loans granted to the private sector, in Romania (Table 1), Hungary (Table 2) and Bulgaria (Table 3). Thus, in the case of Romania, we can notice a positive and significant association between the share of foreign banks in the banking system and the GDP, meaning that the increase in size of the assets of the foreign banks had a significant growth effect on the GDP during the sample period. What is more, we can state that an increase in the share of foreign banks in the banking system causes a decrease of the interest rate. Moreover, if we look at the two dummy variables, we notice that when the share of foreign banks assets is below the mentioned threshold of 60%, at a 1% increase of this weight, the interest rate of bank loans granted to/aimed at the private sector increases with 0.22%. When the share of foreign banks' assets is above the threshold of 60% of total assets, at a 1% increase in this share of foreign banks, the interest rate of bank loans granted to the private sector has decreased to 0.01%. The compelling decrease in interest rates could be caused by two factors. The first factor is determined by the increase of the presence of foreign banks on the Romanian market, which leads to an increased competition in the banking system and a gradual decrease of the interest rate margins in the market. The second factor is a repercussion caused by economic crisis after 2008. Even if in the short term, this crisis has caused a dramatic decrease as regards volume of lending, an accelerated decrease in the basic interest rate of the major global currencies has lowered the basic interest rate with which the parent banks could refinance. By default, the costs of financing for their subsidiaries and, of course, the loans granted by them have also gone down. Returning to the analysis of the situation of Romania, we find that, with regard to the bank loans granted to the private sector (as a percentage of GDP), when the share of the assets of foreign banks increases by 1%, the bank loans granted to the private sector increases by 0.38%.

Table 1 : Estimation of parameter for Models 1 and 2 in Romania

	Dependent Variable Macro-economic and Financial Indicators					
	Economic Growth		Interest rates on bank credit to the private sector (%)		Bank credit granted to the private sector (percentage of GDP)	
Model	I	II	I	II	I	II
	Coefficient (std. error)					
Constant			4,58*** (0,56)	4,89*** (0,79)	1,90*** (0,42)	1,64** (0,62)
Foreign bank assets	0,17** (0,07)	0,04* (0,02)	-0,45*** (0,13)	-0,33* (0,20)	0,38*** (0,09)	0,21* (0,11)
Dummy Variable D1	0,23** (0,10)		0,22*** (0,04)		-0,25*** (0,03)	
Dummy Variable D2	0,27* (0,13)		0,01 (0,06)		-0,05*** (0,04)	
Year 2007 x Foreign bank assets		0,03 (0,05)		-0,18* (0,12)		0,21** (0,09)
Year 2008 x Foreign bank assets		0,05 (0,05)		-0,15 (0,12)		0,22** (0,09)
Year 2009 x Foreign bank assets		-0,12** (0,05)		-0,12 (0,12)		0,23** (0,09)
Year 2010 x Foreign bank assets		-0,04 (0,05)		-0,17* (0,12)		0,24** (0,09)
Year 2011 x Foreign bank assets		-0,02 (0,05)		-0,21* (0,12)		0,24** (0,09)
Year 2012 x Foreign bank assets		-0,03 (0,05)		-0,230* (0,12)		0,23** (0,09)
Year 2013 x Foreign bank assets		0,002 (0,05)		-0,234* (0,12)		0,20** (0,09)

R-squared	0,35	0,40	0,78	0,71	0,87	0,81
F-test	1,62	1,10	16,58***	2,77*	31,88***	4,89***

*Note: The numbers in brackets represent the standard error. *, ** and *** denote statistical significance at 10%, 5% respectively 1% levels.*

In the case of Hungary (Table no. 2), regardless of the used estimation method, we observe a positive and significant association exists between the share of foreign banks in the banking system and GDP - an increase in the size of the assets of foreign banks has had a significant growth effect on the GDP during the sampling period. Furthermore, the share of foreign banks' assets in the Hungarian banking system has a statistically significant influence on the interest rate of bank loans granted to the private sector (%), but in a negative sense, an increase in the share of foreign banks in the banking system causes a decrease in the interest rate of bank loans granted to the private sector. When the share of foreign banks' assets in total assets is below the 60% threshold, we find that with a 1% increase in the share of foreign assets in total assets and the interest rate of bank loans granted to the private sector increases by 0.14%, whereas when the share of banks 'assets is above the 60% threshold, at a 1% increase in the share of foreign banks' assets in total assets, we find that the interest rate of bank loans granted to the private sector has decreased by 0.01%. Finally, we can state that there is a significant/important and positive connection between the evolution of the share of foreign banks' assets in total bank assets and the bank loans granted to the private sector in Hungary. Thus, when the share of foreign banks' assets increases by 1%, the percentage in GDP of the bank loans granted to the private sector also increases (by 1.2%).

Table 2: Estimation of parameter for Models 1 and 2 in Hungary

	Dependent Variable Macro-economic and Financial Indicators					
	Economic Growth		Interest rates on bank credit to the private sector (%)		Bank credit granted to the private sector (percentage of GDP)	
Model	I	II	I	II	I	II
	Coefficient (std. error)					
Constant	-28.58** (13.25)	-18.22** (7.37)	9.87 (1.45)***	10.27 (1.78)***	4.96 (0.66)***	4.71 (0.67)***
Foreign bank assets	6.89** (3.19)	5.21** (1.75)	-1.86 (0.35)***	-1.83 (0.42)***	-0.46 (0.16)***	-0.41 (0.16)**
Dummy Variable D1	0.14 (0.22)		0.14 (0.02)***		-0.004 (0.01)	
Dummy Variable D2	0.10 (0.20)		0.01 (0.03)		-0.03 (0.01)*	
Year 2007 x Foreign bank assets		-0.72** (0.24)		-0.10 (0.06)*		-0.03 (0.02)*
Year 2008 x Foreign bank assets		-0.67** (0.24)		-0.06 (0.05)		-0.02 (0.02)
Year 2009 x Foreign bank assets		-2.41*** (0.24)		-0.06 (0.06)		-0.005 (0.02)
Year 2010 x Foreign bank assets		-0.65** (0.24)		-0.15 (0.06)**		0.009 (0.02)
Year 2011 x Foreign bank assets		-0.38* (0.25)		-0.14 (0.06)**		0.01 (0.02)
Year 2012 x Foreign bank assets		-1.14*** (0.25)		-0.15 (0.06)**		0.007 (0.02)
Year 2013 x Foreign bank assets		-0.24 (0.25)		-0.22 (0.06)***		0.04 (0.02)*
R-squared	0.45	0.93	0.78	0.80	0.48	0.67

	Dependent Variable Macro-economic and Financial Indicators					
	Economic Growth		Interest rates on bank credit to the private sector (%)		Bank credit granted to the private sector (percentage of GDP)	
Model	I	II	I	II	I	II
	Coefficient (std. error)					
F-test	3.37**	16.72***	17.51***	4.54***	4.43**	2.29*

*Note: The numbers in brackets represent the standard error. *, ** and *** denote statistical significance at 10%, 5% respectively 1% levels.*

In the case of Bulgaria (Table 3), the estimated coefficients illustrates a positive and significant relation between the weight of foreign banks' assets in the banking system and GDP, i.e. the increase of the size of foreign banks' assets in the banking system of Bulgaria had a significant growth effect on the GDP during the sampling period. What is more, the evolution of the share of foreign banks' assets in the Bulgarian banking system influences the interest rate of loans granted/provided to the private sector, but conversely, an increase in the share of foreign banks in the banking system causes a decrease in the interest rate of loans granted to the private sector. By relating and considering the two dummy variables, the situation in Bulgaria differs from the situation in Romania. We thus notice that when the share of foreign banks' assets is below the 60% threshold, at an increase of 1%, the interest rate decreases only by 0.02%. Regarding the connection between the assets of foreign banks and the bank loans granted to the private sector (as a percentage of GDP), we notice a direct connection. Thus, when the share of foreign banks' assets increases by 1%, the percentage of bank loans granted to the private sector also increases by 0.96%.

Table 3: Estimation of parameter for Models 1 and 2 in Bulgaria

	Dependent Variable Macro-economic and Financial Indicators					
	Economic growth		Interest rates on bank credit to the private sector (%)		Bank credit granted to the private sector (percentage of GDP)	
Model	I	II	I	II	I	II
	Coefficient (std. error)					
Constant	-45.74 (28.21)	-4.46* (2.63)	20.36*** (7.43)	12.76*** (2.60)		
Foreign bank assets	10.44* (6.49)	0.12*** (0.04)	-4.13* (1.70)	-2.43*** (0.63)	0.96*** (0.04)	0.74*** (0.04)
Dummy Variable D1	3.03* (1.69)		-0.47 (0.41)		-0.18** (0.08)	
Dummy Variable D2	0.47** (0.18)		-0.02 (0.08)		-0.22*** (0.06)	
Year 2007 x Foreign bank assets		0.01 (0.03)		0.05 (0.20)		0.17 (0.15)
Year 2008 x Foreign bank assets		-0.009 (0.03)		0.08 (0.20)		0.20 (0.15)
Year 2009 x Foreign bank assets		-0.12*** (0.03)		0.09 (0.20)		0.21* (0.15)
Year 2010 x Foreign bank assets		-0.07** (0.03)		0.07 (0.20)		0.21* (0.15)
Year 2011 x Foreign bank assets		-0.04 (0.03)		0.03 (0.20)		0.22* (0.15)
Year 2012 x Foreign bank assets		-0.06 (0.04)		-0.03 (0.21)		0.24* (0.16)

	Dependent Variable Macro-economic and Financial Indicators					
	Economic growth		Interest rates on bank credit to the private sector (%)		Bank credit granted to the private sector (percentage of GDP)	
Model	I	II	I	II	I	II
	Coefficient (std. error)					
Year 2013 x Foreign bank assets		-0.05 (0.04)		-0.05 (0.21)		0.24* (0.16)
R-squared	0.46	0.72	0.65	0.64	0.58	0.58
F-test	3.17*	2.99*	8.81***	2.05*	11.18***	4.14*

*Note: The numbers in brackets represent the standard error. *, ** and *** denote statistical significance at 10%, 5% respectively 1% levels.*

Conclusions

There are numerous studies and intensive research has been carried out regarding the relationship between the presence of foreign banks and the financing of the real economy of the host country, and especially, the financing of small and medium enterprises. The results of these various studies are quite diverse, ranging from beneficial effects, such as reduction of costs associated to financial intermediation, the increase of access to credit lines, growing competition and diversity of products and services, to negative effects, such as - increasing economic-financial instability, selective customer behaviors, affecting the availability of local banks to provide loans to the other sectors, especially aimed at small and medium-sized companies.

In this paper, we have analyzed three countries from Central and Eastern Europe, the time frame of the study being the 1996-2016 time period. We have analyzed the relationship between the evolution of the share of foreign banks and the evolution of GDP, of the interest rate of loans granted to the private sector and the share of private loans in GDP, so as to better understand the evolution of some economic and financial-banking aspects that took place during the studied time period. We found, given only small differences from country to country, that there is a positive and significant association between the share of foreign banks in the banking system and GDP, respectively, a negative and significant association between the increase of the share of foreign banks in the banking system and the interest of loans granted to the private sector; finally, we have found a positive, but not always strong association/relationship between the share of foreign banks and loans granted to the private sector (as a share of GDP). We acknowledge that some of these evolution are similar in their nature, but, in other instances, the influence exerted by this foreign presence is ambiguous or inconsistent, and this is the reason for which, in our future research, we propose to develop a model that will generate an overview of these evolutions and correlations in the analyzed region. We will thus better be able to answer the question of whether the positive effects (regarding the entry of foreign banks) upon the economic development as a whole justify and exceed the costs of attracting foreign investors in the financial sector and the negative risks and consequences.

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Table 1 Appendix: Evolution of foreign bank assets, GDP, bank credit granted to the private sector, and the interest rate in Romania, Hungary and Bulgaria (2000- 2016, in %)

Year	Romania				Hungary				Bulgaria			
	Foreign Bank Assets	Economic Growth	Bank credit	Interest rates	Foreign Bank Assets	Economic Growth	Bank credit	Interest rates	Foreign Bank Assets	Economic Growth	Bank credit	Interest rates
2000	46,7	2,4	7,09	53,85	67,4	4,2	31,89	12,6	75,3	5,01	12,04	11,34
2001	51,4	5,59	8,58	45,4	66,5	3,77	32,67	12,12	72,7	4,25	14,38	11,11
2002	52,9	5,18	10,07	35,42	85	4,5	34,38	10,17	75,2	6,02	18,61	9,21
2003	54,8	5,52	13,65	25,43	83,5	3,83	36,5	9,6	82,7	5,08	25,78	8,54
2004	58,5	8,36	15,52	25,61	63	5,01	39,01	12,82	81,6	6,56	33,05	8,87
2005	59,2	4,17	19,81	19,6	81,6	4,38	43,39	8,54	74,5	7,24	38,97	8,66
2006	89	8,06	25,69	13,98	65	3,86	47,56	8,08	80,1	6,75	42,41	8,89
2007	89	6,86	34,6	13,35	64	0,45	53,51	9,09	82,3	7,68	57,91	10
2008	89	8,46	36,97	14,99	67	0,89	59,68	10,18	83,9	5,65	66,59	10,86
2009	85	-7,07	38,49	17,27	64	-6,56	60,25	11,04	84	-4,22	69,18	11,34
2010	85	-0,8	38,76	14,07	63	0,68	61,05	7,59	80,7	0,05	68,21	11,14
2011	83	1,06	38,9	12,13	62	1,74	59,09	8,32	76,5	1,92	65,49	10,63
2012	81	0,64	37,52	11,33	59	-1,6	50,84	9	70	0,03	66,18	9,71
2013	90	3,53	33,86	10,52	60	2,12	46,39	6,3	69,8	0,86	66,17	9,05
2014	89,9	3,08	31,12	8,47	50	4,05	43,15	4,45	60,8	1,33	59,51	8,28
2015	90,4	3,94	29,96	6,77	50	3,15	36,08	2,9	62,5	3,62	55,33	7,46
2016	90	4,82	28,23	5,71	45	1,95	34,62	2,09	76,5	3,44	53,54	6,41

Obs. 1. Foreign bank assets as a percentage of total bank assets; 2. Economic growth - the rate of change of real GDP; 3. Bank credit - granted to the private sector (percentage of GDP); 4. Interest rate – on bank credit to the private sector

Source: TheGlobalEconomy.com. (2018)

Modeling the Hierarchical Composition of Factors Affecting the Consumer Decision-Making Process

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Abstract

Purpose – This research aims to build a hierarchical composition of factors influencing the process of consumer decision-making by means of Internet technologies. **Design/methodology/approach** – In order to address the purpose of this research, factors influencing consumer decision-making by means of Internet technologies were identified and ranked. The methodology of this study is based on the use of such methods as descriptive statistics method; the method of grouping personal data and the method of average assessment; the method of correlation analysis; matrix method; Saaty hierarchy analysis method. **Findings** – The widespread use of Internet technologies leads to the transformation of the consumer behavior model. Producers of goods and services should pay attention to the multidirectional changes in consumer behavior, namely an increase in the rationalization trend, on the one hand, and standardization of consumer decisions, on the other. In order to achieve the above-mentioned tasks, the authors proposed the model of a hierarchical composition of factors that influence consumer decision-making. **Originality/value** - The advantage of application of the proposed hierarchical composition is that consumer decisions management system is based on a modular principle, and therefore is stable and elastic at the same time. The elasticity of such a system is provided by the possibility of changing one or several modules, not the entire system. Modular (partial) changes also guarantee the stability of the system, since they are aimed only at correcting the system, not at destroying its integrity.

Keywords: Internet technologies, Transformation, Behavior model, Consumer decision-making, Hierarchical composition

Introduction

Nowadays, fierce competition in all spheres of economic activity necessitates the search and application of the most effective ways of delivering information about goods and services to the ultimate consumer, which is a prerequisite of the successful functioning of business structures (Baker, 2003; Assael, 2004; Bhatnagar and Ghose, 2004). The active use of Internet technologies by enterprises is considered to be one of these effective ways (Bikhchandami *et al.*, 1992; Metcalfe, 1998; Wenjing *et al.*, 2008; Kautish and Sharma, 2019). It is necessary to take into account the fact that on the one hand, Internet technologies provide enterprises with wide opportunities for their positioning in the market, and on the other hand, they have a transformational impact on the market behavior of a potential customer (Granovetter and Soong, 1986; Chyi, 2009; Sassatelli, 2012; Nikolova and Inman, 2015; Parsons and Maclaran, 2017; Haugtvedt *et al.*, 2018).

In this regard, the primary task for the majority of enterprises that actively use Internet technologies in the course of their economic activity is to figure out what makes a potential customer look for information about goods and services in the web and make purchases online and what factors in the process of consumer decision-making are determining.

The main hypothesis of the research is as follows: identification and ranking the factors affecting the process of consumer decision-making by means of Internet technologies allows to increase the efficiency of production and commercial activity of an enterprise.

This research aims to build a hierarchical composition of factors influencing the process of consumer decision-making by means of Internet technologies.

In order to address the purpose of this research, the following tasks have been realized:

an original methodology for assessing factors that influence consumer decision-making by means of Internet technologies has been suggested;

a survey on the use of Internet technologies in the consumer decision-making process among the residents of the Opole Voivodeship has been conducted;

the matrix of weighted average of factors influencing the process of consumer decision-making by means of Internet technologies has been developed. It was served as a scientific background for modeling the hierarchical composition of these factors.

Questionnaire details of respondents who use Internet technologies in consumer decision-making process in 2018 serve as information background of the research.

Literature Review

The factors influencing the process of consumer decision-making by means of Internet technologies are being researched worldwide. The following scientific works in this field deserve attention.

Wenjing D., Gu D., Whinston A., Gupta P. and Harris, J. study the effects of electronic word-of-mouth on consumer decisions and find the relationship among customer motivation, speed of decision-making and rationality of consumer choice. Based on the findings, it was concluded that those consumers who have high motivation to process information make decisions longer, but select the most optimal products. And the other way around, buyers with low motivation make decisions faster, but irrationally (Wenjing et al., 2008; Gupta and Harris, 2010).

Munkácsi N. devotes his research to the process of forming consumer decisions based on the exchange of information and experience on the use of products, both through personal contacts and through contacts on the Internet. In his articles, the author identifies the sources of information that consumers turn to when making a purchase decision and concludes that consulting with other users of the product (not a manufacturer) plays a pivotal role in the consumer decision-making process (Munkácsi, 2018).

A recent study by Khatwani G. and Srivastava P.R. is aimed at investigating the impact of information technology on the choice of information channel in the process of consumer decision-making. The authors analyze real cases of making multi-criteria consumer decisions by means of Internet technologies and propose a methodology for determining consumer preferences (Khatwani and Srivastava, 2017; Khatwani and Srivastava, 2018).

In scholarly studies of Willman-Iivarinen H. into the ways of transformation of the consumer decision-making process under the influence of modern technologies the author emphasizes that consumer choice is increasingly influenced by social networks, processes of social identification and self-branding. Willman-Iivarinen H. comes to the conclusion that in the future the choice of strategy for making consumer decisions will strongly depend on the social potential of products (Willman-Iivarinen, 2017).

Pantano E., Rese A., and Baier D. do research into the impact of augmented reality technology on consumer behavior in the online trading environment by comparing the youth markets of two

countries (Germany and Italy). The findings of the conducted research reflect the similarities between the markets and reveal differences related to consumer motivation to make consumer decisions using Internet technologies (Pantano et al., 2017).

The articles of such scholars as Manahova I., Rezaei S., Wee C.H., Valaei N., Hall A., Towers N., Zhang Y., Feng Y., Homburg C., Yang, L., Fang E., Yeon J., Kuttschreuter M., Hilverda F. are also devoted to the study of consumer decision-making based on the use of various types of Internet technologies (Zhang and Feng, 2011; Homburg et al., 2015; Yang et al., 2015; Fang et al., 2015; Manahova, 2016; Rezaei et al., 2017; Hall and Towers, 2017; Yeon et al., 2019; Kuttschreuter and Hilverda, 2019).

Despite a certain diversity of all the above scholarly studies, the findings reveal the impact of Internet technologies on the process of consumer behavior transformation, which has two main directions.

The first direction is connected with the process of further rationalization of consumer behavior. According to the theory of consumer choice, the consumer seeks to maximize utility based on three determining factors: their preferences, income and prices for goods / services (Lawson, 2000; Burke, 2002; Hawkins at al., 2004). Today, due to Internet technologies, the consumer has a wider access to information about goods and services, which makes it possible to further optimize the consumer decision-making process in terms of maximum compliance with consumer preferences and incomes (Ha¨ubl and Trifts, 2000; Ha¨ubl and Trifts, 2000; Lee at al., 2001; Dennis at al., 2004; Dennis at al., 2004; Grewal at al., 2004; Harris and Dennis, 2008; Cho and Chan. 2019). In other words, nowadays, consumer decision-making largely depends on the multi-alternative choice the Internet provides a consumer with. This direction of consumer behavior transformation is associated with the intensive development of Internet technologies themselves, which not only contributes to optimizing consumer decisions, but also shapes new consumer preferences, both material and non-material (Ratchford at al., 2001; Parasuraman and Zinkhan, 2002; Zerbini at al., 2019).

The second direction of consumer behavior transformation is associated with the emergence of information cascades due to the wide use of social networks (Bikhchandani et al., 1992; Alevy et al., 2007). The mechanism of information cascades operates as follows: the exchange of information leads to an increase in sales, and the growth of sales leads to the most intensive exchange of information (Senecal and Nantel, 2004). Due to the creation of informational cascades, consumers form so-called “herd behavior”, based not on individual rational choice, but on copying someone else’s most common consumer behavior (Kennedy, 1997; Senecal and Nantel, 2004). Let us call this phenomenon standardization of consumer behavior. Standardization of consumer behavior in its essence contradicts the process of rationalization of consumer choice.

Thus, on the one hand, the amount of information processed by a consumer increases, which in its turn increases the rationality of their decisions, and on the other hand, consumer actions are largely justified by the process of social self-identification, which includes the effect of a standard consumer decision. The authors argue that modern marketing policy should be based on continuous monitoring of the process of consumer behavior transformation. At the same time, the current studies do not propose a universal scheme for identifying and ranking the factors influencing the consumer decision-making process.

Research Methodology

In order to address the purpose of this research, factors influencing consumer decision-making by means of Internet technologies were identified and ranked.

The methodology of this study is based on the use of such methods as descriptive statistics method to identify the main trends associated with the process of consumer decision-making by means of Internet technologies; the method of grouping personal data and the method of average assessment to identify and rank the factors influencing the purchase of goods via the Internet; the method of correlation analysis to identify how close the relationship between the analyzed factors is; matrix

method for calculating the weighted average of factors influencing consumer decision-making by means of Internet technologies; Saaty hierarchy analysis method to build a hierarchical composition of factors influencing the process of making consumer decisions by means of Internet technologies (Saaty, 1980).

Step-by-step procedure for conducting research is presented in Fig. 1.

In order to address the purpose of this research, the data obtained on the basis of a survey of residents of the Opole Voivodeship in 2018 were used.

520 respondents took part in the survey. The sample of respondents is representative. The sample was calculated using the calculator of the optimal size of respondents, presented on the website of the company Partner in Business Strategies. According to the sampling calculator used and on the basis of population data in the Opole Voivodeship at the end of 2018 – 990096 people. The number of respondents in a representative sample may vary within 383 people. (with a confidence level of 95%) up to 663 people. (with a confidence level of 99%).

The factors that determine the respondent's profile as age, gender, place of residence, income level, education, and marital status were not taken into account in the research.

In the first phase of the research, a questionnaire on the use of Internet technologies in the process of consumer decision-making is designed, surveys and accumulation of data obtained from respondents are conducted, and a preliminary analysis of data obtained through questionnaires is carried out. During the preliminary analysis of personal data, the respondents are ranked according to the criterion of the frequency of using Internet resources to search for information about goods and services. As a result of this ranking, inactive Internet users are eliminated and further research is carried out without taking into account the results of a questionnaire. In the result of the preliminary analysis of personal data it is possible to form the respondent's profile.

The second phase of the research is devoted to the assessment of factors motivating a potential consumer to make a purchase by means of Internet technologies. Initially, at this stage, the factors that motivate them to search for information about goods and services on the Internet are assessed, and according to this criterion, potential buyers are grouped. The further analysis of three formed groups of respondents is carried out: within these groups the ranking of factors that encourage them to search for information about goods and services on the Internet as well as evaluation and ranking of factors that influence the purchase by means of Internet technologies are conducted.

In the third phase of the research, a matrix of weighted average of factors influencing the purchase of goods and services by means of Internet technologies is created, which is based on the construction of the vector of indices and the matrix of indices of the analyzed factors.

The fourth phase completes the research process by creating a hierarchical composition of factors influencing the consumer decision-making process, summarizing the findings, and drawing conclusions.

Analysis of data obtained during the survey

Phase 1: "Questionair"

In order to identify the factors influencing the process of consumer decision-making by means of Internet technologies, a survey was conducted among the residents of the Opole Voivodeship.

The first question of the questionnaire "How often do you use the Internet to search for information about goods and services?" served as a background for the process of selection of respondents in terms of their Internet activity.

The following answers were received: 25.0% of all respondents are looking for information about products and services on the Internet daily; 67.3% - several times a month; 1.9% - once a month, 5.8% of respondents less than once a month.

Data on the frequency of using the Internet to search for information about goods and services allow us to distinguish three groups of consumers by level of activity. The first group of respondents who look for information on a daily basis can be called “active users”; the second extensive group, searching for information several times a month - "moderate users". The third group of respondents is inactive Internet users who search for information once a month and less often (this group makes up 7.7% of the total number of respondents). We exclude the third group from further analysis, since the opinion of inactive Internet users is not representative. The analysis is carried out based on the results of the survey of the first and second groups of respondents, those who search the Internet for information about goods and services daily and several times a month.

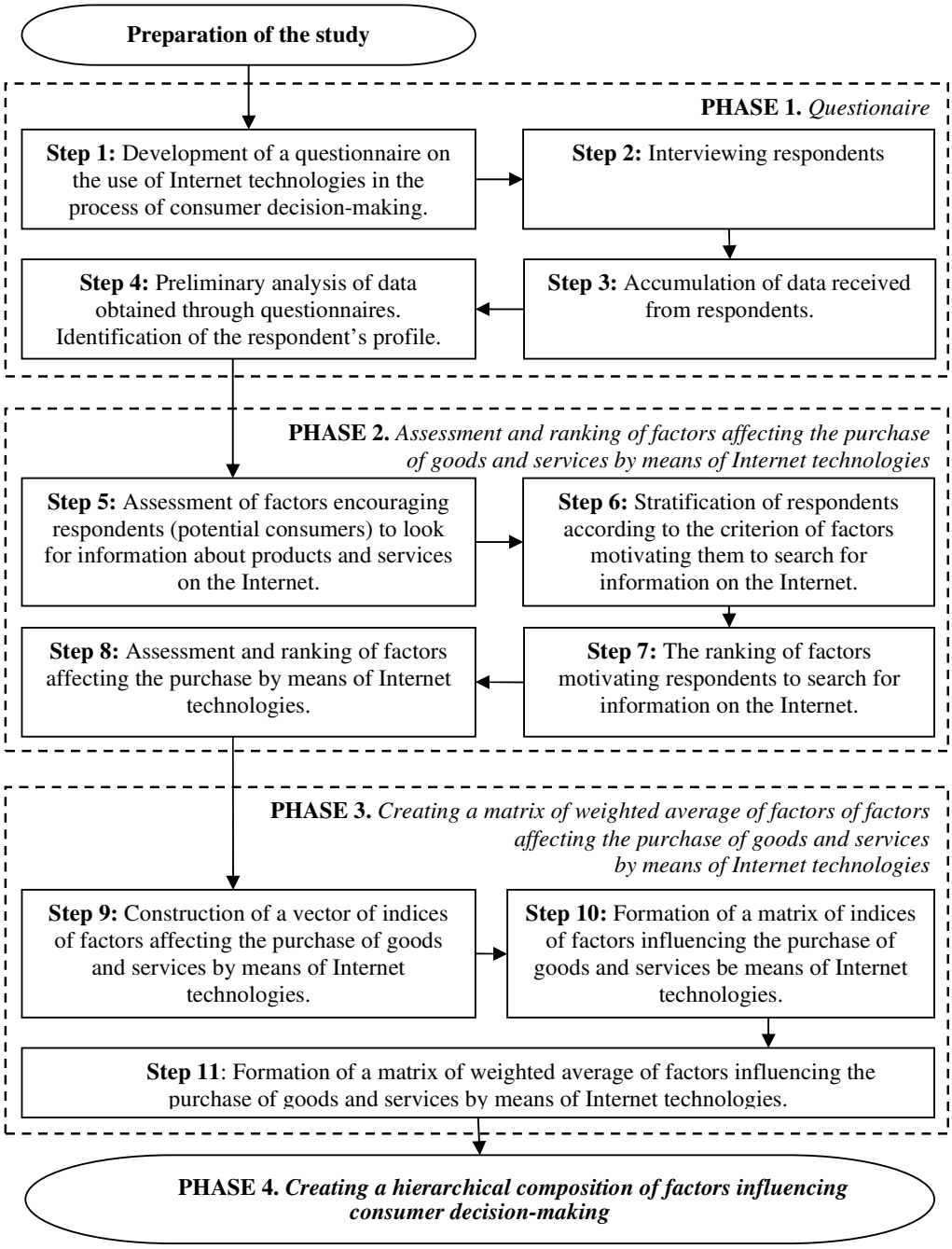

Figure 1: Study Methodology Scheme

Source: developed by the authors

It has been already mentioned that the transformation of consumer behavior takes place in two directions: the direction of increasing the degree of rationalization of shopping due to the large amount of available information on the Internet and in the opposite direction - standardization of consumer behavior (weakening the validity of purchases) due to the "herd effect" formed by information cascades. Information cascades are created on the basis of widespread use of social

networks for commercial purposes. In this regard, respondents were asked the following question: “Do you use any social networks to search for information about products and services on the Internet?”.

More than 93.75% of those analyzed responded positively to this question (respondents who search the Internet for information about goods and services every day and several times a month).

Among these respondents, the most popular social networks are Facebook (91.66% of respondents), Instagram (27.08% of respondents) and YouTube (18.75% of respondents). Less popular are: Google+ (10.42% of respondents); Linkedin (6.25%) and Twitter (4.17% of respondents). Thus, the interviewed respondents actively use social networks, which means that to a large extent their consumer decisions can be formed not on the basis of a rational choice, but under the influence of the “consumer herd effect”.

At the same time, only 10.41% of respondents were able to specify the name of the Internet pages that they most often use. That testifies that the consumer does not have any strong attachment to certain Internet resources.

Then, in order to form the consumer profile of the respondents, they were asked the question: “Information about which goods and services do you most often search on the Internet?”. Respondents could choose from 1 to 3 answer choices for this question. The results of the answers are presented in Tab. 1.

The most popular among the respondents questioned is the information about such goods and services as “Clothing and Footwear” (81.25%) and “Entertainment” (56.25%), the third place is taken by “Household appliances, computers and software” (43.75%). The categories of goods and services that more than 30% and less than 40% of respondents are interested in are the following: “Drugs and cosmetics” and “Education” (39.58%), “Books and audio / video” and “Travel services and sports "(37.50%). Less than 30.00% but more than 10% of respondents is interested in the following categories of goods and services: “Furniture” and “Transportation services” (20.83%), “Consumer goods” (18.75%), “Hotels and accommodation” (16.67%), "Sports Equipment" and "Financial Services" (12.5%). The least popular products and services are the following: "Cars and accessories" and "Legal services", 8.33% and 2.08% of respondents respectively showed interest in them.

Table 1: Categories of goods and services a potential consumer most often searches for on the internet

Group of goods	Categories of goods and services	Number of responses	% of the total number of respondents
1st group of goods	Clothing and Footwear	423	81.25
	Entertainment	293	56.25
	Household appliances, computers and software	228	43.75
2nd group of goods	Drugs and cosmetics	206	39.58
	Education	206	39.58
	Books and audio / video	195	37.50
	Travel services and sports	195	37.50
	Furniture	109	20.83
	Transportation services	109	20.83
3rd group of goods	Consumer goods	98	18.75
	Hotels and accommodation	87	16.67
	Sports Equipment	65	12.50
	Financial Services	65	12.50
4th group of goods	Cars and accessories	44	8.33
	Legal services	11	2.08

Thus, based on the above data, it is possible to form the respondent's profile: this is an active Internet user (searches for information about goods and services daily or more often than once a month), the one who actively uses social networks in the consumer decision-making process, does not have strong attachments to specific Internet resources, most often this respondent searches the Internet for information about goods and services that surround them in everyday life (clothing, footwear, entertainment, household appliances and computer equipment). This means that the consumer behavior of this respondent can be transformed simultaneously in the two aforementioned directions: further rationalization of consumer decisions due to an increase in the processed information about goods and services; standardization of consumer decisions arising from the active use of social networks and generating the risk of "herd consumption".

In other words, the respondent is an average modern consumer, who represents the overwhelming majority of the entire population of consumers. In this regard, the results of this study have practical value for a mass producer who actively uses Internet technologies to promote their products and services.

Phase 2: "Assessment and ranking of factors affecting the purchase of goods and services by means of Internet technologies"

In this phase, it is necessary to identify the factors encouraging the potential consumer to search for information about products and services on the Internet.

When asked the question "What is the decisive factor for searching information on the Internet?", the majority of respondents under analysis identified the following as decisive factors (score 5): "a wide range of goods and services" - 294 respondents or 61.35% of all respondents analyzed, "usability and ease of navigation"- 243 respondents or 50.58%," time saving "- 161 respondents or 33.46% (Fig. 2).

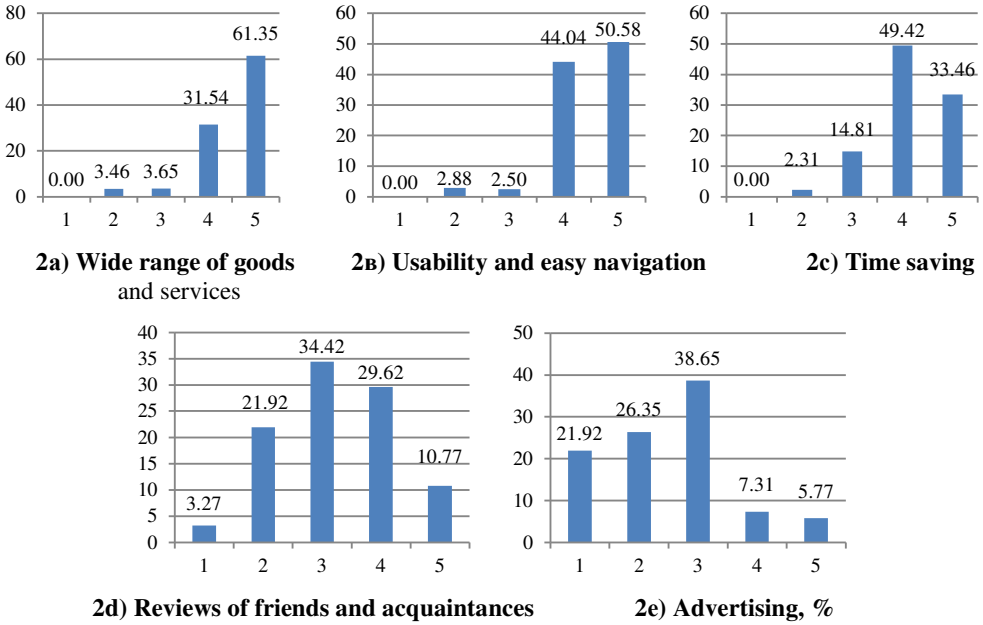

2a) Wide range of goods and services **2в) Usability and easy navigation** **2c) Time saving**

2d) Reviews of friends and acquaintances **2e) Advertising, %**

Figure 2: Assessment of factors that encourage a potential consumer to look for information about products and services on the Internet (% of respondents from the total number of respondents analyzed)

The average assessment of factors encouraging the potential consumer to look for information on the Internet is shown in Fig. 3. According to the calculations, the factor “Wide range of goods and services” has the highest average assessment - 4.51 points out of 5 possible, second place – “Usability and easy navigation” 4.42 points, and the lowest rating is given to "Advertising"- 2.49 points out of 5.

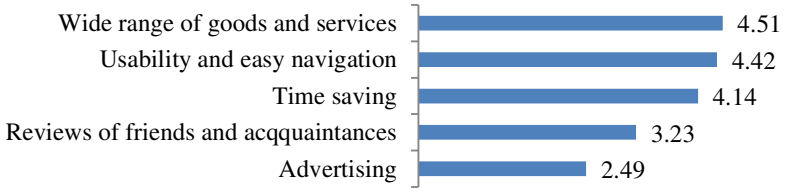

Figure 3: The average assessment of factors encouraging a potential consumer to search for information on the Internet for the entire analyzed sample of respondents

For a more in-depth analysis based on the obtained data, it is possible to find the average assessment of the factors encouraging the potential consumer to search for information about products and services on the Internet using individual questionnaires. This will allow us:

first, to assess the degree of objectivity of the rating submitted by the respondents to the final ranking of factors that encourage a potential consumer to search for information about products and services on the Internet;

secondly, to form consumer groups according to the degree of satisfaction with the search mechanism for information about goods and services on the Internet (more satisfied users will give top rating, less satisfied, respectively, will strive to undervalue their ratings).

The average assessment of respondents varies from 2.6 to 5.00 points, which allows to form three groups with a rating step of 0.8 (formula 1).

$$Step = \frac{(F_{\text{cp}_max} - F_{\text{cp}_min})}{3} = \frac{(5{,}00 - 2{,}60)}{3} = \frac{2{,}40}{3} = 0{,}80 \quad (1)$$

Where

Step – assessment step,
$F_{\text{ср.max}}$ – the maximum average assessment,
$F_{\text{ср.min}}$ – the minimum average assessment.

Using the average maximum and minimum assessment indicator and the given step, we obtain three groups of respondents (out of the analyzed respondents), formed according to the degree of satisfaction with the process of searching for information about goods and services on the Internet (Tab. 2).

Table 2: Groups of respondents, formed according to the degree of satisfaction with the process of searching for information about goods and services on the internet

Groups of respondents	**Group 1**	**Group 2**	**Group 3**
Average assessment($\bar{F}_i$)	$\bar{F}_i \leq 3.40$	$3.40 < \bar{F}_i \leq 4.20$	$4.20 < \bar{F}_i$
Respondents searching the Internet for information about goods and services every day and several times a month	29.17	58.33	12.50

The first group of respondents is a group with an average assessment of all factors that were taken into account in this survey up to 3.40 inclusive; the second group - a group with an average assessment of all factors in the range from 3.40 to 4.20 inclusive; the third group is a group with an average assessment above 4.20. Thus, in the third group there are respondents (they are also potential consumers) who are most satisfied with the search mechanism for information about goods and services on the Internet. Accordingly, in the first group there are respondents who pay the least attention to these factors, and the second group is an intermediate option. The largest number of respondents (53.8%) belongs to the group 2. Groups 1 and 3 include 26.9% and 11.5% of respondents respectively.

According to the data presented in Tab. 3, the priority of factors influencing the decision to search for information on the Internet will be different for different groups. However, for all formed groups, the last place in the rating is taken by such factors as “Reviews of friends and acquaintances” and “Advertising”.

The close correlation among the ratings in different groups of respondents indicates a fairly high reliability (objectivity) of these ratings given by the respondents (Tab. 4). With k = 3, as well as the level of significance (for a two-sided criterion) of the correlation coefficient according to the Pearson 0.01 critical values table. The correlation coefficient is reliable above or equal to 0.934. This brings us to the conclusion that the respondents' assessments are objective.

Table 3: Ranking of factors encouraging a potential consumer to search for information about products and services on the internet (by respondent groups)

Factors encouraging a potential consumer to search for information on the Internet	Groups of respondents					
	1st Group		2nd Group		3rd Group	
	Rank	Average assessment	Rank	Average assessment	Rank	Average assessment
A wide range of goods and services	2	3.86	1	4.61	1	5.00
Usability and easy navigation	1	4.00	2	4.54	2	4.83
Time saving	3	3.71	3	4.18	2	4.83
Reviews of friends and acquaintances	4	2.21	4	3.61	3	4.33
Advertising	5	1.71	5	2.64	4	4.17

Table 4: The correlation coefficients of assessment of factors that encourage a potential consumer to search for information about goods and services on the internet (by groups of respondents)

	Group 1	Group 2	Group 3
Group 1	1		
Group 2	0.954	1	
Group 3	0.978	0.950	1

It should also be noted that, based on the results of the significance assessment of factors encouraging the potential consumer to look for information about goods and services on the Internet. It is higher in the second group than in the first one and lower than in the third one. In other words, the respondents of the second group give the most objective assessments (their decisions are less susceptible to both positive and negative emotions). This may mean that this group of potential consumers of goods and services largely perceives Internet technologies as an integral part of everyday life, which simplifies and accelerates the process of finding the necessary information about goods and services.

It should be emphasized that the factors analyzed above are factors that encourage potential consumers to search for information about goods and services using the Internet technology. The process of searching for information does not always result in making a purchase. In this regard, this study further analyzes the factors affecting the purchase by means of Internet technologies.

Based on the analysis of respondents' answers to the question "What is the decisive factor in the purchase of goods and services via the Internet?". We can conclude that the key factors are the availability of goods – usability and easy navigation, the lowest price and time saving. Advertising occupies the last place in the rating taking 2.646 (on a five-point scale) (Fig. 4)

Tab. 5 presents the average assessment of the decisive factors that encourage shopping by means of Internet technologies for the three groups of respondents formed above. All the factors presented in the table are divided into two categories: "factors that are determined by the rationality of consumer behavior" and "factors that cause herd consumer behavior".

Since the groups of respondents are singled out according to the "degree of satisfaction", the respondents belonging to different groups tend to underestimate, or to overestimate, or to average the assessment. The close correlation between the estimates in different groups of respondents indicates a fairly high reliability (objectivity) of the ratings given by the respondents (Tab. 6).

Analyzing the data presented in Table 6. we can conclude that the most significant factors affecting the purchase by means of Internet technologies are "availability of goods and services", "lower price", "usability and easy navigation", as well as "time saving". These are factors that are determined by the rationality of consumer behavior. The factors that form informational cascades and cause herd behavior have less influence on consumer behavior. In other words, the results of the survey showed that under the influence of Internet technologies, consumer behavior is more transformed towards rationalization. And the information cascades created by social networks help in making rational decisions based on the reviews of another consumer.

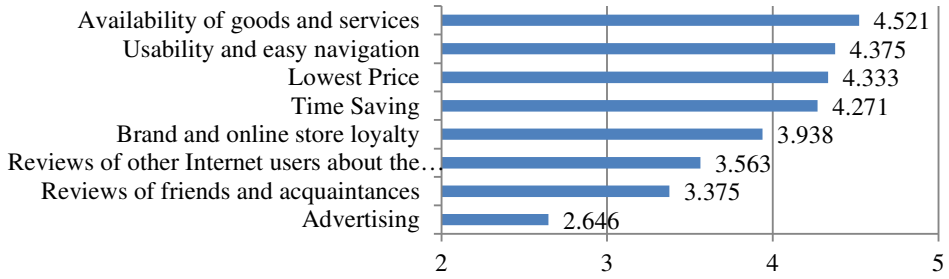

Figure 4: The average assessment of factors influencing the purchase of goods and services by means of Internet technologies, according to respondents from the analyzed sample

Table 5: Ranking of factors affecting the purchase of goods and services by means of internet technologies (by groups of respondents)

Factors affecting the purchase of goods and services by means of Internet technologies	Groups of respondents					
	1st Group		2nd Group		3rd Group	
	Rank	Average assessment	Rank	Average assessment	Rank	Average assessment
Consumer Behavior Rationalization Factors						
Availability of goods and services	2	4.00	1	4.71	2	4.83
Lowest Price	4	3.79	2	4.50	2	4.83
Usability and easy navigation	1	4.07	3	4.43	2	4.83
Time Saving	3	3.93	4	4.29	1	5.00

Consumer Behavior Standardization Factors						
Brand and online store loyalty	5	3.36	5	4.04	2	4.83
Reviews of friends and acquaintances	7	2.57	6	3.64	3	4.00
Reviews of other Internet users about the product or service	6	3.00	7	3.61	4	4.67
Advertising	8	2.00	8	2.68	3	4.00

Table 6: The correlation coefficients of assessment of factors affecting the purchase of goods and services by means of internet technologies (by groups of respondents)

	Group 1	Group 2	Group 3
Group 1	1		
Group 2	0.96*	1	
Group 3	0.91**	0.81***	1

** correlation coefficient is reliable at a significance level of 0.0005*
*** correlation coefficient is reliable at a significance level of 0.005*
**** the correlation coefficient is reliable at a significance level of 0.01*

Phase 3: "Creating a matrix of weighted average of factors influencing the purchase of goods and services through Internet technologies"

The first step in the third phase is to determine the indices of each individual factor affecting the purchase of goods and services using Internet technologies. Indices allow to determine the degree of importance of each individual factor from 0 to 1 and are calculated by the formula:

$$I_i = \frac{\Sigma\left(M_{ij} * W_j\right)}{5} \tag{2}$$

Where

I_i - the index of the i-th factor affecting the purchase of goods and services by means of Internet technologies;

M_{ij} is the average assessment of the i-th factor influencing the purchase of goods and services by means of Internet technologies in relation to the j-th group of respondents;

W_j - percentage of questionnaires selected for analysis (respondents who search for information about goods and services daily or more often than once a month)

5 - the maximum possible rating of the i-th decisive factor affecting the purchase of goods and services by means of Internet technologies.

The calculated indices can be written as the following vector (Tab. 7).

Table 7: The vector of indices of factors affecting the purchase of goods and services by means of internet technologies (for the entire analyzed sample of respondents)

Y	=	0.904	=	A - Availability of goods and services	Consumer Behavior Rationalization Factors
		0.867		B - Lowest Price	
		0.875		C –Usability and easy navigation	
		0.855		D –Time Saving	
		0.788		E - Brand and online store loyalty	Consumer Behavior Standardization Factors
		0.675		F –Reviews of friends and acquaintances	
		0.713		G - Reviews of other Internet users about the product or service	
		0.529		H - Advertising	

The second step of the third phase is the calculation of indices for individual factors for individual groups of respondents (potential customers), which can be presented as the following matrix (Tab. 8).

The indices in tab. 8 were calculated using the following formula:

$$Iij = \frac{M_{ij}}{5} \tag{3}$$

where I_{ij} - the index value of the i-th factor for the j-th group.

Table 8: Matrix of indices of factors affecting the purchase of goods and services by means of internet technologies by groups of respondents

	The first group of respondents	The second group of respondents	The third group of respondents	
A	0.800	0.942	0.966	Consumer behavior rationalization factors
B	0.758	0.900	0.966	
C	0.814	0.886	0.966	
D	0.786	0.858	1.000	
E	0.672	0.808	0.966	Consumer behavior standardization factors
F	0.514	0.728	0.800	
G	0.600	0.722	0.934	
H	0.400	0.536	0.800	

The third step of the third phase is the construction of matrix of weighted average of factors influencing the purchase of goods and services by means of Internet technologies (Tab. 9).

To do this, we calculate the weighting values of each specific i-th factor for the j-th group (data from Tab. 8) and for the entire analyzed sample of respondents (data from Tab. 7).

The weighting values of individual factors are calculated by the formula:

$$P_{ij} = \frac{I\ ij}{\Sigma(I\ ij)} \tag{4}$$

Where

P_{ij} – the weighting value of the index of the i-th factor for the j-th group.
$\Sigma(Iij)$ is the sum of all values of the indices of the i-th factors for the j-thgroup.

The obtained matrix of weighting values allows to determine the significance of each factor taken together which influence consumer behavior by groups of respondents and for the entire analyzed sample of respondents.

Table 9: Matrix of weighted average of factors affecting the purchase of goods and services by means of internet technologies

	The first group of respondents	The second group of respondents	The third group of respondents	For the entire sample	
A	0.150	0.148	0.131	0.146	***Consumer behavior***
B	0.142	0.141	0.131	0.140	

C	0.152	0.139	0.131	0.141	***rationalization factors***
D	0.147	0.135	0.135	0.138	
E	0.126	0.127	0.131	0.127	***Consumer behavior standardization factors***
F	0.096	0.114	0.108	0.109	
G	0.112	0.113	0.126	0.115	
H	0.075	0.083	0.107	0.084	

Phase 4: "Creating a hierarchical composition of factors affecting consumer decision-making"

The resulting matrix of weighted average allows to create a hierarchical composition of factors influencing the process of making consumer decisions. A model of such a composition is presented in Fig. 5.

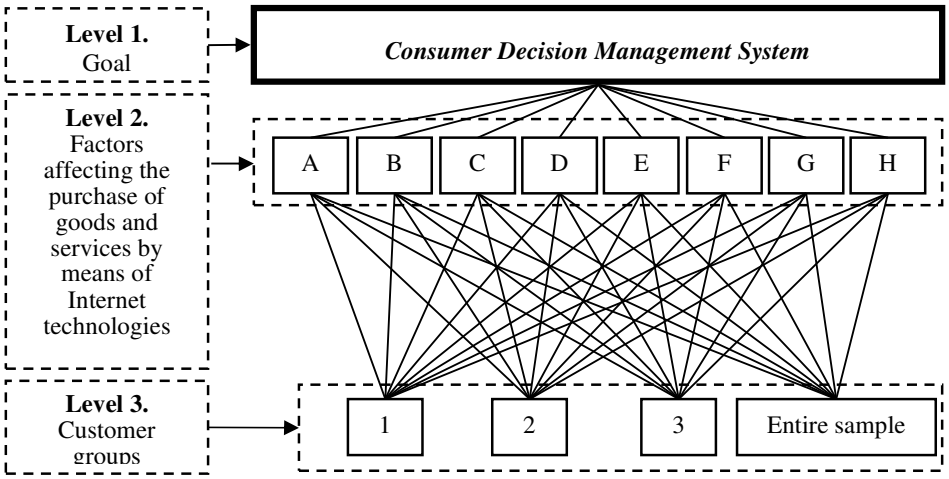

Figure 5: Model of hierarchical composition of factors influencing the process of consumer decision-making

This hierarchical composition allows to understand how the changes in priorities at the second level affect the changes in priorities at the third level and, on this basis, create a system for managing consumer decisions. In other words, the use of the proposed hierarchical composition allows to "encourage the consumer to make purchases" by increasing the influence of consumer behavior rationalization factors or consumer behavior standardization factors. The consumer decisions management system generated in this way can be used both for the entire set of potential customers and for selected groups.

For example, a certain hypothetical entrepreneurial enterprise having researched the market in which it operates decided that customers belonging to the first group are the most important (generate the most profit. are the most promising from the point of view of expanding the range of product sales. etc.). In this case, the most attention should be paid to such factors: C - "usability and easy navigation" (the weighting value of the factor for this group of clients is 0.152). A - "availability of goods and services" (0.150). D - "time saving" (0.147). In other words, the personal comfort of making a purchase has a greater impact on consumer decisions of potential customers of this group. In this case, it is the comfort of the consumer decision-making process that encourages the consumer to make purchases. This means that a hypothetical manufacturer must take certain steps towards improving the comfort zone of a potential customer. At the same time, the price does not have to be the lowest on the market (the weighting value of the factor for this group of clients is 0.142) and the cost of advertising can be reduced or at least not increased (the weighting value of the factor is 0.075).

Thus the created hierarchical composition provides more detailed information on the directions of transformation of consumer behavior and allows the producer of goods and services to optimize the process of managing consumer decisions.

Conclusions

The conducted research allows us to draw the following conclusions.

1. One of the most distinctive features of a modern economy is the intensification of the use of Internet technologies, both in the process of running business and in the process of making consumer decisions. The widespread use of Internet technologies leads to the transformation of the consumer behavior model. Entrepreneurial enterprises should take into account these transformation processes when developing their marketing strategies. In this regard, entrepreneurial enterprises need to constantly monitor changes in the consumer behavior of their customers, as well as respond quickly and efficiently to these changes.
2. Producers of goods and services should pay attention to the multidirectional changes in consumer behavior, namely an increase in the rationalization trend, on the one hand, and standardization of consumer decisions, on the other. To ensure its influence on both trends, entrepreneurial enterprises need to provide the customer with the most comprehensive information about their products and services, which increases the rationality of consumer decision-making, and at the same time takes part in the formation of information cascades, which determine the standardization of consumer choice.
3. In order to achieve the above-mentioned tasks, the authors proposed the model of a hierarchical composition of factors that influence consumer decision-making. The advantage of application of the proposed hierarchical composition is that consumer decisions management system is based on a modular principle, and therefore is stable and elastic at the same time. The elasticity of such a system is provided by the possibility of changing one or several modules, not the entire system. Modular (partial) changes also guarantee the stability of the system, since they are aimed only at correcting the system, not at destroying its integrity.

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Trends of Digital Technologies Implementation in Nonprofit Activities of Foreign Countries and the Russian Federation

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Abstract

The subject of the study is digital technology in nonprofit activities. The goal is to identify experience in the application of digital technologies in this field. Research hypothesis: Russian nonprofit organizations are in line with global trends of digital technologies implementation in the charitable and social activities. The method of comparative analysis of the use of digital technologies in the activities of foreign and Russian nonprofit organizations is applied. Results 1) The popularity of crowdfunding and crowdsourcing as elements of digital technologies is growing all over the world. 2) Crowdsourcing and crowdfunding are innovative instruments of conducting charitable and social activities well developed in European countries and in the USA. 3) Russian Federation is in line with world tendency of expanding the use of digital technologies in nonprofit activities. 4) Though the dynamics is high, the volume of funds collected via online platforms in Russian Federation is much lower than in European countries and the USA due to a certain historic lag in the development of nonprofit activities.

Keywords: Nonprofit Organization, Digital Technologies, Social Entrepreneurship, Crowdsourcing, Crowdfunding.

Introduction

In the European countries, in the USA the nonprofit sector development is characterized by the search for social innovations to solve problems in the social sphere. Nonprofit organizations are in need for diversification of the ways of attracting funds for realization of the nonprofit projects in order to boost their sustainability (Farinha et al., 2020; Garcia-Rodriguez and Romero-Merino, 2020). It becomes relevant to use the achievements of scientific progress, computer technology, expanding the range of investment activity instruments and assessing the social results of the funds spent (Salamon, 2014; Jensen, 2017). The technological direction of the nonprofit activities development arose at the intersection of information technology and traditional nonprofit activities. This direction involves the implementation of economically sustainable solutions to alleviate socially significant problems and meet the needs of socially vulnerable groups of citizens, which are based on the use of digital and information technologies (Howe, 2006; Salamon, 2014).

The research in the field of digital technologies implementation for boosting nonprofit activities is affected by the lack of a systemic understanding of the features of the functioning and development of the nonprofit organizations at the present stage. It also concerns the lack of practical knowledge in the field of digital technologies that are used for fundraising, for the nonprofit projects implementation and as a method of involving a wide range of people in nonprofit activities. The problems mentioned turn to be an obstacle to the sustainable progressive development of the nonprofit organizations and their effective participation in the state social policy implementation. These problems may be solved by studying the principles of functioning of nonprofit organizations and entrepreneurs in the social sphere at the present stage, by studying the concept and essence of social innovations and possibilities of digital technology for boosting nonprofit activities (Howe, 2006; Salamon, 2014; Baran, 2020).

The use of digital technologies in nonprofit activities affects the development of human capital, as it helps to reveal the creative and labor potential of the population, including citizens from socially

vulnerable groups. Promoting the development of human capital, in turn, contributes to the development of technological and social innovations. For the current stage of development of the nonprofit sector concerning digital technologies, it becomes relevant to assess the financial and social results of the activities of nonprofit companies and other participants in the nonprofit activities, including partnerships among the state, business and society in projects for the development of the social sphere. B. Weisbrod was one of the first to study the level of production of social effects in nonprofit organizations and the characteristics of intersectoral interaction with government and business representatives (Weisbrod, 1997). At the moment, the nonprofit project social results are as important as the financial ones and require measuring. The project relevance to the organization's mission is also investigated. That's why the administrative expenses of a nonprofit organization should be partly spent on professional management of a project portfolio (Ang, Sankaran and Killen, 2016). The use of methods for measuring social results and the use of digital technologies to collect this information allows to obtain significant amounts of data on social performance, make social forecasts and identify problem areas in the development of the nonprofit sector as a whole, and improve the nonprofit activities practice. In this way, the nonprofit organizations social impact should be measured individually and in aggregate, which should always be the ultimate goal of collecting information (Branch et al., 2019).

The nonprofit sector, including a wide range of organizations, is subject to all the changes taking place in society associated with increasing informatization. Active development of digital technologies gives the sector both new opportunities and challenges. Thus, the process of interaction and exchange of experience is greatly facilitated through the information technology use. Fundraising, marketing social goods and services is greatly simplified in the virtual world. Features of the implementation of projects through Internet platforms are described in the works of foreign authors (McNutt et al., 2018).

The use of digital platforms is one of the factors that enhance the nonprofit organizations competitiveness. The situation is similar to the situation in industrial production, where modernization is the key to the economic development of the whole country. The choice of a digital platform should be justified by the organizational and legal form of the organization and the features of its functioning (Zavyalov, Zavyalova and Kiseleva, 2019).

At the moment, there exist some online platforms for the exchange of proposals for solving social problems. This approach is based on the concept of open innovation, described by H. Chesbrough in relation to the sphere of production (Chesbrough, 2003). The author substantiates that in order to achieve technological progress and economic growth in modern conditions, it is much more efficient to share the inventions obtained during research and development so that other companies can freely implement them. The exchange of innovations in the social sphere will contribute to the development of the whole society, and scalable and replicated solutions, including those based on the use of innovative technologies, will be implemented in various countries of the world.

The use of digital technologies to engage the population in intellectual volunteering (crowdsourcing) has been studied by J. Howe (Howe, 2006). Currently, crowdsourcing in some areas is used as a form of labor volunteering through Internet services to solve socially significant problems. L. Thompson, a professor at the Kellogg School of Management, USA, has been researching how to improve your search for ideas using written brainstorming, a similar technique used in crowdsourcing (Thompson, 2013). The importance of the development of all forms of volunteering for the successful development of society is substantiated in the works of L. Salamon, V. Sokolowski, M. Haddock (Salamon, Sokolowski and Haddock, 2018). In Russia, the issues of developing volunteering are becoming relevant in connection with the release of the Decree of the President of Russian Federation "On National Goals and Strategic Tasks of the Development of Russian Federation for the Period Until 2024" (Decree No. 204, May 2018), which focuses on taking measures to achieve breakthrough scientific, technological and socio-economic development of the country, including the creation of opportunities for creative and labor realization of human potential. The issues of increasing the possibilities of the population to participate in volunteering, reducing the technological gap from

foreign countries were studied in the report of the Higher School of Economics "Volunteering and Charity in Russia and the Tasks of National Development" (Benevolensky et al., 2019).

The need to use a wide range of tools to raise funds in nonprofit organizations and the use of approaches non-traditional for the charitable sphere was substantiated by L. Salamon (2014). According to the scientist, in order to solve the global problems that humanity faces in the social and environmental spheres, combined with the declining social budgets of governments and traditional benefactors, it is necessary to go beyond the grant approach, funds, and even money circulation. The scientist sees the future of modern charity in the creation of new financial and non-financial tools for conducting nonprofit activities, such as volunteer work platforms, Internet portals, capital aggregators and other organizations and institutions.

An analysis of the literature shows that the issues of introducing digital technologies as a part of innovation element in nonprofit activities are actively explored by foreign authors. This practice has deep historical roots in European countries and in the USA. In Russia these issues are only just beginning to be considered for implementation in the activities of nonprofit organizations, however, there is already positive experience in using digital technologies to solve social problems.

The article sets a goal to conduct a comparative analysis of the practice of introducing digital technologies into the activities of nonprofit organizations in European countries, in the USA and in Russia in order to increase the level of public involvement in nonprofit practices and raise enough funds for the sustainable development of nonprofit organizations.

Research Methodology

The theoretical and methodological basis of the paper was the scientific publications of Russian and foreign scientists on the problems of social development, social innovations generation, functioning of the nonprofit organizations and enhancing economic sustainability and effectiveness of nonprofit organizations. The study consists of four parts: 1) Analysis of digital technologies usage in the practice of nonprofit organizations in the USA, in European countries and in Russia; 2) Examination crowdfunding and crowdsourcing as new tools of conducting nonprofit activities; 3) Determination of the required properties of nonprofit projects; 4) analysis of the practice of digital technologies implementation in the practice of Russian nonprofit organizations.

Another block of information provided concerns facts and statistics of development of crowdfunding and crowdsourcing in Russia and abroad. The article uses a systematic approach to the study of the problem. The following general scientific and special research methods are applied: comparative analysis, synthesis, analogy, as well as logical method. In terms of information, the paper is based on statistics and analytical materials provided by charities and charitable foundations, such as Charities Aid Foundation, Fundly, service of aggregated statistics Statista, official websites of online platforms for giving.

The following terms are used in the article:

- Nonprofit organizations are non-governmental organizations established to achieve socially significant goals, and not to make a profit;
- Fundraising means raising funds from external sources by a nonprofit organization for the implementation of its own projects, with the exception of entrepreneurial activity;
- Crowdsourcing is a way to attract a wide range of people to solving problems, including through Internet platforms, to use their creative potential, knowledge and work experience;
- Crowdfunding is a method of fundraising through online platforms aiming to implement a project in any field, including social.

Results

The technological direction of the nonprofit sector development arose at the intersection of information technology and nonprofit activities. This direction involves the implementation of economically sustainable solutions to alleviate socially significant problems or to meet the needs of socially vulnerable groups of citizens, which are based on the use of digital and information technologies.

Crowdfunding and crowdsourcing can be considered elements of open innovation that combine digital technology and a method of solving problems in the social sphere. They both let potential donors and nonprofit organizations "meet" in the same information space, accelerating the process of finding partners for charitable activities. This service allows to engage in microfinance, providing microloans to individuals, which some researchers consider socially oriented activities (Yunus, 2017). Table 1 presents statistics on the amount of funds raised through crowdfunding around the world for 2012-2019.

Table 1: Statistics on the volume of funds raised through crowdfunding around the world, 2012-2019

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Volume of funds, billion US dollars	0.9	1.5	2.7	6.1	16.2	34.4	No data available	32	-	34
Growth, %	-	66	80	126	165	112	-	-	-	-

Source: compiled by the author according to: Richter, 2013; Fin Tech, 2015; Statista Research Department, 2015; Szmigiera, 2019; Fundly, 2020.

The volume of funds raised through crowdfunding in the world stood at 34 billion US dollars in 2019, which means a 37-fold increase over a ten-year period. The popularity of this instrument of funding projects demonstrated steady growth in the period 2010-2015 and weakened after 2017. Though there's a trend of moderate saturation of the market, the author interprets the skip in 2015 with the changes of methodology of calculation.

Crowdfunding is well developed in European countries and in the USA. The "JustGiving" (United Kingdom) is a platform for giving, where different nonprofit organizations may use crowdfunding to raise money for social and charitable causes all over the world. Since 2000 the platform has helped more than 25 000 charities raise over $4.5 billion for charitable needs from 22 mln donors in 164 countries. "DonorsChoose" (USA, 2000) is an online platform for donations to equip public school classrooms on the principles of trust and transparency. Since it was launched the platform helped raise $953 mln for more than 1,6 mln projects and 39 mln students. "Network for good" (USA) is a certified corporation established to offer software for nonprofit organizations. Since 2001, the corporation has processed over $2.54 bn in donations for more than 300 thousand nonprofits. All the examples provided prove the high demand for digital tools for conducting nonprofit activities not only in developed countries, but all over the world. European experience of launching online crowdfunding platforms is also successful. Such well-known platforms as "CAF Donate" raised £27 mln in 2019. Overall amount of giving in the UK in 2018 remained high at £10.1 bn (Charities Aid Foundation, 2019). "Helloasso" (France, 2009) is another platform letting French associations register and launch their own fundraising campaigns using digital technology. The European Commission harmonized rules to boost European crowdfunding platforms (European Commission, 2019). The new rules aim to enhance investor protection, transparency of the operations and supervision, thus, to create a more open crowdfunding ecosystem.

These examples reveal active process of digital technologies implementation in the practice of nonprofit organizations in European countries and in the USA. The process dates back to the beginning of 2000-th, so almost the 20-year experience in this field is already gained.

The cutting-edge tendency in the development of charitable activities is boosting its financial and economic sustainability combining the following principles: assessment of social impact, fundraising

diversification, innovation. These principles lead to hybridization of nonprofits and blurring the ranks of its activity towards for-profit social entrepreneurship. The origins of entrepreneurship require high level of innovation activity of an organization to attract consumers or to meet the requirements of beneficiaries. Combined with the possibilities of digital technologies the services and products of nonprofit organizations acquire such properties as scalability, openness and replicability, novelty in solving a socially significant goal. In order to boost economic sustainability, the social business or a project should be self-sufficient. Crowdfunding tends to combine the requirements of contemporaneity and provide a tool for socially innovative projects realization.

Crowdsourcing is a way to attract a wide range of people to solving problems, including through Internet platforms, to use their creative potential, knowledge and work experience. The peculiarity of crowdsourcing, in contrast to outsourcing - attracting third-party professional executors - is the voluntary participation in the project. Payment for labor may be absent, be market, or below market. Since crowdsourcing can be used for charitable purposes, it becomes a kind of intellectual and labor volunteering through Internet services to solve socially significant problems.

As part of crowdsourcing, it is possible to use a technique similar to brainstorming - writing brainstorming (brainwriting), that is, recording ideas rather than expressing them, which leads to an increase in the total number of ideas by 20%, and efficiency compared to traditional brainstorming increases by 42 %, according to L. Thomson, professor at the Kellogg School of Management, USA (Thompson, 2013).

There are disadvantages of crowdsourcing as a tool for solving social problems, potentially poor-quality work of volunteers or offering solutions with a low coefficient of innovation, participating in the proposal of solving problems not only with high professional skills, but also without those. There are some problems that are especially relevant in Russia: participation in crowdsourcing for nonprofit organizations may be paid as an “employer”, and it will be difficult to allocate these amounts from the budget and obtain permission to use them; the quality of the proposed solutions may be low due to the relatively low level of competence of the population in social issues and methods of solving them, because of the conviction of the population that volunteering should not require serious efforts, and any developed solutions and innovative ideas should be sold for great reward. But now there is, albeit a small, but modern layer of youth and specialists who understand the essence of the nonprofit sector and seek to use their own potential to solve social issues.

The combination of nonprofit activity with an entrepreneurial approach is a promising direction for the development of the nonprofit sector. The potential of this approach is great, in the conditions of the development of a knowledge-based economy, it can be a valuable source of original ideas for solving problems of the nonprofit sector.

Social innovations and social entrepreneurship in Russia have great potential for development. Since 2008, nonprofit online platforms have been developing, the first of which was “Blago.ru”. Over 10 years, more than 125 million were collected in favor of 117 nonprofit organizations, the platform has more than 32 thousand donors. In 2012, the first crowdfunding platform “Planeta.ru” was launched, and two years later a section with charity projects was established. Since 2017 “Sberbank Vmeste” is a service for regular assistance to nonprofit organizations. It allows to bind a bank card and make donations automatically every month. “MeetForCharity” is an online auction where lots are a meeting with famous people. Funds from the auction are spent on charity needs. The facts above prove that in Russian society is in line with the world trends of nonprofit activity development, but there’s a certain lag in the time of establishment of the platforms. Table 2 shows the statistics on the volume of donations through crowdfunding in Russia over the past six years.

Table 2: The volume of attracted online donations through crowdfunding in Russia, 2013-2018

Year	2013	2014	2015	2016	2017	2018
Mln roubles	23.4	71.2	138	246.5	348.5	407
Annual increase, %	-	204.3	93.8	78.6	41.4	16.8

Source: Khodorova and Bobrova, 2018, p. 7.

The information provided demonstrates the active development of the practice of donations through online platforms. The amount of donated funds for the period under review increased 17 times. However, the growth rate is falling annually. According to the author, this is due to the stabilization of the practice of attracting online donations through crowdfunding and a number of legal and practical restrictions related to the use of this type of fundraising for both nonprofit organizations and donors. Nevertheless, the dynamics of development of crowdfunding in Russia is still high enough. Although the volume of funds collected via online platforms in Russia is much lower than in the USA and UK, this method of conducting charity activities is getting more popular both with donors and nonprofits.

Nonprofit crowdsourcing is actively developing in Russia. Intellectual volunteering platforms are emerging that help nonprofit organizations and civic activists save time and money on resolving legal, financial, and legal issues, using the help of an expert community from the business sector. Russia's first socially oriented crowdsourcing platform, SODEA, was established in 2015. “ProCharity” platform was launched in 2017 by the “Friends” charity foundation. The “Nashe Budushee” Fund has several projects of significant importance for the development of the nonprofit sphere. One of it is the Bank of Social Ideas founded for the exchange of ideas on social entrepreneurship. This service is the embodiment of an open innovation model: users have the opportunity to propose an idea for implementation by other entrepreneurs or gain ideas for developing their own business.

The Russian technological area of nonprofit activity lags behind some developed countries in terms of the amount of funds raised. This is due, first of all, to the later start of the development of crowdsourcing and crowdfunding (Table 3).

Table 3: Information on the time of foundation and the name of socially oriented and charitable platforms abroad and in Russia

	Abroad		In Russia	
	Year	Name	Year	Name
The first charity and nonprofit projects oriented crowdfunding platform	2000	JustGiving*	2008/2014	Blago.ru/Planeta.ru *
The first charity and nonprofit projects oriented crowdsourcing platform	2000	Onlinevolunteering.org	2015	SODEA

Note: The JustGiving and Blago.ru platforms were based on collecting donations, Planeta.ru was founded directly for crowdfunding, where a section with charity projects subsequently appeared.

Source: compiled by the author according to: Khodorova and Bobrova, 2018, p. 6; JustGiving, 2020; United Nations Volunteers, 2020.

Despite the obvious advantages of launching nonprofit projects through online platforms, this method cannot become universally common and universal for nonprofit organizations. At least there are three reasons preventing this: financial instability of nonprofit organizations and lack of additional funds; insufficient qualifications of staff for organizing and managing projects; lack of the necessary skills to evaluate the received or desired social impact. Another problem is the low culture of making donations to nonprofit organizations, which affects the slow spread of charitable fundraising through crowdfunding. Crowdsourcing of charitable projects is also not yet a common practice. A relatively small number of people are involved in innovation, social entrepreneurship, and the implementation

of social projects. This is due to the irregularity of such participation, a low level of personal motivation, and often the coincidence of participation in charity and volunteer activities. At the same time, it is digital technologies that help to bring nonprofit activities to a new level of development, increase the mass participation in it, significantly simplify the collection of charitable donations technically, and facilitate the search for social innovation.

Discussion

Realization of part of the nonprofit activities via online platforms is a call of modern time. Crowdsourcing is one of the new fundraising tools that helps fight sustainability changes and diversify the financial resource for activity. Crowdfunding is an instrument of search of socially innovative ideas that is an essential part of nonprofit activity and social entrepreneurship. Moving towards the standards of conducting traditional business for nonprofit organizations especially in the field of evaluation of social impact and project management is a vivid tendency of nowadays. This result coincides with the position of L. Salamon who argues that a nonprofit organization should diversify its fundraising strategy and evaluate results to become more sustainable (Salamon, 2014). Jensen P. warns that this new neoliberal trend may blur the social mission of an organization and harm its core values (Jensen, 2017). Some researches consider crowdfunding campaigns to be less profitable for nonprofit participants than for others, so this instrument for raising funds for nonprofit projects should be examined better using statistics of a certain country (Makýšová and Vaceková, 2017).

Participating in crowdfunding and crowdsourcing campaigns may bring to the additional costs, which can be problematic for nonprofit organizations experiencing economic instability (McNutt et al., 2018). In Russia about 36% of nonprofit organizations are experiencing financial problems, staffing - another 18%, according to the research of S. Nemgirova (2016). Dolzhenko R. A. points to the need to conduct an expert evaluation of the solutions obtained through crowdsourcing, which in some cases requires the involvement of specialists and additional payment for their labor (2014). But this is not the only difficulty associated with the selection of crowdsourcing projects. Experts are not always able to identify truly innovative projects in view of the large volume of proposals received, or because of their non-standard, complexity, unpopularity - at first glance. In addition, from the author's point of view, crowdfunding can hardly become the main source of fundraising for the implementation of projects for nonprofit organizations: such a source of funds is not financially sustainable and can be used to supplement the organization's core business.

Conclusion

Nonprofit activities that use digital technologies, such as online donation platforms, crowdfunding, crowdsourcing, are recently developing all over the world and in Russia. They are gaining popularity and are undergoing institutionalization in Russian society. Being one of the tools for nonprofit activities, they have their own limitations and opportunities. Limitations are associated with the lack of professional skills of employees, the peculiarities of statutory activities and the financial instability. The use of digital technologies gives nonprofit organizations access to a wide range of people outside the territory of their presence and provides a new vision for solving social problems. Despite obstacles that nonprofit organizations face in Russia, introducing digital technologies in their practice, interest in new tools for nonprofit activities is increasing annually, which encourages nonprofit organizations to gradually widen their participation in electronic platforms.

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The Utility Of Electronic Bracelets For Monitorin Hospitalized Patients

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Abstract

The Romanian health system is currently in need of an update regarding the introduction of new devices to make it easier for specialists in the field of healthcare to offer quality medical services, in order to increase the quality of life of patients. The introduction of electronic bracelets for monitoring patients could serve with success in providing a clear picture of their biological functions in dynamics, but also for location within the hospital institution. A disadvantage of these devices could be the psychological effect of continuous monitoring and physical discomfort.The real effects and benefits of introducing such devices cannot be anticipated successfully, requiring further analysis and research on a significant number of patients.

Keywords: Monitoring, Biological Functions, Technology

Introduction

Today's technology has reached a high level of performance, successfully replacing even some occupations, being within the reach of specialists in many fields. Thus, we can meet cars that park alone, robots that perform surgery, etc. Why not we use this technology on a large scale for patients, to monitor and supervise them successly?

In Romania, the health system has a rather low level of technology, but in the same time and a fairly low number of health care personnel per number of patients. The introduction of intelligent patient monitoring devices would bring a number of benefits, both for patients and for medical staff (doctors and nurses). Thus, these devices can monitor both the vital functions of the patient: blood pressure, pulse, saturation and temperature, as well as its exact location in the institution during the hospitalization or even later.

Types of Patient Monitoring Devices

As Dias and Silva (2018) described, currently we can find a variety of electronic devices, connected to the computer or even on smart phones that track the number of steps or distance traveled, heart rate, the number of calories burned over a period of time, among others. These are not medical devices, but they can provide information about the biometric values of the body.

Portable health devices (WHDs) are an emerging enabling technology, continuous patient monitoring of vital signs during daily life (during work, at home, during sports activities etc.) or in a clinical environment, with the advantage of minimization of discomfort and interference with normal human activities.

Accordind to Di Rienzo (2005), the system, called Magic (Computerized Interactive Maglietta), is composed of a vest, including sensors for ECG detection and respiratory activity and a portable electronic sensor for motion detection, signal preprocessing and data transmission, wireless, to a remote monitoring terminal. The Magic system was tested on free-moving subjects at work, at home, at the wheel of the car

and while riding a bicycle. The applicability of the system to cardiac patients is now being evaluated. Preliminary data obtained from the records made in patients at rest and during exercise have shown: good signal quality in most monitoring periods; a correct identification of arrhythmic events and a correct estimation of the average beat / minute rate. These positive results support the further evolution of the Magic system, which aims to adapt it in approaches for routine use in clinical practice and in everyday life.

The use of WHDs enables the capture of vital signs and monitoring of health status extended periods (days / weeks) and outside the clinical setting, according to Dias and Silva (2018). This feature allows collecting vital data during different daily activities, ensuring better support in medical diagnosis and which helps to better and faster recovery after a surgical intervention or trauma. WHDs are also very useful in sports / fitness activities to monitor the performance of the athlete or even the military personnel to evaluate and monitor the response of their bodies in different dangerous situations and to manage them better in effort and health during work. These devices can be used for both medical purposes, as well as / or fitness / wellness activities, always aimed at monitoring the body.

In the research of Paradiro et. all (2005), another comfortable health monitoring system is WEALTHY. The system is based on a portable interface of textile material, implemented by the integration of sensors, electrodes and woven connections, advanced signal processing techniques and modern comunication systems. Sensors, electrodes and connections are made with conductive wires. The capacity of this system to simultaneously capture several biomedical signals (electrocardiogram, saturation, blood pressure or temperature) was investigated and compared with a standard monitoring system. The results show that the information obtained from the integrated systems is comparable with those obtained by standard sensors. The proposed system is designed to monitor people affected by cardiovascular disease, especially in the rehabilitation phase. The system can help, also, professional workers who are subjected to physical and mental considerable stressors and / or both daily and occupational health risks.

Yilmaz et. all (2010) described that the emergence of wireless technologies and advances in the design of the sensor attached to the body of the patient can lead to the change of the conventional system of health care, replacing it with individual distance-based healthcare systems. Portable monitoring systems can provide continuous physiological data as well as better information on the general condition of health for individuals. Thus, such vital signs monitoring systems will reduce patient care costs through disease prevention and will improve the quality of life with disease management.

The advances in wireless technologies, the Internet and the field of interconnected health determine innovations of portable medical devices at an extraordinary rate. Portables sensor systems made of flexible and extensible materials have the potential to interfere better with human skin, while electronic components based on silicon are extremely effective in processing and transmission of data obtained by sensors. Therefore, flexible sensors, combined with silicon based electronics with reduced power are a viable and effective approach for medical monitoring, according to Khan et. all (2016).

On the website of Zerintia (Spain), the manufacturer of this technology, proposes the introduction of new e-health bracelets that allow improvement technology regarding patient monitoring and biometric measurements; this is a discovery and opens a way to explore new possibilities in the medical world. These new devices also have SDKs that allow developers of medical platforms to integrate quickly and efficiently, exploiting the full potential and adapting them to the needs of each medical center. Zerintia has already started collaborating with partners like Angel Sensor, the Samsung platform or Apple HealthKit. It is desired to develop a device adapted to this environment and focused on medical solutions for the following scenarios:

- Monitoring of hospitalized patients: once configured to the user, if the heart rate,t he temperature, their movements involve agitation or anxiety, an alarm is sent to the medical staff. These bracelets could replace the current ones with barcodes.

- Outpatients: after a surgery or a period of convalescence, they are sent home and do not have the support or supervision of a relative, requiring monitoring in the first days to prevent cases of complications of the type.

All of this will also be improved with new platforms and media and use of Big Data that the leading technology brands offer:

- Microsoft Health Platform: A collection of best practices and guidelines to build fast, secure and efficient e-Health solutions.
- SAMSUNG - Digital Health Initiative: technological platform that combines bracelets with SIMBAND sensors, together with the cloud data storage platform: SAMI.
- Apple: HealthKit is a framework and an important part of iOS8 and is the first step to getting the one more potential from the Apple Watch. It provides centralized information on medical history, in a coordinated and safe way. HealthKit works with third-party applications and provides them to control users over the exchange of information. ResearchKit is an open source framework that allows researchers and developers to create applications for medical research. Its potential lay in its ease of use, real-time tasks, variety of customized surveys and sharing with the scientific community.
- Philips HealthSuite digital platform: a platform for connecting patients, doctors and medical providers. Bringing health beyond the walls of the hospital into our homes and in our daily routine it is a wish.

This new revolution could soon become effective, as well conventional bracelets do, will begin to be part of the scientific research of the health of the ecosystem, of medicine and science, supporting the improvement of measurements, more realistic, real-time and with minimum impactful on patients.

Another producer, Medieta (Finland), also proposes a variant of the e-health bracelets, information found on their website. ErrS bracelet is equipped with GPS and measures several different biosignals, such as blood pressure, cardiac rhythm, respiratory rate and oxygen saturation. The measurement data is transferred in real time to Medieta cloud platform, where the doctor or nurse can verify the measurement data. They are also warned if significant anomalies or changes are detected at the level of vital functions of the patient.

In addition to collecting data, the system analyzes the data collected in the early warning score tables, which are widely used in hospitals and predicts possible development of complications such as cardiac attack. Remote monitoring makes it possible to discharge patients from the hospital earlier and reduces unnecessary hospital visits. This not only improves the well-being of patients, but it also brings substantial cost savings when fewer days of hospitalization are needed, and resources can be allocated more efficiently. Moreover, the data can be used to determine the right medication and treatment needed or, in some cases, even to see if a patient remembered to take the medicine.

Although the bracelet is equipped with suitable features for the pursuit of vitality, the plans of Medieta does not include expansion in the consumer market. Instead, the company considers different bracelet versions, which may be prescribed by doctors not only to existing patients, but also people in high-risk groups.

Advantages and disadvantages in using monitoring devices of patients

The advantages of Introducing the Patient Monitoring System

From the patient's point of view, but also from the medical staff, we can identify a series of advantages:

- monitoring vital functions on a regular basis can create an extremely comprehensive image on the pathological values of blood pressure, pulse, oxygen saturation and / or temperature.
- in case of limit values on vital functions, the doctor and the nurse can be alerted in real time, thus reducing their reaction time.

- the system can provide important data on the effectiveness of a treatment scheme. For example, a patient with high blood pressure can be easily monitored for treatment change of his heart condition.
- in the intensive care units, the introduction of mobile function monitoring systems can be vital of real help in the limit situations, warning in real time the existence of a imminent danger, but also the pathological values of these functions.
- from the psychological point of view, the patient can feel a real comfort knowing that it is monitored in permanence both during the hospitalization period and subsequently at home.
- in addition to monitoring vital functions, the doctor may also have access to other information about patients: medical history of chronic and acute conditions, allergies, chronic treatments, etc.
- by recording the values of the vital functions, with the help of an application installed on a computer from the hospital network, a patient profile and a complete history can be created.
- the care staff, with the help of the mounting device, can find out at any time where it is located inside the hospital

The disadvantages of introducing the patient monitoring system

- any computer system is at risk of being accessed by unauthorized persons and of occurring errors in operation
- certain patients may experience a certain state of anxiety knowing that they are monitored in permanence
- a monitoring device, such as an electronic bracelet, can create some discomfort after long wear

Conclusions

As man adapts to changes and innovations of technology, and not only, in turn technology needs to adapt to the growing needs of humanity. If by the year 1800, the doctor was obliged to attach the ear to the patient's chest to assess its arterial tension, the 21st century brings innovation in technology, especially medical. So, e-health bracelets are a must, soon becoming devices as popular as bicycles or mobile phones. These increase the quality of the medical act, while lowering the costs for providing medical supervision and treatment.

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Accounts for Future Events, which Characterize the Activities of a Company, i.e. a Methodo-Logical Approach

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Abstract

The reporting development in terms of including information about the future of the enterprise is dictated by the needs of reporting users. To improve the quality of reporting, a universal methodology for accounting for future events should be developed. The purpose of the article is to reveal the methodology developed by the author for future events accounting. The method-ology includes sections, i.e. accounting objects, accounting tools and accounting techniques. The article defines the information of current monitoring, with the help of which it is possible to form a predictive opinion on the future values of assets, liabilities, income and expenses. Accounts and tools for its accounting are selected for the specified information. The uniqueness of the method lies in methods of traditional accounting, adapted to the requirements of modern accounting standards and financial reporting, while at the same time it is aimed at reflecting forecasted and integrated information in the reporting.

Keywords: Accounting Methods, Accounting for Future Events, Financial Statements, Integrated Reporting.

Introduction

Financial reporting continues to be the most accessible and reliable source of information about an economic entity. According to a survey of Russian companies board members conducted by PricewaterhouseCoopers, such an issue as 'increasing transparency and reporting' is seen as 'very' and 'rather' important for 93% of respondents ('*Sustainable development under the attention of boards of directors. A survey of board members of Russian companies'*, 2019) recently, the need for reporting users is to see in reporting information about the future of enterprises. Therefore, the practice of integrated reporting is in demand, as well as the inclusion of additional strategic information in the financial report. At the same time, we agree that integrated reporting does not compete with financial reporting and reporting in the field of sustainable development, but is an integral part of it (de Villiers and Sharma, 2017), the task of accounting is to ensure prospects for decision-making (Mouritsen and Kreiner, 2016), and the value of financial statements is determined by its forecast component (Evstafieva and Bogaty, 2013). This determines the relevance of building a convenient, practically applicable methodology for accounting for future events and reflecting them in reports.

To create an accounting methodology, we studied publications in the field of using accounting methods that take into account the time factor (Rayman, 2007; Pope, 2010; Okamoto, 2014; Abdalova and Karelskaya, 2015; Chen and Gong, 2019). The study examined work in the field of accounting methodology (Haynes, 2010; Beattie, 2014), accounting in conditions of uncertainty (Casta and Lesage, 2001; Dulesov *et al.*, 2019).

Non-financial problems, including environmental and social, can have far-reaching strategic importance for a company (Figge *et al.*, 2003). Disclosure of social information is important for investors (Qiu, Shaukat and Tharyan, 2016). Therefore, to construct a methodology for accounting for future events is highly required (Bernardi and Stark, 2018; Stasiskiene, 2019).

The aim of our study is to develop a methodological approach to accounting for uncertain future information, providing a comprehensive presentation in reporting both financial and socially

significant non-financial information, as well as making it possible to draw up forecast integrated reports of enterprises based on the methods and techniques of traditional accounting.

The main goals of scientific research:

- distinguish the objects of accounting information and monitoring of which is necessary to form an assessment of accounting for future events;
- identify accounts that allow you to take into account information that is important for reporting future events;
- Identify accounting tools applicable to the accounting of future events.

This method uniqueness lies in traditional accounting, adapted to the requirements of modern accounting standards and financial reporting, while at the same time it aims to reflect forecasted and integrated information in the reports.

The study was carried out based on Russian accounting practices. The work uses international financial reporting standards. Therefore, the methodology disclosed in the article can be used in other countries whose national legislation entitles these international standards.

Main Part

The study result is the methodology of accounting for future events, developed with the aim of improving the reporting quality and reporting compliance with modern user requirements. The technique is based on the method of structural-functional modeling. The main value of the methodology is the ability to use it to prepare reports taking into account future events. Through the methodology, the accountant has convenient tools for conducting integrated accounting (Table 1).

Table 1: Structural and functional model of future events accounting (developed by the author)

Methodology sections (structure)	The main question being answered	Section Content
Accounting Objects	Things to be taken into account	Objects of current observation, which could be used to generate predictive information about future values of traditional accounting objects
Accounting	Accounts to take into consideration	Accounting for objects of current monitoring Risk accounts Analytical Accounts
Tools, accounting methods	Methods to be used	Traditional accounting methods applicable to specific information about future events

Accounting Objects

The following accounting objects are traditionally distinguished as economic life facts; assets; liabilities; income and costs. The author has identified objects of current monitoring and made possible to generate predictive information about the future values of traditional accounting objects (Table 2).

The ‘Accounting objects for future events’ column reflects accounting objects, the future value of which should be estimated.

The ‘Information of the current accounting observation’ column, information is reflected, which is necessary to form an assessment of accounting objects for future events.

The 'Purpose of monitoring the object' column, an explanation is given of the need to highlight the relevant information of the current accounting observation in solving the problem of accounting for future events.

Table 2: Accounting Objects of Future Events (developed by the author)

Accounting objects for future events	Current accounting surveillance information	Object observation purpose
Assets	Asset maturity	Division of assets into non-current and current
	Asset useful life	Future assets determination
	Current and projected asset value	Reserve determination for value reduction, asset revaluation
	Maturity dates for receivables	Allowance determination for doubtful debts, cash flow planning
	The likelihood of future assets	Information generation of future contingent assets
	Exchange rate	Assets value determination denominated in foreign currency
	Differences between accounting profit (loss) and taxable profit (loss): temporary differences	Definition of deferred tax assets
Liabilities	Deadline	Long-term and short-term obligations division
	Obligations fulfillment	Separation of liabilities into urgent and past due, planning expenses for penalties, cash flow planning
	Exchange rate	Liabilities value determination denominated in foreign currency
	Probability future commitments	Reporting information on estimated liabilities, future contingent liabilities
	The compensation paid to staff	Information on estimated liabilities
	Targeted funding	Target use control, remaining obligations size determination and the possibility of their fulfillment
	Termination likelihood	Reporting information on estimated liabilities, future contingent liabilities
	Differences between accounting profit (loss) and taxable profit (loss): temporary differences	Determination of deferred tax liability
Profit	Obtaining economic benefits confidence	Accrual determination of income, forecast of future cash flow
	Future assets likelihood	Reporting information on future contingent assets
	Contracts, which duration happens on different reporting periods	Reporting period separation (past and future). Planning for future income, expenses
Costs	Future commitments probability	Reporting information on estimated liabilities, future contingent liabilities
	Confidence that a particular operation will result in an economic decrease	Accrual expense determination, future cash flow forecast
	Asset useful life	Depreciation expense determination

Accounting objects for future events	Current accounting surveillance information	Object observation purpose
	Contracts, which duration happens on different reporting periods	Separation of contractual work by reporting periods (past and future). Planning for future income, expenses

Accounts

In relation to the selected information of the current accounting observation, we summarize the possibilities of using accounts (Table 3).

Table 3: Accounts in order to keep track of future events (developed by the author)

Current accounting surveillance information	Accounts
Asset maturity	Synthetic accounts for grouping non-current assets (fixed assets, intangible assets and others) and current assets (materials, finished products, goods, cash and other)
Asset useful life	Analytical accounts (information of an analytical nature for each corresponding synthetic asset accounting account)
Current and projected asset value	Fair value is the inventory accounts of the corresponding asset. Forecasted value is regulatory accounts designed to clarify and adjust the valuation of inventory accounts, for example, 'Provisions for reducing the value of material assets' and 'Provisions for impairment of financial investments'.
Maturity dates for receivables	Sub-accounts for urgent and overdue receivables separation, doubtful debts account, off-balance sheet account for the written-off receivables, and analytical information on the maturity date.
Future assets likelihood	Introduction of additional accounts for the contingent assets accounting
Differences between accounting profit (loss) and taxable profit (loss): temporary differences	Deferred tax asset accounts
Deadline	Long-term and short-term liabilities synthetic accounts
Obligations fulfillment	Subaccounts for the separation of urgent and overdue liabilities
Future commitments probability	Reserves account
The compensation paid to staff	Reserves account
Use of targeted funding	Deferred income account
Termination likelihood	Reserves account
Confidence in obtaining economic benefits from the operation	Revenue account
Contracts, which duration happens on different reporting periods	Income account for work completed stages contractually
Confidence that a particular operation will reduce economic benefits	Expense OR cost account

The main tool for reflecting risk information in the accounting system is the creation of reserves in accounts. Modern standards provide various risk categories. The risk of loss is offset by the creation

of reserve capital with its accumulation in the corresponding account 'Reserve capital'. The risk of the assets value decrease is taken into account by reserving the amount of the reduction in the 'Provisions for reducing the value of material assets' and 'Provisions for impairment of financial investments' accounts. The risk of counterparty defaults is provided in the 'Reserve for doubtful debts' account. The 'Reserves for future expenses' account summarizes information on estimated liabilities.

In addition, it is necessary to note the great importance of analytical accounts in solving the problem of accounting for future events. Through analytical accounting, material information of a qualitative nature that is important for accounting for future events is introduced into the accounting system. For example, the duration of the contracts, the useful lives of the assets and the payment dates of debtors.

Tools and Methods of Accounting

The main tools that allow you to keep track of future events are planning, forecasting, reservation, depreciation, revaluation and accrual basis. Table 4 groups accounting tools and information that can be taken into account while using these tools.

Table 4: Future Event Accounting Tools (developed by the author)

Accounting tool	Current accounting surveillance information
Planning	Contracts, which duration happens on different reporting periods
	The compensation paid to staff
	Termination likelihood
	Asset maturity
	Asset useful life
	Differences between accounting profit (loss) and taxable profit (loss): temporary differences
	Deadline
	Obligations fulfillment
Forecasting	Exchange rate
	Maturity (repayment) period of assets (liabilities)
	Maturity dates for receivables
	Future assets likelihood
Reservation, revaluation	Current and projected value of an asset
Reservation	Future commitments probability
	Termination likelihood
Accrual basis	Economic benefits from the operation
	Confidence that a particular operation will reduce economic benefits

Conclusion

The reporting development regarding the future of the enterprise is dictated by the needs of reporting users. To improve the quality of reporting, a universal methodology for accounting for future events should be developed. The article presents the accounting methodology for future events, which provides reporting information of both financial and socially significant information of a non-financial nature, as well as making it possible to draw up forecast-integrated reports of enterprises based on the methods and techniques of traditional accounting.

The methodology is showed in the following sections, i.e. accounting objects, accounting, accounting tools and accounting techniques. Among accounting objects, such as assets, liabilities, income and expenses the information is highlighted, accounting and monitoring of which is necessary to form an

assessment of future events. Information from the current accounting observation is highlighted based on the purpose of the observation associated with the time factor.

For each type of information some current accounts are selected (both synthetic and analytical). It is especially necessary to note the role of risk accounting and analytical accounting to reflect temporal characteristics and non-financial information.

For the current accounting observation, accounting tools are selected and grouped in a table. Among the traditional methods of accounting the methods following are distinguished, i.e. planning, forecasting, reservation, depreciation, revaluation and accrual basis.

The methodology is developed in accordance with the current standards of financial accounting and reporting. The technique or its individual elements can be put into practice. This requires only their establishment in the accounting policies of the enterprise.

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A Portfolio Optimization Model Based on Polynomial Goal Programing Including Higher Order Moments Skewness and Kurtosis – Bucharest Stock Exchange

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Abstract

Portfolio optimization as method used in finance aims to identify the potential scenarios for satisfying conflicting/competing objectives like, for example, maximizing the return/profit and reducing the risk/loss. Thus, the motivation for choosing studying and applying this method arises from the potential scenarios that the portfolio managers or the individual investors have when applying this framework. The Modern Portfolio Theory, as we know it, considers only the first two moments of the probability distributions of the rates of return as opposed to the considerable number of papers highlighting the need of the higher moments (skewness and kurtosis) acknowledgement, analysis and optimization. In this paper, we intend to use the polynomial goal programing, as an optimization method, to understand the selection problem for Bucharest Stock Exchange (2014-2020) daily quotes and to propose a set of reusable preference parameters when investing in this market. We conclude that shares being preferred in the Markowitz/Sharpe/Treynor frameworks have less impact in the MVSK space.

Keywords*:* portfolio selection, optimization, higher moments, polynomial goal programming.

JEL: C44, C61, C63, G11

Introduction

As most of the portfolio theory selection problem is based on Markowitz's work, the current study is also focusing on the highly attractive goal of portfolio selection and management, overpassing the sole consideration of the average return and risk. Along with a brief analysis of the state of the current research in the area of polynomial goal programming (PGP) we are focusing on the possibilities that the Romanian investor has in adopting goal programing as a technique to select and manage its portfolio.

The paper is structured in three sections: historical analysis of portfolio optimization and PGP, database and methodology used, results and conclusions.

Historical evolution of the goal programing in the portfolio management context

In the financial domain, as part of the Multi Criteria Decision Analysis, goal programing is offering various portfolio management methods and methodologies both to investors and portfolio managers but also to researchers. In the context of portfolio theory, it solves problems related to either achieving results given a certain set of resources and constraints or determining the various resources needed to maximize results while minimizing resources by providing multiple optimal solutions/scenarios for achieving these results.

The works of Charnes et al. (1959), Charnes and Cooper (1961) are the most acknowledged ones in terms of the origin of goal programming usage in the context of the portfolio optimization while the origin of its need is recognized to be Simon's (1957) concept of "satisficing" goals of the decision-

makers, the need to have a set of strategies when it comes to choosing between several alternatives that appear sequentially and that are unknown ex ante. Simon creates the premises for using the optimization methods described here by identifying the need either to simplify the decision-making space in optimization problems or to identify satisfactory solutions (local optimum) in taking into account a greater number of parameters (preferences) in describing the optimization problem.

Romero (1991, 2004) first concludes that goal programming is among the most widely used decision-making methods, with a methodology that is easy to implement and understand, and later (2004) identifies that the vast majority of research papers use the lexicographic approach. Using this one, the weights of the preferences of investors/portfolio managers are not substitutable, the preferences being rather prioritized as importance (i.e. the first being the maximization of the return, the second being the minimization of variance, the third being the maximization of skewness etc.), thus, using this method risks to remain theoretical when the lexicographic function (of prioritizing the criteria to be optimized) is not well-founded.

Weighting programming objectives involves prioritizing constraints by importance, e.g. maximizing the return is always preferred to minimizing risk. The optimal scenarios offered must take into account certain tolerated/acceptable deviation limits from the optimal, in other words, investors will set a certain margin of freedom in which the results may vary in reaching the optimal, i.e. a deviation of x% from the optimum for each individual constraint included in the model.

Although mostly used theoretically in the research paper from the 80's, starting with 2000 the fuzzy programming, is more and more used when targeting uncertainty, yet often this methodology is being complemented by simulation methods for identifying the weights allocated to the optimization criteria.

Among the recent literature review papers focusing on portfolio optimization, Kalayci et al (2019) analize a set of 175 research papers, the ones focusing on multi-objective space with more than just mean and variance taking into account criteria such as: cardinality (the number of securities), transactional costs, industry capitalization and so on. Other research papers of Aouni et al (2014) and Colapinto et al (2017) highlight an increased usage of goal programing in the context of portfolio selection and management pointing out that the lexicographic (preemptive) and weighted (Archimedean) methods are the most common while also recognizing the increased usage of the polynomial goal programming method.

Introduced by Tayi and Leonard, (1988) and Lai (1991) PGP focusing on incorporating higher order moments (skewness and kurtosis) tries to capture investors' preferences for maximizing skewness and for minimizing kurtosis for a more robust selection and management of portfolios. The works of Chunhachinda et al (1997), Wang and Xia (2002), Sun and Yan (2003), Prakash et al. (2003), Davies and Kat (2009), Azmi (2010) are just some of the highlights when discussing about incorporating skewness and kurtosis along with mean and variance.

Recent studies on PGP usage conclude the following: Livingston (2019) highlights the flexibility given by the usage of this method and the diversification of the available optimal scenarios. Khan (2020) identifies a better efficient frontier and the possibility to better fundament the investment decision. Chen (2020) concludes that the advantages of this method is: stabilizing the cumulated return and a better reaction to the market downwards moves/changes, while admitting the downside of the method being the computation time relative to similar methodologies. Cizauskas and Haslifah (2019) highlight that in their particular work the usage of MVS moments outperforms other higher order models. Gupta et al (2019) concludes that the advantages of using the method with MVS-Entropy leads to more flexible decision options while the computation time is still being seen as a small disadvantage of the model. Other recent studies show that PGP usage helps reduce entropy and uncertainty versus risk.

Methodology and database

Following up on the concepts proposed by Henry Markowitz in 1952, given N assets (i=1, N), an observed period T, Pi(t) representing the price of asset i at time t, the return of asset i at the moment t is Ri(t) as shown in equation (1), its expected return is E[Ri] (2) while its variance (the measure of risk) is represented in equation (3):

$$R_i(t) = \ln\left(\frac{P_i(t)}{P_i(t-1)}\right) \quad (1)$$

$$E[R_i] = \frac{1}{T}\sum_{t=1}^{T} R_i(t) \quad (2)$$

$$\sigma_i^2 = E[R_i(t) - E(R_i)]^2 = \frac{1}{T}\sum_{t=1}^{T}[R_i(t) - E(R_i)]^2 \quad (3)$$

The covariance of a given pair of assets is represented in equation (4):

$$\operatorname{cov}(R_i, R_j) = E[(R_i(t) - E(R_i))(R_j(t) - E(R_j))] = \frac{1}{T}\sum_{t=1}^{T}[(R_i(t) - E(R_i))(R_j(t) - E(R_j))] \quad (4)$$

Given the above the expected return and risk of a portfolio are represented in equations (5) and (6) respectively, with wi representing the relative weight of asset i in the portfolio.

$$E[R_P] = \frac{1}{T}\sum_{i=1}^{I} w_i E(R_i) \quad (5)$$

$$\sigma_P^2 = \sum_{i=1}^{I} w_i^2 \sigma_i^2 + 2\sum_{\substack{i,j=1 \\ i \neq j}}^{I} w_i w_j \operatorname{cov}(R_i R_j) \quad (6)$$

Given Markowitz's portfolio theory, the optimum portfolio taking into account mean-variance is computed by using equation (7). We're choosing between the highest expected return on a given level of risk, or the other way around.

$$\max_{w_i} E(R_P) = \sum_{i=1}^{I} w_i E(R_i)$$

$$\begin{cases} \sigma_P^2 = \sum_{i=1}^{N}\sum_{j=1}^{N} w_i w_j \sigma_{ij} \leq c \\ \sum_{i=1}^{N} w_i = 1 \\ w_i \geq 0, \quad i = 1,2,\ldots,N \end{cases} \quad (7)$$

Starting with Mandelbrot (1963) și Fama (1965), the above optimization problem in equation (7) is rejected given the normal distribution of assets returns hypothesis is used.

Thus, we're focusing on taking into account empirical distribution of assets returns, obviously different than the normal distribution so this will impact the portfolio selection and management. To be more robust the weights that investors should choose are computed while selecting the portfolios. Given the hypotheses that investors' impact/weight into the daily traded volume is small they would take into account skewness and kurtosis as parameters/preferences of their optimization model, the assumption being that they consistent returns versus high returns.

The proposed optimization framework, based on PGP, allows identifying solutions using higher moments like skewness and kurtosis.

The component for this framework are given by the decisional space (subset of feasible solutions), the objectives space (the variables to be optimized per se), the parameters space (the parameters/preferences included in the optimization model) and the weights space (for each preference of the model).

We compute the objective functions based on system (8):

$$Mean = M(x) = X^T\overline{M} \quad (8.1)$$
$$Variance = V(x) = X^T VX \quad (8.2)$$
$$Skewness = S(x) = E\left(X^T\left(M - \overline{M}\right)\right)^3 (8.3)$$
$$Kurtosis = K(x) = E\left(X^T\left(M - \overline{M}\right)\right)^4 (8.4)$$

with M the mean return distribution, $\overline{M}$ their median, XT vector of weights (Xi,n) for the assets in the portfolio. V, S and K are variance-covariance, skewness-coskewness and kurtosis-cokurtosis respectively matrix of M.

To include all the parameters that form the multiple objective and maximize the expected return, including skewness while minimizing even order moments of the distribution, we divide the optimization problem into two steps, first computing the individual optimum for each of the 4 moments as follows (I is the vector of 1):

$$M^* = Max(X^T\overline{M})$$
$$V^* = Min(X^T VX)$$
$$S^* = Max(E\left(X^T\left(M - \overline{M}\right)\right)^3)$$
$$K^* = Min(E\left(X^T\left(M - \overline{M}\right)\right)^4)$$
$$\text{subject to:} \quad X^T I = 1$$
$$X \geq 0$$

then we need to compute a vector of weights using the result from the above step.

To aggregte all four optimization problems into one, based on the PGP framework, we define d_i the deviations of moment i of the return distribution from its optimal value (moment*).

The main computation step described below provides the optimal vector of weights for the given set of parameters with Ri the set of restrictions:

$$\begin{cases} Min\left(Z = \left(1+\frac{d_1}{M^*}\right)^{\lambda_1} + \left(1+\frac{d_2}{V^*}\right)^{\lambda_2} + \left(1+\frac{d_3}{S^*}\right)^{\lambda_3} + \left(1+\frac{d_4}{K^*}\right)^{\lambda_4}\right) \\ R1: X^T\overline{M} + d_1 = M^* \\ R2: X^T VX - d_2 = V^* \\ R3: E\left[X^T\left(M-\overline{M}\right)\right]^3 = S^* \\ R4: E\left[X^T\left(M-\overline{M}\right)\right]^4 = K^* \\ R5: X^T I = 1 \\ R6: X \geq 0 \\ R7: d_i \geq 0, \quad i = 1,\ldots,4 \end{cases}$$

All the shares listed at BSE between June 2014 – February 2020 in the standard and premium categories are taken into account before applying the selection based on: industry diversification, market capitalization, liquidity, return/risk. We've opted for daily closing prices to compute the shares returns, while restricting short selling. 25 shares are selected given previously mentioned restriction/criteria.

Results

The first set of results we are interested in is presented in Table 1, capturing the optimal (min/max) values for each of the 4 movements of the returns' distribution.

Table 1: Optimal results for the Moments* of the returns

M*	V*	S*	K*
0.0022	0.0061	1.637	1.51

The next optimization scenario follows the case where the investor is unable to compute its preference parameters (lambda), thus he/she is indifferent to these weights.

To get the high/medium/low preferences for each parameters we force the investor to be neutral to the weight of the parameter (=1) for the rest of the 3 moments of the return. We thus get the high preference value (lambda) for which each momentum when the distribution moment gets very close, almost equal to its optimum (moment*).

Next we compute the preferences for each(individual) moment, i.e. for mean return we try to capture every lambda that has a constent impact on the Z function to get the maximum (high) preference versus the opposite end where we say that the impact on Z is low. The average is in the middle of the improvement slope.

For more consistent preference parameters we've also added an extra constraint making the distances versus the individual optimum (di) not being too spread apart Variance(dij) less than 0.01 since previous computation on BSE data sets (before 2010) led to parameters of preferences varying from 2000 to 1,3 for mean and skewness respectively leading to discrepancies in interpretation and usage by the investor. Below we aggregate the results for (lambda).

Table 2: Moments preferences (lambda)

	M	V	S	K
Low	1	2	1	1.1
Medium	3.5	5	2.5	1.2
High	7	10	5	1.4

Taking into account above, we can say that an investor with high preference for both variance and skewness (minimize risk and have a highly positive asymmetry of the returns) would opt for 10 and 5 lambda parameters for variance and skewness respectively, keeping the other 2 preference parameters at 1.

The results are consistent with Davies and Kat (2009) work in terms of parameters range of values while standing aside for previous works where lambda value was randomly assigned to for example 1,2,3 for low/medium/high in the autor's respective optimization models: Aracioglu (2010), Giesecke (2010), Kemalbay (2011), Škrinjarić (2013).

As expected, from previous runs of the optimization model (2009-2010, 2010-2014) on BSE, the λ3 and λ4 parameters reflect the higher sensitivity of the investors to the changes in the higher order moments preferences.

Similar to Briec (2011) we tried to eliminate saddle points (local optimum points) through multiple distribution of shares (weights) inside the portfolio and increased weight/granularity of each of the 25 shares inside the portfolio, in order to increase the accuracy of the proposed weights.

With the preference parameters computed we can summarize the results for our selected objectives space, we can also describe the weights space and we try to understand and explain the results.

Table 3: Optimization of the portfolios results

M	Medium	High	Low	High	Low	*	High
V	Medium	High	Low	Low	High	*	Medium
S	Medium	Low	High	High	Low	*	Low
K	Medium	Low	High	Low	High	*	Low
TLV	3%	2%					4%
BRD	4%				8%		
TGN	3%				8%		
BIO	4%	2%	10%		15%		1%
SIF1	4%	1%	18%				
SIF2	3%	8%					12%
SIF3	3%						
SIF4	4%						
SIF5	2%	10%					
TBM	7%	35%		36%	4%	14%	16%
RRC	3%		18%				
SCD	7%	10%		32%	11%	19%	14%
OIL	10%		20%				5%
EBS	5%				4%	31%	
CMP	3%		10%		13%	36%	
FP	2%		23%		7%		1%
SNN	4%	3%			11%		5%
ALR	2%	4%					2%
COTE	4%	1%			9%		11%
TRP	5%	14%					12%
IMP	1%	1%					1%
IAR	4%	2%		31%			12%
ELGS	4%	6%			1%		5%
VNC	4%						
ROCE	4%				7%		4%
M	0.0009	0,0014	0,0009	0,0019	0,0007	0,0009	0,0011
V	0.0071	0,011	0,0093	0.0149	0.0069	0,011	0,0191
S	-0.4979	0,0433	0,367	0,794	-0.2444	0,1615	0,4553
K	8.972	5,7119	2,303	4.405	3.96	1.514	2,6767

Note that the (****) portfolio does not include the lambda preferences, the Z function only taking into account the absolute distances (di) vs the individual optimum of each moment. It clearly shows that Kurtosis optimization prevails in terms of the optimization, being very close to the K* result. Of course, the distances (di) need to be calibrated in order to get proportional preferences parameters.

Given at least one lambda gets stronger minimum one of the other three moments of the distribution is less optimum, decreasing in the investor's preference. SIF3 and SIF4 shares are being left out so we can conclude that these 2 securities are average in terms of performance when it comes to using higher order moments along with mean and variance. Although preferred for its higher return, IAR weight in the portfolio is smaller when other moments need to be optimized as well. SCD seems to be preferred the most in the given scenarios, this also being the most inelastic security towards the BSE composite index (BET-Plus).

When comparing to modern portfolio selection models (Markowitz, Sharpe, Treynor) we observe that securities such as IAR, TLV, SIF3 and SIF4 have a less impact in terms of weights in the MVSK portfolios.

It is obvious to say the least that a tradeoff mechanism needs to be identified when giving up on one moment of the return distribution versus the other.

Conclusions

The need to take into account higher order moments gets obvious in the highly uncertainty scenarios and helps the investors (be it individuals or portfolio managers) get to more robust results. Using the proposed PGP framework helps identify various scenarios when dealing with empirical securities returns which always seem not to respect the normal distribution hypothesis.

We managed to identify BSE set of preference parameters (as also confirmed with previous appliations of the model for the 2009-2010 and 2010-2014 time series). We also identified shares preferred through the modern portfolio theory frameworks Markowitz/Sharpe/Treynor fail to be selected in substantial weights inside the MVSK PGP framework.

As concluded by recent studies as well, further efforts are needed to identify the objectives trade-off and in order to ease the computation burden.

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Modelling the Rationality in Residential Investor Decision Making

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Abstract

The article presents a way of choosing an investment strategy by an individual investor on the residential market. It shows in particular that the investor, apart from financial factors (price), makes a decision also based on social and psychological factors. This leads to a new interpretation of the concept of a rational investor, basing the investment strategy on individual preferences, deviating from typical capital market's behavior.

Keywords: Real Estate Market, Rationality, Residential, Investing

Introduction

Among many investment options, the real estate market has always served as a safe and tangible capital investment. Hence, despite the high capital intensity, it is still popular among individuals.

Interest from foreign investment funds has been increasing significantly in recent years. However according to the Evaluer Index Report ("Evaluer Index", 2019), individual investors are still dominating the rental market in the largest Polish agglomerations. In turn, in the report "Emerging Trends in Real Estate. Creating an Impact" ("Emerging Trends in Real Estate", 2019), the authors also point out the steady increase in the inflow of investment capital in the real estate market among private investors. The reason is in low yield on investment in the equity and bond markets, which no longer offer return as is finding at a real estate market (Benjamin, Chinloy & Jud, 2004).

The high rating of a real estate as an investment subject comes from, among others the following premises (Kucharska-Stasiak, 2016):

- real estate is a source of income – this income is most often the result of rents or sale of the property while maintaining its increase in value;

- real estate is an investment protecting against inflation – this is connected with maintaining the real value of the property or even its increase, which is particularly an evident in the phase of increase in construction costs or loan interest;

- real estate is a basis for obtaining tax benefits - income tax is reduced by the costs of taking out a mortgage; hence the decrease in the effective cost of credit;

- real estate is a basis for defrosting capital - in the investor's opinion, this is one of the most important premises encouraging to invest in the real estate market; capital defrosting can take place through the sale of real estate, sale and leaseback and, in particular, the possibility of taking out a loan secured by a mortgage on the real estate;

- real estate is a basis for stimulating consumer demand - the real estate market through consumer spending can act as an accelerator of business cycles;

- real estate is an indivisible investment - the funds invested are usually indivisible, which means that it is difficult to recover their value partially;

- real estate is an investment with moderate investment risk - real estate is usually perceived as an investment with medium risk, between bonds and shares, which is perfectly confirmed by the rates of return obtained from investing in these three types of assets;

- real estate is an active investment that requires management - proper management of the value of the property may result in increasing this value; on the legal side, it protects the owner against failure in renting caused by incorrect selection of tenants.

Investor's Decision Model

Given the above premises, it seems reasonable that an individual investor sees investment benefits on the real estate market difficult to identify on other financial markets. Nevertheless, he faces a choice of investment based on knowledge and available resources. On the financial markets, we are talking about a rational man's paradigm. Economics assumes that when making investment choices a person behaves rationally, correctly analyzes the market environment and on this basis makes the best decision. Meanwhile, due to the tangibility of the subject of investment in real estate, it is impossible not to pay attention to the sociological and psychological factors supporting the decision-making process. On a decision-making basis, we are therefore dealing with a collision of the rational man paradigm (*homo oeconomicus*) with the emotional man paradigm (*homo sapiens oeconomicus*) and the paradigm of a man who is part of a social group (*homo sociologicus*) (Kirchgessner, 2008).

Figure no. 1 presents the investor's decision model, taking into account all of the above factors.

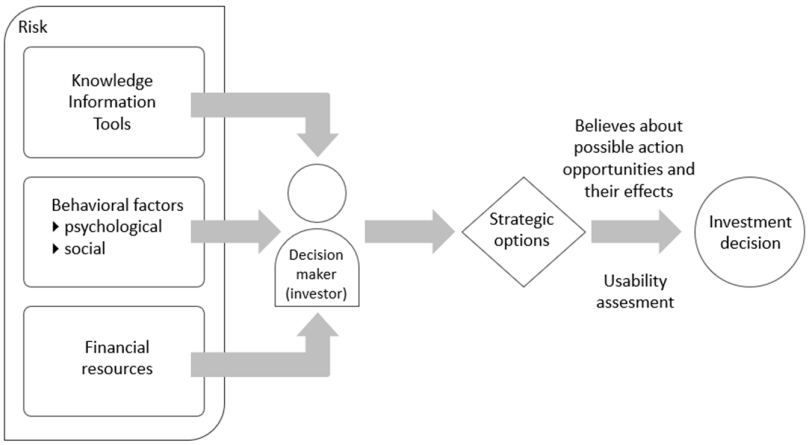

Fig. 1: Real estate investor's decision model

Source: Own study

The range of options to choose (the compilation of economical, sociological and psychological factors), in particular depends on both: the nature of decisions and the conditions under which they are made.

The nature of decisions depends on the investor's experience. We can distinguish here:

- absolute binary decisions (invest / not invest),

- relative decisions based on the most economically viable option,

- portfolio decisions based on the construction of an optimal portfolio, enabling the benefits from diversification,

- time decisions taken with the optimization of the moment of their beginning or ending.

The conditions under which the decision is made is related to the investor's attitude to risk and his ability to assess individual options, in the background of other investors' behavior. These conditions include certainty (rarely) or uncertainty as to the level of project efficiency with the possibility or inability to assess the probability of occurrence of a given state.

Investment Strategy

The above-mentioned criteria are included in the whole spectrum of available investment strategies. Table no. 1 presents profiles that should be considered to create the final investment strategy, tailored to the preferences of the individual investor directly interested in the residential market. When building a portfolio of this type of investment, the strategy selection should be taken x-times, making different choices in individual profiles and thus diversifying the risk of a single strategy.

Table 1: Profiles to create a final investment strategy on the real estate residential market

Profile	Category	Concept / variant
Business model profile	financing	cash
		loan and cash
	profit	use and manage
		buy and earn
		buy and sell
		buy, add value and sell
	risk	conservative concept
		moderate risk concept
		defensive concept
Subject profile	segment	apartments
		premium
		popular
	building	new (development status) - primary or secondary market
		an older block of flats built in traditional technology or prefabricated
		tenement house

	dwelling	micro apartment
		studio
		2-room room flat or bigger
	standard	finished
		for minor refurbishment
		for general renovation
		development standard
Location profile	city	the largest agglomerations in the country
		dynamically developing smaller agglomerations
		small cities
	detailed location	city center
		downtown
		the periphery
		neighborhoods with problems

Source: Own study

The business model profile should be considered one-way, for all the categories listed in the block together. The profit category shows how to obtain the expected benefits from the market. The "use and manage" option means the use of real estate for own needs as a capital investment (increase in value with proper management). The "buy and earn" option is based on regular cash flow income from rents, or is based on a long-term increase in invested capital (passive management) resulting from market trends. The "buy and sell" option is a speculative option to achieve a profit on the difference in transaction prices, resulting from factors other than the price changes over time. Ultimately, the "buy, add value and sell" or in other words quasi-developer variant provides value from active management of property in order to increase it. It includes investment behavior such as flipping, home staging or even transformation of the property layout into one that will positively affect its value (e.g. conversion of a 5-room flat into 5 studio apartments). There is also a variation of this strategy in which the last component 'sell' can be replaced by the component “rent” if the previous actions will result in a higher return on rent instead of sale.

The risk category is not only under the criterion of the conditions in which the decision is made, but it is also a derivative of the investor's individual preferences. The sources of risk considered in the context of this paper include the market, policy, technical and random conditions. These sources allow defining the types of risk that a direct investor faces, ranging from the risk of strategy accuracy, through price change risk, legal risk and ultimately the catastrophic risk. This catalog is very rich, and appropriate mathematical tools with a certain probability allow to estimate the expected return on risky investment (Seay, Anderson, Carswell & Nielsen, 2018). Nevertheless, from the perspective of the rationality of the investor, a man with a certain temperament and at the same time acting in a certain social group, behaving in a way defined by imposed norms, not necessarily legal, can accept different level of risk and what goes with it – different level of yield (Kahneman & Tversky, 1979). Hence, the use of mathematical tools in economic calculations can show (as demonstrated by the study carried out in the

article) that rationalism expressed by the number (e.g. standard deviation) deviates from the final choices of investors.

The subject profile refers to the investment object. The investor must decide in which segment the apartment will be selected, whether the purchase will take place (on the primary or secondary market), what will be the layout, area and standard. At this stage, some categories overlap, and the choice of variant in one of them often determines the other choices. It is therefore important that the investment strategy after the revision of the subject should be consistent.

Location profile, includes categories indicating literally the place of investment. The city category is a broader view on the location and takes into account the selection from the largest cities (with a slightly lower rate of return due to the high capital intensity of investments, but also with a lower risk of vacancies), smaller but dynamically developing cities, and satellite agglomerations. The detailed location category narrows the selection to central and downtown areas, as well as the periphery and neighborhoods with "problems" such as, for example, poor neighborhood reputation or unattractive buildings.

The Rationality Model

The compilation of individual profiles, where the selection is supported by available resources, market knowledge and non-economic factors, ultimately should give the final investment strategy. This model is a function of costs and benefits and takes into account the investor rationality based on logical reasoning, but also emotions and individual motivations. Rationality understood in such a way is a difficult object to modeling investment behavior on the real estate market, but it is certainly an excellent background for the interpretation of atypical behaviors, resulting in accumulation in imbalance of the market condition. This model can take the following form:

$$I_t = f(y, s_f, p_f, \sigma),$$

$$y = f\left(r_f, r_i, r_l, r_m, \sigma_{P,M}\right) = f(P, C, g_1, g_2, \sigma_{P,M})$$

where:

y – yield understood as the expected profit from investment

s_f – social factors

p_f – psychological factors

σ – total uncertainty with respect to built-asset return

r_f – risk-free interest rate

r_i – inflation rate

r_l – liquidity premium

r_m – maturity premium

$\sigma_{P,M}$ – systematic risk

P – price of the asset

C – total additional costs of the investment

g_1 – the expected rent growth

g_2 – the expected growth in asset value

Modeling the rationality of choosing an investment strategy is therefore a function of economic, social and psychological factors taking into account the risk of the project as a whole. Economic factors are represented by the rate of return on investment, which can be reflected by market factors (e.g. risk-free rate, inflation level, risk premium), or the function of factors directly related to the project, taking into account the price of the property, additional costs associated with investment and the expected level of rent and property value. The rate of return also includes market risk.

In each of the profiles / variants, the investor's choice should be based on economic analysis, however, investors are unable to break up with the psychological and social factors mentioned above.

Market Research

To prove that price is not the only factor contributing to the rationality of decisions taken by investors, four large housing estates on the primary market, currently on sale, located in the city with over 600,000 inhabitants were analyzed. Each of these housing estates differ in location (from the city center to the periphery) as well as standard (from the apartment building to popular). The sales curves for each of the individual housing estate, with relation of average prices over time are presented in Figures nos. 2-5.

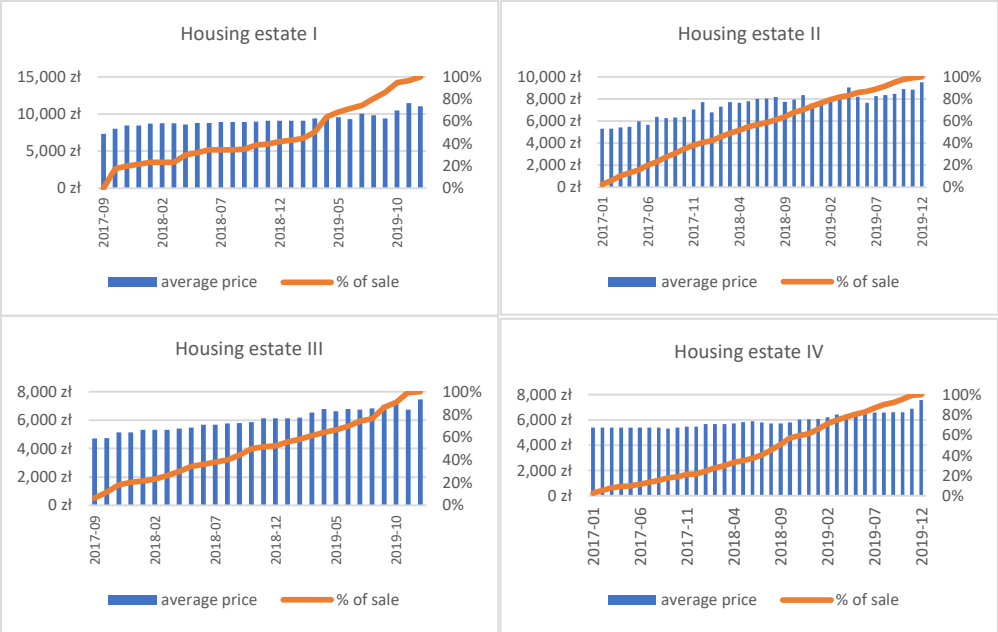

Fig 1-5: Average prices vs percentage of sale in each of the analyzed hosing estates

Source: Own study

In each of the above cases, the correlation coefficient between the change in the average price of flats and the change in the number of flats sold in comparison to the previous period, was additionally analyzed. This ratio for each of the housing estates was respectively: 0.007%, (-24.01%), (-43.93%), (-44.53%). This shows that in three out of four analyzed cases, as the price increases, the number of apartments purchased decreases. However, this relationship is not strong, which may indicate that the change in prices affects the volume of sales, but it is not the only factor shaping it. In the case of the first housing estate, it can even be said that the changes in prices does not matter at all (positive correlation, close to zero). The reason is that the order of presented estates is adequate to the decrease in their prestige. Housing estate no. I is therefore the most prestigious among the others analyzed. The correlation coefficient achieved here is therefore also a confirmation of the Veblen paradox, saying that an increase in price in the case of luxury goods may cause an increase in demand for a given good.

Figures nos. 6-9, for the same housing estates as previously, presents how the sale has changed regardless of time, with price movement between particular periods.

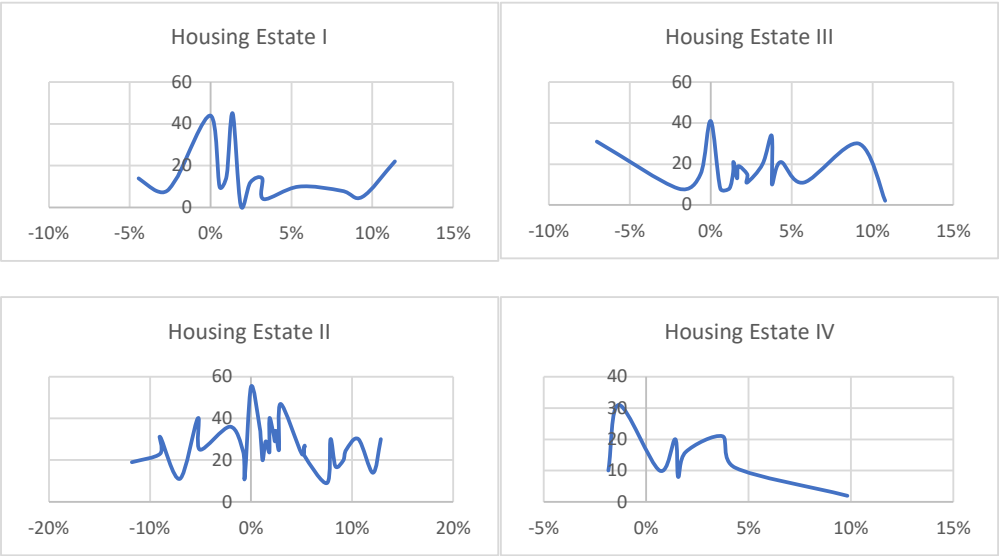

Fig. 6-9: Percentage of changes in prices vs no. of sold apartments in each of the analyzed hosing estates

Source: Own study

In case of housing estates nos. I and II, the largest of the price increases caused a sharp increase in sales. These are apartment and premium class housing estates. In the case of housing estate no. IV, of a popular standard, a price increase above 4% caused only decrease in sales. Nevertheless, in each of the analyzed settlements, it is difficult to look for rationality in the behavior of buyers, associated with increases and decreases in demand with a corresponding decrease and increase in prices.

A rational investor, deciding whether it is on the stock or bond market, rejects sentiments and follows simple mathematical principles. In case of the real estate market, in particular investors buying their "first second apartment", apart from prices, are guided by emotions as they are associated with the subject of investment for years. In addition, they identify it with wealth and prosperity. They boast about their portfolio. And the greater the need for prestige, the greater emotions play a role. Therefore, the investment value on the development market is not only the low price, but the packaging of the sales object with eye-catching marketing tools that also affect psychological and social factors. Hence, the ability to work with a rational customer, understood in the way presented in the article, is the strength of development of the real estate market.

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Renewal and Buiding Social Ties in The Face of The Safety Threat Posed by the SARS-Cov-2 Pandemic - Overview of The Problem

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Abstract

This text outlines the problem of renewing and building social ties in the face of the safety threat posed by the SARS-CoV-2 pandemic. The article presents examples of initiatives taken by society to help people who are in a difficult situation as a result of the pandemic. This article is an introduction to the studies planned.

Keywords: Threat, Pandemic, SARS-Cov-2, Safety, Security, The Feeling of Security

Introduction

It could be expected that in the face of the safety threat that the SARS-CoV-2 pandemic is undoubtedly posing, society will not be willing to help those in need. But it turned out to be the opposite. Every day new initiatives emerge to help others survive this difficult time. In both large and small towns there are groups of people who want to help those most affected by the pandemic. The groups targeted are: the elderly, chronically ill, with reduced immunity, disabled, under official quarantine, and those who have lost their source of income as a result of the pandemic outbreak. The aid provided comes in various forms. It is a financial, material and psychological aid, among others. Just a few days after the announcement of restrictions on the prevention of the spread of the virus in Poland, appeals for help appeared in social media. Many people have been made destitute overnight. The panic that was spreading among the society was also not insignificant. Many people in hysteria rushed to the shops to make supplies. This resulted in a shortage of goods on the shelves, so that the elderly, for example, were unable to make basic purchases. The uniting of society in a state of epidemics is a subject worth considering. What caused the so far indifferent people to help? What is their purpose in this? Will they continue with the projects they started after returning to the pre-pandemic state? These are questions to consider in future studies. The following text will focus on presenting the initiatives taken. At present, the solidarity and commitment, with which strangers help others, is admirable. The current situation is undermining our safety on many levels. It's not something we know and we know how to fight it. Paradoxically, it turns out that an invisible enemy unites strangers.

The next stage, taken after the threat of the coronavirus pandemic has subsided, will be to carry out research indicating the intentions of those who, in the face of the threat, have decided to engage in activities aimed at helping others.

The Need to Feel Safe in The Face of Threat

The SARS-CoV-2 pandemic has undoubtedly shaken the sense of safety around the world. This applies not only to entities such as states, but also, and perhaps above all, their citizens. Zbigniew Ciekanowski defines safety as follows: Safety is an important existential need, resulting from the objective living conditions of people and different social groups and their mutual relations, requiring care for its satisfaction (Ciekanowski, 2010). It should not be forgotten that safety is understood in a variety of ways by many researchers, also as a specific human need, becoming the highest value that he or she seeks in life (Fałdowski, 2018). When looking for reasons for people who have not been involved in any form of volunteering so far, it is necessary to reach for basic human needs. According to the hierarchy of the Maslow Pyramid, immediately after physiological needs the most important need is the need for safety (Maslow, 1943). Perhaps the willingness to help is due to everyone's inner needs. When you are in a situation of danger, which is certainly SARS-CoV-2 pandemic, you realise that one

day you may find yourself in a situation where your need for safety is not satisfied. That is why one tries to help others, because one would not want to get himself in a similar situation - the situation of lack of safety. So, what is a sense of safety and what does it mean to satisfy it? Ryszard Klamut describes the sense of safety as follows: If safety needs are satisfied and the individual realizes the values of safety, he or she experiences a state of satisfaction, happiness, understood as a sense of safety (Klamut, 2012). So maybe satisfaction is the key element that makes people so willing to get involved in helping others. This is an issue that will certainly be investigated. The current state of insecurity is paradoxically conducive to the merging of people. It is possible that this is due to isolation and the impossibility of contact with loved ones.

Initiatives to renew and build social ties as a result of the pandemic

Companies, Polish brands and celebrities are involved in the fight against the pandemic. However, it is worthwhile to raise the issue of involvement of small communities and groups of people, often not known to each other before. One of the first signs of willingness to help were advertisements hung on staircases in multi-family buildings. These advertisements proposes help in everyday grocery or pharmacy shopping to people who, due to their age or health condition, were afraid to leave their homes. After some time, the initiative moved to the Internet, to social networking sites such as Facebook and Instagram. At the same time, it resulted in the expansion of the scope of activities. Both in terms of forms of assistance and addressees. It turned out that there are not only elderly people in need, but also people who for various reasons are afraid for their health. These are often susceptible to infection, chronically ill people or people who are in a difficult financial situation.

One example of groups offering help is the Visible Hand group, which has been operating on Facebook since 11 March 2020. In the first stage of the announcement, mainly people who offered their help were adding. After some time only did the members of the group become active, who needed this help. The response of those determined to help is enormous. At the very beginning of the project there was only one all-Poland group. With increasing interest, regional groups have emerged, which at present cover almost the entire country. The Visible Hand Initiative was initially the initiative of a small group of friends, currently the main group has 108.7 thousand members (Widzialnareka, 2020) The initiative has expanded and there are now over a hundred regional groups of the Visible Hand. The vast majority operate in Poland, but there are exceptions and some of the groups operate in the UK, Berlin, Paris or Vienna.

As already mentioned above, the first proposals to help were mainly aimed at the elderly. Ads appeared on local community groups or notice boards. The advertisements were addressed to people who, for various reasons, cannot leave the flats and need help with shopping or taking care of the animals. A much greater range of help has begun to be offered by people who want to help remotely. There have been advertisements for, among other things, tutoring aids in subjects such as mathematics. Over time, other proposals have begun to emerge, among them: remote teaching of children's activities, storytelling, reading books, free language lessons conducted through platforms such as Skype, fitness classes conducted at a distance, free grocery shopping (mainly for those who have lost their source of income), taking in animals for the owners' quarantine period, conversation or emotional support. Psychologists and psychotherapists offer psychological support at a distance and lawyers offer legal advice. Physiotherapists also do not leave their patients and broadcast live exercises. In response to the high demand, there are also groups offering temporary contract work to support people who have lost their jobs.

It is also becoming increasingly popular to support local and small businesses by ordering and buying goods that are not essential. Such purchases will allow small companies, one-man businesses and self-employed to survive. There is also a growing number of people who are ordering hairdressing or beauty services for the future. Such orders are paid for, but the deadline for their completion will be determined individually after the threat has passed.

Another initiative worth mentioning is the sewing of protective masks by both professional sewers and volunteers. The masks are distributed or sold for symbolic amounts. The initiative of sewing the masks was also joined by, among others, beauticians, circles of rural housewives, pensioners and even

foundations. A related action is also the action of people with 3D printers. The owners of printers wanting to help in a difficult situation of danger decided to print and hand over visors (faceplates) free of charge for doctors working in hospitals. The people who can offer the purchase of semi-finished products were also involved in obtaining the materials necessary for sewing masks and folding visors. In the face of the coronavirus threat, many restaurants have decided to support doctors and rescuers who are on constant alert. Restaurants and bars all over the country provide meals free of charge to Hospital Emergency Wards, infectious disease wards or emergency medical centres. In order to provide products for prepared meals, there are organized collections on the Internet, which can be supported by anyone willing. An example of such a collection is the Meal for the Doctor action, thanks to which it was possible to offer help to 500 restaurants that serve meals to doctors. There are also advertisements on the Internet which provide doctors with free accommodation or offer free rest in resorts after the pandemic.

It is also noteworthy that some investors reduce or remit the fees for renting apartments or commercial premises. This is an expression of solidarity with people who have lost their jobs or are in a difficult situation. It is also popular to organize the collection of basic products such as: water, food, chemistry and cosmetics and to transfer them both to hospitals and individuals.

It is also noteworthy that assistance is not only provided by citizens of a given country, but also by persons temporarily residing within its borders. An example of such activity is sewing masks by Chechen women refugees.

The groups and initiatives that have been created also have another, very important factor - education. Education on how to safely deliver shopping, how to safely bring dogs out, how to react to violence and how to comply with quarantine. People pass on knowledge, develop common methods, face emerging problems.

Conclusion

It turns out that in the face of such a great tragedy as the SARS-CoV-2 pandemic, people can unite and help each other without expecting anything in return. I'm sure it's something to be proud of. It is also to be hoped that the assistance offered will not only be a temporary trend, but an incentive to engage even more in helping those in need.

We are witnessing how, in an emergency, ordinary and extraordinary people are able to unite and help those in need. Often people who need help are family or our closest neighbours, but also strangers whom we may never meet. It is also to be hoped that the solidarity that is emerging in society is not a temporary trend.

It is worth examining not only the types of assistance provided, but also the reasons that drove those providing it. Among a few of the alleged ones one can mention: own satisfaction, willingness to help the weaker ones, involvement of friends, sense of unity with people in a difficult situation, an attempt to temporarily forget about the prevailing situation, willingness to test oneself, compassion, religious motives, patriotism. The planned research will determine the type of assistance, the motives behind the volunteers and the impact of disinterested assistance on their sense of security.

The whole world has stopped, and a new reality may be created before our eyes. It's good that this reality is somehow better. Perhaps the actions taken by society will increase our sense of security.

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A New Approach to Performance Budgeting Based on System Analysis

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Abstract

Despite an extensive experience of performance budgeting, Russia is still at the initial stage of introducing project approach. Hence, there is much room to increase state management effectiveness through the use of system analysis elements when planning budget spending. The goal of our research is assessment of relation between the targets of state programmers, national projects, the performance budgeting tools and the measures they encompass as well as the use of econometric modelling to establish relation between the goals of state policy and necessary financial resources. The results of our work can be used both when planning spending for new programmers and by way of improving the current programmers.

Keywords: performance budgeting, national projects, state programmers, healthcare, life expectancy, econometric models

Introduction

The current programmers of the Russian Federation, state-led and others, as well as the national projects are manifestation of a new wide-scale approach to public finance management, namely program-oriented management of budget expenditures within the framework of performance budgeting. These measures, according to Deyneli (2019), aimed at implementation of a state economic policy assume clear targets and key indicators of state agencies' activities, the ways of achievement and resource allocation (financial, labor, information and others) solely for the purpose of attaining the results.

Although the planned deadlines of budget spending on a significant number of state programmers and national projects are yet to be reached, it is already clear that the bulk of interim targets was not attained pointing to several drawbacks of the measures. Hence, according to Jeffrey (1998) compilation of lists of the planned measures under national, state and agencies' programmers as well as federal projects, etc., and the target systems used to evaluate effectiveness of the measures, is now often based on fragmented research, does not use systemic analysis for the projects. Measures with no direct influence on attaining the targets may be chosen.

Therefore, the aim of this work is econometric analysis of relation between budget financing and the key targets to assess correctness of passports of the national projects and state programmers. The analysis is done for life expectancy, which is very important now, when the demographic situation is negative, and includes consideration of spending on the key directions for systemic approach keeping in mind similar interrelations in other countries.

Literature Review

There is a general view that Russia's performance budgeting dates back to the 1920-1930s. Hence, the 1922 State Electrification Plan contained a common goal – to ensure comprehensive electrification – and the measures necessary to attain it thus becoming the first official economic document complying

with the principles of performance budgeting. Introduction by Robert McNamara of a project approach based on corporate management principles and systemic analysis in the 1960s was a significant step forward in the development of result-oriented budgeting. It was a significant contribution to the U.S.A. defense industry development. However, the systemic approach is not wide-spread in state management (Kosov, 2017; Bondarenko, 2019).

Research by modern scientists, who use some systemic analysis elements to assess effectiveness of performance budgeting are also of interest. Marti (2018) in his article analyzes the role of management by objectives in making budget decisions. He built econometric models linking budget system development, the index of management by objectives and other economic and political factors (Akhmadeev, 2018). The results of modelling, according to Raizberg (2017) demonstrated viability of the method for budget financing, when targets are used not only as a form of reporting to parliament and public, but as the basis for budget funds distribution.

Lavrov (2016) and Buzdalina (2020) built on the idea of using targets for budget decisions. In a research, he used econometric modelling to analyze the interrelations between performance budgeting, mid-term spending ceilings and flexibility of budget indicators. Although performance budgeting was introduced in all OECD states' government management, its results are only used for information about programmer implementation, not to establish future budget allocations (Kosov, 2016).

These researches are an example of how systemic analysis elements can be used to assess effectiveness of the result-oriented approach.

Theoretical Background

We selected the following 25 states for analysis: Australia, Austria, Belgium, the Czech Republic, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Japan, Korea, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Great Britain, the U.S.A. The choice was predetermined by the presence of the Organization of Economic Cooperation and Development statistics on life expectancy at birth and consolidated budget spending by individual directions as well as exclusion of such states as Luxemburg, Estonia and others because of the small size of their economies and less typical other conditions. Spending was analyzed by its functional classification, which breaks down spending into general state expenditure, national defense, national security, national economy, environment, housing and utilities, healthcare, culture, education and social policy, according to the official OECD website. The period under analysis, 1995-2017, was chosen to maximize the period, when the data and the break down are available.

When considering life expectancy at birth in different countries one can notice that despite a general positive trend, fluctuations of the indicator are not the same in different states and are mostly

characterized by their chaotic nature. Thereby, we can conclude that the internal factors are at play here, making the interrelation between life expectancy and spending relevant (fig. 1).

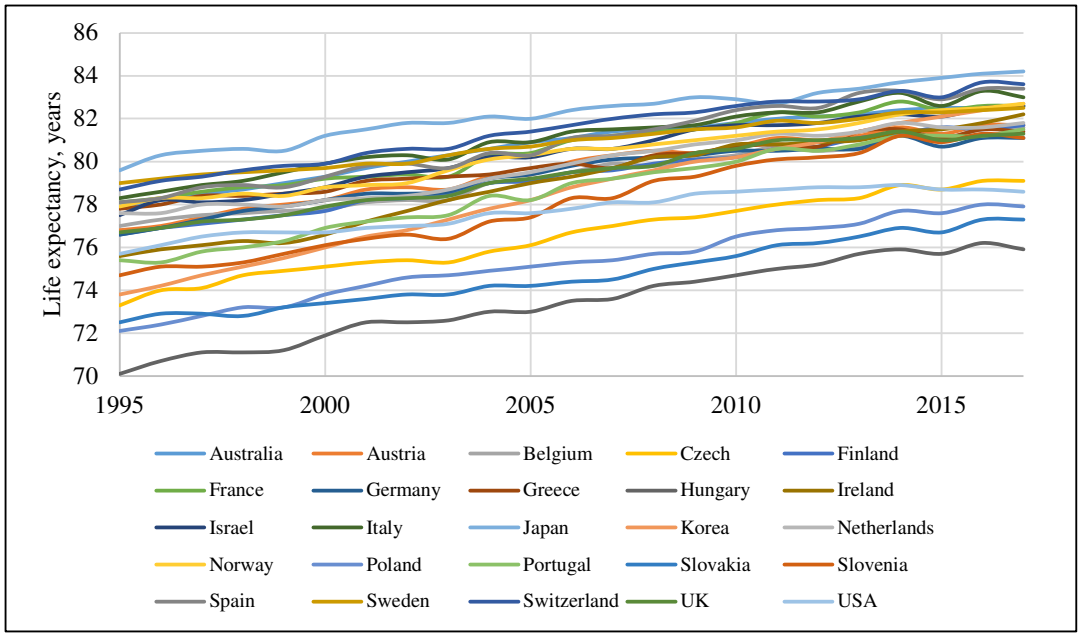

Figure 1: International dynamics of life expectancy at birth

Compiled by the researchers with the help of the Organization of Economic Cooperation and Development data

We calculated the Pearson product-moment correlation coefficient for each of the 250 data series (in this case each data series represents life expectancy at birth and spending by article in each country in 1995-2017) to analyze the interrelation between life expectancy and spending. We observed a strong relation between life expectancy and spending and the type of relation persists from country to country (Table 1).

Table 1: Examples of the strongest relation of the indicators under consideration (product-moment correlation coefficient)

Country /Spending	General state spending	Defense	National security	National economy	Environment	Housing and public utilities	Healthcare	Culture	Education	Social policies
Austria	-0,94	-0,90	-0,91	0,41	-0,54	-0,79	0,93	-0,80	-0,80	-0,27
Belgium	-0,93	-0,97	0,81	0,80	0,65	-0,22	0,94	0,80	0,73	0,78
France	-0,94	-0,81	0,81	0,25	0,96	0,72	0,92	0,90	-0,74	0,88
The Netherlands	-0,91	-0,91	0,92	-0,57	-0,27	-0,34	0,98	0,11	0,73	0,08

Calculated by the authors with the use of the Organization for Economic Development and Cooperation data

However, data averaging for the 25 states produced less typical results of relations due to a large number of multidirectional deviations (Table 2).

Table 2: Average values of linear correlation coefficients in general for the countries under consideration

Indicators	General state spending	Defense	National security	National economy	Environment	Housing and public utilities	Healthcare	Culture	Education	Social policies
Average values	-0,47	-0,54	0,19	-0,11	0,06	-0,37	0,68	0,11	-0,08	0,31

However, the data helps us to conclude that internationally the following spending has a relatively significant impact on life expectancy:

- General state spending (-), Defense (-);
- Housing and public utilities (-);
- Healthcare (+), Social policies (+).

At that, the negative contribution of general state spending, defense and housing and public utilities is not direct, but through redistribution, where this spending is reduced raising spending with a direct stimulating effect on life expectancy, which resulted in positive growth of the dependent factor. We also did vertical analysis of the 2017 interrelations in the countries, where the factorial feature was not the year of observation, but a country. We undertook to build an econometric multifactorial model, where spending on each of the directions under consideration were individual factors. We paid much attention to the removal of multicollinearity, which means ensuring independence of the factorial features. Hence, we discovered explicative variables, which are very closely related when considering pair correlation. These are the factors; whose r-value exceeds conditionally selected value of 0.8 (Fig. 2).

	Y	*X1*	*X2*	*X3*	*X4*	*X5*	*X6*	*X7*	*X8*	*X9*	*X10*	*X11*
Y	1,00											
X1	0,06	1,00										
X2	-0,13	0,67	1,00									
X3	0,00	0,00	-0,07	1,00								
X4	-0,65	-0,02	0,27	0,20	1,00							
X5	-0,35	0,58	0,35	-0,34	0,20	1,00						
X6	0,35	0,15	-0,06	-0,06	0,15	0,03	1,00					
X7	-0,14	0,26	-0,04	-0,26	-0,06	0,37	-0,01	1,00				
X8	0,00	0,41	-0,01	0,03	-0,23	0,14	0,06	0,38	1,00			
X9	-0,43	0,38	0,28	-0,03	0,25	0,65	-0,10	0,19	-0,17	1,00		
X10	0,01	0,34	0,10	0,47	-0,05	0,24	-0,36	-0,09	0,07	0,29	1,00	
X11	0,33	0,86	0,54	-0,25	-0,25	0,35	0,25	0,20	0,23	0,15	0,04	1,00

Figure 2: Multicollinearity removal in analysis of the correlation matrix

It is noteworthy that when considering the economic meaning of the model this value can be both increased and decreased and it was done in this analysis (Bykanova, 2017; Dorofeyev, 2018; Frumina, 2020). Hence, we removed several factors from the model. Besides, we analyzed coefficients for explicative values and compared them with the r-values (Babeshko, 2018).

As a result, we eliminated the factors with opposing values of the indicators (the mismatching of values here violates the economic meaning of the relationship). Later we also eliminated the factors, for which the actual (observed) Student's t-criterion was below the critical (table) level. The factors were chosen simultaneously with the analysis of the F-test for the mode. As a result, we discovered that national security, environment, healthcare, culture and education spending was most important:

$$Y = -4{,}16X_4 + 3{,}26X_6 - 0{,}36X_8 - 1{,}13X_9 + 0{,}58X_{10} + 86{,}80,$$

where Y – life expectancy at birth;

X_4 – national security spending;

X_6 – environmental spending;

X_8 – healthcare;

X_9 – culture;

X_{10} – education.

The negative coefficient of the national security is explained by the aforementioned redistribution, while the negative coefficients of healthcare, which from an economic point of view should have direct relation with the variable, may be explained by higher spending due to the problems arising in the spheres, which result in a negative deviation of life expectancy. Let's consider similar relations in Russia. We have partially regrouped spending to ensure homogeneity in the period under consideration despite significant changes in budget classification carried out in 2011. Similar measures were taken when building a model to eliminate multicollinearity of two criteria. Having removed statistically irrelevant factors, accounting for Student's t-test and provision of economic grounds we developed the following model:

$$Y = 2500{,}92X_6 - 1294{,}99X_8 - 65{,}21X_{10} + 69{,}52,$$

where Y – life expectancy at birth;

X_6 – environmental spending;

X_8 – culture, cinema and mass media spending;

X_{10} – social spending.

The same calculations with a year-long lag demonstrated that environmental and social spending as well as general state spending and debt servicing are the significant explanatory factors. Discovery of the same significant factorial features (excluding spending on culture, cinema and mass media in the first case and on general state needs and state debt servicing in the second, which are of a negative effect on the result due to the aforementioned effects of redistribution and financing on the back of widening social problems) points to a stable nature of relation between life expectancy at birth on the Russian Federation's consolidated budget environment and social spending. It is noteworthy that we

observed no significant relation between the factor under discussion and healthcare spending in both cases (Sigarev, 2018).

Discussion

Hence, our results can be used in project management of state financing. The choice of measures to attain the targets of state programmers or national projects should be done with the help of econometric research on the impact of budget spending on the indicators (Gryzunova, 2018; Kosov, 2019). When considering national projects' passports, we can observe that national project Demography, which aims at increasing expectancy of healthy life until 67, has no ecology reform measures (Smirnov, 2016).

At the same time state programmer Environment, on the contrary, includes measures to improve the ecological situation in the country (Bloshenko, 2017), but its passport has no life expectancy targets (Osipov, 2017; Umerova, 2018).

Conclusion

Hence, our research helps us make the following conclusions. The key international budget policy factors with a positive effect on life expectancy are state healthcare, social and education spending. But in Russia higher life expectancy can be ensured through greater environmental and social spending. At present, the government does not take into consideration the econometric models and the relations they analyze when planning programmer and target budget spending. The results should be used when compiling state programmers and national projects to ensure a targeted impact of the measures on the state economic policy targets.

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Information Technologies Development for Managerial Decision Support within Maritime Activities in Arctic

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Abstract

In article, we present results of information technologies development for managerial decision support within maritime activities in Arctic within environmental economics while climate change. While studies, we used methods of data bases constructing within digital platforms, web-technologies and virtual reality tools. We make statement that maritime activities in Arctic is to be carried out in the environmental economics paradigm as related set of large natural-industrial projects within common space area and time period. We present a block model that combines the investment objectives of such project set with cost of adequate managerial support, including natural risks management goals and tasks. We suggest to use geo-information distributed online platforms as the main technological tools in the tasks of managerial decision support within maritime activities in Arctic. Platform https://www.researchgate.net/profile/Valery_Abramov2/ was used for data exchange and preliminary discussion while study.

Keywords: Information Technologies, Maritime Activity, Arctic, Managerial Decision Support, Environmental Economics

Introduction

Last time, digital transformation, named Industry 4.0, extends in the global economy, during which a lot of enterprises plan to implement wide spectrum of information technologies (Baikov, 2019), (Bidenko, 2019), (Drabenko, 2019), (Grachev, 2017), (Frolova, 2019), (Lukyanov, 2019). This leads to serious information technological changes in managerial support within geo-information management (Kirsanov, 2014), especially in natural risk management (Berboushi, 2014), (Ershova, 2018), (Garcia, 2018), (Isaev, 2015), (Istomin, 2018), (Shilin, 2019).

In paper, we conceder the results of information technologies development for managerial decision support within maritime activities in Arctic, as part of geo-information management area (Burlov, 2018), (Fokicheva, 2016), (Fokicheva, 2015), (Istomin, 2015), (Kirsanov, 2014), (Lednova, 2014), (Malakhova, 2014) in large environmental projects (Mandryka, 2019), (Popov, 2014), (Popova, 2019), (Rumyantseva, 2017), (Zhigulsky, 2018) within environmental economics (Chusov, 2019), (Golosovskaya, 2014), (Karlin, 2014), (Karlin, 2009), (Popov, 2016). Significant attention should be paid to geo-information support of natural risk management (Fokicheva, 2018) in the context of climate change (Mikheev, 2019), (Bournashov, 2014), (Gogoberidze, 2014), including the issues of information collection and processing (Fokicheva, 2019), (Khaimina, 2014), (Popova, 2019).

Methods and data

In study, we used: methods of data bases constructing in case of digital online platforms, web-technologies, big data technologies (Novikov, 2019), (Sokolov, 2019), geo-information technologies (Veretennikov, 2019), (Yaily, 2019) and virtual reality tools. Also, we used Foresight technologies, theory of decision making under uncertainties (Palkin, 2019), risk management approach for maritime activity. From the point of view of geo-information management, we structured geo-space to allocate the interconnected components of the solution space (Istomin, 2015).

Results

Currently, maritime activity in the Arctic (MAA) is a hot spot in the global environmental economy, and there are many ways to approach this problem. From the point of view of geo-information management (GIM), we put forward a statement, that MAA in recent stage is to be carried out in the environmental economics paradigm as related set of large natural-industrial projects (NIPs) within common space area and time period.

In figure1, we present a block model of investment structure while MAA, that combines the investment objectives of such NIPs (blocks 1-5) with cost of adequate managerial support (blocks 6-8), including natural risks management goals and tasks (block 7). Our analysis shows that the largest part of the cost of managerial support is the environmental monitoring (block 8), the essence of which is determined by the content of block 7. Significant part of the cost in block 8 is hardware and software, the cost of which varies significantly.

On basement of above mentioned model, we proposed to develop the managerial support system (MSS) with combined structure for access, storage and analysis of information from open geo-spatial data sources, including archives and operative mode web tools. As a result of the research performed using foresight technologies, we suggest to use geo-information distributed online platforms (GIDOP) as the main technological solutions for MSS while MAA. We give preference to open platforms like Google Earth. Also, we recommend to use GIDOP EOS eos.com, which allows to operate with space images from the Landsat-8 and Sentinel-2 satellite systems with limited open access.

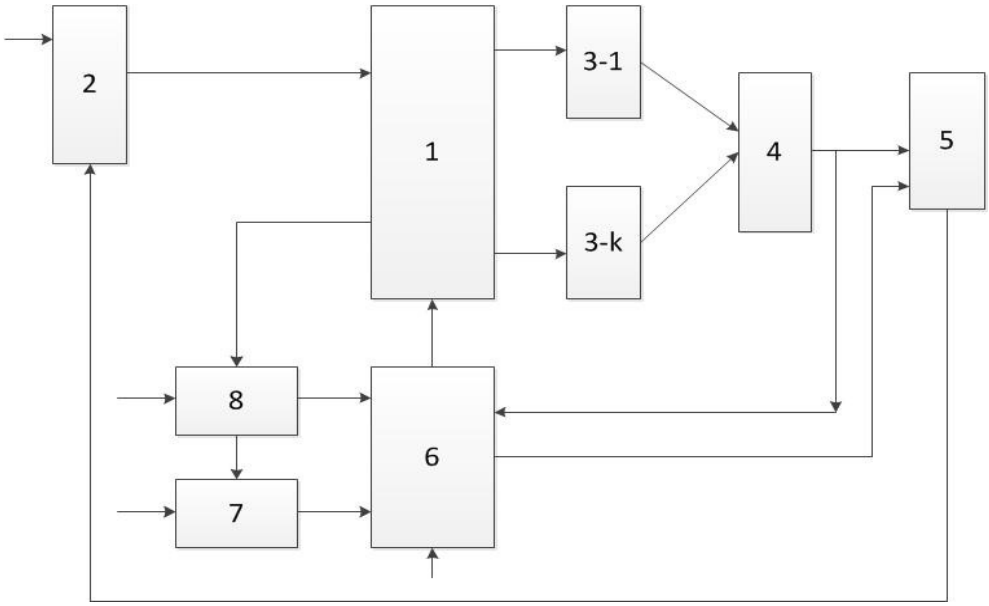

Figure 1 : Block model for investment structure while MAA: 1 – block of distribution of resources; 2 – block of formation of resources; 3 - block of formation of private income; 4 - block of formation of total income; 5 – block of formation of the investment share of resources; 6 - block of comparison with the permissible level of risk; 7-block of formation changing in time set of natural risks, including climate risks; 8 – block of environmental monitoring

In our research, essential was block of environmental monitoring while MAA.

An important direction of MAA development is the usage of the Arctic sea space as a transport corridor between the main cargo ports of Europe and South-East Asia (SEA). One of possible way to solve problem is to use Northern Sea Route (NSR). Reducing the cost of MSS is an important question for MAA within NSR area. We propose to use GIDOP EOS eos.com as basement for low-cost MSS while MAA within NSR area. In figure 2, we post image space of Kara Gate Striate area for 28/02/2020, which we took from GIDOP EOS eos.com in agriculture color combination.

Note, Kara Gate Striate is one of critically important point of NSR, which have to be monitored constantly. GIDOP EOS allows to solve this problem. In figure 3, we present a space image of the Kara Gate Strait area for 27/03/2020 from GIDOP EOS with the natural color combination. Obviously, agriculture color combination gives more detailed information about the state of the ice cover and allows to distinguish between snow, ice and clouds.

Recently, there is intensive maritime infrastructure development in NSR area, including port Sabetta for liquid natural gas (LNG) loading. In figure 4, we present a space image of port Sabetta area on 29/03/2020 from GIDOP EOS with agriculture color combination. Reddish colors in centrum highlight the areas of artificial structures.

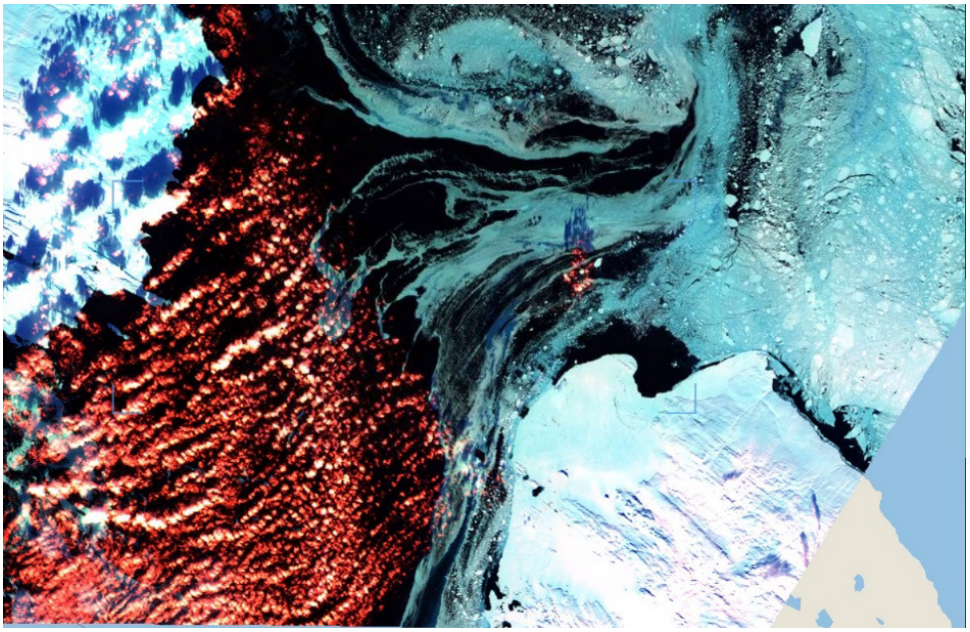

Figure 2: Space image of Kara Gate Strait area on 28/02/2020 with agriculture color combination

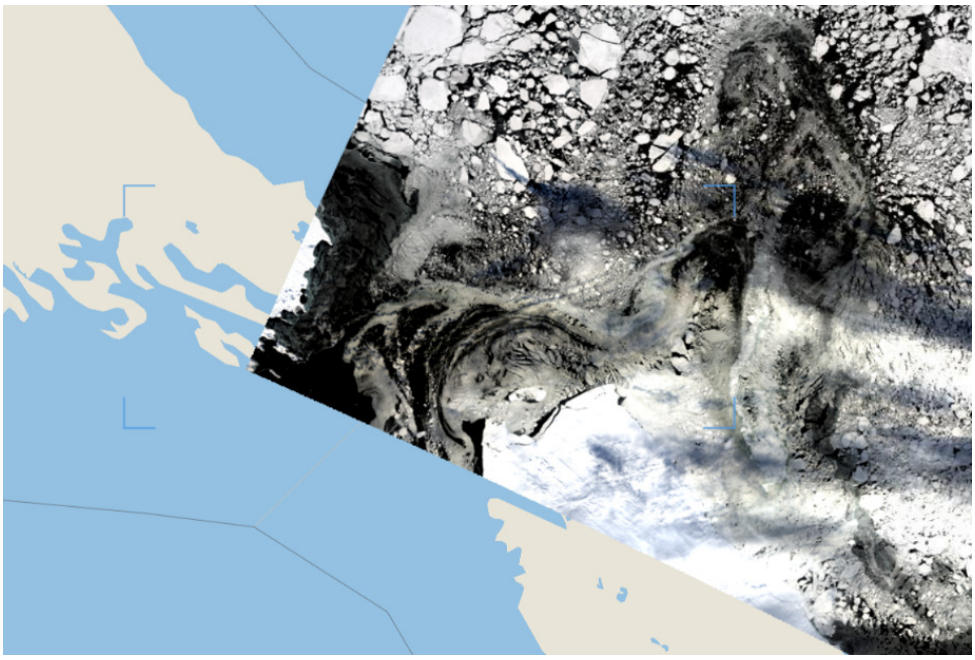

Figure 3: Space image of Kara Gate Strait area 27/03/2020 with natural color combination

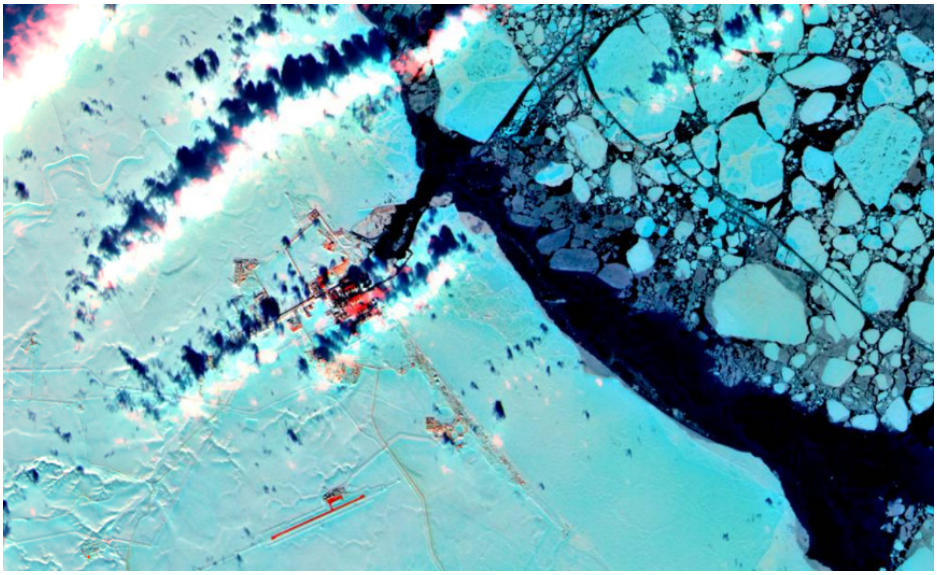

Figure 4: Space image of Port Sabetta on 29/03/2020 with agriculture color combination

As essential result, we propose to use GIDOP EOS eos.com as basement for low-cost MSS while MAA.

Discussion

We propose to use GIDOP EOS for long-period ecological monitoring for important maritime infrastructure area. For example, in figures 5 and 6, we post space images of Neva dumb from GIDOP EOS for 02/05/17 and 02/05/17 with roughly two years' gap. In those figures, we used agriculture combination.

Figure 5 : Space image of Neva dumb on 02/05/17 with agriculture color combination

Figure 6: Space image of Neva dumb on 07/04/19 with agriculture color combination

As basement for low-cost MSS while MAA, GIDOP EOS can be used in educational and training purposes. The essential task of university practical learning (UPL) in the field of MAA is to teach students the practical aspects of work with GIDOP EOS tools, which requires a developed learning base within special geo-information systems (GIS) laboratory. In some cases, real practical work in special GIS laboratory can be undergoes with virtual reality (VR) technologies (Popov, 2019), that can reduce total cost of learning process. The presented in the article results of the research have a significant scientific novelty and can be used in the preparation of master's programs in environmental economics.

Conclusion

In the article, we consider results of information technologies development for managerial decision support within maritime activities in Arctic within environmental economics while climate change. While studies, we used methods of data bases constructing within digital platforms, web-technologies and virtual reality tools. We make statement that maritime activities in Arctic is to be carried out in the environmental economics paradigm as related set of large natural-industrial projects within common space area and time period. We present a block model that combines the investment objectives of such project set with cost of adequate managerial support, including natural risks management goals and tasks. We suggest to use geo-information distributed online platforms as the main technological tools in the tasks of managerial decision support within maritime activities in Arctic. We show that satellite images from the databases of Sentinel-2, Landsat-7, Landsat-8 systems can be used while MAA. The presented in the article results of the research have a significant scientific novelty and can be used in can be used in educational and training purposes, including the preparation of master's programs in environmental economics.

Acknowledgment

Associate professor Nikolay Popov, head of geo-information systems laboratory in Arctic and Subarctic Institute at the Russian State Hydrometeorological University, gave us very useful consulting while study. The platform https://www.researchgate.net/profile/Valery_Abramov2/ gave us excellent opportunities for preliminary discussion and data exchange while this research.

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How to Understand, Formulate and Take Decisions when Managing Wicked Problems

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Abstract

The unpredictability and variability of socio-economic processes resulting from the nature of the world makes it necessary to constantly solve problems. Some of them qualify as wicked problems. Although these problems cannot be completely resolved (at least with the current level of science and knowledge), they require proper reactions and managing. This article analyses the essence of wicked problems and the criteria for their qualification. Key areas in the management of wicked problems are indicated, and a research mode for approaching decision making regarding this group of problems is proposed.

Keywords: Wicked Problems, Decision-Making Process, Black Swan

Introduction

The term *wicked problem* was introduced into research literature at the same time by Simon (1973) and Rittel and Webber (1973). In the article *The Structure of ill structured problems*, Simon (1973) categorised problems into "well-structed" problems and "ill-structed" problems, i.e. those badly, improperly formulated, having a chronic nature (*like an illness*). Regardless of Simon's research, at the same time Rittel and Webber (1973) published an article entitled *Dilemmas in general planning theory*, in which they searched for scientific foundations to confront the problems of social policy planning. They concluded that it was not possible to find these foundations due to the nature of social problems. They identified these problems for the first time in the literature as "wicked problems." They used the term "wicked" to relate to pernicious, harmful, deceitful, aggressive and also when referring to *vicious circle*. In addition, they stated that science can only cope with "tame problems," or "regular" problems, in which the cause of their formation can be clearly defined and a systemic approach (such as those used by engineers), can be used to provide a final solution. It consists of successive stages: understanding the problem, gathering information, analysing, synthesising information and waiting for the so-called *creative leap* and working out a solution.

Wicked problems are those problems that are extremely complex and multidimensional. The system operation described above does not work when trying to solve them. They cannot be described definitively. *Wicked problems* are of a social nature. For example, Rittel and Webber (1973) pointed out that in a pluralistic society there is no such thing as an undisputed public good, there is no objective definition of equity and policies that respond to social problems cannot be significantly correct or false. According to their concept, there is no point in talking about optimal solutions to social problems, unless strict criteria for assessing their solutions are set first. They believe that in the case of social problems there are no solutions in the sense of definitive and objective answers (Rittel and Webber, 1973). They emphasised that this is not a special category of problems that are more complex than others, but "wicked problems" are problems that require a different approach when it comes to solving them.

A very interesting approach to wicked problems was presented by Coyne (2005) in his article entitled *Wicked problems revisited*. He reviewed the original article by Rittel and Webber and applied it to more current theories about rationality and professionalism. As a result of these analyses, he came to

the conclusion that "wickedness,, is not abnormal. According to Coyne, professionalism that pays homage to formal principles, setting goals and norms of rationality is a "deviation."

Over three decades after Rittel and Weber, Lucky (2009) indicated that some problems have such complex social, economic or organisational interactions that they cannot be fully solved. Despite the rapid development of science and technological revolution, the issue of a "wicked problem" still remains valid.

Definition and criteria for qualifying problems as „wicked"

According to Collins Thesaurus of the English Language (2002), "wicked" means: vile, evil, despicable, mean, indecent, disgraceful, shameful, sinful, godless, bad, nasty, malicious, terrible, unbearable, hideous, mischievous, malicious, threatening. There are, therefore, several synonyms for the word "wicked". In Polish literature on the subject, the concept is related to problems that are complicated, terrible, pathological, chronic or despicable. The genesis of this concept and a few contemporary definitions of "wicked problems" are worth analysing to explain what their essence is.

Wicked problems are a class of problems characterised by enormous complexity and high uncertainty. These aspects make them resistant to resolution through a traditional problem-solving process. *Wicked problems* are inherently difficult to define and divide into individual elements, because they are the result of multiple and inextricably entangled (intricate, complicated) causes. In addition, they affect multiple stakeholders whose priorities and goals may differ. Moreover, the perception of the nature of the problem is influenced by the possible solutions considered (Camillus, 2018).

Rittel and Webber formulated ten criteria to verify whether a given problem is a wicked problem. It is not a question of automatically qualifying a problem as wicked, but of insight into its essence, which will help to determine what kind of a problem is dealt with. The criteria, which can also be considered as typical properties of wicked problems, are:

1. The term "wicked problem" cannot be clearly defined.
2. Wicked problems can never be completely solved.
3. Solutions to wicked problems cannot be classified as true/false or good/bad.
4. Wicked problems do not have immediate or definitive solution tests.
5. Each wicked problem solution is a one-time operation.
6. Wicked problems do not have a quantifiable number of potential solutions;
7. Each wicked problem is unique.
8. Each wicked problem can be considered a symptom of a different problem.
9. Existing discrepancies that characterise a wicked problem can be explained in many ways.
10. "The planner has no right to be mistaken."

In their considerations, Rittel and Webber (1973) came to the conclusion that the first fundamental challenge is to formulate the problem. The phrase „wicked problem" is in itself a problem, there will always be some doubts and possibilities to rephrase it. While finding a problem would often mean finding a solution to it, however the problem cannot be defined until a solution is found. The difficulty is to know "what" differs the observed conditions from the desired conditions. Moreover, it is difficult to locate the problem, to find "where" in complex networks of connections the "problem" actually lies. Determining "how" to act, which could effectively narrow the gap between "what is" and "what should be", is equally difficult. A solution exists only in relation to established criteria; if the criteria for assessing the extent to which the problem is solved are changed, it may be that the problem is still unresolved.

Wicked problems are chronic problems with a long history, their nature changes but they are never completely solved. The assessment of the degree of their resolution depends on the adopted criteria, stakeholder value systems, ideological beliefs, considered time and space scale.

Every solution to wicked problems is a one-time operation, because every solution to wicked problems

leaves a trace, every attempt counts, because there is no opportunity to learn by "trial and error". Each action has certain and unknown consequences. When deciding on a solution, it is practically impossible to predict all the consequences. Attempts to solve wicked problems always change the reality. Moreover, not taking any action is also a decision and has consequences. This can lead to chaos, confusion. Therefore, on the one hand there is no opportunity to solve wicked problems, and on the other hand they should not be left unmanaged.

Wicked problems do not have a quantifiable number of potential solutions; there are no criteria to prove that all solutions to wicked problems have been identified and considered. Each wicked problem is unique and can be considered a symptom of another problem. Existing discrepancies that characterise a wicked problem can be explained in many ways. The choice of the explanation determines the nature of the solution.

"The planner has no right to be mistaken", no solution to the problem can be tested beforehand, knowledge is gained only during the implementation of the proposed solutions and their consequences (e.g. a motorway cannot be built for trial purposes, only during its use all the aspects of its functioning can be tested). It is also worth adding that given the megatrends such as globalisation, dematerialisation of production and democratisation of societies of the late 20th century and their continuation into the first twenty years of the 21st century, both the configuration of facts and the configuration of values must be taken into account in the approach to chronic problems. To deal with *wicked problems* it is essential to learn from stakeholders and the many groups with important "local knowledge". This means taking social participation into account in the planning process and solving social problems, the dialogue between policy makers and their audience plays a special role here (Paquet 1999).

Camillus (2018) points out that environmental degradation, terrorism and poverty are classic examples of wicked problems. They stand in contrast to difficult but ordinary problems which people can completely solve at a certain time using standard operating techniques. Moreover, the conventional process of action in the case of wicked problems can exacerbate the situation by generating undesirable consequences. The greatest difficulty is determining the current condition of the organisation and the desired conditions.

Wicked problems always have a social context. In the case of an organisation, wicked problems can occur when it is facing constant changes and unprecedented challenges. The greater the disagreement between the shareholders in the company, the more the problem can be described as wicked. Not all problems are wicked; however, confusion, strife, and lack of progress may indicate the threat of a chronic problem (Camillus, 2018).

Wicked problems are a class of chronic social problems. There are significant difficulties in determining the source of their occurrence. Rather, there is the interdependence and interpenetration of the causes of these problems, which come from many complex systems. It should be emphasised that they do not show any tendency to stabilise, but without corrective actions they plunge into chaos.

Key Areas in Managing Wicked Problems

Given the entire complexity of social problems considered to be chronic and unsolvable today, there is a growing call for an approach aimed at 'good governance' rather than solving them quickly. It is more about dealing with the problem, "addressing" it, and taking into account all its complex nature and different value systems of stakeholders. It is by no means a matter of dividing the "wicked" problem into smaller projects, as this will not result in a progress (Head, 2019). The answer may be actions aimed at seeking innovative, previously unknown solutions. What is needed here is creative thinking and integrated management, sometimes a reversal of the value hierarchy, and organisational changes in the system of shaping development policy. An important role is also played by such elements as: a new formulation (design) of the problem, study of *policy design studies*, capacity building of urban management policies and implementation context.

Problem design is a way of choosing, organising, interpreting and giving meaning to a complex reality

in order to provide signposts for knowledge, analysis, conviction and action. It is a particularly important stage of proceeding, because the way of defining a problem is very often imposes the type of solution. For example, poverty is already a chronic social problem that has served as an example many times. If it is perceived as a problem the source of which lies in the individual: in the deficit of their personal skills and motivation, then the proposed solutions will be oriented towards encouraging individual people to improve their skills and work efficiency. On the other hand, if we consider that poverty results from the social structure generated by the economic system and the market, the solution will be to seek better social security, employment programmes and income security. In fact, the best approach would be to work out a new, previously non-existent solution, assuming that to some extent socio-economic disparities are a natural feature of the modern world.

As indicated above, the fundamental challenge is the correct formulation of the problem. Difficulties result both from an in-depth diagnosis of the current situation and the establishment of the desired conditions which are being pursued. For example, in urban policy, which is a particular type of social policy in the context of planning the development of urbanised areas, a particular difficulty in determining the desired final effect can be observed. However, in the context of strategic planning, five features can be distinguished, which can be adapted to the planning of chronic urban problems:

1. Problems of strategic importance are influenced by many diverse groups of urban actors, who may have different objectives and value systems. The most populated group of city stakeholders are residents. However, city authorities do not always prioritize their interests in urban policy. This can be reflected in conflicts of interest resulting from gentrification.
2. Urban problems usually result from a number of reasons that are strongly linked. It is also difficult to unambiguously separate what the source of the problems is and what its consequences are, the dependencies are inseparably intertwined and multi-directional.
3. A chronic urban problem should be treated as a new problem every time. For this reason, the thoughtless use of previous solutions, patterns and even so-called good practices may not improve the situation. At the same time, it may generate time losses and unnecessary costs (e.g. hasty implementation of “off the point” projects). There is no single recipe for solving a problem. Therefore, it is necessary to diagnose chronic problems every time and use unconventional methods when solving them.
4. In the classical approach, city management can be understood as rational, effective and economically efficient coordination of various activities in the multi-level and multi-criteria structure of urban reality (Maciejewski, Redzik 2012). Whereas integrated city management means creating a new model of spatial organisation, ecological integration and functional integration of the city.
5. In response to the need of managing wicked problems, an approach based on inclusive growth, integrated city management and the combination of smart city multilevel governance is proposed.

Where is the error in the approach to wicked problems?

There is a number of possible causes and scenarios. In the context of managing wicked problems, attention should be paid to the decision-making process, because decision-making errors are costly (Milkman, Chugh and Bazerman, 2009). It is believed that the most significant errors in the management of wicked problems are generated at the very beginning of this decision-making process regarding managing the problem.

There are many different decision-making theoretical approaches in the literature, some of them are regarded as classical (Slovic, Fischhoff and Lichtenstein, 1977, Kahneman and Lovallo, 1993, Bazerman and Moore, 2009). But there is still need to improve the decision-making process (Milkman, Chugh and Bazerman, 2009). According to the approach proposed by Motyl (2015), in his book *Labyrinth. The art of decision making*, decisions are made in three modes: routine, confirmatory mode and research mode. In the table below each of these approaches is characterised (tab. 1).

Table 1: Decision making

Routine	Confirmation mode	Test mode
– unconscious, automated decisions – decisions undertaken on the basis of well-learned and repeatedly used mechanisms, there are applied to situation that occur often	– deliberate decisions – based on rational considerations	– decision making requires the analysis of all available data; – the problem should be looked at from every possible angle, involvement of people with different views is needed

Source: own study based on Motyl, P. (2015), Labyrinth. The art of decision making, ICAN.

Routine decisions are repetitive actions, taking place under conditions of certainty, that is, when we know exactly what the effect of the action will be. They can be also called as *programmed decisions* (Obi, 2018). The main advantage of routine decisions is the time and energy saved by our brains. This helps to develop the desired habits. For example, these decisions concern everyday activities (drinking coffee, driving a car, etc.).

If we encounter any problem, new unknown circumstances appear, and decisions are made in a confirmatory mode or *advocacy procedure* (Greitemeyer, Schulz-Hardt, Brodbeck and Frey 2006). In this mode, in the decision-making process we rely on our experience, knowledge and perception of the situation, which suggests the right solution. We look for so-called "hooking point", and then we look for data confirming that it is a good solution, and once we get it, the decision is made and implemented. There are some advantages to making decisions in this way. These are:

1. It works in a situation in which the so-called classic risk management is involved, i.e. when we know what the consequences of decisions taken will be and with what probability they may occur.
2. In this mode, decision-makers and teams act quickly and efficiently, searching for the key information for their decision.
3. This decision-making mode saves time – one of the most valuable resources in the organisation.

There are also some disadvantages of such an approach, the most frequent of which are:

1. Too superficial and insufficient analysis of data, i.e. available information. This disadvantage often occurs when acting "under time pressure".
2. In some cases, information may even be filtered out in such a way as not to prolong the decision-making process (e.g. not to prolong discussions at a meeting, to obtain confirmation of the correctness of the decision made).

This type of decision making under new circumstances not previously known usually leads to a significant decision error. In particular, one should be careful not act as in "black swan" case. In 2008, Nassim N. Taleb published a book titled *Black Swan: The Impact of the Highly Improbable*, in which he described the case of researchers who persistently created elaborate scientific studies proving why swans can only be white. One can imagine what a huge surprise and shock the discovery of a swan that was black was for those scientists. The black swan is an unpredictable event that goes beyond what is usually expected and has potentially serious consequences. Black swan events are characterised by their unusual rarity, strong impact and widespread persistence, which was visible in retrospect.

Therefore, when dealing with a situation that is a black swan, one should enter into research mode, especially it can be used the design thinking method (Buchanan, 1992). What the decision-maker's intuition and previous experiences suggest may be a mistake. Decision making requires analysis of all available data. One needs to look at the problem from every possible angle, involving people with different views. Decisions should be made by creating teams that are composed of people with different functions and different types of experience. The more diverse the team is, the deeper, more multi-faceted decisions are.

The disadvantage of this approach is that it takes a lot of time to act in this mode. However, its important advantage is that it allows to make decisions that are closest to the optimum, based on complete data analysis and evaluation of different scenarios.

It is considered that the implementation of the research mode in practice, with regard to wicked problems, should bring the best results. However, there are some risks that undermine the quality of the method. These include two aspects. First, the collection and incorporation of information necessary to make decisions. Second, the limitations resulting from the attitude of the decision-maker (one person or a whole group of rulers). Moreover, the two aspects are often inseparable.

In the first case, the success of management of wicked problems is largely determined by the first stage of data collection and analysis. The question arises: what information should be collected and analysed, and which can be omitted and considered irrelevant. It turns out that the selection of data determines the whole analysis process. In addition, there is a psychological phenomenon of omitting (consciously or unconsciously) the information that is inconvenient for the decision-maker, as it is considered "insignificant". Unfortunately, ignoring this information often results in a failure to manage problems that are then easier to be qualified as unsolvable.

The more various constraints on the decision-maker, the greater the probability of failure. These constraints may be related to factors such as: time pressure, limited financial or other necessary resources, lack of courage to go beyond confirmation or routine. In addition, there is a phenomenon known as 'decision-maker narcissism' – the decision-makers become attached to the first decision and instead of entering the obligatory research mode they only seek confirmation that "their" decision is correct.

Therefore, special attention should be paid to whether the research mode is used in the approach to wicked problems, whether the first phase of data collection and analysis is carried out with due diligence, moreover, it should be a continuous process. In the open date era, there are almost unlimited possibilities for such analyses.

An interesting, although controversial example may be the way the Chinese have approached the elimination of COVID-19 coronavirus infection. According to Polish Press Agency (2020), the Chinese media indicate that thanks to the use of information-gathering technologies, the fight against the coronavirus has been managed. The scope of such automated activities as: automated body temperature measurement devices, robots that help doctors with some duties, helmets that detect people with fever and artificial intelligence systems that help in medical diagnostics or analysis of epidemiological data, applications for mobile phones were also developed to check if an individual was not taking a train or flying with someone with a confirmed infection. Interactive city plans are also available, showing where the diagnosed patients lived. Hangzhou was also the first city to introduce the so-called health code in Alipay, a popular mobile payment application. The system assigns users with a code – green, yellow or red – which indicates whether and for how long they should be isolated from society, or if they can, for example, use the subway and enter shopping malls.

Summary

The above considerations lead to the following conclusions:

1. The English phrase *wicked problems* is translated into Polish in several ways. There are at least several equivalents of the word "wicked" in the Polish dictionary. In Polish literature the most popular translations are those that describe wicked problems as problems that are vile or intricate.
2. However, taking into account not only Webber and Rittel's but also Simon's original approach, it is worthwhile to propose, besides the above Polish translations, some chronic problems, which reflect the essence of wicked problems well.
3. Chronic problems are those that cannot be solved in the long run. They consist of many factors that derive from different areas. Among them the most important are: social, scientific and methodological areas.

4. Characterising the first social area, it should be stressed that they concern individuals, social groups or entire societies. Depending on the number of people affected, they have a local, national, international or global reach.
5. Characteristics of chronic problems resulting from the social area are the existence of many stakeholders, either overt or hidden. This is one of the main reasons why chronic problems cannot be solved. The people (stakeholders) affected often have different value systems, may come from different cultures, define success in different ways, and therefore may have divergent goals. How chronic problems are managed is often determined by the economic and political power of the stakeholders, or by the quantitative power of the people involved (e.g. due to the climate strikes in many European cities, the problem could not go unnoticed by municipal and national authorities).
6. The second important area of chronic problems is the scientific area. Depending on the level of development of science and knowledge, as well as the availability of information, opportunities or barriers related to managing chronic problems exist or are being removed. In this area it is also important to select the right people to manage the problem taking into account the key disciplines of science, and to deepen cooperation between them.
7. The last, third area concerns the methodology of chronic problem management. Creative methods such as design thinking or mind mapping are needed to manage chronic problems. On the one hand, it is worth using structured methods to manage them. On the other hand, however, chronic problems require constant search for new methods, innovative, unconventional approaches, and the constant improvement of applied methods.
8. It is not possible to find a complete solution to chronic problems, because by definition, it is impossible to do so. What is more important is managing them. In the approach to chronic problems, continuous activity is needed, consisting in monitoring the problem: its intensity, proposing selected solutions (the most important aspects in the opinion of managers) and implementing them. Then, the chronic problem should be re-evaluated, key aspects for preparing solution in a new situation should be found, implemented, etc. This is a continuous and ongoing process, as is the process of social and economic development.
9. The art of managing chronic problems is based on skilfully formulating them. Many times activities are carried out "in the dark", because it is not fully known what is the cause and effect of an unwanted situation. It turns out that the most difficult part of the process, is to correctly identify the problem and name it (and often it is not entirely possible).
10. Wicked problem management errors can result from many factors. One of the key factors is the process of selection and analysis of information, as well as limitations resulting from the conscious (or unconscious) omission of the key information – treated as petty or uncomfortable – and other limitations resulting from the attitude of the decision maker. Decisions relating to the management of wicked problems should be made in a research mode.

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Hackathons as a Public-Private Collaboration Platform

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Abstract

The article is an analysis of hackathons as a new trend in the field of cooperation between public authorities and private entities. These are events initiated by the government to solve significant problems for society. As statistics show, hackathons are a rather unpopular instrument for implementing public policy. The purpose of the paper is to identify the mechanism of creating new public solutions through public-private partnership in the form of hackathons. The growing role of ICT in social and economic life creates new opportunities to use open data and applications to solve social problems. New ideas and solutions created during civic hackathons are not the only benefits of this form of cooperation between government and non-governmental actors. Other benefits include increasing the transparency of public activities, improving the democratisation of the government as well as meeting social needs more accurately and building trust between partners.

Keywords: Civic Hackathons, Public-Private Collaboration, Open Data, Public Policy

Introduction

The public sector has been evolving for several decades from a bureaucratic model of governance towards a broad cooperation of many stakeholders. It is reflected in such management models as New Public Management, Government 3.0. In the process of co-creating public services, the authorities are looking for new opportunities to engage private entities (citizens, enterprises) in new roles that they could have when cooperating. It means a transformation towards more inclusive, open innovation governance structures (Jäske and Ertiö, 2019, p. 23). Implementing policies under the open system has significant consequences. On the one hand, it means that public agencies are ready for external influences, including critical ones in the form of opposite views. On the other hand, however, it causes the government starts to intensively cooperate with its environment and thus strengthens the problem-solving capacity. This capacity can be used to develop and implement new public solutions. Numerous examples of cooperation confirm the growing position and role of non-governmental actors in public policy. It is emphasised that society is perceived as competent and capable of pursuing its interests and co-creating public services. Building a new type of civic engagement through conscious and active participation is able to initiate the hidden wealth of society (Torfing, 2016, p. 136).

In recent years, civic hackathons have been an increasingly popular way to solve development problems using open data related to citizens' lives. These events are organised by the government for programmers, enterprises and hacker environments in order to generate benefits for the public and private parties (Sieber and Johnson, 2015). Research and analyses included in the literature mostly focus on the outcomes of social solutions, and thus, describe what they are and what new products and initiatives they cover. Very little attention is paid to the two most essential aspects that allow their understanding: the processes of their formation and the organisations that create them (Borzaga and Bodini, 2012, p. 416).

The article aims to identify the mechanism of creating new public solutions through hackathons. The article focuses on civic hackathons using open data as an effective public-private collaboration platform intended to solve social problems.

The article uses two research methods. The first one is literature studies to determine the essence of the collaborative governance process. Theoretical analysis was also used to identify the hackathon idea as a platform for cooperation between public and private entities to solve social problems. The second research method used is case studies, which were used to examine hackathons from several cities around the world. They were considered in terms of mechanisms for solving public challenges and effects. The analyses conducted made it possible to draw some conclusions.

The article is composed of three parts. After the introduction, the essence of the collaborative governance process was presented. This process is based on open policy and civic participation to meet social needs better and improve the quality of life of citizens. In the next part, the essence, features and types of hackathons were analysed. Particular emphasis was laid on hackathons initiated by public authorities with the involvement of private partners that bring specific benefits to all stakeholders. The last part of the article is a collection of case studies presenting the experience of public authorities in the organisation of hackathons from various parts of the world (New York, Dublin, Taipei). Detailed public solutions resulting from individual collaborative actions were also presented.

Involvement Of Non-Governmental Actors In Public Policy Implementation

Social participation is a significant element of many socio-economic development concepts. For many years, it has been postulated, also in public policy, to include residents, enterprises, non-profit organisations both in planning works focused on socio-economic development and the entire public management process. According to A. Sen, people must be actively involved to shape their destiny, and not just be passive recipients of the effects of implemented development programs (Sen, 1999, p. 53). Therefore, it is crucial to create institutional and organisational foundations for the resident's participation in the exercise of power. Social inclusion consists in removing institutional barriers and strengthening incentives to increase the access of the whole society to development opportunities (Ali and Son, 2007, p. 2). A unique role is played by authorities, which should create the proper conditions and take initiative to ensure that society adopts an active attitude and takes responsibility for development in a given area. In this way, public authorities at the central or regional and local level can pay more attention to the quality of residents' life in terms of living conditions, access to health and educational services, security level, *etc*. The participation of a broad group of stakeholders favours connecting public policy with real social needs. In this way, the inclusive government makes its policy more effective and public services more user friendly and user-driven. Thus, inclusiveness becomes a key dimension of effectiveness (OECD, 2015, p. 26). Openness to citizens is noticeable in the shape of public policy.

The new public management models such as New Public Management, Government 3.0 are based on the collaborative governance process. This term refers to agreements in which public agencies engage non-state stakeholders in a collective decision-making process that is formalised, consensus-oriented and oriented towards the implementation of public policy or managing public programs or assets (Ansell and Gash, 2007, p. 543). Therefore, these are the public policy implementation processes that take place in the formula of public-private collaboration. Cooperation processes in such a system should be characterised by appropriate dynamics characterised by the following three key elements (Emerson *et al.*, 2011, pp. 10-17):

- principled engagement (discovery, definition, deliberation, determination);
- shared motivation (trust, mutual understanding, legitimacy);
- capacity for joint action (procedural and institutional arrangements, leadership, knowledge, resources).

Collaborative governance can be treated as a platform in the form of organisations or programs with dedicated competences and resources for facilitating the creation, adaptation and success of multiple or ongoing collaborative projects or networks (Ansell and Gash, 2018, pp. 16, 29). It facilitates multilateral relations between officials, entrepreneurs, citizens, NGOs, business support institutions, *etc*. It also provides a stable organisational framework on which both short-term and more specialised projects can be implemented. One problem may be the fact that the effectiveness of such a network depends on trust between its members (Keast *et al*., 2004, p. 365). It turns out that in political activities, building such relationships can be difficult. Therefore, to overcome this limitation, it is necessary to understand that the individual goals of each network members cannot always be achieved, since all activities are interdependent.

The cooperation may take place at various levels of public authority. There are also many views that collaborative governance is a local process that coordinates resources, expertise and energy of a wide range of actors. The effectiveness of this process is based on the possibility of cooperation in usually difficult circumstances in the region, namely: conflict of interest, mutual dependence, dispersion of power (Rich and Stoker, 2014, pp. 41-42). It is emphasised that divergent interests bring regional partners to some extent, who make an effort to implement common goals (Torfing *et al.,* 2012, p. 2). Therefore, as part of collaborative governance, there is interaction through 'conflict-ridden negotiations that take place within an institutionalised framework of rules, norms, shared knowledge and social imaginaries' (Sørensen and Torfing, 2009, p. 236). A correctly implemented collaborative approach allows public goals to be achieved more effectively than the government can on its own. Moreover, it can be a powerful lever for creating public value (Donahue and Zeckhauser, 2011, p. 4). Unfortunately, this approach is often mistaken for conventional contracting or charity, or public-private partnership.

Due to cooperation, private and public entities jointly strive to implement development programs for a given spatial unit. These programs do not rely on the direct delivery of goods and services but are orientated towards achieving specific benefits. An additional profit is that the involvement of the local community helps in creative problem-solving thanks to the knowledge of its members. This way, it is possible to avoid more professionalised views of public problems and possible solutions.

Hackathons – the idea and benefits

Hackathon is a combination of 'hack' and 'marathon'. Sometimes terms such as 'hackfest' (from the words: 'hack' and 'festival'), 'hackday' (if it lasts one day), 'code camp' or 'jam' are used (Komssi *et al*., 2015, pp. 60, 62). Hackathons are limited in time meetings of programmers, interface designers, graphic designers, entities interested in software development as well as citizens and organisations focused on creating new solutions. The effect of these events can be software applications that meet the expectations set by sponsors (Almirall *et al*., 2014, p. 393). Even though the organisation of hackathons can differ significantly from each other, there can be found some common attributes (Rosell *et al.,* 2014, pp. 1-2):

- focused intensity - these events are limited in time and space. They usually last 1-3 days and are located in one building. It allows participants to focus on specific problems to be solved;
- novelty - through contact with new technology, participants can feel the excitement that will trigger their commitment to new solutions;
- collaborative - teamwork is the key to success here. Each team develops its own work organisation, which is based on an exchange of ideas;
- incentive-based - every hackathon has its own set of rules and rewards. The catalogue of incentives is very wide – it ranges from financial rewards to the opportunity to interact with interesting people, learn from others. In fact, the most substantial incentive to participate is to create something new. In many hackathons, participants retain the intellectual property rights to their inventions. This allows them to continue the development of their solutions.

The degree of their formalisation may vary. They often take place in a loose form, which attracts young people, hacker groups and other communities. Hackathons promote entrepreneurship and trigger the creativity of participants. Most often, they are organised in the form of competitions, and

their organisers are enterprises, social organisations, research networks, cultural institutions, and public authorities. The form of competition means that there is competition between small groups of programmers. Also, they receive external support and encouragement. Moreover, competing teams often help each other. It means that during hackathons there is the so-called 'coopetition'. These are paradoxical (simultaneously competitive and cooperative) multi-level relationships between entities that are aimed at creating shared values and new competencies (Shvindina, 2019, p. 3). However, there are opinions that hackathon organisers should direct the hackathon formula towards either competing or collaborating (Pe-Than *et al.*, 2019, p. 17). The appropriate set of incentives for participants is used for this end.

Hackathons can be divided into two groups: tech-centric and focus-centric (Briscoe and Mulligan, 2014, pp. 5-6). In the first group, the events focus on software development using specific technology or applications. This group includes hackathons, the purpose of which is: (1) Single application - application development, *e.g.*, new programming language, (2) Application type - specific platform development (genre), *e.g.*, mobile apps, video game development, (3) Technology-Specific - developing applications that use specific language, framework (HTML5) or Application Programming Interface. However, the second group of hackathons, the so-called focus-centric ones, are focused on a social issue or a business objective. The following three types of them can be distinguished: (1) Socially-oriented - their subject is a social concern, *e.g.*, public services, (2) Demographic-specific - intended for specific demographic groups, *e.g.*, women, teenagers, (3) Company-Internal – company's employees are developing a new product innovation.
Hackathon initiators often include companies that use tech-centric in addition to company-internal hackathons. However, in recent years, socially-oriented hackathons initiated by public authorities, usually at the local level, have been gaining popularity.

The added value of civic hackathons is the opportunity for private entities to interact with public authorities through modern techniques. Hackathons are a type of event that can be described as idea competition. They are based on the principle of the competition leading to open innovation processes. The competition is about designing and implementing a digital service prototype for a specific purpose based on open data (Hjalmarsson and Rudmark, 2012, p. 10). Governments publish data from various areas, while participants transpose their interests and skills into the public good (Thoreson, 2013, p. 28). In this way, the benefits are reached through the engagement of both parties. For the authorities, this means greater transparency of activities, establishing communication with citizens and the opportunity to use innovative ideas (Brown, 2007). Moreover, applications resulting from the open data contest affect inclusiveness, deliberation, influence, publicity, mobilisation, and knowledge production, which translates into more democratic governance (Jäske and Ertiö, 2019). In turn, for citizens, this is a way to develop their skills and interests and implement solutions that reduce their problems. Furthermore, they develop their soft skills through teamwork, joint problem solving and conflict resolution. In this way, new relationships are created. Benefits also apply to sponsors, *i.e.*, mainly software and hardware companies. For them, hackathons give the opportunity to (1) discover the potential or new applications of their existing products, (2) build a group of users of their products, (3) advertise and promote their brand (4) beta test new products, (5) identify and recruit talented programmers (Lara and Lockwood, 2016, p. 486).

The HackerEarth organisation conducted an analysis of 849 hackathons taking place in 2015-2016. It turned out that only 22 of them (2.6% of all) were initiated by governments or public companies (HackerEarth, 2017). Social welfare (ten events) and multi-themed (five events) were the dominant themes of government hackathons. These studies show that hackathons organised by public institutions are in the early stages of development. Therefore, it can be stated that their organisation, duration, awards and nature of cooperation differ from each other. Over time, when more events of this type occur, the result will be the availability and dissemination of good practices. It will allow to avoid errors and barriers and increase the efficiency of public hackathons.

Hackathons as an Instrument for Creating New Public Solutions

Urban Hackathons - NYC Big Apps

An example of cooperation between city authorities and local entities is the NYC Big Apps project. It is a platform for cooperation between organisational units of city authorities and the academic community, entrepreneurs, developers, designers (Nycbigapps, 2020). The result of joint actions are innovations that are supposed to facilitate functioning in the city, improve the quality of life and improve urban services (New York City Economic Development Corporation, 2020). In addition, the organisers intend to support entrepreneurship and improve the transparency of municipal authorities. The works take place in the mode of annual hackathons. From several dozen to over 100 teams participate in them, which, based on urban databases (open data), prepare solutions, usually in the form of applications for New Yorkers. The city has over 1,000 databases regarding, among others, traffic, real estate transactions, events in the city and the location of schools or constituencies. The competitions are preceded by workshops with representatives of the city's organisational units. They discuss the biggest challenges facing the city authorities. The result of the discussion is determining the areas that will be the point of reference for the participants of the competition. These are, for instance, jobs and economic mobility, lifelong learning, healthy living, energy, environment, and resilience. The competition in 2019 was orientated at applications for blockchain technology for city residents within three spheres: identity, energy and real estate asset management. The culmination of the competition is the so-called 'Demo Day', during which the finalists present their applications. The jury consists of representatives of city authorities and technical experts (Nycbigapps, 2019). During the presentation, residents, potential investors and representatives of ICT companies are present.

In addition to the cash prize, the winners are offered marketing, IT and legal opportunities to develop their ideas. It often happens that they are noticed by investment funds and receive support under venture capital funding. One of the winning projects in 2019 is MyCity.ID. The blockchain-based application is a stand-alone digital identifier that will improve the verification of identity-related information (Milligan Partners, 2020). The advantage of this solution is the security of personal data. The ultimate goal is to streamline the process of applying for social services and benefits by using pre-verified information, making this process faster and easier for residents and service providers.

Smart City Hackathons - Smart Dublin

Smart Dublin is an initiative of four local Dublin authorities (Dublin City Council, South Dublin County Council, Dún Laoghaire-Rathdown County Council and Fingal County Council), which work with intelligent technology providers, scientists and citizens to solve problems and improve city life. The goal of Smart Dublin is to use open data to implement the smart city concept in the areas of mobility, environment, energy, waste and crisis management (Smart Dublin 2020a). The program is being implemented by creating solutions based on new technologies and public data that meet the development needs of the city.

Collaboration and engagement within Smart Dublin are based on the Innovation Quadruple Helix Model. The agreement covers various stakeholders, for example (Smart Dublin 2020b):

- Multinationals & Tech Companies (Google, Intel, AT&T, Microsoft),
- SMEs & Start-ups,
- Research Institutions & Universities (ICHC, Maynooth University, Trinity College Dublin),
- City and State Agencies (Enterprise Ireland, IDA Ireland),
- Citizen/Community Groups.

Since 2016, Smart Dublin has been a co-organizer of hackathons that are focused on solving urban challenges. In 2017, the second place in the competition was taken by the C-Park project (Smart Dublin, 2017). The project assumes the possibility of planning a city trip for people with disabilities. The created application informs about the availability of parking spaces in real-time. Moreover, it

introduces a digital authentication system that eliminated the risk of fraudulent use of disabled parking permits.

In 2018, the problem to be solved during the hackathon was congestion in Dublin city transport. The winner of the main prize was Jump'On solution (Hack Access, 2018). The project involves the monitoring of bus capacities, levels of congestion and any failures using cameras. Information is provided to users through the application and information boards located on the bus route. In this way, they can plan their trip and avoid problems related to the lack of space on buses. In the future, this system can be developed and used to check valid travel permits and detect crimes in public transport.

In 2019, Smart Dublin together with the City Council of Dublin and other members of the consortium, including the Grangegorman Development Agency and Science Foundation Ireland, organised the first 3D Data Hackathon in Ireland (Smart Dublin, 2019). Competition projects were evaluated for the novelty of ideas, adaptation to challenging areas, viability and commercial/social impact. The awards included financial support for developing a winning solution, mentoring and access to the work and exhibition space as well as media coverage of the project (Smart Docklands, 2019). The winner was the Place Engage project, which is based on an augmented reality app which would help citizens of Dublin city understand new developments in the city while in conception phase and help to understand and visualise these ideas in real-time (Maynooth University 2019).

Presidential Hackathons – Taipei

Another initiative organised at the governmental level is in Taiwan. It is called Presidential Hackathon and is focused on the innovative use of open data to meet social and development needs arising from the development of the country (Presidential Hackathon, 2020). The event was initiated in 2018 by the President of Taiwan Tsai Ing-Wen as a forum for the exchange of ideas between sectors, hackers, and public officials. Its goal is to optimise public services through innovation. Teams from different countries can participate in the competition because the impact of the innovations developed can go beyond Taiwan. The main prize, unlike most hackathons in the world, is not a financial prize but a guarantee of implementing the proposals of the five winning teams as part of public service. In addition, the winners attend a special dinner with celebrities from the government sector.

In 2019, the leading theme of the hackathon was 'Enabling Sustainable Infrastructure'. Its participants had to design, build and operate fundamental infrastructures in a sustainable and inclusive way.

This means taking social, economic, and ecological processes into account. The proposed solutions were subjected to the following perspectives (Presidential Hackathon, 2019a):

1. Strengthen transparency and trust,
2. Evaluate and deliver value for money,
3. Improve decision support, risk mitigation and project/asset lifecycle management,
4. Promote cross-domain/cross-border partnerships.

The organisation of the competition was carried out in a strictly defined way. Applications from teams were accepted in April and May. Then, at the beginning of June, a list of some of the best teams was announced, which were invited to Taipei for a three-day hackathon in July. The final of the competition was the presentation of solutions in the Presidential Office Building and the awards ceremony with the participation of the president.

The five winning projects included the Rounding Team. A group of palliative care specialists designed an intelligent platform for the Ministry of Health and Social Welfare. It allows the exchange of experiences, support in difficult times as well as medical and other resources to terminal patients

who remain at home. The solution provides families or people hospitalised at home with a secure knowledge-sharing platform (Business Insider, 2019).

The top five winners also included The Angels of the Aged. It uses big data from the Ministry of Internal Affairs and the Ministry of Health and Welfare to identify seniors living in isolated locations. The program aims to effectively allocate government resources for the most deprived to improve home safety and convenience for senior citizens (Presidential Hackathon, 2019b).

Conclusions

In recent years, interest in public hackathons has increased. They are analyzed in terms of their effectiveness (Johnson, Robinson, 2014), the benefits of cooperation with local partners (Robinson, Johnson, 2016), the possibilities of using them in creating urban space (De Winne *et al*. 2020) or the motivation of participants (Antikainen *et al*., 2010).

The analysis carried out in this article has led to several conclusions.

Firstly, social involvement in the process of planning and implementing public policy is one of the conditions for improving the quality of life. Moreover, broad social inclusion is one of the foundations of new public management processes successively implemented in the last several years. It also resulted in greater exposure of citizens' participation in the decision-making process.

Secondly, public-private cooperation brings new opportunities to create new public solutions aimed at satisfying social needs. New solutions of this type are an example of user-driven innovations, where recipients of innovations become their authors at the same time. It brings tangible benefits to both parties. Public authorities increase the transparency of their activities, improve the level of democratisation of activities and reduce costs, whereas the private party meets their own needs more effectively.

Thirdly, collective solving of social problems using ICT is increasingly taking the form of hackathons. These events can be transferred from business practice to public policy. The examples of good practices presented in the article confirm that non-governmental actors can find the use of open data to solve several social challenges. Creating new knowledge through collective action exceeds the potential and abilities of individual entities.

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The Social Aspect in The Area of Human Resources in The Context of CSR Concept

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Abstract

The development of the economy has also negative effects on the environment and society. The concept of corporate social responsibility is the tool for mitigating the negative effects of enterprises' activity. Its main idea is to implement good practices in business what will have a positive impact on the local environment and societies. The article describes the social aspect of corporate social responsibility in relation to employed people. The article has literature and empirical character. Statistical analysis was used to measure regional and sector differentiation among groups of enterprises in terms of worker-related indicators. Some statistically significant differences were found.

Keywords: CSR, Working Conditions, Forced Labour, Diversity.

Introduction

Analysis of the impact of business operations on the environment and the society is an important process that is forced not only by government authorities, but above all by consumers. The emergence of the concept of corporate social responsibility (CSR) results from building the brand of a socially responsible enterprise, and on the other hand, minimizing and paying attention to the negative effects of business operations. The concept of CSR aims to draw attention to the company's activities in the context of the environment, corporate governance, but also the local environment and internal stakeholders including employees. The approach of the management to its workers is very important in the context of work efficiency, organizational culture and ethics. Nevertheless, it happens that in many enterprises this aspect is overlooked. Some companies do not pay attention to CSR at all, other concentrate on supporting external stakeholders like foundations, schools, local societies, and in the same time does not offer a decent workplace for its employees.

The aim of the article is to analyze the companies' approach to human resources as one of the areas of the concept of CSR. There were regional and sector classifications used in the research. The article has literature and empirical character and has been developed based on literature and statistical data studies.

Performing in-depth statistical analysis about worker-related indicators must be preceded by characterizing the social aspect of CSR.

Social aspect of Corporate Social Responsibility

In recent years, a new concept of CSR has gained popularity. The development of this concept is undoubtedly developing with increasing awareness of people – buyers, users and members of society. They constitute the target group of enterprises as recipients of their products and services. The

consequence of this phenomenon is greater attention devoted by management staff to corporate image, manifested through the positive impact on the environment and stakeholder groups. It also affects the actions taken in the field of ethics and charity. According to Friedman (1970): "*there is one and only one social responsibility of business to use its resources and engage in activities designed to increase its profits so long as it stays in the rules of the game, which is to say, engages in open and free competition, without deception or fraud*". Friedman focuses only on economic and legal dimension of business operations. Young (2005) describes CSR as: "*strategic and long-term approach, available on the basis of social dialogue, transparent relationships and searching for solutions used for everyone; it also achieved a lasting connection while wisely shaping relationships with specific stakeholders (...). It is also possible to apply in business in a way that takes into account ethical values, law, respect for employees, society and the natural environment, as well as enabling joining the development plan by working with them to improve the quality of life for all*".

According to Sokołowska (2009) enterprises are not only the subjects of rights and obligations, but also responsibility in the economic, legal and social dimensions. Gableta (2010) states that the processes leading to the integration of employees with the enterprise should be part of building a competitive advantage. This can be seen more broadly at the interface between broadly understood stakeholders and the company. The goal of CSR is therefore to alleviate the age-old conflict between business and society. In addition, it should be noted that direct translation of CSR performance into financial benefits is questionable. When e.g. Johansson Karlsson and Hagberg (2015) state that there is no significant relation between CSR and financial performance, research made by Samy, Halabi and Bampton (2011) shows it exists. Regardless of its direct financial impact CSR helps to build trust which is crucial in times of crisis.

Adamiak and Nowicki (2012) wrote: "*the concept of corporate social responsibility comes down to special skills with its social and natural environment*". Carroll distinguishes four levels of corporate responsibility: economic, legal, ethical and philanthropic. This author notes that the foundation of business activity according to the concept of CSR is its financial stability and bringing profits. The next levels are legal and ethical aspects, i.e. compliance with all established and generally accepted laws and ethical norms. Only then one can undertake philanthropic activity, which is the top of the A.B. Carroll's pyramid. It is implemented by active support and helping others in need. Consistency and implementation of individual actions in the indicated areas is an evidence of the social responsibility level. It should be pointed out, that the sequence of actions taken (from economic aspects to philanthropic activities) is also important and related to the level of development of the organization. There are many approaches to distinct areas of CSR. One of them was presented by Garriga and Melé (2004) who divided CSR theories into instrumental, political, integrational and ethical. Jones (1980) postulate that important issue of corporate governance can also be improved by realization of the concept of CSR.

Social responsibility focuses basically on fulfilling economic demand of shareholders and stakeholders. Above that there are important aspects concerning environment and the community, as internal stakeholders, but also local people. Therefore, it can be determined that activities in the light of CSR focus on the social, economic, environmental and ethical areas. Their synthetic approach is shown in the Fig. 1.

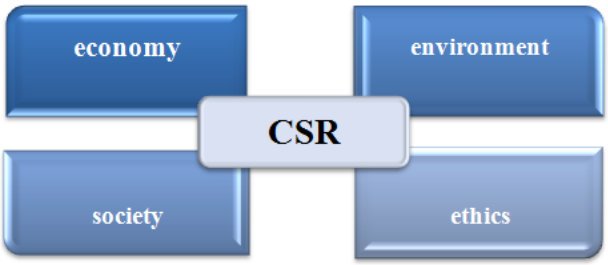

Fig. 1 : Areas of CSR

Source: K. Huk, Logistyka miejska a społeczna odpowiedzialność biznesu – wspólne obszary zainteresowania, „Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach" 2015, nr 249, p. 159.

For effective operation, each organization should consider achieving its primary goals and the ability to bring specific added value. Providing the capabilities and the basis for functioning is important and affects the overall activities, including in the field of CSR. Through functioning and economic stability, entrepreneurs provide jobs, and by reaching a higher level of financial and CSR performance they are able to support society. According to Huk (2015) the social aspect is broadly understood, because it concerns various types of external stakeholders, but primarily the group of employees.

Griffin (2004) defines social responsibility as: "*set of organizational commitments to protect and strengthen the social context in which it operates*". Taking into consideration the multiple count and the complex character of company–workers relation, the most important task in strengthening the social context is to provide a decent workplace for employees, and after then support outside parties. If internal social issues are not fulfilled there it is impossible to continue market presence in long term.

Research Methodology

Data for the needs of this analysis were obtained from the company GES Investment Services. They come from corporate social responsibility ratings. 1096 enterprises from 29 countries, representing 52 industries, were divided into groups according to two classifications: regional, taking into account geographical and cultural proximity and sectoral, according to the Global Industry Classification Standard (2008) (Table 1).

Table 1: Regional and sector classifications of assessed companies

no.	Regions	n	no.	Sectors	n
1.	North America (Bermuda, Jamaica, Cayman Islands, Canada, Panama, USA)	479	1.	Telecommunication Services (TS)	44
2.	Western Europe (Austria, France, Ireland, Germany, Switzerland, United Kingdom)	189	2.	Health care (health)	118
3.	Southern Europe (Spain, Portugal, Italy)	32	3.	Information technology (IT)	79
4.	Australia and Oceania (Australia, New Zealand, Papua New Gwinea)	52	4.	Materials	131
5.	Northern Europe (Denmark, Finland, Norway, Sweden)	50	5.	Industrials (industry)	225
6.	Japan (Japan)	233	6.	Consumer discretionary (CD)	206
7.	China (China, Hong Kong, Singapore)	31	7.	Consumer staples (CS)	118
8.	Benelux (Belgium, Netherlands, Luxembourg)	30	8.	Energy	95
			9.	Utilities	80

Source: own work.

Based on the two classifications presented above, a comparative statistical analysis of groups was carried out in terms of corporate social responsibility towards employees. The overall rating in this area could reach a value from 0 to 10 and was the sum of five indicators:

- management systems and policies regarding occupational health and safety (OHS),
- approach to workplace diversity and discrimination (diversity),
- freedom of association and collective agreements (FOA),
- regulations on working time and remuneration (w. conditions),

- approach to forced labor (forced labor).

The score for each indicator was in the range of [0; 2]. Lack of points meant not taking specific actions in a given scope or their non-compliance with legal regulations, international agreements and guidelines of social responsibility. Points are awarded for: having appropriate policies consistent with or exceeding legal provisions, responsible practices ensuring the practical implementation of policies, raising employees' awareness of applicable internal regulations, the functioning of an anonymous complaint system, risk identification, and social reporting.

Approach to human resources in the context of CSR – statistical data analysis

The human factor is critical for every enterprise's performance. Generated economic an non-financial results depend on people employed in organization. Appreciated people are able to significantly contribute to the increase of the company's profit. However, the basic factor that should be preserved in every enterprise is ensuring human rights and decent work conditions. This study presents statistical analysis of indicators characterizing the human factor in accordance with the concept of CSR. This analysis was carried out divided into 3 dimensions: general, regional and sector.

General analysis

Zero grades were noted in all analyzed indicators. They accounted for from 6.11% in the case of OHS, to 44.53% for forced labor (Table 2). 3.38% of entities obtained zero grades in all, and 52.46% in at least one indicator.

Table 2 : Basic statistics of grades achieved in indicators

	OHS	diversity	FOA	w. conditions	forced labour	overall
minimum	0.00	0.00	0.00	0.00	0.00	0.00
maximum	2.00	2.00	2.00	2.00	2.00	10.00
mean	1.26	1.16	0.66	0.60	0.45	4.12
median	1.67	1.25	0.67	0.50	0.50	4.34
standard deviation	0.56	0.41	0.53	0.51	0.46	1.94
coefficient of variation [%]	44	36	80	84	102	47
0 grades [n]	67	80	313	264	488	37
0 grades [%]	6.11	7.30	28.56	24.09	44.53	3.38

Source: own work

In each indicator, maximum ratings were also recorded, with 1 enterprise obtaining the maximum overall rating. Considering both median and average values, the order of indicators starting from the highest grades is as follows: occupational health and safety, diversity, freedom of association, working conditions and forced labor.

The standard deviation achieved values in the range [0.41; 0.56], however, due to the large variation in central measures, the coefficient of variation better reflects the heterogeneity of the groups. The most similar grades were obtained in the diversity indicator, the east in forced labor.

Regional Analysis

The distribution of general ratings in regional groups is presented in Fig. 2.

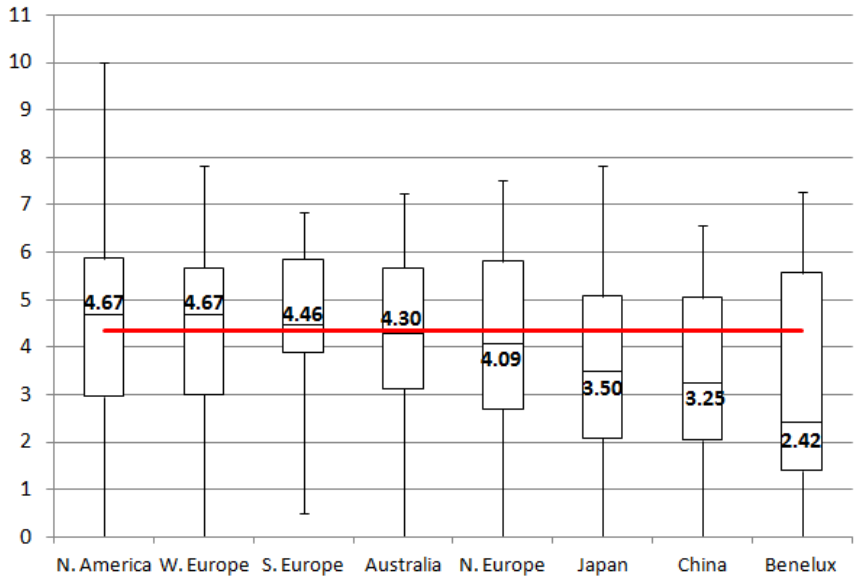

Fig. 2: The distribution of overall grades in regions

Source: own work.

3 regional groups achieved a higher median of overall rating than the entire population. They were: North America, Western Europe and Southern Europe. The lowest median, but also the first and third quartile results were recorded for Japan, China and Benelux. Regarding extreme values, only the Southern European group did not have an entity with an overall zero rating. The only company with a maximum number of points represented the North American group.

The differences seen in the above chart required statistical confirmation. The number of groups above 3, the distribution not close to normal and the uneven number of observations indicated that the statistical significance of the differences was verified using the non-parametric Kruskal-Wallis test. The results of the test indicated that at least one of the groups came from a different population. At a later stage, in *post hoc* analysis pairs were tested using the Mann-Whitney method. The results are shown in Table 3. Results are rounded to 3 decimal places.

Table 3 : Statistical significance of differences between regions for α= 0,05, Bonferroni corrected \ incorrected

	N. America	W. Europe	S. Europe	Australia	N. Europe	Japan	China	Benelux
N. America		0.614	0.638	0.333	0.281	0.000	0.006	0.003
W. Europe	1		0.470	0.532	0.472	0.000	0.012	0.009
S. Europe	1	1		0.257	0.258	0.001	0.011	0.010
Australia	1	1	1		0.997	0.044	0.121	0.084
N. Europe	1	1	1	1		0.054	0.126	0.033
Japan	0.000	0.000	0.031	1	1		0.807	0.237
China	0.169	0.033	0.295	1	1	1		0.484
Benelux	0.086	0.266	0.266	1	0.934	1	1	

Source: own work.

The table above shows that only some of the differences were statistically significant. They occurred in each case between 3 regions with the highest and 3 with the lowest grades, and in pairs Japan–Australia and Benelux–Northern Europe. However, for multiple comparisons Bonferroni corrected results are more reliable. They show that Japan achieved significantly lower results than North America, Western Europe and Southern Europe. No other statistically significant differences were found.

The most homogeneous group in terms of obtained ratings was Southern Europe, whose coefficient of variation was 34%. The highest diversity was observed in Benelux with V = 72%.

The overall scores consisted of 5 partial grades. The values of their medians achieved by specific regions are presented in Table 4.

Table 4 : Partial grades' medians among regions

	OHS	diversity	FOA	w. conditions	forced labour
N. America	1.67	1.25	0.67	0.50	0.50
W. Europe	1.67	1.25	0.67	0.50	0.50
S. Europe	1.67	1.25	0.67	0.67	0.50
Australia	1.67	1.25	0.67	0.50	0.50
N. Europe	1.33	1.25	0.67	0.50	0.00
Japan	1.00	1.25	0.33	0.33	0.00
China	1.67	1.25	0.33	0.33	0.00
Benelux	1.00	1.25	0.00	0.33	0.00

Source: own work.

While it is difficult to clearly identify the group with the highest scores, Benelux obtained the lowest results. Among the indicators examined, the highest scores were given in the field of OHS and diversity, whose medians for all groups were equal. The lowest grades were recorded in the case of forced labor. This situation can be caused by the fact that occupational health and safety issues are regulated and required by law and the diversity issues has been strongly highlighted by some groups of stakeholders in public debates. The problems with freedom of association, working conditions and especially forced labour concerns mostly suppliers of global enterprises. Entities' results in this area can be improved with the extending of the range of responsibility outside organizational borders into the supply chain.

Disproportion between grades obtained in assessed indicators is confirmed also by mean values what is clearly illustrated in Fig. 3.

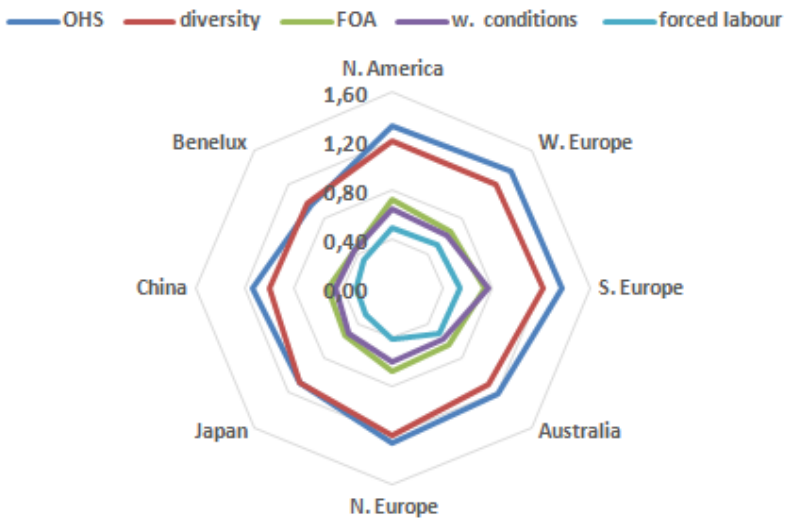

Fig. 2 : Mean values of grades obtained by regions in assessed indicators

Source: own work.

The most homogeneous group in terms of obtained ratings was Southern Europe, whose coefficient of variation was 34%. The highest diversity was observed in Benelux – V = 72%.

Sector Analysis

Regarding the sector classification, it should be noted that the median of overall grades in 3 sectors: consumer staples, energy and utilities reached lower values than the median for all surveyed entities (Fig. 4).

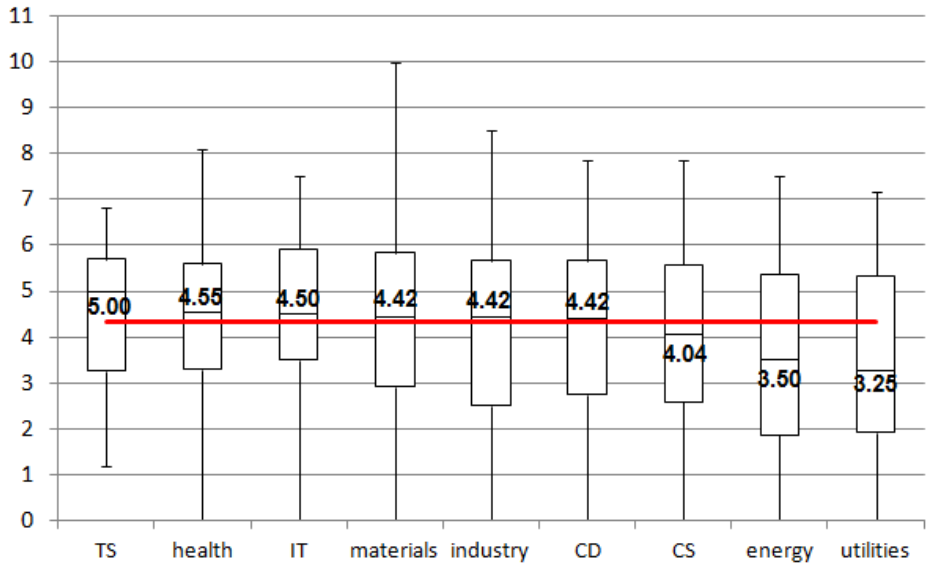

Fig. 3 :The distribution of overall grades in sectors

Source: own work.

The telecommunication services sector achieved clearly the highest median value. In this group no observation was also recorded with an overall rating of 0. The values of the first and third quartiles

were the highest in the IT sector and the lowest in energy and utilities. The Kruskal-Wallis test also in this case indicated that at least one of the groups came from a different population. Table 5 presents the results of *post hoc* analysis carried out using Mann-Whitney tests. Results are rounded to 3 decimal places.

Table 5: Statistical significance of differences between sectors for α= 0,05, Bonferroni corrected \ incorrected

	TS	health	IT	materials	industry	CD	CS	energy	utilities
TS		0.934	0.906	0.958	0.336	0.509	0.220	0.037	0.004
health	1		0.873	0.938	0.231	0.397	0.098	0.008	0.000
IT	1	1		0.968	0.293	0.385	0.119	0.016	0.001
materials	1	1	1		0.175	0.332	0.091	0.006	0.000
industry	1	1	1	1		0.637	0.654	0.077	0.009
CD	1	1	1	1	1		0.399	0.031	0.002
CS	1	1	1	1	1	1		0.187	0.028
energy	1	0.287	0.579	0.223	1	1	1		0.504
utilities	0.141	0.008	0.025	0.009	0.318	0.080	1	1	

Source: own work.

According to unadjusted test values, the utilities sector achieved significantly lower marks than all other groups except energy. This one was significantly worse than telecommunication services, health care, IT, materials, consumer discretionary. Bonferroni corrected test values indicate that the sector utilities achieved significantly lower marks than health care, IT and materials. No other statistically significant differences were found.

The coefficient of variation of the overall ratings obtained in the sectors was in the range of: [35%; 61%]. The smallest diversity of grades occurred in health care and telecommunication services, the largest in energy sector.

As in the case of geographical analysis, the highest partial grades were obtained in the case of OHS and diversity, which also in this case adopted equal median values for all groups (Table 6). The lowest grades were obtained for forced labor.

Table 6 : Partial grades' medians among regions

	OHS	diversity	FOA	w. conditions	forced labour
TS	1.67	1.25	0.67	0.50	0.50
health	1.67	1.25	0.67	0.50	0.50
IT	1.67	1.25	0.67	0.50	0.50
materials	1.67	1.25	1.00	0.50	0.50
industry	1.67	1.25	0.67	0.50	0.50
CD	1.33	1.25	0.67	0.50	0.50
CS	1.33	1.25	0.67	0.50	0.25

energy	1.33	1.25	0.33	0.50	0.00
utilities	1.00	1.25	0.33	0.33	0.00

Source: own work.

Fig. 5 shows mean values of grades obtained by sectors and illustrates the same situation as in regional classification. There is a clear distinction for 2 low and 3 high-rated indicators.

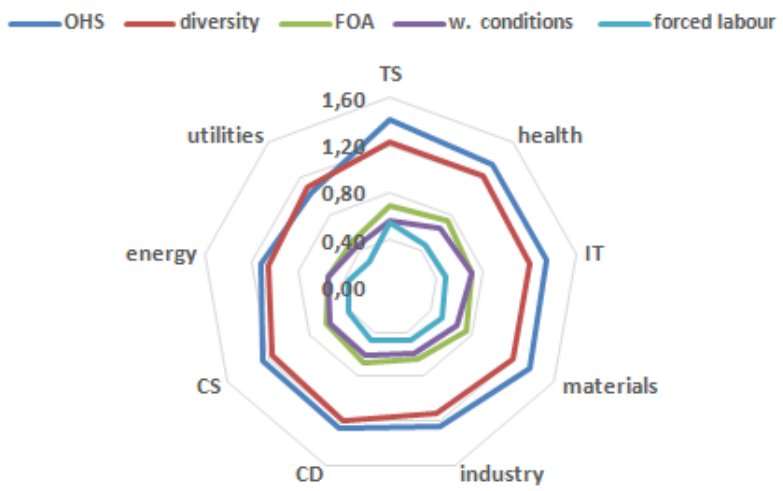

Fig. 4 : Mean values of grades obtained by sectors in assessed indicators
Source: own work.

Summary

CSR is a desirable trend in the development of organization and business, but only when its main goal is pro-social and pro-environmental activity, and not maximizing profit through improved corporate image. One of the most important moral responsibility is to enforce human rights and ensure proper working conditions for the people employed in the organization. The aim of the article was to present and analyze the approach of companies to social aspects in accordance with the concept of CSR.

One of the conclusions that arises after the statistical analysis is the fact that companies achieved significantly higher grades in occupational health and safety and diversity indicators than in the right of association working condition and forced labor. More than a half of assessed entities did not demonstrate any meaningful activities in at least one indicator, and 3.38% were passive in all parameters.

Of the 8 regions studied, North America and Western Europe received the highest overall grades. Companies from Benelux achieved the lowest results. Sectors were less diverse in terms of distribution of grades. The highest scores were recorded in the telecommunication services group, the lowest in utilities.

Statistical analysis showed statistically significant differences between several groups only. For regions, Japan scores worse than North America, Western Europe and Southern Europe. In the sector classification, the utilities group received lower marks than health care, IT and materials.

Benelux was the most internally diversified region in terms of obtained ratings, the least Southern Europe. For the sectors, these groups were respectively: telecommunication services and health care.

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Quantitative Methods for Analyzing the Energy Field at European Level

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Abstract

The aim of this study was to detach the evolutions of the macroeconomic variables that characterize the energy sector at the level of EU countries in the period 2014-2017. The statistical analysis performed in the study was based on secondary data provided by the Eurostat Database. The results of the study considered the combination of research methods and statistical techniques used for time series, in order to measure the existing interdependencies between the macroeconomic variables that characterize the energy system at European level. As macroeconomic variables were used in the study: the price of electricity according to the type of user, export, final energy consumption, gross domestic product. The panel-type analysis and model built in the study using the multifactorial regression and correlation method as well as the validity test were performed using the database management and analysis programs (Excel, EViews).

Keywords: energy field, regression and correlation method, macroeconomic variables, renewable energy, carbon dioxide emissions

Introductory Aspects

Energy is a product of great economic, political, social but also strategic value. This is necessary for the entire economy of a country, both in the industrial and service sectors as well as in social activities. The lack of access to the energy field has significant consequences, and the strategic and political role of the energy field has been clearly highlighted in the last 30-40 years by the various oil or energy crises, regional conflicts, which have degenerated into wars, serious energy damage, social tensions or errors in a country's energy policy.

We can see that, the energy field has a major impact on people's lives, representing both economically and socially, a true force at European level. The specific features of this field of activity can be characterized as follows:

→ this domain is characterized by a large inertia, with a significant period of time between decision and achievement;
→ the energy field contributes significantly to the degree of environmental pollution and climate change;
→ in order to develop and grow sustainably the energy field requires massive investments;
→ in this area it is necessary to implement an adequate legislative and institutional framework, as well as an energy strategy in the medium and long term. All these actions must be accompanied by national energy policies and instruments specific to the market economy.

Because, the EU's energy policy envisages a range of measures, which aim to achieve an integrated energy market and to ensure the security of energy supply and the sustainability of the energy sector. According to the European Commission (2015), the energy policy of the U.E. has the following five main objectives: ensuring the functioning of the internal energy market and interconnecting energy networks; ensuring the security of energy supply in the EU; promoting energy efficiency and energy conservation; decarbonisation of the economy and the transition to a low carbon economy, in accordance with the Paris Agreement promoting the development of new forms of renewable energy for better alignment and integration of climate change objectives within the new market organization; promoting research, innovation and competitiveness.

Over the last decades, this field of activity has been in continuous development, especially from a sustainable point of view. This is because, for a long time, the energy field has acted and developed without considering the environmental norms and a development compatible with the environment. Thus, energy has become a polluting industry in some European countries (especially those with a lower level of development) but which is currently undergoing continuous sustainable remodeling. In this context, the European Commission said that more needs to be done to combat energy poverty, which still affects almost 50 million people across the EU. One way to do this is to promote investment in energy efficiency in households, thus improving living conditions and reducing energy bills. Thus, according to the European Commission, almost EUR 5 billion of the European Structural and Investment Funds for the period 2014-2020 have been allocated to help renovate homes for around 840 000 households. (The European Commission, 2019)

This is because Europe enjoys one of the most comprehensive and reliable networks in the world for electricity and gas. The main objective of the European Commission was to strengthen this network where it was needed to address the remaining security issues of supply, to connect energy islands and to address the challenges arising from the ongoing transition to a low-emission economy carbon. A main objective of the European Commission was to eliminate the energy isolation of the disconnected regions. A success in this endeavor has been registered in the Baltic countries.

Although maintaining low oil prices could affect the competitiveness of renewable energy costs, the long-term prospects for renewable energy are excellent. Renewable energy technologies have become increasingly cost-effective.

Literature Review

Concerns about the creation of a European energy market and the gradual development of an EU-wide energy policy took place together with the Treaty on the European Coal and Steel Community (1951) and the Euratom Treaty on the Establishment of a European Atomic Energy Community (1957). The two treaties focused on coal and nuclear energy as primary energy sources. Much later, with the Lisbon Treaty (2007), the field of energy is given a legal basis and EU policy in this vital area of life considers the following main aspects: to ensure security of energy supply; to promote energy efficiency and energy saving; to ensure the functioning of the energy market as well as the development of new energy sources and renewable energies.

With the discovery of unconventional gas reserves in various EU countries, a process of assessing the effects of the exploitation of this resource on the environment and human and natural habitats has begun at Union level. Along with the European Commission's initiatives addressed at the regular

meetings of energy ministers in EU Member States, the Europeanization of energy policy was complemented by the organization of European Councils on energy among the topics covered (February 2011, May 2013, March 2014, June 2014, October 2014, December 2014, March 2015, December 2015, March 2016, June 2016).

The Communication on the Energy Union launched by the European Commission in 2015 sets out five main targets such as: energy security; solidarity and trust; the internal energy market; energy efficiency, seen as a contribution to moderating energy demand; decarburization of the economy; research, innovation and competitiveness. In 2016, the European Commission adopted the package of measures in the field of energy security which considers the following aspects: legislative proposal to revise Regulation 994/2010 on security of gas supply, legislative proposal to revise the Decision on the transparency of intergovernmental agreements concluded by Member States with third countries in the field of energy, EU Strategy on LNG and storage, Heating and cooling strategy.

The transition to a modern, low-carbon and energy-efficient economy is still in full swing in Europe. This process of transition to a sustainable economy and in terms of energy and the environment has been accelerated with the signing of the commitments made under the Paris Agreement of 2016 ratified by the European Union. Renewable energy has now become a necessity for all EU countries, and waste must be reduced or even eliminated. Renewable energy sources include wind energy, solar energy (thermal, photovoltaic and concentrated), hydroelectric energy, tidal energy, geothermal energy, ambient heat captured by heat pumps, biofuels and the renewable part of waste. One of the positive effects of the use of renewable energy is the reduction of carbon dioxide emissions, having a significant impact on the health of the population, but also on environmental protection. The use of renewable energy is ensured, in accordance with the Kyoto Treaty and in close correlation with the EU energy policy set out in the Lisbon Strategy, environmental protection, reduction of fossil fuel consumption.

In accordance with the energy policy of the European Union, the European level of renewable energy differs according to the sector of activity, namely: 30.8% in the electricity sector, 19.5% in the heating and cooling sector and 7.6% in the transport sector. (Matteo Ciucci, 2020) But due to the lower price, there are still EU countries who choose to use oil as their main source of energy and not renewable energy that requires high implementation costs. In this context, according with Eurostat, countries such as Luxembourg, the Netherlands, Malta, Belgium and Cyprus are among the most dependent on the use of electricity from sources that cause great damage to health and the environment. The consequences of non-compliance by some European countries with the targets proposed by the European Council have led to increased greenhouse gas emissions. (see figure 1).

In 2017 according with Eurostat, energy from renewable sources accounted for 19.5% of total energy consumption for heating and cooling in the EU-28. This represents a significant increase from 10.4% in 2004. Growth in the industrial, services and household consumption sectors (construction sector) contributed to this increase.

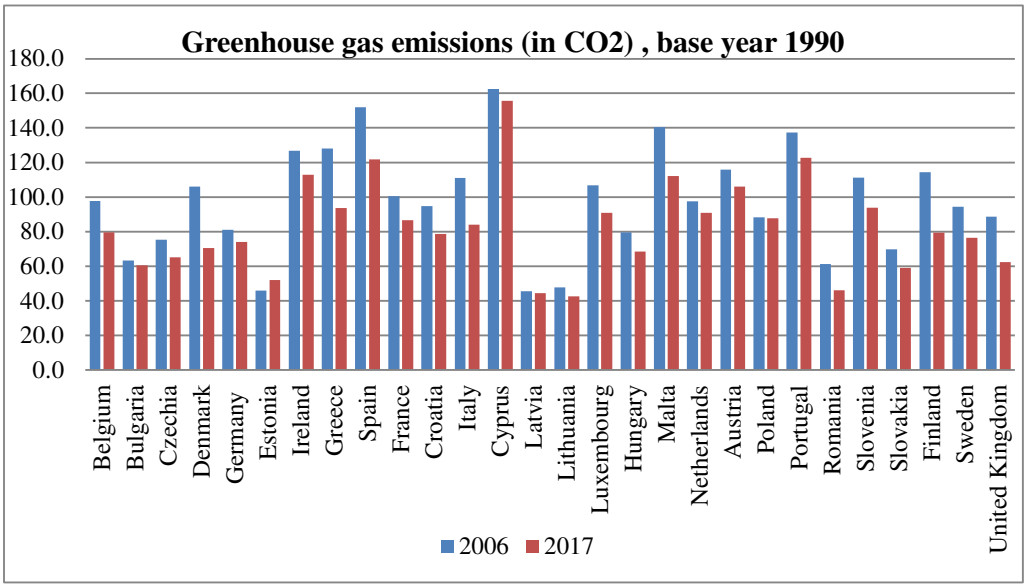

Figure 1: Greenhouse gas emissions (in CO2 equivalent), base year 1990

Source: Eurostat -Data Explorer (sdg_13_10)

According to the European Commission's (2019) Report to the European Parliament and the Council, compared to 2016, final energy consumption increased in 24 Member States in 2017, with the largest increases in Slovakia (+ 7%), Malta (+ 6.7%) and Poland (+ 6.5%). The largest decreases were recorded in Belgium (-1.2%), the United Kingdom (-0.8%) and Italy (-0.6%). However, in 2017, primary energy consumption increased in 20 Member States compared to the previous year, with the largest increases being in Malta (+ 12.9%), Romania (+ 5.7%) and Spain (+ 5.4%). Estonia recorded the largest year-on-year decrease (-4.2%) compared to 2016, followed by the United Kingdom (-1.6%) and Ireland (-1.4%). This is due to the decrease in primary energy intensity in all Member States, with six exceptions Belgium, Greece, Italy, Hungary, Austria and Portugal.

The first legally binding and universal agreement on climate change in Paris, as mentioned earlier in the study, set out a comprehensive action plan to combat climate change. This agreement was also known as the "Clean Energy for All Europeans" package. Under this agreement, the European Union agreed to reduce greenhouse gas emissions by at least 40% by 2030 compared to 1990. At the same time, the Paris Agreement on Climate Change - the Clean Energy for All Europeans package aims to develop the concept of clean energy (a different way of producing and consuming energy) in interdependence with combating climate change.

In this context, in the field of energy, the European Union has made significant progress in terms of unjustified consumption and air pollution. In addition to monitoring the competent European institutions such as the Energy Union, the European Council has proposed in the Europe 2020 Strategy targets for all Member States such as:

- 20% reduction in greenhouse gas emissions (CO2 equivalent) compared to 1990,
- reduction by 20% of the final energy consumption compared to 2005,

increasing energy efficiency and increasing the share of renewable sources in the total energy mix to at least 20%. (Matteo Ciucci, 2020)

One of the main objectives of the Europe 2020 strategy in the field of energy is to increase energy efficiency and increase the share of renewable sources in the total energy mix to a minimum, setting a 20% increase over 2005 for each EU-Member State.

The European countries that encountered difficulties in meeting the target set by the European Commission were the Netherlands, France, the United Kingdom, Ireland and Belgium. The main reasons for not achieving the set goal were: overdevelopment of traditional geographical and energy systems. Although at the bottom of the rankings, France has made progress in the field of renewable energy. Thus, according to Eurostat-European Statistics, from 2010 to 2017, the top 5 countries of the European Union that recorded the best results in order to achieve the objectives of the Europe 2020 Strategy were (see table 1):

Table 1: Top of the first European countries on achieving the objectives of the Europe 2020 Strategy

EU/Member State	**Greenhouse gas emissions**	**Share of renewable energy**	**Energy efficiency**
	Reducing greenhouse gas emissions by at least 20% compared to 1990 levels	**Increasing the share of renewable energy in final energy consumption to 20%,**	**Moving towards a 20% increase in energy efficiency**
Germany	0.14	0.18	276.6
France	0.14	0.23	219.9
United Kingdom	0.16	0.15	177.6
Italy	0.13	0.17	158
Spain	0.10	0.20	119.8

Source: (2017), *Europe 2020 Targets*
https://ec.europa.eu/eurostat/documents/4411192/4411431/Europe_2020_Targets.pdf)

These EU-Member States have achieved or even exceeded their targets in different ways in each country. Measures to reduce coal use, energy efficiency measures to replace inefficient heating equipment and the development of more sustainable means of transport have led to the creation of sustainable energy induction. Also, according to Eurostat-European Statistics, from 2010 to 2017 the last 5 countries of the European Union that have registered the weakest results in order to achieve the objectives were (see table 2):

Table 2: Top of the last European countries on achieving the objectives of the Europe 2020 Strategy

EU/Member State	**Greenhouse gas emissions**	**Share of renewable energy**	**Energy efficiency**
	Reducing greenhouse gas emissions by at least 20% compared to 1990 levels	**Increasing the share of renewable energy in final energy consumption to 20%,**	**Moving towards a 20% increase in energy efficiency**
Malta	0.05	0.10	0.7
Latvia	0.17	0.40	5.4
Estonia	0.11	0.25	6.5
Lithuania	0.15	0.23	6.5
Slovenia	0.04	0.25	7.3

Source ((2017), *Europe 2020 Targets*
https://ec.europa.eu/eurostat/documents/4411192/4411431/Europe_2020_Targets.pdf)

For 10 EU-Member States (Malta, Latvia, Estonia Lithuania, Slovenia, Croatia, Slovakia, Bulgaria, Portugal, Hungary) policies that are currently planned or implemented for the promotion of energy from renewable sources are currently insufficient. Thus, these countries have major deficits in reaching the targets for 2020. The lack of funds was the main cause for which these countries failed to make progress towards achieving the goals, as well as the failure to attract investors and money from the European Commission (2019). The European Union has significantly increased its ambition by setting new targets for 2030, namely: reducing greenhouse gas emissions by at least 40% compared to 1990 levels, reaching at least 32 % of energy from renewable sources (Directive 2018/2001 EU of the European Parliament and of the Council of 11 December 2018), and the increase with the little 32.5% of energy efficiency (Directive 2018/2002 EU of the European Parliament and of the Council of 11 December 2018).(see table 3)

Table 3: Climate and energy framework for 2030- Agreed Objectives

Year	Emissions by gases with effect evening	Energy this sources renewable	Efficiency energy	Interconnection	Issues climate in programs financed by EU	Emissions of CO2 From
2020	-20%	20%	20%	10%	2014-2020 (20%)	
2030	≤ -40%	≤ 32%	≤ 32.5%	15%	2021-2027 (25%)	Cars:-37.5% Vans:-31% Trucking:-30%

Source: https://www.consilium.europa.eu/ro/policies/climate-change/2030-climate-and-energy-framework/

Climate change and environmental degradation are an existential threat to Europe and the world. To find solutions to this threat, Europe needs a new growth strategy that will transform the Union into a modern, competitive and resource-efficient economy, in which:

• by 2050, we will stop emitting greenhouse gases;
• economic growth will be decoupled from the use of resources;
• no person and no place will be left behind. (European Commission, 2019)

The European Green Pact is the EU's roadmap for achieving a sustainable economy. The European Green Pact aims to transform the bloc of EU-28 countries into a low-carbon economy without reducing prosperity and improving people's quality of life through cleaner air and water, better health and a thriving natural world. The development of renewable energy sources can also have the potential to stimulate employment in the EU, by creating jobs in the sector of new "green" technologies.

Research Methodology

The study aimed at measuring the interdependencies of the main macroeconomic variables that characterize the energy field in EU-28 countries in the period 2014-2017. The research methodology was based on secondary data taken from the Eurostat Database. In the study we used simple methods for analyzing the energy domain (the graphical method) and simple methods for analyzing the statistical distributions in order to characterize the evolution of the macroeconomic indicators of the energy field based on the descriptive indicators for the period 2014-2017. We chose this period because the value of the macroeconomic indicators included in the analysis were more efficient that is, they recorded with higher values in terms of sustainable growth according to European Green Pact. The analysis of macroeconomic variables in the energy field is presented in the study independently and in correlation with influencing factors. (Cristache at all, 2019).

To analyze the final energy consumption in interdependence with the macroeconomic variables that characterize the energy field at European level, we used a multifactorial regression model with panel data. Thus, panel data models allow the verification of country-specific macroeconomic variables, which cannot be analyzed or quantified and which do not vary over time. Thus, we analyzed the evolution of final energy consumption as an endogenous variable according to the evolution of exogenous variables: the price of electricity according to the type of users and exports in current prices (market factors) and gross domestic product at current prices (factor economic). The data we have taken into account have been obtained from the official websites of the Statistical Office of the European Union Eurostat for a number of 28 European countries (Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom).

Of these countries, a number of 27 countries are members of the European Union and the United Kingdom has recently left the EU, but it represents one of the main partners of the European Union, partner with important bilateral trade treaties concluded. That is why we considered including in this database also this European country, which was in the first places regarding the energy field during the analyzed period. Data analyzed aimed at describing trends as close to the present time, and the most recent available data for the macroeconomic variables that characterize the energy field considered were those of 2017.

Results and Discussions

The study started by analyzing the statistical distributions of the macroeconomic variables that characterize the energy field in order to derive their descriptive characteristics.

In the period 2014-2017, the macroeconomic variables included in the study did not show significant fluctuations at the level of each country. Thus, in the case of the endogenous variable Cons_final_en, out of the 28 countries analyzed, a number of 7 countries (Germany, Italy, Holland, Poland, France, Great Britain, Spain) had values above the sample mean, and the remaining 21 countries (Austria, Belgium, Bulgaria, Cyprus, Croatia, Denmark, Estonia, Czech Republic, Finland, Romania, Latvia,

Table 4: Descriptive characteristics of the macroeconomic variables that characterize the energy field

	Cons_final_en Million tonnes of oil equivalent (TOE)	**Export (current prices mil. euros)**	**GDP (current prices mil. euros)**	**Price_energ_ el (EUR pe kwh)**
Mean	39.09	159194.2	529920.48	0.18
Maximum	0.55	1256279	3244990	0.96
Minimum	218.71	197.82	8508.3	0.08
Std. Dev.	52.02	240142.5	808151.69	0.09

Lithuania, Greece, Hungary, Ireland, Luxembourg, Malta, Slovakia, Slovenia, Portugal, Sweden) were below the EU-28 average. In the case of the exogenous variable Price_energ_el, 12 EU countries (Austria, Belgium, Cyprus, Denmark, Germany, Italy, Sweden, Italy, United Kingdom, Netherlands, Portugal, Spain) recorded values above the average of 0.1854 (representing an average annual change in energy prices 18.54%), while 16 EU countries (Bulgaria, Finland, France, Greece, Hungary, Norway, Romania, Slovenia, Latvia, Lithuania, Czech Republic, Croatia, Estonia, Ireland, Luxembourg, Slovakia) below this value. Regarding the exogenous variable Export, a number of 8 EU countries (Germany, Belgium, Italy, France, the Netherlands, Great Britain, Italy, Spain) record

an export value above the EU-28 average, while the other 20 European countries below this value. Also, in the case of the exogenous GDP variable, 6 EU countries (Germany, France, Spain, Italy, Great Britain and the Netherlands) recorded a higher average level than the average of the sample, while 22 EU countries (Cyprus, Austria, Czech Republic, Finland, Greece, Ireland, Malta, Norway, Poland, Portugal, Romania, Slovenia, Bulgaria, Hungary, Latvia, Lithuania, Croatia, Estonia, Luxembourg, Slovakia, Belgium, Denmark) lower. At the same time, it should be noted that the data on macroeconomic variables that characterize the energy field at European level, included in the paper had a high degree of heterogeneity. This high degree is a consequence of the disparities existing in the level of sustainable development of the EU countries and the differences existing in the way of energy production and distribution. Next to estimate the existence/non-existence of a relationship between the indicators mentioned earlier in the study we used the econometric concepts associated with the panel data regression models. (Simionescu and Dumitrescu 2017)

Within the panel-type multifactorial regression model that explains in proportion of 97.44% the evolution of the endogenous variable Cons_final_en using the three exogenous variables, the existence of a positive link between the final energy consumption trend and the exogenous variables that characterize the energy field stated above is highlighted. (See table 5) Specifically, Table 5 indicates the existence of a positive relationship between final energy consumption at the level of the EU countries and the exogenous variables included in the regression model using the EViews software package.

Table 5: Estimation results between Cons_final_en and the trend of the energy field (Export, GDP, Price_energ_ el) as exogenous variables at European level in the period 2014-2017

Dependent Variable: CONS_FINAL_EN
Method: Panel Least Squares
Sample: 2014-2017
Total panel (balanced) observations: 112
CONS_FINAL_EN_=C(1) +C(2)*EXPORT +C(3)*
PRICE_ENERG_ EL+C(4)*GDP

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	7,297921	1.824145	4,007463	0.0009
C(2)	0.000049	0.000005	6.382086	0.0000
C(3)	-14.967436	9.139350	-1.437995	0.5049
C(4)	0.000050	0.00001	22.22225	0.0001

R-squared	0.974467	Mean dependent var	39.09678
Adjusted R-squared	0.973785	S.D. dependent var	52.02569
F-statistic	1375.468	Durbin-Watson stat	1.568676
Prob(F-statistic)	0.000000		

From Table 5 we can conclude that, with an increase of one million euros in Exports, an increase of 0.000049 million tons of final energy consumption will be obtained, a positive relationship that is statistically significant because (Prob. <5%) . Similarly, it can be observed that a similar impact is generated by GDP, respectively the increase by one million euros of this indicator will determine the increase by 0.000050 million tons of the final energy consumption at the level of the sample of studied countries. The coefficient related to the GDP variable is positive and significant because (Prob. <5%). Also, the coefficient of the variable Price_energ_el registered a negative value and indicates that it is not quite statistically significant. One argument that this coefficient is statistically insignificant could be that the price of energy in the European Union it depends on a number of different supply and demand conditions, including the geopolitical situation, the national energy mix, import diversification, network costs, environmental protection costs, extremely unfavorable weather conditions or levels of excise and taxation. However, this coefficient slightly exceeds the significance

threshold of 5%. According to the data presented in Table 5, the estimated form of the regression equation, using the panel data, is given by:

Cons_final_en= 7,297921+ 0.000049*Export- 14.967436* Price_energ_el +0.000050*GDP

In order to use this equation, it is necessary to consider the limits of the econometric models, such as the restrictive assumptions needed to be met by the independent variables. Regarding the testing of the significance of the panel-type multifactorial regression model and the multiple correlation report based on the "Fisher" criterion, the following conclusion was reached in the study: because the probability of Sig. F is less than 0.05, the multifactorial regression model is valid, as is the multiple correlation ratios for a significance threshold of 0.05. To reconfirm that the multifactorial regression model developed in the study is linear, we further used the graphical method to see if there is an interdependence link between the variables and if its shape is linear.

So, to analyze to what extent each exogenous variable influences the final energy consumption at European level in from 2014-2017 we used the scatter diagram using Excel software packages. (See figure 2) Based on the correlation graph, we appreciated that the points in the graph network are evenly distributed, without disparities between them, so we can conclude that the connection between exogenous variables that characterize the energy level European Union (Export, GDP, Price_energ_el) and Cons_final_en as endogenous variable is linear, direct. So we can appreciate that the exogenous variables included in the model have a significant influence on the variation of the endogenous variable (final energy consumption) contributing to its average annual growth.

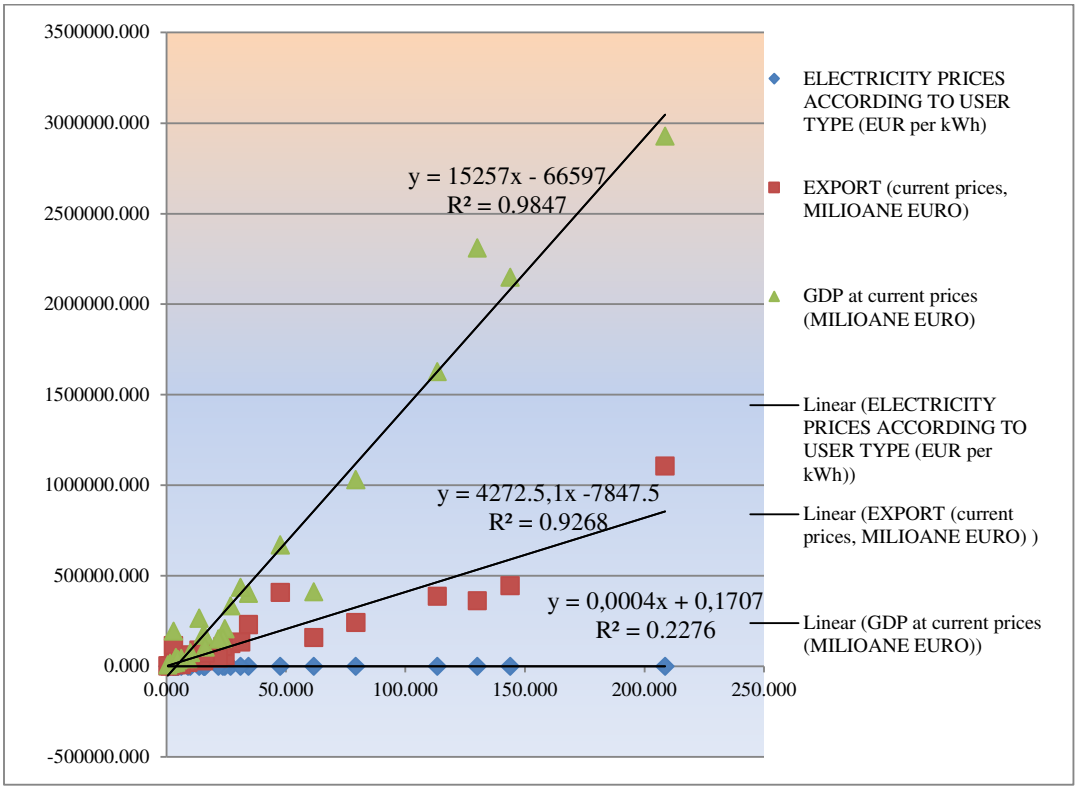

Figure 2: Correlation between Price_energ_el, GDP, Export and Cons_Final_en

Source: Eurostat –European Statistics

The value of the coefficient of determination in the case of the unifactorial linear correlation panel type between the GDP and the final energy consumption of 0.984 shows that 98.4% represents the

significant influence of the exogenous variable on the final energy consumption, the rest of 1.6% coming from other random, random factors, not included in the model as for example: energy productivity, energy efficiency, electricity production, etc. The value of the coefficient of determination of 0.926 in the case of the unifactorial linear correlation panel type between the export and the final energy consumption suggests that 92.6% represent the influence of the export on the final energy consumption the rest of 7.4% coming from other random factors, such as: energy imports, energy intensity, etc. The value of the coefficient of determination in the case of the unifactorial linear correlation panel type between Price_energ_el and the final energy consumption of 0.227 shows us that 22.7% represents the reduced influence of the exogenous variable on the final energy consumption, the rest of 77.3% coming from other random, random factors, not included in the model as for example: energy taxes and taxes, final consumption expenses of households and institutions. This is because there are significant discrepancies in energy prices at European level, there is no uniformity and equalization of these prices. This situation can also be attributed to the uneven development of the economies of European countries mainly due to the different methods and tools applied by them in terms of sustainable economic growth in line with the Europe 2020 Strategy.

Because the time period used in the study was quite short 2014-2017, we did not consider the construction of a VAR model. In the future, in order to deepen the analysis, we plan to extend the time period to develop such an econometric model. OLS hypotheses are tested for the same level of significance, except for the error autocorrelation hypothesis, tested using the Durbin-Watson test. Statistically, DW recorded a calculated value (DW = 1.56), a value that we compared with the critical statistical values for α = 0.05, k = 3 and n = 112; d1 = 1.63 and d2 = 1.72 suggest that the errors are positively correlated. Regarding the verification of the error normality hypothesis, it turned out that the calculated value of the Jarque-Berra test: $JB\,(123.62) > \chi^2_{0,05;4}\,(9.49)$ we appreciate that the hypothesis of normality of errors cannot be accepted. The verification of the multicolinearity hypothesis of the exogenous variables was based on the analysis of the correlation matrix from table 6.

Table 6: Correlation Matrix

	CONS_FINAL_EN	EXPORT	PRICE_ENERG_EL	GDP
CONS_FINAL_EN	1			
EXPORT	0.926818	1		
PRICE_ENERG_EL	0.227657	0.269016	1	
GDP	0.984714	0.900010	0.232288	1

Following the application of the Klein Criterion for verifying multicollinearity, it resulted that $r^2_{(x_1;x_3)} = 0.90 < R^2 = 0.97$ *and* $r^2_{(x_1;x_2)} = 0.26 < R^2 = 0.97$ exogenous variables are not collinear.

Conclusions

The challenges facing the EU in the field of energy include issues such as increased import dependency, limited diversification, high levels of energy prices and their volatility, increased energy demand globally, security risks affecting producing countries and those involved of transit, the increasing threats posed by climate change, the slow progress in energy efficiency, the challenges arising from the increasing share of renewable energy, and the need for greater transparency and better integration and interconnection in the energy markets.

According to the European Environmental Agency (2016) the use of energy from renewable sources has many potential benefits, including a reduction of greenhouse gas emissions, diversification of energy supply and reduction of dependence on fossil fuel markets (in particular, the oil and gas market). The development of renewable energy sources can also have the potential to stimulate employment in the EU, by creating jobs in the sector of new "green" technologies.

At European level, the completion of the internal market of the European Union has since the establishment, among other desires, the elimination of trade barriers, the similarity of policies practiced by each European state individually, as well as the practice of free mechanisms of price formation, based on demand and of the offer. But from an energy point of view, the establishment of appropriate measures for each state in particular has made it difficult for specialists in the field, because each state sizes its electricity production according to the available resources. That is why the significant discrepancies existing in the energy field at European level are still present with all the measures that the EU has taken and is trying to take. There are countries where pollution is still high and there are no modern technologies to reduce it. This is because the standard of living of the European population is not at the same level in all EU countries as well as the unemployment rate and the degree of education.

That is why the significant discrepancies existing in the energy field at European level are still present with all the measures that the European Union has taken and tries to continue to take. However, Europe has much strength, such as: the talent and creativity of its citizens, a strong industrial base, a strong service sector, a prosperous and high quality agricultural sector, a strong maritime tradition, the single market and the common currency, the position of the largest trading bloc in the world and the main destination of foreign direct investment. One of the main objectives of the energy field, existing at present but also estimated in the future, is the use of renewable energy. According to the European Environmental Agency (2016) renewable energies will inevitably dominate the long-term global and European energy system, due in particular to limited fossil fuel resources. The argument, perhaps the strongest one, is that of global warming and the alteration of climate and biological balances, a process that has been accelerated almost 10 times in the last 30 years. According to the European Environmental Agency (2016) the use of systems that exploit renewable energy such as: geothermal energy, biomass, solar energy (HVAC) or: wind, bioenergy, photovoltaic energy, hydropower, tide (electricity production) is a very broad subject of study case ensures better coherence in terms of energy policy as a whole. This can be achieved by integrating the energy policy of the Member States into the definition of the European energy strategy and through coordinated actions at Community level.

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The Use of Artificial Intelligence in Identifying the Quality Costs in Service Companies

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Abstract

The purpose of the hereby paper is to present the possibilities of using artificial intelligence to identify the quality costs in service companies. The quality costs and the use of artificial intelligence in accounting systems are the subjects of the research. Analysis of available literature sources showed substantial gaps in the area of identifying quality costs using artificial intelligence. The author made the attempt to create a tool for identifying quality costs based on artificial intelligence. The work involved a critical analysis of scientific literature on accounting, quality management and IT as well as to selected journals. The present paper forms a body of theory to develop own tool enabling the implementation of quality costs calculation in service companies.

Keywords : artificial intelligence, quality costs, quality costs calculation, service company.

Introduction

Artificial intelligence is an area of science that brings together fields, methods, tools and techniques designed to create and develop a complete computer program that accurately reflects the model of human and his mind functioning, Warszycki (2019). This science has its roots in computer science, philosophy, mathematics, psychology, cognitive science, as well as in many other disciplines, Dignum (2019). It is used more and more widely in all areas of human life. It is used in the modern economy, e.g. in banking, retail, industrial production, Sylpaczuk and Żynda (2019), to predict consumer emotions, Warszycki (2019), as well as in counteracting tax avoidance, Kuźniacki (2019).

Griffin (2016) mentioned that nowadays, artificial intelligence is also practically used in accounting: in all aspects of business operations accounting (implementation of automatic accounting), payment of invoices (automatic payments) and analysis of financial data.

Quality costs are an important cost group in service companies. Particular difficulties arise in their proper identification. The use of artificial intelligence will allow to prepare a solution enabling their correct verification and registration in the company's accounting system.

The article was organized in the following order. In the first part, the author refers to the state of knowledge in the field of quality costs and the impact of artificial intelligence on their identification. The second part presents a mechanism enabling the identification of quality costs in service companies. The third part attempts to critically evaluate the proposed tool. The article ends with the conclusions of the conducted considerations in the summary.

Quality costs and Artificial Intelligence

The first definition of the term *quality costs* appeared as early as 1951. In the opinion Juran (1951), the author of the definition, quality costs is an instrument to measure quality. This interpretation of the term was followed by numerous other specifications in subsequent years. The most important of these are definitions by A.V. Feigenbaum, F. Nixon, W.A. Nowak and K. Szczepańska.

Feigenbaum (1961) believes that these costs are related to pro-quality efforts. For Nixon (1974), these are costs of obtaining certainty that consumer receives only products manufactured according to the requirements. In Nowak's (1997) opinion these are costs of client's needs and expectations embracing prevention and evaluation, as well as costs resulting from inadequate quality. Szczepańska (2017) defines quality costs as costs of failing to meet unidentified requirements of company's clients. The various specifications of quality costs prove lack of one, universal definition of this term.

Service activities is the backbone of modern economies and is increasingly supported by technology, but just like any other economic activity is associated with costs. A large part of the costs allocated to the implementation of the service relates to quality, which from the client's point of view is of fundamental importance in the receipt of the service rendered. Therefore, the estimation and disclosure of quality costs, which "hide" in implemented processes, gains significant value in a company. Sorting out costs related to quality allows an individual to be more aware of the problem of quality and process efficiency.

The first work on artificial intelligence was conducted by W. McCulloch and W. Pitts in 1943, who studied the model of artificial neurons. In their research, they showed that neuron activity is an "all-or-none" process, McCulloch and Pitts (1943). In 1950, M. Minsky and D. Edmonds built the first neural network computer, Akst (2019). The most significant event of this period was the work of A.M. Turing (1950) with his introduction to the Turing Test. The period from the mid-1950s to the early 1980s was about to formulate new hypotheses about programming languages and microcosms, but there was a lack of sufficient technology at the time. Industry investment in artificial intelligence and the construction of useful systems based on it began to become more significant after 1980 and continues to this day. The state-of-the-art examples of technologies using artificial intelligence are robotic vehicles, speech recognition, autonomous planning and machine translation. In the service sector, such examples are virtual assistants (chatbots), robotic service providers, as well as intelligent agents, Ferreira et al. (2020), Makridakis (2017), Burgess (2018). Ferreira et al. (2020) indicate that artificial intelligence has a very significant impact on the provision of services and provides breakthrough technological innovations whose consequences for services are yet unforeseen.

The presented applications of artificial intelligence in services and the economy allow to formulate the claim that the use of artificial intelligence can facilitate the proper identification of quality costs in service companies. For this to happen, it is necessary to develop appropriate software that will help to achieve the set goal. To build this tool, it will be necessary to use the theory of artificial intelligence, which indicates that its main components are in order: data set, computational operations and management module, Nilsson (2014). The data set is one of the most important elements of computer systems, as well as individual computer programs, which is responsible for maintaining and storing all data related to the unit's work, tasks performed, ways of making decisions. Their implementation depends on the wide range of information collected. The management module has a defined strategy and control of the operations of the entire computer system that are implemented by computing operations. As part of the article, work on artificial intelligence has been narrowed to the quality costs in the accounting systems of service companies.

Tool of Identifying the Quality Costs

The main assumptions adopted in the construction of the mechanism for identifying quality costs are: using the existing accounting system in the company, having an integrated management system and quality team, which is responsible for verification of quality costs in implemented processes, and also classifies them into appropriate cost groups. The created program should be based on the components of artificial intelligence: data set, computational operations and management module**,** Akerkar (2019).

Improving the operations of the Quality Team will be possible thanks to the introduction of a computer program called QC, whose task will be to identify the quality cost on the basis of information collected by the accounting system (invoices, other financial documents) and the integrated management system (complaint registers, error reports, information about processes) and

classifying it in the appropriate group of quality costs, The program will automatically assign the following data to each of the estimated costs: name of the process (in which it was created), name of the cost, type of cost, its amount, as well as the source document and will generate a collective quality cost estimation form, which is shown in Table 1.

Table 1: Quality costs estimation form

Name of the process	Name of the cost	Type of cost	The amount of the cost	The source document	Additional information
process No. 1	Cost No. 1				
	Cost No. 2				
	Cost No. n				
process No. 2	Cost No. 1				
	Cost No. 2				
	Cost No. n				
process No. n	Cost No. 1				
	Cost No. 2				
	Cost No. n				

Note: own elaboration.

A periodic summary statement of quality costs prepared on the basis of the quality cost estimation form will be forwarded by the QC program to the quality team for verification. A positively verified and approved document by the quality team will be the basis for preparing a comprehensive quality costs report, which should include quality costs analysis (size, structure, change dynamics, errors, indicators analysis, identification of places where quality costs arise and the processes most burdened by these costs). A periodic quality costs report should be forwarded to the accounting department. The proposed course of the quality costs identification process is presented in Figure 1.

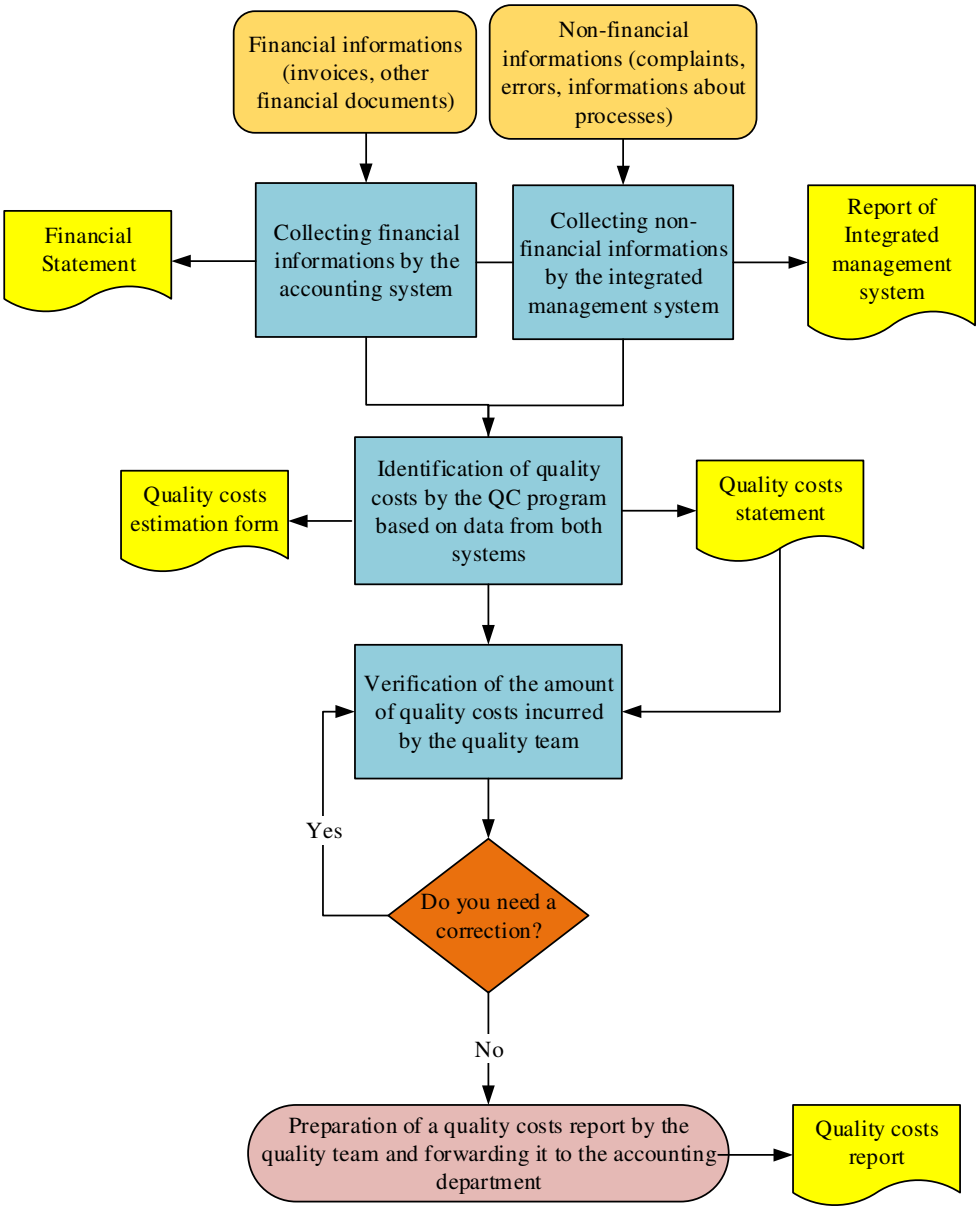

Fig. 1: Proposed process of identifying of quality costs using artificial intelligence
Note: own elaboration.

Results and Discussion

The creation of a computer program QC for identifying quality costs will have a positive impact on "shell" these costs from processes carried out in service companies and will provide an additional source of information for decision makers managing these organizations. The author of the publication recommends the creation of an interdisciplinary research team consisting of specialists in accounting, IT and artificial intelligence, whose goal will be to prepare and implement the QC program.

Automating the identification of quality costs using special computer software that complements the accounting system used will allow to: increase the efficiency of hidden quality costs detection in processes, reduce human errors, save the work time of the quality team and incurred costs, as well as improve business decision making in service companies and will contribute to increasing the quality of services provided and increasing the quality awareness of employees responsible for individual processes. An investment in artificial intelligence to estimate quality costs will help optimize processes in service.

The process of identifying quality costs proposed by the author is based on the use of the accounting system and integrated management system implemented in the service companies. Lack of possession of these two systems will forbid the use of the proposed QC program.

Summary

To sum up, it should be stated that the preparation of a computer program identifying quality costs will require cooperation with specialists in the IT sector, because only in this way will it be possible to fill the existing gap between accounting and artificial intelligence, Stancheva-Todorova (2018).

An efficient program that identifies quality costs should support the work of the quality team, the accounting department and the head of integrated management systems. The next step in extending the use of this tool should be its use to create a computer program for quality costs calculation, Sadkowski (2019).

The process of identifying quality costs using artificial intelligence proposed by the author is an innovative accounting solution that bridges the gap in recognizing and estimating quality costs in services. Creating this program will allow to take the next technological step in the development of IT accounting systems and automate the process of identifying costs related to quality.

The presented article may be an introduction to in-depth research in the field of the effectiveness of the use of artificial intelligence in identifying the quality costs of service companies. It is recommended to continue research in the field of verification of the use of the QC computer program by service companies and preparation of a tool for quality cost calculation based on artificial intelligence.

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Workplace Relations a Panacea for Job Performance: A Case Study of a Manufacturing Company, Ota, Ogun State, Nigeria

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Abstract

This paper aimed to examine workplace relations a panacea for job performance in a manufacturing company in Ota, Ogun State, Nigeria. It investigated the factors such interpersonal relations vis-à-vis mentoring that affect job satisfaction. The population for this study, comprised of organizational employees in the food & pharmaceutical manufacturing company in Ota, comprised of 200 respondents. To reach the objectives for this study, the researcher developed and distributed and collected questionnaires, and analyzed the data obtained from the questionnaires using SPSS. An overall analysis was conducted based on the descriptive and correlation analysis. The findings of this study revealed that interpersonal relations and mentoring have significant effect on job satisfaction. The paper provided recommendations for fostering interpersonal relations and mentoring in the manufacturing organization in Nigeria.

Keywords: Interpersonal Relations, Job Satisfaction, Mentoring and Job Performance.

Introduction

In the business world, there are two categories of organizations and this includes the profit-making organization and the non-profit organization. Both of these organizations were created in order to attain organizational objectives. Objectives are measurable, specific and have a definite time of completion (Abdulla, 2018), which ultimately leads to job performance (Mundia & Iravo, 2014; Abdulla, 2018). Hence, no organization can exist or achieve its specific set of objectives on its own without the availability, use, association, and involvement of human resource and their skills (Fulmer & Ployhart, 2013; Omur & Derya, 2013). In relation, understanding the human resource aspect of an organization

considering that they are the most essential factor in the workplace is vital to attaining workplace objectives (Xesha, Iwu, Slabbert & Ndunai, 2014; Sequeira & Dhriti, 2015). Thus, in essence, can bring about enhanced job performance.

According to Thushel (2015) job performance is characterized as behaviors or actions that are performed to achieve the workplace's objectives. Himanshu (2015), added that job performance is as a result of positive relationship behaviors between employer and employee as well as colleagues in the organization. In support, it was argued that employees perform well through good relationship management existing among individuals or groups of people working together, and are willing to get things done in harmony and peacefully (Emily & Jacob, 2014; Onwu, 2012). Iqbal, Ijaz, Latif, and Mushtaq (2015) opined that different factors at the workplace affect job performance (job satisfaction) of workers and this includes workplace relationship practices. Therefore, in gaining enhanced level of job performance, satisfaction and engagement, it is essential to have effective workplace relationship practices. These practices involve mentoring, interpersonal relations and other positive interactions between employees that are behaving in a properly responsive manner thereby affecting job performance level (Osibanjo, Abiodun & Obamiro, 2011; Deme & Worlu, 2017). Bajaj, Sinha, and Tiwari (2013) revealed that increased trust and interpersonal relations reduce working environment issues. Hence this study believes that workplace relations will drive job performance in the workplace.

Workplace relations, therefore, can be referred to as the formal or informal interaction that exists between overall employees. It also involves employee relations practices. Employee relations practices are key concepts which involve positive interpersonal relations and mentoring practices for enhancing overall job performance in an organization. High performing employees translate their organizations into successful organizations through positive workplace relations. In addition, Sulaimon, Muhammed, Raji, Omede, and Sulaiman, (2016) added that it is a form of social relationship that is part of human beings' characteristics. Elnaga and Imran (2013) drew opinions from many research work and Hawthorne studies that the effectiveness and efficiency of employees is a pointer to the fact that employees are enthusiastic about their job as a result of existing positive workplace relationships. Healthier employee relationships existing within an organization provides a better chance for employees to perform better within a competitive business environment (Dele, 2013).

Moreover, in a highly competitive and turbulent environment faced by firms today, firms depend mainly on the quality of its employees and the relationship developed with them to attain success and sustenance (Worlu, Osibanjo, Ogunnaike, Salau, & Igbinoba, 2016).

Therefore, in undertaking this study, the researcher developed some research objectives, research questions and hypothesis, and made use of extensive literature in relation to this study. Answers to the research questions were provided by the researcher through analyzed questionnaires from respondents in the manufacturing sector suitable for this study.

Objectives of the Study

Examining workplace relations as a panacea for job performance is the main objective of this study.

The primary objectives therefore are broken down into specific objectives which are to:

i. determine the effect of interpersonal relations on job satisfaction.

ii. investigate the influence of mentoring on job satisfaction

Research Questions

i. to what extent can interpersonal relations affect job satisfaction?

ii. in what way has mentoring influenced job satisfaction?

Research Hypotheses

HYPOTHESIS 1

H_0: interpersonal relation has no significant effect on job satisfaction.

HYPOTHESIS 2

H_0: mentoring has no significant influence on job satisfaction.

Literature Review

Interpersonal Relations

In today's workplace, an interpersonal relationship is an important factor. Interpersonal relationship can be referred to as a form of social communication existing among workers at all levels either working together as a team or working together in a work unit.

In addition, workplace interpersonal relations play a vital role as well as a critical precondition for effective business (Olannye, 2014). It is an employees' repeated interactions and participation in the building of relationships through soft skills and organizational communication is a part of interpersonal relations (Adesubomi, 2015). Interpersonal relationships can be referred to as that association existing between individuals at work such as between employees and colleagues at all levels. Employees at levels as well as employers engage in interpersonal relations which takes the form of networking, being assertive, handling emotional behavior and conflict, communication, working in teams or groups, negotiating, handling politics, liaising with customers, performing in a politically smart and moral way to secure the objectives of the HR (Armstrong, 2016). There is a need for long-term beneficial social relationships in the work environment as it represents a stabilizing factor that promotes emotional and cognitive involvement in the work environment as well as promoting employees' attachment to the organization (Zenobia, 2015).

Singh (2012) as cited in the work of Ombayo, Shiamwama and Egessa (2014) affirms that the benefits of a firm's level of outcomes, among others, is as a result of the investment in training employees in issues around interpersonal relations according to research indications.

Mentoring

Mentoring is an employee developmental activity that happens formally and informally in the workplace. Organizations that have mentoring programs experience enhanced success and retains satisfied employees (Tewari & Sharma, 2014; Washington, 2010).

In addition, among other strategies for managing human resources in the workplace mentoring is one of the most essential. It is used to strengthen employee relations, sustain the firms' competitive advantage, build firms' knowledge and provides a one on one basis whereby the younger employees have the opportunity to gain experience and wisdom from the matured and more experienced individuals in the firm (Rollins, Rutherford & Nickell, 2014; Ofobruku & Nwakoby, 2015). In other words, mentoring brings opportunity for the formulation of close relationship between one or more persons.

Tewari et al (2014), opined that mentoring can be referred to as one of the top strategies for advancing and developing a career. Similarly, the researchers defined it as a form of the relationship existing between a more experienced organizational member of with a less experienced organizational individual which provides employees the opportunity to share their personal and professional skills as well as experiences, and in the process leading to growth and development. However, Rollins, et al (2014); Arogundade (2011) asserted that a mentor can be defined as the individual that provides insight and knowledge sharing that have been learned through the years to facilitates or enhance the professional and personal growth of an individual. Maintaining and improving an organization's competitive advantage and employee development through mentoring encompasses the activities encouraged and designed by management (Abomeh & Mohammed, 2016).

Job Satisfaction

A very vital component of an organizations' checklist is job satisfaction. It brings a positive effect in the workplace and it's vital to the organization's employees across all levels (Saad, Muhammad & Rafi, 2012). Satisfaction can be referred to as a mental state of a person in a job. Furthermore, job satisfaction gives an understanding of knowing the reason people work, the level at their job satisfy them and how they get satisfied (Rahman, Gupta & Moudud-Ul-Huq, 2012).

Moreover, there are expectations needed from the organization by employees in other to be satisfied among others (Bakotic & Babic, 2013, Adeniji & Osibanjo, 2012). Job satisfaction is the appraisal of one's job experiences that leads to an emotional state that is both pleasurable and positive (Malik, Danish & Munir, 2012; Singh & Mini, 2013). As employees become contented with their job, job satisfaction is enhanced. Satisfied wants of employees lead to a contentment experience which forms the overall attitude of employees towards work (Chetna & Rajnie, 2012).

Additionally, Shahab and Nisa (2014) opined that job satisfaction is seen as the workplace employees' overall beliefs and collection of feelings regarding their current jobs. In additionally, the job satisfaction level of a worker can range from a very high satisfaction to a very high dissatisfaction (Mohammed & Eleswed, 2013). Job satisfaction is defined as when the employee fulfills their desire at the workplace as a result of their full commitment and happiness with their work (Saad, et al., 2012).

In particular, among many other factors employee performances can be enhanced by satisfied a worker who continuously achieve the goal in line with his or her job (Solanki, 2013). From the standpoint of employees, managers and scientists job satisfaction is an interesting issue.

Empirical Review

Olannye (2014) pointed out in his study on interpersonal relationship that the findings revealed that good interactions that are friendly in nature showed a vast positive effect on the retention of customers. Thus, depicting in a long run the level at which employees are satisfied as a result of friendly interactions which affects the retention of customers. Furthermore, with the findings the study concluded that interpersonal relationship is a vital weapon for competitive advantage in the hotel industry due to its possibilities in

provoking interaction that are friendly, which fosters satisfaction, loyalty, and emotional attachment among others, to the service providers.

Mohammed, Asombo and Daniel (2018) indicated from their study on interpersonal relationship and job performance that from the hypotheses tested, it indicated that there was a significant relationship between interpersonal relationship and job performance among employees. Therefore, the findings shows that there is a relationship between interpersonal relationship and job satisfaction that translates into job performance because there cannot be performance without some level of satisfaction.

Yang, George and Yaojiang (2014) in their study on mentoring found out that the mentees math score was not improved through the program but rather their learning stress increased. In addition, math scores of mentors were improved significantly by 0.57 standard deviations through the program and with no significant change in their mental health scores lowering their dropout rate by 3%.

An empirical work by Rhay-Hung, Ching-Yuan, Wen-Chen, Li-Yu, Syr-En, and Mei-Ying (2010) in their study on the impact of mentoring on job satisfaction and commitment. Their findings showed that between employee mentoring and job satisfaction, employee mentoring has a positive effect. Sebastian and Zacharias (2015) carried out a study on employee mentoring and affective commitment: a study among new generation private sector bank employees in Kerala. However, 36 employees working ICICI bank, HDFC bank and Axis bank were selected using convenience. The findings proved that there exists a positive effect of employee mentoring on employee commitment.

Furthermore, in the work of Shagufta and James (2013) a total of 110 respondents at two private organizations were administered through a constructed questionnaire. These questionnaires were also tested. Out of the administered questionnaires analyzed with Microsoft excel to test the hypotheses of the study were a total of 104 usable surveys. Positive job satisfaction of employees was induced by rewards as shown by findings. Moreover, revealed through findings was that employees' loyalty to the organization was stimulated by their job satisfaction. However, employee pay and the amount of work they do record a very high level of employee dissatisfaction in it.

Research Methods

Basically, the primary method of data collection was adopted in this study. This study also adopted a descriptive survey research design. A sample of 200 respondents was contacted in the manufacturing sector in Ota, Ogun State, Nigeria to obtain responses of the questionnaire. sThe questionnaire was divided into three parts: section A contained the biodata of the respondents, it was made up of the respondents' sex, age, marital status, religion, educational qualification, and length of service while section B (independent variable) and C (dependent variable) consists of questions that relate to this study and would be able to answer the researchers' questions. In addition, Likert scale was used for section B and C with the calibration of Strongly-Agree (SA), Agree (A), Undecided (U), Disagree (D) and strongly-Disagree (SD). Cronbach's Alpha was used to check reliability. All in all, responses were analyzed with the use of Statistical Package for Social Sciences (SPSS) and simple linear regression was used to indicate significant effect of interpersonal relations on job satisfaction, as well as indicating significant influence of mentoring on job satisfaction.

Data Presentation, Analysis and Interpretation

Table 1: Analysis of Response Rate

RESPONSE	NUMBER OF RESPONDENTS	PERCENTAGE (%)
RETURENED	146	73
NOT RETURNED	54	27
TOTAL DISTRIBUTED	200	100

From the analysis above Table 1, 146 respondents which represent 73% of the total retrieved questionnaire will be analyzed in this work while a total of 54 respondents which consist of 27% could not be retrieved. The analysis and findings will be based on the 73% responses retrieved from the employees consisting of 146 respondents.

Test of Hypotheses

In the course of this study two (2) hypotheses have been posed and checked using regression analysis. In regression analysis, we consider the alternative hypothesis and reject the null hypothesis and vice versa when the relevant (sig) value is less than 0.05 for 95 percent confidence level or less than 0.01 for 99 percent confidence level.

In order to test the hypotheses, linear regression analysis and correlation were used.

Test of Hypothesis 1

***Research Objective 1*:** Determine the effect of interpersonal relations on job satisfaction.
***Research Question 1*:** To what extent can interpersonal relations significant effect job satisfaction?
***Hypothesis 1*:**
H_0**:** Interpersonal relations have no significant effect on job satisfaction.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.783[a]	.614	.611	.43765

a. Predictors: (Constant), Interpersonal relations

b. Dependent variable: Job Satisfaction

Interpretation of Results

The model summary Table 2 reveals how much the independent variance in the outcome (job satisfaction) is explained by the predictor variable (interpersonal relations). In this case the R square is 0.614 when indicated by percentage it will be 61.4%. This means that the model explains 61.4% of the variance in the levels of job satisfaction can be predicted from interpersonal relations, which suggest that interpersonal relations is a very good predictor.

Table 3: ANOVA

Model		Sum of Squares	Df.	Mean Square	F	Sig.
1	**Regression**	43.849	1	43.849	228.930	.000[a]
	Residual	27.582	144	.192		
	Total	71.431	145			

a. Dependent Variable: Satisfaction

b. Predictors: (Constant), Interpersonal Relations

Interpretation of Result

Table 3 reveals the valuation of the statistical significance of the result. However, In order to know if the null hypothesis is statistically significant the ANOVA table test is carried out. From the result, the model in this table is statistically significant as the F value is 228.930 at 0.000[b]. Implication is that interpersonal relations as a predictor was significantly better than the prediction without interpersonal relation. Hence, interpersonal relation has a significant influence on job satisfaction.

***Decision*:** The null hypothesis H_0 is rejected. Therefore, there is a significant effect of interpersonal relations on job performance.

Table 4: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	**Std. Error**	**Beta**		
1	(Constant)	.552	.135		4.081	.000
	Interpersonal Relations	.784	.052	.783	15.130	.000

a. Dependent Variable: Job Satisfaction

Interpretation of Result

The coefficients Table 4 indicates the extent to which interpersonal relations has effect on job satisfaction. In this table, the beta coefficient is 0.784 and this implies that holding other variable constant, for every one unit increase in interpersonal relations would result in 78.4% increase in job satisfaction level.

From the above table, it can be concluded that interpersonal relations has a significant effect on job satisfaction. Therefore the null hypothesis H_0 is rejected.

Test of Hypothesis 2

***Research Objective 2*:** Investigate the influence of mentoring on job satisfaction?
***Research Question 2*:** In what way has mentoring influence on job satisfaction?
Hypothesis 2:
H_0**:** Mentoring has no significant influence on job satisfaction

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.768[a]	.590	.587	.45107

a. *Predictors: (Constant), Mentoring*

Interpretation of Results

The model summary Table 5 reveals how much the independent variable (mentoring) explains the level of variance of the dependent variable (job satisfaction). In this case the R square is 0.590 if indicated by percentage will be 59.0%. This means that the model explains 59.0% of the variance in the levels of job satisfaction was predicted from the level of mentoring which suggest that mentoring is a good predictor.

Table 6: ANOVA

Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
1	**Regression**	42.132	1	42.132	207.075	.000[a]
	Residual	29.299	144	.203		
	Total	71.431	145			

a. *Dependent Variable: Job Satisfaction*
b. *Predictors: (Constant), Mentoring*

Interpretation of Result

Table 6 shows the valuation of the statistical significance of the result. More so, in order to know if the null hypothesis is statistically significant the ANOVA table test is carried out. From the result, the model in this table is statistically significant showing the F value to be 207.075 at 0.000[a]. This implication is that mentoring as a predictor was significantly better than the prediction without mentoring. Hence, mentoring has a significant influence on job satisfaction.

Decision: The null hypothesis H_0 was rejected. Therefore, there is a significant influence of mentoring on job satisfaction.

Table 7: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.460	.148		3.103	.002
	Mentoring	.836	.058	.768	14.390	.000

a. Dependent Variable: Job Satisfaction

Interpretation of Result

The coefficients Table 7 indicates the extent to which mentoring has influence on job satisfaction. In this table, the beta coefficient is 0.836 and this implies that holding other variable constant, for every one-unit increase in mentoring, it would result in 83.6% increase in job satisfaction level.

From Table 7, it can be concluded that mentoring has a significant influence on job satisfaction. The null hypothesis H_0 was rejected.

Discussion of Objectives

In the course of this study, two (2) hypotheses were drawn and tested using the simple linear regression analysis. Based on the analyses, findings were presented below in line with the objectives of the study;

Objective 1: to determine the effect of interpersonal relations on job satisfaction.

The findings of this study were based on the statistical data analyzed and hypotheses tested. The analysis of data collected showed that interpersonal relations is a significant predictor of job satisfaction. This finding is supported the work of other scholars such as (Olannye, 2014; Mohammed, *et al*., 2018). Olannye (2014); Mohammed, et al (2018) have been able to determine the effect of interpersonal relations on other relating variable such as customers retention and job performance (dependent variables) respectively that depicted a positive relationship. For instance, in the work of Olannye (2014) it revealed that interpersonal relations had a positive effect on the retention of customers. Thus, revealing there is a relationship between interpersonal relationship and job satisfaction because as employees are satisfied as a result of friendly interactions, this will translate to also affect the retention of customers. All in all, the

null hypothesis one (1) for this study was rejected as findings reveals that there was a significant effect of interpersonal relations on the level of job satisfaction.

Objective 2: To investigate the influence of mentoring on job satisfaction.

The findings from the retrieved analysis of data indicated that mentoring is a significant predictor of job satisfaction. The finding is support by other scholars which includes (Rhay-Hung *et al.,* 2014; Shagufta & James, 2013; Sebastian & Zacharias, 2015). However, even though these scholars used other dependent variables for their work, their work showed that interpersonal relation has some form of influence on job satisfaction. On the other hand, Yang *et al* (2014) was not able to clearly investigate and unveil the influence of mentoring on job satisfaction while using a different dependent variable like the aforementioned scholars. For example, Rhay-Hung et al (2014) was able to reveal that mentoring has a positive effect on employees' commitment. Hence, indicating that since mentoring has a positive effect on employees' commitment then there is some form of positive influence of mentoring on the satisfaction of employees. Thus, this study considered mentoring to be vital and having a positive effect on job satisfaction within an organization. The null hypothesis was rejected being that findings from this study indicate that there was a significant influence of mentoring on the level of job satisfaction.

Contribution to Knowledge

This study has contributed to knowledge by providing through its empirical review valuable collection of ideas, facts and figures that are essential to employers, entrepreneurs, lecturers, students and other scholars in understanding significance of workplace relations as a panacea for job performance within the organization.

Also, this study has contributed to knowledge by providing findings that can be applied, compared and observed respectively with other findings from related studies conducted in business institutions and organizations in Nigeria as well as in the globe. Furthermore, this study has provided more basis for further studies to be conducted in this area of workplace relations a panacea for job performance in other manufacturing organizations

Finally, another contribution to knowledge is that the study has been able to further establish the importance of interpersonal relations and mentoring within the organization in facilitating job satisfaction.

Conclusion

The focus of this study was on workplace relations a panacea for job performance: a case study of manufacturing company in Ota, Ogun State, Nigeria. It was observed that even though through the responses of respondent that employee relations was fairly satisfactory in the selected manufacturing company, the results still shows that employee relations has a significant effect on job performance and is capable of affecting the overall success of an organization. However, it can be safely concluded that the success of an organization may be jeopardized if there is low job satisfaction of employees. Negative trend of low job satisfaction can however be reversed if interpersonal relations and mentoring are improved upon within an organization.

Recommendation

Based on the empirical findings from the objective for this study, indicating that interpersonal relations is a significant predictor of job satisfaction and has a significant effect on job satisfaction. The researcher recommends that management of the organization should ensure that they increase the level of attention and actions necessary to foster interpersonal relations within the organization.

Again, the researcher recommends that since the empirical finding based on the objective for this study indicates that there is a significant influence of mentoring on the level of job performance. Management of the organization should encourage mentoring within the organization as much as possible. Allowing mentoring within the organization will improve the attention to personal problems, encourage fair employee treatment, shared personal knowledge and experiences for good employee relations and ultimately increase the level of job performance between employees at all levels.

Suggestions for Further Studies

This study focused on employees within Nigeria. The employees were respondents based in a manufacturing company in Ota, Ogun state, Nigeria. Moreover, the following suggestions will be beneficial for future research. Studies in line with this subject area workplace relations a panacea for job performance should be carried out in other manufacturing organizations within and outside Nigeria by interested researchers so as to ascertain whether the findings in this study is similar to other context. In addition, studies should be done by studying and comparing more organizations at the same time. In addition, scholars carrying out further studies in this area should indicate and clearly state the variables used in their undertaken studies.

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Space Management During the Pandemic (COVID-19)

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Abstract

Key issues in this context include spatial order protection, the role of spatial planning in integrated development planning, adaptation of space management to the ever-changing role of cities (and urban policy principles), or the way to reconcile different - even from the perspective of scientific disciplines - perspectives related to the perception of priorities and directions of spatial policy. The analysis would then have to take into account the diverse context (economic, political, spatial, etc.) of these countries. Conclusions - relating to the thematic areas presented above - can generally be reduced to:

- assessment of actions taken (both on a national, regional and perhaps primarily local scale);
- developing short-term and long-term recommendations for further actions.

The invitation to implement this research project is addressed to all authors dealing with broadly understood issues of spatial policy in various countries.

Keywords: Covid-19, Pandemic, Space Management

Introduction

Issues related to space management (also recognized as spatial policy) translate into a number of attractive research issues. Key issues in this context include spatial order protection, the role of spatial planning in integrated development planning, adaptation of space management to the ever-changing role of cities (and urban policy principles), or the way to reconcile different - even from the perspective of scientific disciplines - perspectives related to the perception of priorities and directions of spatial policy. The COVID-19 pandemic, however, generates additional problems that also need to be included in the spatial context.

Space Management and Malfunction of Public Authorities

In the literature on the subject of various countries, the priorities and directions of space management are discussed in various ways. The following issues may be considered as particularly interesting (in terms of research, also in the sphere of international discussion):

- the optimal scope of state intervention in the economy and translating related conclusions into a range of possible activities regarding space management (Mickiewicz, Nowak, 2013; Olbrysz, Zachariasz, 2015);
- protection and shaping of spatial order and the optimal scope of limiting the rights of property owners associated with it (Sleszynski, 2018; Gibas, Majorek, 2020; Heffner, Czarnecki, 2015);
- environmental protection in space management (Degorska, Deregowska, 2008);

- social and economic effects of urban spatial development (including the problem of so-called *suburbia*, also in the field of urban sprawl) (Shucksmith, 2010; Sleszynski, 2018);
- integrated development planning, also in the dimension related to regional policy (Maibach et al. 2008).

These kinds of topics can be multiplied. Nevertheless, even their brief presentation will allow to signal the scale of problems and dilemmas related to the space management. In each of the above-mentioned issues, it is possible to distinguish the conflict between conflicting (at least after initial analysis) reasons and directions. In each of these cases, there is also the issue of possible malfunction of public authorities.

This context should be carefully considered when describing another research problem. There is no doubt that the current pandemic causes a number of long-term changes that should also be associated with the sphere of space management. Generally speaking, it can be pointed out that in the analyzed context, the following planes can be distinguished:

- assessment of the authorities' actions - both in the first stage of pandemic, in conditions of relative calming of the pandemic, but also in relation to the economic crisis. Of course, this is the context related to the spatial management system, which boils down to determining whether and to what extent the national authorities change the spatial management system (even temporarily) in relation to the indicated situation, and as in the individual periods identified above, local authorities use direct spatial policy tools: how the frequency of actions changes and what it looks like - a conflict that occurs on such occasions: the speed of planning procedures versus maintaining optimal values for the spatial management system;
- assessment of the possibilities and institutional framework for implementing the social distance project. There is no doubt that at least in the next several months, the so-called *project of social distance* will be incorporated. The spatial framework related to this issue was included, among others, by Richard Florida. It will boil down to imposing a different form of development of numerous facilities, as well as (with a broader understanding of the terms "space management" and "spatial policy") linking to this specific support activities for specific business entities and non-profit organizations. However, it should be stipulated that guidelines and recommendations at the national level are not enough. Analyses and actions at a local level are necessary. Therefore, the possibilities (including institutional ones in this respect) should be verified, followed by the accepted practice;
- assessment of the impact of the economic crisis caused by the pandemic on space management. There is no doubt that also spatial policy entities (also at the local level) must monitor the changes taking place in the socio-economic sphere and, if possible, adapt to them. Sometimes, such a reaction will be reduced to the modification of the applied spatial policy tools, and at other times, to more subdued actions. The systemic problem will be the categorization of these activities and adaptation to specific needs and challenges.

These assumptions will be specified as data on specific activities in municipalities are available and knowledge about the time frame of the pandemic, its economic effects and necessary spatial restrictions is expanded. There is no doubt, however, that an optimal approach to this problem would be covering several countries at least. The analysis would then have to take into account the diverse context (economic, political, spatial, etc.) of these countries, but the authors are convinced that it is possible to make reliable comparisons and draw, at least in part, joint conclusions. These conclusions - relating to the thematic areas presented above - can generally be reduced to:

- assessment of actions taken (both on a national, regional and perhaps primarily local scale);
- developing short-term and long-term recommendations for further actions.

Therefore, the invitation to implement this research project is addressed to all authors dealing with broadly understood issues of spatial policy in various countries. Regardless of the holistic approach to the problem, more detailed analyses relating to selected issues are also possible.

Fast actions are not Necessarily Functional Actions

To clarify the possible way of addressing this issue, it is possible to signal a part of the indicated conditions (currently possible to present and initial diagnosis) occurring in Poland. At this stage, they come down to the activities of public authorities translating directly into the sphere of space management.

First of all, it is necessary to signal the immediately noticeable dilemma regarding the speed of implementation of planning procedures in relation to the preservation of key values in the spatial management system. The example can be the pressure to quickly adopt (in some municipalities) both strategic and regulatory spatial planning acts, at the cost of even broadly limiting the social participation. These dilemmas have expanded after the adoption of the Act of March 2, 2020 on special solutions related to the prevention and control of COVID-19, other infectious diseases and emergencies caused by them (Journal of Laws 2020, item 374 as amended - legal status for April 2020). In the original wording, the following provisions could be associated with the issues of preparing the spatial policy tools:

- Art. 12 of the Act pursuant to which, among others, the provisions of the Act on spatial planning and development shall not apply in the design, construction, reconstruction, renovation, maintenance and demolition of buildings, including changes in use, in connection with the prevention of COVID-19;
- Art. 15zzs. 1, according to which, during the period of the state of epidemic threat or the state of epidemic, constitutive bodies of local government units and collegial bodies: executive bodies in local government units, in associations of local government units, in a metropolitan association, in regional accounting chambers and self-government appeal boards, may convene and hold deliberations, sessions, meetings, assemblies or other forms of action appropriate for these bodies, as well as make decisions, including resolutions, using means of distance communication or by correspondence (remote mode of meeting);
- Art. 15zzs. 8, according to which the time limit for tacit settlement of the case and in another case in which the authority does not express an objection, issue a decision, order or other resolution, entitles the party or participant of the proceedings to take action, perform actions or affects the scope of the participant's rights and obligations - does not start and the started one is suspended.

However, after passing the so-called II of the anti-crisis shield (mid-April 2020), changes were introduced according to which the suspension of deadlines does not apply, among others, to:

- dealing with strategic and regulatory spatial policy tools to the extent that they agree on their projects;
- issuing decisions on development conditions considered as the most disintegrating spatial order of solutions.

These changes were aimed at enabling the planning activities also during a pandemic (to an extent other than the one agreed above). The legislator's reference to the arrangements and opinions was linked to previous practice, under which opinion giving and agreeing bodies very often did not express their opinions on specific planning acts within the required time limit and was considered their tacit agreement. The provisions of previous wording of the "anti-crisis shield" prevented from the continuation of such practice (the lack of authority response, in principle, cannot be considered tacit agreement during a pandemic, unless a specific exception is provided for in this respect). At this stage, the speed of implementation of planning procedures does not seem to be the most important goal – especially since the current planning practice carried out in ordinary conditions raised a number of huge doubts (an important issue still arises in this context: the relation of planning procedures to values in the spatial management system). On the other hand nothing should be done in haste but gripping a flea. As part of the anti-crisis shield, can also be observed the introduction of various solutions that are highly debatable in terms of their impact on mitigating the effects of the impending crisis. An example of such activities may be facilitating the construction of 5G masts by

removing the need to obtain building permits and only notification. It is also worth noting that on the one hand, the government suspends the deadlines for administrative proceedings (e.g. public participation), which extends the deadline for obtaining a construction decision, on the other hand it alleviates the restrictions, as in the case of the 5G masts mentioned above.

Conclusion

The authors intend to develop these issues in their further research. Especially that the polish government announces work on the 3.0 anti-crisis shield. Similar approaches would in depth cover the perspective of other countries. At this stage, the goal of this type of research is to diagnose new conditions and propose optimal solutions in the field of space management problems caused by the COVID-19 pandemic and their socio-economic consequences.

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Econometric Analysis of the Assessment of Politicians' and Public Servants' Statements on Changes in the Oil Price

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Abstract

The purpose of the study is to examine the impact of politicians' and public servants' statements on changes in the oil price. In the research, the authors used the technique for time series study that combines the consistent application of fractal and regression analysis with the use of dummy variables. The study shows that various politicians' and public servants' statements (especially foreign ones) are a real tool for influencing the oil price. The results suggest that if the oil price declines during a period of time, it will soon start to increase and this process will take about 18 days. All factors, except the one that characterizes politicians' and public servants' statements, affect the oil price, and it decreases by 0.02 USD. The above mentioned statements lead to an increase in the oil price by an average of 10.04 USD.

Keywords: fractal analysis, regression, politico-economic statements, oil price.

Introduction

According to Bouri and Demirer (2019), the world oil market is developing continuously, yet chaotically, therefore, there is a need to explore the causes of its fluctuations. Research by Elian, Kisswani (2018), Muradov et al. (2019) shows that the key factors affecting the oil price are the reduction of commercial crude oil inventories, weakening dollar, natural disasters, political and military tension in production countries and actions of oil speculators. However, the main factors of the oil market cannot affect the oil price, which changes monthly or even daily. Recent developments in the oil market only confirm the previous statement. A drop in crude oil demand caused by the coronavirus pandemic and oil-producing countries struggling to agree on production cuts resulted in the oil price crashing after the leaders of Saudi Arabia claimed they would increase output.

After President Donald Trump tweeted about his conversation on the oil price with the Crown Prince of Saudi Arabia Mohammed bin Salman, the oil price went up. Brent crude rose 23.36% to finish at

$30.52 a barrel. There also were cases when Brent crude rose 40% to $35.99 per barrel. The above-mentioned statements are often used to manipulate the oil price, which poses a serious problem for oil market participants.

A lot of politicians, deputies and members of the parliament seem to be unaware of the seriousness of their statements or simply do not understand how their words influence the state of the stock market, exchange rates or the oil price. On the other hand, there is another group of people that knowingly makes certain political, economic and other statements to influence the trading in financial instruments, dollar exchange rate or the oil price and cause fluctuations that probably wouldn't take place without those statements.

Therefore, statements made via mass media including electronic media, information and telecommunication networks (including the Internet), are not only a way of competing and playing the market, due to the fact that many politicians and public servants own securities, stocks and shares in the authorized capitals of companies, but also massive leverage over the political and socio-economic situation in countries.

According to Pirrong (1996), if we analyze the studies on this issue, most of them are devoted to various legal problems related to the deliberate spread of false information via mass media, i.e. market manipulation. In this paper, we will not determine the legal essence of those statements (besides, they do not always contain false information), but will try to understand how they influence the oil price. Note that there are not enough studies devoted to mechanisms of statements and construction of econometric models to evaluate the impact of statements on econometric indicators.

Methods of Research

In the research, we used the time series technique. Based on the data provided by the World Bank, the initial information base was created for daily prices of Brent crude from 29.04.2016 to 15.04.2020. We also created a database for statements made by politicians and public servants via electronic media, information and telecommunication networks (including the Internet). The oil price (*Y*) is an endogenous variable, and politicians' and public servants' statements (*X*) - an exogenous variable.

In accordance with the purpose of the study and the research by Sottinen (2001), we carried out a fractal analysis based on the relationship between future prices and their previous changes to determine the length of the forecast period. In order to conduct a fractal or R/S analysis to determine the time interval and politicians' and public servants' statements that influence the oil price, we need to converse the series and proceed with the determined price increment:

$$\Delta y_i = \ln\left(\frac{y_{i+1}}{y_i}\right),$$

which can be considered as the impact of a certain statement. Next, we normalize and center the values:

$$\Delta Y_i = \frac{\Delta y_i - \overline{\Delta}}{\sqrt{\mathrm{var}}},$$

where $\overline{\Delta}$ is an average value for Δyi, var is the Δyi dispersion. The next step is to calculate the average accumulated values:

$$M_t = \frac{1}{t+1}\sum_{u=0}^{t}\Delta Y_u ,$$

at t=0, 1, ..., n-2, and the cumulative deviation:

$$X_t = \sum_{u=0}^{t} (\Delta Y_u - M_u).$$

The following step is to determine the cumulative deviation range, which is $R_t = \max(M_t) - \min(M_t)$, the standard deviation is:

$$S_t = \sqrt{\frac{\sum_{u=0}^{t} (\Delta Y_u - M_u)^2}{t+1}},$$

and the standardized range of the cumulative deviation for *n* periods is:

$$R/S_t = \frac{R_t}{S_t}.$$

The obtained function should be compared to the Hurst exponent:

$$R/S = aN^H,$$

which shows the deviation of the process from the random walk H=0.5. If H differs from 0.5, the observations are independent. Each observation contains memories about all previous events, such dependence is called long-range and it theoretically persists, unlike the short-range (or Markov) dependence. The impact of present on future can be expressed by a correlation ratio:

$$C = 2^{2H-1} - 1,$$

where C is the measure of correlation, H is the Hurst exponent. The Hurst exponent can be determined by the following equation:

$$H = \frac{\ln(R/S)}{\ln(n/2)}.$$

If H-0.5, the series is random and the events are uncorrelated, C=0 and present does not affect the future. If 0<H<0.5, such series is called ergodic, i.e. if the system was showing an increase over the previous period, then there will probably be a drop in the next period. The stability of behaviour depends on how close H is to 0: the closer H is to 0, the closer C is to (-0.5), i.e. the negative correlation. If 0.5<H<1, the series is persistent, which means that it sustains the trend in the future. The closer H is to 1 (C to 1), the stronger the trend is expressed.

To characterize the impact of statements made by politicians and public servants of economically developed countries via mass media, we constructed a regression equation with a dummy variable:

$$\tilde{Y}_t = a + bt + cx,$$

where t is time,

$$x = \begin{cases} 1, \textit{the statement} \\ 0, \textit{other} \end{cases}.$$

Research and discussion

The fractal analysis is based on the dependence of future prices on previous change. The purpose of the analysis is to determine the length of the forecast period. The cumulative deviation range in our case is $R_t = 0{,}2665$, the standard deviation is $S_t = 1{,}002$ and the standardized range of the cumulative deviation for *n* periods is: $R / S_t = 0{,}2671$, the Hurst exponent H=0.1788 an the measure of correlation C=0.609.

Since 0<H<0.5, the series is ergodic. In other words, the result indicates that, firstly, if the oil price is decreasing continuously, then soon it will start to rise and this process will take about 18 days.

Secondly, since the Hurst exponent did not reach 0.5, we cannot discard the fact that the oil price is influenced by previous statements made by politicians and public servants. We believe that this can be explained by the data considered in the *x* variable (most statements were related to sanctions imposed on Russia, Iran and China).

To evaluate the impact of statements on Brent crude price dynamics, we assessed the relationship between the oil price and statements made by politicians and public servants via mass media, including electronic media, information and telecommunication networks (including the Internet), using the STATISTICA package. The results are presented in table 1.

Table 1: parameters of the regression equation, impact of factors on the oil price

Indicators	Regression equation coefficient	Standard error of the regression coefficient	Student's *t*-test	*p*-significance level
The intercept	78.45	0.950	82.60	0.0000
t	-0.02	0.001	-21.95	0.0000
X	10.04	1.437	6.98	0.0000

Calculated by authors based on the author data base using the STATISTICA package. $R^2=0.274$; $F_{(0.05;2;1536)}=293.29$; $p=0.0000$

The F-test exceeds the table value, which indicates the significance of the equation. All coefficients of the equation are statistically significant at the 5% significance level.

Politicians' and public servants' statements result in the oil price increase. The model parameter *t* indicates that all factors, except the information factor, affect the oil price and it decreases by 0.02 USD. The above mentioned statements lead to an increase in the oil price by an average of 10.04 USD.

The decrease in the oil price is of technical nature due to the futures mechanism and lack of storage places. The feature of futures is that the trader who cannot close the contract on time is expected to make an actual delivery of crude oil. Oil is commonly delivered to the Cushing terminal in Oklahoma. However, as demand for oil sinks, the storage capacity is getting closer to its upper limits due to the economic slump and coronavirus pandemic. To avoid the physical delivery of oil, the traders try to sell oil by the end of the trading day and send prices down. Hence, prices crash at the moment of contract execution.

The main condition for recovery of oil market is gradual removal of restrictions and quarantine. Only after that the demand and oil prices could recover.

According to Carmalt (2017) and Li et al. (2020), if we consider the long-term oil price change, we can see that the decrease in the oil price is due to the qualitative transformation in the world economy related to changes in consumer preferences, regulators' and investors' policies influenced by the moral and ethical transition to low-carbon energy systems and sustainable development. In their research Renne and Fields (2013) note that the growth of decentralization of energy consumption along with digital technologies increases the interest of consumers in stand-alone power systems, and the politics of decarbonization of energy in its turn increases the interest in achieving self-supply based on nonhydrocarbon energy resources. According to Zhichkin (2020), the new generation of consumers, so-called "millennials", are strongly inclined to pursue the goal of rejection of hydrocarbons and goods produced using it. Greta Thunberg is an outstanding representative of this generation. At the end of 2016, one of the world's largest IT-corporations Google (2016) announced that its data centres and the offices would be powered entirely by renewable energy from 2017. Companies such as Facebook, Amazon, Apple and Microsoft have also entered long-term renewable energy agreements.

Therefore, according to Yoshino and Taghizadeh-Hesary (2016), the decline in demand for oil is due to policies of governments of the world's leading countries aimed at the restriction of climate policy and regulation of the hydrocarbons market. As stated by Li et al. (2020), this results in the decline in demand for oil and the development of electrification and low-carbon energy technologies, especially in the sphere of renewable energy sources.

Oil prices plummeting to their current level is very unprofitable for the US slate industry. Median break-even prices for slate producers in the USA is 45-47 dollars/barrel. Therefore, at the current oil price, there is no incentive for the US slate industry to develop, which affects the increase in the oil price, as well as political and militaristic statements made by US politicians. Moreover, the President of the USA Donald Trump, in addition to his tweets, with support from oil companies started to eliminate energy regulations adopted during the Obama years aimed at the development of "green" energy and climate policy.

Conclusions

To sum up, we can safely assume that the global economy will gradually phase out oil consumption. The prospects for the future developments of the global oil market are linked to energy and climate policies of developed countries, demographic changes, technological development and the global economic upturn. The political environment has a great influence on pricing in the global oil market as oil production plays an important role in many countries' economies. Therefore, the oil price is always a primary focus for political leaders.

The research provided new analytic solutions given the analysis of oil market prices, based on the synthesis of the fractal and regression analysis with the use of dummy variables. The result shows that the oil price declines during a period of time, however in 18 days it starts to rise. Moreover, all factors, except the one that characterizes politicians' and public servants' statements, affect the oil price, and it decreases by 0.02 USD. The above mentioned statements lead to an increase in the oil price by an average of 10.04 USD.

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About Some Sources of Personnel Support of Innovative Activity in The Conditions of Deficiency of Highly Qualified Personnel

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One of the main problems of innovation activities is the shortage of highly qualified personnel, or rather, managers and teams capable of solving complex tasks effectively. To get out of this situation, it is advisable to use targeted team training, which at low costs significantly reduces the time and risks of developing and introducing innovations. The article discusses the sources of staffing for innovative activities, clarifies the conceptual framework used to indicate the processes of changing a profession and ways to return to it, substantiates the feasibility of wide implementation of the method of multidisciplinary project training, develops tools for measuring the integral level synergistic effect of educational and professional groups.

Keywords: Innovations, Innovation of Production Processes, Multidisciplinary Project Training, Synergistic Effect, Reprofessionalization.

Introduction

Innovative development of the regions and the country as a whole, modernization of the economy, improvement of production processes at enterprises are impossible without creating a regional system for training highly qualified personnel and involving staff in the implementation of strategic plans for innovating production processes. In tackling the problem of staffing the innovation activities, the role of the lower level (enterprises) is particularly prominent. It is at this level that the mechanism of involving personnel in the implementation of strategic plans for the innovation of production processes should be created and function.

The quality of human resources employed to an enterprise primarily depends on the system of training highly qualified personnel. In planning the parameters of this system, it is necessary to take into account both the requirements for the level of professional education and the identity of employees, who should be motivated, first of all, for creativity, initiative and perseverance in the introduction of innovations. Not the least among these criteria is the ability of an employee to

effectively interact with labor process colleagues with a different profession, in order to persuade them to find comprehensive solutions to all aspects of urgent problems.

One of the main problems of innovative activity in production enterprises and increasing their value is the shortage of highly qualified personnel, or rather, managers and teams capable of solving complex problems effectively. To overcome this situation, it is advisable to use targeted team training, which at low costs significantly reduces time and risks of developing and introducing innovations. Recovery of the relatively small costs of targeted training is provided by an increase in turnover and profits, if at least some of the planned innovative projects were effectively implemented.

Analysis of the publications shows that at present there is practically no scientifically based holistic system of staffing for the management of innovative activities of enterprises that meets dynamically changing requirements, which determines the relevance of the research topic.

The study of the mechanism of involving personnel in the implementation of strategic plans for the innovation of production processes and the sources of the formation of a staffing system for innovative activities revealed that one of the sources of satisfying the need for human resources for implementing innovative projects can be a fairly large social group, whose subjects have higher technical education, don't work in their degree related field, but wish to return to it, provided that they receive certain additional training that actualizes the knowledge and skills they once received.

The purpose of this article is to consider the sources of staffing of innovative activity, to clarify the conceptual apparatus used to refer to processes of change of profession and return to it as a source of staffing, to justify the expediency of wide application of the method multidisciplinary project training (MPT) in the practice of educational activities of technical universities, to develop tools to measure the integral level of the synergetic effect of learning and professional groups.

Research Methodology

The following methods were used in the research: analysis of normative documents, questionnaire survey, systematization and generalization of facts and concepts.

Review of special literature

The term "human resources" was first invented by Tom De Marco and Timothy Lister, who considered the problem of the human factor in terms of its impact on the development of software products [1]. In this context, the characteristics of the software being developed depend not only on what hardware and firmware it is being created for, but also on the team developing the software.

Thus, the concept of "personnel support" has become a term that links the conceptual apparatus of the inanimate component of the process of ensuring the operation of computer equipment with the animate component into a single system [2]. This Association has now become a classic. Its relevance is growing in the digital economy.

Various approaches (program-target, resource, system and functional) to the formulation of the concept of "human resources " are considered in detail in the work of S. M. Korostelev[2].The issues of staffing innovative activities are considered in the works of Torrington D, Hall. L., Tailor S., Parker G, among the Russian authors we can highlight the works of Davankov A.Y., Sokolov K.O., Mingaleeva G.F, Shpilberg S A, Irikova V.A., Gavrilova A, Prikhach A.Y. and other authors.

Almost all authors note that while the methods of innovative personnel management are followed, a properly organized HR management system contributes to the creation of innovative thinking among employees, which turns human resources into an actor of innovation and competitiveness.

Quality of the employed human resources depends not only on the system of training highly qualified personnel, but also on sources of formation of the regional system of staffing the innovation activities (Table 1), which is considered in the work of Davankov A.Y., Sokolov K.O.

Table 1: Classification of sources of formation of the regional system of personnel support for

№	Classification criteria	Classification groups of innovations	Sources of formation of the regional system for staffing innovation
1	Original location of human resources	Internal	Training of specialists. Retraining specialists. Employing qualified specialists, who have gone to other sectors of the regional economy.
		External	Leasing (renting) specialists. Migration and relocation of specialists.
2	Responsiveness of employment	Employing in a short time	Training of specialists. Retraining of specialists. Employing qualified specialists, who have gone to other sectors of the regional economy. Leasing (renting) specialists. Migration and relocation of specialists.
		Over a long period of time	Training of specialists.
3	Duration of employment	Temporary	Retraining of specialists. Employing qualified specialists, who have gone to other sectors of the regional economy. Leasing (renting) specialists. Migration and relocation of specialists.
		Continual	Training of specialists. Relocating specialists.
4	Form of employment	Collective	Leasing (renting) specialists. Relocating specialists. Retraining of specialists.
		Individual	Training of specialists. Retraining of specialists. Employing qualified specialists, who have gone to other sectors of the regional economy. Migration and relocation of specialists. Leasing (renting) specialists.
5	Skill level of human resources	High	Employing qualified specialists, who have gone to other sectors of the regional economy. Leasing (renting) specialists. Migration and relocation of specialists.
		Low	Training of specialists. Retraining of specialists.

innovation [1]

Sokolov K.O. notes the increasing importance of innovation in the development of modern organizations and the increasing role of team methods of managing innovative projects [10].

Many authors pay attention to such a problem as the shortage of highly qualified personnel, more precisely, managers and teams that are able to effectively solve complex tasks for the implementation of innovative activities.

Results

The research allowed us to formulate the following hypothesis: one of the sources for satisfying the need for human resources for the implementation of innovative projects in conditions of shortage of highly qualified personnel can be a rather large social group, the subjects of which have a higher technical education; they are employed in jobs other than their specialties, but they want to return to the specialty they studied for, provided they receive certain additional training that updates their knowledge and skills. One of the forms of such updating can be multidisciplinary educational project teams (EPT). Needless to say, the project form of training as such in this case is highly relevant, because the innovative activity itself has a quite obvious project nature. At the same time, the obviousness of this fact does not negate the need for a qualified discussion of the advantages of a multidisciplinary approach to organizing such training and the obstacles arising along this path.

However, before proceeding to discussing the causes and consequences of changing professions, developing specific recommendations for improving the efficiency of utilizing working potential of workers who have changed their profession and describing the appropriate mechanism for their retraining in educational project teams, it is necessary to remove the difficulties associated with lack of clarity and consistency in terminology. In other words, the discussion should begin with a review of the conceptual apparatus, with the terms that are commonly used to denote the process of changing profession and ways of returning to it. One of these terms is reprofessionalization.

Some researchers understand reprofessionalization as the process of changing occupation, which is accompanied by acquisition of new professional knowledge and skills.

Another option to eliminate confusion would be to introduce the concepts of primary and secondary reprofessionalization — in its connection with primary and secondary professionalization.
Primary professionalization is the process of becoming a specialist. It includes acquisition of professional skills required for a successful start of a professional activity, namely, acquisition of a specialty. An indicator of successful completion of the primary professionalization stage is completion of professional education and obtaining professional qualifications.

Analogically, primary reprofessionalization could intend a change in profession immediately after graduating from professional education and obtaining professional qualifications, which is not only a very common phenomenon nowadays and therefore requires research, but also an indispensable prerequisite for secondary reprofessionalization.

Secondary professionalization is generally accepted to be a transformation of a specialist into a highly qualified professional, formation of a special professional skill, development of a creative approach to a professional activity, and not necessarily within a framework of an initially acquired profession. This is the formation and development of professionalism directly through work experience on the basis of accumulation and use of practical and activity-oriented knowledge. In this case, it would be logical to call the employee's return to the previous profession after the secondary professionalization as the secondary reprofessionalization.

However, in our opinion, in order to simplify the vocabulary and to avoid excessive formalization of the conceptual apparatus to refer to the primary reprofessionalization, it is preferable to use the traditional term "retraining". And by reprofessionalization we mean only the process of returning to the previous profession, obtained as a result of primary or secondary professionalization, through "recovery" training and additional training, which updates their knowledge and skills [3].

The second key term in the framework of the declared topic is the multidisciplinary project preparation. Etymological aspect of the term seems quite clear ("multi" — many), but his understanding is not as straightforward and apparently requires a few comments. It is our submission, that multidisciplinary project training (MPT) within the framework of primary professionalization is a method of reinforcing and developing the main and related professional competences by senior students of technical Universities in the process of joint development of primary project

documentation (design, technological, marketing, organizational and productive, financial and economic, legal, etc.), then preparing a business plan of an innovative project commissioned by an enterprise.

In both conceptual and scientific and applied respects, the MPT method is most thoroughly justified as a tool of primary professionalization. The methodology of project training has been practiced in technical higher education for many decades and has proved its effectiveness in practice as an indispensable tool for the formation of professional competencies of a future engineer [4]. At the same time, collective implementation of educational projects by groups of students, with more or less success imitating the activities of a design or technology agency, is also widely spread. There is seemingly nothing new to expect in this field, but with the granting of the status of technical universities to large technical colleges, one of the goals of which was proclaimed the "humanitarization" of engineering education, a new powerful potential of project training was formed. It has become possible for project groups to include not only engineers and technologists, aerodynamicists and structural analysts but also economists, marketers, environmentalists, lawyers, PR-managers and other specialists, whose training was mastered in the Humanities department. The foundation, ensuring the efficiency of such a student team, is a technical task of the employer to develop a full-fledged innovative project under the guidance of academic staff of specialized departments and mentoring consultants from the enterprise. The practical successes achieved in the course of numerous experiments conducted at the initiative of our Department, including at the interuniversity level, evidences not only to the expediency of widespread introduction of the MPT method in the practice of educational activities of technical universities, but also make us think about its expansion beyond the process of primary professionalization, in particular – about the adaptation of this method to the problems of reprofessionalization.

In developing an investment project able to attract the attention of a real investor with participation of students or participants of courses for professional development, an integrated approach to a set of tasks is maintained, which, outside the framework of the MPT methodology, is perceived as aimed at achieving individual, autonomously existing goals. However, before proceeding to discuss its benefits and issues on the possible extent and ways of using the method of MPT in the process of reprofessionalisation, let us refer to the statistics. The study of Higher school of Economics and Russian Federal State Statistics Service provides information that only half of Russians with diplomas of higher education work in their specialty. And engineers are the least of all who work in the specialty. Among them, only 35% are arranged to work in the specialty, about 30% are employed in areas that do not require higher education.

The study used data from a survey of 270 thousand people aged 15-72 years, while the authors of the study argue that after the economic crisis, the structure of employment in the professions will not change. The statement is quite controversial, but not directly contradicting our reasoning.

The reason for the current shortage of engineering personnel is well known — many universities could not recruit students even for state-funded places and were forced to admit school graduates with poor grades. Interestingly, the reluctance to work in the profession until recently was demonstrated by all age groups of engineers. The engineers of the Soviet formation in the 90s retrained into shuttle traders, drivers, some of them became managers and do not want to return to their previous activities. Many of those engineers who received a diploma in the 2000s became workers — so low was the level of their training even when entering the University. With such assumptions, full-scale reprofessionalization, in our view, is not advisable. At the same time, we can talk about the policy of targeted reprofessionalization, which is possible under at least two conditions.

The first condition is the need for using human resources for innovation in the short term.

The second condition is the desire of an employee to return to the previously obtained profession.

Let us consider in more detail the cases that may encourage such a desire. One of the cases is related to the fact that the main part of university graduates is under the influence of the "gre y" labor

market, i.e. they get a job on their own, focusing on the economic benefits of the proposals, for example, the first salary of a university graduate in the trading network is bigger than the first salary of an engineer at an enterprise. Often the specialty obtained in self-employment is not considered. Employers (mostly companies with private ownership) are willing to pay a worker a higher salary for unskilled labor than a state enterprise for a qualified one. But the employer chooses an employee from a larger number of applicants and generally tend to set the high requirements. When filling any vacant position, preference is given to persons with higher education. This is beneficial to the enterprise: without spending a ruble (the education in a state university is state-funded), it has a sufficiently competent specialist in the prime of his intellectual and physical strength, which expands the potential of the enterprise. As for the employee, it takes 2-3 years of low-skilled labor or labor in a field different from his specialty to lose the skills and knowledge obtained in the university, gradually losing the capacity to work independently and creatively. For a creative person it usually causes a feeling of dissatisfaction with the current situation and awakens the desire to work in the former profession, which causes mainly positive emotions. In addition, he notices that his university colleagues in about a year after acquiring relevant experience in an enterprise start to have the same wage and begin to surpass the salary of a manager in a trading network. No less important is the fact that an employee of an enterprise can also make a managerial career in engineering or manufacturing, or even change the scope of activity when desired, going to the supply, sales, HR, economy, which greatly expands the possibilities of self-realization of a specialist with engineering education at the manufacturing plant.

Another situation may arise due to the fact that an employee cannot work at the previous job due to any force majeure: unsuitability (for example, loss of voice at work related to communication on the phone), staff reductions, etc.

The desire to return to the former profession usually arises in some subjects after communicating with their former colleagues who have successfully realized themselves in the profession. A survey conducted in Kazan National Research Technical University named after A.N. Tupolev showed that on average 10-15% of graduates who are not employed in the specialty obtained at the university would like to practice their specialty, provided that they will get an appropriate additional training.
The next important issue is the required volumes and possible sources of financial resources attracted for reprofessionalization as a part of the multidisciplinary project teams. Turning to this issue, it should be noted that business opportunities are reduced in times of crisis. At the same time, we believe that the costs of such reprofessionalization will be feasible for the region, since it is not a matter of mass retraining of graduates in traditional educational technology, but of reprofessionalization, and not large-scale, but targeted. In addition, the costs of reprofessionalization can be partially funded by the Federal budget via transfers to the budget of the Republic of Tatarstan, which is similar to the financing of the costs of advanced training.

The kind of professionalization and a well-formed educational project team will significantly affect the magnitude of cost [5]. If there is secondary professionalization and subsequent reprofessionalization in an educational project team, the cost of additional training will be significantly lower compared to the cost of the same training for workers who have received only traditional primary professionalization.

The practical significance of the proposals and the results of the implementation

The positive side of reprofessionalization of the workers who have received secondary professionalization may be the possible synergetic effect – when the primary specialty, for example, a heat power engineering graduate returns to his specialty after becoming "secondary professionalized" in the field of computer technology, and therefore already able to more effectively interact with computer technology professionals in educational project teams (EPT).

After all, the main distinctive feature of a specialist who has participated in a project training in multidisciplinary educational project teams is the ability to effectively interact with specialists of other professions in all spheres of economic activity of an enterprise and thus provide system

solutions to their professional objectives in the development and implementation of large-scale innovative production projects.

As the first attempt to develop a tool for measuring the integrated level of synergetic effect of EPT, it is proposed to use a simple additive model, in which the components are relative (normalized) levels of reducing the time for solving typical project problems and the number of proposed erroneous interdisciplinary solutions. For example, we present the calculation of the level of integrated synergetic effect (LISE) of EPT for one of the student educational and research projects, which is presented in table 2.

Table 2: Initial data for calculating the level of integrated synergetic effect of EPT.

Indicators	Classification criteria.	Values
Time frame for the implementation (workdays)	Traditional educational project engineering team with outsourcing of marketing, design, estimate and other non-engineering tasks	56
	Multidisciplinary EPT	44
The number of rejected (incorrect) solutions	Traditional educational project engineering team with outsourcing of marketing, design, estimate and other non-engineering tasks	8
	Multidisciplinary EPT	3

LISE = [(56-44)/56 + (8-3)/8]/2 = [0,27+0,62]/2 = 0,49.
The maximum value of the LISE can be 1 (or 100%).

In more general terms, it is about the possibility of saving on modernization of the university's organizational infrastructure, the need for which is justified due to development of the MPT methodology, for example, in work [13]. The problem of reconstructing the organizational and methodological bases of educational process under the MPT technology has a fundamental character, because it provides for the formation of the matrix organizational structure of the University in accordance with the project approach to the management of educational process, its intensification by shifting from a semester structure the academic year to bimestrial with a training schedule without examinations as well as the development of the Institute of real academic freedom of younger students as part of their pre-training [4].

As already noted, the peculiarity of reprofessionalization through the MPT technology is also the need for more careful selection of candidates for additional training groups, which requires developing and using appropriate tools. Thus, it is needed to comply with another condition. It is about a certain level of residual knowledge of a graduate and his skills. It can be assumed that the value of this level will vary depending on the specific tasks that the people wishing to return to the profession will solve in the future.

In particular, it is necessary to say about the problem of discreteness – qualitative changes in the primary qualification of an employee, which occur at certain intervals. All other things being equal, it is clear that the longer these periods of time between professionalization and reprofessionalization are, the lower the level of residual knowledge and the more difficult reprofessionalization are. Perhaps for some professions it makes sense to define specific values of critical time intervals, and then the problem of selection in additional training groups for certain categories of candidates will be solved almost automatically.

Conclusions

One of the main problems of innovation is the lack of highly qualified personnel, more precisely, managers and teams that can effectively solve complex tasks. To get out of this situation, it is advisable to use targeted team training, which at a low cost significantly reduces the time and risks of developing and implementing innovations. One of the sources of meeting the need for human resources for implementing innovative projects can be a fairly large social group, whose subjects have higher technical education, don't work in their degree related field, but wish to return to it, provided that they receive certain additional training that actualizes the knowledge and skills they once received. In our opinion, multidisciplinary educational project teams are an effective form of

staff reprofessionalization. The positive side of reprofessionalization of employees who have received secondary professionalization may be the appearance of a synergistic effect in some cases. To measure the integral level of the synergetic effect of EPT, the authors propose a simple additive model, in which the terms are relative (normalized) levels of reducing the time for solving typical project tasks and the number of proposed erroneous interdisciplinary solutions.

The work in such teams, in addition to formation and development of professional qualities, with appropriate organization and environment will contribute to formation and development of innovative abilities of managers and specialists also from the standpoint of their personal qualities. For managers, it is the ability to create a creative atmosphere in his team, the ability to motivate employees, high competence; for executives is support of innovations, providing staff with the necessary information, demonstration of a positive attitude to people, etc. With an appropriate organization of interaction between the University and an enterprise, a multidisciplinary educational project team can be a ready innovative team and become a base for supporters of transformation in the organization. An important condition is that the members of the group must be psychologically compatible with each other.

The main application of specialists who have received project reprofessionalization will be found in the aircraft industry, engineering, petrochemical complexes, as well as in other areas of national economy of the Republic of Tatarstan.

The final result of implementing the concept of additional project training of specialists in multidisciplinary educational project teams will be staffing of enterprises and organizations in the form of project-oriented teams of specialists with secondary and higher special education from various disciplines, who are able to solve the whole complex of tasks related to the development, production and promotion of innovative products in close cooperation with each other.

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Mutual Fund Performance on The Polish Capital Market

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Abstract

Analysing the performance of mutual funds is a significant theoretical and practical issue. There is currently no consensus on the market regarding which methods of assessing investment performance should be used. This study examines the performance of Polish mutual funds between 2004 and 2020. The mutual fund data set contains the returns of Polish equity funds with at least 80% of the fund capital invested in domestic equity. The main purpose of this article is to compare different methods of evaluating fund abilities in the area of market timing and security selection. Regression-based Treynor-Mazuy and Henriksson-Merton models were employed to assess the market timing and stock selection abilities of fund managers. The estimated parameters of the models used in the research were statistically significant and the models were well fitted to the data. However, no evidence of any market timing ability in the selected group of funds was found. The results thus indicate that managers of Polish mutual funds exhibit no selectivity ability or timing ability.

Keywords: Mutual fund performance; market timing; selectivity.

Introduction

The main purpose of this article is to examine the abilities of mutual fund managers in Poland. The performance of mutual funds is assessed through measures of selectivity and market timing abilities. These measures make it possible to assess whether portfolio managers can forecast changes in market trends, adapt their investment strategies to these changes, and apply proper portfolio selection techniques to outperform other participants in the market. This provides a tool for comparing actively managed portfolios with passive ones as well as providing benchmarks for the funds. The use of market timing models also facilitates testing of the hypothesis that, on average, a mutual fund obtains returns that are above average for the market indices. Comparing returns yielded by mutual funds with returns on stock market indices implies that only funds that allocate a large part of their assets in the stock market are taken into consideration. For the purposes of this research, an 80% minimum threshold of stock investments was assumed. An analysis was then conducted of eleven mutual funds operating in Poland from 2004-2020.

Evaluation of Portfolio Performance

Evaluation of the ability to use market trend forecasts, as well as pick up stocks, is based on a linear single-index model in which the portfolio return in period t is influenced by an aggregated risk factor (market factor). One of the simplest and most popular models is that proposed by Sharpe (1963). In this model, the relationship is given by the following formula:

$$R_{pt} = \alpha_p + \beta_p R_{mt} + e_{pt} \tag{1}$$

where

R_{pt} – portfolio rate of return in period t,
R_{mt} – market portfolio rate of return in period t,

β_p – measure of the sensitivity of portfolio return to an aggregated market risk factor (manifested in this model by changes in return on market portfolio),
e_{pt} – random residual in period t.

In this model, the market portfolio is treated as a natural benchmark for stock portfolio managers. It can be applied to the analysis of deviations of realised rates of returns from theoretical returns derived from the model. If the average difference between realised and theoretical returns is positive, this can be treated as an excess rate of return resulting from the over-average skills of portfolio managers. This was the concept underlying Jensen's (1968) α measure:

$$R_{pt} - R_{ft} = \alpha_p + \beta_p \left(R_{mt} - R_{ft} \right) + e_{pt} \tag{2}$$

where:
R_{ft} – the risk-free rate of return in period t,
α_p – selectivity measure.

This measure can be interpreted as the difference between the realised rate of return of the managed portfolio and the rate of return of a passive portfolio with the same level of risk.

The model does not, however, identify the source of the excess return and attribute it to the particular skills of a portfolio manager. Jensen's α only provides synthetic information about these skills. Based on the CAPM model, other original models exist that are included among the so-called market timing models. Measures based on these can be divided into security-selection and market timing measures. Such models are also based on regression equations; however, unlike the Sharpe model, it is assumed that portfolio composition may change over time. This generalisation allows pieces of information to be isolated that are needed to assess the particular market-timing skills of portfolio managers. This includes, among others, an assessment of how excellent the trend-predicting skills of managers are and how elastic their strategy is in reacting to changing situations.

One of the first propositions of this type was a quadratic regression model developed by Treynor and Mazuy (1966). This model is based on the assumption that if managers can predict market trend reversals, they will also adjust portfolio composition to align with these changes. This should result in the overweighting of risky assets (market portfolio) when price increases are expected and underweighting when decreases are expected. Treynor and Mazuy proposed augmenting the model by a squared component, which made the relationship between the rate of return on the analysis and market portfolio nonlinear:

$$R_{pt} - R_{ft} = \alpha_p + \beta_p \left(R_{mt} - R_{ft} \right) + \gamma_p \left(R_{mt} - R_{ft} \right)^2 + e_{pt} \tag{3}$$

where: γ_p – market timing coefficient.

A positive value for this coefficient means that the portfolio yields an extra return as a result of adjusting portfolio composition to changes in general stock market trends.

An alternative solution was developed by Henriksson and Merton (1981) and Merton (1981), whose model is based on two regressions. The first corresponds to periods of lower trend (negative excess returns) and the second to periods of upper trends (positive excess returns). A model constructed in this way can be employed to evaluate a manager's skill in adjusting portfolio composition to short-term trends in the market. The ability to adjust involves increasing the risk exposure (higher beta) in periods of growing prices and reducing risk (lower beta) in periods of falling prices. This model can also be expressed in a compact version using the following equation:

$$R_{pt} - R_{ft} = \alpha_p + \beta_p \left(R_{mt} - R_{ft}\right) + \gamma_P \max\left(0, \left(R_{mt} - R_{ft}\right)\right) + e_{pt} . \quad (4)$$

The value of $\beta - \gamma$ expression can be interpreted as a beta coefficient analogue for a downturn in the market. A positive value of the γ parameter means that the manager can predict market trends and adjust portfolio composition in line with these predictions.

Data and Methodology

Analysis of portfolio performance in the area of market timing and security selection was performed for all mutual funds operating in the Polish capital market from 1 January 2004 until 31 March 2020. This choice enabled the research to cover a long period and a relatively large number of mutual funds. Using a large sample (12 mutual funds and 195 monthly periods) also helps to marginalise the influence of outliers on the results of the evaluation. The funds were selected for the analysis based on their allocation strategy. Most of their assets were invested in risky securities, primarily in shares. Inevitably, investment strategies changed during the observation period. However, market-timing models are able to assess such active strategies and the skills exhibited by mutual fund managers in security selection and forecasting trends.

It was assumed that the funds taken into consideration use benchmarks that contain at least 80% of one of the Polish stock market indices. These benchmarks comprise two main indices of the Warsaw Stock Exchange: the Warsaw Stock Exchange Index (WIG) and Warsaw Stock Exchange Large-Cap Index of the 20 major and most liquid companies in the WSE Main List (WIG20). The remaining part of the benchmark comprises the interest rate for deposits in the interbank market (WIBID). For most mutual funds, the benchmarks are corrected by an asset management fee (expressed in percentage terms). In this research, the WIG index was treated as a benchmark for all stock mutual funds as it can be a risk factor for the entire Polish stock market.

Table 1: Rates of returns of mutual funds and equity index WIG

Fund	*R* 2004- I Q20	R_{log} monthly	st. dev. monthly
Aviva	90.36%	0.330%	5.35%
Esaliens	83.86%	0.312%	5.01%
Generali	96.70%	0.347%	5.04%
NN1	84.19%	0.313%	4.84%
NN2	47.68%	0.200%	5.12%
Pekao	-40.84%	-0.269%	6.00%
PZU	-17.12%	-0.096%	5.19%
Santander	51.19%	0.212%	5.58%
Skarbiec	46.44%	0.196%	5.08%
Millenium	9.01%	0.044%	4.94%
Investor1	129.84%	0.427%	5.29%
Inwestor2	73.01%	0.281%	5.05%
WIG index	99.93%	0.355%	5.68%
WIBID	80.12%	0.302%	0.14%

The analysis spanned the period from 1 January 2004 to 31 March 2020. Samples of monthly logarithmic rates of returns were used. The risk-free rate was taken to be the three-month bid rate of the Polish

interbank market (WIBID), adjusted to monthly capitalisation periods. Two of the models discussed previously, Henriksson-Merton and Treynor-Mazuy, were employed in the analysis.

During the period concerned, ten funds yielded a positive return; however, only one had a return higher than that of the benchmark (WIG index). Two funds had rates of return below 0 and five had a positive return but below the risk-free rate. Table 1 presents the rates of returns of mutual funds across the whole period, as well as monthly mean log-returns and their risks (measured in standard deviations).

As shown, 7 of the 12 mutual funds during this period realised lower monthly average returns than the risk-free rate. From a theoretical and practical point of view, the results for monthly horizons are more important as adjusting an investment strategy typically takes time. For this reason, the results are presented for monthly rates of return.

Empirical Results

The results following the application of the Treynor-Mazuy model and Henriksson-Merton models are presented in Tables 2 and 3.

Table 2: Estimates for the Treynor-Mazuy model – monthly rate of returns

Fund	Parameter	Estimation of parameter	Standard error	*t*-value	*p*-value	R^2	F statistic	Degr. of Freedom
Aviva	γ	-0.462	0.135	-3.413	0.0008	0.942	1554.38	192
	β	0.893	0.017	51.408	0.0000			
	α	0.001	0.001	1.256	0.2105			
Esaliens	γ	-0.400	0.130	-3.089	0.0023	0.939	1482.10	192
	β	0.836	0.017	50.292	0.0000			
	α	0.001	0.001	0.960	0.3381			
Generali	γ	0.117	0.133	0.883	0.3781	0.937	1425.78	192
	β	0.862	0.017	50.693	0.0000			
	α	0.000	0.001	-0.385	0.7009			
NN_1	γ	0.228	0.096	2.367	0.0189	0.964	2563.48	192
	β	0.846	0.012	68.336	0.0000			
	α	-0.001	0.001	-1.465	0.1445			
NN_2	γ	0.176	0.105	1.673	0.0960	0.962	2396.02	192
	β	0.892	0.014	65.880	0.0000			
	α	-0.002	0.001	-2.576	0.0108			
Pekao	γ	-0.264	0.154	-1.714	0.0881	0.940	1510.75	192
	β	1.014	0.020	51.298	0.0000			
	α	-0.005	0.001	-4.618	0.0000			
PZU	γ	-0.185	0.135	-1.370	0.1722	0.938	1460.27	192
	β	0.876	0.017	50.546	0.0000			
	α	-0.004	0.001	-3.756	0.0002			
Santander	γ	-0.616	0.156	-3.945	0.0001	0.929	1255.44	192
	β	0.918	0.020	45.853	0.0000			
	α	0.001	0.001	0.499	0.6184			
Skarbiec	γ	0.170	0.163	1.045	0.2973	0.907	931.73	192
	β	0.858	0.021	41.083	0.0000			
	α	-0.002	0.001	-1.673	0.0959			
Millenium	γ	-0.106	0.123	-0.860	0.3906	0.944	1609.08	192
	β	0.841	0.016	53.261	0.0000			

	α	-0.003	0.001	-2.872	0.0045			
Investor_1	γ	-0.573	0.247	-2.322	0.0213	0.803	391.32	192
	β	0.810	0.032	25.551	0.0000			
	α	0.003	0.002	1.419	0.1576			
Investor_2	γ	-0.415	0.183	-2.271	0.0243	0.881	712.33	192
	β	0.816	0.023	34.816	0.0000			
	α	0.001	0.001	0.498	0.6192			

Estimates of model parameters (Table 2 and Table 3 contain results for monthly returns) show that the models are well fitted to the data. All coefficients of determination R^2 are above 0.8, and 10 are above 0.9. F-statistics also indicate a satisfactory level of significance. The analysis for particular coefficients in the models indicates that β parameter estimates are significant in all cases (for both models). The values of these parameters indicate a strong connection between the portfolios and the market index. Beta coefficients for monthly data are 0.673-0.958 for the Henriksson-Merton model and 0.81-1.014 for the Treynor-Mazuy model.

In 4 cases for the Treynor-Mazuy model and 5 cases for the Henriksson-Merton model, there are no premises demanding rejection of the hypothesis that the γ coefficient equals zero (p-values > 0.1). The values of the γ coefficient estimator show that it is difficult to demonstrate any additional skills exhibited by portfolio managers in market timing based on predicted general market trends. In the Treynor-Mazuy model, the γ coefficient is negative in 6 cases and positive in two cases γ (p-values < 0.1). In the Henriksson-Merton model, there are no mutual funds in which gammas are positive and significantly different from zero. Thus, no evidence is found to suggest that managers try to time the market, nor is there any evidence supporting the hypothesis that they have the skills to do so.

Table 3: Estimates for the Henriksson-Merton model – monthly rate of returns

Fund	**Parameter**	**Estimation of parameter**	**Standard error**	***t*-value**	***p*-value**	**R^2**	**F statistic**	**Degr. of Freedom**
Aviva	γ	-0.1718	0.0506	-3.397	0.001	0.942	1553.54	192
	β	0.8144	0.0331	24.575	0.000			
	α	-0.0034	0.0014	2.426	0.016			
Esaliens	γ	-0.1114	0.0490	-2.276	0.024	0.938	1447.93	192
	β	0.7898	0.0321	24.623	0.000			
	α	0.0020	0.0014	1.466	0.144			
Generali	γ	0.0235	0.0496	0.474	0.636	0.937	1421.39	192
	β	0.8708	0.0325	26.791	0.000			
	α	-0.0005	0.0014	-0.364	0.716			
NN_1	γ	0.0287	0.0365	0.787	0.423	0.963	2496.38	192
	β	0.8527	0.0239	35.641	0.000			
	α	-0.0009	0.0010	-0.920	0.359			
NN_2	γ	0.0151	0.0397	0.379	0.705	0.961	2362.07	192
	β	0.8927	0.0260	34.335	0.000			
	α	-0.0018	0.0011	-1.624	0.106			
Pekao	γ	-0.1182	0.0574	-2.061	0.041	0.941	1521.53	192
	β	0.9576	0.0376	25.483	0.000			
	α	-0.0037	0.0016	-2.322	0.021			
PZU	γ	-0.0894	0.0503	-1.777	0.077	0.939	1470.54	192
	β	0.8331	0.0320	25.273	0.000			
	α	-0.0025	0.0014	-1.805	0.073			
Santander	γ	-0.1937	0.0590	-3.283	0.001	0.927	1224.30	192

	β	0.8339	0.0387	21.575	0.000			
	α	0.0027	0.0017	1.638	0.103			
Skarbiec	γ	0.0524	0.0609	0.860	0.391	0.906	929.86	192
	β	0.8805	0.0399	22.080	0.000			
	α	-0.0026	0.0017	-1.538	0.126			
Millenium	γ	-0.0194	0.0461	-0.421	0.674	0.943	1604.10	192
	β	0.8347	0.0302	27.657	0.000			
	α	-0.0026	0.0013	-2.020	0.045			
Investor_1	γ	-0.2824	0.0913	-3.093	0.002	0.807	401.63	192
	β	0.6730	0.0598	11.251	0.000			
	α	0.0068	0.0026	2.653	0.009			
Investor_2	γ	-0.1630	0.0682	-2.391	0.018	0.882	714.61	192
	β	0.7410	0.0447	16.590	0.000			
	α	0.0028	0.0019	1.467	0.144			

In terms of selectivity, the estimators of the respective parameter are somewhat different than for market timing. The parameter is statistically significant in only five cases, both for the Henriksson-Merton and Treynor-Mazuy model. In cases in which the parameter is significant, its value is negative, except for one case in the Treynor-Mazuy model. It can therefore be concluded that almost all funds are unable to generate excess returns as a result of skills in security selection.

Conclusions

Evaluation of mutual fund portfolio management is important from a practical point of view. The results obtained in this research support the hypothesis that, on average, portfolio managers in mutual funds do not achieve excess returns from market timing and security selection activity in comparison to returns from a passive strategy (index investing). These conclusions align with research study by Pietrzyk (2012) based on several other market timing models. Performance analysis on the Polish market has been conducted by, amongst others, Zamojska (2009). The results, however, are not comparable as different time ranges were used.

Analysis of the selectivity indicator also provides little evidence to indicate that above-average advantages from picking up securities are based on particular pricing or forecasting skills. A small number of cases of a significant positive α show that only a few portfolio managers can make active bets when successfully selecting assets to the portfolios.

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Folk Heritage in the Project Activities of Primary School Students

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Abstract

This article reviews some conclusions of the issue of the project activities initiation in elementary school. The authors analyze the experience of participants of a network educational workshop held by "Prosveshenie" Publishing House. The junior schoolchildren's projects on traditional (folk) culture created with the help of ICT are a focus of attention. The authors analyze the stages and the forms of these activities, describe their methodological basis, in particular, the "unity in diversity" principle which provides the use of the elements of cultures of all the ethnoses represented in a given educational institution during the work with the traditional culture phenomena.
The article includes the description of the most successful projects created by the junior schoolchildren from several educational institutions of the Mari El Republic ("From Kids to Kids" and "Children's Urban Mythology"). The range of digital instruments used by the children in the process of designing and publishing their projects in the Internet is indicated.
The authors of the article come to the conclusion that the materials prepared by the Primary school students and published in the Internet are examples of useful and qualitative sources of information on traditional (folk) culture. At the same time, they motivate children to learn and popularize their own unique individual and group creative work.

Keywords: Project Activities, ICT, Elementary School, A Network Educational Workshop Of The Mari El Republic, Traditional (Folk) Culture.

Introduction

Nowadays, children and teenagers devote a significant part of their leisure time to communication on the Internet: (social networks, video games) and instant messengers (WhatsApp, Viber, Telegram, SMS, etc.) (Messengers in Russia 2019). A certain style is formed in the process of exchanging information, its signs include new genres of modern culture (memes) and attempts to graphically express various kinds of emotions (emojis, stickers, emoticons and so on), etc. Special studies have been devoted to these issues recently (see, for example, Internet and folklore 2009; Efimova, Zolotova 2013). At the same time, there is a certain gap between the information that is offered to teachers in various kinds of research and the rapid mastering of ICT by children and teenagers. This article summarizes some of the results of creating the activities for Primary school students in the field of IC technology in the process of implementing the content of teaching materials "Perspectives" (based on the material of traditional (folk) culture).

Goals and objectives

In 2018, an agreement was signed between LC "Enlightenment Publishing House" and a number of RME educational organizations on the creation of a network of pedagogical workshop on the topic "Project activities of a primary school student in the field of IC technologies to implement the content of "Enlightenment" teaching materials". Its goal is the formation of the technological component of ICT – the competence of primary school students to determine the optimal conditions for the formation and development of independent learning activities in primary school students (using the traditional (folklore) culture of the peoples of the RME as an example). The theme of the pedagogical workshop is directly related to the research activities of this team within the network of the experimental platform of the Federal Institute for the Development of Education in the RME to determine the principles of interaction at the lesson and extracurricular activities of Primary school students with materials of Russian traditional and other national cultures of the Volga region. Wonderful folklorist and teacher M. Yu. Novitskaya headed it. The necessity for the organization of experimental work was also caused by the necessity for a bigger use of the cultural values of the Russian, Mari, and other peoples of the Mari El Republic in the training, development and upbringing of the younger generation. This work started in 2011; MarSU, gymnasium "The Blue Bird", secondary school # 6 of Yoshkar-Ola, and the Yurinsky Secondary School named after A. I. Loseva (Zolotova, Novitskaya 2013) took part in it. Gymnasium # 26 named after Andre Malraux and Korkatovsky Lyceum joined the experiment in 2015. Each educational institution had a specific field of work: 1) development of methodological and theoretical principles of research, providing the participants of the experiment with the necessary material (Mari State University); development of lessons of the subject "Social, environmental and scientific education" (SESE) with a dominant ethnocultural component (Gymnasium # 26 of Yoshkar-Ola); 2) development of lessons on the basis of interdisciplinary connections with all the disciplines of elementary school on the basis of ethnocultural issues embedded in SESE (Gymnasium # 26 named after Andre Malro, Yoshkar-Ola); 3) organization of extracurricular activities of a teacher on the basis of interdisciplinary relations in cooperation with parents and family (Republican Gymnasium "The Blue Bird" named after Ishtrikova T. V.); 4) organization and provision of cooperation with social partners and the nearest socio-cultural infrastructure (museums, studios, higher educational institutions, etc. (Korkatovsky Lyceum and Yurinskaya Secondary School). It should be noted that the participants in the experimental study were not limited to a strictly specific aspect in their activities, but tried to synthesize them.

Methodological and theoretical principles of the research

A lot of material was accumulated in the sphere of our interest in Russian science. The search for the national identity of Russians, the specifics of Russian culture in general made the greatest Russian scientists A. N. Veselovsky (1882), V. M. Zhirmunsky (1979), B. N. Putilov (1983, 1994), N. I. Tolstoy (1983), V. M. Gatsak (1993) and others realize the need to solve it based on the comparison with other cultures.

Russian science formulated the principle of *"unity in diversity"*, which is the most important for our work. This principle was formulated in XIX by remarkable Russian philosopher K. Leontyev (1993) and his followers N. Danilevsky and L. Gumilev. Currently, this principle has already been used a lot, for example, by specialists from the Department of Sociology of Art Life at the State Institute of Art Studies (SPB) in a project that claims to create a new model that regulates the relationships between art and society at the present stage (Artistic Life of Contemporary Society 1996; Sokolov 2000).

Thus, the implementation of this principle in relation to our problem involves the usage of the values (elements) of the national culture of representatives of all ethnic groups of this educational community/team in the process of spiritual, moral and civil-patriotic education of youth. In other words, if Russians, Mari, Tatars, Chuvash, Ukrainians, Chechens and others are studying at the same time in a particular educational institution, it is necessary to take into account the components of each culture of these peoples in building educational activities on the basis of the value potential of the folk culture. It is not a simple joining/listing of forms of culture, belonging, for example, to a certain

rite, but the identification of their common core and demonstration of the diversity of national forms on this basis.

The results of the activity of the experimental sites were the development and publication of teaching aids and programs, cycles of lessons and educational events, including the online format (Traditional Culture 2016). Databases and virtual museum of folklore (Folklore of the Vyatka immigrants RME 2020; Virtual Museum of Folklore of the Gornomariysky District 2020; Virtual Museum of Folklore of the Yurinsky District 2020) were created and posted on the website of MarSU to provide participants of the experimental sites with the necessary materials on traditional (folklore) culture (ritual descriptions and comments on it, texts of works of various genres of audio and video recordings).

The project participants understood the importance of participation of schoolchildren in the development at any stage in the process of working on databases and virtual folklore museums (interviewing prominent artists of the region, organizing material, creating collections of genres). The results of the experiment were the subject of special discussion at the All-Russian school-seminar, which took place at the MarSU base in April, 2016. The participants of the school-seminar saw the high level of organization of the event in general, as well as the prospects of such studies and expressed their desire to join the experiment.

As for the principles of using ICT technologies, now there are different approaches to use them in education. Our team was primarily focused on the SAMR model, developed by the consulting company Hippasus (Massachusetts) under the leadership of Ruben Puentedura (2014), a graduate of Harvard University, the founder and president of the consulting company Hippasus, in particular on its third and fourth levels:

– level of modification; that is the technology that significantly changes the educational task: this task is impossible without a program or gadget. For example, when working with some text, pupils can choose pictures, musical fragments, write their own or select someone else's comments to the terms. A teacher must give pupils a list of resources to take information from. Also, pupils can record their monologues, dialogues on the phone/computer to work on mistakes or mutual evaluation. Similar tasks include leaving posts on the Internet on a specific topic;
– level of rethinking/redivision; a task can be created, which was impossible earlier. So, children themselves can create a crossword (Hot Potatoes resource), a survey (Surveymonkey resource), city tours (google maps), animations (Voki resource) for each other on a topic.

The Results of The Research, Discussion

The following projects can be called the most interesting decisions of our team.

"From Kids to Kids": Creation by primary school pupils of copyright collective and individual electronic educational resources (based on traditional culture). The project of gymnasium "Blue Bird" named after Ishtrikova T.V."

One of the areas of the project activity of the SBEI of the Republic of Mari El "Humanitarian Gymnasium "Blue Bird" named after Ishtrikova T. V." is the study of traditional culture in a multi-ethnic region using information and communication technologies. The goal of the work of the gymnasium team in this direction is the formation of pupils' ideas about the traditions of the peoples inhabiting the Republic of Mari El, the study of culture as a single and diverse process, familiarization with the national and universal values, mastering and acknowledgment of the country's cultural diversity.

As the joint experience of teachers and pupils of the gymnasium shows, the usage of ICTs in the field of primary general education is one of the most interesting, visual and accessible elements of the instruction for primary school children. It corresponds with their aesthetic and technological selectivity and has a positive effect on the process of knowledge assimilation. The main thing is that

the usage of ICT allows you to bring the learning process to a higher level from the initial stage of training. Children are happy to work with training programs and electronic manuals; they model, design, develop electronic educational resources and are interested in doing tasks and exercises using technologies.

Thanks to ICT, children also have an opportunity to study certain topics online, not only in general education institutions, but also at home at any convenient time.

The result of the activities of the gymnasium within the network of the pedagogical site was the development and testing of a set of electronic educational resources in traditional (folklore) culture, aimed at spiritual, moral, civil and patriotic education of younger schoolchildren.

For sure, one of the popular ways of presenting information on traditional culture was the presentation. Grammar school pupils of the "Blue Bird" learn to create them in PowerPoint from the first grade and use them in almost all subjects and extracurricular activities as illustrative material. The resources created by children in the SMART Notebook program (2020) were also interesting. This software makes learning effective and interactive, it includes tools that make electronic educational materials more vivid. So, the experience of creating various video projects by children turned out to be impressive. For example, video excursions – a productive and accessible way of giving information that is clear and emotional. The first-graders conducted video interviews among gymnasium pupils in the folklore genre as a part of the research of folklore genres in the special course "Fundamentals of Literary Analysis" SESE. Another interesting type of ELR is video master classes for the manufacture of decorative and applied arts products.

However, the most popular of the varieties of project activities tested by the pupils was blogging. Children explained it this way: a presentation is a very familiar, ordinary and traditional way of presenting materials, but SMART Notebook programs are complex, not always possible for Primary school students, and also not installed on every computer. High-quality recording, editing video materials for excursions require special skills but preparation of educational video materials for the blog format turned out to be interesting and affordable for pupils. At the same time, this way of presenting information is already quite popular among modern pupils, many of them have already mastered it. Creating a video and possibly posting it to a social network or channel is a great opportunity for creative self-realization.

The skills required for blogging are creating a blog concept, creating a content on a specific topic, modeling material, developing a unified, individual style, scripting and recording videos, editing video material. Responsibility for the quality of the posted information is also necessary for blogging. Blogs are a part of a learning tool as a personal educational environment in the work of the gymnasium team. Its creation, placement on the Internet and, accordingly, its usage contribute to the individualization, personification and personalization of the educational process.

Starting to work on the projects, the children identified a range of topics in traditional culture which interest them (they are partially represented in the textbooks of the teaching materials "Perspectives" on SESE) and divided them into five blogs in accordance with the content. Each of them was given a name. The project leaders have become bloggers. However, it should be noted that the educational videos were prepared not only by them, but also by other pupils. Teachers, educators and parents were involved in the creation of blogs, which was very significant and valuable for children. Grammar school pupils coped with the tasks. Materials on traditional culture were studied, recorded and presented, the programs for creating video materials were mastered.

Video blogs created by children can be used as a part of the study of topics in literary reading, technology, computer science, SESE during extracurricular activities and independent preparation. At the same time, a blog is an excellent way to create a community of like-minded people as a part of the study of traditional culture.

The first blog *"According to old recipes"*, developed by the pupils of the 2nd and 4th grades, was about cooking traditional dishes of Mari and Tatar cuisine. Its material became part of the project devoted to the study of the national cuisine of the peoples inhabiting the Republic of Mari El and can also be used to study the following topics on the discipline SESE: "About bread and porridge, about tea and coffee", "We are the family of the peoples of Russia" (1st grade); "The house is not big, but it doesn't tell you to stand", "House as an economy", "Bread and salt on the table" (3rd grade).

The second blog was a video tutorial "Learning by playing". Pupils of the 1st and 3rd grades talked about the folk toy and traditional performance with dolls-nativity in an understandable way for the Primary school students. These materials can be used at the lessons of SESE in the 1st grade when studying the topics "My collection", "Nature in human creativity", in the 2nd grade at the literary reading lessons "Museum of Folk Art", in the 3rd grade – "Images of animals in folk art", "Folk toy – good soul". Material about the Christmas nativity scene can be presented in the 2nd grade at the lessons of SESE "In the Red Corner", "Winter Holidays. Christmas holiday in Russia", in the 4th grade – "The Bright Soul of Russia".

The videos of the third blog *"The Old Workshop"* resemble those presented on DIY channels ("do it yourself"). The materials of the gymnasium pupils contain step-by-step instructions for the manufacture of decorative and applied arts products: the Zhostovo tray in an unusual technique, beregini dolls and horse toys. The material can be used at the lessons of SESE in the 1st grade when studying the topics "People are creators of culture", in the 3rd grade – "Folk toy – good soul", "Images of animals in folk art", "In an old house", at technology lessons during extracurricular activities.

The fourth blog, *"What about you?"* is a brief overview of the folklore genres prepared by the pupils of the 2nd grade. The second-graders talked about the genres of riddles and counters of the peoples of the Republic of Mari El as a part of the study of folklore genres in the special course "Fundamentals of Literary Analysis". The material can be used at the lessons of Literary reading in the 1st and 2nd classes when studying the topics "Riddles", at the lessons of SESE in the 1st grade – "Cause – time, fun – hour", "Nature in human creativity", "What kind of animals are there?", "Wild and domestic animals", in the 3rd grade – "Images of animals in folk art".

The fifth blog *"Clearly about antiquity"* had information about the modern life of ancient rites. Pupils of the 3rd and 4th grades talked about the holy divination. Despite the fact that viewers will not see traditional dresses, absolute accuracy in reproducing all the ritual actions, a complete list of the characteristic attributes of the rites on this blog, in general this is an original attempt to popularize traditional culture by children. The material can be used at the lessons of SESE in the 3rd grade "Winter Holidays. Christmas holiday in Russia" during extracurricular activities.

2. "Children's urban mythology": Creation of copyright collective and individual electronic educational resources by primary school pupils (based on traditional culture). The project of gymnasium #26 named after Andre Malraux

Another original project *"Children's urban mythology"* was developed by the teachers and pupils of Humanitarian Gymnasium # 26 named after André Malraux. It is interesting primarily for its content. The teachers of the gymnasium "Blue Bird" named after Ishtrikova T.V. selected recognizable elements of traditional culture (food, ceremonies, folk crafts, etc.) for the development of projects by Primary school students. The staff of the gymnasium # 26 named after André Malraux paid specific attention to one of the areas of modern folklore – children's urban mythology, and in particular, the area of the terrible (creepypasta). This area is extremely popular among children and teenagers, but maybe not well known among parents and schoolteachers. It should be noted that the teachers of the gymnasium had to turn to the study of the works of scientists who became classics in this field (Vinogradov 1986, Osorina 1986, Toporkov 1992, 1998, Trykova 1997, Loyter 2001, Novitskaya 2002, Cherednikova 2002), articles by beginning folklorists (Mirvoda 2016, 2018 a, b, c), as well as numerous sites with texts of cryptipasta genres (Cryptipasta (scary stories) 2019a, Cripipasta (scary stories) 2019b, Cripipasta (legends and horrors of the Internet) 2019). As a result, it was concluded

that modern childhood mythology (referring to the first decades of the 21st century) has its own specifics: 1) it moved to the field of the Internet; 2) its characters became the heroes of numerous computer games.

A questionnaire was developed and conducted among students [see application], which allowed to get a fairly complete picture of how often schoolchildren play games on gadgets, what games and characters are most popular among them, etc. At the same time, processing the questionnaire materials allowed us to formulate and offer pupils the topics for creating their own projects ("My favorite game", "My favorite cartoon hero", "My favorite game hero", "Funny stories about game heroes", "Horror stories of our school", "Horror stories of our class", "Horror stories of our yard ", etc.).

Individual projects developed by pupils, on the one hand, reflect the specifics of the game, cartoons, and cryptipasta stories, on the other hand, they are an attempt to fix and analyze modern children's urban folklore, presenting this material in the form of a research paper.

It should be noted that pupils were unusually interested in this topic. Many elementary classes began to have groups of children, firstly, who knew the field of culture well, secondly, who were prepared to work in its space, thirdly, who were ready to share their knowledge about a particular game with their peers. So that's how the projects about their favorite computer games and heroes, folklore genres that arose on the basis of a game (for example, jokes and aphorisms) and their own stories (for example, about the reasons for the heroes of their favorite game to have special energy) appeared. At the same time, the pupils not only prepared the texts, developed characters' dialogues, provided the texts with their own illustrations, but also created characters (for example, robots).

Conclusion

The use of ICT in the pupils' project activities forms the key competencies, develops the ability to work with various programs, information sources, improves information literacy and information culture in general, and develops a sense of responsibility for the information provided. Children and teenagers learn to find, verify, select, analyze, process and correctly use the necessary material. In this regard, education becomes multi-faceted, interactive and creative.

Materials prepared by students for the digital educational environment on the Internet may be available to many users, and especially for peers. They should make the network very useful, fill it with qualitative information on traditional culture, help to motivate learning activities, promote unique children's individual and cooperative creativity. Preparing visual materials on traditional culture will be a great way for the pupils to do the work on their own, and not to choose the ready-made material from the Internet, which deprives children of personal creative work.

The creation of projects for children by children is also important and significant for teachers and educators. They allow you to diversify any activity, turn it from traditional to innovative.

In the future, it seems possible to continue the work on the preparation of ELR on traditional culture within the framework of the project "Children to Children" and "City Urban Mythology"; another project, "Epic Creativity of the People of the RME. National Hero" (Secondary School # 6), is planned to be prepared for the centennial of the Republic of Mari El. The result may be the placement of materials as an educational content on the sites of the educational organizations – the project participants as examples of a virtual electronic information and educational environment.

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Appendix 1

Hi!

We adults are eager to know more about the things kids love to play nowadays. Unfortunately, we know very little about them. That's why we're asking you to fill in our questionnaire! This will help us learn more about your interests!

This is not a test or control work, so any answer you give is correct!

Your age: _____ (example: 10 y.o.).

Your school (you can shorten the name):
_____

Don't write your name or surname on this paper!

Questionnaire

Circle one option:

Do you play games on gadgets (a computer, a smartphone, a laptop)?

A) Yes, often.
B) Yes, sometimes.
C) Rarely or almost never.

Do you play or have you ever played “Minecraft”?
A) Yes, I play it often.
B) Yes, I play it sometimes. / Yes, I used to play it in the past.
C) I’ve heard of this game, but I’ve never played it.
D) I’ve never heard of this game.

Which of these Minecraft characters do you know? (You can circle more than one option).
A) Herobrine
B) Entity 303
C) Null
D) Write down another character if you want: _____

Have you heard any weird or creepy stories about these characters?
A) Yes.
B) No.

Where did you hear these stories? Answer this question if you answered “Yes” to question 4.
A) I read them in the Internet.
B) I heard them in a YouTube video.
C) My friends or classmates told me about them.
D) My elder brothers or sisters told me about them.
E) Other option: _____

Do you tell such stories to others?
A) Yes.
B) No.
C) I tell creepy stories, but not about these characters.

Have you ever tried to act out scenes with these characters (or any other Minecraft-themed scenes) with your friends in real life (without using a computer)?
A) Yes.
B) No.

Do you know what creepypasta is?
A) Yes.
B) No.
C) I’ve heard about it but I don’t know what it is.

Have you ever heard of Slenderman?
A) Yes.
B) No.

What other creepypasta characters do you know?
Write their names down: _____

Have you ever heard of SCP?
A) Yes.
B) No.

How did you find out about SCP? Answer this question if you answered “Yes” to question 10.
A) I read about it in the Internet.
B) My friends told me about it.
C) Other option: _____ .

Have you ever tried to tell or write your own SCP stories?

A) Yes.
B) No.

Do you know any characters from Marvel or DC universe?
A) Yes.
B) No.

If you do, name your favorite and the most interesting ones.

What's your favorite computer or mobile game, if any? Name two if you want.

What's your favorite real-life (not computer or mobile) game?

What's your favorite movie or cartoon? You can name both if you want.

Thanks for filling in our questionnaire!

Legal and Organizational Aspects of Preparing the State to Act In Crisis Situations

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Abstract

Crisis management begins already during the normal state of monitoring the situation and detecting threats by preparing to counteract them when they occur, including removal of effects and recovery. The system covers all levels of public administration, it has an organizational structure that allows the execution of tasks according to the specific purpose and the phases of crisis management. Particular important in the fight against extraordinary risks to the security of the State is the legal system, which makes it possible to take specific actions in the event of a risk. Hence, the objective of this study is to present the legal and organizational aspects of crisis management in Poland, drawing attention to the role of extraordinary states in, because, as the results of the research shown, there are discrepancies in this area.

Keywords: Crisis Management, State of Natural Disaster, Natural Disaster, Technical Failure.

Introduction

The human being strives to be safe and feel secure. This is one of the most important human needs, following the physiological needs. Ensuring security has been one of the main driving forces in the social evolution of people. The state of security is not evenly distributed across the globe, in various parts of the world, or even among the citizens of one State. This, however, is notwithstanding the fact that each of the civilizations existing in the contemporary world ensures, in its essence, the security of the societies that comprise it.

The complexity of the category of security is manifested by the multiple types of security identified in different typologies. In general, it may be assumed that they all group the different types of security under its three major dimensions: subjective, objective and procedural.

In the subjective dimension, security concerns the members of a society, whose numbers are growing. Accordingly, state-centric understanding of security is no longer valid and it is necessary to extend the catalogue of protected values. It is worth mentioning the supporter of the school of "World Community", Ken Booth, who altogether dismisses the State as the most important subject of research on security, focusing instead on the individual. The way he sees it, security is based on the emancipation of individuals (Booth, 1991). However, in Martin Shaw's opinion, the security of individuals should not be so radically juxtaposed to the State. A complex analysis is needed of the security of respective subjects as if side by side. According to him, the most appropriate level of the conceptualization of security is the society as an intermediate level between the state and individuals (Shaw, 1993; Polak, 2019; Lu, Gozgor, Huang, Lau, 2020). There is also the interesting concept of human security referring to an individual person. This special kind of human security is currently the most comprehensive and

advanced conceptualization of the security of an individual as a subject. The core is the quality of human life in the society and in the State (Thakur, 1997; Danišauskas, 2017).

By contrast, in the objective dimension, security concerns its various aspects (areas). Meanwhile, the procedural dimension reflects its changeability in time. Security should be treated not only as a state but also as a process. This dimension fully demonstrates its dynamics, which results from scientific and technological progress, sociopolitical thought and conceptualization in science and everyday life. People experience numerous socioeconomic transformations in various aspects of life. According to forecasts, these will be gradually accelerating in the years to come. These transformations bring with them an increased risk to the security of citizens, mainly associated with the development of civilization and the laws of nature, such a flood, fire, technological, chemical and environmental disasters or infectious human or animal diseases.

It is not possible to completely control and predict human behavior, but it is possible to try and limit the situations that cause a crisis and minimize its consequences. It should be noted that crisis is a specific phenomenon that follows a larger, sometimes very long process of changes. It requires readiness to change and accept new challenges and tasks (Ciekanowski et al., 2017; Belas, et al., 2018).

The basic principles of crisis management include:

- The principle of territorial primacy – the leading structure in this model is considered to be the territorial arrangement of the state and the industry arrangement is reduced to the auxiliary function;
- The principle of individual management – one person makes decisions and is accountable for them;
- The principle of the accountability of public authorities – certain authorities become competent and responsible for decision making in crisis situations;
- The principle of unification – administrative authorities receive general competencies that guarantee their performance of duties;
- The principle of categorization of risks – it involves grouping risks by type and size and associating them with specific legal, organizational and financial solutions;
- The principle of universality – crisis management is provided by public authorities in cooperation with existing specialist institutions and organizations and the general society.

New circumstances demand a new approach to the problem of crisis management. The multiple challenges and risks existing at the threshold of the third decade of the 21st century require constant improvements to the crisis management system (Wiśniewski et al., 2017; Valaskova, Kliestik, Kovacova, 2018).

Legal aspects of responding to a crisis

The basic legal regulation that identifies the competent authorities in matters of crisis management and specifies their tasks and principles of operation in this area as well as the principles of financing crisis management tasks is the *Crisis Management Act* of 26 April 2007 (Journal of Laws of 2019, item 1398) amended by the *Act Amending the Crisis Management Act* of 17 July 2009 (Journal of Laws of 2009, no. 131, item 1076).

The Crisis Management Act establishes an integrated crisis management system that covers central and local government administration authorities, the Armed Forces of the Republic of Poland and selected private operators and it defines such concepts as: crisis management; crisis situation; critical infrastructure or civil planning.

According to that Act, crisis management is the responsibility of public administration authorities constituting an element of national security management, which involves preventing crisis situations, preparing to control such situations through planned measures, responding in the event of crisis

situations, removing their consequences and restoring resources and critical infrastructure.
When it comes to the concept of crisis situation, many experts agree that the approach presented in the Act of 2009 grasps its essence and implements the postulates of both the central government and local governments, in particular in terms of facilitating the classification of an event as a crisis situation. According to the definition contained in the Act of 2007, such event occurred, if there existed a risk that triggered jointly the following three effect factors:

- Broken or significantly disturbed social bonds;
- Seriously disturbed functioning of public institutions;
- Use of necessary means to ensure or restore security to an extent that does not justify the need to introduce one of the states of emergency referred to in Article 228.1 of the *Constitution of the Republic of Poland* (Journal of Laws no. 78, item 483).

Meanwhile, the current approach to crisis situation conditions the occurrence of a crisis situation only on the existence of a risk that negatively affects the security of people or the environment to such a degree that it limits the operation of competent public administration authorities, when the resources and procedures of operation of those authorities prove to be insufficient.

An important aspect of crisis management is civil planning, which should be understood as the total of organizational projects that are supposed to prepare public administration for crisis management as well as planning the support of the Armed Forces of the Republic of Poland, should they be used, and planning to use the Armed Forces of the Republic of Poland to implement crisis management tasks. Tasks in the area of civil planning include, among other things: preparing crisis management plans, structures to be activated in crisis situations and resources necessary to perform the tasks provided for in a crisis management plan. In the contemporary world, it is also vital to maintain the infrastructure needed to ensure the functioning of a society, especially in the event of a crisis situation.
The solutions adopted in Poland in the area of the security of the State and its citizens make it possible to declare, in the event of specific risks, if regular constitutional measures are not sufficient, the adequate extraordinary state: the martial law, the state of emergency or the state of natural disaster (Socha, 2013).

The issues concerning extraordinary states are governed in Chapter XI of the *Constitution of the Republic of* Poland of 1997 and discussed in more detail in the following acts: the *Martial Law Act* of 29 August 2002 (Journal of Laws of 2017, item 1932, as amended), the *State of Emergency Act* of 21 June 2002 (Journal of Laws of 2017, item 1928, as amended) ant the *State of Natural Disaster Act* of 18 April 2002 (Journal of Laws of 2017, item 1897, as amended). Pursuant to Article 228, in the event of specific risks, if regular constitutional measures are not sufficient, it is possible to declare the adequate extraordinary state: the martial law, the state of emergency or the state of natural disaster. They can only be imposed on the basis of an act of law, through a resolution that needs to be published. The measures taken as a result of declaring the above states must correspond to the degree of risk and should aim at restoring the normal functioning of the State as soon as possible.

In the event of an external risk to the State, including one caused by terrorist or cyberspace operations, an armed attack on the territory of the Republic of Poland or, if an international treaty requires joint defense against aggression, the President of the Republic of Poland may, at the request of the Council of Ministers, declare the martial law. Meanwhile, in the event of a specific threat to the constitutional system of the State, security of the citizens or public order, including one caused by terrorist or cyberspace operations, the President of the Republic of Poland may declare the state of emergency for a fixed period of time. The state of emergency may only be declared if the above risk actually happens and if it was unexpected. The Constitution does not require simultaneous occurrence of all the circumstances justifying the declaration of the state of emergency.

The President submits a regulation declaring the martial law or state of emergency to the Sejm (lower house of the Polish Parliament) within 48 hours of its signing. The Sejm promptly reviews the regulation, which it may repeal by the absolute majority of votes in the presence of at least half of the

statutory number of the Members of the Sejm. The state of emergency may only be extended once, subject to the consent of the Sejm, for the maximum of 60 days.

Meanwhile, in order to prevent the consequences of natural disasters or technological failures that have the features of a natural disaster and for the purpose of their removal, the Council of Ministers may declare, for a fixed period, no longer than 30 days, the state of natural disaster in a part of or in the whole State. This state may be prolonged subject to the consent of the Sejm.

The structure of crisis management

The structure of crisis management in Poland is based on four levels: central, regional (voivodship), sub-regional (poviat) and local (gmina). Crisis management covering the territory of the country is controlled by the Council of Ministers. In urgent cases, crisis management is controlled by the minister of home affairs. The Council of Ministers has established the Government Team for Crisis Management. It is an evaluation and advisory body competent to initiate and coordinate measures within the scope of crisis management. The Government Center for Security has also been established. It reports to the Prime Minister and provides crisis management related services to the Council of Ministers, the Prime Minister, the Government Team for Crisis Management and the minister of home affairs, and it serves the function of the national center for crisis management (Journal of Laws of 2015, item 508).

Also, the ministers and central administration authorities competent for matters associated with ensuring national security, including protection of the population or economic foundations of the security of the State, were obligated to establish crisis management centers, whose duties include, among other things, serving round-the-clock on-call duty to ensure the flow of information for the purpose of crisis management, cooperating with crisis management centres of public administration authorities, supervising the operation of the system of detection, alert and early warning of the population, cooperating with services engaged in rescue, search and humanitarian operations, and serving continuous on-call duty to increase the defense preparedness of the State.

On the regional level, the competent authority in matters of crisis management is the head of the region (voivode), who performs his duties in collaboration with the regional team for crisis management. Also, regional crisis management centers are established, operated by organizational units competent for the matters of crisis management in regional offices.

The duties of the voivode as the representative of central administration in the region include, in particular:

- To supervise the functioning of the civil preparedness and management system in the region, including to issue orders, to the extent necessary, to public administration authorities to ensure proper performance of their tasks within that system;
- To approve regional plans and programs within the scope of civil planning, including response plans to risks that directly trigger a crisis or risks that lead to a crisis;
- To determine crisis management procedures in the region;
- To verify sub-regional (poviat) plans and programs within the scope of civil planning, including response plans to risks that directly trigger a crisis or risks that lead to a crisis;
- To determine specific tasks within the scope of civil preparedness for public and private operators in the region and to inform them of the need to perform specific activities;
- To verify regional programs and projects for their compliance with the civil preparedness and crisis management system and plans;
- To coordinate management and alert systems and to monitor risks in the region;
- To invest in civil readiness and crisis management in the region, in particular to expand and modernize coordinating, monitoring and warning systems;

- To coordinate activities at times of risk or crisis in the region or a major part of the region, including: to distribute the share of the state reserves allocated to the region and to provide updated information;
- To assist the head of a poviat (starosta) in performing his duties at a time of risk or crisis in the poviat, i.e. to provide logistics, materials, devices, human resources, including special forces, military reserves and the army, however, without overtaking control over the operations at a time of risk or crisis;
- To organize cooperation between poviats or regions or across the country at a time of risk or crisis that covers one or more than one poviats;
- To verify poviat projects and programs, including investment projects and projects involving reconstruction of specific areas, for their compliance with the existing plans, principles and standards of civil preparedness and crisis management;
- To support local civil preparedness and crisis management bodies in acquiring the funds required for reconstruction;
- To organize training and drills verifying the condition of civil preparedness and crisis management.

The competent authority in matters of crisis management in a poviat is the head of the poviat (starosta) who, as the chair of the poviat board, performs crisis management operations in cooperation with the poviat team for crisis management. Poviats also establish their centers for crisis management. On the lowest level of the local government, i.e. in gminas, the authority competent for matters of crisis management is the mayor of the gmina, town or city. The mayor of a gmina, town or city is assisted in the performance of crisis management operations by the gmina team for crisis management. In order to implement those operations, he may establish gmina (municipal) centers for crisis management.

Phases of Crisis Management

Crisis management operations should include:

- Prevention and preparation measures;
- Information collection and situation evaluation process;
- Setting the goals to be implemented;
- Developing various options of action plans and comparing them; and
- Analyzing response methods.

When implementing the above assumptions, it is reasonable to identify four stages of crisis management: preparation, prevention, response and reconstruction.

At the preparation stage, action plans should be developed and the actors responsible for specific operations as well as the scope of work to be performed should be identified. The entire procedure is based on the evaluation of the probability of occurrence of potential risks and on determining the specificity of their occurrence. In order to verify whether plans will work in practice, the personnel engaged in performing the operations contained in the plans should undergo trainings and drills. The crisis response plan identifies the organizational structure of crisis management as well as reporting and cooperation lines. It determines the forces and means that are necessary and that may be used in potential actions and specifies how to protect people and their possessions during crisis. The measures taken at this stage do not involve technologies which – if properly applied – could significantly reduce the consequences of an event, minimize loss and accelerate restoration of the conditions needed for normal functioning (Maciejewski, 1998).

Prevention is an incessant process the goal of which is to eliminate the probability of the occurrence of a risk or to limit the risk and to minimize the loss caused by a disaster. Here, it is important to have a strategy of action that contains the following elements: analysis of risks and evaluation of social vulnerability; promoting applied research and technology transfer; increasing social awareness and popular education in risk prevention; developing a system of financial incentives and restrictions and

proper utilization of resources; ensuring leadership and coordination of activities. It seems that many crisis events would not take place if more attention was paid to the implementation of specific plans, recommendations or guidelines, which could prevent the occurrence and consequences of a disaster (Maciejewski, 1998).
In the third stage – the response stage – the planned recommendations are implemented and the work of competent actors focusing on the provision of assistance to the victims and limiting the loss is coordinated. The key elements of the response stage include, among other things:

- Situation monitoring – it is based on routine collection of data and information on potential and actual circumstances or events that threaten the security of the local community and the environment. The monitoring should be continuous, as it constitutes a substantial basis for the evaluation of a situation, and thus for decision making;
- Risk identification – it means using monitoring information to analyse events and forecast the development of a situation. The type, range and duration of a given stimulus of phenomenon is a prerequisite to evaluate the risk and adequately use the forces and means that enable rescue activities;
- Warning and notification – it concerns the obligation to provide information about a danger, which should reach both the population and the institutions predisposed to appropriately respond to a hazardous event;
- Rescuing people – all the activities undertaken to help victims, involving search and rescue actions, evacuation of people and property from the region of a disaster and provision of medical and psychological assistance.
- Securing property – involves protecting property from damage and looting;
- Social care and assessment of damage – these are two different activities, but they are performed simultaneously. Social care involves measures that are supposed to provide victims with any assistance they may need in order to return to as normal functioning as possible. The main purpose of the assessment of the consequences of a disaster is to apply to management authorities of higher levels for help;
- Restoration – involves, among other things, removal of debris from the site of a disaster, decontamination of an area, restoration of public services, enabling return to normal life. Restoration is an early stage of the phase of reconstruction (Maciejewski, 1998).

The main goal of this stage is to restore, as quickly as possible, minimum living conditions for people and the operation of municipal systems and administrative structures in a given area. Reconstruction is done in such a way as to make the area struck by a disaster more resistant to that disaster in the future. At that time, damage is assessed, debris is removed and disinfection and anti-epidemic measures are performed.

During reconstruction, it is possible to prevent future disasters. The four stages constitute a closed cycle, because the stage of reconstruction should be implemented in such a way as to make it an element of the prevention stage, i.e. new solutions should not only restore the structures from before a disaster but also modernize them and, based on the lessons learned, increase resilience to new risks.

It is worth noting that the literature mentions the fifth phase of crisis management called “learning a lesson”, i.e. accumulating experiences gained in the course of a disaster situation and assimilating this knowledge so that it may be used to combat future risks (Mitroff, Pearson, 1998; Szczepańska-Woszczyna, 2013). The above cycle was developed on the basis of the experiences of economic sciences, but it can well be transposed to the level of ensuring general security.
Accordingly, crisis management involves:

- Acquisition, distribution and evaluation of information – permanent information authorities;
- Situation analysis – headquarters, dedicated, permanent authorities;
- Identifying the goals to be achieved – in normal times, the governing authorities, at times of a disaster – their representations;
- Selecting and implementing action options – top representation – committee and coordinating minister;
- Analyzing the effects of response and reconstruction.

Summary

Over the last years the concept of resilience, or disaster risk reduction, has emerged into public debate, and it is a sign that at long last people in authority are taking seriously the idea of preparing for adverse events, not merely reacting to them. As Timothy Coombs and Daniel Laufer note "Despite the importance of this topic, the state of the literature in the area of global crisis management has yet to be explored" (Coombs, Laufer, 2018).

Presenting a list of existing Polish legal regulations governing crisis management is a more complex task than it is generally believed. There are two schools that can be mentioned here. The representatives of the first believe that the crisis situation referred to in the *Crisis Management Act* exists by the time one of the extraordinary states is declared and continues after it is cancelled, until the State returns to normality. Meanwhile, the representatives of the other school believe that a crisis situation ends once the climax has been passed and the risk drops to a stable, low and acceptable level. Thus, crisis management does not end once one of the extraordinary states is declared, but rather it lasts until the State once again functions normally.

Considering the above, for some, legal regulations governing crisis management include, apart from the *Crisis Management Act*, all the three acts on extraordinary states, i.e. on martial law, state of emergency and state of natural disasters, while others omit the *Martial Law Act* and still others disregard all those acts. Yet others mention more legal regulations, e.g. the *Act on Protecting Persons and Property* or the *Act on the Security of Mass Events.*

Nonetheless, the *Crisis Management Act* guarantees, at least in the legal sense, a harmonious transition of the State management system from a normal state to an extraordinary state. Also, continuous improvement of a specific system makes it more efficient (Pawłowski, 2004), which means that improving the existing solutions concerning the operation of public administration in crisis situations will make them effective and help them avoid mistakes, and at the same time it will enable, if need be, seamless transition of structures from operation in "peace" conditions to operation in a situation of threat (Socha et al., 2015). As David Alexander indicates in his research "The study and management of disasters should involve a mixture of theory and experience. We learn the former in the classroom and the latter in the field. Lack of either perspective is unhelpful or downright dangerous. Theory is the roadmap that enables us to deal with disasters, and experience needs it to be able to make sense of complex and chaotic realities. The field of disasters is unusual, in that the test of theory is its ability to help solve pressing, practical problems right away, not in 50 years' time" (Alexander, 2012). Furthermore, L. Baird's at al. research shows that „A critical component for learning is the application of post-crisis reviews because the process has been found to facilitate organizational learning" (Baird et al., 2000).

It may also be claimed that if operators are prepared to act in a crisis situation, they will also be more effective in implementing their statutory duties in normal conditions. Accordingly, crisis management is a very complex problem, even though it may not seem so, and there still remains a lot to be done in this area both for academics and for practitioners.

With the increased interest in crisis management over the years, including special issues in mainstream business journals – as D. Laufer notes in his research (Laufer, 2015) – hopefully more attention will focus on global issues in situations of non-military threats in the future.

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El Empleo Con Apoyo Desde La Perspectiva De Los Trabajadores/As Con Discapacidad Intelectual

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Abstract

Frente a otras formas de relaciones laborales, la modalidad de empleo con apoyo fomenta la inserción laboral de personas con discapacidad intelectual en la empresa ordinaria. En este estudio, a través de un grupo focal, se analizan los beneficios de esta modalidad de inserción sociolaboral desde la perspectiva de los trabajadores/as con discapacidad intelectual. Los resultados muestran que el empleo con apoyo fomenta su desarrollo personal y profesional, autonomía y bienestar social.

Keywords: empleo con apoyo, discapacidad intelectual, inserción laboral, calidad de vida.

Introducción

El empleo es un medio valioso para las personas, más que una fuente de ingresos, el empleo aporta identidad personal, fomenta el desarrollo personal e incrementa las interacciones sociales entre las personas (Subirats et al., 2004). Para las personas con discapacidad intelectual (DI) el empleo es todavía más significativo, les proporciona un rol social, incrementa sus niveles de calidad de vida y les conduce a disfrutar de mayores niveles de autonomía y participación social, fomentado sus posibilidades de inclusión (Akkerman, Jassen y Meininger, 2016; Jahoda, Kemp, Riddell y Banks, 2008; Verdugo, Martín-Ingelmo, Jordán de Urríes, Vicent y Sánchez, 2009). Asimismo, se establece una relación positiva entre calidad de vida, empleo y salud mental (Dean, Shogren, Hagiwara y Wehmeyer, 2017).

La CRPD (2006) y la directiva para el empleo 78/2000/CE garantizan el derecho a la participación plena en el empleo de las personas con discapacidad en igualdad de condiciones y no-discriminación, en entornos laborales ordinarios, abiertos y accesibles. Sin embargo, todavía hoy nos encontramos lejos de alcanzar esta realidad (CRPD, 2006). Es amplia la literatura que reivindica la situación de desventaja social de las personas con discapacidad en relación al empleo, tasas de empleo inferiores al 50% en toda Europa y altas tasas de desempleo e inactividad (Greve, 2009; Parmenter, 2011; Sharle y Csillag, 2016; Shima, Zóloyomi y Zaidi, 2008). Así como, las barreras que impiden su acceso siendo estas individuales (dificultades para la interacción social, habilidades sociales, cambios de rutina, etc.) (Khayatzadeh-Mahani, Wittevrongel, Nicholas y Zwicker, 2019) y contextuales (estigma y prejucios, bajas expectativas sobre su productividad, desconocimiento de la discapacidad, costes percibidos para los soportes y las adaptaciones y las características propias del lugar de trabajo (Ellenkamp, Brouwers, Embregts, Jossen y Weeghel, 2016).

La orientación de política pública se ha orientado a incrementar los niveles de participación de personas con discapacidad en el empleo. Sin embargo, se continúan invirtiendo recursos en estructuras de empleo segregado (Greve, 2009; Jordán de Urríes y Verdugo, 2012; Wheman, 2012). En los últimos treinta años se ha transitado hacia la aplicación de políticas activas de empleo, que movilizan a las personas con discapacidad a trabajar en entornos ordinarios. Una de estas estrategias para la inclusión laboral de personas con discapacidad es proporcionar apoyos individualizados en entornos laborales ordinarios, también conocido como Empleo con Apoyo (EcA) (Wheman, 2012). En la actualidad, los

mercados *flexiseguros*, definidos como aquellos que combinan mercados laborales flexibles, sistemas potentes de seguridad social y una alta aplicación de las políticas activas de empleo, son los que ofrecen mayores oportunidades de inclusión para las personas con discapacidad (European Comission, 2012; Sharle y Csillag, 2016).

Considerando la importancia del empleo con apoyo para las personas con discapacidad (Akkerman et al, 2016; Jahoda et al, 2008; Evans, 2010; Verdugo et al., 2009; Subirats et al., 2004; Wheman, 2012) , este estudio analiza el empleo con apoyo desde la perspectiva de los trabajadores con DI. Para ello se analiza el caso de una empresa que incorpora por primera vez a trabajadores con discapacidad. El siguente apartado analiza el empleo con apoyo como herramienta de inserción laboral. A continuación se detalla la metodología de la investigación y se analizan y discuten los resultados. El análisis realizado permite comprender los beneficios de esta modalidad de inseción laboral desde la perspectiva de los trabajadores con discapacidad.

La Situación Actual Del Empleo Con Apoyo

El Empleo con Apoyo (EcA) nace en los Estados Unidos y Canadá, entra con fuerza en Europa a finales de los años ochenta. El EcA supone un avance respecto al *Customized Employment* (Inge, 2012). El EcA se considera más que una simple metodología de inserción laboral, esta se acompaña de una filosofía, unos principios (Evans, 2010) y unos valores (Wheman, 2012). El empleo debe ser significativo para el individuo, le debe proporcionar calidad de vida, oportunidades de crecimiento personal y un mayor desarrollo de sus relaciones sociales (Wheman, Inge, Revell y Broke, 2007).

El EcA se ha extendido por todo el mundo, con mayor o menor intensidad. Se dispone de una serie de evidencias científicas que demuestran su impacto sobre la calidad de vida de las personas con DI y su eficiencia respecto de otras metodologias de inclusión laboral (Cimera, 2012). Sin embargo, disponemos de más evidencias para *Indivudual Placement Support* (IPS), una metodología de inserción laboral con apoyo orientada a personas con problemas de salud mental (Luciano, Drake, Bond y Becker, 2014).

Verdugo et al (2012) avalúan el impacto del programa EcA Caja Madrid sobre la calidad de vida de las personas con discapacidad y qué factores influyen en la misma. En relación con los resultados, las personas con DI maifiestan altos niveles de competencia/productividad, niveles intermedios de satisfacción, autodeterminación/independencia y menores niveles de pertinencia social/integración en la comunidad. Concluyen que los trabajadores que participan en el programa EcA mejoran su calidad de vida. Así mismo, Jahoda et al (2008) encontraron que el EcA tenía un impacto positivo sobre la calidad de vida, bienestar y niveles de autonomía de las personas con DI, mientras que se percibían menores niveles de aceptación social. Para Schalok y Verdugo (2007) el concepto de calidad de vida es multidimensional y está influenciado por factores personales y ambientales. Establecen ocho dimensiones para medir los niveles de calidad de vida (desarrollo personal, autodeterminación, relaciones interpersonales, inclusión social, derechos y bienestar emocional, físico y material) y ejemplos de apoyos para fomentarlas.

En relación a los niveles de satisfacción de las personas con discapacidad Verdugo et al (2009) afirman que el EcA tiene un impacto positivo sobre los niveles de calidad de vida, traduciéndose en mayores niveles de autodeterminación, empoderamiento y autoconocimiento. Sin embargo, se muestran menores niveles de satisfacción en relación a su integración en la comunidad. Tanto los factores ambientales, como las características propias del lugar de trabajo y los compañeros influyen en los niveles de autodeterminación de las personas con discapacidad. Por último, demostraron los trabajadores con discapacidad disfrutaban, se sentían satisfechos con su trabajo y mostraban interés por aprender más.

Las personas con discapacidad prefieren trabajar en entornos ordinadarios y muestran mayores niveles de satisfacion laboral que los que trabajan en entornos segregados (Migliore, Mank, Grossini y Rogan, 2007). Para Akkerman et al (2016) los factores que influyen para obtener mayores niveles de satisfacción laboral son: las características del trabajador, las características del lugar de trabajo, las relaciones sociales y apoyos y la adecuación entre la persona y el entorno. En esta línea Págan y Malo (2009) añaden que los mayores niveles de satisfacción de las personas con discapacidad respecto de

las personas sin discapacidad se pueden deber a las bajas expectativas en relación al empleo de los primeros.

Otros estudios han ido más orientados a evaluar cuales han sido los niveles de implementación del programa EcA en los diferentes países europeos. En general, se observa un desarrollo lento, pero progresivo, principalmente porqué la posición del EcA no está suficientemente clarificada y se aplican metodologías diferenciadas (Jordán de Urríes y Verdugo. 2010), así mismo, los recursos que se destinan a los programas son inestables (Beyer, Jordán de Urríes y Verdugo, 2010; European Comission, 2012; Verdugo et al., 2009). En España, el proyecto INCO de Caja Madrid en España, supuso un avance importante para el desarrollo del programa EcA, otorgando una fuente de financiación estable. En 2008 se habían desarrollado 202 iniciativas que ofrecían EcA a 23.342 personas (Jordán de Urríes y Verdugo, 2010).

También se han llevado a cabo estudios cualitativos relevantes como el realizado por Spjelkavik y Evans (2007) con la finalidad de conocer el estado general del EcA en Noruega, comparándolo con iniciativas de otros países como España, o el estudio realizado por Cramm, Finkenflügel, Kujstein y Exel (2009) quienes analizan la perspectiva de los trabajadores con DI sobre los programas EcA. En este estudio, los participantes otorgaron mayor valor a la participación, a la variedad de tareas y al sentimiento de pertinencia. Así mismo, se valoró positivamente el hecho de poder trabajar independientemente, acuerdos laborales claros y compañeros de trabajo amigables, concluyendo que la relación entre el EcA y la integración social es positiva.

A pesar de que se pueden encontrar evidencias interesantes, todavía se requieren de más estudios que sustenten la efectividad de la metodología EcA como un servicio que garantiza un empleo competitivo para las personas con DI (Waghorn, Collister, Killackey y Sherring, 2007). También se requieren más investigaciones que ofrezcan resultados sobre el impacto del EcA sobre los niveles de calidad de vida y niveles de autodeterminación de sus trabajadores (Verdugo *et al.,* 2009).

Metodología

Este estudio se fundamenta en una metodología cualitativa a través de un grupo focal compuesto por cinco trabajadores con discapacidad. Según Verdugo, Jordán de Urríes y Vicent (2009) para evaluar programas de EcA es necesario realizar grupos de discusión con los usuarios del programa y sus famílias, estas últimas no son analizadas en este estudio. Los grupos focales facilitan altos niveles de discusión entre los participantes, útiles para captar la variedad de experiencias personales en relación a la experiencia de EcA en un periodo corto de tiempo (Hamui-Sutton y Varela-Ruiz, 2013). Más concretamente, los grupos de discusión permiten evaluar como impacta el programa EcA en la calidad de vida de los trabajadores con discapacidad, así como, detectar los aspectos positivos y negativos del programa según la percepción de los usuarios para intentar mejorarlos (Verdugo et al., 2009).

El grupo focal constó de un total de cinco trabajadores/as con discapacidad intelectual de entre 18 y 30 años que que desempeñaban las funciones de auxiliar de bibliotecario/a. En los resultados se identifican con la P de participante, P1, P3 y P5 son hombres mientras que P2 y P4 son mujeres. Todos ellos habían participado previamente en un programa formativo en competencias y habilidades para trabajar en empresa ordinaria. En relación con la experiencia laboral previa P1 y P4 habían trabajado previamente en un centro especial de empleo, P2 en un centro ocupacional, mientras que P2 y P5 no tenían experiencia laboral previa.

Para el desarrollo del grupo focal se elaboró un cuestionario de preguntas semi-estructuradas fundamentado en cuatro de las ocho dimensiones del modelo de calidad de vida de Schalok y Verdugo (2007): desarrollo personal, autodeterminación, relaciones interpersonales y bienestar material. Así mismo, se añadieron otras cuestiones relacionadas con el nivel de satisfacción con los apoyos y con las tareas asignadas.

Resultados

En el siguiente apartado se exponen cuáles han sido los principales resultados. En primer lugar, se debe identificar si los participantes consideran que el EcA ha tenido un impacto positivo en sus niveles de

calidad de vida en relación a las siguientes cuestiones: desarrollo personal, autodeterminación, relaciones interpersonales, integración social y bienestar material.

Por otro lado, se analiza la percepción que tienen los trabajadores con discapacidad en relación con los apoyos y a su disposición hacia el empleo: motivación, iniciativa, productividad.

Tabla 1: Variables de análisis para el grupo focal

	Percepción en relación a:	Indicadores
Calidad de vida	1. Desarrollo personal	Progreso , habilidades
	2. Autodeterminación	Autonomia, autoestima empoderamiento
	3. Relaciones interpersonales	Relaciones de amistad, interacciones
	4. Integración social	Aceptación, ambiente de trabajo,
	5. Bienestar Material	Ingresos
Empleo ordinario con apoyo	6. Apoyos	Apoyos naturales y entrenadores laborales
	7. Tareas	Motivación, iniciativa, productividad

Fuente: Elaboració propia

Calidad de vida percibida por los trabajadores con DI en un programa EcA

En general los usuarios del programa EcA valoran positivamente la experiencia de empleo ordinario. Manifiestan que el EcA les ha ofrecido oportunidades para progresar y desarrollarse personal y profesionalmente.

> "*Para mí ha sido una cosa magistral"* [P3].
>
> "*Valoro que he crecido claro, en comparación al trabajo que hacía antes pues claro, años vista"* [P1]

Aquellos que habían desempeñado empleos en entornos protegidos valoran muy positivamente la transición a empresa ordinaria.

> *"He crecido más, he hecho tareas nuevas, he aprendido cosas, he notado un gran cambio con el centro especial de empleo"* [P4].
>
> "*Me ha encantado la experiencia ha sido muy positiva, también me ha gustado esa transición del centro especial de empleo hacia la empresa ordinaria"* [P1]

Así mismo, todos manifestaron el deseo de poder seguir formandose para desempeñar tareas más complejas .

> "S*i porqué hay tareas como el préstamo que solo pueden ellos, me han dicho que aún no puedo hacerlo"* [P3],

En cuanto a la autodeterminación, los participantes reconocen mayores niveles de autonomía personal y en el desarrollo de las tareas.

> "*He aprendido a hacer un mejor uso del transporte público y a ser más responsable con los horarios para no perderlo"* [P1]".
>
> *"Están muy contentos conmigo, lo hacía todo solo, era una persona autónoma"* [P2].

En este sentido, la mayoría de los participantes consideran que el empleo ordinario ha mejorado sus niveles autoestima y habilidades sociales, se sienten más empoderados y tienen una mejor visión de sí mismos.

> *"[…] he aprendido muchas cosas, he perdido bastante la vergüenza, he podido confiar en mí misma"* [P2].
>
> *"He crecido más, he hecho tareas nuevas, he aprendido cosas, he notado un gran cambio con el centro especial de empleo"* [P4].
>
> *"[…] ahora me siento, bueno después de haber hecho esto me siento más seguro de mí mismo, y decir puedo hacer esto"* [P3].

Otro aspecto importante para el análisis es determinar si el programa EcA ha mejorado sus relaciones interpersonales. En general, todos valoran muy positivamente el compañerismo proporcionado por sus compañeros de trabajo, sobretodo que se preocuparan por ellos y los hicieran sentirse cómodos.

> "S*on todos muy majos, son personas que han sabido que éramos personas con discapacidad y han sabido tener una mirada hacía...* [P1].
>
> *"Siempre que entraba me preguntaban cómo estaba, si quería café, me preguntaban si me cansaba, se preocupaban por mí"* [P4].

Consideraron que la relación con los compañeros de empleo debía ser diferente a la amistad y fundamentarse en la confianza y el respeto. En este aspecto, todos los participantes expresaron que confiaban en sus compañeros de trabajo.

> "*Amistad no, pero ir tranquilo al trabajo, estar bien con todos los compañeros"* [P1],
>
> "*Confianza y confiar en mí misma, sé que no puedo hacer amigos"* [P2].
>
> *"En mi caso la confianza…"* [P3].
>
> "*Agradable, cordial con respeto"* [P4].
>
> *"Estar cómodo"* [P5],

Sin embargo, en dos de los participantes se observan menores niveles de interacción social con los compañeros de trabajo.

> *"Les digo hola y poca cosa más […] no soy mucho de hablar, si sale alguna cosa, pero soy más de responder que de preguntar"* [P5].
>
> "*Iba a desayunar solo al bar, cada uno iba a su aire, tampoco buscaba ir con nadie* [P1].

En cuanto a la integración social en general los participantes se sienten aceptados por sus compañeros de trabajo y manifestan que el ambiente laboral es adecuado.

En relación al bienestar material todos los participantes se mostraban satisfechos de disponer de un salario equiparable al resto de trabajadores y se sienten satisfechos de tener cierta autonomía económica para satisfacer algunas de sus necesidades.

> *"Yo he hecho más cosas, o guardármelo, me he comprado ropa"* [P2].
>
> *"He comprado unas figuras de juego de tronos y he gastado porqué es navidad y reyes, he gastado también porqué es el cumple de mi mentora, le he comprado un libro"* [P3].
>
> *"Me compré un par de cosas que quería, un juego para mi cumpleaños, antes pensaba más lo que gastaba porqué tenía ingresos más limitados, me gustaría seguir trabajando"* [P5].

Perspectiva de los trabajadores con discapacidad en relación con los apoyos y el empleo

Por lo que respecta a los apoyos proporcionados, distinguimos entre: apoyos naturales, disponibles en el lugar de trabajo y los apoyos proporcionados por los entrenadores laborales externos.

Los participantes consideran que los apoyos que se les han proporcionado han sido suficientes. En cuanto a los apoyos naturales, los particpantes manifiestan que siempre les han ofrecido ayuda cuando la han necesitado, así mismo valoran muy favorablemente el hecho que se les ofrecieran instrucciones por escrito.

> "E*l primer día estaba un poco perdida, pero me lo trajeron todo por escrito, por pasos, con flechas y después ya sabía hacerlo, siempre que he necesitado apoyo me lo han dado"* [P4].
>
> "*Me dieron una hoja por escrito, pero ahora ya no la necesito, sin que me digan nada se perfectamente que debo hacer, si tenía dudas preguntaba y me ayudaban"* [P4].
>
> *"Al principio no lo tenía claro pero mi compañera de trabajo, se ha puesto a mi lado y me ha ayudado en muchas cosas"* [P1].

En cuanto a los apoyos externos expresan que estuvieron poco tiempo porqué tanto los empleadores como ellos mismos consideraban que ya no eran tan necesarios. Es decir, la intensidad de sus apoyos externos se vio reducido desde las primeras semanas.

> "A *mí también me dieron soporte, el tercer día ya no vinieron, después venían una vez por semana a ver cómo estaba"* [P2].
>
> "*La chica estuvo allí una semana y después de una semana le dijeron que ya se podía ir que no necesitaba a nadie al lado"* [P1].
>
> "*Vinieron el primer día y al segundo ya les dijeron que no vinieran más, que ya sabía todo, venían a visitarme y se iban, me dijeron me voy, no tengo nada que hacer aquí, lo sabes hacer tú sola"* [P4].

En un caso se observó que el participante no podía valorar si el apoyo por parte del profesional externo había sido suficiente.

> *"Hace como dos meses que no la veo, vino la primera semana y ya está, que yo recuerde, tampoco sé si me hubiera ido bien que viniera, no lo sé realmente"* [P5].

Así mismo, todos coincidieron en que los apoyos habían sido claves para ayudarles a gestionar momentos puntuales de estrés laboral.

> *"A veces vienen todos de golpe, mi compañera me dijo que no me preocupara que ella me iba a ayudar, que cuando hubiera mucha faena la haríamos poco a poco"* [P3].
>
> *"Yo con las revistas, es un trabajo que no me gusta, y ya… se tiene que respetar […] en ese momento estaba la Ruth (soporte externo) y dejemos la tarea, …me perdía, una parte la sabía hacer, la otra era mucho más complicada* [P1].
>
> *"Me estrese una vez y vino el compañero […] y él me dijo tu hazlo aquí y yo te ayudo por allí, a veces el sistema se colapsaba y teníamos que cerrar el ordenador"* [P4].

Un último aspecto a analizar es como valoran las tareas, si se sentían motivados para realizarlas, si tenían iniciativa y si consideraban que habían sido lo suficientemente productivos.

En general todos los participantes valoran que las tareas se han adecuado a sus capacidades. Valoraron sus capacidades respecto de las tareas que tenían que hacer del siguiente modo: *"yo un 7"* [P1], *"bastante bien"* [P3], *"bien"* [P2], *"yo muy bien"* [P4].

Así mismo, consideraron que las tareas que hacían mejor fueron:

> *"yo lo que hacía mejor era codificar libros, poner etiquetas, sellar…*[P1].

> "*A mi me gustaba la parte de las bolsas azules, es lo que hago mejor, lo se hacer y también estar allí para cuando alguien viene a pedir un portátil y se lo das"* [P3].
>
> *"En mi caso son muchas las cosas que hago bien, hacer las bolsas azules, dejarlas en el almacén, subir los carros, coger los portátiles que la gente devuelve"* [P2].
>
> *"Pues no lo sé, las tareas son bastante simples para decir que unas me han costado más que otras*" [P5].

Sin embargo, consideraron que tareas como la codificación y ordenacion de libros según la clasificación decimal universal eran más complejas. Aun así, se mostraron dispuestos recibir formación para realizarlas mejor.

En relación con la motivación y compromiso con el empleo, en general todos manifestaron que habían dado lo mejor de ellos, que eran más responsables y hacían un trabajo de calidad.

> "*Muy buena, he dedicado el tiempo a las tareas, además me decían que, hacia muy poco tiempo de descanso, me decían ¿ya estás aquí?* [P1].
>
> *"Yo estaba pendiente del trabajo que tenía que hacer, comprometida, con calidad, sellaba y cuando terminaba lo revisaba"* [P2].

Asimismo, se sintieron productivos y reconocidos por sus responsables, el hecho de terminar tareas que consideraban costosas en poco tiempo les hacía sentirse reconocidos.

> *"A mi un día me trajeron una caja para revisar y me dicen ¿ya está? ¡qué rápido! es que no damos abasto"* [P4].
>
> *"Me gusta poder decir que he terminado una faena que era costosa"* [P1].
>
> *"A mi me gusta empezar tareas y terminarlas, se ponían contentos porqué las hacia deprisa* [P3].

Para finalizar, un dato interesante es el significado que el empleo tiene un sus, vidas. Algunos de los participantes se sentían más motivados a trabajar en una biblioteca porqué se sentían vinculados con los libros.

> "[…] *mi familia viene de libros, todos venimos de libros y ver libros que no has visto nunca, verlos y tocarlos en directo, claro esto para una persona a la que le gusta leer es bonito […]* [P1].

Discusión Y Conclusión

Este estudio tiene como objetivo comprender los cambios que han percibido los trabajadores con DI que han participado en un programa de EcA. Los resultados indican que el EcA ofrece oportunidades desarrollo personal y profesional de los trabajadores con DI. Estos resultados son coherentes con las investigaciones realizadas por Verdugo et al (2009) y Subirats et al (2004). De igual forma, el EcA ofrece mayores niveles de autodeterminación para las personas con DI que se traducen en mayores niveles de autonomía, autoestima y empoderamiento. Este aspecto coincide con los resultados de los estudios desarrollados por Akkerman et al (2016), Jahoda et al (2008) y Verdugo et al (2009).

Asimismo, según los resultados de este estudio el EcA mejora parcialmente las relaciones interpersonales de los trabajadores con DI y sus niveles de integración social, en este mismo sentido, el estudio realizado por Verdugo et al, (2009) concluye que los participantes del programa EcA mostraron inferiores niveles de satisfacción en relación a su integración en la comunidad. Por lo que respecta al bienestar material, el programa EcA garantiza un empleo competitivo integrado en la comunidad, con salarios equiparables al resto de los trabajadores, este aspecto sigue la definición de EcA desarrollada por Wheman (2012).

En cuanto a los apoyos se considera que son fundamentales para alcanzar resultados exitosos en relación a la consecución de objectivos de inserción laboral, sobretodo los apoyos integrados en el lugar

de trabajo. Por lo que respecta a los apoyos proporcionados por los preparadores laborales se observaron diferencias en la intensidad y en la calidad de los soportes puediendo estas derivar de la metodología empleada por cada organización. En general, durante la primera semana se dejaron de prestar soportes intesivos, pasando a un rol de soporte puntual. Estos resultados coinciden con las aportaciones de la European Union en (2012) y Spjelkavik y Evans (2007).

A pesar de que continúan existiendo barreras en relación al empleo como las bajas expectativas en productividad, motivación y iniciativa de las personas con DI, los resultados señalan que las personas con DI son productivas y realizan sus tareas con compromiso y motivación. Estos resultados siguen la línea de las aportaciones realizadas por Lysaght, Petner-Arrey, Howell-Moneta y Cobigo (2017). Por lo que respecta a la iniciativa, en algunos casos las caracteristicas del lugar de trabajo no la han permitido, además, la falta de formación para desempeñar algunas tareas han impedido que las pudieran realizar. Asimismo, los resultados apuntan que las personas que se sienten vinculadas con la tareas se sienten más motivados en su trabajo, este hallazgo también fue puntualizado por Arsuaga y Santiso (2018).

En conclusión, el EcA es una metodología de inclusión laboral efectiva para que las personas con DI puedan ocupar puestos de trabajo integrados en la comunidad y así incrementar sus niveles de calidad de vida y su participación social. Sin embargo, se requiere de más prácticas basadas en evidencias que permitan sustentar todavía más estas afirmaciones. Asimismo, se requieren de más investigaciones en relación a como se pueden fomentar las relaciones sociales de las personas con DI e incrementar la calidad de los apoyos en entornos laborales integrados.

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Epitomising Ethical Dilemma in Public Relations Practice: The Way Forward

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Abstract

The dynamics of globalisation have created an opportunity for African economies, especially Nigeria, to promote public relations. Decree Number 16 of 1990 includes numerous guidelines and by-laws stated by Nigerian Institute of Public Relations. Given the presence of the constitutional guidelines, there remain several issues. Such problems vary from unethical attitudes, lack of sufficient knowledge about the code of profession and institute functions. The aim of this article is to provide a summary of public relations ethics. The principles of public relations, the current state of practice and ethical dilemma. It will provide definitions and discuss key areas of ethical dilemma and controversy from the theoretical points of view. The authors used desk research, also called secondary research, to collect data for the analysis. We collected past NIPR publications via desk study, including policy charter, NIPR News, PRs Journal and workshop papers, PR news releases, etc. Relevant information was sourced from articles indexed in scholars and Scopus. Consequences for practitioners were explored, including research that shows a strong sense of ethics and how ethical decisions will improve public relations professionals' career prospects. Recommendations are proffered for public relations professionals.

Keywords: Ethics, Dilemma, Public Relation Practice, Management

Introduction

Presently, public relations is a crucial marketing tool and powerful communication force which helps business and non-commercial organisations to sell product or services, credibility, and ideas through the information channel. Public relations has taken an essential and challenging shape in a modern society characterised by the growth of industrialisation, competitive business corporations (Kim & Ki, 2014; Yang & Taylor, 2014) and non-government organisations (Taylor & Yang, 2015). The importance of public relations is based on the need to convey the messages of an institution or organisation to a wide range of people both within and outside. The essence of this is to establish and sustain its position in society by managing the relationship with stakeholders. This profession has the responsibility to act as the spokesperson and mediator, to reach target people and to manage the public

perception of organisational crises through appropriate communication (Browning, 2018). This requires an art of communicating messages through proper channels with integrity and ethical values to maintain a cordial relationship with stakeholders.

In the developed world, the public relations profession has received greater importance (Commission on Public Relations, 2009), and however, negative attitudes persist and create misunderstandings about the role of public relations which ultimately (Sterne, 2010; Quinn-Allan, 2010; Genilo, Akther & Chowdhury, 2011), degrade the status of this job in the eyes of employers and other professionals. This is of exemption to developing countries. According to Oyero, Tayo-Adigboluja, Odiboh & Egharevba (2018), Nigerian laws do not allow anyone to practice public relations without licensing or being a professional public relations person by any other name. And such individuals cannot be professionals without being licensed by the Nigerian Institute of Public Relations (NIPR). The institute is an entity entrusted with the responsibility of managing reputation, friendship, relationships and regulating public relations activities in the country.

The Nigeria Institute of Public Relations (NIPR) was founded to perform the following objectives: build a credible and dynamic professional institution with efficient and responsive structures to promote the advocacy of good image and reputation management; promote professionalism and excellence through a high standard of practice by members, in accordance with its established Code of Ethics and Professional Conduct; and ensure a reputation sensitive society built on the core values of mutual respect, dignity, patriotism and communal pride among others. This article argues that following reforms including the federal government conferment of chartered status on the NIPR, the institute's adoption of a code of ethics and the creation of a qualified public relations certificate, the practice of public relations faces some important challenges in Nigeria. However, it is important for professional communicators in public relations to observe a certain degree of ethics during the persuasion process to prevent the very image they hope to build from being tarnished by disseminating verified information to the public. While most regulations do not explicitly regulate business ethics, they do provide the establishment of company-specific codes of conduct or persons that the corporate partnership will comply with. Ratification of codes of conduct helps a party to seek legal action if the parties involved violate the code of conduct. This is not the case in Nigeria.

In recent times, the Nigeria Institute for Public Relations (NIPR) has witnessed many dramatic changes that have elevated serious ethical issues, including the performance challenge. It is against this problem statement that the authors raised specific objectives to guide this study. Decree No. 16 of 1990 includes numerous guidelines and by-laws declared by the Nigerian Institute of Public Relations. Given the presence of these constitutional guidelines, there remain several issues. Such problems vary from unethical attitudes, lack of sufficient knowledge about the code of ethics. The specific objectives raised for this study were to:

(i) review the inevitability of public relations from the theoretical points of view;
(ii) examine various ethical dilemma among practitioners of Public relations; and
(iii) provide pragmatic approach to preventing unethical practices among PR practitioners.

Methodology

The authors used desk research, also called secondary research, to collect data for the analysis. We collected past NIPR publications via desk study, including policy charter, NIPR News, PRs Journal and workshop papers, PR news releases, etc. Relevant information were sourced from articles indexed in EbscoHost, ProQuest, DOAJ, Google scholars and Scopus. The selected articles targeted issues relating to various ethical dilemma in the practice of public relations.

Literature Review

Public Relations defined

Public Relations are the board of an organisation and its public contact (Grunig & Hunt, 1984). Ledingham and Bruning (1998) describe public Relations as the management of a system that recognises, develops and sustains mutual benefit relationship with the public. PR is designed to build and sustain goodwill and a better understanding between an entity and its target audience (Skandari, 2004).

Ethics defined

Ethics means knowing what is right or wrong and then doing the right thing. This definition has meant different things to different individuals. However, it is important to note that the basic principles by which we live our lives are governed by ethics. Ethics guides have been provided by philosophers such as Socrates and Plato. Moral values like integrity, fairness, equality and accountability help to drive how we will act. Ethical deliberation is the mechanism to know what is right and what is wrong and offer defensible reasons for acts well beyond one's original moral intuition.

Ethics in Public Relations

Ethics is a vital concept in people's lives. The term 'ethics' varies from society to society.. Ethics was formed from a Greek word 'ethos' (Solomon, 1999, p.4). According to American Heritage Dictionary, ethics has to do with the study of general nature of morality, specific moral choices, moral philosophy; and ethical guidelines governing the actions of profession members" (Sterne, 2010; Quinn-Allan, 2010). Pearson (1989b) described ethics as applying knowledge, experience, and logic of professional practice to public relations (p.9). This involves principles such as fairness, transparency, commitment, fair-mindedness, reverence, dignity, and direct communication (Bowen, 2016). These opinions seemingly include a defined area of ethical guidelines for the public relations profession with an adequate impression that public relations ethics has gone beyond the thought of generating a persuasive message.

The inevitability of Professionalism and Ethics in Public Relations

Public relations profession offers a great challenge for stimulating professional individuality and socialisation in the field. Though, public relations has been practised in Nigeria for four decades or more; however, it is still important to strengthen the practice in response to the dynamics of globalisation. Public relations is also one of the profession that suffers mostly from a negative reputation based on the following reasons: lack of maintenance of professional ethics and standards; individuals within the society misunderstand public relations and do not use it; people often use public relations interchangeably with press relations and publicity; and it can also be categorised into little executive office tasks (Badran & Ayish, 1996; Kirat, 2005, 2006, 2016).

Apart from the limitations stated above, others are; top managers do not have depth understanding of PR functions, mix-up of prerogatives and tasks, inadequate studies or research, and poor experiences and qualification of PR practitioners (Kirat, 2006, p. 258; Al Khaja, 2009). Despite the problems, public relations agency in developing countries, especially Nigeria, is one of the most vibrant in Africa. Currently, Nigeria has about 100 public relations agencies that focused on education and training to ensure professionalism within the field (Kirat, 2016; Prasad, 2011).

Proposition Development

Research Objective 1: Public Relations from Theoretical Points of View

Genilo, Akther and Chowdhury (2011) defined public relations as the art and science of forming associations, monitoring and evaluating attitudes of public, and ensuring mutual understanding between an organisation and its stakeholders. The mass media are tools for establishing and managing the relationship with the public. In modern terms, public relations is an indispensable aspect of mass communication processes. In this process, a public relations practitioner needs an understanding of media techniques, of communication processes and of public opinion, which can be seen as a combination of feelings, reason, consciousness and temporal experiences (Quinn-Allan, 2010).

In the age of globalisation and influential media, an organisation does not operate in a vacuum: it depends and is affected by external influences to varying degrees (Browning, 2018). A public relations practitioner bridges the gap between an organisation and its stakeholders while scanning the horizon and formulating appropriate policies. Interestingly, the role of a public relations professional has shifted far from media relations to crisis and risk management through to maintaining professional leadership, ethics and organisational policy (Bowen, 2000; Bowen, 2016).

The recent scholarly emphasis on public relations has focused on the relationship management perspective which ensure the balances of interests between the organisation and publics or society through managing the organisations-public relationships (Barić, 2017). From this perspective, public relations includes how to manage crisis, issues, media relations and public affairs (Ledingham, 2003; Browning, 2018). Later approaches to public relations have focused on strategic management. The role of public relations has also been understood in relation to its contribution to national identity and rebuilding communities (Taylor & Yang, 2015). It focuses on how communication efforts are used to establish, maintain or change relationships between organisations and the public. Public relations work through the communication facilities in modern society, bridging the gap among opinion leaders to form social unity and setting a link between people and development processes of a country. An example is the use of development communication through local, community and dialogical tools of communication such as folk media, community radio, posters, and group discussion to enhance the development activities.

Research Objective 2: Ethical Dilemma and Public Relations

Ethics has been found to be central to the multiple, varying and often conflicting responsibilities practitioners face on daily basis (Browning, 2018). The societal perception of public relations is decadent. Public relations is regarded as an unethical profession exhibiting immoral vices such as lying dishonesty, manipulation. To many, ethics cannot exist in public relations as a profession because the practice itself evolved around propaganda, manipulation and distortion of the truth (Genilo, Akther & Chowdhury, 2011).

Critics, such as political makers, journalists and some others believe that in practicing public relations, ethics is a dream and unreal, a means of hiding deception. Also, practicing public relations is an oxymoron (Parson, 2004 p.4). This is the view of Genilo, Akther & Chowdhury (2011) who argues that public relation is lacking in discipline, integrity, loyalty, honesty, forthright communication, openness and respect (Oyero, Tayo-Adigboluja, Odiboh, & Egharevba, 2018). As the saying goes, there is no smoke without fire; perhaps the action of some practitioners in deliberately lying and withholding information from the general public (Amodu, Agedah, Oyero & Okorie, 2018). As a result, ethical rules and codes of conduct were set up to guide public relations practice.

Deirdre Breakenridge (CEO of Pure Performance Communications) (2016) stated that technology has increase the speed of communication among public; hence, it is crucial for PR professionals to be more diligence with the information they share. He further stated that, when time is not taken to review details of information carefully and confirming the accuracy of communication in this age of social

conversations, there will be tremendous challenge. It is therefore the responsibility of the ethical communicators to ensure that the information shared are authentic and be in best interest of all parties involved as stated below:

> *Nicole Spears, who is the social media manager of Geben Communications opined that inadequate education surrounding individual roles in media is a fundamental dilemma that PR are facing presently. She also asserted that nothing can be done to change it. Nicole further added that setting clear expectations with clients and giving can help earn respect with people we work with. Megan Wagner, the founder of MW MarCom asserted that prioritising our message's truth over its connection power felt is one of the challenges facing PR today is prioritising our message's truth over its connection power. According to John Kageorge, who is a strategist for Vital Communications, PR pros should not be afraid of delivering bad news to colleagues.*

Some codes of ethics are not written appropriately and others espouse a set of ethical principles that should be followed. For example, The International Public Relations Association based on United States of America Code of Ethics adopted several Code of Conducts for the public relations professionals in 2010 (Consolidated "IPRA Code of Conduct", 2010, pp.1-2). Endorsed in 2011, the IPRA Code of Conduct is an affirmation of professional and ethical conduct and it is recommended to public relations practitioners universally. Similarly, the Nigerian Institute of Public Relations (NIPR), Public Relations Institute of Australia (PRIA) and the Canadian Public Relations Society (CPRS) require their members to adhere strictly to the ethical practice standards and professional competence (Individual code of ethics, 2010, Code of Ethics, 2011). "The code of ethics says 'you cannot practise public relations by whatever means, if you are not licensed by this institute and this institute, does not just license people as they come, there are certain criteria, there are certain qualifications, there are certain requirements that you have to actually qualify for before that is done'; surprisingly, so many of the people that are asked to manage some of these agencies and uphold the principles are not well-groomed in the Art of Public Relations.

Public relation is a field fraught with ethical dilemmas (Bowen 2001; 2016). Ethical issues comforting public relations practice are multifaceted. The codes of conduct prohibit PR practitioners/professionals from damaging their counterpart's reputation. The code of conduct says that it is unethical for a practitioner to damage the reputation of a fellow practitioner, and it also gives a great opportunity to practitioner to report any unethical conduct of the fellow practitioner. Kirat (2006) and Al khaja (2009) argue that poor qualification, the inexperience of public relations practitioners, confusion of task and prerogatives, lack of understanding of public relations function by managers, absence of research and lack of studies of opinion polls are the major limitations to public relations practice.

Another problem found by Parson is the tension between the personal sense of morality and codified organisational expectations of codes of conduct. Depending on the social background, prevailing conditions and their understanding of codes of conduct, different levels of morality exist among different individuals. If the firm and the client turn out to have conflicting views on the morality of withholding information or the course of action appropriate to the situation, they may need to seek legal assistance to resolve the stalemate. Parson (2010) suggests an analysis of each case on an individual basis when making decisions as each case thrives on different merits, involves different individuals, and different circumstances. Although cases regarding ethics sometimes bear certain similarities, some details in the cases vary and in the same case, circumstances differ, often requiring a change in approach. Even with cases bearing identical facts, a PR practitioner should look at the entire situation, including external circumstances such as the political atmosphere. Trevino and Nelson (2014) suggest that weighing the costs and benefits of disseminating information to the public assist practitioners in making objective decisions in chaotic situations. Ethical issues also arise from unskilled and untrained people parading themselves as PR practitioners. Osho (2017) observed that unskilled practitioners usurp PR practices and engage in unethical activities, creating a nuisance and given the profession bad image that has generated a great cause for concern and setback for professional development and excellence.

Research Objective 3: Way Forward

For NIPR as an established statutory governing body to move forward and for public relations practitioners to uphold ethical practices in their professional conduct, attention must be paid to the enforcement of policies and adherence to the established policies which are meant to guide and instil good attitudes to advance the profession. NIPR needs repositioning to take up the ethical challenges confronting the profession through adequate compliance with the code of conduct. Offenders and defaulters of ethics should be punished to prevent others from following the trend. Firms should be compelled to, "distribute right information and quickly correct any invalid communication for which they might be held responsible and also obeying laws and policies governing their professional activities and, if any law or policy is violated, [they] should act promptly to correct the situation". Public relations profession should go beyond advisory role and should regard themselves as the conscience of their organisation (Judd's 2009, and Ajala 2005).

Presenting the truth to the public would also exonerate the PR firm from blame and possible ruin of its reputation in the future. The second possible solution involves the use of another form of media announcement other than a press conference by the firm. The benefit of this move is that it allows the firm to present the truth in an appropriate manner that does not result in an attack on its efficiency in carrying out its responsibility. Some of the questions that may arise in a press conference situation involve matters of due diligence, which require the firm to investigate the truth of information before sharing the same with the public. Preparing a well-thought announcement would allow the firm to explain its viewpoint without distortion of information famous with press conferences.

Thirdly, the firm may choose to settle the matter with the client and request its management to make the announcement to the public as a damage control measure that allows the client to defend its credibility. Although presenting the information may result in an attack on some of the drug company's policies, it also gives the company the opportunity to explain its position to the public. In addition, this option exonerates the PR Company from blame and situations that cause dilemmas in deciding which information is appropriate for the public to know. Lastly, the firm may choose to institute legal proceedings against the client for misrepresentation. However, this decision should be the last resort as court cases sometimes drag on for years, thus costing the client and the firm valuable time and money. It may also cause negative or dark PR for the firm.

Finally, professionalism should be encouraged through the development of curriculum that includes comprehensive academic, theory-building, social science and management courses. Such courses will provide rich academic skills to their students and help them build an academic reputation that will allow them to gain respect from the general public. The more rigorous the education in professional public relations, the greater the probability that education will improve professionalism. The NIPR is required to play a central role in accrediting public relations practitioners. Accreditation of practitioners is necessary for quality assurance, to guard against unethical behaviour, to prevent penetration of non-professionals. The charter of the NIPR makes accreditation of public relations professionals mandatory until they can practice. That is, someone who works without NIPR is deemed to be a non-professional and risks prosecution (NIPR Bye-Law No. 1, 1992).

Conclusion

Checks and controls are indispensable for curtailing bad practitioners ' activities. It can be recommended that NIPR must consistently ensure that there are effective control and oversight of Public Relations Practitioners ' activities in the country in order to maintain and uphold the principles of the profession. Nevertheless, it is advisable for PR practitioners to look at situations in their entirety when making decisions and making decisions that seem most favourable to all parties without compromising the firm's credibility, dignity and goals. For this purpose, it is advisable that public relations practice pay apt attention to ethical issues and promptly adhere to the established code of conducts. This paper demonstrated that PR is an ethical profession guided by a set of codes of ethics and the public relations professional are expected to follow a code of ethics to promote transparency and accountability in order to make stable their profession. Since the profession is at the growing stage

in Nigeria, it can be said that the job of public relations professionals is to uphold the image of the profession by using analytical, truthful and ethical behaviour so that the final impression about the organisation and a public relations professional himself is established positively.

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Impact of Features of a Managers on the Functioning of Social Networks in an Enterprise

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Abstract

In the contemporary economy, the success of enterprises is increasingly decided by intangible values. One of these is that of social networks that are based on the mutual ties of the management with the employees. The herein paper constitutes a theoretical discourse on the subject of social networks in an organization, as well as an empirical presentation of the role of a manager in the functioning of social networks in enterprises and the impact of social networks on the level of competitiveness of enterprises. The principal aim of the herein paper is to search for answers to the following research questions: Are there differences in the degree of occurrence of the social network with regard to the magnitude of enterprises? To what extent do the features of the manager, influence the level of social network in enterprises? The established aim was executed thanks to the application of the method of critical analysis of literary sources associated with social network, as well as the analysis of the results of empirical research on the social network. As a result of the research, significant statistical relations were discovered between the attributes social network and the managerial features.

Keywords: Social Networks, Enterprise, Manager, Features of A Manager.

Introduction

In times of interest in social capital, which is acknowledged to be an important factor in having an impact on the success of an organization (Lehtimaki and Karintaus, 2013), it is worth reanalysing the significance of social networks that constitute its significant social resource. The characteristic feature of social capital is the fact that, by combining people in social networks, this leads to the fact whereby they reap the benefits of belonging to them. People who are interconnected with each other by means of network ties, trust each other and are mutually obliged to provide support and thanks to this fact, they have access to common resources and thus, achieve success more rapidly. The basis of the functioning of social networks constitutes interpersonal cooperation within employee groups and organizations. The quality of this cooperation depends on the degree in which the given organization acknowledges and shares the set of social norms and values. Sharing this favours the development of social networks, which have an increasing impact on the functioning of enterprises. The developed social networks connected by social ties facilitate the survival of employees in the most difficult moments in an enterprise and may become the foundation for conducting corrective action. That is why it is necessary to build social networks in a conscious manner. A significant role in this process is played by managers who hold a central place in social networks and the efficiency of social networks depends on their actions. The author determined the subject matter to be the impact of a manager on the functioning of social networks in an enterprise. The choice of this research problem was the effect of meta-analysis of the research on social networks in enterprises. By adopting the assumption that a head has a significant impact on the functioning of social networks, three research questions have been formulated as follows: Are there differences in the degree of occurrence of the social network with regard to the magnitude of enterprises? To what extent do the features of the manager, influence the level of social network in enterprises? The search for answers to these questions became the main aim of this paper.

Social Networks in an Enterprise - Theoretical Background

In the analysis of social networks, it is possible to distinguish several approaches. One of the most important ones is the resource approach. P. Bourdieu (1986) noted the importance of social networks in creating the resources of an organization. He writes that the resources of an organization are associated with the possession of constant social networks that are more or less institutionalized relations, mutual familiarity or cognition. In turn, J. Nahapiet and S. Ghoshal (1988) perceive the significance of networks in the creation and transfer of the resources of the organization to the particular members. They are of the opinion that the sum of the actual and potential resources within the organization is available by means of the network of ties. Participation in the network facilitates reaping various benefits on the part of the individuals, albeit only in the situation whereby they are constant and geared towards mutual cooperation. Attention is drawn to this fact by A. Portes (1998, p. 6) who opines that the feature of social capital is the ability of the entities to ensure benefits from the membership of social networks or other social structures. Subbian et al. (2014) claim that actors with a high individual social capital are very frequently key people of influence on a social network. Hence, the significance of the network is the result of the positive effects for the employees participating in them, as well as its impact on the development of the organization. In the theories of networks, it is indicated that the value of enterprises is derived from the ability to create networks of organizations and the right to avail of the knowledge capital created by the network participants (Burt, 2000).

Social networks in an organization may have both external and internal dimensions. In the former, this refers to the network of relations of an organization with its environment, namely with its clients, suppliers, competitors and other entities. In the theory of networks, it is indicated that the value of an enterprise is derivative of the ability to create the network of the organization and the right to avail of the knowledge capital created by the network participants (Burt, 2000, p. 24). The external social networks are sometimes created by the managers of various enterprises. Ch. J. Collins and K.D. Clark (2003) in analysing the strategic practices of human resources in the scope of creating competitive advantage for enterprises from the sector of high technology claimed that the strength and range of the external connections between the managers of the highest levels of high technology firms are important indicators of sales growth in firms.

In the case of internal networks, this refers to social relations which connect employees and managers that have an impact on the creation of the vibe of cooperation and facilitate the achievement of common aims of the employees and the enterprise itself. When an individual is connected with the "appropriate" relations with other people, then these ties are the way to attain important goods from the viewpoint of the individual (Matiaske, 1999, p. 182). Simultaneously, resources and experience which are embedded in social networks are not freely available for everyone in a given organization. Only thanks to participation in the network and ties with others does an individual gain access to specific knowledge and resources basing on the norms and values that are binding in the network (Penuel et al., 2009, p. 129).

The participation of an employee in social networks with other members of an organization creates the situation in which cooperative ties are formed on the basis of mutual trust and cooperation (Bylok et al, 2017). Reciprocity and transitivity are the two most important structural mechanisms underlying a social network (Block, 2015). Other significant factors determining networks are consistency and predictability of a partner in a network. The factors determining these relations are constancy and predictability of the partner in the network. Thanks to this, they enter into long term cooperative ties in the organization. The ownership of these relations may be defined by a range of parameters, such as for instance, their scope of occurrence, range, stability and quality. In terms of ownership, interpersonal relations hold a prominent position which may be identified by means of such indicators as the following: dimension of cooperation of the members of the employee teams, efficiency of communication between the members of the organization, scale of readiness to help others, as well as the awareness of belonging to a group.

In the analysis of social networks in an organization, it is worth focusing attention on the structure of ties between the network members. S. Wasserman and K. Faust (1998, p. 4) perceive the structure of networks in the context of individual actions and patterns of ties between the actors participating in the network. The networks in which the members have a mutual impact on each other are featured by cooperation and the exchange of information (Oh et al, 2004). A significant element of the network is that of nodes (Yang and Xie, 2015) that define its spatial structure. Nodes may be created by people, social positions, or other entities including collective entities (Skolik and Kukowska, 2017, p. 385). They may also be of a positive nature which bring something useful such as friendship, advice or social support; a neutral nature that signifies interactions, yet not necessarily benefits, such as being in a department of a company, or participating in formal communication, or a negative nature that brings something harmful, e.g. harm or animosity (Harrigan et al., 2020).

In the analysis of the network structure the type of relations between the participants is important, which is characterized by the flow of resources of three types as follows: 1) tangible material (physical buildings); 2) symbols (including values, norms); 3) feelings, such as compassion, approval or pleasure (Turner, 2004, p. 606). Likewise, the impact of the three network processes is important: resource and information transfer, status signalling and certification, and social influence. Different mixes of these mechanisms characterize disparate networks because the obligations imposed by ties and the capacities of partners result in situations where mechanisms amplify or diminish one another (Owen-Smith et al., 2015).

It is possible to distinguish three types of networks as follows: 1) bonds occurring between the members of the project team, employees of the department, small organizational units), employees. In these groups of members, there are strong emotional ties, common values, convictions, norms, 2) bridges which form within the organization between the employees belonging to various work teams. The employees that create this are guided by their own benefits. These networks are characterized by weaker bonds; 3) linkage occurring in hierarchical organizations, connecting people that hold various positions in the structure of the firm (Jędrych, 2012, p. 41). Another division of networks was presented by Burt (2000) who by adopting the criteria of the density of the network and the position of the manager in its structure distinguished two extreme hierarchical and egalitarian models. In sum, social networks in an organization may take on a new form and their efficiency to a large extent is dependent on the ties and channels for the flow of information and knowledge between the network participants.

Impact of Features of a Managers on Social Networks in Enterprises in Light of Research

Method and Sample

The intention of the author was to analyse the degree of occurrence of social networks in enterprises with regard to their magnitude, while also defining the level of impact of the manager on their attributes of social networks. The assumed aims were achieved thanks to the application of the survey method with the questionnaire technique. Research on the opinions of entrepreneurs, managers and workers HRM on social network in issue of the enterprises was executed in February of 2018, which was participated in by 149 enterprises, including 63 small enterprises (10–49 employees) and 46 medium-sized enterprises (50–249 employees) and 40 large enterprises (250 workers and more).

Results

With the aim of defining the degree of occurrence of social networks in the analysed enterprises, indicators were built on the basis of the frequency of formal and informal ties between the employees and between the heads and the employees. Research illustrates that the general indicator of networking for the analysed enterprises amounted to 5.73 on a scale from 1 to 10 (in which 1 signifies a lack, whereas 10 signifies high frequency, or closeness of ties) (Fig.1). Detailed analysis of this indicator with regard to the magnitude of enterprises indicates that social networks occur in large

enterprises to the greatest extent (5.91), a relatively lower level in medium-sized firms (5.68) and in small firms (5.67). This results in among others, the specifics of the organization of enterprises, in large enterprises employee teams are created based on cooperation and co-working with the aim of executing the tasks commissioned. They are featured by cohesion that is the result of frequent contact and cooperation during the course of executing the tasks commissioned. Social networks in employee teams and between employee teams provide support for the execution of the aims set out.

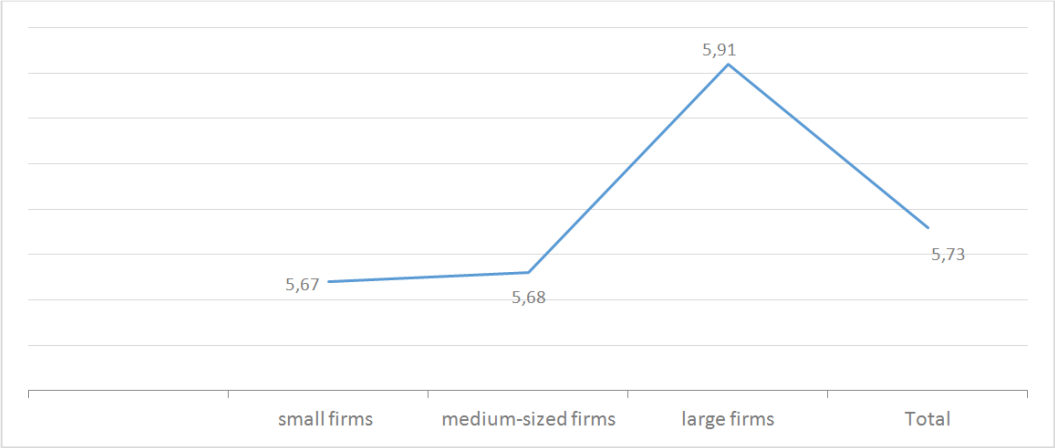

Scale: Scale of values from 1 to 10, in which 1 signifies a lack, whereas 10 signifies great frequency, or closeness of ties.

Fig. 1: General indicator of social networks with regard to magnitude of enterprises

Source: Self-analysis.

Social networks in enterprises function on the basis of formal and informal ties.

Analysis of the indicators of networks in the analysed enterprises indicates the advantage of formal ties over informal ties (Table 1). The indicators of formal ties achieved a relatively high value, namely, the indicator of the frequency of contacts between an employee and other employees with whom he has cooperated with over the past year had a value of 7.59, whereas the indicator of the frequency of contacts between an employee and other employees with regard to professional issues achieved a value of 7.17. Thus, it is possible to state that in the analysed enterprises, employees contact each other relatively often, whereas these ties are of a formal nature at the workplace. By comparison with the formal ties between employees, informal ties between them are at a lower level. Research shows that the frequency of the contacts between an employee and other employees after work, e.g. common outings to a restaurant or pub is at a low level (4.49), while there are differences between the magnitude of enterprises in that the greatest frequency of informal ties occurs in large enterprises and the lowest frequency in small enterprises. Employees enter informal relations at work with relatively few employees. The average number of employees with whom an individual maintains informal contact amounted to 4.36. In small sized enterprises employees enter informal ties with employees, whereas with 4,37 employees in medium-sized firms and with 4.84 employees in large firms.

Formal and informal contacts have an impact on the closeness of ties between employees. Analysis of the indicator of the closeness of ties between employees illustrates the significant differences between enterprises. A relatively higher value was achieved in large firms (5.70), whereas the lowest value in small enterprises (4.23). The closeness of ties between employees is associated with direct communication “face to face”, which is spontaneous by nature, based on a relatively small number of communication nodes. Interpersonal communication by means of universality and mutuality of the flow of information is the fundamental prerequisite of the efficiency of the social networks. Networks

of high intensity of relations and low internal centralization are featured by a relatively high level of efficiency as a team (Mora-Cantallops 2019).

Table 1: Values of indicators of social networks with regard to magnitude of enterprises

Indicators of social networks	Total	Small firms	Medium-sized firms	Large firms
Frequency of contacts of an employee with other employees, with whom he has cooperated over the past year	7.59	5.54	7.75	7.87
Frequency of contacts of an employee with other employees, who made contact for professional issues	7.17	5.15	7.17	7.59
Frequency of contacts of an employee with other employees after work (common outings to restaurants for dinner, supper, or to a pub)	4.49	4.21	4.40	4.68
Closeness of ties with other employees	4.91	4.23	4.47	5.35
Frequency of contacts with a manager, who may be approached for help or advice	6.49	5.27	6.78	6.02
Closeness of ties between employees and a manager	5.08	5.43	4.73	4.89
Number of employees with whom the respondent keeps informal contacts at work	4.36	4.00	4.37	4.84

Scale: Scale of values from 1 to 10, in which 1 signifies a lack, whereas 10 signifies high frequency or closeness of ties.
Source: Self-analysis.

Manager play a significant role in social networks. The central position of a manager in internal networks favours the achievement of good results at work on the part of employees (Mehra et al, 2006). In research, it was accepted that the significant indicators of the role of managers are as follows: the frequency of contacts with heads who may be approached for help or advice, while also the closeness of ties of employees with the head (Table 1). It is worth noting that among the analysed enterprises, this frequency was lower than the frequency of contacts of an employee with other employees with whom he has cooperated over the past year. Simultaneously, the highest level was noted in medium-sized enterprises (6.78), while the lowest in small enterprises (5.27). Another situation took place in the case of the indicator of the closeness of ties of an employee with the manager, in which the strongest ties occurred between them in large firms (5.43), while the weakest was noted in medium-sized firms (4.73). In sum, social networks are becoming an important factor in terms of executing tasks when there is a high frequency of contacts between the employees and the head, while also close ties between the employees and the manager.

The functioning of the social networks depends to a large extent on the features possessed by the managers who have an impact on the quality of ties between them and the subordinates. Research shows that the heads have the following features to the greatest extent: enhancement of their knowledge, respect for norms and values, keeping secrets, acknowledgement that trust is an important source of competitive advantage, being guided by ethical values in terms of ties with subordinates, interest in the enhancement of qualifications by the subordinates and the thinking that the majority of people are open and have an impact on the functioning of the social networks (Table 2).

Table 2: Degree of occurrence of features of managers in analysed enterprises

Features of a manager	Total	Small firms	Medium-sized firms	Large firms
Self-improvement of knowledge	3.64	3.65	3.63	3.35
Keeping secrets	3.49	3.50	3.59	2.94
Reduction of security with regard to long-serving employees	3.07	3.06	3.18	3.00
Tendency to trust others	3.19	3.28	3.27	3.25
Keeping your word	3.36	3.51	3.22	3.51
Thinking that the majority of people are open	3.38	3.40	3.38	3.35
Respect for norms and values	3.62	3.64	3.56	3.64
Acknowledgement that trust is important source of competitive advantage	3.48	3.49	3.50	3.46
Thinking that trust is significant source of innovativeness	3.35	3.41	3.34	3.25
Entering informal ties with employees	2.88	2.65	3.02	3.07
Restricting contacts to closest co-workers	2.78	3.04	2.90	2.76
Interest in increasing qualifications on part of subordinates	3.42	3.37	3.51	3.41
Being guided by ethical values in relations with subordinates	3.47	3.45	3.52	3.43

Scale: Scale of values from 1 to 5, in which 1 signifies very low, 2 – low, 3- average, 4 - high, 5- very high.
Source: Self-analysis.

What is significant from the perspective of the formulated research questions is the analysis of the impact of the features of the manager on the attributes of social networks in enterprises. The Gamma correlation was utilized to analyse this impact. The Gamma correlation indicator defines the strength of the impact of the features of the manager on the elements of the social networks (Table 3). Research illustrates that the strongest statistical relation was indicated in the case of the number of employees with whom the respondent maintains informal contacts, while also keeping your word, respect for the norms and values, as well as being guided by ethical values in terms of relations with subordinates. Likewise, the strong impact on a further attribute of the network, namely, the frequency of the contacts of an employee with other employees with whom he has cooperated over the past year had such features of a manager as respect for norms and values, while also being guided by ethical values in terms of relations with subordinates. In turn, the frequency of the contacts of an employee with other employees with whom he has made contact relating to professional issues was influenced the most by keeping your word and thinking that the majority of people are open, while also being guided by ethical values in terms of relations with subordinates. This correlation also appeared in the case of the frequency of contacts with heads to whom it is possible to approach for help or advice, while also in the case of keeping your word, tendency to trust others and being guided by ethical values in terms of relations with subordinates. A further attribute of the network in terms of the frequency of contacts of an employee with other employees after working hours (common outing to a restaurant for dinner, supper or to a pub) was relatively more weakly influenced by keeping your word and thinking that the majority of people are open. Likewise, the closeness of ties between the employees and the manager was relatively more weakly influenced by keeping your word. Similarly, the closeness of ties of employees with other employees was weakly influenced by the feature associated with keeping your word. By way of conclusion, the greatest significance in terms of the functioning of social networks is exerted by the features of a head associated with values, trust and support of employees in terms of enhancing qualifications.

Table 3: Gamma correlation between characteristics of managers and attributes of social networks

Characteri-stics of managers	Type of attribute of social networks						
	Frequency of contacts of an employee with other employees, with whom he has cooperated over the past year	Frequency of contacts of an employee with other employees, who made contact for profession-al issues	Frequency of contacts of an employee with other employees after work (common outings to restaurants for dinner, supper, or to a pub)	Closeness of ties with other employees	Number of employees with whom the respondent keeps informal contacts at work	Frequency of contacts with manager, who may be approached for help or advice	Closeness of ties between employees and manager
Self-improvement of knowledge	0,221127 p=0,001983	0,267656 p=0,000145	X	0,185055 p=0,008076	0,266872 0,000128	0,247645 p=0,000358	X
Keeping secrets	0,232080 p=0,000880	0,271683 p=0,000083	0,154281 p=0,023981	X	0,348571 p=0,000000	0,240398 p=0,000382	X
Tendency to trust others	X	0,208056 p=0,004601	0,170022 p=0,019158	0,189505 p=0,008961	0,343335 p=0,000002	0,317827 p=0,000010	0,167240 p=0,022500
Keeping your word	0,240163 p=0,000545	0,359932 p=0,000000	0,225906 p=0,000921	0,244444 p=0,000323	0,436791 p=0,000000	0,363649 p=0,000000	0,162459 p=0,017299
Thinking that the majority of people are open	0,259023 p=0,000348	0,290663 p=0,000046	0,222848 p=0,001555	X	0,197880 p=0,004962	0,160664 p=0,021708	X
Respect for norms and values	0,275810 p=0,000098	0,256323 p=0,000250	0,150665 p=0,030114	X	0,379509 p=0,000000	0,254812 p=0,000211	X
Acknowledge me-nt that trust is important source of competitive advantage	0,148373 p=0,038864	0,236584 p=0,000807	X	X	0,308540 p=0,000009	0,189110 p=0,006375	X
Thinking that trust is significant source of innovative-ness	X	0,179696 p=0,010628	0,219555 p=0,001538	0,001538 p=0,004423	0,227300 p=0,001132	0,234389 p=0,000702	0,232516 p=0,000917
Interest in increasing qualifications on part of subordinates	0,211681 p=0,002760	0,271870 p=0,000095	0,205760 p=0,002688	0,171506 p=0,012515	0,307813 p=0,000007	0,279093 p=0,000044	0,196581 p=0,004519
Being guided by ethical values in relations with subordinates	0,261019 p=0,000291	0,291039 p=0,000041	0,194871 p=0,005364	0,196700 p=0,004798	0,361424 p=0,000000	0,308851 p=0,000009	0,148334 p=0,035414

Source: Self-analysis.

These features had the strongest impact on first and foremost the frequency of contacts with managers to whom it is possible to approach for help or advice, the frequency of contacts of an employee with other employees with whom he has made contact referring to professional issues, while also the number of employees whom the respondent maintains informal contacts with at work. Hence, it is possible to draw the conclusion that the functioning of social networks is dependent on the features of a head associated with values in a significant way.

Discussion and Conclusions

Social networks are an important factor that have an impact on the success of an enterprise on a competitive market. Treating social networks as a resource, both in terms of an individual dimension, as well as a group dimension, in terms of which unit gains by participating in differentiated social networks and exchanges with other resources that are appreciated by people (Lin 2001) facilitates the observation of the potential of its significance. The results of the research conducted enabled the definition of the scope of occurrence of social networks in the analysed enterprises. Analysis of the results of empirical research illustrates that in the analysed enterprises the general level of occurrence of social networks is at an average level, while there are differences in terms of its level with regard to the magnitude of the enterprise. Its highest level occurs in large firms, while the lowest level is at large enterprises.

A significant role in the functioning of social networks is fulfilled by managers, who possess the features that favour its development. Research illustrates that the highest rated features are as follows: self-improvement of knowledge, showing respect to norms and values, keeping secrets, acknowledgement that trust is a significant source of competitive advantage, being guided by ethical values in terms of relations of an employee with employees, showing interest in enhancing qualifications on the part of the subordinates. The enumerated features of managers had a positive impact on the frequency of contacts with heads, to whom it was possible to approach for help or advice, while the frequency of the relations of an employee with other employees with whom he had been in contact relating to professional matters, while also the number of employees with whom the respondent maintains informal contacts at work. Thus, it is possible to come to the conclusion that the functioning of the social networks is significantly influenced by the features of the head that are associated with trust and the axionormative system. The research conducted facilitated the formulation of the conclusion that managers should participate in social networks in an enterprise on a bigger scale, which would enable them to stimulate employees to execute more effective work. Knowledge relating to the nature of social networks may help managers in terms of stimulating the pro-innovative activities of employees, which increases the competitiveness of enterprises on the market. With relation to this fact, greater attention should be paid to its formation.

Social networks are beneficial for employees as they gain access to important resources such as knowledge, information, security or prestige. For instance, thanks to belonging to a network, new employees may count on assistance from experienced employees who usually offer knowledge without receiving gratification in the form of presents (Panitz, Glückler, 2020).

The author of this paper wishes to indicate the restrictions of availing of the research results on social networks in enterprises arising from the size of the research sample and the research methods applied. The research conducted with the use of the survey method with the questionnaire technique was aimed at outlining the intricate problematic issues of social networks in organizations and constitute a starting point in the broader research on their function in contemporary enterprises.

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Impact of the 5th Anti-Money Laundering Directive on EU's financial market

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Abstract

This paper gives a general overview of the grounds and needs of implementing 5th Anti-Money Laundering Directive. Events of past years have shown weaknesses of the global anti-money laundering system. This is an important issue of security and trust in financial transaction markets. Preventing such crimes is crucial for stability of the global and European financial market. The actual acts of European law have been briefly described as well as impact of the previous, 4th Anti-Money Laundering Directive. Main purpose of the paper is to focus on the changes that will follow implementation of the new directive that has been in force since January 2020. Its provisions will affect many sectors and institutions of both European and Member States financial markets.

Keywords: Money Laundering, Directive, AML, Impact

Introduction

On 19th April 2018, the European Commission, the European Parliament and the Council of the European Union agreed adopted, in plenary, the amendment of the Fourth EU Anti Money Laundering Directive, which was the initial version of the EU Fifth Anti-Money Laundering Directive (EU) 2018/843 (AMLD V). Revised directive concludes almost two year of negotiations between several stakeholders. Its purpose is to strengthen and improve effectiveness of AML framework in the European Union to prevent and fight illegal financial dealing like those uncovered in the "Panama Papers" during 2016.

The scope of the AMLD V will be extended to include custodian wallet providers, estate agents and rental intermediary, art dealers and, what's seems to be the most important, virtual currency exchanges. New Directive is on the immediate horizon, as it requires Member States to implement these rules into their national laws by 10 January, 2020. It will definitely bring wide changes to both global and European financial market. Next months will be crucial for all entities defined in the directive. Final outcome of new directive will depend on their understanding and implementing directive's provisions of the directive to their own business.

Research background

The 5th Anti-Money Laundering Directive provides for certain amendments to the risk-based approach of the Directive 2015/849 (or 4th EU AML Directive) by mandating that certain situations are exposed to high risk and defined a list of measures, which must be taken in mitigating risk of money laundering process. While EU Member States must give effect to the provisions AMLD V into their national laws by 10 January 2020, it is expected that United Kingdom will bring these provisions into force under its law despite Brexit.

The entities, which are being regulated by AMLD V are expected to examine the background and purpose of a wider range of financial transactions, encompassing those which are at least one of the following: complex, unusually large, without apparent lawful or economic purpose or conducted in an unusual pattern (Bergstrom 2018). Previously, entities were obliged to apply additional scrutiny to transactions with no apparent economic or legal purpose, which either: were complex and unusually or demonstrated unusual patterns (Burrell and Thorne, 2019).

Going further, AMLD V prescribes the following specific enhances due diligence measures for transactions involving third countries, which are said to be high-risk and also for business relationships:

- obtaining information on the source of funds, wealth of the customer and reasons for the intended or performed transactions;
- obtaining approval of senior management for continuing or establishing the business relationships;
- obtaining additional information on the customer, ultimate beneficial owner (UBO) and the intended nature of the business relationship;
- conducting enhanced monitoring of the relationships by increasing the number and timing of controls, which are being applied as well as selecting patterns of transactions that need further examination.

Banks are expected to conduct constant monitoring and investigating the effects of anti-money laundering prevention, especially in area of financial transactions (Laszlo Gal 2018). Number of researchers focuses on data delivered by banks in order to prepare detailed reports in mentioned area. Such reports include information on on-site inspections by authorities and follow-up actions and the quantity along with quality of suspicious transactions reports being filed by banks before and after inspections (for a complete overview of filed reports see Gara, Manaresi, Marchetti and Marinucci 2019).

Simone Wong focuses on the impact of AMLD V on trusts. New directive proposes widening of both the recording of and access to beneficial ownership information in central registers. This expansion of financial transparency raises many concerns about how the processing of more financial information and the wider access to such information about trusts is to be reconciled with right s to privacy and confidentiality (Wong 2017).

Important part of money laundering prevention and combating the financing of terrorism is Financial Action Task Force (FATF). It has become a prime example of a norm-building process that transcends the traditional avenues of public international law, while compelling a high level of compliance and assuring quick adaptation to norms and practices that better address money laundering and the financing of terrorism in their evolving form (Pavlidis 2020).

Leigh-Alexandra Basha describes what recent legislative and regulatory developments on anti-money laundering will change from the US perspective. Paper includes researches relating to beneficial ownership rule, geographic targeting orders, the American Bar Association position and the impact of the AMLD V. It also looks at the impact on the legal profession (Basha 2018).

Virtual currencies pose a serious threat to be used for money laundering, weakening European Union's financial system. Recent directive intends to mitigate these risks by introducing a definition of virtual currencies within EU law. Some financial service providers connected to virtual currencies are made subject to anti-money laundering law. It is important that Member States transpose it proper way. Otherwise, they will create legal uncertainty and loopholes for specific entities (Haffke, Fromberger and Zimmermann 2019).

Future will bring the 6th Anti-Money Laundering Directive (AMLD VI), which came into force at the EU level on 2 December 2018 and which Member States are required to implement by 3 December 2020. It mainly focuses on standardising the approach of European Union Member Stater to the offence of money laundering. Moreover it aims to expand the scope for potential liability for money laundering and sanctions that EU Member States are required to impose under local law (for a complete overview of supposed changes of AMLD VI and its provisions especially in the UK see Burrell and Thorne 2019).

General impact of the 4th Anti-Money Laundering Directive

Flows of illicit money can damage the integrity, reputation and stability of the financial sector, and threaten the internal market of the European Union as well as global financial market. Terrorism financing, money laundering and organized crime remain significant problems which should be addressed at EU level.

Former global enforcement actions against financial institutions highlight the importance of compliance with anti-money laundering and combating the financing of terrorism regulations Such enforcement actions were clear in spite of the fact that the considerable progress made in mitigating risks posed by money laundering and rooting our prior wrongdoing, financial institutions are still falling short of regulators expectations (Mula 2016).

Changes caused by AMLD IV brought significant effects for smaller institutions. Directive which was enacted June 2015 outlines number modification to the previous version (Boszormenyi, Schweighofer 2015). One of the main differences between Third and Fourth Directive were requirements of the risk-based approach. New requirements have been put in place, whereby Member States were later required to evidence that they at least have taken the necessary steps to identify, asses, understand and reduce AML risks. The AMLD IV required enhanced due diligence measures for cases that present a higher money laundering risk (Sefora 2017).

What will change?

The European Union's 5th Anti-Money Laundering Directive which comes into the force on 10 January 2020 addressing its provisions and tightens regulatory controls mainly across following areas: custodian wallet providers, virtual currencies, estate agents and rental intermediaries, and art dealers. AMLD V places greater emphasis on the transparency around ultimate beneficial ownership in an attempt to prevent and fight financial criminals who hide behind complex corporate structures. Relevant approach to new regulations includes ensuring access to trusted data as well as having the right tools to streamline risk mitigation processes. The global efforts to establish an efficient framework for the prevent and fight against money laundering and terrorism financing (ML/TF) required a new approach, which could enable a connection between private sector with the structures enforcing criminal legislation. In a result, countries adopted initiatives to set up a new type of state authority, which was called Financial Intelligence Unit (FIU). Its core function is the receipt, analysis and transmitting reports of suspicions, which were identified and filed by participants of private sector. The Units therefore functions as an intermediary among the private institutions, subject to AML/CFT obligations, and also law enforcement agencies. According to the Standards issued by FATF, all countries should have established an authority which function will be to act as an FIU (Council of Europe).

Among the key amendments to the AMLD IV, listed in Table 1 are due to have a significant impact on the operational workflows of financial institutions.

Table 1: Crucial changes caused by EU's 5th Anti-Money Laundering Directive

Area	AMLD V	Impact
Controls	▪ Self-regulating organisations must report on suspicious transaction reports, violations of the Anti-Money Laundering Directive, suspicious transaction report forwarded to the Financial Intelligence Unit and sanctions imposed. ▪ Protection of whistleblowers who report money laundering from any	▪ As Member States Financial Intelligence Unit will have to request information from each and every entity. Obligated institutions must ensure that they have effective mechanisms to coordinate information gathering and sending in a timely manner.

	kind of the discrimination in the workplace as well as protection of their identity.	
Data collection and processing	▪ Public authorities must have an access to all required information on real estate ownership. The Comission will assess the necessity of interconnecting these across national registrars by the end of 2021. ▪ Public access to national registers of beneficial owners of companies, which are operating within European Union, including subsequent interconnection of national registers. ▪ Separate registries for bank accounts must be created as well, although these will be accessible only by authorities. ▪ Ultimate beneficial ownership regulations will extend also to trust. ▪ AMLD V obliges Member States to prepare functional Politically Exposed Person (PEP) lists that include all titles, functions or roles that are deemed to be politically exposed.	▪ Formalised processes to obtain, update and records beneficial ownership information should be developed. ▪ Obliged institutions will have to reassess the information available in KYC records. They will also need to ensure there are no gaps in collected and recorded data. ▪ Greater emphasis on transparency will help to fight back against financial criminals who often hide behind complex and opaque corporate structures.
Risk assessment and mitigation	▪ AMLD V drops the limit of monthly transactions of prepaid cards from EUR250 to EUR150, with a EUR50 online limit applicable. ▪ Going further, only cards issued within the EU will be allowed, unless they were issued in a specific country with legislation that is deemed on par with European AML standards. ▪ Tougher criteria for estimating third countries with an increased risk of money laundering, i.e. possibility of sanctions against violations of money laundering regulations, obligation to report suspicious transactions. ▪ New directive also focuses on high value goods, which are being used in order to storing and moving funds. AMLD V extends the range of goods that will be subject to regulatory enforcement and reporting requirements.	▪ Risk methodologies may require amending and updating. Also may necessitate assessment and modifications to reflect more detailed checks on prepaid cards. ▪ Obliged institutions should review and be prepared to adopt revised list of the European Union's high risk third countries into KYC processes. ▪ High value goods are: oil, art, arms, tobacco, precious metals, cultural, historical and archaeological artefacts.
Customer Due Diligence	▪ If only the managing director is known and it is impossible to identify the actual beneficial owner	▪ Any provider of exchange services between custodian wallets, fiat currencies and

	of a company, this must be indicated in the special beneficial ownership register. ▪ Virtual currencies will face more stringent controls with exchanges being registered with the respective authorities in their jurisdictions, conduct full customer due diligence, as well as prepare suspicious activity reports when necessary. ▪ Extending the coper of AMLD to cover all existing forms of tax advisory services, freeports, letting agents, electronic wallet providers, art dealers and virtual currency exchange service providers.	virtual currencies will needs to implement internal AMLD processes. ▪ FIUs will be required to keep records, including names and addresses, of those purchasing virtual currency.

Source: Own research

Highlighted are four main areas impacted by AMLD V: Control, Data Collection and Processing, Risk Assessment and Mitigation, and Customer Due Diligence. Each contains widely described sectors and institutions, which need to adhere to new provisions. These seems to be core areas and changes brought to their scope will surely have an impact. Regulators are supposed to deliver proper tools for all institutions and Member States for sufficient understanding and implementations of AMLD V provisions. It is crucial to adhere to new law, so the goals of new directive can be achieved and entities can avoid bearing financial consequences.

The timetable for the AMLD V transposition is as follows:

1. 19 June 2018 – publication in the Official Journal of the EU;
2. 10 January 2020 – new directive is expected to enter into force (18 months after publication);
3. National registrars of business owners along with national registrars of trust owners to persons with the legitimate interest are due to be available for the public during early 2020 (20 months after publication);
4. Interconnection of national registers across the borders within the EU is due to go live during early 2021 (32 months after publication).

Conclusion

Financial crime remains a persistent scourge across the globe, and it is therefore unsurprising that 2019 has seen increased regulatory pressure on the financial institutions and banks to crack down corruption. Ongoing illicit activity, as outlined by the relevant 2018 European Parliament Directive, was a significant catalyst for the new anti-money laundering directive.

While the revised provisions will be improving the existing rules, effectively fighting financial crime will require relevant implementation amongst several market participant along with proper-acting coordination. This is not only a fighting, but also preventing from bigger loss. Total aggregated loss of turnover from financial kind of crimes is estimated at around USD1.45 trillion (Thomson Reuters 2018). It shows how much can be gained.

Notes

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Application of Strategic Planning and Performance in Nigerian Flour Mills: A Conceptual Review

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Abstract

Organizations do not operate in isolation but with interactions with various facets in the environment and have to tackle challenges of fierce competition, change in taste of customers, performance shortfalls, obsolescence of product, technological change, shortages of resource and culture change. This study examined how strategic planning can be applied to the process of sustaining performance using focusing on flour mills in Lagos. A conceptual review of the literature was done with the conceptual framework and models therefrom. Propositions were made, and efforts were made to obtain conclusions from the literature reviewed assessing the subjective and objective aspects of corporate performance. Relevant information was extracted from journals, articles, annual flour industry report, and bulletins presented by corporate strategists and policy planners. The inferences from the propositions revealed that strategic planning could be applied to sustain performance. Based on the finding, it can be concluded that strategic planning important in achieving organisational goals and it was recommended that more organisations should engage in strategic planning to enhance their performance.

Keywords: Strategy, Strategic Planning, Organisation, Performance.

Introduction

Organizations do not operate in isolation but with interactions by various facets in the environment and have to tackle challenges of fierce competition, change in taste of customers, performance shortfalls, obsolescence of product, technological change, shortages of resource and culture change (Nzewi and Orjiagu, 2015; Kolade, Olanipon and Olumuyiwa 2018; Bergstrom, Tran and Lundell, 2013; Shahin, 2011). Despite all these, organizations still strive to achieve their goals and objective with optimal utilization of as possible to satisfy the varied stakeholders of customers, employees, investors and others. Yoshikuni and Albertin (2018) emphasized that earlier studies present that firm performance is distorted by the unfriendly and turbulent environment in addition to other variables.

Bergström, Tran and Lundell (2013) discourses that some organizations achieve their goals and objectives by adapting to flow with the changes and others have various plans simulating possible scenarios and how they should be tackled in the event of a possible occurrence of one of the scenarios. These plans could be strategic plans or long-range plans. Strategic plans guide the organization to where they want it to be stating how it should be done. Thompson, Strickland and Gamble (2012) and Aremu (2010) established that strategic planning standardizes objective setting, implementation and assessment processes that allow an organization to achieve its goals (Agha, Alrubaiee and Jamhour, 2011; Tapinos, 2015; Agwu, 2018).

Dyson (2010); McAdam and Bailie (2012) also highlighted in their studies that organizations must align their strategies and performance measurement systems together. Ansoff (1970) argues that in companies that are strategically managed, planning produces better alignment and results than those that are not. Strategic planning is a challenging process that requires the thinking individual. Management uses a strategic planning process to set goals, schedule activities and measure progress within the organisation (Mostaghel, Oghazi & Hultman, 2015; Monday, 2015). It is strongly believed that every organization is accountable for the outcome of their performance (Akpabot & Khan, 2015; Mohamud, Mohamud & Mohamed, 2015).

Falshaw, Glaister and Tatoglum (2016) posit that the ability to wade to turbulent times and perform well is a function of strategic planning and preparedness of the organization (Lee, 2010). Hence, shareholder satisfaction is changing approaches to corporate decision making. As a result, marketing strategies are evaluated by their capacity to increase shareholders' value and not by traditional yardsticks like market share, sales growth or return on investment. Wijetunge and Pushpakumari (2016) asserted that strategic planning and financial performance relationship might be looked at from four variables which include size, age, planning history and levels of strategic planning. Hence, the objective of this research was to determine the connection between strategy implementation and job effectiveness; appraise the association between strategy evaluation and market share; and assess the association between strategy determination and employee /stakeholder satisfaction.

Literature Review

Strategic Planning

There exist so many definitions of strategy with a few general agreements (O'Regan and Ghobadian, 2007). The strategy is the board and senior management proactive measures towards opportunities and constraints that firms need to grapple with (Falilat, 2013). Planning is currently used in different senses that it risks degenerating into an emotional noise. For the most part, definitions of strategic planning are varied but in many ways, remarkably the same. According to Viljoen (1994), strategic planning is the process of selecting and implementing activities that will improve an organization's long-term performance. Aremu (2010) sees strategy as that utilized to ensure a firms actualization of its goals and objectives. Adeleke, Ogundele and Oyenuga (2008) defines strategic planning as entailing the assessment of internal and external constraints of a firm and formulation of ways and means of reaching the firms objective by optimizing the opportunities and watering down the threats (Thompson et al. 2012; Bergstrom et al. 2013; Knies, Jacobsen and Tummers, 2016). Above all, strategic planning is one of the management function that emphases an organization's growth and sustained future well-being.

Factors Influencing Strategic Planning

Strategic plans are developed by organizations all over the world. They ensure the creation of vision and put in place necessary strategies to achieve it. However, many are still faced with challenges of realizing their vision and delivering the strategic outcomes expected. Unfortunately, the reasons for this dilemma cannot be identified by executive teams, so they keep repeating the strategic planning cycle all over again, hoping to get a better result.

Many factors have been adduced by researchers to influence strategic planning. One very significant one is environmental, and another is uncertainties (Ikoro and Nwosu, 2017; Bergstrom et al., 2013; Makinde, Akinlabi and Ajike,2015). Resource availability, legal forces and well as legislative changes bring in new dynamics that should be taken into cognizance also. Size and complexity of a firm is also another factor as it is believed by Ikoro and Nwosu that as the organization increases so does the need and degree of formulating of policies and strategic planning activities. However, over time it becomes apparent that the strategic goal given to them will not be realized by this team and that the strategy itself will be considered a failure. Managing the strategy that leads to failure is the lack of an Innovation Process. Top management came up with strategies for achieving them that required innovation. They do not have a clear innovation strategy but have new product development strategies. This position is also corroborated by Ufartiene, 2014); Falsaw et al., 2006); Hummelbrunner and Jones, 2013); Thompson *et al.,* 2012; Nimfa and Godwin, 2014). Other factors they also identify are:

i. The level of involvement in operational concerns: strategic planning will need a good knowledge of the operations and those that will implement will also need to grasp the strategic focus and rationale for the development of the strategy.

ii. The implementation gap: a lot of questions have to be answered here. What is the service level agreement between departments in the value chain? Will the implementation be in phases, pilot or abrupt? What are the equipment and facilities needed to implement the strategy?
iii. The competitive environment changes: the strategy formulators will have to take into cognizance the opportunities and threats from competitors and substitutes and how they can as well use their resources to get an advantage over and above their competitors.
iv. Stage in the life cycle of the product or service: in the product or service in the introduction, growth, or decline stage? The product life cycle stage determines their efforts at innovation, rebranding, process change, diversification and other measures.
v. Lack of commitment: the commitment of the management and employees need to be obtained to achieve the desire of the strategy formulators properly. The senior management and board of the need to ensure that the key personnel in the organization are committed and work towards the overall achievement of the strategic focus.
vi. Inadequate instruction to employees: it is one thing to formulate a strategy and another to map out the details and step by step instructions to be followed by employees to attain the desire of the strategy.

Strategic Planning focus of Flour Mills Industry

Strategic planning processes are positive or successful when a communication approach is taken from the bottom-up and top-down. It begins with communication with all staff at various levels notifying them that a process of strategic planning will be taken place. It includes their participation as individuals in this process. This involves communication from the top to the bottom. Employees will also be engaged in the strategic planning process through feedback surveys, focus groups, meetings, etc. on their organizational direction ideas.

Businesses use strategic tools such as a SWOT analysis to investigate strengths, weaknesses, opportunities and threats and also to modify current strategies. Hence, below are some of the characteristics of the flour mills industry that strategic planning needs to take into cognizance:

i. Stiff Competition: competition there is very keen as they have substitute products. Success is mostly hinged on market share and volume and capacity. Also, prices are fixed by the Flour Millers Association.
ii. High Volumes: high volumes will result in a possible reduction in per-unit costs to absorb high overheads, cost, increase margins.
iii. Substantial Cost Outlay: most of their inputs are imported (wheat) and with the heavy import duty and embargo of some goods they need to plan adequately.
iv. Seasonality: their inputs are often from agricultural products and thus are seasonal. Demand is, however often much. How do they take care of this?
v. Price Sensitive Demand: their products have a high elasticity of demand and a major upsurge in prices will lead to a change to substitute. How will this be surmounted?

Challenges of Strategic Planning

For the modern company, strategic changes come in many ways. Based on the report from Harvard Business School, ninety percent of organizations have difficulty in the implementation of their strategic plans (Park, Lee and Chae, 2017; Quigley and Graffin, 2017). When the strategy is not adequately implemented, it can lead to lack of employee goals (Rigby and Bilodeau, 2009), improper allocation of resources (Shahin, 2011; Thompson, Strickland, and Gamble, 2012), inadequate structure and leadership (Wijetunge and Pushpakumari, 2016), and weak communication lines (Yoshikuni, Favaretto, Albertin and Meirelles, 2018. According to Ikoro and Nwosu (2017), the following are the challenges of strategic planning:

i. Lack of commitment: plans should not only be developed, but the buy-in of all stakeholders should be obtained. More notably, management, employees and unions that are key to the effective implementation for results. There is often very difficult because the above mention

stakeholders have opposing interests, and their commitment level will differ depending on what is brought to the fore (Bergström & Lundell. 2013).

ii. Lack of accountability: how easy will it be? Individuals responsible for various aspects of the strategy implementation may not have the requisite resolve to be accountable in their span of control, and these may also be interwoven with others (Agwu, 2018).

iii. Inadequate instructions to employees: plans should be broken down into tactics and bits of instructions that employees understand and can follow through. These will need expertise and understanding by key stakeholders (Caliskan, 2010; Akinyele, 2010).

iv. Power and Influence: authority and power should be warehoused in those that need to wield the necessary influence to get things done. These may be done through the organogram and structure (Bagire & Namada, 2013; Chavunduka, Chimunhu & Sifile, 2015)

v. Culture: strategy planning and implementation may result in culture shock, and the management should ensure they put in adequate change management measures to handhold employees and other key stakeholders. The organization culture may need to be altered to enable the smooth operation of the intended strategy Dubilihla and Sandada, 2014; Gomera, Chinyamurindi and Mishi, 2018)

Firm Performance

The process or action of embarking on or achieving a task, function or an action is referred to as performance (Nzewi and Ojiagu, 2015). The performance comprises of behavioural and outcome aspect. They further emphasize that performance multi-dimensional and dynamic concept that entails outcomes aspects as well as behavioural features. The performance further ensures that given tasks achieved speedily, accurately, wholly and cost-effectively with value creation as ultimate goal and objective (Okpara, 2014; Nzewi and Ojiagu, 2015; Monday and Aladeraji, 2015). Performance in organizations could be looked at from the objective and subjective measures such as profits, sales, return on assets, and return on investment, while non-financial measures emphasis on issues like delivery time, referral rates, customer`s satisfaction and referral rates (Okpara, 2014; Nzewi & Ojiagu, 2015; Falshaw, Glaister & Tatoglu, 2006; Bergstrom et al., 2013).

Flour Mills Manufacturing Firms in Lagos

There are currently 21 flour milling companies in Nigeria. 80% of the market share is controlled by 6 of the 21 firms (NSE 2018 Report). This has resulted in a difference between the 'big players' and others. The six players by market share include Flour Mills of Nigeria Plc, Dangote Flour Mills Plc, Ideal Flour Mills Ltd, Honeywell Flour Mills Ltd, Standard Flour Mills Ltd and Crown Flour Mills Ltd. Due to the stronghold of the market by these 'big 6', other aspiring and prospective flour millers would have 'invisible entry barriers' (Leadway capital, 2018). There is a wide gap between the big six and other firms in this sector. Nigeria's Flour Milling industry has a total capacity of more than 22,000 metric tonnes with Flour Mills Nigeria Ltd. controlling about 38%. Other market shares are 18%, 7%, 14% and 8% for Dangote Flour Mills, Honeywell, Ideal Group and Crown Flour respectively (NSE Report 2018).

The flour mills industry in Nigeria generates more than 10 million jobs according to Anurag Shukla, the Managing Director of Crown Flour Mills Nigeria. This is because their product is used in bakeries, noodles, biscuits, pasta, restaurants and fast foods. According to Akhidenor (2018), Regional Agriculture Counsellor to USDA on Nigeria's Grain and Feed Annual report MY2018/19 wheat consumption by Nigerians is projected at 5.0 million tons, a 5 percent increase over the year 2017. Also, rising domestic demand for animal feeds by Nigerians and accumulative foreign investment in the milling sector are expected to boost corn and cassava usage by 550,000 tons, nearly 40 percent increase 2017. Hence, consumer prices continue to rise mostly as a result of increases in the prices of yam, bread, other cereals, potatoes, and cassava and other tubers which are either inputs or output from the milling industry (Akhidenor, 2018).

Critical Strategic Success Factors in the Flour Mills industry

NSE 2018 report states the following strategic performance-related critical factors:

i. Capacity: this is a critical factor in the Flour Mills industry because it is a volume-driven market. A firm's capability to continuously increase its production abilities distinguishes it from others and makes it a more successful player. Ability to increase capacity in the short and long run.
ii. Marketing: Aggressive marketing is another substantial strategic performance success factor for flour millers. The competition among players makes them deploy considerable resources towards advertisement, promotions, advertisements and general publicity aimed at increasing patronage.
iii. An adequate distribution network is a necessity of flour millers in Nigeria. Flour is consumed in almost all areas and eating lifestyles Nigeria. It is relevant that the product gets to the final consumer as at when needed.
iv. Proper strategic management: quality of management cannot be ruled out in any industry, and this is not an exception. Experience, track record, and competence of top management is essential for the growth of volumes and margins.
v. Adequate Storage Facilities: most of their inputs are perishable goods such as wheat, sorghum, maize, rice and others. With adequate storage in place, spoilages and wastages, as well as deterioration, are mitigated.
vi. Pricing: Flour Millers Association regulates the pricing of products. However, big players often set prices higher than the fixed price for increased margins and profits.

Methodology

Literature survey research design was adopted for this study. Articles and thesis on strategic planning, Strategic management, and long term planning, performance and performance measure were looked up. Besides, textbooks, journals, unpublished thesis, online resources and databases relevant to the study such as Covenant University repository and Leadway Capital annual flour industry report, NSE annual sector reports were reviewed. Secondary material was gotten from relevant textbooks, journal, articles, bulletins and documents by corporate strategists and policy planners.

Model Propositions and Discussions

Proposition 1: Proper strategy implementation has a positive impact on job effectiveness.

The execution phase is an operations-oriented phase that executives have to accomplish. It is probably the most challenging and time-consuming component of the method of strategic leadership (Gomera et al., 2018; Gumel, 2019; Hakimpoor, 2014). This strategy implementation involves the preparation of a strategic plan that sets annual goals, creates an efficient organisational framework, creates a budget, creates a feasible data scheme and usually creates a work schedule for the implementation of jobs. It also includes motivating staff, establishing a culture of support, allocating funds and connecting compensation for staff to the organisation, and so on (Thompson, 2014).

Pressman and Wildavsky (1984) noted that implementation is a method of evolution, not a revolutionary process. Gomera, Chinyamurindi and Mishi (2018) indicated that the key to effective job performance is through alignment of measures, complete and active managerial assistance. The various fragments of the strategy should be outlined by the company and drawn out in manual of operations to guide the employees and the management of firms to ensure and sustain job effectiveness

Proposition 2: Strategy evaluation will help to increase firms' market share over time.

Evaluation of the strategy includes organizing the company's funds and motivating employees to attain goals (Hakimpoor, 2014; Hummelbrunner and Jones, 2013). The competitive worldwide climate of today is complicated, vibrant, and mainly unpredictable. A lot of thinking has fallen into the question of how best to formulate policies to cope with this unprecedented stage of transition and expand market

share. The market share-profit interaction remains a critical study problem in the world's strategic company leadership. There is increasing pressure to make the correct choices rapidly, and one of the difficulties that executives face is how to boost earnings in today's dynamic company environment. To do this, managers need to understand the factors that increase profitability. Studies (Ikoro, and Nwosu, 2017; Knies, Jacobsen and Tummers, 2016; Kolade, Olanipon and Olumuyiwa, 2018) have shown that firms can achieve a substantial market share only when they engage in appropriate strategy evaluation.

Strategy evaluation as done in the flour mills industry through price structuring, capacity expansion and volume increase with ensuring an upsurge in the market share. Strategy evaluation allows room for review to ensure that the target market share aimed at by organizations, causes of shortfalls and actions needed may be initiated. This study concludes that the evaluation and control method aims at ensuring that the company achieves what it intends to accomplish by comparing output with required outcomes, identifying the efficiency status and offering reviews needed for the leadership to make the right intervention (Yabs, 2007).

Proposition 3: Adequate strategy determination is necessary for stakeholder satisfaction.

Strategic choices determine the organisational relationship to its internal setting, cover the full organisation, rely on feedback from all functional fields of the organisation, have a direct impact on the administrative and operational operations, and are vital to an organization's long-term safety (Shirley, 1982). According to Schermerhorn (1989), to achieve shareholders' satisfaction, policies must be well developed and enforced. Therefore, the strategic capacity to guide a company to performance achievement begins well before execution; during formulation. Determination is a significant element of the strategy, according to Pride and Ferrell (2003).

Issues related to the satisfying the expectations of the shareholders include choosing which new company to join, which company to leave, how to allocate funds, whether to grow or diversify activities, whether to join global markets, whether to combine or form a joint venture and how to prevent a hostile business environment (Kim et al. 2011; Gomera et al., 2018; Bagire and Namada, 2013). Strategy determination and formulation enables firms to assess where they want to be and how they want to get there. This is evident in the flour mills industry where capacity and volume of sale as well as distributors targeted at bringing the goods close to the distributors' chain. This is done through the evaluation of the external environment in which operation is done.

Conclusion and Managerial Implications

The study magnified the knowledge, information and understanding of the relationship between strategic planning and organisational performance. It also stresses the overall importance of strategic planning and its ability in the creation of innovative ideas and throughput in the performance process in an organization.

Based on the review and conclusion, the following recommendations are made:

i. The top management of organizations in Nigeria should continuously make an effort at being informed about trends and better business strategies and process to improve their efficiency and effectiveness.
ii. The top management of organizations should not be formulating policies and strategies. Still, it should also endeavour to get them implemented, watching out for feedback and deviations with control measures put in place.

The study revealed that most organizations focus only on strategy plan formulation of and not implementation. Strategic plan utilization ensures competitive advantage, organizational profitability and increment in company market share and therefore recommend that strategic planning should be embraced by organizations.

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Management of Third-Party Logistics in Supply Chain – Aspect of Customer Service

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Abstract

The aim of the herein paper is to characterize the logistics projects in the process of purchasing services from TPL logistics operators (Third Part Logistics). Logistics service providers implement activities within the framework of the supply chain which they will develop in terms of the scale and scope of their activities that also have an impact on customer service at the same time. The activities of logistics operators facilitate the attainment of profits for all participants of the supply chain, as well as matching individual needs arising from the unique nature of a particular order in an appropriate manner. Thanks to this fact, suppliers gain financial profit, clients are well-served, while in the case of manufacturing and service companies it is possible to bring forward future orders. The existing literature depicts the basic elements of third party logistics (TPL). The practical section of the herein paper presents the results of survey research relating to the evaluation of customer service provided by a logistics operator functioning in a supply chain. The findings imply that the level of customer service in practice extends beyond both pretransaction and transaction phases as well as positive verification of introduced hypothesis. The results produce some propositions for future research.

Keywords: TPL, supply chains, customer service.

Introduction

An effective supply chain should have an integrated approach where all the elements of logistics have to be considered to get a balanced customer service level that includes transit time, reliability and cost. The basis of the orientation towards the client and the achievement of success for a firm is the ability to acquire and maintain clients that bring in profits. One of the significant ways of achieving this aim is the skill of effective management in terms of relations with clients. The process of their service transcends the general functional limits of the particular departments of the organization. This is not only the sales department, but the departments of service, marketing, logistics and controlling also take part in the full cycle of contacts with clients, as the relations with a client which have been made in one department have an impact on the type and content of contacts in the other sections or departments in a particular firm. In a competitive environment, in which customer satisfaction is of key importance for the long-term success, it is significant that the logistics operators are able to create such services that fully satisfy the needs of their clients. The functioning of the logistics operators in supply chains requires concentration on clients/partners within the framework of the chain with the aim of intensifying the level of cooperation, while also shortening the timescale of taking decisions and execution of activities, reducing the costs and increasing profits. The elimination of unnecessary activities and shortening the timescale of rendering services shall aid the physical processes. The issue of the lack of the appropriate customer service in terms of logistics services such as the following: storage and planning of distribution, stock management may lead to discrepancies and distortion in the functioning of enterprises in the supply chain.

Literature Review

Such terms as "logistics outsourcing" "logistics allies" "third party logistics", "contract logistics" and " contract distribution" were used interchangeably in order to describe the organizational practice of commissioning part, or all of the logistics operations that had been previously conducted in the firm (Aljohan, Thompson, 2016). Various definitions emphasize various aspects with regard to the

commissioning of tasks for execution, such as an offer of services, the nature and duration of services of interpersonal relations, performance results, the scope of liability of the third party with relation to the logistics process, as well as the position and role in the supply chain.

A logistics operator is usually associated with an offer of multiple service packages rather than merely singular functions, such as transport or storage (Jayaram, Tan, 2010). Modern-day contracts with logistics operators are based on formal (both short-term and long-term) contract relations, as opposed to immediate purchases of logistics services.

The supply chain is defined as a system of organization, people, operations, information and resources engaged in the transfer of a product or service from the supplier/provider to a client. Activities associated with the supply chain encompass the transformation of the natural resources, raw materials and components into a ready-made product, which is delivered to the final client. This is a network of organizations that are involved via ties upwards and downwards, as well as various processes and operations that create value in the form of products and services delivered to the final consumer (Kaina, Verma, 2018). The supply chain may be defined as a set of firms moving the materials forward which launch products and services on the market, including the final clients within the framework of the supply chain (Verm, Seth, 2011).

Logistics operators in the supply chain may lead to the shortening of the timescale of taking decisions and the execution of activities, while also reduce costs and increase profits. It is necessary to choose such operators that will eliminate the unnecessary activities and shorten the timescale of execution, thus supporting the physical processes. Redundancies are a particular issue that should be undertaken as enterprises base their fundamental activities around this, while simultaneously outsourcing the remaining operations of the supply chain for their trading partners.

The evaluation of TPL logistics operators must commence with establishing the criteria of choice. The most frequent criteria relate to such aspects as costs, quality of service and the possibilities of providing services (how vast the range of services of the provider is, what the geographical range is, whether it has a specialized staff of employees). However, the criteria may be intensified if the implementation of long-term projects and close ties are expected. In such a case, other factors are adopted, such as adjustment in terms of culture, flexibility and liability, as well as creative solutions to problems in the case of unforeseen situations. (Nu´n˜ez-Carballosa, Guitart-Tarre´s, 2011)

Logistics operators functioning in supply chains and conducting their activities illustrate that their activities are first and foremost concentrated on the clients. In analysing customer satisfaction, it is necessary to emphasize that it is actually they who constitute the principal aim of the activities of the operator, namely, they concentrate on the fact that it is not service users and clients who are dependent on a firm, but rather its profitability depends on current clients. It is also necessary to note that customer satisfaction is becoming a key element in the concentration of a logistics operator in terms of the pursuit of promoting the repetitive and long-term business relations. In the present competitive environment, it is dangerous to be a firm that is unattached to a client. The majority of firms are competitive and in order to remain on the market they must provide high quality services that make clients satisfied. And in logistics customer orientation and satisfaction usually means perfect order. (McFarlane, Giannikas, Lu, 2016)

Likewise, it is also necessary to acknowledge that firms which render logistics services should know their clients. An operator who has great knowledge about his/her clients, has more possibilities in terms of taking the appropriate decisions relating to the needs of a client, which in turn facilitates the development of new services, among others, by means of projects that contribute to the increased value for clients, while also evaluation of the values desired by the clients. (Meidutė-Kavaliauskienė, Aranskis, Litvinenko, 2014) The problem of evaluating the values is also perceived in the context of the relationship matrix that determines the decision-making level. On this basis, a multitude of alternative solutions to varying spatial and time spheres are formulated. Likewise, the magnitude of the enterprise and the risk of its activities are taken into account from the viewpoint of values. (Heizer, Render, Munson, 2017)

Together with the development of logistics services, multiple logistics operators decide to create supply chains of logistics services by means of ties and integration. Supply chains in the provision of logistics services enable enterprises to fulfil the individualized requirements of clients and the achievement of the necessary abilities to offer services.

In logistics services, a key factor in individualization which ensures competitiveness in the supply chain is the fact that it may offer individualized services at the lowest costs for mass services thanks to the work schedule stipulated in projects. (Liu, Wu, Liang, Zhu, 2018).

A logistics operator is a multi-entity organization of a high degree of intricacy (Skowron-Grabowska, 2010). The specialized nature of TPL enables it to render comprehensive logistics services. Logistics services in terms of earnings encompass the execution of forwarding, transport, storage, while also associated services and the supporting process of the flow of goods between the links of the supply chain. (Dakhli, Lafhaj, 2017). Jeszka (2009) claims: "The areas of the logistics activities undertaken by TPL in supply chains are as follows: supplies, production and distribution". Logistics services are organized and provided by a specialized firm, which manages the logistics system of another enterprise (Golembska, 2010). Logistics services are the response to the demand and expectation of a client associated with providing him/her with the appropriate product within the appropriate timescale, at a suitable price, while preserving the appropriate level of quality of these services and featured by the following properties: (Golembska 2010)

- departure from the typical secondary demand for this service, whereas transportation services are rendered as a result of the formation of secondary demand for this service,
- price of logistics services is the function of the prices of storage, transport and the process of customer service,
- logistics services not only increases the value of goods, but also increases the competitiveness on international markets.

Logistics services management may be divided up into five groups in accordance with their characteristics. The tasks and sets of factors included in them consist of comprehensive logistics services that are rendered by specialized organizations, logistics operators, which is illustrated in Fig. 1.

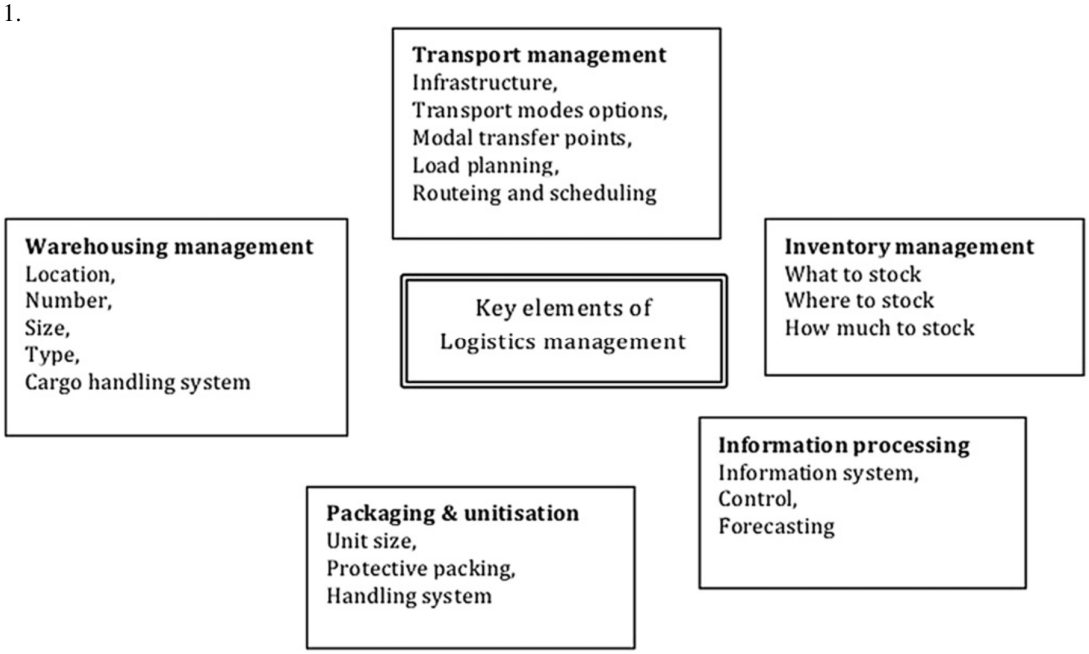

Fig .1: Elements of logistics management

Source: D. M. Z. Islam, J. F. Meier, P. T. Aditjandra, T. H. Zunder, G. Pace, Logistics and supply chain management, Research in Transportation Economics 41 2013, p. 5

In the figure 1 the following types of logistics management distinguished: transport, storage and inventory, packaging with unitisation as well as information processing, which as a common denominator is the organization of the flow of goods and information. According to Gołembska (2010), the development of the forms of logistics services and their range is determined with the aid of four elements:

- storage and handling stocks,
- transportation and handling loads,
- market research and creating a marketing system of information,
- financing transactions, banking and insurance servicing of contracts.

These elements relate to not only the storage and transportation of goods, but also the key areas such as the management of information and financial services. (Gupta, Goh, Desouza, Garg, 2011). The core of logistics services are activities and actions such as the following: transport, storage, market research and financing activities on which the level of the comprehensive logistics services depend (Rydzkowski, 2011). In Table 1, the subjective scope of logistics services has been presented.

Table 1: Subjective scope of logistics services

LOGISTICS SERVICES			
Storage and handling stocks	**Transportation and handling of loads**	**Market research and creating a marketing system of information**	**Financing transactions, banking and insurance servicing of contracts**
1. Stockpiling goods 2. Operating loading ramp 3. Distribution in row of racks 4. Location of warehouse bases 5. Decompletion of loads 6. Creating load units 7. Packing 8. Planning surface size 9. Operating cold storage 10. Operating open and semi-open warehouses	1. Transportation of loads 2. Intermodal transport 3. Multimodal transport 4. Bimodal transport 5. Securing the load in transport 6. Marking the load in transport 7. Operating reloading points 8. Planning transportation routes 9. Planning load space for fleet vehicle 10. Operating close distance transport, lift trucks, cranes etc.	1. Market research, share in profit 2. Creating MIS 3. Prognosis of demand 4. Sales reports, bar codes 5. Planning of magnitude of sales 6. Analysing environs of competition 7. Public relations 8. Promotion 9. Advertising 10. Statistical quality control	1. Leasing agreements 2. Credit agreements 3. Commercial credit 4. Audit 5. Controlling 6. Bookkeeping 7. Execution of collection 8. Factoring 9. Insurance of load in transport 10. Insurance of forwarder and operator

Source: Prepared on the basis of the following: Gołembska E., Kompendium wiedzy o logistyce, Wydawnictwo Naukowe PWN, Warszawa 2010.

Table 1 illustrates that according to Mindur (2008) logistics services encompass all the activities that are essential for the execution of the logistics processes. A logistics operator facilitates the execution of all the enumerated tasks with regard to the subjective nature and high degree of specialization of the executed operations. TPL has the task of facilitating the execution of the specific logistics processes thanks to the defined infrastructure and good organization. The wide range of possibilities offered by a TPL means that clients and trading partners are willing to avail of its services, which in turn makes it competitive among enterprises providing logistics services. Inside the supply chain, TPL performance is positively impacted by supply chain management strategy; consequently,

improving the TPL activity can even more improve the performance of the entire supply chain. (Liu, Yuan, Hafeez, Yuan, 2018)

Methods

Third party logistics (TPL) companies are the chosen context of this study for two reasons: (1) customer service policies in TPL are likely to be constantly improving as the customers' requirements are changing quickly and (2) many TPL companies are increasingly adopting new management practices.

Survey

Based on a literature review, a questionnaire was prepared with two researchers who had extensive experience in the TPL functioning. Then, the questionnaire was pretested with a survey to 20 students attending a part-time postgraduate program at a local university. Finally, undertook a quantitative study to test hypotheses. A representative proportion from TPL sector was desirable, and their customers were carefully checked. In order to satisfy quantitative criteria, a list of 36 firms was prepared from the database of statistical office. A stratified sample of 16 firms and 5 customers for each company was selected from these companies. This gives a group of 80 customers for all 16 TPL.

A formal covering letter was then sent to the personal e-mail of the participant, providing an introduction and a general explanation of the study. From the questionnaires that were sent, 55 questionnaires were returned, but 5 were dropped because of incomplete data. Thus, 50 usable questionnaires represented a 62,5% response rate.

Multi-item measures with a 5-point Likert scale (1=very bad (completely unimportant), 5=very good (very important)) were used to evaluate all constructs. The construct captures the essential actions relating to the level of customers service in TPL and criteria of choosing given TPL by a customer.

Empirical Research

Ciesielski (2006) claims, logistics services for clients are defined as providing them with the appropriate product within the appropriate timescale and at the appropriate location. Another definition characterizes logistics services for clients as "the ability of the logistics system of an enterprise to secure/satisfy the needs of clients from the viewpoint of time, reliability, communication and convenience" (Kozlowski R., Sikorski, 2009). It is possible to add that they satisfy these requirements by availing of various forms of *logistics activity, including transport, storage, stock management, information and packing.* (Kempny, 2001). In practice, logistics operators rendering services to clients may be perceived in a different way of determining the subjective and functional scope of the applied approach (Szumilak, 2007).

1. Service as a specified activity – a set of associated actions to be performed in the cycle of ordering (service as a process),
2. Service as that of offering and maintaining the level of service - standards (norms) of the execution of the basic elements in accordance with the requirements of the clients,
3. Service as a philosophy of the activities and mission of the given firm, this ensuring it has a high position on the market.

Service as a specified activity may be described as a multitude of coupled logistics activities that occur in a specified order, which decide on the level of customer satisfaction following the purchase of a product. The second approach is aimed at providing services for a client in accordance with high standards in order to fulfil the requirements of a client. However, customer service as a philosophy is to "ensure that such relations between the time of submitting an order and the time in which the product is delivered to the client are to fully satisfy and maintain that level of satisfaction for as long as possible"(Szumilak, 2007). Activities aimed at acquiring effectively functioning systems of services must be thought out precisely. Stachowicz-Stanusch (2007) claims, In planning customer

service, it is necessary to recognize and analyze clients and their needs, while subsequently establish service packages and standards of services.

A key element in logistics services for clients is that of planning and organization with the aim of creating a well-functioning system of the distribution of services. Therefore, there must be optimization of the entire supply chain network as well as customer value creation. (Grazia Speranz· 2018) Hence, the research conducted facilitated the analysis of how the effects of the work of logistics operators are evaluated by the clients availing of the aforesaid services. And the hypothesis is formulated as:

H: The better chosen criteria when choosing a logistics operator, the higher will be the customer level satisfaction of logistics service quality offered by the TPL, which in turn, in the end improves the level of transaction service.

In order to assess the services for clients in a TPL, it is necessary to analyze what elements the clients of a TPL pay attention to when choosing a firm. This data has been illustrated in Table 2.

Table 2: Elements taken into account when choosing a logistics operator

What was your criteria of choosing a logistics operator?					
	Responses				
Responses	Very important	Important	Of medium importance	Of little importance	Completely unimportant
Price of services	70%	18%	8%	4%	0%
Timescale of execution of order	80%	12%	8%	0%	0%
Communication with firm	88%	6%	6%	0%	0%
Reliability in provision of services	92%	6%	2%	0%	0%
Opinions on image and position of firm on the market	10%	6%	12%	38%	34%
Safety of provision of services	86%	14%	0%	0%	0%
Professional service	82%	12%	4%	2%	0%
Large choice of services offered	24%	70%	6%	0%	0%
Conditions of making complaints about services rendered	18	34	26	16	6

Source: Prepared on the basis of self-analysis of personal survey research

Table 2 indicates that the elements that are taken into account the most at the moment of choosing a logistics operator are reliability in the execution of an order, communication with the firm, safety in terms of the provision of services, professional service, while also the timescale of the execution of orders. Only after these elements do the clients of a TPL enumerate customer convenience and the price of services rendered. However, the least important is that of the image and market position of the firm. Table 3 presents how the clients of a logistics operators assess service during the course of the execution of orders.

Table 3: Evaluation of logistics customer service of logistics operators

Please conduct an evaluation of customer service provided by logistics operators					
	Responses				
Responses	Very good	Good	Medium	Bad	Very bad
Price of services	18%	58%	22%	2%	0%
Timescale of execution of order	40%	38%	16%	6%	0%
Communication with firm	34%	46%	14%	2%	4%
Reliability in provision of services	6%	30%	64%	0%	0%
Safety of provision of services	48%	40%	10%	2%	0%
Professional service	24%	68%	8%	0%	0%
Large choice of services offered	76%	10%	8%	4%	2%
Conditions of making complaints about services rendered	18%	38%	26%	18%	0%

Source: Prepared on the basis of self-analysis

The clients of a TPL evaluated this as very good (76%), while professional service and the price of services were evaluated as 68% and 58% respectively among those surveyed. Elements such as the large choice of services on offer, the safety of the provision of services, the timescale of the provision of services were evaluated at a very high level, reaching 76%, 48% and 40% respectively among those under analysis.

According to Krawczyk (2000) the logistics services for clients consist of a multitude of mutually connected activities. These may be divided into groups which create the elements as follows:

- pre-transaction,
- transaction,
- post- transaction.

The elements of the logistics services for clients may be divided into 3 groups, in which those surveyed evaluated the level of service provided by the logistics operators. This data has been presented in Table 4.

Table 4: Evaluation of logistics services for clients in three phases: before concluding a transaction, during the course of concluding a transaction and after concluding a transaction

	Responses				
Responses	Very good	Good	Medium	Bad	Very bad
Pre-transaction phase	44%	36%	18%	4%	2%
Transaction phase	38%	52%	10%	0%	0%
Post-transaction phase	28%	38%	18%	16%	4%

Source: Prepared on the basis of self-analysis

Table 4 illustrates that the clients of logistics operators evaluate service rendered in the transaction phase and the pre-transaction phase the best. The low assessment of the transaction phase in terms of customer service may result from the time of expectation for the final evaluation of a complaint about services rendered and other inconveniences arising from the associated procedures. (Render , Stair, Hanna, Hale, 2018) The research results point that the most significant part of the logistics services for clients are the elements of the transaction phase. And this shows the positive verification of the

hypothesis. They constitute the level of customer service and may have an impact on the perception of a logistics operator in the supply chain, while simultaneously constitute the decisive factor in the functioning of the supply chain.

Theoretical and Practical Implications

The results from research offer two main propositions for theoretical advancement. First, study extends the findings of earlier studies with regards to the drivers of customer service in TPL. Findings support an approach which is crucial to achieve competitive success on difficult logistics service market

In their desire to attract the potential users of their service, the logistics operators operating in the supply chain must first of all correctly understand the expectations of consumers and subsequently prepare the provision of these services well. The research conducted on a group of clients of logistics operators indicated that this has a direct impact on customer satisfaction. The high quality of services rendered enhances the competitive advantage of the service providers, as well as the loyalty of the consumers with regard to the operator. The research has indicated that clients assess an operator well that provides high quality services by offering them both in the pre-transaction phase, as well as in the post-transaction phase. Customer satisfaction in terms of the activities of the operator actually creates its capital. Simultaneously, the lack of satisfaction causes a drop in the competitiveness of the logistics operator.

According to the results achieved in the study, in a competitive environment, good knowledge about customer service would help a TPL to enhance its logistics service quality and develop satisfactory relationships with its customer.

A TPL''s general logistics efforts in maintaining sufficient customer service level and in keeping prices flat, accurately may constitute an adequate response to dynamic demand from customers side.

Future Research

Future studies could investigate how criteria are employed in TPLs in other research settings, such as business-to-consumer TPLs. It would be interesting to study the interaction between different customers and the development of the TPL. Moreover, future research could be conducted in international TPL's . Large-scale quantitative studies are needed to develop wide criteria of customer service. Furthermore, although this study has shed some light customers' service evaluation future research might advance the conceptualization stronger relationship between TPL and customers.

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Social Reasons in The Theory and Practice of Economic Safety of Poland

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Abstract

Safety as a state is one of the most important needs of every person. It is perceived in an individualised way, but a person functioning in a particular community cannot separate his or her own feelings from the general social situation. Economic security is one of the types of safety that affect the functioning of society. When presenting content related to the perception of the economic security of Polish society, attention is drawn to the three most important issues in the author's opinion. The first is the social conditions currently prevailing in Poland. These include areas such as life expectancy, professional activity, income per family member, as well as the size of Gross Domestic Product. The second area is the conditions in which social policy is pursued. In this regard, attention is paid to the unemployment rate, which in pandemic conditions may increase sharply, a decrease in the total population and a reduced fertility rate for women in Poland. Given the above, it is proposed in the article to conduct social policy taking into account three main areas, namely health care, educational activities and providing housing for each family. Such an investment in the future may in the future allow for a more effective social policy and increase in the economic security of people in Poland.

Keywords: Safety, Economic Security, Social Policy, Person, Society

Introduction

Safety as a very general concept is considered by the general public as the absence of any noticeable threat. However, it has its own specificity, as there are many spheres and areas that society considers to be safe - without any threats or where the threat is felt subjectively or objectively. Its scale may be different and may concern whole countries, social groups or an individual person. In order to assess the impact of social premises on the theory and practice of economic security in Poland, it is necessary to conduct research in accordance with the accepted and frequently applied sequence of events understood as the process of scientific research. Starting from this assumption, the problem situation should first be identified. The next step is to define the research objective and research problems. On this basis, activities related to the selection of research methods and techniques are undertaken, the use of which will allow obtaining reliable results in the research process.

Considering the above theoretical content, it is advisable to consider that the problem situation examined is social premises in Poland, which have an impact on the state of economic security. These premises are assumed to be perceived in many aspects, starting from the economic situation, through the population, and ending with health and education. Thus understanding the content of the problem situation, it is scientifically justified to specify the purpose of the study, with the following content **to present the impact of social policy on the sense of economic security of society in Poland.**

Literature Review

Literature on safety issues in general as well as economic security is rich, although there are many controversial opinions in this field. There are also many myths and the resulting misunderstandings about defining what is meant by the essence of economic security. These misunderstandings are a consequence of the lack of a clear understanding of the meaning of the term economic security.

An extremely helpful literature on general issues related to economic security is the study by Victor George of 2018 entitled "Social security and society" (Vol. 3), Routledge from the content of this study it can be concluded that ensuring social security is not a manifestation of concern for the poor, but care for the preservation of the status of guo, so that rich people will continue to live at the appropriate level and will support the poor. It is also interesting to say that long-term unemployment is not beneficial when looking for employment. Collective elaboration by Bilan Yurij, Mishchuk Halyna, Samoliuk Natalia, Yurchyk Halyna Impact of Income Distribution on Social and Economic Well-Being of the State proved to be helpful in the aspect of assessing the volume of gross domestic product in the context of conducting social policy. This study indicates the relationship between the volume of gross domestic product and the implementation of tasks under social policy and ensuring social security and shows Poland's place against the background of other Central and Eastern European countries. Another interesting item is the 2019 article titled "Measuring social justice in the light of effectiveness of public distributive policy" by Mishchuk, H., Samoliuk, N. and Bilan, Y. Its content is to show problems regarding the distribution policy of goods and the feeling whether these actions are perceived as fair or not. Luttmer, E. F. & Samwick, A. A. present a different point of view on economic security in an article from 2018 entitled "The welfare cost of perceived policy uncertainty: evidence from social security". On the basis of research, they believe that in order to avoid risk, it is expedient to accumulate funds to ensure economic security in old age.

The discussed papers present a different point of view, but the common denominator is economic security, which as a category is extremely important for the proper functioning of an individual and the whole society.

Research Questions

Taking as a starting point the understanding and interpretation of the fundamental concepts related to the economic security of the Polish society, and at the same time striving to achieve the previously defined objective of the study, it is necessary to adopt the following fundamental research problem defined in the form of the question - ***whether and to what extent social policy in Poland has an impact on economic security?***

In order to attempt to answer such a general question, it seems legitimate to clarify its substance by taking the following specific research problems as a starting point:

- what are the objectives of social policy in Poland and according to what principles are these objectives achieved?
- in what conditions is social policy implemented in Poland?
- what is the subject matter of social policy in Poland?

The research problems specified this way show the complexity of the issue of economic security of the Polish society and at the same time allow to realize the assumed objective of this publication.

Research Methods

In the process of solving partial research tasks, it is necessary to perform subsequent actions also called the research procedure. In its course, research tools, appropriate to the issues under consideration, are used.

First of all, using the method of analysis and synthesis, an attempt was made to determine the basic components such as life expectancy, professional activity, income per family member or unemployment rate. mainly data from the Central Statistical Office were used in this regard. The method of analysis was then used to determine the conditions for conducting social policy in Poland. Particular attention has been focused on content related to the unemployment rate, population, fertility rate and the shift in female fertility age in Poland. On this basis, using the deduction method, areas have been identified where social policy in Poland should focus its attention in the coming years. This applies to health care, broadly understood education, and to providing every family with independent housing.

Bearing in mind the pursuit of the adopted goal and the solution of previously indicated research problems, it is justified to use the theoretical research methods described above. This methodological approach guarantees the achievement of the goal of developing and obtaining reliable results regarding the impact of social premises on the economic security of society in Poland.

Results of Research

Objectives and principles of social policy in Poland

The concept of social policy is sometimes defined in very different, sometimes original ways. However, it seems that it is possible, and even necessary, to assume that social policy is understood as public activity, usually directed at all social groups, in order to provide material and non-material conditions to function at an appropriate level. It is also important that the main target of social policy measures is families as the basic social unit. This does not mean, however, that other communities that are part of the entire Polish society are excluded (Auleytner 2004, p.14 - 23).

It should be noted that there is a gradual evolution of their content as a result of changes taking place in our society. Also, technological progress, economic development and the change of the society's awareness have an impact on the content of the objectives which are implemented in the framework of social policy in Poland in the first half of the 21st century. First of all, it is important to mention the desire to provide all citizens with decent living, learning and even playing conditions in case of children. Achieving this objective is important, as it offers the chance that the main conditions of start will be the same for all citizens. The statement that the start conditions may be the same is, in part, an overstatement. This is due to the fact that even the richest country is not able to equalise living and starting conditions, taking the richest members of society as its point of reference. Despite such an approach, the essence of this goal is that everyone has a chance, and whether he or she takes this chance is already an individual achievement of an individual person. The second objective of social policy should be and is to protect from poverty the part of the population that has been unable and continues to be unable to function in a market economy.

An important objective of social policy in Poland is to ensure that citizens can spend their last years in a peaceful and dignified manner. It is justified to emphasise the importance of this objective given that the life expectancy of Poles is steadily increasing while the number of working citizens is decreasing. In the second quarter of 2019 the population of working persons amounted to 16,484 thousand (of which the vast majority were people of the working age - 96.1%, i.e. 15,833 thousand employed) and increased compared to the previous quarter (by 1.3%), but decreased compared to the previous year (by 0.5%)**Error! Reference source not found.**.

An important social policy objective is to ensure the right of everyone to decent and freely negotiated work. This objective also includes the provision of safe work conditions and a time frame, in which the worker is able to participate in family life, recover and, where possible, participate in leisure activities. It is as if another, higher stage in specifying the objective to be achieved by social policy. An extremely important and, in part, controversial objective is to strive to ensure the right of all citizens to health protection and living conditions in an environment free from threats to human life.

The implementation of sub-tasks to achieve the objectives requires adherence to certain principles. Their content is not always made available to the public as certain content may not appear to be fully popular and accepted by the general public for policy-makers at state level. Nevertheless, in the public space there are usually five principles which should be applied in social policy in the name of the primary objective of reducing poverty while ensuring the economic security of the state.

The first and seemingly basic principle is ***to respect the revenue criterion***. This means that all social assistance activities should be based on a documented revenue per person in the family or other basic social unit. This means that social assistance should be directed only to the poorest people. It is unreasonable to allocate funds to the wealthy, middle-heavy or financially viable.

The second principle in conducting social policy as understood by the author should be ***equal opportunities for everyone***. It is nothing less than a philosophy of thinking and acting, which should be the guiding principle of the bodies dealing with social policy in the state. It is unfair and not understood by everyone to favour certain social or professional groups at the expense of the rest of society. The objective should therefore be to eliminate such cases by treating society as a whole equally.

The third principle relates to ***compliance with the subsidiarity criterion***. Its essence is that state's social assistance should be activated only when other activities related to providing aid have not brought the assumed positive effects. Social assistance should be applied in practice when other ways of solving social problems are less effective or cannot be applied in practice.

The content of the fourth social policy principle is ***compliance with the efficiency criterion***. Currently, there are situations in Poland where unjustified spending of financial resources takes place. Sometimes they are apparent or even fictitious actions. Therefore, there should be a principle forcing officially operating entities to make effective use of the funds allocated to social policy. This can be achieved by introducing statutory provisions introducing an obligation to evaluate to what extent the assistance provided has been effective in a given place and time. It seems appropriate to carry out ex-ante and ex-post evaluations while monitoring the effectiveness of the policy on an ongoing basis using quantitative indicators. The presented proposal is the result of the analysis of the results of activities carried out by the Supreme Chamber of Control in twenty-one county labour offices in Poland. This audit showed that over the long term, this effectiveness has decreased significantly. After two years from the beginning of the activation period, public works proved to be the least effective form of activation (the permanence of employment calculated by county labour offices decreased from 76.5% - after three months - to 9.5% - after two years) and internships (a decrease from almost 78% to less than 27%). The permanence of employment remained at a high, almost unchanged level in the case of subsidies for business activity (a drop from over 93% to about 87%)[1].

The fifth and, in the opinion of the Author, the last principle to be taken into account in the process of conducting social policy is ***respecting the development criterion***. It means that social policy should be geared to helping people go out of poverty, not to preserving in poverty. Such an assumption has huge consequences in the way social policy is distributed.

When assessing the content of the principles of social policy one cannot fail to notice their importance for the economic security of the state. It is based on the fact that the application of the rules may reduce unnecessary spending of the state budget funds and at the same time lead to professional activation of part of the society, which may translate into an increase, although in part of the Gross Domestic Product.

Principles as a kind of dogma and a certain framework are necessary from a state perspective. However, it seems worthwhile to supplement the content of the rules with postulates or requirements articulated by the Association of Entrepreneurs and Employers and the Warsaw Enterprise Institute Foundation. Thesetwoorganisationsbelievethatsocial policy should be:

- predictable, so that citizens can feel secure in the long term;
- flexible, which should be understood as being able to respond to a changing situation;
- coherent across the state without division of tasks into individual ministries, which should result in more efficient management of funds allocated for social assistance;
- activating, understood as activities supporting citizens in solving their problems at an early stage;
- accessible, in terms of information on where, when and how to get help in difficult life situations;

[1]Report by the Supreme Audit Office Efficiency of labour market services The Supreme Audit Office, Warsaw, November 2018 [pol. Efektywność świadczenia usług rynku pracy Najwyższa Izba Kontroli Warszawa, listopad 2018]

- effective, in financial terms, allowing to achieve greater effects in relation to the expenditure on the social assistance administrative system;
- open - being a place where it is possible to exchange information, receive data about the foundations, health services or other data of interest to individual providers;
- modern, through the use of the latest IT systems to collect information and use it online;
- open, i.e. able to cooperate both with state and local government institutions and all kinds of non-governmental organisations.

Expectations concerning the functioning of social policy presented in the form of postulates are not only a set of so-called pious wishes. According to the author, it is necessary to consider their sense and, as far as possible, adapt today's system to the requirements of the 21st century. This may, on the one hand, increase the effectiveness of social assistance, and on the other hand, it will not be dangerous for the state budget.

Conditions for conducting social policy in Poland

Social policy in Poland is conducted under specific conditions here and now. It is therefore appropriate to consider what conditions and why affect the shape and a way to conduct the social policy. The analysis of the current state of implementation of tasks resulting from the state's obligation to conduct social policy shows that it is at least partly dependent on a number of various conditions. Among these, internal and external factors can be distinguished. The internal factors include, in the first place, those resulting from the political system in force in Poland and political activity. They materialize primarily through the functioning of parliamentary democracy and the participation of local governments in the implementation of a number of tasks in the local market. Not without significance in this area is the centralization of activities related to social assistance and the quantitative and qualitative status of the institutions assigned for this purpose in Poland.

An important internal factor determining the conduct of social policy is the economic level of Poland. It is the amount of GDP, the unemployment rate and the amount of social security contributions that influence the shape and quality of social policy. Adding to this the low qualifications of a part of the society, the existing social infrastructure, underdeveloped housing and the existing labour market, there is an under-efficient and under-effective social policy system in Poland.

The important factor determining the functioning of social policy in Poland is the human factor. The first place in this respect is the ageing of the population, which is the result of several factors. First of all, the decreasing number of birthdays should be mentioned as the cause of the ageing population in Poland. Meanwhile, Poland has been experiencing a systematic decline in the number of births for several years, which in a straight line leads to the so-called birth depression (Głowacka, Jarosz, Włoszczak-Szubzda, Dzierżek, 2011, p. 89). In the second decade of the 21st century, the number of births is almost half of the size recorded in the mid 1980s, the last baby boom. For example, in 2013 the total fertility rate was 1.26, which means that for every 100 women aged 15-49 there were only 126 children born. Demographers estimate that the stability of demographic development is only guaranteed by a factor of 2.10-2.15[2]. Another factor causing the ageing of the population in Poland is the extension of the population's life span. This applies first of all to people classified as the oldest category, which clearly accelerates the phenomenon of population ageing (Szukalski, 2008, p. 33). The last thirty years have seen a systematic increase in life span in Poland, which has increased by more than seven years for men and by about six years for women[3]. It is also important from the point of view of the ageing of the Polish society to increase the age at which women decide to give birth to their first child. The reason for this is a number of determinants, such as a longer period of study or greater professional activity of women. This has led to a shift in the fertility of women from the 20-24 age group to the 25-29 age group with a significant increase in fertility in the 30-34 age group. As a

[2]Podstawowe informacje o rozwoju demograficznym Polski do 2014 r., GUS, Warsaw, January 27, 2015, p. 4.

[3]Ludność. Stan i struktura oraz ruch naturalny w przekroju terytorialnym w 2018 r. GUS, Warsaw, 2019, p. 16

consequence of these trends, the last 10-15 years have seen a 4-year increase in the median age of women who gave birth under 30 to a child. The average age of women giving birth in Poland is currently around 28 years[4].

A decrease in the number of marriages is also noticeable. At the end of 2010, there were almost 9 million marriages in Poland, and already since 2018 it has been noted that their number is decreasing, which means that each year the number of newly concluded marriages is lower than the number of marriages dissolved (by death or divorce). For example, in 2010, new marriages were more than 8,000 fewer than those that were dissolved, but already in 2017 and 2018 the difference is more than 30,000[5]. This means that the overall number of marriages in Poland is decreasing and this is a noticeable trend in recent years.

Another factor determining social policy is the fact that people living in informal relationships are increasingly choosing to have children. Such an approach may lead in the near future to a further decline in the birth rate, with the consequent deepening of the demographic crisis. Statistical data show that for several years the share of extramarital births has been systematically increasing. At the beginning of the 1990s, about 6-7% of the children were born in extramarital relationships. In 2000 it was already about 12% of children. In the 21st century, there has even been a leap forward and in 2013, more than 23% of children were born outside of formal marriages[6].

The presented selected conditions of conducting social policy in Poland, in a straight way leading to the phenomenon of demographic ageing, are the consequence of, among others, the processes taking place. They are conditioned by a tangle of changes taking place in the contemporary world. All this makes it necessary to take a new look at the approach and implementation of social policy in Poland in the first half of the 21st century as an element of economic security.

Scope of the subject matter of social policy in Poland

The social policy realized (conducted) in Poland is perceived as an important element ensuring the sense of security of the whole society. This activity can be seen as a narrow or wide undertaking. It is usually mentioned from the theoretical point of view that the subject of social policy is labour, health, education and upbringing (culture) and also housing (Szarfenberg 2003, p. 73).

Labour, as creating conditions for the professional activity of individual members of society, is mentioned in the first place. Labour, also understood as an employment opportunity, can be seen in two aspects - economic and political. From the point of view of an individual person, it is usually seen as an opportunity to obtain a livelihood. At the same time, given the essence of social policy as an activity of "public management of social risks", it is important for the effective management of these risks to ensure that citizens can earn an income by providing jobs (Esping-Andersen, 2010, p. 52). Such activities allow for the provision of services related to the activation of people and shielding activities addressed to the society.

Health as a subject of social policy is one of the most important components of the public good, also called national wealth. A healthy society generates national income and does not require state budget expenditure. In this understanding of health as a subject of state policy, there should be not only verbal but real concern about ensuring adequate health standards of the society. This concern should rest on the shoulders of the state, local governments, NGOs, public and private organisations. Every person - a member of society - should also participate in this activity (Nosko 2005, p. 135). In order to maintain the proportion of responsibility, it should be noted that, on an individual - personal level, good health should be seen as one of the key factors determining quality of life.
Education and upbringing, sometimes with the additional term "culture", are another component of the concerned perception of social policy in Poland. It should be noted that at the beginning of the

[4]Sytuacja demograficzna Polski do 2017 r. Urodzenia i dzietność, GUS, Warsaw, 2018, p. 12
[5]Rocznik Demograficzny 2018, GUS, Warsaw, 2019 p. 221
[6]Małżeństwa oraz dzietność w Polsce, GUS, Warsaw, 2016, p. 12

21st century, it is education and competences that are an important determinant of every person's life chances. Such an understanding of education and the competences possessed results in the fact that education is treated in Poland as one of the basic instruments for increasing chances on the labour market and counteracting the phenomenon of social exclusion of people[7].The universal right of citizens to education is nowadays treated as one of the fundamental social and economic rights that should be guaranteed by the state. It is widely accepted that it is not the most important thing to have a diploma itself, but it is important to acquire and have the knowledge, skills and ability to perform specific tasks. It is obvious that the range of human skills should be based on qualitatively correct education. Today we have an agreed list of key competences in the European Union, which includes, among other things, the need to communicate not only in one's mother tongue but also in foreign languages, mathematical competence together with basic competences in science and technology, digital competence, learning to learn, social and civic competences, sense of initiative and entrepreneurship, and cultural awareness and expression.

Today's view of the education system should enable people to achieve objectives that are articulated by the state but are intended to provide conditions for individual development. This requires care to ensure that each person's individual chances for a good education do not depend on their personal, social or economic situation. These assumptions are not always met, but it is the duty of the state to ensure that the possibility of access to good education is not limited. It is also expected that the state and educational institutions will be aimed at improving social integration, especially of marginalised groups and persons, and additionally they will receive support adequate to the reported needs and capabilities of the state.

Housing as a commonly used term when dealing with the issue of this perception of social policy is nothing more than housing as a whole implemented in a town, region or country. From the point of view of every person it is extremely important because having a roof over one's head is one of the basic human needs (Szelągowska 2011 p. 22 - 31). It is decent housing conditions that are an important prerequisite for the proper functioning of individuals, families and entire social groups. However, it should be remembered that part of the Polish society does not have sufficient income to meet its housing needs independently, at an appropriate level and in a stable way.

Another point of view on the problem of housing is presented by the “Habitat for Humanity Poland” Foundation. The Foundation shows that in Poland there are only 366 dwellings per 1000 inhabitants with an average of 460 in Europe. It is also true that there are more and more apartments on the market, but they are difficult to access because today's average earnings allow you to buy less than one square meter of flats at best.

Conclusions

Economic security is a kind of foundation for the proper functioning of all, every society, including Polish society. This sense of security is a derivative of many factors and events not always fully dependent on man. One should strive to know them in every situation and on this basis take action to ensure a sense of security for all people. Considering the economic and population situation in Poland, it is advisable to focus the efforts of the authorities and the entire society on several key issues that have a significant impact on the sense of social security. The research shows that these issues are:

- conducting effective activities ensuring proper medical care and prevention for every person;
- organizing the education system in such a way that it enables the removal of inequalities and allows an equal start for every child;
- conducting effective housing policy, thanks to which each family will have its own apartment.

[7] How to organize education of students with special educational needs? The MEN guide. [pol. Jak organizować edukację uczniów ze specjalnymi potrzebami edukacyjnymi? Przewodnik MEN. wyd. MEN Warszawa 2010] ed. MEN Warsaw 2010, p. 35 - 55

The aforementioned areas of the state's activity related to ensuring economic security are not a simple task for them, but without trying to resolve them, it may turn out that the economic security of Polish women and Poles may deteriorate in the future.

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Modelling logistics services in the supply chain

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Abstract

The article addresses cooperation and business relationships in the supply chain between logistics centres and courier companies using the CL offer. It presents a model of functioning of courier companies in logistics centres, a model of providing courier services with the use of infrastructure, IT systems, modern technologies and coordinators of logistics processes offered by logistics centres. The analysis concerns the impact of IT systems offered by logistics centres on the execution of courier services and business relationships in the supply chain.

Keywords: Modelling, Supply Chain, Logistics Services, Business Relationships

Supply chain relationships between business partners

The concept of the supply chain has changed the perception of business cooperation in meeting customer needs from an inward to an outward orientation. Perceiving solely own benefits and basing cooperation on the above does not determine the maintenance of beneficial business relationships and achievement of desired results [1]. It is crucial to be outwardly oriented and understand that the final form of a product or service is not the result of the work of one organisation but a network of interdependent entities [4]. A supply chain can be viewed as activities related to the transport and processing of goods, from sourcing all kinds of raw materials to delivering the product to consumers. The concept also includes the flow of information which is relevant during the entire process [5].

In the supply chain, relationships between its links, which may be following: tangible – related to the movement of goods, and intangible - involving the exchange of information, communication, and services can be observed [29]. It can be assumed that in the supply chain, customers are the entities that give rise to decisions made in the supply chain, as they create the demand that drives the supply chain [8]. Thus, the supply chain is to ensure a fast and efficient flow of goods while minimising its costs. It is worth mentioning that the main goals of the supply chain include: [10]

- Market adaptation - understood as the readiness to adapt supply chain design to changes in market structures and adapt supply networks to the company's strategy, products and technologies,
- Flexibility - expressed in the ability to respond to changes in demand and supply as well as quickly identify and remove internal disturbances,
- Taking account of the interests of business partners on both sides - by developing an incentive system for greater efficiency and identifying success factors.

Developing cooperation relationships with suppliers, using intermediaries to acquire new suppliers and new logistics infrastructure, creating flexible designs of logistics products and services, achieving a free information exchange with suppliers and customers, and a customer needs assessment are among the various methods employed to achieve those goals.
Building relationships between its partners, which can result in mutual benefits, constitutes a significant part of the supply chain. Not only the offered product or service is the final effect of the flows in the supply chain, but also the impact of the interaction between the cooperating parties on

their development and functioning. That is not a form of independence from the business partner but interdependence resulting from close cooperation and adjustment of the offer to the environment [16]. The cooperation of courier companies with logistics centres consists in using the potential of logistics centres in the execution of courier services.

A logistics centre can be described as "a spatial object with its own organisation and infrastructure enabling various independent companies to implement activities on goods in connection with their storage and transfer between the consignor and consignee including handling intermodal transport and performing activities on resources used for this purpose" [14]. Its infrastructure consists of warehouses, storage yards, railway container terminals and buildings such as employee hotels, petrol stations, vehicle service stations or food courts, customs services, insurance companies - i.e. places where additional services are provided [17]. It should be stressed that the logistics centre is an independent enterprise whose task is to "coordinate logistic, storage and transport services along with the information flow, as well as control activities" [26]. A logistics centre can also be defined as "a spatially functional facility with its infrastructure and organisation, in which all types of logistics services related to the receipt, storage, distribution and release of goods, as well as support services delivered by economic entities independent of the consignor and consignee, are performed" [7]. It can be noted that the logistics centre is a multi-entity organisation of a high degree of complexity [22]. The multi-faceted nature of a logistics centre allows it to provide comprehensive logistics services. The logistic centre is supposed to enable the performance of specific logistic processes due to its extensive infrastructure and good organisation [20]. The wide range of possibilities offered by the logistics centre makes customers and contractors willing to use its services. Thereby, it becomes competitive among companies delivering logistics services.

Courier companies are operators providing courier services, the essence of which is to "collect a shipment from the consignor by courier and deliver it directly to the consignee". [19]. It should be mentioned that its essential element is the quality standards of provided services, offers of courier companies, and technologies used in the processes of order execution. The reason is that the contemporary courier market, both domestic and international, offers customers solutions tailored to their needs and expectations [13]. Today, Delivery of consignment is a comprehensive service, realized following the principles of logistics, whose priority is customer satisfaction [6].

Courier companies using external logistics services are provided with specialist and reliable service without the maintenance costs they would have to face in case they were to organise their own logistics services and maintain the necessary logistics infrastructure for this purpose. The time and resources saved in this way can be channelled into developing the core business, thereby increasing efficiency. An undoubted advantage lies in the increase in the satisfaction of contractors cooperating with logistic centres and customers thanks to professional service that is a sign of improving the level of customer service [2]. The positive aspects of the application of this method have contributed to the development of the courier transport industry and the establishment of courier companies offering a range of additional services as well as dedicated solutions for companies. Courier companies increasingly see their development and effectiveness in the efficient management, IT systems [18] and modern logistics infrastructure, all of which can be provided when located in a logistics centre [25]. The offer of the logistics centre is extensive and diversified, which makes companies perceive the logistics centre in terms of expected benefits in the form of professional and efficient customer and contractor service, as well as gaining a competitive advantage over other companies offering courier services.

Organisation of Logistics Services in the Supply Chain

Logistics services include commercially performed forwarding, transport, warehousing, as well as related ones and those supporting the process of flow of goods between the links of the supply chain [11]. The areas of undertaken logistics activities by logistics service providers in an enterprise comprise supply, production and distribution [12]. Logistics service is organised and provided by a specialist company that manages the logistics system of another company [9].

As indicated above: "logistic services include commercially performed forwarding, transport and storage services" [12] which include courier services. Their task is to "take over the consignment from the consignor by a courier and deliver it directly to the consignee" [19]. "The areas of logistic activities undertaken by logistics service providers in an enterprise are procurement, production and distribution" [12], where courier services can be used in both procurement and distribution, thus supporting the flow of goods between the links of the supply chain [23]. Figure 1 displays a proposed model of the operation of courier companies in logistics centres.

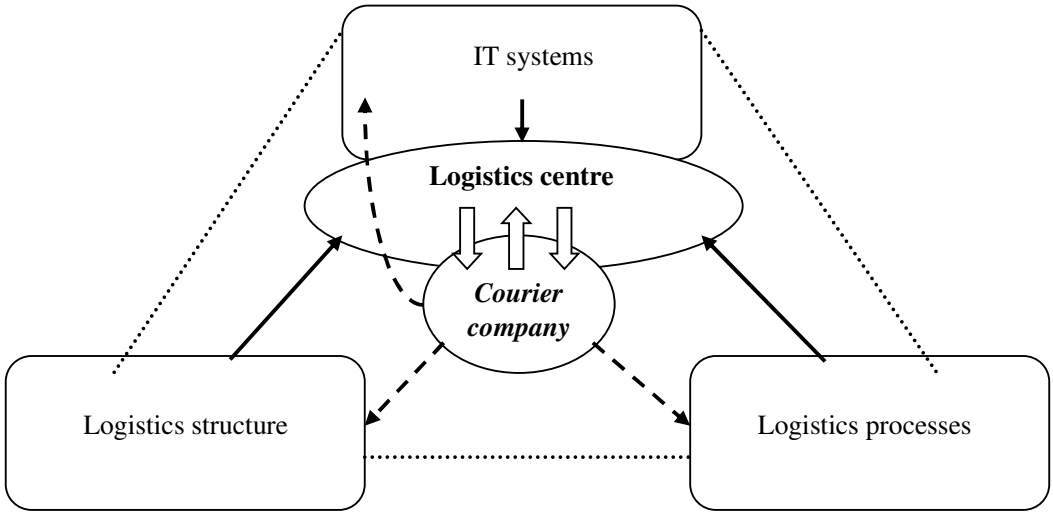

Figure 1: Model of operation of courier companies in logistics centres
Source: Study based on [22]

IT systems in the logistics centre are employed to plan, coordinate, and control activities both inside and outside the organisation (*business partners*), including customisation to the customer needs [3]. The logistic structure includes companies cooperating with the centre and using the provided infrastructure. Logistics processes focus on customer service, building relationships, order fulfilment, demand management, and integrating and coordinating activities taking place in the centre. The courier company cooperating with the logistics centre uses each of the three areas of the centre's operation in the implementation of courier services [21]. The proposed model of courier services in the logistics centre is presented below.

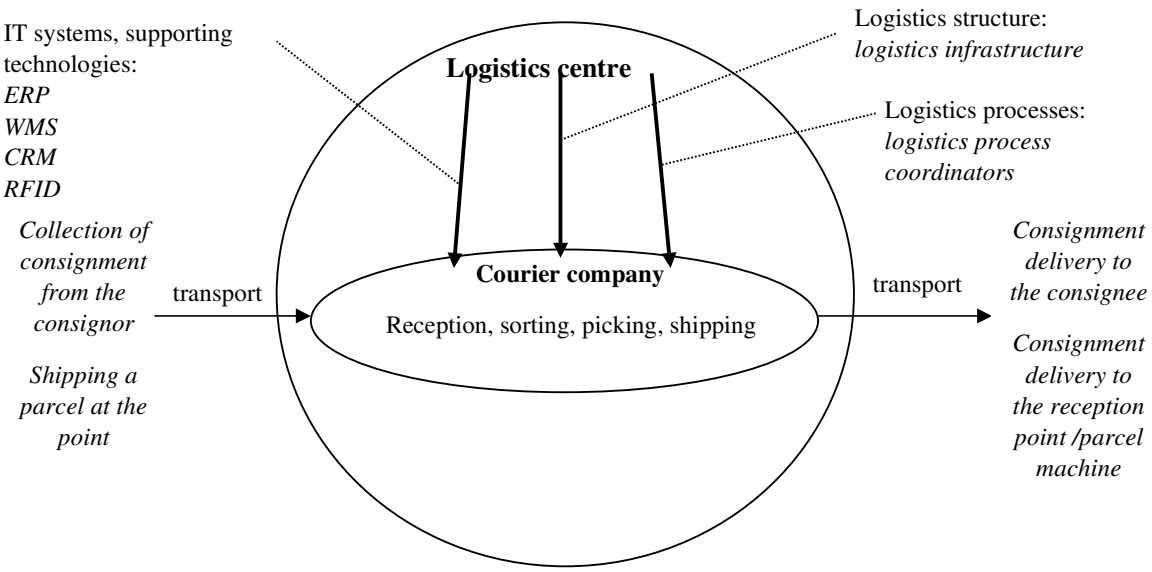

Figure 2: Model of courier services in a logistics centre
Source: Study based on [6], [8]

When providing courier services, the courier company applies the IT systems available in the logistics centre to enable efficient information flow and uses the logistics infrastructure to ensure an uninterrupted shipment flow. Logistics process coordinators, who supervise the course of courier services from the forwarding point through the activities carried out in the centre to the transport to the reception centre, assure synergy of logistics processes in a courier company.

The impact of IT systems on Supply Chain Relationships

A logistics centre that intends to provide logistic services at the highest possible level, taking advantage of modern solutions, is forced to employ an IT system. The use of such modern technologies is inextricably linked to the possession of suitable computer hardware and software. Due to the high level of specialisation and complexity of services, logistic centres offer comprehensive service to their customers. It includes transport, storage, formal and legal services, and other additional ones. Therefore, it is necessary to use an IT system to provide full service efficiently. The logistics centre that has implemented the IT system is positively perceived, which improves its image. The research hypothesis is to study the influence of IT systems in the centres on the functioning of courier companies and relationships in the supply chain. The research task was executed by constructing two survey questionnaires addressed to courier companies and logistics centres. The surveys covered some of the European Union Member States. The questionnaire was sent to 90 logistic centres where courier companies operate and 90 courier companies located in these logistic centres. Completed questionnaires were received back from 58 logistic centres and 53 courier companies. The survey aimed to examine pairs formed by the logistics centre cooperating with the courier company; therefore, from among the received completed questionnaires those without pairs were rejected. Hence, 44 logistics centres and 44 courier companies constitute the surveyed sample. The survey was conducted from September 2019 to January 2020 through a questionnaire.

The survey directed to courier companies allowed for a detailed analysis of their activities, determining, among other things, the effectiveness of courier deliveries, "understood as the degree to which the courier company's objectives are achieved" [28]. As the courier company assumes the aim

of delivering consignments to customers: [27]

- executed within the deadlines set,
- implemented without errors,
- realised in the full specification of the products ordered and
- carried out flexibly, adjusting the delivery time to the customer [1]

these elements were examined by determining the level of their effectiveness based on the respondents' answers [15]. Table 1 presents the execution of courier deliveries considering the set delivery dates.

Table 1. Execution of courier deliveries within the set deadlines

Are courier deliveries executed within the set deadlines?	Frequency	Percentage
often (60% of deliveries)	*4*	*9,09%*
very often (80% of deliveries)	*34*	*77,27%*
always (100% of deliveries)	*6*	*13,64%*
Total	*44*	*100%*

Source: Own study based on survey results.

Table 1. shows that 34 of the surveyed courier companies (77.27%) state that they very often, 6 entities (13.64%) always, while 4 respondents (9.09%) frequently deliver shipments on time. It proves that 6 courier companies are 100% effective in delivering consignments on time, 34 entities are effective in this respect in 80% and 4 respondents in 60% of deliveries.

Assuming that the limit of satisfactory effectiveness is at the level of 80%, 40 courier companies are effective in courier deliveries on time, which constitutes 90.91% of the surveyed companies. The surveyed courier companies were asked about the frequency of errors in courier deliveries. Table 2 presents the results obtained.

Table 2: Execution of courier deliveries without errors

Are courier deliveries executed without errors?	Frequency	Percentage
very often (80% of deliveries)	*30*	*68,2*
always (100% of deliveries)	*14*	*31,8*
Total	*44*	*100,0*

Source: Own study based on survey results.

Table 2 shows that 30 of the surveyed courier companies very often deliver shipments without errors, while the remaining 14 respondents always do so. Therefore, 30 courier companies (68.18%) are 80% effective in delivering consignments without errors, whereas 14 respondents (31.82%) are 100% effective in this aspect. It follows that, with the assumed limit of satisfactory effectiveness at the level of 80%, all the surveyed courier companies are effective in delivering shipments without errors. Moreover, the survey questionnaire allowed examining how often courier deliveries are carried out in full product specification. This issue is presented in Table 3.

Table 3: Execution of courier deliveries in the full specification of ordered products

Are courier deliveries executed in the full specification of ordered products?	Frequency	Percentage
often (60% of deliveries)	*1*	*2,27%*
very often (80% of deliveries)	*36*	*81,82%*
always (100% of deliveries)	*7*	*15,91%*
Total	*44*	*100%*

Source: Own study based on survey results.

As Table 3 shows, one surveyed courier company (2.27%) declares that it often delivers shipments in the full specification of ordered products, while 36 entities (81.82%) do so very often, and 7 (15.91%) always. Among the surveyed courier companies, 97.73% of them perform deliveries effectively. Given the limit of satisfactory effectiveness at the level of 80%, 43 courier companies are effective in delivering consignments in the full specification of ordered products, which constitutes 97.73% of the research sample. The survey also allowed to identify whether courier companies adjust the time of delivery to customers, which is displayed in Table 4.

Table 4: Execution of courier deliveries by adjusting the time of delivery to the customer

Are courier shipments delivered flexibly, with the delivery time adjusted to the customer?	Frequency	Percentage
often (60% of deliveries)	*13*	*29,55%*
very often (80% of deliveries)	*31*	*70,45%*
Total	*44*	*100%*

Source: Own study based on survey results.

Table 4 shows that 13 courier companies (29.55%) often adjust the time of delivery to the customer during the service implementation, while 31 entities (70.45%) admit that they do so very often. It means that 70.45% of courier companies appears effective in taking account of the time of shipment delivery to the customer.

The data collected enabled the assessment of the impact of using IT systems on the logistics centre management. The information obtained from the study allowed the determination of the IT systems class used by logistics centres. Table 5 presents the percentage division of logistics centres according to the use of specific classes of information systems (from the survey directed to logistics centres).

Table 5: Information system class used in logistics centres

		Answers	
IT system class used		N	Percentage
	12_2 – ERP	*44*	*100,0%*
	12_4 – CRM	*44*	*100,0%*
	12_6 – ERP II	*14*	*31,8%*
	12_8 - WMS	*35*	*79,5%*

Source: Own study based on survey results.

Table 5 shows that ERP and CRM systems were used in all surveyed logistics centres. 79.5% of the respondents applied WMS, while 31.8% ERP II class system. The survey questionnaire made it possible to examine whether logistic centres provide courier companies with an IT system (from the

survey directed to logistic centres). The collected results are presented in Table 6.

Table 6: Making the IT system available to courier companies by logistics centres

Does the logistics centre allow courier companies to use its IT system?	Frequency	Percentage
Yes	*44*	*100,0*

Source: Own study based on survey results.

Table 6 presents the findings of the survey, which identified that all surveyed logistics centres allow courier companies to use their IT systems. It means that logistics centres provide courier companies with both logistics infrastructure and IT systems to ensure proper handling of logistics processes. Table 7 presents data on the possibility of using the logistics centres' IT system by courier companies (from the survey addressed to courier companies).

Table 7: Possibility of using the infrastructure of logistics centres by courier companies

Does the logistics centre allow courier companies to use its IT system?	Frequency	Percentage
Yes	*44*	*100,0*

Source: Own study based on survey results.

Table 7 shows that all surveyed courier companies have the possibility to use the IT system employed in logistics centres. The survey identified how many systems offered by logistics centres courier companies apply (from the survey directed to courier companies). Table 8 displays the obtained and developed data.

Table 8: The number of IT systems offered courier companies to use by logistics centres

How many IT systems offered by the logistics centre are used by the courier company?	Frequency
1	*14*
2	*22*
3	*8*
Total	*44*

Source: Own study based on survey results.

As can be seen in Table 8, 14 courier companies (31.82%) use one, 22 respondents (50%) two and 8 (18.18%) three IT systems from the offer of logistics centres. The questionnaire allowed the examination of the impact of the IT system employed in logistics centres on the efficiency of information flow of the courier company (from the survey among courier companies), which is presented in Table 9.

Table 9: The extent to which the use of the IT system of logistics centres affects the efficiency of courier company's information flow.

To what extent does the use of the logistics centre's IT system affect the efficiency of the courier company's information flow?	Frequency
Average	*32*
Large	*14*
Total	*44*

Source: Own study based on survey results.

As shown in Table 9, 32 courier companies (72.7%) state that the use of the IT system offered by logistics centres to the average extent determines the efficiency of information flow in their companies, while 14 surveyed entities (27.3%) describe this impact as high. As a further step, the possibility of using the logistics centre's IT system by a courier company (from the survey directed to courier companies) and the class of IT systems used in the logistics centre (from the survey addressed to logistics centres) were examined. Cross-table 10 was drawn up for this purpose.

Table 10: Does the logistics centre allow courier companies to use its IT system? * What class of information systems is used in the logistics centre?

Cross - table							
			Class of systems from logistics centres' offer				Total
			MRP II	ERP II	ECR	WMS	
Does the logistics centre allow courier companies to use its IT system?	Yes	Number	*44*	*44*	*14*	*35*	*44*
Total		Number	*44*	*44*	*14*	*35*	*44*

Source: Own study based on survey results.

Due to the constancy of answers provided by logistics centres, the Chi-square test was not performed in the question of enabling the IT system to courier companies (Table 10). However, it can be noted that courier companies can use IT systems of all logistics centres, regardless of the class of systems applied. All logistics centres allow the use of their respective system classes, which has an impact on the efficiency of courier deliveries. It can, therefore, be concluded that the smooth information flow resulting from the use of the logistics centres' IT system by the courier companies affects the level of the courier services provided, which is reflected in the efficient delivery of courier services. The following step was the assessment of the impact of IT systems on improving the functioning of the centre (from the survey received back from courier companies) and the possibility of using the logistics centre's IT system by the courier company (from the survey to courier companies). To this end, Cross-table 11 was created.

Table 11: What is the impact of IT systems on improving the functioning of the centre? * Does the logistics centre allow courier companies to use its IT system?

Cross - table				
			Does the logistics centre allow courier companies to use its IT system?	Total
			Yes	
What is the impact of IT systems on improving the functioning of the centre?	Average	Number	*10*	*10*
		% in column	*22,7%*	*22,7%*
	Large	Number	*27*	*27*
		% in column	*61,4%*	*61,4%*
	Very large	Number	*7*	*7*
		% in column	*15,9%*	*15,9%*
Total		Number	*44*	*44*
		% in column	*100,0%*	*100,0%*

Source: Own study based on survey results.

Table 11 shows that the test was not performed since all surveyed logistics centres answered in the

affirmative when asked about the possibility of using the logistics centre's IT system by a courier company. However, it can be noted that among courier companies using the logistics centres' IT system, the influence of IT systems on improving the functioning of a logistics centre is noted as average by 22.7% of the respondents, and as a large and very large respectively by 61.4% and 15.9% of the surveyed courier companies. It follows that courier companies highly evaluate the influence of IT systems used by logistics centres on the improvement of the functioning of logistics centres, which they use to deliver shipments and obtain the support of logistics process coordinators. That proves that the efficient flow of information affects the high level of courier services provided. It translates into good relations and confirms the research hypothesis. Then the number of IT systems used by the courier company (from the survey directed to courier companies) and the class of IT systems used in the logistics centre (from the survey addressed to logistics centres) were investigated. For this purpose, Cross-table 12 and Table 13 showing the Chi-square test were created.

Table 12: How many IT systems offered by the logistics centre are used by the courier company? * What class of IT systems is used in the logistics centre?

Cross - table							
			Class of systems from logistics centres' offer				Total
			MRP II	ERP II	ECR	WMS	
How many IT systems offered by the logistics centre are used by the courier company?	1	Number	*14*	*14*	*5*	*12*	*14*
		% in column	*31,8%*	*31,8%*	*35,7%*	*34,3%*	
	2	Number	*22*	*22*	*7*	*17*	*22*
		% in column	*50,0%*	*50,0%*	*50,0%*	*48,6%*	
	3	Number	*8*	*8*	*2*	*6*	*8*
		% in column	*18,2%*	*18,2%*	*14,3%*	*17,1%*	
Total		Number	*44*	*44*	*14*	*35*	*44*

Source: Own study based on survey results.

Table 13: Chi-square tests: How many IT systems offered by the logistics centre are used by the courier company? * What IT system class does the logistics centre employ?

Chi-square test			
	Value	Df	P
Chi-square	*0,205*	6	*0,999*
N important observations	*44*		

P = 0,05
Source: Own study based on survey results.

Table 13 shows no statistically significant relationships between the variables (p = 0.999). The distribution of the number of IT systems used by a courier company is similar among logistics centres offering specific IT system classes. Almost 50% of courier companies applied two, about 33% of the respondents one, and nearly 17% three IT systems offered by logistics centres. The effectiveness of courier deliveries is possible due to the efficient flow of information provided by IT systems in the logistics centre. Therefore, it can be concluded that efficient information flow influences the high level of provided courier services, which has an impact on positive business relationships.

The dynamics analysis of the phenomena by evaluating relationships between variables, and showing differences in the distribution of response rates between the groups indicates that the main objective of the work has been achieved. It was to examine the effectiveness of courier services in logistics centres as determinants of relationships in the logistics centre. The tests and calculations made it possible to positively verify the hypothesis that the impact of using the centres' IT systems on the functioning of courier companies and relationships in the supply chain exists.

Conclusion

Courier companies need an increasingly advanced IT system to support their management processes. The use of an IT system in logistics centres contributes positively to the improvement of business processes of courier companies. Equipping logistics centres with modern IT systems, RFID technology, and offering logistics process coordinators are the main elements considered when choosing the location of a courier company. That is why logistics centres, with courier companies in mind, endeavour to prepare their offer for their needs. Hence the logistic centres are becoming increasingly crucial for the development of courier services. The relationship that occurs in cooperation between the logistics centre and the courier company consists in the effective execution of logistics services. This refers to both current activities improving the flow of goods and information streams, and the implementation of strategies for financing logistics processes in the supply chain. Although the courier company is a business entity that operates based on logistics, the cooperation with the logistics centre is not a category of outsourcing logistics service, but a well-thought-out strategy that brings chances and opportunities to provide courier services at a higher level in dynamically developing supply chains.

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Human Flows in The Supply Chain – Empirical Results

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Abstract

Issues related to the supply chain management are currently being given more and more attention. Supply chain consists of enterprises cooperating in various functional areas, and their customers, among which the flows of material, information and finance are visible. It is worth noting, yet rarely emphasized in the relevant literature, that apart from the indicated flows of materials, information and finance, there is a need to identify and examine the human flows (or people flows) in the supply chain. The research approach adopted by the authors was intended to answer the initial research questions: (a) What are the situations and rules for human flows in the supply chain? (b) Who is set for a secondment to the other links in the supply chain? The empirical results have been obtained during a three-stage research process. The nomothetic approach has been adopted in order to present an overall picture of the analysed problem. The role of the prepared survey was to identify human flows in the supply chain from the enterprises that are the leaders of that supply chain.

Keywords: human flows, supply chain, supply chain management, employee, secondment.

Introduction

Issues related to the supply chain management (SCM) are currently being given more and more attention. Supply chain (SC) consists of mining, production, commercial and service enterprises cooperating in various functional areas, and their customers, among which the flows of material, information and finance are visible. The function of such a network system is related primarily to the integration and coordination of network participants' activities through developing a coopetition strategy. It means the integration and coordination of material, information and financial flows, beginning from raw material acquisition to consumption. This creates a competitive advantage of the SC links and their customers. It is worth noting, yet rarely emphasized in the relevant literature, that apart from the indicated flows of materials, information and finance, there is a need to identify and examine the human flows (or people flows) in the SC.

According to S.T. Menon (2012) research in SCM has predominantly been the purview of research in the areas of operation management, logistics and information technology systems, with limited reference to human resources. The people dimension has been under-represented both in research and in practice (Sweeney 2013). However, according to Fawcett et al. (2008) people are the key bridge to successful collaborative innovation, and therefore, should not be overlooked. We agree with Sweeney (2013) that supply chains are about people: customers and suppliers. People are those who design, manage and execute SC operations.

Human flows in the Supply Chain

Issues related to the SC are of the upmost importance for suppliers, manufacturers and distributors. None of the SC's links can ignore any kind of flows in the SC: material, financial, informational and human. However, the last type, human flows, are not widely recognized by researchers and practitioners. The literature focusses mainly on the hard aspects of SCM (Stadtler and Kigler, 2011), while the soft aspects (including human flows) are not the main field of researchers' interest. Therefore, the authors of the article found it necessary to focus on existing literature gap.

There is even a lack of SC and/or SCM definitions that include people in the understood as human flows. They have been recognized by the working group of the Scientific Advisory Board of German Logistics Association – BVL through understanding logistics as an application-oriented scientific discipline (Delfamnn et al., 2010): "*the nature of logistics as a scientific discipline […], its interpretation of economic processes as flows of good, information, people, moneys and other objects and its multiperspectival approach to research on these networks*". The working group of researchers has underlined the flows of objects through time and space. Those objects are: goods, information, money and people.

However, in the relevant literature there is a wide scope of issues related to human activities in the SC. The observed lack of consistency in the terminology results in the necessity to identify commonly used terms. Some of the authors examine the so-called HR and SCM (Floethmann, Hoberg and Gammelgaard, 2017; Madani and Wajeetongratana, 2019) that is an integrated system that allows enterprises to develop unique and inter-organizational strategies. Other researchers analyse human capital in the SC (Zacharakis and Meyer, 2000; Kiessling, Harvey and Moeller, 2012; Gonzalez-Loureiro, Dabić and Puig, 2014) that should be understood as an important resource in the enterprise and the SC, especially in terms of people's working experiences. Furthermore, the theory of employee flow that refers to the flows of staff, both internal – intraflows, and external – inflows and outflows, has been presented by Lee (2010).

Although the flows of material, finance and information are widely accepted, the flows of human (or people) are rather unrecognized. The flows of people may be understood in two ways (Delfamnn et al., 2010):

1. From the technical perspective where people operate in any kind of logistics activities such as pickers, forklift operators, truck drivers, etc.
2. From the social perspective where people are actors with a certain level of freedom for the utilization of their actions.

Moreover, three assumptions of human role in logistics can be distinguished (Delfamnn et al., 2010). Firstly, the human as a production factor and/or market actor, whose behaviour may be anticipated likewise material, financial and informational flows. Secondly, the human as an actor with limited rationality and thirdly, the human as a *homo oeconomicus*.

Human flows in the SC have been also noticed by Yun (2017). Based on them the researcher noticed "HRM of the SC" and "human resource SC". The first approach suggests that employees of one enterprise may be transferred to another one in order to increase the production effectiveness. The situation is strongly related to the HRM even if allocation and optimization of HR is in a wider range. The main goal is to maximize the benefits of the SC. Therefore, HR are considered similarly to other resources such as machines, raw materials or energy inputs. Its allocation is only an aspect of resource dispatching. Material flows are the main activity in the SC, while HR activities are supplementary involving inter-organizational sharing, exchanging and cooperation such as: HR expatriating, technological supports providing, cross-organizational team-working, etc. The second approach suggests that enterprises form alliances that acquire HR from their partners. These HR start to be one of the flows in the SC where partners cooperate on the basis of their demand and supply as well as utilization. Therefore, human flows are of the upmost importance and core consideration of all SC's links. The topics related to the above mentioned issues usually refer to the: cooperating alliance

constructing, HR demand forecasting and supply analyzing, members' HR strategy formulating, the alliance's HR inventory policy optimizing, members' and the alliance's HR risks managing, etc. (Yun, 2017).

Nevertheless, despite noticing the essence of human flows in the SC, it seems that the term "human resource supply chain" appearing in the relevant literature illustrates the analogy of HR flows in the enterprise to the material flows in the SC. It can be defined as incorporating the structure and delivery channels of the HR function, the flow of HRM practices across the organization, and the management or governance techniques applied to ensure both structure and flow are operating effectively to reduce uncertainty and achieve organizational goals (Ferndale and al. 2010). Similar understanding is presented by Allen et al. (2013) who identified the concept of human SC with managing the flow of people through an organization as managing the flow of materials through a traditional SC. Other analogies of transferring the SCM methodology to the HR sphere can be found in Kumar (2003), who applied SC thinking to recruitment and Capelli (2008) who considered SC implication for internal talent development system.

This article does not present human activities understood in the perspective of HRM. The authors of the article focus on the SCM's perspective that categorize activities related to people as human flows, as it is with material, financial and information flows. The most suitable term that fits the author's understanding can be found in the theory of employee flow. It suggests that flows are a consequence of a high-performance workplace (Heskett, Sasser and Schlesinger, 1997). These require a high level of trust and integration with customers as well as suppliers. However, the role of the B2B relations cannot be overestimated. The deeper one relationship is more likely with a main supplier's employees (Lee, 2010). The competencies of various SCM employees in various SCs has been widely analysed in the relevant literature (Myers et al., 2004; Christopher, 2005; Kovacs, Tatham and Larson, 2012; Floethmann, Hoberg and Wieland, 2018). The theory of employee flow only partially explains the human flows in the SC. Issues related to that flows has been initially analysed by Lee (2010). The researcher examined people who were: promoted upwards, transferred to another account/division, left the supplier, transferred/promoted from elsewhere within the supplier.

Research Methodology

The research approach adopted by the authors was intended to answer the initial research questions:

1. What are the situations and rules for human flows in the SC?
2. Who is set for a secondment to the other links in the SC?

The empirical results have been obtained during a three-stage research process. The nomothetic approach has been adopted in order to present an overall picture of the analysed problem. The role of the prepared survey was to identify human flows in the SC from the enterprises that are the leaders of that SC. The SC leader is the coordinator of SC activities whose economic strength and position in SC are decisive. Accordingly, the SC leader ensures meeting the goals set for the SC.

The first stage of the research was an initial stage intended to identify the literature gap of the analysed problem as well as the research sample.

The second stage of the research process was a proper research conducted in fall 2019. The authors have thoroughly investigated the relevant literature from worldwide online databases such as World of Science and Scopus as well as industry and branch reports from Poland in order to distinguish types of enterprises selected for the analysis and situations for human flows in the SC. Therefore, the branches representing those types of enterprises are as follows: home appliances, construction, chemical, wood industry, electrical machinery industry, metal industry, electrotechnical, energy, retail, wholesale trade, medical/pharmaceutical, oil and gas, clothing/textile, food, telecommunications, transport/rail/logistics, armaments and other enterprises. Considering the size of the enterprise, authors of the article decided to examine medium and large enterprises. The minimum employment size was assumed for medium-sized enterprises over 100 employees. This choice resulted from the authors'

belief that in smaller business entities situations related to the human flows in SCs are not frequent. The situations when human flows occur are as follows: quality control, IT systems integration, audit, training, supplying the supplier's workforce in case of insufficient production capacity, replacement, accident, joint tasks/projects.

The spatial range of the research was limited to Poland. The structured interview tool has been applied in the research with the computer-assisted telephone interviewing (CATI) method. The research sample consists of 2469 enterprises. 1232 respondent (sampling frame) were included in the research process, where 500 respondents declared the occurrence of human flows in the SC, while 732 enterprises denied. The respondent was a HR manager of a particular enterprise that is a leader of the SC. The obtained results, after comparing them with the relevant literature, constitute a fundamental for diagnosing the role of the human flows in the SC. This stage gave the authors a relevant statistical data that helped to answer both research questions.

Therefore, the third stage of the research process was an analysis of the research data obtained from the stage two. It should be emphasised that the results of the interviews answered the questions from the following fields:

1. Duration of the human flows in the SC.
2. Rules and legal forms of the human flows in the SC.
3. Type of employees set for secondment.
4. Identification of the initiator of human flows in the SC.

Empirical Results

In the structured interview 500 enterprises declared the occurrence of human flows in the SC. In terms of the employment size there was 366 enterprises between 100 and 249 employees (see Table 1) as well as 134 enterprises over 249 employees (see Table 2). The most common situation when human flows in the SC occur is joint tasks/projects and then the audit. Human flows are not so popular in replacement and supplying the supplier's workforce in case of insufficient production capacity. The distribution of the number of situation for both groups of enterprises is similar.

Table 1: Human flows in the SC – period (from 100 to 249 employees)

Frequency	Quality control	IT systems integration	Audit	Training	Supplier' s workforce	Replacement	Accident	Joint tasks/ projects	Percentage
Up to several days at a time	30	35	75	96	20	8	31	273	78%
Once to several weeks	11	6	7	14	0	0	0	79	16%
Once to several months	4	1	0	2	0	0	1	2	1%
Cyclically every week	1	0	0	0	0	0	0	1	0%
Cyclically every month for several days	1	1	3	0	0	0	0	3	1%
Cyclically every year for several days	0	1	13	1	0	0	0	2	2%
Cyclically every year for several months	0	0	0	1	0	0	0	1	0%

Source: own calculations.

Considering the frequency and period for which human flows in the SC exist (see Table 1 and Table 2), both in the group of enterprises with up to 249 employees and in the group of larger enterprises, one-off, short-term (up to several days) flows dominate. This applies to all of the analysed situations. Importantly however, in the group of larger enterprises, the situations regarding cyclical human flows are more often observed. While in the group of smaller enterprises cyclical human flows constitute only 4% of the total flows, in the group of larger enterprises it is already 25%. Thus, it can be seen that in larger enterprises the tendency to build lasting relationships is increasing due to the repetition of human flows. This tendency is most evident when the recipient and supplier enterprises implement joint tasks/projects.

Table 2: Human flows in the SC – period (over 249 employees)

Frequency	Quality control	IT systems integration	Audit	Training	Supplier' s workforce	Replacement	Accident	Joint tasks/ projects	Percentage
Up to several days at a time	22	27	42	44	13	1	33	61	61%
Once to several weeks	14	4	7	0	0	0	0	16	10%
Once to several months	3	5	4	4	1	0	0	0	4%
Cyclically every week	2	2	1	0	0	0	0	9	3%
Cyclically every month for several days	0	4	1	2	1	2	2	23	9%
Cyclically every year for several days	2	5	16	5	2	0	1	14	11%
Cyclically every year for several months	0	0	2	1	1	1	0	1	1%

Source: own calculations.

Empirical studies (see Table 3) also identified the type of contract that forms the basis for the human flows between recipient and supplier enterprises. At the same time, two of the most popular solutions in business practice were considered, i.e. a contract between two business entities and an employee loan agreement, giving the respondents the opportunity to indicate other solutions. The research shows that the dominant form of the contract is the contract between the supplier and the recipient (63% of indications in the group of enterprises up to 249 employees and 55% in larger enterprises). However, it is worth taking a closer look at the results of the research, in situations of accident, replacement and the supply of the supplier's workforce, where employee loan agreement is dominant or at least comparable. This situation is observed in both groups of enterprises. It is also worth developing the thread of other agreements that involve the human flows in the SC. This indication was chosen by 25% of respondents in the smaller group and 30% in the group of larger enterprises. The analysis of their responses shows that these flows often take place without companies signing any contracts. This may indicate a high degree of trust and well-established, continuous cooperation between the SC links analyzed in the survey.

The research also identified the subjects of human flows (see Table 4). Respondents were asked about who are the people flowing between enterprises, considering the place in the hierarchy in the enterprise and the type of work performed. It constituted the criterion for separating such groups as: production and administrative employees as well as lower and senior management. The results of the research show that most often we observe the flow of direct production employees (39% of indications in the group of enterprises up to 249 employees and 4% in the case of larger enterprises) between enterprises.

Secondly, these flows concern administrative employees (34% and 33% respectively). They are much less often related to the management staff, with lower-level management staff flowing more often between enterprises (21% and 18%). And relatively rarely top-level staff (6% of flows in smaller enterprises and 3% of all flows in enterprises larger than 250 employees).

Table 3: Human flows in the SC – type of contract

Number of employees	From 100 to 249 employees			Over 249 employees		
Type of flow	**Employee loan agreement**	**Contract with supplier/recipient**	**Other**	**Employee loan agreement**	**Contract with supplier/recipient**	**Other**
Quality control	11	18	18	4	23	16
IT systems integration	9	19	16	9	21	17
Audit	24	49	25	17	27	29
Training	16	59	39	6	23	27
Supplying the supplier's workforce	10	9	1	3	8	7
Replacement	5	2	1	2	1	1
Accident	14	11	7	15	15	6
Joint tasks/ projects	0	287	73	1	104	19
Percentage	12%	63%	25%	14%	55%	30%

Source: own elaboration.

Table 4: Human flows in the SC – management level

Number of employees	From 100 to 249 employees				Over 249 employees			
Type of flow	**Production staff**	**Administrative staff**	**Lower level management**	**Board members, top-level staff**	**Production staff**	**Administrative staff**	**Lower level management**	**Board members, top-level staff**
Quality control	32	11	4	0	30	11	2	0
IT systems integration	6	23	15	0	20	19	8	0
Audit	50	34	14	0	41	23	9	0
Training	38	57	18	1	16	24	14	2
Supplying the supplier's workforce	19	1	0	0	18	0	0	0
Replacement	1	4	3	0	4	0	0	0
Accident	17	7	8	0	17	14	5	0

Joint tasks/ projects	122	106	91	42	37	41	35	11
Percentage	39%	34%	21%	6%	46%	33%	18%	3%

Source: own elaboration.

Looking at the specific situations in which human flows occur, it can be seen that their subjects are production employees in the cases of joint tasks/projects, audits, quality control, supplying the supplier's workforce and accidents. In turn, administrative employees flow to supplier enterprises in situations such as the implementation of joint tasks/projects, conducting or participating in supplier training, integration of IT systems and accidents. Managing staff is most often a subject in the human flows in the SC in cases of joint tasks/projects and training activities.

Research shows that none of the parties to cooperation is the dominant initiator of human flows in the SC (see Table 5). Respondents indicated that SC leader initiate human flows in 41% in the group of smaller enterprises and in 47% of cases in the group of larger enterprises. This is especially the case in the situations such as audit, training, accident, supplying the supplier's workforce and replacement. In turn, suppliers are the initiators of human flows in 41% in the group of smaller enterprises and in 40% of cases in the group of larger enterprises. This most often applies to the implementation of joint tasks/projects, quality control, integration of IT systems and training. The research shows that the customer are the least frequent initiators of cooperation in the SC through the human flows between its links enterprises (respectively 18% in the group of smaller enterprises and in 13% cases in the group of larger enterprises). Analyzing this situation, it is worth noting that training is such an area of human flows, whose initiator in a relatively proportional distribution are all the analyzed entities, i.e. both companies that are SC leaders, as well as their suppliers and recipients.

Table 5: Human flows in the SC – the initiator

Number of employees	**From 100 to 249 employees**			**Over 249 employees**		
Type of flow	**My enterprise**	**Supplier**	**Recipient**	**My enterprise**	**Supplier**	**Recipient**
Quality control	7	31	9	11	26	6
IT systems integration	17	22	5	22	19	6
Audit	62	35	1	54	19	0
Training	45	32	37	26	15	15
Supplying the supplier's workforce	14	6	0	10	7	1
Replacement	7	1	0	4	0	0
Accident	31	1	0	26	10	0
Joint tasks/ projects	114	168	79	36	64	24
Percentage	41%	41%	18%	47%	40%	13%

Source: own elaboration.

The variables present in the study are measured on a nominal scale. In order to examine the relationship between these variables, the following correlations were determined: contingency coefficient[i], phi measure and Cramer V[ii]. Firstly, the type of situation was taken into account in the correlation, and then the number of situations. Based on these correlations (Table 6), it can be concluded that there is a very weak or weak[iii], significant relationship between the occurrence of individual situations in the period of human flows and the size of employment. The largest – moderate relationship exists between

the implementation of joint tasks/projects and the size of employment. Similarly, within type of contract, management level and initiator of human flows, there is a very weak or weak, significant relationship between the number of situations that occur and the amount of employment. Only in three situations correlations are not statistically significant, these correlations in tables 6 are marked with an asterisk.

Table 6: The correlations of situations in which there are flows of people with the size of employment in the surveyed company for the management level, initiator, situation and the period, and type of contract

Human flows in the SC				
Type of flow	**Management level**	**Initiator**	**Situation and the period**	**Type of contract**
Quality control	Phi 0,225 Cramer V 0,225 Contingency coefficient 0,220	Phi 0,232 Cramer V 0,232 Contingency coefficient 0,226	Phi 0,248 Cramer V 0,248 Contingency coefficient 0,241	Phi 0,243 Cramer V 0,243 Contingency coefficient 0,236
IT systems integration	Phi 0,309 Cramer V 0,309 Contingency coefficient 0,295	Phi 0,269 Cramer V 0,269 Contingency coefficient 0,259	Phi 0,311 Cramer V 0,311 Contingency coefficient 0,297	Phi 0,265 Cramer V 0,265 Contingency coefficient 0,256
Audit	Phi 0,261 Cramer V 0,261 Contingency coefficient 0,252	Phi 0,271 Cramer V 0,271 Contingency coefficient 0,262	Phi 0,320 Cramer V 0,320 Contingency coefficient 0,305	Phi 0,279 Cramer V 0,279 Contingency coefficient 0,268
Training	Phi 0,137 Cramer V 0,137 Contingency coefficient 0,135	Phi 0,109 Cramer V 0,109 Contingency coefficient 0,108 * Not statistically significant	Phi 0,241 Cramer V 0,241 Contingency coefficient 0,234	Phi 0,130 Cramer V 0,130 Contingency coefficient 0,129
Supplying the supplier's workforce	Phi 0,142 Cramer V 0,142 Contingency coefficient 0,140	Phi 0,148 Cramer V 0,148 Contingency coefficient 0,146	Phi 0,184 Cramer V 0,184 Contingency coefficient 0,181	Phi 0,197 Cramer V 0,197 Contingency coefficient 0,193
Replacement	Phi 0,140 Cramer V 0,140 Contingency coefficient 0,139	Phi 0,042 Cramer V 0,042 Contingency coefficient 0,042 * Not statistically significant	Phi 0,137 Cramer V 0,137 Contingency coefficient 0,135	Phi 0,036 Cramer V 0,036 Contingency coefficient 0,036 * Not statistically significant
Accident	Phi 0,249 Cramer V 0,249 Contingency coefficient 0,242	Phi 0,272 Cramer V 0,272 Contingency coefficient 0,263	Phi 0,254 Cramer V 0,254 Contingency coefficient 0,246	Phi 0,237 Cramer V 0,237 Contingency coefficient 0,230
Joint tasks/projects	Phi 0,169 Cramer V 0,169 Contingency coefficient 0,167	Phi 0,164 Cramer V 0,164 Contingency coefficient 0,162	Phi 0,513 Cramer V 0,513 Contingency coefficient 0,456	Phi 0,185 Cramer V 0,185 Contingency coefficient 0,181

*Statistically significant correlations at the 0.05 significance level with the exception of *.*
Source: own elaboration with SPSS.

Conclusions

The analysis of the research results allows to indicate several important conclusions:

1. Human flows are not identified in all SCs. Among the surveyed companies, 41% of entities indicated human flows.
2. The most common type of human flows in the SC is the implementation of joint tasks/projects.
3. Human flows in the SC are usually one-off and short-term (up to several days) in nature. However, in a quarter of cases, cyclical human flows are observed in the group of larger enterprises (over 249 employees).
4. The dominant form of the agreement regulating the human flows in the SC is the agreement between the supplier and the recipient. In selected situations (accident, replacement and supply of workforce), the employee loan agreement is used. Human flows also occur without formal contracts signed by enterprises.
5. Most often, there is a direct flow of production employees between the links of the SC. Secondly, these flows concern administrative employees (34% and 33% respectively). Definitely less often they concern managers.
6. No link in the SC is the dominant initiator of the human flows.

To conclude, human flows in the SC are important factor of every supply chain. Ipso facto, the cooperation of enterprises that is based on human flows tends to the efficient SCM. Nevertheless, authors of the articles are fully aware of the necessity of the further research that should include: the role of human flows in the SC integration, the determinants of the one-off and cyclical human flows as well as the role of the top-level management in operational issues within SC. The comprehensive mathematical models and regression methods are expected to be applied in the further research.

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[i] Values close to zero indicate a weak relationship between variables, and values close to 1 indicate a strong relationship between these variables.

[ii] Both measures the strength of the relationship between variables.

[iii] Interpretation of the correlation coefficient value: (a) value 0 – 0.2 indicates a very weak relationship; (b) value 0.2 – 0.4 – weak relationship; (c) value 0.4 – 0.6 – moderate relationship; (d) value 0.6 – 0.8 – a strong relationship; (e) value 0.8 – 1 – very strong relationship.

Methodology for Assessing the Quality and Comfort of Living in New Buildings as A Tool of Strategic Management of The Balanced Development of The Housing Sector

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Abstract

State regulation of the housing sector based on achieving a balanced housing policy by the development and implementation of an assessment of the quality and comfort of living in new buildings is considered in this article. The proposed methodology for assessing the quality and comfort of living offers the possibility to determine the targets and indicators for the urban environment and the rating of residential complexes at the global level. The methodology is also used for improving quality levels of housing construction in general. The implementation of this methodology is possible using the functioning of the digital platform of scenario planning and forecasting.

Keywords: Regulation of The Housing Sector, Assessment System, Digital Platform of Scenario Planning and Forecasting.

Introduction

The housing market depends on two components: demand and supply. Destructive changes like stagnation with a consequent crisis of the entire industry can occur in the event of an imbalance of these components. The priority task of state policy is to regulate and stimulate the growth of supply and demand in the housing market and the construction industry.

Problem Statement

The theory and practice in the housing market research indicate its diversity as a segment of the economy. The complexity of the structure, as well as the interaction and mutual influence of all its stakeholders are taken into account when studying the housing market, in particular, economic and statistical analysis. Moreover, scientists from various countries are engaged in solving systemic problems and studying the patterns of residential mobility and the changing structure of the housing market. Delft University of Technology (Netherlands), the department of Housing Systems devotes considerable attention to the study and analysis of the supply and demand of the housing sector as well as the regulation of this relation using housing policy by the government management at the national and international levels.

Professor Bolhuver's research contains the analysis of the housing policy instruments used in seven European countries - the Netherlands, Belgium, Germany, Denmark, France, England, and Sweden. According to the results of the research, the author has identified three groups of housing policy instruments: regulation, subsidies, and direct budget investments.

In the Russian Federation, the research of the forms and methods of housing regulation has been described in several works written by scientists and practitioners of the Institute for Urban Economics Foundation — N.B.Kosareva, A.S.Puzanova, T.D. Polidi, I.K. Trutneva, and others.

A significant contribution to the development of theoretical approaches to the solution of the problems of investment activity management in the housing sector was made by O.K.Meshcheryakova, V.Ya. Mishchenko, E.Yu.Okolelova, S.A. Gryaznova, L.G. Dikman, I. A. Liberman, I.A.Rakhman, V.I.Resin, I.S.Stepanov, L.M.Chistov, V.G.Shabalin and others.

With a large number of scientific approaches, the effectiveness of the implementation of the housing policy of the state can be estimated through the universal indicator "Annual volume of housing commissioning, mln sq. meters ". Figure 1 shows these dynamics.

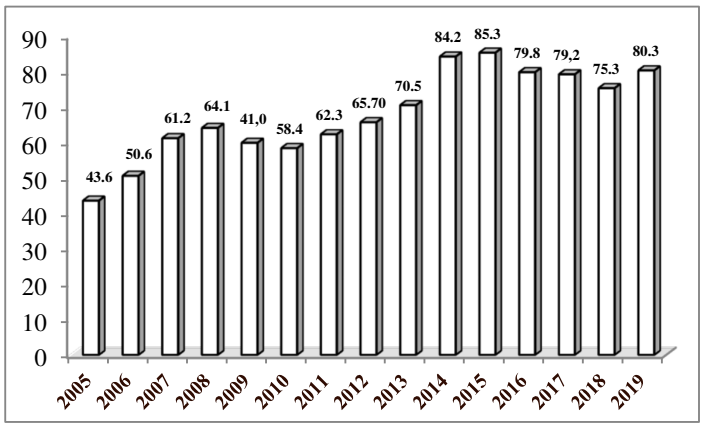

Figure 1: Residential commissioning process in the Russian Federation, mln. meters of the total residential area

The presented figure shows that the record number of square meters was put into operation in the Russian Federation in 2014-2015. In 2016-2018, the level of commissioning has annually decreased by a few percent. However, the supply on the housing market remains substantial. It is confirmed by the residential commissioning in 2019.

It is necessary to note the number of square meters that were put into operation by developers - Figure 2.

Figure 2: The volume of commissioning of apartment buildings by developers, mln sq. meters of the total residential area

According to this figure, in 2018-2021, a slowdown in the growth rate of real estate commissioning is expected due to the necessary adaptation of developers to changes in industry regulation due to the transition to the use of escrow accounts. Some projects will be delayed or reformatted due to the expected transfer of all projects to a new financing mechanism, including those that received building permits until July 1, 2018. This will lead to a redistribution of housing commissioning volumes in 2020-2021.

According to the analysis of Table 1, there is a conclusion that the difference between the square meters which were put into operation by developers and its sales has significantly increased in 2014-2016. Currently, there is a market balance between the volume of construction projects and the volume of sales. This allows predicting a decrease in the number of "problem" objects in housing construction. Additional measures are required to solve the problems associated with the imbalance in the housing market with projected volumes of residential commissioning by 2025 in the amount of 120 million square meters annually.

Table 1: The ratio of residential commissioning by developers and sales in the Russian Federation

Name of indicator (years)	2014	2015	2016	2017	2018
Sales under equity participation agreement, mln. meters	42,2	23,1	25,3	43,0	40,4
Residential commissioning by developers, mln. Sq. meters	48,0	38,9	41,7	46,2	42,4
Difference, million square meters	-5,8	-15,8	-16,4	-3,2	-2,0
Difference, %	12,1%	40,6%	39,3%	6,9%	4,7%

An increase in the demand level of citizens on the environment is a significant factor in influencing the state and development of the housing market. Perhaps this factor may complicate the activities of average developers. Today, environmental quality indicators such as safety, environmental friendliness, overall visual attractiveness, the convenience of domestic areas, the presence or even a variety of social infrastructure near the place of residence, transport accessibility of all urban areas are no longer underestimated, and its priority is not only dictated by global trends but also becomes a tangible argument in the competition of developers.

Research Questions

A strategic analysis of the state of the balanced development of the housing sector has made it possible to diagnose the following key problems:

- Low involvement of financial institutions in the housing sector;
- The growth of economic imbalances in the structure of expenditures on the production of housing goods: investing in an increase in housing assets;
- The rate of increase in the housing stock is constantly outdistancing the rate of increase in the amount of investments;
- The pace of housing construction is outdistancing the pace of providing new housing estates with social and engineering infrastructure;
- Low competition in housing construction;
- Application of unified approaches to the implementation of housing policy without taking into account its territorial differentiation based on the prospects for socio-economic, spatial and demographic development of regions, cities and other settlements.

Taking into account the above key problems, a large supply on the market and the transformation of citizens' approaches to housing choices, it is necessary to develop a system for assessing the quality

and comfort of living in new buildings and residential complexes under construction based on global quality standards adopted in the urban environment. This might allow developers and residents - potential buyers - to create approaches in housing construction that will help stabilize demand and supply as well as further development of the real estate market.

The functioning of this assessment system in the housing market of the Russian Federation will contribute to increasing market activity in terms of demand for residential real estate, as well as the formation of a healthy competitive environment among developers. Also, the functioning of this assessment system will be able to catalyze the development of advertising and marketing technologies which can positively affect regional macroeconomics.

Purpose of the Study

However, it is worth noting that the methodology is put in the first place by the development and implementation of such systems. The key efficiency factors and the basis for developing a methodology for assessing the quality and comfort of living for a balanced development of housing policy are the objectivity of the parameters and evaluation criteria, as well as the transparency of the formation and the results transmission.

Research Methods

The results of a strategic analysis of the housing sector became the basis for the development of a methodology for assessing the quality and comfort of living for a balanced development of housing policy in two areas:

• general criteria and indicators of the quality of the urban environment for all constituent entities of the Russian Federation (the urban environmental quality index that was introduced by Decree of the President of the Russian Federation No. 510 dated March 23, 2019, providing the assessment approach of cities by 36 indicators).
Indicators of the urban environment index are distributed in six areas: housing, social and business infrastructure and surrounding areas, social and leisure infrastructure and surrounding areas, green areas, embankments, street infrastructure, and citywide space, as well as environmental factors - safety, comfort, environmental friendliness, identity, and diversity, modern environment and management

Table 2: shows the assessment of specific residential complexes and surrounding areas by the levels and categories.

Level	Category	Characteristics of assessment
№ 1 «BUILDING»	«Architectural and design solutions»	• architectural aspect of the object; • architectural planning solution; • building density
	«Accessible environment»	• provision with ramps, lifts; • entrance without a barrier; • elevator equipment; • storage space for strollers
№ 2 «BUILDING - YARD»	«Security»	• fenced territory; • video control system; • security; • lighting of the yard
	«Infrastructure»	• utility rooms (basements, pantries); • built-in attached premises; • public premises
	«Improvement»	• planting • playgrounds for different age groups of children; • pedestrian paths, sports grounds,

		public areas, design objects, and small architectural forms
	«Transport»	• driving navigation; • parking; • markings and measures that impede the rapid movement on the territory of the residential complex; • implementation of the concept “yard without cars"
№ 3 «BUILDING - CITY»	«Social infrastructure»	• distance to the nearest kindergarten and school, hospital, park, square, supermarket, and other social infrastructure
	«Transport accessibility»	• distance to the nearest public transport stop; • safe road intersection; • number of public transport routes; • level of traffic flow to the object
№ 4 «BUILDING MANAGEMENT»	«Management company or homeowners partnership»	• ensuring compliance with obligations established by the contract, • organization of events for residents “Meet the neighbors” • planting events, organization of community cleanup

Findings

Thus, the proposed methodology for assessing the quality and comfort of living allows us to determine the targets and indicators for the urban environment at the global level, and for individual subsystems for rating residential complexes. The methodology is also used for improving quality levels of housing construction in general.

The advantage of this approach is to apply the set of targets, indicators, criteria, and parameters for assessing the spatial and economic development of the region. This allows studying the dynamics of indicative characteristics of various areas of housing policy in the region and diagnosing the indicators that impede the balanced development of the region by determining the direction of regional development for the long term.

The use of the digital platform of scenario planning and forecasting of the balanced development of housing construction is necessary for the successful application of this methodology. The platform simulates key indicators of quality and comfort and applies methods of regression and correlation analysis which allows obtaining various scenarios of the development of housing construction (inertial, basic and target), differentiated depending on the degree of the attainability of forecast values. Their application contributes to the adoption of certain state measures to stimulate housing construction by executive authorities in the future.

The model of such a platform implies the availability of a central processor. The processing of data, input and output subsystems and the creation of the database are applied in this processor. This model provides the creation of underlying layer of information (OpenStreetMap). The residential complexes that are in the construction or commissioning process will be graphically placed on the underlying layer. The ability to simulate the state of the housing sector will be available using specialized software and the above indicators, as well as a database of government support measures.

The software packages designed for modeling at the macro level that have been tested in developed countries of the world include the following packages: TransCad® (Caliper Corp., USA); EMME / 2

™ (Montreal University); TRIPS (MVA UK); CUBE SATURN (Leeds University, VISSUM (a component of the PTV Vision package, PTV AG, Karlsruhe, Germany).

A rather wide range of tools for modeling at the micro-level is presented on the market of simulation packages. For example, there are the packages which are widely used in European countries: AIMSUN2; DRACULA; Paramics SISTM; VISSIM.

The practical functioning of this methodology using the model involves:

- creation of a platform that combines information flows into the software on the assessment of indicators which are coming in real time with the ability of its interpretation;
- creation of a single control center with an appropriate support team and with the ability to continuously enter and update data in it, since such a system involves the dynamic change of information about an object;
- development of a subsystem for monitoring the implementation of the amendment regulations, which guarantees timely and complete processing by event operators of the assessment of the impact of state support measures.

Conclusion

This methodology for assessing the quality and comfort of living in new buildings will contribute to solving the following problems in the housing sector of the Russian Federation:

- stabilization of supply and demand in the housing market by encouraging developers to create a comfortable living environment in residential complexes and by increasing the importance of citizens' requests in the housing market;
- increasing the efficiency and competitiveness of regional developers and crowding out unscrupulous construction companies from the housing market;
- increasing the transparency of the provision of real estate services, including the provision of services of sales departments in the system of activities of developers in the construction of a residential complex;
- stimulation of management companies serving a particular housing complex to improve the quality of living during its operation focusing on the best indicators of a comfortable environment;
- balanced development of housing in the regions of the Russian Federation.

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Evaluation of The Military LOGFAS Information System Supporting the Management of Logistics in The Polish Armed Forces of The Republic of Poland As the Determinant of The Country's Military Security

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Abstract

Since Poland's accession to NATO, the Polish Armed Forces have been operationally aware that one of the determinants for improvement of the military security of the country is to have efficient and effective military logistics. From the perspective of the efficiency of the military logistics system, it is crucial to implement and operate an IT system that would support efficient management of logistic information and ensure real-time visibility of resources. The paper discusses the LOGFAS IT system supporting logistic security during national and multinational missions and operations, in the planning and implementation of logistic processes, exchange of logistic information both in the period of preparation and operation. The article also contains the results of research that represent basis for checking, verification and evaluation of LOGFAS functional units. Moreover, the directions for development and the progress of LOGFAS implementation works in the Polish Armed Forces were presented.

Keywords: Military Security, Management of The Military Logistics System, Logistic Information Systems.

Introduction

One of the basic features of ensuring the military security of the country is the ability to acquire, collect and exchange logistic information during peace, crisis and war. This has a significant impact on the end result of each measure taken: whether it be national, international, allied or coalition, military or non-military measure. In NATO, based on long-term experience of the Alliance since the 1990s, a system for the exchange of logistical information for the purposes of the alliance's military operations has been consistently built. Among other things, standards for the exchange of logistical information have been developed and implemented, covering both the transmission method and specifying the types of reports required along with their structure.

The volume of logistic data to be provided during the preparation and conduct of missions and operations is so large that it becomes necessary to implement increasingly advanced ICT solutions in order to manage it effectively. NATO has already drawn attention to this aspect of military logistics management many years ago, and therefore the relevant normative documents have been developed and a specialist IT system has been commissioned to support logistics system management in military missions and operations.

From the very beginning, Poland, as a NATO member, has committed itself to adapting its logistics system to the format supported by the LOGFAS (Logistics Functional Area Services) IT system. Its aim is to unify the information transferred and thus streamline the logistic processes in the phases of both the preparation and conduct of missions and military operations. For many years now, the Ministry of National Defence (MOD) has been building and developing an integrated multi-level IT system (ZWSI RON), and the logistics module is one of its components. In the next phase of implementation

of the LOGFAS system in the Polish Armed Forces the integration of the Integrated multi-level IT system (ZWSI RON) with LOGFAS logistics system is planned.
The subject of the research provided for in the study is a logistic IT system used in military missions and operations, including allied, coalition and national operations. Ignorance of this issue has led to the creation of a specific problematic situation, resulting in the need to carry out research on the IT system used in NATO to support the management of logistics resources and the operations of logistics units. Above all, however, it is a tool to assist the operation commander in ensuring the visibility of the resources committed under his command for operations.

The general objective of this publication, which is to examine and evaluate the LOGFAS IT system in terms of the system's capacity to reflect the planning and monitoring of resources within the individual functional subsystems of logistics, is subordinated to the problematic situation. Another objective of this article is to check the viability of implementing the system in the Armed Forces. The cognitive objective of this article is to broaden theoretically knowledge about LOGFAS system and the scope of its implementation at the Ministry of National Defence (RON).

The implementation of the objectives of the article thus defined required answers to the following research questions: what are the needs of the army in terms of safeguarding the visibility of logistic resources in terms of registering supplies and exchanging information about the logistic capacity? What capabilities does the allied IT system have to support the management of logistic resources of the armed forces? Furthermore, what functional modules does LOGFAS system have?

Due to the research problems formulated in this way, the following research methods were applied: analysis and criticism of the literature of the subject of research, examination of military instruction documents and a diagnostic survey using a surveying technique.

General characteristics of the LOGFAS IT system

The LOGFAS IT system is an allied system used during NATO missions, operations and exercises, supporting the management of logistic resources in all phases of allied operations, including within and outside Article 5 of the North Atlantic Treaty (MOD, 2017). As a basic tool for logistical planning, the system is designed, *inter alia*, for the preparation and exchange of logistic information. It mainly supports allied operations, although the Alliance makes the software available free of charge also the members of the Partnership for Peace (PfP) programme.

The use of the LOGFAS IT system is dedicated to the strategic and operational level commanders in NATO and European Union operations, including NATO Response Forces (NRF) and European Union Battle Groups (GB EU), units declared according to NATO Force Table, Polish Military Contingents (PMC) and units participating in international exercises. The users of the LOGFAS system in the Polish Armed Forces are the General Command of the Polish Armed Forces, the Operational Command of the Polish Armed Forces, the General Command of the Military Police, the Headquarters of the Inspectorate of Support for the Polish Armed Forces and the Command of the missions and operations carried out within the framework of the NATO Response Forces, the European Union Battle Groups and the Polish Military Contingents abroad (MOD, 2017, p. 27).

SI LOGFAS is a multi-unit system that takes into account the following aspects: strategic displacement planning of ADAMS forces and resources, EVE transport planning and monitoring, reception planning, deployment and onward movement of CORSOM troops, logistic reporting on the state of resources for LOGREP operations, material consumption planning and replenishment of SPM and SDM supplies and ACROSS combat assets consumption planning (MOD 2014, pp. 150-151). LOGFAS can be functionally divided into three basic module groups, with some modules being common to all module groups (LOGFAS: 2009a; 2009b; 2010, 2011; 2014a; 2014b; 2014 c):

- The group of logistic reporting system modules LOGREP (Logistic Reporting System) is a software enabling the timely transmission of reports and information and updating the database on the status of tasks in the functional areas of NATO logistics. LOGREP includes applications

used to prepare and send basic logistic reports, i.e. the Logistic Assessment Report (LOGASSESSREP) and the Logistic Update (LOGUPDATE). LOGREP consists of the following common modules: LOGBASE (Logistic Database), SPM (Sustainment Planning Module), LDM (Logistic Data Management Module), GEOMAN (Geo Manager Module) and SDM (Supply Distribution Module);

- A group of modules supporting M&T (Movement and Transportation) planning and execution processes, which includes ADAMS (Allied Deployment and Movement System), EVE (Effective Visible Execution) planning and coordination, CORSOM (Coalition Reception, Staging and Onward Movement) and shared modules: LOGBASE, SPM, LDM and GEOMAN;
- a group of modules supporting ACROSS (Allied Commands Resource Optimisation Software System) resource planning processes to support NATO strategic commanders and member states in the process of planning combat assets critical to the battlefield. ACROSS consists of the following modules: ADMEM (Air Defence Munitions Expenditure Module), AGMEM (Air to Ground Munitions Expenditure Module), LEMEMEM (Land Forces Munitions Expenditure Module), MARMEM (Maritime Munitions Expenditure Module) and LOGBASE, SPM, LDM and GEOMAN (Joint Module).

The dependencies of the individual functional modules are shown in Figure 1.

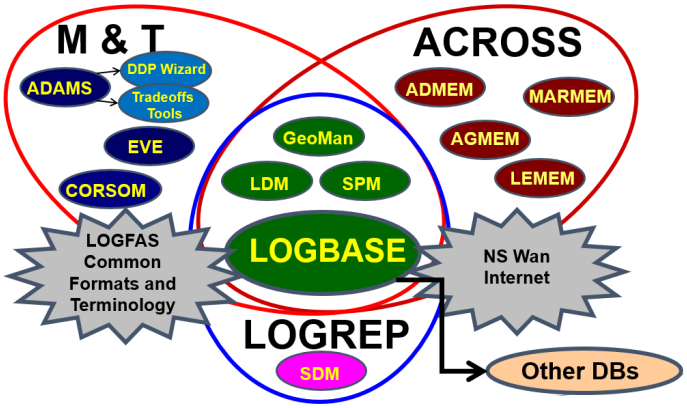

Fig. 1: Functional modules of the LOGFAS system

Identification of conditions determining implementation of the LOGFAS IT system in the Polish Armed Forces

The Polish Armed Forces, despite enormous development efforts taken to implement an IT system supporting the management of the logistics system, do not have the capacity to ensure full logistical interoperability within NATO in terms of planning and monitoring resources for operations. To this extent, in order to ensure the highest possible level of interoperability of the Polish Armed Forces within NATO, it has become necessary, *inter alia*, to fully implement the LOGFAS system in all functional areas of military logistics, which, as a technologically advanced IT system supporting resource planning and monitoring processes, will be used in allied and national missions, operations and exercises. Figure 2 shows the considerations for the implementation of LOGFAS in the Polish Armed Forces.

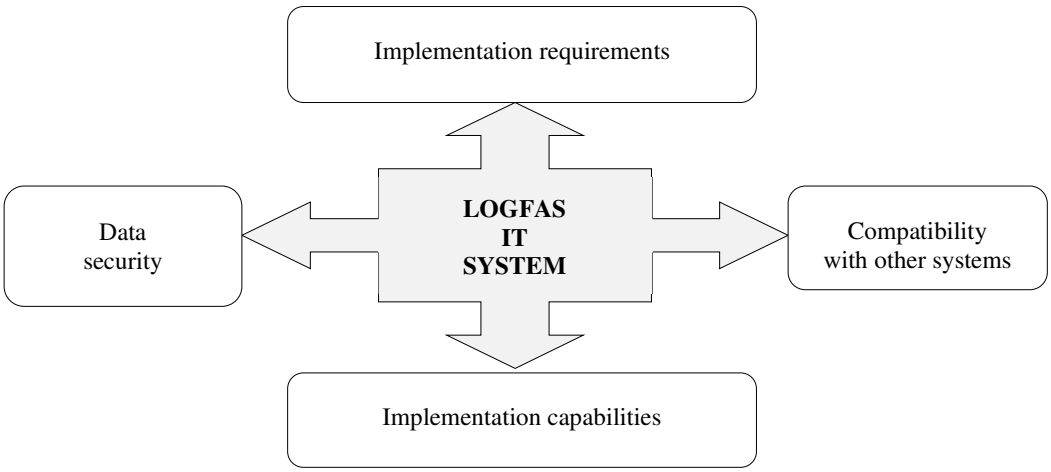

Fig. 2: Factors determining the implementation of the LOGFAS logistics planning system
Source: own analyses

Implementation requirements for the LOGFAS system in the Polish Armed Forces

In compliance with the current NATO arrangements (MOD, 2008), the security and logistic support of the allied forces in the area of operations may be implemented using the logistic options listed below: use of MILU (Multinational Integrated Logistic Units) and MIMU (Multinational Integrated Medical Units) logistics; support of forces by the National Logistics Security Systems of States participating in NSE (National Support Element) Operation; support by the Host Nation Support (HNS); support by the Logistic Lead Nation (LLN); support by the Logistic Role Specialist Nation (LRSN); support by external contractors to CSOs (Contractors Support to Operations); support by NATO agencies responsible for supporting the operations of allied forces and mutual support to States participating in the operation on the basis of international MoUs concluded.

The multiplicity and multidimensionality of allied security and logistic support necessitates to have in place a logistic resource management system capable of identifying, collecting and transferring logistic information both at the MON and NATO level. Currently, the logistic IT systems in the possession of MON do not have such capabilities. For instance, the logistic security system of the Polish Military Contingents in most cases is based on three components, using separate IT systems, i.e. the national supply system based on the integrated multi-level IT system (ZWSI RON), implemented through the NSE; multinational logistics using LOGFAS IT system; and logistics of coalition countries using national logistics systems.

Based on conclusions drawn from the carried out operations, in response to the operation commander's information gaps on the held resources, the Alliance has developed a concept (MOD, 2015b), containing a range of undertakings necessary to ensure the operation commander's adequate visibility of resources, aimed at enhancing efficiency and improving the effectiveness of logistic processes. The document formulates, *inter alia*, requirements for the national IT systems supporting automated tracking of resources allocated to operations. It is assumed that the time interval in which the operation commander should have knowledge of the assets held is the period from the transfer of assets to the operation commander in theatre of operations (assets landing area) until the assets are taken over from the operation commander (assets loading area).

The analysis of the provisions of the national doctrine document (MOD, 2015b, p. 19), a conclusion was drawn that the visibility of resources should support the operation commander in the decision-making process, ensuring that he can make optimal decisions. On the other hand, in accordance with the allied requirements, several important factors must be met. Among other things, account should be

taken of the fact that the resources earmarked for securing tactical operations are not visible in operational-level systems. Therefore, the visibility of resources at this level of command should be taken into account in the systems of the tactical level, which are operated by other IT systems supporting command and control processes at tactical levels.

The general structure of information about logistical resources (MOD, 2015b, p. 11) shows that information about resources is divided into two parts, the first one deals with the visibility of resources subject to relocation and the second one with the visibility of resources under acquisition, stored and used. In order to obtain adequate visibility of the resources being relocated, modern technologies are used, such as: GPRS (General Packet Radio Service); GSM (Global System for Mobile Communications) and GPS (Global Positioning System) satellite navigation system (MOD, 2015b, p. 13). The State, being the owner of the consignment, is responsible for collecting and processing information about the consignment in the national system, whereas information required by the operation commander is made available through the allied LOGFAS (Logistic Functional Services) IT system (Kupiec 2013, pp. 88–96). When a consignment passes through a consignment monitoring node, owned by another country, it is identified in the tracking system. The relevant information about the shipment is then made available to the country of ownership in the NATO Data Exchange Service (MOD, 2015b).

Implementation capacities for the LOGFAS IT system in the Polish Armed Forces

For the purposes of tracking the resources held by the armed forces, a concept of a national resource tracking system has been developed, which defines the assumptions, conditions and principles of operational use of the system in the Polish Armed Forces. The concept sets forth three capacity levels (MON, 2015b, p. 32): basic level - consignment monitoring; extended level - visibility of resources during relocation and full level - total visibility of resources. In accordance with the adopted implementation schedule for the national resource tracking system, it is necessary, in the first place, to ensure the ability to monitor consignments in the territory of Poland and consignments directed to (from) the Polish military contingents (PKW) (Nyszk, 2009; Kurasiński, Pawlisiak, 2013), as well as providing the allied forces, staying in the territory of Poland, with an option of monitoring their consignments.

In the longer term, the National Asset Tracking System will be expanded to enhance its usefulness and to ensure the visibility (MON, 2012), including the ability to track consignments and to integrate the control of relocation of personnel and resources deployed for operations outside national borders, while making available the information required to provide Common Operational Picture (COP).

The system safeguarding the visibility of military resources, improving decision-making processes and the management of logistic processes, should be assessed through the prism of having the ability to: unambiguously marking and identifying resources; collecting and processing information about resources in the national system; making available information about resources relocated, acquired, stored and used in the allied LOGFAS system; automatic identification and tracking identifiers, in accordance with the relevant NATO standardisation agreements; making available in the NATO data exchange service information about other countries' consignments passing through their own consignment monitoring nodes.

In the area of compatibility with the LOGFAS logistics IT system, the national integrated multi-level logistics system (ZWSI RON) is to achieve and ensure the capability of importing data from the national database into the logistics modules of the automated command system interoperable with LOGFAS and IT support for the planning and management of logistics capabilities for NATO (MOD, 2017). To sum up, as far as monitoring the movement of their resources is concerned, the Polish Armed Forces have not yet attained the capacity to track them. Work is currently underway to achieve a minimum traceability of resources, i.e. tracking of consignments.

The functionality of LOGFAS IT system is based on the design of databases with resources and tasks performed by armed forces and means in their geographical arrangement. This applies to the stocks of supplies, equipment, material and technical supplies. It describes the consumption rate depending on the type of operation and the terrain and climate conditions in which the operation will be carried out. For the purposes of LOGFAS IT system, databases are created with data on the size of resources and their location. In addition, the system can be used to assess to what extent needs for required supplies for task implementation under different scenarios for operations or military exercises are being secured have been secured.

The system has the ability to carry out the calculation of the forecast consumption of supplies, using Consumption Rates (CR) and manoeuvring and tactical factors (MF - Modification Factors). For the automatic identification of resources, the LOGFAS IT system uses a uniform data format and uniform methods for the identification, description and classification of military equipment used in an allied operation by means of the Reportable Item Code (RIC). The system also enables the import and export of data and uniform procedures for managing the LOGBASE database (LOGFAS 2011).

A breakthrough for the implementation of LOGFAS IT system for operation in the Polish Armed Forces was the signing of an agreement on the LOGFAS software by the Polish side in 2016. Under this agreement, the Polish Armed Forces may make full use of FAS software and support from the NATO Communication and Information Agency (NCIA), in the field of user training at LOGFAS courses at the NATO School of Communication and Information Technology in Oeiras (Portugal). Under the above-mentioned agreement, since 2019, Polish representatives have also participated in training courses at the NATO Academy in Portugal.

In adherence to the allied obligations assumed by Poland, many components of the LOGFAS logistics IT system have been implemented in the Polish Armed Forces over a span of consecutive years. The milestones and scope of implementation of LOGFAS IT system at MOD are presented in Table 1.

Table 1: Implementation milestones of LOGFAS IT system in the Polish Armed Forces

Item	Objective of Polish Armed Forces	Edition	Name of project
1.	Armed Forces Objective TG 4149	1,998	Implementation of NATO logistic reporting system
2.	Armed Forces Objective EG 4051	2,000	Implementation of NATO's logistic reporting system for automatic processing of logistic data
3.	Armed Forces Objective EG 4100	2,000	Ensure coordination of the transport and relocation system of the Polish Armed Forces with the NATO system by integrating the National Centre for Coordination of Military Movement (CKRW) with the ADAMS system
4.	Armed Forces Objective EG 4100	2,002	Ensuring coordination of transport and relocation of troops between the Polish Armed Forces and NATO
5.	Armed Forces Objective EG 4051	2,002	Application of automatic processing of logistic data of the Polish Armed Forces by establishing a connection for the logistic reporting system with the NATO's LOGFAS IT System
6.	Armed Forces Objective EG 4051	2,004	Providing secure links for automatic data processing between national and NATO-based logistic IT systems
7.	Armed Forces Objective EG 4051	2,006	Providing secure links for automatic data processing between national and NATO-based logistic IT systems

Item	Objective of Polish Armed Forces	Edition	Name of project
8.	Armed Forces Objective EG 2860	2,008	Implementation of network centric IT systems
9.	Armed Forces Objective EG 5023	2,013	Implementation of static networks for LOGFAS IT system in the Polish Armed Forces
10.	Armed Forces Objective EG 5301	2017	Development of communication and logistic information access systems for the LOGFAS IT system in the Polish Armed Forces

Source: Own compilation on the basis of (MOD, 2017, p. 23).

The analysis of source documents (MOD 2017, p. 25) shows that the basic undertakings carried out over twenty years of presence in NATO, MOD during that time included the implementation of NATO normative documents, the launch of a system of training of LOGFAS system operators in the country and the participation of representatives of the Polish Armed Forces in foreign courses. Moreover, it was extremely important from the perspective of IT architecture development for the purposes of LOGFAS IT system to establish ICT links for the exchange of logistic information, to ensure secure data processing through the preparation of the national ICT platform called PMN (Polish Misssion Network) platform, which provides support for the command process during missions and operations on the territory of the country and abroad, including launching a reporting system between the relevant units of the Polish Armed Forces and components separated within the NATO Response Forces.

In the Military University of Technology, as part of the training of LOGFAS system operators, almost 600 soldiers were trained during LOGFAS courses in 2001-2019 to operate the LOGREP module (logistical reporting system) and to operate LOGFAS software modules. Moreover, at the Logistics Training Centre of the Polish Armed Forces of the Republic of Poland, almost 400 soldiers were trained in LOGREP logistic planning and reporting and management of logistic resources using the LOGFAS IT system. (MOD 2017, p. 27).

In addition to the above mentioned undertakings, to implement the LOGFAS IT system in the Polish Armed Forces MOD is obliged to cooperate in the implementation of allied tasks. In the international environment, inter alia, a database (LOGBASE) is maintained and updated, and in the reporting module (LOGREP) update reports (LOGUPDATE) are generated together with reports on planned consumption and recovery of supplies (SPM) for the needs of the forces and resources allocated from the Polish Armed Forces to the NATO Response Forces.

Furthermore, during the preparation of international exercises, the National Centre for the Coordination of Military Movement (NCKRW) prepares a National Detailed Deployment Plan (NDDP) each time in the ADAMS module. On the basis of the NDDP Plan, sent by individual states to the allied Centre for the Coordination of Military Movement within the framework of information exchange, a single relocation plan is created, the so-called Multinational Detailed Deployment Plan (MNDDP) (MOD, 2017, p. 26).

Another example of MOD's implementation of the LOGFAS IT system is the EVE (visibility of means of transport) and CORSOM (planning the acceptance, centring and onward movement of troops) modules, used by Polish Military Contingent in Afghanistan to illustrate the movement of troops in the framework of the reduction of NATO forces in ISAF operation. At the same time, one of the tasks resulting from Poland's accession to NATO was the use of the module for planning warfare agents (ACROSS) and the calculation of stock levels for forces declared to NATO. In this area of information exchange, since March 1999, the representatives of the Ministry of Defence have participated in projects related to planning the stockpile of warfare agents of NATO countries. The results of the calculations were included in the Defence Planning Questionnaire (2008 edition). In this manner, the

NATO standards for calculating the stockpile of warfare agents for forces declared to NATO have been achieved. Currently, ACROSS is maintained by NATO's Communications and IT Agency (MON, 2017) due to lack of development needs.

Checking, verification and evaluation of the LOGFAS IT system based on survey results

Due to the issues raised and the methodology adopted in the study, it was decided to obtain data by means of a diagnostic survey carried out by means of a survey technique. The survey covered the trainees attending the LOGFAS IT system training course. The survey was run and the Military University of Technology in two forms: one was carried out during training course and the other one was carried out in the population of cadets as part of the teaching process. The survey was attended by 80 respondents, of which 85% were men (68 people) and 15% women (12 people). According to the division into age groups, most people (68.8%) were under 25 years of age. Fig. 3 shows a breakdown of respondents by gender and age.

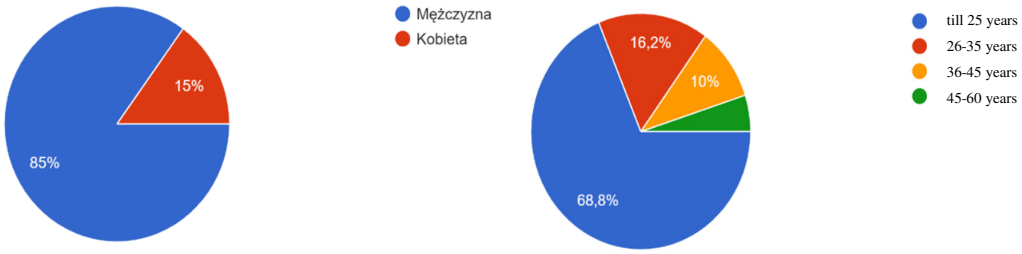

Fig. 3: Breakdown of respondents by gender and age

Source: own analyses.

More than 87% of those surveyed serve in the land forces (Question 17). The most numerous functional division among the respondents (Question 18) were cadets (33.8%), soldiers of the staff division (17.5%), support (13.8%) and commanding officers (10%). According to the breakdown of the respondents into the personnel corps (Question 19), the vast majority (92.5%) were soldiers of the communications and IT troops. According to the breakdown by time in the occupied position (Question 20), the respondents mostly worked for one to three years (77.5%) and below one year (12.5%).

Figure 4 shows a breakdown of respondents by the place where they became familiar with the LOGFAS IT system.

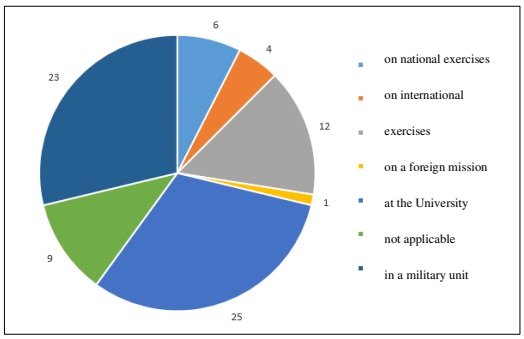

Fig. 4: Breakdown of the respondents by the place of getting familiar with the LOGFAS IT system

Source: own analyses.

The graph in Figure 3 shows that military units and universities are the main contact points with the LOGFAS IT system. Apart from the 12 category-specific questions concerning the surveyed population, the survey also defined 12 subject matter questions. They are presented in Table 2.

Table 2: Specification of subject matter questions concerning the evaluation of the LOGFAS IT system

Question No.	Question	Expanded question
1.	Please evaluate the impact of LOGFAS IT System on the quality of logistic information management at the Ministry of Defence (MOD).	Is it going to have positive impact on the improvement of logistic information management in the armed forces.
2.	Please evaluate LOGFAS IT System's capability to safeguard data security the LOGFAS IT System.	It is concerned with database protection, availability of system resources, network, shared information, certificates, etc.).
3.	Please evaluate the user-friendliness of data entry into the LOGFAS IT System.	Does the LOGFAS IT System have sufficient and clear instructions and manuals for operating and entering data into the system?
4.	Please make an overall assessment of the LOGFAS IT System.	Assessments of the degree of usefulness of the LOGFAS IT System in managing logistic information in the armed forces?
5.	Please evaluate the reliability of the LOGFAS IT System.	Is the System characterized by high failure rate? Does the system allow for assistance with regard to reported errors?
6.	Please evaluate the performance of LOGFAS IT System.	Refers to the response time of the system to an entered command, data transfer, labour consumption by data entry and validation).
7.	Please evaluate the usefulness of the LOGFAS IT system.	It refers to ease of use, ease of navigation in the system, speed of switching to other options, comprehensibility of entered data, etc.
8.	Please evaluate the functionality of the LOGFAS IT system.	Are all real subsystems and functional areas of military logistics represented in the system?
9.	Please evaluate the simplicity of the LOGFAS IT system.	It refers to ability of using the system after a short training, on-the-job training.
10.	Please evaluate the integrity of the LOGFAS IT System.	It refers to an option of eliminating the resultant data entry errors.
11.	Please evaluate the flexibility of the LOGFAS IT System.	It refers to the capability of automatic transformation of the entered data from a tabular form into another one - visualization, graphs, map display, etc.
12.	Please evaluate the interaction of the LOGFAS IT System.	It refers to an option of interaction and data exchange with other national IT systems.

Source: own analyses.

The survey form was developed using closed and semi-open questions. The first type is characterized by the fact that the respondent made the right choice from specified answers. The questions are aimed at answering the questions concerning the main issues covered by the survey. In addition, some of them have been supplemented with an option of own response of the respondent. Such questions have an option of presenting own evaluations, owing to no possibility to list all possible solutions. It was decided to develop design survey form in such way owing to the complexity of the surveyed issues. It was not possible to create an easy to understand form containing all possible options at once. Thanks to such design, the survey is universal by nature and each respondent could be treated individually. The

intention of such design of survey form was to obtain information on the evaluation of the implementation and operation of the LOGFAS IT System used at the MOD.

The answers presented in the figure (Fig. 5) show that the respondents evaluate positively the implementation of the system and its impact on the management of logistic information (45% YES, 40% RATHER YES).

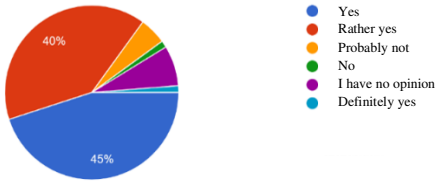

Fig. 5: Evaluation of the impact of the implementation of the LOGFAS IT system on the management of logistic information in the armed forces.
Source: own analyses

Another surveyed area was the search for an answer to the question whether the system has adequate capacity to ensure data security (Figure 6).

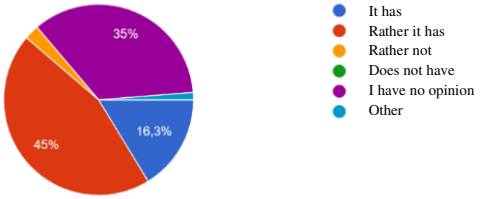

Fig. 6: Evaluation of the LOGFAS IT System capacity to ensure data security
Source: own analyses.

The analysis of the respondents' answers contained in the question in Figure 5, a high percentage of "I don't have an opinion" answers is noted. (35%), which indicates low knowledge about the subject, although the system operates in the "Milnet-Z" classified network. The next question was about the suitability of the system for managing logistic information at the MOD (Fig. 7).

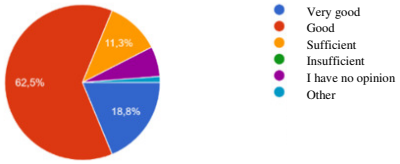

Fig. 7: Overall evaluation of the usefulness of the LOGFAS IT System in the armed forces
Source: own analyses.

The survey showed that more than 81% of the respondents evaluated positively the usefulness of the LOGFAS IT System in the management of logistic information in the armed forces, which is evidence of supporting MOD initiatives in the implementation of information technology, integrating to a large extent the logistic activities of the armed forces. The System functionality was evaluated at a similar manner (Fig. 8).

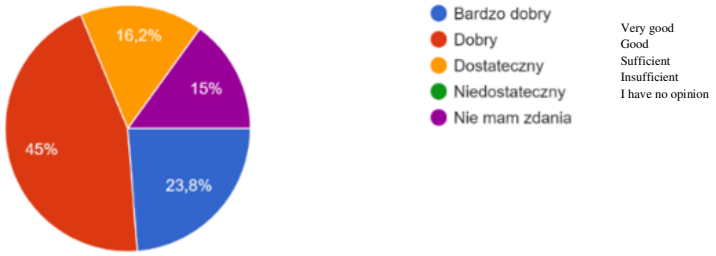

Fig. 8: Evaluation of functionality of the LOGFAS IT System in the armed forces.
Source: own analyses

Analysing the survey findings in the evaluation of other aspects of the System's usefulness, one can also see a high percentage of negative answers (sufficient/not enough/not relevant) to the remaining questions, especially those concerning the area of reliability (50%), efficiency (47%), usability (45%), simplicity (54%), integrity (45%) and the System's capability of interacting with other systems implemented at the MOD (53%).

Negative aspects shown by the analysis of respondents' responses to the LOGFAS IT System evaluation

The majority of respondents evaluated positively the MOD decision to implement in the Polish Armed Forces an allied system of logistic planning of missions and operations, not only NATO, but above all the full implementation of the System in the Polish environment. Among the answers to closed questions, the survey form offered an option of making free statements and presenting evaluations in answers to open questions. The respondents most often paid attention to the following aspects:

1. The number of trained operators at different levels of command is not high enough.
2. Databases are saved to a file on a hard drive, which is accessible to everyone using a certain workstation.
3. There is a lack of consistency and uniform procedures in the development of databases and profiles (sons, databases for a uniform training background).
4. The main problem is the difficulty in software upgrade to higher versions and RIC updates.
5. There are a lot of errors at this stage and often the data export writes are not compatible even though the software version and RIC are the same.
6. The compulsory application of capital letters makes it difficult to enter data such as units' abbreviations.
7. The correctness of data entry is determined by details that may be overlooked easily.
8. Unclear reporting procedures (including reports in the reporting system during the exercises, for example the logistic LOGASSESREP report).
9. The basic activities can be done after a brief instruction, but calculations and other more complex activities require constant practice.
10. The software is not intuitive, the trained person in the short term is not able to cope with all the capabilities offered by the software.
11. The format of the exported profiles (xml) could be more transparent so that data could be freely entered by e.g. using a MS Excel spreadsheet.

Of course, it is impossible to disagree with the above evaluations, bearing in mind the necessity of entering into the LOGBASE database of the LOGFAS system all resources held by the Polish armed forces. According to the entries in the allied documents, this is the responsibility of each NATO Member State, and this requires higher resources for data entry, which means that the number of people trained to use the LOGFAS IT system has to be enhanced.

ICT systems used for information exchange in the LOGFAS IT system

The analysis of the normative document (MOD, 2013a) shows that the communication between the LOGFAS system components is based on the classified ICT system of the MOD (MILNET-Z) and the classified NATO office workflow automation network in Poland (PMN). The hardware and software resources that make the LOGFAS IT system comprise (MOD, 2017):

- ST MILNET-Z servers (virtual instances separated from hardware resources of the servers of the IT Inspectorate working in the MILNET-Z ICT system);
- ST MILNET-Z client stations (workstations of the MILNET-Z ICT system selected for software installation);
- NOAN national network client station (PL_NS NOAN system workstation, selected for software installation, i.e. PL_NS NOAN terminal installed in IWsp SZ);
- LOGFAS server software and client software installed at workstations.

According to the MOD decisions, the LOGFAS IT System operates in the MILET-Z and PL_NS NOAN networks, as well as in the PMN (Polish Mission NATO) network in land forces. The PL_NS NOAN IT network shall be designed for the processing, storage and transmission of information up to and including the "Secret" classification clause. The LOGFAS IT system operates on the basis of a central database in the ST MILNET-Z ICT system, administered by the Head of Logistics Planning of the Inspectorate of Support for the Polish Armed Forces (SPL IWsp SZ). The central NATO database is located at the NATO SHAPE headquarters and is fed by XML files via e-mail in the PL_NS NOAN network (MOD, 2017).

Access to the database (LOGBASE) of the LOGFAS system is via MILNET-Z using a remote connection (client-server), which can be established from any place in the country, after obtaining the appropriate access authorisations. Access to the PL_NS NOAN network is possible under the conditions specified in the system security documentation.

The information exchange through the LOGFAS module in the alliance system is shown in Figure 9.

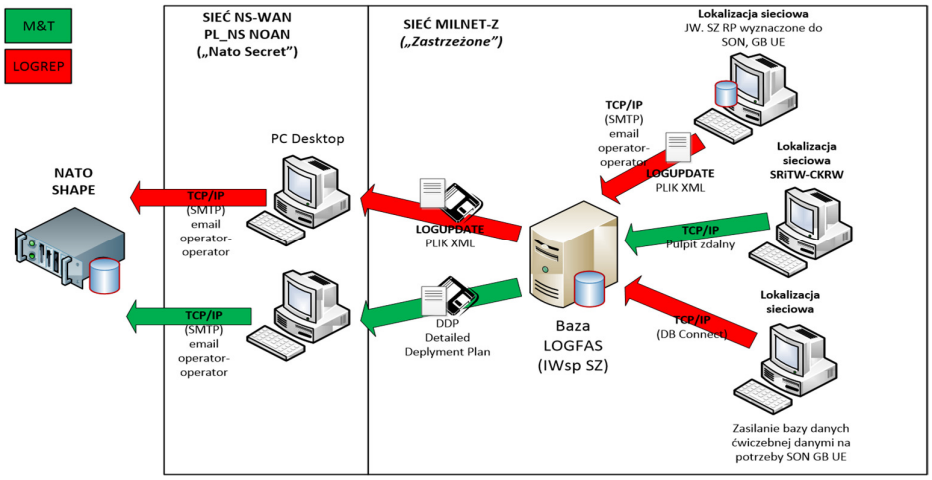

Fig. 9: Exchange of logistic information through the LOGFAS module in the allied system
Source: Own compilation on the basis of (MOD, 2017, p. 37).

Data transfer in the LOGFAS IT system takes place in three ways:

- client (user) - server (remote link to the database);
- by means of a communication protocol controlling data transfer using e-mail services;

- manually, via data carriers such as USB memory stick or CD-ROM.

Meanwhile data exchange in the LOGFAS IT System takes place in two ways:

- Data files generated on the local PC are transferred manually from the local LOGFAS database;
- direct data input using a local PC, which serves as a connection terminal with the LOGFAS database located on the server.

The exchange of information in the LOGFAS IT system for national system operations is shown in Figure 10.

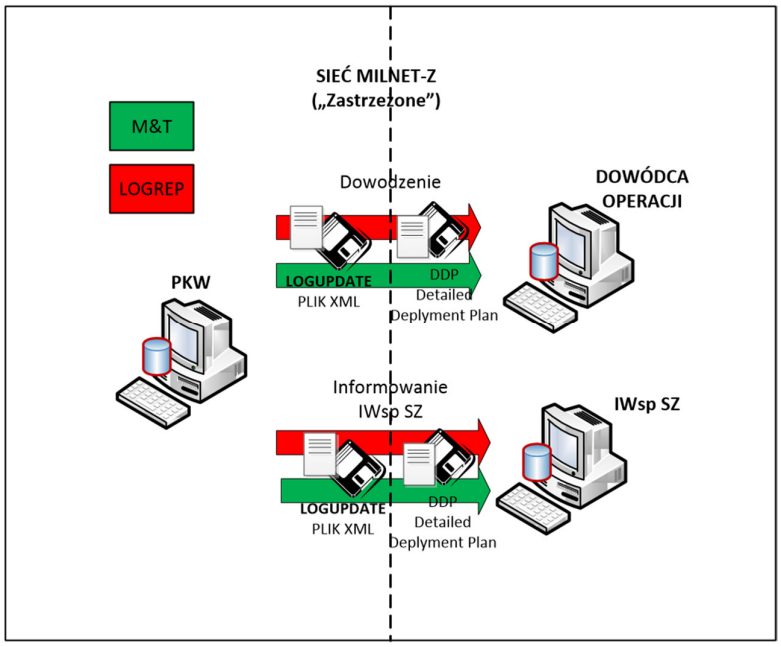

Fig. 10: Exchange of logistic information in the LOGFAS IT System for operations

Source: Own compilation on the basis of (MOD, 2017, p. 38).

The presented diagram shows that in the case of the Polish Military Contingents' mission, the LOGFAS IT system operates on the basis of a local database in the MILNET-Z ICT system, administered by the Polish Military Contingents. Local databases of particular PKW elements are supplied by XML files using MILNET-Z network e-mail. For the needs of the PKW Afghanistan in 2012-2015 the WEN (White Eagle Network) was developed in the area of operations and in Poland as an extension of the NATO AMN (Afghanistan Mission Network) coalition network, which was the first national ICT network capable of processing NATO classified information in the coalition system.

LOGFAS as a tool to achieve interoperability of the Polish Armed Forces in operations

The concept of developing logistic chain management in NATO military operations assumes a parallel process of improving the current logistic chain under the direction of the Allied Command Operations (ACO) and building from scratch new operational logistic chain management capabilities by the Allied Command Transformation (ACT). The assumption of both directions of work is to reach a common concept of Operations Logistics Chain Management (OLCM) providing an integrated view of the logistics situation in the Common Operational Picture. The work is scheduled for completion in 2019 (MON, 2017).

Currently the NATO experts are working on the preparation and development of a new logistics information environment LOG FS (Logistics Functional Services), which will replace the existing LOGFAS system. To this extent, it is necessary to take a number of measures that would provide the

LOG FS with the functionality needed to command and direct all logistic components in allied operations, including in particular the provision of logistic information to the Common Operational Picture. Through delivery of this function, the LOG FS system will reach full operational capability. Through the implement ion of the LOG FS system, the Alliance seeks to optimise the utilisation of existing resources. For this purpose, for instance, the LOGFAS system tools must be equipped with additional functions, including those that meet operational requirements not currently supported. This should improve overall integration, ensure interoperable solutions using new technologies and improve the life cycle of resources, in particular through elimination of duplication and centralisation of shared functions.

It follows from the assumptions developed (MOD 2017) that the new LOG FS environment will be developed on the basis of Logistics Intelligence and Support Services (LOGBIDS), as part of an agreed capability packet. At the same time, NATO is carrying out a comprehensive review of the Alliance's capability packets and projects to determine their importance in the current security environment and their relevance to the new NATO defence planning process. This will allow for a gradual allocation of resources and ensure a pragmatic approach to their implementation.

Data exchange concept between the Integrated Multi-Level National logistics system (ZWSI RON) and the Alliance's LOGFAS IT system

In order to ensure fast and flawless data update in LOGFAS system at the national and, consequently, allied levels, dedicated interfaces for data acquisition from the RON Integrated Multi-level IT system (ZWSI RON) are planned to be developed. Figure 11 shows a diagram of transferring information about logistic resources to the central LOGFAS database by a dedicated ZWSI RON module.

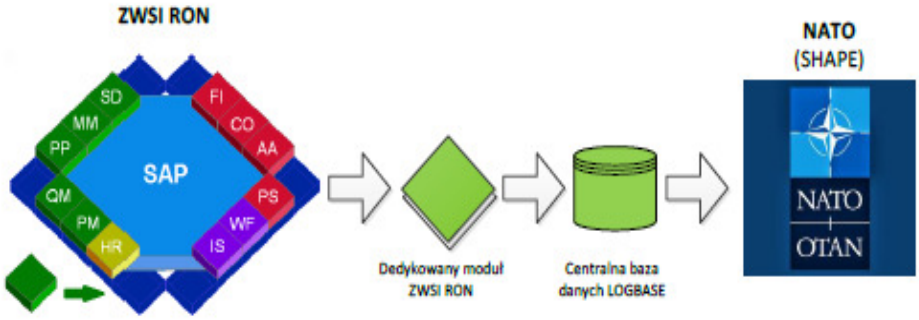

Fig. 11: Logistical data exchange between ZWSI RON and LOGFAS systems

Source: Own compilation on the basis of (MOD, 2017, p. 37).

It follows from the diagram presented hereinabove that a separate module is to be set up in the Integrated Multi-Level ZWSI RON system for the exchange of information with the LOGFAS IT system, that will be used to transfer data from the ZWSI RON system to the central database (LOGBASE) of the LOGFAS IT system. This will allow to feed the LOGFAS system on an ongoing basis with MOD's logistic resources data in order to use it for the purposes of the Polish Military Contingents separated from the Polish Armed Forces to participate in a military operation.

The ZWSI RON system is assumed to feed the LOGFAS system with the following data:

- concerning the National Identity Number (NIC) and the Uniform Material Index (JIM) assigned in the LOGFAS modules to the appropriate NATO's reporting code (RIC);
- concerning military equipment (tactical and technical data);
- about the stock of supplies in the subdivision (their echelons and classification);

- describing the status of equipment concerning its working order (category, place of operation or repair, availability for use, allocation to a military unit).

Discussions and Conclusions

In order to enhance the national military security, the Polish Armed Forces are part of the allied trend of creating multinational logistics security management centres in combined operations. Consequently, there is an urgent need to prepare national logistics authorities for cooperation with such centres. It is assessed that the coordination of logistical tasks and services in an operation requires the logistic governance bodies at both tactical (component headquarters) and operational (operation headquarters) levels to be equipped with IT systems enabling them to: have visibility of logistic resources, exchange of information and enter into logistic interaction with the military components of other States participating in the operation.

The concept based on the integration of multinational logistics in NATO missions and operations requires that the logistic security processes be covered by a uniform management system. The enormous amount of resources to be delivered to the troops under a multinational operation leads to the conclusion that the planning methods must be harmonised within the framework of allied logistics. The aim of these operations is to enable the NATO Commander to provide the most complete data on logistic resources at this disposal.

NATO strives at designing logistic capabilities in operations so as to reduce the level of duplication of national resources committed to the operations, to simplify and streamline the flow of logistic information, and to ensure the visibility of resources to meet operational requirements. This requires logistic support for missions and operations in terms of timeliness and accuracy of logistic information, which will allow to have larger influence on the implementation of logistic support. The Allied or Coalition Operation Commander and the National Component Commanders participating in the operation must receive such information as soon as possible and be kept updated on developments in the theatre of military operations. Their aim is to ensure the proper exercise of their powers to coordinate and prioritise logistic support.

In the Polish Armed Forces, a wide range of tasks to support and secure missions and operations, faced by the military logistic authorities cannot be properly and effectively implemented without an IT system supporting the management of military logistics. The analysis of the experience of participation in missions and operations outside the country allows to conclude that during the preparation and carrying out of operations it is necessary to use an effective and flexible tool supporting the management of logistic resources in each phase of the operation. In the Alliance such a role is performed successfully by the functional modules of the LOGFAS system, which provide the operation commander with full, accurate and current logistic information about the possessed resources, presented in the form of the so called Logistic and Operational Situation Pictures.

The evaluations collected in the article allow us to state Poland's accession to NATO was followed by an increase in interest of the Ministry of Defence management in the issues of computerization of military logistics. The studies carried out confirmed that the experience gained in order to transform the Polish Armed Forces into a fully professional army, prompted the Ministry of Defence to change its approach to computerization of military logistics, in relation to the support of logistic processes with modern information and communication technologies (ICT).

The analyses presented in the article indicate that the essence of the implementation of the LOGFAS IT system in the Polish Armed Forces is as follows:

- to gain an advantage in accessing logistic information during operations;
- to improve the management of military logistics during operations;
- to have real time information about logistic resources, their quantity and location;
- to ensure coherence between national and allied IT logistics systems;

- to ensure the integration and security of the flow of logistic information in a national and multinational operation;
- to manage logistic resources within the national integrated IT system, operating in a network-centric environment, compatible with the allied logistics systems;
- to enable the identification, collection and transfer of information about logistical resources and the tracking of their movements to ensure the visibility of the operation commander's resources.

As of 2020 the weaknesses of the RON IT system supporting the management of the logistics support system of the Polish Armed Forces are as follows:

- The Polish Armed Forces do not have a departmental IT system supporting the implementation of logistic processes in national missions and operations in terms of logistic planning in the period of operation preparation, monitoring of logistic resources allocated to the operation and exchange of information during the operation;
- operational IT systems supporting the management of logistics of the Polish Armed Forces' during peacetime do not satisfy the needs of IT logistics subsystems in all areas of logistic support during the period of preparation and conduct of operations; the first IT system - under a code name of ZWSI RON is an inventory system, which is only used in military budget units; the second IT system under a code name of KONWÓJ is an ICT system for monitoring the position of troops, used by the authorities of troops transport and movement for the purpose of developing and issuing permits for travel and current monitoring of movement of dangerous vehicles, oversized vehicles and columns carried out by the Ministry of Defence;
- no option to exchange logistical information in an automated command and control support systems in the national operations in accordance with NATO standards; in the land component headquarters the command and control support systems (C2 Wierzba system) and special (C2 Spartan system) are in the process of being acquired, whereas the maritime (C2 MCCIS Łeba) and air component headquarters (ICC) do not have the capacity to exchange information not only with the LOGAS IT system, but even with Integrated, Multi-Level IT System (ZWSI RON).

To sum up, the basic directions of implementation and development of the LOGFAS IT system should take into account the use of the latest technologies in the field of ICT equipment, software, networks, servers and ensure security of logistic information flows. To conclude, the full implementation of the LOGFAS IT system, which belongs to the most advanced class of IT systems, on subject matter and technological grounds, supporting the process of logistics management, will enable the Polish Armed Forces to optimize the processes in both multinational and national missions, operations and military exercises.

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Safety Culture of Citizens in Selected Eu Regions and Ways to Deal with The Covid-19 Pandemic

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Abstract

Based on the current systemically related results and experiences collected during the covid-19 pandemic in several cities in different EU countries, the author of analyzes of situation analyzes and behavioral analyzes, actions and interactions of various functions and limitations struggling with the covid-19 pandemic. The composition is characterized by the cultural impact on the effectiveness, efficiency and effectiveness of coping with this challenge by individuals, relationships and institutions. In analyzing problems that arise then, we use organizational and safety models of the organization, developed, perfected and used by the author and his team for almost twenty decades. These models, as research tools, were available, among others in national empirical research at the beginning of the second decade of the 21st century. Research and analysis of clear relationships between safety and culture analyzes, administrative organizations of local administration, services and "ordinary" bodies with the efficiency and effectiveness of several cities and counties in crisis situations. In the author's letter, he justified the thesis that cultural conditions, and specifically - the level and nature of safety culture and organizational cultures, covering various types of risk and legal - in terms of overall impact on the effectiveness of dealing with crisis situations, as well as all, such as the coronovirus pandemic. Joint research and teaching practice includes that a safety culture can be improved.

Keywords: Pandemic, Transdisciplinary Studies, Safety Culture.

Introduction

Pandemic covid-19 is a fact, but also a process with unpredictable consequences and timescale. It is also a relatively poorly recognised phenomenon, which most countries and societies did not manage satisfactorily in March 2020. This pandemic is difficult to compare with other similar phenomena in human history. This difficulty stems not only from the specific properties of coronavirus, but also from the character of the hitherto existing globalised and “pursued” world, and in it “pursued” people. The eloquent title of the work of the Polish Nobel Prize winner, Olga Tokarczuk, "Bieguni" (Warsaw 2019), signals this problem in a convincing way. The protagonists of her book, the title “Bieguni”, were aware of the importance of such values in human life as the ability to reflect (Giddens, 2002), knowledge and **wisdom**. However, the latter value in the 21st century seems to be covered with patina and maybe even “dust of forgottenness”. For many people undertaking higher education, the main goal was often a diploma or certificate, not wisdom. The question remains open whether this value as an objective can be found in the curricula and syllabuses of lecturers, as well as the question whether a "virus", marked with the 3Z symbol (Chuck, Pass, Forget it. [pol. Zakuj, Zdaj Zapomnij]) has nested in some university. However, the extent of its occurrence and the damage it does vary. This is because the destructive effects of this "virus" reveal themselves only after years, and especially when they meet their twin "brother", e.g. the coronavirus.

The education crisis has been discussed in the world for a long time. The Club of Rome reports and the resulting recommendations remained largely theoretical. This has been clearly demonstrated by the covid pandemic19 and the recent financial and economic crisis, as well as by the highly controversial discussions about climate change, its causes and effects. Without going into details about e.g. economic education, the advantages and disadvantages of which can be seen almost every

day, in this article I would like to deal with a wider type of Human competencies, which is his safety culture. The importance of these competencies was realized only after the catastrophe of the Chernobyl nuclear reactor on the territory of the former Soviet Union, which was tragic in its far-reaching consequences. However, for many years the knowledge about the essence and significance of the safety culture and the functions it performs has hardly "penetrated" the social consciousness. Despite this, a group of scientists, also in Poland, continued their research by presenting their results in scientific publications (Pidgeon, 1991, 1998; Carnini, Weiman, 1995; Studenski, 2000; Cieślarczyk, 2001, 2006, 2011, 2019, Filipek, 2007, 2013, 2017; Sadłowska-Wrzesińska, 2018 and others). It is optimistic that in recent years there has been a clear increase in interest in safety culture, especially among young people.

This article attempts to explain the importance of a safety culture for *the persistence, survival and development* of physical and legal entities experiencing various types of crisis situations in connection with the covid -19 pandemic. The basic question is *whether the experience to date of scientific diagnosis and improvement of the safety culture of physical and legal entities can be useful during a coronavirus pandemic, but also after its expiry*?

To begin with, a Few Facts and Related Phenomena

While this article was under development, i.e. in the second half of March 2020, the covid-19 pandemic was spreading dynamically in the world. Only in China, where the first outbreak was detected a few weeks ago, in the third decade of March there was no increase in the disease. The greatest dynamics of the disease was in Europe at that time. The following section shows the increase in the number of cases and deaths in several major European countries.

Let's start with Italy, which was most affected by the pandemic in March. For example, within four days 21-24 March, the number of illnesses in this country increased from 47,021 to over 60 thousand and the number of deaths increased from 4,032 to over 6,800. In Lombardy, over 400 infected people died in just one day. In the following days of March these numbers grew exponentially. At the end of the month, official announcements said that around 1,000 infected people in Italy lost their lives during the day...

Spain was also in a difficult situation. In the analogous period of 21-24.03. the number of coronovirus cases increased from 21,571 to 39,700 people and the number of deaths from 1,093 to 2,696. Also in France at that time the number of cases increased from 12,612 to 22,000 and the number of deaths from 562 to 1,100. In Germany at that time, there was an increase in the number of infections from 19,848 to about 35,000 and the number of deaths increased from 68 to 206.

Due to the high dynamics of changes in the situation, the above data should be treated as indicative. When analysing them, it is also worth remembering that the timing of detection of the first infections and the rate of their spread varied from country to country. Already at this point, one conclusion seems quite obvious. In similar situations to these, the skills to manage space-time and the associated risk are difficult to overestimate. Individual cultures attach different importance to this type of human competence. This is an important part of the organizational and safety culture. Also, individual and institutional decisions and the associated behaviour, actions and interaction of physical and legal entities differed considerably from one country to another.

Let's stop with the situation in Italy and its conditionality. According to Dr Piotr Podemski, an Italianist from the University of Warsaw, from the very beginning a long list of mistakes was made in Italy, which contributed to the rapid spread of the disease. The first case of Covid-19 infection in this country was officially confirmed on the 20th of February in the town of Codogno in Lombardy. According to this scientist, the doctors of Codogno have been wondering for quite a long time that there has been a mysterious increase in the number of cases of strange, persistent pneumonia, which could not be treated with anything. There were more

and more patients, some were dying, but most of them were elderly people. The illnesses and deaths were thus explained by age and the co-occurrence of other diseases. Infected persons were basically not isolated. They've spread out all over northern Italy. As the situation became more serious, the country began to introduce closed or restricted zones. However, the restrictions did not help, and the coronavirus continued to take its toll. Among those who died in Italy, women infected with coronavirus were half as many as men, as reported by the National Health Institute. The situation is becoming more and more difficult in hospitals in Italian Lombardy, especially in intensive care and resuscitation wards - doctors and representatives of local authorities informed about it in the media. “This is a tsunami.”

I quote - “hospitals are full, also places in the Lombardy region are running out” - a doctor named Riva signalled in the media. He was explaining: “In the intensive care ward, we intubate even more than seven people a day and work non-stop, with an average of 14 days off.” “We are close to the moment when we will have no more room for reanimation” said Lombardy Regional President Attilio Fontana on SkyTg24 television. He also reported that one of the most serious problems in the local health service is the lack of a sufficient number of respirators. Efforts are being made to provide additional space for the infected in hospitals. Patients die completely alone and beg to be able to say goodbye to their children and grandchildren," Dr Francesca Cortellaro informed in one of her interviews. In connection with this situation, there were suggestions to place tabletson coronavirus wards, through which dying patients could say goodbye to their relatives for the last time.

Meanwhile, the Mayor of Bari in Apulia, in the south of Italy, Antono Decaro personally "rushed" to the home of undisciplined residents who did not comply with the rules on the ban on leaving without good reason. “This is a national crisis. This is not fun. The images coming in from Milan or Bergamo are not a film, it's really happening, people are dying there,” called out Decaro walking the streets of the city. Also in the historical centre of Bari Decaro, he spoke with a firm voice to the people sitting on the benches to go home. "You can't be on the street. How can I explain this to you?" Luckily, this group of previously carefree Bari residents immediately got up and went home. There was a recording of that intervention on TV. It is worth noting that the media at that time showed similar behaviours of people in many other European countries as in Italy. Among those who died in Italy, women infected with coronavirus were then half as many as men. Research conducted in Poland in 2011 showed a higher level of safety culture for women than for men (Safety Culture, 2015). It cannot be ruled out, however, that in crisis situations women can make better use of their intuition than men (Moir, Jessel, 2002).

Coming back to Italy, it is worth reminding that on 20.03.2020, new coronavirus outbreaks appeared there. "There are still too many infections, and the situation in the north is disastrous." This is how the next day of the epidemic in the country was described by the head of the Department of Infectious Diseases at the National Health Institute Giovanni Rezza. He stressed *that everything should be done to ensure that the rules of fighting the epidemic are respected throughout the country.* And I don't think so." - said this high-ranking official. Commenting on the growing number of infections among medical staff, the representative of the Health Institute stressed: "This is a big problem, a consequence of the fact that we have probably not taken their protection seriously and rigorously enough. It is also true that our medical staff lacked personal protective equipment and that our European neighbours were not helpful. The current coronavirus balance in Italy is 3,405 deaths, more than in China, and over 41,000 confirmed cases of infection". However, he did not point out that almost every country in Europe was already clearly affected by the effects of the pandemic, affecting not only the health security sphere.

In a report titled "Responsible Actions of Managers in the COVID-19 era", the Kearney consultancy wrote that “...industries based on the movement of people and services, as well as those that were already struggling with problems when the new global threat emerged, are particularly vulnerable to the virus. There are industries that will not be so badly affected by the pandemic". However, according to the authors of the report, the global extent of the epidemic and the restrictions and limitations introduced have led to imbalances in world trade and have severely damaged supply chains. The final scale of the crisis is still unknown.

Experts from various industries stress that "COVID-19 clearly has an impact on supply chains. Starting with industrial production, which has clearly slowed down (especially in China, which is the 'factory of the world'). It is suffering from staff shortages caused, among other things, by insufficient number of protective masks required for work and forced quarantine of workers. In addition, travel restrictions have resulted in a drastic drop in demand (and thus in prices) for land and air transport, paralysing them," said Kearney consultant Jakub Dudzic.

The Kearney report shows that the key to ensuring business continuity is to effectively support remote working. In this respect, technology that provides many tools and channels for use in ongoing communication is helpful. "Among our clients are those who almost overnight and without compromising efficiency, have switched most of their office staff to remote working and those who prefer to minimise remote working because it is unusual for their organisation. The same goes for customer relations. Those companies that have invested in multi-channeling and sell their products and services today both at physical points and in mobile applications and online shops are relatively less affected by today's extraordinary situation," - said Kearney Director Krystian Kamyk.

For some time the atmosphere of panic on the stock exchanges grew as the number of coronavirus cases increased. In Europe, the rate of infection was at its highest, and in the USA it started to accelerate. The Fed's decision, instead of improving the situation, only "added fuel to the fire" of market fears. The Wall Street stock exchange was stopped for 15 minutes immediately after the session opened. This is the third such case in the last six days. The reason was that the S&P500 index fell by 8%, which automatically suspended the session to calm investors' emotions. In just a few minutes, the stock market value of S&P500 companies fell by 2 trillion dollars, Reuters calculated. The Fed's decision to cut feet to zero instead of encouraging shopping was a panic-stricken mood. "The fear indicator jumped off the roof this morning," comments Reuters Peter Cardillo, chief market economist at Spartan Capital Securities in New York. The markets are terrified of the situation where central banks are entering and adding billions of dollars of liquidity," he added. Traders also fear that when traffic between countries closes the world's supply networks will be paralysed, which will hit companies' finances. And traders treat the interest rate decision as confirmation that the financial world is in serious trouble. Apple, Amazon and Microsoft reportedly lost about $300 billion of market value together.

Due to the limited framework of the article, only certain problems and phenomena, as well as links and relations between the health and economic security sectors will be highlighted. However, it may be worthwhile to use the models presented in the text of the article in the analyses carried out in relation to the other areas of safety in question, several of which are presented in Figure 1. It was also used to present in a synthetic way the research method adopted for the purposes of the article, as well as basic theoretical assumptions.

Theoretical and Methodological Assumptions Made

In order to better understand the essence of *the problem* signalled in the title of the article and its determinants, as well as while trying to formulate conclusions, the analysis was based on the assumption that in a crisis situation caused by the covid -19 pandemic, elements of the safety theory may prove useful, especially those concerning the safety culture (Pitgeon, 1991; Carnino, A., Weiman, G., 1995); Cieślarczyk, 2001, 2006, 2011); Filipek 2017). For the article, a holistic (Cieślarczyk 1997), systemic (Sienkiewicz 1994) and transdisciplinary (Bremer, 2016) research approach was also used. The adopted research perspective is presented in a synthetic way in Figure 1.

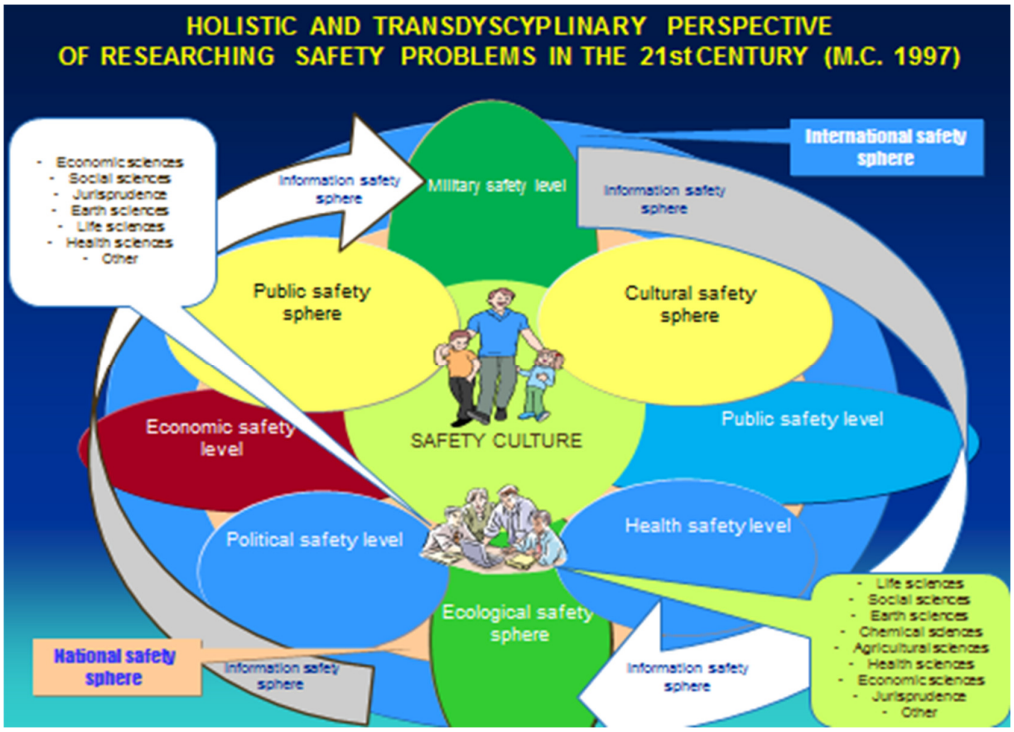

Figure 1: A holistic and transdisciplinary perspective on the study of safety problems in the 21st century (Cieślarczyk 1997, p.110).

Using the achievements of the safety sciences and several other scientific disciplines, our further deliberations will begin by approximating two ways of understanding the term *safety* (Stańczyk, 1996). This knowledge can be used successfully in relation to health security and the pandemic covit-19, which is of interest to us, and its impact on the economic and financial dimension of safety. The first, so called narrow and negative understanding of safety, treats safety as 'no threats'. This understanding is mainly encountered in the common thinking of most citizens, also in Poland. *Such understanding of safety* is often accompanied by treating it as *a state*. In the second thought safety model, the safety is understood as a process that takes place in *time and space* (see elements 6 and 7 in Figure 2). This way of thinking about security, including health and economic security, is not yet commonplace. This is evidenced not only by the results of empirical research (Safety Culture 2015), but also by the behaviour of many people in various difficult situations, also during the covid pandemic - 19. This is also indicated by the specific attitude to the health of some people when nothing ails them. This is particularly evident among young people. In many countries, the ways in which a certain proportion of the young people in the localities affected by the coronavirus pandemic were preserved did not bear witness to a satisfactory level of their safety culture.

The *safety* category, in its broadest sense, also takes into account *challenges, opportunities and risks* in addition to the *"threat"* term. The place of these terms in the structure of the so-called "safety alphabet" has been attempted to be presented in Figure 2 (elements 3.1 - 3.4). Unfortunately, it has to be said that even in scientific activity these terms are not widely known and rationally used. Let us recall that the *challenge* is the broadest concept in relation to the above-mentioned terms (Cieślarczyk 2006, pp. 118-119). It includes the *threats and opportunities* and *risk* terms. *A challenge is understood as a situation or information about that situation. If a challenge is properly identified and the related actions have been taken in a timely manner and in a manner appropriate to the situation, it usually becomes an opportunity. Otherwise, it becomes a threat.*

Skilful use of these terms in the description and evaluation of situations preceding a crisis, but also during and after the crisis, proves to be practically useful. This includes a better understanding of what *risk* is and how to handle it effectively in practice, including in business. Experienced businessmen know that there are no changes without risk. Without changes, there is no *development* as a condition for safety in the long run. However, *the development* is too rarely remembered to be *sustainable*. It is worth noting that the level and nature of the safety culture of the entities, assessed for example on the basis of their behaviour, actions and cooperation in crisis situations, correlates with their understanding of the *safety* term. Safety can be understood "point by point" - as *a state (fact, event)*, or "linearly" - as a process. The understanding of safety as *a spherical phenomenon* occurring in *space-time* (elements 6 and 7 in Figure 2) is much less common in practice. This was quite evident in many countries in the early stages of the coronavirus epidemic, which was not conducive to effective management of this threat. It is worth adding that the "owners" of the first ("point") and second ("linear") *way of thinking* about safety are less likely to use the previously discussed package of concepts: *challenges, threats, opportunities and risks*.

They usually focus on "threats" only. This is not conducive to effective crisis management. This is because it is difficult to *predict and prevent*. This is usually followed by inadequate and usually late *preparations*. This makes *the reaction* ineffective and very expensive, not only in material terms. It would be difficult to say that such situations were not observed in many countries, not only European ones, in the initial phase of the covid epidemic - 19. This was also noticeable during the economic crisis at the end of the first decade of the 21st century.

Based on the above mentioned observations and results of empirical research conducted by the author and his collaborators in Poland in the years 2011-2013 (*Safety Culture, 2015*), the theoretical assumptions adopted for the purposes of the article may be useful at various *stages of crisis management*, also in relation to various types of epidemics, of which probably covid - 19 is not the last one. A higher level of safety culture then proves to be particularly useful in the *prediction and prevention* phase. Then the stage of *preparation* for potential crises is conducted more carefully, which makes the response stage much more operational, effective and efficient. And the way the "reconstruction" phase, i.e. the return to “normal state", is carried out is at a higher level of development thanks to the experience gained during the crisis. These observations can be applied to various crisis situations, including those concerning the health and life of citizens, but also the "health" of the economy.

Knowledge of crisis management has great potential, but unfortunately it is still too little used in practice, as well as knowledge and experience of safety culture. In many countries, it can be seen that crisis management structures at different administrative levels are not always able to "find their way" in large scale crises. This is also visible during the covid pandemic - 19. In the last stage of crisis management, which is *reconstruction*, two different ways of action taken by physical and legal entities are observed depending on the level and nature of the safety culture. One of these ways is to restore the pre-crisis situation. The second one is a kind of activity, when using the experience of crisis, actions are taken to improve the existing organizational, technological and procedural structures, but also "thought structures", i.e. the ways of thinking of employees of a company or institution.

This reduces the risk of further crises, also on a large scale, and if they do occur, it will be easier to deal with them. The actions taken then are more operational, effective, economical and efficient, and the organisation or institution becomes a "learning organisation" (Senge, 1998). Probably "already" in a few months we will know more about how it went during the covid-19 pandemic. It seems that when describing and explaining many processes and phenomena that appear at that time, it may turn out to be useful to see the model called "safety alphabet" in Figure 2.

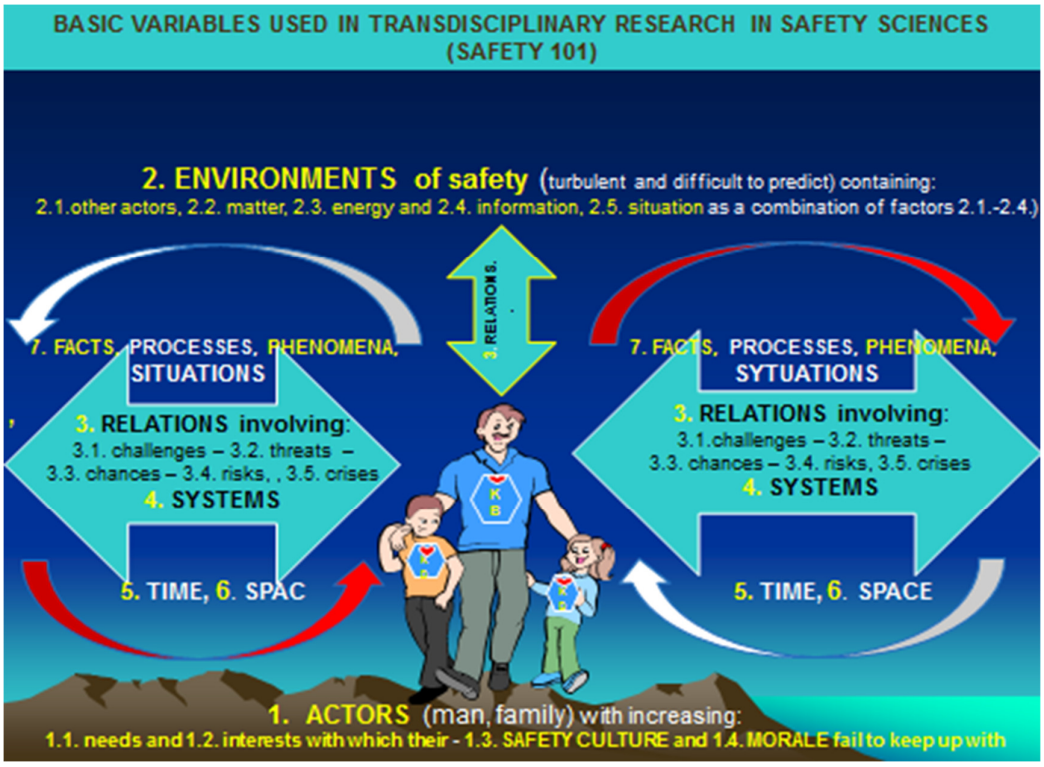

Figure 2: "Safety alphabet" as the element of the safety culture.

The analysis of some events related to the coronavirus pandemic using this model will allow, among others, to better understand the importance of the challenge category in combination with other factors affecting the level of safety of natural and legal entities.

In various life situations and research, the term usually appears in *the relationships* (factor 3 in Figure 2) between the subject (factor 1) and the surroundings (factor 2), and in it with various types of environments. The dynamic analysis of the elements of this model in relation to crisis situations allows us to observe that in relations between actors and with different types of environments there are also crises (factor 3.5.), and among them, "grown up" like the "Siamese brothers" crises in the sphere of health and economic security (Cieślarczyk, Filipek, Ważniewska, Świderski 2011). That is why people have been designing and installing various types of *systems* in relation to their surroundings for centuries (factor 4 in Figure 2).

As already mentioned, systems are located between the *subject* (man, family, institution and organisation, state, nation or community, e.g. the EU) and their closer and further surroundings. It is worth remembering that in the 21st century safety environments are becoming increasingly turbulent and difficult to predict. This was pointed out years ago by U. Beck (2002) when he wrote about "a society of risk".

Both scientific studies and practical experience suggest that in a broad sense of the surroundings term, there are various types of environments necessary for the life and development of homo sapiens. Among the basic environments there are: natural, economic, social, cultural environment - and within the cultural environment there is information environment, etc. They are located in element 2 in Figure 2. As already mentioned, these environments are essential for physical and legal entities to live and develop. Experience to date shows that it is too rarely the sustainable development. There is a growing body of talk that this may be one of the main causes of past and future crises on a global scale. The following years will show how the situation will change in this

respect in the world and in individual countries. In this sense, we can treat the covid-19 pandemic as a *challenge*.

While still following the “safety alphabet” model, it is worth recalling the quite obvious fact that various physical and legal entities live and function in *the social environment* (element 1 in Figure 2). They are characterised, among others, by dynamically increasing *needs* (factor 1.1.) and *interests* (factor 1.2.) over the last decades, which, however, have not been kept up with the pace of improvement of their safety culture (factor 1.3) and its level is not adequate to the needs. In order to satisfy the dynamically expanding range of needs, entities use different types of *matter, energy and information* (factors 2.2 - 2.4). In the information civilisation this order is reversed, which is particularly evident during the covid-19 pandemic. Thus, the question arises: can this global crisis, understood as a *challenge, contribute to the civilisational solstice and accelerate the transition of most countries and societies from the stage of industrial civilisation to the information civilisation, and perhaps even to the civilisation of knowledge and wisdom*? The importance of the latter value, which is *wisdom*, is particularly evident in crisis situations (Cieślarczyk, Kołodziejczyk, 2019), also such as the coronovirus pandemic.

In recent years, there has been a growing awareness that information and knowledge, but also the related *information and communication culture*, will become increasingly important in the coming decades. However, it would be difficult to say that the current level of *information and communication culture* of citizens in many countries has kept pace with the challenges of civilisation, including the pace of changes in modern technologies. This fear is confirmed not only by numerous facts which prove the susceptibility of a significant part of citizens to "wars" and informational struggles since years. The deficit of *the information and communication culture* and the related reduced efficiency, effectiveness, cost-effectiveness and effectiveness in the "fight" against the coronavirus is visible in many countries. Using the “safety alphabet” model it is worth noting that the weave of most of the factors shown in Figure 2 creates *the situations*, marked with symbols 2.5 and 7.

These elements, together with the *safety culture* (symbol 1.4.), can form *a system of operation* (Crozier, Friedberg, 1982) when the level of safety culture of the operators is at least satisfactory. The experience of the covid pandemic - 19 shows that most societies still have a lot to do in this respect. In order to learn more about the essence and importance of *safety culture*, it is worth to use the empirically proven model presented in Figure 3. Let us recall that in the simplest sense, *the safety culture is understood as a universal type of competence of a psychosocial and praxis nature. It is sometimes assumed to be a system (“package”) of competences, useful to natural and legal entities in various situations, especially in crisis situations.* This "Package" consists of: *a) knowledge and thinking about security, b) perception of security and threats, c) way/who to respond to objectively or subjectively emerging threats or perceived security deficits* (Frei, 1997)*, d) for the safety of oneself and others, e) for the closer and further dimension of space-time*. This simplified understanding of security culture is worth enriching (developing) with the use of successive models of this hardly noticeable, as it were, ethereal phenomenon, which becomes more evident during crises. Let's start its next approximation from Figure 3.

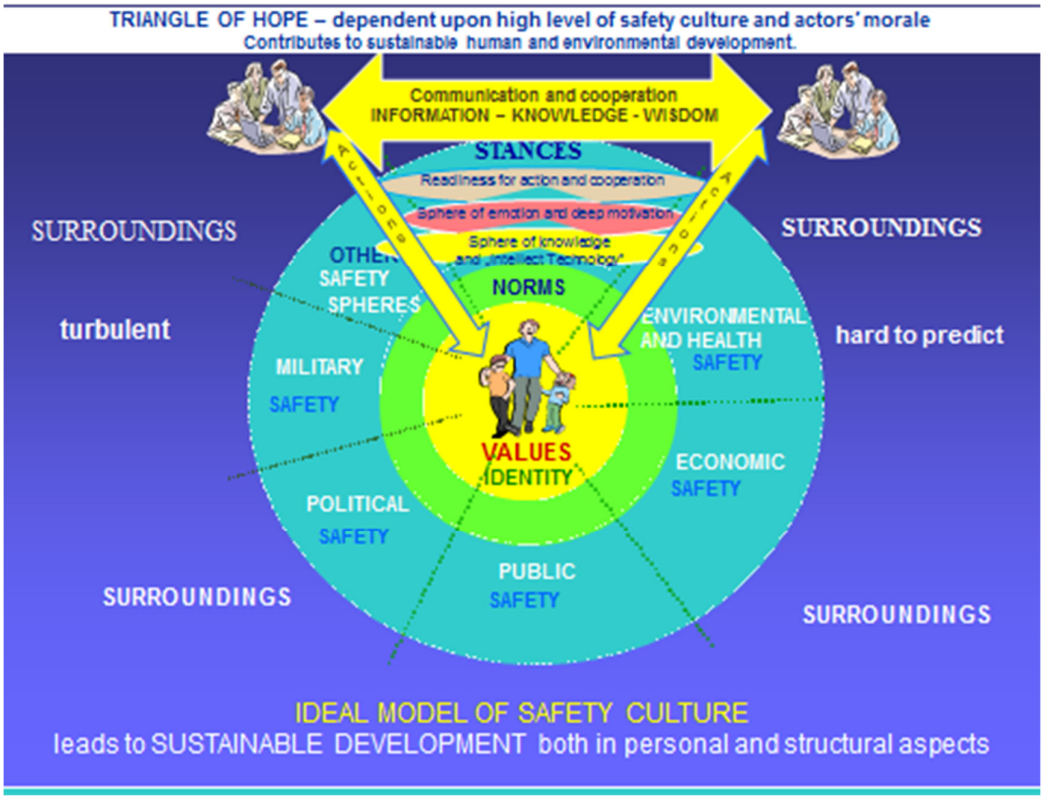

Figure 3: Safety culture - an ideal model (Cieślarczyk 2006, p.212, VIII)

It resembles a section of a tree trunk. Its core (axis) is a *value system* characteristic of a given natural or legal entity, marked in yellow. In the ideal model, the relative balance between the importance the subject attaches to the different sectors of life and safety as shown in Figure 3 and their place in the value system contributes to the fact that the model takes the shape of a circle as the ideal form. This is also achieved by the green colouring of internalised and practical *standards* for different spheres of life and safety. They are particularly important in difficult, crisis situations. And the third - looking from the inside - "tree jar" corresponds to the category of attitudes that can be more or less "rooted" in values. From pedagogical literature (Mika 1981 et al.) we learn that the attitude category consists of three elements, conventionally treated as "layers". These are: knowledge and "technology of the intellect" (M.Marody, 1987), a sphere of emotions ("good or bad"), and an "outer layer", symbolizing the subject's willingness to act, or to give up activity. In Figure 3 we can see that the category of "action" reaches its "roots" to the core of the safety culture, i.e. in *the values* which, combined with *norms*, form *the axio-normative system* of the subject, called *rules* or *patterns* by sociologists (Sztompka 2002, pp. 257-258, Sumner 1927). It would be difficult to say that in recent decades most schools and universities in the world have devoted much attention to these issues. And it is mainly they that determine the quality of human attitudes, which - as in a lens - are more clearly visible in difficult, crisis situations. Then, however, in most cases, the *behaviour* category manifests itself more often than the *actions* category, the formation of which is not supported by the deficit of *reflectiveness* mentioned at the beginning of the article.

It is worth adding that the "golden vectors" presented in Figure 3, symbolising *actions in* the ideal model, in the real model take on a red colour corresponding to behavioural *behaviours*. This is particularly evident in crisis situations. These vectors, symbolizing *relationships*, are then not "rooted" in the system of values, but rather in the emotional layer of attitudes. In difficult, crisis situations, this turns out to be insufficient even when such *behaviours* are motivated by "positive emotions". For example, groups of young people dancing on an Italian beach or in other public

places, "strengthening" themselves with shouts: "we're not afraid of the virus", pointed out on the one hand that these young people "can't be afraid". On the other hand, they gave evidence of a not necessarily high level of their safety culture. Analysing one of the models of *safety culture* presented in Figure 3, it is worth noting that in its "core", i.e. in the system of values, the already mentioned, although not always appreciated at home, in schools and universities, the *wisdom* category plays an important role. It can be understood most easily as *the ability of an entity to use information, knowledge*

and other types of resources to achieve worthy objectives. The objectives, seen not only "here and now" but also "somewhere and someday". These are important elements of *a strategic culture* as an important part of a broadly defined safety culture. It can be assumed with great probability that *wisdom fulfils the role of an operational regulatory centre, which is difficult to overestimate, in relation to the other elements of the safety culture, and within it in relation to the organizational, legal and strategic culture*. The latter category was of particular interest to the European Commission several years ago. However, the campaign launched at that time did not hit the vulnerable ground. This was probably not supported by the level of safety culture of natural and legal entities in most EU countries. More on this subject in the next article, entitled *"The expected impact of the covid-19 pandemic on the basic spheres of life and security of states and societies"*.

Summary

Knowledge of the coronavirus and the effects of the covid-19 pandemic, as well as information available in March 2020 on the behaviour, actions and interaction of physical and legal entities during the build-up of the pandemic, is still fragmented and unstructured. However, even in this situation one can risk saying that significant elements of knowledge on *the safety theory* can be useful *to describe and explain* processes and phenomena related to *the covid-19 pandemic* and its potential consequences. *Safety culture models*, developed by the research team on the basis of many years of experience gathered during other crisis situations, can be particularly useful. Empirical research conducted several years ago in Poland has shown, among other things, a clear link between the level and nature of safety culture of physical and legal entities experiencing crisis situations and the efficiency, effectiveness, economy and effectiveness of dealing with these situations. Although their scope and nature cannot be compared with the covid pandemic - 19, according to the author, many of those experiences may prove useful "here and now", but also in predicting the effects of the pandemic on various spheres of life and human safety. Several years of didactic experience of this research team also allows us to conclude that the culture of safety of individuals and social groups can be diagnosed and improved. The best results are achieved when you start at a younger school age.

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Railway Component of The Central Transport Port as A Determinant of The Transport Security of Military Units

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Abstract

Safety is, inter alia, defined as a condition in which no risks are perceived. These risks may affect different areas, including the meeting of transport needs. For military units and institutions, one of the key needs in the broadly understood logistics is the need for transport tasks. In the 21st century, this need can be met with different modes of transport. When planning to expand the Central Transport Port /CPK/ it is necessary to see the possibility of meeting the transport need using a railway component built and upgraded under the CPK. Whether and as far as possible depends on the transport relationship and the planned course of the new railway line system. Analysis of the planned routes indicates that, in addition to the CPK railway component, other lines should be taken into account, the modernisation of which will create conditions for a fuller meeting of the transport needs of military units and institutions.

Keywords: Central Transport Port, railway component, transport need, security, railway line, modernization, construction.

Introduction

The decision regarding the construction of the Central Transport Port (the CPK) in Poland should be and actually is perceived from different perspectives. The creation of such a facility will affect the economy in two ways. In the short term, it will affect demand in areas such as the production of materials and the acquisition of raw materials necessary for the construction of the airport and the accompanying transport infrastructure, as well as demand for construction and assembly services. When considering investment activities over a longer period of time, one should also notice the impact of the construction of the airport together with the accompanying infrastructure as a factor that drives the entire economy, boosts other investments and conditions the development of international trade. However, it is advisable to consider the construction of the CPK not only from an economic point of view. An attempt should also be made to assess its impact on meeting the transport needs of military units, especially in the context of their involvement in activities ensuring the security of the Republic of Poland. In order for the assessment to be fairly comprehensive, it should be noted that the CPK project is often equated with the construction of the airport, which is not complete information. The airport itself and the infrastructure associated with it are only part of the investment. Accompanying infrastructure such as, among others, modernized and newly built railway lines will have a significant contribution to the subsequent proper functioning of the CPK. From the point of view of military transport, they are the main component that arouses interest in terms of their use in the interest of national security.

Given the above scope and understanding the importance of transport for ensuring the security of virtually all military units, it is justified to assume the ***purpose of the article which is to determine whether and to what extent the CPK railway component affects the performance of transport tasks for the needs of military units to ensure their transport security***.

In order to achieve this goal, it is necessary to specify the research problem as follows: ***does the CPK railway component have an impact on ensuring transport security of military units?*** Solving the main research problem requires solving ***three specific research problems***.

1. Is transport security important from the point of view of a military unit and how is it understood?
2. What are the main routes of military transport services carried out by rail?
3. Does the selected route of railway lines under the CPK meet the expectations related to satisfying the needs of military units?

In an attempt to solve the listed research problems, basic research methods such as ***analysis, synthesis and inference have been used***. ***Surveys*** conducted among soldiers serving in various military units complemented the research process. It was a deliberate selection as it involved participants of courses conducted at the university and, additionally, these were officers actively carrying out tasks related to satisfying transport needs in military units. According to the author, the methodological approach presented allows to obtain reliable data and solve the above-specified research problem.

Transport Security - Theoretical Approach

Transport is a kind of business or service activity that focuses its efforts in the first place on the implementation of tasks related to the movement of various types of cargo /goods/ from the place of loading to the destination (place of consumption or use) [Rydzykowski, Wojewódzka - Król 2010, pp. 35-57]. With regard to persons, transport tasks relate to ensuring the conditions for moving passengers to the place indicated by them. It can be a place of work, recreation or place of residence. In every situation, means of transport which are adequate to the intended transport task as well as infrastructure enabling the safe movement thereof must be provided.

From an economic point of view, transport is nothing more than a paid performance of various transportation tasks. The result of those operations is meeting the needs of individual or institutional clients, and at the same time generating profit by the transport company [Koźlak 2008, p. 11]. When analysing the realization of transport tasks, it is possible to distinguish additional services accompanying the transport service. These can be services that cover a wide range of activities providing added value to the transport service itself. These may include, inter alia, various forms of consulting, storage of goods, their palletization, consolidation, de-consolidation, conditioning, wrapping, binding, repackaging, labelling and other activities ordered by individual clients [Jeszka 2009, pp. 78-122].

Transport system understood as a deliberately complex set of elements, also called subsystems, forming a specific whole designed to meet the needs associated with the movement of people and goods in space. Its internal structure can be divided into technical, organizational, procedural /regulatory/ or financial subsystems. From the point of view of security being the essence of the article, the key element – subsystem is the stationary transport infrastructure, which, when combined with means of transport and supported by organization and legal regulations, will be able to ensure the security of military units and institutions. It is the stationary, linear and point, transport infrastructure that determines the availability and thus the quality of transport services provided. This is important because the institution of the Polish Armed Forces does not have a separate transport infrastructure (with small exceptions such as, e.g. military railway sidings or roads in military training grounds). Therefore, it is the railway infrastructure located on the territory of the country and being at the disposal of specific state institutions that should meet the needs of military units and institutions both in times of peace as well as in crisis or war. Considering the general and only key points about transport, one should consider whether any correlations between transport and security can be found. It seems that since transport as a whole is to meet the needs generated by specific entities, there should be no doubt that satisfying them has a direct impact on the sense of security of these entities [Kośmider, Kitler 2017]. This position of the author results from the fact that security is commonly understood as a state in which the considered entity does not feel a threat in relation to its functioning [Rokiciński, Mikołajczak, Oszowska, 2016 pp. 125-144]. The above statement does not exhaust all possible interpretations of the term security. Polish and foreign authors define the commonly used word “security” in different ways, as shown in the following compilation.

Table 1: List of selected definitions and terms of security

No.	Content – interpretation of the word security	Author / Publication
1.	"Security is like peace, it is not given to people once and for all, without any conditions"	Huzarski M., Variable foundations of state security and defense, AON, Warszawa 2009, pp. 11-14
2.	"Security is nothing more than the ability to resist various threats caused by human action or a natural event /e.g. flood/"	Pokruszyński W., Theoretical aspects of security, University of Regional Economy, Józefów 2010, p. 8
3.	security is virtually identical with certainty /*safety*/ and it means no physical threat /*danger*/ or protection against it	definition by Daniel Lerner included in the UNESCO Dictionary of Social Sciences Zięba R., The institutionalization of European security: concepts - structures - functioning. Warsaw: "Scholar" 1999. p. 27
4.	"Security is the opposite of danger" the view of Professor Charles Manning specialist in international relations at Oxford University	Stańczyk J., Contemporary understanding of security, ISP PAN, Warszawa 1996, p. 16
6.	"Security is freedom of action, which is not accompanied by a sense of danger, and therefore a state of mind that is determined by a specific form of international order" - Roy Edwin Jones, English Professor specializing in problems of international relations	Grader S., The English School of International relations: evidence and evaluation. Review of International Studies, (1998) 14 pp. 29–44, Cambridge University Press 1988
7.	"Security is the only goal and motive of the state's activity and this goal should be achieved by means of applicable legal rules" - the view was expressed by the German philosopher Friedrich Wilhelm Christian Karl Ferdinand von Humboldt	Maneli M., History of political and legal doctrines of the 19th century, p. I, PWN, Warsaw, 1964, pp. 198–207
8.	"Each time when an entity's security is not ensured, it results in damage to a single person or to a larger group of people. This usually results in the destabilization of the entity's functioning and identity."	Kukułka J., New conditions and dimensions of Poland's international security, "Countryside and State", 1995, no. 1, pp. 198–199
9.	"Recognizing security as the primary need of a human being and specific social groups is an important stimulus to act in the name of achieving specific goals"	Zięba R., General theory of state security in international relations, International relations in the 21st century. Jubilee book on the occasion of the 30th anniversary of the Institute of International Relations at the University of Warsaw, Scholar, Warsaw, 2006, pp. 939–950
10.	"Logistic security of military units and institutions is nothing more than providing conditions for maintaining combat capability, among others, by satisfying transport needs – ensuring transport security"	Pawlisiak M., System logistycznydeterminantembezpieczeństwaSiłZbrojnychRzeczypospolitejPolskiej, WAT Warszawa 2017, pp. 64–66

The presented views show only partially how security is perceived and defined. It seems that to further develop and discuss the issues of security in a broader perspective, it is justified to undertake an analysis of the problem presented by Professor Huzarski. He believes that in the process of consider-

ing threats, considering among others the satisfaction of transport needs, it is necessary to recognize the dynamics of change and the variety of factors posing a threat in this area. Sometimes threats and the resulting insecurity (sense of danger) go beyond the military sphere and may take the form of cyberattacks, economic pressures or variations of hybrid wars, which can currently be observed during the conflict in eastern Ukraine. Such situations require actions aimed at limiting threats and thus ensuring security with regard to the functioning of transport.

An equally interesting proposition referring to an attempt at a correct definition of the term threat is the view presented by the Swiss political scientist Daniel Freia, who, based on an analysis of subjective and objective aspects of threats, built a synthetic model that allows to explain the essence of an observable threat. The result of this analysis is the formulation of the following four theses:

- the state of insecurity occurs when a real external threat is correctly and objectively perceived;
- the state of obsession, panic and incapacitation arises in the event of an unjustified exaggeration of an unknown or not fully identified threat;
- the state of false security is the result of unjustified minimization or marginalization of a perceived external threat;
- The state of security occurs only when there is a slight and at the same time correctly diagnosed threat [Frei 1977].

It is also obvious that the state of the art, the tools used and the range of threats have changed dramatically since the 1970s. At the beginning of the twenty-first century, one should be inclined to take a wider look at the series of events determining security. This means that it is advisable to consider theoretical issues of security while expanding the area of interest to include the next stages involving various challenges. It is quite commonly proposed to perceive security as a specific process in which there are certain cause and effect relationships between individual components such as the subject and object of security, the possibility of counteracting threats and the manner of ensuring the security of specific entities [Zięba 2012]. Only such an approach creates premises for the correct perception of security in a specific place and time.

Military Transport Routes by Rail

During peace, units of the Polish Army operate and are quartered in barracks located throughout Poland. The present location of military bases is a legacy of earlier historical events. Until 1918, there was no Polish State, and then the decisions regarding the location of military facilities such as barracks, fortresses or storage facilities were taken by the partitioning countries. When making such decisions they were guided by two premises. First, they sought to ensure their security by placing military facilities in a place where they would protect the territory of partitioning forces against external threats. Secondly, they were to allow peace and security in the occupied territory. After regaining independence in 1918, the shape of Polish territory deviated from today's borders. Investments in infrastructure of that period were also guided by ensuring safety and the results of these activities do not fully correspond to today's reality. In addition, it should be noted that part of today's Polish territory in the interwar period was within the German Reich, which as a state pursued an expansion-oriented policy and attached great importance to the construction of barracks and other facilities for the needs of its armed forces. After the end of World War II, Poland operated within the structures of the Warsaw Pact. Its policy and the opponent's location in the west did not require the construction of new military facilities. At that time, facilities already existing in Poland were used.

The Prime Minister of the Republic of Poland is responsible in the Polish legal system for the overall functioning of the national economy as well as issues related to national defense. In this respect, its decision periodically clarifies the route of railway lines of national importance. These lines perform economic functions as well as are used for military transport just like other transport infrastructure facilities, as the Polish Armed Forces do not have their own national facilities. Although they have, for example, military training grounds or military railway sidings, national railways of defense significance are used for domestic transport.

The above-discussed historical conditions have led to a situation in which the location of chief barracks and storage facilities does not fully correspond to today's political and military situation. Military units use existing facilities; however, there is a need to take action to ensure the possibility of their relocation along routes adequate to the situation.

Fig. 1: Location of chief military units and facilities on the territory of Poland[1]

The schematic distribution of the main military units of the Polish Armed Forces only signals a problem. It should be remembered that units such as the 11th Armored Cavalry Division, which is the main striking force, has its subordinate brigades in Świętoszów, Międzyrzecz, Wędrzyn and Żagań, while any military threat can rather be seen in the east. Unfavourable distribution can also be observed in relation to warehouses, which, according to the earlier concept of the Warsaw Pact, are dispersed unevenly in Poland. Some of them are located in the west of Poland (Potok, Duninów, Jastrzębie, Krapkowice, NowogródBobrzański) and at least to this day no redeployment has been planned. There are also warehouses located a short distance from the eastern border. These are depots in Hajnówka, Osowiec and Bezwola.[2]

To indicate the importance of military transport by rail with regard to particular routes***, the author's own surveys have been carried out***. Respondents were required to answer a number of detailed questions related to the need and possibilities of using rail in military transport. The results of these surveys are presented in the table below.

[1] Own study

[2] The ability to accurately indicate locations of military units and warehouses results from the experience of the author who served in the logistics division of the Polish Army. He was, among others, Commander of the 1st Pomeranian Logistics Brigade

Table 2: The extent of using rail in military transport

No.	Type of transport/freight	The importance of carrying out transport to ensure the transport security of the military unit and institution (%)			
		low	average	high	very high
1.	Operational transport – military equipment:				
	a/ during peace;	13	41	29	17
	b/ during crisis /threat/;	8	21	34	37
	c/ during war;	57	25	13	5
2.	Supply transport - combat and material supplies:				
	a/ during peace;	47	33	12	8
	b/ during crisis /threat/;	13	22	41	24
	c/ during war;	48	25	18	9

Cumulative survey results included in the table show some regularities. In relation to operational transport, rail transport is perceived as significant during peace as well as during crisis, also referred to as the period of threat. At the time before the outbreak of a possible war this type of transport plays an important role in ensuring transport security, as estimated by 55 to 70 percent of the surveyed persons. However, during war its significance decreases and this view is expressed by over 80 percent of the respondents. The results regarding the transport of supplies are slightly different. In the respondents' opinion, rail transport plays an important role especially in times of crisis or threat. This view is expressed by over 60 percent of respondents. During that time, tasks related to supplying troops should be carried out with simultaneous operations related to stocks redeployment. This period allows the use of rail transport as it enables the performance of extensive transport operations with the involvement of a smaller number of transport means. To sum up, it can be stated that the scope of use of rail will be greater during a period of peace and threat while its significance in time of war will decrease. The respondents justify this claim by the fact that the destruction of the railway network will not allow mass use of this type of transport and, additionally, during war it is necessary to carry out transport tasks in a short time, which is what rail transport is unable to provide.

The second main problem studied by the author by means of surveys is the routes along which rail transport is and should be implemented to ensure the transport security of military units and institutions. The results obtained in the course of the research are presented in the table below.

Table 3: Routes in military transportation by rail

No.	Military transportation routes	Importance of routes in military transports (%)			
		Low	Average	High	Very high
1.	Location of the 11DKPanc /Żagań/ – north east of Poland:	11			
	a/ during peace;	3	23	44	22
	b/ during threat;	49	14	35	48
	c/ during war.		35	11	5
2.	Location of the 11DKPanc /Żagań/ – east of Poland:				
	a/ during peace;	12	22	47	19
	b/ during threat;	5	15	34	46
	c/ during war.	51	36	8	5

4.	Location of warehouses (Masuria, Warmia, Podlachia) – west and south west of Poland:				
	a/ during peace;	23	22	34	21
	b/ during threat;	4	6	44	46
	c/ during war.	23	19	25	33
5.	Location of warehouses (Lower Silesia, Opolian Silesia, Lubusz Province) – east of Poland:				
	a/ during peace;	29	24	22	23
	b/ during threat;	11	15	34	40
	c/ during war.	23	23	28	26

The overall survey results in the table show some regularities and trends. They consist in the fact that less significance is perceived during peace and war, while during the period of threat of war, rail transport along the indicated routes can play a very important role. It is an indication that this type of transport should be considered as necessary in the process of delivering supplies as well as the evacuation or redistribution of accumulated stocks of combat and material supplies. Research results also indicate that respondents understood the importance of rail for the effective operation of mass supply transport.

A possible continuation of the presented observations and conclusions resulting from the analysis of the results of the surveys is the need to look at the fact that, in accordance with the current training concept in the Polish Armed Forces [DD 7 (A) 2010], each military unit is required to provide training in field conditions twice in year. This means the necessity to transfer forces and supplies from their place of permanent stationing to training grounds using available means of transport. In the Armed Forces of the Republic of Poland there is a rule according to which military vehicles on tracked chassis are transported on low-loader outfits or using rail transport. Considering the economic factor and the limited availability of low-loader outfits, mainly rail transport is used. Thus, during training in times of peace, military equipment can be transported along the following routes:

- Żagań/Świętoszów – OSPWL DrawskoPomorskie/OSPWL Orzysz;
- Międzyrzecz - OSPWL DrawskoPomorskie/OSPWL Orzysz;
- Szczecin - OSPWL DrawskoPomorskie/OSPWL Orzysz;
- Złocieniec - OSPWL DrawskoPomorskie/OSPWL Orzysz;
- Słupsk - OSPWL DrawskoPomorskie/OSPWL Orzysz;
- Warszawa Wesoła - OSPWL DrawskoPomorskie/OSPWL Orzysz;
- Rzeszów - OSPWL DrawskoPomorskie/OSPWL Orzysz;
- Lublin - OSPWL DrawskoPomorskie/OSPWL Orzysz.

The presented routes do not exhaust the topic, but only show the main directions of transport of military units. The resulting conclusions should be considered as one of the determinants of the design of the CPK railway component.

To sum up the presented results regarding possible routes in operational military transport using rail, it can be observed that their course ends mainly in the north-eastern or eastern part of Poland. Starting—loading—points are located in different parts of the country and this is due to the deployment of military units during peace. In turn, the starting point of each supply transport is usually located in the warehouse, while the destination point is determined by the recipient or the person making the decision regarding the evacuation or redistribution of stocks.

The routes of the Central Transport Port's railway lines and the needs of military units

According to the decision of the central authorities, the modernization and construction of new railway lines is an integral part of the construction of the Central Transport Port. The investment is planned to include as its part a railway network the shape of which resembles a cobweb. In order to

meet this goal, routes to ten important destinations, currently called spokes, have been selected. Additionally, to ensure the possibility of collision-free re-routing of train sets between the "spokes", the construction and modernization of sections, known as "clips" in the draft, has been planned. The entire railway investment will include the construction of approximately 1,600 kilometres of lines, where trains will be able to travel at speeds of 160 to 250 kilometres per hour. Not very optimistic news in this area is the fact that the completion of rail investments is expected by 2040.

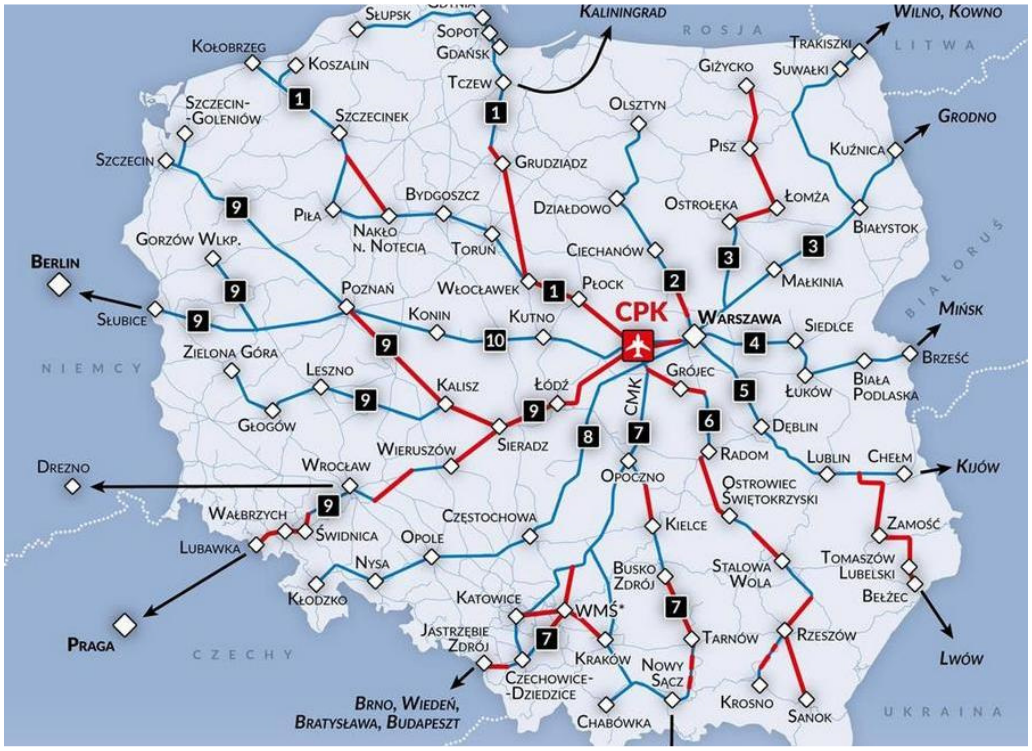

Map of modernized and newly built railway lines as part of the construction of the Central Transport Port[3] – source "kronika 24.pl accessed 25 November 2019

In the author's opinion, several basic railway lines modernized as part of the construction of the Central Transport Port are particularly important for ensuring the transport security of military units. First of all, one should mention the railway line running from the border crossing in Lubawka through Wrocław, Sieradz, and Łódź to the Warsaw junction, from where transport can be carried out along two routes:

- Ostrołęka, Łomża, Pisz, and Giżycko through Orzysz;
- Małkinia, Białystok, Suwałki.

In order to ensure the conditions for the full use of these lines for military transport, it appears necessary to make additional investments in railway lines of lesser importance for the CPK. This applies in particular to railway line No. 283 connecting, among others, Świętoszów with Żagań and railway line 275 connecting Żagań with Wrocław.[4] In this way, convenient transfer of forces and resources from Lower Silesia to the north-east will be enabled. In addition, such a course of the railway lines will allow the evacuation and redistribution of supplies stored in this area.

[3]kronika 24.pl accessed 25.11.2019
[4]https://www.rynek-kolejowy.pl/ accessed 28 November 2019

The second important railway line from the point of view of transport security is the one running from Słubice, through Zbąszynek, Poznań, and Kutno to Warsaw, where there is a possibility of transport in two main directions. The first one leads to Giżycko via Ostrołęka, Łomża, Pisz, and Orzysz while the latter goes via Małkinia and Białystok to Suwałki. In order for this line to meet the requirements, it is reasonable to modernize route number 375 on the Międzyrzecz – Zbąszynek section.[5]

Such rail investments in the Dolnośląskie and LubuskieVoivodeships (Provinces) will ensure favourable conditions for the use of rail transport on essential routes, i.e. a place of permanent deployment of a military unit—a training ground or an area of operational destination.

To enable manoeuvres between individual railway lines already existing as well as those modernized in the future, it is necessary to have other railway lines that are not part of the CPK railway component. This solution can be observed in the modernization of railway line number 219 running from Olsztyn to Ełk.[6] On the one hand, it boosts the development of areas in its vicinity, and from a security point of view it can constitute a viable alternative for military transport in this region.

Assessing the location of military units in the western part of Poland, one can observe a certain dissonance between the CPK railway component and the area of West Pomerania. Military units relevant to Poland's security are also located there. In turn, the primary bearing of the railway lines focuses on the central part of the country. It can therefore be said that for the units of the 12th Mechanized Division, the CPK railway component is not critical in ensuring their transport security. Therefore, it will be necessary to take into account the transport needs of military units located in the northwestern part of the country in other projects related to rail investments. This may include, inter alia, the modernization of railway line No. 210 connecting Chojnice with Runowo Pomorskie through Szczecinek, Złocieniec and Drawsko Pomorskie.

When making a comprehensive assessment of the impact of the railway component on satisfying the transport needs of military units and institutions, it is legitimate to state that the construction of the CPK can improve the conditions of military transport using rail. It should be remembered that the primary role of the CPK is to meet the country's overall transport needs, taking into account the conditions and requirements of the 21st century. In this situation, the transport security of military units and institutions is only one of the factors that have been taken into account when planning and implementing investments. It is also reasonable to recognize the investment needs not only in relation to rail infrastructure. It is also necessary not to neglect the means of transport, i.e. rolling stock as a necessary element in the effective realization of transport tasks. This issue can and should be the area of interest for subsequent theoretical studies.

Conclusion

The construction of the Central Transport Port is a complex undertaking requiring reconciliation of social, economic and security interests of the Republic of Poland. As a result, there might occur situations in which meeting all expectations may prove difficult, and sometimes even impossible. This is also partly applicable to military units and institutions. However, a possible solution should be sought, which has been discussed as feasible modernization of certain railway lines. It also seems that current plans may be subject to modification after taking into account changing political, economic or military conditions. Each time, however, the transport needs of military units and institutions should be taken into account as the factor which translates into the military security of the Republic of Poland.

[5] Ibid.
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Supporting the Operations of a Transport Undertaking in Uncertain Conditions

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Abstract

An IT tool has been designed to support the operational activities of a transport company under conditions of uncertainty. The main component of this tool is a developed random timetable generator for rail transport vehicles, which allows preparing input data on the basis of which can be forecast their departure schedule. The tool allows generating both random schedules and manually enter actual quantity data. The idea of such a solution was based on the Excel spreadsheet of Microsoft Office, in which the built-in functions were used to model random timetables of transport means in a railway company.

Keywords: Supporting the operational activities of a transport company, conditions of uncertainty, tool, data, transport, forecast, analysis.

Introduction

The management of a transport undertaking involves taking decisions in a state of uncertainty, in which certain management decisions have different effects, depending on which state of affairs occurs. In such a situation, the manager of the transport company most often knows the probability distribution of the occurrence of certain states of affairs, and the most common solution to the problem of acting in such conditions is to maximize the expected value, i.e. to choose the action with the highest expected value. Therefore, quick decision making has a huge impact on the situation of the company because delaying it often causes significant losses Raczkowski Noga and Klepacki (2015). Moreover, supporting operational activities in conditions of uncertainty protects and enhances the value of the company as it contributes to the achievement of its objectives.

One of the effective ways to deal with the uncertainty associated with the timely departure of rail transport in this company will be to develop this tool.

Adopted Research Procedures

The goal that the author wants to achieve is to design an innovative analytic and prognostic tool that will facilitate management decisions supporting operational activities in a transport company.

The research problem is the answer to the question: How to design an innovative analytic and prognostic tool that will effectively support the operational activities of a transport company under conditions of uncertainty?

A research hypothesis was adopted: The designed tool will effectively support the decision-making process in a transport company.

The subject of research is designing an innovative analytic and forecasting tool; the audited organization is a railway undertaking.
The testing period is from 2012 to 2014.
Spatial coverage is a railway company operating on the Polish market.

The data used for the research calculations were hypothetical and their scope was limited to one railway line, assuming that the vehicle (train) leaves daily at a specified time.

The following research methods and tools are discussed in the article:

- analysis of the literature on the subject;
- analysis of the structure of statistical population;
- MS Excel spreadsheet;
- forecasting.

The hardcore of the tool is a properly designed random numbers generator which, based on normal distribution in the range from minimum to maximum, generates random departure timetables for the means of rail transport in a railway undertaking. The framework of the study is the following:

- assumptions made for the research process;
- design of a generator of random timetables for means of rail transport;
- building a forecasting model for train departures timetable in a railway undertaking.

Assumptions made for the research process

According to Rowntree (2018), the core of the developed IT tool is the generator of random train timetables in a railway undertaking which allows, in a relatively simple way, the preparation of input data for the forecasting of train departure times with the following options:

1. Setting any time periods for generating results. Data range can be easily changed by adding or removing subsequent days. With Excel functions, data can be grouped using a pivot table in monthly or yearly periods.
2. Creating and modulating delays using various types of distributions. Owing to the Excel functions embedded in the spreadsheet, which reflect probability distributions, different types of distributions can be used in an easy and intuitive way that best present the course of the studied phenomenon. In addition, these distributions can be modulated by specifying measures such as: mean, standard deviation, etc.
3. Thanks to the trigonometric functions available in the spreadsheet, periodic fluctuations of the studied phenomenon can be simulated. In the studied case, a modified sine function was used; if the phenomenon occurs differently, other trigonometric functions can be employed and their parameters can be adjusted.
4. The obtained data can be easily presented using graphical data presentation methods, e.g. in an Excel spreadsheet which offers a full range of ready-made graphic solutions, such as: pie chart, line chart, column chart, bar chart, and histogram.

To make the designed IT tool more transparent, it is possible to collapse the calculation cells to leave the most important information, such as date, planned departure time, actual departure time and the difference between them (Table 1).

Table 1: An example of a timetable sheet after collapsing calculation cells

Date	Planned departure	Actual departure	Delay
01.01.2012	11:00	11:51	00:51
01.02.2012	11:00	12:51	01:51
01.03.2012	11:00	11:16	00:16
01.04.2012	11:00	11:15	00:15
01.05.2012	11:00	11:25	00:25
01.06.2012	11:00	11:19	00:19
01.07.2012	11:00	11:17	00:17

01.08.2012	11:00	11:15	00:15
01.09.2012	11:00	11:16	00:16
01.10.2012	11:00	11:18	00:18
01.11.2012	11:00	11:18	00:18
01.12.2012	11:00	11:18	00:18
01.13.2012	11:00	11:53	00:53
01.14.2012	11:00	11:36	00:36
01.15.2012	11:00	11:18	00:18
01.16.2012	11:00	11:16	00:16
01.17.2012	11:00	11:19	00:19

This form of data structure permits the use of time series analysis methods. The IT tool generates practical random timetables and, based on them, performs analyses and allows conclusions to be drawn. It also helps analyze and forecast a train timetable in a railway undertaking. When designing the tool, the structure of the studied phenomenon was studied using descriptive analysis methods and statistical formulas which allowed calculations in the MS Excel spreadsheet. Some of the statistical functions are embedded Excel spreadsheets while the remaining part was developed independently. The application is integrated with the random timetable generator, which allows the generation of data for the study and then the analysis of obtained results.

Results

The entire generator is contained in one spreadsheet and consists of the following columns: date, planned departure time, random departure delay, degrees to periodicity, radians to periodicity, periodic fluctuations, random factor, unknown component, actual departure time, and delay. The first three rows contain the following fields: years, average, deviation, etc. (Table 2).

Table 2: A spreadsheet of random train departure timetables generator

	A	B	C	D	E	F	G	H	I	J
1		**Year**	2012	2013	2014					
2		**Mean**	0	1	1					
3		**Deviance**	5	4	2					
4										
5										
6	**Date**	**Planned departure**	**Random departure delay**	**Degrees to periodicity**	**Radians to periodicity**	**Periodic fluctuations**	**Random factor**	**Unknown component**	**Actual departure time**	**Delay**
7	01.01.2012	11:00	0:01	90	1,553534829	00:15:00	0,150950713	0:15	11:31	00:31
8	01.02.2012	11:00	0:01	91	1,570796327	00:16:00	0,91044622	1:31	12:48	01:48
9	01.03.2012	11:00	0:00	92	1,588057825	00:15:00	0,396293007		11:15	00:15
10	01.04.2012	11:00	0:00	93	1,605319323	00:15:00	0,589355262		11:15	00:15
11	01.05.2012	11:00	0:00	94	1,622580821	00:15:00	0,477631334		11:16	00:16

12	01.06.2012	11:00	0:13	95	1,639842319	00:15:00	0,030179957		11:28	00:28
13	01.07.2012	11:00	0:06	96	1,657103817	00:15:00	0,074832157		11:21	00:21
14	01.08.2012	11:00	0:03	97	1,674365315	00:15:00	0,086237828		11:18	00:18
15	01.09.2012	11:00	0:03	98	1,691626813	00:15:00	0,033317447		11:18	00:18
16	01.10.2012	11:00	0:02	99	1,708888312	00:10:00	0,109558634		11:17	0:17
17	01.11.2012	11:00	0:02	100	1,726149811	00:15:00	0.000548149		11:17	0:17
18	01.12.2012	11:00	0:02	101	1,743411308	00:15:00	0,593415261		11:17	0:17
19	01.13.2012	11:00	0:01	102	1,760672806	00:15:00	0,3726684		11:19	0:19

Legend:

- “Date" column - this column contains individual dates for which the timetable is tested;
- "Planned departure" column - this column contains the time of planned departure of a freight train. 11:00 was adopted for the study;
- "Random departure delay" column - this field contains a random delay based on normal distribution. The full function is as follows:”= ABS(TRUNC(NORMINV (RAND();C$2;C$3)))/24/60”. It is assumed that in real departure times there is a delay in line with the statistical normal distribution (over the whole studied period, there are several major delays; next, there are more average delays and, correspondingly, many small or no delays). To modulate the function of normal distribution, the values corresponding to the mean and standard deviation are used (fields C2 and C3 in the spreadsheet). The whole algorithm works as follows: The normal distribution function for the given mean, standard deviation and probability of occurrence (the RAND() function which returns a random value from 0 to 1), returns a value consistent with these parameters. Then, it is rounded to integers and, thanks to the number module function, only a non-negative value is returned. In the last step, the function divides the obtained result by 24 (24 hours in a day) and 60 (60 minutes in an hour). The fields of these columns in the spreadsheet have the "time" format set. As a result, the delay value is returned as 00:00:00 (hours, minutes, seconds);
- Degrees to periodicity - this column contains angular degree values in the range from 0 to 365; they are used in further calculations of periodic fluctuations (seasonality);
- Radians to periodicity - column E contains the degrees of plane angle from column D converted into arc measurement, i.e. radians:

$$\boldsymbol{\alpha(rad) = \frac{\alpha(^\circ) * \pi}{180^\circ}\, rad} \qquad \textbf{(1)}$$

  Degrees are converted into radians. While in the spreadsheet, the above formula should be replaced with the function below to make the program understand it. Function "= 2*PI()/360*D8" works according to the algorithm given above using the values from column D;
- Periodic fluctuations - data obtained for this column show the seasonality of the studied phenomenon. In the presented example, assumptions were made that delays are greater in autumn and winter while declining in the spring and summer season. For this purpose, the following function was used: “=((TRUNC((8*SIN(E7)))+8)/24/60)”. This function uses the course of the trigonometric sine function which shows annual variations of delays. The algorithm is as follows: depending on the value in column E (where successive degrees are converted to radians), the sine function returns a specific value consistent with its course. Then, multiplying by 8 and adding 8 ensures that the function is only positive and oscillates between 0 and 15 minutes. Divided by 24 and 60, it allows the function to be written as a time value in the 00:00:00 format. The course of periodic delays in the consecutive days of one year is shown in Fig. 1;

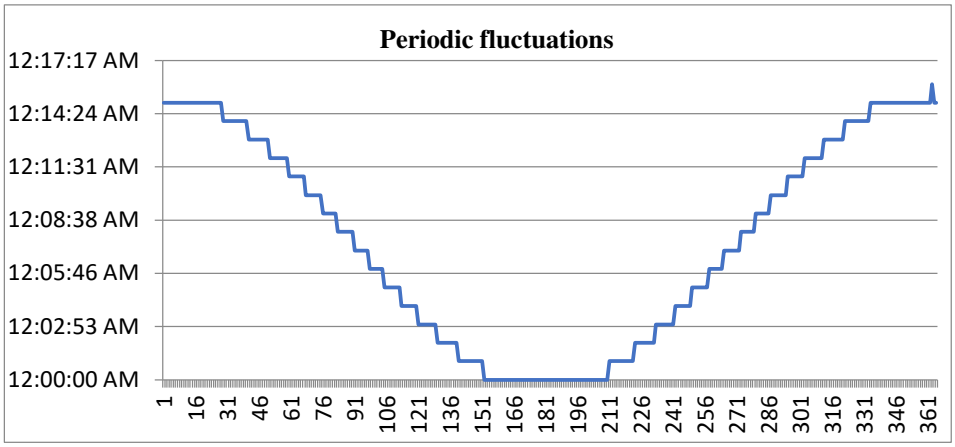

Fig. 1: The course of periodic fluctuations in days of the same year

- Random factor - the column contains random values created using the function RAND() and existing in the range from 0 to 1 inclusive;
- Unknown component - column H fields contain delays not related to periodicity. These are accidental delays that can be caused, for example, by train failure, damage to control devices or an accident. This function is: "=TRUNC((0,07*G7)*24*60)/24/60". After converting the cell format to the "time," values ranging from 00:00:00 to 01:40:00 can be obtained;
- Real departure time - the actual train departure time is returned taking into account all delays generated earlier.
- Delay - the difference between the real train departure time and planned departure time.
-

Fig. 2 presents the procedures for random distributions.

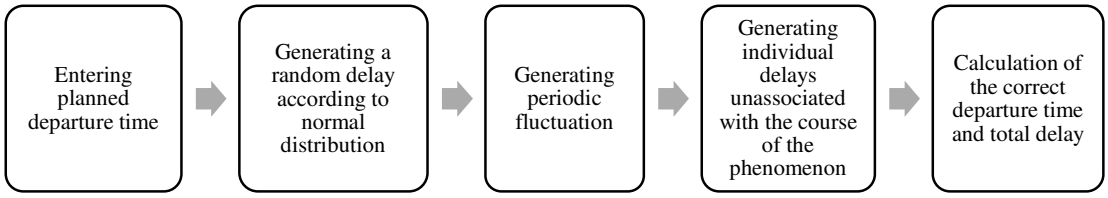

Fig. 2: Operation of random timetable generator

Table 3 summarizes the functions used in the random timetable generator.

Table 3: Summary of functions used in timetable generator

Function	Purpose
ABS()	Returns the absolute value of number
TRUNC()	Rounds number down to the nearest integer
NORMINV()	Returns the inverse of cumulative normal distribution
RAND()	Returns a pseudo-random number between 0 and 1
PI()	Returns number value π
SIN()	Returns the sine of the given angle

The Excel spreadsheet employed in various practical areas was prepared to assist in the performance of large amounts of demanding and repetitive calculations. Computer memory stores quantitative data, texts and completed calculations entered in the table fields. In addition to performing basic functions, such as data entry and simple arithmetic operations, the program offers various tools and functionalities. Additional options include graphic tools, mathematical, statistical and financial functions, let alone mechanism that allow the generation of charts, lists and complex analyzes. The tools offered by MS Excel are worth using to a greater extent in order to collect and process data from many systems. The most popular spreadsheet tool is MS Excel (supplied with the Microsoft Office suite).

The spreadsheet containing the tool is called Data Analysis. It includes instructions on how to generate data and perform analyses and forecasts. Table 4 shows a fragment of the analysis and forecasting tool.

Table 4: Selected fragment of the analysis and forecasting tool

A	B	C	D
Routine procedure		**Measure (Gauge)**	**Result**
1.Refresh the data in the ”Decomposition generator” sheet		Weighted arithmetic mean	0:08
2.Copy the entire content of the “Decomposition generator” sheet		Median	0:11
3.Paste into the “Test data” sheet as values		First quartile	0:06
4.Sort a column "Delay" (column J)		Third quartile	0:17
5.Refresh the pivot table on the “Data analysis” sheet		Variance	509,80
6. Drag the formulas in columns I and J		Standard deviation	0:22
7. Refresh the graphs on a sheet “Graphical presentation of data"		Quartile coefficient of skewness	0:12

Next, a manual was developed that allows the performance of the entire process: from data generation to the calculation of values describing the structure of timetable and its graphic representation. The cells visible to the right of the manual contain descriptions of functions that calculate individual values of the timetable structure. The following values are discussed in the article:

- weighted arithmetic mean;
- median;
- quartiles: first and third;
- variance;
- standard deviation;
- quartile coefficient of skewness.

1. The weighted arithmetic mean was calculated based on its own function (MS Excel does not have such am integrated function). For the purpose of this article, the following combination of functions was calculated: “SUMPRODUCT(G:G;H:H)/SUM(H:H)”. It refers to the columns that will be shown below and which contain a pivot table showing the course of the distribution and point statistical series created on the basis of the generated timetable. It is an ordered series of values along with their frequency of occurrence.
2. The median was calculated on the basis of serial base data, i.e. a simple (calculating) frequency distribution. The function “MEDIAN(“Test Data”!J:J)” is left to be calculated. It is a function embedded in the spreadsheet.

3. The first and third quartiles were also calculated with the embedded function "QUARTILE("Test Data"!J:J;1)." The structure of the function differs only by a parameter which indicates the use of the first or third quartile. The calculations are based on serial data from the "Test data" sheet.
4. Variance as a function is the basis for calculating standard deviation. In order to calculate variance, the time format (00:00:00) was changed into a numerical value showing the number of minutes of delay. This step was necessary because it was not possible to calculate variance when the delay time was below the weighted arithmetic mean (negative time cannot be used). Next, because of the absence of the function of calculating variance for a distribution series, further calculations included in variance were performed: a square from the difference between the statistical unit and the mean multiplied by the frequency of the phenomenon, adding up the total results and dividing by the total statistical population. Table 5 contains a fragment of the spreadsheet with a pivot table constituting a distribution and point series, delay converter into minutes and functions calculating data necessary for variance step-by-step.

	G	H	I	J	K
2	**Delay**	**Number of delays**	**Number of minutes of delay**	$(x_i - \overline{x})^2 * n_i$	$\sum_{i=1}^{N}(x_i - \overline{x}) * n_i$
3	0:00	13	0	841,8024262	558739,7402
4	0:01	50	1	2483,002734	
5	0:02	47	2	1718,605599	
6	0:03	62	3	1579,270106	
7	0:04	47	4	769,7716578	
8	0:05	48	5	445,6388293	
9	0:06	56	6	234,6491938	
10	0:07	46	7	50,424455936	
11	0:08	45	8	0,0993558692	
12	0:09	47	9	42,68680383	
13	0:10	49	10	186,8983366	
14	0:11	50	11	436,0136832	
15	0:12	43	12	671,9307092	
16	0:13	45	13	1103,954286	
17	0:14	53	14	1878,231986	
18	0:15	58	15	2803,972953	
19	0:16	62	16	3921,523756	

Fig. 6: Fragment of the analysis and forecasting model

5. Standard deviation is one of the most important values describing the studied phenomenon, calculated as the root of variance. In addition, the time format was restored (variance is shown in minutes in numeric format).
6. The quartile coefficient of skewness is: the total of the first and third quartiles minus the median calculated before.

In addition, the tool also has the function of graphic presentation of the studied phenomenon. The "Graphic data presentation" sheet contains a graph showing delays in the time function and a delay distribution histogram showing how often specific delays occurred. To illustrate the phenomenon, a linear trend is presented showing the behavior of the generalized function (Figs 3 and 4).

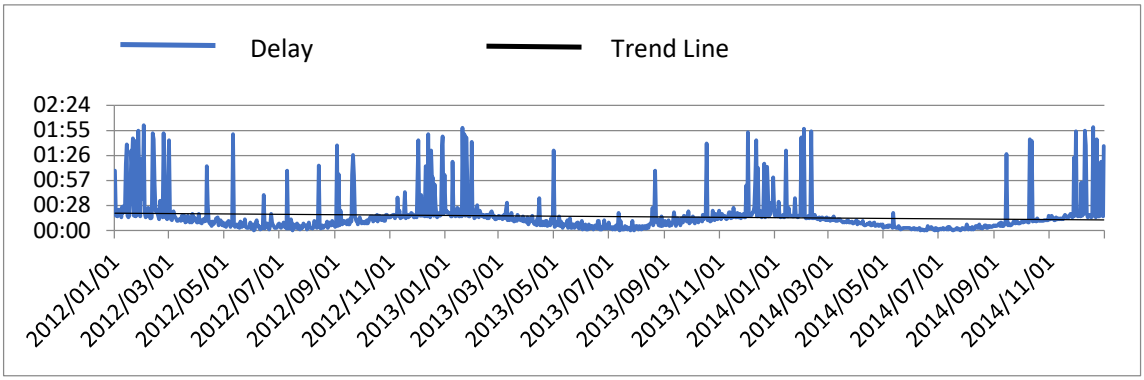

Fig. 3: Graphic representation of delays in time in the years 2012÷2014

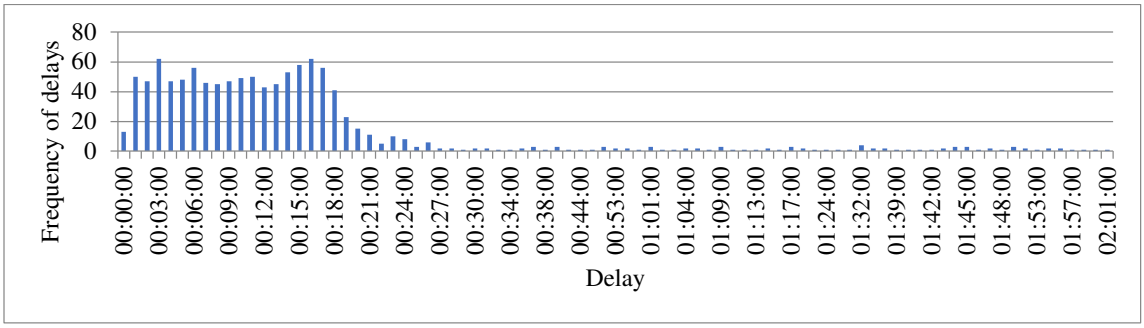

Fig. 4: Delay distribution histogram

Interpretation of study results

The design and development of the timetable generator and the analytical and forecasting tool was aimed to obtain model results for departure timetables along with their analysis. As a result, a number of values and parameters were obtained that can be subject to analysis based on returned results and their graphic representations. Table 6 shows test results in minutes obtained for the selected sample.

Table 6: Test results obtained for the selected sample in minutes

Measure (Gauge)	Results
Weighted arithmetic mean	0:08
Median	0:11
First quartile	0:06
Third quartile	0:17
Variance	509,80
Standard deviation	0:22
Quartile coefficient of skewness	0:12

The research sampling showed that:

1. The weighted arithmetic mean indicates the approximate value in the general population. The study yielded the result of eight minutes. This shows that over four years (the period of study of the phenomenon) each of 1096 train departures was delayed by eight minutes. This value is sensitive to extremes that may blur the clarity of results, therefore further values should be used.
2. Median or a value that divides a series into two equal parts where half of the units have values lower than or equal to the median, and the other half have values greater than or equal to the median. A median of 11 minutes was obtained in the study. This value is the center of totality of all statistical

units of the population. It is worth noting that the median does not respond to changes in the value of extreme features, i.e. unusual and accidental observations.

3. The first quartile was 6 minutes and the third one 17 minutes. Based on these results, it appeared that 25% of the results have values lower than or equal to 6 minutes and 25% of the results have a value greater than or equal to 17 minutes. Half of the results obtained are in the middle range, i.e. between 6 and 17 minutes of delay. This observation helps determine the quantitative distribution of delays.
4. Variance as a measure of dispersion is the basis for calculating standard deviation; as such, it is not used to describe the studied phenomenon.
5. Standard deviation is a measure of diversity and determines the average deviation of individual feature values from the arithmetic mean. The analysis returned the result of 22 minutes, which indicates that the average value of the statistical unit differs by 22 minutes from the arithmetic mean. The result leads to a conclusion that the distribution of the studied feature shows a firm presence around the average (expected) value.
6. The quartile coefficient of skewness is a measure of asymmetry and provides information on how units are distributed in relation to feature distribution. It illustrates in what part of the variability range most of the unit features are gathered. During the analysis, the result of 12 minutes was obtained, i.e. greater than 0, which indicates right-sided (positive) asymmetry where the average value is greater than the median.
7. A graphic representation of delay in a function of time (prepared based on departure timetable database) shows how a given population behaves in consecutive units of time. Based on this representation, several regularities can be identified such as:
   - strong seasonality of the phenomenon;
   - there is a high increase in total delays in the winter season; additionally, there are frequent and single delays with very high values;
   - in the summer season the situation gets stabilized, and there are only a few major delays;
   - looking at the trend line, a downward trend can be discerned, which testifies to a decrease in the number of delays in subsequent periods (Fig. 5).

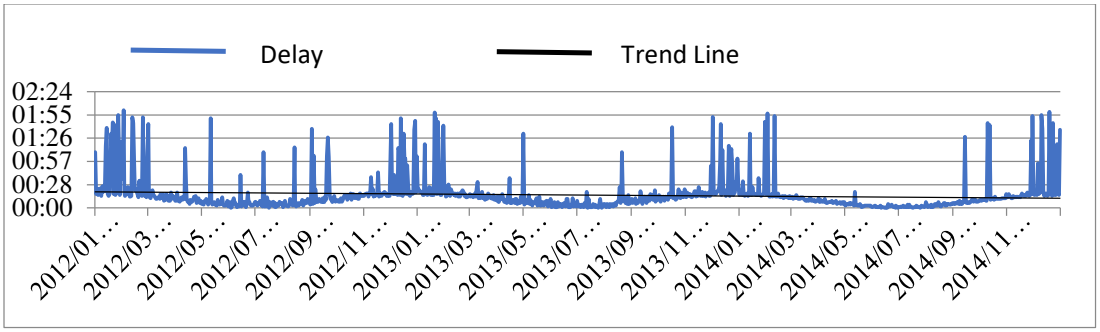

Fig. 5: Graphic representation of linear delays in time in the years 2012-2014

8. Delay distribution histogram is a column chart that shows the frequency of occurrence of individual delays. This form of data clearly shows which values are most common. It can be seen that the largest number of delays fall within 0 to 18 minutes. Greater delays than those given above are rare and get reduced as the value of the delay increases. To illustrate these conclusions, Fig. 6 again shows this delay distribution histogram.

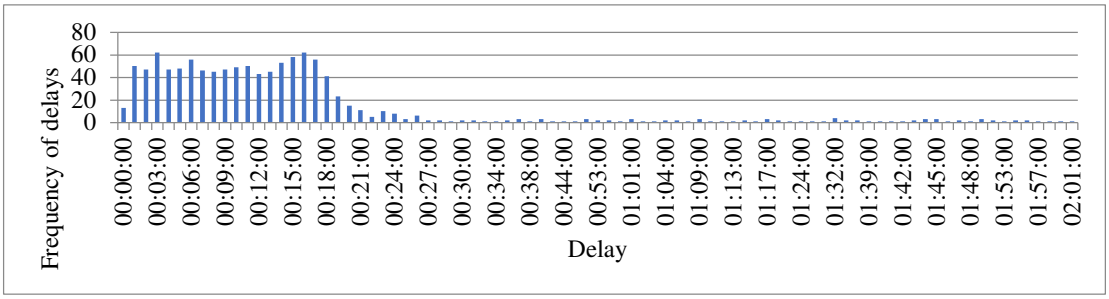

Fig. 6: Delay distribution histogram

Summary and Conclusions

The research shows that the occurrence of large delays of no more than 18 minutes may be caused by bad weather conditions. The trend behavior indicates the right company management strategy which reduces the number of delays across all rendered services. In addition, by analyzing the delays data on a regular basis and comparing it with the management response, it is possible to check the course of the phenomenon thoroughly when making specific decisions. Consequently, it becomes clear which decisions have a positive impact on reducing delays and, ultimately, on improving the quality of services rendered by the railway undertaking.

The adopted research goal was achieved, and the research hypothesis was verified as viable. To achieve that, the procedures and methodology for developing an analytical and forecasting IT tool were designed and its practical application in the company were demonstrated.

Based on the conducted study, the following conclusions were drawn:

1. The designed analytical and forecasting tool allows quick analysis of obtained delay distribution, assists in the forecasting of further phenomena by a decision maker and facilitates drawing final conclusions.
2. The departures timetable generator easily generates data that the user can model to various parameters. This solution allows various courses of delays to be plotted along with making predictions.
3. The data discussed in this article is not real since there author was not authorized to use such data, however it is similar and the application can be implemented for use within the enterprise.
4. The developed tool can be employed at many decision-making levels of the enterprise where the analysis and imaging of the behavior of function help draw conclusions for the future. In addition, the periodicity of the function enables the company to take action to prevent delays; the monitoring of the trend of the phenomenon allows the management to continue such action to reduce the number and size of delays of the means of rail transport. Next, determining the average size of delays and standard deviation can be used to prepare procedures to limit initial delays.
5. As part of further research, the tool can be enhanced through the use of other measures for descriptive analysis of the structure of the phenomenon, also investigating delays from different angles and across different layers. On top of that, it is worth considering external factors in the structure of delays, such as the quality of services provided by competitive railway undertakings, the condition of the railway infrastructure and other factors likely to affect the level of studied delays.
6. The developed innovative IT tool supports decision-making at the managerial level of a railway undertaking, and, thanks to the analysis and forecasting capacity, the entity is able to predict upcoming changes.
7. Such activities are an integral part of the management process and help predict the size of various types of obstructions accurately.
8. Such a good analytical and forecasting tool will contribute to the company's growth while inaccurate and imprecise mechanisms may lead to loss of liquidity and ultimate bankruptcy.

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A Model of Implementing Design Strategies in SMEs

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Abstract

The purpose of this article is to propose a model for implementing design strategies in enterprises in the SME sector. The developed model is the result of observation, experience and research of nearly 80 Polish enterprises in the SME sector. Design strategy in such enterprises is one of the key tools of innovation and product development. Thanks to dedicated subsidies e.g. from national agencies, Polish SME enterprises are increasingly trying to improve their maturity in the field of design by implementing design strategies. Due to the fact that knowledge of strategic management principles in SME companies is often moderate and often there is a lack of competence in formalizing development goals, the use of models for building and implementing strategies seems reasonable. Therefore, the developed model is an attempt to standardize activities related to building and implementing a specific type of functional strategies, which are design strategies. For the purposes of presenting the model and the legitimacy of its use, the article is divided into four main parts. The first one discusses the specifics of design strategies as a form of strategic management in SME enterprises, then the specifics of these enterprises are discussed, indicating problems and competence gaps hindering the implementation of design strategies. The next part presents the strategy implementation model that responds to the identified problems of enterprises in the SME sector and then discusses the example of strategic changes resulting from the application of the model.

Keywords: Design, Strategic Management, Design Strategies, SMEs.

Introduction

The design strategy is a set of actions leading to the launch of new products on the market, often with unique or innovative features. In its assumptions, it bases on good practices in industrial design and as an element of strategic management is not a new phenomenon. The first definitions of design strategies appeared in the 70s and 80s [13] where they were directly related to the company's offer and marketing development. However, in the authors' opinion, the role of industrial design and thus design strategies in the era of Industry 4.0 has increased significantly and thanks to available technologies, it goes beyond the scope of the product itself and implies a number of strategic changes in the area of processes, projects or technologies used in companies. The role of industrial design and product designers is increasing due to the use of the Internet of Things, especially various types of sensors and ever better use of data. Product designers have more knowledge (and what is more important, they get it much faster) about the utility needs, they also have the ability to give products new features by information technology.

Design Strategy as an Element of Strategic Management

As a result of the dynamics of the environment, there is an increase in the importance of the design process, which nowadays is required to design products tailored to the needs of customers. On the one hand, new forms of obtaining and gathering information about usage requirements facilitate product design processes, but on the other hand, they require appropriate preparation of the organization (its maturity or readiness) in the resource or process dimension, which is the heart of modern design strategies.

Market, social and ecological trends are the second group of reasons for the increase of the importance of industrial design. Growing expectations for tailor-made products or products developed according to the principles of the "zero waste" philosophy impose searching for new ways of design and production on the producers.

Premises resulting from technological progress or i.a. ecological trends imply the growing importance of industrial design when designing new products. Thus, the importance of design strategies in the functioning of companies is growing. Design strategy as an element of strategic management is a part of the classic functional strategies of enterprises according to the classification of i.a. J. Penc [6], who distinguished the three classes of strategy:

– enterprise level strategy (shaped by the top management that oversees the activities of an organization that deals with more than one type of economic activity),
– an operational unit level strategy (SBU) is used to control the interests and activities of a particular, individual business unit,
– the functional level strategy creates a framework for managing functions such as products, finances, research and development, marketing, ecology, in accordance with the strategy of the operational unit.

In addition, design strategies can be found in a number of references in [4, 5], where a functional strategy at the implementation level requires the definition of the target market, range and width of the assortment, and product brand policy.

In the authors' opinion, contemporary design strategies are expanding beyond the scope of product change and will force a number of changes in other areas, which will be presented in the last part of the article in the form of a catalog of potential areas for changes in the functioning of the company. Therefore, in this article DESIGN and design strategies do not ONLY refer to the appearance of products, but above all to a set of management, organizational and design activities leading to the delivery of USE VALUE to end users.

The importance of design strategies for the modern economy should also be emphasized. At the turn of 2018 and 2019, regional and national development agencies in Poland awarded funding to several hundred companies from the SMEs sector in the field of design development. In 2019 only, Polish development agencies (including PARP - Polish Agency for Enterprise Development and regional agencies) allocated nearly 300,000,000 to grants for development projects, including the development of product innovation through the implementation of design strategies and design projects ("Design dla Przedsiębiorców" and "Wzór na konkurencję" competitions). Authors deal with strategic analyzes of enterprises of the SME sector in Poland as part of research and consulting work and observe a number of problems in the field of strategic management arising. Among others: due to the lack of formalization of strategies in SME companies, it was considered reasonable to develop a model for implementing design strategies for the needs of this sector. To develop the model, it was necessary to analyze the needs in the area of implementing design strategies and to understand the specificity of SME enterprises.

The specific of SMEs in the context of Building Design Strategies

Design strategy is an example of a development strategy that can be used in a company of any size. The authors' focus on the SME sector and emphasizing the role of this strategy for the development of small and medium-sized enterprises results from two reasons. Firstly, the design strategy refers directly

to the offer (products), which is the core of SME operations, and allows to increase the competitiveness of the current offer. Secondly, it allows the management maturity to increase through the basic formalization of plans and visions, which were often implemented ad hoc and without control in these companies.

Companies from the SMEs sector are often family companies that have built their position through organic development and improvement of the offer. Very often they experimented on their own with the manufacturing and later the improvement of products. Sometimes the success achieved 20-30 years ago was determined by fortuity (e.g. purchase of a machine that enabled mass production of given product). As a result, product development has often been unstructured and not methodical, without knowledge of product design principles, project methodologies, or good R&D practices.

SMEs sector companies are often characterized by high flexibility and the ability to adapt to customer needs, they can modify their products, adapt processes to orders and carry out transactions on a large scale. However, they treat operational processes as a basic propulsion mechanism and often do not plan development in new areas of activity. Most often the investment outlays of these companies are focused on the development of machinery, production improvement, development of halls and warehouses, sometimes new product distribution channels. However, the strategies of these companies, or rather plans, do not refer to vertical integration, buying new companies, taking over market shares or incurring high investment expenses encouraging to develop in new industries (which is typical for large holding companies). Thus, SME enterprises do not build long-term development strategies based on capital but on a product (they do not invest e.g. in acquisitions of other companies).

The problem in building design strategies is to seek the answer to the question HOW to build such a strategy and implement it in organization. While high-level strategies typical of large enterprises, often containing complexly named qualitative or capital goals, are built regularly, small enterprises lack adequate competence to create strategic plans. Therefore, a very important role of the design strategy in SMEs is the role of organizing and formalizing existing visions and imprecise development plans. The authors' experience shows that most of the surveyed companies did not have a defined development strategy and development plans depended mostly on the owner's vision. Observations from 79 SMEs (mainly manufacturing) over the 2017-2019 period indicated that nearly 90% of enterprises did not have any strategy or defined goals.

Table 1: Level of strategy formalization in the surveyed companies

Level of strategy formalization	Number of observations	Comments
Formalized strategy	**2**	In the analyzed companies strategic documents were operating; development goals and plans were defined. The companies had a clearly defined vision and mission as well as defined innovative and development projects.
Informal strategy	**37**	In the analyzed companies the owners had clearly defined development directions that were never written down. The company has no defined vision or mission and product development takes place in an organic way.

Lack of strategy	**30**	In the analyzed companies the owners were focused on product improvement, plant development and ensuring business continuity, however, there was no strategy. Often, companies were in the process of succession, where the owner handed over management to their children expecting them to develop a strategy and continue to achieve the results achieved over 20-30 years.

The above considerations were aimed at presenting a general outline of design strategies and their impact on the functioning of SMEs. The development, implementation and realization of recommendations within the framework of design strategies is of wide importance in the area of product and innovation development, as well as ensuring the survival of companies from the SMEs sector. The table below synthetically presents the advantages of design strategies as a tool for managing the development of SMEs and ensuring their survival. The table indicates the weaknesses of entrepreneurs that are challenges during the implementation of the strategy.

Table 2: Benefits and challenges of design strategies

BENEFITS OF DESIGN STRATEGIES	CHALLENGES FOR ENTREPRENEURS
• Easily noticeable effects of the strategy in the form of visible product changes • Low investment risk • Easy to understand for all employees • Easy to adapt to a smaller company • Low level of complexity (targeted towards the product)	• The need to know the principles of pattern design and analysis of user needs • Knowledge of project management principles • The need to improve design and management competences in many departments at the same time • The need to improve design maturity in order to keep up with the market

The model of implementing design strategies in SMEs

Based on the identified problems in the lack of competence to methodically define design strategies in companies, the authors propose a strategy implementation model based on the best practices of strategic management as well as project management. To develop the model, it was necessary to isolate two states, typical for building and implementing each strategy, i.e. the current state (AS IS analysis - as it is) and the future state (TO BE) also including the way to reach the desired state (strategic change).

The sequence of actions presented in the model allows to learn the conditions of the company's functioning both in micro and macro environment and then to develop recommendations (assumptions for design strategy) and their implementation in the project mode. Design projects are a kind of tool for implementing the strategy or even realization of its assumptions. Due to the fact that the design strategy leads to changes in products, the project form of work is justified (the project is a unique activity that brings a legitimate business change). The biggest challenge is to measure your achievement

level after the change. The authors propose two classes of measures of strategic change (apart from the observed changes in the functioning of the company as a whole).

In the presented model, 2 key areas were distinguished, i.e. audit area, project area. Within each of the areas, a set of actions and tools necessary for the successful implementation of the design strategy in the company and achieving the assumed results in the form of new or improved products of high market importance was proposed. In the following, the model was decomposed and its key elements discussed in detail.

Fig. 1: Model of design strategy management

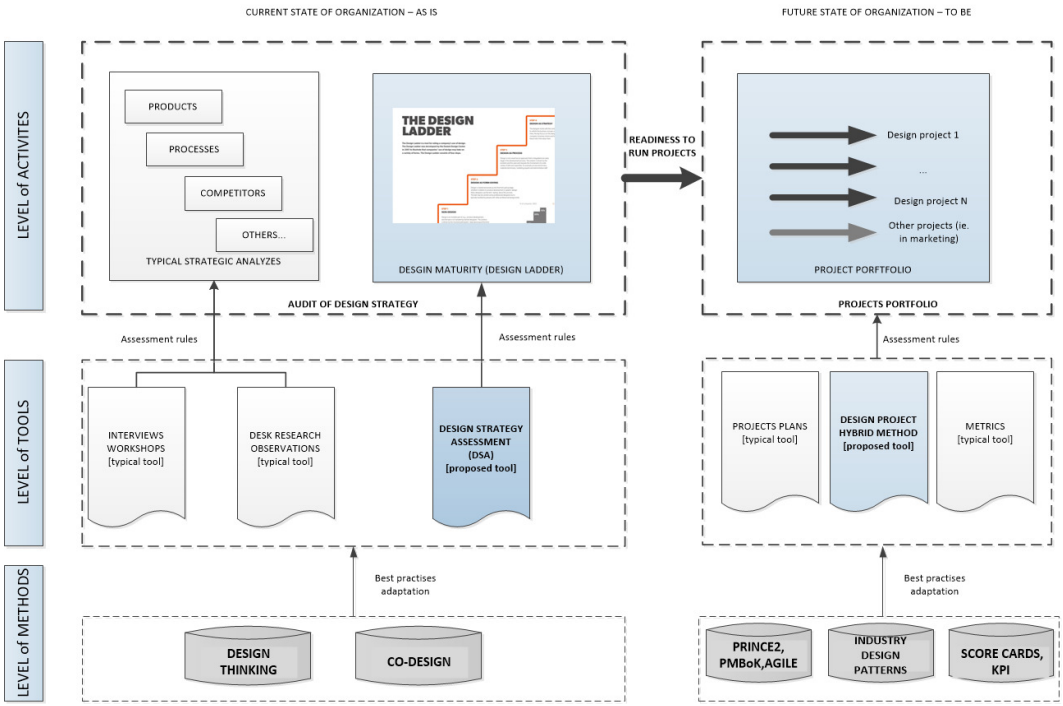

Design audit (AS IS)

Design audit is a basic tool for determining the current state of the company (AS IS) and assessing the company in the context of the closer and distant environment. The audit covers the analysis of all key areas of the company's operation as well as the development of assessments and identification of problems that should be solved by implementing (realization of) a design strategy.

Within the audit activities, the authors try to go beyond the framework of classic strategic analysis which covers a set of basic activities by developing audit analysis with elements of design maturity assessment. Therefore, as part of the audit being a way of analyzing the company before implementing the strategy, two analytical activities were distinguished:

- basic analysis – a typical strategic analysis, consistent with good management practices,
- analysis of design maturity and readiness to implement the strategy – a design-specific analysis determining the level of knowledge and application of good design practices in the company.

Basic Analysis

The basic analysis for the needs of the model implementation strategy is based on the analysis of the company in its surroundings and its inside. The concept of Griffin's environment [5] and the scope of strategic analyzes in [7] comes down to three key areas - the inside, the closer surroundings and the distant surroundings. It should be emphasized that the scope of analyses in the concept in [5] is holistic, in the case of design strategy it should be adapted to key aspects of design. The table below contains the basic areas of analysis for the purposes of diagnosing the company's condition.

Table 3: Areas of basic analysis in design strategy

Area	Type of analysis	Details
Company inside analysis	Product analysis	Includes design analysis and evaluation of the current product offer design. Aesthetic, functional and utility aspects as well as the degree of meeting the needs of users by the products offered by the company are analyzed.
	Process and technology analysis	Includes the analysis of the methods and technologies used in the production of existing products as well as the process of designing new products, its course and efficiency.
	Organizational structure analysis	The purpose of the analysis is to verify to what extent the management structure is conducive to offer development, who is responsible for the processes of implementing new products and to what extent the crew's competences are sufficient to manage design projects.
Close surroundings analysis	Channel and audience analysis	Analyses verifying ways of reaching the recipients of the current offer and the level of their satisfaction with existing products.
	Competitor's product analysis	Comparative analysis presenting the company's current products in comparison with close and distant competitors as well as producers of substitutes and complementary goods.
Distant surroundings analysis	Industry trends analysis	It covers the analysis of trends within a given industry and is used to assess how the industry will change in the coming years in order to best match the company's strategy.
	Social trends analysis	It covers the analysis of habits, behaviors, demographic structure and changing user needs.
	Technological trends analysis	It covers the analysis of machines, devices and technological innovations in relation to the market on which the company operates and to the global market (e.g. in terms of IT trends).

Analysis of Design Maturity and Readiness to Implement A Design Strategy

The analyses of organizational maturity and readiness for change are more and more focused on, as evidenced by numerous studies, including [2,14]. Maturity is often something difficult to measure and yet recognizable intuitively by managers.

It should be noted that so far one key positioning model has been created in design management depending on its design maturity and the share of pattern design processes in the company. This model, called the Design Ladder, is presented below [12].

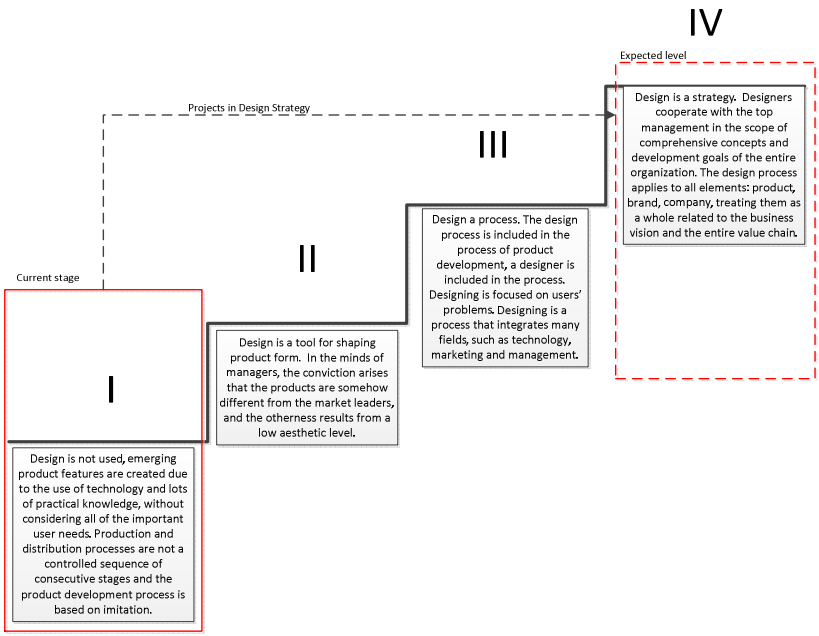

Fig. 2: Design ladder

It seems reasonable to base company's assessment on the design ladder model. The model organizes issues crucial for design very well. However, it does not define tools that allow to unambiguously decide on the level at which the company is located or define transition processes. The goal of the design strategy should be to move to the highest possible level, but there is no clear methodology for implementing the transition process. According to the authors, the implementation of the design strategy that is to ensure the transition to the desired level.

It is worth noting that a similar approach to maturity can be observed in process maturity assessment models such as CMMI [3]. The CMMI model is much more formalized than the Design Ladder model. Assessment questionnaires, such as SCAMPI [11], have already been developed for the CMMI model, which allow, based on observations and responses to a set of questions, to assess the level of company process maturity.

Due to the lack of similar solutions for the needs of design maturity assessment, the authors proposed their own tool for measuring readiness to implement design strategy. The tool does not directly assess design maturity, but complements the Design Ladder model and is an attempt to measure maturity and readiness to deploy strategy.

SECTION: **PRODUCTS**	0/12
QUESTION	ANSWER
R1. How many new products (services) have been introduced to the market during the lat 12 months?	3 options
How many innovative design ideas for new products have been created in the company in the last 12 months?	3 options
How many of these ideas have been implemented in the last 12 months?	3 options
How many design improvements (compared to products / services) have been made in the last 12 months?	3 options
Please select which activities have occurred in your organization during the last 12 months:	X
Top management submitting ideas for new products	YES/NO
Middle management submitting ideas for new products	YES/NO
Submission of ideas for new products by direct production employees	YES/NO
Are people experienced in design working on product development?	YES/NO

SECTION: **PROCESSES**	0/12
QUESTION	ANSWER
Z1. Are the design projects for implementing new products formalized?	YES/NO
Is there a defined process in the organization for building prototypes of new products (the defined process has its own description, the owner of the process – the person responsible and is repeatable)?	YES/NO
Are existing products being improved continuously? (new technologies / new production methods)	YES/NO
Which of the processes necessary for design development were carried out in the company?	X
• Competition anlysis	YES/NO
• Benchmarking new products	YES/NO
• Using creative techniques to define new products (brainstorming, design thinking)	YES/NO
• Ordering expertise / expert consultations with designers	YES/NO
• Initiating cooperation with research units (institutes / universities)	YES/NO
• Feasibility study before launching a new product on the market	YES/NO
• Profitability analysis for new products	YES/NO
• Creating product data sheets for new products	YES/NO
• Purchases of new devices / technologies / licenses to improve production processes	YES/NO

SECTION: **PROJECTS**	0/9
QUESTION	ANSWER
P1. Are new products created in design mode?	YES/NO
How many such design projects have been initiated in the last 2-3 years?	3 options
Have the project cards been developed (project charter - a formal document for all major project work)?	YES/NO
How many projects ended with the implementation of the new product?	3 options
Have dedicated budgets for design projects been allocated?	YES/NO
Were teams appointed to carry out design projects?	YES/NO
Was the risk of design projects managed methodically? (agile projects, design thinking, service design)	YES/NO

SECTION: **PEOPLE AND ORGANIZATION CULTURE**	6/11
QUESTION	ANSWER
L1. Is there a dedicated department responsible for generating ideas for new products and / or their implementation?	YES/NO
Is there a department responsible for market analysis in the field of business?	YES/NO
How many people were involved in the work on new products?	3 options
How many people in your organization have submitted ideas for improving products or production processes?	3 options
How many people were involved in improving production processes?	3 options
How many people participated in industry conferences and / or exhibitions, fairs where own and competition products are presented?	3 options
Did the employees willingly get involved in work on new products or improving existing ones?	YES/NO

Fig. 3: The readiness for design strategy implementation assessment sheet

Depending on the answers received, points are allocated in accordance with the adopted rules:

- • YES / NO questions - 1 point for a “YES” answer, 0 points for a “NO” answer,
- Questions with 3 options to choose from - 2 points for option three, 1 point for option 2, 0 points for option 1.

The maximum possible number of points to be achieved is 44, and depending on the ratio of the number of points to the maximum, the company is classified in one of three levels of readiness:

- From 0 to 14 - low readiness, high risk of failure,

- From 15 to 30 – moderate readiness,
- From 21 to 44 – high readiness.

The developed tool can also be a permanent element of assessing design maturity (not only at the audit stage).

Project Portfolio Management

Design projects are the basic form of implementation of strategic recommendations necessary to achieve the expected state of change (TO BE). The developed model assumes that the implementation of the design strategy should be based primarily on project activities, due to the need to obtain a new or improved product. As a rule, design projects fulfill the classic definition of projects (in accordance with PMBoK [9]) and are temporary, multifunctional activities (involving employees from various departments), unique with a clearly defined result leading to business change in the company. On the other hand, building a portfolio of strategic projects focused on design development is part of the standardization of actions necessary to increase the level (maturity) of design at the SME.

It is worth emphasizing that in the implementation layer, design projects require specialist methodological knowledge and experience of a designer. These projects include a synthesis and analysis stage, which aims to develop the substantive and theoretical foundations necessary to prepare the concept of a new product. In turn, at the stage of conceptualization, it is necessary to develop a new product in terms of shapes, aesthetics, utility functions and initial visualization (e.g. in the form of 3-D models, conceptual sketches, etc.). After validation and approval of the concept for implementation, you can begin to build prototypes or models from substitute materials and assess the technological feasibility of the project.

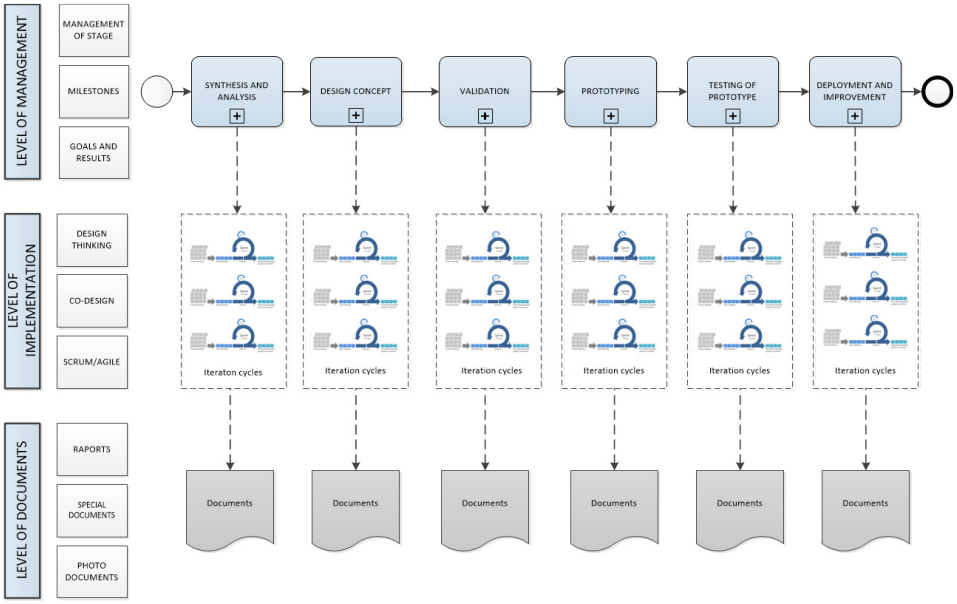

Fig. 4: Design project management hybrid model

As for the very manufacturing level of the design process, work at each stage of the design project should proceed in an iterative and incremental manner. A new product should not be produced without further loops providing feedback from potential recipients and major project stakeholders (e.g. management). Therefore, in the authors' opinion, at the design stage of the design project, agile approaches should be used to ensure "early feedback" and incremental product development.

Therefore, the diagram on the picture no.2 presents the method of implementing design projects within the design portfolio of the design strategy (DESIGN PROJECT MANAGEMENT HYBRID MODEL). The developed scheme assumes a hybrid of good practices in classic project management where the main stages in accordance with good practices in the design project and PRINCE 2 [8] management methods and elements of agile approaches at the level of SCRUM [10] implementation are distinguished.

The biggest challenge for the success of design projects in SME enterprises is to understand the idea of design work in the field of design projects and to ensure design competence. In many companies, the function of an expert can be performed by experienced employees or dedicated product designers, but this is not a common phenomenon. Small businesses focused on ensuring business continuity cannot always hire a full-time product designer or do not need a full-time designer.

Examples of strategic changes that appear as a result of implementing design strategies

In the case of SME enterprises, the implementation of the design strategy as one of the basic or (as indicated earlier) the only strategic activity causes changes in many areas. These changes may be typical for the Kotter model. The natural area is the change in products, however it is not the only area of change caused by the implementation of the strategy. The record of the company's experience based on the observation of nearly 80 companies over 2 years of research has allowed us to identify 7 main areas of change.

Table 4: Areas of SMEs strategic change

Area of change for SME	Specification and examples
Product changes	They constitute a key, fundamental area of change. They refer directly to the current offer and focus on refreshing, modifying, improving or introducing a completely new product that the company has not produced so far. Product changes can mean adding new functions to existing products (e.g. development of an electric bicycle on the basis of a classic one) and may be associated with entering new markets (e.g. vertical integration - production of boats instead of previous production of only the equipment for these boats)
Changes in the recipient structure / segment	These changes are often derived from product changes. The development of new or improved products is preceded by an analysis of the market and the needs of specific groups of users (recipients). As a result of product changes, the company reaches new customer groups or new market segments. An example would be a line of new furniture dedicated to a specific group (e.g. seniors or people with mobility impairments).
Resource changes	Changes in resources are a typical change that occurs in every SME, often regardless of strategy. However, as a consequence of implementing the strategy, there is a need for significant changes in the structure of resources, especially fixed assets. Typical changes in resources include changes in infrastructure or equipment (e.g. new warehouse, new machine park, new production line, development of additional functions in machines).
Changes in the organizational structure	These changes are a consequence of the need to reorganize the company due to the implementation of the strategy through dedicated design projects. The company must include new roles in its structure (e.g. project leaders) as well as sometimes entire departments responsible for the development of the offer.

	An example of such a change is, for example, establishing a research and development department that develops concepts for new products or works in the field of materials (e.g. in terms of the hydrophobicity of the surface of bathroom equipment products).
Changes in the supply chain / logistics chain	As a result of design strategies, there are often changes in the logistics chain and even the entire value chain in the company. This is due to the fact that companies that have been focused mainly on the product for many years, perfectly understand its properties, the owners often improved the products themselves and thus they know the properties of the components they use to manufacture their products. Having deep knowledge of the processes of producing complementary elements, it is easier for them to enter the role of the producer of such an element. An example would be the launch of its own integrated circuit production line at a company that assembles electronic devices (which previously bought integrated circuit boards).
Technological changes	This is one of the key changes resulting from the implementation of the design strategy. Technological changes may relate to changes in production technology (and this is the most common change) as well as, which seems crucial in the era of industry 4.0, changes in the use of IT systems in current functioning. The authors' observations indicate that thanks to the strategic team composed of company representatives and experts from the consulting company, it is possible to accelerate the digital transformation of companies from the SME sector. Companies with a low level of computerization based mostly on basic spreadsheets, thanks to the synergy of the strategic team can go to a higher level of technology use. An example is the implementation of distance sensors for measuring material cutting and data synchronization with an internal production control system.
Process changes	Changes are often a consequence of technological and resource changes. New machines and devices or the reorganization of production lines allowing the use of work automation technologies often implies changes in processes. Some processes are redesigned (e.g. production process) and some cease to be justified. An example of such changes is the redefinition of the quality control process of material cutting and the elimination of manual operation by using a distance sensor that checks whether the material has been evenly cut.

Summary

To sum up the above considerations, it is worth paying attention to the clear benefits achieved by SME enterprises due to the implementation of design strategies. In addition to obvious changes in revenues due to the extension of the offer with new or improved products or more innovative services, according to the authors, changes in the use of information technologies deserve special attention. The natural evolution assumes that companies are moving from analog and manual production to automated and then to controlled with the use of information systems (e.g. ERP). They finally operate in accordance with the paradigm of industry 4.0 where there is an increased share of intelligent technologies and the use of modern solutions, e.g. the Internet of Things in processes operational and strategic decisions. It should be added that the costs of implementing the design strategy are tied with some investment outlays. In the case of the surveyed enterprises, often at the level of several million Polish zlotys, which was in some cases the equivalent of annual income.

The second very important issue arising from the implementation of design strategies is greater organization synergy. Entrepreneurs in the SME sector, who often built their own companies from scratch by acquiring contractors or presenting their products at fairs, fulfilled all key functions

personally - both marketing and controlling production and even controlling this production. Implementation of design strategies in which changes occur in the organizational structure or in the entire resource structure of the company is an opportunity for decentralization of management, which results in greater synergy of many people involved in the company's development activities.

The use of elements of the developed model allows organizing work in the field of implementing design strategies. The presented model has an ordering function and can be a starting point for further development, both in the area of analysis and the area of implementation (based on dedicated design projects). The authors, presenting the current state of research on the model, are aware of its imperfections and the need for modification. Undoubtedly, it is necessary to take into account the aspects of measuring the effects of the strategy, therefore the next steps in the model's development will relate to modeling KPIs of the strategy's implementation performance.

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Structural Analysis of The Connection Network of The W2 Variant of The Metropolitan Rail of The Silesian Voivodeship In Poland

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Abstract

The article presents simulation research, the purpose of which was to assess the parameters of the proposed, modeled by the team of variant W2 authors (the author of this publication was not a member of this team), concept of a new transport network, which goal is to improve public transport in the Silesian agglomeration. The analysis made it possible to assess the network parameters and its assessment in terms of both functionality and resistance to possible interference.

Keywords: Silesian Voivodeship Metropolitan Rail, Structural Analysis, Graph Theory

Introduction

Transport networks have a number of goals to fulfill. These goals are even more demanding in the area of public transport networks. Currently, the most important goals of public transport include [1]:

- enabling the movement of large passenger streams as part of public transport
- enabling the movement from less urban areas to more urbanized areas, and vice versa within the public transport
- reducing the number of individual vehicles in the overall stream of means of transport
- reducing the number of harmful substances emitted to the environment
- reducing the likelihood of accidents and associated negative effects (public transport is characterized by a high safety rate)

The abovementioned environmental factor (reduction of harmful emissions and accidents) is one of the most important elements and tasks set for public transport in accordance with the assumptions of sustainable transport. Obviously, organized public transport must be attractive to users also in terms of a number of elements such as (Sobczak 2017):

- fare
- travel time (especially compared with private transport)
- transport comfort

- the number of necessary transfers

The fulfillment of these criteria is very difficult and at the same time crucial for the implementation of efficient and effective transport. Thus, it is one of the elements and challenges that carriers providing public transport must meet - as well as planned metropolitan railway line in Silesia (Poland).

The concept of the Metropolitan Railway

The metropolitan railway is planned for implementation in the Silesian Voivodeship in Poland. It is significant that the Silesian Voivodeship is one of the most densely populated and urbanized areas of Poland. For this reason, in this area it is particularly important that the applied and proposed public transport solutions meet the abovementioned requirements. Currently, both road and rail public transport (tramway in selected cities and railways throughout the whole province) are carried out in this area, however, it is also an area with very high individual transport. In order to increase the region's transport attractiveness, increase the availability of public transport, and reduce the intensity of individual transport, also taking into account the forecast of growing transport needs in the region, actions have been taken to develop the concept of metropolitan rail (as mentioned in the abstract, the author of this publication was not a member of this team). The concept includes several variants of railway expansion due to the need to take into account both a number of different needs to be met and the required time and financial resources to implement it. The concept developed by its authors allowed for a whole range of very important factors, including factors of the demographic structure of the region, the structure of current passenger flows distribution, current and planned transport needs, as well as, its impact on the overall development of the region. The analyses carried out are a very important element of the created concept. According to the author of this publication, it is worth extending it by structural analysis of planned and proposed connection networks using graph theory.

Graph theory in the analysis of transport networks

The article describes research carried out using the computer simulation method. However, the applied technique was a stimulation technique by using graph theory. The tool that was used to conduct the research was the Gephi software, which is widely known and used for network analysis software. Graph theory in scientific work is used to analyze, among others, social networks (Amaral, Scala, Barthelemy, Stanley, 2000, p. 11149–11152; Newman, Watts, Strogatz, 2002, p. 2566–2572; Arenas, Danon, Diaz-Guilera, Gleiser, Guimera, 2003, p. 373–380), computer networks (Valverde, Solé 2003), or biological networks (Sporns 2002, p. 56 – 60; Stam, Reijneveld, 2007, p. 1–19). Graph theory is also used to analyze transport networks (Newman 2010; Wilkinson, Dunn, Ma, 2012, p. 1027–1036; Li, Guo, Xu, Hu, 2014; Ouyang, Pan, Hong, He, 2015, p. 142, 248; Tarapata, 2015, p. 55-65; Dunn, Wilkinson, 2017, p. 1–12; Stawiarska, Sobczak, 2018; Sobczak, Stawiarska, Buchwald 2020). An important element of the analysis of network connections using graph theory is the ability to perform both functional and organizational analysis (Amaral, Scala, Barthelemy, Stanley, 2000, p. 11149–11152; Newman, Watts, Strogatz, 2002, p. 2566–2572; Sporns 2002, p. 56 – 60; Arenas, Danon, Diaz-Guilera, Gleiser, Guimera, 2003, p. 373–380; Valverde, Solé 2003; Stam, Reijneveld, 2007, p. 1–19; Newman 2010; Wilkinson, Dunn, Ma, 2012, p. 1027–1036; Li, Guo, Xu, Hu, 2014; Ouyang, Pan, Hong, He, 2015, p. 142, 248; Tarapata, 2015, p. 55-65; Dunn, Wilkinson, 2017, p. 1–12; Stawiarska, Sobczak, 2018; Sobczak, Stawiarska, Buchwald 2020). As part of the analysis, coefficients are calculated which allow the assessment of individual network nodes (train stops), but also allow the analysis of the network as a whole. The analysis allows obtaining information about the role of individual nodes in the network (whether it is a local role or the role of a node

constituting the center of the network) as well as enables obtaining estimated information on the network's resistance to possible interference (unintentional in the form of e.g. failure or network accidents) and intentional (e.g. sabotage or terrorist attack) (Amaral, Scala, Barthelemy, Stanley, 2000, p. 11149–11152; Newman, Watts, Strogatz, 2002, p. 2566–2572; Sporns 2002, p. 56 – 60; Arenas, Danon, Diaz-Guilera, Gleiser, Guimera, 2003, p. 373–380; Valverde, Solé 2003; Stam, Reijneveld, 2007, p. 1–19; Newman 2010; Wilkinson, Dunn, Ma, 2012, p. 1027–1036; Li, Guo, Xu, Hu, 2014; Ouyang, Pan, Hong, He, 2015, p. 142, 248; Tarapata, 2015, p. 55-65; Dunn, Wilkinson, 2017, p. 1–12; Stawiarska, Sobczak, 2018; Sobczak, Stawiarska, Oláh, Popp, Kliestik, 2018; Stawiarska, Sobczak, 2018; Sobczak, Stawiarska, Buchwald 2020; Sobczak, 2018a; Sobczak, 2018b; Sobczak, 2018c; Bukowski, Sobczak, 2019; Sobczak, Stawiarska, Buchwald 2020). As part of the research, a structural analysis of the network connection for variant W2 of the Metropolitan Railway concept was carried out. This selection is caused by the author's conducting analogous analyzes for the W1 variant currently recommended by the team of authors. The results of the analysis are presented in the publication (Sobczak, Stawiarska, Buchwald 2020). Variant W2 was analyzed because it is a natural development of the planned transport network. Variant W2 of the planned network is shown in Figure 1.

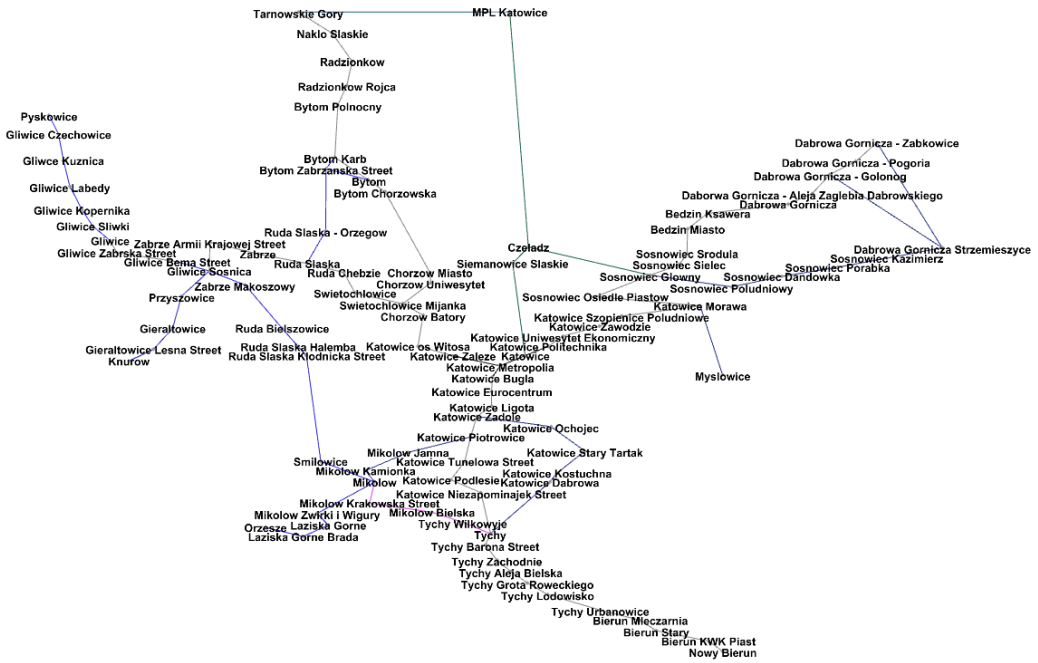

Fig. 1: Concept of Variant W2 of the planned Metropolitan Railway network
Source: Own work based on (Joint publication, 2020)

Results

As a result of the analysis, a number of parameters were obtained that allow the assessment of the properties of the parameters of individual network nodes and their role in the analyzed network, as well as, enables its analysis as a whole. The analyses were carried out for 2 (sub-) variants (network variant with the so-called Mono-rail line and a variant without this line).

Below there are results for the W2 variant without Mono-rail network.

Table 1: Results for the W2 variant without Mono-rail network

		Parameter		
Id	**Node (Train Station) Name**	**Betweeness centrality**	**Authority**	**Pageranks**
1	Bedzin Ksawera	0.040351	0.000003	0.00995
2	Bedzin Miasto	0.057895	0.000006	0.009987
3	Bierun KWK Piast	0.020833	0.000001	0.01193
4	Bierun Mleczarnia	0.061184	0.000006	0.010786
5	Bierun Stary	0.041228	0.000003	0.011205
6	Bytom	0.070249	0.479129	0.012467
7	Bytom Chorzowska	0.071126	0.241249	0.009061
8	Bytom Karb	0.099781	0.477681	0.012589
9	Bytom Polnocny	0.080702	0.236157	0.009431
10	Bytom Zabrzanska Street	0.081981	0.486604	0.012365
11	Chorzow Batory	0.253472	0.037143	0.009448
12	Chorzow Miasto	0.078289	0.127877	0.009368
13	Chorzow Uniwesytet	0.091923	0.080501	0.009346
14	Dabrowa Gornicza - Aleja Zaglebia Dabrowskiego	0.005263	0.000002	0.00945
15	Dabrowa Gornicza	0.022807	0.000002	0.009793
16	Dabrowa Gornicza - Golonog	0.015351	0.000003	0.013207
17	Dabrowa Gornicza - Pogoria	0.000658	0.000002	0.009195
18	Dabrowa Gornicza - Zabkowice	0.009649	0.000003	0.00919
19	Dabrowa Gornicza Strzemieszyce	0.060307	0.000004	0.01319
20	Gieraltowice	0.041228	0.015067	0.010629
21	Gieraltowice Lesna Street	0.020833	0.007111	0.011552
22	Gliwce Kuznica	0.041228	0.000446	0.011197
23	Gliwice	0.118421	0.007557	0.010143
24	Gliwice Bema Street	0.154386	0.030881	0.009512
25	Gliwice Czechowice	0.020833	0.000211	0.011922
26	Gliwice Kopernika	0.080702	0.001848	0.010515
27	Gliwice Labedy	0.061184	0.000912	0.010767
28	Gliwice Sliwki	0.099781	0.003738	0.01032
29	Gliwice Sosnica	0.347734	0.062423	0.017677
30	Gliwice Zabrska Street	0.136623	0.015277	0.009895

31	Katowice	0.357018	0.003303	0.009654
32	Katowice Bugla	0.26356	0.003374	0.009502
33	Katowice Dabrowa	0.062829	0.000443	0.009306
34	Katowice Eurocentrum	0.259942	0.001815	0.009559
35	Katowice Kostuchna	0.063158	0.000326	0.009581
36	Katowice Ligota	0.259174	0.001192	0.009358
37	Katowice Metropolia	0.452705	0.006676	0.013728
38	Katowice Morawa	0.298026	0.000138	0.014776
39	Katowice Niezapominajek Street	0.059211	0.000494	0.00923
40	Katowice Ochojec	0.08443	0.00062	0.009375
41	Katowice os Witosa	0.258516	0.018784	0.009605
42	Katowice Piotrowice	0.203253	0.001168	0.013122
43	Katowice Podlesie	0.06557	0.000452	0.009404
44	Katowice Politechnika	0.345395	0.001636	0.009911
45	Katowice Stary Tartak	0.070833	0.000376	0.009603
46	Katowice Szopienice Poludniowe	0.307895	0.000217	0.010019
47	Katowice Tunelowa Street	0.079167	0.000644	0.009262
48	Katowice Uniwesytet Ekonomiczny	0.333333	0.000813	0.010044
49	Katowice Zadole	0.274415	0.001184	0.013225
50	Katowice Zaleze	0.26356	0.010119	0.009522
51	Katowice Zawodzie	0.320833	0.00041	0.010065
52	Knurow	0	0.002826	0.006456
53	Laziska Gorne	0.041228	0.000719	0.010604
54	Laziska Gorne Brada	0.020833	0.000339	0.011536
55	Mikolow	0.285965	0.002978	0.017529
56	Mikolow Bielska	0.124342	0.00087	0.009409
57	Mikolow Jamna	0.120687	0.00111	0.009159
58	Mikolow Kamionka	0.120029	0.001625	0.009165
59	Mikolow Krakowska Street	0.137281	0.001529	0.009272
60	Mikolow Zwirki i Wigury	0.061184	0.001469	0.00978
61	Myslowice	0	0.000055	0.005737
62	Naklo Slaskie	0.020833	0.026904	0.011681
63	Nowy Bierun	0	0.000001	0.006619
64	Orzesze	0	0.000135	0.006448
65	Przyszowice	0.061184	0.030797	0.009822

66	Pyskowice	0	0.000084	0.006617
67	Radzionkow	0.041228	0.056999	0.010831
68	Radzionkow Rojca	0.061184	0.116512	0.010154
69	Ruda Bielszowice	0.199708	0.015393	0.009722
70	Ruda Chebzie	0.153801	0.102052	0.009183
71	Ruda Slaska	0.251243	0.186535	0.01306
72	Ruda Slaska - Orzegow	0.094481	0.267533	0.008749
73	Ruda Slaska Halemba	0.20223	0.007804	0.009806
74	Ruda Slaska Klodnicka Street	0.207273	0.004242	0.009706
75	Smilowice	0.212317	0.00287	0.009398
76	Sosnowiec Dandowka	0.112281	0.000012	0.009745
77	Sosnowiec Glowny	0.255263	0.000049	0.013847
78	Sosnowiec Kazimierz	0.077193	0.000004	0.009398
79	Sosnowiec Osiedle Piastow	0.266447	0.000074	0.009663
80	Sosnowiec Poludniowy	0.129825	0.000024	0.009617
81	Sosnowiec Porabka	0.094737	0.000007	0.009686
82	Sosnowiec Sielec	0.093202	0.000024	0.009683
83	Sosnowiec Srodula	0.075439	0.000012	0.009902
84	Swietochlowice	0.154678	0.070237	0.009268
85	Swietochlowice Mijanka	0.259028	0.074672	0.013468
86	Tarnowskie Gory	0	0.010693	0.006513
87	Tychy	0.222259	0.00079	0.017343
88	Tychy Aleja Bielska	0.136623	0.000096	0.010074
89	Tychy Barona Street	0.171711	0.000391	0.009409
90	Tychy Grota Roweckiego	0.118421	0.000047	0.010239
91	Tychy Lodowisko	0.099781	0.000023	0.010377
92	Tychy Urbanowice	0.080702	0.000012	0.010544
93	Tychy Wilkowyje	0.119079	0.00066	0.009233
94	Tychy Zachodnie	0.154386	0.000193	0.009826
95	Zabrze	0.234686	0.099754	0.009152
96	Zabrze Armii Krajowej Street	0.235124	0.064456	0.009195
97	Zabrze Makoszowy	0.20223	0.030927	0.009437

Source: Own study using Gephi software

Figures 2 ÷ 4 show graphically the values of individual parameters.

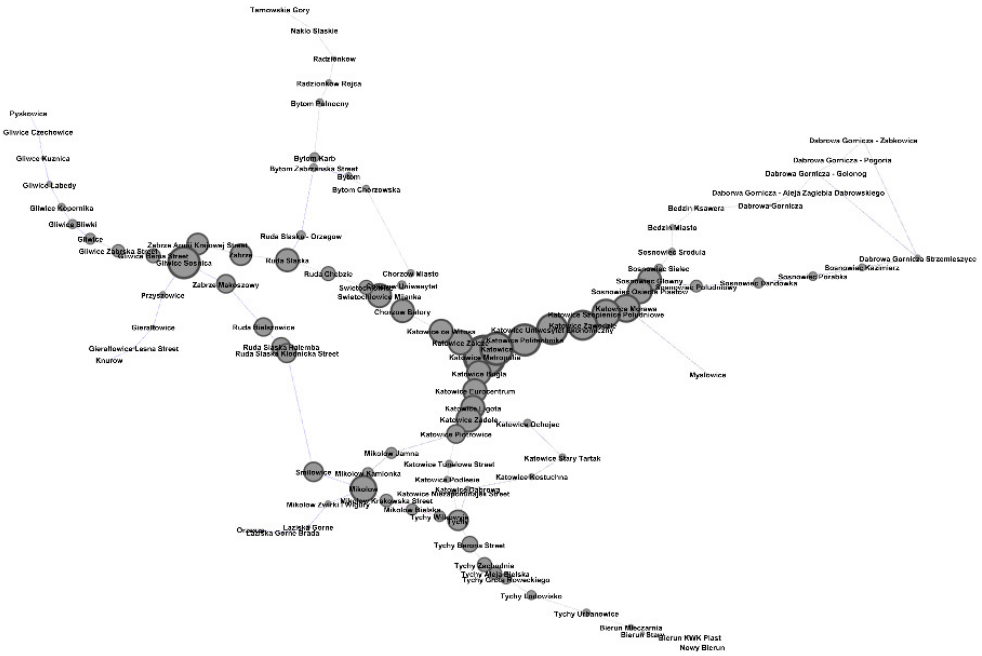

Fig. 2: Distribution of Betweenness centrality values in the analyzed network of the W2 variant without monorail

Source: Own study using Gephi software

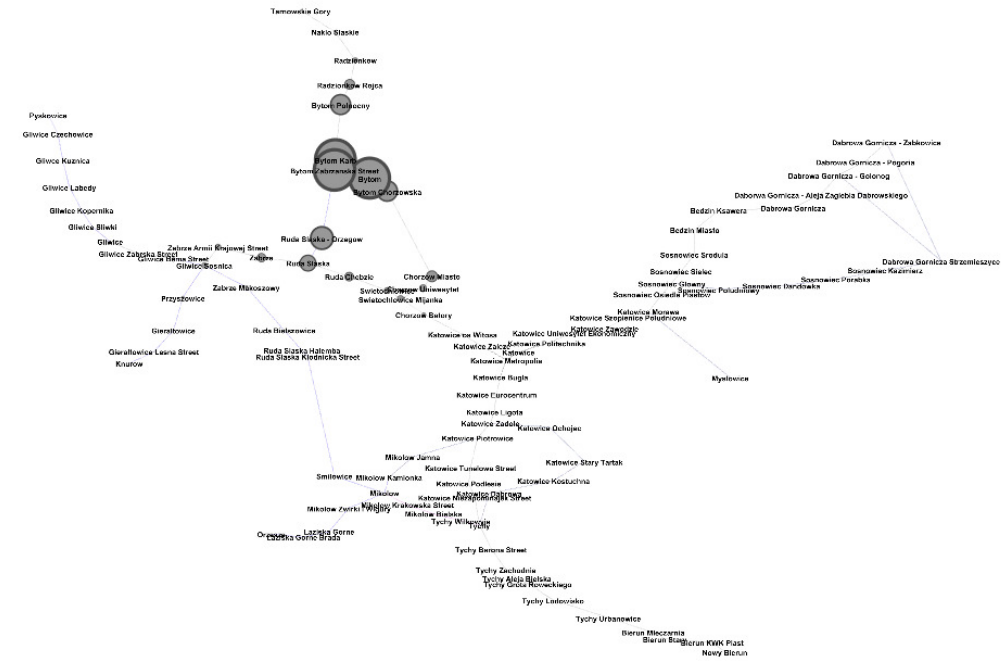

Fig. 3: Authority value distribution in the analyzed W2 variant network without monorail

Source: Own study using Gephi software

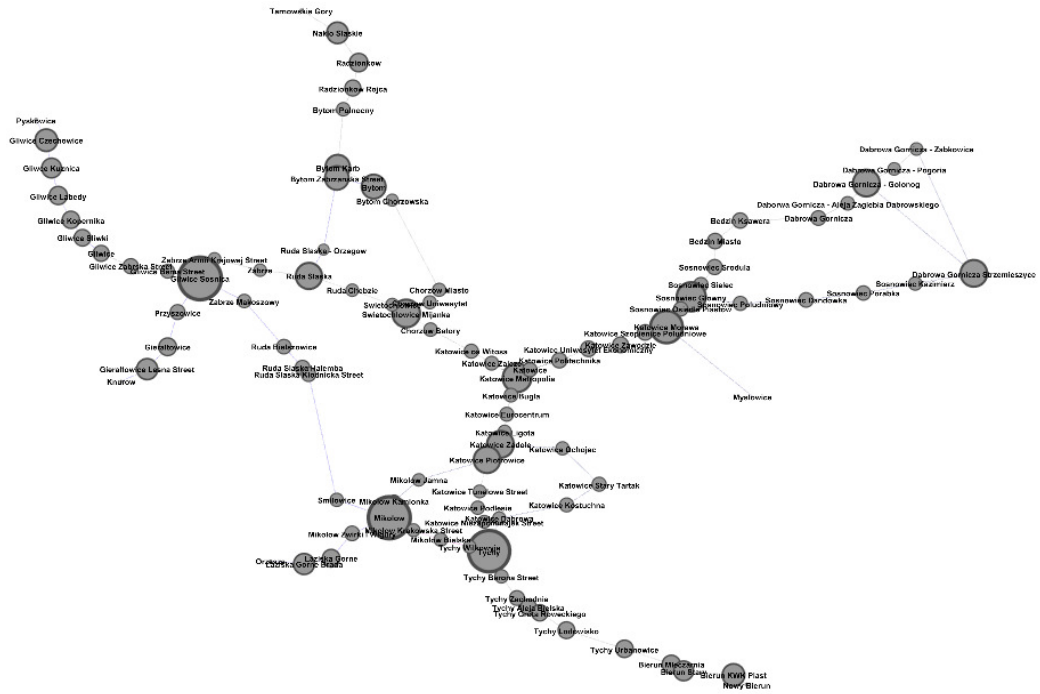

Fig. 4: PageRank distribution in the analyzed network of the W2 variant without monorail
Source: Own study using Gephi software

Table 2 shows the parameters for the entire W2 network without monorail

Table 2: Parameters for the entire W2 network without monorail

The average length of the shortest pathL	***Diemeter D***	***Radious R***
13.417525773195877	34	19

Source: Own study using Gephi software

In the next step, analyses were made for the W2 variant of the metropolitan network, including the monorail Line. The parameter values for individual network nodes are presented in Table 3.

Table 3: Parameter values for individual network nodes for the W2 variant of the metropolitan network, including the monorail Line

		Parameter		
Id	**Node (Train Station) Name**	**Betweeness centrality**	**Authority**	**Pageranks**
1	Bedzin Ksawera	0.039167	0.001105	0.009583

2	Bedzin Miasto	0.056277	0.00204	0.009558
3	Bierun KWK Piast	0.020202	0.000002	0.011578
4	Bierun Mleczarnia	0.059369	0.000007	0.010467
5	Bierun Stary	0.039992	0.000003	0.010864
6	Bytom	0.025373	0.478488	0.012008
7	Bytom Chorzowska	0.018158	0.240938	0.008753
8	Bytom Karb	0.096592	0.477127	0.012047
9	Bytom Polnocny	0.091541	0.236152	0.00887
10	Bytom Zabrzanska Street	0.104288	0.485942	0.011909
11	Chorzow Batory	0.156731	0.037794	0.009098
12	Chorzow Miasto	0.021181	0.127777	0.009064
13	Chorzow Uniwesytet	0.034409	0.080585	0.00904
14	Czeladz	0.328221	0.016133	0.012499
15	Dabrowa Gornicza - Aleja Zaglebia Dabrowskiego	0.004947	0.000758	0.00914
16	Dabrowa Gornicza	0.022057	0.00074	0.009456
17	Dabrowa Gornicza - Golonog	0.014739	0.001167	0.01278
18	Dabrowa Gornicza - Pogoria	0.000618	0.000808	0.008901
19	Dabrowa Gornicza - Zabkowice	0.00938	0.000866	0.008896
20	Dabrowa Gornicza Strzemieszyce	0.058545	0.001371	0.012748
21	Gieraltowice	0.039992	0.015031	0.010311
22	Gieraltowice Lesna Street	0.020202	0.007094	0.011204
23	Gliwce Kuznica	0.039992	0.000445	0.010852
24	Gliwice	0.115028	0.007538	0.009833
25	Gliwice Bema Street	0.150072	0.030811	0.009222
26	Gliwice Czechowice	0.020202	0.00021	0.011573
27	Gliwice Kopernika	0.078334	0.001843	0.010192
28	Gliwice Labedy	0.059369	0.000909	0.010452
29	Gliwice Sliwki	0.096887	0.003728	0.010017
30	Gliwice Sosnica	0.320284	0.062288	0.017149
31	Gliwice Zabrska Street	0.132756	0.015241	0.009603
32	Katowice	0.333783	0.011535	0.012631
33	Katowice Bugla	0.285261	0.006072	0.009
34	Katowice Dabrowa	0.067615	0.000539	0.009022
35	Katowice Eurocentrum	0.281241	0.003199	0.009159
36	Katowice Kostuchna	0.069058	0.000427	0.009292

37	Katowice Ligota	0.279901	0.001977	0.009017
38	Katowice Metropolia	0.399663	0.012081	0.012741
39	Katowice Morawa	0.031798	0.005713	0.014017
40	Katowice Niezapominajek Street	0.064214	0.0006	0.008949
41	Katowice Ochojec	0.090291	0.000919	0.009081
42	Katowice os Witosa	0.163121	0.020103	0.009202
43	Katowice Piotrowice	0.214554	0.001574	0.012715
44	Katowice Podlesie	0.071325	0.000578	0.009121
45	Katowice Politechnika	0.058761	0.005949	0.009087
46	Katowice Stary Tartak	0.076891	0.000535	0.009307
47	Katowice Szopienice Poludniowe	0.019388	0.00334	0.009527
48	Katowice Tunelowa Street	0.084725	0.000856	0.008978
49	Katowice Uniwesytet Ekonomiczny	0.042063	0.003434	0.009418
50	Katowice Zadole	0.29361	0.001777	0.012794
51	Katowice Zaleze	0.169924	0.01279	0.009018
52	Katowice Zawodzie	0.029025	0.002693	0.009558
53	Knurow	0	0.002819	0.006262
54	Laziska Gorne	0.039992	0.000754	0.010287
55	Laziska Gorne Brada	0.020202	0.000356	0.011188
56	Mikolow	0.261898	0.003126	0.017006
57	Mikolow Bielska	0.106164	0.000937	0.009128
58	Mikolow Jamna	0.124469	0.001329	0.00888
59	Mikolow Kamionka	0.121583	0.001771	0.008886
60	Mikolow Krakowska Street	0.118945	0.001615	0.008991
61	Mikolow Zwirki i Wigury	0.059369	0.001542	0.009484
62	MPL Katowice	0.114114	0.013259	0.009035
63	Myslowice	0	0.00227	0.005468
64	Naklo Slaskie	0.100405	0.030094	0.009533
65	Nowy Bierun	0	0.000001	0.006418
66	Orzesze	0	0.000142	0.006256
67	Przyszowice	0.059369	0.030728	0.009524
68	Pyskowice	0	0.000083	0.006414
69	Radzionkow	0.095046	0.058496	0.009507
70	Radzionkow Rojca	0.091541	0.117097	0.009311
71	Ruda Bielszowice	0.171442	0.015365	0.009433

72	Ruda Chebzie	0.111637	0.10198	0.008896
73	Ruda Slaska	0.225613	0.186278	0.012643
74	Ruda Slaska - Orzegow	0.109596	0.267149	0.008458
75	Ruda Slaska Halemba	0.173291	0.007803	0.009508
76	Ruda Slaska Klodnicka Street	0.17865	0.004269	0.009417
77	Siemanowice Slaskie	0.257552	0.010996	0.008624
78	Smilowice	0.184422	0.002939	0.009113
79	Sosnowiec Dandowka	0.109256	0.004099	0.009234
80	Sosnowiec Glowny	0.287972	0.01634	0.01647
81	Sosnowiec Kazimierz	0.075036	0.001416	0.009053
82	Sosnowiec Osiedle Piastow	0.037095	0.008764	0.008966
83	Sosnowiec Poludniowy	0.126366	0.008123	0.00892
84	Sosnowiec Porabka	0.092146	0.002192	0.009269
85	Sosnowiec Sielec	0.090703	0.008094	0.008984
86	Sosnowiec Srodula	0.073387	0.004028	0.009384
87	Swietochlowice	0.11308	0.070333	0.008969
88	Swietochlowice Mijanka	0.160716	0.074996	0.013024
89	Tarnowskie Gory	0.106899	0.017229	0.009388
90	Tychy	0.215316	0.000931	0.016825
91	Tychy Aleja Bielska	0.132756	0.000113	0.009772
92	Tychy Barona Street	0.166976	0.00046	0.009125
93	Tychy Grota Roweckiego	0.115028	0.000056	0.009931
94	Tychy Lodowisko	0.096887	0.000028	0.010068
95	Tychy Urbanowice	0.078334	0.000014	0.010224
96	Tychy Wilkowyje	0.101835	0.000742	0.008952
97	Tychy Zachodnie	0.150072	0.000228	0.009532
98	Zabrze	0.215255	0.099597	0.008872
99	Zabrze Armii Krajowej Street	0.215048	0.064335	0.008912
100	Zabrze Makoszowy	0.174851	0.030861	0.00915

Source: Own study using Gephi software

Figures 5 ÷ 7 show graphically the values of individual parameters for the W2 network including the monorail line.

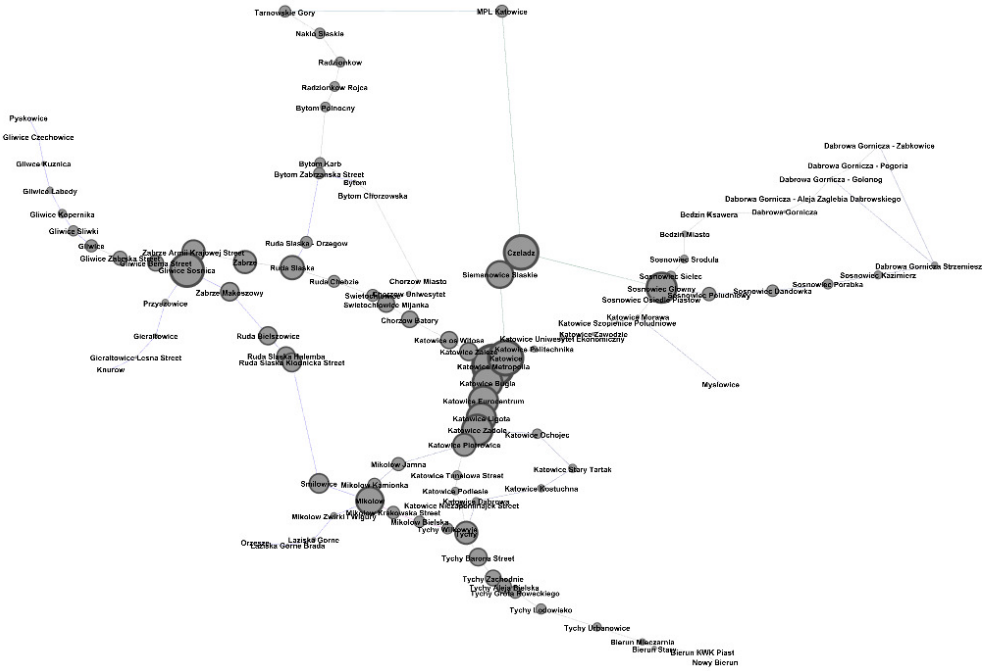

Fig. 5:Distribution of Betweenness centrality values in the analyzed network of the W2 variant with monorail

Source: Own study using Gephi software

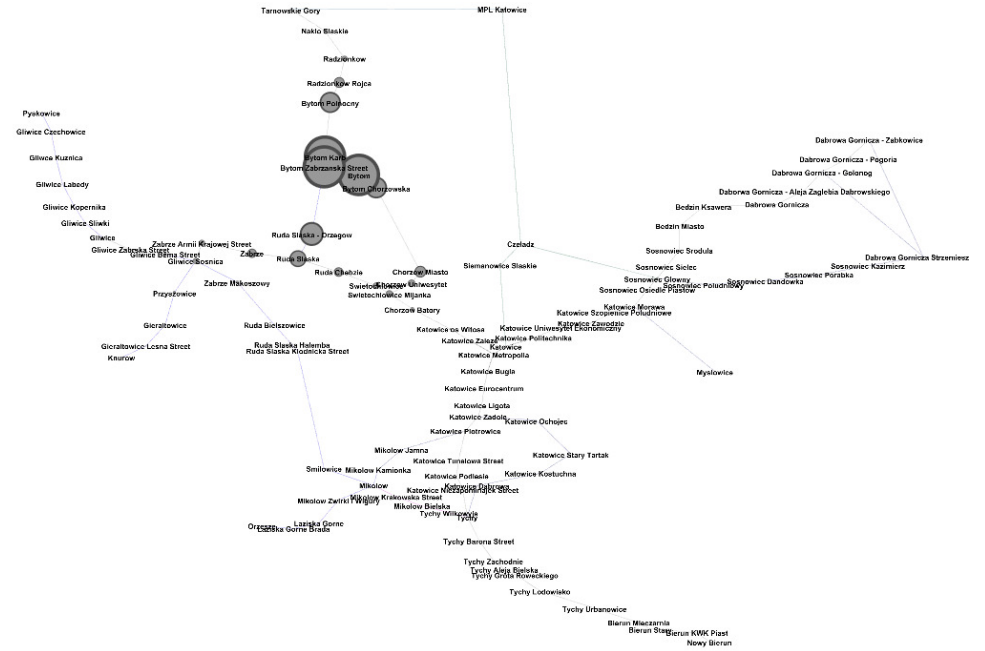

Fig. 6: Authority value distribution in the analyzed network of the W2 variant with monorail

Source: Own study using Gephi software

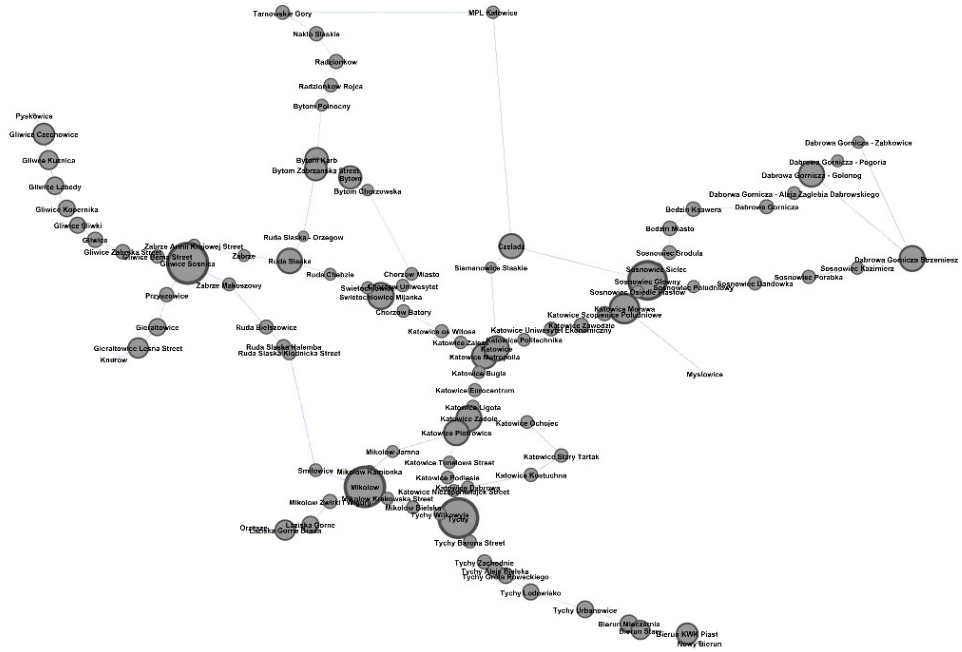

Fig. 7: PageRank distribution in the analyzed network of the W2 variant with monorail

Source: Own study using Gephi software

Table 4: Parameters for the entire W2 network with monorail

The average length of the shortest pathL	***Diemeter D***	***Radious R***
11.840202020202021	30	17

Source: Own study using Gephi software

Conclusions from conducted analyzes

Based on the analyses, it can be concluded that the obtained network (both with and without a Monorail line) is a Scale-Free network. This type of network is characterized by quite high resistance to events and random disturbances such as failures. Unfortunately, they are very sensitive to deliberate actions that disrupt their functioning (e.g. terrorist attacks). The analyses made it possible to obtain information that the nodes Gliwice Sośnica, Mikołów, Sosnowiec Główny and Tychy are very important nodes for the functioning of the network. Importantly, these are completely different nodes than the nodes indicated as key for the W1 variant (Katowice Node and Świętochłowice Mijanka Node)[16], which of course still play an important role in the network, but no longer constitute key elements for the network.

A very important element of network analysis is also the assessment of its parameters as a whole. Table 5 compares the network parameters for variants W1 and W2 (for both sub-options).

Table 5: Comparison of parameters of individual variants of the Metropolitan Railway network concept

Variant	*The average length of the shortest pathL*	*Diemeter D*	*Radious R*
W1	13. 733212341197822	35	18
W2 without Monorail	13.417525773195877	34	19
W2 with Monorail	11.840202020202021	30	17

Source: Own study based on Tables 2, 4 and (Sobczak, Stawiarska, Buchwald 2020)

According to the literature, the lower the values are for the presented parameters, the better the network parameters. The comparison presented in Table 5 clearly indicates that the W2 network concept with Monorail has the best network parameters compared. Importantly, the W2 variant with the Monorail line is also designed to enable efficient public transport between individual agglomeration regions and the Pyrzowice Airport, which is currently a hub not only for the region but also for the whole country (third airport in Poland due to the number of transported passengers and the key airport Cargo), so this is the most suggested variant to consider for the target version of the Metropolitan Railway network.

According to the author, the analysis results presented in the article and the key nodes presented (depending on the variant adopted) are an additional valuable source of information about the role of individual nodes in terms of network structure and can be used during work on the creation of the Metropolitan Railway to better fit its needs and specifics of the region in which it is created.

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Mobile Health Apps Use in The Group of Young Poles – Comparative Analysis

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Abstract

Mobile technology is useful not only in communication, but also as a support for many other activities. Is also rapidly expanding field in the health sector, assisting our life. The purpose of the paper is to discuss smartphones as a platform for m-health delivery for young people in Szczecin. The aim is not only to study the popularity of various health and medicine apps but to analyse changes over time and to examine the association between the installation, use of health-related apps and some socio demographic qualities in this age group. To achieve the purpose, primary research was done. The survey let author collect data from the pre-defined sample of 225 respondents in June 2013 and 212 respondents in June 2019 aged 18-34 years. The questionnaire contained closed ended questions generally in the form of dichotomous questions. Statistical analysis was done using Pearson's chi-square test of independence, coefficient φ and Cramer's coefficient V. According to the results smartphones are increasingly used for health-related purposes by young people in Szczecin. The growing, although relatively small, part of young people uses health or medical applications. Apps are much more often installed than used and their users are usually in good or very good health condition. Mobile technologies have the potential to revolutionize interaction with health services. Observed changes let formulate thesis that health apps will be more and more popular in the group aged 18-34 because of digitalisation and conscious health management trends. M-health increases access to health information and services, as well as promotes positive changes in health behaviours.

Keywords: M-Health, Applications, Smartphones, Young Smartphone Users

Introduction

Increasing interest in health-related issues, commonly implemented health promoting programs plus a rising trend to keep fit, along with advancements in information and communication technologies lead to the question of how mobile technology is utilized in the area of health. It is worth looking into smartphones, popular with young people using various phone functionalities day in and day out, including the software dedicated to health. This study aims to examine how smartphone owners aged 18-34 years use available health applications, how their behaviour in this respect changes in time and what determines such changes. The author focuses on the use of smartphone applications supporting health management and treatment process among young consumers.

The article consists of five parts. It discusses major issues concerning smartphones, their popularity, areas of application and users, research methodology, results of questionnaire survey conducted in a group of 18-34 year old Szczecin residents in 2013 and 2019, comments and conclusions.

Health Apps as A Part Of M-Health

Mobile health (m-health) defined as “medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants and other wireless devices” (WHO, 2011) in combination with global penetration of mobile phones creates new opportunities for people’s health and wellbeing (Patrick et al., 2008; Becker et al., 2014; Ersting et al., 2017). This system, which unfortunately is emerging in large part as a patchwork of incompatible elements (Estrin & Sim, 2010; van Heerden et al., 2012), also includes health applications with self-monitoring as the most common method of engagement approach (Sama et al., 2014).

Via apps can be addressed health-related needs, broadly in two main areas: changing consumer/patient behavior and improving the implementations of prescribed treatment (Becker et al., 2014). In practice applications have the potential to aid a wide range of health-related issues like improving contraceptive knowledge of women (Moglia et al., 2016; Rousseau et al., 2019), physical activity (Coughlin et al., 2016; Jee, 2017), medication management (Stawarz et al., 2014; Ahmed et al., 2018) or disease prevention (Buller et al., 2015; Coughlin et al., 2017). They also serve in a variety of medical problems such as obesity and weight loss (Chen et al., 2015; Rivera et al., 2016), smoking cessation (Iacoviello et al., 2017; Powell et al., 2016), pain management (Lalloo et al., 2015, Reynoldson et al., 2014), diabetes (Arnhold et al., 2014; Wu et al., 2017), alcohol abuse (Crane et al., 2015; Meredith et al., 2015), cardiology (Plante et al., 2016; Martínez-Pérez et al., 2013) or mental health (Larsen et al., 2016; Goodwin et al., 2016).

Despite the researchers interest of the uptake in health-related mobile phone apps in Poland (Bujnowska-Fedak et al., 2016; Kuska & Żukowska, 2017; Kajzer & Szlachetka, 2017) as well as their potential for improving health (Caroll et al., 2017; Krebs & Duncan, 2015), there is the lack of information concerning differences between installation and use in practice of health-related applications and changes over time. Moreover although studies have described the sociodemographic factors associated with mobile health apps use (Kajzer & Szlachetka, 2017; Waligóra & Bujnowska-Fedak, 2019) also among young people (Baranek et al., 2017), so rapid changes force to verify recent published analyses.

Therefore, the aim for this study was 3-fold: (1) to describe the sociodemographic characteristics associated with health apps installation and use (2) to examine differences between apps installation and use and (3) to analyse changes over time.

Smartphone Users

The cellular telephony in Poland started over 25 years ago. The cell phone, initially associated with high social status and luxury, soon became a common, obvious element of everyday life. Over time the mobile cel phone has undergone an enormous transformation into a high tech device called a smartphone. A modern smartphone, more powerful than some computers, apart from phone calls and text messages, allows its owner to enjoy all the benefits of applications (apps) available through the mobile Internet. Apart from access to websites or email services, mobile phone apps allow users to chat via messenger type apps, and offer functions of a number of portable devices, such as satellite navigation, game consoles, MP3 players and digital cameras; it also enables editing texts, images, films and music.

Smartphone markets have been expanding rapidly. In the first quarter of 2013, the number of smartphones sold exceeded the number of stationary phones (IDC, 2014). However, the rising trend in the subsequent years decelerated in 2018 when the sales of new mobile phones dropped from a level of 1.455 billion in 2017 to 1.388 billion. The trend continues, as the year 2019 is expected to end with year-on-year sales drop by 3.1% (Canalys, 2019). This results from the market saturation that might be overcome by promoting 5G technology.

In Poland, the growing trend also slowed down. It is estimated that compared to the record level of 9.5 million pieces in 2018 (GfK Polonia, 2019) the figure will be lower by approximately 5%. Interestingly, even though the sales of smartphones drop, the revenues remain at a similar level. This implies slow progress towards saturation, while demand shifts toward more expensive models. Poles increasingly choose the latest phone models. 21 million smartphones (Jestem.mobi, 2018) were used by 63% of Polish adults in 2018 (Fig 1).

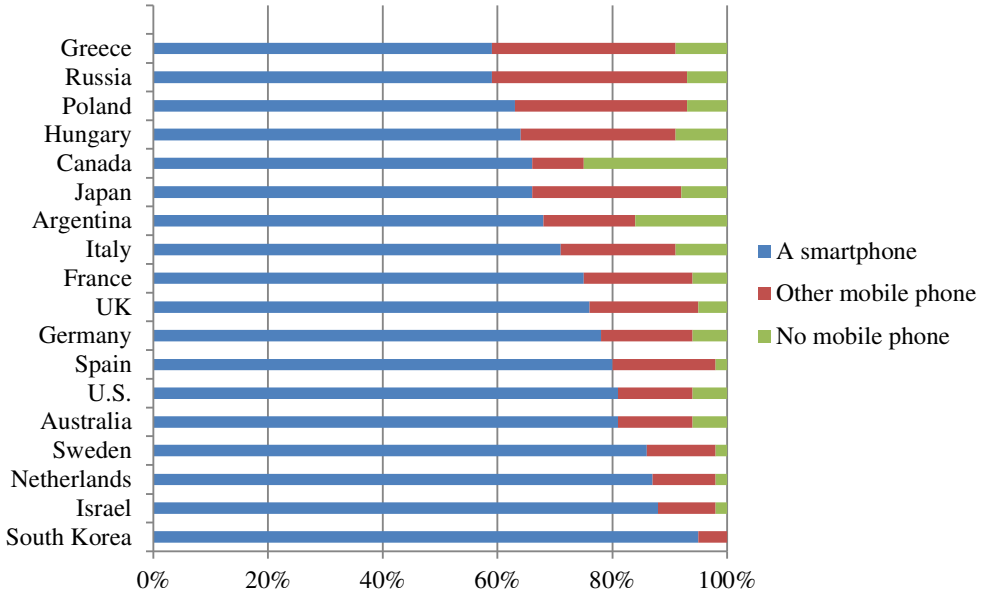

Fig. 1: Smartphone ownership in advanced economies (% of adults) in 2018

Source: Based on Pew Research Center (2019), Smartphone Ownership Is Growing Rapidly Around the World, but Not Always Equally, p.3.

According to global data, among smartphone owners going in for new technologies the leading categories are young men, those with higher incomes and better educated (Pew Research Center, 2019). In Poland, the highest smartphone penetration characterizes the same groups, reaching the smallest differences in gender (males 65%, females 62%), education (better educated 82%, worse educated 57%), income (the rich 74%, the poor 48%) and age (18-34 years old - 93%, 35-49 y.o. - 87% , 50+ y.o. - 35%). However, visible differences gradually diminish, especially in age groups, where acceptance of high tech devices is noticeable among the oldest group of users (Pew Research Center, 2019).

An observable trend of changing from cell phones to smartphones noted for the last few years relates to the functionality offered by the latter. Equipped with a touch screen or qwerty keypad, smartphones have an operating system, and a capacity for installing a wide variety of applications [1]. Personalization is a feature that can make the smartphone the most personal product in the history of electronics, allowing the user to match the parameters and applications suited with their needs.* Practically, every smartphone subscriber uses their device in a unique way.

Use of Smartphones

An analysis of smartphone holders' behaviour shows that a relatively large group does not make use of available functions. Some Poles are not aware of what functions their smartphone offers or use them unaware (Kantar Poland, 2019). Of all the devices with Internet access, the smartphone - always at hand - is used most frequently (GUS, 2019), but 1/3 of the subscribers use it rarely or never. For this group, smartphone use is limited to the functions closely related with making phone calls. The

[1] The definition of a smartphone based on technical parameters.

reasons for this include being unaware of phone capabilities, no need or cost concerns. However, if smartphone holders decide on online activity, which increasingly more users do year by year, their areas of interest include mainly maps, email and some specific applications (IAB Polska, 2018) (Fig 2).

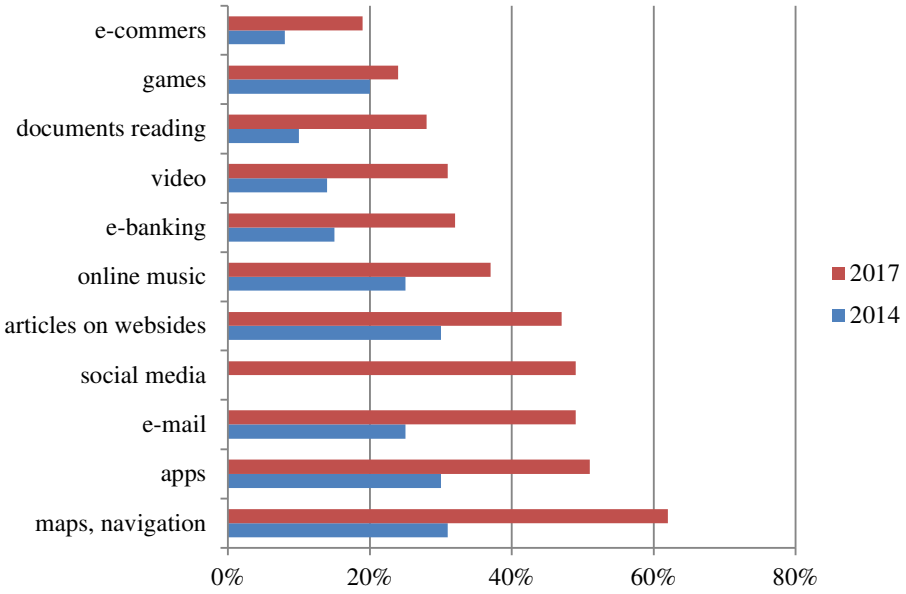

Fig. 2: The most common online activities on smartphones in 2014 and 2017 (in %)

Source: Based on IAB Polska (2018). Mobile 2018, p.15.

Adjusting smartphones to their own needs, smartphone holders may choose from a countless set of applications made available by software firms. Research confirms their popularity and increasing interest. In a report prepared by App Annie an average user in the world uses 10 different apps daily and 30 apps per month (App Annie, 2017). This generally accounts for approximately half or a third of all applications installed on the mobile device. Using applications is a daily habit of an increasing part of the global community. As of the first quarter of 2019, these active app users could choose to download between 2.6 million Android, and 2.2 million iOS apps. And they are choosing: App Annie sets the volume of they in 2018 at 194 million; up to 178 billion in 2017 (App Annie, 2019).

In Poland, the number of people who download smartphone apps is also increasing significantly, but there is a large group of Poles who do not distinguish using the Internet through a browser from using phone apps, as in their understanding an application is something installed in the phone by its manufacturer (Kantar Polska, 2019). Along with the increase in the percentage of users using factory applications, the corresponding number of people downloading free apps is doubled, and there is a slight increase in the number of people downloading paid programs (IAB Polska, 2018). Although the scale of the phenomenon is not large, the users extend their usage of apps installed in brand new phones and seek tools they actually need (IAB Polska, 2018).

The application is considered as a 'life facilitator' and Poles admit that app solutions exist 'for everything', although they usually use only the basic ones. These include satellite navigation and maps (74%) , weather forecasts (64%) and email service apps (63%) (IAB Polska, 2018). The category 'health and medicine' is usually absent in primary selections, but shops with applications offer a wide choice. Both Google Play and Apple App Store under 'health and fitness' and 'medicine'

offer hundreds of free and paid programs. The former category accounts for 3.33% of the available items, 11th in the ranking of categories (Statista, 2019) , the latter - 3.31% and 9th place in the ranking (Statista, 2019a). An analysis of the phenomenon by spending on applications in 2018, the category 'health and fitness' ranks higher: eighth in Google Play, seventh in Apple App Store; in both cases one place up compared to the previous year (App Annie, 2019).

Research Methodology

To examine the use of health applications and compare the results in time, measurements performed in June 2019 were compared to those in June 2013. In the former study 212 randomly selected Szczecin residents aged 18-34 were surveyed, in the latter - 225, with males and females in equal proportion. The study focused on young people as they are the most numerous and most active smartphone users (this is also indicated by research of various institutions, e.g. TNS Polska, NoNoobs and Antyweb, Ericsson), and no other age group reached such high market penetration by uptodate smartphones (Pew Research Center, 2019). Besides, as research shows (Jestem.mobi, 2015), applications are also more popular in this age group than among older users.

The study used a direct questionnaire created on the basis of an American study of Mobile Health implemented by Pew Research Center (Pew Research Center, 2012). Six closed questions asked about the possession and manners of using cell phones, with a special emphasis on health activity using apps; besides, two socio demographic questions about gender and health status. Nominal alternative and ordinal scales were used. Health assessment was built on a five-stage scale of the perceived health status adopted for the OECD Health Statistics 2019 (OECD, 2019).

An analysis of variable relationships was conducted for 2019 data, and the year 2013 was used for demonstrating the emerging changes in the area under survey.

In view of the nature of measurement scales, contingency tables were used to determine the significance and strength of the relationship between the independent variables: gender and health status, and dependent variables: possession and use of health related applications. Significance was examined by Pearson's chi-square test of independence χ^2, wherein Yates correction was used in cases of smaller sample size in particular cells of 2x2 contingency tables. For variables, for which associations were statistically significant, the strength of correlation in the relationship was calculated. For 2x2 tables the coefficient φ and Cramer's coefficient V were applied. The calculations were made by means of the Statistica package v. 13.3.

The results of the survey

Characteristics of the Respondents

In 2013 and 2019, respectively, 225 and 212 people were tested, but the test sample decreased with each subsequent question due to a small number of those who declared installing and using health applications (Fig 3). A question about the use of specific programs in 2013 was affirmatively answered by only eight people, in 2019 – 25.

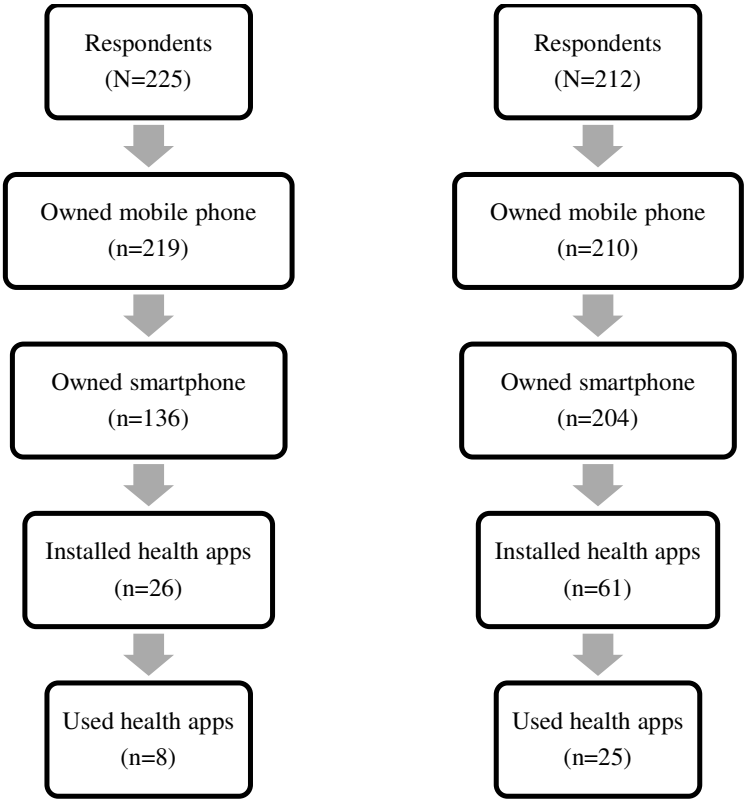

Fig. 3: Flowcharts of respondents through the survey instrument in 2013 and 2019

The test sample of 50/50 division by gender was characterised for health status. The largest group included people with very good and good health, then good/bad, bad and very bad (Table 1).

Table 1: Health status of the sample in the year 2019

	Women	**Men**	**All**
Very good	30 14,15%	58 27,36%	88 41,51%
Good	26 12,26%	47 22,17%	73 34,43%
Fair	5 2,36%	35 16,51%	40 18,87%
Bed	0 0,00%	9 4,25%	9 4,25%
Very bed	0 0,00%	2 0,94%	2 0,94%
All	61 28,77%	151 71,23%	212 100,00%

Ownership of Mobile Phones

Of 225 respondents in 2013 only six persons (2.7%) did not have a cell phone, while in 2019 the group decreased below 1% (2 out of 212). In both cases, men were those who had no phone. As for

the type of mobile phone, in both examined years new generation phones prevailed, and their popularity increased substantially from 62.1% in 2013 to 97.% in 2019. Among smartphone owners, percentage of men was higher than that of women – 66.4% (71 men) versus 58.1% (65 women) in the first period, while in 2019 103 men accounted for 99%, 101 women - 95.3%. The dynamic indicator was 1.55, different for men: 1.49, and for women: 1.62. In 2013, approximately 6.5% of the women were unable to tell whether their phone was a smartphone, at present all owners know what they possess (Fig 4).

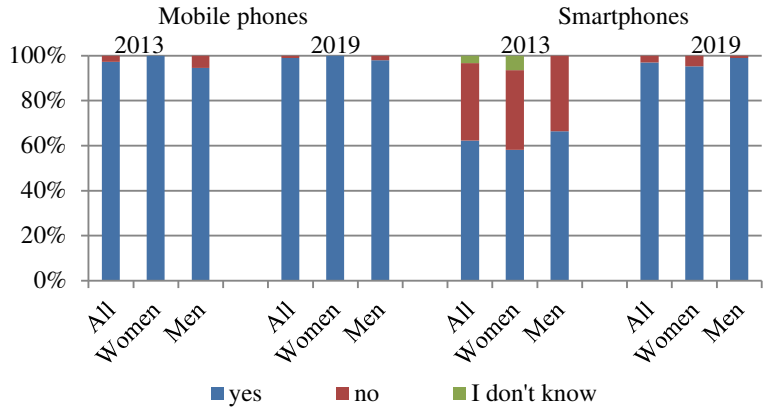

Fig. 4: Ownership of mobile phones and smartphones in 2013 and 2019 (in %)

Mobile phones and health-related activities

Young Szczecin residents have been eager to use various functions of their phones. In most cases, it was sending short text and multimedia messages. Regardless of gender, 100% of phone owners use this way of communication.

The other surveyed areas of activity required access to the Internet. In 2013, 70% of the subscribers made use of the mobile Internet, downloading graphics, using email and e-banking services. In 2019 the internet popularity significantly increased to over 95%, an increase in mobile Internet users by more than 1/3 (Fig 5).

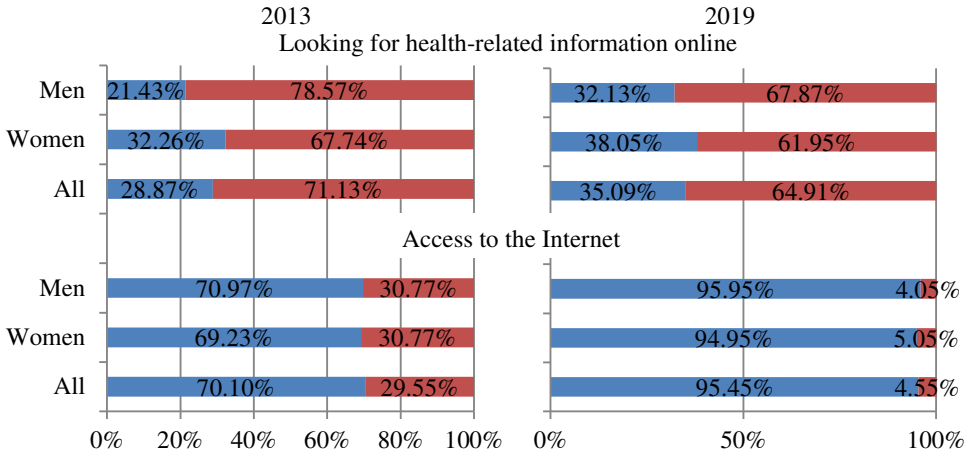

Fig. 5: Looking for health-related information and access to the Internet (in %)

In 2013, 28.87% of the surveyed mobile phone users, more women (32.26%) than men (21.43%) browsed the Internet seeking health related information. In 2019 the figure rose by 21% as more than 35% of the respondents admitted that they used the phone to search for information about health. The figure for women in this respect slightly decreased, with 38% versus 32% for men.

In 2013, applications for health tracking or management were installed by 17 female users (over 25%) and nine men (12.7% of all male users), while in 2019 the corresponding figures were as follows – 42 women (39.6%) and 19 men (17.9%) (Fig 6). This means an increase by 14% for women and 111% for men.

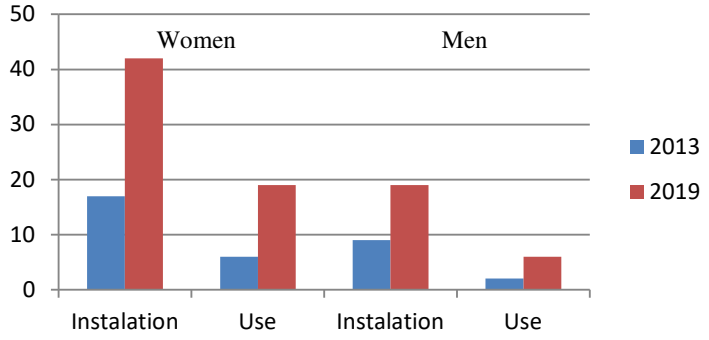

Fig. 6: Installation and usage of health and medicine apps in the studied group

In 2013, one female smartphone owner in ten and one man in fifty admitted using health applications, accounting for only 6% of all surveyed smartphone users. In 2019 the results improved. Although the phenomenon refers to 18.8% of female owners (19) and only 5.8% of males (6) (Fig.6), the dynamic of the change is significant. In both groups, men and women, the increase in the number of health application users was over threefold: men - 1.8% in 2013, 5.7% in 2019; women - 5.4% in 2013, 17.9% in 2019.

Various applications installed in smartphones by young users included workout and fitness, diet and food, weight, menstrual cycle, medicines, sleep (Fig 7).

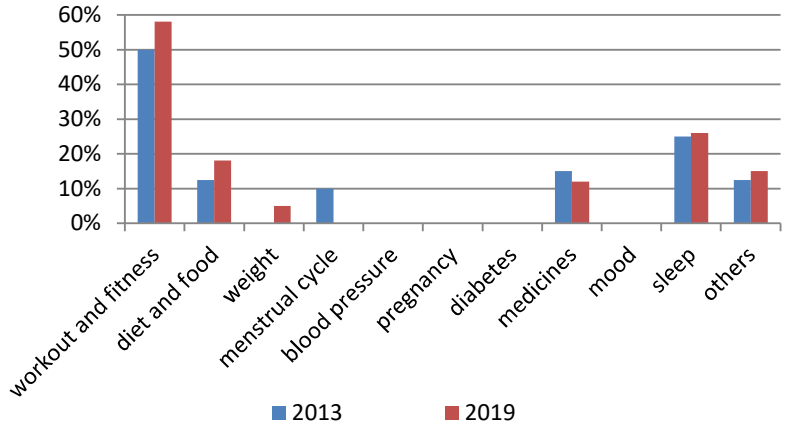

Fig. 7: The popularity of health and medicine apps in the studied group (in % of smartphone users)

The most popular applications come under the workout and fitness category, representing the largest group of programs installed in 2013 by half of health app users, while in 2019 the figure rose to 58%. These applications assist the users in taking care of their physical condition and getting slim, consequently guaranteeing well-being and good health. Endomondo Sports Tracker was the program most frequently used in both surveyed periods, although another app, Samsung Health, emerged as another leader.

Sleep related applications rank second in popularity, including those tracking sleep depth, helping to get asleep or get up as planned. They comprised about 20% of the programmes installed by 25% of health application holders in 2013 and 26% in 2019. An example of these apps is Sleep as Android.

Apps for medicines in 2013 attracted 15% of health applications users, dropping to 12% in 2019. This category includes programs for medicament administration and lexicons. In 2013, the most popular in this group was "Budzik lek" (Alarm clock medicine), while in 2019 „Przypomnienia o lekach i dziennik zdrowia. My Therapy" (Medicine reminder and health log My Therapy).

Diet and food apps had 12.5% share among health apps in 2013, increasing to 18% in 2019. These mobile guides inform users about food they eat, and provide databases on chemicals in food, calory calculators and recipes.

Besides, in 2013 10% of smartphone owners declared using programs for monitoring the menstrual cycle, supporting pregnancy planning, while in 2019 5% of the respondents showed interest in apps for body weight control.

Health status of health app users

Since health related applications should support health maintenance and management, the survey asked respondents using health apps about their health status. In 2013 and 2019 these programmes were mainly used by those in very good and good health (Fig 8), in 2013 half of each group, in 2019 the health status of almost 50% was very good, 42.6% - good, and 8.2% was neither good nor bad. Although there were cases of bad and very bad health status, none of those persons had any of the health apps.

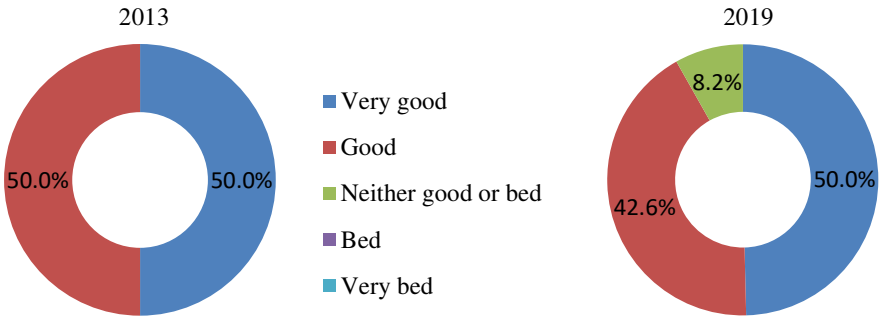

Fig. 8: Health status of health and medicine apps users in 2013 and 2019

Analysis of The Relationships

An analysis of the relationship between gender and installation and use of health supporting programs found out that both relationships were statistically significant. At the assumed level of significance $\alpha = 0.05$ in the former case the value of parameter $p<0.001$, in the latter case $p<0.01$ (with Yates

correction). The strength of the relationship between gender and program installation, measured by the coefficient φ was moderate, between gender and application use - low (Table 2).

Table 2: The relationship between gender and installation and use of health supporting programs

Sex	Instalation of health apps		Use of health apps	
Female	42	p=0,00031 φ=0,2526759	19	p=0,00893 φ=0,1980065
Male	19		6	

An analysis of the relationship between the health status and installation and use of health supporting applications shows that the former relationship (installation) is statistically significant, while in the case of use it is not. At the assumed level of significance α=0.05, the relationship between health status and installation of the programs, the value of parameter p<0.02, for the relationship between the health status and application use the parameter p>0.05. The strength of the relationship between health status and application use is moderate (Table 3).

Table 3: The relationship between health status and installation and use of health supporting programs

Health status	Instalation of health apps		Use of health apps	
Very good	30	p=0,01237 V Cramera = 0,2503472	15	p=0,05365
Good	26		10	
Neither good or bed	5		0	
Bad	0		0	
Very bad	0		0	

Discussion

The conducted research shows that in line with data for Poland (TNS Polska, 2014) and the world (We are social, 2019a) on the popularity of cell phones, including smartphones, possessing of a mobile communication device has been common. Almost all young people have smartphones, the number of which has increased substantially since 2013. The difference between the number of male and female users tends to decrease as women increasingly find multifunction phones attractive, and the corresponding market segments witness similar smartphone penetration.

Apart from phone calls, the smartphone is mostly used for sending text and/or multimedia messages. With time, MMS messages are getting more frequent, while sending short text messages is partly done by means of communicators such as Messenger or WhatsApp (UKE, 2019). The Internet services on the phone gain increasingly more users. This results from wider access and popularity of mobile solutions. Demand for mobile phone Internet is growing, and its cost is dropping (UKE, 2018).

Although the Internet use continues to be an important, even inseparable area of phone holders activity (UKE, 2019), an interest in health related topics was not and still is not particularly large in terms of browsing online or using dedicated apps. Potentially, the age group of 18-34 years old users should be reaching for health and medical programs, as they demonstrate a large, increasingly growing involvement in Internet use, interest in mobile applications (App Annie, 2017) and, resulting from the 'be fit' trend (Deloitte, 2019), considerable interest in a wide range of health issues. However, as the survey results show, the young use such programs occasionally. Significantly more respondents who installed health software in their smartphones did not use them. Consequently, the question arises why many people installed, but did not use health related apps. This may result from

the lack of conviction that such programs help in health care or health recovery or the fact that the applications installed in the past are not useful or not useful enough to use them (Jestem mobi, 2015).

A majority of those who install and use health and medicine applications are healthy. On the one hand, it seems to logically result from the fact that physical activity requires at least good health (the most common applications), while certain afflictions make it impossible to do physical exercises. On the other hand, some of the applications, such as drug reminders or chronic illness monitoring should arouse interest of people with health problems.

Differences in popularity of specific health applications indicate the user profile and factors determining the installation and use. App installation depends on gender and health status, and the use is dependent on gender. These relationships partly result from the predomination of software relating to keeping fit.

Despite relatively small interest in health applications, there is a visible dynamic increase in the number of their users. The number of people who download health applications increased more than twofold, and the number of users tripled. Taking into account the rising trend of apps popularity (We are social, 2019) and e-health solutions (Ministerstwo Zdrowia, 2019) we can predict that in the years to come the interest of smartphone owners in using health management programs will grow substantially. Health and medical applications have a great potential that software providers may exploit, although these programs need to be promoted in preventive and therapeutic medicine. Regardless of their purpose (Zhao & Freeman, 2016), they need to be trustworthy, safe, and their user interface must allow efficient use (Becker et al., 2014).

Research value and research limitation

A strength of this study is research repeated on the same sample stratified by sex and health status six years apart from first survey. This allowed the author not only to know popularity of health apps, but also changes in the behaviour of young residents of Szczecin in this field. Finally, research supplied novel information, contributing to the research field, by linking health status with installation and use of health apps. It provided an information about disparity in apps installation and use, showing a gap between them and relatively small usefulness of health apps.

This study has some limitations. It focuses on young people – the most numerous and most active smartphone users. No other age group has been studied. Consequently mainly healthy people were examined – mobile technology and apps users with a relatively small need to use applications dedicated to various health problems. It means excluded groups could be better sample for analysis. Despite surveying a good-sized group, just a small part of it was interested in health apps. Excluding workout and fitness applications there were only few examples of health apps. Due to small quantity of applications deep analysis wasn't possible. Because the situation on the health apps market is dynamic and continuously evolving, conclusions could be quickly outdated by new developments.

Implications for future research and practice

The use of applications should be constantly monitored due to the dynamic of changes in this area in all age and health status groups. To know more about this phenomenon it is very important to extend analysis to more specialized applications dedicated to specific medical problems. They could be seen as a potential low-cost and effective way to deliver health interventions to populations worldwide. The gap between installation and use of health apps, between apps delivery and real impact on behaviour changes and health status requires deeper analysis, especially if it goes about causes and effects of this phenomenon.

Conclusions

The aim of this paper was to discuss smartphones as a platform for m-health delivery for young people in Szczecin, to study the popularity of various health and medicine apps, to analyse changes over time and to examine the association between the installation, use of health-related apps, sex and health status.

Young Szczecin residents commonly use modern technological solutions for mobile communications, using smartphones for various activities. While the mobile Internet use continues to grow to an impressively high level, online interest in health related topics is significantly lower, although keeps rising, and refers more to women than men.

Health applications have a small share that is dynamically growing, with a disparity between installers and users. Prevailing programs are dedicated to fitness and health maintenance, while those for solving medical issues are of marginal importance. To date, smartphone health apps seem to be chosen by healthy people, and the typical user of these applications is a woman with good or very good health.

Mobile technologies have the potential to revolutionize interaction with health services. M-health increases access to health information and services, as well as promotes positive changes in health behaviours.

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Investment Strategies Support Using Deep Learning: Towards Theoretical Framework

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Abstract

Investment decision-supporting computer systems operate mainly on the basis of technical analysis. Fundamental and behavioral analysis is also aided with computer tools, but the integration of data remains at the discretion of the user since the market lacks a holistic system that automatically integrates the results of technical, fundamental, and behavioral analysis. The main aim of the paper is to develop a conceptual framework of investment decision support systems using cognitive technologies, including deep learning. The study of subject literature by authors has revealed a lack of both papers with a comprehensive presentation of methods to build an automated investment strategy building system and a lack of works about automated systems used in the Polish stock market. The main contribution is to develop a holistic approach based on integration by using collective intelligence methods. The article also fills the gap in using deep learning methods in the Polish stock market.

Keywords: Deep Learning, Artificial Intelligence, Investment Strategies, Financial Decisions

Introduction

Making investment decisions is a complicated and challenging problem, always connected with a certain risk. Current investment decision-supporting computer systems operate mainly on the basis of technical analysis. Fundamental and behavioral analysis is also aided with computer tools, but the integration of data remains at the discretion of the user since the market lacks a holistic system that automatically integrates the results of technical, fundamental, and behavioral analysis. The main aim of the paper is to develop a conceptual framework of investment decision support systems using cognitive technologies, including deep learning.

The study of subject literature by authors has revealed a lack of both papers with a comprehensive presentation of methods to build an automated investment strategy system and a lack of works about automated systems used in the Polish stock market.

The main contribution is to develop a holistic approach based on taking into consideration many groups of factors and their integration using collective intelligence methods. The article also fills the gap in using deep learning methods in the Polish stock market.

Related Works

During the study of the subject literature, no works have been found to contain a comprehensive collection and comparison of methods for developing an automated investment strategy building system. Such works exist mainly in the scope of the FOREX investment market Korczak, Hernes (2017). An additional reason for conducting the studies is the will to use machine learning methods that find more and more purposes of use. Subject literature usually refers to well-developed markets, mainly the USA (Renault 2017, Ziemba et al. 2019). The works focus on particular and specialized aspects, markets, and indexes, such as:

a) the method based on Bollinger bands (Bollinger 2001);
b) predicting the shifting of gold prices with investor psychology (Kumar et al. 2012);
c) the influence of stock market deregulation as globalization factor, replacing traditional trade and the development of algorithmic trade (Klaus et al. 2016);
d) the impact of financial reports and interest rates on the assessment of companies (Nowak, Olbrys 2016, Przekota, Szczepanska-Przekota 2010);
e) evaluation of recommendations made with the DCF method (Behr et al. 2018);
f) formation search study, i.e., using technical analysis as support in selecting companies (Szandula 2018);
g) using moving averages to study profitability on the stock market (Barber, Huang 2016);
h) stock market crises and the ability to predict them (Barber, Huang 2016);
i) study of market liquidity and the influence of liquidity on the profitability of transactions (Kewei et al. 2006);
j) study of Emerging Markets (Kewei et al. 2006);

A very significant aspect of the subject is the use of artificial intelligence and deep learning for the purpose of formulating an investment strategy and proper knowledge flow (Owoc, Weichbroth, 2015 Weichbroth, Brodnicki 2017, Hernes, Sobieska-Karpinska 2016). The analysis of financial trends is an important field of study in Financial Technology (FinTech). The study of turn point forecasting models which can consider international markets together, using multi-modal deep learning, reveals that common consideration of international stock markets may improve the accuracy of forecasts, and deep neural networks effectively support the process of solving such problems (Lee, Yoo, 2019, Shiao et al. 2019)). The deep learning method may also be used to forecast the stock market based on events (Ding et al. 2015), extracted from message text and represented as dense vectors tested with a new neural network of a tensor. Deep learning can also improve the accuracy of market forecasts (Singh, Srivastava 2017). Comprehensive and objective evaluation of both the pros and cons of using deep learning algorithms for analyses and market forecasts (Lee et al. 2019) indicates a general ability of neural networks to predict future behavior and market phenomena. The innovative approach of using deep learning models with vector paragraph and long short-term memory (LSTM) (Takeuchi, Lee 2013) to forecast time series allows to convert press articles into their dispersed representations with a Vector and perform the modeling of the tidal influence of past events on stock rates.

Deep learning is also applicable in formulating quantitative strategy in the option exchange market (Fang et al. 2019). Investment decision strategy (IDS) may be expressed on the basis of deep learning (Hu et al. 2018). In this case, for the purpose of building a portfolio, a deep-learned optimization of representation and modularity was used for grouping stocks and identifying various sectors and selecting stocks in each sector according to their Sharpe ratio. Using artificial intelligence systems in forecasting financial markets requires a reliable and straightforward model that provides profitable growth.

A review of deep learning issues reveals that they are pointed out explicitly in the context of predicting the value of stocks and the financial market (Henrique et al. 2019). Research is also conducted (Yang et al. 2019) of using deep learning on the Yu'e Bao transaction database to maximize profits with deceased investment risk. For the purpose of forming investment strategies on global stock market, financial indexes can be indicated which, when used with deep learning, allow to construct two strategies based on stock rate indexes (Lee et al. 2019): global strategy for forecasting the stock market and regional strategy for allocating the developed/emerging market. Using auto-coder (Takeuchi, Lee 2013) composed of accumulated limited Boltzmann machines allows to extract individual stock rates from the past. Designing Hybrid Attention Networks (HAN) (Hu et al. 2018) allows to predict market trend based on related news. Deep learning methods also allowed to forecast Standard & Poor's 500 index (Vargas et al. 2017) based on financial news headlines and a set of technical data. The methodology of deep learning (Tsantekidis et al. 2017) based on Convolutional Neural Networks (CNN), which uses large-scale high-frequency time series from financial markets' order book, also allows predicting the changes of stock rates. The existing methods of forecasting use both linear algorithms (AR, MA, ARIMA), and non-linear algorithms (ARCH, GARCH, neural networks) and focus on predicting changes in stock index or forecasting prices for a given company upon closing of markings. An innovative end-to-end model (Long et al. 2019) called multi-filter neural network (MFNN) built on the CSI 300 Chinese market index allows extracting features from samples of financial time series in order to predict price change. Both convolutional and recurrent neurons are integrated to build a multi-filter structure to provide information from different areas of market functions and views.

Study of literature has revealed the existence of a research gap in the following aspects:

1. No work has been found that approaches the market in a holistic manner, contains the influence of foreign markets on Polish markets, investment sentiment followed by a selection of strategy to choose the best companies at a given moment. No works about automated systems used on the Polish stock market;
2. Automatic strategies focus mainly on the FOREX or American market;
3. No works about the application of deep learning methods in the Polish stock market.

Research Methodology

In our researches, we use the Design Science Research Process (DSRP) methodology (Vaishnavi et al. 2017). This methodology involves the realization of research works as process-dependent steps responsible for the implementation of basic tasks and the delivery of basic work artifacts. This methodology is based on five basic steps. The first, "Awareness of the problem," focuses on the preparation of a preliminary proposal for a new research topic, which usually results from the analysis of already available achievements and results in related discipline or disciplines, as well as in industry. The second, development of the proposal ("Suggestion"), follows the initial proposal and is a creative step aimed at defining new models, methods, functionalities based on new configurations of existing or new elements. The third, development of the proposal ("Development"), is the stage where the initial research is developed and extended. The fourth, "Evaluation" is the stage where the prepared artifacts are evaluated according to the adopted criteria. The fifth, "Conclusion" can be the end of a given research cycle or is the end of the entire research undertaking. As outlined, each stage ends with a specific result, which then forms the basis and allows for the next step in the process. Also, this methodology assumes that it is possible to return to the previous steps under the observed restrictions. The concept of using the DSRP methodology in this paper is presented in Figure 1.

We mainly use the literature of subject analysis as a research method in the Awareness of the problem and the Suggestion stages. In the development stage, we use such research methods as modeling, design, and implementation and observation of phenomena.

The Evaluation stage uses a research experiment method. The concluding phase is based on synthesis, analysis, induction, and deduction research methods.

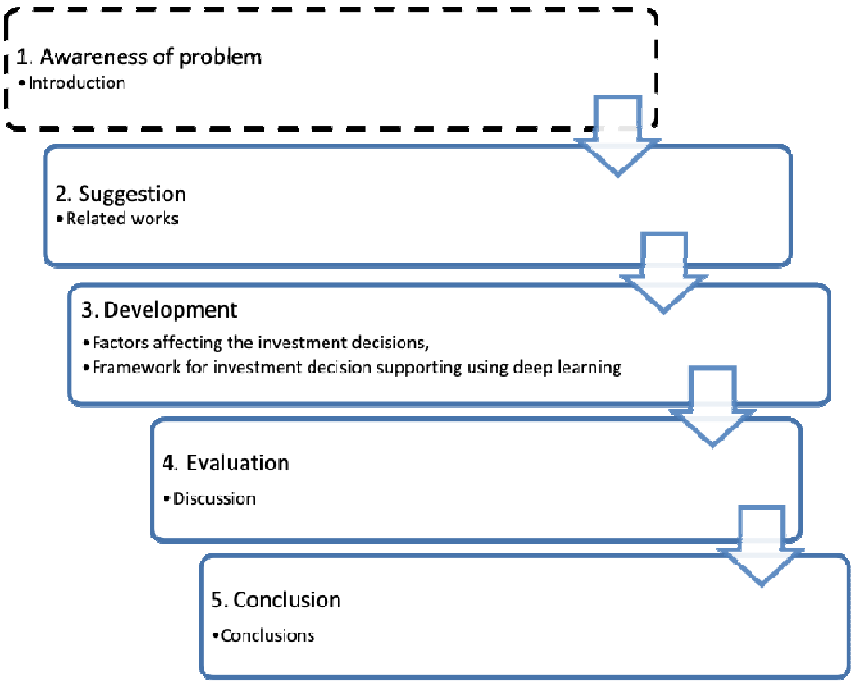

Fig. 1: Stages of research methodology.

Factors Affecting Investment Decisions

A large number of factors that may influence the final evaluation of stock price make it difficult to make an investment decision. Each investor selects their strategy based on a small section of the market and sticks to it. This is the only way a human can cope with the barrage of information, indexes, and speculation. The application of information systems allows detecting patterns and trends in all this. That is why the stock market environment should be a perfect proving ground for the latest artificial intelligence technologies, including deep neural networks. Factors influencing share price are presented in Figure 2.

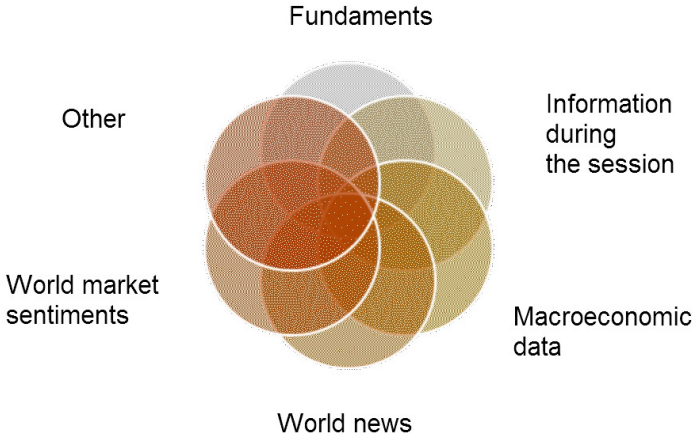

Fig. 2: Factors affecting the share price.

Information from companies is the most important and fundamental. It includes: paid dividends (Sirignano, Cont 2019), company profits (balance, profit, and loss account) (Fang et al. 2019), information on takeovers, share sales, etc. (Hu et al. 2018), announcements of important events for the company, contracts, resolutions, new projects, investments (Maknickienė, Maknickas 2013), changes in company ownership, reduction or increase in the number of shares of a given shareholder (Qian, Rasheed 2007), reduction or increase in the number of shares of a given institutional investor (a trust fund, retirement fund, etc.), the announcement of the purchase of shares, stability and transparency of company operation (Hu et al. 2018).

Another significant factor that influences share prices is information that appears during the session day. It involves in particular: volume of sales, statements appearing on the formation graphs, unpredictable events, such as speeches, geopolitical uncertainties, terrorist attacks, disasters (Maknickienė, Maknickas 2013).

Another equally significant element is macroeconomic data, especially (Henrique et al. 2019, Yang et al. 2019)): interest rates, GDP, inflation, credit, deficit, development of country and individual sectors, taxes introduced, new regulations or changes in laws.

Another group of factors influencing share prices is world news. It may apply to the following: trade wars, new international regulations, decline/boom on world markets, rate of unemployment in the USA etc., income and consumption, housing development (Maknickienė, Maknickas 2013, Fang et al. 2019). Another important factor is the sentiment of a given enterprise. In such a case, the share price mainly depends on the influence of human emotions (Qian, Rasheed 2007).

The last group of factors presented in Figure 2 is 'other' that include (Pradeepkumar, Ravi, 2018; Munkhdalai et al. 2019),:

a) recommendations from brokerage houses, bloggers, fund managers, etc.
b) changes in currency markets,
c) changes in raw material prices on world markets,
d) speculation – from small stock exchange gamblers to enormous hedging funds,
e) seasonality/changing market liquidity – some companies operate in seasonal trend,
f) a number of shares – if a company has a small number of shares issued, their price is higher, but they can also be 'watered down' at any moment,
g) bubbles, fashion, crisis – fashion for a given industry, in which many inexperienced investors invest their money at a given moment,

h) results of similar companies – sector correlation, for instance: rate increase for one gaming company causes increase for another company from the same industry,
i) different classes of assets attract more investors at a given moment – for instance: bonds or deposits are attractive enough for the capital to come their way.

The number of factors influencing the share price is large, and their analysis is very complicated and time-consuming. It has been decided to select a certain range of factors to base on. It has been decided to divide the analysis of investment strategy building issues into several stages where groups of selected factors are analyzed. A number of comparison methods will be applied at each stage in the field of accounting, statistics, and machine learning. On this basis, one of the methods will be selected at each stage to yield satisfactory results. The method must be quick and easily automated.

Deep Learning Framework for Investment Decision Support

Based on the study of subject literature and practical experience of authors of the paper, the deep learning model should consist of the following cascade deep neural networks (Fig. 3):

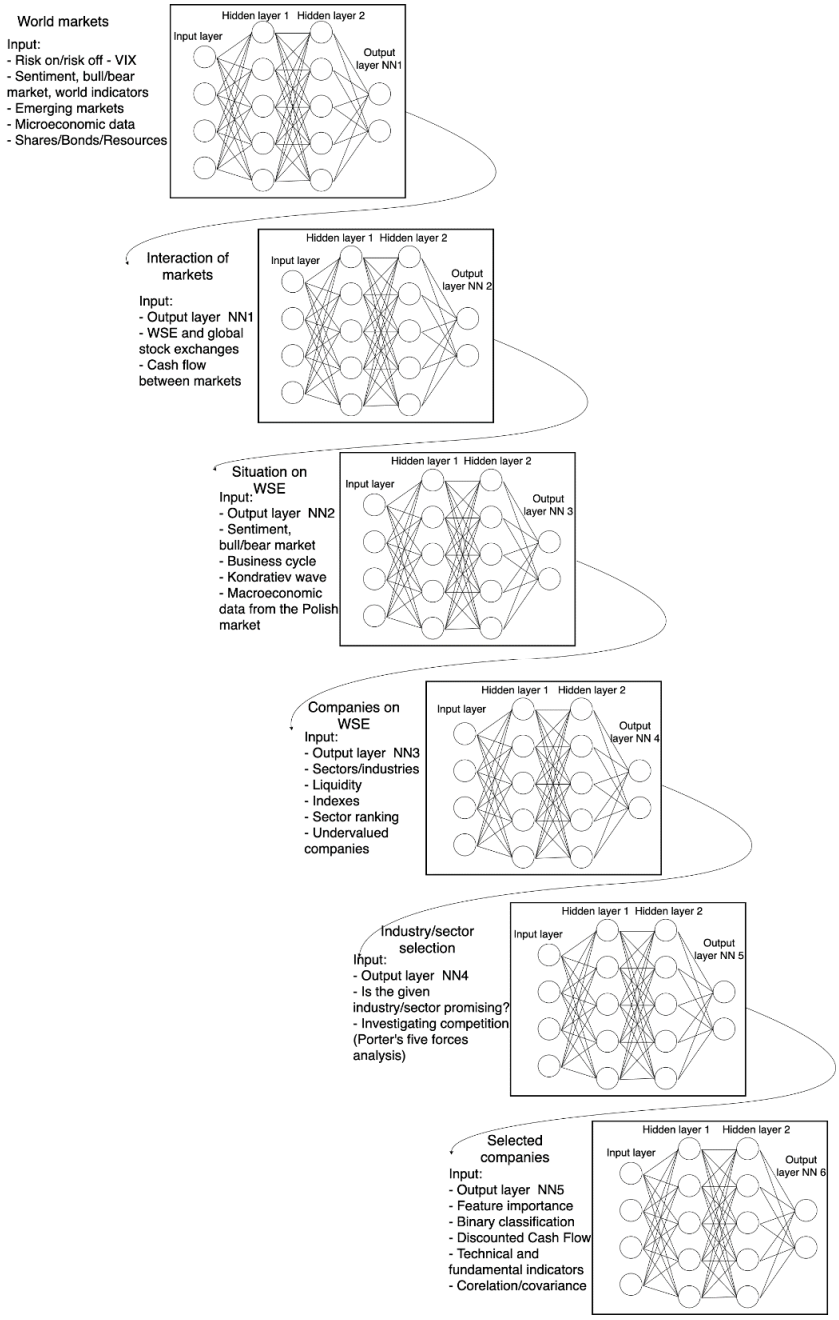

Fig. 3: Deep learning holistic approach.

1. Global situation – at this stage, the general global sentiment should be considered. Is the market outlook good at the moment, or is there a crisis? What is the best target of investment (shares/bonds/raw materials)? How does the current situation influence the capital flow between world markets? This stage should provide an answer whether or not it is a good idea to invest in, for example, Polish Stock Market. However, this stage should be universal enough to answer the question: how and where should money be

invested at the moment? In this section, the main emphasis will be put on the analysis of literature and world economy indexes.

2. Influence of markets on one another – examination of the influence of world markets on one another and their influence on market outlook on the Polish Stock Market.
3. Analysis of the situation on the Polish Stock Market. Checking current trends, investor sentiment, duration of decline or boom, business cycles, and their effect on the upcoming years.
4. Division of companies from the Polish Stock Market on sectors/industries. Applying several methods to check which one yields the best results when selecting the most successful industry or company group (e.g., according to liquidity, WIGs, industries). Creating a ranking of sectors (Fischer, Krauss 2017).
5. A more detailed analysis of a selected industry or sector. Methods used to determine whether a given sector gives perspectives, the study of competition in the sector (Porter's Five Forces Network).
6. A closer look at specific companies upon selecting the sector. Methods such as feature importance (e.g., decision trees), binary classification, DCF, indexes, reports, covariance, correlation (Fang et al. 2019). Creating a ranking of companies based on machine learning methods and fundamental analysis (Fischer, Krauss 2017).
7. Upon selection, the choice of investment strategy, risk approach, and methods for creating a portfolio must be considered.

The outputs of every deep neural network are connected to the inputs of the next neural network. The output of the last neural network represents the ranking of companies – each output represents the value (the range: [0..1]) of the given company's evaluation.

Discussion

The deep learning framework presented above considers the influence of economic news on the Polish Stock Market, therefore it is fundamental data, but with global reach. It is a large group of numerical data, generally available indexes that appear at various time intervals. The question is: what is the influence of fundamental data on the final share price and its movement? The framework allows checking the situation on global markets, the market outlook of world stock markets, and then the Polish Stock Market. Then, the influence of external factors on the situation of the Polish stock market is analyzed along with the fundamental situation of companies selected while creating the tool.

The proposed approach is interdisciplinary. Typically financial factors must be analyzed, being the fundaments of a given company. It is also necessary to consider the correlation and causality of individual information – these are typically statistical aspects. Technical analysis, indexes such as RSI MACD, CCI, oscillators, moving averages, etc. will be used as input and output moment signals. Also, the effects of introducing the processed data into the machine learning system must be examined, and that is a programming issue. Naturally, it is impossible to check the influence of all the listed factors; it is necessary to select the aspect to begin the research with and to check the relations that exist in this field.

Conclusions

Investment decisions are burdened with high risk, and making such decisions is a complicated and incredibly complex task. Predicting share prices is the basic and most challenging element of investment in a stock market. For years, investors have been using various IT tools to optimize their financial decisions and to adopt a strategy of conduct. As pointed out in the article, current computer investment decision-making support systems are mainly based on elements of technical analysis. The market also offers IT tools that use the assumptions of fundamental or behavioral analysis. However,

no system operates in a holistic, complex manner, one that integrates all results from technical, fundamental, and behavioral analysis automatically.

Such a holistic approach, based on the integration of the approaches mentioned above using collective intelligence, was the main aim of this article. The proposed interdisciplinary approach supported by deep learning should consider such factors as global situation analysis of the influence of markets on one another, analysis of the situation on the Polish Stock Market, selection and analysis of industries, followed by a selection of specific companies. Have made the selection, one must consider the investment strategy, approach to risk, and method of creating the portfolio.

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Smart Payment Terminal as an Intelligent Answer to Process Management Problems in Gas Stations in Poland

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Abstract

The Polish gas stations lack labour because of the good economic situation in Poland and the migration of workers to other EU countries, especially those with vocational education. This makes entrepreneurs face the challenge to change their processes to be less dependent on the workforce. It leads to improvements based on technological innovations, e.g. self-service payment for fuel with the use of touchscreens. **Purpose of the Paper:** The aim of this paper is to present an innovative approach - The Smart Payment Terminal (SPT) as an answer to labour problems and as both product and process innovation in the fuel selling process at gas stations in Poland. **Methodology**: Basic function and technical information of SPT are presented. The work has R&D character. **Findings**: The main contribution is developing the innovative Smart Payment Terminal that allows payment with cash, credit cards or fleet cards, or using a special code worth the rest of the money remaining in advance cash payments, as the machine does not give change. It prints receipts or invoices, depending on the customer's choice. **Conclusions**: This innovation will make the selling process more fluent and user-friendly. Moreover, it will allow the company to reduce costs and be more independent from the lack of labour.

Keywords: Payment Terminal, Gas Station, Self-Service Technology, Product Innovation, Process Management

Introduction

The good economic situation in Poland and the connected low unemployment rate (5.2% according to the Central Statistical Office at the end of December 2019 (Główny Urząd Statystyczny, 2020), and 3.3% according to Eurostat, while the average unemployment rate for the European Union member countries at the end of December 2019 amounted to 6.2% (Eurostat, 2020) causes entrepreneurs to face multidimensional challenges (Kotlorz, 2011; Makuch, 2014). One of them is the labour deficit. Results of the research conducted among Polish entrepreneurs show that a serious barrier to the development of companies is becoming, as one might suppose, not the lack of capital, but the lack of employees. This problem is particularly visible in the segment of low-skilled employees and is a

strong barrier to the development of key sectors of the Polish economy (DNB Bank Polska S.A. and Deloittle, 2016; Przemyślańska-Włosek, 2019).

The main factors conditioning the growing shortages in the area of lower-qualified labour supply include the mismatch of the education structure to the needs of the labour market and migration processes.

The high level of enrolment rate (Lewandowski *et al.*, 2017), caused by the easy access to higher education in the late 1990s, led to an increase in the overall level of education of labour resources and significant changes in the structure of labour supply. The number of employees with higher education in Poland in 2005–2014 increased by two-thirds, while in the entire European Union it increased by one-third (Arendt and Gajdos, 2018). This, in turn, translated into an increase in the professional and life aspirations of university graduates who are not willing (understandably) to work below the qualifications obtained.

Migration processes also affected the shortage of employees in the Polish labour market. The economic emigration in Poland intensified after accession to the European Union and the opening of most western labour markets (Kaczmarczyk and Okólski, 2008; Kaczmarczyk, 2012). One of the most important motives for these migrations is the economic aspect, which is manifested in particular in the possibility of obtaining a higher salary. Although the opening of European labour markets for Poles has significantly increased the level of migration of people with higher education, the largest group of migrants are still people with vocational education, which directly translates into the problems of Polish entrepreneurs with finding lower-level employees (Nowak and Kulik-Nowak, 2018).

Because of the problems with labour in Poland described above, many companies, including the trading ones, seek for solutions which make them more independent from the lack of workers. They need to organize their processes in such a way that will not need workers in such quantity as before or not need them at all. It leads to some technological solutions in customers' service which can be applied in trade.

Technology is ubiquitous as never before. In 2017 the top five public companies by market capitalization were tech companies: Apple, Alphabet, Microsoft, Amazon, and Facebook (Klarin, 2019). It shows that people globally use technological solution and have already got used to them. Nowadays, innovation is one of the basic requirements of the company's success. It is innovation rather than efficiency regarded as the key driver of market competitiveness, company's growth, and business success (Tajeddini *et al.*, 2020). According to the Oslo Manual and the OECD experts, the innovation is "a new or improved product or process (or a combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)" (OECD, 2018). There are two main types of innovations indicated above. Product innovation refers to a new or significantly improved good or service and includes significant improvements to characteristics or performance specifications, such as quality, technical specifications, user-friendliness or usability. Business process innovation means a new or significantly improved business process for business functions, including production, distribution and logistics, marketing and sales, information and communication systems, and administration and management. According to the OECD Innovation Indicators Report (OECD, 2020), only 21% of Polish firms are innovative, and they employ 51% of workers in the country.

The aim of this paper is to present an innovative approach - The Smart Payment Terminal (SPT) as an answer to labour problems and as both product and process innovation in the fuel selling process at gas stations in Poland. The possibilities and the advantages of its use in such a specific place of trade are presented. The work has R&D character. The main contribution is developing the innovative Smart Payment Terminal that allows payment with cash, credit cards or fleet cards, or using a special code worth the rest of the money remaining in advance cash payments, as the machine

does not give change. This section should follow keywords. This section should provide background of the study and highlight research motivation.

Related Works

Selling fuel at gas stations in Poland is based on self-service. At the beginning of selling fuels back in the early 20th century, the gas station attendant pumped the gas, cleaned the windshield, and even checked tire pressure while the customer sat in the car. Now, the customers pump the fuel by themselves, may wash the windows, check the tire pressure, or even vacuum-clean the inside of the car, all by themselves. The only thing that is done with the exploitation of employees is the payment process. The driver has to close the car and go to pay to the convenience store which is located in most of the gas stations, buying some food and drinks by the way. It takes a few minutes to go there and back to the car and during that time the refuelling station is blocked by the car.

Increasing customisation of services and lack of labour to work at gas stations, especially at nights, force the companies to improve the selling process. One of the innovations used worldwide in improving products and processes is the use of touchscreen in self-service technology. Many of us use it in everyday life, e.g. cash machines, self-service cash registers in a supermarket, or self-service check-ins at the airport. Self-service technology is becoming more and more popular and increasing in importance because while using it the customer feels empowered to conduct even complex operation by himself in a convenient time and way for him, and has the ability to customize a product or service for him-self. The companies also want to use this technology, because they gain the potential to serve more customers with fewer resources, and thus reduce costs. Also, they want to increase customers' satisfaction, so they would return to the service and not seek alternatives from competitors (Hsieh, 2005; Jokisuu *et al.*, 2015).

To introduce self-service technology in the payment process at the gas station, the pay-at-the-pump service with on-line technology is necessary (Hsieh, 2005). The system of payment at the pump was first used in 1982 in Europe and 1986 in the US. The dispenser with a built-in credit/debit card reader system was available, but only 13% of convenience stores used that technology by 1994, while in 2002, 80% of them had it already implemented. In 2004, Sheetz, an American chain of stores that also sell gasoline, was the first to use touch-screen kiosks at the pump where customers could pay for the fuel and order in-store foodservice items that they picked up after fuelling. Eight years later, in 2012, the touch screens were placed directly on the pump (NACS Online, 2011). Nowadays, such solutions are used in many countries, e.g. in the UK, the US, Australia, Singapore, Ireland, Iceland, Italy etc. In some countries, e.g. Brazil, Egypt, or some states in the US, such a system is illegal, because the government wants to keep fuel attendant jobs in the country to decrease the unemployment rate.

In Poland, all gas stations are self-service, which means that there is no standard service to pump the fuel by an attendant, but you can ask for help. The payment is always done after filling up at the cash desk, mostly placed inside the gas station convenience store, which offers also some fast food. The gas stations are open 24/7, despite the prohibition of trade on Sundays because they perform works or sell goods necessary to the every-day life of the society.

The self-payment service on the gas station has been slowly introducing for the last few years, some small gas stations have been being equipped with self-service payment terminals. However, they are located only near big shopping centres and do not support printing invoices as on-site service as a standard ("eMila," 2020). These stations make about 1% of all gas stations in Poland.

Smart Payment Terminal

The Smart Payment Terminal (SPT) is an intelligent answer to problems with labour at Polish gas stations, being at the same time both product and process innovation in the fuel selling process. As product innovation it uses touchscreen technology to self-service of the payment and is a completely

new product compared to the cash desk, it is user-friendly and its usability is much higher than standard self-service at the gas station. It is also a business process innovation because of the new payment service in the selling process. The process is more fluent and the customer feels more comfortable while using the well-known touchscreen. The company is seen as innovative.

Basic Functions of SPT

Smart Payment Terminal has following functions:

- 24-hour self-service retail sale of fuels and gas,
- payment with a card or an own fleet card services,
- handling cash payments,
- editing and printing invoices,
- checking the discount system for groups or selected users,
- service of own fleet cards,
- use of limits and restrictions related to drivers and vehicles, groups of recipients, groups of vehicles,
- archiving transactions along with the information about the user, transaction time, quantity and value of issued fuel,
- data transfer in real-time,
- integration with any IT system,
- cooperation with management control systems.

Technical Specification

Smart Payment Terminal (SPT) is built in a special anti-burglary housing made of stainless steel, in which the necessary devices and protections required for correct operation have been installed. Construction of SPT is shown on Fig. 1 and Fig. 2.

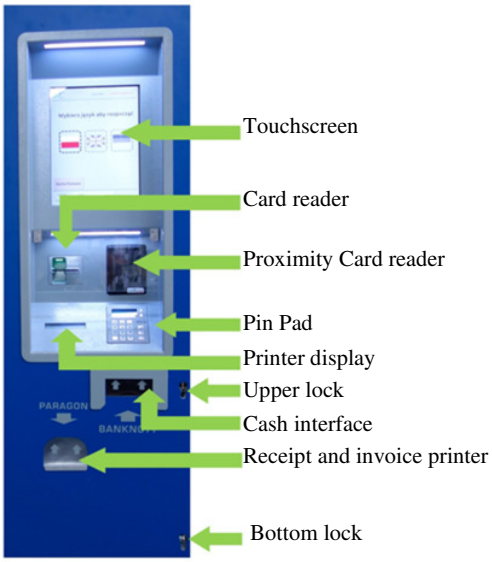

Fig. 1: SPT – front view

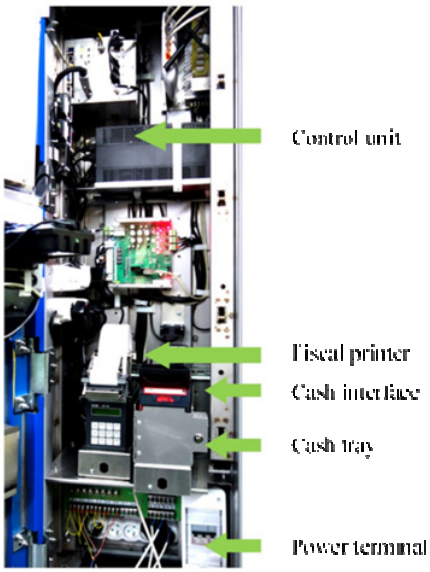

Fig. 2: SPT – inside view

Using the SPT

After turning on the terminal, the main screen of the application indicating available payment methods appears on the touch screen. SPT allows payment (Fig. 3):

- in cash with 10, 20, 50, 100, 200 PLN or 5,10,20,50 € banknotes and their combinations,
- by credit card - a selection of refuelling amount,
- fleet card for regular customers - choosing the amount of refuelling,
- using a special code worth the rest of the money remaining in advance cash payments, as the machine does not give change.

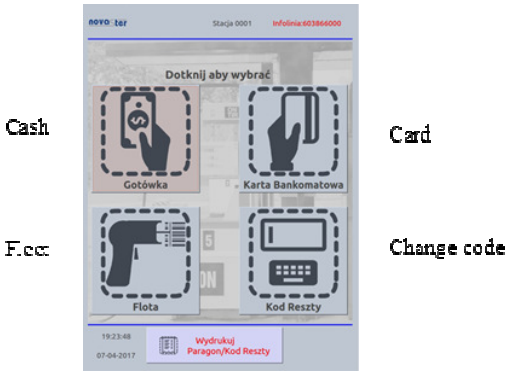

Fig. 3: SPT – payment methods

After accepting payment by the SPT, the user may start refuelling. Due to safety reason the user must start refuelling in 120 seconds. If this time is exceeded, the SPT will print the change code. SPT also allows opting out of buying fuel. After refuelling, the user may choose a refuelling confirmation in

the form of a receipt or invoice, where the company's tax identification number needs to be provided by the user. The remaining customer data are automatically downloaded by the system.

The STP also includes an IT management system (Fig. 4). The system is available after logging in to the appropriate Internet address provided by the SPT supplier. The management system consists of 10 tabs:

- Sales - summary of financial analysis and transactions,
- Fleet cards - card configuration,
- Companies - entering data for companies using SPT,
- Tanks - a preview of the fuel level in the tanks,
- Stations - configuring SPT for fuels, refuelling stations, filling stations,
- Settings - entering basic data related to sales through SPT,
- Service,
- Invoices - issuing invoices,
- Users - granting rights to users,
- Change codes - accounting for unused change codes.

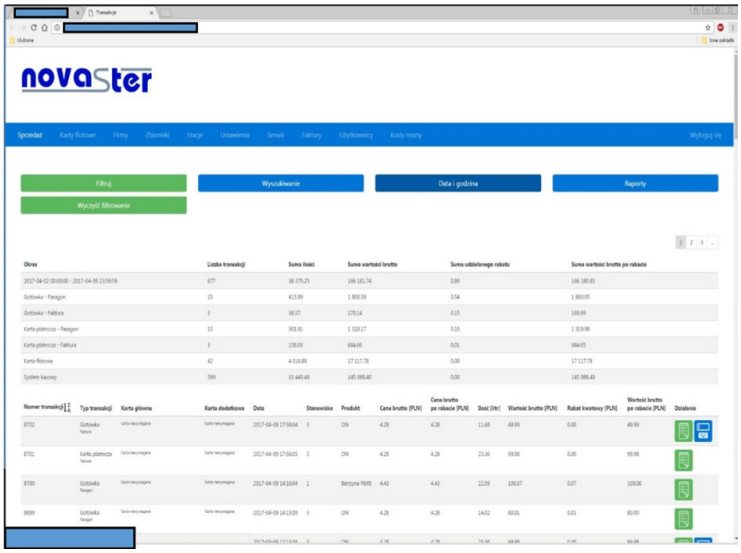

Fig. 2: SPT – management system

Discussion

The presented solution supports the gas refueling process in a complex way. The main advantages are as follows:

- full automation of gas sale process,
- presenting, collecting and processing information regarding the implementation of the purchase / sale process,
- making payments using all available channels,
- compliance with legal standards (e.g. by using fiscal printing),
- printing all necessary documents needed for accounting and fiscal offices,
- integration with gas pump,
- management by dedicated software,

- performing quantitative and qualitative process analysis using the dedicated software,
- possibility of integration of the software with the management information systems (e.g. ERP system).

The main disadvantage of Smart Payment Terminal is a costs of implementation, which is higher, than, for example, mobile applications. On the other hand, the presented solution with SPT is more flexible than mobile applications. For instance, the mobile application offers less payment channels (it is impossible to make payment by cash). Also not everybody has the access to the internet and the use of mobile applications is impossible (e.g. many of seniors). Also lack of a mobile application for customers is a disadvantage of SPT.

Conclusion

The Smart Payment Terminal is a solution to the problems of lack of workers at gas stations in Poland, which begun a few years ago and was caused by the good economic situation in the country, the easy access to higher education and the economic emigration of workers to EU countries. SPT is a terminal which can be used at every gas station in Poland. It allows conducting a self-service payment for fuel with the use of a touch screen. It ensures meeting all possible needs of the customer, as it allows payments by cash, credit cards, fleet cards and special codes that were given in advanced payments. It may print a receipt or an invoice. The last one is not possible at self-service payment terminals at the moment. Printing invoices at a gas station is operated only by an attendant. SPT will change that, the customer will be able to serve himself completely. Such innovation will allow to reduce costs and to make the selling process more fluent. The company will be seen as innovative.
The further research works can be related, for example, to using artificial intelligence tools (e.g. neural networks or cognitive tools) for fuel sales forecasting and to implementation of mobile applications for customers.

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Financial and Credit Intermediation in Emerging Markets: Credit System of People Republic of China

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Abstract

The paper is devoted to the credit system of China, the most significant of which is the segment of the banking system led by the central bank. China's credit system's condition was analyzed taking into account the influence of globalization and the current external shocks on the economies of emerging market. In this context, China's credit system is of particular interest to identify trends in the development of credit and financial-intermediation in emerging markets. It was noted that the central bank in the classic definition - is the bank of banks. Such a definition of an adequate retained its meaning in the middle of the XX century. However, due to the development of the banking periphery, the central bank in modern terms appears as a bank of the system of credit and financial organizations, which includes not only banks. Not all credit and financial institutions in the PRC are controlled by the central bank and therefore do not belong to the second level of the country's banking system. The role of tax instruments to support China's financial and credit system was shown. Exemption of bank deposits interest from the personal income tax stimulates the involvement of public funds in the form of bank deposits. The necessity to revise the role of the credit system of the countries with emerging economies in the face of global external shocks was proved. It was concluded that central banks from the bank the banks develop into megacenter for financial intermediation institutions. At the same time, central banks are not able to become regulators of the national credit system. This conclusion is extremely important for the search engines display the national economies, including emerging markets, the global crisis.

Keywords: credit system, banking system, central bank, emerging markets, globalization of financial markets, tax regulation, tax conditions.

Introduction

We would like to preface our study with the phrase William Rogers: 'From the beginning of time there have been three great inventions: fire, wheel and *central banking system*."

Usually, a study of a national credit system comes down to a review of the banking system, which is led by a central bank. The central bank in the classical definition is a bank of banks (of course, along with other functions). Such a definition retained its adequate meaning back in the middle of the 20th century. However, due to the development of the banking periphery, the formation of several levels in it, in the modern view, the central bank is the center of the system of credit and financial organizations, which includes not only banks. As a result, central banks from a bank of banks develop

into mega-centers (mega-regulators) of financial intermediation institutions. This conceptual setting is also characteristic of the central bank of China. Over the past forty years, financial markets have developed at a rapid pace in the country, which may be evidenced by the entry (according to Fortune Rating) at the end of 2019 of 26 companies directly related to the financial sector (banking, life insurance, the stock market) into the TOP-500 companies the world with the highest financial turnover (table 1).

Table 1: The largest companies in the financial sector of China in 2019

Rank in global rating	Company	Revenue, billion dollars USA	Profit, billion dollars USA	Assets, billion dollars USA	Employees, thousand people
26	Industrial & Commercial Bank of China	$168,979.00	$45,002.30	$4,034,481.60	449,296
36	Agricultural Bank of China	$139,523.60	$30,656.50	$3,293,105.00	477,526
31	China Construction Bank	$151,110.80	$38,498.40	$3,382,421.70	366,996
29	Ping An Insurance	$163,597.40	$16,237.20	$1,040,383.40	376,9
51	China Life Insurance	$116,171.50	$2,566.90	$580,331.60	175,077
44	Bank of China	$127,714.10	$27,225.20	$3,097,612.00	310,119
67	China Development Bank	$103,072.90	$16,744.30	$2,356,616.20	9,507
121	People's Insurance Co. of China	$75,377.30	$1,952.00	$150,259.30	198,457
138	China Evergrande Group	$70,478.90	$5,652.60	$273,829.00	131,694
137	CITIC Group	$70,659.00	$4,566.00	$986,297.00	287,5
150	Bank of Communications	$65,644.80	$11,131.30	$1,388,230.00	92,714
177	Country Garden Holdings	$57,308.70	$5,233.50	$237,367.50	131,387
188	China Merchants Bank	$55,063.50	$12,179.00	$982,526.00	74,59
213	Industrial Bank	$50,991.40	$9,164.50	$977,563.40	59,659
202	Greenland Holding Group	$52,720.90	$1,719.60	$150,974.50	39,091
199	China Pacific Insurance (Group)	$53,572.10	$2,724.10	$194,584.50	107,741
216	Shanghai Pudong Development Bank	$50,545.70	$8,453.00	$916,091.00	55,692
232	China Minsheng Banking	$47,981.30	$7,608.40	$873,155.30	58,338
254	China Vanke	$44,912.60	$5,105.70	$222,652.20	104,3
242	China Poly Group	$46,207.10	$1,495.90	$158,364.30	97,527
289	China Everbright Group	$41,879.70	$1,890.80	$696,969.90	70
368	Yango Longking Group	$33,394.80	$613.6	$51,585.30	21,849
388	AIA Group	$32,369.00	$2,597.00	$229,806.00	22
442	Huaxia Life Insurance	$28,492.80	$398.8	$74,401.50	500

451	China Taiping Insurance Group	$27,485.80	$434	$96,189.10	75,341
498	Taikang Insurance Group	$24,931.70	$1,794.60	$117,398.30	57,406

Source: Fortune. Global 500, 2020. Available at: http://fortune.com/global500/.

Boundaries of subordination of financial institutions to the central bank in different countries of the world are not uniform, they are predetermined by economic and political expediency.

The purpose of this paper is to show the structural differences between the "credit system" and the "banking system", to reveal the diverse structure of credit and financial organizations in the emerging financial market of China, to characterize China's experience in creating the conditions for the successful development of the credit system. To achieve the goal, a complete description of the system of credit and financial organizations of the PRC is provided, adequate to reality, the special provisions of the Central Bank of China are analyzed, tax incentives for the formation of the country's credit system resources are evaluated.

At the heart of any science is a description of the facts. Only on a factual basis can we draw practical conclusions and forecasts, which make up the deep essence and purpose of economic and financial science. If the body of knowledge does not describe the facts, if it is not able to logically lead to comparisons (factors, dynamic models or static samples), and from them to practical conclusions and forecasts, then such a body of knowledge cannot pretend to be scientific.

Of particular interest in researching the characteristics and development trends of the PRC credit system is due to the fact that China remains an emerging market country. Significantly ahead of the rest of the transforming countries in terms of capital turnover in domestic financial markets and in terms of economic growth, China, nevertheless, remains a reference point in terms of the dynamics and trends of structural changes, primarily in the financial and credit sphere. Moreover, emerging markets depend on growth in China and the stability of the Chinese economy. Moving from early to intermediate and further to an advanced stage of development, countries with emerging markets are going through a stage requiring restructuring of the entire economy, the most important component of which is the formation and development of credit and financial infrastructure. In this context, a study of the evolution, current status and prospects of the PRC credit system allows us to identify the most important trends in the development of credit and financial intermediation in countries with emerging markets. The identified trends will allow accelerating infrastructural transformations in emerging markets, which becomes critically important in the face of external shocks in 2020.

Literature Overview

The characteristics of China's financial and credit system are largely determined by the emerging financial market (Lvova, 2016). Many institutions of emerging financial markets have significant specificities (Mischenko et al., 2019; Ivanov et al., 2019; Naumenkova et al., 2020), and the tools applied to developed markets require adjustments for emerging markets (Voronov et al., 2016; Bubnov and Bubnova, 2018; Lukasevich et al., 2018).

Certain aspects of the PRC credit system have been repeatedly considered, firstly, fragmentarily, and secondly, from the point of view of the banking reforms being carried out in the country. Here we can note the work of Zhou and Zlra, 1987; Yk, 1999; Lardy, 2000; Li and Mehta, 2001; Subal and Dan, 2007; Wang, 2018; Xiaochi and Yi, 2019.

The results of previous studies substantiated the importance of tax regulation for economic development in general (Pokrovskaia et al., 2016; Karpova and Mayburov, 2017), and for the credit system (Sokolov and Sokolova, 2016; Ivanova et al., 2019) in particular.

However, the extent to which reforms are large-scale, progressive and consistent can only be grounded after a holistic reflection of the object of reform. Only by understanding the scope of the facility, one can understand the progressiveness or limitations of the reforms. In this regard, the noted publications are narrow in nature and require additional studies, which are the subject of this work.

The structure of the credit system of China

The credit system of China can be divided into several groups of institutions (Fig. 1).

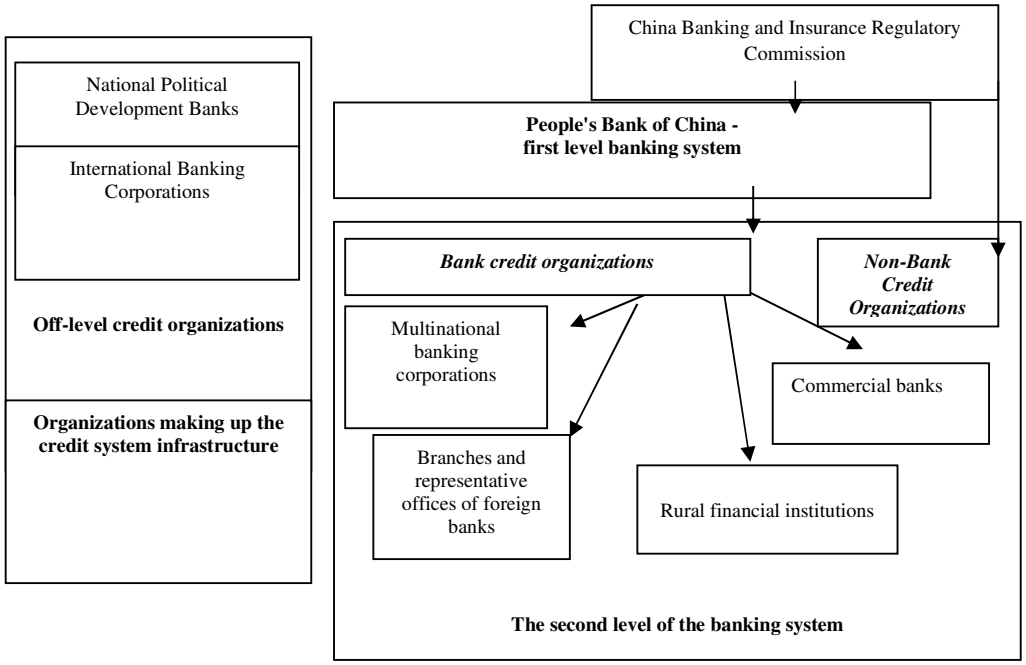

Fig. 1: Credit system of People Republic of China

Source: made by authors.

The first group: a two-tier banking system. It includes:

– The People's Bank of China (PBC) is the country's central bank, representing the first level of the banking system (Sokolov and Nazarov, 2018; Ivanov, 2019);
– a complex of organizations engaged in banking operations, the activities of which are regulated and controlled by PBC. This complex constitutes the periphery of the country's central bank as the center of banking and non-banking organizations, the second level of the banking system.

It should be noted that within this group there are no such organizations between which subordination has developed; therefore, the allocation of a three-tier banking system is fundamentally wrong. For example, it makes no sense to treat banking and non-bank credit organizations as two independent levels. This statement is true not only in relation to the banking system of China, but also in relation to the banking system of Russia.

The second level of the PRC banking system includes:
– the four largest state-owned commercial banks, representing transnational banking corporations;
– commercial banks;
– rural financial institutions;
– branches and representative offices of foreign banks;
– non-bank financial institutions;

The second group: credit organizations that are not controlled by the People's Bank of China, respectively, are not included in the two-tier banking system:

- national political development banks;
- multinational banking corporations.

The third group: organizations that make up the infrastructure of the credit system. These include:

- non-profit self-regulatory organization;
- credit and financial information institutions:
- deposit insurance agency. The practice of reorganization in the banking sector of any country requires the creation of a deposit insurance agency in order to prevent panic among depositors during periods of banking crises. The decision on deposit insurance in the PRC was adopted on May 1, 2015. In accordance with the Decree, the People's Bank of China implements a program of deposit insurance of the population in commercial banks by opening accounts in the Deposit Insurance Fund. The PBC invests the money of this fund in bonds and other financial instruments;
- debt agencies. The prevailing practice of collecting overdue debts consists of going to court, but court procedures are often protracted. Therefore, debt collection agencies began to be created, specializing in extra-judicial collection of overdue receivables and bad debts;
- and others.

First level banking system of China

The center of the banking system of China is the People’s Bank of China. It was formed in 1947 as a result of the merger and nationalization of the three largest commercial financial organizations: Huabei Bank, Beihai Bank and Sibey Agricultural Bank (Sokolov and Nazarov, 2018). In 1949, the headquarters of the bank moved to Beijing.

It should be noted that without the periphery there is no center; accordingly, a single bank cannot be central. As a result of the 1980 reform, four independent banks appeared in the country for settlements, which belonged to the state. And by decision of the State Council of the People's Republic of China since 1983, the People's Bank of China gradually began to be vested with the functions of the central bank.

In 1998, an extensive reform was carried out to reorganize the management system of the People's Bank of China, aimed at forming a credit and financial center and its periphery. If earlier in each province, autonomous region and cities of central subordination there were branches of the People’s Bank of China, there were more than 2000 of them, then after the reform they were reorganized into 9 branches, which covered all administrative units of the country.

Under the PBC, a system of party committees was created to carry out vertical management, as well as the appointment of cadre personnel. Currently, China has branches of the People's Bank of China in Nanjing, Guangzhou, Shanghai, Tianjin, Shenyang, Xiani, Jinan, Wuhan, Chengdu. The objectives of this reform were:

1. independence of the branches of the People's Bank of China from administrative units;
2. Creation of PBC branches in more preferable, from the point of view of economic development, places, since after the reform, the branches began to cover several administrative units of the country;
3. Independence of appointment to senior positions of PBC branches from local authorities.

Thus, the ground was prepared for securing the functions of the country's central bank for the People’s Bank of China. The PBC itself is controlled by the PRC State Council, the highest executive body, and is one of its 25 departments. The activities of the Central Bank of China are regulated by the Law on the People’s Bank of China, which entered into force after the amendments on February 1, 2004.

In 2005, a special regional headquarters of the PBC was opened in Shanghai. He was granted the same rights as the main headquarters in Beijing. In addition, the main headquarters in Shanghai was entrusted with the management of the China Currency Trading Center, the Shanghai Gold Exchange, as well as control over the Chinese payment system ChinaUnionPay.

In addition, on July 10, 2008, the PRC State Council issued an additional provision "On the Basic Functions, Internal Structure and Employees of the People's Bank of China," according to which the powers of the People's Bank of China were expanded and the internal structure of the bank was amended.

In accordance with the People's Bank of China Law, the ultimate goal of the People's Bank of China is to maintain a stable purchasing power of money in order to promote the country's economic growth, which includes stability of the value of the currency, full employment, economic development, maintaining the balance of international payments, and also maintaining the country's financial stability.

The intermediate goal of the activities of the People's Bank of China is indicated in the form of regulation of the money supply in the country, as well as the total lending associated with it.

The most important globalization goals of the PBC's external activities are to strengthen the position of the Chinese yuan (Sokolov and Jiang, 2017) and promote Chinese companies in global commodity markets.

The implementation of these goals is subject to the accumulation of foreign exchange reserves. According to this indicator, the PBC is the leader in the world (Table 2).

Table 2: Official Reserve Assets and Other Foreign Currency Assets (Approximate Market Value), January 2020

Position	Country	Assets, billion dollars USA
1	China, P.R.: Mainland	3 399 949,00
2	Japan	1 387 395,00
3	Euro Area	953 913,59
4	Switzerland	850 776,41
5	Russian Federation	562 311,80
6	Saudi Arabia	501 836,95
7	China, P.R.: Hong Kong	475 639,00
8	India	473 261,70
9	Korea, Rep. of	409 653,00
10	Brazil	359 394,16
11	Singapore	278 625,10
12	Germany	231 494,63
13	Thailand	230 349,06
14	France	201 668,21
15	United Kingdom	200 906,00
16	Mexico	189 195,10

Position	Country	Assets, billion dollars USA
17	Italy	180 931,87
18	Czech Rep.	148 346,09
19	Indonesia	131 703,80
20	Israel	130 162,57
21	United States	129 159,53

Source: IMF. Official reserve assets and other foreign currency assets (approximate market value).

China Banking and Insurance Regulatory Commission and Nonprofit Self-Regulatory Organization

Regulation and control of the credit sector in the national credit and financial system can be external and internal. External regulation and control in the PRC is carried out by the China Banking and Insurance Regulatory Commission (CBIRC), and internal regulation is carried out by a non-profit self-regulatory organization.

The separation of the functions of regulation and control of the credit market from the People's Bank of China took place on April 25, 2003. The transfer of authority to regulate and control banking activities enabled the PBC to concentrate on pursuing a monetary policy.

Currently, the regulation of the credit market is carried out by the China Banking and Insurance Regulatory Commission, which is an agency of the People's Republic of China directly reporting to the State Council. CBIRC was established on April 8, 2018 through the merger of banking and insurance regulators, namely, the China Banking Regulatory Commission (CBRC) and the China Insurance Regulatory Commission (CIRC).

CBIRC is essentially above the banking system. Its main functions are to control the current activities of banking and insurance organizations, develop a legislative framework for the banking and insurance sectors and, if necessary, take measures against violators of regulatory acts. It also conducts audits and supervision of banks and insurers, collects and publishes statistics on the banking system, approves the creation or expansion of banks, and solves potential liquidity, solvency, or other problems that may arise in individual banks.

The Commission monitors the activities of banks and portfolio capital management companies, investment trust companies and other financial institutions that accept deposits, and also protects the rule of law and the “healthy functioning” of the banking sector.

A non-profit self-regulatory organization - the China Banking Association (CBA) - is not a credit institution, but should be included in the credit system as an organization that constitutes its infrastructure, as it expresses and defends the interests of the banking community.

The China Banking Association is a self-regulatory organization created by the Ministry of Civil Administration of the PRC, whose main area of activity is the registration of national non-profit public organizations. The CBA includes the following major committees: a legal working committee, a committee on the legal recognition of qualifications of employees in the banking sector, and a working committee on foreign banks.

National Political Development Banks

Political banks in China are specialized development banks that provide support for state economic policy. Unlike commercial banks, they do not set their main goal of making a profit, although they provide loans on terms of repayment, maturity and payment.

The establishment of development banks in the PRC aimed at creating an effective mechanism for investing in key sectors such as energy, transport, communications, in the implementation of government procurement of agricultural products to ensure reserves and government stimulation of exports, taking into account market principles.

The system of political development banks includes: China Development Bank, Agricultural Development Bank of China, Export-Import Bank of China.

The China Development Bank was established on March 17, 1994. The main functions of the bank include supporting basic industries, implementing policies aimed at the development of individual territories. The Bank is expanding ties with Europe, Africa and Latin America.

The Agricultural Development Bank of China was established on November 18, 1994 to support the country's agriculture. The bank is under the direct supervision of the State Council of the PRC.

The rise of agriculture requires significant funds, loan repayment is slow, therefore, commercial banks consider such loans as high-risk. The Agricultural Development Bank of China provides loans for the general development of agriculture, the state-planned small capital construction in the field of agriculture, forestry, livestock and water management.

The *Export-Import Bank of China* was officially established on July 1, 1994. The Bank is directly subordinate to the State Council of the PRC and is a foreign economic state bank that implements the foreign economic policy of the government.

The purpose of the Export-Import Bank is to provide monetary resources for foreign trade operations. His direct functions include the provision of export and import loans for the purchase of capital goods, primarily for mechanical engineering and electronics products, as well as complete equipment.

Transnational State Banking Corporations

According to the definition of the World Bank, a transnational bank is an organization having divisions or subsidiary banks with one hundred percent foreign capital in more than five countries. Four major transnational banking corporations are distinguished by the volume of capital and scale of activity: the Bank of China, the Agricultural Bank of China, the Industrial and Commercial Bank of China, the China Construction Bank, which are also systemically important banks in the PRC. The authorized capital of these banks is fully formed by the state.

In the past, these banks specialized in one particular area of activity, as their name suggests. However, it cannot be concluded on this basis that the entire Chinese banking system is specialized. At present, these multinational banking corporations are striving to become modern universal banks with a global field of activity, not to mention medium and small banking organizations.

The Bank of China was founded on January 24, 1912 by the decree of President Sun Zhongshan, and on February 5, 1912, it officially began its activities. Its functions were to streamline the monetary system, issue money, manage the treasury. The Bank of China at that time acted as the central bank of China, an international exchange bank and a special foreign trade bank. Currently, the bank has a controlling stake in financial institutions such as the Bank of China (Hong Kong), Bank of China (International), Bank of China (Insurance). In a global context, the Bank of China provides comprehensive and first-class credit and financial services for private clients and companies.

The Agricultural Bank of China, founded in 1951, became the first state-owned commercial bank after the formation of the PRC. On January 15, 2009, the Agricultural Bank of China was transformed into a joint-stock commercial bank, and since 2010 its shares have been traded on the Shanghai and Hong Kong stock exchanges. Agricultural Bank of China A + H shares issued worldwide raised $ 21 billion, becoming historically the largest IPO in world banking history. By the

end of 2009, total assets were estimated at about 9 billion yuan, which amounted to 11.3% of the total assets of the financial sector of banks throughout the country.

The Industrial and Commercial Bank of China has one of the largest financial assets among Chinese commercial banks. By the end of 2003, the total assets of the bank reached almost 53 billion yuan, which amounted to about 20% of the total assets of financial institutions in the banking sector of mainland China.

The China Construction Bank was founded on October 1, 1954. A prerequisite for the creation of the China Construction Bank was the need to manage large-scale investment funds. The implementation of 156 key projects has become a major economic construction in the implementation of the first five-year plan for the development of the national economy of China. China Construction Bank is a state-owned commercial bank.

In addition to multinational banking corporations, the second level in the system regulated and controlled by the PBC includes several hundred credit and financial organizations: joint-stock commercial banks, city commercial banks, banks with foreign capital, branches and representative offices of foreign banks, the Postal Savings Bank of China, rural credit organizations, financial leasing automobile company, etc.

Non-bank credit organizations also belong to the second level of the banking system. These organizations have the right to perform certain banking operations, the list of which is established by the central bank of the country. In the PRC, non-bank credit organizations include cash collection organizations; settlement organizations; portfolio management companies; companies providing financial leasing services; trust companies; currency brokers, etc.

Tax regulation of savings on bank deposits in China

The effectiveness of the credit system, among other things, is determined by the coordination of monetary and tax policies. The most important supplier of financial resources is individuals. It is they who, in the framework of making the most effective investment decisions, ensure the mobilization of national savings and their transformation into investments. During periods of financial instability, the importance of savings increases significantly both for the economy as a whole and for the stability of the banking system in particular.

The World Bank, as part of the Global Financial Development Assessment, calculates the ratio of bank deposits to GDP. The corresponding indicator allows you to compare the importance of bank deposits as a way of saving, as well as the scale of the banking system, taking into account the economic development of the country. The ranked values of bank deposits to GDP by countries with developed and emerging financial markets are presented in Fig. 2 and 3.

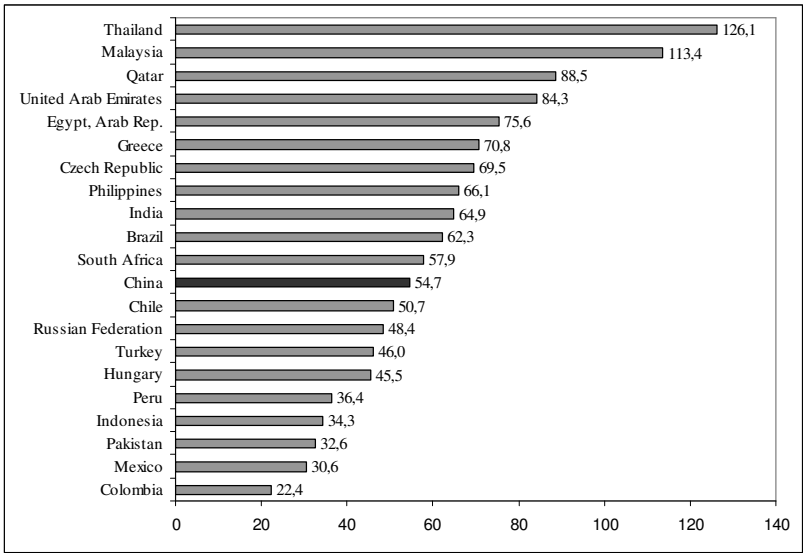

Fig. 2: Bank deposits to GDP in 2017, Emerging markets

Source: author's calculation on Global Financial Development Database.

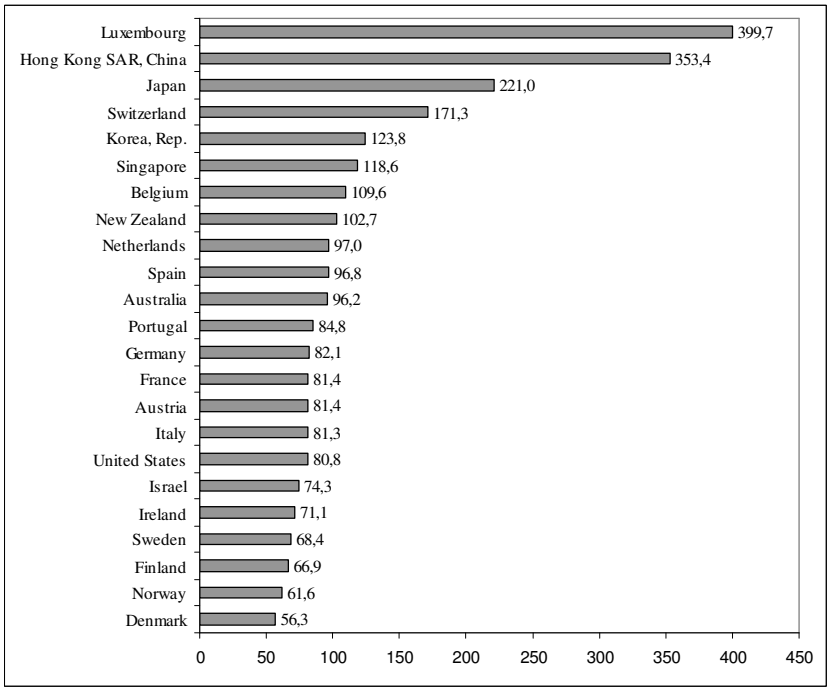

Fig. 3: Bank deposits to GDP in 2017, Developed markets

Source: author's calculation on Global Financial Development Database.

Despite the fact that total bank deposits account for about half of world GDP, the values for individual regions and countries vary significantly. Although the ratio of bank deposits to GDP is similar in some countries with developed and emerging markets (for example, Norway and Brazil, Portugal and the UAE, Thailand and the Republic of Korea), the average values for the groups differs. In countries with emerging markets the average value of bank deposits in 2017 is about 60% of GDP, in countries with developed markets this value is twice as high - 121% of GDP. At the same time, when comparing countries according to the corresponding indicator, it is important to take into

account both differences in the value of GDP and the desire of some countries to actively attract bank deposits of non-residents (for example, in Luxembourg, Hong Kong, Cyprus, Switzerland, etc.).

Deposits to GDP in China approximately correspond to the average value for emerging financial markets, however, when analyzing the dynamics of this indicator (Fig. 4), it is important to take into account the value of GDP and its change.

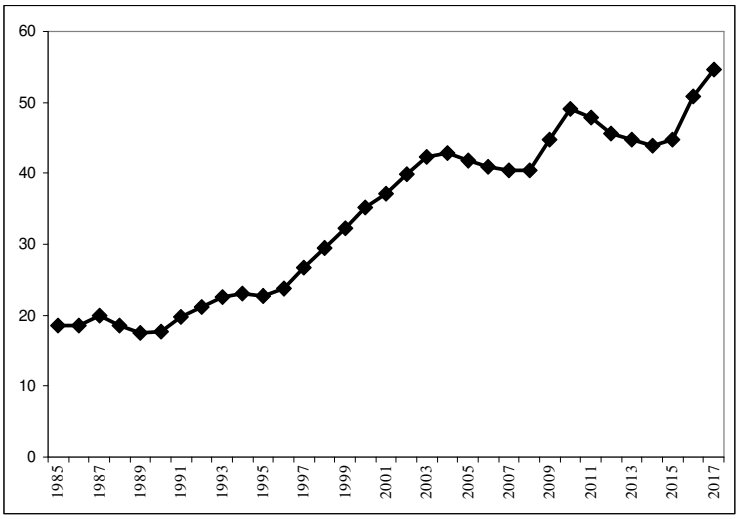

Fig. 4: The dynamics of bank deposits in relation to GDP in China
Source: author's calculation on Global financial development Database.

The tax conditions for income on bank deposits (Table 3) reflect the degree of financial development. The tax rate in emerging market is lower than in developed market. At the same time, significant differences are also observed within the groups. Taxation conditions may reflect a desire to avoid tax evasion (Kireenko and Nevzorova, 2019; Bykov et al., 2015), as is the case, for example, in Russia; a digitalization level (Victorova et al., 2018; Sinenko et al., 2017; Sinenko et al., 2018), national-cultural characteristics (L'vova et al., 2017); fiscal federalism (Salina, 2011; Pokrovskaia and Belov, 2020); other economic parameters.

Table 3: Taxation of bank deposits in developed and emerging markets

Country	Tax rate for bank deposit interest income
1. Emerging markets	
Brazil	from 15% to 22.5%, depending on term
Chile	35%
China	Non taxable
Czech Republic	15%
Egypt, Arab Rep.	20%
Greece	15%
Hungary	15%
India	10% for interest exceeds INR40,000 and INR50,000 for senior citizens age 60 or older
Indonesia	20%
Malaysia	8%
Mexico	20%
Pakistan	15%
Peru	20%
Philippines	20%
Qatar	10%
Russian Federation	35% for deposit on non-market conditions
South Africa	15% ZAR23,800 and ZAR34,500 for senior citizens age 65 or older
Thailand	-
Turkey	15%
United Arab Emirates	From 18% to 28%

Country	Tax rate for bank deposit interest income
2. Developed markets	
Australia	10%
Austria	25%
Belgium	15%
Denmark	8% for first DKK50,217 42% for next DKK 507,844 56% over DKK,061
Finland	30%
France	30%
Germany	25%
Ireland	35%
Israel	15%
Italy	26%
Japan	20%
Korea, Rep.	20%
Luxembourg	20%
New Zealand	10.5%, 17.5%, 30% or 33% according to tax identification numbers
Norway	22%
Portugal	28%
Singapore	15%
Spain	19% for first EUR5,999.99 21% for amount from EUR6,000 up to EUR49,999.99 23% for amount from EUR50,000
Sweden	30%
Switzerland	35%

Source: compiled by author's on EY, 2019.

In China, income from bank deposits is exempt from the personal income tax. Previously, they were taxed at a rate of 5%, and until August 15, 2007 - at a rate of 20%. Thus, the attraction of private investments in the country's credit system is successfully stimulated.

Conclusion

The powerful economic boom that China has demonstrated over the past 35 years shows that it was ensured by the adequate development of the country's credit system, which now has a fully developed structure. It is important that the positive inertia of a prolonged recovery currently allows the PRC to unusually quickly compensate for the significant losses from the crisis caused by the pandemic of the COVID-19. The China Manufacturing Purchasing Managers Index (PMI), which outstripped the indices of Russia and the euro zone in October 2019 by almost ten points and fell by ten points in February, almost completely recovered by early April 2020. In this regard, it should be emphasized that the PRC credit system, effectively fulfilling the role of the "circulatory system" of the Chinese economy in times of crisis, includes: a two-tier banking system, off-tier credit organizations, as well as organizations that make up the infrastructure of the modern credit system.

An analysis of the role and functions of the People's Bank of China as a center of financial intermediation allows us to predict the most important directions for the further quite natural evolution of credit and financial institutions. Compared to the banking and life insurance sectors, property insurance and pensions are still underdeveloped. It is in these areas that one should expect the greatest progress in the growth of the Chinese financial market. There is no doubt that these trends will manifest in one way or another in all emerging financial markets, and this will affect the investment potential of economies in the process of transformation.

In the foreseeable future, with the further development of globalization, with an increase in the turnover of transnational and multinational banking corporations, the concept of the banking center and the credit and financial periphery will change, which will lead to radical changes in the system of credit and financial intermediation, and will allow economies with emerging markets overcome the consequences of powerful global challenges ahead of relatively developed countries.

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The Outlook for Argentine-Russian Cooperation in Science and Technology

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Abstract

The paper discusses benefits of international cooperation in science and technology between the countries with different challenges and tasks of S&T development. It provides feasibility analysis of strengthening S&T cooperation between the Russian Federation and the Argentine Republic. Each of the national R&D systems has own strengths, which can offset weaknesses of the other's. While Argentinean researchers can benefit from access to capital and advanced infrastructure, the Russian science can attenuate the lack of highly qualified human resources. The study of joint projects and publications has identified the most promising areas for cooperation, including physics, medicine, space research, biotechnology, climate and ecology. At the moment intensity of bilateral scientific cooperation is quite low. The Russia's national 'Science' project must be seen as a unique window of opportunity to push mutually advantageous cooperation in the 5 coming years.

Keywords: International Cooperation in Science and Technology, Science Policy, S&T Priorities, Research Infrastructure, Russia-Argentina Cooperation, Co-Publication Analysis.

Introduction

International cooperation in science and technology is an increasingly important part of public policy since global challenges need to be addressed by pooling resources of multiple institutions and nations. Specific forms and objectives of S&T cooperation depend heavily on the economic and political situation in the country. This tool helps world's scientific leaders to strengthen competitiveness by attracting talents and skills and enables researchers from countries with lower scientific capacity to get access to world-class research infrastructures, advanced research methods, and to publish co-authored papers in top journals. In some cases scientific collaboration may help to steer a country out of its international isolation and to mitigate the impacts of economic and technological sanctions. In light of the recent global disasters, the need for teaming up researchers across national boundaries has become ever more apparent. The role of science and technology in tackling the challenges faced by mankind can't be underestimated. The exchange of research results becomes a matter of survival for our civilization.

Russia's S&T internationalization policy is codified in the Strategy for the Scientific and Technological Development of the Russian Federation. In 2019 the Ministry of Science and Higher Education of the Russian Federation published the Russia's Concept of International Cooperation in Science and Technology (ICST). The document outlines the ICST strategic vision, objectives, principles, and priorities of national policy in the field. The Concept considers the international cooperation in science and technology as a means of integrating Russian science into the global science with regard to the national interests of the Russian Federation.

Currently, most of international projects of Russian research teams are performed in collaboration with European and US partners. Researchers from the United States, Germany, France and the United Kingdom have the largest share among international co-authors of Russian researchers. However, Russia's science is far from exploiting ICST's full potential and still there is plenty of room for expanding geographical scope of S&T cooperation.

This paper provides feasibility analysis of strengthening S&T cooperation between the Russian Federation and the Argentine Republic. It proposes mutually beneficial ways of collaboration with respect to the major challenges and tasks of science and technology development in both countries.

Methods

The analysis of the trends in the Russian-Argentine S&T cooperation is based on screening bilateral and multilateral projects with participation of researchers from both countries and on more in-depth study of the use of Russia's research infrastructure by Argentine scientists. This information was obtained by the authors in the course of the survey conducted by the Russian Institute of Economics, Politics and Law in S&T (RIEPL) for the Ministry of Science and Higher Education of the Russian Federation. The survey reached out 343 Core facilities and 198 Large-scale research facilities recorded in the Russian registry of research infrastructures. The full registry is available via the internet portal en.ckp-rf.ru, which is maintained and updated by RIEPL.

Additional information was drawn from co-authored articles published by Argentinean and Russian researchers between 2015 and 2019 in Web of Science indexed journals. The InCites Benchmarking & Analytics tool, by Clarivate, was applied for evaluation of co-publication intensity.

The desk-research of S&T capacities and objectives was used to assess the potential of bilateral collaborations. The analysis of national S&T policy documents provided information for evaluation of the governments' commitment to science and research. The underlying data sources for the analysis of the countries' financial, material and human resources are the OECD's Main Science and Technology Indicators and national R&D statistics.

Results

Identification of entry points for bilateral cooperation starts with mapping the scientific landscape of Argentina and Russia.

Both countries belong to the group of upper-middle economies in the classification of the World Bank Data Team (2019) and occupy neighbouring places (48th and 49th) in the Human Development Index ranking published by the United Nations Development Programme (2019).

According to OECD (2019), the science-intensive gross domestic product of Argentina in 2017 (the latest available data) was 0.54% lower than in Russia (1.1%) and in OECD countries (2.37%). Just as in the Russian Federation, R&D system of Argentina is largely dependent on public funding. The government share reaches 72.6% of the domestic expenditures for R&D, while in OECD countries budgetary funds account for about a quarter of gross expenditures for research and development. In Russia this indicator has stayed stable at around two-thirds.

The 10-year increase in the number of researchers in Argentina was interrupted in 2017, when it decreased from 54.0 thousand to 52.4 thousand within one year.

Argentine academic R&D output, measured by patents and publications, must be regarded as less than satisfactory.

According to the World Intellectual Property Organization statistics, in 2017 Argentina ranked 49th in terms of patent activity (at this period Russia ranked in position 12) with 354 patents for inventions, and 42 patents for utility models granted. Only 766 patent applications for inventions and 216 for utility models were filed by Argentine residents worldwide.

Data analysis for 2013–2017 shows that Argentina falls behind 26 OECD countries in the number of publications in journals indexed in Scopus database, and behind 27 OECD countries in the number of publications in journals indexed in Web of Science. Nevertheless, during the indicated period the average citation of Argentine publications in Web of Science journals (5.58) was higher than that of

Russian papers (3.38). As indicated by Gokhberg et al. (2019), Argentinean papers in Scopus indexed journals were cited on average 6.81 times, Russian papers - 3.57 times.

By no means spectacular but stable, values of R&D output are rooted in S&T policy pursued by the Argentine government in 2003–2015. During this period there was a 20-fold increase in the budgets of research organizations and universities and a 5-fold increase in the salaries of scientists. Trager (2016) reports that a number of programs were launched to develop research infrastructure, to form international collaborations, and to return scientific diaspora members from abroad.

Taking office in 2015, President Mauricio Macri declared a two-fold increase in spending on science and technology. However, just a year later the budget deficit and high inflation forced him to announce 32 per cent cuts in public funding of science and universities. Under pressure from the scientific community, the Congress approved a 16 per cent reduction in funding.

All the research funding agencies were affected by the budget cuts, among them the National Scientific and Technical Research Council (CONICET) and the National Agency for Scientific and Technological Promotion (ANPCyT). Argentina suspended its contributions to a number of international research projects. Grants, scholarships, equipment purchase suffered the greatest reduction. The latter was hit by the double blow, as drastic devaluation of domestic currency (566% in four years) reduced availability of imported research equipment and supplies.

Funding cuts had a particularly negative impact on young people's engagement in science. Some researchers, e.g. Pellettieri L. (2019), say they can't afford to pay publishing fees charged by scientific journals. Consequently, this reduces the likelihood of receiving further grant funding.

Reduction of jobs, erosions of real wages and labour standards have exacerbated the brain drain.

In the context of a deep worldwide crisis, even a dramatic change in political course after the 2019 presidential election will not be able to provide a fast solution to the problems of the Argentine R&D sector, which include:

- underfunding of scientific research;
- imbalance of R&D sending across sectors;
- lack of commercial demand for R&D from business;
- a downward trend in the number of R&D personnel;
- low level of scientific productivity, as measured by bibliometric and patent indicators.

Against that backdrop, international scientific and technological cooperation may help to prevent the outflow of scientists to other countries and to other areas of activity. Argentina has a large number of bilateral agreements with the countries of EU, Latin America, Asia and the US. The year 2019 marked the 20th anniversary of the entry into force of the Agreement between the Government of the Russian Federation and the Government of the Argentine Republic on scientific and technical cooperation. The annual meetings of the Intergovernmental Russian-Argentine Commission on Trade, Economic, Scientific and Technical Cooperation are held in Russia and Argentina in rotation. The possibilities of Russian-Argentine cooperation in agricultural sciences, biotechnology, genetics, medicine, pharmaceuticals, space exploration, and alternative energy were the subject of discussions between officials in different years.

The Russian leaders formulated ambitious goals in the development of science and technology. Thus, in accordance with the national 'Science' project, by 2024 Russia shall be taken into the top five countries ranked by the level of R&D development in the priority areas, become an attractive destination for the leading foreign scientists, and ensure increasing R&D intensity.

As a result of the 'Science' project implementation, Russia shall occupy the place among the world's leading countries ranked by the following indicators:

- number of researchers (top-4);
- number of scientific papers in the priority areas of S&T (top-5);
- number of patent applications in the priority areas of S&T (top-5).

In 2018, the number of researchers in Russia was about 348 thousand people. Over the coming years, it is planned to attract and develop 35 thousand researchers with a focus on young talented scientists. By 2024 young researchers (aged under 39 years) shall account for more than half of all researchers in the Russian Federation.

Implementation of the 'Science' project requires significant financial and human resources. Over 300 billion roubles has been allocated for the implementation of this national project form the federal budget.

The 'Science' national project provides for the active involvement of researchers from overseas.

By 2024, it is planned to create 16 world-class scientific centres, which employ prominent Russian and foreign scientists. In 2019 four mathematical centres and three centres for genomic research were established. On March 20, 2020, the Ministry of Science and Higher Education of the Russian Federation announced a new call for proposals. Grants will be provided for the establishment of at least 3 world-class scientific centres specializing in priority S&T areas:

- advanced digital technologies, artificial intelligence, robotic systems, new materials;
- eco-friendly energy, sustainable use of energy, mineral, biological resources;
- personalized medicine, high-tech medicine and healthcare models;
- high yield and environmentally friendly agriculture and aquaculture, production of safe, high-quality, nutritional food;
- national security (prevention of manmade disasters, biological hazards, social and cultural threats, terrorism, extremism, cyber threats and other sources of danger for society and the economy);
- smart transport and telecommunication systems, research and development of the local Universe and the Earth's geosphere, atmosphere, hydrosphere (Arctic and Antarctica, oceans, airspace, and outer space);
- humanitarian and social issues of the interactions between Man and Nature, Man and Machine.

One of evaluation criteria is the degree of integration of an applicant organization into the global science (participation in international conferences, projects, publications and patents in collaboration with foreign authors). When established, the centres shall attract a certain number of foreign researchers and graduate students.

Another focus of the 'Science' national project is the development of advanced research infrastructure in the Russian Federation. By 2024 Russia's leading scientific institutions shall have 50% of their instrumentation upgraded or replaced.

Special attention is given to large-scale research facilities. Russia actively participates in financing and implementation of experiments at international megascience facilities (CERN, ITER, XFEL, FAIR etc.). Its share in funding these projects ranges from 3% to 26%. At the same time Russia is building a national synchrotron and neutron network, including:

- International centre for neutron research on the basis of the high flux research reactor PIK in Leningrad oblast;
- Nuclotron-based Ion Collier facility (NICA) in Moscow oblast;
- prototype of a spallation neutron source in Moscow oblast;
- 4th generation synchrotron X-ray source in Novosibirsk oblast;
- synchrotron on Russky Island in the Far East.

These facilities shall be open for overseas researchers specializing in the condensed matter physics, materials physics, superconductivity, magnetic systems, biology, medicine and others areas.

Today a wide network of shared research facilities is already available for local and overseas scientists. Information about 615 core facilities and 351 large-scale research facilities (accelerators, reactors, telescopes etc.) is available via ckp-rf.ru portal. More than 1000 foreign institutions are among consumers of their services. Among them are organizations from Argentina, Brazil, Mexico, and Chile.

Comparison of analytical equipment in the core facilities of Russian and Argentinean scientific organizations and universities demonstrated that they used to work with the same manufacturers and brands. The lists of top suppliers of scientific equipment in both countries include US companies (Bruker, Agilent, Perkin Elmer, Thermo Fischer Scientific), Japanese companies (Jeol, Shimadzu, Olympus) and German Carl Zeiss. Generally, researchers from Russia and Argentina use measuring and analytical instrumentation of the same generation, often of the same series, which creates favourable conditions for scientific exchanges. Russian organizations are interested in increasing the share of external users, since this indicator is taken into account when allocating public funding.

Among the examples of successful cooperation on the basis of Russia's research infrastructure is the study of explosive processes of the Universe conducted by the Astrophysical Center of Irkutsk State University in the Tunka Valley for the Institute of Earth and Space Astronomical Science (ICATE) and the Felix Aguilar Astronomical Observatory (OAFA) of the National University of San Juan (UNSJ).

UNSJ Observatory is a part of the Mobile Astronomical System of TElescope Robots network (MASTER) of Lomonosov Moscow State University. The MASTER network brings together eight observatories from Russia, South Africa, Spain, and Argentina. Robotic telescopes enable the detection of gamma-ray bursts, supernovae, comets, asteroids and other optical transients of different nature. Due to the MASTER-OAFA auto-detection system located in Argentina, a nova in the Small Magellanic Cloud was discovered in 2016.

The results of joint scientific research are published in reputable journals. Using the InCites tool, by Clarivate Analytics, we identified 1018 co-authored articles by Russian and Argentine researchers, which were published in 2015–2019 in WoS indexed journals.

Most of the articles deal with subjects of physics, medicine, astronomy, space science and astrophysics. The main subjects of these publications are listed in the Table 1.

Table 1: Number of co-authored articles by Russian and Argentine researchers, published in 2015–2019 in WoS indexed journals, by branches of science

Branch of science	Number of Articles
Physics	454
Medicine	340
Astronomy & astrophysics	56
Biology	41
Genetics	34
Earth sciences	30
Chemistry	24
Environmental sciences	20
Social sciences	11
Materials science	5

Mathematics	2
Agricultural sciences	1

However, the number of co-authored publications is lower if the works of major international research collaborations are not taken into account. Thus, 403 of 452 articles in physics co-authored by Russian and Argentinean authors are the fruits of collaborations' collective efforts. For instance, one of the papers reporting results of the ATLAS Experiment at the CERN Large Hadron Collider includes 659 co-authors. Of the 340 multi-author papers in medicine, 297 describe the results of clinical trials of drugs conducted by medical practitioners in many countries. Collective authorship is also typical for astrophysics. These papers have up to 1940 authors and make up about two thirds of the joint Russian-Argentinean articles: 39 of 58. Excluding the works of scientific collaborations reduces the list of articles by Russian and Argentinean co-authors from 1018 to 196. The main subjects of these publications are presented in the Table 2.

Table 2: The main research areas of co-authored articles by Russian and Argentine researchers, published in 2015–2019 in WoS indexed journals

Branch of science	Areas of research
Physics	nuclear energy, nuclear physics, high-energy physics, nanophysics and nanoelectronics (e.g. nanocrystalline thin films, quantum size effects)
Medicine	treatment of diabetes, oncology, cardiovascular diseases, hematology problems, immunology, and mental disorders
Astronomy & astrophysics	astrophysics and stellar astronomy, high energy astrophysics (cosmic rays, neutrinos, gravitational waves), theoretical physics (dark matter problem)
Biology	molecular biology, biophysics (magnetobiology), microbiology (virology), parasitology, paleontology, zoology
Genetics and evolutionary biology	biodiversity and systematics (phylogenetic taxonomy), molecular genetics of cancer
Earth Sciences	climatology, oceanology, glaciology, hydrology, soil science, volcanology, historical geology
Chemistry	physical chemistry, electrochemistry, nanochemistry, nanophotonics, functional materials, chemical analysis of food products

Diversified collaborative works are devoted to research in the Antarctic: solar observations, the study of the Earth's magnetic field, the Antarctic ice sheet, climate, and fauna.

200 years ago the sixth continent was discovered by the Russian naval expedition led by Faddey Bellingshausen and Mikhail Lazarev. Russia and Argentina were among the original 12 countries that signed the Antarctic Treaty. The Treaty promotes international cooperation in scientific investigation in Antarctica, including exchange of information on scientific programs in the area, exchange of scientific personnel, and exchange of scientific observations and results. The two countries have experience of practical cooperation in the region. In 2002, the Argentinean icebreaker Almirante Irizar participated in an operation to free the Russian polar vessel stranded behind a massive ice sheet. In turn, from 2007 to 2017 Argentina used Russian ships and helicopters to supply the Antarctic stations, as its icebreaker was being repaired. The Argentine Republic has 13 Antarctic stations – more than any other nation. Russia is in the top-3 countries in the number of stations on the continent, however, it lags behind 'newcomers in Antarctica' (primarily China) in technological advancement.

Taking into account that Antarctic Treaty System's Mining Ban prohibiting mineral resource activities (other than scientific research) is valid till 2048, it is important for every party to approach this date with a clear strategy and reliable allies.

The Argentine Republic is a potentially important partner for Russia in bioeconomics. Both countries have favourable conditions for its development, including a vast territory, diversification of climate and bioresources, well-developed agriculture, scientific achievements in the field of cellular and genomic technologies. For Argentina it is also a matter of food security.

Recently the Federal Research Programme for Genetic Technologies Development for 2019–2027 was launched by the Government of the Russian Federation (2019). It is admitted in the Programme that there is high demand for the skilled genetic engineers and genome researchers in the country. In 2016-2017 Russian authors published only 395 articles in the field in scientific journals indexed in WoS Core Collection.

Argentina is a pioneer in gene-editing in Latin America. Gene-editing techniques allow scientists to breed plants and animals with desired characteristics. This is especially important for the country specializing in agriculture. The interest in the development of gene technologies in both countries create favourable conditions for bilateral cooperation and the use of resources of the new world-class genomic research centres created in Russia. The national 'Science' project should give a new impetus to international scientific and technical cooperation in the Russian Federation.

In December 2018 in Buenos Aires, the Russian Federation and Republic of Argentina signed a number of strategic documents, which formed a framework for mutually beneficial economic, scientific and technological cooperation. Among the others, the parties signed the Agreement for the development of mutually beneficial and equal cooperation in the field of fisheries and aquaculture. The parties agreed on sustainable use and conservation of marine living resources, prevention of illegal, unreported and unregulated fishing, cooperation in S&T, and professional training. The first session of the Russian-Argentine Fisheries Commission took part in March 2020. Representatives of the National Institute for Research and Development of Fisheries of Argentina (INIDEP) and the Russian Federal Research Institute of Fisheries and Oceanography (VNIRO) presented the main areas of their scientific research to shape the agenda for cooperation. For example, the Russian party is ready to share its methods for crab stock assessment and new technologies of chitosan and chitin production from crustaceans wastes. Russia and Argentina are determined to implement joint projects, including with a focus on improving the quality and safety of food products.

Apart from the expression of the political will, both governments have to work hard to take full advantage of the opportunities provided by cooperation.

It might be difficult to plan international research projects in post-pandemic era.

With few exceptions, Russia's research institutions and universities cannot afford to pay attractive salaries for foreign researchers on their own. In most cases they use earmarked funds of national programmes for this purpose.

This year Russia has faced a significant budget shortfall due to lower oil and gas revenues. Although the Russian government declares it has no plans for sequestration in 2020, there is still risk of government funding cuts to certain research and development programmes.

Political stability is another vital factor in ISTC promoting. The tension in relations of the Russian Federation with the EU and North America has some impact on Russia's attractiveness for academic staff from other countries.

According to our survey of the leading Russian research institutions, which implement experimental research, more than a quarter of them were affected by sanctions banning supply of consumables. Nevertheless, sanctions are not in the top tier of barriers to successful research. Among the main factors hindering the research the respondents mentioned legal regulation of public procurement and customs proceedings. Time-consuming bureaucracy negatively affects research efficiency. Half of respondents say that procurement – from preparation of specifications to product delivery – takes 4-6

months on average. The other half of those polled evaluates the average procurement timeframe as 2-3 months.

Not many universities and research institutes have well-established procedures to host foreign visitors and to solve the problems of accommodation, medical care etc. Foreign researchers in Russia experience difficulties in their daily life. For instance, limited English proficiency is a problem both in academic community and in society as a whole.

To sum up, we can conclude that success of bilateral cooperation heavily depends on:

- economical environment,
- political environment,
- legal framework,
- administrative framework and
- social environment.

Conclusion

Russia's and Argentina's economies are heavily reliant on exports of natural resources. Both countries recognize the role of science in promoting progressive structural changes. However, the economic downturn, devaluation, and one of the highest inflation rates in the world would hardly allow Argentina to reverse the negative trends in science funding and staffing in the short term. Russia, in contrast, plans to increase R&D financing and the number of scientific personnel over the next 5 years. At the same time the Russia's government has endorsed the expansion of scientific and technological cooperation with overseas countries. The Russian Federation is interested in attracting foreign students, graduate students, and researchers to make maximum possible use of research infrastructure. For the Argentine Republic it is important to retain the human resources in a crisis period.

Russia and Argentina should expand collaboration in physics, space research, medicine, biotechnology, agriculture and aquaculture, and Earth sciences with a focus on Antarctic research. Bilateral interaction shall be initiated both "bottom-up", by individual researchers and organizations, and "top-down", by government agencies and scientific foundations in the form of targeted grants for collaborations. The recent initiatives of the Ministry of Science and Higher Education of the Russian Federation shall reduce administrative difficulties inherent to international cooperation.

Pandemic diseases and environmental catastrophes respect no borders. To meet these and other challenges we need a broad network for sharing ideas, findings and expertise. When borders are closed for people, they remain open for ideas.

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Econometric Models for Mining Industry: The Dynamic Partial Equilibrium Model for Resource Utilization

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Abstract

This paper starts a large research aiming to build up econometric models applicable in mining industry that may be useful for managers working in this economic activities. Being the first one, this article deals mainly with building a dynamic model for resource utilization in mining industry. In his first part, the paper assesses sustainability and the thermodynamic constraints on optimal mining ores depletion in this respect. Starting from these findings, in the second part, a dynamic model of change and substitution techniques for resource utilization in mining industry has been developed. This model will be a useful tool for decision makers for an optimal management in mining industry.

Keywords: Mining Industry, Dynamic Model, Sustainability, Energy, Raw Materials, Technologies, Thermodynamics.

Introduction

The supply of minerals and energy is critical to global society. However, this supply is associated with social and environmental impacts, leading to concerns of generational and intergenerational equity [Moran *et al.*, 2014]. And such, the sustained development of production and the increase of its economic efficiency implies the rational use and capitalization of raw materials and energy resources. The increase of capitalization degree of raw materials and energy resources is a major coordinate of an economic growth, of a more intense increase of the economic efficiency [Brown *et al.*, 2015].

Dealing with the use of material resources, a complex system of elements is assumed, which involves the norms of consumption, the specific consumption of materials, raw materials and energy, the degree of use of raw materials and materials (technological losses), the actual weight of the products made, the specific weight of one unit of main characteristic of the products (machines, machineries), the recovery and capitalization of reusable resources, the use of materials for the substitution of raw materials and scarce materials [Segura-Salazar *et al.*, 2018]. Regarding the norming of raw materials, energy and materials consumption, the following aspects are frequently used: the degree of extension of consumption norms, the evolution of consumption norms, and the degree of meeting consumption norms.

Establishing the technically and economically consumption norms in the design phase of the new products and redesigning the products currently in production, and the fulfillment of the consumption norms and regulations are important requirements of the rational use of material resources to reduce the actual specified consumption of exhaustible raw materials and materials [Azapagic, 2004].

Reducing the actual specific consumption by assimilating new products with superior characteristics and reduced materials and energy consumption, redesigning the products, introducing advanced technologies and improving the existing technologies, respecting the production process of the established technologies, strictly adhering to the consumption norms and regulations, reducing the waste, improving the conditions of transport and storage of materials represent the most important ways to save material resources and to increase the relative base of raw materials and energy, to reduce imports and increase the degree of valorization of material and energy resources, thus increasing the sustainable way of resource management [Fonseca *et al.*, 2013].

Thermodynamic Constraints on Optimal Mining Ores Depletion

The economic process, instead of being a mechanical analogue as traditionally represented in mathematical economics, is an entropic process. In the ultimate analysis man struggles for low entropy, and economic scarcity is the reflection of the Entropy Law, which is the most economical in nature of all natural laws. Thermodynamics itself is the physics of economic value and man's economic activity as analogous (though not identical) to that of the purposive sorting of the famous Maxwellian demon. Economic activity is in fact an extension and a complement of man's biological evolution [Georgescu-Roegen, 1971].

One can argue that the more general use of the term "evolution" employed by physicists and applied to non-living systems connects directly to the narrow biological meaning. Physical evolution is best understood as a thermodynamic phenomenon, and this perspective comfortably includes all of biological evolution. A particular level of evolution can underpin the emergence of higher levels, but evolutionary processes persist at each level in the hierarchy [Tessera and Hoelzer, 2013]. It can be also argued that particular evolutionary processes can occur at any level of the hierarchy where they are not obstructed by material constraints. This theoretical framework provides an extensive basis for understanding natural selection as a multilevel process. The extensive literature on thermodynamics in turn provides an important advantage to this perspective on the evolution of higher levels of organization, such as the evolution of altruism that can accompany the emergence of social organization.

Comparatively speaking, thermodynamics is a young science but has been shown to apply to all work and energy systems including the classic temperature-volume-pressure systems, chemical kinetic systems, electromagnetic and quantum systems [Hatsopoulos and Keenan, 1965; Kestin, 1966; Carathéodory, 1976]; as a result, they have recast the second law of thermodynamics from the old statement of "entropy increase" into a statement that describes systems undergoing processes so that they will reach a unique state of equilibrium. In this respect, we may argue that a reformulated second law of thermodynamics [Schneider and Kay, 1994] to conceptualize the relation between evolution, complexity and ecosystems can also be applied to economic systems. Therefore, we focus on the applications of these thermodynamic principles to the science of ecology as we view ecosystems as open thermodynamic systems with a large gradient impressed on them by the sun.

The thermodynamic imperative of the restated second law is that these systems will strive to reduce this gradient by all physical and chemical processes available to them [Martyushev and Seleznev, 2014]. Thus, ecosystems will develop structures and functions selected to most effectively dissipate the gradients imposed on them while allowing for the continued existence of the ecosystem. Utilizing thermos-economic principles, this enables us to formalize the concept of economic evolution as the development of structural complexity to harness available energy from the environment to avert degradation gradients. We may therefore conclude, speculatively, that as much as life is an inevitable consequence of the reformulated entropy law [Kauffman, 1993; Schneider and Kay, 1994], then this is also true of market economies for the same equilibrium seeking reasons.

Market economies have experimentally proven themselves, more than any other known institutional arrangements, to abet the production of new knowledge and structural complexity, and therefore energy degradation. As a direct extension of the Schneider and Kay hypothesis (already mentioned), market economies are evolutionary stable because of their efficacy in growing knowledge and increasing structural complexity; a consequence, we argue, that follows from the reformulated second law of thermodynamics. The enormous energy transformations typical of market economies, consequent on their ability to induce and harness new transformations, are ultimately the reason they are selected.

Hence, the comparative analysis of the specific consumption of raw materials and materials made by different companies with similar production is meant to highlight the results obtained in reducing the specific consumption as well as the reserves of reducing these specific consumption. Comparisons can also be made regarding the level of specific consumption achieved on the same product and in the member companies worldwide, thus enriching the conclusions regarding the reserves of reducing specific consumption. Thus, a significant aspect in this respect is given by the analysis of the contribution of the increase of capitalization degree of material and energy resources to enhance the marketable production and the net production.

For these purposes, the centralized data processing system must provide data on:

- The value and physical volume of potential secondary resources (inventories) on the economy as a whole and by types of secondary resources.
- The value and physical volume of secondary resources used throughout the economy and by types of secondary resources.
- The degree of exploitation of the potential secondary resources expressed by the weight of secondary resources used in the total volume of the potential secondary resources, on the economy as a whole and by types of secondary resources.
- The degree of meeting the need of raw materials and energy resources with secondary resources, expressed by the weight of the volume of secondary resources used in the total volume of material and energy resources used throughout the economy as a whole and by types of secondary resources.
- The volume of secondary energy resources recycled and their share in the potential energy resources and in the global energy consumption.
- Quantities and values of raw materials and materials resulting from the processing of secondary resources.
- The volume of primary resources saved by capitalizing on secondary resources.
- Reduction of imports as a result of the recycling and reuse of secondary resources.
- The value of the products obtained per ton of secondary resources used.
- The increase in national income obtained by capitalizing on reusable secondary resources.

One of the criteria followed is that of balancing the markets for exhaustible resources by introducing what has been called secondary resources. One of the main problems that arise is related to the structure of the cost of production and to what extent the constituent elements of the cost for exhaustible resources can be translated to the new ones. Depending on the type of resource used, then the basic costs, the auxiliary production costs or the expenses related to the sale of the obtained goods can be analyzed.

The recovery, capitalization, respectively the superior use of secondary resources can also be stimulated by a program that considers the modification of taxes in the total expenses to determine the unit cost of the product. Thus, in the segment containing the royalties, a value r of its level can be assumed with a value:

$$R = \sum p_i r_i ; \sum p_i = 1 \qquad (1\text{-}3.1)$$

where: p_i - represents the share of the resource taken in the analysis;

r_i – is the corresponding royalty.

The extrapolated analysis of consumption and spending on other products can be done in comparison with the existing equilibrium models for which - for example - prices and processing options provide sufficient information. Thus, particularities corresponding to endogenous processes in relation to those in development, which are generally exogenous, can be taken into account [Georgescu-Roegen, 1971].

At national and international level, a wide variety of policies and initiatives are emerging to improve the balance between natural capital (the supply of natural resources and services offered by ecological systems such as waste assimilation) and the needs and wishes of citizens [Lebre *et al.*, 2015]. These large-scale initiatives include pollutant emissions taxes to create a link between the costs of pollution and the one that causes the pollution, with the aim of absolving the company as a whole to bear these costs. Other initiatives related to the water saving process are loss recovery schemes at the consumer level [Gunson, 2013]. Even more, consumers are starting to demand products and services that are more environmentally friendly, noting that the sustainable dimension of the economy is no longer so compelling and manifests itself through innovative initiatives and designs [Sequeira, 2010].

The dynamic model of change and substitution techniques in mining industry

The evaluation of resources used in the economic processes ideally requires a dynamic analysis of the multitude of stimuli fed before the relationship between the economy and the environment. Such a model is simulated with empirical, aggregated data.

Suppose a mining operation to extract the ore from a mine, separated into ore and sterile rock in a series of milling, crushing and flotation processes, which then proceeds to metal, through processing, smelting and refining.

In each stage of production, the extracted minerals are present in increasing concentration. This type of mineral material is accompanied by the use of other materials, such as water and chemicals in the process of milling, and electricity used in electric mining and milling equipment, or heat of furnaces for smelting of waste, and residual heat.

Finally, they are released into the environment, while the desired product is passed on to additional processing or final consumption. Of high quality part (low entropy), the energy entering these processes is irreversibly degraded and released into the environment, and a part of the process is released by the high chemical energy, being incorporated into the material outputs. The use of energy generates an opportunity cost for mining companies and society as a whole, which must be reflected in the company's long-term decision and whether such a decision is optimal.

Suppose we maximize the value of the function of the following mining units:

$$W = \int_0^T \left(\frac{Y(t)}{Y_0} - \frac{E(t)}{E_0} \right) e^{-rt}\, dt \qquad (2\text{-}3.7)$$

where: $Y(t)$ – represents the physical quantity of the production;
$E(t)$ – is the physical quantity of the input energy quality;
Y_0, E_0 - indicate the basic quantities used to normalize the inputs and outputs;
e^r - is the reduction factor.

An increase in output contributes positively to the value function, while an increase in energy quality decreases the value of W. The flow of values generated for each time period is summarized over the life of the mine and extends from the present $(t = 0)$ until a certain future date (T).

For the correct analysis of the changes in the combined economy-environment system, one can investigate, based on simplified hypotheses, the implications of an optimal use of resources over the range from $t = 0$ to $t = T$. To this end, one can maximize (2-3.7) with the help of a set of constraints that represent important features of reality, and to gather information regarding the feasible limits of the future mineral exploitation and processing activity.

A minimum set of such constraints is given as follows: maximizing the value generated by mining is subject to constraint, so that at each point *(J)* of extraction at time *(t)* is non-negative:

$$J(t) \geq 0 \tag{3-3.8}$$

The cumulative extraction from the mine may not exceed *X*, the initial stock *(t = 0)*:

$$Q(T) = \int_0^T j(t)dt \leq X(t=0) \tag{4-3.9}$$

For simplicity, it is assumed that there is no recycling, no new discoveries, and no other type of reserves, other than those obtained by the current extraction, i.e.:

$$X(t) = -J(t) \tag{5-3.10}$$

signifying the constraints imposed by the reduced availability of high quality energy sources.

For example purposes, Ruth [1995] studied the interdependencies between the effects of ore extraction and fuel processing (the evaluation had been detailed for copper and aluminum).

Thus, the material extracted from the mining operations is separated into ore and sterile rocks, making abstraction of raw materials consumption, other than those extracted from the mine and in common of possible products, while the separation process can be described by the following production function:

$$\frac{Y(t)}{Y_0} = \left(\frac{J(t) - J^*(t)}{J_0 - J_0{}^*}\right)^{\gamma_1} - \left(\frac{E(t) - E^*(t)}{E_0 - E_0{}^*}\right)^{\gamma_2}, \tag{6-3.11}$$

where $J^*(t)$ and $E^*(t)$ are thermodynamically determined as limits for material and, respectively, energy use in mining exploitations.

Bearing in mind these findings, we now can move on with our analysis to the next stage. In doing this, the main characteristic of isoquants is that the asymptotic approach has determined thermodynamic limits between the material and energy use. Hence, the use of resources is usually accompanied by two distinct tendencies: firstly, the quality of the superior resources that can be extracted over time, generating a low level of ore extraction in the future; and secondly, the extraction of lower ores may require an increase in energy consumption per ton of ore produced. At the same time, the technical changes take place, thus reducing the energy requirements per ton of ore.

In the model, the quantity of ore *g(t)* is assumed to decrease with the extraction:

$$g(t) = \beta_1 Q(t)^{\beta_2} \tag{7-3.12}$$

with β_1 and β_2 constant.

Similarly, the energy required per output unit *f(t)* may decrease with the experience gained in mining industry. However, there are physically determined limits for lower energy consumption per ore unit, which cannot be exceeded with the help of extractive experience.

In the case of a mining operation, *e(t)* is the minimum energy required to sort component mixtures, calculated here in the case of an ideal mix, as follows:

$$e^{*}(t) = \frac{1}{g(t)} k(g(t)\ln g(t) + (1-g(t))\ln(1-g(t)))\frac{M_1}{M_2}T \qquad (8\text{-}3.13)$$

where: k - Boltzmann's constant ($k = 1.38 \bullet 10^{-23}$ Joule per degree Kelvin);
M_1 - Avogadro's constant ($M_1 = 6{,}022 \bullet 10^{-23}$ mole-L);
M_2 - molecular mass of the extracted mineral;
T - a reference temperature, set here at T = 98.15 K [as proposed by Chapman and Roberts, 1983].

The minimum energy requirements for smelting and refining are determined by the chemical reactions of the substances used. Given $e^{*}(t)$, it is possible to define a learning curve for energy use:

$$e(t) - e^{*}(t) = mQ(t)^{n} \qquad (9\text{-}3.14)$$

where m and n are parameters.

However, learning curves are meant to effectively introduce the technique of changing endogenous variables into a dynamic model of resource use. As a result, not only the production functions at each time point respect the limits of thermodynamics, but also the technical changes are explicitly specified, so that it cannot exceed these limits. With the decline of ore grades, technological improvements may counteract the temporary trend of increasing energy demand. In the long term, however, the effects of depletion on energy use may prevail.

Based on these assessments, Chapman and Roberts [1983] developed a theoretical model for metallic ores, energy costs and energy saving technical change that support energy costs per ton of metal. They developed a framework for assessing the future availability of metals by first reviewing the activities associated with the production of metals. These can be divided into four broad categories: exploration and establishment, mining, concentrating, and smelting and refining.

They then examined factors such as energy economics, forecasting issues, resources and reserves estimation, and trends in technical efficiency. In this respect, subsequent analysis dealt with the evaluation of fuel use in metals production; the secondary production of metals from scrap and other waste materials; non-technical issues that are potential sources of short-term crises; and other applications of energy data. The findings confirm a downward trend, followed by a sharp increase in mineral prices.

In our own analysis, considering the production function (6-3.11), the changes in the quality of resources expressed in (7-3.12), the changes in technology from (9-3.14), the dynamic optimization of the function value (2-3.7), which are subject to constraints (3-3.8) - (4-3.9), then the model indicates the optimal time yields for extracting ores from the mine.

To conclude, now we can argue that an assessment of the use of resources is considered incomplete if the production and consumption processes are neglected. The ore resulting from the extraction is further treated in chemical, thermal and other mechanical processes at the stage at which the desired result is available as a pure metal [van Berkel, 2007].

Anyhow, to simplify the model, the processes of manufacture and consumption from the perspective of the end use by the consumer were not included in this model.

Finally, all these materials are released into the atmosphere, discharged into the ecosystem, stored in lakes and oceans. The evaluation of the resource utilization degree, strictly from the perspective of its physical wear, can be realized by calculating the net energy loss due to the dispersion of materials and the generation of waste heat (as wastes), on one hand, and by evaluating the degree of natural mining ore processing, on the other hand [Bulearca, 2010; Bulearca *et al.*, 2011]. This net loss can be expressed as the irreversibility generated by mining, smelting and refining per ton of finished product metal [Telukdariea *et al.*, 2006].

Conclusions

All the evidence offered in this paper suggest that societies address environmental problems involving external effects sequentially: addressing those with the most immediate costs first, and those whose costs are displaced in time and space later. That evidence is, however, limited by the fact that existing analysis typically test a partial equilibrium hypothesis about emissions of single pollutants, and have little to say about general equilibrium or whole-system impacts. The core of the environmental problem in growing economies is in fact the lack of effective signals of the indirect environmental effects on economic growth. The problem is not with resources whose scarcity is signaled by markets, or whose effects are both local and immediate. The problem lies with effects that are external to the market, that are not clearly visible to consumers, or that are displaced in space and time. It lies with effects that are cumulative, uncertain and potentially irreversible.

It has been argued in the paper, that the economic process, instead of being a mechanical analogue as traditionally represented in mathematical economics, is an entropic process. In the ultimate analysis man struggles for low entropy, and economic scarcity is the reflection of the Entropy Law, which is the most economical in nature of all natural laws. In doing this, market economies have experimentally proven themselves, more than any other known institutional arrangements, to abet the production of new knowledge and structural complexity, and therefore energy degradation. As a direct extension of such hypothesis analyzed in the paper, market economies are evolutionary stable because of their efficacy in growing knowledge and increasing structural complexity; a consequence, we argue, that follows from the reformulated second law of thermodynamics. The enormous energy transformations typical of market economies, consequent on their ability to induce and harness new transformations, are ultimately the reason they are selected.

This are the reasons why we developed in this paper a methodology to integrate concepts from thermodynamics into economic models of optimal natural resource use and to empirically determine relationships between changes in thermos-dynamic states of materials and the use of high-quality energy sources. The integration is aimed at an assessment of technologies, substitution and technical change based on economic concepts that do justice to fundamental physical constraints. And such, a model of natural resource use and production has been developed, by combining econometric time series analysis with dynamic modeling techniques.

Hence, the model explicitly includes thermodynamic constraints on the process of separating minerals from crude ore, the smelting processes, the substitution among inputs, and the endogenous technical change in mining, smelting and refining operations. Based on empirical information and simplifications, the model has been simulated to assess outer limits of feasible resource savings in mining operations, smelting and refining processes. Therefore, conclusions are drawn for the evaluation of products and effluents from mining, smelting and refining operations with regard to changes in the physical resource base and environmental quality.

As a result, through high Government pressures, increasing expectations from society and changing regulations have led to the implementation by many extraction units of ecological production practices and the replacement of traditional equipment with environmentally-friendly equipment and technologies.

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Change Management in Student Organizations in the Industrial Revolution Movement 4.0: Case Study of Student Organizations in Indonesia

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Abstract

The Industrial Revolution 4.0 fundamentally changed the way humans think, live, and connect. This era will disrupt the various human activities in various fields, not only in the field of technology, but also in other fields such as economics, social, and politics. The public has indeed experienced some of these changes, but concern for the challenges in the era of digitization and automation today is fairly minimal. Therefore, the state must take part in the support of the elements of Industry 4.0. By providing a more complete and in-depth understanding, the community will naturally be compelled to prepare and respond to the changes that are supported. Even more important is to encourage the national education sector - basic education to tertiary education - adjusting the education curriculum to the challenges and needs of today. A curriculum that opens access for generations to gain knowledge and training to become competitive and productive workers. Organization as a non-formal institution in the education system is an important factor in increasing soft skills and hard skills that are not obtained in schools. One place to sharpen the knowledge of students who have been obtained at school. Through the organization as well, students can free up the creativity of those who are asked to stay within the limits of the organization's Basic Rules / Domestic Rules

Keywords*:* Management; Organization, Change, Students, Industrial Revolution 4.0.

Background

In the economic sector, it has been seen how the transportation service sector arises from the presence of online taxis and motorcycle taxis. The same thing also happened in the social and political fields. Social interaction becomes unlimited, because of the ease of internet access and technology. The same thing also happened in the political field. Through digital ease of access, people's behavior also shifts. Political action can now be collected through social media-based movements by carrying out certain political ideologies.

But behind the convenience offered, the Industrial Revolution 4.0 kept a variety of negative impacts, including the threat of unemployment due to automation, natural damage due to industrial exploitation, and the rise of hoaxes due to easy dissemination of information. Therefore, the key to dealing with the Industrial Revolution 4.0 is in addition to preparing technological advances, on the other hand, it is necessary to develop human resources from the humanities side so that the negative impacts of technological development can be reduced

The role and existence of student organizations are also part of the strength of civil society, which cannot be underestimated. Its existence is the spearhead of the nation's cadre formation because it is realized that to guarantee the continuity of the nation, future cadres of the nation are needed. And students are the foundation of a nation's future, and they are an important component in every change. (Qibtiyah, 2012).

Changes for the changes that occur in global and Indonesian society can certainly involve young people as the main actors, Widhyharto & Adiputra, (2014) in Azca, Widhyharto, & Sutopo, (2014). Furthermore, Naaf and White (2012) discuss young people can be divided into three perspectives, namely young people as a generation, young people as a transition, and young people as creators and consumers of culture. First, young people in the generation approach remind us that each young generation has its historical side and context. Then Parker and Nilan (2013) in Azca, Widhyharto, & Sutopo (2014) stated that the construction of young people is not the same from time to time, this condition makes the meaning of these young people change. For example,

Second, young people as a transition, are considered as a deterministic approach that believes that young people experience stages of life that are permanent and universal (Sutopo, 2014). This view is in line with the concept of functionalism which asserts the sharing of roles to create balance. This view has created the argument that the transition of youth that emphasizes biological and psychosocial assumptions to development then results in the dependence of legitimacy and intervention of adults to ensure that young people pass the path by the construction and definition that has been exceeded before by adults.

Third, young people as creators and consumers of culture. Luvaas (2009) explains the internalization of young people towards the value of globalization, for example, the phenomenon of doing it yourself culture in the world of young people, so that it raises distros, indie music, zinc, etc. Another study, Nilan (2006) explains the intersection between local and global culture, thus creating a hybrid culture among young Muslims in Indonesia (Luvass, 2009 & Nilan, 2006 in Widhyharto, 2014). This is also part of the strategy of young people to deal with the swift currents of globalization, as well as to show that they can become a cultural agency that sorts and chooses critically. All three views emphasize the dynamics of young people in responding to change.

Then why are young people, not young people, the younger generation or other terms? Young people are considered to represent a large quantity or amount, the autonomous subject (able to make decisions and do it alone or together), they also represent the values and culture (the creator and the model of the values themselves). Responding to the definition, then young people have an incision with various issues of change, young people face a struggle for social, economic, cultural and political values. At the same time, there is a demand for a new lifestyle-culture and political freedom, considering that socially young people are constructed and constructed by various kinds of knowledge, values, status-roles from a dynamic social environment (Pilan 2006, in Nilan & Feixa, 2006).

Then when young people enter the arena of globalization, young people are faced with a more massive structure of externalities, across national borders, and economic, political, and cultural barriers become thinner (Giddens in Ritzer, 2003). This then places young people in an ambiguous position, on the one hand, they are producers and main consumers, but on the other hand, they are the new proletariat class of globalization as explained by Bayat and Herrera (2011) in Azca, Widhyharto, Sutopo, (2014).

Globalization has entered a new era called the Industrial Revolution 4.0. Klaus (Shwab, 2016) through The Fourth Industrial Revolution states that the world has experienced four stages of the revolution, namely: 1) Industrial Revolution 1.0 occurred in the 18th century through the invention of steam engines, so that goods could be mass-produced, 2) Industrial Revolution 2.0 occurred in the 19-20 century through the use of electricity which made production costs cheap, 3) the Industrial Revolution 3.0 occurred in the 1970s through the use of computerization, and 4) the Industrial Revolution 4.0 itself occurred around the 2010s through intelligence engineering and the internet of things as the backbone of the movement and connectivity of humans and machines.

Methods

This study uses a descriptive qualitative approach with in-depth interviews of the informants who have been selected by researchers and processes data obtained in the field and has analyzed its results and concluded by researchers. According to Saeful (2009) Research Methods a decade ago there was an

error in society that the so-called research activities were surveyed. Besides, there is another understanding that research is correct if it uses a list of questions or develops due to the strong influence of positivistic flow.

In this study using a qualitative method that is analyzing field research, the object of research is the Nahdlatul Ulama Student Association and the Muhammadiyah Student Association which is in the form of descriptive. The theoretical foundation is used as a guide so that researchers focus on utilizing the theory of the Organization and the concept of state defense by the facts on the ground. Besides, the theoretical basis is also useful to provide a general description of the research background and as a material for discussion of research results. Case study research or field study (field study) is intended to study intensively about the background of the problem situation and position of an event that is taking place at this time, as well as the interaction of certain social units that are (given). Research subjects can be individuals, groups, institution or society. Case study research is an in-depth study of certain social units and the results of these studies provide a broad and in-depth overview of certain social units. The subjects studied were relatively limited, but the variables and focus under study were very broad in their dimensions (Suryana, 2010).

Results And Discussions

The development of technology gave birth to an interesting phenomenon in the life of today's society, namely the rise of global culture and an instant lifestyle. This phenomenon occurs as a result of the current globalization which can no longer be dammed. Globalization is often interpreted as the hegemony of developed countries (the West) against underdeveloped countries or developing nations. Starting from the style of dress to lifestyle, and consume instant food to absorb news instantly without critical reasoning. One important phenomenon of the globalization process has given birth to the generation of gadgets, a term used to mark the emergence of the millennial generation. The current millennial generation is those aged 17-36 years, those who now act as students, early jobbers, and young parents.

Millennial was born between 1981-2000. (Ali & Lilik Purwandi, 2017) Gadgets are more fitting to be interpreted as equipment so that the generation of gadgets is intended to be the generation that in life has always been in contact with equipment whose name contains elements of information technology. So, as if the various equipment has become an inseparable part of their lives. Connecting gadgets to the internet, resulting in community connections with each other to cross regions, countries, and even continents.

Thus, the development of IT has blurred geographical boundaries. Mc Luhan calls it Global Village because humans can explore distant territories even if they only sit in a confined space. In this context too, the time limit also becomes meaningless. It was also mentioned by Paul Virilio with the theory of Dromology. According to him, technology has destroyed the boundaries of space and time/speed. (Istriyani & Widiana, 2016).

The Industrial Revolution Era 4.0 provides opportunities and challenges for young people. The role of humans is gradually taken over by automatic machines. As a result, the number of unemployed has increased. This, of course, will add to the burden of local and national problems. Therefore, to take advantage of opportunities and respond to the challenges of the industrial revolution 4.0, student organizations must have data, technology, and human literacy abilities.

Technology literacy shows the ability to utilize digital technology to process data and information. Whereas human literacy must be mastered because it shows the element of soft skill or individual character development to be able to collaborate, be adaptive and be wise in the era of "flood" of information.

The term Industry 4.0 was born from the idea of the fourth industrial revolution. European Parliamentary Research Service in Davies (2015) said that the industrial revolution happened four times. The first industrial revolution took place in England in 1784 where the invention of steam

engines and mechanization began to replace human work. The second revolution occurred at the end of the 19th century in which production machines powered by electricity were used for mass production activities. The use of computer technology for manufacturing automation starting in 1970 marked the third industrial revolution. At present, the rapid development of sensor technology, interconnection, and data analysis has led to the idea of integrating all of these technologies into various fields of industry. This idea is predicted to be the next industrial revolution. The number four in the term Industry 4.0 refers to the fourth revolution. Industry 4.0 is a unique phenomenon compared to the three industrial revolutions that preceded it. Industry 4.0 was announced a priori because real events had not yet taken place and were still in the form of ideas (Drath and Horch, 2014). The term Industry 4.0 itself was officially born in Germany precisely when the Hannover Fair was held in 2011 (Kagermann et al, 2011). Germany has a great interest in this matter because Industry 4.0 is part of its development plan policy called the High-Tech Strategy 2020. The policy aims to keep Germany at the forefront of manufacturing (Heng, 2013). Several other countries also participated in realizing the concept of Industry 4. 0 but use different terms like Smart Factories, Industrial Internet of Things, Smart Industry, or Advanced Manufacturing. Even though they have different terms, they all have the same goal, which is to increase the industrial competitiveness of each country in the face of a very dynamic global market. This condition is caused by the rapid development of the utilization of digital technology in various fields.

IPNU realizes that students are an important element of changing times, especially in the industrial revolution 4.0. Collaboration and synergy in realizing big ideas is an inevitability of the organization. A response that is swift and responsive in adapting change is a skill that is internalized in the cadre's mindset early on. IPNU with its resources is committed to bringing forth a variety of creativity and innovation. For example, in the field of information technology, digital economy, ecopreneurs, and creative economics. Empowerment and innovation assistance is indeed one of the focuses of IPNU today.

Then the 4.0 Industrial Revolution and the digitalization era were responded by the HDI, Article 10 Points 2 and 3 of the HDI Article of Association stated, IPM members are Muslim students aged from twelve years to twenty-four years. Current IPM members are filled by Millennials and are dominated by Generation Z according to APJII data, are many internet users.

Conclusion

There are several impacts of the industrial revolution 4.0 process among students. First, Students are more comfortable learning by using the internet. From searching for the process of receiving knowledge to finding a source for a task, everything is done using a device and using internet access. Secondly, social media is a place for student expression, students are currently expressing more things on social media, whether it is heartfelt, complaints, anger or creativity all loaded in social media with a variety of content that attracts the attention of others. Third, the lack of student social interaction, reduced student social interaction because, most students focus on the device, not even a few students are more concerned with looking good on social media than the real world.

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Digitalization of Higher Education: Prospects and Risks

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Abstract

The article reveals the problem of digitalization of the higher education system and its consequences. It gives a comprehensive analysis of the essence and ambivalent nature of this process. The author consistently studies the positive aspects of introducing digital technologies in the learning process, which are connected with the prospects for the development of online and remote education. Particular attention is paid to the consideration of risks associated with the digitalization of education, the study of a possible negative impact of these processes on the social development and the future of mankind.

Keywords: Digitalization, Digitalization of Education, Educational Innovations, E-Learning, Online Learning

Introduction

The information revolution has sweepingly rushed into the life of modern society, considerably changing the functioning of its various spheres. Digitalization as one of the main components of the information revolution has not only gained a strong footing in the mechanism of the education system, but also has substantially transformed this mechanism, as well as the essence and nature of education. This process gained particular importance during the coronavirus pandemic, when many national education systems had to switch completely to online learning, as it happened in Russia. It helped discover in more detail both the new possibilities and shortcomings of such learning process.

If we speak about the classical understanding of the category of education, it means a system of knowledge, abilities, skills and qualifications that a student should master, as well as gaining the experience in creative activity and a values-based attitude to the world. Education precedes other activities and is an important factor in both the socialization of an individual and the development of society, its progress. Therefore, the importance of an educational institution in the life of modern society continues increasing.

However, the content and forms of education have a concrete-historical character, and they reflect the worldview and specific features of society at a certain stage of development. Today's society can be described as informational and postmodern. Professor Peter Weill, a well-known expert in management, compared such a society with a boiler of constantly boiling water. This creates a feeling of constant uncertainty, confusion and chaos. The essence of the postmodernity information era consists exactly in this unpredictability and dynamism, when social dominants are constantly changing, and the information flow collapses as an avalanche on the human mind. Thinkers call it a “liquid” world (as defined by Z. Bauman), “runaway” world (A. Giddens), “ground in motion” (F. Emery).

Any person today as well as any expert should be able to navigate well in such a rapidly changing world in order to make the right decisions. The mission of modern education is to teach this using

modern information technology. These processes are related to the concept of digitalization, which has recently become obviously popular and is often used in the scientific and professional communities: "digital economy", "digitalization in management", etc.

The concept and essence of digitalization

Let us review in more detail the concept of digitalization, which, even though it seems obvious, is, in fact, ambiguous. On the one hand, digitalization in the narrow sense of the word often implies the introduction of digital technologies into various spheres, the transformation of information into a digital form. An example from the education sphere is the replacement of "analog" paper reports of an instructor and various services with electronic personal accounts or a shift of an instructor/student/employee from educational documents on paper (or in simple files) to keeping data with special computer software that integrates an array of information. In this case, the concept of digitalization in the narrow sense, as a rule, is associated with the simplification and acceleration of processes, cost reduction.

At the same time, digitalization is closely interconnected with informatization. At the first stage, digitalization often consists in widespread systematic use of information and computer technologies. We can consider informatization, which is mainly associated with a change in the information channels, the nature and quality of information infrastructure, part of a more complex digitalization process, that has a systemic-functional nature. Digitalization in different fields helps effectively solve tasks set by a person, while forecasting the result.

However, digital methods, like any new methods, require that users are digitally savvy. They include not only the mastery of information technologies, but also knowledge about the specific features of digital systems, skills and abilities to take advantage of such systems, and even the emotional component of the attitude to the digitalization process. Otherwise, if there are no skills of using the new digital functionality, the effect may be the opposite. Digital expertise helps an expert achieve a new level of using modern technology.

In the broad sense of the word, digitalization is a global process characterized by a change in the social, economic, cultural environment, science and education, the penetration of digitalization in all spheres of social and personal life. At the same time, in a "digital" society, people not only have skills of using digital tools, but also use them constantly, they are inextricably linked with their daily life and work. In crisis or difficult periods (for example, the spread of the coronavirus epidemic), digitalization is designed to respond fast to unexpected social problems. The digital world should make any activity more flexible and adaptable to extremely dynamic systems, and, therefore, more competitive. Thus, digitalization today is not just the introduction of digital technologies in life, but a trend in the social development, actively influencing the nature of social relations. And this phenomenon is ambivalent. This is most vividly manifested in the field of education.

The benefits of digital transformation

It is obvious that digital transformation provides a lot of opportunities in the educational sphere. Let us review them. Firstly, new possibilities relate, primarily, to the content of education and training, and ways of mastering it. The development of the Internet provides opens access for instructors and students to the information space, including for self-education purposes. Open access appeared as an alternative to the monopoly of scientific publishers in the late 20th century. Open access means unrestricted free of charge access to the complete texts of scientific publications and educational literature for all users. This means that for a consumer of information there are no technical, financial or legal restrictions on the reading, copying, distribution of research information and its use for other purposes prescribed by law. This process was initiated in 1991 by Paul Ginsparg with the creation of the arXiv open depository, which even today remains the largest free archive of scientific publications in the field of natural sciences (physics, mathematics, computer science, biology, astronomy). All the three articles of Perelman, in which he consistently proved the Poincaré theory, were published on this site.[1] Following Ginsparg, archives were opened by: CogPrints (archive of psychology, linguistics and neuroscience); NetworkedComputerScienceTechnicalReferenceLibrary (Networked reference library for computer

science); RePEc (library on economics); NetworkedDigitalLibraryofThesesandDissertations (Networked library of theses and dissertations). This provided new opportunities for creative activities and for the implementation of projects; expanded the theoretical base of research, making it flexible and relevant; gave unlimited opportunities for communication and sharing of best practices. But at the same time, these processes required the organizational consolidation of the latest approaches to the use of information and research literature, which was undertaken by the Budapest Open Access Initiative (BOAI) in December 2001.[2] Then, in 2002, the methodological and theoretical foundations of open access were formulated at the Budapest Open Access Initiative Conference,[3] and in 2003, in the Berlin Declaration on Open Access to Knowledge, which was signed by almost all leading scientific organizations in the world. Respected systems such as the Public Library of Science-PLoS, the Open Archives Initiative (OAI), which supports interoperability between networks, and others have joined this movement. The open publication of scientific materials and research papers in a virtual space allows not only to make them available to students and instructors, but also to serve as a certain guarantee of protection against plagiarism and other kinds of unfair competition in scientific activity.

New technologies facilitate the development of electronic textbooks, electronic educational resources posted on the websites of educational institutions, and educational software that are not only presented in digital form, but also make it possible to master the content of a certain discipline step-by-step, which is controlled automatically: for example, you cannot move to the next section without having studied the material of the previous one at a sufficient level. Such electronic disciplinary courses have ample opportunity to diversify and make the material easier to understand with the help of instructional videos, as well as to introduce listeners to the video lectures by famous scientists.

As a result of digitalization, electronic educational resources become not just an accessible flow of educational information, but also a system of interactive and multimedia experiences, online dialogues. Teaching aids in this digital format are still not widespread in Russia, their quality is often far from perfect, since the development and implementation of such electronic materials is a meticulous task that requires time, methodological knowledge, a creative approach and digital expertise.

The introduction of innovative technologies necessarily requires, on the one hand, changes in the methodology of teaching and learning, and, on the other hand, many social practices and humanitarian-democratic initiatives can be supported by digital transformation processes. The latter is the most valuable "acquisition" of digitalization. Thus, the opportunities for inclusive education are increasing in satisfying the diverse, including special educational, needs and taking into account the individual capabilities of students. The new virtual educational space facilitates the implementation of the multi-purpose Russian state program entitled "Accessible Environment" and can be aimed at supporting students with physical disabilities or other challenges in adaptation to the educational process, as it can adapt to the lifestyle, needs, psychological characteristics and interests of a particular individual, by giving free equal access to educational resources.

To solve the same problems of increasing the flexibility and mobility of the educational process for different target audiences, the number of open universities and e-learning departments across the world is steadily growing. They implement the relevant methods, including work with open electronic libraries and repositories, the study of specially designed electronic textbooks and workshops, online courses in disciplines from the curriculum, conducting webinars, online tests, discussion of certain issues on the forum, in chat rooms and etc. At the same time, all the information with instructions is compactly placed in virtual classes and students' personal accounts, easily controlled by both parties (students and instructors) and also includes feedback. "Education should be a right, not a privilege," is a slogan put forward by Daphne Koller and Andrew Ng[4], the founders of the first online learning platform Coursera.

The official date for the introduction of online learning in Russia is May 30, 1997. On this day the Ministry of Education of the Russian Federation issued an order which authorized conducting an experiment on online learning in the field of education. Over the recent years, due to the digital transformation, the space of online education has expanded significantly thanks to EdTech (i.e., online learning), the placement of ELR (electronic learning resources); we observe mass introduction of online learning methods (video lectures, online testing and etc.) in ordinary departments. In 2016, the Russian online education market grew by 30%, which is 2 times faster than the global indicator.[5] Higher School

of Economics is at the forefront of promoting online learning in the Russian Federation. Indeed, such learning process has its advantages[6] – cost-saving for students and educational institutions, flexibility and mobility of the learning process, accessibility (can be implemented outside a certain time and space).

EdTechXGlobal believes that the global market volume for EdTech will reach $252 billion by 2020. Global Market Insights has more modest but still significant forecasts – $240 billion by 2023. However, Russia is lagging behind by the volume of online education introduced: now Russia accounts for about 0.5% of this market. Nevertheless, the volume of the Russian market may grow to 53.3 billion rubles by 2021. It is gaining pace faster than anyone in Eastern Europe.[7] Indeed, Russian education, especially higher education, seeks to follow global trends that were defined in 2015 by the United Nations General Assembly in the resolution entitled "Transforming our World: The 2030 Agenda for Sustainable Development", in which education plays a special role . "Ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all" implies a comprehensive digitalization of the educational institution. Today, the Russian Federation pays great attention to the digital transformation processes, which is reflected in the national draft document published in February 2020, "Key Areas for the Development of Russian Education to Achieve the Sustainable Development Goals and Objectives in the Education System until 2035", in which universal digitalization is among the basic global drivers that control the development of civilization and directly affect the institution of education, which must manage to adapt to global changes.[8]

The introduction of digital technologies drastically influences not only the mastery of content and teaching methods, but the entire educational organization. Digitalization should promote the development of a more flexible education system – a personal educational and career "road map", as well as to make management procedures more transparent and susceptible to reengineering. New management technologies in education are based on the values of network culture, based on extreme information transparency, Big Data processing methods, and a regulatory and instructional base. Such digitalization of the education system in the broad sense intends to: on the one hand, contribute to an objective assessment of the current processes and scientific and educational activities, systematize the mechanisms of interaction between the entities, and, on the other hand, promote a comprehensive analysis of current situation at various levels from the whole system in general, up to departments and individuals (instructors and students), make accurate forecasts for long-term planning based on them. Thus, the effectiveness of controlling and the speed of making optimal decisions should increase. The system itself, based on various regulations, should become more clear, organized and predictable. Such a mechanism is introduced through the creation of online rooms for instructors and students, where all information about their activities is collected, through online monitoring mechanisms, business communication, workflow management and reporting, the functioning of rating systems, etc.

It would seem that, thanks to digitalization, the education system is becoming harmonious, unbiased and predictable. The digital future of education is joyous, as in the past we really had to deal with misrepresentation of fact in reports that were difficult to double-check, as well as subjectivity in evaluating activities. But the duality, the ambivalent nature of the digitalization process, which contains hidden and obvious threats and risks, is too obvious. Let us review them.

Threats and risks of digitalization

Considering the reverse side of the coin, we will start again with mastering the content of training courses amid universal digitalization, which has made this process, as mentioned above, open and accessible. However, is every young person able to benefit from it effectively and independently? For example, only the number of articles on the brain exceeds 10 million and it is simply not possible to read them. Moreover, every day at least ten article are published.[9] Without an experienced instructor, it is difficult for a student to navigate in a huge information flow, which is sometimes outdated, sometimes false, or has become junk information. But such information is most easily accessible, and young people often go the shortest way. Moreover, not all publications have become accessible. The most famous and reputable resources do not give public access to the articles immediately, so as not to lose their subscribers. Contradictions between the commercial interests of such publishers and the public movement toward scientific openness sometimes lead to litigation and lawsuits: for example,

the lawsuit of the famous Springer Nature, which was joined by 13 other scientific publishers, against the pirated websites, Sci-Hub and LibGen, that provide open access to research papers.[10]

Another problem is that sometimes students download materials without any critical assessment, without additional processing, without identifying the essence and main ideas. At the same time, students have a syndrome of illusory possession of knowledge ("Internet expert" syndrome), which they aren't actually able to use, since they have not assimilated this information. Indeed, the concept of information is not synonymous with the concept of "knowledge": knowledge is acquired through active and purposeful work with information, the semantic blocks should become convincing for its consumer and take a certain place in the worldview system. This information becomes true knowledge only after joint discussion with other students guided by instructors and the application of this information. Moreover, in different audiences the ways to achieve the truth will be different. During live communication the instructor is sensitive to the specific features of the audience, their needs and capabilities.

Only an instructor who personally (and not virtually) manages the learning process can cope with such tasks. The initial assumptions of EdTech supporters (for example, founder and CEO of Knowledgemotion David Bainbridge) that education can be significantly reduced in price because it can do without instructors did not prove to be right. In Western education, the attempts to replace a real instructor with a virtual one failed. Therefore, today the "profession of the future", a tutor, has started to be introduced into the field of education. This is the organizer of the learning process, a consultant and a personal mentor for a student, who remotely helps navigate the educational virtual space and develop an individual pathway to knowledge.

Nevertheless, the role of a real instructor working directly with students cannot be even slightly compared with an online tutor. Men are social beings, this is key manifestation of their ancestral essence and development. Without the "participation effect" of an instructor and fellow students, not only communicative abilities, teamwork skills, social intelligence weaken and gradually disappear, but the level of cognitive abilities deteriorates. The Wall Street Journal showed that 89% of managers are already struggling to select candidates with the required set of soft skills such as teamwork, communication skills, and social adaptability.[11] What then to expect considering further dominance of online education? Genuine education can only take place in the context of real relationships.

One cannot but recall the dialogic theory of the Russian philosopher M.Bakhtin, which can be considered in this case as the methodological basis of the learning process. His dialogic pedagogy sets a goal of achieving, through communication, a creative understanding,[12] which exists on the border between the "I" and the "Other" and at the same time includes the intentions of the "I" and the intentions of the "Other", and, therefore, new semantic discoveries, and internal convincing discourses.

American sociologist, Ph.D. Randall Collins in his work "The Sociology of Philosophy: A Global Theory of Intellectual Change" highlights a drastic role of personal contacts for intellectual creativity, the social conditioning of cognition in general.[13] The results of a person's spiritual activity live only in social systems of live discussions, dialogue with opponents, like-minded people, etc., and not in computer software and artificial intelligence. By seeing the reflection of his ideas in the thoughts of another, a person begins to understand something new about himself and his position. An expert in neurolinguistics and experimental psychology, Doctor of Philological and Biological Sciences, Corresponding Member of the Russian Academy of Sciences and the Norwegian Academy of Science and Letters T.V. Chernigovskaya sees the deprivation of social communication as a great misfortune: "Such people do not develop the thing that is now considered one of the last (disappearing) privileges of a person compared with all other neighbors on the planet, which is the ability to build a model of another person's psyche. There is no good term for this action in Russian, but in English it is called the theory of mind... This is the ability to look at a situation not with your own eyes (brain), but with the eyes of another person. This is the basis of communication, *the basis of training*, the basis of sympathy, empathy, etc."[14]

At the same time, a student through live interaction not only finds himself as an active actor in the educational process, but also through a dialogue involving discursive polyphony, identifies his stance, personal attitude to information, and deepens knowledge. It is necessary to also consider the transfer

of implicit knowledge, values and implicit skills of intellectual work, experimental experience in direct communication with an instructor – a personality and a well-respected figure. The scientist and philosopher M. Polanyi insisted on this, developing the theory of tacit knowledge after a long observation of chemical and medical students.[15]

The student's social environment in the learning process plays a motivating and organizing role. Not every student is able to discipline himself and independently control the academic process. It is clearly demonstrated by the example of Coursera online learning platform, the most famous one in Russia, which entered the market in 2012. Its launch was very optimistic, and almost in a year, a staggering 2 million number of users was registered there. By 2017, Coursera already had 24 million students. But, despite the huge interest, an unexpected decline came afterwards, and the percentage of students who completed the full training course was extremely small. According to the forecasts of Ambient Insight, people will be less likely to study online on their own over the next five years.[16] Indeed, online courses are not able to control "how people study": "Maybe they turned on the webinars and are watching them attentively, or maybe they are watching them on the background while cleaning their house. It's hard to track when and why they drop the course, and without this data it's impossible to understand how to find gaps and improve content."[17]

Furthermore, the use of new digital technology in education has a negative impact on the development of human cognitive abilities. No need to take notes, availability of the Internet where you can find answers to any questions, fragmentation (mosaic structure) and visualization of information, etc. result in a sharp deterioration of students' ability to draw a border line between scientific and unscientific facts, to single out the key information, to capture the essence of content and problems, to think systematically and critically analyze information, which could allow using it to make adequate decisions. At the beginning of computerization process in the 20th century, the United States was the first country to face the problem of "pseudo professionalism," when employees who were tech-savvy could not effectively use and systematize the information they found. Today, a similar problem is observed in the educational sphere and it was even dubbed "digital dementia".

On the other hand, an instructor in a digital environment is forced to master a huge number of information and digital skills, which is extremely time consuming and results in emotional burnout and stress. At the same time, the creative learning process often fades into the background, turning into a number of strict standards, a set of requirements and instructions, which emasculates an emotional lively atmosphere, especially in the social and humanitarian sphere. If a highly qualified instructor is incapable of or unwilling to master digital skills, he automatically becomes uncompetitive. Thus, even talented instructors who do not want to spend time on "digital accounting" are definitely left behind the new education system.

There is a disturbing trend in higher education, which manifested itself vividly in the 21st century in the Western countries and is trying to come into the spotlight in Russia – not to consider higher education as a certain "privilege", which gives students often abstract, fundamental or humanities knowledge – spiritual capital, which may not be needed for them in their specific professional activities, but which increases the cost of education. Clayton Christensen, professor at Harvard Business School, formulated the Theory of Jobs to Be Done. It says that universities should consider, first of all, the tasks that enrollees set for themselves. In his book *Competing Against Luck: The Story of Innovation and Customer Choice* he writes, "When we buy a product, we essentially 'hire' something to get a job done", that is, we strive to achieve a result in a certain life situation.[18] And low-cost online learning is quite enough to acquire specific skills.

This trend in the education will lead to the simplification of the learning and thinking processes of consumers – students, the incomplete realization of their capabilities, the decrease in the creative potential of future professionals and the absence of the social qualities that are necessary today for an expert who will have to make responsible and important social decisions in the future. A businessman, doctor, economist or engineer should be included in a specific cultural and historical context of their time, its spiritual problems, universal values, and, thus, be able to comprehend their professional problems through cultural and ethical categories.

It is necessary to remember that higher education is, first of all, the development of higher intellectual and cultural values, the spiritual enrichment, necessary for any expert amid the exacerbation of global problems. And this general cultural expertise is again beginning to be appreciated. Thus, according to Catherine Weinberger, an economist from the University of California, Santa Barbara, in western countries, experts with a balanced (including general cultural component) set of competencies today receive 10% more than their "field specific" colleagues.[19]

The conditions in a digital society require a flexible approach to this situation in the education sphere. At our university, Plekhanov Russian University of Economics, each instructor generates Electronic Educational Resources, which turned out to be extremely helpful during the coronavirus pandemic, and are regularly used in other difficult situations when a student is geographically remote or has certain physical challenges, as well as to master the basics of theoretical knowledge (electronic textbook, thesaurus, tests, etc.). However, mastering practical professional (including communicative, social) skills and values requires the “magic” of direct interaction and going out of the comfort zone.

Conclusion

Considering this, we can agree with the current position of the Russian Ministry of Science and Higher Education and its new Head, Valery Falkov, who said, “Online courses should be a mandatory part of the educational process at any university, but they cannot completely replace traditional education ... Online education works best for receiving the second graduate degree and further higher education”.[20] It is encouraging that this opinion coincides with the position of the majority of Russian instructors and students.

At the end of 2018, researchers of the “Modern Digital Environment in the Russian Federation” project presented the results of a sociological survey conducted among employers, instructors and students of higher and secondary specialized educational institutions. More than half of the surveyed instructors and almost 90% of students highly appreciate the opportunities offered by online learning platforms, however, traditional higher education remains a priority for students.[21]

Digital technologies have certainly greatly transformed the educational sphere and require new socialization forms in the educational space. They bring new opportunities for learning, at the same time making the society face new challenges, without which the country will not be able to remain competitive on the world stage.

Notes

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Furniture Industry - Managing the Polish Industry's Sustainable Development

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Abstract

National economy is based on activities taken up by market participants. Domestic economy is viewed globally through the lens of products/services it offers. Therefore, market image building depends on what the given country is associated or identified with. Currently, the Polish economy (according to the Polish Development Fund's data) is valued at 11 billion [Euro] in terms of furniture export. Among industries belonging to the industrial processing sector, the furniture discipline is second in terms of net export. It is therefore very important to sufficiently invest in this sector of the Polish economy. The paper presents an analysis of the furniture industry in terms of own and government research. All of the analyses are embedded in the topic of sustainable development, which constitutes the foundation for fulfilling the basic assumptions of "Industry 4.0". This direction of action is required for industry management. Then, it will be possible to participate in a global, but "digitalised" and "smart" chain of a relations network that satisfies consumer needs. An analysis of the study results allowed for defining the key factors in development planning, i.e. "education" and "house brand". Their participation is required in managing sustainable development in the furniture industry to consciously shape the domestic economy.

Keywords: Furniture industry, sustainable development, Industry 4.0.

Introduction

Competitive advantage is one of an enterprise's priority objectives and is of major strategic significance in the company's development process. Gaining an advantage is related to many activities, which as result allows for achieving success in the economy. An in-depth market analysis constitutes one of many valuable information on the sector in which the enterprise is functioning. On the other hand, an analysis of specific market segments allows for allocating a specific product and/or service in adequate purchasers, thereby enabling the satisfaction of the customer's individual needs.
An analysis of the furniture industry in terms of sustainable development should mostly be focused on the following:

1. Studying the social potential mainly in terms of education, i.e. focused education in the scope of designing in areas in which the furniture industry and wood processing are significantly large (they stand out among other industries).
2. Studying the economic benefits resulting from building strategic network alliances supporting the industry's development. Promoting local brands by striving to strengthen the competitive advantage in foreign markets.
3. Studying the ecological economics, i.e. economic estimates affecting the environment and related to the quotation of natural resources. Focusing mostly on limiting the degradation of the natural tree population and on using state-of-the-art processing lines that reduce, among others, the quantity of wastes or optimise the raw material's consumption.

Analysis of Most Recent Studies and Publications

The modern times are a period of adapting production/service solutions to global solutions aimed mostly at environmental protection. Sustainable development is development that meets the needs of

the present without compromising the ability of future generations to meet their own needs (Gudukeya *et al.*, 2019; Ministerstwo Rozwoju, 2018). The quoted term (UN Report of the World Commission on Environment and Development) is the most commonly used explanation for what sustainable development is. The term is equally often characterised in the manner specified by David Altwegg, et al (2004). The impact on the environment, economy and society constitutes three pillars of sustainable development. Sustainable development is achieved completely by accomplishing all of its three pillars.

Sustainable environmental development refers to: maintaining renewable resources, minimising pollution, limiting the consumption of non-renewable resources. Broader explanations on environmental impact are present, among others, in the following publications (Ijaz *et al.*, 2020; Mikulčić *et al.*, 2020, Vesal *et al.*, 2020).

Sustainable economic development is focused mainly on maintaining a specific level of economic production. Roberto Cervelló-Royo et al (2019) presents an interesting view in which he identifies the factors of a country's economic and sustainable development in relation to capability-based entrepreneurship. On the other hand, a general view on the sustainable economic development as a method of facilitating effective policy designing is presented by Arsenio M. Balisacan et al (2015).

A country's sustainable social development should enable a specific level of social welfare among its residents. The diversity in the approach to social development can be deliberated on in terms of adaptive management of social and economic systems (SES) (Castro-Arce and Vanclay, 2020) and as sustainability referring to the end (often ideal) state, which is constant over time (Segerstedt and Abrahamsson, 2019).

In maintaining social balance, it is necessary to consider how it is affected by economic and environmental balance. On the other hand, economic growth is limited by the society and the society's development largely depends on available natural resources. The significance of the sustainable development concept can be found in many publications. In terms of the production process, the phenomenon is described by Mahdi Naderi et al (2019), while in terms of production systems – by Melissa Demartini et al (2019). The significance of sustainable development among small and medium companies is described by Erik Steinhöfel et al (2019) following the example of companies acting in Germany or for the furniture industry enterprises (Wiśniewska-Sałek, 2018).

In terms of defining the concept of the fourth industrial revolution, scientific literature describes this notion very broadly (Weking *et al.*, 2019; Pacchini *et al.*, 2019; Alaloul *et al.,* 2020; Shatrevich and Strautmane, 2015; Amaral *et al.,* 2019) by analysing them in many areas and relations (Büchi *et al.,* 2020; Müller *et al.,* 2020; Rauch *et al.,* 2020; Rajput *et al.,* 2019; Villa and Taurino, 2019) or doubts concerning the enterprises' readiness to implement them (Ślusarczyk, 2018). It is possible to question the knowledge possessed by enterprises about the Industry 4.0 ideology. The knowledge is required for the company's correct restructuring. The resources in the form of the human factor can also raise doubts. Whether they have skills to analyse the data generated by using advanced technologies, modern and digitalised economy (Wiśniewska-Sałek, 2019; Wiśniewska-Sałek *et al.*, 2019).

Paper's Objective

The main objective of a country is to support entrepreneurs in the process of building the strength of its economy. An analysis of the results of the bottom-up administrative division (i.e. poviat) in relation to the country makes it possible to find factors that are equally important for the functioning of companies at the lowest and highest territorial levels. The factors resulting from the decision made, in terms of economic changes, i.e. the fourth industrial revolution, should be balanced. This also concerns single companies from the SME sector as well as large national manufacturers. The management of the industry's sustainable development requires adapting the unit's business model to the model of managing the country's sustainable industry. The expediency of the furniture industry's study was justified by the high position of Polish furniture in global rankings in terms of export size and the large number of manufacturers often focused in very small areas. The industry's specificity,

i.e. production based on natural resources constitutes a very important element of environmental care, which justifies the expediency of sustainable development. The paper's main objective is to find factors that will constitute a starting point for the furniture industry's development in an environment of sustainable development.

Materials and Methods

The paper utilises two prominent sources. The first source was own research, i.e. a survey conducted on a group of entrepreneurs in the furniture industry. The second source was an analysis of the Polish furniture manufacturers conducted based on the commission on the Polish government (PARP, 2020). The analysis was also supplemented with current information derived from the data published by Statistics Poland (Statistics Poland, 2019a; 2019b; 2019c) and the Polish Chamber of Commerce of Furniture Manufacturers (OIGPM, 2020) and State Forests in Poland (Portal Leśno-Drzewny, 2020; State Forests, 2015).

The survey was conducted on a sample group of 150 randomly selected enterprises with economic activity registered in the Kępno poviat, Wielkopolskie voivodeship. Companies classified acc. to the Polish Classification of Activity (PKD, 2007) and the surveyed entities belong to section C - Industrial processing: Section 31: Furniture production: kitchen furniture, office and shop furniture (the sub-class includes: production of chairs and seats for offices, production rooms, hotels, restaurants and public buildings; production of cinema and theatre, etc. chairs and seats; production of special shop furniture: counters, display cabinets, shelves, etc.; production of office buildings; production of laboratory tables, chairs and other seats used in laboratories, other laboratory furniture, e.g. cabinets; production of furniture used in furniture, schools or restaurants; production of decorative trolleys used in restaurants) and other furniture (the sub-class includes: production of sofas, folding sofas and seat couches; production of garden chairs and furniture; production of furniture for bedrooms, living rooms, gardens, etc.; production of cabinets for sewing machines, TVs, etc.; finishing of chairs and seats, such as upholstery; finishing of furniture, such as: painting (including spray painting), varnishing and upholstering). The survey's questionnaire featured 10 multiple-choice questions and metrics. The questions characterised the furniture industry in terms of its financial, production and resource capabilities. They also referred to the business-related environment, including the education field. The survey was conducted with own resources allocated for the performance of activities as part of the subsidy granted for the funding of scientific research and developmental works as well as related tasks aimed at developing young scientists. The survey was conducted in the period of October-December 2019, contractor: BIOSTAT sp. z o.o., CATI method.

The country-wide analysis was conducted with participation of: European Union – European Structural and Investment Funds as well as the Republic of Poland – Polish Enterprise for Enterprise Development (PARP, PRF group). The studies were conducted as part of the project titled "Development of the furniture industry's Polish brand strategy 2018-2021", which is one of the elements of the "Polish Furniture" Flagship Programme. The project's main assumption was to develop a system strengthening the global position of the Polish furniture industry.

Results

Nearly 50% of the random sample representing the furniture industry's statistical population in the Wielkopolskie voivodeship are companies belonging to the group of micro-enterprises (hiring up to 9 employees), while 37% hires no more than 49 employees. Nearly ¾ of the surveyed enterprises state that they are selling their products abroad under their own brand (however the companies' size raises doubt whether the surveyor and respondent understand the "own brand" term the same way) and only 17% of the surveyed entities acts in the domestic market for over 20 years. Most entrepreneurs established their activity between 1998 and 2008.

Sustainable development of the furniture industry according to own survey research.

The statistically studied enterprise confirms the furniture industry-related educational capabilities in their business-related environment. The results are presented in figure 1.

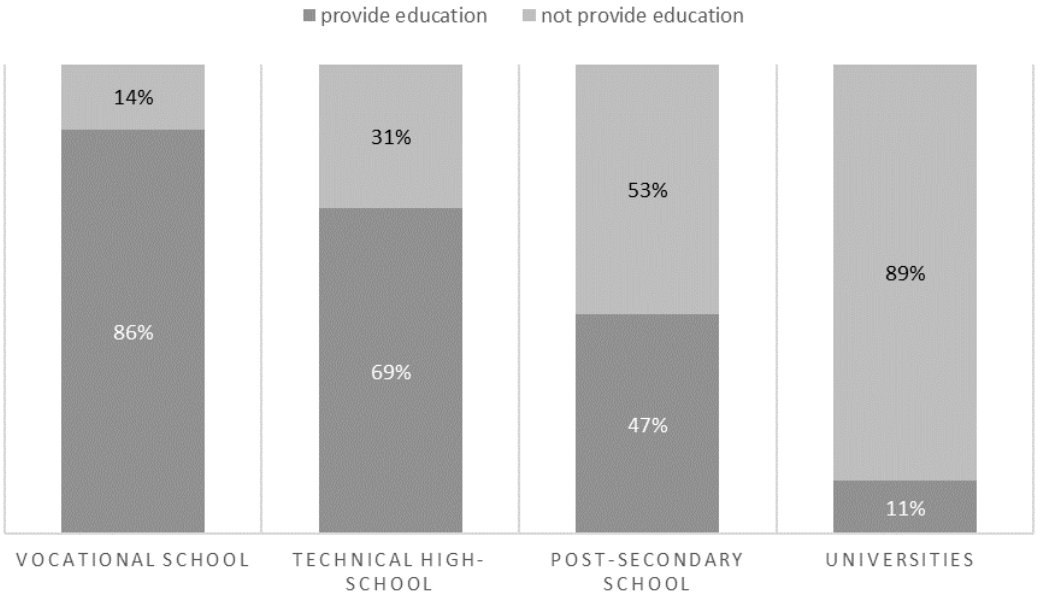

Fig. 1: Share of education institutions providing vocational education on furniture production in 2018.

Source: own research (survey)

The enterprises themselves declare co-operation with institutions, such as (order according to most frequent selection): financial institutions (25%), local government, science and research centers, universities and science institutes (1%). The co-operation results include, among others, access to European structural and investment fund subsidies as well as specific subsidies, financial resources obtained through credits or employment office subsidies. The survey's results have also shown that co-operation with the environment mostly comes down to institutions related to increasing financial resources, not material or information resources.

The economic pillar's analysis shows that the value of production sold amounts to just over or below PLN 100,000 for 26.5% of the surveyed population and the entities forecast that it will increase by 3-5% (for 16% of respondents) and over 5% (for 24% of respondents) in the next 2 years. It is necessary to note that enterprises very reluctantly provide information about their finances. The answers provided may not be completely objective and real, if only due to the fact that 70% of respondents declared export under their own brand.

A production process based on natural resources constitutes a big challenge for the process of managing their sustainable development. The strategic resource consumption planning assumptions should include environmental protection on one hand and support the industrial discipline's development on the other. A resource analysis allows for stating that the estimated annual wood demand for furniture production is distributed relatively evenly. Nearly 30-40% of respondents use pine, beech and oak to produce furniture in general. 70% of respondents produce furniture from birch wood, catalogued in the "other" item, including: chairs, upholstered furniture for the bedroom or gardens. The estimated annual demand for this wood for furniture production does not exceed 10 thousand m^3 per annum. Oak wood is most commonly used in the production process. Its

consumption differs depending on the enterprise. Over 50% of the analysed companies consume less than 10 thousand m^3 of this raw material per annum and over a dozen enterprises requires an estimated million m^3 per annum. Due to its hardness grade (Brinell's wood hardness class III: BNH 3.1-4)), oak wood is dominant in the production of office furniture. Furniture production also includes the use of wood-based materials which enable reducing the degree of forest degradation. The share of wood-based materials amounts to 30-50% in the overall furniture production among the surveyed enterprises. Unfortunately, these are products with lower utility quality, which substantially affects the industry's economic dimension. The detailed statistics are presented in figure 2.

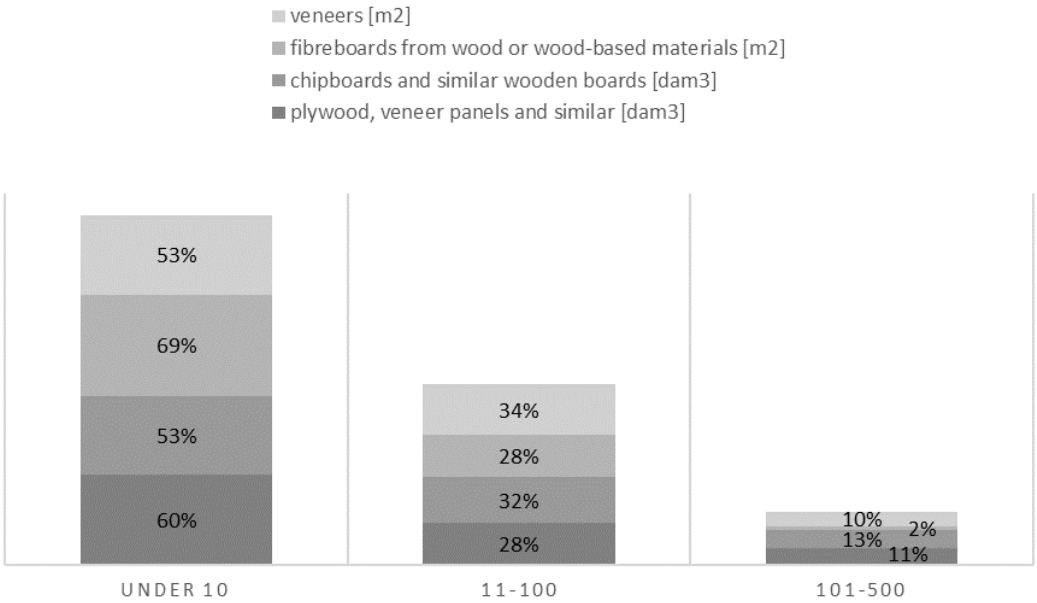

Fig. 2: Share of semi-finished products used in furniture production in 2018.
Source: own research (survey)

The increased applicability (70% of respondents) is visible mainly in the production of upholstered furniture, while veneer is the least popular. It is also concurrently used in kitchen furniture production and its applicability reaches even 10 million m^2.

Sustainable development of the furniture industry according to country-wide research.

The Polish population reached 38,411.1 thousand people in 2018, 60.6% of which are persons of working age. In comparison to 2014, it is a drop in the number of working age persons by 2.4% at the expense of increased number of retirement age persons. The population of educational age (the country's economic future) according to the age groups demonstrates a drop in the last 4 years by 250 thousand of children at the age of 3-6 and 16-18 as well as by 500 thousand for the age of 19-24. A relatively even level – slightly over a million persons – applies to children at the age of 13-15 and an increase by 250 thousand of children at the age of 7-12. (Statistics Poland, 2019c)

Population statistics, specifically the distribution of educational competencies translate substantially into the occupational spectrum. In 2018, the employment in the furniture industry amounted to 161 thousand, including 25% of foreigners from Ukraine, China or India. The average monthly remuneration in the industry is equal to (gross) PLN 3,607.7 and in comparison to 2017 and 2019, it is possible to observe a rising trend of nearly 8% on average. (OIGPM, 2020)

In the 2018/2019 academic year, preparation for work directly in the furniture industry was possible, among others, in I degree industry schools, production and processing studies. The offer was utilised by 20 thousand young people. The same studies in basic vocational schools feature slightly over 1.5 thousand spots. Technical schools with engineering and technical profiles include nearly 120 thousand students and slightly over 18 thousand of them has vocational competencies (passed the exam confirming the competencies). The furniture industry is not only production, but also designing. In the studied academic year, 9,992 persons took up artistic education of the I degree and 12.9 thousand students took up second degree education. (Statistics Poland, 2019a) In addition, 691 qualification vocational courses were organised and featured active participation of 19.1 thousand auditors. On the other hand, higher education in the 2018/2019 academic year featured 235.1 thousand students in technical universities and 16.8 thousand students in artistic universities. Studies correlated with the industry, i.e. engineering and technical constitute nearly 10% of all education profiles. On the other hand, processing and production are studies chosen by 34 thousand persons from 1,230.3 thousand students in the country (most took up studies related to business and administration). At the end of 2018, students studying forestry sciences in Poland included 5,090 persons, 1,231 of which were ready to enter the labour market, i.e. attended the last year of the studies. (Statistics Poland, 2019b)

The furniture industry's economic aspect is measured by its production. In 2018, the furniture production in Poland achieved the value of over PLN 49 billion. The most wooden furniture produced was intended for living rooms and dining rooms (22,991.14 thousand pieces), wooden furniture intended for sitting (13,572.56 thousand pieces) as well as 4,932.09, 3,324.69 and 2,744.46 [thousand pieces] of wooden furniture intended for bedrooms, kitchen and convertible for sleeping purposes. The biggest increase in comparison to 2017 was recorded for wooden furniture intended for living rooms and dining rooms, i.e. by 18.7% and the lowest – for furniture intended for sitting (0.3%). In comparison to 2019, sitting furniture convertible for sleeping purposes featured the highest drops by 6.8% and 23.3% while sleeping furniture featured the highest increase by 23.7%. The Polish furniture industry is mainly the export of products. In 2018, furniture of the value of EUR 10.8 billion was exported from the country. This gives Poland the third position in the global exporter ranking. Within 10 years, furniture export has nearly double in value. The main recipients of Polish furniture are customers from: Germany, the Czech Republic, Great Britain, France, Netherlands, Sweden and USA. (OIGPM, 2020)

The furniture industry's global aspect obviously includes wood and wood-based semi-products. In 2018, the Polish forest inspectorate sold the most medium-sized wood used in the industry and for general use from coniferous trees (13.5 million m^3) and deciduous trees (4 million m^3). (Portal Leśno-Drzewny, 2020) The detailed distribution is presented in figure 3.

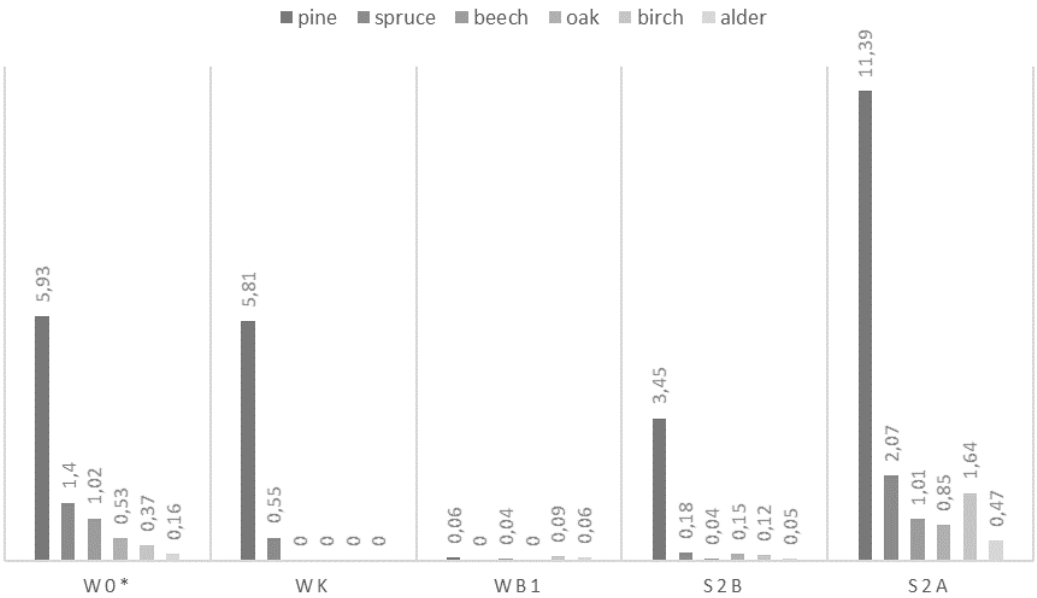

(* W0 – large-size wood: logs (no wood: WA1, WB1, WC1); WK – large-size wood: logs; WB1 – plywood large-size wood; S2A - medium-sized wood: applied in industrial and general purpose; S2B - medium-sized wood: applied for mechanical processing)

Fig. 3: Polish forest inspectorate's wood sale volumes in the product group in 2018 [million m^3].
Source: based on data from Portal Leśno-Drzewny (2020)

The wood sales dynamics featured an overall increase from 2014 among coniferous trees to approx. 31 million m^3 and deciduous trees at a stable 6 million m^3 for all tree types and product groups. According to the notification of the forest inspectorate of 14 January 2020, in 2019 Poland recorded a drop to 28 million m^3 of wood from coniferous trees (including [million m^3]: 11.9 - S2A; 6.9 - W0; 5.9 – WK; 3.3 - S2B) and a further stable state for deciduous tree wood (approx. 6 million m^3). The volume of semi-products used for producing furniture in Poland for 2018 comes down to the following values:

— fibreboards from wood or wood-based materials: 5,430,648.65 [thousand m^2] (increase by +1.3% in 2018 when compared to 2017 and a decrease by -0.1% in 2019 when compared to 2018)
— veneers: 16,173.62 [thousand m^2] (-5%: 2017 and -11.3%: 2019)
— plywood, veneer panels and similar 8,306.42 [dam^3] (+2.3%: 2017 and +2.8%: 2019)
— chipboards and similar wooden boards 4,287.06 [dam^3] (+2.7%: 2017 and +5.9%: 2019)
— total lumber: 2,472.08 [dam^3] (+6.5%: 2017 and -1.5%: 2019).

Conclusions

Managing the industry's sustainable development requires managing the country's sustainable economy, so that the activities taken up by the entrepreneur are compatible with the country's development strategy.

According to the macroeconomic trends developed by the Polish government, the furniture market's activities should take into consideration the impact of urbanisation on the product consumers' life style. These factors include the following: increased number of single people, late parenthood, most middle-class society, facilitated access to education, constant connectivity (Internet), high costs of small apartments' upkeep, focus on infrastructure and services, reduced physical activity resulting from lack of time for relaxation, environmental pollution being the cause of health deterioration.

Furniture designs should therefore be multi-functional and ergonomic. In addition, the increasing participation of the ageing society in the market shared with the millennials generation generates the need to design furniture meeting specific and often peculiar customer requirements. On one hand, it results from the health and financial circumstances, as well as the "mass" personalisation or I-designers on the other. This means furniture without compromise, delivered quickly from the early adopters' zone. (PARP, 2020)

The analysis of the Polish furniture industry's needs and expectations, according to the Polish government's report, comes down to export. The economic dimension of this form of expansion to foreign markets is very favorable for the economy. The source for the Polish exporters' success, among others, is their flexibility, technology and resources, trust, price competitiveness and geo-economic situation. Nevertheless, the cause for the entrepreneur's success can mean the sale of the production capacity instead of the product for the entire industry. The lack of a sales network and brand generally leads to a brand-less industry. Taking into consideration that approx. 80% of all furniture manufacturers in Poland are small companies (hiring up to 49 employees), the lack of financial resources for investing into, for example, a marketing department promoting the brand, deepens the problem of brand recognition. (PARP, 2020)

The environment, specifically forest resources constitute the basis for the furniture industry's functioning. Sustainable forest management around the world, including Poland, comes down to establishing institutions that will manage the possessed resources in a conscious and organised manner. It is necessary to introduce instruments that would allow for certification that the given product is derived from controlled forest areas – FSC or, for example, PEFC. A certificate confirming that the product is made from material not acquired, among others, at the cost of limiting biological diversity. Sustainable management also features supporting the governments of the global south in actions taken to protect forests. The detailed initiatives are presented in fig. 4.

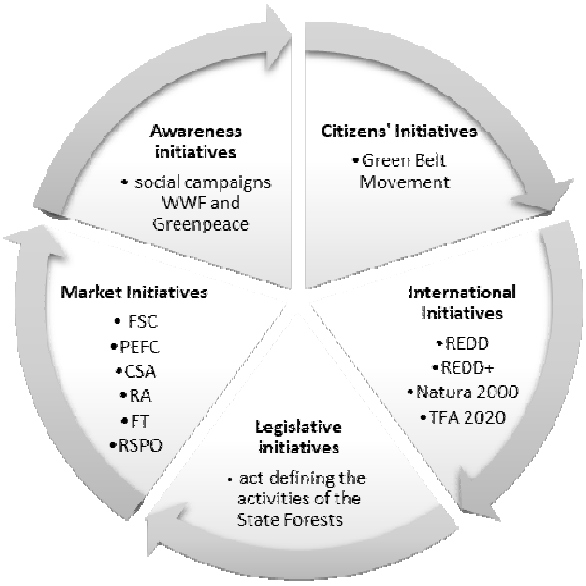

Fig. 4: Initiatives for the protection of forest resources.
Source: State Forests, 2015, p. 48

From the State Forests' point of view, sustainable forestry should be take into account absolute economic superiority. A forest performs different roles: waterproofing, soil-protecting or protection reservations. The economic function constitutes 48.8% of all forest functions. Nevertheless, society is the most import factor for the effective sustainable forest management. Conscious consumption

leading to the elimination of the excess of poor quality, uncertified wood products, will reduce deforestation, thereby favorably affecting the ecosystem and climate. (State Forests, 2015)

The analysis of the data deriving from own and nationwide research allows for the conclusion that the industry's sustainable development management requires the following key aspects:

1. Education:
   1.1. Social dimension – high demand for employees (design, production, knowledge about the material);
   1.2. Economic dimension – balance of supply and demand (conscious consumption);
   1.3. Environmental dimension – climate and ecosystem (forest functions);
2. Product's brand:
   2.1. Social dimension – creating national value (identifying the product/company with the country of origin);
   2.2. Economic dimension – share in the global economy and/or global delivery chain;
   2.3. Environmental dimension – quality certified products (produced in harmony with the natural environment).

Sustainable management means taking into consideration the social, environmental and economic needs. According to the author, the balance in exploiting natural resources in the furniture industry constitutes a starting point for the efficient and sustainable management of the industry's development. However, the balance will be possible to achieve thanks to adequate and comprehensive education, but also production designated with brand associated with quality and a production site that is in harmony with nature.

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Comparative Analysis of Economic Performance in Agricultural Products Obtained in The Conventional System and In Ecological Agriculture

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Abstract

The purpose of the paper is to analyze the economic performance of the agricultural products obtained in conventional system and in organic farming with emphasis on the direct payment schemes, on the incentives that affect the decision of the farmers to adopt the transition from one production system to another, as well as the analysis comparative of the economic performances of agricultural products in accordance with the practices of ecological and conventional management. This study was based on research on the economic calculation and more precisely on the calculation and management of costs at system level, in general, and at agricultural product level in particular, to estimate the effects of the target subsidy reform act of Romania, in particular of payments on income inequality. The research was conducted for the year of production 2020 and offers an overview of the income structure at the level of agricultural product as well as the degree of influence of the direct payment schemes in obtaining the income, the crops of soy, rice, hemp, and sugar beet. The results of the study revealed that there is a considerable differentiation not only in terms of the economic performance of organic agriculture (average production, production costs, revenues) compared to the conventional system, but also the existence of a financial incentive of 218 euros/ha, granted through National Rural Development Program 2014-2020 - sMeasure 11.2 Support for the maintenance of organic farming practices, which differentiates the two production systems.

Keywords: Conventional System, Ecological Agriculture, Subsidies, Incomes.

Introduction

The objectives of the organic production policy are an integral part of the CAP objectives, by guaranteeing that farmers receive a fair profit in exchange for complying with the rules on organic production. (Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 on organic production and labeling of organic products and repealing Council Regulation (EC) No 834/2007).

Starting with the year 2021 the new regulations on organic production are meant to ensure fair competition for farmers and maintain consumer confidence.

Why do farmers need support? Because agriculture is a risky and often expensive activity. If the weather conditions are unpredictable, the crops can be destroyed, and the production and income of the farm can be significantly affected. The negative impact generated affects both farmers and consumers. To compensate for lower prices, farmers cannot rely on the idea that they can sell more products. In addition, fluctuations in demand and supply intensify price volatility on the agricultural market. Price volatility eliminates the safety of farmers with respect to the expected income and reduces the productivity and efficiency with effect on the supply of food for consumers. (A. Volkov, T. Balezentis, M. Morkunas, D. Streimikiene, 2019)

With what indicators can we easily and accurately measure the economic performance level of an agricultural crop? Usually, we have to compare the economic level of a crop from one production system to another production system, in order to assess the impact of a support program. The economic performance of agricultural products will be measured by the profitability rates of the products that could add value in the economy of a farm. But the problem is that we are not sure that for the moment we can indicate exact measures for the indicators. (F. Sgroi, M. Candela, A. M. Di Trapani, M. Foderà, R. Squatrito, Ri. Testa and S. Tudisca, 2015)

The study contributes to the knowledge of the two farming systems, in general, and to the knowledge of the economy of organic farming compared to the economy of conventional agriculture, in particular. There is very little information available on yields, costs, and incomes, given the attention paid to organic farming in recent years.

Material and method

In order to carry out the analysis, technological quotations were developed for soybean, hemp, rice and sugar beet crops, in different calculation variants, specific to the conventional system of production and organic farming, as well as a system of technical-economic indicators that surprise in detail. all elements related to: value of production, intermediate consumption (total expenses), cost of production, taxable income, net income as well as income rates.

Production value (A) is determined on the basis of the average production per ha and the estimated prices on the internal market for the main production (A1 = Val. P.p.) and the value of the secondary production.

Subsidies (B) constitutes the value of the direct support of the state in the harvest year for agricultural producers in the vegetable sector, funds oriented to support competitive agricultural products;

The gross product (C) results from summing the value of the production with the subsidies granted on the product or on the surface unit.

Intermediate consumption (D) sums up the value of the inputs and services consumed in the agricultural production process and includes: seed, fertilizers and amendments, pesticides, mechanical works, irrigation, supplies, general expenses, interest on loans, insurance, depreciation and other expenses for plant production.

Intermediate consumption for the main production (D_1) does not include expenses incurred in obtaining secondary production. Intermediate consumption comprises two groups of expenses:

- variable expenses
- fixed expenses

Gross income (E) is obtained by reducing the intermediate consumption for the main production from the value of the main production.

Net income results from the deduction of taxable income with the value of the related taxes and the addition of allocations and subsidies granted by the state according to the legislation in force.

Rate of gross income (G) is calculated as a percentage by reporting the taxable income on consumption for the main production.

Net income rate + subsidies (H) is calculated as a percentage by reporting net income + consumption subsidies for the main production.

Cost of production represents the expense ratio for the main product and the main production of the respective crop.

Predictable domestic market price is the price of recovery at which the production obtained in the harvest year for which the calculations are made will be sold. (*ICEADR calculation methodology*)

The estimated revenues to be realized in the year of production 2020 were analyzed in two variants: the version with subsidies and the version without subsidies. In variant *income without subsidies* the hypothesis is verified if an agricultural producer could remain competitive in the context in which they would no longer benefit from subsidies. Analysis variant *income with subsidies* aims to highlight the contribution of each payment to the income.

On the basis of research results, to establish production yields for the two types of agriculture, were used statistical data of the National Statistics Institute (INS) and Order 619/2015 on "approving the eligibility criteria for approval payment schemes that apply in agriculture in the period 2015-2020 ". For the calculation of the "income with subsidies" variant, the amounts established and announced by the Agency for Payments and Interventions in Agriculture (APIA) for the production year 2019 were used.

Other research methods used in the paper:

- *Documentation*, which aims at theoretical documentation through the analysis of the specialized literature, in this sense being studied national and international articles;
- *The method of interdisciplinary research*, based on knowledge from other fields, such as those of phytotechnics, culture technologies, statistics, economics, legislation in force;
- *Comparative analysis* used in comparing technical-economic indicators specific to ecological and conventional products.

Results and Discussion

In addition to basic subsidies for agricultural producers, organic producers receive more subsidies than conventional enterprises, in particular support for organic farming. The subsidies granted to organic farmers are intended to offset the greater positive externalities induced by organic farming compared to conventional agriculture and to pay for the internalization of negative externalities (D. Crowder, J . Reganold, 2015).

Soybean

Table 1: Payment schemes for soybean cultivation

Current number	**Direct payment schemes**	**Conventional soybean** (euro/ha)	**Organic soybean** (euro/ha)
1	Single Area Payment Scheme (SAPS)	102,5697	102,5697
2	Redistributive payment	5	5
3	Payment for climate-friendly agricultural practices	58,2361	58,2361
4	Support scheme coupled	206	206
5	Transitional National Aid 1 (ANT 1)	14,7033	14,7033
6	SubMeasure 11.2 - Support for maintaining organic farming practices	x	218
Total subsidies		**386,5091**	**604,5091**

Source: Agricultural Payments and Intervention Agency, 2019

The cultivation of organic cultivated soy is different from the cultivated soy in the conventional system, by the following indicators: subsidies (table no. 1), by the production yield that is less than 40% (1990 kg / ha compared to 3300 kg / ha) , but also through the results the incomes obtained (table no. 2).

Coupled support is a direct payment that is granted to farmers for some crops considered important for Romania, for economic, social and environmental reasons.

Table 2: Comparative analysis of economic performance of soybean culture - ecological system vs conventional system

Nr. crt	INDICATORS	U.M	VALUES				
			Conventional Soybean 3,300 t/ha		Ecological Soybean 1,990 t/ha		Diff. eco/conv (col. 6-col. 4)
			lei	euro	lei	euro	euro
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1	**A. PRODUCTION VALUE**	u.m	4840	1038	3745	803	-235
2	A_1. Of which the main production	u.m	4600	986	3745	803	-183
3	**B (+) TOTAL SUBSIDIES**	u.m	1803	387	2819	605	+218
4	**C (=) GROSS PRODUCT**	u.m	6643	1424	6564	1408	-16
5	**D (-) TOTAL COSTS**	u.m	6487	1391	6821	1463	+72
6	D_1. Of which for the main production	u.m	6247	1339	6821	1463	+124
7	**I. VARIABILE COSTS**	u.m	5688	1220	5696	1221	+1.0
8	**II. FIXED COSTS**	u.m	799	171	1126	241	+70
9	**E. (=) GROSS INCOME**	u.m	-1647	-353	-3076	-660	-307
10	(-) Taxes	u.m	-165	-35	-308	-66	-31
11	**F. (=) NET INCOME**	u.m	-1482	-318	-2769	-594	-276
12	F.1 (=) Net income + total subsidies	u.m	321	69	51	11	-58
13	F.2 (=) Net income + coupled support	u.m	-521	-112	-1808	-388	-276
14	F.3 (=) Net income + subMeasure 11.2	u.m	x	x	-1752	-376	x
15	F.4 (=) Net income + direct payments	u.m	-640	-137	-1927	-413	-276
16	**G. Rate of gross income**	%	-26.4		-45.1		-18.7 p.p
17	**H. Rate of net income**	%	-23.7		-40.6		-16.9 p.p
18	H.1 Rate of net income + total subsidies	%	5.1		0.7		-4.4 p.p
19	H.2 Rate of net income + coupled support	%	-8.3		-26.5		-18.2 p.p
20	H.3 Rate of net income + subMeasure 11.2	%	X		-25.7		-25,7 p.p
21	H.4 Rate of net income + direct payments	%	-10.2		-28.2		-18 p.p
22	**Cost of production**	u.m /to	1893	406	3428	735	+329
23	**Predictable price of internal market**	u.m /to	1394	299	1882	404	+105

Source: Own calculations, ADER (Agriculture and Rural Development) 23.1.1 Project

Incomes without subsidies: the analysis of the gross income obtained from the cultivation of soybeans grown in the ecological system (-660 euros / ha), reveals differences with 87% smaller compared to the soybeans grown in the conventional system (-353 euros / ha, (table no. 2, row 9) . For the two levels of production, 3.3 t / ha and 1,990 t / ha, there is a negative rate of gross income, between 26.4% and 45.1% (table no. 2, column 7, row 16), the difference between the income rates for the two levels of production (ecological / conventional) being 18.7 percentage points (table no. 2, row 16). The correct explanation and appreciation of the action of the physical volume of the soybean production on the gross income can be considered as economically negative, given that the efficiency correlation between the expenditure index as effort and the index of physical production as effect, the income ratio has not been respected. / expenses being 1: 0.55 (table no. 2, column 7, lines 1 and 5).

Incomes with subsidies - in soybean cultivation the income losses are covered by granting subsidies. In absolute values, the income obtained from soybeans grown in the organic system is 58 euros / ha less than the income obtained from soybeans grown in the conventional system (11 euros / ha compared to 69 euros / ha) (table no. 2, row 12).

The influence of the subsidies on the incomes is appreciated, both in absolute values and in relative values, (table no. 2, lines 9 - 23), depending on the contribution of the direct payment schemes to the

realization of the incomes, and the analysis reveals the degree of influence expressed by ***rates of return of culture*** of soy, thus:

- *Net income rate + total subsidies:* the rates of return are positive and are between 5.1% (conventional system) and 0.7% (ecological system), the eco / conventional difference being 4.4 percentage points (table no. 2, row 18). The share of total subsidies (386,509 euro / ha conv and 604,509 eur / ha eco) in the gross product (between 1424 euro / ha and 1408 euro / ha) is between 27.1% for the production of 3.3 t / ha and of 42.9% for the production of 1,990 t / ha (table no. 2, rows 3 and 4);
- *Net income rate + coupled support:* the coupled support contributes to the income, but for the production year 2020 does not have a positive influence on the income. It is estimated a negative rate of return, between 8.3% and 26.5%, the difference between the two production systems, ecological / conventional, being 18.2 percentage points (table no. 2, col. 7, row 19). The weight of the support (960.7428 lei / 206 euros / ha) in the gross product being of 14.5% for both levels of production (table no. 2, rows 3 and 4).
- *Net income rate + sM 11.2:* the amount of 218 euro / ha is granted to certified organic farmers to cover the income losses caused by the lower production yields. In this case, the estimates show a negative rate of return, of 25.7% (table no. 2, row 20). The share of the amount granted by sM 11.2 in the gross product is 15.5%;
- *Net income rate + direct payments:* a negative rate of return between 10.2% and 28.2% is estimated, the difference between the two production systems (ecological / conventional) being 18 percentage points (table no. 2, row 21). The share of direct payments (841,8583 lei / ha / 180,5091 euros / ha) in the gross product being 12.7% for both levels of production;

Conclusion

If the subsidies are not taken into account, the soybean crop registers income losses for both levels of production. From this point of view, soy culture is not economically profitable. If the total subsidies (coupled support, direct payments, etc.) are taken into account, soybean cultivation becomes profitable, the difference between ecological / conventional being 4.4% (58 euros / ha).

Hemp

Ecologically grown hemp culture differs from conventional cultivated hemp by the following indicators: subsidies (table no. 3), through the production yield which is lower by 37.4% (3.460 t / ha eco compared to 5.530 t / ha, conv, but also by income (Table no. 4).

Table 3: Payment schemes for hemp culture

Current number	Direct payment schemes	Conventional hemp (euro/ha)	Ecological hemp (euro/ha)
1	Single Area Payment Scheme (SAPS)	102,5697	102,5697
2	Redistributive payment	5	5
3	Payment for climate-friendly agricultural practices	58,2361	58,2361
4	Support scheme coupled	87,51	87,51
5	Transitional National Aid 1 (ANT 1)	14,7033	14,7033
6	Transitional National Aid 3 (ANT 3)	7,6474	7,6474
7	SubMeasure 11.2 - Support for maintaining organic farming practices	x	218
	Total subsidies	**275,6665**	**493,6665**

Source: Agricultural Payments and Intervention Agency, 2019

The coupled support for hemp cultivation for oil and fiber is granted to active farmers prove that they have achieved a minimum production of 600 kg seeds / ha or 10,000 kg dry stems / ha (art. 47 of Order 619/2015) (6).

Table 4: Comparative analysis of economic performance of hemp culture - ecological system vs conventional system

Nr. crt	INDICATORS	U.M	VALUES				
			Hemp CONV 5,530 t/ha		Hemp ECO 3,460 t/ha		Diff. eco/conv (col. 6-col. 4)
			lei	euro	lei	euro	euro
0	1	2	3	4	7	6	7
1	**A. PRODUCTION VALUE**	u.m	10286	2205	8688	1863	-342
2	A_1. Of which the main production	u.m	10286	2205	8688	1863	-342
3	**B (+) TOTAL SUBSIDIES**	u.m	1286	276	2401	515	+239
4	**C (=) GROSS PRODUCT**	u.m	11571	2481	11090	2378	-103
5	**D (-) TOTAL COSTS**	u.m	9623	2063	10651	2284	+221
6	D_1. Of which for the main production	u.m	9623	2063	10651	2284	+221
7	**I. VARIABILE COSTS**	u.m	8678	1861	6766	1451	-410
8	**II. FIXED COSTS**	u.m	946	203	3885	833	+630
9	**E. (=) GROSS INCOME**	u.m	662	142	-1963	-421	-563
10	(-) Taxes	u.m	66	14	-196	-42	-56
11	**F. (=) NET INCOME**	u.m	596	128	-1767	-379	-507
12	F.1 (=) Net income + total subsidies	u.m	1882	404	635	136	-268
13	F.2 (=) Net income + subMeasure 11.2	u.m	x	x	-750	-161	-161
14	F.3 (=) Net income + coupled support	u.m	1004	215	-1359	-291	-506
15	F.4 (=) Net income + direct payments	u.m	1438	308	-925	-198	-506
16	F.5 (=) Net income + ANT 3	u.m	632	135	-1632	-350	-485
17	**G. Rate of gross income**	%	6.9		-18.4		-25.3 p.p
18	**H. Rate of net income**	%	6.2		-16.6		-22.8 p.p
19	H.1 Rate of net income + total subsidies	%	19.6		6.0		-13.6 p.p
20	H.2 Rate of net income + subMeasure 11.2	%	x		-11.1		-11,1 p.p
21	H.3 Rate of net income + coupled support	%	10.4		-12.8		-23.2 p.p
22	H.4 Rate of net income + direct payments	%	14.9		-8.7		-23.6 p.p
23	H.5 Rate of net income + ANT 3	%	6.6		-15.3		-21.9 p.p
24	**Cost of production**	u.m /to	1740	373	3078	660	+287
25	**Predictable price of internal market**	u.m /to	1860	399	2511	443	+44

Source: Own calculations, ADER (Agriculture and Rural Development) 23.1.1 Project

Incomes without subsidies: analysis of the gross income obtained from the cultivation of hemp grown in ecological system (-421 euros / ha), reveals differences 4 times smaller compared to hemp grown in conventional system (142 euros / ha), (table no. 4, row 9). For the two levels of production, of 5,530 t / ha and of 3,460 t / ha, a gross income rate is registered, between 6.9% and -18.4% (table no. 4, column 7, row 17). The difference between the income rates (ecological / conventional) is 25.3 percentage points (table no. 4, row 17). The correct explanation and appreciation of the action of the physical volume of the production of hemp grown in the ecological system on the gross income can be considered as negative from an economic point of view, since the efficiency correlation between the expenditure index as effort and the index of physical production as effect, the income / expenditure ratio being 1: 0.82 (table no.4, col. 7, rows 1 and 5).

Incomes with subsidies - in the cultivation of hemp grown in the ecological system the income losses are covered by granting subsidies. In absolute values, the income obtained from soybeans grown in the organic system is 66% lower than the income obtained from soybeans grown in the conventional system (136 euros / ha compared to 404 euros / ha) (table no. 4, row 12).

The influence of the subsidies on the incomes is appreciated, both in absolute values and in relative values, (table no. 4, lines 9-25) according to the contribution of the direct payment schemes to the realization of the incomes, and the analysis reveals the degree of influence expressed by the ***rates of profitability of hemp*** culture, as follows:

- *Net income rate + total subsidies:* the rates of return are positive and are between 19.6% (conventional system) and 6% (ecological system), the ecological / conventional difference being 13.6 percentage points (table no. 4, row 19). The share of total subsidies (275.7 euro / ha conv and 514.9 eur / ha eco) in the gross product (in the amount of 2481 euro / conventional ha and 2378 euro / ha organic) is between 11.1% for the production of 5,530 t / ha and 21.7% for the production of 3,460 t / ha (table no. 4, rows 3 and 4);
- *Net income rate + sM 11.2:* the amount of 218 euro / ha is granted to certified organic farmers to cover the income losses caused by the lower production yields. In this case, the estimates show a negative rate of return of 11.7% (loss of 161 euros / ha) (table no. 4, row 20). The share of the amount granted by sM 11.2 in the gross product is 42.8%;
- *Net income rate + coupled support:* coupled support does not have a positive influence on revenue. It is estimated a rate of return between 10.4% and -12.8%, the difference between the two production systems, ecological / conventional, being 23.2 percentage points (table no. 4, col. 7, row 21). The weight of the support (408.1 lei / 87.5100 euros / ha) in the gross product being of 14.5% for both levels of production (table no. 4, rows 3 and 4).
- *Net income rate + direct payments:* a negative rate of return between 10.2% and 28.2% is estimated, the difference between the two production systems (ecological / conventional) being 18 percentage points (table no. 4, row 21). The share of direct payments (841,8583 lei / ha / 180,5091 euros / ha) in the gross product being 16.4% for the production of 5,530 t / ha and 17.2% for the production level of 3,460 t / ha;
- *Net income rate + ANT 3:* the transitional national aid for 2020 for hemp cultivation amounts to 7.6474 euros / ha. The degree of influence of this support scheme on income, expressed through the rates of return varies between 6.6% and -15.3%. In this case, the estimates show differences of 21.9% percentage points between the two production systems (loss of 485 euros / ha) (table no. 4, col. 7, rows 16 and 23). The share of ANT 3 in the gross product varies between 0.3% conventional system and 1.2% ecological ecological system;

Conclusion

The cultivation of hemp in the conventional system brings valuable benefits to the agricultural producer compared to the one cultivated in the ecological system. The losses of income from organic hemp, due to the differences in yield and the costs regarding certification are covered by the amount granted by sM 11.2. From this point of view, the hemp hemp culture is economically profitable, the ecological / conventional difference (of 268 euros / ha) being 13.6 percentage points.

Rice

The ecological rice culture differs from the rice grown in the conventional system, by the level of subsidies (table no. 5), by the level of production that is lower by 24.6% (3.415 t / ha eco compared to 4.530 t / ha, conv) and through the income obtained.

Table 5: Payment schemes for rice cultivation

Current number	Direct payment schemes	Conventional rice (euro/ha)	Ecological rice (euro/ha)
1	Single Area Payment Scheme (SAPS)	102,5697	102,5697
2	Redistributive payment	5	5
3	Payment for climate-friendly agricultural practices	58,2361	58,2361
4	Support scheme coupled	659,99	659,99
5	Transitional National Aid 1 (ANT 1)	14,7033	14,7033
6	SubMeasure 11.2 - Support for maintaining organic farming practices	x	218
Total subsidies		**840,4991**	**1,058.4991**

Source: Agricultural Payments and Intervention Agency, 2019

The support coupled with rice is granted to rice growers, active farmers, who prove, based on a tax bill, the marketing of a minimum production of 4,500 kg / ha rice (art. 47 of Order 619/2015) (6)

Table 6: Comparative analysis of economic performance of of rice culture - ecological system vs conventional system

Nr. crt	INDICATORS	U.M	VALUES				
			Conventional Rice 4,530 t/ha		Ecological Rice 3,415 t/ha		Diff eco/conv (6-4)
			lei	euro	lei	euro	euro
0	1	2	3	4	7	6	7
1	**A. PRODUCTION VALUE**	u.m	7077	1517	6796	1457	-60
2	A_1. Of which the main production	u.m	6677	1432	6796	1457	+25
3	**B (+) TOTAL SUBSIDIES**	u.m	3920	840	4937	1058	+218
4	**C (=) GROSS PRODUCT**	u.m	10597	2272	11732	2516	+244
5	**D (-) TOTAL COSTS**	u.m	10456	2242	11851	2541	+299
6	D_1. Of which for the main production	u.m	10056	2156	11851	2541	+385
7	**I. VARIABILE COSTS**	u.m	9605	2060	9956	2135	+75
8	**II. FIXED COSTS**	u.m	851	182	1895	406	+224
9	**E. (=) GROSS INCOME**	u.m	-3379	-724	-5055	-1084	-360
10	(-) Taxes	u.m	-338	-72	-506	-108	-36
11	**F. (=) NET INCOME**	u.m	-3041	-652	-4550	-976	-324
12	F.1 (=) Net income + total subsidies	u.m	879	188	387	83	-105
13	F.2 (=) Net income + coupled support	u.m	37	8	-1472	-316	-324
14	F.3 (=) Net income + subMeasure 11.2	u.m	x	x	-3533	-758	x
15	F.4 (=) Net income + direct payments	u.m	-2199	-471	-3708	-795	-324
16	**G. Rate of gross income**	%	-33.6		-42.7		-9.1 p.p
17	**H. Rate of net income**	%	-30.2		-38.4		-8.2 p.p
18	H.1 Rate of net income + total subsidies	%	8.7		3.3		-5.4 p.p
19	H.2 Rate of net income + coupled support	%	0.4		-12.4		-12.8 p.p
20	H.3 Rate of net income + subMeasure 11.2	%	x		-35.5		x
21	H.4 Rate of net income + direct payments	%	-21.9		-31.3		-9.4 p.p
22	**Cost of production**	u.m /to	2220	476	268	744	+268
23	**Predictable price of internal market**	u.m /to	1474	316	111	427	+111

Source: Own calculations, ADER (Agriculture and Rural Development) 23.1.1 Project

***Incomes without subsidies*:** analysis of the gross income obtained from rice cultivation in an ecological system (-1084 euros / ha), reveals differences by 49.7% smaller than the rice grown in conventional system (-724 euros / ha, (table no. 6, row 9 For the two levels of production, 4,530 t / ha and 3,415 t / ha, there is a negative rate of gross income, between 33.6% and 42.7% (table no. 6, column 7, row 16), the difference between the income rates for the two levels of production (ecological / conventional) being of 9.1 percentage points (table no. 6, row 16). the gross income can be considered as economically negative as long as the efficiency correlation between the expenditure index as effort and the index of physical production as effect has not been respected, the income / expense ratio being 1: 0.67 for conventional rice and of 1: 0.57 for organic rice (t abel no. 6, rows 1 and 5).

Incomes with subsidies - in rice culture, the income losses are covered by granting subsidies. In absolute terms, the income obtained from rice grown in the organic system is 105 euros / ha less than the income obtained from the rice grown in the conventional system (83 euros / ha compared to 188 euros / ha) (table no. 6, row 12).

The influence of the subsidies on the incomes is appreciated, both in absolute values and in relative values, (table no. 6, lines 9 - 23) according to the contribution of the direct payment schemes to the realization of the incomes, and the analysis reveals the degree of influence expressed by the ***rates of profitability of rice culture***, as follows:

- *Net income rate + total subsidies:* the rates of return are positive and are between 8.7% (conventional system) and 3.3% (ecological system), the ecological / conventional difference being 5.4 percentage points (table no. 6, row 18). The share of total subsidies (840.5 euros / ha - conventional and 1058.5 euros / ha organic) in the gross product (which ranges from 2272 euros / ha to 2516 euros / ha) is between 37% for the production of 4,530 t / ha and 42.1% for the production of 3,415 t / ha (table no. 6, rows 3 and 4);
- *Net income rate + coupled support:* the coupled support contributes to covering the income losses. It is estimated a rate of return of 0.4% and -12.4 %%, the difference between the two production systems, ecological / conventional, being 12.8 percentage points (table no. 6, column 7, row 19). The coupled support (3078.1 lei / 840.5 euro / ha) in the gross product occupies weights of 29% for conventional rice and 26.2% for organic rice (table no. 6, rows 3 and 4);
- *Net income rate + sM 11.2:* The amount of 218 euros / ha is granted to certified organic producers to cover the income losses caused by the lower production yields. In this case, the estimates show a negative rate of return of 35.5% (table no. 6, row 20). The share of the amount granted by sM 11.2 in the crude product to the ecological rice is 8.7%;
- *Net income rate + direct payments:* a negative rate of return between 21.9% and 31.3% is estimated, the difference between the two production systems (ecological / conventional) being 9.4 percentage points, (table no. 6, row 21). The direct payments (841,8583 lei / ha / 180,5091 euros / ha) in the gross product occupy 7.9% weights on conventional rice and 7.2% on organic rice.

Conclusion

it is appreciated that for both production systems, the profitability of the rice crop is ensured by granting subsidies. The difference between the two ecological / conventional systems is given by both the technical characteristics of production (yield with 1,115 t / ha less than conventional rice) and the economic ones (the cost of production by 56.3%). The advantage of organic rice is given by the recovery price which is 35% higher than the conventional rice. (table no. 6, row 22 and 23).

Sugar beet

The cultivation of organically grown sugar beet differs from the sugar beet cultivated in the conventional system, through subsidies (table no. 7), the level of production that is 63% lower (57,100 t / ha eco compared to 21,100 t / ha, conv) and also through the income obtained.

Table 7: Payment schemes for sugar beet culture

Current number	Direct payment schemes	Conventional sugar beet (euro/ha)	Ecological sugar beet (euro/ha)
1	Single Area Payment Scheme (SAPS)	102,5697	102,5697
2	Redistributive payment	5	5
3	Payment for climate-friendly agricultural practices	58,2361	58,2361
4	Support scheme coupled	824,99	824,99
5	Transitional National Aid 1 (ANT 1)	14,7033	14,7033
6	Transitional National Aid 6 (ANT 6)	77,8186	77,8186
7	SubMeasure 11.2 - Support for maintaining organic farming practices	x	218
	Total subsidies	**1,083.3177**	**1,301.3177**

Source: Agricultural Payments and Intervention Agency, 2019

The coupled support for sugar beet cultivation is granted to rice growers, active farmers, who prove that they are selling a minimum production of 26,400 kg / ha (art. 50 of Order 619/2015).

Table 8: Comparative analysis of economic performance of sugar beet culture - ecological system vs conventional system

	INDICATORS	U.M	VALUES				
			Conventional Sugar beet 57,100 t/ha		**Ecological Sugar beet** 21,100 t/ha		Diff. eco/conv (6-4)
			lei	euro	lei	euro	euro
0	1	2	3	4	7	6	7
1	**A. PRODUCTION VALUE**	u.m	8548	1833	4264	914	-919
2	A_1. Of which the main production	u.m	**8548**	**1833**	**4264**	**914**	**-919**
3	**B (+) TOTAL SUBSIDIES**	u.m	5052	1083	6131	1314	+231
4	**C (=) GROSS PRODUCT**	u.m	**13600**	**2916**	**10395**	**2229**	**-687**
5	**D (-) TOTAL COSTS**	u.m	10354	2220	9210	1975	-245
6	D_1. Of which for the main production	u.m	10354	2220	9210	1975	-245
7	**I. VARIABILE COSTS**	u.m	**9126**	**1957**	**7815**	**1676**	**-281**
8	**II. FIXED COSTS**	u.m	**1228**	**263**	**1395**	**299**	**+36**
9	**E. (=) GROSS INCOME**	u.m	**-1807**	**-387**	**-4946**	**-1060**	**-673**
10	(-) Taxes	u.m	-181	-39	-495	-106	-67
11	**F. (=) NET INCOME**	u.m	**-1626**	**-349**	**-4451**	**-954**	**-605**
12	F.1 (=) Net income + total subsidies	u.m	3426	735	1679	360	-375
13	F.2 (=) Net income + coupled support	u.m	2222	476	-604	-129	-605
14	F.3 (=) Net income + subMeasure 11.2	u.m	x	x	-3435	-736	x
15	F.4 (=) Net income + direct payments	u.m	-784	-168	-3609	-774	-606
16	F.5(=) Net income + ANT 6	u.m	-1263	-271	-4027	-863	-592
17	**G. Rate of gross income**	**%**	**-17.4**		**-53.7**		-36.3 p.p
18	**H. Rate of net income**	**%**	**-15.7**		**-48.3**		-32.6 p.p
19	H.1 Rate of net income + total subsidies	%	33.1		17.6		-15.5 p.p
20	H.2 Rate of net income + coupled support	%	21.5		-6.6		-28.1 p.p
21	H.3 Rate of net income + subMeasure 11.2	%	x		-37.3		x
22	H.4 Rate of net income + direct payments	%	-7.6		-39.2		-31.6 p.p
23	H.5 Rate of net income + ANT 6	%	-12.2		-44.4		-32.2 p.p
24	**Cost of production**	u.m /to	181	39	436	94	+55
24	**Predictable price of internal market**	u.m /to	150	32	202	43	+11

Source: Own calculations, ADER (Agriculture and Rural Development) 23.1.1 Project

Incomes without subsidies: analysis of the gross income obtained from the cultivation of sugar beet grown in ecological system (-1060 euros / ha), reveals differences 1.7 times smaller compared to sugar beet grown in conventional system (-387 euros / ha), (table no. 8, row 9). For the two levels of production, 57,100 t / ha and 21,100 t / ha, a negative gross income rate is recorded, between 17.4% and 53.7% (table no. 8, col. 7, row 17). The difference in income between the two ecological / conventional systems is 36.3 percentage points (table no. 8, row 17). The correct explanation and appreciation of the action of the physical volume of sugar beet production on the gross income can be regarded as negative from an economic point of view, as long as the efficiency correlation between the expenditure index as effort and the index of physical production as effect was not respected, the income / expenditure ratio being 1: 0.82 for conventional sugar beet and 1: 0.46 for organic sugar beet (table no. 8, column 7, lines 1 and 5).

Incomes with subsidies - at the sugar beet crop grown in the ecological system the income losses are covered by granting subsidies. In absolute terms, the income obtained from sugar beet grown in the organic system is 51% lower than the income obtained from sugar beet grown in the conventional system (360 euros / ha compared to 735 euros / ha) (table no. 8, row 12).

The influence of the subsidies on the incomes is appreciated, both in absolute values and in relative values, (table no. 8, lines 9 to 25), depending on the contribution of the direct payment schemes to the realization of the incomes, and the analysis reveals the degree of influence expressed by the interest ***rates. profitability of sugar beet culture***, as follows:

- *Net income rate + total subsidies:* the rates of return are positive and are between 33.1% (conventional system) and 17.6% (ecological system), the ecological / conventional difference being of 15.5 percentage points (table no. 8, col. 7, row 19) . The share of total subsidies (1083,318 euro / ha conv and 1301.3 eur / ha eco) in the gross product (in the amount of 2916 euro / ha conventional and 2229 euro / ha organic) is between 37.1% for the production of 57,100 t / ha and 58.7% for the production of 21,100 t / ha (table no. 8, rows 3 and 4);
- *Net income rate + coupled support:* It is estimated a rate of return between 21.5% and -6.6%, the difference between the two production systems, ecological / conventional, being 28.1 percentage points (table no. 8, column 7, row 20) . The weight of the support (3847.5884 lei / 824.99 euros / ha) in the gross product being 28.3% (conventional system) and 37.2% (ecological system) (table no. 8, rows 3 and 4);
- *Net income rate + sM 11.2:* while the sugar beet farmers are beneficiaries of sM 11.2, the estimates show a negative rate of return of 37.3% (loss of 736 euros / ha) (table no. 8, col. 6, row 15). The share of the amount granted by sM 11.2 in the gross product is 9.8%;
- *Net income rate + direct payments:* a negative rate of return between 7.6% and 39.2% is estimated, the difference between the two production systems (ecological / conventional) being 31.6 percentage points, (table no. 8, row 22). The share of direct payments (841,8583 lei / ha / 180,5091 euros / ha) in the gross product being 6.1% for the production of 57,100 t / ha and 8.1% for the production level of 21,100 t / ha;
- *Net income rate + ANT 6:* the transitional national aid for the year 2020 for sugar beet cultivation amounts to 77,819 euros / ha. The degree of influence of this income support scheme, expressed through the rates of return, varies between -12.2% and -44.4%. In this case, the estimates show differences of 32.2% percentage points between the two production systems (592 euros / ha) (table no. 8, col. 7, rows 16 and 23). The share of ANT 6 in the gross product varies between 2.7% conventional system and 3.5% ecological ecological system;

Conclusion

it is appreciated that in the case of both production systems, the profitability of the sugar beet crop is ensured by granting subsidies. The difference between the two ecological / conventional systems is given by both the technical characteristics of production (yield 36.0 t / ha less than conventional sugar beet) and economic ones (production cost higher by 141%). The advantage of organic sugar

beet culture is given by the predictable price of recovery which is 34.4% higher than the conventional sugar beet. (table no. 8, rows 22 and 23).

Conclusions

The economic performance indicators of the studied agricultural products represent a key tool in the economic analysis and a fundamental requirement for the efficient elaboration of the agricultural policies. Among these indicators, the calculation of production cost and revenue were some of the most useful indicators. In this context, we offer all interested parties access to information that can contribute to the efficiency of agricultural product markets.

These guidelines also serve as a useful reference tool for agricultural producers to compare their farm results and for analysts to understand the basics for cost and income estimates.

In addition to describing the methodology, this study also provides practical guidance for calculating revenue and expenditure budgets at the agricultural product level, and the estimated indicators may be internationally comparable.

The performance of the analyzed organic products differs significantly from those of the conventional products, being considered less economically efficient. The expenses exceed the revenues, and the products record losses, despite the fact that they receive higher subsidies. Conventional agricultural products obtain higher values of the input and output indicators. Organic products obtain lower values of the income indicators for the analyzed products, due to lower production yields but also high costs for organic control products.

If the income indicators are lower than the conventional ones, the ecological products have higher prices on the market than the conventional products.

In both systems the economic performance is obtained by the dependence on subsidies. The statement remains to be verified in the next 3 years of research in this direction, thus contributing to the improvement of the information base related to the conventional system and to organic farming.

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Management of Receivables in The Aspect of Universities and Business Units in Poland

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Abstract

Development of a rational receivables management policy in an enterprise is necessary in the face of payment gridlocks occurring on the market. Policy of granting trade credit, debt collection, concluding factoring or forfaiting agreements guarantee control over company's financial liquidity. Often, receivables management requires the management to make difficult decisions, especially financial ones, but it is necessary in order to escalate the market share of a business unit and acquire new customers. It is a process that requires knowledge, experience and thorough market analysis.
Research problem can be summarized as an attempt to approximate importance of receivables management in organizations in Poland. A university was chosen as a research entity in order to demonstrate a specificity of this type of organization in the field of receivables management compared to enterprises. The methodology used explains, through references to literature and legal acts in force in Poland, the receivable management policy and the recovery process in organizations. The article also presents the aspect of the functioning of universities in Poland and the responsibility for violating public finance discipline in the light of applicable law. The general scope of receivables management is presented on the example of a selected university. Conducted research indicates significant differences that occur in the scope of managing receivables at universities and private sector entities resulting from the specificity of the operation of the university as a public sector unit.

Keywords: Management, Receivables, University, Business Unit.

Introduction

Higher education has a very rich history. Education institutions are one of the oldest and at the same time most complex man-made organizations whose goal is to achieve often contradictory goals in research, education and social impact. They are currently organizations full of tension (Geppert and Hollinshead 2017), "suspended" between tradition and modernity (Leja 2013; Kwiek, 2015; Antonowicz 2015; Sułkowski 2016), facing many challenges. These challenges include reduction of public funds for financing, changing requirements of recipients (students, business, government and others), intensive development of new technologies that fundamentally change methods of education, conducting research and shaping relations with environment, focusing on effectiveness and efficiency of activity ("value for money"), pressure on excellence in education and research; putting emphasis on strengthening so-called social impact (Maciąg 2018). Above-mentioned factors rapidly change internal and external context of university management. Given a need to maintain financial stability of the university, readiness for changes is becoming one of the most important tasks faced by managers of these units. As a result, there is a significant increase in demand for financial and non-financial information about university management processes.

Effective and efficient management of organization's receivables is one of important instruments for influencing maintenance of an appropriate level of financial liquidity. Phenomenon of delaying or avoiding settling liabilities is becoming a common practice in current economic environment, as a result

of which it is necessary for enterprises to monitor their receivables on an ongoing basis, as well as to create a policy for managing and recovering them.

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Receivables Management Policy

Receivable, as a result of business activity, is an obligation for provision by a debtor towards a creditor, which should be met within a specified period and in a due amount. It is usually identified with the entity's entitlement to receive a cash benefit from another entity. A receivable is a financial term, and in particular - an accounting category. In financial terms, receivables are sales with deferred payment terms (Kreczmańska-Gigol, 2013). This is a very general understanding, because it means that any form of sale in which release of product or provision of service is separated from the moment the customer executes the payment for them leads to receivable. This form may be monetary or non-monetary, for example a barter transaction where "payment" is a transfer of another item. Since this definition refers to sales, it excludes claims arising from other titles, including due to taxes (e.g. VAT refund) or undeclared work (e.g. by an employee) (Wędzki 2018).

Effective supervision over repayment of receivables is very important because freezing organization's funds in receivables may become the reason for a need to obtain external financing by taking loans on current account or even factoring, which leads to additional costs. Use of trade credit in current economic conditions is almost a necessity (more see for exemple Wysłocka 2013). Often extending the payment deadlines is associated with a need to maintain the company at a competitive level in a given industry, however, it becomes a reason for increase in the level of receivables in company's assets. Therefore, ongoing monitoring of the level of receivables in the enterprise becomes extremely important in order to reduce possibility of overdue payments (see also: Cwynar et all, 2018; Bussoli and Marino 2018; European Payment Report 2019, Intrum).

Receivables management process is a set of activities related to forecasting and assessing their level, developing credit policy applied by a given organization, coordinating collateral in relation to the amount of credit risk, as well as ongoing monitoring of payment settlement. It should be noted, however, that receivables management is not only activities aimed at controlling timeliness of cash receipts, debt collection in the event of delays, disciplining debtors, but also preventive actions, which, unfortunately, are often underestimated. Their goal should be to determine degree of risk associated with a given transaction already at the stage preceding signing of the contract, and then, depending on results achieved, differentiate commercial terms offered to clients. An important element of receivables management process should also be adaptation of hedging measures to previously estimated risk in order to minimize incurred expenses and losses.

Developing a receivables management policy requires great skills and market knowledge. Due to complexity of the problem, there are no universal methods of managing receivables, verified and recognized as effective for all business entities. There are still no economically beneficial and effective

methods of collecting debts (Brigham and Ehrhardt 2014; Paul and Boden 2011). Each enterprise should have an adopted credit policy strategy.

The receivables management strategy should therefore identify issues such as:

- conditions for deferring payment terms, with particular regard to the level of risk, periods of deferred payments, as well as methods of verifying solvency of contractors,
- criteria for assessing profitability of deferring the date of payment, indication of expected profits and costs resulting from granting a trade credit,
- indicating conditions for the use of any price discounts,
- setting general rules for debt collection,
- developing possible solutions regarding ways of obtaining additional sources of receivables financing (Cieplińska and Grzywacz 2018).

Receivables management policy should be formulated in a universal way, but it is important that each transaction with deferred payment is considered individually, while analyzing full cooperation with the recipient. Precision and caution especially in case of transactions for large amounts is extremely important. In that case, any financial benefits connected with deferring payments should necessarily be compared with estimation of maintaining financial liquidity. Maintaining financial liquidity is a prerequisite for maintaining business continuity. In a crisis situation, when it is difficult to forecast future financial situation and solvency, care for liquidity takes on special significance. In the event of a breakdown in company's liquidity, expected future benefits for services rendered or goods or products delivered will not secure the company (Maćkwiak 2018; European Payment Report 2019, Intrum).

Development of a rational receivables management policy in an enterprise is necessary in the face of payment gridlocks occurring on the market. Policy of granting trade credit, debt collection, concluding factoring or forfaiting agreements guarantee control over company's financial liquidity. Often, receivables management requires the management to make difficult decisions, especially financial ones, but it is necessary in order to escalate the market share of a business unit and acquire new customers. It is a process that requires knowledge, experience and thorough market analysis.

Performance of The Recovery Process

A claim is a legal term used in legal doctrine but not specified in a specific legal act. Namely, it is the right to demand (claim) fulfillment of a benefit from a specific obligation relationship that the creditor is entitled to against the debtor. Indirectly, a claim results from art. 353 § 1 of the Civil Code, according to which the obligation consists in the fact that a creditor may demand benefit from a debtor, and debtor should fulfill the benefit (Act of 23.04.1964 Civil Code...). Therefore, two entities are necessary to create a claim: a creditor and a debtor, where liability constitutes rights of a creditor. As a result of concluding relevant legal transactions, these rights may be transferred between business entities.

Debt collection process is a set of procedures used to recover outstanding claims from a debtor. This process is extremely complex, and its course is largely determined by actions taken by entity before receivable arise. Problem of debt collection exists in all companies and has a very large impact on economic situation of a company (for more see Łada and Wejer-Kudełko 2018, Patterson and Wejer-Kudełko 2018). An enterprise may recover one of three methods to recover a claim:

- independent debt collection by competent departments organized within the unit,
- debt collection outsourcing, transferring all activities to an external company,
- mixed model, supporting debt collection activities within the organization by specific external services (Wodyńska 2017).

Number and variety of provisions that should be considered during recovery process constitute a significant impediment for original creditor. Larger organizations delegate a separate employee to debt collection process, or if they have capabilities, they create departments specializing in amicable debt collection. Regardless of which of the above-mentioned recovery models entity chooses, the process itself is the same. There are three stages of debt collection: amicable debt collection, referral to court and debt enforcement proceedings.

The aim of the first stage of recovery process - amicable recovery - is to take effort to recover debt individually, without going to court.
Such debt often leads to a settlement or agreement that is favorable to both debtor and creditor, and that it can be repaid in installments, for example. Benefit of using this type of debt recovery is not only low costs, but also maintaining good relations with contractor (Bekas 2013). Building positive commercial bonds is the basis for an effective debt collection process at the pre-court stage (Mei 2008; Hendley 2004).

In a situation where abovementioned actions prove to be ineffective and will not be finalized by settlement of receivables or settlement, it is necessary to refer the case to court, which is second stage of recovery process. This is a very formal stage, it is necessary to maintain appropriate order of actions, which include initiation of proceedings, obtaining an enforcement order and enforce the enforcement order (Podel 2014).
Legal proceedings in the aspect of debt collection are often inevitable, however, this is a lengthy process and generates significant costs related to stamp duties, court fees and legal representation costs. Decision to file a claim should be preceded by an in-depth analysis of the situation.

In the current culture of business environment, it is a common practice for a creditor to call a debtor for repayment once again after obtaining a judgment enforcement clause, informing contractor of any costs related to debt collection that can be avoided by voluntarily paying a debt. This is a tendency related to understanding difficult situation of recipients, resulting from health problems, family problems or being result of erroneous business decisions, and awareness that a debtor entity may prove to be a lucrative customer in the future (Jamroży 2011).

The last stage of recovery is debt enforcement proceedings, which literature on the subject often treats as an element directly related to judicial recovery. Due to uniqueness characterizing activities undertaken in the enforcement proceedings as well as freedom in choosing the entity conducting an enforcement, it is reasonable to treat this stage separately to court proceedings (Kreczmańska-Gigol 2013).

In a situation where primary creditor, for various reasons, is not able to wait for solution and enforcement of receivables, the sale of receivables is becoming a more and more popular practice. Assignment procedure, otherwise known as a claim transfer agreement, is a fee-based transfer of a given claim to the transferee, i.e. the assignee. This type of procedure can only include uncontested transactions, free from legal defects and other encumbrances (Jurkiewicz 2013). Opinions on assignment of claims in business practice are divided. Its undoubted advantage is an improvement of original creditor's financial liquidity, however, each situation should be considered individually, as creditor's loss of influence on the relationship with debtor recipient is not insignificant.

In order to undertake appropriate and well-coordinated debt collection activities, it is necessary to correctly systematize various claims. Size of claims is also an important aspect. For recovery of lower amounts, less work will be required and its costs will be lower. With high amounts, a creditor should be aware of higher costs and longer recovery time.

From an economic point of view, in the short term, debt collection has a significant impact on the level of receivables and payables, i.e. cash flow, while in the long term, irrecoverable debts affect the overall economic situation of the company (Celczyńska 2012; Filipoviča 2009).

Operation of universities in Poland and responsibility for violation of public finance discipline in the light of law

Activity and operations of higher education in Poland are defined by many legal norms. With regard to university operations, most important document is the Law on Higher Education and Science. The idea behind implementation of this document, commonly referred to as the Constitution for Science, is reorganization of legal acts through their organization and unification, as well as exclusion of provisions imposing unnecessary obligations on universities (this aspect is broadly discussed in, among others, Dziedziczak-Foltyn, 2018). Adoption of Law on Higher Education and Science reduced the number of laws regulating activity of this area from four to one, and the number of regulations by half. Legislator defines the framework issues, leaving them more precise at university's disposal, which increases its autonomy.

Pursuant to provisions of the Act, public universities receive a subsidy from state budget for their activities. Effect of this is necessity of managing assets and managing finances using provisions of the Public Finance Act. This is particularly important in the aspect of university's operation in the field of commercialization of research, supporting manifestations of entrepreneurship in academic circles, as well as implementation of tasks that are on the border of scientific and economic activity (Kapuścińska, Matejun 2013). Process of supervising and managing public finances is subject to special restrictions and regulations.

Article 40 of the Public Finance Act imposes on public universities, as units of the public finance sector, obligation to conduct financial and property management of universities in accordance with provisions of the Accounting Act. Due to management of state budget funds, proper functioning of accounting system at a university is extremely important. As part of their accounting, universities apply the principles and concepts arising from the Accounting Act, but also the National Accounting Standards and International Accounting Standards.

Financial management of an entity of public finance sector requires taking actions characterized by thoroughness, reliability and transparency. Creation of receivables in public finance sector units takes place by virtue of law and is a result of concluded contracts issued by the authority of administrative decisions or other legal actions.
University's receivables and liabilities constitute an important element of managing university's financial management, and any oversight and neglect of obligations result in a threat to violation of public finance discipline.

In connection with implementation of tasks of a public nature by universities, a significant part of funds from which higher education is financed comes from the state budget, which results in a need to comply with applicable legal standards in the field of disposing of public finances in accordance with principles such as transparency, purposefulness and rational disposing of these funds.

In the aspect of spending public funds, public finance discipline is an extremely important concept. There is no consistent definition of budgetary discipline in applicable legal order. Literature on the subject, however, defines it as a need to comply with provisions of all legal standards regarding functioning and operating principles of public sector entities, in particular in terms of ensuring rationality and regularity of business operations carried out, as well as ensuring their compliance with all principles of economy (Piotrowska-Marczak 2011).

Legislator body included precise regulations on ensuring compliance with budgetary discipline in the Act of 17 December 2004 on liability for violation of public finance discipline (Journal of Laws of 2019, item 1440). The document contains the scope of responsibility incurred in the event of violation of mentioned discipline, size of any penalties, rules for appointment and functioning of judicial authorities, procedures, notifications and required checking activities.

In the applicable legal order, concept of responsibility is defined as negative consequences applied to an individual or entity, resulting from a state of affairs that is assessed as not complying with applicable rules and violating standards (Banaszczyk 2015). A consequence of management and disposal of state budget funds is a factual state related to liability for any violations of public finance discipline. The moment of occurrence of a possible violation of discipline is determined by the time in which an entity undertook actions contrary to applicable rules or omitted activities to which it was obliged. Omission can be acknowledged on a day following the date when particular activity is due (Herman 2018).

Receivables Management in Higher Education Entity

Receivables management requires knowledge of the applicable legal order. It is necessary to verify and monitor receivables on an ongoing basis in order to apply a debt recovery procedure in appropriate periods preventing prescription.

In the context of units such as universities, university's management staff is obliged, under pain of violating public finance discipline, among others to:

- ensure compliance of activities undertaken with activity-and-finance plan,
- take measures to ensure that university receivables are properly calculated,
- apply the rules regarding distribution of payments into installments or their cancellation, resulting from separate provisions,
- ensure that the university's receivables are not time-barred,
- ensure that funds allocated by the state budget are spent in a manner consistent with their purpose,
- conduct internal audit of university organizational units.

Management of receivables owned by the university, their monitoring and application of receivables collection procedures has an extremely significant impact on its functioning. Effective debt collection can be defined as receivables recovery consisting of recovering claims, with minimized costs of activities undertaken, while maintaining generally accepted principles affecting maintenance of positive contacts with the contractor. This type of strategy guarantees maintaining financial liquidity at an appropriate level, safe for future operations of the university. In addition, it guarantees that existing public finance discipline rules will be fulfilled. It should be emphasized that overall management of receivables and the process of their possible recovery requires an interdisciplinary approach, and consequently involvement of personnel with knowledge in the fields of management, accounting, finance, as well as law and sociology. It is vital to ensure effective monitoring of receivables and necessary to develop principles and strategies of operation applied in the unit that comprehensively take into account all of the above areas.

Due to specifics of operations of public finance sector, university's monitoring and recovery of receivables is caused not only by care for maintaining financial liquidity, but also by implementation of tasks resulting from a need to apply public finance discipline.

Among the most common university settlements are student settlements. The Law on Higher Education and Science guarantees universities the possibility of charging fees to persons attending classes in the field of additional educational services. Within the scope allowed by the Act, university introduces the amount of payment for provision of services to the legal framework pursuant to the disposition of the

university Rector, at the same time publishing the document on the proper page of the University's Public Information Bulletin.

Therefore, universities introduce unified rules for monitoring student receivables and introduce procedures for collecting receivables from students for fees related to education in studies.

Activities implemented in the field of receivables management are carried out at universities in two stages, as part of pre-recovery proceedings and debt collection.

Pre-collection activities are carried out by employees of dean's offices who have responsibility of monitoring students' duties. In this case, it is necessary to cooperate with central administration departments in order to verify receivables booked and payments recorded. As part of pre-collection activities, dean's office employees conduct a personal (telephone) conversation, in the absence of such an option they send e-mails to a debtor, prepare documentation of activities carried out, as well as in the event of failure to settle amounts, they send requests for payment.

If, despite pre-collection measures taken, there is no payment, administrative procedure is initiated, which involves removal of a debtor from the list of students and recovery proceedings, usually by University's Legal Office. After analyzing submitted documents, the University Legal Office directs the case to court, or decides not to pursue the claim, explaining reasons for not taking debt collection actions and sending a letter to the Rector of university. Debt collection proceedings are conducted before the competent court. Lack of payment of receivables in the event of obtaining a final court judgment is a basis for referring the case to enforcement proceedings.

In special cases, based on application of the person concerned, Rector of university may issue a settlement agreement with a debtor and set detailed payment terms. The settlement should take place in writing and result in suspension of the recovery procedure.

In a situation where the value of claim is low i.e. not exceeding the cost of sending two registered letters with a return receipt, the university does not institute debt collection proceedings against the debtor, whose costs would exceed the value of claim. In this case, only pre-collection measures are taken.

If debt collection actions undertaken do not bring effective satisfaction of claims, the Rector is entitled to make a decision on the use of alternative debt recovery actions, or write-off the value of claim against costs of the university.

Final Conclusions

Public finance sector is made up of extremely diverse entities performing specific tasks whose main purpose is to provide public services. Responsibility of these units, unlike private sector entities, is not to maximize profits achieved, but to achieve public and social goals in an effective, rational and effective way. Current legislation on disposal of public funds is the foundation for compliance with principles of transparency, openness of actions taken, and is also a reason for a need to use numerous procedures in units. For entities subject to provisions of the Act on public finance, this involves a need to perform additional obligations, often extremely labor-intensive, especially in the aspect of preparing various statements and reports. Violation of rules and standards related to disposal of public finances, both in terms of taking actions that are inconsistent with applicable regulations, and possible omission of the required activities, constitute the basis for a decision on violation of the public finance discipline.

University receivables management is a big challenge due to their specificity. Due to non-productive nature of activities, receivables are largely unpaid payments by students for education-related services. The need to collect debts at universities is obviously due to applicable law, and failure to monitor and

enforce debt will become the reason for a violation of public finance discipline. In private sector units, debt collection results from the care for maintaining financial liquidity of the company and not abusing trade credits granted by contractors. Business entities may also be more flexible in negotiating repayment terms with debtors. In the case of enterprises, it may be more beneficial to divide debt of the debtor into installments, defer its payment, or enable it to offset it by exchanging it for products or services, instead of judicial recovery. Maintaining a long-term partnership with contractor, based on this type of interaction, proves to be more advantageous in the long run, because it does not become a reason for termination of cooperation, and any problems with timeliness of customer payments can be temporary. Therefore, before undertaking debt collection measures, a thorough analysis of receivables is necessary. They should be subject to constant and systematic assessment. Receivables management depends on many factors that determine effective operation of business entities. In the case of a public finance sector unit, deferment of payment, dividing it into installments or cancellation is connected with a need to maintain numerous procedures related to disposal of state budget funds. Division of receivables into installments will result in a reduction of interest on late payment, which in turn will reduce the value of funds due to universities, while the write-off of receivables requires comprehensive documentation of a particular social interest. Therefore, rational management of receivables in the aspect of universities is not an easy task, especially if the social aspect is involved.

It should be emphasized that in the current difficult market situation there is an increase in interest in receivables management tools. In connection with the above, an important aspect is also education of entrepreneurs and awareness of existence of financial instruments, which translates directly into the ability to use them. Undertaking activities aimed at disseminating and expanding the knowledge of management regarding available options for ensuring security of transactions with deferred payment is one of the most desirable changes in order to improve activity in the analyzed area. In the fight against unreliable debtors and delaying payments, support is a comprehensive package of mechanisms (civil law, administrative solutions and tax changes) contained in the Act of 19 July 2019 on the amendment of certain acts to reduce payment gridlocks (Journal of Laws item 1649). They entered into force on January 1, 2020 and are intended to discourage lengthening payment deadlines in commercial transactions and strike those debtors who exceed the statutory deadlines more severely.

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Institutional Stability and Its Impact Upon Country-Level Indicators of Innovation in Selected EU Member States

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Abstract

Innovation and Research&Development (R&D) investment represent key aspects of development policies in the European Union. In modern economies, R&D involvement plays an important role in the process of building competitive advantage and innovation at national, regional, and enterprise level. The outstanding significance of R&D activities is not only clearly emphasized in EU strategies of development (Lisbon Strategy, Europe 2020), but also reflected in the ongoing project of the Sustainable Europe 2030 strategy. All of the above documents seem to emphasize perception of R&D activities as sources for the development of Europe as an area integrating highly competitive economies built on the fundament of knowledge. In Poland, country-level indicators of innovation (regardless of the adopted methods and indices, and also in terms of national levels of R&D expenditure) place the economy at the decidedly lower end of scale among the EU Member States. This poor ranking may be the effect of disturbances in the national institutional system, defined here as a combination of varied formal institutions subject to intergenerational pace of development and informal structures characterized by a more intragenerational pace of change (Williamson, 2000). Poland's poor performance in the studied dimension may also be related to some other systemic disturbances, both internal and external, including high pace of change and institutional volatility, lack of institutional clarity, or the lack of complementarity between institutions (both in national and international perspective) which may affect the stability of the institutional system or produce disturbances in its operation, and ultimately produce disincentives and obstacles barring the effective development of R&D initiatives. The main objective of this paper is to present evidence for correlation between country-level indicators of innovation and the stability of national institutional systems. The study was conducted using public information on state-level indicators of innovation, R&D expenditure, and institutional stability from selected EU Member States.

Keywords: NIE, Innovation, Institutional Stability

Introduction

The modern concept of institutional systems and identification of factors of potential impact upon the dynamic structures of socio-economic order clearly belong in the realm of New Institutional Economics – NIE (Kapp, 1976; Eggertsson, 2009). Proponents of this school of academic thought place emphasis on the fundamental role of institutions as vehicles of economic development, with their motto of institutions do matter (Williamson, 2000). NIE researchers also emphasize the correlation between innovation (particularly the R&D involvement) and economic development. Hence, this postulate received key significance in the EU strategies of development, as R&D involvement is deemed to play an important role in building the competitive advantage of the EU, defined here as potential for assuming the lead position in relation to other market competitors (Sołoducho-Pelc, 2016). The significance of R&D expenditures has been emphasized both in the Lisbon strategy[1], the "Europe 2020 Strategy of Development"[2], and the "Sustainable Europe 2030" strategy. This view has also been reflected in formal institutional support for R&D activities, as this type of investment is believed to stimulate the increase of innovation at national, regional, and enterprise level (Tebaldi, Elmslie, 2008).

[1] https://www.europarl.europa.eu/summits/lis1_en.htm

[2] https://ec.europa.eu/eu2020/pdf/COMPLET%20EN%20BARROSO%20%20%20007%20-%20Europe%202020%20-%20EN%20version.pdf

The effective realization of the above postulates is believed to improve the conditions of R&D involvement among the EU Member States, for instance: by ensuring that 3% of GDP be assigned in support of research and development investments with the intended effect of improving the level of innovation and catalysing the formation of the so-called "Innovation Union" [3]. The R&D, on the other hand, is defined in terms of creative involvement in the effective generation of new knowledge and/or new ways to employ the existing knowledge (Schot, Steinmueller, 2018). As such, the R&D activities include three categories of research (Stępniak-Kucharska, 2015):

- fundamental research – experimental or theoretical research designed primarily to discover new knowledge,
- applied – planned research or critical evaluations designed to discover new knowledge and skills for practical development of new products, processes and services or the improvement of existing ones,
- technical development research – this type of research involves the use of existing knowledge for practical development of new products, processes and services or the improvement of existing ones.

Furthermore, it seems rational to assume that institutions play a significant role not only in the development of business environment and the entire economy, but also in the improvement of country-level innovation (Silve, Plekhanov, 2015). Also, some of the changes introduced in the area of legislative regulations are designed to stimulate the effectiveness of the institutional system, defined here as a combination of both formal and informal institutions (Williamson, 2000). In other words, changes in legislation should stimulate the increase of system effectiveness and ensure a dynamic state of institutional equilibrium (Chang, 2011), i.e. proper synchronization between institutions and their reciprocal complementarity (Leković, 2011; Pejovich, 1999). At this point, it may be worth noting that any given set of legislative regulations may produce different effects, depending on the degree of conformance or synchronization between various regulations and informal institutions (North, 1990; Chang, 2011). Thus, it may be wrong to assume that a direct replication of solutions designed for a country characterized by a different institutional structure – with no regard for the specificity of the intrasystemic institutional correlations and culture (defined as a set of informal institutions) may bring the desired effect in another setting. It must be remembered that institutional systems are not modular structures; one cannot assume that a change of a single module (such as a formal regulation) of a structure of this type can be introduced without proper evaluation of its potential effects on other modules (regulations) and on the entire system, due to the nature of correlations between various formal regulations and those between formal and informal regulations. In view of the above, it may be advisable (for cognitive and utility purposes) to ensure proper identification and evaluation of any relations between the stability of the institutional system and the associated country-level indicators of innovation or R&D expenditure.

For the purpose at hand, i.e. for the determination of relations between the three elements described above, it may be useful to employ research methods postulated by the New Institutional Economics. The next section of this paper presents key definitions and some of the most important concepts of the NIE, including: the institutional system, formal and informal institutions, transaction costs, and other factors influencing the stability, flexibility, and effectiveness of the system. This will be followed by evaluations of the role of institutions and of the institutional system in economic growth processes, R&D expenditures, and state-level indicators of innovation. State-level indicator of innovation and R&D expenditures will also be analysed for Poland, in relation to other EU Member States. The last section presents an attempt to determine the character of relations between state-level indicators of innovation, R&D expenditure, and the stability of the institutional system.

Institutions and Economic Processes

Professional literature provides many interpretations of terms employed in this study, including those of institutions, transaction costs, and norms and regulations (Kingston, Caballero, 2009; J. Godłów-

[3] https://www.consilium.europa.eu/media/30776/qc3210249enc.pdf

Legiędź, 2010). For the purpose at hand, the author employed the definition by D. C. North (1990), which describes institutions as rules of play or, more formally, limitations imposed by humans with the view of shaping the activities of whole groups. In effect, institutions serve to construe a structure of stimuli in the sphere of human exchanges of interpersonal, political, social, and economic character (North, 1990). According to North, formal institutions represent written rules, such as the constitution, legal provisions, or rights of ownership, while informal institutions are expressed in the form of sanctions, taboos, customs, traditions, religions, rules of conduct, and other constructs formed on the basis of the group's cultural inheritance. Ultimately, institutions represent not only formal and informal limitations, but also means of enforcing them (North, 1991). Lastly, transaction costs are defined here as the cost of market mechanism utilization, borne by individuals and enterprises (Allen, 2000).

Proponents of the New Institutional Economics clam that there can be no true understanding of the economic reality without due consideration for the institutional environment of the studied market and its practical significance. R.H. Coase (1998) argues that the effectiveness of economies is ruled by institutional solutions. In other words, the institutional system serves to constitute the legal, political, social, and economic order and to shape the course of economic processes. Consequently, it may also affect the state-level indicator of innovation as well as the level of R&D expenditure. Many authors seem to subscribe to the view that effective institutional systems and equally effective enforcement methods serve to improve interpersonal relations, reduce the uncertainty inherent in any exchange process, limit the transaction costs, and stimulate the economic growth and level of innovation (North, 1991; Leković, 2011; Milgrom, North, Weingast, 1990; Greif 1994). In other words, a stable institutional system offers potential to increase the competitive advantage of entire economies and, in effect, produce sizeable increase of state-level indices of both R&D expenditure and innovation.

The system of institutional equilibrium and institutional transformations and their impact upon economic growth and state-level indicators of innovation

The institutional system represents a combination of varied formal institutions (than may change within the span of a single generation) and informal institutions (of a more durable character) (Williamson, 2000). However, the concept itself may also be defined as a network of reciprocal correlations between the main streams of economic activities, namely: consumption, production, and exchange; or alternatively as a system of rules, beliefs, norms, and regulations designed to ensure regularity in all activities undertaken by economic entities (Sukiennik, Dokurno, Fiedor, 2017).

It must be noted, however, that every society is characterized by their own set of institutional structures consisting of formal and informal institutions. In addition, legislative provisions imposed by states constitute an important element of their institutional systems, and their significance may grow in direct proportion to the pace of knowledge dissemination over the course of their gradual transformation into information economies based on human capital and innovation (Woźniak, 2008). Assuming the full harmonization of an institutional system, i.e. its capacity to maintain accord between all its constituent elements, the efficiency of institutions serves to increase the predictability of interpersonal relations, thus reducing the uncertainty of economic processes and forming incentives for investments in new technologies. In effect, the so-called high quality institutions[4], i.e. the most effective ones, may also reduce the transaction costs inherent in many economic processes, such as exchange. In effect, the long-term stability offered by efficient institutional systems results in a sizeable increase of state-level

[4] Measures of institutional quality may be expressed in relation to the level of transaction cost, the institutional capacity in adapting to new phenomena, the observance and clarity of laws, the indices of investment risk, competitiveness, economic freedom, and corruption, to name a few. The above indices can also be used to provide information on the degree of cohesion between formal and informal institutions. On the other hand, the effectiveness of selected fragments of the institutional system can be studied in laboratory conditions, based on stimulation of responses from selected institutions on statistically representative respondent samples and designed to determine the best (most effective) approach to change. It may be worth noting that economic experiments of this type may also be employed for the evaluation of spontaneously formed institutions of a non-informal character, (Jakubowski, Kuśmierczyk, 2009; Camacho-Cuena, Requate, 2012; Ahn, Ostrom, Walker, 2011)

economic effectiveness, and provides incentives for R&D investment. It may be worth emphasizing that the economic development as such may also influence the effective development of many institutional changes. Firstly, the economic growth stimulates public demand for high quality institutions and increases their public appeal. Secondly, the economic growth seems to encourage the involvement of groups interested in the capture and/or formulation of new regulations (Chang, 2011). Thirdly, the economic growth results in technological advancements which, in turn, favour or enforce changes of the so-called rules of play (Kingston, Caballero, 2009).

With respect to the operation of institutional systems, one may also encounter cases where such accord is no longer present. These may serve to assume that the affected system is:

- destabilized, i.e. with no prospect of unassisted return to the former state of equilibrium – either by incorporating new norms of legal interpretation or by negotiating reciprocal adjustments with the existing structures,
- unbalanced, i.e. with some prospect of unassisted return to the former state of institutional equilibrium.

The above forms of disturbance may be caused by factors belonging to one of the following categories:

- internal, caused by the lack of accord or complementarity between constituents of the national institutional system,
- external, caused by the lack of accord or complementarity between institutional systems at national and international level (such as the European Community regulations).

Destabilizations of institutional systems are typically remedied through governmental agency and their cost is borne by the public. In addition, they also produce extra cost associated with implementation of new institutions or modification of the existing ones. Thus, the operating cost of the entire system is far from optimal, and persistent at least up to the point when former balance is ultimately reinstated (Eggertsson, 2009; Colomer, 2014; Greif, Kingston, 2011). A balanced system serves as evidence of continued and effective economic growth, with transaction costs kept at a minimal level even in the face of short-term imbalances on individual markets. Thus, the state of institutional equilibrium should not be perceived as a construct based on a static point of reference, but rather as a realization of specific criteria in a highly dynamic environment. These criteria may include the following (Wilkin, 2011):

- balancing of requirements and needs of individuals and groups,
- enforcing public observance of the rules of order deemed as socially beneficial, while preserving the freedom of choice in all matters within the bounds of the existing institutions,
- ensuring the continuity of regulations and other mechanisms of the institutional system,
- safeguarding the predictability of behaviours between individuals and groups.

Another element with potential to directly affect the state-level increase of innovation is the flexibility of the institutional system, i.e. the capacity of institutions for adapting to changes in the turbulent economic, social, and political environment and vice versa (Safarzyńska, 2013). In such scenarios, the effectiveness of the institutional system may be associated with the relatively low cost of adapting to such changes (Scrieciu, Barker, Ackerman, 2013). Preservation of institutional equilibrium requires involvement of many institutions responsible for keeping the actions of individuals within the specific bounds of local culture, time period, and society (Czetwertyński, 2019). In addition, due to the fact that informal institutions are more resilient to rapid change (Williamson, 2000), the preservation of institutional equilibrium should focus on such legislative changes that offer best prospect of producing the synergy effect in the form of a complete and balanced institutional matrix (North 1991).

Ultimately, the complexity of the system, particularly the multitude of elements, costs, and objectives affected by institutional changes, the optimization of the entire institutional structure may not always be possible to control in an efficient manner (Woźniak, 2008). This observation seems to emphasize the notion of frequency in performing the required changes in formal institutions. As instruments designed to formulate the shape of cooperation between economic actors, these changes should be in good adjustment with the pertinent needs. They should also provide warranty of maximum stabilization in all economic relations. In practice, however, institutions of this type are often shaped under pressure

from various interest groups – this is clearly not the best warranty of their effectiveness. In addition, frequent changes in national legislation – an important element of the institutional system – may produce systemic disturbances and eventually serve as disincentives for long-term B&R involvement. Similarly, poor flexibility of a national institutional structure results in a sizeable increase of operation cost – this is particularly evident in the case of institutional changes introduced at the Community level which are in disaccord with or not complementary with the existing national regulations or informal institutions. Such scenarios will typically raise the expectation of imminent cuts in R&D investments and the decreased inflow of innovation. In this context, it may be useful to attempt a proper identification of criteria deemed of impact upon the effectiveness of the institutional change process. These may include the following (Sukiennik, Dokurno, Fiedor, 2017):

- participation of actors directly affected by the change in the design of new rules and methods of implementation,
- financial involvement from those actors who expect to receive the bulk of benefits from the planned change, to ensure effective coverage of transaction costs related to the design, negotiation, and evaluation of the best possible approaches to institutional transformations,
- potential for tracking historic developments of similar or analogous approaches to institutional change, e.g. those introduced in other countries, to ensure effective replication of model solutions,
- accord between institutional change, path of its historic development, and the associated value system, introduced with the intention of reducing the cost of institutional implementations or modifications,
- complementarity, completeness, transparency, specificity, and clarity of the implemented change, to ensure proper synchronization and equilibrium between institutions, both at national and international level,
- creation of incentives for enterprises in support of their involvement in long-term R&D investment and innovation.

To sum up, processes of institutional change require considerable expenses, due to the steep cost of design, implementation, enforcement, and continued maintenance and adjustment of institutions, norms, and regulations, as well as the cost involved in adjustment of human capital to the planned change. Despite this cost, a stable institutional system will ultimately hasten the pace of economic growth, reduce uncertainty inherent in all transaction processes, limit the cost of such transactions, and build competitive advantages through long-term R&D involvement.

The state-level stability of an Institutional System

For the purpose of this study, the author decided to employ a state-level measure of institutional stability developed on the basis of the Rule of Law Index formulated by the World Justice Project (WJP) and applicable both to formal and informal institutions. Measurements are taken regularly based on surveys designed to collate experiences and opinions from general public and from expert researchers, globally. The WJP index takes account of the following variables:

- Limitations of governmental empowerments:
  - governmental powers are effectively regulated by the legislator,
  - the judiciary imposes effective limitations of governmental powers,
  - governmental empowerments are effectively limited by independent audit,
  - state officials and representatives of the state may be held accountable before proper courts for any misconduct in their duties,
  - governmental empowerments are subject to non-governmental control,
  - transition of powers and delegation of empowerments are regulated by the law.
- Elimination of corruption:
  - state officials and representatives shall not use their public office for personal benefit,
  - state officials holding judicial positions shall not entertain their powers for private benefit,
  - members of military and law enforcement services shall not entertain their powers for private benefit,

- o state representatives employed in legislative departments shall not use their office for private benefit.
- Transparency of governmental activities:
  - o publication of laws,
  - o publication of data and reports,
  - o the right of individuals to be informed,
  - o civic participation (engagement),
  - o provision of effective complaint mechanisms.
- Fundamental laws:
  - o equal treatment and lack of discrimination,
  - o the right to live and prosper in security,
  - o the right to a judicial process and the benefit of counsel,
  - o freedom of opinion and freedom of speech,
  - o freedom of religion and conscience,
  - o the right to privacy coupled with limitation of state paternalism,
  - o the right of assembly and association,
  - o the rights of employment.
- Order and security:
  - o limitation and control of criminal behaviours,
  - o limitation of civic conflicts,
  - o limitation of violence and of its use in resolving personal grievance.
- Regulations:
  - o effective execution of governmental regulations,
  - o prompt and effective enforcement of any breach in public observance of state regulations,
  - o prompt realization of administrative proceedings,
  - o lawful realization of administrative proceedings,
  - o elimination of expropriation without due compensation or without the right of judicial process.
- Judiciary proceedings in civil law (code):
  - o unrestrained access to judiciary services in all matters related to civil code,
  - o the judiciary for civil code is free from discrimination,
  - o the judiciary for civil code is free from corruption,
  - o the judiciary for civil code is resilient to any form of unlawful governmental influence or misappropriation of governmental powers,
  - o the judiciary for civil code is prompt in their responses to claims,
  - o civil code verdicts are effectively enforced,
  - o the state provides alternative, unbiased and effective mechanisms for the resolution of civil code disputes.
- Judiciary proceedings in the sphere of criminal law:
  - o effectiveness of criminal investigations,
  - o effectiveness and timeliness of criminal law adjudications,
  - o effectiveness of the penitentiary system, with the main objective of limiting the incidence of criminal behaviours after discharge,
  - o impartiality of any judgement passed in relation to criminal law,
  - o the judiciary for criminal law is free from corruption,
  - o the judiciary for criminal law is resilient to any form of unlawful governmental influence or misappropriation of governmental powers,
  - o defendants are unrestrained in their right to a judicial process and the benefit of counsel.

Stability of an institutional system is closely correlated to the effective rule of law, as a mechanism designed to limit corruption, poverty, disorders and injustice among the public. All of the above elements constitute a fundament for effective provision of justice, peace, development, responsible governance and observation of laws. The WJP Rule of Law Index is also characterized by other

properties which emphasize its role of a determinant or indicator of stability offered by the institutional system, namely:

- the index measures the observance of the rule of law by means of analytical evaluations of surveys designed to study such aspects as the freedom of access to judiciary services or the system's capacity to effectively control crime incidence,
- in contrast to other instruments of similar application, the index can be described as comprehensive and multi-dimensional,
- the index presents the perspective of ordinary citizens and relates to public perception of rule of law observance; it presents public opinions formed in the course of practical exchanges between governmental authorities and other actors,
- the index is subject to regular updates, and the comprehensive reports are produced annually, based on responses from citizens (1000 respondents per country) and local expert researchers; the effects can therefore be deemed as good approximations of the real conditions observed in societies under study,
- the index is produced in a holistic fashion, meaning that it may safely be applied for any country and any scenario, regardless of the observed practical differences in cultural, social, economic or political patterns.

Table 1: The Rule of Law Index (WJP - World Justice Project)

	Year / Country		2009	2010	2011	2012/13	2014	2015	2016	2017-2018	2019
1	**Denmark**	Position	-	-	-	-	1	1	1	1	1
		Measure	-	-	-	0.90	0.88	0.87	0.89	0.89	0.9
2	**Norway**	Position	-	-	-	-	2	2	2	2	2
		Measure	-	-	-	0.87	0.88	0.87	0.88	0.89	0.89
3	**Finland**	Position	-	-	-	-	4	3	3	3	3
		Measure	-	-	-	0.87	0.84	0.85	0.87	0.87	0.87
4	**Sweden**	Position	-	-	-	-	3	4	4	4	4
		Measure	0.91	0.89	0.89	0.89	0.85	0.85	0.86	0.86	0.85
5	**Netherlands**	Position	-	-	-	-	5	5	5	5	5
		Measure	0.88	0.86	0.85	0.85	0.83	0.83	0.86	0.85	0.84
6	**Germany**	Position	-	-		-	9	8	6	6	6
		Measure	-	-		0.79	0.8	0.81	0.83	0.83	0.84
7	**Austria**	Position	-	-	-	-	7	7	7	8	7
		Measure	0.82	0.82	0.80	0.80	0.82	0.82	0.83	0.81	0.82
8	**Estonia**	Position	-	-	-	-	15	15	14	12	10
		Measure	-	-	0.78	0.76	0.76	0.77	0.79	0.8	0.81
9	**Great Britain**	Position	-	-	-	-	13	12	10	11	12
		Measure	-	-	0.79	0.78	0.78	0.78	0.81	0.81	0.8
10	**Belgium**	Position	-	-	-	-	17	16	13	15	14
		Measure	-	-	0.75	0.75	0.86	0.77	0.79	0.77	0.79
11	**France**	Position	-	-	-	-	18	18	21	18	17
		Measure	0.74	0.75	0.73	0.76	0.84	0.74	0.72	0.74	0.73
12	**Czech Republic**	Position	-	-	-	-	23	20	17	17	19
		Measure	-	-	0.685	0.67	0.67	0.72	0.75	0.74	0.73
13	**Spain**	Position	-	-	-	-	24	24	24	23	21
		Measure	0.74	0.70	0.70	0.73	0.67	0.68	0.7	0.7	0.71
14	**Portugal**	Position	-	-	-	-	26	23	23	21	22
		Measure	-	-	-	0.66	0.66	0.7	0.71	0.72	0.71
15	**Slovenia**	Position	-	-	-	-	28	28	27	26	26
		Measure	-	-	-	0.66	0.65	0.66	0.67	0.67	0.67
16	**Poland**	Position	-	-	-	-	22	21	22	25	27
		Measure	0.67	0.66	0.70	0.71	0.67	0.71	0.71	0.67	0.66
17	**Italy**	Position	-	-	-	-	29	30	35	29	28
		Measure	-	-	0.64	0.63	0.63	0.64	0.64	0.65	0.65
18	**Greece**	Position	-	-	-	-	32	33	41	39	36
		Measure	-	-	-	0.60	0.59	0.6	0.6	0.6	0.62
19	**Hungary**	Position	-	-	-	-	30	37	49	50	57
		Measure	-	-	-	0.65	0.61	0.58	0.57	0.55	0.53

Source: own research based on WJP - World Justice Project reports for the years 2009-2019

Results of institutional stability measurements (Tab.1) suggest that, in the years 2009 – 2019, the institutional system in Poland was fairly stable. As the same time, the reported measures of stability for Poland (0.66) can be seen as evidence of a poor level of stability – clearly in the lower spectrum of the findings for the EU area. The highest scores were reported for: Denmark (0.9), Norway (0.89), Finland (0.87), Sweden (0.85), the Netherlands (0.84), Germany (0.84), and Austria (0.82); for decades now, these countries typically receive the highest scores with respect to their rule of law or, in another perspective, with respect to the stability of their institutional systems.

Levels of R&D involvement and state-level indicators of innovation in selected EU Member States

Developed economies are typically characterized by their strong emphasis on new technologies and innovative solutions, in tandem with the more general trends of rapid globalization of economies and facilitated access to global market outlets. Innovations of processes, products and organizational methods exert a direct impact upon markets and economies. For production enterprises, particularly for providers of highly processed products, innovation is closely correlated with R&D involvement. This type of involvement, in turn, is directly translated into innovative products, processes and technologies. Naturally, innovation of processes and organization methods is equally important, as these elements seem to determine the practical operation of enterprises and entire economies. However, this study places emphasis on R&D involvement and product innovation. One of the most popular measures of R&D involvement is the so-called GERD index designed to illustrate the country-level indicators of R&D expenditure (cf. Tab. 2).

Table 2 : GERD as a percentage share of the GDP in selected EU Member States, in the years 2008-2018

	Year	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
	Country											
1	Austria	2.57	2.60	2.73	2.67	2.91	2.95	3.08	3.05	3.12	3.05	3.17
2	Belgium	1.94	2.00	2.06	2.17	2.28	2.33	2.37	2.43	2.52	2.66	2.76
3	Czech Republic	1.24	1.29	1.34	1.56	1.78	1.90	1.97	1.93	1.68	1.79	1.93
4	Denmark	2.77	3.06	2.92	2.94	2.98	2.97	2.91	3.05	3.09	3.05	3.03
5	Estonia	1.25	1.39	1.57	2.28	2.11	1.71	1.42	1.46	1.25	1.28	1.40
6	Finland	3.54	3.73	3.71	3.62	3.40	3.27	3.15	2.87	2.72	2.73	2.75
7	France	2.06	2.21	2.18	2.19	2.23	2.24	2.28	2.27	2.22	2.21	2.20
8	Germany	2.62	2.74	2.73	2.81	2.88	2.84	2.88	2.93	2.94	3.07	3.13
9	Greece	0.66	0.63	0.60	0.67	0.70	0.81	0.83	0.96	0.99	1.13	1.18
10	Hungary	0.98	1.13	1.14	1.19	1.26	1.39	1.35	1.35	1.19	1.33	1.53
11	Italy	1.16	1.22	1.22	1.20	1.26	1.30	1.34	1.34	1.37	1.37	1.39
12	Netherlands	1.62	1.67	1.70	1.88	1.92	1.93	1.98	1.98	2.00	1.98	2.16
13	Norway	1.55	1.72	1.65	1.63	1.62	1.65	1.72	1.94	2.04	2.10	2.07
14	Poland	0.60	0.66	0.72	0.75	0.88	0.87	0.94	1.00	0.96	1.03	1.21
15	Portugal	1.44	1.58	1.54	1.46	1.38	1.32	1.29	1.24	1.28	1.32	1.35
16	Slovenia	1.63	1.81	2.05	2.41	2.56	2.56	2.37	2.20	2.01	1.87	1.95
17	Spain	1.32	1.36	1.36	1.33	1.30	1.28	1.24	1.22	1.19	1.21	1.24
18	Sweden	3.49	3.41	3.17	3.19	3.24	3.27	3.11	3.23	3.25	3.37	3.31
19	Great Britain	1.61	1.67	1.65	1.65	1.58	1.62	1.64	1.65	1.66	1.65	1.71
	the European Union (EU28)	1.76	1.83	1.83	1.87	1.91	1.92	1.94	1.95	1.94	1.98	2.03
	the European Union (EU15)	1.90	1.99	1.99	2.02	2.05	2.06	2.09	2.09	2.09	2.13	2.17

Source: own research based on Eurostat data: https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_gerdfund&lang=en

As shown above, the GERD index value for Poland, expressing the state-level R&D expenditure as percentage of GDP, represents one of the lowest scores among the selected EU Member States. The GERD level for Poland (e.g. the 1.21 score for the year 2018), is significantly lower compared to the Old Europe average of 2.17 or the EU average of 2.03. Similarly to the recorded levels of institutional system stability, the highest GERD scores were reported for such countries as: Denmark (3.03), Sweden (3.31), Finland (2.75), Austria (3.17), Germany (3.13), and Belgium (2.76).

State-level indicators of innovation for Poland were, again, in the lower range of those recorded for the EU Member States. Poland places at the rear in many international rankings of innovation:

Innovation Union Scoreboard (2018 – 25th in Europe), Global Innovation Index(2019 – 26th in Europe), and Global Creativity Index (2015 –46th, globally). For instance, the Innovation Union Scoreboard examines various state-level determinants of innovation in such aspects as:

- human resources,
- attractive research systems,
- innovation-friendly environment,
- public support and investment in innovative projects,
- private investment in research and innovation,
- others.

Table 3 : State- level indicators of innovation – the Innovation Union Scoreboard results for selected EU Member States in the years 2011-2018

	Year	2011	2012	2013	2014	2015	2016	2017	2018
	Country								
1	Austria	113	116	119	116	117	122	122	125
2	Belgium	116	116	116	116	117	121	124	128
3	Czech Republic	86	81	83	83	85	83	86	89
4	Denmark	141	143	145	143	143	140	141	141
5	Estonia	87	91	91	86	89	81	83	104
6	Finland	132	132	132	129	132	133	135	146
7	France	107	105	107	108	110	113	113	111
8	Germany	128	128	128	124	124	123	126	127
9	Greece	61	61	63	63	65	69	71	82
10	Hungary	66	63	63	64	65	66	68	69
11	Italy	74	76	76	77	79	77	78	85
12	Netherlands	119	126	128	126	127	129	134	135
13	Norway	102	101	102	101	103	120	120	128
14	Poland	53	50	52	50	51	54	57	61
15	Portugal	85	82	84	81	82	81	84	98
16	Slovenia	98	96	97	97	96	97	97	88
17	Spain	76	76	77	71	73	78	82	85
18	Sweden	145	145	146	144	145	148	148	148
19	Great Britain	111	111	109	115	118	127	127	128

Source: own research based on reports published athttps://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards_pl

As seen in Tab. 3, the level of Innovation Union Scoreboard index for Polish economy (61 the year 2018) represents one of the lower scores for those EU Member States which were included in its calculation. The top positions, on the other hand, were invariably associated with such countries as: Denmark (141), Finland (146), Germany (127), the Netherlands (135), Norway (128), Great Britain (128), Belgium (128), and Austria (125). Therefore, it seems reasonable to assume that institutional stability may indeed be seen as a potential determinant of both the state level of R&D expenditure and the state-level indicators of innovation. Effective institutional solutions in a flexible and stable institutional system may provide enterprises and individual with greater incentives to commit in long-term R&D investments and innovations. At the same time, it must be noted that the above correlation is only postulated, and may in fact be a product of a cause-effect type of relation, but this postulate requires further examination in the form of detailed studies.

Conclusions

Analytical evaluations presented herein provide arguments for the assumption that an effective institutional system does act in favour of the economic development and seems to stimulate the increase of R&D involvement among companies. It also seems valid to assume any disturbance within the bounds of such institutional system may be harmful in terms of the state-level economic development. It may also act in detriment of long-term R&D investment, as this particular condition is often associated with elevated levels of corruption and bureaucracy (Brol, 2013). Lastly, it should be noted that no institutional development can be introduced without prior and clearly stated demand from the public for high quality institutions. Hence, the ubiquitous presence of various strong and competitive interest groups can be perceived as highly desirable (Czetwertyński, Brol 2013). In the opinion of F. Fukuyama, failures in effective response to internal demand for institutional changes (or lack of such demand) can be seen as one of the fundamental barriers to economic development of countries (Fukuyama, 2004).

Ultimately, it seems that one of the major tasks in the implementation of institutional changes is to ensure that the new or modified formal institutions are in good accord with the existing structure of local norms and rules. This accord should also be maintained in relation to any formal institutions introduced at the Community level. In other words, the prime responsibility is to preserve the complementarity of institutions and to place proper emphasis on the historic paths of their development. Failure to satisfy these requirements (i.e. the lack of proper synchronization) will result in competing rules or even in utter disregard for selected rules. In such scenarios, the affected institutional system will be bound to operate in a non-optimal fashion, and the resulting state-level indicator of innovation will (at best) remain static, if not lower than expected. Similar outcome can be concluded with reference to the levels of R&D involvement. In light of the above, the true nature of the observed correlation between these three factors may be purely causal, but this assumption may require further examination, with focus on statistical analyses.

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The Influence of Knowledge Creation Tools on Innovation Teams in Learning Organisations

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Abstract

Innovation is an important part of any organisation. Nowadays, organisations are keen to learn to improve themselves by creating knowledge. Using knowledge creation tools are another aspect for assessing innovation inside an organisation. However, it is not obvious whether using knowledge creation tools in a learning organisation can lead to successful innovation inside an organisation. Previous studies have focused on the knowledge creation process and not the tools. The main purpose of this study is to investigate whether the knowledge creation tools used in learning organisations successfully promote organisation innovation, more specifically improving the innovation team. This in-progress research will conduct questionnaires at learning organisations. It will investigate the use of knowledge creation tools and better understand their contribution to a successful innovation team. The results will assist management to assure best practices for innovation teams that use knowledge creation tools in learning organisations.

Keywords: Knowledge creation tools, learning organisation, innovation team.

Introduction

This section should follow keywords. This section should provide background of the study and Most organisations want to improve their performance and do this by including best practices. One area organisations need to be aware of is organisational learning. According to Lopez, Peón and Ordás (2005) the organisational learning in any organisation refers to 'a dynamic process of creation, acquisition and integration of knowledge aimed at the development of resources and capabilities that allow the organisations a better performance'. Thus, organisational learning is linked to knowledge. Therefore, the organisation will need to apply a knowledge creation concept if they want to become a learning organisation.

Knowledge creation process can be applied by using knowledge creation tools. These tools can be IT-based or non-IT-based. Using the appropriate tools will significantly enhance the organisational learning process. The application of knowledge creation tools to improve organisational learning can subsequently support innovation within the organisation. Innovation is another concept that one must take into consideration when discussing organisational learning.

According to Liao and Wu (2009) there is a relationship between the three concepts of knowledge management, organisational learning, and innovation. The previous study has two limitations: 1) The organisational learning that had been studied was simply a mediator between knowledge management and innovation; 2) The study focused only on knowledge management, in general, not knowledge creation tools, in particular. However, this study will focus specifically on knowledge creation, and how its tools can be applied in the context of learning organisations building a successful innovation team. Moreover, this study will not use organisational learning as a mediator but as an environment to apply the knowledge creation process.

The main objective of this research is to investigate knowledge creation tools in an organisation. It will then test to see whether or not these tools support innovation inside an organisation, in the

context of organisational learning. This research will primarily answer the following questions: 1) What are the knowledge creation tools are used inside the organisation? 2) How do knowledge creation tools lead to successful innovation team performance in a learning organisation?

Literature Review

Knowledge creation and its tools

Knowledge management has many processes that can be applied to any type of organisation. It includes knowledge creation, knowledge sharing, acquiring, and capturing (Jimenez-Jimenez and Sanz-Valle, 2013). Knowledge life cycle begin with knowledge creation (Bhatt, 2000). The knowledge itself can be divided into tacit and explicit knowledge (Nonaka and Konno, 1998). The explicit knowledge is the knowledge that can be found in the likes of books and articles. On the other hand, tacit knowledge is the knowledge that people hold onto in their brain and cannot be available physically (Nonaka and Konno, 1998). Accessing this type of knowledge becomes a challenge for many organisations. There is therefore a need for a combination of both types of knowledge, in order to create valuable knowledge.

The focus on knowledge creation is becoming very important, as knowledge is a vital asset within an organisation. However, if this knowledge is not well created, critical issues will emerge inside the organisation (Štorga, Mostashari and Stanković, 2013). According to Kaba and Ramaiah (2020) knowledge creation is 'the ability to search and identify new knowledge, apply existing knowledge to new contexts, understand and absorb unfamiliar knowledge and integrate different bodies of knowledge'. According to Salisbury (2008), knowledge creation happens when an organisation is trying to solve new problems. Many organisations allocate funds for knowledge creation tools (Roth, 2003).

Knowledge management can be applied by using many tools and techniques (Tyndale, 2002). However, this research focusses only on those knowledge creation tools that facilitate the process of knowledge generation in an organisation. Researchers have divided knowledge management tools into many categories. For example, Dalkir (2011) categorises them into a 'knowledge creation and codification phase; 2. knowledge sharing and dissemination phase; and 3. knowledge acquisition and application phase', with every phase including specific tools. The knowledge creation tools are: 'authoring tools, templates, annotations, data mining, expert profiling, blogs, mashups' (Dalkir, 2011; Kaba and Ramaiah, 2017). Some researchers such as Burkhard, Schneider and Meier (2009) and Tyagi *et al.* (2015) have introduced their own knowledge creation tools. Moreover, social media, such as Twitter and Facebook, can be used as knowledge creation tools (Wagner, Vollmar and Wagner, 2014). Wikis and data mining are also used as knowledge creation tools (Brohman, 2006; Watson and Harper, 2007).

Learning Organisation

A learning organisation is 'a form of organisation where processes of learning in some way or another are important' (Mohanty and Kar, 2012). The organisational learning is the process that most of studies link it with the knowledge management process. It is about preparing the organisation community to manage their knowledge effectively (Jain and Moreno, 2015). Previous studies have investigated the two terms 'knowledge creation' and 'organisational learning' as separate issues (Argote, McEvily and Reagans, 2003; Meier, 2011; Lyles, 2014). It can therefore be inferred that knowledge creation is just one of the many knowledge management processes, but has rarely been linked with organisational learning.

Using knowledge creation tools is one of the ways that can be used to create new knowledge to support organisational innovation. Some recent studies have shown a relationship between knowledge management practices and organisational learning, however, it is not known how the knowledge creation tools specifically can be employed in order to achieve organisational innovation. According to Mohanty and Kar (2012) innovative learning organisation should have 'personal mastery, mental models, shared vision, team learning, and system thinking'.

Innovation

Innovation is 'as an idea, practice, behaviour, or artefact that is perceived as being new by the adopting unit' (Eseryel, 2014, p. 806). One way for organisations to retain a competitive advantage over others is through innovation. Moreover, to assure that innovation is continual, organisations need to apply a well of knowledge creation process (Popadiuk and Choo, 2006). Merx-Chermin and Nijhof (2005) studied the factors affecting innovation inside learning organisations. First, they asked through interviews how organisations apply the innovation spiral. Then, they conducted a survey about the factors that affect the use of an innovation spiral.

In order to determine whether a specific organisation practices innovation process successfully, critical success factors should be tested. According to Kim and Wilemon (2002); (Gunasekaran, Patel and McGaughey, 2004; Harmancioglu *et al.*, 2007; Kam Sing Wong and Tong, 2012; Kannan, 2014) the innovation success factors gain 'support from top management, committed team leaders, crossfunctional departments, organisational infrastructure, organisational planning and strategy, incentives and rewards, training, client-customer involvement, supplier-vendor involvement, and knowledge management' (Abu and Mansor, 2019). However, there is a limit to measuring innovation performance inside an organisation (Trantopoulos *et al.*, 2017). Innovation performance is a result of utilising a new knowledge, Moreover, organisational learning can play an essential role in innovation performance (Curado, Muñoz-Pascual and Galende, 2018). Further, Wang and Ellinger Andrea (2011) emphasised that 'the term innovation performance is connected with organisational learning practices'. Figure 1 shows the conceptual framework of the study. Three levels of learning organisation characteristics: individual, team, and organisational. The learning organisation can use one or more knowledge creation tools. The question is whether the combination of using knowledge creation tools and learning organisation can lead to successful team innovation performance. From previous discussion, some innovation factors are chosen and others are deleted depending on factors related to team concept. For example, 'supplier-vendor involvement' is not associated with innovation team factors.

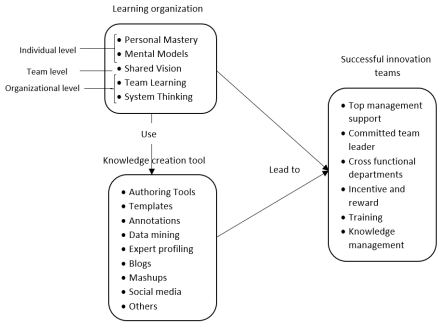

Figure 1: Conceptual framework

Research Methodology

A quantitative method will be used in this research. It offers the most appropriate method for answering the research questions. A questionnaire is designed for organisations' employees who are using knowledge creation tools. First, an investigation of the tools that the organisation uses in order to create new knowledge. Then, testing if the learning organisation characteristics and this tool can lead to a successful innovation team. This can be applied at one of mobile telecommunications organisations, since these organisations need to be up to date in offering new services to their customers. This process (creating new services) needs to quickly achieve a competitive advantage.

Conclusion

This study will contribute to the body of knowledge examining the use of knowledge creation tools in learning organisations for enhancing successful innovation performance. Previous literature has studied organisational learning in the area of knowledge management but not knowledge creation.

Moreover, the focus on the use of knowledge creation tools in learning organisations is missing in the literature. Thus, the relationship between the learning organisation, knowledge creation tools, and innovation, particularly on innovation teams. needs to be more fully explored.

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Diagnostic Tools for Students' Misconceptions Regarding Health Education: The Case of Sexually Transmitted Diseases

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Abstract

The competency-based approach requires the adoption of a training system with teaching strategies centered on an active learner, in order to introduce him/her to professionalization. After the implementation of the LMD (License, Master, and Doctorate) system, the Higher Institutes of Nursing and Health Techniques (ISPITS) in Tetouan in Morocco should align themselves with this approach by training competent health professionals, capable of acting in complex and unpredictable situations. This vision could only succeed by having a pedagogical alignment between the curriculum and the didactic tools of teaching/learning and evaluation. In this context, our study is combining nominal group technique and Mind map as teaching/learning and assessment tools to diagnose barriers to learning of midwives students at ISPITS in Tetouan, Morocco, towards the course of "sexually transmitted infections". The results of the combination of these tools highlighted some conceptions of future midwives and allowed us as teachers to adjust our practices according to the level of acquisition of our learners.

Keywords: Health Education, teaching, learning tools, student, midwife, NGT, Mindmap, barriers to learning.

Introduction

The underdeveloped countries suffer from a marked lack of scientific achievements. This has been confirmed by various surveys (Abouzaj, 2019; Frey, 2018; Labe, 2011; Legendre, 2012).

This observation, which has revealed shortcomings in teaching, has been reinforced by various studies in several disciplinary fields such as didactics, sciences, etc. (Giordan and de Vecchi, 1987).

Among others, in science didactics, researchers have been irritated by this problem and have tried to identify the causes. Among the causes of the failure of learning outcomes in the learning process, research has evoked learners' conceptions (Astolfi, 2010; Clément, 2010; Delacote and Tiberghien, 2010; Giordan and de Vecchi, 1987).

In fact, it has been shown that these conceptions constitute a real obstacle for the learner and teaching that does not take these conceptions into account will not lead to a satisfactory outcome in the quality of learners' learning (Bachelard, 1934; Giordan and de Vecchi, 1994; Pizon *et al*., 2010).

In addition, as a teacher in the Higher Institutes of Nursing and Health Techniques (ISPITS) in Tetouan in Morocco, we have to help train a competent health professional, capable of acting in complex and unpredictable situations (Abouzaj, 2019).

This vision could only succeed by having a pedagogical alignment between the curriculum and the didactic tools of teaching/learning and evaluation (Biggs, 1996, 2003, 2014; Roegiers, 2010) by taking into consideration the obstacles to the learning of our learners.

Thus, since we are in charge of teaching the Sexually Transmitted Infections "STI" course for midwifery students in semester4, we have combined two didactic tools: the Nominal Group Technique "NGT" and the Mindmap to diagnose the barriers to learning for these students in relation to this course. We used this work as a diagnostic assessment to identify the barriers that hinder the learning of our learners towards the "STI" course prior to any teaching of this course. In addition, it would allow us to adjust our teaching according to the level of acquisition of the learners.

This is a first study to our knowledge where we combined two didactic tools, which are the nominal group technique and the mind map tools in order to diagnose the obstacles to learning with regard to the course of sexually transmitted infections "STI", but before describing the approach, we will first make a presentation of the two techniques used.

The Nominal Group Technique

The Nominal Group Technique "NGT" is an evaluative method that emerged from the work of Delbecq and Van (1971) to address group decision-making processes.

We have used this technique because health professionals and educators have demonstrated its ability to extract "collective knowledge" from the profession (Lennon, Glasper and Carpenter, 2012) and formalize it, even though it is often considered operational knowledge that is difficult to verbalize (Foth *et al*., 2016).

The technique was described in 6 steps in the work of the El Hassouny team (2016).

The Mind Map Technique

The Mindmap or Heuristic map is an active learning strategy that facilitates the learning process and helps the learner's brain to develop associations from a central concept (Buzan and Buzan, 1996).

It also allows the student to use existing knowledge or prerequisites (Buzan and Buzan, 1996; Spencer, Anderson, and Ellis, 2013) and is little used in nursing.

Students' conceptions are a barrier to their learning and without considering them; the teacher would not be able to succeed in his or her teaching/educational assignments (André Giordan and de Vecchi, 1987).

We used this tool to diagnose the students' conceptions of the "STI" course before teaching the course, which will enable us subsequently to adjust our teaching practices with the level of the learners.

Methodology

It is a qualitative, exploratory, diagnostic study of barriers to learning. Our study sample consisted of a class of 20 midwifery students from semester 4 of the bachelor class at "ISPITS" in Tetouan in Morocco, during the 2018/2019 school year.In order to conduct this study we had the authorization of administration and the consent of all participants in our sample.

Educational Scripting

In this study, we have used the didactic tools used in the "STI" course that we are responsible for delivering. The choice of this course in the present study was imposed since it represents a major element in the training of the midwifery option.

- ✓ As a first step, before any teaching of the said course, during the 1st session, we facilitated a discussion using the nominal group technique "TGN" to diagnose learning difficulties vis-à-vis the same course (diagnostic group assessment).
- ✓ Then, based on the results found by the NGT, we asked students to develop Mindmaps after having introduced them to this technique, in order to diagnose their misconceptions about concepts related to the same course (individual diagnostic assessment).

Procedure for diagnosing learning disabilities by nominal group technique

- ✓ At the 1st session and before starting the "STI" course and in order to conduct a diagnostic evaluation, we gathered a class of 20 midwifery students from the bachelor's class semester 4 and asked them the following nominal question: "What are the difficulties and problems you have encountered in your previous studies on STI? ».
- ✓ After having put in confidence the 20 learners of the sample, we encouraged and encouraged them to express themselves freely and without constraints on one of the two sheets that we distributed to them.
- ✓ The data collection revealed 12 responses that we wrote on the board.
- ✓ -We eliminated redundant proposals and those that seemed irrelevant to us, such as answers that made sense only in the respondents' logic. Thus, the number of successful responses was reduced to 9 responses.
- ✓ In the next step, we asked students to choose 6 from this pool and prioritize them by assigning a weight of 8 to the top answer, 7 to the second, and so on down to the last.
- ✓ Once the data was collected, we drew up Table 1 (see page below) where the responses are ranked according to a descending Σpi.

Procedure for diagnosing students' conceptions of "STI" concepts

We introduced the students to the Mindmap technique by brainstorming, with the participation of the whole class, some Mindmaps, and then we distributed empty Mindmaps and invited each student to fill them in spontaneously.

The question in the mindmap was as follows:

Hang on to each branch a word (or short phrase) that comes to mind spontaneously when you hear the concept of the Sexually Transmitted Infections "STI":

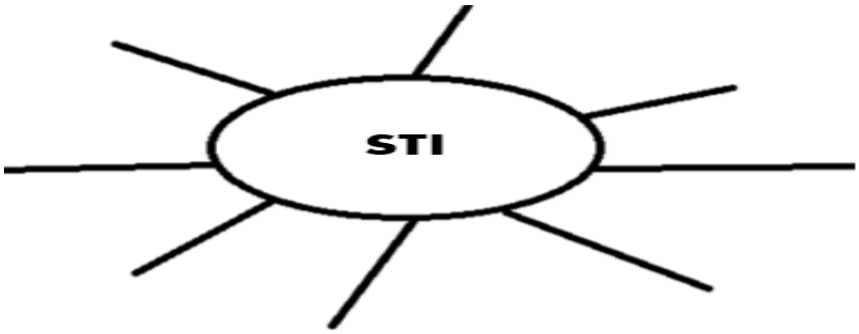

Results and Discussion

Results of student responses obtained by the nominal group technique:

Table 1: Results of student responses obtained by the nominal group technique

Responses on Difficulties Hindering Learning for Students in the STI Course	Σpi	Order
Difficulty and forgetfulness of the Sexually Transmitted Infections concepts	160	1
The course is covered in an incomprehensible way in the textbook	140	2
The language barrier	120	3
Lack of tutorials and practical work in high school	100	4
The time allotted to the course is very insufficient	80	5
It is a taboo subject; students don't dare to interact in class...	60	6

This table reveals that midwives students attribute their difficulties in assimilating the Sexually Transmitted Infections “STI” mainly to the fact that they are not able to assimilate “STI”:

- ✓ To the difficulty and forgetfulness of “STI” notions and concepts seen in the school curriculum.
- ✓ To the content of the textbook stated as "difficult".
- ✓ To the language barrier since they do not master the French language well enough.
- ✓ The lack of the use of practical work and tutorials related to the theme in high school.
- ✓ The insufficient time allocated to the teaching of the sequences of this discipline.
- ✓ Finally to the characteristic of the content whichcame as a "taboo subject".

In fact, the answer that comes at the top of the list with the highest weight (Σpi = 160) refers to the forgetfulness and difficulty of the concepts, this observation is more argued with the answer n2. These answers match the observations of the course of didacticians who confirm with a certain regularity that scientific knowledge is poorly understood, poorly integrated or quickly forgotten by the learner (Giordan and de Vecchi, 1987; ROMAINVILLE, 2000 ; TIBERGHIEN, 1988).

Students' results obtained by Mindmap reported in the table below:

Table 2: Student results obtained by Mindmap

Misconceptions of midwives students approached by the Mind map tool regarding Sexually Transmitted Infections (STIs)
-STI = "incapable", "Sex life destroyed", "Sexual impotence"...
-STI = "Stigmatization", "Excluded from society" ...
-STI = "Human Immunodeficiency Virus" (HIV)
-STI = "Taboo", "Illicit sexual relations", "relations outside marriage"

Using the mindmap tool, we were able to explore some of the misconceptions that students had reported about “STI” concepts, among those misconceptions:

That STIs cause sexual impotence, that those affected are stigmatized by society, that "STI" are synonymous with the Human Immunodeficiency Virus, and that they are a taboo subject reflecting illicit sex outside of marriage.

The results found by the Mindmap are consistent with those found by TGN and are similar to those found by other researchers (Pourmarzi and Sharami, 2017; Rochigneux, 2012; Sabah *et al.,* 2010; Vieira *et al*., 2017). Indeed, midwives students find it difficult to assimilate the prerequisites taught previously.

Consequently, the existence of students' misconceptions that have not been taken into consideration by the education system hampers their learning process. This finding matches other studies at the national or international level (Chakour *et al*., 2019; Pourmarzi and Sharami, 2017) that prove that knowledge is not passed on.

Conclusion

The use of these tools allowed us to identify some of the barriers that hinder the learning process for midwives students. Indeed, the combination of these two techniques can be used as an evaluation to allow the teacher to adjust his/her teaching according to a cyclical and permanent process at any time with the level of the prerequisites of his students.

Finally, we suggest using this approach to diagnose the misconceptions of learners in other disciplines.

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Digital Transformation in Accounting: Systematic Review

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Abstract

Although the subject of digital transformation in Accounting has been widely discussed in the media, there is still a considerable absence of studies on the key research topics in the scientific literature, as well as the trends and impacts on professionals working in this area. Aiming to narrow this gap, the objective of this research is to investigate academic studies on digital transformations in the area of Accounting, map the literature and point out research opportunities. For this purpose, a Systematic Literature Review (SLR) was performed, selecting the publications made up to December 2019, propose a categorization of articles, as well as point out the evolution and scope of the scientific studies published. The results found on about digital transformation in Accounting, in the Scopus and Web of Science databases, is still reduced, but show an increasing curve in the last three years. Moreover, the literature points to the effects on the education of accounting professionals, which is directly complementary to the need for technical skills and knowledge to be developed in the training of professionals. Innovations in digital base technologies, such as blockchain, artificial intelligence, big data, among others, appear with great emphasis this work. Finally, subjects related to the impacts on accounting professionals are still limited and represent the most sensitive aspects, which allows to assess the effects of digital transformation as the focus on future opportunities and also major challenges for the profession.

Keywords: Systematic Review, Scientific Production, Digital Transformation in Accounting

Introduction

Technologies have shaped society over time, so contemporaneously, innovations in Information and Communication Technologies (ICT) have boosted a new and intense transformation called digital transformation (Weiss. M, 2019). It is a fact that this transformation is not limited to improving the quality of human life but includes the remodeling of several areas and the continuous development of new technologies.

Accounting, as an area of knowledge integrated into the social and business environment, also suffer the effects of digital transformation. The truth is that the emergence of the term *Digital Transformation* (DT) fundamentally impacted the discourse on business practices, and thus, it is considered the process that companies use as the most innovative in technology to productivity enhancement and improve their results. Also found spelled, DT consists of a broad process, in which technology becomes central to the organization and companies making use of technological data analysis tools and methodology - such as Robotization, Big Data, Business Intelligence, Artificial Intelligence, Blockchain among others - to increase your performance and create more value. Tomelin et al (2011) mentioned that a strategic alliance between accounting and new information technologies provides safer conditions for decision-making organizations.

Information technologies have changed the way information is managed by "producers" as well as accountants and auditors to "consumers" - as investors, creditors and other users of information (Elliott, RK, 2002). Digital Transformation provides the impetus to reconsider the very nature of accounting information (AIS) in their purpose to manage data and information to be used by decision-makers in

accounting and finance functions, and to contribute to strategy implementation and internal control of the enterprise (Quinn, Martin et al, 2017). In other words, information technology solutions are part of the processes in the accounting area and data security has become vital for business continuity.

It is also important to highlight that other aspects of the accounting profession, such as occupations, activities, the job market, professional education, skills, and competences to be developed and are being largely affected by the digital transformation.

In view of the relevance of this theme, this work aims maps the literature on the subject, and proposes a categorization for it, highlighting the main questions which have been dealt with to date in the research contained in the indexed databases, recognized as important to the scientific community.

In view of the relevance of this theme, the work describes the digital transformation in Accounting, maps the literature on the subject, and proposes a categorization for it, highlighting the main questions which have been dealt with to date in the research contained in the indexed databases, recognized as important to the scientific community. Moreover, based on a critical review of the subjects found, new research questions are proposed that capable of increasing the quality and the relevance of future studies on the subject. The research approach selected was a Systematic Literature Review (SLR), applying bibliometric and network analysis. This Systematic Literature Review (SLR) provides researchers and practitioners with a structured, categorized view of what has been produced in the literature on digital transformation in Accounting to the present (December 2019).

Research Method

This study consists of a Systematic Literature Review (SLR) scientific on digital transformation in Accounting. The systematic review of the literature, generally referred to as a systematic review, is a means of identifying, evaluating and interpreting all available research relevant to a research question or thematic area or phenomenon of interest (Kitchenham et al, 2013). In addition to requires an understanding of the existing literature, including gaps and uncertainties, clarification of definitions related to the research question and an understanding of how they are conceptualized in the existing literature (Armstrong et al, 2011).

SLR is a less demanding scientific investigation, it is a research article with pre-defined systematic methods to systematically identify all relevant published and unpublished documents for a research question, it evaluates the quality of these articles, extracts the data and synthesizes the results (Siddaway AP et al, 2019).

In addition to the RSL should be followed by a rigorous methodology in which to define the research question, write a protocol, search the literature, collect and perform the screening and analysis of the literature. It is important mentioning that all process must also be carefully documented. For this study, the review protocol was developed in the planning phase.

The protocol is an essential component in the RSL process and helps to ensure consistency, transparency, and integrity (Donato et al, 2019). This review protocol includes detailing of the questions, definition of the research terms, study selection, data extraction and data analysis. Fig. 1 is highlighting the five steps of the review protocol to be use this study.

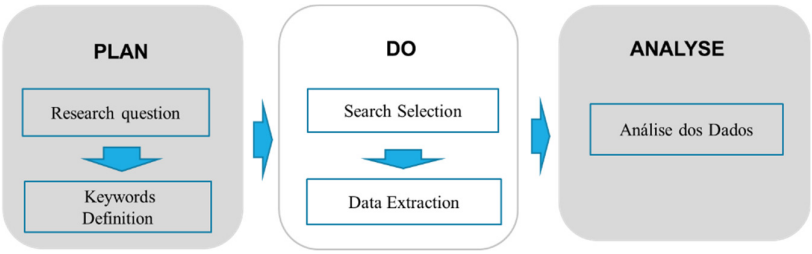

Fig. 1: Review protocol steps

Research Questions

For the study to achieve its objectives, that is, to provide researchers and practitioners with a structured categorized view of what has been produced in the digital transformation in Accounting literature, here are the two proposed research questions. The first concerns the presentation of a global amount of work on the subject, described below:

RQ1. How has the literature on digital transformation in accounting evolved over time?

Seeking answers of a more quantitative nature, this question has been broken down into the following:

RQ1.1. How has the number of publications on this subject evolved over time?

RQ 1.2 What are the main journals for this subject?

RQ1.3. Which countries contribute the most in terms of publications (considering the number of publications)?

The systematic review answers a well-defined research question and is characterized by being methodologically comprehensive, transparent and replicable (Donato H, et al, 2019). In this work of identifying the existing literature to create and develop new studies, a grouping of the major subjects and research questions was taken from the digital transformation in Accounting activities found in the publications from the sample in categories. Thus, the second question of this work is:

RQ2. What are the main issues in the scientific literature on digital transformation in Accounting?

The next section describes the process carried out to perform this systematic literature review.

The Sampling Process

The initial sample was taken from the indexed databases of the Scopus® portal by Elsevier B.V and the Web of Science Core ™ Collection (WOS) accessed through the ISI Web of Knowledge ™ portal. These databases were selected, because they provide interfaces that make it possible to carry out research from different sources through a common set of research chains. In a broad way, that is, without restriction of journals, periods or areas of knowledge, were selected and identified sources studies from 1974 to December 2019, such as: Journal of Corporate Accounting And Finance, Journal of Applied Accounting Research, Pacific Business Review International , focused on the area of Accounting and sources, such as, Journal of Information Technology, Advances in Intelligent Systems and Computing, Journal of Information Technology, as well as ACM and IEEE studies aimed at research in the area of Technology and Systems Engineering.

The initial sample was taken from the indexed databases only publications classified as "Article" and "Conference", which include the principles of these studies, were selected because they have undergone a rigorous peer review process prior to publication. Moreover, these works also contain all the information necessary (metadata) to undertake bibliometric analysis, with authors, references, number of citations and date of publication. Works that did not meet the above requirements were rejected under the quality criterion (Kitchenham and Charters, 2007).

Fig. 2 is a schematic presentation of the process for identifying and selecting the sample for the study. In the publication identification phase, with the use of preliminary definitions for the search strings, carried out on the databases indexed in Web of Science and Scopus. Then, the identical "scripts" of Search 1 and Search 2 were applied in databases used, restricting the search to "Summary", "Job Title" and " Keywords".

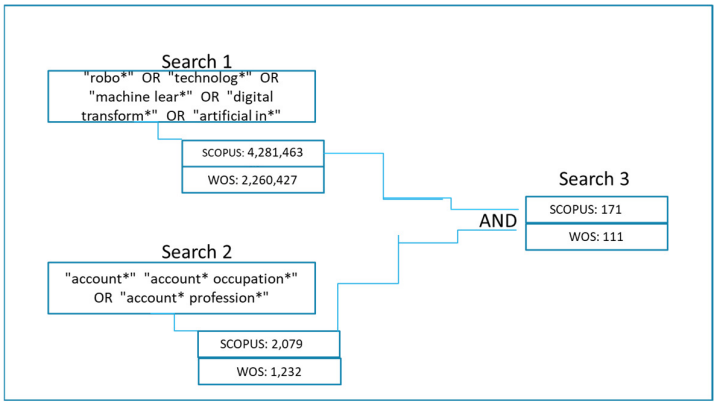

Fig. 2: Search and selection process - search phase – keyword

In Search 3 (Fig. 2), language verification was also inserted, restricting the materials to only the English and Portuguese languages for the authors' appreciation. The refined data from Survey 3 was inserted in the online tool ***Parsifal***[i], which allows researchers to carry out systematic analyzes of the literature, in the application of the review protocol, management of conduct and research documentation.

During the processing phase at Parsifal, this tool performs the identification of duplicate studies between the two sources of data Scopus and WOS, resulting in 232 relevant ones, demonstrated in the demonstrated in the transition from Phase 1 to Phase 2 in Fig. 3.

As Carvalho et al. (2013) suggested, during the triage process the authors of the present study read the titles and abstracts publication. And finally, they kept in the sample only those publications that everyone agreed met the inclusion criteria, that is, they fit the scope of the digital transformation in Accounting had the necessary metadata for the following stages of analysis. The authors created inclusion criteria, which provide potential data to answer the research questions, and exclusion criteria, as shown in Table 1.

Table 1: Search Classification Criteria

EXCLUSION	INCLUSION
No access	Study on Digital Transformation in Accounting Education
Unrelated to the research theme	Study on Digital Transformation and Impacts on Accounting Professionals
Addresses the subject superficially	Study on Digitally Based Technologies in Accounting (blockchain, big data, among others)
Duplicated	Study on Artificial Intelligence in Accounting

Among the 232 publications, 112 were rejected, through the analysis of title and abstract, and classified by the exclusion criteria, therefore, they were excluded from the bibliometric analysis and content phases (extraction). Thus, 110 publications were accepted and were analyzed in this study.

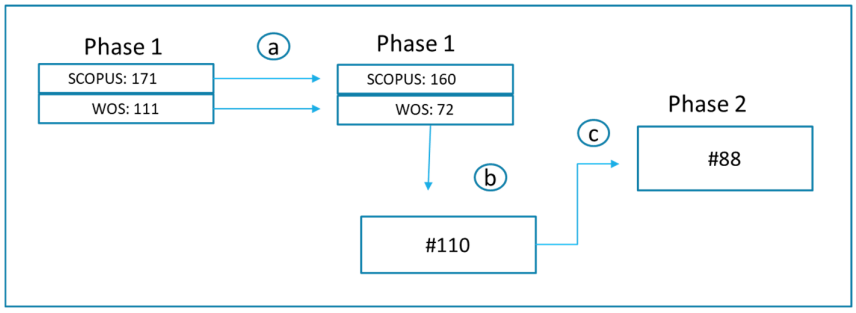

Figure 3: Phase selection

After the selection, it was also identified that in the selection we have articles from the Web of Science Core ™ Collection, the studies were transferred to *Parfisal* with the characteristics of "inprocessing", that is, a study that has not yet been granted full access, thus the publications approved for Phase 2 "C" were from 88 publications.

As shown in Fig. 1, the first activity in the selection and extraction ended the planning phase. Once the research protocol was completed, the practice of separating the sample was established excluding publications that did not meet the inclusion criteria.

Data Analysis

In the data analysis, bibliometric analysis and content analysis were used in order to identify the variety of scientific literature on digital transformation in Accounting, describing trends and identifying patterns.

Bibliometric Analysis

Bibliometric analysis aims is answer the questions related to the evolution of literature, making it possible to identify the most productive authors, journals and periods in which publications were produced, the evolution of publications over time (Ikpaahindi, 1985).

This subsection contains the results of the process of collecting quantitative data related to periods, publications, authors, citations and other information involving the journals that are part of the sample in order to answer questions RQ1.1, RQ1.2 and RQ1.3 of study.

Publications / year / period

The sample covers the period from 1974 to December 2019 and contains 88 publications during and selected works written in English and Portuguese. Only 13 articles (11%) were published between 1974 and 2000, between 2016 and 2017 there was an increase from 5 to 14 studies, and only in 2019 we had 23 (21%) of the total number of publications. It should be noted that 51% of the publications are from the last three years, clearly showing the intensity and growing interest of researchers in the subject.

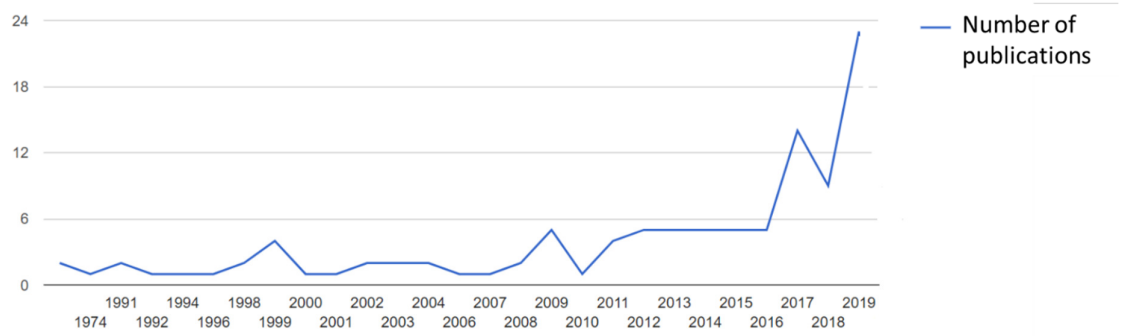

Fig. 3: Publications by Year

Publications / journals / periods

The 88 works in the sample were published in 50 different journals. Table 1 shows only the 5 main journals with the highest number of publications about this study. Moreover, 12% of the selected publications are concentrated in two journals: Journal of Accounting Education and Accounting Education.

Table 2: Number of publications by Periodicals

Rank	Journals	Num. Publications
1	Journal of Accounting Education	6
2	Accounting Education	5
3	Journal of Information Systems	3
4	Journal of Corporate Accounting and Finance	3
5	Accounting Information Systems	3

Countries / Publications

Finally, a location analysis of the main references on the digital transformation of Accounting was made Fig. 4. Of the 88 articles considered, the United States has more publications (35), followed by China (12); Australia (7); United Kingdom (6); Romania (5), Iran and Singapore (3), Malaysia and Turkey (2) and the other countries with only one publication.

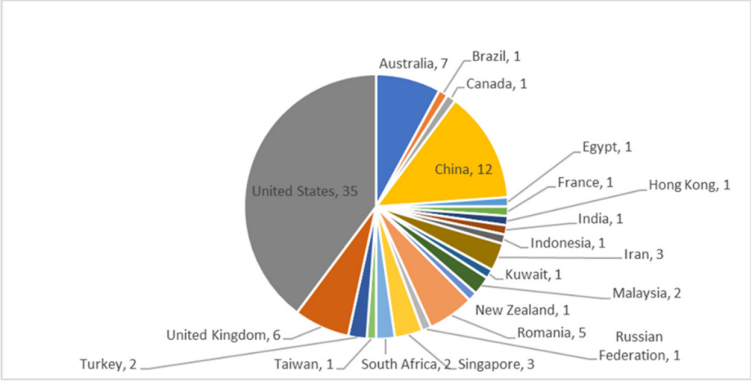

Fig. 4: Publications by country

Content Analysis

During the study, content analysis was used to search for main topics, approaches and methods, most important of the subject in question. For this study, was used the *VosView tool*, which allows organizing the data generated in a "cluster" from the most frequent words and building relationships between them, as shown in Figure 5. The cluster analysis included a variety of methods to classify data multivariate in subgroups, which can help to reveal the characteristics of any structure or pattern present (BS Everitt, 2011).

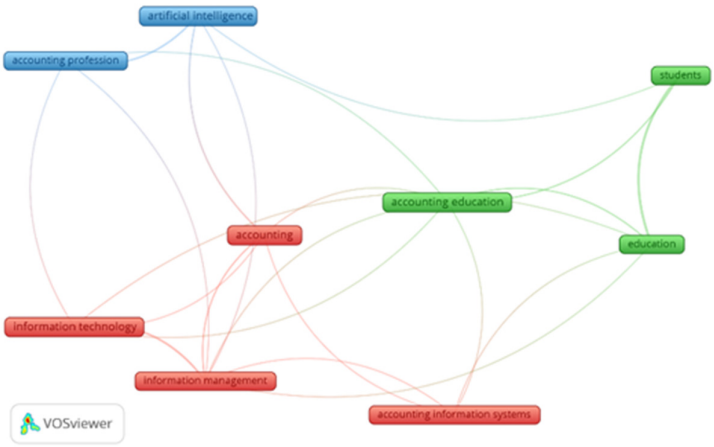

Fig. 5: Grouping by Frequency of Terms

One can see in Fig. 5 there is no direct mention of the term “Digital Transformation in Accounting”, but a grouping of related terms related to the study. However, by performing an analysis of the contents classified for inclusion criteria (Table 1), it is possible to identify synergy between the collected works.

During the analysis and classification of the contents of the collected articles, 44 articles (50%) were identified, highlighting the dynamic nature of information technologies, analyzing their impacts and the need to redefine new skills and competences for the accounting profession (Ku Bahador et al, 2013 and Wilson, et al, 1992) that were highlighted by the cluster in red in Fig. 5.

The second major aspect of the articles is aimed at studies on the impacts of Digital Transformation with a look at the Education and Training of Professionals, 19 (22%) were identified that present ways of identifying whether aspiring professional accountants acquire sufficient knowledge and develop necessary IT skills through empirical research analyzing university curricula, (Stanciu, V.et al, 2015).

Regarding the cluster highlighted in blue (fig. 6) with the theme Artificial Intelligence applied to Accounting, 6 articles were identified, with the main objective to demonstrate how Artificial Intelligence works in an innovative way with the internal control systems to help managers to produce information high quality accounting, reducing the risk of information (Askary, S. et al, 2008)

Finally, the remaining articles 22 are focused on digitally based technologies, such as Blockchain, Big Data, XBRL, among others that seek to identify barriers, group them as related to technology, as well as investigate current practice with regard to the use of these for these innovations, as cited by Perkhofer, Lisa Maria et al (2019) and Tan, BS et al (2019).

Conclusions

This article shows that, among the 88 selected studies, 2019 was the year with the largest number of studies on Digital Transformation in Accounting, and there is a growing trend of publications on this subject. In relation to the journals that published the most on the topic, the Journal of Accounting Education and Accounting Education stand out.

Among the countries, the country with the most publications is the United States, followed by China and few publications in Brazil on this subject; and the studies mainly address the relationship with Digital Transformation in Accounting and the impacts on Accounting professionals (50%), their activities and skills. Followed by the second focus is the impact of digital transformation in the educational structure, which is directly complementary to the need for IT skills and technical knowledge to be developed in your professional accounting training.

The low number of scientific studies on the impacts of digital transformation in Accounting shows that there are gaps and questions to be answered. Future studies can be carried out in the area, comparing and validating the results presented here, especially with the expanded search criteria and databases. In addition, other analysis techniques, such as the example of semantic analysis, can be used in the search for new concepts, definitions or common terms that would best characterize the works, as well as validating the results of this systematic review. Another interesting insight for future research is the relationship between topical research that appears in the network analysis as the strong relationship to the development of new skills and competences to be expected in the training of accounting professionals in technologies and what activities and functions of accounting professionals can be impacted by digital transformation.

[1] Parsifal is an online tool designed to support researchers to carry out systematic reviews of the literature in the context of Software Engineering. https://parsif.al/

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The Mediation of Financial Return Between Innovation and Sustainability of Small Social Entrepreneurship: A Case of Developing Country

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Abstract

The purpose of this study is to establish the mediation of financial return between innovation and sustainability of small social entrepreneurship. Earlier research is limited in this perspective, and therefore this study focuses on filling the gap as far as the relationship between innovation and sustainability of social entrepreneurship is concerned. The research data for this study comes from Nigeria by adopting a Likert Scale questionnaire through a convenience sampling approach. In the data analysis, this research utilized SPSS ver. 25 and SmartPLS ver. 3.2.8 for descriptive statistics, structural equation modeling, and mediation analysis. At the end of the study, the findings show that there is a direct relationship between entrepreneurial innovation and its sustainability, which is mediated by financial return in the developing countries' settings. While this study has successfully established the clarity concerning the relationship between the chosen variables including, innovation, financial returns, and sustainability of social entrepreneurship in the developing countries, there is the need for further research due to the global significance of social entrepreneurship. The research discusses the limitation of the study and recommends future research to focus on comparative study between countries, gender divergence study, culture, and technological effects in social entrepreneurship**.**

Keywords: Social Entrepreneurship, Innovation, Financial Return, Sustainability

Introduction

There is a need for an increase in call and commitment to social entrepreneurship in Africa due to perennial problems and inconsistent policies. One of the engines of economic growth and prosperity in a country is entrepreneurship (Cornwall, 1998; Roundy, 2013). The entrepreneur is the vector of change since its fulfills a certain number of functions (Vries, 1977). Among these functions are the obligation to “undertake”, the recognition and creation of opportunities through innovation and creativity (Dees, 1998; Kings and Roberts, 1987). This opportunity indicates, the displacement of resources from places with low productivity, to qualified areas with high productivity (Kirzner, 1979). Thus, whatever the

role and the place of the entrepreneur, entrepreneurship is a catalyst of economic and social growth for the states which aspire to the emergence for the simple reason that they can influence the economic atmosphere, upset the business climate, and above all, sharpen wealth (Weerawardena and Mort, 2006; Sanusi, Olaleye and Atjonen, 2017).

Several Governments, from Africa, Europe, America and Asia are becoming more and more interested in entrepreneurship by considering it as a revolution which thus responds to the problems of society which are sometimes considered as complex. In Africa, several states have emerged as leaders in the field of social entrepreneurship and social openness in view of the opportunities it abounds in the efficient reduction of poverty, the improvement of the health system, access to educational opportunities and especially the improvement of several social problems for poor communities in disadvantaged countries. Social entrepreneurship, therefore, takes its foundations from the main desire to create wealth, unlike the generation of wealth as conceptualized for companies whose goal is to generate economic wealth (Drayton, 2002; Stevens, Moray, Bruneel and Practice, 2015). Similarly, businesses with an entrepreneurial vocation and carrying out entrepreneurial activities are increasingly known as a strong economic and social indicator in today's society (Mair and Martí, 2006; Urbano et al., 2017).

This study is very important because of the gap in the intervention of financial return between innovative social entrepreneurship and sustainability. This study explains the direct and indirect relationship of innovation and sustainability of small social entrepreneurship in a developing country setting. This result shows a significant direct relationship between innovation and sustainability and the mediation of financial return. This paper is therefore structured as follows: the next section presents a state of the art of the environment of social entrepreneurship in developing countries. Next, we will highlight the variables that make up our research model. The methodology of the study will then be approached in part 4. It will also provide information on the distribution of the questionnaire, the method of analysis of the data collected, the instruments of measurement of the model as well as the structural model of the study. The following section will be reserved for results and interpretation according to the research objectives of the study. The next two sections will be reserved for stating the various theoretical and managerial implications. Finally, we will discuss the different limits of our study as well as the various suggestions for the next studies.

Social Entrepreneurship in Developing Countries' Settings

The various researches on social entrepreneurship for decades have turned more towards a desire to differentiate social entrepreneurs with philanthropic vocation from traditional social entrepreneurs (Austin, Stevenson and Wei-Skillern, 2017; Dhesi, 2010). This research has therefore drawn from the roots by analyzing each entrepreneurial life cycle, from the moment a person is motivated to become an entrepreneur until the moment when he structures and organizes his business. Also, research has focused on financing mechanisms and obtaining financial resources by social entrepreneurs. (Roundy, 2013), for example, analyzed the different speeches and communication methodologies used by social entrepreneurs to attract investors, the media and even business incubators. Social entrepreneurs play a unique role in the social economy through their ability to generate positive gains that impact unrelated individuals not involved in the supply chain (Roundy, 2017; Santos, 2012). The mission of the social entrepreneur is central, detailed and clear. It significantly influences how he assesses an opportunity and explores market trends. Therefore, the impact of mission emerges as a fundamental criterion to the detriment of the creation of wealth, which is only one of the many means of achieving its ends. The creation of value pawns the creation of wealth for a social entrepreneur (Dees, 2018).

As a social service, social entrepreneurship in Africa is a concrete path to positive social change to improve living conditions, and above all to restructure ecosystems. To achieve positive social change with a significant impact on several social strata, several channels should be considered, such as awareness campaigns, advocacy, policy documents, lobbying with appropriate organizations, research, education, and strong legislative restructuring. Africa, the cradle of humanity, regarding social disparities and economic opportunities, presents unique characteristics for researchers in social entrepreneurship. When we consider the enormous economic and social challenges, it is ambitious to

say that the needs that emerge can be transformed into opportunities for companies with a social vision. In this scenario, companies can broaden their fields of intervention by moving from an open economic model to one that responds to specific social challenges such as extreme poverty, marginalized communities and institutional voids. It is then that the mesh between the specificities and social, economic and cultural realities of Africa and social entrepreneurship can lead to a good perspective.

Social Entrepreneurship Atmosphere in Africa

Sub-Saharan Africa is the poorest part of the African continent according to the social- economic indices of the World Bank (Beegle and Christiaensen, 2019) ; It is therefore a mesh of very high social and economic inequality and a high level of poverty that radically changes the vision and the social objective of entrepreneurship. Social entrepreneurship is born when expectations are far from the realities shown by the private sector and governments. It also emerges when expectations can lead to a positive external impact. Huge social problems are also seen in low-income countries in Sub-Saharan Africa, which is a huge breach for the myriad of opportunities for social enterprise creation. Recent discoveries by (Santos, 2012) state that in view of the multitude of social problems existing in Africa, the emergence of social entrepreneurship is therefore important for the strengthening of attributes unique to Africa, and the consolidation of the specificities observed. Indeed, the current African context is therefore favorable for poor and disadvantaged communities in terms of the inclusive aspect, and in terms of difficulties in understanding their external needs (Nega and Schneider, 2014; Pless, 2012). Regardless of the social aspect on the ground, a climate characterized by an extremely high poverty rate will therefore tarnish the social vision associated with businesses. In view of this, the trends would therefore tilt towards the higher the level of poverty, the greater the self-perception as a social enterprise and therefore a choice of activity sector with a strong social dimension. In Africa, the economic, social and cultural environment is strongly influenced by ethnic and tribal groupings, higher than the rest of the world (Berman, 1998). These cultural and ethnic groupings come in several cases to complement the national institutional framework recognized by the states. (Michalopoulos and Papaioannou, 2012) found that several well-known ethnic and cultural groups can help influence social entrepreneurship since they already greatly influence the economy.

The Colonial Legacy

It is undeniable that colonization had a strong consequence on the economic and social life of several African states, and the traces of this colonization are up to the present day visible on several dimensions. It has also tainted the economic, political, social and even cultural fields of several African states with serious consequences, which are felt even fifty years later. Several researchers have conducted comparative studies in several areas of Africa according to whether they were colonized by the British or other parts of the world. At the end of this investigation, the observation is the same: the countries which had British colonizers tend to be more developed than the countries which had French, Portuguese, German, and even Belgian colonizers. This development gap therefore has a significantly large impact and modifies the structure and conception of what social entrepreneurship is in several countries and following colonial history.

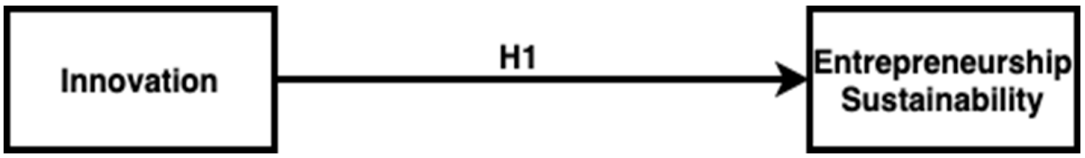

Figure 1: Study one hypotheses conceptual framework

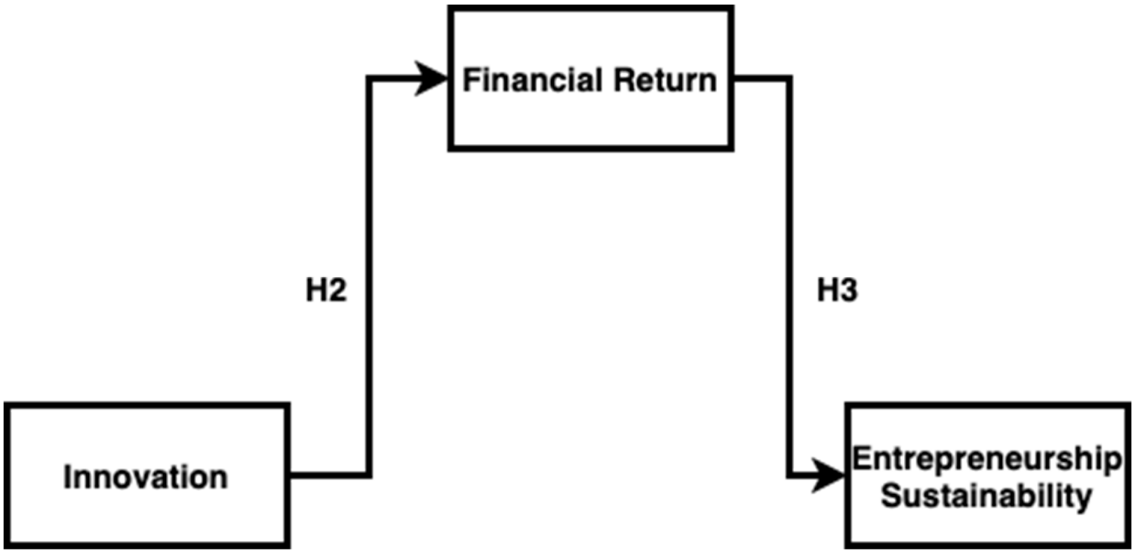

Fig. 2: Study two hypotheses conceptual framework

Social Entrepreneurship Variables

Innovation

Innovation is an important aspect of social entrepreneurship. For the entrepreneur, it is not a question of limiting himself to the resolution of a trivial problem, but to an innovative proposal of lasting and effective solutions which go to the root of the problem and deal with it effectively. To get there, therefore, it would take a lot of creativity and innovation because creativity figures in all the reflections and actions of the social entrepreneur. Even if there is no question of devising a new solution in a situation, the social entrepreneur must be innovative, creative and imaginative in how to go about it in order to maximize reflection in production. Subsequently, it was discovered that social entrepreneurship gives the possibility of bringing together different actors of social change which contributes to carrying out concrete and practical investigations that go beyond borders.

H1: Innovative social entrepreneurship is a direct predictor of small entrepreneurship sustainability.

H2: Innovative social entrepreneurship directly predicts financial return of small entrepreneurship and financial return mediates between innovation and sustainability of small entrepreneurship.

Financial Return

The entrepreneurial economic vision is based on the premise that the mission of a social entrepreneur incorporates maximum profitability of financial income. Concretely, social entrepreneurship has a mission to complete the shortcomings observed in government actions in the production of public goods and the social satisfaction of citizens (Hartigan, 2006) . It is a mix of business models integrating a non-profit, hybrid, and social enterprise architecture. Hybrid businesses flourish partially thanks to the profits generated by goods and services, but also through various grants and donations from governments and organizations (Prahalad, 2009). In addition, the social enterprise differs in that it accentuates efforts, activities and visions on social and financial returns and impacts (Meador, 2014). This means that in this case, a shareholder of a social enterprise receives a return on investment but does not receive dividends because the profits generated are reinvested in the light of the vision and the social objectives set.

H3: Financial return directly predicts sustainability of small entrepreneurship and mediates between innovation and sustainability of small entrepreneurship.

Methodology for Social Entrepreneurship Study

Questionnaire Formulation and Administration

This study reviewed relevant literature on social entrepreneurship innovation, financial return, and sustainability. It adapts Likert Scales questions from the extant studies ranging from 5=strongly agree to 1=disagree. The study designed demographics questions on gender, age, marital status and education levels of a social entrepreneurs in Nigeria's emerging economy. This study targets the social entrepreneurs in Nigeria because of its precarious economic conditions. The study adopts quantitative methodology and administered questionnaires online through Qualtrics to social entrepreneurs. The study considers the participant's privacy and creates an opportunity for the respondents' consent of participation. The social entrepreneurs that participated in this study account for 37 (Peng and Lai, 2012) based on convenience sampling and the data was collected less than two months between the second and third quarters of 2019. The study utilized SPSS ver. 25 for descriptive statistics, and SmartPLS ver. 3.2.8 for measurement, structural analysis and Bootstrapping to test the formulated hypotheses.

Table 2: Demography Descriptive Statistics

Descriptive Variable	Frequency	Percent
Gender		
Male	34	91.9
Female	3	8.1
Age		
Under 25	1	2.7
25 - 34	15	40.5
35 - 44	14	37.8
45 - 54	5	13.5
55 and above	2	5.4
Marital Status		
Single	10	27
Married	27	73
Education		
High School/Diploma	5	13.5
Bachelor	18	48.6
Masters	12	32.4
Doctoral	2	5.4

Information about Descriptive Statistics and Insights

Descriptive statistics analysis and interpretation are important for the simpler interpretation of the data. The result of the descriptive statistics (Table 2) shows that male social entrepreneurs 34 (91.9%) participated in this study and accounts for the greater participants than the female that only accounts for 3 (8.1%). This low turnout of female social entrepreneurs in Nigeria shows that male social entrepreneurs are more interested in issue that pertains to innovation, financial return, and sustainability than their female counterparts. Regarding the age brackets of the social entrepreneurs that participated in this study, ages 25 – 34, which accounts for 15 (40.5%) had the highest frequency followed by ages 35 – 44 with 14 frequency (37.8%). Ages 45 – 54 and 55 and above records are sparing frequency of 5 (13.5%) and 2 (5.4%), respectively. For marital status, the married social entrepreneurs 27 (73%) are more than single social entrepreneurs 10 (27%), and it shows that the majority of the social entrepreneurs that participated in this study are matured based on their marital status. Education-wise, the social entrepreneurs had 18 bachelor holders (48.6%), 12 Masters holders (32.4%), 5 High

School/Diploma holders (13.5%) and 2 academic doctors (5.4%). The descriptive shows that the social entrepreneurs involved in this study are well educated.

Measurement Model of the Study

This study checks the quality criteria of the proposed model before proceeding to the stage of structural equation modelling and founds that all the items loaded well under each factor based on (Fornell and Larcker, 1981) postulation. In Table 3, Innovation had a minimum of (0.873 and a maximum of 0.920). Also, Financial Returns had minimum of (0.886 and maximum of 0.899) while Sustainability had minimum of (0.738 and maximum of 0.928). Table 4 shows the quality criteria of the utilized variables and the Composite Reliability results were all above the thresholds of 0.7 (Bagozzi and Yi, 1988) in the literature and Average Variance Extracted (AVE) also above the boundary of 0.5 (Anderson, Anderson and Hurst, 2010) and the values were strong between the minimum of 0.728 and maximum of 0.805. The model is discriminant valid with diagonal values of Financial Return (0.894), Innovation (0.897) and Sustainability (0.854) and the variables are strongly correlated.

Table 3: Items loadings of Innovation, Financial Return and Sustainability

	IN	FR	SU	ITEMS QUESTIONS
IN1	0.873			…identifying social opportunities
IN2	0.920			…deliver sustainable advantage through innovative goods and services
FR1		0.886		Survival through profits is my aim
FR2		0.897		Making profits a means to achieve a social goal
FR3		0.899		Maximizing the wealth of their investors
SU1			0.738	Environmentally friendly
SU2			0.922	Improve quality of life in the long run
SU3			0.814	Promotes solutions that are ethical
SU4			0.928	…social and environmental concerns

Note: Weak items loading dropped from the study
IN: Innovation, FR: Financial Return, SU: Sustainability

Structural and Mediation Model Result

This section shows the SmartPLS algorithms and bootstrapping results. It also shows the hypothesized variables and the outcome of their relationships (Figures 1, 2, and Table 4). This study hypothesized (H1) that innovative social entrepreneurship directly predicts small entrepreneurship sustainability, that is, Innovation->Sustainability ($\beta = 0.73, t = 7.32, p < 0.05$).

Additionally, the study hypothesized that innovative social entrepreneurship directly predicts the financial return of small entrepreneurship (H2) and financial return mediates between innovation and sustainability of small entrepreneurship, that is, Innovation -> Financial Return ($\beta = 0.60, t = 6.02, p < 0.05$) and also hypothesized that financial return directly predicts sustainability of small entrepreneurship (H3) and mediates between innovation and sustainability of small entrepreneurship, that is, Financial Return->Sustainability ($\beta = 0.65, t = 3.73, p < 0.05$). Innovation as a direct predictor of sustainability has the highest predictor value than other path-coefficients. Besides, the R^2 for Financial Return explained 34.3% variance while Sustainability explained 40.6% variance. Besides, the effect sizes of the variables are extreme. Innovation had f^2 (0.57) while Sustainability had f^2 (0.73). According to (Hair et al., 2016), this is an indication of a strong effect size. In all, sustainability of social entrepreneurship in the context of a developing country had the highest R^2 and f^2 (Table 4). This study established the mediation of financial return based on the three research questions established in the study of (Sarstedt et al., 2014) . First, the study excluded financial return from the path model and embarked on bootstrapping. The bootstrapping result shows that the direct effect between innovation and sustainability is 0.733 and significant at $p \leq 0.01$. Second, the study re-estimating the full model

by including the mediator variable and tests the indirect effect significance. The bootstrapping results indicate that the indirect effect yields 0.391, and it is significant at $p \leq 0.01$. Third, the study computes the Variance Accounted For (VAF) with the below formula:

$$VAF = \frac{indirect\ effect}{total\ effect}$$

The final analysis results for VAF is 0.533 which indicates that there is a partial financial return mediation effect between innovation and sustainability (Sarstedt et al., 2014) .

Table 4: Values of quality criteria of the variables

	FR	IN	SU	CR	(AVE)	R^2	f^2
Financial Return	**0.894**			0.923	0.799	0.343	
Innovation	0.601	**0.897**		0.892	0.805		0.566
Sustainability	0.650	0.731	**0.854**	0.914	0.728	0.406	0.733

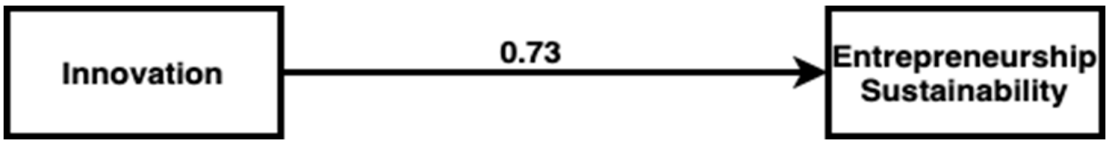

Figure 3: Social entrepreneurship result of tested hypotheses of study 1

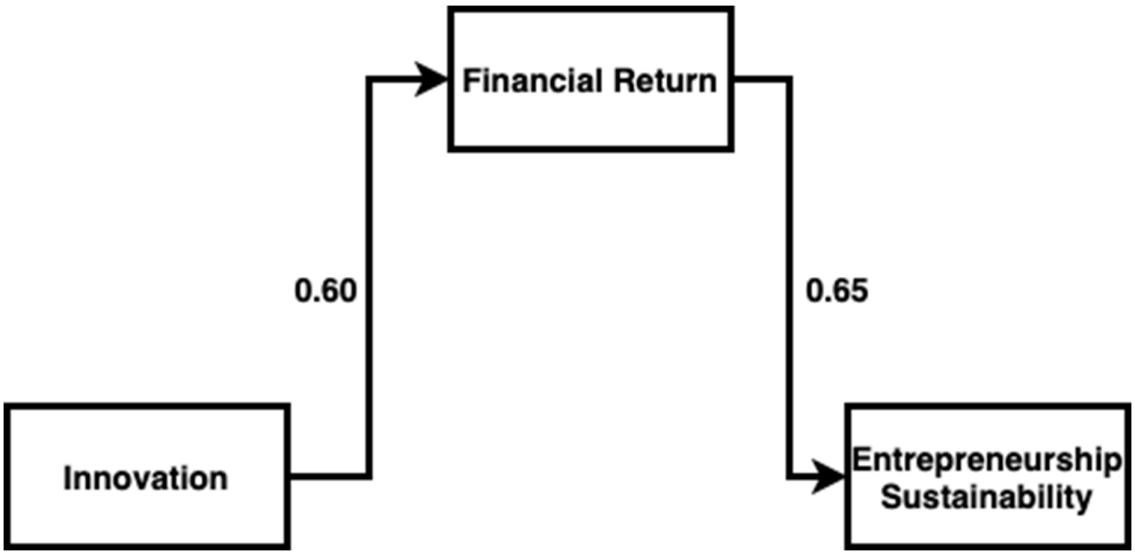

Fig. 4: Social entrepreneurship result of tested hypotheses of study 2

Table 5: Result of tested hypotheses for social entrepreneurship

Hypotheses	Variable Path Coefficient	OS	SD	T. Values	P. Values
H1	Innovation -> Sustainability	0.73	0.10	7.32	0.000
H2	Innovation -> Financial Return	0.60	0.16	6.02	0.000
H3	Financial Return -> Sustainability	0.65	0.11	3.73	0.000

Note: OS: Original Sample, SD: Standard Deviation

Result Discussion

The social entrepreneurs are world changers, especially in developing countries, as they engaged in poverty alleviation through economic and humanitarian intervention to lift people out of poverty. Social entrepreneurship is crucial in the developing nations because poverty has different ripple effects of increases health, economic, and political risks. This study probes the direct and indirect relationship of innovation, financial return, and sustainability as an integral part of social entrepreneurship dimensions based on the earlier recommendation of (Valle et al., 2018) . The findings of this study show the direct relationship of innovation and sustainability as the most significant part of social entrepreneurship in a developing country context. This result indicates that the higher the innovative social entrepreneurship, the higher the sustainability of social entrepreneurship. It indicates that the social entrepreneur that is not innovative will find it challenging to be sustainable. Eleven years ago, the earlier authors stated that there was no sustainable pressure in developing countries than in developed countries. However, today, things are different as sustainability has become a global issue, and there are more focus on the developing countries because they are the epicenter of sustainability needs (Nidumolu, Prahalad and Rangaswami, 2009) . It is possible for a social entrepreneur that considers resource conservation in their product or service life cycles and the supply chains with a core sustainable strategy to have a financial return. Inculcating innovation in a social entrepreneur's sustainable plan helps to get rid of harmful impacts on ecological systems and human health and facilitates healthy communities. There is a strong affinity between innovation and financial return, and in current research, building social capital and persistence innovative role was recommended to the social entrepreneurs (Olaleye, Mogaji, Watat and Ukpabi, 2020). On the other, (Sołtysik, Urbaniec and Wojnarowska, 2019) described sustainable development as an entrepreneurial opportunity to solve social and environmental challenges while (Leal-Millan, Peris-Ortiz and Leal-Rodríguez, 2018) advocate for green innovation and actions that promotes strategies, policies, and practices that curb negative human activities in the environment. The thoughts from the current studies support the significance of direct and indirect intervention of innovation, financial return, and sustainability in the context of social entrepreneurship in a developing setting.

Theoretical Inputs

The direct and indirect relationship between innovation and sustainability in the context of social entrepreneurship in a developing country theoretically contributes as follows. This study sheds more light on the importance of social entrepreneurship dimensions and underscores the structural relationship of innovation and sustainability with high effect size. Second, it shows the mediation effects of financial return and how it transfers the effect from innovation to sustainability. This study established the focal role of financial return as a means of promoting social activities in developing countries with a focus on sustainability. The results of this study are in tandem with earlier studies of (Nidumolu, Prahalad and Rangaswami, 2009; Leal-Millan, Peris-Ortiz, and Leal-Rodríguez, 2018; Sołtysik, Urbaniec and Wojnarowska, 2019; Olaleye, Mogaji, Watat and Ukpabi, 2020). All these studies contribute to the positive direct or indirect relationship of innovation and sustainability, but only a few pay attention to the mediation of financial return. It is clearer that financial return is an essential variable of consideration for social entrepreneurship.

Managerial Inputs

Managerially, this study identifies the direct relationship of social entrepreneurship innovation with its sustainability and the mediation of financial return between innovation and sustainability and offers implications for social entrepreneur managers. First, for existing social entrepreneurs and incoming managers to harness ways of having financial returns to be able to solve complex social needs in the developing countries. Though their objectives are not profit-making, they should look beyond the funders to identify other means of generating income to reduce poverty in society through social missions. Second, change and imbibing innovative ideas are crucial for the development and advancement of social entrepreneurship. The social entrepreneurs should not be satisfied with their present breakthroughs, and they need to innovate more to promote sustainable environmental practices that can foster a healthy community. Third, the social entrepreneurs' managers should implement an innovative sustainability policy and ethics that is robust as a guide and preventer from deviating from sustainable practices.

Limitations of the study and future suggestions

Social entrepreneurship is a growing trend in the developing countries, and this study paved the way for future extension of this research. Despite this study's contribution, there is still a limitation that gives insight to the academic community. This study used three variables from social entrepreneurship dimensions due to its focus, but the future study should look beyond these dimensions and investigate the interplay of culture and emerging technology with the established social entrepreneurship dimensions. Social entrepreneurship is a global issue, and the results of this study should trigger a comparative study between emerging and established economies. The female social entrepreneurs participated less in this study, and this gap should give birth to gender study in the context of social entrepreneurship and its dimensionality. Future researchers should examine the gender divergence of male and female social entrepreneurship as a comparative study of developed and developing nations.

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The Strength of Agreement of Students' Academic Performances as A Counseling Guide for The University Prospective Admission Seekers

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Abstract

This research examines the strength of agreement of students' academic performances for their first and graduating year in the University using Cohen's kappa. Academic records of 710 students which consist of students Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA) for their first and graduating year. This paper is to examine the final academic performances of students in the University based on specific information regarding their academic performances during their first year at the University. This study reveals that a strong agreement exists between the students' first and graduating year academic performance in their result. This work will serve as a useful counseling guide to prospective admission seekers and all stakeholders at enhancing students' academic performances in the University system. This study is divided into five sections: introduction, literature, methodology, discussion while the study limitation and future study forms the part of the conclusion.

Keywords: Academic performance, Intra-class kappa, Cohen's kappa, Cumulative grade point average

Introduction

Academic performance is the outcome of student-teacher efforts, and it depicts the student's preparation and how well the students respond to the material presented to them in the class by the teacher. Research on academic performance is growing, and many authors have contributed positively to the research domain of academic performance, theoretically and methodologically. Some of the recent studies by (Mensink and King, 2020) focused on student online feedback based on the assessment marks, gender and academic performance with educational data mining and discovered gender divergence in how students get feedback through the Learning Management Systems (LMS). Besides, (Baert et al., 2020) explore the correlation or causal relationship of Smartphone use and academic performance with samples from two Belgian Universities with instrumental variable estimation techniques, and their results show that a standard-deviation increase in daily use of Smartphone by the students yields a decrease in their average examination scores. (Donovan et al., 2020) digressed to the environmental impact on student's academic performance based on individual-level standardized mathematics and reading test scores.

They found that an I-SD upward shift in road density within 100 m of a student's home associates with advancing from the 50th percentile to the 47th percentile on reading tests. Consistent with (Mensink and King, 2020) study, (Fernandes et al., 2019) also used data mining to predict the academic performance of students in the central part of Brazil within school terms of two years, and their study found that the attributes of student grades and absences are the most relevant variables to predict the year academic outcomes of student performance. Recent studies by (HemaMalini, Suresh and Kushal,

2020) applied three machine learning techniques for performance analysis of the students and determined the factors affecting their performance. The result shows that Random Forest is the best technique in terms of accuracy, and the factors that contribute to student's performance are parent's education, attention from the faculty members to perform better, number of backlogs, and admission quota while (Mallikarjun Rao and Ramana Murthy, 2020) predicted and examined factors affecting student's performance using the XGBoost classifier.

The result identified parent education, the medium of instruction, style of learning as some of the factors that influence students' performance. (Yaacob et al., 2019) also used supervised data mining to predict student performance using some selected universities in Malaysia. The result shows that Naive Bayes performed better than the other methods. It also reveals some factors contributing to the students' performance. The authors focused on students' performance in different perspectives with different data analysis techniques but the aspect of strength of agreement of students' academic performances as a counseling guide for the University prospective admission seekers is insufficiently researched.

This research, therefore, considers the influences of the student's academic performances during their first year in the University and on their final academic performances and the main objective of this paper is to examine the final academic performances of students in the University based on specific information regarding their academic performances at their first year in the University. Results from this study would enable students to efficiently prioritize their social engagements vis-à-vis their academic activities during their first year in the University as build-up steps towards attaining academic excellence at the end of their studies at the University. This study is divided into five sections: introduction, literature, methodology, discussion while the study limitation and future study forms the part of the conclusion.

Exegesis of Performance Literature

Research is progressive in the research domain of students' academic performance and several researchers have examined the phenomenon. For instance, (Sadiq and Ahmed, 2019) classified and predicted student's performance using Decision Tree C4.5, Random Forest, Support Vector Machine, and Naïve Bayes. The authors also came up with an improved Decision Tree and compared it with the traditional Decision Tree C4.5. The result shows that the improved Decision Tree performed better than the traditional one when applied to three Universities in Iraq. (Sawant et al., 2019) employed Decision Tree in predicting student's performance by including some other factors that may affect their performance in the dataset used.

Still on the use of Decision Tree, (Adebayo and Chaubey, 2019) employed it in classifying and predicting student's performance in high school during a quiz. The authors reveal that the result will help teachers and students predict future performance based on the previous score in the quiz. Moreso, (Sitepu et al., 2019) compared the performance of the Decision Tree and Support Vector Machine method in classifying and predicting the student's performance in getting a scholarship. The result reveals that Decision Tree outperformed the Support Vector machine method in terms of accuracy to predict student's performance in getting a scholarship.

Differentiating from Decision Tree, (Alkadhwi and Adebayo, 2019) used the K-means algorithm to predict the student's performance. The authors reveal that the information from the result can be used by the Universities and Education sector to prevent drawbacks and failures in student's results in the future while (Salal, Abdullaev and Kumar, 2019) implemented nine algorithms to predict and classify the student's performance. The result shows that the school and the study time of the students play a significant role in affecting the student's performance, and three algorithms performed better in terms of accuracy in predicting the students' performance.

Besides, (Sasikala, Rajesh and Sreevidya, 2020) classified and predicted the academic performance of Alcoholic students using a classification model that uses Naïve Bayes and ID3. The authors compared the accuracy of R and Weka in terms of Naïve Bayes. The result shows that Naïve Bayes implemented in R performs better in terms of accuracy than Weka. The accuracy is the same when all the attributes and some of the attributes implemented in R and Weka for ID3 and (Mavani et al., 2020) employed Naïve Bayes classification, which is implemented in R, Weka, Python, and Orange to predict student's performance in S.S.C. and H.S.C. examinations. The result reveals that the Naïve Bayes implemented in Weka performs better in terms of accuracy. The authors suggest that future work will be able to identify the student that needs special attention and guidance to increase their likelihood placement.

Machine learning is now a groundbreaking data analysis technique and (Sana, Siddiqui and Arain, 2019) employed three different classifiers such as Naive Bayes, Decision Tree, and Artificial Neural Network, to examine the effect of some factors on student's performance. In terms of accuracy the result reveals that Artificial Neural Network is the best. Also, the result shows that student's punctuality and parents participating in the learning process are some of the factors that influence students' performance.

Also, (Adejo and Connolly, 2018) predicted student academic performance using multi-data sources with a multi-model different ensemble approach and founds that the approach used command efficiency and accuracy in predicting student performance and helps to identify the student risk of attrition. Also, (de Boer et al., 2018) carried out a meta-analysis review of the effects of metacognitive strategy instruction on student academic performance. Their study discovers the positive small increase effects of long-term strategy, but some specific strategies employed such as metacognitive, cognitive, management, and motivation failed to moderate the overall positive long-term effect of metacognitive strategy instruction. All the studies mentioned above show that one data analysis technique is not sufficient to evaluate and predict student academic performance. Applied linear regression and correlation analysis characterize the study of (Balogun, Oyelere and Atsa'am, 2019) as they determine the relationship between computing students' initial and final academic performance to support decision making in higher education institutions. Their study shows that there is a strong relationship between their first GPAs and graduating CGPA.

Education is defined as an efficient technique for the exchange and change of culture, through formal or informal training of people in a society (Oghuvbu, 2007) . It is a procedure that prompts mental, physical, psychological, and social development of a person in a given society. The prime target of getting educated throughout the world geared towards labor improvement that would encourage national development and advancement. As an instrument for the advancement of man and the general public, the way towards acquiring formal education can be compartmentalized into different categorized stages starting from primary (kindergarten) to higher (tertiary) levels (Ebong, 1996). This various categorized structure of education varies, starting with one nation then onto the next. Presently, there are 165 government-endorsed Universities in Nigeria, 43 of which built up and supported by the Federal Government of Nigeria, and the State Governments own 47 in Nigeria while private entities also own 43. These universities admit several students into their various programs and graduated a reasonable number of them with a different class of degrees annually.

The employability of graduates after University, to a great extent, relies upon the class of degrees they had at the end of their programme. Consequently, it is essential to analyze and assess the procedures that decide the final academic performances of the students while they are still in the Universities. The first year of students in the University is usually portrayed by a long list of activities such as orientation programme, students' union activities, traveling show, having sideshows, sightseeing and rides, engaging in games of skill and the like, all in a bid to get themselves adapt to the new school environment not quite the same as their origination. While these activities would enhance the social status of the students in the school, regrettably, they are similarly equipped for diverting the students from their genuine academic pursuit for their admission into the school.

Cohen's kappa coefficient (k) is a statistic that uses to measure inter-rater reliability (and intra-rater reliability) for qualitative (categorical) items. Kappa statistic is an excellent tool to test the level of agreement between two raters. Relevant studies such as (Banjoko et al., 2015) used kappa statistics to examine the strength of agreement between students' academic performance after their first and graduating year and also examine the factors that influence the students' academic performances at graduation by fitting a Multiple regression model. Also, (Elepo and Balogun, 2016) used Cohen's kappa and Intra-class kappa statistics to examine students' academic performance using their GPA and CGPA in their first and final year.

There are similarities in student's performance studies. (Oguntunde et al., 2018) and (Popoola et al., 2018) used comparable data in their work to study the trend of students' performance in the tertiary institution using multiple regression and correlation analysis for the students first, second, third, fourth-year GPA and final CGPA. They found out there is a strong relationship between the students' GPA and their CGPA. In the current study, we will be using Kappa statistics to reveal the strong agreement that exists between the students' first and graduating year academic performance. The study also shows the percentage of students who improve, maintained, or drop in their academic performance using the same dataset.

Material and Methods

Data Description: Data on results of academic performances of programs in three engineering departments (Information communication engineering, Mechanical engineering, and Petroleum engineering department), Covenant University, Nigeria, during the 2005/2006 academic session were followed-up to their year of graduation in 2010. The academic performance of the students in various courses offered in a session recorded in percentage scores with possible marks obtainable by the student ranged from 0% to 100%. We convert these percentage scores to weighted grade point (WGP), which were after that converted to grade point average (the term used for student's academic performance point average, the term used for student's academic performance point at the end of their second year and beyond in the university).

At the end of the session, the class of degree of a student determines the GPA or CGPA point obtained. Also, the performance of students during the first session of the programme recorded as the GPA, which is a function of courses' credit units and grade points. For two or more sessions, the performance of the student recorded as the CGPA. The dispersion of the scope of GPA or CGPA points attainable by students and their respective classes of degree as appropriate by National University Commission (NUC), the body is responsible for the regulation of University education in Nigeria, as presented in Table 1. Any student that produces a GPA or CGPA point between 0.00 and 0.99 would be withdrawn from the programme or placed on probation (repeat the academic level) depending on whether the student is in their first year or second year and higher of his/her academic programme respectively.

Table 1: Table of possible GPAs or CGPAs

Obtainable GPA or CGPA	Class of degree
$4.50 - 5.00$	First class (honours) -1st Class
$3.50 - 4.49$	Second class (honours) upper division – 2nd class upper
$2.40 - 3.49$	Second class (honours) lower division – 2nd class lower
$1.50 - 2.39$	Third class (honours) – 3rd class
$1.00 - 1.49$	Pass
$0.00 - 0.99$	Fail

Methodology

To set up an agreement between the initial classes of degrees of students at the end of their first year in the university estimated by their GPAs and final class of degrees they attained at the end of their study equally estimated by their CGPAs, a measure of agreement using Cohen's kappa and intra-class kappa statistic (Scott, 1955; Banerjee et al., 1999; Lawal, 2003; Dou et al., 2007; Bloch and Kraemer, 1989). Cohen's Kappa statistic is a correlation-like coefficient that measures the pairwise agreement between two raters in order to decide whether the observed agreement attained by chance or not (Donner and Eliasziw, 1992). (Fleiss, Cohen and Everitt, 1969) extended this idea to come up with a weighted Kappa statistic to evaluate the ordinal scale degrees of agreement or disagreement.

By and large, two possible uses of kappa are (i) to test raters' independence, that is, as a test statistic for testing the null hypothesis that there is no agreement between the two raters than might occur by chance given random guessing and (ii) to quantify the level of agreement (effect-size measure), which is of more worry in this work.

For any typical square $r \times c$ contingency table (with $r = c$) as given by Table 2 ($for\ r = c = 5$), the Kappa statistic k_a definition is:

$$k_a = \frac{(\pi_0 - \pi_e)}{(1 - \pi_e)} \tag{1}$$

Where; $\pi_0 = \sum_{i=1}^{r} \pi_{ii}$ with $\pi_{ii} = \frac{n_{ii}}{n_{..}}$; $\pi_e = \pi_{i.}\pi_{.j} = \frac{1}{n_{..}^2}\sum_{i=1}^{r}\sum_{j=1}^{r}\frac{n_{i.} \times n_{.j}}{n_{..}}$ (2)

The Intra-class Kappa defines as data comprising of blind dichotomous ratings on each of n subjects by two fixed raters. The presumption that the ratings on a subject are interchangeable that is, in the population of subjects; the two ratings for each subject have a distribution that is invariant under permutations of the raters to guarantee that there is no rater bias (Donner and Eliasziw, 1992; Bloch and Kraemer, 1989; Scott, 1955). The Intra-class Kappa k_i defined as:

$$\frac{(\pi_0^* - \pi_e^*)}{(1 - \pi_e^*)} \tag{3}$$

Where $\pi_0^* = \sum_{i=1}^{r} n_{ii}$ and $\pi_e^* = \sum \left[\frac{n_{i.} + n_{.j}}{n_{..}} \Big/ 2 \right]^2$ (4)

Table 2: A typical 5×5 contingency table used for computation of Cohen's Kappa and Intra-class Kappa coefficients and for raters agreement between two independent raters

Class of Degree		Final Class of Degree (j)					Total
		1st	2¹	2²	3rd	Pass	
Initial Class of Degree (i)	1st	(n_{11})	(n_{12})	(n_{13})	(n_{14})	(n_{15})	$(n_{1.})$
	2¹	(n_{21})	(n_{22})	(n_{23})	(n_{24})	(n_{25})	$(n_{2.})$
	2²	(n_{31})	(n_{32})	(n_{33})	(n_{34})	(n_{35})	$(n_{3.})$
	3rd	(n_{41})	(n_{42})	(n_{43})	(n_{44})	(n_{45})	$(n_{4.})$
	Pass	(n_{51})	(n_{52})	(n_{53})	(n_{54})	(n_{55})	$(n_{5.})$
Total		$(n_{.1})$	$(n_{.2})$	$(n_{.3})$	$(n_{.4})$	$(n_{.5})$	$(n_{..})$

Table 3: Table of the interpretation of the estimates of Cohen's Kappa k_a and Intra-class Kappa k_i statistic

Interval of Kappa Estimate	Strength of agreement
< 0.00	Poor
$0.01 - 0.20$	Slight
$0.21 - 0.40$	Fair
$0.41 - 0.60$	Moderate
$0.61 - 0.80$	Substantial
$0.81 - 1.00$	Almost perfect

There is a diverse opinion of scholars' interpretations concerning the right level of agreement using the computed Cohen's Kappa statistic k_a. Traditionally, values of k_a between $-1\ and + 1$ are used to interpret the inter-rater reliability agreement between two raters (McHugh, 2012). However, interpretations of values k_a between 0 and 1 have been a common choice in the literature (Altman, 1991; Viera and Garrett, 2005). Relatedly, Table 3 presents the interpretations of values of k_a as reported by (Altman, 1991; Viera and Garrett, 2005) for values of $k_a = 0.00$ and 1.00 indicate poor agreement and perfect agreement, respectively.

Finally, based on the observed counts in the contingency Table 2, this study determines the proportions of students that:

P_1 = the proportion of students that maintained what they started with, that is, the diagonal entries
P_2 = the proportion of students that improved on their performance, that is, those below the diagonal entries
P_3 = the proportion of students that dropped from the class of grade point they started with, that is, those above the diagonal entries from table 2 using the formula as follows:

$P_1 = \frac{1}{n_{..}} \sum_{i=1}^{4} \sum_{j=1}^{5} n_{ij}$, for $i < j$, $i = 1,2,3,4; j = 1,2,3,4,5$
$P_2 = \frac{1}{n_{..}} \sum_{i=1}^{5} \sum_{j=1}^{5} n_{ij}$, for $i = j$, $i = 1,2,3,4,5; j = 1,2,3,4,5$
$P_3 = \frac{1}{n_{..}} \sum_{i=1}^{5} \sum_{j=1}^{4} n_{ij}$, for $i > j$, $i = 1,2,3,4,5; j = 1,2,3,4$

Thus, P_1, P_2, P_3 are computed by taking the sum counts above the diagonal entries, along with the main diagonal entries, and below the main diagonal entries in Table 2 over the sample. This study utilized IBM SPSS 25 version and Microsoft Excel package for all the data analyses.

Analysis and Result

This study presents the analysis and result of the data collected from the three engineering departments on the students' performances at the end of their first and final academic sessions in this section. Table 4 presents the summary of the academic performances of students in the three engineering departments at the end of their first and final year in the University.

Table 4: showing the proportion of students that maintained their initial classes of degree, improved on their initial class of degree they started with and dropped from their initial class of degree

S/No	Department	p_1	p_2	p_3	Total
1	ICE	0.9943	0.002865	0.002865	1.00003~1
2	ME	0.5783	0.018072	0.4036	0.999972~1
3	PE	0.6615	0.051282	0.2872	0.999982~1

The observed numbers of the students that ended up with different classes of degrees in the three engineering department, the contingency table in Table 5-7 presents the distribution of the classes of degrees obtained by the students that graduated in the three engineering department as cross-classified by their initial classes of degree they had at the end of their first year in the University. Table 8 shows the equal report of distribution of all the 710 students in the three departments cross-classified by their initial and final classes of degrees they had at the end of their first and final years, respectively.

Table 5: Contingency table of Information Communication Engineering Department

Class of Degree		Final Class of Degree (j)					Total
		1st	2¹	2²	3rd	Pass	
Initial Class of Degree (i)	1st	28	0	0	0	0	28
	2¹	0	149	0	0	0	149
	2²	0	0	137	1	0	138
	3rd	0	0	1	33	0	34
	Pass	0	0	0	0	0	0
Total		28	149	138	34	0	349

Table 6: Contingency for Mechanical Engineering Department

Class of Degree		Final Class of Degree					Total
		1st	2¹	2²	3rd	Pass	
Initial Class of Degree	1st	14	17	1	0	0	32
	2¹	0	55	44	0	0	99
	2²	0	3	23	5	0	31
	3rd	0	0	0	4	0	4
	Pass	0	0	0	0	0	0
Total		14	75	68	9	0	166

Table 7: Contingency for Petroleum Engineering Department

Class of Degree		Final Class of Degree					Total
		1st	2¹	2²	3rd	Pass	
Initial Class of Degree	1st	11	6	0	0	0	17
	2¹	4	80	48	0	0	132
	2²	0	2	36	2	0	40
	3rd	0	0	3	2	0	5
	Pass	0	0	1	0	0	1
Total		15	88	88	4	0	195

Table 8: Contingency for three Department

Class of Degree		Final Class of Degree					Total
		1st	2¹	2²	3rd	Pass	
Initial Class of Degree	1st	53	23	1	0	0	77
	2¹	4	284	92	0	0	380
	2²	0	5	196	8	0	209
	3rd	0	0	4	39	0	43
	Pass	0	0	1	0	0	1
Total		57	312	294	47	0	710

Table 9: show the results of inter-rater agreement measure of Cohen's Kappa, Intra-class Kappa statistic and Chi-square test of the relationship between the classes of degrees obtained by students at the end of their first year and final year in the University in three engineering departments.

S/No	Department	Cohen's kappa	Intra-class kappa	Chi-square	P-value
1	ICE	0.9955	0.9955	1021.882	0.000
2	ME	0.3375	0.3151	712.740	0.000
3	PE	0.4308	0.4028	398.236	0.000

Discussion

The main objective of this paper is to examine the final academic performances of students in the University based on specific information regarding their academic performances in their first year at the University. However, this study emphasizes the possible relationship between the initial academic performances of the students at the end of their first year and measured by their GPAs and their final academic performances. Both of these converted into possible classes of degrees that are obtainable within the University system, as provided in Table 1.

Data on academic performances of students in three departments from Covenant University, Nigeria, were collected on 710 students. This study depicts a longitudinal study in which the academic progress of these 710 students followed up until graduation.

Based on the available information on all the academic performances of 710 students in all the three departments from Covenant University as detailed in Table 8. This study discovers that a total of 14 (1.97%) graduates improved on the classes of degrees they had in the first year of their study. Also, 572 (80.56%) of students maintained their classes of degrees they had in their first year till graduation, while 124 (17.46%) of the students dropped from the classes of degrees they started with in the first year of their study at graduation.

Surprisingly, of the 77 students that started with first-class in their first year, 53 (68.83%) of them maintained this class of degree while the remaining 24 (31.17%) dropped to (2^1) class at graduation. Specifically, out of a total of 380 students that had second upper (2^1) at the end of their first year in their departments, only 4 (1.05%) of them improved to first class ((1st)), 284 (74.74%) of them maintained this class of degree till graduation while 92 (24.21%) of them dropped to a second class lower (2^2).

Also, out of 209 students that started with second class lower (2^2)from their first year in the University, only 5 (2.39%) of them improved to second class upper. 196 (93.78%) of them maintained this class of degree till graduation while only 8 (3.83%) of them dropped to third class (3rd) degree status at graduation. Similarly, of the 43 students that had a third-class degree (3rd) in their first year, only 4 (9.30%) improved (the four students had (2^2) while 39 (90.70%) maintained this class of degree till graduation. Only one student started with a pass degree in their first year, and 1 (100%) improved to a second class lower.

The distribution of the classes of degrees obtained by 349, 166 and 195 students that graduated from Information Communication Engineering, Mechanical Engineering and Petroleum Engineering department respectively cross-classified by their classes of degrees they had at the end of their first and final years in the University is presented by the confusion matrices in Table 5, 6 and 7. The pattern of academic performance of students replicates for the three departments in this study, and the results are as follows:

Based on observation, the data in Table 5 for the 349 graduates of Information Communication Engineering department that just 1 (0.29%) student improved on its initial classes of degrees. Whereas

347 (99.43%) students maintained their initial classes of degrees till graduation (main diagonal entries) and while only 1 (0.29%) student dropped from its classes of degrees it started with at graduation.

To further examine the association between the initial and final classes of academic performance of students at the end of their first and final years in the University, the Kappa statistics were computed separately for all the three departments for which the data used is collected from Covenant University using the information provided in Tables 5, 6 and 7. The results of the Cohens Kappa and Intra-class Kappa agreement using statistic (1) and (3) as presented in Table 9 where reasonable agreement observed between the students' initial and final classes of degrees they had at the end of their first and final years of study in the University in all the departments. This result was supported by the results of the Chi-square test of association in which the p-values for each department were significant ($p < 0.05$).

Conclusion

This work examines the impact of the performances of students in higher institutions of learning, especially in the University, during their first year on their final academic achievement at graduation. Emphasis is more on determining the relationship between the initial GPAs and final CGPAs of students at their first and final years in the University system. The follow-up study on the performance of students from three Engineering departments, Covenant University, Nigeria, between 2005 and 2010, determines this development.

These results show that, generally, about 81% of the students in the University do maintain the classes of degrees they had in the first year of their program till graduation. Whereas, about 2% of the students improved on their first classes of degrees during their first year at graduation while only about 17% of them had their academic performances dropped from what they had during their first year.
Results from this study have provided vital information that is useful for prospective students of the University regarding the need to work hard during their first year on their academic programs since the outcome of such efforts would greatly determine their final academic performance on graduation from the University.

Besides, the different results from this work would serve as useful counseling resources to stakeholders in the education sector within and outside the University system towards improving the academic performances of students in the system. This study would equally benefit the parents and guardians to be able to put in place necessary measures that would assist in improving the academic performances of their children and wards in the University.

Information Communication Engineering department had the highest number of students that maintained their grade point, Petroleum Engineering department had the highest number of students who improved on their performance, and Mechanical Engineering department had the number of students that dropped. Also, the strength of agreement that exists between the first year and their final grade of the students is on the average is fair. This study is limited by secondary data and the future research should employ big data with machine learning to advance the results of this study.

Definition of terms

NUC Nigerian University Commission
GPA Grade Point Average
CGPA Cumulative Grade Point Average
ICE Information Communication Engineering Department
ME Mechanical Engineering Department
PE Petroleum Engineering Department

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Project of Empirical Research on Innovative Organizations in Poland

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Abstract

Today, young entrepreneurs who begin their "adventure" with business and are in the initial startup stage, the so-called preseed stage, have problems describing their business plan in terms of its vision, strategy and innovation. They tend to follow the usual patterns and often make too hasty decisions about the final establishment of their business. Then, what becomes the most difficult is the fact that the control group formed by the companies that have already left startups (the so-called post-startup stage) and are building their brand, is not relevant, because their development paths were also poorly thought out and even very often resembled someone else's idea adapted to the demand and economic conditions of the day. This article presents the results of research on Wrocław enterprises (startups) concerning the analysis of the company's mission and vision along with the identification of innovation sources, resources and elements of the Lean Canvas strategy. The original research assumption was to identify the extent of use of creative problem-solving techniques in the context of open innovation. However, in the course of research it turned out that Wrocław startups know very little about the problem being studied, which resulted in a change in the research objective.

Keywords: Innovation, Startups, Creativity, Entrepreneurship

Introduction

J.A. Schumpeter was a pioneer in research on enterprise innovation. Contemporary theorists and practitioners are still discussing the categories he introduced. The classic combinations of production factors in the form of new products, production methods, raw materials, markets and industry organization (Schumpeter, 1960) are currently taking completely different forms, because they take into account the soft social sphere, which the Schumpeter school has ignored, focusing rather on the technical aspects of innovation. Schumpeter's theory arose during the capitalist economy of the early 20th century, which was based on a large concentrated mass industry, and the most important resources were land, labor and capital. The dynamic imbalance caused by entrepreneurs, which is the backbone of the market economy to a greater extent than balance and optimization (Bielski, 2000), has remained unchanged. The analysis of changes that have taken place in recent years in the generally understood organization management process allows us to see important trends in creative destruction. They concern not only the emphasis on introducing technological innovations as the main direction of company renewal, but also changes in the perception of the sources of these innovations. The environment of modern organizations is becoming a new source of innovation, which results in the emergence of open innovations.

The purpose of the article is to present the results of research carried out in the third quarter of 2015 on a group of startups which is the foundation of planned empirical research in the so-called post-startup

stage. The research was initially intended to identify the extent to which creative problem-solving techniques were used in the context of open innovation. However, while conducting research, the research team decided to change its objective due to the fact that the respondents knew so little about creative techniques of project management that it did not make much sense to study it. Therefore, the research focused on mission and vision analysis, identification of innovation sources, resources as well as planned strategies and elements of the Lean Canvas business model. The presented research should be treated as preliminary research for further empirical procedure.

The study consists of three parts. The first part presents the research methodology and description of the target group. Part two presents the results of research carried out in 2015 on the basis of SWOT methodology, and part three presents elements of the Lean Canvas methodology. The conclusion presents the questions of the planned research, which was decided to be carried out among the respondents from 2015. The form of research will thus be longitudinal, although as it turns out - the objectives of current research will be significantly expanded.

Research methodology and description of the group of respondents

The concept that has changed the approach to innovative activity of companies and which can become the foundation of value innovation is open innovation. It is a relatively new concept and not fully recognized in the world of management (Huizingh, 2001). This concept was introduced in 2003 by H. Chesbrough. Open innovation is the antithesis of a traditional, vertical innovation model in which internal innovation activities lead to the internal development of products or services. The author calls this model closed innovation and describes open innovation as *the deliberate use of inflows and outflows of knowledge to accelerate internal innovation and the expansion to external markets* (Chesbrough, 2012). Shifting focus from the center of the organization to its environment does not mean giving up creating innovations inside the company, which in turn leads to the creation of two types of open innovations: outside-in and inside-out. The first one makes use of external sources of knowledge - users, competitors, suppliers, partners, local communities (crowdsourcing). The second one is about sharing the existing internal knowledge with other entities that can use it in their activities. This model is much less recognized and understood, both in academic environments and in business practice *(*Chesbrough*, 2012*). The research problem identified in 2015 was based on observations of organizations developing in the business incubator ecosystem: of the Wrocław University of Economics and the WSB University. Observation showed that entrepreneurs were not able to creatively work on their projects, and they were unable to identify their needs for the range of methods they could use. At that time there were no well-established methodologies in Poland to lead a team during the implementation of creative projects (e.g. brainstorming). There was also a gap in the area of open innovation (the approach, in which the most important is the belief that companies can and should use both external and internal ideas in their innovation processes), which eliminated the possibility of proper assessment of the work of project teams. Due to the need to redefine this goal in 2015 the analysis covered the mission and vision, sources of innovation, resources as well as planned strategies and elements of the Lean Canvas business model.

Research work was carried out in the following stages:

a) Analysis of selected literature - comparison of foreign techniques, their degree of effectiveness and impact on individual stages of solution design.
b) In-depth interviews with representatives of 20 startups operating in Wrocław business incubators - based on a detailed scenario developed on the basis of the applicant's experience and conclusions from the literature - qualitative research
c) Conducting research using a questionnaire among entrepreneurs (40 startup companies) operating in Wrocław - quantitative research

The first research stage of the project was a systematic analysis of the literature on the subject in the field of open innovations, design thinking, brainstorming and tools used in the blue ocean strategy as well as purchase of access to databases (Harvard Business Review, Stanford University case studies database - Graduate School of Business - areas: leadership, human resources, entrepreneurship,

innovation in developing economies). This allowed to systematize the knowledge of commonly used methods and tools in the processes of creative problem-solving, as well as to select research issues that were implemented as practical applications for contemporary entrepreneurs.

The next stage of research involved selecting and conducting meetings with representatives of 20 companies (Startup) based in Wrocław, working on innovative projects. In-depth interviews were conducted on the basis of an in-depth interview scenario. The choice of individual in-depth interviews in the proposed project was supported, among others, by the need to analyze individual opinions and experiences, business specificity and the limited time availability of the respondents. Survey questionnaires made it possible to conduct a quantitative analysis of entities operating in Wrocław incubators, which enabled a comparative analysis.

The study covered the circles of Wrocław enterprises that started their operations at the Academic Business Incubators. The research was carried out on a group of 30 people up to 30 years old, 21 men and 9 women. The group included active students (27%), previous year's graduates (13%) and university graduates from 2009-2012 (60%), including 2 persons with doctoral degrees. For 9 people, the analyzed idea was their next initiative.

Most of the respondents (70%) decided to work individually and independently implement their ideas. 6 ideas were implemented in a group of 2 people, others in teams of more than 3 people, including one in a team of 6 people. Having analyzed the education profile of respondents, it was observed that 18 of the analyzed ideas belonged to industries consistent with the originators' education profile. 50% of the respondents have economic education (students and graduates - including post-graduate studies - of the University of Economics, Wrocław University of Technology, the WSB University, and the Univeristy of Business in Wrocław). 11 people have technical education, of which 8 are educated in IT.

Researchers were aware of the disadvantages of the developed scenarios, used for structured in-depth interviews (SSI), such as the researcher's subjectivity, but the choice of this method in the present study was supported by:

- the need to analyze individual opinions and experiences,
- specifics of the business and
- limited time availability of the respondents.

According to the authors of the study, the group of respondents (young originators) had to be contacted directly to avoid inconsistencies that could be easily clarified during the interview (directly or by referring to other issues). All interviews were conducted according to the assumed plan.

Research results: strengths and weaknesses, opportunities and threats - perspective of entrepreneurs

Initially, the project assumed to analyze the environment of Wrocław enterprises starting their operation at the Academic Business Incubator. According to the researchers' knowledge, the level of research on creative techniques for conducting project teamwork (startups) was very low. This was mainly due to the lack of even basic and, what is worth emphasizing, practical knowledge about creative techniques, which negatively affects the operation of project teams or the behavior of leaders. In the course of project work and analysis of business ideas, it turned out that the level of knowledge of creative techniques of project management is so low that the goal of the project should be redefined. Therefore, the research focused on mission and vision analysis, identification of innovation sources, resources as well as planned strategies and elements of the Lean Canvas business model.

In all the analyzed cases, the respondents had a clear vision of the purpose of the business, they were able to determine the exact needs of consumers addressed by the startup. The respondents had no trouble determining the business profile, which confirmed their awareness and allowed them to conclude on the successful implementation of the adopted strategy. Only 4 out of 30 respondents claim that at the time they applied to the incubator their product / service offer had to be refined and could

not have been placed on the market yet. Others said their product / offer was ready to be placed on at least local market. 14 respondents defined the scope of their activity as nationwide, and 4 respondents indicated that their product / service was ready for the global market. Others (50%) were in the initial stage of operation on the local market, of which 5 people planned to expand the offer to the nationwide market.

Together with the respondents, analyses of the strengths and weaknesses of implemented projects, as well as their opportunities and threats were carried out. Figure 1 presents the results of the research.

Strengths	Weaknesses
- motivation - goal-directing - flexibility (understood as openness to new, unconventional solutions and openness to customer needs) - innovative perspective and positive attitude	- inexperience - lack of time - lack of financial resources - lack of brand recognition - the need to employ unknown subcontractors for larger orders
Opportunities	**Threats**
- innovation of the idea - continuous technical progress - the possibility of receiving financial support for startups (EU Funds, regional competitions, finding and support from investors), perspective of cooperation with other startups, - developed business model, - growing customer demand for a given service / product - help from institutions supporting startup activities: Academic Business Incubators	- distrust of young entrepreneurs, growing customer requirements - "people outflow" to other, more stable jobs, - highly qualified competition, transient trends (in the case of startups focused on nutritional counselling and physical activity) - increasing costs associated with subcontracting (in the case of sole proprietorships)

Figure 1: SWOT matrix for conducted empirical research - preliminary research results
Source: Own study.

Strengths and weaknesses in the study concerned present factors, while opportunities and threats, due to the timing of idea implementation, pointed out future discriminants that could but did not necessarily have to appear. Identification of factors by means of a significantly shortened SWOT analysis allowed the respondents to rationalize the idea, and gave them opportunity to learn about the market from the perspective of objective observers, not emotionally connected with the idea or the originator. In this way, the respondents obtained added value from the research, namely: verification of project assumptions and discovery of so far unnoticed development opportunities.

Research Results - Elements of The Lean Canvas Methodology

As the need arose to change empirical assumptions, the research employed the assumptions of the Lean Canvas methodology. This model was developed for startup companies operating in conditions of extreme uncertainty. The first discussed elements of the model were:

- knowledge of customer segments understood as target groups whose problems are solved by the offered service / product,
- value suggestions, i.e. understanding and determining the solution to customers' needs,
- main competitive advantage,
- solutions and protection of intellectual property,
- subjective feelings about the business risk of running a startup,
- concept of brand and branding,
- revenue streams and knowledge of cost structures.

Only 9 (30%) respondents affirmatively answered the question about having developed a full business model and stated that in their opinion it would allow for stable startup development. In 27 cases the respondents conducted demand analyses for the products offered. As sources of knowledge about market needs they indicated their own previous experience in the industry, virtual resources (internet forums, blogs, industry websites) and the knowledge of other people from their contact network. Two respondents indicated trade press and scientific journals as their main source of knowledge (both had experience of working at a university). The replies also included reports from competing companies that commissioned studies from consulting and advisory companies. In order to verify the value proposition, an expert assessment was made which awarded points (maximum 1) for defining in response to open questions the mission understood as the role of the company on the market, the vision, i.e. image in the distant future and the strategy, i.e. awareness and preparation for action in a changing environment . All respondents were able to clearly assess at least 2 out of 3 points, which indicates their understanding of the proposed solution as a response to customer needs and / or awareness in shaping the market for the needs of startups, as is the case with innovative solutions. Only 2 respondents used tools protecting intellectual property, enabling the protection of know-how and solutions. The responses listed confidentiality agreements, patents and trademark protection. It is worth emphasizing that in 3 cases protection was defined as "keeping the idea for yourself" and "not sharing it with others", which may indicate no willingness to cooperate with other entities. 25 respondents replied that they did not protect their knowledge in any way, of which 60% thought that this problem did not concern them. The results confirm the information published in many reports about the lack of basic knowledge among young entrepreneurs concerning the protection of intellectual property, tools for protecting an idea and / or a solution or even the ability to see innovations and the need to protect them.

In published reports on young entrepreneurs and startups, great attention is paid to risk and overestimating their opportunities on the market. 10 respondents considered the business risk associated with launching a product / service to be low or negligible. 6 of them operate in the IT area, which is characterized by high flexibility and volatility, employee turnover and rapid development. The remaining 4 are companies which are about to start their activity in the artistic or consulting industry (dance school, nutrition counselling), which depend largely on the trends prevailing on the market. In 3 out of 10 cases, respondents, assessing the risk as low, did not carry out a market needs analysis, the next 3 are not sure if their product / service has a chance to achieve a competitive advantage, and 2 people do not have a clear development strategy. Failure to analyze the needs of the market or the lack of strategy can cause significant overestimation of your capabilities, distorting the vision of a startup and, as a consequence, delaying the start of business and entering the market.

According to experts' opinions, small companies entering the market need at least basic knowledge about cost control and cost settlement. It is worth emphasizing that 77% of respondents control the flow of money, and by entering the structures of the incubator they can use the services of a qualified accountant.

Together with the respondents, the following categories of innovation were assigned to their business ideas: technological (product, process), organizational or marketing. Although precise qualification is virtually impossible at the initial stage of development, 15 respondents considered their idea to be a technological - product innovation, understood as significant modifications in products, related to new functional features of the product, tailored to the needs of a new group of service clients. 3 people said that they introduce innovations at the organizational level, and 3 more introduce significant changes in the field of distribution, marketing or product design (marketing innovation). Other people were unable to clearly identify areas of innovation and indicated the vision of a startup. Importantly, the indicated source of innovation in 60% of the analyzed cases was colleagues (their potential) as well as own competences and experience.

Based on the results of the research, it can be concluded that the awareness of cognitive processes that improve creative thinking in project teams is very low.

Conclusion

Contemporary organizations are actively looking for sources of innovation, going beyond the industries in which they previously operated, and thus obtaining tangible intangible benefits (Lichtenthaler, 2011; Grindley, 1997). However, the most important benefit arising from the implementation of an open approach to innovation is the elimination of the NIH syndrome (not invented here), which is the negative attitude among employees of the organization towards a novel that has not arisen within their structures (Laursen , 2006). Other positive consequences are reduction of risk by spreading it over several entities, saving time and money, and creating new networks of relationships based on coopetition and synergistic relationships. The literature on open innovation focuses mostly on three issues: a) how to measure them, b) interaction between an organization's strategy based on open innovations and company choices, c) the growing integration of open integrations with existing theories of innovation, management and economics (West, 2014). However, as it turns out, along with the degree of popularization of information about the imperative use of creative techniques for solving problems in Western literature - in practice it looked quite different in Poland. Researchers' opinions were deliberately used in those years - to show how huge the difference is between what happened in Western countries and what happened in Poland. The question is: what is the same situation like today? Therefore, the presented empirical research is preliminary studies to the main research, in which the following empirical research was set:

1. Do Polish startups use creative problem-solving techniques? If so, to what extent? If not - what are the barriers associated with using such solutions?
2. Do Polish startups use the opportunities associated with open innovations? If so, to what extent? If not - what are the barriers related to the use of such solutions?

In addition, it is planned to conduct longitudinal studies among respondents who participated in the research in 2015. The main goal of the research is the same as the objectives realized in the presented research, and the specific goal is to identify discrepancies and determine the level of maturity of an innovative organization in the analyzed contexts. As part of this research group, decision was made to conduct qualitative research and identify the moments that appeared in the period 2015-2020 which significantly affected the business (barriers, opportunities, crises and their distinguishing features in the area of conducting innovative activities).

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Changes in Public Entities Caused by The Crisis. A Case Study of The Polish Public Prosecutor's Office

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Abstract

Public organizations are in a state of crisis at the moment of significant institutional changes in their structures (Boin, t'Hart, in: Wagnedaar, 2000, pp. 9-31), and the greater the number of people affected - the more the crisis in the organization is felt. In connection with the ordinance of the Minister of Health of 13 March 2020 (Journal of Laws of 2020, item 433), announcing the state of epidemic threat in the territory of the Republic of Poland, common units of the prosecutor's office faced a new challenge regarding quick and effective response to crimes arising in connection with the use of the state of emergency for unlawful purpose. Certainly, for people who act against the law this is a typical opportunity, a situation that can be used to generate spectacular profits. On the other hand, for law-enforcing organizations the state of epidemic threat is, if not a crisis, certainly an emergency situation. Apart from the specific dichotomy that emerged as part of the analysis carried out for this article (the relationship between opportunity and crisis), it is worth presenting the actions taken in the public entity during the crisis caused by COVID-19. What is the purpose of this study? The study analyses the actions taken by the Polish Public Prosecutor's office in reaction to the crisis which aim to minimize the spread of not only the virus, but also criminal activity in Poland. The study consists of 4 parts. The first part is theoretical and describes the issues from management and quality sciences related both to crisis and emergency situation. The second part describes strategic and operational actions taken by organizations in crisis environment. Parts three and four are practical and describe the activities of the Polish public prosecutor's office in the face of the crisis caused by the emergence of COVID-19 in Poland.

Keywords: Crisis, Crisis Management, Polish Public Prosecutor's Office, COVID_19.

The Essence of Crisis and Emergency Situations

Crises can be defined as unexpected, difficult to solve and predict[1] situations that have a significant impact on organizations and stakeholders (Tokakis, Polychroniou, Boustras, 2019, p. 37). As crisis we understand a state in which the organization loses the ability to properly respond to stimuli and, as a consequence, to perform its basic functions. The crisis is a special condition in the life of an organization, constituting either a deadly threat or a source of growth and development opportunities (Skalik, 2003, p. 145). In the literature on the subject, the notion of crisis permanently coexists with

[1] Although, as practice shows, economic crises appear in 10-year cycles, and the economic crisis of 2020 should have happened accordingly in 2018 (the last one took place in 2008-2009), the situation in Poland has been shifted due to a huge bull market in the automotive and real estate markets. However, as it turned out, the global factor, which is the COVID-19 virus, caused a global crisis that could not have been stopped by the accelerating economy. Therefore, a bizarre situation emerges and a new element of the further environment model influencing the enterprise emerge appears, namely: biological factors.

the phenomenon of an emergency situation, and the terms are often wrongly used interchangeably. The difference between these concepts lies mainly in their final effect. Namely, an emergency situation does not directly threaten the existence of an individual, unlike a crisis. One can venture to say that the emergency situation is the sum of specific crisis-forming events. Therefore, it is a state in which the organization deviates from a certain adopted state, and may consequently lead to a crisis. Chronologically speaking, first are crisis events, followed by an emergency situation, the direct consequence of which may be a crisis (Skalik, 2003, p. 146). The current situation related to the economic crisis caused by COVID-19 questions the current knowledge of organization management, according to which the most common causes of crises are external factors of a macroeconomic nature related to a competitive environment (Urbanowska-Sojkin, 1999, p. 21). The appearance of a new element in the model of the further environment of both business and non-profit entities - a biological factor - will forever change the way organizations operate around the world.

The crisis and changes at strategic and operational levels

Managing an organization in crisis is a difficult task, especially considering stress experienced by employees at all levels of management. Under crisis conditions, management shifts attention and focus from implementing strategies to responding to turbulence in the environment, which may implicate a change in the relationship between strategy and structure. In a bull market, you first work on a strategy that determines the structure, while the crisis creates the need to reverse these actions. This results in structural changes, consisting in adapting structures to the existing conditions, which in practice may entail dismissals of employees. The natural effects are savings and promoting flexibility of structures (Nogalski, Marcinkiewicz, 2004, p. 230), but also a decrease in employee morale and an increase in opportunistic behavior.

From the perspective of strategic changes in the conditions of crisis, the implementation of the organization’s mission is losing significance, because completely different goals become important. The pursuit of growth and development is marginalized for survival.

At operational level, in crisis conditions the recommended actions cover seven elements (Slatter, Lovett, 2001) of restructuring. One of them is crisis stabilization - in case of COVID-19 this factor is beyond control, and the only activities are those based on the attempts to minimize the impact of entities building the business ecosystem on organizational reality. Another factor is leadership, which is particularly meaningful in times of crisis. The role of the leader changes towards initiating creative thinking, undertaking and implying risky actions to negate the status quo of the crisis, tolerating diversification of strategic options and promoting various solutions to similar problems in the organization. Leaders become influencers of change to the extent that is possible in the environment in which they make decisions (Paglis, Green, 2002, p. 220) (e.g. top management, or the resources at their disposal). Other activities include supporting interest groups (e.g. obtaining a loan, implementation of the anti-crisis shield by the government), focusing on strategic issues (strong product orientation on industries affected by the crisis to a lesser extent, cost reductions), and thus identifying existing resources and specifying those that are fundamental to the survival of the organization, implementing organizational changes, as well as improving key processes and financial restructuring. The sources of the crisis can be perceived both inside and outside the organization. In the case of the analyzed economic crisis caused by COVID-19, the source is outside the entities, causing consequences inside both enterprises and public entities. Nevertheless, the crisis resulting from the changes taking place in the environment makes it necessary to reformulate the existing ways of functioning, including the structural solutions used, the method of resource allocation (Cyfert, 2004, p. 72) and the architecture of processes.

Practical actions during the crisis: structural changes

The strategic activities of public prosecutors' offices, i.e. public entities who are realizing investigation and public prosecution in criminal proceedings (Act of 28 January 2016. Law on the Public Prosecutor's Office. Journal of Laws of 2016, item 177), in the face of the COVID-19 pandemic, have not changed. Prosecutors continue to carry out activities in cases brought before the courts and perform tasks in the

prosecution of criminals and upholding the law. In turn, operational activities[2] in the case of the Polish public prosecutor's office acquired the features of crisis management, thus determining structural and procedural changes.

On 16 March 2020, according to the Ordinance No. 28/20 of the National Public Prosecutor (Ordinance No. 28/20 of the National Public Prosecutor from 16 March 2020), a team of prosecutors was appointed in the National Public Prosecutor's Office to coordinate the fight against economic crime in connection with the state of epidemic threat. The creation of the team was a reaction to the registered increase in crimes which employed the panic of part of society and information chaos in the face of a pandemic, including, e.g., access to protection measures against COVID-19, supplying necessary products, including groceries, medical articles and disinfectants, disposing of accumulated funds and financial instruments.

The team's main goal is to coordinate fraud-related proceedings related to:

- economically unjustified trade in goods, in particular food products, medicines, medical articles, disinfectants, related to the resale of purchased goods with excessive profit without economic basis, which is a harm for the transaction party;
- causing people to dispose of their property to their disadvantage by misleading them as to the quantity, quality, suitability, actual value of purchased goods, in particular food products, medicines, medical products, disinfectants;
- causing people to dispose of their property to their disadvantage via the Internet by misleading them as to the need to dispose of their accumulated financial resources and financial instruments;
- causing people to dispose of their property to their disadvantage by misleading them as to the operation of sanitary, control and public order services of the country;
- concluding contracts in the conditions of exploiting the forced position of natural persons, imposing the obligation of disproportionate consideration.

The team's tasks include:

- collecting and analyzing information on ongoing proceedings that are the subject of the team's activities in order to assess the nature, growth dynamics and scale of this type of crime;
- ongoing coordination and supervision of such proceedings carried out in individual organizational units of the public prosecutor's office;
- as well as the assessment of the legitimacy of procedural actions taken in the most serious proceedings, including adopted legal qualifications and applied preventive measures, in order to standardize the practice of proceedings and increase their effectiveness.

In addition, due to the state of epidemic threat, the management of common prosecutor's offices were obliged to take steps to ensure the safety of prosecutors, other employees of the prosecutor's office in the performance of their duties, as well as parties and participants in proceedings, when carrying out procedural activities with their participation in the offices of individual prosecutor's offices. For example, the Regional Prosecutor's Office in Wrocław, by letter of 31 March 2002. ref. RP III 013.42.2016, ordered that if necessary to leave the place of residence to the place of the incident, the prosecutor would use, with the consent of the Regional Prosecutor, a private car in order to avoid contact with other people present at the place of the incident.

Practical Actions During Crisis: Procedural Changes

From the point of view of procedural changes, it is important to provide guidelines for examining the corpses at the place of their disclosure, in the event of obtaining information about a sudden death

[2] From the perspective of management and quality sciences - operational activities concern implementation at the lowest levels of management, in contrast to the activities of prosecutors, which mean activities undertaken as part of control over the reconnaissance activities of authorized services.

covered by the order of §169 of the Regulation of the Minister of Justice of 7 April 2016. Regulations of the internal office of common organizational units of the prosecutor's office (Journal of Laws 2017.0.1206) i.e. in cases of murder, communication and construction disaster, and an accident at work with fatal outcome, as well as in other more serious cases which result in death of a person. In particular, prosecutors carrying out activities at the scene of the above-mentioned events were obliged to determine information on the potential threat of coronavirus at the site of inspection, and in the event of such a threat, to immediately notify the competent sanitary inspector. The prosecutor performing on-site inspections of activities should also use individual protection measures adequate to the conditions at the place of the incident and the needs of the procedural step. Recommendations were also made regarding the examination and opening of the corpse of a person who may have been a carrier of the coronavirus. In this case, the body was ordered to be transported to a facility enabling operations to be carried out in conditions ensuring protection against threats, giving the prosecutor the opportunity to perform activities from a room behind the glass or using audio-video transmission. If it is necessary for the prosecutor to be personally present in the room in which the autopsy is performed, the prosecutor should absolutely use personal protective equipment.

In addition, in order to continue the on-call duty, decisions were made to provide protective packages containing the suits, the so-called helmets, protective masks and disposable gloves. A position was also prepared at the Regional Prosecutor's Office in Wrocław to enable interrogation without personal contact with participants of the activities.

By letter of 1 April 2020. ref. PK I BP 024.8.2020 The First Public Prosecutor General's Deputy, The National Public Prosecutor issued guidelines applicable to all public prosecutor's offices. In particular, the National Public Prosecutor recommended taking actions adapted to the location, organizational and technical capabilities of common prosecutor's offices, limiting the spread of the SARS-CoV-2 coronavirus. This resulted in the decision to use the method of conducting procedural activities remotely via videoconferencing, if it was established that the person who was to participate in the activity was an infected person or suspected of being infected with coronavirus. If it is necessary to directly interrogate procedural activities involving a person suspected of being infected with coronavirus, the activities are to be carried out in a specially designated and secured room, while equipping the persons participating in the activities with adequate personal protective equipment and maintaining all sanitary services recommendations (including maintaining the recommended distance, disinfecting rooms, etc.). Emphasis was also placed on directing employees to work remotely, minimizing the number of people performing work in prosecutor's office buildings. To this end, it was pointed out that the number of people rendering work in prosecutor's office buildings should not exceed 30% of employees. Exceptionally, employees may stay at the prosecutor's office beyond the assumed percentage of employees in the case of performing activities in which remote work does not guarantee the possibility of performing key duties.

The heads of organizational units of the prosecutor's office were also obliged to organize the work of prosecutors and other employees so as to limit the spread of the SARS-CoV-2 coronavirus. In particular, it was recommended to organize working places in a way that would allow a distance of not less than 1.5 meters between them. It was also indicated that it is possible to direct employees to overdue holiday leaves, which are to be granted in not less than a weekly period and within a time limit, as far as possible, agreed with the employee. Employees were required to use gloves and were to be given access to disinfectant fluids. It was recommended to secure appropriate individual protection measures for prosecutors carrying out emergency duties, participating in autopsies and performing other potentially dangerous procedural activities, and to determine the area at the premises of individual prosecutor's offices, Departments of Forensic Medicine or other facilities where it would be possible to safely conduct a visual inspection and autopsy It was also recommended to use maximum electronic correspondence, also in internal contacts and to secure employees who have contact with incoming correspondence in paper form.

In addition, a permanent cooperation with competent court presidents, commanders of police units, sanitary inspectors and other services was required. To this end, the need for ongoing contact and regular meetings with representatives of the above services were pointed out, in order to implement

organizational actions allowing for efficient performance of activities, while minimizing the risk of COVID-19 transmission.

The activities described are aimed, despite the spread of the SARS-CoV-2 coronavirus, to ensure continuity in the implementation of tasks of common prosecutor's offices as organs appointed to uphold the law and prosecute crimes, as well as to perform ongoing tasks specified in legal regulations and to fulfil the official duties incumbent on prosecutors.

Conclusion

According to the literature on the subject, organization's problems begin with a strategy crisis that has a negative impact on day-to-day operations (Wawrzyniak, 1999). In the case of public organizations, here: the analyzed case of the Polish public prosecutor's office, the emergence of an economic crisis caused by the COVID-19 coronavirus pandemic did not interrupt or even disrupt the implementation of its strategic goals. The top management implemented a set of conservative actions to secure the functioning of the employees of prosecutor's offices. The organization operates steadily, has not lost control or business continuity, and the implemented procedures and structural changes have secured both employees and recipients of this public organization.

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Towards Semantic Improvement of Marketing Recommendation Systems

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Abstract

The functioning of recommendation systems traditionally involves the analysis of transactional data and customer behaviour. However, raw data, in many cases is not enough to make valuable recommendations. The article proposes the use of taxonomies to extend the perspectives of data analysis and interpretation for the needs of recommendation systems. In particular, semantic models (such as taxonomies or ontologies) may be a response to the deficiencies of recommendation systems due to a lack of data interpretation. It has also been proposed to use external, semantically related data sources to expand the analysis perspectives. Many valuable features can be obtained by semantic interpretation of transactional data and combining them with other data sets. The article presents the Author's suggestions for extending the scope of data analysis that has been made available by the lingerie retail chain. The analyzes aimed at expanding the possibilities of acquiring knowledge about customers and products. This knowledge can be useful to create better recommendations and targeted marketing campaigns.

Keywords: Recommendation System, Marketing, Semantics, Taxonomy

Introduction

In the era of globalization and the development of information technology, knowledge about the market is dynamic. New products are continually appearing, which may interest various groups of recipients. Advanced information technology also creates new opportunities to acquire and analyze data about customers, their shopping habits and behaviour. These changes require managers to be creative in their ongoing pursuit of current market knowledge and forecasting.

Because currently, the information resources obtained from various sales channels have a heterogeneous structure, and their number increases every day, recommendation systems are becoming more and more popular. Their main goal is to provide clients and managers with the most adequate and personalized information. This problem is becoming more and more important because non-expert customers are overwhelmed by the amount of information available. On the other hand, enterprises strive to attract new customers and increase the pool of loyal customers through efficient and personalized service.

In recent years, recommendation systems (RS) have become an important research area combining achievements in behavioural sciences (Celdrán et al. 2016), marketing (Mocean, Marcel 2012), artificial intelligence (Gabrani, Sabharwal, Singh 2017), and user experience (Nguyen 2016). Recommendation systems are a particular class of decision support systems. The customer is a passive recipient of information. He has no direct impact on the operation of the recommendation system. From a manager's point of view, a key issue is how to discover customer interests effectively, and to decide what data will be taken into account when creating recommendations.

This article proposes extending the hybrid recommendation model with semantic aspects that significantly enrich the analysis perspectives, thus enabling the discovery of new useful relationships and features in transactional data sets. The use of semantic models allows for combining various data sets related contextually to the analyzed area of activity.

The considerations presented here are limited to the problem of applying semantics in response to shortcomings of existing systems, lack of knowledge and inference in RS. The purpose of the research work was to develop taxonomies that allow extracting from the data set additional features useful for enriching the recommendation system and targeted marketing campaigns. Data used in the study were made available to the Author by a network of lingerie retail stores located in major cities in Poland. The data was in the form of a flat table exported from a data warehouse containing a list of transactions from two consecutive years.

Many studies are currently focusing on analyzing the behaviour of online store customers. However, the group of customers preferring stationery stores is a particular challenge, as determining their preferences may be more difficult due to the lack of data on their behaviour. Generating useful recommendations for a group of retail store customers requires the interpretation of transaction data and loyalty programs. Data on the preferences of retail store customers can be valuable in creating an Omnichannel strategy. This strategy allows the acquisition and integration of customer knowledge from many communication channels, and retail stores are one of them.

Related Works

Recommender systems, their mechanisms and the data mining algorithms are extensively described in the literature. Recommendation systems are used in many areas (Itmazi, Megias 2006). In general, the RS can be defined as a system that helps Internet users browse Internet resources, providing suggestions for items that may be of interest to them (Shrivastava, Rajawat 2013). In the field of trade, the recommendation system is a particular class of personalized systems that are designed to predict the potential customer's interest in available products and services, based on previously assessed elements or attributes (Lekakos, Giaglis 2006), customer behaviour in the past and the preferences they specify. Conventional recommender systems are known to work well for the case where customers show their preferences for specific products explicitly (e.g., rating the products) (Kim 2013).

In the literature, recommendation systems are considered from three main perspectives (Korczak, Pondel 2018). From the management point of view, the recommendation system is a decision support system that uses large sets of heterogeneous data and inference mechanisms to generate useful knowledge in creating sales strategies and the promotion of products offered. From the customer's point of view, this is an advisory system that facilitates the selection of products following interests, needs and preferences. From the information technology perspective, the recommendation system is an interactive computer platform containing many models of data analysis and exploration, and visualization, integrated with the online store's transaction systems.

The methods used in recommendation systems include:

- integrated collaborative filtering (Goldberg 1992),
- content-based filtering (Pazzani, Billsus 2007),
- constraint-based recommendation (Felfering et al. 2010),

- critiquing-based recommendation (Chen, Pu 2012),
- expert-based recommendation (Amatrian et al. 2009),
- hybrid recommendation (combining two or more recommendation methods) (Burke 2007).

The selection of the filtering method appropriate for a given recommendation system depends on the type of information about customers and products (e.g. purchase history, product evaluation). Literature studies (Beel et al. 2016) show that solutions based on product features (content-based recommendation) and integrated filtering of information are the most popular. The methods mentioned above have their pros and cons.

The essential thing in collaborative filtering recommendation is how to select the most valuable neighbours. Integrated collaborative filtering systems encounter a problem when there are no opinions of other users, in particular when recommendations are to apply to a new product that has not yet been rated, or ratings are sparse. The same problem occurs with new users who have made very few reviews so far. In some areas, the number of products is so large that users are not able to evaluate all, which means that the number of ratings for each product is too small to create a forecast. In the case of a vast quantity of products and the lack of a sufficient number of reviews, semantic categorization based on the domain knowledge of the product can be helpful.

In the case of content-based filtering, the main problems are the form of description and the ability to extract data from it. Problems can occur in particular if the description is in a multimedia form. Another problem is excessive specialization - systems based on content analysis can only extract information from those resources that the user has previously viewed, so they are unable to provide suggestions that go beyond a specific thematic scope. Their weakness is, therefore, the lack of a semantic model of knowledge to allow inference. The advantage of content-based recommendation systems is that they can provide recommendations for “cold-start” items. It is the situation when there is little or no training data available, but typically have lower accuracy than collaborative filtering systems (Gunawardana, Meek 2009).

In the discussed solutions, recommendation systems consist of a recommendation engine, and their programming can be categorized as machine learning algorithms. These types of algorithms are evolving through learning from a training data set. However, an expert system-based approach can also be used to generate recommendations. These types of recommendation systems are a sub-category of expert systems that accumulate domain-specific knowledge provided by human-expert. If the recommendation prediction algorithms work solely based on information about the transaction history or customer ratings, ignoring domain knowledge, the recommendations may turn out to be wrong (Li et al. 2014).

Difficulties in establishing a satisfactory recommendation also occur in the case of people who differ in preferences from the rest of the customers and show inconsistent interests (choosing products from entirely different categories) (Sharma, Singh 2016), or intentionally give product evaluations other than most people (Płoński 2011). In such a situation, there is a problem of assigning a person to a group whose opinion could be used. Data on transactions of such clients cannot also constitute the basis for mechanisms using common filtration and grouping (Bieńkowski 2012). Hybrid systems are to address these problems. They combine many filtering techniques, using both content/product analysis and similarities between users.

The basis for creating recommendations are analytical systems with a large number of algorithms and data on which they could work. However, the multidimensionality of data, which would allow for analyzes at different levels of abstraction, is also of great importance for the accuracy of

recommendations. For example, different levels of product categorization and their semantic combination into groups belonging to one field, as well as complementary and substitution domains, can be helpful.

The semantic knowledge representation in the form of ontology or taxonomy defines the relevant basic concepts and a structure of the modelled domain. Relationships between the concepts represent the structure of the domain. Also, ontologies may contain rules enabling deriving implicit knowledge as well as checking the consistency of knowledge (Lommatzsch 2015). Ontologies and taxonomies can, therefore, be an appropriate formalism in knowledge representation in modern recommendation systems.

Taxonomy of Products

Product categorization is an important issue when creating marketing campaigns and recommendations for online store customers. Detailed knowledge of product specifics can also help in customer segmentation due to interest in specific products.

Taxonomies are the most commonly used semantic models in recommendation systems, mainly because their construction is less time-consuming and does not require such in-depth expert knowledge, as is the case with ontology. The taxonomy is a collection of concepts and relations between them, forming the hierarchy of generalization and specialization.

Many ready taxonomies can be used in recommendation systems in popular areas of e-commerce. Examples of such taxonomies are WordNet, Amazon classification, IPTC NewsCodes or the Open Directory Project. Taxonomies have a twofold use. On the one hand, they help customers of online stores find desired products; on the other, they are useful in data mining and creating marketing strategies by managers. Taxonomies generally have a hierarchical structure - they start with general or broadly understood concepts and gradually reduce the level of detail to exact classifications, such as product name. Despite a large number of taxonomies available, adjusting them to individual needs is often not easy, especially for lower levels of taxonomies describing products in detail. The names of product models in the transaction databases, unequivocally identify individual goods, but they cannot be the basis for some analyzes. The main problem is a large number of different types of goods from many manufacturers. Trade names are to identify a product uniquely, but they usually say little about its features and purpose.

In the case of lingerie stores, the database may contain hundreds of thousands of similar names of goods, so assigning categories to each of them would take too much time (would require checking the manufacturer's website for the type of product and its features). Automating product categorization can, therefore, be very helpful and significantly speed up the work.

Product classification helps managers in choosing strategies and methods for product or service promotion. Categorization also facilitates the appropriate design of the e-commerce store interface, and thus - offering customers a convenient tool to find exciting offers.

Automated product categorization requires a dictionary that allows for interpreting the trade names, for identifying the product category, and more advanced semantic models to determine product usability features. The data table must, therefore, be expanded with additional attributes by adding columns with the appropriate meaning. Adding new attributes to the data set is known as feature engineering. Feature engineering requires analytical skills and in-depth domain knowledge. There are many possibilities to categorize products due to their various characteristics, for example, durability, frequency of use, price range, target audience (age, gender). The more features can be distinguished, the higher will be the ability to assess customer preferences and forecast their future purchases correctly.

Semantic categorization of products can be done in different ways, depending on what data is available. The methods presented here support the automation of this process. Lexical analysis of product model names can identify categories by extracting fragments of names indicating a specific affiliation of the product. Categorization of products can also be carried out based on their descriptions. In addition to the product, the seller receives a lot of information about it. This information is usually in textual form, and it is possible to extract some key features from it. For example, in the case of clothing, it can be size, type of fabric, type of product, group of users (men, women, children), style (sports, casual, elegant). Parameters can also take continuous values representing the intensity of a particular feature (e.g. elegance and comfort). This method of categorizing footwear is implemented by Zalando (https://www.zalando.pl/rodzaje-butow/).

An analysis of product trade names was carried out to automate the categorization. The product names created by manufacturers are usually composed of alphanumeric strings that identify a particular product and some usability features. In the case of the analyzed data set, the Author attempted to categorize the data by extracting strings of characters identifying product features. It should be emphasized that such an approach is not possible and effective in every case. In this study, it was possible to categorize women's bras, according to their functional features—such taxonomy developed by the Author based on product markings presented in figure 1.

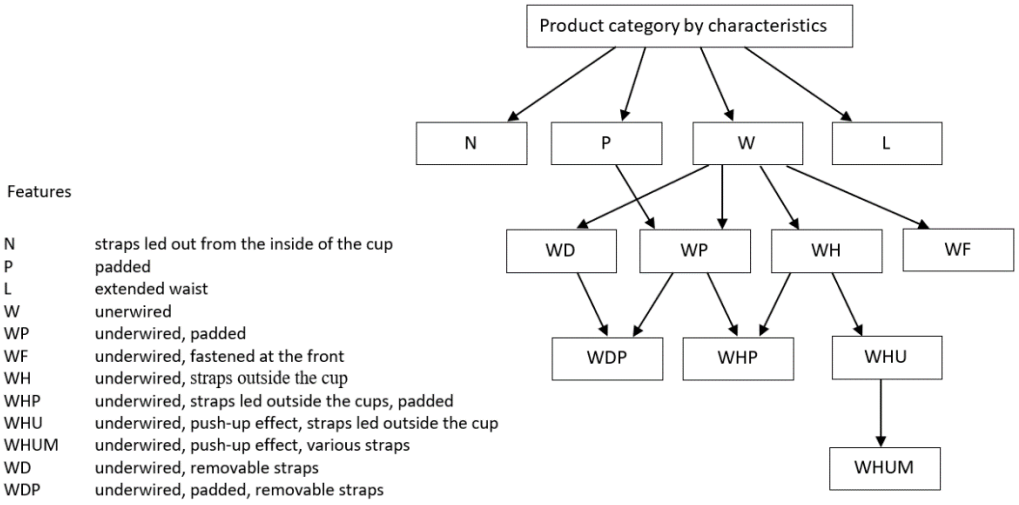

Fig. 1: A fragment of product taxonomy based on functional features

Extraction of significant character strings denoting the product category should be based on previously determined taxonomy. Its creation is a time-consuming process and iterative. For this purpose, a spreadsheet with text functions and the ability to write macros (MS Excel) was used in this research experiment.

The macro algorithm involves checking product names for specific strings. For the correct operation of the algorithm, the order of checking is essential. For example, in the analyzed case finding the "WHU" string does not determine the category, because in the next iteration the WHUM string can be found, similarly in the case of searching for WD and WDP strings. Therefore, the analysis started with shorter sequences (one or two letters), and then the longer sequences were checked. During the construction of the hierarchy, the inheritance principle was applied. The child class has all the attributes of the parent class. So, for example, a WHU category product will have all the features of the WH and W categories. In

this case, there are also multiple specializations, which describe the situation when a given class inherits directly from more than one superclass.

Taxonomy can be useful to calculate product similarity (Poncelet et al. 2019), which is of great importance for recommendation systems. You can easily designate products similar to the one chosen by the customer and recommend them. Two products can be marked as similar if they have the same leaf category in the taxonomy tree.

More than one product taxonomy can be created, taking into account different characteristics. In the case of clothing, it can be style (sports, casual, elegant, sexy, vintage, seamless), age group (children, teenagers, adults), gender (male, female, unisex). It should be noted that the above categories can be flexibly defined based on transaction analysis. Such analysis allows isolating types of products willingly bought by various customer groups. Merging different taxonomies is an effective way to build a complete product taxonomy (Jiang, Lin, Li 2018).

If we have a broad range of products, automation of category creation is essential (Aanen, Vandic, Frasincar 2015). Both the creation of a taxonomy and categorization algorithms require expert knowledge including knowledge of products and their use. The algorithm must be improved as new models appear. The key is to extract data from disordered or semi-structured information and convert it into a structured format, according to a pre-set semantic model. Having a data set supplemented with additional features, you can use any of several grouping (clustering) methods. Clustering (also known as cluster analysis) is an unattended data mining technique whose task is to detect groups (clusters) of objects with similar characteristics in a data set. The method requires defining a measure of proximity of objects demonstrating the degree of their similarity. Objects with a certain degree of similarity are combined into groups.

For sales data analysis, clustering can be performed to find out, for example, which products categories the customers choose most often. With a wide assortment, grouping only by trade name does not give satisfactory results, because the number of generated groups is vast. In this case, the effects of analysis are of little use in making decisions. A much better approach is to group products by a category designated due to its functional characteristics. The research problem in the discussed case is to identify the possibility of extending the data set of the recommendation system with new dimensions of analysis. In particular, the ability to dynamically define product categories. In practice, this means the ability to define multi-level rules that create an interface to the database.

Taxonomy of customer behaviour

Success in marketing and sales depends on the degree of understanding of customer needs and the factors that guide them when making purchasing decisions. Knowledge of their behaviour and relationship that connects them with the company allows you to create the right marketing message. Customer segmentation provides the necessary tool to describe customers in a significant way for price and market strategy. Segmentation can use various criteria, e.g. demographic, geographical, behavioural, psychographic. Based on the results of segmentation, you can create detailed customer profiles that are the basis of knowledge for building marketing strategies.

Psychographic criteria are the most difficult to determine and the most analytically demanding. Psychographic segmentation takes into account factors such as motives, attitudes, opinions, values, lifestyles, interests and personality, and thus features that are hard to measure. After identifying one or more psychographic segments, they can be combined with demographic, geographical or behavioural segmentation to create fully developed consumer profiles (Ferrel, Hartline 2010, p. 177).

Customer characteristics can be determined by direct or indirect methods. In the first case, data can be collected through a questionnaire. However, this method may be affected by mistake due to many factors, such as the way the questions are formulated, the respondent's misunderstanding of the issues, unwillingness to answer, deliberately giving false answers, etc. Indirect methods of extracting knowledge from transactional data sets contribute to a better understanding of the habits and preferences of the client based on the collected facts and allow for establishing similarities between customer groups.

In this study, the Author only had a detailed transaction database along with customer IDs. The challenge was to extract customer knowledge from this database. Therefore, it was proposed to identify additional features based on the semantic interpretation of existing attributes and semantically related data sources. As research shows (Rawski 2015, Sobczyk 2016), enterprises mainly use data obtained from internal sources for analytical purposes. Most enterprises consider this data to be the most valuable. It can, therefore, be argued that breaking this stereotype and focusing analyzes towards greater use of external data sets may create added value for business resulting from expanding the scope of analyzes by discovering semantic relationships.

Figure 2 shows a set of fields in the data table, new features that can be obtained through semantic interpretation, and additional external data sets. The lines in the figure represent semantic links. This way, many new features have been identified that can potentially be useful when constructing recommendations for clients.

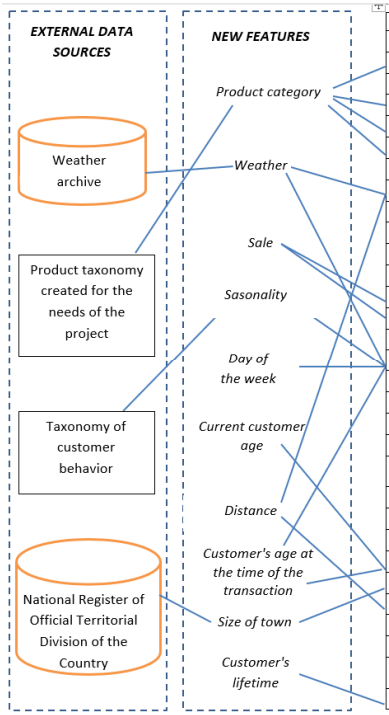

Name of the field in the database	Meaning
ProductID	A unique number assigned to each product item
ProductName	Trade name given by the manufacturer
Model	A unique number that identifies the product model
Color	The code that identifies the color of the product
Cup	The letters - like A, B, C, D - stand for cup sizes of the item
Size	Standard code identifying the size of the clothing
Store	The code that identifies the store in the data warehouse
City	The name of the town where the store is located
Voivodeship	Name of the voivodship in which the store is located
SalesmanID	A unique number identifying the seller
SalesmanName	The unique name of the seller containing the first and first letter of the surname
Quantity	Number of items of a given assortment on a receipt
GrossPrice	Catalog price in PLN
GrossPriceWithDiscount	Price paid by the customer in PLN
VAT	The percentage of VAT for a given inventory item
TransactionDate	Date of purchase
ReceiptID	A number that identifies the receipt within the entire data warehouse
ItemID	A number identifying the item on the receipt
Promotion	Promotion name
ProductGroup	The name identifying the product group adopting one of two values: Triumph, Other
AssortmentGroup	The name of the assortment group that adopts one of four values: daywear, nightwear, swimwear, accessories
CustomerID	Number that identifies the customer if he has a loyalty card
CustomerName	Name that identifies the customer if he has a loyalty card
Gender	F or M value identifying the gender of the customer (loyalty card details)
BirthDate	date of birth of the customer (loyalty card details)
PostalCode	postal code of the place of residence of the customer (loyalty card details)
CustomerCity	Place of residence of the customer with a loyalty card
CupSize	The letters - like A, B, C, D - stand for cup sizes, customer size (loyalty card details)
UnderBust	Under-bust Circumference – customer size (loyalty card details)
ClothingSize	The standard size designation applies to a customer who has a loyalty card (inconsistent data - no explicit understanding has been adopted)
CardEstablishmentDate	Date of loyalty card establishment

Fig. 2: New features in the data set extracted based on semantic interpretation

An interesting issue from the marketing point of view are customer behaviour patterns. Behaviour patterns are customer activities that recur at a particular frequency that can be considered statistically significant. However, the semantic interpretation of these patterns is crucial, i.e. understanding the

reasons the customers are guided by during purchasing decisions when choosing a brand, product category and moment of transaction.

In the case of stores with a large transaction base, valuable information is sequential patterns. Sequential patterns should be distinguished from association rules used in so-called basket analysis that tells you which products customers buy most often in one transaction. On the other hand, sequential patterns inform about what products are purchased by customers in subsequent transactions. This information is vital for the operation of recommendation systems. Information about several transactions of the customer lets us forecast which product he will probably purchase in the next deal and when it may occur. These rules can be extracted from a database containing the transaction history of regular or occasional customers. For comparison, we choose customers who bought the same product or who are somehow similar to the person for whom the recommendation is created.

It should be mentioned that performing sequence analysis requires that for a given customer, there are two or more transactions made on different days in the database. Sequence analysis provides the most common patterns in the form of pairs of predecessors and successors. The predecessor is the product bought earlier, while the successor is the product purchased in the next transaction. You can decide if the pattern is correct based on its frequency of occurrence in the examined data set.

Product categorization, combined with multi-level sequence analysis makes the recommender system operate more flexibly. In particular, it may be important to extract information about substitutability or complementarity of products from the customer's point of view. The recommendation can be created not only based on product features but also taking into account its brand or price range.

Another important information resulting from the sequence rules is the seasonality of specific products. Seasonality can be determined for a given customer (e.g. buying a product of a particular category every two years, or buying related to holidays)by using data mining techniques. The semantics of customer behaviour according to various parameters extracted using the classification are presented in Figure 3.

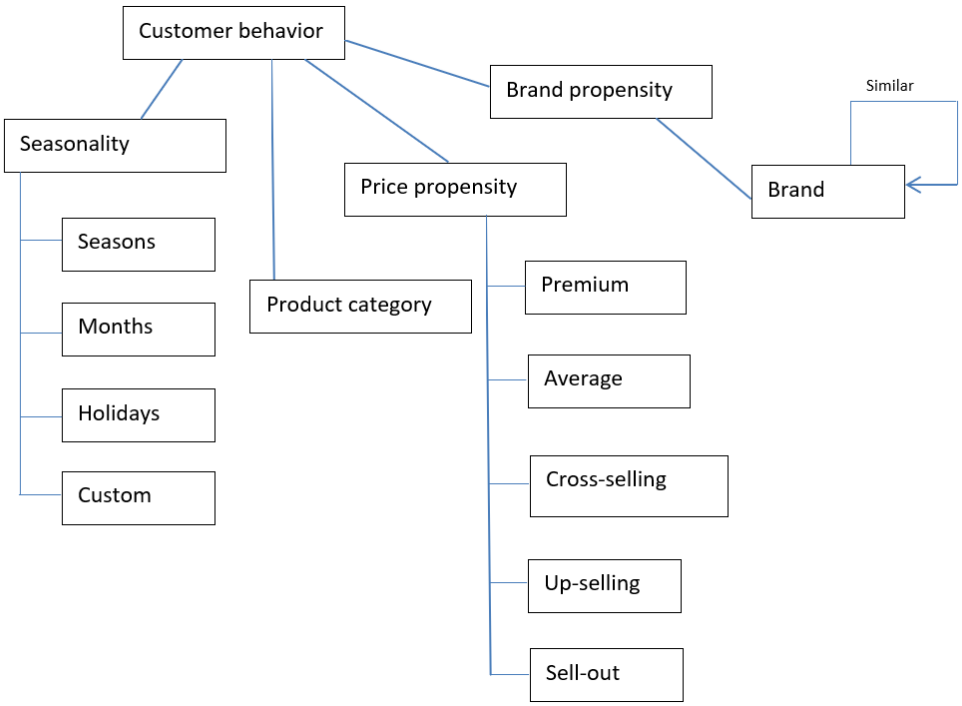

Fig. 3: Taxonomy of customer behaviour

Summing up the analyzes carried out based on an experimental data set, it is possible to extract a customer behaviour profile, consisting of many attributes, such as shopping propensity, seasonality, categories and product usability features preferred by the customer. Such a profile allows extracting rules that can be useful to generate recommendations and create marketing campaigns.

Semantic models such as ontologies and taxonomies enable the formalization of knowledge necessary to make marketing decisions. In particular, this is product and customer knowledge. Formalization of knowledge is nowadays a significant issue of decision support, as it allows automation of inference processes and significantly speeds up the whole process.

Conclusions

Knowledge can be created directly based on a data set by using data mining, in particular, clustering algorithms that group the examined objects according to many features. However, for the results of the clustering algorithms to be useful, they require semantic interpretation.

The hierarchical representation of knowledge in the form of taxonomy enables the categorization of products, which is very helpful for analytical purposes. The article indicates that the use of taxonomy allows flexible creation of analysis perspectives, in particular, adding new variables to the data set obtained by generalization or specialization of existing variables. The semantic model will enable you to create new variables by reasoning and combining different data sets. Thus, in the process of data analysis, new useful knowledge is created that can be used to make decisions.

Limitations of the study and future research

The experimental study presented in this paper shows that new variables are not always significant. During research experiments using data mining, it can be checked whether the new features are useful (e.g. the age of the customer at the time of the transaction, information about the weather on the day of purchase or the distance from the customer's home). A new feature can be is useful if it allows grouping the examined objects (products, transactions, customers), and the division into groups is of practical significance and contributes to the generation of better recommendations.

Future research will include identifying existing taxonomies that can be adapted and used in recommendation systems. The study will also focus on finding and evaluation of external, open data sources that, through a semantic linking, can enrich the results of analyzes and the effectiveness of recommendation systems.

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Electronic Data Interchange basis for the functioning of the Logistics Distribution Center

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Abstract

One of the basic aspects of modern logistics is the system approach, one of its subsystems is logistics distribution centres /LDC/. LDCs are complex facilities, consisting of storage areas, transport infrastructure for various transport branches, transhipment and storage equipment. They must have access to a land and/or sea long-distance transport route operated by means of local origins. They therefore include elements of the goods distribution system as well as transport network routes. These facilities deal with the coordination of logistics services (including transport) integrated with the flow of information, the quality control system and the provision of logistics services packages. The creation of logistics centres takes place as part of the development of new-generation seaports, by creating port logistic platforms, which become centres of comprehensive distribution of logistic services and economic growth poles in the development of regions. Ports of the whole of Europe, including Polish ones, such as: Gdańsk, Gdynia, Szczecin and Świnoujście aspire to such a role. Within them the logistic centres will satisfy needs of business entities.

Keywords: Logistics, Distribution Centers, Logistics System

Introduction

One of the basic aspects of modern logistics is the system approach, one of its subsystems are distribution centers / LDC /. Country logistics is: warehouse areas, transport infrastructure for various modes of transport, transhipment and storage devices, etc. They must have access to a land and / or sea long-distance transport route operated by the local origin of the country. They therefore cover elements of the goods distribution system as well as transport network routes. These facilities coordinate logistics services (including transport) integrated with the flow of information, the quality control system and the provision of logistics services packages. The creation of logistics centers takes place as part of the development of new generation seaports by creating port logistics platforms that become centers of comprehensive distribution of logistics services and poles of economic growth in the development of regions. Ports throughout Europe, including Poland, such as Gdańsk, Gdynia, Szczecin and Świnoujście, aspire to such a role. In them, logistics centers meet the needs of business entities.

Currently, it is increasingly discussed that there is a need to build logistics distribution centers in Poland, i.e. centers dealing with the coordination of logistics services and short- and long-distance transport, ensuring an integrated transport connection along with the flow of information between producers, distributors and consumers, and a control system.
The article introduces the goals and tasks of logistics centers in market economy conditions, as well as presents the existing structure of these facilities and presents solutions for the creation and operation

of logistics centers and assessment of their impact on location solutions and operations of logistics centers in Poland.

Problem Situation

With the above in mind, logistics distribution centers are the subject of research and analysis of various scientific disciplines. Striving to solve the problems of transport, including sea, the synthesis of knowledge in these areas is made, setting goals and hypotheses, adopting the right course of research to prove or deny them. Problems of transport economics focus, among others, on the principles of transport economic calculus, shaping prices for transport and reloading, programming, as well as planning the development of transport networks and shaping transport financing systems, generalizing the functioning of LDC. In the above topic, RESEARCH OBJECTIVE focused on LDC over a set time horizon and changing demand for transport services, taking into account their IT needs, against the backdrop of global political and economic conditions. The main RESEARCH PROBLEM concerned finding the answer to the question: In what logistic environment are LDC functioning processes carried out, and to what extent are LDC forces and resources prepared for the implementation of electronic systems?

The solution to the main research problem was possible thanks to the verification of HYPOTHESIS, which adopted the following wording: due to the growing role in transport logistics, there is a need for changes in its management system, through the leading role of solutions based on the construction of LDCs and their computerization.

The implementation of the research objective and problem contributed to fill the gap in the literature related to transport management, including maritime transport, in the context of the operation of computerized logistics centers.

The main hypothesis, research problem as well as specific problems require defining adequate methods needs and specifying research techniques and tools necessary to carry out tasks and verify accepted hypotheses. Systematic theoretical and empirical methods were used to achieve the objectives of verifying the adopted hypotheses. Theoretical research methods included literature analysis, comparative analysis, generalization, synthesis and inference etc.

Analysis of the literature allowed to obtain the theoretical foundations of empirical research, also conditioned synthesis. It made it possible to determine the current state of knowledge and factors affecting the quality of logistic system security management. The comparison method helped to indicate common features and differences between logistic systems of various entities functioning in the systems, which gave the basis to predict the further direction of development of the studied phenomenon and future possible changes and states.

The synthesis made it possible to determine the relationships and dependencies of the tests carried out and was helpful in the correct interpretation of the test results obtained. In addition, she contributed to the recognition of the overall research problem by linking specific facts with simultaneous partial rejection some of them and with generalization of others, as well as for precise formulation of conclusions.

The research problem in the presented approach touches only some of the problems resulting from determining the place and role of LDC in transport logistics, as well as the impact on its functioning of IT systems, one should be aware of constant changes in the subject of research, the appearance of new technologies, means of transport, etc., this emergence new research areas. Therefore, there is a need to systematically repeat and develop research on the presented problem.

One of the basic aspects of modern logistics is the system approach based on the general theory of systems. According to the assumptions of the system approach, the whole creating a certain system is the most important, while the parts that make it up (elements) play a secondary role. The role of individual parts is determined by the purpose for which the whole exists.

A logistics system. It can be defined as a set of logistics elements whose connections are made concrete through transformation processes in the temporal-spatial, quantitative and qualitative sense in the sphere of the flow of goods and information (Blaik, 1997), or as intentionally organized and integrated (within a given economic system) flows of materials and products and corresponding information enabling optimization in supply chain management (Abt, 1998, Kot et al., 2018, Akhtar, 2019) is the platform for the implementation of logistics processes. It is described, considering many possible components and relationships, as a multi-structural and multifaceted problem. There are many attempts to distinguish and classify various logistics systems and subsystems in the literature on the subject, which indicates that logistics is a specific way of managing procurement, production and distribution as an integrated whole.

The key role of the transport subsystem in the logistics system should be emphasized. Transport plays the function of integrating (binding) the logistics process, and its reliable and stable operation is a condition for the functioning of the entire system. Transport performs its functions by servicing the supply, production and sales spheres, and its main objective is to ensure the highest efficiency of transferring goods from the seller to the buyer. It is indispensable in all phases of the production sphere, starting from moving raw materials, materials and semi-finished products to production positions, by moving these elements during their processing (so-called technological transport), and ending with exporting the finished final product from the place of its production. Therefore, transport is a factor integrating the transformation of raw materials and semi-finished products into a new product. In the sphere of exchange, transport ensures delivery of previously manufactured products to the sales network and ultimately to consumers (Behun et al., 2018). Thus, thanks to transport, the supply, production and distribution phases can be seen as one process. Management techniques applied in transportation increasing the effectiveness of the transportation system, and protecting the natural environment with all its resources (Stawiarska, Sobczak, 2018).

The ongoing globalization of the economy increases the importance of international logistics, whose special features result from the fact that delivery and collection points are located in different countries. Therefore, logistics is facing new tasks related to the implementation of deliveries in cross-border conditions (Kurowska-Pysz et al., 2018, Witkowski et al., 2017). According to H.Ch. Pfohl we can talk about international logistics systems which are more complex than national systems, because the general and specific conditions for the creation of such systems are different (Pfohl, 1998). The economic practice of many developed countries indicates the important role of logistics in all economic enterprises. Logistics has become a decisive factor in the efficiency and effectiveness of individual enterprises and entire economies as systems (through the creation of national logistic systems). Copious evidence from the practice of market economy countries indicates that competitive struggle is being transferred to the sphere of distribution, and more broadly - to the sphere of logistics (Krzyżaniak, 1997). Not only the products themselves, nor their producers, compete but the whole supply chains, because today it is logistics that decides about the real level of customer service, and therefore about the level of income of enterprises providing specific products to the market. At the same time, these activities are the source of specific costs (related to transport, storage and inventory), therefore the logistics sphere has a significant impact on profit. One of the elements of the logistics infrastructure subsystem is logistics distribution centers (Krzyżaniak, 1997). They are very important links in the logistics process of supply chains and are an indispensable condition for fully applying the rules of logistics in the transport of loads.

It should be emphasized, as research shows, that in addition to the basic advantage of creating logistics centers, which is the reduction of costs of warehouse and transport operations, one should also cite their other very important advantages:

- high speed and completeness of supplying city trading points,
- creating an architecturally beneficial urban-forming element - ecological,
- reducing the harmful effects of large delivery motor vehicles on the urban environment, especially its historic buildings,
- creating good working conditions that minimize the accident rate and eliminate the nuisance of physical work,

- the possibility of providing storage services for seasonal products,
- the possibility of organizing specialized repair workshops in the warehouse district and many others, which are an expression of ecological development of the economy.

According to the authors of this article, due to the limited financial capabilities of the state and transport companies, it should be assumed that the process of creating these facilities will be a long-term process, even in the case of cooperation in their financing by external sources.

Logistics Distribution Centres /LDC/

Logistics centers play the role of organizational nodes in the national logistic system, streamlining flows in distribution channels, rationalizing the choice of transport means and communication routes, creating a platform for the operation of logistics, production and service companies, strengthening the trends of economic development (Krzyżaniak, 1997). Thanks to well-functioning centres, the organization of the shipment process can be carried out in all conditions, regardless of the type of market (Kordel, 1999). In practice, LDCs provide, to a lesser or greater extent, services that make up the so-called package of logistic services (Krystek et al., 2008; Chruzik, Mindur, 2015; Bukowski, Feliks, 2012; Loucanová et al., 2019; Korenkova, Zavadsky, Lis, 2019). In general, the following services are included in the package of logistic services: organization of physical movement, and hence transport; storage; distribution; transshipment; sorting; customs services; information services; financial services; insurance services; maintenance services; warranty services. In large centers, offered packages of logistic services contain up to several dozen items. The packages currently offered by logistics operators are becoming the standard on the transport market. Of course, their scope depends on the requirements, needs and expectations of individual clients.

The main tasks of logistics distribution centres (LDC) cover three areas of activity (Mendyk, 1998; Urzúa et al., 2019):

- distribution of goods, including: ordering goods, management of stocks, quality control, accepting returns, short and long-term storage of goods, their packaging, marking;
- transport of goods, including: formation of integrated cargo units, provision of appropriate transport technology for particular types and volumes of cargo, application of appropriate transshipment technology;
- other accompanying services, e.g.: legal and administrative support, forwarding, information, financial, insurance, or other logistic services, including advisory services.

Thus, LDCs can fulfil various functions resulting from the need of efficient handling of logistics chains. Their activities can significantly facilitate the rational control of supply chains, contributing to the increase of the efficiency of the flow of goods.

A characteristic feature of each logistics centre is the fact that all its elements ensuring the service of the goods, from acceptance to its dispatch, should be linked by means of an integrated information and telematics system and data exchange networks with other logistic centres in Poland and abroad and all participants of the exchange of goods. The main effect of the operation of such a centre and its cooperation in the field of handling freight with interested participants in the exchange of goods is to shorten the duration of delivery within logistic chains (Klimek, 2000).

It seems that without virtual connections with participants of the exchange of goods and entities servicing this exchange, the existence of LDCs would cease to be required.

The main effect of their functioning is shortening the delivery time within logistic chains, which contributes to minimizing the costs of goods distribution and transport. In addition, LDCs enable:

- 24-hour distribution of goods and completeness of deliveries;
- increase in the speed of delivery of goods (which can sometimes be a decisive factor in their purchase);
- improving the level of customer service;

- creation of new jobs;
- elimination of arduous physical work;
- increase in work safety;
- reduction of truck traffic on urban arteries (as centers are generally located near agglomerations, due to the requirement of a large free area for development);
- taking care of the cleanliness of the natural environment of the agglomeration;
- creation of synergy effects.

LCDs' operation in Western European countries and their continuous development, also near the borders with Poland, confirm that these entities are undoubtedly one of the most important links in logistics systems and their development in Poland is indispensable.

The construction of a logistics distribution centre from scratch is extremely costly, which is why logistics operators sometimes use existing technical infrastructure, e.g. in seaports or inland ports, or in duty free zones, for the provision of logistic services. Then the expenditures that they incur may concern the modernization of the telecommunications infrastructure, or the purchase of specialized equipment for handling goods in accordance with the client's wishes. In the case of seaports, it is also important that they can handle multimodal transport.

The occurrence of seaports as land-sea transport nodes particularly predestines them to accept the functions of a logistics centre, where various types of cargo and means of transport meet with an extensive camera for their service The attractiveness of seaports for using them as LCDs results from the fact that they generally have the appropriate infrastructure and superstructure, i.e. an appropriate area, a large storage area, devices and mechanized equipment for handling various types of goods, the possibility of high storage of goods, a telephone and computer network, and in port cities - a network of banks, financial and insurance institutions, customs offices (Klimek, 1998). Application of a logistics concept The logistics concept in transport (integrally associated with the operation of the land and sea transport chain) is defined as "the process of planning, implementing and controlling efficient, cost-effective flow and storage of raw materials, production stocks, finished products and related information from the starting point to the point consumption to meet customer needs. (Szwankowski, 1994; Lis & Szczepanska-Woszczyna, 2015; Janoskova & Kral, 2019) focuses its attention on factors shaping transportation needs, and not only on the quantitative aspect of these needs. This concept makes it possible to improve the land and sea transport chain (by increasing the quality of services provided in it) and taking over from its users activities related to physical cargo handling (Paprocki, 1989). These include goods handling operations, auxiliary transport operations, storage, physical distribution services, confectioning, marking, merging into larger units, inventory management, commercial services, final services (e.g. assembly and control), logistics support services and others. These types of services are realized in LDCs that are being built in or near the seaports, in the back of big urban and industrial agglomerations or large railway junctions.

The location of LDCs in ports is also the result of fundamental changes that have occurred in their functioning in recent decades. We are dealing here with the transformation of the traditional role of ports, which from passive participation in maritime trade turned into active and very important participants in global trade and transport system, adopting commercial orientation of their activities in the face of constantly growing international competition, as well as becoming an integrating element in logistic chains through the implementation of the logistics function (Ferrari, Parola, Morchio, 2006; Szwankowski, 2000). The expansion of port operations has even resulted in the extension of the concept of a seaport (Kuźma, Szczepaniak, 1971). Currently, it is defined as a "logistics and economic node in the global transport system, with a strong maritime character, in which the functional and spatially diverse activities are concentrated, directly or indirectly connected with logistics chains [The logistics chain (supply chain) is an activity related to the flow of goods from its original source, through all intermediate forms, to the form in which it is consumed by the final customer. It can also be defined as a "model-designed logistics process (resource flow process), integrated in terms of time, costs, spatial distance and customer service level, using infrastructural factors and organizational capabilities of a given channel or logistics channels. (Chaberek, 2000). However, it should be remembered that traditional supply chains, based on inventories and independence of their participants and oriented at

reducing costs, in the future will give way to supply chains which will be based on virtual information and networks and will be value oriented (this will be the effect of the market situation, necessity to meet individual customer needs, and use of direct marketing), (Augustyniak, 2003)], parts of land and sea transport chains are part of it" (Szwankowski, 2000).

In this way, you can define the leading sea ports of the world and Europe. They are said to be third generation ports. Operation of these ports, in addition to providing traditional port services (transshipment, storage, ship services) supported by modern technology, organization and management, high-performance technical equipment and "infostructure", industrial and environmental services [Generating the added value and associated with the operation of environmentally-friendly devices] and administrative and commercial services [Including procedures related to documentation and port regulations, as well as banking, insurance and legal services]. It is also connected with the creation in their logistics areas of distribution and information centres for international trade and the integration of the port with other links of transport chains (Szwankowski, 2000).

The fact is, however, that many seaports in the world are still in the phase of functioning of the 1st or 2nd generation ports. This is proof of the large diversity of the role and importance of ports on a global scale. All the more so because the largest and most modern ports are entering the fourth generation phase, resulting from the intensive development of their logistics function, manifested by taking over management and supervision over entire logistics chains (Notteboom, Rodrigue, 2008; Szwankowski, 2000). It should be emphasized that the growing competition in the market of port and transport services is the main reason for the diversification of seaport economic activity. It turns out that running only traditional activities (handling, storage) disqualifies seaports in the fight for the client. Therefore, a way to improve the competitive position of the port, the possibility of obtaining additional revenues (including value added), and the increase in the degree of use of owned production assets is diversification of economic activity. It consists not only in offering the widest possible range of services to clients, but also in creating numerous capital connections (with forwarders, sea or land carriers), or undertaking activities not directly related to port and sea trade. The use of electronic systems is also a supporting element, which is necessary today in the functioning of transport economy. Therefore, in order to implement the logistics concept it is necessary to combine human resources, fixed assets, information and goods in the supply chains and apply the basic logistics rule Just in Time /JIT/ but also Electronic Data Interchange /EDI/, which, acting as an information bridge between production and demand, plays a vital role in implementing the JIT principle. The combination of the goods stream and the information stream leads to integrated logistics.

Electronic Data Interchange /EDI/

The smooth functioning of modern supply chains requires the speed of communication of all their participants, their integration (as a result of which individual enterprises are increasingly intertwined), which can be achieved by using EDI, as well as the so-called value-added partnerships to optimize the flow of goods along the entire chain. Therefore, since the modern market requires fast deliveries of goods precisely tailored to the customers' expectations, fast communication and fast automated information processing become necessary, so EDI is the right solution, which allows quick response to market demand, while reducing inventory and shortening the time preceding execution of orders.

The enormous development of EDI in the world has led to an increase in understanding in Poland of the indispensability and inevitability of its use, with the simultaneous resignation of traditional paper documents for electronic documents. Although, for now, the process of introducing EDI by Polish participants of logistics chains is quite slow, in the future one should expect its dynamic development in all sectors of the economy and public administration (Kondratowicz, 1999). Meanwhile, the Internet is gaining more and more importance as a cheap, fast and easily accessible medium of information transmission. It should be emphasized that when introducing EDI, important role may be played by sea ports as LCDs (and LCD located at their back), which freight, transport, commercial, insurance, shipping agencies and other companies have to deal with, and hence their special role in the implementation of modern telematics solutions.

In connection with the significant role of ports in land and sea transport chains, a huge amount of various information is generated, which requires processing and transfer between all participants of port and sea trade. The carriers of this information are documents, the exchange of which using traditional methods involves many tedious, time-consuming formalities and significant costs.

Application of Electronic Data Interchange

The implemented EDI gives additional bonuses related to strengthening the organization's brand and is a signal of its readiness to cooperate with global companies. Almost all global companies use electronic data interchange and often require the use of this technology from their partners. In the European Union, the phenomenon of forcing the implementation of electronic data exchange in the entire logistics chain (by producers of final products at their sub-suppliers) has been observed. EDI is a strategic technology for large organizations that allows you to significantly increase the efficiency of exchanging huge amounts of information and reduce the costs associated with maintaining staff involved in handling paper documents.

EDI is closest to classic systems, allowing for full automation of processes, on the other hand, it uses Internet technologies, including the World Wide Web. This allows EDI to be implemented into the company's information system without the need to incur major investments - assuming that it uses web applications. Lowering the threshold of costs necessary for the implementation of EDI allows for the dissemination of this technology among smaller subcontractors, which will lead to an increase in economies of scale and improvement of business processes in the entire branches of the economy.

This paper highlights the problem of using EDI in international goods exchange. Particular attention was paid to the use of EDI in transport, including sea transport, in the light of the development of the logistics center. One of the important elements conditioning the development of a logistics center is to provide its entities with the possibility of exchanging electronic data within the port environment and with its surroundings. It should be remembered that at present, the strength of logistics is no longer due to extensive infrastructure (including telecommunications and ICT infrastructure), but in particular the effective flow of information made possible by the implementation and development of information services. The basic facts indicating the effectiveness of implementation are:

1. EDI is an abbreviation derived from the English name Electronic Data Interchange which means in direct translation Electronic Data Exchange.
2. EDI is the exchange of data in formats described by international standards, between IT systems of trading partners, with minimal human intervention.
3. EDI combines the possibilities of IT and telecommunications. It enables the elimination of paper documents, increasing the efficiency of all trade-related activities. EDI is the easiest way to carry out commercial transactions, avoiding the laborious work of creating, copying and sending paper documents. EDI creates a bridge that directly connects IT systems of cooperating companies.
4. EDI enables immediate transmission of information that is contained in typical commercial documents. The use of standard and globally accepted data formats ensures that all exchange participants use the same language. The EDI document is the equivalent of a paper commercial document of an established international form that has been adapted for the purposes of electronic data transmission.
5. EDI works regardless of the type of user software. The use of EDI is not limited by the differences in software that business partners use in their enterprises.
6. EDI is not a type of electronic mail. EDI involves the exchange of data in a fixed format between information systems, not between people. These data can be automatically processed by the computer.

EDI lies at the heart of the Electronic Market - the technology underlying strategies such as Continuous Replenishment in the retail sector, JIT (Just-In-Time) in the manufacturing sector, transport tracking in distribution, and electronic payments in all market environments .

The Electronic Market can be seen as both a short-term tactic and as a long-term strategy. No matter how you look at him, you mustn't ignore him, especially because of the benefits it brings:

- Improvements in the design cycle, enabling faster product launch
- Time and cost savings in production processes
- Reduction of general administration costs due to the elimination of manual processes

So how can EDI help? EDI is a strategic economic "catalyst" that unites customers, suppliers, banks and logistics companies, resulting in the creation of more effective partnership relations, based on streamlined working procedures, closer information exchange, increased productivity and stronger trade links. The idea of EDI is to exchange data between information systems, not between people (as it happens in the case of electronic mail). EDI enables immediate transfer of information that is contained in typical commercial documents.

The implementation of EDI requires integration of communication between partner's computer systems, but above all - a well-thought-out strategy. The EDI operator, apart from all technical issues, also deals with the analysis of business goals and the selection of the best solution tailored to the needs. The implementation of EDI brings measurable benefits - saving up to 80%!

The benefits of using EDI are: time saving, elimination of errors and mistakes related to manual data entry, automation of business processes, process transparency, care for the natural environment (saving of paper and energy).

It is an application that provides: sending and receiving electronic documents, creating invoices and WZ documents based on the local catalog, tracking the status of sent documents, built-in archive of received and sent documents, serial printout of received orders, monitoring of event history.

Today, electronic data exchange is the basis of economies around the world, and we are part of the international EDITEL group - a leading provider of EDI solutions in Central and Eastern Europe. The international experience of companies in the whole group allows us to quickly and efficiently connect business partners around the world. We also help in finding local legal regulations.

More and more entrepreneurs are choosing EDI communication. By introducing electronic data interchange - including in the field of orders, invoices, logistic documents - you ensure efficient business processes. Regardless of the scale of operation, EDI communication works in every company. Full control of the processes taking place directly supports the company's effectiveness and, consequently, the implementation of the adopted strategic goals. EDI allows you to instantly transfer information between a company and its suppliers and recipients. Smooth information exchange ensures precise traceability. Global Location Number assigned by the GS1 organization provides such solutions. By deciding on electronic documents, you streamline the process of delivery and production, and reduce the waiting time for the final product, which in turn translates into the company's position on the international market.

Conclusions

The expansion of business activity means that, as part of the logistics concept in transport, modern seaports (regardless of their size) can perform alongside traditional functions: transport, industrial, commercial, passenger and tourist traffic, as well as logistics and distribution functions. The key importance shall be attributed to ensuring that the whole creates a certain logistics system, while the parts that make it up play a secondary role. The role of individual parts is determined by the purpose for which the whole exists.
The research problem in the presented approach touches only some of the problems resulting from determining the place and role of LDC in transport logistics, as well as the impact on its functioning of IT systems, one should be aware of constant changes in the subject of research, the emergence of new technologies, means of transport, etc., this emergence new research areas. Therefore, there is a need to systematically repeat and develop research on the presented problem.

The changes taking place on the Polish transport and forwarding market clearly show the direction in which it is evolving. It is developing in the direction of logistics, which means that companies getting rid of cars and warehouses are increasingly willing to use external operators to manage goods and inventory. Enterprises, in search of cost reduction and building competitive advantage, transfer logistics functions outside. Therefore, there has been a development of enterprises providing comprehensive logistics services. The scope of logistics services rendered is usually very wide and includes activities that go beyond traditionally understood transport or forwarding. Usually these include supply services, distribution, transport, storage, inventory management, packaging, order processing. Therefore, the construction of logistics centers from the point of view of logistics service of the market is a particularly important task. Of course, the implementation of the logistics center location project requires long preparation. The experience of Western European countries indicates that they are necessary. Trade development, improvement of road infrastructure, density of the railway network, and above all new jobs - these are the main and most frequently mentioned advantages. Logistics centers are also an element of state policy, as they will significantly support the development of exports. These are also problems of future scientific research.

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Leadership, Conflict Management Traits and Teachers' Satisfaction

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Abstract

Leadership traits can have a significant effect on the success of an organization and leaders face a range of challenging roles required to lead and inspire their workforce. Personality traits, experience and training are contributing factors of successful leaders. For example, succefull conflict management resolution at work is contributing parameters for job satisfaction and productivity of the workforce. Conflict at work can be and indication of issues which require managerial intervention but managers may feel ill at ease and unprepared to handle conflicts at work. The purpose of this article is to present evidence which support the interaction between leadership traits and the satisfaction of employees. Evidence of a correlation between leadership styles, conflict management style is presented and the interaction between leadership traits and Teachers' satisfaction is illustrated with examples of the interaction between school conflict and school leadership. It would be interesting to investigate this phenomenon in other professions. Further research in this field can elucidate the interaction among different variables including leadership traits and work conflicts, which can affect the level job satisfaction and the effiency of an organization.

Keywords: Leadership, School Conflict, Transformational, Laisezz-faire leadership style

Introduction

Personality traits, experience and training are contributing factors of successful leaders (Leithwood, 2014; Yukl, 2012). There is some evidence to suggest a significant effect of leadership traits on the performance of an organization. Leadership style (You et al., 2015) and conflict management style (Ahmed, 2015; Chen et al., 2012; Lu and Wang, 2017) can have a significant effect on job satisfaction of employees. Job satisfaction can be a reliable indicator of successful management and efficiency of an organization (Aldridge & Fraser, 2016; Banerjee et al., 2016). Conflict at work can be and indication of issues which require managerial intervention but managers may feel ill at ease and unprepared to handle conflicts at work. Conflict management resolution at work is contributing parameters for job satisfaction, efficiency and productivity of the workforce (Chen et al., 2012; Kunaviktikul et al., 2000; Howell & Avolio, 2013; Vestal and Torres, 2016).

The purpose of this article is to present evidence which support a link between leadership and conflict management traits with the satisfaction of employees.

The relationship between the School Leadership and Conflict Management traits.

School leaders are expected to exhibit traits which will encourage the communication between school, students, teachers, parents and other stakeholders (Sosik et al., 2016). A successful school leadership can motivates teachers and students in achieving their goals in academics (Howell, & Avolio, 2013). There is evidence to suggest a significant correlation between leadership styles, conflict management style and job satisfaction of teachers. School leaders may adopt different styles according their personality traits, experience and management skills. There is a range of leadership traits which can be grouped according to their characteristics in different types of leadership styles. According to Bass et al. (2003), different leadership styles are transformational leadership, transactional leadership, and passive leadership, or Laisezz-faire leadership style.

School leaders are faced with challenging issues in a range of their jobs. A particular issue which leaders may face, is work conflict. There is a need for the school leaders and the manager to understand the approaches used in managing conflict by developing high competence in all the conflict resolution areas for the effective running of the schools (Wanjiru, 2019). The various leadership levels of the schools should ensure that they use the best conflict management strategies in defining and determining nature in the conflicts as they try solving it. Besides, the school heads can use various conflict resolution mechanisms to resolve the differences that exist between the members of the school community. The effectiveness of the leaders to use the conflict resolution approaches enhances their awareness of highlighting various conflicting situations that, in turn, lead to the best way of ending the differences among the people (Wanjiru, 2019). The school leaders can comprehend the structure of conflict management strategies so that they understand the root causes of the conflict in schools and select the best approach that will give them an amicable solution. Again, various disputes in schools at a personal level may involve teachers-teachers or learners-teachers (Wanjiru, 2019). These conflicts can be managed by the school heads who embrace the five conflict management strategies to bring them to an end and create peaceful co-existence in school.

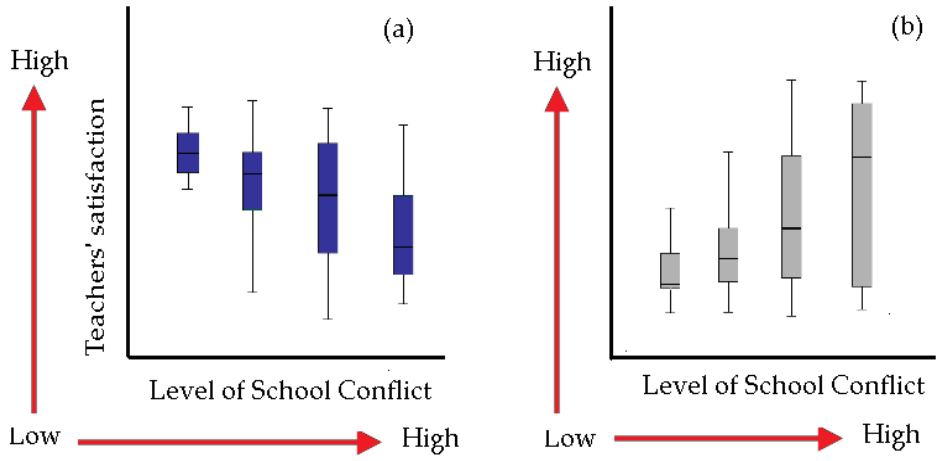

Figure 1: Level of school conflict and level of Teachers' satisfaction with (a) Transformational and (b) Laisezz-faire leadership style. Redrawn from Chandolia & Anastasiou, (2020).

Different leadership styles and conflict management styles may be adopted by school leaders (Saiti, 2015). The effectiveness of school conflict management may vary according different *leadership style* and *conflict management style*. There is some evidence to suggest a negative correlation between successful school conflict and job satisfaction. High levels of school conflict can be associated with lower level of job satisfaction, whereas moderate levels of school conflict can create conditions which attract the attention of the school leader who may exhibit creativity, leadership and conflict management traits which can successfully resolve conflicts. For example, a correlation between school conflict and the effectiveness of school leaders has been reflected on a negative correlation between conflict level and teachers' satisaction (Hareesol et al., 2019). Furthermote, Chandolia & Anastasiou (2020) reported that compared to the *Laissez-faire* school leadership style, *Transactional* leadership style was associated with low level of school conflict.

In the same manner, the effect of different conflict management styles was reflected on the satisfaction of teachers. In their study, Chandolia & Anastasiou (2020) concluded that in most cases, leadership traits have a significant effect on teachers. This is illustrated graphically in Figure 1. The correlation between conflict and Teachers' satisfaction is modified according to different leadership styles (Figure 1). School conflict correlates with teachers' satisfaction. This was a negative correlation when leaders exhibited Transformational leadership style but the reverse was exhibited in school units with a Transactional style adopted by school leaders.

Conclusion

In conclusion, there some evidence to suggest that leadership and conflict management traits can be correlated with the level of school conflict and job satisfaction of teachers. The interaction of all these variables may be modulated by a variety of parameters such as human resources, school resources and several other school parameters (Anastasiou, & Papakonstantinou, 2015; Aldridge & Fraser, 2016; Bass et al., 2003; Anastasiou & Papagianni, 2020). Further investigation is required to elucidate the interaction among different variables including leadership traits, which can affect the level job satisfaction of teacher as well the educational outcome of a school unit. It would be interesting to investigate this phenomenon in other professions.

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Determinants of The Economic Value of Investment Activity as A Factor of Sustainable Business Development

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Abstract

The economic value of investment activity of a telecommunications provider as an internal characteristic of its economic activity is studied through characteristics of the state and efficiency of the investment activity implementation, estimated by indicators of development of the results of economic activity of a telecommunications provider in the value chain. Characteristics of the economic value of an investment activity for a telecommunications provider are mostly reflected in value indicators such as net investments, share of capital investment in net income, capital efficiency, return on invested capital. Results of economic development of a telecommunications provider are characterized by an increase in ARPU, net income and efficiency, growth in assets, formation of net cash flow and economic value added. The specifics of a telecommunications provider are reflected in such operational indicators of development as an increase of subscriber base, an increase of Internet traffic or voice traffic, changes in the structure of traffic characterizing changes which have occurred due to improvement in quality of rendering services, expansion of their scope, etc.

Keywords: return on invested capital, operational indicators of development, quality of services, investment activity, economic value.

Introduction

The concept of sustainable information and communication development, active use of information and communication technologies (hereinafter ICT) underlies national projects of the leading countries of the world, systematically making transition to the digital economy.

Resolution of this contradiction lies in application of a set of innovative approaches in the economy and management of investment activity of a telecommunications provider, the synthesis of which in practice will allow to carry out investment activity of a telecommunications provider at a new qualitative level, which will provide both technical and economic development of the telecommunications provider in accordance with the new socio-economic requirements.

Therefore, the scientific problem resides in the lack of accumulated scientific knowledge on generation of new scientific and applied approaches in the economy and investment management of a telecommunications provider, which create opportunities for sustainable development of investment activity of a telecommunications provider, which should be based on modern approaches to managing the economic activity of a business, experience in using investment financing instruments that are new to businesses, as well as considering current conditions of functioning and specifics of activity of telecommunications providers, related to the specifics of its organization and the product created.

The purpose is to develop theoretical and methodological bases and applied provisions for managing the investment activity of a telecommunications provider on the basis of economic value.

Literature Survey

Interdisciplinary links between enterprise economics and financial management, which are traced to the provided concepts, directly impact on substantiation of methods and tools of analysis, planning

and organization of the investment activity of a business, which largely determine its successful implementation (Eckert, J., & Gatzert, N. (2018)).

However, the existing studies of investment activity focus on individual aspects without providing a unified view of the role, objectives and results of investment activity of a company.

So far, the issues of studying investment activity as a part of economic activity of a company, where it is considered as a holistic phenomenon, which is the primary reason for achieving current and future results of activity, the carrier of economic value, which is the source of generating economic activity of a company on the market and an information driver that supports and develops it, remain insufficiently considered and researched (Cordes, J. J. (2017)).

Considering the important role of the investment activity of a company, it becomes clear that it is appropriate and necessary to apply the appropriate technologies and strategic management tools, which are introduced within the overall approach to managing the economic activity of a company (Badri, H., Ghomi, SF, & Hejazi, TH (2017)). It should be noted that the methods, structure, functions and targets of a company management have undergone considerable changes as a result of the evolution of views and changes in management approaches.

The subject area of the investment activity of a company reveals the interdisciplinary links of its study based on integration of theory and practice of enterprise economics, financial, investment and strategic management, anticipating its further study in the context of such areas as (Grimm, M., Hartwig, R., & Lay , J. (2017)): application of value-oriented management and stakeholder theory, balanced scorecard; development of information and analytical support of a company's economic activity; application of methods of economic analysis, financial planning and budgeting technologies; development of new and improvement of the existing tools for managing the investment activity of a company, taking into account its peculiarities and the role in shaping the result of economic activity.

Within the framework of a value-oriented management and the stakeholder theory (Drobyazko, S., et al. (2019a), Drobyazko, S., et al. (2019b)), a theoretical foundation of value-based management has been formed.

Study of theoretical and methodological aspects of investment activity in the context of value-oriented management will help to investigate its further development in a more meaningful way. Therefore, value-oriented management and stakeholder theory are those promising areas which, in this study, are defined as the basis for economic growth and investment management of a company (Firk, S., Schmidt, T., & Wolff, M. (2019)).

The theory of value-oriented management puts forward the statement on increasing the value of business for its owners and external investors, who, only in case of satisfaction with owning a business, will invest and expand investment resources for its further development. (Vercellini, P., et al. (2018)).

The owners' satisfaction is based on two components. The first is the ability of a business to accumulate in the result of operations of a sufficient and, where possible, regular cash flow that the owner receives from owning it (Zerfass, A., & Viertmann, C. (2017)). The second, equally important component, is the gradual increase of the value of business, which ensures an increase in the well-being of owners in future (Srinivasan, R., & Parlikad, A. K. (2020)).

Simultaneously with the value-oriented management develops the stakeholder theory, which considers the purpose of business as creation and growth of its value for all parties interested in the activities of the business (internal and external agents), called stakeholders. Among the benefits of applying the stakeholder theory are the following:

ensuring importance of the environment research (Franchetti, J., & Page, S. J. (2017));
increasing the level of trust and loyalty of the company's customers (Langner, A., et al. (2017));

opportunities to prevent the risk of damage to the publicity;
development of interaction and communication with society provides potential growth of social importance of a business (Trianni, A., Cagno, E., Marchesani, F., & Spallina, G. (2017)).

In turn, among the shortcomings of the theory of stakeholders stand out the following (Blendinger, G., & Michalski, G. (2018)):

stakeholders are focused on their own needs and do not pay attention to business matters (Töytäri, P., Keränen, J., & Rajala, R. (2017));
taking into account the interests of all stakeholder groups transforms the purpose of a business into a certain list in which some provisions may conflict with each other (Narula, R., & Pineli, A. (2017));
certain areas of a company's progress may be blocked, especially those that conflict with the interests of some stakeholders (Rossi, M., Festa, G., Solima, L., & Popa, S. (2017)).

Harmonization of provisions of the value-oriented management and the stakeholder theory is possible within a balanced scorecard system that provides tools to develop and implement a strategy for a given value (Drobyazko, S., et al. (2020)). BSC provides for consistent implementation of a development strategy, company goals and control of their achievement through the so-called key performance indicators.

Methods

The methodological basis of the work is a set of methods and techniques of scientific cognition, including: dialectical and systematic approaches to the subject of research, as well as theoretical and empirical methods, the main of which are analogies, analysis, synthesis, used in determining the subject plane of the investment activity of a company and its place in the economic activity; abstracting and specifying in formulating definitions of key concepts of the value of investment activity, carrying out decomposition of connection between them, developing a structural and logical scheme of influence of investment activity on the value of economic activity of a company for stakeholders; method of distance from the model, expert methods - measuring the economic value of investment activity.

The information base of the research is analytical reports, data of annual reports of telecommunications providers, monographic researches and publications in periodicals on the researched subject, Internet resources, results of own researches of the autho.

Results

The investment activity of a company usually involves a simultaneous implementation of a certain set of investment decisions, which have different objectives for development of a company’s activity, require different scopes of investments, differentiate by the level and terms of implementation. Such a wide range of characteristics requires agreement of the level of effectiveness of investment decisions in the framework of targeted management units based on economic value.

Proceeding from understanding of the concept of efficiency, the essence of assessing efficiency of investment activity of a telecommunications provider is to compare the result (effect) of its implementation with the cost of its achievement. To evaluate effectiveness of investment activity as a holistic object in the theory of economics and management, we use models, which include formation and planning of a company investment program.

In such circumstances, defining methodological provisions for development of a value based investment program is a task that needs to be addressed in the scientific and practical fields.

Determinants of the investment activity of a telecommunications provider are those decisive levers that, when applied together, provide economic value, allowing for simultaneous growth of the economic effect of each invested hryvna and value characteristics of the activity for the stakeholders.

According to the results of the conducted researches with such determinants it was found that investments in creation of additional services for consumers, which determine directions of diversification of operating activity; capital investment facilities that produce technological leadership; formation of financial support of investment activity from alternative value-oriented sources; justification of investment decisions taking into account the value characteristics of stakeholders.

Logical relationships between the results and objects of a company's investment activity in relation to changes occurring in the economic activity of a company and manifested in certain indicators are presented in the form of a scheme of influence of investment activity on the value of economic activity of a company for the stakeholders, where the objects of investment as investment drivers of generating new added value form specific characteristics for different telecommunications stakeholder groups.

Research of an investment driver of introduction of 3G technologies by Ukrainian telecommunications providers has identified the following trends: acceleration of revenue growth for telecommunications providers due to a significant (over 100%) increase in mobile traffic usage, which influenced growth of mobile data revenue and ARPU, growing the number of subscribers in two of Ukraine's three largest mobile operators. In particular, the results show that the investment driver "3G Implementation" allowed PJSC "VF Ukraine" to move to a new development stage, to increase the value of its activity on the market as a result of a positive impact of the investment decision on the main value characteristics by stakeholder groups.

The consolidated results of determining the integral indicator of economic value of investment activity of telecommunications providers in Ukraine in 2019 and the expert estimates for 2020 are presented in Table 1

Table 1. The summarized results of the integrated evaluation of the economic value of investment activity of telecommunications providers in Ukraine (author's analysis on the basis of financial statements)

Company	2019 standard value	Value considering the weight in 2019	Expert estimation for 2020	Estimated value considering the weight in 2020
PJSC “Kyivstar”	12.75	0.84	14.75	0.92
PJSC “VF Ukraine”	7.46	0.51	11.65	0.71
PJSC “Ukrtelecom”	7.73	0.50	8.15	0.52

The obtained results show that the highest integral indicator of economic value belongs to PJSC Kyivstar and is expected to further improve in 2020. PJSC “VF Ukraine” received a low level of economic value due to the impact of negative economic added value in 2019 and a significant outflow of subscribers, but the experts’ expectations are optimistic-positive. PJSC “Ukrtelecom” has the lowest level of economic value and the worst estimate, which remained positive due to the active technical development and the place occupied by the enterprise on the market. Consistency of experts' opinions is estimated by the coefficient of variation, the value of which varies within the interval [7.5% ... 30%]. The highest consensus of experts' opinions was obtained by the value characteristics of the owners, and the lowest - by the state indicators.

The content and essence of the developed theoretical and methodological bases and applied provisions are aimed at creating opportunities for sustainable development of investment activity of a telecommunications provider on the basis of economic value, taking into account current conditions of accelerated spread of ICT and digitization of economy.

Discussion

Investments of Ukrainian telecommunications providers in 3G technology have had a positive impact both on the value of the economic activities of the companies that have implemented them and on the spread of ICT in Ukraine, since introduction of 3G contributed to reducing digital divide between urban and rural settlements. The value of investment decisions of a telecommunications provider, whose activity is carried out throughout the country, manifests itself in the internal environment of the company, creating the basis for improvement and further development of economic activity and the external one, changing the telecommunication service user habits and preferences, business conditions, level of ICT development, etc.

An increase in the economic added value of a telecommunications provider is possible on condition that a subscriber base is created with the number of subscribers larger than necessary to obtain its minimum size. Therefore, an important aspect for a telecommunications provider is to determine the threshold volume of the subscriber base, the excess of which provides an increase in economic value added without additional capital and operating costs of the network maintenance, since the main cost activity, in this case, becomes marketing, which provides creation of a subscriber base of telecommunications provider, under similar operational and technological conditions, on the basis of effective pricing policy applying modern means of services promotion.

Further development of the model of formation of the investment program of a company allowed to formulate an improved model, which, unlike the existing one, assumes consideration of the value aspects of the investment activity of a company and is based on the following main provisions: projects that on condition of joint implementation generate a net cash flow that ensures creation of economic added value at the maximum permissible level of risk are included into the investment program of a company with a certain implementation period; the cost of the investment program by the amount of investment should not exceed the amount of financial resources available to the company during implementation of the program. The amount of available financial resources depends on the financial condition of the company during implementation of the investment program.

Conclusion

The model improvement is based on the synthesis of key indicators of the concepts of value for money in time and value-oriented management.

As a result, the formulated model of the value based investment program of a company allows to implement investment decisions that have high priority, but not able to provide added value in the first years after implementation, to determine the total amount of annual economic value added from the investment activity of a company, the total level of efficiency of the capital invested in the company.

The results of the integrated assessment of the economic value of the investment activity of Ukrainian telecommunications providers make it possible to determine that the integral indicator is the highest for PJSC Kyivstar. PJSC “VF Ukraine” received a low level of economic value due to the impact of negative economic added value in 2019 and a significant outflow of subscribers, but the experts’ expectations are optimistic-positive. PJSC “Ukrtelecom” has the lowest level of economic value and the worst expectations, which remained positive due to the active technical development and the place occupied by the company on the market. Consistency of experts' opinions is estimated by the coefficient of variation, the value of which varies in the interval [7.5% ... 30%]. The overall positive tendency in the forecast of economic value of investment activity of telecommunications providers is emphasized, where the leading components of its formation are orientation to technological leadership and efficiency, formation of value characteristics of business owners and users of services.

Introduction of a balanced scorecard to determine the value of the investment activity characteristics will enable to develop a strategic map of the investment activity of a telecommunications provider. The developed map is a model that generalizes cause and effect relationships between four strategic

zones of economic activity of a company, forms the basis for investment management through characteristics and indicators that directly or indirectly reflect the economic impact and effectiveness of implementing investment decisions, focusing on the process and result of value adding of economic activity of a telecommunications provider for the stakeholders.

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Corporate Restructuring in The Coordinate of The Life Cycle Model

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Abstract

The SWOT analysis identifies and highlights the advantages and disadvantages of country's sustainable development, as well as the external and internal threats and opportunities in this area. It was confirmed that the strategic goal of economic transformation in country is innovative development, which foresees the rejection of traditional scientific and technical solutions in favor of fundamentally new advanced technologies. The analysis of qualitative methods that build alternatives to the scenarios of a desirable future is represented.

Keywords: Sustainable Development, Security, SWOT-Analysis, Matrix, Innovative Development, Cognitive Modeling.

Introduction

Sustainable development provides the refusal from traditional scientific and technical solutions in favor of fundamentally new advanced technologies, as well as ensuring the release of high-tech products and the implementation of new organizational forms, such as: technoparks, technopoles, as well as the implementation of resource policy and energy conservation.

The urgent need for qualitatively new, systematically agreed principles, approaches, methods for identifying opportunities for assessing trends and prospects for the development of both civilization with its economy in general, and of a particular country, occurs.
The research is relevant because of the identification of new trends, strategic scientific directions, technological advances, which in the long term, will be able to make a significant impact on economic and social development. To this end, in the process of generating alternative scenarios in solving prediction problems, there is a need to involve methods of expert evaluation, the following are the main methods: SWOT analysis, Delphi methods and morphological analysis.

Cognitive modeling is used to construct the scenarios for the selected alternatives, enabling, on the basis of the proposed mathematical apparatus, to get a sound scenario for practical decision making.

The goal of the study is to create a strategy for the development of socio-economic systems based on the mathematical provision of simultaneous application of prediction methodologies for creating

alternative scenarios and cognitive modeling, in order to build scenarios for the desired future and ways of their implementation.

Literature Survey

When designing a strategy for innovative development of large socio-economic systems at the level of the metropolis, large enterprise, region or even the country as a whole, the prediction methodology has proven its advantages in many high-status countries.
According to the foresight methodology, 3-4 alternatives to the scenarios are proposed in the final stage of the decision-making process, which, in the general case, are complex, badly structured problems (Gault, F. (2018)).

Today, within the framework of the prediction methodology, a number of qualitative methods of analysis have been formalized (SWOT-analysis, analytic hierarchy process (AHP) and its modifications, Delphi methods, cross-analysis, morphological analysis, etc.), which became the basis of the toolkit for building script alternatives (Drobyazko, S., et al. (2019a), Drobyazko, S., et al. (2019b), Drobyazko, S., et al. (2019c)).

Experience in the use of foresight in the world has shown that this methodology helps to build strong connection between industry, science, government, non-governmental organizations, etc. (Szopik-Depczyńska, K., et al. (2018)).

This allows to carry a thorough analysis of existing problems and to create special scenarios for the industry under consideration, also to implement the selected project in future, paying necessary attention to the increasing complexity of risk analysis and decision-making in such systems.(Wang, M. X., et al. (2018)).
In order to solve prediction tasks, a wide range of methods can be used, some designed especially for the analysis of the future, others borrowed from management and planning (Skrynnyk, Z., et al. (2019)).

In particular, research (descriptive) methods are distinguished (Manuela, T., & Kristina, R. (2017)), which are based on extrapolations of past trends or causal dynamics (trend analysis, cross-impact analysis, etc.), and normative methods that based on a preliminary consideration of a desirable scenario for future development (trees of importance, morphological analysis methods, Delphi, different scenarios, etc.) (Wang, W., Hou, R., & Qiao, W. (2017, April)).
Another classification is the distinction between quantitative (based on quantitative data input) (Smol, M., Kulczycka, J., & Avdiushchenko, A. (2017)) and qualitative (allow to make conclusions based on subjective expert judgment) methods (Zhao, H., Guo, S., & Zhao, H. (2018)).

In the context of solving prediction problems, methods of Bayesian models, trend analysis and simulation are considered as quantitative. (Ghaffari, S., Arab, A., Nafari, J., & Manteghi, M. (2017)).

Qualitative methods include brainstorming, SWOT and STEEP analysis (Kusi-Sarpong, S., Gupta, H., & Sarkis, J. (2019)), scanning, expert panels, hierarchy, Delphi analysis, morphological analysis, technological "roadmap" (Roadmapping) (Stec, M., & Grzebyk, M. (2018)), as well as, critical technologies, cross-impacts, scenarios, and more.
The problem with solving prediction problems is to determine the proper role of each of these methods, as well as to effectively combine these methods into a single methodology. (Żelazny, R., & Pietrucha, J. (2017)).

These groups of methods represent different approaches, their combination depends on the following factors: the time required for their implementation, financial resources, the nature of the problem under study, the purpose of the task, the ability to organize appropriate expertise (Kasych, A., et al. (2019)).

Predictability tasks are innovative because of this, they are fundamentally unformalized, so they contain fundamentally informal procedures, such as the selection of criteria, the choice of conditions for rational compromise, etc. (Song, M. L., Fisher, R., Wang, J. L., & Cui, L. B. (2018)).
When solving problems that require decision-making in conditions of conceptual uncertainty, often the only possible way of application is the method of expert evaluation. (Tetiana, H., et al. (2019)).

This is due to the fact that, regarding the issue of overcoming the shortage or the fundamental inability to obtain the necessary statistics for solving the tasks set, the only source of information can be the experience and knowledge of people, experts in this field (Kusi-Sarpong, S., Gupta, H., & Sarkis, J. (2019)).

In particular, there is a concept of "subjective probabilities" which, compared to statistical ones, have another origin and is defined by competent experts through specially organized procedures (Hilorme, T., et al. (2019a), Hilorme, T., et al. (2019b), Hilorme, T., et al. (2019c)).

Methods

The computational algorithm is designed to carry out an SWOT analysis of an object, that is, an analysis of its Strengths, Weaknesses, Opportunities, and Threats. The computational algorithm supports all the procedures, models and methods necessary for SWOT analysis. The SWOT Matrix contains 4 sectors that contain options for describing strengths, weaknesses, opportunities, and threats. While creating a model, you can make a list of parameters for describing the internal and external environment.

The structure of the created model consists of the following levels: loading and processing of data; data analysis; construction of SWOT model; prediction.

The first level provides the ability to enter data manually and then edit them to eliminate redundancy or, even, add new data. The next step is preparing the data for analysis. It is possible to use different software products at this level. In our opinion, MS Excel is the most convenient and affordable;
The second level provides an opportunity for mutual analysis of pairs of the following indicators: Strengths-Opportunities (S-O); Strengths-Threats (S-T); Weaknesses- Opportunities (W-O); Weaknesses-Threats (W-T);
The third level provides the tools for building a SWOT- model;
The fourth level implements the prediction based on the created SWOT- model.

Results

The usage of SWOT-analysis provides an opportunity to determine the impact of the external and internal business environment, taking into account the peculiarities of innovative development of the country, on the basis of energy component management in the national security system.

After the study, according to our opinion, the most significant characteristics were identified, and then they were represented in Table. 1.

Table 1:Identification of strengths in the innovative development of the country, based on the management of energy component in the national security system (author's research)

STRENGHTS	
S1	The level of the enterprise provision with its own energy resources
S2	Building a decent foundation for a competitive economy
S3	Achieving of the energy self-sufficiency
S4	NPP network developed
S5	Implementation of internal reforms in the context of network integration with the EU
S6	Change of energy (alternative) and supplier
S7	Creating an energy efficient society
S8	Creating an opportunity to re-equip both the energy industry and the industry as a whole
S9	Improving the security of the economy, energy and the environment
S10	Development of scientific potential
S11	Workplace creation
S12	Convenient geographical location for the development of the electricity industry
S13	Large reserves of natural resources for various industries
S14	Favorable trading geographical location

However, unfortunately, the weaknesses, of the modern economy as a whole and of its individual branches, were even more (Table 2).

Table 2: Identification of weaknesses in the innovative development of the country, based on the management of energy component in the national security system (author's research)

WEAKNESS	
W1	Monopoly dependence on particular supplier or route of energy supply
W2	Insufficient search for alternative sources of electricity, ways for reducing their volumes
W3	High dependence on imports of natural gas and oil
W4	Outdated production facilities and a significant amount of non-usable fixed assets of enterprises
W5	Installation of appropriate tariffs, coefficients for enterprises
W6	Low level of investment and innovation activity in the complex of enterprises of the fuel and energy sector
W7	Need for modernization, re-equipment and restructuring of production with continuation of technological resource of production facilities at the enterprises
W8	Low level of the labor resources skills
W9	High level of corruption
W10	Political and social instability
W11	Increase of tariffs for development of gas fields, up to 5 km deep
W12	Migration of labor resources for permanent residence abroad
W13	Complex implementation of EU standards in the energy sector

W14	Complexity of strategic goals achievement in the energy sphere
W15	Openness of production cycles of most industries
W16	Irrational usage of natural resources
W17	Irrational privatization
W18	Deprofessionalization of energy sector
W19	Low level of industry orientation in the sphere of education
W20	False statements of certain legal acts
W21	Complexity of the certain economic transformations
W22	Increased costs on energy

These characteristics can be eliminated. If the strengths are used rationally and all the existing opportunities are realized (Table 3), over time it is possible not only to compensate all the weaknesses, but also to turn them from disadvantages into advantages.

Table 3: Identification of opportunities for innovative development of the country on the basis of energy component management in the national security system (author's research)

OPPORTUNITIES	
O1	Significant potential of non-conventional natural gas reserves (methane from coal deposits, shale, biogas from landfills, etc.)
O2	The oil and gas pipeline systems are branched and developed
O3	Auction system for the sale of condensate, oil, and liquefied gas
O4	Integration into European standards of the energy system
O5	Significant potential for reducing greenhouse gas emissions
O6	Branched system of centralized heating
O7	Auctions of permits and licenses for the development of hydrocarbon fields
O8	Development of renewable energy sources
O9	High quality and compliance with international standards of Ukrainian scientific developments in the progressive sphere of alternative energy
O10	Introduction of tax motivation
O11	Significant potential for energy savings in industry, transport, budget and consumer sectors
O12	Strengthening of global connection
O13	Increasing energy savings and energy efficiency
O14	Diversification of energy imports
O15	Creation of strategic reserves of fuel and energy resources
O16	Reform of the power system
O17	Innovative renewal in accordance to world standards
O18	Attraction of investments and development of business with foreign capital
O19	Reduction of administrative barriers to entry the market and free investment
O20	Reorientation and renewal of old enterprises, modernization of technological processes
O21	Expanding international relations
O22	Developing mechanisms to counteract corruption
O23	Ability to diversify nuclear fuel supplies

Undoubtedly, there is a range of factors that hinder the development of the economy in the country, and some even cause its decline. We identify a number of threats (Table 4), which, in our opinion, are the most urgent nowadays.

Table 4: Threat detection in innovative development of the country, based on energy component management in the national security system (author's research)

THREATS	
T1	Investment capital withdrawal
T2	The threat of terrorism in energy facilities, as well as in the territories of countries that transit energy resources
T3	Ecological (large-scale crashes, global greenhouse gas emissions, threatening the entire planet)
T4	Speculation in the media, which is a negative manifestation of today's globalized world (artificially created panic, which leads to the destabilization of energy markets)
T5	Social threat (high accident of production, strikes and other possible protests, etc.)
T6	The threat of nuclear terrorism, the problem of non-proliferation of nuclear materials
T7	Energy poverty (lack of access to the sufficient amounts)
T8	External aggression of the energy supplier
T9	Neglect of the rules of “decarbonisation”
T10	The importance of ensuring the stability of energy transportation
T11	Dependence on foreign energy resources
T12	Transit status may be lost
T13	Self-isolation after EU rules were not observed or inadequately implemented
T14	Existence of seismic geological zones in the Carpathian region

We have selected 10 officials from different levels of management of seven energy companies of Dnipropetrovsk region, as experts.The consistency of experts' opinions was calculated by the Kendel rank correlation coefficient, which was 0.67.
The results obtained by implementing the computational algorithm of the SWOT-analysis method are presented in Table. 5.

Table 5. Results obtained from SWOT-analysis (author's calculations)

STRENGHTS		WEAKNESS		OPPORTUNITIES		THREATS	
S_j	F_j	W_k	H_k	O_n	G_n	T_i	B_i
S13	19,7	W10	19,4	O17	5,5	T8	-9,8
S14	18,4	W9	17,7	O1	4,8	T1	-7,8
S6	17,3	W12	16,4	O4	4,1	T5	-6,5
S5	15,1	W5	15,7	O10	3,7	T12	-4,2
S12	14,8	W22	14,4	O8	3,5	T11	-2,2
S3	14,8	W16	13,5	O12	2,3	T2	-1,7
S8	12,4	W17	12,5	O14	2,3	T3	1,0
S11	12,3	W1	12,3	O15	1,9	T6	0,2
S10	10,9	W4	11,3	O21	1,8	T9	0,5
S4	10,7	W3	11,1	O22	1,3	T4	1,2
S9	10,6	W7	10,3	O19	1,2	T10	1,5
S7	10,6	W8	9,0	O18	0,9	T7	3,1

S2	8,3	W20	8,3	O9	0,8	T13	3,7
S1	7,5	W21	8,0	O16	0,7	T14	4,7
		W18	6,2	O2	0,3		
		W13	5,1	O6	0,3		
		W6	4,8	O13	0,1		
		W2	4,7	O7	-0,2		
		W11	4,6	O3	-0,5		
		W15	3,7	O20	-1,1		
		W19	3,6	O5	-1,2		
		W14	3,5	O23	-3,9		
				O11	-3,9		

From the results in table 6, it is advisable to highlight the following.

The strongest characteristics. From the obtained values of the coefficient F it can be seen that it reaches the maximum for the characteristics S13 and S14 (F = 19,7 and F = 18,4 respectively). The S6 characteristic is much smaller than F = 17,3. The other characteristics are also close to those, which were mentioned, their F values are slowly decreasing. There are five strong characteristics with the highest F.

S13 Large reserves of natural resources for various industries;
S14 Favorable trading geographical location;
S6 Change of energy (alternative) and supplier;
S5 Implementation of internal reforms in the context of network integration with the EU;
S12 Convenient geographical location for the development of the electricity industry.

The weakest characteristics. Based on the values of the H coefficients, we can make relevant conclusion about the weak characteristics. For the most important characteristics, these values differ slightly (from 19,4 to 11,1), however, allow them to be prioritized. The values of the coefficient H for the other characteristics gradually fall into the interval [10,3; 3,5]. So the weakest features are the following:

W10 Political and social instability;
W9 High level of corruption;
W12 Migration of labor resources for permanent residence abroad;
W5 Installation of appropriate tariffs, coefficients for enterprises;
W22 Increased costs on energy.

Opportunities with the greatest chance of implementation. The highest value of the coefficient G has the ability O17 (G = 5,5). In second place is O1 with value of G = 4,8. O10 and O8 opportunities are close in value. Thus, the most likely opportunities are the following:

O17 Innovative renewal in accordance to world standards;
O1 Significant potential of non-conventional natural gas reserves (methane from coal deposits, shale, biogas from landfills, etc);
O10 Introduction of tax motivation;
O8 Development of renewable energy sources.

The most dangerous threats. When calculating the coefficient B, we can observe that the most urgent and dangerous threat is T8, for which B = -9,8. Furthermore, nearly equal values of B have T1 i T5 (-7,8 and -6,5 respectively). The range of B values for the rest of the threats starts at -4.2, that means that, the level of these threats is relatively lower. Thus, the most dangerous threats are:

T8 External aggression of the energy supplier;
T1 Investment capital withdrawal;

T5 Social threat (high accident of production, strikes and other possible protests, etc).

Discussion

The development of industries depends on the introduction of critical technologies, in particular, high-priority technologies, the usage of which is crucial for creating or exceeding world-class products. The usage of critical technologies should help to meet national needs in the social, military, economic and other spheres of the economy.

Economic analysis of the factors influencing the definition of priority directions of technological development, shows that the following indicators of the critical technologies introduction may be used in the country's industries:

volumes of budget financing of scientific and technical works, concerning development of perspective technologies and determination of priority directions of science and technology development;
volumes of innovative costs;
introduction of new technologies;
development of new product types;
specific volumes of innovative costs for the introduction of new technological processes.

However, the issues of introducing scientific and technological developments into production remain unresolved. The financial situation of most industries prevents them from introducing new technologies and paying for highly qualified specialists.

Conclusion

Thus, the current priority directions in the development of the strategy and policy of the development of scientific technologies in the country are:

concentration of resources for engineering research in those areas, where country has significant scientific, technological and industrial potential;
the usage of a targeted program approach to finance all sectors of the scientific field;
introduction of market mechanisms to support the development of new technologies, in order to expand the participation of small and medium businesses in scientific and technological development;
bringing the system of intellectual property legal protection in accordance with international norms and introduction of intellectual property into the economic return;
development and implementation of innovative information technologies.

The strategic goal of economic transformation in country is innovative development, which can be realized only in the context of structural restructuring of economic sectors, technological renewal of industry and agrarian sector with the widespread use of perspective technologies.

Selection of critical technologies, creation of rational scenarios for development of strategically important enterprises, determination of priority industries and industrial sector of the state, are advisable to perform on the basis of carrying out a set of works concerning technological prediction.

The perspective research directions in this area are the construction of a cognitive of country's innovative development, based on the energy component management in the national security system, using the factors identified in the results of the SWOT-analysis. Cognitive modeling technology is based on identifying possible and rational ways of managing the situation in order to move from the initial states to the positive ones, using cognitive models. Cognitive modeling technologies do not allow to make rational decisions for the benefit of subjects.

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Information and Communication Technologies (ICT) Usage in Public Administration – Example of Poland

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Abstract

Today's information and communication technologies (ICT) have revolutionized the way of working, transformed the economy and irreversible affected human activity in the information society. Poland is increasingly embracing ICTs as a key enabler of social and economic development. It is important for governments to improve the management of ICT-driven approaches to guarantee continuity of online services as well as to safeguard people's data and privacy. E-government has been growing rapidly over the past years. The purpose of this article is to analyse the use of information and communication technologies (ICT) in public administration in Poland. This issue will be analysed taking into account the structure of central administration and local government units. The method of literature analysis in terms of ICT as well as report analysis and own observations will be used.

Keywords: Information and Communication Technologies (ICT), E-Government, Public Administration, State Administration, Self-Government

Introduction

Information and communication theories became a major driver of the economic development of countries in a global world. Information component plays a key role in the building of competitive potential of countries and the development of international relations (Petkova, Ryabokon and Vdovychenko. 2019). The worldwide rapid progress of ICT in the last three decades has attracted increasing attention among many economists and researchers who have focused on studying the impact of ICT diffusion (Bahrini, Qaffas 2019). The usage of ICT systems provides administration with many diverse advantages. A fundamental one is more efficient achievement, systemic solutions in operations and more efficient reactions in case of emergence of various crises. Many ICT tools can be efficiently used by all unites of public administration.

Information and communications technology (ICT) is a very broad term, analyzed from the standpoint of many areas of science. These technologies are used in all sectors of the economy, and issues related to ICT are the focus of interests of both economists as well as politicians dealing with the economy and business – both in developed as well as in developing countries. The term ICT includes all communication media, media allowing the storage of information and equipment allowing information processing. In addition, ICT also encompass a range of digital applications and complex IT systems allowing the actual implementation of higher abstraction level data processing and storage than the hardware level. It is thus correct to state that ICT are the circulatory system of the knowledge-based economy, in which the information society is of dominant significance. This significance is confirmed by relevant numbers (ITU, 2019):

- It is estimated that 4.1 billion people are using the Internet in 2019, reflecting a 5.3% increase compared with 2018. The global penetration rate increased from nearly 17% in 2005 to over 53% in 2019

- Between 2005 and 2019, the number of Internet users grew on average by 10% every year.

- In developed countries, most people are online, with close to 87% of individuals using the Internet. In the least developed countries (LDCs), on the other hand, only 19% of individuals

are online in 2019. Europe is the region with the highest Internet usage rates, Africa the region with the lowest Internet usage rates.

- In all regions of the world, more men than women are using the Internet.
- The percentage of households with Internet access at home is generally correlated with a region´s level of development. In all regions of the world, households are more likely to have Internet access at home than to have a computer because Internet access is also possible through other devices. In 2019 years, more households in many countries have had Internet access than computers.
- An important barrier in the uptake and effective use of the Internet is a lack of ICT skills.
- European countries lead e-government development globally; the Americas and Asia share almost equal standing in high and middle e-government levels, and many African countries continue to struggle to improve their e-government standing.

Public administration is work of the state implementing its objectives. In other words, it is the entirety of activity conducted by diverse entities, bodies and institutions for the purpose of implementation of the public interest. Two groups can be discerned between: State administration and local government administration. State administration may be further subdivided by its area of activity, into central administration (Chairman of the Cabinet of Ministers, the Cabinet of Ministers, the ministers and central state administration bodies) and field administration (the voivodes and services operating regionally). Central state administration bodies handle the entire territory of the country, with field state administration bodies only operating within a strictly defined area. The local government is and will be one of the main entities controlling the development of the country. Local communities were deemed to be one of the basis for the democratic system – the key component of which is the citizens' right to participate in the control and management of public affairs. Local government authorities are of particular importance for the functioning of the entire system of democratic structures within a state. In order to enable must direct exercising of this right, the Republic of Poland includes since January 1st, 1999, a three-level structure of local government, made up of: the local commune government, the local county government, the local voivodeship government.

As of January 1st, 2020, the administrative subdivisions of Poland spanned: 16 voivodeships 314 counties and 66 cities with county rights, 2477 communes (including 302 urban communes, 638 urban-rural communes and 1537 rural communes). A series of acts of law governs the operation of local government entities; these describe the scope of affairs transferred for control of local governments and the resources that they may make use of. The constitution of Poland establishes rights of local governments, art. 15 section 1 states: „The territorial system of Poland ensures the decentralisation of government". Art. 16 section 2 states in turn: „The local government participates in exercising power. The significant part of public affairs that it is to handle is handled under own name and responsibility".

Digitalisation of economic and social dimensions has become an unavoidable subject in political and social debates, which are based on current technological, social and economic tendencies (Muravska, Stacenko, Zeibote 2019). Intensive development of new ICT technologies has forced a creation of a new type of communication of citizens with the state (authority), and new solutions are defined as: e-administration or e-government. To a narrower extent, e-administration refers to creation of government websites to improve the quality of public services provided to citizens or work organization in an office that is using an electronic document flow (E-administration digital services in Poland).

These conclusions suggest the leading question, which is: What is the level of usage of ICT by public administration in Poland? The presented issue shall be verified through the following detailed research inquiries:

- What is the level of use of ICT in Poland compared to other countries?
- Is the level of use of ICT dependent on the unites of administration?
- In which areas does the implementation of ICT proceed satisfactorily, and which areas require improvements?

The following issues related to information and communication technologies will be analysed in detail:

- access to the Internet,
- providing of mobile devices to public administration employees,
- Intranet usage,
- ICT training for employees of public administration,
- EDMS usage,
- implementation of the ISO system,
- use of Business Intelligence tools,
- level of websites,
- e-service for citizens,
- expenditure on selected ICT equipment (IT equipment, telecommunications equipment).

The analysis shall be based upon a critical analysis of literature, specific reports as well as observations of practice, own experience and thoughts.

Literature Review

Development of a concept of the social investment and innovation is a core element in digitalisation public services (Muravska, Stacenko, Zeibote 2019). The authors suggest to stress in social research a distinct understanding of the co-creation as local, regional, and national governments rely on digital provision of government services.

In recent years, we have seen an increase in interest in topics of ICT. Many scientists from diverse fields of social sciences have been undertaking research in this area. Information and communication technologies (ICT) are a tool used in many areas, including scientific research. Most scientists treat them as basic equipment and use them without even wondering about their significance for their work. Many discuss the topic of the significance of ICT from the point of view of their field of research, e. g. engineering, medicine or economy. Regarding the growing importance of ICT and the way it is transforming the world, many academicians and researchers have focused on studying the impact of ICT on economic growth at the industry level, at the national level, and at the cross-country level (Bahrini, Qaffas 2019).

The evolution of ICT has been shaped by both innovational complementarities and the sequential appearance of imbalances that has focused innovation activity in discrete phases of industrial development (Taalbi 2019). Digital governance structures provides one-to-one link between micro and macro, between individual and government (Erkut 2019).

The successful implementation of the desired e-services depends on the level of e-skills of all entities involved in the planned project. It was concluded that in order to be able to achieve a higher level of e-administration development, we need an efficient, effective, transparent and open model of its development, which will contribute to the increase of accessibility and the level of advancement of public services over the Internet Information and Communication Technology (ICT) can make public administration capable of capturing future challenges. Studies show how the use of ICT affects social live (Tomaszewicz 2018).

According to Carlo Thomsen, two factors have been crucial for digitalisation in the Norwegian public sector and administration. First, the development of technology has made possible a more effective task performance and a better distribution of resources across sectors and levels. Increasing budget limitations has led to a demand for more effective solutions, and hence investement in new technology to facilitate such needs. Second, the expectations of citizens and private businesses have evolved alongside these technological developments. Many services – for example banking services – have become more user-friendly. Users expect rapid problem-solving and direct feedback (Danielsen, Førde and Rykkja 2018). It is worth mentioning that new technologies are not always an effective instrument for improving public services or the quality of life of residents. Such a situation may occur when there is no social acceptance of new solutions or the level of complexity of their application, for example: cities with an aging society, where most residents prefer more traditional solutions (Czupich 2019)

At the national level, the development of innovative technologies enables a country to take higher ranking positions by the level of information and communication technology development. The assessment is carried out using a number of indicators, calculated with the respective index system and applied for analysis of problem areas in politics, as well as for monitoring of progress in the field of innovative technologies introduction (Petkova, Ryabokon, Vdovychenko 2019). Factors indicating the development level in terms of ICT are: the E-Government Development Index (EGDI) the ICT Development Index (IDI), the Web Index and the Networked Readiness Index (NRI).

The United Nations has generated the United Nations E-government Development Index (EGDI). The EGDI is a composite indicator that consists of three indices (online service index, telecommunication index and human capital index) that are equally weighted. In view of the steady growth in technological capabilities and the fact that the UN aims to reflect these developments in their indices. In the most recent summary for the year 2018 Poland is ranked 33rd; compared to the previous period – 2016 – it improved its rank by three and found its place among states classified as very well developed in this regard. The ranking leader is Denmark, which rose in the list as compared to the previous year by a staggering eight levels (https://publicadministration.un.org/en/databases).

The ICT Development Index (IDI), has been published annually since 2009, is used to monitor and compare developments in information and communication technology (ICT) between countries and over time. In the 2017 report, Poland took 49th place (out of 176 ranked states) rising by one level as compared to the year 2016. It was, however, one of the lowest ranked European states (https://www.itu.int).

The Web Index is the first measure of the web's contribution to social, economic and political progress, studying countries across the world. Since its launch, the Web Index has become established as a reference point for governments and policymakers around the world, holding governments accountable and driving public debate. In the last full list, Poland was ranked 34th out of 85 states (https://thewebindex.org).

The World Economic Forum's Networked Readiness Index (NRI), measures the propensity for countries to exploit the opportunities offered by information and communications technology (ICT). It is published in collaboration with INSEAD, as part of their annual Global Information Technology Report (GITR). The report is regarded as the most authoritative and comprehensive assessment of how ICT impacts the competitiveness and well-being of nations. Liderami ranking są Finlandia i Singapur. The list is led by Finland and Singapore. According to this report, Poland took 42th place out of 139 (WEF 2016 report). Poland's neighbours rank better: Germany – 15, Lithuania – 29, the Czech Republic – 36 (https://reports.weforum.org).

On the basis of data from the indicated reports, it must be concluded that Poland still has a lot to do in terms of information and communication technologies. A necessary condition of improved ICT development levels in Poland is support by the public administration entailing bringing legal provisions to order and designating innovative technologies as a priority within state policy.

Data Analysis

The connection of individual bodies with the world digital network is the basic condition of existence of efficient e-administration. In Poland in the year 2018, the most commonly used mode of access to the Internet among public government entities were connections using DSL and broadband connections. The highest level of DSL technology availability was declared by commune offices (75.1%). The lowest level is provided by marshal offices (37.5%), which were in turn characterised by the highest level of availability of broadband mobile connections (at least 3G), even higher than in case of state administration.

Table 1: Public administration units with Internet access by type of access and type of unit (in %)

	state administration		self-government		municipal offices		district offices		marshal offices	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
DSL connection	33,0	42,0	76,8	72,2	79,5	75,1	62,4	55,4	25,0	37,5
Other broadband exed connection	91,2	91,1	46,3	55,3	41,0	50,0	77,2	86,8	100,0	100,0
Broadband mobile connection (at least 3G)	98,9	95,5	68,3	69,5	65,2	66,4	86,4	87,6	100,0	100,0
Narrowband mobile connection	36,3	46,4	11,0	13,4	10,4	12,3	14,2	18,8	18,8	50,0

Source: own study based on Information society in Poland. Results of statistical surveys in the years 2015–2019.

Mobile Internet access encompasses equipping employees with suitable devices. In the year 2018, as compared to the year 2017, the share of employees equipped by offices with mobile devices with Internet access rose by 3.5% and amounted to 20.5%. Within state administration the use of such devices is over twice as high than in local government bodies. Marshal offices rank best in this area.

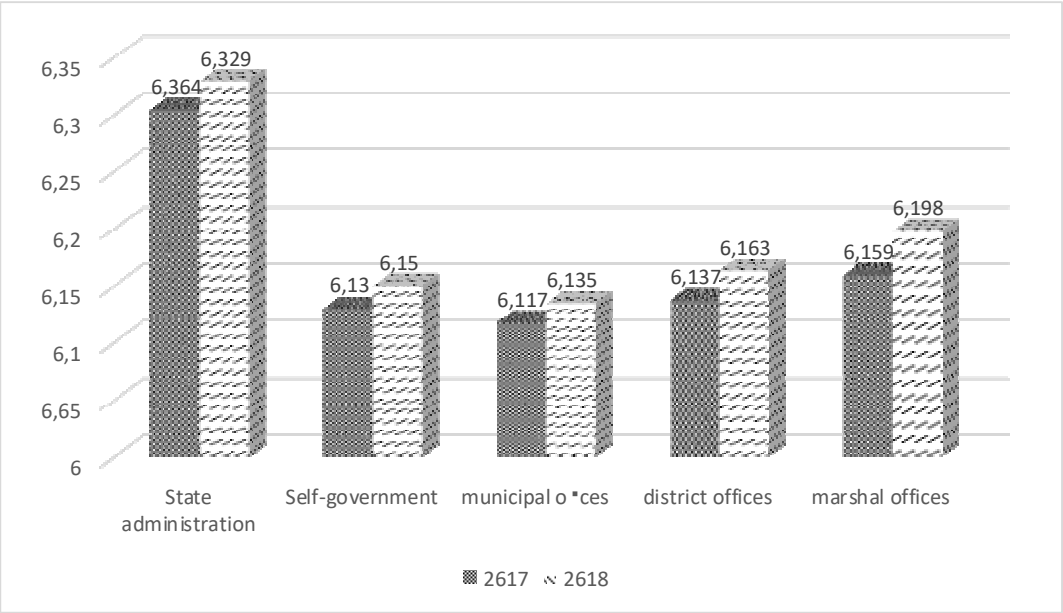

Fig. 1: Employees of public administration units equipped in mobile devices with Internet access by type of units

Source: own study based on Information society in Poland. Results of statistical surveys in the years 2015–2019.

For the purpose of efficient operation of public administration bodies, employees must continually improve their competences, the area of ICT included. It is thus necessary to arrange training seminars both for ICT specialists as well as for the remaining employees. In the year 2018, 90% of state administration and almost half of local government bodies organised such training seminars. All (100%) of marshal offices did this.

Table 2: Information and communication technologies (ICT) - use in management within administration (in %)

	state administration		self-government		municipal offices		district offices		marshal offices	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
Public administration using EDMS	72,5	78,6	59,0	64,7	56,8	62,6	71,3	77,2	81,3	87,5
Public administration using EDMS as a primary mode of documentation of handling and settling official issues mode of documentation (in % of units using EDMS)	60,6	71,6	17,2	26,3	16,9	26,2	17,8	26,5	38,5	35,7
Public administration units having a policy or strategy to share open public data	16,5	40,2	4,4	14,6	4,1	13,4	6,2	22,3	12,5	25
Public administration units that implemented the ISO system	22,0	26,8	10,6	15,2	7,9	12,8	24,3	28,5	68,8	68,8
Public administration units that used Business Intelligence tools	28,6	31,1	1,8	2,3	1,4	1,7	3,6	4,6	18,8	37,5

Source: own study based on Information society in Poland. Results of statistical surveys in the years 2015–2019.

An Electronic Document Management System (EDMS) supports units in management. The share of bodies using an EDMS rose in the year 2018 across all levels of administration. Local government entities use such systems less frequently (2017 - 59%, 2018 – 64.7%) than state-level administration (2017 – 72.5%, 2018 – 78.6%). It is most frequently used at marshal offices (87.5% – 2018). The usage of an EDMS as the basic mode of documentation of the course of handling and resolving issues varies greatly between state and local government entities – the figures for the year 2018 are 71.6% and 26.3%, respectively. Many modern products and services are developed on the basis of open-access public data in the world. They are the source of real savings of financial resources and time. Recipients may utilise public data resources in implementing their own objectives, developing business and social activity and conducting research. In the year 2018, as compared to the year 2017, the share of public administration entities using open data policies of strategies increased. An analysis of available results shows strong differentiation in terms of the participation of the individual levels of administration in terms of provision of open public data. All levels noted significant increases in the year 2018 as compared to 2017. The disparity in the implementation of policies or strategies of provision of public information between state and local government entities in the year 2018 amounted to 25.6 percentage points to the advantage of the former. The highest share of public administration bodies that operate policies or strategies of provision of public information was found for marshal offices (25.0%), and the lowest – for commune offices (13.4%).

The ISO system is a set of standards that helps organizations ensure they meet customers' and other stakeholder needs within statutory and regulatory requirements related to a product or service. In the year 2018 the share of public administration bodies that implemented ISO quality management systems rose – 15.7%. State administration entities possessed implemented ISO quality management systems more frequently than local government entities, they also declared seeking to implement such systems in the relevant year). The share of local government bodies with implemented ISO quality systems is varied; in the year 2018 it was used by 12.8% of commune offices, 28.5% county offices and 68.8% marshal offices. Another very useful concept are Business Intelligence (BI) tools. In the year 2018 they were used by 31.3% of state administration entities and only just over 2% of local government entities. The highest share of local government entities that utilised such tools is found for marshal offices (37.5%). In commune offices this share is very low, and amounted to 1.7%.

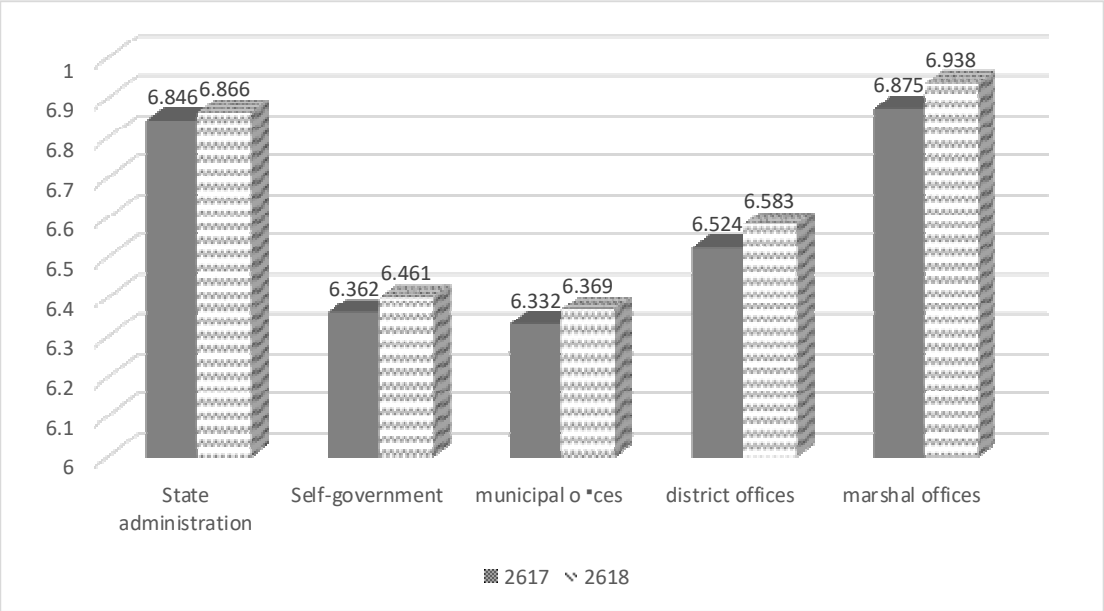

Fig. 2: Public administration units having an Intranet by type of unit

Source: own study based on Information society in Poland. Results of statistical surveys in the years 2015–2019.

Intranets are one of the basic modes of provision of resources to employees as well as for the purpose of communication within an entity. In state government bodies, intranet systems were used twice as frequently than in local government bodies. In case of the former, the share of entities with internal networks in the year 2018 amounted to 86.6%, whereby among local governments it was 40.1%. It was lowest in municipal offices (2017 – 33.2%, 2018 – 36.9%), however within marshal offices it was even higher than in case of state administration (2017 – 87.5%, 2018 – 93.8%).

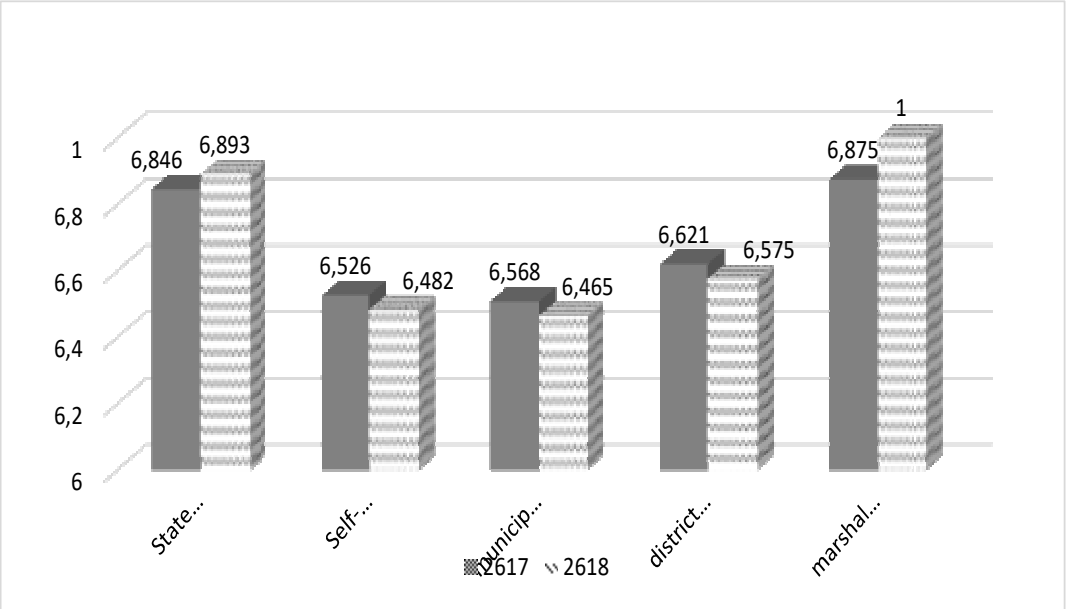

Fig. 3: Public administration units providing training for employees in the field of ICT by type of unit

Source: own study based on Information society in Poland. Results of statistical surveys in the years 2015–2019.

In the year 2018, the share of public administration entities providing downloadable applications for mobile devices offering e-services rose over the year by 8.5% and amounted to 19.8%. In the year 2018, the share of state administration bodies offering downloadable applications for mobile devices offering e-services amounted to 17.9%, whereby it was higher for local government bodies and amounted to 19.9%. The highest share was found for marshal offices (43.8%); it was significantly lower in county (21.8%) and commune offices (19.4%).

Table 3: Information and communication technologies (ICT) - selected solutions offered to clients (in %0

	state administration		self-government		municipal offices		district offices		marshal offices	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
Public administration units providing applications that can be downloaded to mobile devices offering e-services	16,5	17,9	11,1	19,9	10,4	19,4	13,9	21,8	37,5	43,8
Public administration units providing citizens services via Internet	91,2	89,3	86,4	96,9	84,7	96,7	95,9	98,4	100	100
Public administration units using Electronic Platform of Public Administration Services (ePUAP)	-	88,4	-	96,8	-	96,5	-	98,4	-	100

Source: own study based on Information society in Poland. Results of statistical surveys in the years 2015–2019.

Citizens expect to be able to handle as many official affairs on-line as possible. In the year 2018, on-line processing of official affairs was offered by 96.6% of bodies. In state administration this share amounted to 89.3% and improved by 1.9 p. p. over the year, in local governments – this was – 96.9% (an increase of 10.5 p. p.). As in the previous year, electronic services were offered by all marshal offices.

In the year 2018, in the process of implementation of electronic services, 96.5% administration bodies utilised the electronic mail box system offered by the Polish ePUAP platform. The usage of the electronic mail box system was more commonly used by local government bodies (96.8%) than by state bodies (88.4%), whereby this type of service was offered by all marshal offices.

Table 4: Websites of public administration units (in%)

	state administration		self-government		municipal offices		district offices		marshal offices	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
Public administration units having a website adapted to be operated by mobile devices (in % of units having a website)	89,0	91,1	65,9	74,8	65,0	74,0	70,4	79,3	87,5	93,8
Public administration units having a website that meets the criteria of WCAG 2.0 at the level of the AA (in % of units having a website) in 2018	-	81,3	-	74,8	-	73,8	-	80,4	-	93,8
Public administration units having a bilingual website (in % of units having a website)	73,6	71,4	27,4	30,5	24,5	27,9	44,1	45,7	62,5	56,3

Source: own study based on Information society in Poland. Results of statistical surveys in the years 2015–2019.

Web Content Accessibility Guidelines (WCAG) 2.0 covers a wide range of recommendations for making Web content more accessible. Following these guidelines will make content accessible to a wider range of people with disabilities, including blindness and low vision, deafness and hearing loss, learning disabilities, cognitive limitations, limited movement, speech disabilities, photosensitivity and combinations of these. Following these guidelines will also often make your Web content more usable to users in general (https://www.w3.org). Level AA is commonly considered to be optimum; websites at this level conform to specific conditions that allow them to be accessed by a broad group of users. In the year 2018, WCAG-compliant websites were operated by 75.1% of public administration bodies. The share was decidedly higher for state administration – 81.3%, in local government administration this indicator is highest for marshal offices (93.8%).

Ubiquitous access to the Internet and the rising popularity of usage of mobile devices forces administration bodies to change their approach towards processing visitor affairs. More and more offices have website versions adapted for mobile devices. In the year 2018, operation of such websites was declared by 75.4% administration bodies, and was higher by 8.7 p. p. than in the preceding year. A similar value and an increase of this factor was found for local government institutions (74.8% and 8.9 p. p. respectively). In state administration in the year 2018, the share of entities having mobile versions of their websites improved over the year by 2.1 p. p. and amounted to 91.1%.

More and more public administration bodies have websites available in foreign languages. In the year 2018 this option was offered by 32.1% of entities (3.1 p. p. more than in the preceding year), in state administration – 71.4%, and in local governments – 30.5% (the numbers for the year 2017 are 73.6% and 27.4%, respectively).

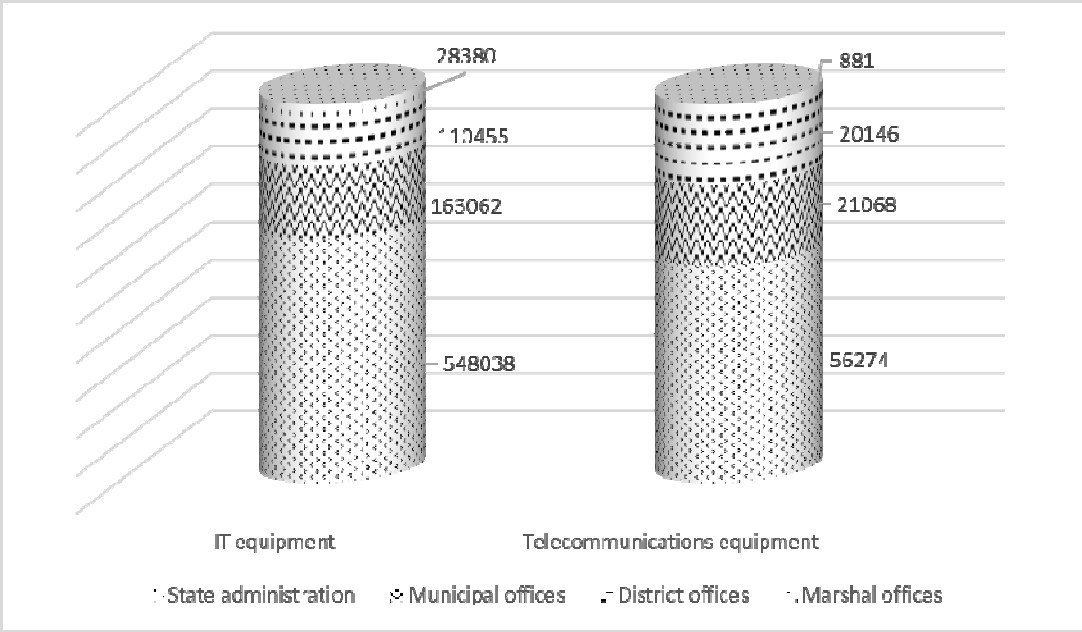

Fig. 4: Expenditure incurred by public administration units on selected ICT equipment in 2018 (in thousand PLN)

Source: own study based on Information society in Poland. Results of statistical surveys in the years 2015–2019.

In the year 2018 over 95% public administration bodies made ICT expenses, including computer equipment – 94.4%, and telecommunications equipment – 61.6%. The total expenditure borne by public administration entities for the purchase of ICT equipment was PLN 948 million. State administration is responsible for over 63% of this amount.

Conclusions

The presented data allows answers to the questions posed in the introduction. What is the level of usage of ICT by public administration in Poland? What is the level of use of ICT in Poland compared to other countries? Is the level of use of ICT dependent on the unites of administration? In which areas does the implementation of ICT proceed satisfactorily, and which areas require improvements? Analyses of public administration in Poland from perspective of Information and communications technologies (ICT) allow the following conclusions:

- Considering the presented world indicators of ICT implementation, it must be stated that Poland is not the leader in these rankings (E-Government Development Index – EGDI 2018 – 33rd position, ICT Development Index – IDI – 49th , Web Index – 34th; Networked Readiness Index – NRI – 42). Regrettably, it is currently difficult to estimate, when Poland will reach the level of development of Western Europe in terms of digitalisation of administration. The objective should be continued development of public services provided electronically and approaching world standards.

- The presented results of research of the state of ICT in Polish administration entities indicate that continued intense development work is needed. Particular attention should be turned towards the lowest level of local government administration – communes. Marshal offices may be presented as prime examples in many areas.

- Most frequently used Internet connections among public administration units were fixed DSL connections and wireless broadband connections (71.0% and 70.5%, respectively).

State administration units usually declared using wireless broadband connections (95.5%) and other fixed broadband connections (91.1%), while local self-government units – DSL connections (42.0%).

- The share of employees equipped by public authorities with mobile devices with Internet access increased but it still is low.

- Most of public administration units had a website meeting WCAG 2.0 criteria. A significantly higher share occurred among state administration, in which 81.3% units declared conformity of a website with these criteria, than in local self-government (74.8%). The highest value of this indicator was reported in Marshal Offices.

- All Marshal Offices provided electronic services. In 2018, in order to perform electronic services 96.5% of public administration units used an incoming correspondence box available on the ePUAP platform.

The study has certain limitations due to the data that was analysed. It is based on results of studies conducted by Statistics Poland and presented within Information society in Poland Results of statistical surveys in the years 2017–2018. Intense and dynamic changes, in particular in terms of new information and communication technologies, require continued verification of data. The analysis should be expanded to include information from the following years 2019 and 2020. This could also be the vantage point for own research by the author.

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Management Perspective of The Eco-Innovation Scientific Landscape – A Bibliometric Analysis

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Abstract

This paper presents the results of a comprehensive bibliometric analysis aiming to describe and evaluate the management perspective of eco-innovation research. The analysis was based on the Web of Science Core Collection database. The VOSviewer software tool was selected to visualize the scientific landscape and determine diverse networks in the analyzed field. Using quantity and quality indicators, the descriptive bibliometric analysis enabled identification of the most prolific authors, sources, organizations and countries in the literature. Moreover, network analyses were performed to visualize and assess the level of multi-faceted scientific collaboration. This made it possible to determine the most influential research channels and impact from sources, countries and research topics, as well as major clusters of publications covering the management perspective of eco-innovation research.

Keywords: Eco-Innovation, Management Perspective, Bibliometric Analysis

Introduction

Innovations aiming at minimizing the negative effect on the environment have gained increased attention among researchers, policymakers and practitioners during last years. This resulted in a significant growth in the number of publications, conferences and workshops on this issue. However, different terms are used to explain this kind of innovation, such as 'eco', 'environmental', 'green' or 'sustainable'. According to Kemp and Pearson (2008), 'eco-innovation' is the production, assimilation or exploitation of a product, production process, service, management or business method that is novel to the organization (developing or adopting it) and which results, throughout its life cycle, in a reduction of environmental risk, pollution and other negative impacts of resources use (including energy use) compared to relevant alternatives. 'Environmental innovation' comprises a set of techniques, systems, products and/or new or modified processes that serve to prevent or reduce environmental damage (Kemp et al., 2001). 'Green innovation' is defined as hardware or software innovation that is related to green products or processes, including the innovation in technologies that are involved in energy-saving, pollution-prevention, waste recycling, green product designs, or corporate environmental management (Chen et al., 2006). In fact, 'sustainable innovation' should be defined as innovation that improves sustainability performance, where such performance includes ecological, economic, and social criteria (Boons et al., 2013). Nevertheless, the vast majority of publications on sustainable innovation refer to definitions that focus on ecological sustainability only. Despite differences in wording, definitions of 'eco-innovation', 'environmental innovation', 'green innovation' or 'sustainable innovation' embrace the environmental component and reflect the two main consequences of this kind of innovation: fewer adverse effects on the environment and more efficient use of resources which might be realized in many forms (e.g., product, process, organizational and/or marketing methods). In fact, 'environmental innovation' was the predominant notion, however the term 'eco-innovation' has had an upsurge in the last years (Díaz-García et al., 2015). Therefore, in this paper the term "eco-innovation" is used to describe any innovation that aims at minimizing the negative effect on the environment and improves environmental performance.

Carrillo-Hermosilla et al. (2010) identified the key dimensions of eco-innovation (i.e. design, user, product service and governance) to explore specific characteristics and analyze variety of studies in

this area. However, research on eco-innovation comprise various categories. Based on path analysis Barbieri et al. (2016) revealed that eco-innovation literature revolves around (1) determinants of eco-innovation, (2) economic effects of eco-innovation, (3) environmental effects of eco-innovation, and (4) policy inducement of eco-innovation. Albort-Morant et al. (2017) distinguished the following main categories of publications on eco-innovation:

- Performance – articles focusing on the results and outcomes of eco-innovation;
- Drivers – articles focusing on finding the antecedents of eco-innovation;
- Types – articles focusing on classifying the different types of eco-innovation;
- Process – articles focusing on the process of the development of eco-innovations;
- Context – articles focusing on showing the context of a study such as a specific region or country, transition economies, etc.;
- Policy – articles focusing on policy evaluation, transition management, and the diffusion of eco-innovation through policies.

With regard to this classification and trends in eco-innovation research field, Albort-Morant et al. (2017) indicated that 'performance' and 'drivers' are the most recurrent categories. Moreover, Díaz-García et al. (2015) observed that there is a clear increase in the relevance of this issue within academia and several thematic trends arise in eco-innovation research, with drivers of eco-innovation being the most popular. Although various publications reviewing the eco-innovation research field have been published in recent years, the papers carrying out a bibliometric analysis in this area still rarely occur in the literature (Albort-Morant et al., 2017; Turkeli and Kemp, 2018). In addition, they focus on general results which undoubtedly requires expansion and updating due to the substantial dynamism of publication activity. Moreover, specific areas of eco-innovation research (i.e. management perspective, technological perspective etc.) seem to be very interesting and needs to be further investigated.

This paper presents a comprehensive bibliometric analysis of scientific literature covering specific area of eco-innovation. It was decided to investigate management perspective of this research field because it is extremally important. This concerns, in particular, conditions, concepts and methods to manage complex processes of eco-innovation development and adoption. The detailed and longitudinal assessment was based on the Web of Science (WoS) Core Collection database. Three types of bibliometric indicators were used: quantity indicators (for measuring productivity), quality indicators (for measuring the impact), and structural indicators (for measuring the connections) (Durieux and Gevenois, 2010). In particular, a network analysis (i.e., co-keyword analysis, co-authorship analysis, and co-citation analysis) was also performed and major clusters of the eco-innovation research were determined.

The results achieved in the analyzed domain are expected to enable researchers and practitioners:

- to identify the most prolific authors, sources, organizations, and countries in the analyzed scientific field,
- to determine the most influential research channels and impact from sources, countries, and research topics in management perspective of eco-innovation research,
- to analyze how the eco-innovation publications covering management perspective are clustered,
- to provide information for further investigation.

Materials and Methods

Management perspective of eco-innovation research was determined and investigated using bibliometric analysis. The analysis covered scientific publications on eco-innovation and concepts related to this notion. The study was carried out in the following phases (Janik et al., 2020): (1) study

design, (2) data collection, (3) descriptive bibliometric analysis, (4) network analysis, and (5) composing the conclusions.

In the first phase of the analysis, online bibliographic database – the Web of Science (WoS) Core Collection – was selected for the research purposes. All types of scientific papers collected in the WoS were chosen for the investigation. In addition, VOSviewer was selected as a software tool for the bibliometric and network analyses. In the next step, a list of the search query wordings and the Boolean operators were identified. Aiming to conduct an in-depth analysis of the extensive scientific field of eco-innovation and to determine management perspective of this research area, the relevant query wordings presented in Table 1 were selected. This set of query wordings encompassed various variants of such wordings as eco-innovation, environmental innovation, green innovation, sustainable innovation, low-carbon innovation and notions similar to these terms (using Boolean operator 'OR'). It was also decided to use query wordings "manag*" and "strateg*" to determine papers comprising management perspective of eco-innovation research (using Boolean operator 'AND'). Due to the fact that the first publication in the analyzed scientific field appeared in the WoS in 1991, the study timespan was determined to 1991–2020.

In the second phase of the analysis, the input data was collected. The analyzed items were retrieved on 16 March 2020 from the WoS database. All relevant query wordings in the publication title (TI) and the publication subject (TS) were used to identify publications in the extensive scientific field of the eco-innovation as well as to determine publications comprising management perspective of eco-innovation research. The obtained results are presented in Table 1.

Table 1: Results of initial bibliometric analysis – searching by different query wordings

No.	Query wording (QW)	QW appearance in title of publication	QW appearance as topic of publication
#1	"eco-innovation"	387	1,116
#2	"eco-innovative"	53	173
#3	"eco-innov*" OR "ecoinnov*" OR "eco innov*"	539	1,331
#4	#3 AND "manag*"	20	596
#5	#3 AND "strateg*"	25	397
#6	"environmental innovation"	173	638
#7	"environmentally innovative"	1	9
#8	"environmentally friendly innovation"	4	17
#9	"environment* innov*" OR "environment* friendly innov*"	277	1,027
#10	#9 AND "manag*"	19	449
#11	#9 AND "strateg*"	17	301
#12	"green innovation"	268	611
#13	"green technology innovation"	35	67
#14	"green innov*" OR "green tech* innov*"	356	770
#15	#14 AND "manag*"	20	378
#16	#14 AND "strateg*"	26	243
#17	"sustainable innovation"	269	672
#18	"innovation for sustainable development"	29	49
#19	"sustainability-driven innovation"	5	9
#20	"innovation for environmental sustainability"	5	10
#21	"sustainab* innov*" OR "innov* for sustainab*" OR "sustainability-driven innov*" OR "innov* for environment* sustainab*"	592	1,345
#22	#21 AND "manag*"	44	536
#23	#21 AND "strateg*"	28	390
#24	"low carbon innovation"	27	75
#25	"lowcarbon innov*" OR "low carbon innov*"	33	91
#26	#25 AND "manag*"	0	17

#27	#25 AND "strateg*"	0	25
Extensive scientific field of eco-innovation research (#3 OR #9 OR #14 OR #21 OR #25)		1,785	3,956
Publications covering management perspective of eco-innovation research (#4 OR #5 OR #10 OR #11 OR #15 OR #16 OR #22 OR #23 OR #26 OR #27)		185	2,090

The third phase of the study covered descriptive bibliometric analysis. This included the determination of the number of publications and the total number of citations, the main research areas and research categories, the most productive authors, sources, countries, and organizations publishing scientific publications on eco-innovation.

In the fourth phase a network analysis was performed. This analysis was conducted using the VOSviewer software tool (version 1.6.14). The networks (i.e. nodes and lines) were created based on clustering technique developed by Waltman, Van Eck, and Noyons (2010). The nodes were represented by relevant keywords, sources or countries. The lines represented the relationships between them, e.g., co-occurrence, citation. The network analysis covered author keywords co-occurrence and scientific collaboration mapping. Author keywords analysis visualized the structure of scientific fields of publications covering management perspective of eco-innovation research. The scientific collaboration was mapped and analyzed using the results of the co-authorship network of countries and the citation network of countries and sources.

The final phase of the analysis included composing and presentation of conclusions.

Results and Discussion

Descriptive bibliometric analysis of publications covering management perspective of eco-innovation research

The performed analysis resulted in 3,956 publications indexed in the WoS covering the extensive scientific field of eco-innovation research (Table 1). The further detailed analysis was focused on publications covering management perspective of eco-innovation research. This analysis revealed 2,090 publications, including four main document types: 1,545 articles (73.92% of all relevant identified publications), 447 proceedings papers (21.39%), 106 reviews (5.07%), and 78 book chapters 3.73%). The vast majority of identified publications was written in English (2,043 items). The other publications were published in Portuguese (15), Spanish (14), Russian (7 items), German (3), Chinese (2), Czech (2), French (2) and Polish (2) language.

Table 2 presents indicators of publication activity related to management perspective of eco-innovation research based on records included in the WoS database. It covers the number of publications (i.e., annual and cumulative) for the period of 1991–2020 and the number of citations that these items received. The obtained data indicated that from 2014 to 2019, the number of publications on management perspective of eco-innovation and of relevant citations increased considerably.

Table 2: The number of publications and total citations related to management perspective of eco-innovation research

Year	Number of publications	% of all publications	Cumulative number of publications	Total citations
1991	1	0.05	1	0
1992	1	0.05	2	0
1993	0	0.00	2	0
1994	3	0.14	5	1
1995	0	0.00	5	3
1996	2	0.10	7	3
1997	2	0.10	9	1
1998	6	0.29	15	1
1999	3	0.14	18	5
2000	5	0.24	23	14
2001	6	0.29	29	23
2002	10	0.48	39	12
2003	13	0.62	52	19
2004	10	0.48	62	36
2005	11	0.53	73	52
2006	20	0.96	93	92
2007	23	1.10	116	146
2008	35	1.68	151	223
2009	45	2.15	196	283
2010	55	2.63	251	414
2011	73	3.49	324	605
2012	82	3.92	406	1,006
2013	97	4.64	503	1,285
2014	114	5.46	617	1,815
2015	174	8.33	791	2,663
2016	231	11.05	1,022	3,777
2017	279	13.35	1,301	5,207
2018	326	15.60	1,627	7,421
2019	397	19.00	2,024	9,869
2020	66	3.16	2,090	2,025

The search for publications related to management perspective of eco-innovation research literature in the WoS returned the first reference to it in 1991 (Edwards, 1991). The most cited article in the analyzed research field indexed in the WoS database, with 834 citations, is 'Sustainability transitions: An emerging field of research and its prospects' written by Markard et al. (2012). The authors focused on sustainability oriented innovation and sustainability transitions, They identified the intellectual contours of this emerging field by conducting a review of basic conceptual frameworks in the field paving the way for new conceptual developments and serve as stepping-stones in the maturation of sustainability transition studies, by linking with the scholarly literatures of management studies, sociology, policy studies, economic geography, and modeling (Markard et al., 2012). In the second place is 'Strategic niche management and sustainable innovation journeys: theory, findings, research agenda, and policy' written by Schot and Geels (2008), cited 631 times. This paper discusses empirical findings and conceptual elaborations in strategic niche management research. The empirical findings showed that the analysis of niche-internal dimensions needed to be complemented with attention to niche external processes with regard to the dynamics of sustainable innovation journeys (Schot and Geels, 2008). The study by Horbach (2008) 'Determinants of environmental innovation - New evidence from German panel data sources' appears in third place with 492 citations. This article explored determinants of environmental innovations based on two German panel databases, the establishment panel of the Institute for Employment Research (IAB) and the Mannheim innovation panel (MIP) of the Centre for European Economic Research (ZEW). The

econometric estimations show that the improvement of the technological capabilities (knowledge capital) by R&D triggers environmental innovations. Environmental regulation, environmental management tools and general organizational changes also encourage environmental innovation, a result that has also been postulated by the Porter-hypothesis (Horbach, 2008).

Table 3 shows the most cited publications related to management perspective of eco-innovation research in the WoS database. It should be noted that most studies on the lists with the highest number of citations are from the period of 2008–2012.

Table 3: The most cited publications covering management perspective of eco-innovation research

Rank	Authors	Title	Source title	Times cited
1.	Markard J., Raven, R., Truffer, B. (2012)	Sustainability transitions: An emerging field of research and its prospects	Research Policy, 41(6), 955-967	834
2.	Schot J., Geels F.W. (2008)	Strategic niche management and sustainable innovation journeys: theory, findings, research agenda, and policy	Technology Analysis & Strategic Management, 20(5), 537-554	631
3.	Horbach J. (2008)	Determinants of environmental innovation - New evidence from German panel data sources	Research Policy, 37(1), 163-173	492
4.	Chen Y.S., Lai, S.B., Wen C.T. (2006)	The influence of green innovation performance on corporate advantage in Taiwan	Journal of Business Ethics, 67(4), 331-339	430
5.	Schaltegger S., Wagner M. (2011)	Sustainable Entrepreneurship and Sustainability Innovation: Categories and Interactions	Business Strategy and the Environment, 20(4), 222-237	427
6.	Horbach J., Rammer Ch., Rennings K. (2012)	Determinants of eco-innovations by type of environmental impact - The role of regulatory push/pull, technology push and market pull	Ecological Economics, 78, 112-122	395
7.	Stirling A. (2007)	A general framework for analysing diversity in science, technology and society	Journal of the Royal Society Interface, 4(15), 707-719	365
8.	De Marchi V. (2012)	Environmental innovation and R&D cooperation: Empirical evidence from Spanish manufacturing firms	Research Policy, 41(3), 614-623	339
9.	Gold S., Seuring S., Beske Ph. (2010)	Sustainable Supply Chain Management and Inter-Organizational Resources: A Literature Review	Corporate Social Responsibility and Environmental Management, 17(4), 230-245	337
10.	Chen Y.S. (2008)	The driver of green innovation and green image - Green core competence	Journal of Business Ethics, 81(3), 531-543	336

In the next step, the main research areas and categories of studies in the analyzed scientific field were identified, together with sources and authors with the most substantive contributions to the literature. Moreover, the most productive countries and organizations in the field were indicated. The analysis results showed that:

- Studies on management perspective of eco-innovation research cover diverse research areas. According to the WoS database, these areas include, in particular, Business Economics (874 records with 41.82% of all identified publications in the analyzed scientific field), Environmental Sciences Ecology (867, 41.48%), Science Technology other topics (587,

28.09%), Engineering (553, 26.46%), Public Administration (109, 5.22%), Operations Research Management Science (107, 5.12%), Social Sciences other topics (103, 4.93%), Computer Science (89, 4.26%), Energy Fuels (66, 3.16%), and Education Educational Research (49, 2.34%).

- Considering the WoS categories, the most popular are Environmental Sciences (643 records in the WoS with 30.77% of all publications), Management (569, 27.23%), Green Sustainable Science Technology (540, 25.84%), Environmental Studies (452, 21.63%), Business (441, 21.10%), Engineering Environmental (329, 15.74%), Economics (224, 10.72%), Operations Research Management Science (107, 5.12%), Engineering Industrial (97, 4.64%), and Regional Urban Planning (91, 4.35%).
- Most publications related to management perspective of eco-innovation research indexed in the WoS database appeared in Journal of Cleaner Production (273, 13.06%), Sustainability (157, 7.51%), Business Strategy and the Environment (96, 4.59%), Technological Forecasting and Social Change (37, 1.77%), Corporate Social Responsibility and Environmental Management (31, 1.48%), Ecological Economics (28, 1.34%), Research Policy (23, 1.10%), Technology Analysis Strategic Management (18, 0.86%), Energy Policy (17, 0.81%), Journal of Business Ethics (16, 0.77%), and Procedia Social and Behavioral Sciences (16, 0.77%).
- The most prolific authors with the most frequent contributions to the analyzed research field in the WoS database are Massimiliano Mazzanti (16 publications), Sabina Scarpellini (16), Angel Peiro-Signes (15), Francisco J Saez-Martinez (12), Ming-Lang Tseng (12), Pablo Del Rio (11), Valentina De Marchi (10), Charbel Jose Chiappetta Jabbour (10), Yu-Shan Chen (9), Zhongju Liao (9), Klaus Rennings (9), and Suhaiza Zailani (9).
- The most productive countries in the analyzed literature field indexed in the WoS database are China (324 WoS-indexed publications), Spain (212), England (207), Italy (199), the United States (198), the Netherlands (151), Germany (136), France (105), Brazil (94), and Taiwan (90).
- The most active organizations are Delft University of Technology (27 WoS-indexed publications), University of Sussex (23), Wageningen University Research (23), Universidad de Castilla La Mancha (22), University of London (22), Universitat Politecnica de Valencia (21), University of Ferrara (21), and University of Padua (18).

In the last step of this analysis phase reference literature which is cited most frequently by publications covering management perspective of eco-innovation research in the WoS database was identified. The results of this analysis are presented in Table 4. The intention behind this analysis was to determine the most significant literature background for the scientific field under consideration. The performed research revealed that 2,090 publications covering management perspective of eco-innovation research cited 73,335 references. The most cited reference, with 314 citations, is article titled 'Redefining innovation – eco-innovation research and the contribution from ecological economics' written by Rennings (2000). This paper specified connections between eco-innovation and three kinds of changes towards sustainable development: technological, social and institutional innovation. Moreover, three peculiarities of eco-innovation were identified: the double externality problem, the regulatory push/pull effect and the increasing importance of social and institutional innovation (Rennings, 2000). The study by Porter and van der Linde (1995) 'Toward a New Conception of the Environment-Competitiveness Relationship' appears in second place with 273 citations. The authors investigated trade-off between environmental regulation and competitiveness. They suggested that properly crafted environmental standards can trigger innovation offsets, allowing companies to improve their resource productivity. In addition, the debate shifting from pollution control to pollution prevention was proposed as a step forward in focusing on resource productivity (Porter and van der Linde, 1995). In the third place is 'Determinants of environmental innovation - New evidence from German panel data sources' written by Horbach (2008), cited 270 times.

Table 4: The most cited documents by publications covering management perspective of eco-innovation research

Rank	Authors	Title	Source title	Times cited
1.	Rennings K. (2000)	Redefining innovation — eco-innovation research and the contribution from ecological economics	Ecological Economics, 32(2), 319-332	314
2.	Porter M.E., van der Linde C. (1995)	Toward a New Conception of the Environment-Competitiveness Relationship	Journal of Economic Perspectives, 9(4), 97-118	273
3.	Horbach J. (2008)	Determinants of environmental innovation - New evidence from German panel data sources	Research Policy, 37(1), 163-173	270
4.	Hart S.L. (1995)	A Natural-Resource-Based View of the Firm	Academy of Management Review, 20(4), 986-1014	199
5.	Horbach J., Rammer Ch., Rennings K. (2012)	Determinants of eco-innovations by type of environmental impact - The role of regulatory push/pull, technology push and market pull	Ecological Economics, 78, 112-122	193
6.	De Marchi V. (2012)	Environmental innovation and R&D cooperation: Empirical evidence from Spanish manufacturing firms	Research Policy, 41(3), 614-623	191
7.	Chen Y.-S., Lai S.-B., Wen C.-T. (2006)	The Influence of Green Innovation Performance on Corporate Advantage in Taiwan	Journal of Business Ethics, 67, 331–339	182
8.	Porter M.E., van der Linde C. (1995)	Green and Competitive - Ending the Stalemate	Harvard Business Review, 73(5), 120-134	181
9.	Carrillo-Hermosilla J., del Río P., Könnölä T (2010)	Diversity of eco-innovations: Reflections from selected case studies	Journal of Cleaner Production, 18(10–11), 1073-1083	162
10.	Chen Y.S. (2008)	The driver of green innovation and green image - Green core competence	Journal of Business Ethics, 81(3), 531-543	151

Network Analyses

Co-Keyword Analysis

Based on VOSviewer tool for the visualization of scientific landscapes, in particular large networks, the author keywords co-occurrence in the analyzed research field was explored. The obtained keyword co-occurrence network is presented in Figure 1. The size of the circles corresponds to the number of occurrences of relevant keywords. This means that the larger the circle, the more the author keyword was co-selected in the eco-innovation literature focused on management perspective. The links between particular keywords indicate the number of publications in which the keywords co-occurred. Moreover, the keyword similarity are demonstrated by the distance between the elements of individual pairs. The obtained network consists of 12 distinct clusters (i.e. different colors of the circles are assigned to individual keyword clusters), representing individual subfields of the analyzed research field.

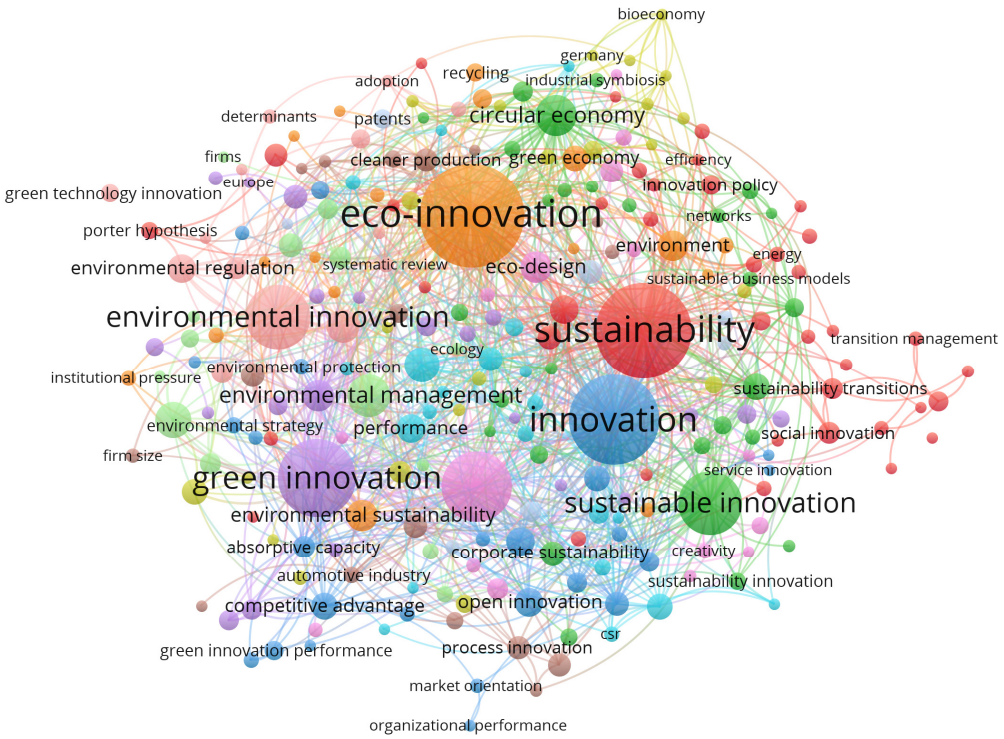

Figure 1: Co-occurrence network of author keywords in the analyzed scientific field

The obtained co-occurrence network of author keywords revealed that:

- The core topics in literature covering management perspective of eco-innovation research with the highest total link strength are: 'eco-innovation', 'sustainability', 'innovation', 'sustainable development', 'green innovation', 'sustainable innovation', 'environmental innovation', and 'circular economy'.
- Twelve subfields (i.e. clusters of author keywords) were identified in the analyzed scientific field, and the main subfields are as follows:
  - Orange cluster grouping together such keywords as 'eco-innovation', 'environment', 'environmental sustainability', 'green economy', 'industrial ecology', 'green marketing', 'green practices', 'sustainable manufacturing', 'green management', and 'sustainable production'.
  - Red cluster grouping together such keywords as 'sustainability', 'climate change', 'strategy', 'social innovation', 'sustainability transitions', 'environmental innovations', 'Porter hypothesis', 'innovation policy', 'transition management', 'product development', and 'sustainable consumption'.
  - Green cluster grouping together such keywords as 'sustainable innovation', 'circular economy', 'business model', 'corporate sustainability', 'resource efficiency', 'business model innovation', 'governance', ;sustainable entrepreneurship', 'sustainable supply chain management', and 'sustainability innovation'.
  - Blue cluster grouping together such keywords as 'innovation', 'knowledge management', 'innovation management', 'open innovation', 'absorptive capacity', 'environmental strategy', 'eco-efficiency', 'green innovation performance', 'new product development', 'proactive environmental strategy', 'green product innovation performance', and 'service innovation'.
  - Purple cluster grouping together such keywords as 'green innovation', 'green product innovation', 'green process innovation', 'ecodesign', 'environmental management system', 'green entrepreneurship', 'innovation strategy', and 'innovation system'.

- Dark pink cluster grouping together such keywords as ‘environmental innovation’, ‘environmental policy’, ‘environmental regulation’, ‘environmental management systems’, ‘determinants’, ‘eco-innovation drivers’, and ‘green technology innovation’.

Mapping Scientific Collaboration

In the first step of mapping scientific collaboration co-authorship occurrences of countries were analyzed and visualized. The network illustrating collaboration between countries in the analyzed scientific field is presented in Figure 2. The size of the circles represents the number of documents and the collaboration strength is demonstrated by the distance between circles in individual pairs. In addition, the total link strength of a country indicates the number of papers in which the authors of a given publication represent the two countries involved.

The obtained co-authorship occurrences of countries network revealed that:

- There are 92 countries represented by authors collaborating in the management perspective of eco-innovation literature.
- China and Spain have the highest number of publications written in collaboration.
- England, the United States and the Netherlands are the countries with the greatest total link strength when it comes to an international collaboration of authors.

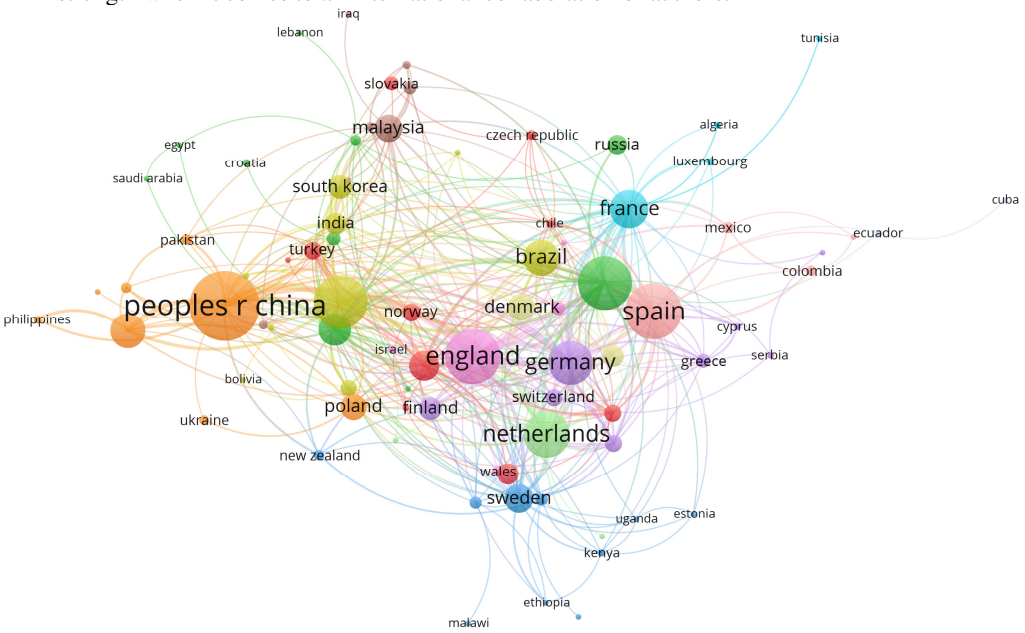

Figure 2: Co-authorship network of countries in the analyzed scientific field

The next step of this research phase concerned the country-by-country citation analysis. The citation network of countries, illustrating mutual international citations in the management perspective of eco-innovation literature is presented in Figure 3. The size of the relevant circles depends on the number of publications in a given country. The distance between circles representing different countries reflects the number of mutual citations of authors coming from them. The more often authors from one country cited authors from another, the shorter is the distance between circles representing relevant countries in the obtained network.

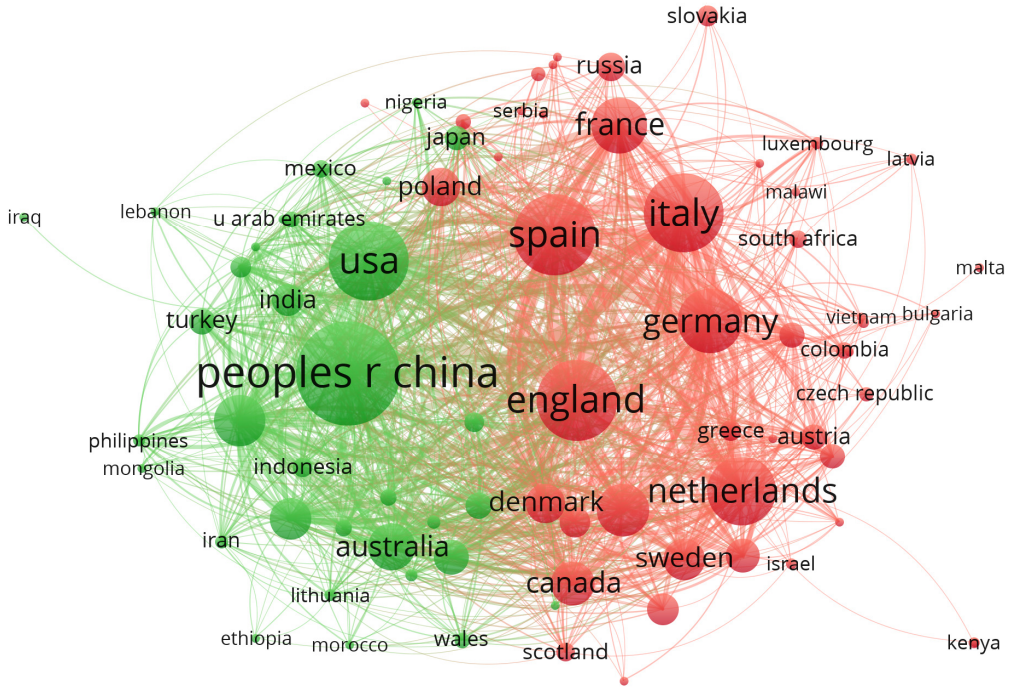

Figure 3: Citation network of countries in the analyzed scientific field

The obtained citation network of countries revealed that:

- There are 92 countries whose publications in the management perspective of eco-innovation literature were cited by foreign authors.
- There are two big scientific communities that have publications in the analyzed literature, comprising, inter alia, the following groups of countries: (1) Spain, Italy, Germany, England, France, the Netherlands, Brazil, Canada, Sweden, Denmark, and Switzerland and (2) China, Taiwan, the United States, Malaysia, Australia, South Korea, and India.

In the last step of this research phase the significance of individual sources in the creation of the management perspective of eco-innovation research field was determined based on the source-citation analysis**.** The source was understood as a journal, a book, or proceedings indexed in the WoS database. The network of mutual citations of different sources of the management perspective of eco-innovation research literature is presented in Figure 4. The size of the circles in this figure depends on the number of publications of a given source. The distance between circles representing different sources reflected the number of their mutual citations. The more often the publications of a given source cited the other source publications, the shorter was the distance between the two sources in the network presented in Figure 4.

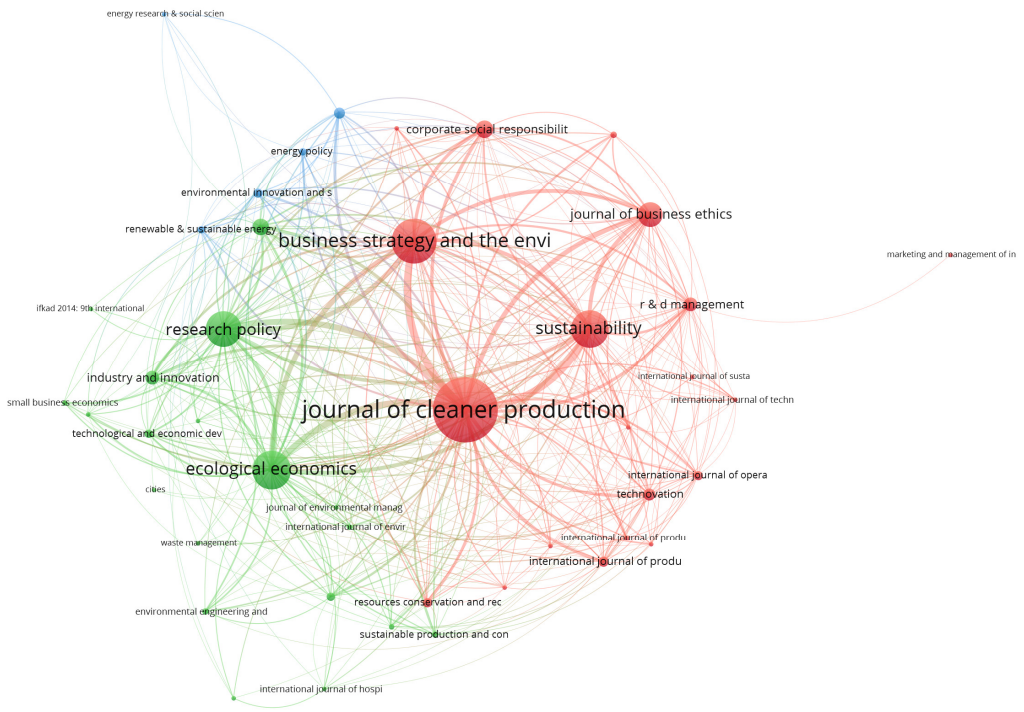

Figure 6: Citation network of sources in the analyzed scientific field

The obtained citation network of sources revealed that:

- There are 919 sources whose publications covering management perspective of eco-innovation research were cited by another source.
- There are three groups of significant sources with strong mutual relations: (1) Journal of Cleaner Production, Business Strategy and the Environment, Sustainability, Journal of Business Ethics, Corporate Social Responsibility and Environmental Management, R&D Management, Technovation, International Journal of Production Economics, International Journal of Operations & Production Management, (2) Ecological Economics, Research Policy, Technological Forecasting and Social Change, Industry and Innovation, Innovation-Organization & Management, Technological and Economic Development of Economy, Sustainable Production and Consumption, Environmental Engineering and Management Journal, International Journal of Environmental Research and Public Health, (3) Technology Analysis & Strategic Management, Environmental Innovation and Societal Transitions, Energy Policy, Renewable & Sustainable Energy Reviews, Energy Research & Social Science.
- There are dominating top sources with the highest value of the total link strength, including Journal of Cleaner Production (total link strength: 1,833), Business Strategy and the Environment (1,037), Ecological Economics (822), Sustainability (803), Research Policy (740), and Journal of Business Ethics (424).

Conclusions

This paper presented the management perspective of eco-innovation research based on a bibliometric analysis of 1991–2020 publications indexed in the WoS database. Three types of bibliometric indicators were used for the purpose of measurement of scientific activities, including quantity indicators (for measuring productivity), quality indicators (for measuring the impact), and structural indicators (for measuring the connections).

The bibliometric analysis results proved that the number of publications covering analyzed scientific field have increased year by year. In particular, this concerns period from 2014 to 2019 when the number of publications and of relevant citations enlarged considerably.

The descriptive bibliometric analysis indicated that publications covering management perspective of eco-innovation encompass diverse research areas such as Business Economics, Environmental Sciences Ecology, Science Technology other topics, Engineering, Public Administration, Operations Research Management Science, and Social Sciences other topics. Considering the WoS categories, the most popular are Environmental Sciences, Management, Green Sustainable Science Technology, Environmental Studies, Business, Engineering Environmental, Economics, and Operations Research Management Science. The most productive sources of publications in the analyzed scientific field include Journal of Cleaner Production, Sustainability, Business Strategy and the Environment, Technological Forecasting and Social Change, Corporate Social Responsibility and Environmental Management, Ecological Economics, and Research Policy. The most prolific authors with the most frequent contributions to the analyzed research area in the WoS database are Massimiliano Mazzanti, Sabina Scarpellini, and Angel Peiro-Signes. However, this scientific field is mainly shaped by authors from the countries, such as China, Spain, England, Italy, the United States, the Netherlands, and Germany. Moreover, considering the affiliations of scientists publishing in the analyzed literature, the following most active organizations should be distinguished: Delft University of Technology, University of Sussex, Wageningen University Research, Universidad de Castilla La Mancha, University of London, Universitat Politecnica de Valencia, and University of Ferrara.

The network analysis revealed interesting findings. The co-occurrence network of author keywords indicated that the core topics in literature covering management perspective of eco-innovation research are: ‘eco-innovation’, ‘sustainability’, ‘innovation’, ‘sustainable development’, ‘green innovation’, ‘sustainable innovation’, ‘environmental innovation’ and ‘circular economy’. Nevertheless, the clusters obtained from the network analysis of author keywords demonstrated a considerable diversity of the co-occurrence of various topics. For example, the keyword ‘eco-innovation’ co-occurs, in particular, with such other keywords as ‘environmental sustainability’, ‘green economy’, ‘industrial ecology’, ‘green marketing’, ‘green practices’, ‘sustainable manufacturing’, and ‘green management’. The ‘green innovation’ keyword co-occurs with such topics as ‘green product innovation’, ‘green process innovation’, ‘ecodesign’, ‘environmental management system’, ‘green entrepreneurship’, ‘innovation strategy’, and ‘innovation system’. In contrast, ‘environmental innovation’ co-occurs with ‘environmental policy’, ‘environmental regulation’, ‘environmental management systems’, and ‘eco-innovation drivers’. This means that the analyzed scientific field must be characterized using multi-faceted and multi-dimensional features. The analysis of the countries’ cooperation network indicated that China and Spain, with the highest number of publications written in international collaboration, are definite leaders in the field of co-authorship. However, England, the United States and the Netherlands are the countries with the greatest total link strength when it comes to the closest international collaboration of authors. The citation network of sources revealed that there are three groups of significant sources with strong mutual relations. In particular, this concerns: (1) Journal of Cleaner Production, Business Strategy and the Environment, Sustainability, Journal of Business Ethics, and Corporate Social Responsibility and Environmental Management, and (2) Ecological Economics, Research Policy, and Technological Forecasting and Social Change, and (3) Technology Analysis & Strategic Management and Environmental Innovation and Societal Transitions.

Eco-innovation is still a young research domain, however, it has gained increasing concern for policy makers, academics and practitioners (Díaz-García et al., 2015). Nevertheless, some areas in the analyzed scientific field appear to be extremely important. For example, this concerns management perspective of eco-innovation research focusing on, in particular, engagement of companies in eco-innovation development and adoption. Determination of factors facilitating the successful inclusion of eco-innovation into business models and creation of value makes it possible to enable companies to gain and maintain competitive advantage. However, it should be noted that effective eco-innovation activity resulting in new or significantly improved products or processes requires comprehensive utilization of specific quantitative and qualitative tools applied both on the strategic

and operational level of the company (Brodny et al., 2016; Janik, 2016; Loska and Paszkowski, 2018; Matusek, 2015; Szafraniec, 2015). In addition, this activity involves the need to develop diverse innovative initiatives (Szmal, 2015) and suitable forms of internal and interorganizational cooperation (Brzóska et al., 2016). These issues seem to be very interesting and need to be further investigated in the future.

The performed analysis made it possible to determine the most frequent topics, the most popular research areas, and also the most active and influential authors, sources, countries, and organizations in the literature covering management perspective of eco-innovation research. This knowledge might be used by future authors of eco-innovation publications to implement efficient publication strategy and become the valuable basis for searching and establishing future collaboration. However, although an effort has been made to perform this research in the most accurate manner, the results presented in this paper are subject to some limitations. The analysis was based on WoS-indexed publications only, which means that it could not be assumed as entirely complete as there might be other important publications in the analyzed scientific field. In order to gather more information and obtain a wider understanding of the management perspective of eco-innovation research, further research should take account of analyses based on other databases (e.g., Scopus or Google Scholar). In addition, the numbers of the publications and total citations were used to measure the quality and quantity of papers regardless of their actual scientific merit. It is worth noting that the number of publications exploring analyzed research field increases dynamically. Therefore, the obtained results ought to be treated with caution because they might become obsolete rather fast. Nevertheless, it should be emphasized that the aim of this study was comprehensive quantitative up-to-date determination and evaluation of management perspective of eco-innovation scientific field based on bibliometric analysis.

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A Mini Bibliometric Review to Explore Decades of Research in Artificial Neural Networks

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Abstract

In this mini bibliometric review, we explore and report on the contributions made in the field of Artificial Neural Networks (ANN) over more than three decades of research endeavors. The review covers the period from 1986 to 2018 with a total of 380,086 documents extracted from Scopus database. The extracted bibliometric information was thoroughly pre-processed while the analysis of authorship was performed using the VOSviewer (www.vosviewer.com). The result of the bibliometric analysis unearths the types of publications, the languages used for the publications, the evolution of the scientific outputs, the distribution of publications by regions and institutions, the distribution of outputs in subject categories and the networks of authorship. The results presented in this paper could help researchers seeking for collaborations in the field of ANN to promptly locate reputable scholars. Funding agencies could also leverage on the results in this study to properly disburse grants for ground-breaking work and measure impact and accountability of investment to support further research in artificial intelligence.

Keywords: Artificial Neural Networks; ANN; Neurofuzzy; Kohonen; Hopfield; Bibliometrics

Introduction

The idea of Artificial Neural Network (ANN) came from the concept of biological neurons in the human nervous system consisting of several processing units that are highly interconnected for the purpose of interaction. Much like the human brains, ANNs are capable of learning by examples. This is why ANN has drawn the attention of a lot of researchers and has become one of the most important tools for pattern recognition and classification (Sivagaminathan and Ramakrishnan, 2007).

ANN is basically a network of nodes or neurons which are highly interconnected. Each neuron is able to receive inputs from external sources or nodes, carry out some processing according to some set of rules and send an output to the environment or other nodes and thus are able to perceive certain features in data. Each input to a neuron has its associated weights, which are manipulated during training of the system. The nodes or neurons are grouped into layers and these layers can fall into any of three groups, namely; the input, hidden and output layer. The input layer accepts independent data, the hidden layer is sandwiched between the input and output layers and is where the data is majorly processed while the neurons in the output layer produces the final result.

The use of ANN offers a number of advantages. Its inherent nonlinearity requires no underlying assumptions for handling nonlinear systems. Other vital advantages of ANN include - adaptability of its weights in real-time, fault tolerance, reliability in decision making, parallel processing ability and capacity to learn as well as adapt itself to its environment.

ANN can be classified into four main groups in terms of their general characteristics. Group one only accepts inputs from the layer before it and send outputs to the layer after but they do not connect to nodes in their own layer. They consist of the Feedforward Networks (FFNs), multilayer perceptron (MLP) and the Radial Basic Function (RBF) (Bildirici et al., 2010). Group two have dynamic connections and store information for future use. They have nodes that connect not only to other nodes but also to themselves. They consist of the Recurrent Networks (RCNs), Elman Network (ELN) and Partially Recurrent Networks (PRN) (Pérez-Rodríguez et al., 2005). Group three are also referred to as the Polynomial Networks. They efficiently process inputs which are polynomial variables. They consist of the Function Link Network (FLN) and Ridge Polynomial Networks (RPN) (Hussain et al., 2008). Group four have the characteristic of being able to work independently in separate modules and then combine their answers in a logical manner with the Modular Networks (MNs) as a major example (Adeodato et al., 2011).

ANN finds applications in different fields that model physical phenomena. For instance, in the finance world, the behavior of stock market prices can be predicted using ANN and it helps investors to better deal with the volatile nature of the market. There are a number of research papers, which have successfully shown the possibilities of stock market prices forecast using ANN. For example, in Chen and Du, (2009), ANN and data mining algorithms were adopted to build a financial distress estimation system. The first phase was the preprocessing, which extracted relevant information from the huge input data thereby improving the quality of the data by filtering inconsistencies and discrepancies. The next phase was to analyze the data by applying the neural network model to find the rules and estimate the financial distress levels. In Codicil, ANNs have been compared with traditional financial models and successfully applied in areas like decision making in investment portfolios, mortgage risks, price analysis, bankruptcy and assessment of risks. In order to predict the financial distress levels of various companies, ANN has also been found very useful in assisting with sending signals to investors before the year-end report of the company is made available or to check report falsifications (Rada, 2008).

ANN is used in the medical fields to intelligently diagnose and determine the nature and types of diseases thus helping physicians to get more accurate results (Lin, 2010) (Adetiba et al, 2011a) (Adetiba et al, 2011b) (Adetiba et al, 2015a) (Adetiba et al, 2015b) (Adetiba et al, 2015c) (Adetiba et al, 2016) (Adetiba et al, 2017a) (Adetiba et al, 2017b) (Adetiba et al, 2017c) (Adetiba et al, 2017d) . For instance, Chou et al (2004). achieved diagnosis accuracy of 98% by the application of multivariate adaptive regression splines (MARS) and ANN for the detection of breast cancer.

A lot of studies have adopted ANN to resolve the complexity and fluctuations in tourism forecasting because ANN has the advantage of capturing subtle relationships in data, even if the relationships are not previously known (Palmer et al., 2006). In Chun-Fun et al. (2012a) were able to accurately predict demands in tourism by developing a forecasting system which made use of Empirical Model Decomposition (EMD) to first break down the complicated raw input data and ANN's Back-propagation Neural Network (BPN) for the forecasting.

ANN found usefulness in the prediction of fracture density of well logs and reservoirs (Reda, 2008). In Zazoun (2013) an experiment was carried out on 170 cores by making use of conventional well log data from 17 unoriented wells using 7 different training algorithms and 8 network architectures to arrive at an optimal 4 layer ANN architecture.

In order to explore relationships in performance between Research and Development (R&D) projects, Yu-Shan et al. (2012) applied a three-layered ANN using Self-Organizing Map (SOM) for classification. The hidden layer nodes employed sigmoid transfer function while the output nodes made use of linear transfer function. The inputs to the network were the skills of project managers, quality of project environment and the effectiveness of teamwork. Applying ANN, they discovered how these inputs have an inverse U-shaped impact on R&D project performances. Their results show that at a certain point, continuous investment in the quality of project environment begins to have a negative effect on project performance while continuous investment in project manager's skill and teamwork always yielded better performance. This provides valuable insights on how companies could improve the performance of R&D projects.

ANN techniques are also popularly being used in the transportation industries. One example is the two ANN-based models in conjunction with data fusion techniques used by Chien-Hung and Ying (2007) to estimate how long it takes to resolve traffic accidents so as to minimize the uncertainty of travel time. The first model provides an initial forecast using traffic data representing the traffic situation prior to the incident, while the second model provides periodic forecasts till the incident is resolved. The research gave good and stable results such that the differences between the estimated duration and the actual were within the range of 200 seconds to 800 seconds and ANN was able to smoothen out the noisy data in the model.

This paper is a bibliometric analysis with statistics highlighting research endeavors in ANN over more than three decades (i.e. 1986 to 2018). The extracted publications on ANN within these periods were analyzed based on countries, institutions, educational fields as well as authorship networks. This bibliometric analysis is important because, at a glance, it shows the relevance of ANN applications, its potentials and thus encourages further research especially in subject areas yet untapped.

Materials and Methods

In order to perform this analysis, a deep search of the Scopus database was carried out using the Title, Abstract and Keyword subfields. The search was carried out using the following search terms: "neural net*", "neural-net*", neurofuzzy, neuro-fuzzy, Kohonen, Perceptron, "Radial Basis Function Network", Hopfield as used in Robert et al. (2004). The ast(erisk was used as a wild card to accommodate for any word prolongation. The search was carried out on 13th April 2018 and year range from 1986 to 2018. The extracted records have been pre-processed using google sheets (https://docs.google.com/spreadsheets/). Google sheets is a spreadsheet web-based software suite provided by Google. The various search queries are presented in Table 1.

Table 1: Search query in SCOPUS

S/N	Search
1	"neural net*"
2	"neural-net*"
3	neurofuzzy
4	neuro-fuzzy
5	kohonen
6	perceptron
7	"Radial Basis Function Network"
8	Hopfield
9	1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8
10	(LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017) OR LIMIT-TO (PUBYEAR , 2016) OR LIMIT-TO (PUBYEAR , 2015) OR LIMIT-TO (PUBYEAR , 2014) OR LIMIT-TO (PUBYEAR , 2013) OR LIMIT-TO (PUBYEAR , 2012) OR LIMIT-TO (PUBYEAR , 2011) OR LIMIT-TO (PUBYEAR , 2010) OR LIMIT-TO (PUBYEAR , 2009) OR LIMIT-TO (PUBYEAR , 2008) OR LIMIT-TO (PUBYEAR , 2007) OR LIMIT-TO (PUBYEAR , 2006) OR LIMIT-TO (PUBYEAR , 2005) OR LIMIT-TO (PUBYEAR , 2004) OR LIMIT-TO (PUBYEAR , 2003) OR LIMIT-TO (PUBYEAR , 2002) OR LIMIT-TO (PUBYEAR , 2001) OR LIMIT-TO (PUBYEAR , 2000) OR LIMIT-TO (PUBYEAR , 1999) OR LIMIT-TO (PUBYEAR , 1998) OR LIMIT-TO (PUBYEAR , 1997) OR LIMIT-TO (PUBYEAR , 1996) OR LIMIT-TO (PUBYEAR , 1995) OR LIMIT-TO (PUBYEAR , 1994) OR LIMIT-TO (PUBYEAR , 1993) OR LIMIT-TO (PUBYEAR , 1992) OR LIMIT-TO (PUBYEAR , 1991) OR LIMIT-TO (PUBYEAR , 1990) OR LIMIT-TO (PUBYEAR , 1989) OR LIMIT-TO (PUBYEAR , 1988) OR LIMIT-TO (PUBYEAR , 1987) OR LIMIT-TO (PUBYEAR , 1986))
11	9 AND 10

Results and Discussions

Type of Publications and Languages of Publications

A total of 380,086 documents have been published in this research area from 1986 – 2018. The publication output is majorly spread across *Journal Articles* and *Conference Papers* with 187,160 (49.2%) and 169,904 (44.7%) respectively. Other publication types are Journal Reviews; 6,648 (1.75%), Conference Reviews; 6,647 (1.75%), Book Chapters; 3,429 (0.9%), Articles in Press; 3,049 (0.8%). Other documents with less weight are Editorials, Letters, Notes, Books, Short Surveys, Erratum, Reports, Abstract Reports and Business articles made up 3,243 (0.85%) documents as shown in Fig. 1. Also, 6 (0.0016%) documents have been retracted in the history of this research area. The Top 10 languages for publications in this research area are English (354,181), Chinese (21,560), Japanese (876), Russian (638), Spanish (624), Turkish (599), German (471), French (412), Portuguese (389) and Polish (355).

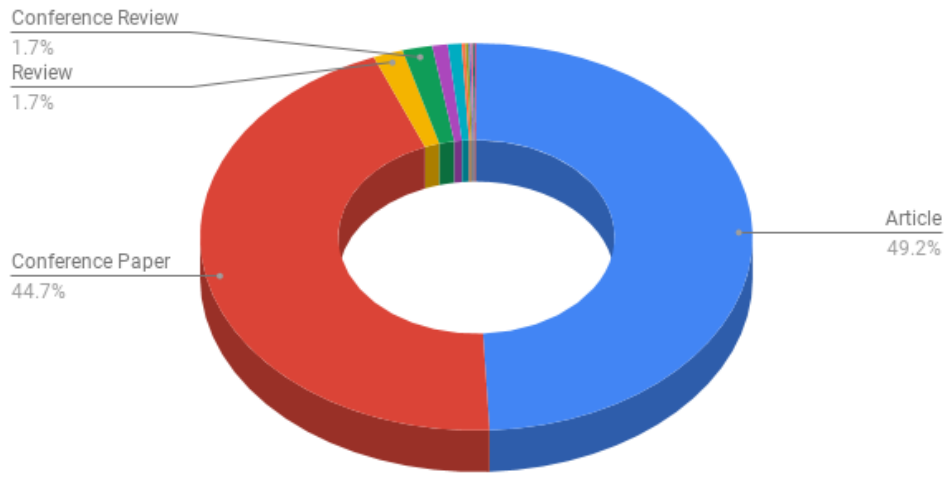

Fig. 1: Pie Chart representation of document type distribution from 1986 – 2018 for Artificial Neural Network

Characteristics of Scientific Outputs

In Fig. 2, the time trend of published papers for artificial neural networks between 1986 and April 13, 2018 is given. A steady increase in the number of publications can be noticed from 1986 to 2009, a negligible decrease in the number of publication output was experienced in 2009 to 2011, followed by a sharp increase in the number of publications from 2011 to 2017. Already in 2018, a total of 7,644 documents have been published. Fig. 3 shows the publication output from 1986 to 2018 on the logarithmic scale, to give an idea of the publication growth rate. The correlation coefficient is given as $R^2 = 0.811$.

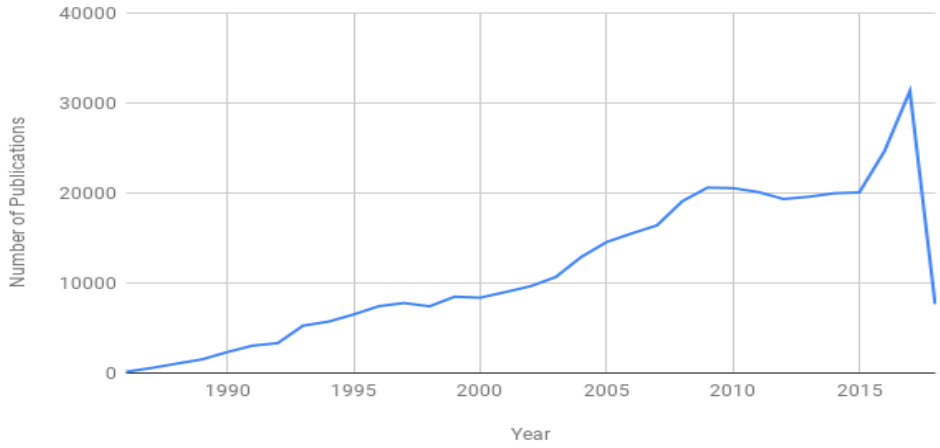

Fig. 2: Evolution of Publication Output for Artificial Neural Network from 1986 – 2018

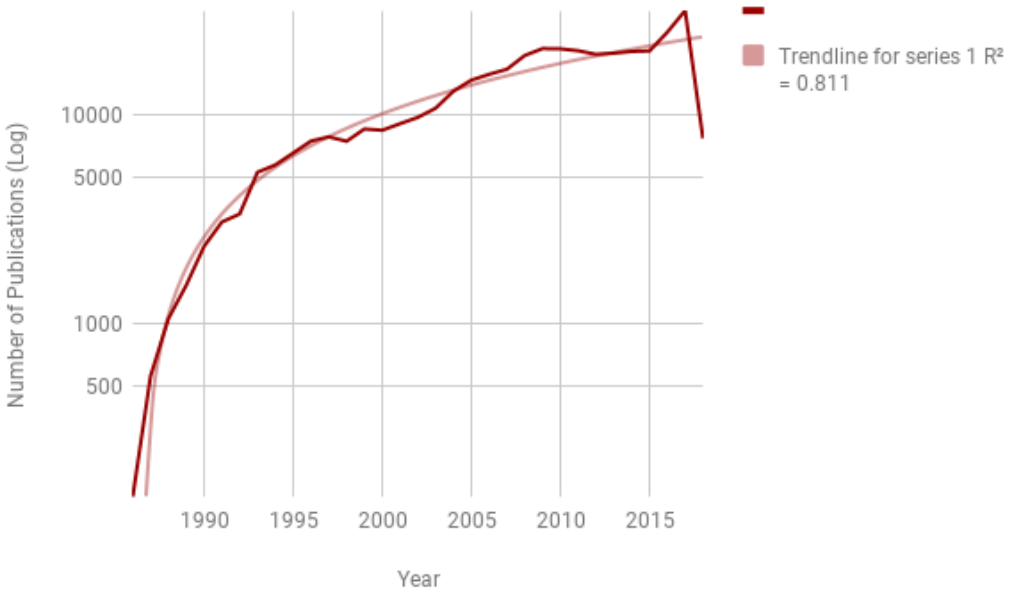

Fig. 3: Evolution of Publication Output for Artificial Network from 1986 – 2018 (Number of Publications – y axis on logarithmic scale)

Publication Distribution by Regions and Institutions

Between 1986 and 2018, a total of 89,548 documents have been published from China on ANN giving it the first place. Next, 64,349 documents have been published from the United States. Following in the publication trend, India is third place with 21,353 documents, United Kingdom (21,168), Japan (19,430), Germany (14,215), Iran (12,376), Canada (12,326), Italy (12,246) and Spain (10, 727). This result agrees with the current trends in Artificial Intelligence resurgence in which groundbreaking strides in research relating to ANN are currently taking place in China, United States and etc. It is noteworthy to point out that it was only until 2002 that China's publication output exceeded 1,000 documents. Whereas, publication output exceeded 1,000 documents in the year 1992 for the United States. Interestingly, India's publication output exceeded 1,000 documents in 2009 and has been on the increase ever since. However, according to the data extraction from Scopus, there were 21,939 documents categorized as *Undefined*. These are indexed documents with no identifiable national affiliation. Figure 4 shows a world map of publication outputs based on countries and regions with respect to ANN. An evolution of research publications for the Top published countries is given in Fig. 5. It was noticed that Iran's publications indexed in Scopus started off in 1991, since then they have continued to gain more publication volume, making them the sixth highest country in terms of publication volume for ANN. Also, 16 out of the Top 20 institutions in ANN research are located in China alone; other Countries in the Top 20 are USA, France, Singapore and Iran as seen in Table 2.

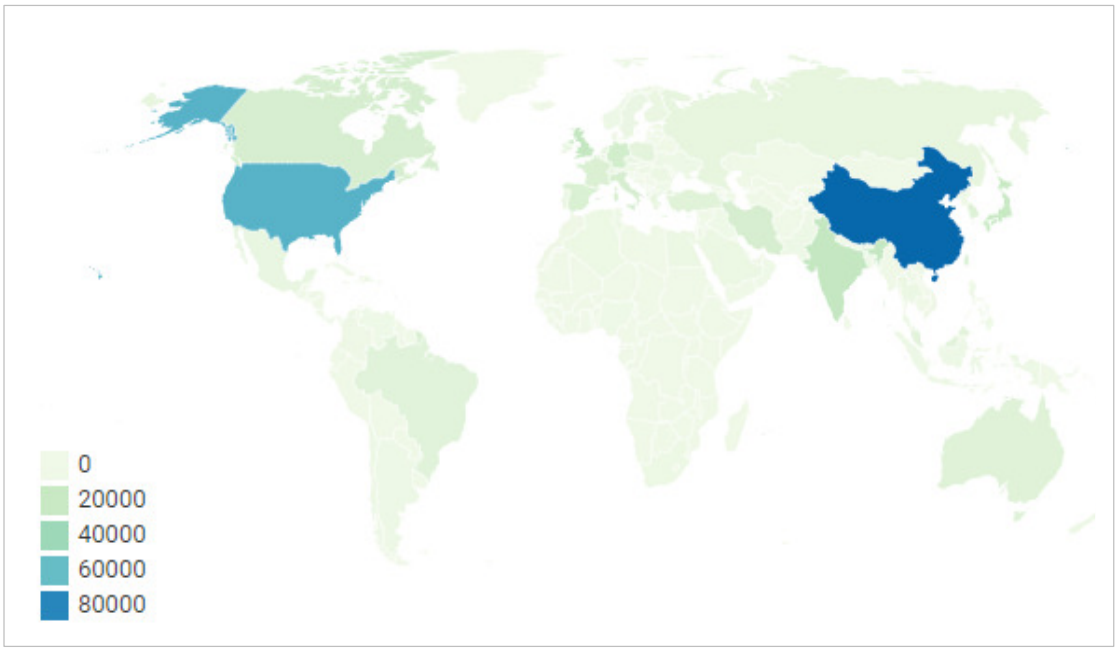

Fig. 4: World Map Showing ANN Publication Distributions

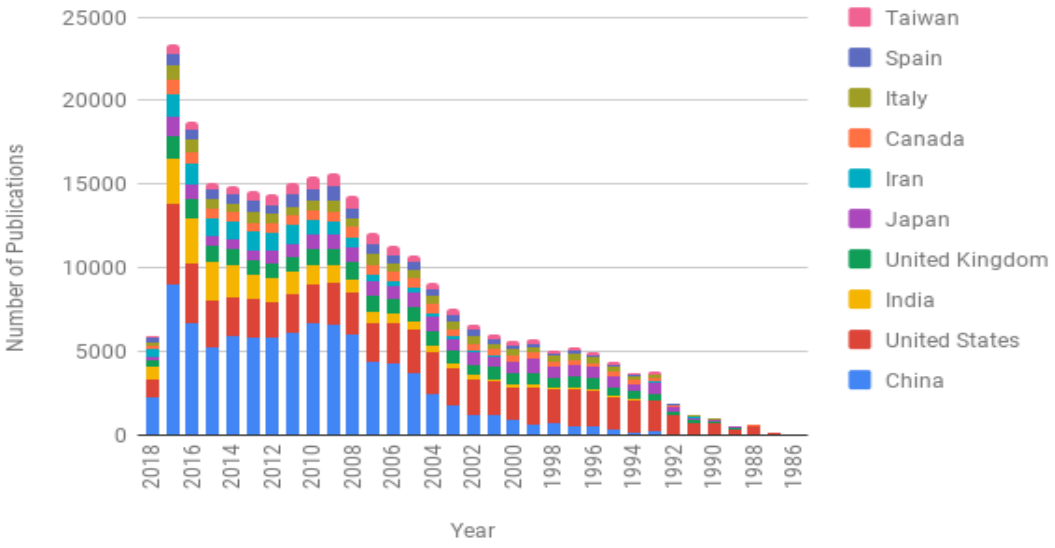

Fig. 5: Evolution of Publication Output for Top 10 Countries

Table 2: Top 20 Research Institutions in Artificial Neural Networks

s/n	Institution	Number of Document	Country
1	Chinese Academy of Sciences	5,271	China
2	Ministry of Education China	3,209	China
3	Tsinghua University	2,955	China
4	IEEE	2,800	USA
5	Harbin Institute of Technology	2,478	China
6	Zhejiang University	2,459	China
7	Shanghai Jiao Tong University	2,401	China
8	Nanyang Technological University	2,364	China
9	Southeast University	2,130	China
10	Huazhong University of Science and Technology	2,053	China
11	CNRS Centre National de la Recherche Scientifique	2,016	France
12	Northeastern University China	1,940	China
13	National University of Singapore	1,797	Singapore
14	Beihang University	1,743	China
15	University of Tehran	1,597	Iran
16	Xi'an Jiaotong University	1,580	China
17	Tianjin University	1,570	China
18	South China University of Technology	1,504	China
19	Dalian University of Technology	1,466	China
20	Chongqing University	1,464	China

Distribution of Outputs in Subject Categories and Journals

The Top 5 subject areas for ANN research based on the number of documents published in the areas as compiled from Scopus is Computer Science (190,107), Engineering (169,104), Mathematics (66,577), Physics and Astronomy (32,664) and Neuroscience (23,127). The Top 20 subject areas are classified in Table 3. Table 4 lists the Top 20 journals and conference proceedings where researchers in the ANN have published between 1986 and 2018. Where Lecture Notes In Computer Science Including Subseries Lecture Notes In Artificial Intelligence and Lecture Notes In Bioinformatics, Proceedings of the International Joint Conference on Neural Networks, Proceedings of SPIE, Neurocomputing and IEEE International Conference On Neural Networks Conference Proceedings makes the top of the list.

It should be noted that three out of the top five publishing outlets are International conference proceedings, which are organized by the United States. Table 4 further gives the comparative ranking of the outlets according to the number of published documents, position held according to the Scimago Journal Rank (SJR) and Source Normalized Impact per Paper (SNIP) computed by Elsevier, type of publication, publisher and status of publishing outlet.

Table 3: Top 20 Subject Categories for Artificial Neural Network

S/N	Subject Areas	Number of documents	S/N	Subject Areas	Number of documents
1	Computer Science	190,107	11	Environmental Science	13,096
2	Engineering	169,104	12	Chemistry Engineering	11,743
3	Mathematics	66,577	13	Chemistry	11,001
4	Physics and Astronomy	32,664	14	Social Sciences	9,959
5	Neuroscience	23,127	15	Agricultural and Biological Sciences	9,881
6	Materials Science	22,715	16	Decision Sciences	7,447
7	Medicine	21,395	17	Business, Management and Accounting	5,066
8	Biochemistry, Genetics and Molecular Biology	16,480	18	Arts and Humanities	4,896
9	Earth and Planetary Sciences	15,246	19	Multidisciplinary	3,762
10	Energy	14,793	20	Psychology	3,605

Analysis of Authorship

An analysis of authorship was performed using bibliometric information extracted from 39,912 documents from the SCOPUS database. Of the 380,086 documents only 39,912 unique documents were synthesized for this analysis. The VOSviewer software tool (Van Eck and Waltman, 2010, van Eck and Waltman, 2014) which was developed by Van Eck was used for visualizing the bibliometric network. This is freely available at www.vosviewer.com. Furthermore, in the visualization of co-authorship network, the size of the symbol representing the authors is determined by the number of co-authored publications. In order to have a high quality visualization, the attraction and repulsion parameters of the layout technique used by the VOSviewer was set to 1 and -1. Also, the resolution parameter was set to a default value of 1. The location of authors in the visualization is set in such a way that authors who have co-authored together are located closer to each other in the visualization. Figure 6 shows the visualization of the number of documents by the Top 1000 authors while Figure 7 shows the visualization of the citation count by the Top 1000 authors. Figure 8-10 shows the authorship links in cluster 1, 2 and 3.

Table 4: Top 20 Journals and the Number of Documents Published Between 1986 and 2018

Journal	Number of documents	SJR	SNIP	Type of publication	Publisher	STATUS	ITEM RANK	SJR RANK	SNIP RANK
Lecture Notes In Computer Science Including Subseries Lecture Notes In Artificial Intelligence And Lecture Notes In Bioinformatics	18,566	0.315	0.552	Book series	Springer Verlag	Active	1	9	9
Proceedings Of The International Joint Conference On Neural Networks	8,029	0.167	0.315	Conference proceeding	IEEE	Active	2	13	15
Proceedings Of SPIE The International Society For Optical Engineering	6,844	0.228	0.384	Conference proceeding	SPIE	Active	3	11	12
Neurocomputing	5,631	0.968	1.589	Journal	Elsevier	Active	4	5	4
IEEE International Conference On Neural Networks Conference Proceedings	4,354	0.14	0.343	Conference proceeding	IEEE	Discontinued in 2010	5	15	13
Neural Networks	3,344	1.39	2.367	Journal	Elsevier	Active	6	3	3
IEEE Transactions On Neural Networks continued as IEEE Transactions on Neural Networks and Learning systems	2,773	2.49	2.408	Journal	IEEE	Active	7	1	2
Applied Mechanics And Materials	2,284	0.116	0.169	Book series	Trans Tech Publication	Discontinued in 2015	8	19	17
Advanced Materials Research	2,193	0.12	0.154	Book series	Trans Tech Publication	Discontinued in 2015	9	18	19
Expert Systems With Applications	2,021	1.433	2.492	Journal	Elsevier	Active	10	2	1
Neural Computing And Applications	1,858	0.637	1.105	Journal	Springer London	Active	11	7	6

ICASSP IEEE International Conference On Acoustics Speech And Signal Processing Proceedings	1,827	0.469	0.879	Conference proceeding	IEEE	Active	12	8	8
Advances In Intelligent Systems And Computing	1,640		0.312	Book series	Springer Verlag	Active	13	20	16
Communications In Computer And Information Science	1,531	0.162	0.317	Book series	Springer Verlag	Active	14	14	14
Proceedings Of The World Congress On Intelligent Control And Automation WCICA	1,411	0.136	0.163	Conference proceeding		Discontinued in 2015	15	16	18
Proceedings IEEE International Symposium On Circuits And Systems	1,410	0.252	0.506	Conference proceeding	IEEE	Active	16	10	11
Proceedings Of The IEEE International Conference On Systems Man and Cybernetics	1,367	0.171	0.528	Conference proceeding	IEEE	Discontinued in 2006	17	12	10
Neural Computation	1,132	0.831	1.261	Journal	MIT Press Journals	Active	18	6	5
Lecture Notes In Electrical Engineering	1,105	0.127	0.118	Book series	Springer Verlag	Active	19	17	20
Plos One	1,071	1.201	1.092	Journal	Public library of Science	Active	20	4	7

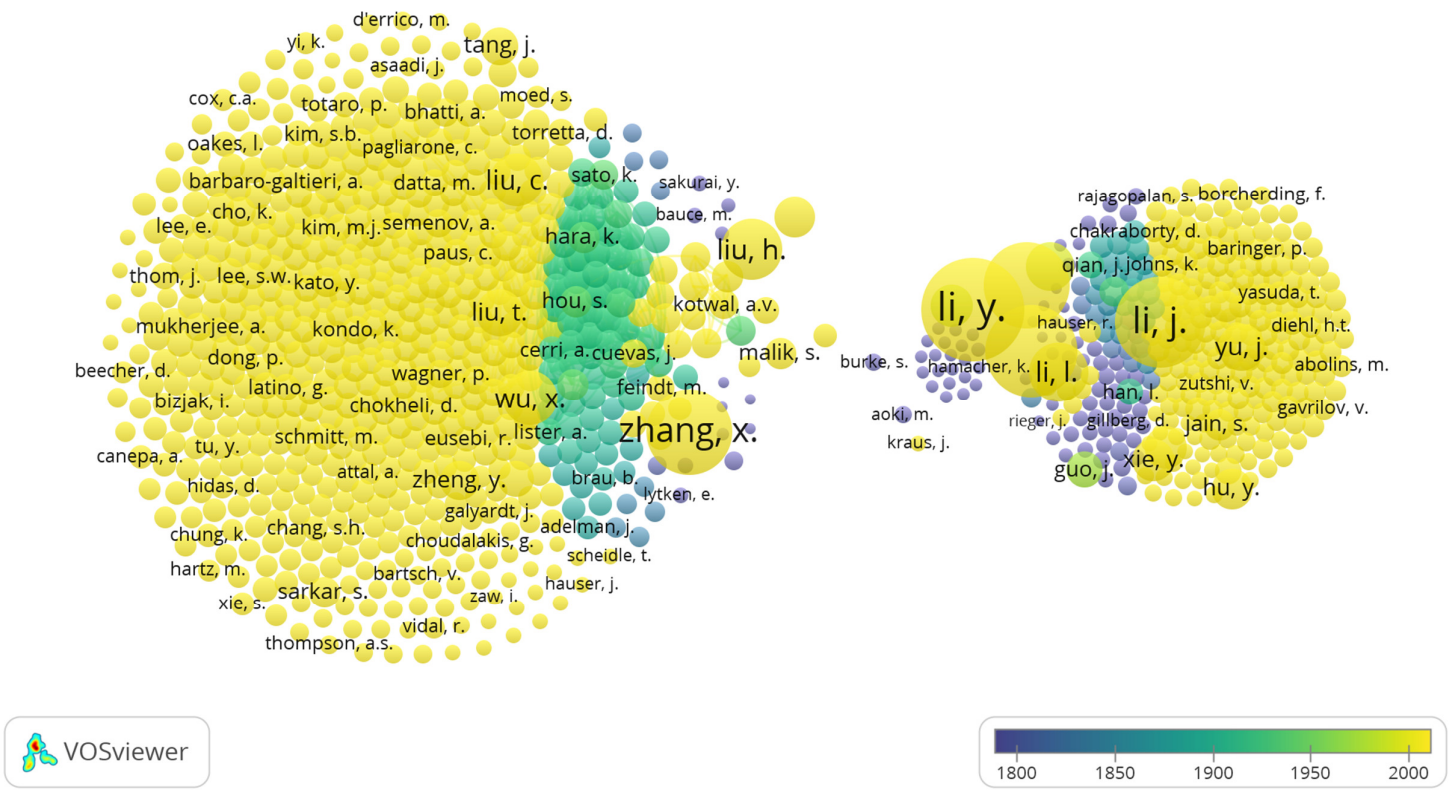

Fig. 6: Visualization Showing 1000 items in 3 Clusters - symbol size representing document numbers for each author

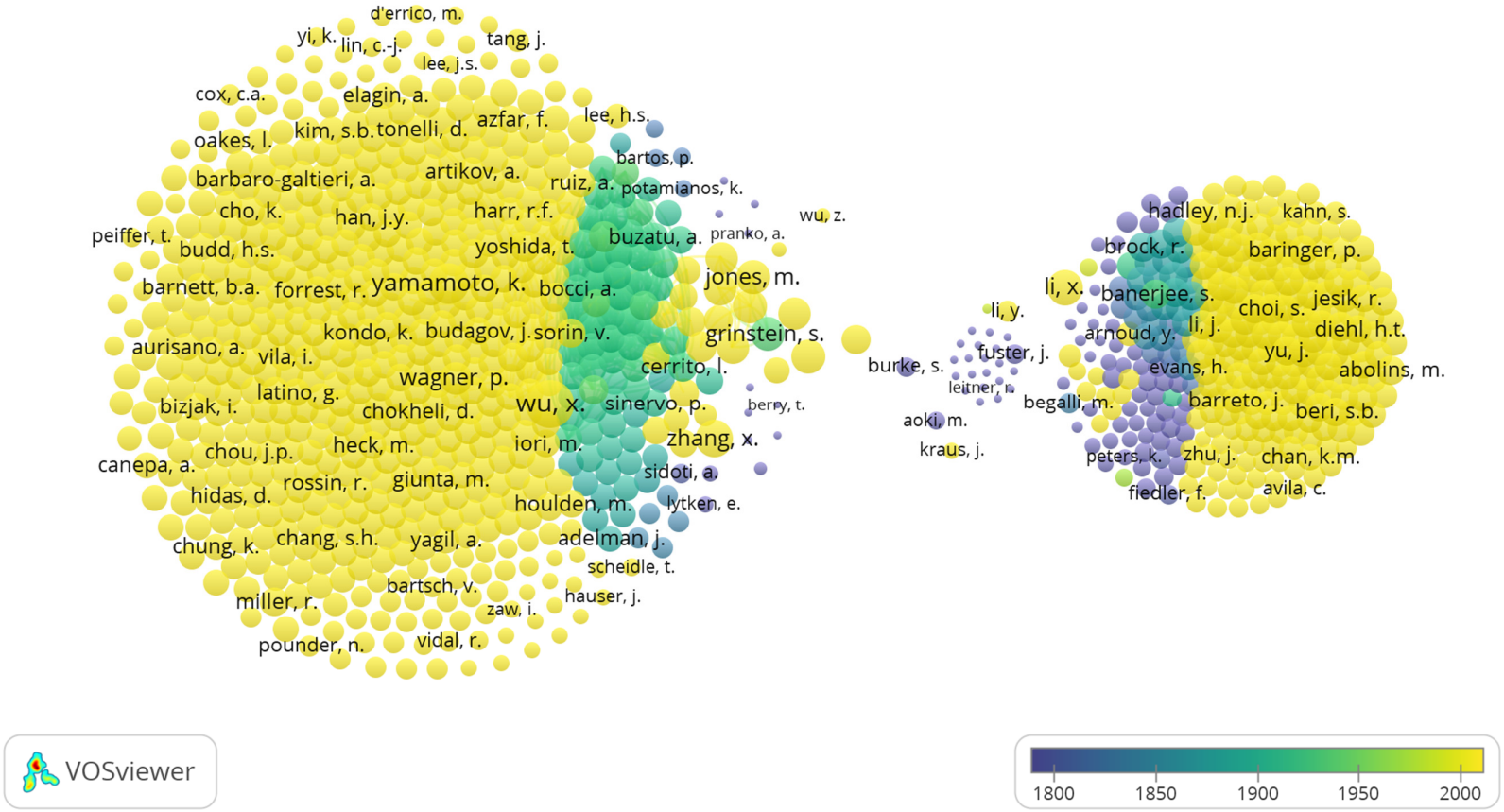

Fig. 7: Visualization Showing 1000 Items in 3 Clusters. Symbol Size Representing Citation Count for each Author

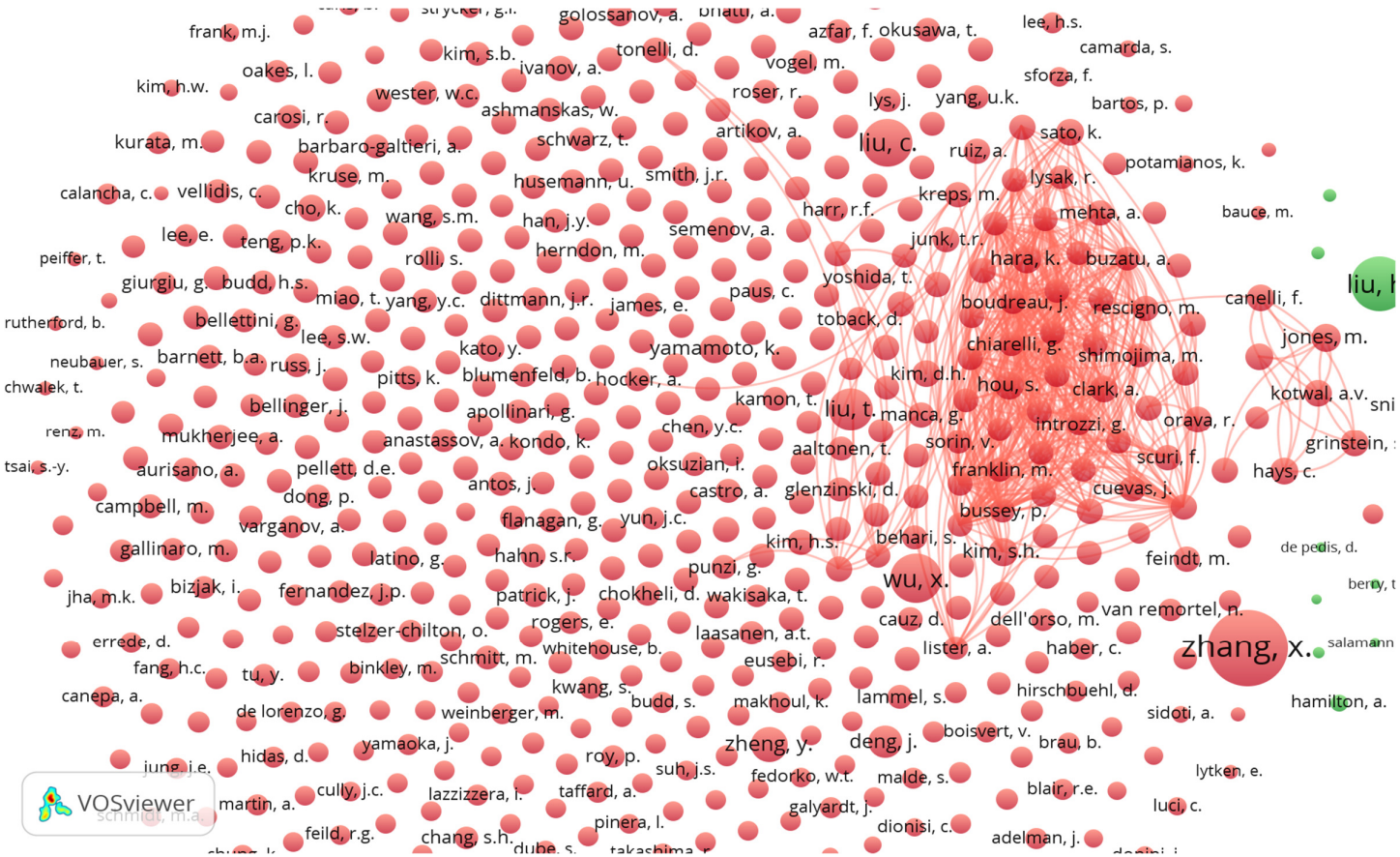

Fig. 8: Co-authorship Links in Cluster

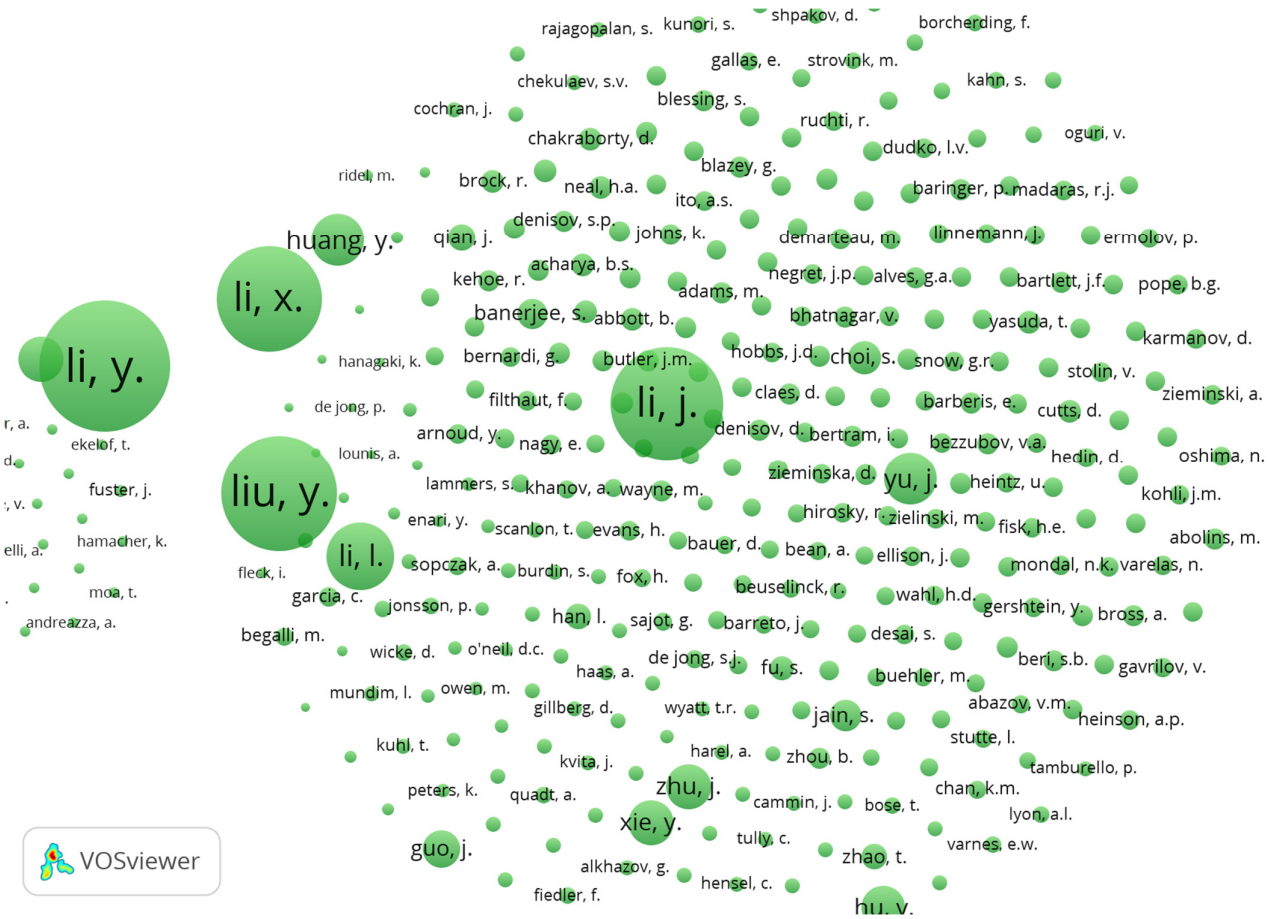

Fig. 9: Co-authorship links in Cluster 2

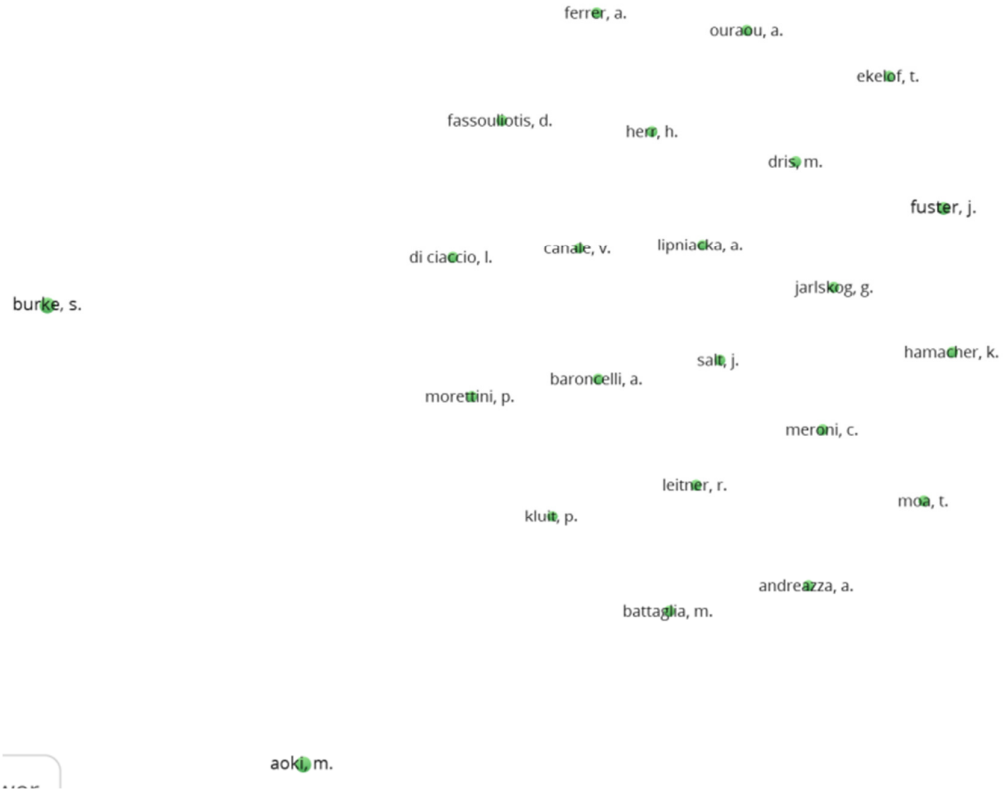

Fig. 6: Co-authorship link in Cluster 3

Conclusion

In this paper, a bibliometric review of publications on ANN published between 1986 and 2018 have been highlighted. A total of 380,086 documents were retrieved which met the search criteria detailed in Table 1. After analysis of the retrieved data, it was discovered that 49.2% of the publications in this research area are Journal articles while 44.7% of the documents are conference papers. Similarly, the top languages favored by researchers in this field are English, Chinese and Japanese. Based on the scientific outputs over the years under study, there has been a steady increase in the number of publications with a correlation coefficient of 0.811. The analysis showed that China, Unites States and India have published the largest number of documents in this area. Also, 16 out of the Top 20 institutions publishing in this research area are institutions located in China. Based on subject area, the top subject areas are Computer science, Engineering, Mathematics, Physics and astronomy and Neuroscience. Also, using the VOS viewer; a co-authorship mapping was performed. A map of the first 1000 authors is presented.

Acknowledgment

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Corporate Leveraged Buyout Market Development Trends

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Abstract

The article is devoted to the peculiarities of international financing transactions on large corporate private equity acquisitions, including M&A deals using borrowed funds. The main emphasis is made on the study of the international leveraged buyout market and the requirements for the values of debt to EBITDA ratios. We made some conclusions concerning the term of loan within the LBO: in the USA and most EU countries the buyer can expect a loan of up to five years, while in Russia it is possible to attract borrowed funds for two or three years. The problems of performing LBO transactions by Russian companies today connected to limited number of banks that are willing to take on non-traditional risks. However, LBO has great prospects in Russia, as knowledge of transactions spreads, and banks become more active in dealing with them, gaining experience, there will be an understanding of the structure of transactions. Gradually, investors will begin to offer more interesting conditions that can contribute to the growth of interest in these mechanisms in a business environment. In the article there were also investigated the results of multiple regression analysis bases on US statistics. A model with three factors, making impact on LBO deals number was built. These factors: industrial PMI, GDP, and bankruptcy of individuals. In the result we found, that business activity index for manufacturing companies and the level of bankruptcy of individuals have the greatest impact on the number of LBO.

Keywords: leveraged buyout (LBO) investors, covenant-light deals, pro forma leverage.

JEL Classification: G32, G35, H25.

Introduction

As a rule, the expectations of investors who actively use leverage (hereinafter referred to as LBO-investors) are that the profit of the acquired company in the future will exceed the obligations on debt interest. The use of borrowed funds increases the expected return of joint-stock companies. By investing as little of their own money as possible, successful firms, can achieve greater return on capital (ROE) and internal rate of return (IRR).

However, along with the potential return on equity growth, risks also increase, since only companies with stable revenue can decide to link debt payments to operating profit. Therefore, it is necessary to estimate several parameters of the target company: the ability to generate free cash flows the target company; to estimate the schedule and the amount of loan payments along with the amount of cash flows that will spent to cover obligations; the dynamics of a company's internal rate of return; sensitivity analysis of the financial model to changes in the external factors.

Financing the purchase of a business with the help of LBO has both advantages and disadvantages. The advantages include a low need for own funds for these purposes (banks are ready to finance up to 50% of the target company's value), a reduction in the tax burden on the company (interest on the use of a loan is the taxable base for income tax). In addition, there is no need for additional liquid collateral or guarantees. Note that the repayment of interest on the loan can be made not only through the receipt of funds from the operating activities of the target company, but also using the money received as a result of the non-core asset's sale.
In addition, it is companies acquired that are undervalued by the market are using the LBO mechanism. As a result, when the loan is paid off and the management has decided to sell the business, the cost of sale is significantly higher than the amount for which these assets were purchased.

Literature Review

In the international publications, there were described a range of leveraged buyout's pros and cons. Some authors (Ayash,et.2017) suggests, that "among successful LBOs, LBOs that enhance operating efficiencies produce the highest "exit" returns; however, LBO sponsors commonly fail to monetize these returns due to delays associated with liquidating portfolio positions". While (Kamoto, 2017) believes, that "management buyouts improve the innovation intensity, even if managers gain no excess value from the buyouts in collaboration with private equity firms".

The idea of concentration of investor's buyout fund commitments in the large fund groups were mentioned by (Hooke and Yook, 2016). The authors suggest, that "many investors consider the large fund families to be the "winners" in the buyout industry". And "

In the USA and Europe, the LBO market reached $1,3 trillion in 2018 against $734 billion in 2007, according to (S&P Global, 2018). The surge was caused by three major transactions (40% of the loan volume for LBO): the first is a $ 17 billion buyout of the controlling stake in Thomson Reuters Financial & Risk Unit, now called Refinitiv, and the second is a $ 11,7 billion LBO (Carlyle and GIC) to acquire Akzo Nobel Specialty Chemicals, as well as a deal to acquire Envision Healthcare.

High geopolitical uncertainty has hampered deal-making processes and contributed to a 30% annual decline in institutional new money, which at the end of the year was $239 billion. Looking at the drivers of institutional new money, it can be seen, that the volume of LBO decreased by 18% in 2019 to $ 107 billion, while other m & a activities decreased by 48% to less than $ 80 billion. In Russia, LBO is still rare.

An increase in the number of such transactions will be observed if the following conditions are met:

- a large number of companies entering the public market through IPOs;
- the end of the period of growth of stock indexes and the emergence of undervalued companies. As a rule, during the period of market growth, the main assets are overvalued and companies prefer to raise funds through IPOs. The LBO is in some sense the reverse process, and its economic validity arises in the event of a fall in the market and the appearance of undervalued assets;
- development of the legal framework in the field of mergers and acquisitions.

Despite the risk associated with increasing debt load, there are a number of notable advantages of LBO transactions for buyers. First, there is a low need for equity. Second, the high return on invested funds. In addition, a significant debt burden usually disciplines managers and concentrates their efforts on making effective management decisions (see Osipov etc., 2017).

Hypotheses

Considering international experience, when making LBO transactions in Russia, it is necessary to:

(1) correctly assess the assets and prospects for the development of the acquired business, the probability of its bankruptcy in the event of a financial crisis;

(2) correctly structure transactions that occur with the participation of an investment bank;

(3) assess the costs of consulting services (legal and financial consulting) as clearly as possible at the stage of registration of the transaction.

Assuming the Russian specifics, the first problem is the most difficult, since the information transparency of Russian companies is not enough. Therefore, it is important to have highly qualified appraisers who are familiar with the specifics of the industry (to which the target company belongs) and can accurately assess the assets (based on the available information). The buyer should also assume the discounts in the transaction price due to insufficient transparency of the target company's risks.

The most significant risk when buying a business using the LBO mechanism is a risk of financial distress and default. Since the interest on the loan is repaid from the target company's cash flows, any failures in its operation can lead to the fact that the funds to pay the loan simply will not be enough.

There are also significant costs for consulting services (legal and financial consulting) at the initial stage of transaction's registration. In addition, if the company acquires a 75% stake, the transfer of property as collateral can be regarded as a transaction with an interest. In this case, it must be approved by most minority shareholders, who can block the decision to transfer the company's property as collateral.

In the process of acquiring a ready-made business with borrowed funds, you can conditionally identify several main steps:

1. The choice of the target company.
2. Search for a lender.
3. Determination of sources of financing and the moment of transfer of rights.
4. Payment for the purchased business and completion of the transaction.

Step 1. Selecting a target company. At the first stage, the buyer chooses the company to purchase and starts building the relationships with the future creditors. The main difficulty is related to the search for such a company that, on the one hand, would meet the business development strategy, and on the other — the requirements imposed by banks to the target company. Ideally, the following conditions should be met for the target company:

– the company's cash flows must be sufficient to repay the interest on the loan for the purchase of the business;

– the company should work in a well-established market and offer customers a fairly simple product line. For example, businesses with a noticeable growth rate, but offering high-tech products are generally not suitable for acquisitions using LBO. Maintaining the growth rate will require additional investment in accounts receivable and inventory (i.e., in net working capital), as well as additional investment in production capacity. In addition, high-tech products are subject to rapid obsolescence, which requires constant significant R&D costs for the introduction of new technologies, while the increase in the debt burden of the acquired company limits its investment opportunities;

- low ratio of own and borrowed funds in the company's balance sheet structure;

– the asset structure is dominated by fixed assets that can serve as collateral for new loans;

- the book value of the target company's assets is lower than the market value.

When selecting a target company, the company's buyer together with the financial adviser performs a SWOT analysis of the business, determines industry trends and business growth potential. In addition, accounting reports are audited, current accounts, liabilities, and tax arrears are checked, and the ownership structure is evaluated.

Step 2. Search for a lender. After the target company is selected, the buyer company makes a presentation of the transaction, the so-called :"bank book", which is sent to potential creditors (banks). The bank book briefly describes the target company and the essence of the transaction, justifies the sufficiency of cash flows for debt service. In case of interest in the project, the lenders inform the buyer about the amount of the loan that they are ready to provide. After that, they are sent a business plan for five years, detailed in terms of forecasting future cash flows.

At the same time, bankers will put forward a number of significant restrictions:

- mandatory target use of the borrowed funds;
- managing the acquired business strictly in accordance with the approved business plan, significant restriction on dividends payments and capital expenditures;
- ban on M&A transactions involving the target company;
- mandatory provision of information to the bank by the buyer company about events that may negatively affect the acquired business;

- the property of the target company cannot be pledged.

Step 3. Determination of financing sources and the moment of rights transfer. Bank - investor is ready to provide up to 40-50% of the funds needed to purchase a business. This is the so-called "senior duty". The buyer's own funds account for 30-40% of the transaction amount. The remaining part of the funds (mezzanine financing) is usually raised by issuing high-yield bonds. Since the bond issue takes from three to four months, an interim bank loan is used, which is then repaid using the funds raised as a result of the bond loan. The moment of transfer of ownership of shares is stipulated in the contract of sale between the seller and the buyer.

After the financing structure of the business purchase transaction is determined, the moment of transfer of ownership rights to the company's assets to the new owner is also defined. Depending on the agreement, shares can be transferred to the new owner either at the time of signing the agreement or after payment.

Step 4. Payment for the purchased business and completion of the transaction.

After all contracts are signed, payment is made. In practice, there are two payment options: first, the entire amount of the contract for the purchase of shares is paid immediately; the second option involves partial payment. Partial payment means that after signing the contract, only a percentage of the total amount of payment under the contract is paid, the repayment of the remaining part depends on the performance of the target company. For example, when a transaction is done, the controlling stake is paid in full, and the balance is paid within the specified period with a coefficient linked to the annual financial results.

The next steps that the new business owner should take: the sale of non-core assets, improving the quality of management and, as a result, the company's financial results. Part of the funds from operating activities and the sale of non-core assets is used to repay the loan debt and pay interest.

The result of the transaction and the fate of the target company will depend on the type of buyer: whether it acts as a strategic investor or a financial one. If the strategic investor is interested in creating an integrated holding company and developing the acquired business, the financial investor will sell the acquired company at a better price in three to five years.

Methodology and Data

In this study, we also investigated the correlation and regression dependence of changes in the number of LBO transactions on various macroeconomic indicators. The source for statistical information for the study was USA market.

First, we investigated, what factors affect the USA annual leveraged loan issues. There were built multiple regression model. As a result, the following multiple regression equation was obtained:

$$Y\ model=-696{,}603+38{,}311*X1-55{,}869*X2-0{,}002*X3 \qquad [1]$$

The resulting equation shows the relationship between the indicators of US Annual Leveraged loan issues, PMI manufacturing, GDP, and US Bankrupts in non-production business.

From the equation it follows that with the growth of PMI (manufacturing companies) by one unit leads to the increase the number of LBOs by 38,311 units; with a growth of this index by one point - the number of LBO to be reduced by 55,869 units; with the increasing level of individuals' bankruptcy by one unit - the number of LBO to decrease by 0,002 units.

Based on the regression coefficients, we calculate standardized coefficients using the formula:

$$\beta_i = b_i \cdot \frac{\sigma_{x_i}}{\sigma_y}.$$

Table of standardized coefficients is given below:
Factor 1 (b1), PMI manufacturing equal to 0, 668339;
Factor 2 (b2), GDP equal to -0,30303;
Factor 3 (b3), US Bankruptcies non-business equal to -0,66547.

Then, equation in standardized form can be presented as:

Y model (standardized) = 0,668* Tx1-0,303* Tx2-0,665* Tx3 [2]

Since the standardized regression coefficients can be compared with each other, we can say that the business activity index (PMI manufacturing) and the level of bankruptcy of individuals have the greatest impact on the number of LBOs, since their coefficients are approximately the same in modulus and significantly exceed the values of the standardized coefficients for other factors.

We also investigated, if there any relationship between M&A Leveraged loan issue and Average equity contribution (we considered two groups of middle market and large corporations).

The correlation coefficient between M&A Leveraged loan issue and Average equity contribution (middle market) is -0.13616 and between M&A Leveraged loan issue and Average equity contribution (large corporations) is -0.06089 (that indicates a weak inverse relationship).

The final problem was identifying, which of the given factors: (1) the number of bankruptcies of individuals and business entities, (2) the business activity index (PMI) for both manufacturing and non-manufacturing companies, and (3) the dynamics of GDP growth has the most significant correlation with the number of LBO transactions.

We found that the number of bankruptcies of individuals and business entities has a weak correlation with LBO numbers (large capitalization): the correlation coefficient for the level of bankruptcy of individuals is equal to -0,1603; and with the level of business entities' bankruptcy, the correlation is equal to -0, 2554. However, the relationship is more negative relationship between LBO number (middle market capitalization) and individuals and business entities bankruptcy (consequently -0, 4425 and -0,5259). The business activity indicator for industrial companies has a moderate direct impact (the correlation coefficient is 0,3702); the business activity indicator for non-industrial enterprises has a moderate direct impact (the correlation coefficient is 0,2407). The business activity indicator (PMI) for manufacturing companies has a weak direct impact (the correlation coefficient is 0,0101); the business activity indicator for non-industrial enterprises has a moderate direct impact (the correlation coefficient is 0,33). The dynamics of GDP growth has a moderate direct impact (the correlation coefficient is 0,53).

Results and conclusion

In the multiple regression equation were made a number of changes (USA market) as far as the number of factors was reduced, since PMI industrial and PMI non-industrial strongly correlate, the same situation with the bankruptcy of physical and legal entities. A model was built with the higher coefficients of determination. As a result, it turned out to be a model with three factors: industrial PMI, GDP, and bankruptcy of individuals.

Since the standardized regression coefficients can be compared with each other, we can say that the business activity index for manufacturing companies and the level of bankruptcy of individuals have the greatest impact on the number of LBO, since their coefficients are approximately the same in modulus and significantly exceed the values of the standardized coefficients for other factors.
The prospect of an LBO as an effective instrument for financing the business' purchase is largely due to the enough funds that banks are willing to offer at a relatively low interest rate and for the long time.

Russian banks are legally restricted in providing leverage for redemption purposes. When lending to buy back shares, a reserve of 21% must be created. Well-structured LBO transactions (for example, through SPV lending for transparent target projects and with a smaller reserve) do not become public. One of the conditions for attracting borrowed funds for a transaction where the object of collateral for the loan is the purchased enterprise itself is a clear justification by the buyer of the debt repayment mechanism. The acquired company must generate enough funds to return the money on time, or it must have some assets that could be used to refinance the debt.

Sometimes refinancing can be done by selling part of the purchased asset. For example, a buyer may agree with an international investor to sell part of the target company before making a transaction. Due to the proceeds from the sale of assets, as well as operating cash flows of the target company, the buyer will be able to repay the loan.

If we mean a large company, it is possible to return the loan through a bond loan or IPO.

As for the repayment of the loan due to the generated cash flow of the target company, there are few such cases in Russian practice, unlike the US market.

Investors make demands not only on the target company, but also on the buyer's company itself. After evaluating the business of the buyer company, you can draw conclusions about how successful the LBO transaction will be, and how it will be able to dispose of the purchase. Sometimes investors require additional guarantees from the buyer. For example, in the Russian market, a deal was made to buy a pipe plant. The buyer was a pipe trader. Even though the buyer's business was profitable, the investor demanded in addition to the pledge of shares, the buyer's guarantee on the loan.

Discussion

Global economic growth is expected to slow in 2020. However, collateral credit obligations (CLOs) currently circulating on the market also contribute to maintaining a stable demand for loans. Interestingly, lenders that provide the main share of financing are now more exposed to risk than they were a decade ago, since their share of loans is higher and their degree of control is lower than in the previous business cycle.

Previously, companies that are at risk of financial insolvency had to follow the agreed values of the ratio of own and borrowed funds (covenant) and, if they are reduced, pay additional risk rewards to creditors. Now the situation has changed, and most deals do not provide for such a covenant. Debt documents give companies more freedom to take risks and use assets as they see fit. Private equity companies can also sell assets without paying off debt and pay themselves dividends.

Covenant-lite loans mean that loans are issued to borrowers with fewer restrictions on collateral, payment terms, and income levels, so this process has historically been integrated with leveraged acquisitions. On the one hand, purchasing shares using borrowed funds requires a high level of financing compared to equity capital, but on the other hand, they can have a huge return for a private equity company and its investors. This latter fact has led to the fact that in recent years, LBO investors have begun to dictate their terms to banks and financial groups. They were not only able to get easing of credit restrictions, but also favorable conditions for the schedule and size of loan repayment, which led to an expansion of their market share.

LBO investors who conduct large M&A transactions are allowed to add expenses incurred back to operating profit (EBITDA adjustments), which significantly improves their financial performance. The largest part of these adjustments is due to the synergy effect or potential cost savings resulting from the merger of the two companies.
With such adjustments, the actual risk is masked, since the borrower's leverage will be underestimated over time if the projected revenue of the company being acquired does not actually meet expectations.

A logical question arises: if the value of the debt-to-EBITDA covenant indicator for a transaction became higher only based on adjusted EBITDA, how much riskier would the transaction be if no EBITDA adjustments were made? The answer is a significant amount. For example, 8% of us LBO's for M&A transactions had a debt-to-EBITDA ratio of 7 or higher in 2018. However, if the expected synergy is not achieved, the share of M&A transactions with seven times the leverage will double, which will almost match the pre-crisis "record" of 2007. Loans that have a Debt-to-EBITDA ratio of six or more times may cause additional risks to the market.

Leverage on loans that support LBO has gradually increased over the past few years all over the world. For example, in the USA approximately 53% of LBO investments for large corporate borrowers in 2018 had a formal leverage of 6 times or higher. For reference, the record continues to hold in 2007, when 61% of LBO fell into this category, and in 2014 the level of loans with a similar leverage was 52% of all transactions. High valuations and geopolitical uncertainty delayed the deal-making process and contributed to an annual 30% decrease in institutional new money volume, which at the end of the year amounted to $239 billion. Refinancing also continued and decreased by 59% year to year indicators in 2019 to $167 billion. If we look at borrowed funds, we can see, that the volume of mergers and acquisitions decreased by a third in 2019 and amounted to $ 253 billion (including acquisitions by 44% below the previous year date). The amount of funds raised decreased by 41% for a year to $ 364 billion in 2019. 74% of the 2019 LBO's were aligned to debt-to-EBITDA ratio at 6x or higher, while 37% were aligned - 7x or higher.

The return on borrowed funds jumped to 8,6% in 2019, it was the highest annual return since 2016.

In the European market in 2018, M&A transactions also became a driving force for the development of lending, including transactions of LBO investors. The total volume of loans issued for them exceeded 80%. To date, the volume of leveraged loans in Europe intended for institutional investors is 41 billion euros.

Conclusions

In the coming years, the growth of LBO deals is closely linked to the growth of the following factors:

– general economic recovery and return of capital to the economy;
– access to borrowed capital in the market ("long-term" money);
– improvement of market and legislative mechanisms, that will greatly simplify procedures and protect the interests of investors and creditors in LBO transactions;
– the Emergence of experienced managers and proven transaction schemes;
– more precise regulation of mergers in terms of the tender offer procedure and guarantees of compliance with the rights of minority shareholders;
– removal of restrictions on initial placement of shares (the period of pre-emptive acquisition, registration of the report on the results of the issue, etc.);
– improvement the companies' bankruptcy procedure.

LBO investors, in the current market situation, may find themselves "in the line of fire". This is due to higher interest rates and reduced opportunities for generating profits against the background of the general economic downturn. Interestingly, it is not even the LBO investors themselves who are at a disadvantage, but their creditors, among whom there has been a boom in risk financing in recent years.

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Research on The Level of Sustainable Development of Kaliningrad

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Abstract

The city as an independent territorial and social unit is a system in which economic, political, environmental and social processes proceed that have their own specific characteristics. Sustainable development of the city entails the implementation of measures that contribute to solving problems of improving the quality of life of the population, the optimal use of resource potential, the development of industrial infrastructure with minimization of environmental damage. The purpose of the study is to conduct a qualitative and quantitative assessment of the sustainable development of Kaliningrad. This requires: to consider the concept of the initiative "Sustainable urban development" and its main provisions; to analyze the process of implementing the concept of sustainable development of Kaliningrad at present; based on the proposed methodology, assess the level of sustainable development of Kaliningrad; to conduct a comparative analysis of the level of sustainable development of Kaliningrad with the average level for the Russian Federation; assess the prospects for the implementation of the concept of sustainable development in this region.

Keywords: Kaliningrad, sustainable development**,** Sustainable Cities Initiative, Fuzzy logic

Introduction

Currently, there are many points of view regarding the concept of sustainable development, which in general terms can be considered as a balanced socio-economic development of territories in the framework of environmental conservation (Denevyuk, 2012; Skhvediani and Kudryavtseva, 2018; Bell and Morse, 2012; Hassan, 2008) With proper planning and development, cities can contribute to the development of an economically, socially and environmentally sustainable society. However, inadequate planning, lack of effective governance and legal frameworks, unsustainable public institutions, low capacity of local authorities and the lack of a reliable monitoring mechanism undermine the capacity for long-term sustainable urban development, justifying the need for a global monitoring mechanism adapted to national and local conditions.

The Sustainable Cities Initiative (SCI) is a multi-year program to assist cities and national government programs to address the challenges of urban sustainability in various countries of the Europe and Central Asia (ECA) region (World Bank; UN,2019)

1. Preservation and restoration of the historical city. Preservation of historical places (including energy-efficient street lighting, adaptive reuse of built assets and reduction of water consumption due to improved construction standards and urban design, etc.).

2. Energy Efficiency and Climate Change. Cities worldwide account for more than 70% of greenhouse-gas emissions; on the other hand, cities consume 60-80% of the country's electricity. Consequently, the way in which cities are planned, financed and managed has a decisive impact on the results of sustainable development, as well as on the lives and livelihoods of urban dwellers.

3. Development of contaminated sites. Contaminated areas are abandoned or underutilized sites with real or perceived pollution problems that pose an obstacle to their development potential, posing a threat to people and the environment. On the other hand, reconstructed brown deposits can become engines of economic development and improve the quality of life of the cities in which they are located.

4. Municipal finance. Decentralization in most parts of ECA has given municipalities greater autonomy as well as more responsibilities and resources for local authorities in managing large and important infrastructure assets, which requires adequate funding for the operation, maintenance and renewal of capital.

5. Solid waste management. Municipalities can increase the economic sustainability and financial viability of solid waste management by reducing the environmental impact of waste generation. Integrated solid waste management systems encourage municipalities to collaborate at the regional level to reduce waste disposal and recycling costs, optimize collection and transportation services, and maximize resource recovery through sorting and recycling.

6. Water and waste water Urban centers in ECA are in the process of rapid modernization, which requires adequate response in the provision of urban infrastructure and services, including water and sanitation.

7. Urban transport The constant deterioration of public transport infrastructure is a major challenge in solving the problems of increasing the social accessibility of cities.

8. Social integration. In this case, the focus is on inclusive urban development: 1) marginalization of socially excluded groups and inequality; and 2) social responsibility and participation. Specific marginalized groups in ECA, such as Roma communities, often live in informal settlements with or without access to sanitation, water, electricity and other basic public services. Cities provide better services to the poor when social responsibility mechanisms linking communities, service providers, and politicians exist.

Thus, the sustainable development of cities makes them resilient, adaptable, mitigating adverse effects, and stimulating positive socio-economic and environmental changes. SD covers all aspects of the healthy development of the city and should provide a solution to financial, economic, social and environmental problems. The Sustainable Cities Initiative provides support to cities and government programs in addressing the challenges of increasing the sustainability of cities in the European and Central Asian region (UN Global Compact).

The main idea of this initiative is that the cities of the ECA region can learn a lot from their neighbors - the cities of Western Europe, which can provide practical examples of how policy changes and investments can be promoted that will enable the ECA region's cities to better prepare for the future of urban development.

The Strategy for Sustainable Urban Development as a socio-Economic System implies the achievement Of Goal 11 (Ensuring the openness, security, resilience and environmental sustainability of cities and human settlements), as set out in Agenda 2015. The United Nations has set the main Objectives for sustainable development in order to achieve them. (World Bank) It can be noted that these tasks are primarily aimed at improving the ecology of cities, accessibility and safety of housing and infrastructure. In turn, these areas affect all areas of sustainable urban development: environmental, socio-economic and infrastructural. In the face of the challenges posed by rapid urbanization, the authorities are forced to rethink and determine how urban infrastructure will be built, how public services will be provided, how citizens will be involved in urban development management, and how all these subsystems will be linked.

The implementation of the sustainable development strategy of the city Kaliningrad

The main document containing the goals of sustainable development for Kaliningrad is the Strategy for socio-economic development of the Kaliningrad region for the long term.

The Strategy was designed to create an effective system of public administration of regional development processes, dynamically developing, competitive and balanced regional economy, conditions for improving the standard and quality of life of the population.

The strategy, developed taking into account the strategic documents of the socio-economic development of the Russian Federation (Figure 1), is based on the following provisions:

1) social orientation (improving the level and quality of life of the population of the Kaliningrad region);

2) the creation of a dynamically developing, competitive and balanced economy, ensuring employment of the population mainly in sectors with high potential for sustainable growth and labor productivity;

3) cooperation providing a combination of regional, interregional and national interests in solving strategic problems of economic, social and territorial development.

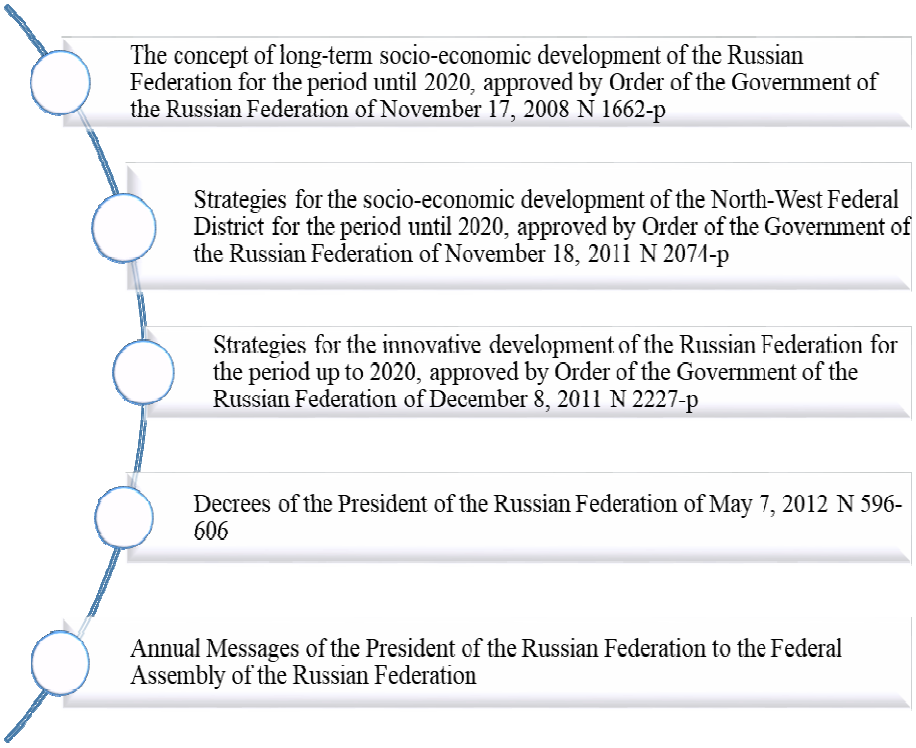

Figure 1: Documents of socio-economic development of Kaliningrad and the Kaliningrad region

Implementation of the Initiative areas of Sustainable Cities Initiative:

1. Protection and revival of historical cities and districts. To create a unified system for the implementation of cultural policy in the Kaliningrad region and conditions for the innovative development of the cultural sphere, to ensure the right of Kaliningrad Oblast residents to participate in cultural life, such targeted programs of the Kaliningrad region were developed and implemented, as follows:

- "Cultural Development of the Kaliningrad region (2007-2013)",
- the subprogram "Development of the State Institution of Culture "Kaliningrad Regional Museum of Amber" and the cultural and educational sector of the amber industry for 2007-2011",
- Regional Program "Amber industry Development" and other (The Ministry of Economics).

In order to familiarize children and youth with Russian cultural and historical values, to develop and strengthen a sense of patriotism and pride in their country in their minds, the target program "We Are Russians" has been implemented since 2007. During the program, more than 70,000 young Kaliningrad people took part in excursion and educational trips to the cities of Russia.

The main directions of urban development, providing conditions and prerequisites for the development of the construction complex of the Kaliningrad region for the period until 2020, are:

1) implementation of the territorial planning scheme of the Kaliningrad region;

2) the development and improvement of regional urban planning legislation and regulatory technical support of urban development activities;

3) the development of architecture and design (the implementation of measures to protect the cultural and architectural and construction heritage, restoration of historical, cultural and architectural monuments, the restoration of the historical part of cities and rural settlements, as well as by creating means accessible to people with disabilities and other means of architecture and urban planning people with limited mobility of the living environment);

4) the development of scientific and technological progress in the field of technology and the organization of construction production (including the development of new technologies and equipment for the disposal of dismantling products of obsolete designs of residential buildings);

5) ensuring environmental safety and applying measures to reduce the negative impact of the construction complex on the environment and the development of protection of the Baltic Sea coast, the Kaliningrad and Curonian lagoons within the Kaliningrad region.

2. Energy efficiency and climate change. The geographical situation of the Kaliningrad region (enclave and involvement in the pan-European system of environmental relations) requires an integrated approach to waste management. To date, the concept of the target program of the Kaliningrad region "Improvement of the waste management system of production and consumption in the Kaliningrad region for 2012-2016" has been implemented (Sauskan and Umansky, 2010)

The solution to the problem of creating infrastructure facilities that will increase the share of waste used as secondary resources and reduce the volumes exported to landfills will be carried out by designing and constructing landfills for household and industrial waste, waste sorting complexes, garbage transfer stations, and creating recycling centers waste intended for additional central collection of valuable components and harmful substances of various kinds from the population and the authority organizations, the systems of reception of temporary storage and disposal of various kinds of industrial wastes.

In order to work more effectively on the creation of a waste management system for production and consumption in the Kaliningrad region, it is necessary to increase the level of environmental protection of society through the development of an environmental education system, education and public education.

3. Development of contaminated sites. The presence of contaminated territories in Kaliningrad is considered as a development potential of the region, which is reflected in one of the main activities in the field of environmental safety (The Ministry of Economics):

The implementation of the target Program of the Kaliningrad Region "Ecological Improvement of the Territory of the Kaliningrad Region for 2008-2013 also contributed to the solution of the tasks set to improve the environmental situation in the Kaliningrad Region, restore, prevent degradation and preserve natural complexes.

The main objectives of the Program were:

- construction and reconstruction of thermal networks and heat supply facilities; construction and reconstruction of water intake facilities and water supply facilities;
- coastal protection of the Baltic Sea and other water basins of the Kaliningrad region;
- construction and reconstruction of sewage facilities and treatment facilities of the Kaliningrad region;
- construction of a waste sorting complex, etc.

4. Financial opportunities of municipalities. In connection with the decentralization processes, the authorities of the Kaliningrad region make decisions in the direction of forming their own regional reports on budget spending, as well as its revenues.

5. Solid waste management. With regard to the disposal of solid waste, the Kaliningrad Region Program "Improving the System of Management of Production and Consumption Wastes in the Kaliningrad Region for 2012-2016" was introduced and implemented.

To reduce waste disposal, the following objectives were set: organize separate collection of waste, which will allow to remove from them the waste fractions, reduce transportation costs, burial costs, extend the life of landfills, and to reduce anthropogenic burden on the environment (Agency for Regional Economic).

Further use of the raw materials collected during separate collection is more environmentally safe, acceptable, energy- and resource-saving production.

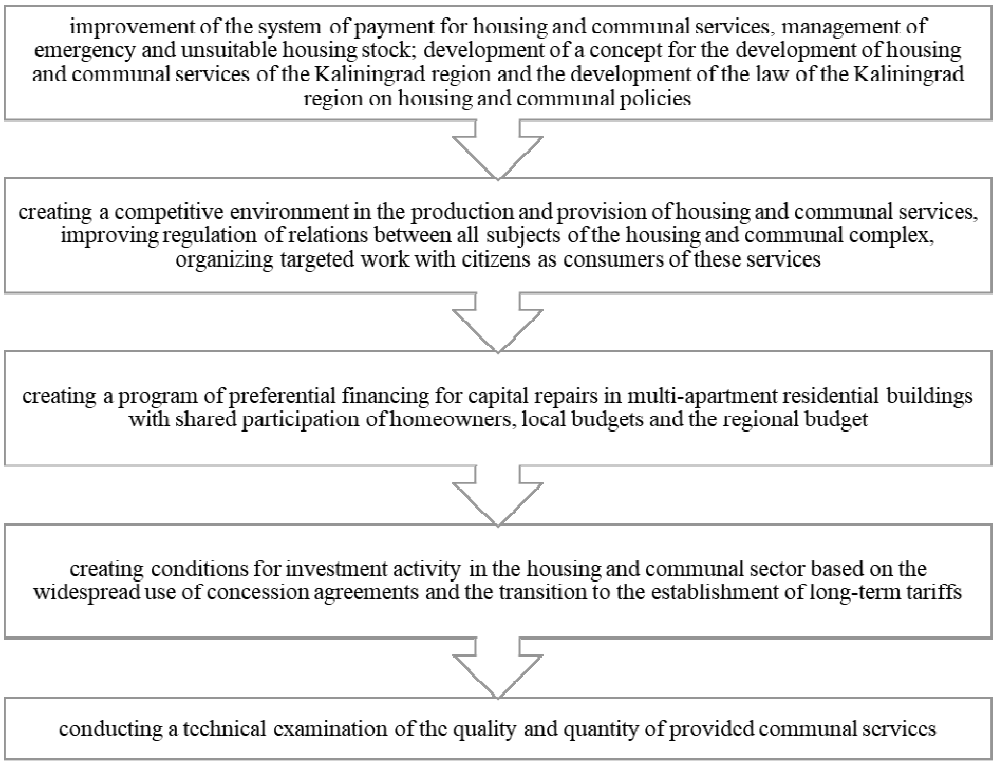

Figure 2: Directions of reforming housing and communal services (The Ministry of Economics)

6. Water supply and sewage systems. Important areas of reforming the housing and communal services of the Kaliningrad region are presented in Figure 2.

7. City transport. As measures aimed at improving urban transport, and subsequently at increasing the social accessibility of cities, only federal targeted programs are formed, for example, "Development of the transport system of Russia."

8. Social integration. The formation of social responsibility among the population of Kaliningrad in the field of sustainable development is implemented through the creation of the portal “Active Citizen. Kaliningrad region". This portal is an online platform for voting on a wide range of issues related to the life of cities and towns, including planning, arrangement and development of the urban environment.

Its purpose is to promote the involvement of citizens in the decision-making processes of state authorities and local self-government on a wide range of city and settlement issues, to facilitate the implementation by civil society institutions and citizens in the implementation of public control.

Based on the data of the process of implementation Of The Sustainable Development Initiative of the city on the example of Kaliningrad, we will form a table reflecting the implementation of the initiative of the city SD in the directions Of The Initiative (table 1)

Table 1: Implementation of the SD initiative in Kaliningrad in the areas of the SD Urban Initiative

Initiative Direction	Kaliningrad
Preservation and restoration of a historic city	+
Energy Efficiency and Climate Change	+
Development of contaminated sites	-
Municipal Finance	-
Solid waste management	+\-
Water and wastewater	+
Urban transport	-
Social integration	-

In Kaliningrad, regulatory documents were adopted containing goals in the field of socio-economic development and sustainable development in general. Regarding the instruments of economic development, special economic zones have been created in the city. Moreover, in Kaliningrad, the special economic zone has specific features and cannot be attributed to any of the four types of SEZs operating in the Russian Federation.

In Kaliningrad, all directions Of The Sustainable Development Initiative are implemented through ministerial decisions or as the goal of the Strategy for Social and Economic Development. Kaliningrad does not fully implement measures to eliminate the problem with solid waste, which is an all-Russian trend. Such areas as the development of contaminated sites, municipal finance, urban transport and social integration are very weak or not at all taken into account in achieving sustainable development.

The study presents an approach to assessing progress toward achieving the Sustainable Cities Goals in the areas Of Initiative.

Materials and Methods

Measuring progress towards achieving the SDGs is a very important tool for cities, as it allows each municipality to have a benchmark for its progress both in relation to the Sustainable Development Goals and in relation to other similar cities (in the same country or globally).

In turn, these areas affect all areas of sustainable urban development: Environmental, socio-economic and infrastructural. In order to assess the sustainability of cities as socio-economic systems, factors should be selected for all four areas.

SDSN has a developed methodology for assessing compliance with sustainable development goals in US cities and Italy (Espey, J., Dahmm, H., & Manderino, L. (2018).). In Spain, REDS has also adapted this methodology for its cities. (Mirando Hacia el Futuro: Ciudades Sostenibles)

Along with the methodology of SDSN, the World Bank and others, there are some domestic methods developed both at the level of large organizations and by individual authors. Unfortunately, all of the above methods have a complex system of calculations or a large number of indicators for which either there are no data at all or there is no data in the public domain, therefore, they cannot be called universal and apply to any country or city.

The Spanish organization REDS has experience in adapting indicators for assessing the level of sustainable urban development, and also includes assessing sustainability across all the SDGs. The REDS report methodology is based on the methodology developed by the SDSN for US cities

(REDS), which, in turn, is based on the methodology developed by the Bertelsmann Stiftung Foundation and SDSN for the Global SDG Index (Sachs et al., 2017; SDSN,2018).

The indicators used to assess the sustainable development of cities in Russia and the world vary. Moreover, in the methodologies considered there are some common features that can be adapted and used to further build the author's model for assessing the sustainability of socio-economic systems (cities).

To assess the level of sustainable development of Kaliningrad, we will use indicators characterizing three areas of sustainable development - economic, environmental, and social. Based on the values of individual indicators, it is rather difficult to draw conclusions about the current level of the city's SD, but based on the available indicators using the fuzzy logic method., it is possible to calculate an indicator that reflects the level of SD of Kaliningrad. For this purpose, we introduce the linguistic variable "Level of sustainable development", describing it as a set of proposed indicators. (Rudskaya and Rodionov, 2018; Gutman Svetlana, Rytova Elena and Kravchenko Valentina, 2018; Kichigin et al., 2018; Leksin and Profiryev, 2017).

After analyzing studies in the field of assessing the level of sustainable development of territorial socio-economic systems, a system was formed of the most frequently used and available for research qualitative and quantitative indicators in three areas of SD: social, economic and environmental (Zaborovskaya, Kudryavtseva and Zhogova, 2019; Kharlamov and Kharlamova, 2019; Shabunina, Shchelkina and Rodionov, 2017; Bogolyubov et al., 2019; Shvetsov et al., 2019; van Zeijl-Rozema, Ferraguto and Caratti, 2011) (Fig. 3).

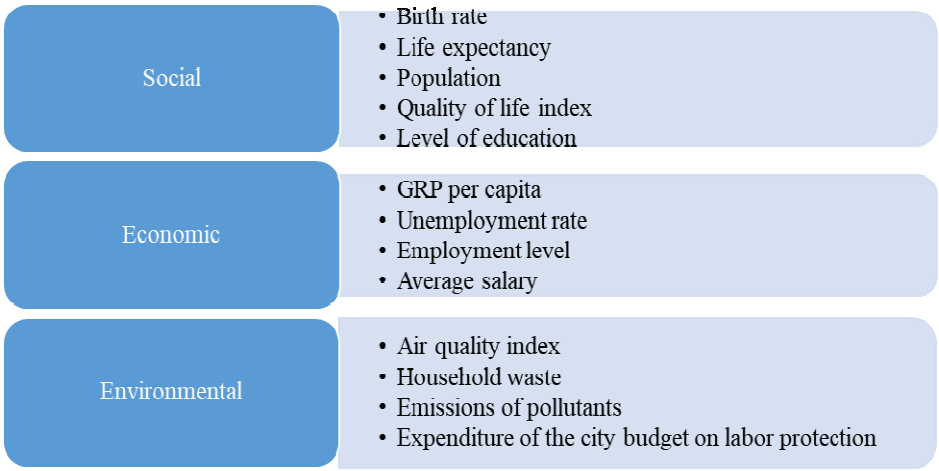

Figure 3: Social, economic and environmental indicators of sustainable development of the city

Each of the indicators has its own scope of definition. In accordance with the basic provisions of the theory of fuzzy sets, if each factor is assigned to the degree of its belonging to an odd set A, then this accessory is expressed by the number μA (x) - the function of an accessory in the interval [0;1].

Further, each value of a linguistic variable (which in its construction is an unclear subset of the values of the interval [0;1]) is compared with the function of belonging to an integral indicator to an odd subset.

Thus, the value of function Y will characterize the level of sustainable development of the city depending on a number of selected factors. This function will be called the parameter that evaluates this element. As a result, the fuzzy scale represents a comparison table between the numerical value of the assessment of sustainable development of the city and its verbal description.

Results

We build a scale of unclear values for the level of sustainable development of the city (Table 2.)

Table 2: Scale of unclear values for sustainable development

Set of values	Level of SD	Description of the level
0 – 0,333	Low	Socio-economic crisis
0,167 – 0,5	Below average	Risk zone, sustainable development of the city is characterized by a precrisis state
0,333 – 0, 667	Average	Negative trends in socio-economic development, indicates a violation of stability in some components of SD
0,5 – 0, 833	Above average	Sustainable socio-economic situation of the city
0,667 - 1	High	Sustainability in all three components of SD cities, factors contributing to the rapid reduction of SD level may appear

Next, we proceed to the selection of indicators we have proposed, factors affecting the level of sustainable development of the city Kaliningrad. We have chosen indicators such as per capita GRP and unemployment as economic factors. Social factors are the average salary and the proportion of graduates to the total population. The Air Quality Index is an environmental factor. It is also a qualitative variable for our method of research.

The air quality index is used by government agencies to inform the public how polluted air is currently or how polluted it is projected to become. Health risks increase with increasing AQI.

The more air is polluted , the higher this indicator, the greater the proportion of the population that may experience the negative effects of pollution - whether it be short-term or long-term health effects.

0-20 Low pollution. Pollution levels are below the recommended exposure limits set by the World Health Organization (WHO) for one year of exposure to pollution.

21-50 Moderate pollution. Air quality is considered acceptable, although it exceeds the WHO recommended threshold of one year. This means that if such values are not year-round, then there should be no adverse health effects.

51-100 Heavy pollution. The air is heavily polluted - World Health Organization recommendations exceeding 24 hours a day.

101+ Very high pollution. Prolonged exposure poses a real health risk. Levels exceeded the recommended WHO exposure threshold by one hour (AQI Index).

In connection with the description of SD levels, we understand that the indicators are multidirectional, therefore, when normalizing, it is necessary to change the signs of the values on such indicators as the Air Quality Index and the unemployment rate.

Table 3 presents the values of the selected indicators of Kaliningrad, as well as their normalized values for 2018.

Table 3: Indicators of sustainable development of Kaliningrad in 2018 (ROSSTAT; EMISS; Eurostat; statdata.ru)

Indicator	Kaliningrad		
	Indicator value	The average value in Russia	Normalized value
Air quality index (AQI), points	21	36	0,417
GRP per capita, rubles	421 479,2	510 253,1	-0,174
Unemployment rate, %	4,7	4,8	0,021
Average salary, rubles	32445	37100	-0,125
The proportion of the number of university graduates,%	0,54	0,85	-0,365

Based on the interval of values of a particular function of an accessory, we calculate the value that characterizes the level in the scale of subsets. Based on the interval of values of a particular function of an accessory, we calculate the value characterizing the level of SD of Kaliningrad in 2018. (table 4)

Table 4: Calculation of the level of SD of Kaliningrad for 2018

Indicator	Subset scale					Significance level
	Low	Below average	Average	Above average	High	
Air quality index (AQI), points				0,375	0,625	0,18
GRP per capita, rubles		0,261	0,739			0,26
Unemployment rate, %			0,468	0,532		0,15
Average salary, rubles		0,187	0,813			0,32
The proportion of the number of university graduates,%	0,048	0,952				0,09
Total, taking into account the weights of indicators	0,00432	0,21338	0,5225	0,1473	0,1125	1
Nodal points	0,165	0,332	0,499	0,666	0,833	
Total	0,0007	0,0708	0,2607	0,0981	0,0937	0,5241

We get the level of sustainability of Kaliningrad development equal to 0.5241. According to the table, this value corresponds to the level of SD above the average. The values of sustainable development levels for Kaliningrad on a subset scale show in what percentage the level of SD refers to a particular term set according to the classification in table 2.

In 2018, we can conclude that relative to Russia as a whole, Kaliningrad has a level of sustainable development of medium-above average, which indicates the existence of problems in some areas of SD.

Conclusion

At the end of the research, we can conclude about the level of sustainable development of Kaliningrad. Based on the study of activities within the framework of the Sustainable Development Initiative, Kaliningrad is not sufficiently implementing various kinds of projects, actions and events. So, for example, to improve the situation with contaminated territories in Kaliningrad, subsidies should be introduced for entrepreneurs introducing special equipment (technologies) a in their enterprises that contribute to reducing environmental damage. Garbage sorting in Russia is becoming increasingly popular, but the pace of the spread of the environmental movement is greatly inhibited due to the lack of competent authorities. The introduction of fines for incorrect or completely absent sorting, for scattering rubbish in public places, and rejection of plastic from large companies would significantly improve the ecological situation in the city. The urban transport project for Russia is the only project of this type in Kaliningrad. There is a significant infrastructure problem, especially in large cities. For the solution it is necessary to draw up new plans of urban arrangement with involvement of designers and urbanists for comfortable movement of citizens. The «Active Citizen» portal operates in almost every city in the country. This is not enough for the successful direction of the population's forces towards sustainable development. The Kaliningrad government should provide better support to people below the poverty line, people with disabilities and older people. Organizations can solve the problem of gender inequality by establishing a satisfactory percentage for men and women working in it. Municipal finance management should be at the same level as regional for more efficient work. You might also consider hosting a major international event in Kaliningrad. In addition to updating the "physical" infrastructure, an event of this level provides a unique opportunity to draw the attention of the world community to the city, showing its openness and willingness to perform the most difficult tasks.

Thus, the joint efforts of both the City Government and the organizations operating in the territory of Kaliningrad and its citizens will allow the city to achieve a higher level of social development.

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Analysis of The Structural Development Stage of The Retail Trade in The Russian Federation

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Abstract

The retail market mainly depends on the purchasing power of the population. The industry situation worsened significantly after the macroeconomic events of 2014, sharp ruble weakening and food embargo introduction. In 2018, real cash incomes of the population again showed a reduction, and the model of consumer behavior changed from saving to lean consumption. In addition, convenience and time saving have become one of the consumer`s priorities, which stimulates the development of e-Commerce (delivery services) and negatively affects traffic and sales in hypermarkets. On the Food Retail market, the largest development is gained by retail chains selling goods at a price close to the wholesale, namely, discounters, with federal chains having the highest rates. Thus, discounters are the most dynamically growing format. The ongoing reconstruction programs can improve the perceived quality of the service provided. Moreover, the market has a high level of retail chain consolidation. It significantly increases the threshold for entering the industry, leads to large-scale promotional activities, and, as a result, negatively affects the profitability of retailers and suppliers. In order to understand what the pace of retail market recovery is and what to expect in the future, we conducted a study of the industry. So the purpose of this study is to analyze the stage of structural development of the retail industry to justify the priority strategic decisions for individual industry participants.

Keywords: Food Retail, Russian Federation, Strategic Analysis, Industry Structure, Competition

Introduction

The retailing is one of the most important sectors of the economy, ensuring the functioning of other industries and the state as a whole. The retailing is the most dynamically developing sector of the Russian economy (Kalinushkin, 2016). The rapid development of international and federal retail chains, the creation of impressive retail complexes that own all the modern technologies for conducting and organizing business, causes the absorption or self-liquidation of uncompetitive Russian organizations by larger enterprises.

Retail is one of the youngest and most dynamic sectors of the Russian economy (Kondratieva, 2018; Ivanova & Titova, 2018). Together with transport and industry, retail is the top three in terms of tax payments to the budget. Moreover, the retail is a leader in the number of jobs - almost a third of all employed in Russia falls on it. Investments in the retail sector stimulate the growth of related industries: real estate, advertising, logistics and more (Grigorievna, Sharnopolskaja & Pogorgelskaja, 2017).

Currently, there are chains and independent trading enterprises in the Russian food retail market. The modern development of retail trade in Russia in many respects follows the path that this industry has already passed in countries with developed economies; one of the characteristic features is the

creation and widespread distribution of chains and chain products. It is the chain organization of retail trade that makes it the most important economic and social tool that directly affects the quality of life of millions of people. A chained organization managed from a single center has the ability to centralize procurement activities, develop a strategy for placing stores, and create its own brand, which creates the prerequisites for lowering costs, more convenient location of a trading company, increasing its recognition with effective positioning and strong associative ties.

The purpose of this study is to analyze the stage of structural development of the retail industry to justify the priority strategic decisions for individual industry participants.

To achieve this goal it is necessary to solve a number of problems:

1) to analyze the retail industry of the Russian Federation, to determine the stage of its life cycle;
2) identify the main strategic groups and their participants;
3) justify the most acceptable strategic decisions of individual companies in the industry, taking into account their competitive positions and the stage of the life cycle of the industry.

Materials and Methods

One of the main indicators of efficiency of retail trade in the economy is the total retail turnover. Figure 1 shows the values of the index of physical volume of retail turnover for the period 2000-2018 according to the Federal State Statistics Service (Official website of Rosstat).

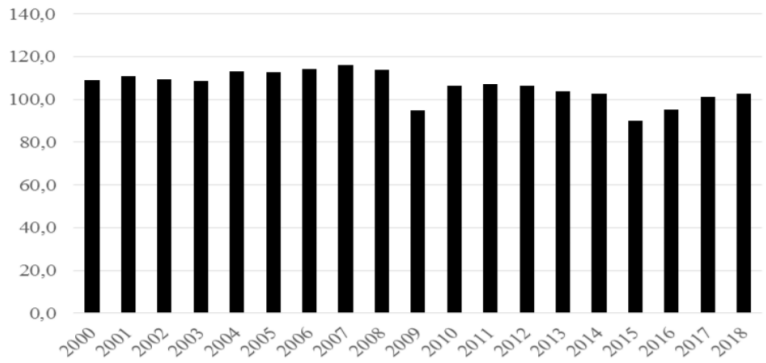

Fig. 1: Index of retail turnover, % to the previous year

For a complete analysis of the retailing of the Russian Federation, we need to consider its structure. Based on the data of the Federal State Statistics Service, a gradual reduction in the number of retail markets and individual entrepreneurs can be observed. Among large trading organizations retail chains stand out. Figure 2 shows a graph of the increase in the share of retail chains in the formation of retail turnover from 2009 to 2018 (Official website of Rosstat), respectively with the gradual crowding out of markets, fairs and individual entrepreneurs.

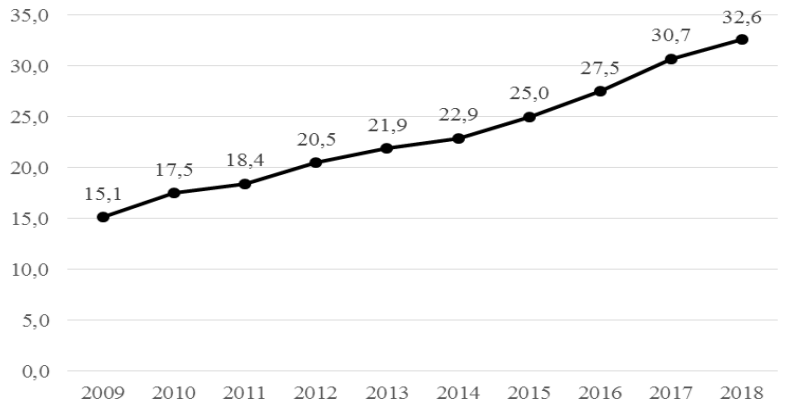

Fig. 2 : The share of retail chains in the formation of retail turnover, in percent

In 2018, there were some shifts in the ranking of the largest retailers in Russia. The rating was compiled by the INFOLine information agency (Official website Information agency «INFOLine»). The top 5 ranking of the largest retail chains in Russia by revenue to the end of 2018 is shown in table 1.

Table 1 - Rating of the largest retail chains in Russia for 2018 (Source: Official website Information agency «INFOLine»)

Position in rating	Chain	Revenue, 2018, billion rub.	Revenue, 2017, billion rub.	The growth rate of revenue to 2017, %
1	X5 Retail Group	1525	1295	17,76
2	Magnit	1237	1143,3	8,20
3	Lenta	413,5	365,2	13,23
4	Auchan Retail Russia	306,4	294,38	4,08
5	Red & white	301	215	40,00

Thus, retail trade remains a fairly stable industry. Current trends in are reducing the number of small players, strengthening the position of large retail chains (fig. 3), a gradual increase in turnover, growth in entrepreneurial confidence. In these conditions, in order to keep pace with all the trends in the market and compete with other market participants, a trading company must have sufficient financial resources. One way to solve this problem is to create an optimal capital structure that provides a balance between liquidity risk and the target return on equity and maximizes the market value of the company (Mednikov et al, 2018, Demidenko et al, 2018) .

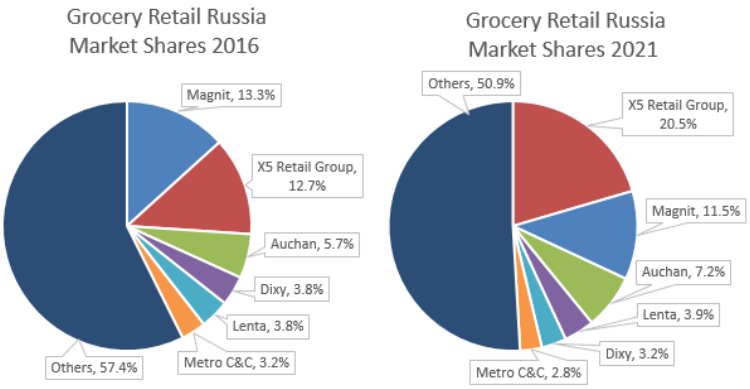

Fig. 3 – Grocery retail Russia Market

Findings and Results

A competitive analysis of the industry according to the model of 5 forces of M. Porter (Porter, 1998) showed that the most significant force influencing the level of competition in the industry is pressure from consumers (Fig. 4).

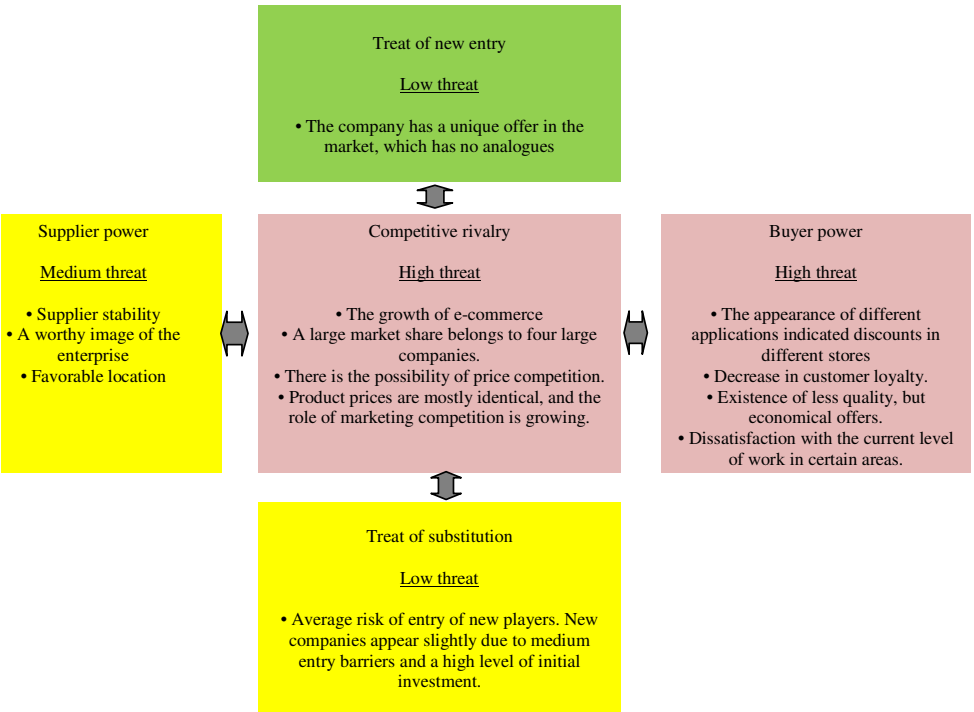

Fig. 4 - Model of five forces of M. Porter for the retailing

The determination of the stage of structural development of the industry was carried out on the basis of the theory of consolidation A.T. Kearny. This model is used by managers of organizations to solve the problem of choosing the type of acceptable strategic decisions and the time of their implementation (Dinz, Kruger & Zaizel, 2004).

The model distinguishes 4 stages of the industry life cycle (consolidation, Fig. 5). The first stage is characterized by low competition within the industry, but there is competition between industries producing substitutes. The number of participants is constantly growing, and their share is decreasing. This stage lasts up to achieving the equilibrium of supply and demand.

The second stage is growth. All organizations are divided into three groups that differ in their strategies. The first group consists of companies that have chosen a growth strategy and are actively using effectively implemented management. The second group is also companies with a growth strategy, but the activity has not been completely reformed, as a result of which they lag behind the leaders. The third group includes new market participants, small organizations that in the long run have a development trend, as well as organizations that have not begun to apply reforms, but they are aimed at a specific market segment.

The third stage is specialization. Here, the groups described above are retained, but the number of participants in the second group is reduced due to a lack of resources to counteract the merger or acquisition. Therefore, small companies have a fairly stable position compared to the second group because of their small size and, therefore, profitability.

The fourth stage is balance. This stage is characterized by a stable state. Leading companies and niche players remain on the market. Leaders occupy 80% of the industry's share, customer growth is almost ceasing, taking a market share of niche participants is contrary to antitrust laws. So, leaders practically lose their strategic perspective. Therefore, for their development, they are trying to penetrate into other industries.

In order to understand the stage of industry consolidation, it is necessary to determine the concentration coefficient at the current time and several years ago. To do this, it is necessary to know the market share of leading industry participants. Industry data are shown in table 2.

Table 2 - The share of users of retail chains in Russia

	Chain	Sales share on 2018, %	Sales share on 2016, %
1	X5 Retail Group	10,7	8
2	Magnit	7,5	7,7
3	Lenta	2,8	2,2
4	Auchan Retail Russia	2	2,6
5	Red & white	2	
	Dixy		2,3
CR3		21	18,3

The industry position is calculated by setting the CR3 concentration coefficient at the current moment and is refined by measuring CR3 in retrospect to determine the industry development vector δ.

CR3 = s1+s2+s3 (1)

Where s1, s2 и s3 – market share of the three leading market participants at a given time.

2018 г.: CR3 = 10,7 + 7,5 + 2,8 = 21,0 (2)

2016 г.: CR3 = 8,0 + 7,7 + 2,6 = 18,3 (3)

Industry Development Vector:

δ (CR3 2018 – CR3 2016) = 21,0 – 18,3 = 2,7 (4)

The consolidation rate can be calculated using the formula:

$\tau = | \delta | / n$ (5)

Where τ – consolidation rate, δ – Industry Development Vector, n – number of years.

$\tau = 2{,}7 / 2 = 1{,}35$ (6)

So, on average, the industry consolidation rate at this stage is 1.35% per year (Fig.4).

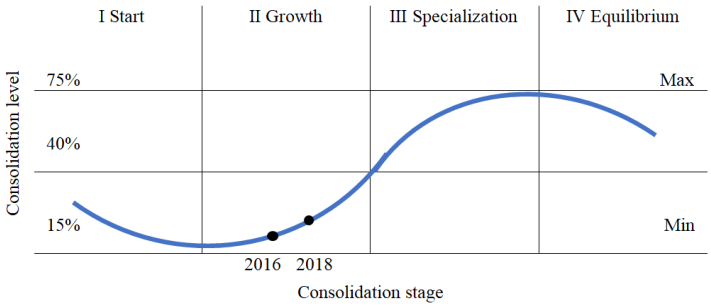

Fig. 5: Stages of consolidation of the retailing in 2016 and 2018

The retail sector of the Russian Federation is in the second stage - "growth", and approaching the third stage. The consumer market is still young, not mature enough, and not enough consolidated and balanced. It is in this uneven development of individual segments of the consumer market that lies the main causes of conflicts that regularly arise between suppliers and trade.

In the second stage, growth goals should be higher than the indus-try average: it is necessary to constantly strengthen the culture of organization, comparing it with the culture of other major players and developing a global vision (Abushova et al, 2018; Bogdanova, 2019).

. Attention should gradually switch from external expansion to internal optimization. It is necessary to adapt the organization to its further growth: improving IT systems, processes and structures in such a way as to create reference methods for knowledge management in this industry (Dubgorn et al, 2019; Lyamin et al, 2019).

The presence of a sufficiently large number of large and at the same time comparable players requires the development of a sound strategy. This is due to the fact that on the next stage with a correctly selected and implemented development strategy that will reveal the clear industry leaders [15, 16, 17, Petrov, 2005).

Strategic groups are a combination of several industry competitors that are united on the basis of long-term similarity (ADL matrix for determining the vector of company development; Assortment analysis using a matrix McKinsey – General Electric). These signs may be different depending on the industry: assortment, quality of goods and services, number of brands, use of technology, etc.

Mapping strategic groups of competitors allows you to identify mobility barriers, identify marginal groups, determine the direction of strategic changes, analyze trends and predict the reaction of players (Domnin, Makarova & Martynenko, 2019; Ilin et al, 2019).

The procedure for graphical strategic analysis of competitors consisted of building maps of strategic groups of competitors (Aaker, 2002), which are a two-dimensional matrix of selected pairs of barriers of strategic grouping, and included:

1. Identification of the competitive characteristics of barriers to strategic grouping of competitors in food retail.

2. Classification of retail enterprises in accordance with the selected competitive characteristics.
3. The union of retail enterprises with similar values of competitive characteristics in strategic groups.

The construction of strategic maps was carried out taking into account the following requirements (Markides & Geroski, 2006):

- The variables used to build the maps should reflect the significant differences between competitors;
- The variables of strategic maps must be separate in nature;
- The variables must not correlate with each other.

Based on the results of processing the survey data, competing cost-effective characteristics of the barriers of strategic grouping of food retail enterprises were determined (Table 3).

Table 3: Barriers of strategic grouping of competitors

Name of the barrier to strategic grouping of competitors	Description of the barrier to strategic grouping of competitors
Product price	Low prices Average prices High prices
The breadth and complexity of the range	Everyday demand (simple) Complex rational Elite (mixed)
Chain affiliation	Chain Non-chain
Level of specialization	Universal Specialized Highly specialized
Additional services	Availability Lack of
Retail Enterprise Size	Microenterprise Small business Medium-sized enterprise Large enterprise
Service form	Self catering Through the counter Advisory

Figure 6 shows a map of the strategic groups of food retail enterprises in relation to the barriers “product price - breadth and complexity of the assortment”.

The classification results of retail enterprises with distinguished competitive characteristics made it possible to unite enterprises into strategic groups and determine their share (Tompson & Strickland, 2003). Figure 6 illustrates the concentration of enterprises in eight squares.

The first group (the square “medium and high prices - everyday demand”) represents enterprises selling food products of daily consumption (bakery products, dairy products, sausages, drinks, etc.). The share of these enterprises is 54% of the sample.

The second group is in the square of the complex assortment and average price, which indicates that the enterprises of this group trade in one or two commodity groups of food products. The assortment of such stores is complex, and the goods are offered to customers at average market prices. These enterprises account for 5% of the market.

The third, clearly traceable, group makes up 5% of the total number of the sample and represents discount stores, as it is located in the square "low price - daily demand". This group of trading enterprises offers goods of a certain category to low-income customers.

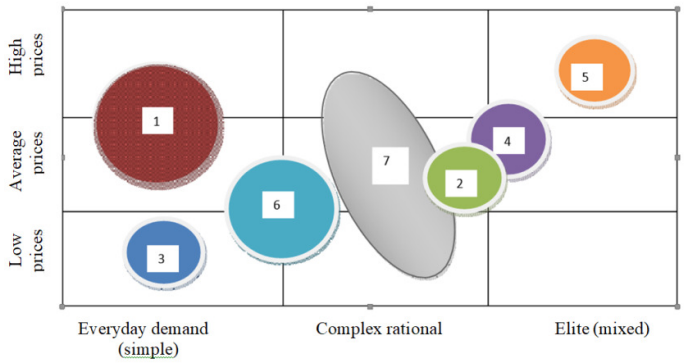

Fig. 6 - Map of food retail enterprises with barriers "price - assortment"

The fourth group is the trading enterprises of food producers operating in the middle market segment. It is one of the small segment, it accounts for 10% of the market.

The fifth group is represented by trade enterprises located in the square "high price - an elite assortment". In the assortment of stores in this group there are premium quality products. Such stores offer a large number of additional services and use modern electronic technologies in customer service. The group is small and makes up 3% of the market.

The sixth group of retail enterprises is located in the "low and medium prices - every day and complex range" zone, offering a wide range of food products, as well as related non-food products. Prices in these trade enterprises are higher than in chain stores. The group is small and makes up 3% of the market.

The seventh group is the trading enterprises united in chains. These enterprises occupy the sector of "low, medium, high prices - a complex (rational) assortment". This group has all the products that can be purchased in the premium class. The share of the total number of sample constitutes 20% of the market.

According to the results of research, strategic segmentation of food and beverage retailers was carried out. The analysis revealed typical strategic groups of competitors:

1. Convenient shops
2. Mono-shops (highly specialized).
3. Discount stores.
4. Branded stores of food and beverage manufacturers.
5. Shops with VIP products.
6. Supermarkets.
7. Trading chains.

The features of the 7th group include:

- convenient location;
- coverage of all areas of the city;
- coverage of a large number of buyers;
- a wide range of food products;
- self-service and trade "through the counter";
- providing discount cards to regular customers.

Trading enterprises of the 7th strategic group have a stable financial position, a high level of logistics, the ability to dictate terms to suppliers.

The disadvantages are:

- the availability of goods of different quality levels;
- products of unknown manufacturers;
- the absence of certain product groups due to the lack of systematic supply of goods.

This group includes the TOP-5 retail chains in the retail(Fig. 7): “X5 Retail Group”, “Magnit”, “Lenta”, “Auchan Retail Russia”, “Red & White”, “O`key "," Dixy "," Pyaterochka and others. (PricewaterhouseCoopers Advisor, 2018; The development strategy of the chain "Magnet").

Activities and projects in the food retail sector

Buying or selling	• X5 Retail Group, Lenta and Azbuka Vkusa has acquired Sedmoy Kontinent's rental rights to retail premises. • Lenta has reached an agreement with the Holiday Group to purchase 22 supermarkets in Siberia. • X5 Retail Group is selling Perekrestok Express and acquiring the O'Key supermarket chain.
E-commerce	• Auchan has started selling products online in Russia.
Innovative technologies	• Perekrestok has launched a new system that identifies customers on their stores' Wi-Fi networks and provides them with personalised offers. • The Pyaterochka supermarket chain has begun using a bot to recruit prospective employees. • Auchan has opened an innovative flagship store in the centre of Moscow with electronic price labels and digital information panels. • X5 Retail Group is developing self-service technology and testing a mobile app that scans and pays for goods automatically.
New opportunities for business development	• O'Key plans to optimize the retail space of hypermarkets (decrease store size from 1,100 – 12,000 sq m to 3,000 – 7,500 sq m) and to reduce a number of retail formats (from 51 to 6). • Magnit has started to test wholesale stores. • Dixy and Megapolis have launched the wholesale distribution of fast-moving consumer goods to small retailers. • Lenta has launched wholesale trade for small businesses.
Strategic partnerships	• O'Key is providing space in their hypermarkets for the fashion retailer Familia. Their partnership includes marketing campaigns and sales promotions. • X5 Retail Group and Danone are planning to sell unique dairy products in X5 Retail Group stores.

Sources: Open sources; PwC analysis.

Fig 7. Activities and projects in the food retail sector (Source: PwC analysis, *PricewaterhouseCoopers Advisor*)

Conclusion

Thus, the retail industry is at the 2nd stage of its life cycle: the industry concentration indicator corresponds to the “growth” stage; according to the “price - assortment” criteria 7 strategic groups are identified that can be identified by A.T. Kearny's model as three significant strategic groups: “leaders” (group 7), “second tier” (individual players from group 7 with a relatively low market share, as well as strategic groups 2, 4 and 6) and “niche players” (strategic groups 1, 3, 5).

To develop the company competitiveness at this stage of development, it is necessary to focus on a number of the most significant strategic decisions.

For a group of leaders at the corporate strategy level, it is necessary to implement of a diversification strategy on a territorial basis both through the creation of their own business units and through the sale of franchises.

The priority areas for development for the group of leaders include (Konnikov, Konnikova et al, 2018; Konnikov, Yuldasheva et al, 2018)

- further expansion of the chain of stores due to an increase in the density of coverage of key markets of presence, as well as organic development in the least developed regions of Russia;
- maintaining focus on chain efficiency;
- retaining existing customers and attracting new ones, improving the overall brand image, including through redesign of stores;
- creation of a unique value proposition for customers in each format;
- organization and development of new sales channels;
- building effective marketing that meets consumer expectations;
- development of digital channels of communication with customers (Zaitseva et al, 2017).

At the same time, it makes sense for companies belonging to the “second tier” group to preserve their business through the implementation of various forms of strategic intercompany interactions up to mergers and associations.

In order to further strengthen the competitive position of “niche players” in the retail industry, it is necessary:

- Adhere to the strategy of strengthening the uniqueness of the product and concentrate on such a target market for which unique characteristics are important (adhere to a leadership strategy in a specific market niche).
- The company should focus its main efforts on building a high level of product knowledge and on building awareness of the unique features of the product.
- To maintain competitiveness, it is necessary to constantly monitor the proposals of competitors and the emergence of new players.
- Reduce the impact of price competition on the company's sales.
- Concentrate campaign activity on building long-term relationships with the buyer, apply special programs for VIP-clients and economy programs for price-sensitive consumers.

Acknowledgment

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Economic Factors and Personal Income Tax Compliance in Nigeria: A Generalised Ordered Logistic Regression

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Abstract

This paper builds on already existing theoretical and empirical research on the economic factors used in explaining tax compliance. The likelihood that personal income taxpayers in Nigeria will be tax non-compliant, low tax compliant or tax compliant for economic factors are evaluated using the Generalised ordered logistic regression. The findings in this paper provide extra information on the mixed results that have been obtained by empirical research on the subject matter of tax compliance by revealing how economic factors have different likelihood values for individuals to fall into the tax compliant category. This paper recommends that a proper analysis of the peculiar traits of the Nigerian tax system be conducted before decisions are made on the combination of economic factors to be employed to move personal income taxpayers to the tax compliant category.

Keywords: Tax compliance, Personal income tax, Generalised ordered logistic regression, Economic factors

Introduction

Since the global financial and economic crises of 2007/2008, strengthening tax compliance has over time become a core development objective in improving tax revenue generation and in aiding a better Domestic Revenue Mobilisation (DRM), in both advanced and developing countries (International Monetary Fund-IMF, 2015; Keen, Toro, Baer, Perry, Norregaard, Ueda, Rojas, Brondolo, Cleary, Hutton, Luca, Thackray, Wingender, Kapoor, Narasimhan, Ruzvidzo, Venon and Prado, 2015). In developing countries, Nigeria inclusive, the achievement of the Sustainable Development Goals (SDGs) in 2030 requires tax revenue to Gross Domestic Products (GDP) ratio to grow by at least 5 percent annually and be at least 15-20 percent to effectively finance health, education, power, transportation, and sanitation; which are key targets of the SDGs (Matthew, Miebaka-Ogan, Popoola, Olawande, Osabuohien, Urhie, Adediran and Ogunbiyi, 2019; Gasper, Amaglobeli, Escribaro, Prady and Soto, 2019; Gupta and Plant, 2019; Prichard, Lustig, Gupta, Krafchik, Gary and Coulibaly, 2019; World Bank, 2015; United Nations, 2017). However, among Sub- Saharan African (SSA) countries, Nigeria has one of the lowest tax revenue to GDP ratio of about 6.5 percent (Okorie, Osabuohien and Oaikhenan, 2020; Umar, Derashid, Ibrahim and Bidin, 2019; IMF fiscal monitor, 2018).

In Nigeria, the issue of tax non-compliance is present in both the formal and informal sectors, among the wealthy and the poor, among corporate bodies as well as Entrepreneurs. Income taxes are paid mainly by persons who are formally employed, and large corporations (Kangave, Nakato, Waiswa, Nalukwago and Zzimbe, 2018). Out of the 200 million Nigerians and the 65 million economically active persons; all the states and the Federal Capital Territory inclusive, only about 10 percent pay taxes (Oyedele and Erikume, 2019). There are also about 130,000 high net worth individuals and companies in Nigeria; however, taxing these individuals has been very challenging (Andersen tax, 2018). In a survey carried out by the Nigerian Economic Summit Group (NESG) in 2018, out of the

16,228 households that were interviewed, 13,066, that is about 81 percent of the respondents did not pay income taxes in the previous year. While for the few that paid, more than 70 percent paid for one month, out of 12 months (International Centre for Tax and Development-ICTD, 2019).

Empirical and theoretical efforts have identified the determinants of tax compliance as either belonging to the economic school of thought or the psychological school of thought. The economic factors are tax rates, tax penalties, and the probability of being detected for tax non-compliance (Oladele, Aribaba, Ahmodu and Yusuff, 2019; Alkahtib, Abdul-jabbar and Marimutu, 2018; Alm, Jackson and Mckee, 1992; Allingham and Sandmo, 1972). While the psychological factors include taxpayers' perception of the government, tax morale, age, sex, tax education and knowledge, personal values and beliefs, social norms, peer effects, trust in the government, provision of public goods as well as eliciting taxpayers' preferences (Umar et al., 2019; Da silva, Gurrereio and Flores, 2019; Alasfour, 2019; Bird and Nozemack 2018; Adeleye, Osabuhoien, Bowale, Matthew and Oduntan, 2018; Gobena and Dijke, 2017). According to the study on tax compliance carried out by Feld and Frey (2007), these factors need to be properly combined and utilised on a country-specific basis to bring about an improved tax compliance rate.

The search for a sustainable solution to tax non-compliance has remained a paramount agenda for the Nigerian government and the tax authorities. To improve personal income tax compliance rate in Nigeria, the Nigerian government, as well as the tax authorities, have employed some economic factors like reduction or increase in tax rates, carrying out tax audits to detect non-compliant persons, as well as meting out penalties to tax offenders (Oladele et al., 2019). Also, Psychological factors like a reduction of tax burdens, provision of tax incentives, tax amnesties, as well as rewards for compliant citizens have been implemented (Oladele et al., 2019). Although the number of taxable adults in Nigeria increased from about 10 million to about 20 million people in 2018, tax compliance rate is still less than 20 percent, and comprises 4 percent of people whose taxes are not deducted at source and 96 percent of persons whose taxes are deducted at source (Osibanjo, 2018; Pricewaterhousecoopers-PWC, 2017).

Some of the recent empirical research on economic factors for tax compliance in developing countries and Nigeria have found significant positive or negative relationships (Oladele, Aribaba, Ahmodu and Yusuff, 2019; Olaoye and Ekundayo, 2019; Umar, Derashid, and Popoola, 2018; Alkahtib, Abdul-Jabbar and Marimutu, 2018; Modugu and Anyaduba, 2014). However, these studies just made conclusions about the extent to which these factors explain tax compliance, with no breakdown of the extent to which these factors move tax non-compliant citizens to become tax compliant. Perhaps, the findings from these empirical researches on tax compliance have not provided full details on how economic factors explain tax compliance in Nigeria and as such, the focus has been on less likely factors or less likely combination of factors.

In trying to understand why personal income tax compliance has been low in Nigeria, this paper employs the Generalised ordered logistic regression to evaluate the likelihood of Nigerians to be either tax non-compliant, low tax compliant or tax compliant when economic factors are put in place. In evaluating tax compliance, this methodology allows for the relaxation of the assumption of equal odds for falling into either tax non-compliant, low tax compliant or tax compliant categories as the explanatory variables increases. Best to the knowledge and review of literature by the researchers, only a few studies have used this methodology in explaining tax compliance in developing countries, with no study conducted for Nigeria (Radulovic, 2019; Ozdemir, Celik and Kara, 2019). This paper also contributes to the existing literature by ascertaining the economic factor with the most impact on personal income tax compliance in Nigeria based on the findings from the Generalised ordered logistic regression analysis.

Insights from Extant Studies

Tax compliance is deciding to pay taxes for the benefit of society and at the expense of personal benefits (Djike, Gobena and Verboon, 2019). It is the will of the taxpayer to act according to the spirit and letter of tax rules and regulations and tax administration without the use of coercion (Newman, Mwandambira, Charity and Ongayi, 2018).

Theoretical Review

Economic Deterrence Theory

This theory was propagated by Allingham and Sandmo (1972) and it explains tax compliance with respect to tax rates, the probability of being detected for evasion, and the penalties and threats of punishments (Ali, Fjelstad and Sjursen, 2013). The theory is based on tackling tax compliance challenges as this challenge is commonplace in almost all countries (Ortega and Sanguinetti, 2013; Alm, 2013). This theory tries to make predictions on compliance with tax laws based on the taxpayers' abilities. Those with the capacity to pay taxes, but fail to do so, incur some consequences under the deterrence theory (Ortega and Sanguinetti, 2013; Chigbu, Eze and Ebimobowei, 2012; Bird and Zolt, 2003). According to John and John (2015) at the core of the deterrence theory, unlawful behaviours can be curtailed by ensuring that repercussions in the form of punishments are in place. The three principles of this theory are certainty; which represents a surety, severity; which represents the weight of punishment, and celerity; which means how fast these punishments would be given to defaulters.

Bringing the theory down to economics and taxation, this is what influences tax authorities to establish tax auditing, tax penalties and other structures for defaulters (Oladele, Aribaba, Ahmodu and Yusuff, 2019). Economic deterrence theory to taxation however only gives one aspect of tax compliance. (Tyler, 2006; Feld and Frey, 2003). This is because when tax rates are imposed, the citizens measure the benefits of evading, they check for the probability of being detected by the auditors and the strength of the penalties and punishments for tax non-compliance.

Theory of Planned Behavior

In the field of psychology, according to Anwar (1995), the theory that explains the relationship between beliefs and behaviours is known as the Theory of Planned Behaviour (TPB). It explains the depth of human behaviour and asserts that attitudes, subjective norms, and perceived behavioural controls are the factors that shape human behaviour (Ameyaw, Abruquah and Ashalley, 2016). This theory is an extension of the Theory of Reasoned Action (TRA) which was specifically based on human voluntary behaviour and behavioural control. TPB explains human behaviour as being deliberate and calculated and that whether or not a behaviour will be performed is best predicted by the intention of coming out with a planned behaviour (Ajzen, 1991).

Empirical and Methodological Review

Studies on economic factors and tax compliance

Akhatib, Abdul-Jabbar and Marimutu (2018) examined deterrence factors in relation to income tax evasion in lieu of small businesses in Palestine. Using partial least square regression analysis, the factors tax penalty and the probability of being detected for tax evasion were statistically significant in explaining tax compliance but were negatively related to tax compliance. On the other hand, Olaleye and Ekundayo (2019) studied the effects of tax audit on tax compliance in Nigeria, using Ekiti as a case study. The result of the Multinomial logistic regression analysis revealed that tax audit was not statistically significant in explaining tax compliance in Nigeria. It was therefore concluded that the effect of tax audit on tax compliance in Nigeria is not concrete.

Using the Taro Yamane formula and judgment sampling technique Oladele, Aribaba, Olamide Ahmodu, Yusuff, and Alade, (2019) assessed the effectiveness of tax enforcement tools for improving tax compliance and overall tax income in the Ondo State, Nigeria. From the Ordinary Least Square regression analysis, tax audit and tax penalty indicated a positive and significant relationship with tax compliance in Ondo State, however, no meaningful association exists between tax amnesty and tax compliance based on the finding of this study. While, Umar, Derashid and

Popoola (2019) asserted that tax audits in developing countries must be done as a three-dimensional process consisting of audit probability, detection and sanction rather than a holistic audit probability. The study argued that these three aspects are distinct and must all work together to ensure an effective audit before the audit process can serve as a deterrent. They also proposed that practitioners should measure tax audit effectiveness based on the three dimensions as put forward in the study.

Methodology

Theoretical Framework

This study adapts the economic deterrence theory by Alingham and Sandmo (1972). Economic deterrence explains tax compliance with respect to tax rates, probability of being detected for evasion, and the penalties and threats of punishments (Ali, Fjelstad and Sjursen, 2013). The three principles of this theory are certainty; which represents a surety, severity; which represents the weight of punishment, and celerity; which means how fast these punishments would be given to defaulters.

The conceptual framework for this study is obtained through the modification of the recommended framework in the tax compliance studies carried out by Oladele, Aribaba, Ahmodu and Yusuff (2019). They explained tax compliance in Ondo state, Nigeria as being determined by the interactions between tax audits and tax penalties. The conceptual framework of this study is such that personal income tax compliance in Nigeria would be explained by:

i. **Tax rates:** It is the rate at which individuals or businesses are taxed.
ii. **Tax penalty:** It refers to punishments for violations of tax laws.
iii. **Probability of no detection for tax non-compliance:** This is likelihood of not getting caught for the violation of tax laws and regulations.

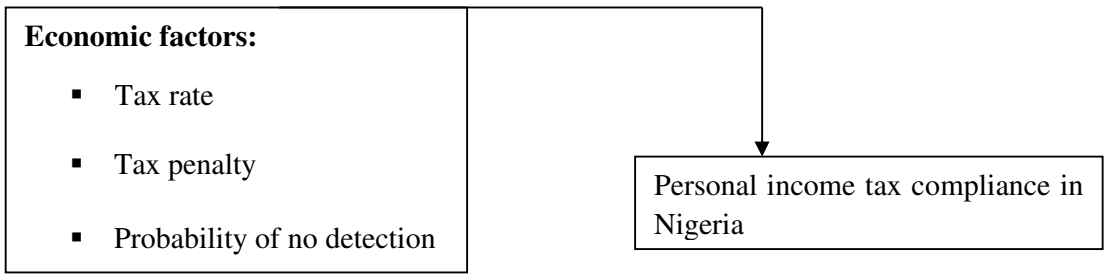

Source: Authors' computation

Figure 1.1: Schematic framework for personal income tax compliance in Nigeria

The schematic framework in figure 3.1 depicts the path flow from economic factors to personal income tax compliance and from economic factors to personal income tax compliance in Nigeria.

Method of Analysis

Model Specification

To achieve the research objectives of this study, the model for this research is specified in line with the adapted conceptual framework presented in Section 3.2.
To assess the likelihood of being either tax non-compliant, low tax compliant or tax compliant in Nigeria when economic factors are utilised, the implicit form of the model is thus:

$$TC = f\ (TP_i, PD_i, TR_i) \ldots\ldots\ldots\

TC: Tax compliance

TP_i: Tax penalty

PD_i: Probability of detection

TR_i: Tax penalty

When equation (1) is rewritten in its linear form, it becomes:

$$Y_i = \alpha_0 + \alpha_1 TP_i + \alpha_2 PD_i + \alpha_3 TR_i + \varepsilon_i \quad \ldots\ldots(2)$$

Where:

Y_i: Tax compliance
α_1, α_2 $and \alpha_3$ are slope coefficients
All explanatory variables are as previously defined

A Priori Expectations

Variable	Expected signs
Tax rate	+/-
Tax penalty	+
Probability of detection	+

Source: Authors' computation

Data Description

This research utilised the 2018 Nigerian Economic Summit Group (NESG) quantitative survey dataset on households' attitudes and perceptions towards tax compliance in Nigeria. The survey was created to be very representative at the national level, geopolitical zones, urban/rural areas, and gender. It included a sample total of 16228 respondents. The basic methodology for data collection was in-home and face to face personal interviews using clustered, stratified, and multistage random selection method to achieve a representative sample. The respondents' selection process was based on a random selection of sampling start points, a random selection of households, and stratified random selection of eligible respondents. Households were sampled from all states (proportionate to their populations), there was a 50:50 gender balance, and respondents from urban areas made up 70 percent while those from rural areas made up 30 percent. To further make the dataset robust, extensive qualitative research was also conducted including FGDs and In-Depth Interviews (IDIs) with tax officials in selected states. The survey excluded non-Nigerian citizens, people aged less than 18 years, and people living in institutionalised settings. This study therefore selected indicators from this household survey data, relating to each research objective. For this study however, all the 16228 respondents in the NESG household survey data were utilised to ensure that this study remains representative of the perception of directly assessed personal income taxpayers in Nigeria.

Data Availability Statement

The data that support the findings of this study are openly available in [International Center for Tax and Development] at [https://www.ictd.ac/dataset/nesg-nigeria-tax-subsidy-perception-dataset/].

Estimation Technique

The review of the literature revealed different methodologies used in explaining the determinants of tax compliance. These techniques include descriptive and logistic regression analysis, ordered logistic regression, probit regression, fixed-effect analysis, as well as weighted least squares. In this study, however, the evaluation of the likelihood of Nigerians to be either tax non-compliant, low tax compliant or tax compliant when economic factors, psychological factors and a combination of both factors are employed is conducted using the Generalised ordered logistic regression. This technique is appropriate for this study because of the ranked ordinal nature of the dependent variable employed as well as the relaxation of the assumption of proportional odds between the different tax compliance categories.

This technique has greater advantages over the other types because most times, in reality, the proportional odds assumption is violated that one or more of the regression coefficients may differ across the categories of the dependent variable (Williams, 2006). It is a simpler method and does not need to estimate several parameters like other non-ordinal estimation techniques that relax the proportional odds assumption. The generalised ordered logistic regression model for this study was estimated using the gologit2 command, which is a Stata user-written command. It was created in line with the gologit command created by Vincent Fu in 1998. However, gologit2 has more strength as it can also be used to estimate logistic regression, partial proportional odds models as well as proportional odds models.

The Generalised Ordered Logistic regression model for this study is specified according to Fullerton and Xu (2016). It can thus be written as:

$$P_r(y = z|X) = \begin{Bmatrix} F(\omega_1 - X\alpha_1) \\ F(\omega_z - X\alpha_z) - F(\omega_{z-1} - X\alpha_{z-1}) \\ 1 - F(\omega_{z-1} - X\alpha_{z-1}) \end{Bmatrix} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (11)$$

Given that $z = 1$,

$1 < z \leq Z - 1$,

$z = Z$

Where F is the logistic Cumulative Density Function (CDF);

α is a vector of logit coefficients that varies freely across logit equation;

X is a vector of independent variables;

ω is a cut-off point;

z is the logit

Criteria for Interpretation of Results

The criteria for the interpretation of the generalised ordered logistic regression results are as follows:

i. The generalised ordered logistic regression presents its results in two sets, namely: reporting coefficients, and reporting odds ratio. The coefficients represent the log odds and it is the signs of these log-odds that are interpreted and not the magnitude. The odds ratio, on the other hand, refers to the comparison between people in a group that is greater than T against people that are less or equal to T (where T represents the levels of the dependent variable). It thus depicts the odds of a situation occurring against the non-occurrence by dividing the probability of the occurrence by the probability of the non-occurrence (Williams, 2006).

ii. For a model whose dependent variable has three response categories (1, 2, and 3), the first panel of coefficients is interpreted like a binary logistic regression in which the dependent variable is recoded as 1 versus 2+3. While the second panel is interpreted like a binary logistic regression in which the dependent variable is recoded as 1+2 versus 3. A positive coefficient, therefore, means that a greater value on the explanatory variables makes greater values of the dependent variable more likely.

iii. Predicted probabilities are used to forecast the likelihood values of an outcome variable as it moves from one point of its category response to another. It can also be used to forecast probabilities of specific points in the dependent variable, based on specific points in the independent variable.

Results and Discussions

Results

Table 4.1: Generalised ordered logistic regression

Variables	Coefficient	Odds ratio	P-value
1. Not wrong at all:			
Tax rate	0.069	1.071	0.065
Tax penalty	0.948	2.580	0.000
Probability of detection	-0.163	0.849	0.000
2. Wrong and understandable:			
Tax rate	0.176	1.191	0.000
Tax penalty	1.044	2.839	0.000
Probability of detection	-0.191	0.826	0.000
LR Chi-square	2054.82		
P-value of chi-square	0.0000		
Pseudo R-Square	0.1044		

Source: Authors' computation

The null hypothesis states that there is no significant relationship between being either tax non-compliant, low tax compliant or tax compliant and economic factors in Nigeria. The first panel of Table 4.1 reveals a non-statistically significant and positive relationship between tax rates and moving an individual from being tax non-compliant to becoming low tax compliant or tax compliant. In the second panel also, tax rate is statistically significant and positive when explaining the shift in an individual from being tax non-compliant or low tax compliant to becoming tax compliant. The odds ratio when tax rate is employed as a tax compliance determinant shows that the odds of a person becoming tax compliant increases when tax non-compliant and low tax compliant individuals are being pushed to a higher category. Tax penalty as well reveals the same result as tax rates. The difference, however, is the value of the odds ratio for tax compliance; with tax penalty having higher odds.

For the probability of no detection for tax non-compliance, the statistically significant and negative regression coefficient in the first panel and second panel shows that an individual will not move to a higher category of tax compliance when there is no probability of being detected. The odds ratio also depicts a continuous reduction in the odds for tax compliance when there is no detection of tax non-compliance.

The explanatory variables were tested for multicollinearity and the correlation matrix in section 2 of the appendices revealed that there is no presence of a strong positive correlation between the explanatory variables. Also, the P-value of the LR chi-square of 0.0000 shows that all the variables combined in this model are relevant and statistically significant in explaining tax compliance.

Table 4.2: Predicted probabilities

TC level	High TR	Low TR	Small TP	Big TP	Low PD	High PD
Non-compliant	45%	9%	22%	4%	24%	18%
Low compliant	50%	62%	65%	45%	64%	66%
Compliant	5%	28%	13%	50%	12%	16%

Source: Author's computation (2020)

The specific points of the explanatory variables in each column used to predict the different categories of tax compliance are defined as high tax rates, low tax rates, small tax penalty, and big tax penalty, high probability of not being detected and low probability of not being detected, respectively. The first column named TC level represents the different tax compliance levels.

From Table 4.2, it can be observed that when tax rates are high or low, the likelihood of falling into the low tax compliance level has the highest percentage. However, low tax rates see an increase in the likelihood of falling into the compliant category of about 23 percent; from the 5 percent of high tax rates. While the likelihood of falling into the tax non-compliant category decreases by about 36 percent when tax rates are lower.

In addition, the likelihood of falling into the low tax compliant category has the highest percentage for both small and big tax penalties. There is however a decrease in the likelihood to be tax non-compliant when tax penalties are considered as big. Also, big tax penalties increase the likelihood of being tax compliant by 37 percent from 13 percent when small penalties are employed.

Furthermore, low tax compliance category has the most likelihood when the probability of not being detected for tax non-compliance is low and high. For the non-compliant category, the likelihood of being in this category reduces when the probability of not being detected is low. The same can also be said for the tax compliant category which reveals a 4 percent increase in the likelihood of being tax compliant when there is a low probability of not being detected.

In Table 4.1, the likelihood of directly falling into the tax compliant category without any other option for increases in the explanatory variables is presented in the second panel. From the second panel, the factor with the highest odds ratio for tax compliance and which is positive and statistically significant is the tax penalty. The predicted probability results in Table 4.2 further buttressed the impact level of tax penalty on tax compliance. Howbeit, it is large tax penalties that have the most impact of about 50 percent, personal income tax compliance in Nigeria.

Discussions

This study found that tax rates, tax penalties, and the probability of not being detected are relevant in the model of the personal income tax compliance in Nigeria. Tax rates and tax penalties were found to positively explain the likelihood of a Nigerian being either tax non-compliant, low tax compliant, and tax compliant. While the probability of not being detected for tax non-compliance negatively

relates to the likelihood of being in a higher tax compliance category. These findings negate the conclusions made by Alkhatib, Abdul-Jabbar and Marimuthu (2018) in their empirical research which posit that tax rates and tax penalties play no role in tax compliance among non-members of the formal economy. Meanwhile, these outcomes corroborate the postulations of Olamide, Ahmodu, Yusuf and Alade (2019) which found positive relationships between tax compliance in Nigeria and tax rates, tax penalties, and tax audits. Also, the findings of this study support the postulations of the empirical research of Ozdemir, Celik and Kara (2019) which also employed the generalised ordered logistic regression and found significant a negative relationship between the probabilities of not being detected for tax non-compliance in Turkey.

Perhaps, the mixed result from the existing literature is because the actual effects of economic factors on tax compliance have not been revealed. The findings of this research disclose two points which a tax non-compliant Nigerian can be. The first point is where he/she has a choice to be either low tax compliant or tax compliant. The second point is to be tax compliant. As far as tax rates are in Nigeria are concerned, the finding from the results presented in Table 4.1 depicts that there are greater odds of being in point two, that is, being tax compliant. Table 4.2 however provided a detailed explanation of this outcome. It is shown that high tax rates bring about a lower likelihood of 5 percent for being in the tax compliant category, while low tax rates bring about a higher likelihood of 28 percent for being in the tax compliant category. More so, a large tax penalty will bring about a 50 percent higher likelihood of being in the tax compliant category, while a smaller tax penalty will bring about a 13 percent lower likelihood of being in the tax compliant category. Meanwhile, a low probability of not being detected for tax non-compliance brings about a higher likelihood of 16 percent to be in the tax compliant category, while a high probability of being detected culminates into a 12 percent lower probability of being in the tax compliant category.

The discussions above provide more explanation on the effects of economic factors on personal income tax compliance and empirical research keeps presenting mixed results of either positive, negative, or no relationship at all. The outcome of this study also showed that a slight increase in either of the economic factors has the most likelihood of putting a Nigerian in the low tax compliant level. Existing literature has also revealed that the directly assessed personal tax system in Nigeria is made up of more tax non-compliant persons than low tax compliant persons. It is therefore not too far from reality that a slight increase in economic factors will only move most Nigerians to the low tax compliant level than any other tax compliance categories. Therefore, depending on the extent to which the factors are employed, there is a higher likelihood of about 45-66 percent that most personal income taxpayers in Nigeria will remain low tax compliant.

From the findings of this study, the economic factor with the most likelihood of moving a Nigerian to the tax compliant regime is tax penalty. This outcome is buttressed in the model estimated for just economic factors as well as the model that combined the factors. This finding explains the reality of the behaviour of directly assessed personal income taxpayers. Majority of them are tax non-compliant but increasing tax penalties will move them to higher categories of tax compliance in Nigeria. However, as already revealed from this research finding, a proper mix of these factors must be sought after, even when the most significant factors are being combined.

Conclusion and Recommendation

This study started with the objective to understand and provide insight on the extent to which economic factors move personal income taxpayers to either tax non-compliant, low tax compliant, or tax compliant categories of tax compliance in Nigeria. This paper concludes that economic factors must be used in a way that would overtime move most, if not all personal income taxpayers to the tax compliant category.

Having successfully answered the research questions and fulfilled the research objectives, this paper recommends that policymakers in Nigeria and other developing countries use the peculiar features of their tax system to implement policy measures to increase the number of compliant personal income taxpayers. These peculiar features could be the number of tax non-compliant individuals, the extent

to which economic factors have to be improved as well as time considerations in the use of these factors to yield desired objectives.

This paper also recommends that tax rates should be kept low, tax penalties should be deepened and utilised to ensure that people know that there are punishments for tax non-compliance. Also, the probability of detection for tax non-compliance should be improved upon to reduce the number of persons that can evade taxes.

One of the limitations of this study is that the quantitative household survey dataset employed in this study did not account for the role of time in moving tax non-compliant persons to the tax compliant category. Further research should, therefore, be conducted in this regard to proffer more explanations on how the factors for tax compliance interact. Also, the interactive and cross re-enforcing effects of economic and psychological factors can be ascertained using other research methods that adequately capture this.

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Appendices

Section 1: Correlation matrix

```
. estat vce, correlation

Correlation matrix of coefficients of ologit model
```

	q34			cut1	cut2
e(V)	q39	q33	q35d	_cons	_cons
q34					
q39	1.0000				
q33	-0.0352	1.0000			
q35d	0.0005	0.0211	1.0000		

Section 2: Generalised ordered logistic regression

```
. gologit2 q34 q39 q33 q35d

Generalized Ordered Logit Estimates              Number of obs   =      10185
                                                 LR chi2(6)      =    2054.82
                                                 Prob > chi2     =     0.0000
Log likelihood = -8815.5109                      Pseudo R2       =     0.1044
```

q34	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
1_ Not wrong at all						
q39	.0686674	.0372711	1.84	0.065	-.0043826	.1417175
q33	.948144	.0318034	29.81	0.000	.8858104	1.010477
q35d	-.1634343	.0270996	-6.03	0.000	-.2165485	-.1103201
_cons	-.4706743	.0991242	-4.75	0.000	-.6649542	-.2763945
2_ Wrong but understandable						
q39	.176199	.0412136	4.28	0.000	.0954219	.2569761
q33	1.043744	.031862	32.76	0.000	.9812955	1.106192
q35d	-.1911134	.0309053	-6.18	0.000	-.2516867	-.1305401
_cons	-3.945662	.1268468	-31.11	0.000	-4.194277	-3.697047

```
. gologit2 q34 q39 q33 q35d, or

Generalized Ordered Logit Estimates               Number of obs   =      10185
                                                  LR chi2(6)      =    2054.82
                                                  Prob > chi2     =     0.0000
Log likelihood = -8815.5109                       Pseudo R2       =     0.1044
```

q34	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
1_ Not wrong at all						
q39	1.07108	.0399203	1.84	0.065	.995627	1.152251
q33	2.580915	.0820819	29.81	0.000	2.424949	2.746912
q35d	.8492223	.0230136	-6.03	0.000	.8052935	.8955474
_cons	.6245809	.0619111	-4.75	0.000	.5142971	.7585137
2_ Wrong but understandable						
q39	1.192675	.0491544	4.28	0.000	1.100123	1.293014
q33	2.839829	.0904826	32.76	0.000	2.66791	3.022826
q35d	.8260389	.025529	-6.18	0.000	.7774883	.8776213
_cons	.0193384	.002453	-31.11	0.000	.0150816	.0247966

Section 2.1: Predicted probabilities

```
. margins, predict (outcome (1))  at (q33=1) atmeans

Adjusted predictions                              Number of obs   =      10185
Model VCE    : OIM

Expression   : Pr(q34==1), predict(outcome (1))
at           : q33             =           1
               q39             =    1.510064 (mean)
               q35d            =    2.107806 (mean)
```

	Margin	Delta-method Std. Err.	z	P>|z|	[95% Conf.	Interval]
_cons	.4477252	.0075902	58.99	0.000	.4328486	.4626018

```
. margins, predict (outcome (2))  at (q33=1) atmeans

Adjusted predictions                              Number of obs   =      10185
Model VCE    : OIM

Expression   : Pr(q34==2), predict(outcome (2))
at           : q33             =           1
               q39             =    1.510064 (mean)
               q35d            =    2.107806 (mean)
```

	Margin	Delta-method Std. Err.	z	P>|z|	[95% Conf.	Interval]
_cons	.5025101	.0066049	76.08	0.000	.4895646	.5154556

```
. margins, predict (outcome (3))  at (q33=1) atmeans

Adjusted predictions                              Number of obs   =      10185
Model VCE    : OIM

Expression   : Pr(q34==3), predict(outcome (3))
at           : q33             =           1
               q39             =    1.510064 (mean)
               q35d            =    2.107806 (mean)
```

	Margin	Delta-method Std. Err.	z	P>|z|	[95% Conf.	Interval]
_cons	.0497647	.0021769	22.86	0.000	.045498	.0540314

```
. margins, predict (outcome (1))  at (q33=3) atmeans

Adjusted predictions                            Number of obs   =      10185
Model VCE    : OIM

Expression   : Pr(q34==1), predict(outcome (1))
at           : q33             =           3
               q39             =    1.510064 (mean)
               q35d            =    2.107806 (mean)

------------------------------------------------------------------------------
             |            Delta-method
             |     Margin   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   .0997554   .0034192    29.18   0.000      .093054    .1064568
------------------------------------------------------------------------------

. margins, predict (outcome (2))  at (q33=3) atmeans

Adjusted predictions                            Number of obs   =      10185
Model VCE    : OIM

Expression   : Pr(q34==2), predict(outcome (2))
at           : q33             =           3
               q39             =    1.510064 (mean)
               q35d            =    2.107806 (mean)

------------------------------------------------------------------------------
             |            Delta-method
             |     Margin   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   .6232312     .00569   109.53   0.000      .612079    .6343834
------------------------------------------------------------------------------

. margins, predict (outcome (3))  at (q33=3) atmeans

Adjusted predictions                            Number of obs   =      10185
Model VCE    : OIM

Expression   : Pr(q34==3), predict(outcome (3))
at           : q33             =           3
               q39             =    1.510064 (mean)
               q35d            =    2.107806 (mean)

------------------------------------------------------------------------------
             |            Delta-method
             |     Margin   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   .2770133   .0060958    45.44   0.000     .2650657     .288961
------------------------------------------------------------------------------

. margins, predict (outcome (1))  at (q39=1) atmeans

Adjusted predictions                            Number of obs   =      10185
Model VCE    : OIM

Expression   : Pr(q34==1), predict(outcome (1))
at           : q33             =    2.115562 (mean)
               q39             =           1
               q35d            =    2.107806 (mean)

------------------------------------------------------------------------------
             |            Delta-method
             |     Margin   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |    .220663   .0050644    43.57   0.000     .2107369    .2305891

. margins, predict (outcome (2))  at (q39=1) atmeans

Adjusted predictions                            Number of obs   =      10185
Model VCE    : OIM

Expression   : Pr(q34==2), predict(outcome (2))
at           : q33             =    2.115562 (mean)
               q39             =           1
               q35d            =    2.107806 (mean)

------------------------------------------------------------------------------
             |            Delta-method
             |     Margin   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   .6489411   .0054417   119.25   0.000     .6382755    .6596067
```

```
. margins, predict (outcome (3))  at (q39=1) atmeans

Adjusted predictions                            Number of obs   =      10185
Model VCE    : OIM

Expression   : Pr(q34==3), predict(outcome (3))
at           : q33             =    2.115562 (mean)
               q39             =           1
               q35d            =    2.107806 (mean)

------------------------------------------------------------------------------
             |            Delta-method
             |     Margin   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   .1303958   .0038345    34.01   0.000     .1228804    .1379113
------------------------------------------------------------------------------

. margins, predict (outcome (1))  at (q35d=3) atmeans

Adjusted predictions                            Number of obs   =      10185
Model VCE    : OIM

Expression   : Pr(q34==1), predict(outcome (1))
at           : q33             =    2.115562 (mean)
               q39             =    1.510064 (mean)
               q35d            =           3

------------------------------------------------------------------------------
             |            Delta-method
             |     Margin   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   .2380666   .0057131    41.67   0.000     .2268691    .2492641
------------------------------------------------------------------------------

. margins, predict (outcome (2))  at (q35d=3) atmeans

Adjusted predictions                            Number of obs   =      10185
Model VCE    : OIM

Expression   : Pr(q34==2), predict(outcome (2))
at           : q33             =    2.115562 (mean)
               q39             =    1.510064 (mean)
               q35d            =           3

------------------------------------------------------------------------------
             |            Delta-method
             |     Margin   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   .6423058     .00555   115.73   0.000      .631428    .6531836
------------------------------------------------------------------------------

. margins, predict (outcome (3))  at (q35d=3) atmeans

Adjusted predictions                            Number of obs   =      10185
Model VCE    : OIM

Expression   : Pr(q34==3), predict(outcome (3))
at           : q33             =    2.115562 (mean)
               q39             =    1.510064 (mean)
               q35d            =           3

------------------------------------------------------------------------------
             |            Delta-method
             |     Margin   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   .1196276   .0038629    30.97   0.000     .1120564    .1271988
------------------------------------------------------------------------------

. margins, predict (outcome (1))  at (q33=4) atmeans

Adjusted predictions                            Number of obs   =      10185
Model VCE    : OIM

Expression   : Pr(q34==1), predict(outcome (1))
at           : q33             =           4
               q39             =    1.510064 (mean)
               q35d            =    2.107806 (mean)

------------------------------------------------------------------------------
             |            Delta-method
             |     Margin   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   .0393549   .0022159    17.76   0.000     .0350118     .043698
------------------------------------------------------------------------------
```

```
. margins, predict (outcome (2))  at (q33=4) atmeans

Adjusted predictions                            Number of obs   =      10185
Model VCE    : OIM

Expression   : Pr(q34==2), predict(outcome (2))
at           : q33             =           4
               q39             =    1.510064 (mean)
               q35d            =    2.107806 (mean)

------------------------------------------------------------------------------
             |            Delta-method
             |     Margin   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   .4517174   .0097757    46.21   0.000     .4325574    .4708775
------------------------------------------------------------------------------

. margins, predict (outcome (3))  at (q33=4) atmeans

Adjusted predictions                            Number of obs   =      10185
Model VCE    : OIM

Expression   : Pr(q34==3), predict(outcome (3))
at           : q33             =           4
               q39             =    1.510064 (mean)
               q35d            =    2.107806 (mean)

------------------------------------------------------------------------------
             |            Delta-method
             |     Margin   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   .5089277   .0113491    44.84   0.000     .4866838    .5311715
------------------------------------------------------------------------------

. margins, predict (outcome (1))  at (q35d=1) atmeans

Adjusted predictions                            Number of obs   =      10185
Model VCE    : OIM

Expression   : Pr(q34==1), predict(outcome (1))
at           : q33             =    2.115562 (mean)
               q39             =    1.510064 (mean)
               q35d            =           1

------------------------------------------------------------------------------
             |            Delta-method
             |     Margin   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   .1802992   .0053708    33.57   0.000     .1697727    .1908258
------------------------------------------------------------------------------

. margins, predict (outcome (2))  at (q35d=1) atmeans

Adjusted predictions                            Number of obs   =      10185
Model VCE    : OIM

Expression   : Pr(q34==2), predict(outcome (2))
at           : q33             =    2.115562 (mean)
               q39             =    1.510064 (mean)
               q35d            =           1

------------------------------------------------------------------------------
             |            Delta-method
             |     Margin   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   .6579079   .0054164   121.47   0.000     .6472919    .6685239
------------------------------------------------------------------------------

. margins, predict (outcome (3))  at (q35d=1) atmeans

Adjusted predictions                            Number of obs   =      10185
Model VCE    : OIM

Expression   : Pr(q34==3), predict(outcome (3))
at           : q33             =    2.115562 (mean)
               q39             =    1.510064 (mean)
               q35d            =           1

------------------------------------------------------------------------------
             |            Delta-method
             |     Margin   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   .1617928   .0050642    31.95   0.000     .1518671    .1717185
------------------------------------------------------------------------------
```

Section 3 Data Measurement

The dependent variable

Variable	Indicator	Response categories
Tax compliance	Q34: Perception of citizens that do not pay their taxes.	1. Not wrong at all 2. Wrong and understandable 3. Wrong and punishable

Source: Authors' computation

The independent variables

Variable	Factor type	Indicator	Response categories
Tax rate	Economic	Q39: Pay more or fewer taxes now, compared to 3 years ago	1. More 2. About the same amount 3. Less
Tax penalty	Economic	Q33: perception of the penalty when caught for not paying taxes	1. Nothing 2. Small 3. Medium 4. Large
Probability of being detected	Economic	Q35d: I would not pay my taxes if I would not get caught	1. Disagree 2. Neither agree nor disagree 3. Agree

Source: Authors' computation

Normalising Strategic Fit Orientation and Business Agility of Non-Oil Export Women Entrepreneurs in Lagos State

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Abstract

Strategic fit orientation is crucial to competitive performance as it involves matching internal activities of firms with diverse external context. The capability of a business to grow and survive depends on its ability to be timely and flexible (agility) in responding or reacting to market changes. Extant research has shown that entrepreneurs, especially women in the non-oil export, are not strategically fit to arrange their limited resources in alignment with prevalent competition and market environment. As a result, this study examined the effect of strategic fit orientation on business agility among women entrepreneurs in non-oil export, Lagos state. This study adopted a descriptive design and quantitative approach to elicit information from selected 402 female entrepreneurs and export managers who are actively involved in non-oil exporting activities in the agribusiness, textile, as well as information and technology business processing outfit (ITBPO). The respondents were conveniently and purposively selected. The data collected was analysed using measurement and structural modelling. The finding indicated that 66.3% variance of business agility is explained by strategic fit orientation ($r=0.814$, $p= <0.05$). This finding implies that women entrepreneurs adapt to technological changes and provide a relative, focused and stable market for their customers. Based on this, women entrepreneurs should consistently develop strategies to alleviate potential risks, evaluate situations and possible consequences of threats in agreement with their objectives to remain dynamic in the business environment.

Keywords: Strategic Fit Orientation, Business Agility, Non-Oil Export, Women Entrepreneurs.

Introduction

The Global Entrepreneurship Monitor report (GEM, 2015/) revealed that women entrepreneurs are akin to starting new businesses at a rapid rate, but rarely grow or perform sustainably beyond the start-up stage. Small firms often face the dilemma of crafting strategies that best suit their resource base in cognisance of the externalities. In Nigeria, women entrepreneurs in non-oil export have issues regarding creating and managing high- performance ventures. Some fail at start-up stage due to insufficient orientation about strategy and externalities influence on performance, strategic and managerial capabilities, in terms of market access and inadequate information (Uchegbulam, Princess, Samuel, and Ayodotun, 2015). Strategic fit orientation (SFO) is the process of tactically matching the internal activities of the firm with its diverse external changing contexts. SFO, through firm agility, releases the ability to respond or react to changing markets using an appropriate strategy to manage different customer needs by the strategic allocation and reallocation of firm resources while hedging disruptions in the system (Ofoegbu and Akanbi, 2012; Cui, Walsh, and Zou, 2014). The rise of turbulence in the business environment caused by open market competition, business dynamism, and globalisation necessitated the ability of organisations to cope, survive and be competitive through the agility of firms to respond to changes, and innovation activities (Arokodoye and Asikhia, 2020). Responsiveness facilitates the ability to consistently identify and seize opportunities more quickly than the competitors through a focused effort to sourcing and sharing real-time market information to aid the performance of the firm's objectives and goals with exigency. Thus, the study aims at filling the gap in the knowledge of strategic fit model as a necessary tool for organisational agility, and further aversion of women business failure.

Literature Review

Strategic Fit Orientation

Strategic fit orientation is a universal strategic management framework which pinned the competitiveness and growth of an organisation on how effectively it matches its strategy and structure with its business environment (Lisboa, Skarmeas, and Lages, 2013; Cui, Walsh, and Zou, 2014; Ingram, Kraśnicka, Wronka-Pośpiech, Głód, and Głód, 2016; Youssef, and Christodoulou, 2017; Ibidunni *et al.,* 2018; Worlu *et al*., 2019). Strategic fit is the alignment in the degree to which the firm strategically matches its internal resources, and capabilities, with its external environmental opportunities, to enable consistent performance and deterrent to imitation (Rivkin, 2000; Siggelkow, 2002; Vorhies and Morgan, 2003; Aagaard, 2016; Kanagavalli. and Surya, 2017). Several researchers have studies strategic fit relating to the performance of organisations (Lukas, Tan, and Hult, 2001; Majukwa and Haddud, 2016; Mohammed, Fatima, Abdennour, and Lakhdar, 2017; Alesksic, and Jelavic, 2017). Understanding the dynamics of the business environment is of utmost importance to strategic fit and for business agility.

Business Agility

The concept of agility arises as a solvent to the dilemma of unpredictable business dynamism. It appeared first in the Iacocca Institute survey in the United States in 1991. It focused on capability-based, flexible and agile production to meet the rapidly changing needs of the market (Iacocca Institute, 1991). Organisation agility is the proclivity for internal strategic flexibility in prompt adaptability to opportunities and response to mitigating threat in the external environment in a fit continuum for sustainable competitive advantage. In practice, however, most women firms, have difficulties in achieving the required strategic fit due to culture, inadequate information, access to markets, and ineffective communication (Iyiola and Azuh, 2014; Nigeria Export Promotion Council NEPC, 2016; Bako and Syed 2018; Etim, and Chux, 2018; Arokodare and Asikhia, 2020). Oyerinde, Olatunji and Adewale (2018) pointed out that poor strategic agility to uncertain regulation and policy instability, challenges of political interference and inadequate infrastructural facilities created erratic firm performance. Yet, existing literature pointed the significance

of firm strategic agility to organisational changes (Zhou and Wu, 2010); and flexibility to responding to the changes in the internal and external environment (Zhang, 2006; Chiang, Kocabasoglu-Hillmer, and Suresh, 2012; Mondal, Rahman, SanoarHosin, and Sarkar, 2017; Shaheen and Almohtaseb 2020); customer satisfaction (Dominici, 2008; Barve, 2010; Bharadwaj, Chauhan, and Raman, 2015); market competition (Johnson, Lee, Saini and Grohmann, 2003; Networks (Gutierrez and Pérez, 2010).

Methodology

This study adopted a descriptive design and quantitative approach to elicit information from selected 416 female entrepreneurs and export managers who are actively involved in non-oil exporting activities in the agribusiness, textile, as well as information and technology business processing outfit (ITBPO). The use of a structured questionnaire was adopted to elicit information from a cross-section of female entrepreneurs who were conveniently and purposively selected in Lagos state, Nigeria. Majority of the non-oil exporting activities in Nigeria are based in the south-west region with most of them located in Lagos, the commercial centre of Nigeria (MAN, 2018). The items in the survey were adapted from prior studies. The questionnaire comprised ten (10) questions with the aid of five (5) point Likert's scale. The strategic fit was measured using cost advantage, risk alleviation, innovative delivery, market stability, adaptation to change, opportunity identification., and consequences of threat evaluation (Vorhies and Morgan, 2003; Aagaard, 2016; Kanagavalli. and Surya, 2017). While business agility was captured using adaptation to unforeseen changes, streamlining of core processes for optimum performance, and capability to deliver products in the most cost-effective manner (Zhou and Wu, 2010; Chiang et al., 2012; Mondal et al., 2017; Shaheen and Almohtaseb 2020).

The Likert's scale ranges from strongly agree (5), Agree (4), undecided (3), disagree (2) and strongly disagree (1). Out of the four hundred and sixteen (416) copies of the questionnaire distributed, only four hundred and two (402) representing 80.2% response rate. The researcher achieved a high response rate due to frequent visitation and familiarisation with the target respondents at their various meeting points. The data collected was analysed using measurement and structural modelling. The use of Partial Least Square – Structural Equation Modelling (PLS-SEM) technique was adopted for the data analysis.

Data Presentation and Analysis

The strategic fit orientation descriptive statistics captured statements, like trying to achieve the cost advantage by producing at the lowest cost. Developing strategies to alleviate potential risks. Service to customers best defined as innovative. Providing a focused, relatively stable market for the customer. Adapting to technological changes, identifies opportunities in the market, evaluating situations and possible consequences of threats on a scale of 1 to 5. The analysis is presented in Tables 1 and 2, respectively.

Table 1: Strategic Fit Orientation

Items for Strategic fit Orientation	Industry	SA	A	U	D	SD	Mean	SD
Trying to achieve the cost advantage by producing at the lowest cost	Agribusiness	58	79	3	2	2	4.312	.714
	Info-Tech	84	102	12	1	2	4.318	.698
	Textile	29	16	9	3	-	4.245	.911
Total		**171**	**197**	**24**	**6**	**4**	**4.292**	**.774**
Developing strategies to alleviate potential risks	Agribusiness	34	97	4	7	2	4.069	.763
	Info-Tech	63	113	17	6	2	4.139	.768
	Textile	21	22	12	2	-	4.087	.851
Total		**118**	**232**	**33**	**15**	**4**	**4.098**	**.794**
Service to customers is best defined as innovative	Agribusiness	43	84	14	2	1	4.152	.702
	Info-Tech	62	106	24	7	2	4.089	.807

	Textile	21	27	7	1	1	4.157	.840
Total		**126**	**217**	**45**	**10**	**4**	**4.133**	**.783**
Providing a focused relatively stable market for its customer	Agribusiness	38	70	33	2	1	3.986	.784
	Info-Tech	57	115	24	2	3	4.099	.755
	Textile	18	26	9	3	1	4.000	.925
Total		**113**	**211**	**66**	**7**	**5**	**4.028**	**.821**
Adapting to technological changes	Agribusiness	42	80	18	2	2	4.097	.769
	Info-Tech	64	103	29	3	2	4.114	.775
	Textile	20	27	8	1	1	4.122	.846
Total		**126**	**210**	**55**	**6**	**5**	**4.111**	**.797**
Identifies opportunities in the market	Agribusiness	40	90	9	3	2	4.131	.731
	Info-Tech	60	118	16	5	2	4.139	.741
	Textile	24	20	10	2	1	4.122	.946
Total		**124**	**228**	**35**	**10**	**5**	**4.131**	**.806**
Evaluating situations and possible consequences of threats	Agribusiness	34	77	24	8	1	3.937	.829
	Info-Tech	46	126	20	7	2	4.029	.747
	Textile	20	28	7	2	-	4.157	.774
Total		**100**	**231**	**51**	**17**	**3**	**4.041**	**.783**

Table 1 indicated that the assessment of the selected respondents on achieving cost advantage. 368 (91.5%) of the women entrepreneurs believed in attaining cost advantage, 24(6%) were indifferent, and 10(2.5%) had an opposing view. Also, their response on development of strategies to alleviate potential risks, disclosed that 350(87.1%) of the respondents thought that they develop strategies to mitigate potential risks, 33(8.2%) were unmoved, and 19(4.7%) had a contrary view. Some 343(85.3%) of the selected women entrepreneurs agreed that their service to customers is best defined as innovative, while 45(11.2%) were indifferent, and 19(4.7%) had an opposing view. In the same vein, the report stated that 324(80.6%) of the respondents believed that conducting an assessment of potential customer needs to provide a focused, relatively stable market is crucial. 66(16.4%) of the respondents were unresponsive, while 12(3%) of the respondents had an opposing view. Similarly, 336(83.6%) of the selected female entrepreneurs and export managers adapted to technological changes, 55(13.7%) were unconcerned, and 11(2.7%) of the respondents had a differing view. The assessment on the identification of opportunities in the market revealed that 352(87.6%) of the respondents identify opportunities, 35(8.7%) were uninterested, while 15(3.7%) had a contrary view about identifying opportunities. In the same way, the effort at evaluating threat situations and possible consequences showed 331(82.3%) of the respondents do evaluate threat situations, 51(12.7%) were indifferent about the statement. In comparison, 20(5%) of the respondents had an opposing view.

The table also displayed the mean and standard deviation of each item measured on strategic fit orientation in the non-oil exporting activities in the agribusiness, textile, as well as information and technology business processing outfit (ITBPO) in Lagos state. The mean value was above 4.00 on a scale of five (5). The result implied the degree of affirmation of the **respondents' adherence to strategic fit practice.**

Table 2: Business Agility

Items		SA	A	U	D	SD	Mean	SD
Quick adaptation to unforeseen changes	Agribusiness	23	82	38	1	-	3.881	.663
	Info-Tech	42	127	26	6	-	4.019	.677
	Textile	16	27	11	3	-	3.982	.834
Total		**81**	**236**	**75**	**10**	**0**	**3.961**	**.725**
Taking great steps to streamline core processes for optimum performance	Agribusiness	24	100	17	1	2	3.993	.663
	Info-Tech	52	118	21	8	2	4.044	.782
	Textile	17	27	12	-	1	4.035	.822
Total		**93**	**245**	**50**	**9**	**5**	**4.024**	**.756**
High capability to deliver products to its customers in the most cost-effective manner	Agribusiness	33	94	13	2	2	4.069	.706
	Info-Tech	65	112	20	4		4.184	.686
	Textile	19	28	8	2	-	4.122	.780
Total		**117**	**234**	**41**	**8**	**2**	**4.125**	**.724**

For the assessment of the business agility, the selected female entrepreneurs and export managers' effort to quickly adapt to unforeseen changes revealed that 317 (78.8%) of the respondents opined that they facilitate quick adaptation to unexpected changes, 75(18.7%) were indifferent. In comparison, 10(2.5%) had an opposing view. Also, the researcher found out that 338(84.1%) of the respondents had the opinion that significant steps are taken to streamline core processes for optimum performance, 50(12.4%) were unconcerned, and 14(3.5%) of the respondents had a contrary view. Besides, the question on the capability to deliver products to its customers in the most cost-effective manner revealed 351(87.3%) of the respondents had the belief that they have high ability to deliver products to their customers in the most cost-effective way, 41(10.2%) of the respondents were indifferent. In comparison, 10(2.5%) had an opposing view of the statement.

Test of Hypothesis

Both structural and measurement models were considered for data analysis. For the measurement model, all items are reflective, and the minimum acceptable value for a factor loading is 0.60 (Fornell and Larcker, 1981), and remarkably, all the constructs have values higher than 0.60. Few items that have a factor loading less than 0.6 were removed, and the results are presented in Figures 1 and 2, respectively. The structural model is the inner model in structural equation modelling. It measures path coefficients (R2) values and significant values. Boots strapping method finds the significance (Vinzi, Chin, Henseler, and Wang, 2010; Sanchez, 2013). The default bootstrapping in PLS is 5000 subsamples to gain significant results (Wetzels, Odekerken-Schroder, and Van Oppen, 2009). This study calculated 5000 subsamples in bootstrapping gains more precise results and path coefficient values to show the relationship between strategic fit orientation and business agility. Results showed that selected women entrepreneurs sampled had almost the same opinion. The hypothesis formulated thus:

H_0: Strategic fit orientation of women entrepreneurs does not influence the business agility of selected women entrepreneurs

The hypothesis has one exogenous variable (strategic fit orientation) and one endogenous variable (business agility). The coefficient of determination/ r-squared, path coefficient (β value) and T-statistic value, effect size ($f2$), the predictive relevance of the model, and Goodness-of-Fit (GOF) index were the core standards for evaluating the structural model as presented in Figures 2 and 3 respectively. Path estimates were calculated by using Maximum Likelihood Estimation (MLE), which was considered to be tolerant to violations of normality assumptions in most of the psycho-behavioural studies (Fornell and Larcker, 1981).

Results of structural models and direct path analysis for strategic fit orientation and business agility have been presented in the figures and tables below:

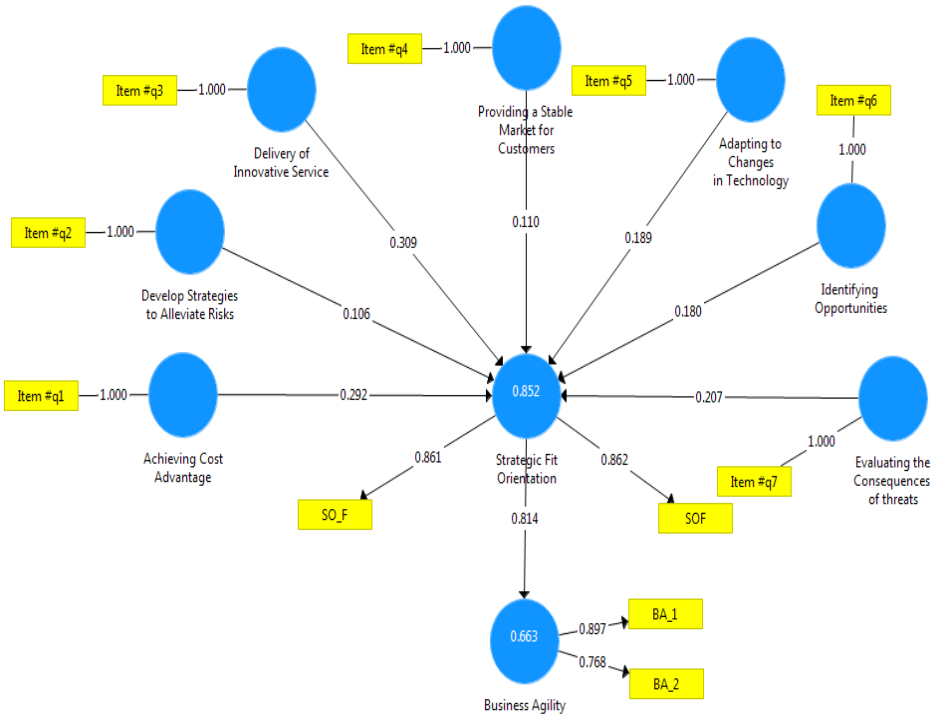

Figure 1: Predictive relevance (Path co-efficient) of strategic fit orientation and Business Agility

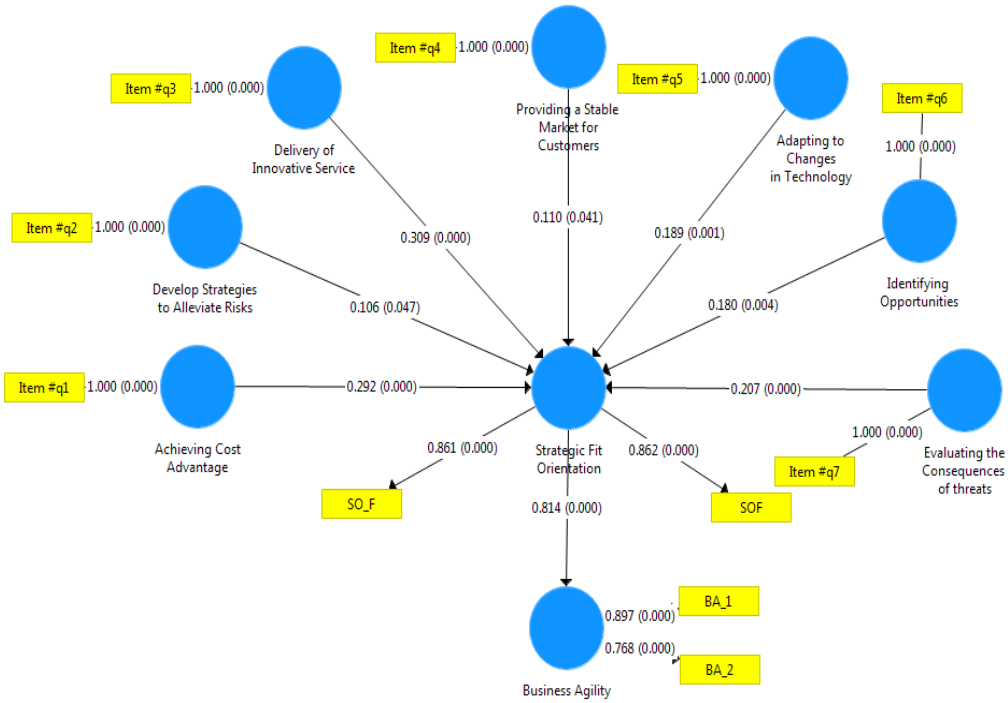

Figure 2: Path Co-efficient and P-values for strategic fit orientation and Business Agility

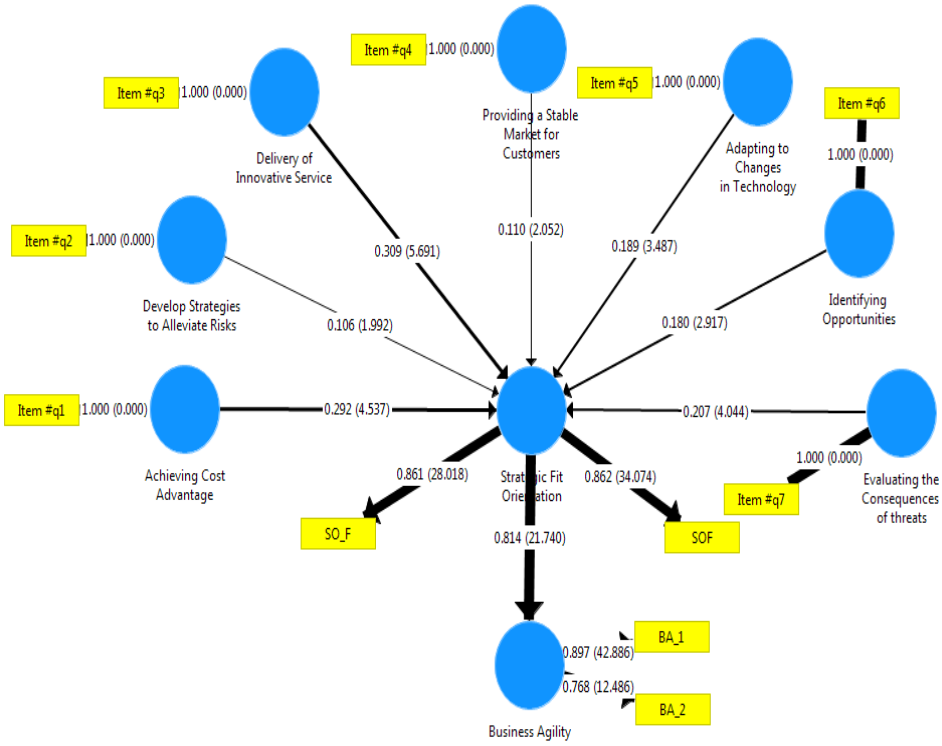

Figure 3: Path Co-efficient and T-values for strategic fit orientation and Business Agility

Estimation of Path Coefficients (β) and T-statistics

The path coefficients in the PLS and the standardised β coefficient in the regression analysis were similar. Through the β value, the significance of the hypothesis was tested. The β denoted the expected variation in the dependent construct for a unit variation in the independent construct(s) (Astrachan, Patel and Wanzenried, 2014). The β values of every path in the hypothesis model were computed, the higher the β value, the more the substantial effect on the endogenous latent construct. However, the β value had to be verified for its significance level through the T-statistics test. The path co-efficient is presented in Table 3.

Table 3: Path Coefficients

Variables and Cross Loading	Path Co-efficient (O)	Indirect Effect (IE)	Std. Dev. (STDEV)	T Statistics (O/ STDEV	P Values
Achieving cost advantage at the lowest cost #q1 → Strategic fit orientation	0.292		0.021	4.537	0.000
Achieving cost advantage at the lowest cost #q1 → Business Agility		0.258	0.019	3.829	0.000
Developing strategies to alleviate potential risks #q2 → Strategic fit orientation	0.106		0.184	1.992	0.047
Developing strategies to alleviate potential risks #q2 → Business Agility		0.101	0.155	1.980	0.041
Service to customers is innovative #q3 → Strategic fit orientation	0.309		0.018	5.691	0.000

Service to customers is innovative #q3 → Business Agility		0.281	0.014	5.627	0.000
Providing a stable market for its customer #q4 → Strategic fit orientation	0.110		0.021	2.052	0.041
Providing a stable market for its customer #q4 → Business Agility		0.103	0.013	1.997	0.038
Adapting to technological changes #q5 → Strategic fit orientation	0.189		0.019	3.487	0.001
Adapting to technological changes #q5 → Business Agility		0.150	0.016	3.399	0.000
Identifies opportunities in the market #q6 → Strategic fit orientation	0.180		0.019	2.917	0.004
Identifies opportunities in the market #q6 → Business Agility		0.142	0.015	2.893	0.003
Evaluating the consequences of threats #q7→ Strategic fit orientation	0.207		0.019	4.044	0.000
Evaluating the consequences of threats #q7→ Business Agility		0.169	0.018	3.968	0.000
Strategic fit orientation → Business Agility	0.814		0.083	7.023	0.000
	R Square (R^2)		R Square (R^2) Adjusted		
Strategic fit orientation → Business Agility	0.663		0.629		

P-values <0.05 are desirable for reflective indicators

This hypothesis predicted that strategic fit orientation which comprised achieving cost advantage at the lowest cost, developing strategies to alleviate potential risks, service to customers is innovative, providing a stable market for its customer, adapting to technological changes, identifies opportunities in the market and evaluating the consequences of threats significantly and positively influence business agility of selected women entrepreneurs. The **path co-efficient** affirmed that achieving cost advantage at the lowest cost #q1 indirectly and significantly influenced business agility ($\beta = 0.292$, $f2 = 0.258$, $p < 0.05$). The indirect influence of developing strategies to alleviate potential risks was observed on business agility of selected women entrepreneurs #q2 ($\beta = 0.106$, $f2 = 0.101$, $p < 0.05$). Service to customers is innovative #q3 also recorded a positive and significant impact on business agility of selected women entrepreneurs ($\beta = 0.309$, $f2 = 0.281$, $p < 0.05$). Providing a stable market for its customer #q4 indirectly and significantly influenced business agility ($\beta = 0.110$, $f2 = 0.103$, $p < 0.05$). The indirect influence of adapting to technological changes was observed on business agility of selected women entrepreneurs #q5 ($\beta = 0.189$, $f2 = 0.150$, $p < 0.05$). Identifying opportunities in the market #q6 also recorded a positive and significant impact on the business agility of selected women entrepreneurs ($\beta = 0.180$, $f2 = 0.142$, $p < 0.05$). In the same way, evaluating the consequences of threats #q7 have also recorded a positive and significant impact on the business agility of selected women entrepreneurs ($\beta = 0.207$, $f2 = 0.169$, $p < 0.05$). Overall, the relationship between strategic fit orientation and business agility of selected women entrepreneurs is confirmed to be directly significant with a beta value of 0.814, which also indicates a strong degree of association.

The indirect effect (IE) of the path co-efficient as depicted in Table 3 is often used to indicate the **effect size** of each item of the exogenous (strategic fit orientation) variables on the endogenous (business agility) in a PLS-SEM model. The effect size (also known as $f2$) indicate the substantive impact of all the items. $f2$ measure the strength of each predictor variable in explaining endogenous variables. Cohen (1988) recommended a guiding principle for determining the effect size. The values of 0.02, 0.15, and 0.35 respectively, signify small, moderate, and large effects of an independent construct on dependent construct; while the $f2$ values of less than 0.02 show that there was no effect. Basically, the effect size of #q1 ($f2 = .258$) was relatively moderate; #q2 ($f2 = .101$) was relatively weak; #q3 ($f2 = .281$) was relatively moderate; #q4 ($f2 = .103$) is relatively weak; #q5 ($f2 = .150$) is relatively moderate; #q6 ($f2 = .142$) was relatively small; and #q7 ($f2 = .169$) was relatively moderate. The result shows that the effect size of strategic fit orientation on the business agility of selected women entrepreneurs is relatively moderate.

The **value of R2** explains the variance between endogenous variables (Henseler *et al.,* 2009; Hulland, 1999). According to Henseler, Ringle, and Sinkovics (2009) and Hair, Ringle and Sarstedt (2013), an R^2 value of 0.75 were considered substantial, an R^2 value of 0.50 was regarded as moderate, and an R^2 value of 0.26 was considered as weak. In this study, the value of 0.663 was observed. This implies that 66.3% variance of business agility is moderately explained by the strategic fit orientation of selected women entrepreneurs. As a result, the analysis provided evidence that the hypothesis was supported. Hence, the R2 value in this study was moderate. By implication, the null hypothesis (H_0), which indicates that strategic fit orientation does not significantly have combined effects on the business agility of selected women entrepreneurs is as a result of this rejected. Above all, the results established that strategic fit orientation is a significant predictor of business agility among the selected women entrepreneurs.

Model Fit and Goodness of fit Index

Model fit can be analysed through Standardised Root Mean Square Residual (SRMR), and Normed Fit Index (NFI) values in PLS under model fit, factor analysis in PLS algorithm. The minimum acceptable value for SRMR is less than 0.08 (Hu and Bentler, 1998). In this research, the SRMR value of strategic fit orientation is less than 0.8. The CMIN/DF indicates an acceptable fit when the hypothetical model is < 3 (Ferron and Hess, 2007). The decision rule that is adopted to determine the acceptability of the model includes CMIN/df must be < 3; RMSEA/SRMR <0.8; NFI, CFI must be > 0.90 (Ferron and Hess, 2007; Fornell and Larcker, 2009). The relative Chi-square = 273.19; CFI = .944; NFI = .907; GFI = 0.910; SRMR = .043 as displayed in Table 4. The model fit indices satisfied the critical threshold, which indicated a fitting model.

Table 4 : Goodness of Fit and Model Fit Index

The Model Fit Index Calculation		**The goodness of fit (GoF) Model**			
Construct	**AVE** ≥0.50		**Cut-Off Value**	**Results**	**Conclusion**
Achieving cost advantage at the lowest cost	0.598	d_ULS		1.551	Good
Developing strategies to alleviate potential risks	0.683	SRMR	≤ 0.08	0.043	Good Fit
Service to customers is innovative	0.719	RMSEA	≤ 0.08	0.076	Good Fit
Providing a stable market for its customer	0.682	Chi-Square	273.19	273.19	Good
Adapting to technological changes	0.729	CMIN/DF	≤ 3.00	1.889	Fit
identifying opportunities in the market	0.684	NFI	≥ 0.90	0.907	Fit
Evaluating the consequences of threats	0.711	CFI	≥ 0.90	0.944	Good Fit
Business Agility	0.788	GFI	≥ 0.90	0.910	Fit

The measurement model indicated that all the model fit indices were found to be in an acceptable range and above the recommended cut-off level as suggested by Lacker and Fornell (2009). The SRMR is an index of the average of standardised residuals between the observed and the hypothesis covariance matrices (Chen, 2007). The SRMR is a measure of the estimated model fit. When SRMR = <0.08, then the study model has a good fit (Hu and Bentler, 1998). The table shows that this study model's SRMR was 0.043, which revealed that this study model has a good fit. The goodness of fit was conducted to evaluate the appropriateness of the model. The Goodness of Fit (GOF) of a statistical model describes how well a model fits into a set of observations. The values of the CFI, TLI and GFI were uniformly high. By implication, this result suggests that all parts of the model fit equally well and the overall or average fit of the model has reached an acceptable level.

Discussion of Findings

The results established that strategic fit orientation is a significant predictor of business agility. By implication, the result shows that achieving cost advantage at the lowest cost will assist in developing

strategies to alleviate potential risks and sustainable business agility among women entrepreneurs. In line with these findings, several studies have shown a relationship between strategic fit orientation and business agility, which is typically relatively strong and positive (Malik, Ghafoor and Iqbal 2013; Kanagavalli, Surya, and Phil, 2017). The finding supports the work of Aagaard, 2016; Aleksic and Jelavic (2017) who reported that ability to strategically fit the activities of the firm internally with appropriate strategy to align with its diverse external context implies the performance. The study by Camuffo and Wilhelm (2016) also affirmed that sustainable performance could be achieved when firms create opportunity in the external environment that match the firm's overall objectives. On the other hand, Hill and Cuthbertson (2011) supported by Kim, Lee, and Park (2015) researched the inevitability of strategic fit in a changing environment. They concluded that responding to changes in the environment and developing strategies for continuous improvement is central to increased performance. Hence, it can be argued that strategic fit is vital for achieving business agility and organisational success. However, the strategic fit concept has also been criticised as being too static and limiting, focusing on existing resources vis-a-vis the environment, instead of the strategic intent of sensing potential opportunities and/or threats. This implies that business sustainability can only be stimulated when women entrepreneurs consistently provide a stable market for its customer, adapt to external changes, recognise opportunities, simplify core processes for optimum performance, and develop the capability to deliver products in the most cost-effective manner.

Conclusion and Managerial Implications

This study brings to knowledge about how cost-effectiveness, evaluation of situations and possible consequences of threats will help to enhance business agility. Since strategic fit orientation is a multidimensional and sophisticated approach that explains how organisations learn and bring themselves close to their ideals. Female entrepreneurs across the agribusiness, Textile, and Information Technology/Business Processing Outfit (ITBPO) should continue to evaluate situations and possible consequences of threats thoroughly in agreement with its objectives and be very responsive to new market demands. To produce superior customers' satisfaction, and have a competitive edge, firms need information at every turn to proactively respond to customers ahead of their competitors.

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Interactive Effect between Financial Inclusion and Financial Stability in 27 Sub-Saharan African countries.

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Abstract

The common consensus is that a well-developed financial system will aid financial intermediation, destroy asymmetric information and enable access to finance for all, if it is inclusive, it will enhance stability and if not, it will threaten stability and undo the very purpose of financial inclusion. It is on this premise that this study examined the interactive effect between financial inclusion and financial stability in twenty seven (27) sub Saharan African countries. Error Correction Method (ECM) with General Methods of Moments (GMM) of Arellanon & Bond (1991) were used to analyze the short panel data obtained from the World Bank database. The study found the existence of a bidirectional long run influence between financial stability and financial inclusion by usage for the low, moderate and high stable countries. However financial stability reacts more quickly to temporal shocks in financial inclusion by quality for countries with highly stable financial system than poor and moderate financial system. The study therefore recommended that efforts should be concentrated in developing the financial system to make it more robust and inclusive. This is because a well-developed and inclusive financial system will make deposit rate to increase while at the same time lending rate plunges.

Keywords: Financial intermediation, financial development, poverty, digital finance, SSA

JEL Code: G21, G23, L26, I24

Introduction

Empirical and theoretical evidence have shown that while financial inclusion drives financial development, financial stability sustains financial development and reduces the risks arising from financial and economic shocks. However, pursuing both financial inclusiveness and stability objectives will result to synergies and trade-offs to both households and firms. (Martin ,David, Mare, Melecky, 2016). It is expected that greater

financial inclusion should result to tangible economic benefits for the users, such as higher GDP growth and lower income inequality and poverty reduction.When a person or group of person's irrespective of geographical location, political affiliation, religion and social strata receive adequate, cost effective and sustainable financial support it will help to encourage stable growth by smoothening savings and investment. The result will culminate into efficient and equitable income redistribution from lenders to borrowers. By this development, individuals are able to create wealth for themselves, income level rises and of course poverty is reduced while at the same time the economy is protected from adverse economic shocks, Adigun & Kama (2013). This argument can be encapsulated in a number of development finance theories which includes Schumpeter (1960), McKinnon (1973), and Shaw (1973) where the authors demonstrated that the services provided by financial institution are impetus for technological innovations, which consequently trigger economic prosperity and stability. CGAP (2012), Christine (2016) and Robinson (2010) posit that extending financial access to the poor will help them create wealth and manage their financial lives as well as contribute to economic growth and prosperity. In the same vein. The Department for International Development (2016) report recommended that for any policy to be successful it must be targeted at rapid and sustainable growth that translates to financial wellness and security of the citizens. Hannig, Alfred; Jansen, Stefan (2010) posit that although financial inclusion exposes the lender to institutional risk, such risk are managed at the institutional level and do not result to systemic risk. The reason is that low income savers and borrowers are resistant to external shocks emanating from financial crisis because they keep their deposits secured and service their loans. One unique thing amongst these theories and studies is their emphasis on the need to provide the poor and those in the informal sector with the required credit to create wealth and reduce poverty and inequality gap as well as achieve stability in the financial market and economy at large.

While lending to the poor seems plausible as supported by various theories and studies, it is important to exercise caution as not every person has the capacity to incur and service debts (Anh, Van, Vo & McAleer, 2019; Garcia, 2016 and Rajan, 2010), . This is because empirical evidence, as well as experience has established an inverse relationship between loan defaults and stability (Priyadarshee & Ghalib, 2011). Lending without proper credit appraisal will bring about high non-performing loans which will make the liquidity and stability position of such lending institution to become weak culminating to insolvency and financial instability. Anh, Van, Vo and McAleer (2019) posit that financial services extended to low income individuals in an economy has potentials to trigger instability into a financial market. Garcia (2016) raised concerns that financial inclusion and financial instability may have strong correlation by either financial inclusion stimulating growth or reinforcing stability or both contradicting each other and vice versa. Ahmad (2018) is of the view that greater financial inclusion is associated with financial instability. These authors are unanimous on the opinion that uncontrolled expansion of credit in support of financial inclusive growth and its instruments might fundamentally lead to higher risks in the financial system. When trust and confidence can no longer be reposed in the formal financial system due to instability people tend to patronize more of the informal savings groups and shadow banking institutions which lend to them at very high interest. Reduction in economic activities as a result of cash crunch and formal financial exclusion will lead to financial instability and systemic risk, which was a major trigger for the global financial meltdown of 2007 -2009 and the 2010 Andhra Pradesh micro finance crisis in India. This in essence, tends to contradict (undo) rather than complement the very objective of financial inclusion and prosperity. Most studies examined the linear relationship between financial inclusion and financial instability and not much have been said about the mutual dependency between financial inclusion and stability especially in SSA region. The main thrust of this study is to ascertain whether increase financial access and usage to the active poor and low income dwellers in rural communities in SSA will strengthen financial stability or otherwise. The question to be addressed by this study is - what interactive relationship exist between financial inclusion and financial stability in SSA countries? The major objective is to ascertain to what extent does financial inclusion drive financial stability or vice versa. The hypothesis written in its null form is that financial inclusion does not have mutual relationship with financial stability.

Conceptual and Theoretical Literature

The Mutual Dependency theory adapted for this study posit that a symbiotic relationship exist between financial inclusion and financial stability, thus, implying a feed-back effect between both concepts. The idea of the mutual dependency hypothesis is that when affordable financial products and services that meets the users' needs are made available in a sustainable and most convenient manner. The customers tend to use more of such products and this will engender the development of a viable and resilient financial market culminating to acceleration of real sector growth and stability of the financial system (Robinson, 2001). When such products are delivered on digital ecosystem it will be able to break most barriers hindering formal financial inclusion of the low income and active poor individuals and micro enterprises in rural communities. When trust is established in the financial system and users of the financial products are able to fulfill their financial needs and attain food and financial security, all economic agents, financial instruments and institutions will be able to perform their expected role in the intermediation process therefore culminating to financial stability. A stable financial system will further reinforce an inclusive financial system and vice versa.

Empirical Literature

The Financial Access Survey (2009) study provides no evidence that financial stability is threatened by increasing basic access to financial transactions, such as receiving wages and subsidies or making payments. But financial stability risks can arise when it comes to broadening access to credit to a wide section of the population. By enabling women and low income users open accounts, obtain credit and enjoy good financial infrastructures economic growth will become more inclusive. When financial systems become more inclusive, they help broaden financial markets and make monetary policy more effective. By bringing more sections of the population into the formal sector, the effects of fiscal policy—both tax and expenditures—are broadened (Christine, 2016). Consequently, while the goal of financial inclusiveness seems laudable and enjoys the support of most economies of the world, just making funds available to a wide spectrum of active poor in rural communities without proper credit analysis, control and monitoring is usually counter-productive and results to poor lending which was a major trigger for the 2007-2010 global financial meltdown (World Bank, 2015). Rajan (2010) posits that uncontrolled expansion in access to financial services could lead to instability. The study argued that policies can contribute to financial instability and social discontent if supervision and regulation do not keep pace. Financial instability, in turn, can lower growth and worsen inequality (as evidenced, for example, in the United States following the global financial crisis), and thus undo the very objectives that were sought through inclusion.

The Consultative Group to Assist the Poor (CGAP) posit that savings strengthen stability especially when done by individuals and households who are large in numbers. This is because small savers have the capacity to contribute to stability at the financial system level notwithstanding that the stability effect of savings at both levels could be discovered in greater details, especially at the level of the financial system (CGAP, 2012). Financial access as well as easy and affordable sources of finance are necessary preconditions for accelerated economic growth and reduction in income inequality and poverty alleviation (Serrao et al, 2012). Rajan (2010), cautions that granting financial access without control could result to devastating effect on financial stability as evident with the U.S. financial distress of 2007 and India's 2010 microfinance crisis. The study argues that financial development can give rise to financial instability and communal disaffection if not properly managed. Financial instability, in turn, can lower growth and worsen inequality (as evidenced by the global financial crisis that emanated from the US), and thus undo the very objectives that were sought through financial inclusion. Likewise, in Brazil, experience have shown that rapid expansion of credit over four years created potentials for bad debt especially among the active poor in rural communities. Aggressive promotion of low cost loans through "Crediamigo" has increased access to credit and correspondingly, the levels of debt (IMF, 2013).

Another study investigated the 2008/2009 Banking Crisis in Nigeria: The Hidden Triger of the Financial Crash, the study found that sudden divestment of FPI in 2009 from the Nigerian economy was the trigger of the financial crash. Improvement in financial inclusion creates opportunities to promote financial stability, Hannig, Alfred; Jansen, Stefan (2010). Also in Kenya evidence shows that those who adopted M-Pesa platform for their financial transactions lived a better life than those who did not adopt (Beck, Cull, Fuch, 2010). 2018 African Economic Outlook report of the ADB shows that 152 million Nigerians live below $2 per day ((Africa Economic Outlook Report, 2018). Distress is when a financial intermediary cannot meet its day-to-day cash withdrawal obligations (illiquid) or when the net worth of the financial institution becomes negative (insolvent). When such illiquidity and insolvency become rampant then the whole financial system is said to be distressed (Adegbite, 2015). According to Adetiloye et.al, CBN should sustain the cashless policy to reduce available cash in the financial system and also improve the education of staff in order to reduce fraud in the banking industry (Adetiloye, Olokoyo and Taiwo, 2016). Also, during crisis, bank run and frequent withdrawals were inherent due to anxiety by depositors, but concurrent withdrawals by depositors could be reduced if depositors are more diversified or accounts held by more individuals than few depositors (Han, Rui; Melecky, Martin, 2013). In a recent report, the Deputy Governor (Financial System Stability) of CBN, stated that 80% (percent) of economic activities in Nigeria is driven by the banking system which underlines the need to make the banking system resilient (NDIC, 2018). In a related development, another study on "Credit Risk Management: Implications on Bank Performance and Lending Growth found that sound credit management strategies can boost investors and savers confidence in the bank and lead to a growth in funds for loans and advances available for lending by banks Taiwo, Ucheaga, Achugamonu, Adetiloye and Okoye (2017). Achugamonu, Adetiloye, Adegbite, Babajide and Akintola (2020) investigated how exclusion of bankable adults impede on financial inclusive drive. The study found that financial exlusion represented by unemployment is not a major factor impeding financial inclusion growth in 27 SSA countries sampled.

Methodology

The study population comprises of the fifty (50) countries located within the sub-Saharan African region. However using a purposive sampling technique, only twenty seven (27) countries were selected for the period 2007 to 2017 from the data sourced from the World Bank database. The sample size therefore accounts for fifty four (54) percent of the total population. This study adopted Granger Error Correction Method (ECM) specification for a short panel data structure. To deal with the problem of persistency, heterogeneity and endogeneity associated with short panel data the study employed differenced Generalize Methods of Moments (GMM) of Arellanon and Bond (1991) for the model specification.

Sample Identification Number

The identification number of the countries sampled are as follows: Angola is 1, Burundi is 2, Botswana 3, Central African Republic 4, Cameroon 5, Congo Democratic Republic 6, Congo, Republic 7, Equatorial Guinea 8, Ghana 9, Guinea 10, Gambia 11, Kenya 12, Liberia 13, Lesotho 14, Madagascar 15, Mozambique 16, Mauritania 17, Mauritius 18, Malawi 19, Namibia 20, Nigeria 21, Rwanda 22, South Africa 23, Seychelles 24, Tanzania 25, Uganda 26 and Zambia which is 27. The choice of this identification number is based on the position of a country in the alphabetical order. Therefore, it does not have any statistical importance/value for explanation of the result except for identification purpose alone.

Definition of variables

Financial inclusion is represented by two strands: (i) inclusion by usage, which is proxy by deposit in commercial banks per 1000 adults (dcpa) and (ii) inclusion by quality, proxy by ratio of depositors to borrowers (rdtb). While financial stability is represented by ratio of bank liquid reserves to bank assets (brba). The justification for using the variables mentioned is based on the recommendation of the World

Bank of the choice of these variables as ideal for measuring financial inclusion and digital finance. Also see Chibba (2009) and Cihak, Mare and Melecky, (2016).

Model Specification

According to Chibba (2009) and Cihak et al (2016), ECM-ARDL Granger framework is adopted to initiate a dynamic short run and long run specification for the model. Thus, financial inclusion is defined as the independent variable {represented by deposits in the commercial bank per 1000 adults (dcpa), and ratio of depositors to borrowers (rdtb)} and financial stability is defined as the dependent variable represented by ratio of bank liquid reserves to bank assets (brba). To establish a mutual relationship, the model will be reversed to have financial inclusion as the dependent variable whereas financial stability becomes the independent variable.

To understand the features of this model, the variables are stated in its general form as:

$$\ln y_{it} = \lambda \ln y_{i,t-1} + \lambda_2 \ln y_{i,t-2} + \phi_0 \ln x_{it} + \phi_1 \ln x_{i,t-1} + \phi_2 \ln x_{i,t-2} + \psi_t + v_{it};$$
$$i = 1,\ldots,N; t = 1,\ldots,T \quad \ldots. \ 1$$
$$v_{it} = u_i + w_{it} \quad \ldots.. \ 2$$

Where: y_{it} is the response variable, x_{it} is the covariate variable, ψ_t is the time fixed effects, v_{it} is the composite error, u_i specific error, and w_{it} is the common error. The specific error is time invariant but the common error varies across time and units.

The specific or derived form of the model is stated as below:

$$\ln brba_{it} = a_0 + a_1 \ln brba_{i,t-1} + a_2 \ln brba_{i,t-2} + a_3 \ln dcpa_{it} + a_4 \ln dcpa_{i,t-1} + a_5 \ln dcpa_{i,t-2} + \psi_{i1} + v_{it1}$$
……3

$$\ln brba_{it} = b_0 + b_1 \ln brba_{i,t-1} + b_2 \ln brba_{i,t-2} + b_3 \ln rdtb_{it} + b_4 \ln rdtb_{i,t-1} + b_5 \ln rdtb_{i,t-2} + \psi_{t2} + v_{it2}$$
……4

The reversal of the model is as stated below:

$$\ln dcpa_{it} = i_0 + i_1 \ln dcpa_{i,t-1} + i_2 \ln dcpa_{i,t-2} + i_3 \ln brba_{it} + i_4 \ln brba_{i,t-1} + i_5 \ln brba_{i,t-2} + \psi_{t3} + v3$$
……...5

$$\ln rdtb_{it} = g_0 + g_1 \ln rdtb_{i,t-1} + g_2 \ln rdtb_{i,t-2} + g_3 \ln brba_{it} + g_4 \ln brba_{i,t-1} + g_5 \ln brba_{i,t-2} + \psi_{t4} + v_{it4}$$
.....6

Where: $\ln dcpa, \ln rtdb, \ln brba$ are natural log of deposits in commercial banks per 100 adults, ratio of depositors to borrowers and financial stability respectively.

Results

Inferential Statistic and Post Estimation Results

In this section, the parameters of the models stated in section three are estimated using one step Diff-GMM estimation technique. This technique provides robust test for the hypothesis stated for this study. The hypothesis focus mainly on the symbiotic relationship between stability and inclusion. Before reporting the results on the tests of these hypotheses, the study displays graphical reports on sample identification

number, average individual country financial inclusion usage and average group usage for the purpose of decomposing the countries into high usage (large saving countries) and low usage (small saving countries) to enhance the uniqueness of the results. The countries are also decomposed into low-financial stable, moderate-financial stable and high-financial stable countries (see the sample identification number in section three).

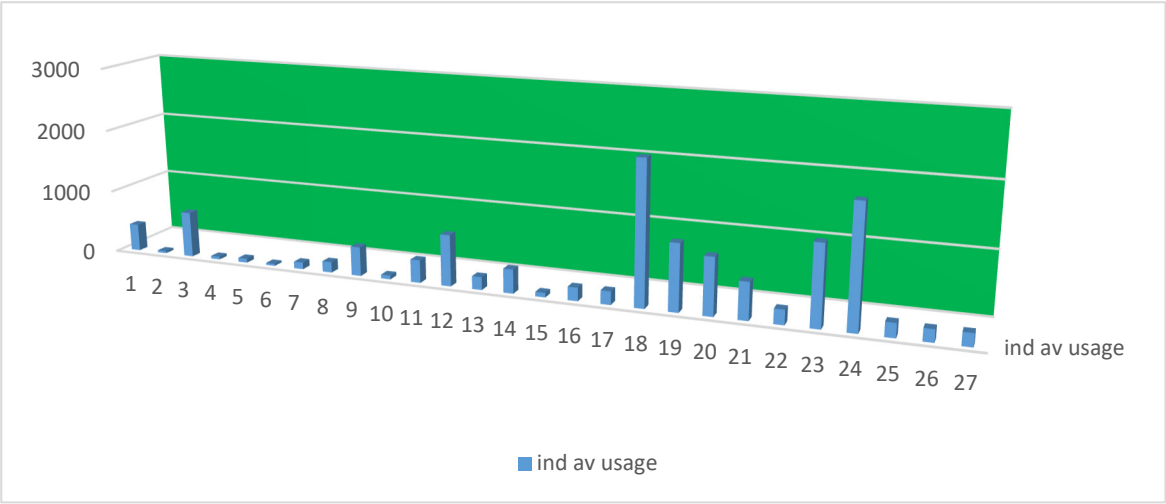

Figure 1: Individual Country's Average Financial Service Usage

A sight view of figure 1 above reveal that Burundi, Central African Republic, Cameroon, Congo Democratic Republic, Congo, Republic, Equatorial Guinea, Guinea and Madagascar have very low usage of financial service. This is followed by Angola, Botswana, Ghana, Kenya, Lesotho, Nigeria and Rwanda that have moderate usage of financial services. Nevertheless, countries like Mauritius, Malawi, Namibia, South Africa and Seychelles are large saving countries because they display high usage of financial services.

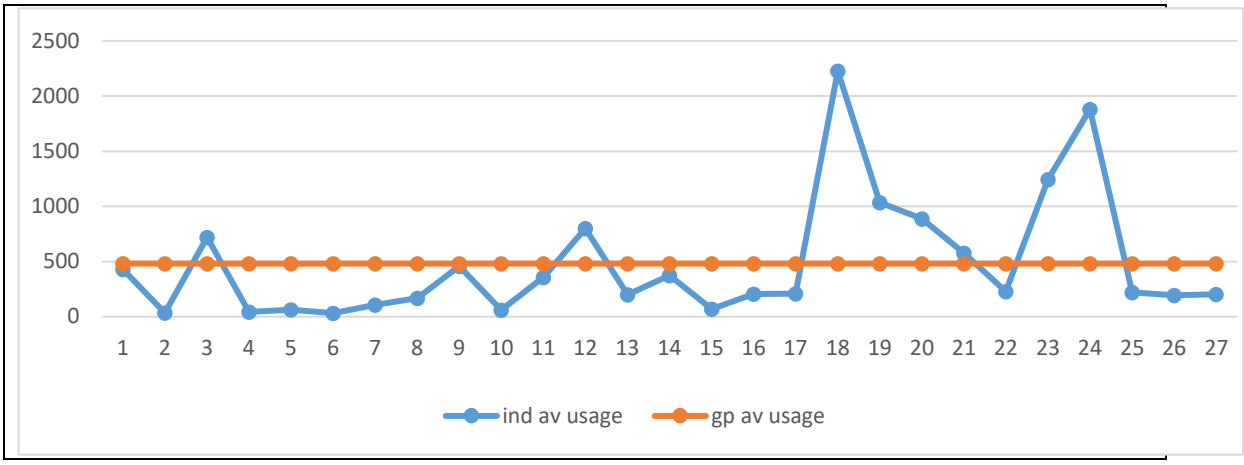

Figure 2: Decomposing Countries into High Usage and Low Usage of Financial Services

The line marked by blue color indicates the movement of individual average usage, while the group average usage is marked by orange color. The group average usage is constant (value=482.64 approximately) and any country that has average return above group average return is considered as large saving country or high usage of financial service; such countries are Botswana, Kenya, Mauritius, Malawi, Namibia, Nigeria, South Africa and Seychelles. While other countries whose individual average return falls below the group

average return are called low saving countries. Thus, the test of the short run and long run dynamics of financial inclusion is conducted for the low saving, high saving and the overall countries in the sample for the study. While the tests of the remaining hypothesis is conducted for low-financial stable, moderate-financial stable and high-financial stable countries.

Causality between Financial Stability and Financial Inclusion

This is conducted to test whether causation (in other word influence) run from financial stability to inclusion or there is symbiotic influences. This test is separately conducted for low, moderate and high financial stable countries, and the results are reported in table 2 below.

Table 1: Causation between Financial Stability and Inclusion by Usage from 2007 to 2017

			Dependent Variables			
Independent Variable	**Low-Stable**	**Financial Countries**	**Moderate Stable**	**Financial. Countries**	**High-Stable**	**Financial. Countries**
	Δlnfinstab	**Δlnfininc1**	**Δlnfinstab**	**Δlnfininc1**	**Δlnfinstab**	**Δlnfininc1**
Δlnfinstab1(-1)	-0.56	1.17	-0.76	0.21	-0.34	0.24
	(0.00)*	(0.00)*	(0.00)*	(0.01)	(0.00)*	(0.18)
Δlnfininc1	-0.071 (0.14)		0.16 (0.35)		- 0.16 (0.25)	
Δ lnfininc1(-1)	-0.08 (0.06)***	-0.30 (0.01)*	0.20 (0.25)	0.53 (0.00)*	0.04 (0.67)	-0.19 (0.21)
ECM	-0.36 (0.0)	-0.33 (0.00)*	-0.92 (0.00)*	-0.36 (0.00)*	-0.32 (0.00)*	-0.20 (0.01)*
lnfininc1(-2)	-0.43 (0.00)*		-0.42 (0.00)*		0.29 (0.00)*	
Δlnfinstab1		0.13 (0.75)		0.12 (0.12)		-0.21 (0.22)
lnfinstab1 (-2)		0.45 (0.21)		-0.12 (0.14)		-0.16 (0.32)
Summation of Short-Run Coef	-0.079	1.30	0.36	0.33	-0.12	0.03
Short-Run Wald Test (P-Value)	0.83	0.01	0.82	0.10	0.17	0.02
Long Run Coefficient	0.16	1.73	-1.19	2.00	2.10	-0.25
Long Run Coef. (P-Value)	0.05	0.03	0.00	0.03	0.58	0.78
Sargan Difference Test (PV)	0.82	0.02	0.01	0.14	0.00	0.01
Sargan Test (P-Value)	0.75	0.25	0.00	0.45	0.37	0.94
AR1 (P-Value)	0.00	0.00	0.00	0.00	0.00	0.00
AR2 (P-Value)	0.51	0.98	0.14	0.73	0.35	0.75
Number of Observations Number of Countries	80 8	80 8	110 11	110 11	80 8	80 8

1) The figures in parentheses are the p-values, *, ** and *** indicate significant at alpha value of 1%, 5% and 10% respectively.
2) Estimation by one step Diff-GMM (Arellano, and Bond)
4) The Sargan test is based on the assumption that the instruments are not correlated with the residuals.
5) AR1 and AR2 tests are based on the hypothesis that the errors are not serially correlated
6) The instruments used are the lags of the regressors.

7) Yearly dummies are excluded.

Table.1 above displays the results of the test conducted on the symbiotic relationship between financial stability and financial inclusion by usage for low-financial, moderate-financial and high-financial stable countries:

For the low-financial stable countries, the ECM coefficients is -0.36 when causation runs from stability to usage and -0.33 when causation runs from usage to stability, and the coefficients are both significant at 1 percent. This suggests that there is long run bidirectional influences between stability and usage. That is in the long run usage Granger causes stability, and equally stability influences usage. Likewise, financial stability response to temporal shocks in financial usage at the speed of 36 percent, usage response to temporal changes in financial stability at the rate of 33 percent. This means that short run disequilibrium in financial stability adjusts faster to equilibrium than short run disequilibrium in financial inclusion by usage. The coefficient of short run effects of usage on stability is -0.079 with p value of 0.83 and the coefficient of short run effects of stability on usage is 1.30 with p value of 0.01. This means that in the short run, there is no significant influence from usage to stability but there is significant influence from stability to usage. In other words, financial stability leads financial inclusion by usage in the short run. The coefficients of long run elasticity are 0.16 and 1.73 respectively for equations where stability is dependent variable and usage is dependent variable. The associated p values are 5 percent and 3 percent respectively. This implies that while, inclusion by usage responses to permanent shocks/changes in financial stability, financial stability also adjusts significantly to permanent shocks in usage. Thus, in the long run the changes in financial stability can be predicted from the changes in financial inclusion by usage.

For the moderate-financial stable countries, the ECM for the equation where stability is dependent variable is -0.92 and the ECM coefficient for the equation where usage is dependent variable is -0.36, and they are both significant at 1 percent. Therefore, there is evidence that long run causation run from financial stability to financial inclusion by usage, and vice versa. Additionally, short run disequilibrium is corrected within a year at the rate of 92 percent and 36 percent respectively for equation where stability is dependent variable and equation where usage is dependent variable. Meaning that stability adjusts faster to equilibrium than usage. Alternatively, financial stability responds to temporal shocks in financial usage, and in the same vein, financial usage responds to temporal shocks in financial stability. The coefficient of the short run effects for the equation where stability is dependent variable is 0.36 and the equation where usage is dependent variable is 0.33. The respective p values are 0.82 and 0.10. This is an indication that while financial usage has significant short run effect on financial stability, financial stability does not maintain significant effect on usage in the short run. However, the direction of the relationship is positive in both cases. The long run elasticity coefficient is significant in each of the equations but negative in the equation where stability is dependent variable. This implies that financial stability declines with the persistent shocks in financial inclusion. While financial inclusion rises with prolonged shocks in financial stability.

The results of the countries with highly stable financial system show that the ECM coefficient for equation where stability is dependent variable is -0.32 and equation where usage is dependent variable is -0.20. The two coefficients are significant at 1 percent level of significance. This is in tandem with the earlier results that confirm long run relationship between financial inclusion and financial stability in both countries with low and moderate financial stable system. The only difference is that in high-financial stable countries, financial stability responds slower to temporal shocks or changes in financial inclusion by usage than it responds to them in low and moderate financial stable countries. Therefore, policy needed to induce stability in high-financial stable country are different from those in low and moderate-financial stable countries. The coefficients of short run effects is -0.12 for equation where stability is dependent variable and 0.03 for equation where usage is dependent variable. Only the coefficient of usage equation that is significant at 5 percent. This suggests that there is significant short run dynamic (positive) effects of financial usage on financial stability. However, such influence does not run from stability to financial service usage. The coefficient of the long run elasticity is not significant even at 10 percent. This is an

indication that financial stability does not response significant to prolong shocks in financial inclusion, and vice versa. The AR (2) and Sargan tests reveal that all the equations are adequately specified, while AR (1) and Sargan in difference tests show evidence of autocorrelation and weak instruments. Thus, it is plausible to uphold the results displayed by these equations, and to discourse their link with existing literature on the subject matter.

Table 2: Causation between Financial Stability and Inclusion by Quality from 2007 to 2017
Dependent Variables

Ind. Variable	**Low-Financial**	**Stable Countries**	**Moderate Financial**	**Stable Country**	**High-Financial.**	**Stable Country**
	Δlnfinstab	Δlnfininc2	Δlnfinstab	Δlnfininc2	Δlnfinstab	Δlnfininc2
Δlnfinstab1(-1)	-0.60	-0.32	-0.58	0.003	-0.39	0.12
	(0.00)*	(0.75)	(0.00)*	(0.98)	(0.00)*	(0.59)
Δlnfininc2	-0.02 (0.35)		-0.13 (0.15)		0.03 (0.75)	
Δ lnfininc2(-1)	-0.01 (0.56)	-0.06 (0.64)	-0.32 (0.02)**	-0.43 (0.00)*	0.12 (0.40)	-0.35 (0.00)*
ECM	-0.46 (0.00)*	-0.04 (0.72)	-0.80 (0.00)*	-0.16 (0.08)***	-0.36 (0.00)*	-0.30 (0.00)*
lnfininc2(-2)	-0.46 (0.00)*		-1.84 (0.00)*		-0.27 (0.01)*	
Δlnfinstab1		-1.09 (0.21)		0.01 (0.93)		0.05 (0.80)
lnfinstab1 (-2)		-1.28 (0.10)***		-0.19 (0.49)		-0.004 (0.98)
Sum of Short-Run Coef	-0.03	-1.41	-0.45	0.013	0.15	0.17
Short-Run Wald Test (PV)	0.80	0.29	0.04	0.95	0.31	0.78
Long Run Coefficient	1.00	0.97	0.57	0.16	-0.33	-74
Long Run Coefficient (PV)	0.91	0.46	0.00	0.02	0.08	0.17
Sargan Difference Test (PV)	0.08	0.20	0.66	0.56	0.83	0.46
Sargan Test (P-Value)	0.59	0.08	0.00	0.47	0.96	0.06
AR1 (P-Value)	0.00	0.00	0.00	0.00	0.00	0.00
AR2 (P-Value)	0.70	0.14	0.13	0.24	0.31	0.09
Number of Observations	80	80	110	110	80	80
Number of Countries	8	8	11	11	8	8

1) The figures in parentheses are the p-values, *, ** and *** indicate significant at alpha value of 1%, 5% and 10% respectively.
2) Estimation by one step Diff-GMM (Arellano, and Bond)

4) The Sargan test is based on the assumption that the instruments are not correlated with the residuals.
5) AR1 and AR2 tests are based on the hypothesis that the errors are not serially correlated
6) The instruments used are the lags of the regressors.
7) Yearly dummies are excluded.

Table 2 displays the results of the test conducted on the interdependence between financial stability and financial inclusion by quality. The test is carried out for three sets of countries vis: countries with highly stable financial system, moderately stable financial system and poorly stable financial system.

For the low stable financial system, the ECM coefficients for the equation where stability is dependent variable is -0.46 and for the equation where financial inclusion by usage is dependent variable is -0.72. The p values are respectively 0 percent and 72 percent. This simply implies that long run dynamic influence does not run from financial stability to financial inclusion by quality, but in contrast long run influence trickles down from financial inclusion by quality to financial stability. Explicitly, by implication it means that in the long run, financial inclusion by quality leads to financial stability, and it responses fast to temporal breaks in financial stability. Therefore, there is one way/unidirectional causation between financial inclusion by quality and financial stability in countries with poorly stable financial system. The coefficients of the short run effects are -0.03 for financial stability equation and -1.41 for financial inclusion by quality equation. Both coefficient are not statistically significant. Meaning that in the short run dynamics, financial inclusion by quality does not drive financial stability positively (and vice versa), and there is no significant influence in-between the two variables in the short run. Furthermore, the long run elasticity coefficients are positive for the two equations but not significant. Thus, we have confirmed that financial stability does not respond to permanent shocks in financial inclusion by quality.

For the countries with moderately stable financial system, the coefficients of the ECM term are -0.80 and -0.16 respectively for stability equation and financial inclusion by quality equation. However, while the ECM coefficient is significant at 1 percent for stability equation, it is significant at 10 percent for the financial inclusion equation. This suggests that the two variables maintain a long run relationship with a bidirectional causation running from both sides. Therefore, financial stability responds to temporal shocks in financial inclusion by quality, and the same time financial inclusion by quality responds to temporal breaks in financial stability. The short run effect coefficients are -0.45 and 0.013 respectively for the two equations. But while the coefficient is significant at 5 percent for stability equation it is not significant even at 10 percent for financial inclusion by quality equation. This confirms the argument that short run dynamic influence only run from financial inclusion to stability (however, influence could run from stability to inclusion in the long-run). Confirming this from the results, the ECM coefficients are significant for the two equations, meaning that there is evidence of feedback effects. The long run elasticity coefficients are positive and significant for both equations. Hence, for the countries with moderately stable financial system financial stability respond to permanent shocks in financial inclusion by quality.
The equations for the countries with highly stable financial system have ECM coefficients -0.36 and -0.30, and they are both significant at 1 percent. This implies that there is long run relationship between financial stability and financial inclusion by quality. Alternatively, in the long run financial stability granger causes financial inclusion by quality (and vice versa). The coefficients of the short run effects are 0.15 and 0.17 for the two equations. Meaning that there is no significant short run influence from financial inclusion by quality to financial stability. However, there is existence of positive interaction between the variables in the short run. The coefficients of the long run elasticity appear to be negative but only significant at 10 percent alpha value for the financial stability equation. It means that only financial inclusion by quality that responds to permanent changes in financial stability in countries with highly stable financial system.

Summary, Conclusion and Recommendation

Summary of Findings

The hypotheses tested is the assertion that there is existence of symbiotic causation/influence between financial stability and financial inclusion by either usage or quality. The test was conducted for three samples of SSA (countries with low stable, moderately stable and highly stable financial systems). The results show that all the ECM coefficients with respect to financial stability-financial inclusion (by usage) relationship for the three sets of countries are negative and significant. This means that there is a bidirectional long run influence between financial stability and financial inclusion by usage for the three sets of countries. This result agrees with a priori expectation that financial inclusion drives stability and in turn financial stability reinforces to promote further inclusion. By implication, as more persons are captured into formal financial net by way of providing financial services that meets their need at affordable cost. Such persons will be able to invest in productive ventures that will create wealth, generate employment and reduce poverty. When persons are gainfully employed, they can achieve food security and weather financial and economic shocks as they arise. They would be able to save money for precautionary, transaction and speculative purposes. Banks and other financial institutions mobilise funds from the surplus to the deficit units for further investment by all economic agents thereby promoting stability and economic growth. This argument can be encapsulated in a number of development finance theories which includes Schumpeter (1911), where the author demonstrated that the services provided by financial institution are impetus for technological innovations, which consequently trigger economic prosperity and stability. Others are supply leading and demand following finance theories, social development, financial intermediation and mutual dependency theories amongst others. CGAP (2012), Christine (2016), Robinson (2010) and Serrao (2012) posit that extending financial access to the poor will help them create wealth and manage their financial lives as well as contribute to economic growth and stability. In the same vein Hanning et. al (2010) posit that although financial inclusion exposes the lender to institutional risk, such risk are managed at the institutional level and do not result to systemic risk. The reason is that low income savers and borrowers are resistant to external shocks emanating from financial crisis because they keep their deposits secured and service their loans as they fall due.

The second major finding is that there is existence of bidirectional long run influence between financial inclusion by quality and financial stability for both moderate and high-financial stable countries. Evidence of unidirectional causation is found for countries with poorly stable financial system. Furthermore, the finding reveals that financial inclusion by quality adjusts faster to financial stability for countries with highly stable financial system, than for countries with either poorly stable or moderately stable financial system. Equally surprising, is that financial inclusion by quality has positive short run effects on financial stability for both countries with moderately and highly stable financial systems. While the effects appear to be negative for countries with poorly stable financial system. This demands that the countries must run different short run domestic policy for intermediation particularly varying the ratio of depositors to borrowers in order to improve financial stability. Long run elasticity is negative for countries with highly stable financial system, but however, positive for countries with poorly and moderately stable financial structures. By implication, for highly stable financial system countries, financial stability declines with prolonged changes in financial inclusion by quality; conversely, for poorly and moderately stable financial system countries, financial stability increases with prolonged changes in financial inclusion by quality. Therefore, long-term policy adjustment must vary in these countries.

Conclusion

In the first place, the study establishes evidence of long run bidirectional influence between financial stability and financial inclusion for SSA countries. In view of this, the study concludes that financial inclusion induces the growth rate of financial stability, simultaneously; stability causes inclusion to change

significantly in the long run. In addition, the study concludes that financial stability adjusts more quickly to temporal shocks in financial inclusion by usage for countries with moderately stable financial system, than countries with either poorly or highly stable financial system. On the contrary, financial stability reacts more quickly to temporal shocks in financial inclusion by quality for countries with highly stable financial system than poorly and moderately stable financial systems. Based on one of the major findings of this study, the researcher concludes that either in the short run or long run dynamics, financial inclusion by quality is a positive determinant of financial stability for countries with poorly and moderately stable financial systems, which is in tandem with the general claims in the literature. However, for the highly stable financial system, financial inclusion by quality is only a positive determinant in the short run go-ahead.

Recommendations

Government, through the central banks should mandate domestic commercial banks to increase deposit rate or shrink the gap between deposit rate and lending rate. That is government should introduce a potentially optimum rate for depositor funds by the policy of guided deregulation. This will unequivocally attract much funds from the public and the number of people who use financial services will increase over time. Thus, consequently the financial system will become more stable. This is a sufficient reason for commercial banks to introduce a self-sustaining policy that can mobilize deposit with attractive interest rate to further reduce the idle funds outside the banking system. In addition to encourage investment in rural communities by financial institutions government should provide amenities such as uninterrupted electricity or aid the means of sustaining consistent power supply; probably through subsidies being granted to power holding companies. This will lead to a drastic reduction in the cost of intermediation, and consequently enhance the quality of financial services.

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Construction of The Methodic Assess Economic Efficiency from The Implementation of An Investment Project of Introduce Lean Production Tools

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Abstract

Modern realities of economic activity in the conditions of digital transformation of economy demand from industrial enterprises of any scale to provide search of intensive ways to increase productivity and reduce production costs. In the practice of developed countries, there are many methods to streamline economic processes, which can include lean production tools. Russian enterprises practically do not use lean technologies in their activity, which does not allow obtaining additional financial benefits from more competent use of available material and human resources. This article is devoted to the development of instrumental approaches to develop a method that will calculate the economic efficiency of the investment project to implement lean production on specific structural units of the industrial enterprise. For quantitative and qualitative evaluation of the efficiency of the investment project it is proposed to use an algorithm based on mathematical calculation of indicators. Practical application of the proposed instrumental approach will allow to substantiate the efficiency of the investment project on the introduction of lean production tools at certain departments of the industrial enterprise and will give a reasonable conclusion about its introduction at other structural units. It is offered to direct the further workings out on adaptation of the developed approach for estimation of advantages from introduction of lean production in various branches of national economy that will allow to receive more complete picture concerning efficiency of lean technologies at the various industrial enterprises, and also will give the chance to develop recommendations, taking into account branch specificity.

Keywords: Lean Manufacturing, Lean Management, Financial Benefits, Finance, Instrumental Approach, Process Optimization, Investment, Loss Reduction, Investment Project, Cost-Effectiveness, Effective Management.

Introduction

Unstable economic conditions make it necessary for business entities to find new ways of organizing effective management. In such conditions, intensive methods that allow a more rational use of enterprise resources, primarily internal ones, come to the fore. At the macro level, it is industrial economic entities that contribute to the strategic competitiveness of the national economy, which increases the importance of finding ways to maximize the efficiency of their functioning at the expense of available internal reserves and rational production (Balashova, Gromova, 2015; Zharikov et al, 2018).

Thoughtful introduction of lean production tools will allow to get a positive effect caused by saving of material resources, reduction of working hours of technological equipment and employees at the workplace. The key idea of lean production is the development of social orientation of business and subordination of economic activities to the interests of consumers, taking into account the capabilities of human resources in the company itself. Employees perform their functions in order to meet the needs of consumers. There is a minimization of secondary tasks that distract employees from their functions and lead to increased workload (Balashova, Gromova, 2017; Vetrenko et al, 2017; Ostrikova et al, 2019).

The development of economic theory has led to the fact that the impact of tangible assets on the capitalization of the enterprise has decreased and has given way to intangible or intangible elements, which determine the intellectual capital. The main factor that affects modern production is people, their knowledge, talents, skills and ability to make creative decisions. It is these factors that determine the commercial success of a business entity in the process of conducting its activities, so that workers, employees, and management personnel who provide production must have the appropriate qualifications, competence, and motivation (Vinogradova et al, 2017; Tkachenko et al, 2019; Zaytsev et al, 2019).

Graphical reflection of the essence of lean production in corporate social responsibility is shown in Figure 1 (Markov, Markova, 2018).

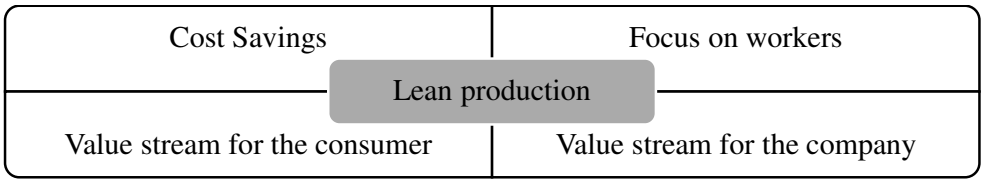

Fig. 1: Lean manufacturing in the CSR system

In the "household" perception, lean production is viewed only as cost saving and worker orientation, while the flow of values to consumers and the company itself is ignored. The object of management in this case is the formation and maintenance of the flow of value creation at an optimal level. It is necessary to create a situation where all participants in the flow become profitable to make efforts to achieve their goals, while other alternative actions were not economically profitable (Pavlova et al, 2018; Asaturova, Khvatova, 2019).

It is worth considering that there is no investment without risk. It is necessary to realize impossibility of achievement of 100 % profit, so the organization in the course of conducting the economic activity aspires to minimization of risks, rejecting inefficient investment projects. The factors influencing profitableness of the investment project on introduction of tools of lean production, it is very difficult to calculate. These may be external macroeconomic reasons in the form of economic crises, growth of inflationary processes or currency fluctuations, as well as internal factors related to internal problems (Avduevskaia et al, 2018; Fayzullin, Dmitriev, 2020).

Thus, introduction of lean production should be grounded, that defines high urgency of research on construction of a technique of an estimation of economic efficiency from realization of the investment project on introduction of tools of lean production.

Scientific novelty of research is under construction on reception of possibility of a substantiation of efficiency of lean technologies on separate divisions of the enterprise both in quantitative, and in qualitative expression. Also the author's approach assumes search of a range of possible financial benefits, considering impossibility of an exact estimation of efficiency. The given substantiation will allow to judge about the further introduction of the given tools on other structural divisions.

The aim of the study is to develop an instrumental approach that allows to assess the effectiveness of the investment project for the implementation of lean production tools in individual production units

of the industrial enterprise.

This requires the following tasks to be completed:

- To consider the essence of lean production from the point of view of evaluation of future efficiency, and also to compare the traditional approach of doing business with the concept of lean production;
- Build a model that can determine the level of lean production implementation and identify the difference between basic and absolute efficiency from project implementation;
- Determine the method of calculation that will help to identify the range of profit obtained in quantitative and relative terms;
- Develop an algorithm of the instrumental approach, which will include step-by-step actions.

Theoretical and practical importance of the work consists in substantiation of the investment project realization on introduction of tools of lean production to use on separate structural divisions of the industrial enterprise by performance of algorithm developed by the author that has been practically tested on an example of the economic entity. At the same time, the importance of the work is emphasized by the possibility of defining both minimum (absolute) efficiency from the investment project and maximum (basic) efficiency, taking into account the difficulties of precise evaluation of financial benefits from the introduction of lean technologies in the production process.

Research Methodology

For a substantiation of development of a technique of an estimation of efficiency from introduction of lean production it is necessary to consider its essence from the point of view of an estimation of future efficiency. It is offered to carry out the analysis of available researches on resource management and use of lean technologies in production processes that will allow to make comparison of the traditional approach of business dealing with the concept of lean production.

The essence of modern resource management is explored in detail in the works of T. Luyster, D. Tapping (2006), D. Hobbs (2007), A. Byrne, J.P. Womack (2013), according to which the use of resource-saving technologies consists in achieving the efficiency of enterprises' activities through a more rational use of available resources, minimizing production costs, increasing profits, maximizing the capitalization of industrial enterprise. In these works there is a sufficient amount of theoretical material, on the basis of which it is possible to build an author's method of assessing the efficiency of lean production at an industrial enterprise.

Lean Production (Lean Production or Lean Manufacturing) is one of the main models of resource management, which was developed by Toyota and otherwise called Toyota Production System (Ohno, 1988). The concept of lean production is discussed in detail in J. J.'s works. Liker (2004) and M. Rother (2009), according to which the company gains a competitive advantage by implementing measures to continuously reduce costs, improve the quality of products and processes, optimize the speed of material flow by following the logic of Just In Time, improve operational efficiency through existing internal reserves and available resources through continuous improvement of all processes, and so on.

In the course of the analysis of the economic literature in the field of lean production, the work of J. J. was highlighted. Liker (2004), who reviewed the practical results of implementing Toyota's production system at various stages of business activities. It should be noted that from the point of view of this concept, lean technologies means the implementation of certain measures to streamline the process, including the creation of output values for the end user of the product, building a consistent stream of creating such values, ensuring continuity of material flow, "pulling" from the customer down the process, as well as the desire for further improvement (Muris, Moacir, 2010).

Based on scientific articles by A.S. Ptuskin, V.Y. Antsev, N.A. Vitchuk (2014), A.B. Dutta, S. Banerjee (2014) and E. Vitchuk (2014). Frackleton, R. Girbig, D. R. Girbig, D. Jacquemont, A.J.

Singh (2014), Zaitsev (2019) it is possible to draw a conclusion that construction of model of calculation it is necessary to understand essence of lean production which organization consists that the finished production should pass stages of addition of cost with the minimum quantity of expenses or with absence of any kind of losses. Lean production is a philosophy of management and culture of production, when every element and subject of an intrafirm structure seeks continuous improvement. Thus, introducing tools on one structural division, it is necessary to direct investments and on neighbouring divisions on which lean production will not be realized that is connected with interaction of divisions.

Having analyzed the works of M. Imai (1986), N. Vamsi, K. Jasti, R. Kodali (2015), M. Butler, M. Szwejczewski, M. Sweeney (2018), V.V. Ling, A.V. Yumashev (2018) proposed a comparison of traditional business and the concept of lean production.

We can say that the main characteristics of traditional business are: meeting targets and achieving maximum indicators of final results by any available means, weak production flexibility and high dependence on supplies in large volumes, focus on mass consumers and mass production of products in large volumes, the company's management is aimed at solving problems and finding those responsible for their appearance, strong control over the activities of production and management workers, a high degree of bureaucratization and hierarchy of management, workers and employees are considered as costly resources of the company.

While the production based on the concept of lean production can be characterized as decentralized, aimed not at identifying problems, but at preventing their occurrence, where the implementation of measures to continuously improve all processes takes place. In such a management, the importance of employees and workers is increased, control is reduced, the cost of training and professional development is increased, in case of problems the culprit is not so important, and the possibilities to correct them, production is focused on reducing changes.

Thus, it can be concluded that the use of lean production can have significant positive effects in the process of production activities, while the concept is based on organizational measures and investment is minimal. As a result of implementing lean manufacturing tools, the company has developed a system of organization and management of production operations, which aims to develop relationships with suppliers and consumers, allowing to adjust production in accordance with customer needs and minimize production defects (Kiseleva et al, 2017; Ivanina, Dmitriev, 2019).

Reductions in production, labour and time costs are not final positive effects. In addition to the above, there is a reduction in production space while maintaining the specified capacity (Tolstykh et al, 2017).

The use of lean production tools in practice leads to the reduction of labor costs by at least 40%, production areas and capital investments by at least 55%, more than 80% less time for the development of new products and production orders (Muris, Moacir, 2010; Tolstykh et al, 2017; Pavlova et al, 2018).

The study of lean production was mainly conducted by foreign authors and there are a large number of scientific and applied works on this problem. Nevertheless, there is an insufficient quantity of approaches which can be used for a substantiation of introduction of the lean approach from the financial point of view, considering impossibility to give an exact estimation of the received financial effect that confirms expediency of working out of a theme.

The great importance of lean manufacturing processes affects the innovative development not only of economic entities, but also of territorial associations (Rudskaia, 2017). From the industrial point of view, there is a growth of intellectual rent, which can be calculated by the method proposed by V. Degtereva, A. Zaytsev, N. Dmitriev (2019). The growth of intellectual rents in enterprises leads to innovative economic renewal at all levels.

E.S. Balashova, E.A. Gromova (2017) and J. Asaturova (2019) note in their works that the lack of a unified concept for calculating the economic effect of the introduction of lean production tools is a problem in the context of Russian experience of industrial development. In their work the ways of calculating the economic effect were proposed and the prospects for further development of lean production as an opportunity to increase the competitiveness of the industrial sector of the economy were determined.

In order to develop an instrumental approach to evaluate the implementation of the investment project to introduce lean production, the study used a mathematical method of making calculations. The main theses of this study were published in the paper by N.D. Dmitriev and A.A. Zaytsev (2019).

Research Results

Measures to implement lean production tools are carried out in separate units of the company, so it is necessary to take into account the economic effect of a particular unit. Investment expenses for project realisation are minimal, however there are difficulties at an estimation of its economic efficiency as profit growth can be insignificant that is connected with insufficiency of introduction of actions in concrete division or negative consequences from absence of these actions in other structures (Suetina, Safina, 2018).

Any investment of economic resources in the long term should have the goal of generating income in the future. To conduct a competent assessment of the financial benefits of lean production tools it is necessary to achieve a certain level of implementation, it can be conditionally called the basic value, above which the company definitely receives benefits.

If annual production data are available, it is possible to present these data in monetary terms, and if there is information on the units where lean production is implemented, it is possible to determine the level of its implementation in the company.

To determine the annual average profit for all structural units it is necessary to use formula 1:

$$V = \sum_{i}^{N} Vi + \sum_{i}^{L} Vi \ , \qquad (1)$$

where V is the average annual output in monetary terms for all divisions of the enterprise;

Vi - the average annual volume of produced goods in monetary terms, obtained at a specific structural unit of the enterprise, where i - number of structural unit (subdivision) at the enterprise;
N - number of structural units where lean production tools are used.
L - number of structural units where lean production tools are not used, but investments are required to maintain functioning.

Then the level of implementation of lean production at an industrial enterprise can be calculated by formula 2:

$$Lm = \frac{\sum_{i}^{N} Vi}{V}, \qquad (2)$$

where Lm is the level of lean production implementation;
V - the average annual volume of produced goods in monetary terms for all divisions of the enterprise;

Vi - the average annual volume of produced goods in monetary terms, obtained at a specific structural unit of the enterprise, where i - number of structural unit (subdivision) at the enterprise;
N - number of structural units where lean production tools are used.

In order to find the absolute financial benefits, it is necessary to determine the basic value of the lean manufacturing implementation level, which can be designated by $Lmbas$. If this value exceeds Lm,

there will be an increase in profits, which will be 100% dependent on lean production (in the absence of other related investment projects). This is shown graphically in Figure 2 (Y1-Yj - time period).

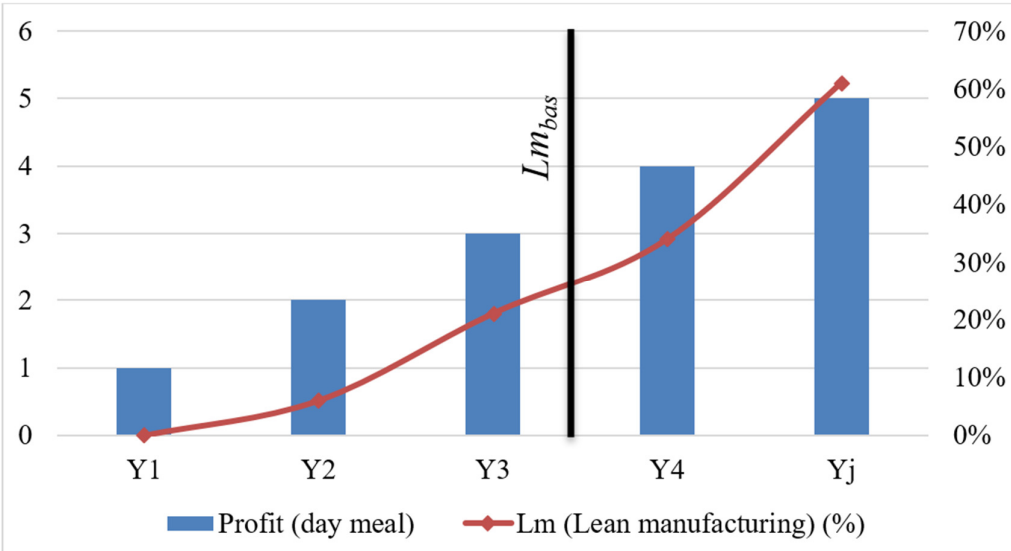

Fig. 2: Graphic display of the basic value of the lean production implementation level (*Lmbas*)

That is, the absolute efficiency at *Lmbas* > Lm will be equal to the difference between the profit that should have come in the standard scenario and the profit in fact. The basic value of lean production level in the company can be found using both mathematical methods and expert method, based on the variety of implemented tools.

On the example of Figure 2, for the absolute profit we consider only profit above plan, which was received for a time period starting from Y4, while for the time period Y1 there was no lean production, and profit above plan received for periods Y2 and Y3 can not be attributed with 100% probability to lean production.

So it is possible to speak about existence of 2 possible kinds of profit from the investment project on introduction of tools of lean production: approximate and absolute.

If $P_{(plan)}$ is the profit that the enterprise will get without introducing lean production, and $P_{(fact)}$ is the actual profit that the enterprise will get after introducing lean production, then the approximate profit is equal to their difference (ΔP). Estimated profit is calculated using formula 3.

$$\Delta P = \sum(\mathrm{Yj})\ (P_{(fact)} - P_{(plan)}), \qquad (3)$$

But if we take into account only the profit made after the base value of Lean Production Implementation Level (*Lmbas*), then the absolute profit (ΔRabs) will be equal to the difference between the actual profit made during these years and the planned profit. In this case, the profit made in excess of the plan for the years up to the baseline implementation level is taken as a deviation from the plan and is not taken into account for the calculation of the absolute indicator. Absolute profit is calculated using formula 4.

$$\Delta P_{(abs)} = \sum(\mathrm{Yj} \geq Lmbas)\ (P_{(fact)} - P_{(plan)}), \ (4)$$

Figures 3 and 4 (Y1-Yj - time period) show the graphical change in profits before and after the introduction of lean production, as well as the dynamics and accumulation of absolute and approximate financial benefits.

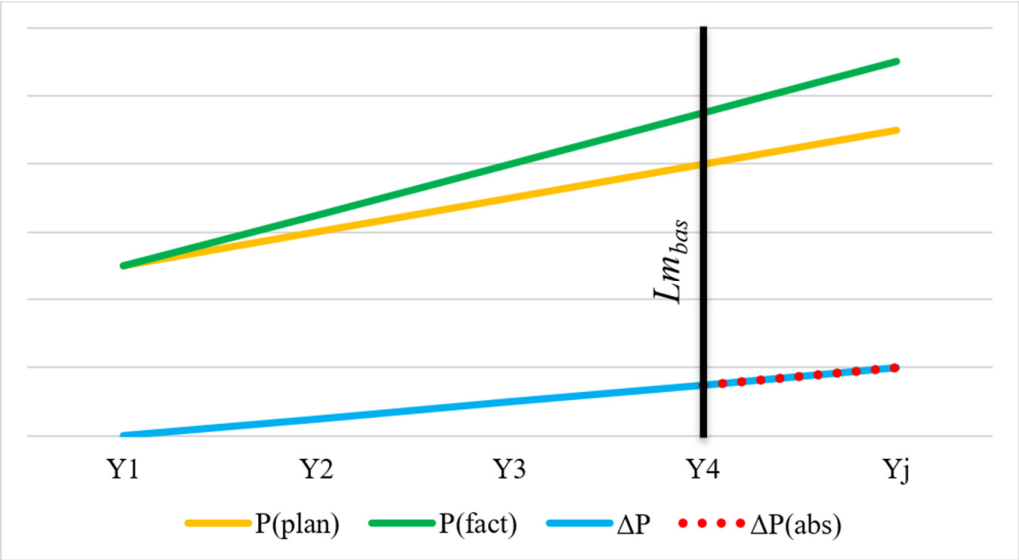

Fig. 3: Graphic representation of planned and actual profit, as well as absolute and approximate financial benefits received from the investment project

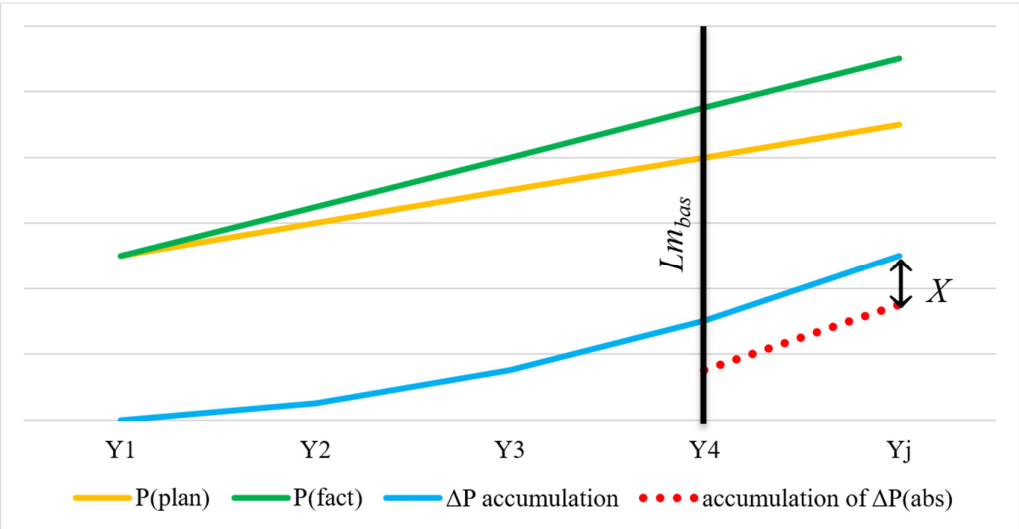

Fig. 4: Graphic representation of planned and actual profit, as well as accumulation of absolute and approximate financial benefits received from the investment project

According to Figure 4, the profit that the company will receive from the investment project is in the range of *X*. Thus, the profit range can be expressed using formula 5:

$$\Delta P \leq X \geq \Delta P_{(abs),} \quad (5)$$

After quantitative calculations, there is a relative economic effect (*E*). It reflects the qualitative result of the investment project to implement lean production in the company for a specific period of time. The amount of investment required for the project (*I*) depends on many factors and is calculated separately, taking into account production needs and specific lean production tools for each structural unit.

However, the amount of investment in the introduction of lean production is insignificant, as notedin the works (Michael, George, 2003), (Markov, Markova, 2018), (Suetina, Safina, 2018).
Calculation of investments by structural units is calculated using formula 6:

$$I = \sum_{t} \left(\sum_{i}^{N} Ii + \sum_{i}^{L} Ii \right) , \qquad (6)$$

where I is the level of investment needed to implement lean production;

Ii - volume of investments in monetary terms necessary for a specific structural unit of an enterprise, where i - number of structural unit (subdivision) at the enterprise;
N - number of structural units where lean production tools are used.
L - number of structural units where lean production tools are not used, but investments are required to maintain functioning;
t is a time period.

The relative economic effect of the estimated profit is calculated using formula 7:

$$E = \Delta P / I, \qquad (7)$$

The relative economic effect of absolute profit is calculated using the formula 8:

$$E_{(abs)} = \Delta P_{(abs)} / I, (8)$$

Thus, the relative efficiency (Y) of the investment project is in the range (formula 9):

$$E \leq Y \geq E_{(abs)}, \qquad (9)$$

The general algorithm of evaluation of the investment project on implementation of lean production tools is shown in Figure 5.

1. Calculation of investment investments for the project, their justification and feasibility.
$$I = \sum_t (\sum_i^N I_i + \sum_i^L I_i)$$

2. Calculation of the planned average annual volume of production by structural divisions in monetary terms.
$$P_{(plan)}$$

3. Calculation of the actual average annual volume of production by structural divisions in monetary terms.
$$P_{(fact)}$$
$$V = \sum_i^N V_i + \sum_i^L V_i$$

4. Determining the level of lean manufacturing implementation for each year
$$Lm = \frac{\sum_i^N V_i}{V}$$

5. Determining the basic level of lean manufacturing implementation in the enterprise
$$Lm_{bas}$$

6. Calculation of approximate profit from the investment project
$$\Delta P = \sum(Y_j)\,(P_{(факт)} - P_{(план)})$$

7. Calculation of the absolute profit from the investment project
$$\Delta P_{(abs)} = \sum(Y_j \geq Lm_{bas})\,(P_{(fact)} - P_{(plan)})$$

8. Determining the range of received profit (X) from the investment project
$$\Delta P \leq X \geq \Delta P_{(abs)}$$

9. Calculation of the relative economic effect approximate profit
$$E = \Delta P / I$$

10. Calculation of the relative economic effect of the absolute profit
$$E_{(abs)} = \Delta P_{(abs)} / I$$

11. Determining the range of relative efficiency (Y) of an investment project
$$E \leq Y \geq E_{(abs)}$$

12. Final conclusions on the effectiveness of the investment project in the structural divisions and the decision to extend it to other divisions

Fig. 5: Evaluation algorithm of the investment project on implementation of lean production tools

Consideration of the proposed algorithm on a practical example is a priority for further development of the problem. At the moment, the authors analyze the company that implemented a project to

introduce lean production in 2015.

The company implements its activity on the territory of the Russian Federation in the industry. The company has 6 structural units, two of which have implemented projects on the introduction of lean production tools as an experiment. The total investment amount was 16.41 million Russian rubles.

The authors analyzed the dynamics of productivity growth in each of the 6 divisions both after the implementation of the investment project and after. As a result, there was a sharp increase in productivity in lean production units.

Based on the author's calculations, it was revealed that from 16.41 million rubles of investment over 4 years, the company received from 43.63 (approximate profit) to 53.12 (absolute profit) million rubles of net profit (excluding discounting), which indicates the effectiveness of the project. Accordingly, the efficiency ranged from 324% (approximate) to 266% (absolute).
After obtaining all the necessary data, it is possible to conduct a more comprehensive study with consideration of each individual step of the author's algorithm, discussed in figure 5.

Conclusions

Lean production can become a rational way to manage the efficiency of the innovation program at an industrial enterprise. Resource management makes it possible to optimize intra-company processes with minimum implementation costs and focus on organizational components (Nikolova et al, 2017).
The result of the proposed algorithm will be the result that testifies to the efficiency of the investment project for the implementation of lean production tools for a specific structural unit. On the basis of the received result it is possible to draw a conclusion about possibility of the further introduction of the given measures on other structural elements.

The instrumental approach will allow quantitatively and qualitatively to estimate economic efficiency from realization of measures on introduction of lean production in the company and to substantiate possibility of realization of such project in practice.

In conclusion of the article it is possible to note that in the Russian practice lean production is practically not used, the main constraint is the imbalance of interests of market participants and non-market mentality of the majority of owners, managers and employees of Russian companies. There are considerable contradictions in the regional innovation activity, which makes it necessary to find and overcome them (Goncharova, Degtereva, 2018).

It is offered to direct the further workings out on adaptation of the offered approach for an estimation of advantages from introduction of lean production in various branches of a national economy.

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Assessment of The Safety of Training Efforts Based on BMIS Of Candidates for Professional Soldiers

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Abstract

The combat task execution and soldiers' readiness are influenced by many factors. One of them is the proper preparation for the task execution, achieved through military training. Equally important is mental and physical resilience, determining the right attitudes even in the toughest environment. Healthy lifestyles - including proper nutrition - have a major impact on the fitness of troops. One of the indicators for fitness assessment is the Body Mass Index (BMI). It has been analysed in this article. The test group consisted of candidates for professional soldiers. Based on the collected data, the impact of gender and year of studies on cadet BMI level was assessed. ANOVA variance analysis was used for this purpose. The obtained results showed a significant correlation between the selected factors (gender and year of studies) and the examined variable, which indicates a need to take measures to regulate the process of nutrition and enhance physical activity.

Keywords: ANOVA Variance Analysis, Cadet Nutrition, BMI, Combat Readiness

Introduction

Nutrition is one of the key determinants of the proper functioning of the human body. Depending on such variables as social or occupational group, the requirements on food consumption may be completely different.

Armed forces nutrition is a variety of mass nutrition. It has to satisfy all the soldier's needs in this area, resulting from activities in different situations and under different physical strain. A food ration should be appropriate in terms of quantity and quality, complement the loss of energy, provide building blocks for the regeneration of tissues that are being used, and contain the required number of ingredients regulating metabolism. In order to develop properly and live in full health, a person should consume daily food that provides the necessary energy volume and contains about 60 different nutrients (Bertrandt, 2002). A low energy value of the food ration may cause soldier malnutrition. The resulting energy deficit, in the first phase, does not always cause visible symptoms, because then the adaptation mechanisms are activated, consisting, *inter alia*, in the reduction of resting metabolic rate (RMR). Prolonged caloric deficiencies cause malnutrition, which in turn trigger certain disease symptoms. Also, excessive consumption (over-consumption) may adversely affect the soldier's health, causing the formation and development of metabolic diseases

of civilisation (Hill et al., 2011; Purvis et al., 2013). This is mainly due to the excessive energy value of food, containing excessive fat and simple carbohydrates in the ration. On the other hand, prolonged consumption of monotonous meals in terms of quality can cause deficiencies in certain nutrients and resultant health disorders (Pillsbury et al. 2011; Caldwell et. al, 2017; Rahmani et al., 2018).

Contemporary scientific research shows that there is a close correlation between the foodstuffs consumed, the nutrients they contain and human health (Papas, 2019; Celis-Morales et al., 2017). This proves that the proper body development, its physical and mental fitness, as well as its general health condition are related to nutrition, the health quality of food and its nutritional value. Knowledge in this area is becoming increasingly important, especially with regard to metabolic disease prevention. In order to maintain proper life processes, the human being should consume a specific portion and type of food every day, providing an appropriate dose of energy and the necessary amount of nutrients. This is referred to as rational nutrition.

In the nutrition of soldiers, as in the nutrition of any man, the priority is to provide the right energy volume. While planning energy demand in the form of carbohydrates, fat and protein, as well as for microelements and vitamins, one should not forget to take into account physical activity and the tasks performed by the soldiers.

Candidates for professional soldiers are a specific group requiring an individual approach. Taking into account the specific operational conditions of cadets, it can be concluded that proper nutrition of the troops has a great impact on the official task execution and, consequently, on the proper operation of the armed forces. In the nutrition of soldiers, special attention should be paid to many factors characteristic only for this group. It requires, above all, a proper planning process that takes into account the daily lifestyle, the duties performed and the resultant physical and mental (emotional) burden. Food supplied to soldiers should provide them with the appropriate nutritional and energy value to enable them to regenerate their bodies before the performance of further tasks. Special attention should be paid to the type of foodstuffs consumed, but also to the facilities where soldiers are fed. They must meet a number of quality and proper performance requirements. Failure to meet the quality and functional requirements may lead to a deterioration in the quality and safety of the meals consumed inside them and thus create conditions representing health hazard and, in extreme conditions, even life hazard to the consumers. In order to prevent such problems, the Polish Armed Forces pay special attention to maintaining high levels of nutrition. However, implemented solutions are not subject to evaluative surveys. Especially in the group of candidates for professional soldiers, their readiness to accept the proposed standards is assumed. Moreover, cadets, due to their position in the military hierarchy, are not willing to lodge claims and make comments - including those on nutrition. That is why this group has become the subject of survey.

Military nutrition literature provides knowledge primarily on the assessment of the consumed products from the perspective of satisfying energy and nutritional demand (Tomczak et al., 2016; Bertrandt, 2013). Macroelements such as protein, carbohydrates and fats as well as microelements such as iodine (Szymandera-Buszka et al., 2007), magnesium (Bertrandt et al., 2001) or calcium (Bertrandt et al., 2018), vital from the perspective of human body functioning. Various military formations are being studied, but special attention is paid to the feeding of special units (Tomczak et al., 2014) and soldiers carrying out tasks under Polish military contingent (PKW) (Kłos et al., 1997) , Budinský et al., 2012). Moreover, most of the publications concerning nutrition of the Polish soldiers are in Polish, which significantly limits their availability. Articles written in English most often concern armed forces in other countries (Kuhar et al., 2009, Bovill et al., 2003) and, according to their authors, can only serve as a point of reference for comparisons, as national characteristics and culture of a given country strongly influence the formation of eating habits.

This article analyses one of the factors evaluating the correct body weight and at the same time the nutritional pattern in a military unit. The Body Mass Index (BMI) was selected. Thanks to BMI, you can learn about the state of your body fat and determine whether your lifestyle and diet are appropriate. BMI correct value determines high ability and readiness to perform tasks, better condition, reduces the risk of metabolic diseases. In order to assess the impact of selected factors - in this case related to gender and year of studies of the respondents - the ANOVA's Analysis of Variance was applied to their BMIs.

Survey Method

The collected data concerned the evaluation of the level of soldiers' nutrition carried out among candidates for professional soldiers in one of the Polish military schools. The survey was carried out in December 2019. 100 students of the 1st, 2nd, 3rd and 4th year of studies were covered by the survey. The main objective of the survey was to assess the nutrition level at the military canteen. The survey material comprised a questionnaire, involving questions about the level of soldiers' nutrition in terms of quality, quantity and nutrition diversity.

The respondents were of similar age - from 22 to 25 years of age, but they were students of different years of studies. The most numerous group was made up of men, the number of women was far fewer. Detailed results are presented in Table 1.

Table 1: Size of surveyed groups of respondents

Surveyed respondents					
Gender	1 year of studies	2 year of studies	3 year of studies	4 year of studies	Total
Man	21	16	16	22	75
Woman	5	10	7	3	25
Total	26	26	23	25	100

Additional data in the carried out surveys were questions about the weight and height of the respondent. Apart from satisfaction with the nutrition level, an important issue is the evaluation of the body mass index. There are many indicators to keep track of whether your body weight is correct and whether there is a risk of diseases associated with an improper diet. The Body Mass Index (BMI) is a particularly useful indicator in assessing the risk of diseases such as atherosclerosis or ischemic heart disease (IHD) that are caused by overweight. This BMI is reliable for adults, excluding pregnant women, athletes and people with significant amounts of muscle tissue, as well as the elderly.

BMI is calculated by comparing height with body weight, according to the following formula (Tomlinson et al., 2019):

$$BMI = \frac{weight\ [kg]}{height^2\ [m]} \tag{1}$$

The result obtained can be analysed by reference to the following values (Khan, 2018):

- below 16 – starved;
- 16 - 16.99 – skinny;
- 17 - 18.49 – underweight;

- 18.5 - 24.99 - correct weight;
- 25.0 - 29.9 – overweight;
- 30.0 - 34.99 - 1st degree of obesity;
- 35.0 - 39.99 - 2nd degree of obesity;
- above 40.0 - extreme obesity.

Therefore, in this article, using the information collected about the height and weight of students, the BMI index has been calculated and examined whether its level is significantly influenced by gender and the year of studies. Based on the results obtained, BMI weight and growth index values and total body fat content were calculated as the basis for determining the occurrence of overweight and obesity. The obtained BMI values, according to the Ferro-Luzzi classification(Ferro-Luzzi et al., 1992), made it possible to classify the surveyed soldiers into underweight, overweight and obese categories (Table 2.).

Table 2: Data collected for the survey.

	Height [m]	Weight [kg]	BMI	Gender	Overweight	Year of studies
1	1.69	68	23.8	M	NO	3 year
2	1.73	69	23.1	M	NO	1 year
3	1.65	57	20.9	F	NO	2 year
4	1.74	69	22.8	M	NO	3 year
5	1.76	74	23.9	M	NO	3 year
6	1.75	74	24.2	M	NO	4 year
7	1.74	70	23.1	M	NO	1 year
8	1.72	64	21.6	M	NO	2 year

It turned out that in the surveyed group there are cases where the ratio of weight to the square of height is too high and on this basis selected students can be classified as overweight. Detailed results in the male and female categories are presented below in Fig. 1, whereas for individual years of studies in Fig. 2.

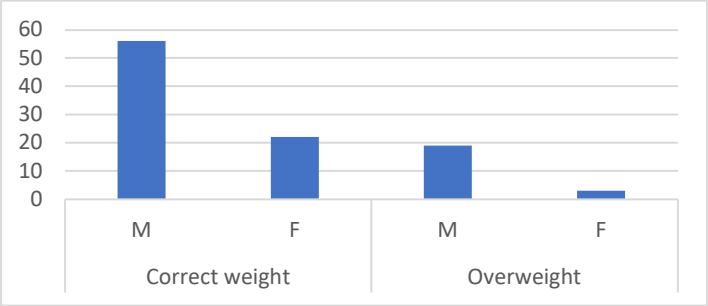

Fig. 1: Number of overweight and normal weight people in the male and female population

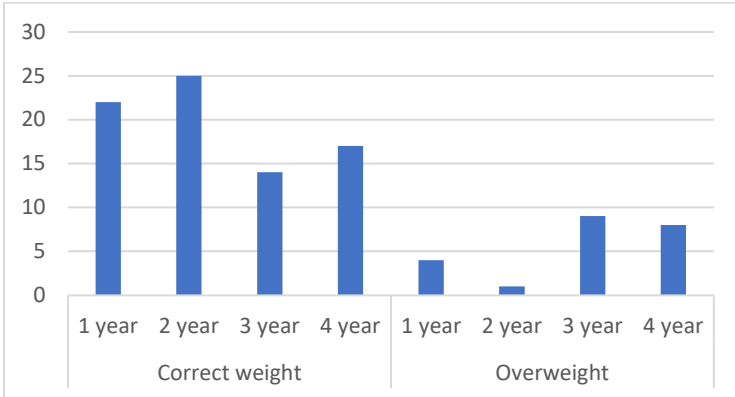

Fig. 2: Number of overweight and normal weight people by individual years of studies

For further research we used Anova's Analysis of Variance, which is a statistical method that allows to check whether an independent variable (factor) influences the results of a dependent variable (single factor analysis of variance) or assesses the influence of many independent variables (factors) on the value of the dependent variable under consideration (multi-factor analysis of variance). In the presented survey, the analysis of variance will be used to verify the hypothesis about the equality of variance in populations determined by variables grouping the year of studies and gender.

In the analysis of variance, the null hypothesis assumes that the variances in all groups are equal, i.e. the analyzed factor does not affect the dependent variable:

$$H_0: \sigma_1 = \sigma_2 = \cdots = \sigma_j = \cdots = \sigma_k \tag{2}$$

Meanwhile the alternative hypothesis provides that are at least two groups for which the variances are different:

$$H_1: \exists j_1 j_2: \sigma_{j1} \neq \sigma_{j2} \tag{3}$$

The analysis of variance uses the F Snedecor test. It is the quotient of two independently estimated variances. In the numerator there is the so-called intergroup variance, meaning the variation of the results of the dependent variable explained by the influence of the independent variable. In the denominator there is the so-called intra-group variance, i.e. the weighted average of variance in individual groups.

Let σ_1^2 and σ_2^2 be independent average squares from a population with normal distributions. If H_0 is true $\sigma_1^2 = \sigma_2^2$ then the statistics:

$$F = \frac{S_1^2}{S_1^2} \tag{4}$$

where: $S_1^2 > S_2^2$,

has Fisher-Snedecor's F-distribution with the numbers of degrees of freedom $u = n_1 - 1$ and $v = n_2 - 1$, where u is the number of degrees of freedom for variance in the meter, and v the number of degrees of freedom for variance in the denominator. If $F_{obl} > F_{\alpha,u,v}$ then H_0: $\sigma_1^2 = \sigma_2^2$ we reject

at significance levelα; variances in the studied populations differ significantly. If the above condition is not met, we have no grounds to reject the zero hypothesis.

In the analysis of variance, two assumptions are necessary to meet:

- the tested variable should have a normal distribution in all$k$ populations,
- The homogeneity of variances in the compared groups is confirmed - they are similar to each other.

Therefore, the above requirements should be checked before testing.

Test Results

Preliminary Analysis

First, a statistical analysis of the collected observations was performed. The sample consists of a quantitative variable BMI and qualitative gender and years of study variables. The basic descriptive statistics for the BMI variable in individual groups are presented in Table 3.

Table 3: Basic descriptive statistics on the groups under study

Descriptive statistics								
Grouping factor	**No. of observations**	**Mean**	**Median**	**Min.**	**Max.**	**Std. deviation**	**Coefficient of variation**	**Skewness**
Male	75	24.1	24.3	19.5	26.9	1.5	6.1	-0.57
Female	25	22.0	21.6	19.2	27.1	1.9	8.8	1.19
3 year	23	24.0	23.9	20.6	27.1	1.8	7.7	-0.31
1 year	26	23.0	23.0	19.2	26.3	2,1	8.9	-0.3
2 year	26	22.9	22.5	19.8	25.5	1.5	6.6	0.007
4 year	25	24.5	24.7	20.7	26.9	1.4	5.8	-0.65

The number of valid observations is similar for each year of studies, due to the similar number of training groups. Large differences in sizes apply to gender - there are far fewer females than males, due to the specific nature of the university.

The measures of the central trend in each group are very close to each other, which is a satisfactory result because the median, compared to the mean value , is an unbiased value. The analysis of distribution variability shows that the results are not high (the highest value of the coefficient of variation is for Year 1 students and is V=8.9%). Of all the groups, men, 1, 3 and 4 years of studies are characterized by left-handed asymmetry (negative coefficient of skewness), which means that larger part of observations are below the mean value. In the other distributions the opposite is true - the asymmetry is right-handed, so most of the observations are above the mean value (positive coefficient of skewness).

At the next stage the assumptions of ANOVA's Analysis of Variance were checked. First, an assessment was made of the compatibility of the distribution of the tested variable in each group

with the regular distribution. Due to the size of the sample, the Shapiro - Wilk test was used. The results obtained for each group are presented in Table 4.

Table 4: The results of Shapiro - Wilk test

Element	Grouping factor	S-W statistics	p-value
BMI	Male	W=0.976	0.164
	Female	W=0.882	0.088
	3 year	W=0,955	0.363
	1 year	W=0,95	0.243
	2 year	W=0,943	0.157
	4 year	W=0,95	0.251

All the above results indicate that there are no grounds for rejecting H_0 about the compliance of the tested distributions with normal distribution. The next step was to compare variances in groups. For this purpose the Levene test was applied to variances in groups for which the null hypothesis assumes their equality. The results are presented in Table 5.

Table 5: The results of Levene test

Grouping variable	Homogeneity of variance Lavene's test	
	F	p
Gender	0.88	0.35
Year of study	1.94	0.13

For the significance level $\alpha = 0.05$ the assumption of variance equality has been fulfilled in all groups. In view of the results obtained, it is possible to use ANOVA's Analysis of Variance.

The main research problem presented in this article was to verify the hypothesis that the BMI level does not depend on gender, nor on the year of studies.

Testing of Gender Impact on BMI

In accordance with the above considerations, the ANOVA's Analysis of Variance was carried out for gender-defined populations. The obtained results are presented in Table 6.

Table 6: BMI significance results for the gender grouping variable

Grouping variable	F	p
Gender	34.17	0.00

The results obtained indicate that there is a gender impact on the BMI of the surveyed students. This is confirmed by the p-value obtained, which reached the level of $p < 0.05$ and that means that the BMI level is highly dependent on whether it applies to men or women.

This is also confirmed by the consumption median values (Fig. 3), that total 24.1 for men and 21.96 for women respectively, which may imply higher nutritional awareness in the population of female cadets.

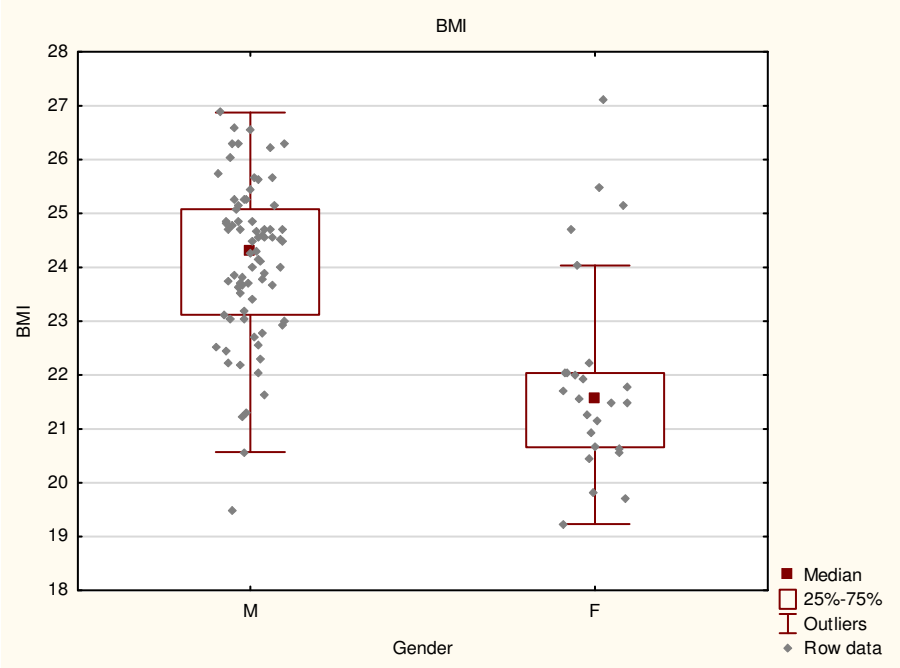

Fig. 3: BMI level depending on the gender

Testing of the impact of the year of studies on BMI

Similar results were obtained by analysing the year of studies (Table 7). The results show that BMI differs significantly in at least two groups. This is evidenced by the p-value obtained, which reached the level of $p < 0.05$ and that means that the BMI level is highly dependent on the year of studies it applies to.

Table 7: BMI significance results for the year of studies grouping variable

Grouping variable	F	p
Year of studies	5.28	0.00

Fig. 4 shows BMI results of individual years of study. The graph shows definitely different results for the 3rd and 4th year of studies, while for the 1st and 2nd year the results are similar. This is confirmed by the median values for individual groups that for the 3rd year amount to 23.99, for 4th

year - 24.51 respectively, whereas for 1st and 2nd year they are similar and amount to 22.97 and 22.9 respectively.

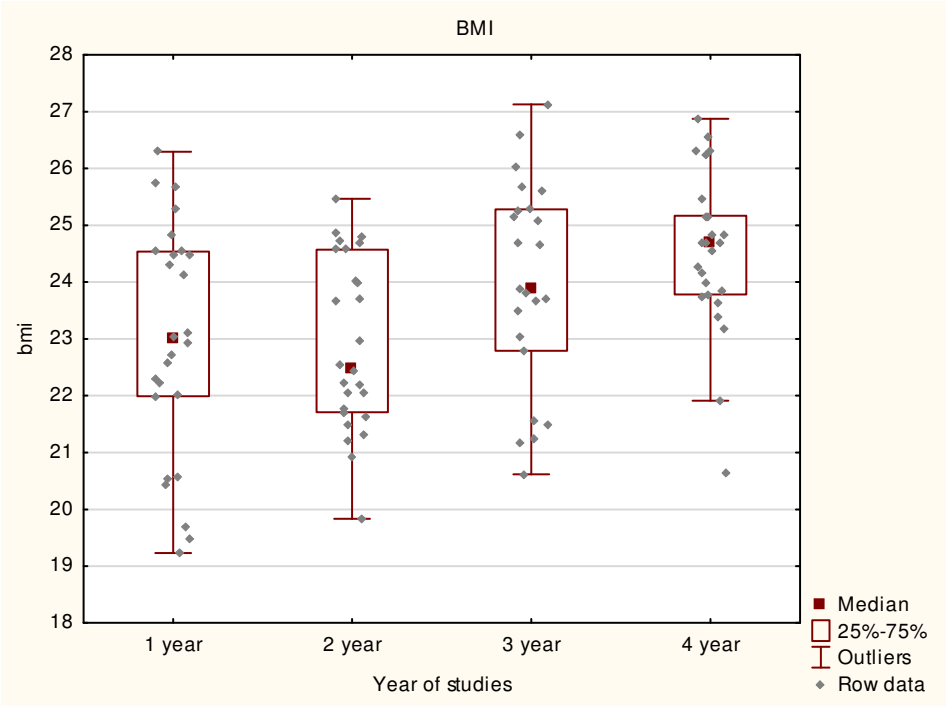

Fig. 4: BMI level depending on the year of studies

Therefore, it was checked whether there are significant differences in BMI for Year 1 and 2 of studies. For this purpose the Student's t-test was used as a statistical method to check whether the two averages differ significantly in statistically terms from each other. The null hypothesis assumes that they are equal. The Student's t-test results are presented in Table 8.

Table 8: Student t-test results for Year 1 and 2 of studies.

Mean 1 year	Mean 2 year	t	df	p	Nvalid 1 year	Nvalid 2 year	Std. deviation 1 year	Std. deviation 2 year	quotient F Variances	p Variances
22.97	22.90	0.13	50	0.89	26	26	2.05	1.52	1.83	0.14

The generated test statistics confirms previous considerations. The groups do not differ from each other significantly. Ultimately, therefore, the differentiation applies to 1st and 2nd year jointly, and to 3rd and 4th year.

To sum up the above results, it should be stated that the BMI level in the student population is influenced significantly by gender and year of studies. Higher BMI values apply to men, which indicates that women place more emphasis on a healthy lifestyle and maintaining proper body weight. It also turns out that subsequent years of study clearly influence the BMI growth trend. This may be due to the mode of academic training and the additional scientific challenges faced by cadets

in each consecutive year of studies. The need to spend more time on learning reduces physical activity, and as a result, the calorie portion supplied becomes too large and results in weight increase.

Conclusions

The energy demand of candidates for soldiers is an important element of the full process of their training, as well as the shaping of correct habits and attitudes. Proper diet requires considering the specificities of military studies, which at each stage are characterized by different levels of training projects. These include traditional academic classes as well as physical and combat training. Additionally, many cadets engage in additional physical education activities, participating in sports sections or training individually. The planned food rations therefore take into account the high energy expenditure and may contribute to weight gain among those who are less active. Therefore, it is necessary to monitor such indicators as BMI which allow for an approximate assessment of the accumulated body fat, lifestyle and diet - including the adequacy of the calorific value of meals to the performed official and non-official activities, which differ throughout subsequent years of studies, which became the subject of the presented research.

The carried out survey indicated a high percentage of soldiers with the correct weight (85% of the total). The remaining 15% of the total number of respondents were slightly overweight. As it turns out, the factor influencing the BMI level is gender and year of studies. The watch for figure and proper body weight is stronger in the group of women. The year of studies is also significant. Each consecutive year at university is conducive to BMI growth. The main reason may be the specific nature of the course, which at the beginning is full of high physical activity. With each consecutive year, the scope of knowledge that students have to acquire goes up. This often requires many additional hours of study and reduces the time spent on sport. Meanwhile, the number of calories consumed in each year of the studies remains unchanged, which may be the reason for such results.

Based on carried out analyses, it is worthwhile, as part of follow-up research, to make in-depth analysis of the energy demand and calorific value of the meals in relation to each stage of the study. Furthermore it is worthwhile - through training - to propagate among soldiers the benefits of the basic principles of rational nutrition in order to avoid diseases of civilization and thus improve the level of implementation of the prescribed training tasks.

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Management of Oil Spills by Using Phytoremediation of Grass Plants

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Abstract

Pollution from petroleum waste has caused a decline in soil productivity. Hydrocarbon spills on the soil has led to disruption to the surrounding ecosystem, including towards people living around the region. This issue remains as Indonesia is an oil-generating country that produces in large scale along with high waste of petroleum. The amount of land contaminated due to the oil production process increases thousands of tons annually. Oil spills may reduce the stability of the soil and the soil function degradation that results into critical lands. The technique of restoring contaminated land with phytoremediation could be used as an alternative to land restoration using plants to immobilize pollutants, absorb and transform them into cells of plant tissue. Plant groups such as grass have higher potential for land restoration compared to other plants as they have plenty of roots and vigorous roots system spreading onto the soil. However, the use of this technology requires coordination between stakeholders to ensure the use of phytoremediation is optimized. The purpose of this research is to analyze grass plants and their potentials to restore oil-polluted soil in connection to the land sustainability. Phytoremediation technology may be applied to remove contaminants from polluted soils with affordable, effective cost, and environmentally friendly.

Keywords: Grass; Land Sustainability; Oil Spill; Phytoremediation

Introduction

Oil industry activities from exploration to refining processes have the potential for oil spills. Oil spills contain pollutants that disrupt the ecosystem on contaminated soils (Fahmi *et al*., 2010). Soil and water pollution from petroleum spills is some of the pollution forms that are harmful to the ecosystem and human health (Viesser *et al.*, 2020). The characteristics of petroleum has undergone changes due to contact with the environment in which the interaction is caused by physical and biological factors (Balachandran *et al.*, 2012). The presence of petroleum in the environment is the result of gradual biodegradation that put the quality of soil and water in jeopardy (Abdel-Shafy and Mansour, 2016).

The decline of soil and water quality caused by oil spills could disrupt the surrounding ecosystems, including humans (Hatami *et al*., 2019). Environmental pollution caused from oil spills remains to be present as Indonesia is an oil-generating country with substantially large quantities along with high of petroleum waste. Efforts are needed to maintain the quality of the environment by removing hydrocarbon pollutants from the soil through physical, chemical and biological technology (Kurnaz, 2016). According to Sari et al. (2018), remediation efforts are required on the topsoil to prevent further crude oil percolation within the soil. Phytoremediation technology serves as an alternative to overcome oil pollution which is environmentally friendly. Phytoremediation conducts an interaction between plants and rhizosphere microorganisms that function to reduce, eliminate and stabilize contaminants in soil and water (Gerhardt *et al.*, 2009; Ali *et al*.,2013). According to Fatima *et al.* (2018), phytoremediation is a promising approach to clean up petroleum hydrocarbon on contaminated soils.

Unlike the other restoration techniques, phytoremediation is also referred to as green technology that is environmentally friendly with the lowest cost. Plant groups such as grass have higher potential for land restoration compared to other plants. Based on the outcome from previous studies, the use of *Brachiara decumbens*, *Brachiaria humidicola*, *Elucine indica*, *Paspalum notatum*, *Setaria splendida* were seen to be receptive and adaptive towards the petroleum-contaminated soils at the initial Total Petroleum Hydrocarbon (TPH) levels amounting to 3.42%. *Paspalum notatum* grasses were able to reduce TPH by 43.4% within 12 months (Suryati, 2016).

In other cases, the implementation of phytoremediation also requires coordination with stakeholders in order to produce optimal results. The use of phytoremediation has not been significantly utilized by the oil industries or the general public, despite of the technology with high level potential, affordable cost and a positive impact towards the pollutant-contaminated soils (Bramley-Alves *et al.*, 2014; Chen *et al.*, 2020). Based on the Decree of the Ministry of Environment No. 128 of 2003 regarding Procedures and Technical Requirements for Biological Waste and Petroleum Contaminated Soil Waste Management, the maximum limit of TPH on land is 1%. Every business and activity that generates petroleum waste are required to carry out waste management with a maximum initial TPH concentration prior to the biological treatment amounting to ≤ 15%.

The purpose of this study is to examine the grasses and their potentials to recover oil-contaminated soils in connection to the land sustainability. According to da Silva and Maranho (2019), choosing the appropriate choice of remediation strategy could restore the environment to its previous condition and reduce the threat of additional or prolonged impacts on the environment, as well as at the lowest cost. Proper coordination between stakeholders is also one of the keys to success to implement this green technology.

Methods

This study utilizes qualitative methods and literature studies on the use of phytoremediation as a rehabilitation effort for oil-polluted soils. The selected area is located in Sedari Village, Cibuaya District, Karawang Regency, Indonesia. This area was chosen as the research area because a pipe leak occurred that caused contamination of soil and water. The data collection techniques utilized in-depth interviews with selected informants with pre-determined criteria. The characteristics of the informants chosen were the Chairperson of the Sedaris Village Community Development Committee and the communities affected by the oil spills. The data that are to be obtained comprise of various research questions, namely (1) the impact of oil spills (2) industrial and government efforts in oil spills management and (3) stakeholders who conduct the phytoremediation technology. Furthermore, an observation was conducted as a review and alignment of interview outcomes with the condition at the area.

The literature study used is secondary data from previous researches and the Indonesian Government Regulation. The source of research data that were used are in relation to the phytoremediation to reduce the concentration of petroleum pollutants due to industrial activities. The research used in this literature study is the research conducted for the last ten years.

Result and Discussion

Utilization of Grass as a Phytoremediation agent

The use of phytoremediation by using selective plants is one of the most cost-effective remediation methods for recovering petroleum-contaminated soils. Plant receptiveness in contaminated soils with organic pollutants such as petroleum occurred through the association of microorganisms with the roots. The stimulation used for hydrocarbon biodegradation is also referred to as rhizodegradation. Rhizosphere organisms utilized petroleum hydrocarbons as the carbon source and convert them into carbon dioxide, water, and biomasses. The use of grass plants as a phytoremediator agent has a high

capability for reducing the oil concentration in the soil as grasses have strong roots and spread within the soil. A literature study method on phytoremediation technology with grass plants to reduce petroleum concentrations is generally presented in Table 1.

Table 1: Types of Grass and Their Benefits for Petroleum-contaminated Soils

No	Years	Grass species	Benefit	References
1	2020	*Chrysopogon zizanioides*	Reduces or takes PAHs on the soil, has a high receptiveness to various pressures and fast growth rate.	(Chen *et al.*, 2020)
2	2019	*Spartina Anglica*	Reduces TPH by 19.1% and significantly reduces C8-14 concentrations and trycilic PAHs	(Zhen *et al.*, 2019)
3	2019	*Festuca arundinacea*	Reduces fluoranthene levels in the soil, multiplies the number of soil bacteria and also the activities of the enzyme dehydrogenase.	(Rostami and Rostami, 2019)
4	2018	*Brachiaria mutica*	Reduces oil content by 61% in oil-polluted soils.	(Fatima *et al.*, 2018)
5	2010	*Jatropha curcas*	Reduces up to 67.3% of the lubricating oil that pollutes the soil.	(Agamuthu *et al.,* 2010)
6	2014	*Poa Foliosa*	Very receptive towards Special Antarctic Blend (SAB) and reduces TPH levels up to 48% within two months.	(Bramley-Alves *et al.*, 2014)

Based on the literature review results, it is shown that *Chrysopogon zizanioides*, *Spartina Anglica*, *Festuca arundinacea*, *Brachiaria mutica*, *Jatropha curcas* and *Poa Foliosa* could grow to a certain extent in oil-polluted land and take and absorb pollutants. Each type of grass has different characteristics and this could be seen from the specific benefits generated and the time required to reduce petroleum content in oil-polluted land. Phytoremediation research utilizes grass plants. The selection of the appropriate type of plant proved to be promising for the decontamination of sediments contaminated by oil industry activities and indirectly contributing to minimize global warming through carbon sequestration (Agamuthu *et al.*, 2010). The implementation of phytoremediation by using endemic species in oil-contaminated areas is a very appropriate choice as the method is easy to be obtained and grown (Bramley-Alves *et al.*, 2014).

In addition to grasses, some plants could be used to reduce petroleum levels. Baoune *et al.* (2019) demonstrated that inoculation of corn plants with *Streptomyces* sp. could remove petroleum hydrocarbons up to 70% and increase plant growth in contaminated soil. There is a decrease of up to 100% for some aromatic Polycyclic Hydrocarbon Fractions (PAH) using *Medicago satuva* (Xiao *et al.*, 2015). According to Sarma (2011), the success of the phytoremediation system relies on the plant species and the climate.

Impact and Efforts to Oil Spills Management

This study examined the use of phytoremediation technology so that it could be carried out optimally with the coordination with local stakeholders. Petroleum pollution certainly becomes detrimental to

both the environment and the local community. As per the outcome of the interview with the Informant 1 explicates that the impact caused by oil pollution:

> *"The impact caused by this oil pollution is the inability to fish in the sea due to the polluted sea, emerging health-related problems such as headaches, eye strain, irritation and the soil pollution as seen from the number of oil spills reaching to the land. This incident also caused a decline in income due to the inability to work impacted from the oil spills."*

The impact of pollution that could be detrimental for the community should have gained the attention and assistance from the industries as well as the Government. As a result of this in-depth interview with the affected community the efforts of the industries and the Government to deal with the exposed area from the oil spill have been further elaborated below:

> *"The industry is seeking the community to work as 'ojek limbah', cleaning the sea and land by transporting the waste oil. Approximately around 3-4 months, we have assisted the industry to ship the crude oil but not all people have done this, so we have to replace it. Every day we are paid Rp. 150,000, but when compared to the income before the oil spill, this is certainly still not enough for our daily needs. The industry promises some money as compensation due to the impact of oil pollution, but until now there is still no compensation just like they said. Only a few households have received the compensation and the amount was not as promised. The condition has gotten quite well, but the oil still remains there though not as bad as before, the smell so bad, and it made me dizzy."*

In addition to the efforts to handle oil spills, thus the researcher asked Informant 1 about the use of phytoremediation as a technology to restore contaminated land conducted by both the industries and government. Informant 1 explicated that:

> *"Such technique has not been carried out, in which we have seen is only to ship the crude oil from the sea and land to the location. If such Method can help to remove oil, of course it's good, it could also be taught to the public, you know and also it's more natural to use plants to remove the oil."*

The researcher also conducted an in-depth interview with Informant 2, namely as the Chairperson of the Sedari's Community Development Committee who became the bridge between the community and the industry in developing community programs. The information from Informant 2 regarding the efforts made by the industry in oil spill management are as follows:

> *"The industry sent a team of experts to examine the situation in the field. Community-owned boats were rented to transport the waste. The industry also provided free emergency medical tent. The industry also asked the public to carry the applicable oil so that they could turn those into a source of income during the times in which the industry was not sailing. Regarding the compensation, some elements have been delivered and some have not been delivered and it is not managed by the industry but rather by the Fisheries Service. While this is more on the handling of oil from the industry, government institutions only serve to monitor the activities."*

In regard to the the management that has been carried out by the industry, the researcher further asked about the restoration carried out while using the biological method, namely phytoremediation, the response from Informant 2 are as follows:

> *"The actual restoration has not been implemented, right now the restoration that is being carried out is still just regular cleaning. The issues that we hear is that the land could recover in 1-2 years. Many researchers also visit this place to observe and take samples, but the industry has not implemented the technology mentioned thus far."*

Based on the results of the interview, there has not been any actions in any good faith conducted by the industries nor the Government to carry out biological remediation. The use of this green technology to restore polluted land requires the outreach and cooperation between stakeholders so in order for this technology to be beneficial.

Indonesian Government Regulation in Handling Petroleum Pollution Through Phytoremediation

Petroleum pollution has a detrimental effect especially towards the human health and ecosystem, soil productivity and social and economic aspects (Zhang *et al.*, 2015). According to Government Regulation of the Republic of Indonesia No. 101 of 2014 concerning Management of Non Hazardous and Toxic Wastes caused by the functions of the environment restoration which is conducted by limiting sources of pollution, remediation, rehabilitation, restoration as well as other means through the development of science and technology.

The remediation referred to in Article 203 is conducted by selecting the remediation technology, planning a plan and the implementation of the remediation as well as the preparing and submitting the remediation on the environmental pollution to the minister, governor, regent/mayor. According to da Silva and Maranho (2019), the appropriate choice of remediation determines the level of success for the environment restoration to its initial state. This regulation is in line with the Decree of the State Minister for the Environment No. 128 of 2003 that it requires the processing of petroleum waste as part of the recovery measures of the environment through biological approach, one of which is phytoremediation.

Implementing the recovery of polluted land with phytoremediation technology must meet the following the requirements of biologically-treated petroleum waste as follows (1) maximum initial TPH concentration amounting to <15%; (2) TPH concentration which was before the processing phase amounting > 15%, it is necessary to initially do the processing or utilization; and (3) TCLP test results of heavy metals were below the quality standard in reference to KEP 04/Bapedal/09/1995. After the processing phase meets the specified criteria, measures could be taken with the requirements as listed in Table 2.

Table 2: Handling of Processed Products After Treatment

Concentration	Handling activities	Note
>2%	The processing phase continues	Until meeting the criteria
1%-2%	Landfill	In accordance with Kepdal 04/1995
≤1%	a. Placement on exclusive and limited land b. Utilization	a. Growing plants not for consumption b. Mixing materials for road layers, building materials and others

(Source: Decree of the Minister of Environment No. 128 of 2003)

As per the Republic of Indonesia Government Regulation, the restoration of biologically-contaminated land could be conducted by following the applicable regulations. Land that has been successfully remediated through specified standards may be re-used by the community to grow plants not consumption and may be used for mixing road layers for building materials and other uses. Based on the aforementioned study, the researcher illustrates the concept of phytoremediation and its potential using grass plants to be applied and developed at the study site.

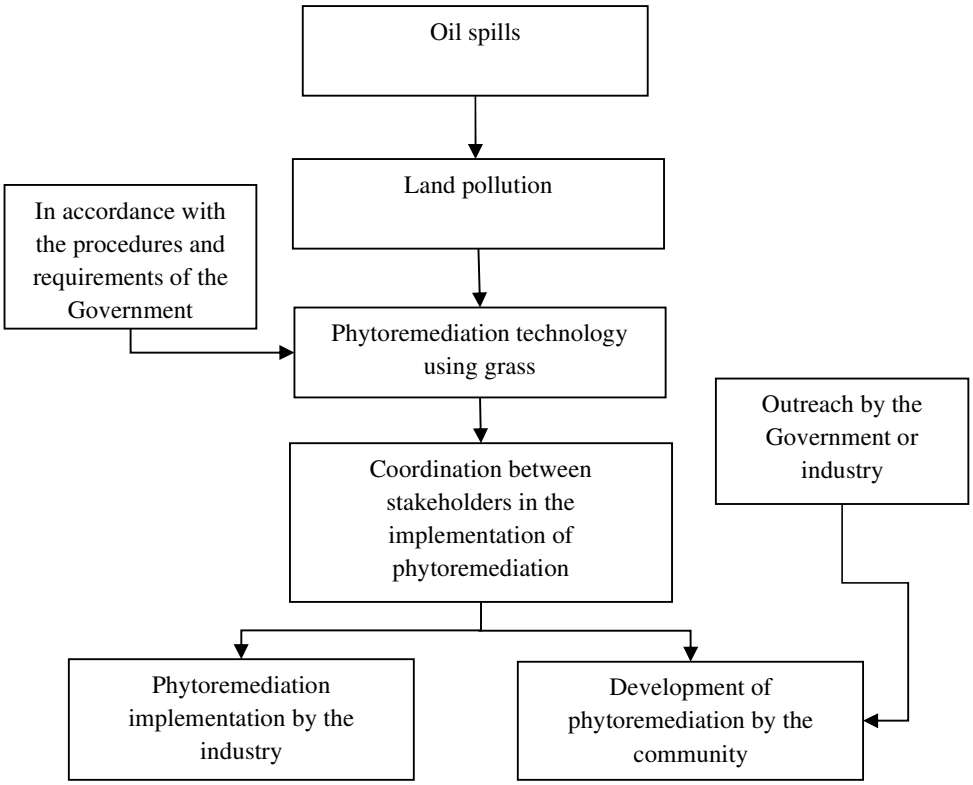

Figure 1: The Implementation of Phytoremediation Concept Using Grass Plants

Based on Figure 1, should there be a proper coordination between stakeholders, efforts to tackle oil could be optimally carried out using phytoremediation technology. In addition, phytoremediation could also be managed or developed by the community or local community through an outreach conducted by the Government and the industries. The use of this technique has not been widely carried out in oil-polluted areas making this paper to become a recommendation for companies or the government regarding this matter.

Conclusion

Phytoremediation by using grass plants could be utilized to handle the petroleum pollution. This is due to the nature of grass plants of being very receptive and adaptive towards oil-polluted land and the grass plants are able to absorb these pollutants. The use of biological remediation could be conducted but must take into account the terms and conditions of the local government. Based on the Government Regulation of the Republic Indonesia, several regulations have been made as a requirement in biological remediation. Biological treatment may be used if the initial TPH concentration is <15%. In its implementation, it is necessary to coordinate among stakeholders as an effort to optimize phytoremediation method in reducing petroleum content. The research also suggests that phytoremediation may also be managed by local communities for the restoration of oil-polluted land. The use of phytoremediation technology has not been widely applied in areas that are especially located close to oil industries. This research is expected to be a recommendation (for the government and other related stakeholders) in efforts to restore oil-polluted soils.

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Transnational Corporations as Actors of International Relations

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Abstract

Transnationalization is the most important component and at the same time the main mechanism of the General processes of globalization. It seems to be the most essential element and one of the main circuits-regulators that ensure the unity of the functioning of the world economy. Through TNCs (Transnational corporations) and related transnational banks pass the financial and commodity flows that determine the development of the world economy. They are the leading factor of globalization of economy, placing separate parts and stages of reproduction processes on territories of different countries. Transnational corporations not only affect the economic, political and social state of society, but also act as a leading factor in world development, so the importance of TNCs in mergers and acquisitions is very difficult to overestimate. With broad financial and organizational capabilities, TNCs are the main participants in the market for mergers and acquisitions, but it is worth noting that TNCs have come a long way from a simple business combination to a deep integration of capital.

Keywords: Systemic transformation of the economy, foreign economic activity, multinational companies.

Introduction

The modern economic world is gradually acquiring the properties of global, although so far limited in scale, self-regulation.

Global processes have evolutionarily created planetary feedback loops that allow to restore planetary equilibrium with relatively small external disturbances occurring at any point of the Earth. This is what indicates the emergence of a new situation in the world economy, which, since the last quarter of the twentieth century, is a single global economic system, self-regulating on the basis of feedback mechanisms.

TNCs perform important functions in the modern world economy, to a greater extent stimulating. They show the following advantages of TNCs: contribute to the development of scientific and technological progress; create a favorable basis for the globalization of the entire economy; favor the spread of international production; impose free competition in international trade; have free access to natural resources, investments and high-tech developments; set a relatively low price of their resources, which affects the investment attractiveness of the Corporation itself; effectively use the scale of the enterprise (ie, their dispersion in different countries); the ability to select specialized personnel and the best staff.

But TNCs also have their disadvantages, such as: the incentive to turn it into a monopoly in the host country; the risk that TNCs can influence not only their competitors, but also the entire state

economy; the emergence of such a phenomenon as the reduction of employment in TNC units in developed countries.

The purpose of the work is to consider current features of the activities of transnational corporations, identify problems and develop proposals for the formation of a global strategy for the activities of transnational corporations in international economic relations, and identify ways to increase the competitive advantages of Russian multinationals.

In the process of solving the set tasks, general scientific methods were used: dialectical, system-functional, structural-level, theoretical, monographic, and private-scientific methods: logical, analytical, comparative, forecasting, graphical and tabular interpretation of data.

Material and Methods

In order to overcome or minimize the negative consequences of the activities of TNCs, it is necessary to realize the emergence of new tasks that clarify the functions of the state in interaction with TNCs. TNCs have teams of specialists who are responsible for both tax minimization and analysis and creation of special schemes to optimize activities. Taking into account this fact, it is necessary to strengthen the position of state institutions as a set of structures regulating the financial and economic activities of TNCs in the specific conditions of the Russian Federation.

Methods of state regulation of TNCs: system of state guarantees and insurance of foreign private investments against risks; tax incentives; agreements on avoidance of double taxation; state credits; antitrust legislation; legislation on foreign investments; legislation on state control over prices; customs and preferential legislation.

Recent studies of domestic and foreign authors differ greatly in the role and assessment of Russia in the global oil market. They are distinguished primarily by the level of operating with statistical data, access to the completeness of information and the level of politicization of the research. Some authors (S.A. Basher, A.A. Haug and P. Sadorsky, 2018) provide objective information about Russia's place on the world oil market compared to the yield of crude oil reserves in Canada, Norway, Russia, Kuwait, Saudi Arabia and the United Arab Emirates. The authors argue that oil reserves affect stock returns in Canada, Russia, Kuwait and the United Arab Emirates. Oil supply shocks are important for the UK, Kuwait and the United Arab Emirates. Mexico is the only country where stock returns are not affected by shocks in the oil market.

Joint research of domestic and foreign researchers (Y. Tuzova & F. Qayum, 2016) showed the interconnection of Russia's positions on the world oil market in the context of the sanctions against Russia. The results showed a significant impact of oil prices on the Russian economy. Researchers predict that Russia's economic prospects are not very optimistic and real GDP for the quarter by quarter will decline by an average of 19 percent over the next two years.

Adnan Vatansever (A. Vatansever, 2017) touches another vector of Russia's position on the world oil market, associated with the construction of pipelines. The consequences of Russia's excess capacity can be significant for Europe and Asia. As for oil, the maneuvering space is wide enough to allow Russia to abandon the whole route of its choice.

Domestic researchers (A. Goppert, D. Ola and S. Prakash, 2015) reveal the importance of introducing innovative technologies in the extraction and development of oil fields, without which it will be difficult for Russia to find its niche in the modern oil market.

Stupin V.V. (2012) notes significant territorial-structural shifts in the oil industry of the world for Russia, and considers it necessary for Russia to take advantage of a favorable situation. A similar opinion is shared by Filimonova I.V. with fellow researchers (I.V. Filimonova, L.V. Eder, V.Yu. Nemov & I.A. Agile, 2017).

A. Bondar (2019) in his study notes that US sanctions have become a kind of catalyst for strengthening Russia's position on the world oil market. But R. Ivanov (2019) believes that not everything is so optimistic for our country and offers three scenarios for the development of world energy until 2050, in which Russia is far from leading positions on the world oil market.

Thus, the relevance of the study of this topic is obvious.

Results and Discussion

TNCs operate primarily for long-term investment. Therefore, TNCs often contribute to the stabilization of the economic environment, including the financial one. However, the purpose of TNCs is to make a profit, so sometimes entire markets and even countries can become victims of them on the way to achieving this goal. As a result, it is necessary to understand the pros and cons of TNC activities and to develop specific measures of state regulation of TNCs to protect the economy from possible negative consequences.

Economically, the processes of transnationalization are mainly conditioned by the possibility and necessity of capital transfer from countries with its relative surplus to countries with its deficit, where, however, there are other factors of production (labor, land, minerals) in excess, which cannot be rationally used in reproduction processes due to the lack of capital. In addition, these processes are stimulated by the need to reduce risks by placing capital in different countries, as well as the desire to bring production closer to promising markets and rationalize taxation and customs payments for the Corporation as a whole. Objectively, transnationalization leads to the equalization of economic conditions in different countries (I.V. Minakova, M.A. Parkhomchuk, A.A. Golovin and T.N. Bukreeva, 2018).

Fortune Global 500 – is the most famous and authoritative ranking of the largest companies in the world. It has been published by the American business magazine Fortune since 1955. The list is compiled annually and shows the largest corporate players, thus allowing you to assess the economic development and trends of the markets.

All companies in the rating are ranked according to the following indicators: total income; profit; assets; share capital; dynamics of income per share for the last 10 years; total annual income of all investors; average annual rate of total income of investors for the last 10 years.

Places on the Fortune Global 500 roster are determined according to the companies' earnings for the past year. The researchers include only U.S. companies that submit an annual report to the U.S. Securities and Exchange Commission (US Securities and Exchange Commission) on form 10-K, as well as private companies registered outside the United States and with open records.

American Walmart received for the year operating income of 514,4 billion dollars and occupies a leading position. The company's profit in 2018 amounted to 6,67 billion dollars. This is stated in the Fortune Global 500 ranking for 2019.

The total operating income of the 500 companies included in the rating reached 32,7 trillion. dollars, this is 8,9% more than last year. Their profits hit a new record high of 2,15 trillion. dollars'. These companies employ about 69,3 million people.

This year, 129 Chinese companies entered the ranking, making China the leader in the number of its representatives in the Fortune Global 500 for the first time in history. And Sinopec entered the top three and took the second place. In 2019, the ranking for the first time included the Chinese smartphone manufacturer Xiaomi (486 place) with an operating income of 26,44 billion dollars and a profit of 2 billion dollars.

There are 121 American companies in the ranking.

The fastest-growing are Amazon with operating income of 232.8 billion dollars, + 30,9% (13th place), Centene with revenue of 60,1 billion dollars, +23,8% (168th place) and Facebook with revenue of 55,8 billion dollars, +37,4% (184th place).

The best Russian company in the rating is "Gazprom". At the end of 2018, it rose from 49 to 42 place. LUKOIL moved from 63 to 50 position. Rosneft advanced from 115th to 86th place. Sberbank-dropped from 205 to 255 position.

In general, the global market is still dominated by American and Chinese corporations.

For a more complete analysis of the current trends in the activities of transnational corporations the Forbes 2000 rating is also considered – the list of 2000 largest public companies in the world according to Forbes magazine. The Forbes ranking of the world's largest companies is based on a combined assessment of revenues, profits, assets and market value.

The Top ten for the number of billionaire firms included the United States and China – the only countries on the list in which the number of giant companies has increased. Also in the top three of the list of countries with the largest number of large companies, what in general includes 61 countries, got and Japan too.

Top 10 largest companies according to Forbes:

1. ICBC is China's largest commercial Bank.

2. JPMorgan Chase-American financial holding company.

3. China Construction Bank – one of the largest Chinese banks.

4. Agricultural Bank of China – China's largest Bank.

5. Bank of America – American financial conglomerate.

6. Apple is an American technology Corporation.

7. Ping An Insurance Group – Chinese insurance group of companies.

8. Bank of China-Chinese financial group.

9. Royal Dutch Shell is a British-Dutch oil and gas company.

10. Wells Fargo is an American Bank holding company.

Four Russian corporations entered the top hundred of the Forbes Global 2000 ranking of the world's largest companies.

Gazprom is the highest in the ranking: it took the 40th place, Sberbank was placed on the 47th, Rosneft-on the 52nd, LUKOIL-on the 97th.

In total, there are 575 American companies in the 2019 ranking, that is 16 companies more than last year. It also included 309 Chinese companies, up 18 companies from a year earlier.

Forbes included 22 Russian companies in the rating in 2019 (there were 25 in 2018), among which Gazprom retains the leadership for the 4th year in a row. Compared to 2018, the Russian gas holding has risen from 43 to 40 places. Its market value, according to Forbes, was $59,9 billion. Assets are estimated at $305,9 billion. Us $ 18,9 billion in profit. USA.

In addition to Gazprom, 4 Russian companies - Sberbank (47th place), Rosneft (52nd) and LUKOIL (97th) – were in the top 100, as in 2018. The rating also includes Surgutneftegaz (330th place), Transneft (386), VTB Bank (471), NOVATEK (500), Tatneft (524), Norilsk Nickel (574), rosseti (767), Novolipetsk metallurgical plant (791), Severstal (925).

Moreover, among the Russian companies in the Forbes list in 2019 are INTER RAO (1189th place), Magnitogorsk iron and steel works (1237), ALROSA (1327), Magnit (1370), Sistema (1467), Moscow exchange (1704), Moscow credit Bank (1837), United aircraft Corporation (1895), RusHydro (1957).

Compared to 2018, the gold mining company Polyus, Aeroflot and Uralkali were eliminated from the rating, which occupied 1552, 1932 and 1993 places, respectively.

The analysis of the rating of Russian transnational corporations for 2018-2019 shows that the activities of domestic TNCs in the international market are mainly limited to the supply of fuel and energy raw materials.

In order to improve the development of transnational corporations, it is necessary to form a global strategy for their activities.

The main goal of the global strategy of transnational corporations is not so much to maximize profits through the globalization of the market of their products/services, but to achieve economically beneficial complementarity (adaptation) with the external environment of their activities.

The result of the formation of the global strategy is the creation of an integrated international trade and industrial system.

Economic hypergrowth management is based on the use of modern management models: value-oriented management (value Based Management, VBM), balanced scorecard and strategic maps (Balanced Scorecard, BSC and Strategy Map), value chain management, intra-firm economic calculation (BUM-Business Unit Management), etc.

Nowadays, successful organizations are rapidly bringing new products out, entering and exiting markets, and sometimes going out of business. In such circumstances, the essence of the global integration strategy is not in the structure of the organization's products and markets, but in the dynamics and time of its formation. The goal is to generate and modify operational routines and hard-to-replicate core competencies based on the generation, evaluation, and development of dynamic capabilities that distinguish an organization from competitors in the marketplace. This makes the use of dynamic capabilities the main tool for shaping the strategy of global integration of the organization in the framework of its development in the national, international and global markets.

To ensure sustainable demand for its products in a changing environment, an organization must be able to recognize new business opportunities and competitive "challenges". And then extracting economic benefits from them through the adoption of adaptive management decisions and organizational changes (transformation of competencies) on the basis of organizational development.

In shaping the strategy of global integration, special emphasis is placed on determining the benefits of targeted Hyper-growth of the organization to generate sustainable competitive advantage.

A TNC implementing a Hyper-growth strategy has the ability to (Strategic Report, 2017):

– to receive advantages, concentrating these or those productions in regions with cheap raw materials and low rates of a salary;

– plan and make profits in different countries depending on the level of income tax;

– adapt production and marketing schemes to the conditions of national markets of different countries;

– to implement the accounting policy of operations of subsidiaries and branches, beneficial to the Central organization;

– respond effectively to shifts in comparative advantage (e.g. commodity prices or exchange rates, changes in tax policy);

– to effectively allocate the education and training of professionals between countries;

– improve reputation in the eyes of mobile consumers who may encounter this firm in different countries;

– the ability to differentiate and more effectively serve multinational customers who simultaneously deal with several divisions of the company in different countries;

– respond to competitive threats using the most convenient and effective forms and methods of dealing with competitors.

These advantages of the strategy contribute to increasing operational efficiency, as well as strengthening the unique position of TNCs.

The issue of competitiveness is quite acute for the Russian economy, especially if it is in the context of the world market. Competitiveness can act as a factor of sustainability and development for Russian TNCs.

Russian TNCs demonstrate competitiveness only in such industries as fuel, metallurgical, military, that is, where there is a comparative advantage, but on the whole domestic companies they have low competitiveness in many areas of activity, because it is necessary to take stable positions in other industries, such as the market of fast-turning goods, information technology, etc. This circumstance explains the fact that a limited number of domestic companies enter the world markets.

Competitiveness is one of the most important factors in ensuring sustainable development of the enterprise economy. Sustainable economic development economic structure characterizes a complex system of indicators, reflecting the dynamics of economic growth, strengthen financial condition and increase of efficiency of use of the entire set and each type of resource, performance during the reporting period, obligations to employees, other businesses and government.

In order to increase the competitiveness of Russian TNCs it is necessary to implement the following stages of strategic analysis: analysis of strengths and weaknesses; compliance with market conjuncture; awareness of consumer desires and market trends; analysis of competitors; tracking trends in production, consumer environment, information, technology, management environment.

Conclusions

With constant and competent implementation of these stages, the Corporation will always meet the constantly changing external conditions, any fluctuations in market conditions, the changing state of the main competitors, as well as carry out internal innovative transformations that meet all modern challenges of the world and regional economies, and, consequently, achieve a certain level of competitiveness.

In a complex functionally integrated management mechanism of TNCs, the effective use of information support systems for business processes is important. The information and logistics system is based on a systematic approach that covers all activities related to planning and managing processes aimed at providing TNCs with the necessary information.

Information logistics is particularly in demand in the activities of corporations and, above all, TNCs, whose enterprises are scattered around the world and which are managed mainly at the level of information flows. Therefore, the solution of the main task of information logistics-ensuring and coordinating information flows at all horizontal and vertical levels of management-will ensure the effectiveness of management of transnational corporations and increase its competitiveness.

The solution of the main task of information logistics-provision and coordination of information flows at all horizontal and vertical levels of management, will ensure the effectiveness of management of transnational corporations and increase its competitiveness.

The priority measures to improve the activities of Russian TNCs in the global economy should be the formation of specialized innovation support institutions, improvement of the legal framework for investment activities and state support for innovations, the creation of organizational mechanisms for managing the innovation activity of corporations.

As for the internal aspects of the activities of Russian TNCs, the main goal can be defined as ensuring transparency of their activities. This can be achieved by improving the relevant legal acts and legislative initiatives to limit monopolistic activities and to protect the rights of investors.

Russia has enormous economic potential, which can be realized with careful planning of the activities of Russian TNCs. Implementation of the proposed measures could provide Russia with stable economic development and expansion of national TNCs. In turn, this would enable our state to take a higher position in modern international economic relations and to use the maximum benefit from the globalization process.

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Transformation of Indirect Tax Administration Amid Digitalization of The Russian Economy

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Abstract

The article explains transformations that are taking place in indirect tax administration along with the digitalization of the Russian economy. The authors explore the evolution of indirect taxes at every stage of economic development. The forms of and trends in the transformations of indirect taxes under the influence of digital technology and amid the application of a risk-oriented approach. As a result of an analytical review, trends in the digitalization of tax administration of indirect taxation in Russia were highlighted. It is proved that these trends can with high probability be reproduced in other tax systems during the development of digital control services. The research concept is, therefore, to advocate the effectiveness of solutions for the transformation of the indirect tax administration system that would be adequate to the global challenges and development trends in the digital economy of Russia.

Keywords: Indirect Taxes, VAT, Tax Administration, Digitalization.

Introduction

The present stage of economic development in the world is characterized by the arrival of digital technology in all spheres of activity. The digitalization of the Russian economy is a source of long-term growth thanks to streamlined production and logistics, better labor and equipment productivity, a more efficient labor market, higher research efficiency, lower resource consumption and production losses. A legislative framework for the development of the digital industry is being created by the government. Russia's national program for the development of digital economy was approved on 6 July 2017. It has been estimated that as a result of the digitalization of the Russian economy the country's GDP could grow by 4.1–8.9 trillion rubles by 2025, which is from 19 to 34% of the total expected GDP growth. In 2018, the share of the digital economy in the country's GDP increased by 150% from 2.1% to 5.1%. Innovations that spread in the global information environment are an essential factor of sustainable economic development, the sphere of indirect tax administration being no exception. Indirect taxes make up a considerable share of total government revenue in Russia, varying from 25% to 30% a year over 2014-18. The share of indirect taxes has continued a steady upward trend over the past five years, with VAT revenue growing by 63.5%, excise duties by 49.5%. At the same time, there is a VAT tax gap in Russia that is the difference between the sales records of suppliers and the purchase records of buyers. According the head of the Federal Tax Service, Russia's VAT gap is the lowest in the world at 0.6%. In Europe, for example, it is 10% and upwards (FTS, 2020).

Methodology

The methodology and research methods were selected with consideration to the supposed long-term impact of digitalization of the economy on the transformation of indirect taxation. The methodology proposed for achieving the goals of the research includes successive phases and methods. At phase one, the scope of digitalization of indirect taxation is determined by means of the content analysis of

available literature on the subject. This made it possible to "scan the environment", i.e., to define current trends in the development of digitalization of indirect taxation and to highlight ideas and make guesses about the future scope of digitalization. Information on the aspects of the subject under research was retrieved by doing a content analysis of key words, abstracts and full-text article in Russian and English repositories of academic articles.

Research

1. Evolution of the system of indirect tax administration. The evolution of the tax system in a country is the result of a large number of minor changes and small-scale reforms along with major changes, such as the introduction of new taxes replacing old ones or an overhaul of the tax administration and collection system. The historical analysis of the transformations of indirect taxation amid a conceptual change of the economic model enables one to distinguish four historical tax systems. Table 1 presents the characteristics of these historical tax systems.

Table 1: Comparison of characteristics of historical tax systems

	Historic period	Economic attributes	Attributes of taxation
Tax system 1.0	Pre-industrial economy	- predominantly subsistence-based agricultural economy; - moneyless exchanges; - land-based economy; - main communication means - books, messengers, by word of mouth.	Self-sufficient economy meets internal needs of society. Economic conditions are created by the economy, are reproduced and recovered from gross domestic product. Up to 70% of gross product is redistributed. Indirect taxes: sales taxes, judicial fees, excise taxes on alcohol, tobacco, salt.
Tax system 2.0	Industrial economy	- man no longer dependent on nature thanks to development of tools and technology; - development of currency system; money as a measure of value; - legally protected and regulated trade; - capital is the key element; - communication means newspapers, magazines, books, later telephone, telegraph, radio and television.	Source of taxes –profits and wages (payroll taxes were viewed as shifted on entrepreneurs' profit). Taxation formula: all taxes are ultimately paid from the capitalist's profit and only some taxes are paid from land rent; the form of tax is irrelevant. Such theory of taxation justified the introduction of any tax, with some reservations about taxes that were directly imposed on entrepreneurs. VAT is a result of the development of the industrial economy; it is an all-pervading tax that has a socio-economic explanation.
Tax system 3.0	Neo-industrial economy	- development of non-manufacturing sector – that of services; - information is the key element; -computer networks; mobile phones, radio, television; - borders between nations are erased; - high money velocity.	- traditional taxation methods are difficult to apply because of a high share of profit-yielding intangible assets; anonymous purchases online; purchases can be made in any place on the planet, which serves as an argument in favor of indirect taxation.

Source: compiled by the authors based on Vishnevsky V. P., Chekina V. D. (2018)

The table leads one to a conclusion that economic conditions determine capacities for taxation. During the pre-industrial period, the complexity of tax administration was the deciding factor for the use of indirect taxes in the form of duties, charges and excise taxes. Indirect taxes are taxes that are paid as a surcharge to the price or tariff and that is collected when a product or a service is consumed by the end buyer, who pays the tax. Criticism of indirect taxes is mainly aimed at the complexity of administration, accounting and control. However, modern digital technology offers new opportunities for wider use

and development of indirect taxes. Indirect taxes in the Russian Federation are regulated by the Tax Code that establishes a system of indirect taxes and general principles of indirect taxation. The characteristics of indirect taxes in Russia are summarized in Table 2.

Table 2 allows the following conclusions to be drawn:

- indirect taxes in Russia are designed to regularly replenish the treasury (on a monthly, quarterly basis);
- legal entities are taxpayers of indirect taxes as they are easier to control; private individuals only pay indirect taxes in the case of importation of goods across the border;
- the object of indirect taxation in Russia is sales of goods and services;
- the tax base for indirect taxes in Russia is the value of goods or services of their volume (excisable goods).

Table 2: Indirect taxes as per Tax Code of Russia.

Attribute	VAT	Excise duties
Tax payers	- organizations; -private entrepreneurs; - persons who are deemed to be taxpayers of VAT in connection with the conveyance of goods across the customs border of the Customs Union;	- organizations; -private entrepreneurs; - persons who are deemed to be taxpayers of excise taxes in connection with the conveyance of goods across the customs border of the Customs Union;
Object of taxation	- the sale of goods (work and services) in the territory of the Russian Federation, , and the transfer of property rights. - the transfer of goods (performance of work, rendering of services) in the territory of the Russian Federation for own requirements, - the performance of construction and installation work for own consumption; - the importation of goods into the territory of the Russian Federation and other territories under its jurisdiction.	- the sale by persons in the territory of the Russian Federation of excisable goods produced by them, including the sale of pledged articles and the transfer of excisable goods under an indemnity or novation agreement.
Tax base	Where taxpayers apply different tax rates in selling (transferring, performing, rendering for own requirements) goods (work and services), the tax base shall be determined separately for each type of goods (work and services) assessable at different rates. Where the same rates of tax are applied the tax base shall be determined as an aggregate for all types of operations assessable at that rate.	- volume, quantity or other physical parameters of imported marked goods for which fixed (specific) rates of excise duties have been established; - value of imported excisable goods for which ad valorem rates of excise duties have been established;
Tax period	Quarter	Calendar month
Tax rate	0 %, 10 %, 20 % depending on the goods or services.	Depends on type of excisable goods

Source: Tax Code (2020)

The concept for the development of tax administration in Russia was designed a few years ago and is being implemented in a phased manner: a risk-oriented approach started to be applied in 2007; a major project to digitalize tax administration of VAT was launched in 2013. The application of the risk-oriented approach for control activities was formally described in the Concept of On-site Tax Audits (in force since 2007). The Concept is an open-source document that was produced with the purpose of creating a system of planning for on-site tax audits that would be universal, open, and clear to both

taxpayers and tax authorities. The concept contains 12 non-classified criteria for self-administered risk assessment; some of them are directly related to consumption taxes (Concept, 2007):

- the business's tax burden is lower than the sector-wide average;
- the tax reports show considerable tax deductions over a certain period. The amount of VAT the business may deduct is equal to or exceeds 89% of the amount of VAT due from that business over a 12- month period; ;
- the taxpayer builds its business and financial activities on contracts with middlemen or intermediaries ("chains of intermediaries") without any sensible economic or other reasons;
- the business runs a high risk of tax noncompliance.

Among the indicators of a high risk of tax noncompliance is the lack of:

- information on the sources of background information about the contract party contract (no TV advertising, no website etc.);
- personal contacts between the executives of the supplier and of the supplying company and the purchasing company in the course of contract negotiations;
- documents confirming the authority of the head of the company that is party to a contract; a copy of his or her ID;
- information on the actual location of the company that is party to the contract and its warehouses, production or sales facility;
- information on the company that is party to the contract in the Unified State Register of Legal Entities;

Additionally, the Concept identifies signs in the relationships between the taxpayer and its contract partners that increase the risk of tax noncompliance. For example, contracts might contain clauses that are different from the typical rules of business conduct (large batches of goods are delivered without any advance payment; transactions are made through third parties; payment with bills of exchange etc.); there are reasonable doubts about the contract partner's ability to fulfill their contractual obligations; the payer (or their contract partner) does not take any action to collect the debt; the contract partner issues, buys or sells bills of exchange etc.

The work to improve the VAT administration system started with the creation at phase one of a system for verification of VAT refund claims using a risk-oriented approach. The system applies practice-based criteria to divide taxpayers into three groups: high-risk, medium-risk and low-risk ones (RMS FTS, 2016).

The next step in the application of the risk-oriented approach was the introduction of automated VAT control system ASK NDS-2 in 2017. The system enables tax authorities to automatically control VAT refund claims and tax deductions. Tax authorities use the system to automatically monitor the entire supply chain, the emergence and size of value added as well as the amounts of VAT invoiced, and VAT refunds claimed. ASK NDS-2 analyses VAT returns of the taxpayer and his contract partners by comparing invoices, sales journals and purchases journals, and invoice journals of intermediaries with the similar data of the contractual partners. The system detects two types of deviations:

- a discrepancy between the VAT amounts (when the transaction is recorded in the returns of both contractual partners, but different VAT amounts are entered);
- a gap (when a transaction is not reported in the returns of one of the contractual partners or one of them is not registered in the Unified State Register of Legal Entities) (FTS, 2020).

Furthermore, the ASK NDS-2 software solution enables tax inspectors to build chains of contractual partners, to create "a tree of connections" and detect complex tax gaps – e.g. incidents of VAT non-payment by a second-tier or further contractor. Over 80 risk criteria are currently applied in Russia to analyze corporate data. The criteria address a company's overall business activity, registration data, track record of tax compliance; beneficiaries etc. The risk assessment algorithms are classified and are

constantly updated on the basis of internal and external information. The analysis results provide grounds for subjecting companies to simplified, regular or enhanced control.

2. Transformation of indirect tax administration. The automated VAT administration system that has been created by the Federal Tax Service of the Russian Federation incorporates:

- a central database that is fed by a network of federal data processing centers;
- a risk management system (RMS AKS NDS);
- a tool for comparison of transaction data that are recorded in VAT returns (ASK NDS-2.

Digital interaction between tax authorities and other government agencies and the expansion of the automated information system of tax authorities (AIS Nalog-3) offers a greater opportunity for detecting and preventing the taxation risks of a state. Under Article 93.1 of the Tax Code of the Russian Federation, a tax authority shall have the right to use data provided by a third party, including a contract partner of an audited taxpayer, for performing an in-house VAT audit (Tax Code, 2020). As of 1 January 2019, tax authorities can request audit firms and private auditors to provide such information should the head of the Federal Tax Service or his deputies decide so (FTS, 2020).

Similar measures are actively employed by tax services in various countries. Figure 1 presents the results of the analysis of data provided by third parties for tax administration in OECD member states (OECD, 2019).

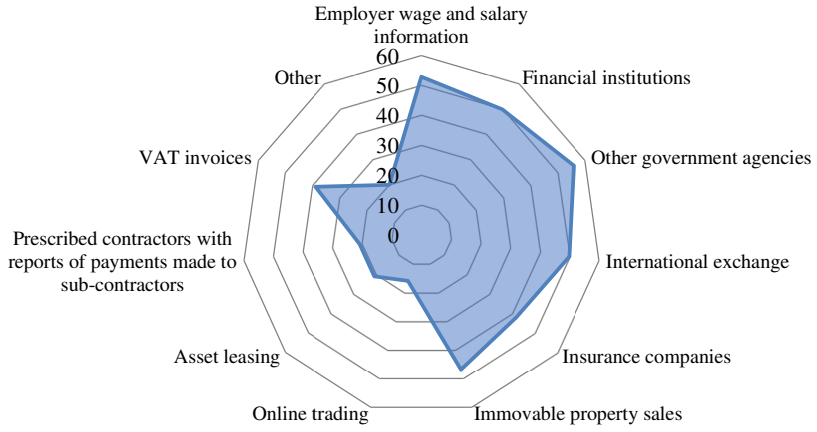

Fig.1: Use of data from third parties in tax administration in OECD countries, 2017

As was stated above, the key advantage of ASK NDS-2 is the capability to automatically find discrepancies in VAT data: the system processes millions of electronic returns and about 15bn electronic invoices a year. Today, a pool of trusted operators of electronic document management software has been established that first appeared back in 2012. Tax administration of electronic accounts has been progressing in the OECD member states, too (Fig. 2).

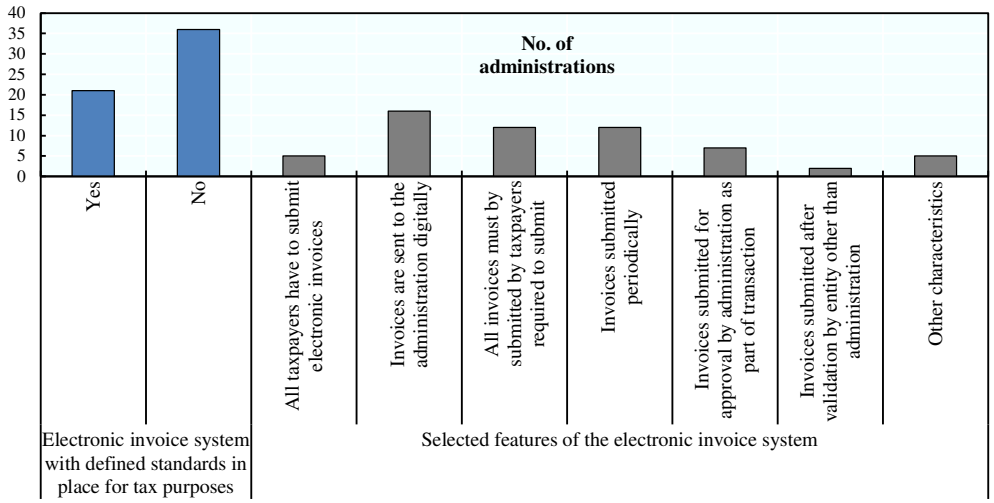

Fig. 2: Electronic invoice systems: existence and selected features in OECD countries as of 2017.

Source: OECD (2019)

Online cash registers that the Federal Tax Service has been introducing since 2017 are a tool for reducing the risk of indirect tax noncompliance. By enforcing online cash registers, the FTS has been efficiently countering money laundering. The transition to online cash registers made it possible to increase VAT collection in retailing by 50%, while the number of active cash registers increased by 150% to over 3.2 million units in possession by 1.4m users. According to the FTS head, over 200m checks are issued. All of them are transmitted in real-time to the FTS servers, their total amount exceeding 125 billion roubles daily. The average check in November 2019 was 700 roubles, with a steady growth in VAT paid by retailers by 50%, or 124 billion roubles over two years (FTS, 2020).

As a positive side effect of the deployment of ASK NDS-2, the number of fly-by-night firms has more than halved from 1.7 million in 2011 to 300,000 in 2018, which is 7.3% of all legal entities in the country. As of January 2019, the share of untrustworthy companies dropped to 4.7% of all registered businesses and other organizations in Russia: the Unified State Register of Legal Entities contained data on 3.9 million entities, while the number of dubious firms was down to 186,900. As the efficiency of tax collection grows, the number of on-site tax audits goes down. The number of such audits decreased by 14% to 30,600 over the past year, while the efficiency of one on-site audit increased by 8% (to 9 million roubles). Thanks to that, the collection of additional amounts of tax due increased to 60% (FTS, 2020).

In additional to the deployment of ASK NDS, the Federal Tax Service of Russia has been working on digital technologies that improve the efficiency of indirect tax administration, including

- sweeping adoption by retailers of cash register equipment that transmits fiscal data online;
- creation of a goods tracking system from the moment of customs clearance to purchase by the end user (RFID tagging, EGAIS).

The goal of the introduction of online cash registers is real time transfer of data on transactions between organizations and private entrepreneurs and individuals to tax authorities. According to the latest reports by the FTS, over 1.5 million taxpayers in Russia have switched over to online cash registers, with the total number of online cash registers in use reaching 3.2 million.

Table 3: Outcomes of implementation of cash registers in Russia, 2017 – 2019

	February - March 2017	2017	2018.	Jan-Oct 2019.
Number of taxpayers	-	500,000.	865,000	1.5 mln
Number of cash registers	более 100,000	1.6 mln	2,3 млн.	3.2 mln
Number of issued receipts per day	-	120 mln	150 mln (for a total of 90bn roubles.)	-
Total number of issued receipts	220 mln.	28bn	-	-
Total worth of receipts	over 110bn roubles.	over 18,700bn roubles (including over 1,600 mln of VAT)	-	-

Source: compiled by the authors with data from FTS (2020).

The cash register reform made it possible to considerably reduce administrative burden on businesses: cash statements have been eliminated; the number of tax audits has decreased by a factor of four against 2016.

A pilot project to electronically tag fur clothing started in the Eurasian Economic Union (Russia, Belarus, Armenia, Kazakhstan, Kyrgyzstan) on 12 August 2016 following the ratification of the Agreement on the Implementation in 2015-16 of a Pilot Project to Tag Fur Clothing. According to the Federal Customs Service of the Russian Federation, the project proved highly effective economically. In 2017, a total of 2.3 million imported and domestically made garments were tagged, a total of 1.2 million garments worth 68.5 billion roubles were sold. The number of declared fur garments increased by 50% in 2017 against 2016 from 277,000 to 417,000. Their value increased by 80% from 129 million dollars to 232 million dollars. The weight of the declared goods increased by 70% - from 417 tons to 693 tons; customs duties paid increased by over 80% (from 38.7 million dollars in 2016 to 69.6 million dollars in 2017). (Table 4).

The labeling and tagging of goods increased excise revenue collected by 20 to 40% over a period of two years (2016-17). Additionally, the tagging of goods makes it possible to decrease the share of the shadow economy by 50 to 60% and increase integration within the Eurasian Economic Union. It has to be noted that one year into the introduction of the ASK NDS automated system, the number of VAT refund claims from businesses halved.

Table 4: Preliminary results of pilot project to tag fur products

	2016.	2017.
Number of declared garments (thousand.)	277	417
Weight (tonnes)	417	693
Value (million US dollars)	129	232
Customs duties (million US dollars)	38,7	69,6

Source: compiled by the authors with data from FCS (2020)

In general, the number of dubious VAT deductions has decreased since the launch of the automated system and is now less than 1%, which is the lowest level in the world. In Europe, for example, this figure varies between 3 and 7%.

3. *Tax risks associated with digital transformations of indirect taxation.* Amid the progress of digitalization, the transmission, storage and integration of data are getting easier to do thanks to new

methods and processes. At the same time, the volume of data that are accessible to tax authorities for the purposes of tax control is growing considerably. A system of tax risk management based on data and big data analysis that is being put into service by the Federal Tax Service of Russia requires taxpayers to make arrangements for effective tax risk management. Table 5 presents a classification of tax risks faced by taxpayers from consumption taxes by type of tax implications.

Table 5: Classification of tax risks for taxpayers associated with consumption taxes

Risk	Legal framework
Risk of audit by oversight authority and heavier tax burden	
Risks envisaged in the Concept of On-site Tax Audits (accessible in public domain)	Instruction of FTS of 30 May 2007 № MM-3-06/333@
Risks of incorrect usage of online cash registers	Article 122 of Tax Code, Article 14.5, of Code of Administrative Offences
Risks of consequences of ASK NDS-2 usage	Article 122 of Tax Code
Risks of tax base adjustment – correction of VAT deduction	Article 54.1 of Tax Code
Risks of VAT minimization through formal through the formal splitting of the business	Article 54.1 of Tax Code, Newsletter of FTS
Risks of criminal prosecution	
Establishment of fly-by-night firms for VAT evasion	Article 173.1 of Criminal Code
Major cases of indirect tax evasion	Article199 of Criminal Code
Reputational risks	
Risks of detection of false information about taxpayer (e.g. fictitious supplies)	Article 76 of Tax Code, Article 119 of Tax Code, Article 76 of Tax Code
Risk of being blacklisted as non-compliant taxpayer	Article 122 of Tax Code

Compiled by the authors based on Concept (2007) Tax Code (2020), Code of the Russian Federation on Administrative Offenses, The Criminal Code of the Russian Federation

Taxpayers should, therefore, independently independent constant monitoring and assessment of tax risks and avoid shady dealings, refuse to deal with dubious companies and keep track of changes to tax legislation. Table 6 presents explanations of digital risks stemming from the transformation of indirect taxation.

Table 6: Description of digital risks of indirect tax transformation

Risks	Description
Digital disconnection	One of the most common issues that shows either in users' unwillingness to embrace the new format of communication with tax authorities, or the lack of stable internet connection (e.g. in remote areas of Russia's north)
Cost and complexity	The introduction of new software is a costly project both for tax authorities and taxpayers. Knowledgeable professionals are scarce
Security and privacy	Electronic communication channels are vulnerable to hacking. There is a human factor problem.
Data conversion	Past period reports are stored in hardcopy or in a format that does not fit the new system. Additional information needs to be filed.
Incoherent legislation	The existing legal and regulatory framework was created in the pre-digital era and is not in line with the current practice

Source: Compiled by the authors

In general, the application of VAT/GST in a digital economy is fraught with a number of problems that governments will have to overcome. A lack of agreement between countries in the field of taxation results in double taxation or the non-imposition of tax. One of the key taxation problems in a digital economy is the complexity of establishing tax nexus, that is, the fact that a business has a physical

presence in a jurisdiction. Establishing tax nexus for a digital company without its physical presence is complicated because of the mobility of intangible assets. At present, the problem could be solved by assigning sales based on the location of the customer (Victorova, N. G., Yevstigneev, EN; Yablokov, DY, Dubolazova, YA., 2018).

Conclusion and Future Research

The analytical review enabled the authors to identify trends in the digitalization of indirect tax administration. As part of the historical analysis of indirect tax transformations that have happened alongside conceptual changes in economic models (tax system 1.0 – pre-industrial economy; tax system 2.0 – industrial economy; tax system 3.0 – neo-industrial economy) explanations have been proposed for transformations that occurred at each phase of economic development. The principles and structural elements of the system of indirect taxation amid conceptual changes to the economic model (Versions 1.0; 2.0; 3.0) are explained. The results are presented of an analysis of an expert survey of tax experts for the sake of verification and interpretation of data that were obtained by means of content analysis. As a result of an analytical review, trends in the digitalization of tax administration of indirect taxation in Russia were highlighted. It is proved that these trends can with high probability be reproduced in other tax systems during the development of digital control services. Tax risks have been identified that are associated with digital transformations of the indirect tax administration system.

Acknowledgment

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Application of RFID in Storage Processes in the Supply Chain

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Abstract

The article addresses the warehouse characteristics and issues regarding the storage process. It focuses on the presentation of the RFID system in warehousing in the supply chain. The advantages and disadvantages of using this technology and problems associated with the implementation alongside the specification of sensitive areas are presented. An assessment of the state of the warehouse infrastructure and the application of RFID technology in warehousing processes and further prospects for implementation was carried out.

Keywords: Logistics, Warehousing, RFID, Supply Chain

Warehouse and storage process characteristics

A size and throughput are the factors that best characterise a warehouse. Its designing should be guided by the priority of providing it with adequate throughput, depending on the degree of mechanisation of warehouse works, handling, movement, storage and release. It implies that such means of transport and working methods should be selected that optimal flow of material goods through the warehouse is ensured in a way to match them to the needs of production or trade in goods [2]. A warehouse is a functional-organisational facility intended to store material goods in a separate space, i.e. a warehouse building. This building should be constructed in accordance with the established technology and equipped with appropriate devices and technical measures. A team of people should be responsible for its management and operation [18].

It is worth noting that warehouse parameters must above all declare the optimal size as well as throughput. These two fundamental values should be adjusted to the tasks resulting from the necessity to secure the needs of the production process in terms of availability of resources and materials. Due to the function of balancing supply and demand, warehouses are created as objects closely related to the environment, and they constitute a consolidation link both in regional and increasingly often in international supply chains, thus ensuring a smooth flow of material goods. Regardless of the need to maintain stocks, warehouse facilities also perform functions linked to the picking activity of specific assortment inventory groups, according to needs reported by customer. Warehouses in the food industry perform additional functions while being in a way an extension of production as the next stage of natural processes directly related and resulting from manufacture technology in the form of, e.g. ripening of fruit or cheese, or freezing of meat, and others. As can be seen, these are further arguments for the existence of warehouses. Given the fact that warehouses are the main link in the supply chain, it can be stated that one of their primary functions is to receive, temporarily store, as well as transfer goods to subsequent links [6]. The issue of the receipt, maintenance and release of stocks must be classified as the fundamental and underlying factor justifying the operation of warehouses.

Warehousing is a process which solves the problems of meeting changing market needs. For the proper functioning of warehouses, it is necessary to equip them with means, devices ensuring the possibility of effective implementation of storage processes. Both the storage infrastructure and the complementary handling infrastructure must contain the necessary equipment, which should be kept in good condition by carrying out the necessary repairs and services. The effectiveness and efficiency of logistics services depend on the condition and degree of adjustment of logistics infrastructure to

the needs of companies providing logistics services [14]. The storage process can be defined as a set of activities related to the temporary stocking of inventories and material goods, their storage in the appropriate conditions, and their transfer to consignees. Inventories are the appropriate amount of resources that are accumulated to ensure the smooth and undisturbed functioning of the organisation in all areas. In enterprises, inventories are all kinds of goods in a strictly defined quantity, which are not used at a given moment, but their presence allows the achievement of specific objectives, in the form of maintaining continuity of the production process and meeting customer needs [12].

Warehousing processes consist of groups of operational activities directly correlated with the receipt, storage, picking and delivery of goods in adapted places meeting certain organisational or technological conditions [10]. Warehouse processes include flows of both materials and information. Handling activities are defined as all types of activities which result in changing the form of the cargo. Not only can they be observed mainly in the phase of receiving and releasing goods, but they are also visible in the phase of storage and picking.

RFID Application in Storage Processes

RFID (Radio Frequency Identification) is a technology that allows non-contact automatic identification and readout of data using radio waves of different frequencies. This technology is a development of barcode technology, but uses low-power radio signals for wireless data exchange between the RFID label - called a transponder or tag - and the reader, i.e. decoder. The reader is used to communicate between the database and the tag and middleware, which condenses and filters the data to avoid inaccuracies and transmits enterprise resource planning (ERP) to the management of operations [15]. The advantage of RFID readers is their ability to read and process a large number of labels within their range. A miniature chip called a tag is placed as a label on various products, packaging, and it consists of a processor ("IC") and antennas. The antenna is usually sprayed on an insulator layer. The data is saved in the processor - IC - cache memory, and its transmission takes place using the antenna. The range, as well as transmission speed, is determined by the size of the antenna, frequency used, the occurrence of interference, and their degree, radiation power [9].

The use of RFID in the warehouse process gives the possibility to carry out the warehouse operations more efficiently, starting from the receipt of goods, through their proper placement and storage, picking, to the moment of release from the warehouse. Any object can be tagged with a label, which allows the control over its position using a reader communicating with the transponder by radio waves without the need to scan the label directly [4]. This method offers a significant advantage in gathering and filtering information. Thereby the activities and processes performed using RFID technology in the warehouse are much faster and more precise. The RFID technology infrastructure consists of IT solutions that process and read data, and radio-emitting readers that are made up of an antenna and a radio transmitter together with a decoder [17]. In connection with ERP, WMS class warehouse information systems, RFID enables accurate and available real-time information on where the tagged object is located or moved.

A specific limitation is the cost of radio tags, which is much higher in comparison to traditional barcodes. It makes that the implementation of RFID technology together with the infrastructure that is necessary for proper functioning generates specific expenses. The implemented and functioning system, in which tags are in constant use, results in a quick return on investment, thanks to the possibility of introducing changes to the information in the company's IT system for its reuse. Moreover, the RFID system is limited by the interference from specific substances, such as metals, which can cause substantial interference or completely suppress radio transmission [16]. In cases of interference, radio transmission can be corrected and adjusted by selecting the correct frequency. Figure 1 shows the RFID system characteristics.

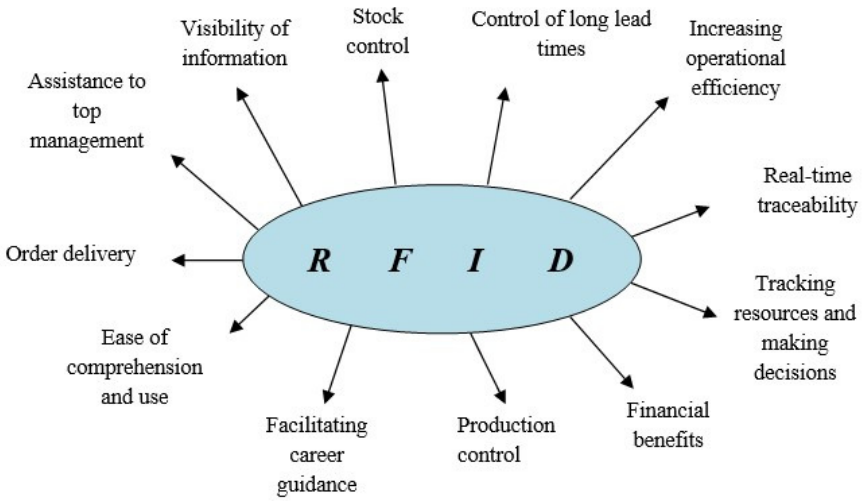

Figure 1: RFID characteristics in the supply chain

Source: own study based on [3]

The main advantages of this technology are speed and the fact that it is relatively inexpensive; it provides autonomous dedicated coding. It is characterised by features such as positioning and position registration, high operational efficiency, data privacy, real-time tracking, transparency, extensive customisation possibilities, work standardisation, process visualisation, and mentoring [11]. Moreover, the use of RFID in the supply chain significantly contributes to the improvement of production control, delivery of customer orders, shortening of production process lead times, development of inventory processes [5]. The main factors that speak in favour of RFID technology include: [8]

- no need for direct visibility of the antenna of the reading element with the identifier utilizing the radio communication,
- RFID technology has the lowest reading error rate when considering all technologies for automatic identification,
- the use of radio tags allows identification in hard-to-reach places where optical methods do not perform their function, as the tags can operate in a wide temperature range and their susceptibility to environmental conditions is negligible,
- the plasticity of radio tags concerning the materials they can be made of and shapes corresponding to personalised needs is free and can be: a cuboid, a ring, a capsule, a button, or a card,
- radio tags give the possibility to write data multiple times - even up to 300 000 and modify parts of them, not only the reading in relation to an unlimited number of readings, which makes the object marked with a tag can carry information of variable content,
- radio tags are not counterfeit because they have a serial number that cannot be changed assigned by the manufacturer at the time of production, and a password assigned by the user can protect the information stored on the tag,
- high versatility and application possibilities in various industries.

In addition to the advantages, there are disadvantages, as the system has certain limitations and problems resulting from the implementation phase as well as subsequent operation. These include, among others: [13]

- technical difficulties at the implementation level as well as the lack of harmonised standards,
- still insufficient resources of qualified personnel familiar with RFID technology,
- some limitations due to the interaction of radio waves and the need to take this phenomenon into account when designing new systems,
- the possibility of a hacker attack forces the security issues to be considered when designing the system.

RFID technology will be particularly useful in warehouses, where great attention is paid to the transparency of goods flow through the warehouse and their accessible location. RFID can improve the flow of products and information, thus determining supply and demand, as well as the quality of customer service to increase revenue and innovation. Furthermore, it has a positive impact on value creation since it intends to reduce costs as well as create a company image and build a competitive advantage.

Implementation of RFID technology in the warehouse requires a set of widely accepted standards and regulations. The areas mentioned below play a vital role in the application of this technology: [1]

- standardisation,
- the cost of the system,
- business process re-engineering,
- integration,
- privacy,
- lack of RFID professionals,
- and sensitive storage problems.

The issue that comes to the fore is system standardisation, followed by privacy and security. The wireless nature of the technology generates potential threats to users' security, as it is possible to intercept the signal communicating tags with the reader. It can lead to data interception and put the wireless transmission and physical storage of data at risk.

The threats and obstacles that can be identified in the RFID technology implementation in warehouses can be listed in the areas: [7]

- technological risk,
- risk of standardization,
- cost-related risk,
- risks related to infrastructure,
- risk with return on investment (ROI) usage.

Although, warehouses deciding to employ RFID technology are aware of the risks and drawbacks of the system, the expected benefits in improving physical and information flows outweigh.

Warehouse Infrastructure Assessment

The condition and type of warehouse infrastructure is the main factor influencing the implementation of logistics services in warehouse facilities in the supply chain. A questionnaire survey was conducted among storage companies having their warehouses to assess the condition of the infrastructure and its adaptation to the needs of logistics services. The research hypothesis was to examine the impact of warehouse infrastructure and its condition and the application of the RFID system on storage processes in the supply chain. The research task was performed using a questionnaire from October 2019 to February 2020 in a group of 53 Polish companies allowing examination of the following aspects. The companies were asked to indicate the technological transport devices they use in their warehouses, as shown in Figure 2.

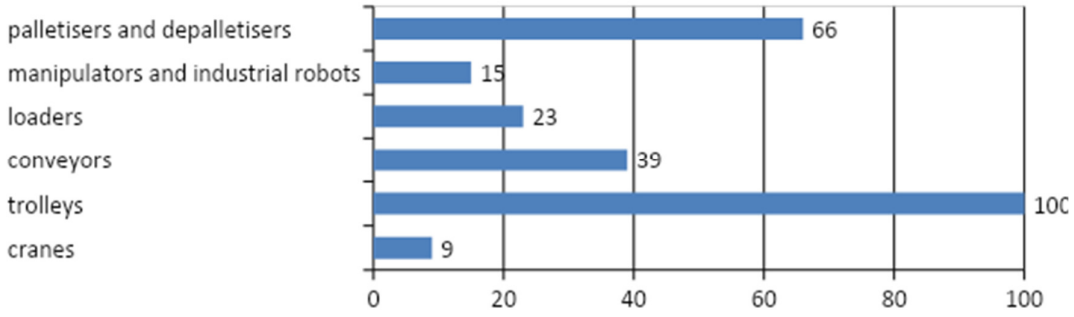

Figure 2: Possession of technological transport equipment in warehouses

Source: Own study based on the research conducted

The surveyed companies use a variety of technological transport devices for the implementation of storage processes. The most frequently used ones include transport trolleys (100% of the surveyed companies), followed by palletisers and depalletisers as well as conveyors (as declared by 66% and 39% of the respondents respectively). The companies (9%) use cranes to the least extent in their work. Then they were asked to assess the technical condition of technological transport equipment. Figure 3 presents the results.

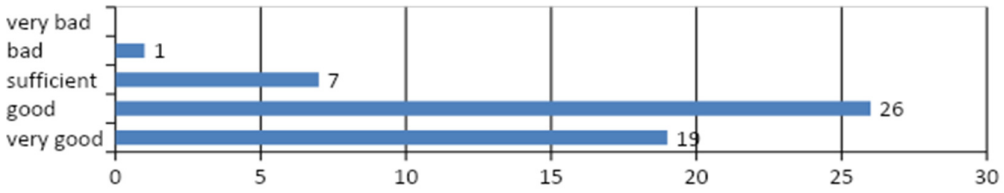

Figure 3: Technical condition of technological transport equipment

Source: Own study based on the research conducted

Among the surveyed companies, 26 described the technical condition of technological transport devices as good, 19 warehouses assessed it as very good, only 7 entities stated that the technical condition of technological transport equipment is sufficient, and one respondent described it as bad. The respondent explained that the poor assessment stemmed from the fact that a few transport trolleys, which were being repaired or replaced with new ones, had broken down. Then the companies were to indicate the auxiliary equipment they use in their warehouses, which included the following: [14]

- cargo containers,
- cargo pallets,
- pallet collars,
- transport and storage containers,
- bridges and loading platforms,
- empty pallet feeders,
- cargo unit securing devices.

The results are shown in Figure 4.

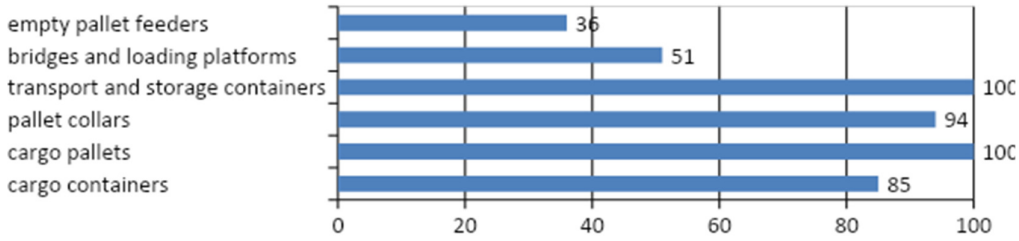

Figure 4: Possession of warehouse ancillary equipment

Source: Own study based on the research conducted

The surveyed companies use a variety of technological transport devices for the implementation of storage processes. The most frequently used ones include transport trolleys (100% of the surveyed companies), followed by palletisers and depalletisers as well as conveyors (as declared by 66% and 39% of the respondents respectively). The companies (9%) use cranes to the least extent in their work. Then they were asked to assess the technical condition of technological transport equipment. Figure 5 displays the results.

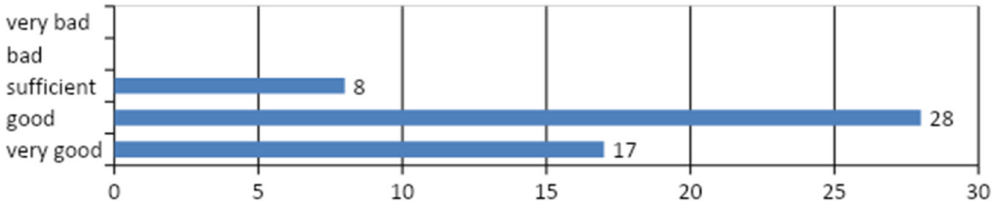

Figure 5: Technical condition of ancillary equipment

Source: Own study based on the research conducted

Among the surveyed enterprises, 28 indicated that the technical condition of ancillary transport equipment as good, 17 warehouses assessed it as very good, only 8 entities described it as sufficient. The survey also allowed collecting information on the actions taken by the warehouses to modernise and upgrade their infrastructure. The data is presented in Figure 6.

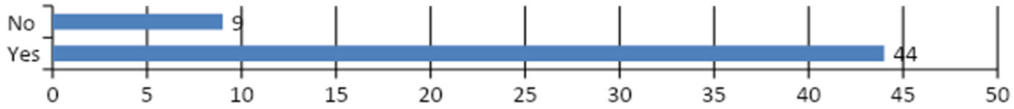

Figure 6: Warehouse infrastructure modernisation and upgrading

Source: Own study based on the research conducted

Figure 6 presents the answer to the question of undertaking actions aimed at infrastructure modernisation, to which 44 warehouses responded in the affirmative and 9 surveyed entities denied taking such actions. Figure 6 displays an assessment of the general condition of warehouse infrastructure.

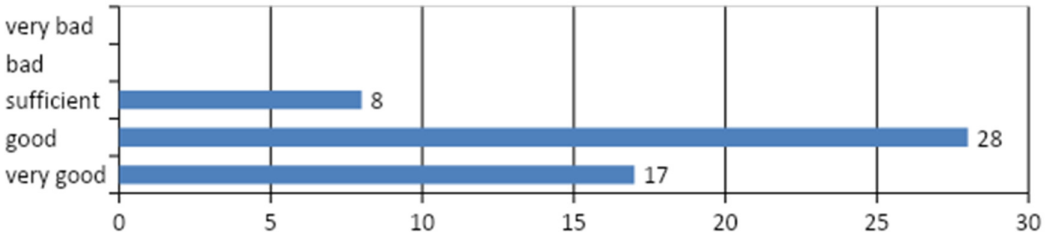

Figure 7: General condition of the warehouse infrastructure

Source: Own study based on the research conducted

The surveyed warehouses were asked to assess the overall condition of the infrastructure. Out of the 53 surveyed entities, 28 described the condition of the infrastructure as good, 17 as very good, and only 8 as sufficient. It can, therefore, be concluded that the high assessment of the overall condition of the warehouses' infrastructure is since upgrades and modernisation of warehouses significantly improve their condition. Next, it was examined whether and to what extent the warehouse infrastructure affects the efficiency of the performance of logistics services in warehouses. The developed data is presented in Figure 8.

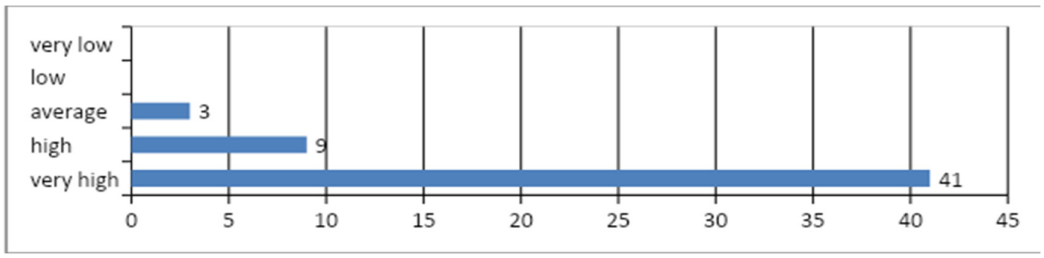

Figure 8: The impact of warehouse infrastructure on the efficiency of warehouse operations

Source: Own study based on the research conducted

According to 41 respondents, the warehouse infrastructure has a very high impact on the efficiency of warehouse operations, for 9 respondents, this impact was high and for 3 medium. These results prove that the assessment of the state of the warehouse infrastructure is very high and the fact that more than 80% of the surveyed warehouses declare taking measures about warehouse modernisation and upgrading influences the efficiency of storage processes in the warehouses. A vast majority of the surveyed entities have a technically efficient infrastructure adjusted to the needs and realisation of storage processes.

Assessment of RFID technology application in storage processes and further prospects for its implementation

The functioning of warehouses and the implementation of storage processes requires an efficient and well-functioning warehouse infrastructure. Given the fact that companies are looking for opportunities to improve their processes, they increasingly decide to implement modern IT systems. The respondents were asked to indicate the class of systems used for warehouse management and assess the degree of impact of the systems applied on the efficiency of logistics services. Besides, the survey allowed checking whether companies use systems for automatic identification, such as RFID to improve the performance of logistics services in their warehouses. Figure 8 presents the class of IT systems used in the surveyed warehouses to manage them.

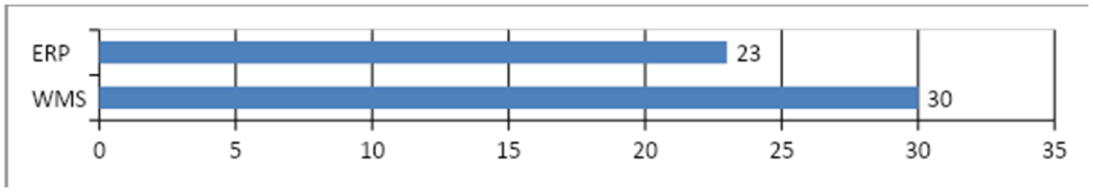

Figure 9: The class of IT systems used in warehouses

Source: Own study based on the research conducted

Figure 9 shows that 30 surveyed companies use WMS systems and 23 ERP systems. Next, it was examined whether the systems used meet the respondents' expectations and enable efficient execution of storage processes. The developed data is presented in Figure 10.

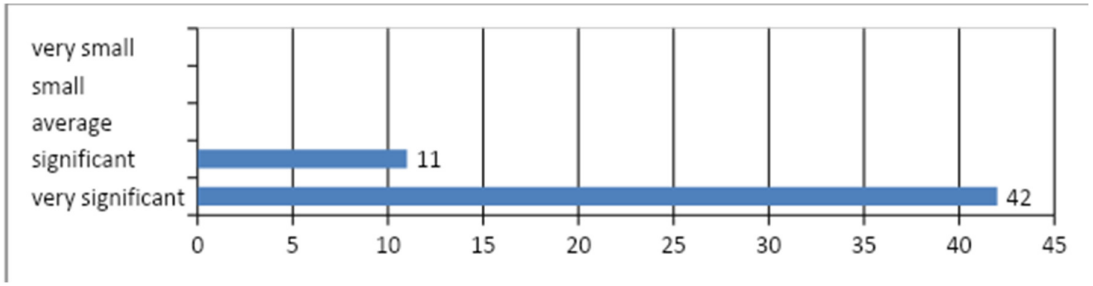

Figure 10: The extent to which the IT systems meet the expectations and enable efficient execution of storage processes

Source: Own study based on the research conducted

The surveyed companies highly evaluate the systems used and their impact on logistics services. 42 respondents believe that their IT systems meet the expectations and enable the efficient realisation of storage processes to a very significant extent, while 11 respondents assess this extent as significant. After that, the respondents were asked about using RFID technology in their warehouses. Figure 11 presents the results.

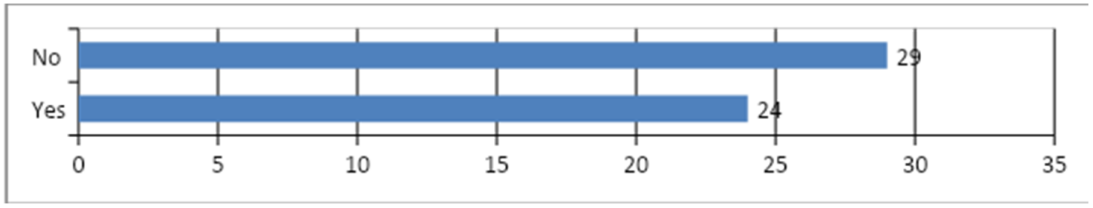

Figure 11: Application of RFID technology in warehouses

Source: Own study based on the research conducted

24 out of 53 respondents confirm the use of RFID technology, while in 29 companies surveyed it is not employed. Next, the occurrence of problems related to the RFID technology implementation was examined. The results are presented in Figure 12.

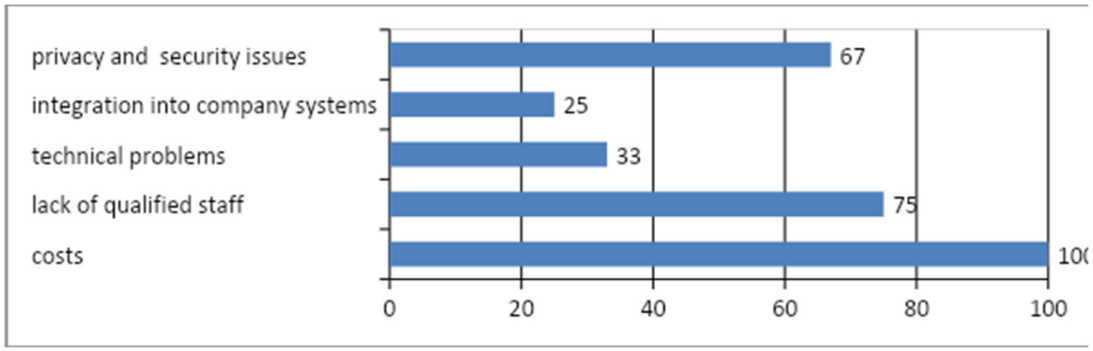

Figure 12: Problems related to RFID implementation

Source: Own study based on the research conducted

As can be seen, the surveyed companies indicate implementation costs as the most common problems related to RFID implementation - 100% of the companies, 75% mention the lack of qualified staff, for 67 of them the privacy and security issues proved to be crucial. Technical issues and integration into enterprise systems turned out to be the least problematic. Then, among enterprises declaring it was examined to what extent the possessed RFID technology affects the implementation of logistics services, as displayed in Figure 13.

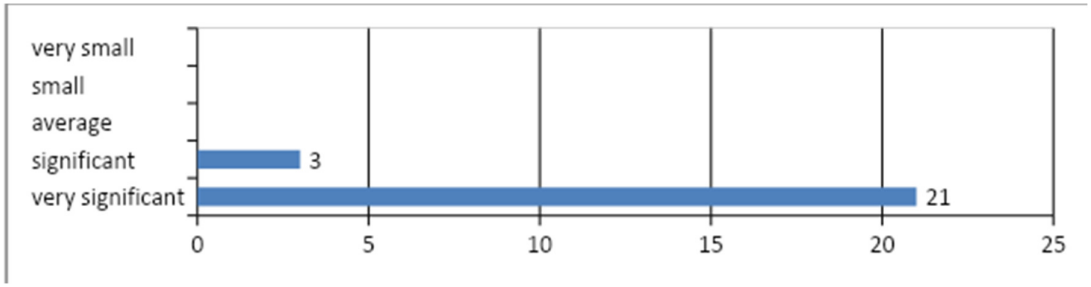

Figure 13: The extent to which RFID technology affects the realisation of storage processes

Source: Own study based on the research conducted

Figure 13 shows that 21 surveyed companies determined that RFID technology has a very high impact on the implementation of logistics services, and for 3 surveyed companies, this impact is high. The respondents who do not use RFID technology were asked if they have plans for its implementation in the next 5 years. The results are presented in Figure 14.

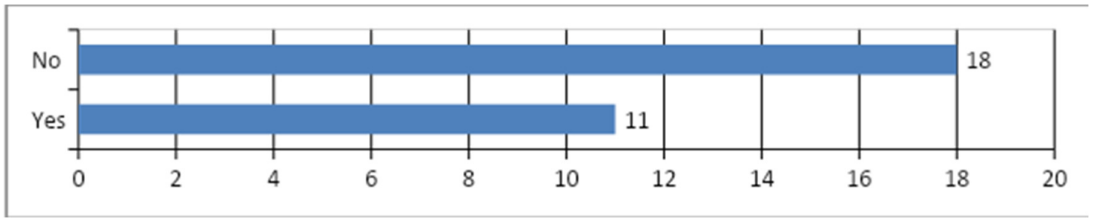

Figure 14: RFID implementation plans for the next 5 years

Source: Own study based on the research conducted

Figure 14 shows that only 11 companies plan to implement RFID technology in the nearest future, while 28 of them do not. Figure 15 shows the factors which enterprises that do not plan to implement RFID technology in the next 5 years have listed as defects of this technology.

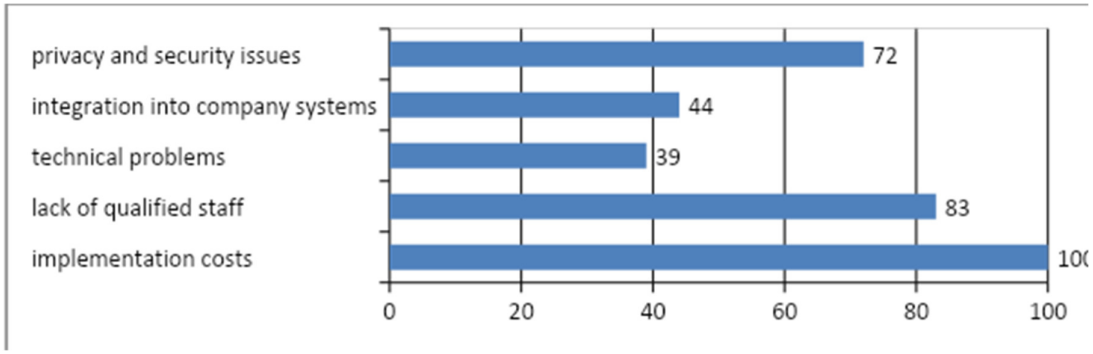

Figure 15: Identification of RFID technology defects

Source: Own study based on the research conducted

It is clear from the below Figure 15 that the surveyed companies (100%) indicate implementation costs as the main disadvantages and reasons why they did not implement RFID technology. It was followed by the lack of qualified staff and the issues of ensuring privacy and security, as indicated by 83% and 72% of respondents respectively. To the least extent, the surveyed enterprises are afraid of technical problems and integration into their systems, which was indicated by 39% and 44% of respondents, respectively.

Conclusion

Therefore, it can be concluded that RFID implementation is not standard among the surveyed companies (24 implementations out of 53 surveyed companies). Nonetheless, the implementation of RFID technology is evaluated positively, which can be concluded from the high assessment of the degree of its impact on the implementation of logistics services. It appears evident that the surveyed companies also identify the disadvantages of the applied technology in the form of high implementation costs or lack of qualified staff. What is more, among the companies that did not implement the technology due to its shortcomings, implementation costs and lack of qualified staff were mentioned. However, 11 out of 29 surveyed companies not using RFID are planning to implement it over the next 5 years. As far as the state of the infrastructure is concerned, 53% of the 53 entities surveyed described the condition of the infrastructure as good, 32% as very good, and only 15% of the entities stated that their infrastructure is in the sufficient condition. Besides, 83% of all surveyed entities confirmed that they are taking measures to upgrade and modernise their infrastructure. Moreover, all companies using RFID say that this technology has a very high (84%) or high (16%) impact on the implementation of storage processes. It is worth noting that the examined enterprises highly rated the use of ERP and WMS systems in terms of meeting and enabling the efficient implementation of storage processes.

It follows that a vast majority of the surveyed entities have a technically efficient infrastructure, tailored to the needs and implementation of storage processes, and the use of RFID system significantly impacts the execution of storage processes. The above confirms the research hypothesis that the warehouse infrastructure, its condition, and the application of RFID system affects the storage processes in the supply chain.

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The Impact of Socio-Economic Issues on Families' Cultural Socialisation and Participation: The Case Study Research in Latvia

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Abstract

The impact of families' lifestyle and cultural orientation on young people's cultural knowledge and interactions is determined by subjective and objective factors of well-being. In addition, cultural principles such as family attitudes, intergenerational dialogue, shared commitments, passing down values, traditions, customs, and patterns of cooperation are important for creating the conditions for economic success. The effect of culture on economic performance may be perceived on the fact that a family is the basic unit of the country's economy and each family is the economic mainstay of its members. The aim of the research is to carry out qualitative data analysis on the impact of socially and economically most pressing issues on families, their well-being and lifestyles, cultural socialisation and participation. The empirical data have been obtained from 10 family case studies and intergenerational semi-structured in-depth interviews in urban, semi-urban, and rural areas of Latvia. The research has been carried out in the framework of the project "Cultural Heritage and Identities of Europe's Future (CHIEF) supported by the EU Research and Innovation programme Horizon 2020 and conducted across nine countries.

Keywords: Family, Intergenerational Dialogue, Culture, Socio-Economic Impact.

Introduction

Culture is a complex phenomenon that traditionally is seen as a broad anthropological and sociological structure, i.e. as a set of attitudes and practices. Culture not only resides within an economic milieu, but it can be approached and defined as economy, "If culture can be thought of as a system of beliefs, values, customs, etc. shared by a group, then cultural interactions among members of the group or between them and members of other groups can be modelled as transactions or exchanges of symbolic or material goods within an economising framework." (Throsby, 2001, p. 10) Among diverse facets of culture there are virtuous and life-enhancing qualities. Being a social asset culture can provide important social and economic benefits: it enhances the quality of life and increases overall well-being for both individuals and countries.

According to Latvian policy documents, culture is not only preservation and management of tangible and intangible cultural heritage, but also a strategic means leading to the national stability and security, as well as to economic development of the country. In long-term policy documents, e.g. "Sustainable Development Strategy of Latvia until 2030" (VARAM, 2010), culture is defined as "an important national foundation without which the country's existence and successful development would not be possible." (Romanovska and Kacane, 2019, p. 98) Cultural conditions, in which economic activity occurs, are directly linked to economic outcomes and, vice versa, economic growth determines the development and preservation of culture, as well as cultural behaviours (socialisation and participation practices) of individuals and groups.

The study has been carried out in the framework of the project "Cultural Heritage and Identities of Europe's Future (CHIEF) supported by the EU Research and Innovation programme Horizon 2020 and conducted across nine countries: the United Kingdom, Latvia, Croatia, Georgia, Turkey, Spain, Slovakia, India and Germany. In each of the project countries within the "Research on Intergenerational Dynamics of Cultural Socialization" that explores family settings as one of the most

important sites of informal cultural socialisation, 10 families were selected to identify socially, economically and politically pressing issues and factors facilitating and/or hindering inter-cultural communication and cultural participation. Cultural identities and practices of the young people are being shaped by many various aspects: it is not only multiple interactions in the framework of the procedural model "family – school – society", but primarily economic conditions and socio-cultural environment of the country and region, as well as national and regional cultural policies. (Kacane, 2020)

Methodology

Twenty-six in-depth semi-structured face-to-face interviews were conducted with representatives of three (in exceptional cases – two) generations from 10 families from September 2019 until January 2020, covering 34 individual family members. They represented geographical differences (rural, semi-urban and urban; mostly located in south-eastern region of Latvia – Latgale), various degrees of openness to inter-group communication, and heterogeneous socio-demographic variability – 12 young people aged 14-25 (5 females and 7 males); 11 people from the middle generation representing parents or similar (9 females and 2 males); and 11 people from the older generation representing grandparents or similar (8 females and 3 males). The interviews, the average length of each being round 60 minutes, were conducted with each family member separately, however, in isolated cases, when it was impossible to do so, they ran as conversations with several family members. One interview with a young person took place via Skype video call. The families represent (or are related to) various ethno-religious groups (Latvians, Russians, Poles, Jews, Belarusians; Catholics, Lutherans, Old Believers, Orthodox). All the interviewees, but one, were the citizens of Latvia. Before conducting the interviews, permissions from interviewees to use audio recording devices were obtained. In addition to audio recording, detailed participant notes were taken to record the context of the interview, the key themes that emerged in the course of the interview, and the reflections on the process of interview. Due to data anonymization, the interviewees were asked to replace their first names and surnames with self-pseudonyms. The languages of the interviews were Latvian and Russian based on the preference of the interviewee.

Results

According to the majority of the interviewees, family is a space of relaxation and purposeful alienation from global and, in many cases, national and regional issues. In general, families prefer topics contributing to building a free and easy atmosphere in their family circle, nevertheless, the theme of current concerns and most pressing issues was most actively discussed during the interviews mostly aimed at gaining insights on intergenerational dynamics and young people's engagement with culture and cultural heritage. The impact of socially and economically most pressing issues on families, their lifestyles, cultural socialisation and participation were most deeply discussed by the representatives of the middle and older generations testifying to existing huge concerns that are not always shared with the younger generation.

Economic Conditions

The quality of life in Latvia varies between regions; expressed in per capita income, it remains very pronounced. Social protection is limited therefore housing conditions are unsatisfactory for a relatively large part of the population. The Latvian financial and governance crisis (2008–2010), affected by the global financial crisis, caused economic and political chaos in the country, entailing a radical consolidation of the general government budget, which continues to have an effect to this today. Although the economic crisis is not deeply rooted in young people's memory, they are aware of the impact of the dramatic events experienced at that time on the Latvian economy and family lifestyle. The interviewed younger generation representatives believe that their families are currently financially secured, nevertheless young people are aware of today's economic challenges; they provide their views on possible solutions to the problems; these solutions have emerged from discussions with their peers, "[…] sometimes my friends and me think that the Baltic States could

unite, since Latvian economy goes into recession; more people die than are born; more people go away than arrive, and therefore, in my opinion, these small countries should be united." (Migle Migla, male, 14, F4, urban)

The interviewed middle and older generation representatives are concerned about the disproportionality of wages and pensions relative to the increase in the total cost of living (e.g. fuel prices). According to the elderly interviewees, the economic conditions are the ones that distinguish a genuinely European country from Latvia and a true European from a resident of Latvia who wants to be a true European, but because of various restrictions it is not possible to satisfy this wish. Many elderly people consider they are not true Europeans because of poor economic conditions, "Why should they [people in Latvia] count every penny? There is nothing like this in the EU". (Krjostnaja Mihailova, female, 67, F4, urban)

Despite financial difficulties and limitation of their needs, parents support the younger generation and invest in children's development in the hope of a better life for them in the future. This gives a distorted impression that the family is not facing economic problems. The middle and older generations not always talk directly about their financial problems but, on the contrary, they tend to appreciate more what they have, not to aspire to material things and not to complain about something they do not have. Such attitudes towards life are rooted in their religiousness where patience, modesty and gratitude are among the most valuable human qualities. An older-generation faithful woman, who lives near a Catholic church, attends the Mass every Sunday and has also instilled church service in her grandson, stresses, "[…], we're grateful for having food on the table, something to wear and we can't cry that we don't have, I don't know, the latest make of car or one produced last year, or we can't fly or go somewhere". (Koshka Kafe, female, 68, F3, rural)

Individual social groups, e.g. large families, are hit particularly hard by economic difficulties. The interviewed widowed mother of five children, who lives in a rural territory of the Latgale region, explains that at a certain time of her life, when the situation had become critical, she officially gave up her children hoping that they would be entrusted to a boarding school which would provide regular meals and warm premises. (Ludviga Felikss, female, 42, F5, rural) Consequently, financial problems, responsibility for the maintenance of children, an excessive workload and busy schedules, as well as depression as a side-effect, are among the reasons why cultural activities, particularly high-quality paid cultural events, are considered secondary and large families refuse to attend them to save the family budget, "We don't go to theatres with a family so frequently. Not a single time have we been to the opera either. […] For five people it is quite an expensive entertainment." (Raičuks Zaraija5, male, 19, F1, rural) The interviewed young people from a large family acknowledged that they do not have such opportunities as children from single-child families and the preservation of culture is only possible if a person is free from financial and economic problems.

Instability

According to the interviewees, the lack of stability, constant changes and reforms, are considered a long-standing problem for Latvia since the beginning of the "Third Awakening" (the second half of the 1980s – the beginning of the 1990s) when the previous political and economic system collapsed. Living at times of constant changes in power, borders, money, etc. causes a sense of chaos and despair in human consciousness. Therefore, instability is one of the causes of burning out, emotional fatigue and depression of the interviewed middle and older generation representatives, and it does not contribute to their cultural participation.

Government decisions are often described as irrational and, in the interviewees' opinion, they are not improving but, on the contrary, destroying the infrastructure, which has been recently created or re-established. Heavy criticism has been expressed in relation to the Administrative and Territorial Reform Aimed at National Development and Ensuring Welfare of the Population. As part of the reform, the number of municipalities will be significantly reduced by 2021 and the "deepening rural-urban divide" will be addressed. (OECD) However, the interviewed middle-aged and elderly people

confirmed that they are exhausted of endless reforms. Parents confess that they also do not recommend their children to stay in the countryside or regions, but suggest them to receive education in cities. Due to population ageing and depopulation, the availability of services (health care, transport, education un culture centres, shops, etc.) to the population still living in the Latvian rural space is decreasing, the places of the provision of services have been moved to more distant locations and have become unavailable to many people due to financial and other reasons. Consequently, the rural-urban gap is not narrowing but, vice versa, expanding, contributing to depopulation of rural areas in favour of cities and to stratification.

In circumstances where the population density in many regional communities of Latvia is less than 10 people per 1 square kilometre, the socio-economic development, along with the reduction in jobs, clearly reveals pronounced depopulation trends in rural territories. Shrinking population leads to closure of schools, health and other institutions, most notably in rural areas and towns located in regions, "Here, as soon as primary school is finished, children go to a secondary school or vocational school. They all go to Riga mostly, and they study at universities there, and stay there. […] There's nothing to do here. There's a very large emptiness here. There are no jobs here, there are very few people left here. Everybody's gone." (Vika Daugaviņa, female, 74, F8, rural)

However, in addition to the general instability in the country as a macrospace, the interviewees of the middle generation mention the particularly pressing issue of instability in the working environment related to the microspace where, given the tensions in the labour market and reforms in certain areas (e.g. the education system), instability, labour volume and competitiveness are increasing, manifestations of mobbing and bossing become evident, people are afraid of losing their jobs; all this affects the emotional well-being of an individual and eventually also the family microspace. The interviewees highlight the burn-out syndrome and exhaustion, a gradual deterioration in human health.

The interviewed middle generation representatives are concerned about the fact that their own effectiveness and that of other employees working in public institutions is declining due to instability, excessive bureaucracy and irrational activities. As a result of the financial crisis, bureaucratization has significantly increased leaving significant impact not only on families but their life-style and cultural participation.

Depopulation and Emigration

According to UN statistics, in 2000, Latvia's population stood at 2.38 million. At the beginning of 2019, it was less than 1.95 million. (Eurydice, 2020) Since joining the EU (2004), Latvia has lost one-fifth of its population. However, economic migration is not the only reason for the country's declining population: a low fertility rate and high mortality rate are among contributing factors. Based on the statistical data, there is a big concern that in 5-6 decades, Latvia may cease to be a nation.

The interviewees are concerned about Latvia's future and they are aware of the fact that in the coming years Latvia will be even emptier, but they express the belief that nowadays people need to go wherever there are workplaces. A large majority of the interviewees regret depopulation of Latvia, but they do not condemn emigration since they understand the reasons why people decide to leave the country. Neither representatives of the middle nor older generation prevent children from emigration. In the first wave of emigration, it was mostly the middle-aged people affected by the crisis that emigrated in search of employment, but today it is young people that are leaving, often encouraged by their parents, with a view to acquiring competitive education and developing a successful career in the future. This nevertheless endangers the transfer of cultural values to younger generations oriented towards supranational and global, "I think that the old will still preserve what we have, but there will be nobody to hand it down to". (Marija Murāne, female, 83, F6, urban)

Some young people, after acquiring knowledge, competences and skills abroad, hope to use them in Latvia, since these young people have a sense of belonging to the country where they come from, "To my mind, it is better to make one's own country better than to go to some other country, which already is better. If I go to some other country, I am nobody, since I am a newcomer, which means that I am an immigrant". (Ārzemnieks Felikss, male, 18, F5, rural) In some interviewed young people's opinion, emigration means the break with ancestors and the lifestyle introduced by them.

Unemployment vs. workforce shortages

Unemployment in Latvia increased dramatically during the economic crisis, but the share of long-term unemployed remains high. The interviewees relate the long-term unemployment problem to individual personal qualities, pointing out that there is a certain group of people who do not want and are not ready to take up employment or to engage in social support programmes, because over the years, they have lost their job skills due to different dependencies (alcoholism, etc.) or other social problems. Consequently, employers, including the individual ones, face difficulties in finding permanent and seasonal workers and bear most of the burden of work on their own shoulders, rarely leaving the rural areas for a longer time, taking leave or attending important cultural events outside the territory of their residence. This points to stratification of Latvia's population, i.e. part of the active workforce suffers from overload, while others do not establish lasting employment relationships. In both cases, there is a decline in cultural participation and consumption.

Thus, culture is impacted by various economic factors and is threatened if people face many socio-economic issues. "People are able to think about culture only if they are provided with everything, and life is favourable". (Ārzemnieks Felikss, male, 18, F5, rural)

Conclusion

The qualitative data analysis allows concluding that in today's Latvia the relationship between socio-economic factors and culture, as well as the effects of economic, cultural, and political interdependence are clearly observed. Although families acknowledge they have aspirations for their children and they are striving to develop their cultural knowledge and cultural literacy by maintaining dynamic inter-generational communication based on specific inherited customs, traditions, cultural values or newly created patterns, they also face many hindrances. Among the most often discussed areas of concerns that have directly impacted the families, villages, towns or the country they live in, there are unfavourable economic conditions, instability, depopulation, long-term unemployment and, thus, impossibility to keep work and life (family) balance. These factors have a negative impact not only on intergenerational dynamics in informal cultural socialisation, but also on Latvia's socio-economic development establishing the threat for the existence of culture in the long term. Families revealed both depressive symptoms and hope for the better future for the younger generation and the nation, although they also expressed fear that the community, which all the time speaks and thinks only about economic problems, is a community where culture cannot develop. They also emphasized that perceiving culture as a marginal aspect regionally and nationally, where the priority focus is on economic challenges, threatens the sustainability of the family, country and nation. Based on the obtained data, culture is not a spiritual value only and it should be looked upon like upon the economy. In Latvia, the problems of survival are the ones that affect and will affect cultural development in the future; socio-economic issues may lead to the disruption of traditions and "the culture of poverty". Although all generations are united in the hope that the fundamentals and cornerstone Latvian culture will be preserved in the future, they assume that culture will change in the coming years and decades. The reasons for that, as seen by the interviewees, are economic issues, globalisation as a process of connecting and open borders, cultural fusion tendencies, emigration and immigration.

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Televised Marketing Communication, Maternal Health and Women in Semi Urban Nigeria

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Abstract
This ongoing multilateral study investigates the role of televised marketing communication in creating awareness and impacting women's health in a densely-populated semi-urban location in Lagos, Nigeria. Opinions and attitudes of housewives, single mothers and potential mothers are examined, using the Health Belief Model. The purposive sampling method of quantitative research was used to design a questionnaire operated on 130 respondents within the age bracket of 15-49 years. Descriptive items were structured in line with the research objectives to elicit responses from the participants. Both terrestrial and subscription television channels were studied for a balanced research finding. Findings indicate that televised marketing communication is useful in creating awareness on maternal healthcare and achieving maternal health behavioural change. However,the audience frequency of exposure to programmes and the level of impact are low among the respondents. Collaborations are invited to expand this continuing study globally.

Keywords: Marketing Communication, Impact assessment, maternal health, Television programme.

Introduction

Subject area	Commercial Health Communication
More specific subject areas	Health Communication, Television Broadcasting, Marketing Communication
Study execution	Survey
Study format	Quantitative methodology
Experimental factors	This is an experimental study using the questionnaire instrument. One hundred and thirty housewives, single mothers and potential mothers were experimental respondents of equal distribution. Respondents for this study were randomly selected on shared proximity and alternate (turn-by-turn) households of each of the three groups of participants.
Experimental features	Data on the impact of televised marketing communication programmes on women's health and wellbeing. Specific information is rendered on housewives, single mothers and potential mothers to: 1. Uncover their awareness on televised marketing communication programmes. 2. Examine their level of exposure to televised maternal healthcare programmes 3. Unveil their impact assessment of televised marketing communication programmes on maternal healthcare and behavioural change.
Preliminary study location	Ejigbo, a densely-populated semi-urban area on mainland Lagos, Nigeria
Data accessibility	Potential collaborators and explorers may request for original data to guide their study simulation.

Value of Study

1. This study is valuable to the achievement of the United Nations Sustainable Development Goal (SGD) three, namely Good Health and Wellbeing.
2. Similar studies on the same subject could borrow form the preliminary findings of this endeavour.
3. Increasing global attention to womanhood and the girl-child could use the result of this study partly or wholly for reference, socioeconomic and documentary purposes in the future.
4. The interlocking citations of this study consist of the following:

    a. Health Communication, Research and Theory. Sample in: Aluko-Arowolo and Ademiluyi (2015); Olawale et al., (2019); WHO (2017, 2019); Bello (2015); Okoro and Nwachukwu (2015); Okorie (2013); Babalola, Fatusi and Anyanti (2009); Omotoso (2009); Achary et al., (2015); Oyesomi et al., (2017); Oyesomi et al., (2020);Asmah, Twerefou and Smith (2013); Akakiti and Ojomo (2015); UNICEF (2017); Zamawe et al.,2016; WHO (2019); Akinrinola et al., (2009); Chiwuzie et al., (2009); Rural Health Information Hub (2017); Glanz (2010); Avedian (2014); Odiboh et al., (2018); Odiboh, Adeyeye & Ekanem (2018); Krejcie and Morgan (1970); Research Advisor (2006).
    b. Marketing communication. Sample in Odiboh and Oladunjoye (2019), Odiboh, *et al.* (2020a), Odiboh and Ajayi (2019), Odiboh, Ezenagu, and Okuobeya (2019), Adelua, *et al.* (2020a), Adelua, *et al.* (2020b), Adelua, *et al.* (2020c), Adelua, *et al.* (2020d), Aiyende, *et al.* (2020a), Aiyende, *et al.* (2020b), Fayemi, *et al.* (2020a), Fayemi, *et al.* (2020b), Fayemi, *et al.* (2020c), Fayemi, *et al.* (2020d), James, *et al.* (2020a), James, *et al.* (2020b, James, *et al.* (2020c), James, *et al.* (2020d), Ndubueze, *et al.* (2020), Ndubueze, *et al* (2019), Nejo, *et al.* (2020a), Nejo, *et al.* (2020b), Nwosu, *et al.* (2020a), Nwosu, *et al.* (2019), Nwosu, *et al.* (2020b), Olabanjo, *et al.* (2020a), Olabanjo, *et al.* (2020b), Olabanjo, *et al.* (2019), Omokiti, *et al.* (2020a), Omokiti, *et al.* (2020b), Salau, *et al.* (2020a), Salau, *et al.* (2020b).

Experimental Design, Materials and Methods

This continuous study covers housewives, single mothers and potential mothers in a semi-urban community in Nigeria. It is restricted to those within ages 15-49. This age-group represents the average childbearing age, as revealed in WHO research findings on maternal health (WHO, 2017). Thematically, the study is restricted to televised marketing communications on maternal healthcare programmes on both terrestrial and subscription television channels.

Preliminary Study Results

Descriptive statistics using frequency distribution tables are adopted in rendering the report of this study.

Table 1 shows above-average awareness of commercially televised maternal health programmes.

Table 1: Awareness of commercially televised programmes on women's health

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	71	54.6	54.6	54.6
	No	44	33.8	33.8	88.5
	Not Sure	15	11.5	11.5	100.0
	Total	130	100.0	100.0	

Table 2 indicates that half (50%) of the respondents get maternal health messages from television talk shows, 20.8% on entertainment shows, and 13.1% on news programmes. In comparison, 7.7% and 8.5% get it from paid public service announcements.

Table 2: Which of the following are you aware of on television healthcare programmes?

		Frequency	Percent	Valid Percent	Cumulative Percent
	Talk Shows	65	50.0	50.0	83.8
	Entertainment Programme	27	20.8	20.8	33.8
	News Programme	17	13.1	13.1	13.1
	Others	11	8..5	8.5	91.5
	Public Service Announcement	10	7.7	7.7	100
	Total	130	100.0	100.0	

Table 3 shows that 58.5% of the respondents opine that televised maternal healthcare programmes have created awareness on mothers' survival; 27.7 % are not sure it has created awareness. In comparison, 13.1% disagree with televised maternal health care programmes create awareness on maternal survival.

Table 3: Impact of marketed healthcare programmes on mothers' survival

	Frequency	Per cent	Valid Percent	Cumulative Percent
Yes	76	58.5	58.5	58.5
Not Sure	36	27.7	27.7	99.2
No	17	13.1	13.1	71.5
Total	130	100.0	100.0	100

Conclusion

The empirical findings of this study will be useful to health care agencies of the government and the non-governmental organizations (NGOs). It will help them in considering the media framework for engaging and sustaining healthy maternal habits amongst women. Televised healthcare programme producers and directors will also benefit from this study. They will be aware of the effectiveness of their programme on semi-urban women. Donor agencies and international maternal healthcare advocates will obtain a better understanding of semi-urban women and their healthcare habits. Families and society will gain more in-depth insight on issues on maternal healthcare.

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Research on The Consumption of Basic Food Products by The Russian Population in The Context of Food Security

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Abstract

The paper examines the consumption of basic food products by the Russian population in the context of ensuring food security. Sufficient food consumption by the population is the ultimate goal of ensuring food security. The initial stage of the study is an assessment of changes in the volume of basic food products consumption by Russian households. As a result of this stage, it was determined that for one part of food groups there is a negative trend of decreasing consumption, and for the other a positive trend of growth. Then, a comparison of consumption volumes of urban and rural households was made. It was revealed that there was a large disparity in the consumption of rural and urban households at the beginning of the study period. On the positive side, these imbalances were either completely eliminated or minimized by the end of the study period. Then the actual consumption was compared with the standard consumption and it was found that there is a significant under-consumption of some food products and excess of the standard consumption of others. Comparing the cost of purchasing food products of plant and animal origin allowed to determine a significant difference in their size for rural and urban households. In addition, the rural population is forced to give preference to less expensive and high-quality food products with a low degree of processing. A comparative analysis of the prices at which food was purchased by urban and rural households made it possible to identify macroeconomic and climatic factors as the main reasons for their high volatility. A comparison of the prices paid for food by urban and rural households determined lower prices for the majority of food products purchased by the rural population. The overall result of this work was the conclusion that the main reason for the low level of satisfaction of food needs by the population of the country is their low income.

Keywords: Food security, food stuff, food consumption, food cost, food prices, urban population, rural population, Russia.

Introduction

Food security is closely linked to the national and economic security of the state. The link with national security is determined by the provision of food to the population, and the level of this provision determines the stability of the socio-economic and socio-political framework of the state. The shortage of food in Russia became one of the catalysts of discontent in the XX century, which eventually led to the revolution and the disastrous consequences that accompanied it. The incompetent policy of the country's leadership and climatic conditions led to starvation in the 30s of the XX century. Famine in Central Russia, the Volga region, Ukraine, and Kazakhstan led to significant mortality among the population and, as a result, irretrievable losses of labor resources.

Food security in conjunction with economic security is determined by the need to provide raw materials for processing industries, achieve the stability of the functioning of agricultural producers, create jobs in rural areas, and create conditions that determine an adequate standard of living for the population (A.I.Altukhov, 2017). Not the least role in the national economy is played by the activities of agro-industrial production entities. Of course, not all agricultural business sub-sectors are profitable, requiring significant subsidies, but a number of sub-sectors are quite competitive, including in the global market. Even such an instrument of state regulation as subsidizing has an additional effect, which is manifested in stimulating the development of domestic science and technology (A.A.Golovin, S.A.Starykh, O.I.Solodukhina and Z.A.Vasileva, 2019).

Providing food to the population is the ultimate goal of the food security process. The assessment of the level of satisfaction of the need for food products should be carried out in comparison with the standards established by official governmental and intergovernmental authorities and organizations. Only in this case the question can be answered - Does the amount of food consumed cover the scientifically justified need for it? The volume of food products consumption is closely dependent on the assortment on the shelves, sales prices and income of the population (D.I.Babin, 2016).

Thus, the assessment of the level of food security of the population and the factors that influence it is a very relevant task, which allows us to determine the satisfaction of the population and the reasons that have a negative impact on this state. The identification and assessment of the causes that affect the degree of satisfaction of food needs is the first step in the development of programmatic measures to ensure food security.

The purpose of the work is to study the volume of consumption of basic food products by the population of Russia in the context of ensuring food security, as well as to study the factors that determine them.

The need to achieve this goal required the following tasks:

– to assess changes in the consumption of basic food by Russian households;

– to conduct a comparative analysis of the volume of food consumption by rural and urban households in Russia;

– to compare the actual consumption of basic food products with the standards set by the Russian Ministry of Health;

– to compare the total cost of food consumed by rural and urban households in Russia;

– to compare the total cost of plant foods consumed by rural and urban households in Russia;

– to compare the total cost of animal products consumed by rural and urban households in Russia;

– to study the change in prices for basic food consumed by urban and rural households in Russia;

– to compare the prices of food consumed by rural and urban households in Russia.

The object of the study was the socio-economic processes that determine the level of consumption of basic food products in the context of ensuring the country food security.

The subject of the study is the level of food consumption and food security of the state.

The working hypothesis of the study is the scientific assumption that ensuring the normative consumption of basic food products is an integral element of food security of the state and that the level of income of the population has the greatest influence on the volume of consumption.

Material and Methods

The theoretical and methodological basis of the study are the theoretical provisions, methodological approaches and concepts, research results of domestic and foreign scientists in the field of food security, food accessibility and agribusiness economics.

The main Russian scientists and economists who paid attention to the problem of ensuring food security are A.I.Altukhov, I.N.Buzdalov, I.G.Ushachev, E.N.Antamoshkina, V.Yu.Baganov, A.Yu.Belugin, R.R.Gumerov, A.A.Kaygorodtsev, S.V.Kiselev, A.I.Kostyaev, E.N.Krylatykh, A.G.Paptsov, N.I.Shagayda, T.A.Strokova etc. Among foreign scientists-economists D.Grey, J.N.Schubert, K.A.Hubert, X.Liu, A.McBratney, A.Sen, W.Su, P.Aylwin, J.Beauvais, G.Bickel, E.Clay made a significant contribution to the theory and practice of food security.

The study used a complex of methods: empirical, abstract-logical, grouping, monographic, system analysis, economic-statistical, comparative analysis, vertical and horizontal analysis. For the purpose of visual presentation, systematization and scientifically based interpretation of empirical information, a tabular and graphical form of presentation of the material is used.

The information and empirical base of the study was made up of scientific publications on the studied problem, materials of the Food and Agriculture Organization of the United Nations (FAO), the Ministry of Agriculture of the Russian Federation (Ministry of Agriculture of the Russian Federation), the Ministry of Health of the Russian Federation (Ministry of Health of Russia), and the Ministry of Economic Development of the Russian Federation (Ministry of Economic Development of Russia) , Federal State Statistics Service of the Russian Federation (Rosstat), research results of scientific institutions of Russia, given monographic and collective research, periodicals and the Internet.

Results and Discussion

The Doctrine of Food Security of the Russian Federation provides the following definition: “Food security is a state of socio-economic development of the country in which the food independence of the Russian Federation is ensured, and physical and economic accessibility for each citizen of the country of food products that meet mandatory requirements is not less than rational norms of consumption of food products necessary for an active and healthy lifestyle." Thus, from the definition it follows that food security is not only the production of the necessary amount of food, but also the consumption of food at a level not lower than rational norms. The volume of production sufficient to cover the country's food needs characterizes food independence, and if the income of the population allows satisfying its scientifically substantiated food needs, this state will determine the food security of the country as a whole (V.V.Garkavy, 2015).

To achieve the goal of the study, the changes in the volume of consumption of basic foodstuffs by Russian households should be estimated (Figure 1).

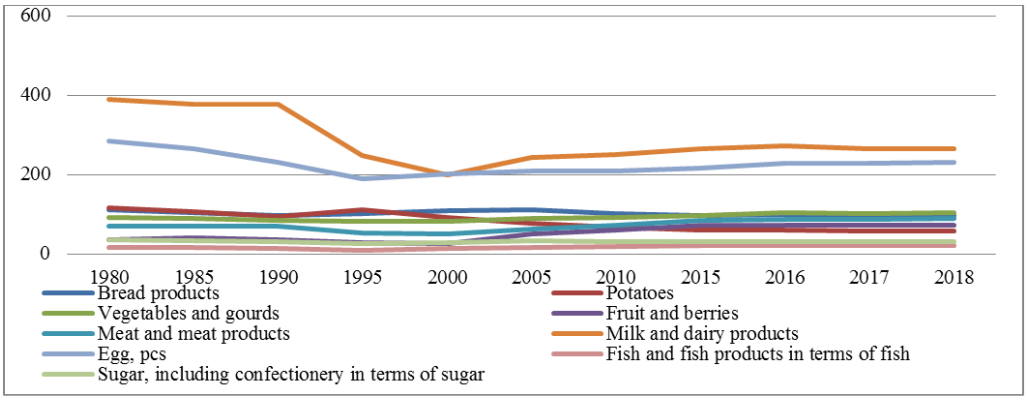

Fig 1: Change in the volume of consumption by households of Russia of basic foodstuffs for 1980-2018, kg / year / person

Source: compiled by the authors using statistics from the Federal State Statistics Service (Rosstat)

The data in Figure 1 indicate a significant decrease in the average annual consumption of milk and dairy products. In 1980, one person consumed an average of 390 kg / year of milk and dairy products per year, and in 2018 only 266 kg / year. The largest decline in consumption occurred in 2000, when 199 kg were per person per year. The general assessment shows a decrease in the consumption of milk and dairy products in 1980-2000 and recovery dynamics until 2013, starting from which the consumption volume is quite stable.

Over the study period, egg consumption significantly decreased from 286 pcs / year / person in 1980, up to 231 pcs / year / person in 2018. The peak decline in consumption occurred in 1995, when there were 191 eggs per person per year, and since 1996 there has been a steady increase in consumption.

Vegetables and gourds are an essential element of a healthy diet. In Russia, from 1980 to 2000, there was a decrease in the consumption of vegetables and gourds from 92 kg / year/person to 82 kg / year/person. Then there was an increase and again a decrease from 2005 to 2009. The general situation with changes in the consumption of vegetables and gourds is its high volatility. A positive point is that in 2018 the consumption of 104 kg/year/person of vegetables and gourds is higher than in 1980 by 12 kg.

Fruit and berry consumption shows unstable dynamics. A positive aspect is the growth of fruit and berry consumption in 2018 in comparison with 1980 by more than 2 times. This situation is due to the weak growth in consumption observed in 2005-2018, and before this period there was a decrease in the volume consumed.

Consumption of meat and meat products was stable in 1980-1990, when it was 70 kg / year/person, and since the end of 1990, there is a strong decline. In 2005, 50 kg of meat and meat products were consumed per 1 person, which is 20 kg less than the level of 1980-1990 since 2005, a stable increase in the volume of consumption was recorded, which provided for consumption of 89 kg/year/person in 2018.

Thus, the analysis of the data shown in Figure 1 demonstrates that the consumption of milk, dairy products, eggs, bread products, potatoes and sugar in 2018 did not reach the level of 1980, and if in the case of sugar, potatoes and bread products this can be assessed on the positive side, then for milk and dairy products this is definitely a negative situation. Undoubtedly, there is a positive trend in the consumption of fruits, berries, vegetables, gourds, fish, fish products, meat and products from it. The volume of consumer consumption of the products of these food groups in 2018 exceeded the level of 1980.

In Russia, as in any other country in the world, there is a differentiation of the population into urban and rural, each of which has its own way of life and sphere of activity. The urban population mainly buys food in stores and has a higher level of income. The rural population to some extent covers the needs for food at the expense of their own natural production, only those food products that can not be produced independently are purchased. At the same time, the income level of the rural population is significantly lower than that of the urban population. In this connection, there is an objective need to give a comparative assessment of the volume of food consumption by urban and rural populations (Figure 2) (I.V.Minakova, M.A.Parkhomchuk, A.A.Golovin and T.N.Bukreeva, 2018).

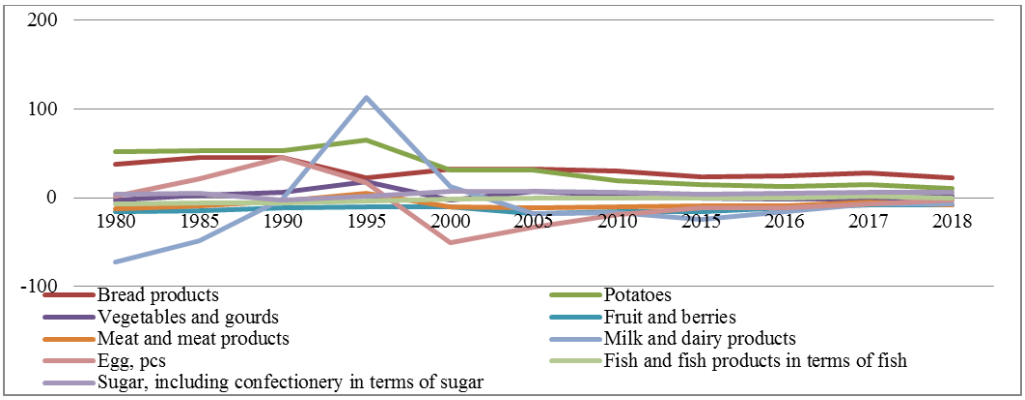

Fig 2: Comparative assessment of the volume of food consumption in rural and urban households in Russia, kg / year / person

Source: calculated by the authors using statistical data from the Federal state statistics service (Rosstat)

Figure 2 shows that there is a significant gap in the consumption of basic foodstuffs by rural and urban households. By the end of 1980, the rural population consumed 38 kg/year/person more bread products than the urban population and 52 kg/year / person of potatoes. There is a slightly smaller gap in the consumption of eggs, sugar and confectionery. The rural population consumed eggs by 2 pcs/year/person more than the urban population, and sugar and confectionery by 4 kg/year/person. This situation is a consequence of the natural production of the rural population and the relative cheapness of goods. The main crop grown in rural households is potatoes, which has predetermined its predominance in the diet, and sugar is used in preparations and for the production of home-made alcohol. Bread products are significantly cheap, as is the egg production process.

Thus, a retrospective of differences in food consumption by the Russian population revealed a situation in which the rural population in the Soviet period had an extremely unbalanced diet with a predominance in the diet of potatoes and bread products and a lack of consumption of milk, dairy products, meat, meat products, fruits, berries, vegetables, melons, fish and fish products. With the beginning of the restructuring of the economic system of the USSR, there was a change in consumption – the rural population began to eat much better than the urban population. This situation is the result of the development of private production in rural areas, which allowed to cover their own needs and the consequence of the destruction of state production complexes and economic chains, which caused a shortage of food in the city.

Since the assessment of food consumption does not provide a complete picture of the balance of nutrition and food security, it is necessary to assess actual food consumption in comparison with the standards set by the Ministry of Health of the Russian Federation (Table 1).

Table 1: comparison of actual consumption of basic food products with the standard set by the Ministry of Health of Russia according to data for 2018

Product Name	Norm, kg / year / person	Fact, kg / year / person			Deviation of actual consumption from the standard (+,-)		
		Russia	Urban population	Rural population	Russia	Urban population	Rural population
Bread products (bread and pasta in terms of flour, flour, cereals and legumes)	96	95,7	89,9	112,9	-0,3	-6,1	16,9
Potatoes	90	58,7	55,9	66,7	-31,3	-34,1	-23,3
Vegetables and gourds	140	104,1	103,5	105,8	-35,9	-36,5	-34,2
Fruits and berries, including dried in terms of fresh	100	73,7	75,7	68	-26,3	-24,3	-32
Meat and meat products in terms of meat	73	89,1	91,3	82,7	16,1	18,3	9,7
Milk and dairy products in terms of milk	325	265,5	267,4	260,1	-59,5	-57,6	-64,9
Eggs, pcs	260	231	231	229	-29	-29	-31
Fish and fish products in terms of fish	22	21,7	21,5	22,4	-0,3	-0,5	0,4
Sugar, including confectionery in terms of sugar	24	31,3	29,7	35,7	7,3	5,7	11,7
Vegetable oil and other fats	12	10,7	10,3	12,1	-1,3	-1,7	0,1

Source: calculated by authors using statistical data of Federal state statistics service (Rosstat) and the Ministry of Health of the Russian Federation

Table 1 shows that in Russia as a whole, the consumption of bread products is below the level set by the Ministry of Health of Russia. This situation was made possible by the consumption of bread products by the urban population at a level below the standard by 6.1 kg / year/person. The rural population, on the contrary, in 2018 consumed 16.9 kg/year/person more than the standard level.

Russia has a low level of consumption of vegetables and gourds. With a standard of 140 kg / year / person, the average consumption in the country is 104.1 kg / year/person, which is 35.9 kg/year/person less than the established standard. The rural population consumes vegetables and gourds slightly more than the urban population. Under-consumption for the urban population is 36.5 kg / year / person, and for the rural population is 34.2 kg / year/person. This situation is the result of natural production of private farms of the rural population.

The standard of fruits and berries consumption established by the Ministry of health of Russia is 100 kg/year/person. The analysis shows that in Russia there is a lack of fruits and berries consumption by urban and rural populations.

Consumption of meat and meat products is at a high level, exceeding the established norm of 73 kg / year/person. The population of the country as a whole consumes 16.1 kg/year/person more than the norm, the urban population by 18.3 kg/year/person, and the rural population by 9.7 kg/year/person. It should be noted that exceeding the norm, as well as not achieving it, is a negative situation. The predominance of pork and meat products in consumption threatens the balance of nutrition and, consequently, the health of the population.

A negative situation has developed with the consumption of milk and dairy products. When the

standard of consumption of 325 kg/year/person, the population consumes only 265,5 kg/year/person. Urban population consumes 57.6 kg/year/person less than the norm, and rural 64.9 kg/year/person. This situation is the result of high prices for milk and dairy products, as well as a consequence of reducing the number of dairy cows in private farms.

Thus, the overall situation with the consumption of basic food products should be assessed as negative, since there is a lack of consumption of vegetables, gourds, fruits, berries, milk and dairy products. Consumption of more than the established standard of meat, meat products, sugar, and confectionery can also be assessed on the negative side. A positive situation has developed with the consumption of bread products, potatoes, eggs, fish, fish products, vegetable oils and other fats. Under-consumption of bread products, potatoes, vegetable oils and other fats is a positive point in the diet. Consumption of fish, fish products and eggs is at a level that can be adjusted without significant effort to achieve the standard.

Further research should be conducted on the basis of studying the financial component of consumption of the main product groups. The feasibility of this approach is determined by the different income levels of urban and rural populations, as well as the level of food prices. The initial step is to compare the total cost of food consumed by rural and urban households (Figure 3).

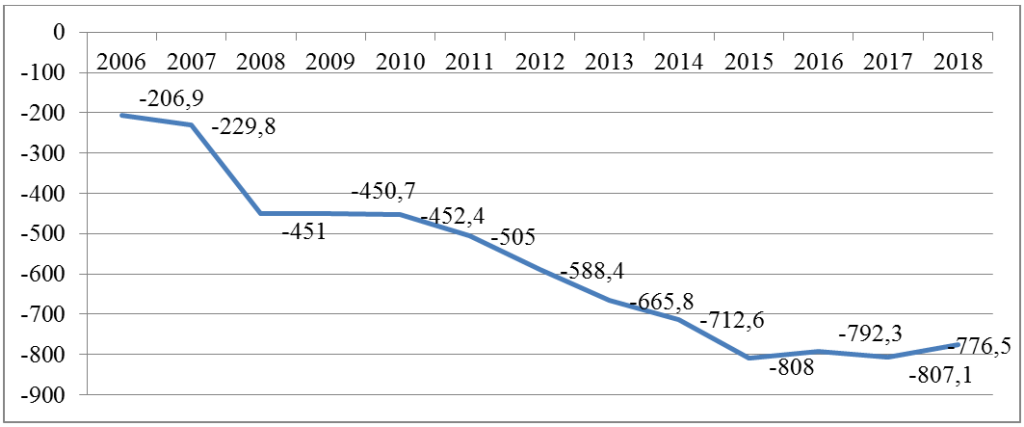

Fig. 3: Comparison of the total cost of food consumed by rural and urban households in Russia, rub / month / person

Source: calculated by the authors using statistical data from the Federal state statistics service (Rosstat)

Comparison of the total cost of food consumed by Russian households suggests that the growth rate of food costs consumed by the urban population is faster than the cost of food consumed by the rural population. This difference grew during 2006-2015, then stabilized and shows slight variability in the range of 776.5-808 rubles / month./person. In general, over 13 years, the rural population began to spend more on food products than the urban population by 776.5 rubles/month./person, and the total increase in the difference in consumption costs was 275.3%.

Look in detail at what caused this differentiation in the cost of food products for rural and urban populations. Comparison of expenditures of rural and urban population is shown in the context of food products of plant and animal origin (Figure 4, 5).

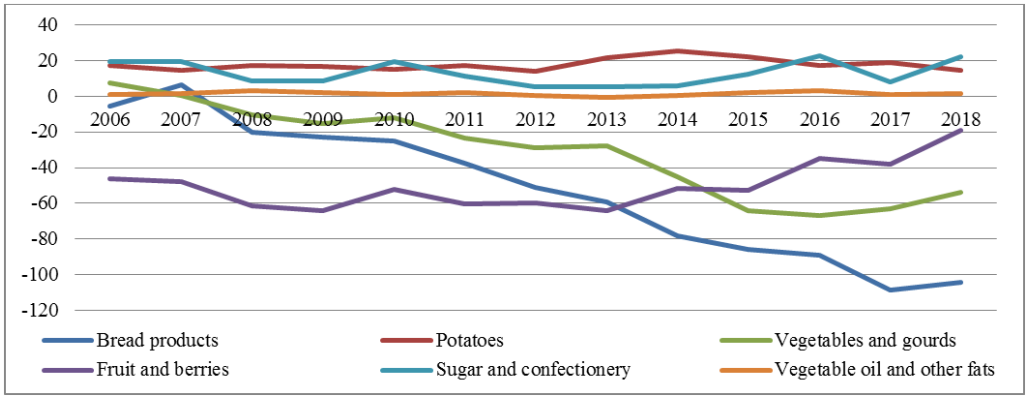

Fig. 4: Comparison of the cost of plant-based food consumed by rural and urban households in Russia, rub / month / person

Source: calculated by the authors using statistical data from the Federal state statistics service (Rosstat)

Figure 4 shows that at the end of 2006, the rural population spent less than the urban population on bread products, vegetables, gourds, potatoes, sugar, confectionery, vegetable oil and other fats. At the same time, the urban population spent less on fruits and berries. Considering the dynamics of the cost of food, it is clear that the difference in costs for fruits and berries was minimized and in 2018 does not exceed 18.9 rubles/month. Gradually, the costs of the urban population for bread products, vegetables and melons became significantly higher than the costs of the rural population for similar goods. In 2018, this difference was 53.6 rubles/month for vegetables and gourds per person, and for bread products 104.1 rubles/month.

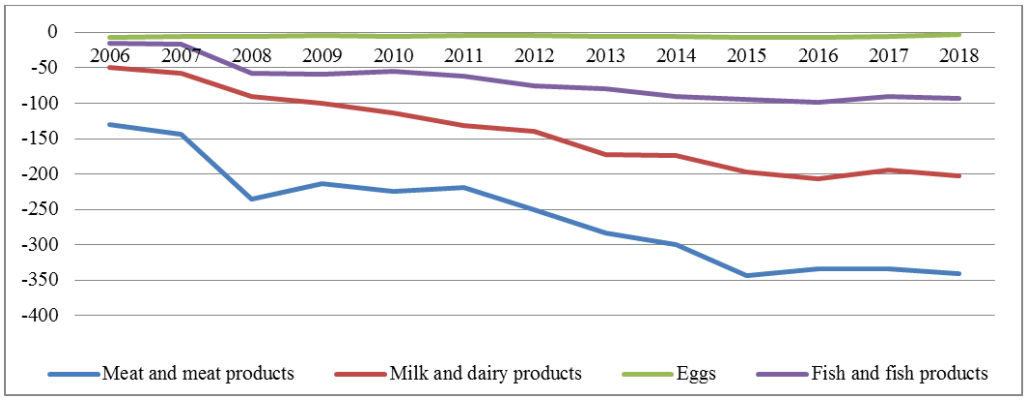

Fig. 5: Comparison of the cost of animal food consumed by rural and urban households in Russia, rub / month / person

Source: calculated by the authors using statistical data from the Federal state statistics service (Rosstat)

The dynamics of comparing the costs of animal food consumed by rural and urban households, shown in Figure 5, shows that the urban population spends a lot on purchasing this category of food. An important feature is that the growth rate of urban population spending on food is significantly faster than the growth rate of rural population spending. This feature is typical for meat, meat products, milk, dairy products, fish and fish products. This feature is not observed in eggs. The considered situation is the result of exceeding the volume of consumption of these products by the urban population over the volume of consumption by the rural population.

The volume of consumption and the amount of food costs are affected by their price and the level of income of the population. Therefore, it is necessary to consider changes in prices for the main food groups consumed by urban and rural populations (Figure 6) (I.V.Minakova, M.A.Parkhomchuk, A.A.Golovin and T.N.Bukreeva, 2018).

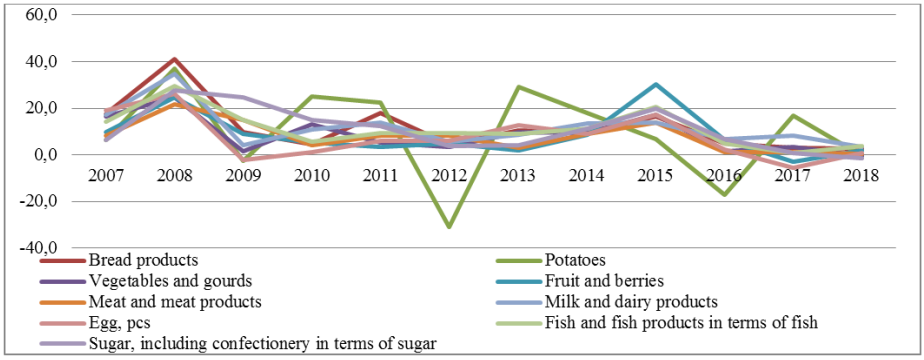

Fig. 6: Changes in prices of basic foodstuffs consumed by urban and rural households in Russia, %

Source: calculated by the authors using statistical data from the Federal state statistics service (Rosstat)

The trends shown in figure 6 indicate high volatility of prices for food consumed by the country's population. Food prices show a high dependence on macroeconomic crises and the results of the state's foreign policy. Thus, during the 2008 crisis, the growth rate of food prices ranged from 20 to 40%. Then the growth rate decreased and from 2009 to 2013 it was from 0 to 20%. Price changes 2013-2015 this was due to the country's macroeconomic problems, international economic sanctions against Russia and the retaliatory food embargo (G.V.Makhanko and A.S.Volosatykh, 2016). Along with macroeconomic and foreign policy factors, the prices of food sales are influenced by natural and climatic conditions. The increase in food prices in 2010-2011 was associated with a decrease in crop yields caused by an abnormal drought.

The assessment of price changes does not give a complete picture of their differentiation by territorial distribution of the population. To complete the picture and assess the factors that affect the size of the difference in food consumption by urban and rural populations, a comparative analysis of food prices is necessary (Figure 7).

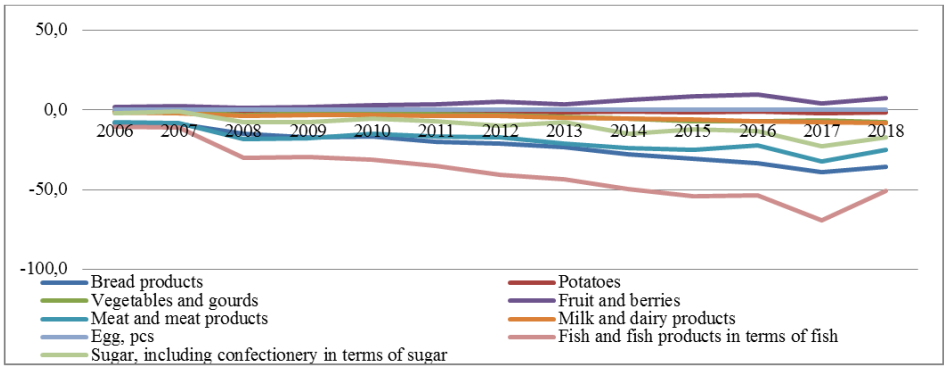

Fig. 7: Comparison of prices for food consumed by rural and urban households in Russia, rub / kg

Source: calculated by the authors using statistical data from the Federal state statistics service (Rosstat)

From the trends shown in Figure 7, it can be seen that the prices of food purchased by the rural population are lower than the prices of food purchased by the urban population. This situation is due to the quality of products and the level of their processing. As noted earlier, the urban population prefers seafood, while the rural population prefers river fish and the cheapest seafood. The situation is similar with bread products, the rural population mostly buys ordinary bread products and pasta, flour, and the urban population-pasta made from expensive varieties of grain crops, whole grain pastries, etc.

Thus, an assessment of changes in the total cost of food consumed and prices paid by urban and rural populations suggests that the reason for underconsumption of food is primarily due to low incomes, rather than high prices. This conclusion is supported by the fact that at lower prices for food consumed by the rural population, there is a significant underconsumption. Another conclusion is that the low prices of food for the rural population are primarily due to its low quality and degree of processing.

Conclusions

Thus, the study of the consumption of basic food products by the Russian population in the context of food security allowed to draw a number of conclusions:

1. The assessment of changes in the average per capita consumption of basic food products allowed us to determine the negative dynamics of reducing the consumption of milk, dairy products, eggs, bread products, potatoes and sugar. The level of consumption of these products in 2018 is below the level of 1980. Positive dynamics of growth in consumption volumes are shown by such food groups as fruits, berries, vegetables, gourds, fish, fish products, meat and meat products. The volume of consumption of these food groups in 2018 exceeded the level of 1980.

2. By the end of 1980, the rural population consumed significantly less meat, milk, fish, fruit, berries, and significantly more bread products and potatoes than the urban population. This situation was the result of the planned economic model of the USSR and the uneven distribution of social product. By the end of 2018, there was a minimization in the difference in consumption volumes between rural and urban populations, which can be assessed on the positive side.

3. As a result of comparing the actual and normative volume of consumption of basic food products, it was possible to identify a negative situation caused by underconsumption of vegetables, melons, fruits, berries, milk, dairy products and excess of the normative consumption of meat, meat products, sugar and confectionery. A positive situation has developed with the consumption of bread products, potatoes, eggs, fish, fish products, vegetable oils and other fats.

4. Comparison of expenditures on consumed food products of plant origin allowed us to conclude that the rural population spends less than the urban population on vegetables, melons, fruits, berries, bread products and more on other food groups. A similar comparison of food products of animal origin allowed us to determine that the urban population spends significantly more than the rural population on meat, meat products, milk, dairy products, fish, fish products, and almost equally on the purchase of eggs.

5. The assessment of changes in prices for the main food groups made it possible to determine that prices are strongly influenced by the macroeconomic state of the national economy, natural and climatic conditions, foreign policy and the exchange rate. The most stable food prices were in the period from 2010 to 2013, and the rest of the studied years were affected by the 2008 crisis, the 2010 drought, events in Ukraine and their consequences (sanctions, food embargo, devaluation of the national currency).

6. A comparison of the prices of food consumed by rural and urban households in Russia shows that the prices of food purchased by the rural population are significantly lower than the prices of food purchased by the urban population. This situation is typical for all food groups with the exception of

fruits and berries. The explanation for this situation is the higher quality and degree of processing of food products consumed by the urban population.

Summarizing the results of the study, we can conclude about the reason for under-consumption of food products by the population of Russia. This reason is the low level of income of the population. Despite the fact that food prices paid by the rural population are lower than those paid by the urban population, there is still a greater under-consumption of food by the rural population.

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Features of The Formation and Management of Production Costs at Energy Enterprises

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Abstract

The article describes the features of formation and management of production costs at energy enterprises. The relevance of the research is determined by the fact that cost reduction leads to an increase in the company's profit and overall economic stability, which is a strategic advantage in a competitive environment. The study identified the following features of cost formation in the energy sector: the cost of energy takes into account the costs not only for production, but also for transmission and distribution of energy; the absence of work-in-progress leads to the fact that production costs can be fully attributed to the cost of energy produced; the cost of energy is affected by the cost of maintaining the capacity reserve at power plants; the level of energy costs can vary significantly for individual types of power plants and power systems; there is a dependence of the cost of energy source. The results of the research activities of the energy company – PJSC "IDGC of Center" – "Kurskenergo" determined that the percentage of the cost of transmission of electricity in total cost structure of company's sales is quite high, however, the share of gross profit of the activity in the general structure of gross profit of the enterprise is much less. Thus, it is necessary to reduce the cost of electricity transmission by optimizing the cost of this type of activity. In addition, the main areas of cost reduction and profit increase should include the following: measures to reduce borrowing; increase capacity utilization of power grid equipment; reduce the level of electricity losses; reduce unit investment costs; increase labor productivity and innovation efficiency; meet the deadlines for technological connection and achieve a level of reliability of provided services.

Keywords: Costs, Expenses, Energy, Energy Production, Energy Enterprise, Production Cost, Expenses, Production Cost Management.

Introduction

The effectiveness of the organization is largely determined by the quality of management activities, which, in turn, depends on the quality of the economic information provided, which is the basis for the development of a management decision. All enterprises pursue the goals of improving the efficiency of their activities and preventing the occurrence of crisis situations, so there is a need to create a system for generating information about costs, financial results of the organization's activities and a cost management system. The cost management process includes:

- the analysis of the size, location, time and purpose of expenditure of material, labor and financial resources;

- forecast of necessary additional volumes of various resources;

- identifying inefficient costs and ensuring the maximum possible increase in the level of return on resource use, that is, the company's costs should generate profit.

Costs related to produced products (performed works, rendered services) are expressed in the cost of production (works, services). The cost of production is the monetary cost of its production and sale. The cost of production (works, services) of an enterprise consists of the costs associated with the use of natural resources, raw materials, materials, fuel, energy, fixed assets, labor resources, and other costs in the production process.

Thus, at the present stage of development of market relations in Russia, such direction as cost management in production is of particular importance and thus it becomes relevant for the activities and development of economic entities. In a competitive environment, the issue of improving the efficiency of enterprises based on minimizing production costs is acute, so the problem of forming an effective cost management system is particularly relevant. It is extremely important to have a holistic view of the size and dynamics of production costs in order to make the right management decisions, thereby increasing the competitiveness of the enterprise through profitability, productivity and production efficiency (A.A.Golovin, S.A.Starykh, O.I.Solodukhina and Z.A.Vasileva, 2019).

The purpose of the work is to determine the features of formation and management of production costs at energy enterprises, as well as to analyze the costs of a specific energy enterprise and develop measures to reduce them.

The need to achieve this goal required the following tasks:

- to consider the theoretical basis for the formation and management of production costs at energy enterprises;

- to determine the features of formation and management of production costs at energy enterprises;

- to conduct a study of the production cost management system at an energy enterprise;

- to evaluate the results of managing production costs at an energy enterprise;

- to determine the main directions for reducing production costs at an energy enterprise.

The object of the research was economic processes that determine the size and structure of production costs of energy enterprises.

The subject of the study was the production costs of the enterprise.

The working hypothesis of the research consists in the scientific assumption that the processes of forming and managing the costs of an energy enterprise have their own characteristics due to the specifics of economic activity and the degree of state regulation.

Material and Methods

The theoretical basis of the research was the works of leading scientists in the field of energy production cost accounting, periodical publications, research reports and legal framework on the subject under study. The theoretical significance of the research is to generalize the basics of formation and ways to manage production costs at energy enterprises.

Accounting and control of production costs were studied by such Russian scientists as A.E.Suglobov, B.T.Zharylgasova, S.A.Khmelev, A.S.Karataev, V.Y.Savin, I.S.Kamaykina, I.A.Dontsov,

D.M.Manyshin, A.A.Podrezov, O.D.Kaverina and others. The specifics of managing production costs of energy enterprises were touched upon by such scientists as N.S.Kulakova, O.V.Tarasova, O.A.Petrova, O.A.Fil, T.V.Malinina, L.S.Kazarinov, T.A.Barbasova and others.

Among the foreign scientists-economists who have made significant contributions to the theory and practice of production cost management we can distinguish Edward J. Blocher, David E. Stout, Gary Cokins, John H. Shank, John K. Shank, Vijay Govindarajan, Shank Govindarajan, Don Hansen, Maryanne Mowen, Liming Guan, and others; and among those who have been engaged in production cost management at energy enterprises we can mark Italo Atzeni, Luis G. Ordóñez, Gesualdo Scutari, Daniel p. Palomar, Javier Rodríguez Fonollosa, Nils Weinert, Stylianos Chiotellis, Günther Seliger and others.

The methodological basis of the research is such general scientific methods as scientific abstraction, analysis, synthesis, methods of induction and deduction, modeling, comparison, as well as the method of the system approach.

The information and the empirical base of the research concluded the scientific publications on the problem under study, the materials of the Council on International financial reporting standards, the Ministry of natural resources and ecology of the Russian Federation, the Ministry of industry and trade of the Russian Federation, the Ministry of energy of the Russian Federation, the Ministry of economic development of the Russian Federation, results of the research scientific establishments of Russia, data of monographs and collective studies, periodicals and the Internet, as well as data from the annual accounting statements of PJSC “IDGC of Center”.

Results and Discussion

Theoretical bases and features of formation and management of production costs at energy enterprises

Production costs in industry and energy are referred to as either annual production costs, operating costs, or current costs. Cost is the most important qualitative indicator of the company's performance. It reflects all the main factors of production activity: the level of labor productivity, the degree of mechanization and automation of production processes, the level of use of fixed assets, the cost-effectiveness of fuel, raw materials, materials and energy, the quality of operation and organization of production. Cost reduction is the basis for improving the efficiency of public production and one of the ways to increase the profit and profitability of the enterprise.

The purpose of cost accounting is the timely, complete and reliable determination of actual costs associated with production and sales of products, calculation of the actual cost of individual types and all products, as well as control over the use of material resources and cash (A.E.Suglobov, B.T.Zharylgasova, S.A.Khmelev and others, 2017).

The costs of power generation by power plants, transmission of energy through networks and in general by power companies are calculated in two documents: in the cost estimate and in the cost calculation.

A cost estimate is a document that reflects the total costs associated with the production or transfer of goods (services) without dividing costs by product type. In the estimate, costs are grouped by economic elements:

1) material costs, including:

- costs of raw materials and basic materials (includes the cost of purchased raw materials and materials that form the basis of the product or are necessary components in its production);

- expenses for auxiliary materials (including the cost of purchased materials spent on production and economic needs);

- production-related services (these include the cost of paying for work and services of a production nature performed by third-party organizations or divisions of the company itself that are not related to the main type of activity);

- fuel costs (includes the cost of all types of fuel purchased by the company);

- energy purchase costs (includes the cost of purchased energy of all types, including those spent on production and economic needs of the company and losses in the electric networks);

2) remuneration of labor (accruals to employees at tariff rates, incentive payments and compensation allowances, expenses related to the maintenance of employees provided for in labor contracts and collective agreements);

3) insurance contributions to social funds (intended for raising funds necessary for medical care, state pension and social security of citizens);

4) depreciation (reflects the amount of depreciation deductions for the full restoration of fixed assets);

5) other expenses, including:

- costs for repair services in the contract method of repair (costs for maintaining fixed assets in working condition, costs for carrying out current, medium and capital repairs);

- advertising expenses (expenses of the company for purposeful informing of consumers and promotion of products on sales markets);

- representation expenses (expenses related to the company's commercial activities);

- expenses for business trips related to production activities;

- expenses for training and retraining of personnel (expenses related to training and retraining of personnel in accordance with agreements with educational institutions);

- environmental payments that do not exceed the maximum permissible concentration charged to natural users whose economic activities have a negative impact on the biosphere;

- lease payments (expenses related to the lease of fixed assets from other legal entities or individuals);

- payment for services of mobile operators (hereinafter MO) and automatic telephone exchanges (hereinafter ATE);

- amortization of intangible assets;

- expenses for compulsory and voluntary property insurance (includes insurance premiums for all types of compulsory insurance, as well as for some types of voluntary insurance);

- expenses for research and development (hereinafter referred to as R&D);

- expenses for the maintenance of official vehicles;

- expenses for legal, informational, consulting, and audit services;

- expenses for market research;

- the cost of serving the industries and farms;

- expenses for the maintenance of paramilitary, fire protection;

- expenses for labor protection;

- environmental measures at the expense of cost;

- water tax (expenses related to general or special water use in accordance with the legislation of the Russian Federation);

- land tax (expenses related to the use of land);

- deductions to trust funds (O.D.Kaverina, 2018).

The variety of classification features of costs, their composition and volume form several types of cost, the use of which affects the organization and methodology of the calculation process. Cost types by cost structure are shown in table 1.

Table 1: cost types by cost structure

Type of cost price	The contents of the total cost	Content of the individual cost of a product or process
The cost of technology (for direct costs)	Direct production costs in the area, in the team, for a separate unit, land area	Costs for raw materials, materials, purchased semi-finished products, technological energy, labor remuneration of production workers
Reduced production cost	Process cost + General production expenses	Technological cost per unit + Share of general production expenses
Input cost	Reduced production cost + General economic cost	Reduced production cost per unit + Share of General expenses
Total cost	Production cost + Commercial expenses	Production cost per unit + Share of business expenses

In accordance with International accounting and financial reporting standards and accounting practices abroad all costs are summarized in three areas of activity:

1) for calculating cost, estimating inventory and work-in-progress, and determining profit;

2) for making management decisions, planning, forecasting;

3) for control and regulation (M.V.Kosolapova, 2018).

The classification of costs in accordance with International accounting and financial reporting standards is presented in table 2.

Table 2: cost classification

Classification sign	Cost group
1. Classification of costs for the purpose of calculating the cost of inventory and determining profit	
According to the degree of homogeneity	Singleton
	Complex
For a correct assessment of profit and loss	Inbox
	Past
By the method of inclusion in the cost of a unit of production	Direct
	Indirect
On the relationship of costs to the technological process	Main
	Invoices (general production, general economic, commercial)
By area of origin	Industrial
	Non-industrial
Depending on the time of occurrence	Current
	Nonrecurrent
2. Classification of costs for purposes of managerial decision-making, planning and forecasting	
From the planning point of view	Planned
	Unplanned
By efficiency (expediency)	Industrial
	Non-industrial
In relation to the production volume	Variable
	Permanent
	Mixed
On materiality for decision making	Relevant
	Irrelevant
In the development of management decisions (If it is necessary)	Irrevocable
	Imputed
	Incremental and marginal
3. Cost classification for control and regulation	
According to the Manager's influence on costs (If it is necessary)	Controlled
	Uncontrolled
By accounting objects	Costs by place of origin
	Costs for responsibility centers

The data obtained for expenditure elements is necessary for developing business plans determining the volume of purchases of material resources, the payroll fund and the amount of depreciation, organizing expenditure control, calculating resource efficiency indicators (material intensity, labor intensity), and a number of other indicators.

The cost of production is one of the most important economic indicators of enterprises, which comprehensively reflects the impact on it of the organization and technical level of production, labor productivity, the degree of efficiency of spending raw materials, materials, fuel and energy, the level and use of production capacity and all other conditions of production and economic activity of this enterprise.

Cost accounting is due to the necessary reimbursement of production costs and profit by the enterprise at the expense of funds received from the sale of products. Cost accounting information is used to determine the performance of energy companies and analyze the performance of their

branches. All expenses of such enterprises for production and sale of products in monetary form are the cost of these products.

The cost of production at energy enterprises is determined by the monetary expression of material and labor costs for the production and sale of electric energy for the planned period. The cost of production is calculated by economic elements and calculation items (A.E.Suglobov, B.T.Zharylgasova, S.A.Khmelev and others, 2017).

Calculation is a way of grouping costs for production and sale of products, goods, works and services. In the process of manufacturing products, purchasing goods for resale, performing works, providing services in the course of economic activity, material, labor, and financial resources are used (M.V.Kosolapova, 2018).

In accordance with the technological features in energy production, when planning and accounting for annual production costs and calculating the cost of generated energy, the following grouping of costs by expenditure items is used, shown in figure 1.

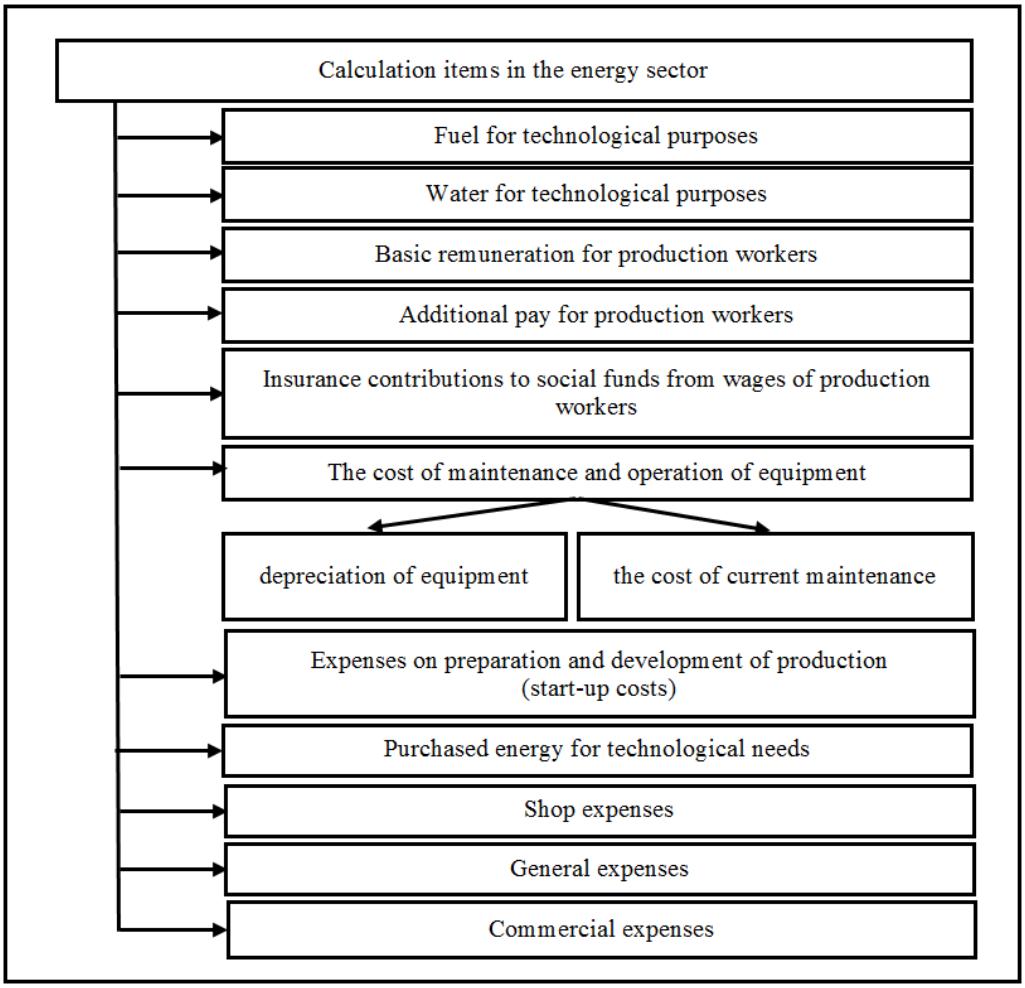

Fig. 1: Calculation articles in the energy sector

The procedure for calculating the cost of production is influenced by the range of produced products. In the energy sector, some enterprises produce one type of product (electricity), while others produce

two (electric and thermal energy). In the first case, the cost is determined by the total amount of incurred expenses, and in the second - they must be distributed among individual types of energy.

The most important feature of energy production is that enterprises in this industry work directly for the consumer without creating inventory and accounting for work-in-progress, and the incurred expenses during the reporting period are completely written off to the cost of energy generated, so there is no need to distribute them between finished products and work-in-progress.

In the energy sector, there is no shop cost. At power plants, due to the lack of work in progress, the shop cost of energy is not calculated, except for power repair enterprises and some other types of auxiliary production.

Research of the system and results of production cost management at an energy enterprise

Consider the formation of production costs and production costs on the example of the leading power grid company in Russia - PJSC "Interregional Distribution Grid Company of the Center" (hereinafter – PJSC "IDGC of Center"), which was founded in 2004 in the process of reforming the Russian power industry and dividing power companies by type of activity, their subsequent regional integration. The main activities of PJSC "IDGC of Center" are: services for transmission and distribution of electric energy in networks with a voltage of 0.4-110 kV and services for technological connection to them.

Based on the results of the analysis of the production cost management system of PJSC "Interregional Distribution Network Company of the Center", we can say the following. In assessing the results of on-farm activities, an important role is given to methods and procedures for analyzing the costs of production (provision of services). Cost analysis is carried out in order to make the most efficient use of the company's resources and find potential opportunities to reduce costs. Cost analysis of products, works and services is of great importance in the cost management system.

In the structure of production costs of PJSC "IDGC of Center", the largest share is taken by material costs. In 2019, the share of material costs in the total structure of production costs was 61.05%. Based on the results of the cost analysis for 1 ruble of sold products of PJSC "IDGC of Center", it can be determined that the growth rate of the cost of sales is higher than the growth rate of revenue during the entire analyzed period. In 2019, commercial expenses decreased by 7.02%, but management expenses increased by 0.83% in 2019. Thus, in 2019 1 ruble of revenue accounted for 0.92 rubles of the total cost of sales (T.V.Dobrinova and K.V.Shipulina, 2018).

In the structure of revenue, cost and gross profit of PJSC "IDGC of Center", the largest share is taken by the main activity – electricity transmission. Thus, in 2019 revenue from electricity transmission amounted to 95.89%. The main reasons for the growth of revenue from electricity transmission are:

- increase the average fare;

- amendments to "the Rules for non-discriminatory access to electric power transmission services and the provision of these services in terms of load losses";

- reduction of useful output.

In 2019 the cost of electricity transmission in the total cost structure of the enterprise was 98.03%. Profit from electricity transmission in the total gross profit structure of PJSC "IDGC of Center" in 2019 was 77.85%.

According to these facts the following conclusions can be drawn. PJSC "IDGC of Center" is a Russian electric grid company with such main activities as transmission of electricity and technological connection of new consumers to electric networks. Building a unified corporate

information system for resource management allowed automating all the main processes of the enterprise and significantly improving the efficiency of managing the power grid complex. In 2018 PJSC “IDGC of Center” started implementation of the concept of “Digital transformation of the electric grid complex 2030”. The strategic objectives implemented by the company in the framework of the transformation of the electric grid complex 2030 are presented in the following areas:

- improving the reliability and quality of power supply;

- increasing security of supply;

- improving the efficiency of the electric grid complex;

- reducing the number of territorial grid organizations.

Regarding the main types of activities - services for transmission and distribution of electric energy in networks and services for technological connection to electric networks - PJSC “IDGC of Center” takes measures to reduce costs. One of the ways to improve the efficiency of the power grid complex and reduce the cost of electricity transmission through the networks is to reduce electricity losses. Due to the implementation of a set of measures to optimize (reduce) electric energy losses in 2019, the amount of savings amounted to 167.5 million kWh (433.8 million rubles) (T.V.Dobrinova and K.V.Shipulina, 2018).

It must be said that PJSC “IDGC of Center” takes measures to detect and prevent non-contractual and unaccounted-for consumption in order to reduce power losses. Effective technical measures that reduce losses include load reallocation and disconnection of unloaded transformers at substations, installation of a larger section of wire on overloaded power lines (hereinafter referred to as power lines), and installation of self-supporting insulated wire on lines.

PJSC “IDGC of Centre” also conducts energy saving and energy efficiency measures aimed at reducing costs. In accordance with “The energy saving and energy efficiency improvement program" of PJSC “IDGC of Center” for the period 2017-2022, the following activities are carried out:

- reduction of electric energy losses during transmission and distribution over electric networks;

- consumption of energy resources for household needs;

- equipped with modern electricity metering devices in the retail market;

- use of led lighting devices.

Technological connection of new consumers to electric networks is a fully regulated activity on the part of the state. In order to reduce the network organization's costs for technological connection and reduce the terms of execution of contracts for technological connection, PJSC “IDGC of Center” continued to increase the share of contracts for which activities are performed in an economic way.

In the field of production cost management, the following activities are applied and implemented at the enterprise:

1. Improving the efficiency of the process of managing maintenance and repairs of equipment, buildings and structures.

2. Improving the efficiency of working capital management.

3. Improving the efficiency of fixed assets management.

4. Improving the effectiveness of the procurement and supply chain management system.

5. Introduction of modern technologies and use of innovations:

- “Innovative development program”.

6. Optimization of the staff motivation and remuneration system.

7. Improving energy efficiency:

- “Energy saving and energy efficiency improvement program”;

- “The program of decrease in losses”.

As for the reserves of PJSC “IDGC of Center”, they include spare parts, fuel, and costs in work-in-progress. As a part of improving the operational efficiency of PJSC “IDGC of Center”, the concept “Improving the efficiency of working capital management” in terms of inventory optimization was implemented in 2018. The achieved economic effect amounted to 12.3 million rubles.

In addition, as a part of improving the operational efficiency of PJSC “IDGC of Center”, the following measures were implemented to reduce costs. Improving the efficiency of management of fixed assets, in part increasing the productivity of equipment as a result of technical re-equipment and reconstruction of existing and construction of new production facilities, as well as the use of power transformers 6(10)/0.4 kV with reduced energy consumption (energy-efficient). The achieved economic effect was 2.3 million rubles. Reducing the costs associated with the maintenance and management of non-core assets, including as a result of their alienation, provided an economic effect equal to 2.8 million rubles (T.V.Dobrinova and K.V.Shipulina, 2018). In addition, with respect to the valuation of property, plant and equipment and intangible assets, at the end of each reporting year, depreciation methods, useful lives and residual values are reviewed to determine whether they need to be revised and, if necessary, revised.

Improving the efficiency of the procurement and supply chain management system has produced an economic effect of 431.6 million rubles. This result is a consequence of conducting trade and purchasing procedures due to re-bidding.

As a result of optimizing the system of motivation and remuneration of the staff in the part of forming a unified policy in the field of remuneration of staff, we managed to get an economic effect equal to 426.5 million rubles, and the formation of a unified policy in the field of non-material incentives for employees gave an economic effect of 2.6 million rubles.

The introduction of modern technologies and the use of innovations as a result of the implementation of the “Program of innovative development” gave an economic effect of 99.1 million rubles.

The increase in energy efficiency as a result of “The energy saving and energy efficiency program” provided an economic effect of 4.1 million rubles, and the economic effect of “The loss reduction Program” was 108.8 million rubles.

Thus, on the basis of the mentioned above, and, in particular, the analysis of the activities of PJSC “IDGC of Center”, we can draw the following conclusions and give practical recommendations. Throughout the analyzed period, all activities of the enterprise bring in gross profit. Percentage of the cost of transmission of electricity in total cost structure of company's sales is relatively large, however, the share of gross profit of the activity in the general structure of gross profit of the enterprise is much less. The cost of production, respectively, and the costs included in it have a huge impact on the profit and profitability of the enterprise. Based on the marked above, it should be concluded that PJSC “IDGC of Center” should analyze in detail the costs included in the cost of electricity transmission, as well as find possible cost overruns according to the norms, or ways to reduce item-by-item costs. As mentioned earlier, PJSC “IDGC of Center” is a leading electric grid

company that provides services for the transmission and distribution of electric energy, as well as services for technological connection to electric networks. Based on this fact, the main directions of cost reduction at this enterprise are to reduce losses in the power grid, correct loading of lines taking into account losses, in particular, optimization of power equipment capacity utilization modes at power plants and in power systems, optimization of the composition of operating and backup power equipment, including the frequency of repairs and costs for their implementation, as well as reducing the number of maintenance personnel of electric networks.

PJSC "IDGC of Center" should develop such activities as technological connection services and the production of other products, goods, works, and services of an industrial nature, since at a relatively low cost, the share of gross profit from these activities is quite high and has been increasing throughout the period, reaching its maximum in 2019 (the share of gross profit from technical connection was 15.45%, and the share of gross profit from other industrial products was 5.72%).

If we consider the transmission of electricity through networks in the context of costs included in the formation of the cost of this type of activity, we can make the following suggestions. Most of the costs (67.58% in 2019) are non-controlled costs. The group of non-controlled expenses includes the following types of expenses: compensation for losses, payment for services of PJSC "FGC UES", payment for services of territorial network organizations, as well as depreciation of fixed assets and intangible assets. To manage these types of costs is extremely difficult, you should also consider the fact that PJSC "IDGC of Centre" is an entity of natural monopoly, the main business is transmission and distribution of electricity from the main networks of PJSC "FGC UES" to territorial grid companies, utilities and large consumers, and key consumers of PJSC "IDGC of Center" are enterprises that have an important regional significance. Accordingly, it is not possible to regulate the price of services of PJSC "FGC UES" and the price of TNO services. The cost of compensation for losses can be reduced, in particular, if you introduce new technologies, install self-supporting insulated wire on lines, redistribute loads and disconnect unloaded transformers at substations. In particular, it is possible to reduce depreciation of OS and IA by increasing the productivity of equipment as a result of technical re-equipment and reconstruction of existing facilities, as well as construction and commissioning of new production facilities. It is also necessary to review the feasibility of maintaining non-core assets and unused fixed assets, and if they are found, take measures to preserve the fixed assets, as well as to sell or lease them.

The largest share in the structure of expenses for technological connection services of PJSC "IDGC of Center" is made up of personnel costs (payroll fund, insurance payments, NPF). As mentioned earlier, reducing this component of costs is possible by increasing labor productivity, as well as reducing the cost of labor for employees sent to carry out emergency recovery operations, by preventing emergency situations and unscheduled repairs.

In the structure of funding sources, a significant share is taken by borrowed capital (52.3% in 2019). The company needs to review its lending policy by gradually reducing its leverage, either increasing the company's equity, or paying off its obligations as quickly as possible.

It should be noted that PJSC "IDGC of Center" uses measures to control and manage fixed assets, optimize the system of motivation and remuneration of staff, and control power losses in the networks.

As recommendations, as in the case of management expenses to reduce other costs, it is necessary to consider the expediency of incurred expenses in the context of this article, and to reduce labor costs, measures should be applied to increase labor productivity.

Conclusions

Based on the results of studying the basics of formation and ways to manage production costs at energy enterprises, it was determined that the formation of cost in the energy sector has a number of features:

1. The cost of energy takes into account the costs not only for production, but also for the transmission and distribution of energy (due to the inextricable link between production and transmission of energy).

2. The absence of work in progress leads to the fact that the production costs for a certain period of time can be fully attributed to the cost of energy produced.

3. The cost of energy is affected by the cost of maintaining the capacity reserve at power plants and in the power grid to ensure uninterrupted power supply to consumers.

4. The level of energy cost can vary significantly for individual types of power plants and power systems.

5. There is a dependence of the cost price on the type and quality of the fuel.

6. There is the impossibility of disconnection from energy sources of some users of social purpose.

In contrast to other industries, the electricity industry calculates the cost of a unit of production that is not produced, but released. Definition of the released cost but not a manufactured unit is due to the fact that for electricity production (heat) the generating units consume part of the energy produced for own needs, and the transport energy part of it is consumed in the form of losses when you transfer energy networks.

In order to determine the cost of certain types of products, the calculation classification of production costs by expenditure items (calculation items) is used.

An important factor affecting the value of the cost of transmission and distribution of electricity is the amount of capital investment (the cost of fixed assets) in the construction of network facilities, while the better technically equipped production, the less the share of live labor in operating costs and the higher the share of materialized labor, thus, in electric grid enterprises with an increase in network capacity, the share of wages decreases, and depreciation charges increases. Also, the cost of electric power transmission in distribution networks is affected by their length and load. At the same level of power consumption, the higher the cost value, the longer the network length and the lower the load.

Thus, it can be concluded that an increase in production volume leads to a reduction in cost and, as a result, to an increase in profit per unit of production, an increase in the profitability of energy production. To get a higher profit in the power system, it is advantageous to maximize the load of power plants with a high share of fixed costs and the lowest fuel costs.

Cost is the most important, and in its economic content, the most perfect indicator of production efficiency, since it comprehensively reflects the level of labor, material and financial costs. Thus, the definition of ways to reduce individual items of current costs can be traced by analyzing the unit cost of production, that is, the cost of production items.

Based on the results of the research and analysis of the activities of PJSC “IDGC of Center” – “Kurskenergo”, we can draw the following conclusions and give practical recommendations. Throughout the analyzed period, all activities of the enterprise bring in gross profit. Percentage of the cost of transmission of electricity in total cost structure of company's sales is quite high, however, the share of gross profit of the activity in the general structure of gross profit of the enterprise is much less. Thus, it is necessary to reduce the cost of electricity transmission by optimizing the cost of this type of activity.

As for the branch JSC “IDGC of Center” – “Kurskenergo”, it is especially necessary to develop the type of activity “technical connection” because at a relatively low cost to the cost of the activity (less than 1% in the cost structure of company's sales), the share of gross profit from connection rather

high and very close to the share of gross profit from electricity transmission. Also the branch of JSC “IDGC of Center” - "Kurskenergo" you should pay attention to other products, goods, works, services of industrial nature, as this type of activity at a relatively small fraction of the cost in the cost structure of the company's sales, bringing a significant portion of the gross profit of the PJSC “IDGC of Centre” – “Kurskenergo”, this is especially noticeable in 2017, when the cost of other products, goods, works, and services of an industrial nature in the total structure of the cost of sales of the enterprise was 0.39%, and the share of gross profit in the total structure of gross profit of the enterprise was 11.76% (T.V.Dobrinova and K.V.Shipulina, 2018).

Based on the mentioned above, it should be said that PJSC “FGC UES” and PJSC “IDGC of Center” are natural monopolies and tariffs for services of companies are set by Executive authorities. Thus, if we consider the contractual activities of companies whose sphere of activity does not belong to the monopoly sector as a recommendation for contractual obligations, in particular for the provision of services, we could recommend reviewing the terms of contracts with existing suppliers, or finding new suppliers. However, since in our case both companies belong to natural monopolies, it is not possible to revise the price for the services of PJSC “FGC UES” or find another service provider.

Thus, as the prospects of development of PJSC “IDGC of Center” in the management of production costs it is possible to define the following aspects: implementation of the schedule of input of objects into operation; increasing capacity of electric grid equipment; reduced specific operating expenses (costs); reduction of electricity losses; reduced specific investment costs; increase productivity; increase of efficiency of innovative activity; the deadlines for technological connection, and achieving the level of reliability of services.

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The Contribution of Pesantren Cooperatives in Improving People's Economy in East Java Province

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Abstract

This research aims to analyze the effect of pesantren (Islamic Boarding School) cooperatives toward economic growth compared to the number of informal workers, growth in interest rates, and growth in the inflation rate in East Java Province in 2013-2017. This research uses quantitative approach with panel data regression method in 38 districts/cities in East Java Province in 2013-2017. This research determines random effect model as he best model. The results shows that there were three variables with significant effects toward economic growth in East Java Province in 2013-2017, which were growth in the number of pesantren cooperatives, growth in interest rates, and growth in inflation rates. The growth in the number of pesantren cooperatives of 10% has a significant positive effect toward economic growth of 1.64118%. Interest rate growth and inflation rate growth of 10% had a significant negative effect toward economic growth respectively -10.22606% and -1.37082%. From the great potential of pesantren cooperatives in economic growth. The government needs to encourage the development of pesantren cooperatives through facilities of licensing and access for financial capital.

Keywords: Pesantren cooperatives, Economic growth, Panel data, Macro Indicator.

Background

Ratification of Pesantren (Islamic Boarding School) Draft Law (RUU) into Pesantren Law (UU) in House of Representatives Plenary (DPR) on Tuesday, September 24th, 2019 was an affirmation efforts made by the government to accommodate the existence of pesantren in Indonesia. If pesantren is usually only considered as non-formal educational institutions, then with the enactment of the Pesantren Law, pesantren will be able to develop into part of an important element in shaping character and increasing the capacity of education for the community. Based on Madjid (1997), is an institution which conduct fair processes in the development of the national education system. In terms of history, pesantren is not only identical with the meaning of Islam, but also contains the value of authenticity of Indonesia (indigenous). It means that the pesantren is present in the midst of the community as a pillar of education that contributes greatly in improving human resources. The role of pesantren as an educational institution in Indonesia existed long before Indonesia's independence.

According to Religion Ministry in 2019, there were 28.194 pesantren with total of 4,290,626 people spread throughout Indonesia. From the total, 82.34% or 23,175 boarding schools are located in Java, or only 17.66% or 4,971 boarding schools located outside of Java. Furthermore, the Ministry of Religion states that the large number of pesantren is expected to be a strategic potential for Indonesia in three ways which are religious institutions, educational institutions, and social institutions. This means that the existing pesantren is expected to be able to be an agent of development not only in the

closed aspects of religion and education as it currently exists, but also in social aspects of society especially in developing the economic potential of the community.

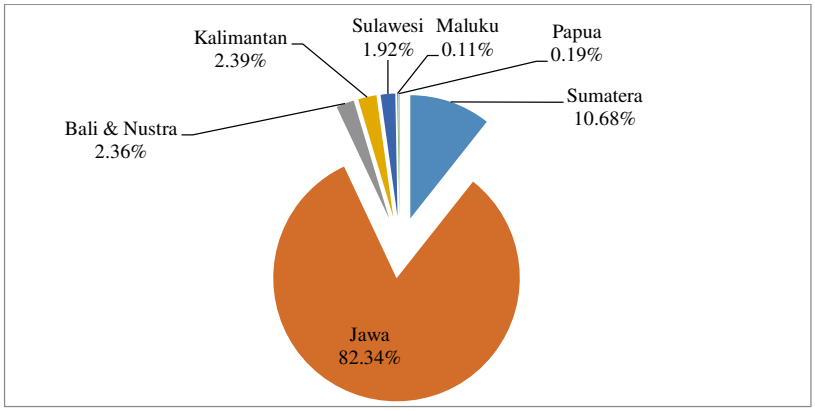

Fig. 1: Percentage of Pesantren Distribution in Indonesia (Source: kemenag.go.id)

Pesantren is the oldest education institution in Indonesia, which *brings out* scholars in Indonesia (Syafe'i, 2017). The distinctive education system is wrapped with the local wisdom of the archipelago. It makes pesantren easily accommodate the educational needs of people in Indonesia from various walks of life. Pesantren is not only one of the opponents in the education system in Indonesia, but is also able to become a pillar of the Indonesian economy. Pesantren has a long history of developing a populist economy in Indonesia because previously the source of pesantren's life came from agricultural products to hereditary (Ningsih, 2017). Furthermore, it forms the progress of pesantren to develop not only as an educational institution, but also a community economic institution which is expected to be able to contribute in increasing the economic activities of the community. Based on Marlina (2014), Pesantren is present as real practice laboratory to apply sharia/Islamic economic theory in current economic activities. Moreover, the pesantren is currently present as a symbol of the development of a economic democracy system in Indonesia. Mubyarto (2014) explains economic democracy system system is a family-based economic system, the sovereignty of the people, and Pancasila, and shows the partiality of the people's economic interests. It is relevant if the pesantren is considered as one of the forces in the economic driving force of society in Indonesia because of the considerable potential in quantity.

Based on the data of Religion Ministry in 2015/2016, as economic institution, there were 18,885 pesantren (65.15%). Pesantren which had economic potential, including: agricultural potential of 3,024 (16%), cooperatives or *Baitul Mal wa Tamwil* (BMT) of 1,498 (7.93%), entrepreneurship of 795 (4.21%), livestockof 587 (3.11%), and plantations of 579 (3.07%). Cooperatives or *Baitul Mal wa Tamwil* (BMT) owned by pesantren were established with the aim of improving the pesantren's economy, training the entrepreneurship of the santri, and being a catalyst for improving the economy of the villages around the pesantren.

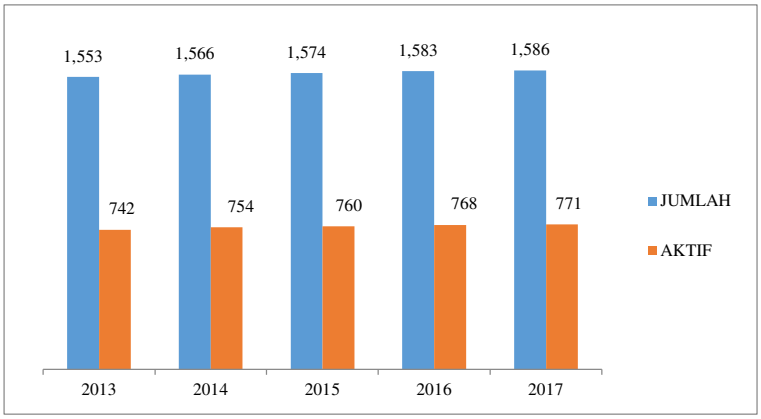

Fig. 2: Number of Pesantren Cooperatives in East Java in 2013-2017 (Source: Ministry of cooperatives and SME)

The effort to improve people's economy through pesantren faces big challenge. According to Central Bureau of Statistics (BPS), the poverty rate in Indonesia in September 2018 was 9.66% and the open unemployment rate was 5.34% in August 2018. Research related to the contribution of pesantren in improving the community's economy has never been carried out so far. Previous research on pesantren in the community economy was conducted by Marlina (2014) and Ningsih (2017).

In a research entitled The Potential of Islamic Boarding Schools in Sharia Economic Development, Marlina concludes that Islamic boarding schools have the potential in developing Islamic economics in society, which includes the role of Islamic boarding schools as agents of social change in the field of Islamic economics, Islamic boarding schools as syllabic business blaborators, and Islamic boarding schools as centers of learning of Islamic/sharia economics (Marlina, 2014). Furthermore, Ningsih in her research entitled Pesantren Economic Empowerment through Local Resource Development (Study at Daarut Tauhid Islamic Boarding School) states that pesantren as a cultural institution has a strategic role which not only positions as an educational institution and religious institution, but is also able to address social and economic problems in Public (Ningsih, 2017).

Research specifically discussing pesantren cooperatives was previously conducted by Rahayu and Rusydiana (2018). It focused to measure the efficiency of pesantren cooperatives. In a research entitled Measuring The Efficiency of Pesantren Cooperatives: Evidence in Indonesia, Global Review of Islamic Economics and Business, Rahayu and Rusydiana measured the effectiveness of pesantren cooperatives in Pesantren Suryalaya by using Data Envelopment Analysis (DEA). However, this research did not directly measure the comparison between the effectiveness of pesantren cooperatives with the impact of economic improvement on the surrounding community.

In measuring economic performance in a region, There are three very important macroeconomic variables as follow; Gross Domestic Product (GDP), inflation rate, and interest rates (Mankiw, 2013). Improvement in the community's economy in this research can be seen from the economic growth based on Regency/City GRDP in East Java Province in 2013-2017. Economic growth is seen as a terminology in the expansion of economic production in a region. In the traditional neoclassical economic growth approach, economic growth is affected by community savings, labor capital, and per capita income (Todaro and Smith, 2011). In the growth theory initiated by Robert Solow (in Mankiw, 2013), economic growth seen through the GDP of a region (Y) is determined by the existence of physical capital (k) and labor force (l) with the following equation $Y = F(K, L)$.

The relation between investment (I) and capital stock (K) is explained in the Horrad-Domar growth model with the equation $I = \Delta K$. This means that net investment in an area is determined as a change in the capital stock (Todaro and Smith, 2011). Investment also has a correlation with interest rates. A

company will purchase investment goods (I) to increase capital stock and replace consumable capital. The amount of capital goods demanded depends on the interest rate (r) used to finance investment. Then, This is summarized in equation I = I (r). This means that when the interest rate rises, the amount of investment will fall (Mankiw, 2013).

When it comes to inflation, it is closely related to inflation theory explained by the Phillips Curve (Phillips Curve). The Phillips curve explains that the inflation rate is affected by three forces, as follow: a) expected inflation; b) deviation of unemployment from the natural rate or unemployment skills; c) bid shocks. This is illustrated by the equation of $\pi = \pi^e - \beta (u - u^n) + v$ (Mankiw, 2013). It means inflation = expected inflation - (β x unemployment skills) + supply shocks. High unemployment has a tendency to reduce inflation. Economically, unemployment does not only have an impact on inflation but is more broadly related to the economic growth of a region. Okun's Law explains that there is a negative relationship between unemployment and the economic growth of a region (Mankiw, 2013). The permanent unemployment rate will have an impact on increasing economic growth calculated through GDP of 3.5%.

Furthermore, Mankiw pointed out the relationship between interest rates and economic growth in a region. Companies and households will have a tendency to purchase investment goods to increase the capital stock. The amount of investment goods requested depends on the existing interest rate. Absolutely, it will fluctuate at any time according to existing conditions. If the interest rate rises, fewer investment projects are profitable, and the number of investment goods requested decreases. Thus, economic growth in a region will tend to weaken (Mankiw, 2013).

Based on theoretical references above, the improvement of The economy of the people in East Java Province in this research will be measured in one dependent variable such as the level of GRDP and four independent variables, as follow: boarding schools, interest rates, the number of informal workers, and inflation. Therefore, this research is conducted with the following objectives: 1) to observe the relationship between the number of pesantren cooperatives and economic growth in East Java Province in 2013-2017; 2) To see the relationship between the number of informal workers and economic growth in East Java Province in 2013-2017; 3) To observe the relationship between interest rates and economic growth in East Java Province in 2013-2017; and 4) To observe the relationship between inflation rates and economic growth in East Java Province in 2013-2017.

Research Method

This research is to measure pesantren contribution in economic growth in East Java Province using panel data. It is a combination of time series data and individual data or cross sections. Time series data are data in 2013-2017, while cross section data is represented by data per district/city in East Java Province for each variable, both dependent and independent variables. There are 38 regencies/cities in East Java for each variable, bringing the total panel data used in this research of 190 data. The data used in this research are secondary data per district/city in East Java Province, which consists of GRDP data as the dependent variable, as well as data on the number of pesantren cooperatives, the level of interest rates, the number of informal workers, and the inflation rate as an independent variable or variable which will be measured in relation to the dependent variable in this research. Panel data processing uses eviews software 9 , with the panel model equation as follows:

$$LOGY_{it} = \beta_0 + \beta_1 LOGX1_{it} + \beta_2 LOGX2_{it} + \beta_3 LOGX3_{it} + \beta_4 LOGX4_{it} + e_t$$

LOGY is Gross Regional Domestic Product (PDRB) of East Java in 2013-2017 based on business field (Rupiah); LOGX1 is the Growth in the Number of Pesantren Cooperatives per Regency in East Java in 2013-2017 (units); LOGX2 is Growth in the Number of Informal Workers (Units); LOGX3 is the Growth of Interest Rates in East Java in 2013-2017 (Percentage); LOGX4 is the Growth Rate of Inflation in East Java in 2013-2017 (Percentage)

Result and Analysis

Based on data of East Java Province economic level in 2013-2017 as seen through GRDP data based on business in the Province of East Java, in general GRDP in East Java Province experienced a good trend with a consistent increase from 2013 to 2017. Increased GRDP in Java Province East significantly occurred in 2013 and 2014, reaching 11.24%. It means that during 2013-2017, East Java Province experienced good economic growth with an upward trend every year.

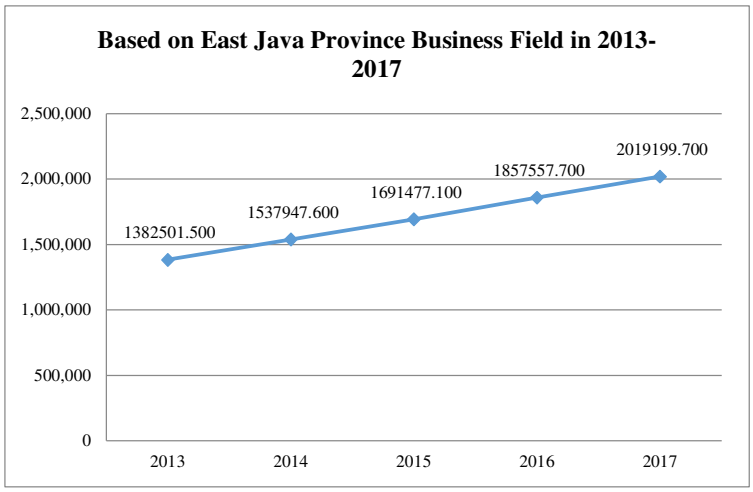

Fig. 3: Gross Regional Domestic Product (PDRB) Based on East Java Province Business Field in 2013-2017 in Billion Rupiah (Source: https://jatim.bps.go.id/)

As the economic growth in East Java Province in 2013-2017, several variables assumed to have correlations are also closely watched for trends. Islamic boarding schools cooperatives as one of the variables measured in this research also had an increasing trend in 2013-2017. In Law Number 17 in 2012 concerning Cooperatives, article one paragraph one, cooperatives are defined as legal entities established by individuals or cooperative legal entities, with the separation of the members' wealth as capital to run a business. It fulfills common aspirations and needs in the economic, social and cultural fields in accordance with the values and principles of cooperatives. In addition, cooperatives are established with the aim of increasing the welfare of members in particular and society in general, as well as an inseparable part of the democratic and just national economic order.

If it refers to the data of The Ministry of Cooperatives and SMEs, the number of pesantren cooperatives is divided into two based on their status, such as the number of pesantren cooperatives which are still active and the number of pesantren cooperatives that are not active. Active pesantren cooperatives are pesantren cooperatives registered in the Ministry of Cooperatives and SMEs database and currently continuing economic activities. While the pesantren cooperatives which are not active are those which have been registered in the Ministry of Cooperatives and SMEs database, but are not currently carrying out economic activities. From the data,in the East Java Province, there is quite a large gap between the existing pesantren cooperatives and active pesantren cooperatives, which is between 815 units and 771 units.

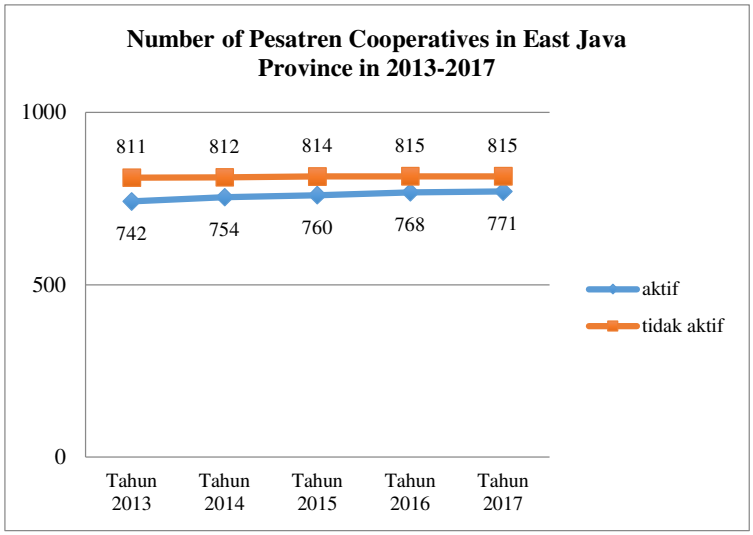

Fig. 4: Number of Pesatren Cooperatives in East Java Province in 2013-2017 (Source: Ministry of Cooperatives and SMEs, processed)

The improvement of economic growth in East Java Province in 2013-2017 was inversely proportional to the trend in interest rates in East Java Province in the same period. In general, credit interest rates in East Java Province in 2013-2017 had fluctuated since 2014 with a declining trend.

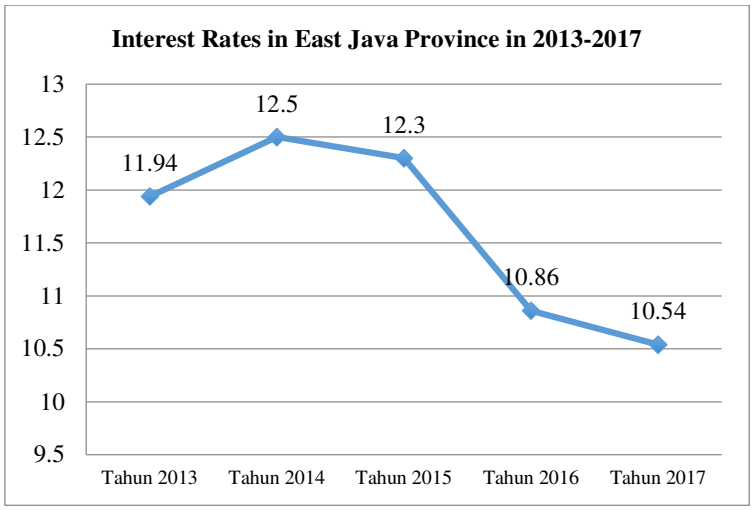

Fig. 5: Interest Rates in East Java Province in 2013-2017 (Source: Bank Indonesia, processed)

The number of workers in East Java Province in 2013-2017 had increased every year insignificantly. In general, the workforce is divided into two categories which are formal and informal labor. Based on data on labor in East Java Province in 2013-2017, the number of informal workers still dominated when compared to formal workers. Informal labor is one of the alternative solutions in the industrial world along with the rapid influence of globalization in the economic process as a company response to all existing labor regulations (Hussmanns, 2004). Therefore, the high number of informal workers in Indonesia must be balanced with government efforts to improve the provision of social security and improve the quality of informal workers.

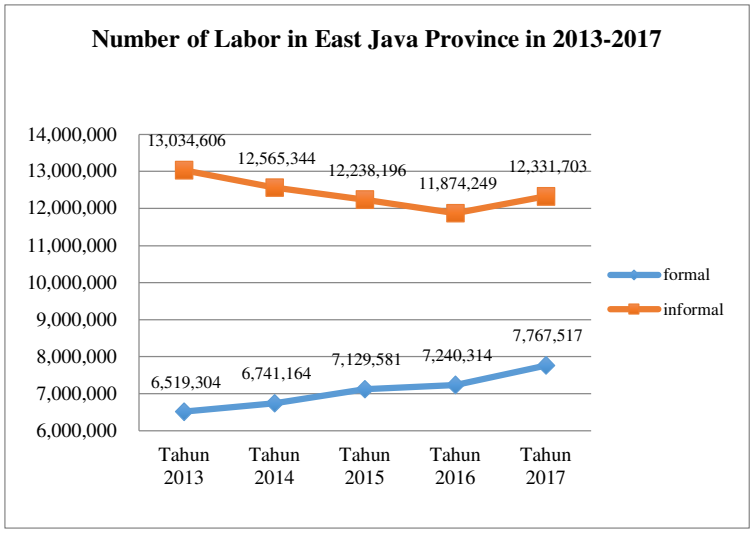

Fig. 6: Number of Labor in East Java Province in 2013-2017 (Source: Ministry of Manpower, Processed)

If it is seen from the data, Inflation in East Java Province in 2013-2017 experienced a fairly fluctuating trend. The peak in 2014, East Java Province had a large inflation which was equal to 7.77. The high level of inflation is influenced by rising subsidized fuel prices (BBM) as one of the government's policies in the economic field.

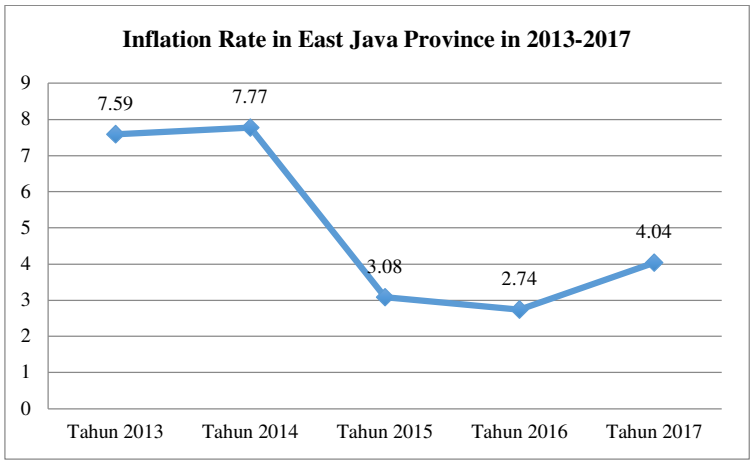

Fig. 7: Inflation Rate in East Java Province in 2013-2017 (Source: Bank Indonesia, Processed)

All variable will be measured by using panel data regression to find out the relationship between variables with one another. In this research, the first process undertaken is the process of transforming data and selecting the best panel data model in drawing conclusions in research. The data transformation process is carried out to equalize the unit scale in each variable. Therefore, in this research, all data on all variable is transformed into logarithms (log).

The panel model selection is conducted to obtain the best model from the three existing panel data models, namely: Common Effect Model, Fixed Effect Model, Random Effect Model using eviews software 9. In the process of selecting the best model is carried out with two test models which are the chow test and thirst test. A chow test is performed to choose the best model between the Common Effect Model and the Fixed Effect Model. If the Fixed Effect Model is the best model, then the next

test will be conducted with the hausman test to test the best model between the Fixed Effect Model and the Random Effect Model.

Table 1: Selecting The Best Panel Model

Model test	Result	Information
Common Effect Model vs *Fixed Effect Model*	F(588.400954) = Chi-square (924.609526) Value Prob 0.0000 < α 0,05 so H0 is rejected, H1is accepted. It means that *Fixed Effect Model* fits	Chow test H0 is *Common Effect Model* H1 is *Fixed Effect Model*
Fixed Effect Model vs *Random Effect Model*	Chi-square = 0.000000 Value Prob 1.0000 > α 0,05 so, H1 is rejected, H0 is accepted. It means that *Random Effect Model* fits	Uji Hausman H0 is *Random Effect Model* H1 is *Fixed Effect Model*

Source: Statistic output result of Eviews9

In chow test, it is obtained the result that a probability value of 0.0000 <α 0.05 then H0 is rejected and H1 is accepted. It means Fixed Effect Model is appropriate . Next, hausman test is performed and the results are obtained that the value of Prob 1.0000> α 0.05 then H1 is rejected and H0 is accepted. It means that Random Effect Model fits. After conducting the two tests, it is determined that the Random Effect Model is an appropriate model to be used in this research to see the contribution of each variable in the research. Furthermore, testing the classical assumptions of the selected model is needed to ensure that the existing model can be used as a reference to assess real conditions. The classic assumption test in the Random Effect Model is carried out through a multicollinearity test.

Table 2: Multicollinearity Test

	LOGKOPPESANTREN	LOGTKIINFORMAL	LOGSUKUBUNGA	LOGINFLASI
LOGKOPPESANTREN	1.000000	-0.068861	0.488919	-0.104069
LOGTKIINFORMAL	-0.068861	1.000000	-0.114780	0.577281
LOGSUKUBUNGA	0.488919	-0.114780	1.000000	-0.150988
LOGINFLASI	-0.104069	0.577281	-0.150988	1.000000

Source: Statistic output result of Eviews9

From the result of classic test above, it can be seen that there are no problems related to multicollinearity because the value of the correlation between independent variables <0.8. Thus, data can be concluded to represent the reality that occurs in the field and it can be continued in the process of further data analysis. After going through the results, the panel data regression equation with the Random Effect Model in this research are seen below:

LOGGDP = 11.36302 + 0.164118*LOGKOPPESANTREN + 0.092864*LOGTKIINFORMAL - 1.022606* LOGSUKUBUNGA - 0.137082*LOGINFLASI

Prob (F-Stat) 0.000000; t-stat (P-Value): LOGKOPPESANTREN (0.0518), LOGTKIINFORMAL (0.2246), LOGSUKUBUNGA (0.0000), LOGINFLASI (0.0000).

LOGGDP is East Java GRDP Growth in 2013-2017 based on business fields (Rupiah); LOGKOPPESANTREN is the Growth in the Number of Pesantren Cooperatives per Regency in East Java in 2013-2017 (units); LOGTKIINFORMAL is the Growth in the Number of Informal Workers (Units); LOGSUKUBUNGA is the Growth of Interest Rates in East Java in 2013-2017 (Percentage); LOGINFLATION is the Growth Rate of Inflation in East Java in 2013-2017 (Percentage).

Based on the p-value in the F-Stat of 0.000000 which indicates a value smaller than 0.05, all the independent variable has a significant effect on the dependent variable. Interpretation of the results of the calculation of statistical data is seen partially through the t test. Based on the results of these calculations, it is concluded that the number of pesantren cooperatives has a significant influence on economic growth in East Java Province of 0.0518 with a coefficient value of 0.164118. This means that every increase in the number of active pesantren cooperatives will positively contribute to improving the economy of East Java Province through increasing the amount of GRDP based on business. In addition, based on a p-value of 0.0000 for the variable interest rates and the inflation rate, it can be concluded that both of them also have a significant negative effect on economic growth in East Java Province. While the variable number of informal workers has an insignificant effect because the p-value is greater than 0.05 or equal to 0.2246.

Analysis of The Effect of Pesantren Cooperatives Number Growth toward Economic Growth in East Java Province

Pesantren has a great economic potential to support the economic improvement of the surrounding area which ends in the goal of improving the community welfare. A pesantren which successfully develops economic ventures and becomes a role model for pesantren economic development in Indonesia is the Pesantren Sidogiri in Pasuruan District, East Java Province. Sidogiri Islamic Boarding School is currently successfully developing an economic enterprise based on Pesantren cooperatives. This originated from the idea of developing a pesantren cooperative, with the Baitul Maal wa Tamwil (BMT) Syariah Muamalah Cooperative model Masholihul Ummah (MMU) with an initial capital of IDR 13,500,000, which was collected from 200 students (Mursyid, 2011). The Sidogiri Islamic Boarding School Cooperative can develop rapidly by utilizing students and alumni network spread across 11 provinces in Indonesia through the BMT Sidogiri Integrated Joint Business since 1997. Evidently, the current BMT turnover owned by the Sidogiri Islamic Boarding School is able to reach IDR. 19 Trillion with assets of IDR. 2.6 trillion.

Based on the results of panel data regression with the Random Effect Model, pesantren cooperatives are the most contributing variables compared to other variables in this research to improve the economy of East Java Province as measured by the value of district/city GRDP. This is indicated by the p-value of 0.0518. This means that there is a significant positive effect between economic growth and the number of pesantren cooperatives in East Java Province. The magnitude of the influence of the number of pesantren cooperatives on economic growth in East Java Province with a coefficient value of 0.164118. It means that the 10% increase in the number of pesantren cooperatives will have an impact on economic growth of 1.64118% in East Java Province.

Pesantren cooperation are able to perfect the role of SMEs as micro-institutions in the midst of the conditions and threat of the crisis in Asia. BMT Cooperative as a community-based strategic micro institution is able to take a position as an initiative of Islamic microfinance institutions in Indonesia, which is able to be an alternative source of finance for SMEs in obtaining credit (Antonio, 2011). With the growing popularity of the concept of Islamic economics in Indonesia, the Islamic financial scheme run by Pesantren will be able to fill a strong strategic position to support the development of the Islamic banking industry and strengthen the national economy.

Analysis of The Effect of Informal Labor Number Growth toward Economic Growth in East Java

Labor is an important component in the process of producing goods and services. However, along with the high economic demands of a region especially after the monetary crisis, the definition of labor also begin to develop in two categories which are formal labor and informal labor. The trend of the development of informal labor is currently increasing. The low demands on companies' obligations to fulfill labor rights make the informal labor category an alternative employment solution which is widely taken by companies.

Through the calculation result of panel data regression with Random Effect Model in this research, it shows that informal workers have a p-value of 0.2246. It is greater than the error tolerance level of 5%, the null hypothesis is accepted. This means that there is no significant effect between the number of informal workers and growth in East Java Province in 2013-2017. In addition, in this research, there is a negative correlation or relation between the number of informal workers on the economic growth of East Java Province. This is indicated by the coefficient value of 0.092864. This means that an increase in the growth of the informal labor of 10% will have an impact on economic growth of 0.92864% in East Java Province. This is also a labor problem which not only occurs in East Java Province but also employment problems nationally. On the one hand, the existence of informal workers is one alternative to reducing unemployment, but on the other hand, informal workers also do not have a contribution in the economy because they do not have the obligation to pay taxes even though the amount of income is included in the income tax category (PPh). Thus, the increase in the number of informal workers does not significantly affect the economic improvement of a region.

The research about informal worker in developing country had been conducted by Onwe with the Nigerian research locus as one of the developing countries in Africa. Informal workers constituted a percentage of 21% of the total workforce in Sub Saharan countries in Africa and 38% of GDP in Nigeria (Onwe, 2013). However,The Nigerian government has not responded positively to the existence of the informal sector in the existing employment structure, as evidenced to date Nigeria has not started a clear policy on efforts to encourage the growth of the informal sector to improve its national economy (Onwe, 2013).

Analysis of The effect of Interest Rate Growth on Economic Growth in East Java Province

Low lending interest rates will encourage people to take out loans to make investments. Investment will be able to create economic activity in the community and increase employment. An increase in employment will affect the increase in people's income which creates prosperity and good economic growth for an area.

Based on the calculation of panel data regression with the Random Effect Model in this research, the interest rate in East Java Province in 2013-2017 showed a p-value of 0.0000 smaller than the error tolerance level of 5%, the null hypothesis was rejected. This means that there is a significant negative effect between interest rates on economic growth in the province of East Java. In addition, the results of the calculation of panel data regression in this research indicate the value of correlation or negative relation between interest rates and economic growth in East Java Province. This is indicated by the coefficient value of -1.022606. This means that an increase in loan interest rate growth of 10% has an impact on the decline in economic growth of 10.22606% in East Java Province. This is in line with the findings of previous research conducted by Harswari and Hamza that interest rates had a significant negative impact on GRDP/PDRB in 20 Asian countries in 2006-2015 (Harswari and Hamzah, 2017). Besides, in this research, influence is also mentioned that interest rates will directly affect the increase or decrease in a country's GDP and inflation (Harswari and Hamzah, 2017).

Analysis of The Effect of Inflation Rate toward Economic Growth in East Java Province

In East Java Province, the inflation rate in 2013-2017 was quite volatile. This condition was then measured as one of the variables to see the effect on economic growth. In this research, based on the results of the calculation of panel data regression with the Random Effect Model shows that inflation has a p-value of 0.0000 greater than the error tolerance level of 5%. The null hypothesis is rejected. This means that there was a significant negative effect between the inflation rate on economic growth in East Java Province in 2013-2017. In addition, in this research, there is a negative correlation between inflation and economic growth in East Java Province. This is indicated by the coefficient value of -0.137082. This means that an increase in inflation of 10% has an impact on the decline in economic growth of 1.37082% in East Java Province. This condition is relatively more unique when compared to general conditions, in which the controlled inflation rate will contribute to economic growth.

Negative effect between inflation rate toward economic growth does not only occur in East Java Province, but also occurs in other regions and even in other countries. This condition is inline with previous research related to inflation. In a previous research by Kasidi and Mwakanemela related to inflation, it also mentioned that the inflation rate in Tanzania in 1990-2011 had a negative correlation and impact on economic growth in the region (Kasidi and Mwakanemela, 2013). This condition is affected by several things, one of them is because people tend to reduce spending as a form of caution against the risk of high price increases during inflation. Thus, it will obviously affect the decline in economic activity and then also affect economic growth. Besides, if reviewed from the supply side, inflation will cause wage increases and price increases for goods, especially imported goods. This has resulted in a decrease in people's purchasing power and reduced investor interest, which has a negative impact on the economic growth of a region because the economic wheels are sluggish and hamper development (Sutawijaya, Zulfahmi. 2012).

Conclusion and Recommendation

Based on the calculation result of statistic data with panel data regression method with Random Effect Model, it can be concluded that there are three independent variables whcih have a significant effect on the economic growth of East Java Province in 2013-2017 as follow; the growth variable in the number of pesantren cooperatives, the variable interest rate growth, and the inflation rate growth variable. The growth variable of pesantren cooperatives has a positive and significant effect toward economic growth in East Java Province as seen from the GRDP based on business, with a p-value of 0.0518 and a coefficient value of 0.164118. It means that the 10% increase in the number of pesantren cooperatives will have an impact on an economic increase of 1.64118% in East Java Province. The variable interest rate growth and inflation rate growth have a significant p-value of 0.0000 but contribute negatively to economic growth in East Java Province. The variable of interest rate growth and the growth of the interest rate inflation and the inflation rate have coefficients of -1.022606 and -0.13082, respectively. This means that the growth in interest rates and growth of the inflation rate of 10% has a significant negative effect on economic growth of -10.22606% and -1.37082%, respectively. While the variable number of informal workers has an insignificant effect with a p-value of 0.2246 with a coefficient of 0.092864. In addition, the p-value in the F-Stat in this study is 0.000000 or smaller than 0.05. It can be concluded that all independent variable has a significant influence toward the dependent variable.

Based on the result of the research, there are some recommendations as follow:

1) The optimization of cooperative development by providing licensing facilities in accordance with regulations and easy access to financial capital for pesantren cooperatives; 2) In the future, the government needs to increase the protection of informal workers, one of which is through social security for informal workers. In addition, to encourage the trend of increasing the formal workforce, the government needs to increase the amount of training and certification of the workforce: and 3) Government policies are needed in the form of lowering lending rates to increase investment and economic activity in society.

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The Use of Controlling in Companies Operating in Poland

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Abstract

Circumstances of the market economy have increased the importance of new tools of management, especially controlling, that are necessary to implement in most, if not all, organizations. The use of controlling systems by European enterprises has given them a competitive advantage in their respective markets. At the same time, a lack of controlling has led to a wide gap between Polish enterprises and other European enterprises that have used controlling systems with success. There are many definitions and concepts of what controlling is and what it entails. This study aims to (1) analyze the manifestation and the definition of controlling in the literature and practice as well as to (2) answer the question: What is the current state of controlling practices in Polish companies? Based on a review of literature and the research, controlling may be defined as a tool of management that enables managers to steer a company based on continuous monitoring of company metrics and results, that is aligned with the company objectives through a coordinated management system, and that bridges planning and supervisory functions with information-sharing systems. The results of the research indicate weak implementation of controlling in companies operating in Poland. Over 85% of those surveyed claimed that they knew about controlling, but only 34.9% of them implemented it. Most that used controlling were large, foreign-capitalized companies with high revenues.

Keywords: Concept of Controlling, Management Accounting, Implementation of Controlling

Introduction

There are many views on the best business management tools to adjust the activities of enterprises to the realities of a market economy. Nevertheless, both theorists and practitioners agree that management needs effective tools to ensure long-term viability of a company and to achieve planned objectives. One management tool that satisfies the above criteria is controlling. Properly applied, controlling allows companies to respond quickly to changes in the environment through comprehensive coordination of objectives, decisions, and actions.

Historically, the use of controlling has been most prevalent in Germany and other German speaking countries. The adoption of controlling occurred in Poland in the 1990s, mainly due to the increasing size of companies and the globalization of markets. Although in recent years controlling has been associated with management accounting, the term has not officially been promulgated in the literature and it is still defined differently by different authors. Attempts made to unequivocally define controlling have not produced the expected results. A concrete definition of controlling has even eluded the greatest experts in the field. P.R. Preißler notes that "everyone knows what controlling means and what it should be, but everyone thinks about this a little differently (Preißler, 1985)." A. Zünd confirms: "Other business environment, other definition of controlling" (Zünd, 1978). The myriad of definitions helps cloud the distinction between controlling as a function and controlling as a position in the organizational structure. Furthermore, in practice, there are even more facets and forms of controlling than those described in the literature.

The aim of this paper is twofold. First, it provides an answer to the question of what is (the core of) controlling from the point of view of research practice and corporate practice and if it has developed differently from international management accounting research. Second, it analyses the use of controlling in companies operating in Poland. The research of the concept and use of controlling is facilitated by two types of empirical material, a quantitative analysis of journal publications of

controlling scholars and qualitative questionnaire interviews with, mostly, board members of the surveyed companies.

The research tested the following two hypotheses:

Hypothesis 1: Controlling is ambiguously formulated and addressed in the subject literature, as well as in the practices of Polish enterprises.

Hypothesis 2: Controlling is utilized mainly in large companies with infusions of foreign capital.

Theory

The Genesis of Controlling

Controlling's roots are in the West. The first controllers appeared in England in the public sector in the XV century as part of the royal court (Weber, 1999). The term "controlling" appeared for the first time in the Constituency of USA in 1778 when Congress established the rules of appointing a comptroller, treasurer, and auditor (Wojtania, 1999). In private institutions, the term "comptroller" appeared in the Atchison, Topeka & Santa Fe Railway System Company in 1880 (Weber, 2001). Controlling was gradually adopted by other countries in the second half of the 20th century when American corporations set up branches in Europe. Perhaps the biggest influence on the development of controlling was the oil crisis in the 1970s. Controlling was adopted by companies to help them reduce their costs and improve their efficiency to remain viable.

Nowadays controlling is predominantly developed and applied in Germany and other German-spoken countries, where it is used not only by big corporations but also by medium and small enterprises. Poland was relatively late in adopting controlling. Enterprises in Poland began to implement controlling systems in the 1990s in response to corporate growth and market globalization, which considerably complicated management processes. At first controlling had the function of control and was used to provide oversight in corporate finance. Now controlling tasks are so diverse and dynamic that it is difficult to pinpoint a single interpretation of controlling in theory and practice.

Definitions and Interpretations of the Concept of Controlling

Controlling is an interdisciplinary concept, which uses not only the achievements of management, accounting, and financial analysis, but also other components of the broader disciplines of economics. Both in literature and in practice, this term has different economic meanings. The many diverse opinions on the concept of controlling have contributed to the large number of controlling definitions, and these definitions (opinions) are constantly evolving in concert with transformations within enterprises and markets. For the purpose of this research, only some of the many interpretations and approaches to the concept of controlling will be considered.

Table 1: The most common meanings of controlling appearing in the literature

Author	Meaning	Interpretation
Marciniak, 2004	**conception of management**	way management uses philosophy and ideas of controlling in decision-making processes
Hahn, 1987	**philosophy of management**	involves posing clearly defined objectives, marking out paths to achieve them, and supervising their implementation using the numerical tools of accounting and finance
Horvath, 1998, Brzezin, 2001, Grudzewski, 2001,	**system, subsystem,**	aimed at optimizing financial results and value of the company; creates and coordinates planning, control, and supply of information, thereby

Goliszewski, 1990, Pocztowski, 1994, Nowak, 2003, Chaberek, 2001, Zadora, 1996 , Sikorski, 1993	**or model of management**	facilitating adaptation and coordination of entire system from standpoint of achieving objectives
Krüger, 1979, Vollmuth, 1993, Mann and Mayer, 1998, Janik, 1999, Haus and Nowosielski, 1995	**system of steering or supporting management**	supports managers in steering a firm in terms of objectives and performance monitoring; compares actual results with planned objectives and takes corrective actions to prevent/mitigate/eliminate problems
Wierzbicki, 1995	**system of coordination**	integrates activities of planning and control, collects and processes information, and organizes, selects, and trains personnel; implements decisions and actions of managers at all levels
Günter, 1985	**system of management control**	ensures integrity of enterprise-wide objectives and efficient measurement and assessment of the results of operations by comparing the current state of desired (planned) with current state of existing
Dellmann, 1996, Kloock, 1997, Jarugowa, 1997, Sobańska, 2003, Dobija, 1997	**system of management accounting**	deals with steering an enterprise and solving coordination problems between management subsystems via management accounting tools
Preißler, 1992, Hülsenberg and Wróbel, 1995, Knop and Sawicki, 1994, Sierpińska, 2004	**tool of management**	supports process of decision-making and process of steering an enterprise's activities towards determined targets through coordination of planning processes (distribution and control) and development of reliable analytical information systems
Czubakowska, 2004, Penc, 1994, Dźwigni, 2003, Mielczarek, 1999	**method of supporting management**	facilitates information-sharing and coordination of business functions; involves creation and modification of planning systems; creates measurements of company's financial situation and prepares information for decision making
Komanderek, 2002, Weber, 1999	**function of management**	combines elements of planning, disposal, inspection, analysis, and information supply and provides corporate management rationality through efficient use of resources with set goals
Kerzner, 1989	**process of management**	includes measurement of economic values, assessing level of achieved objectives, identification of causes of deviations from targets; corrects unfavorable trends and sustains favorable trends
Wojtania, 1999	**technology of management**	allows control over process of generating a profit and of making company navigable (subject to will of managers)
Steinmann and Schreyögg, 1986, Schweitzer and Friedl, 1992	**managerial task**	provides access to information for coordination of company management to ensure achievement of corporate goals through shaping organizational structures/processes and through securing agreement on the roles of staff and supervisors

Kwiecień, 1993	**discipline of management science**	coordinates planning, controlling, and supplying of information and facilitates steering of enterprise's activities
Saunders, 1996	**management information system**	directs processes in an enterprise using mechanisms of management accounting, budgets, cost centers, and revenue, etc.
C. P. Zeithalm and T. P. Bateman, (Fjałkowska, 2003)	**style of communication between groups**	directs ideas and human behavior towards achieving goals
Source: own elaboration.		

Based on a study of published literature, controlling is a broad and ambiguous term. Individual authors draw attention to varying aspects of a controlling system. For some, controlling is a system of steering a company. For others it is a tool of management or a function supporting management. Controlling is also known as a system, subsystem, or "oversystem" of management. Other conceptions of controlling involve the establishment of the company's goals and/or supervision of achieving the company's goals, both short and long term. There are also definitions classifying controlling as a process of management.

Most definitions of controlling are results-focused and assign dominant importance to coordination and the steering process. Furthermore, its importance in decision-making processes and information-sharing across the enterprise is often emphasized. In some definitions, controlling's role in the creation, coordination, and management of enterprise information is underlined. Other definitions of the term emphasize the functional aspects of controlling. In many definitions, controlling represents the overall coordination of information for planning, execution, and control. There are also definitions of controlling categorizing it as a process, function, philosophy, model, or concept of management. In defining a controlling system, it is often referred to as "a system of control over the execution of tasks in isolated responsibility centers of the company".

Controlling and Management Accounting

Some authors relate controlling to accounting, financial accounting as well as managerial accounting. Others are of the opinion that controlling has a boarder meaning. Furthermore, more and more authors equate contemporary controlling with management accounting.

According to A. Jarugowa, controlling is a modification of management accounting (Jarugowa and Nowak, 1997). A. Jarugowa contends that the goals, tasks, methods, and techniques of accounting and controlling do not have any noticeable differences (Jarugowa, 1995). Because controlling has evolved concurrently with management accounting, these two systems have many common features. Contemporary controlling does not differ considerably from management accounting. Often the terms controlling and management accounting appear together or are treated as synonyms. I. Sobańska shares this opinion and believes that controlling is a modification of management accounting. She contends that controlling and management accounting differ only in the presentation of knowledge and in the nature of these disciplines. To paraphrase her, controlling has a more complex structure and is connected with functions realized in an organization, e.g., financial controlling, personnel controlling, and ecology controlling. Controlling usually involves creating new roles for and/or expanding the reach of traditional management accounting (Sobańska, 2003). This is also confirmed by the research conducted by J. Płóciennik-Napierałowa, who demonstrates that the implementation of controlling usually involves the creation or expansion of scope of management accounting (Płóciennik-Napierałowa, 2001). Also, information systems developers often describe controlling as a variation of management accounting with elements of steering, regulation, and strategic management.

The identification of operational controlling as being associated exclusively with accounting management is quite common and is also emphasized in foreign literature. K. Dellmann's conception of controlling is based on accounting, with key functionality related to the planning, controlling, and coordination processes through the use of accounting systems (Dellmann, 1996). Similarly, J. Kloock, who essentially equates controlling with accounting, describes controlling as a subsystem having an organizational independence and competence to solve the existing problems of coordination between the subsystems of management via tools of management accounting (Kloock, 1997). Conversely, D. Schneider believes that controlling can be fully replaced by "planning and controlling" cost accounting (Schneider, 1991).

A deep insight into management accounting in German-speaking countries was presented by A. Wagenhofer (2006). German researchers dealing with the question 'What is Controlling?' have pointed out that the notion of 'controlling' stands for what in the Anglo-Saxon world would be called management accounting, and it reflects cultural differences between Germanic and Anglo-Saxon management accounting practice (Messner et al., 2014). Thus, controlling is sometimes called a German version of management accounting, combined with elements of steering, regulatory oversight, and strategic management (Jarugowa, 1995).

Sharman emphasizes that in many German-spoken countries there is a distinct organizational division within organizations (Sharman, 2004). Companies generally have a department responsible for financial accounting and a department responsible for controlling (Sharman and Vikas, 2004). Also, K. Zehetner and S. Eschenbach (2017) admit that although the goals of management accounting and financial accounting are the same – to provide the public with a true and fair view of corporate performace and to support managers' decisions – the managerial as well as financial accounting programs within German-speaking countries are materially different as compared to their United States counterparts.

A research study conducted by K.R. Krumwiede shows that non-German companies pay more emphasis on financial accounting than the German ones. American companies are more interested in capital markets and in strengthening their financial accounting systems than in implementing advanced cost accounting systems. In Germany, the number of "management accountants" and "controllers" is higher than the number of accountants who deal with financial accounting reports. Recently, a tendency to imitate the American model in combining employees and data in one department and system has been observed in Germany and other countries (Krumwiede, 2005). German companies emphasize management accounting more, and U.S. companies emphasize financial reporting accounting practices (Krumwiede, Suessmair, 2007&2008).

Researchers examining the German-speaking literature on management accounting, as it pertains to academic legitimization and the establishment of the discipline of controlling, suggest being cautious when using the notion of a 'discipline'. The authors have argued that different social and institutional contexts may result in different trajectories of a particular discipline in different countries. However in this case, there is no need to regard Germanic controlling and U.S. management accounting as different disciplines (Messner et al., 2014). The differences between German and US management accounting were also outlined by Portz and Lere (2010) within the context of how culture impacts the organizational and methodical aspects of cost accounting system design.

On the other hand, a confluence of accounting systems can be observed in business practice. K. Zehetner and S. Eschenbach (2017) have identified three major catalysts for this process of convergence: (1) the development of ERP systems, (2) regulatory requirements, and (3) changes in management thinking. In the practice of large worldwide companies (based on German and Anglo-American capital, where the two concepts collide), there is no distinction between the titles and duties of controllers and management accountants. Typically, the terms "controllers" and "management accountants" are used interchangeably (Sobańska, 2003). Similarly, the terms "controlling" and "management accounting" are used interchangeably (Sobańska, 2002). Also the IFAC considers the functional area defined as "management accounting" in the English-speaking countries to be known in Continental Europe as controlling, analytical accounting, or internal accounting. All of the systems that

make up this area were developed on the basis of cost accounting system and realize similar tasks, but differ in scope and degree of integration (IFAC, 1998).

When relating the differences between management accounting and controlling, many authors point out the areas of expertise, tools, functions, tasks, and goals that do not coincide. As indicated by W. Brzezin, management accounting is a major instrument (subset) of controlling (Brzezin and Dziewiątkowski, 2001). Similarly, when describing his classification of instruments for controlling, D. Hahn lists financial accounting and management accounting as his primary tools (Hahn, 1994). The definition of controlling by W. Grudzewski also categorizes management accounting as one of the tools of controlling, along with management by objectives, economic forecasting techniques, and elements of computer science and praxeology (Grudzewski, 2001). Similarly, P. Olech provides a list of controlling tools, including management by objectives, planning, and management accounting (Deyhle and Olech, 1997).

A. Karmanska references only the ex-ante dimension of management accounting, but emphasizes both the retrospective (ex-post) and prospective (ex-ante) nature of controlling, thereby indicating a wider range of controlling functions compared to management accounting (Karmańska, 2006). An opponent of equating controlling with accounting management is also M. Sierpińska, who is of the opinion that accounting is (only) effectively the information system for controlling (Sierpińska, 2004). H. Błoch believes that equating controlling and management accounting results in too much focused attention on documenting past events, i.e., neglecting the future-oriented characteristics of controlling (Sierpińska, 2004).

The above mentioned definitions lead to the observation that initially controlling was a pure accounting concept, involving the functions: cadastral, revision, collaboration with external revision, tax, and interpretation (Horvath, 1979). By the end of the twentieth century, the literature distinguished the concepts of controlling and management accounting as separate areas of knowledge. As a management tool, controlling uses the same tools, methods, and techniques as management accounting, but/and realizes similar functions, tasks, and goals. In recent years, a holistic understanding of controlling as an approach to management has appeared. Similarly, controlling has been described as a management style. In this sense, controlling is not only one of the tools of management, but is also a business management concept.

Management functions included in controlling may create discrepancies in interpreting the scope of the impact of controlling, its functions, and the role it plays in the enterprise. It may also lead to an equalization of the concepts of controlling and enterprise management. According to S. Nowosielski, equating the two concepts is not appropriate because controlling does not have any functionality for governing, it only supports managerial functions (Nowosielski, 1998). M. Urbanowicz is also critical of the belief that controlling is an oversystem of the system of management (Urbanowicz, 1997). Differentiating controlling from management is not practical because controlling does not have any stand-alone functions, it only supports managerial functions (Kużdowicz and Kużdowicz, 2012). The belief that controlling oversees management is contrary to its intended function, i.e., a process and tool of management.

Based on a review of the literature and the theoretical aspects of controlling referenced therein, a new definition of controlling has been formulated by the author of this paper. *Controlling is a tool of management that enables managers to steer a company based on continuous monitoring of company metrics and results, that is aligned with the company objectives through a coordinated management system, and that bridges planning and supervisory functions with information-sharing systems.* As a decision support tool, controlling provides executives with the instruments and information necessary to perform the work of planning, monitoring, and control. The growing demand for information for management purposes in the modern market economy and the direction of change in accounting determined by the development of international accounting rules for financial reporting promote conditions conducive to, or even necessary for, the implementation of controlling (management accounting) in enterprises.

Empirical Research Results

The main source of empirical data for the research study was a company survey. The survey targeted firms with at least 50 employees in Poland. Questionnaires were sent to the 257 randomly chosen organizations, of which 173 answered the questionnaire. After the initial analysis, 169 firms were selected for further consideration.

The Implementation of Controlling

Most published literature touts the numerous advantages of controlling usage as described and confirmed by the results of companies in German-spoken countries; however, the situation in Polish organizations seems to be more complex. In more than half the surveyed companies, the term controlling was known but it was not used by these organizations (Table 2).

Table 2: Implementation of controlling systems in the analyzed firms

Is "controlling" known and used?	**n**	**%**
Known and used in a firm	59	34.9
Known and not used in a firm	86	50.9
Unknown	24	14.2
All analyzed firms	**169**	**100**
Source: own elaboration.		

To determine whether or not there was a correlation between familiarity and use of controlling with other company characteristic variables, the chi-square statistic was used. The results show that factors that condition controlling usage include: form of ownership, value of revenues, and value of assets. ($p<0.05$). Cramer's V coefficients indicate a weak strength of dependence (Table 3).

Table 3: Use of controlling systems vs. characteristics of the analyzed firms – the assessment of stochastic independence

Analyzed characteristics	**Is "controlling" known and used?**		
	χ^2	**P**	**V**
Legal-organizational form	17.470	0.064	-
Number of employees	9.383	0.058	-
Ownership form	**21.135**	**0.006**	**0.250**
Kind of business activity	5.819	0.213	-
Profitability	7.973	0.436	-
Revenues	**22,636**	**<0.001**	**0.262**
Value of Assets	**32,125**	**<0.001**	**0.307**
Number of offered products	3.350	0.764	-
Source: own elaboration.			

The conducted research shows that the presence of foreign capital is often a key factor in the use of controlling in a company. When foreign enterprises had a partial or whole stake in the analyzed firms, the parent firms generally imposed their modern tools of management on their subsidiaries. So foreign capital, in addition to privatization in medium and large enterprises, was shown to be positively correlated with controlling implementation in these companies (Fig. 1).

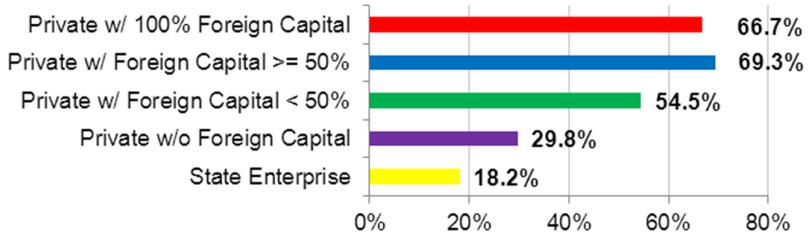

Fig. 1: Use of controlling systems vs. form of ownership

Source: own elaboration.

Cramer's V coefficient (V = 0.262) indicates a weak association between the use of controlling and the value of revenues. Nevertheless, there is a general tendency for companies with higher revenues to use controlling (Table 4). Only 22.2% of companies with revenues up to 800 thousand euro used controlling, while 55.6% of companies with revenues exceeding 5 million euro implemented some form of controlling.

Table 4: Use of controlling systems vs. revenues

Value of revenues [M euro]	Controlling known and used in a firm		Controlling known but not used in a firm		Controlling unknown		All analyzed firms	
	N	%	N	%	N	%	N	%
up to 0.8	6	22.2	14	51.8	7	25.9	27	100
0.8 - 2.5	12	23.1	30	57.7	10	19.3	52	100
2.5 -5	10	32.3	16	51.6	5	16.1	31	100
> 5	30	55.6	24	44.4	0	0	54	100
Source: own elaboration.								

There is also a weak association (V = 0.307) between the use of controlling and the value of assets. A higher interest in controlling was recorded among companies whose value of assets exceeded 5 million euro. Among this group, 70.3% of the surveyed companies used controlling (table 5).

Table 5: Use of controlling systems vs. value of assets

Value of assets [M euro]	Controlling known and used in a firm		Controlling known but not used in a firm		Controlling unknown		All analyzed firms	
	N	%	N	%	N	%	n	%
Up to 1.5	15	21.7	38	55.1	16	23.2	69	100
1.5 – 2.5	7	25.9	17	62.9	3	11.1	27	100
2.5 – 5	10	31.2	19	59.4	3	9.4	32	100
> 5	26	70.3	10	27.0	1	2.7	37	100
Source: own elaboration.								

Linking knowledge and application of controlling with number of employees showed no significant relationship (p = 0.058). Graphical representation of the results (Fig. 2) reveals that the greater the number of employees, the lesser the ignorance about the nature of controlling and the greater the application of controlling.

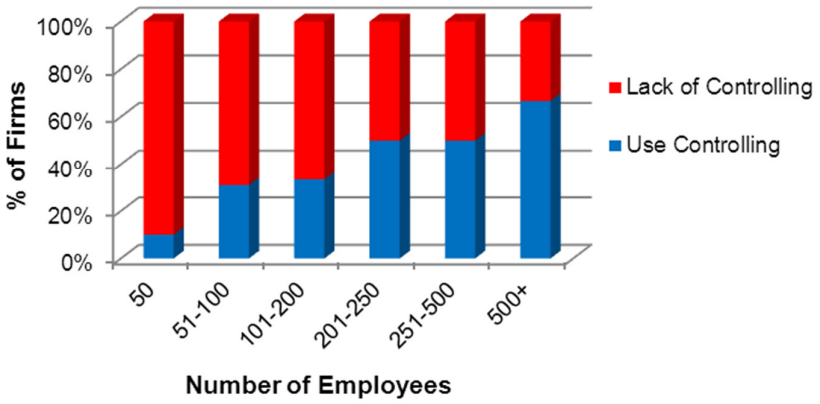

Fig. 2: Use of controlling systems vs. size of firm

Source: own elaboration.

Firms that use controlling are mainly large and medium enterprises. Although small companies indicate that they are familiar with controlling, they are not fully conscious of its usefulness in management (Fig. 2). In large, multi-plant companies, typically those operating on an international scale with a diversified manufacturing program, controlling allows the organization to function in a more integrated and coordinated manner, ensuring flexibility and an enhanced ability to prosper and grow.

As for the relationship between the use of controlling and ROE (Fig. 3), the ratio between the number of companies that use controlling and the number of firms that do not is similar in each income group (with the exception of the three companies with the highest profitability). However, in the group that did operate under a deficit, the smallest subgroup was companies that used controlling (31.8%).

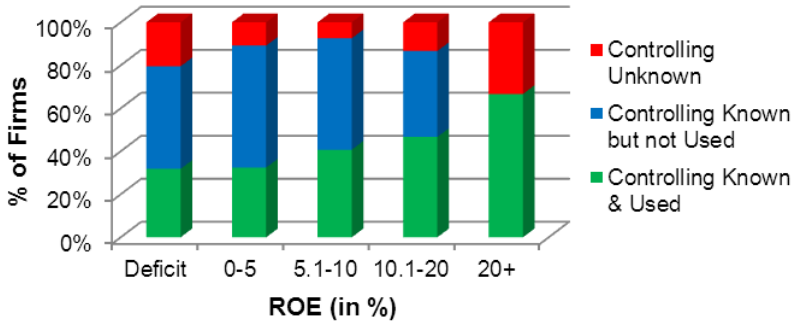

Fig. 3: Use of controlling systems vs. ROE of the firms

Source: own elaboration.

The Interpretation of Controlling

Due to the disparate definitions of controlling, with discrepancies in the interpretation of the scope of impact of controlling, its tasks, and its role in an enterprise, how controlling is understood by business practice was investigated.

Table 6: Controlling in the understanding of the surveyed companies

CONTROLLING INTERPRETATION	N	%
A set of instruments helpful in management	44	30,3
Budgeting	28	19,3
Information system	23	15,9
Control tool	23	15,9
Position in the organizational hierarchy	4	2,7
Profit control system	4	2,7
Philosophy of management	2	1,4
Total surveyed companies familiar with the term „controlling"	**145***	**100**

Source: Own study
* The total does not match the sum due to the possibility of choosing several response options.

The description of various practical solutions used in enterprises in Poland shows that controlling is most often understood as a results-oriented management support system. The survey results show that only 2.7% of the surveyed companies equate controlling with a profit control system (table 6). Most often, enterprises view controlling as a set of instruments helpful in company management or budgeting system. Identifying controlling with budgeting results in focused attention on activities related to the processes of planning the enterprise's economic goals and the subsequent procedures used to assess the compliance of planning assumptions with actual results. However, this understanding of controlling leads to an oversimplified view that neglects other areas of activity under the purview of controlling. Controlling is relatively often associated with an information system or control tool. Rarely, companies identify controlling only with a position in the organizational hierarchy or treat it as an expression of the company's policy, philosophy, or culture.

The average results presented above differ when segmenting by the size of the enterprise. In the case of small companies, controlling tends to fulfill more of a planning and control function and less of a management function. Similarly, the significance of a controlling as a management function tends to increase in concert with the size of the enterprise. In terms of acheived results, companies that were more profitable or that had relatively high revenues were more likely to view controlling as a profit control system and/or a set of instruments helpful in management. Companies that were less profitable or had relatively low revenues were more likely to view controlling as a control tool.

Many enterprises have implemented a controlling system as a result of corporate financing by large Western companies and corporations. Therefore, the interpretation of controlling may depend on the origin of the enterprise's capitalization. As shown by the research, the increase in foreign capital causes a broader interpretation of the concept of "controlling." And so those surveyed enterprises that are completely owned by Western companies, which represent almost half of the sample, view controlling as a control tool, a set of instruments helpful in management, an information system, and a budgeting system. Further, the interpretation of controlling depends to a large extent on the particular Western country. German financed companies tend to observe a link between controlling and management accounting. French financed companies tend to view controlling as a tool for coordinating planning, management, and control processes, as well as a tool for providing information.

Results and Discussion

The research enables the author to verify the hypotheses.

Hypothesis No. 1, stating that controlling is ambiguously formulated and addressed in the subject literature as well as in the practices of Polish enterprises, was supported.

The cited views show that controlling is not univocally based on the structure of management. Although a contemporary understanding of controlling is very wide, it is commonly assumed that controlling is a tool of improving the efficiency of organizations. Erroneously associating controlling with other functions or subsystems of management can be the main reason that its role is misunderstood and that there is a perceived dichotomy between controlling and management.

The term controlling has many disjunctive interpretations. Controlling definitions continuously change and evolve in concert with changes in enterprises and their environment. The interpretation of controlling also depends on the country in which it is formulated and developed. In German practice, controlling is strongly connected with cost accounting systems and is used to coordinate different parts of enterprise activities. In the USA, controlling plays a big part in the preparation of financial reports for external audiences and focuses on the effective usage of resources to foster corporate growth. In French enterprises, controlling appears in the form of analytical accounting and deals with ways to steer company activities via budgets aligned with corporate objectives. In Poland, controlling supports management mainly through the use of accounting tools.

Hypothesis No. 2, stating that controlling is utilized mainly in large companies with infusions of foreign capital was also supported.

The increasing involvement of foreign capital in Polish enterprises, due mainly to the integration of the Polish economy with the European economy, increases the need to improve how Polish businesses are managed. The study shows that the use of controlling can be seen most often in companies that are funded with foreign capital. Most of these companies are also medium or large enterprises, with (relatively) high yields, high sales volumes, and high asset values (more than 5 million euros). Many companies have implemented controlling systems as a result of mergers or acquisitions. Large parent companies, especially foreign ones, will often impose their controlling systems on satellite offices.

Conclusion

The aim of the conducted reseach is to not only contribute to the understanding of the emergnce of the field of controlling but also to expand the knowledge of its usage in Polish companies. As shown in the literature, there are a variety of views regarding controlling and what it entails. Controlling is often referred to as a system of management, an instrument of management, a support function, or a management control system. Other definitions relate controlling to a process, function, philosophy, model, or management concept. Some authors equate controlling and management accounting.

Controlling is necessary in almost every organization because it is difficult to imagine the long-term viability of a company that does not know how to adequately establish its goals and assess its achievements. However, according to the study, only 34.9% of the analysed companies have implemented it. Most that used controlling were large, foreign-capitalized companies with high revenues. The weak implementation of controlling in Polish companies, relative to its high recognition (85% of surveyed representatives of firms claimed that they knew about controlling), indicates that controlling is not only possible but also increasingly necessary in Polish enterprises. Nevertheless, implementation requires a significant corporate effort including:

- Implementation of new cost accounting systems,
- Modification of applied procedures,
- Implementation of responsibility centers,

- Training of personnel.

Polish companies still have a long way to go in first implementing controlling systems and then developing them to a level consistent with good management practices. This requires an understanding and acceptance of the system as well as full engagement in its implementation and usage. Only then can companies generate long-term value creation.

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The Analysis of Russian Enterprises Readiness to Introduce Industry 4.0 Projects

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Abstract

At present the competitiveness of the Russian economy is largely due to the successful transition in the national industry to a new digital technological level. The implementation of industrial Internet projects is becoming the main driving force of the industrial revolution and is one of the main factors in increasing production efficiency. This study analyzes the features of the development of the industrial revolution in Russia and abroad. An analysis is made of the level of readiness of Russian enterprises for the implementation of Industry 4.0 projects. The factors hindering the implementation of industrial Internet projects in the Russian economy have been identified. The priority tasks and estimated prospects for the development of the industrial Internet in Russia are formulated.

Keywords: Industry 4.0; Industrial Internet; digitalization; Russia; enterprise.

Introduction

In recent decades, the global economy is at the stage of active development of the fourth industrial revolution. In the context of the countries rivalry that has begun in the implementation of the Industry 4.0 program, the issues of transferring national industry to a digital technology platform are becoming particularly relevant. The development of projects in the field of industrial Internet will lead to an increase in the level of industrial productivity, bringing a huge economic effect both for the global economy and for the country's economy [1]. According to the World Economic Forum in Davos, the development of the main technological areas underlying cyber-physical systems, such as the Internet of things, cloud and quantum computing, big data, biotechnology, autonomous robots, virtual and augmented reality, 3D modeling and 3D printing can bring more than 30 trillion US dollars for the global economy in the next 10 years [2].

In recent years, the industrial Internet, as an integral part and the most important direction of the development of the industrial revolution, has been effectively introduced into the activities of Russian industrial enterprises [3]. Many large projects have been launched and are successfully functioning; a platform for the development of the industrial Internet is being developed. However, along with obvious successes in the development of industrial Internet in Russia, there are also some difficulties on the way of its introduction into the industry [4]. And the main problem is the lack of willingness of Russian enterprises to digitalize production processes and introduce industrial Internet technologies. The aim of this work is to analyze the current state of the Industry 4.0 concept in Russia and develop priority tasks that contribute to the development of industrial Internet at Russian enterprises. Achieving the goal requires solving the following tasks:

1. Assessment of the current state of industrial Internet development at Russian enterprises.
2. Analysis of the factors hindering the implementation of industrial Internet projects in the Russian economy.
3. Analysis of the level of readiness of Russian enterprises for digitalization and implementation of industrial Internet projects
4. Identification of tasks conducive to the development of industrial Internet in Russia.

Data and Methods

The theoretical basis of this work is the research of leading Russian and foreign scientists in the field of methodology for the development of the industrial revolution and the practice of its implementation in the economy of various countries, including in Russia. In the works of modern scientists, the tasks of the formation of the industrial revolution, the search for development paths, the study of the consequences of the impact on the economy and social life of society are solved. The general problems of the new industrial revolution are highlighted in [5, 6, 7]. In [8, 9], the impact of the Internet of things on the transformation of industrial production is investigated. The issues of the direct implementation of the Internet of things in industrial enterprises are considered in [10]. The impact of the industrial Internet on the competitiveness of various industries is estimated [11, 12, 13]. The issues of working with big data using Internet technologies are considered in [14, 28]. Studies of the socio-psychological and economic consequences of the introduction of intelligent technologies are considered in [15]. However, it should be noted that insufficient attention is paid to the analysis of the features of the development of the industrial Internet in the conditions of the Russian economy in modern literature. Assessment of the current state and prospects for the development of the Industry 4.0 concept at Russian enterprises determines the scientific novelty of the work.

The methodological basis of the study is the work of leading domestic and foreign scientists on statistics, financial and economic analysis, modern information technologies for storing and processing data. Assessment of the current state of development of the "Industry 4.0" concept at Russian enterprises is based on a comprehensive economic and statistical analysis of the state of Russian industry and an assessment of current trends in its development using methods of mathematical statistics and expert estimates. Studies were conducted on the basis of state statistical reporting. The statistical tools of the study were the methods of analytical grouping, correlation analysis, methods of mathematical forecasting and trend analysis.

Analysis of the level of readiness of Russian enterprises to implement projects Industry 4.0. is carried out on the basis of the method of assessing the maturity index of Industry 4.0, developed by the Acatech German Academy of Science and Technology [16]. Using this method allows you to set the current level of readiness of production companies to "Industry 4.0", as well as to identify areas in which further action is required. The method involves a systematic determination of the weaknesses and capabilities of the enterprise, and serves as the basis for manufacturing companies to develop an individual plan for implementing the Industry 4.0 concept, corresponding to their business strategy. Acatech Industry 4.0 Maturity Index helps determine at what stage the enterprise is currently being transformed into a developing, flexible company. The method allows you to evaluate from a technological, organizational and cultural point of view with emphasis on the business processes of manufacturing companies [29, 31]. Using this method, each company must make a strategic decision regarding the specific advantages it wants to achieve, its priorities and the sequence of appropriate measures. As a result of applying this methodology, the main weaknesses and difficulties in implementing the concept of "Industry 4.0" are identified and an action plan is developed to develop a common digital transformation strategy for the enterprise as a whole.

This methodological analysis provides the possibility of a comprehensive analysis and defines a number of guidelines that allow companies to establish what characteristics they need to develop for implementing Industry 4.0 projects. The statistical tools of the study were the methods of correlation analysis and expert assessment methods.

Results

Let us consider the features of the introduction of industrial Internet in Russia. Based on a comprehensive analysis of state statistics of the Russian Federation using methods of mathematical statistics, we can conclude that the Russian market for the introduction of industrial Internet is at the initial stage of its development. However, the proportion of the industrial segment in the Russian Internet of things market prevails. In 2016, its share was 64%, while the cross-industrial segment

occupied 20%, and the state and consumer segments about 8% [17]. This indicates good prospects for the development of industrial Internet technologies in Russia. In addition, it should be noted that the introduction of industrial Internet technologies among Russian companies varies greatly depending on the region. An analysis of the Russian market of industrial Internet of things, based on a study of the trend line of its development, showed that in 2017 it amounted to 17.9 million devices and grew by 42% compared to 2016. By 2021, the total number of Internet of things devices will grow to 79.5 million, and by 2026 - 164.7 million. The widespread introduction of the industrial Internet will be able to increase the world GDP by 10-15 trillion dollars in 20 years [18, 26].

An analysis of the readiness level of Russian enterprises for the implementation of Industry 4.0 projects based on the Acatech maturity index assessment method showed that despite a clearly expressed desire to introduce digital technologies at their enterprises, there are objective difficulties that hinder their implementation at Russian enterprises. The results of a survey of heads of companies from various sectors of the economy as a whole across the Russian Federation, interviewed in mid-2018, showed [19]:

• 32% of companies confirmed their desire to implement Internet of things technologies in their production.
• 11% of companies have already implemented projects using the Internet of things in their company.
• 57% of companies do not use IoT technology.

The results of the analysis also showed that at the moment its use is more typical for systems of automated data collection from devices at industrial facilities [20]. For example, in mechanical engineering, energy, mining. The area of inter-machine interaction is primarily developing among transport companies that effectively use navigation systems. As a positive trend, we can note the increase in the proportion of organizations that use information management systems in production [21, 27]. From 2013 to 2018, their percentage increased from 25 to 30%. First of all, their implementation is noted in the communication sectors, chemical production, electrical equipment and metallurgy [22].

The methodological analysis of the readiness of enterprises for digital transformations in accordance with the methodology for analyzing the weaknesses and capabilities of the enterprise revealed the factors that impede the integration of industrial Internet projects into production in the Russian economy [23].
Among the internal factors can be identified:

• insufficient flexibility of companies, holding back the ability to implement changes in the company in real time;
• insufficient development of business models of the company;
• lack of qualified personnel capable of servicing new technologies;
• limited funding [24].
Among external factors can be identified:
• low degree of awareness and accessibility of technologies;
• insufficiency of the normative failure base in the field of IT-technologies;
• low degree of elaboration of security issues, information protection when working with data;
• psychology and bureaucracy.

Based on the results of the above study, we formulate the priority tasks that contribute to the development of industrial Internet in Russia [25]. Thus, the priority tasks for the development of industrial Internet in the Russian Federation are:

1. Development and ensuring the availability of IoT platforms for the collection, storage and processing of data.
2. Creation of information and telecommunication infrastructure providing technological possibility of using new Internet technologies.

3. Creation and development of enterprises whose business model allows the use of IIoT technologies.
4. Creating a domestic market for connected devices capable of interacting with the IoT platform.
5. Public or public-private financing for the implementation of industrial Internet projects. Support for pilot projects.
6. Support for domestic developers of high-tech products, research in the field of creating artificial intelligence, information management systems, networking.
7. Reconstruction of the education system and training in the field of IT-technologies.
8. Development of a regulatory framework conducive to the development of new technologies, ensuring their legal legality and protection of information [30].

Conclusions

An analysis of the level of readiness of Russian enterprises for the implementation of Industry 4.0 projects showed that despite a clearly expressed desire to introduce digital technologies at their enterprises, there are objective difficulties that hinder their implementation. In particular, it was established that the main factors hindering the integration of the industrial Internet into production in the Russian economy are the lack of flexibility of companies, the lack of developed digital business models of the company, the lack of qualified personnel, and limited funding. Among external factors, one can single out a low degree of awareness and accessibility of technologies, a lack of a normative-failure base in the field of IT technologies, and a low degree of elaboration of information security issues when working with data. The creation of a unified digital technology platform in Russia, the development of information and telecommunications infrastructure for the use of new Internet technologies, as well as the solution of the tasks posed in the final part of the study, will contribute to the successful implementation of projects in the field of the industrial Internet of things in the Russian economy.

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Creating Enterprise Image Versus Non-Financial Reports – A Case of The Social Reports Competition

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Abstract

Enterprise image represents an invisible resource which creates opinions and ideas among stakeholders responsible for making strategic decisions. Creating enterprise image is possible owing to the properly composed set of both non-financial and financial information, provided to stakeholders in various types of non-financial reports (e.g. in an integrated report). From the perspective of modern accounting, it can be observed that non-financial reports are increasingly frequently perceived as a form of enterprise representation. The process of non-financial reporting, as a new trend in contemporary accounting, is characterized by a voluntary, creative and individual approach. The offered information does not originate directly from traditional accounting. The process of such reports preparation covers as follows: analysing the reasons underlying their development (considering both advantages and disadvantages), identifying the main stakeholder groups (addressees), highlighting important problems, defining goals and activities which address the disclosed issues, selecting and developing the respective measurement indicators, choosing the form of disclosure. One of the methods to present and create an image is the voluntary participation of an enterprise in the competitions of non-financial reporting dedicated to social responsibility purposes (e.g. Social Reports Competition organized in Poland). The competition contributes towards propagating the idea of non-financial reporting, increasing the transparency of business operations and engaging in the dialogue with stakeholders, which has a positive effect on enterprise image creation. Awareness in image development should be based on considering both benefits and threats resulting from the information presented in non-financial reports.

Keywords: Enterprise Image, Non-Financial Reports, Social Reports Competition.

Introduction

Enterprise image (representing one of the invisible resources in traditional accounting) has an essential impact on achieving competitive advantage from the strategic perspective. The characteristic features of an enterprise image include, among others, enterprise uniqueness, the source of future benefits, correlations with other invisible resources, e.g. (Itami and Roehl, 1987) identity, brand, relationships with stakeholders. Enterprises use various forms of either direct or indirect contact with their stakeholders to develop a positive image. Among the instruments creating such image the following can be listed: the Internet and radio broadcasts; press publications; participation in competitions, fairs, festivals, exhibitions; interviews; posters; published reports; sponsorship; charity actions.

Reporting, understood more extensively than financial reporting alone, is an important instrument allowing for enterprise image development. The information provided in non-financial reporting and disclosed to a wide range of stakeholders is primarily of non-financial nature. Constructing a positive image is also enhanced by enterprises' participation in the competitions promoting corporate social responsibility (CSR) based on these reports. Such competitions contribute to a dialogue with stakeholders. The analysis of websites and social rankings allows concluding that CSR has become an important factor supporting the formation of an enterprise positive perception. These enterprises which include social aspects in their activities gain numerous benefits that have impact on developing and maintaining a positive image as well as affect the other invisible resources (Branco and Rodrigues, 2008). These benefits include, e.g.: winning a strong market position, higher

competitiveness, developing financial market confidence, gaining the status of a widely respected employer, employee satisfaction, increasing the attractiveness of offered products, improving work efficiency, larger access to capital and stakeholders' attention.

Image, as one of the invisible resources related to a modern enterprise, influences the widening gap between balance sheet value and market value of an enterprise, as it is not presented and disclosed in the traditional accounting system. The disclosure of non-financial information about an enterprise image in non-financial reporting is the manifestation of accounting opening to an intangible dimension. In the long run, an image (and its capital) exerts impact on financial figures, such as, e.g., revenues, profits and financial liquidity. An enterprise image is created by both the economic and social dimension of the conducted business activity.

The purpose of the article is to present the correlations between creating an enterprise image and its non-financial reports from both scientific and practical perspective. The theoretical approach to the analysed problem is based on an overview of the subject literature, applying descriptive and deductive methods and the author's considerations. The example of Social Reports Competition (organized in Poland by the Responsible Business Forum and Deloitte) was used to analyse enterprises' participation in the Competition, types of non-financial reports and the information they provide, in particular the ones affecting the image of selected enterprises.

Enterprise image – an Important Invisible Resource

The research addressing the problem of image was initiated by P. Martineau (1958), who described an image as the sum of functional properties and psychological attributes of a product present in the consumer's mind. Initially, the term image referred to a product, however, it evolved along with the subsequent research on the overall concept of an image. D. Bernstein, using the network theory, proposed to expand this concept, approaching it as a network resulting from the interaction of experiences, feelings, knowledge and impressions presented by people about a given enterprise (Abratt and Mofokeng, 2001). Currently, an image refers to a product, a person, an enterprise, an industry, a region and a country. The object of an image has also been expanded and applies not only to customers but also to a wider range of stakeholders (e.g. investors, suppliers).

An image is most often presented as a picture being the sum of ideas, experiences, impressions and thoughts functioning in the minds of people who come across a given object. An image in the mind of an addressee is co-created by, e.g., his/her experiences, observations, impressions, information and opinions of others. An image is the result of data processing, visualising signals and collecting experiences (Nawrocka, 2013). An image stands for the public portrayal of a person or an enterprise, presented in a favourable manner, which aims at gaining social acceptance for its activities and attracting stakeholders (Altkorn, 2004). According to G.R. Dowling (1986) an image is "a set of meanings by which an object is known and through which people describe, remember and relate to it". In turn, J. Penc (1998) suggests defining the company image as a composition of an enterprise personality resulting from its philosophy, history, culture, strategy, management style, reputation as well as employees' and its other representatives' behaviour.

An image refers to the company personality, which people perceive, identify with, and about which they express their opinions and emotions. Image placement in the minds of stakeholders and also the perceptions and feelings about an enterprise have impact on its positioning, as compared to the competition. The decisions made by enterprises are influenced by the pursuit of an ideal (desired) self-image, which they often try to achieve as a result of additional activities preferred at a given moment. According to J. Altkorn (2004) "an image which positions an enterprise precisely enough in the minds of its target audience remains the significant source of competitive advantage". A strong image ensures greater profits, lower risk and better functioning stability. The value of a company image (image quality) affects the process of company value creation, thus stimulating the demand for its products/services, the achieved profits and its brand strength. An image stands for a self-presentation outside. An image is the way of an enterprise perception, the form of its characterization and presentation (Budzyński, 2002). Appropriate creation, conducted business operations and mission

are crucial to develop a positive image, which is the result of everyday activities and does not stand a chance of satisfying everyone. It should be based on the presentation of the most important assets and merits. Creating a positive image of an enterprise is possible if it features reliability, dependability, trust and confidence in the environment, recognition and sustainable socio-environmental policy.

Non-financial reports as the Instrument for An Enterprise Image Creation

Non-financial information in accounting (primarily in financial reporting) is approached in two ways. Firstly, as an element explaining and correcting the imperfections of financial information, and secondly as a long-term source of value and knowledge which indicates the directions of enterprise development. Non-financial information (e.g. referring to enterprise image) can be classified, among others, in terms of their:

- form (e.g. descriptive/narrative, presented as figures, amounts, percentages),
- scope (e.g. social, environmental),
- characteristics (e.g. time range – retrospective and/or prospective, nature of achievements – operational and/or strategic, availability, specificity, usefulness, confidentiality),
- place of disclosures.

The purpose of non-financial information is primarily to inform about the value creation and the achievements, develop a competitive advantage, support understanding the business model and inform about the key tangible and intangible/invisible resources that affect both strategic and operational activities performed by an enterprise (Morros, 2016).

The non-financial dimension of reporting is related to the reports containing non-financial information (Gazdar, 2007), supplemented by financial information being largely voluntary and creative, where the information disclosed extends and supplements the information presented in financial statements, e.g., referring to the enterprise market value. The first disclosures of non-financial information in corporate annual reports appeared at the beginning of the 20th century and covered the enterprise activities in the area of human resources (e.g. employee security) and social involvement (Nehme and Koon Ghee Wee, 2008). The increasingly frequent presentation of non-financial information was observed in the late 1960s, and was gradually expanding from employee, social, quality problems to environmental and sustainable development issues. Currently, 95% of the largest corporations worldwide (capital groups) publish social reports, and the international report database provides over 41,600 publications (www.globalreporting.org/standards). In the accounting practice, both an increase in the demand for non-financial information and a higher supply (disclosures) of such information by the interested enterprises can be observed (Arvidsson, 2011).

The process of disclosing non-financial information is characterized by the following features: voluntariness, creativity and individuality. These enterprises which are not required to disclose non-financial information can individually decide whether to provide such disclosures and, if so, what is their scope and form. The process of preparing reports is characterized, to a great extent, by individualization, which consists of the following activities:

- considering the premises for their creation (taking into account the advantages and disadvantages),
- identification of major stakeholder groups,
- highlighting important issues,
- defining goals and activities in the area of disclosed issues,
- selection and development of measurement indicators,
- choosing the form of disclosure and contact with the stakeholders.

The disclosure of non-financial information results in both benefits (e.g. developing company image and reputation) and threats for an enterprise (e.g. failure to comply with the ethics and good practice requirements) summarized in Table 1.

Table 1: Crucial advantages and disadvantages of disclosing non-financial information

Advantages	Disadvantages
Information availability for all stakeholders. Developing stakeholder confidence. Engaging in a dialogue and improving communication with various stakeholder groups. Achieving competitive advantage. Explaining the difference between enterprise balance sheet value and market value. Creating a product brand. Building enterprise image and reputation. Developing good relationships with customers. Informing about the compliance with the principles of ethics and corporate governance. Promoting enterprise activities through the participation in various competitions and rankings. Higher awareness of taking care about the natural environment. Educating employees and constructing relations with the company. Supporting the local community. Awareness of the enterprise participation in global operations and participation in market trends	Difficulties in verifying the disclosed information by stakeholders. Selective disclosure and no specificity. Risk of liability to stakeholders. Loss of competitiveness as a result of trade secrets' disclosure. Estimating the value of invisible resources without the support from an accounting system. Subjective selection of measures and methods for measuring invisible resources. Costs of generating, disclosing and disseminating information in non-financial reports. The absence of mechanisms allowing feedback on the opinions regarding the disclosed information. Preparing "on demand" reports for stakeholders

Source: author's compilation based on (Gazdar, 2007; Krasodomska, 2014).

The disclosure of non-financial information is exposed to manipulation of the so-called stakeholders' impressions. D. M. Merkl-Davies and N.M. Brennan (2011) introduce the phrase "impression management", used in the reporting narrative, which aims at developing an enterprise image and reputation.

The scope of the disclosed non-financial information is diverse (it is up to the individual decision of an enterprise). As a rule, it covers the prospective information, not subject to legal regulations and free from any obligation to disclose it (Radebaugh and Gray, 2002). In the reporting practice, however, there are examples of its mandatory presentation along with the disclosed information in the reporting of large public-interest entities (e.g. Directive 2014/95/EU). Thus, it can be concluded that non-financial reporting is subject to a certain evolution: from optional to obligatory (but only with reference to some entities), from the creative choices of international standards and the widespread practice (determining their preparation) to national regulations provided by balance sheet law or the recommended guidelines.

Since January 1, 2017, all the EU Member States should follow the national provisions implementing Directive 2014/95/EU, the main assumption of which is to increase the transparency of social and environmental information in the area of corporate social responsibility as well as its cohesion and comparability. In Poland, the obligation of extending non-financial reporting has been provided by the Accounting Act (The Accounting Act dated December 15, 2016). Article 49b of the aforementioned Act refers to the obligation of extended reporting covering non-financial information, which should be included in the statement on non-financial information (as part of the activity report) or in a separate report on non-financial information. The number of enterprises having this obligation is quite small, therefore the majority of entities are going to follow their internal decisions and needs in this matter. The disclosed mandatory non-financial information should cover economic, social, employee related, environmental aspects, respecting human rights as well as counteracting corruption and bribery. The obligation of extended non-financial reporting in Poland refers to public interest entities at the level of individual and consolidated statements, including, e.g., limited companies,

limited joint-stock partnerships if they exceeded the following values in the financial year and in the preceding year: 500 people (average annual employment), PLN 85 million total balance sheet assets or PLN 170 million net revenues from the sales of goods and products.

The Global Reporting Initiative (GRI) and the International Integrated Reporting Council (IIRC) are the main organizations promoting non-financial reporting worldwide, in particular integrated reporting, which, however, represent divergent concepts. The GRI guidelines focus on the identification of various groups of stakeholders and emphasize the importance of environmental, economic and social spheres, whereas the IIRC is primarily concentrated on improving the information addressed to investors and also on business models and the creation of value (GRI-G4, 2018; IIRC, 2013). The enterprises preparing non-financial reports follow various standards, guidelines and recommendations developed by many international organizations, including, e.g., Social Accountability 8000, AccountAbility AA1000, GRI G1-G4, ISO 26000, ISO 14001, OECD. Enterprises can make choices within the framework of creative (voluntary) accounting policy regarding the standards, norms or reporting guidelines they are going to apply (national, EU, international, their own principles or a combination of different standards), provided the information about their decision is included in the report. The most popular, out of many guidelines, are the standards developed by the GRI, which specify basic principles and measures to be used in measuring and developing performance information related to economic, environmental and social aspects. The GRI guidelines are used in social and integrated reporting (www.globalreporting.org/standards). Over 80% of all enterprises applying the GRI guidelines used the GRI-G4 version.

Social reports and integrated reports are considered the sources of non-financial information (Śnieżek et al., 2018). Additional information, as part of a financial statement, although containing a marginal component of non-financial information, definitely signals the need to expand financial information in the evolution process of reporting and constitutes the preform of non-financial reporting. More developed presentations of non-financial reporting (also referred to as social reporting) take the form of sustainability reports and corporate social responsibility reports, whereas an integrated report holds the status of the most comprehensive and complex form of non-financial information disclosure.

The scope of disclosed information should depend on the type and purpose of a non-financial report (Table 2). Social reporting covers the issues related to measuring social achievements (results) related to the expectations of investors and the society. They are primarily dedicated to the local and global community. The purpose of corporate social responsibility reporting is to develop relationships between an enterprise and stakeholders (including the society), which allows disclosing both credible and reliable information, on the one hand, and making informed and well-analysed decisions, on the other. Therefore, the “information providers” are obliged to present and disclose it with due diligence. Compliance with social responsibility has impact on, among others, positive changes in the immediate milieu and transformations in the quality of life. Sustainability reporting refers to the disclosure of non-financial information relating to economic, social and environmental issues (Herzig and Schaltegger, 2006), balancing which in the course of business activities contributes significantly to its development in respect of the external (e.g. natural environment) and internal (e.g. employees, ongoing processes) milieu.

Table 2: The scope of disclosed information in non-financial reports

Type of non-financial report	The scope of disclosed information
Social report, including: • corporate social responsibility report • sustainability report	The report subject structure is diverse, its main elements are: company characteristics, business description (business model: activities, stakeholders, products, supply chain, customers), strategy description and risk management (e.g. operational, financial). Important issues cover: employees, human rights, workplace practices, social issues (involvement in social development), natural environment, dialogue with various stakeholder groups, corporate and organizational governance. The disclosed information refers to the following areas: – economic and financial (e.g. capital, market share, profits, investments in research and development, cash flow), – social (e.g. labour practices, human rights, employee programmes, safety and working conditions, employee diversity, remuneration policy, employee training), – environmental (e.g. consumption of natural resources, air and water pollution, applying ecological regulations, greenhouse gas emissions, waste management, energy consumption, recycling, soil contamination and erosion)
Integrated report	Main elements (in accordance with the IIRC): – characteristics of an enterprise and its external milieu, – corporate governance, – business model, – opportunities and threats/risks, – strategy and location of resources, – achievements, – perspectives, – basics of information preparation and presentation. Elements of the business model: resources (e.g. human, intellectual), activities (e.g. implementation of quality policy), results (e.g. profit), effects (e.g. customer satisfaction)

Source: author's compilation based on (GRI-G4, 2018; IIRC, 2013).

In response to the imperfections of non-financial reporting the concept of an integrated report was developed, which should allow stakeholders to find out about the enterprise capacity to create value in the future and observe how financial and non-financial information affect each other (Eccles and Krzus, 2010). The combination of financial and non-financial, retrospective and prospective, as well as economic, environmental and social information aims at creating a comprehensive picture about the operations and results of an enterprise. Integrated reporting, despite continuous improvements in its structure (included in various proposals of standards and norms) is still recognized as a new form of enterprise reporting. In the first development phase, integrated reporting was considered an excellent method for information disclosure that is intended to integrate financial information with non-financial information to meet the stakeholders' needs and reduce the existing information gap between the book value and the market value of an enterprise (IIRC, 2013). However, the several years of experience in preparing integrated reports does not confirm this enthusiasm, and receives a lot of criticism instead (Flower, 2015). The predominantly voiced allegations refer to an extensive freedom in creating non-financial information and the absence of their correlation with financial information.

Having analysed the subject literature and the accounting practice, one can conclude that a certain conceptual chaos does occur in terms of terminology referring to different types of non-financial reports, e.g., the term social report is used interchangeably with the phrase sustainability report. In the author's opinion, the term used should result directly from the purpose and scope of the report, and a non-financial report should be identified with the general/universal concept referring to non-financial information reporting. The sustainability report and the corporate social responsibility report can be

identified with the broadly understood social report, which also includes environmental and ethical issues. The social report is mainly focused on economic, social and environmental aspects, whereas the integrated report offers a wider range of financial and non-financial information. All the listed reports represent non-financial reports. In the process of studying non-financial reports, it is important to analyse their content by means of which both systematic and objective identification of the specific characteristics, inherent in the provided information, becomes possible (Dyczkowska, 2019).

Enterprise image creation in Polish practice based on non-financial reports submitted to the Social Reports Competition

Voluntary participation of enterprises in various competitions, e.g. dedicated to corporate social responsibility, opens opportunities for their image presentation and strengthening. The Social Reports Competition has been held in Poland since 2007 and its organizers are: Responsible Business Forum and Deloitte (until 2014 the competition was co-organized by PricewaterhouseCoopers – PwC and CSR Consulting, and in 2015 by Société Générale de Surveillance – SGS). This initiative aims at disseminating the idea of CSR, sustainable development, natural environment protection and social involvement. It is addressed to enterprises and organizations which publish reports presenting their performance in the aforementioned areas. The main goal of the Competition is to attract attention to the importance of non-financial reporting and to identify good practices in this area (http://raportyspoleczne.pl). The Competition awards and distinguishes reports prepared by the enterprises which, taking into account social and environmental aspects in their core activity, are capable of presenting their achievements published in non-financial reports in a clear, transparent and reliable manner. The Competition contributes towards increasing the transparency of enterprise operations, creating its image and engaging in a dialogue with stakeholders. From the perspective of thirteen years of experience in organizing the Social Reports Competition, a significant interest of enterprises in this event can be observed, as evidenced by the growing number of the submitted reports (from 12 to 46). Three periods can be distinguished in the development of the Competition:

- origins (2007-2011),
- early youth (2012-2016),
- mature youth (2017-2019).

The number of submitted reports in the distinguished periods presents the following ranges: from 12 to 18, from 27 to 35, from 41 to 46.

The name of the Competition is not consistent with its subject matter, which results from the existing conceptual chaos observed with reference to various types of non-financial reports. The Competition covers non-financial reports and, in particular, corporate social responsibility reports, sustainability reports and integrated reports. The submitted reports, in their major part – over 90% are prepared in accordance with the GRI guidelines. Awards are granted for various types of non-financial reports: sustainability reports (e.g. Cemex Polska Sp. z o.o, in 2015 and 2017), corporate social responsibility reports (e.g. Santander Bank Polska, former Bank WBK, in 2015 and 2019) and integrated reports (e.g. Orlen Group in 2016).

Table 3 presents the participation of enterprises in the Social Reports Competition by the industry sector in 2007-2019. The dominant industries involved in the Social Reports Competition represent such sectors as: finance, energy, food industry, raw materials and fuels. In the finance sector, the Competition active participants are as follows: Bank Millennium S.A., Santander Bank Polska (former Bank Zachodni WBK), ING Bank Śląski S.A., mBank S.A. Energy industry is represented by: Grupa Energa, PGE Polska Grupa Energetyczna, Grupa Enea, Tauron Polska Energia S.A. Food industry is most often represented by: Kompania Piwowarska S.A., Carlsberg Polska, Nestlé Polska S.A., Coca-Cola HBC Polska Sp. z o.o., Grupa Żywiec S.A., Danone Sp. z o.o. The leading participants in the sector of raw materials and fuels are: PKN Orlen S.A., KGHM Polska Miedź S.A., Grupa Lotos S.A.

Table 3: Social Reports Competition in 2007-2019 by the industry sector - number of participating companies

Industry* (total number of companies)	**Year of the Competition**												
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
1 (21)					2	1	1	1	1	3	5	4	3
2 (51)		1	1	3	2	6	3	6	9	5	5	7	3
3 (12)		1	2	2	1		1	1	1	1	1	1	
4 (62)	3	2	3	2	2	4	5	4	5	6	8	9	9
5 (16)	1			3			1		3		4	2	2
6 (2)											1		1
7 (18)				1		2	1	1	3		2	3	5
8 (1)									1				
9 (6)			1		1							2	2
10 (10)		1				1	1	1	2	2	1		1
11 (14)						1	1			4	2	3	3
12 (8)				1			1	1			1	3	1
13 (2)		1										1	
14 (1)													1
15 (2)												1	1
16 (44)	2	4	2	2	2	6	5	5	4	2	5	2	3
17 (1)	1												
18 (2)					1								1
19 (3)				1	1		1						
20 (30)	1	3	2	2	2	3	4	3	2	2	2	2	2
21 (9)	1				1	1	1	1	1		1	1	1
22 (16)	2		1	1	2	1	1	1	2	1	1	2	1
23 (19)					1	1	4	3	1	2	2	2	3
24 (2)										1		1	
Total	**12**	**13**	**12**	**18**	**18**	**27**	**30**	**28**	**35**	**29**	**41**	**46**	**43**

**1 – Construction and real estate, 2 – Power engineering, 3 – Pharmaceutics, 4 – Finance, 5 – Trade, 6 – Hospitality, 7 – Other, 8 – Consulting, 9 – Media, 10 – New technologies and IT, 11 – Non-governmental organizations, 12 – Chemical industry, 13 – Wood, paper and furniture industry, 14 – Electromechanical industry, 15 – Textile industry, 16 – Food industry, 17 – Tobacco industry, 18 – Recycling, 19 – Entertainment, 20 – Raw materials and fuels, 21 – Telecommunications, 22 – Transport and logistics, 23 – Services, 24 – Water and sewage services.*
Source: author's compilation based on http://raportyspoleczne.pl.

The enterprises use non-financial reports to highlight the most important information from the perspective of their image creation (see Table 4), e.g., the enterprises operating in the raw materials and fuels sector emphasize their activities focused on natural environment protection (Dreegan et al., 2000). PKN Orlen often distinguishes its brand by referring to numerous rankings and brands owned (19 brands, including Orlen, Verva, Vitay Club, Benzina plus). Participation in the discussed Competition and communication with the stakeholders through non-financial reports offers an opportunity to restore a given enterprise image if there occurred any negative incidents in the past, directly related to its operations, e.g. related to environment pollution or accidents at workplace.

Enterprise image creation is possible, e.g., through disclosing non-financial information about invisible resources and their intellectual capital (Bąk, 2020), in particular related to product brand, customer relations, innovation, human resources, reputation and identity (recognition). Having analysed the selected non-financial reports of Orange Polska (former Telekomunikacja Polska), KGHM Polska Miedź S.A. and Kompania Piwowarska S.A. it is possible to trace the disclosure of

such issues as, e.g. (Table 4): company identity, product brand, relations with stakeholders (including customers), activities for innovation, human resources management respecting the rights and diversity. At the same time, the disclosed non-financial information refers to economic and financial (e.g. financial stability), environmental (e.g. environmentally friendly manufacturing processes) and social (e.g. dialogue with the local community) aspects.

Table 4: Examples of enterprise image creation based on the selected non-financial reports

Enterprise - characteristics including participation in the Competition	Enterprise image creation – examples
Orange Polska (former Telekomunikacja Polska) Participation in 9 editions in the years: 2007, 2011-2015, 2017-2019. Awards received: • 4 distinctions for the corporate social responsibility report, • 1 distinction for the integrated report, • 1 Grand Prix for the corporate social responsibility report. Types of non-financial reports: • 6 corporate social responsibility reports, • 3 integrated reports	**Integrated report (2018 edition)** A letter by the President of the Management Board to stakeholders. Orange on the telecommunications market in Poland. Key trends affecting the company operations, e.g. digitization. Presentation of network infrastructure and IT systems. Presentation of sales network and market knowledge. Customer relations: contact channels, customer service. Product brand. Investment areas, e.g., fibre-optic network extension. A friendly employer in the digital world: trainings and employee satisfaction. Employees involved in voluntary service. Donations to various institutions (participation in public life). Impact on natural environment: energy consumption, reduction of greenhouse gas emissions, recycling, waste management. Disclosure of indicators referring to occupational diseases and accidents at workplace. Respect for diversity (gender, age, education, religion, nationality). Financial aspects, e.g., equity, dividend per share. Management Board structure and photos of its members
KGHM Polska Miedź S.A. Participation in 7 editions in the years: 2012-2014, 2016-2019. Awards received: • 1 award for the corporate social responsibility report, • 1 distinction for the integrated report. Types of non-financial reports: • 2 corporate social responsibility reports, • 1 sustainability report, • 4 integrated reports	**Integrated report (2016 edition)** A letter by the President of the Management Board to stakeholders. Crucial figures in the operations of KGHM Polska Miedź S.A. Importance of metals in the national economy. Leading trends on the global market, market position. Activities of the Management Board and Supervisory Board. Financial stability. Business model: exploration and penetration, ore mining, ore enrichment, metallurgy and refinery, processing, sales and trade, reclamation. Presentation of customer relations. Innovation development. Cooperation of science and practice in research and development, projects within the framework of international cooperation. Cooperation with local communities as part of corporate social responsibility. Involvement in environment protection: implementation of

	pro-ecological investments, timely payment of environmental fees, energy consumption, reduction of CO_2 emissions. Human resources. Employee competences and safety. Selected items from a separate and consolidated financial statement. Management Board structure and photos of its members
Kompania Piwowarska S.A. Participation in 9 editions in the years: 2007, 2011-2015, 2017-2019. Awards received: • 4 distinctions for corporate social responsibility reports, • 1 distinction for the integrated report, • 1 Grand Prix for the corporate social responsibility report. Types of non-financial reports: • 6 corporate social responsibility reports, • 3 integrated reports	**Sustainability report (2019 edition)** A letter by the President of the Management Board to stakeholders. Presentation of brands, products and novelties. Awards received. Membership in organizations. Relations with stakeholders. Contribution towards achieving sustainable development goals. Focus on health care and life quality. Participation in programmes: career from scratch, good education. Respect for diversity (gender, age, education, religion, nationality). Actions promoting responsible alcohol consumption. Development of the alcohol-free beer segment. Responsible alcohol consumption. Employee training on refusing to sell alcohol to minors. “Check your alcohol level” program allowing to estimate the level of alcohol in one’s blood after drinking it. Responsible labelling of products, e.g., “Don't drink alcohol when pregnant”. Employee development: education and trainings. Employee safety and health. Activities aimed at natural environment protection: protection of bison in the Białowieża National Park, optimal water consumption in manufacturing, energy, sewage and waste management, sales of beer in returnable bottles, replacement of machines and equipment into energy-efficient ones, environmentally friendly technologies and production processes. Climate oriented actions. Promoting fair market competition. Partnership for cooperation. Management Board structure and photos of its members

Source: author’s compilation based on http://raportyspoleczne.pl.

Based on the analysis of non-financial reports, submitted to the Social Reports Competition, the following conclusions can be put forward:

- enterprises prepare various types of non-financial reports for the subsequent editions (e.g. Orange Polska – from a corporate social responsibility report to an integrated report),
- the scope and form of non-financial reports is diverse, which results from the voluntary, creative and individual nature of their preparation, allowing enterprise image creation,
- some components of non-financial reports are the same for all enterprises, e.g. a letter by the President of the Management Board to stakeholders, which purpose is, e.g., to improve and strengthen the image,
- the disclosed non-financial information aims at developing confidence in the enterprise for its responsible operations and its image improvement,

- some non-financial information is intended to make the prospective financial information more credible (e.g. good customer relations are manifested in the achieved sales revenues),
- absence of consistency and mutual relations between financial and non-financial information,
- prevalence of non-financial information over financial information,
- for the sake of positive reception of the provided information (i.e. to create a positive image of an enterprise), diverse forms of information disclosure are used, among which the following can be listed: pictures, photographs, drawings, diagrams (column, pie or area charts, bar or linear graphs, scatter plots), patterns, schemes, interviews and letters.

The author proposed the structure of an integrated report using a synthetic approach (Table 5), which according to its concept should allow integrating non-financial and financial information, as part of the business model and value creation (e.g., in terms of disclosed and undisclosed assets in accounting). Both identity and self-reflection are essential in enterprise image creation.

Table 5: An integrated report structure – synthetic approach

Section title	Issues in individual sections
Enterprise – **identity**	About us: type and scope of activity, organizational structure Development strategy for the given years Stakeholders Contribution to the industry sector, market and local community development Awards and distinctions Membership in associations and organizations Crucial events Enterprise creators and personalities The most valuable asset
Enterprise – **self-reflection**	A letter by the Chairman of the Supervisory Board, a letter by the President of the Management Board Strategy implementation in the given year Risks (e.g. financial risk, commercial risk) Opportunities and threats as well as challenges for an enterprise Retrospective and prospective business activities
Business model and value creation	Property disclosed in accounting – identification of components (assets, liabilities, equity, costs, revenues) – financial statement as the primary source of information – value creation: components – activities – results – effects
	Property undisclosed in accounting approached as invisible resource and intellectual capital – identification of components (e.g. brand, customer relations, reputation, image, innovation, organizational culture, employees) – measurement of the components of undisclosed assets – financial and non-financial measures – value creation: components – activities – results – effect – mutual relations between the components of undisclosed and disclosed assets

Source: author's compilation.

Including, in the enterprise *curiculum vitae* (an internal document supporting, e.g., the image), information about the participation in the Social Reports Competition may contribute to higher prestige and reputation.

Conclusion

The author's considerations present a voice in the debate on the existing correlations between creating enterprise image and its non-financial report. Due to the complex nature of this relationship,

only the most important issues have been addressed in the study based on the subject literature and practice (including the selected example). The analysed problem (correlations) consists of many aspects and dilemmas, e.g., adjustment of financial and non-financial measures characterizing the image, choice of the disclosed information scope and reporting forms, awareness and behaviour of the enterprise board/management.

The opening of modern accounting to non-financial information, disclosed in voluntary and diverse reports can contribute to better knowledge about invisible resources from an accounting perspective, which makes up a significant part of any knowledge-oriented enterprise property. One of such invisible resources is represented by enterprise image, the development of which is possible, e.g., as a result of properly arranged set of non-financial and financial information, provided to stakeholders in various types of non-financial reports (e.g. in an integrated report).

The practice of modern accounting proves that non-financial reports represent a valuable source of information about enterprise achievements and value for potential stakeholders. The presented non-financial information extends and supplements the financial information disclosed in traditional financial reporting. Non-financial reports constitute one of the instruments supporting enterprise image creation, and their characteristics – diversity and individual nature allow creating enterprise personality (impressions about it).

From the perspective of modern accounting, it can be stated that the increasingly frequently prepared non-financial reports are approached as a kind of enterprise business card. In the course of preparing these reports the following factors are taken into account, e.g.: reasons for their development (advantages and disadvantages), identification of the main groups of stakeholders (addressees), highlighting important problems, formulating objectives and activities in the area of the disclosed issues, selection and development of the respective measures, choice of the disclosure form.

One of the methods for image development is the voluntary participation of enterprises in non-financial report competitions dedicated to corporate social responsibility. Based on the example of the selected enterprises participating in the Social Reports Competition, which has been organized in Poland since 2007, the scope and types of non-financial reports were analysed. Examples of non-financial information influencing the enterprise image were identified and the enterprise board/management increasing awareness regarding the significance of these disclosures was observed.

Voluntary participation of enterprises in the competitions promoting the idea of non-financial reporting, including information on corporate social responsibility and sustainable development, as well as the information about invisible resources of an enterprise, contribute significantly towards image creation and its credibility in the opinions of various stakeholder groups and competitors.

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Nouveau Protocole De Sécurité Intégrant L'ECC et l'MQTT pour La Sécurité De L'environnement IOT-Cloud

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Résumé

Cloud Computing et Internet des objets (IoT), deux technologies très différentes, font déjà partie de notre vie. Leur adoption et utilisation massives devraient de plus en plus augmenter, qui fera d'eux l'avenir du futur internet. Le tsunami d'inter-connectivité entre objets et de la collecte de données, repose de plus en plus sur le Cloud Computing, où l'analyse des données et l'intelligence réside réellement. Un nouveau paradigme où le Cloud et l'IoT sont fusionnés qui créera un nouvel air dans le monde de la technologie, qui sera un déclencheur et le générateur de nombreux services et application utile à l'humanité. Cependant, malgré ses avantages significatifs, ce paradigme souffre encore de certaines limitations qui freinent son expansion, principalement dans le domaine de la sécurité. Afin de garantir la réussite de l'intégration de ces deux technologies, une sécurité efficace et fonctionnelle de l'IoT est nécessaire afin de garantir l'anonymat, la confidentialité, l'intégrité, l'authentification, le contrôle d'accès des données. Dans cet article, nous proposons un protocole d'authentification mutuelle léger qui implémente MQTT comme protocole de communication, et basé sur la cryptographie des courbe elliptique. Le protocole proposé a été testé avec l'outil Avispa et a montré des résultats très satisfaisants.

Mots-clés : Sécurité, ECC, internet des objets, MQTT.

Introduction

Aujourd'hui, la présence d'appareils intelligents offrant une connectivité au monde à chaque seconde est considérée comme une partie obligatoire de notre vie. Ainsi, le nombre d'appareils connectés augmente rapidement chaque année. Cela nécessite la création d'un dispositif de communication autonome. L'une des solutions prometteuses aujourd'hui est connue sous le nom d'Internet des objets (IoT) [1]. IoT est un réseau d'information qui permet à la recherche d'informations sur les objets du monde réel d'interagir directement les uns avec les autres au moyen d'un identifiant unique (ID). D'ici 2025, une centaine de millions d'objets à ressources limités seront connectés à Internet qui communiquent et partagent diverses données avec Internet afin de fournir des services pour les utilisateurs tels que les soins de santé, les maisons intelligentes et transports \& logistique. Cependant, cette grande masse de données générées par ces objets ne peuvent être exécutés par un environnement de serveur unique.

Cloud Computing [2] ou " informatique de nuage ", est un paradigme informatique connu qui est devenu très mature en terme de services à la demande qu'il propose, des services qui sont accessible n'importe où et n'importe quand. Le Cloud Computing a une capacité illimitée en termes de stockage, puissance de traitement et peut s'adapter facilement au besoin de l'utilisateur, chose qui va certainement résoudre les problèmes que rencontre l'IoT. Ainsi on peut dire qu'un nouveau paradigme informatique est né, dans lequel le Cloud et l'IoT sont deux technologies complémentaire qui converge afin de donner un nouveau sens à l'Internet d'aujourd'hui et du future.
Malgré les différents services et applications que peut apporter cette technologie IoT-Cloud [3] à l'humanité. Ce paradigme souffre de nombreux problèmes ou niveau de sécurité, et cela dû aux interactions et les communications spontanées des dispositifs IoT et le Cloud Computing. On parle d'un Billard de communication transportant des informations sensible vers le Cloud. Sécuriser les

Dispositifs IoT, le Cloud et la transaction de data échangé, demeure un vrai challenge qui entrave l'expansion de cette de technologie.

Dans cet article, nous avons proposé un schéma de sécurité basé sur l'intégration de l'ECC et MQTT pour sécuriser l'environnement IoT-Cloud. Le protocole proposé garantit l'authentification mutuelle ainsi toutes les exigences de sécurités. Le reste du document est organisé comme suit. Dans la section 2, nous discuterons les préliminaires de notre étude. Dans la section 3, nous discuterons quelques travaux de recherche dans la littérature. Dans la section 4, nous proposerons un nouveau schéma de sécurité ECC. Dans la section 5, une analyse des performances a été réalisée. Nous avons vérifié dans la section 6 le protocole proposé en utilisant l'outil de validation automatisée des protocoles de sécurité Internet et applications (AVISPA). Enfin, nous conclurons dans la section 7 articles.

Préliminaire

MQTT

Il existe plusieurs protocoles de communication pour gérer les échanges de communication dans L'environnement IoT-Cloud comme L' HTTP et L' MQTT. Le protocole HTTP est généralement utilisé pour l'échange de données Web, il peut être utilisé pour gérer des données IoT. Mais la capacité de l'HTTP est moins adaptée lorsqu'il est utilisé sur des applications IoT.

Le protocole HTTP utilise un modèle de demande / réponse (request/response), qui est actuellement le mode le plus courant. MQTT utilise un modèle de publication / abonnement (publish/subscribe) [4] Le protocole HTTP n'est pas conçu pour un réseau omniprésent et peut causer une baisse de performance, en particulier dans l'utilisation de la bande passante et la durabilité de la batterie. Les applications IoT nécessite moins de bande passante, une réponse en temps réel et une faible consommation d'énergie car elle est couramment utilisée pour les petits appareils.

Une étude menée par Vergara et.al a montré la supériorité de l'MQTT implémentée sur Android appareils, ce qui peut réduire la consommation d'énergie par rapport au protocole HTTP [5]. MQTT et HTTP fonctionnent tous les deux sur TCP. Cependant, l'MQTT offre certains avantages tels que l'économie de l'énergie, parmi tant d'autres [6]

TLS/SSL

Transport Layer Security (TLS) [7] est un protocole qui assure l'authentification, la confidentialité et l'intégrité des données entre deux applications communicantes. Il s'agit du protocole de sécurité le plus utilisé à ce jour et utilisé pour les navigateurs Web et d'autres applications qui nécessitent un échange sécurisé des données sur un réseau, telles que les sessions de navigation Web, les transferts de fichiers, les connexions VPN, les sessions de bureau à distance et la voix sur IP (VoIP).

TLS a évolué à partir du protocole SSL (Secure Sockets Layer) de Netscape et l'a largement remplacé, bien que les termes SSL ou SSL / TLS soient encore parfois utilisés. Les principales différences entre SSL et TLS qui font de TLS un protocole plus sûr et plus efficace sont l'authentification des messages, la génération de matériel clé et les suites de chiffrement prises en charge, TLS prenant en charge des algorithmes plus récents et plus sécurisés. TLS et SSL ne sont pas interopérables, bien que TLS offre actuellement une certaine compatibilité descendante afin de fonctionner avec les systèmes hérités.

Cryptographie à Courbe Elliptique

Dans cette sous-section, nous introduisons le concept d'ECC (cryptographie à courbe elliptique). Pour commencer, les clés RSA qui ont la taille recommandée, continuent d'augmenter pour maintenir une force de cryptage suffisante. De 1024 bits à 2048 bits, sont les plus utilisées pour les certificats SSL il y a quelques années. Une alternative aux clés RSA est les clés ECC. Ces deux types de clés

principales partagent la même propriété importante d'être des algorithmes asymétriques (une clé pour chiffrer et une clé pour déchiffrer). Cependant, ECC peut offrir le même niveau de puissance de cryptage pour des clés beaucoup plus courtes, offrant une meilleure sécurité tout en réduisant les exigences informatiques. L'utilisation de courtes clé ECC peut aider à économiser des coûts évidents. Cette taille de clé réduite nous permet également de mettre en œuvre et de concevoir un fonctionnement cryptographique plus rapide et puissant, ce qui fait de l'ECC une option très attrayante pour les appareils dont la puissance de stockage ou de traitement est limitée, ce qui devient de plus en plus courant à l'ère de l'Internet des objets.

An elliptic curve E defined on r is a smooth curve given by a Weierstrass equation:

$$E: y^2 + a_1xy + a_3 = x^3 + a_2x^2 + a_4x + a_6 \quad (1)$$

We will consider in what follows an elliptic curve, is a curve that is drawn by the points that will solve the following equation:

$$E: (x, y) |\ y^2 \equiv x^3 + ax + b \text{ with } a, b \in K \quad (2)$$

a and b will have to fulfil the following condition $4a^3 + 27b^2 \neq 0$ K can be in the following fields $\{\mathbb{R}, \mathbb{Q}, \mathbb{C}, \mathbb{Z}/p\mathbb{Z}\}$.

Soit E une courbe elliptique définie sur un ensemble K, et deux points P, Q ∈ E (K), L la ligne reliant P à Q (la tangente à E si P = Q) et R le troisième point d'intersection de L à E. Soit L la droite verticale passant par R. On définit P + Q sur E (K) comme le deuxième point d'intersection de L avec E. Avec la loi de composition (E (K), +) est un groupe abélien dont l'élément neutre est le point vers l'infini (O).
L'addition scalaire et la multiplication scalaires sont deux opérations courantes sur les courbes elliptiques. La multiplication scalaire nP sur une courbe elliptique E (a, b) est définie comme des ajouts répétés, comme indiqué dans l'équation. (3) ci-dessous:

n.p = P+P+P+...+P (n fois) (3)

Où n ∈ K* La sécurité d'ECC dépend de la complexité et de la difficulté de résoudre les problèmes suivants:

Problème 1 :
Nous supposons une courbe E($\mathbb{Z}/n\mathbb{Z}$), En donnant P,Q ∈ E($\mathbb{Z}/n\mathbb{Z}$), avec Q multiple de P. Nous devons trouver K qui résout l'équation suivante Q = KP. C'est un problème difficile à résoudre. C'est ce qu'on appelle le problème du logarithme discret ou (ECDLP).

Problème 2 :
Étant donné trois points P, u et v sur une courbe elliptique E (a, b), où u,v ∈ K*. Il est difficile de résoudre uvP sur E (a, b) .en temps polynomial.

Notion utilisé

Table 2: Notations utilisées

Notation	Description	Notation	Description
ID_i	Identité du dispositif i	N_1, N_2	Nombre aléatoire généré pour les paramètres ECC
ID_{Bro}	Identité du Broker	**H(.)**	Fonction de hachage cryptographique
$Topic_i$	Souscirption au Tpoic i	**K**	clé d'authentification mutuelle
K_i	Clé du dispositif i	**M / C**	Message/ Message crypté
R	Nombre aléatoire	G	Générateur de point ECC
P	Large nombre premier avec ordre 2^{160}	$\oplus$	Operateur XOR

Travaux connexe

En 2015, un nouveau protocole proposé par Kalra & Sood [8] est apparu, ils ont acquis de l'expérience des protocoles discuté dans le paragraphe précèdent. Ils ont proposé un schéma d'authentification mutuelle pour sécuriser les communications entre un dispositif connecté est le Cloud avec une clé de session en utilisant des cookies HTTP (Hypertext Transfer Protocol). Ce protocole est destiné uniquement au petit dispositif qui est des clients HTTP. Malheureusement en 2017 Kumari et al. [9] ont prouvé que l'algorithme proposé par Karla est vulnérable contre les deux attaques "offline password guessing" \& "insider attack". Par la suite, ils ont exploité cette faille et ont amélioré l'algorithme en proposant un schéma d'authentification mutuelle avec deux facteurs pour assurer l'anonymat.

Durant les dernières années, les chercheurs essayent de diminuer la complexité de leur algorithme, et d'exploiter au mieux l'avantage qu'offrent les Clés ECC. Pour ce faire ils se sont penché à étudier l'intégration des protocoles de communication léger adapté à l'IoT comme MQTT, afin de développer des protocoles de sécurité puissant et léger très adapté à l'environnement IoT-Cloud. En 2019, Ankur et al. [10] ont proposé un schéma d'authentification et d'autorisation basé sur MQTT et ECC, malheureusement, ce schéma n'expose pas le véritable rôle des Borker MQTT et comment la distribution des clés est effectuée.

Protocole Proposé

Dans cette section, nous proposons un ECC protocole d'authentification léger pour l'environnement IoT-Cloud qui est des Abonnés MQTT.

Dans une Communication MQTT, le Broker est un élément très essentiel pour la distribution rapide des messages d'un éditeur à un abonné selon un thème donné. Notre conception est basée sur la connexion de plusieurs abonnés enregistrés dans un thème au Cloud, selon la fonction ou la tâche que cet appareil intelligent occupe, via le Broker en charge de l'expédition des informations. Puis le Cloud prend des décisions et publie cette dernière a la abonné concerné et ainsi de suite.

Cette prise de décision doit être sécurisée en raison de l'importance de l'information qui circule. Dans notre Modèle, nous ne supposons que le Broker à suffisamment de capacité de stockage et de calcul pour générer et distribuer les clés.

Le Cloud Computing dans notre cas, doit tout d'abord être abonné à tous les thèmes avant d'avoir l'habilité d'être un éditeur (**Figure 1**).Notre système renforce l'intégrité et le contrôle d'accès aux messages suivant un thème donné en utilisant d'un côté l'autorisation et le cryptage pour l'éditeur et de l'autre côté une clés de déchiffrement pour les abonnés.

Notre modèle se compose de trois phases. La première est l'initialisation où le Broker initie les paramètres nécessaires à la génération et distribution des clés. Le second est l'abonnement entre les objets et le Broker est également composé de sous-section que nous détaillerons plus tard. Et enfin la troisième est la publication, c'est là où l'éditeur (Cloud) publie des informations aux abonnés via le Broker.

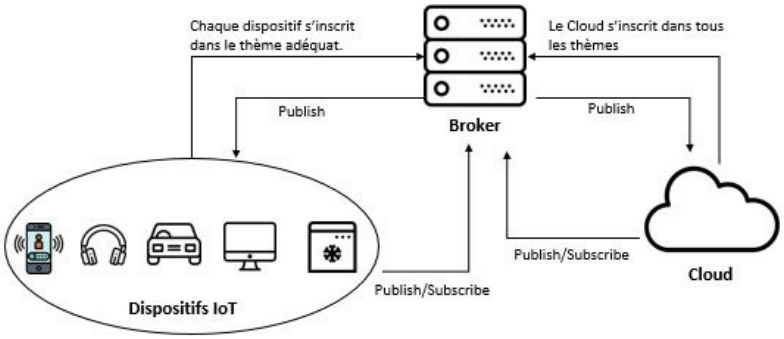

Figure 1 : Les entités impliquées dans notre modèle

Phase d'initialisation

Dans cette phase c'est le Broker qui est en charge de la génération et distribution de clés suivant les étapes suivante:

1. Génère aléatoirement deux grands nombres a,b $\in \mathbb{Z}$ après il choisit une courbe elliptique E ($\mathbb{Z}$) sur $\mathbb{Z}_p$.
2. Le Broker choisit sa clé secrète $K_m \in \mathbb{Z}_p$.
3. Le Broker génère le générateur de point G tel que $n \times G = O$. $n > 2^{160}$.
4. Le Broker calcule la clé publique $L = G.K_m$.
5. Finalement, il diffuse les paramètres publics $K_p \leftarrow (E_p, G, p, L)$.

Phase Souscription

Après cette phase une mutuelle authentification sera générée entre les abonnées et le Broker. Pour ce faire deux sous phases seront développé. La première qui est la phase d'enregistrement, qui permettra d'enregistrer les abonnés au Broker. La deuxième est la phase de login/authentification dans cette phase, le Broker s'assure des informations des abonnés puis génère une clé de session entre les deux parties.

<u>Phase d'enregistrement</u>

Etape 1 Afin que l'abonnée i s'enregistre auprès du Broker, il se présente auprès de ce dernier avec son identité I_i calculé comme suit:

1. $I_i \rightarrow h(ID_i \| Topic_i \| rG)$

Etape 2 Le Broker Génère pour chaque abonnée i les paramètres de sécurités suivant :

1. Le Broker calcule $A_i \rightarrow h(K_m \| K_i)$, avec $K_i = h(N \| I_i \| ID_{bro}) \oplus topic_i$, ensuite il enregistre $A_i' = A_i.G$.
2. Le Broker calcule $K_s = K_m \oplus K_i$, $B_i = h(K_s \oplus I_i \oplus A_i')$ et enregistre $B_i' = B_i.G$, K_i et $Topic_i$ correspondent à l'identité ID_i de l'abonnée.

Phase du Login/Authentification

Etape 1 Avant chaque connexion, l'Abonné sélectionne un nombre aléatoire N_1 et puis calcule et enregistre les points ECC P_1 , P_2.

1. $P_1 = N_1.G$.
2. $P_2 = h(N1.A_i')$.
3. Envoie P_1 , P_2. et K_i au Broker.

Etape 2 Une fois le Broker reçoit les paramètres envoyé par l'abonné commence à la calculer les paramètres suivant:

1. $A_i \rightarrow h(K_m \| K_i)$ en calculant $K_m = K_s \oplus K_i$.
2. Après il calcule $P_2^* = h(P_1.A_i)$. Le Broker vérifie ensuite si la valeur de P_2^* est égale à la valeur reçue P_2 afin de valider les paramètres envoyés par l'abonnée i.

Etape 3 Après la validation des paramètres envoyés par l'abonnée i, le Broker ensuite choisit un nombre aléatoire N_2 pour calculer ses Points ECC :

1. $P_3 = N_2.G$.
2. $P_4 = N_2.B_i'$.
3. Envoie P_3, P_4 , et K_s à l'abonnée i.

Etape 4 De même afin que l'abonnée vérifie les paramètres du Broker il calcule les valeurs suivantes **:**

1. $B_i = h(k_s \oplus I_i \oplus A_i')$.
2. Calcule $P_4^* = P3.B_i$ L'abonnée i vérifie ensuite si la valeur de P_4^* est égale à la valeur reçue P_4 afin de valider les paramètres envoyé par le Broker.

Etape 5 Après la validation des paramètres du Broker, l'abonnée i calcule la session K comme suit :

1. $K = N_1.P_3 = N_1 . N_2 .G.$
2. Calcule et envoi au Broker $V_i = h(P_2 \| K)$.

Etape 6 Encore une fois le Broker compare V_i^* avec la valeur reçu de l'abonnée V_i :

1. Le Broker Calcule $V_i^* = h((P_1.A_i) \| K^*)$ avec $K^* = N_2.P_1$ afin de valider le paramètre reçu.

Phase de publication

Après l'authentification mutuelle. On passe à la phase de publication, où l'éditeur envoie un message crypté aux abonnés via le Broker, Pour ce faire on doit suivre les étapes suivantes:

Etape 1 L'éditeur (Publisher) doit demander la publication en présentant son identité ID_{pub} .

1. $ID_{pub} = h(topic_i \| ID_i \| G.K)$.

Etape 2 Le Broker ensuite vérifie l'identité de l'éditeur en calculant ID^*_{pub}.

1. $ID^*_{pub} = h(topic^*_i \| ID^*_i \| G.K^*)$.
2. Puis envoi son identité à l'éditeur.

Etape 3 Afin que l'éditeur publie ses messages d'une manière chiffré à l'abonnées à travers le Broker il calcule C_{pub} et envoie au Broker {Pub}:

1. $C_{pub} = r.G.K_i \oplus M$.
2. Envoie au Broker $Pub = h(Topic_i \| ID_i \| rG \| C_{pub})$.

Etape 4 Finalement le Broker extrait le message et le publie à l'abonnée en calculant les valeurs suivante:

1. Calcule $C_b = r.G.K_s \oplus C_{pub} = rGK_s \oplus rG.K_i \oplus M$ d'où $C_b = K_m \oplus M$.
2. Le Broker Calcule le message crypté à envoyer au Abonnée
   $C_i = C_b \oplus rGK_s = K_m \oplus M \oplus rGK_s$ d'où le message à publier est
   $C_i = rGK_i \oplus M$

Analyse de performance

Un protocole d'authentification efficace doit tenir en compte des coûts de calcul et de communication lors du processus d'authentification. Avec ECC, notre protocole utilise des opérations XOR et des fonctions de hachage unidirectionnelles, ces deux opérations sont très coûteuses en cryptographie. Notre protocole est très sécurisé et efficace car il est basé sur des valeurs aléatoires nonce. Lors du calcul du coût du protocole, les valeurs nonce (N_1, N_2), le nombre aléatoire R et les paramètres de sécurité sont tous supposés avoir une longueur de 224 bits. De plus, la sortie d'une fonction de hachage unidirectionnelle est de 224 bits et le cryptosystème à courbe elliptique est ECC - 224 bits.

Notre protocole est composé de subscriber/publisher et le Broker en charge de l'envoi d'informations. Le protocole proposé pourrait être évalué en termes de divers coût généraux,
Paramètres de sécurité et évolutivité. La communication entre les éditeurs et les abonnés est généralement sécurisé avec SSL / TSL. Dans cette section, nous allons évaluer et comparer notre protocole avec SSL / TLS.

SSL / TSL a 13 Handshakes, et c'est la version de TLS la plus courante. Comme la taille du message de chaque Handshake varie (**voir Tableau 2**), nous avons essayé d'approximer la taille des messages SSL / TLS dans chaque connexion de prise de contact. Rappelons que l'en-tête d'enregistrement TLS pour chaque enregistrement est de 5 octets et l'en-tête du Handshake TLS est de 4 octets. Nous en avons 4 enregistrements échangés (20 octets). Chaque message à une entête Handshake, et nous en avons 7 d'où 28 octets. Le coût total d'une seule nouvelle connexion SSL / TLS converge vers 1789 Octets. (20 + 28 + 170 + 75 + 1500 + 130 + 2 + 24 = 1789 octets). Le coût total d'une connexion SSL / TLS existant est d'environ 332 octets. (15 +16 + 202 + 75 + 2 + 24 = 332 octets).

Table 2: MESSAGE SIZES OF SSL/TSL

Message type	Message size
ClientHello	160–170 bytes
Server Hello	70–75 bytes
Certificate	800–1500 bytes

ClientKeyExchange	130 bytes
ChangeCipherSpec	1 byte
Finished	12–36 bytes

Cout De Communication

Le coût de communication d'un protocole est le coût impliqué dans la transmission des paramètres de sécurité. Dans le protocole proposé, les paramètres de communication sont :

- Pour la phase de souscription : $P_1, P_2, P_3, P_4, K_i, V_i, K_s$ = [224 + 224 + 224 + 224 + 224 +224 +224] = [7*224]= 1568 bits = 196 Bytes.
- Pour la phase de publication : [2 ID_{pub} , Pub, ID_{Bro}, C_i] = [2*224+ 224 + 224 + 224] = [5*224] = 1120 bits = 140 Bytes.

Table 3 : Comparaison de performance entre notre protocole et SSL / TLS(Phase de souscription)

Type de paramètre	Notre protocole	SSL/TLS
Coût de calcul	*2 XOR+ 4* T_{ecm} *(Sub/pub)* *6 XOR + 4* T_{ecm} *(Broker)*	-
Coût de communication	140 bytes	>1789 bytes

Avec T_{ecm} Coût d'une opération de multiplication scalaire ECC

Table 4 : Comparaison de performance entre notre protocole et SSL / TLS(Phase de publication)

Type de paramètre	Notre protocole	SSL/TLS
Coût de calcul	*3 XOR (Sub/pub)* *4 XOR (Broker)*	-
Coût de communication	196 butes	>1789 bytes

Vérification formelle du schéma proposé à l'aide d'Avispa

Avispa (validation automatisée des protocoles d'Internet et d'applications de sécurité) c'est un outil pour la validation automatisée de la sécurité des protocoles et d'applications. Il fournit un langage formel modulaire et expressif pour spécifier les protocoles et leurs propriétés de sécurité, et intègre différents back-end qui mettent en œuvre une analyse automatique avec une variété de techniques

[11]. Avispa propose un langage appelé langage de spécification de protocole de haut niveau (hlpsl) [12] pour décrire les protocoles de sécurité et spécifier leurs propriétés de sécurité prévues, ainsi qu'un ensemble de d'outils pour les valider formellement.

Le schéma proposé est analysé en utilisant les Back-ends OFMC et CL-AtSe et les résultats de l'exécution sont montrés dans la **Fig.** 2 et la **Fig.** 3. Dans ce modèle, l'intrus a un contrôle total sur le réseau de telle manière que tous les messages envoyés par les agents correspondant aux rôles sont à la disposition de l'intrus. Ce dernier peut intercepter, analyser et / ou modifier les messages. Il peut agir comme n'importe quel agent et envoyer n'importe quel message à un autre agent participant la communication. Les résultats de la simulation montrent que le le protocole est sécurisé.

```
SUMMARY
 SAFE

DETAILS
 BOUNDED_NUMBER_OF_SESSIONS
 TYPED_MODEL

PROTOCOL
 /home/span/span/testsuite/results/Test_algo_these.if

GOAL
 As Specified

BACKEND
 CL-AtSe

STATISTICS

 Analysed   : 0 states
 Reachable  : 0 states
 Translation: 0.01 seconds
 Computation: 0.00 seconds
```

Figure 2. Sortie du backend ATSE

```
% OFMC
% Version of 2006/02/13
SUMMARY
 SAFE
DETAILS
 BOUNDED_NUMBER_OF_SESSIONS
PROTOCOL
 /home/span/span/testsuite/results/Test_algo_these.if
GOAL
 as_specified
BACKEND
 OFMC
COMMENTS
STATISTICS
 parseTime: 0.00s
 searchTime: 0.02s
 visitedNodes: 4 nodes
 depth: 2 plies
```

Figure 3. Sortie du backend OFMC

Conclusion

La convergence entre l'IoT et le Cloud présente clairement des avantages dans plusieurs domaines, transport et logistique, santé, domaine de l'environnement intelligent ainsi que le domaine social. Dans ce chapitre, nous avons proposé un protocole de sécurité léger basé sur MQTT et la complexité des ECC. L'idée d'intègre le protocole de communication MQTT avec l'ECC pour authentifier les appareils intelligent au Cloud, est nouveau et satisfait toutes les exigences essentielles de sécurité nécessaires pour la convergence IoT-Cloud. Une comparaison des performances de notre schéma avec le TLS / SSL a été faite et le résultat a été très satisfaisant. Une analyse de sécurité formelle basée sur le modèle d'attaque a été effectuée et qui prouve que notre protocole est robuste contre toutes les menaces connues. Enfin, nous avons vérifié la validité de notre modèle en utilisant la vérification automatisée via l'outil AVISPA. Les résultats ont montré que notre protocole est sûr.

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Decisions Ranking Based On Z-Numbers

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Abstract

Decisions are an essential part of the life of every human. Every decision should be concerned with the goal, the resources available to achieve the purpose, and the restrictions. The decision-making process is complicated, and the multi-dimensional environment for all decisions has to be supported by a mathematical approach. Many scientific works are based on the decision-making process. The field of this research is concerned with Z-numbers proposed by Zadeh and its application in decision-making. The Z-numbers' arithmetic is a crucial aspect of the article. The proposed method combines Z-numbers and ranking of decisions by the expert. The approach is based on the expert's knowledge expressed in Z-number, where the reliability of the opinion, as a critical factor, is considered in the model of decision-making. A numerical example illustrates the proposed method. Also, case studies were carried out that confirm the usefulness of the technique in the decision-making process.

Keywords: Decision making, Z-Numbers, Ranking.

Introduction

Shakespeare's question from Hamlet," To be, or not to be ..." in Shakespeare (1603) is quite old but shows the necessity of decision-making. The famous sentence presents the two options about living in this case but also shows that decisions are in the human's life. Decision-making, to obtain pieces of information, is a strategical activity. It is based on sections of information obtained from the environment. Those decisions are connected not only with personal matters, but what is more critical with organizational issues. Those features are the essential aspect of environmental analysis in case of uncertainty and changes in the environment, which was shown in Dill (1953), Duncan (1972), Draft et al. (1988), Boyd and Fulk (1996), Elenkov (1997), May et al. (2000), McGee and Sawyerr (2003), Day and Schoemaker (2005). All cited sources indicate that the decision-making process is still fundamental and a critical factor in the managerial area.

Decision-making is nothing without information. Information can be defined as all that we can use to better the choice of acts for obtaining a goal in Kolmogorov (1968). The most critical aspects of information are in Stoner et al. (1995):

- Quality of information,
- Timeliness of information,

- Quantity of information,
- The function of information.

Those aspects show that the appropriate value of information is connected with the fullness of information and the possibility of a good understanding of it. The better the information is, the better decisions made on it are. We can also consider information as a part of the decision process where we can see: data (collected form environment), information (analyzed data), managerial information (selected for managers), and decision in Stoner et al. (1995). The flow of information from the source to the user requires the construction of a system for collecting, storing, and analyze information in an organization. Every information system has to have in Griffin (1995):

- Set of information,
- Means of storage of information,
- Analysis of information,
- Presentation of information.

The information system is based on the quality of information, and the quality of information is based on certainty. To ordinary human life, many pieces of information are based on uncertain environments, and that causes some problems. To cope with some mathematical approaches were presented. Especially connected with fuzzy sets in Zadeh (1965), Zadeh (1979), Bellman and Zadeh (1970), Gaines et al. (1984), and Z-numbers in Zadeh (2011), Yager (2012), Yaakob and Gegov (2016), and understanding of natural language in Zadeh (1999), Liu and Jin (2012), Tian et al. (2016). To cope with multi-dimensional data from the environment, the necessity to organize decision-making as a process and develop a system that can support them in Trieu (2017).

Decision-making is an essential process in a human's and manager's life. This article presents a new approach in supporting the decision-making process by using a ranking of decisions made by an expert based on Z-numbers. The proposed system uses simple calculations on Z-numbers, which, according to scientific publications, can be quite complicated. To all scientific works we have reached, there were no tries of that approach.

The article contains sections: Introduction, which provides the scope of the paper. Than related works, which show the scientific field of interest and the novelty of the article. Another part is Preliminaries, which reminds the grounds of decision-making and fuzzy and Z-numbers. Then the next part is the Method description followed by a Numerical Example, which contains a Case Study, and finally, Conclusions.

Related Works

As it was shown earlier, decision-making is an interesting topic for researchers who are deploying it in different areas. Its application is divided into decisions in an uncertain environment in Kang et al. (2012), Peng and Wang (2017), multi-criteria decisions in Xiao (2014), Peng and Wang (2018), using fuzzy numbers in group decision-making in Liu (2013), in decision-making in case of incomplete information in Wang et al. (2009), in finances in Afful-Dadzie et al. (2015), Ruan and Fedrizzi (2012), in fuzzy Delphi method in Bouzon et al. (2016), Hsu et al. (2010), Lawnik and Banasik (2020). All those application areas are concerned to provide as full as possible information

for people making decisions. The criteria are used for determining which option is better than the other; obtaining data from the uncertain environment is focused on completion of the information, and fuzzy numbers are a way to cope with incomplete or natural language data in decisions.

The specific field of interest for authors is Z-numbers. In the process of decision-making, we can find Z-numbers in use with TOPSIS group decision-making to provide ranking in Yaakob and Gegov (2016). The combination of fuzzy logic and the multi-criteria decision is shown, but the use of Z-numbers offers better accuracy of human language in Gardashova (2014). The reliability of knowledge in the use of Z-numbers delivers better results than the classical fuzzy approach in Aliev and Zeinalova (2014). The Z-number arithmetic is an essential part of the study, and the solutions for adding the Z-numbers is not widely recognized, so the solution of Zadeh and Aliev is a significant step to the proposed method in Zadeh (2011), Aliev et al. (2017). Besides decision-making, Z-numbers have their application, for example, in the area of choosing an appropriate group of users for UX implementation in Banasik and Lawnik (2019) or in the Delphi method using Z-numbers in Lawnik et al. (2019).

As has been shown, the decision supporting topics is very significant in the scientific world. That statement determines us to present our approach to decision support tools using Z-numbers in the ranking of decisions.

Preliminaries

Decision-Making Process

The decision-making is a process which contains four phases in Turban et al. (2005):

- Analysis - the phase dedicated to the identification of a problem and gathering knowledge for experts,
- Projects - phase of finding or creating problems' model, gathering knowledge of possible solutions, decomposition of a problem,
- Choice - phase of selecting an answer from a set of alternatives,
- Implementation - a period of realization of the chosen solution.

The phases can be quite complicated. That forces researchers to find solutions to the problems. One of the approaches is the decision support system. The decision support system is a program, which contains artificial intelligence methods that help to recognize the problem and make the decision in uncertainty, lack of data in Burke et al. (2005).

Decision support systems are often based on mathematical models or simulations. The optimization methods can be divided by Turban et al. (2005):

- Type of problem being solved;
- Restrictions of the optimization method;
- Number of variables;

- Criteria of optimization.

To provide an appropriate mathematical model, a goal (to be reached) should be declared, resources provided (involved in the process), and restrictions indicated. In the case of a multi-criteria approach, it is necessary to provide better visualization of the decision process - the solution is the decision matrix. A decision matrix is a series of values in columns and rows that allows you to visually compare possible solutions by weighing their variables based on importance in Kou et al. (2014). The array can not only help you select the best course of action for your business, but it can also aid you in prioritizing tasks, problem-solving, and crafting arguments to defend a decision you've already made.

Fuzzy and Z-numbers

The mathematical approach presented in this article is based on fuzzy sets. The fuzzy set A defined in space X is set of pairs in Zadeh (1965)

$$\mathrm{A} = \{(\mathrm{x}, \mu_{\mathrm{A}}(\mathrm{x})) : \mathrm{x} \in \mathrm{X}\}. \tag{1}$$

The most important function in case of fuzzy set is a membership function. Function $\mu_A : X \to [0,1]$ is named membership function and it defines the element's degree of belonging x to A.

There are many possible choices for membership functions. One of the simplest membership functions is trapezoidal membership function:

$$(a,b,c,d) = \begin{cases} 0, & x \leqslant a \\ \frac{x-a}{b-a}, & a < x \leqslant b \\ 1 & b < x \leqslant c \\ \frac{d-x}{d-c}, & c < x \leqslant d \\ 0, & x > d \end{cases}. \tag{2}$$

Fuzzy sets can be transformed to crisp values. One of the options of converting fuzzy set A into crisp value $\overline{x}$ is Center of Gravity method in Patel and Mohan (2002):

$$\overline{x} = \frac{\int x \mu_A(x) dx}{\int \mu_A(x) dx}. \tag{3}$$

Fuzzy sets can also be defined in the interval form with the help of their bandwidth. Bandwidth A^b of fuzzy number A is value in Singh and Lone (2020)

$$A^b = |x_1 - x_2|, \tag{4}$$

where $\mu_A(x_1) = \mu_A(x_2) = 0.5$. Using the bandwith of fuzzy set A, its interval form $[A^{b1}, A^{b2}]$ can be defined in Fuh et al. (2014) as:

$$\mu_{[A^{b1},A^{b2}]}(x) = \begin{cases} \frac{1}{2}, & A^{b1} \leq x \leq A^{b2} \\ 0, & \text{otherwise} \end{cases}. \tag{5}$$

Fuzzy number is a fuzzy set A (where $A \subseteq \mathbb{R}$), which membership function fulfill listed conditions in Michael (2005):

- $\sup_{x \in \mathbb{R}} \mu_A(x) = 1$ (fuzzy set A is normal),
- $\mu_A(\lambda x_1 + (1-\lambda)x_2) \geq \min\{\mu_A(x_1), \mu_A(x_2)\}$ (set A is convex),
- $\mu_A(x)$ is intervally continuous function.

Another approach connected with natural language data is Z-number. Z-number in Zadeh (2011) is the ordered pair of fuzzy numbers (A, R), where A is the fuzzy limit of a certain real variable x, while R is a measure of the reliability of the first component.

Arithmetic operations on Z-numbers are quite complicated. Their simple form can be found in Zadeh (2011), and Aliev et al. (2017). For two Z-numbers $Z_1 = (A_1, R_1)$ and $Z_2 = (A_2, R_2)$ basic arithmetic operations $\{+, -, *, /\}$ are:

$$Z_1 * Z_2 = (A_1^b * A_2^b, R_1 \times R_2), \tag{6}$$

where A_1^b, A_2^b means bandwidth of number A_1 and A_2, else $R_1 \times R_2$ is the product of the fuzzy numbers R_1 and R_2.

In order to sum $\sum_i Z_i$ formula (6) of Z-numbers in the form of trapezoidal components $Z_i = \left(\left[A_i^{b1}, A_i^{b2}\right], (a_i, b_i, c_i, d_i)\right)$ can be written as

$$\sum_{i=1}^{k} Z_i = \left(\left[\sum_{i=1}^{k} A_i^{b1}, \sum_{i=1}^{k} A_i^{b2}\right], \left(\prod_{i=1}^{k} a_i, \prod_{i=1}^{k} b_i, \prod_{i=1}^{k} c_i, \prod_{i=1}^{k} d_i\right)\right), \tag{7}$$

where $\left[A_i^{b1}, A_i^{b2}\right]$ is the interval representation of component A_i of Z-number Z_i^S.

Method

The method of assessment of given decision variants is based on the knowledge of an expert. The expert declares, in each criterion, his or her decision, giving the value of the Z-number. The values provided by the expert can be in a linguistic form, which will be translated into a distinct possibility of controlling the experiment by the contracting entity. The next steps of the method can be described as follows:

- The expert evaluates each of the $O_i (i = 1,2, \dots, n)$ decision variants by giving k criteria's as Z-numbers in linguistic form.
- All the linguistic variables are converted into numerical values in the form of fuzzy trapezoidal numbers (2). The support for the first component of Z-number (A) is in the range $[0,10]$, while for the second component (R) is in the range $[0,1]$.

- The first components of given Z-numbers are converted into fuzzy interval numbers using (5), and the sum Z_i^S is calculated according to the formula (7) in each decision variant O_i.
- The received sums of Z_i^S are converted to the crisp value according to the formula:

$$Score(Z_i^S) = \frac{A_i^{b1} + A_i^{b2}}{2} \cdot \overline{x}, \tag{8}$$

where A_i^{b1}, A_i^{b2} are the restrictions from the interval form of Z_i^S, and $\overline{x} = \frac{\int x \mu_{R_i^{prod}}(x) dx}{\int \mu_{R_i^{prod}}(x) dx}$, and $R_i^{prod} = \left(\prod_{j=1}^{k} a_j, \prod_{j=1}^{k} b_j, \prod_{j=1}^{k} c_j, \prod_{j=1}^{k} d_j\right)$.

- Decision variants O_i are ordered according to the value obtained from the previous point (8).

Example

An IT company wants to open a new branch. A hypothetical logistics expert evaluated three location suggestions in terms of time, cost, and attractiveness. Example assessments for each of the decision numbers in the form of Z-numbers (linguistic components) are provided in Table 1. In the next step, the linguistic variables are converted to numerical values, and the results for these are given in Table 2. In all tables Loc. means location. The final results (Table 3) show that the best location, according to the Expert, is location A.

Table 1: Expert assessments to three different company locations in the form of Z-numbers with linguistic variables components.

Loc.	Time	Cost	Attractiveness
A	(about 9, high)	(about 7.5, very high)	(about 8, high)
B	(about 8, medium)	(about 8.5, high)	(about 9, very high)
C	(about 8.5, high)	(about 7.5, high)	(about 7.5, medium)

Table 2: Expert ratings for three different company locations in the form of Z-numbers with fuzzy trapezoidal numbers as components.

Loc.	Time	Cost	Attractiveness
A	((8.25, 8.75, 9.25, 9.75), (0.8, 0.83, 0.87, 0.9))	((6.75, 7.25, 7.75, 8.25), (0.9, 0.93, 0.97, 1))	((7.25, 7.75, 8.25, 8.75), (0.8, 0.83, 0.87, 0.9))
B	((7.25, 7.75, 8.25, 8.75), (0.7, 0.73, 0.77, 0.8))	((7.75, 8.25, 8.75, 9.25), (0.8, 0.83, 0.87, 0.9))	((8.25, 8.75, 9.25, 9.75), (0.9, 0.93, 0.97, 1))
C	((7.75, 8.25, 8.75, 9.25), (0.8, 0.83, 0.87, 0.9))	((6.75, 7.25, 7.75, 8.25), (0.8, 0.83, 0.87, 0.9))	((6.75, 7.25, 7.75, 8.25), (0.7, 0.73, 0.77, 0.8))

Table 3: The sum of the expert grades and their final value calculated based on the formulas (7) and (8).

Loc.	Sum	Final assessment
A	([23.0, 26.0], (0.576, 0.641, 0.734, 0.81))	16.920
B	([24.0, 27.0], (0.504, 0.563, 0.649, 0.72))	15.547
C	([22.0, 25.0], (0.448, 0.503, 0.583, 0.648))	12.826

Case Study

Looking at the expert's assessment given in Table 1, it can be seen that location C is determined by location A. This is because the assessment and reliability in each criterion are lower. Intuitively, such a decision option should be rated lower. This is also confirmed by the results in Table 3. Also, it is worth showing the sensitivity of the algorithm to the adopted values. You can modify the value of the first variant in the third criterion (attractiveness) from (about 8, high) to (about 8.5, high). Then the sum of Z-numbers is ([23.5, 26.5], (0.576, 0.641, 0.734, 0.81)), and the final score is in turn equal to 17.265 (compare with Table 3). That means that the proposed method is susceptible to the values given. A similar sensitivity applies to the reliability of the assessment. Replacing the value in the first variant again in the third criterion (attractiveness) from (about 8, high) to (about 8, very high) we get the results ([23.0, 26.0], (0.648, 0.718, 0.818, 0.9)) for the sum of Z -numbers and 18.902 for the final grade (compare with Table 3). That means that a change in the reliability of the assessment has a significant impact on the final result.

Conclusions

The article presents the possibility of manage the decision-making process supported by expert's knowledge and by that provides additional information for the manager. It is essential to simplify the data provided for the top management level. The reason is self-evident - the manager has plenty of sources of information. A large number of sources indicates the necessity of simple value information for people responsible for making decisions. The solution to this issue is the use of Z-numbers in the process of decision making. Therefore this article presents a method of decision making with the use of mentioned Z-numbers and only arithmetic calculations with them.

The ranking of the decision method using Z-numbers provides possible solutions, their classification, and credibility. The most important advantage of the technique is that it is sensitive to values in the decision process. Another advantage is the simplicity of mathematical operations based on the sum of Z-numbers.

The proposed method is universal and can be used in different fields of application. The only restriction is based on intervals and their adding procedure.

The proposed method may be developed by choosing another defuzzification method.

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Barriers in the Technological Innovation Implementation and Digital Entrepreneurship Development

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Abstract

Nowadays, digitalization plays an increasingly important role for both the economy and society. The development of organizations without technological innovations is currently significantly limited. Despite of many advantages of digitalization, this process is limited by many internal and external barriers. The advantages and disadvantages of digitalization are analyzed mostly in large enterprises, and analogous studies in SMEs are insufficient. This creates difficulties in determining the causes and determinants for the development of digital entrepreneurship. In this paper, we try to identify and assess the impact of barriers in the implementation of technological innovations in the digitization of processes and activities in SMEs, which affects the development of digital entrepreneurship. To achieve the set goal, a survey research among Polish small and medium enterprises was carried out in 2019. As a result of the study, the intensification of barriers in the implementation of technological innovations in SMEs was assessed and their impact on the development of digital entrepreneurship was examined.

Keywords: Digital Entrepreneurship, Digitalization, Management, Smes, Technological Innovations

Introduction

The importance of digitalization for business entities and society is constantly growing. Digital technologies are described as ones with the most significant impact on how new business ventures are created and developed (Elia et al., 2020). They are giving rise to the 4th industrial revolution and digital transformation by unprecedented convergence of computing, communications, contents, and networking of humans. Jeschke et al. (2017) explained Industry 4.0 as a new industrial stage at which there is an integration between manufacturing operations systems and ICTs which has impact on the forms of competition, the industry structure and customers' expectations. Industry 4.0 combines the advantages of optimized industrial manufacturing with advanced Internet technologies to create competitive advantages for organizations (Hamada, 2019). This is why the 4th industrial revolution can not exist without digitalization.

Digitalization can be explained as implementation of digital technologies for business improving, business processes transformation, value added creation, and building business environment, whereby digital information is at the core (Parviainen et al., 2017). In general, digital technologies are platforms, infrastructures or artefacts that use the power of computing on an existing public network (Zaheer et al., 2019). Digitalization could be understood for enterprise as the process of using digital technologies to create and obtain value in new ways (Gobble 2019). Organizations increase not only their performance but also their competitiveness when digitalizing. However, digitalization demands a holistic approach in its management for navigating in this rapidly changing surrounding.

Digital transformation describes how existing organizations may need to transform themselves radically to succeed in the emerging digital world (Nambisan et al., 2019). In the last decade, technology trends such as mobile services, social media, cloud computing, Internet of things, big data and robotics developed new forms of collaborating, organizing resources, new product development, matching complex demand and supply, and creation of new standards and solutions for entrepreneurship (Markus, Loebecke, 2013). Such rapid development has redesigned the competitive

environment and reshaped traditional business strategies, models and processes (Bharadwaj et al., 2013).

Digital technologies enabled the creation of new business ventures and digital start-ups, which constantly implement technology innovations as a vital component of their business models and operations. In this sense, digital technologies are enablers of the entrepreneurial activity (von Briel et al., 2018). This constant convergence between enterprise and digital technologies creates a new category of entrepreneurs who use digital technologies and the Internet to create new business ventures and the constant renewal of their organizations (Giones, Brem, 2017). Wherefore, there is a visible transformation of entrepreneurship into digital entrepreneurship.

Despite of many advantages of digitalization, this process is connected with many obstacles as well. It is usually complex and expansive in implementation, and only because of that keeping up with the requirements of industry 4.0 becomes difficult for many entities, especially SMEs. As SMEs play a crucial role for each economy it is important to constantly analyze and reduce barriers in their digitalization to provide them with the opportunity to compete with larger entities (Havierniková et al., 2017). However, studies on digitization barriers in SMEs remain modest, which leaves a research gap for further analysis. With this in mind, the main objective of this paper is to diagnose and assess the influence of barriers to technological innovations implementation in digitalization of processes and activities in SMEs.

Literature Overview

Digitalization of enterprises is a process dependent on many factors and conditions. The literature on the subject is most often devoted to problems and challenges concerning large enterprises or public institutions, while the digitization of small business is often described casually.

Technological Innovations in Stimulating Digital Entrepreneurship

The impact of ICT and digital technologies on business innovation and entrepreneurship is multifaceted. Those technologies can play a role of a facilitator, mediator or outcome of entrepreneurial operations, or determine the whole business model (Steininger, 2018). The terms digital entrepreneurship and digital innovation are linked to the intersection of digital technologies with traditional entrepreneurship and innovation processes and results. Both domains are the source of transformational changes introduced by digital technologies (Berger et al., 2019).

The concept of digital entrepreneurship was introduced to describe the creation of new ventures and transformation of existing businesses by developing new digital technologies or experimenting their novel usage (Shen, et al., 2018). It is similar but not identical with the concept of cyber-entrepreneurship since it refers to the use of the Internet and technology platforms to manage and execute business operations with clients, agents or partners (Shabbir et al., 2016), or sell products or services across digital networks (Guthrie, 2014). Digital entrepreneurship is a fundamental element for digital economic development by seeking to exploit opportunities based on digital media and technologies (Elia et al., 2020). It supports the exchange, transfer and acquisition of knowledge and information, and introduces new ways of doing business (Geissinger et al., 2018). Digital entrepreneurship refers to how startups use digital technologies and human resources to implement the overall entrepreneurial process (Le Dinh et al., 2018).

An attention to digital entrepreneurship in scientific researches has increased as it allow to generated opportunities to combine resources, reach markets and create value in creative ways, thus ensuring contemporary social and technological development (Kraus et al., 2018). Innovation and entrepreneurship are often interrelated because many digital entrepreneurial ventures cannot exist without digital innovation (Bessant, Tidd, 2007). Digital entrepreneurship can be described as a stream of entrepreneurship, with the unique characteristics. According Davidson et al. (2010), it is a multi-faceted phenomenon, which consists of three interconnected types of entrepreneurship: business entrepreneurship, knowledge entrepreneurship and institutional entrepreneurship.

For many enterprises, innovation, especially technological one, is the key to survival. According to products, technological innovation can improve performance characteristics of the product to ensure its commercial success. In relation to organizational processes, technological innovation can include a new technology adoption or implementation of an improved production process. Moreover, technological innovation could involve change in organization structure, working processes or new and innovative ways of human resource management (Gupta, Barua, 2016). Since innovation leads to more innovation, businesses that invest in R&D and build technological and organizational capabilities are likely to induce further innovation (Yigitcanlar et al., 2019). It should not be forgotten that nowadays innovations usually coincide with digital transformations that give entrepreneurs the opportunity to access new markets and offer goods and services to as many consumers as possible. The introduction of innovations in connection with digital transformations allows generating above average profits that stimulate entrepreneurship (Galindo-Martín et al., 2019).

It is emphasized, that SMEs and start-ups level have enormous potential for technological innovation across different countries of the world (Gupta, Barua, 2016; Fiala, Hedija, 2019). For SMEs, pioneering technologies, new techniques and digitalization allow to immediate response to the contemporary market dynamics, while creative products allow SMEs to differentiate themselves among competitors, minimize the risks, and ensure successively growth and development (Bagheri et al., 2019).

Barriers in Technological Innovations Implementation in SMEs

Digitalization and digital transformation are even more challenging for manufacturing SMEs, who need to follow suit large firms or risk being left out of digital supply chains (Peillona, Dubruc, 2019). Even though digitalization can offer vast opportunities for SMEs to enter new markets, the digital transformation path is not obvious, and manufacturing SMEs face major barriers and obstacles to run business in digital world.

There are many internal and external barriers to technology change of enterprises. From legal constraints to workforce resistance, the higher the barriers to the adoption of new technologies, the more expenses companies must incur to implement those (Fatorachian, Kazemi, 2018). In addition, the complexity of adopting new technologies is even higher when considering small companies, which don't have the necessary skills, absorptive capacity or financial resources (Cohen, Levinthal, 2000).

On the barrier list of digitalization, the factors related to the workforce occupy usually the highest positions (Teixeira, Fortuna, 2010). They relate to employment disruptions and the need for enhanced skills in new digital reality. Technological transformation of enterprise requires completely new competencies, resources, and forms of cooperation and networking. Lack of digital skills may be even more important constrain for SMEs. Digitalization significantly increases the complexity, abstraction, and problem-solving skills needed by all employees. This reality requires employees to be more involved and open to new approaches, usually characterized by people with high education and qualifications, which are often missing in small business. Advanced digital competences, necessary to implement digital technology innovations effectively, can be regarded as a prerequisite for the enhancement of digitalization (Süße et al., 2018).

Moreover, digitalization contributes to the development of entirely new business models and technological innovations represent a radical change. People are the firm's most valuable asset, but only when they bring creativity, knowledge and innovation to the organization. Employee expression and demonstration of these values cause rapid and positive changes that can ensure the success and survival of the company. The condition is, however, that employees constantly and promptly respond to environmental challenges (Entezari 2014). Meanwhile, radical change connected with digitalization often causes resistance in organizational structures, because it brings organizational and process change. Each modification entails specific costs for employees due to the fact that it distorts their current behavior patterns and expectations; people's unwillingness to change, or their indifference to the need to change may be the most important cultural barrier and is often underestimated and usually not recognized by companies (von Leipzig et al., 2017).

Moreover, it is concluded that the lack of suitable education system is one of the main barriers to digitalization and it causes other barriers like the employee resistance to the technological transformation, difficulties in finding qualified workforce, aversion to innovation and poor ICT adoption.

It is noted, that organizational strategy, not technology, should drive digital transformation. The strengths and benefits of digital technologies do not result from the technology itself, but rather in how companies integrate it to transform their business and take advantage of its potential (Peillona, Dubruc, 2019). Technological transformation involves the use of digital technologies to change key business operations, products, processes, organizational structures and management concepts (Matt et al., 2015). In turn, Müller et al. (2018) indicated that strategic opportunities, like new business models based on digital solutions, are mainly suitable for large corporations. Whereas, operational opportunities like improvements in process efficiency are more suitable for SMEs. This study also marked that environmental and social opportunities are transversal for all company sizes.

Valmohammadi (2016) pointed, that, the significant barriers to these opportunities are integration challenges, such as the difficulty in finding the proper suppliers of digital solutions, high investment outlays particularly in comparison to small size of enterprise, reduced investment capacity, and privacy and security concerns. Barriers in technical innovation are also visible such as customers' experiencing unforeseen technical issues, interactions that are more personal required by customers, or privacy concerns (Marcon et al., 2019).

Many authors strongly recommended that companies should systematically analyze and modify their business models concerning the industry 4.0 transformation with new business logic, based on platforms and service-oriented business models. Top management involvement and the workforce value recognition are crucial to deal successfully in the industry 4.0 era assuming that the knowledge and competence gaps of employees will be supplemented, organizational resistance to changes that will be introduced throughout the entire supply chain will be overcome (Dalmarco et al., 2019; Betakova et al., 2018).

Technological innovations are the basis for digitalization, but they are varied, complex, most of all expensive since they encompass Internet o things, big data and analytics, cloud computing, cyber security, mixed and augmented reality, advanced manufacturing solutions, additive manufacturing, simulation of connected machines, and artificial intelligence (Paschou et al., 2018). SMEs are financially limited and have problems obtaining external financing and lack easily available technical resources to implement and update digital technologies (Mittal et al., 2018). Also point to macroeconomic barriers, especially unsatisfactory and unreliable technical infrastructure, which is necessary to effectively use the offer of digital services (Lerch, Gotsch, 2015).

Based on a given literature a main hypothesis can be formulated:

H1: Barriers on technical innovations implementation determine a level of tendency to digital entrepreneurship development.

Methods

The study aims to diagnose and assess the influence of barriers to technological innovations implementation in digitalization of processes and activities in SMEs. After in-depth literature review, a direct questionnaire survey was realized. The survey was conducted in 2019 among 160 Polish small and medium-sized enterprises.

Sampling was purposeful and non-probability. As part of targeted selection, the focus was only on small and medium-sized enterprises. The enterprise sample was selected in convenience way. This is why the conclusions from the research should not be generalized, and the study should be treated as a seed study. However, it may be a preliminary model for wider research in the future.

In total, 160 full questionnaires were obtained, which were subjected to further statistical analysis. For the opinion forming questions the 5-point Likert scale was adopted. After data collection, they were entered into statistical software. For evaluation, the descriptive statistics and correlations analysis using non-parametric test (the Kendall Tau coefficient was calculated for p-value = 0.01 and 0.05) were done as the basis for multiple regression model building.

The barriers in technical innovation implementation selected to analyze ware classified in two groups:

- Internal barriers:
    - B1. Lack of equity capital
    - B2. Lack of time for innovation implementation
    - B3. Lack of qualified employees within an enterprise
    - B4. No idea for innovation
    - B5. Low advantages of implementation innovative technological solutions in the company
    - B6. The reluctance of employees / managers to new solutions
    - B7. Impossibility / difficulty in combining new technological solutions with the existing machine park / existing methods of operation
- External barriers:
    - B8. Bureaucracy
    - B9. Difficulties in recruiting qualified employees from the labor market
    - B10. Lack of support from public institutions
    - B11. Non-supportive tax solutions
    - B12. Unfavorable legal provisions
    - B13. Limited access to grants from the European Union
    - B14. Problems with obtaining external financing

Digital entrepreneurship (DE) development was a dependent variable being tested in a present research. It was discover as an answer to the question “Do you undertake real efforts to digitization processes and activities at various levels of the company?”

Results

The assessment the 5-point Likert scale indicated the highest barriers in technical innovation implementation in SMEs. The mean of answers is presented in Table 1 and, in general, indicate, that external barriers are seen as stronger than internal barriers. Three barriers with the highest average rating are: Lack of equity capital; Unfavorable legal provisions; and Limited access to grants from the European Union.

Regression analysis was utilized for hypothesis 1 testing, and the descriptive statistics and correlations of the study’s variables are presented in Table 1.

Twelve of fourteen analysed barriers in technical innovation implementation are significantly and negatively correlated with digital entrepreneurship development, which is consistent with the proposed entrepreneurial orientation model. The highest correlation intensity is visible to the factors: Lack of time for innovation implementation; Lack of qualified employees within an enterprise; and Low advantages of implementation innovative technological solutions in the company. This suggests problems with innovation at the basic level in SMEs, which do not understand the advantages of new solutions and do not treat them as the basis for maintaining competitive advantage.

The next step was identifying the correlations between predictors. Correlations between barrier variables were mostly week to modest, ranging from r = .05 to r = .59 (the value of .05 is exceeded only in two cases), which allow to assumed that it would be no problem with regression analysis.

Table 1: Descriptive statistics and correlation analysis (n=160)

	Mean	S.D.	Range	DE	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13
DE	3,81	0,97	1-5														
B1	3,74	1,36	1-5	-0,14[i]													
B2	2,97	1,15	1-5	-0,19[i]	0,22[i]												
B3	2,84	1,16	1-5	-0,23[i]	0,32[i]	0,25[i]											
B4	2,63	1,05	1-5	-0,16[i]	0,20	0,26[i]	0,40[i]										
B5	2,41	1,03	1-5	-0,23[i]	0,18[i]	0,26	0,29	0,52[i]									
B6	2,33	1,07	1-5	-0,16[i]	0,11[i]	0,26[i]	0,29	0,32[i]	0,44[i]								
B7	2,91	1,08	1-5	-0,13[i]	0,30	0,20[i]	0,28[i]	0,33[i]	0,32[i]	0,29[i]							
B8	3,26	1,27	1-5	-0,07[ii]	0,17[i]	0,23[i]	0,18[i]	0,16[i]	0,08[ii]	0,19[i]	0,22[i]						
B9	3,25	1,16	1-5	-0,03[ii]	0,22[i]	0,14[i]	0,42[i]	0,17[i]	0,09[ii]	0,18[i]	0,17[i]	0,35[i]					
B10	3,45	1,06	1-5	-0,09[ii]	0,29[i]	0,12[i]	0,31	0,22	0,12[i]	0,15[i]	0,26[i]	0,31[i]	0,48[i]				
B11	3,58	1,04	1-5	0,05[ii]	0,14[i]	0,08[ii]	0,19[i]	0,12[i]	0,02[ii]	0,00[ii]	0,19[i]	0,24[i]	0,35	0,51			
B12	3,48	1,07	1-5	0,04[ii]	0,09[ii]	-0,02[ii]	0,08[ii]	0,05[ii]	-0,01[ii]	0,03[ii]	0,17	0,36[i]	0,29[i]	0,46[i]	0,59[i]		
B13	3,39	1,03	1-5	-0,14[i]	0,36	0,12[i]	0,31[i]	0,23[i]	0,18[i]	0,12[i]	0,23[i]	0,23	0,28[i]	0,46[i]	0,41[i]	0,47	
B14	2,66	1,11	1-5	-0,07[ii]	0,36	0,13[i]	0,21[i]	0,21[i]	0,26[i]	0,24[i]	0,17[i]	0,16[i]	0,16[i]	0,23[i]	0,17	0,28[i]	0,38[i]

[i] *p<0.05;* [ii] *p<0.01.*

The tendency digital entrepreneurship development effects of the barriers on technical innovations implementation were assessed by applying multiple regression analyses. The digital entrepreneurship development level was included as dependent variables in regression. Multiple regression model summary (Table 2) confirmed that the whole model is statistically significant (p<0.05). However, the whole model explained 8.2% of variation in the response, which is limited result.

Table 2: Multiple regression model summary

Model	R Square	Adjusted R Square	Sum of Squares SS	df	Mean Square MS	Change Statistics			F	p
						SS	df	MS		
DE	0,404	0,082	24,161	14	1,726	124,214	145,000	0,857	2,015	0,020

n=160	Parameters estimates Sigma-restricted parameterization			
	EI Param.	EI Std. Err.	t	p
Intercept	4,583	0,371	12,354	0,000
B1	-0,029	0,078	-0,371	0,711
B2	-0,077	0,074	-1,039	0,301
B3	-0,158	0,087	-1,818	0,041
B4	0,029	0,095	0,307	0,759
B5	-0,163	0,101	-1,622	0,046
B6	-0,032	0,086	-0,369	0,713
B7	0,015	0,081	0,183	0,855
B8	-0,032	0,072	-0,438	0,662
B9	0,090	0,088	1,022	0,038
B10	-0,119	0,106	-1,118	0,266
B11	0,123	0,103	1,193	0,235
B12	0,078	0,110	0,704	0,483
B13	-0,085	0,104	-0,822	0,412
B14	0,051	0,082	0,625	0,533

Within model three predictors: B2, B3, B9 seems to have the positive influence on the digital entrepreneurship development with statistical significance. For the remaining barriers, the level of $p>0.05$ does not allow for unambiguous inferences, which can be dictated by the fact that the research group was of relatively low numbers. Hence, there is a justification for expanding research in the future.

Conclusion

Digital technologies are seen as external enablers and facilitators of the start-up process (von Briel et al., 2018). On the one hand, the progressing digitization significantly reduces the various barriers to entry and can therefore be expected to lead to more entrepreneurial acts (Fossen, Sorgne, 2019; Lemanska-Majdzik, Sipa, 2015). On the other hand, digitization itself generates a number of barriers and new risks that are manifested in different types of enterprises with varying degrees of strength. Given the potential of digital technologies as enabling and facilitating entrepreneurship, the authors point out the need for in-depth research into the conditions and impact of digital transformation on entrepreneurship (Nambisan, 2017). This is due to the fact that technological innovation projects comprise decision uncertainty, complexity, multiple objectives, and dynamic interactions (Wu et al., 2010).

Digital transformation is very slow in SMEs (Sommer, 2015). Among the barriers to the development of digital entrepreneurship, the lack of digital competence is particularly highlighted. This is a common problem among SMEs that lack the knowledge and skills to apply new technologies in business operations (Marques et al., 2017). As a result, this causes a lack of positive attitudes, including motivation and setting appropriate priorities by entrepreneurs for the implementation of digital technologies (Kilimi et al., 2019; Havierniková et al., 2019).

The present research shows that there are many obstacles in implementation of technological innovations. They have their source in the enterprise's operations but result also from the influence of the company's environment. In general, it could be said, that these barriers influence negatively digital entrepreneurship development. Both the lack of opportunities for innovation and the willingness and commitment to implement them result in SMEs often lagging behind when it comes to absorbing the idea of industry 4.0. Meanwhile, the development of a modern enterprise is practically impossible without digital technology.

This study contributes to digital entrepreneurship research by presenting the intensity of selected barriers of technological innovations and their impact on building digital entrepreneurship in relation to a specific group of enterprises - SMEs, operating in a specific country – Poland. As digitalization of SMEs will became more and more important research problem, an interesting development of current research could be to verify and expand the list of determinants for the digital entrepreneurship development, while comparing dependencies for two or more countries.

The study involves some limitations. The main limitation seems to be the size and unrepresentativeness of the research group. In addition, if the model explained 8.2% of variation it seems necessary to verify the list of factors limiting the implementation of technological innovations in SMEs. Despite above limitations, we believe that this research helps deepening the theoretical understanding of barriers on technological innovations in digital entrepreneurship development in a unique context of SMEs.

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The Stability of Economic and Employment Growth Before and After Crisis: World Perspective

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Abstract

One of the most important issues discussed currently on economic growth is the similarity of development of groups of countries and regions. Studies in this area frequently use the concept of real convergence. The approach proposed in the research is based on the classification of objects and measures stability of the obtained divisions and the similarity of time series. The main objective of the research is to divide countries into homogeneous groups according to the dynamics of gross domestic product (GDP) and employment. Classification was carried out for Europe, Asia, Africa and Latin America. The research includes the temporal analysis of the stability of belongingness of countries to a given cluster using the Rand index, and assessment of the sensitivity of clusters on the global economic crisis which has started in 2007. The data come from the Total Economy Database and covers the period 1993-2017. The findings highlight the unbalanced and not sustainable growth of GDP and employment during last three decades. The dynamics of these variables were very different in Africa and Asia, and similar in Europe and Latin America. Europe was the only continent with the full recovery of GDP growth after last economic crisis, but together with Latin America they suffer from stagnation on the labour market. The lowest level of similarity of economic growth and labour market development paths was observed in Asia, while the highest homogeneity of countries according to dynamics of these two indicators was observed within particular clusters in Europe and Latin America.

Keywords: Economic Growth, World Economy, Classification, Similarity Index, Temporal Analysis

Introduction

The legitimacy of searching for factors influencing economic growth and, consequently, the level of development of countries is well reflected in the still valid statement of Polish econometrician Zbigniew Czerwiński from many years ago, "We are witnessing huge disproportions between the levels of economic development in different countries. In this situation, it is of paramount importance to detect certain regularities in the economic development of countries and to find ways of rapid and harmonious development (Czerwiński, 1977). The persistence of differentiation in the level of development of countries is mainly due to differing long-term growth rates: "If we want to understand what causes the significant differences in quality of life between countries, we need to explain the mechanism for differentiating their long-term growth rates" (Barro and Sala-i-Martin, 2004). This task is difficult not only because of the complexity of the problem and changes in growth factors, but also because of the choice of the proper research tool. Many of researchers pointed out that the inequality of growth in spatial and temporal terms is mostly the result of the diversity of sets of considered phenomena that determine the dynamics of growth. These include economic and non-economic phenomena characterising a given country, especially those specific to a given stage of its development (Pritchett, 2000). The limitations of the models used should also be taken into account, including, inter alia: high generalization and simplification of the applied growth models in relation to the complicated economic reality, difficulties in defining and measuring the variables used and

frequent lack of resilience of the results obtained to the assumed time and spatial range of the research sample. The discovery of regularity, and in particular the factors determining the rate of economic growth, is the basis for the creation of an effective economic policy aimed at ensuring sustainable growth, especially during economic crises. Bosworth and Collins found that a very large portion of the cross-country variation in economic growth experiences over forty years 1960-2000, can be related to differences in initial conditions (income level, life expectancy, population), the quality of governing institutions (law and order, corruption, protection of property rights) and other factors (geographical location, predisposition to trade (Bosworth and Collins, 2003). Initial identification of growth factors can be made by observing evolution and verifying existing economic theories in this area. They show how the set of factors considered decisive in the process of economic growth has historically changed. A broad discussion on the relationship between crucial micro and macroeconomic factors and types of economic growth can be found in the work of Batóg (2010).

In the growth literature there are opinions that only selected phenomena significantly influence the economic growth rate (Durlauf *et al.* 2004). However, there is no consensus on what these factors are in the studies so far. The rate of GDP growth in the European Union countries in 2010-2016 was determined mainly by consumption, investment, export and labour productivity. In periods of economic slowdown, the set of key determinants of growth was complemented by public debt. Enlargement of the EU and a drop in consumption resulted in an increase in the importance of export as key factor of growth. Some authors still underline the significant meaning of classic factors like employment for economic growth. Kaseeram and Mahadea investigated the marginal effects of employment with respect to real output and capital in South Africa, using annual data covering the period 1946-2015 and the VAR/VECM Johansen's framework. The results show that there exists a statistically significant long-run co-integrating relationship between employment and real GDP growth (Kaseeram and Mahadea, 2017). Other paper examined the contribution of employment, capital accumulation and total factor productivity to economic growth in African countries over the period 1986-2014. The methodology was based on the translog dynamic stochastic production frontier for a set of 49 African economies. The main finding was however that the level of employment contributions to GDP growth is smaller than contributions of capital (Amador and dos Santos, 2018). These observations, confirmed by many other studies, formed the basis for the choice of employment as an additional dimension in the classification of countries according to their economic growth rates. This classification and the assessment of its stability over time are the main objectives of this study. To obtain this goal we follow the view that „There is no single classification with precisely defined criteria that can be applied to each country in order to provide relevant information and reliable picture of development of countries in the world. That is the main reason that it is necessary to determine a relatively small number of well-chosen macroeconomic indicators" (Račić, 2018).

Identifying the necessary strength and areas of state intervention requires not only knowledge of the development of general changes in the economic activity of a country, but also the detection of similarities between these changes and other countries, especially those with strong economic ties. Previous research indicates that EU countries exhibit significant variation in the degree of convergence of economic fluctuations over time, making it very difficult to anticipate economic developments and assess economic risks (Batóg, 2013). The situation is further complicated by the occurrence of a significant difference in the social and economic structure between the old and the new Member States of the European Union, despite the fact that nominal and real convergence is taking place. Similar patterns can be observed in other continents, particularly in Asia and Africa, where significant differences in the dynamics of economic growth and changes in employment can be observed. It is therefore difficult to expect a high degree of similarity in terms of the factors considered across the set of countries analysed. Rather, separate groups of countries should be visible, constituting specific "growth clubs" similar to "convergence clubs" described by Quah (1997). In addition to identifying homogeneous groups of countries and specifying the differences between them, the stability of received classifications in time by means of Rand index will be considered. Robustness of particular group of countries to the last global economic crisis studying macro variables co-movements within the period 1993-2017 will be also assessed. Research highlighting the differential resilience of economies to shocks opens up the possibility that long-run

growth paths are associated with how regions cope with and recover from such shocks. Some results suggest that regions with greater employment shares in sectors that are less susceptible to demand fluctuations are likely to experience more stable growth rates and be more resilient to economic downturns. This has implications for understanding the importance of evolutionary trends and specifically the role of national contexts and industrial legacies in shaping regional resilience (Webber *et al*. 2018). Within developed countries in EU we can observe the different behaviour during and after last economic crisis between south Europe (Spain, Portugal, Italy and Greece) and north European countries. In the last one Germany seems to be the less affected by the current economic crisis. There is the main reason of a strong discussion about whether all countries should be considered equal and, so on, whether they should be treated in the same way (Duarte *et al*. 2018).

This research covers four continents: Europe, Asia, Africa and Latin America. The analysis did not include North America as well as Australia and Oceania because they were represented in the database only by two countries each. The statistical data were obtained from the Total Economy Database developed by The Conference Board, Inc. (TED November 2018). The rest of the paper is organized as follows. In the next part chosen current research related to the economic growth and employment are presented. Third part presents methodology used in classification of economies according to their economic growth and employment change, its stability and assessment of similarity of time series of these factors. Fourth section consists data characteristics and discussion on the results and findings of the study. The last section presents concluding remarks and potential directions of future research.

Current Research

According to the majority of studies the fundamental factor that determines both the income divergence as well as the GDP *per capita* levels in different countries are the discrepancies in long-term economic growth rates. The expected long-term growth rate is an important factor for societal planning, for example investment plans, as they indicate future potential tax revenues, savings and pensions. On a global level expected long-term growth rates, and differences in growth rates between countries, affect inter- national relations, trade and power balances (Alfredsson and Malmaeus, 2017). The past decade has been characterized by fragile growth, high investor uncertainty and periodic spikes in global financial market volatility. Nowadays, at the global level, world gross product is forecast to expand at a steady pace of 3.0 per cent in 2018 and 2019. However, stronger economic activity has not been shared evenly across countries and regions, with many parts of the world yet to regain a healthy rate of growth. It is expected that developing economies from East and South Asia will remain the main drivers of global growth. The longer-term potential of the global economy continues to bear a scar from the extended period of weak investment, low productivity growth, weakness in wage growth, high levels of debt and elevated levels of policy uncertainty (*World Economic*…, 2018).

Both the previous and the latest studies on economic growth do not provide clear premises for separating one and additionally limited set of its determinants. Some authors provide empirical evidence related to the significant impact of two factors: R&D spending and export. R&D expenditure are strongly related to the technological innovations as well as technological spillovers and diffusion, while relative level of export and consequently share in international trade seems to be one of the most important engine of modern economic growth. Chen and Dahlman (2004) found for 92 countries for the period 1960 to 2000 that the level of domestic innovation, technological adaptation, and the level of ICT infrastructure exert statistically significant positive effects on long-term economic growth. In terms of innovation, they discovered that a 20 percent increase in the annual number of USPTO patents granted is associated with an increase of 3.8 percentage points in annual economic growth (see also Batóg and Batóg, 2015; Fernandes, 2013). At the same time, we can find many studies, confirming significant impact of changes in employment on the level of economic activity and growth. Increase in the level of entrepreneurship and the related increase in employment has been identified as a key contributor to economic growth by the quantitative empirical study based on pooled panel analysis and using annual secondary data from 2001 to 2015 for the BRICS countries (Meyer and Meyer, 2017). The relevance of labour depends on its main

characteristics, including: share of labour in the national income, labour productivity and the number of hours worked. The share of labour in national income has been one of the most important issues in economics and remains the focal point of modern economic theories. However, we can observe a long-term downward trend for labour shares in the majority of countries. The study conducted by Bassanini and Manfredi (2012) for 25 OECD countries, 20 business-sector industries and covering up to 28 years, indicated that total factor productivity growth and capital deepening jointly account for as much as 80% of the within-industry contraction of the labour share. According to Sweeney (2012-2013) the decline in labour share in GDP has contributed to increased inequality in the distribution of national income. He also pointed out the main reasons of this phenomenon: technology and policy changes, globalization, increased domestic and international competition, growing financialization and sectoral shifts in employment. It is not only the level of employment itself that is an important factor in economic growth. In the long term, its sectoral structure is also important. Countries characterised by a permanent economic growth and relatively low unemployment have a low share of persons employed in agriculture and a high share of persons employed in services in total employment. In the process of creating employment growth and economic growth in the short term, it is of great importance that particular countries have sectors characterised by high dynamics of employment growth. Countries with a mature sectoral structure of employment, i.e. characterised by a high share of the service sector, achieve on this account above-average increases in the number of employees (Batóg and Batóg, 2007).

Research Method

The methods of the analysis of similarity of time series are widely discussed in the literature. Here the Authors mention only several examples of similarity measures applied. Basalto and De Carlo (2006) proposed Chaotic Map Clustering algorithm in order to recognize groups of stocks sharing synchronous time evolutions and the correlation coefficients between time series lied at the bottom of this method. The study of Bełej and Kulesza (2014) examined similarities between local real estate markets in Poland from 2006-2013 analysing changes in housing prices and using Chebyshev distance. De Benedictis and Tajoli (2007) analysed the similarity of the trade structures toward the European Union market between four Central and Eastern Europe Countries and the EU15. They considered different measures of similarity and distance and finally applied the Bray-Curtis semimetric.

Dorosiewicz and Michalski (2000) described the similarity measure which is based on the cosine of an angle between the tangent lines to the graphs of two functions – this measure could also be applied to time series. Gullo *et al*. (2009) proposed the *Derivative time series Segment Approximation* (DSA) representation model which enables to capture the main trends of time series and data compression. Liao (2005) presented the overview of the measures used to determine the similarity/dissimilarity between two time series being compared, either in the forms of raw data, extracted features, or some model parameters. Oregi *et al.* proposed the On-line Elastic Similarity Measure, an adaptation of conventional ESMs suited to measure the similarity between time series in on-line settings which allowed to compute measures of similarity incrementally, and incorporate a forgetting mechanism to adapt to changes in the streaming time series. Palomba *et al*. (2009) applied pair-wise similarity of short-run dynamics (countries i and j have similar short-run dynamics if they share the same forecast function) and multi-wise similarity of short-run dynamics (countries belonging to a set have similar short-run dynamics if all of them share the same forecast function) in order to analyse the similarity of short-run inflation dynamics across European Union Member States during the Euro period. Serrà and Arcos (2014) compared the results of classification 45 time series coming from a variety of scientific domains using 7 different similarity measures coming from alternative measure 'families' and did not find one universal measure which is the best for every time series. Batóg and Dmytrów (2016) analysed similarity of economic development of Polish regions using Dynamic Time Warping.

The approach presented in the paper is slightly different. As a measure of time series similarity, the correlation coefficient for the examined period was used. The similarity of time series for all

countries for both the GDP growth rate and employment growth rate was examined, as well as the similarity between the examined variables in each year. Then countries were divided into 4 groups in each year as follows:

Group 1 – countries with GDP growth rate greater or equal median and employment growth rate greater or equal median,
Group 2 – countries with GDP growth rate less than median and employment growth rate greater or equal median,
Group 3 – countries with GDP growth rate less than median and employment growth rate less than median,
Group 4 – countries with GDP growth rate greater or equal median and employment growth rate less than median.

In the next step two indices of concordance of classifications were computed. The first one allows to evaluate the percentage of countries which stayed in the same group in two consecutive years (propensity to stay in the same class of objects):

$$C_1 = \frac{\sum_{i=1}^{n} c_i}{n} \tag{1}$$

where:

i – number of object (country),
n – number of objects,
$c_i = 1$ when object i is in the same group in both years,
$c_{rs} = 0$ when object i is not in the same group in the first and in the second year.

The second measure of concordance of classifications was index presented by Rand (1971):

$$C_2 = \frac{\sum_{r,s;r<s} c_{rs}}{\frac{n(n-1)}{2}} \tag{2}$$

where:

r, s – number of object (country),
n – number of objects,
$c_{rs} = 1$ when objects r and s are in the same group in both years or objects r and s are not in the same group in both years,
$c_{rs} = 0$ when objects r and s are in the same group in one year and are not in the same group in the second year.

Index C_2 assesses the level of similarity of structure of groups of countries in two consecutive years.

At the end of the analysis the division into 4 groups on the base of average growth rates was conducted and differentiation in every group of countries was computed. As a measure of differentiation the mean Euclidian distance from centroid was applied (3).

$$D = \frac{1}{k}\sum_{j=1}^{k}\sqrt{\left(x_j - c_x\right)^2 + \left(y_j - c_y\right)^2} \tag{3}$$

where:

k – number of objects in the given group,
c_x, c_y – coordinates of centroid of the given group,
x_j, y_j – values of average growth rates for GDP and employment.

All measures were computed separately for each continent.

Data Characteristic and Results

Our data came from The Conference Board Total Economy Database™, November 2018, and concerns GDP growth rate and employment growth rate in 1993–2017 for 119 countries from four continents. The data set covers 25 countries from Africa, 37 countries from Asia, 40 countries from Europe and 17 countries from Latin America. Figures 1, 2, 3 and 4 present medians of GDP and employment growth rates in Africa, Asia, Europe and Latin America respectively.

Fig 1. Medians of GDP and employment growth rates in Africa in 1993-2017
Source: authors own study

Fig 2. Medians of GDP and employment growth rates in Asia in 1993-2017
Source: authors own study

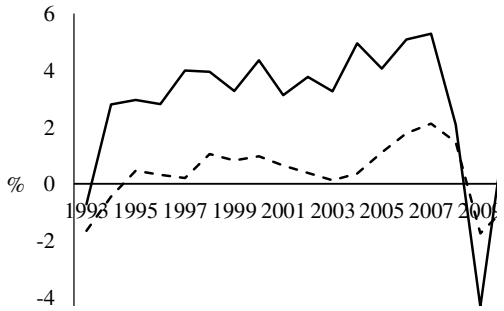

Fig 3. Medians of GDP and employment growth rates in Europe in 1993-2017
Source: authors own study

Fig 4. Medians of GDP and employment growth rates in Latin America in 1993-2017
Source: authors own study

It is visible (Fig 1-4) that GDP growth rates are always higher than employment growth rates in all cases. All the groups of countries surveyed were affected by the crisis that started in the United States in 2007. The economies in Europe and Latin America reacted the most strongly to the global crisis.

It can also be seen that only in European countries, after a relatively fast end of the recession, several years of GDP and employment growth have been recorded. The strongest immediate relation between changes in GDP and employment was observed in countries in Europe and Latin America, while in African and Asian countries changes in employment were characterised by a one-year lag with respect to real production.

For all possible pairs of countries in every continent correlation coefficients for GDP growth rates as well as for employment growth rates were calculated for 1993-2017. The Table 1 presents these results in the synthetic way – it contains percentages of statistically significant coefficients of correlation for all possible pairs of countries (assuming significance level 0.05).

Table 1: Percentage of statistically significant coefficients of correlation for all possible pairs of countries

Continent	GDP	Employment
Africa	15.7	23.0
Asia	26.1	13.4
Europe	52.6	35.4
Latin America	30.9	7.4

Source: authors own study

The results obtained (Table 1) indicate that the strongest synchronization of both GDP and employment changes occurs in European countries. In the most of the examined countries, apart from Africa, changes in GDP are characterised by a higher level of dependence compared to dependence of employment.

For the same period analysis of correlation between the GDP growth rates and employment growth rates for every single country was conducted. The Table 2 contains percentages of statistically significant coefficients of correlation for countries in every continent (assuming significance level 0.05).

Table 2: Percentage of statistically significant country specific coefficients of correlation between GDP growth rate and employment growth rate

Continent	GDP and Employment
Africa	32.0
Asia	42.2
Europe	85.0
Latin America	58.8

Source: authors own study

Similarly as in the case of a separate analysis of time series of both variables, the study of correlation between changes in GDP and employment in individual countries showed the highest level of dependence in European countries and Latin America.

After temporal analysis the stability of classification of countries to a specific class were checked. During the first step all countries belonging to the particular continent were divided into 4 different classes according to the scheme described in the research method part above. Then for all period the year-to-year concordance index C_1 was computed for every continent. The results are presented in the Figure 5.

Fig. 5: The year-to-year concordance index C_1 for 4 continents in 1993-2017
Source: authors own study

As can be seen (Fig 5), the stability of class membership on all four continents was moderate and relatively varied, both in space and time. It ranged from 5.9% to 77.5%, with the highest values for European countries and the lowest for Latin American countries. In Europe the strong decline in stability of class membership over several years started at the beginning of the economic crisis in 2008 – C_1 dropped from 78% to 35%.

Table 3 presents concordance index C_2 for chosen sub-periods for every continent separately.

Table 3: Values of index C_2 in chosen subperiods (in %)

Subperiod	Africa	Asia	Europe	Latin America
1993/2017	63.3	63.7	61.3	64.7
2007/2008	69.0	71.6	67.2	64.7
2008/2009	68.3	70.0	62.8	64.7
2007/2009	66.0	70.4	61.0	67.6
1993/1998	61.3	63.7	62.8	61.8
1998/2003	62.3	61.3	70.8	59.6
2003/2008	64.0	62.5	63.1	58.8
2008/2013	66.0	67.9	58.2	66.9
2013/2017	68.3	64.3	59.2	64.7

Source: authors own study

In all analysed periods there was a higher than average similarity of the structures of the obtained classes of countries – pairs of countries which in the first and second year of a given period were characterized by similar levels of changes in GDP and employment or in both these years were in different groups dominated. However, the differences in this measure between the continents are quite small.

The last part of results concerns average growth rates in 1993-2007 and their division into four groups. Figures 6, 7, 8 and 9 present average growth rates of GDP and employment for individual countries in Africa, Asia, Europe and Latin America respectively.

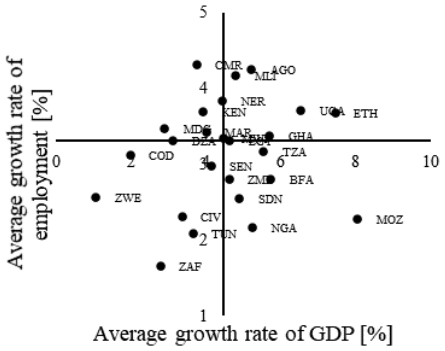

Fig 6. Average growth rates of GDP and employment in 1993-2017 in Africa
Source: authors own study

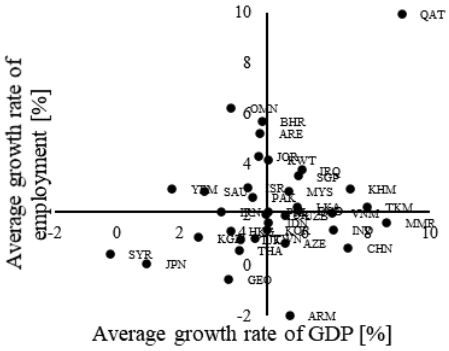

Fig 7. Average growth rates of GDP and employment in 1993-2017 in Asia
Source: authors own study

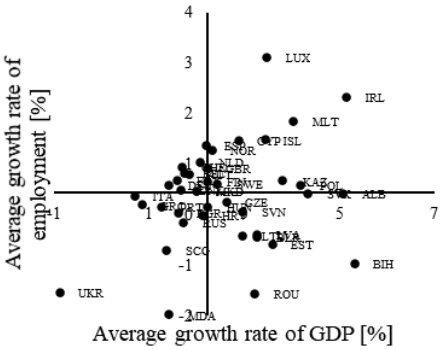

Fig 8. Average growth rates of GDP and employment in 1993-2017 in Europe
Source: authors own study

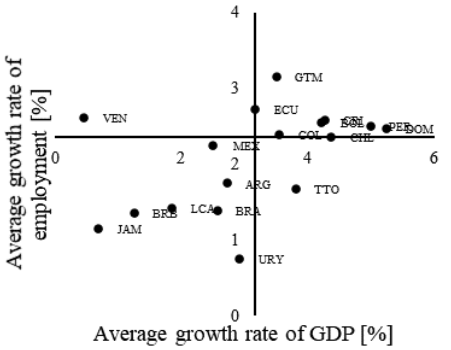

Fig 9. Average growth rates of GDP and employment in 1993-2017 in Latin America
Source: authors own study

The centroids for each continent had the following coordinates of average GDP and employment growth rates: Africa (4.47; 3.13), Asia (4.85; 2.38), Europe (2.53; 0.38) and Latin America (3.06; 2.06). Hence, the fastest economic growth was observed in Asia, and Europe was experiencing stagnation on the labour market.

All African countries were characterised by positive average GDP and employment growth rates. Zimbabwe (ZWE) and South Africa (ZAF) had the worst situation in terms of both parameters considered, while Mozambique (MOZ) and Ethiopia (ETH) had strong GDP growth rate, with the former being accompanied by relatively low employment growth rate.

Among Asian countries, the worst macroeconomic situation was observed in Syria (SYR) and Japan (JPN) and the most favourable one in Qatar (QAT). The negative average employment growth rates occurred in two countries: Georgia (GEO) and Armenia (ARM).

In the group of European countries, the worst situation was in the case of Ukraine (UKR), and the most favourable situation in Ireland (IRL), Luxembourg (LUX) and Malta (MLT). Bosnia and Herzegovina (BIH), Romania (ROU) and Moldova (MDA) had negative average employment growth rates, with Moldova (MDA) also having a low GDP growth rate.

Latin American countries constituted the least diverse group. They were distinguished by the negative macroeconomic situation of Jamaica (JAM), Barbados (BRB) and St. Lucia (LCA). Venezuela (VEN) was characterised by stagnating GDP growth, and Uruguay (URY) by low

employment growth. The strongest GDP growth was in the Dominican Republic (DOM) and Peru (PER), but at the same time these countries had an average employment growth rate.

Table 4 presents values of the measure of differentiation *D* in every group of average growth rates separately.

Table 4: Values of the measure of differentiation *D*

Group	Africa	Asia	Europe	Latin America
1	0.99	1.90	1.05	0.58
2	0.59	1.61	0.33	1.36
3	1.09	1.51	0.98	0.81
4	0.94	1.55	0.96	0.47

Source: authors own study

Looking at the values of the measure of differentiation *D* in the columns of Table 4 it could be observed that taking into account both analysed variables the highest differences between individual countries were in Asia whereas the smallest ones were in Europe.

Conclusions

The study of the degree of similarity between countries in terms of the two most important macro-economic parameters, the GDP growth rate and the employment growth rate, allows to formulate several general conclusions. During almost last three decades we were witnesses of unbalanced and not sustainable growth of these two variables, and in general, medians of GDP growth rates were much smaller than medians of employment growth rates. The dynamics of medians of GDP and employment growth rates were very different in Africa and Asia, and quite similar in Europe and Latin America. After the last world economic crisis there was a big drop in GDP growth rates in case of all continents, whereas the declines of employment growth rate were much smaller. Europe was the only continent with the full recovery of GDP growth after 2010, but together with Latin America they suffer from stagnation on the labour market. The strongest synchronization of GDP and employment was observed within European countries, while for employment the smallest one was noticed in Latin America, which means that almost every country on this continent had its own pattern of development of labour market. Classification of all countries according to both kinds of growth rates was quite unstable, especially in Latin Amerika, as well as in Asia and Europe directly after the last economic crisis. The lowest level of similarity of economic growth and labour market development paths was observed in Asia, while the highest homogeneity of countries according to dynamics of these two indicators was observed within particular clusters in Europe and Latin America.

Received results can be considered as a basis to create and apply differentiated anticyclical financial, monetary and fiscal policy across groups of countries characterized by the same pattern of GDP and employment growth. Identifying the necessary strength and areas of government intervention requires not only knowledge of how a country's overall economic activity evolves, but also the ability to detect its relationship with fluctuations of economic activity in other countries.

Apart from dynamics of GDP its structure is also important (e.g. the share of advanced technologies, such as products and services or raw materials). The relevance of labour contribution to economic growth depends also on its main characteristics, including: share of labour in the national income, labour productivity and the number of hours worked.

In the further research more detailed analysis could be conducted for individual countries. Also the classification of countries could be performed by means of other classification method, for example the cluster analysis with using more variables such as export and investment.

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Students' Perception of Corporate Communication Units in Universities: The Nigerian Perspectives

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Abstract

Student's perception of corporate communication units in universities is the focus of this short paper. It shows the extent of corporate communication unit's interaction and engagement of students within six selected universities in the southwest, Nigeria. The administration of questionnaire to 265 undergraduates of six universities in the country produced the data. Descriptive and inferential methods of analysis were uses to process the research data. This paper is for potential teamwork with investigators from other universities all over the world.

Keywords: Corporate communication, Corporate Communication Units, Public relations, Students, Universities

Introduction

The success of what university administrators do depend on effective corporate communication with stakeholders, particularly, the students (Ekanem *et al*., 2020). Communication provides ways of motivating, influencing and interacting with students as they are the main target of services offered by universities (Aririguzoh, 2016; Amodu *et al*., 2019). Corporate communication units manage communication within universities. They aim to create mutual understanding, attain organisational goals and serve the publics' interests (Odiboh, 2020; Fashiku, 2016; Olatunji, 2014). Since, corporate communication units manage information within universities and keep the university community up-to-date with management plans, policies, and decisions among others. Thus, the assumption is that every member of the university community knows and is well acquainted with the Unit and its tasks (Amodu *et al*., 2017; Ekanem, *et al*., 2018; Saha, 2014; Goodman, 2006). It would, therefore, be insightful to investigate the perception of students on the subject matter.

This study can help university administrators, public relations professionals, universities' corporate communication units, regulators of higher institutions to uncover students' knowledge of their university's communication offices and its activities.

Subject area	Public Relations
More specific subject area	Corporate Communication and New Media Studies
How the study was executed	Survey through the use of a questionnaire
Study format	Quantitative
Experimental factors	The data for the survey was obtained from two hundred and sixty-five students in six public and private universities in Lagos, Ogun and Oyo States, Nigeria. The researchers designed the questionnaire, and the data was analysed using the Statistical Package for the Social Sciences (SPSS 22).
Experimental features	Corporate communication is a branch of public relations which deals with information exchange and management within an organization. Universities engage corporate communication Units to keep the university community, particularly the students, informed about managements' decisions, plans, and policies. It is imperative to find out students' knowledge of their university's communication offices and their perception of the Unit's activities.
Preliminary study location	Nigeria
Data accessibility	Study is available for further collaborations

Value of this study

1. This preliminary study will reveal student's knowledge of their university's communication offices.
2. It will reveal students' perception of the activities of the corporate communication units.
3. It could serve for additional enquiry on improving unit-students interaction and engagement.

Experimental Design, Materials and Method

The data for the survey came from mass communication undergraduates of six selected universities in Nigeria. Berry and Lindgren's (1990) 10% rule was applied to determine the sample size of the students for the administration of the copies of the questionnaire. The reason for using the 10% rule was to have a normal distribution since the population was small. This helped the researchers to avoid bias and ending up with data that was not representative. An observation was that in an attempt to interact and engage with students actively, corporate communication units of universities now have new media platforms. However, most of these new media platforms have low student followership because the students do not like the design of the pages. This point could not be accommodated in the research considering that the subject stands on knowledge of corporate communication units. The data gathering instrument was designed by the researchers to elicit responses about the identified variables. The data were analysed using the Statistical Package for Social Science (SPSS 22).

Preliminary Study Results

This study highlights the age, gender, undergraduate's knowledge of the existence of corporate communication units of six selected universities in Nigeria. Three were private and three were public universities. Descriptive and inferential methods of analysis were used to present the data obtained as shown in Tables 1 to Table 5:

Table 1: Age Distribution								
Age		Universities						Total
		LASU	Caleb	FUNNAB	Babcock	UI	Lead City	
18 - 22 years	Units	53	29	1	55	17	8	**163**
	%	63.1	59.2	2.9	93.2	73.9	53.3	**61.5**
23- 27 years	Units	29	20	5	5	6	6	**70**
	%	34.5	40.8	14.3	6.8	26.1	40.0	**26.4**
28- 32 years	Units	1	-	11			1	**14**
	%	2.4	-	31.4	-	-	6.7	**5.3**
33 years & above	Units	-	-	18				**18**
	%	-	-	51.4	-	-	-	**6.8**
Total	**Units**	**83**	**49**	**35**	**60**	**23**	**15**	**265**
	%	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Virtually all the universities had the majority of its students between the ages of 18years and 27years. The Federal University of Agriculture (FUNNAB) was the only university with more students between the age bracket of 28years and above.

Table 2: Gender Distribution									
			Universities						
			LASU	Caleb	FUNNAB	Babcock	UI	Lead City	**Total**
Gender	Male	Units	26	26	17	21	8	6	**104**
		%	31.0	53.1	48.6	35.6	34.6	40.0	**39.2**
	Female	Units	58	23	18	38	15	9	**161**
		%	26.8	46.9	51.4	64.4	65.2	60.0	**60.8**
Total		**Units**	**83**	**49**	**35**	**60**	**23**	**15**	**265**
		%	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Though females were more than male students, the males were well represented in the survey.

Table 3: I know my University has a Communication Unit							
	Universities						**Total (%)**
	LASU	CALEB	FUNNAB	BABCOCK	UI	LEADCITY	
Strongly Agree	50.0	18.4	22.9	27.1	17.4	40.0	**30.9**
Agree	41.7	24.5	40.0	45.8	65.3	40.0	**41.1**
Undecided	7.1	36.7	25.7	16.9	13.0	13.3	**18.1**
Disagree	3.6	12.2	5.7	8.5	4.3	6.7	**6.8**
Strongly Disagree	1.2	8.2	5.7	1.7	-	-	**3.0**
Total	**100 n=83**	**100 n=49**	**100 n=35**	**100 n=60**	**100 n=23**	**100 n=15**	**100 n=265**

From Table 3, the majority of the respondents, 72%, agreed that they knew that their respective university has a corporate communication unit. Only Caleb University's students (57.1%) do not know about the existence of a corporate communication unit in their institution. Meaning that the Communication Unit of the institution does not sufficiently interaction and engage with the students.

Table 4: Knowledge of Students on the name of Corporate Communication Unit

Unit Name	Universities						Total (%)
	LASU	CALEB	FUNAAB	BABCOCK	UI	LEAD CITY	
Centre for Information, Press and PR	79.8	-	-	-	-	-	**25.3**
Directorate of Corporate and Students' Affair	-	-	-	-	-	20.0	**1.1**
Directorate of Public Relations	-	-	2.9	-	-	20.0	**1.5**
Media and Public Relations Unit	-	-	-	-	-	-	**0**
Department of Marketing and Communication	-	-	-	3.4	-	-	**0.8**
Directorate of Public Communication	-	-	-	-	4.3	-	**0.4**
No Idea	20.2	100	97.1	96.6	95.7	60.0	**70.9**
Total	**100 n=83**	**100 n=49**	**100 n=35**	**100 n=60**	**100 n=23**	**100 n=14**	**100 n=256**

Table 4 shows that although the students were aware of the existence of corporate communication units in their respective universities (See Table 3), very few know the name of the unit. Lagos State University (LASU) is the only university where, 79.8% of its students correctly identified the Unit as the *Centre for Information, Press and Public Relations* (CIPPR). This impeccable result could be as a result of the Centre's acronym CIPPR. It makes it easier for the students to remember as virtually all the respondents filled it that way in the instrument. Next to LASU is Lead City University; even after the University merged its Communication Unit with Students' Affairs' Department, giving the students more reasons to interact with the Unit, only 20% could recall its name. Meanwhile, majority of Caleb University's Students either left their instruments blank on this question or filled public relations unit.

Table 5: The Communication Unit keeps me informed about University Activities

	Universities						Total (%)
	LASU	CALEB	FUNNAB	BABCOCK	UI	LEAD CITY	
Strongly Agree	36.9	8.2	20.0	15.3	-	53.3	**20.0**
Agree	45.2	16.3	25.7	23.7	34.5	26.7	**23.4**
Undecided	11.9	40.8	42.9	40.7	43.8	6.7	**41.5**
Disagree	4.8	22.4	5.7	18.6	17.4	13.3	**11.7**
Strongly Disagree	1.2	12.3	5.7	1.7	4.3	-	**3.4**
Total	**100 n=83**	**100 n=49**	**100 n=35**	**100 n=60**	**100 n=23**	**100 n=15**	**100 n=265**

Table 5 shows that undergraduates, 56.6%, one of the essential publics of the university, do not know that one of the tasks of the corporate communication unit is to keep them informed. Less than half of the respondents, 43.4%, agreed that the communication unit keeps them informed. This is primarily as a result of Lead City University, 80%, which has its Communication Unit merged with its Student's Affairs Department.

Conclusion

There are signals in this preliminary study that undergraduates of the six universities surveyed are not in tune with the corporate communication units in their institutions. Notably, corporate communication is an instrument of management that harmonises all internal and external interactions. The overall objective is to create a favourable basis for relationships with the stakeholders of an institution. This study is a benchmark for examining same scenarios in any university anywhere in the world. It is for this reason, further studies through co-authoring collaborations are required to expand the scope, and multidisciplinary potential of this research.

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The impact of COVID-19 pandemic on Financial Statements and Audit

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Abstract

Undoubtedly pandemic has far reaching implications for each sphere of our lives and accountancy is no exception. Auditors must adapt to new circumstances. The aim of this paper is to evaluate the possible impact of current COVID-19 pandemic on financial statements and external audit to drive broader discussion about approach to audit procedures in the new circumstances. The aim was accomplished by researching and analyzing key impacted areas trying to find possible answers to newly recognized challenges.The natural next step for further research will be to conduct audits in new circumstances, gather practical experience, insights, data and based on that draw final conclusions which may change approach to audit in the future. This will include also recommendation for reasonable alternative and additional audit procedures.

Keywords: Audit, Assurance, COVID-19, Accounting, Going Concern

Introduction

In December 2019 the City of Wuhan (China) reported the coronavirus COVID-19 outbreak. Since then the number of cases in other cities and countries has spread to the point that World Health Organization (WHO) named COVID-19 disease as a pandemic. When writing this paper coronavirus is affecting 210 countries and territories around the world. There are over 2 million confirmed cases. Certain restrictions has been introduced in almost every country to limit the impact.

Among these restrictions the most popular are isolation of cities and countries, people movement restrictions, travel bans and school closure. Coronavirus has impact on human health but also significant economic effects on companies. Key business impacts are: supply chain disruptions (especially that China was the first one impacted), interruptions of production, unavailability of personnel, inability to raise financing, reduction in sales, delays in planned investments and increased volatility in financial instruments value. What is more – the pandemic is affecting global economy and major financial markets leading to unavoidable crisis.

These economic conditions have also significant implications on accounting, reporting and auditing financial statements. Challenges never before faced by auditors in performing audits are emerging. The key is remembering that, while the auditing standards outline the performance requirements for obtaining reasonable assurance the financial statements are free from material misstatement, the auditing standards do not set specific requirements on how auditors might obtain that assurance. Now, more than ever, auditors might rely on technology in performing audit procedures.

Each entity must carefully consider this unprecedented circumstances and risk exposure when analyzing the impact for their financial reporting. Auditors must also analyze and audit those accounting considerations and perform additional procedures. Additionally some standard procedures cannot be performed in the standard way which disrupt the way auditors work even further.

Key Accounting Considerations Impacting Financial Statements

The current situation means that special attention should be given to events occurring after the reporting period and possibly required disclosures and recognitions. For majority of entities in Europe with a 31 December 2019 year-end this will be a non-adjusting event, since it occurred in January 2020. In case of most companies this will be significant event therefore an estimate of its financial effect should be disclosed by way of note. It will obviously vary according to specific industry, facts and circumstances.

For entities with year-end after 2019 the impact on financial statement will be more significant and careful consideration is required especially if it comes to accounting estimates, fair value measurements, inventory valuation, onerous contract provisions, hedge accounting, breach of loan covenants, employment termination benefits, taxation. For example if it comes to inventory valuation – inventories are measured at the lower of cost and NRV (net realizable value). In a new difficult economic circumstances, the NRV calculation may need additional challenge and scrutiny at the reporting date. If it comes to onerous contract provision - such contract arises when the unavoidable costs of meeting the obligations under the contract exceed the benefits expected to be received. In the current circumstances it is quite likely that some of company's contracts become an onerous ones. Breach of covenants (even after the reporting date) may also lead to situation where lender has right to demand full repayment which in turn may affect going concern basis. Another issue may be taxation, in particular when assessing ability to recover deferred tax asset which now may not be possible in the new economic environment.

All of abovementioned areas are now very sensitive to new economic environment and almost each of these can impact going concern assumption which entities and auditors must consider now in particular as even in case of non-adjusting event after reporting period – it may have significant impact on going concern basis which in turn has impact on the whole financial statement [*Audyt finansowy w jednostkach gospodarczych, p. 253-286*]. For example companies from sector like travel, aviation or leisure & hospitality has very high likelihood of bankruptcy therefore going concern basis may not be appropriate in the light of new economic circumstances. They need to consider running several possible sensitivity analyses to determine whether there is any material uncertainty on its ability to continue as a going concern. Going concern assessment should be continuously updated to the date the financial statements are approved. In such uncertain environment going concern assessment is a very complex problem therefore it requires a lot of time and attention form the auditors.

New Challenges to Audit Procedures

Apart from key accounting considerations and additional audit procedures requirement, pandemic circumstances are impacting also more practically the way auditors are performing their standard procedures.

First of all, pandemic and isolation requirement is affecting normal communication with clients due to impossibility to access client's premises or sick leaves of client's key staff members. This in turn results in inability to obtain audit documentation or evidence which may in some extreme cases hold issuance of auditor's report (for example when it is not possible to get representation letters or collect sufficient audit evidences). Given such challenges and limitations auditors need to develop alternative audit procedures to gather sufficient audit evidence.

Access to client records is one of the challenging areas, especially if clients still maintain mainly paper records. Auditors may obtain client-prepared copies or scans of key records but proper professional skepticism and additional audit procedures needs to be applied to consider the authenticity, accuracy and completeness.

Another challenging area is audit plan which is usually based on proper understanding of the business and test of the internal controls. In the new circumstances performing walkthroughs and test of controls may be very limited. This may in turn result in not relying on control and increase substantive testing required but even then basic understanding of crucial internal controls is needed. It clearly has an impact on the planned procedures, risk assessment and so on and so forth. It is possible to perform test of controls during preliminary fieldwork which in most cases happened before COVID-19 outbreak

but follow up and inquire about internal controls changes is needed. And probably due to current pandemic circumstances the way entities works has changed significantly which means that most likely system of internal controls is now different as well.

Physical Inventory counting may also be a big challenge, especially that inventory is often a significant position. This will affect companies which were not able to conduct stock count before COVID-19 outbreak so the ones with later year-end date. It is crucial to obtain sufficient audit evidence for inventory existence and condition. This is usually achieved by attending physical counting, recounting sample and observation of company's procedures. Now some retails locations or warehouses may be closed. Even if stock count is happening auditor may not be able to attend due to travel restrictions or simply limited staff which create an obvious challenge. Possible solution is to reschedule stock count to later date when it is safe to perform. Auditor will then perform additional audit procedures to rollback. If the company is able to perform stock count but auditor is not able to be there – maybe auditors should consider usage of new technologies such as live video feeds. Of course procedures performed virtually may be limited so additional audit procedures should be in place. If audit risks cannot be reduced to an acceptable level, it may result in scope limitation.

Secondly, given the very serious impact on business and all the business continuity planning needed, issuance of historical financial statements may not be the highest priority right now. A lot of employees are on sick leaves or just transitioning to remote work model. They may not be able to prepare all the accounts and financial statement on time. Audit companies may need to rebuild their schedule not only due to client's inability to provide data on time but their own employees will be affected by the coronavirus as well. This creates additional complexity. For sure it will cause a lot of delays in issuing financial statements. Thankfully in some countries, like Poland, deadline for preparation and approval of the financial statements has already been extended which gives some relief and is absolutely crucial.

Conclusions

The COVID-19 pandemic is impacting everyone – accountancy and assurance included – and will have far reaching consequences. We can see how world is changing in front of our eyes and even after the pandemic is gone nothing will be the same anymore.

In case of auditing financial statements the pandemic is implicating two categories of challenges. Firstly it is impacting the entities' business performance very significantly which requires additional audit considerations and performing additional procedures to gain sufficient assurance. Key matter is a going concern assumption but evaluation is very complex and time-consuming. Secondly, auditors also experience COVID-19 impact and has limited staff members available while whole schedule is changing very dynamically. On top of that imposed restrictions cause additional challenges when carrying out even standard procedures.

In this case surely new alternative methods needs to be developed to be able to perform audits and obtain sufficient audit evidence, especially that we are not sure how long will it take to fight this pandemic. Perhaps it is time to move to more technologically advanced analytical procedures and usage of big data analytics which would allow auditors to deliver higher audit quality and gain additional audit evidences [*How New Technologies Can Change Our Approach to Audit*]. In the time where it looks like we need to be more creative and collect more evidences remotely it is crucial.

Looking ahead, the impact of COVID-19 on the global economy and business is expected to continue to evolve so ongoing considerations are required. In this uncertain times auditors needs to be flexible and look for new solutions, new alternative procedures to gain sufficient assurance and above all share insights with each other as this is a very unique situation in which we found ourselves.

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Comparison of Regional Carbon Footprints of Multinational HSR Projects: the Case of the Rail Baltica Project

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Abstract

The project of the High Speed Railway construction in Baltic States is the largest joint infrastructure project in the post-Soviet era. Rail Baltica (RB) is considered as the most energy-efficient project having the lowest environmental impact. The aim of the current research is to determine the regional indicators of CO2 emissions intensity of Rail Baltica, based on the project's energy consumption and carbon intensity of each individual RB Member State. The approach applied by the author in the current study is based on the significant effects of import/export of electricity by RB Member States and grid losses, in contrast to the local-based method for calculating emissions based on CO2, emission factor of electricity production, recommended by the International Union of Railways.
The author's calculations demonstrate the substantial difference in the figures of CO2 emissions intensity between the Lithuanian, Latvian and Estonian sections of the project, which is related to the trainload rate, traffic intensity, CO2 emission factor of Member State. Using RB project as an example, author demonstrates that conclusions regarding the positive environmental effect of multinational European HSR projects should not be based on average projects 'indicators, but on the environmental impacts of the project's sections in each Member State in order to avoid conflict of interests between the project participants, as well as, the delay in the implementation of such project due to the fact that the asymmetric information received was identified late by the project's participants.

Keywords: Carbon Dioxide Emissions; Carbon Intensity; Environmental Impact; Multinational High-Speed Railway; Rail Baltica.

Introduction

In recent decades European structures have been promoting High Speed Railway (HSR) within the framework of ecological rhetoric of sustainable mobility.

However, if we look at the sequence of procedures regarding the construction of HSR, then a certain discrepancy appears - the assessment of the ecological repercussions of each HSR construction project is conducted extensively only after the decision regarding the construction itself has been made. In this respect, European statistical reports indicate that the carbon footprint of HSR is almost zero during the operational stage due to the fact that CO_2 emitted during electricity generation does not need to be taken into account (IEA and UIC, 2017).

Nevertheless, the carbon dioxide intensity of the electricity used to power the train is, in fact, the key factor behind the environmental impact of HSR.

The existing official practice of silencing the data regarding the HSR carbon dioxide intensity may mislead the decision-makers into believing in an indisputable advantage of the investments into the expensive HSR infrastructure over other measures available to minimize the CO_2 emissions in the transport industry.

The construction of HSR project in the Baltic States – Rail Baltica (RB), is considered to be strategically and economically important for number of regions such as Estonia, Latvia and Lithuania and their citizens.

Unlike many other European HSR, this project involves the organization of both passenger and freight traffic on the new high-speed corridor. This is reflected in Regulation (EU) No 913/2010 of the European Parliament (2010) and of the Council of 22 September 2010 concerning a European rail network for competitive freight (OJ L 276, 20.10.2010, p. 22) RFC8 North Sea–Baltic.

In this respect, it is important to note that up till now the official European structures have carried out the comparison of HSR services only for passenger service and not for freight.

It has to be said, that in the investment justification of the RB project around 38 % of monetized socio-economic benefits out of total of 16 226 million euros constitute ecological improvements: among them air pollution reduction amounts to 3 268 million euros, whereas climate change mitigation amounts to 3 024 million euros (Ernst & Young, 2017).

At the same time, the analysis of the investment justifications of the already implemented European HSR projects has revealed the fact that the assessment of environmental impacts of RB project is nine times different from the assessment of other ongoing HSR projects. This way, National Audit Office in 2001 determined that the environmental savings are 3.9 % of the total benefits from Channel Tunnel Rail Link (CTRL) project (NAO, 2001). Whereas, the study of the AVE Madrid-Barcelona along with the CBA has presented four sensitivity analyses in which the environmental savings are 4.3% of the total benefits (ADIF, 2009).

As the result of the abovementioned comparison a significant number of questions arise regarding the environmental performance of the RB project, which should bring mutual benefits to all the actors involved.

The RB project investment justification has not addressed properly such issues as the energy consumption and the indirect CO_2 emissions associated with the need for electricity generation required for the operation of the project.

This paper aims to evaluate and compare regional performances of CO_2 emissions intensity level of the new HSR infrastructure. The analysis conducted will indicate the existing differences in performance between Latvia, Lithuania and Estonia and examine the results of research calculations made on the basis of the efficiency analysis.

It should be noted that in this article, the author, in contrast to the methodologies adopted in the official sources, takes into account the influence of import-export of electricity by the Baltic States on the country index of CO_2 intensity, which determines, to a large extent, the regional environmental results of the RB project.

The article is structured as follows: Section 2 demonstrates different points of view on energy consumption and the environmental impact of HSR projects by various researchers. Section 3 highlights the methodology and other details of the research. Section 4 presents the assessment results of the carbon footprint of all sections of RB. The conclusions are drawn in Section 5.

Background

Following European Commission (2011 a,b,c) policy documents as “A Roadmap for Moving to a Competitive Low Carbon Economy in 2050”, “A Roadmap to a resource efficient Europe”, “Regulation of the European Parliament and of the council (on Union guidelines for the development of the trans-European transport network” consider HSR as the most energy-efficient mode of transport having the lowest environmental impact.

However, with the accumulation of data on the results of construction and operation of HSR in Europe, the findings of researchers on the environmental friendliness of HSR have become more and more ambiguous.

Gonzalez-Gonzalez E. *et al* (2010), along with the research already mentioned above, determined that the environmental benefits of HSR construction projects represent only a small part of the benefits. The environmental impact assessment of HSR projects, according to the researchers, mainly affects route alignment and route selection. Therefore, as a pro-environmental policy, the development of HSR has significant limitations.

Miyoshi and Givoni (2012) have investigated the potential for environmental benefit from the introduction of the High Speed Train (HST) on the London–Manchester route in the UK, focusing on carbon dioxide (CO_2) emissions. The importance of demand in determining the environmental performance of HST lines was defined clearly. Thus, they demonstrate the train energy consumption (21.45 kWh per km) in cases where the UK electricity carbon reaches intensity (0.45 kg CO_2 per kWh). Their analysis shows relatively limited potential of HSR for reduction in CO_2 emissions. In 2033, the overall CO_2 reduction due to HST operation on the London–Manchester route is estimated at 100,000 t CO_2 per annum, which is less than 0.1 per cent of the total UK domestic transport emissions in 2007.

The reason for difference in HSR CO_2 emissions among the countries is the variation in numbers of such parameters as occupancy levels and the sources of electricity supply for the trains ʼoperation. For example, the French HSR has low CO_2 emissions per passenger-km (pkm) mainly due to the high share of nuclear power in French electricity supply to rail operators (Seguret, 2014). Nevertheless, there is a chance that investments into the rail industry may end up with much less environmental benefits than was expected during the planning stage due to several factors. In the research conducted by Von Rozycki *et al.* (2003) the CO_2 emissions figures for German HSR network are much higher (69.4 g/pkm), which can be explained by the fact that the demand is relatively low whereas the level of CO_2 emissions is quite high.

Alternatively, number of researchers criticize the approach of the determination of the environmental consequences of HSR based only on the analysis of the operational phase of such projects (Chester & Horvath, 2009; Westin & Kageson, 2012; Bueno *et al.*, 2016; Akerman, 2011; Givoni and Banister, 2012). The point of view taken up in these studies is that significant amount of energy consumption and CO_2 emissions originate from non-operational aspects of HSR systems, such as construction of stations and infrastructure in general, manufacturing of the vehicles, its maintenance and fuel production.

Jehanno (2011) claimed that the emissions from the construction of the HSR lines were estimated "in the range of 58 t–176 t of CO_2 per km of line and year. Lines with a moderate space and relief constraints (for example in France) emits around 60t of CO_2. The construction, maintenance and disposal of the rolling stock lead to emissions of 0.8 CO_2 to 1.0 g CO_2 per pkm. The construction of an airplane (0.5g CO_2/pkm) is in the same magnitude as HSR."

All the studies mentioned above were devoted to HSR projects that have been already implemented and are operating within the framework of one state.

The works devoted to the study of carbon footprint of international European HSR and the impact of their regional differences on the state policy of individual participating States in relation to the project currently are not available in the academic literature.

Only Dʼ Alfonso et al. (2016) has modeled the environmental impacts of London-Paris HSR-air transport competition, capturing the effects of induced demand, schedule frequency, and HSR speed: the authors showed that the net environmental effects of HSR can be negative since there is a negative trade-off due to the substitution effect.

Report of the European Court of Auditors (2018) explicitly mentions the problems of international European HSR projects implementation related both to differences in the estimated level of line congestion in different sections of such projects, and to the significant amount of earthwork

operations in individual sections, which will lead to various environmental results lowering the interest of individual States in the speedy implementation of projects.

Considering the Rail Balica project, it is important to mention the lack of research works available that include analysis of the carbon footprints of the future project and their impact on the public policy of RB Member States regarding the project.

Only Humal *et al*. (2018) have noticed that the authors of the RB investment justification have ignored the requirement of 'Guide to Cost-Benefit Analysis' (EC, 2014) regarding the CO_2 emissions arising out of the project's new infrastructure construction.

As it was already mentioned, Rail Baltica project involves the organization of both passenger and freight trains along a new corridor. The problem is that according to the review of the European Parliament (2015), HSR freight transport is still a 'poor relation'.

However, no significant researches on the comparative analysis of environmental indicators of cargo HSR are available and accessible in the international academic databases at the current moment. Therefore, Prussi and Lonza (2018) in their paper on the comparison of emissions profiles between HSR and air transportation on some European routes make a final observation that HSR is not used for freight, hence no comparison can be made with airfreight segment.

Methodology

When developing investment justifications for international transport infrastructure projects that are co-financed from EU funds, an averaged approach is used, which is correct to address general EU policies, but which does not allow to optimize policies at national level.

It was previously mentioned (Rail Baltica, 2018), that State's strategic development programs of the RB Member States were not taken into account in the calculations for the project. But States participating in the projects such as Rail Baltica are interested in assessing the impact (ex-ante and ex-post) of their own environmental policies. Accordingly, in order to understand the environmental impact of the abovementioned project on each participating State, it is necessary to take into account, at least, the drastic differences in CO_2 emission intensity (CI) of each of the RB Member States, which has not been done yet.

Calculations of CO_2 emissions for passengers and cargo traffic most often are based on the location-based method of the GHG Protocol Scope 2 Guidance (UIC, 2012). One of the key indicators in this case is the CO_2 emission factor. International Union of Railways recommends the use of index of CO_2 intensity of electricity production. However, this approach does not take into account grid losses and artificially lowers the indirect CO_2 emissions associated with the consumption of HSR electricity.

Unlike recommended UIC index of CO_2 intensity of electricity production, in the current research, the author uses National and European Emission Factors for Electricity (NEEFE) to estimate indirect CO_2 (tCO_2/MWh) or GHG (in tCO_2-eq/MWh) emissions related to the project's electricity consumption, which is calculated by applying the LCA emission factors to the energy carriers consumed to produce electricity. The LCA default emission factors have been calculated by adding to the standard emission factors, emissions from the supply chain as estimated from the latest version (v3.2) of the European Life Cycle Database (JRC, 2017).

In the case of a "closed system" (without import or export of electricity), Electricity consumed equals Electricity produced minus the losses in the grid. But in case of net export of electricity, both the losses in the national grid and the emissions related to the exported electricity (even if consumed outside the country) are accounted for. Inversely, for countries with consumption of electricity higher than production, the derived NEEFE calculated is smaller than the NEEFE*p* factor, because it accounts for the imported electricity but not for the associated CO_2 emissions (which are emitted outside the country).

That is, in case of important import or export of electricity, the NEEFE that are significantly different to the NEEFE*p* factor. However, it is problematic to find any information on the amount of emissions related to the import or export of electricity in European countries, since such information is generally not available in the existing international energy datasets.

Having assessed the CO_2 emissions of the RB project, the author has come to the conclusion that the above mentioned difference is of great importance, since two out of three participants of the RB project have considerable differences between the index of electricity production and index of CO_2 intensity of electricity consumption (NEEFE).

So, for Estonia, the export of electricity plays an essential role, because the main share of electricity in Estonia is produced from oil shale. Lithuania, on the contrary, provides the demand for electricity with its own production only covering 1/3 of the demand, and, hence, is significantly dependent on its imports.

Therefore, from the methodological viewpoint, the current research emphasizes the importance of taking into account the abovementioned impacts of electricity import/export by the countries-participants of the RB project.

As it was already indicated in the introduction, the data used for the current research includes the results of passengers and freight flows scenario forecast (Ernst & Young Baltic, 2017) as well as the data obtained from the official statistics of International Union of Railways (UIC, 2016), Eurostat and International Energy Agency (Table 1; Table 2).

Table 1: Passenger flow data

		Estonia		**Latvia**		**Lithuania**			
Indicators of RB		**Tallinn -Parnu**	**Parnu-EST/ LV**	**Total section**	**Riga-RIX**	**LV/LT - Panevežis**	**Panevežis - Kaunas**	**Kaunas Vilnius**	**Kaunas -LT/PL**
Line length (LL), km		119	94.25	262.42	13.3	93.3	103.43	101.9	88.5
Number of trains (NT) / Occupancy rate (OR) (Pairs/day/%)									
2030	Base	8/40	8/36	8/40	36/17	8/40	9/68	11/65	5/58
	Low	8/35	8/29	8/32	36/13	8/31	8/54	9/63	4/57
2040	Base	8/50	8/42	8/44	36/20	8/44	10/67	12/65	5/62
	Low	8/38	8/33	8/34	36/17	8/34	8/59	10/68	4/62
2050	Base	8/55	8/45	8/48	36/24	8/47	10/63	12/69	5/67
	Low	8/42	8/36	8/37	36/19	8/37	8/63	10/65	4/66

Source: compilated from the materials Ernst & Young Baltic, 2017

Table 2: Freight flow data

Indicators of RB		Estonia		Latvia		Lithuania			
		Tallinn Parnu	**Parnu-EST/LV**	**LV/EST Salaspils**	**Salaspils–LV/ LT**	**LT/LV-Ramygala**	**Ramygala - Kaunas**	**Kaunas Vilnius**	**Kaunas -LT/ PL**
Line length (LL), km		119	94.25	126	77.4	92	76.6	101.9	95
Number of trains (NT)/ Load factor (LF) (Pairs/day/%)									
2030	Base	9/65	9/65	9/65	10/72	10/72	10/72	10/67	22/69
	Low	7/67	7/67	7/67	9/63	9/63	9/63	8/66	18/67
2040	Base	11/68	11/68	11/68	13/70	13/70	13/70	12/70	28/69
	Low	9/67	9/67	9/67	11/66	11/66	11/68	10/68	23/68
2050	Base	12/70	12/70	12/70	15/68	15/68	15/68	14/66	31/69
	Low	10/67	10/68	10/68	12/69	12/69	12/68	11/67	25/69

Source: compilated from the materials Ernst & Young Baltic, 2017

It should be pointed out that in 2019 a more intensive Operational Plan of traffic organization for the RB corridor was presented (Rail Baltica, 2018). Yet, the given Plan does not take into account the aforementioned changes, since the information about the load factor/occupancy rate of trains and cost performance of the new traffic organization were not put forward.

CO_2 emissions indicators for RB passengers and freight traffic are calculated using the following equations:

$$ACE_{p(f)} = AEU_{p(f)} \times TC_{p(f)} \times LL \times 365 \times NT \times CCEF / 10^3 \quad (1a)$$

$$CEI_p = ((AEU_p / OR) \times CCEF) / 10^3 \quad (1b)$$

$$CEI_f = ((AEU_f / LF) \times CCEF) / 10^3 \quad (1c)$$

Where:

$ACE_{p(f)}$ - Annual CO_2 Emissions [kt CO_{2eq}];

$CEI_{p(f)}$ - CO_2 Emissions Intensity [g CO_{2eq} /p (t) km];

LL – Length of Railway line by Section (kilometres);

NT – Number of train/day;

TC – Train capacity, determined as the number of seats in a train for the passenger train (402;228 for the section Riga-Airport) or the total weight of the train in cases of the train transporting freight (1098 tonnes);

OR – Occupancy rate, the relation between the number of places occupied and the maximum number of places offered;

LF – Load factor, is the ratio of the average load to total train freight capacity, in tons or volume. Since such data is not available for the whole EU for all modes (with exception for aviation), the load factor is defined as the number of tonnes-km divided by the number of train-km;

AEU_p (Average electricity use pass.) (kWh/seat-km) - is the required amount of energy to transfer one seat travelling for 1 km. This indicator was considered by Jehanno (2011), Jurado (2012) and IEA & UIC (2017) based on the electric consumption of an Alstom AGV (0.033 kWh/seat-km);

AEU_f (Average electricity use freight) (kWh/tonne-km) - is the required amount of energy to transfer one ton of goods travelling for 1 km. This indicator was taken by the author as being equal to 0,05 kWh/tonne-km according to the methodology proposed in García Álvarez *et al*. (2013), due to the lack of the following data in the statistics of the European Union;

CCEF (country CO_2 emission factor) (in t CO_2-eq/MWh) - this indicator is assumed to be equal to the NEEFE for each Mamber States of RB Project, due to the lack of data regarding the future electricity suppliers for the project.

Moreover, as it was mentioned above, a complete carbon impact analysis of a HSR system should include both embedded and operational emissions. The data on the distribution of carbon dioxide emissions by years of operation arising during the construction of the railway infrastructure was adopted by the author on the basis of the IFEU/Tuschchmid methodology (UIC, 2016). However, taking into account that according to this methodology, the emissions are distributed by linear depreciation, the author of the study has conducted a procedure for compounding the built-in CO_2 emissions at construction at a rate of 5%, similar to the socio-economic discount rate of 5%, which is adopted in the investment rationale for the project. It was also taken into account that greenhouse gas emissions emitted during the construction stage are measured in terms of kg (or tonnes or grams) of carbon dioxide equivalent, written CO_{2eq}.

The total amount of CO_2 emissions will be an amount of the required reduction of emissions from other modes of transport, cargo and passengers, which will have to switch to a new railway.

The evaluation of the carbon footprints was carried out on the basis of a cluster analysis of the environmental consequences of the RB project for each of the participating countries with a subsequent comparison of their share in the project's environmental benefits.

Results and Discussion

The results of CO_2 emissions intensity assessment segregated by the types of flows are shown in the Table 3 and on the Fig.1 and Fig. 2.

Table 3: Performance of CO_2 emissions passenger and freight flows on Rail Baltica

Perspective		CEI_f, g CO_{2eq} /tkm			CEI_p , g CO_{2eq} /pass.km			
		Estonia	**Latvia**	**Lithuania**	**Estonia**	**Latvia**		**Lithuania**
		Total	**Total**	**Total**	**Total**	**Total**	**Riga-RIX**	**Total**
2030	Base	155.15	13.52	9.17	164.75	15.19	17.39	7.26
	Low	150.52	13.97	9.86	206.07	19.40	21.96	8.20
2040	Base	148.31	13.31	9.18	143.45	14.27	15.37	7.06
	Low	150.52	12.99	9.48	186.18	18.12	19.58	7.54
2050	Base	144.07	13.21	9.45	131.80	13.54	13.73	6.85
	Low	149.54	13.38	9.38	169.37	17.20	17.57	7.29

Source: author's compilation

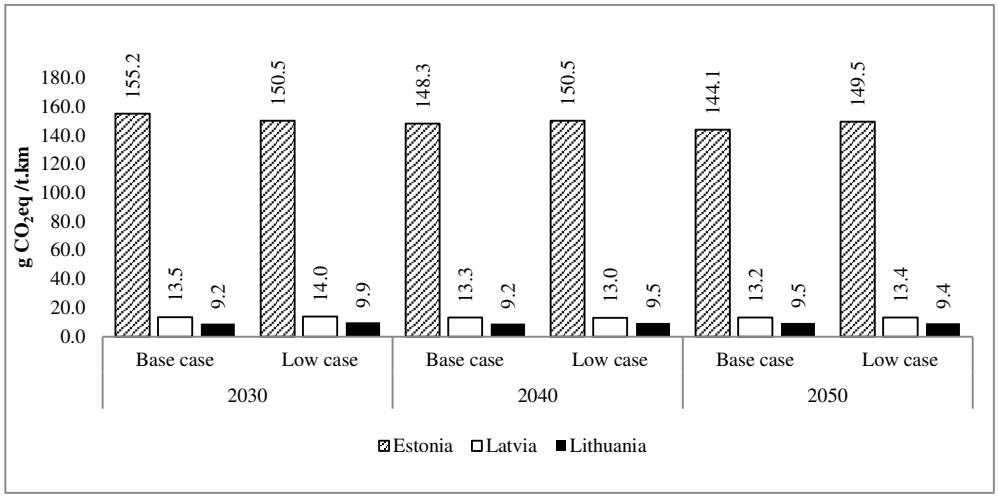

Source: author's compilation

Figure 1: Carbon footprints of freight flows on Rail Baltica.

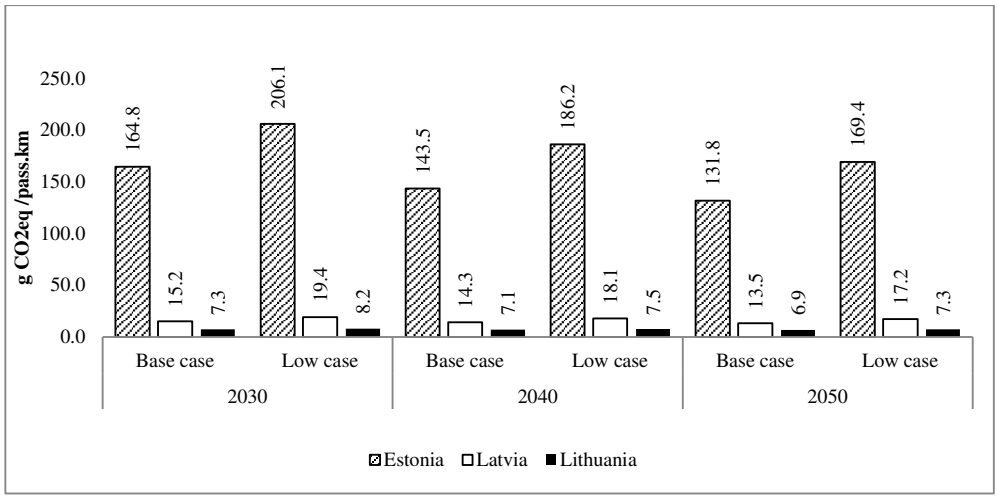

Source: author's compilation

Figure 2: Carbon footprints of passenger flows on Rail Baltica.

The results of the calculations show that Estonia has exceptionally high level of carbon dioxide emissions associated with the country's CO_2 emission factor (NEEFE). The intensity of emissions for the Estonian part of the RB will change from 164 g CO_{2eq} /pkm in 2030 to 131,6 g CO_{2eq} /pkm in 2050 (in case of the baseline scenario) and from 206,07 g CO_{2eq} /pkm to 167,37 g CO_{2eq} /pkm in 2050 (in case of the low scenario).

If we compare the carbon dioxide intensity of the Estonian section of RB with the intensity of CO_2 emissions from air transport and passenger vehicles, then it becomes obvious that the comparison is not in favour of RB. In ATOC analysis for Greengauge 21(Davies and Thompson, 2009), made on the basis of the carbon reduction strategy for road, it is stated "that new car emissions per passenger km might fall from around 105 g CO_2 now to around 40 g CO_2 per passenger km by 2055. And aviation emissions per passenger/km could fall from around 120 g CO_2 today to around 50 g CO_2 by 2055."

This suggests that the CO_2 emissions intensity of the Estonian section of RB from passenger traffic may exceed even the current CO_2 emission intensity figures exhibited by those types of transport that RB railway aims to replace due to its "high environmental friendliness" as stated in the investment justification of the RB Project.

In respect to the freight traffic, it has to be said that due to the high NEEFE country-wide index CO_2 emission intensity indicators for the Estonian section in 2030 will be much higher than CO_2 emissions produced by trucks per tonne/km (EP, 2015): 155,15 g CO_{2eq} against 75 g CO_2..

By 2050 the Estonian section will see a slight decrease in the intensity of CO2 emissions amounting to 144,07 g CO_{2eq} /tkm. Yet, it is not a competitive value if we compare it with the forecast data for the road transport.

With respect to other project participants having a comparable level of NEEFE indexes – Lithuania and Latvia, the following situation may be observed in terms of the intensity of CO2 emissions. Under the baseline scenario passenger flows on the Lithuanian section will have two times lower emission rates per one pkm than on the Latvian section: 7,26 g CO_{2eq} against 15,19 g CO_{2eq}, in 2030, and 6,85 g CO_{2eq} against 13,54 g CO_{2eq}, in 2050.

Such a significant difference is due to a lower occupancy rate in the Latvian section. It should be noted that the Lithuanian section provides for the construction of three railway stations for passengers: Vilnius, Kaunas and Panevežis, whereas on the Latvian section passenger stations will only be located in Riga, connecting the city centre and the airport. The consequence of this will be the high agglomeration effect of the RB project in Lithuania, which will eventually entail an increase in the occupancy of passenger trains within the region, and respectively, an increase in energy efficiency per one passenger km and a subsequent decrease in the emission intensity.

In Latvia, however, the opposite effect will be observed as follows from the Ernst & Young scenario. Low occupancy of passenger trains leads to high energy intensity of transportation and this, in turn, will affect not only the environmental performance of the project but also the price aspects of passenger transportation. The baseline scenario of the investment justification of the RB project provides that in the averaged current expenditure of the project, 17% - is electricity costs. As follows from the above calculations, the component of these costs will vary considerably, depending on the section and, therefore, will affect the price of the ticket.

Regarding the intensity of CO_2 emissions of freight traffic of the Lithuanian and Latvian sections of RB, it is necessary to emphasize again that due to the similar level of energy efficiency in the range of differences, the difference in emission intensity depends only on the difference in the NEEFE indexes: 9,17 g CO_{2eq} /tkm in 2030 on the Lithuanian section against 13,52 g CO_{2eq} /tkm on the Latvian section (while maintaining this proportion throughout the life cycle of the project.)

The author's calculations demonstrate significant difference in the intensity of CO_2 emissions among the Latvian, Lithuanian and Estonian sections of the RB project in relation to the train load factor and CO_2 emissions factor, taking into account the significant import/export of electricity by the countries participating in the project.

It becomes obvious that the project does not carry the same social benefits for all the participants of the project but involves only a synthesis of some stable links between the Member States, connecting them into a certain community.

Table 4 presents the final calculations for the total volume of CO_2 emissions per one km of each section of Rail Baltica, with the inclusion of CO_2 emissions resulting from the construction of the project's infrastructure.

Table 4: Total CO_2 emissions level of Rail Baltica by section

Perspective		CO2 Emissions from constructions, kt CO_{2eq} /year	Emissions from passenger flow, kt CO_{2eq} /year	Emissions from freight flow, kt CO_{2eq} /year	Total, kt CO_{2eq} /year	CO_2 Emission per one km, t CO_{2eq} /year		
						Estonia	Latvia	Lithuania
2030	Base	66.62	44.4	195.1	306.1	973.6	161.0	132.7
	Low	66.62	43.9	154.2	264.7	811.9	149.2	119.9
2040	Base	108.52	44.6	240.2	393.3	1 183.4	226.5	152.8
	Low	108.52	44.0	197.2	349.7	1 021.7	211.9	135.4
2050	Base	138.50	44.6	264.0	447.1	1 298.7	271.1	165.2
	Low	138.50	44.0	218.4	400.9	1 137.0	253.7	142.3

Source: author's compilation

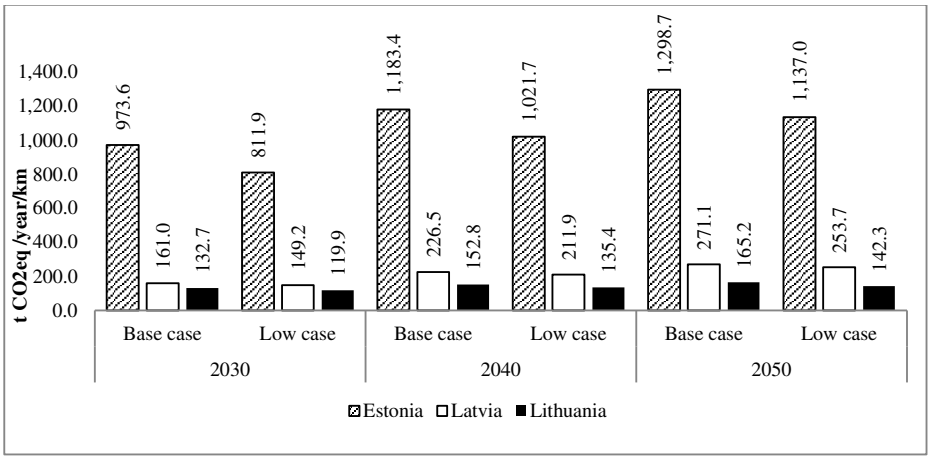

Figure 3: Total carbon footprints level of Rail Baltica by section.

Source: author's compilation

The results of the study shows considerable disagreement between the stated aims and performance criteria of the RB project and the objective elements of the economic structure of the regions of the three participating countries, including the country-wide CO_2 emissions factor and the structure of power generation as well as significant volumes of electricity import/export. The magnitude of indirect CO_2 emissions on the Estonian section may lead to a crisis of the entire project.

The investment justification of the RB project averages the environmental performance and ignores the CO_2 emissions associated with it, whereas current research separates this whole mass into independent regional elements. In practice these elements will interact with each other while maintaining their own status quo.

Conclusions

For the success of international European HSR projects and their high environmental performance achievement, it is important that favorable conditions are created before the start of their operation. This is one of the prerequisites in order to attract shippers and passengers of the regions to use the railway transport more often than they are used to it. Experience has shown that either rail transport should significantly improve the service, relying on favorable conditions provided by the respective governments, and/or that governments should take decisive measures to force shippers or passengers

to use rail transport. But the governments of individual States solve the issues of their sections of similar projects on their own, since all the infrastructure associated with such projects, in any case, is not the common property of the project Member States.

The defining feature of the RB project is its multinational character. Clarifying the qualitative difference in the evaluation of CO_2 emissions by region is a necessary step towards the formation of a sustainable development policy for all Member States of the RB project.

In author's opinion, currently, the conduction of the adjustments to the investment justification of RB project is required, in which the following factors should be considered:

a) all national programs of the countries-participants in the project aimed at achieving sustainable mobility;
b) the interests of the main external actors involved in the transportation services market in the region of the RB project. To believe that they would remain indifferent to such a powerful competitor as the RB project is to adopt a short-sighted attitude towards this situation, since the questions of tariff maneuverings can also lead to the project's crisis.
c) the depreciation's period of railway assets is significantly longer than the lifecycle of automotive vehicles and, therefore, it leaves less chance for the railway to change rapidly along with the innovative requirements of the freight and passenger market;
d) to take into account the high level of seasonality of the tourism industry in the RB project's region in terms of passenger transportation;
e) to ensure the development of the "last mile" infrastructure with the inclusion of cost's calculation into the total investment costs of the project.

Apart from that, Project holders need to start concluding contracts of intent with potentially low- CO_2 emissions electricity suppliers for the RB project. It needs to be done since the potential project customers and taxpayers of the RB Member States should realize the environmental orientation of the project already at its design stage. This measure should also be reflected in the investment justification of the project.

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Financial Reporting of Cryptocurrencies

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Abstract

This paper deals with cryptocurrencies and their financial reporting in selected European countries, i.e. the Czech Republic, the Slovak Republic, and the Federal Republic of Germany. Its main aim is to compare and discuss attitude to financial reporting of cryptocurrencies in three selected European countries. Firstly, interpretation and characteristics of cryptocurrencies is introduced. Further, main rules of their disclosure in financial statements are analysed and compared not only within three selected countries, but also in view of IAS/IFRS interpretation.

Obtained findings suggest that an attitude to cryptocurrencies financial reporting differs among selected countries. While the Czech Republic discloses cryptocurrencies as inventories in the statement of financial position, the Slovak Republic integrates them into short-term financial assets and the Federal Republic of Germany recommends to disclose them as the long-term intangible assets or other assets. Taking account also IAS/IFRS interpretation it can be stated that the Slovak Republic holds different post not only in relation to the rest selected countries, but also to IAS/IFRS that treat cryptocurrencies as intangible assets or inventories. The Czech treatment corresponds to IAS/IFRS interpretation and also the German treatment does not contradict it. The Slovak attitude differs but in some aspects it better corresponds to functioning of cryptocurrencies in practice. Disclosure of cryptocurrencies in the statement of financial position than influences also disclosure of related revenues and expenses in the statement of financial performance. In the case of the Slovak Republic they influence solely financial net income while in the rest two countries they influence mainly operational net income.

Keywords: Cryptocurrency, Bitcoin, Financial Reporting Of Cryptocurrencies, IAS/IFRS

Introduction

Cryptocurrencies that belong to a broader category of cryptoassets still represent a relatively new phenomenon and so their accounting treatment differs not only among EU countries. Bitcoin, probably the first cryptocurrency, was firstly used approx. in 2008 in order to accelerate peer-to-peer transactions worldwide with utilization of blockchain technology. From accounting point of view, some countries recognize cryptocurrencies as cash or financial assets, some integrate them into the long-term intangible assets or the current assets. Evidently, financial reporting of cryptocurrencies is not unanimous and so their reporting in financial statements may signify relatively important differences among countries and used regulations.

Also understanding of a cryptocurrency may differ in literature. For example, it may be defined as means of exchange, similar as US dollar, but digital and using cryptographic tools to control production of currency units and to confirm transfers of money (PricewaterhouseCoopers, 2017). Martinák (2015, p. 47) states that digital currencies are a new kind of currency, electronically created and deposited which also represents their main specific in comparison with classic national or international money that naturally exist in a form of cash. Also Lánský (2018, s. 1) for example considers cryptocurrency as a type of digital currencies that use cryptographic means to confirm transactions. Martinák (2015, s. 55) summarizes characteristics of cryptocurrencies as follows: full decentralization of currency, an absence of agent, worldwide territory, low transaction fees, and anonymity. Cryptocurrencies are regulated by no central authority, transactions take place directly without any agent across the whole world and anonymously. Moreover, virtual transactions are subject to low transaction fees in comparison with classic economic transactions. Lánský (2018, s. 19) supplements characteristics of

cryptocurrencies as follows: specific production of new cryptocurrency units, provability of ownership, elimination of duplicity, no possibility of changes. Production of new units is regulated only by system, ownerships can be proved only cryptographically, duplicate transactions are excluded and once realized transaction cannot be changed or cancelled.

At present, more than 2 000 types of cryptocurrencies operate on market. The most important cryptocurrency as for market capitalization is Bitcoin (about 65 % of the total market capitalization at present). The second and the third position occupy probably Ethereum (about 8 %) and Ripple (about 4 %) while the total market capitalization according to CoinMarketCap (2019) represents approx. 180 billion US dollars at present. The total market capitalization values show significant fluctuation when the highest vales fluctuated about 830 billion US dollar at the turn of 2017 and 2018. Among biggest cryptocurrency exchanges can be put Bitstamp, Binance, Bitfinex or Coinbase currently. There must exist sufficient offer and demand on a cryptocurrency exchange to realize a transaction. It means a substantial difference in comparison with a common exchange office that holds the post of seller or buyer. The less active and smaller cryptocurrency exchange, the less liquid; which is also one of disadvantages of cryptocurrencies that can be characterized by lower liquidity generally. Further drawback represents a question of safety. Cryptocurrency exchange crashes are not extraordinary events and verifying client's identity happens by personal data provided.

Financial reporting of cryptocurrencies differs depending on particular jurisdictions. It usually comes from interpretation of cryptocurrency established by local financial or other central authority and from characteristics of cryptocurrency. As it was indicated above, presenting of cryptocurrencies in financial statements varies significantly among countries and these differences may be material depending on a ratio of cryptocurrencies on the total assets. That is way we decided to analyse and compare attitudes to disclosure and reporting of cryptocurrencies in selected EU countries.

Methodology and Data

This paper deals with cryptocurrencies from accounting point of view. Its main aim is to analyse current accounting regulations concerning cryptocurrencies in the Czech Republic and to compare them with regulations in the Slovak Republic and the Federal Republic of Germany. Comparison of cryptocurrencies reporting will be discussed also with respect to IAS/IFRS interpretation. The paper concentrates on reporting of cryptocurrencies in financial statements, i.e. the statement of financial position and statement of financial performance. Firstly, we examine interpretation of cryptocurrency established by jurisdictional financial authorities because usually it creates a base for relating accounting treatment. We compare jurisdictional interpretation also with IAS/IFRS attitude. Further, we analyse and discuss a way of disclosure of cryptocurrency in the statement of financial position and the statement of financial performance.

As a research sample we used three neighbouring EU countries, i.e. the Czech Republic, the Slovak Republic and the Federal Republic of Germany that have similar accounting history, especially the Czech Republic and the Slovak Republic. In this paper we loosely follow our previous research and in the future we would like to enlarge a research sample by other European countries.

For purposes of the paper we used basic scientific methods, i.e. literary search, description of cryptocurrency utilization development, analysis of the current state of cryptocurrencies reporting in the Czech Republic, the Slovak Republic and the Federal Republic of Germany, and comparison of jurisdictional attitudes with IAS/IFRS. In the last part of the paper we used synthesis of findings and discussion.

As main data sources we used monographies, scientific papers, expert comments, and accounting regulations issued by the Czech, Slovak, and German authorities.

Main findings and Discussion

It can be stated, in the Czech Republic do not exist obligatory explication of a cryptocurrency at present. In practice it is possible to follow statements of the Ministry of Finance of the Czech Republic, the Czech National Bank and the Customs Administration of the Czech Republic. The legal characteristic of cryptocurrency is not unequivocal though it is essential for fair and true financial reporting.

According to the Czech National Bank (2014) Bitcoins cannot be regarded as money, resp. non-cash money because they do not even fulfil characteristics of electronic money, i.e. at least Bitcoins do not represent a claim to anybody who issued them. Similar stand on cryptocurrencies takes European Central Bank (2012, s. 43). The Czech National bank further supplements that Bitcoin is not also financial instrument because it embodies no right or claim. The Ministry of Finance of the Czech Republic (2018, s. 9) however opposes that virtual currencies may embody features of financial derivatives or investment instruments. But at the same time it adds that virtual currencies do not fulfil a definition of securities because they do not have a documentary form. As it is evident, the Czech National Bank does not define cryptocurrency explicitly but excludes it understanding as money and financial instruments. On the base of this characteristic the Ministry of Finance of the Czech Republic (2018) issued communication in which describes virtual currency as an intangible asset and recommends to report it as a "supply of its kind".

In fact, this attitude is also in compliance with IAS/IFRS when the Interpretation Committee published an agenda decision concerning holdings of cryptocurrencies at its meeting in June 2019 (IFRS, 2019). The Committee firstly characterized cryptocurrencies as: "a) a digital or virtual currency recorded on a distributed ledger that uses crypthography for security; b) not issued by a jurisdictional authority or other party; c) does not give rise to a contract between the holder and another party." As for nature of a cryptocurrency, the Committee stated holding of cryptocurrency meets the definition of intangible asset according to IAS 38 (non-monetary and non-physical substance, separable from the entity and sold). Further the Committee concluded that when cryptocurrencies are held for sale in the ordinary course of business IAS 2 Inventories applies to them. If IAS 2 is not applicable an entity should apply IAS 38 to holding cryptorurrencies. In accordance with its conclusion the Committee presented also recommendation for disclosure of additional information concerning of cryptocurrencies in financial statements.

As table 1 implies the Ministry of Finance of the Czech Republic (2018) recommends to disclose cryptocurrencies in the statement of financial position separately from other items as the current assets, specifically as goods in the case of trade activities or cryptocurrency exchange and as own product or work in process in the case of cryptocurrency mining. Some experts however question this recommendation and suggest to disclose cryptocurrencies as non-tangible assets, securities or even cash. But above described statements of the Czech National Bank and the Ministry of Finance of the Czech Republic impede recognition of a cryptocurrency as money or securities.

Tab. 1: Cryptocurrencies disclosure in the financial statements – international comparison

Interpretation and disclosure in financial statements		**The Czech Republic**	**The Slovak Republic**	**The Federal Republic of Germany**
Interpretation of cryptocurrency		Inventory of its kind	Play role of payment means	Private payment means in barter trade
Statement of financial	Trade and exchange activity	Inventories – goods	Short-term financial assets	Long-term intangible assets or Short-term assets (Other receivables)
	Cryptocurrency mining	Inventories – own products, work in process	Sub-ledger accounts until exchange or sale	

	Alternative	Intangible assets	-	-
Statement of financial performance		Sale and cost of cryptocurrencies sold disclosed in operational net income Fees and exchange differences in financial net income	Revenues and expenses relating to operations with cryptocurrencies disclosed in financial net income	Sale and cost of cryptocurrencies sold disclosed in operational net income
Further specifics or recommendations		Separated disclosure recommended	Analytical evidence according to individual cryptocurrencies	Disclosure as money or financial assets do not recommended

Source: author's own processing based on jurisdictional regulations

Interpretation of cryptocurrency in the Slovak Republic is similar as in the Czech Republic. As the Ministry of Finance of the Slovak Republic states (2018) cryptocurrency is not money, legal means of payment or currency. But, as the Ministry admits it can play a role of payment means. Probably for this reason Amendment to the Act on Accounting and its implementing regulations interpret cryptocurrency as short-term financial assets and distinguish between cryptocurrency acquired by purchase and by mining. If cryptocurrency is acquired by mining, it is recorded on sub-ledger account until the moment of its exchange or sale. In other cases, (purchase or exchange) cryptocurrency is recognized as short-term financial asset immediately at the moment of its obtaining. Disclose of cryptocurrencies as financial assets in the statement of financial position implies also recognition of related revenues and expenses in the statement of financial performance. They are disclosed in the financial area of the statement and so influence net income from financial activities.

In Germany cryptocurrencies are treated as “clearing unit” (BAFIN, 2013). BAFIN argue that cryptocurrencies are comparable with foreign currencies but they are not legal payment means. They serve as private payment means in the terms of barter trade. Simultaneously cryptocurrencies are not counted as electronic money because they have no issuer in the form of any central authority. As for cryptocurrency accounting there exists no official or compulsory procedure in Germany at present. German branch of Mazars (2019) however states that cryptocurrencies are treated as long-term intangible assets, more specifically purchased licences and rights or other receivables in short-term assets when period of their possession is not longer than one year. Mazars (2019) further recommends to disclose cryptocurrencies neither as financial assets because they do not obtain any right to property of a company, nor as money because they are not legal payment means. Disclosure of cryptocurrencies as intangible assets imply also recognition of relating revenues and expenses. They will be encompassed to operational net income.

As our analysis implies legal regulations of selected countries do not contain any precise definition of cryptocurrency at present. For purposes of accounting treatment however statements of local central authorities are decisive. In the Czech Republic cryptocurrency is considered as a supply of its kind, the Slovak Republic states that cryptocurrency is not a legal payment means however it plays this role in practice which further specify German experts that understand cryptocurrency as private payment means in barter trade. Rather than precise definition experts or local authorities enumerate how cryptocurrency should not be interpreted.

As for disclosure of cryptocurrencies in financial statements, the Czech Republic encompasses them into inventories, i.e. either goods (when they are purchased and determined to sale) or as own products or work in process (in the case of mining). Alternatively, they could be included into intangible assets. In the Slovak Republic cryptocurrencies are disclosed in short-term financial assets which is differing in comparison with the rest two countries however it reflects functioning of cryptocurrencies in practice. When cryptocurrency was acquired by mining it is recorded on sub-ledger account until its

exchange or sale. In Germany cryptocurrency is treated as intangible assets or other assets (when it is possessed one year at maximum). Compared with IAS/IFRS it can be concluded that the Czech and the German attitude to cryptocurrency disclosure in the statement of financial position is not in contradiction to them. IAS/IFRS apply to cryptocurrencies IAS 2 Inventories when they are held for sale and IAS 38 Intangible assets. Classification of cryptocurrencies into specific asset category determines also disclosure of relating revenues and expenses. While according to the Czech and the German treatment they influence financial net income mainly, according to the Slovak treatment they influence financial net income.

Conclusion

This paper is focused on comparison of interpretation and disclosure of cryptocurrencies in financial statements. As a research sample were chosen the Czech Republic, the Slovak Republic and the Federal Republic of Germany.

Our analysis confirmed varying attitudes to interpretation and disclosure of cryptocurrencies within the research sample. While the Czech Republic and the Germany treat cryptocurrency as either inventory or intangible asset which corresponds to IAS/IFRS recommendation, the Slovak Republic interpret cryptocurrency as the short-term financial asset. It seems that this treatment probably reflects characteristics of cryptocurrency better though it is in contradiction with the definition of securities or financial instruments. Disclosure of cryptocurrencies in the statement of financial position further implies disclosure of related revenues and expenses in the statement of financial performance when in the Czech Republic and Germany they will be recorded mainly to operational net income and in the Slovak Republic to financial net income. In our future research we would like to enlarge a research sample by other European countries and to compare more factors relating to cryptocurrencies accounting treatment.

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An Overview of Decision Making, Entrepreneurship and Performance: A Bibliometric Mapping and Visualization

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Abstract

The concepts of decision making and entrepreneurship have attracted researchers' attention for their relevance to a firm's performance. The purpose of this article is to provide an overview of the academic research on decision making, entrepreneurship, and performance. To achieve this, a bibliometric analysis was performed, which involves the analysis of 378 articles published in Web of Science in the 2000-2019 period, concerning the analyzed subject and a keywords' mapping in this field. This analysis focuses on articles, journals, countries, institutions and number of citations retrieved by the analyzed articles. For this analysis, the information provided by the Web of Science database through the "Analyze Results" and "Create Citation Report" sections were used. Moreover, "VOSviewer" software was used to map the keywords, and the co-occurrence of keywords represented the basis of this analysis. The main results illustrate the most relevant articles, journals, countries, authors and institutions with contributions to decision making, entrepreneurship, and performance research. The findings illustrate that the proximity between the concepts entrepreneurship and performance describes a strong relatedness between them, while the distance between entrepreneurship and decision making is showing a weaker relatedness.

Keywords: Bibliometric Analysis, Decision Making; Entrepreneurship, Performance, Vosviewer.

Introduction

The concepts "decision making" and "performance" represent two topics that are increasingly interconnected in the academic research. The notion of decision making is closely linked to the efficiency of an organization, its long-term success and organizational performance. In this respect, the decision making process is a key factor in determining the performance of an organization. The existing link in the academic research regarding these two concepts was studied in detail through a bibliometric analysis in a previous research (Gora, 2019). On the other hand, another concept related to organizational performance, that has attracted attention in time for its relevance to a firm performance, belongs to the entrepreneurship field and it is represented by the entrepreneurial orientation (Andrade-Valbuena, Merigo-Lindahl and Olavarrieta, 2019).

In this concern, the purpose of this paper is to map and cluster the existing connection between the concepts of decision making, entrepreneurship and performance from the research literature. This will provide an overview of the influential relationships in the literature, for future research on the studied topic, through a bibliometric analysis. Firstly, this study is underlining the most active and influential articles, authors and journals with contributions related to the subject analyzed, as well as the impact of these articles from the perspective of the number of citations received. Secondly, by mapping and clustering a keywords analysis, this article aims to graphically highlight the keywords of this research and to emphasize the connection of these keywords with other concepts in the field. Also related to keyword analysis, the research aims to present a map that showing the links between keywords in time.

The bibliometric mapping and clustering techniques are tools that help in structuring and visualizing the research and academic literature. During time, the bibliometric analysis has been performed on different research topics, using various databases and data analysis software. Blanco-Mesa, Merigó and Gil-Lafuente (2017) carried out a bibliometric analysis on the subject of "fuzzy decision-making" to highlight the main contributions in this field. Their article is based on the analysis of 950 articles

related to the research topic, articles extracted from the Web of Science (WoS) database. The "VOSviewer" software was used for mapping the keywords analysis. Related to "the expatriates and their impact on business performance" topic, Dabic, González-Loureiro and Harvey (2014) performed a bibliometric analysis on the existing analysis in the academic literature on these concepts, using 438 articles from the WoS database and the "Wordstat" software for keyword analysis. Regarding the entrepreneurship education, Aparicio, Iturralde and Maseda (2019) use data extracted from the Web of Science (WoS) database on 325 articles and perform a bibliometric analysis using "SciMat" software. Also related to the subject of entrepreneurship education, starting from the data extracted from WoS, Fellnhofer (2019) analyzes 1773 peer-reviewed documents and performs a bibliometric mapping and visualization using "VOSviewer" software.

Furthermore, on the subject of entrepreneurship, other researches have been identified that carry out bibliometric analysis related to this field. For example, Andrade-Valbuena, Merigo-Lindahl and Olavarrieta (2019) perform a bibliometric analysis that aims to outline an overview of existing research in the academic literature on the topic of entrepreneurial orientation. Using data from Web of Science and VOSviewer software, through this article, these authors analyze articles published for over 20 years and highlight who are the main authors having contributions on this topic, the most relevant journals and the most important articles in entrepreneurial orientation research (Andrade-Valbuena, Merigo-Lindahl and Olavarrieta, 2019). Another bibliometric analysis in the field of entrepreneurship belongs to the author Dionisio (2019), who offers an overview of research on social entrepreneurship. This research is based on articles published in the "Social Enterprise Journal", a publication that explores the social entrepreneurship field, and uses for analysis the open-source software package "R". The main analyzes conducted through this article focus on identifying the key authors who publish in the field of social entrepreneurship, the most relevant institutions associated with this topic and their geographical areas (Dionisio, 2019).

Starting from the mentioned aspects, this paper aims to highlight, through a bibliometric analysis, the existing connection between the concepts of decision making, entrepreneurship and performance in research literature. The structure of this article it is presented below. The following section describes in detail the research methodology, the steps that have been taken to collect the data and the methods used for data analysis. This section is followed by the results' discussions on the analysis of the selected papers and the mapping analysis. The last section of this article outlines the findings, limitations and future directions of research.

Research Methodology

To carry out this bibliometric analysis, a keyword search process was performed in 2020 in the Web of Science Core Collection: Citation Indexes database. Starting from similar bibliometric articles of other researchers (Andrade-Valbuena, Merigo-Lindahl and Olavarrieta, 2019; Aparicio, Iturralde and Maseda, 2019; Blanco-Mesa, Merigó and Gil-Lafuente, 2017; Dabic, González-Loureiro and Harvey, 2014; Fellnhofer, 2019), a topic keyword search in Wos (includes searches in the following fields within a record: title, abstract, author keywords and Keywords plus) was used, with the words ""decision making"*", "entrepreneurship" and "performance", using the 'and' connector between them. Also, the wildcard `*` and the signs `""` were used to find all the combinations of the decision making notion (e.g. decision-making, decision making, etc.) and to extract records containing the exact phrase of "decision making". This search was limited to articles published in the Web of Science database from 2000-2019 and a total of 456 articles were obtained. Subsequently, a series of filters were made, for keeping into analysis only the articles written in English and falling under "Business", "Management", "Economics" or "Operations Research Management Science" WoS categories. Also, only articles containing the "Article", "Review" or "Proceedings Paper" types were included in the analysis, while the category "Book Chapter", "Early Access" or other document types were removed. In total, 378 articles fulfilled these characteristics, these being selected for analysis in this research.

Following the selection of the 378 articles, the objectives of this research were to carry out the following types of analyzes:

a) The analysis of 378 selected papers by referring to:

- Yearly distribution of articles published in the period 2000-2019.
- Distribution of articles by authors or co-authors' country of origin.
- Highlighting the authors with the most contributions related to the subject analyzed.
- Highlighting the institutions with the most contributions related to the subject analyzed.
- Paper distribution on conference volumes or journals.

b) The analysis of the received citations:

- Top 10 articles sorted by the received citations.
- Top 10 journals sorted by number of received citations.

c) The analysis of the keywords:

-The occurrence, co-occurrence and the links between keywords.
-The keywords map (grouped in clusters).
-The mapping links between keywords in time.

Different research methods were used to carry out the 3 types of analyzes. Thus, for the analysis of the 378 selected papers and of the citations received the information provided by the Web of Science database through the "Analyze Results" and "Create Citation Report" sections were used. To perform the co-occurrence of keywords analysis, the "VOSviewer" software developed by Nees Jan van Eck and Ludo Waltman (2011) was used. This tool is a powerful network analysis software (Vallaster et al., 2019; Van Eck and Waltman, 2010), that helps to examine the structures of the addressed research field and to visualize the dynamics of a science. "VOSviewer" software has been used over time to perform bibliometric analyzes in various fields (Andrade-Valbuena, Merigo-Lindahl and Olavarrieta, 2019; Blanco-Mesa, Merigó and Gil-Lafuente, 2017; Fellnhofer, 2019; Vallaster et al., 2019).

Results and Discussions

Within this section, 3 types of analyzes have been performed through this paper, namely: selected papers analysis, citations analysis and keywords analysis.

Selected papers analysis

A first objective of the present research was to analyze the 378 scientific papers available on the Web of Science database, having the decision making, entrepreneurship and performance topics. Thus, the distribution of the selected papers by years, countries, authors and institutions with contributions related to the subject, as well as the distribution of 378 articles on conference volumes or journals were analyzed.

The distribution of the papers published between 2000-2019 per years is presented in Table 1.

Table 1: Distribution of 378 selected articles per year

Year	Number of articles	Percentage	Cumulative percentage
2000	4	1.06%	1.06%
2001	3	0.79%	1.85%
2002	3	0.79%	2.65%
2003	4	1.06%	3.70%
2004	5	1.32%	5.03%
2005	4	1.06%	6.08%
2006	10	2.65%	8.73%

2007	13	3.44%	12.17%
2008	10	2.65%	14.81%
2009	11	2.91%	17.72%
2010	20	5.29%	23.02%
2011	14	3.70%	26.72%
2012	16	4.23%	30.95%
2013	16	4.23%	35.19%
2014	15	3.97%	39.15%
2015	36	9.52%	48.68%
2016	46	12.17%	60.85%
2017	52	13.76%	74.60%
2018	58	15.34%	89.95%
2019	38	10.05%	100.00%

Source: WoS (2020a)

By analyzing the information provided by Table 1, it can be observed that the number of scientific articles referring to the topic of decision making, entrepreneurship and performance was generally increasing between 2000-2019. The highest number of articles published in a year was 58 (15.34% of the total of 378 articles), in 2018 and the smallest number of articles published during the analyzed period was 3, registered in 2001 and 2002. Moreover, the cumulative percentages in Table 1 illustrate that over the last 4 years of the analyzed period, and more precisely in the period 2016-2019, more than half of the total number of selected articles were published (51.32%). This might suggest that lately the topics of decision making, entrepreneurship and performance, as well as the study of the links between these concepts, have attracted attention and have begun to represent an area of interest for researchers.

As far as the country of the authors is concerned, there are a total of 39 countries / regions to which at least one author of the 378 selected articles is affiliated. As shown in Figure 1, 5 countries accumulate 74.34% of the total selected articles, namely: USA, England, Germany, Italy and Peoples R China.

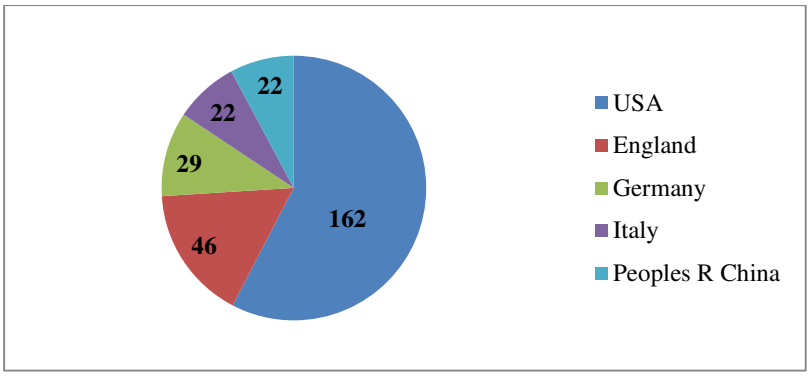

Figure 1: Distribution of articles by country

Source: WoS (2020a)

Thus, with a total number of 162 documents (42.86%), the USA is the country with the largest number of articles to which at least one of the authors of the selected papers is affiliated. In second place is England, with a total of 46 articles (12.17% of the total).

Table 2 lists the top 8 authors and institutions with contributions on the topics of decision making, entrepreneurship and performance ranked by the number of published articles and affiliated to those authors or institutions.

Table 2:Top 8 authors and institutions with contributions on the analyzed subject

Authors		Top 8	Institutions	
Author Name	**Contributions**		**Institution Name**	**Contributions**
Shepherd D.A	7	1	Indiana University System	18
Baron R.A	5	2	Indiana University Bloomington	17
Sarasvathy S.D.	5	3	State University System of Florida	14
Wincent J.	5	4	Indiana University Kelley School of Business	12
Busenitz Lw.	4	5	Syracuse University	10
Dimitratos P.	4	6	University Of North Carolina	10
Morris Mh.	4	7	University of Oklahoma Norman	9
Verheul I.	4	8	University of Oklahoma System	9

Source: WoS (2020a)

A total of 863 authors contributed to the writing and publication of the 378 articles analyzed through this research. Analyzing table 2, it can be observed that the most contributions on the studied subject belong to the author Shepherd D.A., who published a total of 7 documents out of the total of 378. As for the institution to which this author is affiliated, according to information from the Web of Science database, it appears that this author is affiliated with 4 institutions, two of them being in the top 8 institutions illustrated in Table 2, namely "Indiana University System" and "Indiana University Bloomington". The next authors, according to the number of articles published on the subject analyzed, are Baron R.A, Sarasvathy S.D. and Wincent J., having 5 articles. These authors are not affiliated with any institution listed in Table 2. On the other hand, by analyzing the institutions affiliated with the authors of the 378 selected and analyzed articles, from Table 2, it can be stated that the institution with the most contributions on the subject, namely 18 articles, is Indiana University System, followed by Indiana University Bloomington, which contributes with 17 articles related to the topic analyzed.

Papers` distribution on conference volumes or journals are presented in Table 3.

Table 3 : Papers` distribution on conference volumes or journals

Rank	Conference volume or journal	Articles
1	Journal of Business Venturing	29
2	Entrepreneurship Theory and Practice	14
3	Journal of Business Research	14
4	Small Business Economics	12
5	Journal of Business Ethics	10
6	Journal of Small Business Management	10
7	Journal of Management	9
8	Strategic Management Journal	9
9	International Small Business Journal Researching Entrepreneurship	8
10	International Business Review	7

Source: WoS (2020a)

In total, the 378 selected articles were published in 166 journals or conference volumes that are directly related to the topics of decision making, entrepreneurship and performance. Most papers written on the subject analyzed are published in the "Journal of Business Venturing" (29 articles), in the "Entrepreneurship Theory and Practice: (14 articles) and in the "Journal of Business Research" (14 articles).

Citations Analysis

The second objective of the present paper was to analyze which are the most cited paper related to the topic analyzed, namely decision making, entrepreneurship and performance and which are the journals in which the 378 selected papers cumulate the highest number of citations.

The 378 analyzed articles have received from the moment of publication until the moment of this analysis (March 10th, 2020) a total number of 14,837 citations. Table 4 presents the Top 10 most cited articles related to the topic analyzed.

Table 4: Top 10 most cited articles on the analyzed subject

No.	Authors	Total number of citations	Average citations per year
1	Sambamurthy, Bharadwaj and Grover (2003)	991	55.06
2	McMullen and Shepherd (2006)	879	58.60
3	Alvarez and Busenitz (2001)	746	37.30
4	Shane and Cable (2002)	653	34.37
5	Baron (2008)	487	37.46
6	Covin, Green and Slevin (2006)	465	31.00
7	George (2005)	430	26.88
8	Baum and Wally (2003)	376	20.89
9	Lepoutre and Heene (2006)	328	21.87
10	Shrader, Oviatt and McDougall (2000)	308	14.67

Source: WoS (2020b)

Analyzing Table 4, it can be observed that the most cited article related to the topic analyzed through this article is written by the authors Sambamurthy, Bharadwaj and Grover (2003). The total number of citations accumulated since the date of publication until the time of analysis (March 10th, 2020) was 991, which represents an average of 55.06 citations per year. The article in the second position of the Top 10 most cited articles belongs to the authors McMullen and Shepherd (2006) and has accumulated a total of 879 citations. An important aspect to be mentioned regarding this article that occupies the position 2 in the ranking of the most cited articles in the total of the 378 documents analyzed, refers to the fact that one of its authors, namely Shepherd, is the first one in the ranking of the authors with the most many contributions related to the topic analyzed - decision making, entrepreneurship and performance (according to the information provided in Table 2).

The oldest article in the Top 10 most cited articles was written in 2000, belonging to the authors Shrader, Oviatt and McDougall (2000) and it is 10th as rank, with a total number of 308 citations. On the other side, the most recent article in the analyzed top was published in 2008 and belongs to Baron (2008). This article has accumulated 487 citations, which represents an average of 37.46 citations per year. Moreover, based on the information provided by Table 2, it can be observed that the author of this article, Baron, is in the second position in the Top 8 authors with contributions related to the analyzed subject, having published a number of 5 articles on this topic. In conclusion, it can be stated that there are more recent papers that have received more citations than other articles which were indexed before. This finding illustrates that the high number of citations received by these articles is

due to the quality and relevance of the topics they are dealing with, but also due to the opportunity to be published in prestigious journals.

The top 10 journals, according to the number of citations accumulated from the publication of articles from the 378 selected and analyzed, it is presented in Table 5.

Table 5 : Top 10 journals ranked by number of citations of the analyzed papers

Rank	Journal name	Articles	Citations	Average citations per article	% of 14.837 citations
1	Journal of Business Venturing	29	1881	64.86	12.68%
2	Journal of Management	9	1516	168.44	10.22%
3	Academy of Management Review	4	1433	358.25	9.66%
4	Entrepreneurship Theory and Practice	13	1209	93.00	8.15%
5	Journal of Business Ethics	10	1104	110.40	7.44%
6	Strategic Management Journal	9	1036	115.11	6.98%
7	Mis Quarterly	2	992	496.00	6.69%
8	Management Science	4	920	230.00	6.20%
9	Academy of Management Journal	5	909	181.80	6.13%
10	Organization Science	7	433	61.86	2.92%
Total		**92**	**11,433**	**-**	**77.06%**

Source: Created by author with VOSviewer (Van Eck and Waltman, 2020)

By analyzing Table 5, it can be observed that the "Journal of Business Venturing", in which most articles with contributions on the decision making, entrepreneurship and performance topic were published (29 articles), it is also the journal that accumulates the largest number of citations through the 29 articles, namely 1881, which represents 12.68% of the total citations of the 378 articles during the analyzed period. The second place, according to the citations accumulated, is represented by the Journal of Management which totals a numbers of 1516 citations, with 9 published articles (10.22% out of the total of 14.837 citations).

On the other hand, a more relevant analysis of the top journals that accumulate the most citations can be highlighted based on the average citations per article. In this regard, it can be noted that "Mis Quarterly", which is not in the Top 10 conference volumes or journals with contributions related to the analyzed subject, accumulated, by the 2 published articles, a total of 992, which represents an average of 496 citations per article. The second place in the ranking, according to the average citations per article, is the "Academy of Management Review", which cumulates a number of 1.433 citations, with 4 articles out of the 378 articles analyzed, which represents an average of 358.25 citations per article.

Connections of keywords on decision making, entrepreneurship and performance research

The last objective of the present research was to analyze the keywords from the 378 selected articles and to perform the keywords map. For this analysis, both the keywords provided by the authors and the keywords in the "keywords plus" category were considered and the following steps were taken:

Step 1: Extracting various information regarding the 378 articles analyzed from the "Web of Science" database: article title, authors, abstract, year of publication, keywords mentioned for each article.

Step 2: Inserting information collected from the "WoS" database into "VOSviewer" software (Van Eck and Waltman, 2020) for creating a map based on bibliographic data. During this stage, the "VOSviewer" software counted a total of 1894 keywords found in the 378 articles published on the topic of decision making, entrepreneurship and performance.

Step 3: Choosing a minimum number of occurrences per keywords equal to 20. In this context, the "occurrence" term illustrates the number of documents in which a keyword appears. As a result of this filtering, 25 keywords were retained for analysis.

Step 4: Highlighting for the 25 keywords analyzed the number of occurrences, the links between them and the co-occurrence (or the total strength between them) (Table 6).

Step 5: Creating the keyword map and grouping them into clusters (Figure 2).

As mentioned above, Table 6 presents the 25 keywords retained to create the map, ranked after the number of occurrences.

Table 6 : The keywords` number of occurrences, number of co-occurrences and links

No.	Keyword	Number of Occurrences	Links	Number of Co-occurrences
1	Performance	201	24	579
2	Entrepreneurship	151	24	448
3	Decision-making	139	23	387
4	Corporate entrepreneurship	63	23	198
5	Innovation	62	24	208
6	Firm performance	61	23	174
7	Management	57	24	205
8	Firms	50	21	157
9	Model	40	24	140
10	Strategic decision-making	40	20	117
11	Entrepreneurial orientation	39	20	130
12	Organizations	36	23	126
13	Business	35	22	123
14	Strategy	33	20	110
15	Orientation	32	24	116
16	Growth	32	21	110
17	Behavior	30	22	103
18	Impact	29	22	91
19	Decision making	26	20	89
20	Risk-taking	24	20	88
21	Knowledge	24	19	82

22	Perspective	24	22	80
23	Uncertainty	23	23	80
24	Moderating role	23	16	77
25	Effectuation	23	20	76

Source: Created by author with VOSviewer (Van Eck and Waltman, 2020)

Analyzing the information provided by Table 6, it can be stated that it is relevant to explain that by searching the three words (decision making, entrepreneurship and performance) in "Web of Science" after the topic (including searches in the following fields within a record: title, abstract, author keywords and Keywords plus), the word "performance" was mentioned as a keyword in 201 articles out of the total number of 378, the word "entrepreneurship" was mentioned in 151 of articles and the word "decision making" appears as a keyword in 139 articles under the form of "decision-making" and in 26 articles under the form of "decision making".

The VOS clustering technique, developed by Waltman, Van Eck, and Noyons (2010) was used to map the keywords and to group them under the form of clusters. The 25 keywords were assigned by the "VOSviewer" software in three clusters marked with different colors in Figure 2. The red cluster and the green cluster are composed of nine keywords, while the blue cluster is the smallest and includes seven keywords.

As explained in previous articles (Gora, 2019; Popa and Gora, 2020), the VOS clustering technique uses the number of nodes, the links between them, the total number of links and the total strength between them (the number of. co-occurrence). Moreover, VOS clustering provides for each node the distance from others and each node is positioned in a two-dimensional space (a representation called mapping).

Figure 2 presents a map with 25 nodes (based on the number of keywords that appear in at least 20 documents out of the total 378, also present in Table 6). The size of a node is given by the number of articles in which the keyword is found. From Figure 2, it can be observed that the largest node is represented by the keyword "performance", followed by the node "entrepreneurship".

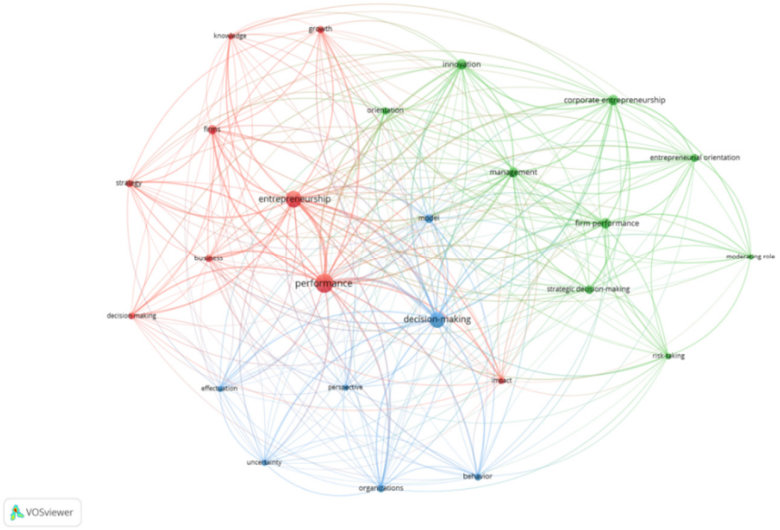

Figure 2 : Keywords map
Source: Created by author with "VOSviewer" (Van Eck and Waltman, 2020)

An important aspect to be discussed is concerning the connections between the nodes. From Figure 2, it can be observed that these links are represented by curved lines, having different thicknesses. The thickness of a line is given by co-occurrence (or the link strength between keywords). Thus, the thicker the line between two keywords, the stronger is the link between those keywords. In this sense, Figure 2 illustrates that the strongest co-occurrence keyword (or the total link strength) is formed between "performance" and "entrepreneurship". The next strongest co-occurrence is between keywords "performance" and "decision-making", followed by keywords "entrepreneurship" and "decision-making".

Furthermore, the relatedness of keywords (which refers to the distance between the nodes or keywords) is another aspect to be discussed. This aspect highlights that the closer the two keywords are on the map, the stronger is the relationship between them. In this respect, Figure 2 illustrates that the proximity between entrepreneurship and performance describes a strong relatedness, while the distance between entrepreneurship and decision-making shows a weaker relatedness.

Also, in terms of keyword analysis, a second map was performed, presented in Figure 3, that illustrates the mapping links between keywords in time.

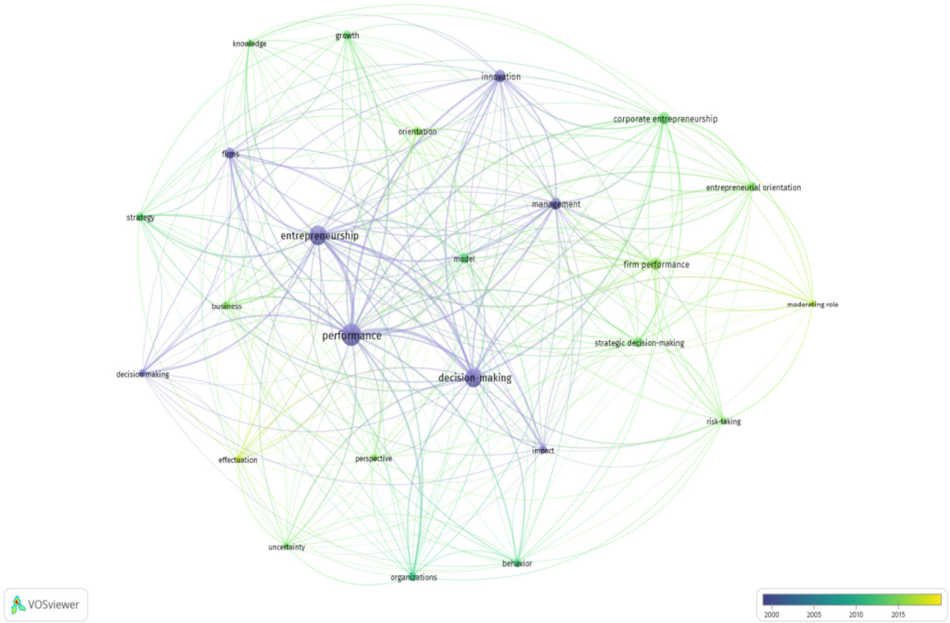

Figure 3 : Mapping links between keywords in time.
Source: Created by author with "VOSviewer" (Van Eck and Waltman, 2020)

From Figure 3, it can be noticed that at the beginning of the analyzed period, and more specifically, in the period 2000-2005, the researches focused on "performance", "entrepreneurship", "decision-making", "innovation" and "management". Between 2005-2015 the academic research focused more on topics such as "organizations", "behavior", "knowledge" or "strategy". In the last analysis period, respectively 2015-2019, the keyword "corporate entrepreneurship" becomes a representative subject for researchers. Also, during this period, the research focused on other topics such as "firm performance", "entrepreneurial orientation" and "strategic decision-making".

Conclusions

Through this research, a general bibliometric analysis was conducted, which focused rather on the content of the analyzed documents than on the three types of analyses (the analysis of selected papers, the analysis of the received citations and the analysis of the keywords). The results of the

existing connection between the concepts decision making, entrepreneurship and performance highlighted which are the most active and influential articles, authors and journals.

Firstly, the general overview of decision making, entrepreneurship and performance research illustrated that the USA is the country with the most contributions in this subject. Shepherd DA is the author with the most articles published on this topic, in the "Journal of Business Venturing" being published 29 articles out of the 378 analyzed articles.

Secondly, the analysis of the most relevant articles and journals with contributions in the field, based on the number of citations accumulated, revealed that the 378 articles accumulate a total of 14,837 citations at the time of this analysis. The most cited article totals 991 citations and it was written by the authors Sambamurthy, Bharadwaj and Grover (2003). The journal with the highest number of citations by published articles on the subject analyzed was "Journal of Business Venturing" with 1881 citations (an average of 64.86 citations per article). However, if we refer to the average citations per article, the most relevant journal was "Mis Quarterly", having an average of 496 citations per article.

Lastly, the findings have shown that the proximity between the entrepreneurship and performance concepts describes a strong relatedness between them, while the distance between entrepreneurship and decision-making shows a weaker relatedness. Also, from mapping links between keywords in time, it was found that in the period 2000-2005, the articles related to the analyzed topic focused rather on concepts such as "performance", "entrepreneurship", "decision-making", "innovation" or "management". In comparison, in the period 2015-2019, the "corporate entrepreneurship" keyword became representative, along with other concepts such as "firm performance", "entrepreneurial orientation" and "strategic decision-making".

The implications of this study might be useful to researchers and practitioners interested in this topic because it highlights the links between the three concepts analyzed: decision making, entrepreneurship and performance. Also, the article illustrates the correlation between the studied concepts and some other relevant ones, underlining the importance of these topics in academic research over time. Furthermore, the presentation of the most relevant articles, journals, countries, authors and institutions, with contributions on the analyzed subject, highlights the current state of existing academic research and opens new perspectives to continue research in this field, starting from the bibliometric analysis of the academic literature in the field.

Moreover, this article provides value for entrepreneurs, as it illustrates that over time researchers have highlighted the importance of the decision-making process, for achieving organizational performance. In this concern, by taking into account the findings of this research, entrepreneurs could be more aware of the correlations between these concepts. Moreover, several methods and techniques could be identified for better underlining their decisions and for achieving more efficiently and effectively the objectives set, concerning the organizational performance.

Given that the aim of this article is to provide an overview of the academic research on decision making, entrepreneurship and performance, it is important to emphasize that there have been some limitations of the research. Thus, a first limitation of the research is that the articles and information analyzed through this paper were only extracted from the "Web of Science" database. This could exclude a few relevant articles with significant contributions on the analyzed topic, published in other databases such as Scopus, Science Direct, etc. A second limitation of the research could be the period analyzed (2000-2019), existing the possibility of excluding some important papers published before or after this selected period, or even papers published during the analyzed period, but which were not yet included in "WoS" database at the time of analysis. Another limitation of the research could be the fact that only the articles in the "Business", "Management", "Economics" or "Operations Research Management Science" WoS categories were analyzed. Finally, the use of "VOSviewer" software could represent a research limitation because it does not allow the analysis of articles and information extracted from different databases at the same time, and the results highlighted by this tool should be taken with caution.

As for future research, this could also include analysis of articles published in other databases on the topics of decision making, entrepreneurship and performance, in order to extend and generalize the findings. Moreover, other bibliometric analysis techniques such as bibliographic coupling, networks connected by co-authorship, co-citation links, etc. can be used on the subject analyzed by this research.

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Education as An Instrument Supporting the Economic Socialization of Young Generation

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Abstract

This study aims to determine the relations between particular factors affecting the young consumer behaviour, and to identify the models of consumption and preferences of generation Y, and consequently to indicate the importance of education a crucial instrument for young people's socialization. The scope of research comprises young consumers from generation Y in selected countries around the world, with particular focus on the students of economy faculties at the universities in Poland and Croatia. The cognitive evaluation of factors affecting the young consumer behaviour in the consumption processes made it possible to obtain original research results, allowing to select the most important factors and preferences affecting the purchasing decisions of generation Y. The empirical research conducted by the authors of this study proves that for many young people, price, quality and brand are still very important, but the environmental and social issues are more and more acknowledged. This indicates that the consumption among the young does not reveal only hedonistic aspects, but also features the economic and environmental aspects.

Keywords: Young Consumers, Taking Decisions, Education, Economic Socialization, Generation Y, Multiple Correspondence Analysis

Introduction

Over the past decades, the concept of consumption has significantly been developed. It was formed by concepts such as 'consumer society', namely the society with consumption in the centre, and 'consumerism' defined as overemphasis on acquiring material goods. The consumption and consumerism shall not be used as synonyms. It results from the fact that consumption as a feature refers to individuals and consumerism is attributed to the society (Bauman, 2009, p.36). Moreover, the difference involves the fact that consumerism occurs when the consumption becomes the main driving force of the society and takes the key role, e.g. becomes a stronger rationale than work (Bywalec, 2010, p.17).

In recent years, especially after the crisis which began at the turn of 2008, consumerism became the subject of severe criticism. More and more people, especially more educated part of the society, raise a growing objection to the attitude of people who purchase large volume of material goods and services unreasonably beyond their actual needs as well as the ecological, social and individual costs, and who perceive their increased consumption as a measure of the quality of life or the most important or alternatively the only value. The disapproval of consumerism may apparently seem as aberration since in general it is believed that the abundance of consumer goods used to satisfy various needs shall be treated as good. Meanwhile, as reality shows that uncontrolled and excessive consumption brings numerous threats and adverse consequences. The negative effects of consumerism include, first of all: waste of natural resources, human labour, goods and destructive impact on the spiritual side of human life, allowing the situation where the more you have, the greater the desire to possess even more, materialistic approach to life, tendency to consume for show, and increasing addiction to compulsive buying.

The phenomenon of consumerism was acknowledged the civilization disease and named affluenza. This extreme symptom of consumerism is a civilization disease caused by 'continuous search for satisfaction provided by things which cannot bring any satisfaction'. The symptoms of this disease include: nervous tension, rush, feeling of relentless fatigue and dissatisfaction, feeling of continuous lack of something, which leads to nearly obsessive buying. Whereas the implications include: permanent indebtedness in banks, workaholism, deteriorating relations with the society, excess of post-consumer waste[i].

Apart from the negative phenomena and implications, the consumption, consumers and consumption civilization are also defined by positive aspects and roles to play, e.g.: developing own interest through the consumption, consumption related to work is a factor leading to gaining better and better education, the development of needs drives the market, new forms of trade are developed and the economic structure is changed, technique and science develop (Słaby, 2007, p.16). On the one hand, the negative and positive aspects of consumption raise questions on the nature of needs and their finiteness; on the other, indicate that proper reduction in consumption is no threat, and the consumption civilization should be associated with its more and more reasonable depiction.

The optimal method leading to respect and the ability to accept good models of consumer behaviour among the young is education. Education is the key instrument that may be used to limit the impulsive consumption. It may contribute to preventing the atomization of social and family life as well as its consequences, such as: cult of individualism, hedonistic and utilitarian attitude to life, new lifestyles e.g. instant, fragmentation of identity, ubiquitous entertainment leading to infantilization of thought and behaviour, as well as addictions.

This study aims to determine the relations between particular factors affecting the young consumer behaviour, and to identify the models of consumption and preferences of generation Y, and consequently to indicate the importance of education as a crucial instrument for young people's socialization. The scope of research comprises young consumers from generation Y in selected countries around the world, with particular focus on the students of economy faculties at the universities in Poland and Croatia.

The article is structured as follows: the first part comprises introduction, the second presents the demographic profile of young consumers in the light of empirical research, the third presents the shopping preferences of young consumers from generation Y, the fourth analyses the research material and describes the method, the fifth comprises research results, whereas the sixth and the last one provide the conclusions.

The demographic profile of young consumers in the light of empirical research with particular focus on generation Y

The research on young consumer behaviour constitutes an important trend in the analyses of the quality of life among societies. So far, numerous theoretical frameworks have been developed, in relation to the impact of consumption on every person's life, on the general level shaping the lifestyle and on the level of particular choices. The review of reference literature confirms that the style of making shopping decisions (purchasing styles, consumer decision-making styles) may be categorized into three main attitudes emphasized by Sproles and Kendall: psychographic attitude (concentration on defining the lifestyle), descriptive attitude (consumer characteristics approach) and consumer typology attitude (defining recipient groups) (Lysonski et al. 1996;Sproles, Kendall, 1986). Therefore, we can determine that the shopping styles result from mental orientation towards making choices in the purchasing process and the result of using the skills acquired through own experience that are relatively permanent, both in time and in different conditions and education. The examples involve differences in the shopping decision-making styles in the third group of receivers, determined by Sproles and Kendall, featuring young people divided into generation X, Y, and Z.
Generation X includes people born between 1965 and 1979. The representatives of generation X appreciate values, such as: personal development, independence, diversity, diligence and professional stability. In general, people from generation X believe that promotion is gained through hard work

and everything in life must be earned individually. Generation Y, the so-called 'millennials', includes people born between 1980 and 1990. People from generation Y are multitasking employees open to new challenges. They are strongly engaged in their work – provided that they perceive the work as interesting. Furthermore, they value flexible working hours and are open to relocation. They look for work which is going to satisfy them financially and the new employer will ensure their professional development. The representatives of generation Z include people born after 2000. They do not know the world without new technologies which, for them, are the main instruments used to acquire knowledge. They can move around smoothly in the virtual world and quickly analyse the information. They are perceived as pragmatics since they are aware of changes arising from the future automation and lack of stability. They look for work that will ensure their development.
The consumers from generation Y constitute a specific group, regarding their characteristic approach to consumption. The people who recently entered the labour market have significant financial potential and are very active as consumers. It is confirmed by studies conducted by Bitette (2019), which indicate that the millennials (generation Y), as clients are becoming a group of clients most influential on the world market of goods and services. It is predicted that e.g. in the USA the consumers between 17 and 34 years of age will spend 200 billion USD on consumption annually, and throughout their whole life over 10 sextillion USD (Lobo 2014). According to the PEW Research Center (2010) Report on the American society, generation Y is also the most educated one in the American history. The young consumers from this generation are also open to new trends and eager to new experience. According to the Travelport Report (2018), 51% of the American millennials went travelling in 2018.

Because of their upbringing in the 'digital era', generation Y is used to enjoy technical novelties and quick methods of communication. The survey by IPSOS (2019) conducted in Great Britain in 2013 indicated that 77% of the generation Y representatives used the Internet several times a day, and 54% used mobile devices to this end. The trend refers not only to the developed countries but also to the developing ones. People between 18 and 24 and between 25 and 34 years of age frequently use the social media. According to the DataReportal Report (2019), 24% of women and 35% of men frequently use facebook.com. and generation Y is the largest generation to use this platform. Whereas, the Horowitz Group Report (2018) indicates that more than 60% of the surveyed between 18 and 24 years of age use three platforms on a daily basis: Facebook, Instagram and Snapchat. For comparison, within a group of people aged between 25 and 34 years old, 80% mainly use Facebook.
The above mentioned research results indicate that nowadays, the Internet is becoming the main information medium for the young. On the one hand, the Internet is a quick source of information on any sphere of life and on any topic, and on the other, it generates the 'information overload' which involves the overflow of information, where it is difficult to find real and essential information. As emphasized by Berg (2018) (see also: Batat, 2010; Singh, 2012), young people as a large group of Internet users, are particularly exposed to the digital commercial pressure, especially when we take into account easy access to personal data, often used by the suppliers of goods and services.

The previous analyses of the behaviour of young consumers, with particular focus on generation Y, concentrated mainly on the general typology of consumers and on defining the recipient groups. In this context, it is worth presenting the research results defining the attitude and models adopted by the young consumers from generation Y, which has been described in the next part of this article.

Shopping preferences of young consumers from generation Y

The prospective model of consumption is still under discussion. In principle, there are only general suggestions about the impact on its structure. It is a demanding task as the models of consumption change in time and are closely connected with the increase in the society living standards. In recent years, significant emphasis is put on the issues of sustainable development of consumption. The sustainable consumption involves the use of goods and services to fulfil the needs in a satisfactory manner, improving the living standards, and, at the same time, to make it also available for future generations. Certainly, as emphasised by H. Pondel (2013, p. 21), these issues shall be perceived on multiple levels and not perceived only as ecological issues.

It is worth combining the analysis of the behaviour of young consumers from generation Y and their attitude to sustainable consumption with the issue of collaborative consumption which can be defined as the highest level of ecological awareness. Recently, it significantly gained in importance since it provides people with benefits resulting from the title to ownership combined with lower individual burden and lower costs, as well as lower detrimental impact on the environment. The collaborative consumption among the young is becoming more and more convincing alternative to the traditional forms of purchasing and possessing goods and services. Within the collaborative consumption the goods that constitute private property can be shared or leased to other people. It seems that collaborative consumption will prove to be neither niche trend nor temporary fashion. It features the social and economic changes resulting from better care for the natural environment and the cooperation with local community.

Interesting research results were presented by Ordun (2015), where the behaviour and preferences of clients coming from various age groups were compared. The survey was conducted among 4000 clients of two fashion companies, operating on the world markets and having more than 100 international stores. The survey focused on 13 features of products and their impact on purchase, and consequently: price, trend, loyalty, prestige, brand, volume (size), quality, suggestions, advertisement, environment, availability, diversity and service. The explorations indicated that the analysed clients from generation Y opted more often for the price, trend, prestige, brand and service. Interestingly, they rarely relied on the suggestions of other people or advertisements. Moreover, the presented analyses make it possible to attribute the following features to the consumers from generation Y:

- they are characterised by special ethos of cooperation with companies and brands. they want to co-design a particular product and brand (see Lewis 2013);
- they have a lot of friends and colleagues, both in real life and online. they share their experiences, observations and desires with others via social media (see Horowitz 2018);
- they are not confrontational in relation to other generations;
- they expect that the technologies they use on a continuous and uninterrupted basis will be user-friendly;
- they value experience, discoveries and emotions (see Uptin, 2016).
- they follow their own values and desire authenticity (see Solomon, 2018).

The social and cultural changes seem inevitable. They are going to influence more significantly the changes in consumer behaviour. The cultural context is extremely important in developing the consumption models, especially of the young. Meanwhile, the market began to fill in the social vacuum resulting from rapid transformations in every sphere of social and economic life, to a larger and larger extent. The market became not only the most important sphere of social life, but also the model of social relations. It was clearly visible, first of all, in post-socialist countries, where after 1989, after years of shortage economy, they experienced the consumption boom and transformation in the models of consumer behaviour. We can say that generation Y is a generation where, on the one hand, their consumer choices are influenced by family and social identity (although the impact of these factors is decreasing), and on the other, by the Internet, including the promoted global trends. It was confirmed by the above mentioned results of studies conducted by researchers in various countries, as well as primary research conducted by the authors of this article, presented in the part entitled: statistical material and method, and results.

Statistical Material and Method

The analysis of factors taken into account upon doing shopping by the young between 18 and 25 years of age (generation Y) included questionnaires addressed to students of economy faculties in Poland and Croatia at the turn of 2019. The answers were obtained under their acceptance to participate in research. As many as 1340 correctly filled-in questionnaires were received, and among the respondents the dominant group included students from Poland, only every third student came from Croatia. Over 67% of the respondents were women. The questionnaire included nine factors that might be taken into account while doing shopping. They included: price, quality, brand, compound,

country of origin, advertisements, ecological markings, consumer awards and ecological packaging. The respondents were to assess the impact of these factors on their decisions. Moreover, the research included variables related to the country of origin and sex. The categories of variables received the following symbols:

- country: PL – Poland, HRV – Croatia,
- sex: K – women, M – man,
- level of the study: L1 – Bachelor's, L2 – Master's and PhD,
- price: P1 - always; P2 - usually; P3 – never,
- advertisement: A1 - always; A2 - usually; A3 – never,
- quality: Q1 - always; Q2 - usually; Q3 – never,
- brand: B1 - always; B2 - usually; B3 – never,
- compound: C1 - always; C2 - usually; C3 – never,
- country of origin: CR1 - always; CR2 - usually; CR3 – never,
- ecological marking : EM1 - always; EM2 - usually; EM3 – never,
- consumer awards: EP1 - always; EP2 - usually; EP3 – never,
- ecological packing : EP1 - always; EP2 - usually; EP3 – never,

The research was based on the Multiple Correspondence Analysis – MCA. The method enables to recognize accurately the coexistence of categories of variables (or objects) measured on a nominal scale. The algorithm for the application of Multiple Correspondence Analysis includes the following stages (Greenacre, 1984, 1993, 1994; Goodman 1986; Lebart, Morineau, Warwick, 1984; Stanimir 2005; Bąk 2009):

1. Computing the Burt matrix (B) to obtain the symmetric block matrix where apart from the main diagonal there are the contingency tables, corresponding to two different variables, containing the number of objects of fixed categories of these two features. Whereas, on the main diagonal there are diagonal matrices where non-zero values determine the count of occurrences of particular variable category.
2. Defining the volume of real co-existence area of variable category K under formula:

$$K = \sum_{q=1}^{Q} (J_q - 1) \tag{1}$$

   where: J_q – number of categories of variable q (q = 1, 2, …, Q), Q – the number of variables.
3. Verifying to what extent eigenvalues of lower dimension of space explain the total inertia[1] with the application of Greenacre criterion, indicating that research-significant are the principal inertias higher than $\frac{1}{Q}$.
4. Modifying the eigenvalues as per the Greenacre criterion to increase the quality of projection in *n*-dimensional space as follows:

$$\tilde{\lambda}_k = \left(\frac{Q}{Q-1}\right)^2 \cdot \left(\sqrt{\lambda_{B,k}} - \frac{1}{Q}\right)^2 \tag{2}$$

   where: Q – number of tested variables, $\lambda_{B,k}$ – k-th eigenvalue of matrix B (k = 1, 2, …, K), $\left(\sqrt{\lambda_{B,k}} = \gamma_{B,k}\right)$, $\gamma_{B,k}$ – k-th singular value of matrix B.
5. Presenting graphically the results of correspondence analysis in *n*-dimensional space, including the modification of eigenvalues. New values of coordinates are equal to:

$$\tilde{F} = F^* \cdot \Gamma^{-1} \cdot \tilde{\Lambda} \tag{3}$$

   where: $\tilde{F}$ – matrix of new coordinate values for the categories of variables, F* – matrix of primary coordinate values for the category of variables, Γ^{-1} – inverse of diagonal matrix of singular values, $\tilde{\Lambda}$ – diagonal matrix of modified eigenvalues.

[1]Total inertia λ is the K sum of eigenvalues, where K is the dimension of real space coexistence.

Results

The correspondence analysis was conducted under the Burt matrix sized 33×33 created from 21 variables of the above mentioned categories. The dimension of real space coexistence of answers to analysed questions determined under formula (1) totalled 21. During the subsequent stage it was verified to what extent the eigenvalues of space of lower dimension explain the total inertia (λ = 1.7500). To this end, the Greenacre criterion was applied, indicating that research-significant are the principal inertias higher than $\frac{1}{Q} = \frac{1}{12} = 0.0833$. Table 1 shows that these are inertias for K taking the values of max. 6. For these dimensions the value of measure τ_k was analysed. Moreover, the graph of eigenvalues was provided, and with the use of 'elbow' criterion it was possible to determine that the space of coexistence of various variables should be three-dimensional (fig. 1). The degree of explaining the inertia in this space amounts to 31.02% (tab. 1). In order to improve the quality of projection in three-dimensional space the modification of eigenvalues was implemented, under formula (2), which proved that after the modification the degree of explaining inertia increased to 67.76%.

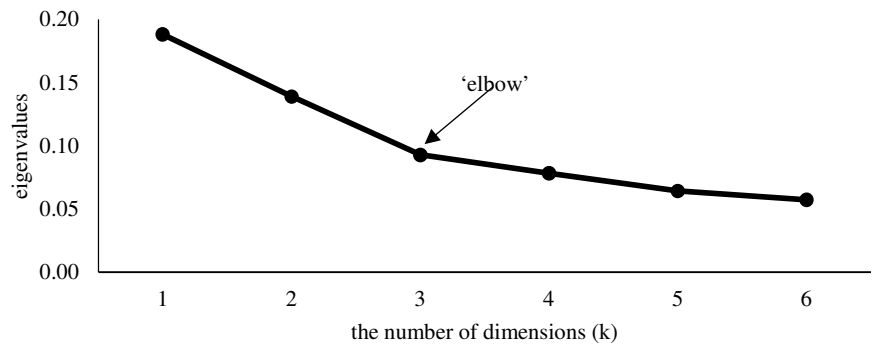

Fig. 1. Plot of eigenvalues - elbow criterion

Source: own elaboration

Table 1: Singular values, eigenvalues and the degree of explanation of total inertia in primary and modified version

K	Singular values (γ_k)	Eigenvalues (λ_k)	$(\lambda_k/\lambda) \cdot 100\%$	$\tau_k \cdot 100\%$	$\tilde{\lambda}_k \cdot 100\%$	$\tilde{\lambda}_k/\tilde{\lambda} \cdot 100\%$	$\tilde{\tau}_k \cdot 100\%$
1	0.4808	0.2312	13.2097	13.2097	18.8009	30.3750	30.3750
2	0.4248	0.1805	10.3137	23.5234	13.8797	22.4242	52.7992
3	0.3623	0.1313	7.5008	31.0241	9.2617	14.9633	67.7625
4	0.3396	0.1153	6.5888	37.6129	7.8134	12.6235	80.3860
5	0.3156	0.0996	5.6912	43.3041	6.4196	10.3715	90.7575
6	0.3026	0.0916	5.2318	48.5359	5.7207	9.2425	100.0000
7	0.2870	0.0824	4.7068	53.2427	$\tilde{\lambda} = 61.896$		

Source: own calculations using the Statistica 13.0 package.

The in-depth analysis of the results obtained based on the correspondence analysis involved the use of the Ward method; it enabled to determine the relations between the variable categories. The result depicted as dendrogram was presented in fig. 2.

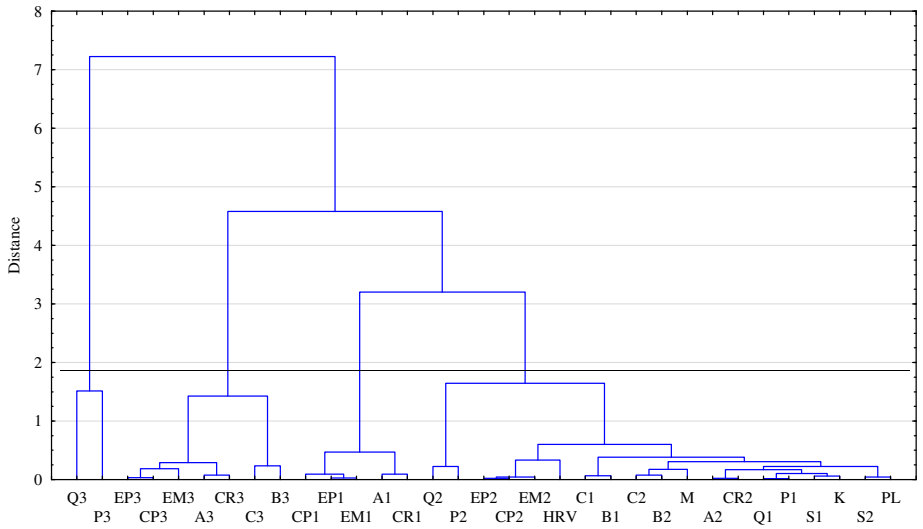

Fig. 2. Classification of categories of analysed variables using the Ward method

Source: own elaboration

The line of 'cut off' at the height of 1.426 was determined under Grabiński factor[ii]. On these grounds, four classes of categories were specified:

- Class I (P3, Q3), the smallest group (1% of the respondents) – consumers within the first group do not attach importance to price and quality of purchased products;
- Class II (B3, C3, CR3, A3, EM3, CP3, EP3), including ca. 3% of the respondents – young people within this group, in their purchasing decisions, do not attach importance to brand, compound, advertisements, country of origin, consumer awards and ecological issues.
- Class III (CP1, EP1, EM1, A1, CR1), including ca. 12% of the respondents – the representatives of this group in their consumer choices frequently or always take into account the advertisement of product, ecological issues (packaging and markings), as well as consumer awards and the product country of origin.
- Class IV (K, M, S1, S2, PL, HRV, P1, P2, Q1, Q2, C1, C2, B1, B2, A2, CR2, EP2, EM2), the largest group, ca. 84% of the respondents – the representatives of the fourth group include both women and men, living in Poland and Croatia, students of the first and second cycle studies, who take into account, first of all, the price, quality, compound and brand in their purchasing decisions. Whereas, they attach little importance to advertisements, country of origin and issues related to ecology.

In the analysis of consumption we can rely on two theoretical trends: hedonistic and eudemonistic. In the quantitative empirical analyses, based on experiments or statistical analysis of data from the surveys, in general the first one is applied. Following the assumptions included in the first trend, and analysing the data based on the conducted surveys it turns out that the contemporary generation Y is characterized, to a large extent, by the hedonistic approach. The results of conducted research also indicate that the economic and ecological awareness of the young Polish and Croatian consumers is increasing, although slowly. The economic awareness - since 84% included the respondents who, at their purchasing decisions, take into account, first of all, the price and quality. The ecological awareness – since 12% of young consumers, at their purchasing decisions, frequently or always take into account the ecological issues (packaging and markings), as well as the consumer awards and the product country of origin. It should be noted that among the respondents (within group IV) 84% emphasize that while purchasing goods they do pay attention to the compound, namely the materials used to make the goods. Therefore, the young people from this group of respondents take into account the ecological issues but do not give them priority. Under the conducted analyses we can also determine the shopping styles of the surveyed consumers and divide them into three groups: social (for show), utilitarian (decision-making based on quality and price) and pro-ecological. Summing up,

it can be concluded that the identified four classes of categories related to the buying preferences of consumers studying at the faculties of economy in Poland and Croatia prove that also in these countries (although rather slowly at present) we can observe the revision of social and economic awareness among young people.

Conclusions

The authors' guiding idea is to identify key issues of the changing economic life in the context of economic socialization of young consumers, strongly correlated with the economic culture of societies in particular countries. This is the basic consideration since as G. Krzyminiecka (2009) puts it, the economic culture as the achievement of historic development exerts significant impact on the environment of economic processes, on the standards of human behaviour and the quality of interpersonal relations in organizations. It also affects the conditions of dissemination of knowledge on economic processes in societies, and consequently, the development of human capital for economic purposes.

At present, the most current social issues include those related to social change, namely globalization, consumption and technological development. As emphasised by Korzeniecka-Bondar (2016) and Krajewska (2015), for many social researchers (Alan Aldridge, George Ritzer, Jean Baudrillard, Zygmunt Bauman, Grzegorz Adamczyk, Felicjan Bylok, Mateusz Marciniak, Małgorzata Bogunia-Borowska and others), the consumption category constitutes the starting point for discussion on the contemporary society (consumption), culture (consumption) and human (consumer). Although the related studies are usually sociological or anthropological in their nature, the issue is also analysed in the area of economy and widely defined education. It results in the following constatation, namely that in the new millennium, where the consumerism boom has reached a significant level, the socialization has become a crucial issue. Therefore, numerous discussions among the representatives of various fields of science emphasize the importance of socializing processes, including the economic aspect which makes it possible to understand the surrounding economic reality. Within the meaning of market mechanisms, the key importance shall be attributed to education. It results from the following premises:

- thanks to the economic socialization, the young consumers can do shopping more effectively, and first of all, better understand the mutual influence of market components and the surrounding economic reality,
- economic socialization is a process taking place in the context of cognitive and social development of young people,
- as socialization in general, the economic socialization is a lifelong process since in the early stages of life, the habits related e.g. to consumption, expenditure planning and saving are developed.

Certainly, the socialization of young people cannot only be focused on economic premises since it is basically interdisciplinary in its character. Moreover, it must include numerous institutions, both formal and informal. In the case of young people from generation Y (and also other generations), the key elements include: family, closest environment, schools, universities and the country. Many universities provide educational activities to that effect; however, as emphasised by K. Szelągowska-Rudzka (2018, p. 221), despite the observed positive changes related to the form and lines of education at the universities, we need further, more widely understood, coherent and effective educational system, connected with mission and vision as well as strategy and development of universities. Wide access to the Internet provides enormous possibilities for the producers of goods and services to advertise their products on a local, regional, national and global level. The resulting 'information overload' makes the consumers confused. Education constitutes the main instrument used to strengthen the standing of consumers on the market since better informed consumers take more rational decisions and become the aware citizens in the global world. It also provides possibilities for the increase in consumers' awareness and focus on social choices. In the case of young people it must be based on developing the new models of consumer behaviour and the awareness of sustainable consumption. However, the research conducted e.g. by the authors of this

article shows that generation Y attaches importance to ecological issues, mainly in their declarations. Practically all research results (primary and secondary presented in this article) indicate that price and brand are the priority. Therefore, the young people from generation Y are not truly aware of prospects and risks resulting from unsustainable consumption, on both individual and social level. Meanwhile, it seems that the intensified youth movements in 2019 aimed to protect the natural environment show entirely opposite tendencies.

Thus, education is a prerequisite for building such awareness among the youth. First of all, it makes the economic socialization of the young, necessary not only to protect their own interests, more real, but also makes it possible to pressure the economic entities to address the environmental and social issues. The inspiration for research in this area came from the social, cultural, political, technical and technological changers we observe in recent years. As a result of these conversions the consumer behaviour began to transform quite rapidly. However, practice revealed that some premises e.g. regarding rationality of consumer behaviour influenced by the changed and rapidly changing reality lose relevance. As a result of these circumstances more and more economists begin to emphasize the exceptional role played by the consumers, in particular young people, and their impact on the development of companies and countries. In such situation it seems that in-depth analysis of this area of economy is not only advised, but also necessary to make it possible for the producers to schedule the production of goods and services for young consumers, and consequently obtain better results, in the scale of an individual company as well as the economy. Moreover, this study will be equally significant for scientists, economists, sociologists, psychologists, anthropologists, as well as those engaged e.g. in engineering and medical sciences, since this research may become inspirational for many of them and make them continue more thorough analyses.

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Notes

[i] Encyclopedia of Management, https://mfiles.pl/pl/index.php/Konsumpcjonizm

[ii] In order to divide the dendrogram and determine the number of classes, factor Grabiński (1992) was used: $\tilde{d}_i = \frac{d_i}{d_{i-1}}$,where d_i is i-th distance. The highest value $\tilde{d}_i$ indicated the dendrogram 'cut off' point.

Intramural Expenditures On R&D by Types of Costs in Poland: Evidence From NUTS-2 Regions

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Abstract

R&D activities play a significant role in firms' innovation activities and competitiveness of firms and regions. Within this context, the issues related to R&D expenditures are of particular importance. This paper aims to investigate how intramural expenditures on R&D by types of costs incurred by firms, universities and regional policy actors differ in Poland at NUTS-2 level. Special concern was put on current and capital expenditure on R&D. The empirical evidence was based on data from Statistics Poland, Local Bank Data for the period 2004–2018 (except of 2008, due to missing data). The zero unitarization method and multivariate analysis were employed to hypothesis testing. This paper provides a contribution to the discussion on R&D activities in Poland. The findings reveal relatively high diversity between regions at NUTS-2 level in Poland in terms of current and capital expenditures on R&D incurred by firms, universities and regional policy actors. The results indicate also perpetual changes in the level of intramural expenditures on R&D in the most of Polish regions at NUTS-2 level. A policy implication is that regional policy actors should strengthen R&D policy in order to stimulate R&D activities and enhance firms' and regions' competitiveness.

Keywords: Intramural Expenditures On R&D by Types of Costs, Current Expenditures On R&D, Capital Expenditures On R&D, Polish Regions At NUTS-2 Level.

Introduction

R&D activities are increasingly seen as a key factor for knowledge creation and are strongly associated with innovation activities of firms. While there is a strong interaction between firms' innovation activities and competitiveness of regions, R&D activities take on a particular significance. In this regard, a growing literature discusses and evaluates the capacity of R&D activities to increase innovation performance (Huggins & Williams, 2011). This topic is especially important in context of creation conditions for economic growth of firms and regions (Fritsch *et al.*, 2019). This is also related with supporting knowledge diffusion processes between, among others, firms, universities and regional policy actors for strengthen innovation performance (Grillitsch *et al.*, 2019). However, despite an extensive literature on R&D activities (Chybowska *et al.*, 2018), little attention has been paid to intramural expenditures on R&D incurred by firms, universities and regional policy actors in Poland at NUTS-2 level.

To fill this gap, this study aims at gaining a deeper empirical understanding of R&D activities by shedding light on how intramural expenditures on R&D by types of costs incurred by firms, universities and regional policy actors differ in Polish regions at NUTS-2 level. Special attention was attached to such types of costs as current and capital expenditures on R&D.

The empirical evidence is based on data from Statistics Poland, Local Bank Data. The research period was 2004–2018 (except of 2008, due to missing data). The zero unitarization method and multivariate analysis were employed for hypothesis testing.

This study contributes to the literature on R&D activities by providing insights about differentiation of current and capital expenditures on R&D between Polish regions at NUTS-2 level. Focusing on

NUTS-2 regions is relevant because of the role of regional policy actors to strengthen conditions for competitiveness of firms, research system and regions.

The structure of the paper is as follows: the first part presents the theoretical framework and hypothesis development. The second part describes the data and the methodology used to investigate how intramural expenditures on R&D by types of costs incurred by firms, universities and regional policy actors differ in Poland at NUTS-2 level. The next part focuses on providing the results. The last part contains the concluding remarks, including the implication of the study, limitations and future research directions.

Literature Review

A number of empirical studies show the relevance of innovation for economic growth of firms and regions (Fritsch *et al.*, 2019). The interest in innovation enhance due to abilities of innovation to shift competitive advantage. For this reason, a vast body of literature focuses on determinants of innovation performance (Zygmunt, A., 2020; Scandura, 2016). Most studies seem to suggest the significance of exogenous and endogenous determinants in increasing innovation performance (Zygmunt, J., 2018a; Zygmunt, J., 2018b; Klemens, 2018; Maj, 2017; Rokita-Poskart & Jończy, 2019). While recognizing determinants of innovation performance, pivotal emphasis is put on interactions between firms' innovation activities and competitiveness of regions (Zygmunt, A., 2018). In this way, innovation activities of firms affect firms' competitiveness and, consequently, economic growth of regions. On the other hand, regions play a significant role in creating conditions for increasing firms' innovation activities. Therefore, these interactions are crucially important in diffusing innovation. In line with these arguments, the existing evidence suggests the significance of the networks between, among others, firms, universities and regional policy actors (Grillitsch *et al.*, 2019). Special concern is put on knowledge diffusion processes as crucial for innovation (Huggins & Williams, 2011). These issues are particularly emphasised by knowledge spillover and endogenous growth theories, and place-based approach.

While interactions between firms' innovation activities and regions' growth and knowledge diffusion processes seem essential for competitive advantage, a set of studies focus on the linkage between R&D activities and innovation performance (Scandura, 2016). This set of studies show that R&D activities are seen as a key component of enhancing innovation and knowledge flow between firms, universities and regional policy actors (Huggins & Williams, 2011). Over the past years, a vast body of literature has argued that R&D activities are the principal part of knowledge flow especially between firms and universities (Isaksen *et al.*, 2018). Such cooperation may take various forms. For example, it has been observed the great interest in patents, publications and collaborative R&D projects (Fritsch *et al.*, 2019). As noted Tijssen and Winnink, patents and publications express "R&D excellence" (Tijssen & Winnink, 2017, p. 689) as an effectiveness of knowledge diffusion processes between universities and firms. This body of research stresses the role of co-patenting, co-publications between firms and universities to create new knowledge crucial for innovation processes (Fritsch *et al.*, 2019). Empirical evidence finds also a strong focus on collaborative R&D projects between firms and universities to strengthen firms' innovation activities (Scandura, 2016).

A wide body of empirical literature assesses also the role of regional policy actors in creation and strengthen conditions for R&D activities (Huggins & Williams, 2011). Facing the need for increasing competitiveness of firms, regional policy actors may offer a various set of support. Following this, the existing studies point to support knowledge diffusion processes as being crucial for firms' and universities' innovation (Isaksen *et al.*, 2018). Another line of research emphasises the role of public R&D as providing support for innovation performance (Grillitsch *et al.*, 2019). Such support is seen as an essential for enhancing competitive advantage of firms and, consequently, competitive advantage of regions.

When supporting R&D activities and knowledge diffusion processes, strong emphasis is put on intramural R&D expenditures. It has been suggested that such R&D expenditures can be seen as

knowledge ability to improve innovation performance. A number of studies assess the role of intramural R&D expenditures on the national level (Tijssen & Winnink, 2017). According to Tijssen and Winnink, size and components of intramural national R&D expenditures provide feedback about country's "R&D excellence" (Tijssen & Winnink, 2017). Another part of the literature is focused on intramural R&D expenditures incurred by firms as important for firms' innovation performance (Haus-Reve *et al.*, 2019). From an innovation point of view, also intramural R&D expenditures incurred by universities and incurred by regional policy actors are crucial for firms' innovation activities. Such R&D expenditures built conditions for knowledge diffusions processes and to increase competitiveness.

A recent research on R&D activities in Poland focus, among others, on issues related to the linkages of R&D activities with knowledge diffusion issues. For example, the studies emphasise the role of R&D activities in enhancing total factor productivity of NUTS-2 regions (Danska-Borsiak, 2018). In this sense, R&D activities are crucial "to create jobs in technology and knowledge-intensive sectors" (Danska-Borsiak, 2018, p. 48). Another part of the literature is focused on identifying the role of R&D activities to increase Poland competitiveness (Chybowska *et al.*, 2018) and to shift intellectual capital of Polish and Slovak NUTS-2 regions (Pachura *et al.*, 2018). These studies also refer to intramural expenditures on R&D as a part of set of the measures employed for the research. Particularly, to the study related to total factor productivity of Polish NUTS-2 regions, intramural R&D expenditures on the national level were employed (Danska-Borsiak, 2018). Intramural R&D expenditures on the national level were also applied as a one of the measures of study regarding intellectual capital of Polish and Slovak NUTS-2 regions (Pachura *et al.*, 2018). To the research concerning the role of R&D activities to increase Poland competitiveness, intramural R&D expenditures incurred by firms, universities and regional policy actors were used (Chybowska *et al.*, 2018).

Thus, while a number of studies investigating R&D activities in Poland, very few studies address the issues related to intramural expenditures on R&D in Poland. Hence, it is important to carry out research and investigate intramural expenditures on R&D at NUTS-2 level. Research attention was put on intramural expenditures on R&D incurred by firms, universities and regional policy actors. The emphasis was also put on intramural expenditures on R&D by the types of cost: current expenditures on R&D and capital expenditures on R&D, which represent expenditures for fixed assets connected with R&D activity. Therefore, the hypothesis to be tested is the following:

H: Intramural expenditures on R&D by types of costs incurred by firms, universities and regional policy actors differ in Poland at NUTS-2 level.

Materials and Methods

The empirical data used in the study was retrieved from Statistics Poland, Local Bank Data. This dataset includes, among others, information on innovation performance of Polish firms, universities and regional policy actors at NUTS-2 level. While this research focuses on intramural expenditures on R&D by types of costs, using data from Statistics Poland, Local Bank Data, allows analysis how expenditures in question differ between NUTS-2 regions in Poland. In the research, particular attention was put on such types of costs as current and capital expenditures on R&D incurred by firms, universities and regional policy actors. The time period was referring to 2004–2018. Due to missing data for 2008, this year was excluded from the study.

The research consists of two parts. The first part contains a comparative analysis of intramural expenditures on R&D by types of costs between NUTS-2 regions in Poland. The second part focuses on how intramural expenditures on R&D by types of costs incurred by firms, universities and regional policy actors differ in Poland at NUTS 2 level, employing the zero unitarization method and multivariate analysis. Table 1 summarises descriptions and descriptive statistics of variables used in the study.

Table 1: Description and descriptive statistics of variables

Variables		Description	Mean	St. Dev.	Min.	Max.
Current expenditures on R&D	X_1	Current expenditures on R&D (PLN) per inhabitant	192.84	175.77	42.64	766.45
Capital expenditures on R&D	X_2	Capital expenditures on R&D (PLN) per inhabitant	61.95	43.91	15.55	184.40

Source: own study based on: Statistics Poland, Local Bank Data (Statistics Poland, 2020).

Since Statistics Poland, Local Bank Data, gathers information on intramural expenditures on R&D by types of costs incurred by firms, universities and regional policy actors at NUTS-2 level, to research how these types of costs differ in Poland, a comparative analysis of diagnostic variables and the zero unitarization method and multivariate analysis were used. This combination of methods enables an understanding of the differences between NUTS-2 regions in Poland and 'enables comparing the values of synthetic index for all years' (Balcerzak, 2015, p. 191).

To the normalisation of variables, a constant reference point was used (on the ground of zero unitarization method) (Kukuła & Bogocz, 2014, p. 7):

$$R(X_{jt}) - \max_{it} x_{ijt} - \min_{it} x_{ijt} \qquad (1)$$

Because variables used in the study are stimulants, the normalisation was conducted employing the following formula (Kukuła & Bogocz, 2014, p. 7):

$$z_{ijt} = \frac{x_{ijt} - \min_{it} x_{ijt}}{\max_{it} x_{ijt} - \min_{it} x_{ijt}} \qquad (2)$$

where $z_{ijt} \in [0,1]$; $(i = 1,2,\dots,n)$; $(j = 1,2,\dots,m)$; $(t = 1,2,\dots,l)$

Finally, the synthetic measure was calculated on the basis of the following formula (Balcerzak, 2015, p. 196):

$$SM_{it} = \frac{1}{m}\sum_{j=1}^{m} z_{ijt} \qquad (3)$$

where $z_{ijt} \in [0,1]$; $SM_{it} \in [0,1]$; $(i = 1,2,\dots,n)$; $(j = 1,2,\dots,m)$; $(t = 1,2,\dots,l)$

This procedure enabled to analyse how intramural expenditures on R&D by types of costs incurred by firms, universities and regional policy actors differ in Poland at NUTS-2 level.

Findings

Comparative analysis of variables

Figures 1–2 provide the results of the comparative analysis of intramural expenditures on R&D by types of costs incurred by firms, universities and regional policy actors at NUTS-2 level in Poland in 2004–2018. The comparison of current expenditures on R&D incurred by firms, universities and regional policy actors at NUTS-2 level indicates substantial features (Figures 1).

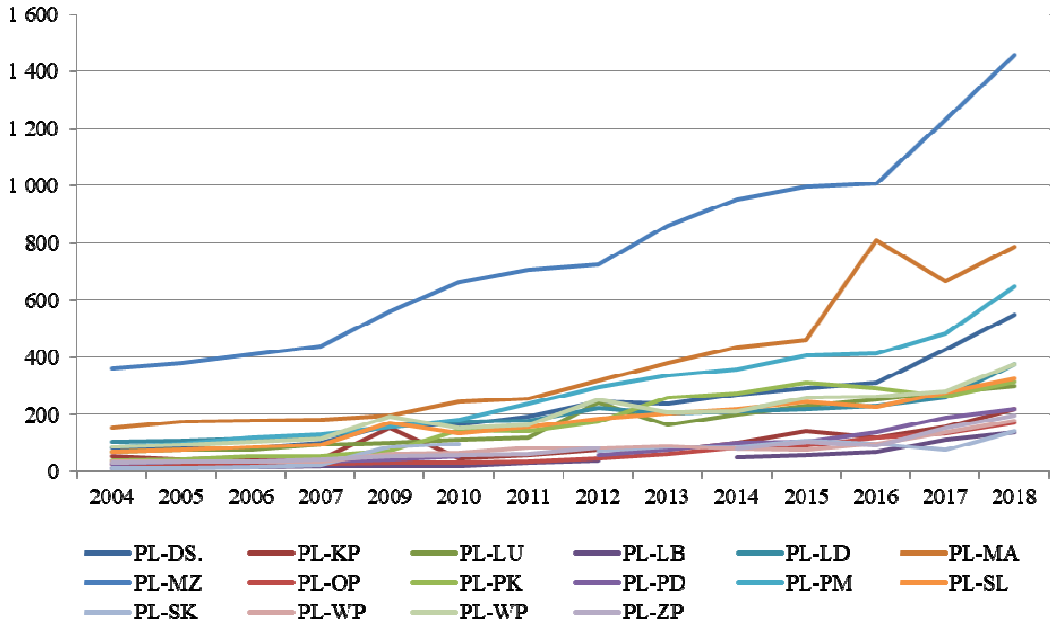

*Legend: PL-DS – Lower Silesian Voivodship; PL-KP – Kuyavian-Pomeranian Voivodship; PL-LU – Lublin Voivodship; PL-LB – Lubusz Voivodship**; PL-LD – Łódź Voivodship; PL-MA – Lesser Poland Voivodship; PL-MZ – Masovian Voivodship; PL-OP – Opole Voivodship; PL-PK – Subcarpatian Voivodship; PL-PD – Podlaskie Voivodship; PL-PM – Pomeranian Voivodship*; PL-SL – Silesian Voivodship; PL-SK – Świętokrzyskie Voivodship*; PL-WN – Warmian-Masurian Voivodship; PL-WP – Greater Poland Voivodship; PL-ZP– West Pomeranian Voivodship**; * lack of data for 2011, ** lack of data for 2013.*

Figure 1: Current expenditures on R&D (PLN per inhabitant) in Poland in 2004–2018
Source: own calculations based on data from: Statistics Poland, Local Bank Data (Statistics Poland, 2020).

First, the notable increase of current expenditures on R&D incurred by firms, universities and regional policy actors can be seen at NUTS-2 level in Poland in 2004–2018. This trend imply that current expenditures on R&D play an increasing role in firms', universities and regional policy actors' performance and may result in enhancing innovation activities of firms and, consequently, to increase competitive advantage of firms and regions.

Second, an important feature that can be observed when comparing Polish NUTS-2 regions is the gap in the level of current expenditures on R&D incurred by firms, universities and regional policy actors. It may be noticed that in such Polish regions at NUTS-2 level as Masovian Voivodship, Lesser Poland Voivodship, Pomeranian Voivodship and Lower Silesian Voivodship, current expenditures on R&D incurred by firms, universities and regional policy actors are noticeably higher than in other NUTS-2 regions in Poland. This gap is persistent over the period 2004–2018 and may be the consequence of firms', universities' and regional policy actors' capabilities to stimulate R&D activities. This may have wider effect on knowledge diffusions between universities, firms and regional policy actors and may affect innovation activities of firms and regional development.

When considering capital expenditures on R&D incurred by firms, universities and regional policy actors in Polish regions at NUTS-2 level in 2004–2018 (Figures 2), much lower intensive engagement of these types of cost for intramural expenditures on R&D is found in comparison to current expenditures on R&D. This reflects that firms, universities and regional policy actors are likely to stimulate R&D activities through current expenditures on R&D.

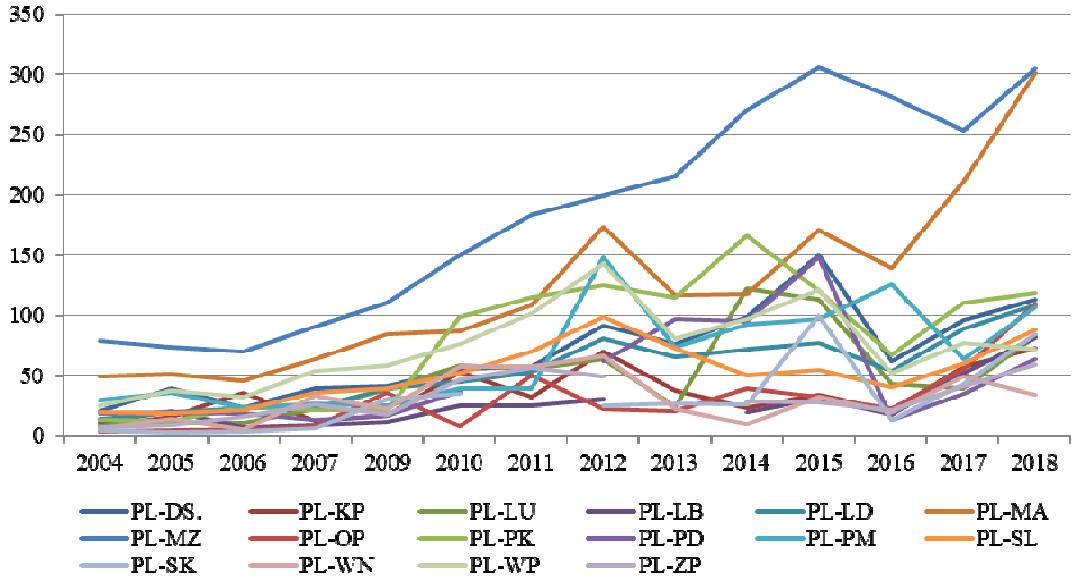

Figure 2: Capital expenditures on R&D (PLN per inhabitant) in Poland in 2004–2018
Source: own calculations based on data from: Statistics Poland, Local Bank Data (Statistics Poland, 2020).

Legend: like in Figure 1.

The results also reveal perpetual changes in the level of capital expenditures on R&D incurred by firms, universities and regional policy actors in the most of Polish regions at NUTS-2 level in 2004–2018. This may result in hampering R&D activities and may affect competitiveness of firms and regions. The study shows such changes for, among others, Lublin Voivodship Podlaskie Voivodship and Subcarpatian Voivodship. However, since 2016, the vast majority of NUTS-2 regions in Poland have been distinguished by growth of capital expenditures on R&D incurred by firms, universities and regional policy actors. This should be treated positively as increasing capabilities to stimulate R&D activities. It may be also noticed that in comparison to others Polish regions at NUTS-2 level, Masovian Voivodship emphasises a relatively high level of of capital expenditures on R&D incurred by firms, universities and regional policy actors in 2004–2018. This finding suggests high potential of Masovian Voivodship to knowledge diffusions between universities, firms and regional policy actors and to economic growth of firms and region.

The Zero Unitarization Method and Multivariate Analysis Results

Tables 2–3 shows the results of the zero unitarization method and multivariate analysis of intramural expenditures on R&D by types of costs incurred by firms, universities and regional policy actors in Poland at NUTS 2 level in 2004–2018.

Table 2: Current and capital expenditures on R&D between Polish NUTS 2 regions in 2004–2018 – part 1

2004			2005			2006			2007			2009			2010			2011		
No.	Co.	SM	No.	Co.	SM	No.	Co.	SM	No.	Co.	SM	No.	Co.	SM	No.	Co.	SM	No.	Co.	SM
1	PL-MZ	1.0000	1	PL-MZ	1.0000	1	PL-MZ	1.0000	1	PL-MZ	1.0000	1	PL-MZ	1.0000	1	PL-MZ	1.0000	1	PL-MZ	1.0000
2	PL-MA	0.4987	2	PL-MA	0.5608	2	PL-MA	0.5252	2	PL-MA	0.5346	2	PL-MA	0.5337	2	PL-MA	0.4529	2	PL-KP	0.0445
3	PL-PM	0.2730	3	PL-WP	0.3529	3	PL-WP	0.3292	3	PL-WP	0.3949	3	PL-WP	0.3950	3	PL-PK	0.4153	3	PL-MA	0.4302
4	PL-WP	0.2479	4	PL-DS.	0.3496	4	PL-KP	0.2892	4	PL-DS.	0.2891	4	PL-DS.	0.2817	4	PL-WP	0.3422	4	PL-PK	0.3663
5	PL-DS.	0.2098	5	PL-PM	0.3454	5	PL-PM	0.27953	5	PL-SL	0.2616	5	PL-SL	0.2780	5	PL-DS.	0.2792	5	PL-WP	0.3414
6	PL-LD	0.1979	6	PL-LD	0.2441	6	PL-LD	0.27952	6	PL-PM	0.2510	6	PL-LD	0.2670	6	PL-LD	0.2492	6	PL-SL	0.2349
7	PL-SL	0.1842	7	PL-SL	0.1991	7	PL-DS.	0.2359	7	PL-LD	0.2264	7	PL-LU	0.2123	7	PL-LU	0.2479	7	PL-DS.	0.2221
8	PL-LU	0.1202	8	PL-PD	0.1438	8	PL-SL	0.2270	8	PL-LU	0.1811	8	PL-PM	0.1949	8	PL-SL	0.2420	8	PL-PM	0.1996
9	PL-PD	0.1201	9	PL-LU	0.1397	9	PL-PK	0.2032	9	PL-WN	0.1793	9	PL-SK	0.1585	9	PL-PM	0.2357	9	PL-LD	0.1962
10	PL-PK	0.1008	10	PL-KP	0.1290	10	PL-PD	0.1417	10	PL-ZP	0.1424	10	PL-KP	0.1509	10	PL-WN	0.2095	10	PL-LU	0.1637
11	PL-KP	0.0858	11	PL-LB	0.1270	11	PL-LU	0.1334	11	PL-PK	0.1319	11	PL-OP	0.1365	11	PL-KP	0.1792	11	PL-WN	0.1416
12	PL-LB	0.0533	12	PL-WN	0.1092	12	PL-ZP	0.1185	12	PL-KP	0.0650	12	PL-PK	0.1003	12	PL-ZP	0.1644	12	PL-ZP	0.1209
13	PL-ZP	0.0525	13	PL-PK	0.1081	13	PL-WN	0.0408	13	PL-PD	0.0602	13	PL-WN	0.0936	13	PL-SK	0.1554	13	PL-OP	0.0834
14	PL-WN	0.0508	14	PL-ZP	0.0701	14	PL-OP	0.0373	14	PL-OP	0.0213	14	PL-ZP	0.0651	14	PL-PD	0.1252			
15	PL-OP	0.0200	15	PL-OP	0.0239	15	PL-LB	0.0328	15	PL-LB	0.0123	15	PL-PD	0.0472	15	PL-LB	0.0611	14	PL-LB	0.0000
16	PL-SK	0.0022	16	PL-SK	0.0000	16	PL-SK	0.0000	16	PL-SK	0.0051	16	PL-LB	0.0000	16	PL-OP	0.0079			

Legend: like in Figure 1.
Source: own calculations based on data from: Statistics Poland, Local Bank Data (Statistics Poland, 2020)

Table 3: Current and capital expenditures on R&D between Polish NUTS 2 regions in 2004–2018 – part 2

2012			2013			2014			2015			2016			2017			2018		
No.	Co.	SM	No.	Co.	SM	No.	Co.	SM	No.	Co.	SM	No.	Co.	SM	No.	Co.	SM	No.	Co.	SM
1	PL-MZ	1.0000	1	PL-MZ	1.0000	1	PL-MZ	1.0000	1	PL-MZ	1.0000	1	PL-MZ	1.0000	1	PL-MZ	1.0000	1	PL-MZ	1.0000
2	PL-MA	0.6272	2	PL-MA	0.4474	2	PL-PK	0.4249	2	PL-MA	0.4716	2	PL-MA	0.6310	2	PL-MA	0.6583	2	PL-MA	0.7401
3	PL-PM	0.5422	3	PL-PK	0.3675	3	PL-MA	0.4215	3	PL-DS.	0.3452	3	PL-PM	0.3937	3	PL-DS.	0.2930	3	PL-PM	0.3271
4	PL-WP	0.4936	4	PL-PM	0.3088	4	PL-PM	0.3309	4	PL-PM	0.3095	4	PL-DS.	0.2221	4	PL-PK	0.2555	4	PL-DS.	0.3016
5	PL-PK	0.3865	5	PL-DS.	0.2551	5	PL-LU	0.2998	5	PL-PK	0.2996	5	PL-PK	0.2216	5	PL-PM	0.2423	5	PL-LD	0.2280
6	PL-DS.	0.3424	6	PL-WP	0.2475	6	PL-DS.	0.2945	6	PL-WP	0.2757	6	PL-WP	0.1756	6	PL-LD	0.2033	6	PL-PK	0.2224
7	PL-SL	0.3194	7	PL-SL	0.2242	7	PL-WP	0.2568	7	PL-LU	0.2453	7	PL-LD	0.1622	7	PL-WP	0.1868	7	PL-SL	0.1707
8	PL-LD	0.2983	8	PL-PD	0.2070	8	PL-LD	0.2097	8	PL-PD	0.2425	8	PL-LU	0.1540	8	PL-SL	0.1460	8	PL-WP	0.1587
9	PL-LU	0.2611	9	PL-LD	0.2068	9	PL-PD	0.1942	9	PL-LD	0.1735	9	PL-SL	0.1356	9	PL-LU	0.0978	9	PL-OP	0.1516
10	PL-KP	0.1612	10	PL-LU	0.0744	10	PL-SL	0.1713	10	PL-SK	0.1570	10	PL-OP	0.0448	10	PL-KP	0.0870	10	PL-LU	0.1506
11	PL-WN	0.1548	11	PL-KP	0.0520	11	PL-OP	0.0772	11	PL-SL	0.1459	11	PL-KP	0.0422	11	PL-OP	0.0739	11	PL-KP	0.1027
12	PL-PD	0.1224	12	PL-SK	0.0329	12	PL-KP	0.0554	12	PL-KP	0.0554	12	PL-PD	0.0389	12	PL-WN	0.0601	12	PL-LB	0.0887
13	PL-ZP	0.1065	13	PL-WN	0.0249	13	PL-SK	0.0525	13	PL-OP	0.0252	13	PL-WN	0.0287	13	PL-LB	0.0557	13	PL-PD	0.0852
14	PL-SK	0.0299				14	PL-ZP	0.0529	14	PL-ZP	0.0244	14	PL-ZP	0.0284	14	PL-PD	0.0492	14	PL-SK	0.0945
15	PL-LB	0.0232	14	PL-OP	0.0000	15	PL-LB	0.0196	15	PL-WN	0.0176	15	PL-SK	0.0155	15	PL-ZP	0.0489	15	PL-ZP	0.0672
16	PL-OP	0.0037				16	PL-WN	0.0170	16	PL-LB	0.0066	16	PL-LB	0.0087	16	PL-SK	0.0195	16	PL-WN	0.0152

Legend: like in Figure 1.
Source: own calculations based on data from: Statistics Poland, Local Bank Data (Statistics Poland, 2020).

The results reveal relatively high diversity between Polish regions at NUTS-2 level in supporting R&D activities by current and capital expenditures incurred by firms, universities and regional policy actors in the period under the study. These findings are consistent with the stated hypothesis. Since R&D activities play an important role in firms' innovation performance, such diversity may affect competitive advantage of firms and regions. While intramural expenditures on R&D present lack of steady trend in the vast majority of NUTS-2 regions in Poland in 2004–2018, stated diversity may results also in limited capabilities to stimulate R&D activities.

According to the findings, the highest diversity in terms of current and capital expenditures on R&D incurred by firms, universities and regional policy actors can be seen between Masovian Voivodship, Lesser Poland Voivodship and Świętokrzyskie Voivodship, Opole Voivodship, Lubusz Voivodship. That findings suggest also that Masovian Voivodship and Lesser Poland Voivodship highlight relatively the highest level of current and capital expenditures on R&D incurred by firms, universities and regional policy actors in comparison to other Polish regions at NUTS-2 level. This suggests high potential of Voivodships in question to knowledge diffusions and supporting R&D activities. On the other hand, compared to other NUTS-2 regions in Poland, the results indicate relatively the lowest level of intramural expenditures on R&D incurred by firms, universities and regional policy actors in Świętokrzyskie Voivodship, Opole Voivodship and Lubusz Voivodship. These suggest that above Polish regions at NUTS-2 level may experience difficulties in stimulating R&D activities. This may affect innovation activities of firms and competitive advantage of regions. A relatively low level of current and capital expenditures on R&D incurred by firms, universities and regional policy actors can also be observed in such NUTS-2 regions in Poland as Warmian-Masurian Voivodship and West Pomeranian Voivodship and may result in limitations of economic growht of firms and regions.

Conclusions

This paper provides a contribution to the discussion on R&D activities in Poland. This research complements previous studies by shedding light on how intramural expenditures on R&D by types of costs incurred by firms, universities and regional policy actors differ in Polish regions at NUTS-2 level.

The study shows relatively high diversity between regions at NUTS-2 level in Poland in terms of current and capital expenditures on R&D incurred by firms, universities and regional policy actors in 2004–2018. In connection with constant changes of intramural expenditures on R&D level in the vast majority of Polish regions at NUTS-2 level, such feature may result in limited capabilities to knowledge diffusions between universities, firms and regional policy actors and to stimulate R&D activities. That may contribute to firms' innovation activities and to competitive advantage of firms and regions.

The findings call for policy implications. Since R&D activities are the important component of competitive advantage, there is a need to strengthen R&D policy to support firms and universities in improving innovation performance. The attention should be also paid to strengthen conditions for knowledge diffusion processes between firms, universities and regional policy actors in order to enhance competitiveness of firms, research system and regions.

This study is not without limitations. The results are limited to current and capital expenditures on R&D incurred by firms, universities and regional policy actors at NUTS-2 level expressed in overall value and some conclusions may not be observed. For future studies, intramural expenditures on R&D by types of costs should be dealt with separately in relation to firms, universities and regional policy actors. It would be also beneficial to investigate the causes of relatively high diversity between regions at NUTS-2 level in Poland in terms of current and capital expenditures on R&D incurred by firms, universities and regional policy actors.

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Ways to Modernize the Trade and Economic Policy of The Kursk Region in The Second Half of The XIX and Early XX Century

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Abstract

The development of local economic systems in modern Russia stimulates the interest of researchers in studying the historical experience of similar processes in the regulation of trade and market relations, development vectors of infrastructure elements, and economic practices. Aggravation of public and scientific discussion about the ways of modernization of the country and its results at the beginning of the XXI century increased the importance of studying regional and local markets in the all-Russian system.

Keywords*:* Trading Exchange, Trading Companies, Agricultural Production, Handicraft Production, Urban Social Classes, Merchants, Petty Bourgeois.

The case of Tula province, which combined typical features of the development of economic processes within the Central Industrial and Central Agricultural regions, allows us to come closer to understanding the versatility of capitalist modernization in the European part of the country during the period of the Great Reforms and their first results (Borodkin L.I. et al., 2007).

A research of the local markets of the Kursk province, due to the specifics of all-empire institutions, elements of local infrastructure, proximity to the capital, and specialization in commercial and industrial development, allows us to study the features of the spatial organization of market relations in Russia in the second half of the XIX century.

Kursk has long been a city with developed trade. In the last third of the XIX century, when railway construction greatly facilitated communication within the province and expanded the possibilities of relations outside it, new conditions appeared for the revitalization of trade. A large number of agricultural products were exported from the province, including grain, raw skin, fur, hemp, lard, and vegetable oils.

As shown, for example, by the governor's report for 1879, this year the bread trade was especially brisk and the bread was readily bought by visiting agents of foreign trading firms despite the high prices of all the grain crops in the provincial markets. Also, 1,497 patents for trade and crafts were issued for local merchants (Excerpts on the history of Kursk province, 1965).

With the growth in the number of people in trade, a need arose for a variety of information - about prices, demand, areas of most profitable sales, etc. The need for proper execution of transactions began to feel more acute.

One of the most common forms of capital organization in Russia was trading houses, the legal status of which was fixed in the 1807 Manifesto, “On new benefits granted to merchants, and new ways to

spread and strengthen trading enterprises". This act established two types of "merchant partnerships": full partnership and trust partnership (limited partnership), which existed unchanged until 1917.

A full partnership "was formed from two or many comrades who put together the common name of all." A trust partnership, which is a higher form of associating capital, was formed from one or many partners with the "involvement of one or many investors who first entrust the known amounts of their capital" (Code of laws of the Russian Empire, 1903) without directly participating in management.

The study of trading houses allows you to establish the organizational structure of capital and characterize the initial stage of its association.

Moreover, this makes it possible to determine the extent of the spread of new forms of entrepreneurial activity.

This problem was to some extent investigated by historians.

In the available papers, the general indicators (number, structure, composition of owners) of trading houses throughout the country as well as the work of individual large partnerships (Bokhanov A.N., 1930) are analyzed

However, the same parameters for individual regions, particularly the Central Agricultural Region, are poorly studied.

This article represents the first experience in the study of partnerships in the Kursk region based on a complex of archival and print sources.

In Kursk province, trading houses became common structures in 1890s. According to the data of local city administrations and public self-governments as of January 1, 1893, there were only 3 trading houses with a capital of 70 thousand rubles in the province. However, in 1897 there were already 9 different partnerships operating (the capitalization is unknown).

The numerical growth of trading houses was accompanied by territorial expansion. In 1892, all partnerships were registered in large cities of the Kursk province (Kursk and Belgorod), with 66.6% of trading houses operating in Belgorod, and 33.3% in Kursk. However, in terms of size, the largest partnerships, which accounted for 85.7% of the capital, functioned in the provincial center.

In 1896, 25 trading houses (89.2%) conducted their business in cities and only 3 (10.7%) - in villages. It should be noted that more than half of the trading houses (60.7%) operated in Kursk, which was the economic center of the province. 85.7% of all limited partnerships were also located here. By the way, the latter carried out their operations only in large cities.

All this shows us yet another correlation: the higher the level of development of trade and industry in a particular area, the more intensive process of association took place here.

Most trading houses carried out their activities within the place of registration. Few partnerships extended their activities to the nearest cities or rural settlements of the Kursk province. E.g., the trading house "A. N. Mikheeva and sons" was mainly engaged in wine trade both in the town of Shchigry, the location of the main office, and throughout the county.

Another example is the alcohol trading partnership "I.A. Morozov and P.I. Belyansky", registered in the city of Korocha, but having its branches in the city of Novy Oskol and adjacent counties.

Social indicators of owners of trading houses are of undoubted interest.

Table 1: Number and state of trading house owners in 1892 and 1915

	Number of full partners	State of full partners*					
		merchants	hereditary honorary citizens	petty bourgeois	peasants	foreigners	other**
1892	6	4/66.7					2/33.3
1915	65	12/18.4	2/3.0	29/44.6	16/24.6	1/1.5	5/7.6

** Numerator is the number of the owners; denominator is the percentage of the owners.*

*** This category included workshop and college secretaries, as well as those who did not determine their state affiliation (midwives, dentists, etc.).*

As you can see, in 1890s most full partners were the merchants, but there were practically peasants and bourgeois among these entrepreneurs. It resulted in a class homogeneity for the owners of trading houses, characteristic of the end of the 19th century. However, by 1915, as the table shows, there were strong changes in the contingent of full partners.

On the one hand, their number increased due to the influx of members of various social groups, which contributed to the destruction of class homogeneity of owners of trading houses. On the other hand, there was a significant increase in the proportion of peasants and bourgeois. They accounted for a total of 69.2% of full partners. Finally, there was a reduction in the share of merchants. By 1915, it decreased by 72.3% and amounted to only 13.4% (State Archives of Kursk Region).

Belonging to "urban social class", merchants concentrated mainly in cities. For example, in 1897, urban merchants accounted for 78.3% of all merchants in the Kursk province. This distribution, in turn, affected the geography of their trade activities, which were concentrated in cities. The state of merchant trade is shown in Table 2 using the provincial center and one county center as an example (the numerator is an absolute value; the denominator is percentage) (Zakharov V.V., 1994).

Table 2 : Merchant trade in the Kursk province

	Kursk		Lgov	
	1896	1914	1893	1916
Number of merchants' trading enterprises	80 29.8	49 14.0	37 31.0	13 10.8
Turnover (rubles)	3958100 73.2	3249217 41.0	816500 77.5	892800 35.8

As you can see, at the end of the last century in Kursk, merchants owned a third of all trading enterprises with 73.2% of the total monetary turnover. At the beginning of the XX century, the number of merchant shops and stores was almost halving, and their share was 14.0%. The turnover of merchants' trading enterprises decreased from 3,958,100 rubles to 3,249,217 rubles (by 17.9%).

By 1916, the number of merchant shops decreased to 13, which amounted to 10.8% of the total number of trading enterprises. Their turnover increased slightly, but the proportion decreased to 35.8%.

Thus, a process of reducing merchant trade is clearly observed both in absolute and relative terms in the cities of the Kursk province in the second half of the XIX and early XX century.

In their commercial activities, members of the merchant class were not limited to cities and were active in rural areas. In the counties, the shops were kept not only by merchants who lived here permanently, but also by representatives of the "urban merchants" who traded through their clerks.

A general picture of the evolution of rural merchants' trade can be drawn from the verification materials district for 1896 and 1913.

According to verification journals of the Stary Oskol county in 1896, there were 77 stores that belonged to merchants, accounting for 25.2% of the total number of stores. Their turnover reached 291,350 rubles, or 61.9% of the turnover of county trade. In 1917, there were only 15 merchant trading enterprises (6.3%) with a turnover of 690 thousand rubles (21.8%). In other words, there was a decline in the merchant sector in rural trade (State Archives of Kursk Region).

Internal characteristics of merchants' rural trade is shown in Table 3 using verification journals of the Stary Oskol county (the numerator consists of absolute value and bracketed percentage, and the denominator is percentage relating to total count) (State Archives of Kursk Region).

Table 3 : Characteristics of rural trade in the Kursk province.

	1896		1917	
	Stores	Annual turnover	Stores	Annual turnover
Less than 5 thousand rubles	63 (81.8) 21.9	98850 (33.9) 39.1	1 (6.6) 0.5	4000 (0.5) 0.1
5-25 thousand rubles	12 (15.5) 75.0	112500 (68.6) 81.6	6 (40.0) 21.4	73000 (10.5) 23.4
More than 25 thousand rubles	2 (2.5) 100	80000 (27.4) 100	8 (53.3) 34.7	613000 (88.8) 23.6

As you can see, at the end of the last century, in the villages, merchants owned, as a rule, small shops. For example, in the Stary Oskol county in 1896, 81.8% of merchant shops were small, they accounted for 33.9% of all merchant turnover. The proportion of trade enterprises of this size was small and amounted to 21.9% (revenues - 39.1%).

At the end of the XIX century representatives of the merchant class concentrated in their hands most of the large and medium-sized trade in industrial goods and foodstuffs in the cities and villages of the Kursk province. However, the decrease in the number of merchants that began in early XX century entailed a reduction in merchant trade, which was carried out primarily due to the small and medium trading sectors.

At the same time, controlling up to half of local trade, merchants occupied prominent positions among traders of the Kursk province. The merchants used various organizational forms of trade. Along with traditional trade (stores), more modern types (shops, exchanges) also developed. This indicates that the merchants, modernizing their entrepreneurial activities, adequately responded to the "challenges of the time" (Zakharov V.V., 1996).

According to sources, in the late XIX - early XX centuries there was a numerical growth of partnerships. From 1892 to 1915, their number increased by 9.3 times, and the amount of capital - by 16.1 times.

It is noteworthy that the time of establishment of trading houses did not always coincide with periods of favorable economic conditions. They were created both during the crisis years and at the stage of economic recovery. One of the reasons for this was, presumably, the economic orientation of the province (its agricultural specialization), as a result of which the state of agriculture, which did not always fit into economic cycles, largely determined the local trade and industry, as well as their association. By the way, the two Gründer bursts coincide with the years when a good crop was harvested (Zakharov V.V., 1996).

In the period under review, the contingent of owners of trading houses significantly changed. Merchants lost their dominant position to people from the lower classes. This is evidence that local business have adapted to new economic conditions.

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Research of Motivational Activity at The Enterprise

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Abstract

The study of motivational activity is conducted primarily in order to understand to what extent it contributes to the effectiveness of the enterprise. The development of effective solutions in the field of motivational activity requires a detailed analysis, which is impossible without a competent choice of research methods. The article offers two scenarios for the study of motivational activity. Qualitative and quantitative indicators for evaluating the effectiveness of motivation are given.
It is proved that the application of the proposed approaches will ensure balance of the motivation system towards the goals of the organization, that is, the applied forms and methods of motivation will be linked to both the objectives of the enterprise and the expectations of employees

Keywords: Motivation, incentives, labor productivity, wages, staff turnover, types of motivation, effectiveness of motivational activity.

Introduction

Motivation is usually understood as an incentive to work, reflecting the employee's perception of their responsibilities, and the behavior of the employee during the work process. Motivation is based on the needs of employees, as well as on an understanding of which needs can be met at a given workplace now, and which needs can be met in the near future.

The system of personnel motivation in an enterprise is a combination of various measures that stimulate employees not only to work at a job that pays but also to the desire to work in this organization, ensuring high results in their activities.

The socio-economic significance of motivation is not in dispute. However, in many Russian enterprises, this issue is almost ignored. To some extent, only material motivation is used, which is reduced to the presentation of "insignificant" gifts or certificates, and it often has a negative effect.

Currently, there is already a negative experience of huge losses associated with the dismissal of key employees. As a result, the problem of developing an effective system of motivation and incentives for staff is urgent. And no less relevant is the work on analyzing the effectiveness of motivational activities of specific enterprises.

Meanwhile, the assessment of the motivational work of many Russian enterprises either is not carried out or is reduced to the analysis of one or two indicators. For example, the dynamics of the proportion of premiums in wages or to the analysis of wage differentiation, for which all of the staff

is grouped by level of regular income in three groups: low-wage(under 8 category), medium-wage(8 to 12 category) and high-wage (12 to 18 category). The analyst's opinion on what level of income in which region to recognize as high or medium becomes important in this issue. It is clear that the lack of evaluation of the effectiveness of motivational activities does not help to identify problems in the field of personnel motivation in the enterprise.

The development of effective solutions in the field of motivational activity requires a detailed analysis. The basis for analyzing the motivation system is a clear definition of goals and objectives that take into account the specifics of a particular organization (field of activity, the state of personnel, their professional specialization). Obtaining the required information is impossible without a competent choice of research methods.

The purpose of the article is to analyze the effectiveness of motivational activity at one of the industrial enterprises of the Republic of Tatarstan on the basis of the proposed methodology and to develop recommendations aimed at improving its effectiveness.

Research Methodology

The following methods were used in the research: analysis of normative documents, statistical research methods, questionnaire survey, systematization and generalization of facts and concepts.

Review of specialized literature

There is an extensive literature on staff motivation. Among foreign authors it is possible to emphasize Drucker P. F. (1977, 2003) Maslow A. (1943) McGregor D. (1960), McGregor D.(2005). Among the Russian are Kibanov, Gerchikov V., Rebrov, Svirina A. and others.

We shall consider which components of motivational schemes can be used in Russian enterprises.
Most researchers almost subconsciously associate motivation with Maslow's pyramid, who states that each person has five consecutive levels of needs to be satisfied, and until the lower-level needs are met, it makes no sense to motivate a person based on more complex needs [2]. A similar idea underlies MacGregor's theory of X and Y (i.e., the needs of people X are at the two bottom levels of the Maslow pyramid, and the needs of people Y are higher). The disadvantage of these classical theories is the premise that an employee who is not satisfied, for example, in terms of social needs, cannot be motivated by the need for respect or self-realization.

Also, under no circumstances can a person Y be motivated to work by simply promising stable earnings. From the modern point of view, it is obvious that these assumptions are not always correct: the presence of material needs does not completely exclude ambition. Similarly, even for a person whose main goal in work is achieving the best result (the need for self-realization is maximized, the person clearly belongs to the category Y), at least, there may be periods in life when stable earnings may be a priority for him, regardless of the type of work. At the same time, he will be satisfied with the work, since his self-realization in this case will be expressed in achieving stability. Thus, a person can be simultaneously characterized by the needs located at all levels of the Maslow pyramid.

This idea is reflected, although incomplete, in the two-factor theory of Herzberg, where the working person in terms of satisfaction can be at one of the stages of satisfaction (Dissatisfaction;
Lack of dissatisfaction; Lack of satisfaction; Contentment).

Modern theories of motivation based on setting goals, motivating work tasks, and fairness proceed from the premise that an employee is a reasonable and adequate being, capable of objective assessment of himself and reality. Therefore, the goal setting theory assumes that every employee strives for self-effectiveness, which is the confidence that they are able to perform the tasks they face. However, it is obvious that all types of result-oriented motivations do not work if employees do not adequately assess their abilities and contribution to the overall result, which indicates that classical motivational theories are not applicable in this case.

Researches on the most successful global business practices (the works of J. Collins, J. Lyker and K. Kobyel) clearly confirm that modern business organizations that have achieved the highest productivity indicators do not use any special incentive schemes, but they pay special attention to the selection of people with specific features of motivation pattern.

Therefore, it makes sense to consider the theory of motivation, which is most applicable to Russian conditions and is known as the typological theory of V. Gerchikov. After conducting thousands of interviews with employees at various levels, V. Gerchikov concluded that there are five types of work motivation – instrumental, professional, host, patriotic and lumpen.

For people of the instrumental type, work itself is not of any value: they are only interested in money [3]. Such a person will work with maximum efficiency in any job, as long as they are well paid. Most Russian managers believe that all or most of their employees are belong to the instrumental type, and base the motivation system only on material incentives.

A person with professional motivation, on the contrary, values not the material reward, but the content of the work itself.

An employee with a host's motivation takes full responsibility for the case. Such an employee may seem ideal, but he is difficult to manage.

An employee of the patriotic type first of all wants to feel needed by his organization. Most of all, he values the effectiveness of the common cause and the recognition of his achievements by the management. This category of employees is also known in foreign theories of motivation. But special attention is paid to the fifth type of motivation, discovered in the framework of V. Gerchikov's theory During the research was found that there is a category of people who do not want to work at all and do only what they will not be punished by the management. V. Gerchikov called this type avoidant, or lumpen. In Western theories, the existence of such a category of people is denied in principle, but in Russian practice they are quite common.

Despite the logic and clarity, the typological model of V. Gerchikov is not used by many companies. One of the reasons is the lack of willingness to spend resources to allocate different groups of employees and develop their own motivational schemes for each of them. The methods of motivation recommended by the author of the theory for various categories of employees are presented in table 1.

Table 1: Methods of stimulating employees with different types of motivation [1]

Types of incentives	Types of motivation				
	Instrumental	Professional	Patriotic	Host	Avoidant (lumpen)
Negative (punishments, threat of job loss, etc.)	Possible in monetary form	Prohibited	Possible in sign form	Prohibited	Basic
Money	Basic	Possible	Neutral	Possible	Neutral
Natural (buying or renting a home, providing a car, etc.)	Possible in monetary form	Possible for target-based agreements	Possible in sign form	Possible for target-based agreements	Basic
Moral	Prohibited	Possible	Basic	Neutral	Neutral
Paternalism (caring for the employee)	Prohibited	Prohibited	Possible	Prohibited	Basic
Organizational (content, conditions and organization of work)	Neutral	Basic	Neutral	Possible	Prohibited
Career and development	Possible	Basic	Neutral	Possible	Prohibited
Participation in co-ownership and management	Neutral	Possible	Possible	Basic	Prohibited

People with certain types of motivation are also more likely to have certain types of work, which was also considered by Vladimir Gerchikov [ibid].

According to estimates of Russian recruitment agencies, hiring an employee with inappropriate motivation leads to a loss of about 25% of their productivity and, consequently, to lost profits for the organization.

It is also necessary to pay attention to the possibility of studying the structure of employee motivation based on the Motype test developed by V. Gerchikov.

Further development of the idea of V. Gerchikov can be found in the works of Rebrov and Svirina A. In particular, A. Svirina suggests identifying qualitative and quantitative indicators that characterize the effectiveness of motivation.

According to Svirina A., the first qualitative indicator is the level of staff satisfaction (table 2).

Table 2: Evaluating the motivation process in an organization

Characterization of satisfaction	Motivation process evaluation
Most employees are satisfied with their job	High
Half of the employees are satisfied with their work, while others mostly describe their condition as unsatisfactory (lack of satisfaction, according to Herzberg)	Above average
Most employees describe their condition as unsatisfying (lack of satisfaction, according to Herzberg)	Average
Most employees describe their condition as normal (no dissatisfaction, according to Herzberg)	Below average
Most employees are unsatisfied with their job	Unacceptably low

The second indicator that characterizes the motivation process is the balance between the types of motivation and the work performed (table 3).

Table 3. Evaluating the quality of the motivation process

Percentage of people holding positions, not corresponding to the dominant motivation	Charachterization of the level of motivation
0-7	High
7-15	Average
15-25	Permissible
25-40	Low
More than 40	Unacceptable

As a quantitative indicator, A. Svirina suggests using an individual coefficient of motivational leverage (similar to the operating one), which characterizes how much percent the profit from sales of an enterprise will increase (decrease) when the number of employees satisfied with their work increases (decreases) by 1%:

$$ML = \frac{\sum_{i=1}^{n} \frac{\Delta \mathrm{Ps}}{\Delta \mathrm{Se}}}{n}$$

Where i is the number of analyzed periods from 1 to n;

ML - motivational lever;
ΔPs — change in profit from sales;
ΔSe - change in the number of employees who are satisfied with their work.

The level of motivational leverage increases with the increase in the number of unsatisfied employees, which leads to a decrease in profit from sales.

Research Result

The study of motivational activity is carried out primarily in order to understand to what extent it contributes to the efficiency of the enterprise, and is implemented in two directions:

- analysis of the company's regulatory documents aimed at determining compliance with legislative acts and summarizing official information about all elements of the motivation system;
- analysis of the labor output and personnel performance, which allows us to clearly define the boundaries and direction of the upcoming research. In fact, in the course of this analysis the need to improve the motivational activities is revealed.

Analysis of the first direction -- the documentation of the studied enterprise engaged in the production of radio devices - revealed the following:

- the regulation on remuneration of labor reveals the structure of the forms and systems of material reward used, as well as the conditions for obtaining it by employees;
- the regulation on certification defines the methods and procedure for determining the results and personnel performance;
- internal regulations contain a set of requirements (rules) for the behavior of employees, as well as a list of disciplinary penalties, etc.

Thus, the analysis of regulatory documents of the studied enterprise allowed us to give them a positive assessment and determine the prerequisites for motivational activity of the enterprise.
The following information was used for the implementation of the second direction - analysis of labor results and efficiency of the personnel of the studied enterprise:

- indicators that characterize the dynamics of labor productivity;

- indicators that reflect trends in staff turnover;
- enterprise plans that define requirements for the main results of work.

The analysis of enterprise plans is a necessary element in the structure of motivation system research. The plans reflect the requirements for the staff performance in a certain time period. Plans are implemented if the labor standards on the basis of which the plans are calculated are fully justified. Over-fulfillment of the plan can only be caused when employees apply excessive efforts. Therefore, if the plans are constantly implemented in excess of labor standards, this indicates either that the regulatory framework is lagging behind the conditions of a particular production, or that the methods of material incentives used do not correspond to the results achieved. Any consistently observed deviation of labor results from the planned indicators allows us to draw conclusions about the inefficient use of personnel [1].

So, to analyze the results of personnel performance, it is necessary, first of all, to evaluate the indicators that characterize the dynamics of labor productivity.

The initial data for analyzing the results of labor and efficiency of personnel are presented in table 4.

Table 4:The source data for the analysis of the results of work and efficiency of employees

№ p/p	Indicators	2017	2018	2019	2018 to 2017	2019 to 2018	2019 to 2017
1	Revenue, thousand rubles	2 621 108	2 463 046	2 524 963	0, 940	1.025	0.963
2	Average number of employees, people	539	481	436	0.892	0.906	0.809
3	Payroll, thousand rubles.	252,588	222,288	216,624	0.880	0.975	0.858

The evaluation of information should begin, as already noted, with an analysis of labor productivity. Workforce productivity is calculated using the following formula:

$$WP = \frac{R}{Avg}$$

Where WP is an indicator of workforce productivity at the enterprise, in rubles/person.

R is revenue for the accounting period, thousand rubles.
Avg is Average number of employees, people
The average salary is determined by dividing the payroll by the average number of employees for the same period.

The calculation results are shown in table 5.

Table 5: The indicators used for the analysis of the results of work and efficiency of employees

№ p/p	Indicators	2017	2018	2019	2018 to 2017	2019 to 2018
1	Labor productivity, thousand rubles/person	4 862,9	5 120,68	5 791,2	1.053	1.131
2	Average salary, rubles	39 052	40 674	41 404	1.042	1.018

The actual indicators of labor productivity at this enterprise slightly exceed the planned indicators, which corresponds to the requirements formulated above.

Next, we will determine the presence or absence of organizational problems in the field of personnel motivation in the enterprise. The following always indicates organizational problems:

- decreasing dynamics of labor productivity during the study period, if this trend is not related to the seasonal nature of the organization's activities;
- the turnover rate, if its indicators for a sufficiently long period (at least six months) exceed 7 - 10%.

As for the studied enterprise, according to the data presented in table 5, it can be seen that the rate of labor productivity increases over the analyzed period.

To formulate conclusions about the effectiveness of the applied system of motivation and incentives for staff, it is also necessary to analyze the ratio of the growth rate of labor productivity and the growth rate of average wages [3]. The coefficient of outpacing the growth rate of labor productivity over the growth rate of average wages is defined as the ratio of the labor productivity growth index to the average wage growth index. The advance rate of labor productivity growth over the growth rate of average wages in 2018 was 1.011 (1.053/1.042), in 2019 - 1.111 (1.131/1.018), which can be assessed positively.

The level of average wages at the enterprise outstrips the level of average wages in the Republic of Tatarstan as a whole.

Given the increasing dynamics of labor productivity during the study period, the faster growth rates of labor productivity in comparison with the growth rate of average wages, a fairly high level of average wages, it could be concluded that the forms and methods of incentives used are linked to both the objectives of the enterprise and the expectations of employees, and the applied system of motivation and incentive of personnel is balanced relative to the goals of the organization.

However, this conclusion is hasty, since staff turnover rates were not taken into account.

When formulating conclusions regarding balance of motivation system, it is necessary to consider the following generalization: if productivity is consistently kept at the target level, the turnover rate does not exceed 7-10% for six months, and there are no changes in the activities of the enterprise, further study does not make sense, because the incentive system is balanced relative to the goals of the organization, i.e., the forms and incentives used correspond to both the objectives of the enterprise and expectations of employees.

At the enterprise under study, productivity is maintained at the level of planned indicators. However, there is a high turnover of staff, the level of which in 2019 significantly exceeded 30%. Moreover, turnover over the last three years has been growing, and in the face of the falling average number of workers there is an increase in the number of dismissed. If an organization introduces new methods of organizing production, new technologies, and equipment that lead to an increase in labor productivity, this may be considered normal. Therefore, to avoid hasty conclusions, it is necessary to determine staff turnover indicators and study the reasons for dismissal.

The indicators of absolute turnover and their dynamics are presented in table 6.

Table 6: Analysis of employee turnover in the enterprise

№	Indicators	2017	2018	2019	2018 to 2017	2019 to 2018
1	Average number of employees, people. (Avg)	539	481	436	0.892	0.906
2	Dismissed, people (Dp)	129	125	157	0.969	1.226
3	Turnover, % (T)	24	26	36	1.083	1.385

The data presented in table 4 indicate the catastrophic scale of staff turnover at the enterprise and the inactivity of the enterprise's management to solve this problem. Turnover limits for enterprises in various fields of work differ [2]. For the production sector in Russia, the normal turnover is about 10 percent. In a rapidly growing business, especially at the mass hiring stage, the turnover rate can be higher, at about 20 percent. Turnover at the level of 36%, as already noted, is disastrously high for a

business that is not characterized by high activity, and leads to a decrease in the constancy of personnel.

For a more detailed analysis, along with the analysis of absolute turnover, it is necessary to determine the relative turnover for each division, within a certain age, gender, among employees with a particular experience, grounds for dismissal, etc.

Along with the turnover coefficient, the staff constancy coefficient is calculated.

It was revealed that in 2019, the number of people who worked for a full year was only 22, which can be estimated very unsatisfactorily. It is obvious that at this enterprise, the work on the analysis of turnover and the reasons for its appearance is carried out formally or not at all, and measures to reduce staff turnover are not implemented.

To develop measures aimed at reducing staff turnover, it is necessary to know the reasons for turnover. The reasons for the dismissal of employees, i.e. basis for termination of the employment contract according to the labour code are: the agreement of the parties, the expiration of contract, termination of the contract by the employee or the employer, the employee can be transferred to another employer, the refusal of the employee from continuing work in connection with the change of certain parties of the employment contract terms etc. It should be taken into account that dismissal of employees for some reasons does not affect the turnover rate. When calculating the turnover rate, only the reasons for dismissal are taken into account, which do not depend on industrial or state necessity. For example, layoffs for reasons of staff reduction, downsizing, reorganization of the company, personnel changes due to a change in management, retirement do not affect the turnover rate.

The most common reason for dismissal in the company under study is voluntary resignation. As it turned out, it is used even when the employee is dismissed at the initiative of the employer, due to the fact that none of the parties to the employment relationship is interested in conflict situations and legal proceedings.

In case of voluntary dismissal, the labor law does not oblige the employee to explain the reasons for dismissal, and for the employer, voluntary dismissal exempts from certain procedures, in particular, it is not necessary to pay increased compensation for dismissal, and there is no need to search for valid arguments to terminate the contract.

In this regard, there is a need to more deeply identify the actual reasons for dismissals. For this purpose, a survey is usually conducted in the form of a questionnaire in order to assess the level of satisfaction of employees with various motivating conditions. The survey applies to employees who leave the company and those who remain working at the company, but are thinking about leaving. Thus, the main causes of turnover are usually identified by the results of a "job satisfaction" survey.
At the enterprise under study, the main causes of turnover in 2019 were identified based on the results of a survey and are shown in figure 1.

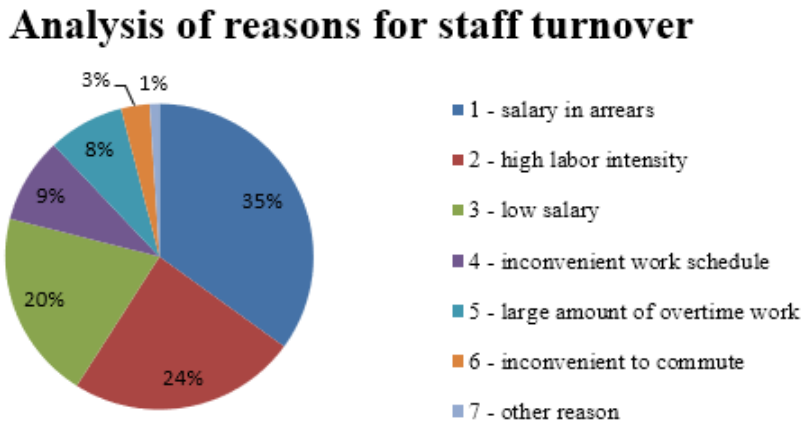

Fig. 1: reasons for staff turnover as a percentage by type of reason

Summing up the interim results, we can note that the analysis of the company's regulatory documents carried out according to the first direction allowed us to give them a positive assessment and determine the prerequisites for motivational activity.

At the same time, when analyzing the second direction of research, it was found that the system of motivation and incentives for staff is not balanced with respect to the goals of the organization, and the forms and methods of incentives used do not fully meet the expectations of employees.

Motivational activity does not fully contribute to the effective operation of the enterprise and requires improvement, which involves identifying the causes of high labor intensity and a large number of hours of overtime, eliminating excessive differentiation of wages by category of personnel, as well as identifying the causes of wage delays.

At this point, the analysis of the motivational activity of the enterprise under study can be considered complete, since specific problems have been identified, and they require developing specific measures.

However, there may be other situations in an enterprise that involve using other approaches for the study of motivational activity. For example, if there was an increasing dynamics of labor productivity during the study period, and the level of turnover for a sufficiently long period (at least six months) did not exceed 7 - 10%, it would be necessary to move to the next stage (direction) - to conduct a more in-depth study, in particular, to study the motivational profile of each employee (for starters, key employees) on the basis of the Gerchikov test (Motype test). Identifying the motivational profile is necessary, in particular, in order to transfer employees with inappropriate motivation to other types of work. According to estimates of Russian recruitment agencies, hiring an employee with inappropriate motivation leads to a loss of about 25% of their productivity and, consequently, to lost profits for the organization.

In addition, the study of the motivational profile of each employee allows you to identify their short-term and long-term motivation and suggest appropriate measures. The fact is that short-term motivation influences only the dominant character traits. For example, an employee belongs to the instrumental type of motivation and, consequently, the incentive is provided exclusively by monetary payments (table 1).
Long-term motivation is based on taking into account the motivational profile of the employee's personality as a whole and allows you to develop measures aimed at changing this profile in the company's desired direction. Ideally, it is necessary to take into account and develop all the motivational components of the employee's personality.

The final stage of analysing motivational activity in the enterprise is calculation of indicators that allow you to assess the effectiveness of motivation. For this purpose, it is proposed to calculate both qualitative indicators (the degree of staff satisfaction (table 2) and the quality of the motivation process (table 3)), and quantitative. As a quantitative indicator for evaluating the effectiveness of motivation, it is proposed to use the motivational lever.

A decrease in the level of employee satisfaction, incorrect motivation, or lack of correspondence between the type of employee motivation and the work performed by them can lead to a deterioration in the company's performance indicators.

Conclusions and Recommendations

When evaluating motivational activities of personnel, it is not enough to rely only on analysing the company's documentation, assessing work results and performance of employees, as it is also needed to analyse the ratio of productivity growth rate and wage growth rate, to study turnover rate, identify their causes, to determine actions for their systematic elimination.

In that case, if during the study period there is a rising dynamics of labour productivity and the turnover rate does not exceed 7 - 10% for a sufficiently long period (at least six months), it is recommended to continue the analysis of motivational activity to conduct a study of motivational profile of key employees (ideally all employees) on the basis of test Motype to identify the type of motivation and to choose forms of incentives (table 1).

If necessary, measures should be developed to change motivational profile in the company's desired direction.

The final stage of the analysis is to evaluate the effectiveness of motivation, which is performed:

- evaluation of the motivation process based on the level of staff satisfaction (table 2);
- studying the balance of motivation types and work performed (table 3), which allows us to conclude about the quality of the motivation process;
- calculation of the motivational lever.

A decrease in the level of employee satisfaction, incorrect motivation, or lack of correspondence between the type of employee motivation and the work performed by them can lead to a deterioration in the company's performance indicators.

A constant monitoring of condition and movement of enterprise's personnel, a development and an implementation of measures aimed at achieving an optimal balance between labor productivity growth and wage growth, a reduction in staff turnover, an increase in employee satisfaction, a proper motivation, a match between the type of motivation and the job will provide a balanced system of incentives relative to the goals of the organization, that is, the applied forms and methods of stimulation will correspond to the objectives of the enterprise and the expectations of employees.
It is necessary to understand that any system of labor motivation does not show results immediately. Comprehensive measures should be carried out constantly considering specific characteristics of employees and with full respect and understanding of the needs of each employee.

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Sharing Economy Platforms and Tourism Destination

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Abstract

The paper presents indirect impacts of sharing economy platforms in tourism on functioning of cities as tourism destinations. The SALSA analytical framework (Search, AppraisaL, Synthesis and Analysis) as well as qualitative and quantitative content analysis of selected publications were applied in order to appoint areas of city functioning which are influenced by activity of sharing economy platforms. Five topics appeared to be the most commonly linked with the development of sharing economy in tourism. They are: entrepreneurship and innovativeness of citizens, real estate market, local transportation, citizens' quality of life and local budgets' incomes. As recognized the indirect impact includes both positive and negative consequences.

Keywords: Sharing Economy Platforms; Tourism Destination, Cities, Indirect Impacts

Introduction

The development of ICT-based exchange platforms is currently taking place in many sectors (e.g. financial, hotel, transport) and is affecting more and more people in the world who raise funds for innovative projects (e.g. on Kickstarter.com) and share their apartments (e.g. through HomeAway.com), or free space in the car (e.g. giving an announcement on BlaBlaCar.com). Many authors emphasize that the sharing economy is an emerging economic-technological phenomenon that is fuelled by developments in information and communications technology (Botsman & Rogers, 2010; Kaplan & Haenlein, 2010; Wang & Zhang, 2012).

Fast development of the *sharing economy* (hereinafter referred to as SE) can be seen in big cities, where the new business model finds many supporters and followers. This trend is in line with growing popularity of big cities as tourism destinations. Tourism remains one of the most important areas of development of SE. Sharing economy in tourism is a very big and diverse phenomenon, most of the research and press releases are connected with two biggest platforms that enhance peer-to-peer relations, i.e. Airbnb in the hospitality sector and Uber in the passenger transportation. Since the second decade of the 21st century, the effects of platform activities have been the subject of scientific research conducted in various disciplines – IT management, urban planning, sociology, economics, spatial management etc.). This is due to the fact that the size of their operations has direct and indirect impacts on cities. The direct impacts are understood as impacts on the tourism industry (e.g. hotel sector). The indirect impacts mean any impact on others areas of city functioning. The size of their operations and the scale of their influence as well as legal controversies makes them very interesting topic of scientific debate.

The purpose of the article is to identify the state of art of scientific research on indirect effects generated in cities by the sharing economy platforms functioning in tourism. The aim was achieved by application of SALSA analytical framework method (Search, AppraisaL, Synthesis and Analysis) as well as qualitative and quantitative content analysis of selected publications in order to appoint areas of city

functions which are influenced by sharing economy. The analysis embraced papers from two popular citation bases – EBSCOhost and Science Direct. Reaching presented findings required two steps. The first one was identification of the most important areas of SE's impact on cities development, while the second was selection of papers presenting that impact.

The paper is divided into five parts. The first one is devoted to presentation of theoretical foundation of sharing economy and sharing economy platforms. The second one described in detail methodology. The results presented in third part of the paper show that sharing economy in tourism has impact on cities, particularly on entrepreneurship and innovativeness of citizens, real estate market, local transportation, citizens' quality of life and local budgets' incomes. The article additionally presents discussion with findings other researchers. Conclusion, limitations and proposals of further research close this paper.

Defining the sharing economy and SE platforms

The lack of universal and clearly definition of the term "sharing economy" is noticed by many academics (Walsh, 2011; Koopman, Mitchell & Thierer, 2014; Cheng, 2016a; Oei & Ring, 2016; On & Moon, 2016; Zale, 2016; Curtis & Mont, 2019). As Frenken and Schor (2017) noticed the sharing economy refers to consumers' providing temporary access to their under-utilized physical assets and it is oriented probably for obtaining of monetary gains.

Many of researchers explain term of SE through the description of its dimensions and attributes, but it is not definition. Although the dimensions do not constitute a definition of the sharing economy (Curtis & Mont, 2019), but they discover the complicated nature of SE. The differences in understanding of the SE nature lead to existence the different terms of this new phenomenon, e.g.: "collaborative consumption" (Botsman & Rogers, 2010; Hamari *et al.*, 2016; Möhlmann, 2015), "access-based consumption" (Bardhi & Eckhardt, 2012; Barnes & Mattsson, 2016), "on-demand economy" (Cockayne, 2016) or "gig economy" (Greenwood *et al.*, 2017). Aloni (2016) proposed to use the "peer-to-peer" (P2P) economy term, what allows to avoid many misunderstandings and misconceptions about what sharing economy is. According to his concept the "peer-to-peer" economy model include for-profit web platforms or mobile apps facilitate peer-to-peer exchanges of goods, services, space, and money. The crucial role of "digital platforms", "ICT" (information-communication technology) or just "technology" in the sharing economy development was noted by many researchers (Tab. 1) and was proposed as a defining characteristic, separating the term "sharing economy" from traditional sharing (Oei & Ring, 2016; Sutherland & Jarrahi, 2018).

The development of information technologies alongside the growth of web 2.0 has enabled the development of online platforms that promote user-generated content, sharing, and collaboration (Kaplan & Haenlein, 2010). SE operates through technological platforms, such as a website or mobile app, facilitating the sharing of goods and services through information technology. The platforms also are referred to as e.g. peer-to-peer (P2P) platforms (Rodrigues & Druschel, 2010), online platforms or CC (collaborative consumption) platforms (Hamari Sjöklint & Ukkonen, 2016), network platforms (Oskam & Boswijk, 2016), IT platforms (Ho, 2015). This digital infrastructure empower the growth of model of production, distribution and consumption whereby people share their assets or other resources on an spare capacity basis. Internet-based platforms and applications create new ways for people to share goods and services with one another on a previously unimaginable scale, emphasizing that the platforms focus on collaboration (Kaplan & Nadler, 2015) between providers, and consumers of goods and services (Tab. 2). As Ranjibari *et al.* (2018) noticed the most frequent term in SE definitions is "online platforms" containing websites and mobile applications.

Table 1: Definitions of sharing economy focused on digital platforms/technology

Author	Definition	Internet/ online	Technology	ICT	Digital platforms
Lessig (2008)	*"The allocation of resources between the parties to the exchange, exploding due to the development of the Internet, based not on money but on interpersonal relations and motivated more by social than economic factors."*	•			
Wosskow (2014)	*„…sharing property, resources, time and skills across online platforms"*	•			•
Stephany (2015)	*"The sharing economy is the value in taking underutilized assets and making them accessible online to a community, leading to a reduced need for ownership of those assets"*	•			
Hamari Sjöklint, & Ukkonen, (2016)	*"The peer-to-peer-based activity of obtaining, giving, or sharing the access to goods and services, coordinated through community-based online services."*	•			
Aloni (2016)	*"An economic activity in which web platforms facilitate peer-to-peer exchanges of diverse types of goods and services; in detail: an economic model in which for-profit web platforms or mobile apps facilitate peer-to-peer exchanges of goods, services, space, and money."*	•			•
Cockayne (2016)	*"The on-demand or 'sharing' economy is a term that describes digital platforms that connect consumers to a service or commodity through the use of a mobile application or website"*	•			•
Hult & Bradley (2017)	*"The initiatives based on horizontal networks and participation of a community. It is built on distributed power and trust within communities, which often meet and interact on online networks and peer-to-peer platforms."*	•			
Laurell & Sandström (2017)	*„ICT-enabled platforms for exchanges of goods and services drawing on non-market logics such as sharing, lending, gifting and swapping as well as market logics such as renting and selling".*			•	•
Ranjbari, Morales-Alonso & Carrasco-Gallego (2018)	*„An economic system, whose intermediary companies utilize online platforms to facilitate and lower the cost of the for-profit transactions of giving temporary access– without the transfer of ownership – to idle resources of consumers in the peer-to-peer networks that it has created, because of the trust built among its members, who may be individuals or businesses.*	•			•
Curtis & Lehner (2019)	*"A socio-economic system that leverages technology to mediate two- or multi-sided markets, which facilitate temporary access to goods that are under-utilised, tangible, and rivalrous"*	•	•		•

Source: Compiled on the basis of quoted literature.

Table 2: Definitions of Sharing economy platform

Author	Definition	Characteristics
Rodrigues & Druschel (2010)	*"a system in which content generation is highly distributed and decentralized as a result of the organic growth and strong user self-organization."*	content generation and distribution system, decentralized
Dervojeda *et al.* (2013)	*"a company to have an accessibility based business model for peer-to-peer markets when their value proposition consists of creating a match between a peer owning a certain resource and a peer in need of that resource, at the right time and against reasonable transaction costs."*	business model for peer-to-peer markets, connecting
Kaplan & Nadler (2015)	*"a sharing economy companies, like Airbnb, offering a variety of Internet-based solutions and applications that create new ways for people to share goods and services with one another on a previously unimaginable scale, emphasize that the platforms focus on collaboration"*	company, new way of collaboration based Internet
Demary (2015)	"that the business models of the Sharing Economy are usually platform-based to connect demand and supply and goods or services are shared between individuals"	business model, connecting demand and supply
Coyle (2016)	*"the hybrid entities using digital technology as an interface between the users or consumers of a product or service and its suppliers"*	digital technology, hybrid entity, interface
UNWTO (2017)	"the intermediaries, connecting providers with users through an online platform, and facilitating transactions between them"	intermediaries connecting providers with users
de Reuver, Sørensen, & Basole (2018)	*„the digital infrastructure, rules, and processes that enable resource exchange between external producers and consumers."*	digital infrastructure
Airbnb (https://news.airbnb.com/en-uk/about-us/)	defines itself as *"one of the world's largest marketplaces for unique, authentic places to stay and things to do, offering over 7 million accommodations and 40,000 handcrafted activities, all powered by local hosts. Airbnb promotes people-to-people connection, community and trust around the world."*	trusted market connecting people, a place of exchange

Source: Compiled on the basis of quoted literature.

Enabling the connection between spare capacity and demand (Gazzola, 2018), platforms decide about costs and scale of sharing and provide to increasing consumption of sharing economy services and the number of transaction. They makes the peer-to-peer transactions for the under-utilized assets viable (Ranjibari *et al.*, 2018). Due to this important role of Internet-based platforms in sharing, UNWTO (2017, p. 14) named the sharing economy as the platform economy and the exchanged goods as the platform tourism services. The new platform tourism services was defined as business models in which private individuals offer goods or services to visitors through digital platforms that match demand and supply.

Methodology

In order to investigate how the researchers perceive the problem of the impact of SE platforms activity on areas of city functioning as: entrepreneurship and innovativeness of citizens, real estate market, transportation, local budgets' incomes and quality of life/gentrification, we conducted a literature review followed by quantitative and qualitative content analysis method. This method increases the level of order and the level of detail of research, and is also the most relevant in the case of review study and has already been used in scientific articles on SE (Gössling, 2013; Glotz-Richter, 2016; del Romero Renau, 2018). The research procedure in the review process has been divided into four critical

steps: search, appraisal, synthesis and analysis that were the root for the SALSA abbreviation. By many authors (Bruce, 2001; Grant & Booth 2009; Major & Savin-Baden, 2010; Sadruddin *et al.*, 2017), SALSA is considered to be an appropriate research behaviour in a variety of types of reviews, including literature review. By organizing and structuring the research, SALSA makes it easier to find the most notable articles in this subject field and a sophisticated analysis (Edwards, Russell & Stott 1998; Booth, Sutton & Papaioannou, 2016).

Searching

Literature review-type scientific article requires searching and selecting articles that will undergo in-depth critical analysis. This stage involved selecting scientific databases which will be used to select articles about SE. The large number of databases and diverse approach of researchers to this issue should be noted. In the research process in the field of SE and SE platforms researchers usually review Web of Science, Scopus EBSCOHost and/or Science Direct databases. The EBSCOHost (EB) and Science Direct (SD) are selected in this article as those databases were regarded as the largest and the most popular (Görög, 2018; Cheng, 2016b; Buhalis & Law, 2008).

AppraisaL

The next stage consisted in selecting the articles, i.e. qualifying or rejecting the scientific article based on the analysis of the content of the whole article in terms of the content of terms specified in the categorization key. It is a set of words/categories needed to make the selection. Among many categories/terms related to SE, such as: collaborative consumption, collaborative economy, peer-to-peer consumption, digital economy, it was decided to use the most appropriate keywords considering the title and goal of the article: "sharing economy" and "tourism" as well as "cities or urban or city". Other criteria of selection strategy:

- *article part* – title and abstract and key words and main text,
- *availability* – full text document,
- *journal type* – science journal,
- *article category* – reviewed article,
- *period* – 2008-2019,
- *language* – English.

As a result, 161 articles were found in SD corresponding to the assumed selection criteria, in EB – 75 were found and chosen for further research.

Synthesis

At this stage, in this paper applied the traditional approach to synthesis that involved reading the content of all articles (236) selected at the previous stage and taking notes. This was related by the desire to ensure high quality of research resulting from the advantage of the human mind over IT programs. In this part of article has presented specific research topics undertaken by academics in these articles. 21.2% of articles irrelevant to the issues of this study were identified (these were articles that contained at least one of the keywords in the content, but they were not dedicated to the issue investigated), which were rejected from further research procedure. Thus, 186 articles (78.8%) were taken into account, including 122 from the SD database and 64 from the EB database. Then, they were subjected to the synthesis process in which the tabular method and narrative were adopted. There are articles that raise more than 1 subject. Therefore, the TAT index for each base is higher than the number of articles taken for the study. The table shows a quantitative indicator that measures the number of articles in individual databases and according to the subjects identified in the study, as well as a structural indicator that measures the share of individual articles by subject. Researchers examine many aspects of rapidly developing SE in tourism phenomenon. The most frequently discussed issue was "customer value/experiences/ motivations/preferences/choice" (14.4% of articles) (Tab. 3). Articles in lines 13 to 17 (Tab. 3) emphasize the relationship between SE in tourism and cities examining the impact of SE in tourism on particular areas of city functions, i.e. an entrepreneurship and innovativeness of citizens, real estate market in cities, city transportation system, quality of citizens' life/gentrification and city budgets' incomes. Eventually, there were 33 articles like these in two databases jointly (SD and EB)

and having eliminated the repetitions in them (Horn & Merente 2017; DiNatale, Lewis & Parker 2018; Wegmann & Jiao 2017), 30 of them were qualified in total for the next stage.

Table 3: Topics appearing in the literature review

No.	Topic	SD	EB	Total	%
1.	Customer value/experiences/motivations/preferences/choice	30	6	36	14,4
2.	Impact on hospitality	15	14	29	11,6
3.	Host-guest relation including trust and reputation	13	12	25	10,0
4.	Locality of short term rentals	9	11	20	8,0
5.	Governance and regulations	7	14	21	8,4
6.	The nature of SE in tourism	14	3	17	6,8
7.	Prices	8	5	13	5,2
8.	Impact on transportation	7	5	12	4,8
9.	Business model	5	9	14	5,6
10.	Impact on different forms of tourism	3	5	8	3,2
11.	Impact on environment and climate change	6	0	6	2,4
12.	Segmentation	3	0	3	1,2
13.	An entrepreneurship and innovativeness of citizens	3	1	4	1,6
14.	Real estate market in cities	4	11	15	6,0
15.	City transportation system	8	5	13	5,2
16.	Quality of citizens' life/gentrification	5	7	12	4,8
17.	City budgets' incomes	0	2	2	0,8
18.	Total articles by topics (TAT)	140	110	250	100

Source: own compilation.

Analysis

The stage involved an in-depth qualitative content analysis method of the selected articles. The purpose of the research at this stage was to identify the purpose, methods, results and subject scope of 30 articles Additionally, the use of the content analysis method allowed to structure a database of 30 articles according to the following criteria: type of research (desk and filed research), data sources (primary and secondary, scientific and non-scientific), the nature of the article (review, empirical and mixed) and the number of issues raised in one article (Tab. 4).

Table 4: Detailed Indicator Analysis

Criterion	Number of Articles (N=30/100%)		
Data Sources	Scientific (based solely on scientific articles by other authors)	Mixed: Scientific and Non- Scientific (25/83.3%)	
		Sources based on methodology or created by academics	Sources based on methodology or created by academics
	5/16.7%	22/73.0%	10/33.3%
	Primary	Secondary	Mixed: primary and secondary
	5/16.7%	21/70.0%	4/13.3%
Type of Research	Field research	Desk research	Mixed: desk and field research
	2/6.7%	24/80.0%	4/13.3%
Type of Article	Review	Empirical	Mixed: review-empirical
	5/16.7%	16/53.3%	9/30.0%

Source: own elaboration.

Findings

Development of SE platforms in tourism has impact on different aspects of cities' economies and societies. Analysis of scientific literature allowed to point five areas, these are: entrepreneurship and innovativeness of citizens, real estate market, city transportation system, quality of life and city budgets' incomes.

Development of SE platforms in tourism – impact on entrepreneurship and innovativeness of citizens

The relationship between the development of SE in tourism and local entrepreneurship and innovativeness is underlined. This relationship is complex, complicated and two-dimensional and includes positive and negative aspects (Tab. 5).

Table 5: Development of SE platforms in tourism – impact on entrepreneurship and innovativeness of citizens (positive and negative aspects)

Positive	Negative
• Diversification of services offered by microentrepreneurs • Upgrade to new entrepreneurial opportunities and ecosystems. • New employment opportunities through micro and part-time entrepreneurship • Establishing new types of companies • Increased opportunities for individuals to become micro-entrepreneurs • Enhanced innovations in the sector of microentrepreneurs • Alternative income streams for residents who become micro-entrepreneurs • Lowering unemployment rate	• Labor exploitation • Unfair competition • Ethical issues

Source: own elaboration based on: Wu & Zhi (2016); Alrawadieh & Alrawadieh (2018), Stabrowski (2017); Palgan, Zvolska & Mont (2017).

Both, positive and negative connected aspects with the impact of the SE platforms in tourism on entrepreneurship and innovativeness of citizens are difficult to be measured and finding convincing evidence. Especially, in case of impact on innovativeness and entrepreneurship, benefits are underlined and cities' representatives make efforts to maximize them. Those actions include financial support, space, individual advice and matchmaking for technological start-ups and creative entrepreneurs in collaboration with the private sector.

Development of SE platforms in tourism – impact on real estate market of cities

Majority of publications agree that this impact is only or almost only negative (Brauckmann, 2017). However Horn and Merante (2017) state that there is only limited evidence on whether and how home sharing affects the housing market, despite the obvious overlap between these two markets. The essence of that impact (negative) is related to big increase in the demand on the houses and apartments created by prospect runners of the P2P services (Lima, 2019) (Tab. 6).

Table 6: Development of SE platforms in tourism – impact on real estate market of cities (positive and negative aspects)

Positive	Negative
• More efficient use of existing properties to build the sharing economy offer	• Increased demand for properties, increased prices of properties • Transfer of many properties from the long term rental to tourism short-term rental • Deepening the existing housing affordability problems

Source: own elaboration based on: DiNatale, Lewis & Parker (2018), Wegmann & Jiao (2017), Palgan, Zvolska & Mont (2017), Horn & Merante (2017).

These negative effects on the real estate market can be contrasted only by a positive consequence resulting from the more effective use of available properties in the city area (Horn & Merante, 2017). The SE platforms in tourism accommodation industry has grown, in part, due to the natural tendency for capital to maximize return on investment. In many places, short-term tourism rental appeared to be more profitable to local residents than renting. As a result, investors, both big players and small local ones, in order to maximize their profits have been drawn to the P2P accommodation market where small investors with as little as one apartment to rent can access the global marketplace.

Development of SE platforms in tourism – impact on transportation system of cities

Innovative sharing companies are often perceived as the ones that bring a new solution for existing transportation problems in most of cities. Those problems involve congestion and traffic jams and CO_2 emission (Cohen & Kietzmann, 2014). Car sharing may improve effectiveness of use of assets (cars) while bike sharing is a strong support for probably the most ecological and demanded way of local transport. However, due to huge scale and pace of development of SE platforms, many additional problems arose here (Tab. 7).

Table 7: Development of SE platforms in tourism – impact on transportation system of cities (positive and negative aspects)

Positive	Negative
• New, innovative solution for city traffic problems • Greening of transport system due to more efficient use of modes of transport and lowering the number of cars possessed by citizens • More efficient operations of local taxi companies forced by competitive environment • Improvement of public transportation traffic in cities	• Unfair competition and tension between employees of traditional transportation companies and employees engaged in new sharing-ones, especially between taxi drivers and Uber drivers • Advancing unjust tendencies to privatize public space and services • Increasing congestion when car-sharing and hailing services compete with public transport

Source: own elaboration based on: del Romero Renau (2018); Cohen & Kietzmann (2014); Hall et al. (2018); Dudley et al. (2017); Kim et al. (2018); Mounce & Nelson (2019), de Chardon (2019); Pawlicz (2019); Gössling (2013).

The most commonly noticed problem are legal differences between taxi companies and their drivers and drivers of Uber who do a similar job. Because of the level of prices connected with fees paid by traditional taxi drivers and taxi corporations, Uber's position on the market is very strong and privileged and it is difficult to make market opportunities for traditional taxis and Uber-like platforms more equal without administrative and/or legal measures.

Development of SE platforms in tourism – impact on quality of life in cities

It is expected that the development of tourism sharing platforms should create additional incomes obtained by particular cities' inhabitants (Di Natale, Lewis & Parker 2018), thus improving their quality of life (Horn & Merante, 2017). This phenomenon undoubtedly takes place, however, recently, a new phenomenon, which is clearly a limitation to positive economic effects for ordinary urban residents, can also be seen (Tab. 8). This phenomenon is related to the purchasing of attractively located real estate mentioned above and is regarded as a capital investment, which is additionally supposed to pay off by bringing revenues by selling accommodation through SE platforms. In many cities apartment networks come into being. These new trends are the reason why real estate renting revenues from SE platforms are not distributed to a wide range of residents, but are transferred to a small group of investors, who sometimes are from outside.

Table 8: Development of SE platforms in tourism – impact on quality of citizens' life (positive and negative aspects)

Positive	Negative
• A source of additional incomes for inhabitants • SE platforms in tourism have implications for the cities' sustainability	• Introducing tourism into quarters that were so far reserved for inhabitants • Overcrowding the most attractive parts of the city and overcrowding local roads as well as means of local transportation • Uneven distribution of economic benefits • Increased cost of living • Unfavorable change in the character of a part of the city

Source: own elaboration based on: Postma & Schmuecker (2017), Wachsmuth & Weisler (2018), Garcia-Ayllon (2018), Frenken & Shor (2017); Palgan et al. (2017), Wu & Zhi (2016).

A significant increase in tourist traffic, for residents is often a problem. It is increasingly often referred to in literature by the concepts of overtourism and tourismophobia (Goodwin, 2017). Too many tourists is a cause of congestion in many, especially central, places in cities, as well as local roads, means of transport or even bicycle routes. Often, the inappropriate behaviour of tourists who feel too anonymous in the crowd, is also a problem.

Development of SE platforms in tourism – impact on city budgets' incomes

The impact of SE in tourism on local budgets' incomes is a subject of deeper interest of authors of as little as two articles (DiNatale, Lewis & Parker 2018; Wachsmuth & Weisler 2018), although the main purpose of these papers was to study the impact of SE platforms in tourism on the real estate market. A significant number of customers using SE platforms are not only guests 'taken' from the traditional accommodation business, but also, to a large extent, newly generated tourist arrivals. The increasing number of visitors contributes to the increasing development of entrepreneurship and employment growth also in other areas related to the operation of tourist traffic, such as gastronomy, tourist attractions, tour guide business. In recent years, these enterprises have faced a significant increase in turnover in many cities, which also increases revenues to local budgets (Tab. 9).

Table 9: Development of SE platforms in tourism – impact on city budgets' incomes (positive and negative aspects)

Positive	Negative
• Introducing the lodging taxes and license fees and generating increased tax revenue to areas with few traditional lodging types • Increasing number of hosts, the owners of short-term rental who are taxpayers • Growing number of tourists that pay local taxes	• Growth in grey economy • Difficulty with collecting taxes from short-term rental • Increasing police and city staff cost

Source: own elaboration based on DiNatale, Lewis & Parker (2018), Wachsmuth & Weisler (2018).

Discussion

Based on literature review, this study helps understand that the sharing economy in tourism impacts on areas of city's functioning. Researchers conducted works devoted to 5 areas (the real estate market, local transportation systems, quality of citizens' life, an entrepreneurship and innovativeness and local budgets' income) as we saw above.

Sharing economy platforms in tourism and the entrepreneurship and innovativeness of citizens

The authors of 4 articles on the impact of SE platforms in tourism on entrepreneurship and innovativeness of citizens emphasize that that this process has enhanced opportunities to open up new

markets and expand the existing markets. SE platform is often perceived as a typical niche business suitable for micro-businesses and innovative start-ups (Martin, 2016). To confirm those, Davidson and Infranca (2016) indicate that entry costs and innovation risk for new companies as the main factors of entrepreneurship and innovativeness development were reduced. Sharing economy brings many positive effects on local entrepreneurship and innovativeness, however, its development in tourism is not free from problems (Martin, 2016; Frenken & Schor, 2017).

Sharing economy platforms in tourism and the real estate market

Review of articles provides evidence that development in SE platforms in tourism brings more costs than benefits on real estate market causing many conflicts in the area of land use and land revenue. The following negative externalities are particularly highlighted: increasing prices of properties and rental, limiting the number of properties for long-term rental for residents which contributes to making the existing housing affordability problems even more serious. However, according to Davidson and Infranca (2016), the process of increasing prices of long-term rental of properties does not have to occur because it depends on the share of short-term rentals in the total rental. Miller's research (2016) conducted under a slightly different angle draws attention to additional aspects of the impact of development of SE platforms in tourism on the city real estate market. On the one hand, it contributes to the market growth, and on the other hand, to real estate market speculation. Some benefits of SE platforms in tourism to real estate market identified in this review of articles can be supplemented by the results of a study by Jefferson-Jones (2016) who noted that the revenues obtained from short-term rental can help owners defray mortgage and pay real estate tax costs.

Sharing economy platforms in tourism and the local transportation systems

Many articles (13) subjected to detailed analysis concern the impact of SE platforms in tourism on local transportation systems where the authors emphasize that car-sharing and bike-sharing services enrich urban transportation. They also indicate that they are more innovative, green and efficient modes of transportation and, as Davidson and Infranca (2016) add, they change patterns of mobility. On the other hand, the same authors (Davidson & Infranca, 2016) indicated the negative impact on public urban transportation, which may be related to a decline in demand for its services. And this, in turn, can make the existing problems with the efficiency of transportation systems in cities even more urgent. This may prompt to increase transportation tariffs - a process which is unfavorable for residents. Other costs are also recognized in the articles examined, such as: competition between employees of traditional transportation companies and employees involved in new sharing-ones, progressing tendencies to privatize public space and services, and competition between car-sharing services platforms and local public transportation increases congestion in cities. While, Standing, Standing and Biermann (2018) suggest a reverse effect: less traffic congestion and reducing the demand for parking.

Sharing economy platforms in tourism and the quality of citizens' life

Based on the literature review that we made, it can be concluded that many researchers emphasize mainly the benefits of renting Airbnb accommodation for non-commercial residents. DiNatale, Lewis and Parker (2018) identified the most Airbnb hosts that operate a single short term rental and most hosts list their unit as their entire home. However, the research by Horn and Merante (2017) conducted in Boston, indicates that only 18% of hosts had multiple properties listed simultaneously in Boston, but their properties represented almost half of those listed on Airbnb (46%). This suggests that a large part of Airbnb's properties in the city are leased by commercial operators. However, the quality of life of the inhabitants cannot be measured only by means of economic effects. Gurran and Phibbs (2017) and Garcia-Ayllon (2018) are of similar opinion emphasizing social externalities. Onete *et al*. (2018) supplement this view with cultural and moral perspectives on human coexistence (prosocial/altruistic behavior, collaborative symbiosis). However, other researchers also see the social costs of SE development in tourism for residents neighboring short-term rental accommodation. Jefferson-Jones (2016) claims that permanent residents may argue that short-term tenants do not have ties to the community and do not or cannot, therefore, reflect the values of the community. These arguments conflate how long they stay in a community with whether or not they are able (or more precisely the unable) to be a good neighbor.

Sharing Economy Platforms in Tourism and The Local Budgets' Income

When analyzing the impact of SE platforms in tourism on local budgets, the authors of two articles (DiNatale, Lewis & Parker 2018; Wachsmuth & Weisler 2018) drew readers' attention to three sources of local revenues, i.e.: tourist expenses, taxes and fees from service providers, as well as to citizens' expenses from additional income achieved from operations in SE. Nevertheless, Davidson and Infranca (2016) cools the enthusiasm of the researchers, indicating the risk of leakages of revenue from the local economy due to high commissions charged by the SE platforms (e.g. Uber commission ranges 5-20% of the fare).

Conclusion, Future Research and Limitations

Review of scientific papers indexed in two of leading international citation bases allowed to draw several conclusions.

The number of scientific publications devoted to SE in tourism and SE platforms is growing exponentially last years, but usually the research problem is connected with the general nature of SE and platform perceived as a new business model or with the impact of SE on tourism market or hotel sector. Topic of indirect impacts of the SE platforms operating in tourism on functions of the cities is researched rarely and almost only in a form of studying of particular forms of impact, never complex.

In papers where the authors study particular of SE platforms in tourism and their development in the cities, the most often studies are connected with impact on local real estate market or on local transportation systems. In the first case the studies are connected with accommodation-sharing and most often with Airbnb – the biggest global web platform linking peers. In the second case studies concentrate on car and bike sharing and car hailing companies like Uber. Those two bodies of literature are rarely interconnected. Due to of very different nature of the impact accommodation –sharing and car-sharing are usually researched separately.

Development of SE platforms in tourism creates both positive and negative effects for particular cities. Most of them are clearly identified but there are very few proves showing the scale of particular effects and their measurement is complicated as many of those are connected with qualitative changes and/or impact issues which are simultaneously influenced by others factors independent from SE in tourism.

Using SALSA research procedure found five areas of indirect impact of SE platforms functioning in tourism on the cities. Among them, three topics are researched relatively often, and the other two are researched rarely or very rarely (i.e., entrepreneurship and innovativeness of citizens and local budgets' incomes). Most commonly, the researchers are interested in the real estate market, the city transportation systems, and the quality of citizens' life.

The conclusions presented above allowed to point several gaps in our scientific knowledge as well as the most important directions of future research. The results of the literature review show that the number of publications dealing with the topic of indirect effects of the development of SE platforms in tourism is surprisingly low. It means that actually any empirical studies within this topic should be welcomed, however those researching the impact of SE in tourism on entrepreneurship and innovativeness and on local budgets are the most demanded. Even more necessary are studies presenting those effects as a total impact of SE in tourism on cities sustainable development or at least trying to compare the impact on two or more areas of functioning of cities. Such papers are extremely rare.

In the study area of the impact of SE platforms in tourism on entrepreneurship and innovation of residents, future research should enable the answer two important questions:

(1) What is the role of peer-to-peer platforms in raising entrepreneurship and self-employment of seniors, the unemployed, disabled city residents or people with low incomes and qualifications?
(2) What actions should city authorities take to make the distribution of benefits from the development of SE platforms more socially equal?

The impacts of SE platforms in tourism on local budget incomes remains the least explored field. Among the goals of future research should be: an estimation the city's income generated by SE in tourism and expenses related to limiting the negative consequences of activities of SE platforms.

Another important direction of future studies is connected with dealing with effects by practice. Contemporary literature presents only fragmented knowledge on effects observed in particular cities and on measures undertaken to deal with them. However, the most urgent issue seems to be estimation of effectiveness of those measures to establish some benchmarks for authorities of particular cities starting their efforts to maximize benefits and minimize cost of development of SE. It is also expected to get more evidence from cities from other continents than just Europe (mainly Western Europe) and North America.

Limitations of the study are the result of the disadvantages of the content analysis method used, which is weakly codified and the resulting fluctuation of the study structure itself. In addition, it is difficult for a researcher to remain objective because 'reading' the content is never free from his/her interpretation. Like in other review articles about new phenomena that do not have unambiguous names, the issue of searching and selecting the appropriate documents is the limitation of this research. Therefore, the authors are aware of the fact that in their analysis, they did not take account of all adequate publications placed in the databases selected. Different options to filter the resources of the scientific bases selected were an additional difficulty.

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The Concept of Assessing Logistic Capabilities of Maritime Container Terminals – A Case Study in Poland

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Abstract

The paper presents a concept of assessing logistic capabilities of maritime container terminals on the example of Poland, in which management and applied logistics methods have been used. The solution suggested in the paper comes as a model which offers a possibility of providing a parametric evaluation of the analysed facilities in terms of their logistic capabilities, with consideration of criteria related to the logistic interoperability levels and actual maximal annual cargo handling capacity of the discussed facilities. The results obtained during the research can be applied to configure land-sea logistic transport chains and to evaluate capability levels of handling potential customers by the discussed facilities. The study is of conceptual nature, however it has been verified based on the data provided by the Polish maritime container terminals for the years 2015-2016. It has been written under the individual project *Modelling Strategical Capabilities of Maritime Industry on the Example of Poland – an Economic and Defensive Area* , implemented by the Author at the Baltic Centre of Applied Logistics.

Keywords: a maritime container terminal, logistic interoperability, a conceptual model, management, logistic capabilities.

Introduction

Intermodal transport is the key service provided on the market of international and national cargo shipping . It results mainly from its universal nature based on some well-established logistics standards, among which intermodal transport units take a significant position along with technical and technological solutions related to transporting and cargo handling operations between the modes of transport engaged into these processes, without stripping load units. The applied standards make it possible for interested parties to achieve all their key logistic targets, including time of delivery / move time, logistic costs optimization and quality of services they provide (Cf.: Rushton, Croucher, Baker, 2006). The minimal cargo handling requirements related to the shortening of the lead time and the reducing of logistic costs and cargo safety and security on the way from its senders to its receivers come as the fundamental factors which affect the level of customer service influencing the competitiveness of supply chains.

One of the basic sub-systems which operate in the system of intermodal transport is the container transport system. The aim of this study is to present a model for parametric evaluation of logistic capabilities of maritime container terminals and its verification based on the data related to the discussed type of facilities operating in Polish maritime economy.

The research problem which must be solved in order to achieve the above-mentioned aim is to find an answer to the following question: in what way should the data and other information related to maritime container terminals be used in order to develop a tool for assessing capabilities of such facilities in the field of container transport handling?

A working hypothesis which should be proved in order to solve the above-mentioned problem has been formulated as follows:

If the proper structuring and decomposing of logistic capabilities of maritime container terminals are provided, based on the actual data given in specialist periodicals, it is possible to develop

a tool for assessing capabilities of such facilities in the discussed set and for providing their ranking list in the field of container transport handling.

In order to achieve the aim, to solve the research problem defined above and to prove the working hypothesis, the following research tasks must be carried out:

- defining a research scheme;
- identifying a set of maritime container terminals for the analysis;
- reviewing specialist literature and developing a model for assessing capabilities of the analysed facilities, according to the assumed assessment criteria;
- adopting and substantiating a particular method for assessing logistic capabilities of maritime container terminals;
- performing tasks related to the evaluation of the elements defined in the model and to the interdependencies observed among them;
- quantifying logistic capabilities of the container terminals in the defined set and providing their ranking list referring to the discussed field.

There have been the following limitations assumed in the study:

- the research refers to the maritime container terminals which operate at Polish sea ports;
- the analysed data on the discussed facilities refer to the years 2015-2016.

The research Scheme

The research procedures are divided into three stages (Figure 1):

1. ***Preliminary stage*** – is focused on a review of specialist literature and selection of publications referring to the system of maritime container transport, including data related to the analysed sector, obtained from the market. At this stage, relevant limitations have been assumed in relation to the scope of the research and time period of the required data. The research includes all the maritime container terminals operating at the Polish sea ports (Table 1 and Figure 2);

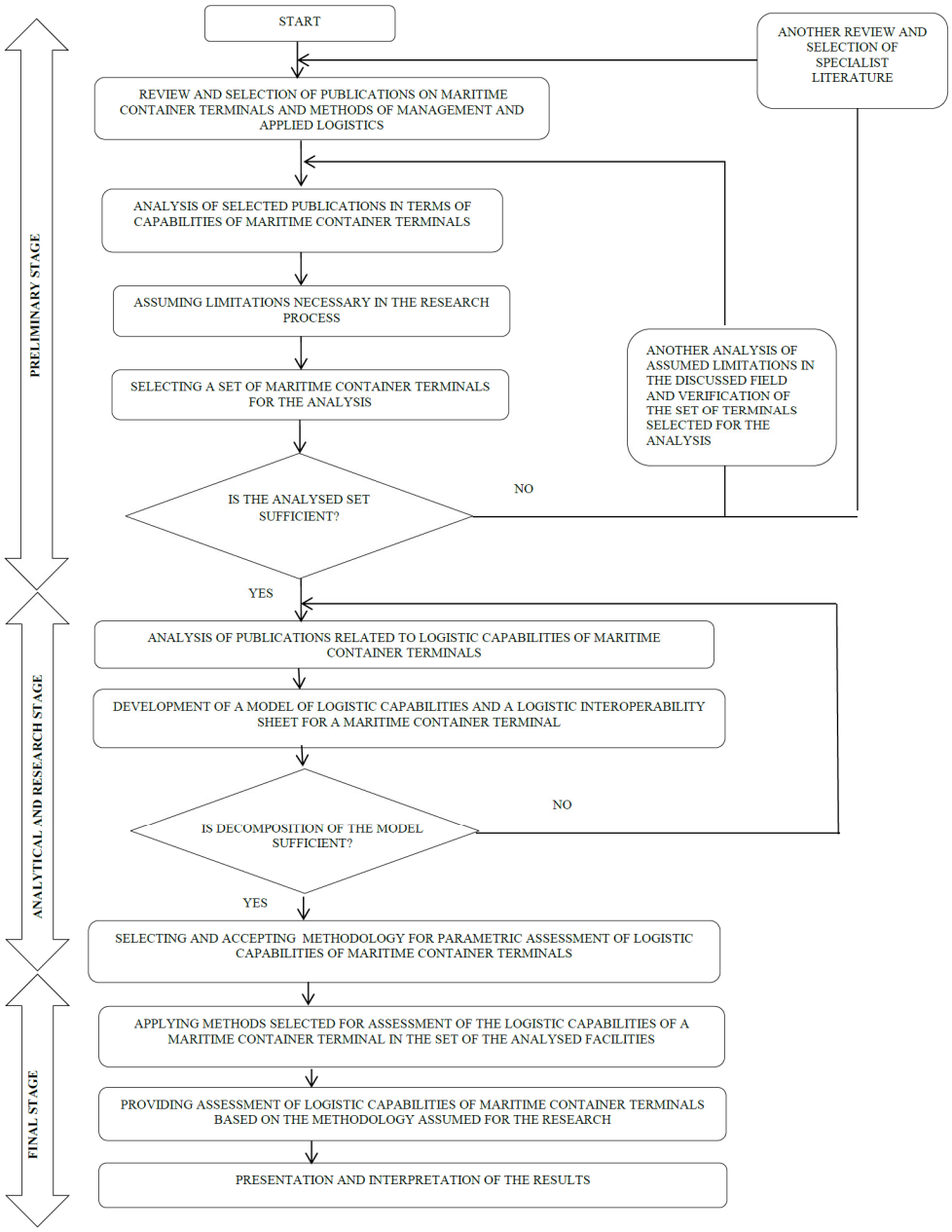

Figure 1: Scheme of the research stages

Source: Elaborated by the author

2. ***Analytical and research stage*** – includes development of a model of logistic capabilities of a maritime container terminal in the field of transport handling. There are two main assessment criteria identified, namely: actual maximal annual cargo handling capacity and logistic interoperability (Figure 3). Logistic interoperability is an equivalent of the quality of a maritime container terminal which affects its cargo handling capacity. For the requirements of the research, this value is described with the use of a relevant assessment sheet. The required data have been obtained from specialist periodicals referring to the years 2015-2016. In order to provide the assessment of logistic capabilities, a positive correlation between the identified assessment criteria and the logistic capabilities of a terminal has been determined.

Table 1: A set of the analysed maritime container terminals

No.	Maritime container terminal	Total area [ha]	Storage area [TEU]	Actual maximal annual cargo handling capacity [TEU]
1	Deepwater Container Terminal S.A. (DCT Gdansk).	49	29000	1500000
2	Baltic Container Terminal S.A. (BCT Gdynia)	66,2	20000	1200000
3	Gdynia Container Terminal (GCT) S.A.	19,6	8200	429000
4	Gdansk Container Terminal (GTK) S.A.	6,7	4000	70000
5	DB Port Szczecin S.A.	12,7	4000	120000
6	OT Port Świnoujście S.A.	20	2000	70000

Source: Elaborated by author based on Office of Rail Transport (2016)

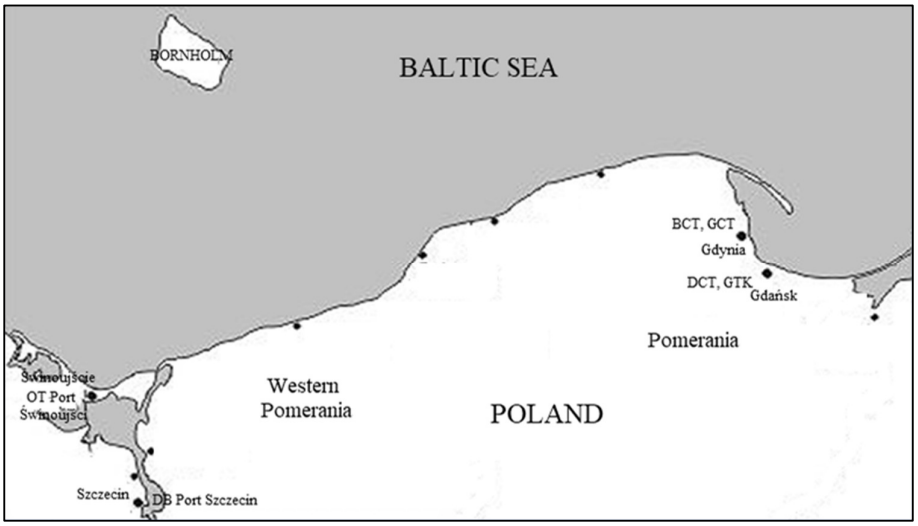

Figure 2: Geographical location of the maritime container terminals analysed in the research
Source: Elaborated by the author based on LINK (2016)

Logistic interoperability is understood as capabilities of a logistic facility to provide logistic services to customers/contractors and customers'/contractors' abilities to accept such services (Cf.: NATO, 1997). Therefore, it is possible to identify the positive correlation between the logistic interoperability of a terminal and its maximal annual cargo handling capacity.

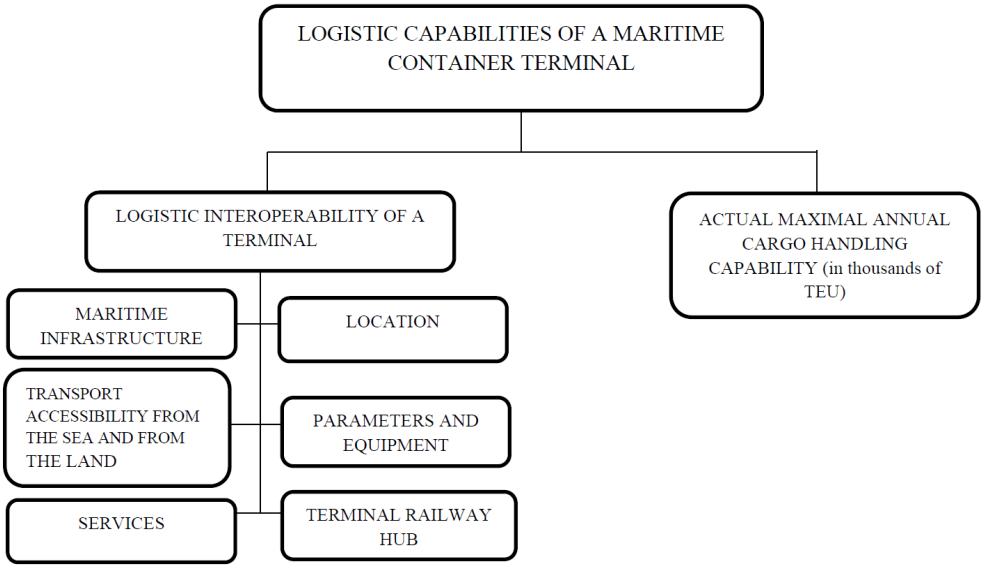

Figure 3: Logistic capabilities of a maritime container terminal

Source: Elaborated by the author based on Office of Rail Transport (2016).

In accordance with the model suggested in the study, logistic interoperability consists of six components (S_i) which include diagnostic features (C_{ij}), forming a sheet of logistic interoperability (Table 2). These components are:

- location of a terminal, including its location along the transport corridors and its location at the sea port, also the modes of transport handled at the terminal and the vicinity of an urban agglomeration and industrial zones;
- parameters and equipment of a terminal, including the total area of the analysed facility and TEU storage area, the number of container layers in stacks, cargo handling facilities (ship – to shore gantries, mobile harbour cranes, rail mounted gantries, rubber – tyred gantries, straddle carriers, reach-stackers, yard tractors, forklifts, road chassis and terminal chassis etc.), railway cranes, capacity of truck parking areas, the number of electrical connectors;
- maritime infrastructure: length of wharfs with cargo handling facilities, depth of berths for vessels, the number of cargo handling berths at the port, width of ramps for handling ro-ro vessels;
- transport accessibility from the sea and from the land, including the linear infrastructure of road transport (communication lines, in accordance with the AGR agreement) and of rail transport (communication lines, in accordance with the AGTC and AGC agreements), vicinity of airports and inland ports, regular vessel connection lines and regular ocean shipping services;
- terminal railway hub, including the number and the length of cargo handling railway tracks, the total length of railway tracks, the number of railway sidings, the number of regular national and international connection lines;
- services provided to handle vessels and block trains, basic services provided to handle containers (customs services, electronic reporting systems, storage of full and empty containers, services provided to handle RID, ADR and isothermal containers) and other services provided to handle containers (sealing and cleaning containers, emergency repair services). Additionally, the services also include cargo handling relations and services related to temporary storage.

Table 2: A sheet of logistic interoperability of a maritime container terminal

S_1	**Location**
C_{11}	Transport corridor (yes or no/which one?) and location at the port
C_{12}	Modes of transport handled
C_{13}	Vicinity of an agglomeration (yes or no/the size of the population)
C_{14}	Industrial zone (yes or no)

S_2	**Parameters and equipment of a terminal**
C_{21}	Total area
C_{22}	Storage area
C_{23}	Number of layers in a stack
C_{24}	Cargo handling facilities
C_{25}	Number of railway cranes
C_{26}	Capacity of truck parking areas
C_{27}	Electrical connectors

S_3	**Maritime infrastructure**
C_{31}	Length of cargo handling wharfs
C_{32}	Depth of vessel berths
C_{33}	Number of vessel berths at the port
C_{34}	Width of a ro-ro ramp

S_4	**Transport accessibility from the sea and from the land**
C_{41}	Linear infrastructure of road transport
C_{42}	Linear infrastructure of rail transport
C_{43}	Vicinity of airports
C_{44}	Vicinity of inland (river) ports
C_{45}	Regular vessel connection lines
C_{56}	Regular ocean shipping services

S_5	**Terminal railway hub**
C_{51}	Number of cargo handling railway tracks
C_{52}	Length of cargo handling railway tracks
C_{53}	Total length of railway tracks
C_{54}	Railway sidings
C_{55}	Number of regular national connections
C_{56}	Number of regular international railway connections

S_6	**Logistics services**
C_{61}	Vessel handling
C_{62}	Block train handling
C_{63}	Basic services provided to handle containers
C_{64}	Additional services provided to handle containers
C_{65}	Cargo handling relations
C_{66}	Temporary storage facilities

Source: Elaborated by the author

3. ***Final stage*** – includes relevant calculations, according to the method accepted for the research. In this method the values related to the logistic interoperability of a maritime container terminal are taken into consideration, along with the actual maximal annual cargo handling capacity and the relation between these parameters. Based on that, the relevant preference rates have been calculated, according to actual maximal annual cargo handling capacity, according to logistic interoperability along with an average decision-making rate which determines the position of a particular terminal in the analysed set, based on its logistic capabilities. The final stage is ended with the interpretation of the results.

Methodology assumed for the assessment of logistic capabilities of a maritime container terminal

In order to identify a logistic capabilities level for a maritime container terminal and to provide a ranking list of terminals, the following sequence of actions has been applied:

1. Calculating the value of logistic interoperability at the level of the diagnostic features, based on the arithmetic mean of evaluations obtained during the expert research survey (Table 3), with the use of the following equation:

$$PC_{ij} = W_{ij}\ x\ \overline{WC_{ij}} \quad (1)$$

where:

PC_{ij}– is the logistic interoperability value of the jth diagnostic feature in the ith component of logistic interoperability;

W_{ij} – is the weight coefficient of the jth diagnostic feature in the ith component of logistic interoperability; weight coefficients have been determined by the AHP (Analytic Hierarchy Process) method and verified by the consistency ratio CR (Saaty, 1980);

$\overline{WC_{ij}}$ – is the arithmetic mean of the logistic interoperability evaluation provided to the jth diagnostic feature in the ith component, identified on the basis of expert opinions;

WC_{ij} – is the expert evaluation of logistic interoperability of the jth diagnostic feature in the ith component; the scale of expert evaluation has been ranged from 0 to 10;

$\sum_{k=1}^{n} WC_{ijk}$ – is the sum of the expert evaluations of logistic interoperability of the jth diagnostic feature in the ith component, where n=10 – is the number of the experts. The experts have been recruited from the academic environment focused on research studies related to maritime economy.

The expert opinions referring to the particular features in the particular components of logistic interoperability have been analysed in terms of convergence, based on the classical coefficient of variation (Everit B.,1998), according to the following equation:

$$v_{ij} = \frac{\sigma_{ij}}{\overline{WC_{ij}}} \quad (2)$$

v_{ij} – is the classical coefficient of variation (calculated for the particular features);

σ_{ij} –is the average standard deviation for the particular analysed diagnostic feature.

Table 3: A table for evaluation of diagnostic features in terms of logistic interoperability components

| | | |

Table 4: The preference scale of the classical coefficients of variation

v_{ij}	Preference scale
$v_{ij} \leq 0{,}1$	Weak differentiation of the coefficient (a satisfactory level)
$0{,}1 < v_{ij} \leq 0{,}3$	Medium differentiation of the coefficient (an acceptable level)
$0{,}3 < v_{ij} \leq 0{,}5$	Strong differentiation of the coefficient (an unacceptable level)
$v_{ij} > 0{,}5$	Very strong differentiation of the coefficient (an unacceptable level)

Source: Elaborated by the author

2. Calculating the value of logistic interoperability at the level of the components, according to the following equation:

$$PS_i = W_i x \sum PC_{ij} \tag{3}$$

where:

W_i – is the weight coefficient of the ith component, determined by the AHP (Analytic Hierarchy Process) method (Saaty, 1980);

$\sum PC_{ij}$ – the sum of the value of logistic interoperability at the level of the diagnostic features forming the ith component of logistic interoperability.

3. Calculating the logistic interoperability rate of a maritime container terminal, according to the following equation:

$$\pi_z = \frac{\sum PS_i}{\sum PS_i^{Max}} \tag{4}$$

where:

π_z – is the logistic interoperability rate (the value expressed with a decimal fraction) of a maritime container terminal, where the z index indicates the subsequent terminal analysed in the identified set; in the research survey z= 1,2,3,4,5,6 (see: Table 1);

$\sum PS_i$- is the sum of the value of logistic interoperability at the level of the components in the analysed maritime container terminal;

$\sum PS_i^{Max}$ – is the benchmark value $\sum PS_i$ for which all the diagnostic features take the maximum value = 10.

4. Calculating the *cargo handling capacity - logistic interoperability* rate for the zth maritime container terminal (the relation of the cargo handling capacity of a terminal to the level of its logistic interoperability):

$$e_z = \frac{q_z}{\pi_z} \tag{5}$$

where:

e_z- is the *cargo handling capacity - logistic interoperability* rate of a maritime container terminal;

q_z- is the relative value of the cargo handling capacity of a maritime container terminal.

with consideration of:

$$q_z = \frac{Q_z - Q_{MIN}}{Q_{MAX} - Q_{MIN}} \quad (6)$$

where:

Q_z- is the actual maximal annual cargo handling capacity of an analysed terminal.

Q_{MAX}- is the highest value of the actual maximal annual cargo handling capacity of a terminal in the analysed set;

Q_{MIN}- the lowest value of the actual maximal annual cargo handling capacity of a terminal in the analysed set;

The q_z value indicates the relative status of the cargo handling capacity of the particular facility in the analysed set. This is a relation of the reduced absolute value of the actual maximal annual cargo handling capacity of the analysed terminal to the total analysed variation interval of that value in the discussed set of terminals (Figure 4).

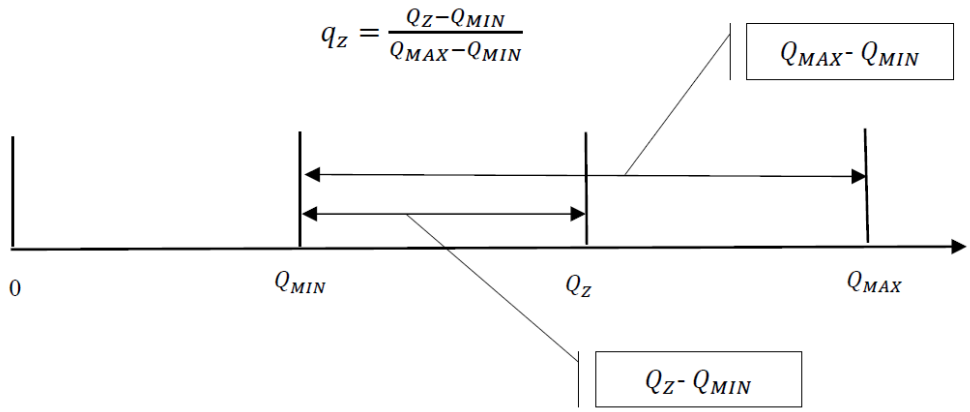

Figure 4: Interpretation of the relative status of cargo handling capacity of a terminal
Source: Elaborated by author based on Kolman (2015)

where:

$Q_{MAX} - Q_{MIN}$- is the total analysed variation interval of the actual maximal annual cargo handling capacity in the analysed set of container terminals.

$Q_z - Q_{MIN}$ - is the reduced absolute value of the actual maximal annual cargo handling capability of the analysed terminal.

5. Calculating the decision interpretation rate for the analysed terminal:

$$d_{kz} = 0{,}5e_z \quad \text{for } e_z \in (0 \div 1\rangle \quad (7)$$

$$\text{and } d_{kz} = 0{,}5 + 0{,}5(1 - \frac{1}{e_z}) \text{ for } e_z > 1 \quad (8)$$

where:

$d_{kz} \in (0 \div 1\rangle$ – is the decision interpretation rate for the analysed terminal (see: Kolman, 2015). The rate enables the Author to establish a preliminary ranking list of terminals within the aspect of logistic

capabilities, taking into consideration the logistic interoperability and the actual maximal annual cargo handling capacity of the facilities under research.

6. Calculating the absolute rate of cargo handling capacity of a terminal:

$$C_z = \frac{Q_z}{\Pi_z} \quad \text{[thousands of TEU/ \%]} \tag{9}$$

where:

Q_z – is the actual maximal annual cargo handling capacity of the analysed terminal, expressed in thousands of TEU;

Π_z – is the logistic interoperability rate of the analysed terminal, expressed in %;

7. To calculate the preference rates for the assumed criteria and the average decision-making rate which determines the position of a terminal in terms of its logistic capabilities, the following factors related to the logistic interoperability level and the actual maximal annual cargo handling capacity of a terminal have been taken into account:

- d_{kz} - the decision interpretation rate for the analysed terminal;
- π_z - the logistic interoperability rate of the analysed terminal;
- c_{Qz} – the relative value of the absolute cargo handling capacity rate of the analysed terminal.

The c_{Qz} value indicates the relative status of the absolute cargo handling capacity rate of a particular facility in the analysed set of terminals. This is a relation of the reduced value of the absolute cargo handling capacity rate of the subsequent analysed terminal to the total analysed variation interval of that rate in the discussed set of terminals (Figure 5).

8. Calculating c_{Qz} value using the equitation:

$$c_{Qz} = \frac{C_z - C_{MIN}}{C_{MAX} - C_{MIN}} \tag{10}$$

where:

C_{MIN} – is the lowest value of the absolute cargo handling capacity rate recorded in the analysed set of terminals;

C_{MAX} – is the highest value of the absolute cargo handling capacity rate recorded in the analysed set of terminals;

$C_{MAX} - C_{MIN}$ – is the total range of variation of the absolute cargo handling capacity rate in the analysed set of container terminals;

$C_Z - C_{MIN}$ – is the reduced value of the absolute cargo handling capacity rate of a particular container terminal in the analysed set.

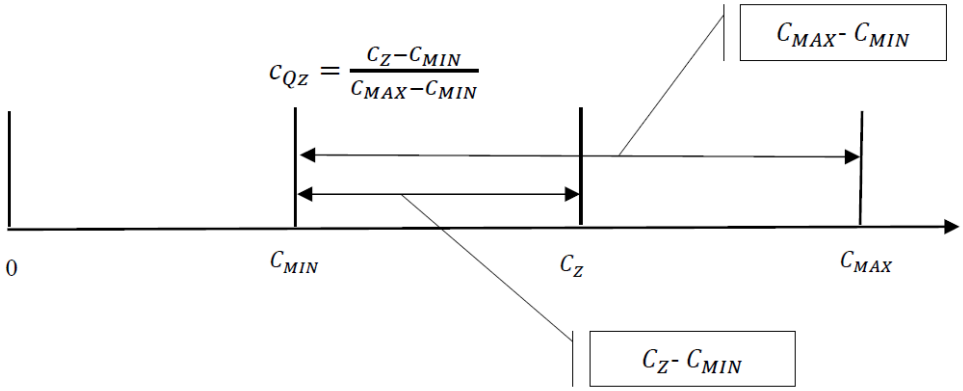

Figure 5: Interpretation of the relative status of the absolute cargo handling capacity rate of a terminal

Source: Elaborated by author based on Kolman (2015)

9. Calculating the preference rate of the logistic interoperability of a terminal with the use of the following equation (Cf.: Kolman, 2015):

$$WP_z = \frac{\alpha\pi_z + \beta d_{kz} + \gamma c_{Qz}}{\alpha + \beta + \gamma} \quad (11)$$

where:

$\alpha, \beta, \gamma,$ - are the significance coefficients for which the following proportion has been assumed, considering the requirements of the research survey: $\alpha : \beta : \gamma = 3 : 2 : 1$.

As a result, the following equation has been obtained:

$$WP_z = 0{,}167(3\pi_z + 2d_{kz} + 1c_{Qz}) \quad (12)$$

10. Calculating the preference rate of the actual maximal annual cargo handling capacity of a terminal with use of the following equation (Cf.: Kolman, 2015):

$$WQ_z = \frac{\alpha c_{Qz} + \beta d_{kz} + \gamma \pi_z}{\alpha + \beta + \gamma} \quad (13)$$

where:

$\alpha, \beta, \gamma,$ - are the significance coefficients for which the following proportion has been assumed, considering the requirements of the research survey: $\alpha : \beta : \gamma = 3 : 2 : 1$.

As a result, the following equation has been obtained:

$$WQ_z = 0{,}167(3c_{Qz} + 2d_{kz} + 1\pi_z) \quad (14)$$

11. Calculating the value of the average decision-making rate referring to the logistic capabilities of a maritime container terminal and defining its position on the ranking list (Cf.: Kolman, 2015):

$$W\Pi_z = 0{,}5(WP_z + WQ_z) \quad (15)$$

Calculations and verification of the Results

In Table 5 a synthetic presentation of the results obtained during the research is displayed. It refers to the logistic interoperability levels of the maritime container terminals analysed at the particular stages of the model decomposition. Table 5 presents the following data:

- $\overline{WC_{ij}}$ - the arithmetic mean of the logistic interoperability evaluation provided to diagnostic feature level determined on the basis of the expert evaluations, where the $v_{ij} = \frac{\sigma_{ij}}{\overline{WC_{ij}}} \leq 0{,}3$ condition has been met for each feature (see: Table 4);
- the weight coefficients at the level of the diagnostic features (W_{ij}) and the weight coefficients at the levels of the subsequent components of logistic interoperability (W_i). The weight coefficients at the level of the diagnostic features and the components of logistic interoperability have been determined by the AHP ((Analytic Hierarchy Process) method, for which the relevant Consistency Index (CI) and Consistency Ratio (CR) have been calculated, providing that the following condition has been met:

$$CR = \frac{CI}{RI} \leq 0{,}1 \tag{16}$$

  where:

  RI – is the random index (Saaty, 1980). In this case, it depends on the number of the compared elements, referring to the diagnostic features in a component of logistic interoperability or on the number of components of logistic interoperability of a maritime container terminal;

- the values of logistic interoperability at the level of the diagnostic features (PC_{ij}) at the particular terminals;
- the values of logistic interoperability at the level of the components (PS_i) at the particular terminals;
- the logistic interoperability rates of the analysed maritime container terminals (π_z).

The calculations referring to the preference rates at the logistic interoperability level, the actual maximal annual cargo handling capacity of the analysed terminals and the average decision-making rate of logistic capabilities for the analysed maritime container terminals are presented in Table 6. The graphic interpretation of Table 6 is presented in Figures 6,7 and 8.

Table 5: Logistic interoperability of the maritime container terminals – presentation of the results

	Weight coefficient	DCT Gdańsk		BCT Gdynia		GCT Gdynia		GTK Gdańsk		DB Port Szczecin		OT Port Świnoujście S.A.	
	W_{ij}	$\overline{WC_{ij}}$	PC_{ij}	$\overline{WC_{ij}}$	PC_{ij}	$\overline{WC_{ij}}$	PC_{ij}	$\overline{WC_{ij}}$	PC_{ij}	$\overline{WC_{ij}}$	PC_{ij}	$\overline{WC_{ij}}$	PC_{ij}
Location – S_1													
C_{11}	0,4673	10	4,673	10	4,673	10	4,673	10	4,673	5	2,335	5	2,335
C_{12}	0,2772	8,5	2,356	6,5	1,802	6,5	1,802	6,5	1,802	8	2,218	7,5	2,079
C_{13}	0,0954	9	0,859	8	0,763	8	0,763	9	0,859	9	0,859	6	0,572
C_{14}	0,1601	9	1,441	8	1,281	8	1,281	9	1,441	8	1,281	6,7	1,073
	$\sum PC_{ij}$ →		9,329		8,609		8,609		8,775		6,693		6,059
	W_i		PS_i		PS_i		PS_i		PS_i		PS_i		PS_i
S_1	0,3327		3,104		2,864		2,864		2,919		2,227		2,016
Parameters and equipment of the terminal – S_2													
C_{21}	0,1074	8,0	0,859	10	1,074	5	0,537	3,5	0,376	2	0,215	5,4	0,579
C_{22}	0,2684	10	2,684	7	1,879	4,8	1,288	3,5	0,939	3,5	0,939	1,5	0,403
C_{23}	0,1407	9,5	1,337	10	1,407	8,1	1,139	6	0,844	6,2	0,872	5,5	0,774
C_{24}	0,1718	9	1,546	10	1,718	8	1,237	4,5	0,773	5,9	1,014	5,8	0,996
C_{25}	0,1939	9	1,745	9	1,745	0	0,00	8	1,551	0	0,000	0	0,000
C_{26}	0,0589	6,5	0,383	8	0,471	0	0,00	2,5	0,147	9	0,530	10	0,589
C_{27}	0,0589	10	0,589	8	0,471	1	0,059	2	0,118	5,2	0,306	5,2	0,306
	$\sum PC_{ij}$ →		9,143		8,765		4,260		4,748		3,876		3,647
	W_i		PS_i		PS_i		PS_i		PS_i		PS_i		PS_i
S_2	0,1072		0,980		0,939		0,457		0,509		0,416		0,391
Maritime infrastructure – S_3													
C_{31}	0,3828	10	3,828	7,0	2,679	4,8	1,837	2,8	1,072	7,5	2,871	5,0	1,914
C_{32}	0,3475	10	3,475	7,4	2,572	6,2	2,154	5,3	1,842	5,4	1,876	7,8	2,711
C_{33}	0,1420	10	1,429	8,0	1,136	7,0	0,994	4	0,568	5	0,71	5	0,71
C_{34}	0,1277	0	0,000	6,0	0,766	0,0	0,000	2,5	0,319	10	1,277	0	0,00
	$\sum PC_{ij}$ →		8,732		7,153		4,985		3,801		6,684		5,335
	W_i		PS_i		PS_i		PS_i		PS_i		PS_i		PS_i
S_3	0,1947		1,700		1,393		0,971		0,740		1,301		1,039
Transport accessibility from the sea and from the land – S_4													
C_{41}	0,1008	10	1,008	10	1,008	10	1,008	10	1,008	8	0,806	7,5	O,756
C_{42}	0,1588	10	1,588	9,0	1,429	9,0	1,429	9,2	1,461	9,4	1,493	8,8	1,397
C_{43}	0,0492	10	0,492	9,4	0,492	9,4	0,462	8,9	0,438	7	0,344	4,6	0,226
C_{44}	0,0699	7,1	0,496	0,0	0,000	0	0,000	5,7	0,398	10	0,699	7,2	0,503
C_{45}	0,2108	8,2	1,728	7,5	1,581	7	1,476	3,9	0,822	4,5	0,949	0	0,000
C_{46}	0,4105	10	4,105	0,0	0,000	0	0,000	0	0,000	0	0,000	0	0,000
	$\sum PC_{ij}$ →		9,417		4,510		4,375		4,127		4,291		2,882
	W_i		PS_i		PS_i		PS_i		PS_i		PS_i		PS_i
S_4	0,1947		1,833		0,878		0,852		0,803		0,835		0,561
Terminal railway hub – S_5													
C_{51}	0,1791	8,5	1,522	10	1,791	4,6	0,824	4,6	0,824	4,4	0,788	2,9	0,519
C_{52}	0,1311	6,5	0,852	6,1	0,799	6,3	0,825	2,9	0,380	10	1,311	6,5	0,852
C_{53}	0,0752	9,2	0,692	9,1	0,684	6,2	0,466	4,2	0,316	10	0,752	10	0,752
C_{54}	0,0861	10	0,861	6,1	0,525	6,1	0,525	4,2	0,362	4	0,344	3,5	0,301
C_{55}	0,2266	2	0,453	0,0	0,000	10	2,266	0	0,000	0	0,000	0	0,000
C_{56}	0,3019	2	0,604	10	3,019	4	1,208	2	0,604	5	1,506	0	0,000
	$\sum PC_{ij}$ →		4,984		6,818		6,114		2,486		4,701		2,424
	W_i		PS_i		PS_i		PS_i		PS_i		PS_i		PS_i
S_5	0,1072		0,543		0,723		0,416		0,277		0,461		0,244
Services – S_6													
C_{61}	0,0983	8,5,	0,835	9	0,885	9	0,885	6,5	0,639	7,2	0,708	7,2	0,708
C_{62}	0,3232	9,5	3,070	9	2,909	3,5	1,131	0	0,000	0	0,000	0	0,000
C_{63}	0,2223	9,5	2,112	9	2,001	9	2,001	8	1,778	8	1,778	8	1,778
C_{64}	0,1462	9,5	1,389	9	1,316	9	1,316	8	1,169	8	1,169	8	1,169
C_{65}	0,1375	9	1,237	9	1,237	9	1,237	6,5	0,894	8	1,100	8	1,100
C_{66}	0,0725	10	0,725	8,4	0,609	7,5	0,544	0	0,000	0	0,000	0	0,000
	$\sum PC_{ij}$ →		9,368		8,957		7,114		4,480		4,755		4,755
	W_i		PS_i		PS_i		PS_i		PS_i		PS_i		PS_i
S_6	0,0636		0,596		0,569		0,445		0,285		0,302		0,302
π_z			0,876		0,736		0,601		0,553		0,542		0,455

Source: Elaborated by the author

Table 6: The preference rates of logistic interoperability, the actual maximal annual cargo handling capacity of a terminal and the average decision-making rate

Terminal	DCT	BCT	GCT	GTK	DB Port Szczecin	OT Port Świnoujście S.A.
q_z	1	0,790	0,178	0,00	0,034	0,00
π_z	0,876	0,736	0,601	0,553	0,542	0,455
e_z	1,141	1,073	0,417	0,00	0,063	0,00
d_{kz} / (*)	0,562 /(1)	0,534 / (2)	0,209 (3)	0,00 (6)	0,032 (4)	0,00 (6)
Π_z	87,6	73,6	60,1	55,3	54,2	45,5
Q_z (in thousands of TEU)	1500	1200	429	70	120	70
C_z	17,1	16,3	7,14	1,26	2,21	1,54
c_{Qz}	1,000	0,949	0,371	0,00	0,060	0,018
WP_z	0,793	0,706	0,433	0,277	0,292	0,231
WQ_z	0,835	0,776	0,356	0,092	0,131	0,085
$W\Pi_z$ / (**)	0,814 /(1)	0,741/(2)	0,394 /(3)	0,185 / (5)	0,211/(4)	0,158 /(6)
(*) – position of a terminal on the preliminary ranking list (**) – position of a terminal on the final ranking list						

Source: Elaborated by author

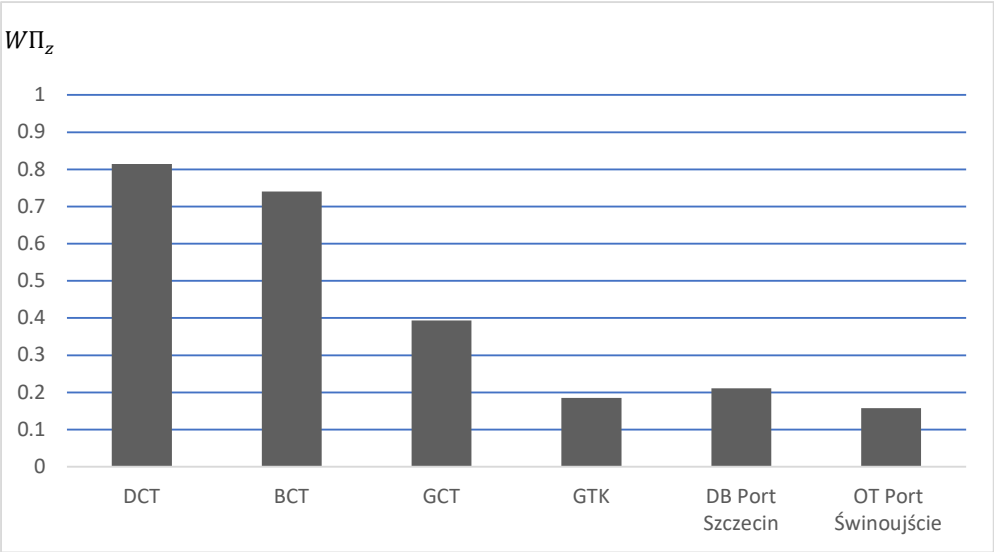

Figure 6: The average decision-making rate referring to the logistic capabilities of a maritime container terminal

Source: Elaborated by author

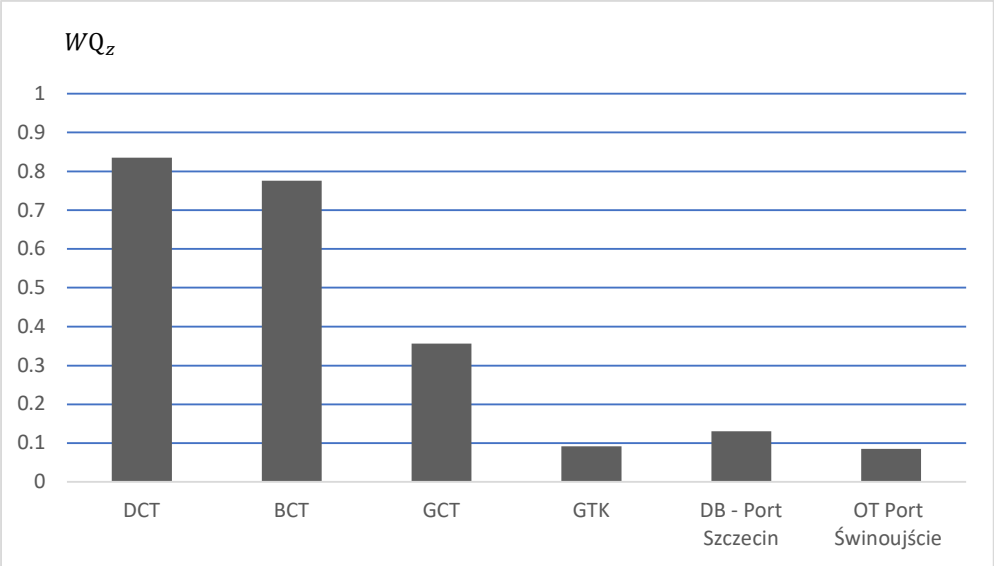

Figure 7: The preference rate referring to the actual maximal annual cargo handling capacity of a maritime container terminal

Source: Elaborated by author

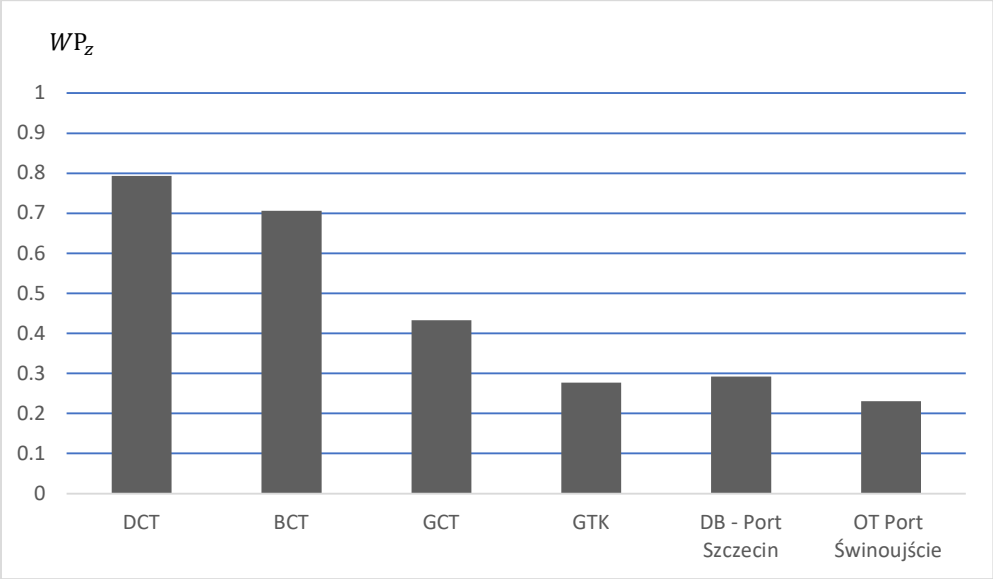

Figure 8: The preference rate referring to logistic interoperability of a maritime container terminal

Source: Elaborated by author

The analysis of the results obtained during the research, based on the actual data referring to the maritime container terminals operating at the Polish sea ports allows the Author to draw the following conclusions:

- the values of the decision interpretation rates (d_{kz}) and the average decision-making rates ($W\Pi_z$), achieved by the terminals under research, place the facilities on the similar positions, both on the preliminary and final ranking lists;
- the largest group of maritime container terminals is situated in the Gulf of Gdańsk;
- the analysed maritime container terminals located there indicate 94.3% of their total annual cargo handling capacity during the analysed period of time;
- the highest average decision-making rate of logistic capabilities is indicated by the Deepwater Container Terminal which is the largest facility of this type on the Polish coast, both in terms of the actual maximal annual cargo handling capacity and of the TEU storage area;
- during the analysed period of time, DCT, BCT and GCT terminals indicate the highest levels of balance between the calculated preference rates referring to logistic interoperability and the actual maximal annual cargo handling capacity. It can be interpreted as proper adjustment of their current logistic interoperability to the tasks they perform, which are determined by their maximal annual cargo handling capacity;
- considering the largest installations, the levels of using their maximal annual cargo handling capacity during the analysed period of time are respectively: 79.2% for DCT, 39.5% for BCT. Hence, this fact indicates uneven distribution of workload among the facilities located in the same area, which provide services to the same port hinterland;
- the area of Western Pomerania (see: Figure 2) is still underinvested and underdeveloped in terms of services provided to handle container transport in land-sea supply chains, despite the fact that the shortest way connecting Scandinavia with Southern Europe runs through the sea ports in Szczecin and Świnoujście;
- the coast between the group of the sea ports of Szczecin-Świnoujście and the sea ports of Tricity (sea ports of Gdańsk and Gdynia) is a completely passive zone in terms of services provided to handle maritime transport of cargo, mainly because of the lack of advanced port infrastructure required to handle all categories of cargo shipping;
- important elements which affect logistic interoperability are the TEU storage area and total area of a terminal because these are the factors that strongly influence the growth of the maximal annual cargo handling capacity, especially when facilities indicating similar transport accessibility from the sea and from the land are considered.

Concluding Remarks

To sum up the research survey, it should be stated that the suggested model makes it possible for interested parties to compare maritime container terminals in three aspects, namely:

- logistic capabilities of a particular terminal in the field of container transport handling operations;
- logistic interoperability of a particular terminal, with consideration of actual maximal annual cargo handling capacity of that installation;
- actual maximal annual cargo handling capacity of a particular terminal, with consideration of the logistic interoperability level of a that installation.

The method applied in the research allows interested parties to analyse the relative status of the facilities in the discussed set of maritime container terminals, in terms of their cargo handling capacity and their logistic interoperability. The research has been limited to the area of Poland, nevertheless, more access to relevant data will make it possible to provide assessment of any terminal located in a particular water region.

Presented in the research study, the concept of assessing logistic capabilities of a maritime container terminal is verified on the basis of real data referring to the years 2015-2016. It has allowed the Author to draw some conclusions referring to further research on the development of maritime economy of the State in terms of the analysed facilities.

From the perspective of 2019, it is now obvious, that the DCT has been growing dynamically in terms of the TEU storage area; the terminal has significantly increased its maximal annual cargo handling capacity up to 3 250 000 TEU, which are used in 69% in practice.

Strong competition of German sea ports (e.g. Rostock) should result in significant investment into the maritime container terminals in Szczecin and Świnoujście. There has been a decision made about construction of a new deep-water container terminal in Świnoujście, whose annual cargo handling capacity is planned for 1.5 million TEU. An additional advantage will be the deepening of the fairway between the Port of Świnoujście and the Port of Szczecin to 12.5 m in order to allow vessels of the capacity of 2500 TEU to enter that sea port. This investment would increase the operability of the sea port in Szczecin in terms of handling land-sea container transport chains.

There is also a question related to the central coast. The Polish sea ports located in the Gulf of Gdańsk are situated in the immediate vicinity of the Kaliningrad Region and in a situation of a crisis or an international conflict they can be completely neutralised in terms of economic and military aspects. Hence, while analysing the volume of containers transported through the Polish coast to the region and in transit, a concept of "the third window" should be considered, that is namely: construction of an additional port facility on the central coast. It would complement the ports of Tricity and it could, at least partially, take over tasks performed by these sea ports. To sum up the research study, the fact of uneven development should be emphasized as well as the lack of even distribution of resources and facilities required to handle maritime container transport along the Polish coast.

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Economics of Biofuels: Assessment of The Fiscal Incentives in Nigeria's Biofuel Policy

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Abstract

The paper provides an assessment and economic analysis of Nigeria's biofuels policy by considering the fiscal incentives therein and its effectiveness. It starts with an overview of biofuel industry in Nigeria, highlighting its growth and then describes the biofuels policy with a focus on its fiscal elements. Using available data in a two-scenario model, biofuels investment is appraised to capture basic financial and economic analytics. The study finds that biofuels investment with respect to the sole production of only ethanol is not efficient economically,given the available fiscal incentives. The outcome, however, changes when the number of products increases to include animal forage, processedsugar, and power generation for sale; with inherent risks. Furthermore, it reveals the potential implications of biofuels on government from a fiscal perspective. Following the several open issues for consumers and the environmental effects of petroleum combustion, this paper recommends their consideration to enhance the prospects of biodiesel, biorefinery and bioeconomy in Nigeria.

Keywords: Biodiesel, Biofuel policy, Ethanol, Fiscal incentives, Nigeria

JEL Code: Q2, H2, F1

Introduction

Biofuels are obtained from biological materials, particularly from plants, micro-organisms, animals and waste. They are gaseous fuels gotten from biogas that contain a high amount of sugar. Examples include starch from cassava and corn, oil from palms and soybeans, sorghum and sugarcane.They, therefore, emit zero Carbon dioxide (CO_2) unlike carbon-based fuels (Ejemeyovwi, Obindah and Tiena, 2018; United States Department of Agriculture-USDA, 2006). Basically, biofuel originates from the conversion of solar energy to chemical energy makes it different from fossil fuel. Some of the strengths of biofuel over fossil fuel include its easy extraction from biomass and its biodegradable properties that make it sustainable and environment friendly (Gaurav, Sivasankari, Kiran, Ninawe and Selvin, 2017).Consequently, with increasing CO_2 emissions and global population rise which has affected social and environmental well-being, energy demand rose suddenly (Gershon and Patricia, 2019; Gaurav et al., 2017).

Owing to the fact that fossil fuel is used majorly in the transportation sector around the world, enormous effort has been made to improve biofuel production, as well as, its management. Global biofuel production increased steadily from about 16 billion litres in the year 2000 to around 122 billion litres in 2015, accounting for about 3.5 percent of global road transport fuel. In this regard, Brazil has

succeeded in providing about 25 percent of the current demand for road transport fuel (Energypedia, 2018). Also, the United States as at 2017 had biofuels representing about 5% of their transport fuel demand (Energy Information Administration-EIA, 2018).The interest in biofuels has furthermore been motivated by the search for low carbon energy alternatives, the increasing global oil prices, and the pursuit of energy independence (Sivashankar, Weerahewa, Pushpakumara and Galagedara, 2016; Sorda, Banse and Kemfert, 2010). This interest in biofuels is stirred within the context of the emerging bioeconomy as well as the global energy transition from oil-based fuels to bio-products (Ceapraz, Kotbi, and Sauvee, 2016).

In biofuels production, African countries have lagged behind – neither manufacturing nor utilizing much conventional biofuels. However, power generation and heat heavily relies on available residue (Sielhorst, Molenaar and Offerman, 2008). Many of these African countries have technical production potential, however, liquid biofuels are manufactured and utilized on a mini scale, with no export. Although, some African countries have started investing in the plantation of jatropha oil seeds for biodiesel production, they are still faced with financial barriers, technical expertise as well as uncoordinated government policies (Sekoai and Yoro, 2016). Burkina Faso has successfully planted over 70000 jatropha oil seed trees and has even partnered with the European Union Biofuel Directive to improve the renewable energy sector. Ghana is not left out as they have put in place targets of 10 percent and 20 percent for the years 2020 and 2030 respectively, for an improved biofuels production. South Africa is among the leading African countries in biofuels production as it contributes about 14 percent of their renewable energy.

Nigeria on the other hand has produced up to 134 million litres of ethanol annually from its 5 primary commercial scale ethanol distillery plant. However, for Nigeria to be part of the African countries where the domestic demand for biofuel will be about 2 billion litres in 2030 as forecasted by the Energy Information Administration, the production of biofuels needs to be largely improved (Oniemola and Sanusi, 2009). To expand biofuels production and consumption, there is a need for supportive energy prices as well as policy interventions (Fundira and Henley, 2017). Cue is taken from advanced economies like USA, Japan, China, and the European Union, as well as, Brazil that have thriving renewable energy industries. The United States of America focuses on ethanol production as their cars are mostly powered by gasoline while Brazil focuses on sugarcane-based ethanol production with a production of about 21 billion litres annually (Sekoai and Yoro, 2016). As such, energy transition is driven by deliberate government policies which in turn mean that biofuels policy development arises out of a thoughtful process in attempt liquid fossil fuels (Ceapraz, Kotbi, and Sauvee, 2016).

In 2005, the Nigerian government releaseda mandate on Automotive Biomass Programme with objectives to encourage an environment suitable for the creation of the industry for local ethanol fuel.The set goal was to steadily move the country from its dependence on imported gasoline, reduce factors polluting the environment, put in placea commercially operational industry, and bring about sustainable jobs within Nigeria (Aliyu, Deba, Saidu, Muhammad and Usman, 2017). More so, in 2007, the Nigerian Biofuels policy was launched and incentives were added to it to reflect the intent and seriousness of the government to achieve the policy objectives. Government aimed to build a strong and successful fuel ethanol industry through the use of agricultural products which will in turn improve the quality of transport fuel, as well as, increase clean energy supply in the country (Ugwoke, Gershon, Becchio, Corgnati, and Leone, 2020; Oniemola and Sanusi, 2009).The expected gains from the Biofuel policy were increase in government's tax revenue, improvement in farming techniques, power generation for households and firms as well as environmental gains. As such, this paper assesses how tax attractiveNigeria's Policy on Biofuels is to the achievement ofits objectives.In other words, this study is investigating the extent to which the tax incentives in the biofuels policy is attractive enough for investments to deliver the set goals.

Insights from Extant Studies

Contemporary biofuels markets were created as a result of constant oil price volatility since 1970 as well as climate change concerns (Viaggi, 2016). Countries around the world, in seeking to achieve energy independence, formulated policies for alternative transportation fuels(Gershon, Gershon,

Ezenwa, and Osabohien, 2019; The Economist, 2013). Brazil and the United States were the first to create a productive market for ethanol through the use of sugarcane and corn respectively. They had policies like legal mandates, exemptions from taxes, subsidies as well as favourable credits.They were closely followed by the European Union (EU) whosebiofuel industry was aimed at achieving the Kyoto protocol targets through the use of tax exemptions and statutory mandates.So far, over 50 countries have adopted renewable energy sources, however, Brazil, the Unites States and The European Union produce about 91 percent of the global biofuels (HLPE, 2013).

In a survey carried out on biofuels among a group of countries, it was revealed that biofuels policies, like shared and contrasted fiscal instrument use, as well as, mandates to reduce Green House Gas (GHS) emissions from transport fuel, land use policies and excise exemptions. For instance, in 1975, Brazil initiated a National Alcohol Program with incentives and subsidies attached to it, which boosted the Brazilian ethanol production (Shikida, Finco, Cardoso, Galante, Rahmeier, Bentivoglio and Rasetti, 2014). The biofuels policy in the United States sees biofuels as a route to energy independence. To this end, they made use of tax exemptions, import duties on fuel ethanol (Naveen and Andrew, 2014; HLPE, 2013).

The South African biofuels policy is made up ofa fast depreciation scheme for the production of biodiesel facilities and also a 50 percent exemption from general fuel levy. Irrespective of this, the objectives of the South African biofuels policy were not created as a result of the need to gain energy independenceor to get rid of CO_2emissions. It was put in place to bring about rural development and alleviate poverty (South African Biofuels Regulatory Framework, 2014; HLPE, 2013). The Indian Biofuels policy on the other hand, is focused primarily on non-food foragewhich is to be obtained from wastelands regarded as not suitable for agriculture. This was aimed at ensuring food security is not given away to the search for good fuel. India's biofuels policy also gives room for appropriate periodic financial and fiscal schemes including support for feedstock prices and the promotion of the employment of biofuels in all sectors of the economy. It also contains an increase in the ethanol production target from 2 percent to 20 percent by 2030 (India National Policy on Biofuels, 2018; National Policy on Biofuels, 2009). However, there have been food insecurity issues with biofuels and agricultural land use in Malawi (Herrmann, Jumbe, Bruentrup, and Osabuohien, 2018)

The primary aim underlying the Nigerian biofuels policy is to improve the agricultural sector by connecting it to the lucrative and thriving energy sector. Though a good objective, a survey of the United States biofuel's policy revealed that there are negative economic impacts for linkages between the energy and agricultural sector (Naveen and Andrew, 2014). It has been argued that the Nigerian Biofuels policy may fail unless there is food security and effective regulatory standard for the environment. (Elliot, 2015; Oshewolo, 2010). This is because in Nigeria, using sugarcane to make ethanol has been estimated in the range of 55% to 65% of total cost of producing ethanol.(Dias, Cunha, Jesus, Scandiffio, Rossell, Filho, and Bonomi, 2010; Kojima, Mitchell and Ward, 2007).

It has been asserted that biofuels produced from waste oil takes care of the threat of food insecurity evident in the biofuels production of the first–generation. Though it has been successfully employed in Europe and has generated about 2 billion litres of biofuels (Kojima et al., 2007), the case could be different in Nigeria. Moreover, there is a need to determine its economic viability within the context of Nigeria's biofuel policy.This study, hereby contributes to existing literature as it investigates the effectiveness of the tax incentives in the Nigerian Biofuels policy.

Methods of Analysis

Methods and Techniques

To achieve the aforementioned research objective, first the policy's tax components are ascertained. This is followed by the estimations of Capital Expenditure (CAPEX) and Operating Expenditure (OPEX), as well as the consideration of different biofuel price scenarios. Based on the Discounted Cash Flow (DCF), a spreadsheet economic model from the policy implementation is created to explain the

fiscal gains to biofuels investors, the cost to the government as well asthe biofuels consumers. In this study, the fiscal cost to the government and consumers of biofuels is viewed using an industry-wide single integrated investment. In other words, the biofuel project is conceived comprehensively from the plantation to the distillery plant, with focus on the returns and fiscal gains to the biofuels investors.

Data Analysis

Reproduced succinctly in Table 1, are tax elements of the NigerianPolicy on biofuels production. It assumes the country needs 1.3billion litres of ethanol per year to be blended with gasoline at 10%. Furthermore, the policy uses daily gasoline consumption of 36.5million litres and estimates ethanol demand to reach 2billion litres per year in 12years.

Table 3.1: Nigerian Biofuels Policy Tax Incentives

S/N	Fiscal Incentive
1	Exemption from the 66.67% rule on the cap on allowable capital allowance deduction
2	Tax Holiday of 10 years which could be extended for 5 more years
3	10year Waiver of Import Duties
4	Exemption from Value Added Tax
5	With-holding Tax Exception on dividends and interests

Source: Adapted from Ohimain (2013)

The assumption in Table 3.1 is used to estimate the fiscal impact of the Nigerian biofuels industry as well as its economic performance.

Table 3.2: Assumptions for Determining the Tax Implications of the Biofuel Investment

Industry Characteristics	Unit	Value
Plant Capital Expenditure	$ Millions	111.33
Plant Capacity	Million Litres/year	10.00
Ethanol Mandate	Billion Litres/year	2.00
Capital Expenditure Requirement	$ Billions	22.27
Ethanol Mandate in Start Year	Billion Litres/year	1.30
Ethanol Mandate in 12th Year	Billion Litres/year	2.00
Ethanol Yield of Sugarcane	Litres/meters	42.00
Capacity Ramp up Duration	Years	10
Fiscal Terms		
Tax Holiday	Years	10
Industry Lifecycle Duration	Years	20
Initial Allowance	%	95
Annual Allowance	%	0
Education Tax	%	2
Company Income Tax Allowance	%	30
With Holding Tax Rate (WHT)	%	10
Value Added Tax (VAT)	%	5
Customs Duty	%	20
Cost Basis and Macroeconomic Rates		
Plant Capacity Utilised.	%	95
Price of Ethanol	$/Litres	0.67
Price of Sugarcane	$/metres	33.19

Feedstock as Percent of Operating Expenditure	%	55
Escalation Ethanol	%	2
Escalation Sugarcane (Feedstock)	%	2
Discount Rate	%	10
Financing Terms		
Debt as Percentage of Capital Expenditure	%	70
Interest rate	%	10
Moratorium	Years	5.00
Loan Tenor	Years	10.00

Source: Authors' computation

Evaluation of the Nigerian Biofuels Industry – Impact on Government Receipts

Tax credits and/or tax holidays have implications for domestic resource mobilization (Adesuwa, Gershon, Blessing and Makwal, 2017). As such, the waivers and exemptions granted in the Nigerian biofuels policy are assessed in relation to their wider economic impact. A $22.27 billion Capital Expenditure estimated over a 10year period is needed for the achievement ofthe Ethanol blend mandate of 2 billion litres per annum. This will result in an estimated waiver of excise tax of $4.01Billion, Value Added Tax (VAT)of $2.33 billion and estimated ethanol import subsidies of $0.84 billion.

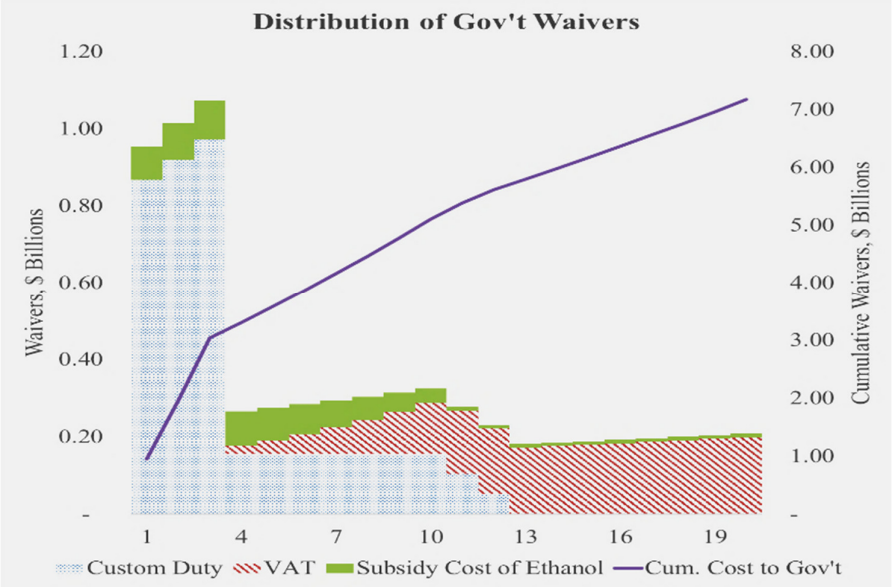

Figure 3.1: Profile of Tax Incentives to the Biofuels Industry – Excise Tax, Value Added Tax and Subsidies

Source: Authors' computation

Figure 3.1 presents a 20-year profile of tax incentives of$7.17 billion. The initially high customs duty reduces as a result of a decreasing Capital Expenditure (CAPEX), as capacity is being built. Value Added Tax (VAT) on the other hand, increases as feedstock consumption as well as the manufacturing of ethanol improves. Furthermore, it is worth noting that the subsidy incentives decreaseswith increase in domestic production to a pre-set level.

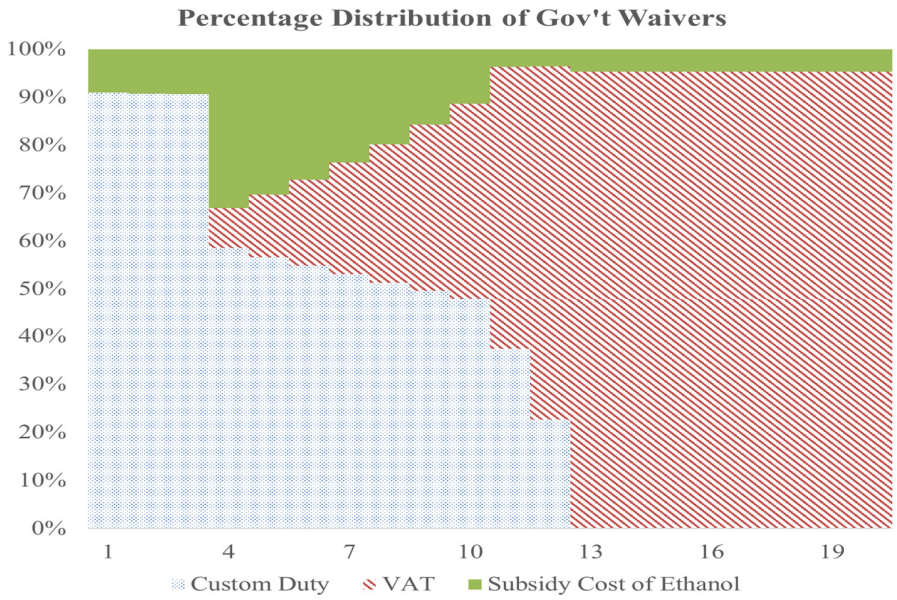

Figure 3.2: Percentage Distribution Profile of Tax Incentives/Waivers to the Biofuels Industry – Excise Tax, Value Added Tax and Subsidies

Source: Authors' computation

Relatively, Value Added Tax (VAT) increases and accounts for the most proportion of waivers (>90%) granted to the biofuels industry at the latter period as can be seen in Figure 3.2.During the latter period, post the twelfth year, the waivers on customs duty drop off to 0% of all the waivers issued as investment in meeting the targets.

Table 3.3: Economics of Biofuels Industry in Nigeria with Tax Incentives/Waivers

Viability Indices	**Unit**	**With Waivers**		
CapEx	$ Bln	22.27		
Debt Issued	$ Bln	15.59		
OpEx	$ Bln	63.94		
Lifecycle Revenue	$ Bln	21.69		
Lifecycle Volumes			BlnLtrs	25.10
NPV0			$ Bln	(48.94)
NPV10			$ Bln	(20.23)
Taxes				
Ed. Tax			$ Bln	-
CIT			$ Bln	-
WHT			$ Bln	-
Total Gov't Take			$ Bln	**-**
Unit Viability Indices				

Revenue	$/Ltr	0.86
Debt	$/Ltr	0.62
CapEx	$/Ltr	0.89
OpEx	$/Ltr	2.55
GT	$/Ltr	-
Ind. Profit	$/Ltr	(1.95)

Using the results in Table 3.3 in which the tax assumptions made in Table are maintained, the economic viability of the integrated biofuel project/industry is analyzed. It is revealed that the Nigerian biofuels Industry is not economically self-sustaining when ethanol is only produced from sugarcane. As such, with the incentives/waivers, it is unprofitable and unable to bear the burden of corporate income tax. To be profitable, this industry will need a 20-year subsidy of about $1.95l per litre. A long-range bioethanol price of $2.66/litre is required by the industry to breakeven on Net Present Value (NPV) basis. With the recent reduction in the cap pump-price of premium motor spirit (PMS), this subsidy will be more.

Evaluation of the Biofuels Industry – Impact on Consumer Prices

Table 3.4: Comparative Analysis or Ethanol and E10 blend Prices

	Units	**Symbols**	**Based on $0.67/LtrEthOH**	**Based on $2.66/LtrEthOH**
Pct Gasoline	%	**A**	90%	90%
Pct Ethanol	%	**B**	10%	10%
Ex. Rate	N/$	**C**	305.50	305.50
Ex-Depot Gasoline	$/Ltr	**D**	0.44	0.44
Ex-Depot Ethanol	$/Ltr	**E**	0.67	2.66
Ex-Depot Ethanol (GEE)[1]	$/Ltr	**F = 1.50*E**	1.01	3.99
Ex-Depot EthOH-Gasoline Blend	$/Ltr	**G = (A*D) + (B*E)**	0.49	0.79
Ex-Depot EthOH-Gasoline Blend	N/Ltr	**H = G*C**	150.65	241.85
Retail Margin	N/Ltr	**I**	11.72	11.72
Retail EthOH-Gasoline Blend	N/Ltr	**J = H + I**	162.37	253.57
Retail Gasoline	N/Ltr	**K = (D*C) + I**	145.00	145.00
Difference from N145	N/Ltr	**L = J - K**	17.37	108.57

Source: *Authors' computation*

Where: EthOH is Ethanol; GEE is Gasoline Energy Equivalent

The impact on the retail price of E10 depicts that the biofuels consumer will pay ₦17.37/litre above the current gasoline retail price of ₦145.00/litre, given the currently estimated price of ethanol of $0.67/Litre. At this point, Net Present Value (NPV) is at $20.23 million; depicting a poor performanceof the industry. To achieve a 10 percent Internal Rate of Return (IRR), the industry long-range ethanol price will have to be $2.66/litre, which is four times the current estimated ethanol price of $0.67/Litre, and ten times the current Import parity price of gasoline generated based on energy equivalence. E10 retail prices is to be retailed at ₦108.57/litre, a price above the current gasoline retail price, for the achievement of the Ethanol impact of $2.66/Litre.

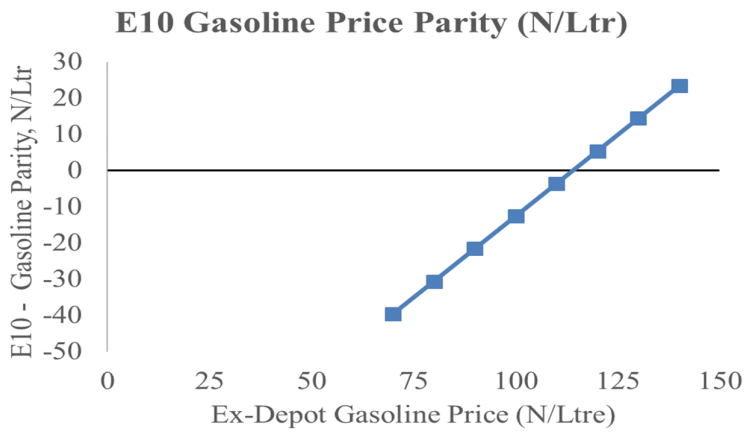

Figure 3.3: Ex-Depot Gasoline Price to Achieve E10 Gasoline Parity at N114/litre

Figure 3.3depicts the Ex-depot price of gasoline and ethanol for the achievement of the E10 price parity,given the present retail gasoline price of ₦145.00/litre. When Ethanol Price is kept at $0.67/Litre, Figure 3.3 reveals that the E10ex-depot price of gasoline is at parity of ₦114.00/Litre, which is smaller than the current Ex-depot gasoline price of ₦133.28/Litre.

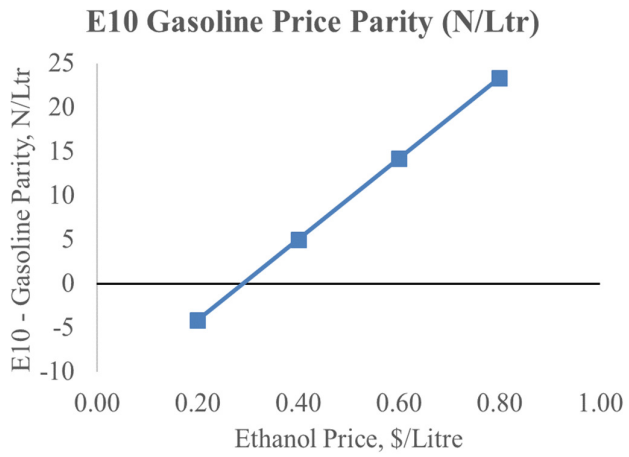

Figure 3.4: Ex-Depot Ethanol Price to Achieve E10 Gasoline Parity at $0.29/litre

To keep the Ex-depot price gasoline price at N133.28/litre, the ethanol price for E10 parity with gasoline is $0.29/Litre. This observation means that ethanol price will have to be 57% less than present ethanol prices for the achievement of E10 gasoline parity. This will depreciate the economic performance of the biofuel industry as NPV10 will sink to **$24.09 million**from **$20.23 million** andimprove the industry's support required from the government from **$48.94 billion** to **$61.24 billion** over a 20year period.

According to Kojima et al. (2007), countries with negative taxes on petroleum fuels would find it hard to build a viable biofuel market on a commercial basis as biofuels require large reductions in tax to remain competitive with petroleum fuels. The Nigerian Biofuels Policy will therefore cost the government **$4.01 billion** in forgone duties, **$2.33 billion** in forgone Value Added Tax, **$0.84 billion**of import subsidies. This will lead to a yield of an estimated total of **$7.17 billion** over a 20year period. Additionally, in the same time period, it is important for the government to bear a subsidy burden of **$48.94 billion** to allow the biofuels industry make profit. From the biofuels consumers end, given the current prices of gasoline and ethanol, the E10 blend will cost the biofuels consumer **₦17.37/litre**more than the present gasoline price of ₦145.00/litre if it is not subsidized. There would be a translation to an annual consumer subsidy burden of **$739Million** per annumif the government is allowed to subsidize the biofuels consumer at the policy-assumed gasoline consumption level of 35.6Million litres/day,.

Evaluation of Integrated Biofuels Plant Project

In this section, the extent of the fiscal incentives contained in the biofuels policy is examined from the view of a biofuels plant integrated with a sugar cane plantation. Bearing in mind that one of the gains of the biofuels policy is to providespecific co-generation energy benefits where an ethanol distillery also produces electricity for sale to the power grid. Analysis will be conducted under the following production cases:

- Case 1: Production of Ethanol, Animal Feed, and CO_2
- Case 2: Production of Ethanol, Animal Feed, CO_2, Refined Sugar, and Electricity

Table 3.5: Detailed Production Cases for Integrated Projects

	Units	**Scenario No. 1**	**Scenario No. 2**		
Plantation CapEx	$ Million	130.99	130.99		
Plant CapEx	$ Million	151.75	203.51		
Products				**Quantity Produced**	**Units**
Ethanol	Binary	1	1	51.87	Million Ltrs/yr
Yeast	Binary	1	1	63,000	Mt/yr
CO2	Binary	1	1	2,000	Mt/yr
PW Sugar	Binary	0	0	108,030	Mt/yr
Refined Sugar	Binary	0	1	108,030	Mt/yr
Electricity	Binary	0	1	64	MW

Source: *Authors' computation*

This table above represents cases of integrated projects for specific products in Nigeria, using two different scenarios.

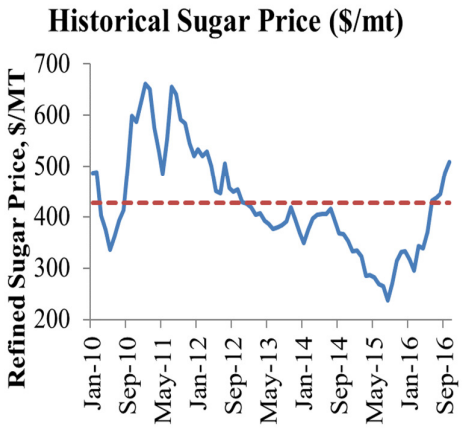

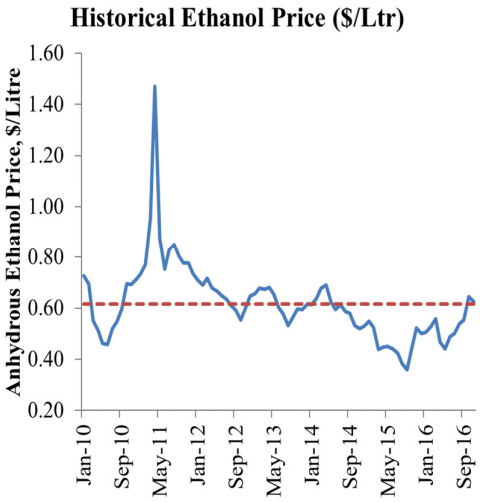

Figure 3.5: Historical Price of SugarFigure 3.6: Historical price of Ethanol

Error! Reference source not found. and **Error! Reference source not found.**displays the price history of processed sugar and ethanol respectively, which are key products from a bio refinery. They form the basis for the choice of ex-distillery ethanol price of $0.67/Litre, and refined sugar of $427.60/mt.

Table 3.6: Assumptions for Integrated Biofuels Project

Project Details	**Units**	**Values**
Project Start Year		2017
Capacity Rampup Duration	Years	6
Industry Lifecycle Duration	Years	25
Discount Rate	%	15%
Capacity Utilization	%	100%
Qty of Sugar Cane	Million mt	1.24
Production		
Ethanol	Million Ltrs/yr	51.87
Yeast	Million mt/yr	0.063
CO2	Million mt/yr	0.002
PW Sugar	Million mt/yr	0.108
Refined Sugar	Million mt/yr	0.108
Electricity	MWhr	408,593.21
Product Prices		
Ethanol	$/ltr	0.67
Yeast	$/mt	400.00
CO2	$/mt	40.00
PW Sugar	$/mt	384.80
Refined Sugar	$/mt	427.60
Electricity	$/kWhr	0.20
OpEx - Biofuels Plant	**Units**	
Feedstock Price	$/mt	33.19
Feedstock as % OpEx	%	55%
Annual OpEx	$ Million	38.39
OpEx - Plantation		
StartupOpEx (first 6 years)	$ Million	2.00
Post-Ramp up OpEx	$ Million	38.00
Land Lease	$ Million	0.07
Conversions		
SugarCane Yield/Ha	mt/ha	65.00
Ethanol Yield/mt SC	Ltrs/mt	42.00
Sugar Yield	mt Sugar/mt SC	0.09
Electricity Consumption	kWhr/Ltr	2.93
Financing Assumptions		
Debt as Pct of CapEx	%	55%
Interest rate	%	6%
Moratorium	Years	6.00
Loan Tenor	Years	15.00

Source: *Authors' computation*

The Table 3.6gives the details of the assumption that the prices of electricity from the co-generation facility and the sugar cane yield per hectare are $0.20/kwhr and is 65mt/Ha respectively.

Table 3.7: Fiscal Assumption Scenarios under which the Integrated Biofuels Project are Evaluated

Fiscal Assumptions	Units	Waivers	No Waivers
Tax Holiday	Years	10	0
Initial Allowance	%	95%	95%
Annual Allowance	%	0%	0%
% Ass. Profit as CA Recovery	%	100%	66.67%
Education Tax	%	2%	2%
CITA	%	30%	30%
With Holding Tax Rate (WHT)	%	10%	10%

Source: *Authors' computation*

To evaluate the integrated project, the principles of Transfer Pricing Regulations is employed; where the production of sugarcane is combined with the biofuels plant on an arm's length basis with the recognition that the biofuels plant forage can be sourced from out growers as contained in the policy. Also, the out growers can also supply feedstock other Agro-Allied industry purposes.

Economic Viability Indices

To measure the extent of fiscal incentives granted by the biofuels policy, key economic viability indices are used. The impact of the integrated project performance to both investor and government is judged based on the following indices:

Net Present Value (NPV): It is the Present Value (PV) of future Net Cash Flows discounted at a given hurdle rate. A project is regarded as viable if the NPV discounted at the investor's hurdle rate, D%, is greater than zero that is, NPV at D% > 0). Generally, for a project to be regarded as viable, a higher NPV is the criteria. The NPV formula is as seen below:

$$\boldsymbol{NPV} = \sum_{t=0}^{N} \frac{\boldsymbol{NCF_t}}{(\boldsymbol{1} + \boldsymbol{D})^t} \qquad (\boldsymbol{1})$$

Internal Rate of Return (IRR): This is the discount rate which makes the NPV of all cash flows from a project equal to zero. IRR calculations rely on the same formula as NPV does.

$$\boldsymbol{IRR} = \{\boldsymbol{D} | \boldsymbol{NPV} = \boldsymbol{0}\} \qquad (\boldsymbol{2})$$

Government Take (GT): This is an important metric that measures government receipts from the integrated biofuels project. For this project, it is calculated as the sum of government inflows which consists Education Tax (ET), Corporate Income Tax (CIT), and WithHolding Tax (WHT) on interests. Value Added Tax (VAT) and Customs Duties (CD) are not added to this computation. The formula is as seen below:

$$\boldsymbol{GT} = \sum_{t=0}^{N} \boldsymbol{ET_t} + \boldsymbol{CIT_t} + \boldsymbol{WHT_t} \qquad (\boldsymbol{3})$$

Results

This section reportsthe integrated biofuels plant economics in Table 4.1 and Table 4.2 respectively,for both Case 1 and Case 2; given the impact of fiscal waivers.

Table 4.1: Economic Indices of Integrated Biofuels Projects (Equity)-Case 1

	Unit	With Waivers	Without Waivers
CapEx	$ Mln	282.74	282.74
Debt Issued	$ Mln	155.51	155.51
OpEx	$ Mln	2,969.68	2,969.68
Lifecycle Revenue	$ Mln	2,598.52	2,598.52
Lifecycle Qty of SC	Mlnmt	23.47	23.47
IRR	%	na	Na
NPV0	$ Mln	(500.10)	(515.87)
NPV 15%	$ Mln	(190.18)	(193.66)
Ed. Tax	$ Mln	1.70	2.47
CIT	$ Mln	-	0.96
WHT	$ Mln	-	14.05
Government Take (GT)	$ Mln	1.70	17.48
GTPV 15%	$ Mln	0.10	3.58
Project Life	Years	25	25
Time to Payout	Years	0.00	0.00
Payout Year		**0**	**0**

Source: *Authors' computation*

In Case 1, the NPV15 of the Integrated Project when waivers are in placeis **$190.18 million** and without waivers is **$193.66 million.** While Government Take (GT) on the other hand is **$1.70 million** with waivers and **$17.48 million**without waivers, reflecting a difference of about **$15.78 million.** In Case 1 where only Ethanol, Animal Feed, and $CO_2$are produced, this result implies that the project is not viable to equity investors, even with the waivers. This in turn shows the inadequacy of the government waivers to turn unviable projects into viable projects, at the given cost price structure of the project.

Table 4.2: Economic Indices of Integrated Biofuels Projects (Equity)-Case 2

	Unit	With Waivers	Without Waivers
CapEx	$ Mln	334.50	334.50
Debt Issued	$ Mln	183.97	183.97
OpEx	$ Mln	2,997.30	2,997.30
Lifecycle Revenue	$ Mln	5,888.70	5,888.70
Lifecycle Qty of SC	Mlnmt	23.47	23.47
IRR	%	29%	25%
NPV0	$ Mln	2,259.97	1,879.83
NPV 15%	$ Mln	247.30	164.71
Ed. Tax	$ Mln	31.65	58.64
CIT	$ Mln	449.25	785.58

WHT	$ Mln	-	16.81
Gov't Take(GT)	$ Mln	480.90	861.04
GTPV 15%	$ Mln	30.62	113.21
Project Life	Years	25	25
Time to Payout	Years	7.38	7.18
Payout Year		**2024**	**2024**

Source: *Authors' computation*

In Case 2, NPV15 when waivers are in place is **$247.30 million** while without waivers is **$164.71 million**. Government Takers with waivers in place is $380.14 million and when there are no waivers it isat $861.04 million. Recall that Case 2 comprises the production of Refined Sugar and Electricity in addition to Ethanol, Animal Feed, and CO_2. Dias etal.(2010) also reported the viable economics that results from the addition of refined sugar and electricity generated from biofuels plants. Thus, the sale of surplus electricity produced as a by-product of bio-ethanol from distillation has a positive impact on the economics.Note that in Case 2, the waivers only serve to enhance the project value to the equity investor which is already positive under the no-waivers scenario that is, NPV15 of $164.71 million and IRR of 25%.

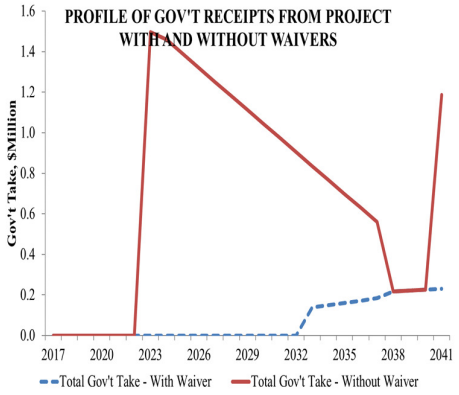

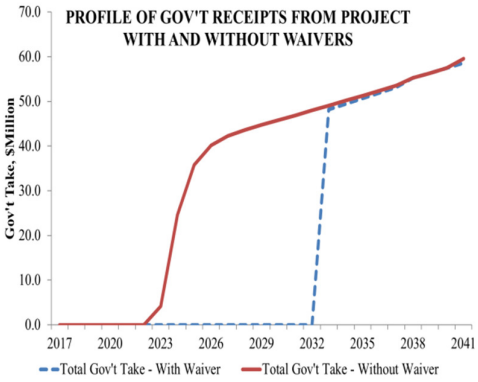

Figure 4.1: Government's Receipt-Case 1 **Figure 4.2: Government's Receipt-Case 2**

Figure 4.1 and Figure 4.2 shows the comparison betweenthe Government Take (GT) profilesin Case 1 and Case 2. It provides a deeper revelation of the tax dollar received and the timing of receipts impact of waivers.From thesegiven profiles, it is seen that GT commencement is delayed by 10 years in both Case 1 and Case 2 with waivers, relative to the commencement of GT without waivers. When viewed from a present value angle, the delay in tax receipts caused by the waiver in both Case 1 and Case 2further reduces Government Take. In Case 2 GT with waivers is $480.90Million in undiscounted terms, while in discounted terms it amounts to $30.62Million, which is about 6% the value in undiscounted terms. In Case 1, GT is much lower with the waiver than without waiver, even after taxes begin to flow. This contrasts with Case 2, where once GT (with waivers) commences, the level rises to the level it would be without waivers. Additionally, in Case 1, GT without waiver reduces from 2024 to 2037.This is due to the Withholding Tax (WHT) imposed on the reduction of interests paid by the investors, thus, constituting most of the inflow to the government under this case. The lack of taxable incomeagainst what to charge the Company Income Tax (CIT) enables the bulk of tax receipt to be the WHT on interests. The spike at the end of the profile is due to the later stageavailability of taxable income on which the CIT rate is applied.

Table 4.3: Revenue Contribution of Products from Integrated Biofuels Plant

Revenue Source	Case 1	Case 2
Ethanol	57.89%	18.49%
Yeast	41.98%	13.41%
CO2	0.13%	0.04%
PW Sugar	0.00%	0.00%
Refined Sugar	0.00%	24.58%
Electricity	0.00%	43.48%

Source: *Authors' computation*

Table 4.3 gives a breakdown of the source of revenue to the integrated project under Case 1 and Case 2. Under Case 1, Ethanol contributes about 58 percent; Animal feed contributes about 42 percentwhile sales of CO_2contribute less than 1 percent to the revenue. However, under Case 2, sales from Electricity contribute about 44 percent; Refined Sugar contributes about 25 percent; Ethanol contributes about 19 percent, and Animal Forage contributes about 13 percent. For the economically viable Case 2, the revenue distribution shows that the viability of the integrated biofuels project is dependent on the sales of Electricity and Refined Sugar than it is on Ethanol. This therefore means that:

- Given the poor record of payments for electricity supplied in Nigeria a 44 percent revenue derived from electricity is a high risk to the project (Gershon&Ezurum);
- The biofuels project receives waivers to effectively refine sugar, an activity in accordance to the Nigerian Sugar Master Plan (National Sugar Development Council, 2011).

When focus is on ethanol in the integrated biofuels projects reflecting economic viability, attention is paid to ethanol price with respect to its impacts on the extent of Government Take sacrificed due to waivers (Forgone Government Take, or Government Waivers) where Forgone Government Take (FGT) is defined as:

$$\boldsymbol{FGT = GT_1 - GT_2} \qquad (\mathbf{4})$$

Where:
$\boldsymbol{GT_1}$: Government Take without waivers
$\boldsymbol{GT_2}$: Government Take with waivers

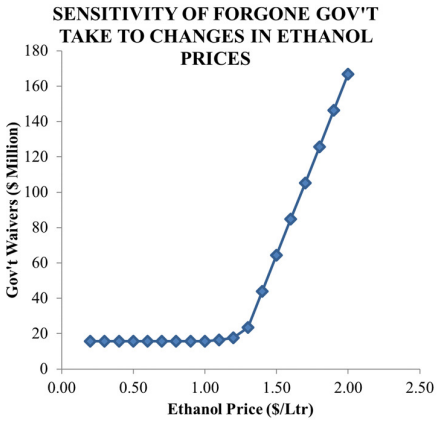

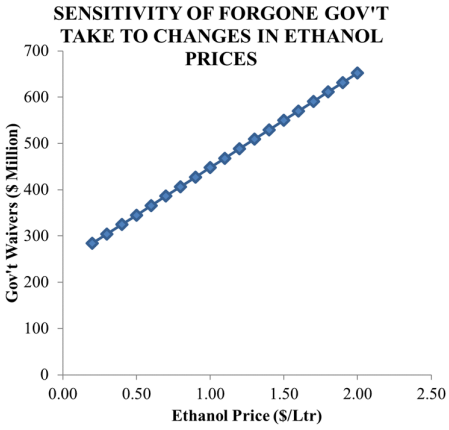

Figure 4.3: Impact of Ethanol prices on Forgone Government Take- Case 1 **Figure 4.4: Impact of Ethanol prices on Forgone Government Take- Case 2**

In Case 1, for ethanol prices up to $1/litre and beyond $1.30/litre the extent of government waivers remains constant at $15.77 million. The extent of waivers increases by $20.47 million for every $0.1/litre increase in ethanol prices. This profile showsthat a minimum ethanol price is needed for government waivers to increase as project profitability increases. However, over the price range considered in Case 2,due to the support provided by the other sources of project revenue, government waivers increase with the ethanol price. These profiles emphasize that government waivers are static below a certain profitability threshold.

Conclusion

Bio-economics has strong potential for innovation and is emerging in many developed countries as a new development model (Viaggi, 2016; Romano, 2012). The Nigerian biofuels policy attempts to strongly build a successful fuel ethanol industry by employing agricultural products. This will in turn, connectthe agricultural and the energy sectors, with the underlying goalto stimulate the development of the agricultural sector. To stimulate private sector involvement in the achievement of a thriving ethanol industry and bio-economy, fiscal incentives were contained in the Nigerian Biofuels policy. Most of the literature surveyed on the biofuels industry in Nigeria centred on food security and environmental impact. This paper, however, considered the fiscal perspective and their economic impacts. The following key findings were obtained:

1. The mandate of 2 billion litres per annum of ethanol blend needsa 10year estimated $22.27 billion Capital Expenditure. This means about **$7.17 billion of** waivers and subsidies are required over a twenty-year period;
2. The biofuels industry when only ethanol is produced is not economically self-sustaining and thus requires **$48.94Billion** (with the waivers in place). This will cause the industry to be profitable with subsidy over a 20years period. At the current ethanol price of $0.67/litre, the retail price of E10 will be **₦17.37/litre** above the current gasoline retail price of ₦145.00/litre and **₦108.57/litre** above the current gasoline price for the industry to achieve a 10% IRR;
3. The ethanol price for E10–gasoline parity is $0.29/litre, a price 57% less than current ethanol prices, which will worsen the biofuel industry economic performance;
4. This analysis also considersan integrated biofuels plant project when given the following production cases:
    a. Case 1: Production of Ethanol, Animal Feed, and CO2
    b. Case 2: Production of Ethanol, Animal Feed, CO2, Refined Sugar, and Electricity
5. Under Case 1, the project is unviable to equity investor even with the waivers thus showing the inadequacy of the Government waivers to improve the unviable project to one that is

viable. Government Take (GT) with waivers is $1.7 million and without waivers is $17.48 million;

6. Under Case 2, NPV15 with waivers is **$247.30 million** while when there are no waivers it is **$164.71 million**. GT with waivers in place is $380.14 million less than when it is without waivers at **$861.04 million**. The waivers in Case 2 only serve to enhance the project value to the equity investor which is already positive under the no-waivers scenario (NPV15 of $164.71Million and IRR of 25%);
7. 68% of revenue from electricity sales is derived for the economically viable projects.

This study highlighted the extent of the biofuels fiscal incentives as contained in the Nigerian Biofuelspolicy. It revealed the impact of implementing biofuels in the fuel mix on consumer spending and illustrates the inadequacy of fiscal waivers within the industry cost price structure and the possible errorsin the biofuels policy. Perhaps, if this policy is changed there could be better outcomes.

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The Development of Instruments for Countering Insurance Fraud – Polish And International Solutions

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Abstract

The article addresses the issue of insurance fraud in the aspect of instruments used to limit this negative phenomenon on the market. This is a fairly complex economic problem that affects the entire insurance sector, both in terms of domestic and global market. The article indicates the scale of insurance fraud by referring to the figures concerning selected foreign markets as well as data relating to the Polish insurance market. Joint initiatives often adopting the nature of system solutions were illustrated using Poland as an example, but also in relation to the three largest insurance markets in Europe, i.e. the United Kingdom, Germany and France. The internal instruments used by insurers in countering insurance fraud were also presented. This is the result of research among key insurers on the financial market in Poland and trends in international markets based on information from insurance institutions. The article ends with conclusions on possible solutions to increase the efficiency of fraud detection, which may contribute to reducing this negative phenomenon on the insurance market.

Keywords: Insurance, Insurance fraud, Instruments for countering

Introduction

Insurance fraud is a growing socio-financial problem. It is understood as actions contrary to both the law and the interests of insured persons. Participants of the insurance market (insurers, insurance institutions, insured, etc.) are constantly exposed to the risk of insurance and benefit fraud as well as losses caused by various types of criminal acts (Maciążek 2014). The development of the insurance market is accompanied by the perpetual emergence of new ways and methods of fraud, with the constantly increasing range and number of perpetrators of insurance fraud. For a long time in Europe, criminal acts concerned primarily occasional fraud and were mainly related to settlement of motor claims. However, the dynamic development of the financial market caused a change in the approach to fraud mechanisms, as well as their number and the area of their occurrence increased significantly. In the developed European markets (i.e. the United Kingdom, Germany or France) already at the end of the 1990s, insurance fraud began to take the form of organized crime involving specialized criminal groups. Insurance fraud has become a negative phenomenon not only on individual domestic markets, but has also occurred at a meso-level, as the phenomenon of insurance crime is definitely global (cross-border).The research process required the use of the following methods and techniques: critical analysis of literature, desk research, observation, qualitative methods, and graphic presentation of research results.

Insurance fraud as the subject of research

Insurance fraud is the result of many factors: socio-cultural, economic, legal, or already associated with the very specificity of insurance activity. In the book by Bera, Kordela, Pauch and Bera definition of insurance fraud understood as *all crimes and offenses affecting directly and indirectly the interests of insurers, as well as other insurance market participants (insurers, insured, beneficiaries, financial institutions, etc.*) (2019, 2018). In a research study by Derring on the other hand, in a broad sense, insurance fraud means all unfavourable phenomena occurring on the

insurance market, which are identified, verified, and eventually combated and prevented from happening (2002).

Insurance fraud Köneke, Müller-Peters, Fetchenhauer are defining manifests itself, among others, in activities such as (2015):

- providing false or incomplete information in the insurance application;
- submitting a request for compensation based on untrue circumstances of the event in order to obtain benefits from the insurance agreement;
- submitting false documentation and evidence regarding specific damage;
- prohibited acts committed by the insured themselves or third parties;
- crime against the insurer related to individual or group claims as a result of fictitious injuries caused by a road accident;
- acts committed by highly specialized criminal groups aimed at extorting unjustified benefit or compensation.

According to *Insurance Europe*, the scope and scale of insurance fraud varies from country to country. The estimates of *Insurance Europe* indicate that detected and undetected fraud represents up to 10% of all compensations and benefits paid in Europe. According to this organization, the scale of fraud is much higher in countries where insurance supervision is weak for examples in the countries of Africa and some countries of Asia and South America. Furthermore, this number varies between countries and types of insurance due to several factors including the size of the insurance market or the obligation to purchase certain types of insurance.

Table 1 contains estimates of losses due to insurance fraud calculated by *Insurance Europe* in 2015-2016.

Table 1: Losses due to insurance fraud in selected countries

Country	Insurance type	Losses
Germany	All types of insurance	10% of claims
Australia	All types of insurance	10% of claims
Canada	All types of insurance	10-15% of claims
Spain	Motor insurance	22% of claims
The United Kingdom	Personal insurance	7% of claims
Scandinavian countries	All types of insurance	5-10% of claims
The USA	All types of insurance	10% of claims

Source: (Bera, Kordela, Pauch, 2019)

In a research study by Miksiewicz according to international and national institutions, among others the Polish Chamber of Insurance, fraud value may annually constitute 3% of the premiums collected by insurance companies (2015). On the other hand, according to the data obtained by the Polish Chamber of Insurance, the average annual losses from insurance fraud in 2011-2016 in Poland were: in Section I – PLN 9 731 678, in Section II – PLN 142 440 649. Whereas, the median over the period considered was as follows: Section I – 10 227 982 PLN, Section II – 135 730 128 PLN. The annual values of losses of insurance companies are presented in Figure 1.

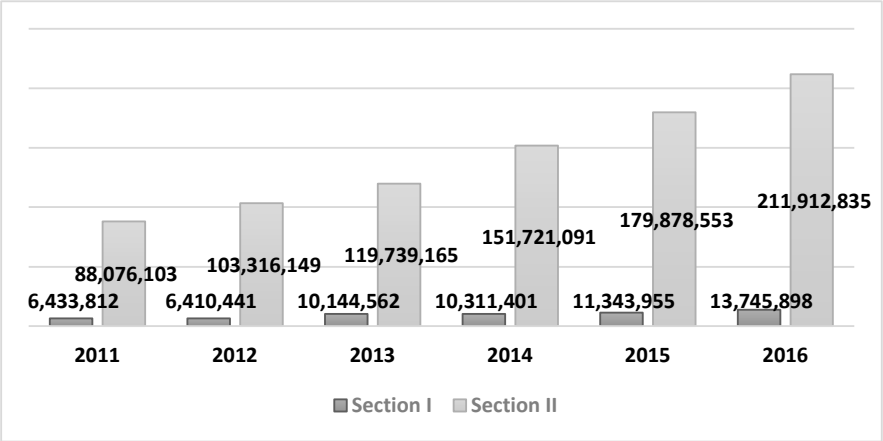

Fig. 1: Value of fraud in Sections I and II in 2011-2016 (PLN)
Source: own work based on: (Majewski 2017)

The difference in the value of detected fraud between Sections I and II is partly due to the fact that the products of Section I are not equally subject to extortion. Classic life products, accident insurance, as well as group and sickness insurance can be used to generate fraudulent claims. In a research study by Polish Chamber of Insurance On the other hand, the group of products less subject to fraud include investment insurance, which, due to its structure, prevent obtaining compensation by false pretences (2017).

In addition to obtaining indemnities or benefits by false pretences, insurance companies also record insurance fraud outside the area of payment of compensations (Figure 2). In this case, the risk of crime concerns not the client, but mainly the insurance company. Dishonest employees and insurance intermediaries can be a serious source of financial loss.

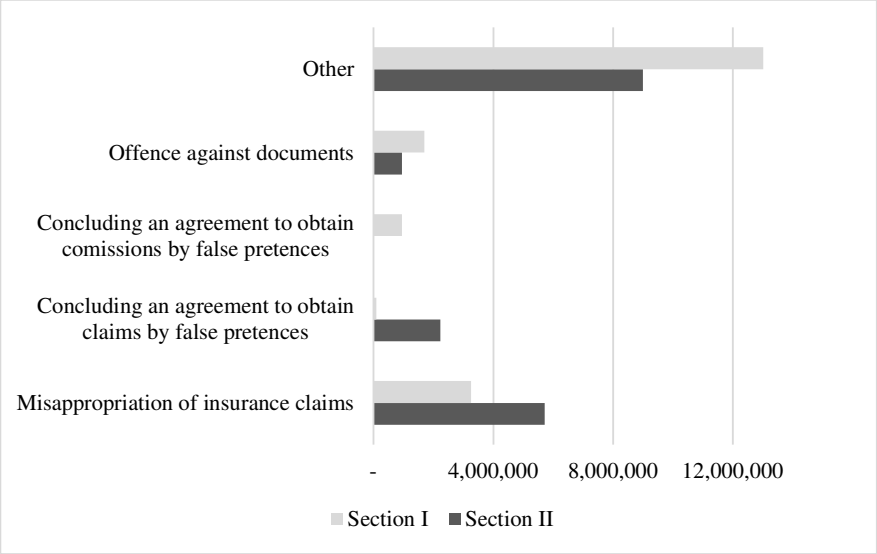

Fig. 2: Insurance fraud outside the payment of compensations in Sections I and II in 2016 (PLN)
Source: own work based on: (Majewski 2017)

In the "other" category, insurance companies indicate, in particular, money laundering, cybercrime and social engineering. Criminals tend to impersonate the person entitled to receive payments on benefits and take over the payment by changing the bank account number.

Conclusions from the research in the light of Polish experience in the field of joint initiatives in counteracting insurance fraud

The scope of joint initiatives undertaken to counteract insurance fraud, as well as the group of entities involved in this process, is constantly growing. Apart from insurers in Poland, a key role is played by financial institutions (the Polish Financial Supervision Authority, Insurance Guarantee Fund (UFG), the Polish Chamber of Insurance, Financial Ombudsman, etc.), which through their activity and holistic solutions implement tools to improve detection in the field of insurance fraud. Furthermore, the entities involved in counteracting insurance crime include: the Ministry of Justice, Prosecutors, Courts, Police, motor vehicle surveyors, forensic laboratories, scientific and research institutes, and coroner's court, etc. Moreover, this group should include entities that are able to prepare useful expertise in identifying fraud in such fields as: automotive, mechanoscopic, physicochemical, document and writing examination, firefighting, accounting, medical, reconstruction of road accidents, or interdisciplinary.

The results of research conducted among all insurers operating in Poland (in 2018) show that among the joint initiatives first of all the following should be mentioned:

- improving the quality and speed of information exchange between insurers,
- inspiring legislative initiatives to help prevent and counter insurance fraud,
- cooperating with the Police and other institutions, as well as the very activity of these institutions,
- developing joint initiatives in the field of IT (information technologies) tools,
- educational and preventive activities.

An efficient and effective system of information exchange between insurers is one of the priorities of the institutions whose activities focus on improving the quality of preventive activities in the field of insurance fraud. Information plays an important role in the proper functioning of insurance companies. Without reliable, high-quality and timely information about suspected damage, the insurer's ability to make the right decision in the claim settlement process is at a significant risk of error. Information from various sources is used during claim settlement. Hence, an important factor in the proper investigation process of investigating a prohibited act is cooperation between insurance companies and public administration institutions, as well as law enforcement authorities and courts. In the exchange of information, the effectiveness of the system is determined by: the reliability of exchanged data, transmission speed, functioning of the system in accordance with applicable legal standards, and security of data transmission.

A special role in the Polish insurance market in terms of identifying insurance fraud will be played by a platform created as a part of the Integrated Platform for the Identification and Verification of Insurance Crime project launched on February 4, 2019. The platform's task, which is the basis for knowledge about insurance fraud, is to support all insurance market participants in disclosing and counteracting fraud. This platform enables (www.ufg.pl) primarily:

- identifying, verifying and sharing information on phenomena related to insurance fraud,
- formulating inquiries and conducting analyses of insurance fraud phenomena based on data held by UFG,
- sharing information in the field of multiple motor insurance,
- providing information on the results of verification of facilities submitted by insurance companies with public registers,
- sharing information about vehicles and material damage,

- secure communication as part of reported incidents of a criminal nature,
- access to the Knowledge Base for international institutions, insurance companies and citizens.

The aim of the platform is the typing of suspicious claims and payments, as well as criminal networks that simultaneously affect many insurance companies through the use of advanced analytical techniques (including predictive models and data mining tools). As consequence, the use of the new tool is to lead to effective reduction of the scale of insurance fraud in Poland. Although it is impossible to completely eliminate this negative phenomenon from the market, limiting it to a size that does not threaten the financial stability of insurers is already becoming a real and feasible goal for entities in the insurance sector.

Conclusions from the research in the scope of internal activities of insurers used in countering insurance fraud (regardless of the insurer's country of origin)

Insurance companies themselves should play an important role in the fight against insurance fraud. In addition to commonly used reports and inquiries within available information databases, scoring methods are one of the modern and increasingly common ways used to fight insurance fraud in the area of research on insurance extortion probability. The range of scoring models used is very extensive in terms of operational risk, as well as supports detection of insurance fraud. The aim of the predictive model is to minimize its effect on the entire claim settlement process in terms of time, costs and quality, while effectively isolating claims with the highest risk of fraud. The early warning system allows for analysis of the symptoms of extortion and, consequently, for actions leading to a reduction or temporary refusal to pay compensation. Statistical models and data mining is used to efficiently and quickly detect fraud regarding damage and are the basis for building a utility predictive model (Figure 3).

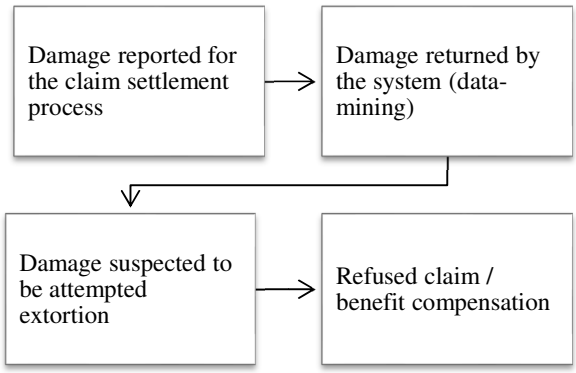

Figure 3: Suspected damage detection process

Source: own work.

In a research study by Leśniarek-Woźniak, Raubo in statistical models of the type – *data mining* – fraud modelling in the form of enhanced trees can be used (2012). Along with the increase of awareness and knowledge of insurance institutions about the risk related to offenses committed in the area of fraud insurance, risk management strategies have become an important factor in mitigating the risk. Strategies for managing fraud risk can influence its reduction as well as mitigation of negative consequences. For this purpose, risk maps and other supporting tools are used. They consist of four interdependent elements having a direct impact on the level of organization resistance through assessment, prevention, detection and reaction technique. In a research study by Flejterski the elements that make up the whole risk management strategy include (2013):

- threat assessment, which is the first step on the way to managing fraud risk; before implementing preventive strategies, risk factors should be identified, categorized and assessed, as well as identification regarding which of them requires restriction and what strategy to use for this purpose should be carried out;
- implementation of preventive strategies based on estimating risk factors; there are many such strategies – from promoting corporate ethics to control methods; preventive strategies aim to anticipate, counteract and discourage to commit offenses;
- selective implementation of fraud detection strategies; the scope and intensity of these activities may vary – from periodic audit to constant monitoring of transactions (random checking of selected transactions or checking all transactions in real time);
- preparation of logical scenarios for responding to detected fraud in order to minimize their negative impact on the company and to protect it against the consequences.

The constant emergence of new forms of fraudulent insurance claims on the market indicates that in order to combat insurance fraud, particular emphasis should be put on the development of innovative tools to counteract this phenomenon. To this end, IT tools used in insurance companies should be systematically developed in order to identify undesirable phenomena. The new tools are to help effectively identify fraud patterns of behaviour and anomalies, as well as indicate risks and threats. In a research study by Dudek it appears that a large amount of data available in insurance companies can be properly analysed only when using dedicated IT systems, which, thanks to advanced analytics, are able to properly combine and interpret it (2017). At the same time, another important element used in this process are networks of connections. The analysis of links between entities allows discovering hidden relationships and suspicious interdependencies between clients, accounts, vehicles, damage or other entities.

In a research study by Morley, Ball, Ormerod thus, two main approaches applied to combat fraud by technology can be identified (2016). The first and perhaps most common is the use of data mining methods, in which systems make it possible to access databases of information on customers and claims, and cross-check it with external data sources for identification. The other technology-based approach to combat fraud employs methods that aim at 'profiling' probable fraudsters, including techniques such as voice stress analysis. However, techniques such as voice stress analysis require direct contact of the insurance company with the insured. This is somewhat difficult, as more and more insurance products are sold through external entities, e.g. insurance intermediaries and via the Internet.

According to a survey conducted by Accenture (data from 2014), the most important initiatives taken by insurers to increase the detection of fraud include use of modelling techniques, improvement of data collection processes from both internal systems and external sources, increased support by the IT department. The research results indicate that in the next years insurers will focus mainly on organizational restructuring, training courses and process improvement in order to increase the level of fraud detection. The use of analytical methods (76 percent), providing better IT support and optimization of data collection processes are becoming a priority (Figure 4).

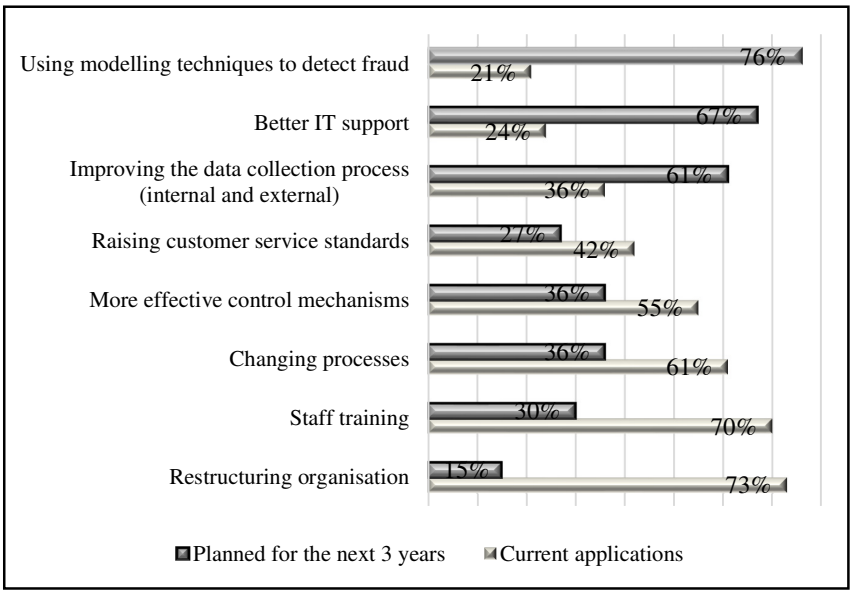

Fig. 4: Key initiatives implemented by insurance companies to improve fraud detection
Source: (Accenture, 2016)

Another important element is the development of analytical tools to identify fraud damage by assessing transactions in real time. This involves combating insurance fraud at the time of taking out insurance (and not, as before, only at the stage of claim settlement).

Countering Insurance Crime – Experience from Key European Insurance Markets

The scope and scale of fraud in individual countries varies. The diversity results from many factors related to the functioning of national financial markets. It is also the result of the state's financial policy and public-legal relations. Due to the differences in the offenses committed in the insurance sector, the approach and method of identification, as well as the selection of insurance crime prevention tools, differ. In some countries, the most important task in the fight against crime is to determine the number of revealed and undisclosed offenses and fraud in order to assess losses and select risk management instruments regarding insurance fraud. Whereas in other countries, crime prevention institutions focus on the ongoing detection of insurance fraud to limit the payment of fraudulent damage and benefits (www.insuranceeurope.eu 2019). Regardless of the approach, the aim – which is to define current and future activities and initiatives that will effectively and thus efficiently prevent fraud attempts – is the same. Selected initiatives and actions taken on foreign markets are quite diverse, which was presented in relation to the market in the United Kingdom, Germany and France.

The United Kingdom

Initiatives to reduce insurance fraud are common in the UK. An example is the activity of *the Insurance Fraud Enforcement Department* (IFDE), which is a specialized police unit dealing in combating insurance fraud (www.cityoflondon.police.uk 2019). Established in 2012, the IFED is funded by the Association of British Insurers (ABI) and members of Lloyds of London. It is a part of the City of London Police Economic Crime Directorate. The team of IFDE detectives, investigators and police employees operates independently, working closely with the insurance industry. The IFDE prevents established crime in the field of motor insurance, civil and commercial liability while

focusing on emerging threats such as illegal insurance advisers. The unit also actively fights organized crime groups that are responsible for the growing number of insurance fraud on the UK financial market. Also in the United Kingdom, a special institution named the *Insurance Fraud Bureau* was established, whose activity is focused on detecting and preventing organized insurance fraud. The IFB conducts and coordinates the work of the insurance sector in identifying fraud detectability and cooperates closely with the police and other law enforcement agencies.

The Insurance Fraud Register (IFR) is an important tool on the British market. It was launched in 2013 as the first industry cross-sectoral database of insurance fraudsters. Two-thirds of the insurance market (by market share) is currently registered and uses this service, which includes approximately 18 000 records about dishonest individuals, businesses and entities on various personal and commercial lines. In December 2017, the IFR Board decided to extend the rights to include members of the *Lloyd's Market Association*. The IFR software plays an important role as an information exchange system for insurers. The system can be used in the investigation of property and life crimes, as well as at any time during the life cycle of the insurance product. For security reasons, only insurance companies that meet certain requirements can use the system. Furthermore, the information contained in the programme must strictly fall under the definition of insurance fraud, whereas registered entities have the right to appeal against the decision in order to dismiss the allegation of committing insurance fraud. Although the IFR is not intended to generate an automatic result on the crime committed, it supports the entire decision-making process and the management of fraud risk in the area of insurance. The system allows a thorough analysis of the case being investigated – enables its assessment, scale and area of operation, and also supports in the process of selecting instruments for preventing insurance crime.

Germany

In Germany, among the many initiatives taken in this field, the Warning and Information System tool - HIS (Das Hinweis- und Informationssystem der Versicherungswirtschaft) occupies a particularly important place. The German Warning System is primarily used to counteract insurance crime and supports fraud risk assessment. This tool has been developed in close cooperation with the authorities dealing with the protection of personal data to maintain full security. The basic structure of the system was established in 1993. The current system is the result of evaluating warning files initially used only for motor insurance. Then, the system was gradually implemented in the scope of other types of insurance. The system is responsible for assessing the risk of an insurance claim in terms of an attempt to extort a compensation / benefit. A HIS message about a suspected attempt to extort an unjustified benefit does not completely reject the application, but it prompts the insurer to further investigate the case. HIS acts as a warning signal if irregularities are detected. As an information centre, it also collects data on the insurer (in terms of: the type of risk covered by the agreement, the general conditions of the agreement concluded, other information that may be useful in the course of the investigation of an insurance fraud).

The German Warning and Information System is an instrument designed to increase effectiveness in counteracting insurance fraud. Its fundamental feature is transparency, reliability and accuracy of information while maintaining full security of transmitted data. This system is the fundamental database for the German insurance market, which is currently used by the majority of active insurers on the market.

France

According to data published *by the French Insurance Federation* (Fédération Française de l'Assurance – FFA), a significant increase in insurance fraud in all areas of insurance has been recorded (/www.ffa-assurance.fr 2019). According to the organization's estimates, French insurers spend about EUR 20 million annually on combating this negative phenomenon. France is certainly a pioneer in the fight against insurance fraud, as the anti-fraud agency ALFA was created in 1989. ALFA is a specialized organization aimed at supporting the fight against crime, which creates new instruments to prevent fraud and supports activities aimed at combating insurance fraud. The agency

aims to raise public insurance awareness and train specialized experts to fight insurance fraud. Due to the dynamic development of new forms of insurance fraud, at the request of the employees of this organization in 2012, the country's political control against insurance fraud was increased. This was due to the fact that this phenomenon is becoming increasingly negative for individual, collective and economic interests of the country.

SAS is another tool in the fight against insurance fraud, dedicated to insurance companies in France. This application is a complete solution for the prevention, detection and management of fraud risk in the area of all available insurance. This solution includes detection, management, alarming, investigation, analysis, statistical research on unfair behaviour and monitoring of fraudulent behaviour (www.sas.com/ru 2019). Among the benefits of using the SAS system in countering insurance fraud, market experts state: reduction of losses caused by fraud, detection of similarities in acts committed, enriching the rules and instruments for combating insurance fraud, increasing detection of internal fraud and organized groups, the possibility of building complex detection models.

Conclusion

The development of innovative anti-fraud systems is the only possible way to increase efficiency in detecting crime and insurance fraud. The use of ICT solutions is a great opportunity to increase the transparency of the insurance market. These solutions allow for: early detection of fraud, increasing the efficiency of preliminary investigations, greater involvement of operational units in preventing fraud, and limiting expenses related to fraud. Nevertheless, it should be borne in mind that in the whole process of detecting insurance fraud, man still remains the key element. Even if the system correctly detects irregularities, the employee of the insurance company must properly analyse and address them as well as decide what to do with a given case.

The anti-fraud solutions adopted in Poland and other emerging countries are largely based on the system solutions presented in the article and used in the United Kingdom, Germany and France. An example is the implementation of an integrated platform for the identification and verification of criminal activities (which took into account the experience of the discussed markets). It should also be noted that a significant part of the initiatives undertaken in this area are joint projects, an example of which is the successfully completed endeavour of the Baltic countries. It was the Oslofjord project, whose creator was the Norwegian government, dedicated to coastal, organized crime in Norway and Scandinavia, and the Baltic States of Europe. It allowed breaking up of one of the largest organized criminal groups responsible for insurance fraud in Scandinavia.

In conclusion, it should be stated that it is important for insurance companies to be leaders in building and implementing modern solutions in detecting fraud and improving defence mechanisms in the technological, process and human areas. The role of state insurance institutions remains paramount and is significant above all in the context of financial security of the financial system of the state as a whole.

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Innovative Approaches to State Policy Development in the Field of Aggregated State Assessment of Sustainable Development of Ukraine

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Abstract

In article the question of the beginning of a scientific discussion about the urgent need of development and introduction of a global objective system of assessment of a condition of sustainable development in Ukraine in modern conditions are updated, the present place of our state in the global world rankings is shown, the key conventional international rates (indicators) which can be used at assessment of the state of affairs in the state (society) are analysed. An innovative author's algorithm for the development and introduction of a global aggregated system for assessment the state of sustainable development with step-by-step detail, consistent with modern democratic principles of international cooperation, which is based on existing public available tools, does not require additional financial and material costs and can be implemented in the shortest possible time is proposed, based on the study of international experience.

Keywords: the aggregated system of assessment of a condition of sustainable development, sustainable development, state policy of regulation of a system of assessment of a condition of sustainable development, the aggregated rates (indicators).

Introduction

Like the vast majority of the developed countries of the world, Ukraine is in urgent need of professional scientific justification for the basic principles and practical ways of implementing state policy aimed at developing new approaches to the development and implementation of an aggregated system for assessing the sustainable development of the state in the current conditions of global transformation.

The assessment of the current state of sustainable development and its The assessment of the current state of sustainable development and its prospects in the various spheres of human activity is essential for any country in the world. This scientific and practical problem has become particularly urgent for Ukraine at the current stage of the state - after the annexation of the Crimean peninsula and the deployment of hybrid aggression by the Russian Federation in eastern Ukraine. Objective analysis of the development of the Ukrainian state and society in the sustainable development, constant monitoring of the domestic security of the environment are an integral part of the system of ensuring the sustainable development of Ukraine and require constant professional expert and predictive support.

The tasks to improve the state system of strategic planning, to create a unified system of monitoring, analysis, prediction and decision-making in the sustainable development were initiated as early as January 2015 in the Strategy for Sustainable Development "Ukraine-2020" (President of Ukraine, 2015),

However, despite the held organizational and administrative and scientific and communicative events, it is not possible to introduce more or less effective system of indicators (rates) of a condition of sustainable development of Ukraine for information and analytical support the leaders of the state of the estimated and expected data necessary for decision-making on questions ensuring sustainable development in peace time, the crisis periods and during the special period yet.

The works of such well-known scientists, as (N. Andreev, 2010; I. Bystriakov, 2012; O. Bilorus, 2006; B. Burkynskyi, 2011; V. Heiets, 2000; Z. Herasymchuk, 2004; B. Danylyshyn and O. Maslyukivska, 2008; M. Zhurovskyi, 2006; V. Kravtsiv and P. Zhuk, 2013; L. Melnyk and O. Kubatko, 2009; A. Mokii and M. Flaychuk, 2008; P. Nadolishnyi, 2002; M. Pashkevych, 2012; V. Potapenko, 2013; D. Stechenko, 2007; V. Trehobchuk, 2004; E. Khlobystov, 2008) and others are devoted to the study of various aspects of defining and understanding the essence of sustainable development, as well as the definition of its components at the present stage of development.

However, issues related to the methodology of development and introduction of the aggregated system of evaluation of sustainable development of Ukraine in the conditions of modern challenges and threats remain insufficiently developed in the domestic and foreign literature. Today, the need to study the mechanisms of implementation of the state policy aimed at forming new approaches to the development and introduction of an aggregated system of assessment of the state of sustainable development of the state, as well as to determine the methodology of its regulation is particularly relevant.

The main purpose is the author's theoretical and methodological justification of the basic principles and practical ways to implement the latest approaches to the state policy of regulating the processes of social and economic changes aimed at the development and introduction of an aggregated system of assessment of the state of sustainable development of Ukraine in the context of the latest geopolitical realities.

Research Methodology

In our study we proposed an author's vision of new approaches to the introduction of an aggregated system of assessment of the state of sustainable development, which determine the place of Ukraine among other states of the world almost in a hundred parameters and characterizes the situation in almost all spheres of life of Ukrainian society.

The analysis made it possible to propose an author's algorithm for the development and introduction of a global methodology for assessing the state of sustainable development not only of Ukraine, but also of other states in the field of sustainable development.

At the first stage. Not to develop (invent) own exclusive parameters or assessment indicators, but to borrow them in already existing recognized world methods and ratings. It is only necessary to determine which of them we need in order to fully characterize the state of sustainable development of a particular state. The use of any parameters (indicators) of the world global ratings is free subject to copyright, they are public available and regularly updated.

At the second stage. It is necessary to group borrowed parameters (indices) into areas of sustainable development. If necessary, on the basis of them, to develop integral (aggregated) indices in order to integrated assessment of the overall state of sustainability of a particular state and society in the field of sustainable development. Then determine the form and frequency of presentation of the obtained results (comparative table, charts, maps, etc.).

At the third. Develop and implement a targeted international PR strategy to advance our methodology (rating) for a global assessment of the sustainability of the world's states and societies in the field of sustainable development. At this stage, the mandatory participation of international organizations, the Ukrainian world diaspora and foreign foundations is expected. Such activities should become a strategic task in the near future for Ukrainian state institutions.

In the study we used methods of system approach and system analysis of rates (indices), which together allowed to reach a more or less objective assessment of the general state of sustainable development of the states of the world and to determine the place of Ukraine in this system in the first approach. This study was carried out on the following aggregates:

- The sustainable society index is determined by indicators (sufficient food, sufficient to drink, safe sanitation, education, healthy life, gender equality, income distribution, population growth, good governance, biodiversity forest area, biodiversity protected area, renewable water resources, ecological footprint, energy use, energy savings, greenhouse gases, renewable energy, organic farming, genuine savings, GDP, employment, public debt);

- Worldwide Governance Indicators (WGI) – the methodology, rates of which were used to measure the overall sustainable development status of each individual country in the world by key management ratings (indices) of administration (voice and accountability, political stability and lack of violence/terrorism, government effectiveness, regulatory quality, the rule of law, control of corruption).

Using the method of prediction, the effectiveness of state policy of Ukraine in the field of regulation and prediction of rates of sustainable development were assessed.

Research Results and Discussion

UN Millennium Development Goal, which was adopted in 2000, by 189 countries at the UN Millennium Summit, and which established a comprehensive framework of values, principles and key factors of development under the three core UN mandates: peace and security; development; human rights, is the modern guide to human development for the entire civilized world. The road map for the implementation of the Millennium Development Goal proposed a set of eight universal goals, with specific time frames and quantitative indicators, aimed at eliminating all major obstacles to the decent life of every human being in any society, namely, the eradication of hunger and extreme poverty; access to education; ensuring gender equality; reducing maternal and child mortality; reducing HIV/AIDS and other diseases; environmental sustainability and harmonization of external assistance for developing countries (Millennium Development Goals Ukraine: 2000 - 2015: National Report, 2015).

In September 2015, within the 70th session of the UN General Assembly, the world community defined new guidelines for the development of mankind for the next fifteen years (2015-2030), called Transforming our world: The 2030 Agenda for Sustainable Development and presented in the form of seventeen global Sustainable Development Goals.

Ukraine, by participating in the historic United Nations Summit for Sustainable Development in Rio de Janeiro (Rio+20), has clearly demonstrated its strategic freedom to shape its own future on the basis of the principles of sustainable development. Along with other countries, our country have worked hard to realize the Millennium Development Goals determined by the results of the UN Millennium Summit held in 2000. Thus, in January 2015 the Strategy of Sustainable Development "Ukraine - 2020" was approved by the Decree of the President of Ukraine P. Poroshenko, in which, in addition to general phrases about the transition to a new era of history and a unique chance to build a new Ukraine, a number of concrete practical measures were defined with the aim of introducing European standards of life in our state and reaching the leading positions in the world (President of Ukraine, 2015).

In September, 2019 the Global sustainable development goals till 2030 proclaimed the Resolution of the General Assembly of the United Nations of September 25, 2015 No. 70/1 were supported by the Decree of the President of Ukraine V. Zelenskyi and the results of their adaptation taking into account specifics of development of Ukraine stated in the National report of “a sustainable development goals of Ukraine” and also definite purposes of sustainable development of Ukraine until 2030 (Ministry of Economic Development and Trade of Ukraine, 2017); President of Ukraine, 2019).

According to the carried-out analysis, for two decades from the moment of the official introduction the concept "sustainable development" already left the plane of purely scientific term, and is rather widely used by the international community (in particular, in acts of the UN and the EU) and domestic political elite not only in standard and legal documents, but also in daily communications.

The introduction of the term "sustainable development" is the official Ukrainian equivalent of the English term "sustainable development", the literal translation of which, according to the context, can be "viable development" and, within the meaning of "self-sustaining development", can also be interpreted as a comprehensively balanced development. According to the United Nations Commission on Sustainable Development, its purpose is to meet the needs of modern society without compromising the ability of future generations to meet their needs.

Lee Endress & James A. Roumasset (1994) mentioned that the theory of sustainable development is an alternative to the paradigm of economic growth, which ignores the environmental danger from development according to an extensive model (Endress and Roumasset, 1994).

Today, in investigating new approaches to public policies of regulation in the field of sustainable development, we put special emphasis on operating an aggregated system of assessment of its provision.

According to recent data, Ukraine has strengthened its position in key international ratings, which provides an argument for certain stabilization of the situation in the country as a whole, a tangible improvement in the tax burden situation, economic freedom, competitiveness of domestic institutions, gender equality, etc. Analysis of the dynamics of rates of key international indices (Table 1) shows indirectly the continuous and gradual growth of the stability of the Ukrainian state and society in the sustainable development.

Table 1: Ukraine's positions in key international indices

Name of rating	Year	Place of Ukraine/total number of countries [a]	Dynamics [b]
The Global Innovation Index	2017	50/127	+ 6
Fraud Surveys: Corruption perception	2016	1/41	+ 1
Global Terrorism Index	2017	17/134	- 6
Global Peace Index	2017	154/163	+ 2
GCI - WEF	2017	53/137	+ 1
Rule of law index	2017	77/113	+ 1
The Global Gender Gap Index	2017	61/144	+ 8
Index of Globalization	2016	45/207	- 3
Democracy Index	2017	83/167	+ 3
The Global Wealth Report	2016	95/173	- 12
Environmental Performace Index	2017	109/180	N/A
Index of Economy Freedom	2017	150/180	+ 16
English Proficiency Index	2017	47/80	- 6
Bloomberg innovation index	2017	46/50	- 4
The Global Competitiveness Index	2017	81/137	+ 4

Name of rating	Year	Place of Ukraine/total number of countries [a]	Dynamics [b]
Higher Education	2017	35/137	- 2
Institutions (GCI-WEF)	2017	118/137	+ 11
Easy of Doing Business	2017	76/190	+ 4
Global Slavery Index	2016	25/167	N/A
Human Development Index (UNDP)	2016	84/187	without changes
Fragile States Index	2017	90/178	- 5
Global Firepower Military Ranks	2017	30/133	without changes
The legatum prosperity index	2017	112/149	without changes
Social Progress Index	2017	64/128	- 1
Corruption perception index	2017	130/180	+ 1
World Happiness Report	2017	138/156	- 15
Happy Planet Index	2016	70/140	N/A
Paying taxes ranking	2017	43/189	+ 41
WCY	2017	60/63	- 1
World Press Freedom Index	2017	102/180	+ 5
Freedom in the World (Freedom House)	2016	107/195	+ 1
The Human Capital Index	2017	24/130	+ 2
***a* – Note:** *the closer to the first place, the worse*			
***b* – Note:** *"+" – position improvement, "-" – position deterioration.*			

Source: Own elaboration with (Ukraine in global rankings, 2020)

The established world practice of assessment of the situation in a certain state is based on the methodology of using appropriate special indicators (indices), which allow to give the most objective assessment of the state or changes taking place in certain spheres of life of the country (society). The main purpose of such a methodology is to assess the current state of affairs (or events) in a separate sphere of life, to develop a prediction of the most probable development of the situation, as well as to develop a strategy (action plan) for its positive solution.

The analysis highlights two main approaches that are used in the leading countries of the world and include the use of special indicators (indices) to assess the situation in the state:

The first

Construction of a system of indicators (indices), by means of which it is possible to estimate certain aspects of the state and development of certain spheres of life of the state (society), for example:

- citizens' satisfaction with the degree of protection of their constitutional rights and freedoms, personal and property interests, in particular against criminal trespasses;
- weight of modern weapons, military and special equipment in the structures of the security and defence sector of the country;
- life expectancy;
- gross domestic product per capita;
- the decile ratio of income-consumption differentiation (the ratio of income of 10% of the richest population to income of 10% of the poorest, or per capita, consumption of goods and services);
- inflation and unemployment rates;
- share of expenses for the development of science, education, culture, health, etc. in gross domestic product;
- the proportion of the country's territory that does not meet recognized environmental standards.

The second

Development of integral (aggregative) indices for the purpose of comprehensive assessment of the overall state of affairs in the state (or region). The main disadvantage of this approach is that it is almost impossible to clearly determine the weight of the initial rates for assessing the general status of the state (society) without losing their importance and then avoiding subjectivity.

Currently, there is no conventional science-based quantitative rate (index) that measures the overall state of an individual state and society in the sustainable development objectively. However, many countries of the world and international organizations use quite widely various methods, which allow to make a general assessment of the state of sustainable development of both the individual country and the region as a whole, indirectly, through analysis of quantitative raates of certain aspects of social, political, economic, sociocultural, environmental and other life of the country.

Among such methods, the analysis of rates (indices) of which in conjunction allows to reach in the first approximation for a more or less objective assessment of the overall state of each individual state in the sustainable development, should be:

The Sustainable Society Index is a combined indicator of the Sustainable Society Foundation that measures countries' achievements in terms of sustainability of social development. Research direction: study of economic and social processes. The area of research is public administration. Started from 2006 to the present. The frequency of the study is regular, once every few years. Project leaders: Geurt van de Kerk and Arthur Manuel (SSF, 2020).

Indicators for determining the Sustainable Society Index for the countries of the world

The Sustainable Society Index is determined by such indicators for the countries of the world:

1. Sufficient Food: number of undernourished people in % of total population. The index is developed and regularly published by the Food and Agriculture Organization, FAO) (SSF, 2020);

2. Sufficient to Drink: number of people as % of the total population, with sustainable access to an improved water source. The index is developed and regularly published by FAO;

*3. **S**afe Sanitation*: number of people in % of total population, with sustainable access to improved sanitation. The index is developed and regularly published by FAO;

4. Education: combined gross enrolment ratio for primary, secondary and tertiary schools. The index is developed and regularly published by UNESCO (UNESCO Institute for Statistics, 2009);

5. Healthy Life: life expectancy in the country. The index is developed and regularly published by World Health Organization, WHO (World Health Organization, 2020);

6. Gender Equality: gender gap index is defined in the Annual Global Study of the World Economic Forum with the accompanying world ranking (Economic Discussion Club, 2017);

7. *Income Distribution*: ratio of income of the richest 10% to the poorest 10% of the people in a country. The index is defined by the World Bank for each certain country of the world (World Bank. 2018);

8. *Population Growth*: 5-years change in total population size (in %). Index is determined and published by WB;

9. Good Governance: sum of the values of the six Worldwide Governance. Index is determined and published by WB;

10A. Biodiversity forest area: 10-year change in the forest area of the country. The index is defined according to the program document of the UN Transforming our world: the 2030 Agenda for Sustainable Development and is also regularly published in the Protected Planet Report) (Protected Planet Report, 2016));

10B. Biodiversity protected area: protected land area in % of land area of the country. The index is defined in Protected Planet Report;

11. Renewable Water Resources: annual water withdrawals in m^3 per capita as % of renewable water resources. Index is developed and regularly published by FAO (FAO, 2016);

12. Ecological Footprint: degree of human impact on the natural environment, which makes it possible to calculate the necessary size of the surrounding area for restoration of consumed environmental resources and absorption of waste products. The index is determined and regularly published by Global Footprint Network, an international nonprofit organization (The Ecological Footprint, 2020);

13. Energy Use: energy use in tons oil equivalents (toe) per person. The index is determined and published by International Energy Agency, IEA (IEA, 2020);

14. Energy Savings: 4-year energy consumption change index in %. The index is determined and published by IEA;

15. Greenhouse Gases: CO_2 emissions per capita per year. The index is determined and published by IEA;

16. Renewable Energy: consumption of renewable energy as % of total energy consumption in the country. The index is determined and published by IEA;

17. Organic Farming: area for organic farming in % of total agricultural area of a country. The index is determined and published by Research Institute of Organic Agriculture, FiBL (FiBL & IFOAM – Organics International, 2016);

18. Genuine Savings: Adjusted Net Savings as % of Gross National Income. The index is determined and published by WB (Hamilton, 2020);

19. GDP: integrated index, which is regularly determined and published by the International Monetary Fund, IMF based on analysis of Gross Domestic Product per capita, PPP and current international $ for each country of the world (IMF, 2020);

20. Employment: unemployment as % of total labour force of the country. The index is determined and published by WB (World Bank, 2020);

21. Public Debt: the level of public debt of a country as % of GDP. Index, which is regularly determined and published by the International Monetary Fund, IMF for each country of the world (IMF, 2015).

Today the general data of the Sustainable Society Foundation (SSF) include information on the specified rates for 154 countries of the world for 2006-2016 period, as well as progress over the past 10 years. It made it possible for us to summarize the current data on the rating of Ukraine according to the Sustainable Society Index (SSI) of the world countries for the specified period, which is provided in free access and present them in the (Table 2 and Figure 1).

Table 2: Analysis of Rating of Ukraine on the Sustainable Society Index of the world countries for the period 2006 - 2016:

Human Wellbeing						
Year	**2006**	**2008**	**2010**	**2012**	**2014**	**2016**
Rate	33	31	27	31	30	36
Environmental Wellbeing						
Year	**2006**	**2008**	**2010**	**2012**	**2014**	**2016**
Rate	106	98	97	102	102	85
Economic Wellbeing						
Year	**2006**	**2008**	**2010**	**2012**	**2014**	**2016**
Rate	44	44	48	61	102	130

Source: Own elaboration with the data from the official site (SSF, 2020).

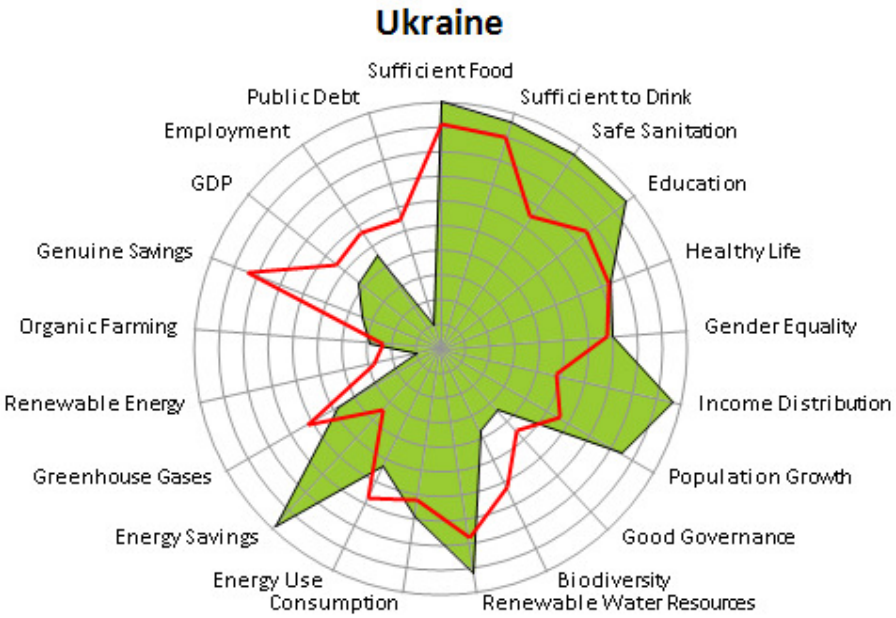

Figure 1: Rates of Ukraine on SSI Sustainable Development Indices
Source: elaboration with (SSF, 2020)

Information:

On the Fig.1 – the spiderweb shows the score of each of the 21 indicators of the country in green, on a scale of 1-10 (10=sustainable, 1=not sustainable). The red line is the weighted average score of all countries..

Worldwide Governance Indicators **(WGI) –** is another methodology that can be used to assess the overall sustainable development situation of each individual country in the world. A project initiated by the World Bank (WB) since 1996 presents aggregate and individual management success rates in selected countries across six key management ratings (indices):

- Voice & Accountability (*Note:* the Voice & Accountability rate records the extent to which citizens can participate in the election of their government, the state of freedom of speech, assembly and the media);
- Political Stability and Lack of Violence;

- Government Effectiveness;
- Regulatory Quality (*Note:* the Regulatory Quality indicator reflects the ability of the government to formulate and implement robust policies and procedures that enable and promote private sector development);
- Rule of Law;
- Control of Corruption.

The aggregative WGI rates combine the views of a large number of respondents with more than 30 organizations, institutions and experts, use more than 40 data sources relating to nearly 200 countries and are updated annually since 2002.

According to The Global Economy data, the average value of *the Voice & Accountability index* was – 0.03 points among the countries of the world for 2016. The largest value was in Norway: +1.58 points, and the lowest – in North Korea: – 2.13 points. Ukraine scored +0.02 points in this rating and took 100 place of 194 countries of the world.

The average value of *the Political Stability index* is 0.04 points. Singapore had the highest value: +1.53 points, and the lowest is in Syria: - 2.91 points. Ukraine scored - 1.89 points in this rating and took 183 place of 194 countries of the world.

The average value of *the Government Efficiency index* is 0.02 points. The largest value was in Singapore: +2.21 points, and the lowest – in Somalia: – 2.18 points. Ukraine scored – 0.58 points in this rating and took 131 place of 193 countries of the world.

The average value of *the Regulatory Quality index* is 0.03 points. Singapore had the highest value: +2.18 points, and the lowest is in North Korea: – 2.33 points. Ukraine scored – 0.43 points in this rating and took 120 place of 192 countries of the world.

The average value of *the Rule of Law index* is – 0.04 points. The largest value was in Sweden: +2.04 points, and the lowest – in Somalia: – 2.37 points. Ukraine scored – 0.77 points in this rating and took 147 place of 193 countries of the world.

The average value *of the Control of Corruption index* is – 0.04 points. The largest value was in New Zealand: + 1.3 points, and the lowest – in Guinea: –1.81 points. Ukraine scored – 0.84 points in this rating and took 153 place of 193 countries of the world (TheGlobalEconomy.com: Business and economic data for 200 countries, 2018).

Conclusions

Today, Ukraine is presented in more than three dozen various global world rankings which define our place among other countries of the world almost behind one hundred parameters characterizing a situation practically in all spheres of human activity. However, none of these generally recognized global ratings aims to carry out a comprehensive integrated ranking of the countries of the world according to the criteria of sustainable development, assessment of stability of the state and society, level of development of the security and defense sector, etc. There are no universal methods in the world that allow an objective comparative analysis of the place (rating) of Ukraine among other countries of the world in the context of realizing their own national interests and ensuring the sustainability of the state and society in the field of sustainable development.

In the context of the hybrid war launched by the Russian Federation not only against Ukraine, but against the rest of the civilized world (interference in the last election of the President of the United States, provoking a wave of illegal migration to the European Union, terrorist acts in Great Britain, etc.), our country and the international community demand urgently the development and introduction of a global comprehensive methodology for assessing the state of sustainability of states and societies in the sustainable development. The practical implementation of such a project undoubtedly will have a positive impact on the image of Ukraine on the world stage and will bring

our country to a qualitatively new level of international cooperation.

The existing experience of developing own (exclusive) methods of assessing the state of sustainable development in Ukraine shows that this process, despite a decade of history, does not have more or less logical completion, and then – practical implementation yet. At the same time, the main disadvantage is the lack of a unified approach to assessing the state of sustainable development, the subjectivity of the evaluation criteria, the lack of tools and financial support for constant monitoring. And even if we`ll ever be able to develop an exclusive system for assessing the state of sustainable development, the process of its recognition in the international arena seems rather problematic.

The proposed conceptual approach (scenario) for the development and introduction of a global integrated system for the assessment of the state of states in the sustainable development is consistent with the modern democratic principles of international cooperation, based on new public available tools, will not require additional financial costs and can be implemented as soon as possible. In addition, such an approach can be applied to the development of systems for assessing the national sustainability of the state, the capacity of the security and defence sector, etc.

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Urban Agriculture Management: Lesson Learned from Urban Farmer's Experience in Central Jakarta, Indonesia

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Abstract

This paper proposes that urban agriculture (UA) enables urban farmers to cope with issues of food, economic, and social insecurity, as well as lack of urban green space; therefore, it contributes to the practical efforts made towards sustainable urban development. In Jakarta, some programs and policies have been developed to manage existing UA practice. However, some practical gaps and environmental challenges are left unaddressed, thus limiting their performance in supporting and sustaining UA development. This study considers urban farmers' motivation to farm and their experienced benefits from farming as critical success factors in sustaining UA activities. This study was done qualitatively by employing focus group discussions and questionnaire surveys to identify and analyze urban farmer's motivation to farm and their experienced benefits from farming in Central Jakarta—the centermost municipality of Jakarta. Results revealed gaps in urban farmers' motivations and experienced benefits from farming that had not been addressed by the currently implemented UA policies. From therein, some entry points for policy development were discussed. It was concluded that with no novel approach and policy intervention, it will be increasingly challenging for urban farmers to sustain UA activities; this will also hinder UA's contribution to sustainable urban development.

Keywords: Urban Agriculture; Urban Development; Motivation; Perceived Benefits.

Introduction

Urban agriculture (UA) is defined as the activity of planting, processing and distributing food products through the cultivation of plants and animal husbandry in and around urban areas (Mougeot, 2006; RUAF Foundation, 2018; Zezza & Tasciotti, 2010). The integration of agricultural system into the urban environment through UA is considered to be a strategy that enables urban farmers to cope with societal challenges or urbanization such as: food, economic, and social insecurity, as well as lack of urban green space (Artmann & Sartison, 2018; Pemprov DKI Jakarta, 2018). As such, UA contributes to sustainable urban development (Artmann & Sartison, 2018; Cahya, 2016; De Zeeuw, Van Veenhuizen, & Dubbeling, 2011; Kutiwa, Boon, & Devuyst, 2010), that is defined in this study as a process of integration and co-evolution among the economic, social, environmental, and physical aspects that make up a city, which results in non-decreasing level of wellbeing in the long term, without compromising the chance for development of surrounding areas by reducing the harmful effects of urban development on the biosphere (Capello, 2017). Ecologically, UA creates green spaces in urbanized landscape (Mougeot, 2005; Zasada, 2011), creates ecosystem services, and enhances microclimate qualities (Akinnifesi et al., 2010; Deelstra & Girardet, 2000). Socially, participation in community gardening has been studied to increase community cohesion (Chan, DuBois, & Tidball, 2015; Säumel, Reddy, & Wachtel, 2019) and resiliency during times of crisis (Chan, DuBois, &

Tidball, 2015). In addition, there is a growing number of literature that correlates leisure farming with increased quality of life and personal well-being (Zasada, 2011) and more positive outlook in life (Mourão, Moreira, Almeida, & Brito, 2019). Economically, UA has been documented to provide opportunities to obtain alternative income (Aubry et al., 2012; Indraprahasta & Agustina, 2012) and reduce the risk of food insecurity through food production (Altieri et al., 1999; Maxwell, 1995).

It is widely acknowledged that UA's potential in reducing urban poverty and food insecurity is often critically limited by urban development and the rise of value in urban land markets (Badami & Ramankutty, 2015; Redwood, 2009; Zezza & Tasciotti, 2010). This study is also aware that UA is not likely to replace the role of conventional agriculture (Redwood, 2009). Nevertheless, it finds UA's economic abilities to build a safety net and to secure access to nutritious foods in low-income populations (Duchemin, Wegmuller, & Legault, 2009; Zezza & Tasciotti, 2010) remain relevant in the study site.

This study focuses on UA that is practiced within the intra-urban environment of Central Jakarta—the centremost municipality of Jakarta—one of the highly urbanized city in Asia. Historically, UA has been documented to provide various socioeconomic supports in response to times of food crisis in Jakarta and the Jabodetabek Metropolitan Area (JMA), particularly through its provision of food and nutrition security for the urban poor (Pribadi & Pauleit, 2015, 2016). Some programs and policies have also been developed to manage existing UA practice; however, some practical gaps and environmental challenges are left unaddressed, thus limiting their performance in supporting and sustaining UA development. This study seeks to update the existing UA developmental strategies due the importance of understanding variations in urban farmers and existing urban farming practice to allow efficient tailoring of incentives and policies (Indraprahasta & Agustina, 2012). Few studies have been conducted on the topic of urban farmer's relationship and influence over UA, particularly regarding UA in cities outside of the Global North. Therefore, this study adds to the literature with insights on needs-based assessment to support UA's development.

As a collective urban food movement, this study considers urban farmer's motivation to farm and their experienced benefits from farming as critical success factors in sustaining UA activities. Therefore, this study seeks to analyse urban farmer's motivation and experienced benefits in Central Jakarta. Procedures on data acquisition and analyses that were used in this study are summarized in the following Methods section. Lastly, the study results and discussion of urban farming motivation and benefits experienced by urban farmers can also be found in the Results and Discussion section.

Methods

This study was performed using qualitative approach to provide a more comprehensive understanding of the multifaceted nature of UA and sustainability issues. Data acquisition took place in Central Jakarta, the centermost municipality of Jakarta, particularly on sites where UA activities were previously recorded by the Department of Food Security, Maritime Affairs and Agriculture (*Dinas Ketahanan Pangan, Kelautan dan Pertanian*; DKPKP), one of several government agencies that managed existing UA and its related programs in Jakarta (Fig.1). Two methodologies were mainly used for this step: focus group discussions (FGD) and questionnaire survey. FGD sessions were performed with key urban farmers and representatives from DKPKP. On the other hand, questionnaires were distributed to urban farmers in the community via snowball sampling, which yielded 221 respondents that were later analyzed.

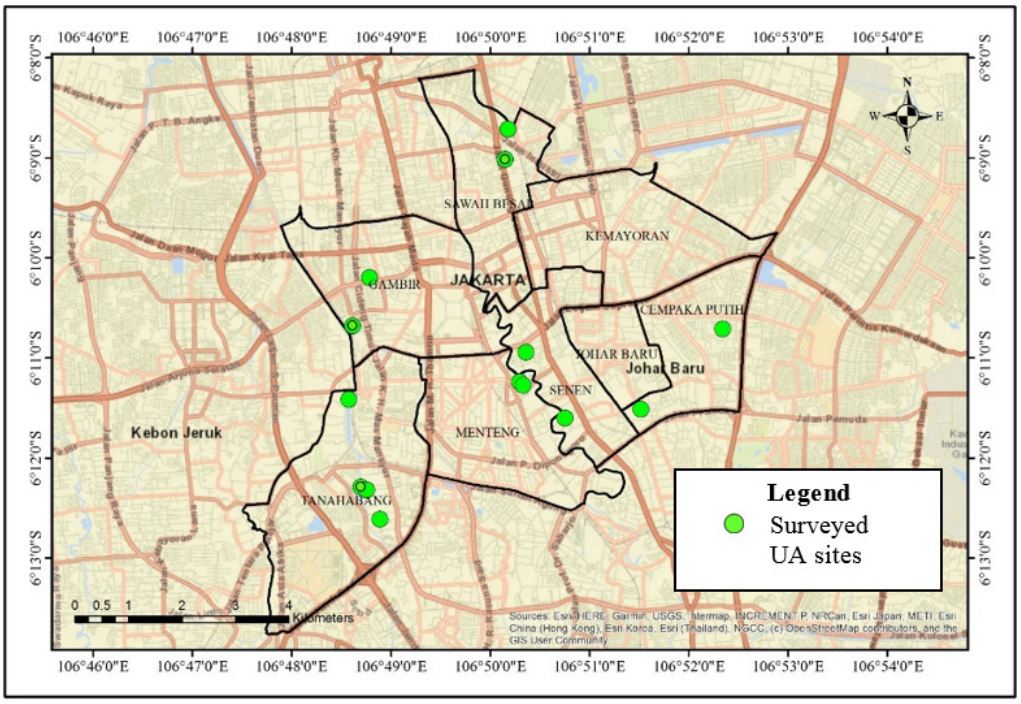

Fig. 1: Distribution of UA sites that were studied in Central Jakarta

Questionnaires

Questionnaires were distributed to identify and measure two main variables: motivations to farm and experienced benefits from farming. Two sub-variables of motivation were identified and analyzed using descriptive statistics: urban farmer's reasons to start farming and frequency of farming in a week. On the other hand, three sub-variables of experienced benefits were measured using Likert scale and analyzed with descriptive statistics: economic, social, and environmental benefits from farming.

Analysis

Z-score (standard score) (Equation 1) was used to compare the values of all three sub-variables of experienced benefits from farming (i.e., the economic, social, and environmental aspect of the experienced benefits). This analysis described the position of each sub-variable in terms of its distance from the mean value of experienced benefits from farming. Therefore, positive z-score indicated that the value of said sub-variable lied above the mean and was interpreted as greater expression of experienced benefit from that aspect relative to the average.

$$z_i = \frac{x_i - \mu}{\sigma}$$

……

(Equation 1)

Where:

z_i : Z-score for sample i

x_i : Mean of sample i

μ : Population mean

σ : Standard deviation of population

Results and Discussion

The observed UA sites mainly existed in public or communal spaces such as roadsides in residential areas, riverbanks, vacant lots, or integrated as part of green space area in several public parks. Insecure land tenure and limited space for farming are some limiting factors that are identified in previous studies (Purnomohadi, 2000; Sampeliling, Sitorus, Nurisyah, & Pramudya, 2012) and were also evident in UA sites Central Jakarta. Furthermore, soil contamination, pest, and insufficient sunlight exposure for planting were also prominent concerns. Table 1 summarizes the most common farming activities, which were practiced in small scales with hardy plant and animal species as a mean of adaptation to the lack of space.

Table 1: Frequency distribution of identified farming activities

Identified activity	Total % of respondent
Planting crops	34.2
Planting herbs or medicinal plants	25.5
Planting fruits	18.6
Transplantation	8.6
Aquaculture	6.3
Post-harvest processing	6.1
Raising poultry	0.6
Others	0.2

In addition, urban farmers also developed adaptive measures such as optimizing the use of vertical spaces and above ground planting with alternative planting media to adjust to the non-accommodating planting conditions (Fig. 2).

Fig. 2: Optimization of vertical space: (a) Planting fruit trees above open sewers in Gambir Sub-District (SD); (b) aquaponics system in Johar Baru SD; (c) medicinal plants planted in pots above open sewer in Sawah Besar SD

More than half (57.3%) of sampled urban farmers were involved in both individual and community gardening in the neighborhood; 37% only participated in community gardening; and 11.3% only participated in individual farming within their private property. Lack of space for home garden in urban farmer's private property was reported to be the main reason why some of them participated solely in community gardening. Some socioeconomic patterns were observed on-site; the location of UA sites greatly overlap with high-density residential areas with predominant low to middle income households and 56.5% of the studied respondents received income below the provincial minimum wage in 2019 (Rp3,940,973 per month), thus indicating a condition of financial insecurity shared among urban farmers.

Motivations to Farm

Access to fresh food was the most common reason that motivated urban farmers to start farming (17.1%), followed by farming as a hobby (15.8%), and environmental beautification (14.6%) (Table 2). Food production being urban farmer's primary motivation is consistent with findings from Maxwell (1995) and Zezza and Tasciotti (2010), which hold UA's role in securing nonmarket source of food of particular importance in the context of financial insecurity.

Table 2: Frequency distribution of reasons to start farming

Reasons	Percentage (%)	Category
Access to fresh food	17.1	Economic
Hobby	15.8	Social
Environmental beautification	14.6	Environmental
Socializing	12.8	Social
Improvement of environmental quality	11.2	Environmental
Self/community enrichment	9.7	Social
Grocery savings	6.4	Economic
Community education	6.1	Social
Additional income	5.3	Economic
Household waste management	1.1	Environmental

A major proportion of the sample (38.4%) reported that they tend to their crops/livestock every day (7 days a week) (Table 3), which may indicate high motivation to keep maintaining and sustaining UA activities in more than one third of the sample.

Table 3: Distribution of frequency of farming

Frequency of farming in a week	Percentage (%)
Every day (7 days)	38.4
Once a week	26.5
2-6 days/week	21.5
Less than once a week	13.7

Further cross-analysis with an FGD session suggested that variation in farming frequency may be influenced by the implementation of UA program in the community and the type of farming activities urban farmers were involved in (i.e., individual, community, or both). Informant 1, who was a key urban farmer who actively coordinated and participated in community gardening sessions in Sawah

Besar Sub-District, informed that UA program that was being implemented by the DKPKP in the local community also encouraged urban farmers to actively participate in community gardening,

> "(Aside from) watering and transplanting which I do together with my husband, I and the community gardening members also participate in *jumantik* (*juru pemantau jentik*; *Aedes aegypti* mosquito larvae monitoring as a method of dengue fever prevention) and post-harvest processing activities once a week every Friday." (Informant 1)

This session also informed that community gardening were held once a week along with other communal activities that were relevant in the local community. Therefore, urban farmers who solely participated in community gardening due to their involvement in these communal activities had a tendency to farm less frequently (Table 4). On the other hand, those who participated in both individual and community gardening activities tend to farm more frequently and consistently (Table 4).

Table 4: Crosstab analysis between frequency of farming and types of UA activities

Frequency of farming	Types of UA activities			Total
	Individual	Community	Both	(Urban farmers)
Less than once a week	3	22	3	28
Once a week	5	20	30	55
2-6 days/week	1	14	30	45
Every day (7 days)	3	20	57	80

Informal interviews with DKPKP representatives and key urban farmers further confirmed that currently there was a lack of enthusiasm from the community gardening members to participate more actively and consistently. This may also explain the greater incidence of inconsistency in farming frequency (i.e., greater proportion of urban farmers that farm less than once a week) in urban farmers who solely participate in community gardening activities relative to the other two groups. Given that frequency of farming is considered as one of key sub-variables that express urban farmer's motivation to sustain farming, it can be concluded that high motivation to sustain UA is not expressed equally among urban farmers in the community.

The currently implemented UA program's integration to other communal activities has been functioning as an entry point strategy for extending farming opportunities in the community. However, alternative approach needs to be developed to increase community's enthusiasm and need for UA beyond the weekly communal activities. To do so, this study suggests further efforts to be made firsthand to address the underlying issues of insecure land tenure and lack of space for farming to make farming accessible for all.

Experienced Benefits from Farming

Analysis of perceived benefits from farming using Z-score analysis showed that urban farmers particularly experience the social aspect of farming the most and the economic aspect the least (Table 5). Further analysis confirmed that in exception of some success stories, the agricultural production of urban farmers was often minimal. This result deviates from previous studies by Kutiwa et al. (2010) and Mougeot (2006), which attribute UA's economic benefits to its potential to create jobs and generate additional income among urban farmers in developing countries.

Table 5: Comparison of values of economic, social, and ecological aspects of experienced benefits

Aspects of Experienced Benefits	Number of Response	Minimum Value	Maximum Value	Mean	SD	Z-Score
Social	208	14.00	25.00	20.13	2.46	1.07
Ecological	214	10.00	20.00	17.10	1.86	0.26
Economic	144	6.00	15.00	11.18	1.72	-1.33

Further cross-analysing with FGD results indicated few interest for farming and greater demand for non-agricultural land use in the community, which may indicate other sector's greater potential in supporting livelihood.

> "This used to be an empty lot…which was used by the neighbors to park their (peddling) carts, for peddling, and other means of self-interest. Then, with the help of both village and district chiefs, a garden was built (in the empty lot)… That time we managed to (get the place) tidied up, but now the neighbors have attempted (to use the space)… for drying clothes again… they view that space as an opportunity for (gaining) income, (considering) previously (that empty lot) used to be a food stall, a barber shop, and a parking space for peddling carts." (Informant 1)

This session informed that there were repeated attempts by some community members to reclaim the lot back as a functional aspect of their livelihoods. It is possible that aside from urban farmers, the community does not experience direct benefits from the existence of UA, hence the evident lack of interest and support. However, further study needs to be done to better understand non-practitioner's perception of UA and the resulting dynamics UA has on the non-practitioner side of the community.

This study finds that in order to bring forth UA's optimal benefits, it is imperative for UA to be adjusted to the biophysical and sociocultural needs of the community. Following previous study by Reuther and Dewar (2006), the evident lack of UA's role in poverty alleviation may indicate that UA is not economically feasible to be implemented in the studied sites. Urban development and the rise of value in urban land markets have been identified to limit UA's economic performance (Badami & Ramankutty, 2015; Redwood, 2009; Zezza & Tasciotti, 2010). Even so, this study wants to bring focus to UA's potential in providing safety net as evident in reported income shares from farming or contribution to savings on grocery. It can be concluded that increasing the economic aspect of UA's experienced benefits may positively influence UA's appeal and sustainability in the community.

Conclusion

This paper set out to analyse urban farmer's motivation to farm and their experienced benefits from farming. The study found that UA was mostly practiced in high-density residential areas with predominant low to middle income households. Access to fresh food was found to be the most common reason for urban farmers to start farming and this is of particular importance given the context of financial insecurity in the studied site. Variation in farming frequency may be influenced by the implementation of UA program in the community and the type of farming activities urban farmers partake in (i.e., individual, community, or both). The current UA program's approach needs to be developed to increase community's motivation to sustain UA program and activities; to do so, this study finds it imperative to primarily address the underlying issues of land tenure and space for farming. Z-score analysis showed that urban farmers particularly experience the social aspect of farming the most and the economic aspect the least, which may indicate UA's lack of economic feasibility in the studied sites. In order to optimize UA's benefits and ensure its sustainability, this paper suggests further adjustments to be made on UA practice to suit the biophysical and sociocultural needs of the community.

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Computational Algorithm and Method in Solving Problems of Heat-Insulated Structural Elements

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Abstract

A numerical study of the thermomechanical state of rods of variable cross section in the presence of local temperature, heat flux, thermal insulation, heat transfer, and axial forces is of interest for technology and technological processes related to the strengths of elements of partially insulated structures.The rapid development of the processing of natural wealth, which faced scientists with new problems in developing adequate mathematical models of universal computational algorithms and methods, allowing a comprehensive numerical study of the thermoelastic state of partially heat-insulated structural elements of variable cross-section working in a complex thermal and force field. The relevance of these problems is also motivated by the fact that many structural elements of variable cross section work under the simultaneous action of tensile (compressive) axial force, local temperature, heat flux, heat transfer and thermal insulation.

Keywords: Heat Flow, Heat Transfer, Thermal Expansion, Thermal Conductivity, Heat Transfer, Elastic Modulus, Thermal Insulation.

Introduction

Load-bearing elements of a modern gas power plants, nuclear and thermal power plants, hydrogen and jet engines, internal combustion engines, installations of deep processing of mineral raw materials and oils work in complex power and thermal field. Reliable operation of the above installations will depend on thermal strength characteristics of their load-bearing elements. As bearing elements was considered rods of limited length and of constant cross section [1][2]. In these problems, based on fundamental laws of thermal physics [3] defined the field of temperature distribution along the length of the rod of limited length, taking into account existing types of heat sources. Other similar problems are considered in works [4-6]. In these works, the authors limit the definition of the law of temperature distribution along the length of the rod depending on the types of specified sources. In contrast, in this paper as the load-bearing element of construction is considered a horizontal rod of limited length and a constant cross-section. Thus the lateral surface of the rod is completely thermally insulated. The cross-sectional area of the left end is supplied with heat flux of constant intensity. Through the cross sectional area of the right end occurs heat exchange with the

environment. In the simultaneous presence of diverse types of heat sources in the bearing elements of the strategic structures arise axial compressive stress: the field distribution of displacements, elastic, temperature and thermoelastic components of the deformations and corresponding stresses. In this regard, development of fundamental methods for deep exploration of complex thermo-physical conditions of load-bearing structural elements is an actual problem of applied physics.

In this task, using the fundamental laws of conservation of energy [1] are defined:

- the law of temperature distribution along the length of the considered rod;
- the value of thermal lengthening;
- the value of the axial compressive force;
- the laws of distribution of elastic, thermal and thermo elastic components of deformation and stress;
- the displacement field [2].

The output of allowing equations

Considered a horizontal rod of limited length L [cm], the cross-sectional area of which is F [cm2] constant along its length. The cross sectional profile of the rod can be round, rectangular, triangular, polygonal, etc. Thermophysical material properties of the rod are characterized by the coefficient of thermal expansion of the material of rod α [1/°C], thermal conductivity κx [$\frac{W}{cm*°C}$] and a modulus of elasticity E[$\frac{kg}{cm^2}$].

The cross-sectional area of the left end of the sample rod, supplied with heat flux q [$\frac{W}{cm^2}$]. In summing up the heat flow to the local surface, its value may be negative, i.e. q<0. Through the cross-sectional area of the right end of convective heat exchange with its environment. The heat transfer coefficient h [$\frac{W}{cm^2°C}$], and the surrounding temperature $T_{°C}$[°C]. It is required from the beginning to determine the law of temperature distribution along the length of the researched rod depending on the form of the existing heat sources, geometrical and thermo physical characteristics of the rod. To do this, first construct the local approximation quadratic spline function [3].

Calculation scheme of the considered problem is shown in figure 1.

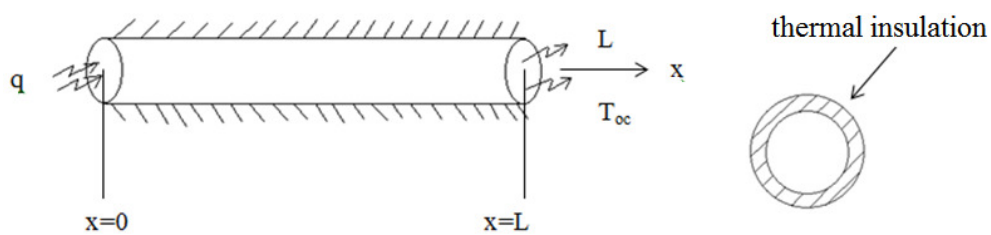

Figure 1: The calculation scheme of tasks

Let us assume

$$T(\mathrm{x}=0)=T_i;\ T\left(x=\frac{L}{2}\right)=T_j;\ T(x=L)=T_k \tag{1}$$

The law of temperature distribution along the length of the researched rod we approximate full second-order polynomial spline functions [4]

$$T(x)=ax^2+bx+c=\varphi_i(x)\,T_i+\varphi_j(x)T_j+\varphi_k(x)T_k;\ 0\le x\le L \tag{2}$$

where

$$\varphi_i(x) = \frac{2x^2-3Lx+L^2}{L^2};\ \varphi_j(x) = \frac{4Lx-4x^2}{L^2};\ \varphi_k(x) = \frac{2x^2-Lx}{L^2};\ 0 \le x \le L \qquad (3)$$

Now for the investigated problem we write the functional which characterizes the law of conservation of energy [5].

$$J = \int_{S(x=0)} qTdS \int \quad + \int_V \frac{kxx}{2}\left(\frac{\partial T}{\partial x}\right)^2 dV + \int_{S(x=L)} \frac{h}{2}(T - T_{0C})^2 dS\ , \qquad (4)$$

It should be noted that the dimension of each member is [W°C]. This is the work done by temperature, by analogy, the work force [kg*cm]. Physical considerations are:

$$J_1 = \int_{S(x=0)} q * TdS = FqT_i \qquad (5)$$

$$J_3 = \int_{S(x=L)} \frac{h}{2}(T - T_{0C})^2 dS = \frac{Fh}{2}(T_k - T_{0C})^2 \qquad (6)$$

To calculate the volume integral in the expression (4), it is necessary to determine the temperature gradient

$$\frac{\partial T}{\partial x} = \frac{\partial \varphi_i}{\partial x}T_i + \frac{\partial \varphi_j}{\partial x}T_j + \frac{\partial \varphi_k}{\partial x}T_k = \frac{4x-3L}{L^2}T_i + \frac{4L-8x}{L^2}T_j + \frac{4x-L}{L^2}T_k,\ 0 \le x \le L \quad (7)$$

Next, substituting (7) in the expression J, and using the known formula

$\int_V f(x)dV = F\int_0^L f(x)dx$, we get

$$J_2 = \int_V \frac{k_x}{2}\left(\frac{\partial T}{\partial x}\right)^2 dV = \frac{Fk_x}{\partial x}(7\,T_i^2 - 16T_iT_j + 2T_iT_k - 16T_jT_k + 16T_j^2 + 7T_k^2) \qquad (8)$$

Then the functional of total thermal energy is:

$$J = J_1 + J_2 + J_3 == FqT_i + \frac{Fk_i}{\partial x}\left(7\,T_i^2 - 16T_iT_j + 2T_iT_k - 16T_jT_k + 16T_j^2 + +7T_k^2\right) + \frac{Fh}{2}(T_k - T_{0C})^2 \qquad (9)$$

It should be noted here that to determine the values of T_i, T_j и T_k we can obtain a system of linear algebraic equations, which takes into account all existing natural boundary conditions, varying J throughT_i, T_j and T_k.

$$\left.\begin{array}{ll} 1) & \frac{\partial J}{\partial T_i} = 0;\ \rightarrow Fq + \frac{Fk_x}{6L}(14T_i - 16T_j + 2T_k) = 0 \\ 2) & \frac{\partial J}{\partial T_j} = 0;\ \rightarrow \frac{Fk_x}{6L}(-16T_i + 32T_j - 16T_k) = 0 \\ 3) & \frac{\partial J}{\partial T_k} = 0;\ \rightarrow \frac{Fk_x}{6L}\left(2T_i - 16T_j + 14T_k\right) + FhT_k - FhT_{0C} = 0 \end{array}\right\} \qquad (10)$$

From where we receive

$$\left.\begin{array}{l} 7T_i - 8T_j + T_k = -\frac{3Lq}{k_x} \\ T_i - 2T_j + T_k = 0 \\ 7T_i - 8T_j + 7T_k + \dfrac{3Lh}{k_x}T_k = \dfrac{3LhT_{OC}}{k_x} \end{array}\right\} \qquad (11)$$

Solving the system (11), we define

$$T_i = T_{OC} - \frac{q}{h} - \frac{Lq}{k_x};\ T_j = T_{OC} - \frac{q}{h} - \frac{Lq}{2k_x};\ T_k = T_{OC} - \frac{q}{h} \quad (12)$$

Next, substituting (12) into (2-3), we define the law of distribution of temperature along the length of the researched rod taking into account the simultaneously presence of insulation, heat flow and heat transfer. It will have the following form:

$$T = T(x, T_{OC}, q, h, L, k_x) = \left(T_{OC} - \frac{q}{h} - \frac{qL}{k_x}\right) + \frac{q}{k_x}x;\ 0 \le x \le L \quad (13)$$

This shows that in our case the law of temperature distribution along the length of the rod is linear.

The definition of the thermal state of the rod

Now, we will solve the next task. Due to the presence of the temperature field, the test rod will be extended. Required to determine the amount of lengthening depending on the simultaneous presence of heterogeneous heat sources. For this, assume that the left end of rod rigidly clamped is and right - free. From the general laws of thermodynamics [5] it is known that the value of lengthening rod from field temperature is determined as follows:

$$\Delta l_T = \int_0^L \alpha T(x)dx \quad (14)$$

If we assume that α=const, we have

$$\Delta l_T = \int_0^L \alpha T(x)dx = \alpha L(T_{OC} - \frac{q}{h} - \frac{qL}{2k_x}) \quad (15)$$

We will consider a case where both end of the researched rod are rigidly fixed, it can neither be lengthened nor shortened. In this case there is axial compressive force R[kg]. We define it as the solution of statically indeterminate tasks and at the same time use compatibility conditions of deformation:

$$\frac{RL}{EF} + \Delta L_T = 0 \rightarrow R = -\frac{\Delta L_T EF}{L} = -\alpha EF(T_{OC} - \frac{q}{h} - \frac{qL}{2k_x}) \quad (16)$$

After, this is easily determined the following solution, the definition of the emerging field of thermo-elastic stresses $\sigma\left[\frac{\text{кГ}}{\text{см}^2}\right]$. It is determined according to the generalized Hooke's law: [9]

$$\sigma = \frac{R}{F} = -\alpha E(T_{OC} - \frac{q}{h} - \frac{qL}{2k_x}) \quad (17)$$

This shows that the field distribution of the thermo-elastic component of the stress σ will be straight line that is parallel to the axis of the rod and the ox axis.
Again applying the generalized Hooke's law, we find the solution of determining the field of thermo-elastic deformation of the component

$$\varepsilon = \frac{\sigma}{E} = -\alpha(T_{OC} - \frac{q}{h} - \frac{qL}{2k_x}) \quad (18)$$

From the solution it is clear that it is linear and parallel to the axis ox.

If we consider that q<0, then from (16-18) shows that R, σ and ε will only have compressive nature.

Then using the fundamental laws of thermodynamics, it is possible to solve the following problem of determining the field of temperature deformation of the component

$$\varepsilon_T(x) = -\alpha T(x) = -\alpha\left[\left(T_{OC} - \frac{q}{h} - \frac{qL}{k_x}\right) + \frac{q}{k_x}x\right], \quad 0 \le x \le L \qquad (19),$$

This shows that ε_T- will have a compressive nature, and the field distribution is linear.

Using the generalized Hooke's law, we will define the following, when the distribution of temperature field of the stress component has the following form:

$$\sigma_T(x) = E\varepsilon_T(x) = -\alpha E\left[\left(T_{OC} - \frac{q}{h} - \frac{qL}{k_x}\right) + \frac{q}{k_x}x\right], 0 \le x \le L \qquad (20)$$

it is clear that it is linear and contractive nature.

The field of elastic deformations we define the components of the fundamental law

$$\varepsilon_x(x) = \varepsilon - \varepsilon_T(x) = \frac{\alpha}{k_x}\left(-\frac{qL}{2} + qx\right) = \frac{q\alpha}{k_x}\left(-\frac{L}{2} + x\right), \qquad (21)$$

This shows that $\varepsilon_x(x)$ is linear. On the section $0 \le x \le \frac{L}{2}$, it has tensile nature. In the cross-section is x=$\frac{L}{2}$, $\varepsilon_x\left(\frac{L}{2}\right) = 0$. Further it has a compressive character.

Follows from Hooke's law

$$\sigma_x(x) = E\varepsilon_x(x) = \frac{q\alpha E}{k_x}\left(-\frac{L}{2} + x\right) \qquad (22)$$

His character is the same as for $\varepsilon_x(x)$.

Now, finally, we solve the tenth problem of determining the displacement field U(x). It is determined from the ratio of the Cauchy

$$\varepsilon_x = \frac{\partial U}{\partial x} = \rightarrow U(x) = \int \varepsilon_x(x)dx = \frac{q\alpha}{k_x}\left(-\frac{L}{2}x + \frac{x^2}{2}\right) + C, \text{ где C=const.}$$

The value of the constant will determine from the condition of clamped both ends, i.e. U(x=0)=U(x=L)=0. Then C=0 and the displacement field has the following form:

$$U(x) = \frac{q\alpha x}{k_x}\left(\frac{x}{2} - \frac{L}{2}\right), \quad 0 \le x \le L \qquad (23)$$

In this section, from the area $0 < x \le L$, moves in the direction of *Ox*.

Of course, clamped the ends do not move, i.e. U(x=0)=U(x=L)=0.

Conclusion

Based on fundamental laws of conservation of energy developed computational algorithm and method of the study established thermo-physical state of a thermally insulated rod of limited length in the simultaneous presence of heat flow and heat transfer. It is revealed that the distribution laws of the temperature, elastic and thermal components will be linear; the values of the thermo elastic component of strain and stress will be permanent. The distribution law of displacement will have a quadratic character, and all sections of the rod will move from left to right if q<=0.

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The Concept of a Scientist in The Representations Of Students of a Russian University

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Abstract

Great attention is being paid to the problems of the development of science and state support for the involvement of young people in the scientific activity in the Russian Federation. Science is one of the important mechanisms for the development of society and the state. Thus, the role of the higher education system in the training of highly qualified and competitive specialists who can make up the human resources of science in the country is growing. Among the urgent problems of modern Russian science are obsolescence of scientific personnel, violation of the continuity of generations of scientific traditions. It determines the special social significance and relevance of the scientific search in the field of psychological and pedagogical mechanisms for involving young people in research activities, their activation, the formation of positive motivation for research work in higher education. The paper focuses on the approaches to the consideration of research activities in psychological science; motivation of scientists and university students involved in research work; sources and mechanisms of interest formation, motivation of research activities among students. The analysis of scientific sources has revealed that the perception of science, scientific activity, and the image of a modern scientist can also become a significant factor inhibiting or activating the interest of young people in participating in scientific work. The aim of the study is to study the image of a scientist in the representations of students of a Russian university. 230 students involved in research activities of a regional Russian university have taken part in the empirical study. It has studied the ideas about modern problems of science, the image of a scientist and motivation for scientific activity of famous scientists of the country and region. A comparative analysis has been conducted between groups of university students, differing in the degree of activity and effectiveness of participation in research activities, involvement in the scientific environment. The work highlights the experience of a regional Russian university in popularizing science, enhancing the research activities of students, including raising the awareness of university students about modern scientists through organizing various meetings and master classes with scientists. It gives information about the achievements of science and higher school teachers as research scientists.

Keywords: The image of a scientist, the image of science, representations of the students, motivation for research activities, Russian regional university**.**

Introduction

Science is one of the important mechanisms for the development of society and the state, in connection with this, the role of the higher education system in training highly qualified and competitive specialists who can make up the human resources of the country's science is growing.

Great attention is being paid to the problems of the development of science and state support for the involvement of young people in the scientific activity in the Russian Federation. The measures taken in Russia over the past decade to attract and consolidate young people in the scientific field are yielding results: the age structure of researchers has become more balanced. According to statistics for 2017, the proportion of researchers under the age of 29 was 18.4%, from 30 to 39 years old - 25.4%, from 40 to 49 years old - 14.2%, 50 - 59 years old - 16.6%, 60 - 69 years 16%, 70 years and older - 9.3% (Indicators of science, 2019).

There was a quantitative and qualitative decline among the scientific staff; the number of scientific personnel was reduced with a deterioration in their age structure, age-related imbalances in the scientific staff caused by the difficult demographic situation, the aging of the scientific and pedagogical staff of the higher education system, and the violation of the continuity of scientific schools (Volodina, E. D., 2014; Allahverdyan A.G., 2014).

Scientists note that in the personnel structure of modern scientific institutes the middle-aged layer of scientific workers has been "lost", respectively, the continuity of scientific traditions and scientific thinking was interrupted. As a result, young researchers for the most part do not have the necessary knowledge, skills, methods of scientific thinking, and a value base for carrying out scientific activities as a professional (Razina T.V., 2014).

But the situation in this area is still complicated, which determines the special social significance and relevance of the scientific search in the field of psychological and pedagogical mechanisms for involving young people in research activities, their activation, the formation of positive motivation for research work in the higher education system.

D. Berlyne, C. Hutt, H. Keller, H.-G. Voss have studied the psychological problems of scientific activity abroad that are devoted to the problems of research behavior. The isssues of social factors of a scientific career are studied by G.J. Feist (Feist G.J., 2006), values and ethical-moral aspects of scientific activities are shown by L. Tondl (Tondl L., 2001), M. W. Martin (Martin M.W., 2006), the psychological phenomena of scientific thinking are observed by J.J. Clement (Clement J.J., 2008).

An analysis of foreign scientific sources shows that the perception of science, scientific activity, and the image of a modern scientist can also become a significant factor that inhibits or activates youth's interest in participating in scientific work.

One of the common areas of research in the field of studying science and scientific activity is research on the perception of scientists by different groups of the population, including differences depending on gender, culture and socio-economic status (Christidou V., 2011).

For this purpose, children's drawings are often used, including the Draw-a-scientist-test (DAST). It was found that children have stereotypical ideas about scientists. Since the 1950s the image of scientists as older men in white coats and glasses, working in the laboratory alone are shown in studies as the stereotypical concept of scientists, (Chambers, 1983; Fung, 2002; Newton & Newton, 1998; She 1995, 1998; Song, Pak & Jang, 1992). Over time the problem began to change in several countries. (Milford & Tippett, 2013; Fralick, Kearn, Thompson, & Lyons, 2009). For example, in a study in the United States and China, in which 1350 Elementary school children took part, about 35% of female scientists appeared in children's drawings (Farland-Smith, 2009). The same study also identified changes in stereotypical representations of Chinese schoolchildren associated with robots.

A number of researchers suggest that children's attitudes toward science are largely dependent on their perceptions of science. Studies show that most young children have a positive attitude towards science at the age of 10, but then this interest decreases sharply, and by the age of 14, their attitude and interest in studying science has largely changed (Archer, L., DeWitt, J., Osborne, J., Dillon, J., Willis, B., & Wong, B., 2010).

A study by Narayan R. et al. (Narayan R., Park S., Peker D., Suh J., 2013) compared the views of 1800 students from five different countries (China, India, South Korea, Turkey and the USA) about science and scientists reflected in their drawings using a modified version of the Drawing-A-Scientist-Test. In all countries, the results showed that lower levels of education have fewer stereotypical perceptions than higher ones. It was shown that in any country, participants' perceptions of scientists were not related to their choice of profession.

A study of Thomson MM, Zakaria Z., Radut-Taciu R. (2019) of the young school children from Romania enrolled in both rural and urban public schools showed that most children represented stereotypical characteristics of scientists in their drawings such as white male wearing lab coats using instruments that reflected a chemistry lab.

In a study (Buldu M., 2006) of the perception of scientists by children aged 5 to 8 years in Turkey it has been revealed that such perception differs depending on age and socio-economic status.

In a study by El Takach S., Yacoubian H.A. (El Takach, S. & Yacoubian, H.A., 2020), conducted in Lebanon using the Draw-a-scientist-test (DAST), teachers (middle school chemistry teachers) and their students were involved. The results showed that a stereotypical view of a male scientist working in the laboratory and conducting experiments mainly in chemistry is widespread. The participants had a positive attitude towards scientists, many students, as a rule, had a positive attitude towards a career in science and technology. Interestingly, elementary school students had more diverse images of scientists, and stereotyping of images increased among high school students, becoming more similar to the images of their teachers. Among the preferred names of the scientists presented by the students, there were no modern scientists and women scientists.

A study by Miller D. et al (Miller D., Eagly A., Linn MC, 2014) conducted in 66 countries among 350,000 participants showed that, despite the fact that over the past 40 years, the proportion of women in science has increased significantly in most countries, gender-scientific stereotypes, as before, associate science with men more than with women. The work revealed that gender stereotypes in the perception of science are still strong even in countries with small gender differences in participation in scientific activities.

In a study by Fralick B., Kearn J., Thompson S., et al. in the United States 1600 middle school students from urban and suburban schools in the southeastern United States took part. The results show that students participating in this study most often perceive scientists as working indoors and conducting experiments. It has been revealed that the ideas of young students about engineers and scientists often inhabit misconceptions and stereotypes (Fralick B., Kearn J., Thompson S., et al., 2009).

Scientists and university professors today are forced to think about how they perceive natural and technical sciences in society, in particular, about what kind of science dominates the minds of an educated and not very educated public (Sismondo S., 2010).

The scientific work of A.G. Allahverdyan (Allahverdyan A. G., 2014), A.V. Yurevich, M.G. Yaroshevsky (Allahverdyan A.G., Moshkova G.Yu., Yurevich A.V., Yaroshevsky M.G., 1998); Yurevich A.V., 2013; Yurevich A.V., Tsapenko I.P., 2010), T.V. Razina (2016), A.L. Mazaleckaya (2011), Yu. S. Medvedeva (Medvedeva Yu. S., 2015), T.V. Ogorodova (Ogorodova T.V., Medvedeva Yu.S., 2013), Bokhan T.G., Alekseeva L.F., Shabolovskaya M.V., Moreva S.A., Kuznetsova T. M. (2014), Boyarkina, S.I., Ivanov, E.A., Tucuman, B.G. (2015), Edronova V.N., Ovcharov A.O. (2013) is devoted to the study of the psychological characteristics of research activities in modern Russian psychology.

An analysis of scientific sources on the problem of psychological characteristics has showed that the research activities of university students are one of the most significant components of the training of a future specialist. This is due to the fact that this type of activity is one of the main in higher education and contributes to the development of students' competencies.

There are several approaches to the consideration of research activities in psychological science. Of particular interest is the personality of a student engaged in research work in the process of obtaining higher education, a system of motives and incentives, creative abilities. Searches for sources and mechanisms of interest formation, motivation of students' research activities, are being studied, relevant forms of participation in scientific work are studied.

However, it should be noted the lack of research on the psychological characteristics of the research activities of students in universities of the regions of the Russian Federation.

Earlier, we have already considered the problem of the relationship between the features of the research activities of university students with their motivation for studying at the university and personal creativity (Zakharova A.N. et al, 2020).

One of the least disclosed topics, in our opinion, is the problem of social ideas about the science and scientific activity of university students.

One of the least disclosed topics in Russian science, in our opinion, is the problem of social ideas about science and the scientific activity of university students.

Scientists have revealed the existence of vivid dynamics of the image of science, which can be associated with the continuous acceleration of the development of scientific thought, the rapid expansion of the scientific knowledge, changes in the social context of the functioning of the institute of science, the complexity of the forms of interaction between science and society, as well as the specifics of the practical request, which is important for theoretical understanding of socio-psychological problems in general (Razina T.V., Volodarskaya E.V., 2017; Volodarskaya E.V., Razina T.V., 2017; Tsvetkova N.A., Petrova E.A., Gorshkova V.V., 2017).

The image of the scientist is evolving in the European historical and cultural tradition. Scientists have shown that the public perception of the scientist's personality and the social role played by him have historically changed with the development of science and society (Matyash, Matyash, 2015).

Scientists prove the relevance of studying the image of the ideal scientist among modern young Russians to understand the formation of their professional preferences and the desire to engage in scientific activities in modern conditions of science.

In the article M. I. Mikeshin discusses the problem of the widespread everyday, "standard" idea of science and scientific activity, characteristic of people who receive education in Russia. This idea is based on the collective practices of everyday, educational, scientific and is not the result of only personal experience. A popular image has the property of normativity, i.e., serves to create a single space of principles and standards of the community (Mikeshin M.I., 2018).

Boyarkina S.I., Ivanova E.A., Tukumtsev B.G. came to the conclusion that the ideas of the young generation are dominated by idealized images of scientific activity and qualities that a scientist should possess. The authors suggest that these representations may be due to parental influence or stereotypes (Boyarkina S.I., Ivanova E.A., Tukumtsev B.G., 2010).

In the study of the image of science in the students' view, carried out using the method of incomplete sentences, the authors have revealed the degree of influence of various factors (training course, university specialty) on the formation of the image of science of modern students. Students of humanitarian specialties assign a dominant role in the development of science to a person, personality, specialist. Representatives of technical specialties pay more attention to the material and technical base when highlighting factors for the development of science. As a result of the study, 4 generalized categories were identified that make up the image of science and the scientist: the social

functions of science, the social factors of the development of science, the image of the scientist, the attitude of students to science. The most significant generalized categories turned out to be “Social Functions of Science” and “Attitude of Students to Science”, which are directly related to the concept of “science”. Such trends are observed in all categories of students regardless of the course or faculty (Razinskaya V.D., Zhiryakova E.S., Kuzminova N.V., 2013).

The structurally meaningful special features of the scientist's image among students and working youth, and the factors that determine it (Razina T.V., Volodarskaya E. A., 2017) were established. The image of an ideal scientist is characterized by cognitive (ability to formulate a problem, express one’s thoughts, resistance to uncertainty, discipline of thinking) and personal (determination, determination, principle, focus on results, high efficiency, versatility, originality, rich imagination) qualities. The conclusion is drawn about the substantial similarity of the images of the ideal scientist among working and studying youth, and the differences in its image-forming basis.

The purpose of the study was the study of ideas about science and scientific activity, the image of a scientist, among students of a Russian university involved in research activities.

Research Methods

Research methods are analysis of scientific sources, questionnaires, methods of mathematical and statistical data processing.

Based on the analysis of scientific sources, a questionnaire was compiled to determine the attitude of university students to research activities, their personal interest in scientific work, the image of a scientist, opinions on modern problems of science, knowledge of famous scientists of their country and region.

To process the obtained results, a mathematical-statistical method was used, including descriptive statistics, a T-test for the significance of student differences.

The study involved students from a university in Cheboksary, Russian Federation, engaged in research activities. The total number of respondents is 230 people aged 18 to 24 years.

Based on the survey, all participants have been divided into two groups. The criteria for dividing into groups has been the answers to questions devoted to identifying the degree of student participation in research activities (NID), the effectiveness of NID, the experience of using scientific knowledge.

The first group - “Active members of the NID” (N = 150) are participants of the Student Scientific Society of the university who make presentations at conferences, participate in olympiads and competitions, have publications in collections of scientific papers, become laureates, winners and prize-winners at various conferences, olympiads and competitions.

The second group has received the name - “Less active participants in the NID” (N = 80) - these are university students who have taken part in scientific student events less effectively, less often became winners and winners until they published the results of their research activities.

Results

According to the question "Why do people engage in scientific activity, become scientists?" (Tab. 1) it turned out that the ideas of university students about the image of a scientist is curiosity, readiness to engage in creative, innovative, creative activity, which is of high importance at the state level.

Table 1: Answers of university students - participants of the NID to the question "Why do people engage in scientific activity, become scientists?",%

Answer Options	General	Active participants in the NID (N = 150)	Less active participants in the NID (N = 80)
I like it, it is interesting	70	68.7	72.5
Desire to invent / learn new	13.5	10.7	18.8
Develop our country / science	15.2	19.3	7.5
Material benefit	0.9	0.7	1.3
Prestige, fame	0.4	0.7	0

Material incentives and motives of public recognition are less significant than the scientific activity itself. It can be noted that the choice of "desire to invent or learn new things" and "development of the country / science" has been made by university students who are actively involved in scientific research.

Based on the answers to the question "What are the main problems of modern science, you can name?" (Tab. 2) it has been revealed that most university students note a combination of internal and external factors. According to students, people these days lack personal interest, involvement, perhaps curiosity, and confidence in personal material well-being to engage in research work. This assumption is relevant in the midst of the younger generation, university students, since at this age stage, professional self-determination and entry into an independent adult life take place. So, individuals who decided to build a scientific career, according to the respondents, leave their homes in search of a more paid and technologically comfortable place of work, including abroad.

Table 2: Answers of university students - participants of the NID to the question "What are the main problems of modern science you can name?",%

Answer Options	General	Active participants in the NID (N = 150)	Less active participants in the NID (N = 80)
Lack of funding	50.9	49.3	53.8
People are not interested in scientific work	11.7	12.0	11.3
Lack of personnel	10.9	14.7	3.8
Brain drain to other countries	8.7	6.0	13.8
Outdated equipment	6.5	7.3	5.0
Low level of education	3.5	2.7	5.0
Excessive commercialization of science	3.5	4.0	2.5

Not enough youth (qualified personnel) in science	1.7	2.7	0.0
Unclaimedness of scientists in the labor market	1.3	0.0	3.8
Lack of information	1.3	1.3	1.3

We would like to note the difference in the number of responses of active and less active participants in the NID regarding the position of personal interest in doing science. It is possible that, at the time of the study, less active students lack an element of fascination for more active participation in research activities at the university.

In answers to the questions “What scientists of Russia do you know?” and “What scientists of Chuvashia can you name?” (table 3) the answers have been distributed as follows. Students named mainly prominent people of domestic science of past centuries (Russian scientists - 57% and scientists of the Chuvash region - 52%). Students are less aware of the state of science at the regional level (65% are scientists of the Chechen Republic versus 89% are scientists of Russia).

Most students named the following prominent scientists and educators of Russia 18-19 centuries: the first Russian natural scientist Lomonosov M.V., a famous scientist-encyclopedist, chemist, physicist Mendeleev D.I., fzik, electrical engineer and inventor Popov A.I. , surgeon, creator of the anatomical atlas Pirogov N.I., first researchers of higher nervous activity, physiologists Sechenov I.M. and Pavlov I.P.

Representatives of the Chuvash region that have been named: the linguist, author of the Chuvash dictionary Ashmarin NI, orientalist, one of the founders of Russian Sinology Bichurin N. Ya., mathematician, founder of the Russian school of shipbuilding Krylov A. N., teacher, leading Chuvash educator Yakovlev I. Ya.

Among the modern scientists of Russian science of the 20th century were named: designer-rocket engineer Korolev S. P., Nobel laureate, physicist Sakharov A. D.

Modern scientists of the Chuvash region: the teacher, founder of ethnopedagogy Volkov G. N., chemist Abakumov G. A., historian, archaeologist, leading researcher of the medieval history of the Volga and Volga peoples V. D. Dimitriev, physicist, doctor of physical and mathematical sciences, creator of the first NI laboratory in physics in Chuvashia Abrukov S. A., scientist in the field of theoretical mechanics, teacher-organizer of higher school Saykin S. F.

From our point of view, it is significant that very few women scientists have been named. In the views of students, the image of a scientist is male. Of the Russian scientists of the past centuries, the following were named: the mathematician, mechanic, the first woman in the world - professor of mathematics S. Kovalevskaya and psychologist, founder of domestic pathopsychology Zeigarnik B. V. Of the modern scientists of Chuvashia, only 2 women were named, the representatives of the university in which the study was conducted.

It should be noted that students very rarely indicated their own teachers as modern scientists. Almost all of them conduct serious scientific activity and have a scientific degree. This fact indicates that students need to cover the achievements of university science as broadly and vividly as possible, to acquaint with outstanding scientists working in the university, women scientists, which will contribute to a wider involvement of student youth in science.

Table 3: Answers to the questions "What scientists of Russia do you know?" and "What scientists of Chuvashia can you name?", man/% (N = 230)

Answer Options	Scientists of Russia	Scientists of Chuvashia
Modern scientists	74 (32%)	30 (14%)
Figures of science 17 - 19 centuries	132 (57%)	121 (52%)
Difficulties to answer	26 (11%)	79 (34%)

The question has been asked about the ideas about the features of motivation of scientific research activities of scientists for a more detailed study of the ideas about the science of university students,. The motives of the research activity were taken from the research of Yu.S. Medvedeva, T.V. Ogorodova (Ogorodova T.V., Medvedeva Yu.S., 2013) and were evaluated on a five-point scale. The results were distributed as follows (Tab. 4).

Table 4: Motivation of the research activities of scientists in the views of university students

NID motivation	General indicator	Active NID participants (N=150)	Less active NID participants (N=80)	Significance of differences	
				t	p
Professional level	4.24 ± 0.81	4.23 ± 0.82	4.26 ± 0.81	-0.317	0.751
Comfort	4.17 ± 0.84	4.11 ± 0.87	4.28 ± 0.78	-1.450	0.148
Social Utility usefulness	4.14 ± 0.83	4.15 ± 0.83	4.11 ± 0.84	0.355	0.723
Communication	4.06 ± 0.94	4.10 ± 0.94	3.98 ± 0.95	0.956	0.340
Creativity	3.97 ± 0.96	3.97 ± 0.99	3.95 ± 0.90	0.176	0.861
Career	3.30 ± 1.06	3.31 ± 1.08	3.28 ± 1.04	0. 260	0.795
* Material well-being	3.12 ± 1.09	3.28 ± 1.09	2.81 ± 1.02	3.160	0.002

*Note: * - differences significant at $p \leq 0.01$.*

Students see the "Professional level" as the most dominant motive for doing science, interest directly in the field of science and the desire to deepen their professional theoretical knowledge, the desire to become a strong specialist in their field, the development of new technologies and theories not only in their field, but also related ones.

In second place is the attributed motive "Comfort," which in this classification of NID motives is understood as the desire for convenience and freedom of action, the preference for some independence, the absence of pressure. Interest in the activity itself is associated with the conditions for the implementation of the activity, while the activity will become unattractive if there are conditions that do not satisfy the person and vice versa.

The third rank is the motive "Social Utility". This type of motivation for NID is characteristic of people seeking to interact with society and the ability to influence it, while such people need not only to be useful, but to feel their importance in doing so.

Further on the representation is the motive “Creativity” which is associated with the need for the possibility of self-realization and self-development in scientific activity in a creative context, implementation in a topic of interest, creating a new, previously unknown, unique.

The motives “Career” and “Material well-being” are turned out to be the lowest in the study.

Most students involved in research activities have not appreciated the importance of Career motivation related to rapid career advancement, ensuring respect and acceptance by society or the team, when the interest in the activity is not related to its subject, but to the possibility of promotion in service.

Such a motive for pursuing science as “material well-being” is expressed in the desire for prosperity and financial independence, realized through research activities, has been rated the lowest. This type of motivation has given the opportunity to identify significant differences ($p \leq 0.01$). Students who are effectively engaged in scientific work within the walls of the university have rated higher this type of motivation. Perhaps this is due to the fact that they know more about the possibility of obtaining grant support, other forms of material support and encouragement of scientific activity.

Conclusion

Based on the results, we can offer the following recommendations for activating the NID of students at a university:

It is necessary to consider the personal interest of students as one of the main elements for the development of their research activities, to identify and help them use their emotional attitude to various forms of scientific work. To conduct trainings in order to disclose and develop the interests, inclinations, motives of students. To develop the motivation and creative activity for research activities through participanion practical conferences, Olympiads, in scientific competitions and forums (Alexandrov A.Yu., et al, 2018).

To create conditions for increasing the motivation of learning by taking into account individual aspirations, inclinations and interests of students, taking into account their wishes regarding the organization of forms of scientific and educational activities, providing the opportunity to independently choose some disciplines, conducting special courses. It is necessary that the content of training be practice-oriented and consistent with the direction of future professional activity of a university student (Zakharova A., Talanova T., et al, 2018; Morova N.S., et al, 2017).

To develop the scientific potential of university students with the inclusion of active and interactive teaching methods in research activities to enhance the process of learning new things, ways to stimulate independent and creative search in solving educational and research problems .

To conduct psychological training in order to disclose and develop scientific, creative interests, inclinations, and enhance the motives of students' research activities.

To increase the forms of students' personal and emotionally involved participation in the development of new material through business games, round tables (discussions, debates), quests, intellectual games, project activities, the BarCamp method, when students themselves are the ideological organizers of conferences.

To give university students the opportunity to learn about the scientists of their time. So that university students have information about the achievements of teachers of higher education, about scientific researchers of our time. To do this, you can conduct master classes and various meetings with scientists and teachers of higher education.

Considerable experience has been accumulated in the direction of popularizing science, enhancing the research activities of students, including raising the awareness of university students about modern scientists through organizing various meetings and master classes with scientists, modern

scientists, informing about achievements of science and teachers of higher education as a research scientist in the Chuvash State University.

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How to Promote the Well-Being of The Urban Employee's? Roles of Psychological Capital and Work Engagement

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Abstract

Purpose: Aim of the present study is to examine the influence of Psychological Capital (PsyCap) and Work Engagement (WE) in predicting Employees Well-Being (EWB) who work in Jakarta as the capital city of Indonesia. Variables of PsyCap consist of self-efficacy, hope, optimist and resiliency. WE determine by employee's vigor, dedication and absorption, while employee's subjective well-being explained as the employee's overall satisfaction in the three aspects including work, life and psychologically. **Design/methodology, approach:** Quantitative research design is used in the present study. 400 employees who work at Jakarta were participated in this study. PsyCap measured by a scale developed by Luthans et al. WE measured by *Utrecht Work Engagement Scale* (UWES) and EWB measured by Scale developed by Zheng et al 2015. Two step Structural Equation modelling was used to analyze data. Confirmatory Factors Analysis (CFA) showed that, the measurement model of each variables are valid and reliable. **Result:** Result in the present study found that, PsyCap and WE significantly predict EWB with R Square 63.5 %. PsyCap show higher coefficient correlation with EWB ($r= 0.587$, $p <0.01$) in compare to the relationship between WE with EWB ($r=0.260$, $p<0.01$). Therefore, to ensure employee well-being, it is important to promote self-efficacy, hope, optimist and resilience among employees who work in Jakarta. Not only that, employee's dedication, vigor and absorption toward their job also can predict employee's well-being.

Keywords: Employee well-being, Psychological capital, Work Engagement

Introduction

Chartered Institute of Personnel and Development research (CIPD, 2007) shows that health and well-being in the workplace increase business productivity. Employee well-being (EWB) is actually the quality of employee life and psychological status at work (Siegrist et al., 2006 in Zheng, Zhu et al, 2015). This involve satisfaction with job and the absent of emotional exhaustion at work. Although it is sound promising for a quality job, however, maintaining the well-being among the urban employees is not an easy task.

Various problems faced by the urban employees every day, it is not only due to time consuming during the traffic jump, a very competitive working environment, demanding superior at work and juggling with work life balance. Therefore, urban employees need to ensure their well-being for a better job performance.

Past study shown that, psychological capital as one of the variables related to individual internal characteristic, significantly enhance employee well-being. Psychological capital is a positive psychological state of an individual that is characterized by having self-efficacy, hope, optimism and resiliency (Luthans, 2007 as cited in Chen & Lim, 2012).

Other variable that also can enhance employeee well-being, which related to job aspect, is the work engagement. Schaufeli and Bakker (2004), stated that, employees who engaged with their job show,

absortion,vigor and dedication toward their job. However, still lack of study focusing on the empirically test, the relationship between these two variables, especially in the context of urban employees in the Asian countries.

Therefore the present study aim to examine the roles of psychological capital and work engament in predicting well-being among the urban employees who work in Jakarta. Jakarta is one of the biggest cities in Indonesia. Which consist of 304,397 worker who work in this city as per year 2011 (www.bps.go.id). The work demand and stressful work and life problems commonly experience by employees in Jakarta nowadays. As Nafiri (2015) found in his study, there is the impact of stress on work and the well-being of the employees in Jakarta. Further, study also found that, the engagement level among the employees in Jakarta also not high. Therefore, the present study will shed a light on promoting well-being of the urban employees, by designing a proper intervention in enhancing psychological capital as well as the work engagement among the urban employees in Jakarta.

Literature Review

Employee Well-being

There are two main philosophical perspectives on well-being, the first being happiness-oriented e.g. hedonism and subjective experience of happiness. Other perspectives are aware of potential human strengths, for example eudemonism results from personal achievement, self-actualization, or self-position. Most recent welfare studies accept these two different perspectives (Ryan & Deci, 2001 in Zheng, Zhu et al, 2015). In the present study, employee well-being involves three basic aspects namely life, work, and psychological (Zheng, Zhu et al, 2015).

Work Engagement

According to Schaufeli and Bakker (2004), work engagement consist of; vigor, dedication and absorption. Vigor is characterized by high levels of energy and mental endurance at work. Dedication is characterized by a sense of importance, enthusiasm, inspiration, pride, and challenges, while, absorption is characterized by being fully concentrated and happy at work, where time passes quickly and one has difficulty separating from work (Burke, 2006).

Psychological Capital

Luthans (2007 as cited in Chen & Lim, 2012) stated that, there are four dimension of psychological capital including the; self efficacy, hope, resilience and optimism. Self efficacy which reflect, ones'confidence to carry out tasks or achieve goals. Hope, refers to an individual's perceived ability to obtain pathways to achieve desired goals and to motivate oneself through thinking agents to use pathways. Optimism refer to those who make internal and stable attributions regarding positive events and negative event attributes (for example, job loss) to external, temporary, and situation specific factors. Resiliency refers to the capacity to recover from adversity, conflict, failure, or even positive events.

Relationship between Psychological Well-being, Work Engagement and Employee Well-being

Past studies examine several factor that related with employee well-being. Katie Davis (2016) examines the roles of Corporate Psychopathy and The Influence of Negative Leadership Behaviors on Organizational Performance and Employee Well-Being" . This study found that the more the leader shows psychopahty characteristic, the more likely that the employees will not have a good well-being. Further, Abbas and Usman Raja (2015), indicated that, psychological capital also related with innovative performance and job stress in Pakistan.The result of this study stated that, the employees who are innovative and less stress are the one who have psychological capital.

Oi Ling Siu (2013) examine the relationship between "Psychological Capital, Work Well-Being, and Work-Life Balance Among Chinese Employees. Result indicated that, psychological capital significantly related with work well-being.

Previous study, also found that work engament is related with good organizational culture. The more enganged the employees, the more likely that, organizational culture create a better job outome and happy workplace (Akbar, 2013). Carolyn Timms, Paula Brough, Michael O'Driscoll, (2014) conducted study on the flexible work arrangements, work engagement, turnover intentions and psychological health. This study found that, employee engagement is related with the psychological health of the employees.

Based on the literature, the hypothesis of the present study are:

- Psychological Capital and work engagement predict well-being among urban employees in Jakarta.

Method

Quantitative research design is used in the present study. 400 employees who work at Jakarta were participated in this study. PsyCap measured by a scale developed by Luthans et al. WE measured by *Utrecht Work Engagement Scale* (UWES) and EWB measured by Scale developed by Zheng et al 2015. Two step Structural Equation modelling was used to analyze data. Confirmatory Factors Analysis (CFA) showed that, the measurement model of each variables are valid and reliable.

Result and Discussion

Results of the confirmatory factor analysis shows all dimensions are valid and reflecting their respective variables in which, all dimensions of each variable have a loading factor> 0.5. From the psychological capital variable on the dimensions of self-efficacy of 0.708, hope of 0.773, resiliency of 0.664 and optimism of 0.631. In the work engagement variable on the vigor dimension of 0.846, dedication of 0.836 and absorption of 0.761. Employee well-being on the LWB dimension of 0.618, WWB of 0.759 and on the PWB dimension of 0.695.

In addition, all the measures used in the present study also indicated that a reliable measure with Critical ratio greater than 0.5.

Result of structural model of the analysis after conducting some modification to fit the model, found that, there is significant contribution between psychological capital ad work engagement with employee well-being. In which PsyCap and WE significantly predict EWB with R Square 63.5 %. PsyCap show higher coefficient correlation with EWB ($r= 0.587$, $p <0.01$) in compare to the relationship between WE with EWB ($r=0.260$, $p<0.01$).

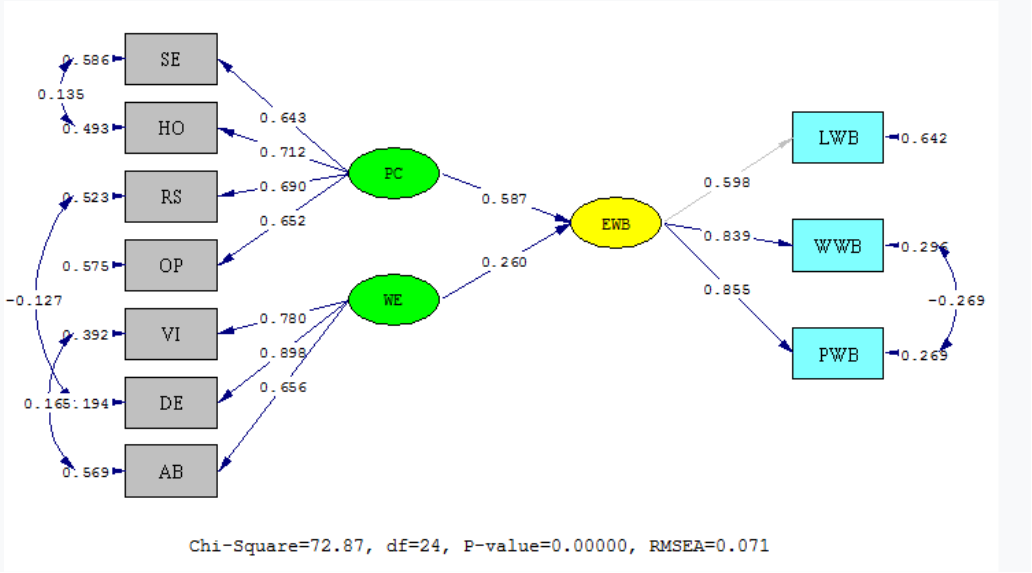

This finding is line with the previous study done by Oi Ling Siu (2013) who found that the more the employees show Psycap the more likely that that will have the well-being. In addition, result in the present study also inline with the previous finding on the role of work engament in enhancing well being. Carolyn et al (2014) indicated that, employees who show well being will perform better at work and more happy at the work place. In addition, Oktaviana Sasmita and Mardhatillah (2019), also stated that, a better well being can be achieved through individual efficacy in balancing about work life and see the enhancement between different roles. This efficacy is inline with the aspect of psychological well being, in which the more individu believed that, they are capable in doing the task the more likely that they will have a better well being.

The contribution of Psycap are greater than work engagement in the present study. This result lead to the important intervenstiom in enhancing Psycap among employees in Jakarta. Several interventions can be done to enhance self efficacy, hope, resilience and optimism. Resilien at work program can be design by the organization, in away to enhance individual coping strategies in dealing with difficult situation as well as promoting the self love. Several self help training can be implemeted at the workpalce to enhance Psycap. Not, only that, office policies and culture can be realligned in way to promote better wellbeing among the employees.

Further, with regard to the employee engagement, several work crafting activities, in term of task crafting, relational crafting and the variation in doing the job, might enhance employees dedication, absortion as well as vigor in conductin their job. By ensuring the work engagement consistently improved as well as continuously enhance the Psycap skill among the employees, the wellbeing among employees in Jakarta might be come better and lead to a better performance at work.

Conclusion

In conlusion, the present study , found significant relationship between Psycap and work engagment with employee well being in Jakarta. Therefore, to ensure employee well-being, it is important to promote self-efficacy, hope, optimist and resilience among employees who work in Jakarta. Not only that, employee's dedication, vigor and absorption toward their job also can predict employee's well-being.

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Multidimensional Analysis of The Project Teams Flexibility – The Results of The Pilot Study

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Abstract

The organization flexibility is one of the key determinants of increasing efficiency and effectiveness, and as a result increasing the chance for success in project management. It is most often defined as an organization's ability to make changes under the external and internal factors, and the degree of adaptability to changes within the project environment. Modern conditions of the companies' operations put new challenges to project teams, and higher flexibility of the organization is now a very desirable attribute. Changes in the area of project teams' flexibility are inherently related to the flexibility of the parent organization structure in which the teams operate. The aim of this Paper is to present the results of a pilot case study to identify the intensity of the basic structural dimensions occurrence to determine the flexibility of project teams' organization. The research techniques used are: analysis of the organizational documentation content and an in-depth semi-structured interview within the method of multiple exploratory case studies, aiming to formulate further research directions. The article presents the results of a study conducted in the second half of 2019 for two companies (A and B) with foreign capital, operating in Poland. The findings showed that company B, as a result of the transformation, began to show higher flexibility in the organization of project teams and consequently better adapted to the conditions of its external and internal environment.

Keywords: Organization Flexibility, Project Teams, Structural Dimensions, Production Companies

Introduction

In today's world, project management, the organization of flexible project teams and the continuous improvement process to meet the various customer expectations for new and innovative products are becoming ever more important (Thompson, 2018; Trocki, 2014).

There are many terms for project teams in the literature: task forces, work teams or problem teams. Most often they are defined as a temporary group of people appointed to solve a specific task. Project structures ensure the integration and coordination of the individual team members work and significantly increase the flexibility of a particular organization (Lichtarski, 2018; Kerzner, 2017; Lock, 2014).

Large and medium-sized companies face increasing intra-organizational obstacles to their adaptation to dynamic environmental conditions (Bełz and Cyfert, 2017; Basol and Dogerliogliu, 2014). The literature studies conducted have shown the presence of many concepts relating to the issue of project management success factors, increasing the efficiency and effectiveness of project teams (Ika, 2009). It has been noted that a significant contribution to organizational efficiency has the shape of an organizational structure, as it helps to cope the problems related to management, enables the innovation capability and employee relationships improvement while reducing costs.

The basic attributes of a flexible organization are: active adaptation to change in the company, the ability of employees to participate in many projects simultaneously and to set priorities quickly,

integration (a sense of being a team member with the company and a willingness to change roles) in addition to commitment and readiness to changes (Galbraith, Downey and Kates, 2002).

The most influential concept has been the proposal of the Aston group (Pugh et al., 1976), who have empirically confirmed the existence of five basic dimensions of the organizational structure, that is: specialization, standardization, formalization, centralization and configuration. The intensity of structural features determines the organic nature of the examined structure, i.e., the lower the intensity of features, the more organic (less mechanistic) the structure and vice versa (Burns and Stalker, 1961). To the basic structural features need to be added the networkability, defined as the durability of the network configuration and its complexity, that is the result of increasingly intense inter-organizational cooperation, as well as the shifting of organizational boundaries. The extreme states of these dimensions make it possible to distinguish two types of structures with different flexibility: mechanistic (inflexible) and organic (perfectly flexible) structures and an infinite number of intermediate states (Burton, 2011).

The reason for undertaking the subject of the study are certain gaps in empirical research and theoretical analysis in management-related sciences. The theoretical gap identified by the Authors is insufficient recognition of project teams' organizational structures in manufacturing companies in the context of their flexibility evaluation. On the other hand, the empirical gap results from the deficiencies of research studies, which focus mainly on quantitative rather than qualitative researches - without considering the context of the examined reality. The use of the case study method, allows to examine and understand today's phenomena in an in-depth and multifaceted way. The aim of the article is to present the results of the pilot case study, which is to identify the intensity of occurrence of basic structural dimensions to determine the flexibility of project teams' organization.

Research Methods

The pilot study, conducted in the first half of 2019, covered two companies from Lower Silesia focusing on the production of electrical machinery and equipment for the power sector with an international range. A purpose selection was used here, based on the following criteria: type of activity - production, the need to execute orders through project management with the involvement of project teams, the size of companies classifying them as large and, most importantly, the companies affected by the acquisition (an important external factor of the environment, allowing to verify the degree of flexibility of the organization). The companies examined, coded in the article as "A" and "B", are multinational companies with foreign capital, of which company "A" was acquired by "B". The research methods consist of two parts. In the theoretical part the analysis of Polish and foreign literature on the subject was used, in the empirical part the Authors used the measurement process of multiple case studies, the questionnaire of a semi-structured in-depth interview addressed to respondents - representatives of senior management, actively participating in project teams for at least several years. The questions concerned issues allowing to determine the occurrence intensity of particular structural dimensions in order to determine the flexibility of project teams' organization. The Authors of this study, to maintain the context of the examined reality, used the qualitative characteristics of the examined phenomena, supplementing it with the quantitative presentation of structural features. The range of the measurement scale for determining the occurrence intensity of structural indicators is in the range from 0 to 1. The use of a unified and coherent measurement scale allows to precisely measure the current state and changes in the occurrence intensity of individual features and to compare them with each other. A thorough analysis of the organizational documentation content was done: charts of organizational structures, regulations, procedures and instructions for project execution as well as roles and responsibilities of team members. The reason for the use of multiple/comparative case studies was the repeatability of the research procedure and the possibility of comparing the results from different cases with each other (Yin, 2009).

In order to achieve the objective of this Article, the following research questions have been formulated:

- RQ 1. What is the occurrence intensity of particular structural dimensions in both examined companies?

- RQ 2. Which of the examined companies A and B shows higher flexibility of project teams' organization?

The Authors have attempted to determine for the companies examined the intensity of occurrence of the basic structural dimensions of flexibility, i. e. indicators: configuration, centralization, specialization, formalization and networking, using modified concepts of Pugh et al. (1976). The Authors took into account the dimension of networkability and applied formalization in the context of details and rigorousness, omitting standardization. In order to determine the degree of flexibility in the organization of project teams, the direction of influence of individual dimensions on higher flexibility (dependent variable) had to be unified to correspond to the orientation of influence on specialization and networking. Accordingly, the flatness of the structure, which is the inverse of the configuration's slenderness, decentralization instead of centralization, and a move away from bureaucraticity as the inverse of formalization were used to show greater flexibility. To determine the occurrence of structural dimensions, the Authors used the following formulas.

$$W_S = \frac{S}{(Rp + S)}$$

S - number of levels of structure in the most vertically expanded unit

Rp - arithmetic mean of typical control spans for all levels
Rpi - arithmetic mean of typical control spans at i-th level

The total centralization index Cp was determined using the following ranks for decisions: w = 1 execution; w = 2 allocation; w = 3 methodical; w = 4 directional most relevant for the organization development. To this purpose, the respondents were asked a question: what affects the distribution of decisions within the organization and what levels of organization hierarchy of making a particular decision. The formula was used to determine it:

$$C_p = \frac{\sum_n^{i=1} C_i}{f_o}$$

Ci - an indicator of centralization of decisions within individual functions
fo - number of functions implemented in the company (12 were taken)
In order to determine the specialization indicator (Si), the respondents were asked to clarify the division of responsibilities in their company (how many positions have been defined for a specific function) using the following ranks: r = 1 position; r = 2 section; r = 3 department; r = 4 division.

$$S_i = \frac{r_i}{r_{max}}$$

Si - degree of specialization i-th function

ri - ranks of the degree of specialization i-th function
r max - highest possible rank value (rated as 4)

Total specialization indicator (for the entire company) – So

$$S_o = \frac{\sum_n^{i=1} S_i}{f_o}$$

So - total specialization degree indicator

Si - specialization indicator i-th function
fo - number of organizationally identified functions (12)
The rate of formalization was determined for individual document Fd and the entire company Fp using the following rank values: r = 1 activity is not included in the organization's documentation at all; r = 2 activities are included in general; r = 3 activities of the members of the organization are defined in more detail; r = 4 existing regulations almost completely limit the employees' behaviour in a respective area.

Formalization degree indicator for a particular document – Fd

$$F_d = \frac{r_d}{r_{max}}$$

rd - the rank value of formalization for a given document resulting from its content and strictness of information
r max - highest rank value (rank 4 was taken)
Total degree of formalization indicator (for the entire company) – Fp

$$F_p = \frac{\sum_{d=1}^{n} F_d}{n}$$

Fd - the degree of document formalization
n - number of all organizational documents
Networkability intensity indicator - N was determined by the Authors of this study using the proposed formula below:

$$N = \frac{m}{M}$$

m - number of positions of project team members from outside the organization of the examined company, i.e. all members of the project team from outside the local company organization
M - total number of positions in project teams in a particular company

Empirical results and Discussion

According to the research, the configuration indicator (Ws) in company A is Ws=0.28, and in B: Ws=0.25. The flatness of structures was determined from the difference 1-Ws (company A: 0.72, and company B: 0.75). The proportion of administrative positions to all positions in each company is about 1/4 of the staff (Table 1).

Table 1: Indicator of the configuration and span (range) of control for the examined companies

Company:	**A**	**B**
Ws	**0.28**	**0.25**
1-Ws	**0.72**	**0.75**
S	5.00	4.00
Rp	12.93	11.69
Rp: level 1	6.00	14.00
Rp: level 2	2.83	17.75
Rp: level 3	2.67	3.00
Rp: level 4	3.17	12.00
Rp: level 5	50.00	-

According to the research, in the most vertically expanded unit of company A the number of levels is S=5 which is 1 level higher than in the company B. On the other hand, the arithmetical mean of the typical spans of control (Rp) on particular levels is similar for both examined companies (respectively in A: Rp=12.93, and in B: Rp=11.69). However, it is important to point out that the range of control is significantly different for both companies at the highest level (A: Rp=6, and B: Rp=14) and at the second level (A: Rp=2.83, B: Rp=17.75), which shows the reason for reducing the number of management levels of company B while maintaining a similar number of employees. The total centralization indicator Cp is similar (respectively in company A: Cp=0.55 and in company B: Cp=0.56), and consequently decentralization intensity of structures was determined from the difference 1-Cp (company A: 0.45 and B: 0.44). In company B the senior management wants to have more often its significant contribution to the decision-making.

The Si specialization indicator in company B is 0.70, while in company A it was only 0.58. The higher by 20% index of company B is the result of a large grouping of specialized jobs due to competence and combining them into specialized larger teams.

The formalization indicator Fp in company A is 0.82 and in the company B it was significantly lower, 0.65. So in company B the formalization indicator is lower by 21%. The lower the formalization degree, the higher the flexibility is, so the Authors determined the inverse indicator for the bureaucraticity of the organization from the difference 1-Fp (Table 2).

Table 2: Formalization indicator for the examined companies

Company:	**A**	**B**
Fp	**0.82**	**0.65**
1- Fp	**0.18**	**0.35**
Fd	29.50	23.25
n	36.00	36.00

This indicates a certain freedom of acting, it does not limit the B company's staff to rigidly adhere to the written rules, it allows for a certain individualization in the approach to their interpretation. With the acquisition of company A by company B, many of the previously existing organizational documents have lost their validity or have been replaced by new ones, valid only in company B.

The last of the examined dimensions was the network intensity indicator N, which in enterprise B was considerably higher than in A and was 0.33 (Table 3).

Table 3: Networkability indicator for the examined companies

Company:	**A**	**B**
N	0.12	0.33
m	2.00	7.00
M	17.00	21.00

This is due to the different number of external business partners in the inter-organizational networks of the examined companies: in B it is 7 people out of 21 team members, while in A, 2 people out of 17. To illustrate better the differences in the degree of flexibility between companies A and B examined, a figure showing these differences is given below.

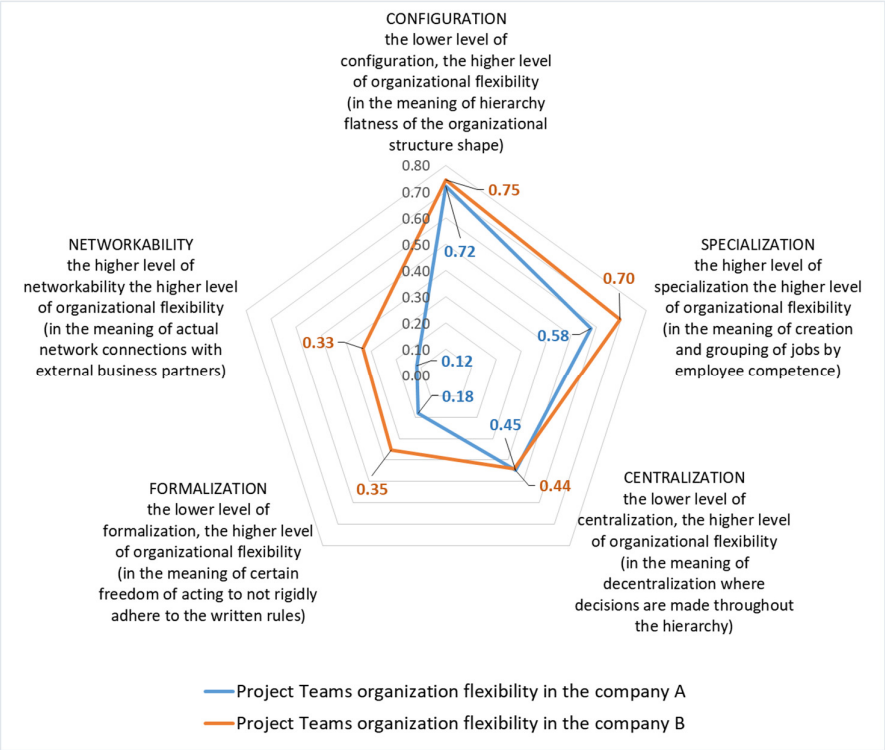

Fig. 1: Comparison of the intensity of structural dimensions of the examined companies A and B

Conclusion

The research on the flexibility of organizational structures was carried out through the perspective of their specific features, such as specialization, configuration, centralization, formalization and networkability, which taken together determine the degree of flexibility of the organization.

With regard to the first research question, the self-conducted research shows that the particular structural dimensions of the two companies are significantly different. In the company B, due to the larger number of project team members and their higher geographical dispersion, coordinating the work of the team requires more effort from the project coordinator. The project teams operate in a more multicultural organization with dominant forms of communication being rather virtual.

Referring to the second research question, company B is much more flexible than A. The organizational structure of both companies is mixed, showing at the same time the attributes of functional and matrix structure at different levels of management. The companies examined use the PMI project management methodology and the projects lifecycle is relatively long (from 9 to 48 months). Company A has been incorporated into the global supply chain of company B, with stronger market rules and competing inside the organization and with external companies also. This was an important exogenous factor for the transformation and increased flexibility of the organizational structure.

In the future, the Authors plan to expand the scope of research in terms of sample size and examined objects. Due to the limitation of the research sample size to only two companies (pilot studies), the Authors are aware the generalization of research results should be done carefully. The Authors recommend further research, including quantitative approach on a larger sample size, in order to increase the certainty of inductive deductions for formulating generalizations, and also propose the following research question: Which are the key factors for the flexibility of project team organization in manufacturing companies?

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Legal Regulation of Digital Economy in A Modern State: Challenges and Prospects

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Abstract

This article is devoted to the analysis of issues regarding the problems and prospects of legal regulation of digital economy in a modern state. It is noted that in the current legal system of the Russian Federation relations related to the development of digital processes are not regulated in a comprehensive and systematic manner. In particular, at both the legislative and by-law levels, such institutions of the digital economy as "block chain," crypto currency" , "startup," "smart-contact", "ICO" (primary placement of obligations in the market of crypto currency) and some others are still not properly regulated. Within the framework of this work, the authors have attempted to define the peculiarities of the legal regulation of the digital economy in Russia and in the world, to highlight some discussion and problematic points on this problem and to express their own position for their solution. At the end of the study, the authors propose how to use foreign positive experience in this direction and determine the directions of its refraction in the Russian legal system.

Keywords: Legal Regulation, Digitalization, Digital Economy, Digital Economy Institutions, Information Society, Innovations, National Program.

Introduction

It should be noted that currently in the Russian Federation and in the world there is a digitalization of various spheres of society, connected with the active application of information technologies in the development of the information society. One of the segments of general digitalization is the digital economy, the effective functioning of which as a whole and its individual institutions seems impossible without a qualitative (arbitrary and non-competitive) legal regulation of the relevant sphere of social relations. Meanwhile, it should be noted that in the current legal system of the Russian Federation, relations related to the development of digital processes are not sufficiently regulated in an integrated and systematic manner. In particular, at both the legislative and by-law levels, such institutions of the digital economy as "block chain," crypto currency", "startup", "smart-contact", "ICO" (primary placement of obligations in the market of crypto currency) and some others are still not properly regulated. This situation, as confirmed by a number of scientists [1], causes gaps in the legal regulation of the digital economy, as well as various legal conflicts that actually lead to the displacement of a number of digital transactions, carried out primarily by small and medium-sized businesses, into an illegal financial and economic field. Moreover, resources attracted by domestic business entities in virtual world capital markets, for example, as a result of the issue of crypto

currencies are qualified by the law enforcement agencies of the Russian Federation as "operations for the illegal import of capital," which is the basis for administrative and criminal liability.

In foreign countries, too, the legal vacuum in the regulation of the digital economy causes serious problems in the social sphere. Thus, N. Jones, as an example of such a situation, cites the introduction of such innovative technology as Uber in the sphere of services provision, as a result of which the traditional model of legal regulation of transport services provision was not applicable in a number of countries, in particular in India [2]. Moreover, some Western scientists believe that the development of the digital economy can significantly change the established goals, tasks and functions of public authorities and even influence national sovereignty [3].

In this regard within the framework of this article, it seems appropriate to refer to the definition of peculiarities of the legal regulation of the digital economy in Russia and in the world, to highlight some discussion and problematic points on this problem and to express the authors' view on their solution.

Methodology

The methodological basis of the study is based on the application of various popular scientific techniques and methods of scientific knowledge (analysis, synthesis, derivation, induction, system-structural, formal-logical approaches), as well as private scientific methods - formal-legal, comparative-legal and interpretative.

Discussion and Results

Before considering the peculiarities of the legal regulation of the digital economy, it seems logical, from our point of view, to turn to the concept of legal regulation as a whole. Note that "regulation" (from lat. regulare - to put in order) in social, political, psychological, and economic domains can take many forms: legal restrictions promoted by a government authority, contractual agreements (for example, contracts between regulations and regulations 4 norms), co-regulation, third-party regulation, certification, accreditation or market regulation [5].

This approach makes it possible to speak of legal regulation as a whole as a dynamic system (process), including the formation of legal norms; their effect which results in legal relations arising or changing; realization of subjective rights and obligations through which the objectives of legal regulation are achieved [6; 7, 8; 9].

As for the concept of "digital economy," the emergence of the corresponding concept in the 1990s is related to the name N. Negroponte, who, using the metaphor about "the transition from atom processing to bit processing", noted the lack of classic goods in their "physical" embodiment such as weight, raw materials, transport, and declared advantages of a new economy based on lack of goods weight, virtuality, lack of demand for raw materials, instant global movement [10]. In the legal literature, in parallel with the concept of "digital economy," the term "intellectual economy" is also found. The authors of this term associate the functioning of this economy type with the wide use of innovation, including artificial intelligence [11].

As the Competition Committee of the Finance and Business Office of the Organization for Economic Co-operation and Development (OECD) notes the concept of "digital economy" is the basis for referring to markets focused on digital technologies that are generally involved in the trade of information goods or services through electronic commerce. The digital economy operates on a multilevel basis with separate segments related to data transmission [12].

It should be noted that the specific characteristics of the digital economy, which differ from the post-industrial model of recent times [13], require a qualitatively different model of legal regulation, to the peculiarities of which we propose to refer in more detail.

First, let us draw attention to the fact that the digital economy is more globalized than traditional models of economic relations. Due to that certain regularities and universal principles of its legal regulation at the international and national levels in different countries can be found, so that the ways of solving emerging problems in legal regulation found in different countries will also be identical. Thus, in Russia and in the world, there is uncertainty and fragmentation in the legal regulation of the digital economy institutions, which cause problems at the international level.

The main difficulty in this matter is the specificity of the subject matter of the legal regulation. The fact is that the digital economy cannot be described as a single structured system, and therefore cannot be regulated by a "package" of laws or by public administration reform in this area. This system is complex, includes a wide variety of institutions and activities and does not cover all sectors of economic activity.

The specifics of the legal regulation in this field can be described in the following example. Thus, in 2009, the report of the Australia Government Department of Broadband, Communications and Digital Economy, setting out a strategy for the development of the digital economy in the country, noted that the development of the sector required concerted action by society, industry and the State, whose role was to fill market gaps, avoid social inequality and ensure the legitimate and efficient functioning of markets. The main task of the State is to provide opportunities for all subjects to take advantage of digital opportunities through the creation of appropriate infrastructure, the promotion of innovation and the consolidation of a favourable legal regime. [14]

The main idea of this report is a perfectly fair indication that "digital" regulation and "digital" development based on it in all spheres of social relations is possible only on the basis of clear strategic conceptual planning. This principle of legal regulation of the digital economy in the Russian Federation has been embodied in the relevant strategic documents.

The main strategic document that established the legal definition of the digital economy in the Russian Federation, is the Decree of the President of the Russian Federation No. 203 of 09.05.217 "On the Strategy for the Development of the Information Society in the Russian Federation from 2017 to 2030," which established the purposes, tasks and measures for implementation of domestic and foreign policy of the Russian Federation in scope of information and communication technologies, aimed at the development of the information society, the formation of the national digital economy, the promotion of national interests and the implementation of strategic national priorities. According to this regulation, the digital economy is economic activity, the production key factor of which is digital data, processing of large volumes and use of the results of analysis. If to compare with the traditional forms of economic management they allow to increase significantly the efficiency of various types of production, technologies, equipment, storage, sale, delivery of goods and services [15].

The document specifying the Strategy, in terms of the digital economy, is Resolution of the Government of the Russian Federation No. 234 of 02.03.2019 "On the System of Management of the Implementation of the National Program "Digital Economy of the Russian Federation"[16], which established the functional structure of the management system; procedure for development, monitoring and control of federal projects implementation; responsible authorities and organizations. This document "replaced" the previous program of the same name, but retained most of its shortcomings, namely, the lack of a definition of the concept of the digital economy and its structure; incomplete quantitative indicators of the future development of its national sector; poor development of issues of integration of domestic subjects of economic relations in the virtual segment (lack of an indication of the institute "block chain"); pretentiousness, non-availability with specific legal requirements [1, p. 70].

Foreign experience in the legal regulation of the problem is of interest in this study. In particular, since 2016, the United States has developed and implemented a comprehensive program for the development of the digital economy "Digital Economy Agenda" [17, p. 51], which regulates simultaneously the access liberalization and information security of citizens on the Internet, as well as

a number of issues to support the activities of ICT producers and sellers in the North-American and world industry markets. The analysis of the main provisions of this document shows that it is, to some extent, protectionist towards digital producers. At the same time, the program is aimed at (a) improving the efficiency of antitrust legislation in the field of digital technologies and virtual economy sectors; (b) stimulating economic actors operating in these markets; (c) improving the legal status of entities of the virtual sector of the digital economy, such as virtual corporations, financial and credit institutions (internet banks and investment funds, etc.; (d) development of legal regulation of financial and economic transactions carried out using crypto currency; (e) optimization of complex regulatory and legal support of smart-contracting institution.

Accordingly, the positive experience of such legal regulation can also be accepted by the domestic system of legal regulation of the ICT market in such areas as ensuring competitiveness and openness of production and sale of ICT for state and municipal needs; full introduction of antitrust compliance in the activities of economic actors; systemic and integrated public-private partnership in ICT; promotion of domestic technologies in developing ICT markets of "friendly" states within the framework of economic blocks such as the EAEU and BRICS.

In order to implement the directions mentioned above, it is proposed to solve the following main issues.

First, while modernizing the legal regulation of the digital economy, it is necessary to make a thorough analysis and assessment of the relevance of existing legal models, as well as the existence of conflicts and gaps in existing legislation [18].

There is a view that in the sphere of the digital economy there is a greater demand not for forward-looking (forecast-based) legal regulation, but for an approach aimed at streamlining already existing social relations after their emergence on the basis of the information available at that time [2, p. 24]. This approach can hardly be considered absolutely justified for our legal system, as it is suggested by the representative of Western civilization, where the main regulator is precedent. As for the analytical component of the law-making process in the development of the relevant legal and regulatory framework, its feasibility is beyond doubt.

Second, administrative barriers to the functioning of the digital economy institutions need to be reviewed and, if possible, eliminated (this is, inter alia, the example given at the beginning of this article on business in virtual world markets).

Third, to create unified approaches for all member states of the Eurasian Economic Union in the field of legal regulation of the digital economy, which contribute to the development of the digital economy in the corresponding legal space;

Fourth, to develop and approve the necessary methodological documents (regulations) aimed at forming appropriate competences in the field of digital economy for lawyers, public servants and other persons directly involved in the drafting process, adoption and implementation of regulatory legal acts in the sphere of regulation of the digital economy in the territory of the Russian Federation, and undertake the necessary measures to develop these competencies (professional retraining, advanced training, conferences, etc.).

Conclusion

As a result of the study carried out on the problems and prospects of legal regulation of the digital economy in the Russian Federation, the following conclusions can be drawn:

- The digital economy, as a subject of legal regulation, is characterized by its global nature, and therefore, at the international and national levels, there are certain patterns and universal principles for its regulation in various countries;

- The digital economy does not have a unified, homogeneous structure and cannot be regulated by a "package" of laws or by public administration reform in this area; it is an integrated system that brings together diverse ICT-based institutions and activities;
- "Digital" legal regulation and "digital" development based on it is possible only on the basis of clear strategic conceptual planning, which is reflected in the relevant strategic documents named and briefly analysed in our work;
- The use of foreign experience in modernizing the system of legal regulation of the digital economy is of some interest[18, p 3850].

Thus, basing on the analysis of various approaches to the study of optimizing the legal regulation of the digital economy, it can be concluded that in this area it is necessary to create a legal regime that would ensure, on the one hand, the smooth development of innovation and, on the other, minimize the possible risks associated with the inability to predict the development of institutions of the digital economy for a long period of time.

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The Adequacy of The Pension Systems in Poland

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Abstract

There are many pension solutions in Poland such as the general system, the provision system and the agricultural system. In each of these pension systems there are privileges for selected groups. The objective of this paper was to assess the pension systems in Poland in terms of their adequacy which can be considered in three dimensions: the consumption smoothing, protecting against poverty and differences between the genders. The analysis indicates the occurrence of significant differences between individual systems, which result from the extensive pension privileges for selected groups. The conducted assessment shows that only the provision pension system is fully adequate. Other analyzed systems firstly, are not fully adequate, and secondly, the adequacy is not equal. Significant inequalities in the adequacy or its complete absence indicate that building one, uniform, coherent pension system in Poland requires the introduction of many systemic actions.

Keywords: Pension Privileges, Social Security, Generosity, Adequacy, Income, Old Age.

Introduction

There are many pension solutions in Poland - the general system (including miners), the provision system and the agricultural system. Pension privileges are an integral part of each pension system, mainly in post-Soviet states. In Poland, the numerous pension privileges fall into the following three groups: privileges in the general pension system, privileges in the provision pension system, and privileges in the agricultural pension system (Walczak, 2019). Maintaining the current pension privileges in Poland results from several reasons. One of them is rent seeking (Tullock, 2003; Krueger, 1974). Some professional groups maintain privileges in exchange for their support given to politicians in elections. But most privileges are a result of past decisions and upholding the acquired rights (Walczak, 2019). Another reason for pension privileges, which is frequently presented in Poland, is the supposed inability to work in certain professions long enough to reach the general retirement age. Subject literature often considers the particular nature of a given profession as an argument for maintaining the existing privileges (Jarmołowicz, Sikora, 2016).

In turn, when examining Poland's pension system, one should refer to the characteristics that every pension system should have, which also applies to privileged systems. These characteristics were formulated by The World Bank (Holzman, Hinz, Dorfman, 2008) and comprise adequacy, affordability, sustainability, equity, predictability, and robustness. Similar objectives of the pension system were defined by the European Commission (European Commission, 2012) which points out to

the fact that a pension system should deliver adequate, sustainable and safe retirement incomes. The European Commission also emphasizes that the proposed solutions within retirement incomes must be based on fiscal sustainability (debt reduction) and ensure increasing employment, mainly for women and older workers.

The objective of this paper is to assess the pension systems in Poland in terms of their adequacy. Thus, the following hypothesis was assumed:

H1: Pension systems in Poland are characterized by equal adequacy.

The Adequacy as One of The Features of Pension Systems

The qualities which can be explored within the pension systems include equity, adequacy, sustainability, and affordability (Holzman, Hinz, Dorfman, 2008).

An equitable pension system should provide the same benefit for the same contribution. This principle in relation to privileged solutions is not observed by definition. Being privileged or covered by any special pension system ultimately comes down to receiving benefits that exceed the amount of contributions paid. In addition, for similar reasons, the privileged system could not be actuarially fair (Vidal-Melia et al., 2009).

When it comes to adequacy, the first dimension of an adequate pension is protecting against poverty (Holzman, Hinz, Dorfman, 2008). Saunders and Wong (2011) provided a similar description, when presenting adequacy in relation to the income level. An adequate pension should allow avoiding or alleviating poverty and should be adequate for one person. The second dimension, consumption smoothing (Attias et al., 2016; Verbič et al., 2006), means that a pension is to be considered adequate if (besides preventing social exclusion) it allows one to maintain their lifestyle and consumption level unchanged after retirement. The third dimension of an adequate pension according to Chybalski and Marcinkiewicz (2016) is the difference between genders. The target of adequacy is to prevent discrimination of women and men in terms of pension benefits. A sustainable system is one that is financially sound and can be maintained over a foreseeable future under a broad set of reasonable assumptions.

An affordable system, in turn, is one that is within the financing capacity of individuals and society and does not unduly displace other social or economic imperatives or have untenable fiscal consequences (Holzman, Hinz, Dorfman, 2008). Each of the privileged systems in Poland requires co-financing by the state. Privileged pension schemes are a PAYG (Pay-As-You-Go) scheme (see more in the following sections). This ultimately results in the financing of retirement benefits from pension contributions or taxes paid by non-privileged persons. Because of their structure, these systems are based on intergroup solidarity, or solidarity of the entire community (Baldwin, 1989; Mesa-Lago, Bertranou, 2016). Solidarity is based on the individual's responsibility for the community and the community's responsibility for the individual, when it comes to activities of common interest (Walczak, 2015; Houtepen, Ter Meulen, 2000). In the case of pension benefits, we can talk about one-way solidarity. Due to financial and social issues, privileged systems are subject to a continuous political debate on potential changes (Armeanu, 2010; Inglot, 2016). For those reasons, privileged pensions systems are not sustainable or affordable.

Pension Systems in Poland – The General and Privileged Groups

Exactly as it was indicated in the introduction, in Poland the "tri-system" of old-age pensions is functioning, which consists of (Walczak, 2019):

- the general system,
- the provision system,
- the agricultural system.

In Poland employed persons as well as private entrepreneurs belong to the general pension system (for more about Polish pension system, cf. Kompa, Witkowska, 2015, European Commission, 2017). However, many social and professional groups are covered by separate systems – the provision pension system and the agricultural pension system (Czarzasty, 2016). Some people also make use of the different provisions existing within the general pension system, which contains numerous pension privileges (cf. the Act of 1998). The following can be considered as privileges (for more information on pension privileges in Poland, cf. Walczak, 2019):

- miners' pensions,
- bridging pensions of persons performing work in particularly difficult,
- compensation benefits for teachers,
- financing social security contributions for clergymen by the Church Fund.

The general pension system is operated by a specially designed institution, ZUS (Zakład Ubezpieczeń Społecznych, Eng. Social Insurance Institution, SII). It is the third largest employer in Poland with about 45,000 employees.

The provision pension scheme offers the following privileges:

- retirement provisions for military personnel,
- retirement provisions for former officers of the police, the Internal Security Agency, the Intelligence Agency, The Military Counterintelligence Service, The Military Intelligence Service, The Central Anticorruption Bureau, The Border Guards, The Marshal's Guard, The State Protection Service, The Government Protection Bureau, The State Fire Service, The Customs and Treasury Service, and The Prison Service, and for their families,
- retirement provisions for judges and prosecutors.

As this is a non-contributory, fully tax-financed pension scheme, the calculation and payment of benefits, for the first two groups, are being handled by the relevant ministries (The Ministry of Defence, The Ministry of Internal Affairs, or The Ministry of Justice). As for judges and prosecutors, those activities are performed by the bodies in which the judge or prosecutor received the last remuneration before the end of their professional career.

The last of the existing pension systems is the agricultural pension system, which is subjected to a separate institution – KRUS (Kasa Rolniczego Ubezpieczenia Społecznego, Eng. The Agricultural Social Insurance Fund, ASIF) (The Act of 1990). In Poland, this system includes not only farmers, but also other persons related to agriculture, such as spouses, members of the household, persons handling a special agricultural production unit, or even relatives helping the farmer (Pawłowska-Tyszko et al., 2013; Walczak, 2019).

Characteristics and Assessment of Pension Systems in Poland

The assessment of the adequacy of pension systems functioning in Poland can be carried out based on the following three dimensions (Chybalski, 2012):

- consumption smoothing,
- protecting against poverty,
- lack of differences between the genders (in the original version Chybalski uses the phrase 'differences between the gender' but for the sake of clarity, the authors of this article reformulate it into 'lack of differences between the genders').

When we are considering consumption smoothing, we should take into account the average pension's value in each type of system. Table 1 shows the amount of pension benefits received by different professional groups. The average monthly pension represents only about 50% of the pension of the miners and military personnel. The lowest payments are received by farmers who, however, also pay the lowest pension contributions (see Table 2). Judges and prosecutors receive the highest benefits.

They do not pay social insurance contributions, and, at least theoretically, do not retire but proceed to the so-called 'non-active status' (decommissioning). The rule is that the benefit constitutes 75% of the total basic salary and seniority allowance received at the last position held (The Act of 2001).

We cannot analyse the pension benefits without taking into consideration their co-financing by the state budget. The total subsidy from the state budget to the general pension system amounted to approximately 44 billion PLN, out of which almost 10 billion PLN was spent on subsidising miners' pensions. The payment of bridging benefits generates an expense of 658.9 million PLN, while compensation benefits for teachers cost 208.2 million PLN. State subsidies for uniformed services pensions paid out by three different ministries amounted in total to approximately 16.1 billion PLN in 2017 (including 6.4 billion paid by The Ministry of Defence, 8.3 billion paid by The Ministry of Internal Affairs and 1.4 billion paid by The Ministry of Justice). Due to the multiplicity of entities obliged to pay benefits (i.e., each Court and each Prosecutors Office in Poland), the most difficult to determine is the value of the co-financing for decommissioned judges and prosecutors, which was estimated at 600 million PLN. The subsidy for the agricultural pension system (including both disability and pension benefits), in turn, amounted to 16.7 billion PLN in 2017, which constituted approximately 90% of the expenditure on these benefits. The subsidy to the church fund from which the contributions for the priests are financed, amounted to 143.8 million PLN (CSO, 2018; SII, 2018a; SII, 2018 b, Council of Ministers, 2018; Walczak, 2019; SAO, 2018).

Table 1: Average pension value in 2017 (in PLN)

Type of system	Paying institution	Type of benefit	Average pension
The general pension system	SII	Average monthly pension	2,085.60
		Miners	4,215.82
		Bridging benefits	2,514.00
		Compensation benefits for teachers	2,073.98
The provision pension system	The Ministry of Defence	Soldiers and military intelligence and counterintelligence officers	3,481.61
	The Ministry of Internal Affairs	Officers of the Police, Internal Security Agency, Intelligence Agency, Central Anticorruption Bureau, Border Guards, Marshal's Guard, State Protection Service, State Fire Service, Customs and Treasury Service and State Protection Bureau	3,574.60
	The Ministry of Justice	Prison Service Officers	3,775.99
	Last employer (relevant court or prosecutor's office)	Judges[1] Prosecutors[1]	8,189.00 9,273.00
The agricultural pension system	ASIF	Farmers	1,221.69

[1]data from 2016.
Source: own study based on (CSO, 2018; SII, 2018a; SII, 2018 b; Walczak, 2019).

The existing pension privileges were shaped in the years 1945-1990, i.e., during the years of Communist control in Poland. Then, authorities used the system as an instrument allowing them to attain their political goals (Golinowska, 2009). At present, these privileged groups are large enough to exert political influence, which provides them with political support (Saunders, Wong, 2011). The original reason for creating each of the privileges was quite different. However, it is important to note

that they have all remained to this day in an almost unchanged form. Below, we present a short explanation for each of these privileges. Let us note that we listed only potential reasons, as these were probably not the only factors which influenced the decision to adopt the indicated solutions in the times of communism in Poland (Walczak, 2019). However, it is easy to observe the following facts:

- miners, as representatives of 'the working people', enjoyed the privileges of producing coal, the most important raw material of the Polish People's Republic (1952-1990) (Riley, Tkocz, 1998),
- the Polish state after World War II confiscated properties belonging to the Catholic Church. In return, a Church Fund was created, paying social security contributions to priests, which was intended to constitute a partial compensation for the confiscation (Bilska-Wodecka, 2006),
- officers of the uniformed services, as persons closely supporting the communist state, enjoyed numerous privileges, including retirement benefits (Bernhard, 1990),
- farmers received their privileges in 1982 (the privileges have been in force until now, this time under the Act of 1990), i.e., during the period of martial law that was introduced in Poland at that time (Wierzbicki, 2016).

Each of these groups also benefits from other privileges, which, in fact, come down to the financial aspect. Miners, the uniformed services, and judges and prosecutors receive an extra bonus salary (one month's extra pay). Retired miners are entitled to a coal allowance (the cash equivalent of three tons of coal paid in PLN), and soldiers leaving the military (e.g., retiring officers) are entitled to the so-called 'housing allowance' (amounting even to several hundred thousand PLN). In turn, farmers benefit from subsidised crop insurance premiums, subsidised interest rate payments paid on investment loans, and, what is more, they do not pay income tax (Walczak, 2017).

Pensions privileges in each of these solutions, in fact, come down to the following three aspects: 'age', 'contribution', and 'benefit'. The age privilege is the possibility of retiring earlier than the generally applicable retirement age in Poland (60/65). Table 2 contains the retirement age of 60 for women and 65 for men. This age was valid until December 31, 2013 and was introduced again starting from October 1, 2017. In the time period of January 01, 2014 to September 30, 2017, the retirement age was being gradually increased and was supposed to attain 67 years for both men (starting from 2020) and women (starting from 2040). However, this reform was never fully introduced. Miners and uniformed services are entitled to benefit from the retirement age privilege. Privileges regarding the possibility of paying lower pension contributions cover the uniformed services (who do not pay at all) and farmers. Miners and uniformed services can benefit from retirement age preferences.

Table 2: Main features of the pension systems in Poland and privileged solutions

Privileged solutions	General pension system	Miners	Provision pension system	Agricultural pension system
Contributions payer	employee/ employer	employee/ employer	without	farmer
Contribution rate	100%	100%	-	Much lower than in general pension system
Benefit (value)	-	Higher than average	Higher than average	Lower than average
Retirement age	60/65	55 years (in case of a sufficiently long service in the mine it is 50 years)	● no requirements – the uniformed services[1] ● 60/65 years - judges and prosecutors	60/65

Minimum employment period	20 years for women and 25 years for men	20 years for women and 25 years for men (Including at least 10 years of mining work)	● 15/25 years – the uniformed services[1] ● Without requirements for judges and prosecutors	25 years
DC/DB	DC	DB	DB	DB
PAYG (not-funded)/funded	PAYG/(partially funded)	PAYG	- (without contributions)	PAYG

[1] The length of service required to qualify for a retirement pension is 15 years, regardless of age, for people who started their work prior to January 01, 2013. For people who started work after December 31, 2012 the required length of service is 25 years.
Source: own study based on (Walczak, 2019).

Miners pay pension contributions in accordance with similar regulations binding all citizens belonging to the general pension system. Some of them also pay contributions to the second funded pension pillar. However, pension amounts do not depend on the value of the accumulated funds. They are calculated on completely different terms, which are dependent on the years of service and are more advantageous for miners. In order to benefit from an earlier pension, based on the defined benefit pension scheme, miners have to transfer funds accumulated on an account in the second pillar to the Treasury.

The way of calculating contributions and benefits for farmers differs significantly from other systems. As much as 99% of farmers (their spouses and household members) pay the same social security contributions. Merely 1% of persons have farms with an area of over 50 hectares and, therefore, they pay higher contributions that are still much lower than those in the general pension system (Pawłowska-Tyszko et al., 2015). Paying increased contributions does not, however, impact the amount of the future benefit. Moreover, pension benefits for farmers are differentiated theoretically only by the number of years of insurance. For a person that has been insured for 25 years, the pension amounts to 118% of the basic pension. However, for a person who pays insurance for as long as 50 years, the pension is 130% of the basic pension. Therefore, it can be stated that this system has more features beneficial to the insured under the defined benefit pension scheme than to those under the defined contribution pension system.

The reform of the pension system in Poland was introduced in 1999. It changed the rules of financing and functioning of the pension system. At present, pension benefits in the general pension system are calculated based on the value of the accumulated capital (Chłoń-Domińczak, Strzelecki, 2013; Kurach, Papla, 2016). As a result of this change, the level of benefits is decreasing dynamically (Jarocinska, Ruzik, 2016).

In general, 'protection against poverty' (one of pension adequacy dimensions) in the Polish pension system is provided by guaranteeing a minimum pension (Chłoń-Domińczak, Strzelecki, 2013). However, the possible elimination of this rule in the future may result in the payment of benefits which, in fact, will not guarantee proper protection against poverty. It will concern women in particular. In Poland, women earn less than men, especially if they are employed in the private sector (Regulska, Grabowska, 2008; Eurostat, 2017). They are also entitled to a lower retirement age and they tend to save on their own for old age (Bajtelsmit et al., 1999). Due to parental responsibilities, they also have more frequent breaks in the employment period. As a result of calculating the future pension based on the value of the accumulated capital, the value of their benefits will be lower.

One of the advantages of the privileged pensions in Poland is the lack of gender pension gap. Their legal structure resulted in the lack of significant differences on the grounds of gender. The privileged systems in Poland can be defined as gender-neutral pension systems (Frericks, Knijn, Maier, 2009). This results from several factors. Firstly, the public sector in Poland has one of the lowest gender pay gaps in Europe – 3.9% (e.g., Germany 13.4%) (Eurostat, 2017). Thus, women working as soldiers,

policemen, judges, or prosecutors earn as much as men do. In addition, for these professions the chances of advancement for women, (which means better earnings) are similar (or even better than in the past) to the chances that men have (Kozerawski, 2017). For example, a woman is the First President of the Supreme Court, however, a man is the President of the Supreme Administrative Court (as of April 22, 2020). Considering the way pension benefits are calculated in the provision pension system, they are of a similar value for both genders. In the case of farmers, due to the lower retirement age, women retire earlier. However, as indicated in the description contained in Table 2, in this system the benefits are slightly differentiated and, practically, they do not depend on the number of years of insurance. In principle, it should not be stated that benefits in the agricultural pension system are gender-differentiated because of the lower retirement age of women.

Due to the method of calculating contributions and benefits, the agricultural pension system does not ensure income equalization after retirement. Farmers' pensions are slightly higher than the minimum wage (see Table 1). Meanwhile, farmers in Poland are getting richer. Many farms are in fact well-run production companies. At the same time, the absence of any link between the farm income, the pension contribution and the benefit received results in a significant inadequacy of retirement benefits. Analysing the retirement situation of women and men in the case of miners is groundless, since mainly men work underground in mines.

Conclusions

In the case of pensions in Poland, there is no single coherent retirement system. The pension privileges introduced years ago contributed to the widening of differences in the functioning of several fragmented pension systems intended for various groups. Pension systems should have different characteristics, one of them is adequacy expressed in three dimensions.
The aim of the work was to assess the adequacy of the presented pension systems. A summary of the comparison of individual dimensions of adequacy for pension systems in Poland is presented in Table 3.

Table 3: Pension adequacy and the pension systems in Poland

Adequacy dimensions	General pension system	Miners	Provision pension system	Agricultural pension system
Consumption smoothing	NO	YES	YES	NO
Protecting against poverty	YES	YES	YES	YES
Lack of differences between the genders	NO	-	YES	YES

Source: see also (Walczak, 2019).

As can be seen in Table 3, only the provision pension system is fully adequate. Other analyzed systems firstly, are not fully adequate, and secondly, the adequacy is not equal. Therefore, the hypothesis that the analyzed pension systems are characterized of equal adequacy cannot be confirmed. There are significant differences between the general pension system (including the different solutions for miners), the provision pension system and the agricultural pension system. The first dimension – the consumption smoothing – is visible only in the pension system for miners and in the provision pension system. The second dimension – protection against poverty – theoretically, is filled by guaranteeing a minimum pension in Poland. In this case, there is a risk of abolishing this principle of the future, the effects of which may be particularly unfavorable for women. Whereas the third dimension of adequacy – lack of differences between the genders – is fulfilled in the case of the provision and agricultural pension systems only. Significant inequalities in adequacy or its complete absence indicate that building one uniform, coherent retirement system in Poland requires the introduction of many systemic actions.

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The Power of Instagram In Tourism: Visual Content Categories in Small Destinations

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Abstract

The advent of the web and its evolution have brought to an enormous production of data. Different forms of content such as textual, visual and audio-visual can be posted online but tourism is a sector particularly linked to imaging. Photos have several roles in documenting and shaping the tourist's experience and this is the reason why in the tourism sector photo-based social media use is constantly growing. Following this trend, this research would like to adopt a content analysis to the photos of small destinations uploaded on Instagram, to categorize the different image contents. In the literature this analysis was applied referring to big and famous cities mainly, but since small destinations have different features, more studies about this topic are needed. The objective is to shed light on which contents are uploaded as pictures related to small destinations. A framework for analysing contents can help destination management organizations to obtain useful insights for better answering to tourists' needs and wants and to exploit user generated images to provide both an economic and a social contribution to the tourism industry.

Keywords: User Generated Content, Tourism, Image Categories, Small Destinations

Introduction

Today social media are becoming a relevant marketing and communication tool for many industries. Looking at the tourism sector, competition is increasing, and this leads to the need of innovative tools to properly manage destinations. Destination management organizations (DMOs) have to start analyzing and understanding users-generated contents posted online (Kim et al., 2017). Many research are actually focused on the use of social media, but literature on the visual contents shared by tourists is still limited and mainly related to large cities or famous destinations (Galí and Donaire, 2015, Mukhina et al., 2017).

Image contents can represent small destinations and thus what is shared by tourists on Instagram can offer social, cultural and political insights. For these reasons we want to understand 1) which photos' contents are shared by tourists about small destinations and 2) whether the photo categories previously used in literature to study big cities can be useful for smaller tourist destinations too.

Literature Review

Social Media and Visual Contents in Tourism

Tourism has always played an important role in the development of social media (Minazzi, 2015), with a lot of contents linked to travel experiences.

Among the different forms of content such as textual, visual and audio-visual shared online, tourism is deeply related to visual media (Negri, 2018). Since photography can both build and transform an

intangible experience into something tangible, photo-based social media use is constantly growing in tourism (Mukhina et al., 2017).

More specifically, Instagram has become an effective place to find travel inspiration (Tenbarge, 2019) portraying the most "instagrammable" spots. Several places that have their own uniqueness became a tourism destination due to a post in Instagram (Mariani and Amir, 2016).

DMOs are aware of these ongoing trends and thus they try to explore the opportunities to produce online contents and use tourist-generated ones for their destinations, by developing and implementing new communication strategies (Zeng and Gerritsen, 2014, Kim et al., 2017).

Tourism in Small Destinations

Different analyses have been carried out to shed light on the potential of small cities and rural communities to position themselves more effectively in the tourism market (OECD, 2014, Brouder, 2012, Pierce et al., 2011).

On the one hand, we can see the growing power of a number of major urban centres, on the other, nowadays with the advent of a networked society smaller communities have found new opportunities to effectively compete with larger places in attracting visitors (Richards, 2019).

In fact, tourism has gone through enormous changes, with small unknown destinations that take a leading role in many countries, as they are able to combine the beauty of the landscape with history, culture, and traditions that are frequently missing in large mass destinations (Cracolici et al., 2008, Papatheodorou, 2002).

Using a quantitative research approach, Pabel & Prideaux (2016) have analysed how tourists who visit small destinations use social media - focusing on the pre-trip information search - and have considered how DMOs can use this knowledge to develop more effective social media strategies. They have demonstrated that social media have the potential to boost the online visibility of small destinations.

The Research Questions

Before Internet and social media diffusion, small destinations remained largely unknown, especially for international tourists. Now the situation has changed and these destinations already account in many countries for a sizable share of the total tourist flows (Istat, 2019, Sharpley, 2012, Jordan, 2000) but there is scarce research on how these destinations are portrayed online and how to analyse contents devoted to them.

Therefore, our research questions are:

RQ1: Which are the photo contents that are mostly shared about small destinations?
RQ2: Are the photo categories previously used in literature to study big cities representative of smaller tourist destinations too?

Design and Methodology

The research is carried out in three main phases:

- Phase 1 – Context selection: among different classification of small destination and a great numbers of small destination in most countries, we selected Italian *borghi* (typical small towns) as research setting. Italy is one of the world's major destinations, and according to the Association "*I Borghi più Belli d'Italia*", a *borgo* represents a prestigious assembly of territories with: (1) a population less than 2,000 inhabitants in the historical centre, and less than 15,000 inhabitants in the whole

municipality; (2) a remarkable urban and architectural heritage, certified by the Superintendence of Fine Arts.

- Phase 2 - Data collection: due to its explorative purpose, photos on Instagram about a sample of Italian *Borghi* were downloaded through the name of the town hashtag.
- Phase 3 - Content Analysis was applied to downloaded photos. Visual content analysis is an unobtrusive and nonreactive method specifically selected for the analysis of photographs (Negri, 2018; Galí and Donaire, 2015). A deductive content analysis using categories adopted in previous research and an inductive one are combined based on the image analysis. First, the items selected for content analysis are classified into categories, in accordance with suggestions by Bernkopf and Nixon (2019), then, some adjustments to the previously identified categories are made in order to better fit the territorial context. A final list of categories and subcategories are then defined. The inter-coder reliability for categories is tested on a 35 images subset (10% of the sample) using Krippendorff's alpha coefficient (Hayes and Krippendorff, 2007).

Results: categories and Sub-Categories Definition

The sample

The analyses are made on a limited sample of Italian *borghi* (small destinations) in order to test and define the image categories and sub-categories. These small destinations are selected among the northern part of Italy ones. Considering just the *borghi* that have an official Instagram account because of homogeneity (official accounts can increase the spread of specific hashtags). Only 5 *borghi* match these criteria. Images are downloaded from Instagram using the hashtag of the small destination name. The photos posted between 15 and 18 of August 2019 are considered. Sample is composed by 341 pictures (Table 1).

Table 1: Sample analysis

Destination Name	#Bienno	#Etroubles	#Sabbioneta	#Venzone	#Volpedo
Number of photos	60	34	86	156	5

Main Findings

Starting from the existing literature (Bernkopf and Nixon, 2019, Sonne and Erickson, 2018, Ferwerda et al., 2016), main photos features and content categories are identified and tested in our sample. Main findings related to RQ1 are summarized in table 2 and table 3.

Table 2: Human presence relevance in photos

	Relative frequencies %	**Relative frequencies for sub-categories %**	**SUB-CATEGORIES**
Human presence as main element *(Adapted from Sonne & Erickson, 2018 and Hausmann, Toivonen et*	19.65%	19.40%	With people posing alone (not selfie)
		7.46%	With people posing with others (not selfie)

al. 2018)		9.00%	With people taking a selfie alone
		14.93%	With people taking a selfie with others
		26.87%	With people doing something specific (for example a craft job)
		22.39%	Other

Despite of the context in which human presence appears, we found out that in 19.65% of the sample people are portrayed (Table 2). To classify this content, we adapted the sub-categories from Sonne & Erickson and Hausmann, Toivonen et al. (Hausmann et al., 2018, Sonne and Erickson, 2018) by focusing on both the way the photo is taken (selfie or not) and if it includes the tourists or general people doing some specific activity. Human presence is a cross-section category since it also appears in other sub-categories in an explicit (i.e. in leisure and recreation) or implicit way (i.e. pictures with a person and parts of a building as main subjects).

Table 3: Main findings of the photo categories

CATEGORY	**Category relative frequencies %**	**Relative frequencies for sub-categories %**	**SUB-CATEGORIES**
Culture history and art *(Bernkopf & Nixon, 2019)*	52.79%	29.61%	Quarters of the *borgo [new]*
		14.53%	Food (both dishes or typical products such as fruit or mushrooms) *[modified]*
		13.97%	Buildings *[modified]*
		11.17%	Parts of a building *[new]*
		7.63%	Sculptures and monuments *[modified]*
		6.70%	Details such as frescos *[new]*
		5.59%	Churches *[modified]*
		1.12%	Folklore
		9.68%	Other
Additional *(Bernkopf &Nixon, 2019)*	14.37%	46.94%	A specific object (as a bike wheel, a GPS device etc) *[new]*
		42.86%	Urban details (most of them are architectural ones framing especially windows and doors) *[new]*
		10.20%	Other

Natural resources *(Bernkopf & Nixon, 2019)*	11.14%	89.47%	Landscapes
		1.47%	Partial views *[new]*
		0.59%	Plants and animals *[modified]*
		8.47%	Other
Tourist infrastructure *(Bernkopf & Nixon, 2019)*	5.28%	77.78%	Store windows or store products *[modified]*
		22.22%	Restaurants, bars and ice-cream shops *[modified]*
Leisure and recreation *(Bernkopf & Nixon, 2019)*	5.51%	75%	People doing sport (mostly riding a bike or a motorbike) *[modified]*
		25%	People enjoying dinner out *[new]*
General infrastructure *(Bernkopf & Nixon, 2019)*	2.35%	100%	Urban centre street view *[modified]*
People *(added by authors)*	8,56%	100%	People as unique subject *[new]*

Table 3 shows the main results in applying Bernkopf and Nixon (2019) categories to the *borghi* territorial realities. It is important to underline that considering small territories as Borghi, two out of eight categories do not appear and one new category (people) was added. The category list was adapted by deleting "political and economic factors" which refers to elements such as parliament, safety, terrorism, and "natural environment" which refers to factors such as crowds, smog, traffic. Also looking at sub-categories, we detect that some of them are not applicable, some need to be modified while others need to be added in an inductive way. Results show that the most relevant sub-categories (higher number of recurrences) are part of "culture, history and art". In this category, some adjustments were needed. For example, we found that considering only buildings was not enough in order to explain the photo contents and we added the "parts of a building" dimension. The same happened for the "landscapes" sub-category, since a lot of shots did not show a full landscape, the "partial views or quarters" sub-category was introduced. Also in the "additional" category, we included a new sub-category which considers the photos that focus on any "urban detail". Moving to "natural resources" the "sky" is added. Furthermore, elements such as "fruit" and "other local products" are selected for the "food" sub-category. While, by evaluating photos about stores, we realized that "typical food shops" are so relevant that they could even represent a separated sub-category (RQ2).

Conclusions and Managerial Implications

This research focuses on images shared on Instagram about Italian small towns called *borghi* and has an explorative purpose. Results identify the most shared contents in small destinations and demonstrate that the existing content categories proposed in literature in order to represent a territory and mainly adopted for big and crowded cities do not perfectly fit these realities. Since a *borgo* is a small village made of high cultural values and ancient traditions, several elements representing big cities cannot be applied, and other new elements emerge.

We found that the most portrayed elements of a *borgo* are the ones that deal with architecture, moving from photos of entire buildings, to small architectural details such as a window, a column, a

door peephole. Instead, due to the nature of the considered territories, there is almost a total absence of portrayed infrastructures (RQ1).

Starting from the photo categories previously used in literature to study big cities, we found out that some readjustments are needed. In fact, categories such as "political and economic factors" and "natural environment" are not applicable and also some adjustments to sub-categories are found to be required. Furthermore, the need of considering the human presence in the picture, normally considered in social media analysis, arises in this specific tourism perspective (RQ2).

Listening and monitoring images posted online by users can benefit both the public government and companies involved in the tourism industry. This paper provides a categorization that fits small destinations, adapting previous classification and thus filling the gap found in the literature and providing new knowledge about online visual contents. Further analysis considering a larger sample is needed to confirm our findings. Analysing data through this framework can offer new opportunities for small destination managers. In fact, DMOs will have a detailed understanding of what is the projected image of the destination and tourists desire in relation to their time spent in small locations. Moreover, they will learn how to develop their social media strategy correctly to better face the actual increasing competition.

Furthermore, two future studies could be implemented. First study could relate the analyzed pictures of this research with its metadata such as likes, comments and hashtags in order to understand the photos which are perceived as highly engaging according also to the different categories of contents. A second study could be aimed at analyzing the effect of photo categories on tourists' response adopting a quantitative approach based on a questionnaire distributed to a sample of tourists to confirm results of the first study that are based on insights data. Representative images from each category identified in this research could be selected in order to test the effects on respondents in terms of cognitive, affective and conative response.

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Smartwatch Adoption: A Conceptual Model for Older Adults

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Abstract

In the context of a fast aging population, the usage of smart wearables responds to the increasing needs for healthcare and assistance in the case of older adults. The purpose of this study is to propose a conceptual model for adopting smartwatches by older adults. The proposed model includes factors that have been highlighted in prior studies, but have never been used altogether in a TAM model. The identified factors are defined and the corresponding hypotheses concerning the relationship between the factors that contribute to the adoption of smartwatches among older adults are formulated. Also, the analytical procedures that will be used to test the conceptual model are presented.

Keywords: smart wearables, smartwatch adoption, technology acceptance model, TAM.

Introduction

The need for monitoring older adults in order to increase their Quality of life (QoL) and wellbeing led to the development of specific systems to solve these problems (Dobre, Băjenaru, Marinescu, Tomescu, 2019). Nowadays, the IoT-based smart wearable devices became very popular and can be used for various tasks in the daily life. Older adults are able to obtain immediate feedback on their vital signs (e.g. heart rate, blood pressure), and thus real-time healthcare by transmitting physical condition data to a medical center through wireless sensor networks. The smart wearables have numerous advantages, such as reducing the cost of physical checkpup and decreasing the risk of hospital admission, thus facilitating the healthcare delivery process for older adult (Li et al., 2019).

Although the concepts of technology adoption have been widely used to measure user perception and social impact for a number of new technologies, in the case of adopting wearable devices (e.g. smartwatches) among older adults the research is limited to a small number of studies. The aim of this article is to propose a conceptual model for the adoption of smartwatches by older adults. The present study identifies and describes potential factors that may contribute to the adoption of smartwatches by older adults.

The paper is structured as follows. The next section focuses on the literature review concerning the technology adoption and the adoption of wearable technology. Section 3 presents the proposed research model, while section 4 describes the analytical procedures that will be used to test the proposed model. Conclusions and future work are provided in section 5.

Literature Review

Technology adoption

With regard to technology adoption, Davis (1989) proposed the technology acceptance model (TAM). TAM is one of the most commonly used models to understand the individual adoption of emerging information and communication technologies. TAM has been applied and validated for a wide range of new technologies and information systems, such as e-health systems (Martinez-Caro et al., 2018) and smartphones (Roy, 2017).

TAM postulates that perceived usefulness (PU) and perceived ease of use (PEOU) are two cognitive

belief dimensions that shape the users' attitude, which then determines behavioral intention to use and actual use. Additionally, TAM proposes that technologies are perceived as more useful when they are easier to use, and that usefulness also directly influences the behavioral intention to use (BI). PU is defined as "the extent to which a person believes that using particular technology will enhance his/her job performance" (Davis, 1989). PEOU describes "the degree to which a person believes that using a technology will be free from effort" (Davis, 1989).

Adoption of wearable technology

Smartwatches serve mostly for collecting useful data from a paired smartphone via wireless Bluetooth connection and providing more convenient, faster, and substitutable access to information, since its information processing is less demanding. This characteristic of smartwatches distinguishes them from other mobile devices, making them technologically and psychologically unique communication tools that deserve further investigation (Kim & Shin, 2015).

Scholars extended, adopted and applied TAM to different wearable contexts (Pal et al., 2018; Choi & Kim, 2016). Dutot et al. (2019) explored the differences of adoption of smartwatches in China, France, and Thailand. Overall, the results show that perceived affective quality, mobility, and trust are positively related to perceived usefulness (PU) and perceived ease of use (PEOU) and that PEOU, PU and attitude influence the intention to use smartwatches.

Dehghani, Kim, Dangelico (2018) investigated the factors contributing to the intention to keep using smartwatches. Complementary goods, healthology, aesthetic appeal and hedonic motivation were identified as key factors that play an important role in user behavior of smartwaches. Hong, Lin & Hsieh (2017) found that customer innovativeness was positively related to continuance intention of smartwatches, which was mediated by both hedonic and utilitarian value. Usefulness was found to be more satisfying for consumers than enjoyment/joy. Chuah et al. (2016) found that the key factors of smartwatch adoption are visibility and usefulness. Also, smartwatches are perceived by consumers as fashnology (fashion and/or technology).

Proposed Research Model

The proposed conceptual model is presented in Figure 1. By using TAM as the basic framework for the adoption of smartwatches by older adults, the proposed model witholds the influence relations between PEOU, PU, and BI from the original model by Davis (1989), as follows: *H1. PEOU has a positive influence on PU; H2. PEOU has a positive influence on BI; H3. PU has a positive influence on BI.*

The following section presents the factors and corresponding hypotheses linked to smartwatch adoption.

Ubiquity

Ubiquity represents the characteristic of IoT-based wearable devices to be operational and accessible anytime and anywhere when required for use (Balog, Băjenaru, Cristescu, 2019). Ubiquity includes *mobility (MB)* (the degree to which users believe that they can move to different locations and use their devices in transit (Shin, 2012)) and a*vailability (AV)* (the degree to which users believe that their devices offer real-time connectedness to information and services (Shin, 2012)). Therefore, the following hypotheses: *H9. MB has a positive influence on PEOU of smartwatches; H10. AV has a positive influence on PEOU of smartwatches.*

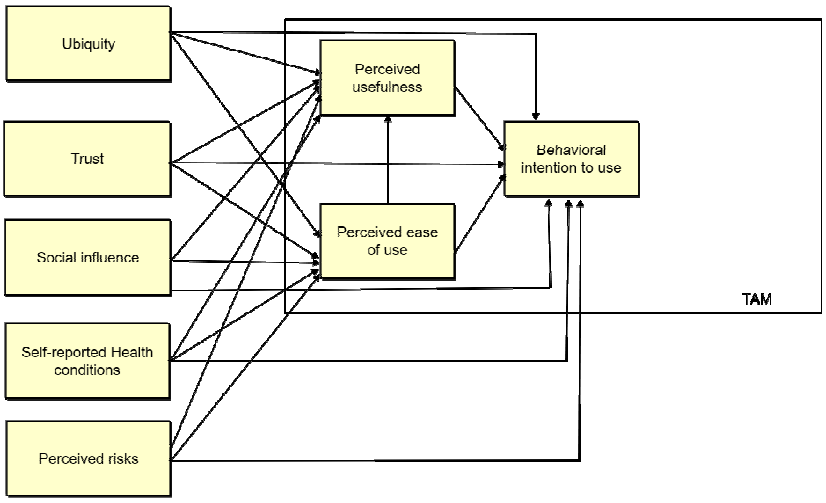

Figure 1: Smartwatch adoption model for older adults (source: authors)

Trust

In the present study, trust was defined taking into consideration the "willingness to rely" on the smartwatch. The correlation between trust and PU has previously been defined as positive (Gefen, Karahanna, Straub, 2003), similar to the correlation between trust and PEOU. Thus, the following hypotheses are presented: *H8a-8b. Trust has a positive influence on the PU and PEOU of smartwatches.*

Social influence

Social influence (SI) refers to the degree to which family members or important peers believe that the user should accept a technology (Venkatesh et al., 2003). Also, SI was identified as a strong antecedent for intention to use of Internet and perceived usefulness of consumer health information technology (Chen and Chan, 2014). Therefore, the following hypotheses are proposed: *H4a–H4c: SI has a positive influence on older adults PEOU, PU, and BI.*

Self-Reported Health Conditions

Self-reported health conditions reflects the current health status and biophysical characteristics of respondents. Significant influence of health conditions on adoption and usage of smart wearables was reported in previous studies (Chen and Chan, 2014). In the future empirical studies that the authors are going develop, the participants will be older adults aged 60 years or above, whose health status may at some point influence the adoption of smartwatches. Thus, hypotheses related to self-reported health status are as follows: *H7a–H7c.: Health has a negative influence on older adults PEOU, PU, and BI.*

Perceived Risks

Perceived risks can have a negative effect on how people perceive a new technology, which may act as a serious barrier in adopting it. The perceived risks that we have taken into account in our model are listed below.

Since the smartwatches have not been widely accepted by older adults, such systems may lead to potential risks, such as perceived social risk (PSR) and performance risk (PR) (Chan et al., 2012). PSR measures the degree to which health monitoring device users perceive stigmatization and humiliation by adopting smartwatches. PR refers to the degree to which users believe the technology may bring unanticipated risks (e.g. functionality risk and privacy violation) (Chatterjee, Price, 2009).

Therefore, PSR and PR are considered possible determinants that affect BI among older adults. Thus, the following hypotheses: *H5a–H5c. PSR has a negative influence on older adults PEOU, PU, and*

BI; H6a–H6c. PR has a negative influence on older adults PEOU, PU, and BI.

Analytical Procedures

The next phase of our research will deal with operationalization of constructs (definition and description of items) and the data will be gathered by means of a questionnaire. Data analysis will been carried out using the statistical package SPSS 23.0 for Windows. Structural Equation Modelling (SEM) with AMOS 23 software will be used to test the model. This technique is chosen for its ability to examine a series of dependence relationships simultaneously, especially where there are direct and indirect effects among constructs within model.

The data normality will be analyzed using the following tests: univariate outliers, multivariate outliers, skewness and kurtosis. The goodness of fit of the measurement model, the convergent validity and the discriminant validity will be analyzed taking into consideration the methodological recommendations concerning the evaluation criteria and the specific thresholds (Hair et al. 2014; Bagozzi & Yi, 2012; MacKenzie et al., 2011). The structural model will be examined in order to identify the links between variables and to test the hypotheses. The obtained results will be compared with findings from other studies.

Conclusion and Future Work

Recently, smartwatches have gained mass public awareness, but the actual adoption of these devices is not as high as expected. Understanding the factors that drive older adults to accept and adopt new technologies is one of the biggest challenges. Most studies on user perceptions are based on the technology acceptance theory. In addition, intentions to buy, use and continue to use new technologies are closely associated with the factors that influence and motivate users or potential users in adopting or continuing such behaviors.

The present study proposed a conceptual model for adopting smartwatches by older adults. The proposed model includes factors that have been highlighted in prior studies, but have never been used altogether in a TAM model. In the conceptual model, factors concerning the uniqueness of smart wearables including perceived social and performance risk, and health status, were considered to specifically predict the adoption of smartwatches by older adults. Moreover, the hypotheses were developed.

As the next step of this study, the measurement instrument will be developed and its reliability and validity will be examined. A survey among older adults will be carried out to examine the proposed conceptual model. The study will analyze the relationship between constructs, and will test the hypotheses concerning the relationship between the factors that contribute to the adoption of smartwatches.

Acknowledgement

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Modern Machine Park Management in The Era of Industry 4.0 Concept

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Abstract

The Internet of Things and Technologies Industry 4.0 today uses machine manufacturers and applications that are far more effective than previously maintaining their performance, ensuring high performance and plant safety. The development of the Polish economy largely depends on innovation and the ability of new solutions. In the coming years, the industry will become one of the sectors that use modern technologies, including IoT. The article assumes research attempts to identify the main problems that link the condition of the machines with the quality of products in the company. In addition to the important issue of the functioning of a knowledge-based company and innovative methods used in the assessment of production quality, issues in the area of rational use of machines in terms of use and handling were distinguished, with the distinction of machine diagnostics. Machine diagnostics play an increasingly important role as a control element in the operation process, as it is an integral part of the operation strategy according to the state that effectively displaces the previously used plan and preventive strategy. The main problem is to improve the maintenance of machines in airworthiness by extending the possibility of vibration diagnostics of the main machines of the technological process, which translates into the quality of the plant's products. Recognition of the structure and tasks as well as the technological process of the plant gives reasons for the locations (facilities, machines) of the applications of the diagnostic procedures developed. The article presents the research goals, theses and scope of planned research.

Keywords : Maintenance, Product Quality, Industry 4.0 In Poland, Innovations.

Introduction

The contemporary, highly competitive productive environment offers enterprises the challenge of dealing with extensive data function, dynamic control of decision movement or flexibility of processing processes. Particularly the aspect of production flexibility is a key element here because, at present, the nature of production is shaped by changes in the model from mass production to production on demand, directed at customer needs (Gerwin 1994). These activities result in a shorter product life cycle, an increased product range, as well as a change of processes to those with high efficiency and the change of equipment and machinery to more flexible.

The effect of developing the technological process is the increase in complexity in all areas of the company's operations. This leads to increased demand for innovation in new materials and technologies, innovative production processes, but also an innovative approach to maintenance.

Traditional industrial maintenance strategies usually consist of two elements. The first is a schedule-based preventive approach. This solution assumes that machines are inspected and repaired at certain times. The time between subsequent inspections may be based on a calendar or mileage, and the supplement is servicing as part of fault repairs. Maintenance is another option after the plant is shut down, but most companies try to avoid it because of the cost of doing so.

However, this approach is not very effective. Most of the equipment that needs to be replaced because of the schedule could work smoothly for a long time. This is the main place where losses occur. And

while too frequent servicing generates excessive, unnecessary costs, extending the intervals in the schedule can result in increased defects and reduced product quality. The above strategy is less and less effective in modern industry, where equipment is complicated and requirements for reliability are increasingly high. Therefore, more accurate real-time insight into machine operating conditions is needed to ensure that service actions are appropriate (Fig.1.).

To meet the expected complexity of modern systems, a new concept based on knowledge, technology and tools, simulation, optimization and monitoring of existing production systems was created - Industry 4.0. However, Polish companies are not yet fully ready for this revolution.

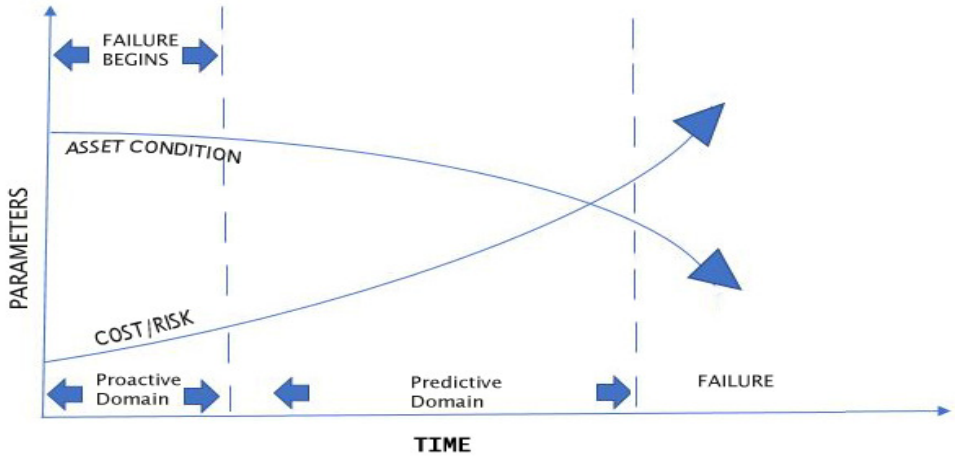

Fig. 1: What is Condition Monitoring?

Industry Concept

The concept of Industry 4.0 was first presented at the Hanover Fair in 2014 as a report with synthetic research results (Abele, Reinhart 2011). From 2011 it was assumed that in the area of Industry 4.0, the company's production system will consist of an information system and numerically controlled machines that will be operating autonomously and display elements of artificial intelligence. Reality has verified this approach because due to the specificity of production systems in various industries, the term Industry 4.0 cannot be generalized in principle (Lasi , Fettke, Kemper, Feld, Hoffmann 2014, Schmidt, Möhring, Härting, Reichstein, Neumaier, Jozinovi 2015). Therefore, the scope of the definition of Industry 4.0 should be considered individually, depending on the needs of a given enterprise. The naming of the new concept is also changing. Nevertheless, generalizations and definitions of Industry 4.0 have been undertaken.

The first industrial revolution brought mechanization into production, the second is related to the electricity introduction. In the 70s of the last century, there was a third revolution, which further developed production processes with the introduction of information technologies. The term Industry 4.0 means the fourth industrial revolution, which assumes the functioning of intelligent factories built from intelligent cyber-physical systems. The implementation of this idea should allow the implementation of intelligent production systems that, in addition to the autonomy mentioned above, will have self-configuration, self-control or self-repairing properties. Under the model, science, technology and society are in a cyclical relationship and influence each other. In the future, it is expected that technologies that automate part of our human intellect and feelings will become the basis for future development.

Currently, Industry 4.0 is one of the most frequently discussed topics among practitioners and scientists, thus becoming paramount for many research centres and companies. The Industry 4.0 concept covers areas that include many technologies and related models. As the Industry 4.0 concept develops, every enterprise is perceived as offering an intelligent module to use in the production process and delivering the product to the customer, the size of the enterprise ceases to matter. Meanwhile, the level of technology used, the level of highly qualified staff employed and openness to unrestricted communication are becoming more important.

According to prof. Mariusz Bednarek, vice president of the Industry 4.0 Institute, Polish companies are very diverse when it comes to preparation for entering the era of the digital economy and it is difficult to clearly define their digital sophistication. At the request of PSI Polska by the PMR research agency, in the first quarter of 2019, the study "Readiness of production companies to implement Industry 4.0 solutions" was carried out. It covered large and medium production companies using ERP IT systems operating in Poland and with a turnover of over PLN 20 million. It showed that over half of the companies (52 per cent) met the term Industry 4.0. Big producers (62%) were more familiar with this concept than medium (41%).

The goals of Industry 4.0 announce new production systems. As the analyzes show, some have already been implemented or are being developed. For smaller factories, implementing the concept of 'Industry 4.0' is currently very difficult or still impossible. The planned research assumes the analysis of more advanced service and maintenance strategies and reference to how IoT and various components allow such activities to be carried out.

Goals and theses of Planned Research

The following objectives were set for carrying out the planned study:

- Literature analysis aimed at identifying the current state of the knowledge-based enterprise, its productivity, creative and innovative activities using virtual techniques.
- Identification of the currently used Support System for Maintenance and Maintenance Management in the selected company.
- Isolation of differences between the currently used model supporting the management of the machine park and the diagnostic model extended by the OPTIMUM, SVD, SIBI methods, and diagnostic modelling.

The main thesis of the planned research:
The functioning of a modern knowledge-based enterprise in a free market economy is possible with the use of creative and innovative activities in the area of productivity and quality, capturing the possibilities of information techniques for the needs of the wide application of modern methods in maintaining the condition of machines

Scope of Planned Research

Based on the literature analysis carried out so far, it can be said that computer-aided maintenance systems provide the opportunity to collect information about damage to objects, about their operation and allow the development of schedules for both periodic and preventive inspections. However, these systems do not have typical diagnostic functions in their structure, which should be supplemented with available software.

It will be necessary to study the changes in the state of machinery in the company using the proposed methodology of vibration diagnostics (experiments, results, statistical study).
It will be advisable to present the concept and develop recommendations supporting operation and maintenance management for the selected enterprise.

Therefore, the work necessary to achieve the research objectives will include:

- literature analysis on the subject of maintaining the fitness of machines,

- analysis of regulations and literature on modern methods of maintaining the fitness of machines in the era of Industry 4.0,
- study of changes in the state of machines of the enterprise using the vibration diagnostics methodology.

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Assessment of The Impact of The Region's Level of Innovation on Its Competitiveness

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Abstract

The article describes the method and results of quantitative assessment of the impact of innovative economic development on the competitiveness of the region. The competitive position of the region was estimated using the author's method of determining the level of regional competitiveness, taking into consideration factors such as the level of economic potential and efficiency of its use, the region's attractiveness for people and for business, innovativeness of the regional economy

Keywords: Region, Competitiveness, Innovation.

Introduction

Competitiveness is one of the important aspects of social and economic development of regions. In this way the competitiveness of regions mainly defines by the level their innovative development. Moreover on the modern economy actually innovative component mostly determined and predetermined the achievement competitive advantages of the regions. Consequently to define the degree of importance this factor on the formation of competitive position of region is too significant.

As research has shown the competitiveness of the region correctly to define as the ability of region to formation, maintain, improve and use own competitive advantages on the relationships and interactions with other players on the market. And the aims of this action are the provision of sustainable social and economic development of the region and growth of welfare of population of this region. A large number of created or just inherited from nature the competitive advantages of region and high level their implementation describes the big competitiveness of the region. At the same time, just the mere presence of certain competitive advantages does not in itself mean that the system is competitive, since they still need to be implemented.

Competitiveness can be viewed and evaluated from two approaches quantitative and qualitative. If we talk about the first, the level or degree of competitiveness is usually assessed using a special system of indicators and appropriate methods, which are currently very numerous, but the most popular and applicable in recent years is the rating system.

As a rule, several groups of indicators are taken, for example:

– Standard of living of the population;
– The level of investment attractiveness;
– The level of efficiency of resource use.

The impact of innovations on the competitiveness of the region is carried out through the creation of a new type of competitive advantages innovative, which, unlike many others, for example, natural resources, which are ultimately inexhaustible, are not limited either by the possible impact potential or time frame. They are able to ensure continuous and sustainable economic growth and progressive development of the region both in the current period and in the strategic plan in any future.

Thus, the relationship between innovation and competitiveness indicates the unity of the quantitative and qualitative sides of the latter and actually means a new quality of competitiveness.

As for the analysis of the qualitative side of the category under study, it makes sense to use the approach of M. Porter, who, as we know, identifies “four interrelated stages in the development of competitiveness: factors of production, investment, innovation and wealth”.

In the first stage, competitiveness is achieved through competitive advantages related to the availability and use of human and financial resources. At this stage, the economic system is most sensitive to such phenomena as economic crises, currency fluctuations, etc., which, by the way, is very typical for the economy of modern Kazakhstan as a whole and its regions.

At the second stage of investment, competitiveness is ensured by an effective and even “aggressive” investment policy aimed at developing and implementing improved technologies and expanding the scale of production and sales, increasing investment in knowledge-intensive industries, and creating an effective scientific, technical and economic infrastructure.

For the formation of regional investment policy, it is important to identify and evaluate the investment potential of the region. Investment potential is an integral element of the investment climate, a characteristic of objective prerequisites for accepting investments, objects for investment in a region or country. It is calculated on the basis of macroeconomic indicators that take into account factors of production, consumer demand of the population, etc. Among the variety of indicators that reflect the state of economic and investment potential, it is necessary to highlight the main ones for the purposes of forming investment policy. These include a set of internal investment resources of the region (regional budget funds, funds of enterprises and financial institutions, funds of accumulation of the population, the value of collateral objects in the region).

The investment potential of the region is a complex indicator that reflects the state of investment resources, both actual and potential. It takes into account the main macroeconomic indicators, the saturation of the territory with factors of production, consumer demand of the population and other characteristics. The investment potential of the region consists of eight private potentials (each of which, in turn, is characterized by a whole group of indicators): resource and raw materials, labor, production, innovation, institutional, infrastructure, financial, and consumer potentials.

In such a vast country as Kazakhstan, the regional factor plays a key role in the overall economic development and investment of innovations. Today's priorities include: preventing further decline in the role of scientific and innovative and productive potential in the economy of regions, reducing the number of depressed cities and regions, overcoming the crisis situation in small cities and their

revival on an innovative basis by ensuring the influx of scientific and technological achievements and other innovations.

The set of actions listed above represents the practical implementation of regional investment and innovation policy. As a scientific category, the term "policy" means a set of goals and objectives of a strategic and tactical nature, which the subject of management seeks to achieve, and the mechanism for achieving them in any sphere of social development".

Based on this, the essence of regional investment and innovation policy can be defined as a purposeful, scientifically based activity of regional authorities and management to attract and effectively use investment resources to solve problems of socio-economic development of the region and improve the quality of life of the population based on scientific and technological progress.

The process of implementation of regional investment and innovation policy can be represented as a sequence of works performed by regional public authorities, in accordance with figure 1.

At the first stage, social, environmental and economic problems of the region are identified, the solution of which requires innovation and investment. When solving problems of regional development, strategic and tactical goals and priority directions of innovative development and investment are selected.

At the second stage, innovative development is determined which areas of the region's economy will have the greatest impact on solving social, environmental and economic problems in the region. At the third stage, priority directions of innovative development of the region's economy are determined. At the fourth stage, the regional investment strategy is determined. At the same time, a number of conditions are defined that must be met by investment projects implemented in the region.

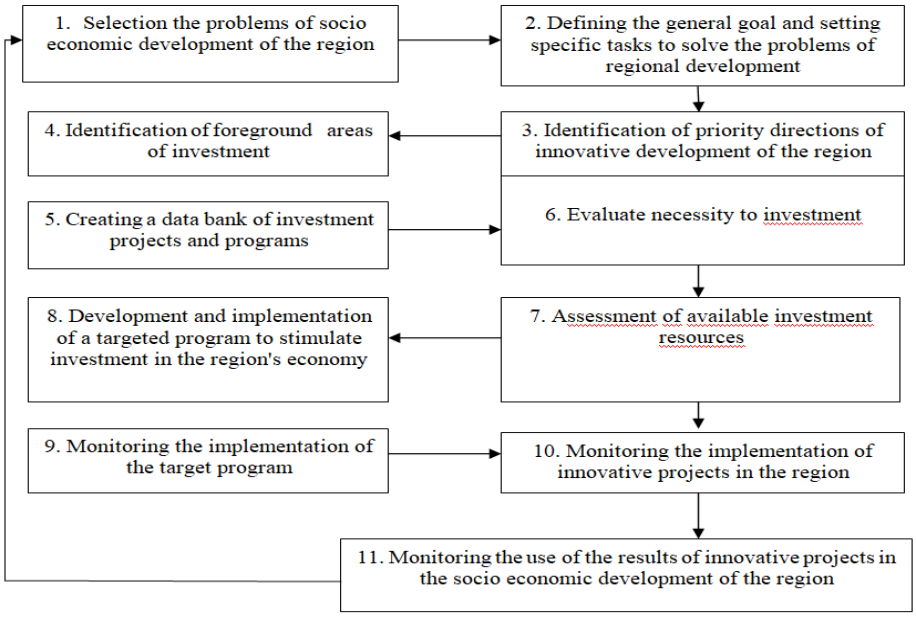

Figure 1: Formation and implementation of investment and innovation policy
Note – Complied by the authors

The main ones are:

1) Investments should be innovation-oriented, ensuring the modernization of the region's industry, increasing labor productivity and employment;
2) Investments should be regionally oriented and ensure that the interests of the region's population are given priority when making investment decisions;
3) As one of the main investment criteria, the principle of "no degradation" of the region's population's habitat should be used, which implies taking into account environmental factors when calculating the projected results and consequences of investments. Compliance with this condition can be ensured by the introduction of mandatory expertise of investment projects and proposals.

At the fifth stage, the regional innovation and investment program has been formed.

Let's look at how the scheme of the regional investment and innovation policy model might look, in accordance with figure 2.

Based on the characteristics of the regional investment and innovation policy, two key blocks can be identified in the above diagram. The first block is criteria and methods for selecting objects and projects for regional development. The second block is mechanisms for attracting investment resources.

In accordance with figure 2, the central role in the scheme is occupied by the block of the regional investment and innovation program, which reflects the type of regional investment and innovation policy and determines its effectiveness. The main factor is the availability of a block for attracting resources.

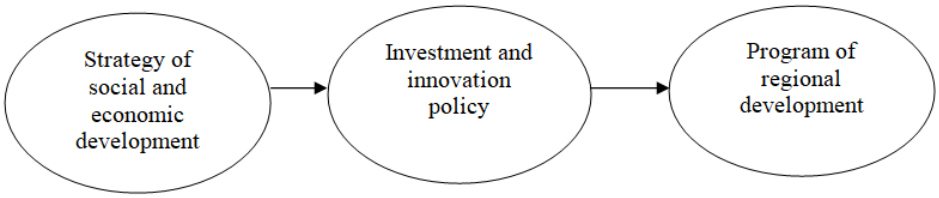

Figure 2: Regional investment and innovation policy

Note – Complied by the authors

Under a centralized management system, state investment and innovation policy was based only on state resources that were concentrated in the hands of the state. Therefore, the problem itself and the technology for attracting investment were absent, and investment policy consisted mainly in the distribution of resources. Thus, the components is the economic potential of the territory, the development strategy and the economic self sufficiency of the region are prerequisites for the formation of a regional investment and innovation policy, as shown in figure 3.

Investment activity reflects the level of use of innovative potential in production and social relations. Innovation activity determines the ability of the region to perceive innovations in production. And this indicator should be required a special importance when forming investment and innovation policy in the region.

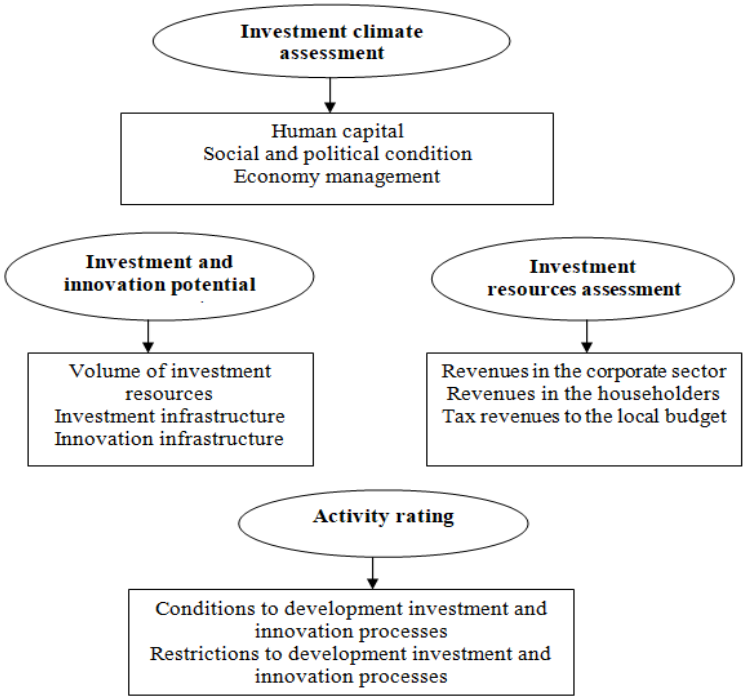

Figure 3: Methodological tools for evaluating investment and innovation activities
Note – Complied by the authors

The third stage has a particular importance innovative stage, when competitive advantages are actively formed by economic entities themselves, and domestic enterprises not only improve foreign technologies, but also create their own. This stage is characterized by the wide use of innovations in all spheres of economy and management, the creation of incentives for the introduction of new equipment and technologies, the growth of the number of scientific institutions and organizations focused directly on the needs of firms and industries, etc.

The analysis of works devoted to the assessment of the impact of the level of innovation of the regional economy on its competitiveness in various regions of the country allowed us to identify and systematize the key indicators of the level of innovation of the regional economy (Table 1).

Table 1: Indicators for assessing the impact of the level of innovation in the economy on the competitiveness of the region

Element of regional innovation system	Advantages of indicator	Disadvantages of indicator
1	2	3
Number of organizations doing R&D	Scientific and innovation potential of region assessment	Does not allow evaluating the structure of scientific organizations
Number of R&D personnel employed per 1,000 residents of the region	Assesses the human resources potential of knowledge generation and dissemination institutions	There is no information about performance and employment structure
Graduation of doctoral students with dissertation	Assesses the potential of the economy in the field of new	It does not allow you to assess the level of involvement of specialists

defense for 1 thousand residents of the region	personnel	in the process of creating knowledge
Technological innovation costs, as a % of GRP	Assesses the amount of investment in the final result of innovation activity	It does not allow evaluating the contribution of individual RIS entities to innovation financing
Volume of innovative goods, works, and services as a % of the total volume of goods, works, and services	Assessment of the degree of demand for scientific and technical achievements	Does not allow you to evaluate the degree of improvement of goods, works, services
Level of business innovation activity	Comprehensive assessment of business innovation activity	Evaluating the activity of industrial organizations only
Number of institutes for the development of scientific and technological potential in the region	Assessment of the development of the innovation infrastructure sector	It does not allow evaluating the activity of development institutions in supporting R&D
The number of registered subscriber stations of cellular communication	Assessment of the level of development of the information and communication environment in the region	Shows only an approximate degree of integration of elements RIS
Note – complied by the authors		

Based on the comparative analysis of the advantages and disadvantages of the RIS assessment methods, it can be concluded that the most effective method for a comprehensive assessment of the impact of the level of innovation of the regional economy on its competitiveness is the construction of integral indices.

The construction of a complex assessment in the form of an integral index consists of several consecutive stages:

1. Select a set of indicators.
2. Processing of primary data according to the selected processing method.
3. Normalization of calculated indicators, i.e. bringing them into a comparable form in the range [0,1].
4. Determining the relative importance of influence factors, i.e. weight coefficients.
5. Calculating the values of the integral index.

Testing of the results obtained on real data.

In our model, for each indicator, its normalized (index) value is defined as the ratio of the deviation from the minimum sample value to the sample size:

$$Ij = Xj - Xmin / Xmax - Xmin, \quad (1)$$

I_j – index value of the object's j-th characteristic
X_j – the observed value of the indicator for the object's j-th characteristic
X_{min} – minimum value of the indicator in the sample
X_{max} – maximum value of the indicator in the sample.

Since indexes can be heterogeneous in composition, i.e. contain "positive" and "negative" indicators, the resulting normalized values should be converted so that the dependence of the index values and the corresponding indicator corresponds to its conditional "positivity, or "negativity". This means that the greater the value of a positive indicator, the greater the index value should be, and in contrast the greater the value of a negative indicator, the smaller the index should be.

Therefore, if the indicator is conditionally positive, we leave it unchanged. Otherwise, the indicator value should be replaced with its complement to the unit.

$$Ij = 1 - I\Pi j; \quad (2)$$

I_j - the final value of the "negative" indicator for the object's j characteristic;
I^{Π}_j - index value of the "negative" indicator for the j characteristic of the object, calculated using the formula (2).

The proposed indicators for assessing the impact of the level of innovation in the economy on the competitiveness of the region allow us to evaluate and commercialize the results of R&D, and can be used to test various hypotheses (Table 2).

Table 2: Indicators for assessing the impact of the level of innovation in the economy on the competitiveness of the Kyzylorda region

Element RIS	2015	2016	2017	2018	2019	Growth rate of 2019 to 2015, %
Number of organizations doing R&D	7	6	6	8	10	42,8
Number of R&D personnel employed per 1,000 residents of the region	192/0,26	205/0,27	253/0,33	236/0,30	228/0,29	11,5
Graduation of doctoral students with dissertation defense for 1 thousand residents of the region	51/0,07	18/0,02	26/0,03	24/0,03	27/0,03	-13,3
Technological innovation costs, as a % of GRP	7 133,1/0,56	16 011,1/1,1	27 065,2/1,96	4 088,5/0,35	34 565,9/27,7	48,4
Volume of innovative goods, works, and services as a % of the total volume of goods, works, and services	3 645,0/0,28	6 641,7/0,45	4 761,2/0,34	6 930,3/0,59	6 295,2/5,06	17
Level of business innovation activity	12,8	12,0	10,1	11,7	11,2	-12,5
Note-calculated by the authors						

According to the table, in 2019, there was a decline in indicators such as the graduation of doctoral students with a thesis defense per 1 thousand residents of the region by 13.3%, the level of business innovation activity by 12.5% and therefore, there was a slowdown in innovation processes in the Kyzylorda region.

Conclusion

With the development of regionalization and local self-government processes, there is a division of powers, functions and responsibilities between the Government, regions and local self-government bodies. This includes investment and innovation policy, where regions have the opportunity to develop and implement their own investment and innovation policy by identifying priority investment and innovation facilities, developing and adopting regional legislation that promotes investment and innovation, and forming innovation and investment infrastructure in the region.

The model of regional investment and innovation policy at the stage of transition to a new industrial and innovative economy has a number of fundamental features that distinguish it from the models of investment policy of previous periods. The General strategy of socio-economic development of the region is a prerequisite for the formation of regional investment and innovation policy. In relation to it, the investment and innovation policy is a tool and should be agreed on the goals and deadlines for the implementation of individual projects, taking into account their synergistic impact. One of the features of the development of regional investment and innovation policy of the transition period is the limited overall period of its formation.

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SVM Data Mining for Social Project Evaluation

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Abstract

Evaluation processes should focus on estimating the outcomes of social projects and interventions because good intentions and positive looking goals do not always lead to the achievement of assumed and intended social benefits. There are many finance-economics evaluation methods and models. Against this background, the achievements in the field of social aspects evaluation are much more modest. Expanding the set of available solutions, it is worth looking for sources of inspiration related to the digital era, new business analytics methods and machine learning approaches. The main purpose of this paper is to explore the possibilities of using Support Vector Machine (SVM) data mining for social project evaluation. The proposed method can be a significant complement to the solutions used so far in this field. Properly conducted evaluation of social projects is one of the most important conditions for their proper implementation and success. The method allows conducting research using large collections of various data, it can be a real support in reducing the subjectivity of evaluation processes regarding social aspects of interventions from public funds by obtaining reliable research results and relatively easy identification of calculation errors. The paper presents theoretical considerations as well as an example implementation of the system supporting the evaluation of innovative social projects and the results of empirical research related to the verification process of the proposed method. Possible directions of further research in the field of development of the presented solutions are also indicated.

Keywords: Social Project Evaluation, Project Management, Support Vector Machine, SVM Data Mining.

Introduction

The United Nations' 2030 Agenda includes seventeen Sustainable Development Goals (SDG), which are a source of valuable inspiration related to the functioning of commercial and public institutions, as well as planning and implementation of commercial and non-commercial projects. They concern key sustainability problems concerning humanity and the entire planet, which include, for example, poverty, good health and well-being, inequalities reduction, quality of education, climate change, natural environment protection, decent work and economic growth as well as global and local partnership for achieving the goals (UN, 2015). SDG indicators serve as the basis for measuring and evaluating the sustainability of enterprises (Drobyazko et al., 2019) and various types of projects.

The guidelines contained in the documents related to SDG are associated with significant new challenges regarding corporate sustainability reporting (Tsalis et al., 2020) and conducting evaluations of various types of activities and projects. The issues of evaluation carried out in accordance with the SDG are of increasing importance and its proper implementation can provide significant difficulties, as projects are becoming more complex and the objectives to be achieved (observed from the perspective of various groups of stakeholders) are multifaceted, often inconsistent and contradictory. There is also usually considerable variation in the perception of project success by diverse groups of stakeholders and the need to develop modern methods and models for project evaluation that take into account dynamic changes of perspective within many time frames and many research perspectives occurs (Davis, 2017; Turner and Zolin, 2012). It is therefore necessary to carry out methodological studies taking into account the multifaceted nature of the social project outcomes evaluation.

On the part of policy makers, practicing managers and academics, there is considerable interest in the issues of multifaceted analyzes of social projects outcomes and social innovations carried out in the context of sustainable economic development in the digitalization era. Digitalization affects sustainable development and it is necessary to search for appropriate methods and measurement models for both micro and macro aspects related to sustainability dimensions (Jovanović, Dlacic and Okanovic, 2018). The key drivers for sustainable development are various types of innovations and it is necessary to conduct multidisciplinary research and discussion related to, i.e., with new technologies for sustainable development and challenges regarding social innovations (Silvestre and Tirca, 2019). Literature research on creating a clear picture of the academic discussion on the link between SDG and social innovation shows that it is a constantly growing field (Eichler and Schwarz, 2019).

Social projects (which are often based on the power of data) can solve societal problems, improve human development, be a source of valuable innovations, create social sustainability and desired changes (Howaldt and Schwarz, 2017). Until now, research related to the use of analytical modeling, machine learning and various numerical analysis has been mainly focused on solving technical and business problems. Therefore, there are challenges regarding the use of big data and data mining potential in solving social problems as well as taking data-driven decisions regarding the creation of new paths of social innovations and evaluation of sustainable development projects (Pappas et al., 2017). Social innovation projects are playing an increasingly important role in the development of modern societies and it is necessary to develop approaches and methods that support their multifaceted evaluation, including inspired by business analytics solutions.

The development of new research methods that can potentially meet the challenges of multifaceted evaluation of social projects can be based on conducting research work under the following two streams: improving methods known from social sciences or interdisciplinary research using achievements related to progress in the field of machine learning, AI and intelligent systems - single and mixed (Grzeszczyk, 2018). The achievements in the field of project evaluation related to the second stream are much more modest. Therefore, when conducting methodological research concern expanding the set of available methods for evaluating social projects, it is worth using sources of inspiration related to the digital era, new business analytics methods and machine learning approaches. Thus, a significant supplement to the solutions used so far in social project evaluation may be the method based on Support Vector Machine (SVM) data mining.

The main purpose of this paper is to explore the possibilities of using SVM data mining for social project evaluation. In addition to presenting theoretical issues, an example implementation of the system supporting the evaluation of social projects and verification studies based on empirical data were carried out. Empirical research was conducted using data on innovative social projects planned for implementation with financial support from the European Social Fund in Poland. Finally, possible directions of further research in the field of development of the proposed method were signaled.

Social Project Evaluation

Many contemporary projects are non-commercial and their goal is to achieve various social outcomes related to SDG, such as combating poverty, improving health and well-being, inequalities reduction, ensuring access to high quality education, reducing adverse climate change, protection of natural environment, decent work and economic growth as well as providing partnership for these goals. An overview of research concerning sustainable development and project management is provided in (Farias de Toledo et al., 2019).

In the programming period (2014-2020) of the EU Cohesion Policy, programs supporting economic and social cohesion, are implemented. Social projects implemented under these types of programs are used to involve organizations and local communities in activities related to the achievement of the objectives of the Europe 2020 Strategy for Smart, Sustainable and Inclusive Growth (Saracu and Trif, 2019). Among previously undertaken similar programs related to innovative activities were, among

others Community initiatives under the European Social Fund and among them several EQUAL themes promoting innovative social projects and social economy.

The implementation of mechanisms for equalizing employment opportunities for social groups experiencing inequalities resulting from a lack of qualifications and a low level of education, and ensuring their participation in the development of the information society requires the use of specific approaches focused on local conditions related to specific geographical locations of implemented social projects. In particular regions and countries there are differences in levels of digitalization specific problems related to social sustainable development in the digitalization era. For example, the first program in Poland aimed at implementing innovative projects tailored to local social problems is EQUAL Community Initiative. Many projects implemented under this program were innovative and set future standards for action in subsequent local programs and projects supported by the European Social Fund (Klimczuk 2015).

The issues of innovative social projects evaluation are not well researched. In the case of evaluation of such contemporary projects, methods based on cash flows and simple financial indicators are not useful. The evaluation methods used for sustainable projects should consider their diversity, complexity and be consistent with the following concepts: Corporate Social Responsibility (CSR), Triple Bottom Line (TBL) and Sustainable Project Management (Sabini, Muzio and Alderman, 2019). Approaches to CSR are discussed in more detail in publications such as e.g. (Jankalov and Jankal, 2017) and (Krajnakova et al., 2018).

There is a considerable variety of project evaluation methods (Gertler et al., 2016; Linfield and Posavac, 2019). However, it is worth paying attention to one more specific feature of social outcomes and social efficiency notion. In contrast to the measurements based on universal economic values, social measures are characterized by a significant diversity resulting, for example, from differently and subjectively understood social values, expectations and customs that can occur in societies and communities located in different regions of the world (Grzeszczyk and Pelszynski, 2020). Significant differences can be noticed even among people from one country who speak different languages and profess different religions (Crafa, Liu and Brodeur, 2019). Social projects usually involve a large number of stakeholders, often with significant cultural, linguistic differences and attitudes towards official responsibilities (Diallo and Thuillier, 2005). Social Impact Assessment is one of the approaches to support the resolution of this type of multifaceted problems related to mainly long-term social and environmental impacts of public projects and programs (Wong and Ho, 2015).

As part of evaluation studies concerning social projects, predictions or measurements of multifaceted outcomes are made. The proposed evaluation method should, first of all, take into account aspects of the hard to quantify and measure, sustainable and responsible socio-economic development - in accordance with the SDG criteria. Evaluation research can be related to many aspects, i.e. economic, ecological, technical, research, organizational, cultural, political, legal, etc. However, the key aspects are those related to social outcomes. Evaluation criteria of individual projects may differ significantly and depend on the regulations occurring in the programming documents of entities financing the evaluated projects. The criteria regarding socio-economic efficiency are of fundamental importance. The literature recommends focusing on assessing of social interventions, projects and programs, as well as according to the classical definition, evaluation of programs is their systematic assessment that includes improvement of social conditions and individual and collective well-being (Rossi et al., 2019).

It is necessary to harmoniously develop research on multicriteria evaluation of social projects in accordance with the SDG. The development of this type of research requires a new look at current achievements in evaluation theory and practice and going beyond the methods used so far towards approaches and solutions inspired by the digital era, new business analytics methods and machine learning approaches. Such inspirations may contribute to proposing new methods of evaluation of social projects that are a significant complement to the solutions used so far in this field.

The results of literature studies show that there is still not enough research on the applications of artificial intelligence and machine learning methods that are used in social project evaluation processes. The problem of evaluating this kind of projects can be considered complicated and complex and its resolution takes place in conditions of considerable uncertainty. It is justified to further explore new methods that are useful in processes of social projects evaluation and would take into account key achievements in the field of artificial intelligence methods. Significant potential which can be exploited in this field is associated with machine learning methods - including SVM.

The Potential of Using SVM Models in Project Evaluation

SVM is one of the most valued machine learning models as evidenced by the dynamically growing number of papers on its applications (Yu et al., 2020). The increase in interest is due to the relatively simple mathematical description and ease of use. Despite its simplicity, it has significant potential that can and should be used in various fields (Ma and Guo, 2014). For solving complex and nonlinear problems (concerning regression and classification), kernel methods are used, which are based on transferring the learning set to high-dimensional space using the appropriate mapping function. The use of such methods and models is also necessary when solving the problem of project evaluation.

The operation of SVM models is based on the use of the approach referred to as supervised learning - principle of searching for the most appropriate answers on the output of the model in response to the input data. The model learns based on sets of learning examples that contain pairs of input data and their corresponding output data. In this way, the learned model is informed about the belonging of objects to defined classes. A useful feature of machine learning models is their ability to generalize knowledge, i.e. to generalize the experience gained in learning processes. This involves the possibility of obtaining correct model responses to input data not previously found in the train set.

Classified objects can be characterized by the values of many features (attributes, criteria). The significant potential for applications in the field of evaluation of various types of projects results from the basic feature of the assessment process, which is systematic examination using the adopted evaluation criteria. Estimating the quality and value of public intervention, in the form of projects, cannot be carried out without using specific criteria. The necessity of basing the evaluation process on several evaluation criteria and the use of multi-criteria evaluation results from the multifaceted and comprehensive nature of the social projects evaluation problem.

The criteria for evaluating social projects that can be applied in calculations using SVM models are often complex, multidimensional and interdisciplinary. In addition to the quantitative financial-economic criteria (typical for commercial projects), there are also other types of criteria that take into account the qualitative and hard-measurable aspects of sustainable development compatible with the SDG. They are related to social aspects, but often also economic, technical, organizational, legal, ecological, cultural, political and other attributes describing the conditions of implementation and the evaluated project environment.

Models and methods based on SVM work well in carrying out research processes based on significantly differentiated and large data sets. In addition to the undoubted advantages, they also have some disadvantages typical for machine learning methods. Among them, there are some difficulties in assessing built models and estimating ex-ante errors. In practice, in the case of solving regression problems related to e.g. forecasting, accurate error estimation is possible ex post, as a result of comparing actual values with forecasts. However, the advantages of SVM methods outweigh their disadvantages. They are usually effective in accuracy and in many cases ensure obtaining correct calculation results at relatively low computation power.

SVM-based methods and models have huge and untapped research potential in the evaluation. Against the background of current achievements and considerations regarding the potential of SVM applications, there is a clearly visible gap in the application of such models in evaluation of various types of projects. This is an inspiration to develop research in this area.

Methodology

The research question - '*Is there a need and possibility to use SVM Data Mining in supporting social projects evaluation processes?*' - is the basis for the selection of appropriate research methods that allow the collection and analysis of empirical quantitative and qualitative data. In these studies, the following research methods and techniques were used: literature research and analysis of documents related to the evaluation processes of innovative social projects, which were evaluated in terms of possible funding from the ESF - European Social Fund in Poland (within EQUAL Community Initiative). The most important documents that were analyzed were the forms filled in by experts conducting the evaluation of social projects. In addition, simulation and computer experiments based on SVM data mining algorithm available in TIBCO Statistica 13.3 software were used. To facilitate these simulations and calculations, the collected empirical data was recorded in a spreadsheet.

Projects evaluated by experts were primarily an innovative complement and development of standard activities supported by the ESF and the state budget. They concerned activities related to the development, implementation and promotion of new, innovative methods of combating inequalities and discrimination that may occur on the labor market. The scope of these projects included experimental and innovative concepts, as well as transnationality activities that were planned to be implemented not by individual institutions, but through partnerships of many organizations with significant diversity, e.g. national, regional and local state authorities units as well as organizations supporting discriminated groups , private enterprises, universities and research centers and others (EQUAL, 2007).

The scope of document analysis was limited to priority Theme A, whose basic priorities were associated with supporting equalization of opportunities on the labor market for social groups with low qualifications and level of education, and therefore experiencing inequalities as well as including these groups to participate in the development of the information society. As part of this Theme (in 2004), 425 project proposals were submitted. This accounted for over half (around 57%) of all proposals. Other themes were less frequently represented (from one to several percent). 88% of project proposals (375) successfully passed the formal assessment phase. These projects were then sent to the second phase of substantive evaluation. After the second stage of evaluation carried out by a panel of experts appointed by the government institution, 248 projects were positive evaluation results and 127 were negative. Projects intended for financial support and implementation were selected from a set of projects evaluated positively.

Two sets of positive and negative evaluated projects were designated for computational experiments. The large amount of quantitative and qualitative empirical data justifies the use of SVM Data Mining for these calculations. The collected set of empirical project data was analyzed in terms of their acceptance (possible coverage with public funds) or rejection. Two decision classes have been identified: projects evaluated positive or negative (coded 1 and 0 respectively). Projects from these decision classes were divided into two random subsets: training (75%) and testing (25%). A model of SVM was built by using the training set. Then data saved in the testing set was applied in the process of verifying the suitability of SVM data mining for social project evaluation.

Results and Discussion

The presented results and discussion mainly focus on issues related to seeking answers to a research question regarding the need and possibility of using SVM Data Mining in supporting innovative social projects evaluation processes. The analysis of documents related to the evaluation of innovative social projects mainly concerned the forms filled in by the evaluators. Based on this analysis, the evaluation criteria, that were used by expert evaluators during the substantive evaluation phase, were identified. Analogous criteria have been applied in calculations based on SVM data mining, i.e.:

- The purpose of the partnership established to implement the evaluated project and connection with the program documents,

- Justification of the need to support the proposed activities of the partnership,
- Planned work and activities of the partnership,
- Ensuring partnership,
- Approach related to empowerment,
- Innovative approach,
- Approach to the dissemination and inclusion of results in accordance with the principle of mainstreaming,
- The objectives in the field of transnational cooperation.

Multicriteria analysis parameters and results obtained using SVM data mining (a multiclass, non-linear binary SVM classifier) are presented in Table 1. The obtained value of overall classification accuracy can be considered satisfactory and a good basis for further development of research on proposing practically useful tools not only for the needs of conducting scientific experiments, but also for supporting project evaluation processes.

Table 1: Multicriteria analysis parameters and results

Analysis parameters		SVM results	
Kernel type – RBF (Radial Basis Function), Gamma	0.125	Number of SV	62
Size of training sample (random sampling)	75%	Training classification accuracy	94.66%
Maximum number of iterations	1000	Test classification accuracy	91.49%
Stop training at error	0.001	Overall classification accuracy	93.87%

Source: own calculations

The basic concept associated with the classification based on the available SVM algorithm is support vector (SV). As a result of the calculations, 62 number of SV and 53 bounded support vectors (BSV) are detected. The number of SV proves the relatively good suitability of the built model for classifying projects from the analyzed data set. There are relatively few of them in relation to the number of evaluated projects. Future computational experiments related to the use of other types of algorithms may lead to a decrease in this number and an improvement in the functioning of the classifier from the point of view of the ability to generalize knowledge acquired in the learning process.

The correlations between the number of criteria and the numbers SV and BSV are opposite, i.e. as the number of criteria increases, the number of SV moves higher (positive relationship), while BSV decreases (negative correlation). Achieving similar and relatively small SV and BSV numbers in this case is a compromise solution because this means achieving a balance between two differently correlated parameters. The use of visual methods can be helpful in better understanding this kind of dependency (Caragea et al., 2008).

The confusion matrix for the innovative social project classification can be seen in Table 2. It includes two decision classes used in calculations. The form of the matrix proves the good properties of the built SVM model from the point of view of the ability to readily separate from each other the established decision classes. The number of cases from the learning set turned out to be enough to create a model that is a very powerful tool with significant practical utility in supporting project evaluation processes. When building supervised learning models (to which SVM belongs), requirements for too large learning collections are sometimes blocking many practical applications.

Table 2: Confusion matrix for social project classification

Class observed	0	1
0	27	3
1	5	59

Source: own calculations

The classification results obtained with the use of SVM data mining can be considered as quite satisfactory. These results of empirical research are only preliminary, but they make it possible to draw a conclusion about the practical usefulness of the proposed solution. These calculations show the possibility of using this method for social project evaluation. In the future, it is worth comparing the results with other classifiers.

Conclusions

Literature studies have shown that existing approaches, methods and research tools for the evaluation of social projects are often insufficient and it is worth paying attention to the possibilities of extending the set of available solutions to reduce the subjectivity of the assessments carried out (especially in the case of qualitative criteria). Therefore, there is a need to look for new research methods that could be applied in this field. An interesting source of inspiration for conducting methodological research are achievements in the field of AI and machine learning. One of the models known in machine learning is SVM, which enables analyzing large empirical data sets and solving classification and regression problems related to the evaluation of social projects. The paper synthetically indicates the significant potential of models and methods based on SVM Data Mining in this field.

Theoretical considerations and results of empirical research show that the proposed solution can be an interesting and major complement to other methods and models used so far. Its usefulness has been demonstrated in supporting multicriteria evaluation of innovative social projects whose goals refer to the SDG. The results of the conducted research allow confirming the need and possibilities of using the proposed method in supporting the evaluation processes of this kind of projects. The following advantages of this method have been demonstrated: SVM models are built relatively easily, it is not difficult to conduct analyzes using large data sets on multicriteria evaluation of social projects, the results obtained can be considered reliable and it is possible to assess computational errors using objectively verifiable indicators.

The presented research is only of a preliminary nature and there is a need to continue it in the direction of further improving the SVM data mining-based methods proposed in this paper. The obtained research results justify the need for further development of interdisciplinary research in this field. It is possible, for example, to supplement the developed solution with procedures for including in the ex-ante evaluation processes also data from ex-post evaluation concerning the results obtained after the completion of social projects. It is also possible to improve the quality assessment principles for the built evaluation models based on SVM data mining by increasing the number of parameters describing such models. The development of the proposed solution may also involve conducting research concerning the possibilities of using it to support the evaluation of other types of projects related to sustainable development, e.g. ecological. It is also interesting to consider modifying the mathematical and IT tools used. In particular, one can perform computational experiments with various computer algorithms and perform a comparative analysis to select a model with lowest computational errors.

The paper proposes a solution characterized by practical utility. The presented concept of using SVM data mining for social project evaluation can be useful in designing various types of systems supporting the processes of planning and evaluation of projects, as well as supporting decision

making by experts (evaluators), politicians, officials from different (state, regional and local) levels of public administration, contractors and other project stakeholders.

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Application of RFID Technology to Model Transport of Dangerous Goods

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Abstract
The article discusses the problem of hazardous loads transported by roads. Possibility to use RFID technology for tracking and at the same time to model travel routes based on data sent to central databases. Locating the data in one place would allow for the tracking of vehicles with hazardous loads in a centralised manner.

Keywords: RFID, hazardous loads, transportation.
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Introduction

The main factor influencing economic development is the transportation of people and loads. Transportation has influenced the evolution of many branches of economy and social life. Nowadays, in order to compete effectively on a difficult transportation market, it is necessary to respond flexibly to customers' needs and offer them services meeting their requirements. One of the ways to achieve this goal is to collect “historical” information, necessary to analyse and forecast market and customer needs. In recent years road transportation has become the main mode of transportation with an increasing trend [19,20] (0).

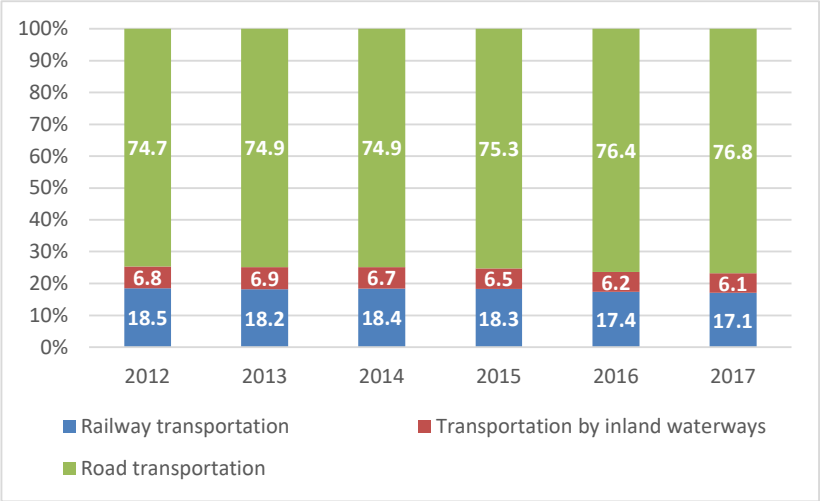

Fig. 1:The statistics by the European Union Eurostat on transportation structure
Source: compiled on the basis of [□,□].

Poland is the second country in Europe, after Germany, in terms of the amount of loads transported by roads. The volume of loads transported in the European Union by Poland in 2016-2017 is shown in Figure 2. 2017 was a record year in this respect.

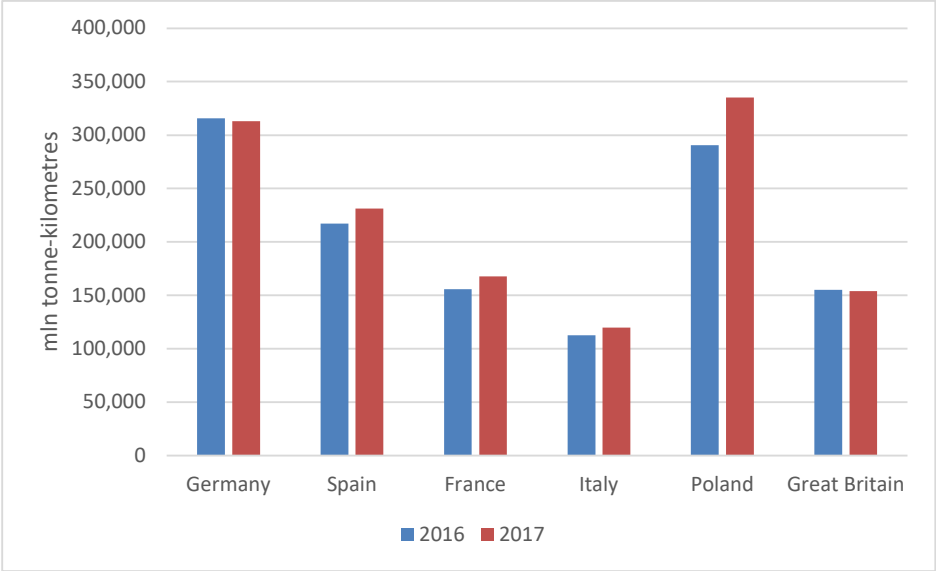

Fig. 2: Volume of loads transported by road in Europe between 2016 and 2017
Source: compiled on the basis of Eurostat [□].

Figure 3 presents data that show an upward trend in the transportation of hazardous loads at the Polish carriers and the largest European carriers between 2012 and 2017. It is estimated that the volume of dangerous loads transported in Poland will increase every year from 2% to 4% [□].

The transportation of hazardous loads by road in Poland accounts for about 15% of all loads transported. The quality structure of the transportation of hazardous loads is at the following levels [□]:

- liquid fuels about 72%,
- liquefied gases about 19%,
- other toxic substances about 9%.

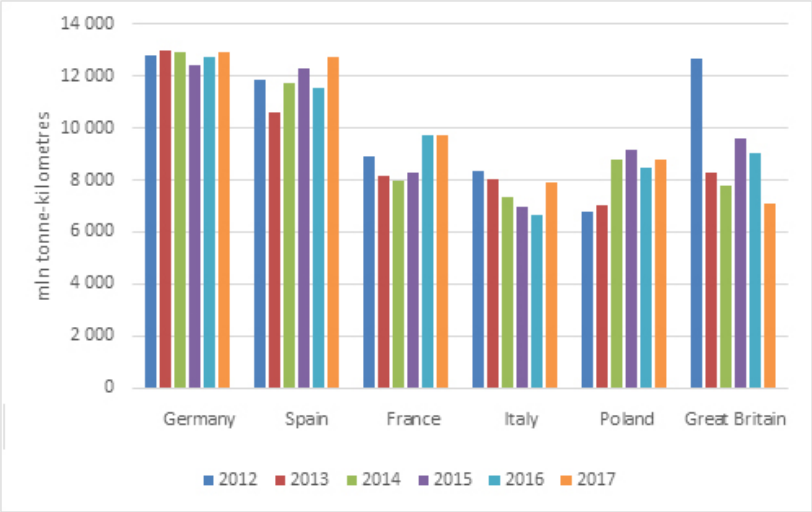

Fig. 3: Volume of hazardous loads transported by road in the EU
Source: in-house elaboration compiled on the basis of [□, □].

The increasing demand for the transportation of hazardous loads each year results in an increased flow of cargo between senders and recipients. This increases the risk caused by more vehicles on the roads. Tankers with various chemical compounds and other combustible materials are increasingly moving at the same time and in the same direction. Often, hazardous loads are carried on the same road at small distances and at high speeds, posing a threat to other road users and the environment. Such an example is the situation that took place on August 6, 2018 on the bypass of Bologna in Italy, where a tanker of LPG raided a heavy goods vehicle with solvents [□].

The transport of hazardous loads should therefore be monitored by the government services responsible. Voivodes and voivodeship marshals are responsible for the supervision of hazardous loads transported by road within the voivodeships. Unfortunately, they do not have enough tools (both legal and physical) to do so.

Action 2. RFID technology for hazardous loads tracking and route planning - the author's own proposal

In the age of the widespread internet and information circulation around the globe in a fraction of a second, the alternative to tracking hazardous loads is to use radio identification of products with a transponder containing the information. The possibilities of using this technology are still being discovered and thus increasingly common. It can be used on small, medium and long distances. Thanks to its diverse interface, it can be combined with other solutions using IT networks or used, for example, as a tool for data collection and transmission.

The most common solution is to place RFID transponders on parcels, electronic devices, car parts, expensive clothing or other products that can move near RFID concentrators with antennas. RFID concentrators, as devices for reading and transmitting information to the database, are usually stationary objects. The mobile part of the technology are transponders. The proposal to mount RFID concentrators on vehicles carrying hazardous loads would change the current utilization of this technology. Figure 4 shows the elements of a system that can monitor the process of transporting hazardous loads by roads. RFID transponders would be deployed along the roads. Vehicles equipped with RFID concentrators, based on read-out transponders placed along the road, could transmit their location. Such a solution would indicate how many vehicles carrying hazardous loads are on the roads equipped with transponders. Drivers with a dangerous load would be informed how far ahead of them another ADR transportation is located.

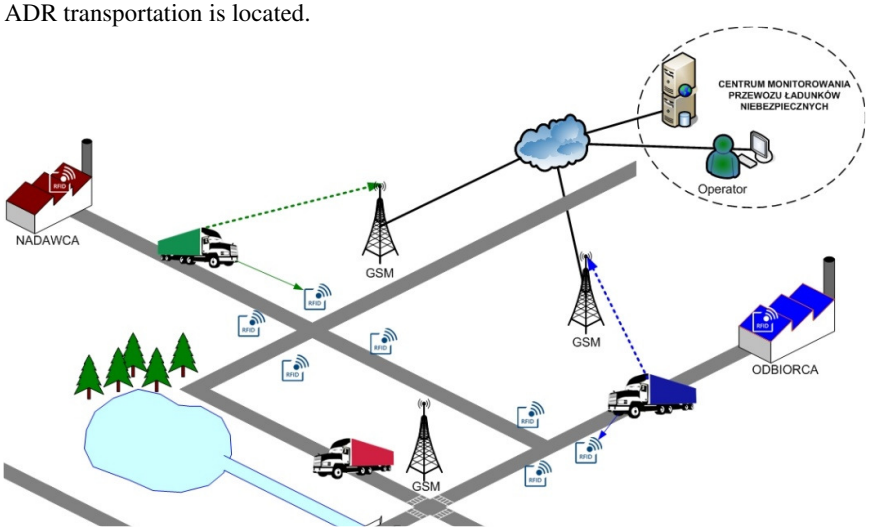

Fig. 4: Proposal to apply RFID technology to the transportation of hazardous loads
Source: the in-house elaboration.

An important part of the vehicle's equipment would be a transponder identification device (0). The RFID concentrator will be integrated with a device equipped with a GSM card for data transmission in a mobile network via UMTS.

Fig. 5: A vehicle with RFID concentrator

Source: the in-house elaboration.

RFID transponders will be located at the entrance and exit of the road links. If the road is located at the border of administrative areas such as voivodeships / districts / communities, the border areas transponder will be mounted here. Vehicles carrying the hazardous loads when leaving the sender's location will register the first transponder thereby recording the start time. This information will be sent by means of data transmission via GSM telephone to the Monitoring Centre for the Transportation of Hazardous Loads (MCTHL) and will be stored in a database under the load authorisation number. The database will contain information about: quantity, class of load, type of packaging and a driver with the number of the certificate for transporting this type of load. Each successive transponder is information for the centre where the vehicle with the load is located. The arrival of the vehicle at the recipient's premises and the loading of the last transponder will complete the process of tracking the loaded vehicle and sending the information to MCTHL.

The application of such a solution integrating a global Internet network with packet transmission and recording in a database of information on the location and movement of vehicles will allow authorized inspection authorities to better control the implementation of the process of transporting hazardous loads. On the other hand, the State Fire Service in its area of operation will be able to more efficiently remove the causes of chemical disasters (0).

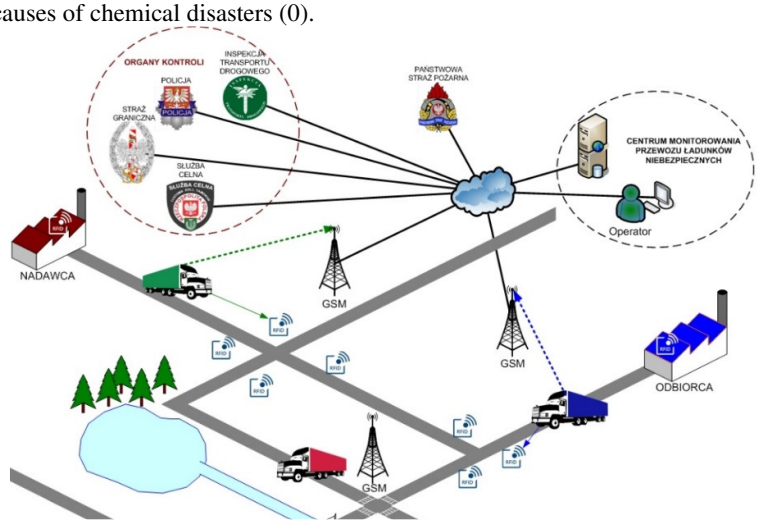

Fig. 6: Network control system

Source: the in-house elaboration.

Control authorities such as: Inspectorate of Road Transport, Police, Customs Service, Border Guard, State Fire Service and Military Gendarmerie (only for loads transported for military purposes) will be able to track the vehicle moving with hazardous loads in their area via a web link and a web browser.

This way, the transponder information collected would be recorded as database records (0).

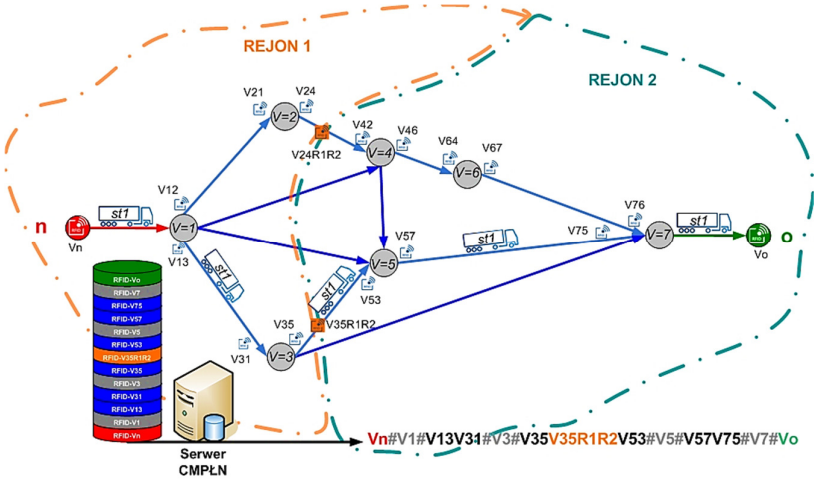

Fig. 7: The example of route record

Source: the in-house elaboration.

The driver of the vehicle will only enter the authorisation number, the system will automatically connect to the MCTHL database to download the following data:

- authorisation number issued by General Inspectorate of Road Transport (GIRT),
- number of class of material,
- packing group,
- identification number (UN) of the material and quantity of a load,
- the name of the sender with its exact location,
- name of the recipient with his location,
- planned place and time to start a route,
- the number of crew members and their documents,
- ADR approval certificate number.

On the basis of this data, the system will determine the shortest route, which will consist of the appropriate transponder numbers (0). An important element will be the time of departure, which may be decisive in determining the route. Assuming that the planned time of departure will be consistent with the actual one, the system will send a route information to the driver's device and load into the device's memory all relevant transponder numbers on that route. This route planned this way will be the shortest and safest one for the moment.

In 0Figure 8 shows the situation when the driver changes the route and interferes with the readings of transponders by the device. The disturbance will be reported to the MCTHL operator and will inform him which vehicle changed the route. There may be a situation where the RFID concentrator may have been damaged or the transponders are unreadable. To eliminate such situations, the number of the first transponder will be duplicated in the same direction at a distance of 0.1 and 0.2 of the entire section. Duplication of transponders with the same number is allowed in RFID technology. This increases reading reliability and eliminates errors. If the vehicle is registered at the entrance of the node and is not registered at the exit of the node and no transponder is read, then the MCTHL operator will receive information, on which node there was interruption. This type of situation will allow the controlling services to start up to locate the vehicle or try to contact the driver.

By analysing such situations and other disturbances, it is possible to take action in relation to equipment problems or to consider whether this is not an intentional action by a carrier or a driver. This will allow you to see what could have caused this type of disturbance.

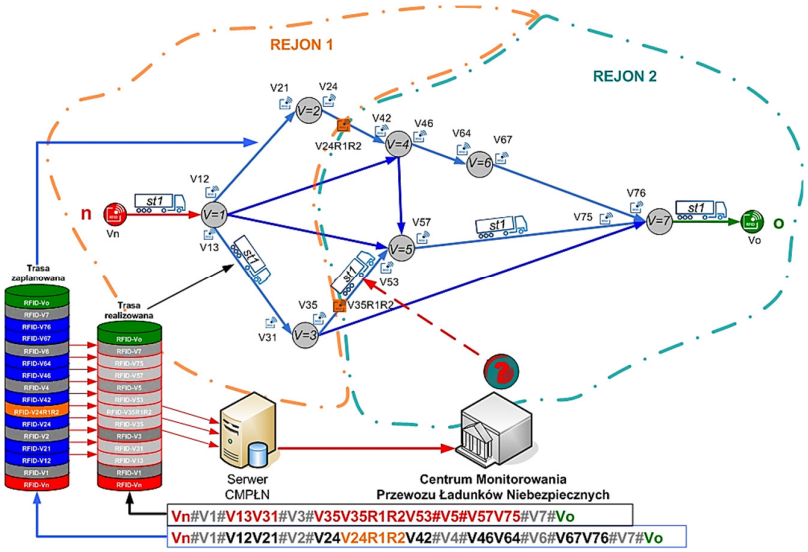

Fig. 8: The exampled illustration of a faulty route

Source: the in-house elaboration.

This type of solution would assist carriers in planning routes for the transport of hazardous loads and at the same time would automatically collect data on the directions of flow of such loads. It would also make it possible to analyse the work time of ADR drivers in view of the very high responsibility that lies with them. The transportation process can be carried out by many vehicles in the same time frame. The definition of the time frame is the same day and the same time of departure from different senders to the same recipient.

In 0Figure 9 illustrates the situation when a recipient receives hazardous loads from different suppliers within the same time frame. A delivery time may be approximate due to various external factors that may occur during loading. Carriers are present at the premises of the senders n and n' in order to load the transport. Once the loading procedure is completed and the drivers enter the authorisation number, the system will determine the routes for the vehicles *st1* and *st2* that are intended to move in a given moment.

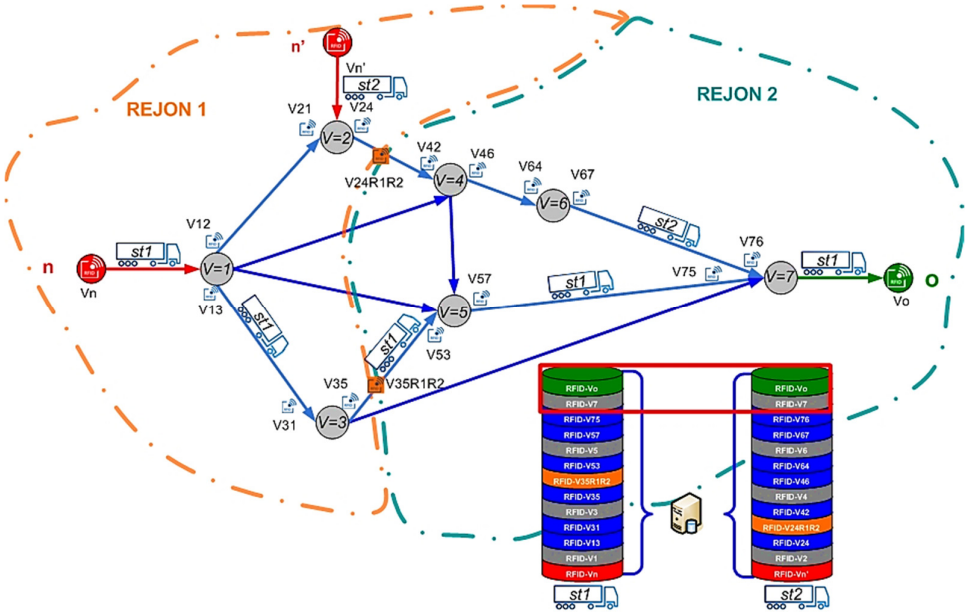

Fig. 9: Image of the travel and comparison of two transportation routes

Source: the in-house elaboration.

The travel routes for vehicles *st1* and *st2* will be compared. Repeated transponder numbers will be highlighted to check the approximate time of travel through these transponders. If times vary, the system will not change a plan of transportation route. However, if there is a possibility that vehicles *st1* and *st2* meet at the same transponder, the system will decide to change the route or will make a change during the departure of one of the vehicles.

At present, route planning by carriers is based on experience and knowledge of ADR issues. Efficient routing does not guarantee the successful delivery of a load to the recipient. The carriage of dangerous goods should be treated the same way as flight controllers treat aircraft during their flight. The flight controller is to determine the flight path so that the aircraft reaches its destination without approaching other aircrafts. Planning the transportation of hazardous loads by roads is the utilization of a single dimension, which is the length of the road section between the nodes from sender to recipient.

Transportation of hazardous loads by roads should be carried out with the participation of the system and organizational units located at the Voivodeship Commands of the State Fire Service. The system should track and exchange information between regions such as voivodeships. Vehicles with hazardous loads leaving one region would be taken over by the next region. In each of the regions there would be a organizational cell for tracking hazardous loads, placed at the Provincial Headquarters of the State Fire Service functioning as the end of the MCTHL monitoring centre.

Action 3. The method to optimise the transportation of hazardous loads with using RFID technology

Studying the process of transporting hazardous loads by roads is a complicated activity and requires taking into account a wide range of parameters and variables. The essence of the process of transporting hazardous loads is safe loading, carriage and unloading. In addition, the route must be planned in the shortest possible time, on the roads designated for this purpose, taking into account safety of road traffic. Hazardous loads are carried by different carriers who monitor their transportation on the roads but know nothing about other participants carrying dangerous goods in the same direction or on the same roads. Chaotic transportation of cargo carries a high ecological risk for the property and the environment.

For research purposes, the 3D spatial model was built to track the transportation of hazardous loads (0). In the model, the movement takes place in one direction from sender to recipient.

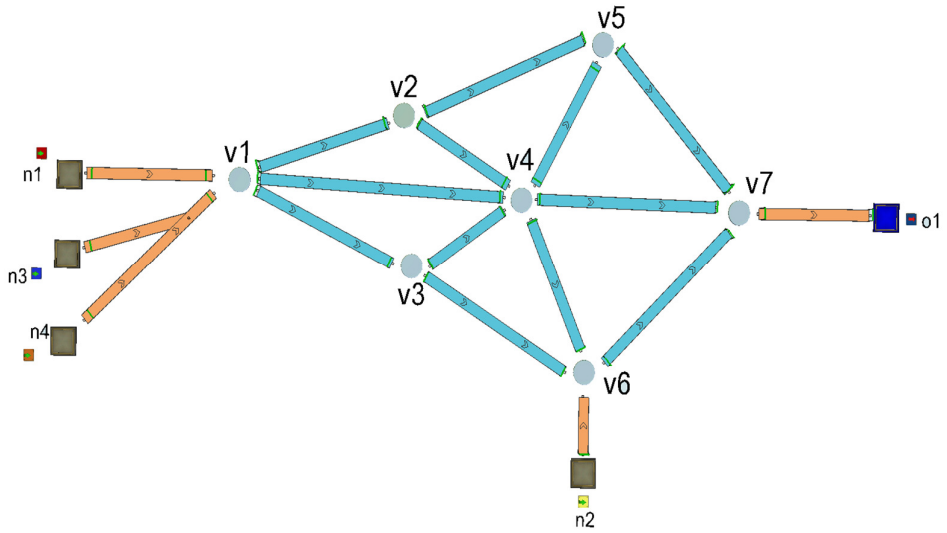

Fig. 10: Imaging the 3D model

Source: the in-house elaboration.

The model consists of 4 senders designated as *n1, n2, n3, n4* and one recipient designated as *o1*. The model contains 7 intermediate nodes *v1, v2, v3, v4, v5, v6, v7* connected by 12 arches (*v1v2, v1v3, v1v4, v2v4, v2v5, v3v4, v3v6, v4v5, v4v5, v4v6, v4v7, v5v7, v6v7*), on which the transports with hazardous loads will move. In the model there are 4 access arches connecting the senders n1, n3, n4 with intermediate node v1 and the sender n2 with the node v6. Node v7 is connected with the access arch to the recipient o1. For the purposes of the research, the following length of arches are adopted: 10 and 15 km, while the access arches from the senders to the intermediate nodes are between 500 and 1000 meters long. The travel time amounts to 10 seconds to go through the intermediate nodes. At the beginning and the end of the arches, RFID transponders were placed in the form of gateways (0).

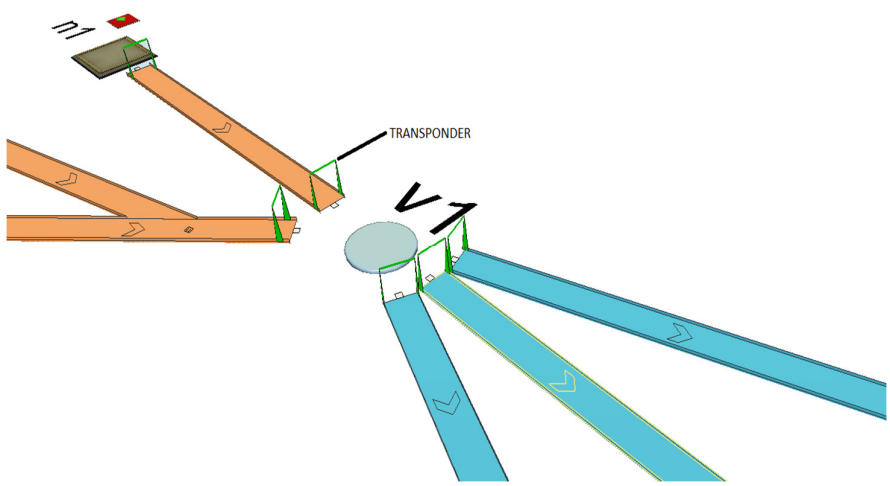

Fig. 11: Exampled visualisation of RFID transponders in the model

Source: the in-house elaboration.

The transponders record vehicles entering and leaving the nodes. The average speed can be determined from the readings of the transponders within the arch. The algorithm controlling the node, based on the transponder readings, directs the vehicle to the arch, which is the safest and guarantees the fastest travel. It has been assumed that the average speed of the vehicles in a loaded vehicle model will be between 5

m/s and 20 m/s (from 18 km/h to 72 km/h) with a 0.1 m/s increments. It has also been assumed that the vehicles with a hazardous load should keep the distances between themselves in the range from 75 m to 2500 m in 1 m increments. The increment parameter for speed and distance has been determined in order to examine precisely at which speed and distance the best route can be determined for vehicles carrying hazardous loads. The model simulates vehicle traffic based on an exponential function where the departure time of the loads is the average time for each sender. The time of study was assumed to be 24 hours.

Discussion

The method developed for the research conducted in the thesis is characterized by phasedness and repeatability. It is necessary to distinguish the individual steps identifying the decisions to be taken on each of them, as well as their specific types of data and results. To this end, appropriate proprietary algorithms have been developed, ranking the activities and decisions for each of the above mentioned steps, thus putting the process of carrying hazardous loads in order.

The transportation of hazardous loads is divided into three stages:

- stage I - loading,
- stage II - carriage,
- stage III - unloading.

Using the algorithms, Stage II was tested. Thus, a single algorithm marked FA was used, which simulates conditions similar to the actual carriage of hazardous loads. Three basic algorithms marked RAP-TR, RbP-TR, RRiA-TR have been created. A combination of six algorithms marked RAPRbP-TR, RAPRRiA-TR, RbPRAP-TR, RbPRRiA-TR, RRiARAP-TR, RRiARbP-TR was built on the basis of these basic algorithms (Table 1).

The developed and applied algorithms are designed to determine the best method for planning routes for the carriage of hazardous loads with the support of RFID technology.

Table 1: Functions of Algorithms

No.	Algorithm	Description
1.	FA	The first any arch
2.	RAP-TR	Randomly accessible arch with RFID transponders
3.	RbP-TR	Randomly available arch with percentage distribution with RFID transponders
4.	RRiA-TR	Randomly available cyclically if the arch is free with RFID transponders
5.	RAPRbP-TR	Linking RAP and RbP algorithms with RFID transponders
6.	RAPRRiA-TR	Linking RAP and RRiA algorithms with RFID transponders
7.	RbPRAP-TR	Linking RbP and RAP algorithms with RFID transponders
8.	RbPRRiA-TR	Linking RbP and RRiA algorithms with RFID transponders
9.	RRiARAP-TR	Linking RRiA and RAP algorithms with RFID transponders
10.	RRiARbP-TR	Linking RRiA and RbP algorithms with RFID transponders

Source: the in-house elaboration.

Three basic algorithms RAP-TR, RbP-TR, RRiA-TR have been tested and applied to all nodes having a minimum of two output arches. The next six algorithms RAPRbP-TR, RAPRRiA-TR, RbPRAP-TR, RbPRRiA-TR, RRiARAP-TR, RRiARbP-TR are used on nodes where the first algorithm in a pair controls nodes that have at least three output arches, while the second algorithm in a pair is designed to control nodes that have two output arches.

All algorithms have been tested for speed and distance between the vehicles carrying hazardous loads. After testing the algorithms, the best algorithm is RRiARbP-TR (0), in which there are 28 optimization solutions, we have 6 repetitive speeds which gives us 19 variants. The speed range of the carried loads ranges from 12.6m/s (45km/h) to 15.6m/s (56km/h) ensuring that the transportation task is completed within a reasonable time. Rapid faults between the intervals take place at points of speed change. This type of solution will allow flexible adjustment of speed and distance between vehicles carrying hazardous loads.

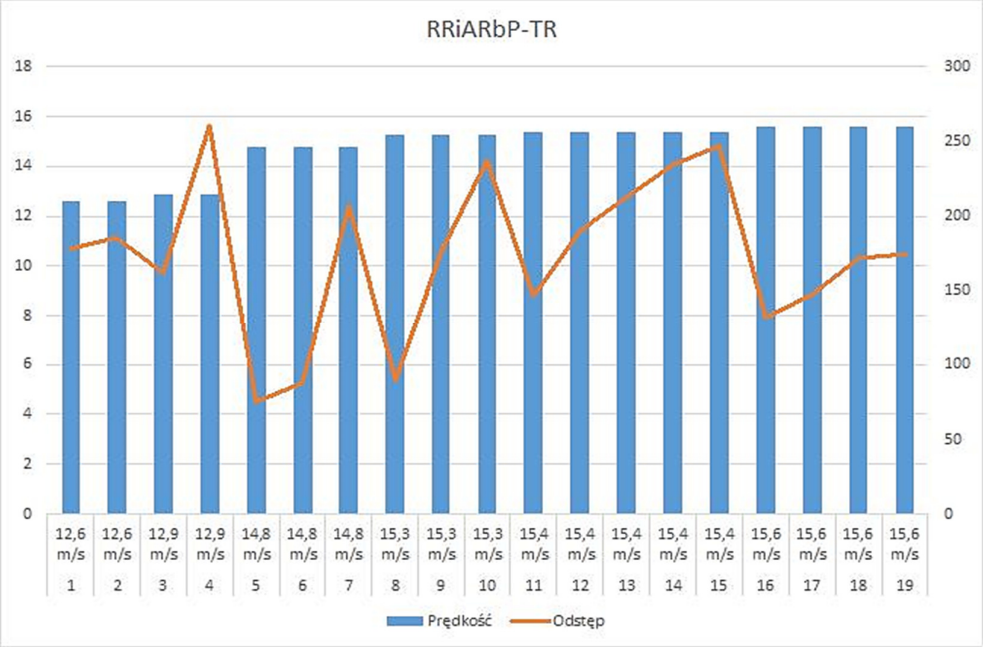

Fig. 12:The optimal solution for RRiARbP-TR algorithm

Source: the in-house elaboration.

Conclusions

The transport of dangerous goods is an industry that is developing very dynamically. Unfortunately, the inability to model routes with hazardous loads becomes dangerous for the environment we live in. The use of IT tools, RFID technology, computer simulation systems and combining them into a single system will create a new tool to assist in tracking hazardous loads. Centralised routing would increase safety for traffic participants and the driver would be able to complete the task.

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Preventive Measures to Increase the Safety of The Logistics Operations of a Production Enterprise

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Abstract

The article presents one of the functioning production companies in which the analysis and assessment of the safety of logistic activities was conducted. The main part of the study are preventive actions increasing the safety of logistic activity in this entity. The final part presents the results of the research conducted. The summary refers to the degree of achievement of the agreed objective and draws conclusions.

Keywords: safety, logistics activity of an enterprise

Introduction

The main reason for developing the topic of the article is the author's interest in management of safety of logistics systems.

The objective set by the author of the article is to emphasize the role of preventive actions in increasing the safety of logistics activity in production enterprises.

The research problem was formulated as the question: What actions should be given special attention to increase the safety of a logistics activity of an enterprise?

Research hypothesis adopted: The lack of appropriate preventive measures in the logistics activity of the production enterprise is associated with a decrease in the level of safety, which directly transforms into a reduction in competitiveness by the examined entity.

The subject of the research is the analysis of the level of logistics safety and the assessment of effectiveness to manage logistics processes in the examined entity.

The examined entity is one of the operating business entities, in which the main field of activity is production.

The scope of the location covered the area of Poland.
The time span was from 2015 to 2019.
The research methods and the tools used in the article are: literature analysis, indicator analysis, 5-stage analysis.

Sources used in the content of the article are domestic and foreign literature and data obtained from the owner of the analyzed production enterprise.

Safety in theory

Safety is the interdisciplinary term. It is a very broad concept in terms of meaning and definitions. Safety issue has a multidisciplinary dimension. The safety term is referred to by many sciences, e.g. politics, economics, finance, ecology, political science, international relations, international law, culture. The diversity and definition of safety indicates the absoluteness when is studied from a scientific point of view.

In the context of logistics, given the size of the entity as a basis for division, the scope of safety can be categorised as:

- personal safety - the scope of individual safety e.g. recipient, customer, consumer;
- microeconomic safety - the scope of microeconomic safety e.g. businesses, farms;
- macroeconomic safety - the scope of state safety e.g. products, economy condition, unemployment;
- safety of local economy - the scope of local safety, e.g. safety of municipalities, safety of cities.

The field of interest in case of safety related to logistics is very broad. The number of areas of safety concerns contributes to this fact. Given the essence of logistics, which ensures the usefulness of place and time, safety can involve a variety of processes and actors. According to A. Szymonik, such an approach makes it possible to divide safety into three groups according to (Table 1): field of interest, relationship with the field of activity, the domain in which safety occurs.

Table 1: Safety categorisation taking into account the essence of logistics

GROUP	SUB-GROUP	EXAMPLES
FIELD OF INTEREST	Global safety	• global supply chains
	International safety	• international logistics networks
	National security	• military logistics
	Local safety	• urban logistics • hospital logistics
RELATIONSHIP TO THE FIELD OF ACTIVITY	External safety	• supplier market • customer market
	Internal safety	• manufacturing processes • warehousing processes • transportation processes • customer service processes
DOMAIN OF SAFETY	Industrial safety	• logistics of enterprises
	Economic safety	• logistics of business systems
	Environmental safety	• recycling logistics
	Security of energy supply	• gas supply system • energy supply system • water supply system
	Security of IT systems	• IT systems • Internet • Intranet • traceability in the supply chain • upstream
	Structural safety	• links in the supply chain
	Personal safety	• recipient • customer • consumer

Source: (Szymonik 2014, p. 594)

Safety in logistics is a specific feature that gives the enterprise a competitive advantage on the market, because enterprises that care about guaranteeing the safety of their products and services are highly valued by customers. According to I. Horzel, this is "the multidimensional phenomenon, relating to entities, tangible and intangible goods and processes, according to this definition, indicates the need to ensure the usefulness of place, time and condition" (Horzela 2018, Jałowiec 2018, p.232).

According to A. Szymonik, the safety of logistics is a theory and a practice that ensures the flow of material streams and accompanying information for the benefit of the safety entity, primarily by taking advantage of opportunities, taking up challenges, reducing risks and preventing and counteracting various types of threats to logistics activities (Szymonik 2016, p.14)

According to M. Pawlisiak, "(...) Every time the key to ensuring logistics safety is a person. He is the animator of all activities related to ensuring his own flow of supply of goods and services enabling continuity and rhythm of functioning. The quality of the logistics system depends on the work of a single employee, regardless of his or her position." (Pawlisiak 2016, p.54)

When considering safety, the approach of enterprise to occupational safety management cannot be overlooked. According to Karczewski and Karczewska, the modern approach in this respect is to build the image of enterprise based on the following points (Karczewski, Karczewska 2012; Bąk, Kapusta 2015, p.15):

- safety is an investment (economic approach);
- a key safety objective - prevention first and foremost;
- safety is an integral part of daily business management (system approach);
- the system is supposed to help, not interfere with everyday operation;
- without a correct and complete professional risk assessment there is no effective and at the same time efficient occupational safety management;
- all employees are responsible for safety of work;
- safety culture is the key to success.

Identification of the logistics system of the production enterprise X

The safety state is not stable and is not a good given once and for all. All activities in the logistics systems of enterprises should be oriented towards any changes in the environment, both internal and external, and managers should also take care of the possibility of cooperation with other entities as part of safety.

The tasks carried out in an enterprise's logistics system determine its logistics needs, which include:

- demand forecasting;
- production planning;
- purchases;
- movement and transportation of goods;
- warehousing and storage;
- industrial packaging;
- controlling the inventories;
- customer service at the appropriate level;
- waste collection and disposal.

When analysing the safety management activities in the logistics system of the examined enterprise, it can be seen that they are related to the safety of all its subsystems and the relations and links between them.

The assessment of the activity of the enterprise logistics system is carried out, among others, within the framework of logistics controlling, by using both short-term and long-term tools (S. Bartosiewicz, 2017, p. 52).

J. Pionta and T. Chenskowsky distinguished the following functions of the indicator system in logistics controlling (Pionek, Chenskowsky 2007, p.212-213; Dobroszek 2011, p.60-61):

- optimisation function - with the help of logistical indicators, you can measure and optimise the performance of your logistics activities, your logistical objectives and assess whether your objectives have been achieved;
- steering, controlling function - the system of indicators is closely linked to the management system (managing, planning, steering and controlling processes);
- information function - a system of indicators can positively influence the quality of the information provided and provides necessary information for current management;
- coordination function - allows, through a selected system of indicators, to combine many decentralised logistics areas into one whole and to indicate the relationships between them and other areas of economic activity;
- cognitive, decision-making function - the use of indicators makes it possible to get to know the current situation, identify the strengths and weaknesses of the logistics activity and, on this basis, make further decisions that would enhance and improve the current situation and activity of the entire enterprise. This function also allows for the analysis of deviations between planned and actual reports, for their assessment and for making appropriate decisions in this respect;
- responsibility function - a system of indicators used to steer and control specific fields of logistic activity, which also allows for the assessment of persons responsible for the fields analyzed and results obtained.

The system of logistics indicators plays an important role in assessing the proper functioning of this enterprise. If there is a conflict between the logistics objectives, they can be used to assess opportunities, risks and to identify possible deviations in a short time. The system of logistics indicators also makes it possible to initially detect weaknesses in logistics operations and, on this basis, to adjust and implement improvement measures. “Furthermore, the system of indicators, compared to other logistical controlling instruments, is easy to apply and allows the most important aspects of logistical activities to be presented in a short time” (Dobroszek 2011, p.61). When assessing the logistics system, its identification and analysis of its activities should be carried out and, on this basis, procedures for its assessment should be proposed.

Analysis and evaluation of the enterprise logistics system by using the indicator method

The small production enterprise X was analysed. It is a legally and economically separate business unit operating on its own account, producing reusable bags and rucksacks in order to achieve material benefits by satisfying customers' needs. The owner's intention is to achieve a high level of productivity and development, and a low level of the own enterprise costs. The enterprise has no extensive departments. In the examined enterprise, a great deal of emphasis is placed on:

- development of enterprise,
- identification of employees with the enterprise activities,
- planning the production,
- executing the production,
- controlling the production.

The whole activity of the production enterprise can be divided into four spheres of activity:

- the sphere of supplying;
- the sphere of production;

- the sphere of sales;
- the sphere of management.

Each of them constitutes one separate centre of responsibility. The spheres of supplying, production and sales function as result centres. Organisational units performing management functions have the form of cost centres.

The production department is supervised by the production manager, who receives directly from the owner of the enterprise guidelines on the models and quantities to be produced at a given time.

The owner of the enterprise was asked to take part in the evaluation of the functions of the indicator system used in logistics controlling, on a five-point scale. It includes five quality levels, in which:

- score 5 - means very good performance of the function being evaluated
- score 4 - means good performance of the function being evaluated,
- score 3 - means sufficient performance of the function being evaluated,
- score 2 - means insufficient performance of the function under assessment,
- score 1 - means poor performance of the function under assessment.

Table 2: Evaluation of the function of the indicator system in the logistics controlling according to the owner of the analyzed production enterprise

No.	Functions analyzed	Scores	Severity coefficient	Assessment
1	optimisation function	4	0.20	0.80
2	steering, controlling function	4	0.20	0.60
3	information function	5	0.15	0.75
4	coordination function	4	0.15	0.60
5	cognitive, decision-making function	5	0.15	0.75
6	responsibilities	4	0.15	0.60
Total			**1**	**4.1**

Source: own study

The resulting score was good. The owner of the analyzed enterprise rated the optimization function highest.

The conclusions of the study:

- in the enterprise, particular attention is paid in the first instance to the performance of the logistics activity and the assessment of the achievement of the objectives set;
- the owner pays equal attention to the quality of information provided for management purposes, as well as to the improvement of logistics activity and verification of any deviations;
- thirdly, the owner focuses on the steering, controlling function, even though he has previously stated that the production planning, production execution and production controlling are particularly important in the enterprise. It treats this function on an equal footing with the coordination function and the responsibility function, which makes it possible to assess those responsible for the fields analyzed and results obtained.

The assessment of the safety level of logistics activity was made on the basis of an analysis of five logistic indicators, which the author of the article considered the most important in the context of this assessment.

Table 3: The value of logistics indicators in a enterprise X in the years 2015-2019

Type of indicators	2015	2016	2017	2018	2019
COVERAGE INDICATOR [days]	27	27	28	28	28
NON-REVOLVING INVENTORY INDICATOR [%]	-	15.87	16.15	16.19	16.42
DELIVERY TIMELINESS INDICATOR [%]	87.64	86.57	92.24	90.54	88.13
ORDER FULFILMENT INDICATOR [%]	95.8	94.5	94.6	94.7	95.0
COMPLAINT INDICATOR [%]	3.75	3.27	2.14	2.17	2.13

Source: the in-house elaboration.

The coverage indicator (CovI), determines how much a given inventory item is sufficient for average daily consumption. This indicator can be calculated by using the formula:

$$CovI = \frac{\text{average inventories within the period studied}}{\text{sales within the period studied}} \times \text{number of days in the period studied} \quad [1]$$

This indicator stayed at 27 days between 2015 and 2016 and at 28 days between 2017 and 2019. It's not the positive phenomenon. This could have been influenced, for example, by the fall in GDP (gross domestic product) dynamics in Poland, with simultaneous optimistic forecasts for the growth of this indicator. Entrepreneurs often see the expected increase in inflation as an incentive to increase inventories in order to later sell products at higher prices.

Non-revolving inventory (NRII) is the part of the inventories that are not regularly used for sale. This inventories are intended to be the safety inventories. However, in practice, it often turns out that only a certain part of it is the safety inventory, which is necessary to maintain the assumed level of customer service, and the rest is excessive inventory, the maintenance of which is unjustified and brings only costs, mainly variable costs of inventory maintenance, and besides that it does not bring any value to the whole process. Each non-revolving goods are a cost in the form of unsold goods and occupied space in the warehouse. The lower the inventory indicator, the better the inventory utilisation and the warehouse generates less losses. This indicator is calculated according to the following formula:

$$NRII = \frac{\text{non-revolving inventory value within the period studied}}{\text{total inventory value within the period studied}} \times 100\% \quad [2]$$

In the studied enterprise in the years 2015-2019, this indicator remained at the level of about 16%. This shows that 4/25 of the finished products in the inventories of the enterprise were not sold. This shows the inefficiency of production planning processes with regard to reducing costs frozen in inventories. The owner should pay more attention to this indicator and monitor it periodically.

The delivery timeliness indicator (DTI) is calculated according to the formula:

$$DTI = \frac{\text{number of deliveries made on time within the period studied}}{\text{the sum of deliveries within the period studied}} \times 100\% \quad [3]$$

The delivery timeless indicator within the period studied was 89% on average. The business owner should answer the question: How to improve the timeliness of deliveries? Maybe the supply chain

should be reorganised. The competitiveness of companies increases every day. Customers want to receive delivery well, cheaply and on time.

The order fulfilment indicator (OCI) is very important. In the case of low value of this indicator, the business owner knows that there is insufficient inventories in the enterprise, and this may result in the loss of dissatisfied customers who will leave to another competing enterprise.

$$OCI = \frac{\text{number of order units delivered to customers within the period studied}}{\text{number of order units within the period studied}} \times 100\% \quad [4]$$

This indicator was around 95% during the period studied in the manufacturing enterprise, i.e. inventories in the enterprise are sufficient.

The complaint indicator (ComI) indicates how many of the total orders have not been fulfilled as expected by the customers, and which enterprise received the complaint. This indicator should be as low as possible. The high level of this indicator indicates the number of defective goods and the unreliability of employees. This indicator covers quantitative and/or qualitative complaints, but does not take into account price complaints. This indicator is calculated according to the following formula:

$$ComI = \frac{\text{number of complained orders in the period studied}}{\text{number of orders picked up by customers within the period studied}} \times 100\% \quad [5]$$

The complaint rate decreased from 3.75% in 2015 to 2.13% in 2019. It can be stated that in the analyzed enterprise the goods are taken care of. However, it should be noted that this indicator in 2017-2019 was comparable to 2017 - 2.14%, 2018 - 2.17%, 2019 - 2.13%.

Analyzing the last three indicators (the delivery timeliness indicator, the order fulfilment indicator, the complaint indicator), it can be concluded that in the analyzed production enterprise there is a relatively high efficiency of logistics process management in the field of transportation and order fulfilment.

Summary

The conducted indicator analysis of the security level of logistics activity of a manufacturing enterprise X is the example of using quantitative data to evaluate it.

The enterprise belongs to the group of economic entities whose main objective is to continuously improve the quality of manufactured products and productivity.

On the basis of the conducted in-house research, the following final conclusions were drawn:

1. The owner conducts control of individual departments only on the basis of the results obtained from the analysis of the value of quantitative parameters, while he does not conduct control based on indicator analysis:
   - in the first instance the business owner pays particular attention to the performance of the logistics activity and the assessment of the achievement of the objectives set;
   - secondarily, his attention is paid to the quality of the information provided for management purposes and the improvement of logistics activity and verification of any deviations;
   - only in the third place he focusses his attention on the controlling/steering function, despite the fact that he had previously declared a particular emphasis on production planning, production execution and production controlling, treating this function on an equal footing with the functions of: coordination and responsibility, which allows for the assessment of persons responsible for individual areas of activity and the results obtained.

2. In a production enterprise, it is the safety management of its logistic activity and employees (process participants), who should maximize the limitation of any threats that might disturb them, influence the continuity of the realized logistic processes.
3. In future, the owner of the analyzed production enterprise X should in practice focus more attention on the steering/controlling function of the logistics system processes.
4. The assessment of the security level of logistics activity in production enterprise X was made on the basis of the value of five logistic indicators, which the author of the article considered to be the most important in the context of this assessment: coverage indicator, non-revolving inventory indicator, delivery timeliness indicator, order fulfilment indicator, and complaint indicator.
   In the analyzed five-year period of operation of this enterprise (years 2015 - 2019) there is a relatively high efficiency of management of logistics processes in the area of transportation and order fulfilment, but in the near future the owner of this enterprise should pay more attention to controlling the supplying and production subsystems.

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Product Life Cycle in Relation to The Issue of Recycling and Reuse of Waste from The Manufacture of Airbags

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Abstract

The article presents the analysis of the life cycle of the product obtained from the automotive industry as well as the process of its recycling in order to manufacture the secondary raw material. The analyzed example is the reprocessing and management of waste from materials used for the manufacture of airbags and airbags themselves which have not positively passed the quality control. The conducted research was to analyze the state of this branch of industry and determine the impact of recycling on the processability of regranulates and thus the ability to manufacture new products and the effect on their selected properties. The scope of the study included the determination of technological factors (Melt Mass Flow Rate (MFR) and Melt Volume Flow Rate (MVR)) and the impact of impurities and the regranulation process on these indicators. The conducted analysis indicated significant changes in the value of the key indices responsible for the correct processing and thus the need to adapt the technological process to the properties of the material as well as the need to verify the properties of the regranulate itself.

Keywords: Polymers, Recycling, Product Life Cycle, Melt Flow Rate

Introduction

At present, 360 million tons of thermoplastics are manufactured and processed all over the world every year. These figures relate only and exclusively to the use of the so-called original materials which have not been processed yet (Fig. 1).

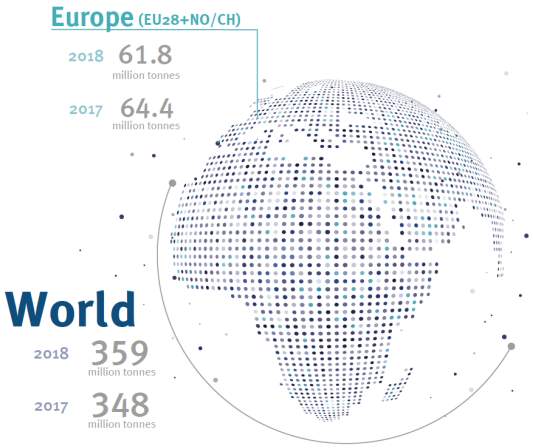

Fig. 1: The global and European market of the plastic processing [31]

Thera are many times more plastics traded in the so-called secondary market. It should also be pinpointed that a significant amount of worn plastic parts and polymeric waste is stored (the most often at the landfill) and is not managed in any way thus contributing to the destruction of the natural environment [48,49,50, 51].

In recent years, more and more activities have been undertaken on an international scale to increase the awareness of consumers and processors in terms of segregation of waste, recycling and reuse of polymeric materials which have already been possessed. In recent years (the research conducted since 2006), in the area of the EU, recycling and reuse of plastics have doubled (Fig. 2) [46].

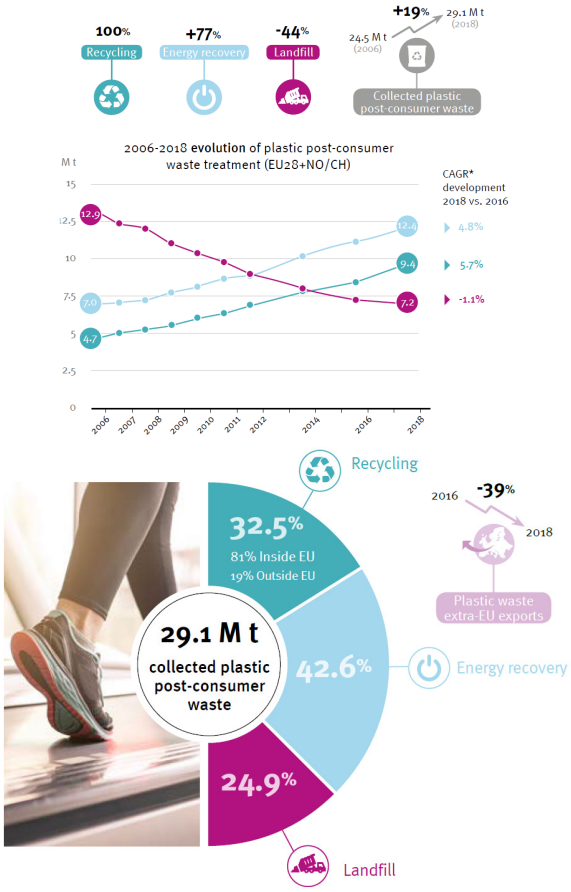

Fig. 2: An increase in the significance of recycling in recent years [31]

However, this is still not enough. Subsequent steps include new industries. This also applies to the automotive industry and the possibilities of managing the production waste of the industry. It is a difficult challenge due to polymeric materials used in this industry, which often, in addition to their very good mechanical and thermal properties (hampering reprocessing), contain a number of excipients and fillers (glass fibers, carbon fibers) which additionally hinder recycling. The companies dealing with recycling on a large scale are often reluctant to reach for technical materials obtained from the automotive industry. The reprocessing of these materials frequently requires specific machinery and equipment but also relevant knowledge and the so-called “know-how” [47, 52]. The objective of the conducted research was to determine the product life cycle in relation to airbags placed in motor vehicles and waste generated in the process of their manufacture as well as the possibilities of managing this waste. Moreover, the aim of the conducted research was to determine technological indicators, such as Melt Mass Flow Rate (MFR) and Melt Volume Flow Rate (MVR) resulting from the process of the reprocessing of regranulates and the impact of impurities (polypropylene, silicone) on these indices.

Literature Review

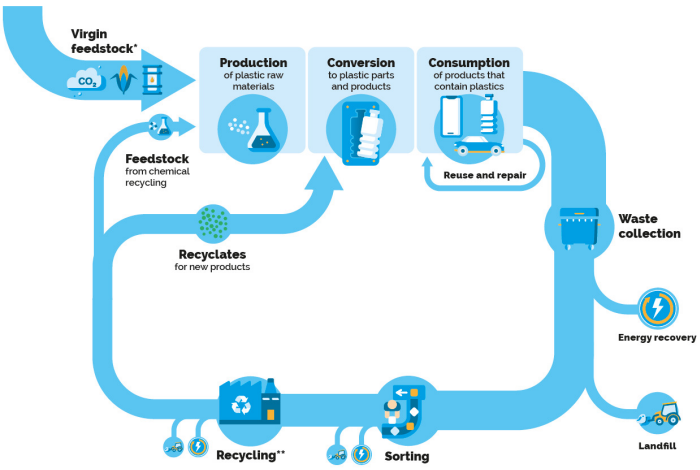

Fig. 3: The diagram of the circular economy [31]

The current legislation and European directives are to introduce sustainable economy and circular economy where the manufactured goods (mostly products made of plastics) will not get to the landfill but will be reused (Fig. 3). One of the possibilities is still energy recovery (in many cases, it becomes the only alternative for storage; where the polymeric material is not suitable for reprocessing or is excessively degraded, this solution is also used in the case of dangerous polymers or the ones containing compounds hazardous for the natural environment).

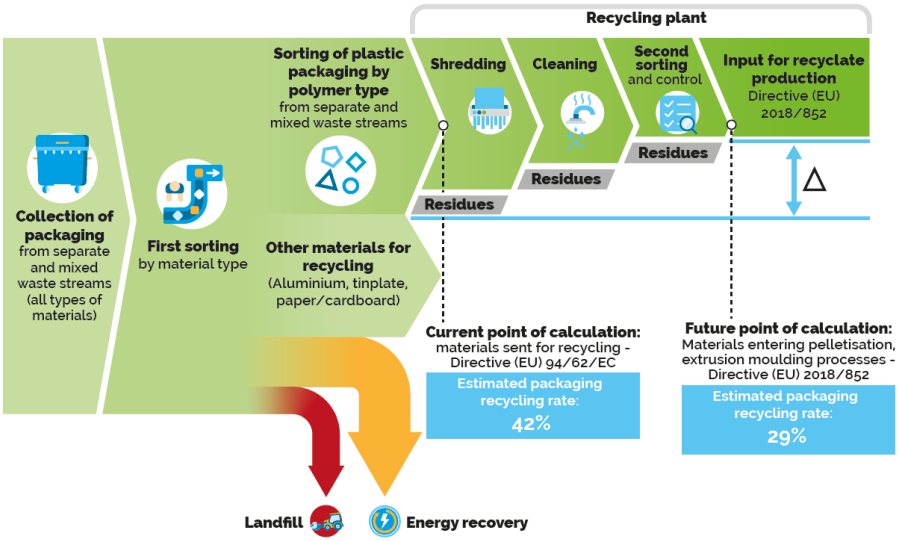

Fig. 4: The diagram of the process of the collection of waste and its reuse in the recycling process [31]

In Figure 4, the diagram of waste management is presented. Nowadays, the aspirations of the EU and international organizations are to make the stream of waste for storage and energy recovery as small as possible with a clear focus to significantly reduce (of these two) the storage of plastic waste at landfills [48,49, 52].

Level of circularity / Application sector	Resource Efficiency						Impact on marine litter	Life time of products
	Material Efficiency	Energy Efficiency	CO_2 Reduction	Recyclability	Durability	Bio-degradability		
Packed goods	✓✓✓	✓✓✓	✓✓✓	✓	✓	✓	High	Short/ Medium
Building & Construction	✓✓	✓✓✓	✓✓✓	✓	✓✓✓		Very low	Very long
Automotive	✓✓	✓✓✓	✓✓✓	✓	✓✓		Low	Long

Fig. 5: The goods manufactured, taking into account the sectors of the economy and the product life cycle [31]

Products, semi-finished products and waste from the automotive industry are mostly characterized by the use of high-quality plastic, with very good mechanical, thermal and utility properties (Fig. 5). These materials are also characterized by a high content of mineral or fibrous fillers additionally modifying their properties. From the point of view of the final customer, these actions affect the quality and the manner and length of their use. On the other hand, from the point of view of their reuse, they are often the factors hampering recycling and leading to an increase in energy and economic input [53].

For many years, as mentioned in the introduction above, some works aimed at better use of waste polymeric materials have been carried out. The automotive industry is also inclined towards the introduction of technological solutions enabling reuse of polymers. In the studies [1-32, 39,42, 43], the authors mainly focus on the mechanical recycling of highly filled plastics from the group of polyamides [40] (the main substances modifying mechanical properties are glass fibers and just in terms of those the studies are being prepared and the research is being conducted; the use of glass fibers is connected primarily with their price and availability and the conducted research is to determine the impact of the recycling and shortening of glass fibers and polymer chains on the properties of the material itself and the finished product). Sólya J., Miskolczi N. [33] analyzed the impact of reprocessing on the properties of reinforced and non-reinforced polyamide while considering the issues of energy recovery. In addition, the subject of the analysis was also the amount of CO2 and NOx generated in the case of subjecting airbags to the process of utilization. The authors also focused on the issues of the consumption of energy and water during the production of the polymer itself as well as in relation to its reprocessing. Singh R., Kumar R., Ranjan N., Penna R., Fraternali F., in the work entitled "On the recyclability of polyamide for sustainable composite structures in civil engineering, Composite Structures", conducted the analysis of changes in mass melt flow index of the non-filled polyamide 6, subjected to the multiple processing process in relation to the possibility of its reuse in civil engineering. Similar research was carried out by Hassan M.M., Badway N.A., Gamal A.M., Elnaggar M.Y., Hegazy E.A. [37,38] and they analyzed the impact of the addition of shredded elastomers on the properties of the reprocessed polyamides. In this case, the filler was intentionally introduced into the polymer. The changes in the properties of the polyamide 6 contaminated with polypropylene was analyzed, among others, by Ghasemi H., Mirzadeh A., Bates P.J., Kamal M.R., in the publication entitled "Characterization of recycled polyamide 6: Effect of polypropylene and inorganic contaminants on mechanical properties". The authors focused on the effect of impurities on the mechanical properties of the obtained standardized moldings made of PA 6 contaminated with polypropylene and other inorganic impurities. The conducted research focused on impurities and fibrous fillers and their impact on selected mechanical properties. In the selected studies, the authors analyzed rheological properties or melt flow rate itself, however, there is no clear indication of the impact of these factors on the processability and technological nature of reuse of polyamide regranulates [53-56].

The issue discussed is to determine the impact of impurities in the form of silicones and interlayer foils on selected rheological and technological properties in relation to the product life cycle and the general possibility of reuse of the polymeric waste of this type. The works of this type have not been carried out so far and the issue of the effect of impurities on technological indicators have not been discussed. The literature review revealed that technological references in the process of recycling thermoplastic polymeric materials are marginalized and they are to determine the possibility of reuse of the material

and allow its classification in the appropriate processing technology. There are currently no studies clearly indicating how different types of impurities affect technological properties and thus the processability of selected material groups, which is crucial from the utilitarian point of view.

The analysis of the process of receiving waste and reprocessing materials from the automotive industry

Research Methodology

The objective of the conducted study was to determine the manner of reuse of airbags being a piece of equipment of all passenger cars and trucks moving on the roads all around the world as well as the waste from their production in terms of the product life cycle and the issue of recycling and the possibility of their reuse. The conducted research consisted in the determination of the stream of the waste flow and the possibility of its reuse. The process took into account the identification of the type of the processed polymeric material and possible impurities (in that case it was polypropylene interlayer foils and the silicone layer). The conducted study also indicates the possibility of changing the way of thinking and the course of conduct with the waste received (eliminating the need for the storage of waste of this type or its combustion for energy recovery). Another stage of the research was to carry out the process of recycling of the waste received and to manufacture high-quality regranulates which could be reused. The regranulates acquired were subjected to the analysis of their technological properties in relation to the pure material containing no impurities. The measurements of technological indicators were made using the plastometer Zwick. There were estimated: Melt Mass Flow Rate (MFR) and Melt Volume Flow Rate (MVR) for three types of materials: pure polyamide, polyamide contaminated with polypropylene and polyamide contaminated with silicone.

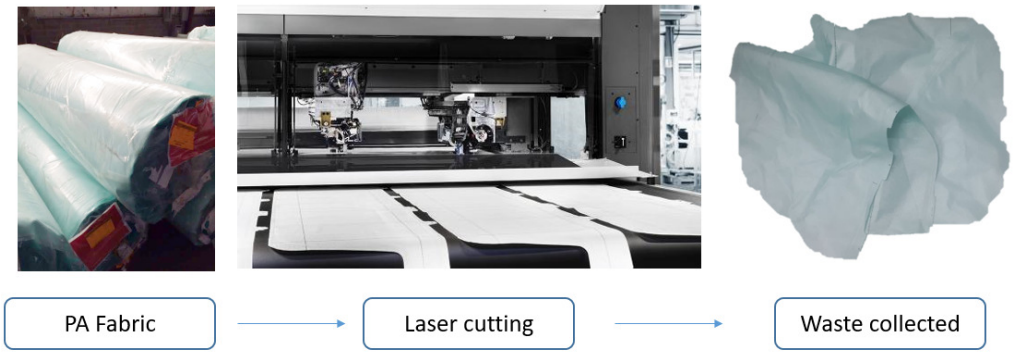

Fig. 6: Waste acquisition diagram (Own study)

The analysis of the stream of the material flow and waste acquisition

The presented case study is based on the process of reprocessing and reuse of production waste from the manufacture of airbags (waste received after the completion of the cutting process as well as finished products which do not meet the quality requirements, after removal of pyrotechnic charges, are subjected to reprocessing).

The input material for the process of airbag manufacture is mainly two groups of polymeric materials, i.e. polyamide (PA) and poly (ethylene terephthalate) (PET). These materials, in the form of fabric, are provided in bales, which are placed on the laser tables (in order to increase performance, many layers are often cut in this process; the number of layers depends on the type of material, its thickness, type of the applied interlayer foil or other type of coating, e.g. silicone and the power of the laser itself). For the purposes of the optimization of the cutting process, specialized software is used, which allows maximum use of the fabric surface (as little waste as possible – the reason is the costs and difficulties associated with transport, reprocessing and waste management and, obviously, the price of the fabric itself) (Fig. 6) [45].

As already mentioned, the difficulties with management are due to numerous factors, however, the main one is the presence of other polymeric materials in the fabric, these are mostly foils (manufactured from different polymers) as well as protective coatings made of silicone. While the foils can be mechanically separated, the silicone protective coating cannot be removed using mechanical methods (in the case of PET fabrics, there is the possibility of chemical separation and depolymerization of the material to the form of monomers, however, this process is costly and burdensome for the natural environment).

Scraps obtained after the cutting process are transferred as waste to the plant reprocessing this type of materials (the requirement is to possess appropriate machinery and equipment and "know-how" enabling the adequate processing of technical materials with foils or protective coatings).

The solutions in which polyamide fabric/PET fabric is coated with silicone are used to protect the fabric against high temperatures during firing the pyrotechnic charge of the airbag and thus to prevent the possibility of its damage and malfunction. However, the introduction of an additional material in the case of reprocessing gives rise to a number of technological problems and may significantly influence the properties of the finished product. The objective of the article is to determine the impact of undesirable additives (foils, silicone) on the properties of the regranulate itself and the finished product.

The analysis of the process of reprocessing the waste collected

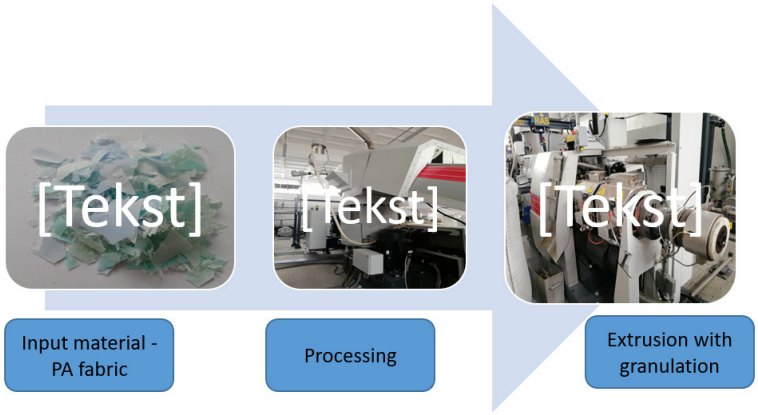

Fig. 7: The diagram of reprocessing the waste collected (Own study)

The advantage of this waste is the fact that it does not need to be subjected to the washing process (its cutting takes place in enclosed spaces using discharging systems for impurities and gases produced during the cutting process). Its transport, both in the company dealing with the manufacture of airbags and transport to the reprocessing plant takes place in containers with no contact with environmental conditions that may affect the properties of the material (temperature, humidity).

The waste collected just after the completion of the process of cutting the fabric for airbags is not suitable for reprocessing. Due to the size of the fraction, it is necessary to use the process of mechanical grinding. Only the material prepared in this manner can be fed to the extruder and reprocessed to obtain regranulates (Fig. 7).

The analysis of technological properties of regranulates manufactured

The subject of the analysis was three types of polymeric materials belonging to the group of polyamides 6.6.
All the analyzed materials come from the reprocessing of technological waste of the airbag manufacture

process. They were the fabrics which the three types of regranulates were made of: pure material (PA 6.6) which, prior to the processing process, polyethylene foil was separated from (polyamide fabric was not coated with silicone), the second group is PA 6.6 regranulates, processed along with polypropylene foil (in the case of these fabrics, the material was also not coated with silicone) and the third group of materials was PA 6.6 regranulates contaminated with silicone (airbag fabric was coated with the silicone layer that was impossible to remove using mechanical methods, in that case, there was no interlayer foil).

The subject of the analysis was three types of materials coming from technological waste acquired in the process of the manufacture of airbags. The stream of material in the form of straps from the technological process (Fig. 8) was divided into three groups: pure material subjected to the process of sorting and physical separation of impurities marked as polyamide 66, the second group was polyamide 66 contaminated with polyethylene (there was no physical separation of the sealing polypropylene foil which polyamide was coated with) and the third group was polyamide 66 coated with silicone which was impossible to remove.

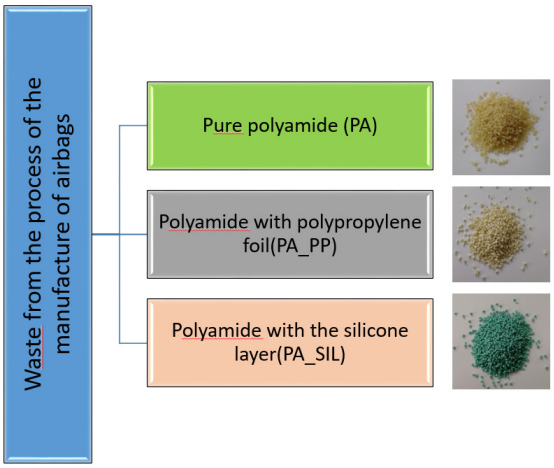

Fig. 8: Division of waste acquired for the research (Own study)

For all the three material groups, the reprocessing scheme was implemented according to the following assumptions. The material in the form of polyamide fabric trimmings was automatically transported to the crushing system (the crushing system is made of a roller equipped with a range of blades allowing the fragmentation of the material fed). Subsequently, the pre-ground material was fed to the compaction system seen in Figure 7. After the concentration, the material was transported to the system plasticizing the single-screw extruders of the STARLINGER company (Fig. 7). The device is equipped with the double degassing zone and the "wet" granulating head (the items of equipment are also visible in the picture). Another step was to dry the regranulate and its packaging. The analyzed regranulates were manufactured in the above technological cycle.

The assessment of the impact of impurities on selected rheological properties and utility properties of the finished product

For the purposes of the assessment of the impact of impurities in the form of unseparated polypropylene foil or a protective silicone coating on the properties of the reprocessed polyamide fabrics, the research into Melt Mass Flow Rate (MFR) and Melt Volume Flow Rate (MVR) was carried out. The measurements allow the assessment of usefulness of technologically acquired regranulates.

In relation to the analysis of the properties of the previously examined regranulates, the analysis of Melt Flow Rate was carried out according to the standard PN-EN ISO 1133 Plastics, Determination of Melt Mass Flow Rate (MFR) and Melt Volume Flow Rate (MVR) of thermoplastics. The plastometer of the ZWICK MFLOW company was used for the purposes of the research.

In order to calculate the indicators received, the following equation was carried out:

$$MFR(T, m_{nom}) = \frac{600m}{t}$$

where : T – test temperature [expressed in degrees Celsius], m_{nom} – nominal load [in kilograms], m – average weight of extruded profiles [in grams], t – cut-off interval [in seconds], 600 – coefficient to convert grams per second to grams per 10 minutes (600 s).

Melt Volume Flow Rate:

$$MVR(T, m_{nom}) = \frac{A600l}{t}$$

where: T – test temperature [expressed in degrees Celsius], m_{nom} – nominal load [in kilograms], A – arithmetic mean of the cross-section of the cylinder and the piston head [in square centimeters], predeterminated measurement time or arithmetic mean of individual time measurements [in seconds], l – predeterminated distance of the piston displacement or arithmetic mean of the results of individual distance measurements [in centimeters].

Before the measurement, all the material groups were properly prepared for the process, each of the materials was subjected to the drying process using the shelf drier SHINI; the drying process lasted for 4 hours and the drying temperature was 80°C. The measurement was carried out at 280°C at nominal load of 5 kg.

The obtained results of measurement of Melt Flow Rate are presented in Table 1.

Table 1. The results of measurement of Melt Mass Flow Rate (MFR) and Melt Volume Flow Rate (MVR) for the materials tested

Polymer tested	MFR [g/10min]	MVR [cm^3/10min]
PA6.6	96.64	91.20
PA6.6 + PP	115.80	110.15
PA6.6 + silicone	46.87	44.60

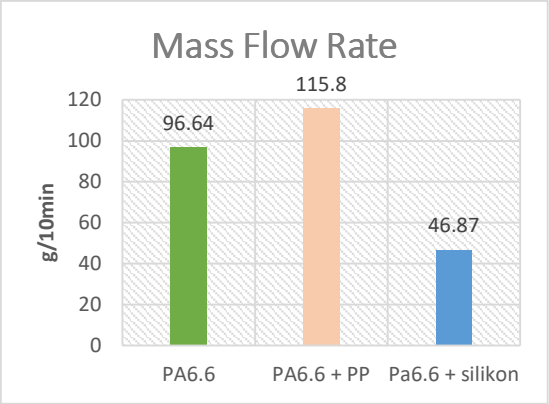

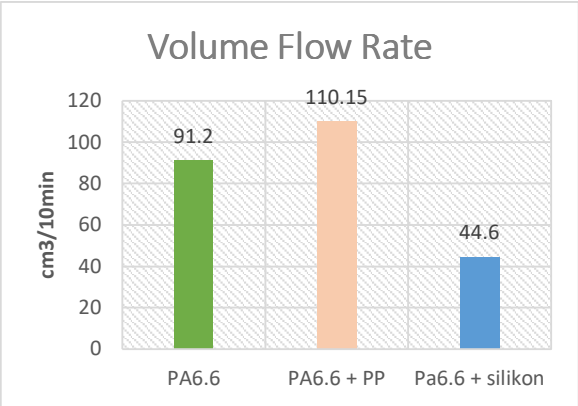

The obtained results indicate different effects of impurities on the material liquidity received. The uncontaminated polyamide 6.6 regranulate is characterized by a relatively high Melt Flow Rate, which indicates low melt viscosity at elevated temperatures and may affect the manner of filling the form of a mold cavity during the injection process. The Melt Flow Rate of polyamide 6.6 with no impurities was regarded as the reference point; the other results obtained were assessed in relation to this value. This measurement is one of the main factors to assess the technological and processing properties of the plastic. This value is one of the primary indicators and given in the first place (the so-called technical data sheet (TDS)). The value of this indicator and its repeatability determines the quality of production and repeatability of the properties of the finished product. This parameter is critical and affects the processability of the polymer. From the technological point of view, it is determined how fast the polymer flows and it is directly correlated with its viscosity and the manner of filling mold cavities of the injection mold. The changes in its value due to the presence of undesirable substances may affect the properties of the polymer melt, formation of defects in the form of incomplete filling of mold cavities or their overfilling and formation of outflows (both situations are undesirable from the economic point of view and have a negative impact on the condition of the tools used – injection molds). During the determination of Melt Flow Rate, both Melt Mass Flow Rate (MFR) and Melt Volume Flow Rate (MVR) were estimated by calculating both the mass and volume of the polymer flowing through the capillary, received during the measurement, which provided an opportunity for a comprehensive assessment of the behavior of the materials tested and evaluation of the impact of impurities on their further processing.

The determination of Melt Flow Rate is also required in terms of the application of subsequent processing technologies. The excessively significant reduction or increase in the value of this parameter may exclude the regranulate from use (processing technology) and affect the destabilization of the process and formation of defects of molded pieces and reduction in the quality of production.

In the case of the manufacture of regranulates contaminated with polypropylene, the obtained indicator and the viscosity of the polymer undergo further changes. The viscosity of the melt is reduced further.

The opposite effect can be observed in the case of polyamide 6.6 contaminated with silicone, for this material, a significant decline in Melt Flow Rate was obtained and thus an increase in the viscosity of the material tested. A significant reduction in the Melt Flow Rate of polyamide 6.6 contaminated with silicone can be related to the formation of silicone agglomerates impeding the flow of the polymer.

Conclusions

The conducted research indicated that the intentional introduction of impurities in the form of polypropylene and silicone has an impact on selected properties of the acquired regranulate. The introduction of these additives significantly affects the viscosity and thus the processability of the regranulates tested. In the case of adding polypropylene to polyamide, there is a sharp decline in viscosity and an increase in both Melt Mass Flow Rate (MFR) and Melt Volume Flow Rate (MVR). In the case of the polyamide regranulate with silicone, there is a significant increase in viscosity and a double decline in the value of Melt Mass Flow Rate. From the technological point of view, this knowledge enables better control of the process and thus improves the quality of molded pieces obtained from these regranulates.

The obtained results allow for the statement that the plastic reprocessing industry is a growing industry requiring support and greater knowledge in terms of the analysis of the properties of reprocessed polymeric materials. In addition, in view of increasing consumption of polymeric materials but also the amount of waste generated, it is necessary to find an optimal alternative which could relieve the natural environment and, at the same time, lead to reuse of once recycled plastics.

The presented results clearly indicated how the reprocessing of polyamides used for the manufacture of airbags, contaminated with polypropylene or silicone, affects the indicators of processability. The research allowed for the indication of significant changes in the values of Melt Flow Rate and thus the possibilities of processing the regranulates acquired. It seems necessary to search for the solutions which will enable the introduction of materials which are significantly different from the original in the market.

In the context of production management and the product life cycle definition, it is also required to change the approach to the way of management of regranulates required. It becomes impossible to reuse these materials for the manufacture of airbags. The factors affecting this are impurities and changes in basic technological indicators (MFI changes). However, it does not rule out the possibilities of their management since there are many processing technologies and applications using the modified processability of regranulates under consideration in the market.

Further work focuses on determining the impact of technological factors and the processability of the regranulates of polyamide 6.6 contaminated with polypropylene or silicone on thermal and mechanical properties which are directly linked to the properties of the finished product.

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The Main Areas of The Strategy of Socio-Economic Development of The Mari El Republic For the Period Until 2030

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Abstract

In order to ensure sustainable socio-economic development of the republic, strengthen the economy, develop the social sphere and identify areas of priority development a Strategy for the Long-Term Socio-Economic Development of the Republic of Mari El until 2030 was developed. The main goal of the development of the Strategy is to identify ways and means to ensure sustainable improvement of the welfare of the residents of the Mari El Republic, the dynamic development of economy of the Republic in the long term. Being one of the fundamental documents of the strategic planning system of the Mari El Republic that defines long-term socio-economic policy, the Strategy is formed on the basis of a bunch of principles analyzed in this work. This study examines the main principles of the Strategy for socio-economic development of the Republic of Mari El for the period until 2030, analyzes the priorities, targets, tasks and areas of socio-economic development of the Republic of Mari El (RME). It considers a set of system decisions of the Government of the RME for the long-term period ensuring that the Republic of Mari El will become one of the most dynamically developing regions of the Volga Federal District in 2020-2030.

Keywords: strategies for socio-economic development of the Mari El Republic for the period until 2030, targets and priorities for socio-economic development, areas of the Strategy implementation, structural diversification of industries.

Introduction

In order to ensure sustainable socio-economic development of the Mari El Republic, strengthen its economy, develop its social sphere and identify areas of priority development a Strategy for the Long-Term Socio-Economic Development of the Mari El Republic was developed.
The Strategy for the Long-Term Socio-Economic Development of the Republic of Mari El defines the targets and development tasks of the Republic of Mari El, the main purpose which is to improve the quality of life and well-being of the population based on sustainable economic growth in the Republic of Mari El.

The key tasks of the socio-economic development of the Republic of Mari El until 2030 are determined by:

1) improving the standard of living of the population;
2) ensuring sustainable economic growth, doubling the gross regional product of the Mari El Republic over a ten-year period, developing a regional investment and innovation system;
3) implementation of priority national projects;
4) creation of conditions for the most effective management of public finances in accordance with the development priorities of the republic.

The strategy implements the main principles of dynamic socio-economic development of the Republic, the most significant of which are:

the principle of effectiveness of strategic planning, which means that the choice of methods of achieving the goals of socio-economic development of the Republic is based on the need to achieve the desired results;

the principle of efficiency, which requires the validity of the choice of strategic goals and mechanisms from the standpoint of minimizing costs;

the principle of realism, which assumes that in determining goals and objectives of socio-economic development we were guided by the possibility of achieving goals and solving tasks in a timely manner, taking into account resource limitations and risks;

the principle of resource provision, which means that when developing and approving strategic planning documents developed as part of planning and programming, the sources of support for the development are identified;

the principle of measurability of goals, which requires an assessment of the goals of socio-economic development of the republic set in the Strategy using quantitative and (or) qualitative targets, criteria and methods for their assessment;

the principle of compliance of indicators with goals that determines that the quantitative and qualitative indicators reflected in the Strategy correspond to the goals of socio-economic development of the republic and the Russian Federation.

Materials and Methods

The object of the study is the Strategy of socio-economic development of the Mari El Republic for the period up to 2030 as the fundamental document of the strategic planning system of the Republic, which determines the long-term socio-economic policy of the region.

The subject of the study is the priorities, targets, tasks and directions of socio-economic development of the Republic of Mari El for the long term period as well as systemic solutions designed to implement the target indicators of the developed Strategy.

Despite a large number of translated monographs and publications on the theory of strategic planning and management of regional economy a lack of uniformity in the explanation of the same terms is observed, which leads to the complexity and inaccessibility of their use, vagueness and ambiguity which creates a distorted semantic meaning. When developing strategies an unsystematic automatic listing of all the basic approaches and techniques used in foreign practice is often observed [7]. This

situation is explained by the complexity of perception and adaptation of control methods. The effective functioning of Russian regional economies, the smoothing out of excessive territorial imbalances in the level of their socio-economic and balanced development are becoming priority aspects of Russian economy modernization and its sustainable growth. Strategic planning is a tool by which a system of goals for the functioning of the economic system is formed, approaches to achieve specified performance indicators are determined and the efforts of all management entities are combined. The main goal of planning is primarily to provide optimal opportunities for efficient business activity, profitability, competitiveness, as well as control and operational management of financial resources. Strategic planning simultaneously solves proactive (anticipatory) and reactive (adaptive) tasks. The main methodological instruments of the theory of strategic planning were developed in the works by F. Abram, I. Ansoff, M. Porter, G. Hamel, R. Kaplan and D. Norton, G. Steiner, A. Thompson, V.N. Burkov, V A. Irikov, B.Z. Milner, S.P. Nikanorov and others.

The analysis of regional development and regional economy is widely reflected in domestic science in the works by L.I. Abalkin, V.L. Baburin and E.M. Bukhwald, L.B. Vardomsky, O.V. Kuznetsova, V.I.Suslov, A.N. Shvetsov, V.E. Shuvalov, etc.

Practical research of state and municipal strategic planning in the Russian Federation is carried out by such scientists as S.L. Baidakov, M.E.Dmitriev, I.N. Ilyina, I.A. Nikolayev, O.O. Smirnova, etc.

The methodological basis is the methods of working with statistical information (economic and statistical analysis, comparative analysis), legal analysis, forecasting, scenario method, system analysis as well as quantitative and qualitative methods, including text analysis.

Research Results and Discussion

The analysis of socio-economic development of the Mari El Republic allows to single out a number of regional strengths, threats and opportunities that can be effectively used for the progressive social and economic development of the Republic on the basis of which the authors conducted a SWAT analysis and built a matrix, Table .1.*

Table 1: The Matrix of the SWAT analysis of the assessment of socio-economic development of the Republic of Mari El in the long term period

Strengths	Weaknesses
Favorable economic and geographical position; Rich historical and cultural heritage; Rich recreational resources (ethnographic, ecological and rural tourism); Favorable environmental situation which allows environmentally friendly products release; High scientific, technical and personnel potential; The diversified nature of the industrial complex, which has a number of high technologies; Open economy to investment and innovation	Llimited raw material resources of the region; Available mineral resources are not fully utilized; Uneven spatial development of the Region; Significant differences in the socio-economic development of municipalities; Significant differentiation of the average monthly wage of workers in municipalities; Differentiation of municipalities for economic development; Unequal increment (accumulation) of the existing resources in both quantitative and qualitative terms
Opportunities	**Threats**
Doubling the gross regional product (GRP) of the Republic of Mari El over a ten-year period; Improving the standard of living of the population; Ensuring sustainable economic growth; Development of a regional investment and innovation system; Implementation of priority national projects (14); Creating conditions for the most effective management of public finances in accordance with the development priorities of the Republic	The deterioration of the demographic situation; Natural population decline; Aging of the population and growing burden on the able-bodied population; The presence of strong neighboring competing regions; Migration loss of population; Low level of average monthly wages of employees and average cash income per capita; Insufficient pace of development of high-tech industries;

	Problems in scaling up the introduction of innovations in business processes aimed at improving the competitiveness of enterprises; Lack of qualified personnel with a high level of knowledge, skills and mastery meeting the demands of the innovative development of the economy.

* Developed by the authors.

The weaknesses and threats to the long-term socio-economic development of the Republic of Mari El limit the opportunities for economic growth and social development of the Republic, nevertheless, they are not insurmountable obstacles to achieving the goals set in the Strategy.

Based on the results of the analysis of the competitive advantages of the Mari El Republic, long-term development trends of Russian and the world economies the mission, priorities, goals and objectives of the socio-economic development of the Mari El Republic until 2030 are determined.

The main strategic goal is the development of human capital as a condition for the formation of a dynamically developing region of the Russian Federation with comfortable conditions and high quality of life.

The main tasks of socio-economic development of the Mari El Republic in the long run are:

ensuring a high standard of living for the population of the Republic, the availability of quality education, health care, culture, sports, personal security infrastructure development; improving economy of the Republic through the development of an innovative economy open to new technologies; creation of conditions for investments and development of entrepreneurship; a balanced system of public, private and public-private institutions ensures the sustainable development of small and medium-sized businesses; ensuring balanced spatial development of the Republic; the effectiveness of the system of state and municipal administration; realization of the natural potential of the Republic; ensuring environmental safety and security of the life of the population.

The choice of strategic priorities is based on highlighting the key factors of sustainable economic growth and transformations in the social sphere which should cause the development of various types of activities, raising the living standards of the population of the Republic.

A list of the main areas of strategic development of the Mari El Republic until 2030 is defined:

1. Health.
2. Education.
3. Mortgages and rental housing.
4. Housing and public utilities and urban environment.
5. International cooperation and export.
6. Labor productivity.
7. Small business and support of individual entrepreneurial initiative.
8. Reform of control and supervisory activities.
9. Safe and quality roads.
10. Ecology.
11. Agro-industrial complex and agriculture.
12. Tourism.

The choice of priorities determine the main goals and objectives of the strategic development of the Republic of Mari El which are presented in Table 2.

Table 2 : Strategic goals and objectives of the development of the Republic of Mari El

Strategic goal	Strategic objective
The development of human capital	Demographic development; Educational development; Health system development; Culture and media development; The development of physical education and sports; Development of labor market and employment; Improving the standard of living of the population; Modernization of social services; Improving the system of social support for the population; Improving the availability and quality of provided state and municipal services; Creating a comfortable living environment; Providing affordable and comfortable housing to the population of the Republic; Ensuring a guaranteed level of protection of the population and territories from emergency situations within the limits of acceptable risk indicators;
Development of structural diversification of priority sectors of economy	Development of priority manufacturing industries; Development of the agro-industrial complex; Consumer market development; Service sector development;
Victory in the competition for the investor	Formation of a favorable investment climate; Development of public-private partnerships;
Development of small and medium enterprises	Improving the competitiveness of small and medium enterprises;
Infrastructure development	Development of transport infrastructure; Development of telecommunication infrastructure (industry); Development of energy infrastructure and increase in energy efficiency;
Development of tourist and recreational system of the Republic	Effective use of historical and cultural resources; Formation of the system of recreational, sports and entertainment zones on the basis of natural and recreational potential of the Republic;
Development of interregional and foreign economic relations	The development of foreign trade and international relations, ensuring the supply and demand of local producers and the needs of residents of the region;
Financial Development	Ensuring high efficiency of the financial system

The implementation of the Strategy is aimed at maintaining and improving the achieved positions by the main macroeconomic indicators in comparison with other regions of the Volga Federal District. As a result of the implementation of the Strategy it is supposed to improve the quality of the life of the population and the structure of economy.

The implementation of the Strategy of socio-economic development of the Mari El Republic until 2030 will allow the Rrepublic to accelerate socio-economic development, create new industries and modernize existing ones, increase the competitiveness of economy and the standard of living of the population.

It is expected that in 2030 the volume of gross regional product of the Republic will increase 2.2 times (1.2 times in comparable prices) by 2015.

The main indicators of the results of the implementation of the Strategy are presented in Table 3.

Table 3: Indicators of the results of the implementation of the Strategy of socio-economic development of the Republic of Mari El until 2030

Indicators	Indicator values		
	2016	2020	2030
1	2	3	4
Goal 1. "Development of human capital"			
The average annual population, thousand people	685,3	680,0	667,0
Birth rate	13,9	13,8	12,3
Total birth rate	1,980	1,88	1,88
Life expectancy at birth, years	70,8	73,4	74,6
Mortality from all causes (per 1000 population), people	13,2	13,2	12,6
Mortality rate for working age population, per 100 thousand people of working age	589,3	580,0	560,0
Dynamics of real cash incomes of the population (cumulative in relation to 2011), in%	107,6	113,2	140,1
Growth rate of real average monthly wage compared to 2011, in%	111,7	119,0	141,8
The population with cash incomes below the cost of living, in% of the total population	23,2*	21,0	16,2
Unemployment rate (according to the methodology of the International Labor Organization), in%	6,0	5,8	5,4
The number of pupils of preschool educational institutions, people	38269	38308	38628
The number of students in secondary schools, people	72667	82800	96226
The number of students in vocational educational institutions, people	13576	13851	14121
The share of employed population aged 25 to 65 years, trained in the continuing education programs and (or) the professional retraining programs, in the total number of people of this age group employed in the economic sector	39,0	39,0	45,0
The share of culture expenses in the volume of expenses of the consolidated budget of the subject of the Russian Federation, in%	4,9	6,0	6,1
Goal 2. “Development of structural diversification of priority sectors of economy”			
Labor productivity index relative to the level of 2011,%	123,1	131,3	165,1
The average annual number of people employed in the economy, thousand people	301,8	297,8	291,5
The number of high-performance jobs, thousands.	58,2	68,7	81,8
The ratio of the number of highly productive jobs to the average annual number of people employed in the economy,%	19,3	23,1	28,1
Volume index of gross regional product,% by 2011	114,5	119,2	147,2
Industrial production index,% of 2011	132,2	142,5	199,6
Agricultural production index,% of 2011	202,2	240,2	304,2
Retail turnover per capita, thousand rubles	114,5	140,5	251,4
Depreciation of fixed assets at the end of the year,%	55,2	55,4	52,0
Goal 3. “Development of an innovative system in the Republic»			
The share of high-tech and knowledge-intensive industries in the gross regional product relative to the level of 2011, in%	109,3	130	160
The volume of shipped innovative products, million rubles	10 323,2	14 500,5	18 900,0
Share of shipped innovative products in gross regional product,%	6,4	5,9	5,1
Goal 4. “Victory in the competition for the investor”			
The volume of investment in fixed assets per one person employed in the economy, thousand rubles	90,1	95,7	178,4
Index of physical volume of investments in fixed assets, in% by 2011	81,2	79,3	112,3

1	2	3	4
The ratio of investment in fixed assets to gross regional product,%	16,6	13,7	14,0
The ratio of fixed investment to the value of fixed assets at the end of the year, in%	10,8	8,5	10,8
Goal 5. “Development of small and medium enterprises»			
Share of small and micro enterprises, including entrepreneurs, in gross regional product,%	25,0	27,0	30,0
Goal 6. “Infrastructure development”			
Energy intensity of gross regional product, tons of fuel equivalent per million rubles	19,6	18,6	14,3
The proportion of citizens with access to state and municipal services on the principle of "one window" by residence, including in multifunctional centers for the provision of state and municipal services,%	92,83	92,83	92,83
The proportion of citizens using the mechanism for obtaining state and municipal services in electronic form,%	50	70	70
Goal 7. “Development of the tourist-recreational system of the Republic”			
Tourist flow, thousand people per year	610,3	1000,0	1500,0
Goal 8. “Development of interregional and foreign economic relations”			
The share of exports of the Mari El Republic in the total export volume of the Russian Federation, in%	0,09	0,1	0,12
The share of export of non-primary products in the total export of the Mari El Republic, in%	100	100	100
Goal 9. “Development of financial capital”			
Receipts of taxes, fees and other obligatory payments to the consolidated budget of the Russian Federation from the territory of the subject of the Russian Federation	20 095,0	23 597,0	32 836,1
Receipts of taxes, fees and other obligatory payments to the consolidated budget of the Russian Federation from the territory of the subject of the Russian Federation per one employed in the economy, thousand rubles	66,6	79,2	112,6
The share of households with broadband Internet access, in the total number of households,%	65	67	70

** Preliminary data of the Federal State Statistics Service*

The analysis of indicators of the results of the implementation of the Strategy shows a deterioration in demographic indicators for the long-term 10-year period associated with objective demographic problems of the Russian Federation which coincide with global trends. For the remaining blocks of goals a steady increase in the qualitative and quantitative indicators is predicted, which allows achieving the set goal of increasing the GRP by 2.2 times.

The stages of the Strategy implementation and terms are presented in Table 4.

Table 4: Dates and stages of implementation of the Strategy

Stage name	Time limits	Stage Content
Stage I of the Strategy	2017 - 2020	Implementation of anti-crisis measures, restoration of economic growth rates achieved in 2014 and consolidation of macroeconomic stability in 2020
Stage II of the Strategy	2021 - 2025	Formation of conditions for a new model of economic growth of the region
Stage III of the Strategy	2026 - 2030	Structural diversification of the economy of the Republic, increasing its competitiveness

Taking into consideration the SWAT analysis it seems possible to propose the use of a scenario approach to forecasting socio-economic development of the Rrepublic. It is assumed that it is advisable to use a moderate and innovatively active scenario for the implementation of the Strategy, Table 5.

Table 5: Scenarios for forecasting socio-economic development of the Mari El Republic

Scenario	Content
Moderate	It assumes moderate economic growth under the prevailing trends in the development of Russian economy, restrained investment policy and the dynamics of consumer demand. The implementation of this scenario will help maintain the average annual GRP growth rate of 102% per year, its volume will increase by 1.3 times by 2030.
Innovatively Active	It provides for a higher pace of development of the Republic, intensification of investment and innovation activities of enterprises, reduction of negative consequences associated with geopolitical tensions and creation of conditions for solving strategic planning tasks. It is supposed to change orientation of economy towards an investment development model and growth in consumption expenditures and social obligations of the state and business in the first year. GRP growth by 2030 will amount to about 103.0% per year, investments in fixed assets will increase by an average of 5.0% per year.

The choice of the optimal, balanced scenario for the socio-economic development of the Mari El Republic will be associated with the assessment of the necessary resources for the implementation of the scenarios and budget forecasts.

Conclusion

The implementation of the Strategy requires attraction of significant financial resources. Their sources will be budgetary (federal budget, republican budget, local budgets) and extra-budgetary funds (funds of enterprises-investors, etc.).

It is planned to raise funds from the federal budget for the implementation of the Strategy in accordance with the current procedure for financing state programs of the Russian Federation, federal target programs, the federal targeted investment program, the rules for the provision of budgetary appropriations of the Investment Fund of the Russian Federation within the total budget appropriations approved by the federal budget for the corresponding year.

According to the forecast of the socio-economic development of the Mari El Republic until 2030 at least 170 billion rubles of investment over a ten-year period must be attracted to the region to achieve strategic goals and achieve the planned growth indicators.

The implementation of the Strategy will allow the region to take its rightful place in the Volga Federal District and in the Russian Federation in terms of the quality of life of the population, the development of human capital and the level of socio-economic indicators.

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Analysis of Russian Practice of Bank Mergers and Takeovers

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Abstract

The topic of bank mergers and acquisitions is given great attention both in the Russian Federation and abroad. The mergers and acquisitions market is cyclical, unstable, however, it does not lose its relevance. Many large modern banks are the result of completed merger or acquisition transactions.
Currently, in the Russian Federation the topic of bank mergers and acquisitions is very relevant, since in the period of economic instability bank mergers and acquisitions are a survival tool for small and medium-sized banks. The changes that are currently taking place in Russian banking sector create all conditions for bank mergers and acquisitions. The number of credit organizations is decreasing, the number of mergers and acquisitions, which is caused by the need of banks to comply with regulatory requirements, is increasing. One of the most effective ways to increase a bank's capital is through mergers and acquisitions. For small players a merger and acquisition deal can be a lifeline. For large players new opportunities appear for rehabilitating problem banks and acquiring competitors at the lowest possible prices.

Keywords: Banks, Mergers, Acquisitions, Consolidation, Reorganization, M&A Transactions, Bank Of Russia, Financial Sector Of Economy

Introduction

Bank mergers and acquisitions to some extent reflect the state of a country's economy. According to the Bank of Russia`s data of 01.01.2020 the number of operating credit organizations in Russia is 442, including 402 banks , 24 banks had their licenses revoked in 2019, 57 banks - in 2018. The downward trend in commercial banks in the Russian Federation is slowing down but still continues, since in 2016 82 banks had their licenses revoked, in 2017 - 74 banks and in total 575 banks had their licenses revoked since the beginning of 2008. The dynamics of a decrease in the number of banks can be clearly seen in Figure 1, which shows the data of the Central Bank of the Russian Federation on the number of credit organizations (COs) that are eligible for banking operations. The data are shown from 2009 to 2019**.**

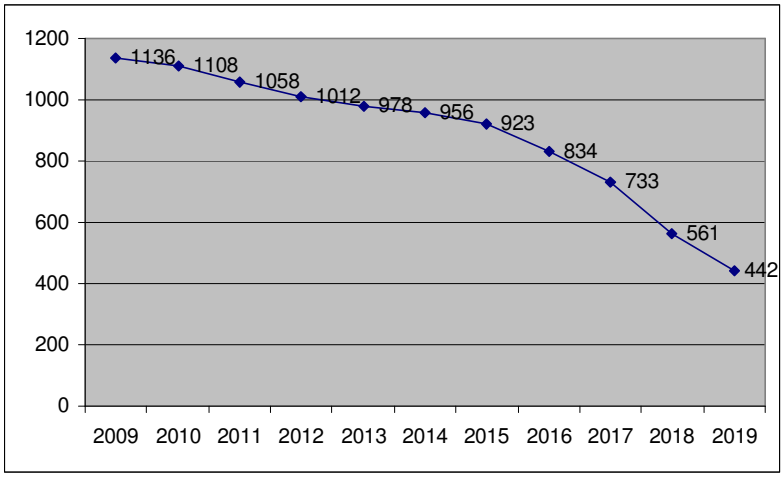

Fig. 1: The number of banks in Russia from 2009 to 2019

Source: Compiled by the author based on data from the Bank of Russia.

New banking organizations practically do not open. In recent years, one bank opened in 2019. The reason for this is mainly mergers and acquisitions in the banking sector.

Bank mergers and acquisitions allow credit organizations to open up new opportunities for increasing a bank's overall capitalization and competitiveness, improving the quality of banking services provided, expanding the customer base and reducing financial risks and costs. All this will help banks become more successful and in the future enter the international market.

Materials and Research Methods

The object of the study is bank mergers and acquisitions over the past 10 years from 2009 to 2019.

The subject of the research is Russian practice and foreign experience of bank mergers and acquisitions.

The theoretical basis of the study is the scientific development of Russian practice and foreign experience of bank mergers and acquisitions, problems of transactions of this type and recommendations for solving problems related to bank mergers and acquisitions. The concentration of bank capital is of interest to financiers studying the country's financial system. The phenomenon characteristic of the 20th century i.e. the concentration of banking capital has been studied in many scientific papers. Of great interest to both theorists and practitioners is consolidation of banks and concentration of bank capital in the form of mergers and acquisitions.

The economic model has been studied that describes relationship between an increase in the number of M&A processes in the Russian banking sector and the factors affecting these processes in Russia. When writing this work the scientific works of O.I. Lavrushin, M.A. Eskindaro etc. were used. Mergers and acquisitions, including banking, were studied by such domestic scientists and practitioners as Babenko I.A., Vladimirova I.G., Ignatishin Yu.V., Molotnikov A.E., Smelyansky I.E., Chernova E.G. as well as by such foreign authors as R. Braille, S. Reed, R. Lajou, T. Koch and S. MacDonald, T. Cowland and J. Weston, J. K. Van Horne and others.

The methodological basis was historical and logical, formal and substantive, unit and general approaches, deductive and inductive research methods.

Research Results and Discussion

The modern economy in the XXI century shows rapid dynamics causing adjustments to macroeconomic proportions, industry models that have existed for many years. All new changes relate in part to each industry. The banking sector is considered the most flexible to all changes. It was it which first was affected by all innovations that arose in the external and internal environment. Business financial models are highly dependent on any changes and cannot be inert. The external environment affects the systemic relationships of the banking system and its elements. Since 2008 the classical forms of conducting business have changed significantly throughout the world. For 2014-2019 a trend towards consolidation of the banking sector took place in the Russian Federation.

The causes of this trend are natural within each industry. The interest of banks in consolidation, the presence of state directives aimed at implementing anti-crisis measures and the existing policy of the Bank of Russia in the sphere of consolidation of the banking system contributed to this process. In addition, the market for bank mergers and acquisitions began to develop very actively. The Bank of Russia acts as the main regulator in carrying out this procedure. It receives its powers according to Russian law. The Bank of Russia has the right to establish mandatory standards for credit firms, including the liquidity standards of a credit institution, the adequacy of its own funds and the minimum reserves of a credit company. If a credit institution has completely exhausted its resources, then in order to fulfill the compiled standards it will most likely have to start the process of reorganization (mergers / acquisitions).

At the end of the 20th century an important part of history of mergers of Russian banks is the merger of commercial banking organizations with Rosselkhozbank. In the future mergers and acquisitions in the Russian market were not significant. All of them were carried out within the state and pursued the following goal: increasing influence, scale of action.

In the "Main Directions of the Unified State Monetary and Credit Policy for the Period of 2018–2019", the Central Bank of the Russian Federation makes a forecast that the internal financial conditions "will remain moderately harsh for a long time and the potential for reducing nominal interest rates in the economy will be limited taking into account the Bank's Russian monetary policy. " These factors became the reason for banks beginning reorganization of their own business (caring out M&A transactions).

Since 2014 the market for bank mergers and acquisitions in Russia experiences a crisis. According to the National Rating Agency (NRA), the Russian banking sector in 2016 should show the worst result in the last 10 years in the number of classic M&A transactions (mergers and acquisitions). According to the NRA forecasts, the number of acquisitions carried out using the financial recovery mechanism is similar to one of the previous years. It was planned that the number of transactions of traditional M&A could significantly increase and will increase the demand for the assets of private commercial banking organizations that managed to survive the financial crisis and achieve good results. In addition, market regulation will be tightened. According to the research by the Russian banking market of M&A, the results of which the NRA declared at the conference "Banking Mergers and Acquisitions" in 2005-2014 185 M&A transactions worth $ 17.4 billion were concluded in the Russian market.

Information on transactions in the financial sector (banks and insurance companies) is given in table 1.

Table 1: Information on the value and number of transactions on bank consolidation

Indicators	2014	2015	2016	2017	2018
Total cost, billion dollars	3,8	2,1	1,1	9,1	3,3
Amount of transactions	59	51	44	31	48
Average transaction value, billion dollars	0,064	0,041	0,025	0,045	0,028

** Developed by the authors.*

As our analysis of the industry value of a transaction is limited, it should be noted that it is impossible to take into account all debt portfolio restructuring transactions that are gradually gaining growth

in the Russian banking sector and have become the most popular after 2018. An obvious example of such transactions is the purchase of Financial Corporation by the Central Bank (2017, valued at $ 7.7 billion) and the purchase of Promsvyazbank by Deposit Insurance Agency Group of Companies (2018, for $ 1.967 billion). Both transactions were excluded by us in calculating the average transaction value in the financial sector.

The obtained values may indicate that there is a tendency to reduce the value of a transaction both in the economy as a whole and in the financial industry. This fact can be considered as a positive trend in the Russian market of mergers and acquisitions - a transition to transactions among not so large companies.

An important event in the practice of restructuring is the creation in the second half of 2018 of the Bank of Non-core Assets (BNA), which included various debts and shares of borrowers of large rehabilitated banks. At the moment BNA has received an unprecedented number of troubled assets formed by Otkritie (Discovery), Trust, BIN and ROST banks. The year 2018 was not a year of borrower restructuring but a year of bank restructuring in the context of measures taken by the government to improve the banking sector. An interesting trend from the point of view of M&A in 2018 is that banks increasingly sought to become quasi-shareholders of their borrowers, moreover, the main ones. We also observe that banks, having gained de facto (less often - de jure) control over the business begin, regardless of the will of the shareholder, to seek a buyer for this business - and it is here that we see a strong connection between the debt restructuring market and M&A market.

The largest banking services transactions completed in 2018 are shown in table 2.

Table 2: Largest banking services transactions completed in 2018.

Transaction object	Buyer	Seller	Acquired share, %	Amount of transaction, mln.dol.
«Promsvyazbank»	GC «Deposit Insurance Agency»	Private shareholders	99,9%	1967
«Invest project»	«SAFMAR Financial Investments»	Mikhail Gutseriev, Said Gutseriev	100%	210
«SAFMAR Financial Investments»	Institutional investors	«SAFMAR Financial Investments»»	15%	163
NPF «Blagosostojanie» (Welfare)	«Gazprombank»	RGD (Russian Railways)	50%	160
Nu Pagamento SA (Nubank)	DST Global	Existing shareholders	45,9%	150

The results of 2018 on mergers and acquisitions allow us to draw the following conclusions:

- the total value of transactions amounted to 3.3 billion dollars, which is 64.1% less than in 2017;
- the number of transactions amounted to 48, which is 45.5% more;
- transactions for the purchase of Russian assets amounted to 0.2 billion dollars, which is 40.5% less;
- transactions on the purchase of foreign assets - $ 0.3 billion, which is 1075% more;
- domestic transactions - 2, 8 billion dollars, which is less by 67, 5%.

Thus, the volume of transactions in the market of mergers and acquisitions in the banking sector is significantly reduced, the total share of this market is 6.3%.

In 2018 the value of transactions in monetary terms as a whole across the market decreased by 7% compared to the previous year, amounting to $ 51.7 billion, which is mainly due to the absence of

major transactions during this period. At the same time, the number of transactions increased significantly - from 552 transactions in 2018 to 652 transactions in 2018.

The growth in the amount of transactions compared to the previous year was recorded only in two key sectors of economy - oil and gas (by 96.8%) and consumer sector (by 55.6%). The most significant decrease in the total amount of transactions is observed in the sector of banking services, metallurgy and mining and in the real estate sector.

At the end of 2019 financial institutions with three transactions with a total volume of $ 7.54 billion (17.8% of the total value of TOP-30) were in the second place in the all-Russian ranking of M&A transactions (Table 3).

Table 3: Industry analysis of TOP M&A transactions in 2019

Industries	Volume of transaction, mln.dollars	Share in total volume	Number of transactions	Share in total amount
Fuel and energy complex	11514	27,2%	5	16,7%
Financial institutions	7539,3	17,8%	3	10%
IT	5970	14,1%	4	13,3%
Transport	3468,7	8,2%	6	20%
Communication	2774,4	6,6%	2	6,7%
Trade	2671,2	6,3%	2	6,7%
Sport	2350	5,6%	1	3,3%
Engineering	2242,3	5,3%	2	6,7%
Construction and developmentment	1910,4	4,5%	2	6,7%
Metallurgy	1209	2,9%	1	3,3%
Power industry	332,9	0,8%	1	3,3%
Agriculture	330	0,8%	1	3,3%
Total	42312,2	100%	30	100%

** Developed by the authors.*

The largest transaction of the year in the financial sector and the second largest in a year was the sale by Sberbank of Russia of its subsidiary in Turkey Denizbank to Emirates NBD for $ 5 billion. In addition, a major bank in the industry was reorganized and made it into the top ten largest transactions of the year: in July the Central Bank of Russia, within the framework of the bankruptcy prevention participation plan, acquired a 99.99% stake of Moscow Industrial Bank PJSC for $ 2.03 billion. On the whole, the number of reorganizations decreased markedly compared to 2018: MInBank - the first transaction of that kind since January 2019.

Next we consider the TOP 10 M&A market participants in 2019 (Table 4).

Table 4: TOP 10 M&A Market Participants in 2019

Market Participant	Acquisition	Sale	Total number of transactions
PJSC VTB Bank	10	8	18
PJSC Rostelecom	10	2	12
PJSC Gazprom	6	5	11
Alfa Group Holding	7	2	9
PIK Group	6	-	6
PJSC Sberbank of Russia	3	3	6

JSC IKS Holding	4	2	6
Safmar Group	5	1	6
PJSC National Bank Trust	-	6	6
GC Rostec	2	3	5

In the ranking of active market participants in terms of the number of M&A transactions completed in 2019, the first three lines are occupied by state-owned companies. The leader in the number of transactions VTB Bank PJSC, which made 18 M&A transactions during the year, is particularly notable. The Bank has set itself the task of creating a vertically integrated United Grain Holding, which will combine a number of grain production, storage and transportation companies.

Of the TOP 10 participants in the M&A market in 2019, out of 10 companies 4 were held in the financial sector: VTB Bank PJSC, Alfa Group Holding, Sberbank of Russia PJSC, National Trust Bank PJSC.

By the number of transactions, the financial industry is only in 4th place, after the transport, fuel and energy and IT.

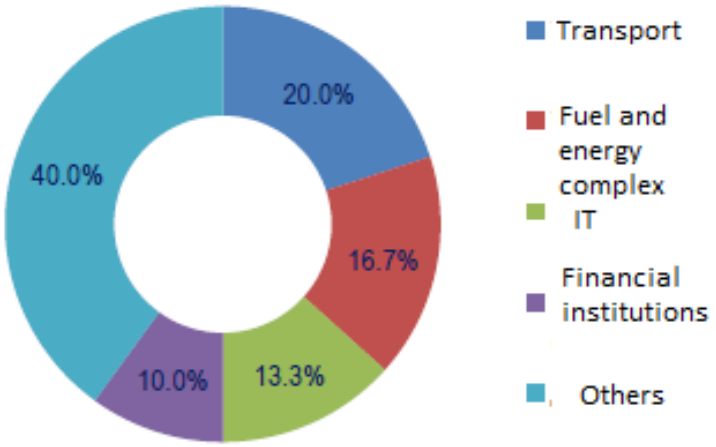

Fig. 2: Industry Analysis: Number of M&A Transactions in 2019.

According to expert forecasts conducted in 2014-2017, the number of M&A transactions in 2018-2019 was to grow. However, they did not come true. Sanctions yielded negative results and aroused caution among investors.

In addition, among the largest 30 transactions in 2019 the share of cross-border transactions remains, as in the market as a whole, extremely high. So, in the total volume of TOP-30 transactions ($ 42.3 billion) of the acquisition of Russian assets by foreign investors (out-in) they occupy a share of 61.4% - their value is $ 25.99 billion and the number is 11 transactions. In general, this trend should be seen as a continuation of the sale of Russian assets abroad. The main reason is anti-Russian sanctions that complicate the work of subsidiaries of Russian entrepreneurs and therefore large players are forced to get rid of these assets.

At the same time, out-in deals occupy the first five lines of the rating. So, in the first place among foreign investors' acquisitions of Russian assets is the largest transaction in 2019: the merger of oil and gas companies Wintershall owned by the German concern BASF and Dea Deutsche Erdoel of

Russian businessman Mikhail Fridman for an estimated $ 7.18 billion. The second place out of cross-border out-in transactions (as in the overall rating) holds the sale of Sberbank of Russia`s subsidiary bank in Turkey Denizbank to Emirates NBD for $ 5 billion. In the third place there is the November acquisition by the American investment fund Blackstone of 99% of MagicLa from Andrei Andreyev and Finam estimated at $ 3 billion.

The fourth place among out-in deals was occupied by the sale of Brooklyn Nets basketball club, which was purchased by Joseph Tsai, vice president and co-founder of Alibaba Group, from Mikhail Prokhorov for $ 2.35 billion and the fifth was the acquisition by Sokar Energoresurs (Azerbaijani SOCAR owns 60%, Sberbank - 40%) 80% of the shares of Antipinsky Oil Refinery, estimated at $ 2.32 billion.

However, with regard to the acquisition of Russian investors abroad (in-out), the situation is exactly the opposite. Among all the TOP-30 transactions, only two belong to this category and their total value is $ 800 million (1.9%). The largest of the two in-out transactions was the March purchase by Michael Friedman` DEA of Mexican oil and gas Sierra Oil & Gas for approximately $ 500 million. It also became the largest in oil production in Mexico, since in 2013 the country's oil sector was open to foreign investors. In the second place there was the last in the rating, the 30th deal: in April, the Max-iPost group of companies acquired a controlling stake in the Chinese logistics platform Guangzhou Hanxuan International Freight Forwarding Co for an estimated value of $ 300 million.

At the same time, one of the major in-out transactions, the completion of which was expected in 2019 and which could enter the TOP-30, did not take place. So, Mikhail Fridman and his investment fund LetterOne faced difficulties associated with further repurchase of shares of the retailer Dia. Recall that in early 2019 the company announced its intention to acquire the majority share of the Spanish retailer (before that it owned 3% of its shares). In March the investment fund became the owner of 70% of Dia and received permission for a full buyout of the company. However, over the summer Dia stocks plummeted and Mikhail Fridman was accused of artificially lowering the company's value. In Italy an investigation was launched into an anonymous complaint, but the businessman denied the conspiracy. He emphasized that he had already invested 1.6 billion euros in the company and more than others suffered from a drop in quotations. We continue to monitor the developments.

The general trend remains negative. The activity of Russian companies in foreign markets is hindered by the deterioration of political climate - in particular, the imposition of US sanctions against a number of Russian companies and entrepreneurs.

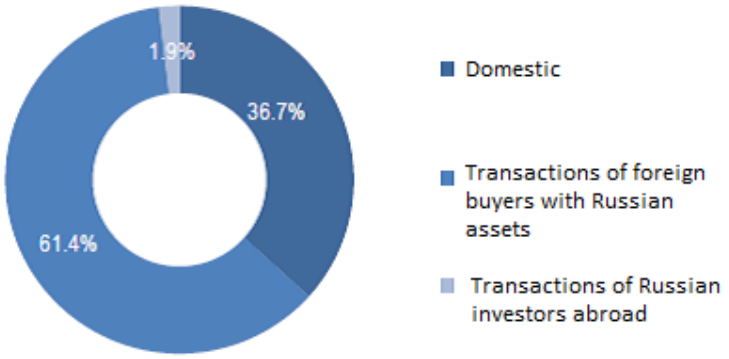

Fig.3: The share of domestic and cross-border transactions by amount in 2019.

Companies where the state is the controlling shareholder completed 11 business acquisition transactions totaling $ 15.25 billion, which were included in the TOP-30 transactions for 2019. The most active transactions with large enterprises were state-owned companies such as VTB Bank PJSC, Sberbank of Russia PJSC, Russian Railways PJSC and Rostelecom.

The largest transaction involving a state-owned company was the sale by Sberbank of Russia of its subsidiary Denizbank in Turkey to Emirates NBD for $ 5 billion. Rostelecom consolidated 100% of T2 RTK Holding LLC (Tele2) with an estimated value of $ 2.04 billion. The third place among transactions with state participation was also taken by a transaction in the financial sector: in July, the Central Bank of Russia, as part of implementation of its participation plan to prevent bankruptcy, acquired a 99.99% stake in Moscow Industrial Bank for $ 2.03 billion.

It is worth noting that Russia is not only involved in mergers and acquisitions through its companies, but also remains an indirect driver of M&A activity in a number of industries. In some sectors legislative innovations encourage state-owned companies to sell their foreign business (for example, in the financial sector, fuel and energy sector and trade), or, conversely, to buy Russian companies to consolidate assets in sectors necessary for self-sufficiency of resources (IT, telecommunications and others). In addition, in the financial sector legislative changes in the order of reorganization of troubled banks can significantly increase the state's share in this market, even taking into account the subsequent privatization of part of these assets.

In addition to transactions recorded statistically, transactions are conducted which methodologically do not meet the requirements of M&A transactions, but are inherently very close to them. So in 2019 MTS PJSC bought 99.7% of MTS-Bank PJSC from the parent Sistema JSFC, however, the transfer of ownership did not take place, therefore, the transaction was not included in the statistics. And in July VTB Bank acquired from Sergey Gordeev a 15.48% stake in PIK Group for 38.6 billion rubles. ($ 609 million). After that VTB's share in the group increased to 23.05% and Gordeev's share fell to 59.15% - that is, there was no change in the controlling shareholder. In November Yandex announced a change in the management structure of the company and created the Public Interest Fund with which it will coordinate the consolidation of more than 10% of shares, the transfer of personal data and other issues. The restructuring process has just begun, but Sberbank has already returned to the company a "golden share", which has been owned for 10 years.

As for forecasts for the future, it can be said that M&A transactions in the financial sector will certainly take place, but most likely they will also concern the bank reorganization procedure. The pace of economic recovery was still slower than expected by the government. The main reason for this can be still existing uncertainty around the sanctions. Russian economy has already been able to adapt well to the sanctions that were introduced in 2014. And investors have learned to work under existing restrictions.

In recent years, merger and acquisition activity of domestic organizations markedly decreases. The main players in the market are foreign investors from France, the USA, Norway and Cyprus. Mass departure of foreign banking organizations from Russian market began in 2009. The main reasons for this were the effective cost reduction to zero and general political situation.

Until this year foreign investors were considered the main players in the domestic banking market of M&A. And banks with state participation in capital belonged to the second most important group. From 2005 to 2017 they managed to conclude 14 transactions worth more than $ 3.2 billion. The largest transactions include:

- Sberbank's purchase of the Troika Dialog investment bank, which allowed Sberbank to expand its investment services market;
- VTB Bank (PJSC) purchase of Transcreditbank OJSC, the transaction amount is $ 1.7 billion [8].

The peak of transactions, both in quantitative and in monetary terms, the peak came in 2006–2008, as this was the period when cheap loans were available to banks and the purchase brought a fairly quick financial effect. To the tops of the Russian market of banking M&A services 2005–2017 they include: Otkritie banking group - 3 transactions, BIN group - 6 transactions, Promsvyazbank group - 6 transactions and Gazprom-Bank group - 5 transactions.

In each sector, the M&A market completely depends on the degree of economic activity in the state, the investment climate, the national currency, the political situation and Russia's ability to quickly survive the crisis. According to experts of the banking business, the cleansing conducted by the Central Bank will help to maintain a position only for large financial institutions, high-tech medium-sized banks that have managed to adapt to new conditions. Large banking organizations have already built federal networks. They do not need new acquisitions. A large number of small and medium-sized banks are inclined to carry out a merger, which will help them to strengthen and withstand constantly increasing competition, to win the struggle for resources.

Today, a new type of transaction has emerged in the domestic banking market of M&A. When a credit institution loses its license, a deal may be concluded to transfer property rights and obligations. The right to approve a participation plan, transfer of all obligations is obtained by the CBR. For example, the right of the first stage is transferred from the "recalled" bank to the functioning one. The Deposit Insurance Agency (DIA) does not use funds from its own fund, since the “receiving” bank receives deposits worth more than the amount of insurance compensation. The assets of the bank are transferred in the amount of such liabilities and the buyer is given the right to choose the bank's asset for the amount of liabilities. There were two transactions of that kind on the market: PJSC Binbank, therefore, bought assets from Probusinessbank OJSC and the bank of Russian Capital JSCB (PJSC) - from OJSC Nota Bank. The essence of such transactions is the purchase of assets, but instead of paying a functioning bank assumes obligations of depositors. The interest of a functioning bank lies in the client base of borrowers and depositors.

According to experts, in recent years a healthy consolidation of assets could not be noticed in the domestic financial market. A bank was reorganized by the Central Bank or merged with another financial organization. Transactions of insurance companies and NPFs are not comparable in volume with the banking sector. It is probably wrong to take into account reorganized banks in M&A data. These are not deals concluded on the market, but only a necessary measure of a regulator. This opinion is shared by many financial market analysts. To activate real transactions in the financial segment of the Russian Central Bank you need to announce the completion of banking clearing, to convince everyone that there are no complaints against the remaining banking institutions.

Conclusion

The study of merger and acquisition practice of Russian banks allows us to conclude that they are carried out mainly for the purpose of consolidating indicators of a credit company to improve its financial stability. The Central Bank's policy is aimed at stimulating transactions between banks. It can be considered as a way to strengthen the pooling of bank capital. A large number of small and medium-sized banks, due to an increase in the reviews of licenses of financial organizations, are ready to merge aiming at enlargement.

Experts believe that in Russia there is almost no pure bank merger that allows each participant in the transaction to obtain a synergistic effect. Most often a major player "eats" small. There are virtually no takeovers on a voluntary basis.

If there are noticeable signs of economic recovery, the number of transactions in traditional M&A may again increase significantly. The demand for the assets of private sector players who were able to survive the financial crisis will increase.

But there is potential for growth, even if investors do not really believe in it. Now Chinese, Korean, Indonesian and Kazakhstani investors are already showing more interest in Russia than in 2015-2017. Inside the country there is a tendency to consolidate medium-sized IT companies around banking and telecommunication groups. Banks are also most interested in the high-tech industry.
Summing up, we can name the following current trends in the Russian market of mergers and acquisitions:

- merging credit organizations into banking groups / bank holdings;

- capitalization and consolidation of banks;
- decrease in the dynamics of mergers and acquisitions in the banking sector.

Strengthening requirements for financial institutions, the introduction of world standards have led to the fact that Russia has to keep only trusted and reliable players in the banking sector. This process allows to motivate banking institutions to consolidate. To meet modern requirements banks will already need to bear the costs, to analyze the possibility of future development and carry out activities in such a way that it is profitable.

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The Impact of Official Development Assistance Flows on The Social and Economic Development of Selected Central and South Asian Countries

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Abstract

Socio-economic development and related issues are an extremely important issue raised at both theoretical and practical levels. The diversity of countries in terms of the level of socio-economic development is one of the most important global problems faced by both researchers and politicians. Central and South Asia stands out economically due to its high level of industrialisation, which, however, does not translate into quality of life and prosperity. Historical histories, including those of the colonial period, play an important role in the contemporary development path of many countries in the region. This article will attempt to answer the question about the impact of development aid on the socio-economic development of selected countries in Central and South Asia. The grey incidence analysis method will be used for this purpose.

Keywords: development assistance, Asian countries, development, GIA

Introduction

The problem of developing countries arise primarily from the eternal question: why are some regions developing much faster than others? These reflections go back to ancient times, where already the world's ancient state of knowledge and consciousness divided countries and geographical areas into rich and poor, which was mainly related to the availability of raw materials and favourable conditions for agricultural development. With the diverse development of individual countries, much poorer regions than others began to emerge. Examples include Sub-Saharan Africa and Central and South Asia. It is the latter that seems to be extremely interesting because there is no denying that Asian countries have chosen their path of development, different from that of the West. While Taiwan, Singapore, Japan and South Korea have developed and continue to develop rapidly, countries like India, Afghanistan and Bangladesh are still underdeveloped in terms of economic and social development.

The improvement of the situation of these countries was to be influenced by their support by foreign capital. Most transfers were made based on development assistance, which can be provided as money transfers, provision of consumer and investment goods or expertise and advice. Although it has been provided for decades, it is worthwhile, in the face of a growing wave of criticism (especially its effectiveness and efficiency), to check whether countries recorded economic and social development thanks to official development assistance. To this end, a study on the impact of development assistance on social and economic development was conducted in a group of the 5 largest recipients of British development assistance in Central and South Asia (India, Afghanistan, Bangladesh, Pakistan, Nepal) using the *grey incidence analysis* method.

Development and growth in Economic Theory

For many centuries, development was understood only in an economic context. It must be assumed, therefore, that great researchers like Ricardo, Mill or even Marx in the field of economics have partly dealt with the issues of economic development. The early theories of development economics did not distinguish between development and growth. It was assumed from the top down that growth and modernisation lead to solving problems faced by developing countries. It was also assumed that other aspects of economic and social life would improve with the growth of gross domestic product (GDP). It can, therefore, be seen that the overarching objective of that period was for countries to achieve growth that was synonymous with an overall improvement in the situation in developing countries. This is not entirely true, because even Smith in his greatest work distinguished between material wealth and prosperity. There can be no prosperity without material wealth, but material wealth does not mean prosperity.

Economic growth includes quantitative changes in aggregate GDP growth. Research on economic growth has for years been conducted by many prominent economists such as Schumpeter, Solow, Ramsey, Diamond, Romer, Lucas, Rebelo, Aghion and Howitt. They distinguished different growth paths within their models depending on the economic approach they represented. Generally speaking, economic growth has been characterised by an increase in the volumes such as national income, production and consumption over a given period. The calendar year is usually taken as the period in which comparisons are made more easily.

Many researchers have indicated that economic growth has a direct impact on national development. It is certainly a desirable element in society because it is connected with the improvement of living standards, development of civilization, but above all with the increase of income. However, the definition of development itself includes not only quantitative changes but above all certain aspects of a qualitative nature that directly affect, among others, the standard of living. Economic prosperity alone, without a corresponding increase in social welfare, is not enough to break through the barrier of a developing country.

Rapid sustainable economic growth is a relatively young phenomenon. So far, the average GDP per capita growth rate in Western Europe (1500-1820) was only 0.05%, which is an extremely unsatisfactory result. The impulse to accelerate growth was provided by the industrial revolution of the mid-18th century, which began in England at the time. It contributed to the rapid development of the railways, mining, shipbuilding, mechanical industry, textiles, as well as the arms and energy sectors. The newly created sectors required an inflow of money, creating a huge demand that could not be met by traditional goldsmiths' banks. Continuous technological innovation and industrial development on an unprecedented scale brought with it an increase in labour productivity and an increase in income. As a result, the overall level of GDP per capita has increased.

Economic development, in turn, is a process of structural change characterised by constant technological innovation and industrial progress. Modern economic growth is based on labour productivity growth and is therefore essentially a process of continuous structural change in terms of technology, economic sectors and infrastructure. These phenomena are conducive to raising labour productivity and accompany improvements in infrastructure and institutions which in turn reduce transaction costs in the economy. Transaction costs are the costs of concluding financial transactions and their existence leads people to use money more efficiently.

The procedures for explaining economic backwardness create a certain problem area that can be effectively addressed by the researchers' theory of growth or development. This problem area also contains colloquial ideas about difficult living conditions, poverty, disease, archaic social structures or depravity. According to the "dynamic model", the situation of developed countries is seen as a norm which has been temporarily prevented from being repeated by other countries by internal, external factors or a combination of these. It is implicitly assumed in the literature that the transformation of the economy of a backward country into a developed one is impossible without elements of coercion by the state and other subjects of modernization, which does not mean that it is completely acceptable to

use it. The high degree of the indifference of economists to violence results from the utilitarian treatment of coercion as not necessarily a noble but acceptable tool to push the system to a higher level, the evaluation of which is directly dependent on the results of systems. When thinking about violence against economically lagging countries, one can think of the most direct forms of its manifestation, e.g. the forced nature of employment, irreversible ecological damage, segmentation of social groups, monopolization of political choice or discrimination in terms of ethnic, religious or worldview.

The economic successes of the Asian economies were in line with the American slogan "trade not aid", which further stressed that money flows from rich to poor countries alone will not help them overcome their economic difficulties. Opening up to the global economy and liberalising flows of goods and services was supposed to foster growth in developing countries. Trade instead of aid was pushed through by P. Bauer, pointing out that a poor country in which there are incentives to invest does not need development assistance, while one that does not have such incentives will not use development flows for investment but rather for current consumption.

The societies of developing countries have their specificities. Therefore, techniques that correspond to the level of knowledge and skills should be used in their context. This is why Schumacher believed that one of the most important factors in development is education, as it directly influences work efficiency and the system of its organisation. The imposition of top-down more advanced production techniques on traditional society will not contribute to productivity growth but will even be seen as an attack on the internal social structure. Myrdal at the time argued that growth in developing countries could be achieved by levelling income and social inequalities. For this to happen, a wide-ranging institutional reform would have to be carried out, which would introduce rational ownership relations in the economy, as well as eliminate market defects such as corruption and nepotism. Theories have also emerged in those years to include the influence of cultural and institutional factors in the analysis of growth and development issues.

The theory shows that the trajectory of development is from agricultural production (African countries dominate at the lowest level of the economic ladder, reflecting the lowest income per capita), followed by industry (currently dominated by Asian countries) going from services to high value-added industry and research and development respectively. All countries should strive through the different stages of development to the highest because they have the highest GDP per capita. However, this is not the rule. For example, most Asian countries have moved from exporting goods to the powerhouse of production, leaving aside, for example, the stage of agricultural development.

Definition of developing countries

The countries have adopted to be divided into the developed and developing ones, with the vast majority of the countries in the world being classified as the latter, and therefore sufficient attention must be paid to them. The disparities between the two categories of countries concern not only economic aspects such as gross domestic product, inflation or trade balance, but above all social aspects such as different levels of education or access to medical care. Due to the differences, these countries cannot take advantage of the opportunities offered by the modern economic reality to the same extent. The literature of the subject indicates multiple approaches to the definition of a developing country. Various authors point to different classification criteria. There is no single universal and universally applicable definition. This is because under the common name of a developing country we will find countries that:

- have many natural resources (Venezuela, Democratic Republic of Congo) and countries without raw materials (Chad, Somalia),
- countries with a high GDP *per capita ratio* (Qatar, United Arab Emirates) and countries with the lowest values (Ethiopia, Afghanistan),
- with a relatively high level of social development (South Korea, Singapore) and those with a very low level (Yemen or Niger),
- with a huge territory such as Brazil and Mongolia, as well as micro-states in the Pacific Ocean,

- with high population density like India or China and low population density like Argentina or Ecuador,
- independent for over 100 years like Liberia and those that have gained independence quite recently like South Sudan,
- Catholic in Latin America and Muslim in Africa and Asia,
- the most indebted to their GDP (Rwanda, Lebanon) and rich thanks to the export of raw materials (Saudi Arabia).

However, economists often assume that this classification should be based on economic measures. The use of an economic measure alone was justified in the mid-20th century, but since the 1970s there have been many other aspects that also determine a country's actual level of development. The biggest weaknesses of the above approach include:

- lack of fully reliable statistical data due to different census traditions,
- not taking into account the costs of environmental degradation in GDP, but taking into account military goods and armaments spending,
- to ignore the standard of living of the inhabitants and economic potential in the future,
- the existence of a significant size of the 'grey economy' and a natural economy that produces subsistence goods,
- diversification of the population's income, making it useless to convert economic figures *per capita*.

It is much easier to determine which country deserves to be called a developed country, and then to say that a country which does not have such qualities is a developing country. To qualify a country as a highly developed country, political and social pluralism, as well as individual freedoms in the broadest sense, should be respected alongside economic freedoms.

The role of Asian countries in the global economy

Today we are witnessing a situation where the points of view of the people of Asia and Africa, the two most colonized continents, are beginning to spread. The undoubted economic and political success of Asia, including many former colonies (e.g. India, Hong Kong, Singapore, Malaysia, South Korea or Taiwan), makes us see the old dependencies on Europe or Japan differently. This is particularly evident in the context of Afghanistan or Nepal, which have never been anyone's colony.

In East Asia, many years ago, a model for their own was invented, combining market and state interventionism. This model was called the "development state" and can be applied to the whole of Asia because it takes into account its specific regional circumstances. The whole concept of a development state has been fulfilled by the work of Chalmers Johnson, who published his work in 1982. Initially, these were opposed and controversial, but over the years they have been considered the classic paper for Asian development. Johnson admitted from the beginning that the issue of linking democracy and development is important, but the state can develop in both democratic and autocratic conditions. This thesis was to be proved by his research on a long time series (1925-1975) when both types of political systems were present in the countries studied. In his opinion, the state is not just a "dictatorship of development", as it has legitimacy in two areas. Firstly, it is based on clear and transparent modernisation objectives for both the state and society and secondly, it is effective in its actions. The defence of this thesis is Japan's economic success in the second half of the 20th century. This approach quickly found its followers in the region in the form of Hong Kong, South Korea or Singapore. All these countries had common features:

- methodical planning of development to move towards modernity and modernisation,
- an export-oriented and open to the world economy,
- the vast resources of cheap labour resulting from demography,
- forced social discipline, enforced even at the cost of temporary oppression.

Thanks to these factors, the system was highly dynamic and flexible, and when necessary (or more precise: when the state considered it necessary) absolute. However, these countries were similar but

had different internal conditions, so they adapted the model developed by Japan well to their capabilities, resulting with success.

Methodology and results of empirical research

The diversity of the level of socio-economic development of countries and its causes is a field of interest for more and more researchers. International institutions as the UN, OECD and the World Bank, are also researching this area. The following set of variables was chosen to characterise socio-economic development:

- Gross Domestic Product per capita (in current prices, USD),
- Mortality per 1000 live births,
- Unemployment rate (%),
- Industrial added value per capita.

The following countries were selected for analysis: India, Afghanistan, Bangladesh, Pakistan and Nepal, which are the largest recipients of British development aid. Tables 1 to 5 show the evolution of development assistance per capita and previously presented socio-economic development indicators.

Table 1: Differences in the volume of development assistance per capita and selected socio-economic development indicators in India 2011-2017

	2011	2012	2013	2014	2015	2016	2017
UK development assistance per capita value	0,36	0,37	0,33	0,35	0,22	0,09	0,09
GDP per capita (in $, current prices)	1458,10	1443,88	1449,61	1573,88	1605,61	1729,27	1981,27
Mortality per 1000 births	20,50	19,92	19,42	18,98	18,63	18,33	18,08
Unemployment rate (%)	3,53	3,62	3,46	3,41	3,49	3,51	3,52
Industrial added value per capita	426,70	435,26	446,43	472,24	511,72	545,31	571,64

Source: Own study on https://data.worldbank.org/, https://stats.oecd.org/ (accessed 20.01.2020).

Table 2: Differentiation of development assistance per capita and selected indicators of socio-economic development in Afghanistan in 2011-2017

	2011	2012	2013	2014	2015	2016	2017
Development assistance value per capita	14,06	13,92	10,26	9,75	13,32	8,98	8,05
GDP per capita (in $, current prices)	591,16	641,87	637,17	613,86	578,47	547,23	556,30
Mortality per 1000 births	38,75	37,69	36,67	35,71	34,81	34,22	33,30
Unemployment rate (%)	8,23	7,94	8,45	8,71	8,86	8,84	8,84
Industrial added value per capita	122,28	125,74	127,57	126,77	128,06	123,60	120,99

Source: Own study on https://data.worldbank.org/, https://stats.oecd.org/ (accessed 20.01.2020).

Table 3: Diversification of development assistance per capita and selected socio-economic development indicators in Bangladesh 2011-2017

	2011	2012	2013	2014	2015	2016	2017
Development assistance value per capita	2,47	2,06	2,78	2,22	1,60	1,27	1,42
GDP per capita (in $, current prices)	591,16	641,87	637,17	613,86	578,47	547,23	556,30
Mortality per 1000 births	20,66	20,25	19,86	19,50	19,16	18,00	17,44
Unemployment rate (%)	3,65	3,91	4,43	4,43	4,43	4,35	4,37
Industrial added value per capita	210,11	227,30	246,34	263,42	285,67	313,92	342,33

Source: Own study on https://data.worldbank.org/, https://stats.oecd.org/ (accessed 20.01.2020).

Table 4: Differences in the volume of development assistance per capita and selected indicators of socio-economic development in Pakistan in 2011-2017

	2011	2012	2013	2014	2015	2016	2017
Development assistance value per capita	1,81	1,60	2,76	2,25	2,86	3,07	2,49
GDP per capita (in $, current prices)	1164,98	1198,11	1208,90	1251,16	1356,67	1368,45	1464,99
Mortality per 1000 births	29,86	29,67	29,49	29,32	29,12	28,89	28,60
Unemployment rate (%)	0,80	1,84	2,95	1,83	3,57	3,84	4,04
Industrial added value per capita	199,14	199,92	197,23	201,89	207,96	215,27	220,44

Source: Own study on https://data.worldbank.org/, https://stats.oecd.org/ (accessed 20.01.2020).

Table 5: Differentiation of development assistance per capita and selected indicators of socio-economic development in Nepal in 2011-2017

	2011	2012	2013	2014	2015	2016	2017
Development assistance value per capita	3,85	4,08	5,42	6,85	4,99	5,10	4,67
GDP per capita (in $, current prices)	699,43	698,47	715,92	743,41	792,55	777,15	911,44
Mortality per 1000 births	22,26	21,88	21,52	21,18	20,84	20,52	20,20
Unemployment rate (%)	2,53	2,89	3,30	3,00	3,10	3,06	2,74
Industrial added value per capita	87,68	90,49	93,15	99,76	100,80	93,53	103,74

Source: Own study on https://data.worldbank.org/, https://stats.oecd.org/ (accessed 20.01.2020).

Variables that are presented in Tables 1 to 5 were the basis for further calculations. The *grey incidence analysis* (GIA) method was used to examine the impact of British development assistance (measured per capita) on selected indicators of socio-economic development of selected Central and South Asian

countries. It allows examining the similarities that exist between sets of variables. The most important advantage of this method is the possibility to analyze short time series, additionally, it is also possible to study not only quantitative but also qualitative variables. Due to the availability of data and reliability of the GIA method, it was decided to use it to study the impact of British development assistance on socio-economic development in selected South and Central Asian countries.

The test procedure was conducted in the following stages:

1. Formulating a set of time series that are subject to grey analysis together with linear unitization of the variables subject to grey relation analysis together with linear unitization of the variables. The general form of a time series that has been scaled may be presented as follows:

$$Xij = (xi(1), xi(2), xi(3),..., xi(n)), \qquad (1)$$

where:

i = 1.2..., 5 - indicates the country number

j = 1,2,...,4 - indicates the number of the variable under investigation

n - number of elements in a time series

How each country is marked is shown in Table 6.

Table 6: Country designations

i	Country
1	India
2	Afghanistan
3	Bangladesh
4	Pakistan
5	Nepal

Source: Own study.

The method of determining individual variables is presented in Table 7.

Table 7: Indications of variables used in the test

j	Variable
1	GDP per capita (in $, current prices)
2	Mortality per 1000 live births
3	Unemployment rate (%)
4	Industrial added value per capita

Source: Own study.

The reference vector, due to the purpose of the study (*Xr*), is the time series that characterises the value of development assistance per capita. The time series covered the period 2011-2017. The next part of the procedure will be presented on the example of India. The first step of the method for India resulted in the following time series:

X_1 = (0,03 0,00 0,01 0,24 0,30 0,53 1,00)
X_2= (0,03 0,00 0,01 0,24 0,30 0,53 1,00)
X_3= (0,56 1,00 0,24 0,00 0,37 0,44 0,53)
X_4= (0,00 0,06 0,14 0,31 0,59 0,82 1,00)
X_r= (0,99 1,00 0,86 0,96 0,46 0,03 0,00)

2. Subtraction of the individual values of the time series from the corresponding values of the reference vector gave the following form of vectors

X_1 =(0,00 -0,03 -0,02 0,22 0,27 0,50 0,97)

X_2 =(0,00 -0,24 -0,45 -0,63 -0,78 -0,90 -1,00)
X_3 =(0,00 0,44 -0,31 -0,56 -0,19 -0,12 -0,03)
X_4 =(0,00 0,06 0,14 0,31 0,59 0,82 1,00)

3. Calculation of vector behaviour measures by determining *si*, *sj* and *si-sj* indicator modules according to the following formulas:

$$|s_i| = \left|\sum_{k=2}^{n-1} x_i^0(k) + \frac{1}{2} x_i^0(n)\right| \quad (2)$$

$$|s_j| = \left|\sum_{k=2}^{n-1} x_j^0(k) + \frac{1}{2} x_j^0(n)\right| \quad (3)$$

$$|s_i - s_j| = \left|\sum_{k=2}^{n-1} [x_i^0(k) - x_j^0(k)] + \frac{1}{2} [x_i^0(n) - x_j^0(n)]\right| \quad (4)$$

The results of these activities are presented in Table 8.

Table 8: Measures of vector behaviour

εij	*si*	*sj*	*si-sj*
X11	1,439	**-2,134**	-3,560
X12	-3,483		1,362
X13	-0,744		-1,377
X14	2,414		-4,535

Source: Own study.

4. Calculate the absolute similarity index according to the following formula:

$$\varepsilon_{ij} = \frac{1+|s_i|+|s_j|}{1+|s_i|+|s_j|+|s_i - s_j|} \quad (5)$$

Table 9 shows the results of the absolute similarity index for all countries. The lowest values for a given country are highlighted and the highest values are marked in bold.

Table 9: Results of the absolute similarity index for countries

Country/Variable	GDP per capita	Mortality per 1000 live births	Unemployment rate	Industrial added value per capita
INDIA	0,56	**0,83**	0,74	0,55
AFGANISTAN	0,57	**0,94**	0,55	0,54
BANGLADESZ	0,58	**0,91**	0,53	0,55
PAKISTAN	**0,93**	0,53	0,90	0,81
NEPAL	0,83	0,54	0,87	**0,95**

Source: Own study.

The value of the absolute similarity index reflects the strength of relations between individual vectors (time series of variables). In a situation when there is a higher value of the indicator, the more strongly one variable affects the other variable. Based on the results obtained, development assistance (UK) had the greatest impact on the mortality rate per 1000 live births. The least impact was on industrial value-added per capita and mortality per 1000 live births.

Conclusions

The article aimed to examine the impact of development assistance on socio-economic development in a group of the 5 largest recipients of British official development assistance in Central and South Asia (India, Afghanistan, Bangladesh, Pakistan, Nepal). The characteristics of the level of socioeconomic development were reflected in the following indicators: GDP per capita (in current prices, USD), mortality per 1000 live births, unemployment rate and industrial value-added per capita. The *grey incidence analysis* method was used to carry out the impact analysis, which is extremely useful for short time series.

The results of the study indicate that the least impact UK development assistance has on industrial added value per capita and mortality per 1000 live births. In contrast, mortality per 1000 live births is also most affected. Such results may indicate that development assistance results in development areas related to social rather than economic aspects.

In the future, research may be extended to other countries that also benefit from UK development assistance. A wider set of indicators that are related to socio-economic development could also be considered.

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Evaluation of the Possibilities of Development of Digital Competence According to Labour Market Trends in Latvia

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Abstract

The importance of this issue has increased nowadays because in future today's generation actually faces real consequences of current socioeconomic activity, and it is exceedingly much as never before requires new technology-based approaches and methods in acquiring knowledge, skills and norms needed for all jobs, from the simplest to the most complex. The *purpose* of this study is to explore and substantiate the possibilities of the development of digital competence according to labour market trends in Latvia. The *research methodology* applied in this research study involves examining, analysing and summarizing relevant theoretical concepts, literature and Internet sources as well as statistical data. To achieve this goal, an interview was carried out as the key method of the research. In total, 25 (twenty-five) experts were addressed and in total 6 (six) field experts from business, education policymakers in Latvia and universities were interviewed by sorting them in 3 (three) groups. For each group, questions were prepared differently. The Analytic Hierarchy Process (AHP) method was used to analyse the development scenarios of the possible development of digital competence in the higher education system in line with labour market requirements. *The results indicate* that despite the widespread availability of technology, almost everywhere in the education system, there is still a large gap between educational technology adaptation in education organizations and the demand of the labour market and trends in building competencies. This requires maintaining the holistic approach to targeted digital education management.

Keywords: Analytic Hierarchy Process (AHP), Digital competence/skills, Education system, Labour market trends.

Introduction

The current period describes the digital revolution due to the growing use of information and communications technologies (ICTs). As a result, digital transformation is taking place in almost all areas. It means that digital technologies are used in many sectors such as farming, healthcare, transport, education, retail, automatics, energy, shipping, logistics, teaching and the information and communications technology industry. Careers such as engineering, accountancy, nursing, medicine, art, architecture, and many more require increasing levels of digital skills (European Commission, 2017a). Therefore, significant structural changes in the labour market and the nature of work, which could have significant impacts on employment. The demand for information and communications technology specialists is growing fast.

According to the McKinsey Global Institute, the highest demand will be observed for advanced IT and programming skills, as well as for basic digital skills, which could grow as much as 90 and 70 percent between 2016 and 2030. The demand for other skills that constitute this category will also grow, but not as strongly (Skill shift: Automation and the future of the workforce, 2018). In order to adapt to the change caused by digital transformation, and digital competence/skills are needed for all jobs, from the simplest to the most complex. Therefore, higher education institutions must have to equip graduates with relevant and up-to-date skills (Eteris, 2018). This will encompass a range of skills, from technical, academic, sectoral and digital skills to softer skills like problem solving, creative and design thinking, communication, emotional intelligence, multicultural openness, leadership, managerial and interaction skills (European Commission, 2018a). It means that the digital economy will require for all people to build up a range of new knowledge, abilities and different digital skills needed not only in traditional STEM occupations and ICT professionals but also in nearly for all job sectors where ICT complements existing tasks (Carnevale, Smith, & Melton, 2011).

It has to be mentioned that currently the EU has a significant and systemic gap between market needs and what is offered in terms of skills related to advanced digital technologies. For example, 44% of European citizens between 16 and 74 years of age do not have basic digital skills (European Commission, 2017b). According to the Digital Agenda Scoreboard 2018, 59.2% of European companies in the food industry and 62.5% in the construction industry state that they have the necessary skills to harness a digital transformation. This observation shows that more than one in three companies in these two industries in Europe struggle to find the human resources needed to exploit the opportunities offered by the digital economy. As well as 37% of people in the labour force – farmers, bank employees, and factory workers alike – also lack sufficient digital skills, despite the increasing need for such skills in all jobs. Europe also lacks skilled ICT specialists to fill the growing number of job vacancies in all sectors of the economy. For example, there are more than 350,000 vacancies in Europe for highly skilled technical experts in areas such as artificial intelligence, data analytics and cybersecurity (European Commission, 2018b).

As for Latvia, there is quite impressive progress in using computers in public services: the country ranks 8th in e-government performance, according to the EU's e-Government Benchmark-2017 analysis, which is higher than the EU average level. Latvia is among a top-ten group of advanced countries in e-government score, together with Malta, Denmark, Sweden, Estonia, Norway, Austria, the Netherlands, Latvia, Lithuania and Portugal. Besides, Latvia is among top EU Member States with the main public services online reach for citizens and businesses (Eteris, 2018). Despite progress, the most *essential problem* of developing digital competence, is educational system of Latvia, that is not sufficiently flexible in responding to the needs of the labour market. Latvian employers have difficulty finding people with the digital skills they need to grow and innovate. Therefore, the *purpose* of this study is to explore and substantiate the possibilities of the development of digital competence according to labour market trends in Latvia.

Taking into account that digital competence/skills shortage is likely to reduce the competitiveness of businesses in Europe and Latvia as well, there is necessary to invest not only in new technologies, but also in education, rooted not just in learning but in learning how to learn, and transforming teaching and learning of digital competence in lifelong learning in providing access to learning opportunities for all, including the training of teachers. In this context, the European Commission has created a new *Digital Europe Programme 2021–2027* with an overall budget of €9.2 billion to shape and support the digital transformation of Europe's societies and economies. The programme will boost frontline investments in supercomputing and five key digital sectors: high performance computing, artificial intelligence, cybersecurity and trust and advanced digital skills, thereby ensuring the wide use and deployment of digital technologies across the economy and society in order to strengthen European industrial technological leadership.

The new *Digital Europe Programme 2021–2027* with a budget of €700 million will expand the digital talent pool with around 256,000 people who will be able to deploy the latest technology in business throughout Europe. It will focus on three types of actions:

1) Master programmes in cutting-edge digital technologies developed together with EU excellence centres in artificial intelligence, cyber and high-performance computing. The aim is to offer 160 new master programmes training 80,000 digital specialists.

2) Short-term specialized training courses in advanced digital technologies for around 150,000 job seekers and employed people, especially for SMEs. The aim is to equip them with the competences that will enable the deployment of digital technologies across all sectors of the economy.

3) 35,000 job placements in companies or research centres where advanced digital technologies are developed or used. The aim is to give people the opportunity to learn specialists' skills working with the latest available technologies (European Commission, 2018c; d).

The theoretical basis of the study

In recent years, the concept of *digital competence* is increasingly used together with another concept – *digital skills*. It has to be noted that these terms are often used as synonyms. In this context, we should take a look at what is the relation between digital competence and digital skills. It makes us seek answers to the questions on how to explain these concepts from the theoretical aspect, what competences and personal traits have to be developed to prepare new professionals according to the challenges of the labour market.

The concept of digital competence

The present-day attitude towards the individual, to his/her development and to their values system has changed substantially, as, by putting a competent personality in front, apart from professional activities, this person has to ensure the social role/position in society no less. Each individual person has to become the subject of social changes, and must be able to understand the complicated processes of societal development, and, to influence them. All of this in turn serves to determine new requirements for the further development of the individual's competences of a human being. (Bikse, Riemere, 2013). Therefore, the European Commission developed a framework of 8 key competences (communication in a mother tongue and in a foreign language; mathematical, scientific and technological; digital; learn to learn; social and civic; entrepreneurship; and cultural awareness) as part of their lifelong learning strategies that have to be developed by everyone, beginning from childhood and throughout the entire life. These competences are considered equally important for life and work in a knowledge-based society (European Commission, 2006). In this respect, the OECD suggests that governments should make effort to identify and conceptualise the required set of skills and competences, and then incorporate them into the educational standards (OECD, 2010).

According to the European Commission (2017b), digital competence is one of the eight key competences and refers to the confident and critical usage of the full range of digital technologies for information, communication and basic problem-solving in all aspects of life. Within the context of using digital technologies in policy documents, in the academic literature, and in teaching, learning and certification practices, several terms have been used to describe the skills and competence, such as ICT skills, technology skills, 21st century skills, e-skills, computer literacy, media literacy, digital literacy, and digital skills. Differences were found between concepts by several authors (Ilomäki, et al., 2011, 2016; Gallardo-Echenique, et al., 2015). This paper does not intend to examine all these terms. A recent study aimed to identify the different approaches associated with digital competence and its connection to digital skills.

In specialized literature, policy-related papers and reports, a number of different definitions characterizing the concept of *digital competence* can be found. Having studied them, the conclusion is that, excepting a few differences, all the authors focus more or less on the same issue. For example, Caravello, et al. (2020) described digital competence as the ability to keep abreast with the rapid changes of technology; it includes the relevant knowledge and skills people need to use information and communications technology (ICT) in an appropriate way for their own purposes, both personal and professional.

A widest description of the concept of *a digital competence* is given by other authors, where digital competence consists not only of knowledge and digital skills but also include soft skills. For example, Justenhoven (2018) has defined digital competence as a set of knowledge, skills, attitudes, abilities, strategies, and awareness that are required when using ICT and digital media to perform tasks; solve problems; communicate; manage information; collaborate; create and share content; and build knowledge effectively, efficiently, appropriately, critically, creatively, flexibly, ethically, reflectively for work, leisure, participation, learning, and socializing. Moreover, OECD (2016) documents stress that the concept of digital competence, has to be focused on a broader approach, as in the digital economy era, ICT skills will not be enough and other complementary skills will be needed. Digital competence is ranging from good literacy and numeracy skills through to the right socio-emotional skills to work collaboratively and flexibly (OECD, 2016). Within the context of this other authors concludes that digital competence can be considered as digital literacy and requires the presence of four literacies: a) *information literacy* for managing digital information; b) *computer literacy* for treating data in different formats; c) *media literacy* for analysing and creating multimedia messages; and d) *communication literacy* for participating in a safe, ethical and civic manner from a digital identity (Gallardo-Echenique, et al., 2015).

So, according to these definitions, the digital competence is a very broad concept, including much more than basic skills in the use of ICT. It is about being competent to use technology in different situations (e.g. work, leisure) and for different purposes (e.g. learning, communicating, solving problems, online collaboration, building knowledge, creating and sharing). In a broader sense, digital competence can be defined using a wide range (21) of key components, which have to be developed to prepare new professionals according to the challenges of the labour market. To understand the nature of digital competence better, the European Commission has developed the *European Digital Competence Framework for Citizens* (DigComp) which is divided into five competence areas: information and data literacy; communication and collaboration; digital content creation; safety; and problem solving (European Commission, 2011; 2014; 2017b; 2017c). From the above, it is important to maintain the acquired knowledge and skills to such a level that they are useful in the global labour market which is constantly changing.

Digital competence and its connection to digital skills

As it was said before, the concept of digital competence includes a combination of knowledge, skills and attitudes such as being confident and critical. It means that digital competence and digital skills are closely related but not identical. Digital skills are the important component of digital competence. Within the context of this, the concept of digital competence may be explained in a much broader sense than that of skills. The relation between *competence* and *skills* is defined in an OECD project as follows: "A competency is more than just knowledge and skills. It involves the ability to meet complex demands, by drawing on and mobilizing psychosocial resources (including skills and attitudes) in a particular context" (OECD, 2005, p. 4).

Consequently, the concept of *digital competence* may be explained in a much broader – socio-economic – sense than that of digital skills. It means that along with professional training, the overall development of an individual as a personality, as well as the development of the individual's key competences, including digital competence, has to be ensured. It is built

through a process of acquiring knowledge, skills, and experience, i.e. in the digital education process. To our knowledge, digital education may be viewed in two senses: *in a broader sense,* it is oriented towards developing a certain set of personal traits and soft skills, which are important in any field of activity and in life, without directly associating it with how to use of ICT, while *in a narrow sense*, any particular stage of the educational system involves developing specific digital skills and acquiring knowledge of and experience in how to use of ICT. In this regard, the process of studies has to be oriented towards developing competences and integrating the elements of digital education into all study programmes in order to develop digital competence not only in those who plan to connect their professional life with ICT but everyone – future engineers, biologists, physicists, chemists, mathematicians, and many more. Besides, digital competences have to be developed in everyone from their childhood through implementing various digital education programmes at all levels of the education system, as well as through lifelong learning.

European Commission (2018) documents stress that the elements of digital education should be integrated in all study programmes (courses) or taught as a separate subject focused on building digital competences to give all students and teachers the opportunity to use digital tools and materials in their teaching and learning activities. This requires a complex approach not only to tackling organisational problems in the learning/training process, placing the main focus on the formation of personality and creating opportunities for self-realisation, but also to targeted digital education management. Success depends on the commitment, collaboration and expertise of many players, such as national governments, regions, local authorities, industry, academia, foundations, professional bodies, workers and civil society, and people themselves, seizing opportunities to make the best of their talents (European Commission, 2018b).

Research Methodology and Participants

Digital education is a dynamic and complex system. Equally complicated methods should be used for its research. Due to a complex character of the digital education, the interdisciplinary approach should be used which, in turn, means including both the qualitative and quantitative indicators in the analysis. To evaluate the possibilities of development of digital competence in the education process, an interview and an analysis of opinions were carried out as the key method of the research. In total, 25 (twenty-five) experts were addressed and in total 6 (six) field experts from business, education policymakers in Latvia and universities were interviewed by sorting them in 3 (three) groups. For each group, questions were prepared differently. Experts were selected on the basis of evaluating the competence level performed earlier. Experts whose field of action, experience, and position were sufficiently significant were selected for the survey to assess the offered priorities in the development of digital education. (Table 1) The interviews took nine months, from January 2019 to December 2019. In order to organize the experts' work scientifically and correctly and to process the results of the experts' assessment, the authors used the Analytic Hierarchy Process (AHP) and the key principles of the expert method (Saaty, 2008; 2012).

The data mathematical processing was performed with the computer programme Ms Excel. The criteria comparison results were illustrated in a graphic figure as a minimal, maximal and average coordinate of each factor's priority vector. A differentiated approach was used for scenario building and evaluation. The scenarios were created by the author of the research, while a scenario evaluation was carried out by experts from Latvia.

Evaluation of the development of digital competence in the education system by using the AHP method

The Analytic Hierarchy Process (AHP) method was used to analyse the development scenarios for the possible development of digital competence in the higher education system in line with

labour market requirements. The differentiated approach was used for working out and assessing the scenarios: the scenarios were worked out by the authors but they were assessed by experts. The criteria hierarchy for determining the priorities was developed during the research. The hierarchical pyramid of the research was divided into four levels as it is shown in Figure 1.

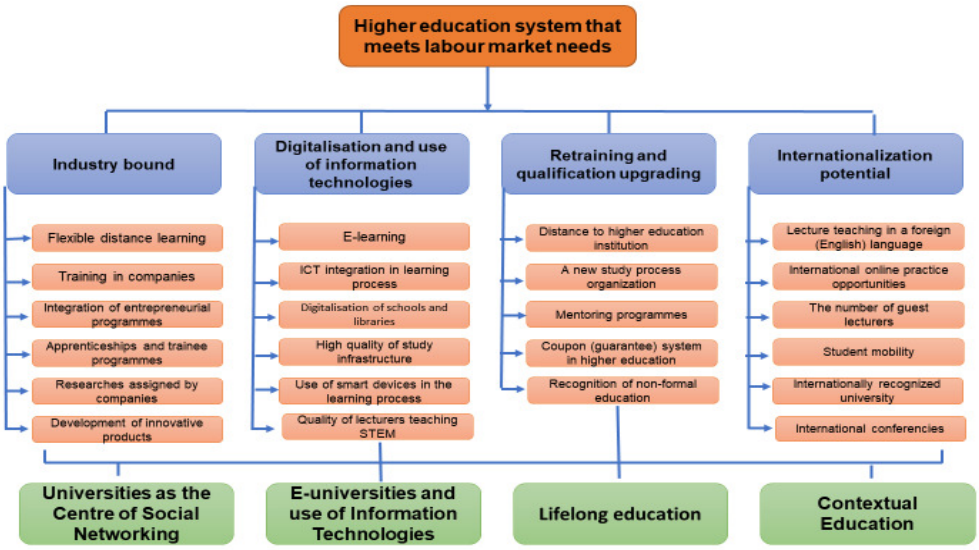

Figure 1: Structure of the Analytic Hierarchy Process in the research. Source: Author's figure.

As shown in Figure 1, the ***highest goal (first level)***– "Higher education system that meets labour market requirements" was chosen.

At the ***second level,*** four groups of criteria have been defined. These criteria groups were formulated according to the main tasks set in the strategy "Sustainable Development Strategy of Latvia until 2030" adopted by the Saeima of the Republic of Latvia (2010). The proposed structural reform challenges are grouped according to the main objective of structural reforms: higher education system development scenarios in line with labour market requirements: 1) *Industry bound.* Collaboration between students and organisations - after completing necessary theory courses, training is performed in companies in accordance with the knowledge obtained during the studies. 2) *Digitalisation and information technologies.* Use of information and communication technologies in teaching and learning processes and accessibility of massive online open course (MOOC) services. 3) *Retraining and qualification upgrading.* Recognition of non-formal knowledge, skills and competencies to provide a person with the opportunity to receive a formal education document and adults without specific pedagogical education to be a voluntary mentor or advisor. 4) *Internationalization potential.* Teaching is in English and education has an international focus, with the aim of preparing students to become global citizens, and the students are provided with opportunities to participate in global activities.

The next stage of the method envisaged identifying and defining the assessment criteria. Also, at the ***third level,*** the sub-criteria defined for second level criteria groups were set using the same 2030 strategy as previously. In order to make it easier for all the experts to carry out the evaluation, handouts were prepared in which each defined sub-criterion (third level) was described. (Table 2)

Table 2: Defined sub-criteria in the research by the authors

Linking with industry	
Flexible distance learning	Students choose their own courses and, if necessary, have a mentor who assists in studies.
Training in companies	Training is provided in companies in the profession.
Integration of entrepreneurial programmes	The programmes of professional and higher education institutions not only prepare young people as employees but also to focus on opportunities to develop an entrepreneurial career - practical knowledge of starting and running a business.
Apprenticeships and trainee programmes	Develop apprenticeship or trainee programmes in educational institutions by integrating practical tasks and regular practice in the labour market environment.
Researches commissioned by companies	Meaningful tasks and environment-related projects for students.
Development of innovative products	Creation of labs and workshops according to industry needs.
Digitalisation and use of information technologies	
E-learning	Accessibility of massive online open course (MOOC) services
ICT integration in the learning process	Use of information and communication technologies in teaching and learning processes.
Digitalisation of schools and libraries	Creation of digital content and free access to learning materials in the e-environment.
High quality of study infrastructure	Education infrastructure is crucial elements of learning environments in schools and universities.
Use of smart devices in the learning process	Meaningful use of smart devices in the learning process.
Teaching STEM	Introduction of the best STEM solutions in higher education in Latvia.
Retraining and qualification upgrading	
Distance learning	Access to the modern study process and digitization of Latvian libraries.
New study process organization	Some of the lessons are taught by teachers in the classroom, while some of the content is explained in a virtual environment.
Mentoring programmes	Adults without specific pedagogical education as a voluntary mentor or advisor.
Coupon (guarantee) system	Higher education institutions with more students receive more municipal and state funding.
Recognition of non-formal education	Recognition of non-formal knowledge, skills and competencies to provide a person with the opportunity to receive a formal education document.
Internationalization potential	
Teaching in a foreign (English) language	A student with higher education must be fluent in at least two foreign languages.
International online practice opportunities	The opportunity for students, alongside their studies, to go online for example to Microsoft, Google or other global companies.
Number of guest lecturers	Increase in the number of guest lecturers contributes to healthy competition and ensures a higher level of quality in the educational institution.
Student mobility	Regular contacts between schools in Latvia and other countries, student and teacher exchange and internship programmes (for example, the Erasmus programme)
Internationally recognized university	Teaching is in English and education has an international focus, with the aim of preparing students to become global citizens.
International conferences	Students are provided with opportunities to participate in global activities.

At the ***fourth (the lowest) level,*** the following alternatives for the Latvian education system that meets labour market requirements scenarios were analysed. These alternatives are set as possible solutions in the 2030 strategy to create one of the best educational systems in Europe:

1) *Universities as the Centre of Social Networking* under the guidance of which parents, educatees, as well as a wider local community, including entrepreneurs, representatives of professional and sectoral associations, participate and co-operate.

2) *E-universities and use of Information Technologies (IT).* IT have entered in our daily lives and they should be used skilfully in the learning process. In addition, institutions of higher education may create distance learning programmes, using e-technologies, which mainly take place in the e-environment. It could acquire the skills necessary for economic activity and would improve the general level of digital competence.

3) *Lifelong education.* By increasing the role of lifelong learning in society, the ability of every person, especially a young person, increases to see the necessity and to use education and career development opportunities throughout their lives. In the nearest future, a solution should be found for the way to create a link between the system of formal education and digital education.

4) *Contextual Education.* Systematic cooperation between general, vocational and higher education institutions should be oriented towards the development of individuality and necessary competences in the youth (skills, knowledge and personal traits) and for curriculum development, improvement of teachers' competences for teaching more than one study subject.

The next step envisaged performing an expert evaluation (procedure of obtaining experts' ratings) to find out the importance of ratios for each factor. After the survey, all the data were processed. When all the project hierarchies had been correctly formed, calculations were done. The result of calculation shows which of the alternatives was the most acceptable in the aspect of all the mentioned criteria. The results of the experts' survey were further analysed taking into account the context of digital education.

Summarizing the expert ratings for criteria groups for a ***higher education system*** that meets labour market requirements, the highest average rating was given to "Digitalisation and use of information technologies" – 0.43 (Figure 2). Then "Internationalization potential" and "Industry bound" followed with an identical rating – 0.21, yet "Retraining and qualification upgrading" followed with 0.14; thus, the experts considered the most important need for the education system in Latvia was to create a learning environment that would promote the cognitive process and develop the competences/skills that match the demand of the labour market.

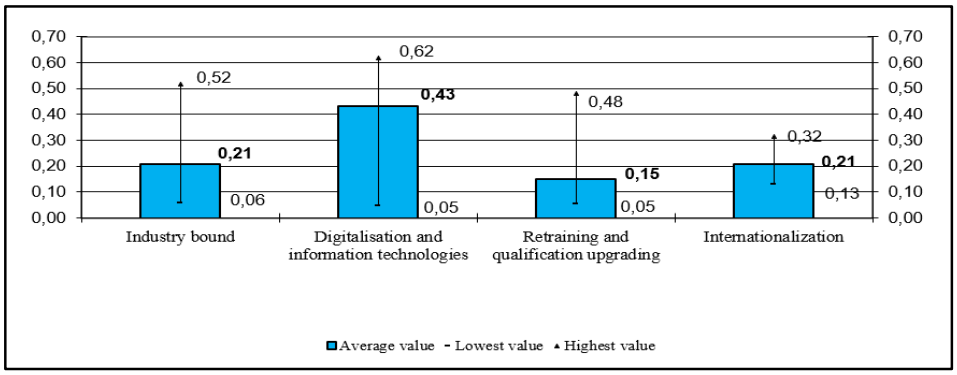

Figure 2: Expert ratings of criteria groups for a higher education system that meets labour market requirements. Source: authors' calculations and figure.

At the same time, assessing the defined scenarios by criteria group in relation to the following criteria groups - *Industry bound, Digitalisation and use of Information Technologies* and *Internationalization potential* - the highest average score was given to *Contextual Education*. A similar rating (for the criteria "Contextual Education" with a rating of 0.39) was given in the summarizing assessment of all the groups of criteria (Fig.3).

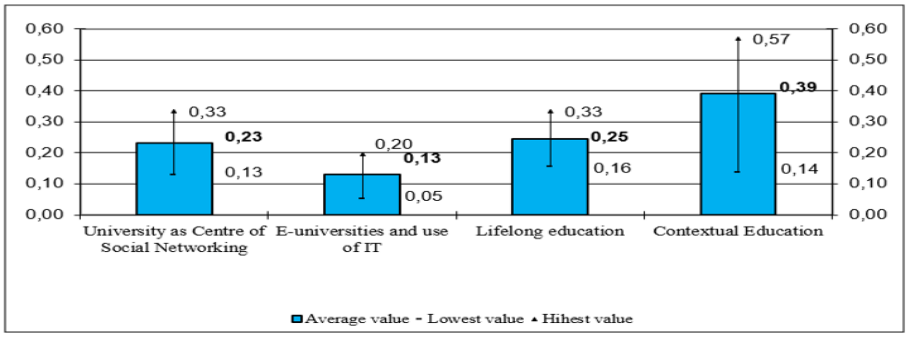

Figure 3: The summarized assessment of the development scenarios for the digital education system by the experts. Source: authors' calculations and figure.

However, there was rather considerable dispersion of the expert ratings, namely, the lowest rating of the scenario was 0.14, whereas the highest was 0.57, which indicated expert disparity. The next advisable scenario was "Lifelong Education" – 0.25, and the scenario "University as the Centre of Social Networking" – 0.23, the scenario "E-universities and use of IT" with a rating of 0.13, which was the lowest.

The criteria group "E-universities and use of IT" had the lowest rating among all the criteria groups, which might be because of the common idea of the experts that the future higher education system should be oriented towards the development of individuality according to the challenges of the digital transformation and labour market trends.

Taking into consideration the ratings provided by the experts of possible development of digital competence in the higher education system in line with labour market trends, it is possible to conclude that currently in Latvia young people are not sufficiently prepared for the digital economy and society. Therefore, it is very important to facilitate collaboration among academics, policymakers and practitioners and to modernise the education and training systems. It means that it will increasingly depend on the link between the educational system and changes in the labour market, as well as the capability to prepare a person for work in changing conditions during his or her whole life.

Conclusion and Recommendations for a Future Research Study

The research findings show that the concept of *digital competence* is much broader than the concept of digital skills. Digital competence is a combination of knowledge, skills and attitudes, including the development of soft skills such as problem solving, collaboration and creativity. Consequently, digital skills are the important component of digital competence.

According to the labour market trends, the demand for highly-qualified, competent to use technology in different situations and for different purposes, employees will considerably increase in Latvia. Therefore, the education system has to adapt to the labour market challenges, enabling every young individual to build up their digital competences in the process of education through implementing the elements of digital education in various study programmes at all the levels of the education system, as well as through lifelong learning. This requires maintaining the holistic approach to targeted digital education management.

The analysis of the development of digital competences in the education system and the hierarchy analysis performed allows concluding that: *firstly,* despite the widespread availability of technology almost everywhere in the education system, there is still a large gap between educational technology adaptation in education organisations and trends in building digital competences. *Secondly,* studies show that the one of the challenges of higher education is the lack of a unified vision among students, education providers and employers about the aims and content of education. These three stakeholders rarely cooperate with each other, which makes it difficult for employers to find and recruit employees with the skills needed in a fast-changing work environment. Because of this reason, there is a prediction about the increasing gap between universities and private companies.

In order to reduce the labour market disproportions, it is necessary to provide significant changes in the education system, the quality of contemporary education content and the required impact on the labour market. In order to ensure access to a modern learning process and information, digitalisation of all schools and libraries of Latvia should be implemented. In addition to the usual learning process, educational institutions should create distance learning programmes, using e-technologies (Saeima of the Republic of Latvia, 2010).

It is important to the universities to ensure that courses are delivered by the lecturers who are highly-qualified, creative, progressively-minded, and well aware of theories and practices (experienced in practice and research) and who are interested in integrating the elements of digital education in their courses. The mission of university lecturers is to assist every student in comprehending and developing their personal traits and abilities, to encourage them to use technology in different situations and for different purposes.

Significant attention should be paid to lifelong learning, as we live in a very dynamic period when one speciality throughout the working life is not enough. It is advisable to develop a strategic action plan for competitive lifelong learning in Latvia with priority competencies defined, which needs to be acquired, based on the desired objectives to be achieved.

As regards improving the general level of digital education in Latvia and the necessity to focus on a sustainable strategy in order to meet the demands of the labour market, in the future it is advisable to conduct in-depth research into these fields, and researchers have to elaborate recommendations for the Ministry of Education and Science on the (1) possibility of development of youth digital competence in the education system, (2) and research needs to analyze how the collaboration among academics, policymakers and practitioners facilitate digital education management in order to become involved in the development of new approaches to enhance digital competence in educational contexts.

Acknowledgments

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Securing Continuity of Transport Supply in FMCG Enterprises in Costative

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Abstract

The fundamental decision problem in the process of managing an (fast-moving consumer goods) FMCG industry is the development of a transport plan ensuring the right selection of vehicles for tasks and a rational distribution of the supply stream in the transport network. The specificity of delivered goods requires shortening the time of delivery and ensuring appropriate transport conditions. An important element especially in the FMCG industry is the quality of transport processes, which is part of the company's competitive advantage and leads to a reduction in the logistics costs of operations. In connection with the above, it is important to have tools supporting decision making in this area. This study assesses the possibility of using linear programming methods to optimize the implementation of transport processes based on the simplex algorithm. The objective function was to minimize transport costs. On the basis of daily estimation of chicken egg sales and the production capacity of suppliers, a mathematical formulation of the problem was made and limitations in the values of decision variables were indicated. Then, based on the results obtained, a freight transport plan was developed.

Keywords: Securing Delivery, Transport Issue, FMCG, Delivery Schedule

Introduction

The specificity of the transport industry is characterized by multidimensional decision problems in the area of transport means planning and management. They usually concern the optimization of the transport process by minimizing costs and empty runs, setting transport quotas, determining the minimum route in the communication network or the maximum stream of the transport network.

We are constantly looking for new solutions and methods to increase the efficiency of transport processes that affect the high level of end customer service. An important problem is therefore the planning and implementation of such transport work of motor vehicles, which will allow to minimize costs while using their maximum efficiency. Reliable provision of transport services based on economic efficiency is the basis of competitiveness in the transport industry, therefore methods for minimizing operating costs are constantly being sought.

The main aim of the article is to analyze the possibility of using the simplex algorithm in the decision-making process related to the rationalization of vehicle route mapping in an enterprise distributing products in the FMCG (fast moving consumer goods) network. A mathematical formulation of the problem was made based on the weekly sales estimation and daily eggs production capacity of suppliers. On this basis, an optimal distribution of the size of the supply stream has been developed, aiming to minimize transport costs. Then, the results obtained were summarized and directions of possible further works were indicated.

Review of the literature - condition of the problem

Ensuring the correct transport of FMCG loads plays a key role in managing the company operating in the above industry. It is estimated that about 30% of losses of fast moving products are caused by inadequate transport conditions. Therefore, the rational selection of vehicles for the implementation of tasks and the duration of the transport process are key factors influencing the decision making in the process of developing distribution plans. Effective planning and management of an enterprise's fleet is usually implemented by optimizing the allocation of the supply volume stream so as to maintain the quality of delivered goods and minimize transport costs.
The effectiveness of distribution processes and their quality significantly affects the logistics costs of business operations, but also their competitive advantage. The problem of route planning includes rationalization of deliveries from producers to recipients leading to minimization of transport costs in the network. In operational research, it is included in the group of vehicle routing or vehicle routing VRP (Vehicle Routing Problem) [17]. Efficient planning and management of an enterprise's fleet is usually achieved through the optimal allocation of vehicles to individual transport tasks. For this purpose, linear programming methods can be used, including those based on the simplex algorithm. They make it possible to plan the transport of goods in accordance with the adopted objective function, e.g. minimizing costs or time to complete tasks. The transport issue was formulated in 1941. by FL Hitchcock [7], while the algorithm for its solution was developed by GB Dantzig, and then introduced to economic sciences by Koopmans [32]. In the literature, the above tool is most often used to study transport problems (open and closed), transport and production problems, and to determine production locations or minimize empty runs.

The analysis problems of securing continuity of transport supply in costative is of interest to many studies available in extensive literature [14], [18], [30], [36]. The most frequently available studies are based on the functions of mathematical modeling [1], [3], [22], [28], [31]. The purpose of the research is to minimize the function of the overall costs of planned transport. To solve such problems commonly used simple algorithms, ie. Hungarian algorithm method, simplex method, the nodal analysis and the top-left corner transport matrix analysis [12], [14], [18], [36], [39]. Among the more complex methods, the minimum element of the cost matrix or the VAM (Vogel Approximation Method) should be listed [29], [33]. There are also numerous publications solving the problem of allocation by heuristic methods, i.e. genetic algorithm, particle swarm algorithm, or fuzzy sets [6], [12], [15], [21], [26], [27], [31], [39]. In addition, in practice, modern IT systems are increasingly used to optimize the allocation, which automatically develop the concept of an interactive planning system using specific automatic generation and optimization procedures. The programs allow not only the construction of the plan [18], [20], [38] but also its ongoing verification of implementation [3], [13], [22], [25], [28].

In transport practice, the problem of optimal allocation of tasks to means of transport is much more complicated and leads to the construction of significantly complex mathematical models, the solution of which requires the use of specialized algorithms and methods. Due to the dynamics of actions implemented in transport enterprises, very high algorithm speed is required, enabling planners to work in almost real time. In addition, the complexity of the issue is increased by numerous and difficult to define restrictions, e.g. special delivery conditions, provision of additional services as part of the transport task, designated time windows for loading and unloading, current changes in the transport plan, random events and multidimensional relations between the customer and the recipient and the driver. Constantly changing market requirements and the fact that rational allocation of tasks for means of transport is key in the aspect of economic efficiency of an enterprise, the above issue is a current problem and is of interest to many authors.

Transport issue with application of linear programming

Planning the allocation of means of transport to tasks was based on linear programming using a simplex algorithm. The algorithm for solving transport problems allows determining the volume of deliveries for which the sum of transport costs in the analyzed network will be the lowest. Transport network means a set of routes and transport points in a given area [7]. It can be represented by a structure in the form of a *G* graph, where:

$$G =< W, L > \tag{1}$$

where:

W – set of numbers of vertices of graph G having interpretations of transport nodes,
L – set of arches of the graph G, constituting direct connections between nodes in the transport network.

In each network, a set of transport nodes numbered with the index i [10], should be distinguished, for which W is a set of numbers of distinguished nodes (1):

$$W = \{1, \dots, i, j, \dots, \overline{W}\}, \tag{2}$$

where:

$\overline{W}$ – the number of transport hubs identified.

However, the elements of the set of arches are defined as follows [4], [11]:

$$L = \{(i, j): \eta_{ij} = 1, i \neq j, i, j \in W\}, \tag{3}$$

where:

η_{ij}– mapping of transport connections in the network.

In the transport issue, it is assumed that the transport network is bipartite and full (fig. 1). All available nodes can be divided into two groups, i.e. deliveries ($i=1,2,\dots,m$) and pickup ($j=1,2,..,n$). However, for each arc is determined unit cost of transport of the products transported c_{ij}.

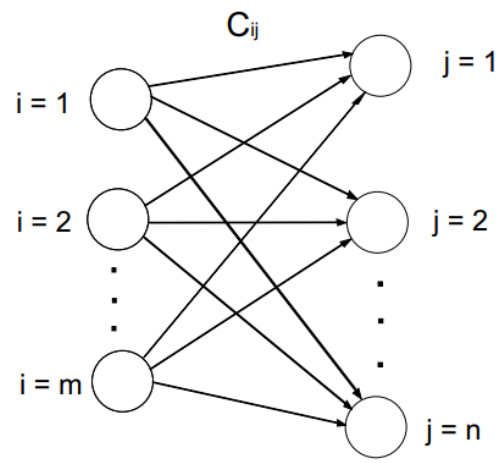

Fig. 1: Bipartite and full transport network [12]

The solution to the above problem is to find transport volumes x_{ij}, that minimize the total cost of transport z, satisfying the needs of n customers in line with the supply offered by m suppliers [8]. The above network interpretation makes it possible to formulate the problem in mathematical form. The objective function is to minimize transport costs:

$$z(x_{ij}) = \sum_{i=1}^{m} \sum_{j=1}^{n} c_{ij} \cdot x_{ij} \rightarrow min, \tag{4}$$

under conditions determining:

– total inventory level in all warehouses:

$$\sum_{j=1}^{m} x_{ij} = a_{i,} \quad i = 1, \dots, m \tag{5}$$

– total demand of all customers:

$$\sum_{i=1}^{n} x_{ij} = b_{j,} \;\; j = 1, \dots, n \tag{6}$$

- and

$$x_{ij} \geq 0, \qquad i = 1, \dots, m, \qquad j = 1, \dots, n \tag{7}$$

If the inventory level in the warehouse is equal to the customer's demand, the data is a balanced transport task. In market conditions, the above assumption is most often not met, therefore unbalanced tasks are widely used. There are two variants:

- inventory in the warehouse is smaller than the needs reported by customers:
-

$$\sum_{i=1}^{m} a_i < \sum_{j=1}^{n} b_j \tag{8}$$

- the demand for products is less than the available stocks:
-

$$\sum_{i=1}^{m} a_i > \sum_{j=1}^{n} b_j \tag{9}$$

The authors in the article adopted a procedure based on the simplex method, because it is also possible to reduce unbalanced TP to balanced TP by adding appropriate variables. The essence of which is to study subsequent basic (acceptable) solutions presented in canonical form, using three main iterations:

- finding any underlying solution to the problem,
- checking the optimality of the indicated solution,
- constructing further acceptable solutions that are not worse than the previous one.

The search procedure ends when it is determined that the current solution is the best for adopted restrictive conditions. The results of individual stages are presented in the following simplex tables. Since the algorithm consists in studying the basic solutions of the canonical form, in the case of solving unbalanced transport problems before building the first table, all inequalities should be reduced to the form of an equation by introducing new variables. In the case of inequalities of the type "≤", additional free variables should be placed on the left, while with regard to the inequalities of "≥", free variables should be subtracted from the left and replaced by so-called artificial variables. Building the objective function, for free variables as coefficients one should take *0,* while for artificial variables so-called coefficients *M,* where *M* is a number approaching infinity [9].

Selection of transport means for implementing tasks in the transport network – case study

The subject of the research of this study is a trading company from the FMCG industry dealing in the sale of chicken eggs, which it purchases from selected producers (designated P1, P2 and P3). The company has signed contracts with 3 contractors for the delivery of goods to specific distribution centers (A, B1, B2, C1, C2). The contract specifies the annual minimum order quantity, which, according to the received monthly sales forecast for a specific type of product, is spread over 12 consecutive months, and these in turn into individual weeks and days. The location of individual manufacturers and customer distribution centers is shown in fig. 2 and in tab. 1 and 2.

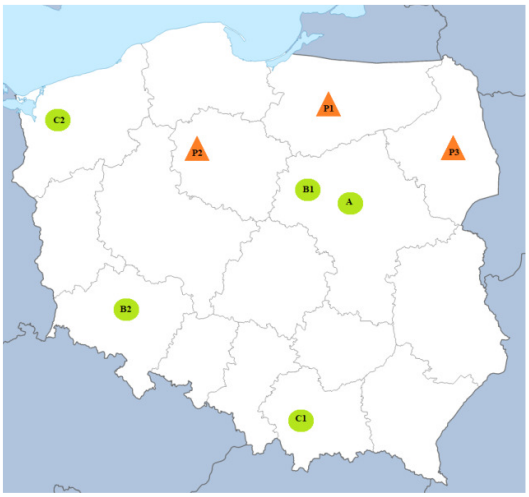

Fig. 2: Arrangement of chicken egg producers and delivery pickups (own elaboration)

Tab. 1: Locations of individual distribution centers of the company's clients (own elaboration)

Contractors	Locations of distribution centers	Contracted, minimum annual order quantity
K1	A: Warszawa	6 900 000
K2	B1: Płock, B2: Wrocław	25 500 000
K3	C1: Kraków, C2: Szczecin	10 200 000

Tab. 2: Locations of chicken egg production plants (own elaboration)

Manufacturers	Production plant locations	Contracted, minimum annual production volume
P1	Julianowo	6 900 000
P2	Bydgoszcz	25 500 000
P3	Białystok	10 200 000

Each producer produces 6 types of chicken eggs, which, depending on the type of farming (cage [K], litter [SC] or free range [WW]) and size (M or L) are packed in the appropriate type of unit packaging (egg tray). The daily production capacity of individual suppliers is presented in tab. 3.

Tab. 3: Daily production capacity of individual suppliers (own elaboration)

Manufacturer	Size M			Size L		
	cage farming	free range	barn reared	cage farming	free range	barn reared
P1	88 816	9 033	22 399	50 720	20	5 453
P2	44 408	54 195	7 466	25 360	120	1 818
P3	14 803	27 098	44 798	8 453	60	10 906

In order to prepare the delivery, each of the unit packages is packed into collective cartons, and then onto a pallet in accordance with the following specification. For the type of packaging containing 10 eggs in size M and L, it is assumed that 1 EURO pallet contains 50 collective packaging and 600 individual packaging. The weight of one pallet is estimated at 415 kg. Deliveries are planned on the basis of product sales estimation developed for the following weeks of the year based on a 7-element moving average method. The survey was based on a forecast of individual recipients' needs prepared for the 10th week of 2019 (tab. 4-8).

Tab. 4. Estimation of egg sales for contractor 1, branch A (own elaboration)

Type of eggs	Contractor 1, branch A				
	Monday	Tuesday	Wednesday	Thursday	Friday
10 L K	15 812	36 226	20 520	12 441	21 621
10 L SC	9 420	20 338	10 100	8 421	7 881
10 L WW	26 905	61 856	35 825	22 726	40 607
Sum	**52 137**	**118 420**	**66 445**	**43 589**	**70 109**

Tab. 5. Estimation of egg sales for contractor 2, branch B1(own elaboration)

Type of eggs	Contractor 2, branch B1				
	Monday	Tuesday	Wednesday	Thursday	Friday
10 L SC	33 267	22 558	25 121	25 285	29 130
10 M WW	1 748	5 184	8 245	3 649	15 173
Sum	**35 015**	**27 742**	**33 366**	**28 934**	**44 303**

Tab. 6. Estimation of egg sales for contractor 2, branch B2 (own elaboration)

Type of eggs	Contractor 2, branch B2				
	Monday	Tuesday	Wednesday	Thursday	Friday
10 L K	26 012	35 968	33 401	13 085	36 405
10 L SC	22 112	23 579	27 229	18 821	31 559
Sum	**48 124**	**59 547**	**60 630**	**31 906**	**67 964**

Tab. 7. Estimation of egg sales for contractor 3, branch C1 (own elaboration)

Type of eggs	Contractor 3, branch C1				
	Monday	Tuesday	Wednesday	Thursday	Friday
10 L K	51 784	62 655	49 154	31 219	49 507
10 L SC	25 958	26 597	28 669	22 806	32 770
10 L WW	29 536	35 546	42 955	21 711	55 653
10 M K	31 279	42 205	26 017	55 444	56 386
10 M SC	159	79	132	53	26
10 M WW	183	1 710	10 147	3 780	12 621
Sum	**138 898**	**168 792**	**157 074**	**135 013**	**206 963**

Tab. 8: Estimation of egg sales for contractor 3, branch C2 (own elaboration)

Type of eggs	Contractor 3, branch C2				
	Monday	Tuesday	Wednesday	Thursday	Friday
10 L K	51 784	62 655	49 154	31 219	49 507
10 M K	31 279	42 205	26 017	55 444	56 386
10 M WW	183	1 710	10 147	3 780	12 621
Sum	**83 246**	**106 570**	**85 318**	**90 443**	**118 514**

Based on available daily estimates, it is planned to select means of transport for the tasks being carried out, assuming that trucks with a GVW of up to 24 tons and a load capacity of up to 33 pallets are used for transport. Having information about the forecasted sales volume of eggs to individual departments and about the daily production capacity of individual manufacturing plants, the supply volume was divided between individual suppliers and recipients in the supply network. For this purpose, the linear programming method using the simplex algorithm was used. The objective function was to minimize transport costs, which is implemented by striving for the lowest mileage of vehicles in the network. In the first step, the distance between individual branches in the network was calculated, which will be used to estimate transport costs. It was assumed (based on market research) that the cost of transporting products over a section of 1 km is PLN 2.6, and then the cost matrix is plotted. Then a tabular record of the transport issue was made and the search for the optimal solution began.

Tab. 9: Table of unit costs of transport, supply of producers and consumer demand (own elaboration)

		Recipients j=5					Supply producers A_i [palettes]
	c_{ij}	A	B1	B2	C1	C2	
Manufacturers i=3	P1	603.20	455.00	1 323.40	1 305.20	1 567.80	30
	P2	845.00	413.40	743.60	1 154.40	712.40	25
	P3	551.20	761.80	1 411.80	1 268.80	1 963.00	20
	B_j	10	7	9	27	16	
		Consumer demand [palettes]					

Then a mathematical formulation of the problem was made, where:

- goal function:

$$z\,(x_{ij}) = 603.20 \cdot x_{11} + 455.00 \cdot x_{12} + 1\,323.4 \cdot x_{13} + 1\,305.2 \cdot x_{14} + 1\,567.8 \cdot x_{15} + 845.0 \cdot x_{21} + 413.4 \cdot x_{22} + 743.6 \cdot x_{23} + 1\,154.4 \cdot x_{24} + 712.4 \cdot x_{25} + 551.2 \cdot x_{31} + 761.8 \cdot x_{32} + 1\,411.8 \cdot x_{33} + 1\,268.8 \cdot x_{34} + 1\,963.0 \cdot x_{35} \rightarrow min. \quad (10)$$

- conditions for recipients:

$$\begin{aligned} x_{11} + x_{21} + x_{31} &= 10 \\ x_{12} + x_{22} + x_{32} &= 7 \\ x_{13} + x_{23} + x_{33} &= 9 \\ x_{14} + x_{24} + x_{34} &= 27 \\ x_{15} + x_{25} + x_{35} &= 16 \end{aligned} \quad (11)$$

- conditions for producers:

$$\begin{aligned} x_{11} + x_{12} + x_{13} + x_{14} + x_{15} &\leq 30 \\ x_{21} + x_{22} + x_{23} + x_{24} + x_{25} &\leq 25 \\ x_{31} + x_{32} + x_{33} + x_{34} + x_{35} &\leq 20 \end{aligned} \quad (12)$$

- boundary conditions:

$$x_{ij} \geq 0, where\ i = 5, j = 3 \quad (13)$$

Since the supply of producers exceeds the demand, the above problem is an example of an unbalanced transport problem. Before calculating the transport plan, it should be reduced to a closed issue. To this end, a fictitious recipient *D* should be introduced whose demand (b_6) is equal to the excess of supply over demand, i.e.:

$$b_6 = \sum_{i=1}^{3} a_i - \sum_{j=1}^{5} b_j \quad (14)$$

The search for the optimal solution was based on the Solver application, which is an addition to MS Excel. Table 10 presents the obtained optimal solution.

Tab. 10: Optimal transport plan solution

x_{ij}	A	B1	B2	C1	C2	D	Sum	A_i
P1	0	3	0	27	0	0	**30**	**30**
P2	0	0	9	0	16	0	**25**	**25**
P3	10	4	0	0	0	6	**14**	**20**
Sum	**10**	**7**	**9**	**27**	**16**	6		
B_j	**10**	**7**	**9**	**27**	**16**			

Based on the above calculations, a graphic transport plan was developed (Fig. 3).

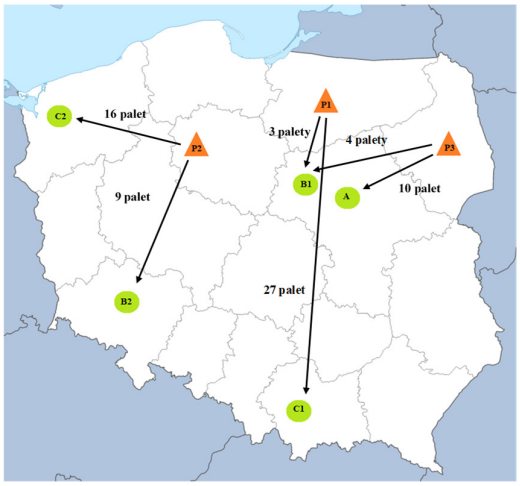

Fig. 3: Delivery distribution plan in the transport network (own elaboration)

For the solution thus obtained, the value of the objective function, i.e. transport costs, is PLN 4529.2 with a total vehicle mileage of 1742 km. In no case will the delivery amount exceed 33 pallets, i.e. will be carried out using one truck. Producer 1 should deliver eggs to recipients B1 and C1, producer 2 should supply recipients in western Poland, i.e. C2 and B2, while producer 3 will handle entities A and B1.

Summary

The aim of the article was to analyze the possibility of using linear programming methods based on the simplex algorithm to plan the distribution of the supply stream in the transport network. The enterprises operating on the FMCG market, specializing in the production and distribution of chicken eggs, were analyzed. The starting point for the conducted research were weekly sales estimates based on a 7-element moving average, juxtaposed with the values of daily production capacity of individual assortment groups among selected suppliers. On this basis, a mathematical formulation of the problem of dividing the supply stream in the transport network was made, and limitations of decision variables and the objective function were determined. The aim was to minimize transport costs. The division of tasks was optimized based on the linear programming method using a simplex algorithm. The results obtained allow the development of a transport plan between individual suppliers and recipients. The use of the above tool allows to minimize the logistics costs of business operations. In addition, by minimizing the total mileage of vehicles significantly affects the quality of transport processes carried out by reducing the time of delivery, reducing the possibility of losses in the assortment delivered. In addition, the above tool can be used for other purpose functions, i.e. minimizing delivery time, reducing empty runs, and minimizing the cost of delayed orders.

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Intermittent Demand Forecasting Accuracy Measures

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Abstract

The aim of the article is to discuss forecasting accuracy measures for intermittent data. It is emphasized that many forecasting errors are inappropriate for intermittent data. Accuracy metrics for such data should feature specific properties. Division by zero must be avoided. They ought to be scale-independent (relative) and also unbiased. It is assumed that a given accuracy metric is biased if it favors underestimated or overestimated forecasts. In this article unbiasedness is particularly emphasized. It was demonstrated that such error measures like MASE favor underestimated forecasts, often zero forecasts. Therefore, other metrics are discussed, such as mean-based errors (mean-based MAPE), Cumulative Forecast Error, Number of Shortages, Periods in Stock. Moreover, the author's proposal is presented – namely the scaled Compound Error. All of these metrics are evaluated on the theoretical and empirical basis. In the empirical research presented measures are evaluated in terms of two forecasting methods: TSB and SES. Zero forecasts were also taken as a benchmark. Forecasts for 355 time series with high intermittence from a company selling work clothes and tools were analyzed. The final remark is that mean-based MAPE seems to be the best accuracy measure for highly intermittent data.

Keywords: Intermittent Demand Forecasting, Accuracy Measures, Mean-Based Measures, Scaled Compound Error

Introduction

Intermittent demand is defined as infrequent or sporadic. It means that in certain time periods the demand is equal to zero. It often happens that times series consist of only a few demands and many zeros. That kind of data requires specific forecasting methods as well as special forecasting accuracy measures. Indications as to which forecasting method is the best frequently depend on the accuracy measure selected. For instance, such error measures like MASE or MAE favor methods yielding lower forecasts, sometimes even zero forecasts. This is unacceptable with regard to stock management and consumer service level. Moreover, many conventional error measures, such as MAPE, could not be used, because they are undefined. For intermittent data the actual values are often zero, thus MAPE could not be computed.

Therefore, the main objective of this article is indicating what the most accurate forecasting error measures are for intermittent data. Furthermore, it is stated that unbiased forecasting error measures should be preferred. It was assumed that an error measure is biased if it favors underestimated or overestimated forecasts. The following forecasting errors will be verified: MASE, mean-based MAPE, Cumulated Forecast Error (CFE), percentage Number of Shortages (NOSp) and Periods in Stock (PIS). Additionally, a new forecasting measure is proposed by the author, one named scaled Compound Error (sCE). The new forecasting measure takes into account both forecast biasedness and precision. All of these error metrics are verified for the TSB and SES method. As a benchmark zero forecasts are also considered, chiefly to find which forecast errors favor underestimated forecasts.

The article is organized in the following manner. In the next section literature review is presented. In order to precisely describe errors, literature review has been combined with methodology. Aside from forecast errors, forecasting methods used in empirical research are presented, including references to literature. On the basis of theoretical properties the best forecasting errors are emphasized. The third

section is an empirical example in which forecasts for 355 intermittent time series and statistical properties of accuracy metrics are verified. In conclusions the best accuracy measures are pointed out and future research directions are indicated.

Methods and Literature Review

An interesting review of forecast accuracy measures is presented in Hyndman and Koehler (2006). Forecasting error measures are separated into five groups:

a) scale-dependent measures

b) percentage errors

c) relative errors

d) relative measures

e) scaled errors.

An ex post forecast error for a single period t is equal to $e_t = x_t - \hat{x}_t$, where x_t is demand (zero or non-zero) in a given period and $\hat{x}_t$ is a forecast. For intermittent data often $x_t = 0$. The most popular scale-dependent measures include:

– Mean Error (ME):

$$ME = 1/H \sum_{t=1}^{H} e_t = \overline{e_t} \tag{1}$$

– Mean Square Error (MSE):

$$MSE = 1/H \sum_{t=1}^{H} e_t^2 = \overline{e_t^2} \tag{2}$$

– Mean Absolute Error (MAE):

$$MAE = 1/H \sum_{t=1}^{H} |e_t| = \overline{|e_t|} \tag{3}$$

In these formulas errors are averaged in an ex post forecast horizon $h = 1, 2, \dots, H$. These are out-of-sample values. There are also different variants of the above measures, in which, instead of means, medians are calculated. They might be more robust with regard to outliers. MSE has an unreal unit, therefore Root Mean Square Error (RMSE) is sometimes recommended, where $RMSE = \sqrt{MSE}$. Mean error is important due to biasedness. Its absolute value informs how biased forecasts are. Scale-dependent measures are not useful for intermittent demand forecasting, because typically forecasts for many products are estimated. If each error has a different unit (or scale) it is not possible to compare (e.g. to average) them.

Percentage errors are scale-independent. The most popular is the Mean Absolute Percentage Error (MAPE). Also symmetric Mean Absolute Percentage Error (sMAPE) is sometimes applied, see Hyndman and Koehler (2006). If we assume that a percentage error for a single period t is $p_t = 100e_t/x_t$, then

$$MAPE = 1/H \sum_{t=1}^{H} |p_t| = \overline{|p_t|} \tag{4}$$

This measure is inappropriate for intermittent demand because it is undefined if $x_t = 0$, which is often the case. Moreover, if x_t is close to zero, MAPE is extremely skewed. Generally, percentage errors are recommended for variables measured on a ratio scale.

MAPE also puts different penalty on positive errors and on negative ones. For example, if in a forecasted period demand $x_t = 2$ and forecast $\hat{x}_t = 4$, then $MAPE = 100\%$. The error is negative in this case ($e_t = 2 - 4$). On the other hand, if $x_t = 4$ and forecast $\hat{x}_t = 2$, then $MAPE = 50\%$. In the second case the error is positive ($e_t = 4 - 2$), but of the same magnitude and MAPE is lower. To eliminate this disadvantage sMAPE was proposed:

$$sMAPE = 1/H \sum_{t=1}^{H} 100 \frac{|x_t - \hat{x}_t|}{(x_t + \hat{x}_t)/2} \tag{5}$$

The main problem with this metric is that if $x_t = 0$, which frequently happens for intermittent data, sMAPE is always equal to 200, no matter what the forecast $\hat{x}_t$ is. Additionally, if demand is low, forecasts will be low as well, which could make the denominator close to zero. It results in a highly skewed distribution of sMAPE. A division by a number close to zero highly increases this measure. The symmetry of sMAPE was also questioned in Hyndman and Koehler (2006), Goodwin and Lawton (1999) and in Koehler (2001). To sum up, percentage errors are not useful for intermittent demand data, mostly because demand is often zero, which makes that kind of errors undefined.

In Hyndman and Koehler (2006), to eliminate scale-dependence, measures based on relative errors are proposed. A relative error for a single period is $r_t = e_t/e_t^*$, where e_t^* is an error for the benchmark method. Naïve forecasts, where forecast for period t is a value from the previous period, often constitutes a benchmark, but for intermittent data it is often zero, which could render that kind of errors undefined. In this class of errors the Mean Relative Absolute Error (MRAE) and the Geometric Mean Relative Absolute Error (GMRAE) are recommended:

$$MRAE = 1/H \sum_{t=1}^{H} |r_t| \tag{6}$$

$$GMRAE = \sqrt[H]{\prod_{t=1}^{H} |r_t|} \tag{7}$$

The above measures may be applied to compare different forecasting methods, but e_t^* could be very small, so the problems resulting from the division by numbers close to zero remain.

Instead of using relative errors, relative measures might be applied. That kind of errors are presented in Hyndman and Koehler (2006), Syntetos and Boylan (2005) or Syntetos (2001). They could be used for scale-dependent or percentage errors. For instance, relative MAE is $RelMAE = MAE/MAE_b$, where MAE_b is a mean absolute error for a benchmark method. If $RelMAE < 1$, then the considered method is better than the benchmark. In Syntetos (2001) it is stated that relative error measures based on geometric mean are robust to outliers. Those kinds of measures require several forecasts for the same series to compute mean or median. In the case of a forecast for one period these measures are undefined (they become a relative error).

To sum up, relative measures are applicable to intermittent data, when forecasting methods are compared. The disadvantage is that if many forecasting methods are compared, there are many possible combinations. There are also non-parametric alternatives, such as Percentage Better (PB) or Percentage Best (PBt), where fractions of better (or best) forecasts are computed for a given method. However, these measures do not take error sizes into account, which could be misleading. For example, method A could yield slightly worse forecasts than method B in nine out of ten cases and a much better forecast in the last case. With regard to the PB (or PBt) method, method B, which is generally worse, will be preferred.

Relative measures and measures based on relative errors are scaled with regard to out-of-sample values (values for an ex post forecast horizon). In Hyndman and Koehler (2006) a new measure is suggested that is scaled on an in-sample MAE from the naïve forecasts. In this metric an out-of-sample MAE is scaled by in-sample MAE for the naïve method. It is called the Mean Absolute Scaled Error (MASE):

$$MASE = \frac{1/H \sum_{t=1}^{H} |e_t|}{1/(N-1) \sum_{n=2}^{N} |x_t - x_{t-1}|} \tag{8}$$

where N is the number of in-sample periods.

If $MASE < 1$, then a verified method is better than naïve (in-sample) forecasts. MASE cannot be computed only if all in-sample values are equal. In Hyndman (2006) MASE is strongly recommended for intermittent data. It is scaled, so it might be applied for large data sets. It could also be computed for all non-trivial cases and it is easily applicable to intermittent demand forecasts. However, two series with the same forecast errors, but different in-sample values will have a different MASE, what might be confusing.

Another widely known scaled measure is the MAE/Mean Ratio. It is a quotient of the MAE/ME, where all the values come from an ex post forecast horizon (out-of-sample values). The problem with this metric is that for intermittent data ME might be close to zero, what inflates variance and makes the distribution of MAE/ME highly skewed.

For intermittent demand data error measures like MASE or MAE could indicated as best these methods that yield the lowest forecasts. In Teunter and Duncan (2009) it is emphasized that sometimes even zero forecasts are pointed as being the best, what is unacceptable for inventory management. Therefore, in this article it is claimed that forecast accuracy measures for intermittent data should take into account biasedness.

Measures that fulfill this requirement are proposed in Prestwich et al. (2014), where mean-based measures are presented. In mean-based measures forecasts $\hat{x}_t$ are compared not with point empirical values x_t, but with the in-sample mean x_t^m. For intermittent data $x_t^m > 0$ if at least one in-sample value is positive, so these errors are always defined. In mean-based errors, instead of $e_t = x_t - \hat{x}_t$, we have $e_t^m = x_t^m - \hat{x}_t$, instead of $p_t = 100 e_t / x_t$, we have $p_t^m = 100 e_t^m / x_t^m$, and so on. The mean of time series could be set as a benchmark if there is stationarity. If series are non-stationary, then x_t^m should be a function of time. Furthermore, moving averages could be applied. Many mean-based errors can be defined. For example, the mean-based MAPE is estimated as:

$$mMAPE = 1/H \sum_{t=1}^{H} 100 \frac{|x_t^m - \hat{x}_t|}{x_t^m} \tag{9}$$

where x_t^m is an in-sample mean. It is always defined for intermittent data and is scale-independent, so forecasts for many time series could be compared. It also informs about the percentage deviations from mean level of demand rate. The disadvantage is that the actual values in the forecast horizon do not matter. If for two items in-sample means and forecasts are the same, mMAPE will also be the same, even if the actual values in forecast horizon are very different. Also forecasts equal to in-sample means are highly favored.

Interesting proposals concerning metrics important on account of biasedness are presented in Wallström and Segerstedt (2010). Measures like Cumulated Forecast Error (CFE), Number of Shortages (NOS) and Periods In Stock (PIS) are proposed.

Cumulated Forecast Error is the sum of errors in a given period:

$$CFE_H = \sum_{t=1}^{H} e_t \tag{10}$$

For unbiased forecasts CFE should be close to zero. However, CFE gives no information about forecast errors variability. Therefore, in Wallström and Segerstedt (2010) it is suggested that the maximum and minimum of CFE should be analyzed as well. $CFE_{max} = max_{t=1,2,\dots,H}\{CFE_t\}$ is the greatest shortage and $CFE_{min} = min_{t=1,2,\dots,H}\{CFE_t\}$ is the greatest surplus in the forecasted period. However, the maximum and minimum could be very volatile, especially in the case of outliers, thus they are not robust variability measures. Additionally, it could be noticed that CFE provides the same information as ME. These two measures (CFE and ME) might be identified, but CFE is useful in the context of the next measure (NOS).

Number of Shortages (NOS) is the number of times when CFE_t is over zero and demand occurs. If CFE_t is positive, demand is underestimated. For each period with positive demand it is checked whether, without a safety stock, shortage will occur. The forecasting method is biased if NOS is very low or very high. If NOS is low, there is a surplus and the forecasting method probably overestimates demand. In turn, if NOS is high, forecasts are possibly underestimated. To enable comparisons, in Wallström and Segerstedt (2010) a percentage version of NOS is proposed.

Percentage Number of Shortages in period $t = 1, 2, \dots, H$ is:

$$NOS_{p,H} = \frac{\sum_{t=1}^{H} NOS_t}{D} \tag{11}$$

where

$NOS_t = 1$ if there is a demand in period t and $CFE_t > 0$,

D – number of (positive) demands.

NOS demonstrates what would happen in a fictitious warehouse with no safety stock, if a given forecasting method is applied. It simulates fictitious stock for verified forecasting method.

The next measure, Periods In Stock, is also supposed to simulate forecast errors impact on stock level. It measures the total number of periods spent by a given item in a fictitious stock or the number of fictitious stock-out periods. This measure is presented in Wallström and Segerstedt (2010). PIS is related to CFE. To be precise, PIS is the integration of CFE over time, with a reversed sign:

$$PIS_H = \sum_{t=1}^{H} (\hat{x}_t - x_t)(H + 1 - t) = -\sum_{t=1}^{H} CFE_t \tag{12}$$

PIS measures not only forecast errors, but also how long it takes to correct these errors. If $PIS_H > 0$, then forecasts are overestimated and stock level is too high. If $PIS_H < 0$, then forecasts are underestimated and stock level ought to be increased.

The last forecasting error measure, the scaled Compound Error (sCE), is the author's proposal. It is scaled and takes into account both biasedness and precision. The formula is:

$$sCE = \frac{|\bar{e}_t| + \overline{|e_t|}}{\bar{x}_{1-N}} = \frac{|ME| + MAE}{\bar{x}_{1-N}} \tag{13}$$

where $\bar{x}_{1-N}$ is in-sample mean.

The scaled Compound Error is a sum of absolute value of scaled Mean Error and scaled Mean Absolute Error, where scaling is obtained through division by in-sample mean ($\bar{x}_{1-N}$). The problem with many forecasting errors is favoring the lowest forecasts, sometimes even zero forecasts. At the same time, those kinds of forecasts are biased. Scaled Compound Error provides the possibility of taking biasedness into account by factor $|ME|$. MAE represents forecast precision. Scaling in this metric occurs with regard to the in-sample mean, which is different than in mean-based measures, such as mMAPE. In mMAPE the in-sample mean is used in an ex post forecast horizon, instead of point empirical demand values. Therefore, in mMAPE forecasts are not compared with empirical demand. In sCE ex post forecasts are compared with empirical values and then they are scaled by the in-sample mean.

With regard to intermittent data there are many other ideas concerning forecast accuracy. For instance, in Snyder et al. (2012) and Kolassa (2016) it is claimed that not point forecasts but predictive distributions should be evaluated. There are also many inventory-based measures focused on inventory level and customer service. Those kinds of metrics are used in Syntetos et al. (2015), Teunter and Duncan (2009), Engelmeyer (2016).

To sum up, after a preliminary analysis, the following forecast errors were assumed to be the most accurate for intermittent data:

a) MASE,
b) Mean-based MAPE (mMAPE),
c) Cumulated Forecast Error (CFE),
d) percentage Number of Shortages (NOSp),
e) Periods in Stock (PIS),
f) scaled Compound Error (sCE).

All these measures are defined for intermittent data.

For the sake of clarity, only two forecasting methods are applied in the empirical example, TSB and Simple Exponential Smoothing (SES). TSB method is presented in Teunter et al. (2011). As a benchmark also zero forecasts (ZF) are tested.

TSB is dedicated to intermittent data. Generally, Croston's method is the basis for intermittent data (Croston, 1972). However, in Syntetos and Boylan (2005) or Syntetos (2001) it was proven that it is biased. Moreover, in Syntetos (2001) or Doszyń (2019) it was indicated that Croston's method sometimes works worse than much simpler alternatives, such as SES or Moving Average.

Generally, in the TSB method smoothing values are updated differently with regard to demand size. If $x_t > 0$, then:

$$\hat{x}_t^+ = \hat{x}_{t-1}^+ + \alpha(x_t^+ - \hat{x}_{t-1}^+) \tag{14}$$

$$\hat{p}_t = \hat{p}_{t-1} + \beta(1 - \hat{p}_{t-1}) \tag{15}$$

where

x_t^+ – demand size (non-zero demand),

$\hat{x}_t^+$ – smoothed demand size,

$\hat{p}_t$ – smoothed sales probability,

$\alpha, \beta \in \langle 0,1 \rangle$ – smoothing factors.

If $x_t = 0$, then:

$$\hat{x}_t^+ = \hat{x}_{t-1}^+ \tag{16}$$

$$\hat{p}_t = \hat{p}_{t-1} + \beta(0 - \hat{p}_{t-1}) \tag{17}$$

Sales probability is updated in each period, which is important with regard to obsoletes. A forecast is the product of an adjusted demand size and sales probability: $\hat{x}_t = \hat{x}_t^+ \hat{p}_t$.

In SES smoothing assumes the following form:

$$\hat{x}_t = \hat{x}_{t-1} + \alpha(x_t - \hat{x}_{t-1}) \tag{18}$$

Empirical Verification

In the research demand is identified with sales. It is justified because in the considered company consumer service level is close to one. The proposed forecast errors are evaluated with the assumption that for intermittent data the TSB method should be the best and zero forecast ought to be the worst, with SES lying between the other two. Hence, errors for which $TSB \succ SES \succ ZF$ are treated as being the best. As many as 355 real intermittent demand time series were analyzed. These are weekly data, where the first 205 weeks consist of in-sample values and the next 5 weeks are out-of-sample values. For the last 5 out-of-sample values ex post forecast errors are estimated. So, for each time series forecasts were calculated on the basis of 205 weeks and then ex post forecasts for the next five weeks were computed.

The data derives from a company selling mostly tools and work clothes. Weekly sales frequency, defined as a share of non-zero sales during 205 weeks, for each item was smaller than 0.20 and, on average, equal to 0.10. Descriptive statistics, but only for non-zero sales, are presented in the following table.

Table 1: Descriptive statistics for non-zero demand for all products (n – number of products, $Q_{1.4}$ – first quartile, Me – median, $Q_{3.4}$ – third quartile)

N	Min	$Q_{1.4}$	Me	$Q_{3.4}$	Max	$\overline{CV^2}$
355	1	1	1	2	2911	4.48

Source: own calculations.

With regard to quartiles, most of the products are slow-moving. The third quartile is equal to 2, so 75% of all sales were equal to 2 or less. However, the maximum is high and equal to 2911, thus there are also products sold in higher quantities (with a different scale). Furthermore, an averaged coefficient of the variation is high ($\overline{CV^2} = 4.48$). This is the result of outliers. The coefficient of variation for a given time series is a relation of variance and squared mean, but only for non-zero sales.

In the next step forecast errors were verified. The chosen characteristics of analyzed forecasting errors are presented in the following table.

Table 2: Descriptive statistics of chosen forecast accuracy errors for TSB, SES and ZF

		Min	$Q_{1.4}$	Me	Mean	$Q_{3.4}$	Max
MASE	TSB	0.00	0.05	0.49	1.62	1.18	81.60
	SES	0.00	0.05	0.43	1.64	1.21	81.60
	ZF	0.00	0.00	0.00	1.26	0.59	81.60
mMAPE	TSB	0.00	0.36	0.74	0.77	1.00	9.37
	SES	0.00	0.39	0.81	0.91	1.00	7.78
	ZF	1.00	1.00	1.00	1.00	1.00	1.00
CFE	TSB	-196.22	-0.79	-0.03	-	0.08	73.72
	SES	-180.83	-0.71	-0.02	-	0.36	74.71
	ZF	0.00	0.00	0.00	-	1.00	100.00
PIS	TSB	-221.15	-0.43	0.10	-	2.16	588.65
	SES	-224.12	-0.62	0.10	-	2.11	542.48
	ZF	-240.00	-4.00	0.00	-	0.00	0.00
NOSp	TSB	0.00	0.00	0.00	0.09	0.20	0.80
	SES	0.00	0.00	0.00	0.09	0.20	0.80
	ZF	0.00	0.00	0.00	0.10	0.20	0.80
sCE	TSB	0.00	0.21	1.58	5.18	3.42	273.33
	SES	0.00	0.17	1.39	5.24	3.67	273.33
	ZF	0.00	0.00	0.00	4.35	2.05	273.33

- Values not computed.
Source: own calculations.

Generally, values of MASE lower than one are preferable, because the forecasting method is then better than the naïve alternative. The median of MASE for all methods was lower than one, so at least half of the forecasts are performing better than naïve forecasts. The means of MASE are higher than one, which is due to outliers causing some errors to be very high. The maximum of MASE is extremely high due to outliers. In such cases positional measures like a median should be used to evaluate forecast quality.

The minimum of MASE is equal to zero for all forecasting methods. All quartiles and mean values of MASE are lowest for ZF and highest for SES, with TSB lying between the two. Therefore, with regard to MASE, zero forecasts turned out to be the best forecasting method. The explanation is that for intermittent data there are mostly zeros, so MASE is the best for ZF. However, zero forecasts are unacceptable due to inventory management and especially – consumer service level. TSB performed very similarly as SES.

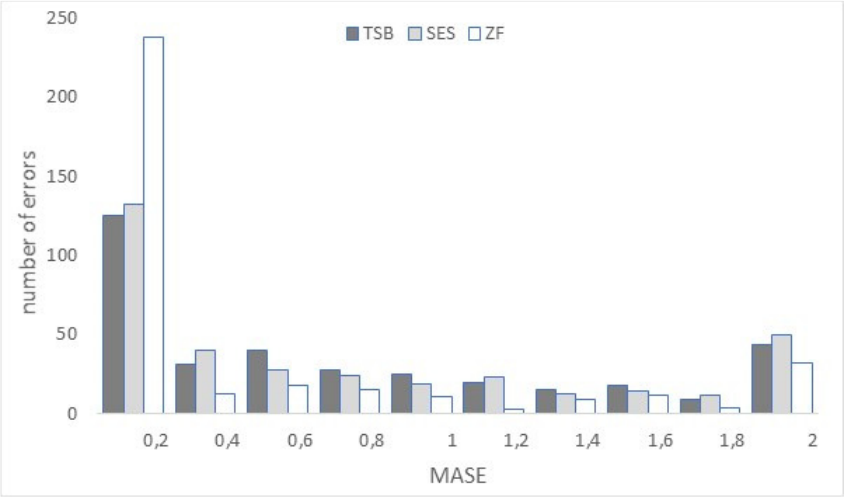

Fig. 1: Distribution of MASE for considered forecasting methods

Source: own elaborations.

The forecasting method works better if mMAPE is lower. However, percentage absolute deviations from in-sample means and not from the actual values are calculated. The actual out-of-sample values do not matter, which is a disadvantage of this metric. Mean-based MAPE for ZF is by definition equal to one, so all the used positional measures are on this level. The minimum of mMAPE was the same for TSB and SES. The first quartile, median and mean are better for TSB. The median for TSB is 0.74, so percentage deviations from in-sample means are quite high and consist 74% of in-sample means. But for intermittent data in-sample means are usually very low, hence it was expected. For all the forecasting methods the third quartile was equal to one. The maximum was highest for TSB. To sum up, mMAPE seems to be promising for intermittent data. ZF was indicated as the worst method and TSB – as the best one, which is consistent with expectations.

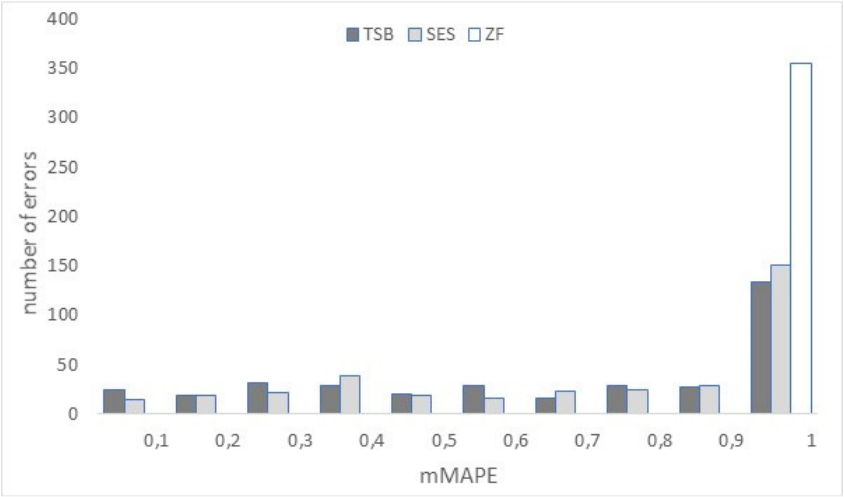

Fig. 2: Distribution of mMAPE for considered forecasting methods

Source: own elaborations.

The next forecasting errors, CFE and PIS are scale-dependent, therefore means are not calculated. But positional statistics can be analyzed. These measures are important due to forecast biasedness. Generally, values close to zero are preferable. If CFE is positive, forecasts are underestimated, if CFE is negative – forecasts are overestimated. Ex post forecasts were calculated for the last 5 weeks. Hence CFE is presenting what happened with the stock level for a given item if it depended only on a given forecasting method. The minimum of CFE was lowest for TSB and only slightly better for SES. These values are the result of an extreme fall of sales in the forecast horizon, which causes forecasts to be highly overestimated. For ZF the minimum of CFE is equal to zero, because forecasts always remain on this level. The medians of CFE for all forecasting methods are close to zero, thus at least half of the forecasts are unbiased. High maximal values are the result of outliers. In those cases sales were very high in comparison to forecasts. The distribution of CFE (Figure 3) informs that TSB works in a similar way to SES. ZF errors dominate in the interval with zero, but there are also many underestimated forecasts in the last interval.

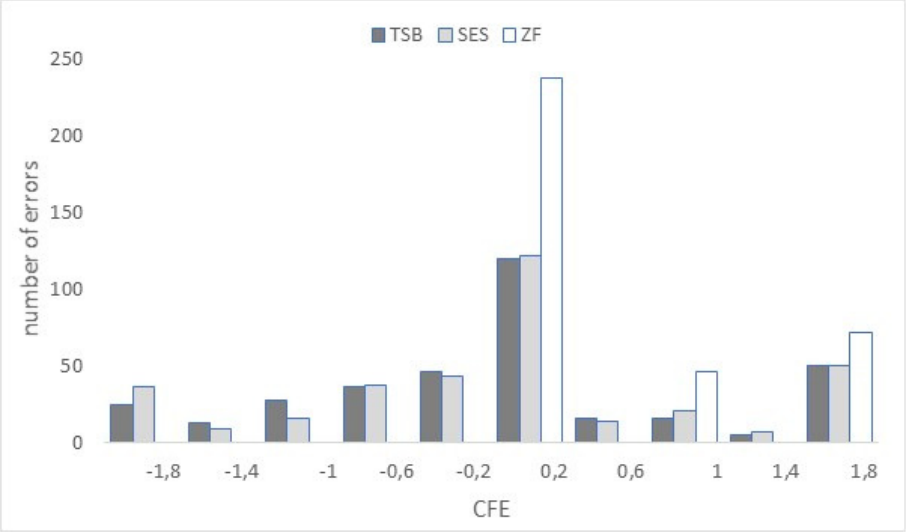

Fig. 3: Distribution of CFE for considered forecasting methods

Source: own elaborations.

PIS is the cumulated sum of CFE, but with an inverse sign. It informs about the number of periods that products spend in the fictitious stock. Differently from CFE, negative PIS is a result of underestimated forecasts. The medians of PIS are close to zero, so forecasts are generally unbiased. The results obtained for TSB and SES are similar. The minimum of PIS is an effect of outliers. The maximum is high for TSB and SES. For these cases forecasts are overestimated. TSB and SES are very similar due to CFE and PIS. ZF is underestimated. Overall, these errors provide the same kind of information.

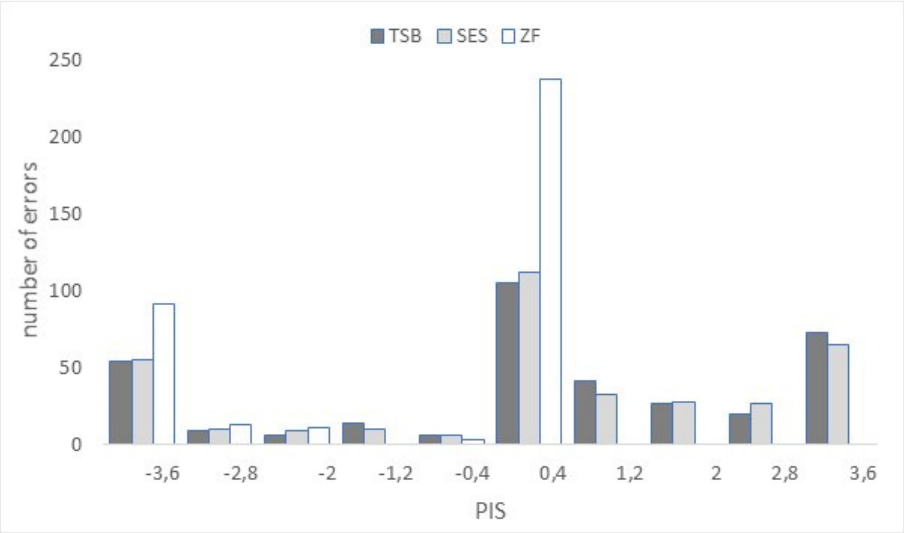

Fig. 4: Distribution of PIS for considered forecasting methods

Source: own elaborations.

For all forecasting methods the values of NOSp are almost identical. Only the means are slightly different, but very close to 0.10, so for considered items, on average, there are 10% periods with shortages. The maximum share of shortages for all methods is equal to 80%.

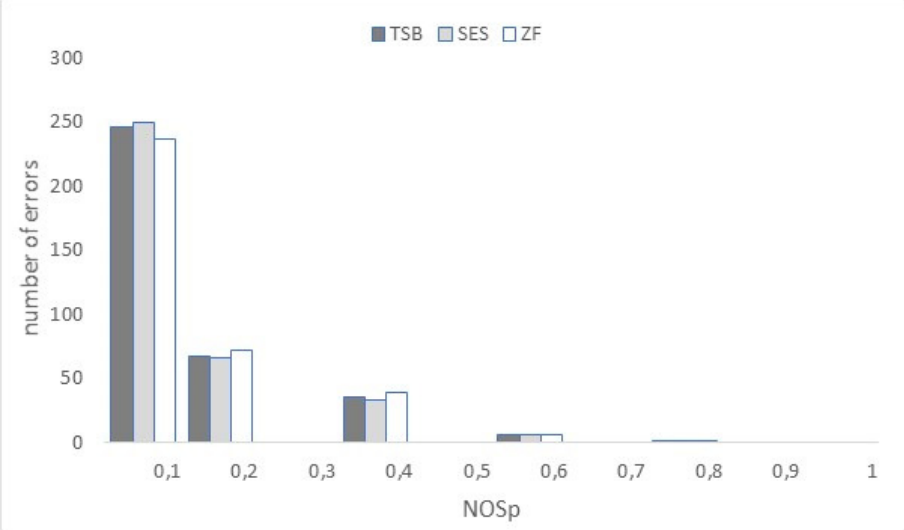

Fig. 5: Distribution of NOSp for considered forecasting methods

Source: own elaborations.

For all forecasting methods the minimum of sCE is the same and equal to zero. Generally, descriptive statistics favors the ZF method. TSB and SES work in a very similar manner. The first quartile and

the median are lower for SES, while the median and mean are in favor of TSB. The maximum is an effect of an outlier and is the same for all methods. To sum up, sCE indicates ZF as the best option, which is unacceptable for inventory management.

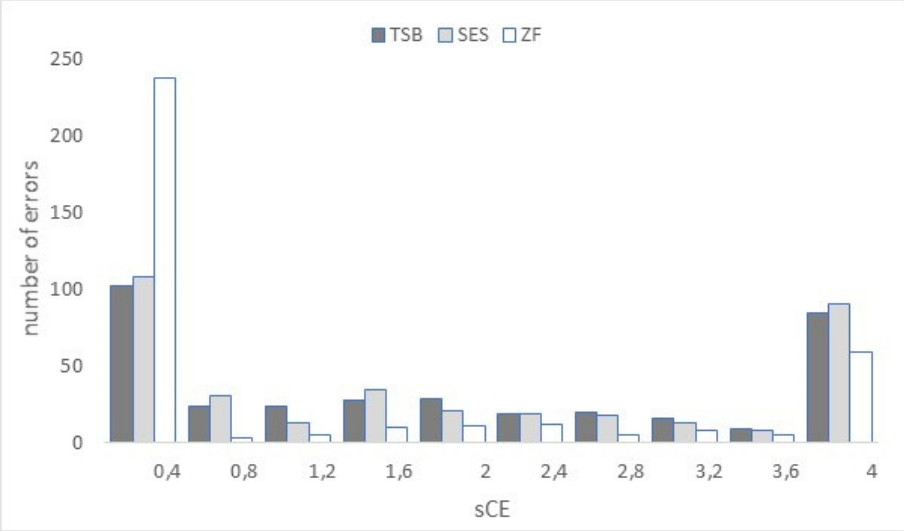

Fig. 6: Distribution of sCE for considered forecasting methods

Source: own elaborations.

Conclusions

With regard to theoretical properties and empirical findings it could be stated that not all forecasting error measures are appropriate for intermittent demand data. Usually errors are calculated for large data sets, so accuracy metrics should be relative. Measures also ought to be defined for intermittent data, where actual values are often equal to zero. In this article, after a preliminary selection, six accuracy measures were analyzed: MASE, mMAPE, CFE, NOSp, PIS, sCE.

Overall, if one measure has to be chosen, it would be mMAPE. MASE favors underestimated forecasts, which could result in unsatisfactory consumer service level. In turn, CFE and PIS are interesting on account of forecast biasedness, but they are scale-dependent. Therefore, it is hard to verify these errors for many forecasts at the same time. But, to some extent, it could be achieved by means of their distributions, which was presented in the article. NOSp might seem to be useful, but in the presented research it was hard to discriminate forecasting methods due to this error. The author's proposal – sCE – takes into account biasedness, but despite this it also favored the lowest forecasts.

Mean-based MAPE behaved correctly. It is scale-independent and always defined for intermittent data. Therefore, this error measure could be recommended. The disadvantage of this metric is that the actual values in the forecast horizon do not matter, because forecasts are compared only with the in-sample mean. What is more, in order to use an in-sample mean as a reference point, series should be stationary. However, for intermittent data it is often an acceptable assumption.

In the future research mean-based error measures will be verified on different datasets with intermittent time series.

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System of the Use of Force in Modern International Relations

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Abstract

Modern international relations show that the most developed and leading states often resort to armed force in order to ensure their own interests. Conflict prevention and preventive diplomacy should be the main way to overcome tensions in international relations. It is important that all states are equally protected from the global risks and threats and bear a common responsibility for their reflection. Therefore, the international community has faced with the need to create an effective mechanism for managing modern processes. A special role in solving this problem belongs to the UN, the unique universal mechanism to ensure international peace and security. At the same time, it is necessary not only to maintain the main responsibility of the UN Security Council for keeping peace, but also to strengthen the function of its control over the occurrence and settlement of conflict situations. The paper analyses the use of force in modern international relations and determines the directions for improving political and legal measures in this area.

Keywords: International Relations, Conflict Prevention, International Security, Use of Force.

Introduction

Currently, the scale of threats that can destroy international security, plunge the world into chaos and instability remains significant. These include the danger of nuclear proliferation, proliferation of biological, chemical and other types of weapons of mass destruction, the growing number of regional conflicts, the danger of a new round of the arms race, etc.

In accordance with international law, the grounds for the use of force against sovereign states arise in two cases. In the exercise of the state's right to individual and collective defense, or pursuant to decisions of the UN Security Council on the elimination of a threat to peace, violation of peace or an act of aggression. Arbitrary military measures bypassing the UN Security Council, including prevention of a 'humanitarian catastrophe' are inadmissible. Meanwhile, modern international relations obviously demonstrate that the most developed and leading states often resort to armed force in order to ensure their own interests. In this regard, it is necessary to more clearly define the legal aspects of the use of force in international relations. Conflict prevention and preventive diplomacy should be the main way to overcome tensions in international relations.

The purpose of the study is to analyze the use of force in modern international relations and determine the directions for improving political and legal measures in this area.

Research Material and Methods

During the research process, there were used the following research methods: system analysis, historical and legal method, and formal logical method, method of comparisons and analogies, and generalization. The problems of the legitimate and unlawful use of force and maintaining international peace and security were studied in the works of the following scholars: Kotlyar V.S. (1999, 2005), Davydov Yu.P. (2002), Tuzmukhamedov B.R. (2006), Kaufman Y. (1956), and Morgenthau H. (1967).

Research Results

The use of force in international relations is the use of the armed forces of states individually or collectively (as a part of coalitions) for the purposes and methods compatible with the UN Charter and other norms of international law. The main provision of the UN Charter, the prohibition against the use or threat of force in international relations, is stated in Article 2 (4): All members of the United Nations shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the United Nations. The term 'refrain' is used in subsequent UN documents as a prohibition. The Charter defines two situations of lawful use of armed force.

Firstly, these are collective actions to maintain or restore international peace and security (Article 42), carried out on the basis of the decision of the UN Security Council and under its leadership. Moreover, the use of armed force bypassing the UN Security Council is unlawful, for example, under the pretext of the responsibility to protect the population from genocide, war crimes, ethnic cleansing and crimes against humanity.

Secondly, it is the exercise of the right to individual or collective self-defense in response to an armed attack (Article 51). In this case, the state or states exercising the right to self-defense have to immediately report to the UN Security Council the measures taken. In this situation the key importance is the determination of the moment the attack begins, it is a moment when the right of self-defense arises.

However, these provisions enshrined in the UN Charter are regularly violated. For example, deployment of international forces in Kosovo in 1999, the bombing of Libya by NATO members in 2011, the invasion of the United States and its allies in Iraq in 2003, the invasion of British and French troops in Egypt in 1956, and the US intervention in Grenada in 1983 and others.

Make decision to use unilateral military force abroad, states resort to various arguments, mostly political rather than legal. Ensuring the democratic nature of political processes is perhaps the most unconvincing argument for the use of military force abroad. It opens up the broadest scope for manipulating public opinion and applying double standards. Thus, the UN Security Council resolution 940 adopted on July 31 stated that 'the goal of the international community is to remove the military leaders and restore democracy in Haiti' and that the situation 'continues to constitute a threat to peace and security in the region' (Official Website of the UN). Many Latin American countries were against the resolution. Mexico's UN ambassador, Victor Flores Olea stated that this resolution 'sets an extremely dangerous precedent in the field of international relations', because the crisis 'does not constitute a threat to peace and international security' (Knowledgr.ru). Cuban Foreign Minister Roberto Robeyn supported him. Brazilian President Itamar Franco also strongly opposed the UN decision, saying that it violates the basic principles of peaceful co-existence between countries. Uruguay pointed out that the situation in Haiti poses no threat to international peace and security, and its representative at the UN, Ramiro Piris-Ballon, said that his country 'will not support any military intervention, unilateral or multilateral' (Knowledgr.ru). Later, on January 17 1995, the UN Secretary-General Boutros Boutros-Ghali presented a report on the result of the intervention in Haiti, noticing the ongoing repression in Haiti, a complete lack of justice, worsening economic situation in the country (Knowledgr.ru).

The use of force abroad to protect human rights has also been significantly discredited over the past two decades. An example of unsuccessful military actions to ensure human rights was the events in the territory of the former Yugoslavia in the middle-second half of the 1990s. Violations by the Serbian participants in the conflict were used as a pretext for military intervention, while the illegal actions of the Albanian, Bosnian, and Croatian structures towards the Serbs were practically not restrained by anything (Nikiforov, 2011).

The conflicts that caused the greatest number of civilian casualties either did not meet with effective opposition from the international community (the Rwandan genocide, the First and Second Congo Wars), or were directly caused by the actions of foreign states declaring human rights protection (the Iraq war) as one of the tasks. The study analyses two examples of the use of force in international relations.

March 20–May 1, 2003 the combined forces of the United States and the anti-Iraq coalition conducted a military operation against Iraq. Official Washington initially called the military operation in Iraq 'Shock and Awe', later it got the name 'Freedom of Iraq'. The official reason for the invasion was the connection of the Saddam Hussein regime with international terrorism, in particular the Al-Qaeda movement, as well as information from the CIA about the weapon of mass destruction in Iraq, which subsequently did not find confirmation.

The decision to use military force against Iraq was supported by 45 states of the world. 32 states sent their military forces there. 98% of invading forces were provided by the US and the UK. The US and the UK planned to vote in the Security Council on the relevant resolution that they had developed, but refused, as Russia, China and France made clear that they were ready to use their veto power to block passage of a new Security Council resolution authorizing force against Iraq. Ignoring this, the United States launched a military operation. On March 20, 2003, Russian President Vladimir Putin issued a statement in connection with the start of the bombing of Iraq by the US and UK armed forces. In this statement, V. Putin called the military action against Iraq a big political mistake. The President of the Russian Federation stated that 'the military actions are being carried out in Iraq contrary to world public opinion, contrary to the principles and norms of international law and the UN Charter' (Ria.ru).

The war entailed the most negative consequences for the political, economic and humanitarian situation in the country and the region. In addition to numerous casualties, the war destroyed public infrastructure throughout the country, including water supply, electricity production, transport, employment structures, food supplies, etc.

Former British Prime Minister Tony Blair, in an interview with CNN in October 2015, apologized for the mistakes in the war and admitted that there were 'elements of truth' in the theory that the invasion of Iraq by the US and its allies in 2003 became one of the main reasons of the rise of ISIS (Edition.cnn).

In 1969, in Libya, under the leadership of Captain M. Gaddafi, the king was overthrown and a socialist regime established. During Gaddafi's reign, Libya entered the Guinness Book of Records as the country with the lowest inflation. In terms of GDP per capita, it ranked first among African countries. Education, health care and even the most expensive medicaments were free. The government provided free electricity to the citizens of Libya, and the price of petrol was 14 cents per liter. M. Gaddafi has implemented the world's largest irrigation project. The so-called 'Great Man-Made River', the world's largest irrigation project, was developed to provide fresh water resources throughout the country. The system was funded by the government of M. Gaddafi, who called it the 'eighth wonder of the world'.

In 2011, protests prepared by the West began in the city of Benghazi. On the 18th of March 2011, the UN Security Council adopted Resolution 1973, which a lot of people called the treat to international law. Firstly, the resolution extended the previous sanctions and introduced a number of new against Libya. Secondly, there was a demand for an immediate ceasefire, but without specifying the

addressees of this requirement. Thirdly, the resolution granted the right to participating countries to protect the country's civilians by all necessary means, except for direct military occupation of the country. It was not really prohibited to use armed forces or aerial attacks. Fourth, the sky over Libya was declared closed, with the proviso that any measures can be taken by the UN member countries to meet this requirement (Official Website of the UN).

On the 19th of March, a military operation began against the regime of M. Gaddafi with the participation of the armed forces of several states: the USA, the UK, France, Canada, Belgium, Italy, Spain, and Denmark. The result of the military operation was the actual collapse of Libya as a single state. The immediate damage from the NATO bombing is estimated at 14 billion USD. The Libyans have lost a number of social guarantees that they had previously. In the country itself, terrorism and banditry have spread. According to the representative of the Office of the United Nations High Commissioner for Refugees, Melissa Fleming, as of March 2, 2011, the number of refugees in the conflict area reached 180 thousand people (Ria.ru).

'The oil-rich country, a key departure point for some of the thousands of migrants travelling to Europe, once had one of the highest standards of living in Africa, with free healthcare and free education. But the stability that led to its prosperity has been shattered' (BBC.com).

The establishment of a unipolar world at the end of the 20th century contributed to the fact that the unilateral use of force became regular. However, improving the international legal framework for the use of force in international relations is possible, but it requires a more detailed examination.

1. The agreement on the meaning of aggression. It can be based on the provisions of UN General Assembly Resolution 3314 on 14 December 1974. In accordance with them, aggression is equated not only invasion, attack or annexation by the use of force, but also with bombardment by the armed forces; the blockade of the ports or coasts; the use of foreign armed forces located in the territory of a state in contravention of the conditions provided for in the agreement; the action of a state in allowing its territory to be used for perpetrating an act of aggression against another state. This list can be supplemented by a significant use of force against civilians of a foreign state, diplomatic workers, air and sea vehicles.

2. Agreement based on the principles of countering unlawful use of force in international relations. It should provide a list of issues and conditions that are not recognized by the parties to the agreement as circumstances justifying the use of force by some states against other states.

3. Treaty based on the principles of the use of force to counter the proliferation of nuclear weapons and weapons of mass destruction. This treaty should establish a clear procedure for establishing violations of the international regime for the non-proliferation of nuclear weapons and weapons of mass destruction. Its components should include a political charge; auditing; verifying audit findings; administering a warning; in case of urgent need – making a list of objects subject to targeted liquidation; forming multilateral military units carrying out the liquidation in accordance with the decision of the UN Security Council.

4. Treaty on the principles of the use of force to counter state-sponsored terrorism. The agreement should establish a procedure for establishing and verifying the facts of state-sponsored terrorism, making a list of objects and persons subject to targeted force on the territory of foreign states by multilateral forces acting in accordance with the decision of the UN Security Council.

All these international agreements will contribute to improving the regulatory framework for the use of force in international relations. At the same time, the main international legal principles for the use of force in international relations, already contained in the UN Charter, must be preserved.
Another possible solution to this problem is a 'reanimation' of the Military Staff Committee, a subsidiary body of the United Nations Security Council. It would be responsible for the operational command of the International Rapid Reaction Forces, which would include elite specila forces of permanent members of the UN Security Council and other states based on decisions of their

governments. These forces could be used to conduct 'hot spot' military operations against infrastructure facilities, organizational structures, and individuals identified by the UN Security Council as a significant threat to international peace and security (Minakova, Parkhomchuk, Golovin, and Bukreeva, 2018).

Conclusion

The changes that took place in the world at the end of the 20th and the beginning of the 21st centuries radically changed the conditions for the development of international relations. The prospect of their global transformation has been opened up. It is imperative that this process proceed evolutionarily, enabling the world community to adapt to new circumstances. In the new modern conditions, it is important that all states are equally protected from the global risks and threats and bear a common responsibility for their reflection. Therefore, the international community has faced with the need to create an effective mechanism for managing modern processes.

A special role in solving this problem belongs to the UN, the unique universal mechanism to ensure international peace and security. At the same time, it is necessary not only to maintain the main responsibility of the UN Security Council for keeping peace, but also to strengthen the function of its control over the occurrence and settlement of conflict situations.

Strengthening the international legal basis of the world order and ensuring the rule of law in international affairs should be one of the priority tasks of the world community.

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Impact of Internal Conditions at The University on The Possibilities of Implementing EU Projects

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Abstract

Funds from the European Union budget obtained for the implementation of projects under long-term financial perspectives are also an opportunity for public universities to intensify their development. Possibility of obtaining EU funding is influenced by many factors, including internal factors at the university. Therefore, main purpose of the study was to analyze and assess impact of internal factors at the university on possibility of obtaining and implementing EU projects by universities. First part of the article is theoretical and has been prepared based on analysis of literature in the field of project management. Second part of the text is based on primary data collected during the survey among EU project managers implemented at public technical universities in Poland. Results of the study indicate that the strongest impact on possibility of obtaining EU funds and subsequent implementation of EU projects by public technical universities will be affected by increase in the size of owned infrastructure and the number of researchers.

Keywords: EU Project, Project Management, Public Universities, Internal Conditions.

Introduction

Currently, most entities, regardless of whether they are private or public entities, implement many projects simultaneously. Therefore, these projects compete with each other for limited organization resources. In the case of EU projects, part of funds necessary for their implementation comes from EU funds, which are allocated based on announced competitions. This means that units applying for support from EU funds also compete with other organizations for a limited pool of European funds.

In the process of absorbing EU funds, public universities compete with each other for limited resources available under programs directed to universities in a given country. It is noticeable that some universities are doing much better in this process than others. Therefore, it is important to make efforts to determine factors which increase absorption capacity of public universities.

Projects are implemented under time and cost constraints. This is particularly evident in the case of projects co-financed from external sources, including in particular EU projects, for which acceptable categories of costs that can be planned, as well as the time frame determined by periods of eligibility of these costs have been determined.

Key resource limitations are defined at the planning stage of an EU project, which is based on the assumption that changes in the project during its implementation may not lead to an increase in the value of funding. This means that if a given expense has not been planned in the project budget, then it will be possible to bear it only from university's own funds. An important limitation in this respect is also provision of resources necessary to make own contribution and cover any ineligible costs. Value of own contribution is defined in competition documentation as a percentage share in total costs of the project. This means that the greater the value of a project, the greater in monetary terms will be own contribution required by university. In turn, ineligible outflows may be known at the stage of budget preparation, when a given cost cannot be financed under the announced competition and will be planned in the budget. Most often, however, ineligible costs are unplanned and arise during implementation of the project.

Project constraints

Project is a special type of organized activity. Its main characteristics are temporariness and uniqueness. This means that each project has a specific start and end time, and there are significant differences between the projects that allow them to be identified as unique (Miedziński, 2012). A specific type of projects are projects co-financed by the European Union and falling under its policy, called EU projects (Domiter and Marciszewska, 2013). Receiving co-financing from EU funds is associated with compliance with specific standards and guidelines, which are also an element that distinguishes EU projects from other projects (Büttner and Leopold, 2016).

All projects, irrespective of the source of financing, serve to achieve assumed goals. Achieving them determines whether the project will be successful. Organizations that manage projects and project portfolios are more likely to achieve their goals, and these activities alone increase the probability of successfully completing the project. This is due to formalization of project planning process, defining procedures for its implementation, as well as placing greater demands on project managers (Anantatmula and Rad, 2018).

Bearing in mind that project management process is at least a medium-term process and in the case of large long-term projects, elements of strategic planning can also be included in project management process, which should translate into increased chances of successful completion of the project (Papke-Shields and Boyer-Wright, 2017). It is worth emphasizing that the use of project management methods and tools increases not only probability of successful completion of the project (achievement of goals and indicators) but also of successful implementation of project results and success of the investment in a project itself (Badewi, 2016).

In the project management process, various methods and techniques are used to ensure effective project implementation. Recently, the use of modern methods of automating data collection and processing enabling preparation of an integrated project plan has been increasing (Pellerin and Perrier, 2019). Attention is also paid to aspects of sustainable development as elements affecting successful completion of the project (Carvalho and Rabechini, 2017). Sustainable development is becoming increasingly important in implementation of projects, this is mainly due to requirements set by project stakeholders. This applies not only to taking into account aspects of sustainable development within emerging project products and results, but also to sustainable management of project implementation process (Kivilä, Martinsuo and Vuorinen, 2017). This is particularly important in projects co-financed from the EU, in which one of criteria is compliance with Community's horizontal policies, including principles of sustainable development. It should be emphasized that stakeholders play a significant role in the entire project implementation process and stakeholder management should become an element of comprehensive project management (Martens and Carvalho, 2017)

Ultimately, the project manager and his team have greatest responsibility for project's success. That is why it is so important to increase employees' knowledge and competence in project management. It is also important to use previous experience and use best practices. Development of project management should therefore go in the direction of strengthening competences of people and organizations (Radujković and Sjekavica, 2017).

Each project has some limitations (Mishra and Moktan, 2019). Because all resources, including human resources, are limited in every organization, individual projects compete with each other for access to them (Perez and Gomez, 2016; Ballestín and Blanco, 2011). Launch of many projects, regardless of assessment of availability of resources in the organization, will therefore lead to the fight for them, overloading employees, poor quality of products and project results, and delays in design work (Sońta-Drączkowska, Ziemski, 2010).

Second key limitation in projects is time. The period of implementation of EU project is specified in co-financing agreement, but it is possible to end the project earlier or extend its implementation period. Each time, however, this will require obtaining consent of the Intermediate Body and signing

an annex to the contract. What distinguishes EU projects is one more limitation in project implementation resulting from cost eligibility periods. Each financial perspective of the European Union has a specific funding framework. In the current financial perspective, eligible costs can be incurred between 1 January 2014 and 31/12/2023. This means that project implementation period specified in the grant agreement may not go beyond these dates. On the other hand, costs that would be incurred outside eligibility period automatically will become ineligible costs and will have to be covered by university's own funds.

Methodology of Research

The article is based on analysis of literature and results of own research. The project management study was conducted among EU project managers implemented by public technical universities in Poland in the previous financial perspective of the European Union. Studied population was determined on the basis of data from national information system SIMIK 07-13. An additional criterion, apart from the source of financing used in the identification of projects in the system, was implementation of a project by a public technical university alone or as part of a consortium / partnership in which the university was a leader. As a result, 659 projects meeting the adopted criteria were identified, out of which projects were selected based on random selection. A systematic sampling was taken as a sampling scheme for every k^{th} unit, with k = 5. As a result, every fifth completed project was drawn from each of eighteen public technical universities in Poland.

The survey questionnaire was prepared on an internet platform. An invitation to complete the survey was sent by email to the managers of the projects drawn. A total of 132 invitations were sent, to which 85 respondents replied by completing the questionnaire in full, which gave a 65% response rate. The survey questionnaire concerned one project and included closed and semi-open questions. The rank-based questions were based on a five-point Likert scale, where extreme answers were placed on opposite sides, very significant - completely irrelevant, so the middle answer "hard to say" was treated as "neither high nor low", " average".

A limited number of questions with a narrow scale of answers were factors facilitating the study. The survey questions were adapted to the specific terminology used in the implementation of EU projects. The main limitation of the study, especially in the case of questions relating to aspects of management, was the subjectivity of expressed opinions. This is due to the willingness of respondents to show their project as efficiently and effectively managed in the eyes of outside persons.

Research Findings and Discussion

Possibility of obtaining and implementing EU projects by public universities is influenced by many factors, which can be divided into external and internal factors. External factors include those over which the university has no direct impact, such as the amount of funds allocated under the competition and the requirements applicants that determine how many institutions will compete for funds. Second group consists of internal factors that can be shaped by universities to increase the chance of obtaining funding and successful completion of the project. During the survey, internal factors affecting possibility of obtaining EU funding and subsequent project implementation by public technical universities were assessed. Results obtained are summarized in Table 1.

Table 1: Assessment of the impact of increase of these factors on the possibility of obtaining EU funds by public technical universities

Specification	Very significant		Significant		Hard to say		Not relevant		Completely irrelevant	
	L*	U**	L*	U**	L*	U**	L*	U**	L*	U**
Total assets	5	5,9	32	37,7	38	44,7	8	9,4	2	2,4
Equity value	5	5,9	40	47,1	25	29,4	12	14,1	3	3,5
Net revenues	0	0,0	29	34,1	36	42,4	11	12,9	9	10,6
Number of researchers	21	24,7	34	40,0	17	20,0	8	9,4	5	5,9
Number of administrative employees	20	23,5	20	23,5	26	30,6	14	16,5	5	5,9
Size of owned infrastructure	22	25,9	41	48,2	18	21,2	3	3,5	1	1,2
Other	5	5,9	32	37,7	38	44,7	8	9,4	2	2,4

** number of answers, ** share in %*
Source: self elaboration based on research, n=85.

In the current financial perspective of the European Union, financial support for development of university infrastructure has been significantly reduced. This is due to assumption that necessary infrastructure was created as part of financial perspective for 2007-2013. Therefore, support was directed mainly to implementation of research and development projects using already existing infrastructure. Funds for this purpose in Poland come mainly from Intelligent Development Operational Program. This means that in current competitions, largest opportunities to receive funding are those universities that have the best-developed infrastructure, primarily research infrastructure. Therefore, it is not surprising that respondents' assessment indicates that greatest impact on the possibility of obtaining EU funds, and thus on the implementation of EU projects, has an increase in size of their infrastructure (74.1% of respondents described this impact as significant and very significant). Similarly, an increase in the number of researchers was mentioned almost equally often (64.7% of respondents described this impact as significant and very significant), which was caused by the same reasons. Having a modern laboratory base is of little use if the university does not have scientific staff who will work on it. Third factor is of a more general nature and is associated with an increase in the amount of equity (53% of respondents described this impact as significant and very significant). Given the growing share of competitions requiring the university to make its own contribution to cover part of eligible costs of the project, an increase in equity may significantly increase absorption capacity of EU funds by public universities.

In order to summarize results obtained, received answers were assigned to appropriate ranks, i.e. "very significant" 5 points, "significant" 4 points, "hard to say" 3 points, "irrelevant" 2 points and "completely irrelevant" answers 1 point. Basic descriptive statistics for the assessment of impact of the increase of these factors on the possibility of obtaining EU funds by public technical universities are presented in Table 2.

Table 2: Descriptive statistics for assessing the impact of increase of these factors on the possibility of obtaining EU funds by public technical universities

Specification	Average	Median	Mode	Standard deviation
Total assets	3,3529	3	3	0,8267
Equity value	3,3765	4	4	0,9255
Net revenues	3,0000	3	3	0,9512
Number of researchers	3,6824	4	4	1,1256
Number of administrative employees	3,4235	3	3	1,1890
Size of owned infrastructure	3,9412	4	4	0,8501
Other	3,3529	3	3	0,8267

Source: self-elaboration.

In-depth analysis with basic descriptive statistics allowed to indicate, based on weighted average values, that three key factors are the size of owned infrastructure (average = 3.9412, median = 4, mode = 4, standard deviation = 0.8501), number of researchers (average = 3.6824, median = 4, mode = 4, standard deviation = 1.1256) and the number of administrative employees (average = 3.4235, median = 3, mode = 3, standard deviation = 1.1890). The highest level of standard deviation was observed for both academic and administrative staff, which means that in these cases respondents had the most different grades. In addition, statistical analysis based on weighted average value showed that since the increase in the amount of equity (average = 3.3765, median = 4, mode = 4, standard deviation = 0.4728), the increase in the number of administrative employees has a greater impact on possibility of obtaining EU funds by public technical universities, although it has a lower median and dominant value. Acquiring an EU project, its implementation and completion each time involve preparation of relevant documents by beneficiaries. Therefore, participation of university administrative staff is important in this process. Increasing the number of administrative employees can therefore have a positive impact on improving internal processes at the university related to obtaining EU funds and subsequent project implementation. Summing up the analysis of factors affecting acquisition of EU funds by public technical universities, an impact map was developed, which is presented in Figure 1.

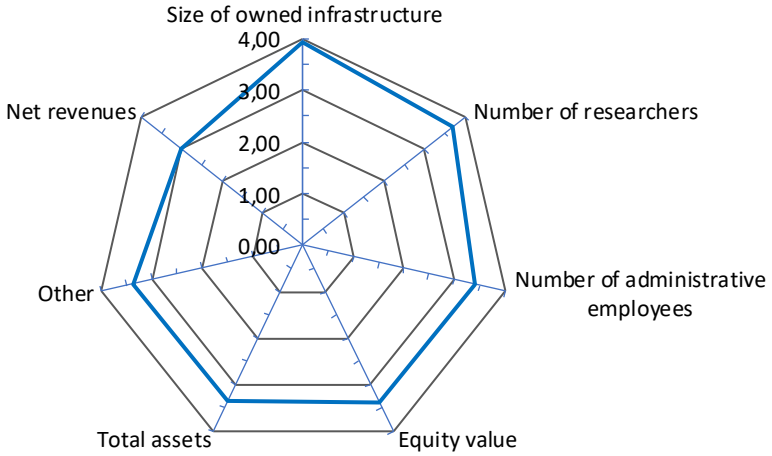

Figure 2: Map of influence

Source: self-elaboration.

At the center of the map is the absorption capacity of a public technical university, while individual factors regarding the interior of a university are placed around it. The greater the distance from the center, the greater the impact of a given factor on possibilities of obtaining EU funds and subsequent successful implementation of the project.

Conclusion

By applying for EU support for the implementation of development projects, public universities, like other entities, compete with each other for available funds. A limited pool of EU funds means that only certain projects will receive funding and will be able to be implemented. Many factors, including internal factors at the university, have an impact on success of acquiring and implementing EU projects.

Results of the study indicate that the strongest impact on possibility of obtaining EU funds and subsequent implementation of EU projects by public technical universities will be affected by increase in the size of owned infrastructure (74.1% of respondents described this impact as significant and very significant) and the number of researchers (64.7% of respondents described this impact as significant and very significant). It should be noted that this is confirmed by the way in which funds are allocated to the current financial perspective of the European Union, where emphasis has been placed on cooperation between science and business. This cooperation should be based on using existing infrastructure potential of the university. Thus, universities that have more developed infrastructure and have more scientists have a much greater chance of obtaining funds for EU projects.

Administrative staff is necessary to ensure an adequate level of project management, which translates into increased opportunities for successful completion of the project. The project manager and the team play a key role here, but without support of university's administrative units, it is not possible to efficiently spend funds and settle them under EU projects. Therefore, it is necessary to underline a need for proper preparation not only of the project itself, but also of the organization that plans to implement it, placing particular emphasis on project management, which is to enable effective project implementation under time and cost constraints.

Costs in EU projects are often associated with a need for universities to provide required own contribution and to secure funds to cover ineligible costs. Since it is not possible to unequivocally determine whether ineligible costs will occur and what their value will be, then universities should not engage all of their resources, some of them should remain at the disposal as a reserve for eventual coverage if they occur. Respondents pointed out a need to increase own funds at the university's disposal as one of internal factors having a significant impact on possibility of obtaining and implementing EU projects.

Public universities interested in increasing absorption capacity of EU funds should strive to develop their infrastructure and use it effectively. To this end, it is worth intensifying cooperation with an industry, which, by outsourcing research work to universities, gains access to innovative solutions and products, while universities acquire funds for purchase of equipment and employment of research workers. These funds are also partly allocated to administrative costs and profit generated will be an element increasing university's equity. Thanks to these activities, absorption capacity of EU universities will increase, and in consequence university will develop further and it will be able to intensify cooperation with industry. Undoubtedly, an additional effect of these activities will also be an increase in innovativeness of the country's economy.

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Equipment and Accessories Supporting Soldier's Feeding in Contemporary Operations

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Abstract

Proper nutrition is one of the key factors affecting the accomplishment of tasks by soldiers. Nutrition in field conditions takes place with the use of food rations, which include, among others, accessories, such as cutlery and disposable tableware and warmers. The Polish Armed Forces should meet the new demands of the modern battlefield. Involvement in various armed conflicts and peacekeeping missions around the world increases the demands for contemporary soldiers. Therefore, it must be provided with appropriate conditions to perform the tasks entrusted to them. One of the elements that can help soldiers can be modernization of equipment, including food equipment. The updating of the equipment can be associated with innovative heating techniques, e.g. using solar energy. The increasing use of food rations during field training causes that more and more post-consumer waste is generated. In the face of legal changes resulting in the withdrawal of certain plastics from the market, new solutions should be sought for biodegradable or compostable materials, the introduction of which will contribute to the broadly understood environmental protection.

Keywords*:* Equipment, Food Rations, Innovations

Introduction

Contemporary military operations are characterized by great diversity in terms of their character, dynamics and location. Due to the participation of the Polish Armed Forces in the structures of NATO and the European Union, Polish troops are involved in operations in various regions of the world, which are associated with activities in various climatic and terrain conditions.

Military logistics is inseparably connected with the concept of conducting military operations, which is understood in many ways. On the one hand, it is perceived as a scientific discipline about the planning and use of military materials and services resulting in support and maintenance of combat readiness. On the other hand, these are specific actions supporting combat readiness, which includes the following areas: materials management, repairs, transport, military infrastructure and hospitalization.

It can be assumed , follow Wiech and Stawicki (1992) the basic task of modern military logistics, that is securing the functioning of the armed forces, is still valid. However, the conditions for its functioning have changed. It is primarily associated with technological development and the opportunities offered by modern industry and science. Currently, the armed forces should be smaller, but more mobile and more effective in operation.

Quoting Smal (2010), military operations under the North Atlantic Alliance are characterized by the participation of many countries. Therefore, NATO member countries ratify and implement a number of standardization documents and allied publications. Those related to logistics include NATO's common policy in logistics or logistics doctrines. More detailed documents are standardization

documents, specifying common procedures and technical requirements for individual tasks carried out by logistics.

One of the components of modern logistics is supplying soldiers with food. Due to the role of nutrition in human life, nutrition of soldiers is a key issue in the functioning of the army, which during combat operations may find itself in a survival situation, without the possibility of supplying food. For this reason, an important aspect for modern armies is the design of food rations which will provide soldiers with adequate food, that can be prepared regardless of living conditions.

Purpose of the paper

The purpose of the article was to assess the suitability of equipment and accessories found in food rations or used in the process of feeding soldiers using rations

Research Hypothesis

Taking into account NATO standardization requirements for food rations, it can be assumed that the rations used in the Polish Armed Forces do not fully meet the requirements of STANAG 2937. The use of innovative solutions in the field of heating meals and water purification would increase the versatility of effective use of rations in the conditions occurring during operations. The verification of the above hypothesis was based on the analysis of documents constituting a source of information in the area of equipment and accessories used in food rations.

Food Rations in the light of NATO requirements

The success of modern military operations depends on many factors. The basic ones are the amount and quality of the measures used and the way they are used. Also during food rations designing, attention should be paid to their functionality and simplicity of use in various operating conditions. To facilitate the process of food ration designing according to NATO standards, appropriate documentation has been developed.

The current document was updated and released in 2019 STANAG 2937 Operational Rations for Military Use, at the same time, attachments regarding specific types of rations were developed: AMedP-1.11 "Requirements of Individual Operational Rations for Military Use" - edition B and AMedP-1.18 "Requirements of Group Operational Rations for Military Use ”- edition A.

Food rations according to STANAG 2937 should meet many requirements for interoperability, which ensures the efficient functioning of the feeding system and creates conditions for reducing the costs of operations. These requirements concern food products in rations as well as equipment enabling the preparation and consumption of meals.

NATO requirements for equipment and accessories for preparation of meals from food rations

The ability to heat meals in food rations is one of their most important features. Consuming a hot meal during increased activity, especially on the battlefield, has a positive effect on maintaining the appropriate level of soldiers’ morale. In addition, this is important especially in adverse weather conditions.

The necessary equipment needed to heat and consume individual rations was specified in the allied publication AMedP-1.11. It is recommended that this equipment would be inlcuded as component of ration. If such a solution cannot be used (e.g. due to practical reasons), it is allowed to create separate sets with the necessary accessories, which will be issued separately, but will be a component of the ration (with the established NSN - NATO Stock Number).

On the other hand, the AMedP-1.18 publication refers to group food rations, which specifies two types of rations – ready-to-eat group rations and cook-prepared group rations. In the case of ready-to-eat group rations, they can be consumed cold as well as hot.

Ready-to-eat rations can be self-heating or be adapted for heating in hot water. In addition, all necessary accessories for heating, dispensing and consuming meals should be included in the set of rations. If this is not possible, all accessories for heating, dispensing and consuming rations should be issued separately as a component of the ration (with the established NSN).

Cook-prepared group rations require more time and equipment to prepare. Their preparation and distribution require the use of some type of kitchen. It is also necessary to use appropriate kitchen equipment that enables heat treatment of dishes. It is recommended that accessories for issuing and consuming reasons are included in it. Just as the first type of group ration, packages with accessories for issuing and consuming rations can be issued separately.

Another issue is determining the requirements for water purification. In both mentioned annexes to the STANAG 2937 documentation, water-related issues are discussed in relation to two points - water requirements and methods of water purification. In the points related to the requirements for water, attention is drawn to the fact that most food rations require the use of drinking water to prepare meals or beverages. It is recommended to secure the amount of drinking water that will allow you to prepare the ration for its intended purpose. According to NATO documentation, the best way to avoid the need for water purification is to supply it in the right amount as drinking water through proper transport. Such proceedings will avoid problems with the delivery or use of water purification equipment. However, even a sufficient supply of drinking water for nutritional purposes may not be sufficient to avoid the need for water purification in all situations, especially when the use of field water sources is necessary during operations due to environmental conditions, distribution and encountered threats on the battlefield. In such situations, it is recommended to supply water purification equipment separately with the appropriate instructions for use (this also applies if some type of water purification agent is included in the package with the ration).

Equipment and accessories for preparing and consuming the meals used in food rations of the Polish Armed Forces.

The requirements included in STANAG 2937 documentation are requirements at the NATO level. Poland as a member country applies the provisions included therein. In addition, the requirements for food rations are specified in the national documentation. In Poland, these requirements have been included in the Defence Standards and Military Technical and Technological Documentation.

Currently in the Polish Armed Forces there are three types of Individual Food Rations: S-R, S-RG and S-RS and Group Food Ration PS. Each of these rations is intended to use during different operation. Depending on the type of ration, the relevant documentation contains a detailed description of the requirements for individual ration components - food products and accessories for heating and consumption of meals.

Meal Heating Possibilities

In pursuance of the most possibly effective meals heating, various methods are used. The type of heaters used in food rations of the Polish Armed Forces depends on the following factors:

- Type of ration,
- Meal's packaging and meal's size intended to heat,
- Time we have for heating,
- The numbers of meals and drinks to be heated.

Fig. 1. Elements of Individual Food Ration S-R with an individual flameless chemical heater

Fig. 2. Elements of Individual Food Ration S-RG with Military Kit for Cooking and Heating Meals

Each of the individual food rations used by the Polish Army consist meals to heat. To heat meals in ration S-R and S-RS an individual flameless chemical heater is used (Fig. 1). It is a single-use heater, used to heat meals in the form of canned food in soft aluminium packaging or water in the field conditions. For heating water, a suitable bag made of PA / PE material resistant to high temperatures is used. The flameless heater consists of two elements: a protective cardboard envelope and a plastic bag with a sachet of reaction mixture. The heating process is the result of an exothermic reaction between the reaction mixture and added water, which is an essential substrate to occur the reaction. What's important, it can be bottled water as well as water from a natural water reservoir. During the reaction, generated temperature is higher than 100°C which allows to heat canned food without fire within 15 min to 62°C.

On the other hand, meals occurring in ration S-RG are heated with usage of kit for cooking and heating meals (Fig. 2). The kit includes: folding metal burner - stove, two waterproof tubes: the first one with 8 fuel tablets and the second one with universal metal can holder, matches (min. 12 pcs.), storm matches (3 pcs.) and a plastic bag for a used kit. This kit allows you to prepare hot meals and drinks. The attached holder is adapted to hold or lift metal cans, which can also serve as a vessel for heating water. The construction of the set and the amount of fuel and matches allow for its multiple use. The fuel used does not release harmful substances when used. It also does not affect the organoleptic characteristics of prepared meals. The heated meals reach a temperature of approx. 65°C within 10 minutes, water - approx. 80°C.

Heating meals for groups of soldiers requires different solutions. If feeding in field conditions is done using a PS Group Ration, then field kitchens are used to prepare meals. This solution applies to canned food in thermoformed plastic trays for 5 or 10 people. This canned food is heated by immersion in hot water in specially designed baskets (Fig. 3). The heating time is about 40 minutes.

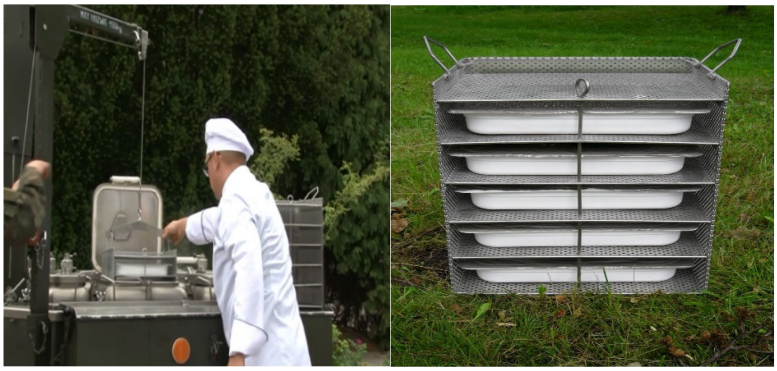

Fig. 1: Field Kitchen KPZ 100 with special basket.

It is worth to note that the use of PS Group Ration takes place primarily in the field conditions, when there is no access to fresh food. However, it may happen that as a result of stock rotation, soldiers in the garrison will be fed in the canteen by using this group ration. Then the food products in plastic trays can be heated in the stationary kitchen using available kitchen equipment. Thanks to the unification of the size of trays to the dimensions of ½ GN containers, it is possible to heat these trays in bain-maries with water or in convection steam oven. Preparing meals from PS Group Ration in places with kitchen facilities and a place to eat meals do not require a lot of effort and is an uncomplicated process.

Water Protection in Operation Conditions – Water Acquisition and Purification

During operation is extremely important to provide soldiers with adequate quantity and quality of drinking water. The human body in a high degree consists of water, so it is very important to prevent dehydration. Water loss means weight loss and consequently reducing the body's exercise capacity. It is particularly important to replenish fluids in the case of soldiers who are exposed to heavy water loss when performing combat tasks.

In connection with the above, particular attention should be paid to solutions in the field of acquisition and purification water for the needs of use in the preparation of meals and beverages, but not only.

The amount of water needed to prepare meals and beverages varies depending on the type of ration. To prepare beverages that are part of one set of S-R Ration, 250 ml of water is needed, which gives 750 ml for daily meals. Similarly, to prepare beverages that are part of the S-RG Ration you need water in the amount of 1750 ml for one set. On the other hand, to prepare meals from products that are in PS Group Ration, for a group of 10 soldiers it is necessary to have 20, 1 litre of water (breakfast – 10.1 l, lunch – 5 l, dinner – 5 l). These amounts do not include water necessary to heat the products.

Except using water for nutritional purposes, it is also necessary for sanitary and hygienic purposes as well as production and services purposes. In each of these areas, water must be safe for the user, especially microbiologically. Water contamination can be catastrophic for a single soldier and for a larger group also.

To realise the above objectives, in the Polish Armed Forces the responsibility for protecting water is divided into several entities:

1. Engineering Service - water extraction and purification (individual water purification agents and group filters),
2. Medical Service – allowing water for consumption (tests),
3. Food Service - water storage and distribution.

In the case of water purification devices, they are subject to Defence Standard NO-46-A200, specifying the requirements and test methods for consumables used in military water purification devices in field conditions. These materials include filtration and sorption materials, ion exchangers, disinfectants, coagulants and agents for the regeneration of cation exchangers. Currently, water purification accessories do not appear as a part of the food ration of the Polish Armed Forces.

In the article of Mazurczuk et al. (2011) we find out that supplying troops with water is one of the most important logistical undertakings. In operation conditions it is recommended to supply bottled water, safe for direct consumption. However, combat operations may cause that bottled water will not be available. Then, using appropriate equipment, activities relevant with extraction, purification and distribution water from natural reservoirs (ponds, lakes, rivers) are undertaken. For carrying out of above activities are responsible sappers from engineering troops. In the same paper we can read, that the process of water purification used in military equipment consists of several partial stages: oxidation and chlorination, coagulation, sedimentation, filtration and sorption on activated carbon deposits, chemisorption on catalysed activated carbon and ion exchange. The following types of water purification filters are differentiated:

1. Individual (pocket) filters for a single soldier;
2. Portable backpack or transportable sets for small units (teams, vehicle crews) - capacity 30-50 l / h;
3. Portable sets for companies, medical points, resistance points, command posts - capacity 200-500 l / h;
4. Transportable stations (trailers / cars) for branches from the battalion up - capacity from 1 to 15 m3

As we can find out in paper of Wewior (2015) it should be remembered that in water obtained in field conditions from any source, contamination always occur, therefore, especially in the context of preparing meals and beverages, such water must be brought to normative quality. The process of water purification must be oriented on many levels, because the pollution present in the natural environment can be of various origins, among others mechanical, biological, bacteriological or radioactive.

In the article of Mazurczuk et al. (2011) we can find information about currently water purification solutions in the Polish Armed Forces. One of them is the KSW-12 container water purification station. This station has the highest capacity (10-12 m3 / h). Its task is to treat surface and underground water from natural and purposeful admixtures for nutritional purposes. Another of the used devices is the FPW-350 filter (Fig. 4), operating in settling technology. This filter purifies water with a capacity of 350 l / h. His working time can be 150 hours, up to the exchange of deposits. For the FPW-350 operation, a generator set and an electric pump were used, which considerably facilitates filter operation. The next one small device is the FPW-50 filter (Fig. 5), designed for emergency supply of drinking water for self-standing teams (groups of 10 people). This filter is a device with a capacity of 50 l / h, and the purification of 20 litres of raw water takes place within approx. 25 min. from the moment of starting the electric pump for pumping water. This pump can be powered from the cigarette lighter socket or via an adapter, directly from the battery. In case of a failure of the electric pump or lack of power source, water can be pumped using the hand pump, provided with the filter.

Fig. 4. FPW-350 pump and filter unit KSW-12.

Fig. 5. FPW-50 pump and filter unit

As an element of emergency water purification, the Polish Armed Forces use also an individual filter. Its modified version for the civil market is presented in Fig. 6. This filter eliminates most of the harmful admixtures. As a sorbent in this filter, chemically oxidized DTO activated carbon was used, with an oligodynamic silver layer on the surface. In addition, water disinfecting tablets are placed in the cap. Their task is to eliminate microbial hazard. The filter can be used to purify 20 litres of water with a maximum capacity of 10 litres / day. Importantly, this filter has a certificate of compliance with STANAG 2136 MED.

Fig. 6: Modified version of Individual water filter.

Possibilities in preparing and consuming meals from food rations

Due to the increased mobility of conducting military operations, the requirements for the equipment have changed. These changes should concern the following areas:

- use in diverse climate and terrain conditions,
- using light and tough materials,
- applying eco-friendly solutions,
- simplicity of use.

Meeting the requirements mentioned above can significantly simplify operating of soldiers and give them the opportunity to focus on performing their tasks. In addition, the use of pro-ecological solutions may be an indication for other armies and society that the fight against global climate change can be fought on various fronts.

Solutions for Heating Meals

In the article of Forbes-Ewan et al. (2016), researchers noticed that food technology has paramount importance in the period leading up to war or between battles. It's time for soldiers to prepare and consume meals. The provision of adequate quality and quantity of water and food is the major determinant as to whether troops will be fit to fight. The earliest food preservation technologies, like smoking or drying did not need to be heated. To heat meal soldiers have used fire. Currently, when contemporary operations are faster and more mobile, soldiers need suitable equipment. The latest innovations in food technology are: flexible packaging, retort pouches and freeze-drying food. Both flexible packaging and retort pouches are made of multilayer material, which provides a barrier to moisture and air. Freeze-drying food need to be rehydrate by using water (hot or cold). Freeze-drying

food also need to have high-barrier packaging to maintain very low moisture (< 2% by weight). All of these products had longer shelf lives than commercial foods. But if soldiers want to eat hot meal, it necessary to heat pouch or heat water to prepare freeze drying meal.

For individual heaters, one of the options is to use reusable bags. An example of a set of reusable bags is shown in Fig. 7.

Fig.7: Set of reusable bags of Individual Flameless Heater.

Presented kind of set should consist of one reusable outer bag, optionally one drink bag (reusable) and depending on the number of meals to heat - the appropriate number of disposable chemical heating inserts. Reusable bags should be made of materials resistant to high temperatures. Multiple use is possible thanks to the use of an additional layer of aluminium in the bag structure. Heating meals and beverages is a result of contact of the reaction mixture with water. The size of the outer bag makes possible to heat the meal and beverage at the same time, which significantly reduces preparation time. Moreover, this requires usage of only one heating insert. In addition, taking into account modern ecological problems, endurance tests of bags made of plant materials are carried out. After usage, these bags could be biodegraded.

Also heating meals from a group food ration requires the search for alternative methods, which could increase the operational capabilities of troops. Currently, along with the transport of food rations, it is necessary to transport heavy field kitchens. A more mobile solution could be usage of the Multimeal flameless heater (Fig. 8). This heater allows simultaneous heating of meals and water / beverage in a specially designed bag, resistant to high temperatures. Using such heater allows simultaneous heating of 4 trays with food, i.e. preparing a meal for groups of different sizes, depending on the needs and the heated assortment.

To heat meal to a temperature 62°C takes about 40 minutes, while it takes about 20 minutes to heat a water / beverage to a temperature 80°C. Moreover, thanks to used materials this bag has insulating properties, which allows you to maintain the desired temperature when stored in low as well as in high environment temperatures. This is especially important when a meal cannot be eaten immediately. The construction and compact size allow to heat meals / beverages e.g. during a march. The heating process is possible thanks to the use of chemical heating inserts - the reaction mixture in contact with water (of any origin) leads to an exothermic reaction. In addition, the unused heater can be folded, making it three times smaller in size. The described properties as well as light and tough construction make this heater very useful in very different climate and terrain conditions.

Fig. 8: Multimeal flameless heater

In case of lack of access to water, an alternative method may be the electric heater (Fig. 9). This heater is used to heat 1 tray with food from group food ration or a bag with water. Optionally, it can be used to simultaneously heat several individual meals (e.g. in doypack). The most important feature of this heater is necessity to connect to an energy source. However, what is important, it can be energy from various sources. First of all, the energy source for the electric heater can be alternating current (230 V) as well as direct current (12 / 24V). In addition, after connecting a portable solar panel, the source of energy may come from the sun, which is particularly desirable e.g. in desert areas. Importantly, energy can be supply at the moment of use or it can be drawn from a previously charged battery.

Fig. 9: Electric heater and canned food in plastic tray

The above possibilities of sourcing energy allow for widely using the electric heater. By using alternating current, placing several heaters side by side allows you to create a self-service food point, that can be arranged in garrison as well as in field conditions. On the other hand, you can get energy by connecting the heater to the cigarette lighter socket. This solution allows to prepare a hot meal while a group of soldiers are moving in a combat vehicle. Technical solutions used in the electric heater are very innovative. Heat conduction takes place through nanocomposite heating mats, ensuring optimal heat distribution, while minimizing energy loss. The applied insulation technology means that the heat generated is directed primarily at the heated meal. In addition, highly specific fabrics with hydrophobic or waterproof properties were used. The above features make the heating process very effective.

The heating time to 62°C for trays with food from the PS group ration ranges from 40 to 60 minutes, depending on the assortment. It takes about 20 minutes to heat the water to 80°C. The temperature during heating is controlled by an electronic system in which the achievement of subsequent temperature zones is signalled to the user by coloured diodes and sound signals. Another important feature for user is light total weight of the electric heater, which is about 2,5 kg. In addition, the winter tests show that the temperature of the canned food in plastic trays being in the closed heater at an ambient temperature of 0°C dropped by only 2-4°C after 60 minutes from the end of heating[1]. It is extremely important in the context of using the heater in moderate climate conditions, especially in the autumn and winter season. In addition, the reliability and functionality of the electric heater is confirmed by the positive opinion of polish company Rosomak S.A., which has a long-term tradition in repairing, upgrading and producing special equipment for the Army.

The last proposed heating solution is the multifunctional set for cooking and heating meals (Fig. 10), combining the new solutions described above. This set consists of three heating systems that can be used depending on the conditions in which the meal will be prepared.

Fig. 10. The multifunctional set for cooking and heating meals.

The multifunctional set consists of the following elements: transport bag, electric heater, Multimeal flameless heater, sachets with heating substance, bag for heating water, solar system with battery, soup spoon, serving spoons, plastic 1 liter bag to measure water, cleaning tissues and disposable knife. The construction and components of the set allow for a complete independence in the preparation of meals in various climatic and field conditions during military operations. The mobility of the whole set is also affected by the total weight of only about 13 kg.

Solutions for Water Purification and Filtration

As we can read in articles by Smith (2018) and Mitchell and Ensley (2019) water is a nonnegotiable component of all military operations. The soldiers, which are water purification specialists, in a time of crisis take contaminated water from a natural sources and purify it, so it is safe for consumption, whether it be showering, cooking or drinking. Water shortages can completely degrade combat effectiveness. For example, the reliance on bottled water contracts throughout Operation Enduring Freedom and Operation Iraqi Freedom has lulled Army leaders into a complacent view of water supply. This approach potentially could be a base for disaster in future conflicts. After long wars in static and arid environments, Army leaders have neglected the potential of using water purification equipment and instead have relied on bottled water to meet their needs. Army doctrine must evolve to reemphasize the importance of bulk water purification and distribution. Thanks devices for water purification and distribution equipment, Army units hold the potential to be self-sufficient on the battlefield. Self-sufficiency increases a commander's flexibility and operational reach. To fully attain water self-sufficiency, high-level Army leaders must reallocate water purification equipment to enhance unit freedom in purification and distribution. Moreover at the field-grade level, Army leaders must emphasize the importance of training and maintenance on this equipment.

Accordingly also devices for water purification and filtration should be modified in a way to use on an increasingly larger scale, which help soldiers to perform easier their tasks. One of the modifications may be usage of solar panels that can power an electric pump in a group filter. This solution would be a great help in hot climate conditions, if it is impossible to draw energy from the cigarette lighter or battery. The group filter set with solar panel is shown in Fig. 11.

Fig. 11: The group filter with solar panel.

Solutions for Meal Consumption Equipment

Each set of food rations consist of accessories for consumption. In the case of individual food rations these are disposable cutlery and in the case of S-RG - disposable cups for beverages, additionally. Meals are consumed directly from the packages, which aims to minimize the volume and weight of ration. For PS Group Rations, each set includes disposable cutlery, cups for beverages, and trays. In addition, breakfast and dinner sets include disposable soup bowls. Due to changes in European legislation that will eliminate plastic cutlery from the market in the coming years, it will be necessary to use substitute materials in food rations. It is also worth considering alternative material solutions for plastic disposable trays.

Currently used disposable cutleries are made of polystyrene (PS). One of the materials which, due to its properties, could be a substitute for it seems to be polylactide (PLA), whose strength parameters are similar to polystyrene (PS). In the article of Faris et al (2014) mentioned, that polylactide are mostly made from renewable natural resources, e.g. wheat, potatoes, rice and corn. Modified PLA forms have properties similar to polypropylene and polyethylene. In addition, PLA has excellent organoleptic characteristics, making it ideal for contact with food. Starch based plastics have been processed into eating utensils, plates, cups and other products. Importantly, polylactide can be combined with many additives to optimize it for special applications. Under appropriate conditions, with controlled temperature and humidity, PLA is a biodegradable and compostable material. Also disposable straws that would disappear from the market in the future could be made from PLA.

Another element of ration that could be modified in the nearest future is a disposable tray, currently made of polypropylene (PP). In our opinion the material which could replace polypropylene is recycled PET (rPET – recycled polyethylene terephthalate). In the article of Makkam and Harnnarongchai (2014) mentioned that PET is widely used in industrial productions, such as beverage bottles, packaging films and textile fibers. Products made of rPET plastic may contain up to 100% recycled plastic if they meet all sanitary standards (resulting from contact with food). However, during the recycling process PET undergoes hydrolytic and thermal degradations, and consequently its viscosity, melt strength and mechanical properties. Despite the temperature restrictions on the use of rPET (deformation at temperatures above 65°C), it seems reasonable to consider the use of recycled PET material, especially in the context of changing law.

Plant-origin materials can be used to produce all the consumption accessories. An example set of accessories is shown in Figure 12.

Fig. 12: An example set of accessories made from ecological materials

Conclusions

The success of military operations depends on many factors. This paper presents solutions in equipment and accessories supporting soldier's feeding. This article describe solutions, which are using in the Polish Armed Forces and some which are innovative.

The use of new solutions in packaging of meals from food rations requires the use of new solutions in equipment for heating meals. This equipment should enable soldiers to prepare meals in all combat conditions. To meet the requirements of the modern battlefield, it is necessary to constantly modify the equipment solutions to make them more mobile.

It is important not to rely only on bottled water. More attention should be paid to the use of water purification equipment. It's because operating conditions can force the use of such solutions. Therefore, during field training, water collection, purification and distribution should also be trained in various conditions.

Along with the development of technology, it's necessary to use eco-friendly solutions skillfully. On the one hand they are more and more important for the world opinion (e.g. the use of biodegradable materials), and on the other hand they allow to use the full potential of the natural environment (e.g. by using solar energy to heating meals)

Footnotes

[1] Producent's own research Report

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Value Innovations in Management of Organizations

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Abstract

Purpose – The purpose of this paper is to present the concept of value innovations, particularly in a model notion. **Design/methodology/approach** – The literature is examined from different perspectives. First, enterprises must present products and services in their offer that are of the nature of value innovations. Decisions taken by enterprises in order to instigate new consumer needs and satisfy them in an appropriate way in the new dimension of value were taken into account in the model decisions. Second, the tasks of the managerial staff in the process of competing and managing resources in enterprises with the aim of achieving value innovations were emphasized. **Findings –** An important emergent theme from the literature is the importance of taking a complete view, and the innovation nature in enterprises. At the same time, it is also apparent that this requirement to take such a complete and systemic view of the problematic issue of the management of organizations indicates the high level of variety and validity. Organizations that function on the market are obliged to undertake challenges that are formulated by consumers. This could done within an organization that develop value of innovation. **Research limitations** – The scope of this review is by design limited to a cross-section of the literature in this area. **Practical implications –** This review of the literature serves to highlight the dependence between innovation and creating value in management approach in enterprise. **Originality/value –** This study reviews a sample of literature in the field of value innovation, and in doing so provides some recommendations for the conduct of future research.

Keywords: Management of Organizations, Value Innovations.

Introduction

In the process of the functioning of organizations, there is a multitude of intricate problems that determine the aims and tasks for current and strategic activities. Among these problems are innovations that determine the development and position of enterprises on the market, which are of particular importance. However, global innovations have become a subject point of analysis in terms of value innovations. Their concepts are identified with the process of the discovery of needs by consumers with the simultaneous necessity to satisfy them. In the claim that there are new values for clients in the generated needs, the basis for the manufacturing and effective provision of new products and services is created, which are created from the beginning by consumers. These processes are identified with the value innovations and are reflected in the management of organizations, particularly by means of their consideration in business models. In business models organizations are located in terms of their resource potential that is directed towards value innovations as a result of the integration of the domain of supply and demand on the market.

The enterprise-client relation is of key significance when viewed from the perspective of the resource and competence spheres. In the area of management, decisions in the sphere of resources, inter-organizational relations and innovativeness and values are all significant. These processes have an impact on the competitive position by means of the skills of the managerial staff in terms of their potential to generate value, particularly value innovations. The potential of value innovations results from the novelty of the demand created for clients, while the offers of enterprises in this area are synchronized with the aims of the organization. The execution of the aims of enterprises in the challenges of the processes of management requires taking the issues of sustainable development into account.

An ideal premise for the implementation of sustainable management is that of value innovation, whose priorities are concentrated on the requirements of clients which are directed in an appropriate way. In this manner, a client accepts the sustainable development of enterprises as the consequence of activities preferred in the theories of the science of management, as well as the challenges of the sphere of business. The position of the capital of intangible goods is emphasized in terms of the opportunities to implement the sustainable management of organizations. The use of intangible goods is ensured by the personnel of enterprises.

Literature Review

The management of organizations determines a multitude of intricate problems, which in turn determine the functioning and development of enterprises. Enterprises are obliged to conduct constant analysis of the issues that have a strong impact on the range and directions of enhancing activities on a competitive market. The market currently creates important challenges for enterprises in the sphere of innovations, which have an impact on the competitiveness of an organization in a significant way. The evolutionary nature of innovations with the integrated dynamic development results in the emergence of a new phenomenon that is defined by the term value innovations.

In the areas of the innovative activities of organizations, particularly those shaping the position of entities/consumers on the market, there are premises for the generation of values in a systemic notion. Within this range there is a group of clients of the organization, for whom the system of values is created. With regard to the afore-mentioned relations, R. Krupski assumes that activities in the sphere of innovations, their scope, function and position in the systems of management render the definition of value innovations possible. The author further claims that activities in the afore-mentioned sphere "which transgress standards are termed value innovations." (Krupski, 2014)

An important element in the situation of creating the market by organizations is that of the needs discovered by the clients, coupled with the simultaneous awareness of the necessity for rapid fulfilment. (Pine, Gilmore, 2017), The fulfilment of this aim is rendered possible by innovativeness via the effective provision of the required new products or services, while taking account of the financial and cost aspects. (Plinke, Rese, Utzig, 2015) Fulfilment of such generated needs creates new values for clients. (Bertola, Colombi, Vacca, 2017)

The concept that integrates innovativeness with the new dimension of values for clients created by organizations may be acknowledged to be that of value innovations. The aforesaid definition is the result of the further claim that the notion of value innovations "is not the effect of the adaptive processes for the environment, but the manifestation of the creation of the environment." (Krupski, 2014) Enterprises should aim to cultivate the value innovations. (Krawiec, 2002)

The fundamental place for the creation of values relating to innovations is that of an enterprise that has the potential for resources at its disposal, which ensures the achievement of the surplus of revenue over costs. Individual review of the economic results of enterprises with the increasingly expanding inter-organizational relations creates the justifiable basis to state that it is essential to overcome the restrictive barriers. These barriers determine the boundaries of the activities of an individual enterprise.

It is purposeful to indicate resource management in a process notion for the continuation of analysis, while also to emphasize the importance of inter-organizational relations in the sphere of values and innovativeness. (Fig. 1)

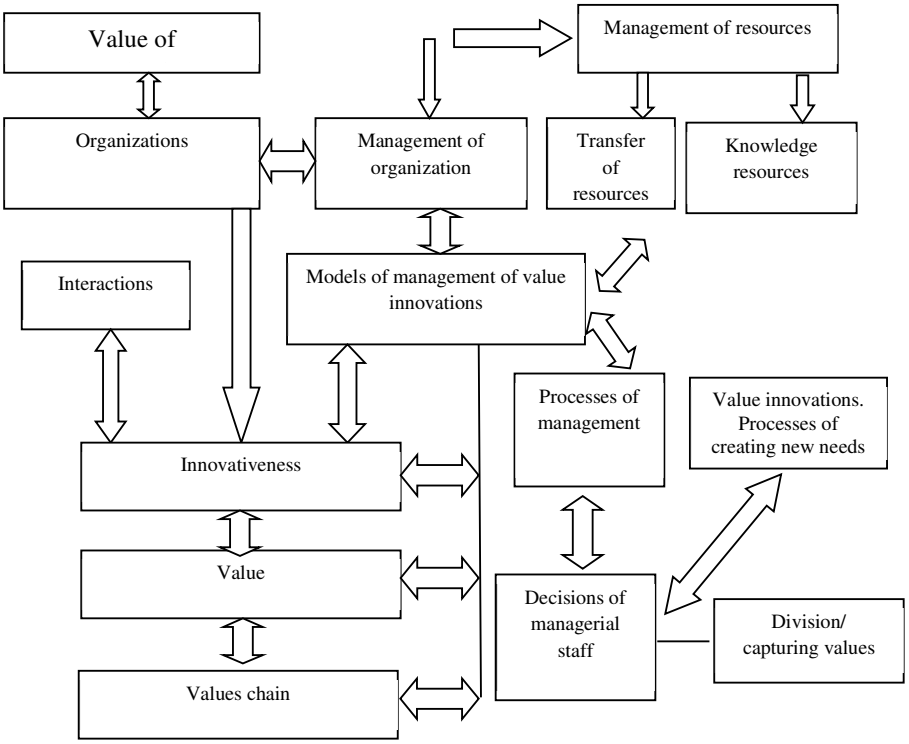

Fig. 1: Value innovations in management

Source: Self-analysis on the basis of C. Mele and T. R. Spena, M. Kolurio, Co- creating value innovation through resource integration International Journal of Quality and Service Science Vol.2 No.1, 2010 (pp.60-78).

The diagram above may be acknowledged to be at the root of the problem in terms of the management of organizations geared towards value innovations. Interactions occurring in the area: innovativeness – value – management determine the spatial framework for preparing the models of the management of value innovations. The consequences of the appropriately prepared and implemented model variants facilitate the growth of the competitive position of enterprises.

In the opinion of W. Dyduch and M. Bratnicki, potential is being created in the skills of the managerial staff for the creation of values, while also the methods of capturing them (Dyduch, Bratnicki, 2015). Perhaps this fact is similar to the aims and results of value innovations as the team of managers in the organization creates the needs of clients.

The expansion and growth of intensity of the activities of enterprises occur in the value innovations as novelty results from the demand created for the clients. Such an offer is presented by enterprises that operate in differing model conditions. Decisions on the basis of models are aimed at achieving the goals of the organization.

The execution of the goals of an organization requires constant analysis of supply and demand on the market. The dynamics of the market cause the necessity to adjust to the changing requirements of clients. Value innovations are among these important requirements, but also taking the problems of sustainable management into consideration. (Fig. 2)

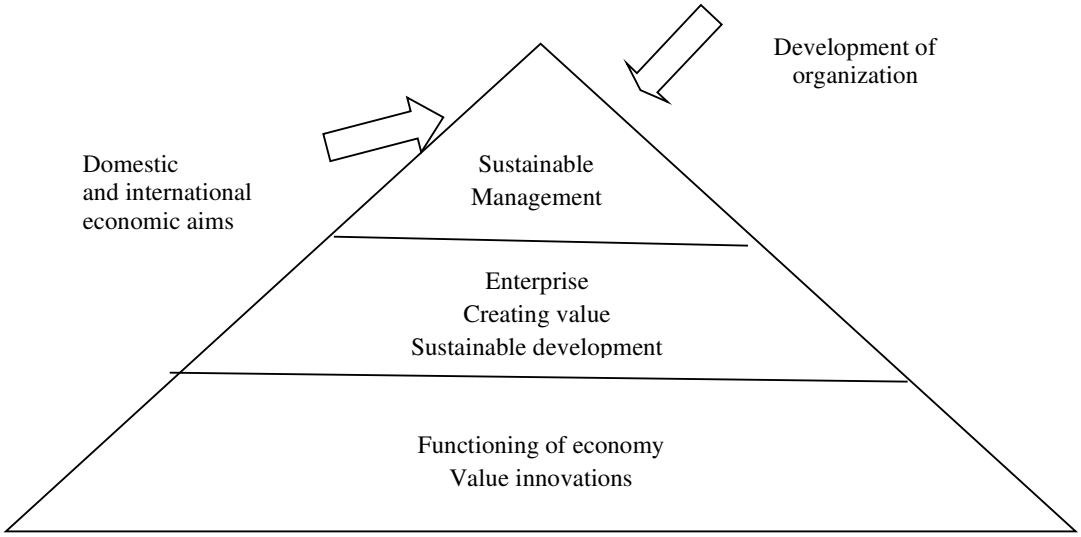

Fig. 2: Creating sustainable value chain

Source: Prepared on the basis of: J. Bee, P. Diby, M. Mbacke and B. Wettstein, Nestle: Sustainable Value Chain Management from the Farm to the Fork [In] CŚR (s.313-325) s.314.

Emphasizing the importance of the sustainable development of an organization is on the one hand the result of activities preferred in the science of management, whereas on the other hand social challenges and opportunities that are required by the current business goals (Regans, Zuckerman, 2008). The prevalence of the highest standards of business in multiple model concepts is the direct indication of value innovations. These innovations occur as a manifestation of the creation of new needs by means of the environment. The multitude of manifestations currently created may be exemplified by the restriction and even elimination of foil packaging. However, the problem of the client remains the lack of possibility to apply a substitute that is less harmful to the natural environment. The identification of threats however, is the potential challenge for sustainable management, while also innovations (Kwartalnik, 2017) for their creation require the capital of intangible goods.

The report on the state of intellectual property in the world in 2017 entitled "Intangible capital in global value chains" (Kwartalnik, 2017), which was published by the World Intellectual Property Organization is deemed to be meritorically significant. In this report, concentration was geared towards the value of intangible goods for the first time. It was stated that…" almost one third of the value of all goods created worldwide and sold in the period of 2000-2014 was constituted by intangible goods. It is assumed that thanks to intangible values, the value of products grows significantly. (Kwartalnik, 2017) Significant differentiation prevails in the sector as intangible goods are prevalent in one sector, while their significance is lower in other sectors. The afore-mentioned facts are taken into account in the problematic aspects of the sustainable management of organizations. The management of innovations illustrates great importance.

The central decision making points are the aims and challenges of the sustainable management of organizations. New innovative products fulfil the requirements of clients. At this juncture, innovative ties are created. The afore-mentioned ties are confirmed by the integrated nature of innovativeness, while also sustainable management in the context of value innovations. The process-product approach with the simultaneous consideration of the requirements of clients in the sphere of innovations have an impact on the decision making sphere by determining the area for the management of organizations of

a sustainable nature (Rutkowski, 2017). The afore-mentioned context causes the fact that it is expedient to refer to the approach, according to which it is important to ...”create a sustainable global financial system." (Mikołajek-Gocjena, 2018) In the context of the sustainable aims, the innovativeness of ecosystems is inherent, within the framework of which the suppliers, clients and other entities all function. An innovative ecosystem should be acknowledged by all entities as a priority in their business activities, one which is realistic to implement within the framework of the rules of radical innovations. (Rothaermel, 2017). The processes of management in this sphere are expanding automatically into value chains, if the particular enterprise is its link. (Wirtz, Elsaber, 2017)

In subject-related literature, the significance of personnel is illustrated in the process of sustainable management. Personnel resources constitute an important entity in the management and development of an organization. Ensuring the development of an enterprise is the result of sustainable management thanks to innovations (Martins, Zambalde, De Souza Bermejo, Henrique, 2019), which require the appropriate level of involvement of the employees. The personnel approves of the creative behaviour and while expecting the appropriate resources of knowledge creates inventions that facilitate innovativeness. As a result of this process, sustainable values of innovative values of an innovative nature are created by the employees. (Lee, Raschke, Louis, 2016)

In IT systems, there is an increasing concentration on virtual organizations. In these organizations, there is growing interest in innovations created in enterprises. Virtuality is identified with the ability to generate partnership ties between enterprises. The essence of cooperation is determined by complementary organizations cooperating in the chain with the aim of maximizing value for clients by means of the utilization of innovations. Independent enterprises are to be found in the virtual model of the organization which create a virtual value chain, which is geared towards one goal – the creation of value, (Walters, Rainbird, 2007), while maintaining sustainable management. The potential of innovativeness and creativity of enterprises, which constitute its genotype falls into the strategy of development. (Nowodziński, 2013) The execution of the strategies of innovation facilitates the achievement of the synergy effect, which subsequently ensures the growth of efficiency of the enterprise (Brzozowska, Szymczyk, 2018). By assuming the base point of these deliberations to be the creation of new values as a result of the execution of the strategies of innovation, it is possible to accept the indication as fact that the sustainable management of an enterprise ensures growth in value for clients. (Gutierrez-Renteria, 2017)

Hence, the appropriate strategy also facilitates the achievement of a high level of value innovation.

Empirical Research

The current market situation constitutes the sphere and trends occurring in the processes of management in enterprises. Indicating a client as the fundamental entity that has an impact on the domain of management in the supply and demand relation causes the fact that the enterprises search for activities that enable customer satisfaction on the market. One of these activities is the creation of the needs of a consumer in the form of value innovations. In enterprises that are geared towards innovative products and are characterized by a high level of added value, it is necessary to indicate the flexibility and speed in terms of reacting to the needs of clients. The EU programs lead to the fact that in the sphere of innovativeness in Poland positive dynamics of change are in evidence. Nevertheless, it is essential to underline the fact that the answer to the question of whether the direction chosen within the framework of the EU programs and specified in the economic organizations in the sphere of innovative development is integrated and strategic activity is significant. Analysing the innovative problems from the viewpoint of strategy indicates the accuracy of the view of A. Sopińska and P. Dziurski with regard to the significant…” degree of utilizing cooperation with the environment in the process of generating value for clients as a result of the innovation created, while also the internal mechanisms applied with the aim of acquiring some of this value for themselves.” (Sopińska, Dziurski, 2018), The authors assume that innovations may be executed with the aim of achieving value as a strategic aspect in the links of the value chain. A strategic aspect also requires taking account of the sustainable value chain, as well as value innovations. Value creation is an idea that has long been recognized in enterprises (Porter, Kramer, 2019) especially in the context of innovation. The execution

of value innovations is possible thanks to the cooperation of enterprises with various entities, particularly those representing the sphere of R&D. This may be exemplified by the research results regarding the cooperation of enterprises with universities in Spain. The research of Soetanto D.P. and Jack S.L. indicates that there is a positive impact of networks in enterprises and universities on the use of resources. The resources were divided into tangible and intangible resources. (Soetanto, Jack, 2013). Regarding the tangible resources, there is a prevalence in the use of equipment and laboratories, which were defined at the level of approximately 10%. The importance of intangible resources is over three times higher in the evaluation of enterprises and relates to the acquisition of university knowledge, the competences of employees, innovative projects and student apprenticeships. (Soetanto, Jack, 2013).

This research aims to build an understanding of the cooperation the relationship between enterprises and universities. In this case, the data were collected from participants in their working environment using short survey with three questions. This method allowed the capture of data about the research problem, and gave the researcher the flexibility to build hypotheses. A total of 76 interviews were conducted in different production enterprises with senior and middle managers. The businesses were selected using random sampling.

The analysis of each single question such that the results obtained from the interviews of each of the organisations can be compared. Interviews were listened, transcribed and analysed. Data analysis involving display and verification was ongoing throughout the analysis. The main intention was to comprehend how these firms engaged in collaborative relationships with universities and their importance for successful innovation.

The interviewees in all organisations confirmed analyses derived from the data. This provides a reasonable degree of validity. The survey was conducted in May and June 2019.

The author at hand conducted her own pilot research with reference to several significant issues in the sphere of innovations in enterprises. The essence of problems is characterized by the following questions and answers from the survey sheet:

Customer demand creates value innovations	**Entities cooperating with universities**		**Total**
	Yes	**No**	
Yes	**37**	**12**	**49**
No	**15**	**12**	**27**
Total	**52**	**24**	**76**

Does a dependency exist between the features of X “Customer demand creates the value of innovation” and Y “entities cooperating with universities”?

Enterprises that select the cooperation with universities would likely pursue a greater degree of innovation creation because that kind of cooperation would help to create value available for clients. Based on this rationale, two hypothesis are proposed:

H_o : The features of X and Y are dependent (there is a dependency between the case of a firm cooperating with a university and the case of whether the demand of clients creates the value of innovations).

H_1: The features of X and Y are independent (there is no dependency between the case of a firm cooperating with a university and the case of whether the demand of clients creates the value of innovations).

The Yates correction for chi-square statistics test:

The Yates correction. In small tables of dimensions of 2 x 2, it is possible to correct the approximation of the chi-square statistics by a reduction in the absolute value of the differences between the expected and observed multiplicities by multiplying it by 0.5 prior to the operation of increasing to the square (Yates correction). The correction causes a more careful evaluation and is usually applied in a situation when there are small multiplicities observed in the table in such a way that some of them are lower than 10 (a more thorough analysis of this subject may be found in the following: Conover, 1974; Everitt, 1977; Hays, 1988; Kendall and Stuart, 1979; and Mantel, 1974). (Help for Statistica 13.0 program)

$$\chi^2 = \sum_{i=1}^{2}\sum_{j=1}^{2}\frac{\left(\left|n_{ij} - \hat{n}_{ij}\right| - 0{,}5\right)^2}{\hat{n}_{ij}}$$

where: n_{ij} –empirical numbers, $\hat{n}_{ij}$ – theoretical numbers.

	Test statistics	p-value
Chi-square (df=1)	3.21	p= 0.0733
Chi-square corrected by Yates	2.35	p= 0.1252

At the level of significance of 0.05, there is no basis to reject the null hypothesis, namely whether the customer demand creates the value of innovations and has an impact on whether the firm undertakes cooperation with universities.

Resources of enterprises enabling the manufacturing of products and creation of services as value innovations	**Entities cooperating with universities**		**Total**
	Yes	**No**	
Yes	30	15	**45**
No	22	9	**31**
Total	**52**	**24**	**76**

Does a dependency exist between the features of X "**Resources of an enterprise that facilitate the creation of products and services as value innovations"** and Y "**Entities cooperating with universities**"?

	Test statistics	Column 2
Chi-square (df=1)	0.16	p=0.6918
Chi-square corrected by Yates	0.02	p= 0.8844

At the level of significance of 0.05, there is no basis to reject the null hypothesis, namely whether **the resources of an enterprise that facilitate the creation of products and services as value innovations** have an impact on whether the firm undertakes cooperation with universities.

Resources of enterprises enabling the manufacturing of products and creation of services as value innovations	**Entities cooperating with science and technology parks**		**Total**
	Yes	**No**	
Yes	**35**	**10**	**45**
No	**22**	**9**	**31**
Total	**57**	**19**	**76**

Does a dependency exist between the features of X **"Resources of an enterprise that facilitate the creation of products and services as value innovations**" and Y "**Entities cooperating with science and technology parks**"?

	Test statistics	p-value
Chi- square (df=1)	0.45	p= 0.5004
Chi-square corrected by Yates	0.16	p= 0.6860

At the level of significance of 0.05, there is no basis to reject the null hypothesis, namely whether **the resources of an enterprise that facilitate the creation of products and services as value innovations** have an impact on whether the firm undertakes cooperation with science and technology parks as the sphere of R&D.

The aforesaid analysis confirms the theory that the processes of creating value innovations are aided by the cooperation of enterprises with scientific and research entities, particularly of the nature of sustainable cooperation, which determines the management of resources and the supply and demand relation on the market.

Summary

The analysis of the theory of management presented in the sphere of value innovations, while also the pilot research conducted facilitate the formulation of conclusions. The fundamental conclusion that is necessary to accept is the fact that the importance of value innovations is rising in the business activities of enterprises as a derivative of the cooperation between consumers and enterprises with reference to the creation of needs, while also the possibilities of satisfying them. Consequently, there is a subsequent integration of supply and demand on the market. The processes of generating value innovations require the cooperation between enterprises and scientific and research entities. The basis of the evaluation of cooperation constitutes the research results on enterprises and universities in Spain, which reveal the fact that intangible resources create innovations. The author at hand conducted an evaluation of customer demand for the creation of value innovations in a pilot research study. Enterprises cooperating with scientific and research entities generate value innovations for clients. Their source is integrated and sustainable resources, particularly intangible resources.

Future Research Topics

Further studies should be made on the development of cooperation between enterprises and universities,. Also, further empirical research should be made to facilitate measuring the relationships between universities and enterprises. Furthermore, the possibilities of creating business model of cooperation should be analysed.

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Determinants of the Technology Innovation Implementation in Small and Medium-Sized Enterprises

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Abstract

Technology is the main factor of efficiency and competitiveness of modern enterprises. The implementation of technological innovations not only allows to achieve a competitive advantage, but is an important factor in the survival of an organization. Therefore, it seems advisable to constantly research the causes and benefits related to the implementation of new technologies in various types of organizations. These analyzes allow for more effective use of appropriate management tools and methods, which will translate into operational efficiency. The main aim of the research is to diagnose and assess the level of determinants and expected advantages of technology innovations implementation in enterprises. The additional aim of the research was to establish if there are correlations between the above variables and the management style in enterprise. To achieve of the main aim, a survey was realized in 2019 among 160 small and medium-sized enterprises in Poland. Using descriptive statistics, the intensity of impact of specific determinants and advantages of implementing technological innovations was indicated. In addition, independence of perception of these factors has been demonstrated from the management style in enterprises.

Keywords: Innovations, Leadership Style, Management, Smes, Technology

Introduction

Many reasons confirm the attention paid to small and medium enterprises (SMEs) in management literature. Basically, SMEs create the largest group in the business system including 99.8% of the corporate sector in Europe (European Commission, 2018; Havierniková et al., 2017). Just because of that, SMEs play a fundamental role in economic growth and stability. The importance of new technologies and innovations for competitiveness and growth of enterprises seems to be a truism among researchers, managers, and policy makers (Martínez-Román et al., 2019). Since Schumpeter (1942) stated that innovation is an essential factor for company development and economic growth of the country, the definition of innovation and factors to enhance it within businesses, they have become a primary concern to researches of innovation for the last decades. Despite its importance, knowledge on innovation in SMEs remains incomplete and inconsistent in the literature (Amara et al., 2008; Lemańska-Majdzik, Sipa, 2015).

Definitions of innovation are varying, but generally it refers to new approaches or solutions, which result in meaningful improvements. They include the creation, development or implementation of new or better ideas according to production, services, strategies, procedures etc., which finally generate added value for economy and society (MacNeil et al., 2019). Innovativeness is also described as the degree to which an organization implements new ideas or technology in relation to their competitors to gain competitive advantages relative to time, cost, and quality of products and services. Hence, innovations are not only a means of survival in the contemporary market but is also an important driver of growth, productivity, and competitiveness (Chege, Wang, 2020). Moreover, it is considered to be the key element of organizational sustainability and regional advantage in the era of non-linear dynamics and rapid change (Sharma, 2018). In order to pursue new market opportunities, entrepreneurs endeavor to bring innovation in the offered products or services, and, indirectly, entrepreneurship plays a key role in boosting the economy (Zeb, Ihsan, 2020). From this point of view, innovations are important not only to business performance but also to society to the extent it is related to employment,

productivity and growth. In this sense, diverse countries promote policies in order to leverage research, development, and innovation (Cardoso et al., 2020). Although coexistence with innovation involves risks and barriers for companies, this is one of the main ways to gain competitive advantage (Biancolino et al., 2013).

The remainder of this paper is organized as follows. The second section discusses a literature review with detailed theoretical context that describes different aspects of technology innovations. The third section discusses the research methodology. Section 4 presents the results of empirical research, while section 5 covers the conclusion, implications, and recommendations for future research.

Literature Overview

The technological innovation refers to the process of technology and economic integration, bearing in mind the fact that the main purpose of technological innovation is the commercial application of technologies and market success of new products and services (Liu et al., 2012). The technological innovation in enterprise refers to use the new knowledge, new technology, new ways of production and operation solutions to increase market shares and capitalize the market value of the technical and economic activities through improving quality, innovative products, and innovative services (Zheng, Yao, 2011).

Technology innovations are described as an approach that provides a competitive advantage to an enterprise (Chege, Wang, 2020) by assisting in market diversification and generating new commercial opportunities (Damanpour, Gopalakrishnan, 2001). They enhance service quality, improve employee productivity, and lessen operational costs (Karadag, Dumanoglu, 2009; Kuncová et al., 2016). Technology innovations will develop a novel decision-making behavior, and will evolve over time. As technology matures, technological opportunities are relatively easy to spread, which means that technological innovations become the foundation of organizational values and sustainable development (Ho et al., 2029).

To bring out the advantages of technological innovations, work processes and organizational resources need to be properly adjusted (Burge, 2014) so that the structure of the organization, its human resource management as well as resource allocation could take advantage of the technology implementation. However, a crucial aspect in the assimilation of technological innovation is the psychological needs of the employees and their approach to these innovations and to the coexisting changes in organizational processes. In practice, employees very often resist to changes, and are willing to prefer known organizational culture and climate over new ones; in this way, the implementation of technological innovations can create a sense of uncertainty and announce the addition of new tasks that many employees definitely prefer to avoid (Hasgall, Ahituv, 2018; Fiala, Hedija, 2019).

For SMEs technological innovations are particularly important. SMEs are able to differentiate themselves among their global competitors when they implement up-to-date technologies and head towards the digitization of business, as well as develop creative products which allow them quickly respond to the new market dynamics (Gupta, Barua, 2016; Bagheri et al., 2019).

Leadership is crucial for effective functioning of any organization. The fundamental of leadership is its persuading power on human resources as an organizations' source of competitive advantage, and the resultant outcomes (Gemeda, Lee, 2020; Betakova et al., 2018). The leadership style determines many aspects of economic activity. It affects the attitudes of organization members, the organization of tasks and processes, and openness to changing environments.

There is a lot of systematization of leadership styles. One of the basic is the traditional leadership distinction proposed by Lewin et al. (1939), who has specified 3 major leadership styles (Sousa, Rocha, 2019): autocratic, democratic and laissez-faire. Each of these styles has many advantages and disadvantages and one cannot conclude on the obligatory advantage of one of the styles over the other when it comes to the effectiveness of the organization.

Methods

The main aim of the research is to diagnose and assess the level of determinants and expected advantages of technology innovations implementation in enterprises. The additional aim of the research was to establish if there are correlations between the above variables and the management style in enterprise. To achieve of the main aim, a survey was realized in 2019 among 160 small and medium-sized enterprises in Poland.

The research group consists of small and medium-sized enterprises (SMEs), because of this, the research group can be described as purposeful. The enterprise sample was selected in convenience way, and for this reason, the results of the research could be treated as initial and should not be generalize.

To assess the determinants and expected advantages of technology innovations implementation the 5-point Likert scale was adopted. Then, descriptive statistics for variables was presented. The next step of the research was a calculation of Kendall Tau coefficient, as one of the most commonly used coefficient within non-parametric methods, for p-value = 0.05 between the above factors and management style, which was assess as intensity on a 5-point scale of one of the main management styles, i.e. autocratic, democratic or laissez-faire style in managers opinion.

Within the group of determinants, which was analyzed by implementation of technology innovations, there are six factors:

D1. Need to reduce / optimize costs
D2. The need to gain a competitive advantage
D3. Willingness to improve the quality of products / services
D4. Customer expectations for a lower product / service price
D5. The need to improve the way the company operates
D6. Opportunities for obtaining subsidies for innovative solutions

Expected benefits combined with the implementation of innovative technological solutions in enterprises eleven factors were selected:

A1. Improving the quality of products / services
A2. Performance improvement
A3. Cost reduction / optimization
A4. Improving resource efficiency
A5. Increased flexibility of actions
A6. Better matching to customer expectations
A7. Less downtime, breakdowns
A8. Higher company profitability
A9. Acquiring new customers
A10. Increasing the scale of production of products / services
A11. Entering new markets

Results

Among the determinants of the implementation of technological innovations, the desire to improve the quality of products and services was indicated as the most significant (mean of answers = 4.28). High indications were also obtained by the factor regarding the need for competitive advantage (mean = 4.20), which was also characterized by the lowest standard deviation, which indicates a significant uniformity of response (Fig. 1). In turn, the lowest grade was obtained by the factor related to the possibility of obtaining subsidies for innovative solutions, where also the divergence of grades was the largest (St. dev. = 1.08).

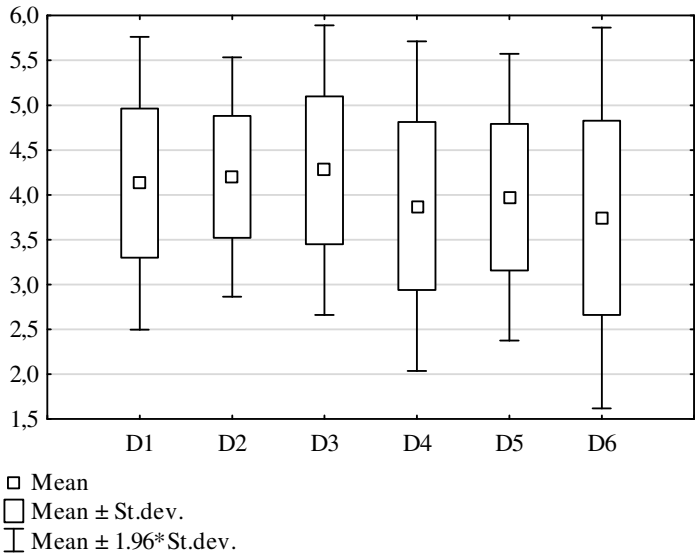

Fig. 1: Descriptive statistics for determinants of the implementation of technological innovations (n=160)

When examining the relationship between factors affecting the implementation of technological innovations and the intensity of a particular management style (Tab. 1.), one should point to correlations of weak or very weak intensity, which has been statistically confirmed for many factors. It should therefore be concluded that the strength of the impact of individual factors on technological innovation does not significantly depend on the style of business management.

Table 1: Kendall's Tau correlation analysis (p<0.05)

leadership style	D1	D2	D3	D4	D5	D6
autocratic	-0,07[i]	-0,13	-0,21	-0,07 [i]	-0,11	-0,08 [i]
democratic	0,11	0,14	0,21	0,15	0,08 [i]	0,15
laissez-faire	-0,03 [i]	0,15	0,14	0,09 [i]	0,02 [i]	0,05 [i]

[i] *p<0.05*

The analysis of benefits from the implementation of technological innovations, expected by entrepreneurs from the SME sector, indicates that higher profitability of operations as a result of technological development is expected (average answer = 4.43). Entrepreneurs expect similar improvement of efficiency in the company, and in this case it should be pointed out that the answers are significantly uniform (0.61).

The least significant for entrepreneurs in the empirical study turned out to be the benefit of greater flexibility of actions (average = 4,025), which probably results from the characteristics of small business, which is somewhat flexible in nature. Similarly, the factor related to the reduction of downtime and failures (average = 4.09) was obtained.

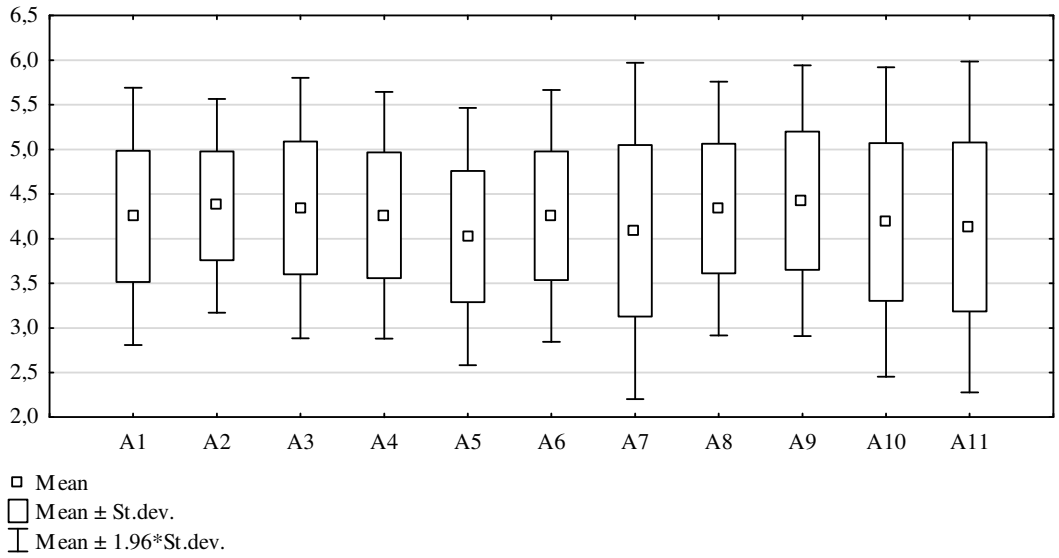

Fig. 2: Descriptive statistics for expected advantages of the implementation of technological innovations (n=160)

As in the case of the determinants of the implementation of new technologies, there is a weak correlation between the benefits of this implementation and enterprise management styles. For statistically significant results ($p < 0.05$), Kendall's Tau coefficient ranged from 0.00 to 0.08, which in practice indicates that adopting a specific management style does not affect the perception of the importance of specific benefits from technological innovations.

Table 2: Kendall's Tau correlation analysis (p<0.05)

leadership style	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11
autocratic	-0,11	0,00 [i]	-0,01 [i]	-0,12	-0,17	-0,12	-0,02 [i]	-0,11	0,02 [i]	0,04 [i]	0,01 [i]
democratic	0,06 [i]	0,04 [i]	0,07 [i]	0,05 [i]	0,24	0,21	0,00 [i]	0,02 [i]	0,22	0,11	-0,03 [i]
laissez-faire	0,04 [i]	0,07 [i]	0,08 [i]	0,14	0,14	-0,04 [i]	0,04 [i]	0,07 [i]	0,07 [i]	0,07 [i]	0,13

[i] *p<0.05*

The research allowed to determine the perception of the significance of specific determinants and benefits of technological innovations, while pointing to the negligible impact of management style on the studied variables.

Conclusion

The modern SME sector has the opportunity to develop only by implementing technological innovations, especially in the field of digital technologies, which will allow to maintain a competitive position on the market in the era of industry 4.0. With the increasing use of new technologies, the business environment is becoming more and more competitive. Hence, organizations work constantly to improve their production processes, retain their market shares, and survive the competition in a cost-effective manner (Gillani et al., 2020; Havierniková et al., 2019). Additionally, consumers have easy access to information about market offers because of information and communication technologies, thereby raising the demand for economical and personalized products with high quality and shorter lead times (Horváth, Szabó, 2019).

The conducted research shows that the most important reasons for implementation of technological innovations in SMEs are achieving competitive advantage and expectation to improve the quality of products and services. In turn, the expected advantages when implement the technological innovations are higher profitability of operations improvement of business efficiency. The correlation analysis shows that the perception of analyzed factors is not dependent on management style preferred in the enterprise.

The presented research could bring some implications for researches and business practice. In particular, entrepreneurs can rethink and modify innovation policies to meet the challenges of the modern world, such as digitization and production automation. It should be also noted that empirical research has shown several limitations, among which the lack of representativeness of the research group comes to the fore. This resulted in, among others, the inability to statistically confirm all relationships between the variables studied. Hence, research needs to be developed in the future along with more details on the factors determining the implementation of technological innovations.

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The Nature and Types of Security for Stablecoins

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Abstract

The article is devoted to stablecoins as special types of crypto-assets. The aim of the study is to characterize the economic nature and effective mechanism for managing stablecoins. Cryptocurrencies and stablecoins are similar, but still different types of digital assets, which are based on blockchain technology. The features of stablecoins are their issuance by specific issuers, as well as the availability of real provision, binding to some highly liquid underlying asset. It is proved that stablecoins, being a digital analogue of an asset, in particular national currencies, perform certain functions of money, but nevertheless they are not a new type of money. The functioning mechanism of stablecoins is determined by two elements: the stabilization mechanism and ensuring the rights of the issuer and the owner of a stablecoin. The approaches to the management of stablecoins are disclosed on the example of the management model of the global stablecoin Libra. The anonymity often found in stablecoins can be used to hide financial transparency and facilitate various financial crimes. Stable coin issuers, operators and intermediaries should fully disclose the terms of their services, and service consumers should receive detailed information about their rights and how to link the coin to the underlying asset. Stablecoin holders should be protected as much as possible from erroneous and fraudulent transactions. Financial risks associated with stablecoins require state regulation of these types of crypto assets.

Keywords: Stablecoin, Crypto-Asset, Digital Token, Cryptocurrency, Currency, Security, Risks.

Introduction

Until recently, the topic of stablecoins did not attract much attention either from corporations, or from the banking community, or from academic science. However, the situation has changed dramatically in connection with the Facebook project for the release of the Libra stablecoin that appeared in 2019. As Lael Brainard, a member of the US Federal Reserve Board of Governors, noted, because of its potential global reach (2.7 billion network users), the Facebook project makes the discussion about what form money can take, who can issue it, and how payments can register and implement (Brainard, 2019). Chairman of the House Financial Representatives Committee of the House of Representatives Maxine Waters expressed concern that Facebook is seeking to create a “global financial system” that will compete with the US dollar (Clayton, 2019).

Of course, the Facebook project made the discussion about the nature of stablecoins and their impact on the financial system more acute. Therefore, the central banks of developed countries and their financial regulators, international financial organizations quickly responded to this project, expressing concern about the possible destabilization of the entire global financial system, given the huge number of Facebook network participants. The widespread belief that cryptocurrencies do not pose a significant risk to financial stability, could certainly change with the launch of global

stablecoins. At conferences of finance ministers and central bank governors G7 (July 2019) and G20 (October 2019), it was emphasized, in particular, that global stablecoins pose serious risks associated with the fight against money laundering and terrorist financing, protecting consumer rights and their data, with fair competition, tax compliance. Therefore, the finance ministers of the EU countries made a joint statement on stablecoins on December 5, 2019, in which they again emphasized that global stablecoins should not begin to be legally used in the EU until all the legal, regulatory and supervisory risks and challenges associated with them will not be evaluated, defined, and eliminated (Council of the EU, 2019).

Thus, the theme of stablecoins is quite relevant. Unlike cryptocurrencies, not so many works are devoted to the functioning of stablecoins. Nevertheless, we would like to highlight the detailed report of the G7 working group on global stable coins (G7, 2019); the report prepared by the staff of the European Central Bank D. Bullmann, J. Klemm, A. Pinna (2019); the historical and theoretical work of G Samman and A. Masanto (2019). It should also be noted the work of Japanese and Swiss authors (Makiko et al., 2019; Berentsen and Schär, 2019), specialists from the International Monetary Fund (Tobias and Mancini-Griffoli, 2019), and employees of the Reserve Bank of Australia (Dark et al., 2019), which examined in detail the various types of stablecoins and the risks involved. A large empirical study on stablecoins was conducted by Blockchain. Data was collected on 57 stable coins in a wide range of categories (Blockchain, 2019).

Satblecoins are a challenge for both monetary and tax policies. Among the pressing issues of developing credit systems (for example: Naumenkova et al., 2020; Mishchenko et al., 2019), the influence of information technology occupies an important place (Naumenkova et al., 2019); this is true for taxation in general (Fedotov and Pokrovskaia, 2017; Bannova et al., 2016; Lvova et al., 2016), stimulation of investment activity (Ivanov et al., 2019a; Ivanov et al., 2019b), tax support innovation (Victorova et al., 2019a; Victorova et al., 2019b)

A review of existing research on stablecoins shows both commonality of opinion and disagreement. The subject of our study is two debatable issues: a) what is the economic nature of stablecoins and b) what should be an effective mechanism for managing the provision of stablecoins.

Research Methodology

In the study of the identified issues, we proceed from the following grounds.

Firstly, the understanding of stablecoins is based on the theory of money. In our opinion, money expresses relationships based on trust. They have three functions: the unit of account, the means of accumulation, and the means of circulation (payment).

Secondly, when analyzing the provision of stablecoins with fiat currencies, it is necessary to see the differences between the money issued by credit institutions and the money of central banks.

Thirdly, stablecoins are an independent form of digital financial assets, secured by the value of underlying assets, and not just a type of cryptocurrency. “Digital financial assets”, in our opinion, can be defined as digital analogues of cash and securities operating in a particular information and communication system.

Economic Essence of Stablecoin

The concept of stablecoin does not have a single universally recognized definition. In many studies, stablecoins are seen as a kind of cryptocurrency that eliminates their most important drawback - high volatility (Clifford Chance & R3, 2019). According to Japanese scientists Makiko Mita, Kensuke Ito, Shohei Ohsawa, Nideyuki Tanaka (2019), stablecoins are cryptocurrencies with price stabilization mechanisms that correspond to the price of another currency with lower volatility. In the Financial Stability Report published by the US Federal Reserve in November 2019, stablecoins are seen as a form of cryptocurrency whose value is tied to the underlying asset or basket of assets (Board of

Governors of the Federal Reserve System, 2019). This understanding of stablecoins is based on the history of their appearance from the world of crypto assets. In stablecoins, many are attracted by the idea of combining in them the price stability of fiat currencies and the well-known "advantages" of cryptocurrencies.

However, there are other points of view. So, D. Bullmann, J. Klemm, A. Pinna (2019) characterize stablecoins as digital units of value that are not a form of any particular currency (or their basket), but rather use a set of stabilization tools to minimize fluctuations their prices. According to G. Samman and A. Masanto (2019), a stable coin is a digital token, a digital representation of real assets. The Financial Stability Board considers stablecoins as a crypto asset designed to maintain a stable value relative to another asset (usually a unit of currency or good) or a basket of assets (Financial Stability Board, 2019). Stablecoins are not considered by the Financial Stability Board as a type of cryptocurrency, but as a type of crypto-asset, along with cryptocurrencies.

According to the Japan Financial Services Agency (JFSA), the characteristics of stable currencies differ from the characteristics of virtual currencies and, therefore, they do not fall under the legal competence of cryptocurrencies. According to the Japanese Payment Services Act, companies that issue stablecoins must register as an “Issuer of prepaid payment instruments” or “Providers of money transfer services” (Helms, 2018). Based on this, it can be assumed that stablecoins in this case are considered as electronic money in that sense, as is understood in the legislation of the EU and Russia.

The Swiss financial market supervision authority FINMA has a special look at the nature of stablecoins (FINNMA, 2019):

– when qualifying stablecoins, it is necessary to be guided by two principles:
1) “the same activity, the same risks, the same rules, the same supervision”, and
2) “the prevalence of the essence over the form”, i.e. paramount importance should be given to the economic function and purpose of stablecoin;
– to determine the nature of stablecoins, it is necessary to know the composition and management scheme of the assets providing them;
– in some cases, stablecoins can be considered as a bank deposit or security;
– the essence of stablecoins is largely determined by the features of the design of stablecoin and the mechanism of stabilization of its price;
– in the payment system using stablecoins, the issues of combating money laundering and the financing of terrorism must be resolved.

As you can see, according to FINMA, there is no common pattern for determining the economic nature of stablecoins. It is necessary to study each specific issue of stablecoins, focusing on their economic function and specific features.

On the Internet, of course, one can also come across statements about stablecoins as another financial bubble. However, the prevailing opinion is the need to conduct research on this topic.
Summarizing the various points of view on the nature of stablecoins, it is necessary, first of all, to note that cryptocurrencies and stablecoins are close, but still different types of digital assets (Fig. 1).

Common characteristics of cryptocurrencies and stablecoins are: blockchain technology, the absence of intermediaries and the presence of consensus in decision-making on transactions. The fundamental difference is in two points: a) cryptocurrencies are created by the system itself (mining), and stablecoins are issued by specific issuers, b) stablecoins have real security, are tied to some highly liquid underlying asset, and cryptocurrencies do not have security, and their prices are determined only supply and demand.

The question arises: are stablecoins a new type of money, a type of electronic money, digital token or securities? The methodology of disclosing the economic content of stablecoins involves determining the goals of their creation, the functions that they perform, the analysis of the types of support and their management. As various studies show, stablecoins can perform the following functions. Firstly,

it is the implementation of payments, and, above all, cross-border. The challenge is to make them simple, fast, cheap, affordable and safe. Secondly, stablecoins can be used as a unit of account (allows you to measure and compare the cost of goods and services). Thirdly, they can become a means of storing (saving) assets for a long time without losing their value. Fourth, stable coins provide the convenience of arbitration between trading floors, as conventional cross-border transfers are processed slowly (up to several days). Fifth, they perform the function of hedging risks when negative news is predicted for the cryptocurrency market. In this case, cryptocurrencies can be instantly converted into stablecoins, but the usual exchange of cryptocurrencies for any fiat currency would require hours and even days.

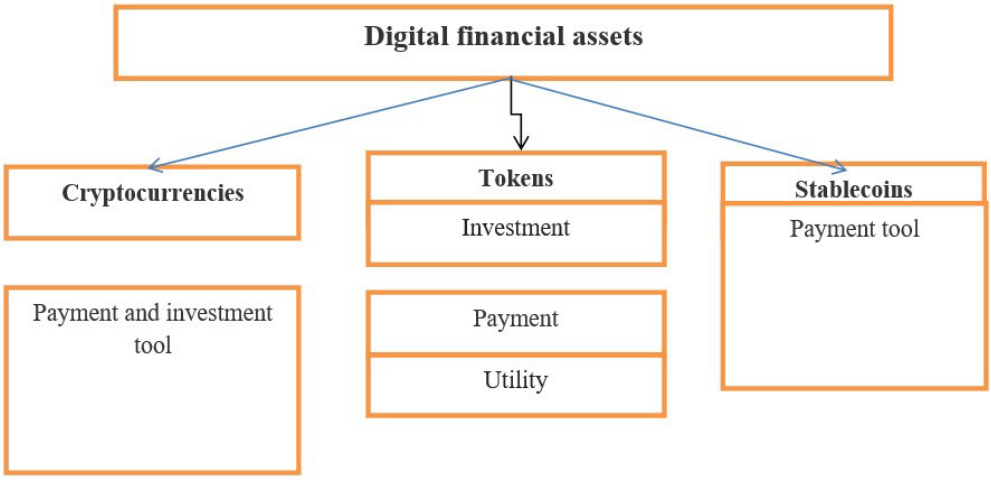

Fig. 1: Types of Digital Financial Assets

Source: compiled by the authors, relying more on studies by the American Securities and Exchange Commission (SEC) and the Swiss FINMA.

Stablecoins, being a digital analogue of an asset, in particular national currencies, in our opinion, perform certain functions of money, but are not yet a new kind of money. Rather, they are similar to electronic money that operate in PayPal, WebMoney, Yandex.Money, Qiwi, etc. payment systems with the difference that the national currencies operate in these payment systems, and stablecoins operate in payment systems, being a digital coin, secured by various assets. In their current definition, electronic money can only be tied to one currency, but not to a basket of currencies, or to non-monetary assets. In addition, a whole security management unit is created for stablecoins, which is absent, for example, in Yandex.Money.

Stablecoins are also close to defining them as digital payment tokens. For example, the Monetary Authority of Singapore believes that “stable coins” consist of digital tokens, which are backed by a reserve of real assets. However, under Singapore law, they cannot be classified as “electronic money” or “digital payment tokens” (Allen & Overy, 2020). In Libra and JPM Coin projects (JP Morgan Chase project) stablecoins are considered as digital tokens.

In our opinion, stablecoins are a new form of payment instruments. This is a digital asset with a cryptographic signature, written on the blockchain, usually supported by some real asset. They can be considered as a special type of electronic money, as a kind of digital payment token, provided by specific assets. Such an understanding of stablecoins, for example, is most consistent, as it seems to us, with the Japanese legislation on payment services, which was mentioned above.

The functioning mechanism of stablecoins is determined by two elements: a) the stabilization mechanism and b) ensuring the rights of the issuer and holder of a stable coin. The stabilization

mechanism itself includes the provision of stablecoins and ways to maintain a stable value. The list of rights of the issuer and the owner of the stablecoin is especially important in matters of converting stablecoins into fiat currencies and on the issues of redemption of coins. The legal qualification of stablecoins depends on how these issues are resolved.

Stablecoins Management Mechanism

In the literature, depending on the provision, three types of stablecoins are provided that are secured: a) fiat currencies (one or several fiat-collateralized), b) physical assets (gold, other types of precious metals - commodity-collateralized), c) one or multiple cryptocurrencies (crypto-collateralized). In addition to secured stablecoins, so-called non-collateralized algorithmic stablecoins are also distinguished when supply and demand are balanced by means of a set of rules expressed in the program code (Fig. 2).

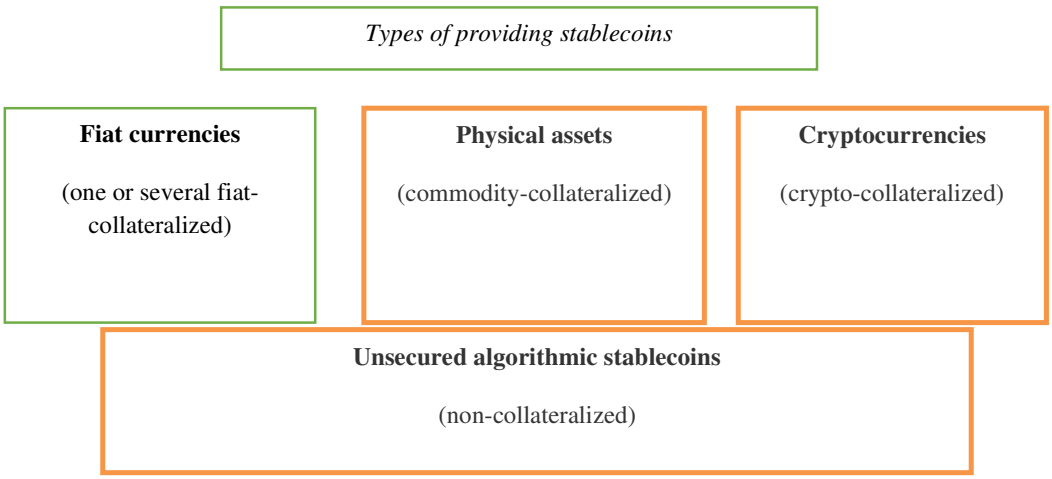

Fig. 2: Types of providing stablecoins

Source: Stablecoins in detail: Basic schemes, operating principles and prospects Available at: https://coinspot.io/analysis/stejblkoiny-v-detalyah-osnovnye-shemy-principy-dejstviya-i-perspektivy/

The allocation of stablecoin types depending on the types of collateral raises the question of provision management models. The binding of the most popular stablecoin Tether (USDT) is carried out to the US dollar in the ratio of 1: 1. This means that if Tether Limited's bank account is replenished by $ 1, it issues 1 USDT token, and if dollars are withdrawn from the company's account, then USDT tokens are redeemed. So, the mechanism of maintaining a one-to-one exchange, at first glance, is quite simple. The problems are who and how provides this ratio: the USDT issuer himself, or the custodian (bank, custodian) on his behalf, and what are the guarantees here. For example, when providing stablecoins with US dollars, the problem may be the presence of credit risk, since the bank, the depositary, is at risk of excessive lending and possible bankruptcy.

Things are much more complicated with unsecured stablecoins, which are controlled by algorithms. For example, the stablecoin Kowala (kUSD) is algorithmically "tied" to the value of 1 US dollar. However, this binding to fiat currency is provided not by a stock of real assets, but by program code and mathematics. The following principle applies here: if the value of one stablecoin exceeds $ 1, the supply of coins increases, and when the cost is less than $ 1, the supply decreases (that is, the coins are "burned"). The mechanism of such regulation is carried out through smart contracts with the participation of traders (Dark et al., 2019). Supply and demand can also be regulated using bonds (Blockchain, 2019).

For the most part, the literature does not contain a detailed description of the control system for providing stablecoins. Therefore, in our opinion, of great interest is the model of managing the global stable coin Libra, the central place in which is occupied by the independent non-profit organization Libra Association. Members of this association are various organizations from around the world. One of its main tasks is managing the technical development of stablecoin and resolving issues of the organization itself. She will also manage the operations of the Libra Reserve Support Fund, including the creation and destruction (or "burning") of stablecoin. An independent Calibra division is being created for operational project management. Within its framework, the social network with the same name with a digital wallet should appear, which will allow payments to be made in WhatsApp and Messenger (Libra, 2020). Such a management system allows to a certain extent to avoid the monopoly of one company - Facebook.

In our opinion, the stablecoins collateral management system should, in principle, include an independent collateral management company, depositories / central depositories, a collateral verification system (audit), and possibly collateral insurance.

Conclusion

Technologies are changing the world of payments and opening up opportunities for transactions to be convenient, fast and cheap for users. At the same time, new payment methods pose new risks. Stablecoins also carry risks associated with legal uncertainty, cybersecurity, market integrity, data privacy and consumer protection. It should also be borne in mind that collateral alone does not guarantee stable price stability during a financial and economic crisis. In addition, the risk of breaking into the payment system and the storage system of assets transferred as collateral doubles: not only stablecoins, but also the collateral itself can steal. Storage of assets in commercial banks carries credit risk.

What could be the consequences of introducing stablecoins? For example, banks may have reduced deposits, since some of them will be converted into stablecoins. At the same time, the currency supply of stablecoins will be stored in the largest banks, which may help strengthen the latter. Concerns are also expressed that dollar stablecoins may lead to dollar dependence of countries with weak economies, and the widespread use of global stablecoins can to some extent weaken the dominant role of the US dollar.

The ten-year history of cryptocurrencies does not give reason, in our opinion, to consider them as the future of money. The five-year history of the first generation stablecoins (2015-2019), due to their small number and scale of use, shows a low demand for them.

As for the second generation of stablecoins (the Facebook project to create the Libra, the JP Morgan Chase project to create the JPM Coin, the project of the largest banks in the world to create an institutional stable USC coin), such global coins can have the most significant impact on payment systems, on monetary and credit policy of central banks and in general on financial stability. The consequences of their widespread use without proper regulation can be devastating for the entire global financial system. Therefore, the regulation of global stablecoins should be carried out within the framework of the international regulatory framework.

Regardless of the economic and legal qualifications, stablecoins should be evaluated in terms of combating money laundering and combating the financing of terrorism. Anonymity, often found in cryptocurrencies and stable coins, can be used to hide financial transparency and facilitate various financial crimes. Stable coin issuers, operators and intermediaries should fully disclose the terms of their services, and service consumers should receive detailed information about their rights and how to link the coin to the underlying asset. Stablecoin holders should be protected as much as possible from erroneous and fraudulent transactions.

It should be said that serious steps have already been taken in this direction. Thus, the EU adopted the EU directive 843/2018, which significantly limits the crypto sector due to the introduction of strict

anti-money laundering measures and the mandatory KnowYourClient procedure (EU, 2018). The FATF adopted in 2019 the final version of the recommendations on the regulation of cryptocurrencies and the activities of cryptocurrency services operators (FATF, 2019). All this, of course, will contribute to transparency in cryptocurrency systems, including stablecoins.

The penetration of large technology companies into the banking system is inevitable. However, the issue of any stablecoins, especially "global stable coins" such as Libra, should not be allowed until the issuer protects the rights and interests of its customers and provides evidence that significant risks will be eliminated. In any case, the beneficiary of innovations should be the consumer of financial services.

The prospects for the study of stablecoins are largely related, in our opinion, to two areas: a) using interbank transnational settlements and b) projects for creating digital currencies of central banks.

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Investment Passivity of Russian business: Coping Mechanisms

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Abstract

The paper addresses key challenges for investment activity in the Russian Federation. The research also shows that investment behavior of Russian companies differs depending on the industry and the region of activity. This allows suggesting the mechanisms for overcoming investment passivity of the Russian business. We argue that necessary measures in this field are the following: improving the investment climate, especially in terms of guaranteeing stable fiscal business environment, protection of entrepreneurs from the law enforcement agencies of pressure, reform of the judicial system in the direction of its real independence from the executive authorities; increasing financial availability for Russian business, primarily cheaper borrowing; ensuring the growth of real incomes of the population and, accordingly, poverty reduction; technical re-equipment of companies based on modern technologies.

Keywords: Investments, Investment Behavior, Investment Activity, Russia.

Introduction

In the development of the Russian economy over the past 20 years, both ups and downs GDP growth rates and investments in fixed assets (after this – investments, capital investments) have been observed (Ivanov et., 2018; Ivanov et al., 2019; Lvova et al., 2018). The recovery of economic growth in the country was expected due to a significant increase in investments in fixed assets in 2017. Thus, the growth of investments in 2017 amounted to 4.8%, and the share of investments in GDP increased to 21.5% (Rosstat, 2019a), which also had a positive effect on GDP growth (GDP growth in 2018 compared to the previous year was 2.3%). However, in the future, a progressive increase in the growth rate of investment in fixed assets in 2018 and 2019 did not happen (Grigoriev, 2019). At the same time, the share of investments in GDP decreased in 2018 to 20.7% (Rosstat, 2019a). In 2019, the growth turned out to be insignificant - the share of investments in fixed assets compared with 2018 increased by only 0.3 percentage points and amounted to 21%. GDP. Details on the dynamics of Russia's GDP and investment in fixed assets from 1999 to 2019 are presented in Fig. 1.

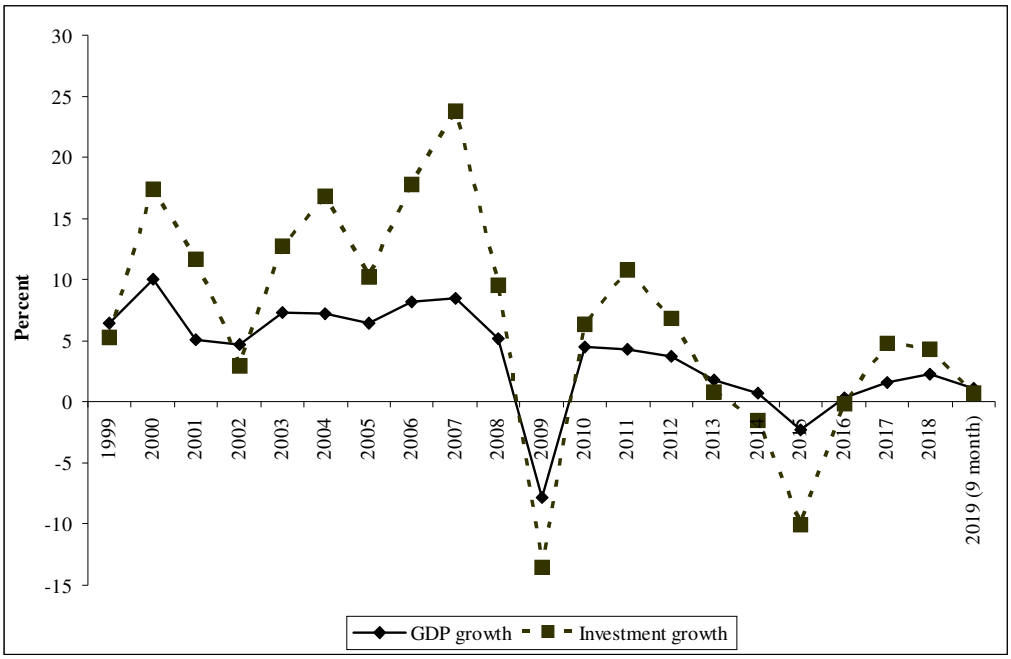

Fig. 1 : GDP and investment growth in Russia (Rosstat, 2019a; Rosstat, 2019b; Grigoriev, 2019).

According to Message from the President of the Russian Federation to the Federal Assembly of the Russian Federation of 01.15.2020, it is planned that since 2020 the annual investment increase should be at least 5%. The task is problematic, but despite significant challenges, there are certain prerequisites for its implementation.

Note that the trend of investment activity of a business in Russia is not homogeneous for various types of activities and territories of the country. There are sectoral and regional growth points, the identification of which is relevant and significant for the development of investment policy. In addition to the question of how the investment behavior of companies differs depending on the industry and the region of activity, the paper analyzes key challenges for investors, which allows us to justify the mechanisms for overcoming investment passivity of business in the Russian Federation.

Business investment activity in the regions of the Russian Federation

An analysis of regional features of investment activity is especially relevant for Russia, taking into account its federal structure and significant differences between regions in terms of the level of business activity, consumption, etc. For the analysis of investment activities of Russian companies by region, the data of the SPARK-Interfax information system were used. We analyzed 10 thousand largest companies by assets— the total amount of all Russian companies currently more than 4 million.

We researched the acquisition of non-current assets by companies in 2018 was (more recent data are not available in the SPARK system). To analyze the investment activities of companies in a particular region we summarized data for the largest organizations in this region, which fell into the 10 thousand largest Russian companies. We consider the region where the company was registered since taxes are paying in this region.

As a result of the analysis, the following data were obtained. The most significant share of investments falls on city of Moscow – this is 33.4% of the total amount of investments of the 10 thousand largest Russian companies. In absolute terms, this is 2 756 820 million rubles. Next,

Moscow is followed by the Tyumen region (15.33%) and St. Petersburg (6.33%). They are followed by the Moscow region (4.67%). Thus, 4 regions account for almost 60% of investments, and two of them merge into one - the Moscow metropolitan area.

Analyzing the outsiders of the rating, we noted that in 6 regions investments amount to less than 1 billion rubles and in relative terms, 0.01% or less. Among them are the Stavropol region and five republics of the North Caucasus. The difference between the size of investments in large companies in Moscow (2,756,820 million rubles) and Kabardino-Balkaria, which closes the list (17 million rubles), is 162 thousand times.

It can be assumed that these figures will change a little bit if we analyze not only the largest companies. The revealed trends and patterns also reflect the flows of population migration in Russia and the attractiveness of the regions for investors.

Sector features of investment activity in Russian Federation

During the investment stagnation from 2015 to 2019, some sectors continued to show steady growth in fixed capital investments, while others stopped investing.

Which Russian industries are leading in terms of capital investments? First of all, we are talking about mining. In the first half of 2019, investments in mining increased by 5.3% in annual terms, including in coal mining by 36.3%, in oil and gas – by 3.8%. High rates of investment growth in the first half of 2019 took place at textile enterprises (an increase of 89.6%), freight rail transport – 79.8%, coke production – 62.3% and some other sectors (Rosstat, 2019a).

The most significant reduction in investment activity was observed in manufacturing. However, in this area, for specific subsectors, rather high investment growth rates remained. In particular, this applies to the production of chemicals and products, paper and paper products and other sectors.

Note that active investment is characteristic of enterprises with a high margin level, which correlates with the features of investment financing, which will be discussed later. Accordingly, investment passivity is observed, first of all, in those sectors where there is a low margin level, insufficient demand for manufactured products.

Curiously, the low growth rate of investments in manufacturing is simultaneously characterized by a reasonably high growth rate of financial investments. So, in 2018, the growth of financial investments in companies in the industry amounted to 31.2%, while the total volume of financial investments exceeded 12% of the volume of financial investments in all types of economic activity and significantly exceeded the volume of financial investments in the field of mining.

Summary results for the most significant cases are presented in table 1.

Table 1: Some financial indicators dynamics of Russian companies in the analyzed industries

Industry / Indicators, years	Total	Transportation and storage, total	Mining, total	Including		Manufacturing, total	Including	
				Coal	Metal ore mining		Chemical production	Paper production
1. Investments in fixed assets at actual prices, billion rubles								
2015	2,146.6	13,897.2	2,385.3	80.5	158.4	2,167.6	312.6	39.9
2016	2,424.1	14,748.9	2,710.4	98.6	159.1	2,103.3	367.8	51.7
2017	2,659.4	16,027.3	3,023.2	139.9	187.1	2,296.5	424.8	69.5
2018	2,983	17,595	3,199.6	167.6	254.1	2,584.9	498.6	86.4
2. The growth rate of investment in fixed assets by sector, %								
2016 г. to 2015 г.	–0.2	5.5	9.2	11.6	–7	–10.6	9	20.2
2017 г. to 2016 г.	4.8	4.9	6.1	37.1	12.8	5.4	11	29.6
2018 г. to 2017 г.	4.3	5.8	2.9	14.3	30.2	7	11.8	19.5
2018 г. to 2014 г.	–3.5	–26.3	23.7	9.1	29.9	–6.5	63.1	36.1
3. Sales margin, %								
2016	8.1	10.8	27.2	23.8	54.7	10.5	24.5	20.1
2017	7.5	9.7	25.9	30.6	50.3	11.5	19.8	20.5
2018	12.3	8.8	33.6	31.4	57.3	12.8	26.5	28.1
4. Return on assets, %								
2016	6.4	5.3	10	8.1	21.4	6.6	13.8	16.1
2017	5.3	4.7	11	16.5	15.6	5.5	8.6	13.2
2018	6.4	4.1	17.3	11.6	17.6	6	6.1	17.3
5. Financial investments in actual prices, total, billion rubles								
2017	165,669	13,095	7,641	548	2,093	22,632	1,235	261
2018	246,503	22,508	11,977	491	5,711	30,116	1,523	494
6. Short-term financial investments in actual prices, total, billion rubles								
2017	147,083	7,736	6,988	306	1,155	19,055	1,098	252
2018	213,867	11,471	11,086	388	866	25,052	1,456	487

Source: compiled by the authors on (Rosstat, 2019a).

Reasons investment passivity of Russian business

What is the reason for such a significant difference in the investment activity of Russian companies? According to a survey by the Rosstat of the heads of large and medium-sized companies, the most significant reasons were insufficient equity, uncertain economic situation, high interest on loans and insufficient demand for products (Rosstat, 2019a).

The Ministry of Finance of Russia has a slightly different opinion, ranking the reasons for investment passivity: an increased level of economic uncertainty and dependence on the pricing environment in commodity markets; an insufficient degree of protection against possible risk scenarios due to the low level of the accumulated reserves of the sovereign; an unbalanced structure of budget expenditures that does not contribute to the correction of structural imbalances in the economy; the presence of structural barriers to development associated with distortions of the competitive landscape and incentives for investment, the quality and effectiveness of public administration, demographic trends and the development of human capital.

Note that the Ministry of Finance of Russia does not recognize the significant impact of the challenges of insufficient equity and high interest on loans. There are some reasons for this position. Significantly, that the companies demonstrate low investment activity, are active in financial investments. Many of these volumes of investments are much higher than the volume of investment in fixed assets. If in 2017 this excess was 10.3 times, then in 2018 it increased to 14 times (see table 1). However, more importantly, for decades, the primary source of financing of capital investments in the Russian Federation are own funds. Moreover, their share in the structure of investment financing is increasing, which, however, is not accompanied by an increase in investment activity (Table 2).

Table 2: Dynamics and structure of investments of Russian companies by sources of financing (excluding small enterprises)

Indicator	1st half of 2018 г., %	1st half of 2019 г., billions of rubles	1st half of 2019 г., %
Investments in fixed assets – total	100	5,041.5	100
Equity	59.7	3,032.5	60.2
Liabilities – total	40.3	2,009.0	39.8
Including: bank loans	8.0	532.0	10.5
loans from other organizations	4.1	230.2	4.6
budget resources	12.1	537.1	10.6
funds of organizations and the population raised for construction	3.2	189.8	3.8
Others	12.2	495.5	9.8

Source: compiled by the authors on (Rosstat, 2019a).

Among the liabilities, the most significant volumes have the budget funds (federal, regional and local). According to the results of the 1st half of 2019, the share of budget funds decreased by 1.5 percentage points in annual terms, which was a significant factor in the low growth rates of investments in fixed assets in 2019. At high interest rates, the share of funds raised from Russian loans commercial banks remains negligible. In the 1st half of 2019 it amounted to only 10.5% of total investment in fixed assets.

In these circumstances, the position of the Central Bank of Russia (CBR), according to speech by E. Nabiullina at the International Finance Congress is, above all, to "make corporate loans more attractive for banks". Meeting the needs of the real sector in the "cheap" and "long" loans (Miroshnichenko and Tarsova, 2018; Grinko, 2019; Grinko et al. 2019) to provide the required rate of growth of the economy of the CBR is currently not among the priorities, as the "cheapening of credit resources will mask structural problems and lead to macroeconomic instability". However, studies of

emerging economies note the negative aspects of this scenario (Mishchenko et al., 2019;; Iwasaki and Kumo, 2019; Naumenkova et al., 2020).

However, the reasons for the current situation with the financing of capital investments are varied. In particular, it highlights the decline in purchasing power due to a decrease in real disposable income. In the 1st quarter of 2019, real incomes of the population decreased by 2.2%. In 2017, only in 14 regions of Russia, the median salary exceeded 30 thousand rubles per month, and in 14 regions it was less than 17.3 thousand rubles (Rosstat, 2017).

The literature in this context it is also often considered a high tax burden on business (see, e.g., Sinenko et al., 2018; Victorova et al., 2018). However, our study showed the speculation of such statements or at least the paradox of such conclusions (Lvova et al., 2016). When analyzing the impact of the tax burden on the investment activity of a business, it is essential to take into account its differentiation by sector (Fedotov and Pokrovskaia, 2017; Kireenko and Nevzorova, 2019). The most significant industry average tax burden, taking into account the burden on insurance premiums in 2018, was observed in the mining sector – 43.5% and the gross margin in 2018 was 33.6%. The tax burden in the field of manufacturing is 7.1%, in the field of transportation and equipment – 6.5%, i.e. six times less than in the field of mining. At the same time, both the margin and the growth rate of investments in fixed assets in these areas were also lower than in the mining sector.

Conclusions

The investment passivity of Russian business, of course, is primarily due to external challenges. International economic sanctions have a negative impact, limiting the possibilities of attracting foreign investment, obtaining cheap loans by foreign financial institutions from Russian financial institutions, and acquiring and using modern foreign technologies by Russian companies. However, the study showed that the main reasons that hinder the investment activities of Russian companies are associated with the slowness of solving the internal problems of the functioning of the national economy.

As the main mechanisms to overcome the investment passivity of Russian companies and, accordingly, priority measures to accelerate economic growth, in our opinion, are necessary:

1) improving the investment climate, especially in terms of guaranteeing stable fiscal business environment, protection of entrepreneurs from the law enforcement agencies of pressure, reform of the judicial system in the direction of its real independence from the executive authorities;

2) increasing financial availability for Russian business, primarily cheaper borrowing;

3) ensuring the growth of real incomes of the population and, accordingly, poverty reduction;

4) technical re-equipment of companies based on modern technologies.

According to the authors, measures in these areas will contribute to enhancing the investment activity of Russian business.

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Students' Management of Free Time - Selected Aspects

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Abstract

The aim of the study is to identify forms of spending free time by students. Students are a social group that thanks to their young age and energy can become a factor of social change and influence the transformation of entire society or region. The basic method of collecting the research material was a diagnostic survey, in which the author's own questionnaire was used. The study was conducted in February of 2018 and of 2020. The students turned out to be a very diverse social group, so it's impossible to talk about any group-specific way of using leisure. There are, however, clear differences in the ways of spending free time related to gender and employment status. Leisure of young male students is clearly dominated by the use of computer and the Internet.

Keywords: Leisure, Time Budget Of The Population, Forms Of Free Time Use, Computer Games, Students.

Introduction

Real (clock or calendar) time is an important subject of research in economics, sociology, psychology, philosophy and practice of economic life. The success of economic entities (enterprises or individuals) as well as the level of socio-economic development and economic well-being depend on the use of time and time resources. In the context of contemporary scientific research, real-time resources are treated as the basic determinant of the quality of life, in both the individual and the social dimension [Czaja 2011]. In the past, as an aftermath of the theory of value developed by Adam Smith, the attention of researchers focused mainly on working time, because it was the input of productive work that was considered to determine the national wealth [Bartkowiak 2008]. Today, as a result of socio-economic changes, technological progress and globalization, free time and its management play an increasingly important role in human life. Free time gets systematically extended as a result of changes in labour legislation and of automation of production processes that increases work efficiency. As a consequence, there is an increase in demand for goods and services that meet the needs related to leisure management. The release of labour resources resulting from technical progress in the agricultural and industrial sectors has caused the shift of human capital from these sectors to the one of services [Walczyna, Łucjan 2012]. Development of the service sector has proved necessary both for the economic development and for smooth operation of all areas of the economy [Schulze 2011]. An increasing proportion of service activities is dedicated to leisure activities (e.g. hotel and catering services, information and communication, education, culture, entertainment and recreation). Time management refers to the proportion of working time and free time. It is a subjective – even if economically conditioned – decision of the individual, as it depends on the financial situation of the individual and on his institutional environment. According to economists, time is the most valuable resource at the disposal of a human being. Its uniqueness lies in the fact that it is not only a measure of life duration, but also a non-renewable and indispensable resource in the production and consumption of any goods [Nowak 2010].

The study of population's time budgets shows that the amount of time devoted to leisure activities is gradually increasing [Kolny 2016; Roettke 2017]. On the other hand, the use of free time affects many areas of family, personal and professional life, and also translates into economic processes and

social issues on a macro scale. Therefore, it seems very important to acquire knowledge about time management for various age groups and various levels of education. The way of spending free time adds to the overall image of young generation, and also provides information on the preferences, values and attitudes of young people towards important social issues. Students are a social group that thanks to their young age and energy can become a factor of social change and influence the transformation of entire society or region, so it is not without significance to study and learn about ways of spending free time by this social group.

The aim of the study is to identify forms of spending free time by students. The discussion is divided into three parts. The first explains the concept of leisure and how to interpret it. The second part describes the methodology of researching the population's time budget and contemporary changes in individual behaviour patterns. The third part presents results of the analysis of research results. The basic method of collecting the research material was a diagnostic survey, in which the author's own questionnaire was used. The research was carried out twice, in February of 2018 and of 2020, on a research sample of 468 people, i.e. first-degree students.

Actual Free Time Resources – Methods of Interpretation

Leisure time, observed as early as in ancient times, became a recognizable category only at the turn of the eighteenth and nineteenth centuries [Mroczkowska 2008]. Aristotle pointed out the separation of leisure time and working time, at the same time clearly emphasizing the relationship between leisure and culture, art and self-realization. Free time was supposed to serve the pursuit of perfection, it was filled with activities conducive to human development (including philosophy, contemplation or science). In economic theory, time started to be noticed during the development of value theory. While searching for sources of value, Adam Smith and David Ricardo built a labour-based value theory, according to which value was created solely by productive work [Bartkowiak 2008]. There was a question of measuring working time using clock time. Working hours vary depending on employees' abilities and the arduousness of their work. Karl Marx, in his turn, undertook to solve the problem of qualified work and introduced the concept of socially necessary time [Czaja 2011]. He saw time as an economic "surplus" that created added value. Therefore, working time was analysed in the theory of economics, while leisure was often seen by economists as belonging to the private sphere of an individual, and therefore was excluded from detailed research of economics for a long time. Today, traditional macroeconomic measures – GDP and GNP – are criticised as inaccurate measures of the volume of production in the economy, because they fail to cover e.g. the value of free time [Juster, Stafford 1991].

Nowadays, the issue of free time is dealt with by representatives of various scientific disciplines, including sociology, psychology, physical cultural studies, education studies, medicine and economics. This results in an abundance of definitions of free time that focus on specific aspects, significant from the point of view of a given area of science.

The most common criteria of delimiting working and leisure time are [Dumazedier 1960]:

- voluntary nature,
- selflessness (not-for-profit, non-commercial nature).

An individual, by his own volition or under the influence of the institutional environment, decides to carry out activities that bring him pleasure. He fills his leisure time, of which he can freely dispose, with activities that positively affect his personality. The amount of free time is the time that remains after performing the activities required to satisfy physiological needs and perform mandatory activities which depend primarily on the point in the individual's life cycle. A young person learning in a full-time education system, another one on his working age and still another already retired will have very different scope of duties. According to Barbara Pisarska, the structure of an individual's time budget depends on many factors, among which the most important are [Pisarska 2015]:

- biological factors: health and physical fitness level,

- mental factors: personality, temperament, intelligence level, attitude to life, value structure of needs and interests,
- demographic factors: sex, age, marital status, number of children and stage of family life, household size,
- social factors: education level, professional activity, occupation and nature of work, social environment and origin, place of residence,
- economic factors: income level, household equipment, means of transport, access to recreational equipment, facilities and offer (discounts, large-family card).

Also interesting is the approach of John Rawls, who within his theory of rational justice proposes to treat leisure as one of the basic social goods that make the basis of individual's self-esteem [Rawls 1994]. According to Julie L. Rose, citizens have the right to free time and can use it to pursue their own goals, whatever they may be [Rose 2016]. Mostly, free time is considered as the opposite of time spent on for-profit activities. According to Małgorzata Bombol, free time is the time during which a person does not perform any obligatory activities. It is a natural element of an individual's functioning, set out from the 24-hour time budget [Bombol 2008]. Leisure time is defined more comprehensively, i.e. in two ways, by Ryszard Winiarski. In the quantitative way, he defines it as the part of daily time budget that remains after performing all professional and non-professional duties and after satisfying the basic bodily needs (physiological and hygienic). In the qualitative way, he defines it as the time which an individual can freely dispose of, allocating it, for instance, to leisure, entertainment and self-improvement [Winiarski 2011]. Undoubtedly, free time is what distinguishes an individual, his personality and decision-making capacity.

Increasingly, leisure activities are reflected in consumer needs - new forms of relax and recreation are sought, and free time is becoming the time allocated to the acquisition of increasingly sophisticated goods and services [Niezgoda 2014]. It seems that free time is becoming another consumer good. More and more often it is not just a "time to do nothing", but it becomes a good (service) with which we can display our position at work and in society.

Free time is an important element of our lives. The amount of time and ways of using it determine the quality of work performed, training and professional development, everyday well-being and health, i.e. the overall quality of life [Kwilecki 2011].

Study of The Population's Time Budget and Life Cycle - Changes in Behavioural Patterns

In economic sciences, the way in which man organizes his time is referred to as managing the time budget. Time budget is a total of the time periods planned for implementation of various life activities [Pięta 2008]. The study of the population's time budget provides information on how time organization changes in connection with the changes taking place in both economy and social life. It provides information about many aspects of life, including the distribution of time spent on various spheres of life. In Poland, surveys of population's time budget are conducted by the Central Statistical Office (GUS). Household sample for the study on time budget is selected randomly (multistage random selection). The studies are carried out on a sample representative at the country level, and participation is voluntary. The surveys are conducted by the direct interview method, using paper-based questionnaires (PAPI). The last survey was conducted by the Central Statistical Office in 2013 and it was the fifth study on this subject, and at the same time the second one carried out in cooperation with the Eurostat. The study was carried out on a sample of 10.3 thousand households. The study subjects were people aged 15 and over who kept time diaries for 2 days; one weekday and one weekend day [Nowak, 2010]. It is worth emphasizing that starting from the 2003-2004 study, it follows all the methodological standards recommended by the Eurostat and the International Association for Time Use Research. Particular emphasis was placed on working time (for-profit and not-for-profit) and free time.

The structure of the daily time budget, developed on the basis of an indicator of the duration of activities per day, changes throughout the human life cycle along with its successive stages and

adopted social roles - from adolescent through adult (parent and employee) to pensioner [GUS 2016]. Each of these stages is characterized by different needs, which are reflected in the type and intensity of activities performed. The time available to an individual during the day is divided into ten groups of activities, i.e. [GUS 2016]:

1. satisfying physiological needs (including sleep, meals, personal hygiene etc.),
2. professional work,
3. learning (at school or university),
4. household chores,
5. voluntary work in organizations,
6. using mass media (e.g. watching TV, listening to the radio),
7. social life (e.g. social meetings, cinema, cultural events),
8. personal passions (e.g. computer and internet use, hobby)
9. participation in sports and recreation,
10. commuting.

In the study of time budget, groups of activities from 6 to 9, i.e. the use of mass media, social life, personal passions, and participation in sports and recreation are assumed to be the activities freely opted for by an individual, i.e. his leisure time (free time). Research shows that free time is getting extended and working time is reduced. In the years 1976-2004 in Poland, the time devoted to professional work during the day decreased from 7h10m down to 6h53m [Kolny 2016].

In subsequent time budget surveys, changes in the free time use by individuals were observed. These changes occur under the influence of various factors that can be divided into technological, demographic, economic and cultural ones. Technological factors are associated with the development of new technologies, especially in the area of communications, new forms of sales or availability of e-services. Demographic factors affecting changes in household time budget include the aging of population, slowing down of natural population increase, and increased life expectancy. The level and sources of income, as well as the prices of goods and services are economic factors affecting the management of free time. In turn, the elevated expectations and changes in consumer preferences and mentality, manifested in the growing importance of qualitative aspects of life, as well as the growing importance of free time, are examples of cultural factors affecting the distribution of time budget [Murawska 2015].

The development and dissemination of new technologies causes a significant increase in the time spent on activities related to computer use. Research conducted in the United States by Mark Aguiar (Princeton University), Mark Bils (University of Rochester) Kerwin K. Charles and Erik Hurst (both from the University of Chicago) demonstrated that young men aged 21-30 showed a significantly greater decrease in the number of hours worked than older men or women. Since 2004, there has been a significant change in activity patterns in the group of young men who devote more and more of their free time to computer games, i.e. recreational use of a computer [Aguira et al. 2017]. It is pointed out that for young men computer games are a kind of luxurious way of spending time and, moreover, for an increasing number of young men this is the main and only activity during the day. In 2015, young men aged 21-30 allocated 5.2 hours a week to computer games, which means an increase by 45% when compared to 2004, while their total leisure time increased by just 4% [Aguira et al. 2017].

Similar conclusions can be drawn from research conducted in Poland by the Central Statistical Office, although comparisons are difficult due to a different methodology used. Considering the average duration of free time activities in Poland, with reference to the years 2003/2004 and 2013 it can be stated that in 10 years this did not change and amounted to 4h39m. A detailed analysis indicates, however, that there have been some quite significant changes in the ways of spending free

time. The time spent on social life and the use of mass media has decreased, while the time for personal passions (in particular for using the computer or the Internet) and participation in sports and recreation increased. In the period between 2013 and 2003/2004, computer use as a form of spending free time by people over 15 y.o. increased by an average of 18 minutes per day.

In 2013 in Poland, young men aged 16-24 living with parents devoted 2h7m daily to games (individual, social or computer) as leisure activity, while with slightly older men, aged 25-44, it was 1h57m. Married men aged 16-44 spent 1h46m on games. Women aged 25-44 played the shortest - 57 minutes. Women aged 16-24 spent 1h06m of their free time on games. At the same time, married women aged 16-44 spent 59 minutes gaming, i.e. 47 minutes less than men of this category [GUS 2016].

Student Ways of Spending Free Time – Study Results

The academic community is a very diverse social group, but the main responsibilities of young people are related to the role of 'student', as appropriate at this phase of life, while the role content seems to most strongly determine the framework of the individual's functioning [Zaniewska 2012]. For a student, free time is the time remaining after satisfying physiological needs (sleep, meals, hygiene) and after fulfilling the duties and obligations arising from the role of a student and a family member. This is the time that a young individual, already emancipated from parental control, has at his disposal. The academic youth can use their free time e.g. for leisure, fun, developing own interests and abilities, activities developing their personality and creative abilities, as well as participation in social life. The value of free time, in the context of young people, is not only related to its functionality, but also has a formative, self-improving context, even when this is not intentional. Along with individual development, the forms of spending and managing leisure time change, and therefore the more developed and mature the subject is, the greater self-improvement value of free time. Modern technologies have greatly influenced the ways and forms of spending free time, especially among young people. Students are a social group that, on the one hand, is a significant driver of the creation of novel leisure activities, and on the other benefits most from all kinds of novelties.

In order to identify the leisure activities of full-time students, surveys were conducted in February of 2018 and of 2020 on a sample of 468 first-year undergraduate students of Economics and Management. The research was carried out by direct survey among students of two academic centres, i.e. Wroclaw University of Economics (Branch in Jelenia Góra) and the University of Szczecin.

Table 1: Respondents by sex and employment status

Specification	Total sample size	2018		2020	
		women	men	women	men
Number of respondents	468	159	108	114	87
Financially dependent on parents	225	99	43	54	29
Financially independent	52	13	13	12	14
Mixed – partial dependence on parents supplemented with own earnings	191	47	52	48	44

Source: own work.

The structure assessment of the academic youth sample according to sex showed that a majority of respondents were women, constituting 60% of the sample in 2018 and 57% in 2020 (Table 1). During the period examined, the structure of student population surveyed changed significantly in terms of employment status. In 2018, more than a half (53.2%) of the surveyed students were fully dependent financially on their parents, 37.1% were dependent on their parents and additionally earned some extra money, and 8% of students were financially independent. In 2020, 41.3%of the total number of surveyed students remained financially dependent on parents (decrease by 11.9 percentage points), those partly dependent on parents and earning extra money made 45.8% (increase by 8.7 percentage

points), while the employed made 12.9% (increase by 4.9 percentage points). In both survey years we observed large differences between genders in terms of employment status. Women students were far more often financially dependent on their parents. In 2018, the percentage of women students dependent on their parents was 62%, and men 40%. In 2020, the proportion of women dependent on parents dropped to 47%, i.e. by 15 percentage points, and the proportion of men dropped by 7 percentage points to reach 33%. The number of full-time students combining studies with work has clearly increased.

The study assumed that free time included such activities as social life and entertainment, participation in sports and recreation, the use of a computer for entertainment, and the use of mass media. The research conducted showed that the students' free time was 6.7 hours on an average weekday in 2018, and 7.4 hours in 2020 (Table 2). The increase in the amount of free time results from the changes in class planning introduced at universities. Increasingly, students only have classes on selected days of the week - usually three days a week. Limitation of the number of study days results, on the one hand, from a change in regulations, i.e. in the Higher Education Law, which set a minimum number of class hours to be 1800, and the number of ECTS (European Credit Transfer System) points at 180. On the other hand, the arrival of students from low-birth-rate years has allowed the accumulation of classes on selected days of the week, as universities have free lecture halls. During weekend days (Saturday, Sunday) in 2018, students had 8.6 hours free, and in 2020 it was 8.7 hours of free time.

During the period analyzed, the structure of students' daily time budget changed. On weekdays, the biggest change was to reduce the time spent on physiological needs (sleep) by 1.3 hours and the study time (contact classes) by 0.4 hours. The time spent working (an average of 1 hour per day) and enjoying social life (increase by 0.4 hours) was extended. The time spent at computer for weekday entertainment increased slightly, i.e. from 2.6 hours in 2018 to 2.8 hours in 2020. On weekend days, the time spent on physiological needs (sleep) decreased by 1.2 hours, and the time for for-profit work increased (by 1 hour). The ways in which students spend their free time have changed only slightly. Students spend their free time mainly using the computer for entertainment (computer games) - 2.6 hours a day, or enjoying social life and entertainment for about 2 hours.

Table 2: Structure of the students' daily time budget in 2018 and 2020 (in hours)

Activity	2018		2020	
	Weekday	Weekend day	Weekday	Weekend day
Physiological needs	8.8	9.7	7.5	8.5
Learning (attending classes)	5.5	1.2	5.1	1.5
Household chores	1.7	1.9	1.6	1.8
Employment (paid work)	1.3	2.5	2.3	3.5
Voluntary work in organizations	0.2	0.1	0	0
Social life and entertainment	1.7	3.2	2.1	3.2
Sports and recreation	0.9	0.9	1.2	1.4
Computer use for entertainment	2.6	2.8	2.7	2.6
Use of mass media	1.5	1.7	1.4	1.5

Source: own work.

However, data on the time spent using a computer for entertainment should be interpreted cautiously, because also phones are increasingly used for entertainment. Mobile phones (smartphones) are great not only for communication purposes, but also for listening to music, watching movies or playing games. Mobile phones have become multifunctional devices. This means that every student can use the telephone for 'all day' entertainment. In fact, students spend much more time on entertainment than the research showed. They admit that while performing various duties or working, they often use their phones for entertainment purposes in the meantime.

When analyzing the leisure activities by gender, significant differences – often resulting from social roles – become apparent. Women much more often than men spend time with their families and do housework (Table 3).

Table 3: Students' forms of spending free time, by sex, in 2018 and 2020

Forms of spending free time	2018		2020	
	F	M	F	M
I take a rest	59%	51%	62%	62%
I catch up on sleep	48%	32%	36%	47%
I read	25%	20%	27%	13%
I listen to music or watch TV	55%	44%	43%	48%
I spend time with my family	69%	47%	71%	49%
I go out	41%	32%	45%	24%
I practice sports	14%	32%	25%	38%
I do household chores (cleaning, DYI)	23%	5%	32%	13%
I play computer games	11%	60%	11%	48%
I learn	14%	10%	14%	15%
I engage in my favourite pastime or hobby	19%	36%	25%	32%

Source: own work.

Comparing the structure of the women's (F) and men's (M) time budgets, it can be observed that both sexes mainly take a rest in their leisure time (62%). With other forms of activity, significant differences were revealed. During their free time, 71% of women spend time with their family, while in the case of men it was 49% (a difference of 22 percentage points). The biggest difference between men and women was observed with the activity of playing computer games. In 2018, as much as 60% of men and only 11% of women indicated this way of spending their free time (a difference of 49 percentage points). In 2020, it was respectively 48% men and 11% women (the difference was 37 percentage points). Importantly, young men significantly reduced their use of computer for entertainment during the period studied, while with women this share has not changed. In their free time, women usually spend time with their families, take a rest, leave the house (go shopping) and listen to music or watch TV. On the other hand, young men usually take a rest, play computer games or catch up with sleep in their free time. More and more students practice sports in their free time. In 2020, 25% of women and 38% of men get involved in sports in their leisure time. Men much more often than women have time for their favourite pastime or hobbies. On the other hand, women more often do housework (cleaning) in their free time - in 2020 this form of leisure activity was indicated by 32% of women and 13% of men. Our research shows that the students' forms of spending free time are determined by their employment status. Students who are fully dependent financially on their parents usually spend their free time with their families, take a rest or listen to music. They devote the least time to household chores (catching up with cleaning, DIY). Students who are financially independent during their free time listen to music, take a rest or play computer games, spending the least time on learning. In turn, students who remain financially dependent on their parents, but also earn extra money in their free time, most often spend time with their families, take a rest or sleep. They spend the least free time on computer games and learning.

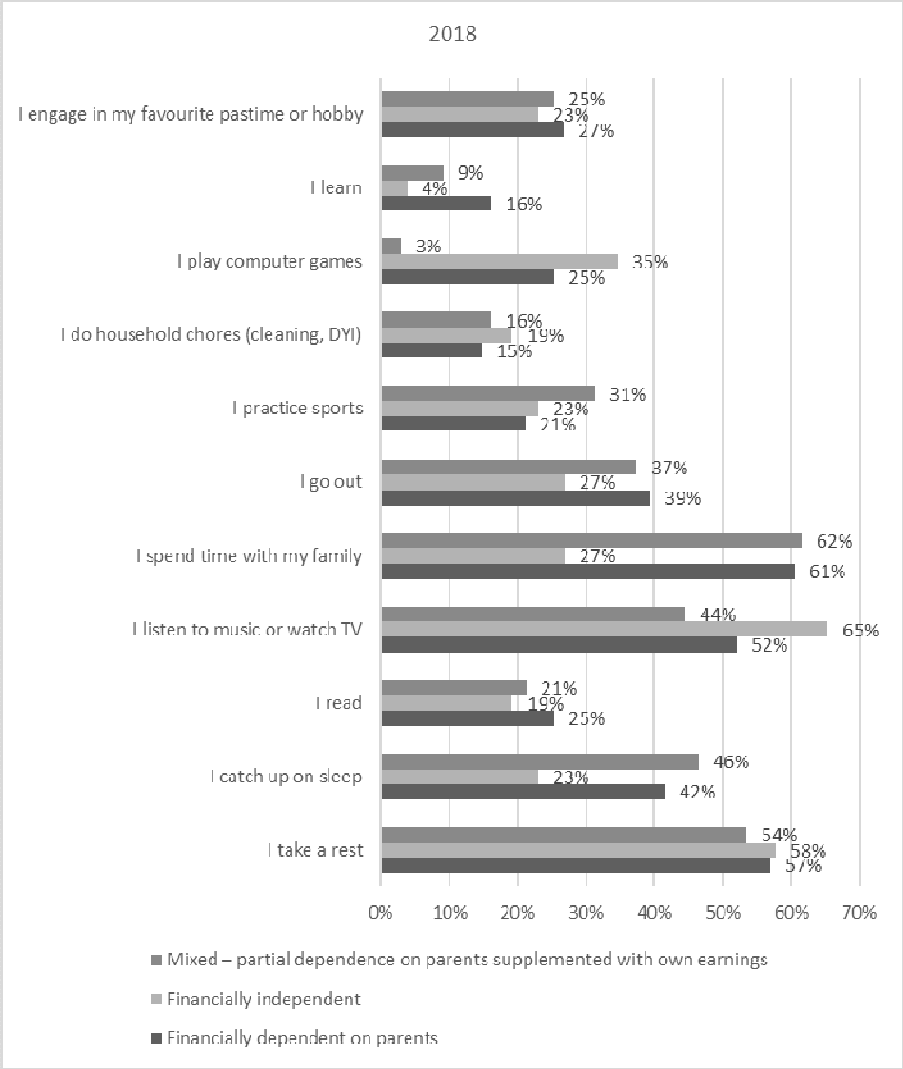
2018
I engage in my favourite pastime or hobby
25%
23%
27%
I learn
9%
4%
16%
I play computer games
3%
35%
25%
I do household chores (cleaning, DYI)
16%
19%
15%
I practice sports
31%
23%
21%
I go out
37%
27%
39%
I spend time with my family
62%
27%
61%
I listen to music or watch TV
44%
65%
52%
I read
21%
19%
25%
I catch up on sleep
46%
23%
42%
I take a rest
54%
58%
57%
0%
10%
20%
30%
40%
50%
60%
70%
Mixed – partial dependence on parents supplemented with own earnings
Financially independent
Financially dependent on parents

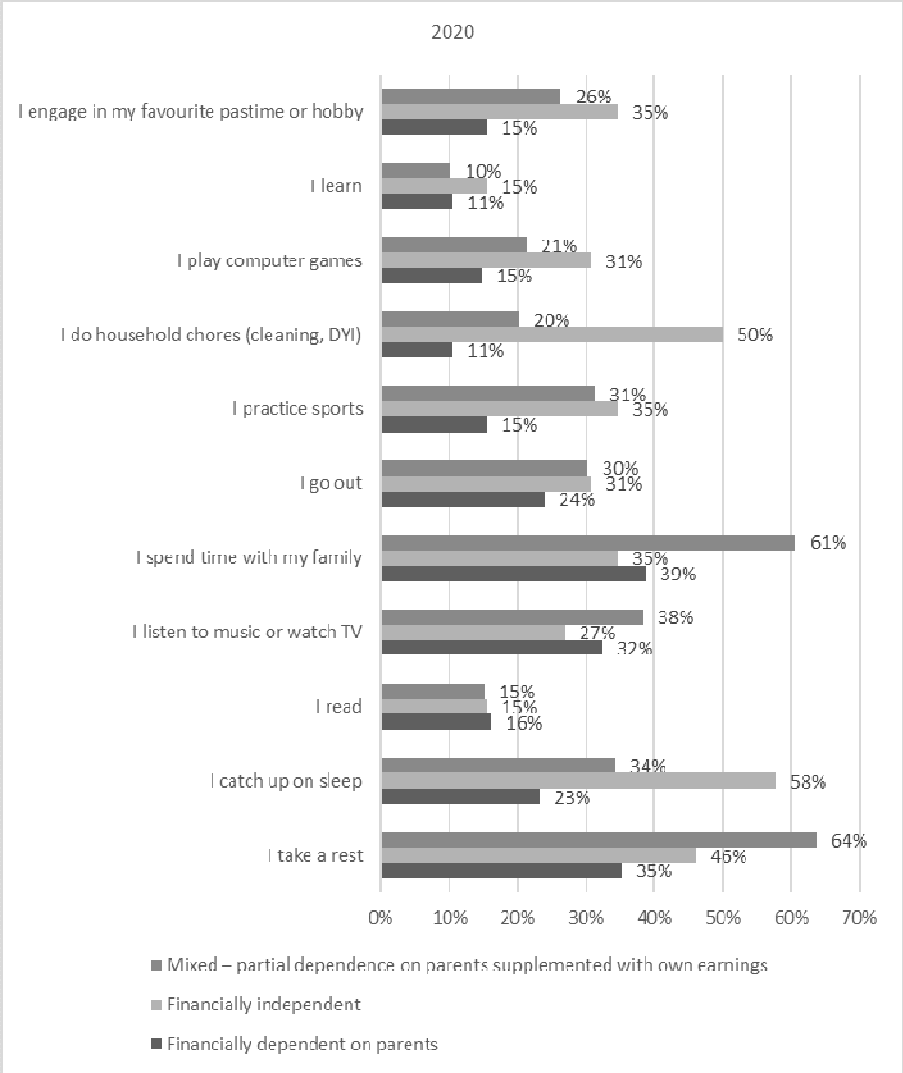

Fig. 1: Students' forms of spending free time, by employment status, in 2018 and 2020 (in %)
Source: own work.

Conclusions

Free time is a very important element of everyday life, and decisions on how to spend it are made directly by individuals. The form of spending free time depends on many factors, among which the most important are individual needs, age, gender, education, behavioural patterns and employment status (financial situation).

The students turned out to be a very diverse social group, so it's impossible to talk about any group-specific way of using leisure time. An analysis of forms of spending free time by gender has shown that leisure activities pursued remain strongly influenced by social stereotypes that determine the division of tasks and social gender roles. In their free time, women more often than men spend time with their families, leave the house (shopping) and clean up (overdue cleaning). Men, in turn, more often catch up with sleep, play computer games or devote time to their favourite pastimes or hobbies.

Students more and more often take up paid work while still studying. In the period examined, this was mainly due to the globally good economic situation as well as to the statutory limitation of the number of class hours.

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The Impact of Innovation on Organizational Process Maturity - Research Concept

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Abstract

The article consists of three parts. The first part covers the characteristics of process maturity, presents a comparison of process mature and process immature organizations, and introduces the models of process maturity. The second part of the study focuses on the definition of innovation and its typology according to the Oslo Manual. The final part includes a proposal for a research model which would verify the phase of the organization's involvement in shaping the process maturity model depending on the type of innovation. The article is an attempt to identify hypotheses and research questions that can be used in potential empirical research.

Keywords: Process Maturity Innovation, Process Maturity Model.

Introduction

In the world of globalization, continuous development and change, enterprises try at all costs to seize the opportunities presented to them and eliminate high uncertainty and high risk. In addition, the technological progress and industrialization strongly affect the way modern organizations are managed. The process of changing methods of management happens on several levels, including structural, work management systems, competences, technologies and organizational procedures as well as key values (Gierszewska and Wawrzyniak, 2001, p.14).

In recent years, the change that has determined the functioning of enterprises is the application of the process thinking paradigm in management sciences. By reorganizing thinking and moving away from linear flows towards optimizing them, a new philosophy and management school was created. The process thinking paradigm assumes a horizontal view of the enterprise as a set of interrelated processes (Hammer and Champy, 1996, pp.45-49). The process approach was implemented in phases (Smith and Fingar, 2007), and their last stage happened in the 1990s. resulted in a departure from the application of revolutionary changes, in favor of evolution, in which the analysis and control of processes in the company, as well as supporting their information systems, played an important role.

It would seem that process management, so intensively implemented and accepted at the beginning of this century, should lose its currency today in favor of other concepts, e.g. two-handed organization or organizational agility. The exact opposite happened, mainly due to the need to perceive the organization through the prism of processes and thus determining its effectiveness and bottlenecks - including organizational ones. Interest in the process approach, in the context of the organization's maturity and level of its innovativeness, seems to be the next stage in the development of this archaic, but still valid, management concept. Therefore, the article presents a research problem that aims to link the stages of process maturity with the kinds (types) of innovations that are directly related to the process approach.

Process Maturity - The Essence of The Issue

Enterprise process maturity is defined in different ways. It depends primarily on whether the approach is one- or multi-dimensional. The vast majority of process maturity models are based on currently functioning enterprises, which are used for the analysis of the level of implementation of process management (Raczyńska, 2017).

In order to determine the level of process maturity in an enterprise, the advancement of implemented process management methods and techniques is assessed. It is key to identify the strengths and weaknesses and classify functional solutions in the area of solutions (Bitkowska, 2009, p 105 and more). Without achieving individual stages of development in process management, it is extremely difficult to achieve a high level of maturity (Bitkowska, 2008).

W.S. Humphrey, the author of the concept of Business Process Maturity, defines it as the degree of identification, management, measurement, control and effectiveness of processes. According to him, enterprises with high process maturity should be proactive, i.e. implement processes in accordance with established procedures and defined objectives (Humphrey, 1987, pp.1-10).

Another definition defines process maturity as a dimension of coverage and proficiency, thanks to which it is possible to compare the effectiveness and efficiency in the context of processes (Rosemann, 2004, p.6). On the other hand, in the Polish literature on the subject one can find the definition offered of P. Grajewski, according to which the process maturity of an enterprise is a certain range within which the organization's processes are formally defined, managed, flexible, measured and effective (Grajewski, 2009, pp.381-388). In addition, the author states that factors affecting maturity result from the desire to constantly improve the organization in the context of processes (Grajewski, 2016, pp.124-125).

The identified features of process maturity in the organization show how a process-oriented enterprise should operate and what behaviours should be eliminated (Kalinowski, 2018). The distinguishing features of process maturity describe maturity models that present ways to develop organizational capacity. In the literature, the most frequently presented models are a) stages-of-growth models, b) stage models and stage theories (Paranto and others, 2003). In the era of growing interest in process maturity models within various organizational areas, it can be concluded from the literature review that the CMM / CMMI and BPMM-OMG models have so far been best described, providing inspiration for the newly emerging ones. In Polish literature, on the other hand, one can find a model authored by, among others, K. Nowosielski, who served as the starting model for further considerations (Bitkowska , 2009,pp.156-157) .

The big advantage of using maturity models is their structured and hierarchical form. Each level of maturity is a defined range of states that should be achieved in a sustainable manner to achieve full maturity. Each subsequent level builds upon the previous one, introducing increasingly more developed and advanced processes to the organizational culture until the organization is capable of self-improvement and continuous development.

Types of Innovations - Process Context

Innovation as a term has not only been very broadly and ambiguously defined, but also widely abused, even in spite of its slightly more negative connotations in the past. Until the mid-nineteenth century, the only people able to envision the applicability of their ideas were the innovators themselves (Zabłocka-Kluczka, 2019, p.18). Apart from the multitude of definitions, due to publication restrictions, a complete and uniform definition of innovation was needed - primarily for statistical and comparative purposes. It was initiated by the OECD as part of the Oslo Manual, in which experts proposed the following definition: “An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations” (OECD, 2008, p.48). The quoted definition of innovation covers a relatively wide range of implementable innovations. However,

in a narrower sense, innovation could be defined as the simultaneous implementation of one or more types of innovation. When creating the above definition, the OECD experts considered the novelty of the implemented "innovation" in a given organization or the fact that it significantly improved the organization's functioning.

The source also described four types of innovations. According to Oslo Manual experts they are (OECD, 2008, p.50):

1. product innovations – "the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics";
2. process innovations - "the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software";
3. organizational innovations - "the implementation of a new organizational method in the firm's business practices, workplace organization or external relations";
4. marketing innovations - "the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing;"

Product innovations can be based on new applications or combinations of existing resources and knowledge. New products may take the form of a product or service that is distinguished to a large extent by individual features or purpose from other products previously manufactured by the enterprise. The changes introduced with new product may be small or involve significant improvements (OECD, 2008, p.50). Process innovations often accompany product innovations. Their goal can be to reduce unit costs of production or delivery, but also to improve the quality of finished products delivered to customers (Kamińska, 2014, p.80). The implementation of process and product innovations requires the high involvement of business participants, in addition, it is a period in which the costs incurred by entrepreneurs increase, which can be demotivating and discouraging for many. However, innovations can also lead to cost reductions by implementing process innovations, leading to staff reduction and the consequent savings. The simultaneous introduction of innovative product solutions may force the company to introduce new organization management methods included in the group of organizational innovations, thanks to which enterprises implement new business practices or operating standards in which the company decides to build a foundation of good practices based on existing knowledge and experience. The last group included in the above typology are marketing innovations. Their goal is to improve the satisfaction of the needs of recipients, entering new markets, or positioning of the product against the competition in completely novel way (OECD, 2008, p.54).

The innovations presented in the next part of this study will be compared with the organizational maturity model of the organization.

Process Maturity Versus Innovation - The Foundations of The Research Process

Innovations are among the six factors mentioned in the subject literature that affect the process maturity of an organization. In addition, J. Sanders and J.L. Lindermann provided evidence that process management can lead to innovations of much greater quality (Sanders and Lindermann, 2014, pp. 335–358). Similarly, De Boer's team specifically names technological innovation as a success factor in pursuing the process maturity of enterprises (De Boer and others, 2015, pp. 908-927). It was also observed in the study of the authors L. Roslyakov and P. Ravesteijn, based on the T test statistics, that the maturity of an enterprise's processes relative to its innovation varies depending on the number of employees in the enterprise. In addition, conclusions have been drawn that say that improved processes and knowledge seem to have a positive impact on creating innovation in organizations (Ravesteijn and others, 2016). A review of the literature revealed that while there are studies on innovation and maturity of business processes, the relationship between them has not been sufficiently studied. Therefore the research project was launched.

The first stage of the research process was the analysis of the literature on the subject. That stage allowed, therefore, to make a general hypothesis according to which: *A higher level of innovation favors achieving higher levels of process maturity.* The main research question posed in the planned empirical research is: *What is the nature of the relationship (positive or negative) between the company's process maturity and innovation?* The model subjected to verification, will be the model of S. Nowosielski, which aptly captures the stages of process involvement in the context of types of innovation, according to the Oslo Manual.

In this approach, the correlation of the following empirical matrix will be examined - Table 1.

Table 1: Summary of S. Nowosielski's process maturity model and types of innovations

Level of process maturity	Name of the level	Type of innovation
Level 0	Lack of process awareness	product innovations; process innovations; organizational innovations; marketing innovations;
Level 1	Awareness of the need for a process approach	
Level 2	Identifying and documenting processes	
Level 3	Measurement and keeping record of process results	
Level 4	Planning and controlling processes	
Level 5	Systematic improvement of processes	
Level 6	Process management	

Source: own study.

In this perspective, a detailed research question arises, whose purpose is to determine how product / process / organizational / marketing innovations affect achieving higher levels of enterprise process maturity? At the same time, determining the impact of the type of innovation on the implementation of the hierarchy of process maturity in the organization becomes a key part of the research.

The research project prepared in this way allows to distinguish five areas of process maturity - Table 2, around which a questionnaire will be prepared, submitted to respondents via the Internet surveying CAWI (Computer Assisted Web Interview) technique.

Table 2: Identified areas for enterprise process maturity

Level of process maturity	Name of the level	Type of innovation
Level 1	Awareness of the need for a process approach	product innovations; process innovations; organizational innovations; marketing innovations;
Level 2	Structuring processes	
Level 3	Implementing processes	
Level 4	Monitoring processes	
Level 5	Systematic improvement of processes	

Source: own study.

However, questions about specific types of innovations will include implementations that are completely new to the organization or significant improvements in products or services. Research concerns both manufacturing companies and services providers, the industry is not relevant in this case. The third stage of the research project is the implementation of research. The collected data will be processed and analyzed which will allow to draw conclusions and recommendations.

Conclusion

The use of a process approach has many benefits for the company. The most important ones include obtaining a uniform description of the company, preparing the company to implement a quality management system according to ISO 9001, as well as to implement a workflow system and manage the company's electronic resources (including documents). Identification and classification of areas for

improvement are also becoming extremely important, allowing for continuous improvement of the operation of one's own enterprise and the improvement of relations with external clients by responding to their needs and reducing the costs of products / services, which will result in increasing the financial result of the enterprise (Bitkowska, 2009, p.22).

What is important from the point of view of a modern organization is an attempt to identify tools supporting process maturity, which certainly include innovation. The article presents initial theses and research assumptions that will be verified during further theoretical and practical work.

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Horizontal and Vertical Dimensions of Trust in Online Advertising. Model Assumptions and Results of Marketing Students Survey in Poland

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Abstract

The program assumptions and areas of expertise of the IBIMA conference provide an opportunity to present the results of research on the assessment of trust in the information included in online advertising. This problem is a kind of cognitive gap in research on categories of trust and research on various areas of marketing, including: relationship marketing, B2C and B2B marketing, online marketing, and marketing communication. The paper presents an excerpt of study results obtained in the course if an original NCN grant of the National Science Center in Poland, titled *Information Asymmetry in On-Line Advertising in the Context of E-Consumer Behavior Manipulation* [2018/29/B/HS4/00563] in 2019. The primary objective of this article is an empirical assessment of Internet users' trust towards information contained in online advertising. The structure of the considerations includes three issues: 1. theoretical context of the problem justification, 2. assumptions of the research model and 3. evaluation and discussion of the results obtained. The conclusion shows the constraints and implications for further research. The source of the analysis are the results of original research done in 2019 on a group of students of the Faculty of Management and Marketing at a university of economics in Poland.

Keywords: Online Marketing, Manipulation, Online Advertising.

Introduction

The context of the theoretical problem justification refers to two basic categories: social trust and advertising as an informative characteristic of a company's marketing offer. Trust is the subject of extensive international research in various scientific disciplines: sociology, psychology, organizational theory, management, and marketing sciences. The problem of trust in advertising, including specifically information which is the essence of a message, is cognitively important, and at the same time it is relatively little recognized in existing scientific research. The main current of research on trust in the fields of sociology and psychology tackles the essential features, conditions and dimensions of social trust. Similarly, in management sciences, including marketing and its particular areas, the scientific discourse concerns the importance of trust for the realization of the organization's market objectives and strategies, relations on B2B and B2C markets, organizational ties, and creating a community around the brand in social media etc. This is clearly a growing trend of research in management sciences. Trust in on-line advertising is a cognitively important and significant problem, yet it has not been included in mainstream trust and advertising research. The main aim of the article is to empirically assess the confidence of Internet users in information included in Internet advertising messages.

The Theoretical Context of Research Problem Justification

The importance of trust in advertising messages is determined by the significant role of advertising in shaping consumers' behavior and influencing their market decisions. In the presentation of the context of theoretical justification, we would like to emphasize the most important aspects that allowed us to create a research model as well as its empirical verification.

Trust is a complex cognitive construct. It is multidimensional. Similarly, its conditions, characteristics, consequences, models and measurement methodologies are numerous. While conducting the narrative on the basis of management sciences, let us emphasize the most important features relevant to the title

issue of the article. The *definiens* of the category of trust relates to a broad and varied approach. It is heterogeneous both within the discipline and, understandably, between the variants of approach. Literature review also leads to such conclusions [Kennig, 2018]

The literature assumes that trust is a feature of the evaluation of interpersonal relations or relations expressed on the "I-object" plane and determines certainty about the future actions of a given person or the properties or states of a given object. Trust is treated as a variable, both situational and relational. It has an individual and a social dimension, taking micro and macro perspectives. It is both a real, concrete category and a completely abstract one, characterized by relations in large and very large social groups, including international ones. Trust in business management is the subject of research in the intra- (work environment) and inter-organizational dimensions (relations between the company and its environment, both in B2C and B2B relations, in the processes of cooperation and coopetition). Trust is the certainty or a specified, high degree of probability of certain expected behavior of another party or of particular declared states of ownership of an object. As such, it eliminates uncertainty, reduces risk and creates the rationale for making a specific, rational or reasonable decision when there is insufficient or even excess of information. Trust reduces uncertainty in mutual relations and facilitates decisions the consequences of which will be revealed in the future. P. Drucker was right when he wrote that modern enterprises are not built on strength, but on trust [Drucker, 1999]. This is why the importance of trust in business relationships is nowadays widely accentuated and, it seems, adopted as a paradigm in management sciences [Morgan, Hunt, 1994].

The category of trust is studied at different levels. In management sciences it is an area of research on management in an organization, HRM, interpersonal relations and relations in systems: superior-subordinate, organizational climate, knowledge management and organizational culture, business relations and cooperation networks in market channels. In marketing, the category of trust occupies an important place in business relationships, research both on the B2C and B2B market, in customer satisfaction and loyalty research. In market research on buyer behaviors, trust is an important variable that explains or mediates between a company's offer and the final purchase decision and consumer satisfaction. It is an important element in valuing offers, focusing on finding relevant information and evaluating each variant of the market behavior process. Trust is a key element of a customer's market lifecycle, and strategies to form customer trust - in each phase of the cycle: acquisition, maintenance and possible loss - are important parts of customer-oriented business strategies. Trust in customer value models is of similar, significant importance, which is a condition of the CLV category itself, the elements determining the buyer's life value and a component of the calculation methods for this category. In relation marketing, the main stream of theoretical studies and empirical research is to identify the importance of trust - including the credibility of relationship partners and participants in the communication - in the interaction, evaluation of the strength of the relationship, its value, and conditions. Trust is an essential element of any basically relational marketing model, based on an evolutionary and subjective approach (e.g. the classic R.M. Morgan and S.D. Hunt's model).

Trust is the level of customer engagement in relations with the company. It is a basic and key condition for the benefit of each customer, both individual and institutional. This is part of the transition from transactional marketing to relationship marketing, based on the category of trust and creating a kind of "community of experiences and expectations". Among the foundations for the creation of such ties, trust is crucial.

This reflection aptly corresponds with the emphasis on the social dimension and the importance of trust in institutions, including the institutions of life and the public sector, in the media, in the culture of trust in the development of social capital on a broad scale [Fukyama, Blomquist, Atkinson &Butcher, Sztompka]. New areas have emerged on the map of research on trust in the last decade, including trust in information and communication technologies [Lippert Swierz, 2005]. This last area, under the conditions of the "fourth industrial revolution" [Schwab, 2016], the digital transformation, and the creation of the "human digital" [Ch. Skinner, 2018] represents a significant challenge for further research.

Trust research accurately emphasizes the importance of the credibility of participants in the communication and relationship. Credibility is treated as an important premise for the multiplication of previous experiences for an a priori assessment of future events and at the same time an opportunity to shape long-term business relationships. Each of these components of trust is important for the presentation of the second pillar of the theoretical justification of the title issue of the article.

Advertising is a mass media form of communication characterizing the company and its product offer, shaping consumer needs and preferences. Quite commonly, at a certain level of generalization, three types of basic functions: informative, persuasive, and competitive, are assigned to advertising. They are the subject of specific tasks: shaping brand awareness, promoting its identity and image, providing consumers with information - arguments for purchasing and choice preferences, creating a community around the brand in social media, and shaping post-purchase experiences, buyer loyalty, and creating long-term relationships. The modern market, with its wealth of product offerings, with excess of demand and supply (that can be described as manipulative supply) shifts the importance of these functions from informational to persuasive and competitive. The latter seems to be still gaining in importance, due to the mechanisms of sectoral competition, globalization and standardization of production. T. Levitt was right claiming that today there is no competition between what companies make but rather what they add to their products in the form of advertising [Levitt, 1969].

Advertising is a transfer of coded information through the media. M. Bruhn, and more broadly the German school of marketing identifies advertising with the medium, treating both categories in an inseparable relationship when writing about *Mediawerbung* (media advertising) [Bruhn 2008, Bruhn 2013]. As such, advertising is information of a specific nature. It is not a complete description of one's offer, but an abbreviation, often incomplete and simplified. This highlights the system of European law in which advertising, due to its information "limitations", does not constitute an offer but is merely an invitation to conclude a contract. Advertising is an expression of encoding the sender's intentions into a form acceptable to the media and economic account requirements. Such a code is USP [Reeves]or a unique value of advertising, expressed in the form of a specific creative strategy, whose basic element is the advertising slogan, the nature of the message and the style of communication. Advertising can, and certainly is, an incomplete, ambiguous, hidden message. Such a message is aptly expressed by a passage from a poem by the Polish poet B. Leśmian: . …*and the words roam and ramble across the sky, and pretend they mean something more than what they mean . . .*

Trust in information can have its affective (emotional) and cognitive dimension. These dimensions are also important elements of the discussion on social trust and the methodology of measuring it in general - they are also critical for the evaluation of information contained in online advertising and the model adopted. These two dimensions of trust are referred to by the assumptions of the strategy of message creation in advertising, the nature of slogans, as rational or emotional on the one hand, and on the other hand - positive and negative. Each of these strategies of creating a message and formulating the character of advertising has a significant impact on the formation of trust. It has specific relevance in different market segments and sectors, and different phases of the market life cycle of a product.

The message may express the asymmetry of information between the advertiser and the addressee. Each of the parties to the marketing communication process may have a separate set of information in terms of quantity and quality. This situation was at the basis of the concept of "information asymmetry" by G. Akerlof, later developed by M. Spence, J. Stieglitz and other researchers [Akerlof, 2015].

The above current of reflection allows us to state that advertising is a kind of information game in which three entities participate: 1) company - broadcaster of the advertisement, 2) consumer (addressee of the advertisement), and 3) media. Each of the participants of the communication process is important in the analysis of the title issue of the article. Their broader analysis is beyond the scope of the paper. We only wish to underline the key issues related to the trust. Research on trust focuses on the nature of the participants' relationships: credibility, historical experiences, identity and image. Such a characteristic refers fully to the analysis of the trust of consumer, as the addressee of the advertisement in relation to its "unique value". This is the first, fundamental dimension of the relationship and at the same time a premise for measuring consumer confidence in the information contained in the advertising message. The link between the two sides of the marketing communication process is a kind of "information interest community". This "community" and the level of identifying the issue includes the media. The reasoning behind this position is as follows. The consumer and the company are the basic participants of the marketing communication process, carried out in the form of advertising through the media. This rationale is reinforced by our position in a slightly different ontological perspective: the company communicates with the market through the media, which, in McLuhan's view, are a type of information: *The medium is the message,* and the modern man is *an extension of the media* [McLuhan, 1962]. Therefore, we treat rust in the information contained in advertising as the basic plane of

the relations and realization of the participants' needs of various nature and configurations, especially in medium and long periods. These needs express themselves and rotate - like a spiral - around the world of interests of each subject of communication, seemingly different values and levels of usefulness, but aiming at a zone of compromise. An important, but naturally not the only link in this "world of interests" is trust towards information. In this configuration, the mechanism of integration and interaction can, with some caution, be compared to the Triple Helix. The category was proposed in the study of the Triple Helix Model Lawton Smith, & Leydesdorff, 2020, Etzkowitz H., Leydesdorff L.,2000]. Trust in information in online advertising initiates the behavior of the addressee of the advertisement. It is a premise for the evaluation of individual sources of information (forms and types of online advertising), as well as, in a slightly broader perspective, the evaluation of the credibility of the sender of the message and the credibility of the medium (Figure 1). The key platform for the formation of the trust is their interdependence. In the case of online advertising, it is clear and obvious. They are expressed in the common field of interest, their interconnection and conditionality. That community expresses the integration and convergence of action. We explain them from the perspective of the goals of each entity - a participant in the marketing communication, emphasizing the connection of two constructions: credibility and trust. As it seems, an important argument in the discussion could be the modern convention of perceiving categories of trust, which was presented by R.J. Lewicki, D.J. McAlister, and R.J. Bies. We adopt their position in clear opposition to the traditional current of research, which treated trust as the opposite of mistrust in a linear system, i.e. being two poles of the same category - the probability of a certain state of relations occurring in the future. The concept of Lewicki, McAlister and Bies [1998] is fundamentally different. It rightly assumes that contemporary conditions of communication, development of means of social communication mean a multitude of relations, a multitude of connections and interactions, together with a wide set of various conditions, often emergencies. An important role in forming trust in relations is played by context in every dimension: psychological, historical, cultural, technical, social, and economic. Each of these elements can be analyzed in different aspects, but this statement about the multiplicity of connections, including informative relations and the importance of media conditions for the formation of a certain level of trust in relations between the company, the sender of the advertisement, the addressee-consumer (Internet user) seems to be sufficient. Instead of the classic mainstream question: "Do I trust?" and the antinomy of "trust - mistrust" (lack of trust) in the new approach, forming trust can be expressed by the metaphor of concentric, wave-shaped circles of communication (following the example of a HUB model) and the question of how trust is built up in the relationships of participants in communication through the media in a horizontal and vertical arrangement. This approach is also an argument for analyzing the problem of e-consumer confidence in the advertising broadcast by the company in a three-dimensional perspective, including the medium of transmission of the advertising message.

An indispensable premise for the effective functioning of a company in the competitive structures of the modern market is to reach a potential customer and provide them with a package of information about the advantages of the promoted product (in all its concentric circles - T. Levitt) and benefits associated with its purchase in comparison with the utility set offered by competitors. Through advertising and other instruments of integrated marketing communication, the company creates needs and preferences, encourages purchases, promotes its identity and image, and pursues its other goals in different time horizons. From the point of view of the article's objective, we would like emphasize that the essential function, a specific mission of communication is seen in ensuring a constant, informative presence of the company on the market - in the awareness of potential buyers, media, and events. The contemporary world of the media, the world of the Internet and the development of information and communication technologies together with their important feature, which is non-synchronicity and multidimensional communication, entitle us to identify such a function.

The importance of advertising for the consumer, as the addressee of the advertisement is multidimensional and determined by different perspectives. The adopted profile of the article and the research issue provide a prerequisite to emphasizing two aspects.

First of all, advertising has an educational function in a broad sense: it provides information about the product, its properties and attributes, conditions of use, attractiveness in relation to competitive ways of satisfying the need, but it also constitutes a source of information about the advertiser: its identity,

mission, history, market position, attitude to important challenges from local communities, stakeholders, the environment (e.g. CSR, business ethics, climate change, etc.) and forms of its involvement [Sanak-Kosmowska, 2018].

Secondly, we stress the completely new role of the consumer in the process of market communication in the conditions of the development of the Internet, information and communication technologies, the digital transformation of all areas of social and economic life, the development of digital society, and the creation of the "digital human" [Skinner, 2018]. The traditional model of one-to-many communication replaces the model of communication in a hypermedia computer environment, with the main many-to-many formula [Hoffman, Novak, 1996]. The addressee of the advertisement is first of all an Internet user with an extensive network of informational contacts, crossing the borders of market segments, industries, sectors, time, cultures, and countries. The global reach of the Internet has translated into a global range of communication and a multitude of relations in communication between the company and the market. This environment has created a new type of recipient of the advertisement, the network user, namely, a com-sumer - the recipient who consumes information and who simultaneously creates it. A recipient entering broadly and deeply into on-line communication, interactions, looking for relevant information (including in order to solve purchasing dilemmas) and willingly shaping it by their own opinions, modifications of the evaluations expressed in forums, in social media among brand fans, revealing the desire to integrate groups and micro-communities around a specific problem, including the problem shown in on-line advertising [Wiktor, 2016]. The opinions of Internet users published online must be taken into account by the advertisers affected by the issue, assessment, or information. The form of such a relationship is to consult on the brand, its credibility, but also to comment on it online, which makes online communication vertical.

The opinions of Internet users become an important platform for two-way modification of the advertising message: they enhance or negate it, thereby forming a level of trust. They also become a key element of the research model for the title issue of the article. They allow to explain the two adopted dimensions of research on trust in advertising. The first, horizontal one concerned communication in a traditional environment, explained by a linear, as it were, horizontal flow of information in either a one-to-one or one-to-many formula. The second, vertical dimension describes the mechanism of the formation of trust in the hypermedia digital environment (Fig. 1).

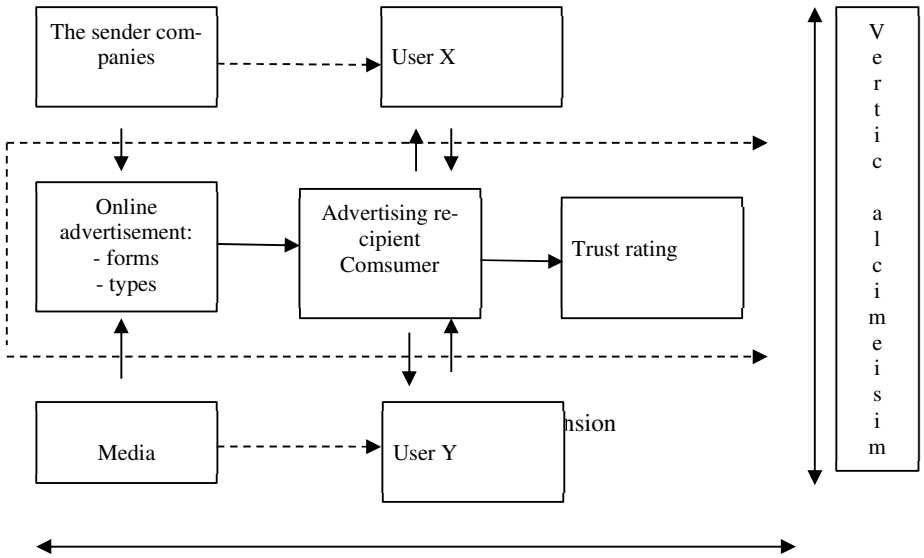

Fig. 1: Horizontal and vertical dimensions of trust in online advertising. Source: own research

Opinions, interactions, multiplicity of relations in "many-to-many" online communication results in the fact that the trust of a particular addressee in the information provided via advertising is a result of

many different conditions, including opinions and comments of Internet users and information published by them online. This may be an element characterizing the "second helix" in the perspective of the triple helix model.

The third subject in the study of trust towards on-line advertising was the media. The media play a special role in the advertising transmission. On the one hand, it constitutes information in itself: *medium is the messenger* [McLuhan, 1969]. On the other hand, the media are a bridge through which advertising reaches the chosen audience and through which all media functions of marketing communication are realized: informative, persuasive and competitive. In doing so, they ensure a continuous, informative presence of the company in the media space of social communication. This expresses the basic functions of mass media: transmission and publicity [McQuail,2010]. The important role of the media in advertising is aptly explained by the "publicity model". Their own autonomous function becomes to attract attention and keep it constant, satisfying the sender of the message. The role of the media is not limited to providing marketing information to broadcasters. It also expresses itself in the pursuit of its own goals, often at the expense of media competing for viewers, users, listeners, readers, for their contact time, needs (information and entertainment, opinions, comments) and preferences. This reflection is related to the creation of an attractive image and marketing of the media, concern for maintaining certain standards of functioning, credibility, image and social trust. In this current of reflection, we emphasize an important element, namely, the differentiation between intra-media analysis and intra-media analysis. It is important to analyze the problem of trust. Individual media, including detailed forms and tools of on-line advertising (e.g. websites, company marketing director's blog, personalized newsletter, mailing, brand profiles in social media) may have a different image and create a different level of trust in the information transmitted by each of them. These elements, focused around one's own interests, can express features of a third helix. Combining the horizontal and vertical dimensions of the problem analysis is also important for research on trust in online advertising.

Model Assumptions, Methodology and Characteristics of The Research Group

The theoretical framework of the problem presented above allowed us to indicate the dimensions in which the assessment of trust in advertising could be analyzed. The assumptions of our own simplified test model are shown in Figure 2.

The model is based on the assumption that the following factors have a significant impact on the assessment of e-consumers' confidence in information contained in advertising:

1. The digital competence of the Internet users was assume to be expressed as an index of answers to questions relating to the frequency and manner of using the Internet, the degree of professionalism in relation to websites, online platforms and knowledge in the area of online advertising and marketing, e.g. knowledge of the mechanisms of cookies, retargeting, etc. It was assumed that the higher the digital competences of the respondents, the lower their declared trust in advertising will be. This thesis corresponded with the horizontal dimension of communication and at the same time trust in advertising, based on the knowledge and digital competences of the respondents.

2. The way of perceiving an advertisement represented by an Internet user, including the assessment of forms of advertising and its types. The examined construct was reduced to three dimensions: negative, objective and positive. It was assumed that a positive perception of an advertisement influences the high rating of trust in advertising, and a negative one lowers the declared trust in online advertising. This element of the model reflects the vertical dimension of trust towards advertising.

3. The evaluation of the "informationality" of advertising is a construct relating to the content of advertising. In particular, the construct referred to the subjective evaluation of the comprehensibility and concreteness of the advertisement and its adjustment to the needs of the Internet user. In this proposal, the horizontal dimension of trust in the assessment of the "informational" nature of advertising became more apparent again influenced by "many-to-many" communication. According

to the authors' hypothesis, the higher the informational rating, the higher the level of trust in advertising was.

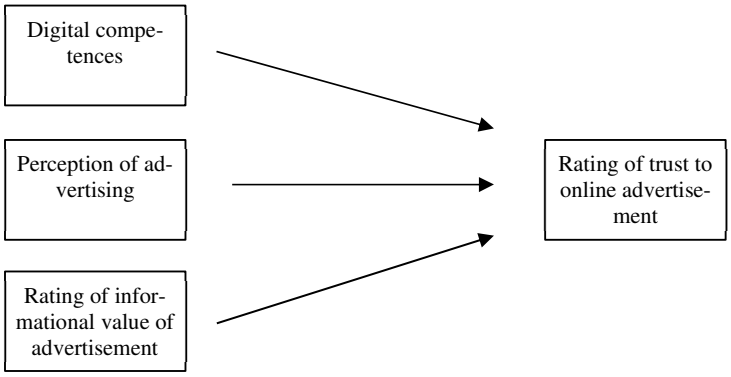

Fig. 2: Research model.Source: own research

The research results presented in this part of the article are part of the NCN grant: *Asymmetry of information in online advertising and manipulation of e-consumer behavior* [2018/29/B/HS4/00563], carried out in the years 2019-2020 in the Department of Marketing, University of Economics in Krakow. The research was a pilot study primarily performing the functions of substantive and methodological verification of the research tool [Bryman, 2008]. An important element of the study, despite its pilot nature, was the initial assessment of two dimensions of trust in online advertising: horizontal and vertical. The identification of this problem was made possible by the construction of the research model and its verification in the course of own research.

The study (May 2019) involved 138 students of the Cracow University of Economics, studying economics and business. Participation in the survey was voluntary. The online version of the survey was conducted using the Google Forms tool. Filling out the form was encouraged by teachers and students using social networking sites, especially informal discussion groups on Facebook. The students were able to complete the survey at any time and in any place. They could also stop answering at any time by canceling the survey. The time of filling in the questionnaires was not controlled, however, experience shows that it took less than 15 minutes to complete it. Table 1 shows the characteristics of the study group. The study involved 109 women and 29 men. The selection of the samples was purposeful. The respondents were dominated by persons aged 18-25.

Table 1: Demographic characteristics of the students

Selected characteristics of the students		**Online research**	
Total		138	100%
Sex	Female	109	79%
	Male	29	21%
	No answer/" Rather not tell"	0	0%

Selected characteristics of the students		**Online research**	
Age	18-25	132	96%
	26-35	6	4%
	No answer/" Rather not tell"	0	0%

Source: Source: own research

Evaluation and Discussion of Results

The starting point for the analysis of the obtained results was the operationalization of the dependent variable expressing trust towards online advertising. The variable distribution is shown in Figure 3. The studied variable ranged from 8 (minimum) to 32 (maximum). The average score of 23.35, standard deviation 3.97.

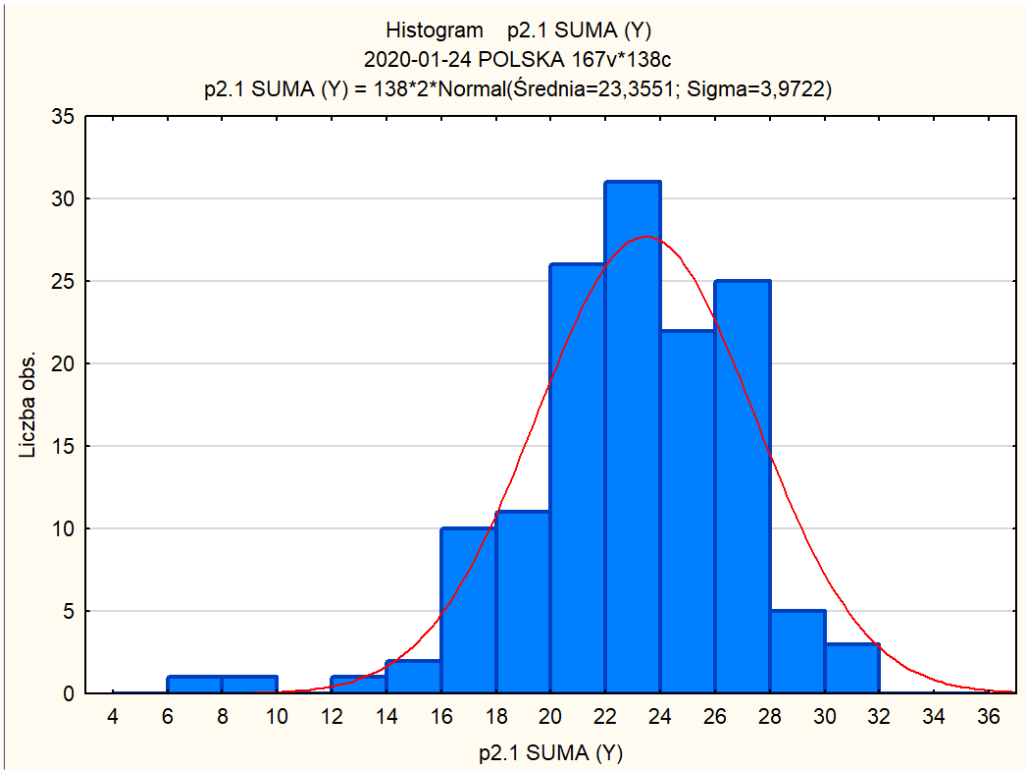

Fig. 3: Distribution of the dependent variable expressing confidence in online advertising.

Source: own research (N=138).

Table 2 presents the distribution of the examined dependent variables: evaluation of information matching the needs of Internet users (P2a), concretization and comprehensibility of the content of advertisements (P2b), digital competence (K1), and the ways of perceiving the advertising: negative (K3a), objective (K3b) and positive (K3c).

Table 2: Distributions of independent variables. Source: own research (N=138).

Variable	Descriptive statistics (2020-01-24 POLAND)				
	Valid N	Mean	Minimum	Maximum	St. Dev
Adapting to the needs (P2a)	138	0.000000	-1.97554	2.835524	1.000000
Informa-tiveness of advertising (P2b)	138	0.000000	-2.73266	2.420923	1.000000
Digital com-petence (K1)	138	0.782610	0.45833	1.000000	0.133267
Negative perception of advertis-ing (K3a)	138	0.000000	-1.66471	2.594427	1.000000
Objective perception of advertis-ing (K3b)	138	0.000000	-2.56490	1.677828	1.000000
Positive perception of advertis-ing (K3c)	138	0.000000	-2.17709	2.664485	1.000000

In the first stage of statistical analysis carried out with Statistica software, the correlation between individual independent variables and the dependent variable was analyzed. Detailed results have been shown in Table 3.

Table 3: Correlation analysis of the variables examined. Source: Source: own research (N=138).

Variable	Correlations (2020-01-24 POLAND) Marked as correlates are significant with p < .05,000 N = 138 (Missing data was removed case by case)
	Confidence in online advertising (Y)
Adapting to the needs (P2a)	0.195787

Informativeness of advertising (P2b)	-0.254766
Digital competence (K1)	-0.064548
Negative perception of advertising (K3a)	-0.093895
Objective perception of advertising (K3b)	0.485992
Positive perception of advertising (K3c)	-0.341535

The results obtained allow for the analysis of individual relationships between the dependent variables and the independent variable. The relationships between matching the content of the advertising to the needs of the Internet users and an objective and positive perception of the advertising were statistically significant. Analyzing the variables under study in an individual way, it is possible to confirm the negative correlation between the informational function of advertising and trust assessment (-0.255, $p<0.05$) and the negative correlation between positive perception of advertising and trust (-0.341, $p<0.05$). In the light of the results obtained, it can be concluded that the more objective the perception of advertising is, the higher the trust rating (0.486, $p<0.05$).

In the further part of the study, a multiple regression analysis was carried out, allowing to capture the total effect of the examined variables on the independent variable (Table 4). After the reduction of insignificant coefficients, the cumulative effect of the three dependent variables was confirmed. The hypothesis regarding the level of digital competence (K1) of Internet users has been confirmed. The subjective assessment of trust towards online advertising decreases as they grow. At the same time, this may indicate the importance of the vertical dimension of trust. High digital competence allows respondents to communicate freely on the web, including in social media, to critically assess all types of information, including advertising and its distribution in different online communication channels. In addition, the more objective and neutral the perception of information presented in online advertising (K3b) is, the higher the confidence in it. Surprisingly, a positive evaluation of advertising content has the opposite effect: the more positive the evaluation, the lower the confidence in online advertising was.

Table 4: Multiple regression analysis.

N=138	Summary of the dependent variable regression: P2.1 SUM (Y) (2020-01-24 POLAND) R = .55623525 R 2 = .30939766 correct. R2= .29393641 F(3.134)=20.011 p					
	b*	St. dev. with b*	b	St. dev. with b	t(134)	p
Constant term			27.84199	1.742741	15.97597	0.000000
Digital competence (K1)	-0.192352	0.073711	-5.73327	2.197040	-2.60955	0.010097

Objective perception of advertising (K3b)	0.457831	0.077254	1.81858	0.306864	5.92634	0.000000
Positive perception of advertising (K3c)	-0.218072	0.075978	-0.86622	0.301796	-2.87022	0.004768

Source: own research (N=138).

The assumptions of the studied model were met. First, the assumption of residual normality was fulfilled. A residual normality chart is shown in Fig. 4.

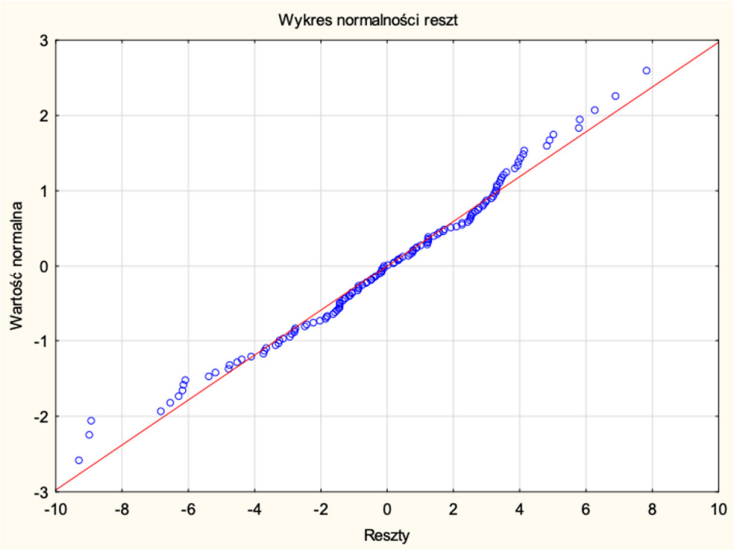

Fig. 4: Residual normality chart for the research model.

Source: own research (N=138).

On the basis of the statistical analysis, it can be concluded that the tested model also meets the homoscedicity conditions, and therefore has a constant variance of the random component for individual values of the independent variable (Fig. 5).

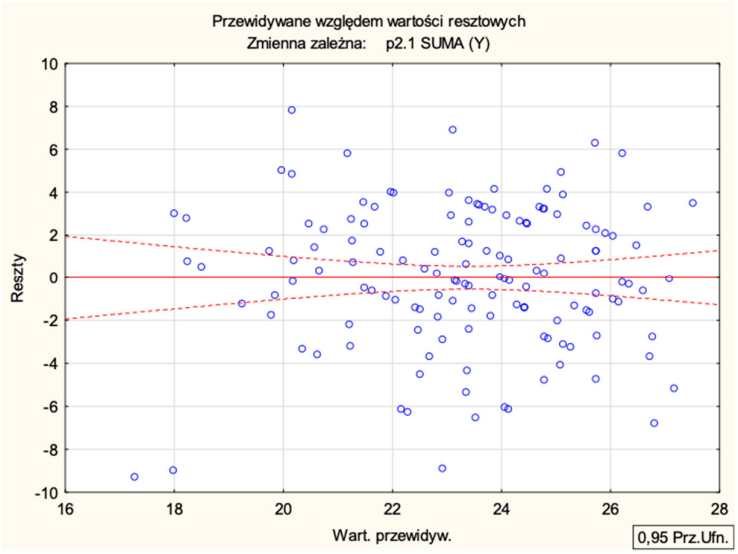

Fig. 5: Homoscedicity of the residuals for the model under examination.

Source: Source: own research (N=138).

The residuals, for both high and low ratings of trust towards online advertising, have a similar dispersion around the regression line. The assumption of homoscedicity was therefore also fulfilled.

In the light of the results obtained and the statistical analysis carried out, the relationship between the level of digital competence and perception of advertising and trust towards online advertising in both dimensions: horizontal and vertical was confirmed. As a result of the multiple regression analysis, the dependent variables relating to the evaluation of the content of the advertising, and thus the evaluation of its informative character and its adjustment to needs, were reduced (Fig. 6). The relationship between the level of digital competence and trust has been confirmed. The higher the competence, the less trust in the content presented in online advertisements was observed. An important explanation for such results is the specificity of online and many-to-many communication on top of the importance of the vertical dimension in forming trust towards online information. This dimension, which is the activity of Internet users creating and sharing content, especially in the social media environments, clearly enriches and modifies the traditional dimension of analysis and assessment of trust in information on a horizontal level, between the participants of the marketing communication: the company and the consumer in a specific online media environment.

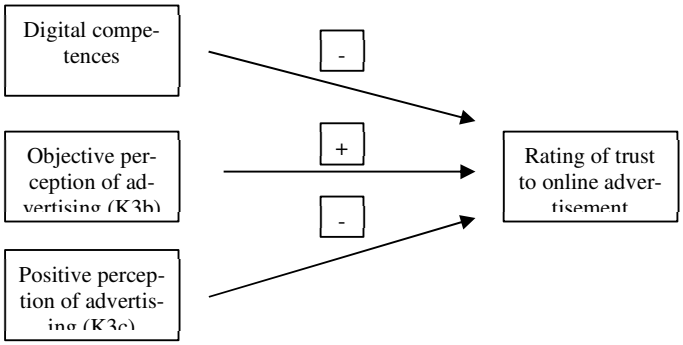

Fig. 6: Verified model of trust towards online advertising

Source: own research.

Limitations of the Research and Implications for Further Research

The limitations of the outlines studies result from their pilot character, the size of the research sample, the targeted selection of participants and the limitations of the structure of elements included in the model. The research was preliminary and exploratory. However, it brought some interesting results, both cognitive and methodical, which are a starting point for wider research. The experience obtained will be used in their design, highlighting several issues. First, we recognize that the index of digital competence requires further verification. Attempts to standardize and objectify it should be made. Secondly, we stress that the model adopted for the pilot study does not take into account all the factors influencing the assessment of the credibility of online advertising and trust in its specific features, forms and ways of organization on the web. Further research should take into account such variables as the assessment of the sender's intentions, the type and content of the message, the characteristics of the various "environments" of online communication, user search strategies (push and pull), the strength of influence of other Internet users, psychological variables of users' personalities, individual differences, which can significantly affect, and, according to pilot studies, do affect the level of trust in online advertising. Certainly, the research should also cover other consumer groups, niches and market segments with different characteristics that are relevant to the creation of target markets.

The presented issues are part of the research on contemporary marketing, wherein a significant development trend is determined by digitalization and internationalization. The problem addressed, its significance and openness in the scientific sense are an incentive to continue research on trust in online advertising on interdisciplinary and, in the long run, international teams. Such premises, combined with a specific methodological standard, can produce valuable cognitive results that will become a significant contribution to the development of marketing science, online advertising and e-consumer market behavior.

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Basic Determinants Affecting the Understanding of The Concept of Responsible Socio-Economic Development

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Abstract

The idea of responsible socio-economic development represents one of the most interesting concepts formed on the basis of past experiences and observations of both the economic sciences and the economic practice. The paper presents selected dilemmas related to the understanding of the concept, set in the context of the evolutionary progress of theories of socio-economic development. The authors placed emphasis on selected determinants which are deemed as fundamental for this particular approach to civilizational progress.

Keywords: Responsible Socio-Economic Development, Determinants Of Economic Development

Classification JEL: B1, O1, Q00

Introduction

The concept of responsible socio-economic development is representative of the modern set of approaches to complex processes and functional transformations of contemporary societies and the associated economic phenomena initiated in the 20th century. This trend has always been at the centre of modern economic thought, from the early precursor work of R. Cantillon and A. Smith, through the classical school of economics (D. Ricardo, T. Malthus and J.S. Mill), down to their spiritual successors (K. Marks). They also constituted an important part of the input generated by the Older and the Younger Historical Schools of economic thought and of the postulates of the Veblen's institutional economics. Lastly, they were also employed – in a slightly modified form of formal mathematical models of economic growth – by the subjectivism and marginalism trends of economic thought, particularly the neoclassical economics. [Stankiewicz, 2007, Landreth & Colander, 2005] Modern economic literature in its entirety seems to provide such models in great abundance. [Krelle, 1985]

This study places focus on the concept of responsible socio-economic development. The attribute of 'responsible' provides an explicit definition of correlations between the various elements, both objective and adopted. Objective elements can be exemplified by such notions as the availability of economic resources or the existing barriers to growth. Adopted elements, on the other hand, are represented by such notions as values, measures, states, or principles. Thus, the attribute of 'responsible' should be interpreted in relation to an external point of reference. In this sense, the realisation of responsible development shall be a derivative of such relations. This allows us to place the concept in contrast to the ideas of sustainable development or durable development, where attributes of development are related directly to internal qualities of a strategy. Thus, the concept of

responsible development seems to contain much more axiological elements compared to other ideas and approaches to socio-economic development.

This study is aimed at identifying basic determinants that impact the understanding of the notion of responsible development. This is by no means directed towards verification of any specific theses or hypotheses. It is these authors' belief that it may be much more useful, at least at the present stage of studies in the area, to focus our efforts on appropriate formulation of research questions. Such an approach would not only help attain a more precise definition of responsible socio-economic development, but also reduce the amount of information noise. The latter factor has already distorted the course of yet another fascinating concept of the late 20th century, namely: the idea of *Sustainable Development*. In effect, too much energy was placed on terminological disputes rather than methodical realisation of socio-economic development strategies as such. It may also be useful to note that this type of explanatory approach has already been emphasised in other realms of study, such as modern physics and cosmology, and was also found of value in such a notionally and conceptually advanced discipline as mathematics.

The Notion of Responsible Development

The notion of responsible development, as one of the new postulates originated in the late 20th century along with such concepts as *Sustainable Development*, sustainability, integrated development and durable development, was coined in response to the following:

- the apparent inadequacy of the existing 'philosophies' of socio-economic development;
- the negative consequences of economic transformations, such as deterioration of natural environment, income inequalities or rapid pauperisation of whole social strata;
- new challenges of civilizational progress, such as the rise of the information society and the associated development of knowledge-based economy.

The concept of responsible development introduces yet another important aspect, namely: transition from knowledge to wisdom. Knowledge represents an ordered set of information subordinated to certain verification procedures, but devoid of criteria other than those substantiated by scientific evidence. Thus, knowledge provides us with the ability to act effectively and efficiently, but fails to provide other justifications for our actions, such as the legitimacy, justice or any other axiological 'virtue' of our deeds. The concept of responsible development introduces such axiological evaluations as part of its characteristics. To put it in another way, the concept of responsible development takes account of not only the effectiveness and efficiency of strategy realisation, but also of its axiological qualities.

What elements should then be included in the concept of responsible development? Several factors seem of particular importance in this context, namely (Fig, 1):

- potential for effective realisation of specific goals and undertakings;
- internally cohesive representation of the vision of development, ensuring a proportionate representation of each of the following dimensions: economic, social, environmental, institutional, and psychological;
- effects of strategy realisation, perceived from the viewpoint of the entire megasystem: man-society-economy-natural environment-symbolic environment (i.e. broadly defined culture);
- economic effectiveness, based on standard indices derived from cost-benefit analyses;
- socio-psychological consequences introduced by the postulated realisation of development, particularly their humanistic dimensions;
- the advisability of individual actions, with anticipation of their various effects;
- resource feasibility, referring to the suitability and availability of economic resources, both in terms of their volume and quality;
- social responsibility founded on a humanistic dimension of approach to development processes, i.e. with ample representation of such humanistic criteria as the limitation of labour market exclusion and

poverty, and coupled with corporate social responsibility, proper social and interpersonal communication, democratisation of societies, and the spirit of tolerance;
- civilizational responsibility, expressed in a suitable choice of development 'philosophy' (progress, prosperity, human dignity, etc.), but also in respecting the legacy of the past, particularly the most valuable elements of human cultural capital;
- intra-generational justice, including the right of relative equality among men in their pursuit of individual strategies of development and their effects;
- inter-generational justice, which in this context relates to observance of interests and objectives of future generations as part of all present decisions, with the view of ensuring preservation (if not betterment) of both the living conditions and the economic resources available to future generations.

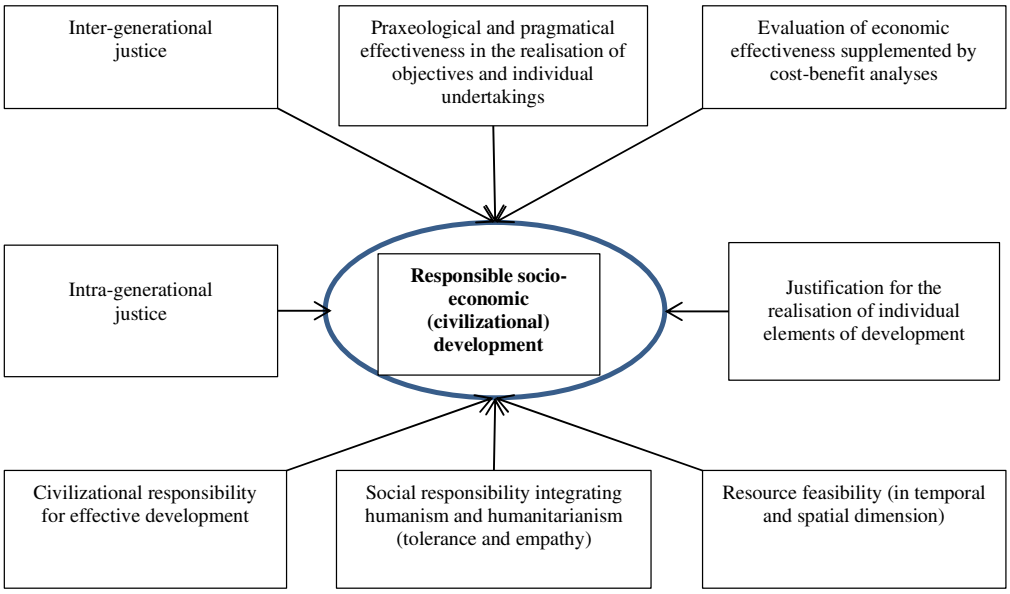

Fig.1: Elements of responsible socio-economic development

As shown in Fig. 1 above, elements constituting the essence of responsible socio-economic development can be arranged into the following groups of functional determinants (layers of influence):

- praxeological-functional determinants describing the feasibility of a given strategy of development;
- economic-functional determinants describing the required level of economic effectiveness for the realisation of a given strategy of development;
- axiological-monitoring determinants related to effective application of principles of inter-and intra-generational justice;
- general civilizational determinants associated with various dimensions and aspects of responsibility within the framework of a given strategy of development (Fig. 2).

The above groups of determinants define the means and the methods available for the realisation of strategies of socio-economic development, both at their design phase and in the course of their subsequent implementation. At the same time, they serve an important role as part of the so-called 'adjustment and perfection monitoring'. This type of monitoring can be a particularly potent determinant in the course of practical implementation of strategies of responsible socio-economic development. In contrast to the concepts of durable and sustainable development, responsible development is not limited to the study of objective limits of such development, but also to supplement it with a suitable set of socio-axiological determinants (which can also be perceived in philosophical, religious or humanistic terms) deemed acceptable by the majority of societies or

communities affected by the planned change. This represents both the essence and the success condition of responsible socio-economic development.

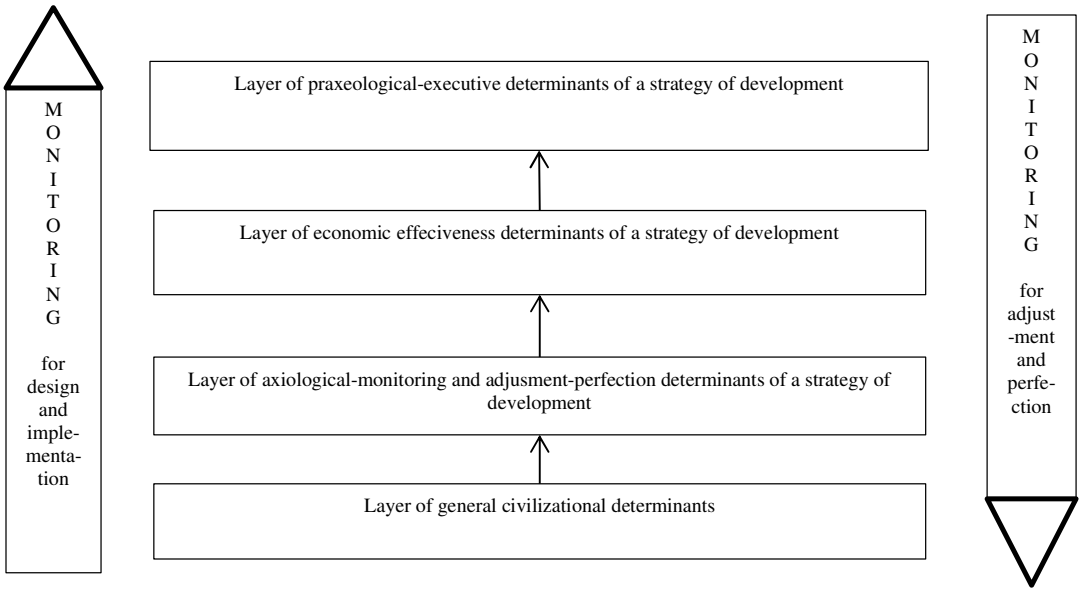

Fig. 2: Layers of functional determinants of responsible socio-economic development

Projects of development strategies and the associated choices should be founded on a strong basis of general civilizational determinants, to help determine the principal directions and attributes of the required course of socio-economic development. These may include, for example: (1) respect for human dignity, (2) respect for human freedom, or (3) satisfaction of the fundamental human needs. These should be supplemented by (4) the right of a just share in benefits brought about by scientific, technical and social progress and development, but also (5) any duties and responsibilities associated with such rights, including responsibility for change. Civilizational determinants also include (6) reduction of the various forms of exclusion, (7) providing access to reliable and verifiable information, and (8) proper access to various forms of interpersonal and social communication. Human relations should be based on (9) tolerance and (10) respect for cultural identity and diversity. Many more determinants can be identified in this context, but they all share the same fundament of broadly defined humanism, empathy and mutual respect.

The layer of axiological-monitoring and adjustment-perfection determinants is a direct descendant of the underlying layer of general civilizational determinants. This layer is associated with the use of various controlled actions designed to emphasise and support the intended direction of socio-economic (civilizational) changes and transitions. For instance, when the focus is placed on protection of the natural environment, the strategy should include identification, creation and implementation of mechanisms that offer proper rationalization of the associated burden placed upon natural resources as well as effective protection of the most susceptible elements of the affected ecosystems. When the emphasis is placed on reinforcing civic engagement and participation, other mechanisms are needed, such as implementation of a mature system of power based on democratic rule, effective protection against power abuse, and incessant education in democracy-related issues. When unrestrained access to information becomes the central determinant of general civilizational development in information societies, the transition should be supported not only by the development of proper technical infrastructure, but also by suitable training of communication and IT skills, and by propagation of civic sense of responsibility for our words.
One characteristic trait common for both layers is their reliance on not only knowledge, but also – and most of all – wisdom. While knowledge is a decisive factor in generating ideas for possible plans of action, it is wisdom that helps us discern the most suitable solutions. A good illustration of this

process is the determination of paths for government intervention taken for the purpose of stabilising the economic situation on domestic markets. In such a scenario, knowledge (in the form of Keynesian economics) offers numerous solutions, from state investment in communication and transportation infrastructure, through increased support for municipal housing and public amenities, investment in environment protection infrastructure, income redistribution (e.g. in the form of guaranteed income), social support, development of gratuitous health care service systems, up to such broad-scale projects as space exploration and militarisation of economy. Each of the above solutions can prove effective in creating aggregated demand, but their effects on individuals and on the civilizational progress as such can be radically different. This is the point where wisdom should take on a dominant role to help us determine the most suitable strategy.

Another layer – that of determinants related to the economic effectiveness of strategies of responsible development – is activated after the conclusive set of viable solutions has been defined. This layer introduces a number of economic effectiveness criteria, i.e. instruments allowing for determination of relations between the expected effects of a given undertaking and the economic outlays required for their realisation. Effectiveness represents one of the elementary categories in economic sciences. As such, it can be employed not only for strictly bookkeeping purposes, but also as a criterion for the evaluation of various forms of economic activities. Modern literature provides us with varied approaches to the concept of effectiveness (such as economic, technical, x-effectiveness), both in static and dynamic perspectives. [Kozun-Cieslak, 2013, Ziolko, 2018] The inclusion of economic effectiveness criteria offers one significant benefit, namely: the optimal (and thus rational) utilisation of the available economic resources for the realisation of individual activities and strategic objectives. In the world of scarce resources, this fact alone makes them indispensable.

The next layer – the one related to praxeological and pragmatic aspects that crown the effective realisation of a strategy of responsible socio-economic development – can be regarded as the ultimate test. If the objectives of a given strategy or any of the associated activities (including their intended effects) cannot possibly be brought to successful conclusion, all the remaining layers become mere verbal expressions of intent or plans of action. It is the praxeological dimension that yields the ultimate attribute of viability to our strategies.

Thus, the recommended sequence in the analyses of determinants of responsible socio-economic development should extend in two directions: monitoring for design and implementation, and monitoring for adjustment and perfection. As such, it can be seen as a joint expression of both knowledge and wisdom.

Responsible Development Relative to Other Ideas of Social and Economic Development – A Retrospective Analysis

Effective realisation of the idea of responsible development does not in any way negate the previous expertise gathered in relation to previous forms and approaches to development strategies carried out in the past. On the contrary. On the one hand, it represents an attempt at integrating some of the best (most advantageous) elements of past strategies. On the other hand, it may serve to eliminate those elements of past strategies that no longer fit the present or future requirements of socio-economic or environmental character.

For it must be remembered that:

- strategies of stagnant preservation have allowed our ancestors to gradually adjust to changes in their environment and to better understand its nature. Colloquial knowledge and, subsequently, scientific knowledge have served them as a fundament for future changes, in the course of a process referred to by Karl Marx as the law of constant development of the productive force;
- strategies of extensive development, typical for changes associated with the industrial revolution, have brought radical changes to economic processes and structures, accompanied by rapid urbanisation, more effective realisation of material human needs (as a result of productivity increase), and serving as fundament for future strategies;

- strategies of intensive development emerged as a resultant of positive outcomes from past development and in response to barriers to such development, as part of the attempt of eliminating them.

The need to formulate new 'philosophies' of socio-economic development is – without doubt – directly related to the emergence of new phenomena and of the increasingly more pronounced cognitive, predicative and decision-making inadequacies observed in the previous theories of growth (development). Most of the past theories have proved to be of little use, despite their elegant formal expressions and their suitability for logical processing. The crisis of the modern theory of economic growth is clearly the product of the authors' fascination with mathematics and quantitative methods, and is further aggravated by the growing discord between the realities of complex socio-economic phenomena and their model-based representations. This can be perceived in terms of a conflict between the non-linear character of socio-economic phenomena and the decidedly linear nature of their formal (model) representations.

Precursors and founders of the early concepts of socio-economic development, such as R. Cantillon, A. Smith, D. Ricardo or T. Malthus, placed their emphasis upon discovery of the real causes of phenomena and their courses rather than the elegance of their formal presentation. [Mayer, 1996] This is fairly evident in such examples as the theory of secular stagnation by D. Ricardo, the Malthusian theory, and – most specifically – in K. Marx' concept of socio-economic formations. This trend seems to place emphasis on driving forces, mechanisms, and dynamics of their operation.

The Older and the Younger Historical Schools sought to identify similarities and contrasts in historic development with the view of separating stages in socio-economic development. Such a static approach can be useful if we try to derive directions of future socio-economic development on the basis of past experiences and their delayed effects. This represents a sort of a comparative analysis of time-delayed feedback, and offers potential for avoiding at least some of the judgement errors and excessive outlays associated with socio-economic development.

Later concepts, such as Veblen's institutionalism, the Schumpeterian approach and neo-institutionalism, have brought some important modifications to the modern theories of socio-economic development, namely:

- interest in the study of barriers to development (for instance, in forms employed by G. Myrdal's concept of cumulative causation and the 'vicious circle of poverty) along with analyses of collapse (catastrophic) risks to civilizational progress, both those of endo- and exogenous character, as exemplified by T. Veblen's concept of civilizational changes;
- exposure of some of the endogenous forces that fuel the socio-economic development processes, such as innovations in the formal approach postulated by J. Schumpeter and continued by P. Romer;
- inclusion, in the best spirit of the German Historical School, of entirely new categories of determinants of socio-economic development, such as environmental, cultural, or information-related aspects.

Without doubt, the above approaches to the subject at hand can also be seen as directly stimulating the development of global modelling in the 1960s and 1970s (such as the WORLD modelling framework) and, consequently, as a fundament for modern holistic concepts of socio-economic development, such as sustainable, integrated or responsible development.

The idea of responsible socio-economic development is construed on the basis of the most impactful elements of the earlier concepts. As such, it utilises knowledge associated with evaluations of process effectiveness and efficiency, identification of barriers and limitations to development, and the study of resource-related determinants of development. It is also strongly influenced by modern disputes on social or even philosophical and axiological aspects of civilizational changes, particularly those related to reduction of civilizational expansion (the Spaceship Earth concept supported by Sagan and Boulding in opposition to the 'cowboy economy' worldview) [Boulding, 1992, Sagan, 2018] or even the *zero-growth model* of growth. [Mesarovic & Pestel, 1977] With such solid fundaments, the

concept of responsible socio-economic development can be seen in terms of a skilful integration of knowledge and wisdom.

Conclusions

The notion of responsible development is utilised in two separate contexts. On the one hand, it represents a substantiated and logically correct concept that describes social and economic changes required to attain desired effects, objectives or states. In this context, the idea represents an integration of past knowledge with wisdom (defined here as effective utilisation of knowledge). The above expectations can also be used to describe any other substantiated and logically correct idea of development and the associated strategies of realisation.

On the other hand, the concept may be used in a purely ideological or political fashion, reducing the idea of responsible development to a narrow path determined by political vision, which does not necessarily correspond with effective civilizational progress or positive change.[1]

The above considerations lead to a conclusion that the effective identification of the notion and the attributes of responsible socio-economic development should integrate the study of general civilizational and axiological determinants of growth with analyses of determinants related to effectivity and praxis.

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[1] Such a purely declarative approach can be exemplified by the governmental „*Strategy for Responsible Development*", prepared in 2016, which fails to address any of the key conditions of 'genuinely' responsible development. The document is a collection of political catchphrases, often contradicting and disconnected, presented with no analytical evidence, no resource feasibility studies, and no vision of gaining social approval. See: https://www.miir.gov.pl/strony/strategia-na-rzecz-odpowiedzialnego-rozwoju/ [accessed: 5.5.2019]

Assessment of The Impact of The Selected Factors on The Sense of Security in Public Passenger Transport on The Example of The Capital City of Warsaw

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Abstract

The purpose of the article is to analyse and assess the factors affecting the sense of security in public passenger transport on the example of the capital city of Warsaw. The factors were defined on the basis of the standard "PN-EN 13816: 2004 Transport. Logistics and services. Public passenger transport. Definitions, goals and measurements regarding the quality of services" and data collected by the Municipal Transport Authority in Warsaw. A survey was conducted on this basis, the results of which were used to model the level of the sense of security using artificial neural networks (ANN). ANN, among many criteria, enabled the assessment of the key factors having impact on the level of the sense of security.

Keywords: Sense of Security, Public Transport, Neural Modelling

Introduction

Economic development directly impacts the development of mobility. Along with the progress of technology, the mobility of the society has increased and will continue to do so. This issue applies to both freight and passenger transport, including public passenger transport. At the same time, the challenges related to this issue are growing and changing, including the quality of transport services, their efficiency, economy, impact on the environment, or the sense of security in public passenger transport.

The sense of security is one of the key factors determining the extent of using transport services, including public transport. Safety, according to Maslow's hierarchy of needs [1], right after physiological needs, is a fundamental human need. Many studies in the field of psychology have shown that without a sense of security, a human being would not be able to function normally in the longer term.

The sense of security is a very subjective feeling; therefore, an attempt to assess this factor is a difficult process. Depending on various groups of criteria or characteristics that affect the sense of security, this sense is perceived and assessed differently. As a rule, there is no linear correlation between the individual criteria affecting the level of this sense, because it often changes over time. Therefore, it was assumed that the main research problem is the analysis and assessment of factors affecting the sense of security in public passenger transport on the example of the capital city of Warsaw. The factors were defined on the basis of the standard "PN-EN 13816: 2004 Transport. Logistics and services. Public passenger transport. Definitions, goals and measurements regarding the quality of services: and data collected by the Municipal Transport Authority in Warsaw [7]. A survey was conducted on this basis, the results of which were used to model the level of the sense of security using artificial neural networks (ANN). ANN, among many criteria, enabled the assessment of the key factors exerting influence on the level of the sense of security. The purpose of the article is to use artificial neural networks to model the level of the sense of security based on the collected information.

The status of the issue

In the literature, one can find numerous studies related to the quality, technology and the sense of security in public passenger transport [6], [10], [12]. The sense of security during a journey using collective public transport is one of the main requirements posed by the passengers [3].

Analysing the available literature, one can notice a variety of factors taken into consideration when assessing the safety of public transport. Xiaomeng Shi et al. defined the safety of public passenger transport on the example of the subway as: preventing passengers from injury, crowdedness on platforms and on trains, safe and quick exit from the subway [18]. According to [10] the quality of public transport is perceived, among others, as passenger and baggage safety on board, safety while waiting at a bus stop, short journey duration or service availability.

In turn, Torbjørn Rundmo and Trond Nordfjærn have proved in their research that the priority of safety and sensitivity to risk are the most important factors influencing decisions to select public transport as a means of transport [16].

The quality of public collective transport services includes a set of criteria in accordance with the standard PN-EN 13816: 2004P Transport. Logistics and services. Public passenger transport. Definitions, goals and measurements regarding the quality of services, Polish Committee for Standardization, Warsaw 2004, were divided into 8 following categories [11]:

- availability: range of the public transport service offered in geographical units, time units, frequency and type of transport,
- accessibility: access to the public transport system, including connections with other means of transport,
- information: systematic provision of knowledge about the public transport system in order to assist in the planning and implementation of travel,
- time: time issues related to the planning and implementation of travel,
- customer care: elements of the service in order to meet the passenger's requirements,
- comfort: elements of the service in order to ensure that travellers have relaxation and rest,
- security: a sense of personal protection for passengers.
- environmental impact: environmental impact resulting from the provision of the service.

In relation to the quality of transport services, three quality categories can be distinguished: postulated by users, offered by carriers and executed by service providers [15]. All the exemplary categories have a direct impact on the perception of security in the collective public transport.

Artificial neural networks are one of many artificial intelligence algorithms. The application of this type of tools applies to solving non-linear tasks. With the development of technology, the use of artificial intelligence in various market segments is also developing [4], [17]. ANNs find application in, among others, the assessment of the economic efficiency of vehicle exploitation [8], the assessment of transport services [14], or in measuring innovative potential [5]. The next example of another artificial intelligence algorithm is the use of fuzzy logic to assess the quality of public transport [2], or the use of machine learning to plan and predict visits in hospital research.

The analysis of the literature allows for stating that it is possible to use ANN to assess the impact of the selected factors on the level of the sense of security.

Method and the Research Subject

The sense of safety in public collective transport was examined in the area of the capital city of Warsaw. During the study, all available means of public transport offered by the Municipal Transport Authority in Warsaw were taken into consideration, i.e. buses, trams, underground, fast public transport and

suburban rail. The research took into account only those factors which result from the above-mentioned standards and data collected by the Municipal Transport Authority in Warsaw. The set of factors used in modelling the assessment of the sense of security is presented in table. 1.

Table. 1. The set of factors used in modelling the assessment of the sense of security

No.	Identification of factors	Names of factors	Permitted factor value
1	O_{km}	Accessibility of public transport	1-5
2	D_{km}	Accessibility of public transport	1-5
3	I_{km}	Information about public transport	1-5
4	T_{tm}	Duration of urban public transport	1-5
5	J_{tk}	Customer care	1-5
6	K_{pkm}	Comfort in public transport	1-5
7	W_{otm}	Impact on the environment of urban public transport	1-5
8	Z_{pp}	Behaviour of the driver	1-5
9	P_{st}	Technical condition of the vehicle	1-5
10	K_{sp}	Procedure of ticket inspections	1-5
11	S_{st}	Technical condition of the stops	1-5
12	A_{st}	Transport means breakdown	0-1
13	D_{st}	Transport means devastation	0-1
14	W_k	Accident/Collision	0-1
15	Z_{rkm}	Halting public transport for other reasons	0-1
16	Cz_{pkm}	Frequency of commuting by public transport	1-5
17	$Bezp_{ptp}$	A sense of security in public transport	1-5

Source: the author's own elaboration

The scale of the assessment of individual factors was defined as follows:

- 1-5 - where 1 means very poor, 5 means very good,
- 0-1 - where 0 means no event, 1 means the occurrence of an event.

Questionnaire surveys were conducted for such defined factors between 15 September and 31 October 2019. The questionnaire consists of 17 questions. 258 surveys were collected. This way, a total of 4386 responses were collected, which were used to model the assessment of the sense of security in public collective transport using artificial neural networks.

Neural Modelling

While creating a neural network, all factors were used table. 1, and were divided into quantitative input signals (factors 1-16) and quantitative output signal i.e. $Bezp_{ptp}$. Examples of collected data based on surveys used in the neural network learning process are presented in table. 2.

Table. 2. Sample data used in the process of neural network learning

No.	O_{km}	D_{km}	I_{km}	T_{tm}	J_{tk}	K_{pkm}	W_{otm}	Z_{pp}	P_{st}	K_{sp}	S_{st}	A_{st}	D_{st}	W_k	Z_{rkm}	Cz_{pkm}	$Bezp_{ptp}$
1	3	2	3	3	4	3	4	5	4	3	2	1	0	0	1	3	3
2	4	3	4	3	4	3	4	4	4	4	4	1	1	0	0	1	4
3	4	4	4	3	3	3	3	4	5	3	3	0	0	0	0	2	3
4	2	3	2	2	2	2	3	4	5	1	2	0	0	0	0	1	1
5	4	3	3	3	2	3	3	5	5	4	3	0	0	0	0	3	3
6	5	5	5	2	4	4	4	5	5	2	4	0	0	0	0	3	4
7	3	3	2	3	3	2	3	4	5	1	5	0	1	0	0	3	4
8	4	3	3	2	2	1	3	1	2	1	2	1	0	0	1	4	2
9	3	3	2	2	2	2	5	3	3	4	5	0	0	0	0	3	4
10	4	5	4	4	3	4	3	3	4	3	4	0	0	0	0	5	4
11	4	4	3	5	2	5	4	5	5	1	3	0	0	0	0	3	4
12	4	3	5	2	2	2	3	5	5	4	2	1	0	0	0	3	3
13	4	4	2	4	2	2	5	5	4	3	2	0	0	0	1	3	4
14	3	5	3	1	3	3	3	5	5	1	3	1	0	0	1	3	3

Source: the author's own elaboration

With the use of the results obtained by, among others [8], [9], [13], [14] scientific papers, a *Multilayer Perceptron* was used together with learning algorithms of: conjugate gradients; the fastest fall and BFGS *(Broyden - Fletcher - Goldfarb - Shanno)*. The division of the data set into parts is adopted in the neural modelling:

- 80% - training set used to modify weights,
- 10% - test set used for ongoing monitoring of the learning process,
- 10% - validation set used for assessing the quality of the network after completion of the learning process.

After determining the input signals, output signal and network parameters, the learning process was conducted on a neural network, using the Statistica 13.3 computer program. Examples of its results are presented in table. 3.

Table. 3. Sample results of the neural network learning process

ID	Network name	Quality of learning	Testing Quality	Validation quality	Learning algorithm	Hidden activation	Output activation
1	MLP 16-22-1	0.991908	0.968173	0.908724	BFGS 118	Exponential	Tanh
2	MLP 16-29-1	0.917600	0.781902	0.589081	BFGS 53	Logistic	Tanh
3	MLP 16-19-1	0.915607	0.881879	0.770698	BFGS 49	Tanh	Exponential
4	MLP 16-22-1	0.975012	0.874080	0.706106	BFGS 64	Tanh	Exponential
5	MLP 16-6-1	0.909922	0.842092	0.644993	BFGS 93	Logistic	Linear
6	MLP 16-12-1	0.934763	0.896350	0.739260	BFGS 52	Tanh	Linear
7	MLP 16-11-1	0.980496	0.797617	0.776693	BFGS 73	Exponential	Tanh
8	MLP 16-39-1	0.971528	0.833009	0.731826	BFGS 75	Exponential	Exponential

Source: the author's own elaboration

The structure of the best neural network took the form of MLP 16-22-1, which means 16 neurons in the input layer, 22 neurons in the hidden layer and 1 neuron in the output layer (fig. 1).

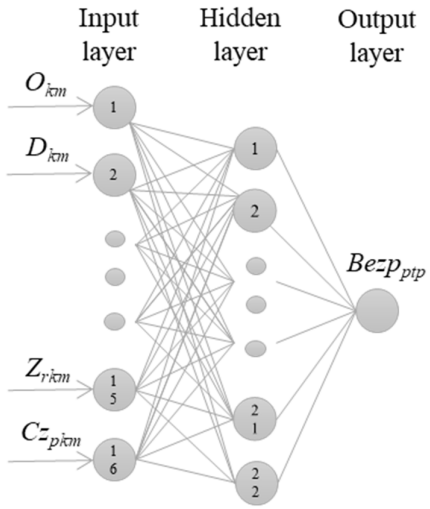

Fig. 1. The structure of the best neural network created MLP 16-22-1

Validation of the neural network and calculation results

In table. 3 the learning quality of MLP 16-22-1 network was estimated at about 99% probability of indicating the correct answer, i.e. the adopted measure of the sense of security in public passenger transport. Testing quality - at the level of 97% and validation quality - at the level of 91%. The best learning algorithm turned out to be the algorithm BFGS 118. The positive learning result of the neural network is demonstrated, among others in the learning graph (fig. 2). It shows that the best network structure was found in the 118th cycle; the share of incorrect answers was 9% and the error was estimated at 0.0023.

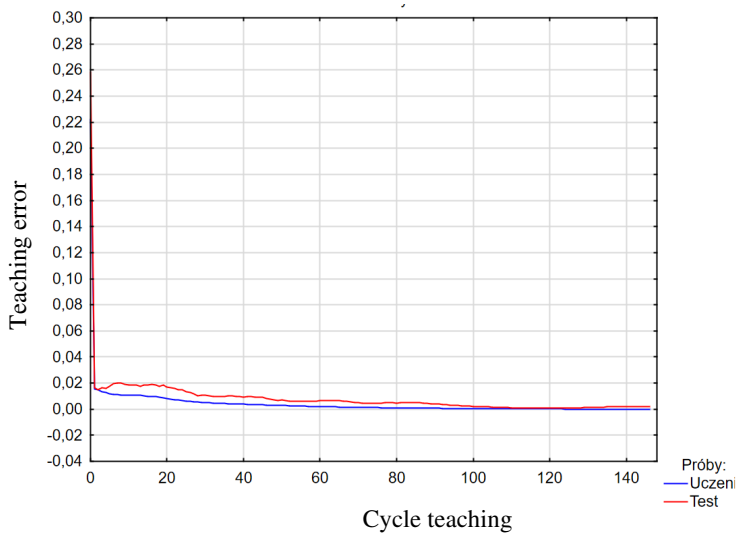

Fig. 2. Learning outcomes of the neural network MLP 16-22-1

Also the course of the scatter changes, set to fig. 3, indicates a positive learning outcome of the network.

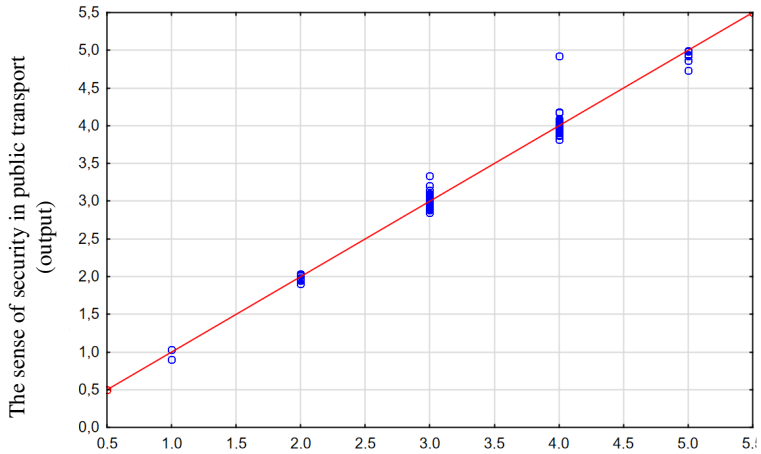

Fig. 3. The scatter of the dependent variable of the neural network MLP 16-22-1

The results of the calculations presented on fig. 4 show the dispersion between the predicted value of the sense of security (Y axis, the result of the calculation in the network during learning) and its actual value (X axis). The visible concentration of the scatter value near the straight line is the desired result of model calculations.

A global sensitivity analysis was performed for all neural network models presented in table. 3 which consisted in checking how the network error behaves when input signals are modified. In this calculation, the input signal values are replaced by the average of this signal from the training set. After providing such modified input data, the network error was checked. If the error has increased significantly, it means that the network is very sensitive to the signal.
Global sensitivity analysis for created neural networks reflects the impact of individual network input variables on the output signal (table. 4).

Table. 4. Global sensitivity analysis for created neural networks

	D_{st}	Z_{rkm}	K_{pkm}	J_{tk}	K_{sp}	T_{tm}	Z_{pp}	S_{st}	A_{st}	O_{km}	W_{otm}	P_{st}	I_{km}	D_{km}	W_k	Cz_{pkm}
MLP 16-22-1	36.46	63.60	**54.57**	**43.95**	43.28	**42.10**	31.30	33.65	23.42	34.60	21.21	19.47	16.75	19.66	8.39	1.459
MLP 16-29-1	3.40	6.03	**2.40**	**2.21**	2.11	**2.57**	2.56	1.80	3.29	1.60	1.97	1.72	2.62	2.04	1.86	1.553
MLP 16-19-1	2.44	2.84	**3.01**	**3.88**	4.01	**3.49**	1.97	6.89	4.87	1.60	2.96	1.16	3.74	1.71	1.48	1.088
MLP 16-22-1	19.39	10.64	**9.95**	**6.59**	7.76	**5.55**	7.16	7.01	7.61	5.28	3.67	7.22	5.48	3.62	2.12	1.777
MLP 16-6-1	3.54	2.34	**3.41**	**2.58**	2.28	**1.68**	2.68	3.03	5.20	2.82	5.10	1.66	2.00	1.56	1.51	1.090
MLP 16-12-1	2.93	4.21	**3.69**	**1.72**	3.26	**3.52**	2.62	3.28	3.71	1.96	3.24	1.16	2.38	2.14	1.43	1.187
MLP 16-11-1	15.96	19.05	**7.00**	**10.86**	6.95	**8.63**	8.45	12.18	6.98	7.81	4.41	7.89	8.68	4.24	5.05	1.603
MLP 16-39-1	58.50	9.17	**7.55**	**7.40**	7.45	**7.92**	15.67	3.86	13.89	11.36	9.44	9.35	6.08	3.19	1.63	1.882
Average	17.82	14.734	11.445	9.898	9.639	9.431	9.052	8.961	8.622	8.378	6.498	6.204	5.967	4.769	2.935	1.455

Source: the author's own elaboration

Considering only the factors resulting from the above standards, the greatest impact on the sense of security in public passenger transport is exerted by:

- K_{pkm} - travel comfort in public transport,
- J_{tk} - customer care,
- T_{tm} - duration of city transport.

In fig. 4 the results of the tests carried out for the factors mentioned above and the sense of security in public passenger transport are presented.

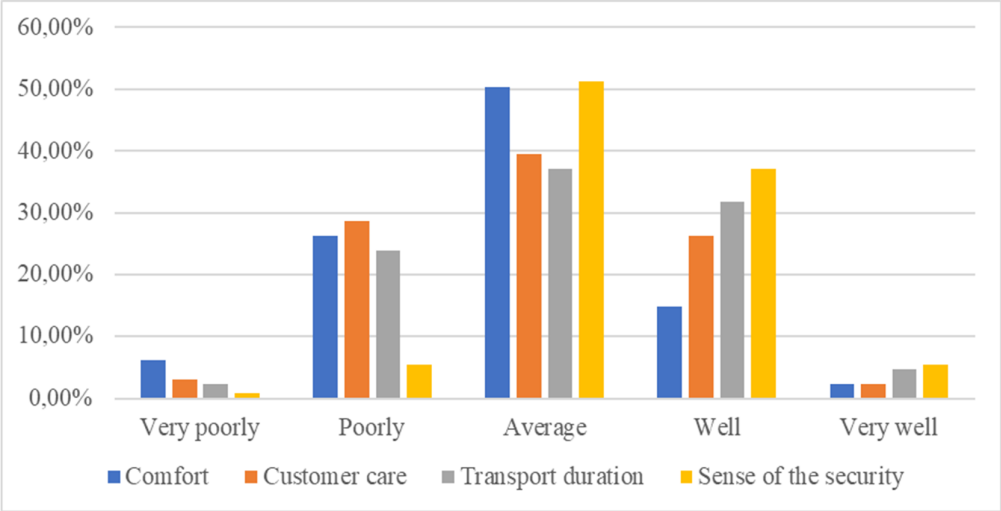

Fig. 4. The results of the tests for the factors: travel comfort, customer care, transport duration and sense of security

From the author's proprietary research it can be concluded that the factors mentioned above strongly influence the assessment of the sense of security. The results obtained are numerically comparable in the groups of assessments and the relationship between the level of the factors mentioned above with the sense of security is visible. The sensitivity analysis for the created neural networks (table. 4) and the conducted author's own studies (fig. 4) confirm the strong impact of the factors mentioned above for the sense of security. Therefore, in the remainder of the article, only the factors mentioned above were subjected to modelling.

Based on the selected neural network MLP 16-22-1 (table. 3), trends of changes in the level of the sense of security were shown when changing the factors mentioned above. These factors were raised by +1 in the first attempt and raised by +2 in the second attempt. Sample data used to model the level of the sense of security with modified factors is presented in table. 5.

Table. 5. Sample data used to model the level of the sense of security with modified factors

No.	O_{km}	D_{km}	I_{km}	T_{tm}	J_{tk}	K_{pkm}	T_{tm}	J_{tk}	K_{pkm}	W_{otm}	Z_{pp}	P_{st}	K_{sp}	S_{st}	A_{st}	D_{st}	W_k	Z_{rkm}	Cz_{pkm}
				+1			*+2*												
1	3	2	3	4	5	4	5	5	5	4	5	4	3	2	1	0	0	1	3
2	4	3	4	4	5	4	5	5	5	4	4	4	4	4	1	1	0	0	1
3	4	4	4	4	4	4	5	5	5	3	4	5	3	3	0	0	0	0	2
4	2	3	2	4	3	3	5	4	4	3	4	5	1	2	0	0	0	0	1

5	4	3	3	4	3	4	5	4	5	3	5	5	4	3	0	0	0	0	3
6	5	5	5	3	5	5	4	5	5	4	5	5	2	4	0	0	0	0	3
7	3	3	2	4	4	3	5	5	4	3	4	5	1	5	0	1	0	0	3
8	4	3	3	3	3	2	4	4	3	3	1	2	1	2	1	0	0	1	4
9	3	3	2	3	3	3	4	4	4	5	3	3	4	5	0	0	0	0	3
10	4	5	4	5	4	5	5	4	5	3	3	4	3	4	0	0	0	0	5
11	4	4	3	5	3	5	5	4	5	4	5	5	1	3	0	0	0	0	3
12	4	3	5	3	3	3	4	4	4	3	5	5	4	2	1	0	0	0	3
13	4	4	2	5	3	3	5	4	4	5	5	4	3	2	0	0	0	1	3
14	3	5	3	2	4	4	3	4	5	3	5	5	1	3	1	0	0	1	3

The data mentioned above was introduced into the selected neural network and sample results were presented in table. 6 The description of individual columns should be understood as:

Survey data - level of the sense of security indicated by respondents

- ANN - the level of the sense of security reflected by the selected neural network MLP 16-22-1,
- ANN +1 - the level of the sense of security reflected by the selected neural network MLP 16-22-1 with increased selected factors, i.e. T_{tm}, J_{tk}, K_{pkm} *by level +1,*
- ANN +2 - the level of the sense of security reflected by the selected neural network MLP 16-22-1 with increased selected factors, i.e. T_{tm}, J_{tk}, K_{pkm} *by level +2.*

Table. 6. Sample results modelling the level of the sense of security using the MLP 16-22-1 neural network

No.	Questionnaire data	ANN	ANN+1	ANN+2
1	3	2.97	3.54	4.28
2	4	3.95	4.93	5.00
3	3	3.05	3.12	4.15
4	1	0.90	1.01	1.00
5	3	3.05	2.76	3.13
6	4	4.07	4.48	5.00
7	4	4.02	3.59	4.42
8	2	1.96	2.66	3.46
9	4	4.05	3.09	2.54
10	4	3.88	4.67	5.00
11	4	3.97	5.00	2.83
12	3	2.95	2.87	3.32
13	4	4.01	2.84	2.87
14	3	2.97	3.07	3.27

In fig. 5 the results of modelling the level of the sense of security using a neural network for a sample size of 99 are presented.

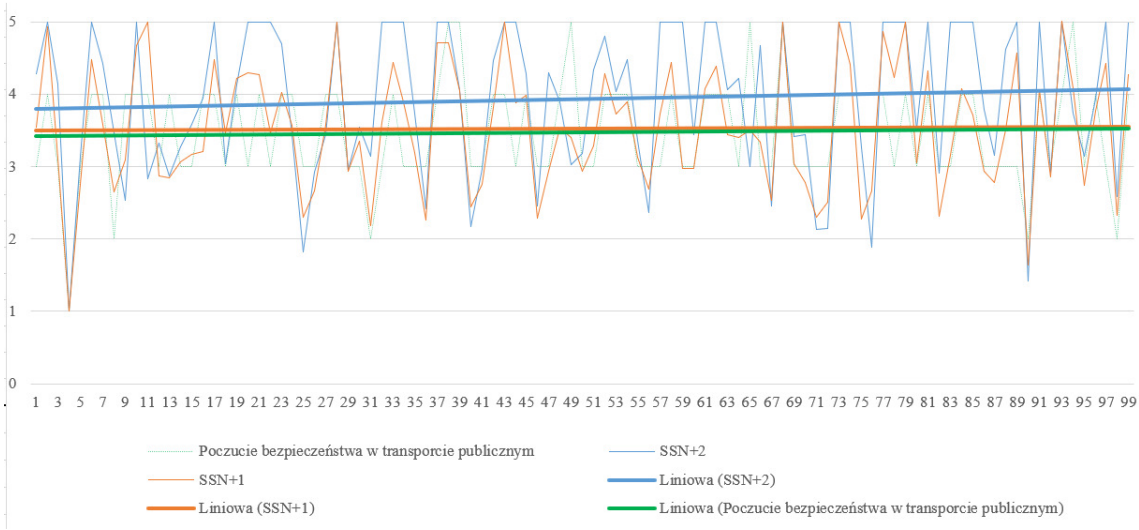

Fig. 5. Results of modelling the level of the sense of security using a neural network

The calculations show that:

- by raising the level of assessment by +1 of three selected factors, the level of the sense of security increases slightly, based on 99 trials, this level increased on average 0.54 and is within the average rating of 3.5,
- by raising the level of assessment by +2 of three selected factors, the level of the sense of security increases significantly, based on 99 trials, this level increased on average 1.28 and is within the average rating of 4.

Summary

The purpose of the article is to analyse and asses the factors which affect the sense of security in public passenger transport on the example of the capital city of Warsaw, defined on the basis of the standard PN-EN 13816: 2004 and author's own research, as well as the use of artificial neural networks as a tool allowing for modelling the level of security.

The following conclusions were drawn from the conducted tests:

- the developed neural network model correctly maps the output signal, in this case the level of the sense of security in passenger public transport on the example of the capital city of Warsaw based on author's own research,
- the quality of the solutions obtained is around 90%,
- the research conducted demonstrated a positive impact of changing selected factors on the level of the sense of security,
- thereby confirming the thesis whereby artificial neural networks can be effectively used to analyse and solve such problems,

It should also be emphasized that all 3 selected factors were analysed simultaneously, and the impact of individual selected factors on the final result was not considered. The direction of further research should focus on the analysis of the impact of individual factors on the sense of security, these factors should not be limited to the standards mentioned above.

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Impact of Influence Marketing on Attitudes of Tourist Service Users

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Abstract

Influence marketing as a complement to contemporary market activities enables the formation of opinions and attitudes of users. Unlike traditional direct interactive techniques and marketing tools reaching to consumers without the use of intermediaries, influence marketing focuses on a person - influencer who transmits a communication message through the platform. Business entities can segment a targeted audience that is gathered around influencers, enabling an effective communication message and reduce communication noise that arises due to too much information which is visible through the use of a whole number of ad blockers. The paper focuses on the members of the Generation Z, do they believe in influencers, can influencers affect their attitude on choosing a tourist destination and their way of getting online information at the prefetch stage researching tourist services. The goal is to show how the personal attitudes of the Generation Z influence on the future intentions of behaviour. Authors use a Theory of Planned Behaviour in order to get answers to the question whether and in what way influence marketing effects on personal attitudes of students considering the use of tourism service, and in which the students' attitudes and their intentions are related. Descriptive analysis and multivariate analysis were used in the analysis. Research has shown which variables are important for the selection of the influencer in marketing activities - the number of followers, the frequency of the published content, the number of comments, the rate of response to the comments, the specialized content or something else.

Keywords: influence marketing, tourist services, attitudes, students

Introduction

Three basic problems are solved by forming communication: what to say (message strategy), how to say it (creative strategy) and who will say it (message source) (Kotler and Keller, 2007). The first problem concerns the strategy of the message, and when determining it, the management of the company seeks to find messages, themes or ideas that will be in touch with mark positioning, thus helping to identify points of similarity and points of difference. Some may be directly related to the features of a product or service, while others may relate to several aspects such as the brand's modernity, popularity or tradition. Product customers expect rational, social, sense of satisfaction or fulfillment of the ego.

One of the goals of marketing activities is to sell and promote products by making profits. However, from the point of view and the time of returning invested funds to advertising as part of a marketing mix, we can outline the following advertising goals (Kesić 2003, p. 237):

- "Stimulating primary or selective demand
- Advertising of products or institutions
- Creating direct (action) or indirect effects (preferences, opinions, attitudes)."

The main goals of promotion are to stimulate consumer awareness in an effort to use such products and services as much as possible. Promotion requires financial resources to constantly seek new ways to reach consumers. A trend in promotion today represents the strategy of influence marketing. Unlike the classic ways of promoting influence marketing is aimed at creating an image of an individual whose goal is to inform consumers by using one of the online promotion channels.

The paper focuses on the members of the Generation Z and way of getting online information at the prefetch stage researching tourist services. The goal is to show how the personal attitudes of the Generation Z influence on the future intentions of behaviour.

Influence Marketing

Influence marketing can be observed as part of integrated marketing communication. Influence marketing is just one of the language versions that are used for for marketing campaigns that use influential individuals - influencers. Other phrases used are Influencer marketing or influencer and should not be confused with influence marketing. "Influence marketing focuses on individuals (influencers) pushing products to consumers. Instead, it's about the power of content or context and empowering consumers with relevant data throughout the entire path to purchase, from brand awareness and consideration to purchase decision, which includes comparing products' quality, price, popularity, proximity and even relatability" (Forbes, 2018). Influencers in influence marketing campaign pass their personality and status to the brand they promote. Thanks to social networks influencers have tremendous power and can contribute to brand creation or decline, as they can directly reach their audience. According to Lagrée (2017), social marketing value and influence on social networks are one of most important concepts in the area of online advertising and most companies that promote in online environment must have a "social" strategy. Managers who manage brands recognize their potential and successfully use them to develop sponsorship cooperation agreements. But this co-operation encompasses more photography and photo publishing. Based on the Woods (2016) with social media growth advertising agencies allocating more of their media budgets to social and using influence marketing strategy, because advertising industry is in search of effective strategies to get the most return on investment when it comes to social, There are several factors and dimensions relevant to selecting a person who will advertise a particular product or service. In addition, marketing inflows help create awareness and help to position and to reposition existing products and services. Consumers with a high level of opinion, also called opinion leaders, seeking behaviour tend to search for information and advice from other consumers when making a purchase decision and have a significant influence on consumers' attitudes and behaviours (Chu and Kim, 2011). The whole process of the communication message should begin with determining the targeted audience such as potential product buyers of the company, current users, decision-makers, or having some influence, individuals, groups, a certain part of the public or the public in general. Influencer marketing can bi compared with digital equivalent of word-of-mouth marketing. It is defined as "a type of marketing that focuses on using key leaders to drive a brand's message to the larger market" (Tapinfluence, 2015). Subramani and Balaji (2003, p. 300) define that "the role of the influencer is mainly to create awareness and signal benefits to others within their social network and can be particularly influential in encouraging trial and adoption of novel products and services". It is important to state that Some experts believe influencer marketing has launched a revolution in terms of how a particular message finds a path to a targeted audience as well as potential buyers. "Influencers are generally people who have an influence on other people and they are often considered as Key Opinion Leaders (KOLs). Influencers are mostly famous people and "Celebrity Endorsement" is also the first form of influencer marketing" (Nguyen, 2018). Influencer marketing can also be defined as a presentation of a product or service whose origin is in personal experience. In other words, it is a strategy in which one person, usually familiar to the public, describes the use of products or services, suggesting to potential buyers that they should buy it.

Influence marketing in tourism

As we have mentioned in the last chapter influencers are people who've spent time building their own brand and cultivating their audience online by a different approach. in this category, we can make four basic segment: Celebrities, Industry experts, Bloggers, and content creators and Micro Influencers (Khamis et. al. 2017). Influencers can also be divided according to the content they create (Forbes, 2019):

- Pets
- Parenting
- Fashion
- Fun
- Travel
- Gaming
- Fitness
- Beauty
- Gastronomy
- Home
- Technology and business
- Children

We can conclude that travel and gastronomy as parts of the tourist offer are in are in the domain content for influence marketing. The development of technology "has enabled today's modern consumers, i.e. users, to search for information on a tourist destination in real time or prior to their arrival at a destination using mobile technology" (Kelić et al, 2017, p. 228). The use of social media marketing by Destination Marketing Organizations is "still evolving as the use of social media by travelers and the tourism industry continues to expand" (Sigala et al 2012, p. 112). Tourist destination might identify influencers to seed a word-of-mouth campaign using social media. Di Pietro at al (2012, p. 67) found "that tourists' choice of destinations for travel is influenced by electronic word of mouth". As such, Social Media platforms have proven to be effective as a destination marketing tool. Strategy of using celebrities in the form of endorsements has been generally used for years as a tool in a promotion of tourist destination, retail marketing, and product marketing. However, influence marketing strategy, "is an emerging trend where everyday people who are popular on social media platforms become leaders and inspiration to others on social media" (Bokunewicz and Shulman 2017, p. 214). Influencers create content that is in line with the wishes and needs of their audience. Consumers identify with them and most often pay attention to what influencers promote and are inclined to want the product or service they are advertising themselves. It is therefore important to "adapt the content created in the online environment so as to balance tourism supply and demand in a particular tourist destination" (Kelić et al. 2017, p. 229). In general, creative content has become key to creating competitiveness in the tourism industry and influence marketing is a strategy for delivering information to the consumer. i.e. tourists.

Theoretical framework of the Theory of Planned Behaviour

The Theory of Planned Behaviour is used in numerous social and scientific disciplines. It has been applied more and more in the area of research regarding human behaviour and expanded to research related to personal behaviour (Lin and Chen, 2010; Ajzen, 1991). The premise of the Theory of Planned Behaviour is that "individuals make rational decisions to engage in specific behaviours based on their own beliefs about the behaviour and their expectation of a positive outcome after being engaged in the specific behaviours" (Harding at al 2007, p. 258). The Theory of Planned Behaviour is used to show the impact of attitudes, subjective norms and perceived behavioural control on the intentions of individuals resulting in certain behaviour (Ajzen, 1991) (Figure 1.).

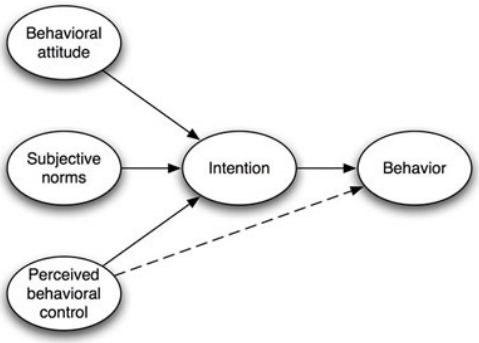

Figure 1: Theory of Planned Behaviour model

Source: Ajzen I. (1991). Theory of Planned Behaviour. Organizational behaviour and human decision, 50, 179-211.

Attitudes toward behaviour are the level to which the performance of behaviour is judged as positive or negative by the individual. Allport (1935) defines personal attitude "as permanent mental or neural willingness gained from the experience, making the directive or dynamic influence on an individual's response to objects and situations that he comes into contact with". Ajzen and Fishbein (1980) defined the attitude toward a behaviour as "a person's general feeling of favourableness or unfavourableness for that behaviour". Furthermore, the same authors defined the Subjective Norm as "a person's perception that most people who are important to them think they should or should not perform the behaviour in question". The third predictor, Perceived behavioural control, "includes the perception of one's own abilities and sense of control over the situation and is defined as a combination of locus of control (belief about the amount of control that a person has over events and outcomes in his life) and self-efficacy (perceived ability to perform the task)" (Ajzen, 2002).

The behavioural intention has been identified in the theory as the most significant predictor of behaviour (Ajzen and Madden, 1986; Ajzen, 1991, Ajzen and Fishbein, 2005).

Tourist Attitudes

According to Lee (Ajzen 1991; Schiffman and Kanuk, 1994, as cited in Lee, 2009, p. 218) tourist attitude describes "the psychological tendencies expressed by the positive or negative evaluations of tourists when engaged in certain behaviours". Tourist attitude is an "effective predictor of tourist participation and satisfaction" (Ragheb and Tate, 1993, as cited in Lee, 2009, p. 218).

The Theory of Planned Behaviour is frequently used to study in the tourism and hospitality industry, especially in tourist attitudes. Some authors describe in which way tourist attitudes influence on intentions toward behaviour: according of travel mode (Bamberg et al, 2003), behaviour of wine tourists (Sparks, 2007), intentions of hunting (Rossi and Armstrong, 1999), visit intentions according perceptions of country, product and cuisine (Kim and Kwon, 2018; Jacobsen, 2000), choosing a travel destination (Lam and Hsu, 2006; Jalilvand and Samiei, 2012), consumer complaining (Yuksel et al, 2006). Furthermore, some authors did not find a significant contribution between attitudes and intention and behaviour (Ajzen, 1992; Lam and Hsu, 2006; Sparks, 2007).

Thus, the following main research hypotheses are proposed:

H1: Attitudes toward influence marketing has a significant impact on the intention of visiting a tourist destination.
H1a: Influence marketing as part of word-of-mouth online marketing is dominant for getting information about a tourist destination by members of Generation Z.

Previous research related to the hypotheses that should be mentioned is research of Iyiola and Akintunde (2011) who had measure "how consumers will form an opinion(s) on a particular product

based on information at their disposal, which will determine whether such product is selected". Bokunewicz and Shulman (2017) analyze "network data from Twitter how destination marketing organizations (DMOs) use Twitter to promote attractions and special events and to build brand awareness". In their paper, they have identified influencers that can aid in DMOs' marketing campaigns. Taking into account previous research, the authors defined hypotheses for the purpose of this paper, focusing on the Generation Z and different social networks.

Research Methodology

The aim of this research is to show how the personal attitudes of the generation Z influence on the future intentions of behaviour. In order to identify content consumers on the demand side, the authors focus on the representatives of Generation Z, also known as Post-Millennials, the iGeneration, or the Homeland Generation, is the demographic cohort following the Millennials. Although there are various definitions of Generation Z, for the purposes of this paper the authors have used a definition according to which "Generation Z is born in the 1990s and raised in the 2000s during the most profound changes in the century who exists in a world with web, internet, smartphones, laptops, freely available networks and digital media" (Singh and Dangmei 2016, p. 2). Authors use a Theory of Planned Behaviour in order to get answers to the question whether and in what way influence marketing effects on personal attitudes of students considering the use of tourism service, and in which the student's attitudes and their intentions are related. The emphasis in the research has been placed only on the predictor of personal attitudes of students. The research has been implemented on a sample of 135 university students (attending only graduate study programs). The description of the sample regarding the observed socio-demographic data has been provided in Table 1.

Table 1: Sample description

		N	%	Missing
Gender	Male	52	38,2	N = 3 % = 2,2
	Female	80	58,8	
Year of study (graduate)	1st	64	47,4	N = 1 % = 0,7
	2nd	70	51,9	
Student status	Non-paying	106	78,5	N = 2 % = 1,5
	Fully-paying	27	20,0	

Source: Authors' research

The data has been gathered using a study questionnaire, in which the study participants were informed about the topic and the aim of the research. Considering that there are no related researches of impact of influence marketing on attitudes of tourist service users through the Theory of planned behaviour authors are arbitrarily prepared questionnaire. Previously in the text, it was stated how the Theory of planned behaviour is frequently used to study in the tourism and hospitality industry, especially in tourist attitudes. But, no one has been studied in relation to influence marketing. So, the self-administered questionnaire was designed to measure the research model variable constructs taking into account the above-mentioned researches. The questionnaire consisted of three sections. In the first part authors want to find out which social networks are accessed by students, do students follow influencer and in what way they impact them and what motivated them to visit a tourist destination. In the second part, the attitudes and the intention toward behaviour were tested and in the last part of the questionnaire were related to the socio-demographic characteristics of the study participants. A five-point Likert measurement scale (ranging from 1-totally disagree to 5-totally agree) was used in the questionnaire. The research results were obtained using the SPSS 18.0 statistical software package. Descriptive analysis, multivariate analysis (correlation analysis, linear regression, factor analysis) and analysis of variance (ANOVA) were used.

Research Results

Most of the respondents (88.9%) own a Facebook profile, then Instagram (56.7%), LinkedIn (31.1%), Snapchat (30%) and Pinterest (28.1%). Other platforms are represented in less than 15% (Twitter, Tripadvisor, Blog, Vlog). Respondents who own a personal Facebook profile and Instagram access and review them once or more times a day, while users who own a personal profile on Linkedin, Snapchat, Pinterest and Vlora access and browse platforms once or more times a year. Also, the results showed that respondents who have created a profile on Facebook and Instagram often or almost always access during the afternoon, evening and night hours.

Research has shown that 97% of respondents know what the term influencer is and that 72% of respondents monitor an influencer on a platform. The most important item in influencing choices to be monitored by the respondents is the subject that the influencer deals with, ie the content being published (4.31), and the frequency of the release of the content (3.34), while the response speed to the comments of the escort and the number of followers are the items that are not very important when selecting influencer (2,38 and 2,21).

Most of the respondents (91.9%) visited a tourist destination in the past year, and as the main motives for visiting the destination are the recommendations of friends (54.1%), blogs, specialized journals and portals (17.8%), information about the destination created by other users (37%), and least motivated by content like tips, and recommendations from online flyers, magazines and brochures (8.9%). We can conclude that word-of-mouth strategy like friends' recommendations and information about the destination created by other users are dominant for getting information. This confirms the auxiliary hypothesis H1a which state that influence marketing as part of word-of-mouth online marketing is dominant for getting information about a tourist destination by members of Generation Z who are present on social networks and track the content of friends and other users - influencers.

Since the paper observed only users views of tourist services, the impact of influence marketing to them and how their attitudes effect on their future intentions of behaviour, in continuation of the paper only the attitudes will be used in the analysis. According to this, authors used exploratory factor analysis to contract variables in a smaller number of common factors (Table 2). The factor analysis and the consistency analysis have been performed on the 7 variables of the predictor Attitudes. The sample included 133 (98,5%) of the study participants. The rest have been excluded from the factor analysis.

Table 2: The results of the factor analysis

Variable of the predictor Attitudes	Factor 1	Factor 2	h^2
I believe influencers are paid by business entities to publish the content as desired	.641		.424
I consider influencers to a large extent influence the creation of attitudes, opinions and decision-making of their followers	.613		.404
I believe that influencers can greatly assist business entities in promoting their products and services	.769		.593
I believe that influencers can provide adequate information on tourist destinations	.602		.409
I think how influencers can influence the decision-making on the choice of a tourist destination	.702		.520
I believe influencers publish content only at their own discretion and motivation		.459	.211

I consider influencers to a large extent influence my own creation of opinions, opinions and making decisions		.874	.798
Eigenvalue	3,52	3,48	
Variance percentage	50,3	49,7	
Number of variables in the factor	5	2	

Source: Authors' research

The Cronbach's alpha coefficient is 0.718, the Kaiser-Meyer-Olkin measure is 0.725, and the Bartlett test is $\chi 2$=251,093, df=21, Sig.= .000. Two factors have been identified through factor analysis, and they were given the following titles:

Factor 1: Attitudes as influencers publish content according to the instructions of business entities and influence their followers
Factor 2: Views as influencers publish content at their own discretion and affect my (student) self-creation attitude

It is necessary to see if there a statistically significant correlation between two extracted factors of students' attitudes and the students' intentions toward behaviour. Table 3 shows the results of the Pearson correlation. Both factors are in positive statistical correlation with the intentions toward behaviour.

Table 3: Correlation analysis (n = 135)

Predictor variables	Intentions toward behaviour	
	Pearson correlation	Statistical significance
Factor 1	.232**	.004
Factor 2	.546**	.000

***Correlation is significant at the level of 0.01*
Source: Authors' research

The linear regression model is shown in Table 4. The results of the regression analysis show a statistically significant positive correlation between attitudes as influencers publish content according to the instructions of business entities and influence their followers (Factor 1) and views as influencers publish content at their own discretion and affect my (student) self-creation attitude (Factor 2) and their future intentions toward behaviour. The model explains the total of 37% of the variance in the intentions toward behaviour. Determination coefficient (R2) measures the ratio of the variance of the dependent variable around its mean value as explained by prediction variables. The larger R means the greater the power of the model in explaining the regression function and the better the prediction of the dependent variables.

Table 4: Linear regression model

Predictor variables	βeta	t-value	Significance (p)	Model summary
Factor 1	.268	3.757	.000	R = 0.606 R2 = 0.367 F = 37.708
Factor 2	.561	8.023	.000	

a. Dependant variable: intentions toward behaviour
Source: Authors' research

Statistical analysis indicates that this confirms the hypothesis H1 which state that attitudes toward influence marketing have a significant impact on intention to visit a tourist destination i.e. users trust

the influencers who know how to present the products they work with and find the best way to get the message to as many people as possible.

Conclusion

Influence marketing enables tourism business entities to let their consumers choose the source and the channel of information that suits them best. The aim of the paper was to analyze to what extent members of Generation Z search for online content what is the influence of influencer marketing on their decisions. The significance of the influencer is best explained by the fact that messages and content are announcing the contributions and popularity of a particular product or service. Collaboration between business entities and influencers has become a trend in marketing activities since the influencers are focused on narrow niches and expert on topics they deal with. Modern consumers become immune to traditional advertising and since influencers spend a lot of time building relationships with their audience, they develop mutual trust in the long term. Although there is no previous research which will support hypotheses, research that served as the basis, analyze only one social network and another tourist destination. Research that was used led to the conclusion of how structure and popularity of influencers allows marketers to cheaply connect with the masses. Based on the above authors have focused on Generation Z and different social networks. Research results has shown that consumers are most trusted by personal sources when it comes to referrals, but it's important to note that many people look at influencers as their friends and people they know. The research included an analysis of the current level to what extent are members of Generation Z familiar with influencers and what is the impact of influence marketing at their attitudes. The aim of the research was to test the proposed hypothesis. The results obtained have confirmed the hypothesis that attitudes toward influence marketing have a significant impact on the intention of visiting a tourist destination. The paper has defined how the personal attitudes of Generation Z influence on the future intentions of behaviour. Although consumer behaviour is influenced by several factors, one of the elements of customer rapprochement is a model in which the targeted audience of influencers becomes a target audience of a business entity. We can conclude that influencers can influence on attitudes of consumers of Generation Z and their behaviour. A well-designed marketing influence strategy that is consistent with the vision and strategy of brand with the use of an influencer who has a strong enough companion base greatly increases the success and profitability of investment in influence marketing in tourism.

This research has some limitations. In paper it observed only the personal (students) attitudes in higher education, so the inclusion of the other predictors of the Theory of Planned Behaviour in the research would complete the image of the intentions toward behaviour among students. Although the sample was only graduate students (from Continental Croatia), some of the research results can be taken as general characteristics of the industry. According to everything mentioned previously, it is necessary to conduct further research in order to resolve the limitations of this research and fill the blanks left by this research.

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Perception Of Lean Manufacturıng - Analysis Of Production Enterprises Before And After LM İmplementation

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Abstract

Lean Manufacturing (LM) is a concept that is comprehensive in nature and includes a set of many useful methods and tools. Despite the fact that a number of publications highlight measurable benefits related to the implementation of lean, plenty of companies still fail to implement or take any action with respect of LM. For the above reasons, based on existing research described in subject literature, a cognitive gap in the form of a time factor, which significantly affets the perception of barriers connected to the implementation of lean tools, has been identified. Thus, the purpose of this article is an analysis of perception of LM by companies that are before and after implementation of lean tools with reference to four selected cognitive areas. In order to achieve the scientific objective, a CATI survey has been conducted in Polish manufacturing companies, operating in Zachodniopomorskie Province. The research questionnaire has been divided into four parts and included: identification of internal and external barriers, knowledge of lean tools, awareness of expected benefits resulting from the implementation of Lean Manufacturing and plans to implement lean in companies in the near future. Selected methods of multidimensional comparative analysis have been applied. The results have been summarized, compared and discussed.

Keywords: Lean Manufacturing, implementation of lean, manufacturing industry

Introduction

Modern enterprises operate in complex market conditions, which are characterized by high competition, constant struggle for clients' favour, as well as high dynamics of economic processes. Production companies are also facing these problems, but due to their specificity they constitute "the most developed and complex economic activity (...) in which all problems and business processes focus, with all its consequences" (Ficoń, 2007, p. 202). This means that production companies wanting to survive on a dynamic market, must constantly monitor and respond to changes related to their production processes. Therefore, it is necessary to analyze the efficiency and production capabilities, the availability of production resources or even the information technologies used (Information and Communication Technology). The concept of Lean Manufacturing (LM) turns out to be helpful in this respect, which in its scope includes a set of many useful methods and tools of non-uniform nature. In addition, importantly, the LM principles are universal and "can be applied in every industry across the globe" (Womack, Jones, Roos, 2007, p. 6).

Correct implementation of lean tools has a positive effect on all areas of company operations and it is a necessary condition for the next stage which is industrial evolution - commonly called as Industry 4.0. Despite numerous publications from different countries, which describe measurable benefits achieved from a successful implementation of LM, many companies still do not take any activity in this area or, for some unknown reasons, cease further initiative. However, based on existing research described in subject literature, a cognitive gap in the form of a time factor, which significantly affects the perception of barriers connected to the implementation of lean tools, has been identified. The scientific goal of this article is to analyze the perception of LM by companies before and after implementation of lean tools in relation to four selected cognitive areas, which took the form of the following research questions:

- What is the perception of Lean Manufacturing implementation barriers in companies before and after lean implementation, broken down into internal and external barriers?
- What is the knowledge of the surveyed companies about Lean Manufacturing instruments?
- What is the perception of benefits of lean implementation among the surveyed enterprises?
- What are plans related to lean implementation in enterprises with experience in this field, as well as among companies without practice in this area?

In order to achieve the scientific objective, a CATI survey was carried out among Polish Companies (in Zachodniopomorskie Province). It enabled to achieve research objective and answer the research questions.

Literature Review

According to Grzesik (2010, p. 145) "it is now recognized that the manufacturing industry is a key factor that determines the dynamics of development and market situation". Research carried out by Eurostat confirms this view as it indicates that industrial production in EU accounts for 16% of gross value added in economy and provides employment for 31.8 million of people. In Poland, this indicator is also at a high level as industrial production accounts for 20% of gross value added in economy and provides employment for 3.1 million of people. It is also worth mentioning that every tenth EU citizen involved in industrial production works in Poland (Dmowski et al., 2016, p. 21). Therefore, it is extremely important to take action with respect to the concept of Lean Manufacturing, which integrates processes in an entire organization, starting from purchasing, through production, ending with distribution.

The concept of Lean Manufacturing in its present form is based on the Toyota Production System (TPS), which was developed in response to the problems of the Japanese industry in the post-war period (Czerska, 2014, p. 9). Before it was formulated, the most known and widespread concept was the production system set up by H. Ford. It used mass production, economies of scale and powerful equipment, making it possible to produce the largest possible number of parts in the most cost-effecitve manner. Unlike Ford and GM (after the World War II), Toyota had limited capabilities and was forced to produce various vehicles on the same assembly lines. As a consequence, flexibility of assembly lines became the most important for operations of this company, which over time enabled it to obtain, among others, greater customer satisfaction, higher quality and productivity, as well as better use of equipment and space (Liker, 2016, pp. 35-36). The above-mentioned achievements have made the concept of Lean Manufacturing another (after mass production) important stage in industrial evolution.

The success of Toyota, which took the form of the LM concept, is also very popular among scientists who define lean in a different manner. Examples of definitions are presented in Table 1.

Table 1: Selected definitions of Lean Manufacturing

Authors	Definition
Bicheno, J., Holweg, M.	Doing more with less.
Lean Enterprise Institute	The core idea is to maximize customer value while minimizing waste. Simply, lean means creating more value for customers with fewer resources.
Quality Progress Magazine	The permanent struggle to flow value to each customer.
National Institute of Standards and Technology	A systematic approach to identifying and eliminating waste through continuous improvement, flowing the product at the pull of the customer in pursuit of perfection.
	" (...) definition of Lean includes both the people and the process components on the one hand and internal (related to the firm) and external (related to supplier and customer) components on the other hand".

Anvari, A., Ismail, Y., Hojjati, S.M.H.	LM refers to an evolving dynamic new process of production covering the total enterprise, embracing all aspects of industrial operations (product development, manufacturing, organization and human resources, customer support) and including customer-supplier networks, which is governed by a systemic set of principles, methods and practices.
Tortorella, G.L., Vergara, L.G.L., Ferreira, E.P.	LM is a business model that values the human being as the main human element for continuous sustainability in the organization. The interaction between employees contributes to the knowledge acquisition to support future projects of the organization.
Taj, S.J.	LM is a set of concepts, principles, methods, procedures, and tools to reduce losses in the value stream.

Own study based on: Bicheno, J., Holweg, M. (2016). The Lean Toolbox. A Handbook For Lean Transformatıon, Production and Inventory Control. Systems and Industrial Engineering (Picsie) Books. Buckingham, p. 1; Anvari, A., Ismail, Y., Hojjati, S.M.H. (2011). A Study on Total Quality Management and Lean Manufacturing: Through Lean Thinking Approach. World Applied Sciences Journal 12 (9), pp. 1585, 1587-1588; Oliveira de, R.I., Sousa, S.O., Campos de, F.C. (2019). Lean manufacturing implementation: bibliometric analysis 2007–2018. The International Journal of Advanced Manufacturing Technology 101, p. 980.

Lean Manufacturing is a comprehensive and "multifaceted concept that may be grouped together as distinct bundles of organizational practices" (Yang, Hong, Modi, 2011, p. 252). A list of bundles of lean practices should, however, contain well thought-out and deliberately chosen methods and tools. Due to their multitude and their mutual connection, LM implementation should be a process planned for several years. In addition, the sequence of implementation (Knosala, 2017, p. 125), selection of and the number of instruments being implemented is still problematic as no consensus in this respect has been reached to date. Compliance, in principle, was achieved in terms of benefits that arise as a result of the implementation of LM. Perhaps this is due to the fact that effects are visible relatively quickly after the first implementation of a specific method or tool (often at small expenditures, e.g. the 5S method). According to research conducted in Poland, the most frequently mentioned benefits and improved indicators include the following (Horbal et al., 2010):

- efficiency (increase from 5% to 66%),
- use of machines (OEE) (increase from 7% to 59%),
- stocks of work in process (reduction from 30% to 80%),
- area (reduction from 15% to 61%),
- transition time (reduction from 9% to 70%),
- set-up times (reduction from 9% to 96%).

In addition, some companies also mention other benefits, such as (Horbal et al., 2010):

- significant improvement in quality,
- reduction in the number of complaints,
- increase in the number of improvements proposed by employees (from 2 to 10 times more),
- improvement of communication,
- reduction of waste.

Research Methodology

The study has been carried out based on literature research (Web of Science database), which allowed to identify and then systematise and categorize conditions that are key for the implementation of LM in production companies. As a result, a developed matrix of lean implementation conditions was developed, divided into internal (engogenic) and external (exogenous) factors (Frankowska, Myszak, Sowa, 2017, pp. 431-440). On the basis of the obtained results, a cognitive and research gap was identified in the form of limited consideration of temporal aspects (time factor) in the perception of LM implementation barriers. In connection with the above, a detailed literature review was carried out

regarding the barriers faced by organizations in the Lean Manufacturing approach. Next, research methodology was formulated, as a result of which two questionnaires were developed and applied, which included the four research areas: implementation barriers (internal and external), knowledge of LM tools, perceived benefits of lean implementation and implementation plans of the surveyed enterprises. Two types of questions have been used in the questionnaire: multiple choice questions and questions employing Likert scale, ranging from 1 (definitely disagree) to 5 (definitely agree). The first questionnaire was addressed to companies that have not implemented any lean tools, while the second one to enterprises that have experience in this matter, that is, they are implementing lean manufacturing at present or are planning to do so in the future, i.e. to implement further Lean instruments. At the same time, a database of 250 manufacturing companies based in Zachodnipomorskie Province has been created. Nonprobability and quota sampling has been employed in the study, which, as a result, was conducted on a sample of 40 production companies that meet the following criteria:

1. Study no. 1: an organization has not undertaken any activities towards the implementation of LM earlier - 20 companies qualified here;
   Study no. 2: an organization has undertaken activities towards the implementation of LM - 20 companies qualified here.

CATI telephone interview technique (i.e. computer-assisted telephone interview) has been employed to carry out the study. The research material was submitted for analysis, on the basis of which a multidimensional comparative analysis was carried out that enabled to draw conclusions and propose preliminary recommendations. The conceptualization of the conducted research has been presented in a visual way in Figure 1.

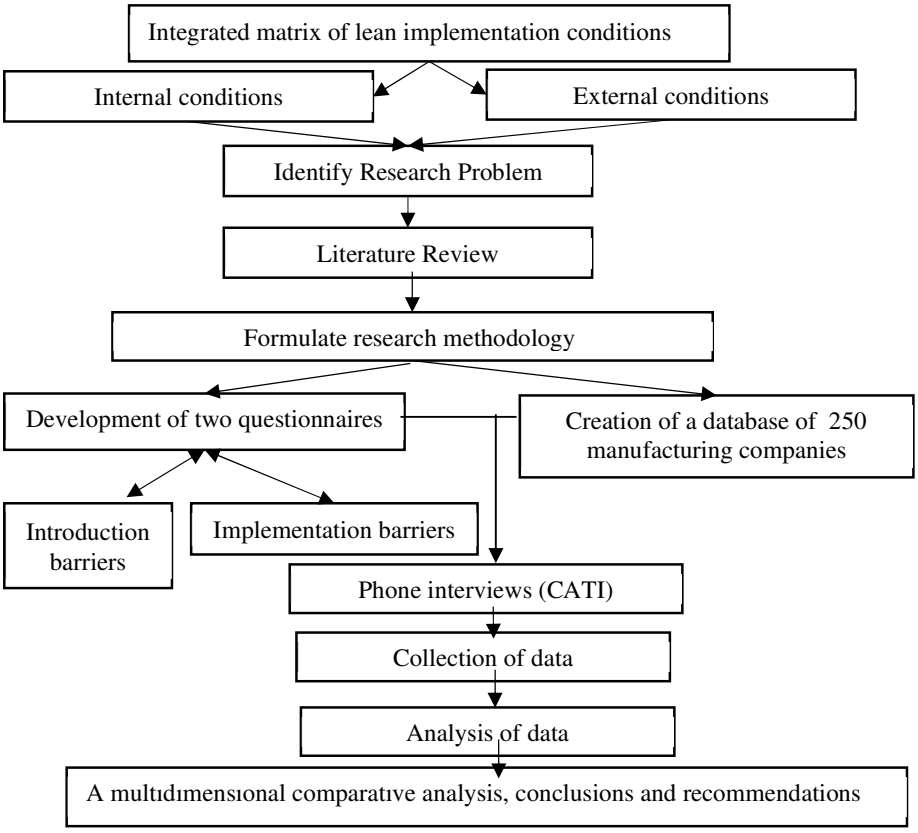

Fig. 1: Research methodology

Source: author's own work

Unfortunately, the research sample obtained is not representative and, therefore, the results of the research are of probing character and require confirmation in further research.

Comparatıve analysıs of the research sample

In the group of 20 companies that have never implemented LM, there are 8 small enterprises, 5 medium companies, 4 micro-enterprises and 3 large companies. However, the situation is different among enterprises that have already taken steps to implement LM. This group consisted of 10 medium size and 7 big companies. Only three companies in this group were small enterprises and there were no micro-enterprises.

With regard to the ownership of business, in the group prior to implemntation, most companies were of domestic capital (15), however, there were also enterprises of foreign capital (2) and three public ones. In case of companies in the other group, this structure looked a bit different: there were 10 companies of foreign capital, 9 of domestic capital and one public enterprise.

With respect of the fime of functioning on the market, significant diversity has been observed in both groups. When it comes to the first group, only one company has operated on the market for the period shorter than 5 years, and the remaining entities have been operating for 6 to 10 years, four companies for the period ranging from 11 to 20 years and seven companies have existed for more than 25 years. In the second group, four companies have operated on the market for less than 5 years and the remaining six entities had operated for 6-10 years, four entities for 11-20 years and six companies have existed for more than 25 years.

The respondents in the survey, belonging to the group of companies before implementation, were primarily representatives of senior management (8) and middle management (8), but included also qualit assurance specialists as well. The situation looked similar in the group of companies after the implementation of LM. Respondents included the most-important senior management (8), as well as senior management (6) and specialists (6).

Results and Dıscussıon (Findings)

The study has been divided into four main areas. The first area includes an analysis of the perception of LM implementation barriers in companies before and after lean implementation, divided into internal and external barriers. In connection with the above, the respondents were asked to evaluate the importance and extent of internal factors constituting a barrier to lean implementation in a company (Figure 2). Most assessments fluctuate around average results, but it seems that the most challenging barrier in both categories is having appropriate resources, understood as the right number of employees, sufficient time allocation and their range of knowledge. It is also worth paying attention to financial factors, which are treated as the most prominent internal factors in introduction barriers. Interestingly, this factor does not play such a significant role among enterprises that have already taken actions to implement lean compared to others. Perhaps it is related to the fact that implementation of some LM instruments does not always mean incurring considerable costs. In case of enterprises that have already undertaken lean activities, determinants related to management and organization are of greatest significance, such as: leadership or attitude and necessary competencies to implement the philosophy of lean both among staff and management. The specificity of technologies used in enterprises may also be problematic, especially the level of their advancement. Moreover it seems that the least challenging barrier in both categories is the specificity of manufacturing systems of the surveyed companies, understood as a type and form of production organization and the number of positions and / or plants.

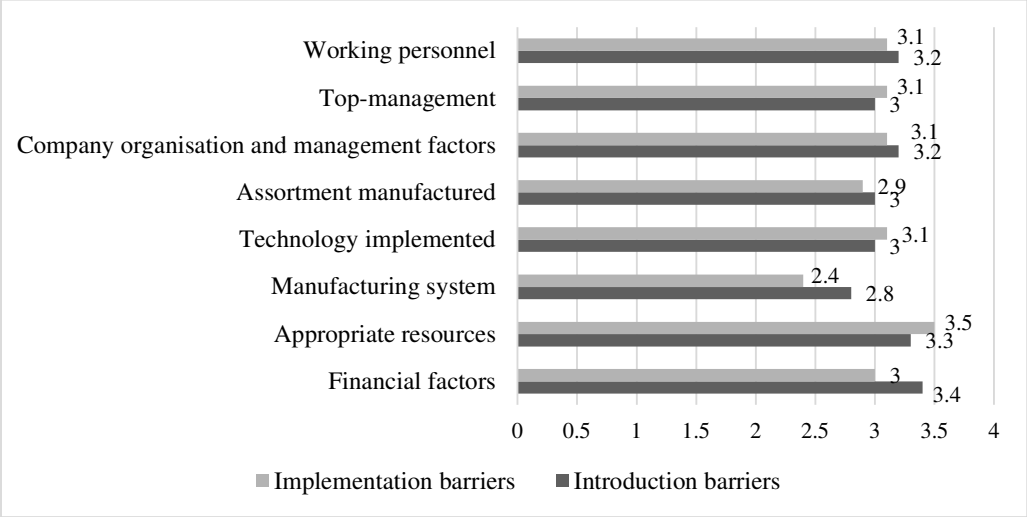

Fig. 2: Average rating of internal barriers for the implementation of Lean Manufacturing
Source: author's own work

Next, respondents were asked to assess external barriers, i.e. the surroundings and conditions in which companies operate (Figure 3). Basically, in all cases pre-implementation fears prevail over post-implementation ones. It seems that this may be related to insufficient knowledge of LM among enterprises, which in turns translates into a huge disparity in responses given. For example, the biggest difference between barriers (before and after) can be seen in the lack of interest among customers as well as external financing. This may mean that limited knowledge of managers leads to companies making hasty conclusions.

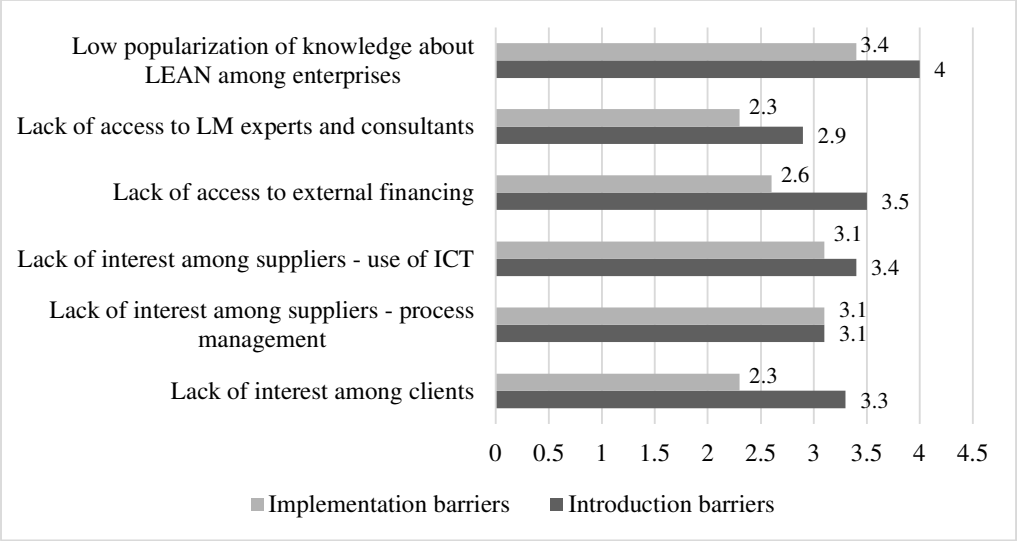

Fig. 3: Average assessment of external barriers for the implementation of Lean Manufacturing
Source: author's own work

When comparing the assessment of internal barriers before and after implementation of LM among the surveyed companies (Figure 4), it can be noticed that they are rated similarily, and respondents rather do not see any significant limitations related to their operations. Nevertheless, the difference is visible in the perception of external barriers related to the environment. Ignorance of the knowledge of current

and potential partners (suppliers, customers, experts) may exert negative influencce on actions taken with respect to the implementation of LM.

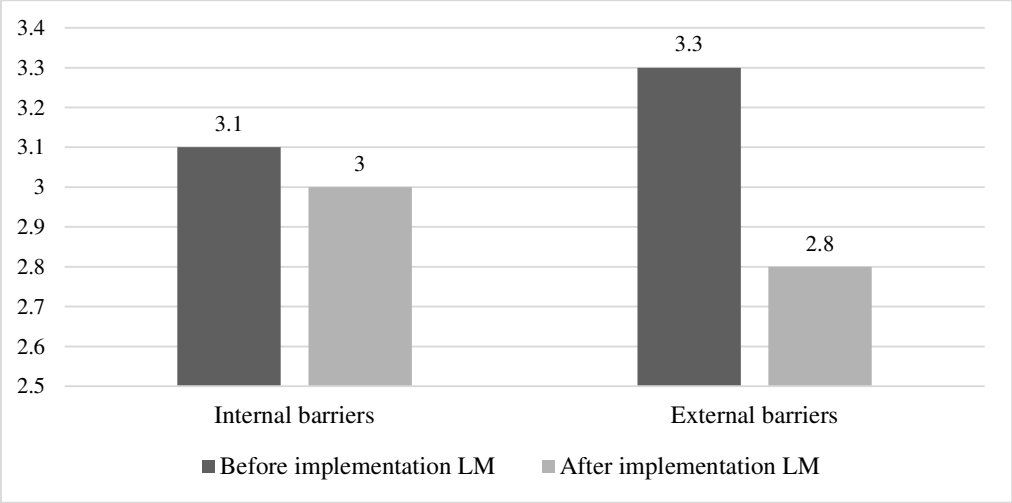

Fig. 4: Average assessment of pre-implementation barriers and implementation barriers of Lean Manufacturing

Source: author's own work

As far as the second research area is concerned, knowledge of surveyed companies on the subject of Lean Manufacturing has been analyzed. Respondents were asked to identify lean tools that are known to them (prompted awareness) (Figure 5). On average, respondents before implementation of LM declared that they knew more than four LM tools (4,4), among which the following ones: 5S, Kanban and Kaizen were mentioned most often. After implementation of LM, respondents' awareness of LM instrument was raised and they indicated 6,7 LM tools on average. Tools that are known to at least half of respondents include: 5S (16), Kaizen and standarized work (14 each), Kanban and SMED (13 each), MUDA mapping and Poka-Yoke (12 each), Six Sigma and Andon (10 each).

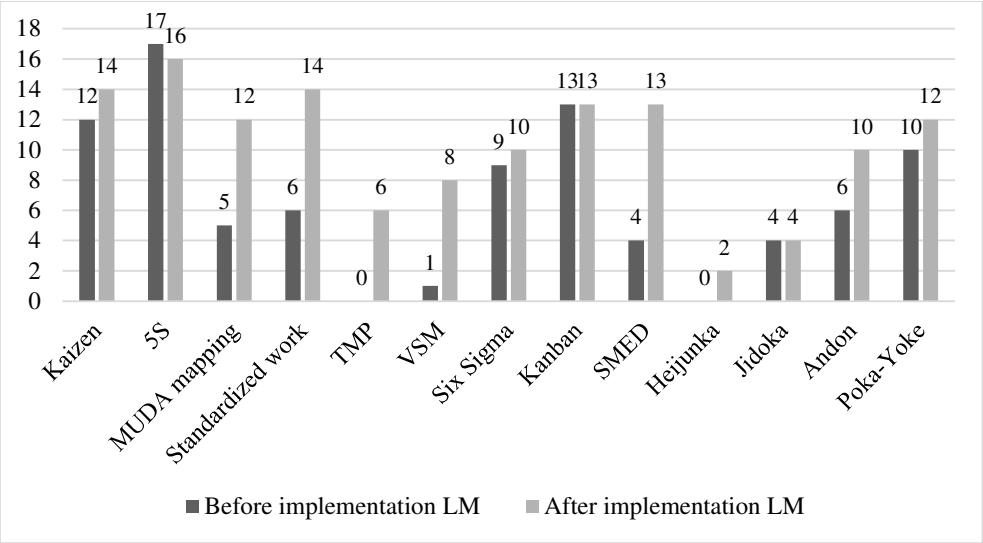

Fig. 5: Knowledge of Lean Manufacturing tools

Source: author's own work

The third of the four areas involved an analysis of perceived benefits of lean implementation among the surveyed enterprises. The respondents were asked about their opinion on the benefits achieved by companies which have implemented LM (Figure 6). Prior to implementation, as many as 40% of respondents of LM had no knowledge in this aspect or believed that companies do not actually have benefit from the implementation of LM. The results obtained seem to be surprising, especially that among the respondents after the implementation of the LM the vast majority (85%) declared that their companies are experiencing positive effects from the implementation of LM. It can therefore be concluded that there is a large disproportion between theoretical and practical knowledge in the field of Lean Manufacturing.

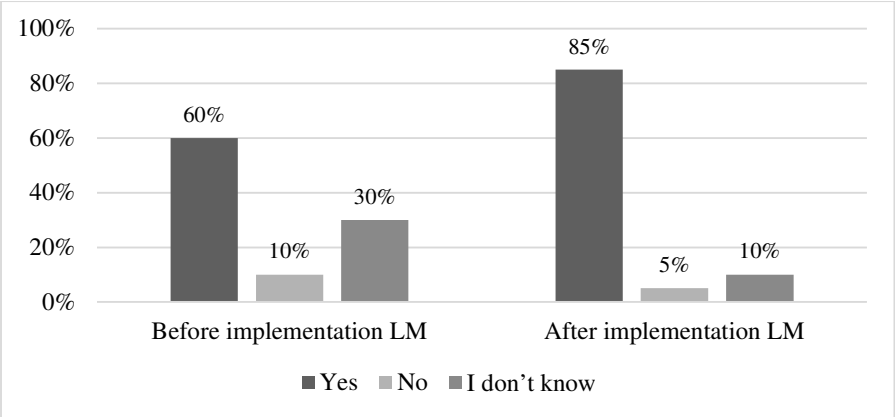

Fig. 6: Lean implementation and achieving benefits by companies

Source: author's own work

Then, respondents were asked to indicate specific benefits that they think the companies gain or they themselves have gained thanks to the implementation of lean (Figure 7). In both cases, respondents above the average (more than 4 points on the Likert scale) indicated the following: better work organization, faster job performance and lower production costs. Moreover, more respondents observe lower benefits in terms of improved timeliness of performance of orders and higher product quality. Compared to other responses, in both cases the greatest discrepancy in the perception of expected benefits is noticeable here.

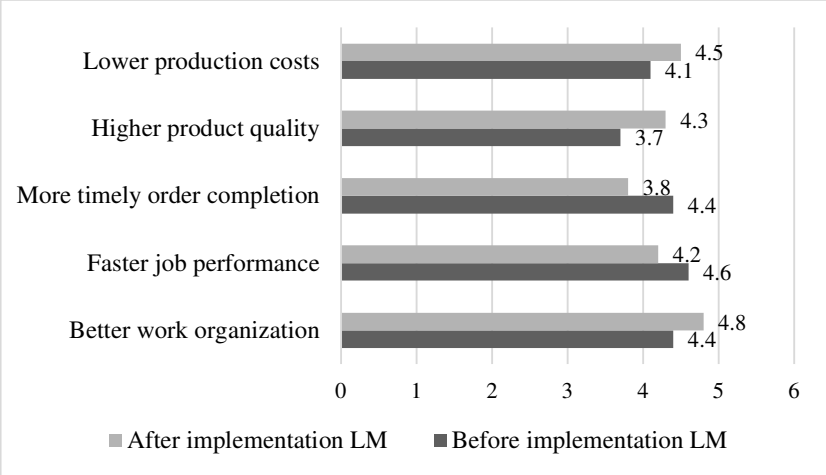

Fig. 7: Average assessment of the benefits of the implementation of LM

Source: author's own work

The purpose of the last, fourth research area was to examine plans related to the implementation of lean among enterprises with experience in this field, as well as among companies that have never taken action in this area before (Figure 8).

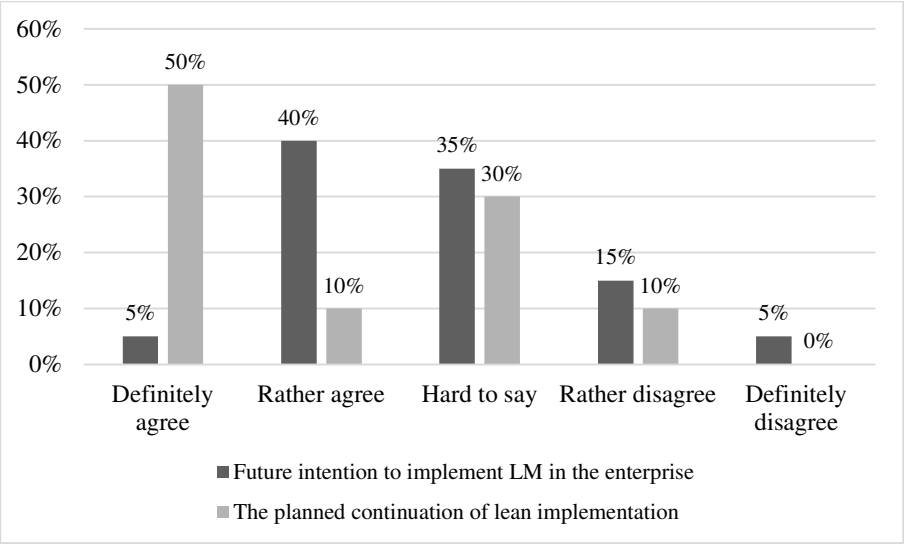

Fig. 8: Future plans related to the implementation or continuation of lean implementation among enterprises before and after implementation of LM

Source: author's own work

Due to the observed positive effects of implementation of lean, companies that have already implemented LM adopt a definitely clear respect on this issue. As many as half of them are determined to continue implementation of further activities in this area. Companies which have not implemented lean yet find it more difficult to adopt a clear position. Although 45% of respondents is willing to implement LM, about one third is undecided, and every fifth examined company will not decide to implement lean in the near future.

Conclusions

The collected research material made it possible to analyze the perception of Lean Manufacturing by companies that are before and after implementation of lean methods and tools in relation to four selected cognitive areas. The first area included an analysis of perception of LM implementation barriers in companies that are before and after lean implementation, divided into internal and external barriers. As far as the second research area is concerned, knowledge of surveyed companies on the subject of Lean Manufacturing has been analyzed. The third area included an analysis of perceived benefits of lean implementation, while the goal of the last, fourth research area was to examine the nearest plans related to the implementation of lean in surveyed enterprises.

Due to the fact that the scientific literature relatively broadly describes various cases of LM implementation along with the description of barriers that come up during or after the implementation of various lean instruments, the new aspect raised in the article is the introduction of time factor. Time factor is a determinant that not only affects the perception of barriers related to the implementation of LM, but also significantly affects the decision to implement LM. An analysis of research results shows that the level of perception of barriers is relatively similar (except for external barriers, where there is a 5 point difference) in both categories of companies. However, barriers present in companies before the implementation of LM are in fact more important, as they limit the actual decision to implement LM.

It is worth adding that knowledge about instruments that can be implemented is developing at a relatively low level. Respondents (from companies before implementation) showed an average

knowledge of 4,4 LM methods or tools, and respondents (from companies after implementation) mentioned 6,7 instruments out of 13 listed tools. A low level of knowledge about the nature, purpose and applicability of a particular LM tool may result in erroneous (seeming) perception and interpretation of internal and external barriers with respect to implementation. For example, companies before implementation, notice above all major financial problems (i.e. willingness to incur expenditures and availability of financial external support). Interestingly, this factor loses importance among companies that have taken action with this respect. Here, the barrier associated with having the right resources, i.e. the right number of employees or the scope of their competence and knowledge, is important.

Analysis of research results also indicates that companies (before implementation) have average awareness of the expected benefits of lean implementation. Only 60% of respondents notice opportunities in this area. Among companies that have knowledge in this field (both before and after implementation of lean), the most often indicated benefits included: better work organization, faster job performance and lower production costs.

As far as future plans related to the implementation or continuation of implementation of lean, companies that have already implemented LM have a much clear position (as much as 50% declare implementation of subsequent activities). Companies that have not yet implemented lean find it more difficult to take a clear position, which results form lack of experience in this area. In total as many as 55% of them are enterprises that are undecided or explicitly declare that they do not plan any activities related to lean implementation in the near future. Because of a small sample the author is aware of limitations of their study, however, the obtained results suggest that it would be advisable to carry out further in-depth, qualitative research in the future.

In conclusion, it should be noted that the conducted research made it possible to obtain research objectives presented at the beginning. Lean Manufacturing is a concept that integrates processes in anentire organization, which is why the knowledge gained from the research on the perception of implementation barriers may in the future enable development of appropriate remedial actions that will prepare enterprises for accepting or continuing lean successfully.

Acknowledgment

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A Creative Team Model

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Abstract

This article presents the stages of a comprehensive model of a creative team. The model is the result of several years of research on work teams and consists of four subsequent stages: recruitment, team building, moderation, and talent management. The model incorporates knowledge about different types of thinking, contains creative methods, and constitutes an answer to the concept of the enterprise of the future.

Keywords: Creative Team, Learning, Creative Methods, Recruitment, Talents.

Introduction

A common feature of all teams is collective work, which requires a combined effort and generates synergy. A creative team enjoys a higher freedom to act than a traditional team and is unrestricted by authority, and thus, should be allowed the possibility to experiment. This means that a creative team requires unusual methods of recruitment that will yield employees with particular traits, such as creativity and innovativeness. However, these employees have to be provided the appropriate tools to foster their potential. The potential of a creative team allows it to produce new ideas for solutions in the company. New ideas are almost always constructed from previously acquired knowledge. Truly creative ideas emerge once any ideas that limit thinking have been rejected (Ward, Finke and Smith, 1995).

It goes without saying that the members of a group influence one another, and their dynamics and self-organizing ability may be an example to others. In this context, a group can be thought of as a mentor (Hooker, Nakamura and Csikszentmihalyi, 2014) and constitute a role model for good practices, which is when it becomes a valuable asset to a well-organized company. A creative team also needs a leader. However, management and leadership have not been considered to significantly affect creativity or innovation, at least in the traditional approach (Styhre and Sundgren, 2005). The goal of the creative team model presented in this paper is to change this approach, as the model specifically requires systematic team management based on knowledge about different modes of thinking.

These modes include situational learning, a set of methods of teaching through short but enjoyable everyday activities. In other words, a company should organize work in such a way that the employees are engaged in their tasks. Examples of situational learning methods are incidental learning, the delayed prompt procedure and the instruction–model procedure. This manner of learning is essential in modern educational conditions (Dohn, Hansen and Hansen, 2019). Another example is bottom-up thinking. In contrast to analytical, or top-down, thinking, bottom-up thinking is non-linear and may produce ideas that require combining different branches of science, solving riddles, and searching for new solutions to difficult problems (Hutchinson, 2002; Mlodinow, 2018). Modern forms of engaging employees include design thinking, managing multiple models at the same time, and lateral thinking, all of which provide the employees with a new perspective on the situation or allow them to redefine the problem.

The model presented in this paper is the result of several years of research. Each stage requires a different approach. The model uses methods that are popular and widely available alongside those designed by the author of this paper. Most currently available models of teamwork expect high effectiveness but do not suggest any particular means of maintaining this result. Moreover, they do not create good working conditions, e.g., through organizational culture, nor do they strengthen the potential of the employees. Instead, they focus on managing conflicts within the team and its barriers. The model presented in this study takes an extra step: while it still takes into account group processes, it also provides methods for stimulating potential and promoting talent. The model consists of four subsequent stages: recruitment, team building, moderation, and talent management. From the very beginning, it allows searching for employees who fit the specifics of an innovative company. The model can support teams such as problem-based teams, self-managing teams, interfunctional teams, or virtual teams. The name depends on the company's individual requirements, from expected organizational structure to scope of operation. The company also decides which and how many positions will be based on teamwork.

Each stage of the model involves designing teamwork, performing tasks with each employee, and implementation. The components of each stage include:

- an unstructured interview to establish the company's expectations;
- determining the team composition;
- observation of hidden group processes taking place within the company;
- application of a synectic method focused on group work (participant observation) to identify any disruptions;
- West's innovative group model or the Assessment Center method;
- selection and application of creative problem-solving methods;
- assessment of the applied method and the team (structured interview and open observation);
- drafting of recommendations for the company.

The model supports the concept of the enterprise of the future, which takes on a specific structure and determines future goals.

Stages of the Creative Team Model

Figure 1 shows the structure of the creative team model developed by the author of this paper. The procedure begins with recruiting the team and ends with managing its talents.

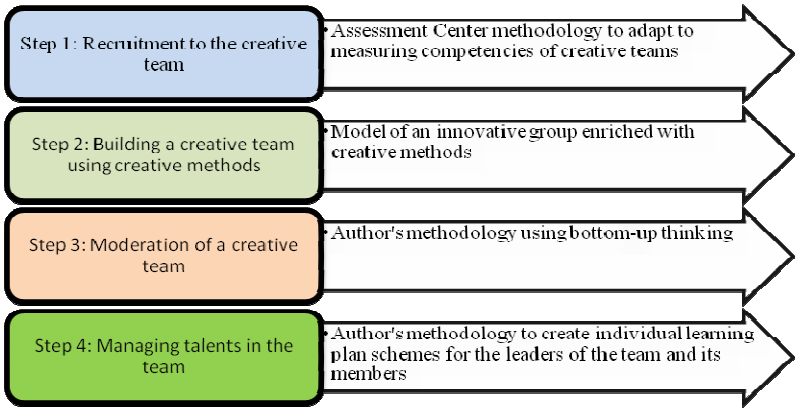

Fig. 1: Stages of the creative team model

The model verifies the team's competences, prepares it for innovative work, supports the company's goals, and facilitates management. Individual development programs for each member of the team can be designed based on an assessment of work results.

Step 1: Recruitment to The Creative Team

Establishing work teams whose goal is to be creative is important enough to begin during recruitment and selection for the company. However, noticing typically teamwork-related traits in any single person is not easy. Therefore, companies have to create special tasks, experiments, and work samples in order to observe these traits. A popular means of achieving this goal is the Assessment Center (AC) method, the effectiveness of which has been verified by many studies (Thornton and Rupp, 2006; Taylor, 2007). Because AC evaluates a person's competences and managerial potential, primarily at mid- and high-ranking managerial positions, it focuses on recruiting individual employees, rather than teams. This study retains the rules of AC (Rupp D. et al., 2005), but expands its scope by adapting it to the selection of candidates for creative work teams. Before recruitment to a creative team can begin, the company has to define competences, not only those common for all teams, but also the competences that are specific for creative teams, such as creativity or familiarity with and use of creative problem-solving methods. This study used the following names of competences: creativity, creative problem solving, group decision making, relationship building, and innovativeness. Appropriate behavioral indicators and tasks to verify these competences were prepared (Tomczak-Horyń and Wasilewska, 2019). Table 1 shows a sample description of a competence.

Table 1: Description of competence: innovativeness

Competence name	Innovativeness
Competence definition	Predisposition for innovation (ability to think in an innovative manner); the ability to implement and adapt newly-generated solutions.
Behavioral indicators of the competence	Following technological novelties and social trends. Knowledge of types of innovation, barriers to innovation, and planning and implementation of innovation. Taking advantage of available methods and techniques of creating innovation or creating your own activating methods. Focus on results.

The following task was proposed to verify it:

Non-role-playing discussion

Task type: group.

Name: New department.

Duration: 50 minutes.

Competences studied in the task: creativity, decision making, innovativeness, creative problem solving, building relationships.

Instructions for the participant

Your group's task is to create an innovation department that you will soon join. You have a real influence on the shape of the new department. Design the structure of the department, its positions and scope.

Step 2: Building a creative team using creative methods

The second stage focuses on building the team from the ground up using West's model of an innovative group (2000), which was expanded with new elements based on the research procedure applied in this study. The model helps to indicate the factors that can improve a group's innovativeness (Figure 2). These factors define the group's initial contribution and intragroup processes, thus producing measurable results. The model assumes that once the effect of the organizational context has been accounted for, the final result is determined by the group's contribution.

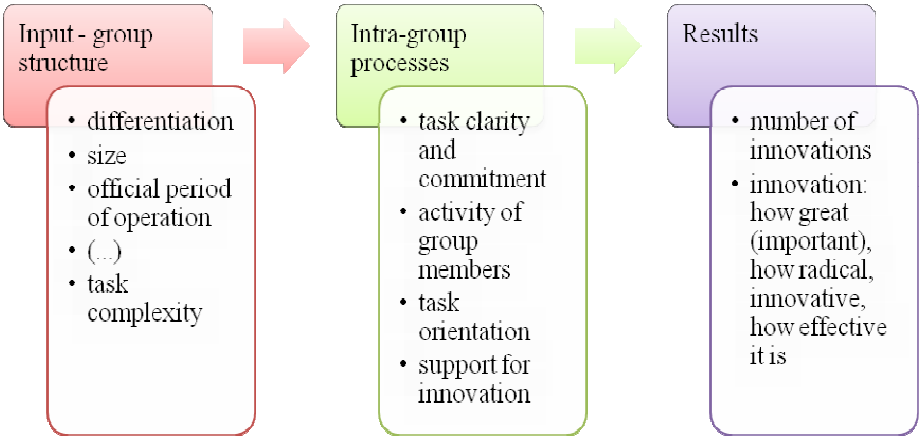

Fig. 2: West's model of an innovative group (West, 2000)

Use of the model helped to build a team in an organized manner and eliminate any disruptions. However, the key part of the model is the creative methods, which were added to intragroup processes. These methods are (Wasilewska, 2018):

1. Influence engagement: the provocation method, creative warm-up, heuristic rules, and creative thinking strategies.
2. Make sure that every team member is active: the six thinking hats method and personal identification.
3. Create an impasse: reversing and redefining the situation or problem.
4. Remove (emotional) barriers: associations, metaphors, and analogies.

Step 3: Moderation of a creative team

Appropriate moderation encourages searching for innovative solutions, motivates the employees to take action and develops their skills, and allows for teamwork planning. The company should select a moderator for the problem at hand carefully. Many moderators are experts (advisors) in their field. Their primary tasks include:

- leading the discussion;
- making sure that the meeting proceeds according to plan;
- applying creative competences (knowledge, skills, and attitude);
- providing the necessary tools, methods, techniques, and procedures.

Whether the selected moderator is an in-house employee or someone from outside depends on additional requirements and needs related to the problem, such as the complexity of the problem (Wasilewska, 2017).

A creative method may also be selected based on a particular source of insight. M. Sawhney and S. Khosla (2015) propose seven sources of insight, or "insight channels". An attempt was made to assign each method to the inspirations that support it. Figure 3 provides an example.

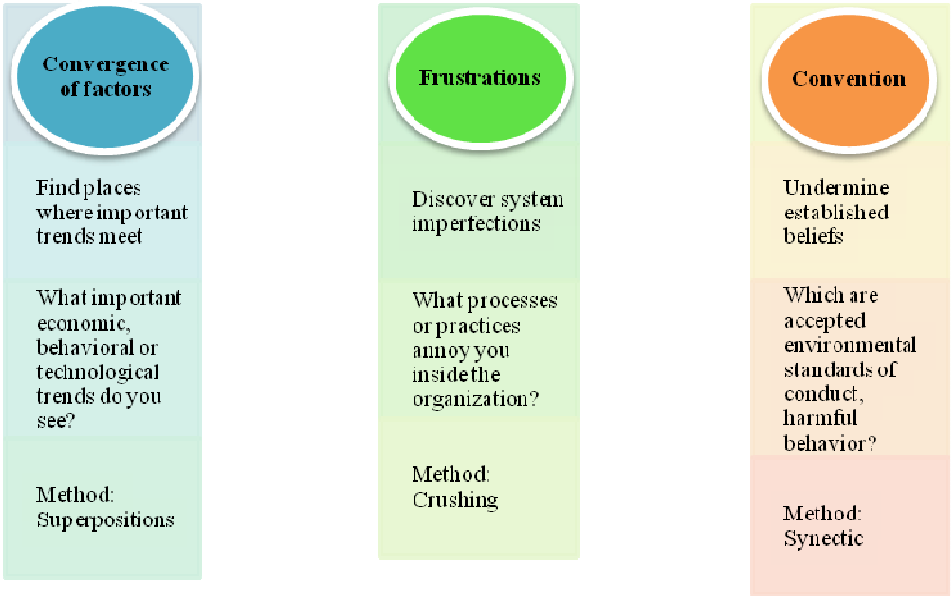

Fig. 3: Sources of insight and their ascribed creative methods (own formulation based on Sawhney and Khosla, 2015)

The superposition method helps to associate objects that are distant and have, at first glance, little in common with one another. The crushing method indicates four types of faults, which makes it easier to notice a problem. The synectic method is based on four types of analogies and uses what is called a fantasy excursion, which helps to find unusual solutions to a problem by seeking solutions to an analogous problem.

Step 4: Managing talents in the team

Traditional talent management involves a number of comprehensive actions aimed at strengthening the position of highly skilled employees and enabling an effective use of these talents by the company, by means of a specially designed tool, i.e., development programs. Programs related to talent management are often very complicated. However, there are certain basic conditions related to successes and failures that, if met, will ensure effectiveness. An important aspect of any competence model created for this purpose is its adjustment to the company's current situation, mission, strategy, and goals; all this with the company's future in mind. This study took into account these conditions. The starting point for talent management was the results of a questionnaire filled in by the team members and their leader. Tests are used to identify traits that are important for the employees'

development. Next, the employees focus on improving the traits with the lowest score. This allows for designing individual learning plans for each employee (Figure 4).

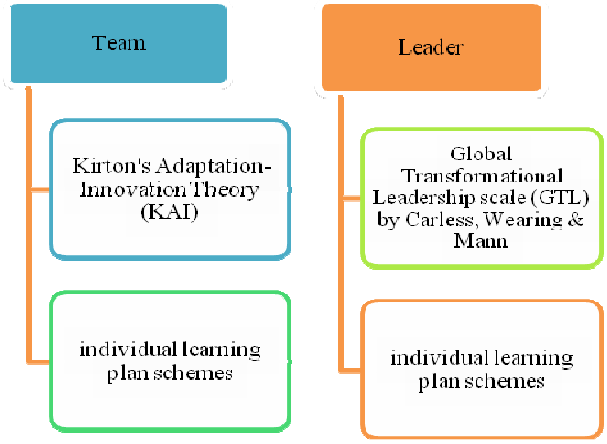

Fig. 4: Final stage of the model incorporating talents

Kirton's Adaptation-Innovation Theory test (Kirton, 2003) is used to identify each team member's cognitive style – whether he or she is an innovator or an adaptor. Adaptors rely on well-established systems to find solutions to problems, whereas innovators prefer to go beyond the standards to find new, untested solutions. Both styles are considered to be necessary for good teamwork. Every person's cognitive style is partly innate and partly determined by his or her experiences in life. According to Kirton, understanding the different cognitive styles present within the company can greatly improve organizational culture, including diversity and the way changes are introduced.

The leader fills in the Global Transformational Leadership (GTL) scale questionnaire (Carless, Wearing and Mann, 2000). The scale consists of seven dimensions, namely: indicate broad horizons, encourage employees to develop new skills, use individual incentives, support the employees in decision making, introduce innovative ideas and methods, serve as a role model for effective action, and radiate charisma. GTL separates effective managers from ineffective managers, which improves the team's efficiency (Stewart, 2006).

For both the team members and the leader, learning plans are established according to the design of the author of this article. These plans evolve based on the company's current needs, but their core elements are the aforementioned types of thinking. Employee learning plans are established in four steps. These are as follows:

1. Determine the employee's current knowledge, skills, understanding, and methods of learning (based on his or her score from a given test).
2. Establish personal development goals based on familiarity with processes in the company and the specifics, trends, and challenges of the industry.
3. Select learning methods to suit company and personal capabilities and preferred methods, taking into account the value added to the team.
4. Establish how the employee is going to monitor his or her progress.

Furthermore, roles, tasks, and projects can be assigned to specific employees to match their particular cognitive style and skills and ensure optimal results. This also helps establish new organizational behaviors.

According to N. Furr and J.H. Dyer (2015, p. 102), a mental space should be created where the innovation process can take place. The leader should let the employees know that innovation is going to transcend borders. For instance, he or she may demonstrate readiness to revise the company's

fundamental assumptions about its products, clients, and business models. The leader also underlines that uncertainty is acceptable, and that he or she is able to manage it. He or she leads by example, embracing new and different things. Furr and Dyer add that innovation requires dedicated time periods. This means facing specific challenges through observation and experiments. Allocating one or two days for innovation may help the employees to use this time effectively.

The aforementioned learning plans take into account the concept of the enterprise of the future, even though the concept itself has yet to be defined in detail; and although there is a growing number of studies on the subject, they still lack a distinct structure. All that is known so far is that the concept involves increasing the rate of innovation and the speed of learning in a complex, rapidly-changing world (Murray, 2017). Thinking in the categories of the enterprise of the future means developing one's own strategy, identifying and minimizing risks, and transforming traditional, knowledge-gathering organizations into effective, knowledge-based enterprises. The enterprise of the future is a continuous search that enforces interdisciplinary action. Traditional business and organizational models impede the flow of knowledge and fail to produce results. Instead, new business models, strategies or even ecosystems should be designed. An increased capacity for innovation and learning among teams will allow for faster responses to changes in the market or even for leading such changes, and this will provide the enterprise of the future with an opportunity to improve competitiveness. Understanding the essence of the changes benefits the creation of advanced systems and production processes, such as intelligent production technologies, online production services, digital production worlds, support systems for production know-how, and other modern production environments (Schlick, Trzcieliński, 2016). This indicates an increasing demand for creativity in technical teams, such as in maintenance departments.

Summary

Contemporary organizational structures are undergoing a significant transformation. They are becoming more dynamic, sometimes over the course of multiple reconstructions. Furthermore, the importance of teamwork is growing. Employees are expected to be more flexible.

The creative team model presented in this paper is the result of several years of research. Each of its stages requires a different approach. The model uses methods that are popular and widely available alongside those designed by the author of this paper. It requires systematic management achieved through knowledge about different types of thinking. The model supports the concept of the enterprise of the future, which takes on a specific structure and determines future goals.

Further research should aim to enrich the model with new creative methods, to stimulate the search for innovative solutions. It is predicted that an audit will be necessary a year after the company implements the model, which is when new tools should be developed that will improve the model.

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Taboos in Higher Education: How Ethical Values Are Bent Under Pressure

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Abstract

The goal of the paper is to analyze the reasons why ethical breaches are expanding within several levels in higher education. The research paper conducts a case study at a faculty from a technical university in Romania through quantitative and qualitative research with case analyses on the experience of younger teachers and the pressures they faced in student-teacher issues and associated management behavior. The funding system for public higher education institutions, decreasing number of enrolled students and lack of a proper family educational background for an increased number of students are causing breaches in applying specific university regulations with fairness and objectivity. Avoiding to bear with time-consuming procedures to solve student issues as well as the mechanism for financing university budgets are however the most common reasons that source unseemly actions. Results provide insights on the effects of indirectly tolerating misconduct and the correlated outcomes in the educational process on medium- and long-term: students' performance issues and the decreasing level of acquired skills by university graduates are among the most obvious side effects. The implications of the research highlight the importance of upholding high academic values by starting with one's own example and how they influence students' conduct, teachers' motivation and the overall perception of higher education institutions.

Keywords: Academic Values, Ethical Breaches, Student-Teacher Issues, Teacher Responsibility

Introduction and Literature Review

The decreasing number of potential students due to demographic decline and lower high school graduation rates in recent years are already challenging the majority of universities in Romania as the most important part of their budget is financed according to the number of enrolled and graduating students (Duerrenberger and Warning, 2018). To increase their attractiveness most universities have procedures to evaluate their academic curricula and teaching staff and have started reviewing their internal teaching processes with more objectivity in order to improve the quality of their study programs based on students' and teachers' evaluations and views upon the quality of the educational process and the teachers' performances in their activity. The specific conclusions and/or corrective measures that will arise after these assessments should nevertheless not miss to underline that the university's teaching policy should be supported by strong ethical and moral value (Schwartz, 2017) as to properly complement the educational principles on which it leads its activity to shape the character and skills of its future graduates (Lofstrom et al., 2015).

Students in Romania are currently more exposed to the harsh competitive nature of today's modern society which is enhanced by the rapid technological development and their career choice is still mostly influenced by certain external factors: parents' educational background (Merenkov, Antonova and Popova, 2018) and/or their specific job profile, friends' and colleagues clear career choices and peer pressure, perspectives and opportunities after graduation – mainly related to financial benefits (Havlíček, Dömeová and Hlavatý, 2018). These pressures create huge expectations which are not always met and may sometimes create an urge to try and influence things to go in a certain way, which often translates into ethical breaches and corruptive actions (Puiu and Ogarca, 2015), topics that are not uncommon in Romania's higher education climate (Osipian, 2009). Misconduct always occurs when there is a breach, when the students sense some kind of weakness (Satalkar and Shaw, 2018; Thomas, 2017), but the proportion of these acts is directly influenced by the way the teacher and/or university management handle these cases (Evans and Levine, 2016; Sârbu, Dimitrescu and Lacroix, 2015) and hesitant or inconsistent measures weaken the institutions' ability to proactively prevent further unethical behavior and issues (Hodgkinson et al., 2016). Nevertheless, the role of the university should be to address these concerns of its students (Tabsh, Abdelfatah and El Kadi, 2017) and guide them to not only focus on the degree itself, but instead, to support their acquired knowledge, skills and value of their studies with a proper mindset based upon high ethical values (Savelyeva and Douglas, 2017).

The present paper focuses on a case study conducted within one of the faculties of a renowned university in the Western region of Romania regarding the upholding of ethical issues at several hierarchical levels within the faculty and the higher education institution. The aim of the paper is to provide a comprehensive overview upon the reasons which lead to a very precarious way of handling students' issues and provide insights to better understand the implications and consequences of such unethical and doubtful practices.

Methodology

The research in question uses empirical evidence and the case research method for a data sample to analyze how internal regulations, administrative procedures and ethical conduct are being upheld by using quantitative and qualitative data. The presented case studies are from one of the faculties within an important technical university in the Western region of Romania, which comprises ethical issues, views and conduct of the Head of Department, Vice Dean, Dean and Rector of the institution in regards to specific situations. The main research questions refer to analyzing why certain students seek to obtain passing grades at any cost (**Research question 1:** Why do students who clearly fail certain subjects due to their own lack of academic commitment put up such a struggle afterwards to try and convince the teachers they should be passed regardless?), why regulations and procedures are completely disregarded within a faculty or university (**Research question 2:** Why are internal regulations and procedures of the university ignored in most cases when it comes to students asking for their exams to be reassessed by another teacher?) and why there is a large gap between what is expected and what is in fact delivered regarding ethical behavior (**Research question 3:** What is the reason why teachers with managing positions within the faculty and university impose and praise high ethical conduct within public talks, but fail to do so within their own everyday activity?).

The students in question from the case studies were in their graduation year. A total number of 434 bachelor degree students were enrolled in their last academic year between 2016-2019 (an average of 108 students/graduating academic year), the timespan from which these case studies are presented, in one of the most problematic graduation generation (class of 2017) more than 30% of students had been subject of misconduct issues and 7% had employed corruptive methods towards the teachers from this research. Attendance figures, overall average grades, dynamic of total faculty allocated places and percentage of graduated students are analyzed with methods of data analysis (arithmetic mean, sample size, validity testing) used to provide necessary context. Data was collected from the grade register of the faculty, faculty and university reports (each register and report contains extensive data, only the data regarding the matter is presented), teachers' specific records upon each student, individual discussions with colleagues, group interviews and department/faculty council meetings. Due to the sensitive topic of the paper only the most relevant ideas, information and

comments are presented, despite the extensive amount of data the authors gathered throughout each presented experience.

Results

Case study 1: An assistant teacher receives a surprise visit in his office after an evening lecture from the father of a student who failed to pass her exam at the subject at which the assistant teacher holds the seminar. He accuses the teacher of intentionally not wanting to pass her, is very aggressive verbally and threatens to physically beat the teacher in case his daughter does not pass the exam next time.

Background information: The student was caught cheating at her semester project in the third Bachelor year at the assistant teacher's subject and was failed at the seminar due to this misconduct issue (19 such students were caught from a total of 109). In the fourth Bachelor year, the same student handed in the project after the deadline had passed and sent an e-mail to the teacher letting him know that she left the project at the faculty on Christmas Eve. Despite accepting the project for review, the teacher considered the project very poor (graded it accordingly) and due to the student also not passing the semester evaluation test, failed her again due to poor professional performance and her lack of obtaining a passing grade (at least 5 out of a maximum of 10) at the seminar (6 other students failed as well from the total of 30 which had to redo the seminar). In the fifth year (first extension year) the student managed to obtain a passing grade for the project, but again failed the semester evaluation test. However the average of the two grades was enough for her to pass the seminar at the subject (she was among the 3 students who passed, 4 had failed again). Her results are shown in table 1.

Table 1: Grades obtained by the first student at the seminar, 2016-2018 (source: faculty registry)

	Semester Project	Semester Evaluation Test	Average Grade	Result
3rd Bachelor year	copied	1.50	N/A	**failed**
4th Bachelor year	3.95	4.00	3.97	**failed**
1st extension year	6.25	4.00	5.12	**passed**

In order to pass a subject a student needs to successfully have a passing grade for both the seminar and the exam. All exams have a theoretical and a practical part (an exercise similar to those performed during seminars), with different teachers being in charge of the lecture (gives the grade for the theory part) and seminar (gives the grade for the exercise part) and a student has to obtain a passing grade for each individual part of the exam in order to pass. The student in question had failed to pass the exam 13 times (3 times in the 3rd Bachelor year – twice being absent, 5 times in the 4th Bachelor year – twice being absent in the special 4th presentation and 5 times in the 1st extension year – never even once managing to pass any part of the exam, neither the theoretical, nor the practical part). The 4th presentation was given twice (despite being against university regulations) in order to grant an extra passing chance to the student, but in the 4th Bachelor year she chose to absent on both occasions, whereas in the extension year she failed to pass on both dates (7 out of 10 students managed to pass the exam at the first date). Between the final extension year exams, the student had an argument with the tenured teacher of the subject in the faculty yard, with the teacher being very surprised by her rude attitude, in addition to her spreading rumors at her job that the two teachers do not want to pass her on purpose and also filing a complaint at the Rector's office. The student's results for the exam are highlighted in table 2.

Table 2: Grades obtained by the first student at the exam, 2016-2018 (source: faculty registry)

	1st presentation		2nd presentation		3rd presentation		4th presentation*	
Exam results	*Theory*	*Exercise*	*Theory*	*Exercise*	*Theory*	*Exercise*	*Theory*	*Exercise*
3rd Bachelor year	4	abs	abs	abs	abs	abs	N/A	N/A
4th Bachelor year	4.50	2.50	4.25	4	4.75	3	abs	abs
1st extension year	4	3.25	4	1.75	4.50	2	4	3

Resolution: The two teachers decided to eventually pass the student. "I have never been so scared and intimidated by anyone in my entire life, as by the threats of her father in my office that evening" (assistant teacher); "I could have given her the grade she deserved and fail her again, but I had enough of her and I could not bear to see her again after those ill-mannered allegations" (tenured teacher). The student would afterwards admit within a written statement (submitted to the Dean of the faculty) that she had not prepared for any of the exams and that she had mislead both her father and the Rector into believing that the teachers were at fault, but no actions or measures were taken by the faculty or university management against her.

Case study 2: A junior lecturer is asked to come to the Vice Dean's office and discuss about the exam result of a student who claims she did not deserve to fail. The teacher brings the exam of the student and explains why she did not pass any of the parts, but is constantly interrupted by the frantic reactions and disapproval of the student, encouraged by the interventions of both the Vice Dean and the faculty secretary who consider that the assistant teacher has no right to grade her exam and suggest passing her on the spot would be the "wise solution".

Background information: The student was frustrated because the exam results she was complaining about were after the 4th presentation and failing would have meant starting a year of extension. Nevertheless prior to that, she had a very strange behavior throughout all the previous exam presentations as she would sit until the end of the exam without writing too much and when asked by the junior lecturer why she remained until the end despite not having learned or solved the exercise she answered: "I am not worried, the tenured teacher will eventually have pity and pass me.", neglecting the fact that the exam had two parts, graded by two different teachers. The tenured teacher of the subject had to leave for a business trip and would be away for the exam within the 4th presentation, but he left designated theoretical subjects to the assistant teacher and asked him to take the exam without him. The second student's exam results are shown in table 3.

Table 3: Grades obtained by the second student at the exam, 2016-2018 (source: faculty registry)

	1st presentation		2nd presentation		3rd presentation		4th presentation*	
Exam results	*Theory*	*Exercise*	*Theory*	*Exercise*	*Theory*	*Exercise*	*Theory*	*Exercise*
3rd Bachelor year	abs	abs	4	abs	5.50	4	N/A	N/A
4th Bachelor year	abs	abs	4.25	5	4.25	4	4	4
1st extension year	4.25	4	4	abs	5.50	4	5	5

The student absented at 2 of the 12 presentations and from the remaining 10 attempts she left the exam 3 times prior to the exercise even being given as she had not written a single word on the exam paper for the theoretical part. According to the ranking of the 97 students of the class of 2017, the second student was ranked 88th with an average grade of 6.31 throughout the 4 Bachelor years, within the last 10% of the class by academic results obtained. The distribution of overall average grades obtained by the class of 2017 throughout their 4 Bachelor years is shown in figure 1. Only 5%

obtained very good results (overall average higher than grade 9.00), a quarter of the class had above average results (overall average grade higher than 8.00), whilst more than a half scored within average results (overall average grade between 6.50 and 7.99). One of five students had below average results (overall average grade under 6.50) with the rate of weak and very weak results being of over 40%, a highly unusual amount of students having such weak academic results.

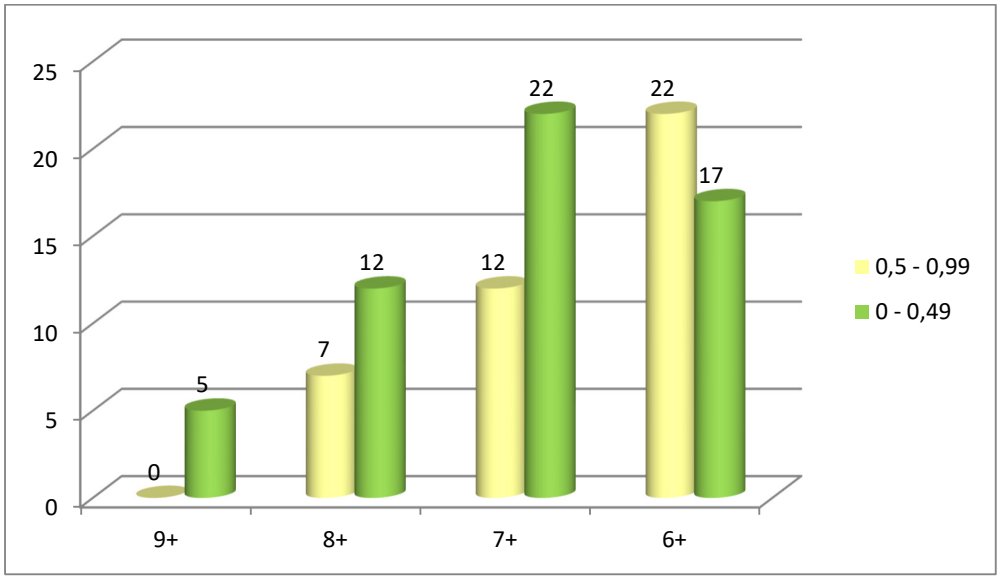

Figure 1: Overall average grades throughout the 4 Bachelor years, class of 2017 (source: faculty registry)

The Vice Dean insisted that he may also grade the theoretical part of the paper (despite him teaching a completely different subject) and that he himself would pass her. At this point the assistant teacher reminded him that in order to pass, she would have needed to also pass the exercise (which he graded) and that it would not make any difference. The Vice Dean then said it is not the junior lecturer's call and decided to have the tenured teacher evaluate the exam after sending pictures by e-mail of both the theory and exercise, but the tenured teacher's response surprised him: "The theoretical part is not suitable for passing in my opinion, it is very weak. The exercise is the responsibility of my assistant (i.e. the junior lecturer) and whatever he says, goes for me as well. Since he is there and I am not it's his decision and whatever grade he gives is final." The secretary then suggested the Vice Dean to annul the exam, but this would have however meant that 6 of the 8 students who had passed would have had to retake the exam, so he would have to think of another solution to help the student.

Resolution: The Vice Dean decided to retake the exam only for those who failed at a date at which the tenured teacher would be present. At that date, after the theory subjects had been given, the student left the exam saying she had not prepared and left without complaints. It would later be revealed that the student had lied at her job that she had already graduated and when asked to present an attestation by her employer she decided to get things solved quickly by asking the Vice Dean to help her in this matter.

Research question 1: Why do students who clearly fail certain subjects due to their own lack of academic commitment put up such a struggle afterwards to try and convince the teachers they should be passed regardless? Answer: The external pressures from either family or job requirements as well as the unrealistic self-evaluation of students' own academic levels lead to a large gap between their expectations and actual reality and creates frustration, often enabling that gap to actually expand over time and sourcing further troubles in both the students' long-term careers and personal development.

Case study 3: One of the youngest assistant teachers of the faculty is visited by a student who has never attended his seminar throughout the entire semester. He explains that he has decided to become a Police Officer back home and just wants to pass the seminar and get his diploma. The assistant teacher explains why this is not possible, but the student says that he does not care because he will still get the situation solved with a wide smirk on his face and terminates the conversation by leaving his office.

Background information: Students have only 7 weeks of lectures and seminars for the subjects from the second semester of the graduation year which are marked by week 10 (after all sessions) and registered at the secretarial office, giving the students at least 4 full weeks for the preparation of their diploma project defense (each semester having 14 weeks). According to the university regulations, in order to pass the semester activity (seminar, project or laboratory) a student must attend at least two thirds of the classes, hand in the required work and have a professional performance which complies with the teacher's minimum passing requirements. The third student came to talk to the assistant teacher in week 11, one week after even the grades for the exam were final and thus the subject ended for that academic year. Despite this setback the student would go and see the other teachers telling them about his change of career plans and claimed he had passed all the exams except for their exam. Meanwhile the assistant teacher received a call from the university asking him about why he failed the student and after his explanations he was told to be "more aware of the situation" and to try to "avoid trouble". The next day after that phone conversation, the student would again come to try and convince the assistant teacher to pass him and stated that this would be "in the best interest of everyone concerned", but the assistant teacher upheld his decision.

Resolution: The student would eventually pass the subject and receive his diploma that summer. Knowing that convincing the assistant teacher would be impossible, the student went to see the Rector, who spoke to the tenured teacher of the subject and told him he could overrule the assistant teacher's grade and change it in the faculty registry but insisted the tenured teacher was not to inform his assistant upon the issue. Both the assistant teacher and the Dean of the faculty were surprised to see the name of the third student among those who would defend their diploma project that summer, because both knew the student failed the other's subject. "He failed my exam 4 times and he begged for another chance, despite being against regulations. I accepted knowing he had already failed in one subject (i.e. the assistant teacher's subject), so I thought it would not make any difference and I also marked his grade in the registry, upon him insisting I do it then for him not to have to remind me to do so in autumn, as we verbally agreed before the exam." (Dean of the faculty) The exam was graded and marked at the secretarial office after the student's meeting with the Rector, despite the student's claim that he had passed everything except the assistant teacher's seminar. The assistant teacher informed the tenured teacher, Dean and Rector about the entire situation, but no corrective actions or punitive measures were taken by the faculty or university management against the student for misleading and deceiving academic staff. Instead, the assistant teacher was informed he could face disciplinary action.

Case study 4: A lecturer is called by the Head of the Department to discuss about his results from the students' evaluations conducted within the university. The lecturer faces a surprisingly harsh feedback and incongruous allegations throughout the discussion, but at the end of the discussion is left even more surprised as he is promised that the imputations would be overlooked if he were to pass a certain student at an upcoming exam.

Background information: After each semester the university conducts an online assessment of the staff's teaching performance and evaluation criteria, as perceived so by the students. The assessment is done at the university, within the faculty's 3 laboratories, because the students are given codes and matching passwords for every subject by a random teacher who is in charge of the process. The results of the assessment are sent from the university database to the Head of Department who then sends them out to the teachers concerned. Table 4 provides an overview of these results.

Table 4: Results of students' evaluation for a specific subject, 2018 (source: university database)

	Tenured teacher			Assistant teacher (lecturer)		
Subject	**Answering students**	**Total number**	**[%]**	**Answering students**	**Total number**	**[%]**
Class of 2018	61	148	41.21	4	148	2.70
Group 5	59	29	203	4	29	13.79
Attendance	**Under 25%**	**Between 25-75%**	**Over 75%**	**Under 25%**	**Between 25-75%**	**Over 75%**
Class of 2018	5	30	26	1	0	3
Group 5	1	17	31	1	0	3

Besides the figures, the Head of the Department also provided some additional remarks he claimed the students had made in regards to the lecturer's performance at the seminar, which were: lack of attractiveness, clarity and interaction. He also added using "too direct language" and making fun of students. The lecturer was shocked and insisted that there had to be a mistake and that those evaluation results could not possibly be associated with him and his performance. He also referred to the low amount of students (under 3%) assessing his performance, the data inconsistency (a student marked he had under 25% attendance, which was impossible because all students passed the seminar and in order to do so a minimum attendance of 66% is required), as well as the very odd overlap of data by group 5 in regards to the class (203% answer ratio is impossible), but the Head of the Department replied by saying "That's what it says, these are the conclusions and I do not wish to comment more." The lecturer was very surprised by these remarks, as his personal feel after the seminar was a very positive one. Upon analyzing the results of his students, similar conclusions would support this feeling, as the overall subject average was 0.39 points higher than the class's overall average grade for their 4 Bachelor years (a 5% increase in the grade), 105 of the 148 students managing to score a higher grade in the subject than their overall average (70% of all students), whilst average attendance figures for the subject's seminar (an indicator of interest and attractiveness) were well above usual average attendance figures (88% on average), exceeding the minimum attendance requirement by 25%. The results of group 5 were no different: almost 2% increase in subject grade compared to overall average, 65% of students scoring higher grades and an 84% average attendance (more than a quarter of students having recorded a 100% attendance). An overview of these figures is provided by table 5.

Table 5: Results of subject grades compared to overall average grade, 2018 (source: faculty registry)

Results	Subject average grade	Overall average grade	Difference	Above overall average grade	Under overall Average grade
Group 1	8.40	8.27	+ 0.13	25	10
Group 2	7.76	7.45	+ 0.31	16	9
Group 3	6.78	6.80	- 0.02	15	9
Group 4	9.32	8.08	+ 1.24	30	5
Group 5	8.14	8.00	+ 0.14	19	10
Class of 2018	8.20	7.81	+ 0.39	105	43

The student the Head of the Department was referring to was related to him and his father was in charge of the maintenance for the faculty's printers and had refused to service and repair the printers "until the situation was solved". Prior to the discussion between the lecturer and the Head of Department, the student had failed the exam 3 times: once leaving the exam after the subjects were handed out (blank paper), then not obtaining a passing grade for the theoretical part and again leaving

the exercise part blank and the third time not managing to obtain a passing grade for any of the parts of the exam.

Resolution: The student would eventually pass them exam. Although he rightly obtained a very good grade at the exercise, his performance at the theoretical part was very poor, but the tenured teacher passed him nevertheless. As a consequence, within the next week all pending problems, maintenance issues and needed repairs of the faculty's printers were taken care of with promptness. The tenured teacher commented: "I could have failed him and we would have still had the problems with our printers, so what would I have gained? This way, everybody wins." In addition, the lecturer's presumed poor assessment by the students did not seem a problem anymore, as the Head of the Department stated: "It's not actually a problem, only a question of balance. I think you need to be more careful with the relationship with certain students and adjust things accordingly when there are specific issues."

Research question 2: Why are internal regulations and procedures of the university ignored in most cases when it comes to students asking for their exams to be reassessed by another teacher? Answer: First of all, these procedures are time-consuming and require hearings, discussions and paperwork, as well as communicating decisions to both the student, teacher and the university administration and are formally registered and will be integrated in the university report, which is perceived as a very negative occurrence. Then there is the chance of the student not being pleased with the resolution, which would mean he pursues and addresses the university directly with a similar procedure involving different staff and Vice Rectors who have to reassess the solution given by the faculty, making it even lengthier. Thus a simple and on the spot fix for the student is much easier for those potentially involved and the faculty and university management prefer this alternative (time and paperwork savings, student leaves happily), despite it being against own regulations, highly questionable as an approach and unethical in most cases.

Case study 5: An assistant teacher is called by the Rector for a discussion regarding the amount of recent complaints received by him and his younger colleagues at the university. Despite always praising the university's ability to provide highly skilled graduates as a result of high ethical standards and academic values, the Rector seems to see things differently when talking to the assistant teacher and suggests that "finding proper solutions for each individual case" would lead to a "wiser long-term outcome". He also mentions that if the assistant teacher were to abide the university regulations too strictly, he would be facing disciplinary action and that this discussion is just a "friendly warning" to prevent such a thing happening in the future.

Background information: The Rector was also aware of the cases previously mentioned and pointed out that if the Ethics Commission from the university would have analyzed the accusations brought upon these younger teachers (including him), regardless of the outcome, their right to be promoted to a superior academic position would have been suspended for a time span of 5 years according to the university's internal regulations. After letting the assistant teacher present his view on the 4 cases, the Rector was nevertheless quite surprised of the amount of details he had not been aware of when judging and interpreting those situations prior to the discussion with the assistant teacher and admitted he had not thought to do some background research on the students who came to complain to him. Despite agreeing with him on the 4 cases, the Rector concluded that it is important for all of them to "get the message" and understand the fact that sometimes the younger teachers need to show "special attention and consideration to certain situations".

Table 6: Student figures and place allocations at faculty level, 2016-2018 (source: faculty registry)

	2016		**2017**		**2018**	
Number of students	1st Bachelor year	Graduates (Class of 2016)	1st Bachelor year	Graduates (Class of 2017)	1st Bachelor year	Graduates (Class of 2018)
	179 (179)	98	156 (155)	98	162 (145)	114
Number	**2016**		**2017**		**2018**	

of allocated places	Bachelor degree	Master degree	Bachelor degree	Master degree	Bachelor degree	Master degree
	155 (185)	115 (140)	156 (180)	110 (140)	156 (180)	110 (140)
Number of own students	**2016**		**2017**		**2018**	
	Enrolled in Master degree	Master degree places	Enrolled in Master degree	Master degree places	Enrolled in Master degree	Master degree places
	46 (98)	115 (140)	42 (98)	110 (140)	49 (114)	110 (140)

The proportion of students enrolled who also graduate at the end of the 4 year Bachelor studies has slowly risen throughout the last 3 years, from 54.7% (2016) to 70.3% (2018), but the number of budgeted places allocated to the faculty has decreased by 13.3% within the last 5 years, from 180 places (2012) to 156 places (2017) due to the declining number of students who manage to finish their Bachelor studies once enrolled within the 1st year compared to previous forecasts. Within the last decade the proportion of students enrolled within the 1st year who actually finish their studies has decreased from around 80% to around 60% (61.2% in 2015, 54.7% in 2016 and 62.8% in 2017), meaning that the proposed number of allocated places for the faculty was also adjusted downwards: from 240 places (2008) to 195 places (2012) and 180 places (2017), an overall decrease of 25% in the last 10 years. The proportion of budgeted places has also been reduced: from around 95% (2008) to 86% (2018) and has also affected the allocations for the master degree programs after 3 consecutive years where the number of enrolled student figures had decreased (by 20% in 2016, by a further 5% in 2017 and another 7% in 2018). Thus, if there were 225 total places available in 2008, this number would decrease by 20% in 2012 (180 total places) and by a further 22% in 2016 (140 total places), more than a third of the available places being cut due to the shift of graduate students' dynamics. Although the proportion of budgeted places has remained at a steady 80%, the deceasing number of enrolled and graduating students has affected the overall budget of the university, as financing is obtained according to the number of enrolled students, on the one hand, and depending upon the number of graduating students, on the other hand. Moreover the retention figures of own graduates in the Master's degree programs (46.9% in 2016, 42.8% in 2017 and 42.9% in 2018) has also declined and is now under 50% for the third year in a row after a constant rate of around 70% or more in previous years. With Bachelor students' graduation figures being rather modest, with low chances of having improved future dynamics and a poor retention of own graduates in the master programs, perspectives are not looking very encouraging for future years in terms of increasing financing for the budget of the university.

Resolution: Knowing the Rector also likes to talk about student figures during his public speeches, the assistant teacher asks if passing them all is what is expected of him and his colleagues. The Rector avoids giving a direct answer, but nevertheless implies it: "I would not want you to do that. Instead of failing them, have them redo their evaluation test/project at the end of the semester until it complies or just give them some extra assignments and eventually pass them." This idea is confirmed within a meeting the Rector has with the faculty staff where he states that the teachers have to show "more consideration and understanding of the circumstances, challenges and situations certain students might face and help them solve their academic issues and avoid generating troubles". Meanwhile, on public and official settings he presents the university as an organization with high academic standards, offering very skilled graduates with a solid educational background and high ethical and moral values and praises the high number of graduates it produces every year. These words were contradicted by local companies who employ many of the university's students at a recent conference on higher education, where several examples were given which contradicted the Rector's praise of the institution's graduates.

Research question 3: What is the reason why teachers with managing positions within the faculty and university impose and praise high ethical conduct within public talks, but fail to do so within their own everyday activity? Answer: Managing positions also mean having to source funding and being in charge of providing consistent figures and the higher the figures, the better the general acceptation is, despite the quantity-quality balance being highly neglected within such an approach. Business is

money is thus valid even when education is concerned, as receiving an extra grant and funding shows to be more important that upholding (even own) ethical values.

Discussion and conclusion

The proportion of students' misconduct is directly influenced by the way the teacher and/or university management handle such issues with hesitant or inconsistent measures thus weakening the ability to proactively prevent further ethical breaches. Lowering assignment difficulty, grading standards or increasing vigilance during exams are only short-term fixes, whereas indirectly tolerating certain breaches in ethics by not applying harsh penalties will further deepen the issue. Education is a continuous process and is the basis of a healthy society, thus the role of those who intervene is essential in developing correct values, respect and responsibility. In a report from 2016 the Coalition for Clean Universities outlines that academic integrity is a major problem of the educational system in Romania, as 77% of students and 34% of teachers perceive that the level of corruption in universities is high. The reason mainly comes from background education, as there is a strong sense of competitiveness and pressure from parents towards their children to have them follow successful careers and outperform them by all means. This is due to certain features and gains they may enjoy as are those of social status, reputation and other benefits resulting from such achievements.

The interference in the educational process by parents or nepotism alters the capacity to objectively assess the qualities, knowledge and academic results of a student and negatively affects his appropriate personal and career progress. Because scandals rapidly catch our attention, we tend to associate strong feelings towards such issues and there is a natural tendency to avoid this happening in higher education as this may cause negative commentaries upon the institutions' reputation if "word gets out", so the silent solutions are usually preferred. A former Dean of the faculty sees things differently: "Students leave university after the completion of their studies, fellow teachers work with us together for much longer than that, and we know our colleagues better than we know the students, so not giving credit to the teachers in student-teacher issues is not the proper way to find sustainable solutions". Authority is however a very important sign of acceptance, as students prefer to look for higher authority when a teacher does not pass them or when they are not pleased with certain outcomes: should the higher authority confirm the teacher's decision, then he gains in reputation and respect from students, however should his decision be overruled, then students will be more likely to continue seeking "second opinions" from higher authorities within the faculty/university.

The rules are thus rules only when it's convenient for those who have to apply them to actually apply them. When there is a situation which implies students, no matter their degree of mistake, fault, lack of proper academic behavior, the rules are usually bent in his favor by a higher authority and the concerned teacher is hindered in his jurisdiction, becoming a pattern followed by those students who do not comply with certain academic standards and then search to seek solving their issue by other means. By not following the established procedures, they obtain their desired result a lot faster and without passing through a thorough examination of the issue by those who decide to overrule the teacher's decision. Teachers faced with such issues will be more likely to shift their focus and motivation towards those activities which add more value to themselves in their academic career and be less concerned with investing their efforts in the teaching process as a consequence of losing their authority, ultimately lowering the quality of the educational process provided. More recent issues (silently solved) include a teacher asking for fictive students at the end of the semester and during the exam, teachers showing up drunk in class or not showing up for more than half a semester or even an unruly student offering to pay a teacher on the spot for a finished bachelor thesis only 2 days prior to the deadline and with another teacher present in the office during the entire scene.

Technical competences will most likely be sooner or later acquired by graduates and strictly focusing on the specific knowledge of a subject and neglecting to develop a deeper understanding of the content will hinder creative thinking and problem-solving skills which are so necessary in today's fast developing technological setting. Moreover, by not imposing a high level of academic values and upholding them, universities will in future lose their reputation as higher education institutions and the level of their students will confirm the decrease in quality and performance of their educational

process. The efforts of the university should thus be oriented towards handling these situations with higher attention and priority, finding solutions to avoid their expansion and providing positive examples by those who are in leading management positions by promoting high ethical and moral values through their own conduct as an inspiration for their fellows, colleagues and students. Future research directions on this sensitive topic could be represented by analyzing career development outcomes on short and medium-term for teachers and students involved and how these issues have affected their subsequent personal and career paths. An important implication to be analyzed within this background is how these types of situations and challenges have shifted young teachers' motivation and conduct and how their decisions in similar issues were affected.

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Integration of Information Systems in a United Information Environment of a Manufacturing Enterprise

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Abstract

This article discusses the requirements for the integration of information systems in a united information environment of an industrial enterprise. Compliance with these requirements allows you to minimize the loss associated with configuring integrated systems in a common system. This integration is based on the subsystems available at the enterprise that operate in the information infrastructure. The principle of information compatibility of subsystems is shown as the intersection of the set of data coming from the source subsystem to the recipient subsystem. The levels of necessary support for the components of subsystems for reliable, uninterrupted and safe operation of a united information space are considered. Describes the characteristics of the necessary work on maintenance and configuration of individual subsystems to prevent emergencies in the entire system as a whole. Reliability indicators of the solutions used to create the infrastructure subsystems are presented. The factors of the order of interaction between the personnel of subsystems and the personnel of the automation object are determined.

Keywords: Information Technology, Industrial Enterprise, Production.

Introduction

The main goals of industrial enterprises in the conditions of the fourth industrial revolution are to increase the competitiveness of products, improve the quality of products and services at all stages of the product life cycle, ensure technological independence in the most sensitive areas, and increase the production of high-tech products. Achieving these goals is possible only through deep information modernization of industry, especially engineering.

Literature Review

The theoretical and methodological basis for the study of complex information systems, which include systems for automating the production environment of an enterprise, are system theory, system and data mining. The greatest contribution to the development of this scientific area was made by M. Lipov (1974), P.B. Moranda (1972), S.V. Novikov M.E. Shooman (1972), C.A. Sukert (1977), K. Wall (1977), S.V. Novikov (2018), A. Bikmullin, B. Pavlov, Z. Khusainov, G. Mingaleev (2019).

The problems of implementing the key technologies of Industry 4.0 in the integrated information environment of an enterprise are considered in the works of scientists V.Komarova, A.A. Zamkovoi, S.V. Novikov (2019), Tikhonov A.I., Sazonov A.A., Novikov S.V. (2019).

Object: industrial enterprises specializing in the production of high-tech products and implementing information and digital technologies in manufacture.

Methods: analysis, systematization and synthesis of data, modeling and algorithmization of processes.

Methodology

One of the main directions of industrial modernization is the development, implementation and application of information systems that allow integrating production processes into the product life cycle.

The general concept is to form a united information system (UIS) to ensure the development and production of the product. UIS is designed to automate the collective work of specialists and heads of design departments, units of design preparation of production, technological preparation of production and technological bureaus of the workshops of the main production in the development, preparation of production and support of product operation. All measures to create an UIS are possible only if there is a prepared IT infrastructure.

The goals of creating the UIS are the following:

1) Ensuring the collective development in electronic form of the products, taking into account geographically distributed process participants and safety requirements;
2) Creation of a united database of the products;
3) Automation of the processes of design and development, production preparation, planning and accounting in production, testing and maintenance;
4) Ensuring the processing and safety of product data.

In the practice of using separate information systems, their composition is quite stable and their list can be described by the following components:

1) Subsystem for the integration of production and operations, human resources management, financial management and asset management (ERP);
2) Product data management subsystem (PDM);
3) Subsystem for managing the production program, projects and cooperation (PM);
4) Master data management subsystem (MDM);
5) Computer-aided design subsystem (CAD);
6) Computer-aided manufacture subsystem (CAM);
7) Computer-aided engineering subsystem (CAE);
8) Advanced Planning and Scheduling subsystem (APS), which includes planning, management and monitoring functions;
9) Manufacturing executive system (MES);
10) Enterprise service bus (ESB).

The subsystems that are UIS's parts during the operation process exchange information through the enterprise service bus. This exchange is based on:

- automation of information exchange in the form of formalized messages (XML – eXtensible Markup Language), transmitted through the ESB integration bus;
- automation of business processes between allied UIS's subsystems in the form of workflow templates;
- automation of computation data management due to the formation of a united information environment.

Data exchange, carried out through the ESB, operates on the basis of the developed data formats, protocols and data exchange regulations between the above-mentioned allied UIS's subsystems.

Results

Information compatibility of UIS's subsystems is ensured on the basis of digital transformation during data exchange between allied UIS's subsystems and bringing it to the format of receiver systems. Such a transformation is carried out by describing the interaction of information systems, and is represented according to the cybernetic principle of the "black box", by the three data sets presented in the Figure 1 for two subsystems.

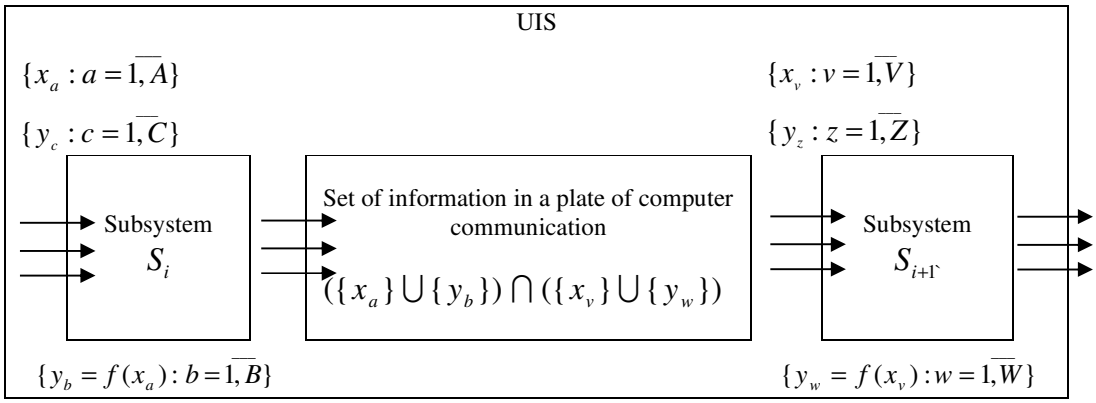

Fig. 1: Integration of subsytems.

In the Figure 1 S_i, $S_{i+1`}$ are the subsystems, correspondingly;

$(\{x_a\} \cup \{y_b\}) \cap (\{x_v\} \cup \{y_w\})$ is a set of information understood by the first and second subsystems, formed by the intersection of the information bases of these subsystems.

Note: 1. $\{y_c\} \subset \{y_b\}$;

2. $\{y_z\} \subset \{y_w\}$.

The indicated sets for the first subsystem are:

Input of the system — $\{x_a : a = \overline{1,A}\}$ — a set of input information for S_i subsystem;

Body of the system — $\{y_b = f(x_a)\}$ — a set of tasks to be solved for S_i subsystem;

Output of the system — $\{y_c : c = \overline{1,C}\}$ — a set of the solutions for S_i subsystem.

The indicated sets for the second subsystem are:

Input of the system — $\{x_v : v = \overline{1,V}\}$ — a set of input information for S_{i+1} subsystem;

Body of the system — $\{y_w = f(x_v)\}$ — a set of tasks to be solved for S_{i+1} subsystem;

Output of the system — $\{y_z : z = \overline{1,Z}\}$ — a set of the solutions for S_{i+1} subsystem.

The intersection of the sets of information bases of integrable systems defines a special format of communication, including a set of specific (typical, standard) conditions:

$$\left\{ y_w = f(x_v) : w = \overline{1,W} \right\}$$

The resulting format of communication is a necessary component of the integration process, determining the set of valid information involved in the communication of information subsystems. The concept of "communication" is functionally a certain set of information that is unambiguously understood by integrable systems. Communication is ensured by linguistic compatibility due to the

use of a single message description language XML during the exchange of information between allied UIS's subsystems. The communication between the allied UIS's subsystems is carried out through standard data exchange protocols supported by the enterprise data transmission network, taking into account the current requirements of regulatory documents.

In the production cycle of the enterprise, the UIS provides:

a) in the regular mode (this is an operating mode of the UIS, in which the functions are performed in full: all components and functionality of the subsystems are available, the provided computing power meets the engineering specification):

- continuous work of divisions in a single environment;
- data exchange between the allied subsystems;

b) in service mode (technological maintenance mode, in which a number of infrastructure subsystem components are withdrawn from operation in a planned manner, application subsystems operate on backup computing capacities. For some components of infrastructure subsystems with preliminary coordination is allowed for a short interruption to switch to the reserve capacities):

- subsystem modernization;
- data back-up;

c) in emergency mode (the mode of operation of the UIS, in which a number of components of the infrastructural subsystems fail as a result of a failure or fault. The mode is characterized by a significant limitation or lack of capabilities to perform the UIS's tasks due to malfunctions of its hardware and software):

- data back-up.

For the UIS in all operating modes, the reliability, safety and security of the information processed in it is ensured. This is achieved at the level of applied subsystems, where the mutual solution of the problem occurs:

- The UIS should provide tools for diagnosing the subsystems' processes that are part of it, including logging and monitoring of the performed process.
- In the event of an emergency, the diagnostic tools should allow you to save the set of information necessary to identify the problem.

At the level of infrastructure subsystems' components are provided:

- Maintaining system logs implemented by the standard hardware and software of each of the infrastructure subsystems' components, indicating the date, time, status data at the time of the occurrence of malfunctions, errors, and incidents.
- Providing standard, documented hardware and software interfaces for remote monitoring provided by the subsystem architecture.
- Ensuring the possibility of modernization related to the release of new versions (releases) of software, including operating systems with preservation (with the possibility of expansion) of the functionality of all subsystems implemented as part of the implementation of the UIS.

Requirements for the qualifications of personnel are established by the job descriptions approved and applied for each staff unit at the enterprise. Employees who have been instructed in accordance with the system role, certified and have an account are allowed to work in the UIS (by the time it is put into operation). Also, by the beginning of the industrial use of the UIS, the staff of the necessary fully-staffed personnel is being trained both in standard courses corresponding to the system role and in the framework of instruction according to user instructions developed for this role. Specialists are organized into the necessary working groups with established work schedules.

To calculate the minimum staffing level of administrators, you must consider:

- subsystem availability indicators and a wide range of administrative responsibilities requiring a permanent presence at the workplace;
- need to provide a substitute for vacation or illness.

The UIS installed on an enterprise's hardware platform with a performance not lower than the minimum requirements for a system should ensure that all requirements specified in the initial task for the system's functioning are met. The UIS's components can undergo changes under the conditions of business processes, and it is necessary that the infrastructure subsystems ensure the operation of the application subsystems that are part of the UIS for all categories of users, including geographically remote ones, with centralized databases and logical structure.

UIS's components are configured with the ability to implement:

- scalability by the number of users;
- setting and changing the configuration of user workstations;
- independence from changes in the organizational structure of subdivisions while maintaining the composition and content of the functions performed;
- the ability to relocate users within the corporate network.

The UIS's components can be modernized and developed when the parameters of the automation object are changed within the framework of industrial production, as well as when the composition of the requirements for the functions and types of support is changed. The modernization and development of the UIS's components is carried out by subject matter experts and application service programmers using appropriate software that automates the modernization and development process, as well as documenting the results. When expanding the functionality or the number of UIS's users, an assessment is carried out and the need for technical means is determined to preserve the temporal characteristics of functioning.

None of the UIS's components can be the cause of emergencies. All UIS's components are configured for the correct processing of user actions and error messages from the operating system; they are correctly informed of erroneous actions on their part.

UIS's hardware and software is provided with the necessary maintenance and configuration of individual modules without UIS's components.

The UIS performance is restored within 4 hours if the application software fails, if there are no hardware problems, it does not require restoring the operating system, deploying and configuring special software on servers, or restoring data using the latest backup.

Providing protection against information loss at various failure levels of the software and hardware complex (for example, server, DBMS, etc.) is carried out using the data of the replicated server. This ensures data integrity, and restoring the database to the state at the time of the last transaction completed by the subsystem occurs regardless of a failure or loss of electrical power. However, in case of damage to the DBMS transaction logs, the restoration of the state of the system component occurs at the time of the last data backup, but no more than one day before the failure.

Ensuring the UIS reliability is carried out at the stages of development and operation. At the stage of development of the EIS, structural redundancy of critical components of the EIS is provided, including the introduction of additional components into the structure that perform the functions of the main ones in case of failure.

The solutions used to create infrastructure subsystems as part of the UIS are based on reliability indicators that allow:

- ensure the availability factor of infrastructure subsystems as a whole is not worse than 0.95;
- within 24 hours to restore the operability of the target application of UIS's subsystems using the resources of infrastructure subsystems.

Convenience, unambiguity and stability of user communication with software and hardware are the prevailing factor for all types of interfaces. The user interface of the UIS's components is a standard

solution for all users and includes the ability to customize to user requirements (changing the order of menu sections, highlighting the most frequently performed functions in a separate list). The UIS's user interfaces are implemented in a modular fashion with the greatest possible unification and typification of the solutions used. Design of screen forms is carried out taking into account the specified requirements, while:

- all screen forms of the user interface within the subsystems are performed in a single graphic design, with the same arrangement of the main controls and navigation;
- similar graphic icons, buttons, and other control (navigation) elements are used to indicate similar operations. The terms used to indicate typical operations (adding an information entity, editing a data field), as well as the sequence of user actions when they are performed, are unified.

During the operation, maintenance, repair and storage of system components, the following requirements must be adhered to:

a) Maintenance of UIS's components is performed by administrators of subsystems.

b) Engineering solutions for the development and modernization of the UIS's components are provided for the possibility of a planned shutdown of the individual components of the subsystem for routine maintenance without loss of functionality and stop the UIS as a whole.

c) The operation of UIS's software and hardware includes the following types of services:

- runtime service;
- scheduled maintenance;
- accident operation;
- modernization of the subsystem's modules and elements;
- disaster recovery.

d) Operational maintenance provides daily monitoring of the functioning of the UIS's software and hardware using stand-alone administration tools for the UIS components. Operational service does not affect the performance of the functions of the UIS's components for the provision of information services in general. During operational maintenance, documentation of ongoing procedures and operations, analysis of the functioning of the UIS's components and elements, development of recommendations for improving the operation of the UIS are carried out. At the same time, a periodic review of the regulations and the introduction of the necessary changes to the operating procedures is carried out on the basis of the experience in operating the UIS.

e) Preventive work includes periodically checking the relevance of the regulations, checking and maintaining the components, checking the operability of the backup procedures for individual UIS's elements and components, backup and data recovery procedures for which such maintenance and procedures are provided for by operational documentation. Preventive work is also documented during the procedures and operations, an analysis is made of the functioning of the UIS's components and elements, recommendations are made to improve the work of the UIS.

f) A backup copy of the current version of the UIS's components application software is stored on magnetic or optical media and is available for use by maintenance personnel.

g) Operation in case of accidents of UIS's components provides for the procedure for transferring services to redundant elements, notifying management and users about switching to redundant elements, ensuring the relevance of software and information support, operability of redundant elements of UIS's components, and carrying out the necessary set of emergency recovery work.

h) When upgrading UIS's components, it is necessary to provide for a set of regulated procedures for withdrawing from service and replacing obsolete modules and elements, putting updated modules and elements into operation, and documenting actions taken.

i) Disaster recovery is carried out on the basis of the regulated recovery of UIS performance, data recovery in case of malfunctions and hardware failures, recovery of software media, analysis of malfunctions and causes of the accidents. During restoration, the work and operations performed are documented, the causes of the accidents and the functioning of the UIS's components and elements during an accident are analyzed, recommendations are developed to ensure the reliability of the UIS and the necessary changes are made to the restoration procedures.

Information protection from unauthorized access at the level of application subsystems is implemented by the application software subsystems.

Design and engineering solutions for the construction of UIS are implemented on the basis of the requirements of the current legislation on copyright and related rights for patent purity, which govern the creation of automated systems. Being parts of the UIS software and hardware should be patented. In this regard, the purchase of software and hardware products, rental of means and communication lines are carried out only by those organizations that have rights to such activities. Engineering tools and means of communication are certified in the relevant state structures in order to obtain permission to operate in data transmission systems.

When developing an UIS, it is envisaged to use unified forms of input documents, international, state and industry classifiers, unified protocols for the exchange of information between all levels of the UIS. Also, the reporting documents generated by the UIS's components have a unified content in terms of the formats of the data presented and a unified presentation for each type of report.

System software is unified by version and composition within the implementation object and automated working station.

Automation of information flows in accordance with the list of information flows from the subsystems is based on the developed model of work processes in accordance with the functional applied architecture of the UIS. In this case, the loading of data received from outside, the integrity control of the electronic document during processing and transmission is implemented in accordance with a custom state model and the authority to process or confirm it. Monitoring the integrity of the data during the passage (processing and transmission) is carried out in accordance with the regulations for data transfer.

When saving data, daily data backup is carried out with the backup stored on magnetic or optical media. The recovery procedure is standard for the used DBMS and OS and provides recovery from the last copy and restoration of changes of the current day from the transaction log.

The software of the UIS's components is implemented in high-level programming languages, which ensures the solution of all tasks for the implementation of the functions of the UIS. It is allowed to use high-level languages that meet the requirements of implementing the tasks of the subject area with user interaction with the UIS's components at the level of the graphical interface. As part of the UIS's components, means are needed to describe the subject area and the automation object, as well as document the results. The software used is independent of the types of client workstations and server equipment, if this is not provided for by the developed documentation of preliminary UIS projects.

The organization of the functioning of the system and the interaction between the personnel of the subsystems and the personnel of the automation object are determined by the following factors:

- Operating procedures for application and operation of the UIS's components;
- Actions of officials to ensure the application of UIS's components;
- Actions of maintenance personnel to maintain the health of UIS's components;
- Organization and procedure for repair and restoration of UIS's components;
- Concepts of sources and consumers of information of UIS's components;
- Composition of users who are consumers of information;
- List and presentation of data for exchange in the UIS.

Discussion

The system is built in such a way that the erroneous actions of personnel do not lead to fatal consequences, e.g. destruction and the impossibility of its restoration. For this purpose, the system is

divided into subsystems, and thus a failure in one subsystem does not affect the performance of other subsystems and the system as a whole.

For putting into service the UIS, it is necessary to comply with the established requirements and carry out the planned work on the preparation of information for putting, for which is necessary the following:

- bringing data to a form suitable for processing by UIS's subsystems;
- bringing the structure of information processing business processes to the form corresponding to the developed requirements;
- creation of conditions for the operation of subsystems, under which the compliance of the subsystems with the requirements is guaranteed.

In order to optimize resources during the operation of UIS, it is necessary to create and further improve the structure of the department of information technology with the creation of additional work places for specialists in support of UIS.

Thus, if you have a unified information system, you can take the following steps, such as integration with Supply Chain Management system (SCM) and Customer Relationship Management system (CRM).

Conclusion

At this stage of research, it was planned to combine 12 application subsystems in the enterprise's UIS taking into account infrastructural subsystems, but as part of the outline design, the need to include 3 more application subsystems was revealed: the subsystem for requirements management, the subsystem design and integration of the product systems, taking into account their physical features, mutual influence, external conditions and the subsystem of planning, management and monitoring of production and logistics.

Based on a sufficiently large number of UIS's subsystems and, accordingly, a large number of information flows arising from data exchange, it was concluded that in order to ensure interaction, it is necessary to unify data exchange mechanisms.

Thus, in the continuation of research, it is additionally necessary to consider the issue of developing a subsystem of integration interaction. It is clear that for many product data management systems, for example Teamcenter, there are so-called standard integration modules with other systems, but in the current project it is necessary to integrate data exchange into the product development process at different stages of the life cycle, to define a unified data exchange format, transfer regulations and etc.

Issues of a unified data exchange of the designed subsystem of the integration solution will be highlighted in further research.

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Climate Change and Agricultural Production in Nigeria

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Abstract

This study uniquely highlights an underlying factor (climate change) which has not been acknowledged in Nigeria's farmers-herders clashes which has claimed many lives. Autoregressive Distributed Lag (ARDL) is applied on data of seventeen agricultural crops grown in Nigeria for 36 years. Climate change variables include: CO2 emissions, temperature and mean annual, while livestock is represented by the production index. The paper investigated the nexus of climate change with crop production and livestock production. The results indicate a long run relationship between crop production and climate change but there is no long run relationship between livestock production and climate change. To overcome the effect of rainfall uncertainty, it is recommended that agricultural firms partner with energy companies (and/or government) to invest in combined hydro power and irrigation project – especially, in drought-prone areas. The government should increase its expenditure on agriculture (both capital and recurrent) to especially support farmers and agro-allied companies who have been affected by the COVID-19 shutdown. This could increase the level of mechanized farming with modern equipment, farming implements and enhanced seedlings which are resilient to climate change to boost crop and livestock yield. National orientation programmes aimed at enlightening Farmers and Herders about emerging changes in climate extremes.

Keywords: Agriculture, CO_2 Emissions, Climate Change, Sustainable Development Goals.

Introduction

Climate change and failure in the mitigation/adaption measures are the leading threats to the global economy, after COVID-19 (World Economic Forum, 2020). Available data shows that the last decade has been the warmest ever recorded with 2016 being the warmest year during the period (National Aeronautics and Space Administration, 2020). Furthermore, the data indicates that since the late 19th century, the average temperature of the earth's surface increased by over 1.62 degrees Fahrenheit (0.9 degrees Celsius). Consequently, increasing concentration of greenhouse gases in the atmosphere is changing precipitation patterns, raising temperature, spurring frequent extreme weather events, and shifting growing seasons (Egbetokun, Osabuohien, Akinbobola, Onanuga, Gershon & Okafor, 2020).

Meanwhile, Nigeria's agriculture and agro-allied industries could potentially drive the economy's growth and diversification from crude oil (Gershon, Ezenwa & Osabohien, 2019) However, it is largely climate fed - depends mainly on rainfall and temperature. Moreover, infrequent fluctuations in rainfall and temperature patterns have distorted the standard April to October rainfall period and October – March harmattan weather or dry season. On the one hand, untimely rainfall and climatic extremes could threaten potential agricultural investment (Gershon & Patricia, 2019). Excessive rainfall, on the other hand, can

prompt the development of many pest and diseases which affect crop yields and animal breeding. Increasing temperature also provides a conducive atmosphere for the breeding of pests which damage crops.

More so, the outbreak and spread of Corona Virus disease, popularly known as COVID-19, has proven that Nigeria cannot rely on crude oil as its main source of revenue. Global oil prices which recently plunged to a 17-year low creating a gloomy macroeconomic outlook for most oil-exporting countries – including Nigeria. Reviving the dwindling economy requires deliberate and strategic action to fully reap the benefits of agriculture and minimize its vulnerability to climate change and/or COVID-19.
In 2019, the sector accounted for 25.16% of real GDP growth. Crop production and livestock farming remain the major drivers of the sector as they accounted for 85% and 8% respectively of agricultural GDP in 2019. (National Bureau of Statistics, 2019).

Against the above background, this paper sought to: (a) ascertain the types of the relationship that exists at the nexus of climate change, crop and animal production in Nigeria; (b) determine the difference between climate change's effects on crop yields and livestock production.

The Autoregressive Distributed lag (ARDL) estimation technique is applied with data from 1981-2016 (36 years) to analyze the variables of interest. This seeks to highlight possible actions to minimize the vulnerability of Nigeria's agricultural sector to climate change towards achieving SDGs 2 and 13 which remain critical for economic progress. Farmers and agro-allied businesses could be incentivized to benefit from the potential positive effects of climatic factors and guard against negative effects.

To highlight the relevance of this work, a review of relevant literature is presented hereafter. Subsequent three sections contain respectively, methods; result presentation with discussions; as well as, the conclusion with recommendations.

Literature Review

Adedeji, Tiku, Waziri-Ugwu and Sanusi (2017) employed regression analysis to show that rainfall has a positive and significant effect on rice yield while temperature was found to affect rice yield negatively. However, greenhouse gas emissions which are the primary causes of climate change apart from the natural variations in temperature and rainfall were not included in the model. Ayinde, Muchie and Olatunji (2011) demonstrated that rainfall and temperature have positive and negative effects on agricultural productivity respectively using descriptive statistics and co-integration technique. It was also observed that the previous year's rainfall has a negative, significant effect on current year agricultural productivity.

Agba, Adewara, Adama, Adzer, & Atoyebi (2017) using time series data showed that rainfall had a positive, significant on crop output in the short and long run while temperature and carbon dioxide emissions had a negative, significant effect on crop production only in the long run. Aondoakaa (2012) demonstrated that a weak, positive significant relationship exists among temperature, rainfall and crop yield during a 10year period in Abuja. Using correlation and regression analysis. A longer and wider dataset should have been collected to account for annual changes in temperature and rainfall. Other factors that affect crop yield such as soil fertility, land, irrigation should also be included in the model.

Exenberger, Wolters and Pondorfer (2014) also showed that middle and low-income countries are affected by increased temperature, changes in precipitation, frequency of droughts and these adverse effects are more pronounced in Sub-Sahara Africa. Conversely, climate change rarely affects agricultural production in high-income countries. The results also revealed that technological heterogeneity is a reason for cross-country differences regarding how climate change affects agricultural production.

Ekpenyong and Ogubagu (2015) concluded that in the long run, agricultural productivity is affected by increased carbon emissions. The Autoregressive Distributed Lag was employed for analysis using 1984-2014 as the time period.

Ejemeyovwi, Obindah and Doyah (2018) applied Fully Modified OLS and found out that a positive, significant long-run relationship exists between crop production and CO2 emission. This implies that increased carbon dioxide emissions will increase crop production over time. The result obtained here differs from that of other studies as CO2 emissions had a positive, long-run effect on crop production in spite of its usual notion of pure negativity. This is also in contrast to the existing hypothesis that rising CO2 levels in a tropical country (like Nigeria) negatively impact crop production. Reasons for obtaining this result could be due to types and seasonal properties of crops used in determining the crop production index which was used as the dependent variable.

Climate change factors examined in the reviewed studies include rainfall, temperature and carbon dioxide emissions. Measures of agricultural production popularly examined include crop production and agricultural productivity. The effect of climate change on livestock production has received limited attention in Nigeria - probably due to its complex nature and peculiarity of nomadic farming in the country.

Methodology

Data Sources

The data used in this study were sourced from World Bank Development Indicators; Food and Agricultural Organization; CBN Statistical Bulletin and World Bank Climate Change Portal.

Definition of Variables

Mean Annual Rainfall

This is defined as an average of the total amount of rainfall recorded during a year in Nigeria. Rainfall is included in the model to capture the natural aspect of climate change; climate change induced by fluctuations of weather variables. Adequate rainfall is also a necessary requirement for growth and chemical processes that take place within the crops. It is measured in millimetres (mm). Average rainfall data in the study is for a period of 36 years.

Mean Annual Temperature

The mean annual temperature refers to the average of the total temperature recorded during a year. It is included in the model to capture the natural cause of climate change that is fluctuation in annual temperature. It is measured in degree Celsius (°C).

Carbon Dioxide Emissions

This refers to the amount of CO2 (a greenhouse gas) released into the atmosphere over a specified area and a particular time. For this study. it captures the amount of CO2 released annually in Nigeria. CO_2 emissions in this paper is measured in kilotons (kt)

Arable land

Arable land refers to land that is fertile enough for ploughing and growing crops.. Increased availability of arable land enables farmers to grow more crops which will result in higher crop yield, hence its inclusion in the model. Data on arable in this research arable is measured in square kilometers

Manure Application

Manure is organic matter derived from animal faeces which can be used to improve soil fertility in agriculture. It is a necessary fertilizer that stimulates crop growth. The amount of manure applied to the soil is measured in kilograms (kg) in this paper.

Crop yield

Also known as "agricultural output", crop yield refers to the measure of grains generated from a unit of land. It is measure in kilograms/hectare in this study. Crop yield is the dependent variable, it depends on the aforementioned variables. It is measure in kilograms/hectare in this study.

Agricultural Government Expenditure

This refers the amount allocated and spent (both current and recurrent) on agriculture by the government during a year. It is recorded is in Naira billion. Adequate agriculture expenditure is necessary to purchase farm implements and ultimately increase crop yield.

For the livestock production model, the variable below is inlcuded;

Livestock Production Index

Livestock production index is number that shows the relative level of the aggregate volume of products such as eggs, cheese, honey, wool, and hides and skins etc. for each year in compared to production in the base period 1999-2001. It is used as standard to depict the amount of products derived from livestock in Nigeria annually. It is also a dependent variable, impacted by the other variables listed above.
Data on the aforementioned variables spans from 1981-2017, a period of 36 years.

Model Specification

Following the works of Iheoma (2014), and Agba, Adewara, et al (2017), the modified model to examine the effect of climate change on crop production is specified as;

$$Y = f\,(MAR, MAT, CO_2E, AL, CMA, AGE) \qquad (1)$$

Where f= functional relationship
Y= Crop yield (dependent variable)
MAR= Mean annual rainfall
MAT= Mean annual temperature
CO_2E= Carbon dioxide emissions
AGE= Agricultural government expenditure
AL= Arable Land
CMA- Crop manure application
Independent variables; MAR, AGE, AL, CMA are expected to positively influence crop yield while MAT and CO_2E are expected y to have negative effects on crop yield

Following the work of Iheoma (2014), the modified model to examine the effect of climate change on livestock production is given as;

$$LPI = f(MAR, MAT, CO_2E, AGE) \quad (2)$$

Where:

f= functional relationship
LP1 = Livestock production index (dependent variable)
MAR= Mean annual rainfall
MAT= Mean annual temperature
CO_2E= Carbon dioxide emissions
AGE= Agricultural government expenditure
Dependent variables MAR and AGE are expected to positively influence the livestock production while MAT and CO_2E are expected to negatively nfluence livestock production.i
Stating eq 1 in its non-linear form gives;

$$YIELD = MAR^{\beta 1}\ MAT^{B2}\ CO_2E^{\beta 3}\ AL^{\beta 4}\ CMA^{\beta 5}\ AGE^{\beta 6} \quad (3)$$

Stating eq 2 in its non-linear form gives;

$$LPI = MAR^{\gamma 1}\ MAT^{\gamma 2}\ CO_2E^{\gamma 3}\ AGE^{\gamma 4} \quad (4)$$

In order to state the econometric form eq (3) model, it has to be linearized.
The linearized crop production model is given as;

$$YIELD = \beta_0 + \beta_1 MAR + \beta_2\ MAT + \beta_3 CO_2E + \beta_4 AL + \ \beta_5 CMA + \beta_6 AGE + \ \mu \quad (5)$$

Where;

β_0= constant/ intercept parameter
$\beta_1 - \ \beta_6$ = slope coefficients
μ = stochastic error term
Whereas the linearized livestock production model is given as;

$$LPI = \ \gamma_0 + \ \gamma_1 MAR + \gamma_2 MAT + \gamma_3 CO_2E + \ \gamma_4 AGE + \ \mu \quad (6)$$

Where;
γ_0 = constant/ intercept parameter
$\gamma_1 - \gamma_4$ = slope coefficients

Estimation Technique

This research study employs the Auto regressive Distributed lag to determine the type of the relationship exists between climate change and agricultural production in Nigeria. The econometric techniques to be performed are briefly discussed below

Augmented Dickey Fuller (ADF) Unit Root Test

Economic data collected overtime tend to be non-stationary and if used for analysis may yield spurious regression results. Hence there is need to test data for stationarity prior to model estimation. The Augmented Dickey Fuller (ADF) unit root test is used to detect stationarity or the presence of a unit root in a time series data at a level of significance (1%. 5% or 10%) between variables

Autoregressive Distributed Lag (ARDL) Model Estimation

This is one of various methods to estimate a model taking into account information regarding the long run and short run relationship between the variables in the model. In an ARDL model, the present value of the dependent variable is expressed as a function of current and lagged values of the independent variable(s)

as well as lagged values of the independent variable. The optimal lag length of variables in the may be determined by a number selection criteria. The main steps involved in co-integration technique are ARDL Bound's Test, ARDL Co-integration Test and Vector Error Correction

Results and Discussion

Descriptive Statistics

From Table 1, the mean is the value average of the series and summarizes the whole time series data over a single period with a single variable. It is a measure of central tendency while the standard deviation is a measure of dispersion. The standard deviation measures how much the series deviate from the mean. There is the likelihood of a large coefficient if the mean is larger than the standard deviation. On the other hand, there is the likelihood of a large coefficient of variation if the mean is smaller than the standard deviation.

Table 1: Descriptive Statistics of Variables

Descriptive Statistics	CY (In Millions	LPI	COE (In Kilotonnes)	CMA (In Thousands)	AL (In Millions)	AGEXP (In Billions)	MAR (in millimetres)	MAT In (Degrees centigrade)
Mean	91.42	87.05	72927.57	8818.81	30.98	49.51	91.95	27.17
Median	93.91	86.29	73505.02	8645.08	33.10	15.49	92.70	27.20
Maximum	159.05	123.65	106068.0	12350.12	37.00	180.10	111.78	27.83
Minimum	30.76	51.64	35199.53	6337.10	16.47	1.35	72.68	26.46
Std. Dev.	36.997	24.17	24916.98	1790.66	5.476	54.37	9.33	0.34
Skewness	-0.157	0.136	-0.213	0.569	-1.437	0.735	-0.356	-0.0906
Kurtosis	2.072	1.503	1.499	2.315	4.165	2.184	2.713	2.457
Observations	37	37	37	37	37	36	37	37

Source: Researchers' Compilation 2020

The median is the middle of the series and is often seen as a social measure as its value is better reporting income than the mean. The mean of crop yield provides that average crop yield of Nigeria's 17 majorly produced crops is 91.42 million which appears quite low when compared to the maximum value of 159.05 million, although crop yield has been substantial on average. Increased crop yields will certainly aid Nigeria to boost her agriculture production in light of her significant agriculture resources. The mean of AGEXP is relatively low when compared to its maximum value suggesting that agriculture government expenditure has been low on average over the period of 1981 to 2017. All other variables, LPI, COE, CMA, AL, MAR and MAT have all been high on average as their mean values are quite high relative to their maximum values.

Further, from the table, we see that the mean is greater than the standard deviation for all variables except AL, indicating a possibility of small coefficient of variation. However, the standard deviation of AL is greater than the mean indicating the possibility of a large coefficient of variation. Skewness is the extent to which a distribution differs from a normal distribution. A long right tailed distribution indicates positive skewness while a long left tailed distribution indicates negative skewness. From the table, we observe that LPI, CMA, AGEXP have a long right tail while MAR, MAT, CO_2E and CY have a left tail. The skewness of a normal distribution is zero.

Kurtosis measures how flat or peaked a distribution is. If the kurtosis of a distribution is greater than 3, it is peaked; if it is less than 3, the distribution is flat. From the table. it is observed that AL is the only variable with a peaked distribution while the others have a relatively flat distribution.

Econometric Results

Unit Root Test Results

The Augmented Dickey-Fuller test was used to check for the stationarity of the variables in this research. If ADF t-stat is greater than the absolute critical value at 5%, the variable is stationary but if it is less than the critical value, it is not stationary. The results of the test are presented in Table 2.

Table 2: Results of Augmented Dickey Fuller Unit Root Test of Variables

Variables	Series at Levels			Series at First Difference			Order of Integration
	ADF Statistic	Critical Value at 5%	Remarks	ADF Statistic	Critical Value at 5%	Remarks	
CY	-0.808	-2.951	Not Stationary	-3.130	-2.951	Stationary	I(I)
LPI	-1.639	-3.540	Not Stationary	-5.989	-3.544	Stationary	I(I)
AGEXP	-2.999	-3.544	Not Stationary	-7.111	-3.548	Stationary	I(I)
AL	-1.920	-3.540	Not Stationary	-4.575	-3.548	Stationary	I(I)
MAT	-5.283	-3.540	Stationary	8.550	-3.548	Stationary	I(0)
MAR	-3.889	-3.540	Stationary	-6.946	-3.552	Stationary	I(0)
CMA	-2.938	-3.540	Not Stationary	-7.685	-3.544	Stationary	I(1)
CO_2E	-1.838	-3.540	Not Stationary	-5.908	-3.204	Stationary	I(1)

Source: Researchers' Compilation 2020

The results show that the variables are a combination of I(0) and I(1) variables. MAT and MAR were stationary at level while CY, LPI, AL, CMA, CO_2 and AGEXP were stationary after first differencing. This necessitated the use of bounds test for cointegration.

Bound's Test Crop production

From table 4 the F-statistic (10.59235) is greater than the upper bound of 3.61 at the 5% level of significance. As such one concludes that a long run relationship exists between CY and its respective independent variables, MAT, MAR, CO2E, AL, CMA and AGEXP.

Table 3: Test for Counteraction Result for Relationship between Crop Production and Climate Change

ARDL Bounds Test			
Null Hypothesis: No long-run relationships exist			
Test Statistic	Value		
F-statistic	10.59235		
Significance	Lower Bound I(0)	Upper Bound I(1)	
10%	2.12	3.23	
5%	2.45	3.61	
2.5%	2.75	3.99	
1%	3.15	4.43	

Source: Researchers' Compilation 2020

Livestock Production

The ARDL bounds test was also used to check for cointegration between climate change and livestock production. From the results presented in Table 5, the F-statistic (1.055450) is lower than the upper bounds of 4.01 at 5%. It is, therefore, conclusive that there is no long run relationship between the dependent variable LPI and its respective explanatory variables, MAT, MAR, CO_2E, and AGEXP.

Table 4: Test for Relationship between Livestock Production and Climate Change

ARDL Bounds Test			
Null Hypothesis: No long-run relationships exist			
Test Statistic	Value		
F-statistic	1.055450		
Significance	Lower Bound I(0)	Upper Bound I(1)	
10%	2.45	3.52	
5%	2.86	4.01	
2.5%	3.25	4.49	
1%	3.74	5.06	

Source: Researchers' Compilation 2020

ARDL Results for Crop Production

Table 5: ARDL Regression Results for Crop Production

ARDL Co-integrating and Long Run Form				
Dependent Variable: CY				
Variables	Coefficient	Std. Error	t-Statistic	Prob.
D(CY(-1))	0.310	0.142	2.183	0.0606
D(CY(-2))	1.235	0.171	7.234	0.0001
D(CY(-3))	0.274	0.189	1.454	0.1839
D(MAR)	15.562	10.625	1.465	0.1812
D(MAR(-1))	-3.251	1.442	-2.254	0.0543
D(MAR(-2))	-4.421	1.380	-3.204	0.0164
D(MAT)	-3.864	1.160	3.332	0.0000
D(COE)	5.159	0.889	5.801	0.0004
D(CMA)	5.986	1.974	3.032	0.0163
D(CMA(-1))	-5.475	1.522	-3.597	0.0010
D(CMA(-2))	-10.475	2.446	-4.282	0.0027
D(AL)	1.659	0.678	2.448	0.0401
D(AL(-1))	2.573	0.839	3.068	0.0154
D(AL(-2))	-3.021	0.602	-5.014	0.0010
D(AGEXP)	4.572	3.371	1.3565	0.2121
D(AGEXP(-1))	-3.769	2.937	-1.284	0.2352
D(AGEX(P-2))	9.638	3.582	2.691	0.0275
CointEq(-1)	-0.969	0.126	-7.664	0.0001
Cointeq = CY - (11.476*MAR -30.443*MAT + 2.427*COE				
+ 14.580*CMA + 1.433*AL -2.370*AGEXN -12.254)				
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
MAR	11.476	2.779	4.130	0.0033
MAT	-30.443	22.670	-1.343	0.2162
COE	2.427	0.439	5.533	0.0006
CMA	14.580	1.134	12.859	0.0000
AL	1.433	0.464	3.090	0.0149
AGEXP	-2.370	0.825	-2.873	0.0037
C	-12.254	4.843	-2.530	0.0084

Number of Observations: 32

Source: Researchers' Compilation 2020

Interpretation of Long Run Coefficients for Crop Production

From the table, the coefficient of mean annual rainfall (MAR) is 11. 476. A unit increase in mean annual rainfall will lead to an 11.476 increase in crop yield. It is statistically significant. The coefficient of mean annual temperature (MAT) is -30.443. A unit increase in mean annual temperature will result in a -30.443 decrease in crop yield. It is however statistically insignificant. The coefficient of carbon dioxide emissions (COE) is 2.427. A unit increase in carbon dioxide emissions will cause a 2.427 increase in aggregate crop yield. It is statistically significant.

The coefficient of crop manure application (CMA) is 14.580. A unit increase in crop manure application will lead to a 14.580 increase in crop yield. It is also statistically significant. The coefficient of arable land (AL) is 1.433. This means that a unit increase in arable land will result in a 1.433 increase in crop yield. It is statistically significant. The coefficient of agricultural expenditure (AGEXP) is -2.370. A unit increase in agricultural expenditure cause a -2.370 decrease in crop yield. It is also statistically significant.

The coefficient of the constant is -12.254 which connotes that the value of crop yield will decrease by -12,254 when the independent variables are kept constant. The lag of the error correction term (Cointeq(-1)) is -0.969 and is statistically significant which indicates that 96.90% of errors in the previous period are corrected in the current period. This is a high speed of adjustment of the estimated ARDL Error correction model.

ARDL Results for Livestock Production

Interpretation
The R squared of the model is 0.7938 which connotes that 79.3% of the variation in the dependent variable, Livestock production index is explained by the explanatory variables. The probability of F- statistic which measures the joint significance of the variables is 0.000000 indicates that the estimated ARDL model is correctly specified. The Durbin-Watson statistic of 2.017181 indicates that there is no serial correlation in the model.

The coefficient of LPI(-1) IS 0.7653 implying that a unit change in one period lagged livestock production index will result in a 0.7653 unit change in current period livestock production index and it is statistically significant. The coefficient of MAR is -0.1865 suggesting that a unit change in current period mean annual rainfall will lead to a 0.4162 change in the livestock production index. It is also statistically significant.

Table 6: ARDL Regression Results for Livestock Production

Dependent Variable: LPI				
Method: ARDL				
Variables	Coefficient	Std. Error	t-Statistic	Prob.*
LPI(-1)	0.765394	0.083093	9.211273	0.0000
MAR	-0.186498	0.099755	-1.869567	0.0842
MAR(-1)	0.146404	0.084880	1.724836	0.1082
MAR(-2)	-0.060954	0.085504	-0.712872	0.4885
MAR(-3)	-0.014887	0.083074	-0.179203	0.8605
MAR(-4)	0.416262	0.108797	3.826039	0.0021
MAT	1.639287	2.976973	0.550656	0.5912
MAT(-1)	4.610707	3.482983	1.323781	0.2084
MAT(-2)	-10.03760	3.358915	-2.988347	0.0105
MAT(-3)	3.096976	2.613098	1.185174	0.2572
COE	-8.17E-05	6.84E-05	-1.194843	0.2535

COE(-1)	0.000185	7.76E-05	2.382175	0.0332
COE(-2)	-4.11E-05	8.32E-05	-0.494190	0.6294
COE(-3)	-0.000114	7.57E-05	-1.504086	0.1565
AGEXP	0.0794	0.029642	2.679315	0.0077
AGEXP(-1)	0.009903	0.030779	0.321743	0.7528
AGEXP(-2)	-0.003390	0.030222	-0.112155	0.9124
AGEXP(-3)	0.0763	0.0269	2.833	0.007
C	11.07838	187.0626	0.059223	0.9537
R-squared	0.793875	Mean dependent var		89.79281
Adjusted R-squared	0.685395	S.D. dependent var		22.87967
S.E. of regression	2.765048	Akaike info criterion		5.158707
Sum squared resid	99.39138	Schwarz criterion		6.028987
Log likelihood	-63.53930	Hannan-Quinn criter.		5.447180
F-statistic	117.1966	Durbin-Watson stat		2.017181
Prob(F-statistic)	0.000000			

Number of Observations: 32

Source: Researchers' Compilation 2020

The coefficient of MAT is 1.6392 implying that a unit change in the current period mean annual temperature will bring about a 1.6392 unit change in the livestock production index and it is statistically significant. The coefficient of COE is 0.000185 meaning that a unit increase in current period carbon dioxide emissions will result in a 0.000185 unit increase in the livestock production index. It is statistically significant. The coefficient of AGEXP is 0.0794 which shows that a unit change in current period agricultural expenditure will bring about a 0.0794 unit change in livestock production index. It is statistically significant. The coefficient of the constant term C is 11.0784 meaning that the value of livestock production will increase by 11.0784 keeping all explanatory variables constant.

Discussion of Results

The bounds testing confirms the study's hypotheses of a long run relationship between climate change and crop yield but, no long run relationship between climate change and livestock production. Furthermore, ARDL cointegration test results showed that climate change affects both agricultural subsectors differently and through different channels. Specifically, rainfall has a positive and significant effect on both crop yield and livestock production, while temperature has a negative effect on both subsectors - though insignificant for crop production. Also, CO_2 emissions affects crop production positively while it affects livestock production negatively.

The ARDL results for crop production showed that a long run relationship exists between climate change and crop production. Mean annual rainfall and CO_2 emissions significantly influence crop yield while mean annual temperature had an insignificant effect on crop yield. The non-climatic variables (agricultural expenditure, crop manure application and arable land) also affect the yield of 17 major crops produced in Nigeria significantly in the long run. Furthermore, the results provide evidence of the economic significance of the coefficients of each variable.

Meanwhile, the mean annual rainfall had a positive effect on aggregate crop yield in Nigeria in line with the *apriori* expectation and existing literature (Ayinde, 2011; Adedeji et al, 2017; Aondoakaa, 2012; Agba et al, 2017). As such, increased rainfall due to climate change will lead to increased crop yield particularly in dryland areas with poor irrigation systems. In contrast, Nwachukwu, Ezeh & Emerole (2012), Jonsonn (2011), and Enete (2014) observed a negative relationship between rainfall and crop yield. However, mean annual temperature had a negative effect on crop yield. This implies that increased temperature caused by increased greenhouse gas emissions will reduce aggregate crop yield in Nigeria. Ayinde et al (2011), Adedeji et al (2017), Jonsonn (2011) and Ajetemobi et al (2015) arrived at similar results. On the other hand, Aondoakaa (2012), Nwachukwu et al (2012) concluded a positive relationship exists between temperature and crop yield.

CO_2 emissions has a positive effect on crop yield. This goes against the *apriori* expectation and results from existing literature. Possibly, CO_2 emissions do not affect crop yield directly, but causes higher temperature and reduced rate of photosynthesis which negatively affects aggregate crop yield in Nigeria. Ejemeyovwi et al (2018) obtained similar result while Agba et al (2017) concluded that CO_2 emissions has a negative effect on crop production.

Arable land showed a positive effect on crop yield. This is in line with the *apriori* expectation and existing literature as increased availability of arable land enables farmers to grow more crops which in turn increases crop yield. Crop manure application showed a positive effect on crop yield too in line with the *apriori* expectation and as manure is used to fertilize towards increased crop yield. Contrary to *apriori* expectation, government's agricultural expenditure showed a negative effect on crop yield. Previous research outcomes indicate increased government expenditure on the agricultural sector is meant to boost yield of crops by making farm implements and funds available for farmers. This could be indicating that increases in government expenditures require better channels or more effective distribution mechanism to achieve the expected result. Perhaps, government expenditure into the agricultural sectors is leaking away or being diverted inappropriately.

Livestock Production

The ARDL results showed that no long-run relationship exists between climate change and livestock production. The findings for each variable are discussed herewith. The four-period lagged mean annual rainfall has a positive and significant effect on the livestock production index. This is in accordance with the *apriori* expectation and existing literature as rainfall provides water for livestock and growing of forage crops to feed livestock. The two-period lagged temperature has a negative and significant effect on the livestock production index, confirming the *apriori* expectation from existing theory. Increased temperature causes heat stress in livestock, dries up water bodies that provide water for livestock and increases the spread of pests and diseases which negatively affect livestock production.

The current period lagged CO_2 emissions has a negative effect on livestock production index, as expected but the estimate is not statistically significant. Government's expenditure on agriculture in the current period has a positive and significant effect on livestock production in Nigeria. This outcome appears to supports existing government-backed herders-support programmes and justifies proposed rangeland management initiatives to address the herders-farmer disputes in Nigeria (Chiluwa & Chiluwa 2020; Chukwuma, 2020; Mbih, 2020).

Conclusion and Recommendations

Conclusion

Climate change is a major reality for all countries of the world including Nigeria. It has a significant influence on various sectors of Nigeria's economy, one of which is agriculture as examined here with

extended linkage to farmers-herders dispute. This is because, as has been shown here, climate change impacts on agricultural outputs (of farmers and herders) - crop yields and livestock production. Both outputs are central to the Nigerian economy given their contribution to food security in Nigeria and the government's initiatives to diversify away from the petroleum sector (Fubara, Iledare, Gershon & Ejemeyovwi. 2019).

So far, this paper has examined the effect of climate change on agricultural production in terms of crop yield and livestock production in Nigeria over the period 1981 to 2016. The findings of the study revealed that a long-run relationship exists between climate change measured by (rainfall, mean annual temperature and CO_2 emissions) and crop yield. However, no long-run relationship exists between climate change measured by mean annual rainfall and temperature, CO_2 emissions) and livestock production. Meanwhile, results here suggest that the effect of climate change on agriculture depends on the measure of agriculture production and climate change employed in studies.

This study has contributed to literature in two ways: firstly, it employs aggregate output of 17 crops main produced in Nigeria - cassava, cocoa, groundnuts, kolanut, maize, melon, millet, oil palm, plantain, rice, rubber, sorghum, soybeans, yam, cashew, sesame and potatoes. As such, it offers a more representative sample of aggregate crop production in Nigeria. Secondly, the study uses the livestock productivity index to ascertain the effect of climate change on Nigeria's agricultural sector. Thereby, it has uniquely highlighted an underlying factor (climate change), previously acknowledged, in Nigeria's farmers-herders clashes which has claimed many lives.

This study was limited by the lack of data on the emissions of other greenhouse gases and livestock production values in Nigeria (offering better representation than the index). Future studies on climate change and agriculture could investigate how other greenhouse gases (apart from carbon dioxide) affect crop yield and livestock production in Nigeria and across West Africa. Additionally, further endeavours could analyze the comparative effect of climate change on the yields of individual crops produced in Nigeria's six geopolitical regions. This study could be extended to cover selected states in Nigeria where climate change impacts on rainfall and temperature are perceived as more severe for agriculture.

Recommendations

Based on the empirical results obtained in this study, businesses, policymakers and government agencies should consider the following strategies:

The government should implement strategies to boost environmental sustainability, initiate mitigation initiatives to reduce the carbon footprint on agriculture and also enforce policies to curb greenhouse gas emissions. The trend analysis of carbon dioxide emissions shows that these emissions have increased considerably since 2000. Strategies that can be employed include: charging taxes on carbon emissions, promoting greater use of renewable energy resources, promoting sustainable agricultural practices through reduced use of inorganic fertilizers, as well as, encouraging afforestation and the use of organic manure
Farmers should devise adaptation initiatives aimed at reducing the vulnerability of crops to the effects of climate change on agriculture in Nigeria. Such initiatives include farmers growing crops and raring animals that are resistant to adverse weather conditions; government incentive support for research and technological innovations to boost crop yield (such as biotechnology). To overcome the effect of rainfall uncertainty, it is recommended that agricultural firms partner with energy companies (and/or government) to invest in combined hydropower and irrigation project – especially, in drought-prone areas.

The government should increase its expenditure on agriculture (both capital and recurrent) to especially support farmers and agro-allied companies who have been affected by the COVID-19 shutdown. This could increase the level of mechanized farming with modern equipment, farming implements and enhanced seedlings which are resilient to climate change to boost crop and livestock yield.

National orientation programmes aimed at enlightening farmers and herders about emerging changes in climate extremes should be implemented by the government. This is to ensure farmers make informed decisions regarding crop production and livestock rearing paying attention to changes in climate.

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The Concept of Agile Project Management Usage for ERP Implementations

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Abstract

Complexity of business processes within enterprises make the implementations of ERP systems more difficult and complicated projects. Traditional approach to project management becomes insufficient thus new ways and concepts are being considered. Companies developing and implementing ERP systems start researching of agile methodologies. Beside of their obvious advantages like faster system productive operation those frameworks have another set of challenges, conditions and restrictions comparing to traditional ones. Leading ERP vendors like SAP, Oracle or Microsoft sell their products with own agile methodologies – ready-made receipts for successful implementations. Since ERP projects are amongst biggest organizational efforts for most companies, they must verify whether such approach is meeting their expectations. The up to date effort made by project managers must be shifted and they need to focus on another factors like closer look to fit/gap analysis and resulting changes to standard or more on-going coordination of different modules during realization phase. The article discusses some advantages and drawbacks of contemporary project management methodologies used in the area of ERP implementations.

Keywords: PMBOK, Agile project management, ERP systems, SAP Activate

Introduction

World becomes smaller when IT facilitates collaboration between companies residing in different time zones, countries and even continents. The growth of information amount, its complexity and interdependencies caused the development of tools that are able to manage all aspects of data. In business environment, the central part of IT ecosystem is usually taken by Enterprise Resource Planning system – ERP. Gartner established the term ERP in 1990 to describe the evolution of materials requirements planning (MRP) and manufacturing resource planning (MRP II) as they were extended to include other processes of the whole enterprise. ERP systems evolved rapidly during the 1990s as they were seen as a cost-effective way to replace multiple, old systems with a standardized package that could also address issues like introduction of EURO or "millennium bug" (Perkins, 2019).

ERP systems integrate various processes within organization allowing the flow of information/work between departments and thus increasing of organization's overall performance. The vendors of major ERP systems (SAP, Oracle or Microsoft) promise to cover most business areas ranging from financials through marketing and sales, logistics, manufacturing to human resources. As the systems are composed of standardized modules, only a certain level of configuration is possible - most companies implementing ERP will need to adapt or even completely rework their business processes to fit the requirements of the system (Davenport, 1998). This makes the decision of implementing an ERP system to higher level – not only mere technical installation of a software but usually a deep transformation of business processes impacting whole company. Panorama Consulting Solutions, which regularly surveys businesses on the outcomes of their ERP projects, found in 2015 that just 58 percent of organizations rated their latest project a success, while by 2019 that figure had risen to 88

percent (Fruhlinger et al., 2020). Although the trend is positive, the consequences of a failed software rollout can be serious, including shareholder lawsuits and financial problems.

On the other hand the benefits of implementation of ERP are significant. They vary from operational performance improvements to the perception of the company on the market. As observed by Tan et al. (2014), publicly traded firms in the USA not stock value increase when they announce implementation of ERP systems, showing that investors view this decision positively and indicating the potential for future growth. Introduction of ERP system is a major project requiring a significant level of resources, commitment and changes throughout the organization. It is often the biggest project that an organization has ever launched (Moon, 2007). The outcome of this fact is the abundance of methodologies for project management that mitigate the risk of failure for the enterprise.

Since Agile Manifesto was published (Alliance, 2001), agile methodologies have been gaining more and more attention in the IT world. The new way of project management focused mainly on delivering working software, allowing incremental delivery of new functionalities meeting the expectation of project stakeholders thanks to their constant feedback, was promptly adapted by software companies. Although at the beginning agile management was neglected in ERP projects, at some point the scale of "products" grow sufficiently big to draw attention of decision makers. Large scale ERP projects were traditionally implemented with waterfall methodologies due to their complex nature involving software and business operational changes. This approach had drawbacks - although the full process was predicted and planned, the final outcome - the product, might not meet customer's expectations. First attempts were made to adapt some agile features to well-established procedures – as the result major ERP publishers like SAP, Oracle or Microsoft have prepared their own methodologies – respectively: SAP Activate, Oracle Unified Method and Microsoft Sure Step.

This paper describes various project lifecycles according to PMBOK and shows some of their usage aspects in ERP implementations. In particular predictive (waterfall) and iterative (agile) approaches are overviewed. SAP Activate methodology is presented as an example of agile approach to ERP project management.

Project lifecycles

PMBOK stands for Project Management Body of Knowledge and it is the entire collection of processes, best practices and guidelines that are accepted as standards within the project management industry. It is maintained and developed by Project Management Institute (PMI), a global not-for-profit association of PM professionals. The first edition of the PMBOK Guide was published in 1996 and until now six versions have been published – last in 2017. As other project management standards, PMBOK covers all processes that form a project – it covers all processes directly associated with project management as well as topics concerning general project environment like budgeting and forecasting, organizational behavior or management science. In the intention of authors the PMBOK standard describes knowledge and practices that are "applicable to most projects most of the time and there is a consensus about their value and usefulness" as well as "the application of the knowledge, skills, tools, and techniques can enhance the chance of success over many projects" (PMI, 2017).

"A project life cycle is the phases that a project passes through from its start to its completion" as PMBOK® Guide 6th edition explains (PMI, 2017). By its nature, each project has a start and an end and several stages that it needs to pass as it progresses across these two points. The number of phases differs among industries and even every project – the structure of stages can vary as well. PMBOK defines four general phases that can be applied to any project: Starting the project (Initiation), Organizing and Preparing (Planning), Carrying out the work (Execution) and Ending the project (Closure). During all phases, group of processes called Monitoring and Control is executed simultaneously to allow constant measurement of work progress, various performance indicators and allow to react accordingly.

The introduction of ERP to organization's business ecosystem have various aspects – first of all a particular system must be selected from many available on the market. Requirement analysis must be

performed to discover business critical needs and select proper ERP packages (modules) the would address them. Parameters that will affect the decision include cost of licenses, terms of contract with potential integrators (the companies that implement the software), availability of maintenance services, time needed and level of changes that organization must undergo to start operating particular ERP. Than the implementation itself - there are many ERP implementation methodologies available on the market, both generic and widely available for practitioners and proprietary, published by the ERP vendors along with their systems. When ERP system is implemented, it needs constant process of improvements ranging from installation of technical updates, fixing of minor problems to implementation of new features that enrich system functionality. There are several examples of approaches available in literature for each of aspects – acquisition process is commonly modelled as six-stage process. Maintenance process is described in detail by ITIL, a set of detailed practices for IT service management that focuses on aligning IT services with the needs of business. The focus in this paper is on general approach of implementation aspect.

PMBOK distinguishes five different life cycles - predictive, iterative, incremental, adaptive and hybrid. Predictive cycle, known as well as waterfall was traditionally a standard for project management. This approach assumes planning of whole project at its beginning. Gathered customer requirements are base for the scope of the project and they serve as the foundation for other phases. Detailed planning allow reduction of estimation errors in areas of quality, time, cost or risks. During execution of the project it is allowed to have more precise planning called "progressive elaboration" or "rolling wave planning" but any changes to scope need close examination as they usually influence the time and budget (called sometimes "golden triangle of project management – time, scope and cost). Because of this, the waterfall model is not flexible when new requirement is presented. Changes in the project are more expensive as it progresses.

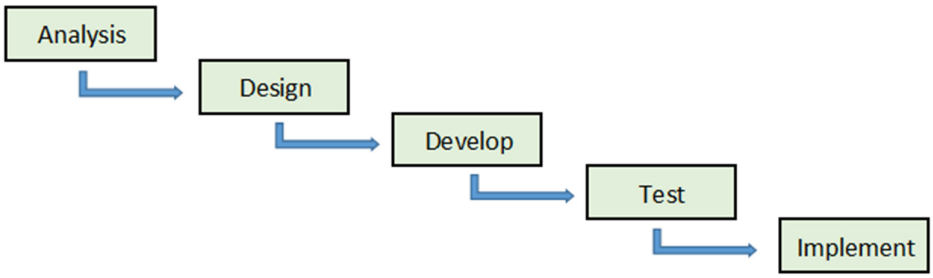

Figure 1: Predictive cycle – own elaboration based on PMBOK

Iterative approach assumes that, the final product is known but cost and time of tasks can vary. Large projects are split into smaller parts and then executed in smaller cycles. Gathering of requirements and detailed planning takes place at the beginning of each iteration and at the end it delivers smaller portions of functionalities. At the end customer receives full functionality. In terms of flexibility, this approach is placed by PMBOK between predictive and incremental. During the project, there are several chances to reschedule or reevaluate changes, but the changes themselves are technical rather than corresponding to scope – iterative cycle could handle the changes faster and less expensively.

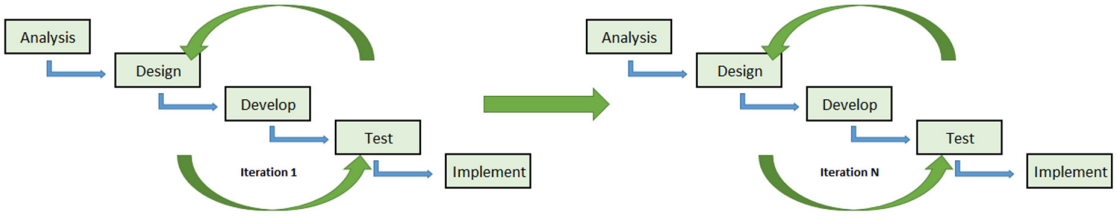

Figure 2: Iterative cycle – own elaboration based on PMBOK

Adaptive Life Cycle (change-driven or Agile) requires project charter (a document containing project statement of the scope, objectives, etc.) as well but unlike previously presented cycle the project team reviews it regularly and is allowed to modify it. It means that the aspects of initiation phase can be carried during whole project. At the beginning only general idea of the product is available - detailed scope is planned at the beginning of each iteration (called sprint) with close cooperation of customer and vendor. In addition to iterations being sequential or overlapping, they could also run in parallel. As they are usually limited to 2 – 4 weeks the inherited risks of providing erroneous solutions is mitigated. The approach requires two critical success factors to provide successful (ie. within the budget and on time) results – the customer must actively take part in team's work and the team must be able to provide new requirements for each cycle. According to Sharma and Hasteer (2016) the most popular framework available on the market is SCRUM.

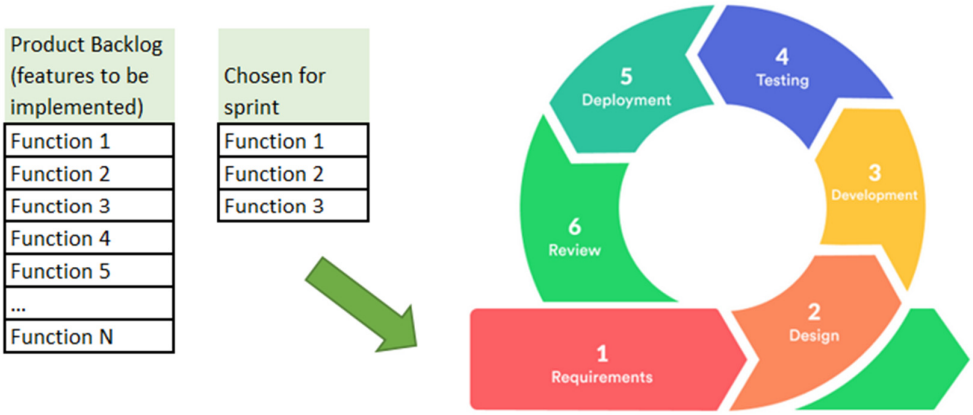

Figure 3: Adaptive cycle – own evaluation based on SCRUM methodology (Borowiec, 2019)

Hybrid cycle is literally an approach that take different proportions of features from other cycles – mainly from predictive and adaptive with stress put mostly on scope changes. The parts of the project well defined are realized according to predictive project plan and the unknown parts are progressed with adaptive methods. In such approach the WBS can co-exist with backlog and sprints can be executed in parallel to traditional phases.

Agile implementation of ERP system based on SAP Activate methodology example

SAP SE (later referenced as SAP) is the world's largest provider of enterprise application software - 92% of Forbes Global 2000 companies belong to SAP customers (SAP SE, 2020). It holds the first place as software company in Dow Jones Sustainability Index for 13 years. Although it's traditional ERP software (called "on-premises") was the market share leader, SAP have developed as well a broad portfolio of cloud business solutions becoming top vendor in this area. In its almost 50 year history the company have travelled a long way in approach of providing the software from installation on mainframes to accessing it via web. The concept of supporting the customers and consulting companies in systems development was changing over time as well. The first methodology that SAP prepared for implementation of its ERP was called ASAP – it was providing a toolkit for vendor evaluations as well as benchmark for project cost-effectiveness/performance. ASAP has been evolving from guidance of installing the software into full project management methodology. It was including changes in the SAP ERP itself and developments in surrounding Project Management and IT best practices.

SAP Activate was introduced along with SAP new product - S/4HANA, as a tool to accelerate the process of its adoption. SAP Activate is a framework consisting of three components:

1. best practices - that deliver scenarios for real-life business processes and best practices for migration and integration,
2. configuration tools for cloud and on-premise versions of software,
3. SAP Activate methodology that uses agile techniques to implement the SAP S/4HANA solution in the cloud or on-premise (SAP SE, 2020).

SAP Activate methodology is aligned with the PMBOK Standard – it is the successor of ASAP and SAP Launch (implementation of SAP cloud solutions) methodologies. The vendor states that it is modular and agile methodology – it supports deployment at the beginning and later continuous business development. The methodology also enables co-innovation with customers and is accessible for partners. It builds on the ready-to-run business processes (1) and their documentation from SAP Best Practices – so called Scope Items are basis of solution architecture providing detailed business processes guides as well as built-in test cases. It uses the configuration tools (2) to adjust the baseline solution to customer needs based on the results of the fit/gap analysis, which is conducted in the Explore phase. It also provides project teams with structured approach to implement the solution (3), but also with the solution and product specific content for implementation or transition to SAP S/4HANA - standardized roadmap and project plans are available for adaptation for each company involved.

Figure 4: SAP Activate phases – own elaboration based on SAP SE (2020)

In sections below each phase is described briefly. Although SAP Activate have proven its ability to deliver successful project there are practitioners still emphasize some questions to consider to avoid possible pitfalls (Osterhaus, 2018). The methodology consists of six phases – four core and two additional that reference several PMBOK process groups:

Discovery

Discovery is classified as an additional phase. Although it is not core for the project, it plays very important role, as it allows setting the business contexts and the goals of whole project. It puts much stress on setting the long term strategy for digital transformation of the company combining the S/4HANA technology as well as other available to build competitive advantage (called the Road Map). The broad perspective of the phase includes workshops with users to facilitate value and impact analysis, preparation of implementation scenarios and technical infrastructure review.

In terms of PMBOK this phase includes elements of Initiation and Planning process groups. Although it is difficult to imagine a project without selection of technology and future use planning the phase has no formal quality gates (formal way of specifying and recording the transition between critical stages in the project lifecycle). Since the stakeholders are not fully identified at this point there is a risk of neglecting parts of the scope. Potential problems that companies might have include as well insufficient level of understanding the expectation and assumptions made by both sides when signing the contract (Scheck et al., 2019) and underestimation of IT infrastructure needs especially when running in cloud environment.

Prepare

Prepare is core phase where the initial work for project preparation is done. Based on findings of previous phase, project governance is defined, resources are identified and management plan for running the project is prepared. During this phase the team should be officially formed, roles and responsibilities should be established and staff should be trained on the methodology and tools available/chosen.

From PMBOK perspective this phase contains processes from Initiating, Planning and Executing groups. Special attention must be given in this phase for proper setup of not only project plan but as

well quality assurance processes. Customers should actively identify all interfaces with currently used systems in its IT landscape and understand restrictions that apply in new system. The user trainings for methodology is probably the last moment when organization must realize and adopt agile approach for project management.

Explore

Explore is second core phase. At this point the fit/gap analysis is performed based on a system where SAP Best Practices for respective business area are installed. The team closely examines the preconfigured processes provided by SAP to find how they can be applied to the company, additional configuration requirements are gathered and configuration gaps established. The technical environment is created at this time – sandbox and development systems must be up-and-running and IT infrastructure must be examined to provide the proper sizing of infrastructure. All needed items form the backlog that will be the baseline for implementation in later phases.

The activities in this phase are mostly referencing to PMBOK's Execution process group. Risks in this phase include improper output from fit/gap analysis resulting in wrong understanding of what standard SAP business process offers. Superficial documentation of gaps found during the workshops, in future can seriously affect budget and time needed for implementation of workarounds or process fixes.

Realize

Realize is the core phase for agile approach – it is used for iteratively and incrementally build functionalities of the backlog. Process of customizing, configuration and custom coding build on top of best practices is run recursively by project team during the sprints. The customer/product owners is involved in prioritization of tasks that are delivered and tested according to their needs. The initial data migration is run to check if process works smoothly. Unit and sprint tests of functions are done in this phase as well as integration of all components needed by the organizations is examined.

The activities in this phase are mostly referencing to PMBOK's Execution process group. Although Monitoring and Control processes are used across whole project, the additional stress is pointed here because of several iterations. The activities now depend heavily on products form previous phases but it is also the moment where typical size of ERP implementation projects plays important role. As the quantity of modules (like Finance, Sales or Inventory Management) grow, the number of interdependencies increases as well. Issues with proper planning of functionalities sets can result with delays in certain modules that cannot be implemented before others. For instance Production Planning depends on Inventory Management and this in turn on Finance – appropriate level of coordination between consultants must be maintained to execute the sprints in the way that all parties involved have planned sufficient functionalities to continue the work.

Deploy

Deploy if the final core phase – all processes, data migration, IT infrastructure is checked again to confirm readiness to switch into business operations with the new solution. If the decision is made to start operation on new system, the cut-over activities are performed. When customer starts operating new system after go-live, the team starts hyper-care activities to support the business to adopt the new functionality.
This phase is built as well around Execution processes from PMBOK and contains elements of Closing group. Issues occurring in this phase do not significantly differ from typical "waterfall" implementations and include mainly poor quality data migration, cutover issues and initial system stability problems.

Run

Run is an additional phase that represents the deliverables and tasks to run and operate the SAP solution. This phase allows handling of proper operation of the implemented system. It includes administration of the system, monitoring of process metrics (both – technical and business), providing analytics for review, ALM processes (small enhancements/fixes outside the project release and change management of software) or optimization of services. During this phase the goals of digital transformation of the company (the Road Map) is reviewed – decision makers need to state weather they are still important, adjust the strategy and start planning of new features.

Although it is mentioned as the last phase in the SAP Activate methodology, it is focused on PMBOK's Planning process groups. Operation of the company during this time finally tests the strategy of whole project. BAU (Business as Usual) activities continue and they are mostly associated with tasks out of standard project management scope.

Conclusions

"SAP Activate is a clear process of structured and solution-specific practices, carried out in a standardized environment, that puts business users in the driver's seat" this sentence taken from SAP marketing materials (SAP SE, 2020) shows both – strengths and weaknesses of the methodology. On one hand it provides standardized approach with track of proven successful implementations and as proprietary methodology was designed to be used with SAP systems, so it reduces project management time and effort by providing so called accelerators. It promises to enable business users to do their own configuration thus minimizing the employment of external consultants. On the other hand, organizations that have limited experience with internal project management using agile methodologies can have problems with cooperation with service providers operating the SAP Activate methodology. The involved stakeholders without IT background can oversee some technical problems (for instance interfaces) while SAP itself have troubles with providing consistent view on its own products (especially after acquisitions of external companies SAP offers systems with almost identical purpose like SRM or Ariba), their evolution and support plan (SAP WM module's maintenance was announced to be ended in 2025 with its functionalities taken over by Extended Warehouse management, now it is going to be prolonged with new name (Wehler, 2019) - Stock Room Management) and aggressive SAP sales sometimes not taking into account customer's needs. This mixture is something that organization must understand, accept and try to evaluate risks with mitigation plans – but that is pure essence of project management.

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Digital Transformation of a Business Model: Evolution of A Value Chain to A Network Value Space

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Abstract

The use of digital technology is leading to radical business changes. Value propositions change, traditional business processes are rethought from simple linear chains and value creation flows to more complex two-way network systems and network value space. New types of business models based on digital platforms are being introduced. The article focuses on the digital transformation of a business model based on digital platforms. The results of the analysis of various digital business models of companies in different fields of activity are presented. Information on what types of companies and which business models most clearly demonstrate their high competitive position is summarized. The characteristics of new types of business models of next-generation firms are given.

Keywords: Digitalization, Digital Platforms, Business Model, Value Chain, Network Value Space.

Introduction

In search of competitive advantages and the achievement of sustainable competitiveness, firms traditionally turn to management tools to increase the efficiency of using their own resources, their combination and the synergy effect. However, the variability of the competitive environment and the dynamism of economic processes are so rapid that it requires the search for "new combinations," among which, according to J. Schumpeter, is the production of a new good or the creation of a new quality of a good (Shumpeter 1982). Increasingly, the competitive success of the company is associated with its business model. Initially, the business model was considered as a way of doing business, which provided the company with income and profit.

Currently, many researchers agree that the business model describes the processes of exchanging value, a value between different participants in the business process. This is reflected in the writings of such authors as H. Chesbrough (Chesbrough 2006; 2010), D. Teece (Teece 2010), A. Osterwalder and his co-authors (Osterwalder, Pigneur and Tucci 2005), Y. Baldina, N. Masyuk. (Baldina and Masyuk 2019), P. Petrichev (Petrichev et al 2018), N.K. Temnova (Temnova 2019), S.I. Mezhov, A.V. Boldenkov (Mezhov and Boldenkov 2016), etc. A. Afuah, C. Tucci (Afuah and Tucci 2001) characterize the business model as a system that consists of components, the relationships between them and the dynamic processes within; the focus is on activity; the main focus is value.

A value-based approach to doing business was proposed by M. Porter (Porter 2013), where he argued that competitive advantages cannot be understood when looking at the firm as a whole. The real advantages must be found in the value chain - separate but interconnected economic actions that the company performs in order to deliver a certain value to its consumers. The value chain is characterized as a sequence of transformations of material and intangible resources in order to create value for the consumer. To understand the value chain, M. Porter proposed dividing all the activities of the company into primary (primary) and auxiliary (supporting) and characterize each of them with the processes involved in creating value for the consumer.

The main activity of the company is directly related to the physical creation of the product and its delivery to the consumer. The main activity processes are supply logistics, production processes, distribution logistics, marketing and sales, service, after-sales service, and customer support, etc. The auxiliary activities of the company provide support for the primary activities, and its processes are technology development, human resources management, procurement, maintenance infrastructure, and others

Since each firm has unique “manufacturing combinations” unique to it (Shumpeter 1982), the value chain for each firm is also unique. Its analysis allows you to determine in which processes the value is most successfully created or added; which activities are most important in the chain; who controls the value chain. By exploring the chain processes step by step, you can establish where the company is competitive and where it is vulnerable.

The development of the value approach was the idea that the consistent implementation of all processes that are carried out with the product from the development of its concept to delivery to the consumer forms the stream of value creation. This idea was reflected in the Lean Production business model, which was first implemented at Toyota and presented in the work of D. Roos, J. Womack, and D. Jones (Roos, Womack and Jones 2007). The business model based on Lean Production was a breakthrough in management and quality management without significant additional costs, as well as in ensuring long-term competitiveness.

The evolution of the idea of the possibilities of increasing the benefits received from the value stream has led to the understanding that success and sustainability in modern business are achieved by contracting, which allows combining the interests of counterparties in the formation of the value stream for the end-user. In these conditions, the value chain or stream goes beyond the boundaries of the company and is further formed together with suppliers, transport, and trading enterprises as a stream of creating value for the consumer. Each participant in the flow is not only responsible for their processes but also brings their understanding of what is valuable to the consumer in the perception of the final product and the way it is received. The integrating principle in the processes of creating, transforming, and implementing value for the consumer is the business model. She, as the most flexible management tool, is transformed under the influence of factors of the external environment and the internal environment of the company.

The transformation processes of the business model have become especially active with the advent of digital technologies and digital platforms (Masyuk, Bushueva and Bragina 2018). They provide completely different competitive opportunities for the companies that implement them, and in comparison sharply reduce the effectiveness of business models without digital technologies. This is manifested in the fact that the old business model ceases to be a source of value for the consumer, does not allow stable profit-making in the long term, and deprives the company of the opportunity to maintain a profit flow even in the medium and short term. The use of innovative digital platforms can be attributed to “creative destruction” (Shumpeter 1982), as previous methods and tools give way to new, more advanced ones from the standpoint of competition.

The platforms include virtual trading platforms, a set of users, interaction intermediaries, software, and network systems. The platform is a special type of business model of the company, the company itself, and a trading platform organized by the company, which provides its operation with a system of technologies and equipment. The platform research issues are reflected in the works of A.

Kovalenko (Kovalenko 2016), B.B. Kovalenko and K.Yu Rodimenkova (Kovalenko and Rodimenkova 2018), I.Z. Gelishanov and his co-authors (Gelishanov, Yudina and Babkin 2018), K. Linz, and his co-authors (Linz, Stevensand and Zimmerman 2019), N. Masyuk et al(Masyuk, Bushueva, Vasyukova and Kiryanov, 2018), etc.

Research Methodology

There are various methods and approaches to the study of the causes and mechanisms of the transformation of a business model. The transformation process occurs according to the laws of dialectics because the dialectic approach is used to understand the patterns in its development. As methods for studying the causes of the transformation of business models and understanding the economic interests of participants in the transformation process, a synergistic combination of value and system approaches has been adopted.

The study focuses on the digital transformation of a business model based on digital platforms. A comparative analysis of various business models of companies in different fields of activity expands these ideas.

The modern transformation of business models occurs as a process of digital transformation. The meaning of digital transformation is not in technologies as such, but in the changes brought about by the widespread use of digital technologies. Therefore, digital transformation is not so much a characteristic of the level of application of new technologies as a characteristic of creating and maintaining an effective business model. Digital technologies force management to radically change business models in all sectors. So, in the field of finance and credit, the places of banks, insurance companies, and investment companies are gradually taken by manufacturers of mobile devices and applications, such as Apple, PayPal, Google, Yandex, as active creators of new client services. Representatives of a major retailer, such as IKEA, are claiming a share of the financial operations of their customers, intruding on the insurance industry to sell insurance policies along with furniture and other non-food and food products. Digital technology is being actively introduced into other industries, undermining, and even destroying them. So Uber undermines a sustainable taxi business, Airbnb - the hotel business, Amazon, Alibaba, Ozon - the retail business.

The study of the processes of the active penetration of digital transformation into the economy allows us to generalize and systematize information about which types of companies and which business models most clearly demonstrate their high competitive positions.

1. Companies with developed digital capabilities and a business model based on mobile technologies (Amazon, Google, Yandex). Companies of this type actively enter existing markets and create a new attractive value proposition for consumers, for example, mobile devices and applications. According to the forecasts of analysts of the World Telecommunication Union (ITU), in 2020 the number of Internet users will exceed 4.1 billion people, of which more than 65% prefer access to the Internet using mobile devices (Internet-access (World Market) 2020).

2. Companies with a strong market position and a business model based on digital technologies that provide mobile interactions with customers in offline and online formats. Companies of this type are widely present in the service sector, primarily in trade. According to ITU, in 2019, the volume of online sales on a global scale exceeded $ 2.36 trillion. Each year, this figure is growing on average by 16 - 18%, while global trade is increasing annually by 2.1 - 3.3%. According to the information agency RosBusinessConsulting (RBC), a significant increase in these indicators is also expected in Russia. If in 2018 the volume of online trading exceeded 1.29 trillion rubles. and amounted to 4.07% of the retail turnover, then by 2024, the volume is expected to increase to 2.78 trillion rubles. and 8.5% of turnover, respectively (world market) 2020).

3. Companies that are successful in one industry or industry use digital technology and digital tactics to cross-industry boundaries and enter another industry. This trend is observed in many areas. For example, households are perceived by banks, insurance companies, realtors, and other counterparties

from other areas of activity as a very attractive market niche for which there is competition with the use of digital technologies.

The processes of digital transformation are so radical that we can talk about a digital revolution based on the opportunities that digital technologies provide. There are the following justifications for this. Firstly, this relates to Big Data and methods of digital processing of arrays of information. Secondly, these are digital online platforms as a complex of devices and programs that provide digital space and the process of user interaction with complex standard solutions as a platform. Thirdly, the digital transformation has led to the rethinking of traditional business processes from simple linear chains and value stream to more complex two-way network systems and value network space in search of competitive advantages and opportunities for sustainable functioning.

Digital technologies can lead to large-scale changes, as they become available to most companies. But technology is still just a tool that does not always create a competitive advantage. To form and maintain it, it is necessary to change the business model, to offer customers attractive service conditions, which is made possible through the use of digital technologies; Create a new value proposition that buyers find it possible to pay. Fulfillment of the above conditions may become a prerequisite for the creation of new types of business models of the next generation company (Table 1).

To determine what type of business model a firm should choose based on strategic development plans, the manager must answer the following questions to make a choice. Firstly, the company is an elementary part of the value chain or part of a more complex digital ecosystem, where the leader provides not so much control as the dynamics of maintaining and using the ecosystem. Secondly, what is the degree of awareness of the head of the company about the needs of customers? Thirdly, to demonstrate an understanding of the prospects for interacting with customers through digital technology.

Having determined which characteristics of business models are more consistent with the firm's goals, the manager can make an informed decision whether the firm should retain the old business model or should it move on to a new digital business process model. So, for a firm that remains part of the value chain, you can maintain the old business model of a supplier of tangible or intangible resources. This is true for companies which are working in B2B interactions.

Table 1 : Comparative characteristics of new types of business models

Type of business model	Characteristics of business model
The business model of a provider of tangible or intangible resources	The manufacturer or seller delivers the product to the consumer on a contractual basis, directly or through intermediaries.
Omnichannel business model	An integrated value stream is created, forming a multi-channel system of interactions with consumers.
The business model of the modular manufacturer or seller	The supplier of tangible or intangible products prepares them for use by the consumer at one of the stages (in the module) of the product life cycle.
The business model of the ecosystem driver of value space	The ecosystem organizer coordinates the creation and development of a network of companies, mobile devices and technologies, customers to create value that is essential for all ecosystem participants.

Source: (Moazed and Johnson 2019), adapted by the authors

The omnichannel business model, as well as the business model of a modular manufacturer or seller, is used by large retail chains (for Russia - Okay, Lenta, Perekrestok, etc.), the activities of which are an example of creating and supplementing a value chain. The leaders of such firms control everything related to the movement of the product: prices, deliveries, product placement, sales time frames. However, managers do not always know who supermarket buyers are and why they are buying

certain products. Digitalization allows consumers and businesses to know more about each other and find more benefits.

Firms with a business model of the value ecosystem driver are rapidly increasing revenues and profits. Most large companies can use historically established fruitful interactions with customers or take advantage of the networks, namely the assets and capital of digital business partners, to develop in the space of value. The ecosystem driver (Amazon, Ozon, Wildberries, Lamoda) provides consumers with more choices, offers the best price.

The value for consumers increases due to the fact that different suppliers sell similar (or even identical) goods often at different prices or with different levels of service; Due to quick feedback, suppliers manage to improve the quality of their products and services. For example, thanks to Amazon's work with suppliers, consumers get everything at once in one place, they have more choice and more detailed information on prices and quality. The Amazon platform allows you to see data on all the actions taking place in the ecosystem.

The largest Russian ecosystem driver is the Savings Bank of the Russian Federation. A leader in the application of digital technologies, the bank not only provides customers with classic banking services but also expands its network space through non-traditional banking. Understanding the needs of customers, the bank offers such services as Sber-Market, Sber-Logistics, Market Place (created in the same ecosystem as Yandex), House-Click (real estate portal), Sber-Mobile, Sber-Food etc. These services form the value space of consumers who respond to the bank with loyalty and commitment.

Discussion

The need for digital transformation is no longer in doubt since this is the future of the business, which has already come for some enterprises but not yet for others, but which cannot be left. The question is when and how will the company carry out a digital transformation. In a digital economy that has already become a reality, many firms cannot succeed simply by adjusting management methods and business models that have led to success in the past. As a result of the widespread use of digital technology, radical changes are taking place in the business. Value propositions, consumer preferences, monetization methods, requirements for key competencies, operational models, strategic control are changing.

When deciding to maintain or transform a business model, a manager must understand that he sets his company apart from others and compete with one or more competitive advantages. In the digital economy, they are the digital content of products and information, the customer experience of multi-channel and multiple products, the presence of internal and external digital platforms.

Conclusion

Initially, the business model was characterized as a way of doing business, which provided the company with income and profit. The application of the value approach has expanded the idea of the essence of the business model, which is interpreted as an integrating principle in the processes of creating and exchanging value between participants in the business process. The business model, as the most flexible management tool, is transformed not only under the influence of the external and internal environment of the company but also under the influence of digital technologies. As a result of the widespread use of digital technology, radical changes are taking place in the business. Value propositions change, traditional business processes are rethought from simple linear chains and value creation flows to more complex two-way network systems and network value space. In search of competitive advantages, firms are introducing new types of business models based on digital online platforms. Platform business models provide new opportunities in creating value for all participants in the process and expand the benefits of organizing and using the network value space. Therefore, business leaders seek to incorporate digital platforms into their business models.

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Application of DEA Methodology to Assess the Performance of Logistics Process Management

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Abstract

Performance is a category measured in numerous areas of operation of decision-making units. One of such areas is logistics supporting the functioning of supply chains and networks, so that the processes of flow of material goods, services and information create added value with each activity. Optimal movement of resources is possible thanks to the management of logistic processes, primarily in the context of available infrastructure and logistics operation services. For this reason, the logistics performance index (LPI) was adopted as the measure of logistic processes, and the Data Envelopment Analysis (DEA) methodology was adopted to assess the performance of logistics process management. Based on the review and analysis of the source literature, it has been shown that the performance of the implementation of logistics processes is the basic category of analysis in the implementation of information and decision-making processes in supply chains and networks, and the DEA methodology is an important tool in assessing logistics performance, which can be considered as a measure of the degree of implementation of logistics processes.

Keywords: Data Envelopment Analysis, effectiveness, logistics management, logistics performance index, logistics processes.

Introduction

Logistics is an application-oriented branch of science. It allows modelling and analysis of the economic system from the point of view of material, product and information flows, including time and space and creating value for people. Its task is to design and implement a flow system with the help of available scientific methods. In the field of logistics, problems related to configuration, organisation and control of flows in the system are solved. Logistics plays a conceptual and instrumental role in shaping customer satisfaction. Logistics goals are achieved thanks to the implementation of physical displacements of materials and products, as well as flows of capital and information through subsequent stages of activities of an enterprise or a group of enterprises. Therefore, an inseparable element of functioning of logistics are processes related to the flow of all types of resources, whose effectiveness affects profits and performance (Long 2018, Dias, Ierapetritou 2017; Ierapetritou, Nihar Sahay 2016), and thus market success (Nitkiewicz 2013). Therefore, logistics processes are the basis for the competitiveness of the logistics system, i.e. in a broad sense of the supply chain or network. Therefore, the importance of logistics processes in the functioning of the logistics system forces the implementation of their management. Logistic process management is understood as planning, organising and controlling the implementation of activities that improve processes related to the flow of all types of resources in the system. However, a problem of how to measure the level of logistics process implementation, appears. In the present paper it was assumed that a measure of the degree of implementation of the logistics process, are indices forming the Logistics Performance Index (LPI). This index is considered the most important measure showing and comparing the situation of the logistics sector of countries around the world (Çemberci et al., 2015). The efficient operation of supply chains and networks depends on the effectiveness of decisions in relation to the implementation of logistics processes. Logistic processes are aimed at increasing the exchange value and use value of products with spatial, as well as temporal value (Gaschi-Uciecha, Podgórska, 2015). The spatial value means that the logistics processes lead to the

efficient transfer of the product to its destination, while the temporal value that they lead to the transfer of the product in a timely manner. The transfer of the product to the right customer at the right time is the primary goal of logistics process management, which includes comprehensive planning, organisation and control of processes and logistics activities implemented to ensure the efficient and effective flow of all types of resources between partners in the supply chain or network. An important element of logistics processes is also quality assurance (Nowicka-Skowron, Ulewicz, 2015), as well as the role of feedback associated with the process of quality improvement in the supply chain (Drljača, 2019).

Traditional decision analyses are mainly focused on maximising profits and minimising costs (Moghadam et al. 2016). In management, however, what counts is the relationship of costs and profits, and more generally of the expenditure incurred and the consequently obtained results. This relationship expresses performance of operations, which is the basic category of the operation of supply chains and networks. Therefore, the following hypothesis 1 was made:

"*The performance of implementing logistics processes is the basis for creating new spheres of control (regulation) relating to information and decision-making processes in supply chains and networks*".
Logistics processes focus primarily on delivering goods to the customer in accordance with their needs as to quality, time and cost. These are often complex processes, characterised by a multitude of goals that are not rarely contradictory. Such situations require the use of tools to support the logistics process management so as to ensure the rationality of the operation of the supply chain and network as a result of an integrated, multidisciplinary and transparent approach (Della Spina 2016). Classical approaches to assessing the performance of operation of the supply chain and network are inadequate to the complexity of decision-making situations. Performance defines the degree of achievement of the goal at specific inputs and is thus associated with the concept of performance. Performance is understood as the possibility of achieving the assumed goals using a given method. These categories should therefore be considered together as they complement each other. Thus, based on the analysis of the literature, hypothesis 2 was verified:

"*DEA models are a vital decision tool in the assessment of logistics performance, which is a measure of the degree of the implementation of logistics processes*".

Logistics Performance Index as a measure of the degree of implementation of logistics processes

The management of logistics processes should lead to increased performance of system operation. The starting point for improving the performance of the system operation is therefore a process-based approach, and the process becomes the basic category of analysis for each organisation. Therefore, the identification of logistics processes that ensure the efficient and effective flow of resources in the system is an essential element of its operation.

Logistics includes activities aimed at guaranteeing the performance and effectiveness of all procedures related to the flow of all types of resources from origin to destination, while meeting the required quality of service, including reliability of information and sensitivity to customer needs (Domingues, Reis, Macário, 2015, p. 663). Logistic operations are necessary to efficiently and effectively solve problems related to transportation, storage, and packaging, and thus to ensure the competitiveness of enterprises and countries (Çakır, 2017, p. 177). The operational measure of effectiveness is performance (Śliwczyński, 2011). There are many approaches to measuring performance in the source literature (Kabak, Ekici, Ülengin, 2019; Schøyen et al., 2018; Hammes et al., 2020). In the paper, logistics performance is described using elements which form the logistics performance index (LPI). LPI is understood as a weighted average obtained on the basis of six basic areas, which include:

1. customs clearance – the performance of the clearance process (or speed, simplicity and predictability of formalities) by border control authorities, including customs,

2. infrastructure – the quality of trade and transport related to infrastructure (for example ports, railways, roads, information technology),
3. international shipments – ease of organising shipments at competitive prices,
4. logistics competencies – the quality of logistics services (for example, the competencies of carriers, customs agents),
5. tracking & tracing – options for identifying and tracking shipments,
6. timeliness – the timeliness of shipments in reaching their destination within the designated or expected delivery time (punctuality of deliveries).

The logistics performance index reflects the organisation of logistics processes that affects the image of the state. Focusing on the image of the state built in the majority of the image of economic entities is all the more justified because the European Commission in the task defined as service performance suggests creating a quality mark related to the level of logistics service provided. Logistics performance, because of the way it is understood and measured, determines market development. The international market requires organising and synchronising flows through strategic nodes and networks that facilitate transport, storage, protection and any other value-added services that are necessary because of the characteristics of the goods being transported (Puertas, Martí, García, 2014). Investing in logistics infrastructure should be treated as an area of investment with the greatest possible benefits that bring the highest profits from future economic growth (Tang, Abosedra, 2019).

Data Envelopment Analysis in Examining the Performance of Economic Systems

The Data Envelopment Analysis (DEA) is a frequently used method in the study of social and economic performance. DEA is a nonparametric method of assessing the effectiveness of each of a set of comparable decision variants (Saen, 2010). It is indicated that DEA is the best tool to identify best practices or success (Premachandra, Chen, Watson, 2011). DEA allows finding the best combination of possessed resources within a given technology, which is understood as a way of transforming resources into desired results (Anokhin, Wincent, Autio, 2011). In other words, thanks to DEA models it is possible to determine the performance of an entity on the basis of the performance index calculated including numerous inputs and results simultaneously (Song, Wu, Wang, 2011). Therefore, it allows the determination of technical efficiency, which is considered a difference between the stated level of production of a given enterprise and the limit of its actual production capacity (Nieszporska, 2007).

In order to assess the technological efficiency of units belonging to a certain set it is necessary to (Guzik, 2009):

1. specify a set of J assessed entities $O_1, ..., O_j$ (e.g. countries, regions, economic entities),
2. specify a set of R results of activities that will constitute the basis for assessing the performance of the examined entities,
3. specify a set of N inputs allowing the achievement of predetermined results,
4. specify for each entity the amount of the corresponding results y_{rj} ($r = 1, \ldots, R, j = 1, \ldots, J$) and inputs x_{nj} ($n = 1, \ldots, N, j = 1, \ldots, J$),
5. specify the relative technological performance of individual entities.

It should be remembered that inputs are quantities enabling obtaining certain results of activity and do not have to be considered in the sense of accounting, finance or productivity analysis. In other words, it is a quantity that should be, ceteris paribus, increased to obtain an increase in result. In turn, technological performance is determined by the effectiveness of transforming inputs into results. Therefore, the technology of the entity will be its vector of empirical inputs and results.
To assess technological performance, an indicator understood as the ratio of the value of results to the value of inputs is used, which is calculated according to following formula:

$$E_j = \frac{\sum_{r=1}^{R} u_r y_{rj}}{\sum_{n=1}^{N} v_n x_{nj}},$$

where: E_j – performance index of the j-th entity,

u_r – valuation of the unit of the r-th result (unit value of the r-th result if the market prices of the result are known),
v_n – valuation of the unit of the n-th input (unit value of the n-th input if the market prices of the input are known).

The performance index formulated in this way:

- is normalised in the range [0; 1],
- its higher value means higher performance,
- determines at least the relative performance of the entity.

The set of entities, inputs and results should be characterised by:

- homogeneity – compared entities should be by definition homogeneous or almost homogeneous, and not inherently different,
- non-negativity, which applies in particular to inputs and results (if results or inputs are expressed as negative quantities, it is necessary to add to them a certain constant), although in the case of results, their negativity is allowed if the model is focused on inputs (focus on inputs means that inputs are minimised while the results are reduced to a lower level),
- uniformity of measurement units, which means that a given type of input and result must be measured in all units with the same unit of measurement,
- uniformity of the direction of preferences – for the quantity being a result, its increase must be assessed positively from the point of view of the purpose of operation of the examined entities, while for inputs, its increase, ceteris paribus, is assessed unfavourably.
- significance of inputs – there must be a clear relationship between input and at least one result,
- an adequate number of entities, which should be significantly greater than the total number of inputs and results, although this is not a prerequisite for the study.

Thanks to DEA models it is possible to identify the performance limit, which is formed by effective entities (Liu et al., 2011). However, it should be remembered that the DEA method allows the determination of only relative performance, because of the fact that to calculate efficiency, information on many decision-making units is used.

Application of DEA methodology to assess the effectiveness of Logistics Process Management

The increase in the complexity and uncertainty of decision-making situations in the area of logistics and the insufficiency of previously applied methods to support the decision-making process have contributed to the more frequent use of DEA methodology to support logistics decisions. Table 1 presents the logistics decision areas that are supported by the DEA methodology most often.

Table 1: The logistics decision areas supported by the DEA methodology

Logistics decision areas	Literature
Selection of suppliers of raw materials	Dobos and Vörösmarty (2019), Visani et al. (2016), Boudaghi and Farzipoor Saen (2018); Cheng et al. (2017), Jauhar and Millie Pant (2017), Rashidi and Saen (2018), Zhou et al. (2016), Shabanpour et al. (2017), Dobos and Vörösmarty (2018), Toloo and Nalchigar (2011),
Selection of service providers	Park and Lee (2015), Azadi and Farzipoor Saen (2011), Steven and Egbers (2011), Schøyen et al. (2018), Lai et al. (2015), Holden et al. (2016), Baltazar et al. (2014), Hamdan and Rogers (2008), Lun et al. (2015)
Evaluation of logistics performance (macro- and microeconomic approach)	Mariano et al. (2017), Martí, Martín and Puertas (2017), Chen (2018), Rashidi and Cullinane (2019)
Location of distribution centers	Yazdani et al. (2020)
Transport fleet management in distribution centers	Andrejić, Bojović and Kilibarda (2016)
Optimization of transport activities	Lai et al. (2015), Bai et al. (2019), Gupta et al. (2019), Muñuzuri and Muñoz-Díaz (2019)
Selection of software supporting the implementation of logistics processes	Smirlis, Zeimpekis and Kaimakamis (2012)
Assessment of the effectiveness of tourist services	Huang (2018), Chaabouni (2018)
Assessment of the effectiveness of the supply chain	Badiezadeh et al. (2018)

The DEA methodology is widely used in assessing the performance of logistics processes implemented in various systems. Most often it is used in the selection of suppliers of supply raw materials and logistics service providers. Less often, the DEA methodology is used to assess logistic performance, although it is applied in this area at both the macro- and microeconomic levels.

The application of the DEA methodology to assess logistic performance in the context of an environmentally oriented logistics concept was mentioned by Mariano et al. (2017). They assumed that logistics includes a number of activities such as freight transport, storage, border checks and payment systems, and thus improving logistics performance is the key to economic growth and competitiveness. However, logistics processes are associated with carbon dioxide emissions, which is a serious problem in implementing logistics processes. The authors proposed the development of an alternative index for LPI with the DEA methodology application that allows:

- inclusion of the environmental dimension in the index by taking into account a variable determining the level of carbon dioxide emissions in transport,
- application of weights for each dimension (environmental, economic, technical one),
- determination of the index as a relative measure, allowing a comparison of the study entities.

The proposed index, in addition to six elements of the LPI index (customs, infrastructure, international shipments, logistics quality and competence, tracking and tracing, and timeliness), also included gross domestic product and carbon dioxide emissions for the transport sector, the environmental variable being input to the system, and the other elements outputs from the system. The proposed index assesses the logistic performance of the country in dynamic terms (at the assumed moment or period) and allows ranking of countries in this respect. Country ranking, in turn,

can be used to identify best practices that may form the basis for national or international public policy, identification of possible priority objectives for these practices, and identification of the best means of their achievement. In addition, they developed a dynamic index using the Malmquist index to assess the evolution of logistics performance in each country.

DEA methodology for ranking countries in context of Logistics Performance Index was also used by Martí, Martín and Puertas (2017). These authors ranked the countries according to the criteria constituting the LPI components, but using the DEA methodology, creating the DEA-LPI model. They considered three scenarios:

1. First scenario (base)
- Inputs: Customs, Infrastructure, Ease of arrangement shipments,
- Outputs: Logistics quality and competence, Tracking and trading, Timeliness.
2. Second scenario
- Inputs: A single constant variable
- Outputs: Customs, Infrastructure, Ease of arrangement shipments, Logistics quality and competence, Tracking and tracing, Timeliness.
3. Third scenario
- Inputs: Logistics quality and competence, Tracking and tracing, Timeliness,
- Outputs: Customs, Infrastructure, Ease of arrangement, Shipments.

Comparing the original LPI with DEA-LPI, the authors observed a high degree of correlation between country rankings made using both indices, taking into account three scenarios.

The primary aim of the study of Rashidi and Cullinane (2019) was to assess the sustainable logistics performance of OECD countries. According to the authors, the assessment of the performance of sustainable logistics operations requires the development of an aggregated tool that would ensure a balance between the economic, environmental and social aspects of logistics performance at national level.

Therefore, the following criteria for assessing individual aspects of logistics performance were adopted: “logistics activity” reflects the economic aspect, “energy use” and “greenhouse gas emissions” reflect the environmental aspect, and “rate of job creation” reflects the social aspect. The environmental variable “greenhouse gas emissions” has been considered as input, while the other variables are output. Using the DEA methodology, a new index called the sustainable operational logistics performance (SOLP), which was integrated with the LPI index, was created. Thus, the “sustainable logistics performance index” (SLPI), which is an interesting and potentially useful alternative to LPI and is the sum of LPI and SOLP, was obtained.

Chen (2018) also used the DEA methodology to assess logistics performance. In this study, three inputs and three outputs were included:

- Inputs: investment in fixed assets in transport, storage and post (100 million yuan), number of employed persons in transport, storage and post at year-end of 2009 (person), length of transport routes at year-end of 2009 (km);
- Outputs: freight traffic (10, 000 tons), freight ton-kilometers (100 million ton-km), gross regional product in transport, storage and post (100 million yuan).

The highlighted inputs reflects capital, labour and transport costs, respectively, in the logistics sector. The first two effects represent the regional performance of the logistics sector, while gross regional product reflects the direct economic benefit of the logistics industry.

Therefore, he logistics performance index allows for a holistic approach to the problems arising with the flow of material and information resources in logistics systems. It enables monitoring of progress in the implementation of activities related to transport, storage and service of these processes. Increasingly, basic logistics processes relate to current concepts in the economy, e.g. sustainable

development. Therefore, the multitude of features characterising logistics processes requires the use of tools that will allow the assessment of their degree of implementation and, as the examples show, the DEA methodology is increasingly becoming this tool.

Discussion and Conclusions

Performance is a measure that includes the effectiveness, as well as the efficiency and productivity of the system, including the logistics system. In a sense, it reflects the degree of rationalization of operations in the logistics system, or striving to shape the appropriate structure of processes that are the source of logistics costs and an appropriate level of customer service. Therefore, logistics has an impact on the structure of the added value, as well as the structure of inputs necessary to create this value. Thus, performance is affected by numerous organisational solutions, including those related to the operation of the logistics system. As part of these solutions, factors are defined as inputs and resulting benefits. Therefore, the basis for creating new control spheres in logistics is determined by the performance of processes implemented in supply chains and networks.

Performance allows for a comprehensive assessment of activities taken in the system, and in particular compares benefits from the implementation of the processes that create these activities to the input necessary for their achievement. Most often, performance is measured by financial analysis indices. This most likely results from the access to relevant data necessary for their calculation, which is recorded in every economic system. Unfortunately, these indices include only those benefits and inputs, which are expressed in monetary units. Numerous limitations are also associated with the use of econometric models in the performance study, mainly because of the inability to determine partial results and inputs. The DEA methodology is free of these limitations, and its common application in the decision-making process results from:

1. a possibility to study entities described by numerous inputs and results,
2. the use of less detailed information than in case of indicator methods or econometric models,
3. a possibility to express results and inputs not in monetary units, but in their natural ones.

The specific nature of the modern market shows that consumers currently expect not only the production of goods, but above all their delivery. Activities that enable the continuous flow of materials, goods and products, as well as accompanying intangible assets are becoming priority issues. For this purpose, however, it is necessary to create the appropriate infrastructure that will enable efficient operation of supply chains and networks. This infrastructure consists of elements such as transport infrastructure, warehouse infrastructure, packaging and information technology infrastructure. These elements complement each other and together they guarantee an efficient flow of resources in a specific time and space at specific costs. The logistics performance index reflects all elements of the infrastructure necessary to implement logistics processes, and is therefore a good measure for determining the degree of this implementation.

The DEA methodology is supported by the decision-making process in the implementation of logistics processes. It is also used to assess the performance of logistics processes that are becoming the most important source of operating costs of supply chains and networks. Performance and efficiency are categories that should be considered together. Performance determines the degree of implementation of logistics processes and can be measured by the logistics performance index, and the DEA methodology can be used to compare supply chains (at the micro- or macroeconomic level) in terms of performance, while assessing the technical efficiency of their operation.

Limitation and Future Research

Obviously, the presented discussion does not cover all possibilities in the area of decision-making within the framework of logistics processes management using the DEA methodology. However, they indicate a variety of solutions in relation to the assessment of the performance of process implementation and a variety of consequences of made decisions. The disposition of the effects caused by the implementation of each of the possible solutions allows them to be compared and

ranked according to the decision-maker evaluation system, while ensuring the rationality and effectiveness of the entire process of the assessment and decision-making. Therefore, DEA models are an important decision-making tool in logistics. Undoubtedly, research in this area should be deepened and extended to include the assessment of logistics processes management performance at the enterprise level.

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Analytical Models of The Program-Target Approach in Working Capital Management in The Agricultural Sector

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Abstract

The development of agricultural production in modern conditions takes place in a difficult socio-economic situation, which is associated with the introduction of economic sanctions at the international level against Russia; retaliatory embargo; emerging environmental threats to the sustainable functioning of agriculture as the most vulnerable sector of the agricultural sector of the economy. Such factors lead to the need to search for scientific methods and techniques in working capital management that provide positive economic results that contribute to improving the sustainable development of the agricultural industry, both as a whole and for individual agricultural enterprises. In order to exchange experience in improving the functions of working capital management of integrated agro-industrial formations, the article deals with the use of analytical models to assess the elements of capital, its composition and structure, and the reasons for changes necessary for the development of a program-oriented approach to agricultural production management. Based on the study of mechanisms for regulating own funds of integrated agricultural enterprises, the author substantiates the peculiarity of the system-target approach necessary for developing a working capital management strategy. Disclosed is the sequence of policy development working capital of agricultural enterprises, based on practical examples in the hierarchy of agricultural production, as the results of functioning of agricultural enterprises depend on effective working capital management, efficient use of material and financial

resources, which ensure a continuous process of agrarian business. The directions of improving the process of managing a holistic working capital policy using a systematic approach to the relationship of all management tools taking into account the characteristics of agricultural production are substantiated.

Keywords: Analysis, Management, Capital, Models, Programs, Target Approach, Methods, Mechanism.

Introduction

The agro-industrial complex is characterized as a complex economic system that aims to develop agricultural production, provide industrial and processing enterprises with raw materials, and meet the needs of the population with quality food products. One of the conditions for achieving this goal is a competent management system (Polyanin A., 2017) that ensures sustainable development of agricultural production, stable functioning of integrated agro-industrial enterprises, and efficient use of resources.

The creation of a mechanism for managing the sustainable development of agricultural enterprises is associated with the problem of combining their financial interests, the availability of funds to ensure high solvency, and the rational use of production resources in a market economy. Effective transformation of financial resources (Grafova G. F., 2004), turnover of funds, as well as profitability of business processes, ensure the financial well-being of not only the agricultural enterprise, but also its owners and staff. The volume and composition of financial resources in the agribusiness system in modern conditions are of paramount importance, since they ensure the autonomy and independence of the company. Thus, the management of working capital and its rational use acquire an important role in the conditions of the Russian economy's recovery from the crisis situation and stabilization of the external market, which determines the relevance of scientific research in this area.

The policy of working capital management of integrated agro-industrial enterprises is characterized as a set of scientifically-based program measures that should be aimed at the effective movement of structural elements of capital, increasing the results of their use for the purpose of maintaining and developing agricultural production. To date, there is an urgent need to reform the agricultural policy, the legal framework for its implementation, making management decisions on the formation of a strategy for the development of the agricultural sector of the economy, individual sectors and economic entities of the agro-industrial complex, choosing forms and methods of rational management by agricultural producers, applying effective management methods and techniques, searching for reserves to increase sustainability.

The purpose of the research is to develop the methodological foundations of working capital management based on improving analytical tools when applying the program-target approach in agricultural production for evaluating and controlling material and monetary resources, developing recommendations for making management decisions on the composition and structure of capital, determining the need for material resources, and selling products of integrated agro-industrial formations.

The research objectives include: application of analytical models in the mechanism of working capital management (Sheremet, A.D., 2017), formation of a model of the program-target approach to working capital management, justification of the program-target approach for the relationship of hierarchical levels of management in the field of agro-industrial production, optimization of working capital losses in the agricultural business as a result of inefficient capital management.

Modern Concepts of Working Capital Management in Agribusiness

Increasing the activity of agricultural enterprises depends to a large extent on the constructive mechanism of management (Zagaytov I., Ternov K., 1994), the combination of its elements and functions that allow to concentrate the impact of the managing entity on the managed object. New

conditions for the development of the agribusiness system require improving functional approaches to managing the sustainable development of agribusiness enterprises, developing methods of analysis and forecasting, and forming information support for making management decisions.

In modern conditions, it is particularly important to determine the most effective options for the formation and use of working capital (Blank Ia, 2008). The availability of working capital of agricultural enterprises and their effective use are important factors that affect the results of production activities, since they depend on the quality, completeness and timeliness of agricultural work, therefore, the volume of production, its cost, and financial condition.

The development of the mechanism for managing current assets of agribusiness enterprises is based on improving methods and scientific approaches to the organization of a set of interrelated tools, the main purpose of which is to maximize profits (Petrova Yu.M., 2016).

For the purposes of working capital management, the composition of working capital is classified according to various criteria. Many scientists consider working capital as a set of production funds and circulation funds in value form (V. I. Barilenko, 2012). Circulation funds consist of finished products, funds in settlements with customers, as well as funds necessary for the purchase of raw materials, materials, fuel, etc.

According to the Brothers A.V., the Current assets of agriculture can be divided into two parts (Bratchev A.V., 2011). The first of these parts includes items and materials that have not yet entered the production process and are in production stocks (stocks of seeds and planting materials, feed, fertilizers, pesticides, fuel and lubricants, spare parts). The second group consists of items and materials that are already in the process of production in the form of products that are being produced, but not yet finished (young animals, animals on fattening, work in progress.

Modern concepts of working capital management of agricultural enterprises is to determine the strategy and directions of production development, working capital parameters in accordance with the specifics of agriculture. Many agribusiness enterprises form their strategies using high-quality terminology that corresponds to the directions of Federal and regional agricultural development programs, and are defined by specific goals and objectives. A well-organized business largely determines the business development strategy (Abrams, J. B., 2010).

Currently, the problem of optimal working capital creation in the sphere of agricultural production is associated with the presence of negative phenomena, which is caused by the use of inefficient methods of management. The lack of own sources of working capital created by the enterprise for many agricultural organizations leads to the need to attract borrowed funds (Mezdrikov Yu.V., 2007). This situation leads to an increase in the cost of paying interest on the use of borrowed funds and credit resources, which often leads to a decrease in the solvency and financial instability of subjects.

Program-Target Approach to Managing Elements of Working Capital in Agricultural Production

Policies of working capital management in agriculture are determined by the targets of the state program of development of agriculture, as well as specific industries, which include agricultural production (2012) the Structure and content of policy allows you to define a guideline for the formation and use of overall working capital and its individual elements, based on the use of program-target approach in the system of agrarian business (Merenkova, I. N., 2013). Taking into account the specifics of the agricultural sector of the economy, the sequence of the system-target approach can be represented as a relationship between segments of agricultural production, elements of working capital aimed at achieving common targets.

The analysis of production indicators for the livestock industry shows that the indicative program indicators were exceeded in 2017 by 0.9%, the growth rate in comparison with 2016 was 1.3%. Over the past five years, the industry has also seen an increase of 2.3%. The main areas for which there is

effective development of agricultural production in the livestock industry, and for which there is an increase in output are: poultry growth target of 6.9%; pig farming – an increase of 5%.

Despite the ambiguity of development of branches of agrarian sector of economy, at the end of 2017, an increase of profitability of agricultural enterprises in relation to indices of 0.3%. Over the five-year period from 2013, the increase in the coefficient of profitability of agricultural enterprises amounted to 7.0%, compared to the previous year, there is a decrease in the coefficient.

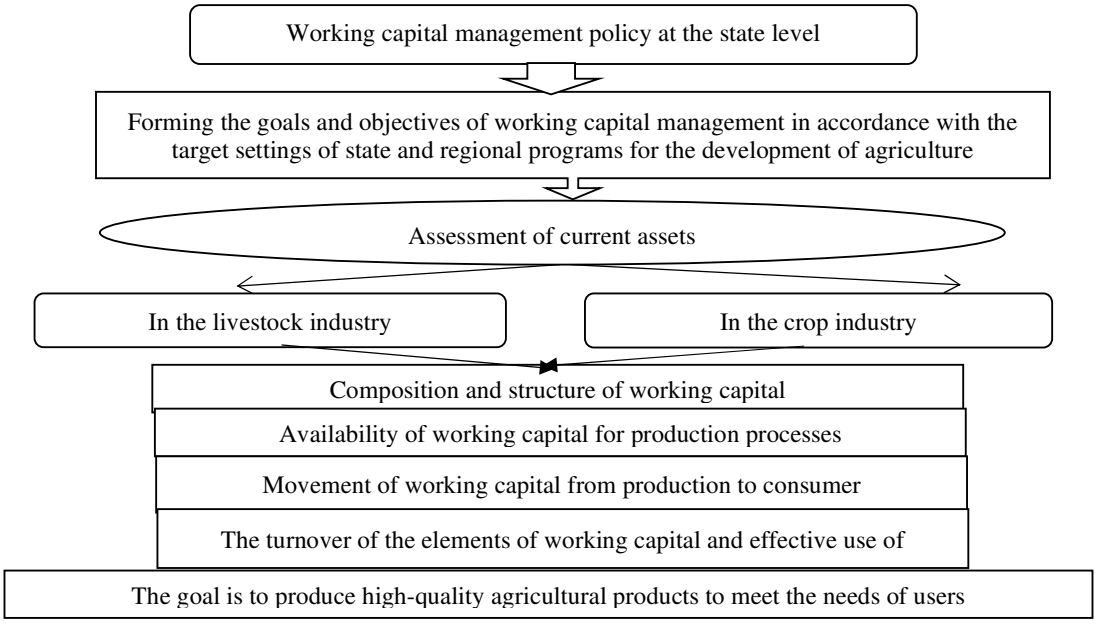

Fig. 1: Consistency of the system-target approach in the policy of working capital management in the agro-industrial complex

Investment is one of the positive factors that have affected the growth of agricultural production. The index of physical volume of investments in fixed assets of agricultural enterprises was 103.1% in 2017, which is higher than the planned figure of 2.5%, but much lower than the indicator of 2016.

Table 1-Dynamics of actual indicators of the State program for agricultural development (in comparable prices),% *

Indicators	year 2013	year 2014	year 2015	year 2016	year 2017		Change in 2017 data in comparison		
					plan	actually	with the plan	C data from 2016	data from 2013
Indices of agricultural production for all categories of farms (by the previous year)	105,80	103,50	102,60	104,80	101,70	102,4	+0,7	-2,2	-3,4
Indices of agricultural production for all categories of farms	111,20	104,90	103,10	107,60	101,50	102,10	+0,6	-5,5	-9,1

(by the previous year)									
Indices of livestock production for all categories of farms (by the previous year)	100,60	102,00	102,20	101,50	101,90	102,80	+0,9	+1,3	+2,2
Indices of the physical volume of investments in fixed assets of agricultural enterprises	101,50	99,00	86,90	112,30	100,60	103,10	+2,5	-9,2	+1,6
Profitability of agricultural enterprises, including subsidies	7,30	16,10	20,30	16,40	14,00	14,30	+0,3	-2,1	+7,0
The index of labor productivity	106,20	103,30	104,50	103,50	104,00	104,40	+0,4	-0,9	-1,8
Average monthly salary accrued to employees of agricultural enterprises, rubles	16853	19243	21626	24106	21790	26280	+4490	+2174	+9427

**National report on the progress and results of the implementation in 2017 of the State program for the development of agriculture and regulation of markets for agricultural products, raw materials and food for 2013-2020.*

Factor of growth of agricultural production was the growth of labor productivity, growth of labour productivity increased compared to target and last year. In the management system of agricultural production, it plays a significant role in managing the internal environment of enterprises (Parushina, N. V., Lytneva, N. A. 2016).

Analysis of the results of agricultural development by industry shows that in 2017, the crop production increased the acreage of grain and leguminous crops. The gross grain harvest amounted to 135.4 million tons, which is characterized by a growth rate of 12.2%, including winter and spring wheat growth of 17.1%. The volume of gross wheat harvest in 2017 amounted to 85863.1 thousand tons, and last year it was equal to 73294.6 thousand tons. Over the five-year period from 2013, the gross wheat harvest increased by 64.8% or 33772.3 thousand tons, while the yield for this crop increased annually and in the analyzed period reached 31.2 C / ha, 6.4% higher than in 2016. the Increase in production volume compared to last year and in dynamics is observed for such crops as sugar beet, soy, rapeseed. Special attention is paid to the production of rapeseed. From 2013 to 2016, the cultivation of this crop decreased all the time, from 1259.2 thousand tons to 998.9 thousand tons, respectively. In 2017, the increase to the previous year was 151.1%, the yield increased by 143.6% .

Table 2-Dynamics of crop production by agricultural enterprises of all categories in Russia*

Types of agricultural crops	**year 2013**	**year 2014**	**year 2015**	**year 2016**	**year 2017**	**2017 in % of the**	
						2016	**2013**
The volume of gross yield, thousand tons							
The volume of grain	92384,80	105315,0	104786,0	120671,80	135393,1	112,20	146,55
Winter and spring wheat	52090,80	59711,40	61785,80	73294,60	85863,10	117,10	165,03
Collecting corn for grain	11634,90	11332,10	13173,30	15309,80	13235,70	86,50	113,76
Sugar beet harvest	39321,20	33513,40	30030,50	51366,80	51933,90	101,10	132,08

Sunflower for grain	9842,40	8475,30	9280,30	11010,20	10481,20	95,20	106,49
Volume of soybean collection	1517,20	2363,60	2708,20	3135,20	3621,30	115,51	238,68
Rapeseed harvest	1259,20	1337,90	1012,20	998,90	1509,00	151,07	119,84
Crop yield, hundredweight / hectare							
Grain crop	22,0	24,10	23,70	26,20	29,20	111,45	132,73
Winter and spring wheat	22,30	25,0	23,90	26,80	31,20	116,42	139,91
Grain maize	50,10	43,60	49,30	55,10	49,0	88,92	97,80
Sugar beet	442,10	370,10	387,80	470,40	442,10	93,98	100,0
Sunflower for grain	14,50	13,10	14,20	15,10	14,50	96,03	100,0
Soybean yield	12,60	12,30	13,0	14,80	14,10	95,27	111,91
The yield of rapeseed	11,30	12,60	11,20	11,0	15,80	143,64	139,82

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The decrease in gross harvest in 2017 is observed for such crops as corn for grain, for which the growth rate by 2016 is 86.5%, the decrease was almost 15%. For such crops as corn for grain, sunflower for grain, sugar beet, soy, there is a decrease in productivity in comparison with 2016. the Largest decrease in productivity in 2017 for corn for grain, by 2016, the yield was 88.92%, and by 2013, 97.8%.

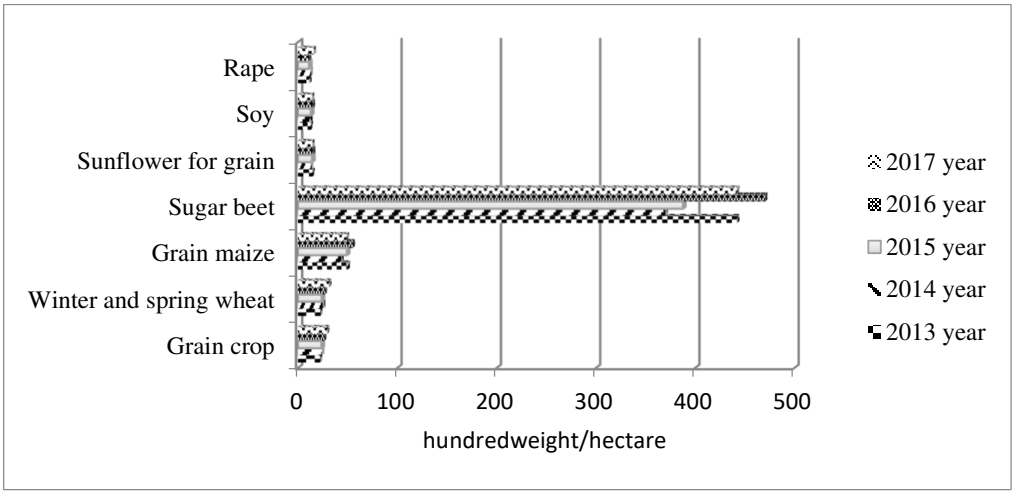

Fig. 2: Dynamics of yield of grain crops by agricultural enterprises of all categories in Russia

In order to support agricultural producers and ensure their sustainable development, the state implements management actions to Finance agricultural production. In comparison with 2016, 11.3% of budget funds were allocated for the implementation of the State program in 2017 to support the agro-industrial complex.

The main amount of budget funds is used to Finance the programs "Promotion of investment activities in the agro-industrial complex" and "Development of agro-industrial sectors". The volume of credit resources, which is used for the development of agriculture issued the "agricultural Bank" in the amount of 1104,9 billion rubles, including short-term lending 870,1 bn and investment lending 234,8 billion.

State programs are supported at both the Federal and regional levels of government. Data from the territorial body of the Federal state statistics service for the Orel region indicate that the volume of agricultural production for all farms in actual prices in 2018 amounted to 67.2 billion rubles. in the crop industry, the volume of production is 44.7 billion rubles, in the livestock sub-sectors, it reached 22.5 billion rubles. The share of the volume of production produced by agricultural enterprises accounts for 72.6 % of the total volume, peasant (farm) farms and individual entrepreneurs produced 11.0 % of production, 16.4% were created in households of the population (Orel, 2018).

Analysis of data on agricultural production in the Central Federal district indicates that the Oryol region ranks eighth in agricultural production. The growth rate of agricultural production at comparable prices in relation to 2017 is 106.5 %. The increase in production of crop production-8.5 %, in the livestock industry-3.0 %, in peasant (farm) farms, the index of production was 109.7 %. Production of agricultural products per capita in the Oryol region in 2018 amounted to 89.9 thousand rubles, which is significantly higher than the figures for the Russian Federation, equal to 34.9 thousand rubles, and for the Central Federal district – 35.2 thousand rubles.

According to the analysis, improving the management system at the regional level has helped to stabilize the situation in agriculture in the region, which in turn contributes to increasing the sustainability of the development of agricultural enterprises.

The Orel statistical office provides the following data on the development of agricultural production in the sub-sectors of crop production in 2018: "... the threshing of grain and leguminous crops in weight after completion amounted to 3,193. 8 thousand tons (100.5 % by 2017). In comparison with 2017, the gross harvest of millet increased 5 times in the farms of all agricultural producers in the grain group, winter triticale almost doubled, spring wheat - by 15.4 %, oats-by 14.8 %, corn for grain-by 9.8 %, spring barley-by 9.1 %, winter rye-by 8.2 %."

Improving the mechanism for managing agricultural production at the regional level has allowed us to achieve positive dynamics in the development of the industry, to ensure the stability of the functioning of individual enterprises (Kyshtymova E. A., 2017).

The analysis of indicators of sustainable development of the industry indicates an increase in the profitability of agricultural production. The profitability of asset management was 1.1%, and the profitability of goods, products, works, and services sold was 30.4%.

Agricultural organizations in the region in the 1st quarter of 2019 are characterized by the highest return on product sales of 30.4%. In second place are organizations engaged in educational activities 16.6%, in third - organizations of manufacturing industries 8.2%.

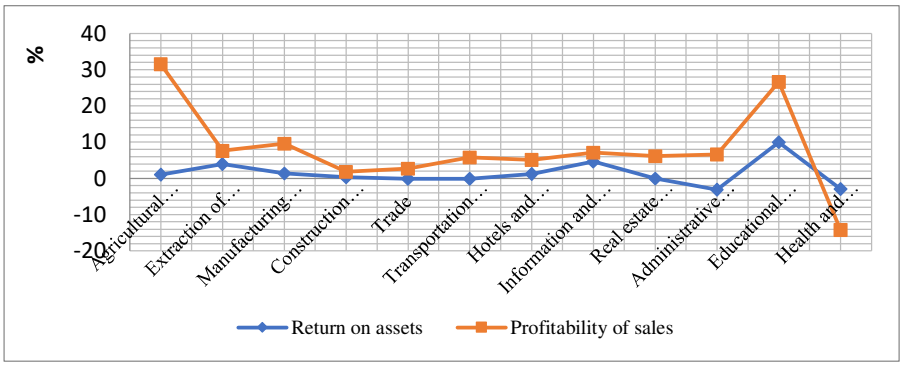

Fig. 3: Indicators of profitability of organizations in the Oryol region in the 1st quarter of 2019*

** Information on the results of the government of the Orel region in the field of agro-industrial complex in 2018.*

For certain types of activity, there is a loss: wholesale and retail trade 0.1%, transportation and storage activities 0.1%, the provision of administrative and related additional services 3.1%. The worst results are observed in the field of health and social services, for which the loss was received both on assets of 2.9% and on the sale of services of 11.3%.

The data of the comparative analysis showed positive high results for agriculture. However, these are the results of only 1 quarter, which may change towards the end of the year in a downward direction. In this regard, at the level of regional management, there is a task to ensure sustainable development of both individual agribusiness enterprises and the agricultural sector of the Oryol region as a whole. 2018 is characterized by an increase in the amount of funding for organizations that carry out animal husbandry. 477 million rubles were allocated for the development of this industry, which is 2.4 times more than in 2017, and 221.2 million rubles were allocated for the development of livestock breeding.

"In 2018, support was provided to 14 novice farmers in the amount of 25.2 million rubles, 1 family livestock farm – 9.0 million rubles, 4 agricultural consumer cooperatives received grants for the development of material and technical base in the total amount of 41.6 million rubles. Grantees created 31 permanent jobs and provided a product growth of at least 10 %" (Orel,2018). In addition, investment activities in the agricultural sector of the region are carried out in the following areas:

- it invests the amount of 280 million rubles in the modernization of production project "the Modernization of dairy complex, and forage with the goal of increasing the number and productivity of cattle population" implemented by the limited liability company "Jupiter" Bolhovskogo area industry dairy farming;

- investment of the project implemented by the limited liability Company "inter Finance project" Znamensky district of the Oryol region for the new construction of a dairy farm for 1200 heads of cattle has begun;

- investment projects are being implemented for the development of meat livestock by integrated agricultural enterprises "Znamenskiy selection and genetic center" limited liability Company and "Miratorg" Agricultural and production enterprise limited liability Company.

Major investment projects are being implemented in the food and processing industry of the region for milk processing, cheese production, etc., which promote agricultural products to the population, taking into account their needs and demand.

The effectiveness of implemented projects depends on the set of measures of each agricultural enterprise separately, aimed at ensuring their sustainable development, sustainable development of individual territories and the entire region as a whole. A significant role is played by the control of enterprise resources (Lytneva, N., 2019).

Final conclusion

At present, "...one of the most important directions of the state agricultural policy is strategic planning, development of forecast balances of production and consumption of the main types of agricultural products, priority development in the regions of those branches of agro-industrial production that most meet the natural and socio-economic conditions of the subject of the Russian Federation" (Nechaev V., 2010). In this regard, there is an increasing need to improve the tools of the program-target approach to working capital management in the hierarchical system of agricultural management.

The application of the program-target approach will improve the quality of management of working capital elements for making management decisions to achieve program goals and objectives of agricultural development in modern conditions of economic uncertainty.

Agricultural enterprises need new models where the main parameters and variables are the characteristics of agricultural products. This will allow us to evaluate development options and

formulate targets, rationally approach the formation of effective measures for the placement, preservation and increase of their own working capital, integrate management functions to maximize the profit of agricultural production.

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The New Strategic Concept of Defence Expenditures in The NATO Member States and The Russian Federation - The Comparative Analysis

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Abstract

The paper has examined the results of the treaty provisions related to defence expenditures in NATO member states and compared them with the Russian Federation's defence expenditures. By use of appropriate economic tools as well as the available data (sometimes estimated), the authors have proved that the treaty provisions on defence expenditures thresholds of 2% of GDP and 20% on the army's modernization have not been implemented in most member states. The analysis of the structure of these expenditures has shown that NATO member states have predominantly incurred expenditures on personnel of about 56%, contrary to Russia. Moreover, calculation of the expenditures at the USD market rate and according to purchasing power parity (PPP) has indicated significant inaccuracies in Russia's real expenditures, which are 3 times higher. Maintaining such disparities in the future can threaten security not only in Europe, but also in the world.

Keywords: Strategic Concept, National Security, Financial Analysis, NATO, Defense Expenditure

Introduction

Basic necessities, which every country is obliged to provide, ensure a sense of security and welfare. They also involve maintaining country's independence and sovereignty as well as security of the borders so that citizens could function and perform their duties peacefully. One of the determinants of the security level in the modern world has been and will remain the state of the army in terms of the number and training of soldiers as well as possession of the most modern equipment. The financial resources and defence expenditure result directly in the strength of the army and its military capability. These funds depend on many factors such as the state's economy and financial policy. The dynamics of civilizational development and international threats require more and more funds for defence expenditure. This issue seems to be extremely important. It is also the constant subject of discussions among politicians and entities responsible for the country's security. With time and transformations in the geopolitical and military situation in the world, the requirements for the North Atlantic Pact have also changed (Banasik, 2015; Krzysztoń). It is due to the imperial policy of some countries. Russia's war doctrine poses a threat for NATO, and in particular for Central and Eastern Europe. That issue, among others, has inspired the Authors to write this paper. ***The aim of the paper is to compare the financial expenditure allocated to defence in the North Atlantic Alliance member states in reference to the Russian Federation's expenditure.***

This paper presents the scale of expenditures related to maintaining the independence and sovereignty of individual countries. It can also have a positive impact on budget planning in the years to come.

For the purpose of the study, the following methods were applied: monographic, analysis, expert, participatory observation, induction and deduction, synthesis and comparison (Apanowicz 2005; Szarucki 2016).

The following were the sources of information: available literature, magazines, press articles, interviews, reports, authors' own experiences as well as the documents found on the websites of NATO and Russian Federation, mostly in English or Russian.

The used reports come from the official NATO sources and show the current and estimated future defence expenditures. These amounts actually reflect the government's military expenditures and those to be incurred during the tax year(Jeppesen 2019).

Notably, these are sensitive data, often unpublished and cited as estimates. This is especially true of the Russian Federation's statistics, where most of the expenditure is concealed and defence expenditure is hidden in the other ministries' budgets. Thus, it is just an attempt to approximately render the actual image of reality.

Financial Policy of Defence Expenditures

Nowadays, none of the country's leaders run the peaceful foreign policy, and undoubtedly, Russia is regarded as one of the countries that pose the greatest threat to the world's peace. The country headed by Vladimir Putin raises concerns around the world, in particular as a serious threat to Central and Eastern Europe. The fall of the Berlin Wall, one of the symbols of the Cold War, followed by the collapse of the Warsaw Pact in political and military terms, as well as the USSR disintegration marked a new era in the history of Europe and the world. It also posed a challenge for NATO, which until then regarded the Warsaw Pact, and in particular the USSR, as its main enemy.

The new geopolitical situation led to major changes in the structure of the North Atlantic Pact and a new approach towards the countries outside the 'Iron Curtain'. As part of the plan to increase security in Europe, NATO launched programmes to enable former EU countries, as well as countries that gained independence as a result of the disintegration of USSR and the Socialist Federal Republic of Yugoslavia, to join the Pact structures.

At different time, the number of NATO member states increased from 16 in 1991 to 29 in 2017.

Simultaneously, the NATO strategic concept has fundamentally changed. In 1991, the so-called new strategic concept was launched, which aimed at maintaining sufficient conventional and nuclear forces capable of deterring possible aggressors and complying with measures to prevent possible armed conflicts in the world (Mierzwa i Tomaszycki 2020).

The concept of 1991 did not specify a definite adversary, which resulted in a decrease in defence expenditure in many countries, reduction in the armed forces' personnel and the USA troops' presence in Europe and a significant reduction in the number of logistics stocks as well as military equipment and infrastructure. Over the years, the United States' initiative in Europe was declining, while the Russian Federation's military capability was growing. For a long time, Russia also kept investing heavily in military potential.

In recent years, Russia has started to pursue a particularly aggressive policy towards Central and Eastern European countries. Explicit military interventions involved the war with Georgia in 2008, Ukraine in 2014 and the incident in the Kerch Strait of November 2018. Russia's more sophisticated and covert actions consisted in a cyber attack on Estonia in April 2007 (Wierzbicki 2015), the coup attempt in Montenegro in 2016 (Rybczyński 2018), the attempt to block the Macedonian agreement with the Greeks in 2019 (Strzelecki 2018), or combat exercises and reconnaissance operations in Norway by Russian Specnaz in 2019 (Czermiński 2019). Those are just examples of Russia's actions within the "hybrid war" or "conflict below the threshold of war".

Those events led to a new approach towards the Euro-Atlantic defence policy and they started dynamic changes in the strategic concepts both in NATO and EU countries.

Further NATO summits in: Newport in 2014, Warsaw in 2016, Brussels in 2017 and 2018 totally changed the approach towards real international threats and those in Central and Eastern European countries. The last NATO Summit in London of December 2019 was particularly important for Poland and the Baltic states (Białczyk 2019). Since 2014, Russia has been identified as the main aggressor and the greatest security threat to the NATO member states. In view of these facts, it was necessary to develop a new defence policy and strengthen the "Eastern wall" with Russia.

In this context, NATO leaders, frequently using the terms of 'cohesion' and 'coherence', stress that unity is essential for success. Thus, 'cohesion' and 'coherence' have become distinctive indicators of the NATO current strategic concept in the defence, military and institutional policies, which also requires a new approach towards the management policy of the Alliance's finances.

In order to clarify and implement the concepts that are crucial to the current conception, it is increasingly important to understand what 'NATO Cohesion' and 'NATO Coherence' mean.

NATO cohesion means a level of political and ideological unity and solidarity between the members of the Pact. That mainly applies to the principles on which the Alliance is based. In particular, it refers to the member states' commitment to joint defence policy in order to deal with threats and challenges facing the Alliance. On the other hand, NATO coherence means consensus between the member states on augmentation of the Alliance's capabilities and possibilities necessary to ensure the maximum effective implementation of the NATO mission which, among other things, includes: strategic plans, resource requirements, material capacities, operational procedures, command structures, number of soldiers and logistics infrastructure (Chojna- Duch 2010; Hodges, Doran, Bugajski 2019).

The new conception not only leads to an increase in defence expenditure incurred by individual member states but also changes the structure of it (Bartz 2002; Baszczyński, Borsuk i Stańczyk 2009). According to the former NATO Secretary-General Anders Fogh Rasmussen, ‘an alliance that cannot ensure collective defence will lose its cohesion in achieving collective security’.
The issue of defence expenditure posed a challenge for the Alliance as it was raised at the NATO Summit in Brussels in 2018.

The defence budget of the Alliance members is set at 2% of GDP for each member state, of which 20% should be allocated to modernization of equipment and research. In the press release published by the NATO Department of Public Diplomacy 4 days before the NATO Summit in Warsaw, it was stated that "after years of cuts and constraints on defence budgets (until 2014), the trend was halted in 2015 (at that time a minimum increase in defence budgets of 0.6% was noted) and that defence expenditure was projected to increase by 3% in 2016. The countries that comply with the NATO's recommendations of 2% of GDP defence expenditure include: the United States (3.61%), Greece (2.38%), the United Kingdom (2.21%), Estonia (2.16%) and Poland (2.0%). The increase in such expenditures reflects the Alliance’s greater understanding for the need to strengthen the military capabilities and potential in the face of increasing traditional and non-traditional threats and security challenges” (Soloch i Pietrzak 2011).

Further on in this paper, the authors present the detailed analysis of defence expenditures in different aspects (Dylewski 2010, Kożuch i Ucieklak-Jeż 2014).

Comparative analysis of defence expenditures of the NATO member states vs the Russian Federation.

NATO's primary mission is ensuring the security of its members. Extension of the defence budget is the Alliance’s response to the contemporary security threats and how planning and investing in funds

is adapted to the current and future challenges (Baczyński, Borsuk i Stańczyk 2009; Mierzwa, Rupa i Sienicki 2018).

Moreover, defence expenditures involve intensified efforts to accelerate work on new military technologies and innovations as well as investments to enhance the capabilities to combat global terrorism. The concept of "defence expenditures" is worth explaining as it is a concept much broader than expenditure on the army. The essential amounts of defence expenditures are invested in maintaining the size of the armed forces and military equipment and infrastructure at the appropriate level, the process of training each soldier/military specialist, equipping the military sub-troops with equipment corresponding to the current battlefield conditions(Frysztak 2011; Klecha I Lis 2012)

The comparative analysis of defence expenditures incurred by the member states started at 2% of GDP thresholds established in the NATO's new strategic concept. Figure 1 illustrates how this indicator changed in NATO countries in comparison to the Russian Federation over the years of 2013-2018.

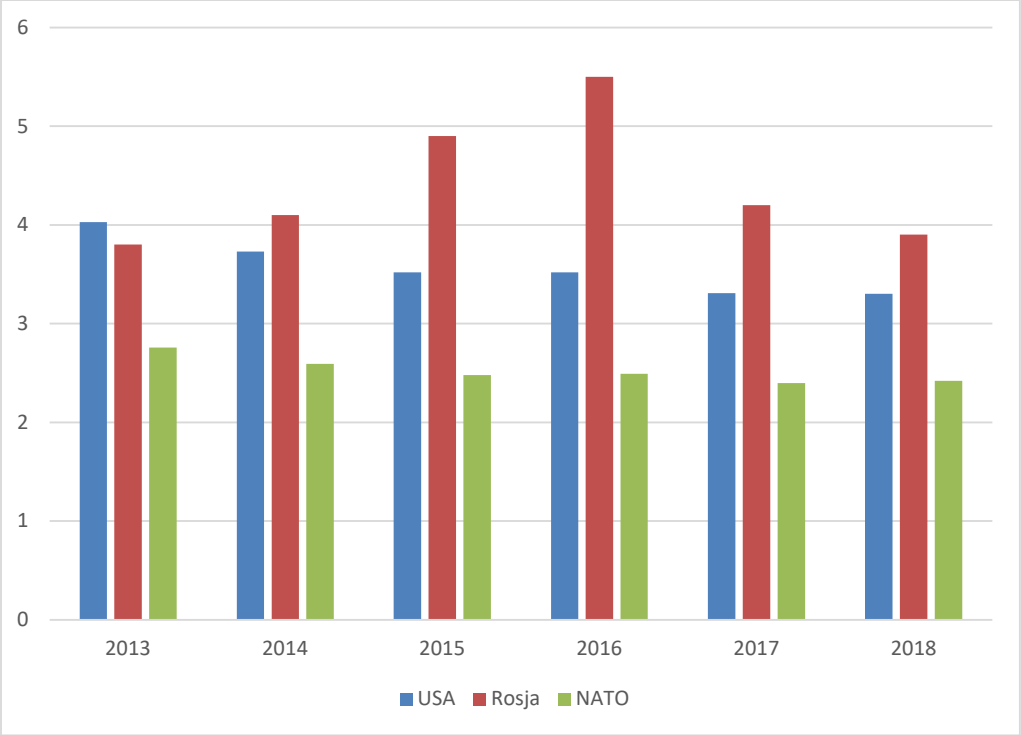

Fig. 1 : Comparison of defence expenditures of NATO vs the Russian Federation in the years 2013-2018 in [%].

The above Figure shows a slight reduction in defence expenditures incurred by the United States from 2013 to 2018 (by 0.73 % points). The attack of 11.09.2011 on the World Trade Center changed the United States policy resulting in an increase in the funds allocated to defence to 5.29 % of GDP. The factor which halted that increase again was the financial crisis which began in the United States in 2007. The crisis affected all major global economies - which contributed to a slowdown in GDP growth and consequently a decrease in defence expenditures not only in the USA, but also in European countries. The budgetary constraints of the United States affected the overall defence budget of the North Atlantic Alliance, which at that time also indicated a downward trend.

During the same period, an increase in defence expenditures was noted in the Russian Federation. The upward trend was reported there until 2016, followed by downfall. In 2017, compared to the previous year, the funds allocated for that purpose fell by 1.3 %, and a year later by another 0.3 % points. The reduction in expenditures spent by Russia in recent years has been the result of the intensified modernization policy of the Russian armed forces in the previous years as well as the embargo imposed on Russia due to its aggressive policy. Michael Kofman (the CNA think-tank expert on Russia) stated the thesis on the website "War on the Rocks" that the Kremlin does not want to fall into the trap of overwhelming defence expenditures as it did during the Cold War. In his opinion, that was, among other things, the cause of the USSR economic disintegration in the 1980s (Kucharczyk 2019). Based on the Kofman's analysis, it can be inferred that the Russians plan to spend on defence about 2.5-3 % of GDP in the coming years. Consequently, modernization will no longer take place at such a dynamic pace as in the previous years.

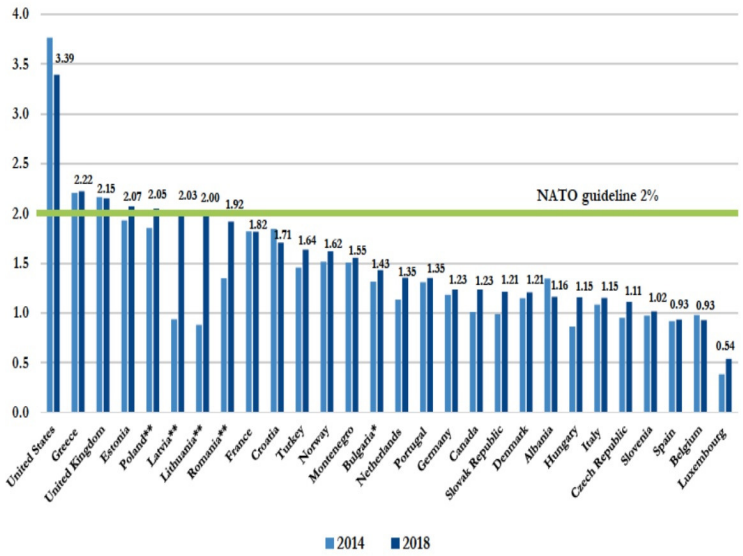

Fig. 2: Estimated defence expenditures of NATO countries in 2014 and 2018 counted as a share of GDP in [%]

Figure 2 shows the rate at which NATO increases its defence potential. The statistics refer the comparison of 2014 and 2018.

After analyzing the above data, it can be concluded that the vast majority of countries comply with NATO recommendations and increase their defence expenditures. However, the rate of this growth is insufficient for most member states. According to the publicly available data, it fell from 6% in 2017 to 3.8% in 2018. The threshold recommended by NATO of 2% of GDP in 2018 was only reached by the USA, UK, Greece, Estonia, Poland, Lithuania and Latvia.

Defence expenditures incurred by the USA and NATO with its allies in the years 1989 – 2018 are also worth considering. Figure 3 shows the average amount that 29 NATO member states spent on defence compared to the USA and European countries with Canada.

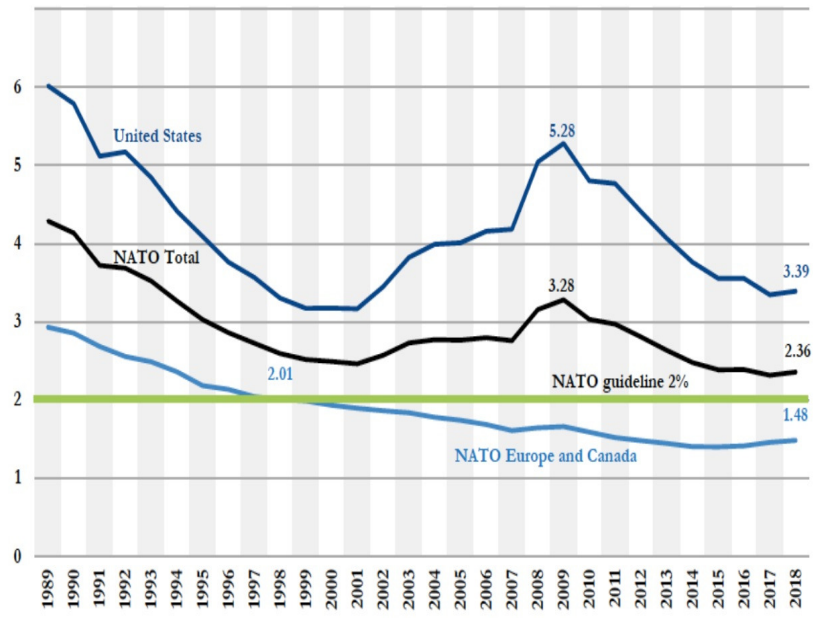

Fig. 3: Defence expenditures of the United States, NATO, and the allies in Europe and Canada.

Based on the above data, it can be stated that the percentage of NATO's total expenditure (NATO Total) is 2.36% of GDP. Without the United States (whose expenditure in the entire budget of the North Atlantic Pact accounts for about 70 %), it appears that the member states of Central and Eastern Europe, together with Canada, spend only 1.48%. Thus, it is obvious how the whole world's security, not just Europe's, depends on the USA military power. With such knowledge, it can be concluded that the USA leaders undoubtedly have the greatest impact on creation of the financial policy of the entire Alliance.

Another comparison which reveals disparities in funds invested in military expansion by some world powers is presented in Figure 4. Clearly, it confirms the previous thesis. The following countries have the largest military expenditures: the USA 36% and China 14% respectively, while the North Atlantic Alliance spends 50.4% of its global expenditures on defence.

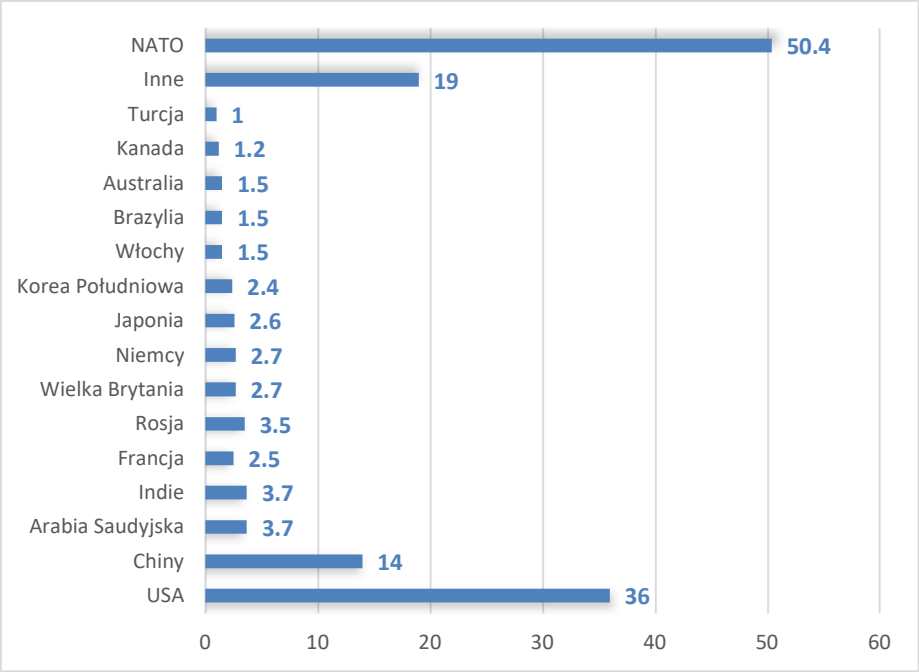

Fig. 4: Military expenditures of the selected countries and NATO in 2018 in [%]

After the preliminary analysis, there arises a question: Does the current Alliance ensure the security of its members? Unfortunately, based on the information gathered so far, an unequivocal answer is currently not possible. Other aspects that may distort the picture still need to be analyzed.

Comparison of expenditures on modernization of the NATO armed forces vs the Russian Federation

One the most important comparisons, presented by many authors in their scientific papers, which defines (Pietrzak i Soloch 2016; Szatkowski 2019; Szmidtka 2016) the rate of development of the armed forces recommended by NATO, also refers to the budget allocated to military modernization. The North Atlantic Alliance recommends that this rate should oscillate at 20% including research, development and modernization expenditures.

Modernization of the armed forces is aimed at increasing the military capabilities of a given army by purchasing new and technologically advanced equipment as well as modernizing the existing equipment that the army is provided with (Polak 2015; Wolny 2017). It consists in the replacement and installation of modern and more durable advanced subsystems, which significantly affects the useful value of equipment. Figure 5 shows the expenditure on modernization of the armed forces in percentages in the NATO states and Russia in 2018 (Trusewicz 2018). The Russian data available on the world forum, indicate that Russia's expenditure amounts to 50-60% (the list includes an average value of 55%). The largest percentage refers to the smallest country of Luxembourg, which spends 41.8% of its budget on modernization of the army, Latvia (35.4%) ranks second, followed by Romania (34.4%). etc.

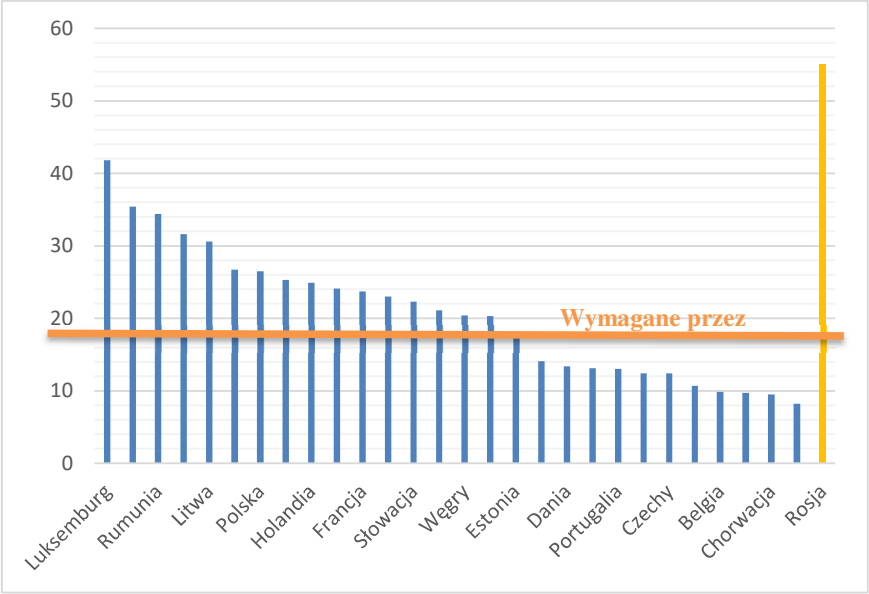

Fig. 5: Expenditures on modernization of the Member States' armed forces in 2018 in [%]

This overview shows that numbers are delusive. Luxembourg's military budget converted to a percentage of GDP is the largest, while it ranks last in NATO expenditures. On the other hand, Greece, which ranks second in respect of its defence expenditure, spends 12.4% of its budget on the purchase of modern equipment. On average, NATO European countries, along with Canada, spend about 12% on modernization of their armies (see Figure 6). 2017 marked a significant breakthrough as then military expenditure increased by 8.8% points compared to 2019.

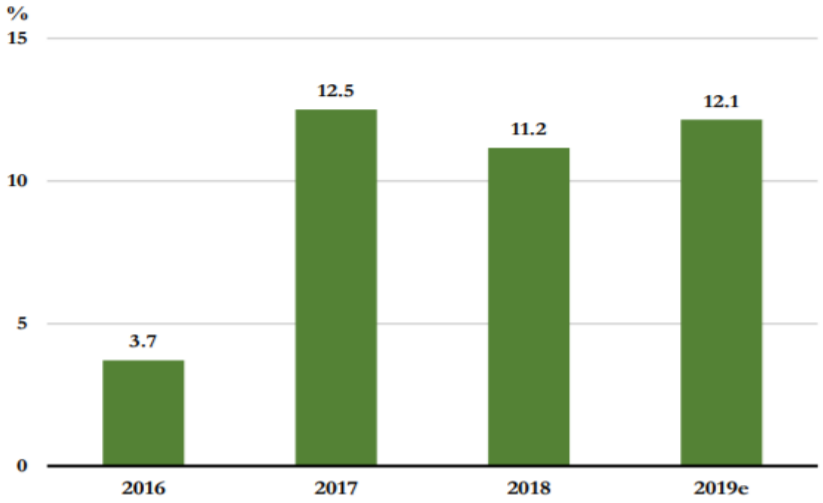

Fig. 6: Expenditures on military equipment of Central and Eastern European countries with Canada in [%]

More accurate analyses take into account the structure of expenditures, which is important, i.e. which activities consume the cash streams allocated from the budget. (Milewski 2016)

Most of NATO expenditures are not directly those spent on improvement of military capabilities, such as soldiers' wages and pensions and maintaining the current units for which they are responsible (Jankiewicz, Mierzwa i Tomasiewicz 2018; Persson 2019). Contrary, the Russian Federation authorities focus more on modernization of the army. It is difficult to state how true these data are as from year to year they are concealed by the Russian statistical offices RosStat. They do not disclose official figures which are only estimates. That leads to a reduction in the integrity of Russian statistics and thus thwarts a real analysis.

Expenditures on personnel and equipment modernization – comparison of Russia and the North Atlantic Alliance

The issue of military funds does not only account for the amount funds allocated to the armed forces, but also how it is distributed. Table 1 shows the percentages of expenditures on military equipment and human resources.

Table 1: Expenditures on personnel and equipment modernization in 2014-2018 - Russia, NATO in [%]

	Russian Federation		**North Atlantic Alliance**	
	Military Personnel	**Military equipment**	**Military Personnel**	**Military equipment**
2014	25	68	57,24	13,14
2015	20	56	58,35	14,74
2016	18	56	57,81	15,31
2017	24	51	52,85	17,29
2018	25	46	53,44	19,51
Średnio	**22,4**	**55,4**	**55,93**	**16,59**

The above overview indicates that there is a large disparity of personnel expenditures and those spent on the wider modernization of the army. The North Atlantic Alliance spends an average of 55.93% on personnel and 16.59 % on military modernization. In contrast, the Russian Federation spends 5.4% on modernization of the army and 22.4%. on personnel. Thus, the Russian Federation has a huge advantage in allocating more and more funds to the purchase of new military equipment and modern technologies.

Comparison of On Defence Expenditures Incurred by NATO And the Russian Federation [In USD Bn]

Continuing the analysis, it is worth paying attention to the amount of expenditures spent by the United States and other member states of the North Atlantic Alliance (see Figure 7). Based on the Figure below, a large difference between the USA and other NATO members can be observed. The United States spent on defence USD 685 billion in 2019 and the expenditure declined by USD 11 billion compared to 2013.

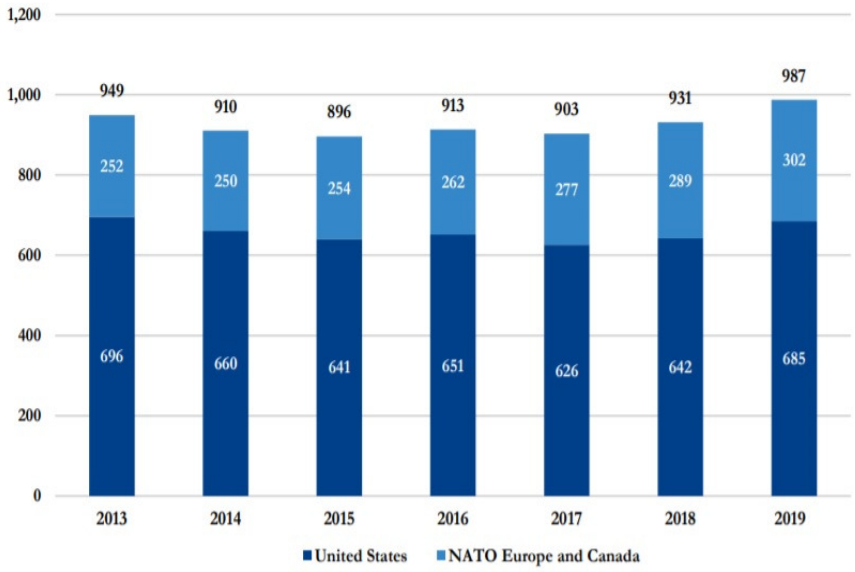

Fig. 7: Defence expenditures of the United States and Central and Eastern European countries in 2013-2014 in [USD bn].

Meanwhile, the funds spent by the European part of NATO and Canada increased by USD 50 billion during the same period. Probably, that was due to the promotion of President Donald Tump's new financial policy in recent years. However, calculating these amounts for each member state, on average gives an increase of USD 1.7 billion a year, which is very insubstantial. The authors compared these expenditures with those of the Russian Federation (see Figure 8).

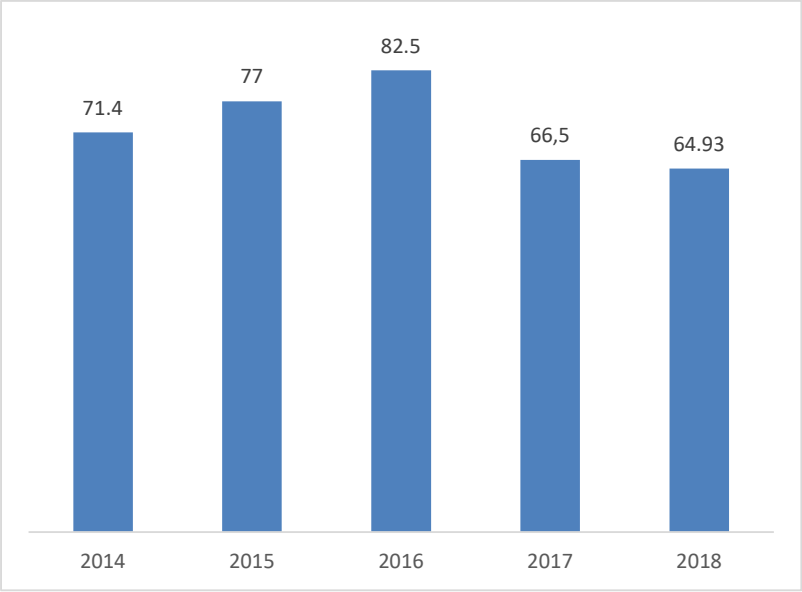

Fig. 8: Expenditures of the Russian Federation on defence in 2014-2018 (in USD bn).

According to the above Figure, on average Russia spent USD 72.46 billion on armaments over the studied period. Despite financial problems, Director of the Budget Policy Department of Russia's Ministry of Finance announced that, in line with the project, defence and security expenditures would rise from RUB 1,382 trillion to RUB 2,456 trillion in 2020, and then to RUB 2,523 trillion in 2021 (SIPRI 2019; Trusewicz 2018).

Comparing the expenditures of the Russian Federation with the expenditures of the North Atlantic Alliance, it might seem that the Russian Federation does not stand the slightest chance to defend its borders in confrontation with the United States, let alone the Alliance as a whole. Nevertheless, Russia's policy and its actions arise concern among European countries.

Analysis of The Russian Federation's Finances in Respect of Purchasing Power Parity

The purchasing power of money was taken into account in order to properly analyze the funds incurred on defence expenditure (Samuelson 2002). The expenditures converted to dollars at the USD rate do not account for its purchasing power in a given country. For this reason, calculation of military expenditures in individual countries is difficult (Tymoczko Nr283). The discrepancies are shown in Figure 9.

The Figure above shows Russian expenditures in rubles and dollars at the average market exchange rates. However, these expenditures are increasing in rubles (RUB) and they are decreasing in dollars (USD).

Volatility of exchange rates is not the only problem while applying the market measures to calculate military expenditures. The fact, which seems to be even more important is that many goods and services have different relative prices in a given country and they cannot be traded. That relativity can be essential in calculating relative military expenditures. If the price of goods and services ordered by the Russian Government for military purposes is lower than that of the USA goods and services, the measure of expenditures on the military market, based on the exchange rate, underestimates the capacity of a given shopping basket (Ruboszeki Serwa 2009)

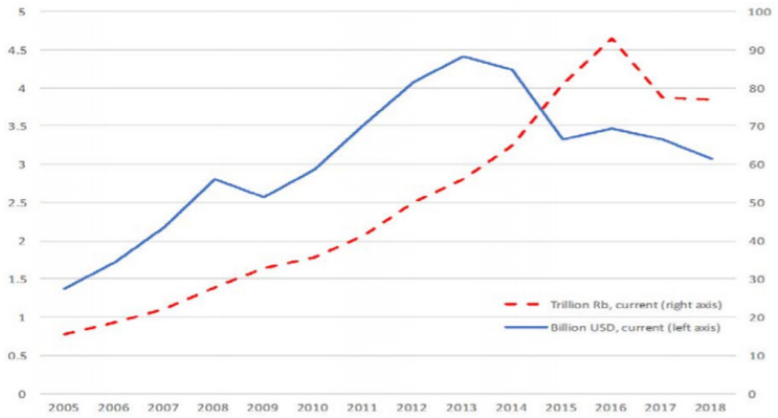

Fig. 9: Comparison of Russia's defence expenditures in RUB and USD at the market exchange rate.

In order to reflect the real purchasing power of money, when converting the currency is necessary, one needs to make use of the indicator called "purchasing power parity" (PPP), often referred to as the law of one price.

Taking into account the above indicator, the Russian ruble is said to be "the most underestimated currency in the world". This indicates that the seemingly weak currency, especially from the viewpoint of abroad, for the Russians themselves has a completely different value – much higher.

According to the most popular institutions dealing with military expenditure (SIPRI and the International Institute for Strategic Research), the Russian Federation is currently spending just over USD 60 billion on its army, an amount similar to France or the United Kingdom. If we simplify the analysis, it can be concluded that the amounts spent by Russia should be multiplied by 2.5-3 in order to receive a more realistic diagnosis.

Applying purchasing power parity we can take into account the differences in relative costs, which significantly changes the amounts of expenditures incurred by countries. The PPP-based estimates provide a more realistic approximation of the actual military expenditures of the Russian Federation. The effects of application of purchasing power parity can be observed in Figure 10.

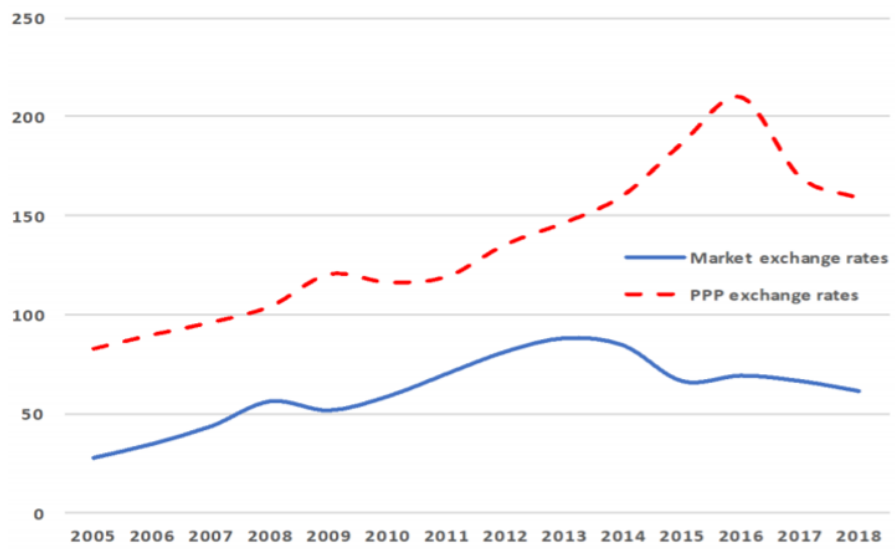

Fig. 10: Russian military expenditures in the years 2005-2018 at the USD market rate and according to PPP.

Application of these two approaches to measure military expenditures in Russia confirms the previously stated thesis that the possibilities of the Russian army 's modernization are about 2.5 - 3 times higher than those officially reported. According to the Figure, measurements by use of purchasing power parity (PPP), Russia's military expenditures exceeded USD 80 billion in 2015 and, already in 2016, they exceeded USD 200 billion. In 2018, the level of military expenditures remained at about USD 150 billion, due to Russia's debt repayment to the native companies of defence industries. It is easy to notice that this does not coincide with the data demonstrated in Figure 7, where Russia's expenditures amount to nearly USD 70 billion. While converting the amounts to percentages and calculating these expenditures by use of both rates (PPP and the market exchange rate), the difference is huge (see Figure 11).

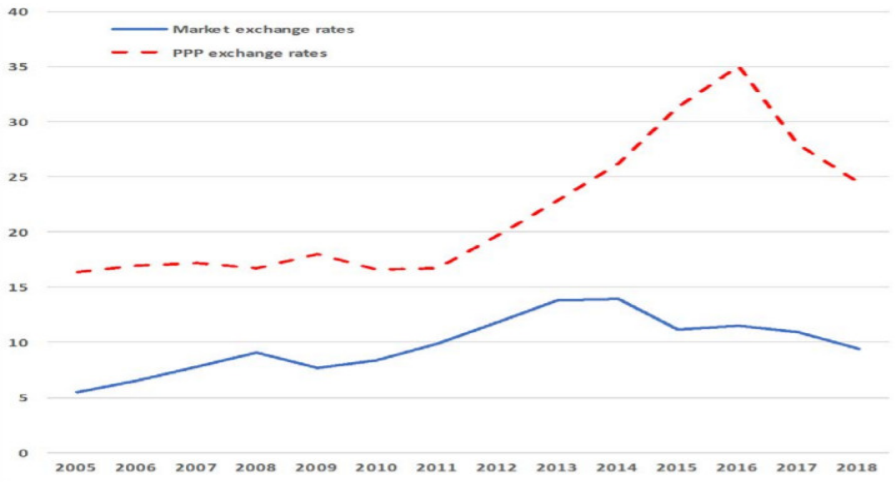

Fig. 11: Russian military expenditures per dollar and according to PPP in [%]

It can be calculated that at the USD exchange rates, Russian expenditures did not exceed 14% of its expenditures - even at its peak (2013). After depreciation of the ruble in the years 2014-2015, the

indicator decreased significantly as it fell below 10% . However, observation of the PPP indicator creates a different situation. Even before the start of the modernization programme in 2011, expenditures oscillated around 20% - as purchases increased in the years 2012 - 2016, Russian expenditures soared to 35% and then it fell to 25% in 2018. Figure 12 illustrates Russia's position among the world's largest military powers calculated according to PPP.

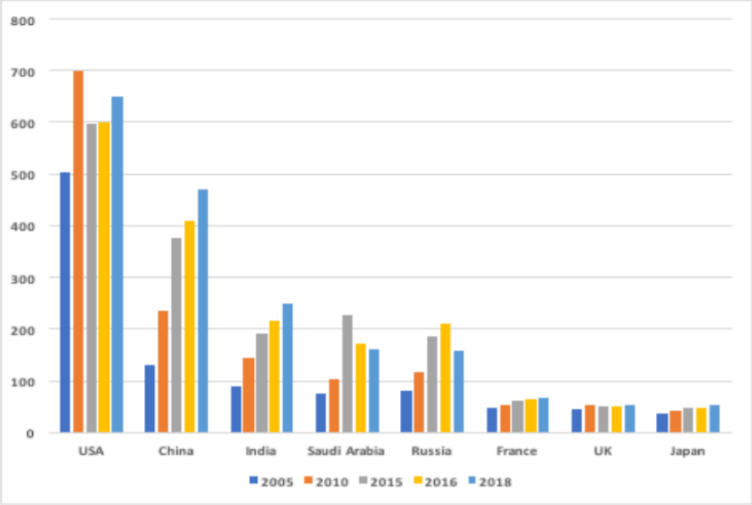

Fig. 12: Military expenditures of the selected powers according to PPP rates in 2005-2018 (in USD bn).

As shown above, Russia ranks 5th among the world's largest military powers. While the USA remains the leader in defence expenditures, the distance to other countries decreases during the studied period. Clearly, China's economy is accelerating, as its military expenditures are increasing from year to year. This may mean that in the near future, China's vigorously developing economy may obtain such military capability that, along with Russia, it may threaten international security.

Final Conclusions

The paper examined the results of the treaty provisions related to defence expenditures in NATO member states and compared them with the Russian Federation's defence expenditures. The comparative analysis was multifaceted and led to the following conclusions:

(1) Treaty provisions put forward consecutively at the NATO Summits in recent years, which established the 2% of GDP thresholds, have not been implemented in most member states despite understanding and declarations on the part of their governments. Only the USA, UK, Greece, Estonia, Poland, Lithuania and Latvia have have fulfilled these recommendations.

(2) The recommended amount of expenditure on the army's modernization and new technologies, which should constitute 20% of defence expenditures, has been implemented by 16 countries, which is only half of all. On the other hand, the analysis of the structure of expenditures has indicated that NATO member states predominantly incur expenditures on personnel of about 56% and on the army's mdernization of about 16%. Contrary, the Russian Federation has a reversed proportion as 22% of its expenditures is on personnel (despite the larger number of soldiers), and about 55% on the army's modernization.

(3) Calculation of expenditures at the USD market rate and according to purchasing power parity (PPP) indicates significant inaccuracies in Russia's real military expenditures. Calculating the expenditures according to purchasing power parity, the amounts that Russia spends on the army's maintenance are 3 times higher than the amounts found in the statistics. Thus, Russia

ranks 5th among the world's greatest military powers. Maintaining such disparities in the future may threaten international security, taking into account for example, the joint military capabilities of China and Russia.

It is worth noting that although the level of Russian military expenditures is much higher, it does not necessarily mean a serious threat to other countries. Russia has to spread its military budget for many different purposes and categories such as: research and development of the cutting edge weapons – hypersonative weapons, maintenance of all entities responsible for the deterrence strategy along with the world's largest arsenal of tactical nuclear weapons. Moreover, Russia has to train, equip and maintain one of the largest conventional armies in the world, while the army's activities comprise very vast areas, borders and oceans at the two ends of the huge country. Obviously, it is necessary to discuss and analyze whether defence expenditures ares increasing rapidly enough in NATO European countries in order to take appropriate actions. Such was also the application objective of this paper, to be regarded as a voice in the discussion and put forward for further in-depth research. The authors realize that due to the difficulty of obtaining data, the presented image is only an approximate version.

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Using the ICAPM to Estimate the Cost of Capital: Developed Market and Polish Market Stock Portfolios

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Abstract

In our paper we present the method of estimating the cost of capital of portfolios characterizing the Polish, EU, US, Japanese and global markets. We introduce the classical CAPM and the three factor Fama-French model. Model tests are run on 252 monthly returns of stocks listed on the markets in the years 1995-2017. The assessed cost of capital refers to the company project portfolio with real options of these projects. Stock returns are generated by the companies implementing projects and real options modifying these projects. Such procedures for estimating the cost of capital may be a valuable tool for large institutional investors to make optimal investment decisions. We use the bootstrap method to estimate the confidence interval of the cost of capital. The cost of capital is assessed for systematic risk estimated at 36, 60, 120 and 180 monthly periods, and for risk premium estimated at all 252 months. The length of the beta estimation period, and the type of model used has little effect on the cost of capital in the case of developed markets. The highest values of the cost of capital are found for the US market portfolio. The lowest values of the cost of capital are found for the Japanese market portfolio. The cost of capital assumes different values and different variability of the results for the Polish market.

Keywords: ICAPM, Cost of capital, Risk premium, Bootstrap method

Introduction

The scientific financial literature provides several basic methods for estimating the cost of capital. Commonly known procedures are the Build-up Model, CAPM applications, expanded CAPM Cost of Capital Formula (see: Pratt, 2002), and the Intertemporal Capital Asset Pricing Model (ICAPM) proposed by Merton (1973). The boundary condition of the applicability of the ICAPM to estimate the cost of capital is limited to companies listed on stock markets. The model proposed by Hamada (1972) attempts to overcome this limitation. The cost of capital can also be estimated by other methods, e.g. the discounted cash flow method or the method based on the yield on company's own bonds with a risk premium (see: Brigham, Gapensky, 2000, p. 260). It should be noted that each method is based on historical returns or capital flows that are extrapolated into the future.

Another methodological assumption is the fact that the above-mentioned methods of estimating the cost of capital use market returns being returns perceived by an external investor.

The presented interpretation of the cost of capital results in the possibility of using CAPM (ICAPM) mainly for the assessment of portfolio managers. In particular, planned investments in characteristic

portfolios built by large institutional investors may be examined. Therefore, the intended investments concerning selected markets can be subject to evaluation.

The estimation of the cost of capital may also apply to individual companies. However, in this case the cost of capital is related to a hypothetical portfolio of investment projects of company as seen by the external investor. Such a portfolio is a combination of undergoing and planned projects, weighted with selected real options. As a consequence, the cost of capital determined in this way can't be considered as a benchmark for the implementation of new company projects but only as an important indicator for the investor. If the investment projects implemented by the company were not influenced by real options, then the sufficient condition for a correct estimation of the cost of capital would be the use of pricing procedure consistent with the CAPM (ICAPM). Causes and consequences of inconsistent pricing in light of the CAPM are presented by Jagannathan and Wang (1996), Berk, Green and Naik (1999) and Bernardo, Chowdry, and Goyal (2007). Zhi, Guo and Jagannathan (2012, p. 205) state that "… the CAPM could work well on the option-adjusted risk premium and beta". The cited Authors propose procedures to modify the relations between options and pricing and construct the option-adjusted beta, and option-adjusted stock returns. The basic condition for the pricing consistent with the CAPM (ICAPM) is generating multifactor-efficient portfolios by the pricing application used (see Fama (1996)). This seems to be in line with Ferson's and Locke (1998), who state that the necessary condition for estimation of the cost of capital using ICAPM is proper estimation of the risk premium which is more important than the estimation of systematic risk. The research of Prat (2002), and Mauboussin and Callahan (2013) show that if the length of the measurement period is shortened, the standard error risk premium estimation increases. Damodaran (2017) states that the risk premium on the US market at the beginning of 2013, depending on the research method, varied in the range of 3.20% to 6.02%. The cited research results support the use of long historical periods. Ibbotson Associates recommends using the entire available historical period.

The existing literature studies of the cost of capital estimation relate primarily to individual companies. Graham and Harvey (2001), and Welch (2008) indicate that the classical and multifactor CAPM are the most popular methods of estimating the cost of capital, while the method of dividend discounts is cited as the least popular. Kozarević and Džafić (2014) use the classical CAPM to estimate the cost of capital of companies listed on the Sarajevo Stock Exchange.

As early as in the 1970s, the research of Fama and MacBeth (1973) shows the compatibility of stock pricing in light of the CAPM for portfolios. It seems advisable to make an attempt to estimate the cost of capital for characteristic portfolios of a given market, see Cochrane (2001, p.445). To our knowledge, there is a lack of thorough literature studies estimating the cost of capital of the characteristic portfolios of selected markets. The results of such research would allow us to direct the portfolio managers to a given characteristic portfolio and a given market. Such studies would enable large institutional investors, in particular investment funds, to take optimal decisions in the field of investment policy.

The aim of our study is to estimate the cost of capital of stock portfolios characterizing the selected markets, using the classical CAPM and the Fama and French (1993) ICAPM pricing application[1]. The study is based on portfolios consisting of stocks listed on the Polish (PL) market and Developed markets such as EU, US, Japanese (JPN) and Global (GL) markets. Our work differs from the methods of risk premium estimation adopted so far. The risk premium is estimated on the basis of two procedures presented in the next section.

The estimation of the cost of capital is also associated with the determination of the error value at the assumed level of significance. Therefore, we use a method to create a confidence interval of the cost of capital. Because the distribution of the cost of capital is unknown, we use the bootstrap method to evaluate its error.[2]

In Section 2 we present the methodologies for estimating the cost of capital using the CAPM and ICAPM applications. Section 3 presents the data and procedures of portfolios construction. Section 4 presents and analyzes the estimated systematic risk and risk premium components, average cost of

capital and its bootstrapped confidence intervals for characteristic portfolios, and statistic test results comparing the values of cost of capital for different boundary conditions for the PL and the tested Developed markets. In the last two sections, we present the Discussion and Conclusions.

Theoretical Model Approaches

The financial form of ICAPM can be expressed as follows:

$$E(r_i) = E(RF) + \sum_{k=1}^{K} \beta_{ik} E(F_k), \quad (1)$$

where β_{ik} is the systematic risk vector of stock *i*, $E(F_k)$ is the expected value of risk premium vector defined as the expected value of factors F_k for the analyzed market, $E(RF)$ is an expected return on a risk free asset, and $E(r_i)$ is the expected return on an analyzed asset.

In the case of CAPM, $E(r_i)$ depends on one factor defined as an excess on market return *RM* over risk free asset. In the case of FF application, $E(r_i)$ depends on well known three factors: *RM-RF*, *HML* and *SMB*.

We use the estimators of $E(RF)$, β_{ik} and $E(F_k)$ to get the value of cost of capital $Ccap_i$ as follows:

$$Ccap_i = \widehat{E(RF)} + \sum_{k=1}^{K} \widehat{\beta_{ik}^T} \widehat{E(F_k)}, \quad (2)$$

where $\widehat{\beta_{ik}^T}$ are systematic risk components for *i* asset estimated using *T* investment periods. We use two procedures to estimate $E(RF)$ and $E(F_k)$.

Procedure 1

The expected returns of $E(RF)$ and $E(F_k)$ are estimated as an arithmetic average of RF_t and F_{kt}, t=1,…,T, according to Eq. (3):

$$\widehat{E(RF)} = 1/T \sum_{t=1}^{T} RF_t \quad (3a)$$

$$\widehat{E(F_k)} = 1/T \sum_{t=1}^{T} F_{kt} \quad (3b)$$

In the case of CAPM:

$$\widehat{E(F_1)} = E(RM - RF) = 1/T \sum_{t=1}^{T} (RM_t - RF_t) \quad (4)$$

while for the FF model:

$$E(F_1) = E(RM - RF) = 1/T \sum_{t=1}^{T} (RM_t - RF_t), \quad (5a)$$

$$E(F_2) = E(HML) = 1/T \sum_{t=1}^{T} HML_t, \quad (5b)$$

$$E(F_3) = E(SMB) = 1/T \sum_{t=1}^{T} SMB_t. \quad (5c)$$

Procedure 2

The corresponding two-pass econometric model is built, according to Eqs. (6) and (7):
In the first pass:

$$r_{it} - RF_t = \beta_{i0} + \sum_{k=1}^{K} \beta_{ik} F_{kt} + e_{it};\ t = 1, \ldots, T;\ \forall i=1,\ldots,m, \quad (6)$$

where F_{kt} is the value of *k* factor model in period *t*.

Once the estimators $\widehat{\beta_{ik}}$ are calculated using (6), then we use them to get the estimator $\widehat{\gamma_k}$ of the parameter γ_k using the following second pass equation:

$$r_{it} = \gamma_0 + \sum_{k=1}^{K} \gamma_k \widehat{\beta_{ik}} + e_{it};\ t = 1, \ldots, T;\ i=1,\ldots, m \tag{7}$$

The estimated values of γ_0 and γ_k are estimators of the expected returns of $E(RF)$ and $E(F_k)$ according to Eqs (8) and (9):

$$\widehat{E(RF)} = \widehat{\gamma_0} \tag{8}$$

$$\widehat{E(F_k)} = \widehat{\gamma_k} \tag{9}$$

The estimator $\widehat{\beta_{ik}^T}$ in equation (2) is obtained from the following equation:

$$r_{it} = \beta_{i0}^T + \sum_{k=1}^{K} \beta_{ik}^T F_{kt} + s_{it};\ t = 1, \ldots, T;\ \forall i=1,\ldots,m. \tag{10}$$

In order to assess the accuracy of cost of capital estimation we use bootstrap methods by bootstrapping the residuals of models (3a,3b), (4), (5a,5b,5c), (6), (7) and (10).

Data and model digitization

We evaluate the cost of capital using the CAPM and FF model. We analyze 252 monthly returns of the stocks listed on the US, EU, JPN, GL and PL markets in 1995-2017, and characterized by their positive book value. We estimate the cost of capital for 25 Fama-French characteristic portfolios for the examined market. The portfolios are formed in two directions on book value (*BV*) to market value (*BM*) and capitalization (*Size*) at the end of the month of the previous quarter. The quintile portfolios are formed on *BM*. Those portfolios, in turn, are divided into other quintiles formed using the *Size* calculated for each stock company. *BM* and *Size* for portfolios are arithmetic means of these functions of various portfolio securities. Returns on given portfolios are average stock returns weighted by market capitalizations.

Finally, we calculate the average estimated cost of capital of 25 portfolios, weighted linearly. Such a procedure is used for each market.

The return and model factor values for the Developed markets are taken from the Kenneth R. French-Data Library.[3] All returns are calculated on the basis of prices in US dollars, and include dividends and capital gains. Market return *RM-RF* is the return on a region's value weighted market portfolio minus the US one month T-bill rate.

The factors of CAPM and FF model are calculated in the case of the Polish market. The data for defining the stock return, *BV* and *Size* of the Polish market are provided by the Warsaw Stock Exchange (WSE). The monthly value weighted portfolio returns, as well as the factor values are calculated on the basis of prices in the Polish currency, and include dividends and capital gains. Market return *RM-RF* is the return on the Index of the WSE (WIG) minus the Polish one month T-bill rate.

The expected value of risk premium vector $E(F_k)$ and the expected return of risk free asset $E(RF)$ are estimated from the entire historical period.

If Procedure 1 is used $\widehat{E(RF)} = 1/252 \sum_{t=1}^{252} RF_t$ and $\widehat{E(F_k)} = 1/252 \sum_{t=1}^{252} F_{kt}$.

If procedure 2 is used, systematic risk β_{ik} and risk premium components γ_k are estimated on the basis of the two-pass econometric model using 252 months. The regression parameters are estimated using GLS method according to the Prais–Winsten procedure where first-order autocorrelation of the residual components is taken into account. The heteroscedascity of residuals is justified by the transformation of variables. The errors-in-variables are corrected by Shanken's (1992) statistic.

Researchers recommend different periods of beta estimation. In the case of cost of capital assessment we use regression (10) to estimate betas from 36, 60, 120 and 180 last months. The period of 60 months is most often appropriate (see: Prat, 2002, p. 82). However, due to observable extended business cycles in the last two decades we pay more attention to betas estimates from the last 60 and 120 months.

Results and their Analysis

In Table 1 we show the values of the bootstrapped beta components estimated for the PL, EU, US, JPN and GL markets by the CAPM and FF model.

The medians of $\widehat{\beta_{\iota M}}$ and $\widehat{\beta_{\iota,SMB}}$ components are the highest for the US market, and the lowest for the PL market. The medians of $\widehat{\beta_{\iota,HML}}$ are the highest for the US market, and the lowest for the GL market.

If the Polish market is analyzed, the differences between the maximum and minimum beta values, estimated on the basis of 36, 60, 120 and 180 monthly periods, are 0.47 for $\widehat{\beta_{\iota M}}$, 0.03 for $\widehat{\beta_{\iota,HML}}$, and 0.25 for $\widehat{\beta_{\iota,SMB}}$. If Developed markets are analyzed, the differences between the maximum and minimum beta values range from 0.02 to 0.09 for $\widehat{\beta_{\iota M}}$, from 0.02 to 0.04 for $\widehat{\beta_{\iota,HML}}$, and from 0.01 to 0.05 for $\widehat{\beta_{\iota,SMB}}$. The differences between the maximum and minimum beta values, estimated on all the tested markets range from 0.27 to 0.71 for $\widehat{\beta_{\iota M}}$, from 0.15 to 0.16 for $\widehat{\beta_{\iota,HML}}$, and from 0.28 to 0.55 for $\widehat{\beta_{\iota,SMB}}$.

Tab. 1:The systematic risk components estimated by the CAPM and FF model for the Polish and chosen Developed markets

Market	$r_{it} = \beta_{i0} + \beta_{iM}(RM_t - RF_t) + \beta_{i,HML}HML_t + \beta_{i,SMB}SMB_t + \varepsilon_{it}$; FF model $r_{it} = \beta_{i0} + \beta_{iM}(RM_t - RF_t) + \varepsilon_{it}$. CAPM Beta median (width of 95% confidence intervals)											
	$\widehat{\beta_{\iota M}}$				$\widehat{\beta_{\iota,HML}}$				$\widehat{\beta_{\iota,SMB}}$			
	Period for beta estimation, months											
	60	120	180	Max[b]	60	120	180	Max[b]	60	120	180	Max[b]
PL CAPM	0.56 (1.20)	0.95 (0.55)	0.95 (0.44)	0.47	-	-	-		-	-	-	
FF	0.53 (0.85)	0.90 (0.44)	0.89 (0.37)	0.41	0.04 (0.17)	0.05 (0.17)	0.06 (.16)	0.03	0.20 (0.33)	0.26 (0.30)	0.30 (0.25)	0.25
EU CAPM	0.98 (0.22)	1.00 (0.12)	0.98 (0.10)	0.02	-	-	-		-	-	-	
FF	1.02 (0.15)	1.00 (0.09)	1.01 (0.07)	0.02	0.05 (0.26)	0.05 (0.20)	0.05 (.18)	0.02	0.57 (0.33)	0.56 (0.22)	0.55 (0.18)	0.05
US CAPM	1.15 (0.36)	1.17 (0.19)	1.16 (0.16)	0.04	-	-	-		-	-	-	
FF	1.02 (0.21)	1.03 (0.13)	1.04 (0.11)	0.02	0.19 (0.29)	0.19 (0.20)	0.21 (.18)	0.03	0.59 (0.30)	0.58 (0.24)	0.58 (0.19)	0.03
JPN CAPM	0.94 (0.31)	0.95 (0.20)	0.98 (0.17)	0.09	-	-	-		-	-	-	
FF	0.99 (0.20)	1.01 (0.13)	1.00 (0.11)	0.02	0.05 (0.35)	0.06 (0.25)	0.07 (.21)	0.04	0.53 (0.37)	0.56 (0.25)	0.58 (0.19)	0.05
GL CAPM	1.01 (0.21)	1.03 (0.11)	1.03 (0.10)	0.04	-	-	-		-	-	-	
FF	1.01 (0.13)	1.02 (0.07)	1.02 (0.06)	0.02	0.04 (0.25)	0.04 (0.18)	0.04 (.16)	0.02	0.55 (0.30)	0.56 (0.21)	0.57 (0.17)	0.01
Max [a]	0.63	0.27	0.28	-	0.15	0.15	0.16	-	0.39	0.32	0.28	-

Notes: This table presents the average medians of bootstrapped systematic risk components (β) of 25 Fama-French portfolios estimated using 60, 120, 180 last months. The median of risk using 36 last months are available from the Authors on request. The Polish (PL), EU, US, Japanese (JPN) and Global (GL) markets are analyzed. The medians, and confidence intervals are calculated using the bootstrap distributions with 5000 iterations. Max[a] – differences between the maximum and minimum beta values, estimated on all the tested markets on the basis of 36, 60, 120 and 180 monthly periods, Max[b] – differences between the maximum and minimum beta values, estimated on a given market on the basis of 36, 60, 120 and 180 monthly periods. 1996-2016, 252 months.

The above results indicate more stable values of systematic risk components in the Developed markets. However, the length of the estimation period has the greatest impact on the risk component due to market portfolio, $\widehat{\beta_{iM}}$.

In table 2 we show the risk premium components for the Polish and Developed markets estimated using two procedures explained in Section 2.

The risk premium $E(\widehat{RM-RF})$ estimated for the Polish market by Procedure 1 is negative, and equal to -0.80% monthly with corresponding *p*-value 6.79%. On the other hand, the risk premium $\widehat{\gamma_M}$ estimated by Procedure 2, both by the CAPM and FF model is positive (however statistically equal to zero) end equal to 2.11% and 2.58% with corresponding *p*-values 18.39% and 15.67%, respectively.

The risk premium $E(\widehat{RM-RF})$ estimated for the US market (by Procedure 1) is positive, and equal to 0.60% monthly with corresponding *p*-value 3.56%. The risk premium $E(\widehat{RM-RF})$ estimated for JPN, GL and EU markets is statistically equal to zero and ranges from 0.05% to 0.51%. The risk premium $\widehat{\gamma_M}$ estimated for Developed markets (by Procedure 2), both by the CAPM and FF model (except GL market and the CAPM estimation) is also statistically equal to zero.

Tab. 2: The values of risk premium vector and portfolio efficient statistic estimated for the Polish and chosen Developed markets by the CAPM and Fama-French (FF) model

Market	$\gamma_M, \gamma_{HML}, \gamma_{SMB}$; Procedure 2 $E(\widehat{RM-RF}) = 1/252\sum_{t=1}^{252}(RM_t - RF_t)$; Procedure 1 $E(\widehat{HML}) = 1/252\sum_{t=1}^{252} HML_t$; $E(\widehat{SMB}) = 1/252\sum_{t=1}^{252} SMB_t$;							
	$\widehat{\gamma_M}$	$E(\widehat{RM-RF})$	$\widehat{\gamma_{HML}}$	$E(\widehat{HML})$	$\widehat{\gamma_{SMB}}$	$E(\widehat{SMB})$	$Q^A(F)$	GRS-*F*
	Monthly values, %							
	(*p*-value, %)							
PL CAPM	2.11 (18.39)	-0.80 (6.79)	-	-	-	-	1.39 (12.22)	1.70 (2.40)
FF	2.58 (15.67)	-0.80 (6.79)	2.11 (0.03)	2.32 (0.16)	-0.05 (91.45)	-0.21 (70.84)	1.00 (46.91)	1.83 (1.16)
EU CAPM	0.11 (88.89)	0.51 (12.18)	-	-	-	-	2.41 (0.08)	2.41 (0.04)
FF	-0.49 (61.74)	0.51 (12.18)	0.36 (4.89)	0.40 (1.57)	-0.00 (97.38)	0.08 (56.28)	2.34 (0.12)	2.28 (0.08)
US CAPM	-0.23 (66.90)	0.60 (3.56)	-	-	-	-	1.87 (1.40)	3.60 (0.00)
FF	-0.88 (30.05)	0.60 (3.56)	0.24 (21.16)	0.25 (20.85)	0.18 (21.31)	0.19 (38.02)	1.86 (1.47)	3.45 (0.00)
JPN CAPM	-0.07 (93.92)	0.05 (87.91)	-	-	-	-	1.21 (24.04)	1.17 (27.31)
FF	0.65 (57.22)	0.05 (87.91)	0.37 (9.14)	0.38 (4.94)	0.11 (48.88)	0.10 (62.99	1.13 (31.52)	1.01 (45.45)
GL CAPM	-1.61 (2.91)	0.47 (9.40)	-	-	-	-	2.05 (0.57)	3.00 (0.00)

FF	-1.14 (26.58)	0.47 (9.40)	0.30 (6.38)	0.38 (1.58)	0.06 (64.37)	0.03 (81.36)	2.14 (0.35)	2.83 (0.00)

Notes: This table presents risk premium components estimated by two procedures: 1) $E(\widehat{RM-RF})$, $E(\widehat{HML})$, $E(\widehat{SMB})$ - as an arithmetic average of factor components, and 2) $\widehat{\gamma_M}$, $\widehat{\gamma_{HML}}$, $\widehat{\gamma_{SMB}}$ - in the second pass CAPM and FF regression using the panel returns on 25 portfolios sorted by BM and capitalization (Size). The corresponding p-values appear in brackets. The Polish (PL), EU, US, Japanese (JPN) and Global (GL) markets are analysed. RF_t is the 91-day Polish T-bill rate for Polish market, and the US one month T-bill rate for the Developed markets. GRS-F is F-statistic of Gibbons et al. (1989) and its corresponding p-value indicated below in brackets. $Q^A(F)$ reports F-statistic and its corresponding p-value, for Shanken's (1985) test that the pricing errors in the model are jointly zero. The errors-in-variables are corrected by Shanken's (1992) statistic. The Prais-Winsten procedure for correction of first-lag autocorrelation is used. The heteroscedascity of residuals is justified by transformation of variables. 1996-2016, 252 months.

Zero or negative values of the risk premium $\widehat{\gamma_M}$ estimated by the CAPM prove the incorrect model specification for a given market, whereas zero or negative values of $\widehat{\gamma_M}$ estimated by the FF model do not contradict the ICAPM assumptions, and prove the priority impact of risk premium due to *HML* and *SMB* factors (see: Fama, 1996, 463-464).

The risk premiums due to *HML* and *SMB* estimated by both procedures assume similar values on all the tested markets.

The risk premium due to *HML* assumes the highest positive values (above 2% with corresponding *p*-values below 0.16%) for the Polish market. Also, the risk premium due to *HML* assumes positive values for the EU, JPN and GL markets, equal to about 0.38%, 0.38% and 0.34%, respectively, with corresponding *p*-values from 1.57% to 9.14%. The risk premium due to *HML* for the US market is positive but insignificantly different from zero, equal to 0.24%.

The risk premium due to *SMB* assumes insignificant and close to zero values for all tested markets.

The portfolios closest to the multifactor-efficient portfolios are generated by the FF model only for the JPN market. The GRS-*F* and $Q^A(F)$ statistics are small at 1.01 and 1.13, respectively, with *p*-values of 45.45% and 31.52%, respectively.

In table 3 we show the average bootstrapped medians and confidence intervals of the cost of capital for 25 Fama-French portfolios estimated by the CAPM and FF model.

Tab. 3: Average percentage cost of capital (*Ccap*) for 25 Fama-French portfolios estimated for the Polish and chosen Developed markets by the CAPM and FF model

Market	Procedure 1 FF: $Ccap_i = E(\widehat{RF}) + E(\widehat{RM-RF})\widehat{\beta_{iM}} + E(\widehat{HML})\widehat{\beta_{iHML}} + E(\widehat{SMB})\widehat{\beta_{i,SMB}}$ CAPM: $Ccap_i = E(\widehat{RF}) + E(\widehat{RM-RF})\widehat{\beta_{iM}}$				Procedure 2 FF: $Ccap_i = \widehat{\gamma_0} + \widehat{\gamma_M}\widehat{\beta_{iM}} + \widehat{\gamma_{HML}}\widehat{\beta_{i,HML}} + \widehat{\gamma_{SMB}}\widehat{\beta_{i,SMB}}$ CAPM: $Ccap_i = \widehat{\gamma_0} + \widehat{\gamma_M}\widehat{\beta_{iM}}$			
	Ccap median, % yearly (width of 95% confidence intervals)							
	Period for beta estimation, months							
	36	60	120	180	36	60	120	180
PL CAPM	2.88 (10.20)	2.04 (12.00)	-1.68 (19.56)	-1.68 (19.68)	-6.48 (24.12)	-5.04 (19.32)	0.48 (6.36)	0.48 (6.24)
FF	4.20 (10.20)	3.12 (11.76)	-0.12 (18.96)	0.12 (19.08)	-7.68 (22.68)	-7.32 (20.40)	0.36 (4.92)	0.36 5.04)

EU CAPM	8.16 (15.36)	8.04 (14.76)	8.16 (14.88)	8.04 (15.12)	9.24 (1.44)	9.24 (1.32)	9.24 (1.44)	9.24 (1.32)
FF	9.24 (15.72)	9.12 (15.36)	9.12 (15.12)	9.00 (15.48)	9.00 (0.96)	9.00 (0.96)	9.12 (0.84)	9.12 (084)
US CAPM	10.56 (15.84)	10.32 (15.12)	10.44 (15.60)	10.32 (15.84)	11.52 (3.12)	11.64 (2.76)	11.64 (2.88)	11.64 (2.88)
FF	11.40 (15.60)	11.44 (15.60)	11.52 (15.84)	11.40 (15.60)	11.64 (1.32)	11.64 (1.32)	11.52 (1.32)	11.40 (1.32)
JPN CAPM	2.76 (13.44)	2.76 (14.52)	2.88 (14.52)	2.88 (14.88)	4.20 (2.76)	4.20 (2.04)	4.20 (1.92)	4.08 (1.80)
FF	3.48 (16.20)	3.60 (16.08)	3.72 (16.32)	3.72 (16.44)	3.60 (1.56)	3.60 (1.32)	3.84 (1.44)	3.84 (1.32)
GL CAPM	7.80 (12.84)	7.80 (13.08)	7.92 (13.56)	7.92 (13.56)	8.64 (1.68)	8.40 (1.56)	8.04 (1.44)	8.04 (1.44)
FF	8.16 (13.44)	8.16 (13.56)	8.28 (13.92)	8.28 (13.68)	8.28 (0.84)	8.28 (0.72)	8.16 (0.72)	8.16 (0.72)

Notes: This table presents the average bootstrapped median and confidence intervals of the cost of capital for 25 Fama-French portfolios estimated by the CAPM and Fama-French (FF) model. The Polish (PL), EU, US, Japanese (JPN) and Global (GL) markets are analyzed. The widths of corresponding 95% confidence intervals appear in brackets. $\widehat{\beta_{\iota M}}$, $\widehat{\beta_{\iota,HML}}$ *and* $\widehat{\beta_{\iota,SMB}}$ *are the loadings on the market factor and HML and SMB factors estimated from the first-pass time-series regressions. The bootstrap distributions are determined with 5000 iterations; 1996-2016, 252 months.*

Figure 1 shows the graphic distribution of medians and confidence intervals assessed cost of capital for beta estimations from last 120 months.

In table 4 we show *p*-values of normality statistic of the bootstrapped *Ccap* using 60 and 120 last month periods (from the whole period of 252 months) for beta estimation. Table 4 also shows the results of Wilcoxon rank sum test examining the equality of bootstrapped medians of *Ccap* using betas estimated from 60 and 120 periods (hereafter denoted as β_{60} and β_{120}).

a)

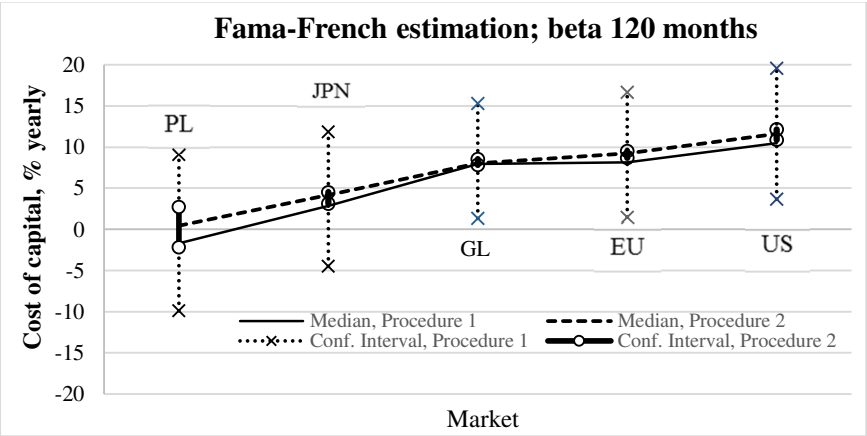

b)

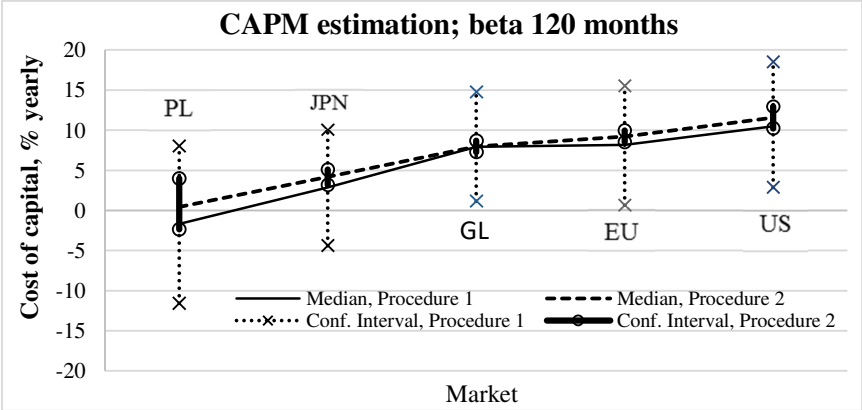

Figure 1: Average percentage cost of capital for 25 Fama-French portfolios estimated for the Polish and chosen Developed markets by the Fama-French model a) and CAPM b)

Notes: The figure shows the cost of capital bootstrapped medians and 95% confidence intervals (marked by vertical sections) for Polish (PL), Japanese (JPN), global (GL), EU and US markets. Beta components are estimated using 120 last months. The bootstrap distributions are determined with 5000 iterations.

Two procedure are used. 1996-2016, 252 months.

Procedure 1

Fama-French: $Ccap_i = E\widehat{(RF)} + E(\widehat{RM - RF})\widehat{\beta_{iM}} + E(\widehat{SMB})\widehat{\beta_{i,HML}} + E(\widehat{SMB})\widehat{\beta_{i,SMB}}$

CAPM: $Ccap_i = E\widehat{(RF)} + E(\widehat{RM - RF})\widehat{\beta_{iM}}$

Procedure 2 II pass econometric model

Fama-French: $Ccap_i = \widehat{\gamma_0} + \widehat{\gamma_M}\widehat{\beta_{iM}} + \widehat{\gamma_{HML}}\widehat{\beta_{i,HML}} + \widehat{\gamma_{SMB}}\widehat{\beta_{i,SMB}}$

CAPM: $Ccap_i = \widehat{\gamma_0} + \widehat{\gamma_M}\widehat{\beta_{iM}}$

Tab. 4: Statistics of the average bootstrapped distribution tests of the cost of capital (*Ccap*) using betas estimated from 60 and 120 periods

Market	NSW		Tmed
	Period for beta estimation, months		
	60	120	60/120
	Panel A: Procedure 1; *p*-values, %		
	FF: $Ccap_i = E\widehat{(RF)} + E(\widehat{RM - RF})\widehat{\beta_{iM}} + E\widehat{(HML)}\widehat{\beta_{i,HML}} + E\widehat{(SMB)}\widehat{\beta_{i,SMB}}$		
	CAPM: $Ccap_i = E\widehat{(RF)} + E(\widehat{RM - RF})\widehat{\beta_{iM}}$		
PL CAPM	0.62	53.6	0.00
PL FF	2.31	22.0	0.00
EU CAPM	18.3	48.6	0.00
EU FF	82.4	68.2	0.00
US CAPM	49.1	21.3	0.00
US FF	57.1	18.6	0.01
JPN CAPM	49.6	44.1	0.00
JPN FF	66.1	43.4	0.00
GL CAPM	26.1	48.7	0.00
GL FF	54.7	39.1	0.00
Market	Panel B: Procedure 2; *p*-values, %		
	FF: $Ccap_i = \widehat{\gamma_0} + \widehat{\gamma_M}\widehat{\beta_{iM}} + \widehat{\gamma_{HML}}\widehat{\beta_{i,HML}} + \widehat{\gamma_{SMB}}\widehat{\beta_{i,SMB}}$		

	CAPM: $Ccap_i = \widehat{\gamma_0} + \widehat{\gamma_M}\widehat{\beta_{iM}}$		
PL CAPM	0.00	0.00	0.00
PL FF	0.00	0.00	0.00
EU CAPM	0.00	0.00	0.00
EU FF	12.2	0.00	0.00
US CAPM	0.00	0.00	0.00
US FF	0.00	0.00	0.00
JPN CAPM	0.00	0.00	0.00
JPN FF	0.00	0.00	0.00
GL CAPM	0.00	0.00	0.00
GL FF	0.00	0.00	0.00

Notes: This table presents the p-values of chosen statistic tests of the average bootstrapped distribution of the cost of capital for 25 Fama-French portfolios estimated by the CAPM and Fama-French (1993) FF model. The bootstrap distributions are determined with 5000 iterations; NSW – Shapiro-Wilk normality test, Tmed – Wilcoxon rank sum test, 1996-2016, 252 months.

Discussion

In order to estimate the confidence interval for the cost of capital we use the bootstrap method. As a result we get that differences between the maximum and minimum β_M and β_{SMB} bootstrapped medians (estimated on the basis of 36, 60, 120 and 180 months) are the largest for the Polish market, and several times higher than for the Developed markets. These results indicate the stability of all risk components on the Developed markets and the instability of risk components β_M and β_{SMB} on the Polish market in 1996-2016.

The risk premium is one-dimensional due to the *HML* factor, and insignificant due to the *RM* and *SMB* for the PL, EU, JPN and GL markets. All the components of the risk premium are insignificant for the US market. The risk premium due to the *HML* assumes the highest positive values (above 2% monthly) for the Polish market. The risk premium due to the *HML* is several times lower for the EU, JPN and GL markets (about 0.38% monthly).

The analysis of Ccap on the Developed market

The bootstrapped medians of *Ccap* estimated by two Procedures assume similar values. However, assessed 95% confidence intervals are many times wider if Procedure 1 is used (see Tab. 3 and Fig. 1). It means that the application of Procedure 2 made it possible to estimate the *Ccap* with higher accuracy.

It is interesting to note that the length of the beta estimation period has little effect on the "nominal values" of the bootstrapped *Ccap* (see Tab. 3).[4] However, (due to different widths of the confidence intervals) the bootstrapped medians of *Ccap* estimated using the β_{60} and β_{120} are significantly different at the level of about 0.00% (for all the tested markets and the both Procedures, and the CAPM and FF model, see Tab. 4).

Interestingly the "nominal values" of bootstrapped *Ccap* estimated by the CAPM and the FF model are similar (see Tab. 3 and Fig. 1) – despite the incorrect specification of the CAPM and generating multifactor-efficient portfolios only on the JPN market, and only using the FF model (as evidenced by the data in Tab. 2). However, the bootstrapped medians of *Ccap* estimated by the CAPM and the FF model are significantly different at the level about 0.00% (for all the tested markets and both procedures, and the CAPM and FF model).[5]

The highest "nominal values" of the bootstrapped medians of *Ccap* are found for the US market portfolio. If Procedure 1 is used the *Ccap* is equal to about 10.34% yearly for the CAPM and 11.53% for the FF model with the confidence interval of about 15.38% and 15.67%, respectively (average for all tested periods of beta estimation). If Procedure 2 is used, the *Ccap* is equal to about 11.64% for

the CAPM and 11.54% for the FF model with the confidence interval of about 2.76% and 1.32%, respectively (see Tab. 3).

If Procedure 1 is used the *Ccap* for the EU market portfolio is equal to about 8.06% for the CAPM and 9.12% for the FF model with the confidence interval of about 14.90% and 15.36%, respectively. If Procedure 2 is used the *Ccap* is equal to about 9.24% for the CAPM and 9.07% for the FF model with the confidence interval of about 1.37% and 0.86%, respectively (see Tab. 3).

If Procedure 1 is used the *Ccap* for the GL market portfolio is equal to about 7.87% for the CAPM and 8.28% for the FF model with the confidence interval of about 13.25% and 13.68%, respectively. If Procedure 2 is used the *Ccap* is equal to about 8.26% for the CAPM and 8.21% for the FF model with the confidence interval of about 1.49% and 0.74%, respectively (see Tab. 3).

The lowest "nominal values" of the bootstrapped medians of *Ccap* are found for the JPN market portfolio. If Procedure 1 is used the *Ccap* is equal to about 2.81% yearly for the CAPM and 3.70% for the FF model with the confidence interval of about 14.54% and 16.27%, respectively. If Procedure 2 is used, the *Ccap* is equal to about 4.15% for the CAPM and 3.77% for the FF model with confidence interval of about 2.06% and 1.37%, respectively (see Tab. 3).

The analysis of Ccap on the Polish market

The "nominal values" of bootstrapped medians of *Ccap* for several beta estimation periods are negative, and confidence intervals are wide (about 22%). The positive "nominal values" of bootstrapped medians of *Ccap* are estimated with several times narrower confidence intervals (about 5% for Procedure 2 and about 11% for Procedure 1). It can be assumed that the negative median values result from large errors in the estimated cost of capital, which may result in a lack of multifactor efficiency of the generated portfolio (see Tabs 2 and 3).

The medians and confidence intervals of estimated cost of capital by two Procedures are different from each other. Also, the length of the beta estimation period has a major impact on the estimated cost of capital.

The bootstrapped medians of *Ccap* estimated using the β_{60} and β_{120} are significantly different at the level of about 0.00% for the CAPM and FF model (see Tab. 4).

Similarly to the Developed markets, the "nominal values" of bootstrapped *Ccap* estimated by the CAPM and the FF model are similar (see Tab. 3). However, the bootstrapped medians of *Ccap* estimated by the CAPM and the FF model are significantly different at the level of about 0.00%.[6]

The estimated cost of capital, using the CAPM or ICAPM discretized by market returns, is related to a hypothetical portfolio of investment projects as seen by the external investor. According to the proposed procedure, the estimated cost of capital, according to the above-quoted statement by Prat (2002, p. 185), may be a valuable indicator for portfolio managers. However, such an estimate of the capital cost cannot be considered as a benchmark for making decisions regarding new investment projects of stock companies.

Conclusions

Our work leads to the following conclusions related to the estimation of the cost of capital:

Developed Markets

1) The cost of capital estimated by both Procedures assumes similar values. The using of the two-pass econometric model (Procedure 2) made it possible to estimate the cost of capital with higher accuracy than in the method defined by Procedure 1.

2) The length of the beta estimation period, and the type of model used (CAPM or FF) has little effect on the cost of capital.
3) The highest values of the cost of capital are found for the US market portfolio (about 10.34% and 11.53% yearly for the CAPM and FF model, respectively – for Procedure 1, and 11.64% and 11.54% yearly for the CAPM and FF model, respectively – for Procedure 2).
4) The lowest values of the cost of capital are found for the JPN market portfolio (about 2.81% and 3.70% yearly for the CAPM and FF model, respectively – for Procedure 1, and 4.15% and 3.77% yearly for the CAPM and FF model, respectively – for Procedure 2).

Polish Markets

5) The cost of capital estimated by both Procedures assumes different values. The reason may be a greater impact of the beta estimation period on the cost of capital of 25 FF portfolios, compared to the Developed markets
6) If Procedure 2 is used, the values of cost of capital estimated by the CAPM and the FF model are similar.
7) If Procedure 2 is used and betas are estimated from 120 or 180 months the cost of capital medians are positive and equal to about 0.36% – 0.48% yearly, assuming the widths of corresponding 95% confidence intervals of about 5%.
8) The negative values of bootstrapped median of confidence interval result from a large error in the estimated cost of capital (assuming the widths of 95% confidence intervals of about 22%) and do not represent the cost of equity capital of companies' projects.

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[1] This applications hereafter are denoted as the CAPM and FF model.
[2] Bootstrap methods are widely described by Efron and Tibshirani (1993).
[3] See: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html
[4] Here, "nominal values" is understood by the Authors as the median value calculated without considering the estimation error.
[5]The results of Wilcoxon rank sum test for medians differences (estimated by CAPM and FF) are available from the Authors on request.
[6] See footnote 5.

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Overeducation Among Highly-Educated Employees in Poland

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Abstract

This paper presents the issue of overeducation affecting highly-educated employees on the Polish labor market. It analyzes the risk of occupational mismatches according to age, gender, place of residence, economy sector and size of the company, form of employment, field of study, and other factors. Statistical methods were used (descriptive statistics and logistic regression). In this study, a logistic regression model was used to estimate the probability of overeducation for different independent variables. Although the percentage of overeducated women was lower than that of men, more factors affected the risk of occupational mismatches among women. Factors such as: sector and job position, part-time work, and the time spent looking for the first job of over a year proved to be significant for the risk of overeducation.

Keywords Overeducation, Labor Market, Logistic Regression.

Introduction

Poles want to be educated. They associate higher education with a better job, higher wages, and greater employment stability in the future. Higher education in Poland is steadily increasing (in 2000, 12.5% people aged 25–34 had higher education, in 2006, the share was 24.7%, and in 2016, it grew to as much as 44.6%). A survey conducted among people aged 15–64 (European Commission) found that for persons older than 15 years, the percentage amounted to 7.4% in 1996, 13.9% in 2006, and 22.8% in 2016. However, a larger number of educated employees can lead to a phenomenon called *overeducation*, i.e., the need to work in positions below one's level of education. Although the rate of unemployment among people with higher education is low in Poland – 3% in 2016 (LFS, 2017) – it is important to also analyze such factors as the level of occupational mismatches with respect to the situation of such people on the labor market.

There are several important issues to address in the context of such mismatches. How important is the problem of overeducation for the Polish labor market is and who is particularly at risk of it? Does occupational mismatches vary across regions? What other questions related to the dynamics of overeducation should be asked? The aim of this paper is to identify the correlates of educational mismatches on the Polish labor market. There is no single theory of overeducation. Some authors have proposed to consider overeducation in the context of semi-formal economic models (Freeman 1976, McMillen et al., 1999). There have been also several proposals on how to theoretically explain overeducation. The most important are the human capital theory (Becker, 1962), job competition theory (Thurow, 1972), signaling theory (Spence, 1973), job assignment model (Roy, 1951; Tinbergen, 1956) developed by Hatrog (1977) and Sattinger (1993), and the theory of skill heterogeneity (Green and McIntosh, 2007). A new explanation was proposed by Bulmahn and Kräkel (2002), according to whom employers hire higher-educated people (than needed) to avoid a breakdown of the production process, as such workers are more capable of improvisation. Recent theories also characterize overeducation from a sociological perspective as a new form of labor market stratification (Caspada-Munsech, 2017).

Studies on overeducation pay more attention to return estimates (including the effect of overeducation on wages) than to the potential causes of the problem. It has been shown that working below one's skill level may have a negative impact on wages (with exception of results achieved by Groot and van den

Brink (2000)), productivity and job satisfaction (Allen and van der Velden, 2001; Fleming and Kler, 2008; Green and Zhu, 2010; Mavromaras, Mcguinness and Fok, 2009; Mavromaras, Sloane and Wei, 2015; Peiro, Agut, and Grau, 2010; Verhaest and Omey, 2010; Wincenciak, 2016).

The latest works in the field of overeducation focus, among others, on the incidence of and factors influencing occupational mismatches, especially with respect to the characteristics of overeducated employees. Research indicates a correlation between occupational mismatches and gender and family status. Married women are more at risk of being overeducated (Büchel and van Ham, 2003). Similar results for the Polish labor market are presented by Baran (2016), whereas other authors indicate that women in Poland seem to be less prone to being overeducated than men (Kucel and Vilalta-Bufi, 2012, Kiersztyn, 2013). Nevertheless, there is a lack of recent research in this area, and the issue of overeducation is worth updating, as more and more women take up and complete university studies and use the acquired qualifications on the labor market.

Studies also indicate that one of the disadvantaged groups are young workers, especially those with tertiary education (Dekker, de Grip and Heijke, 2002; Frei and Sousa-Poza, 2012; Vahey, 2000). Research also indicates the importance of completed degrees and the level of education. In many countries, technical and scientific degrees lead to a lower risk of overeducation than humanistic and social sciences degrees (Barone and Ortiz, 2011; Ortiz and Kucel, 2008; Reimer, Noelke, and Kucel, 2008). In Poland, different studies yield different conclusions: some have similar results (Baran 2016), while other studies indicate the opposite effect, with technical degrees leading to a higher risk of overeducation than social sciences (Kucel and Vilalta-Bufi, 2012). Employees with a master's degree are less exposed to occupational mismatches than those with a bachelor's degree (Barone and Ortiz, 2011). One of the more interesting studies also shows a relationship between the business cycle and the scale of overeducation (Assirelli, 2015; Di Pietro, 2002; Verhaest and van der Velden, 2013). This thread is becoming particularly relevant in the current period of recession that is affecting the global economy.

Gaps in research related to overeducation indicated in the subject literature include individual, contextual, and structural factors that can affect the probability of overeducation among employees (Caspada-Munsech, 2017). The article presents the development of research on the causes of overeducation and the correlations between individual factors and factors related to the labor market and the risk of overeducation and is an attempt to fill the aforementioned research gap. The article is also a contribution to the discussion concerning overeducation on the Polish labor market, because there is no unanimity regarding the relationship between overeducation and gender, field of study, and spatial diversity.

Different methods for measuring overeducation can be used, primarily (Overeducation in Europe…, 2003):

1) Objective measure – involving a systematic job evaluation (comparing the employee's level of education with the level required for a given position);
2) Subjective measure – in which respondents assess the level of education and training needed to apply to or work at a given position;
3) Empirical method – a person is perceived as overeducated if his or her level of education is more than one standard deviation higher than the mean for a given position.

It should be noted, however, that all of the above-mentioned methods lead to similar results (McGuinness, 2006; Sloane, 2003). In this paper, overeducation was assessed using the second of the three methods, which resulted from the availability of survey results containing a subjective assessment of occupational mismatch (which, taking into account the similar results provided by all the methods, justifies the choice of such a method).

Method

Descriptive statistics primarily refers to two factors that are considered to be important in the context of occupational mismatch, i.e., gender and field of education. Two types of overeducation, formal and actual, are considered. Formal overeducation refers to the formal requirements associated with applying for the position held. Actual overeducation means the level of education actually required for this position. A person is considered as overemployed if the level of education required for a given position is lower than his or her education.

The socioeconomic distribution of overeducation in 2016 was analyzed using logistic regression on a sample of working respondents with higher education. The logit model is a special case of the generalized linear model (McCullagh, Nelder, 1989). Binary logistic regression is used to explain the dichotomous qualitative variable Y depending on the level of exogenous variables X_1, X_2, ..., X_n (qualitative or quantitative). The explained variable is usually represented by a zero-one variable and takes the value of 1 if the event occurred or 0 if the event did not occur (Agresti, 2002).

Dependent Variable

The model can be written as:
$Y^*_i = X'_i \beta + \gamma OED_i{-}1 + c_i + u_i$,
where i denotes the individual, OED_i is a binary variable which takes the value of 1 for those respondents who are overeducated and 0 for those respondents who are well-matched, X'_i is a vector of explanatory variables, c_i is an individual-specific measure of unobserved heterogeneity, and u_i is an error term.

Independent Variables

The use of logistic regression helped to find the statistically significant predictors of the risk of overeducation. The following qualitative predictors were analyzed: family status (marital status and having children), the age of the youngest child under 3 years old, place of residence (voivodship, rural or urban areas), field of study completed by each respondent, level of higher education (Bachelor or Master degree), size and sector of the company, position held in the company, part-time job, form of employment, period of unemployment, period of looking for the first job, and type of employment contract). These variables were introduced to the model using zero-one variables. One of the quantitative variables was the number of children. The variable age was taken into account in two ways:

1) As a categorized variable – three age categories have been distinguished (25–31, 32–38, and 39–45 years), represented in the model by two zero-one variables (the youngest age group, 25–31 years, became the reference group)
2) As a continuous variable minus 25 (in this case, 25-year-olds formed the reference group).

The use of the logistic regression model should help to find answers to potential research questions, including:

- Do employers have greater educational requirements towards younger employees?
- Does living in rural areas increase the risk of occupational mismatches?
- Is below-qualifications employment is more likely among the graduates of specific fields (e.g. artistic, humanities) with the same level of formal education?

The empirical data used in this paper come from a wider study carried out as part of the project "Resourcefulness of Polish Families" at the Wroclaw University of Economics and Business in 2016. The survey was conducted on a randomly selected nationwide sample of Poles with higher education (at least a bachelor's degree). A total of 902 interviews using the CAPI technique were carried out. The study selected a random sample of households, stratified with proportional allocation, and representative by age, gender, and place of residence.

The sample was divided into three sub-samples, i.e.:

a) Sub-sample A: respondents aged 39–45 years (301 interviews);
b) Sub-sample B: respondents aged 32–38 years (300 interviews);
c) Sub-sample C: respondents aged 25–31 years (301 interviews).

The criterion for selecting such a research sample was the desire to analyze the situation on the labor people of people who began their studies during the political transformation in Poland (after 1989), which brought changes in the educational and professional possibilities of Poles. New career paths appeared along with negative phenomena – not only unemployment, but also employment below one's desired working time or below one's qualifications. Cohorts were distinguished based on shared educational and professional experience acquired by adults since 1990.

Results

Descriptive Statistics

The risk of overeducation should be strongly related to the field of study that the graduate has completed also (depending on the profession) the graduate's gender. Table 1 presents the range of overeducation according to gender.

Table 1: Incidence of overeducation among highly-educated employees aged 25-45 years according to gender (own calculations)

	Total	**Men**	**Women**
Overeducation in the first job (formal)	50.9 (0.017)	48.4 (0.027)	52.6 (0.022)
Overeducation in the first job (actual)	48.3 (0.017)	48.1 (0.027)	48.4 (0.022)
Overeducation in the present job (formal)	39.4 (0.017)	42.2 (0.027)	37.5 (0.021)
Overeducation (actual) in the present job	41.5 (0.017)	44.4 (0.027)	39.7 (0.022)

Notes: *Standard errors are indicated in parentheses.*

The level of overeducation is higher for the first job than at the later stages of one's professional career. For the first job, however, the level of formal overeducation is higher than that of actual overeducation. The opposite is true for the current job: actual overeducation is higher than formal overeducation. Interestingly, in the case of the first job, the level of overeducation is higher among women than men. The opposite is true for the current job, where the percentage is higher for men. This means that women more often than men start working below their level of education; however, over time, their professional situation improves, and they achieve positions consistent with their education (a change by 9 and 14 percentage points for formal and actual overeducation, respectively). For men, this change is less significant, with the level of overeducation decreasing by 4 and 6 percentage points for formal and actual overeducation, respectively.

The field of completed studies also seems important for the level of overeducation. Table 2 presents the level of overeducation according to field of study and gender. The lowest occupational mismatches appear, for both men and women, among employees with a degree in Law, while the highest mismatches appear among those with a degree in Arts (for women) and Other degree (e.g., Physical Education; for men). Furthermore, about half of employees with a Technical degree worked below their qualifications (this rate was higher for men). This phenomenon was similar among employees with a degree in Economics. However, the situation was different among graduates of other social sciences universities. In their case, a smaller proportion of men than women remained overeducated. Overall, overeducation affects men more than women.

Table 2: Overeducation in Poland according to field of study and gender (%) (own calculations)

Field of study	Overeducation (formal)			Overeducation (actual)		
	Total	**Men**	**Women**	**Total**	**Men**	**Women**
Humanities (excluding Law)	35.2 (0.04)	36.0 (0.07)	34.7 (0.06)	36.9 (0.04)	32.0 (0.07)	40.3 (0.06)
Law	17.6 (0.1)	0.00 (0.00)	27.3 (0.14)	17.6 (0.1)	16.7 (0.17)	18.2 (0.12)
Medicine	31.6 (0.08)	33.3 (0.14)	30.8 (0.09)	31.6 (0.08)	33.3 (0.14)	30.8 (0.09)
Social Sciences (including Pedagogical Studies, but excluding Economics)	32.8 (0.04)	29.2 (0.07)	35.3 (0.06)	33.6 (0.04)	29.2 (0.07)	36.8 (0.06)
Economics	33.1 (0.03)	38.7 (0.05)	28.7 (0.04)	35.5 (0.03)	44.3 (0.05)	28.7 (0.04)
Arts	69.2 (0.13)	60.0 (0.25)	75.0 (0.16)	76.9 (0.12)	60.0 (0.25)	87.5 (0.13)
Technical	48.0 (0.04)	54.3 (0.06)	44.5 (0.04)	49.5 (0.04)	55.7 (0.06)	46.1 (0.04)
Natural and Agricultural Sciences	42.9 (0.09)	41.7 (0.15)	43.5 (0.11)	45.7 (0.09)	41.7 (0.15)	47.8 (0.11)
Other (e.g. Physical Education)	66.7 (0.11)	80.0 (0.2)	62.5 (0.13)	66.7 (0.11)	80.0 (0.2)	62.5 (0.13)
Total	39.4	42.2 (0.03)	37.5 (0.02)	41.5	44.4 (0.03)	39.7 (0.02)

Notes: *Standard errors in parentheses.*

Overeducation (formal): Less than higher education is required at a given position (based on the respondents' answers)
Overeducation (actual): Actual level of education required at a given position, less than higher education (based on the respondents' subjective assessment)

Logistic Regression Results

Factors that may affect mismatch on the labor market include:

1) Individual and family features (such as age, family situation, place of residence, or field of education);
2) Characteristics of the current workplace (sector and size of the company, position held, working time);
3) History of employment (characteristics of the first job – time spent looking for it, type of employment contract, the longest unemployment period).

Many of the previously mentioned predictors (such as age, field of education, level of higher education, family situation, length of unemployment, employment contract in the current and first job, and company size) were found to be insignificantly correlated with the dependent variable and were not included in the model (using the Method of Forward Stepwise in SPSS). For the place of residence, only the distinction between urban and rural and Masovian Voivodeship (including, in particular, Warsaw) as the place of residence was found to be a significant predictor in the model. Table 3 presents the risk of occupational mismatches depending on selected factors broken down by gender.

Table 3: Logistic regression of overeducation, by gender (own calculations)

	Overeducation (formal)						Overeducation (actual)					
	Men			Women			Men			Women		
	B	**SE**	**Exp (B)**	**B**	**SE**	**Exp (B)**	**B**	**SE**	**Exp (B)**	**B**	**SE**	**Exp (B)**
Place of residence (rural=0 urban=1)	-0.170	0.361	0.844	-0.866 ***	0.312	0.421	0.139	0.380	1.149	-0.705 **	0.307	0.494
Place of employment (public sector = 0 private sector = 1)	0.623	0.392	1.865	0.848 **	0.347	2.334	1.132 ***	0.417	3.101	0.883 ***	0.335	2.417
Part-time work (no = 0 yes = 1)	-0.042	0.476	0.958	1.473 ***	0.436	4.362	-0.050	0.496	0.951	1.398 ***	0.440	4.046
Length of first job search (less than a year = 0 above a year = 1)	1.001 **	0.420	2.721	0.506	0.381	1.658	1.304 ***	0.437	3.683	0.441	0.382	1.554
Employment sector:												
Industry or construction	-0.541	0.540	0.582	-0.280	0.465	0.756	-0.250	0.556	0.779	-0.489	0.471	0.613
Agriculture, forestry or fisheries	0.615	1.016	1.849	-0.700	1.605	0.496	0.631	1.027	1.879	-0.718	1.594	0.488
Public administration	-0.899	0.559	0.407	-0.724	0.527	0.485	-0.794	0.585	0.452	-0.377	0.511	0.686
Education	-1.597 **	0.806	0.202	-1.194 *	0.652	0.303	-1.674 *	0.914	0.188	-1.269 *	0.649	0.281
Health Service	-0.842	0.672	0.431	-0.905	0.675	0.405	-0.722	0.688	0.486	-1.024	0.677	0.359
Financial services	-1.193 **	0.599	0.303	-1.157 **	0.512	0.314	-0.825	0.599	0.438	-0.608	0.494	0.545
IT services	-1.374 *	0.784	0.253	-1.483 **	0.676	0.227	-0.155	0.730	0.856	-1.525 **	0.680	0.218
Trade and gastronomy	0.070	0.570	1.073	-0.268	0.514	0.765	0.313	0.591	1.368	0.078	0.521	1.081
Position:												
A	-0.982	1.071	0.374	-0.615	0.878	0.540	-0.815	1.076	0.443	-1.259	0.888	0.284
B	-1.327	0.904	0.265	-2.134 ***	0.817	0.118	-1.338	0.901	0.262	-2.116 ***	0.812	0.121
C	-0.840	0.852	0.432	-1.045	0.782	0.352	-0.670	0.845	0.512	-1.026	0.780	0.358
D	0.225	0.890	1.252	0.499	0.809	1.648	0.439	0.889	1.551	0.398	0.811	1.489
E	0.809	1.148	2.246	1.671	1.435	5.315	0.305	1.161	1.357	0.199	1.260	1.220
F	1.172	0.939	3.228	0.574	0.834	1.776	1.449	0.951	4.257	0.768	0.841	2.155
G	2.193 **	1.102	8.967	1.942 **	0.929	6.971	2.948 **	1.308	19.06	2.127 **	0.975	8.392
Masovian Voivodeship (no = 0 yes = 1)	-0.524	0.427	0.592	-1.114 ***	0.389	0.328	-0.487	0.427	0.615	-1.178 ***	0.377	0.308
Constant	0.119	0.897	1.126	0.559	0.854	1.749	-0.813	0.901	0.444	0.494	0.852	1.638
Log pseudo-likelihood	285.351			383.181			269.878			390.824		
Chi- square (df)	124.162 (20) ***			226.681 (20) ***			143.945 (20) ***			227.924 (20) ***		
Nagelkerke R Square	0.453			0.529			0.507			0.527		
Model sensitivity	68.0			70.8			71.9			68.9		
Model specificity	87.4			88.7			84.1			90.5		
N	304			463			304			463		

Notes: *SE – standard error; *** p<0,01 ** p<0,05 * p<0,1*

A. Directors, senior government officials, and management staff (managers, heads, and team leaders)
B. Specialists and free professions/freelancers (e.g., doctors, lawyers, artists, teachers, and chief accountants)
C. Office workers (e.g., secretaries, primary level officials, and accountants)
D. Traders, insurance agents, sellers, and waiters
E. Employees of uniformed services (e.g., soldiers, policemen, firemen, and customs officers)
F. Other physico-mental workers (e.g., nurses, drivers, couriers, hairdressers, and beauticians)
G. Physical workers.

For women, the correlation between the place of residence and overeducation was significant. Living in a city reduces the risk of occupational mismatches by almost 60% for formal and over 50% for actual

overeducation. The effect is similar for living in the capital (risk reduced by almost 70%). Interestingly, no such effect occurred for men. For women, overeducation is also strongly associated with part-time work. Such work increases the probability of occupational mismatch four times. However, there is no such correlation for men.

For men, on the other hand, the impact of the length of time spent looking for their first job is significant. If the time is over 12 months, the risk of overeducation increases by about 200%. The sector in which a person works is also significant. Working in the private sector has a significant negative effect on the probability of being overeducated compared to the public sector (public enterprises and state and local government units). This effect is much stronger for men than for women: the probability increases more than two times higher for women and three times higher for men (for actual overeducation). Working in educational, financial and IT services reduces the risk of overeducation by up to 80%. Physical work is associated with a significantly higher risk of overeducation among both women and men (up to nineteen times higher), while for women, working in a free profession or as a specialist reduces it (by over 80%).

Research results do not support the hypothesis that employers have greater educational requirements towards younger employees, since age did not prove to be a factor significantly affecting the risk of overeducation. There is a certain relationship between field of study and the level of overeducation, but this relationship proved to be insignificant in the logistic regression model. However, this problem is worth analyzing further using other methods. In fact, living in a rural area increases the risk of overeducation compared to other places of residence.

Conclusions

The Polish labor market seems extremely attractive to people with higher education. This belief is present among parents who wish for their children to complete university studies, and manifests itself through a very low unemployment rate among this group of employees. However, despite such benefits, higher education on the labor market may be associated with overeducation, i.e., the need to work at a position below someone's level of education. Overeducation can be considered as a significant problem among people with higher education, especially taking into account that about 40% of them think that they work below their education.

A certain relationship between the completed field of study and the level of overeducation is noticeable (although it did not prove significant in the model). Overeducation does not particularly vary across regions, although living in the Mazowieckie Voivodship stands out from the rest of the country as a factor that reduces the risk of occupational mismatch. The study seems to confirm the observations made in other countries, including Switzerland (Frei and Sousa-Poza (2012)), that overeducation is not age-related (it does not decrease with the age of the employee); rather, employees of all ages are at risk of overeducation. The family situation (relationship, number and age of children, etc.) also had no significant impact on the risk of occupational mismatch, nor did the longest period of unemployment and the form of employment (in the first and current job) or the size of the company. On the other hand, factors such as sector and job position, part-time work, and the time spent looking for the first job of over a year proved to be significant. However, more variables were significant for overeducation among women than men. Although the percentage of overeducated women was lower than that of men, more factors affected the risk of overemployment among the former.

Among the particularly vulnerable to overeducation are rural residents, employees in the private sector and long-term job seekers. The important issues that should be analyzed further in the context of overeducation include determining the source of differences in factors influencing overeducation among men and women, the reasons for the greater sensitivity of women to particular factors or the situation of immigrants and their offspring on the Polish labor market (as in Poland this is a dynamically developing phenomenon, especially in recent years). Another subject worth researching is whether the level of overeducation will increase in Poland due to the recession caused by the events in recent months (Covid 19 pandemic).

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Acquiring New Customers and Gaining Their Loyalty in Online Enterprises

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Abstract

The purpose of this paper is to present the possibilities of acquiring new customers and gaining their loyalty in online enterprises. The author attempts to identify the most useful tools to acquire and maintain customers. The online market is very difficult for contemporary enterprises, as it involves many challenges. Meeting the expectations of contemporary customers is difficult, but also beneficial, which makes it worth trying and gaining as many benefits as possible. The article uses questionnaire surveys that were conducted using the Internet and aimed to show the number of people shopping online and to show the tools needed for acquire and retain customers in online enterprises. 50 respondents from all over Poland took part in the survey. According to the survey, 77.5% of Poles over 15 years old shopping online in Poland. According to the respondents participating in the research, the main tool used to acquire and retain customers in online enterprises, is clear and well-prepared website of the company, advertising on local and social portals, whisper marketing, opinions about the company and its products on the internet portals. It should also be mentioned that the conducted research did not exhaust the topic and are a good basis for the further research.

Keywords: customers, managing in online enterprises, modern technologies, online shopping

Foreword

The contemporary methods of acquiring and maintaining customers are improving and becoming easier to apply. The Internet is a place of economic activity, both for commerce (sales and auctions) and services (online banking and insurance). It should be noted, however, that customers have access to an unlimited selection of goods and services. Online shopping has become very common and convenient for customers. The ability to apply the latest technologies to search for attractive products is very useful in meeting the increasing expectations of customers. The accessibility of services and products via the Internet enables the customer to obtain all the necessary information concerning a product from home. Shopping online saves a lot of time, makes products available round the clock and enables choosing the best offer available on the market. Purchasers have tools to find the best price or quality offered. The Internet makes it possible to compare product prices in many traditional and online shops. The development of online shops makes it possible to reduce maintenance costs and offer attractive prices. Technological development also enables searching for new products on the market that are necessary to meet the high demands of the contemporary society. All aspects of the social life must be of the highest possible standard to make people satisfied. Accordingly, entrepreneurs must make their products available online. This has many advantages as well as certain disadvantages. Each entrepreneur must determine for himself how he is going to function in his industry in the domestic and international market as well as online. Online businesses reach an unlimited number of potential customers who may buy the products they need via the Internet.

Traditional and online enterprises

Currently, there are many different types of economic operators in the market. Diversity in many areas of operation enables acquiring a specific group of customers who should be the target group of a product. Obviously, not every entrepreneur determines a specific group of customers. Often, a product is initially dedicated to a specific group of customers.(Taranko 2013, p.7) However, once the product is released on the market, the group of customers grows much bigger. All this depends on the interest in a product and the customers' wish to have it. Enterprises that operate in the market should look at the products and services they offer through the eyes of customers. Enterprises operating in various industries sell their products through traditional outlets. However, this is not enough nowadays. Customers force entrepreneurs to create new shopping possibilities through internet shopping and mail orders. Online businesses have more possibilities to acquire new customers whom they could not reach in the traditional way.(Bilińska-Reformat 2014, p.186) Obviously, customers, too, appreciate the ability to shop from home or from work. In order to meet the needs of both traditional and virtual customers and to be ahead of competitors, it is necessary to implement innovative solutions in services as well as in production.(Bettencourt, Brown, Sirianni 2013, p.13) Customers shopping online represent more than half of all the consumers. Adapting to market needs makes it possible to gain major financial benefits.

The right approach to the customer is also important, because acquiring customers is more difficult online than via traditional sales channels. Numerous studies conducted by the US Consumer Chamber have shown that attracting a new customer costs an enterprise five times more time and money than maintaining an existing customer.(Cichosz, 2005, p.112) Thus, it is important to build lasting relationships with existing customers and ensure the overall satisfaction of all consumers. The contemporary customer has many tools, e.g. to compare multiple product offers at the same time. The level of customer service, i.e. approach to the customer is very important here, and it is often analyzed by customers. An important tool that is often used by customers of online stores is verifying the opinions about a seller or product range before concluding a transaction. Social media provide the Z generation consumers with the new ways to connect with businesses. They can above all express their opinions about the company's products. It should be noted, however, that having extensive knowledge about an enterprise does not always help avoid dishonest sellers.(Maciejewski 2014, p.235) It also happens that some negative opinions are not justified, but they may result in the loss of many potential customers. It should be noted then that, although the Internet is a very useful tool, it may also cause unexpected loss. One factor that increases the competitive possibilities of an enterprise is employee creativity.(Pachura, Nowicka-Skowron 2010, p.118) Every entrepreneur must analyze the profitability of such solutions, and every customer must decide for themselves whether certain information is true or not.

The relations between customers and entrepreneurs are determined by the areas of application of the Internet: (Skuza, Przedlacki, Pałaszewski 2001, p.22)

- B2C Business to Customer, which means relations between a business and individual customers that involve retail trade and selling services and information to consumers,
- B2B Business to Business, which means market contacts between enterprises in business trading that cause integration of added value chains from raw material suppliers to the end customer,
- C2B Customer to Business is the reverse of the B2C system; here, the initiating party is the customer who wishes to buy a product or service and determines the parameters of the transaction and the price they are willing to pay,
- C2C Customer to Customer means auctions for individual customers (device, automobile and other auctions).

The above types of relations linking online buyers and sellers should be based on common service standards and good business practices. (Chodak 2008, p.38) Only such relations can strengthen online business and yield financial profit.

Using the Internet in economic activity gives many possibilities to make work easier both in contacts with the customers and in any other area. Nowadays, the companies try to do everything to make the product visualization allow the best idea and imagination of how in fact the product looks like in the reality.

The ability to send information fast and to communicate fast is nowadays much needed and required in any developing enterprise in the market. (Wolny, 2016, p.284) Enterprises that want to reach an unlimited number of customers and contractors and improve their business must have unlimited access to the Internet. This is why the number of enterprises with broadband access to the Internet is increasing (fig. 1).

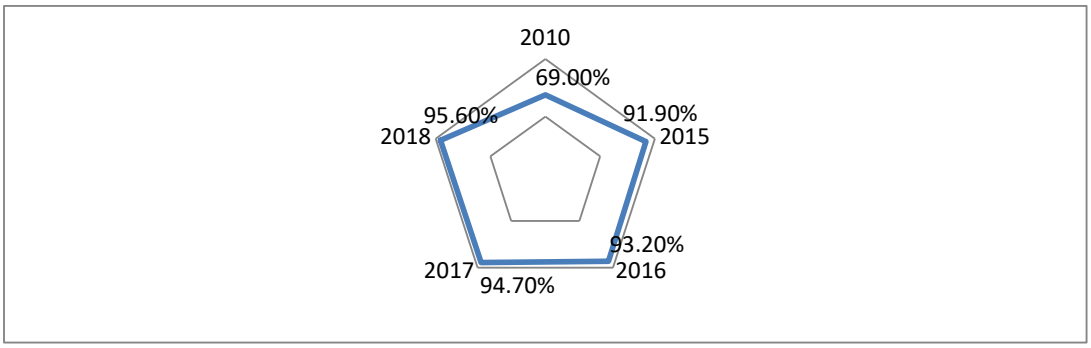

Fig. 1: Enterprises with broadband access to the Internet

Source: www.parp.gov.pl

Figure 1 shows a major increase in the percentage of enterprises with broadband access to the Internet among all the enterprises. In 2010, they represented 69%, and in 2015, their number grew to 91.9%. In subsequent years, their number continued growing and it reached 95.6% in 2018. By the end of 2020, 100% of enterprises are expected to have access to broadband Internet.

Also, many enterprises have mobile access to the Internet, which enables faster and continuous contact with customers. This trend is shown in figure 2.

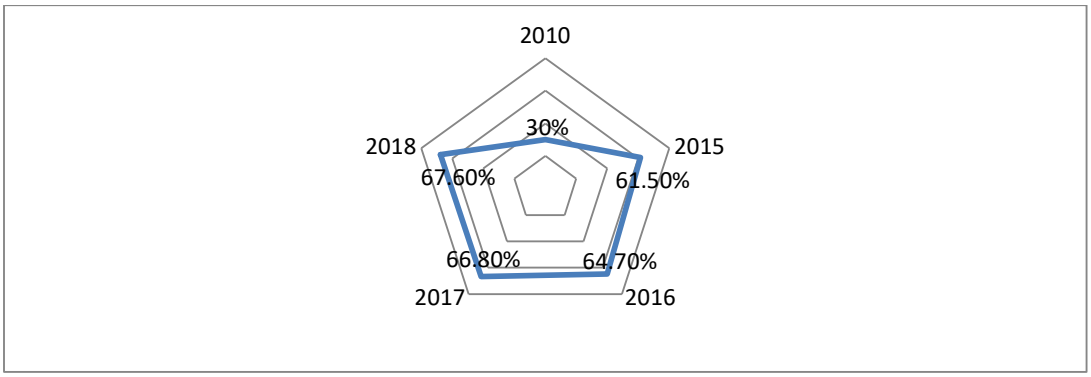

Fig. 2 : Enterprises with mobile access to the Internet

Source: www.parp.gov.pl

Figure 2 shows enterprises that have mobile access to the Internet via various devices. In 2010, 30% of enterprises had such access, in 2015, the number grew to 61.5% and in 2017, it was more than 66.8%. In subsequent years, the number of enterprises with mobile Internet access continued growing.

Access to mobile and fixed electronic sources reduces the time between order and delivery. All activities associated with access to the Internet, which is now the most important communication

tool, make it possible to take faster and more efficient actions in every area of operation of enterprises.

Customers of Online Enterprises

A vast majority of the society are customers of online enterprises. The number of persons of all ages doing their shopping online is increasing.(Piorunowska-Kokoszko 2014, p.96) The vast majority of online shoppers are aged 16-34 years, representing more than 54%, followed by persons aged 35-49 years, and the least numerous group are persons aged over 50 years (fig. 3).

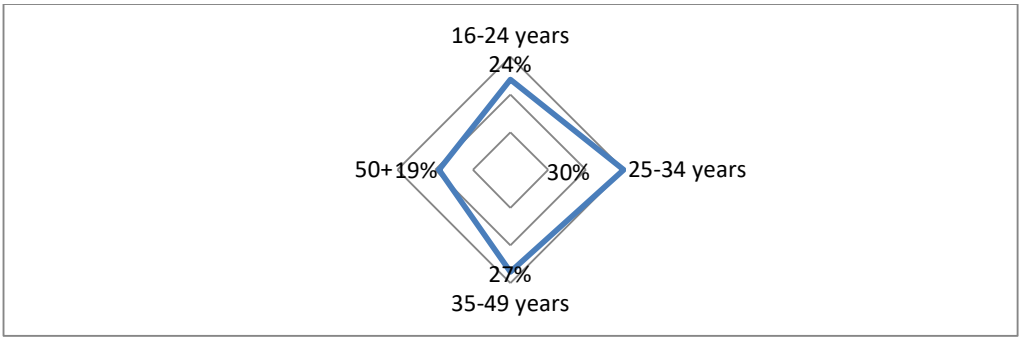

Fig. 3: Poles using the Internet.
Source: ecommercepolska.pl/files/9414/6718/9485/E-commerce_w_polsce_2018.pdf

The data presented in figure 3 show generation groups and their activity in the online world. More than 77.5% of Poles aged over 15 years use the Internet. 48% of them are men and 52% are women. The most numerous age group are persons aged 25-34 years (30%), followed by persons aged 35–49 years (27%), 16–24 years (24%) and 50+ years (19%) who represent the lowest percentage of Poles using the Internet. Compared to previous years, the number of persons shopping online increased in the more senior age groups (35–49 and 50+) and in the youngest age group (16–24).

Using the Internet to do shopping has multiple advantages, including but not limited to: (Kucia, 2002,p.29)

- Saving time, round-the-clock access to shops

- Easy and fast access to information

- No need to carry the shopping home

- Being able to verify the opinions of other product users

- Saving money, e.g. competitive product prices.

However, this form of shopping has some disadvantages, too: (Jaciow, Wolny 2011, p.676)

- Not being able to examine a product “closely”

- Not being able to have the product immediately upon purchase

- Concerns about the safety of a transaction (e.g. payment)

- Concerns about problems with delivery

- Being used to traditional sales channels.

In the Internet, consumers may search for specific products and share information about them over a long period of time. (Gołąb-Andrzejak, 2014, p.765) They may also leave their opinion and successfully persuade others to buy or not to buy a given product. A satisfied customer will not only leave a positive opinion about an enterprise and a product but they will also be loyal over an extended period of time. Information collected by a consumer may change their decision or reassure them that their decision is right. Searching for information on products takes place on a mass scale and is not limited geographically. Online businesses may sell products to customers all over the world. The Internet reduces the distance between the customer and the manufacturer, which makes transactions faster.

General access to the Internet enables communication in the social, cultural and business spheres. According to research, the largest groups are representatives of the young generation, for whom the Internet is the most important source of communication and a tool they use in all the aspects of their lives. (Wolny, 2015, p.853) What makes this generation different is that they are used to technology. For representatives of the young generation, constant access to the Internet is normal and evident, because the Internet has been there in their lives since they were born.(Stopczyński, 2016, p.206) Another group are persons who must function in the changing environment focused on continuous contact and using the Internet to be constantly connected for private and professional purposes. These persons are aware of how fast the world is changing and try to be up to date with the changes. It should be noted, by the way, that they highly trust online shopping. (Gołębiowska, 2016, p.134) Persons aged over 50 years also have to learn to use new technologies that make it easier to do many things. Introduction of changes requires readiness of the employees engaged in the process of their implementation. (Huizingh, 2011,p.2) Thus, changes should be introduced in the right way and employees should adapt on an ongoing basis so that their work may become easier thanks to the Internet.

The situation in the other Member States of the European Union as regards online shopping in 2017 was as follows (fig. 4).

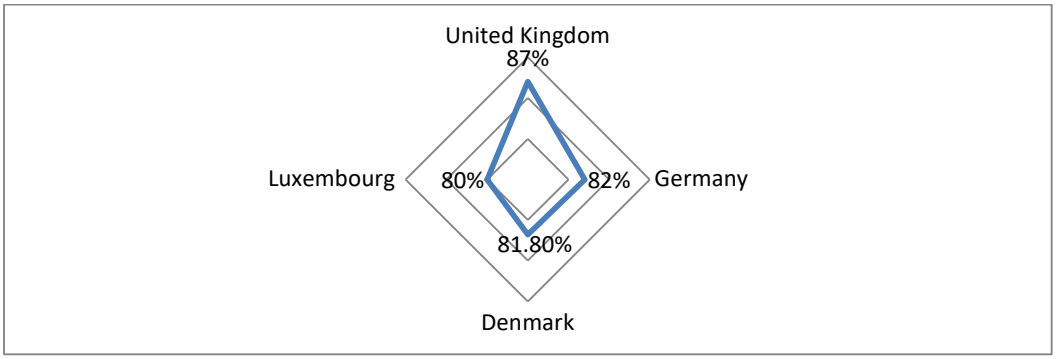

Fig. 4: E-shopping in top EU Member States

Source: www.ec.europa.eu/eurostat

Figure 4 shows the percentage share of EU Member States in online shopping. The first is the UK, with a score of 87%, followed by Germany – 82%, Denmark – 81.8% and Luxembourg – 80%. Poland is in the 14th place with a score of 53%. The lowest share in online shopping was reported in Macedonia (16%) and Romania (18%). The ability to do shopping online depends on a number of factors, such as access to the Internet, number of online stores, being confident about buying things without seeing them, etc.

Analysis of Research

According to analyses, the most frequent customers who shop online are young people aged up to 30 years. Accordingly, the respondents of the research belong to three age groups. The questionnaire was performed by means of an online survey and it was supposed to present the tools of acquiring and maintaining customers in online enterprises. The survey was answered by 50 respondents from

across Poland. The first group were persons aged up to 30 years – 67%, the second were persons aged from 31 to 50 years – 4% and the third were persons older than 50 years – 9% (fig. 5).

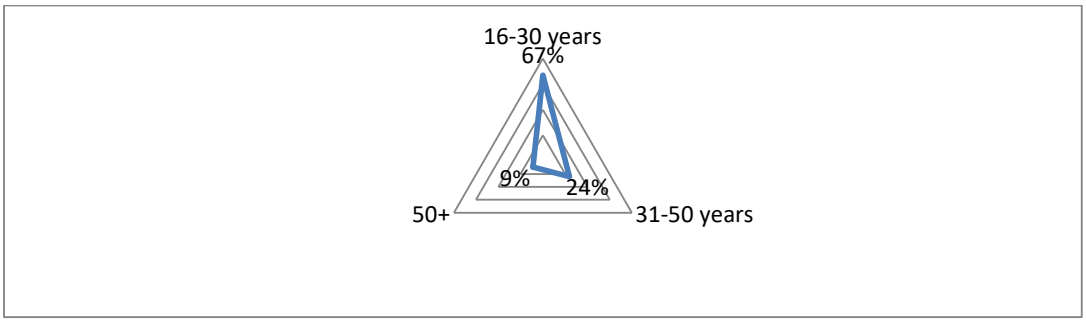

Fig. 5: The age of respondents

Source: Own elaboration based on the survey

The majority of respondents were professionally active and had limited time to do shopping and search for the products they needed. Among the most important reasons for choosing this type of transactions, they indicated the speed of transactions and fast product delivery to the required address. Also the ability to use the Internet is higher in the first and second groups than in the case of older persons who do not know how or are afraid to use such solutions.

Concerning the question about the tools used to acquire and maintain customers, the respondents most often chose the following options (fig 6).

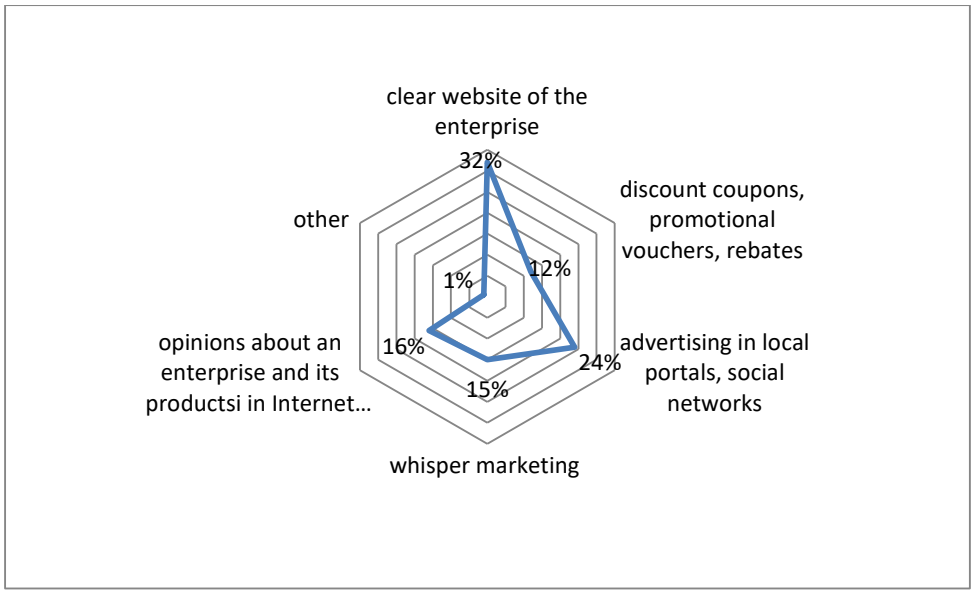

Fig. 6: The tools used to acquire and maintain customers.

Source: Own elaboration based on the survey

Based on the data from figure 6, the following tools used to acquire and maintain customers in online enterprises may be listed:

- A clear website of the enterprise – 32%

- Discount coupons, promotional vouchers, rebates offered by the enterprise – 12%

- Advertising in local portals and social networks – 24%
- Whisper marketing – 15%
- Opinions about the enterprise and its products in Internet portals – 16%
- Other – 1%

These tools are used by the respondents and it may be assumed that the presented research sample suggests the importance of creating a clear website for every enterprise that wants to have the right level of online product or service sales. Another important thing is advertising products and services in local portals and social media. According to Ł. Bojar, Vice President Sales & Marketing of Senetic, which is a global solution provider for companies and public institutions, the most important thing in building relationships with a customer is currently adapting to his custom needs occurring at the moment. Through this approach, the client's attachment to the company and his loyalty in the future take place. Obtaining positive and reliable opinions as well as whisper marketing were also indicated as important tools that help acquire customers. Note should also be taken of discount coupons and promotional vouchers for both new and existing customers.

Conclusion

To some up the above deliberations, it may be definitely stated that nowadays, it is a must for enterprises to be active in the Internet. Accordingly, establishing and maintaining the best possible relations with customers wins their loyalty for the company. Entrepreneurs who want to acquire new customers present a product that has the best possible price and quality and also try to provide additional services at no extra cost. Such measures make it possible to acquire new customers as well as maintain the existing ones. All the tools used to contact customers should be constantly upgraded. Direct contact with customers makes it is possible to find out about customer expectations and meet customer needs. Nowadays, contact means mainly the use of online messengers that are active 24 hours a day, 365 days a year. An undeniable advantage of online sales are lower operating costs and a broader range of products offered by online shops compared to traditional shops. In order to offer many products, it is not necessary to have such a big shop or warehouse as in the case of traditional shops, which generate high maintenance costs. Nowadays, all the well-functioning enterprises offer the option to buy their products and services online. The online services market is very large, which means that e-entrepreneurs need to be innovative in order to gain a major position in that market. Individual customer approach helps build trust and profit from product sales.

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Intergenerational Differences and Similarities in Private and Professional Life of the X, Y, Z Generations' Representatives

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Abstract

The objective of this paper is to show the intergenerational differences and similarities in the understanding of the world by three generational groups: X, Y and Z. The social, economic and financial differences across all the generations tend to be very significant, which is why taking advantage of emerging opportunities and a completely different approach to life is so interesting in the context of the explored subject. Showcasing the differences and similarities between the generations will help us understand the need for lifelong learning. Using the surveys, own interview and observations was carried out by the author on a selected group of respondents in the Śląskie Voivodeship. Based on surveys conducted on a randomly selected group, the author will explore whether change is a positive or negative phenomenon.

Keywords: Generations X, Y, Z, Modern Workers, Technological Development

Introduction

The following paper is based on the author's observations and the survey concerned the perception of life and work among different generational groups, which makes finding significant differences concerning different generations a given, since there have always been differences between representatives of different generations, which involved various areas of life.(Wrzesień, 2007, p.140) In many cases, the perception of the world by more experienced generation X is completely different from that presented by Y and Z generations, and these differences in worldviews have always been highly controversial, leading to many disputes.(Kroenke 2015,p.95) The Y and Z generations have always believed that they have the right to make their own decisions, believing that the opportunity to learn from their own mistakes and gain their own experience is a necessary prerequisite to gaining wisdom in life.(Kopertyńska, Kmiotek, 2014, p.42) On the other, hand, it is difficult for generation X to identify the opportunities for development and Y and Z generations willingness to grow, as they often tend to impose their own point of view and attempt to force them to make decisions which are right in their mind. Thus, the subject matter of this paper aims at encouraging further analysis of the topic at hand.

Characteristics of Generational Diversity Between Generations X, Y And Z

These days, the most important issue connected with generational analysis is the multi-faceted perception of life in the context of differences and similarities between the examined generations. It should be noted that in subject literature, the generational limits may vary slightly between various authors. The labour market sees several generations working hand in hand, in spite of their different approaches to work and leisure time, their competencies, as well as their requirements and demands concerning themselves and their employers. Representatives of generation X prefer personal or written communication, while representatives of Y and Z generations are adept at operating and working in the virtual world, which to them serves as a basic means of everyday communication. Another important matter concerns flexibility concerning professional and social mobility in search of a better place, which does not represent any obstacle for the Y and Z generations. These days, mobility is often ensured by means of private road transport.(Hopkins 2016, p. 155) Generation X are

used to a sedentary lifestyle and having one permanent job. It should be noted that the need to adapt to changing working and living conditions is often a very difficult life experience for the representatives of generation X. The current lack of opportunities to secure permanent employment forces employees to react quickly to the circumstances, changing their competencies and workplaces. All the representatives of the examined generations want to achieve satisfaction and sufficient conditions in private and professional life.

The older generation on the labour market, which actively participates in social life comprises people born between 1965 and 1980, often referred to as the Generation X.(Adamkiewicz 2016, p.171) This group includes people characterised by great diligence and loyalty to their employer. The representatives of this group are committed, yet cautious, entrepreneurial and creative. Generation X is motivated by the financial aspects of their jobs, as well as their desire for self-fulfilment, self-improvement, prestige and recognition. Generation X employees are attached to their workplaces and rarely exhibit professional mobility. They also feel the need to have their own place on Earth. When building a house or buying an apartment, they want to stay there for the rest of their lives. They surround themselves with things that are supposed to serve them for a long time, which does not result in excessive consumerism.(Reisenwitz, Iyer 2009, p.97) The representatives of generation X often face the need to gain new experience in social and professional relations with other generations. They face the need to modernise their experiences and patterns used throughout their lives due to the impact of technological innovations that change their lives. This generation is oriented towards professional development, while maintaining a healthy work-life balance.(Rutkowska 2007, p.325)

The next generation, for whom modern technologies are not a problem, is referred to as Generation Y.(Fazlagić, 2010, p.63) The representatives of this generation were born in 1981-2000, and they are characterised by a completely different approach to work and life than their predecessors. Generation Y is characterised by less loyalty towards their employers. Generation Y is well-educated, oriented towards development and opportunities for gaining new experiences, as well as fulfilling their interests. They are also credited with greater flexibility and openness to change, a willingness to learn and an unwillingness to make long-term commitments, compared to previous generations. These characteristics are said to stem from the need to adapt to a rapidly changing environment. What this generation cherishes the most is satisfaction with their jobs and the connected remuneration. If problems ever arise, they are willing to change their job or even their place of residence. Generation Y is passionate and focuses on friendly atmosphere at work, they like working in groups, while keeping up the boundaries of individuality.(Kaczyńska, Kałuziak, Stankiewicz-Mróz 2015, p.69) The representatives of this generation have no great difficulty in establishing remote social and professional relationships. They are also characterised by their ability to multitask, which is often manifested in working for several employers at the same time or in combination with running their own businesses, while also working for others. Using the tools at their disposal, they are able to efficiently manage their time and opportunities, combining even several professions at the same time. Generation Y considers prestige and high social position to be important, they also like flexibility in terms of working conditions and time, while focusing on putting their personal development plans into practice.(Piwowar-Sulej 2009, p.194)

The youngest generation, which is also referred to as Generation Z, is made up of people born since 2001. According to observations, those are people with a low level of loyalty to the employer.(Nolan 2015, p.70) This generation is often characterised as entitled and self-interested, pursuing their goals with no regards to others. They are hardly reluctant to express their own opinions or needs to their employers. Some of their disadvantages include lack of respect for privacy, unrealistic life expectations, irresponsibility at work and lack of interpersonal skills.(Smolbik-Jęczmień 2013, p.92) They are also characterised by a lack of patience, which manifests itself in the desire to obtain immediate effect of work, feedback or satisfaction of needs. Generation Z may experience difficulties with teamwork. Electronic means of communication serve as their main way of communication in both personal and professional lives, while Internet remains their main source of the required information. People from the Z generation function most of the time in the virtual world, to which they are accustomed from the beginning of their life. They treat it on an equal level with the real world.(Korombel A., Ławińska 2019, p.1023) They use it at all times and everywhere, they also use social media both in their professional and social lives.(Adamkiewicz 2016, p.171)

The representatives of all generations have their own approaches to life and work. The changes of lifestyles between generations and generational changes pose many challenges for mobility service providers and further increase the need to shift the demand for mobility services towards sustainable urban mobility.(Hopkins 2017, p.380) Generations Y and Z show great commitment to their shopping behaviours, they are consumers who want to get as many modern gadgets as possible, which they use to showcase their status and social prestige.(Parment 2013, p.191) They do not remember the world without the Internet or their mobile phones, which is why they communicate solely through them on a regular and constant basis. The representatives of the Z generation spend a lot of time in the Internet, searching not only for the solutions to their problems, but also communicating with others and looking for new ways of spending free time.(Biel 2020, p.59) Generation Y and Z lack the ability to find information in places other than the Internet. Representatives of the Y and Z generations often expect employers and co-workers to give them specific tasks, because that reflects the way they were brought up. Young people are not able to work independently, they were brought up by their parents planning their time and rewarding them immediately after their tasks were done,(Fazlagić 2008) which is why they continue with this approach in adulthood. Socially, they are oriented towards fulfilling their own dreams and needs, as well as receiving the expected and corresponding rewards. This clash of the presented worlds in many companies is a difficult test both for older workers, who need to show patience and understanding of this approach to work and life, as well as to adapt to change.(Mazur-Wierzbicka 2016, p.173) Workers from the X generation are forced to operate in the virtual world, which for them is often very difficult and time consuming; however, it is essential for the companies to survive in the changing labour market. They tend to transfer the solutions they use in their professional work to their private lives, which allows them to be more efficient in the virtual world and to deal with many matters without having to leave home. Whereas representatives of the Y and Z generation tend to be unable to understand certain behaviours of older people, which are often misunderstood. The opportunities to quickly acquire and process information using the available electronic sources enable a broader analysis of the issue at hand.

Research Methodology

The results of the study presented in this paper are based on a quantitative survey conducted by means of a questionnaire, partly on an interview and the author's own observations with 100 respondents from Śląskie (Silesian) Voivodeship, encompassing representatives of each of the characterised generational groups. The survey and an interview were conducted between October and December 2019. Both the interview and the questionnaire are the same set of questions asked to the various representatives of generational groups. The group of respondents included employed people aged 18-50, both women and men, working in the private and public sector. Some of the respondents were also students at the time of the survey. For the purposes of the paper, the author assumed that the representatives of Generation X are people aged 40-50, while Generation Y comprises people aged 20-39, and Generation Z is made up of 18 and 19-year olds. The paper includes only some of the responses provided by the respondents, which enable us to determine their priorities and characteristics concerning the subject at hand.

The main part of the questionnaire consisted of introductory questions, the conclusion and the supplement, and the survey results will be presented in this order. In the first part, they asked about gender, age, place of residence, education. In the second part, the question was, among others, about the values that are most important in the lives of respondents, about maintaining a balance between personal and professional life, ways of communicating, the purpose of undertaking professional work. The introductory questions were aimed at characterising the groups of respondents participating in the survey.

Analysis of the Surveys

The following results can be presented from the research part, referring to the results of the author's surveys, interviews and observations:

The surveyed group was dominated by the representatives of Generation Y, who made up 54% of the total number of respondents, with the remainder being Generation X - 25% and Generation Z - 21% (Fig. 1.)

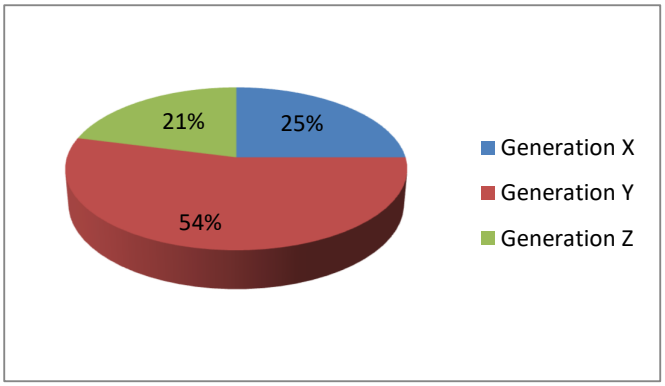

Fig. 1: Quantitative aggregation of the respondents, broken down by generations.
Source: Own compilation

Among the respondents, there were 78% who worked in the private sector: 61% from generation Y, 12% from generation Z and 5% from generation X, and 20% of them had their own enterprises: 17% from generation X, 2% from generation Y and 1% from the generation of Z. While the remainder constituted employees of state-owned enterprises. Nearly 62% of the respondents were lower-level employees, 27% were in expert positions, and only 11% held managerial positions. The youngest generation - Generation Z, was mostly represented by respondents, who were still in education and who were just entering the labour market, which is the reason for a smaller number of papers presenting their attitudes as employees.(Stachowska 2012, p.34-36) However, all researchers, who focus on analysing the functioning of this generation agree that its representatives do not know the world without a computer, telephone, Internet and many other electronic devices. Their functioning both in private and professional life is influenced to a very high extent by constant access to wireless communication systems and smart electronic tools, which are said by some to be an indicator of belonging to this generation. Representatives of Generation Z therefore expect that modern technology, which is ubiquitous in their lives, will also be available in their workplaces, as well as in interactions with superiors, colleagues and customers. In their professional life, they seek opportunities for development and participating in interesting tasks.

The survey asked, among other things, about the values that are most important in the lives of the respondents. The vast majority - 69% of the respondents - considered family to be the most important value: 29% from generation X, 25% from generation Y and 15% from generation Z. 21% chose good health: 10% from generation X, 7% from generation Y and 4% from generation Z and 9% chose work: 5% from generation X, 2% from generation Y and 2% from generation Z, the remaining 1% chose a different value (Fig. 2).

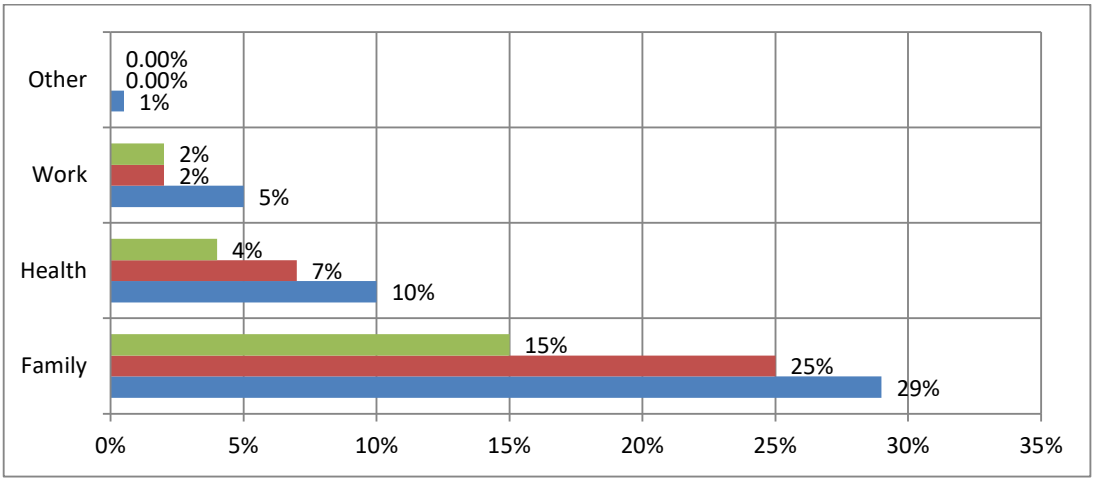

Fig. 2: Values represented by respondents.
Source: Own compilation, based on surveys

The data presented in Figure 2 shows that in spite of different views on life, family remains the most important value for most respondents. This result may stem from the fact that the Polish society has a deeply rooted notion that a family is an important aspect of a happy and fulfilled life. Many people believe that good family relationships help to overcome even the greatest difficulties in life. Another noteworthy aspect is the fact that representatives of the representatives of the Y and Z generation have a completely different attitude to having a job. In many cases, they keep living with their parents for a long time, which undoubtedly lowers the pressure on them to get a job that would allow them to support and sustain themselves. Given these circumstances, starting their own family is no longer one of their top priorities, which enables them to forgo the need to have money to support a family and focus on looking for a perfect job and frequent changes. The representatives of Generation X knew that when they reached adulthood, they had to become independent, which is why getting a job and having their own money was a priority for them.

Another important question in the context of the subject at hand was the work-life balance among generations. In this question, 75% of the respondents considered it to be very important. (Fig. 3.)

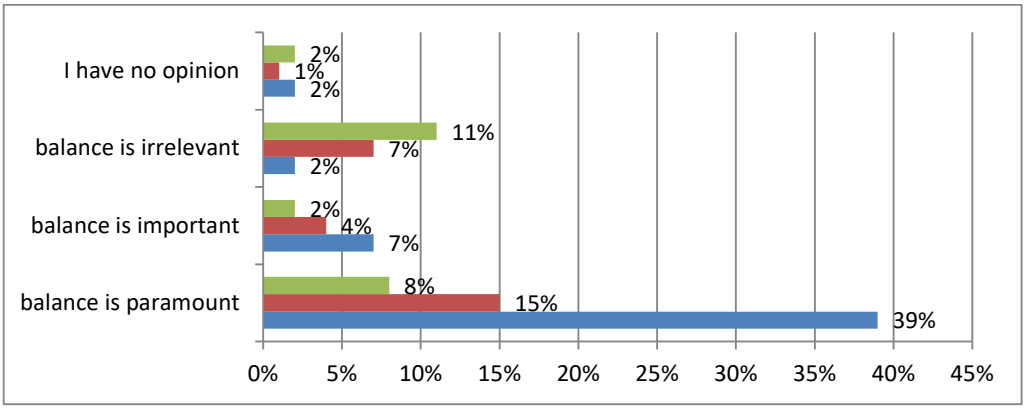

Fig. 3: The importance of work-life balance.
Source: Own compilation, based on surveys

The analysis of the results presented in Fig. 3. makes it apparent that this question is understood differently by representatives of different generations. For Generation X, this balance is associated

with combining family and professional responsibilities in the context of the whole life and family. On the other hand, the representatives of Generations Y and Z focus on their own lives, with their aim being spending their free time outside of work on their own development or travelling. The possibilities of achieving a balance depend on how one perceives the concept of professional and personal life. Nevertheless, every generation would like to be able to separate these two life roles.

Another important question for the analysis was the use of means of communication in both personal and professional lives (Fig. 4.)

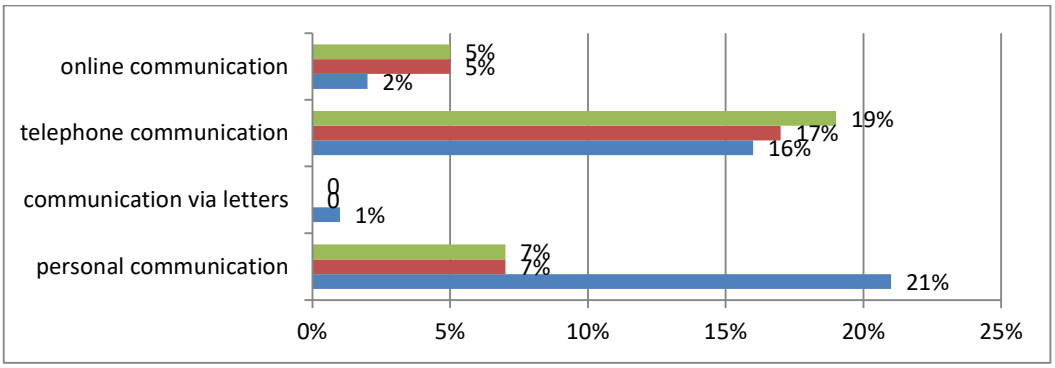

Fig. 4: Means of communication used by the examined generations.
Source: Own compilation, based on surveys

In fig. 4, we can see the respondents' answers concerning the ways they communicate. The choice between online and telephone communication made it a difficult question for many, since the representatives of the Y and Z generation do not see any difference between these two modes; therefore, these two modes of communication should be considered one. The analysis of the results clearly shows that personal meetings no longer serve as the foundation of social communication, which is now based on the use of modern tools for faster and more efficient communication without leaving home. Communication via letters is virtually no longer practised. These days, the majority of the society takes advantage of the significant benefits of telephones and instant messengers for facilitating social and professional relationships, which also facilitate contact while travelling. Back in the day, telephone calls abroad used to be very expensive, but these days all people need to communicate for free is access to the Internet. Changes in the way we communicate are most visible in relation to differences between generations.

The last question, which exhibits the differences in the perception of work among the respondents is the purpose of taking up employment (Fig. 5.)

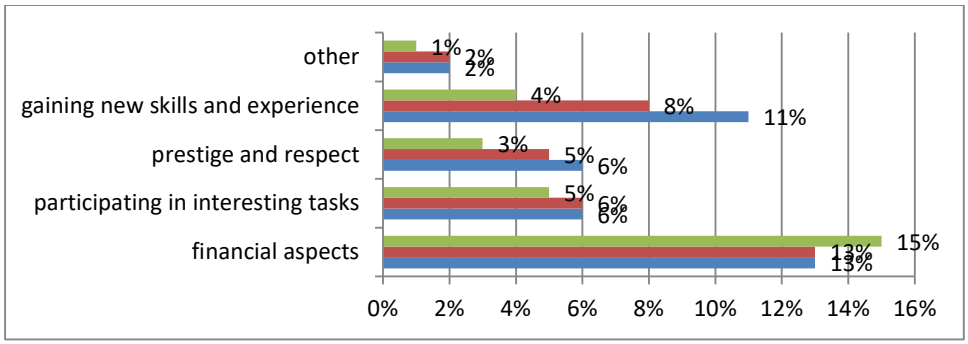

Fig. 5: The purpose of taking up employment.
Source: Own compilation, based on surveys

The data presented in Fig. 5 show that 41% (that is 13% from generation X and Y and 15% from generation Z) of all respondents take up employment due to the need to obtain funds needed to support themselves and pursue their dreams. 23% of all respondents were people for whom the most important objective was to gain new skills and experience. The data also show that 14% contains 6% from generation X, 5% from generation Y and 3% from generation Z of respondents named prestige and social respect as the key reason. According to the study, taking up employment is an important factor for all respondents, regardless of age.

The results of the survey enabled the author to obtain answers to the most important research questions posed earlier: are the differences in the perception of life and work are beneficial for socio-economic development in intergenerational terms. By analysing the results of the survey, it can be concluded that there have been significant changes which have a positive impact on development. Today's employees are satisfied with the working conditions, tasks and interpersonal relations within their organisations.

Conclusions

To sum up, it should be noted that the presented social and economic behaviours of all the examined generations are inextricably linked to the development of all aspects of life. The changing environment, the constant desire to improve and make life and work easier, forces the search for new solutions. Changes in the labour market are linked to changes in private life and therefore everyone, regardless of age and social status, needs to adapt to some extent. The studies carried out enabled the author to showcase and confirm the key goal, namely the need for lifelong learning. All the representatives of Generations X, Y, and Z participating in the survey agreed that making changes is necessary and inevitable, only the sheer number of these changes can be frightening for the representatives of generations X, who are not used to experiencing so many changes in such a short timeframe. They remember the times when life seemed to be calmer and their jobs felt more secure. These days, they are forced to function in chaotic times, where everyone is focused on quickly gaining everything they want at the expense of health and family life. On the other hand, representatives of the generation Y and Z are accustomed to such behaviour; they are able to understand many changes that can help them get a better job and home, or better their living conditions. Communicating is also normal for them, as long as they can use their phones, instead of personal contact. Back in the day, family and company meetings were the only way to develop social ties. These days, such meetings are often held without personal contact, using innovative technologies. This is caused not only by upbringing and getting accustomed to phones and the Internet, but also by the lack of time; therefore, it should be noted that many things have changed the world for the better - it has become more global, and distance is no longer a barrier. The benefits of taking advantage of innovations in professional and private life are very important, they just need to be used in a skilful manner, while giving everybody time to get used to them. Social and economic development in relation to contemporary life of all social groups is irreversible and allows to improve the quality of life.

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Preferred Organization Management Styles. The Perspective of Polish Family Businesses

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Abstract

Management is one of the most important functions in the organization, therefore, the level of management determines the adaptation of the organization to variable environmental and business conditions. Among the conditions for effective management, it is possible to distinguish the level of knowledge, skills to be a manager, the level of power as well as the desire to manage organizations, but most of all the adopted relevant attitude which affects the management style. The literature review indicates a wide range of divisions involving organization management styles, which confirms that the management situation is affected by the factors which determine the style and, what is more, in the case of family businesses, the combination of familiness and business. Therefore, the management of family businesses includes the combination of both formal and informal mechanisms, which may arise inside or outside the organization, which directly influences the mixed management styles of such organizations. The objective of the article is to show what management styles are dominant in the management of family businesses taking into account the divisions adopted. The reasoning is based on the results of the research on a group of Polish family businesses. The research conducted in 2018 clearly indicates that there are mixed management styles in family businesses, which combine relevant styles associated with management in family businesses. The most dominant management style in the case of the simple style division is the autocratic style and, in the case of the extended division, the integrated style.

Keywords: Management Styles, Leadership and Power, SME Sector, Family Business.

Introduction

Family businesses are the largest group of enterprises operating in all economies in the world. The vast majority of family businesses are enterprises from the sector of small and medium entrepreneurship which, while operating in local and regional markets, are characterized by specific features. The specificity of the operation of family businesses is due to the features characteristic exclusively of this group of organizations as well as the combination of business with family conditions. The impact of familiness on entrepreneurship can be perceived both in terms of allocation of organizational resources as well as in terms of organizational behavior affecting the performance or, more broadly, market success. Therefore, the management of family businesses may result from the family nature of entrepreneurial intentions. The adopted style of managing family organizations may be due to a number of factors which are directly related to the family nature of the business as well as the conditions of the business environment. Nevertheless, the adopted style of management of this type of organizations may differ from the style of managing non-family enterprises.

The objective of the article is to indicate what management styles are dominant in the management of family businesses, taking into account the divisions adopted. The reasoning is based on the author's own research conducted in 2018 on a group of Polish family businesses belonging to the SME sector.

Leadership and Power in Family Businesses – Literature Review

Leadership in the organization is the process of influencing others. It consists of various components, among others, authority, power, influence, acceptance and responsibility (Yukl 2010). It is particularly

important since it affects the performance of the organization or creates the conditions for the development of organizational culture (Schein 2010). Leadership is thus culture-related and Daft (2005, p. 22), Toor and Ofori (2009, p. 534) even emphasize that leadership creates changes in the enterprise, doing so in the face of organizational culture. According to Lievens, Van Giet and Coetsier (1997, p. 416), leadership is the key factor in organizational variability of each company.

The organizational structure of the enterprise forming its framework should provide the organization with an appropriate system of mutual relations, which is logical and transparent for all its members. However, this is not possible without the rules and principles in force in the organization, which are established and determined by managers (Stoner et al 2011, p. 335; Mynarzova et al 2016), and in the case of family businesses, also by owners. Power and authority in the process of business organization includes the manner of holding power as well as the approach of the owner, manager or a person in charge to employees, including decision-making and delegation of power (Lemańska-Majdzik 2019). In the case of family businesses, all areas of the organization are affected by ownership in the family business. The ownership of family businesses may vary in terms of at least six dimensions which often interact. These dimensions include (Daspit et al 2018):

- a number of families or family members participating in ownership,
- a share of family ownership,
- dispersion of ownership among families or family members,
- relationships between owners,
- demographic characteristics of owners,
- nature of the owners' involvement in management bodies, such as board of directors, advisory board or family board. Each dimension separately and in combination creates a set of original resources enabling the acquisition of competitive advantage of family businesses.

Power and authority in the organization have a significant impact on its shape and market behavior, therefore, in the case of organizing family businesses, the family members of business owners play an important role. The involvement and competence of the family members participating in the operations of the family business, in the opinion of Więcek-Janki (2014), determine the competitive advantage and the figure of the person in charge or the owner managing the family business is crucial in gaining the advantage.

According to La Port, Lopez de Silanes and Shleifer (1999), power in the family organization affects financial capacity and management processes. Family businesses, compared to non-family ones, have weaker financial results and poorer management structures. In turn, Bloom, Genakos, Sadun and Van Reenen (2012) claim that, in this group of enterprises, it is more difficult to introduce new practices related to management and the possible duration of their introduction is much longer than in the case of non-family businesses. These differences may be due to how managers and owners perceive their roles and responsibilities in companies. Safin (2007, pp. 300-301) pinpoints that owners in family businesses constitute the management pillar of this type of organizations.

In the case of family businesses, management control and leadership, which are inseparable, are therefore of particular importance. There is no management control without leadership and the opposite. Management control is defined as a system in the social, cultural, political and economic environment applied by the manager or the owner in order to adapt employee behavior to organizational objectives or the management of internal and external interrelations (Sorenson 2000; Jogulu 2010). It consists of the control of results, processes and culture, without excluding each other but rather overlapping and strengthening in everyday implementation. The control determines the results expected from employees (also known as performance measurement). This type of control provides flexibility, requires the delegation of powers and promotes creativity among employees in order to search for alternative operations to achieve the previously defined set of objectives. The process control focuses on measures/behavior of employees and promotes strong and positive organizational culture,

allowing the organization members to monitor each other and to possess self-awareness in the activities for the benefit of the development of the family business (Efferin 2015).

The nature of family involvement in the management and ownership of the company are the primary source of heterogeneity of the family business. Such involvement affects the implemented objectives and performance of the enterprise, which results from the implementation of not only the objectives related to the maximization of the economic value of the enterprise but also the implementation of family objectives, which is characteristic of family businesses (Daspit et al. 2018).

Among the determinants affecting the management style of family businesses, as indicated by Krajewska-Nieckarz and Klimka (2014), the owner's parental attitude should also be distinguished. This is due to the fact that, in this type of organizations, it is the owner that has a decisive vote in strategic decisions in the company (Gorzeń-Mitka, Okręglicka 2015). However, while conducting the analysis of the management style, the attention should also be drawn to the company's profile, field of its activity or organizational culture which prevails in the company. Koziński and Listwan (2005, p. 104) emphasize that the general manager has a decisive vote in terms of the selection of the management style, therefore, in the case of family businesses, it will often be the owner.

Management is both influencing the employees of the organization and the relationships between them (Bielski 2002, p. 205). It occurs that the skillful management of employees in the company affects the level of their motivation, degree of their involvement and appropriate level of interpersonal relations (Jasińska 2009). The management of the organization is the determination of strategic objectives of the company, e.g. the selection of the organization's production profile, cooperative relationships, range of services etc. In management, it is necessary to know the market, to be able to recognize customer needs, which is often possible through experience and intuition. Effective management is related to the appropriate impact on employees, which can be achieved through actions for the benefit of the change in their behavior (Gach, Pietruszka-Oryl 2005, p. 213).

Management is one of the most important functions in the organization, and thus the level of management of managers determines the organization's adaptation to the variable conditions of the environment. Among the conditions of effective management, in the opinion of Wachowiak (2001, p. 15), there are, among others, the possession of power, abilities to be a manager as well as the desire, but most of all the adoption of the appropriate attitude which affects the management style. The subject literature provides a number of divisions including management styles in the organization, which confirms that the management situation is influenced by factors which determine the style. For instance, according to Fiedler, it is the atmosphere at work, the manner of constructing tasks for employees or the manager's authority and the scope of their power. According to Halal, the management situation is influenced by the types of tasks to be performed and determinants motivating employees, and according to Yetton, the manner of solving problems in the organization is critical. In turn, Hersey and Blanchard claim that these are the abilities and predispositions of employees and the degree of their involvement in work (Wachowiak 2001, p. 29; Leszczewska 2007, pp. 105-106).

The simplest division of management styles distinguishes the autocratic, democratic and liberal (non-interference) management styles. Wachowiak (2001, p. 29) indicates that it is not possible to determine which of the three suggested management styles is the best one. This is due to the fact that the management style should be adjusted to the situation in the organization, therefore, in the case of family businesses, the management style is the combination of all three styles. It turns out that, depending on the situation, the first, the second or the third style is dominant (Balogun, Hailey 2008). For example, in the situation of creative tasks, managers ought to manage organizations following the democratic or/and liberal style, in turn, in the case of duplicated tasks, reconstructive ones, they should manage the organization following the autocratic style (Wajda 2003, p. 92).

Another interesting division of management styles which may also be assigned to family businesses is the division according to J.W. Reddin's division, who relied on the flexible approach to the manager who must refer to the existing situation in the organization. By expanding the management network,

created by Blake and Mouton, he distinguished four basic management styles, such as: related (friendly), integrated (comprehensive), separated (isolated) and dedicated (zealous) (Michalska 2015, p. 75).

One of the most important stages of the life cycle of the family business is the moment of the transfer of ownership and leadership. Lack of succession planning is one of the most important reasons for which many first-generation family businesses do not survive their founders. The preparation of the business transfer is a long and complex process entailing a range of difficulties (Vassiliadis et al 2015). Then, family businesses face the dilemma of long-term survival, not only overcoming the difficulties common to all types of business activities but also the conflict which directly results from their family-business nature of the relationships in the enterprise (Brenes et al 2006).

Management in family businesses also includes the manner of management of financial, human, intellectual, social and organizational capital (Gersick, Feliu 2014). In this way, the management of family businesses includes the combination of formal and informal mechanisms which may arise inside and outside the organization. Practices in the field of the management of family businesses may affect employees' activities, strategic behavior and company's performance and may include the use of financial control systems, recruitment and involvement of non-native resource managers, implementation of human-resource practices, decentralization of power and increased involvement of management board (Dekker et al. 2013).

Research Methodology

Due to the specificity of family businesses (Sułkowski 2011; Lemańska-Majdzik et al. 2016) and the mixed management style declared in the previous studies, the decision has been made to test the relationships for two different management styles (Basco, Pérez Rodríguez 2011):

- for the basic division, including autocratic, democratic and liberal styles,
- for the extended division (based on the Reddin's model), including related, integrated, separated and dedicated styles.

The objective of the article is to indicate what management styles are dominant in the management of family businesses, taking into account the adopted divisions.

The research on a group of enterprises from the SME sector, i.e. micro-, small and medium enterprises, was conducted in 2018. 358 Polish family businesses participated in the research, classified by employment size as micro-, small and medium enterprises. During the study, an anonymous questionnaire consisting of closed-ended questions was used, which was addressed to the owners/managers of the surveyed enterprises from the south-central Poland. The questionnaires were completed primarily by the owners or managers of family businesses. The selection of enterprises was random, i.e. the fact of accepting the enterprises for the research was determined by a chance.

Research Results and Discussion

The preferences concerning the management style (basic division) in family businesses are presented in Figure 1. The respondents used the 7-point Likert scale where 1- definitely not, 2 - not, 3 - rather not, 4 - average, 5 - rather yes, 6 - yes, 7 - definitely yes.

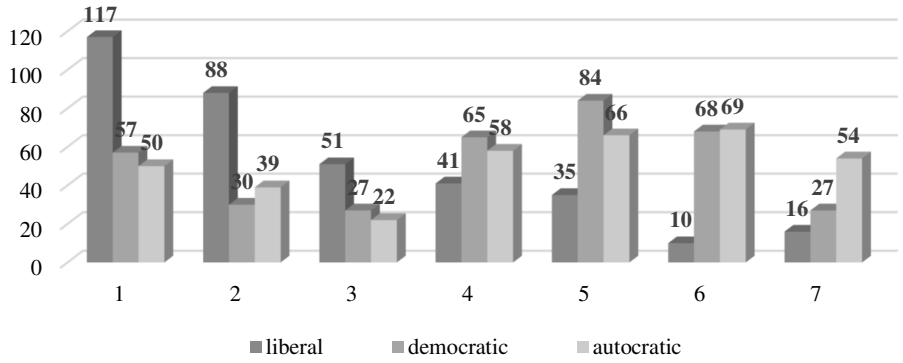

Fig. 1: The preferred management style (basic division) in family businesses, N=358

Based on the conducted research, it can be concluded that the liberal management style in family businesses occurs in the case of nearly 7.3% of the respondents since only 26 of the surveyed Polish entrepreneurs declare that this management style occurs in their enterprises. On the other hand, as many as 256 respondents indicate that this management style is not dominant in their family businesses. The democratic management style in family businesses is indicated by a total of 50% of the surveyed Polish entrepreneurs, i.e. 179 companies. Moreover, 57 family businesses declare that this management style does not occur in their family businesses. The conducted research shows that the autocratic management style in family businesses is indicated by a total of 189 respondents. Therefore, it turns out that nearly 52% of those questioned declare that the autocratic style is the management style in their enterprises. At the same time, it turns out that as many as 111 respondents declare that this management style does not occur in their family businesses (Fig. 1).

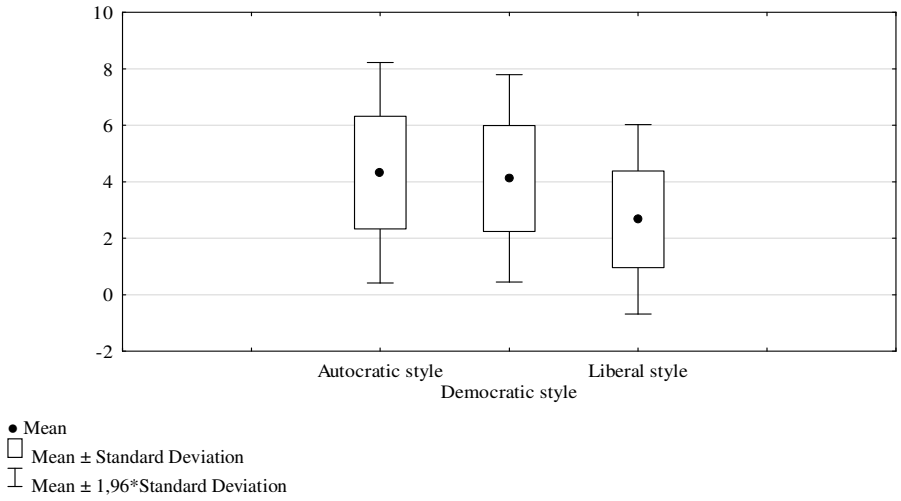

Fig. 2: Descriptive order statistics of the preferred management styles (basic division) in family businesses, N=358

Figure 2 illustrates the descriptive order statistics of the preferred management styles in family businesses. The conducted analysis indicates that the preferred management style in the surveyed enterprises is the autocratic style consisting in the fact that the entrepreneur sets the objectives and tasks of the company themselves while fully getting involved in the company's operation through ongoing control and verification of employee operations. The average value for the autocratic style amounts to 4.32 on the 7-point Likert scale. This level deviates from the average value by +/-1.99 pts. The minimum value for this management style indicated by the respondents amounts to 1.00, whereas

the maximum value is 7.00 on the 7-point scale. Another style preferred by the owners or/and managers of family businesses is the democratic style which somehow limits the company's owner, providing maximum freedom to employees. This style consists in encouraging employees to co-decide in the process of the company's operation. The conducted analysis shows that the average value for the democratic style amounts to 4.12 on the 7-point Likert scale and the level deviates from the average value by +/-1.87 pts. In the surveyed family businesses, the liberal style, which leaves employees maximum freedom, is indicated the most rarely. The person managing the company in this style attempts to interfere in employee operations as little as possible, however, provides them with appropriate tools and working conditions. The respondents assess that, in the case of family businesses, this style of management occurs very rarely, determining its level in the process of business management at 2.67. The level deviates from the average value by +/-1.71 pts. It follows that, in practice, this management style does not occur in the surveyed family businesses.

The preferences concerning the management style (extended division based on the Reddin's model) in family businesses are presented in Figure 3. The respondents also used the 7-point Likert scale where 1- definitely not, 2 - not, 3 - rather not, 4 - average, 5 - rather yes, 6 - yes, 7 - definitely yes.

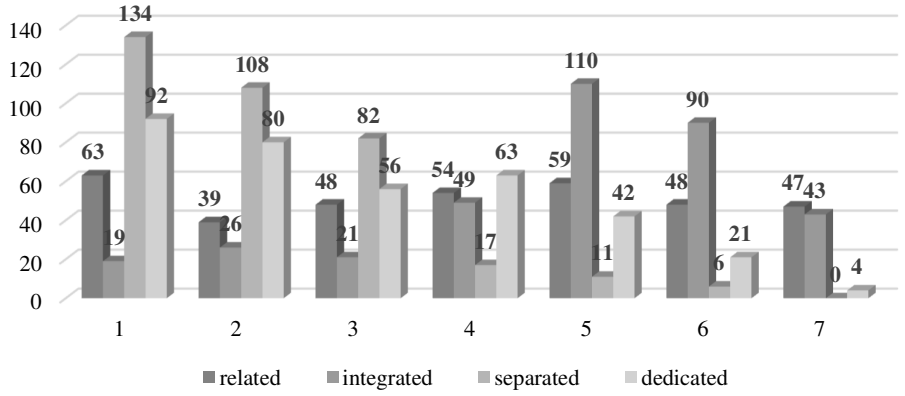

Fig. 3: The preferred management (extended division) in family businesses, N=358

The results of the conducted research indicate that a total of 154 Polish entrepreneurs running family businesses declare the related management style, which amounts to 43.02% of all the indications. The related style is not the management style in family businesses in the case of 111 companies. The distribution of responses concerning the integrated management style in family businesses indicates that it is the most frequently indicated management style in the surveyed enterprises. A total of 243 respondents indicate that this style is the management style in their enterprises, which amounts to as much as 67.88% of all the surveyed Polish companies. Only 66 respondents declare that this style does not occur in their enterprises. The research results also show that two management styles – separated and dedicated – occur the most rarely in the surveyed companies. In the case of the dedicated style, the respondents indicate that it occurs in the process of the management of family businesses in 67 companies, which amounts to 18.75% of those questioned. In turn, in the case of the separated management style, such a declaration is made by 34 respondents, which amounts to merely 9.50% of the surveyed family businesses (Fig. 3).

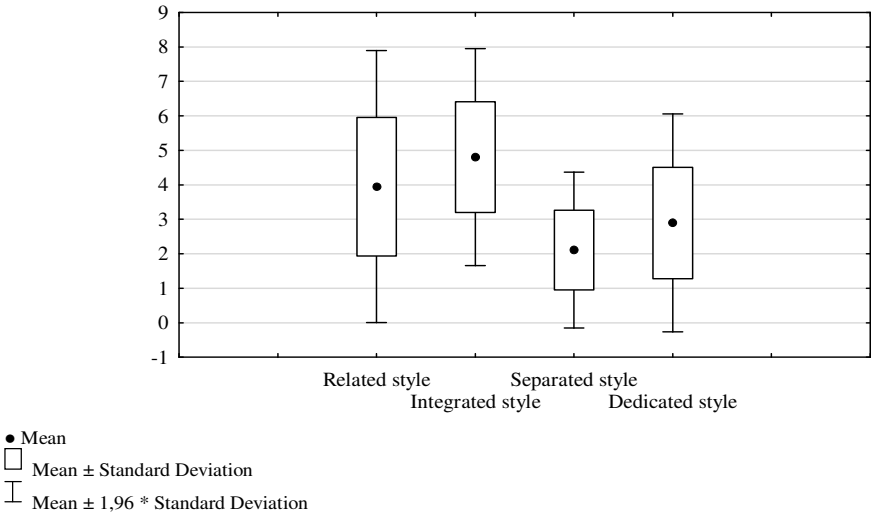

Fig. 4: Descriptive order statistics of the preferred management styles (extended division) in family businesses, N=358

In Figure 4, the descriptive order statistics of the preferred management styles in family businesses are presented. The conducted analysis indicates that the preferred management style for the owners or/and managers of family businesses is the integrated style consisting in the fact that the manager focuses on both currently performed tasks and appreciates individual employees. Group debates are the form of setting tasks to them and they assess employees in terms of their suitability. It can be concluded that the manager is far-sighted and manages people by showing them ideals and setting ambitious tasks. The average value for the integrated style amounts to 4.81 on the 7-point Likert scale. This level deviates from the average value by +/-1.61 pts. Another management style preferred by the owners or/and managers of family businesses is the related style, in which the manager focuses on employee problems and to a small extent on tasks. They like contacts with subordinates and have the ability to settle conflicts, however, not to stimulate subordinates to operate. The analysis indicates that the average value for this management style amounts to 3.95 on the 7-point Likert scale and the level deviates from the average value by +/-2.01 pts. In the surveyed Polish family businesses, the dedicated style, in which the manager is focused on tasks, wants to gain dominance over others, giving instructions and clues to subordinates, is the management style indicated by the respondents rather rarely. They operate in the short term and assess subordinates from the point of view of their suitability for the performance of tasks, however, they consider rewards and punishments to be the best management tools. The respondents assess that, in the case of family businesses, this management style occurs rather rarely, determining its level at 2.67 on the 7-point Likert scale. The level deviates from the average value by +/-1.15 pts (in practice, this management style does not occur in the surveyed family businesses). The most rarely indicated management style in the surveyed family businesses is the separated style, in which the manager is hardly oriented to tasks and people. They impose punishments in the form of withdrawing decision-making powers, avoid innovation, prefer known and tested methods, moreover, have difficulty in establishing contacts and cooperation with people. The manager applying the separated management style appreciates rationality and finds it destructive to give in to one's emotions. The respondents assess that, in practice, this management style does not occur, determining its level at 2.11 on the 7-point Likert scale. This level deviates from the average value by +/-1.61 pts. In practice, this management style does not occur in the surveyed family businesses.

Conclusions

The research conducted in 2018 on a group of Polish family businesses of the SME sector indicated that, in this group of enterprises, mixed business management styles are dominant. This is confirmed by both the research on a group of Polish family businesses (Wachowiak 2001, p. 29; Sułkowski 2011; Koziński, Listwan 2005, p. 104; Safin 2007; Sobiecki et al 2014) and the international research (Basco, Perez Rodriguez 2011, Daspit et al 2018, Ramadani, Hoy 2015; Toor, Ofori 2009; Belias, Koustelios 2015), which indicates that the management style in family businesses is the combination of relevant styles associated with the management of a family business in which one or two styles are dominant. Therefore, in the study, the author has made an attempt to indicate what management styles are dominant in the management of family businesses, taking into account various divisions.

Summing up, it can be indicated that, while adopting the basic division of management styles, in which the autocratic, democratic and liberal styles are distinguished, the most dominant management style in Polish family businesses is the autocratic style, followed by the democratic one, and the least dominant is the liberal style. In turn, while adopting the extended division, taking into account the Reddin's model, in which the related, integrated, separated and dedicated styles are distinguished, the most dominant management style is primarily the integrated style and the rarest one – the separated style.

The obtained results encourage the continuation of the literature and empirical studies, particularly in terms of the continuation of the analyses of the research material collected, including the use of the cluster analysis for the construction of groups combining relevant management styles in relation to the adopted divisions, i.e. basic and extended division. In view of the particularly important role of family businesses in national economies and their large share in enterprises in total, it is worth conducting the research into this type of organizations in the future.

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Practices of Flexibility in The Area of Organizational and Innovative Change Management in Family Businesses

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Abstract

Flexible operations of the organization are primarily due to changes in the business environment, but the multidimensionality of the concept of the flexibility of operations leads to the considerations in terms of organizational behavior from the perspective of enterprise management. The flexibility of operation, as a characteristic of family businesses, is identified in all management areas, including the area of organizational and innovative change management. Family businesses are a special group, among others, characterized by the type of management, level of innovativeness, acquisition and mobilization of capital, cultural continuity, but also stability. The objective of the article is to assess the level of flexible operations in the area of organizational and innovative change management by family businesses. The survey using the authors' research tool, conducted on a group of Polish family businesses, enabled the conclusions to be drawn using statistical methods. The conducted analysis indicated that, among the factors affecting the level of flexible operations in the area of organizational and innovative change management, including the implementation of changes and innovation and new technologies, there are the ones characterizing enterprises as family businesses. The determinants conditioning the level of flexible operations in the analyzed area, based on the conducted research, include the participation of family members in the power in the company as well as the generational profile of the company.

Keywords: Enterprise Management, Organizational Flexibility, Changes and Innovation, Family Business

Introduction

Changes in the macroenvironment of the organization, considered as turbulent, unexpected and uncertain, force enterprises to undertake flexible operations. However, flexible organizational operations, necessary in the era of changes, are not only due to the turbulence of the environment but also from conditions for competitiveness.

Family businesses, characterized by specific features, may affect their abilities in terms of flexible operations which, will become the standard. In this case, the level of organizational flexibility results from internal conditions of this type of organizations and allows them to adapt to market changes and customer needs in a flexible manner. It is the family spirit occurring in business that makes that market advantages can be achieved by enterprises in a flexible manner. Moreover, the flexibility of operations as a characteristic of family businesses, according to the literature review, is identified in all management areas.

Shimizu and Hitt (2004) point out that family businesses, as a specific group of enterprises, have the ability to rapidly identify significant changes in the market, engage their resources in new, often strategic solutions and quickly respond in the business environment, which causes that they become flexible in all areas of management functions.

Creating flexible organizations is a response to challenges of the environment and flexible companies may effectively respond to the dynamic environment (Sanchez 1995) and competitive changes. The flexibility of operations means that entrepreneurs flexibly modify plans or decisions continuously, adapting to changing circumstances (Brettel et al 2012), at the same time, they can make changes in a relatively short time and, at comparatively low expenditures. These changes are often radical, including the change in primary objectives or strategies and can be made in all areas of the company's operations (Lemańska-Majdzik 2019).

The objective of the article is to assess the level of flexible operations in the area of organizational and innovative change management by family businesses. In the article, the authors relate to own research carried out in Poland in 2018, using the authors' survey questionnaire for family business owners.

Practices in terms of the implementation of change, innovation and new technologies in family businesses – results of the literature research

The ongoing process of globalization pinpoint the significance of the ability of the company to engage in the development and implementation of innovation and organizational changes (Camps, Marques 2014; Mynarzova et al 2016), however, in order to capture new business opportunities and translate innovativeness into better results of the company, something more than just the ability to develop products is needed. Innovation is directly related to creating value for the enterprise (Lee et al 2012), which determines the operation of the organization and has a positive impact on its development. The enterprises which are pioneers in the market implement innovation easily, thus increasing their opportunities for survival and development (Cefis, Marsili 2006). This situation also applies to family businesses which are often defined as enterprises set up by a creative person with leadership qualities (Duran et al 2015). The research by, among others, Craig and Dibrell (2006) indicates that family businesses may have characteristics favorable for innovativeness. While establishing business objectives, family businesses remain unanimous, pointing out that the factors affecting their market success, in addition to the organization members, are just the implemented innovation. The report on the state of family businesses in Poland indicates that the high level of investment expenditure linked to innovation has been rising in recent years just among such firms (Barometr firm rodzinnych 2016). The research conducted on a group of family businesses shows that the innovation which is financed mainly with the EU funds and own resources of family members participating in the company's activities is being implemented more and more often and increasingly intensively.

The research indicates that family businesses place great emphasis on innovation (De Massis et al 2013; Röd 2016; Sharma, Salvato 2011). However, the opinions on this issue are divided, some studies show that family businesses are more innovative than non-family businesses (Muñoz-Bullón, Sanchez-Bueno 2011), while others show the opposite (Block 2012). The commitment of the owner's family to the company is also defined as the family spirit, which is an important distinguishing feature of this type of organizations. It turns out that a significant part of the portfolio of the company's resources is an important component in understanding the operation of the family business (Kellermanns et al 2012; Carnes, Ireland 2013). The research into innovativeness of family businesses (Llach, Nordqvist 2010) confirms that the family may affect the efforts of family businesses for the benefit of innovation.

The literature review additionally indicates that family businesses, characterized by the overlapping of private life and business, have unique characteristics, which may provide a competitive advantage over non-family businesses (Habbershon et al 2003; Röd 2016). Innovation in family businesses is idiosyncratic due to the family engagement in the company's activities and the decision-making process (Rondi et al 2018). Therefore, the innovative attitude of the family business can be defined through its strategic orientation resulting from the participation of the family in business activities. It is also due to the climate, philosophy and practices influencing the development of innovation in

family businesses. According to the literature devoted to family businesses, two dimensions of the family business innovative attitude are identified: propensity to take risk, attachment to tradition.

As indicated by the research at the company level, propensity to take risk is lower in family businesses than in their non-family counterparts and depends on the degree of the family involvement in business (Li, Daspit 2016). Therefore, propensity to take risk is the propensity of the family business to engage in behavior with uncertain consequences. For this reason, the family business with propensity to take risk tolerates uncertainty, encourages to personal initiative within a family group (Isaksen, Tidd 2007). The studies by De Massis et al. (2016) shed light on the significance of the past family business in terms of innovation, identifying "new innovativeness" assigned to family businesses, known as "innovation by tradition". Family businesses, while implementing innovation, reject the past to make space for the future, whereas the innovation strategy indicates that some family businesses have a unique set of possibilities allowing them for interpretation and reinterpretation of expertise, which is remote in time, thus they implement innovation based on tradition (De Massis et al 2016; Gorzeń-Mitka, Okręglicka 2015). Therefore, attachment to tradition is regarded as the extent to which the family business is anchored in its past and wishes to forward it to the future. Family businesses with high attachment to tradition attach great importance to their history, wishing to preserve their heritage, whereas family businesses with low attachment to tradition focus more on the present than on the future and consider their status quo as the starting point for creating something new. The past is treated as the stage which the company must leave and take on new challenges aimed at evolution (Kammerlander et al 2015).

When relating to the categorization of innovative family business attitudes into separate theoretical types, the multidimensional approach to the recognition of the complex and interdependent nature of innovation in the family business can be adopted (Cornelissen 2017). According to Rondi, De Massis and Kotlar (2018), family businesses can take four different orientations or attitudes to stimulate innovativeness (see Figure 1).

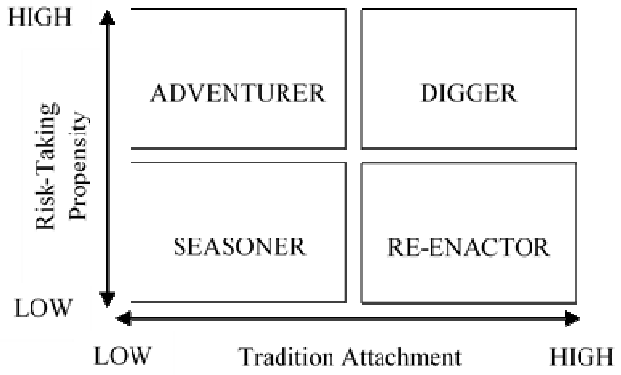

Figure 1: Typology of family business innovation postures (Rondi et al 2018)

The combination of the dimensions including propensity to take risk and attachment to tradition determines the framework of various innovative attitudes with alternative orientations which the family may achieve in business, developing the philosophy, climate and innovative practices. In relation to these two dimensions, the typology of four heterogenous combinations can be identified, each of which, in the opinion of Rondi, De Massis and Kotlar (2018), leads family businesses to commitment to highly innovative behavior.

From the point of view of family business innovation, the ownership structure, which undoubtedly affects the results in the area of innovation, is also important. Family businesses need to simultaneously combine various innovation objectives, including gradual and radical innovation but

the intensity of these objectives may vary over time (Sharma, Salvato 2011) and depends on management characteristics (König et al 2013). It turns out that the companies managed by the founder are more innovative than those managed by a larger number of family members or connecting family clans (Block 2012). On the one hand, family businesses are known for combining financial objectives with socio-emotional objectives concerning organizational wealth, leading to long-term orientation and greater openness to innovation. On the other hand, the literature suggests (Chin et al 2009) that the ownership of the family, in particular tighter control by a larger share in ownership is linked to lower innovativeness. Families who build their own capital also have a greater incentive to closely monitor how the money is spent, which favors the saving policy but may also discourage from innovation expenditure, particularly in relation to radical innovation with unknown origin (Chrisman, Patel 2012).

While considering the multigenerational nature of family businesses, it turns out that that the founders of family businesses are often remarkable innovators. However, many family businesses managed by subsequent generations seem to lose this ability (Kraiczy et al 2015). Following this way of thinking, it can be concluded that favoring the potential successor during their upbringing may lead, among others, to nepotism, lack of professionalism or even corruption (Jaskiewicz et al 2013). Therefore, instead of a constant search for new opportunities, the tendency to optimize the existing strategies may dominate in many older family businesses. As a result, the subsequent loss of innovativeness may threaten the longevity of the company. Moreover, other factors, such as harmful family conflicts (Eddleston, Kellermanns 2007), insufficient management systems and lack of competence and/or legitimacy of the successor (Carney et al 2015) often contribute to a harmful effect of the loss of innovativeness. The international studies show that along with a growing number of generations, innovation performance in family businesses is constantly declining. Future generations may be less oriented to innovation in their operations (Beck et al 2011), however, intergenerational cooperation is also considered as the factor positively influencing the level of innovation in family businesses (Hauck, Prügl 2015).

The results of other studies conducted on a group of family businesses also indicate that family businesses are particularly good at innovation on the basis of their unique history and resources and a long-term perspective, which stimulates them to engage in more radical innovation ensuring their long-term stability. It turns out that family businesses are initially reluctant to engage in discontinuous innovation, however, when they do that, they adapt new technologies faster and more efficiently than non-family businesses (Penney, Combs 2013). Kiełtyka (2016) pinpoints that it is the ability and flexibility of the use of new technologies that affects the success of the organization, creating organizations of the future.

The above considerations led the authors to carry out the research in this area in terms of flexible operations in the field of the implementation of changes and innovation by Polish family businesses.

Flexibility in the implementation of changes, innovation and new technologies by family businesses – results of the empirical research

Research Methodology

The primary objective of the article is to assess the level of flexible operations in the area of organizational and innovative change management by family businesses.

To accomplish the assumed objective, the following research questions were formulated:

- What is the level of flexible operations in the process of the implementation of changes, innovation and new technologies in family businesses?

- Does the level of flexible operations in the area of management of organizational changes and innovation in family businesses depend on the participation of family members in the power in the company?
- Does the level of flexible operations in the area of management of organizational changes and innovation in family businesses depend on the generational profile of the company?

The research was carried out in 2018 on a group of Polish family businesses. Both small and medium family businesses, classified by the number of employees (according to the EU standards) participated in the research, i.e. a total of 346 companies. During the research, the tool of the authors' survey questionnaire was used, previously subjected to operationalization in order to verify its reliability. The entrepreneurs-owners of the surveyed family businesses took part in the research. In order to accomplish the objective of this study, only the selected research area, including the implementation of innovation and new solutions by family businesses, was subjected to the analysis.

Results of the own Research and Discussion

The operationalization of the research tool allowed for the identification of two dimensions in the area of flexible operations associated with organizational and innovative change management, namely:

- implementation of changes in the organization (KZOI_WZO),
- implementation of innovation and new technologies (KZOI_WINT),

therefore, in the subsequent research, these two dimensions are subjected to the analysis.

Flexible operations in the dimension of KZOI_WZO were rated by the respondents at a rather low level of 3.33 on the 7-point scale. Q25 indicates that at least 25% of the family businesses rated flexible operations in this dimension at the level of up to 2.60. In turn, the value of Q75 indicates that at least 75% of the surveyed family businesses rated flexible operations in the dimension of implementation of changes in the organization at the level of up to 4.00 on the 7-point scale. Flexible operations in the dimension of KZOI_WINT were rated by the respondents at a quite high level of 5.29 on the 7-point scale. It turns out that at least 25% of the family businesses rated flexible operations in this dimension at the level of up to 4.50, at least 50% of the respondents – at the level of 5.50 or lower, and at least 75% of the surveyed family businesses rated flexible operations related to this dimension at the level of up to 7.00 on the 7-point scale (see Table 1).

Table 1: Descriptive statistics for the dimensions concerning organizational flexibility in family businesses

Dimensions	N	Average	St. deviation	Min	Q25	Median	Q75	Max
KZOI_WZO	346	3.33	1.00	1.00	2.60	3.20	4.00	6.60
KZOI_WINT	346	5.29	1.33	1.00	4.50	5.50	6.00	7.00

Another stage was to explore if there are relationships between the levels of flexible operations in the identified dimensions (KZOI_WZO, KZOI_WINT) using tau Kendall's Tau. The conducted analysis of the correlation of the variables showed that there is a positive statistically significant relationship between the identified dimensions (Kendall's Tau=0.19). This means that along with an increase in the value of one dimension there is an increase in the value of the other one (see Table 2). The above considerations lead to the confirmation of the results of the authors' research into the frequency of undertaking flexible operations which influence their number. At this point, one may agree with the research results by Batarlienė et al. (2017), who claim that the frequency of undertaken operations positively affects the number of undertaken actions.

Table 2: The relationships between the level of flexible operations in the dimensions related to the implementation of organizational changes and innovation in family businesses

Dimensions	KZOI_WZO	KZOI_WINT
	Kendall's Tau ($p < 0.05$)	
KZOI_WZO		**0.19**
KZOI_WINT	**0.19**	

Another stage of the conducted research was the analysis of flexible operations in the area of organizational and innovative change management in family businesses in relation to the participation of family members in the power. When analyzing the surveyed family businesses, it is worth pinpointing the participation of family members in the company's activities since, as indicated by the subject literature, the power in the hands of the family determines the organizational behavior of enterprises (Mullins, Schoar 2016; Daspit et al 2018). The literature review leads to the identification of three situations in which 1) the power is exclusively in the hands of the family, 2) the power is in the hands of both the family and people outside the family and 3) the power in the family business is in the hands of people outside the family. During the analysis of the obtained data in this study, two situations were identified, the first, in which the power is exclusively in the hands of family members and the second, when the power is in the hands of both the family and non-family members. An attempt to identify the third group of family members failed due to the lack of such a declaration by the respondents. This phenomenon, as indicated by the literature review, is quite common in this type of organizations because entrepreneurs-owners or family members involved in the company's management do not want to give all the power to outsiders (Jogulu 2010).

During the conducted analysis on the assessment of the organizational flexibility in family businesses in relation to the participation of family members in the power in the company, the nonparametric Mann Whitney U test was applied. In the case of the Mann Whitney U test, probability observed p was used instead of critical values. Therefore, if this probability, according to the calculations, is found to be lower than the assumed level of significance of $\alpha=0.05$, the zero hypothesis (H0) is rejected for the benefit of the alternative hypothesis (H1).

Table 3: Statistics of the Mann Whitney U test for the dimensions related to the flexible implementation of organizational changes and innovation broken down by the power in the company

Dimensions	U	p	r Wendta
KZOI_WZO	10143.5	**0.080***	0.126
KZOI_WINT	11467.0	0.871	0.000

** tendencies towards differences, statistically insignificant relationships at the probability level of $p<0.05$*

The research showed that, in the case of the dimension of KZOI_WZO, there are tendencies towards differences, whereas, in the case of the dimension of KZOI_WINT, there are no differences in the level of flexible operations between the companies in which the power is exclusively in the hands of the family and the companies in which the power is in the hands of both the family and people outside the family (see Table 3). Therefore, subsequently, the subject of the analysis was only the dimension of KZO_WZO. It turned out that the level of flexible operations in the dimension of KZOU_WZO was the highest in the group of family businesses in which the power in the company was in the hands of both family members and managers from the outside of the family (mixed power), at the level of 3.54. It turns out that at least 25% of the family businesses rated flexible operations in this dimension at the level of up to 2.60, and at least 75% of the surveyed family businesses rated flexible operations related to this dimension at the level of up to 6.60 on the 7-point scale. In turn, when the power in the companies was exclusively in the hands of family members, the level of flexible operations was slightly lower, at the level of 3.27 on the 7-point scale. Moreover, at least 50% of the respondents rated flexible operations associated with this dimension at the level of up to 3.20 on the 7-point scale (see Table 4). Therefore, it can be concluded that more flexible

operations in the area of organizational and innovative change management, including the implementation of changes in the organization, are introduced by family businesses managed both by family members and external managers.

Table 4: Descriptive statistics concerning the flexibility of operations broken down by the power in the family business

Dimension of KZOI_WZO								
Power in the company	N	Average	St. deviation	Min	Q25	Median	Q75	Max
Family	261	3.27	0.96	1.00	2.60	3.20	4.00	6.20
Mixed	85	3.54	1.10	1.40	2.60	3.40	4.20	6.60
Total	346	3.33	1.00	1.00	2.60	3.20	4.00	6.60

Another stage of the conducted research was the analysis of the relationships between the generational profile of the company and flexible operations in the area of organizational and innovative change management. The literature review enabled the identification of three generational groups of family businesses (Sułkowski 2004; Vassiliadis et al 2015), namely: 1) the 1st generation/the company's founder, 2) the 2nd, 3rd generation and 3) the 1st and next generation simultaneously.

For the conducted analysis, the nonparametric analysis of variance (Kruskal-Wallis test) was used, which indicates the existing differences in the distributions for the level of the flexibility of operations in the analyzed dimension broken down by the generational profile of the companies.

Table 5: Statistics of the Kruskal-Wallis test for flexible operations in the dimensions of the implementation of organizational changes and innovation broken down by the generational profile of the company

Dimensions	H	p	Epsilon-squared
KZOI_WZO	5.401	0.067*	0.015
KZOI_WINT	1.427	0.490	0.004

** tendencies towards differences, statistically insignificant relationships at the probability level of p<0,05*

The conducted analysis using the values of the statistics of Epsilon-squared, indicated the tendencies towards differences. These are statistically insignificant relationships with the probability level of $p<0.05$, however, these tendencies will be subjected to the further analysis. In the case of this dimension, Epsilon-squared=0.015, which is the evidence of a very weak tendency towards differences (see Table 5).

Table 6: Probabilities observed of the post hoc Kruskal-Wallis test concerning flexible operations broken down by the generational profile of the company

KZOI_WZO	Generational profile of the company		
	1st generation/ the company's founder	2nd, 3rd generation	1st and the next generation simultaneously
1st generation/the company's founder		0.335	0.149
2nd, 3rd generation	0.335		0.972
1st and the next generation simultaneously	0.149	0.972	

The subsequent analysis showed that probabilities observed of the post hoc Kruskal-Wallis test for the dimension of KZOI_WZO, concerning flexible operations broken down by the generational profile of the company, do not confirm statistically significant relationship or tendencies towards differences (see Table 6), therefore, it cannot be concluded that such differences between the groups exist.

Conclusions

The research carried by the authors among Polish family businesses, the objective of which was to assess the level of flexible operations in the area of organizational and innovative change management by family businesses, allowed for responding to the first research question:

- The level of flexible operations in the process of the implementation of changes amounts to 3.33, whereas, in the process of the implementation of innovation and new technologies in family businesses, it amounts to 5.29 on the 7-point Likert scale.

Moreover, in the article, the research was conducted into the impact of the participation of family members in the power in the family business on the level of flexible operations in the area of organizational and innovative change management. On the one hand, the literature review indicates that the commitment of family members positively affects the level of flexible operations in family businesses (Daspit et al 2018; Chrisman, Patel 2012). On the other hand, the literature points out (Mullins, Schoar 2016; Bloom et al 2012) that the commitment of family members has a negative impact on the implementation of changes and flexibility of family businesses. The obtained results of the authors' research partially confirmed the studies referred to and the second research question can be responded to:

- Yes, the level of flexible operations in the area of organizational and innovative change management in family businesses does depend on the participation of family members in the power in the company. Moreover, the participation of people outside the family positively affects the level of flexible operations in terms of the implementation of organizational changes.

The obtained research results did not confirm (no statistically significant relationship) that the generational profile of the family business affects the level of organizational flexibility. These results are inconsistent with the research results by Liu et al. (2015), who indicate that the level of the company's flexibility is determined by future generations who manage family businesses, which, in the opinion of Giambatist et al. (2005), influences the level of management, including the level of propensity to changes, innovation and new technologies. Therefore, the third research question can be responded to:

- It cannot be unequivocally confirmed that the level of flexible operations in the area of organizational and innovative change management depends on the generational profile of the company.

The multidimensionality and a wide range of topics of the analyzed scientific problem do not exhaust the subject matter in question. It can be assumed that they are just the starting point for subsequent literature and empirical studies. Due to a significantly important role of family businesses in national economies and their substantial share in a total number of enterprises, it is worth carrying out the research into the level of organizational flexibility in relation to other areas of management in the future.

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Telemedical technologies: The Needs of Elderly People in Poland

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Abstract

Telemedicine is still an uncontested space in Poland (Chan Kim, Mauborgne, 2015). Exploring it in detail is worthwhile, because it can affect the process of successful aging, whose rates are very low in Poland (OECD, 2017, Online). Telemedicine and telehealth can offer elderly people an important value – autonomy and independence. It also makes the monitoring of the health condition and vital functions of the elderly possible, which is an additional asset in the times of the pandemic. The article discusses the condition of seniors and describes what seniors and their caregivers actually expect of telemedical solutions and which solutions they accept and reject. The research proceeded in three stages. The unobtrusive measures method was applied in the first stage, comparative analysis in the second stage, and a survey on the usefulness of telemedicine devices in the third stage (Babbie, 2004; Webb, 1966; Øyen, 1990). The aim of the survey was to design an optimized device for the elderly and their caregivers, according to the rules of the Design Thinking process (Brown, 2009; Brown, Wyatt, 2010).

Keywords: elderly people, design thinking, education, telemedical technologies

Introduction

According to the statistical data of Statistics Poland (GUS, Poland's central bureau of statistics), Poland's population reached 38,383,000 people at the end of 2019. The number was lower by 28,000 than at the end of 2018. At the same time, a negative natural population growth was recorded as the number of births was lower than the number of deaths by 35,000, representing the lowest value since World War Two. The total fertility rate dropped, consequently precluding what is referred to as generation replacement. The proportion of people in the retirement age bracket was 21.5% of the total population, with people aged 65 years old and older accounting for nearly 18%. Seniors aged 80 years old and older made up as much as 18% of the elderly population (GUS, 2020, Online).

Though typical of European countries, the increase of the overall average life expectancy is correlated in Poland with exceptionally low indices of what is known as *successful aging.* Admittedly, according to the Eurostat data, sixty-five-year-old males and females in Poland can expect to live, respectively 16 and 20.5 more years on the average, but their estimated prospective periods of "healthy life" are considerably shorter, specifically 8.2 years for males and 8.9 years for females (OECD, 2017, Online). Health-related issues are highly relevant to successful aging, and the prospects for Poles to "successfully age," i.e., to grow old retaining satisfactory levels of cognitive and physical functions, are scarce. Poland's successful aging rate is among the lowest in Europe and currently stands at 1.6%, which represents a vast difference from Europe's best outcomes in this respect: 21.1% in Denmark and 17% in Sweden, and even from the European mean value of 8.5% (Hank, 2011). This makes it clear that it is exigent and urgent to apply knowledge in the fields of gerontology, andragogy, and counselling in order to improve telemedical technologies in the senior sector and to optimize practices and interventions for senior citizens. This is particularly pressing at the present moment, when post-traditional societies have an immense freedom of choice and enjoy nearly unlimited possibilities. At the same time, however, this abundance may cause decision paralysis (Schwartz, 2004). Given this, a reflexive approach to successful aging becomes particularly important, as does reflexive designing of one's own life (Giddens, 2013), including in the context of developing telemedicine technologies.

Telemedicine is a new and still untapped Blue Ocean (Chan Kim, Mauborgne, 2015) on the Polish map of products and services which can affect successful aging. Telemedicine is defined as "the natural evolution of healthcare in the digital world" (ATA, 2020, Online). It is based on the real-time interactive communication in which information about health status is exchanged between a patient (an elderly person) and a physician/practitioner/caregiver at a distant site through telecommunications equipment (AHRQ, 2020, Online; CMS, 2020, Online). In telemedicine, medical knowledge and technical solutions, therein information technologies, are innovatively combined with each other. One of its purposes is to offer the elderly as users a value they cherish, specifically as much self-reliance and independence as their psychophysical condition permits. Telemedicine also makes it possible to regularly monitor the health status and vital functions of the elderly. Additionally, it affords opportunity to rapidly respond to whatever irregular, unwelcome developments or incidents take place.

The aim of this article is threefold. First, discussing the condition of polish seniors. Secondly, describing what seniors and their caregivers actually expect of telemedical solutions and which solutions they accept and reject. Thirdly, designing an optimized device for the elderly and their caregivers, according to the rules of the Design Thinking process.

Materials and Methods

The research process was sequenced in three stages. The first stage employed the method of *unobtrusive measures* (the non-reactive research method, e.g., content analysis) (Babbie, 2004; Webb, 1966). The situation of the elderly in Poland was analyzed on the basis of the existing statistical data (GUS, Eurostat, OECD, WHO). The investigation also involved exposing the limitations of the health care and social welfare systems for the elderly, whereby statistical data were used together with the literature. This stage aimed to (1) describe the problems, needs, and condition of seniors in Poland as accurately as possible; and to (2) identify the potential weak points where the health care system failed to adequately respond to the real problems and needs of seniors. The second stage involved a *comparative analysis* of the existing telemedicine solutions for the elderly available on the Polish market in terms of the features they offered. The collected data were used to select the technically most valuable solutions which could respond to seniors' still unmet needs and were relatively easily acceptable to the elderly. In the third stage, a survey study was carried out among senior to find out about their views on the utility of telemedicine devices, possibilities of applying them, and their key functionalities. The goal of the survey was to help design an optimized device for seniors in conformity with the definition and rules of the *Design Thinking* process (Brown, 2009; Brown, Wyatt, 2010). The research sample surveyed for this purpose included thirty seniors and thirty caregivers from their families.

The research process complied with the principles of Design Thinking, understood as "a human-centered innovation process that emphasizes observation, collaboration, fast learning, visualization of ideas, rapid concept prototyping and current (…) analysis which ultimately influences innovation and (…) strategy" (Lockwood, 2009, xi). Design thinking now requires the social designer be sensitive to generational problems and to know how to solve problems, regardless of the complexity of these problems (Nijs, 2019, 65).

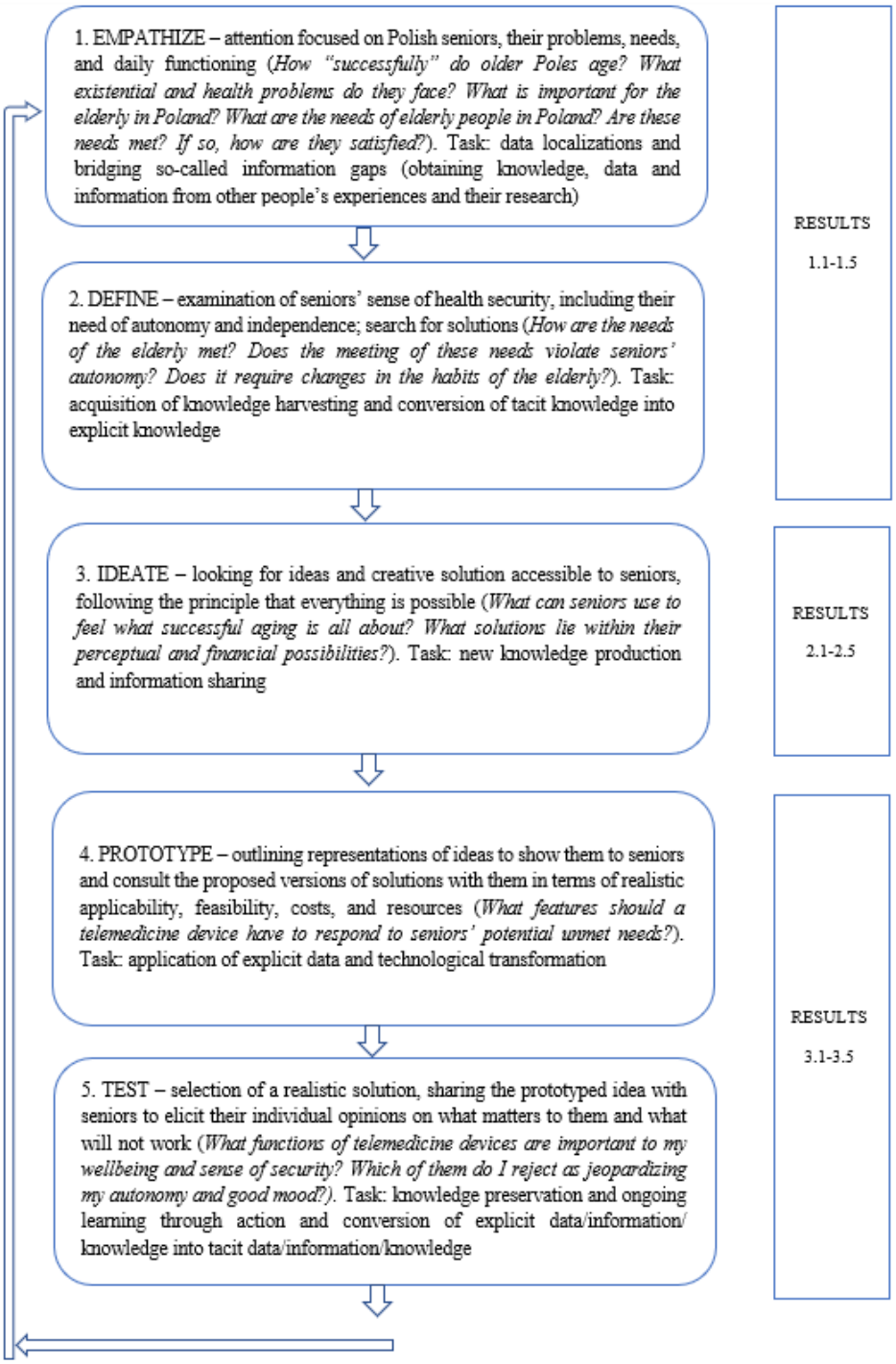

Fig. 1: Apply the Design Thinking process in order to design an optimized device for the elderly

The author was guided by the notion of value innovation (Chan Kim, Mauborgne, 2015), which helps (1) explore potential users in order to eliminate the factors which the market has so far taken for granted but which are not considered salient values by these users, e.g., including social media options in telemedicine devices; (2) reduce some factors clearly below the standards in place in order to avoid the mistake of too numerous possibilities on offer (in keeping with B. Schwartz's notion that the wider the choice, the greater the user's decision paralysis and sense of loss caused by making this rather than any other choice [2004]); (3) increase some factors clearly above the standards in place to prevent users from having to compromise (e.g., the accuracy of heart-rate measurement, operating time without charging the device); and (4) produce a new quality not offered yet by the device developers, e.g., a telemedicine device as offering a new experience of old age which enables seniors to function independently at home and in their close, familiar environments with the sense of security afforded by a device that monitors vital functions.

Results

1. <u>Orientation on the user's needs as the cornerstone of Design Thinking – non-reactive research results:</u>

1.1. The situation of the elderly in Poland is difficult and worrying. The major problem faced by Polish seniors include: the lack of economic security and the lack of medical and care support for the elderly. The situation of people suffering from neurodegenerative conditions, such as dementia and Alzheimer's disease is a matter of particular concern.

1.2. The elderly's right to decent life is essentially put at risk by factors such as: long waiting times for specialized medical procedures, limited access to specialized physicians and geriatricians, increasingly shorter hospitalization periods, the decreasing number of hospital patients older than 75 years of age, the reduction of beds in or even the closing of geriatrics wards.

1.3. Elderly care in Poland is predominantly provided by families (about 85% of caregivers for the elderly are so-called natural caregivers, i.e., family members and loved ones). Seniors, their caregivers, and members of social organizations advocating for the elderly report that there is no operating system of support for dependent seniors (especially dementia patients) and their caregivers. Social support is provided by volunteers of NGOs, in particular religious ones, e.g., Caritas (Caritas Polska, Online);

1.4. It is exigent to launch systemic policies and interventions aimed at counteracting what is known as indirect discrimination. Indirect discrimination involves implementing ostensibly neutral solutions or failing to actually implement any action, which results in restraining seniors' right to a long and independent life (RPO, 2018, 9-10; see United Nations. General Assembly – Resolution, 2019, Online). Such policies and interventions should: (1) support holistic approaches to the needs of the elderly and their expectations of the support they receive; (2) seek to put in place a community support system which is adequate to differing (aggravating in time) dependence of the elderly and results from consultations with seniors, especially in terms of the incidence of potential risks and discriminatory practices; (3) promote multi-sector engagement (cooperation of the public, private, and non-governmental sectors) in the professionalization of social support through devising comprehensive offers; (4) use state-of-the-at technology in order to support basic communities (mainly families of the elderly) and informal caregivers of depended seniors, in compliance with the principle of subsidiarity; and (5) strive to make sure that the elderly with limited self-reliance enjoy the right of independence, activity (correlated with their possibilities), and self-determination;

1.5. The most frequent diseases and conditions among Polish seniors were identified. They were arterial hypertension, back and neck pain, movement-impairing osteoarthritis, coronary disease, and diabetes. Complaints concerning motor abilities, sense organs, and self-servicing capability included vision and hearing impairments, impeded walking and problems with self-servicing understood as performance of daily activities which form the basis of an adult's existence (GUS-EHIS, 2015; GUS, 2018, 12-14). The elderly in Poland often suffer from "geriatric syndromes," that is, disorders caused by multiple comorbidities which require help from other people aided by telemedicine technologies which facilitate daily lives of the elderly and their caregivers.

2. Experience-based approach to the problem as the cornerstone of Design Thinking: Findings of comparative research:

2.1. Prevalent telemedicine devices used in Poland include "life wristbands" and remote senior care services. Telemedicine wristbands have been implemented in five Polish cities for a few months now. The scope of functionalities of these devices is considerably constrained, and they serve the elderly in a very limited way. This is linked to cost reduction efforts at the level of local self-governments, whose responsibilities include care for seniors. However, the actual demand for such wristbands has not been studied yet; nor has their functionality in the context of seniors' needs been examined.

2.2. The most frequent features offered by producers of telemedicine devices include: heart-rate monitoring, senior fall alert, and instant help button.

2.3. The most popular telemedicine devices available on the market offer the following functions: (1) bilateral communication (possibility of making and receiving phone calls); (2) button for contacting a caregiver or another designated person; (3) SOS button calling a pre-defined number (e.g., 112) and sending text messages to pre-defined telephone numbers; (4) GPS/LBS location; (5) heart-rate monitoring; (6) sleep monitoring (providing the caregiver with information about deep and light sleep); and (7) pedometer and calorie counter.

2.4. Some telemedicine devices also contain the following features: (1) Virtual wall (marking the safe zone within which the wristband wearer can move); (2) Movement sensor; (3) Fall sensor; (4) Listening to the environment (the caregiver can at any time discreetly listen to the environment in which the senior finds him/herself, for example, when voice contact is impossible or hindered); (5) Reminder of cyclic functions (drinking water, taking medicines, moving) and (6) Alarm (indicates a failure of the device).

2.5. Telemedicine devices very rarely are furnished with the following features: (1) Temperature sensor (monitoring the temperature level in the closest surroundings); and (2) Voice notification about the current time.

3. Testing, i.e., interviewing seniors about the solutions which they believe can work in the real world: Survey study results[i]:

3.1. More than half of the respondents (46 people; 76.66%) had never heard of telemedicine devices for seniors before. None of the respondents had ever used telemedicine devices, though 14 people (23.34%) had heard of them.

3.2. Eighty-five percent of the respondents (51 people) thought it was a good idea for the elderly who had problems with independent functioning to use telemedicine devices. None of the respondents (0%) found it was a bad idea, while 15% of the respondents (9 people) formed no opinion on the issue and answered "I do not know."

3.3. Asked to select three major features of telemedicine devices which would facilitate care for the elderly, the seniors and their caregivers opted for: (1) bilateral internal communication (36 votes – 60% of answers); (2) incident reporting (39 – 65%); and (3) fall sensor (35 – 58.3%). The functions less frequently chosen for their utility included: (4) reminders of cyclical activities (26 votes – 43.3% of answers); (5) senior GPS location (24 – 40%); (6) movement sensor (16 – 26.66%); (7) alarm (12 – 20%); (8) listening to the environment (11 – 18.33%); and (9) heart-rate monitoring (10 – 16.66%). The respondents believed that the following features were least needed in telemedicine devices: (11) pedometer and calorie counter (1 vote – 1.66%); (12) temperature sensor (3 – 5%); (13) voice notifications about the current time (3 – 5%); (14) virtual wall (3 – 5%), and sleep monitoring (5 – 8.33%).

3.4. Asked to pick the three main features of telemedicine devices which could be most relevant to elderly users, the senior respondents and their caregivers chose the following: (1) bilateral internal communication (39 votes – 65% of answers); (2) reminders of cyclical activities (35 – 58.33%); and (3) incident reporting (34 – 56.66%). The functions whose utility was less frequently recognized included: (4) fall sensor (19 – 31.66%); (5) heart-rate monitoring (12 – 20%); (6) alarm (11 – 18.33%); and (7) senior GPS location (10 – 16.66%). The features which were lowest-rated for usefulness in telemedicine devices were: (8) pedometer and calorie counter (1 – 1.66%); (9) virtual wall (2 – 3.33%); (10) listening to the environment (3 – 5%), (11) voice notifications about the current time (3 – 5%); (12) sleep monitoring (3 – 5%); (13) temperature sensor (5 – 8,33%); and (14) movement sensor (6 – 10%).

3.5. Asked to state which three features of the wristband were redundant, both the senior respondents and their caregivers selected: (1) pedometer and calorie counter (52 votes – 86,66% of answers) and (2) voice notifications about the current time (36 – 60%). The choice of the third function was more problematic, as the respondents hesitated among (3a) sleep monitoring (18 – 30%), (3b) temperature sensor (15 – 25%), and (3c) listening to the environment (15 – 25%). Other features the elimination of which was considered by the respondents also included (4) virtual wall (12 – 20%) and (5) movement sensor (11 – 18.33%). The respondents less frequently opted for the exclusion of: (6) alarm (7 – 11.66%); (7a) heart-rate monitoring and (7b) senior GPS location (6 votes and 10% of answers each); (8) fall sensor (3 – 5%); (9a) bilateral internal communication and (9b) incident reporting (2 votes and 3.33% of answers each). None of the respondents suggested removing reminders of cyclical activities from telemedicine devices as their redundant feature.

The table below brings together the choices of useful functionalities of telemedicine devices as reported by the senior respondents (A) and their caregivers (B), together with the scores for the three discarded functionalities whose inclusion was not considered indispensable for the monitoring of seniors' health status (C). Column 6 presents the total scores for all functionalities, showing which of them had the lowest and the highest number of positive votes. The votes from column 5 (C) were subtracted from the sum of positive votes from columns 2 (A) and 3 (B), which resulted in some negative scores in column 6 (D). The functionalities which have the lowest scores in column (D) were the least attractive ones to the respondents.

Table 1: The respondents' assessment of the functionalities of telemedicine devices (stage 3 of the research study)

Functions of telemedicine devices[ii]	Most important for the elderly votes (picks) (A)[iii]	Relevant to the caregiver votes (picks) (B)	Key functions of telemedicine devices votes (picks) (A)+(B)	REDUNDANT functionalities votes (picks) (C)	Sum of the votes obtained votes (picks) (D) = (A)+(B) – (C)[iv]
Function 1	39 (65%)	36 (60%)	**75**	2 (3.33%)	**73**
Function 2	6 (10%)	16 (26.66%)	22	11 (18.33%)	11
Function 3	5 (8.33%)	3 (5%)	8	15 (25%)	-7
Function 4	34 (56.66%)	39 (65%)	**73**	2 (3.33%)	**71**
Function 5	19 (31.66%)	35 (58.3%)	**54**	3 (5%)	**51**
Function 6	12 (20%)	10 (16.66%)	22	6 (10%)	16
Function 7	10 (16.66%)	24 (40%)	34	6 (10%)	28
Function 8	1 (1.66%)	1 (1.66%)	2	**52 (86.66%)**	- 50
Function 9	3 (5%)	11 (18.33%)	14	15 (25%)	- 1
Function 10	11 (18.33%)	12 (20%)	23	7 (11.66%)	16
Function 11	3 (5%)	3 (5%)	6	**36 (60%)**	- 30
Function 12	2 (3.33%)	3 (5%)	5	12 (20%)	- 7
Function 13	3 (5%)	5 (8.33%)	8	18 (30%)	- 10
Function 14	35 (58.33%)	26 (43.3%)	**61**	0 (0%)	**61**

Combining the needs and negations of the elderly respondents and their caregivers indicates that the most expected functionalities of telemedicine devices that facilitate the daily monitoring of seniors' health status are comprised of: (1) Bilateral internal communication (the possibility of calling a designated person to repot the lack of supplies – such as food or medicines – or an event that requires an intervention) (73 votes); (2) Incident reporting (a senior presses the button to call for help or to report an incident) (71 votes); (3) Reminders of cyclical activities (e.g., drinking water and taking medicines) (61 votes); and (4) Fall sensor (51 votes). The respondents' lowest assessments were given to the features including "Pedometer and calorie counter" (52 negative votes) and "Voice notifications about the current time" (36 negative votes).

Conclusion

Telemedicine devices offer a real opportunity for improving the quality of life of elderly people and supporting families in their care for seniors. While they are not popularly known to the Polish public, they invite a considerable approval and are identified by families, relatives, and caregivers as providing aid in the process of caring for the elderly.[ii] Telemedicine devices can alleviate the burdens to the health care system, which grapples with staff shortages and long waiting times for specialist consultations and procedures (difficult access to specialists is a ubiquitous problem in Poland). More than that, telemedicine devices can also secure the health and lives of the elderly by enhancing their control over diseases, complaints, and their own condition. The constant monitoring of vital processes and events round the clock can effectively support long-term therapies and make seniors feel less controlled by their loved ones or professional carers. Consistently with the policies defined in *Health 2020*, telemedicine devices can become an important component of the patient-oriented health care system in Poland as well (WHO, 2013, 3). For this to happen, the key requirement to be met by telemedicine devices is that they should contain an array of universal features, because too circumscribed a focus on a particular group of clients with narrowly defined diseases and disfunctions may prove ineffective in case of multiple coexisting disabilities. Such universal features undoubtedly include options of bilateral communication and "incident reporting" (so-called instant help buttons). They are particularly important for sustaining seniors' social participation and minimizing their sense of social exclusion. The awareness that seniors can count on quick help from another person who will rapidly respond to incidents requiring intervention will bolster their sense of security and satisfaction from life. This will affect their self-esteem by fostering the feeling of autonomy and, consequently, of self-worth and self-determination.

If telemedicine devices meet the needs of the elderly and their caregivers in terms of the functionalities they offer and their simple, attractive forms that encourage daily use, they may promote quite a new experience of aging. The improved opportunities for living on one's own in one's familiar environment, coupled with the awareness that one's vital functions are systematically monitored, can be reasonably expected to reduce people's fear of helplessness, disability, and suffering alone in oblivion. Importantly, telemedical devices can also contribute to eliminating "indirect discrimination" by buttressing seniors' right to live independently as long as possible and by bolstering the quality of their daily functioning. In this way, telemedicine devices may influence the "successful aging" rate in Poland, as they offer their users the paramount value of autonomy and self-reliance (adjusted to their health status).

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[i] The research sample included 63 respondents: 42 females and 21 males. As some survey questionnaires were incomplete (some respondents passed over some questions), 60 surveys were selected (30 filled in by the seniors and 30 by their caregivers) to ensure the comparability of results. Females accounted for 66.66% of the total sample, and males for 33.34% thereof. The age distribution within the senior sample facing problems in daily functioning was as follows: people aged 56-65 years old made up 40% of the sample (12 people), respondents aged 66-75 years old formed 33.34% of the sample (10 people), and individuals aged 76 years old and older accounted for 26.66% of the sample (8 people). As for their caregivers, 16.66% were people younger than 29 years old (5 people); 33.33% were caregivers aged 30-40 years old (10 people); 16.66% were individuals aged 41-55 years old (5 people); 20% were caregivers aged 56-65 years old (6 people); 10.02% were people aged 66-75 years old (3 people); and 3.33% were individuals aged 76 years old and older (1 person). In both samples, the majority of the respondents had university-level education (23 people in each group, 76.66%) or secondary education (6 people in each group, 20%). One person (3.33%) had trade-school education.

[ii] The survey carried out in the third phase of the research study stirred so much interest among the respondents that ¼ of the sample asked the Author for very detailed data about the foreign telemedicine technologies and devices which are already available on the market. In their opinion, such devices can significantly improve the quality of functioning and security of both the cared-for and the caregivers.

Being "Eco" As the Future for The Cosmetics and Household Chemistry Market in Poland. The Preliminary Research

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Abstract

Purpose. The aim of the article is to learn the behavior and opinions of consumers of the cosmetics and household chemistry market in Poland. **Methodology**. Our analysis is based on data collected by survey method. In the analysis we use the data provided by 222 respondents – the consumers in Poland. The survey was created by the authors of the article to find out the opinions and behavior of respondents regarding pro-ecological behavior while shopping in the cosmetics and household chemistry sector at the end of 2019. Descriptive statistics and graphic data presentation were used to present the research results. **Findings**. Research results have shown that Poles are very environmentally aware and implement many behaviors in their daily lives in order to counteract climate change. 85% of respondents declare their willingness to buy cosmetics and environmentally friendly household chemistry. As the most important product feature, determining the choice of cosmetics and household chemicals, respondents indicated the composition of the products offered. **Originality/value**. This paper makes two major contributions to the literature and business practise. First, it presents possible green activities on the cosmetics and home chemistry market. Secondly, it presents consumer opinions on the demand and criteria for selecting this kind of products in Poland. This analysis may be the basis for building production, promotion and sales strategies for enterprises operating on the cosmetics and household chemistry market in Poland.

Keywords. Green marketing, green sales, green products, cosmetics market, eco-friendly consumers, eco-friendly market.

Introduction

In the world, for the last few decades researchers have observed a significant change in the consumer behaviour from choosing products based on its physical attributes such as size, color, flavor or aroma to other important features like environment and health (Kirilenko and Sedjo, 2007). In Poland, the topic of ecology has been treated quite marginally so far, but nowadays disturbing information on the state of the environment and the impending climate crisis is becoming more widely announced. One of the most important documents is the IPBES global report 'The Global Ecosystem Assessment' on biodiversity of nature (https://ipbes.net/global-assessment) presented in May 2019 in Paris, stating that the current rate and scale of extinction of millions of species of plants and animals have never been observed before. This report has been widely commented on in the media, and it can be assumed that it has significantly affected Polish consumers. As a result, the producers' market faced implementation of changes.

21st century consumers are becoming more and more conscious of the products they purchase. They have become more informed buyers, for whom not only price is the main criterion for selection. They make more rational and thoughtful purchases, and with certain groups of products, they become less receptive to advertising. At present, producers need to have some added value that will allow them to

distinguish themselves from competitors. It becames common among consumers to expect companies to be involved in local affairs or global issues, especially those regarding the environment (Kantor and Hübner, 2019). Consumers play an important role in the exploitation of the environment. They purchase products, so they have an impact on the resources consumed or the devastation of the natural environment (Witek, 2017). Due to striving for rational use of natural resources, the desire for ecological consumption has developed (Angowski and Domańska, 2016). They begin to be interested not only in the price of the product, but also in its composition and how it was produced and what impact it has on the environment (Baer-Nawrocka and Szalaty, 2017). It has led to creation of a new category of consumers who have started working on to find out ways and means to at least mellow down the effect of climate change. We call this category of customers as the eco-friendly consumers (Kirilenko and Sedjo, 2007).

At the same time, market behavior of many companies, including those from the cosmetics and household chemistry sector, shows that they are taking more responsibility for the effects of their actions on the environment. Frequently, the implemented solutions are innovative, and as such they contribute to image building of modern, pro-ecological and socially responsible enterprises. It can also be seen that companies effectively use pro-ecological activities to strengthen their image, and thus – competitive advantage. However, it is worth noting, that more and more introduced changes are obligatory, therefore real competitive advantage should result from activities that go beyond legal regulations (Stefańska, 2016). Continuous dynamic changes are also observed on the Polish cosmetics market. Recent years have brought intensive development and currently the Polish cosmetics market is at the forefront of Europe (6th place). Due to the fact that natural and organic cosmetics, which until now generated about 33 billion dollars of global profit, are gaining more and more interest worldwide, with buyers from countries of North and South America (Brazil), Europe (France, Sweden, Germany, Italy, Great Britain) and Asia (Japan, China and Korea) (Rybowska, 2015), and an increasing number of reports on the state of climate in Poland, it seems reasonable to check current consumer preferences on the cosmetics and household chemistry market in Poland. Therefore the purpose of the article is to learn the behavior and opinions of consumers of the cosmetics and household chemistry market in Poland.

Natural Cosmetics Market in Poland

The cosmetics market that has undergone intense development in the recent years, is one of the largest and most promising ones in the Polish light industry. The value of the Polish cosmetics market in 2016 amounted to PLN 16 billion, while in 2002 it was PLN 9 billion (Report: Branża Kosmetyczna Sektory Banku Zachodniego WBK, 2017). The Polish market has reached this level due to continuous development over the past fifteen years. The cumulative real market growth in this period was 32%, i.e. on average 2% annually, while in contrast, nominal cumulative market growth was as much as 78%. The industry leap is impressive, especially when compared to the situation in other European countries, as Poland is the sixth cosmetics market in Europe and is growing the fastest. This is even more vital because other large markets, such as French and Italian, not only have not recorded increases, but even contracted (by 0.19% and 1.09%, respectively). As a result, the estimated value of the cosmetics market in Poland in 2021 amounted to PLN 20 billion.

Today more than ever, the green trend is a part of the world economy; more and more consumers eat green, drive green cars, use green electricity, wear green clothes and naturally, turn to green cosmetics. According to Euromonitor, the 5% worldwide growth of the cosmetic sector in 2007 was mainly due to the input of green products (Cervellon et al., 2011). In Europe, the market for organic cosmetics is extremely dynamic, with a growth of 20% per year (Ecozept, 2010).

Natural cosmetics account for 4% of the entire cosmetics market in Poland (Report: PMR Rynek żywności bio i kosmetyków naturalnych w Polsce. Analiza rynku i prognozy rozwoju na lata 2019-2024, 2019). Forecasts indicate that this segment will grow dynamically in the coming years, even twice as fast as the entire cosmetics market. The increase in popularity of natural cosmetics is related to, among others, growing ecological awareness of consumers. Consumers try to avoid products tested on animals or those that contain a large amount of chemical compounds. The growing number of people declaring veganism or vegetarianism is also important – this translates not only into diet, but also to

other purchase. In turn, the market for cleaning and washing products in Poland generated revenues of over EUR 1.27 billion in 2018, and according to forecasts, these revenues will increase to EUR 1.34 billion in 2023, which means an annual average increase of 1,7% in 2010-2023 (Report: Branża Chemii Gospodarczej. Wzrost znaczenia polskich producentów na świecie, 2019).

It will also be essential for the industry to keep up with the trend, which in the wide horizon changes the perception of the concept of "health". Nowadays it is not only "lack of illness" but it is associated with the term "physical and mental well-being". This is definitely an area for development by the cosmetics industry, which until now has not been defined in these categories.

The Essence of Being "Eco" In the Cosmetics and Household Chemistry Industry

Green Composition

The market for green products is booming all over the world in a variety of industries. Green product is defined as “one that has less of an environmental impact or is less detrimental to human health than the traditional product equivalent” (Kumar, 2005). The term "eco" is nowadays frequently used by producers in many industries. Many cosmetic products introduced on the market are advertised as natural, ecological or biological. The recognition of criteria and the multitude of signs placed on product packaging results in confusion for both consumers and producers themselves (Pawlik et al., 2017).

Many cosmetics manufacturers advertise their products as "natural", "eco" or "bio", but there are no legal regulations defining these concepts (Kantor and Hübner, 2019). The definition of natural cosmetics turns out to be imprecise, and was only introduced in the Guidelines of the Committee of Experts on Cosmetic Products at the Council of Europe's Public Health Committee in September 2000. Since then, this definition has not been standardized in any document (Platta and Żyngiel, 2014).

As a result, various organizations in Europe have developed and introduced their own certification rules for natural and organic cosmetics. In order to harmonize the definition and production rules of such cosmetics, the main European certification organizations: BDIH from Germany, COSMEBIO & ECOCERT from France, ICEA from Italy and SOIL ASSOCIATION from Great Britain developed common COSMOS standards in 2010 (http://cosmos-standard.org, accessed on: January 25, 2017.) The COSMOS standard distinguishes two categories of products: organic cosmetics and natural cosmetics.

Organic cosmetics should consist of at least 95% of organic raw materials processed by physical methods (e.g. extraction, distillation, drying), including a minimum of 20% ingredients from organic farming, and the presence of no more than 5%. For natural cosmetics, the amount of 5% of synthetic substances is allowed. As fragrances, only natural essential oils can be used in natural cosmetics, while as preservatives synthetic substances identical to natural ones (e.g. benzoic, salicylic, sorbic acid and benzyl alcohol), which together can constitute no more than 5% of the product. Cosmetics that meet the above requirements are marked with the certification organization's name or logo, e.g. ECOCERT or BDIH. The composition of each product must be declared in accordance with the International Nomenclature of Cosmetic Ingredients INCI, while the organic ingredient should be marked with annotation: "comes from organic farming" (Pawlik et al., 2017).

Green Marketing

Due to the universality of the "eco" trend, many companies want to promote their products with its usage. Marketing is a process in which companies are creating values for consumers and build relationships in order to capture value from customers in return (Kotler and Armstrong, 2013). In recent decades, marketing has become a powerful tool that has successfully fueled consumption around the world. However the side effect of such marketing activities is over-consumption and current climate

problems (Sheth and Sisodia, 2006). Therefore, green marketing is more and more frequently mentioned.

Researchers have found a newline of research that has been given various labels, such as ecological marketing (Fisk, 1974), green marketing (Ottman, 1993;), greener marketing (Charter, 1992), environmental marketing (Peattie, 1995), enviropreneurial marketing (Menon and Menon, 1997) or sustainable marketing (van Dam and Apeldoorn, 1996; Fuller, 1999). The first definition related to Green Marketing dates back to 1976, when Hennion and Kinnear highlighted that Ecological Marketing was "concerned with all marketing activities that have served to help cause environmental problems and that may serve to provide a remedy for environmental problems" (Hennion and Kinnear, 1976). Although some authors distinguish these labels conceptually (see, for example, Van Dam and Apeldoorn, 1996), they are normally considered synonymous terms referring to the same field of study: the analysis of how marketing activities impact the environment and how the environmental variable can be incorporated into the various decisions of corporate marketing (Chamorro et al., 2009). The basic definition of green marketing is as follows "marketing of products that are presumed to be environmentally safe" (Mishra and Sharma 2008). That mean, that green marketing is producing and promoting reusable and eco-friendly products (Schiffman and Wisenblit 2014).

Green marketing probably can play some role in, at least, reducing to some extent the impact of climate change since there is sufficient evidence to support the fact that human activities are the major contributors towards climate change. Green marketing is the marketing of products and services in ecofriendly manner. It can be practiced in all the product categories (Kirilenko and Sedjo, 2007).

Awareness regarding green products and green marketing has increased and it is becoming more important as now people are more concerned about their environment and becoming more socially responsible. The objective of green marketing is to satisfy the needs and desires of the customers, and keep the company responsible in maintaining long-term social and environmental gains. All green marketing activities are focused, along with environmental concern, on green marketing (Zulfiqar and Shafaat, 2015).

In the cosmetics and household chemistry market, green marketing activities in Poland so far have been manifesting in communicating the natural composition of products (although it is not always so), in informing about the biodegradability of packaging or offering consumers the possibility of returning the packaging for reuse. However, it seems that these activities will soon be insufficient, because an increasing number of consumers are sensitive to the authenticity of the actions, and not just the "eco" label.

Going forward, if considering this sort of approach, one should bear in mind that (as with carbon neutral) the era of ''little things that make a big difference'' has probably passed. It is a fallacy that we can avert a global climate change disaster without significant change (Grant, 2008). To have any chance of success, green marketing needs to use the existing structures and thinking, to ensure environmental issues become a core component of how the markets and marketing operate. Marketers need to broaden their activities, creating alternative ways of presenting value and costs, changing the way businesses talk about human interactions and the environment, and reframing consumption from a focus on acquiring goods, to ways to sustainably achieve desired satisfaction (Polonsky, 2011).

When considering the relationship between ecological activities and strategies of commercial enterprises, it is worth mentioning the phenomenon of "greenwashing" (Lyon and Montgomery, 2015). "Green window dressing" or "green lie" include, among others, the use of a positive pro-ecological image of products to strengthen the company's image, while not complying with the overall strategy of the company, which is not based on the concept of sustainable development. There are fears that the pro-ecological strategy of enterprises may be misued in order to create the halo effect, i.e. extending the pro-ecological image to products or enterprises not authorized to do so. It is worth emphasizing that trading companies can fulfill the aforementioned role of "green gate keeper" and limit the phenomenon of producers' greenwashing, especially since in the case of "falsification of the product image" the image of retailers would also suffer (Stefańska, 2016).

Green Sale

To be able to speak about the complementarity of the company's activities in the field of ecology, apart from the product and marketing activities, it is very important to conduct sustainable sales. First of all, it can rely on sales promotion (price discounts, free samples of goods and others), which is designed to accelerate consumer purchasing decisions by offering them immediate or deferred benefits. Thanks to sales promotions, many customers will come into contact with an eco-friendly product or service for the first time, try them out and may repeat such purchases in the future. Authentic satisfaction with this type of goods will cause consumers to issue positive opinions about them in their environment. This can be an incentive to buy this product for others and it may increase the number of consumers who choose environmentally safe products (Pabian, 2015). A company that wants to conduct truly sustainable sales should also conduct consumer education, focused on the goals and assumptions of balanced development, as well as on the implementation of the principles of sustainable consumption in everyday life (Kobylińska and Zbierzchowska, 2011).

Many researchers are also currently dealing with the issue of selling methods in the context of minimizing the carbon footprint. Some retailers and also researchers have been actively claiming that internet shopping yields environmental benefits (Rotem-Mindali and Salomon, 2007). Equally, consumers seem to have a widely held view that online purchases and home delivery are beneficial to the environment because they reduce personal travel demand (Matthews et al., 2001). However, a review of literature studies and research conducted by Halldórsson, et al. shows that this is the case only if more items are purchased in one shipment (Halldórsson, et al., 2010). For this reason, sellers wishing to act in accordance with the principles of sustainable sales, should promote purchases of more items during one-off purchases.

Another important issue in the context of "green" sales is the packaging of the purchased goods both in traditional sales and e-commerce. Just a few years ago, shopping bags (most often referred to as "plastic bags") were added, free of charge, in stores to the purchased good while shopping (Żakowska, 2007). Since legal regulations in this area have been put into force in Poland (last consolidated text, Journal of Laws 2005, No. 175, item 1458, as amended), sellers have been legally obliged to record the amount of plastic bags disposed of and the recycling fee (Zarębska, 2013). Therefore, an increasing number of sellers are choosing paper or cloth bags – which are reusable. The situation is similar in the case of the thinnest plastic bags used for products by weight – more and more often manufacturers offer reusable material bags as an alternative. The same rules apply to e-commerce enterprises, including online stores in particular, because for these enterprises all waste management activities are, in principle, the same as for traditional trade. The difference is that virtually every order in e-commerce involves the need to package the product, which is why waste management and packaging in particular, is especially important in this form of business. Each stage of product logistics, from the manufacturer, through the online store to the final buyer, involves the use of packaging. Some packaging, due to its specificity, can be used only once, then becoming waste, an example of this would be stretch film (Łagutko et al., 2018). Therefore, e-commerce stores wishing to operate in accordance with the principles of sustainable sales, are trying to use recycled cardboard, paper adhesive tape in their packaging, and use e.g. a scraper or paper as a filling.

Research Methodology

Data Sources

Our analysis is based on data collected by survey method. The survey was created by the authors of the article to find out the opinions and behavior of respondents regarding pro-ecological behavior when making purchasing decisions related to the cosmetics and household chemistry sector at the end of 2019. The survey consisted of 10 questions, 4 of which concerned metric data, and 6 were the actual questions in which the respondents were asked:

- whether they are afraid of a potential climate disaster,

- whether they implement pro-ecological behavior in everyday life,
- what features they take into account when choosing cosmetics and household chemistry,
- if they would choose cosmetics and household chemistry limiting their harmful impact on the environment.

Selection for the study was convenient. 222 people took part in the study, of which nearly 70% were women (155 people) and 30% (67 people) were men. This result indicates that, most likely, women in households buy cosmetics and household chemistry. The surveyed population consisted of 35 people (15.8%) under 20 years of age, 29 people (13.1%) people between 20 and 30 years old, 124 people (55.9%) people aged 31-40 years, 28 people (12.8%) aged 41-50 and 6 people (2.7%) over 50 years of age. The vast majority of the surveyed sample were residents of large cities with more than 500,000 inhabitants. In the research sample they constituted 112 people, which is more than half (50.5%). 29 (13.1%) people from the sample live in cities with 100-500 thousand inhabitants, 50 people (22.5%) live in cities between 10,000 and 100,000 inhabitants, and 31 people (14%) from cities inhabited by less than 10,000 citzens.

Research Results

The first question that the respondents were asked, was about their awareness of the risks of climate change and how much they care of it. Respondents' answers presented in Figure 1 show that as much as 93% of respondents are somewhat to very highly concerned about climate change, of which 68% are highly and very highly concerned. It could indicate that the ecological awareness of Polish society is increasing and that they are aware of the consequences of not counteracting climate change.

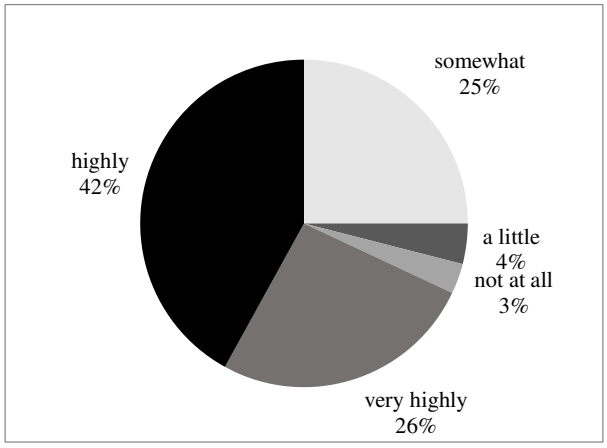

Figure 1: Respondents' level of concern about climate change

Source: own study

Another topic of interest of researchers was whether and to what extent respondents care for ecology in everyday life (e.g. by segregating garbage or using reusable shopping bags). The results presented in Figure 2 show that 67% of respondents do this often and very often. In addition, as many as 29% use this type of practice with moderate intensity, and only 7% do it rarely or not at all. These results may indicate that Poles are not only aware of the state of the climate, but also try to implement remedial behavior in their daily choices.

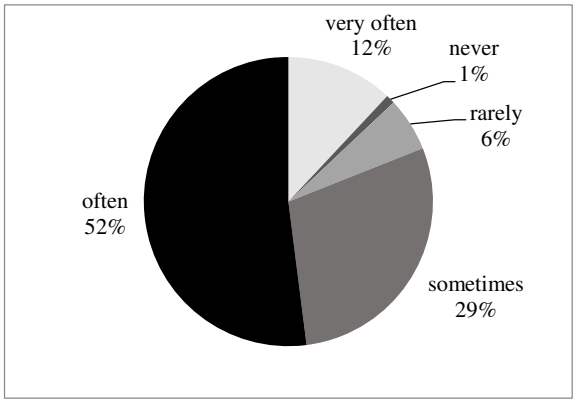

Figure 2: Frequency of everyday ecological behavior implemented by respondents
Source: own study

To have a bigger picture of the situation, researchers asked the respondents if they sometimes choose a less favorable, but more environmentally friendly solution (e.g. buy a more expensive paper shopping bag instead of a cheaper plastic one; go to a distant cafe, because they do not use plastic straws). The results, which are presented in Figure 3, are also surprising. More than half of the respondents (54%) often or very often decide to choose more environmentally-friendly solutions, even at the expense of their own interests. And only 17% never or rarely choose such solutions. This result may indicate that caring for the environment has become for many people very essential, and they are able to give up their own comfort or material values.

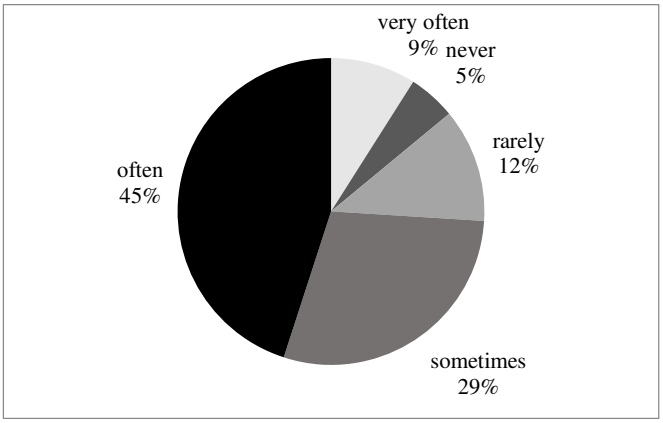

Figure 3: Frequency with which respondents choose less favorable but environmentally friendly solutions
Source: own study

To obtain detailed data on the cosmetics and household chemistry sector, respondents were asked what criteria they take into account when making purchasing decisions in the cosmetics and household chemistry sector (Figures 4 and 5).

The results indicate that both in the case of household chemistry and cosmetics, the most important criterion determining the choice, is the composition. This is important information for producers indicating that consumers are becoming more aware and have knowledge about used ingredients. Therefore, it can be assumed that products with a "better" composition are more popular. In the case of household chemistry, the next features taken into account by the respondents are the price, availability and brand of the product. This may indicate that in the case of household chemicals, products that are

easily accessible and their price is not different from other products on the market. The quality and effectiveness of products were less important in this category.

In the case of cosmetics, it is clearly seen that the aforementioned composition has a decisive influence on the purchasing decision. It seems that the brand, price and availability of products are in this case a less important category. It is also worth noting that in open-ended section in the survey, respondents declared up to 6 times that non-testing products on animals (cruelty-free) is of great importance to them.

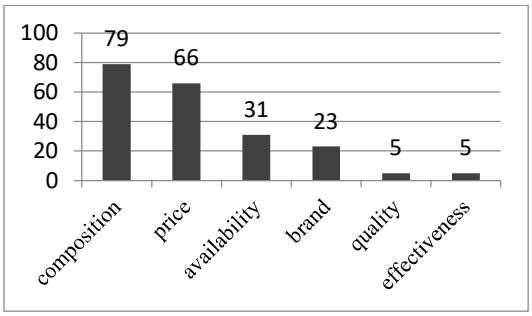

Figure 4: Importance of household chemistry features when making a purchasing decision
Source: own study

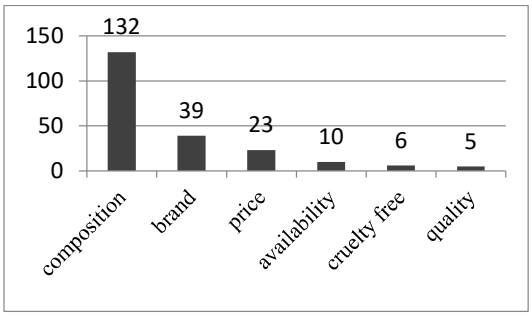

Figure 5: Importance of cosmetics features when making a purchasing decision
Source: own study

To get specific guidance for the household chemistry and cosmetics sector, respondents were also asked whether they would be willing to buy household chemistry products and cosmetics that limit the harmful effects on the environment. The results of their answers, presented in Figure 6, show that the vast majority gave an affirmative answer (85%). This is a clear tip for the industry on seeking competitive advantages.

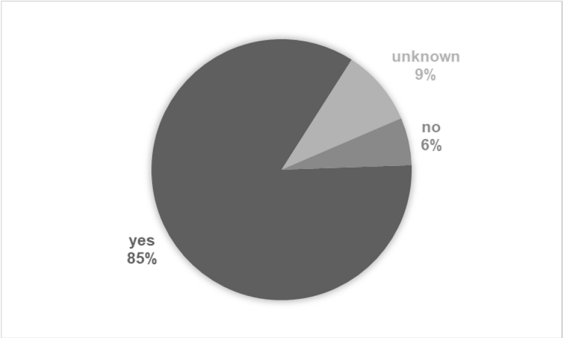

Figure 3: Respondents' opinion on the willingness to buy a product from the cosmetics and household chemicals sector reducing harmful effects on the environment
Source: own study

Conclusions

The cosmetics and household chemistry market has been recently one of the most dynamically developing in Poland, therefore it is worth thoroughly analizing the needs of consumers in order to be able to develop a solid competitive advantage. It was the strongest motivation for the authors to address this subject. However, it is necessary to mention that in our empirical research the sample has not been tested for representativeness. Moreover, our research has in fact a pilot feature. Consequently, the obtained findings should be treated as a contribution to an in-depth discussion in this area.

The research results presented in the article showed that Poles are becoming more and more aware of climate change, which has an impact on their purchasing decisions and behavior. Understanding the opinions and expectations of consumers in this area, it can and should become the basis for building production, promotion and sales strategies by companies operating in this market. Consumers, in addition to the features they expected from traditional products on the market (such as price, brand, availability or effectiveness), pay more and more attention to "good" composition, and non-testing on animals. Therefore, it appears that market success requires taking this information into account and responding to consumer needs. However, to get a full picture of the situation, extended research in this area would be worth conducting, which will not be based only on the respondents' declarations, but will track their real purchasing choices.

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Referneces

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Impact of Production Automation on Product Quality in An Automotive Company

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Abstract

The purpose of this work was to analyse the quality of the product made by hand with spot welders and to analyse the quality of the product made by the industrial robot "Fanuc Robotics S-420i". The product was a front panel of the car body, made of semi-finished products in the process of spot welding. In conclusion, it was stated what is the impact of production automation on the quality of the product. Applications of robot welding process are used not only because of better quality parameters, but also due to significant reduction of production costs and less fatigue of employees. The robot operator is a quality controller and contributes to quality management.

Keywords: production automation, product quality, industrial robots

Introduction

The quality of products delivered to the market is currently determined and assessed by an increasingly demanding customer, forcing companies to increase the effectiveness of their operations (Abramson 1999). The customer more and more often demands diversified products, fulfilling many functional and safe functions even in extreme conditions. Among such competitive criteria as cost, flexibility, speed, reliability and quality, quality is becoming a priority. What are the benefits of automation of production in this respect? Is automation necessary for companies? Will manual work be a thing of the past? Why do people want robots to replace their work? Such and many questions arise in the modern world.

The modern economy operates in the industrialised, technical and technocratic world, where it seeks to make robots work for people - and people will only manage them (BORCZYK 2003: 14-15). Robots will do hard work for people, and they can do something else. But will they do it right? Will it be a qualitatively more reliable product? Surely robots are more efficient, more resistant to fatigue, they are faster. But will they improve product quality? Doesn't manual work seem more accurate,

qualitatively better and more precise? These and other questions are answered in this work. It wasn't the quantity, productivity or production costs that were the subject matter of the work, but the quality of the product, a specific product for the automotive industry - before and after automating the workplace (Bigvand, Fay 2017).

In practice, robotics is used in many economic locations, be it in the agricultural industry (Lowenberg-DeBoer, Huang, et al. 2020), whether it also affects the way employees are employed (Daron, Restrepo. 2019). Therefore, no matter where automation is applied, it is important that it usually has positive effects on economic growth (Alpeeva, Volkova 2019). The product described is not a decoration, but it is a part of a car body intended for the automotive industry. So the most important thing here is the quality of durability, reliable, which depends on our health and life. Improvement in quality is noticeable in Japan. Newer and newer industrial robots are used in production, not only to improve productivity, but also quality (Panchev 2017: 484-487). Robots produce machines, machines produce goods, man as a consumer evaluates the quality of products and tries to improve it, but not by directly affecting the product, but by improving the machine (Witting 2005).

A modern organisational unit bases its market competitiveness and survival in the market on an information system in which information determines, among other things, the efficiency of logistics management and is the driving force behind logistics strategy. The information needs have led to the creation of an information system that provides continuous access to up-to-date, accurate and truthful information. An information system includes information resources and those elements which enable the power supply, maintenance and provision of those resources to the user. An information system in which information technology is used to acquire, collect, process, and transmit information is called an information system (Knapiński, Pietras 2017).

In order to make the most of these technologies to significantly accelerate the development of manufacturing companies and increase competitiveness in the global market, a new paradigm is being discussed worldwide. Industry 4.0 or the fourth industrial revolution are just some of the terms used to describe the phenomenon of extensive implementation of intelligent devices on production lines that can communicate autonomously along the value chain (Dendera-Gruszka, Kulińska 2018). In this approach, machines and programs collect information on an ongoing basis to automatically improve their configuration and provide valuable indicators and calculations to help employees make quick decisions and deliver better quality goods and services. Industry 4.0 in technological terms is a group of modern and developing technologies which are the basis for the changes currently taking place in manufacturing industry (Graham, Burns, et al. 2019). Previously, companies used preventive maintenance methods, rules for servicing machines at regular intervals or reacted when a breakdown occurred. A predictive maintenance method can be used in a factory equipped with intelligent technologies (Kubińska-Jabcoń E., Niekurzak M. 2019).

The aim of this work was to compare the quality of the product made by hand spot welding machines with the product made by the industrial robot "Fanuc Robotics S-420i". The product was a car body front panel, made of semi-finished products in the spot welding process. The research methods used in this work were: observational methods, methods of analysis and logical construction and comparative methods. The research was carried out in the Opole automotive company in 2017-2019.

Methodologies for Quality Measurement

Reliability assurance is a series of activities that ensure that the product reliability requirements be realised in a product life cycle. However, as reliability assurance activities are usually only implemented in design and usage, the integration of reliability assurance with quality control in production has not attracted the attention it deserved, thereby hindering production performance improvement to satisfy increasingly stringent customer requirements (Yihai, Changchao, Zhenzhen, Jiaming 2018).

The first difference between quality assurance and quality is the difference in importance for the customer. Quality, high quality should, in the customer's understanding, be associated only with his full satisfaction with the purchased product (service) and entail other benefits such as: (Dahlgaord, Kristensen, Kanii 2001: 26) reliability, speed of service (delivery), appropriate price/goods ratio, warranty, etc. As regards the concept of quality assurance, it is possible to talk about the customers' (recipients') trust in a given company, brand or type of product (so-called steel, loyal customers). The second difference - when using the concept of quality we always refer to a specific product, good, service or contract. And quality assurance usually refers to the company, plant - generally the organisation. The third difference - the highest goal for quality is to produce only good, compliant products - a requirement that generally stems from the previous differences, i.e. achieving the goal: "zero errors", "zero defects". The highest objective for quality assurance is the state of a well-organised organisation, i.e. "no conflicts", where employees will be satisfied with their work both materially and immaterially (the need for respect, self-fulfilment, being in a group, achieving success, etc.). In order to be able to realize such an ambitious task set for the company, which is management through quality, one should take a serious interest in the implementation of the quality assurance system according to the international ISO 9000 series standards (Doroszewicz 2002). Although these are not obligatory standards, they are becoming more popular in Poland, where since 1990 about 1000 certificates confirming the compliance of the quality assurance system with the chosen model of the standard have been granted. The collection of ISO 9000 series standards constitutes a series of standards that can be divided into those related to internal quality assurance (ISO 9004 family) and external quality assurance: ISO 9001, ISO 9002, ISO 9003. The ISO 9000-1 standard, as a basic standard, is a set of guidelines to facilitate the selection of the right model for a quality system in a particular company (Ciepiela, Kozioł 1978).

In the last years of the 20th century, societies of technologically and civilizatically developed countries have been experiencing radical changes, referred to as global information society or "third wave" society. From the economic point of view, new technologies are of particular importance, especially information technologies (computerisation, automation and global information networks eliminating the distance barrier, knowledge is becoming the main production factor). The problem of ownership and supervision of knowledge, which is the main "device" and the driving force behind the development of societies, has become important. New knowledge-absorbing organisations are emerging and centres of economic attractiveness are moving towards places such as the "Silicon Valley". Information is one of the most important factors of production, as before, capital and labour. The growing importance of knowledge, which is becoming the most important factor of the new order, has led to the identification of so-called knowledge-absorbent sectors of the economy. Radical restructuring has begun - traditional and non-organic sectors are disappearing and new types of industrial production (computer, electronic, biochemical, aviation) are emerging (Gołębiowski, Janasz, Prozorowicz 2002: 192).

The growing importance of knowledge is particularly evident in natural sciences (new discovery in astronomy, physics, mathematics, biology or chemistry) (Mas-Tur, Modak 2019). Knowledge as a production ingredient has led to the fact that white-collar workers are the most important in a company: scientists, engineers, technicians, programmers and managers (Ivanov, Das, Cho 2018). The choice of the model of the quality system should depend on the functional and organisational capacity of the company in relation to the manufactured products or services. The basis for building such a system may be the requirements of one of the models of quality assurance systems:

a) ISO 9001 - model of quality assurance in design, development, production, installation and service. The quality assurance system is appropriate for companies offering products, which from design, through the production cycle to service are created in this organization,
b) ISO 9002 - model of quality assurance in production, installation and service. The model covering quality assurance in production, installation and service of a company (no design or construction element),
c) ISO 9003 - Model for quality assurance in final inspections and tests,

d) ISO 9004-1 - serves the so-called internal quality management. It contains basic assumptions for the implementation of the quality system understood as: "organisational structure, distribution of responsibilities, procedures and resources enabling quality management". This standard attributes particular importance to the management's declaration to the quality policy: it defines the necessity of involvement of all employees in the quality development process. "We are at the beginning of a new era of human development - the age of quality. The process of its creation is accelerating and irreversible". The higher the quality, the greater the benefits for the company, and thus the fewer faults and higher productivity (Figure 1 illustrates some of the benefits). A satisfied customer "returns", which gives the company a competitive advantage (Fiorino, Barone, et al. 2019).

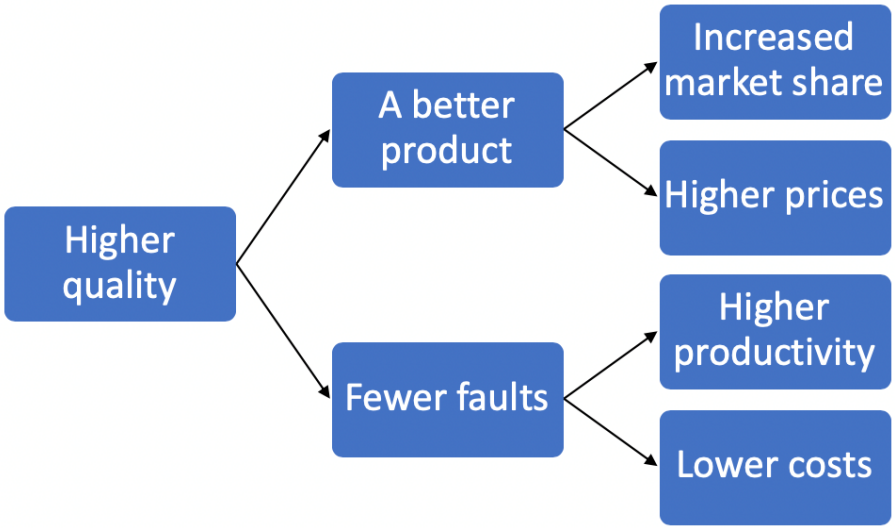

Fig.1: Some benefits of quality management [own study]

Maintaining Product Quality

Maintaining the quality of a product is an integral part of the quality science of product durability from the moment it is manufactured to the end of its use. It includes technical, technological and organisational measures to achieve the objectives during storage, storage, transport and use of goods. It is based on explaining the mechanisms of changes taking place in products, i.e. aging and spoilage of stored goods and developing methods to counteract these phenomena (Kulińska, Masłowski 2018). The notion of quality assurance is formulated in the PN-ISO-8402 standard as "systematic and, if necessary, proven activities carried out under the quality system to arouse appropriate confidence that the facility will meet the quality requirements". Thus, it is a modern field of science and technology involving the preservation of the initial quality of products obtained from natural resources, produced during the industrial process or obtained as a result of agricultural activity in order to extend their desired properties over time (Waluya, Iqbal 2019). The possibilities of modern technology and technology allow for the production of huge quantities of material goods. The mass and high efficiency of production of industrial products, especially regionalisation and specialisation lowering production costs cause that these products, before they reach the final recipient, waiting for possible further processing or delivery, must be in conditions allowing to maintain their initial properties at least during the guarantee period. Currently, technologists have at their disposal highly efficient technologies and air conditioning devices, effective preservation methods, as well as excellent packaging materials, thanks to which there are possibilities to slow down the operation of product degradation mechanisms.

Each product has specific characteristics and is sensitive to specific factors. These characteristics can be called the sensitivity of the product. On the basis of the sensitivity of the product to external and internal factors, it is possible to determine the exposure against which the product should be protected. The physical, chemical and biological exposures are shown in Figure 2. However, only the sensitivity of a product to physical, chemical and biological exposure cannot establish a complete list of exposures against which the product should be protected. This is due to changing product properties and external conditions.

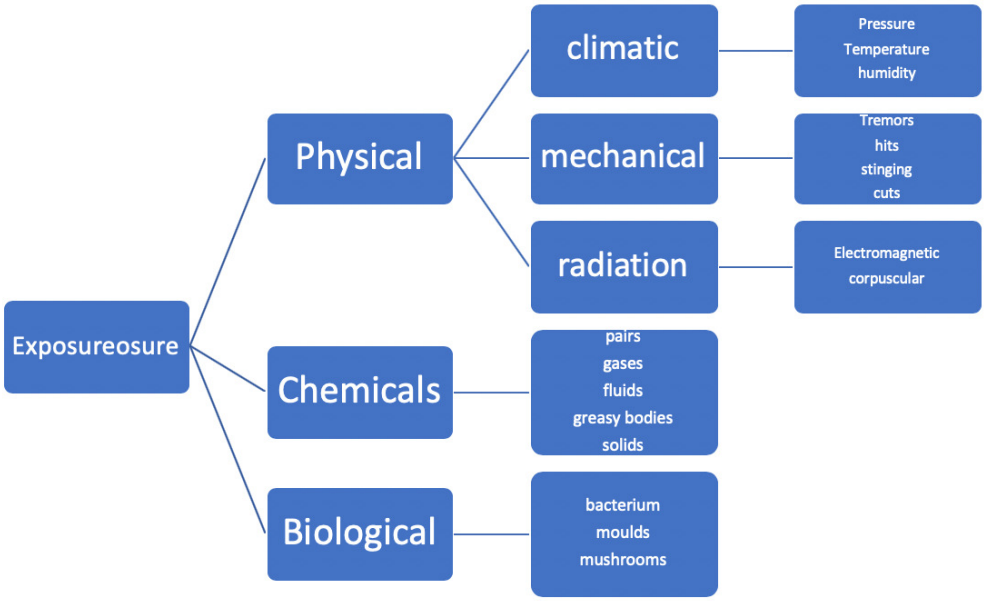

Fig. 2: Distribution of exposures acting on the product [own study]

Indeed, the exposures described may have a negative impact on the product, but when analysing them carefully, it is not difficult to see that the same factors that adversely affect the quality of the product are often used to prolong its shelf life. Pressure (negative pressure), temperatures (both negative and positive), radiation (infrared, ionizing, ultrasound), gases - all of which, depending on the values and conditions, can be used for maintenance or product quality parameters (Witting 2005).

Comparative Analysis

The company, located in Opole, belongs to a global automotive company with its headquarters in the USA. The company produces accessories and car body parts of well-known and valued brands. The location of production plants is strictly dependent on the company's strategy, macro- and micro-environment. The company produces in such countries as: Belgium, Brazil, Canada, China, France, Germany, India, Italy, Japan, Mexico, Poland, Slovakia, Spain, Korea and USA. A characteristic feature of the factory is the specialization in which the company "rotates". The company mainly deals with metal joining: spot and hump welding and MigMag gas shielded welding. Most technological processes are automated.

The analysis has expanded the description of the technological process of the welding station, which is performed by an operator performing welding with a manual welding machine and industrial robot Fanuc Robotics.

Welding is the process of permanent joining of elements without adding a binder. It consists in heating up the elements to doughiness and then pressing firmly. The following types of welding are distinguished: electric, frictional, ultrasonic. In robotics, electric resistance welding is most often used, which, due to the method of obtaining and the shape of the weld (place where the elements are placed), is divided into two: point welding (the diagram is shown in Fig. 3), hump welding (point welding at the projection points), linear welding, short-circuit welding (strong pressure on the elements to be welded) and spark welding (small pressure providing current contact in several places). The application range of resistance welding is very wide: spot welding is used in the manufacture of cars, airplanes, railway cars and metal goods, hump welding - in the manufacture of cars, refrigerators, linear welding - for the manufacture of thin-walled tanks and pipes, short-circuit and spark welding - for connecting railway rails, rebar, chain links, bicycle wheel rims (Masłowski, Kulińska 2018). However, robotized spot welding is used primarily in the automotive industry, in the process of building car bodies (Jezierski 2006: 217). For example, it can be stated that the car body assembly process is robotic in more than 90 %.

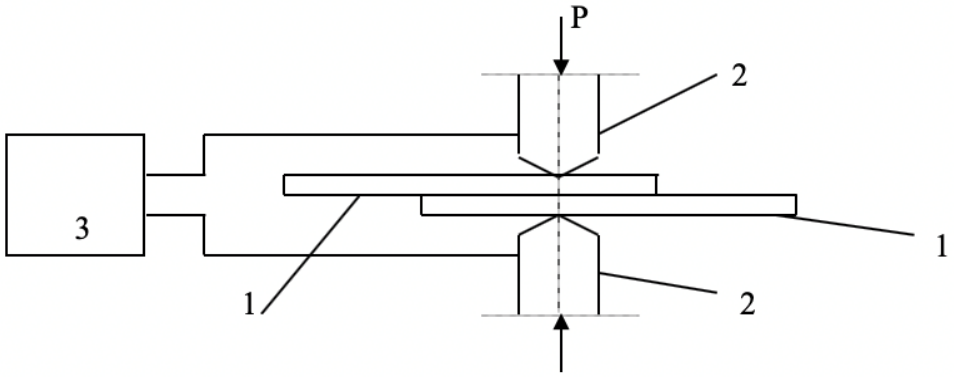

Fig. 3: Spot welding process: 1- connected sheets, 2 electrodes, 3 power source, P- clamping force. [own study]

The spot-welding process is particularly easy to robotise due to the accuracy achieved by the robots and the possibility to perform the welding in any position. Robots used for welding, most often articulated robots, should be characterized:

- a sufficient number of degrees of freedom such that the bend in the required position resulting from the geometry of the welds can be performed,
- working space dimensions to ensure access to all points,
- the required positioning accuracy.

The use of industrial welding robots requires appropriate equipment and above all the selection of a suitable welding machine. To cooperate with the robot, welding machines equipped with the following functions are used:

- microprocessor-controlled power source. After the operator has selected the type of operation of the device and the sheet thickness, the device control system automatically selects the correct current

value and welding time and, if necessary and justified, dynamically regulates these values during the welding process. If the welding current is too low, an acoustic warning signal is activated,
- built-in mains voltage control system recognizing low-voltage states, with automatic measurement and control of welding current. This ensures stabilization of the welding current, multi-programmed correction of the welding current as a function of the number of welds performed, the so-called stepper,
- automatic control of the welding process, especially the clamping force of the electrodes to the elements to be connected.

The company has at its disposal, among others, Fanuc and Motoman robots presented in Figure 4.

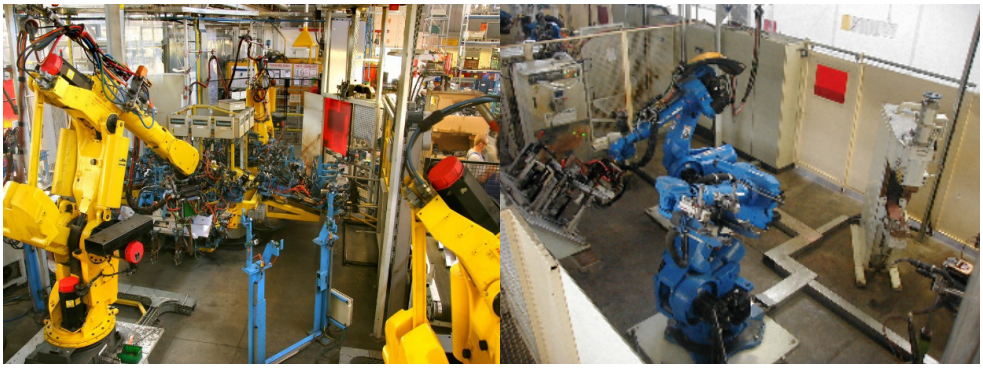

Fig. 4: Fanuc S420iF robot in spot welding process (left), Motoman UP-6 robot with welding, sealing and bonding function (right) [own study].

The company combines metal elements: car bodies, complex structures (front panels, steering rods) and A-class components (doors and accident protection - bumpers). Until February 2007, the factory received semi-finished products from the German factory. After the purchase and launch of the PME 630t progressive press, the company punched the semi-finished products on site, which significantly reduced logistics costs. The figures below show several finished products for the automotive industry manufactured in the Opole company.

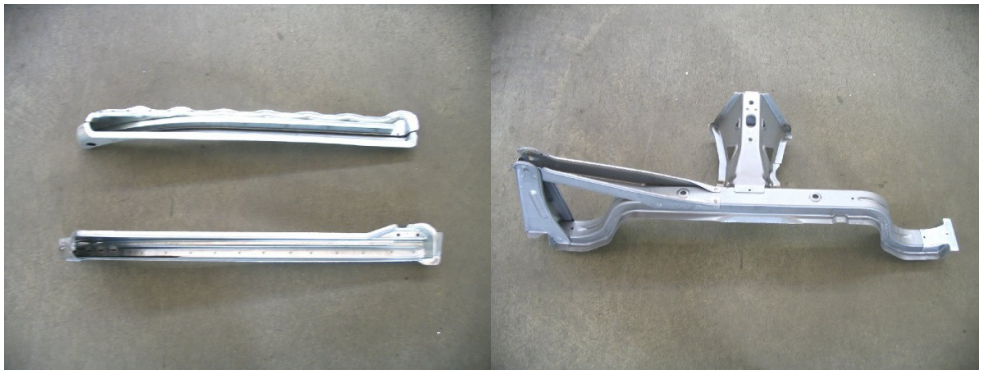

1 2

3 4

Fig. 5: Side door guides (1), Body bracket (2), Fuel tank (3), Rear bumper (4) [own study].

Product Analysis Before Automating the Technological Process

The factory received semi-finished products, which were joined by hand welding machines at 42 welding points. Three employees worked in one shift, performing the standard of 125 front panels (fig. 6).

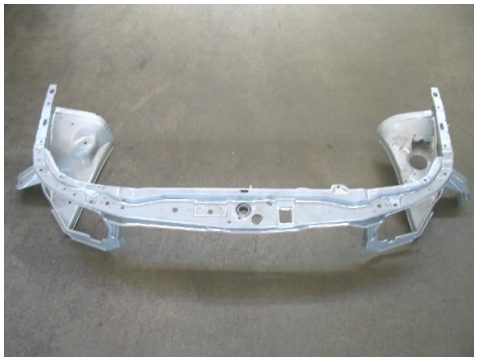

Fig. 6: Front panel [own study]

Figure 6 shows a finished body element for the Opel Astra II consisting of 7 elements - connected by welding machines according to the technological instruction:

A) prior to commencing work, the first shift has inspected the workstation according to the maintenance instructions for Z10,
B) The FT-227 part of the FT-227 is fitted on the fixing studs and closed with a tensioner (Figure 7),

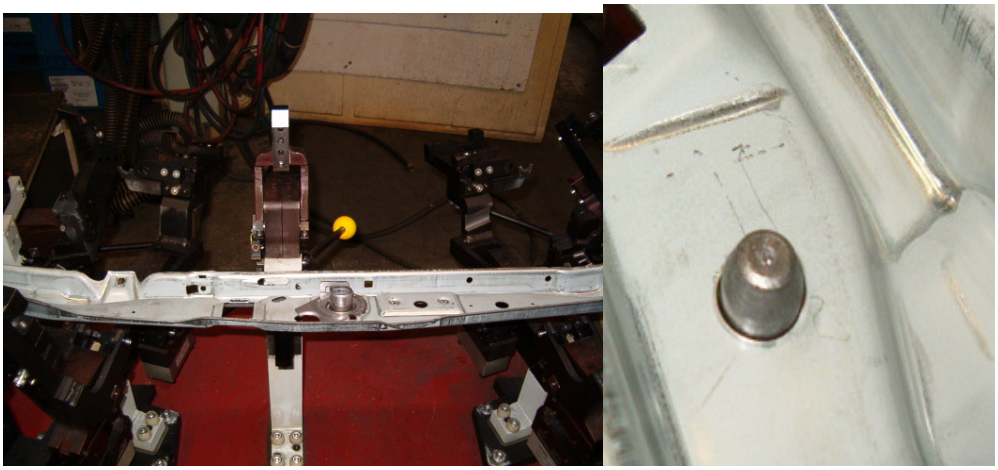

Fig. 7: operation I: the FT-227 part (left), the appearance of the pin that fixes the position of the part (right) [own study].

C) then, on the left side of the instrument, the parts KT-258, KT-262 and FT-225 are inserted (Figure 8). The clamping tensioners were tightened,

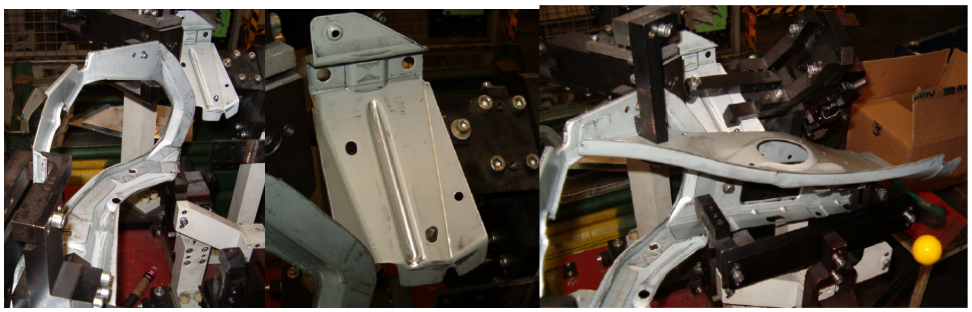

a b c

Fig. 8: appearance of semi-finished products: a) KT-258, b) KT-262, c) FT-225 [own study].

D) the treatments were performed on the right side of the instrument. Parts KT-259, KT-263 and FT-224 have been installed (Fig. 9). The clamping tensioners were tightened,

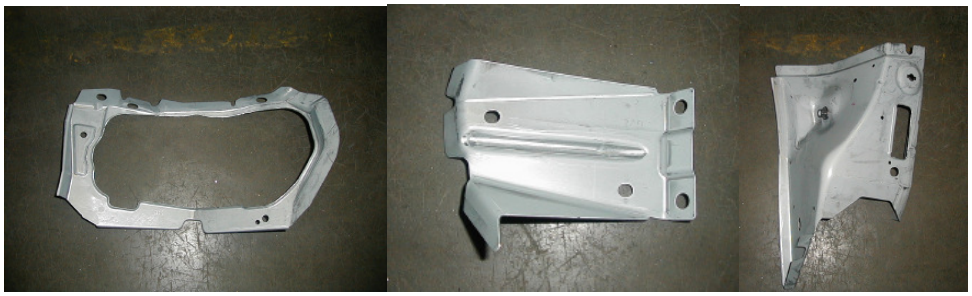

a b c

Fig. 9: appearance of semi-finished products: a) KT-259, b) KT-263, c) FT-224 [own study].

E) welding started with welder A - welder on the left side with horizontal welds (fig. 10),

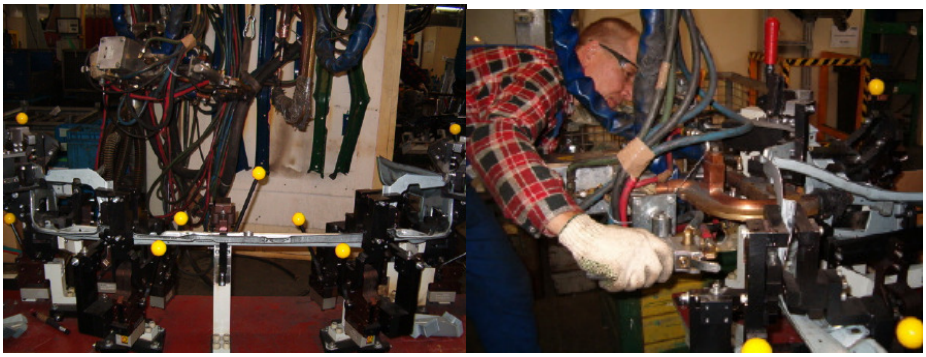

Fig. 10 :Manual welding machine: appearance of the manual welding machine with horizontal welds (left), worker performing the welding (right) [own study].

F) 6 side welds were made (Fig. 11). Then 2 top welds were made,

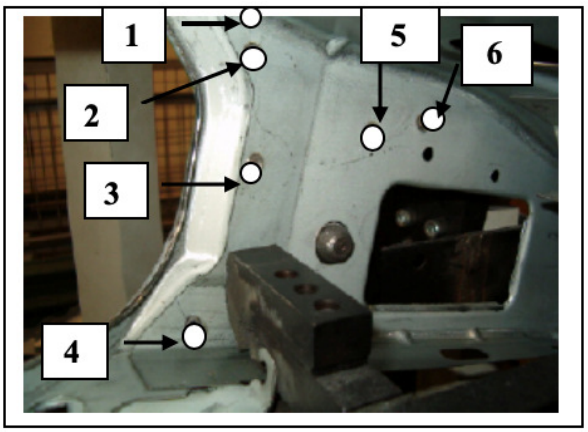

Fig.11: Side welds made with a hand welding machine with horizontal welds [own study].

G) after 8 weldings with welder A, welding with welder B (vertical welder) started. 8 welds were made - 4 on the left side of the FT-227 part and 4 on the right (Fig. 12),

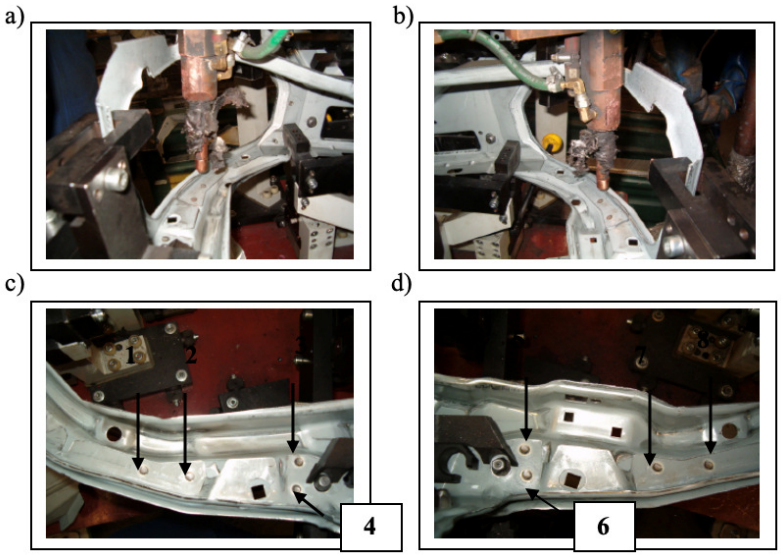

Fig. 12. a) view of the welding machine electrode - working on the left side of the front panel, b) view of the welding machine - working on the right side of the panel, c) view of 4 welds on the left side of the panel, d) view of 4 welds on the right side [own study].

H) after the welder B has been put away, welding with welder C (from an adjacent position with horizontal welds) started. On the right side of the device 5 side welds and 1 top weld were made (fig. 13),

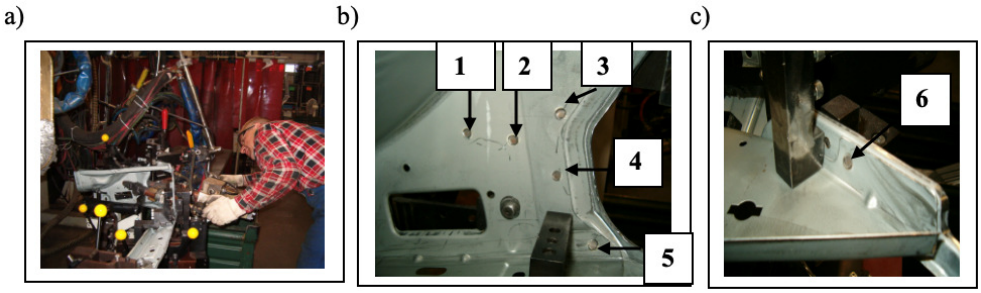

Fig. 13: operation I with welder C: a) worker holding welder C, b) making 5 side welds, c) making 1 top weld [own study].

The total number of welds made in operation I was 22: welder A- 8, welder B- 8, welder C- 6.

I) The tensioners were opened, part of the fixture was removed and handed over to the adjacent position (end of Operation I),

J) the part pre-welded in operation I was taken, placed on the pins fixing the FT-227 semi-finished product (Fig. 14) down, the tensioners were fastened. Welding with C welding machine (with horizontal welds) was started. On the left side of the part 3 welds were made (Fig. 15), on the right side 5 welds were made (Fig. 16),

Fig. 14. Shifting a semi-finished product and starting operation II [own study].

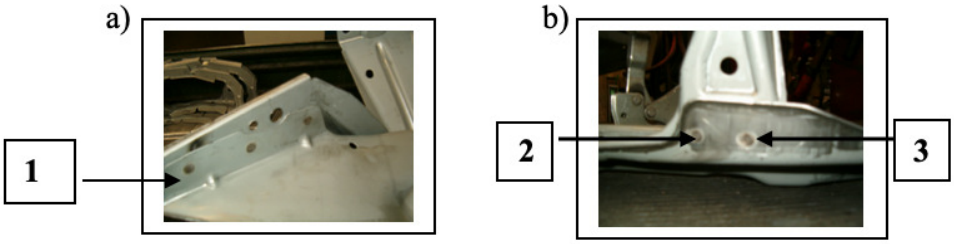

Fig. 15: execution of 3 welds on the left side of the panel: a) view of executed 1 weld at the end of the panel, b) view of 2 welds near the spotlight [own study].

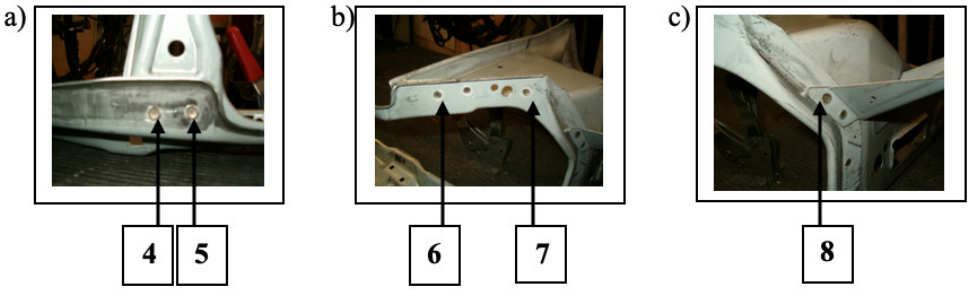

Fig. 16. Making 5 welds on the right side of the panel: a) view of 2 welds under the headlamp, b) view of 2 welds above the headlamp, c) the weld made at the end of the panel [own study].

K) at the end of operation II, the instrument was turned by 180 and 12 welds were made (Fig. 17) with the D welder (with vertical welds),

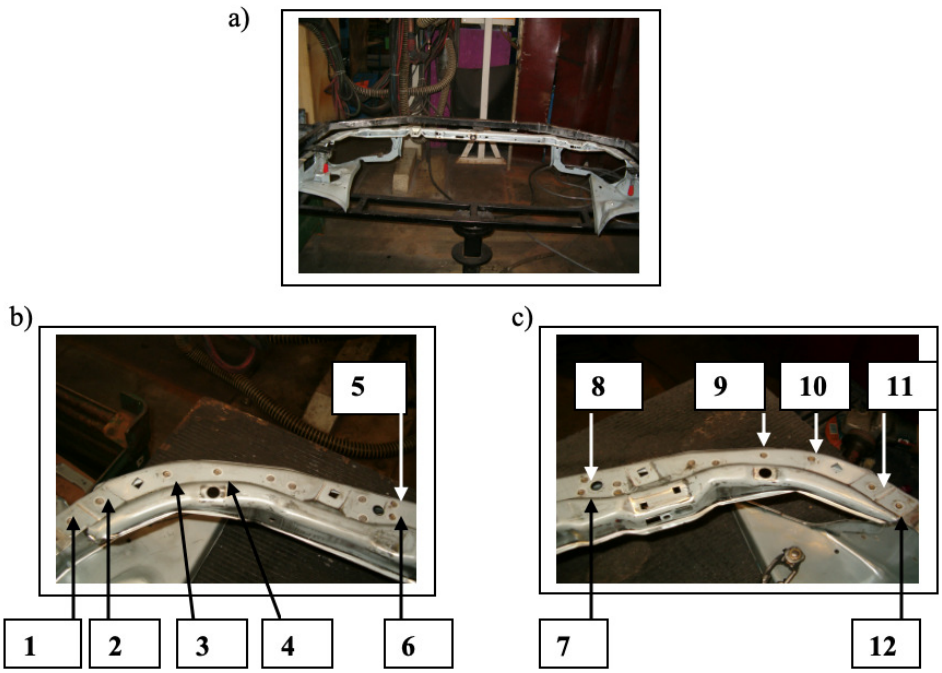

Fig. 17: View of the rotated front panel a) and the arrangement of 12 welds: b) on the left side of the part, c) on the right side [own study].

The sum of welds performed in operation II was 20: welder C performed 8 welds, welder D-12 welds. The welds made by the D welder were checked for burrs. Burrs were removed with a pneumatic grinder.

L) The panel was removed from the instrumentation and controlled according to the self-control card, M) after operations I and II (42 welds in total) the green signal lights were lit (Fig. 18). This is a sign that the correct number of welds on each weld has been made,

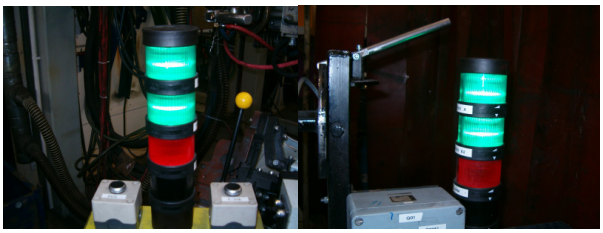

Fig. 18: Lights indicating the correct number of welds made: green light indicating the left side of the device (left), signal received from the right side (right) [own study].

N) packing of the finished product into a container.
The two operations described above were performed by 3 people in shifts, who operated 4 **manual** sealers. The standard was 125 finished elements for the customer. The work before automation was hard, because one sealing machine weighed 150 kg and it was very difficult to reach all sealing

points. There were a lot of burrs that had to be removed. One shift replaced 8 electrodes, which also had to be cleaned after several operations.

Product Analysis after the automation of the Technological Process

After automating the technological process, one employee per shift produced 225 finished elements according to the technological manual:

A) before commencing work, the first shift has inspected the workstation according to the maintenance instructions for Z19 - new panel welding workstation (Fig. 19 - left),

B) the FT-227 part (Fig. 19 - right) is fitted on the fixing studs (Fig. 20) and closed with a tensioner,

Fig. 19: Robotized welding station for the front panel (left) and the first part of the panel fixed with a tensioner (right) [own study].

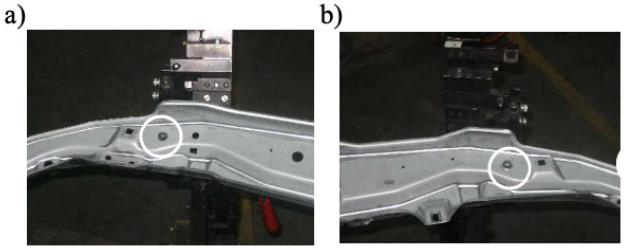

Fig. 20: Positioning pins: a) left hand pin of the instrument, b) right hand pin [own study].

C) Then, on the right side of the instrument, the parts KT-258, KT-262 and FT-225 are put on the fixing pins. The fixing tensioners are closed. Figures 21 show the activities discussed, performed by the station operator,

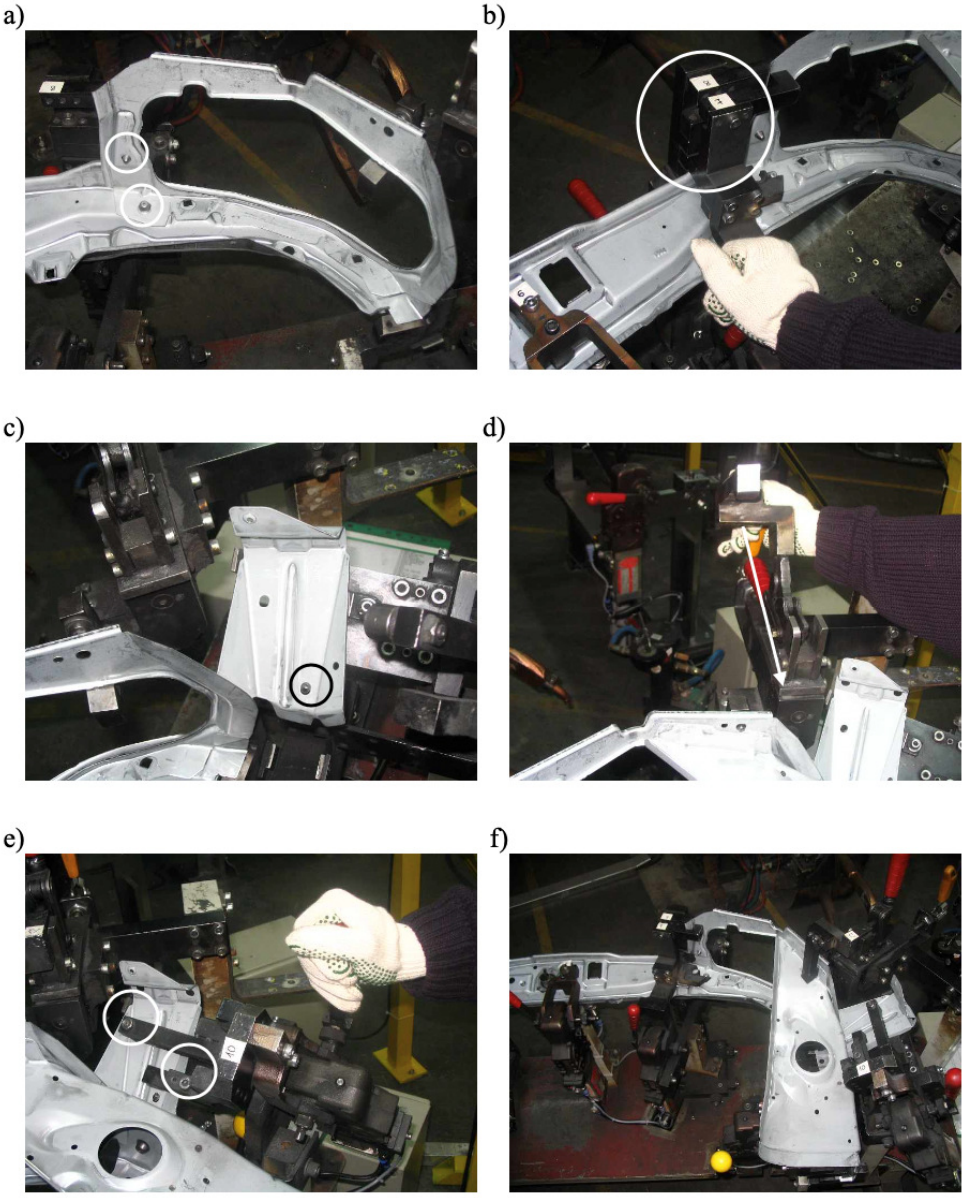

Fig. 21. Fixing the components on the right-hand side in operation I: a) part KT-258 mounted on the position fixing pins, b) fastening of the fastener, c) overlapping semi-finished product KT-262, d) fastening of the panel, e) fastening of the part KT-262, f) overlapping and fastened part FT-225 [own study].

D) after this operation, the parts KT-259, KT-263 and FT-224 were placed on the left side of the instrument. They were pressed with the clamping tensioners - as shown in Fig. 22,

Fig. 22: Fixing the components on the left-hand side in operation I: a) part of the KT-259 mounted on the positioning pins, b) fastening of the fastening tensioner, c) KT-263 overlayed on the pin, d) panel for tightening the KT-263 part, e) properly closed tensioner, f) part of the KT-263 fixed [own study].

E) after all the semi-finished products have been installed, the welding cycle was started by means of a green, pulsating button (Fig. 23)

Fig. 23: Green button on the control panel, indicating that all parts are well fixed and the welding process can begin [own study].

(F) the part pre-welded in operation I was removed. The FT-227 part was placed on fixing pins (Fig. 24 a, b) and the tensioner was fastened (Fig. 24 c, d),

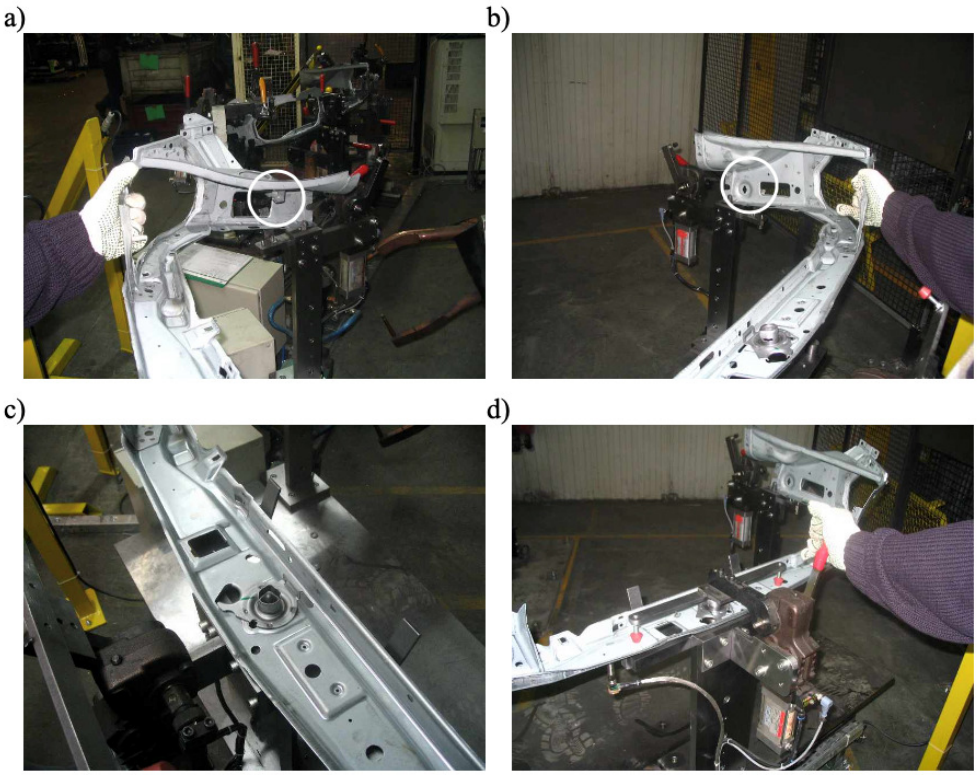

Fig. 24:(a) panel overlayed by left-handed fixing pin, (b) right-handed fixing pin supporting the panel and Operation II: (c) panel turned by 1800, (d) panel fixed with tensioner [own study].

G) The welding cycle is started with the green (flashing) button.

A green flashing button marked the insertion of all components and the closing of all fastening cylinders. If the button did not flash green, the completeness of the components and the closure of all actuators was checked. Information about the problem was shown on the display (fig. 25), and a red light was lit with the word "Alarm" (fig. 26). The "Reset" button had to be pressed at the time of the alarm. If the stand did not react, maintenance had to be notified.

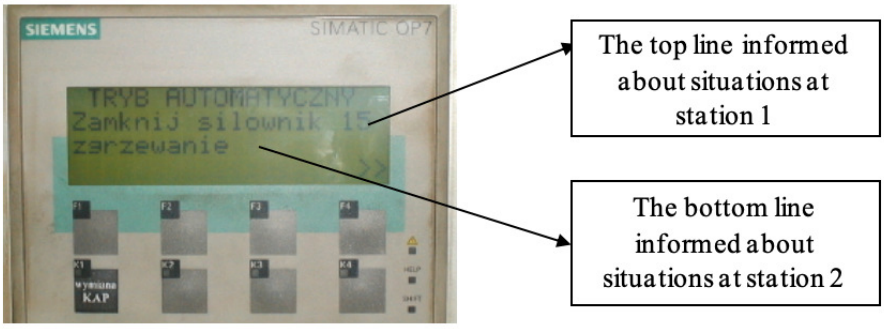

Fig. 25: Siemens display, showing errors made by the operator [own study].

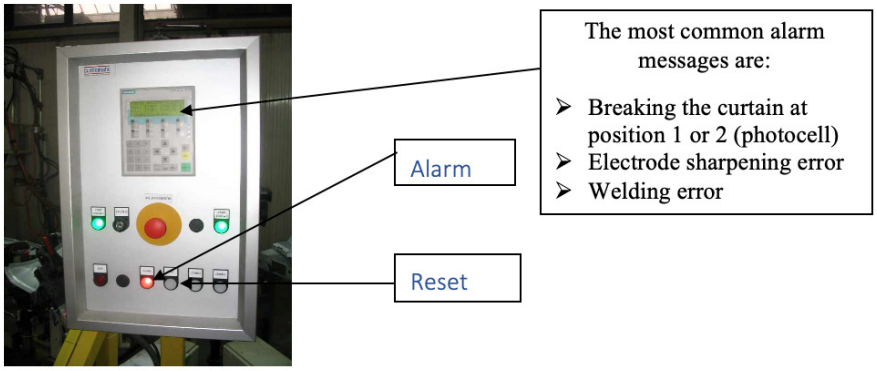

Fig. 26: Operator's panel signaling the alarm [own study].

One employee made 225 finished front panels for the Opel Astra II. There were no burrs (as in the case of manual welding machines) and there were no shortages of material. The Fanuc Robotics S-420i distributed the welds very precisely and had the function of automatically sharpening the electrodes, which used much less.

From the above analysis of the production processes, it appears that there were significant advantages for the product made with the Fanuc Robotics S-420i industrial robot, because:
- there were lower production costs (there was one operator working on one shift, who made 225 finished elements, rather than the previous one - 125 elements made by three employees),
- less fatigue of employees (one welding machine weighed about 150 kg). Three workers operating 4

manual welding machines, during a shift, made 125 finished parts, times 42 welds, which gives us 1750 welds per person!

- good funnel. A lot of space was taken up by the distribution of semi-finished products for production (near the welding station). In the case of the automated station - the distribution of materials and the production socket was at least 2x smaller,
- Production downtime was almost zero (previously caused, among others, by: frequent replacement of used electrodes or temporary rest of employees),
- very good quality parameters. In manual welding, the welds were inaccurately distributed, there were burrs and the welded joints were not strong enough. There were many material shortages due to incomplete components. There were many returns by customers.

Conclusion

In the analysis of the product and in the conclusions it can be seen that the product quality is definitely better after using the most modern production technologies. In the automotive industry the most common robotic applications are welding stations. An example of such an application is a station working in the Opole automotive factory, which produces pre-assembled car body parts. This workstation uses an industrial robot Fanuc Robotics S-420i, controlled by an R-J2 controller, together with a superior control unit S7 315-2DP, which - apart from supervising the robot's work - also controls two welding devices. The first device, equipped with 15 pneumatic cylinders, is designed to ensure repeatability of the geometry of the workpiece to be welded, while the second device, equipped with 3 pneumatic cylinders, only immobilizes the workpiece to be welded. The OP7 operator panel is used to communicate with the operator.

Applications of the robot welding process are used mainly due to very good quality parameters, their repeatability and a high increase in production efficiency - which was also confirmed by the described installation. Before the modification, the double stations equipped with a manual welding machine and a welding device with manual clamps that fix the elements to be welded - operated by three employees - achieved an output of 125 pieces of finished components per shift. After modification, 225 finished components are produced in one shift. It should be noted that the robotized station is operated by only one person (employees who are no longer required to operate the described robotized station, after training, have filled the newly created positions). In this way, the efficiency of produced elements per one employee has increased over four times - with repeatable, very good quality parameters.

The basis for the operation of a production enterprise today is to satisfy the needs of customers at the lowest possible price. To obtain a good quality product at a low price, the company should invest in new and improved production technologies.

An excellent example is a company from Opole. After the production processes were automated, production costs dropped significantly. After the purchase of the press, logistic costs dropped. The company achieved four times its productivity, improved working conditions, ergonomics and invested in training. An additional motivator is job responsibility. The robot operator has become a quality controller, the number of deficiencies has decreased, and most importantly, the robot has replaced the heaviest physical work and is not exposed - like a human being - to loss of health or life. There are defects in every company. This includes too high a turnover of workers due to low wages. Tower Automotive Poland, despite the fact that production has quadrupled, has not been able to double its earnings, which can be explained by large technological investments.

Acknowledgment

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Polish Controlling Students' Perception of Accountant and Controller Professions

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Abstract

The study investigates controlling students' perception of accountants and controllers. The research is qualitative and takes a behavioral approach using projection and narrative analysis. The findings show that there is a general agreement among the controlling students that an accountant's work is important, repeatable, rules-based, and scrupulous. The ambiguity of the image concerns accountants' personality (malicious versus majestic) and their position in the company (looked down to versus respected). Nevertheless, the accountant's image among controlling students is, to a large extent, coherent. For the controller as well, people with experience in this position underline a problematic part of his work. There is a general agreement among the respondents concerning the controller's actions and tasks, which are seen as important, information-related, and numbers-focused. Similar to the accountant's image, most disagreements relate to the character of controllers (caring and friendly versus dangerous and double-faced). People with no accountant nor controllership experience tend to perceive them in a more idealistic manner, sometimes regarding them as to be omnipotent or more one-sided, negative way.

Keywords: Behavioral Accounting, Controller, Accountant, Perception

Introduction

The perception of different positions in the company is crucial for potential job-takers. It also constitutes significant research filed for academics. The understanding of the controlling student's comprehension of the accountant and controller's profession is interesting for accounting and human resources management researchers. It can also give fruitful insight for employers, members of accountants' and controllers' associations, and students who plan their careers in accounting or controlling.

There were the number of studies related to the perception, image, identity and stereotype of an accountant, e.g. (Caglio 2019), (Nishiyama et al. 2014), (Dalton et al. 2019), (Dellaportas et al. 2019), (Burns 2007), (Smith, Jacobs 2011), (Malthus, Fowler 2009), (Jacobs, Evans2012), (Nga, 2012), (Czarniawska, 2012), (Sugahara, Boland 2006), (Germanou, Hassall 2005), (Baldvinsdottir et al. 2009), (Gendron, 2014), (Low et al. 2012), (Miley, 2012), (Smith, 2017), (Evans, Fraser 2012), (Wells, 1996), (Parker, Warren 2017), (Wessels, Steenkamp 2009), (Warren, Parker 2009), (Nowak 2019), (Nowak 2017). The studies related to the same aspects of the controller's (or management accountants) profession were scarce (Hiller et al. 2014), (Ahrens et al. 2010), (Lambert 2012).

The goal of the present study is to identify the perception of the accountant's and controller's profession by students of controlling. The research questions are the following:

1) How are accountants perceived by controlling students?
2) How are controllers perceived by controlling students?

The study takes a qualitative, ideographic research approach. The projection technique is used. The Forced Metaphor Elicitation technique is applied.

Research Group and Method

The research group consisted of 15 part-time students of the second year of Master Studies at Wroclaw University of Economics and Business. Accounting was a general field of their study, and they were majoring in controlling. Therefore the group was educated in both accounting and controllership and trained to be accountants or controllers. As the research had a qualitative character, the number of people taking part in the study is sufficient. Among the respondents, there were 13 women and two men, which is characteristic for Poland where the accountant profession and accounting education are feminized a lot, which was investigated by Masztalerz (2018) and Kabalski and Szwajcar (2015). The average age of respondents was 21 years old. The research took place in October 2019.

The respondents' task was to associate the accountant and controller with the animal and explain their proposal of metaphors. The zoomorphic metaphor was used previously in the field of psychology by Woodside (2008).

Research Results

The results are presented in Table 1.

Table 1: Metaphors for accountant and controller and their justifications

No.	Gender	Age	Experience in the accountant's profession	Experience in the controller's profession	The proposed metaphor for an accountant and its justification	The proposed metaphor for a controller and its justification
1	M	23	Y	N	Ant – small, meaningless, hardworking, engaged	Lion – dangerous, unpredictable, ruler of jungle, strives for blood
2	F	23	N	N	Monkey – malicious, petty	Snake- cunning
3	F	23	N	N	Owl – wise, calm	Lemur – a lemur, was the king in "Madagascar" movie, is crazy
4	F	29	N	N	Ant – works a lot, regularly, systematically, does the work which is beneficial for a business unit	Cat – outside kind and friendly, inside searches for an occasion to destroy ☺
5	F	23	N	N	Sloth – calm, self-controlled, anemic	Lion – guards the order, father of the whole company
6	F	23	Y	Y	Ant – many documents to account in a short time, which needs a fast mode of working	Boar (burrowing in the ground) – dismantles everything into constituent parts, searches for details
7	F	35	N	N	Owl – it is widely acknowledged that	Fox – is cunning, inquisitive and capable

					owl is associated with a wise person wearing glasses, thorough who lives to investigate, read, and improve her skills. Owl Is majestic, sits and observes or counts in case of an accountant	of smelling everything out, visits each hole to check if there is anything to eat and to fetch the prey
8	F	25	N	N	Parrot – the accountant's work seems repeatable and possible to train. Parrot has the ability to repeat words.	Falcon, because controller should have falcon's eyes and should be sensitive to details
9	M	22	Y	N	Alpaca – obedient, humble, patient, focused	Llama – curious, brave, territorial, patient
10	F	22	Y	N	Rabbit or hare – is faint, inquisitive, easily adapts to changes on the way (tax changes, etc.)	Lion – is wise and prudent, does not hurry in decision-making
11	F	27	N	N	Fox – smells everything out	Cheetah – precision. Concentration on result, numbers, speed
12	F	24	N	Y	Dog – well trained knows the rules and sticks to them	Fox – has to be cunny, needs to have a lot of information, is not necessarily available, has to manage in difficult situations, and must be fast
13	F	23	N	N	Eagle – watches over the company, everybody feels respect for him, knows what is essential for him to	Badger – hardworking, when controls and spots mistakes and spots them out so everybody fears
14	F	24	N	N	Owl – scrupulous, notes down everything, precise, well-organized	Dog – sniffs everything out, explorer, likes to run a lot and check, curious
15	F	23	Y	N	The dog acts according to patterns and does not rut out of the line; if he lost something, he searches for it until he finds it	Lion – guards his pack and keeps everything in one piece

The most popular metaphors for accountants are ants and owls. Three respondents proposed them. Two people introduced a dog metaphor. Other metaphors recommended by one person only are monkey, sloth, parrot, alpaca, rabbit, hare, fox, and eagle. The narration justifying these metaphors characterize accountants as having many intellectual qualities ("owl – it is widely acknowledged that owl is associated with a wide person in glasses, thorough who lives to investigate, read and improve her skills; “owl is majestic, sits and observes or counts in case of an accountant"; "owl – wise, calm”), working in a very fast and organized way ("ant – a lot of documents to account in a short time, which needs a fast mode of working"; "rabbit or hare – is fast, inquisitive, easily adapts to changes on the way (tax changes, etc.)"), calm (“sloth – calm, self-controlled, "anemic; "alpaca – obedient, humble, patient, focused”), scrupulous ("owl – scrupulous, notes down everything, precise, "well-organized), hardworking ("ant – small, meaningless, hardwiring, engaged”; “ant – works a lot, regularly, systematically, does the work which is beneficial for business unit”). The role of an accountant in a company is perceived as underestimated and looked down on (“ant – small, meaningless, hardworking, engaged”; “alpaca – obedient, humble, patient, focused”). The accountant’s work seems to be repeatable ("parrot – the accountant's work seems repeatable and possible to train. Parrot has an ability to repeat words. "). An accountant is perceived to be humble and obedient (“dog – acts according to patterns, does not rut out of the line”; “dog – well trained knows the rules and sticks to them”; “alpaca – obedient, humble, patient, focused”). He or she is seen as knowing the rules, sticking closely to them and adapting to them (“rabbit or hare – is fast, inquisitive, easily adapts to changes on the way (tax changes, etc.)”; “dog – well trained knows the rules and sticks to them”; “dog – acts according to patterns, does not rut out of the line”). Accountants can be malicious (“monkey – malicious, petty”). An accountant is also perceived as an important, respected person (“eagle – watches over the company, everybody feels respect for him, knows what is most important for him”), characterized even by majesty (“owl – it is widely acknowledged that owl is associated with a wide person in glasses, thorough who lives to investigate, read and improve her skills”; “owl is majestic, sits and observes or counts in case of an accountant”). An accountant is also perceived to be well-informed or able to get the information that he/she needs (“fox – smells everything out”; “dog – acts according to patterns, does not rut out of the line; if he lost something he searches for it until he finds it”). Also, some physical aspects of accountant’s look are given (“owl – it is widely acknowledged that owl is associated with a wide person in glasses, thorough who lives to investigate, read and improve her skills”;” owl is majestic, sits and observes or counts in case of an accountant”).

There is a general perception of an accountant that emerges from the respondent's narration – that accountant's work is important, repeatable, related to knowing and applying the rules, and needing scrupulous actions. The ambiguity of the image is concentrated on the personality of accountants (malicious versus majestic) and their position in the company (looked down to versus respected). Anyway, the accountant image can be characterized as coherent.

The most frequently used metaphor for the controller is a lion (chosen by four people). The second popular metaphor is a fox. Here are also other animals that appear to be associated with controllers: snake, lemur, cat, boar, falcon, cheetah, badger, lama, dog. According to justifications of metaphors, controllers are cunning and clever (“snake- cunning”; “fox – is cunning, inquisitive and capable of smelling everything out, visits each hole to check if there is anything to eat and to fetch the prey”; “fox – has to be cunny, needs to have a lot of information, not necessarily available, has to manage in difficult situations, must be fast”). They are perceived to be dangerous, as well (“lion – dangerous, unpredictable, ruler of jungle, strives for blood”). Moreover, controllers are seen as unpredictable (“lion – dangerous, unpredictable, ruler of jungle, strives for blood”; “cat – outside nice and friendly, inside searches for an occasion to destroy”). Moreover, according to respondents, controllers are dangerous (“lion – dangerous, unpredictable, ruler of jungle, strives for blood”; “cat – outside nice and friendly, inside searches for the occasion to destroy"; “badger – hardworking, when controls and spots mistakes and spots them out, so everybody fears”). The role of the controller is perceived as a guard of a company (“lion – guards his pack and keeps everything in one piece”; “lion – guards the order, father of the whole company”). Controllers also are viewed as crazy (“lemur – lemur was the king in "Madagascar" movie, is crazy”). Many associations relate to the controller's tasks. Some of them refer to decision-making (“lion – is wise and prudent, does not hurry in decision-making”). Others connect with analytical skills and actions (“boar (burrowing in the ground) – dismantles

everything into constituent parts, searches for details") and concentration on details ("falcon, because controller should have falcon's eyes and should be sensitive to details"). The respondents are aware of the necessity of getting (or rather haunting for) necessary data, which is sometimes difficult to achieve ("fox – has to be cunny, needs to have a lot of information, not necessarily available, has to manage in difficult situations, must be fast"; "boar (burrowing in the ground) – dismantles everything into constituent parts, searches for details"). Therefore controllers are perceived to be curious ("llama – curious, brave, territorial, patient"; "fox – is cunning, inquisitive and capable of smelling everything out, visits each hole to check if there is anything to eat and to fetch the prey"; "dog – sniffs everything out, explorer, likes to run a lot and check, curious"). Moreover, respondents underline a controller's concentration on numbers and results ("cheetah – precision. Concentration on result, numbers, speed"). Sometimes the controller is perceived to be ruthless ("lion – dangerous, unpredictable, ruler of jungle, strives for blood"; "badger – hardworking, when controls and spots mistakes and spots them out so everybody fears").

There is a general agreement among the respondents concerning the controller's actions and tasks. Similar to the accountant's image, most disagreements relate to the character of controllers (caring and friendly versus dangerous and double-faced).

Conclusions and Discussion

The interesting founding is how experience in profession influences the perception of the job. People with expertise in an accountant's work have a more realistic approach to this profession. They see the expectations towards an accountant and disadvantages of his/her work ("alpaca – obedient, humble, patient, focused"; "dog – acts according to patterns, does not rut out of the line, if he lost something he searches for it until he finds it"; "ant – small, meaningless, hardworking, engaged"; "ant – a lot of documents to account in a short time, which needs a fast mode of working"; "rabbit or hare – is faint, inquisitive, easily adapts to changes on the way (tax changes, etc.)").

For controller as well, people with experience in this position underline demanding part of his work ("fox – has to be cunny, needs to have a lot of information, not necessarily available, has to manage in difficult situations, must be fast"; "boar (burrowing in the ground) – dismantles everything into constituent parts, searches for details").

People with no accountant nor controllership experience tend to perceive them in a more idealistic manner, sometimes regarding them as to be omnipotent (accountant-owl is majestic, accountant fox smells everything out, everybody feels respect for owl accountant, controller-dog sniffs everything out) or more one-sided, negative way (accountant-monkey is malicious and petty, cat controller appears to be kind and friendly but inside searches for the occasion to destroy).

What is interesting, the male respondents (who are the minority in this group) perceive the job from the power-submission perspective including fighting element (accountant - alpaca is humble and obedient, accountant-ant is small and meaningless, controller-lion is a dangerous ruler striving for blood, controller- llama is territorial).

The study is consistent with findings of concerning employer-employee relations and its perception by accounting students of IIIrd year of bachelor studies (Nowak 2018). The comparison can be made due to the fact that the present research on the perception of accountant and controller is done among young people who are just starting their professional careers; therefore, they see themselves as present or future accounting employees. Study of Nowak showed that the employee is often perceived as an ant, small fish or bee – quite busy and hardworking, but also underestimated.

The study is also, to a large degree, consistent with the study of the perception of an accountant's job by accounting students of IIIrd year of bachelor studies majoring in accounting performed by Nowak (2017). The owl metaphor is most prevalent in both studies. Also, such aspects of the accountant's intellect as wisdom are underlined. Both studies show that an accountant's work is perceived to be slow, precise, demanding patience, and scrupulous. Also, both respondents group notice such disadvantages of an accountant's work as being underestimated and looked down upon and needing

repetitive actions. Even conclusions about physical appearance (wearing glasses) are similar. Nevertheless, there are some differences. Bachelor students majoring in accounting are more optimistic about the accountant's job and position in a company than master students of controlling. Also, younger and less experienced full-time bachelor students are focusing more than part-time managerial accounting and controlling master students on the observable aspects of the accountant's work and his look.

The results are also consistent with the research of Nowak (2019) conducted among statutory auditors. They also tend to compare accountants to hardworking animals. The ant is popular, but also working ox or horse are the examples. Apart from mentioning hard-work as a hallmark of an accountant's job, also the necessity of obeying rules and adaptation to them is given the important aspect of an accountant's work. Moreover, intelligence and learning capabilities are stressed as the principal accountant's abilities.

The manner in which students perceive accountants and controllers is partly the result of their education. During accounting lectures and workshops, professors focus mostly on rules, guidelines, law. The students usually are assessed by tests in which they are to account for, to perform different accounting operations. The model of teaching is rather unified, and it is based on Polish accounting law and international standards. The teaching pattern is highly defined by the fact that accounting is regulated in terms of by whom and how it should be performed. Therefore animals associated with accountants and the justifications of metaphors focus as aspects such as sticking to the rules, repeatable work, being well-trained.

The controllers are perceived in a slightly different manner by the students. As controlling is not imposed by the law (although it can be forced by headquarters of the corporation), it can be used in a variated way. Students during their education not only get knowledge on different controlling tools, but they also learn a lot about controlling organization, selection of controlling instruments, and their application for various types of business units and organizations. Moreover, they are taught about the controller's job itself and his tasks, and the meaning of performance of this job for the results of a company. Therefore students chose the metaphors showing high importance (e.g., lions) and justify the metaphors by describing different controller's 'tasks (such as dismantling everything into pieces which is characteristic for budgetary control and analysis).

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Consumer Towards New Products on The Polish Market

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Abstract

The purpose of the paper is to present the behaviour of Polish consumers of various consumer sectors towards new products with the emphasises put on the changes in these behaviours in 1995 - 2018. The analyses were conducted in the segments of consumer types resulting from the Rogers' model, i.e. innovators, early followers, early majority of late majority and marauders. The paper presents development of this consumer typology on the Polish market. It is shown that the behaviours of Polish consumers towards new products depend on the basic characteristics of these consumers, such as: gender, age, education and source of income. It is recognised how consumers representing the surveyed groups assess new products offered on the Polish market. The paper presents the differences between the considered consumer groups in terms of sources of information used when purchasing consumer products of various industries. The analysis is based on the results of nationwide surveys conducted in the long term, i.e. 1995, 2001, and 2017-2018. The research results show a relatively higher susceptibility of Polish consumers to new consumer products than the Rogers' model, as evidenced by the greater number of innovators and early followers on the market of each studied product group. Consumer responses to new products clearly vary depending on their age, education and source of income. The typology of consumers observed on the Polish market according to their approach to new products influences their declared evaluations of these products, which confirm more positive attitudes of innovators, early followers and the early majority as opposed to sceptical and even critical attitudes of the late majority and conservatives-marauders. They also differ in terms of the type of information sources from which they obtain information about the market offer of products. This was the basis for the presented in the article, enterprises oriented recommendations, regarding the necessity of marketing activities towards specific groups of consumers differentiation

Keywords: New Products, Consumers-Innovators, Followers;

Introduction

High competition on the modern market is a factor determining or even enforcing the processes of creation of product innovations designed to encourage consumers to familiarize with the offer of enterprises. Innovative dynamism is a feature of modern markets. The process of innovation acceptance by consumer is a special case of market decision making. Considering the length and the course of individual phases of this process, i.e. the cognitive, affective and behavioural phases, the typology of consumers according to the Rogers' model (Rogers 1995) should be indicated. It includes innovators and early followers, early and late majority and conservatives. The course of these phases is the shortest for innovators who, from the very beginning, are positive about innovations, present great interest in them and are ready to accept new products. Early followers need a little more time to collect data about innovations, but they also buy a new product relatively quickly. The decision-making process lasts much longer in the case of consumers belonging to the early and late majority, and even more in the case of conservatives who express sceptical attitudes towards all innovations. The purpose of the paper is to present the behaviours of Polish consumers towards new products in

1995 - 2018 in the segments of the types of consumers mentioned before. The following research questions were formulated:

- what is the consumer typology on the Polish market, resulting from the Rogers' model and what are the changes in this typology in the indicated long term?
- what is the diversity in behaviours of Polish consumers towards new products, depending on the basic characteristics of these consumers, including: gender, age, education and source of income?
- how do consumers representing the analysed groups evaluate new products offered on the Polish market?
- what sources of information are used by innovators and other consumer groups while purchasing products from various sectors?

The analysis is based on the results of nationwide surveys conducted in the long term, i.e. at the beginning of the system changes in 1995, on a population of 1004 consumers, then in 2001 on the population of 1079 respondents and in 2017 - 2018 on the population of 1328 respondents in 10 voivodships selected from 16 voivodships in Poland. The % share of the surveys conducted in each voivodship corresponded to the share of the voivodship's population in the total Polish population. The applied samples are comparable according to the basic criteria, i.e. age, sex, education, place of residence city-village, main source of income and income situation. The study applies the method of quota sampling, while selecting respondents within the above-mentioned groups.

Factors Determining the Adoption (Acceptance) And Diffusion of Innovations

The article assumes that consumer innovativeness is expressed by the tendency to buy new products more often and faster than other people or being more susceptible to new ideas. Various reasons for such innovation are indicated, including the expression of the need for stimulation and search for novelty, as well as the need to emphasize the uniqueness and independence from the experience of others (Roehrich, 2004 p. 671). According to Rogers, consumer sensitivity to innovations can be measured by the number of innovations adopted by them in a given period or by the tendency to introduce change in consumption.

While the adoption (acceptance) of innovation concerns a specific consumer, the diffusion of innovation consists in the spread of innovation on a given market through various (direct and indirect) channels of communication with the buyer. People-to-people contacts, and mutual interactions of individuals generated by reference groups play an important role in this process. The course of this process depends on a number of factors related to product features, consumer characteristics and the patterns of consumption they follow. The impact of marketing factors and information&communication technologies that increase access to information about a new product and stimulate interest in the innovation is also extremely important. The adoption of innovation by a consumer depends primarily on the following factors. (Filser, 1994, Robertson, 1975):

a) the importance of the product in the hierarchy of consumer needs,
b) the level of recognition of the product by the consumer's social environment, especially by the basic reference groups,
c) product prices - in relation to the purchasing power of the consumer,
d) product features that make it distinguished on the market,
e) the nature of innovations and their perception by consumers,
f) the speed of making decision by the consumer,
g) the consumer's propensity to take risks.

Ad. a) The greater the importance of a product in the hierarchy of consumer needs, the greater its involvement in acquiring market information and experiences related to the product, and thus greater readiness to adopt the product.

Ad. b) High recognition of the new product by reference groups shapes positive consumer reactions and accelerates purchase, while giving the product a specific symbolic value.

Ad. c) The high price of a new product in relation to purchasing power of the consumer creates a natural barrier in the decision-making process. This process becomes more complex, and its result depends on the strength of the influence of the level of urgency of needs, as well as the prestigious importance of the product.

Ad d) The product features that distinguish it on the market, such as: complex structure and technological design, explicit symbolic values, a high level of risk to health or life, affect the extension and complexity of the decision-making process regarding the purchase of this product.

Ad e) Decisions to adopt a new product depend on the nature of the innovation and its perception by consumers.

The process of making decisions about the purchase of absolute innovations, i.e. products that meet the needs that yet have not been met is the longest. This is because, while creating new needs, these products lead to fundamental changes in consumption (e.g. personal computer, mobile phone, television, video recorder). In the case of continuous or dynamically continuous innovations, consumer reactions are shaped by the factors corresponding to the specific character of these products. And so in the case of new food products, product quality, price, nutritional value, habit, positive opinion of other customers, information on the packaging, brand, convenience and origin of the product are the most important factors determining the purchase of the product as declared by young consumers are:. (Bartkowicz, 2018).

International studies (World Innovation Panorama, 2015) conducted in key regions of the world (North America, Latin America, Asia, the Middle East, North Africa and Europe) have shown that the dominant trend in food product innovation is the pursuit of pleasure expressed by such product attributes as: sophistication, a wealth of impressions, exoticism and fun. The second most frequent trend in product innovation is "health" highlighted by product features such as: naturalness, medicine and vegetation(Figiel 2017, p.107). These trends in food market innovation are a response to the expectations of modern consumers.

Ad f, g) The pace of diffusion of innovation also depends on such features of consumers as the ability to make quick decisions and to take risks. Certain innate personality traits that predispose consumers to specific market behaviours are usually the basis for these characteristics.

In comparison with "late buyers", innovators are distinguished by a large interest in marketing products, sensitivity to promotion and considerable susceptibility to influence from media. They are more willing to take risks and are less attached to the brand (Schiffman, 2010).

High susceptibility to adopting innovation also results from personality features, as well as from the demographic and social characteristics of innovators. Innovators are usually young, educated, rather wealthy people, of highly prestigious professions.

Trendseters following new market trends, as well as designers and artists who often experiment and strive to create these trends, are characterized by high sensitivity to new products. In turn, celebrities play the role of a medium for communicating consumer trends (Mróz 2013, p. 119).

To determine the level of consumer innovativeness, it is important to recognize the sources of obtaining information about the market offer, including new products. To succeed in launching a new product, it is necessary to communicate with customers at an earlier stage, whereas social media are the best channel of this communication.

Diffusion of Innovations of The Polish Market

The respondents' choice of one of five answer options allowing to qualify them in the appropriate category of consumers more or less susceptible to innovation was the basis for the analysis of this process in relation to the Polish market.

Therefore, the percentage structure of consumers by type of response to these products can be considered as a measure of the diffusion of new products.

Table 1: Consumer behavior towards new products (percentage of respondents)

Types of consumers		food	clothing, footwear	cleaning supplies	cosmetics	household appliances	RTV equipment	tourist equipment	books
Innovator	1995	10,5	15,4	10,3	12,9	6,2	6,9	4,9	30,2
	2001	12,5	14,5	12,4	15,3	6,1	7,3	5,0	26,4
	2017 2018	16.4	20,7	8,1	14,6	10,4	11,0	5,6	29,8
An early follower	1995	25,7	32,5	23,7	25,6	13,8	15,7	14,2	32,1
	2001	28,1	33,6	22,4	22,0	14,5	16,0	11,7	26,0
	2017 2018	30,8	39,4	18,7	20,7	19,7	18,1	15,0	28,7
Early majority	1995	23,3	19,1	29,2	22,6	28,8	28,2	25,2	9,8
	2001	23,5	17,1	29,0	22,9	21,2	20,1	17,6	9,8
	2017 2018	21,2	19,5	29,0	26,1	29,0	30,2	24,9	13,7
Late majority	1995	22,6	17,1	25,9	22,3	36,9	35,3	32,8	11,5
	2001	22,3	16,4	24,7	21,7	39,0	35,9	26,5	13,6
	2017 2018	14,5	8,4	21,0	20,5	25,5	26,5	23,6	14,5
Marauder	1995	18,3	15,8	10,9	16,4	14,3	13,8	22,9	16,3
	2001	13,6	18,4	11,5	18,1	19,2	20,7	39,3	24,3
	2017 2018	17,1	12,0	23,1	18,2	15,3	14,2	30,9	13,4

Source: Own study based on surveys carried out in 1995, 2001 and in the period of 2017 -2018.

After years of functioning of unsustainable market in Poland, new products were especially strong incentives for consumers to make shopping decisions. This was demonstrated by the implemented models of innovation diffusion, which were different from the E. M. Rogers model by a much larger share of innovators and early followers, although this was significantly dependent on the nature of the product. Surveys conducted in 1995-2001 and 2017-2018 on nation-wide representative Polish populations showed that the number of innovators, i.e. consumers declaring that they like to be the first to buy a new product in this period represented 12.1 - 14.6%, i.e. more than in the Rogers' model[1] (Tab. 1).

Also the number of early followers (buying a new product relatively quickly, even though after some reflection) was higher than the number expressed by the Rogers' model. It reached in 1995-2018 about 22.9 - 23.9%.

Approximately 20.2 -24.2% of buyers waited for the product to be tested by others before making the purchase decision, while it is worth noting that the number of consumers of the so-called late majority who buy a new product when most friends have already purchased it and rated it positively declined from 25% in 1995-2001 to 19.3.0% in 2017-2018. The number of marauders, i.e. people who are reluctant to buy new market products, which reached 16.1-18%, after a slight increase in 2001 (20.5%) was relatively closest to the Rogers' model in the discussed period of 1995-2018.

[1]According to this model, innovators constitute only 2.5% of all buyers, customers early accepting a new product represent 13.5%; the majority accepting innovation early constitutes 34%, the late majority also constitutes 34% of buyers, whereas conservatives 16% (Rogers, op. cit.).

It should be emphasized that diffusion of innovation is considerably dependent on the nature of the product. The proportions between the groups of buyers of mechanized household appliances and radio and television equipment are the closest to the Rogers' model. The number of innovators in the purchase of these products is more than twice smaller than in the purchase of other goods. The number of early followers is also smaller. Considerable caution in buying new types of equipment results from their high prices. Over 60% of consumers make decisions to buy these products after others have already purchased them and rated them positively. In the case of tourist equipment, the number of conservative-marauders (39.3 - 30.9%) was the highest in comparison with other products in 2001-2018 and, which is important, it increased when compared to 1995.

Meanwhile, in the case of most of goods, the share of conservatives decreased, which proves the growing openness of consumers to market novelties. The exception applies to responses to new food products and cleaning products, as the number of customers who reluctantly buy these new products increased in the discussed period, for food from 13.3 to 17.1%, and for cleaning products from 11.5 to 23.1%. On the other hand, positive changes are observed in other consumer groups, i.e. innovators, early followers and the early majority because in each of them more and more people purchase market novelties. However, the size of the late majority group has decreased, which also confirms positive changes in behaviours towards new products.

The processes of diffusion of innovations were proceeding the fastest on the book market, which results from the special nature of the book as a marketing product. Although the record-high number of innovators (30.2%) in 1995 who liked new publications decreased in 2001 to 26.4%, in 2017-2018 the percentage of innovators returned to a high level, i.e. 29.8%. This proves that Polish consumers are still really open to new publications in all age groups, but especially in the 50-59 age group (35.3%). Even in the oldest age group, i.e. 60+ age group, the percentage of innovators in 2017-2018 was 21.3%, which could not be observed in any other product group. However, an upward trend in the number of innovators, early followers and early majority is observed in all studied groups of products. Meanwhile, when it comes to the number of marauders who are reluctant to buy market novelties, it is observed that after the phase of increase in this number in 1995-2001 (food is the exception), there was a downward trend in 2001-2018. The exception relates to cleaning products and food products for which the number of marauders increased. This may result from the uncertainty of more conservative consumers who are reserved about innovation in these markets.

The process of diffusion of innovations is determined by individual features of buyers, i.e. socio-demographic, personality and economic characteristics.

The results of the analysis conducted in segments of various groups of goods show a clear impact of consumer age on their declared willingness to adopt an innovation. This is illustrated by the data presented in Tab. 2. Consumers from lower age groups accept product novelties faster. The number of innovators is relatively the largest in the 18-24 age group and is definitely declining in higher age ranges, at a pace depending on the nature of goods.

Table 2: Changes in the distribution of innovators and marauders in 1995-2018 (by age)

Years	Age					
	18-24	25-29	30-39	40-49	50-59	pow. 60
Innovators						
1995	17,7	12,9	13,7	10,6	10,3	6,1
2001	13,6	14,3	13,6	12,3	9,1	7,8
2017/2018	16,3	18,3	1 13,6	9,9	11,6	7,8
Marauders						
1995	11,0	12,5	13,0	14,3	21,8	26,0
2001	12,5	15,3	16,8	20,6	26,2	46,4
2017/2018	15,6	17,4	15,4	22,2	19,5	31,0

Source: Own study based on surveys carried out in 1995, 2001 and in the period of 2017 -2018.

It is interesting to look at the diffusion of innovations among young consumers. In addition to high readiness to acquire new publications, they are also innovators in the processes of purchasing clothing and footwear (26.7%). The number of early followers is also record-breaking in this industry (on average 39.4%). Next there are purchases of new jewellery among young people (23.3% of innovators, 26.6% of early followers). In the 18-24 age group there is also a relatively large number of innovators in the purchase of computers and smartphones (24.4%), and in the 30-39 age group there is a large number of early followers (32.9%), as these are very important products in consumption models of younger consumer generations.

The largest, eightfold differences between age groups are observed in 2017-2018 in the purchase of computers and smartphones (24.4% of innovators among 18-24 age group, and 3.1% in the group of seniors 60 years and older), while five-fold differences observed in 2001 in the case of clothing and footwear decreased in 2018 to three and a half-fold differences (26.7% of innovators aged 18-24 and 7.5% in the group over 60). This is because they are products quite often purchased, and changes in these products, especially those that meet the diverse needs of consumers, are increasingly better accepted by older people. In 2017-2018, the difference between age groups is also similar in relation to the number of innovators on the food market (19.3% among 18-24 year-old buyers, and 4.3% for people over 60). This seems to be justified by a greater willingness to try new products and differentiate consumption patterns presented by young people, as well as greater food traditionalism of elderly people, which is also influenced by health limitations.

Threefold differences between age groups in terms of the number of innovators relate to such products as cosmetics, mechanized household appliances, consumer electronics and tourist equipment. The smallest, because twofold differences between age ranges in relation to the number of innovators are noticed on the market of cleaning products and the book market, but also here the regularity of faster diffusion of innovation among younger buyers is confirmed. This regularity is less evident among early followers; their shares in general buyer populations are more even, and in many markets the largest share of early followers is observed in the 18-24 age group (clothing, household appliances, books), 30-39 age group (food, electronics, books), and also 40-49 age group (cleaning products, tourist equipment).

In the segment of buyers reluctant to buy market novelties, older people, mainly aged 60+ predominate, and their share among the so-called marauders is more than twice as large as among 18-24 age group.

In 1995–2001, the number of marauders in all age groups increased at a faster pace, with the higher the age of consumers. In the 60+ age group, the number of people reluctant to buy market novelties increased from 26 to 46 percentage points, and among 18-24 age group of consumers, the number of marauders increased by just one percentage point. This trend continued in 2017-2018 only in younger and middle-aged groups, whereas a decrease in the percentage of marauders respectively from 26.2 to 19.5% and from 46,4 to 31.0 % is observed among mature consumers, i.e. aged 50-59 and 60 years old and older. This may prove the effects of civilization progress, which is associated with greater openness of consumers to innovation.

Meanwhile, still there are differences between age groups in terms of the number of innovators, as the growth rates of the number of innovators are greater in younger age groups. This increase mainly concerns the purchase of books, but also hygiene products and cosmetics.

The importance of consumers' education in shaping their behaviours towards new products is also revealed
(tab. 3) .

Table 3: Types of consumers by approach to product innovations and their level of education (percentage of respondents)

Types of consumers	Level of education			
	Basic	Vocational	Secondary	Higher
Innovator	12, 8	11,6	15,7	17,5
An early follower	14,4	19,3	23,2	29,6
Early majority	24,5	21,1	24,3	29,1
Late majority	16,0	18,5	18,7	23,8
Marauder	32,4	29,5	18,1	22,9
Total	100,0	100,0	100,0	100,0

Source: Own study based on surveys conducted in 2017-2018

Conducted research shows that as regards most products, the number of innovators is the highest among buyers with higher and secondary education. This also applies to the number of early followers, and to the early and late majority in 2017-2018. On the other hand, among consumers with primary education, people who are reluctant to buy market novelties have relatively the largest shares. These shares are two to three times higher than in the population of people with higher education and concern most products except for clothing and footwear as well as jewellery, where the differences are smaller. In the case of tourist equipment as well as computers and smartphones, the share of marauders is the highest among consumers with vocational education. In terms of the number of innovators, the reduction of disparities between consumer groups with different levels of education is a positive phenomenon. Only in the case of cosmetics and books, the share of innovators in 2017-2018 was about twice higher among consumers with higher education. The relatively large disproportions between the number of innovators and marauders in relation to durable goods (i.e. in mechanized household appliances, consumer electronics and tourist equipment) observed in 1995–2001 across education levels were also caused by larger differences in the level of purchasing power of the studied consumer groups.

The education factor determines consumer behaviour towards new products not by itself, but also in some correlation with income.

Growing consumer income increases their propensity to buy innovations. This is reflected by the greater share of innovators in the higher income groups, and the smaller share for those reluctant to buy market novelties. This regularity refers to all goods, even though the strength of the impact of the income factor on diffusion of innovation depends on the type of product.

The shares of the first buyers of mechanized household appliances and electronics were in the highest income group four or five times higher than in the lowest income group. In the case of tourist equipment and cosmetics, the differences were threefold, and in other cases two-fold.

Only in the purchase of cleaning products the percentage shares of innovators are not clearly differentiated in the segments of income groups, although such a relationship is manifested to some extent in relation to people who are reluctant to buy market novelties. These people have relatively the largest share among the consumers with the lowest incomes.

Research also shows the diversity in diffusion of innovations depending on the gender of consumers. Women are more prone to adopt innovations occurring in the markets of food, clothing and footwear, washing agents, cosmetics and books. Men are more willing to accept new products on the markets of all types of mechanized equipment, because they more frequently make buying decisions related to these goods.

Consumers' Opinions on New Products

The changes taking place on the market influence the improvement of consumer opinion about new products, because in 2017-2018 almost every fifth of the respondents (19.8%) claimed that the

products increased the usability for the customer, while in 2001 such belief was expressed by only 12% respondents. However, the number of respondents who expressed negative opinions about new products did not decrease, because in the analysed period it remained at the level of approximately 37% of respondents. They emphasized the apparent features of new products, unnecessary increase of the product price and even misleading the consumer. Furthermore, the percentage of those consumers who perceive new products only in terms of expanding the choice on the market decreased from 50% to 43.2%. This is presented by data in Tab. 3.

It is interesting that, men are more convinced about actual increase in the usability of the product and provision of real benefits to the customer, while women are more critical in this respect. However, they appreciate more the greater customer choice thanks to new products.
The study shows that in 2017-2018 the actual usability of new products was also noticed by relatively more young people, i.e. 18-24 years old (26.4%) and 25-30 years old (20.1%), while among mature people i.e. 50-59 years old by only 7.9%, and in the case of those over 60 years old this refers only to 4.0% of them.

The basic source of income of respondents defining their socio-professional status is an important criterion for assessing new products. The perception of the real advantage of new products in terms of increasing product usability and generating additional benefits for consumers is observed mainly among self-employed people (31, 4%), as well as among freelance professionals (19.6%) and white-collar workers (19, 9%). Freelance professionals, similarly to farmers, also appreciate most the role of new products in increasing consumer choice, representing 54,3% and 60.0%, respectively. The most critical opinions about new products are expressed by people living on unemployment benefits and pensions.

They emphasize that apparent product changes mislead the consumer. This is indicated by 28.6% of respondents in the first group, and 18.9% in the second group respectively. It is related to the income situation of these consumers, which is confirmed by opinions about new products analysed in the segments of income groups. Among respondents declaring a very good income situation, one in three expresses good opinions about new products, while emphasizing that they increase the usability of the product, whereas among low-income consumers only one in ten expresses such an opinion.

The general attitude and readiness of the consumer to accept an innovation is also an important criterion for assessing new products. In general, innovators are more positive about new products, and this concerns all industries. The greatest differences between the opinions expressed by innovators in comparison with other groups of consumers concern composite products, i.e. mechanized household appliances, electronics, computers and smartphones, as well as services. And so rate of innovators indicating that new products of these industries actually increase the usability for the client is 41-44%, in the group of early followers it is by half smaller, i.e. 21-29%, and in subsequent groups it decreases even more and amounts to 19-24 for early majority, 10-15% for late majority and 5- 16% for marauders. This is most clearly seen in relation to computers and smartphones, as illustrated in Tab. 4.

Most consumers, apart from innovators, perceive new products mainly from the perspective of increasing consumer choice. Even in groups of early followers, every third consumer emphasizes above all this aspect of new products, and in the late majority group it is indicated by every second consumer. The differences between innovators and other consumer groups in terms of the evaluation of new products are much smaller in relation to food and drugstore products, clothing and footwear, as well as jewellery and books. However, in each of these cases, the advantage of innovators is confirmed when it comes to their conviction about greater usability of new products. In this group, there are relatively fewer sceptics indicating that apparent changes in product characteristics mislead the consumer. The rate of such sceptics among innovators is at the level of 5-8% in relation to all studied products except cleaning products and books. Meanwhile, critical opinions emphasizing only apparent changes in product features that mislead the consumer are declared much more often in other consumer groups, i.e. nearly twice as often (12-18%) among early followers and the early majority.

Table 4: Consumer opinions about new products (number of respondents in %)

Lp.	Consumer opinions	2001	2017-2018
1.	Increase usability for the customer	12,0	19,8
2.	They seem to distinguish the product from others	10,6	14,6
3.	They make the product more expensive	12,9	9,0
4.	Increase the customer's choice	50,4	43,2
5.	Mislead the consumer	14,1	13,4

Source: Own study based on surveys carried out in 2001 and in the period of 2017-2018.

The exceptions are opinions about cleaning products, which are even more favourable than among innovators not only in the groups of early followers and early majority, but also the late majority, which may result from the lower sensitivity of these groups of consumers to changes introduced in these products.

The relatively highest scepticism towards new products is expressed by marauders, who, beside pointing to apparent changes in new products, also more often emphasize that new products are distinguished only by a higher price than other consumer groups. This is indicated by nearly twice higher rates of respondents among the marauders (10-17%) than among innovators (4 - 10%) in relation to almost all analysed product groups except for clothing and footwear, as well as computers and smartphones, where differences of opinion between these groups are threefold.

The reasons for the greater scepticism of consumers - marauders are different for each of these product groups, as new models of computers and smartphones can be treated with distance by people less oriented in the progress of their production technology, while critical opinions about new clothing and footwear products can generally result from negative or indifferent attitude to changing fashion trends.

In order to effectively influence the attitudes and behaviours of the analysed consumer groups, it is necessary to identify where they obtain information about the offer of goods and services. Despite the diversity of the share of these sources of information in the segments of products, there is a regularity, according to which reference groups (relatives and friends) play a dominant role as sources of information about the offer. This is declared on average by almost every second respondent. Then consumers also use their own experience (33 4%), online advertising (28.7%) and social media (25.7%). TV commercials are a source of information only for every fifth respondent, and every tenth respondent indicates obtaining knowledge about the offer from store advertisements and directly from sellers. Press advertisements (4.0%), press releases 2.2% and radio advertisements (2, 3%) are marginal in this respect.

Conclusions

Polish consumers expect from new products facilitating everyday life, but also meeting their needs in a more rational way thanks to better prices and adapting to the latest consumer trends (Żółcińska, 2020).

Susceptibility of Polish consumers to new consumer products, shown in the research is relatively higher than in the Rogers' model. It results from the specificity of behaviours of these consumers shaped in the process of transformation from the unbalanced market to the saturated market. Thus the number of innovators and early followers on the market of each studied product group is greater. Research on this typology of consumers depending on their age, education or source of income revealed the importance of these features in shaping behaviours towards new products.

Greater susceptibility to innovation characterizing young, better-educated and more affluent people, perceiving reality more optimistically, makes them opinion leaders. While consciously or unconsciously influencing the environment, they provide people with patterns of meeting the needs. The level of integration of opinion leaders with their social group which is higher than among

innovators is an important premise that determines the direction for future research on diffusion of innovation. Behaviours towards new products and opinions about them significantly depend on the level of knowledge about new products. This is particularly evident in the convenience food market (Olejniczak, 2009).

The evaluations of new products presented in the paper by individual consumer groups are a cumulative expression of knowledge about these products and emotions related to them. These are important elements of attitudes towards the discussed products. The analysis of these evaluations allows for verification of presented typology of consumers according to their declared behaviours towards new products. There is a clear diversity of sources of information about the offer used by individual consumer groups. Innovators' preference of online sources, especially when buying high technology products, is justified by the greater advancement of these consumers in the use of new information and communication technologies. The relatively large significance of own experiences in the behaviour of early followers towards new products indicates that this group of consumers strive to find their own arguments confirming their decisions concerning choice. However, the early and late majority is distinguished from others by greater susceptibility to the impact of information obtained from reference groups, which affects their opinions and behaviours towards new products. In the attitudes and behaviours of the most conservative group, i.e. marauders, internet sources are relatively less important while own experience as well as reference groups and traditional forms of communication, such as television commercials are more important. Furthermore, this group values information obtained from sellers more than others, which results from the relatively greater need among those consumers for support from other people while making a buying decision.

Recognising where individual consumer groups obtain information about the market offer of products is extremely important in a marketing communication strategy focused on buyers with different propensity to adopt new products.

The diversity of consumer attitudes and behavior towards new products is a big challenge for companies in their marketing activities. It is necessary to adapt the types and nature of communication messages to the identified consumer groups. Messages send to innovators should contain a large load of professional knowledge about the features that distinguish the product from others, including those highlighting the technical parameters of the product (among others computers and smartphones as well as electronics and household appliances)**.** The most effective in this case are personalized forms of communication corresponding with the consumers-innovators level of knowledge and their readiness to try and test the product. Great possibilities in customization of these messages result from the development of information and communication technologies. There are also special incentives and forms of cooperation with a company, that expects customers to fulfill the role of influencers that, using social media and relationships with many people, are able to influence their shopping behavior.

In turn, marketing messages directed to a group of early followers should emphasize those features that allow them to be distinguished from other customers. i.e. originality, modernity, prestige. Internet and television broadcasts are very effective in this respect. However one cannot forget about and should emphasize the role of customers' own experiences, that they follow in order to verify the emitted communication messages**.** The early majority of consumers are more sensitive to rational arguments persuading them to buy, and especially emphasizing the good relationship between price and quality. Due to their relatively high readiness to trying new products, presentations and demonstrations of new products are effective, as well as the experience of opinion leaders, especially those from aspiration groups.

For consumers representing the late majority, it is particularly important to emphasize, in the communication messages, arguments that create a sense of security and guarantees associated with the product for buyers. Hence, it is effective to refer to expert assessments and favorable test results. Salesmen and sales agents have a big role to play in building customers' trust, explaining product features, and strengthening arguments presented in advertising. (Loudon**,** 1993).Moreover**,** reference groups to which the consumers belong are particularly important in providing pre-purchase

arguments, as similar mentality and perceptions increase the credibility of messages. The increasing use of various forms of internet communication increases the effectiveness of their impact on participants of online communities who exchange information, knowledge and opinions about a new product between each other. Summing up the recommendations for enterprises, it should be emphasized that the most difficult group to reach with the message about a new product is marauders' consumers due to their low interest in new products, and also less frequent use of internet communication channels. However, this group of consumers should not be overlooked in marketing activities, but their interest should be stimulated by deeper recognition of perception mechanisms and strengthening it with appropriately selected promotional arguments, emphasizing the usefulness of a new product and possible benefits, especially of an economic nature. Greater efficiency can be achieved by using a new forms of communication such as content marketing and native advertising. For placing the message in the context of useful and very attractive content makes it easier to raise interest of all groups of the recipients. Moreover, companies should make greater use of the potential of leading users and opinion leaders in the dissemination of innovation process.

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Teamwork and Collective Work Engagement in Public, For-Profit and Nonprofit Organizations; The Case of Poland

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Abstract

Teamwork is an important component of modern organizations. It may nevertheless be different in public, for-profit and nonprofit entities marked by structural, cultural and personal differences. The aim of the article was to answer the research questions: are there any differences in the assessment of teamwork between employees of public, for-profit and nonprofit organizations? and are there any differences in collective team engagement between employees of public, for-profit and nonprofit organizations? To this end, a survey study was conducted in 2019 which collected responses from 315 purposively selected teams members in public, for-profit or nonprofit organizations. The Kruskal-Wallis test was performed to test the validity of the formulated hypotheses. The obtained results may suggest the existence of differences between the cognitive and affective-motivational aspects in the approach to teamwork.

Keywords: Team, Teamwork, Collective Work Engagement, Public Organizations, Nonprofits, For-Profits

Introduction

The concept of teamwork has become very popular among management theorists and practitioners. Over the past decades many papers have been written on the topic (e.g. Benevene et al., 2011; Brill, 1976; Katzenbach and Smith, 1993a, 1993b; Lipnack and Stamps, 1997; Morgan et al., 1994; Salas et al., 2015; Wise et al., 1974). Some researchers have pointed to the advantages of teamwork (Sundstrom et al., 1990; Drew and Coulson-Thomas, 1997; Salas et al., 2000, 2005; Vašková, 2007; Hanaysha and Tahir, 2015). However, although teamwork can boost efficiency and effectiveness, it is not a priori more efficient than individual work (West and Markiewicz, 2004). Its course and outcome depend on various factors: personal, interpersonal, organizational (D'Amour et al., 2008; Martin-Rodriguez et al., 2005), or those related to job attitudes (Morgan et.al., 1994) or feedback in a given type of organization. Liao-Troth (2003), based on the example of paid employees and volunteers, found that differences in job attitudes result from organizational culture rather than individual approach to work. The organizational context can therefore be an important determinant of teamwork. This work may differ for public, for-profit and nonprofit organizations, as each of these is significantly different in structural (Toepler and Anheier, 2004), axiological (cultural) and personal terms (Van der Wal et al., 2008; Almond and Kendall, 2000; Goulet and Frank, 2002; Benz, 2005; Borzaga and Depedri, 2005; Borzaga and Tortia, 2006; Lyons et al., 2006; Melnik et al., 2013; Mirvis, 2006).

Despite the growing interest of researchers in the subject of teamwork, there are few publications comparing it in organizations representing three main sectors: public, for-profit and nonprofit. Instead, most such comparisons have been limited to two sectors (Benevene et al., 2011; Sharma and Bajpai, 2014; Chen and Rainey, 2014), with no cross-sectoral studies in sight, including those assessing teamwork and collective team engagement. With this article, we hope to reduce this research gap.

The purpose of the article is to answer the following research questions:

Q_1: Are there any differences in the assessment of teamwork between employees of public, for-profit and nonprofit organizations?
Q_2: Are there any differences in collective work engagement between employees of public, for-profit and nonprofit organizations?

The article is divided into sections, which are as follows: introduction, literature review, methods, results and conclusions.

Sectoral differences between public, for-profit and nonprofit organizations

In the literature, it is common to see modern organizations being divided into three main groups: public (governments, local governments, and their agencies), commercial and nonprofit. Commercial organizations provide goods and services, while nonprofits are agents of change occurring in people (Drucker, 1990). This typology is semi-teleological and arose from the division of company activities and goals into private and public. Moore (2000) puts this somewhat differently by saying this differentiation stems from two key variables: defining source of revenues and the value produced by organizations.

Sectoral boundaries are becoming blurred. Hybrid organizations are emerging that operate in various organizational fields, combine business and social logic, and are linked to both the market and civil society (Cooney, 2006; Davies and Doherty, 2019; Evers and Laville, 2004; Knutsen, 2016; Jager and Schroer, 2014; Litrico and Besharov, 2019). Despite the resulting cross-cutting of knowledge and practices, organizational management is still very much sector-specific due to the differences between commercial, public and nonprofit entities. Toepler and Anheier (2004) used an ideal-typical comparison to also point out some differences in areas such as: function, outputs, distribution criteria, size, structure, decision-making, accountability and control, participants, motivation.

All these differences have an axiological basis and concern basic cultural values. Van der Wal et al. (2008) point to the existence of two separate and relatively classic value systems for public and commercial organizations. Accountability was recognized as the most important value in public decision-making, followed by lawfulness, incorruptibility, expertise, and reliability. In enterprises, meanwhile, the ability to yield profit is valued the most (Van der Wal et al., 2008) alongside those economic values which are oriented to the company's performance and include: competition on the market, growth, profitability, quality, adaptation, rigour in management, professional integrity, will to be number one (Calori and Samin, 1991; cf. Marcoulides and Heck, 1993; Van der Wal et al., 2008). Differences can also be found by comparing the public sector to nonprofits. In public organizations, universalism and equity are largely predominant, whereas nonprofits lean more towards particularism and responsiveness (Lipsky and Smith, 1989-90). For third-sector entities, the principal value is solidarity (Jager and Schroer, 2014; cf. Whitman. 2009).

Organizations can also differ in approach. The literature indicates differences in the personality, motivation, values and attitudes shown by paid and non-paid workers. Paid employees are the pivot of activities run by public and for-profit organizations while non-paid staff fuels nonprofits. Nonprofits, therefore, rely on employees' beliefs, views, passions and are a manifestation of their ethical attitude towards the world (Rothschild and Milofsky, 2006). Volunteering is therefore the way to go for nonprofits, which is why concepts such as altruism (Smith, 1981; cf. Rose-Ackerman, 1997) and pro-social orientation of volunteers (Briggs et al., 2010; cf. Bussell and Forbes, 2006; Studer and von Schnurbein, 2012) are often brought up. Volunteers have been shown to be more agreeable and extraverted than paid workers (Elshaug and Metzer, 2001) and also seem to demonstrate a larger sense of control over their own fate and stronger causative optimism than non-volunteers (Olkowska, 2008). Pearce (1993) argues that both categories differ in job attitudes while Liao-Troth (2003) found that differences are due to organizational culture and not individual approach to work. His research suggests that, when analyzing staff behavior in organizations representing different sectors, the organizational context should be taken into account (cf. Studer and von Schnurbein, 2012). This stance was adopted among others by Melnik et al. (2013) who found that managerial capability is positively correlated with overall

employee satisfaction in the workplace. They also found that job satisfaction is strongly linked to salary and individual perception of work environment while nonprofit work is associated with greater overall job satisfaction. In general, nonprofit employees appear to be more willing to 'offer work' and are more loyal to organizations than employees in other organizations (Almond and Kendall, 2000). Benz (2005; cf. Borzaga and Depedri, 2005; Ren, 2013) found nonprofit employees to be more satisfied with their work than those in the commercial sector. These sector-specific differences do not concern just employees but also managers. Managers in publics and nonprofits share a similar set of values, but have a different perception of the importance of altruism, generosity and individualism (Miller-Stevens et al., 2015; cf. Miller-Stevens et al., 2018). Managerial positions are usually held by women in nonprofits and by men in for-profits (Claus et al., 2013; cf. Lee and Wilkins, 2011). This may suggest a more feminine organizational culture in the third sector (see: Hofstede, 1980). EU countries that can be characterized as *female* have been shown to have more nonprofit organizations while *male* countries have more for-profits (Claus et al., 2013).

Much of the research has not gone beyond analyzing one sector or comparing two sectors. There is significantly less research across three sectors. Studies by Goulet and Frank (2002), Borzaga and Tortia (2006), Lyons et al. (2006), Mirvis (2006) are some of those few. It has been found nonprofit employees experience greater job satisfaction and have greater confidence in their superiors than public and for-profit workers (Mirvis, 2006). Similarly, Borzaga and Tortia (2006) demonstrated that nonprofit employees are usually more content with their work compared to those employed in the other types of organizations even though their salary tends to be lower. Public-sector employees are the least satisfied of all. Lyons et al. (2006) analyzed the differences in general values, work values and organizational commitment between private, public and para-public employees and they observed dissimilarities in work values. They also found that commercial employees are overall more committed than employees in the other two sectors. Previously, Goulet and Frank (2002; cf. Mirvis, 2006; Ren, 2013) showed that organizational commitment ran highest among for-profit employees, followed by nonprofits and with publics coming last.

These structural, cultural, axiological and personal differences provide an organizational context that can influence the course, commitment and assessment of teamwork. We shall have a look at the literature where these issues are raised.

Teamwork in different types of organizations

Teamwork is not by any means a novel concept. We analyzed the contents of Google Scholar and EBSCO databases for the 1980–2019 period[1] and there is clearly a growing interest in this topic (Table 1).

Table 1: Number of publications in Google Scholar and EBSCO databases containing key terms related to research subject (1980-2019)

Database	Element of publication	Number of publications in Google Scholar and EBSCO[2] containing the term 'teamwork' (by time period)							
		1980-1985	1986-1990	1991-1995	1996-2000	2001-2005	2006-2010	2011-2015	2016-2019
Google Scholar	Title	92	142	417	703	999	1.530	2.380	2.310
	Content	7.390	10.900	22.500	47.700	95.200	120.000	105.000	88.900
EBSCO	Title	154	197	496	739	971	1.762	2.671	3.141
	Content	2649	4289	16.319	41.517	68.978	105.110	135.964	114.548

Source: own study based on: https://scholar.google.pl/, http://www.bu.uz.zgora.pl/index.php/pl

In these publication, the word "team' is termed as 'a small group of people with complementary skills who are committed to a common purpose, performance goals and approach for which they are mutually accountable' (Katzenbach and Smith, 1993b; cf. Lipnack and Stamps, 1997; Wise et al., 1974) or more specifically as 'a distinguishable set of two or more people who interact, dynamically,

interdependently, and adaptively toward a common and valued goal/objective/mission' (Salas et al., 1992, p. 4; cf. Devine, 2002). According to Benevene et al. (2011, p. 518; cf. Sangaleti et al., 2017; Katzenbach and Smith, 1993a), most of the definitions (regardless of team type) include the following features: "a group of at least two individuals, who share one or more goals and perform tasks, interact (also virtually) among them, and therefore are work interdependently, having different roles and responsibilities, but also boundaries and linkages to the rest of their organization, to which they are collectively accountable for the work done'.

Teamwork[3] typically involves groups of interdependent employees who work cooperatively to achieve group outcomes (Parker and Wall, 1998). A broader description of team-working employees was presented among others by Brill (1976, p. xvi) who says it 'is done by a group of people who possess individual expertise, who are responsible for making individual decisions, who hold a common purpose and who meet together to communicate, share and consolidate knowledge from which plans are made, future decisions are influenced and actions determined'. Morgan et al. (1994; cf. Salas et al., 2015) are convinced that "teamwork focuses more on the shared behaviors (i.e., what team members do), attitudes (i.e., what team members feel or believe), and cognitions (i.e., what team members think or know) which are necessary for teams to accomplish tasks'.

Teamwork can be largely beneficial. According to Sundstrom et al. (1990), 'it provides more complex, innovative, and comprehensive solutions to organizational problems'. Salas et. al. (2000, 2005) indicate that 'teamwork offers greater adaptability, productivity and creativity than any individual can offer,. Vašková (2007) adds that this productivity growth concerns in particular the spheres which require creativity while solving different tasks, a high degree of adaptability and operational management. She also argues teamwork facilitates employee learning and skill acquisition, as well as information sharing (Vašková, 2007; cf. Froebel and Marchington, 2005). Drew and Coulson-Thomas (1997), as examples of teamwork benefits, indicate 'promotion of effective communication and collaboration, speeding actions, raising the commitment level, creating a more customer-focused culture and increasing organizational adaptability and flexibility'. According to some researchers, teamwork also favors job satisfaction (Hanaysha and Tahir, 2015; Griffin et al., 2001) and staff retention (Heywood and Jirjahn, 2004). We may refer to Acosta et al., (2012) who found that collective work engagement leads to improved business performance, better task implementation in teams, increased scope of positive impacts within the team and team effectiveness, and finally, increased work commitment at individual level. This engagement is 'conceptualized as a positive, fulfilling, work-related shared-state that is characterized by team work vigor, dedication, and absorption which emerges from the interaction and shared experiences of the members of a work team' (Torrente et al., 2012, pp. 338–339). Bakker et al. (2011) suggest that collective engagement refers to the engagement of the team/group (team vigor, team dedication, and team absorption), as perceived by individual employees. Costa et al. (2012, p. 5) define team work engagement as 'a shared, positive, fulfilling, affective-motivational emergent state of work related well-being'. They distinguish the three components of team-level work engagement are conceptualized as the following: 'Team vigour: shared high levels of energy and an expression of willingness to invest effort in work and persistence in the face of difficulties (e.g., conflict, bad performance feedback); for example, team members enthusiastically encourage demoralized colleagues, and explicitly express their desire to continue working; Team dedication: shared strong involvement in work and an expression of a sense of significance, enthusiasm, inspiration, pride and challenge while doing so; for example, team members talk to each other and to others (external to the team) about the importance of their work and about the thrill they feel concerning their work; Team absorption: shared focused attention on work, whereby team members experience and express difficulties detaching themselves from work; such as, team members talking about their work during breaks, commenting on time passing quickly and not engaging in non-work related interactions when working'.

Let us further pay attention to the opinion held among others by West and Markiewicz (2004; cf. Alderfer, 1977; Benevene et al., 2011; Morita, 2001) that, although teamwork can boost efficiency and effectiveness, teams themselves do not generate more productive work than individuals. In their view, introducing teamwork in an organization does not guarantee success; on the contrary, if implemented incorrectly, teamwork may lower efficiency, innovation and satisfaction[4].

As mentioned before, the empirical or theoretical research showed that teams are not easily implemented, that the creation of a team of competent members does not guarantee success, and that teamwork does not just happen (e.g. Hackman, 1998). For example, Mathieu et al. (2008) state that a team will fail if its members cannot successfully share knowledge, coordinate behaviors and trust each other. Schmutz et al. (2019; cf. Sheikh et al., 2016) are convinced that if the team is to be effective, team members need to collaborate and engage in teamwork. According to D'Amour et al. (2008) and San Martin-Rodriguez et al. (2005; cf. Honein-Abou Haidar et al., 2017), determinants of teamwork include: interaction factors, which relate to the interpersonal relationship between team members; organizational factors which relate to working conditions within institutions; and systemic factors that are elements external to work institutions, such as cultural, educational and professional systems.
Our analysis of Google Scholar and EBSCO databases revealed that teamwork has been more often analyzed in public and private organizations than in nonprofits (Table 2).

Table 2: Number of scientific publications in Google Scholar and EBSCO databases containing in the title selected key terms related to research subject (1980-2019)

Key terms related to teamwork – selected items	Number of scientific publications containing key terms in title	
	Google Scholar 1980-2019	EBSCO 1980-2019
Teamwork and organization (organisation)	88	130
Teamwork and employee	78	76
Teamwork and worker	8	66
Teamwork and private sector	3	3
Teamwork and company	28	23
Teamwork and enterprise	16	13
Teamwork and firm	10	13
Teamwork and corporate	14	7
Teamwork and public sector	4	3
Teamwork and administration	23	10
Teamwork and school	111	108
Teamwork and university	136	124
Teamwork and hospital	123	244
Teamwork and army or military	26	13
Teamwork and police	4	0
Teamwork and prison	1	1
Teamwork and judiciary	1	0
Teamwork and third sector	0	0
Teamwork and nonprofit	1	1
Teamwork and nonprofit	1	1
Teamwork and NGO/NPO	0	2
Teamwork and non-government	1	1
Teamwork and voluntary	2	0
Teamwork and volunteer	1	5

Source: own study based on: https://scholar.google.pl/, http://www.bu.uz.zgora.pl/index.php/pl/

Despite the growing interest of researchers, only few publications have compared different types of organizations[5], which inspired our research. Sharma and Bajpai (2014), for example, found that public-sector employees have a greater degree of teamwork compared to private-sector workers. They also found that job satisfaction increases or decreases along with teamwork level. Chen and Rainey (2014) similarly showed that public-sector employees are more prone to teamwork than their corporate

counterparts. This was explained by greater formalization in public entities and also the fact that public employees work under greater protection. Benevene et al. (2011), meanwhile, comparing third-sector employees and public organizations, found teamwork is more effective among the third-sectors. Nonprofits show a higher level of members' commitment to teamwork and satisfaction with teamwork. This explains strong commitment to teamwork among nonprofit workers. Among the tri-sectoral studies there is an article by Kalleberg et al. (2006) which found nonprofits and publics to be more willing to use self-directed work teams.

Methods

The cross-sectoral teamwork research was conducted in 2019, in Poland's Lubusz Province. The research process consisted of the following stages: literature analysis, research gap identification, formulation of research questions and hypotheses, sample selection and development of adequate research tools, data collection and analysis, formulation of conclusions, indication of limitations and future directions.

To answer the research questions, the following hypotheses were formulated:

H_1: There are differences in the assessment of teamwork between employees of public, for-profit and nonprofit organizations.
H_2: There are differences in collective work engagement between employees of public, for-profit and nonprofit organizations.

Respondents were selected using purposive sampling[6]. They were asked to assess different aspects of teamwork and also their work teams, including their engagement.

Research tools - questionnaires consisted of 9 original questions in the teamwork assessment part. However, when examining team work engagement, an abbreviated (9-item) version of the research tool was used called "collective work engagement scale' (Torrente et al., 2012). Team work engagement considered three dimensions: vigor (3 items), dedication (3 items) and absorption (3 items). In the research tool, a Likert-type scale ranging from 0 "never' to 6 "always' was used. Questionnaires were given to different team members whose participation in the study was voluntary. A total of 315 questionnaires were completed correctly by team members employed in one of the three types of organizations.

Statistical analyses were carried out using Microsoft Excel. A nonparametric test was also performed - the Kruskal-Wallis test (using Statistica software). This was preceded by examining the normality of the distribution of individual research groups - using the Kolmogorov-Smirnov test with the Lillefors correction, whose results justified performing a non-parametric test.
In the study there were 105 respondents for each of the sectors: nonprofit, for-profit and public. There were more women (59.37%) than men. The average age of team members was 36.6. Every third respondent held a managerial position.

Public team members most often worked in medium-sized (50-249 employees; 35.14%) or large entities (over 250 employees; 35.24%), while other members mostly worked in small or micro entities (up to 50 employees; 27.62% in total). Those were mostly: offices (42.86%), army and police and prison (18.09%), educational institutions (15.24%), hospitals (13.33%).

Every fifth (19.05%) for-profit respondent worked in a company with fewer than 10 employees, while every fourth (25.71%) - in a small, every third (30.48%) - in a medium-sized and every fourth (24.76%) - in a large enterprise. The predominant industries were wholesale and retail trade (23.81%) and manufacturing (22.86%)

Nonprofit employees more often represented associations (74.3%) than foundations (25.7%). Every third (30.48%) worked for an entity with fewer than 10 permanent employees (paid, non-paid, members). Almost half (47.62%) were involved with organizations employing 11-50 people, while the

rest (11.90%) worked for larger organizations. They represented entities operating in various areas but mostly: social and humanitarian aid (37.14%), education and research (35.24%), culture and recreation (24.76 %) or development and housing (22.86%).

Results

The surveys made it possible to determine how employees representing teams operating in organizations from different sectors assess certain aspects of teamwork. It was found that in 6 out of 9 cases (66.67%) there are grounds for rejecting the null hypotheses about the uniform distribution of perceptions of various aspects of teamwork by team members in public, for-profit and nonprofit organizations (H_{1a}-H_{1d}, H_{1f}, H_{1h}) (Table 3). Hence the decision to undertake further analyses.

Table 3: Results of the Kruskal-Wallis test regarding teamwork assessment by the surveyed employees representing organizations from different sectors

Teamwork….	Independent (grouping) variable: organization type α=0,05 Kruskal-Wallis Test		
	H(2,N=210)	**Chi²**	**Result of hypotheses testing[7]**
enables **better results** than individual work	2,668333	2,652632	**H_{1a}**
enables **faster task fulfillment** than individual work	8,051678	7,076936	**H_{1b}**
makes it **easier to develop knowledge and professional** (substantive, job-specific) **skills**	1,660303	1,580268	**H_{1c}**
makes it easier to **develop social skills** (e.g. communication, negotiation, cooperation)	5,672902	5,531561	**H_{1d}**
is **more pleasant** than individual work	1,182612	1,260000	**H_{1e}**
makes **failure less painful** than individually	6,728156	5,393186	**H_{1f}**
makes employees **more motivated** to act than during individual work	0,278604	0,416426	**H_{1g}**
comes with **a smaller sense of responsibility** for outcomes than individual work	1,576336	1,458333	**H_{1h}**
makes **decision-making more difficult** than individually	2,946098	7,960289	**H_{1i}**

Source: own study

Reasons for rejection found

No reasons for rejection found

Based on the results, we found that team members in different types of organizations did not differ in their assessment of the following teamwork features:

- is more pleasant than individual work (H_{1e}),
- makes employees more motivated to act than during individual work (H_{1g}),
- makes decision-making more difficult than individually (H_{1i}).

It was also found that employees of nonprofits' teams less frequently than for-profits or publics thought that teamwork:

- enables better results than individual work (H_{1a}; NPO: 86.67%; F-P and public: 92.38% each);
- enables faster task fulfillment than individual work (H_{1b}; NPO: 78.10%; F-P: 87.62%; public: 90.48%);

- makes it easier to develop knowledge and professional (substantive, job-specific) skills (H_{1c}; NPO: 84.76%; F-P: 90.48%; public: 87.62%);
- makes it easier to develop social skills (e.g. communication, negotiation, cooperation) (H_{1d}; NPO: 92.38%; F-P: 99.05%; public: 95.24%),
- makes failure less painful than individually (H_{1f}; NPO: 57.14%; F-P: 71.43%; public: 59.05%),
- comes with a smaller sense of responsibility for outcomes than individual work (H_{1h}); NPO: 51.43%; F-P: 59.05%; public: 52.38%),

Throughout the research we also looked at how people working in organizations from different sectors assess collective work engagement[8]. It was found that in 3 out of 9 cases (33.33%) there are grounds for rejecting the null hypotheses about uniform distribution (Table 4).

Table 4: Results of the Kruskal-Wallis test regarding perception of collective work engagement by employees of different types of organizations

Statement	Independent (grouping) variable: organization type α=0,05 Kruskal-Wallis Test		
	H(2,N=210)	**Chi²**	**Result of hypothesis testing**
During the task, my team feels full of energy	8,829839	10,69011	**H_{2a}**
My team feels very persistent during the task	3,714753	0,981474	**H_{2b}**
My team feels strong and vigorous during the task	2,640987	2,743062	**H_{2c}**
My team is enthusiastic about the job	5,179776	4,613611	**H_{2d}**
My team enjoys doing the task	4,040115	9.214976	**H_{2e}**
My team feels very motivated to do a good job	0,739699	2,202797	**H_{2f}**
When my team is working, we forget everything else around us	0,928506	1,217200	**H_{2g}**
Time flies when my team is working	8,206857	4,457427	**H_{2h}**
My team feels happy when we are engrossed in the task	3,977609	3,994104	**H_{2i}**

Source: own study

	Reasons for rejection found
	No reasons for rejection found

Statistically significant disparities are only observed for statements such as: '*My team feels very persistent during the task'* (Vigor; H_{2b}), '*My team is enthusiastic about the job*' (Dedication; H_{2d}), '*Time flies when my team is working*' (Absorption; H_2). For the remaining statements, the differences were not significant. Detailed findings related to collective work engagement are shown in Table 5.

Table 5: Collective work engagement from the perspective of employees of different types of organizations

Statement	Never	Almost never	Rarely	Sometimes	Often	Very often	Always	Average
	Not once	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day	
	[%]							
	0	1	2	3	4	5	6	
COLLECTIVE VIGOR								
During the task, my team feels full of energy								
Public	8,57	12,38	20,95	28,57	18,10	9,52	1,90	2,71
For-profit	8,57	10,48	18,10	24,76	19,05	8,57	10,48	3,03
Nonprofit	1,90	17,14	11,43	18,10	20,95	23,81	6,67	3,37
Total	**6,35**	**13,33**	**16,83**	**23,81**	**19,37**	**13,97**	**6,35**	**3,04**
My team feels very persistent during the task								
Public	3,81	5,71	12,38	17,14	24,76	25,71	10,48	3,72
For-profit	0	4,76	8,57	15,24	28,57	23,81	19,05	4,15
Nonprofit	0,95	15,24	7,62	16,19	20,00	21,90	18,10	3,77
Total	**1,59**	**8,57**	**9,52**	**16,19**	**24,44**	**23,81**	**15,87**	**3,88**
My team feels strong and vigorous during the task								
Public	4,76	8,57	15,24	24,76	20,00	20,95	5,71	3,32
For-profit	2,86	2,86	11,43	27,62	27,62	20,95	6,67	3,64
Nonprofit	0,95	14,29	8,57	22,86	17,14	22,86	13,33	3,63
Total	**2,86**	**8,57**	**11,75**	**25,08**	**21,59**	**21,59**	**8,57**	**3,53**
COLLECTIVE DEDICATION								
My team is enthusiastic about the job								
Public	1,90	15,24	16,19	25,71	15,24	21,90	3,81	3,18
For-profit	2,86	12,38	13,33	26,67	17,14	20,95	6,67	3,32
Nonprofit	1,90	12,38	10,48	20,00	18,10	22,86	14,29	3,66
Total	**2,22**	**13,33**	**13,33**	**24,13**	**16,83**	**21,90**	**8,25**	**3,39**
My team enjoys doing the task								
Public	2,86	3,81	18,10	22,86	22,86	20,95	8,57	3,56
For-profit	2,86	4,76	16,19	23,81	24,76	18,10	9,52	3,55
Nonprofit	1,90	12,38	7,62	18,10	14,29	25,71	20,00	3,88
Total	**2,54**	**6,98**	**13,97**	**21,59**	**20,63**	**21,59**	**12,70**	**3,66**
My team feels very motivated to do a good job								
Public	2,86	11,43	10,48	15,24	25,71	20,95	13,33	3,65
For-profit	2,86	3,81	11,43	28,57	19,05	22,86	11,43	3,71
Nonprofit	1,90	12,38	6,67	21,90	14,29	23,81	19,05	3,82
Total	**2,54**	**9,21**	**9,52**	**21,90**	**19,68**	**22,54**	**14,60**	**3,73**
COLLECTIVE ABSORPTION								
When my team is working, we forget everything else around us								
Public	11,43	12,38	21,90	22,86	13,33	14,29	3,81	2,72
For-profit	13,33	13,33	27,62	13,33	11,43	12,38	8,57	2,68
Nonprofit	7,62	17,14	21,90	15,24	15,24	14,29	8,57	2,9
Total	**10,79**	**14,29**	**23,81**	**17,14**	**13,33**	**13,65**	**6,98**	**2,77**
Time flies when my team is working								
Public	2,86	1,90	11,43	18,10	20,00	26,67	19,05	4,07
For-profit	1,90	1,90	1,90	15,24	23,81	27,62	27,62	4,5
Nonprofit	2,86	10,48	10,48	16,19	19,05	18,10	22,86	3,84

Statement	Never	Almost never	Rarely	Sometimes	Often	Very often	Always	Average
	Not once	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day	
	[%]							
	0	1	2	3	4	5	6	
Total	**2,54**	**4,76**	**7,94**	**16,51**	**20,95**	**24,13**	**23,17**	**4,14**
My team feels happy when we are engrossed in the task								
Public	4,76	7,62	18,10	29,52	13,33	20,00	6,67	3,26
For-profit	4,76	2,86	15,24	25,71	20,95	20,00	10,48	3,57
Nonprofit	2,86	17,14	8,57	19,05	9,52	20,00	22,86	3,67
Total	**4,13**	**9,21**	**13,97**	**24,76**	**14,60**	**20,00**	**13,33**	**3,5**

Source: own study

Having averaged the results in the three individual dimensions of collective work engagement, it was found that: a) public employees rated all three dimensions of collective work engagement the lowest; b) for-profit and nonprofit employees rated 'Collective vigor' higher ($\bar{n}$=3.61 and $\bar{n}$=3.59, respectively) than public workers ($\bar{n}$=3.25); c) nonprofits rated 'Collective dedication' higher ($\bar{n}$=3.79) than those employed in for-profits ($\bar{n}$=3.53) or publics ($\bar{n}$=3.46), d. for-profits rated "Collective absorption' higher ($\bar{n}$= 3.58) than those representing nonprofits ($\bar{n}$=3.47) or publics ($\bar{n}$=3.35).

Conclusions

Teamwork is currently one of the most sought-after social competences. Employees skilled in teamwork tend to be more creative, generate better solutions and implement them faster; they also communicate and share knowledge faster, experience greater job satisfaction, etc. This explains the growing interest in teamwork among management theorists and practitioners seeking to pinpoint the prerequisites of teamwork, the possibility of optimizing the teamwork outcomes, etc. Despite the rising popularity among researchers, only few publications comparing different types of organizations exist, which inspired our research. Our results signal the existence of statistically significant differences between employees of teams operating in public, for-profit and nonprofit organizations regarding how they assess certain aspect of teamwork. It was found, among others, that nonprofit employees less frequently (usually by 5-10%), compared to those employed in public and for-profit entities, thought that teamwork enables better results, faster task implementation or development of substantive and/or social skills, but also that it evokes a smaller sense of responsibility for outcomes than individual work. The biggest differences concerned issues related to the feeling of failure and faster task fulfillment under teamwork (approx.12-14%). A larger percentage of for-profit employees, compared to the other two types, claimed that failure is less painful when experienced in a team than individually. The results show that, in the cognitive aspect, for-profit and public employees assess teamwork better than nonprofit team members. This may be due to the higher level of professionalization of commercial and public entities and the development of teamwork training which promotes the essence of teamwork.

Our findings also flagged certain differences regarding collective work engagement between employees of public, for-profit and nonprofit organizations. Using the Collective Work Engagement Scale, it was found, among others, that public team members, compared to the other two, assessed all three dimensions of collective work engagement the lowest. For-profit and nonprofit members rated collective vigor higher than those representing public entities. Nonprofit employees assessed collective dedication higher than those employed in for-profits or publics. Additionally, for-profit workers rated collective absorption higher than employees of nonprofit or public entities.
Our results are partly consistent with the studies by other authors who have analyzed work engagement at individual level. Let us recall that Lyons et al. (2006) found individual for-profit employees to be more engaged than workers in the other two sectors. Similar findings were expressed in Goulet and

Frank (2002; cf. Benevene et al., 2011) where the highest engagement was observed among commercial employees, followed by nonprofit employees and only then public-sector workers.

Attention should be paid to the differences between the cognitive and affective-motivational aspects of teamwork approach adopted by employees representing each type of organization. This is best exemplified by public employees who appreciate teamwork but consider themselves part of the least engaged teams. The opposite is true for nonprofit workers. Perhaps the reason for this is the differences at individual-team level. In the case of cognitive teamwork assessment, employees shared a personal view, while team engagement was assessed in relation to group behavior. Knowing this, the differences could be explained by the impact of the context, e.g. organizational culture. Nonprofits are by default community-driven and collectivist, which is why they have a significant ability to build strong commitment towards teamwork, although their employees may have different views on its essence.

Lastly, let us recognize some limitations of our research. They study concerned Polish organizations, meaning it was implemented in a specific cultural context that should be borne in mind when formulating conclusions. Also, sample selection was purposive and therefore sensitive to generalizations. It might be worth recommending further research, both quantitative and qualitative, to better understand the subject at issue. These new studies should be in-depth and rely on techniques requiring direct contact, interviews, observation, case study, etc.

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[1] As at 20.03.2020.
[2] Publications that have been peer-reviewed.
[3] In the literature we find various teamwork theories and models, e.g. sociotechnical theory (Kolodny and Kiggundu, 1980), group processes and productivity theory (Steiner, 1972) or input – process–output models (Gladstein, 1984; Hackman and Morris, 1975).
[4] According to Vidal (2007), teamwork has no significant general effect one way or the other.
[5] A comparative teamwork study was also carried out e.g. in the context of differences between: people exercising different professions in the same country (Li, 2013; Asio and Cross, 2015), employees representing the same industry but working in different countries (Wergin, 2003), employees of different professions in different countries (O'Connor et al., 2012), managers working in different countries (Beckmann, 1995).
[6] Random selection was abandoned because it was impossible to determine the number of organizational teams in the studied area. Results therefore cannot be generalized to the entire population.
[7] The null hypothesis (about uniform distribution) is rejected when H value is larger than the Chi^2 distribution (Ostertagová et al., 2014; cf. Jóźwiak and Podgórski, 2012).
[8] Work engagement has been described as 'a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption' (Schaufeli et al., 2002).

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The Level of Entrepreneurship in Poland In Comparison to Europe

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Abstract

Entrepreneurship, a complex and interdisciplinary concept, is difficult to define unambiguously. Entrepreneurial activity perceived as a process consists of successive stages that involve the establishment of a company and its development as well as stabilisation and cessation of its operation. A deeper insight into the nature of the entrepreneurial process is provided by the GEM approach, which studies people, not companies. The aim of the study is to analyse the level of entrepreneurship in Polish society compared to the average of European countries included in the GEM study. The article defines the level of entrepreneurship on the basis of indicators measuring the participation of adults involved in business activity, starting from taking the first steps to set up a firm, through running it, and finally withdrawing from business. In order to understand the essence of entrepreneurship, the motives for starting a business are also analysed, as motivation is an important factor that determines the future of business ventures.

Keywords: Entrepreneurship, Global Entrepreneurship Monitor - GEM, Poland

Introduction

An important factor of the socio-economic life is entrepreneurship which, for many years, has been the focus of interest of a number of environments proposing its various definitions. The lack of a single consistent definition of entrepreneurship causes that it is not presented explicitly but in a descriptive way, most often with the emphasis on the economic dimension. The indicators created on the basis of the above most frequently relate to setting up a business activity, enterprises of the SME sector or personal characteristics of the entrepreneur

The aim of the article is to assess the entrepreneurial activity in Poland by indicating the percentage of people at particular stages of the entrepreneurial process and specifying the motives that guide people when deciding to set up their own business. The article uses the GEM indicators that reflect four forms of entrepreneurship depending on the stage of development of companies, with particular emphasis on the TEA and measures indicating the reasons why people engage in business activity. For a better understanding of Polish entrepreneurship, the analysed data for the years 2014-2018 are compared to the average for the European countries studied.

Literature Review

Entrepreneurship is a complex phenomenon that involves a great variety of contexts and factors. It can be examined in a broad and narrow perspective. In the first case, entrepreneurship is seen as a process of planning, organising and running a business, as well as taking the associated risk by people called entrepreneurs (Griffin, 2007). Therefore, the meaning of entrepreneurship assumes that everyone who establishes and runs a business is an entrepreneur. In the narrow sense, however, entrepreneurship is the ability to take advantage of arising chances and opportunities to implement projects in the economic

field (Bifulco *et al.*, 2011). This applies to all new ventures undertaken by both newly established and existing companies in the face of certain opportunities and circumstances (Bratnicki, 2011).

According to S. Shane and S. Venkataraman (2000), entrepreneurship includes all activities that consist of identifying, assessing and exploiting opportunities to introduce new products and new services as well as ways of organising, new markets and raw materials. This perception of entrepreneurship is based on the following assumptions (Shane, 2003):

- entrepreneurship requires the existence of market opportunities which, through their objective elements, do not exist only in the consciousness of entrepreneurs;
- Entrepreneurship presupposes that there are differences between people and thus diverse perceptions of emerging opportunities;
- Risk-taking is an integral part of the entrepreneurial process, as market opportunities are usually uncertain;
- The entrepreneurial process requires creating new combinations of resources and introducing innovations that are not necessarily ground-breaking.

The essence of entrepreneurship lies in initiating projects as well as new forms of activity that satisfy needs, generate profits and enable reproduction and development of entrepreneurship.

In the literature on the subject, the phenomenon of entrepreneurship is often presented in the attribute and process approaches (Makieła, 2013; Ropęga, 2016; Czaja, 2014). In the first case, entrepreneurship is perceived as a specific human attitude towards the surrounding world and people, expressed in a creative and active pursuit of improving existing states of affairs, in readiness to take new actions or expand previous ones in order to improve working conditions and quality of life (Wiatrak, 2003). In turn, the perception of entrepreneurship as a process means creating and shaping something new, a set of consecutive actions that have an effect on the market (Ropęga, 2016; Reynolds *et al.,2005*). Entrepreneurship as a process of transforming creative ideas into economically vital activities and implementing creative solutions remains one of the main challenges of management (Kuratko and Hodgetts, 2007). According to the process approach, entrepreneurship is defined as a process of setting up and running a business, which involves several steps. The first stage is based on identifying opportunities, risks and possibilities to operate on the market, while the second one is to develop a business plan and gather necessary resources. Establishing and managing an enterprise is the target and final component of the essence of entrepreneurship in the process approach.

Entrepreneurship can be analysed in both the short and long term. In the first case, it means taking actions aimed at adapting an organisation to the needs of its environment and offering products to meet those needs. In the second one, entrepreneurial activity consists in implementing innovations that determine economic development (Ropęga, 2016).

Nowadays, entrepreneurship is recognised as an element necessary to ensure lasting economic growth, which is a condition for continuous improvement of social welfare (Zięba, 2016; Bhuyan and Pathak, 2019; Horrington and Coduras, 2019). However, according to Baumol's typology of entrepreneurial activity, only one of the three categories – productive entrepreneurship – is valuable in terms of generating welfare (Baumol, 1990). Entrepreneurship is also believed to contribute to economic development because entrepreneurs create new businesses, and new businesses create jobs, intensify competition, and may even increase productivity through technological change (Bosma, 2013).

In the GEM reports used in this article, entrepreneurship is understood as a process in which individuals play a key role. This process encompasses all phases of a business venture's life cycle and all persons who are entrepreneurially active in each of them. Among them are people who have an idea and begin

to invest in creating their future business, those who run companies, and people who withdraw from business activity. However, particular emphasis is placed on the early stages of activity.

In the entrepreneurial process, the GEM uses three stages of development of business ventures. Based on the stage which an entrepreneur is at, he or she can be defined as a potential entrepreneur, nascent entrepreneur or an owner-manager of a mature company. Nascent entrepreneurs are people who are considering starting their own business, while taking some actions aimed at achieving this, and who have worked on organising a company for no longer than 3 months. It should be noted that many enterprises, usually due to a lack of readiness to operate on the market, do not pass the trial period and soon after registration or start-up, owners withdraw from business. A company is established and enters the introduction stage, and later the growth stage, at the moment when salaries for employees or owners have been paid for more than 3 months. Maturity and the ability to maintain a lasting presence on the market as well as further development are achieved by a firm after 42 months of operation. The first two groups of entrepreneurs form the TEA index, which allows forecasting the intensity of entrepreneurial activity in society by taking account of people who are at the stage of creating a new company.

Metothology

On the basis of the GEM reports for the years 2014-2018, the necessary information was selected in order to indicate the level of entrepreneurial orientation of Polish society, juxtaposed against European countries. Due to the vast amount of data included in GEM projects, the research refers to selected indicators of entrepreneurship included entrepreneurial activity and motivation for entrepreneurship. In the assessment of the level of entrepreneurial activity, all stages of the economic venture are taken into account, including the stage preceding the formal beginning of its implementation, i.e. taking first actions towards the establishment of the company. In the GEM study, the focus of attention is, however, the early stages of activity. People involved in setting up a business and managing the company operating for no longer than 3.5 years (the period considered as critical for entrepreneurial activity, the survival of which is the evidence of success) create the key TEA indicator. The last issue discussed in the article is motivation for involvement in a business activity, which translates into the future development of the specific economy.

This study is mainly descriptive hence the statistical methods applied include descriptive tables and graphs plus a set of principal component analyses that provide additional information and details to obtain more accurate interpretations on some specific results.

Results

In the GEM study, which is the basis for measuring the level of entrepreneurship in Poland in this article, the entrepreneurial process involves several consecutive phases, from recognising business opportunities, through running a company, to withdrawing from this activity. The adopted division of the entrepreneurial process into individual stages enables a comprehensive view on the issues related to creating new firms.

Taking into consideration the data presented in Figure 1, it can be noticed that in Poland, in the first two years of the research period, the TEA index and its components were at the same level. In 2015, only the share of people running mature enterprises decreased, and its value of less than 6% was the lowest one in the analysed years. Nevertheless, from 2016 onwards, the values of individual indicators were not as stable. In 2016, the proportion of people at the stage of setting up a company decreased by almost 1 percentage point, with a simultaneous increase in new enterprises. These changes had a positive impact on the TEA index, which in 2016 amounted to 10.7%, thus reaching the highest value in the analysed period as a whole. The improvement observed on the labour market resulted in the fact that a number of already employed people did not decide to launch a much riskier business venture. In 2017, however, the elements constituting the key indicator in the study, including people running young companies, were completely different than in the previous year, i.e. the share of people willing to take

a risk and set up their own business increased by almost 2 percentage points, while the share of people running companies for no longer than 3.5 years decreased threefold. Unfortunately, these changes resulted in a decrease in the TEA index by almost 2 percentage points. The downward trend continued until the end of the analysed period, while both the share of people at the stage of organising their own business ventures and companies present on the market for anywhere between 3 and 42 months decreased in 2018. Due to another decline in the last year of the analysis, only 1 in 100 Poles ran a new company. However, the TEA index fell to the lowest level in the history of the GEM study in Poland and amounted to just over 5%. On the other hand, starting in 2015, the percentage of people running a company for more than 3.5 years had been systematically increasing, as a result of which the proportion of mature companies in 2018 was as high as 13%. It is worth noting that the greater the economic development of a country, the higher the share of mature enterprises in the structure of economic entities. The growing share of this type of companies was undoubtedly an effect of the improvement of the competitiveness of the Polish economy, where companies with a strong enough position were able to stay on the market. On the other hand, however, the level of competition was already so high that it constituted a significant barrier to entry for new business entities. Furthermore, in the period of low unemployment, which amounted to 5.8% at the end of 2018 in Poland, due to the high availability of wage labour, the interest in setting up a business declined. A favourable situation on the labour market increases the sense of employment stability, due to which the number of people willing to risk running their own business decreases.

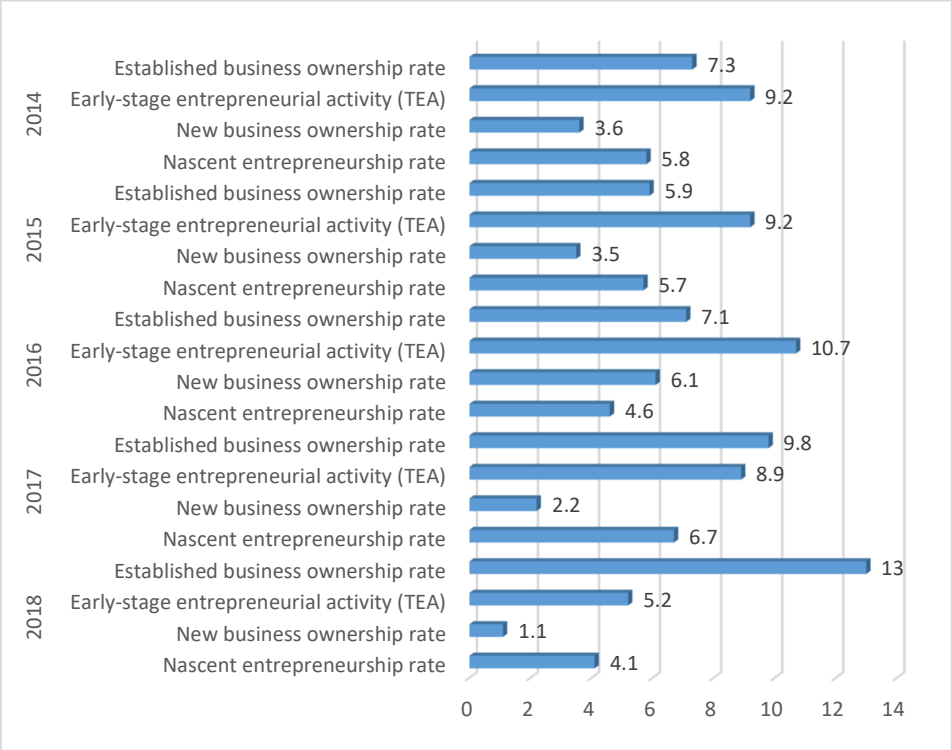

Fig. 1: The level of entrepreneurial activity in Poland in the years 2014-2018 – setting up and running companies

Throughout the analysed period, the number of male entrepreneurs was bigger than of female ones, but the share of women was steadily increasing. While in the first years of the study there were twice as many male entrepreneurs than female ones, in 2018 the difference decreased to just 1.5%.

Table 1: The level of entrepreneurial activity in Poland in comparison with the average for the examined European countries in the years 2014-2018

Phases and types of entrepreneurial activity	Poland					Europe average				
	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018
Nascent entrepreneurship rate	5,8	5,7	4,6	6,7	4,1	4,8	4,8	5,2	5,1	6
New business ownership rate	3,6	3,5	6,1	2,2	1,1	3,2	3,1	3,4	3,1	4,3
Early-stage entrepreneurial activity (TEA)	9,2	9,2	10,7	8,9	5,2	7,8	7,8	8,4	8,1	10,1
Established business ownership rate	7,3	5,9	7,1	9,8	13	6,7	6,6	6,9	7	6,9

Comparing the data for Poland with the average for European countries examined in the GEM project shows that each year the involvement of Poles in their own business was slightly higher. In Poland, the lowest level of entrepreneurship was recorded in 2015 and the highest in 2017, with respective values of 15.1% and 18.7%. In European countries, on the other hand, the share of people running companies ranged from 14.5% in the first two years to 17% in the last analysed year. In the years 2014-2016 in Poland, far more people ran young companies, i.e. those with a life span no longer than 42 months. Nonetheless, in 2017-2018 this relationship was reversed, and mature companies became the dominant group, whose share exceeded the TEA index 2.5 times in the last year analysed. This means that there were more than 2 owners of mature companies per 1 person running a young company. In European economies, the share of people starting and running new businesses was generally higher than the share of people running companies for more than 3.5 years, as about 6.8% were owners of mature enterprises, and the share of people forming the TEA index was between 7.8% and 10%.

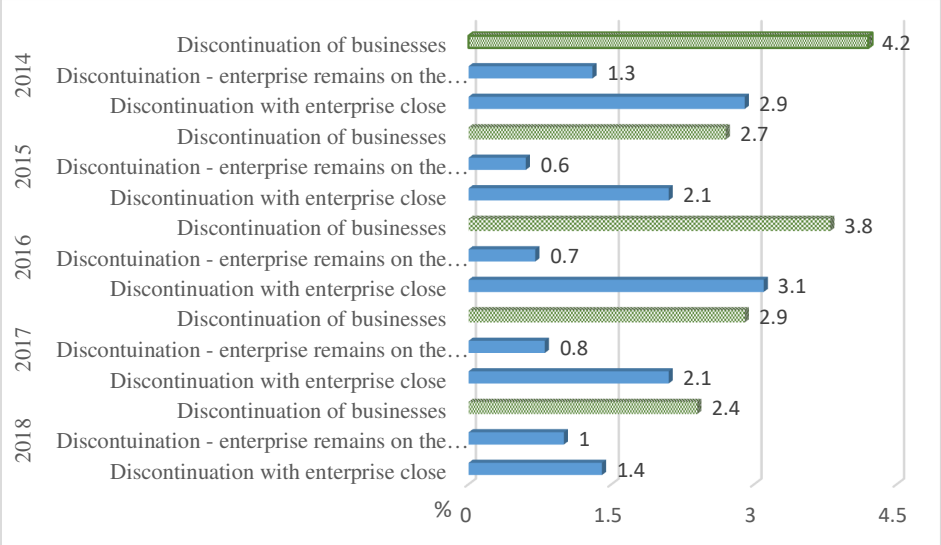

Fig. 2: Discontinuance of business activity in Poland in the years 2014-2018

The constantly changing operating conditions mean that not all companies are able to continue functioning on the market. Therefore, an important measure of the condition of entrepreneurship in a

given country is the indicator reflecting the number of people who have withdrawn from business in the last 12 months. Too much omission may indicate a low level of preparation for starting an enterprise, its improper management or an extremely strong impact of market distortions. In turn, too low a value of this indicator may suggest poor dynamics of the economic system, which maintains an inefficient business structure, e.g. due to complicated exit regulations or state tax policy. Sometimes it can even mean excessive caution in society and thus loss of opportunities as a result of a lack of risk-taking. It is therefore important to consider not only exit indicators, but also how they relate to people's involvement in running their own business.

In Poland, there was a favourable trend in terms of the business discontinuance rate. Considering the extreme years in the research period, there was a decrease in the number of people who withdrew from business, because in the first analysed year the indicator was at the level of 4.2 (the highest value), while in the last year it amounted to 2.4. The changes that had taken place made it possible to come closer to the level recorded in Europe (the average of 2.8%), and in the years 2017-2018 the value for Poland was even better than the average for the European countries studied. In turn, when comparing the discontinuance rate to the level of entrepreneurship, it can be stated that a higher business exit rate in Poland than in Europe, noticeable until 2017, was adequate for countries with a large percentage of people setting up businesses. It should be noted, however, that as time passed, fewer and fewer Polish company owners closed their own businesses, which may indicate better preparation for the role of an entrepreneur who not only properly perceives emerging opportunities, but also accurately assesses his or her own abilities. What is more, the growing share of mature companies indicates faster adaptation to changes taking place in the environment of a business entity, conquering new markets, and thus gaining a competitive advantage and strengthening one's position.

Table 2: Discontinuance of business in Poland in comparison with the average for the examined European countries in the years 2014-2018

		Poland	**Europe average**
2014	Discontinuation with enterprise close	2,9	1,7
	Discontuination - enterprise remains on the market	1,3	0,9
	Discontinuation of businesses	4,2	2,6
2015	Discontinuation with enterprise close	2,1	1,8
	Discontuination - enterprise remains on the market	0,6	0,8
	Discontinuation of businesses	2,7	2,6
2016	Discontinuation with enterprise close	3,1	2
	Discontuination - enterprise remains on the market	0,7	0,8
	Discontinuation of businesses	3,8	2,8
2017	Discontinuation with enterprise close	2,1	2
	Discontuination - enterprise remains on the market	0,8	1
	Discontinuation of businesses	2,9	3
2018	Discontinuation with enterprise close	1,4	1,9
	Discontuination - enterprise remains on the market	1	0,9
	Discontinuation of businesses	2,4	2,8

It is worth emphasising that an entrepreneur's withdrawal from business does not always mean that his or her company ceases to exist. However, as the chart shows, both in Poland and in other European countries, there were definitely more people who, by discontinuing their business activity, closed their companies than those who withdrew from business personally but allowed their companies to stay on the market. Nevertheless, the situation in Poland in this respect definitely improved.

There are numerous and various reasons for discontinuing business activity. Entrepreneurs close their businesses for a number of reasons that can be seen as either positive or negative. On the one hand, it may be a desire to take advantage of a sales opportunity, an appearance of an attractive job offer, or other opportunities elsewhere, or simply planned retirement. On the other hand, discontinuation of activity may be caused by a lack of profitability, problems with access to external financing, tax burden, and sometimes a changing personal situation.

In Poland, the invariably dominant reason for abandoning a business was a luck of profitability. An appearance of another job or business opportunity as well as all kinds of family or personal matters preventing further business activity were equally important. It should be noted, however, that over the analysed years the importance of these factors was decreasing. What is interesting, in 2017-2018 the number of people who withdrew from business due to retirement increased (from 1.7% in 2016 to 9.5% in the last year of the analysis).

The reasons for which people decide to set up and conduct a business activity are necessary for understanding the nature of entrepreneurship of the specific country. The willingness to grasp a chance (an emerging opportunity) has other implications than the establishment of own company out of necessity, most frequently in the absence of earning alternatives. The basis for the identification of positive motivation is the assumption that starting a business is the result of the conscious choice of a better alternative, preceded by an internal impulse. An emerging opportunity for a successful venture in the environment, noticed by a potential entrepreneur, is important in here. The other type – negative motivation – is based on the assumption that a higher level of unemployment remaining for a longer period of time or a risk of losing a job stimulates the desire for self-employment by starting a business activity. Then, creating a company is the reaction to a socially difficult situation or little chances in the labor market. Unfortunately, entrepreneurship out of necessity does not bring effects as good as entrepreneurship undertaken out of desire to grasp a chance, it is characterized by a lower survival rate and a lower growth potential. Strong impact of factors which enforce entrepreneurial behavior is highly responsible for often a low quality of business ventures. This may result in poorer translation of TEA into the number of mature companies in the future and also impede the creation of jobs and value added by the established companies.

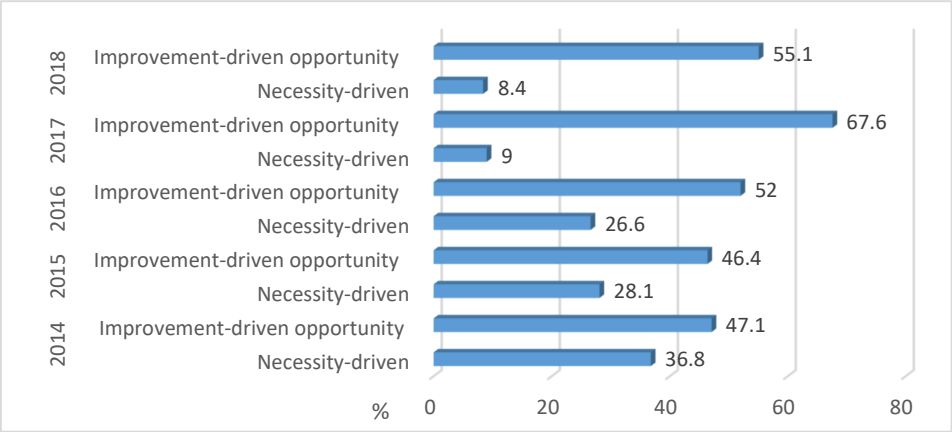

Fig. 3: The structure of motivations to start a business in Poland in the years 2014-2018 (% TEA)

The data presented in the figure 3 show that in the analysed period the motivation of Poles to set up and run a business significantly improved. Although each year the main motive for starting one's own business was the desire to take advantage of the opportunities related to running a company, 27-37% of the society started a business out of necessity in the years 2014-2016. As a result of the improvement on the labour market and systematic growth in 2017, only 1 in 7 positively motivated Poles who, due to the lack of an alternative, was somehow forced to start his or her own business. In the last analysed year, this favourable trend slowed down, as slightly more than 8% of people started a company due to

the lack of job opportunities. However, little more than half of Polish society decided to set up a business as a result of seeing it as an opportunity to increase income and gain independence. The favourable situation on the labour market once again influenced the entrepreneurial activity of Poles, and the visible strengthening of positive motivation almost each year was undoubtedly due to seeing a chance for individual development in their own businesses, while fewer people were forced to do so because of the availability of other jobs.

Table 3: The structure of motivations to start a business in Poland in comparison with the average for the examined European countries in the years 2014-2018 (% TEA)

		Poland	Europe average
2014	Necessity-driven	36,8	22,8
	Improvement-driven opportunity	47,1	47,9
2015	Necessity-driven	28,1	22,4
	Improvement-driven opportunity	46,4	47,5
2016	Necessity-driven	26,6	20,9
	Improvement-driven opportunity	52	51,1
2017	Necessity-driven	9	19,7
	Improvement-driven opportunity	67,6	50,3
2018	Necessity-driven	8,4	18,1
	Improvement-driven opportunity	55,1	47,6

In Europe, especially in the first analysed year, significantly fewer people decided to start their own business out of necessity. However, the changes that occurred within the motivational structure of Polish society meant that from 2017, twice as many Europeans as Poles decided to take this step because they could not find employment. On the other hand, the share of people running young companies from the need to take advantage of the opportunity to improve the standard of living was at a similar level both in Poland and in Europe, oscillating around 50% (only in 2017 the share of Poles motivated positively was higher by 18%).

Conclusions

Entrepreneurship is often associated with an effective way of thinking and acting, with the intention of making independent economic decisions, and with the ability to act rationally and achieve measurable market benefits in the form of profit. In the process approach, the essence of entrepreneurship lies in establishing and managing an enterprise. The research conducted shows that in the analysed period of time the share of people involved in entrepreneurship increased both in Poland and in Europe, while the involvement of Poles was slightly greater each time. Until 2016, entrepreneurship in Poland could be described as young, because with a similar level of mature enterprises in Poland and Europe (about 7%), there were more people setting up and running their businesses for no longer than 3.5 years in Polish society. In the years 2014-2017, the key indicator for young companies in the GEM – the TEA index, oscillated around 8% in Europe and 9% in Poland, with the exception of 2016 when it reached its highest level of 10.7%. In the last year covered by the study, the index of young companies in European countries increased to 10%, while in Poland the situation changed dramatically, as the TEA level declined with a simultaneous increase in the share of mature companies. As a result of these changes, for every 5 people running young companies there were 13 owners of companies operating for more than 42 months. In Europe, however, the share of people running companies for no longer than 3.5 years was twice as high and in terms of mature ones almost twice as low (less than 7%). The increase in the share of mature companies in Poland was undoubtedly influenced by the fact that far more people set up their businesses in order to seize the opportunity, not out of necessity, which would mean inability to find a job. It is also worth mentioning that Poland experienced favourable changes

related to the discontinuance rate, as its level not only decreased and oscillated around the average for the analysed European countries, but also fewer and fewer people closed their companies after withdrawing from business, and instead left their enterprises in the hands of other owners.

Although some actions and conditions may ensure greater success when setting up a company, it should be kept in mind that there are a number of uncontrollable factors that pose a risk of failure. However, a potential entrepreneur must be willing to take a risk in order to have a chance to succeed.

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Methods for Forming the Characteristic Function of a Cooperative Game in Modeling PPP Relations

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Abstract

At the current stage of economic development in Russia, against the background of the recent dramatic changes in industries in many countries that were traditionally owned and controlled by the government before, the government is trying to actively use new opportunities to solve strategically important tasks. One of the effective options for solving the tasks becomes the mechanism of attracting private capital through public private partnership. The article is devoted to the substantiation of the application of the mathematical apparatus of the theory of classical cooperative games to the distinguished tasks of public-private partnership management. The authors also proposed the construction of a game-theoretic mathematical model based on PPPs and developed specific concepts of solutions based on the theory of cooperative games, which allow analyzing PPP projects from the point of view of partnership management by state bodies.

Keywords: Public Private Partnership; Cooperative Game Theory; Game-Theoretic Mathematical Model

Introduction

In Russia, the objects called strategically important for the country cannot be privatized. However, often the funds allocated for the development of such enterprises in the state budget are not enough, and development is suspended until new funds are allocated (Bataevet al (2018); Ahmed and Ali (2006); Demidenko et al (2018); Kaza et al (2018); Kudryavtseva et al (2018)).

As is known, in order to resolve such a contradiction, the mechanism of state private partnership is used in world economic practice. In its general form, PPP combines state resources with their ownership potential, and the resources of private investors with sufficient funds to implement the necessary projects. Note that private business can also contribute its managerial experience and skills, in addition to financial resources, as a share of its contribution to the investment ((Bataevet al (2018); Kuznetsov et (2017); Demidenko et al (2018); Kudryavtseva et al (2018); Lebedev et al (2018); Rodionov and Rudskaia (2018); Rodionov et al (2018); Rodionov et al (2018); Rudskaia and Rodionov (2018)). Each such project is unique, and joint actions of the state and business aimed at its implementation are fixed in the contract for a period equal to the deadline for the implementation of a

specific project. Projects of this kind are usually carried out in various sectors of the economy: from R&D and industry, to the provision of public services. ((Shabunina et al (2018); .Bataevet al (2018); Kudryavtseva et al (2018); Lebedev et al (2018); Rodionov et al (2018); Rudskaia and Rodionov (2018)).

For maximum efficiency of interaction between the state and the private sector, it is necessary to ensure the profitability of joint actions (cooperation) for both the state and private investors. An interesting question is how the composition of the concession participants will be formed, and who is more interested in the implementation of certain PPP projects. Therefore, in this article we will try to answer this question using the mathematical apparatus of the theory of cooperative games.

Literature Review

It is known that the state's need for investment significantly exceeds the possibilities state budget. According to expert data, it amounts to about 300 billion dollars for the period until 2010 ((Dermine, J. (2017); Shabunina et al (2018); Dietz et al (2016); Kudryavtseva et al (2018); Lebedev et al (2018); Rodionov et al (2018); Rudskaia and Rodionov (2018)).

In Russia, in the past ten years, state-owned infrastructure facilities have not been developing or updating. According to the development plan of Russia in 2008-2010, developed by the Ministry of Economic Development and Trade, the pricing environment for products in the fuel and energy and raw materials markets, through the export of which the bulk of the state budget is replenished, can also change in the direction unfavorable for Russia (Evdokimova et al (2019); Kaza et al (2018); Kuznetsov et al (2017); Lorrain and Stoker (1997); Matveev . (2007); Moulin E. (2011)).

With a negative development of events, the presence of contracts for the implementation of projects with private business will positively affect the further development of the economy.

In this case, the state attracts private resources for the implementation of critical strategic projects, effectively manages the infrastructure, improves the quality of services provided and stimulates innovation. It should be noted that the state shares the risks of the projects with investors, in addition, PPP projects are selected so that they have the maximum return on invested capital (Morkovina et al (2015); Morkovina et al (2013); Nabukeera (2016); Pechersky and Belyaev A.A. (2001); Pichtel et al (2014)).

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The current stage of development of the Russian economy is characterized by favorable conditions for large-scale and long-term investment in infrastructure, which is especially important in a crisis economy, when a number of projects that bring "quick" profit become highly risky or impossible due to lack of liquidity among investors. To ensure guarantees for the return of private sector investment and to support PPPs, the state has created the following institutions:

1. Investment Fund of the Russian Federation: at the beginning of 2008, accumulated funding amounted to 9.7 billion dollars, the planned volume of investment funds for 2009 was 3.6 billion dollars, however, due to the crisis, it is planned to reduce it to 2.1 billion $ (Pichtel, J., (2014), Varnavsky V.G. (2015).
2. The Federal Agency for the Management of Special Economic Zones, whose budget is about 700 million pounds (Rodionov and Rudskaia, I. (2018); Rodionov et al (2018); Rodionov et al (2018); Rudskaia and Rodionov (2018));
3. Special Development Bank, its capitalization totals about 3 billion pounds (Rodionov and Rudskaia, I. (2018); Rodionov et al (2018); Rodionov et al (2018).

It is through the funds accumulated in these institutions that the state is going to fulfill part of its financial obligations for the implementation of PPP projects in the sectors of the Russian economy.
The Investment Fund of the Russian Federation was created in accordance with the decree of the Government of the Russian Federation of November 23, 2005. No. 694 "On the Russian Investment Fund Federation " (Rüßmann et al (2015); Solovieva M.Yu. (2019); Sosnova S. (2017).

According to this decision, the RF IF is formed from the following sources: the estimated difference between the federal budget revenues forming the Stabilization Fund at the base price for crude oil of the Urals brand and the base price of crude oil of the Urals brand reduced by 1 US dollar per barrel; projected reduction in government external service costs debt of the Russian Federation with early repayment of this debt.

The mission of the Investment Fund is to act as a catalyst for attracting private business funds, it can invest up to 75% of the total project costs in the capital of companies or provide a guarantee of 60% of the funds received from the private sector to finance the project. In order for the project to qualify for receiving funds from the fund, it must satisfy the investment criteria of the Ministry of Regional Development, including a business plan that demonstrates the economic viability of the project.

More than 50 applications for projects that are eligible for financing from the RF IF funds were submitted for consideration as part of the selection of investment projects. (Schmidt et al (2015);. Varnavsky V.G. (2015)).

Among the projects reviewed, 23 investment projects relate to the transport industry, 7 projects to the energy sector, 9 projects from the industrial sector, another 6 to housing and communal services, 3 projects are aimed at the development of agriculture, five projects are other sectors of the economy (Schmidt et al (2015);. Varnavsky V.G. (2015); Rodionov et al (2018); Rodionov et al (2018)).
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It is not surprising that a sufficient number of projects, the implementation of which will be used PPP mechanism refers to the improvement of transport infrastructure.

According to VTsIOM data, 1.5 times more gasoline is required on Russian roads than in developed countries. In addition, the service life of cars is 30% less. The transport component in the cost of production in countries with good roads is 7% -8%, while in Russia this figure reaches 12% -15%. According to expert data, poor road conditions can lead to economic losses of up to 5.5% of GDP Shabunina et al (2018); Dietz et al (2016); Kudryavtseva et al (2018); Lebedev et al (2018); Rodionov et al (2018); Rudskaia and Rodionov (2018)).

We also note that the construction of highways stimulates the development of various areas of business, such as trade, food, light industry, and services.

By 2025, it is planned to build and reconstruct about 8 thousand kilometers of federal highways in Russia, about 13 trillion rubles will be spent on transport infrastructure, this amount is included in the federal target program “Development of the Russian transport system for 2010-2025” (Lebedev et al (2018); Rodionov et al (2018); Rudskaia and Rodionov (2018)).

Since PPP projects are long-term, in this case there are significant problems with attracting financing in the necessary volume and for the right term. Standard & Poor's assesses the prospects for the development of relationships between partners and analyzes the risks that may arise. Also in the near future, she intends to develop a rating of Russian PPP projects that will enter the stage of implementation and organization of financing. In the future, this will contribute to expanding the financing tools for projects implemented under the PPP framework. It is clear that the main problem of PPPs is that the concession agreements may last decades before the final sale of the facility, while for banks lending for more than 15 years is associated with significant risks associated mainly with the borrower (Lebedev et al (2018); Rodionov et al (2018); Rudskaia and Rodionov (2018)).

In this case, if the project is assigned a high rating by a well-known agency, this will increase the confidence of interested investors. Then, even if for some reason the state does not fulfill or defer the fulfillment of part of its financing obligations, with the help of funds already raised, the projects will still be able to be completed. At this stage of the development of partnerships in Russia, it is time to move from the question of whether public-private partnership in the country is possible to practical application PPP mechanism and tools for implementing large investment projects, with a discussion of the terms of their payback, profitability. At the same time, experience shows that it will take a lot

of time to create a really working mechanism that allows solving complex strategically important tasks for the state.

An analysis of the formation of partnerships in the UK shows that the creation of PPP took more than two decades, and currently there is further improvement and development of new models of PPP.

Research Methodology

If in the overwhelming majority of works devoted to the mathematical aspects of the theory of cooperative games, the characteristic function is considered to be initially known, then in applied economic and mathematical studies the complex of problems associated with the methods of its construction acquires fundamental significance.

As is known (Moulin E. (2011); Moulin E. (2011); Owen G. (2008)), one of the most widely used methods for constructing the characteristic function of a cooperative game with transferable utilities is based on finding its values as the results of solving auxiliary non-cooperative games. Namely, each of the potential coalitions of players $S \subset I$ has "rational" reasons to evaluate its utility (or, in other words, the utility that it has reason to rely on in the event of its actual formation) as the price of a coalition-free antagonistic game G with two "integrated" participants: S and I \ S, uniting individual participants ($i \in I$).

Many of the strategies for these integrated players are defined as

$$Z_S = \Pi_{i \in S} Z_i \text{ and } Z_{i/S} = \Pi_{i \in I/S} Z_i,$$

and utility (wins) in some situation z as

$$U_S(z) = \sum_{i \in S} u_t(z) = -U_{i/S}(z),$$

where u_t are the individual utilities of the players (before the formation of coalitions).

Accordingly, the value of the characteristic function for the coalition S is found as

$$v(\{S\}) = U_S(z^*) = \sum_{i \in S} u_t(z^*) = -U_{I/S}(z^*),$$

where z^* is the equilibrium (solution) in the game S, against I \ S.

In the case of a game-theoretic model of public-private partnership, the described approach, with rare exceptions, turns out to be unproductive. This is primarily due to the fact that precedents for the emergence of "anti-coalitions" I \ S for any coalitions S are uncharacteristic. Moreover, the hypothesis that the interests of a possible coalition S and other participants are directly opposed is extremely unlikely. Thus, we conclude that when constructing PPP models, the task of constructing a characteristic function can be solved solely on the basis of an analysis of individual financial and economic characteristics of separately considered projects. Attempts to construct "universal" recommendations, as a rule, lead to inadequate solutions that objectively do not allow us to reflect the real points of contact and disagreement of the interests of potential participants in partner associations.

The task of constructing a characteristic function in the context of a cooperative game-theoretic model of PPP breaks down into two principal stages: determination of the financial and economic indicator laid down in the base for measuring the characteristic function; construction and verification of methods for calculating the values of the characteristic function for all kinds of (potential) participants in a public-private partnership.

As a basis for measuring the characteristic function, various financial and economic indicators can be proposed. In the general case, one can take the proceeds obtained from the results of the project, if there is some specifically designated level of revenue when concluding a concession agreement, which is unlikely in a significant number of cases. This is mainly due to the fact that PPP projects, being long-term, often over 30 years old, will generate income from some year of the project until its completion, and then the project will generate operating income. Thus, in general, it is possible to calculate the forecast value of income using the net present value method (NPV).

Imagine that it will take $(t=\overline{1,T})$ years to implement the project, and the cash flow for the project in the t-th year will be CF_t, the profitability for the project is i, the growth rate is g, in this case the net present value for the project will be as:

$$NPV=\sum_{t=1}^{T}\frac{CF_t}{(1+i)^t}+\frac{CF_{t+1}}{(i-g)(1+i)^T}.$$

The net current discount found in a similar way, discounted by years of the project, could act as the value of the characteristic function.

However, if the profitability required by investors can be calculated on the basis of the CAPM model, then the data on the cash flow of PPP projects are mainly confidential information. Thus, it turns out to be rather difficult to use this indicator, mainly due to the lack of data for its calculation.

On the other hand, you can take the indicator of income that will be obtained during the operation of the object obtained as a result of the project. For example, it may be rental payments received by companies participating in the project. Such an indicator can be calculated if there is information relating to the statistical and predictive. In particular, on the road construction project, such information will be: the number of cars traveling on this road per day, and the estimated fare for each type of car. However, we note that the use of such an indicator is not entirely justified, since it will not take into account income received before the start of operation of the construction project. However, this approach does not have an important disadvantage of a lack of information for its calculation. You can also use the indicator of net undiscounted income, in which case you should also take into account such an economic parameter as expected return. It is advisable to do this when it is possible to conduct a comparative analysis of a number of projects in order to determine some indicator that allows in future to calculate the total undiscounted income. This approach is quite adequate and makes it possible to overcome the inaccessibility of information on project parameters.

Suppose that the participation of an investor in a project in the simplest case will be completely determined by the benefit expressed in monetary form, which he will receive from investing his funds in it. The project income will be an estimate of the net total undiscounted income, since, as previously indicated, the real data on project income is in most cases confidential information. To overcome this problem, a comparative analysis of projects carried out in St. Petersburg was carried out. In this regard, the values of capital costs and undiscounted net total income were studied for a number of similar projects, taking into account the criteria for the payback period and the level of profitability of the investor's own funds. The project average ratio of undiscounted net total income to capital costs was determined: $\text{average}\left(\frac{NDTNI_j}{CAPEX_j}\right)\approx 1{,}8$.

This value was used to obtain an adequate estimate of the undiscounted net total income for the projects under the PPP model (Kudryavtseva et al (2018); Lebedev et al (2018); Rodionov et al (2018); Rudskaia and Rodionov (2018)). The approach described above seems to be the most preferable option for calculating the values of the characteristic function, since it can be used for most of the ongoing projects.

Let us present the calculation procedure in a general form. So, investors are forced to unite in a coalition for the implementation of the project, this coalition according to the results of the project receives a certain amount of money. The values of the characteristic function will be found by grouping agents by different coalitions.

In the game-theoretic model, in addition to many participants, there are also l many projects $(l \in L)$.

Each project proposed for implementation will be characterized with c_l capital expenditures (CarEx) and a calculated estimate of the net undiscounted total income p_l that it will bring to investors.

In turn, investors will have a certain amount of money to invest in projects, $D = \{d_1, d_2, ..., d_n\}$.

The value of the characteristic function will be an estimate of the net undiscounted total income of the coalition from its projects. Moreover, we note that a situation may arise when coalitions will be profitable to invest financial resources in several projects simultaneously $(L = 2^L)$.

In this case, the value of the characteristic function for this coalition will correspond to the income received from the joint implementation of these projects. Then she will receive a greater total income than if she invested money in only one project, which would bring more profit than others.

However, with the simultaneous execution of projects, the coalition's gain will be greater.

Thus, the characteristic function in such a cooperative game based on the PPP model has the following form:

$$v(S) = \max_{L' \in 2^L, \sum_{i \in S} d_i \geq \sum_{i \in L} c_i} \left\{ \sum_{I \in L} p_I \right\}.$$

The characteristic function of the coalition S is equal to the sum of the estimates of the net undiscounted total income for those projects (d) for the implementation of which the corresponding coalition has a sufficient amount of initial funds (starting capital), i.e.

$$\sum_{i \in S} d_i \geq \sum_{i \in L} c_i .$$

We give an example of the use of this general methodology and the calculation of the net undiscounted total income indicator for a cooperative game with three participants. The names of the projects and their main parameters necessary for further calculations are presented in the table one.

Table 1: Casual investment projects sample for Spain

Objects	Capital costs, mln. euro	Net total undiscounted income estimation, mln. euro
Burgos Hospital	275	495
Hospital General de Toledo	300	540
Autovia de Ademuz CV-35	200	360
Granada Light Railway	230	414

Source: www.infra-news.com

There are also three potential participants who possess funds in the amount indicated in table 2 (data on investment volumes were obtained by expert estimates (Kudryavtseva et al (2018); Lebedev et al (2018); Rodionov et al (2018); Rudskaia and Rodionov (2018)).

Table 2: Participants' investment means

№	Agents	Money means, mln. euro
1	Investor 1	185
2	Investor 2	170
3	Investor 3	155

Source: calculation on www.infra-news.com information base

In accordance with the methodology for the formation of the characteristic function, the first stage is that all possible coalitions are formed, and for each coalition of participants the amount of money that they jointly own is calculated. For this amount, players can implement a subset of projects (see table. 3).

Table 3: Coalitions money means

Coalitions variants	Money means, mln. euro
{}	0
{1,}	185
{2,}	170
{1, 2,}	355
{3,}	155
{1, 3,}	340
{2, 3,}	325
{1, 2, 3,}	510

Source: calculation data

Thus, a subset of projects is formed that can be acquired by coalition members. This can be either a single project or several projects, in accordance with the condition of sufficient funds to pay for the capital costs of the project. Consider an example for one coalition {1,2,3}. She has cash in the amount of 510 million euros. In this case, this coalition is suitable for all projects worth less than or equal to 510 million euros, as well as groups of projects whose capital expenditures also do not exceed the available amount of money. Thus, this coalition can implement either individual projects or a group of projects, which is more profitable. So the projects "Burgos Hospital" and "Granada Light Railway" require 505 million euros of investments, as a result of their implementation will bring the coalition 909 million euros of income, which will be the value of the characteristic function for the "full" coalition of participants. Hence, in this example, the characteristic function will have the following form (see table. 4).

Table 4: Characteristic Function Values

Coalitions	Win, mln. euro
{}	0
{1}	0
{2}	0
{1, 2}	540
{3}	0
{1,3}	540
{2,3}	540
{1,2,3}	909

Source Estimated Data

Now we will consider an example of a cooperative game based on a PPP model with five participants and demonstrate how a coalition can form a subset consisting of several projects, and not one as in the previous example (Table 5).

Table 5: Projects

Objects	Country	Capital costs, mln. euro	NDTNI (Net total undiscounted income) estimation, mln. euro
Aeropuerto de Corvero	Spain	150	270
Autovila Vilanova-Manresa	Spain	181	326
Prato Signa Link	Italy	242	436
Parma Light Rail	Italy	306	551
Raims Tram	France	300	540
A88 Road concession	France	190	342
New Stadium in Lille	France	170	306
Paris Sante Prison	France	140	252
A5 Motorway	Germany	280	504
Chemnitz Court Buildings	Germany	74	133

Source: www.infra-news.com

Information on the number of PPP participants and the funds available to them is contained in the table. 6.

Table 6: Data on PPP participants

№	Agents	Money means, mln. euro
1	Investor 1	71
2	Investor 2	63
3	Investor 3	60
4	Investor 4	55
5	Investor 5	53

Source: calculation data

This example also takes data on the size of the proposed investment, based on expert estimates on the amount of invested investments.

Note that the projects are selected in such a way that when all participants are united in a coalition, their total amount of funds will not be enough to implement some of the presented in table. 5 projects. However, with increasing data on the size of investment funds, previously unrealized projects become available.

At this stage of the work, the lack of financial resources for investing in the creation of any object from the sample will not be of fundamental importance in the framework of the PPP model, since it does not affect the formation of the characteristic function of the game.

All kinds of coalitions with an indication of the amount of funds that investors of each such coalition are willing to invest in total are presented in Table. 7.

Table 7: Coalition cash

Варианты коалиций	Money means, mln. euro	Варианты коалиций	Денежные средства,
{}	0	{5,}	млн. евро
{1}	71	{1,5,}	53
{2}	63	{2, 5,}	124,00
{1, 2}	134,00	{1,2,5,}	116,00
{3}	60	{3,5,}	187,00
{1, 3}	131,00	{1,3,5,}	113,00
{2, 3}	123,00	{2,3,5,}	184,00
{1, 2, 3}	194,00	{ 1,2,3,5,}	176,00
{4}	55	{ 4, 5,}	247,00
{1, 4}	126,00	{1,4,5,}	108,00
{2, 4}	118,00	{ 2, 4, 5,}	179,00
{1, 2, 4}	189,00	{1,2,4,5,}	171,00
{3, 4}	115,00	{3,4,5,}	242,00
{1, 3, 4}	186,00	{1,3,4,5,}	168,00
{2, 3, 4}	178,00	{2,3,4,5,}	239,00
{1, 2, 3, 4}	249,00	{1,2,3,4,5,}	231,00

Source: calculation data

Further, for each coalition, we form many projects that it can implement based on the criterion of cash sufficiency. Again, consider an example for a coalition of three members {2,3,5}. She is ready to invest 176 million euros in projects. In accordance with the methodology for constructing the characteristic function of such a coalition, projects and groups of projects are suitable for which the amount of capital costs does not exceed the amount of cash available to it. A selection of the possible for implementation by the considered association of participants in PPP projects that demonstrate the process of calculating the characteristic function values for a given coalition is presented in Table. 8. In this case, the coalition has a choice: either invest in the New Stadium in Lille project, or in the Alicante Tram and Chemnitz Court Buildings project group.

Table 8: An example of the formation of possible options for the acquisition of projects

Projects	Capital expenditures, million euro	NDTNI (Net total undiscounted income) estimation, mln. euro
New Stadium in Lille	170	306
Alicante Tram + Chemnitz Court Buildings	174	313

Source: calculation data

After the formation of many projects for each coalition, a project (group of projects) is selected that brings the greatest profit to the members of the association. Accordingly, the option with the highest indicator of undiscounted net total income by years of implementation is selected from the sequence of projects. It should be noted that for a coalition, it is not just the money and capital costs of the project that are compared, and then the project with the maximum profit value is selected, and options are considered when the coalition has enough funds for two or more projects.

In this case, the total profit of the group of projects and the value of the profit of other possible individual projects are compared. Further, from them, on the principle of maximizing profit, a project or group of projects with the highest value of this indicator is selected. This value of profit is

attributed to the value of the characteristic function for a given coalition. In the example we are considering for the {2,3,5} coalition, the highest value of the total gain is achieved with the implementation of two projects, Alicante Tram and Chemnitz Court Buildings, in which case the coalition's profit will be the largest and will amount to 313 million euros, unlike the others possible options for implementing projects. For all other coalitions, the values of the characteristic function can be seen in Table. 9, they are calculated in a similar way.

Table 9: Values of the characteristic function for a game with five participants

Coalition options	Money means, mln. euro	Coalition options	Money means, mln. euro
{}	0	{5,}	0
{1}	0	{1,5,}	180
{2}	0	{2, 5,}	180
{1, 2}	180	{1,2,5,}	326
{3}	0	{3,5,}	180
{1, 3}	180	{1,3,5,}	326
{2, 3}	180	{2,3,5,}	313
{1, 2, 3}	342	{ 1,2,3,5,}	439
{4}	0	{ 4, 5,}	180
{1, 4}	180	{1,4,5,}	320
{2, 4}	180	{ 2, 4, 5,}	306
{1, 2, 4}	326	{1,2,4,5,}	436
{3, 4}	180	{3,4,5,}	270
{1, 3, 4}	326	{1,3,4,5,}	403
{2, 3, 4}	320	{2,3,4,5,}	403
{1, 2, 3, 4}	439	{1,2,3,4,5,}	540

Source: calculation data

Such a calculation of the characteristic function in the game is logically justified, proceeding from the fact that its values should represent the maximum gain of the coalition of investors formed to participate in the project. Thus, with such a formation of the characteristic function, it is important to adequately determine the financial and economic indicator, based on all available information on the projects.

However, the characteristic function can have another form, for example, the set of its values can consist only of 1 and 0. Suppose that some system consisting of n divisions has the task of jointly performing a certain amount of work. The same volume can be fulfilled either by one "main" and any (one or several) of the remaining units, or all the rest together without a "main" unit. It is necessary to determine the "fair" share of each of the units.

We construct a formal model. Assign each unit of the system in question a serial number, designating the "main" unit with number "1", other units with numbers 2,3, etc. Let S be the coalition of divisions, and I the set of different coalitions. The characteristic function in this game will have a specific form, namely, it will take the values 1 or 0. The characteristic function will be representable as follows: 1 if the work is done, 0 if the work is not done:

$$v(S)=\begin{cases}1, S=\{1,2,\ldots,n\};\\ 1, \{1\}\cap S=\text{empty}, S\neq 1, S\subset I;\\ 0; \text{in other cases.}\end{cases}$$

Note that since a game in a (0-1) -reduced form is some normalization of a cooperative game with arbitrary values of the characteristic function, we can take into account the following point. The value of the characteristic function can be interpreted as a relative measure of the players' desire for cooperation. Thus, the smaller the corresponding value of the characteristic function (great interest in integration), the more opportunities for its implementation and, accordingly, for finding all kinds of divisions. And, on the contrary, the integration of "strong" players requires an accurate search for a compromise solution taking into account the needs of such participants. Moreover, a solution may exist, i.e. there will be a sufficient number of shares, and may not exist. The problem of the existence of a solution in a cooperative game is quite interesting, especially when considering and analyzing it from an economic point of view.

Limitation

Thus, an adequately constructed characteristic function corresponding to the problem being solved within the framework of the game-theoretic model of PPP allows one to draw correct conclusions regarding the modeled relations of the partnership participants. At the same time, the unclearly formulated goal of the problem under study can lead to the erroneous appearance of this function and the impossibility of its application for further analysis. We have listed the main tasks of managing such a complex object as a state private partnership. Their solution involves the use of an adequate mathematical apparatus of the cooperative theory of games. But also when implementing the mechanism of public-private partnerships, it is necessary to consider options for solving the problem of profit distribution. For these purposes, other methods and models of game theory are used.

Significance of Research

The game-theoretic cooperative model of PPP that we have built up opens up ample opportunities in terms of analyzing the patterns of partnerships, as well as the reasons that prevent their emergence.
This model can be considered as an auxiliary mechanism in solving basic problems from the point of view of classical approaches to solving cooperative games with transferable utility: forming a coalition consisting of the number of participants necessary for the implementation of the project; determination of the share of participation (amount of surcharge) for the state in PPP projects.

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Specific Solution Search Concepts for Cooperative Game Theoretic PPP Model

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Abstract

The mechanism of state private partnership allows overcoming the limited opportunities of the state to implement social and infrastructure projects requiring the accumulation of significant financial resources. By combining with private business, the state can transfer to it some of the risks associated with investment facilities, and at the same time use the experience of the private sector in order to improve the quality of services provided and increase the efficiency of infrastructure management. The organization of PPP is a rather difficult task and depends on the correct assessment of the economic feasibility of projects and the degree of satisfaction of the partnership participants with the return on investment.

On the basis of an analytical review, the article obtained informative economic interpretations of the classic solutions of cooperative games with transferable utilities within the framework of the game-theoretic model of PPPs, which allow us to draw informative conclusions about the patterns of development of these relations in the current Russian economy.

Keywords: public private partnership; transferable utilities; game theory model

Introduction

At each stage of economic development, it is important to ensure its further sustainable functioning and increase the investment attractiveness of the business. To realize such tasks, significant investments are needed in the production infrastructure, in the development of industries such as energy, the oil and gas industry, transport, communications, roads. Sectors of the Russian economy are currently characterized by a fairly high degree of competition not only from Russian companies, but also from non-resident companies. Development and modernization of infrastructure is one of the most important tasks facing the state at present.

In the conditions of the modern Russian economy, public-private partnerships are becoming an increasingly effective way of solving both infrastructure tasks that fall under the state's responsibility and for carrying out entrepreneurial activities of private firms and companies. This is especially true in the light of fundamental changes initiated by the global financial crisis (Kudryavtseva et al (2019); Galimova et al (2019); Rudskaia and Rodionov, D. (2018); Borovkova et al (2019); Demidenko, et al (2018)); Lebedev et al (2018); Evdokimova et al (2018); Gasser et al (2017)). '

An important and significant direction of the study of the laws of development of relations between subjects of public private partnership is their analysis from the perspective of the distribution of income derived from the implementation of projects carried out by these partnerships. Considering PPP as some cooperative associations of various economic entities, we naturally come to the thesis about the effectiveness of using the theory of cooperative games for their mathematical modeling.

At the conceptual level, the game-theoretic cooperative model of private and state partnerships is based on a fairly simple and logically transparent scheme: the subjects participating in the partnership are players, the income received by them as a result of a joint project, acts as the values of the characteristic function of the game. (Demidenko et al (2018); Bataev et al (2018); Bataev et al (2018); Rudskaia and Rodionov, D. (2018); Kudryavtseva et al (2018); Rodionov and Rudskaia (2018)).

Literature Review

Based on the ideology of the game-theoretic cooperative model, we can distinguish two fundamental situations characteristic of PPP modeling procedures. (Demidenko et al (2018); Bataev et al (2018); Bataev et al (2018); Rudskaia and Rodionov, (2018); Solovieva (2019); Sosnova S. (2017)).

In the first case, partnerships are "formed" around a project representing objective economic interest for all potential participants who do not, however, have the ability to fully finance it.

Accordingly, the state acts as a source of additional financing and, of course, expects to receive its share of the subsequent income brought by the joint project. From the point of view of a cooperative game-theoretic model, the state in the described situation is fundamentally no different from the rest of the partnership and is formally included in many players. Conclusions regarding the share of state participation in models of this kind can be obtained, based on classic conceptual approaches (C-core, N-core and Shapley vector). (Pechersky and Belyaev, (2001); Matveev, (2007); Moulin (2011); Moulin E. (2011); Brusser et al (2007)).

At the same time, a qualitatively different situation is possible. It is characterized, on the one hand, by the objective interest of the state in the implementation of a large (usually socially significant project), which requires the accumulation of significant material resources of the project, and, on the other hand, by the relative disinterest of private investors in the formation of a coalition association capable of successfully completing this project .

From a formal point of view, this situation can be described as follows. By I we mean many players (investors) whose participation is objectively necessary for the successful implementation of a project in which the state is interested. For compact presentation, we will not consider situations in which a project is possible only with the participation of a subset of players. In addition, we note that this simplifying premise is not of a fundamental nature: abandonment of it will only lead to an increase in the "volume" of the model, but will not qualitatively change the conclusions obtained on the basis of the cooperative PPP model.

We will also consider that the utility (income, gain) value of the full coalition v (I) from the implementation of the project "desirable for the state" and the utility value of the sub-coalitions $S \subset 2^1$, obtained by them on some alternative projects are correlated in such a way that the game is balanced (i.e. the conditions of the Bondareva-Shapley theorem are not satisfied).

The emptiness of the C-core in the game, obtained on the basis of the cooperative PPP model, is just a mathematical reflection of the fact of the initial disinterest of private participants in an association capable of implementing a project that is desirable for the state.

Note that the motives that prompt the state to force the project under consideration are considered in this case as extra-model factors. For example, they can be determined at the previous stages of solving the process of developing an investment program. Such factors, as a rule, are caused by social functions performed by government bodies. Indeed, in a significant part of modern infrastructure projects (for example, the construction of a port in Ust-Luga, Western High-Speed Diameter), the initiative to form partnerships entirely belongs to the state side ((Demidenko et al (2018); Bataev et al (2018); Bataev et al (2018); Rudskaia and Rodionov, D. (2018); Kudryavtseva et al (2018)).

Speaking about the reasons that make local associations more attractive for private investors compared to joining a "big" project, it is necessary to pay attention to the negative role of the cost factor in the first role. A certain time elapses from the announcement of the concession tender to the identification of the winner, during which further refinement of the financial model can take place, where, among other parameters, the estimated costs are important.

In the process of establishing a winner in a concession tender, the estimated capital costs of the project can, generally speaking, increase, i.e. investors submit applications based on one amount of capital costs for the project, and as a result receive an adjusted amount of investments in excess of the initial capital costs. So, in the construction project of the Western High-Speed Diameter, the estimated volume of investments grew 2.5 times. Initially, when the concession tender was announced in 2016, it amounted to 84 billion rubles, and by 2008 it had grown to 212 billion rubles. Obviously, the very possibility of such "variations" becomes for the investor a strong argument in favor of the decision to refuse to participate in the project (Bataev et al (2018); Bataev et al (2018); Rudskaia and Rodionov, D. (2018); Kudryavtseva et al (2018) Pichtel (2014)).

Another factor causing the lack of interest of private investors in joining the "big" coalition is the instability of the modern stock market. Its impact is especially visible in situations of free circulation on the stock exchange of a special project company (SPK), created as part of a PPP project. A fall in stock prices inevitably leads to a depreciation of the portfolio of projects owned by this SEC. Thus, the value of the share of equity in ongoing projects in monetary terms is reduced, while the percentage ratio of equity and borrowed capital remains unchanged, which means an increase in capital costs, as well as the search for new sources of financing. The increase in financial risks, in turn, results in the refusal of private investors to participate in the coalition project.

This means that local coalitions may turn out to be "more profitable" for individual market participants. In this case, the situation of instability of the coalition of all participants is analyzed, which leads to a variant of a cooperative game with the absence of a C-core (Bataev et al (2018); Bataev et al (2018); Rudskaia and Rodionov, (2018); Solovieva (2019); Sosnova S. (2017)).

At the same time, uniting the participants into a "full" coalition, which could solve major socially significant problems, turns out to be less profitable for certain private sector entities compared to smaller projects, but having a higher attractiveness for them. In this case, if the state does not interfere with private investors, a "full" coalition may cease to exist.

The social significance of a project is assessed by the state, depending on the degree of importance of the project, it can take on a certain share of financial investments. Or to finance investors with the aim of uniting them into a "full" coalition and excluding the possibility of any member withdrawing from it. This will be of fundamental importance at the stage of selecting investors for the project. That is, if a situation arises when the number of applications for participation in the tender is less than the number of those who have expressed interest in implementing the project, while the submitted applications with the indicated amounts are not enough for its implementation, in this case the state can intervene and stimulate investors to participate mainly with point of view of its implementation for the project community.

Within the framework of the described system of relations, the state can no longer be (due to the objective discrepancy of its interests, goals and objectives) included in the composition of players (potential participants in the partnership). On the contrary, based on the economic content of the described problem, it should be considered as a separate entity that solves the problem of "encouraging" players (private investors) to create a large (complete) coalition that is able to implement the project necessary for the state.

In this context, the problem of determining the necessary costs that the state should incur, stimulating the process of forming a large coalition, looks quite natural.

In our opinion, the following approach can be formulated to solve this problem within the framework of a cooperative game-theoretic model of PPP. Consider this approach.

Research Methodology

The concept of the ε -core as a continuation of the concept of the C-core

One of the main directions of this study is the identification of sustainable solutions that belong to the so-called game kernels (C-core and smallest C-core). Such a decision (profit distribution) is stable in the sense that it is not profitable for any of the coalition S to separate from other players and distribute the gain v (S) among the participants. The C-core is one of the most important concepts in the theory of cooperative games; its definition is based on the ratio of dominance on a variety of divisions. The very concept of the nucleus has an economic content, since it represents the outcome of a cooperative game that cannot be improved by any coalition of participants, that is, it can be said that the nucleus is a state of equilibrium (Matveev, (2007); Moulin (2011); Moulin E. (2011)).

The c-nucleus was introduced by Gillies. By definition, the C-kernel of a game v is the set of all its non-dominated partitions. It is said that dividing x dominates dividing y if there is a coalition S such that d: dominates dividing y from coalition S. Dividing x dominates dividing y from coalition S if two conditions are true: for any member of the coalition S, sharing x will be better than sharing y, that is, $x_i > y_i, \nabla i \in S.$

Formally, the definition of C-nucleus is as follows:

$$C(v) = \left\{ x \in R^1 \middle| x(I) = v(I); x(S) \geq v(S) \right\},$$

for all $S \subset I$, where R is the set of divisions.

Other symbols: assign each unit of the system in question a serial number, designating the "main" unit with number "1", other units with numbers 2,3, etc. Let S be the coalition of divisions, and I the set of different coalitions. By division we mean a vector $\{x_{1,}\ x_{2...}x_n\} \in R^n$, satisfying the next conditions: the condition of individual rationality, reflects the natural requirement that, as a result of the distribution of the coalition's gain, each of its participants should receive no less than it can "earn" individually, without joining any coalition. Equality (2), called the condition of group rationality, formalizes the requirement that the income of a "large" (full) coalition should be distributed among all participants in the game without loss (Matveev, (2007); Moulin (2011); Moulin E. (2011)).

However, it is difficult to establish that a certain partition x belongs to the C-core from this definition, since it is necessary to make sure that there is no such partition y that y dominates x, and the set of divisions is infinite in the general case. In addition, in a cooperative game the C-kernel may be empty, in which case it is not possible to determine the set of undominated divisions (Varnavsky (2015); Varnavsky (2016)).

This approach to solving the problem of "the size of state influence" on the process of forming a large coalition is based on the concept of a ε core. This approach of a cooperative game is the set of divisions satisfying the conditions

$$C(v) = \left\{ x \in R^1 \middle| x(I) = v(I); x(S) \geq v(S) - \varepsilon, \forall S \neq O, I \right\}$$

The notation is identical to the notation in the C-core approach.

According to this definition, the ε -nucleus coincides with the C-nucleus for $\varepsilon = 0.$

Besides, $C_{\varepsilon}(v) \supset C_{\varepsilon'}(v)$, if $\varepsilon > \varepsilon'$, moreover, the inclusion is strict if $C_{\varepsilon}(v) \neq \text{emptyset}$.

Obviously, $C_{\varepsilon}(v)$ has many sharing strategies for large enough ε and, starting with some ε (maybe negative) becomes empty.

Thus, the ε- value determines the moment from which either the C core appears in the game or it becomes empty depending on ε various values.

Traditionally, the value ε in economic applications of the theory of cooperative games is interpreted as “additional” costs arising from the formation of small coalitions (when $\varepsilon > 0$) or, conversely, as additional bonuses received by them (when $\varepsilon < 0$).

In a PPP situation, values ε can be considered as quantitative characteristics of the impact of government on private investors, aimed at reducing the attractiveness of projects for them, involving local associations (small coalitions), and, accordingly, increasing interest in participating in a PPP project (association within a large coalitions). An example of such impacts can serve as measures to strengthen taxation, increasing the cost of "local" projects, and the introduction of additional conditions that cause an increase in indirect costs. Also, government intervention in the processes of PPP formation can be carried out through various forms of tariff policy.

Thus, when potential participants in the partnership do not see the need to create a “full” coalition, since their interests are better taken into account in other local coalitions, which is expressed in the form of the size of the winnings of such coalitions, it seems advisable to use an approach based on the concept of the ε core to determine the actions of state bodies acting as an external force initiating the emergence of a large coalition.

It should be noted that, within the framework of the public private partnership model, a situation may arise when the state needs to implement not a large project, but a series of projects that require small capital costs, but are socially important. In this case, the state is no longer interested in uniting investors into a large coalition, while investors themselves are interested, since the implementation of the project with full cooperation will bring them more income than if they join in the sub-coalition. In other words, if investors choose from a number of investment projects, they will choose a large project and form a “complete” coalition for its implementation, other projects will be unattractive to them.

Then the state can increase the attractiveness of a number of small projects by subsidizing and providing tax benefits for less capital-intensive projects requiring a small number of participants for their implementation, in which case the value - $\varepsilon < 0$.

Similar situations can also be considered and analyzed within the framework of the PPP model, however, in the framework of this study, we are interested in modeling PPP relations in the absence of potential investors' desire to unite into a “full” coalition.

Practical Results

This idea can be illustrated using the following reduced example of a PPP model with three participants. The characteristic function of the cooperative game obtained in the framework of this model is presented in table 1.

The model under consideration, despite its simplified nature in terms of proportional proportions of coalition utility values, corresponds to the real economic situation that arose during the

implementation of PPP projects in the UK in 2015-2017 (Morkovina et al (2017), Nabukeera (2016); Jacobsen et al (2013); Liu (2015); Mirzadeh and Birgisson (2016); Button and Cold (2019); Behrendt et al (2016)).

Table 1: Finding ε figure in game

Coalition	V(S)	V(S)-ε	X(S)
{}	0	0	0
{1,}	0	0	3
{2,}	1	1	1
{3,}	2	2	2
{1,2,}	4	4	4
{1,3,}	5	5	5
{2,3,}	3	3	3
{1,2,3,}	6	6	6

Source: calculation data

Based on the definition of the ε-core, the standard approach to solving the problem of finding the ε-value will be the use of an adequate apparatus of mathematical methods, most of which are presented in numerous mathematical packages.

For example, to search for the ε value of a and the variant of the division lying in the ε -core, you can use the MS Excel add-on "Search for a solution". The approach implemented in this add-on is based on solving an optimization problem with given conditions on the basis of the theoretical definition of the ε - core.

The sought value ε is 0, thus, $C_{\varepsilon}(v)=0,$ i.e. ε - the core in such a game coincides with the C-core.

Let us analyze several examples of cooperative games with three participants, within the framework of the conditionally theoretical model of PPP, in order to show various options for the dominance of player coalitions. For each game in question, we find a division belonging to the β-nucleus, which is the distribution of the gain received by the players in the event of joining in a "full" coalition. In the examples below, the C-core will be empty, therefore, local coalitions of participants are strong, in which case the value of s will characterize the amount of "surcharge" to the players to create a "full" coalition. Since the cooperative games under consideration present various options for the dominance of coalitions, it is interesting to conduct a comparative analysis of the obtained values ε and examples of dividends located in the ε - core.

Imagine that for the implementation of a major PPP project, it is necessary to unite all possible participants and to prevent the emergence of sub-coalitions of players, that is, the task of finding the amount that will be enough to stimulate investors to create a "complete" coalition. Thus, it is necessary to find the ε value in the described game and the division located in the ε-nucleus. To define a cooperative game, it is necessary to determine its characteristic function. There are three investors with certain financial resources that they are ready to invest in the projects proposed to him. In this case, it is a vector (5; 3,5; 3). The following table shows the distribution of the required capital costs for each PPP project (table 2). The data used in the described model conditionally correspond to the real situation of the construction of a conference center in Dublin ("Dublin International Conference Center"), completed in 2016. This example is reduced in terms of proportional ratios of the size of the share of investments of investors, project parameters and the gain of possible coalitions.

Table 2: Projects parameters in conditionally-theoretic model

Projects	Capital costs, $ mln.	Net total undiscounted income estimation, $ mln.
Project 1	8,5	24
Project 2	6,5	20
Project 3	8	24
Project 4	11,5	25

Source: calculation data

Thus, the characteristic function for an individual coalition, including the "empty" and "full" coalitions, in each of the examples considered below is determined based on the total amount of monetary resources of the coalition that its participants are willing to invest. Next, from the number of projects, such a project is selected that the necessary capital costs for it are no more than the available funds from the coalition of investors. In accordance with the selected project, the value of the characteristic function will be equal to the estimate of the net total undiscounted income for this project.

After constructing the characteristic function in the game, it is possible to determine if the C-core exists, find the Shapley vector, the ε-core.

1. A game with symmetric coalitions
The characteristic function is determined in such a way that the winnings of local coalitions coincide (see Table 3):

$$v(1,2) = v(2,3) = v(1,3).$$

Table 3: Characteristic function figure for game with three participants

Coalition	**V(S)**
{}	0
{1,}	0
{2,}	0
{3,}	0
{1,2,}	20
{1,3,}	20
{2,3,}	20
{1,2,3,}	25

Source: calculation data

The C-core in a game with such a characteristic function is empty, since participation in sub-coalitions is more profitable than joining a full coalition, i.e. investors get more income if they join in coalitions in two, than otherwise.

Table 4: Finding ε figure in game with three participants

Coalition	**V(S)**	**V(S)-ε**	**X(S)**
{}	0		
{1,}	0	-3	8
{2,}	0	-3	8
{3,}	0	-3	8
{1,2,}	20	17	17
{1,3,}	20	17	17
{2,3,}	20	17	17
{1,2,3,}	25	25	25

Source: calculation data

The desired ε is 3.33, the calculated data are presented in table 4. Therefore, it is necessary pay 3.33 units to coalitions to motivate investors to merge into a "full" coalition. In this case, the division belonging to the g-core is as follows (8.3; 8.3; 8.3). The Shapley vector in such a game is (8.3; 8.3; 8.3).

In this example, the shares found on the basis of different approaches coincided. This circumstance may indicate that in the case when in a cooperative game there are only symmetric subcoalitions, the solution to the problem of finding the division located in the ε-core will coincide with the Shapley vector.

2.A game with one “dominant” coalition: the characteristic function is determined in such a way that the gain of one of the local coalitions is dominated by the other two:

$$v(1,2) > v(2,3) = v(1,3).$$

We will check the pattern of change in winnings for individual investors in case of additional ε payments to them, the calculated data are shown in table 5.

Table 5: Finding the ε value in a game with three participants

Coalition	V(S)	V(S)-ε	X(S)
{}	0	-	-
{1,}	0	-5	10
{2,}	0	-5	10
{3,}	0	-5	6
{1,2,}	24	19	19
{1,3,}	20	15	15
{2,3,}	20	15	15
{1,2,3,}	25	25	25

Source: calculation data

In this game, the value ε is 4.66, the division found (9.6; 9.6; 5.6).

The Shapley vector in the game in question is (9; 9; 7). In this case, it is more profitable for two investors to join a “full” coalition with a ε core-based distribution.

3. A game with two “dominant” coalitions: The characteristic function is determined in such a way that the win of two of the local coalitions dominates the last one coalition:

$$v(1,2) = v(2,3) > v(1,3).$$

Table 6: Finding values ε in a game with three participants

Coalition	V(S)	V(S)-ε	X(S)
{}	0	-	-
{1,}	0	-6	11
{2,}	0	-6	7
{3,}	0	-6	7
{1,2,}	24	18	18
{1,3,}	24	18	18
{2,3,}	20	14	14
{1,2,3,}	25	25	25

In such a game with an empty C-core it is 5.9 (see table 6), the found partition is (11; 7; 7), while the Shapley vector is (9.6; 7.6; 7.6) .

Here is another situation when the distribution based on the division lying in the ε-core is not beneficial for the two investors, as their winnings are reduced. However, the gain for the first investor is much better in the case of distribution based on the ε-core, i.e. if the first investor is a "strong" player who possesses a certain kind of resources, for example, an administrative resource, then he can lobby for the necessary distribution of profits.

When considering cooperative games with three participants, in most cases, sharing belonging to the ε-core is more preferable for individual players than sharing found on the basis of the Shapley vector. A more stable situation is when both divisions found on the basis of different approaches coincide. In this case, the contradictions that may arise between individual investors; are smoothed out, and the adequacy of the distribution of profit from the project is confirmed by two approaches to solving the problem of finding the distribution of income from the project.

Consider a summary table of the results of the three examples described above, on its basis we analyze the benefits and losses of each investor when using two approaches to finding interesting dividends, including when local coalitions are strong (see table 7).

Table 7: Search Results for Three-Party Games

A game	with symmetrical coalitions	with one dominant coalition	with two dominant coalitions
E-core sharing	(8,3;8,3;8,3)	(9,6;9,6;5,6)	(11;7;7)
Shapley Vector	(8,3;8,3;8,3)	(9;9;7)	(9,6; 7,6; 7,6)
Value ε	3,3	4,6	5,9

With an increase in the number of dominant coalitions, the ε value grows, this can be interpreted in such a way that in order to motivate investors to join a "full" coalition, more funds will need to be spent, and their size will increase along with an increase in the number of dominant coalitions. This means that it would be more profitable to level out the possibilities of forming a large number of local sub-coalitions that would be "privileged" with respect to others. The smallest value ε is obtained in a cooperative game where only symmetric coalitions exist. Thus, if the state is interested in reducing the amount of the additional payment to investors in order to stimulate their unification into a "full" coalition, it is necessary to choose investors so that their possible participation in the sub-coalitions is not dominated by any other association, i.e. the winnings of the sub-coalitions coincided. Therefore, we can single out the fact that the dependence of the ε - value on the number of "dominant" coalitions is directly proportional, which should be taken into account when conducting concession tenders for the choice of investors for the implementation of the PPP project.

When there is one dominant coalition in a cooperative game, it is necessary to determine which player is the most "strong". In this case, the "strong" participant will be the one with the most cash for investing.

Thus, in the games considered above, investor No. 1, who has 5 units of monetary resources, is a "strong" player. In a game with one "dominant" coalition, this participant receives 9 units in the case of income distribution based on the Shapley vector, and 9.6 units in the distribution based on the s-core concept, which is 6.6% more. The coalition {1,2} is "dominant" in the game, in addition, investor No. 2 has 3.5 units available for investment in projects and is the second "strong" player. The weak player in this example is represented by investor No. 3 with 3 monetary units. Since the {1,2} coalition is "dominant," players 1 and 2 receive more than the third player in the distribution, both in the case of calculating the Shapley vector and in determining the partition belonging to the ε core.

Thus, with this option, investor No. 1 and No. 2 will lobby for the distribution found on the basis of the ε core, despite the fact that with such a distribution, the gain of investor No. 3 decreases from 7 units to 5, 6 units, those. by 25%.

However, he will not be able to get more, because he does not take part in the "privileged" coalition. The situation may change if investor No. 3 has an additional resource that will affect the possible distribution of income. For example, if he possessed an administrative resource, then he could lobby for the distribution of profits based on the calculation of the Shapley vector and get 7 units. However, in this case, only one option is considered for possible dominance over other participants in the partnership, namely the possession of a financial resource.

In the example of a game with two "dominant" coalitions {1,2} and {1,3}, a ε-core sharing is beneficial only to investor No. 1, he receives 11 units instead of 7 units, which is almost 15% more than his Shapley vector distribution gain. While participants 2 and 3 get more precisely when dividing in the form of a Shapley vector. However, investor No. 1 is the "strong" player, and therefore income distribution will be based on the -nucleus, otherwise all participants will not unite in a "full" coalition, and it will be more profitable to participate in local "dominant" coalitions.

Thus, if there are two or more "privileged" coalitions in the game-theoretic model of PPPs, then it is not obvious that the distribution of project income based on the divide found in the calculation of the ε-core will be more profitable for most participants than the distribution based on the Shapley vector , but the "strong" players will receive more monetary units. The task of the state in implementing a socially significant project is to make its implementation profitable for "strong" investors so that they are ready to unite in a "full" coalition.

Limitation

The main comment on the described approach to finding the share of government spending in order to encourage investors to create a "full" coalition is that in the situation of state motivation for the partnership participants, it will be necessary to "add" the value s of each local coalition, and this value will be the same for any subcoalition. However, not all local coalitions will constitute a "counter-threat" to the creation of a large coalition of participants in the partnership.

In this case, we would like to know how much the surcharge should be, which is necessary to make the participants serve as an incentive for unification and neutralize the existing advantages of local coalitions. When considering the problem from this perspective, there arises the option of modernizing the proposed concept ε-core. It is necessary to find the amount of surcharge only to members of the "full" coalition. At the same time, the winnings of local coalitions will not be considered, since within the framework of the proposed approach they will not have a direct impact, since they will remain unchanged.

Significance of Research

The importance of the problem of constructing a characteristic function determines the problem of its determination, which consists of two stages. Based on the considered options for constructing this function, an adequate methodology for its formation was proposed, which allows us to analyze the relations of the partnership participants in terms of the resulting estimate of the net total undiscounted income.

Consideration of classical solutions to cooperative games (C-core, smallest C-core, N-core, Shapley vector) allows us to highlight the disadvantages and advantages of such solutions, as well as to obtain their interpretation in terms of the mathematical model of PPP, based on the principles of proximity of various solutions, which can be a good enough reason for the participants in favor of a particular partnership.

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Integration of the Manufacturing Operations Management Subsystem into a Unified Information System at the Enterprise

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Abstract

The procedure of integration of the Manufacturing Operations Management (MOM) subsystem into a unified information system of an enterprise is considered. As one of the main integrated subsystems at the enterprise, the subsystem of planning, management and monitoring of production is considered, which allows you to organize interaction with other allied subsystems used by consumers of enterprise's products. The structure of the subsystem is considered in details, and the structure of logical connections between the subsystem and allied ones is determined. The list of data groups for exchange between the considered subsystem and allied subsystems is formed. The scheme of interaction of PMM subsystem with allied subsystems in terms of the functions performed is proposed. The proposed integration procedure will allow the company to synchronize all types of productions, logistical support; to reduce the time and complexity of monitoring and analyzing the state of production processes, as well as to reduce the response time of management services to changes (deviations) in production schedules.

Keywords: Integration, Information System, Planning, Monitoring.

Introduction

Currently, most high-tech industrial enterprises are actively engaged in the transition to a digital form of interaction between all participants in the life cycle of manufactured products. This process is quite laborious and requires all participants to be involved in a unified information environment or a corporate system with a clear separation of functions, rights and responsibilities.

The general concept is to form a unified information environment (UIE) to ensure the development and production of the product. The UIE is designed to automate the collective work of specialists and heads of design departments, departments of design preparation of production, technological preparation of production and technological bureaus of the workshops of the main production during development, preparation of production and support of product operation.

The organization of a unified information space for managing the activities of the enterprise is carried out in order to ensure control of the release of finished products, product repairs and upgrades as well as operational monitoring of the state of production activities.

Literature Review

The level of development of life cycle management technologies in world practice is quite high, however, the first experience in introducing and applying such technologies was obtained abroad. In the Russian Federation, there is a shortage of research on this topic, especially works of a complex

nature. This deficit is caused by a number of internal and external factors in the functioning of production systems, but in connection with the stable positive dynamics of high-tech industries development, research in this area is of particular relevance. Among specialists working on this topic, it is necessary to note the works of C. Larman, V.R. Basili (2003), V.N. Evdokimenkov, D.A. Kozorez, M.N. Krasilshchikov (2019), O.N. Dmitriev S.V. Novikov (2019), A.I. Kanashchenkov, S.V. Novikov , D.S. Veas Iniesta. (2019), B. Mandal (2011), A. Telishev, G. Mingaleev, R. Galyamov. (2019), I.Sh. Sharafeev, I.M. Zakirov (2014), T. Wallace (2001) and others.

Methodology

The methodological basis of this research is the system and process approaches to the implementation of measures to improve the industrial enterprise effectiveness at all stages of its products' life cycle.

The creation of a Unified Information System (UIS) is a complex project that provides processes related to the design, production, maintenance and operation of products. As part of the UIS, as a rule, a unified engineering information space is created, which includes a distributed virtual design bureau and digital production (Dmitriev O.N., Novikov S.V., 2019).

Creating a unified enterprise information system allows you to:

- Synchronize among themselves all types of productions (procurement, machining, galvanic, thermal, assembly, repair, modernization), logistical support and provision of complementary parts;
- Reduce the duration, labor effort of monitoring and analysis of production processes state, as well as reduce the response time of the enterprise management services to changes (deviations) in production schedules;
- Reduce losses in processes and accelerate informed management decisions;
- Implement a specific-order accounting system in accordance with applicable law;
- Provide real-time monitoring of labor costs.

The list of tasks to be solved within the framework of the creation and implementation UIS at an enterprise include:

1) Production and supply management in the UIS;
2) Formation of orders for the product range assembly, indicating its composition and manufacturing technology;
3) Synchronous planning and calculation of production and supply schedules;
4) Accounting of the actual performance of production work.

As part of the study, the UIS is presented as an automation object, characterized by a certain set of indicators.

For example, the technical indicator of the automation object is a unified technological space for all production subdivisions during the planning and accounting process in production. The unity of the technological space is to ensure that all operations for all types of productions involved in the manufacture of products are performed, including auxiliary production for tooling, related to the process of creating a production plan and accounting for the implementation of production tasks in a Unified Information System.

Production and economic indicators of the UIS is a combination of changes in labor costs and time of labor use to ensure production processes. These include the following indicators:

- 50 % reduction in the duration and labor effort of monitoring the state of production processes;
- 50% reduction in the labor effort of accounting for the implementation of production;
- Ensuring compliance with regulatory requirements.

The criteria for assessing the achievement of the goals of creating the UIS are:

- in terms of technical indicators - automation of all functions associated with the planning and accounting processes in production, putting the system into industrial operation;
- in terms of technological indicators - the unification of operations when forming a production plan and accounting for the implementation of production tasks, automation of business processes, minimizing redundant and duplicate functions;
- in terms of production and economic indicators - reducing the duration and labor effort of monitoring the state of production processes, reducing the labor effort of accounting for the implementation of production orders, the introduction of a specific-order accounting system at the enterprise.

Unified Enterprise Information system should automate:

- the process of forming the production nomenclature plan and plan for the provision of materials and purchased component parts of the enterprise;
- process of completing production tasks;
- registration procedures for start-up and release in the factory workshop (at the level of processing stage / workshop inputs), production lots, inter-workshop movements (transfer from one workshop to another, receipt at the workshop).

Implementation of the UIS should be carried out in stages, taking into account the interconnections of the production structure of the enterprise with the observance of the principle of scalability, which means ensuring the possibility of connecting structural units to the EIS, both in stages and in other work (without changing the already deployed system components) (Kanashchenkov A.I., Novikov S.V. & Veas Iniesta D.S., 2019).

The functioning of the client parts of the UIS should be carried out within the local network of enterprise subdivisions in accordance with the delimitation of user powers.

Results

At the enterprise under study one of the main UIS's subsystems designed to provide control over the release of finished products, carry out repairs and modernization of products and provide operational control over the state of production activity, is a subsystem for planning, management and monitoring of production (PMMP). This subsystem as applied to the object of study should include the following modules:

- Control over Reference Information and Product Data;
- Production Management;
- Production Logistics;
- Supply Management.

The enlarged functional affiliation of each of the modules is presented in the Table 1.

Table 1: Modules and Their Functionalities

No.	Module	Module Functionality
1	Production Planning	Allows you to plan the supply of inventory and production processes
2	Production Management	Allows you to manage discrete and assembly production, both at the inter-workshop level and at the level of workplaces,

No.	Module	Module Functionality
		taking into account resource limitations (APS – advanced planning)
3	Supply Chain Management	Allows you to manage the supply of materials and components, taking into account production requirements and restrictions associated with suppliers and supply processes
4	Product Data Management	Allows you to manage product data required to support a production management process
5	Production Logistics	Allows you to control the movement and condition of materials and production items
6	Quality	Allows you to register the results of quality control upon receipt of inventory in the workshop and for parts and assembly units of their own manufacture
7	Administrator	Allows you to configure the functionality of the subsystem, configure access rights for users

The subsystem of planning, management and monitoring of production should interact with other allied subsystems used by consumers of enterprise products (Telishev A., Mingaleev G. & Galyamov R., 2019).

A detailed elaboration of the UIS's structure and functioning should be carried out at the stage of developing technical specifications for the subsystems and described in a separate document.

Requirements for the Manufacturing Operations Management subsystem include:

1. Production and supply planning:

- formation of orders for disassembly, fault detection, repair, production and assembly of products on the basis of shipping orders, decisions on modernization and results of fault detection;
- maintaining production plan options;
- calculation (or recalculation) of the production and supply plan;
- analysis of production and supply plan options in terms of deadlines, resource requirements, purchased materials and components;
- adjustment of production and supply plans;
- approval of a production and supply plan option, launching work orders.

2. Dispatching at the level of production subdivisions (workshops):

- plan-fact of orders by workshops, by workshop entrances, by deadlines and priorities;
- configuration control and formation of requirements for issuing;
- start of work at the processing stage with the reservation of materials, third-party components, parts and assembly units;
- disassembly and fault detection;
- accounting of release and defects upon completion of batch processing in the workshop (at the processing stage);
- transfer of batches to the next processing stage or to the consuming subdivision;
- production batch separation.

3. The ability to separately account the launch, release, transfer, receipt of production orders (at the inter-workshop level). Production logistics:

- accounting of the inventory movements: acceptance from the supplier; transfer to production; transfer in production; receipt in production; launch in production; issue in production; acceptance of products, registration of defects and disassembly results; decision on defects detection and defects; separation of batches; adjustment of balances; return of not accepted parts; shipment to customers;

- accounting of the results of control of inventory items, parts and assembly units of their own production entering the workshop;
- monitoring the status, availability and movement of inventory in production at the level of inter-workshop movement.
- formation of a list of work tasks for the batches launched at the workshop level (at the processing stage);
- uploading the list of work tasks to the subsystem “Intrashop production management for the machining shop and the final assembly shop”.
- loading of true condition of fulfilling work tasks from the subsystem “Intrashop production management for the machining shop and the final assembly shop”.

The main goals of creating the subsystem "Planning and Monitoring System" are:

- synchronization among themselves of all types of production (procurement, machining, galvanic, thermal, assembly, repair, modernization), supply of materials of third-party components;
- reducing the duration and complexity of monitoring and analyzing the production processes conditions and reducing the response time of management services to changes (deviations) in production schedules;
- cost reduction and acceleration of informed management decisions;
- implementation of a specific-order accounting system;
- real-time monitoring of labor costs.

The task of creating a subsystem "Planning and Monitoring System" is to automate the following processes:

1) formation of planned orders for production on the basis of transferred orders for finished products from the subsystem Managing the Program, Projects and Cooperation (MPPC), the composition of the product and its manufacturing technology;
2) synchronous planning, calculation of production schedules and logistical support (LS) for a single calculation cycle, taking into account available resources;
3) accounting for the fact of the performance of production work and logistical operations
4) formation of tasks for the completion or manufacture of parts and assembly units, instead of inappropriate products of their own manufacture.

The implementation of the subsystem Planning and Monitoring System (PMS) is carried out in stages, taking into account the interconnections of the production structure of the enterprise with the observance of the principle of scalability, which means ensuring the possibility of connecting structural units to the PMS subsystem both in stages and within other work (without changing the already deployed components of PMS subsystem).

The functioning of the client parts of the planning, management and production monitoring subsystem is carried out within the local network of enterprise divisions in accordance with the differentiation of powers between users of this subsystem.

The Manufacturing Operations Management subsystem is deployed in the form of separate copies of ERP class software at each of the enterprise divisions.

At the same time, interaction between instances of the Manufacturing Operations Management subsystem between themselves is not provided directly.

Each instance of the Manufacturing Operations Management subsystem is hosted on the enterprise server in the internal network.

Each instance of the Manufacturing Operations Management subsystem interacts with an instance of an allied UIS’s subsystem for its enterprise.

The subsystem exchanges information between modules through the internal core of the production planning, control and monitoring subsystem.

The generalized composition of the subsystem is shown in the figure 1.

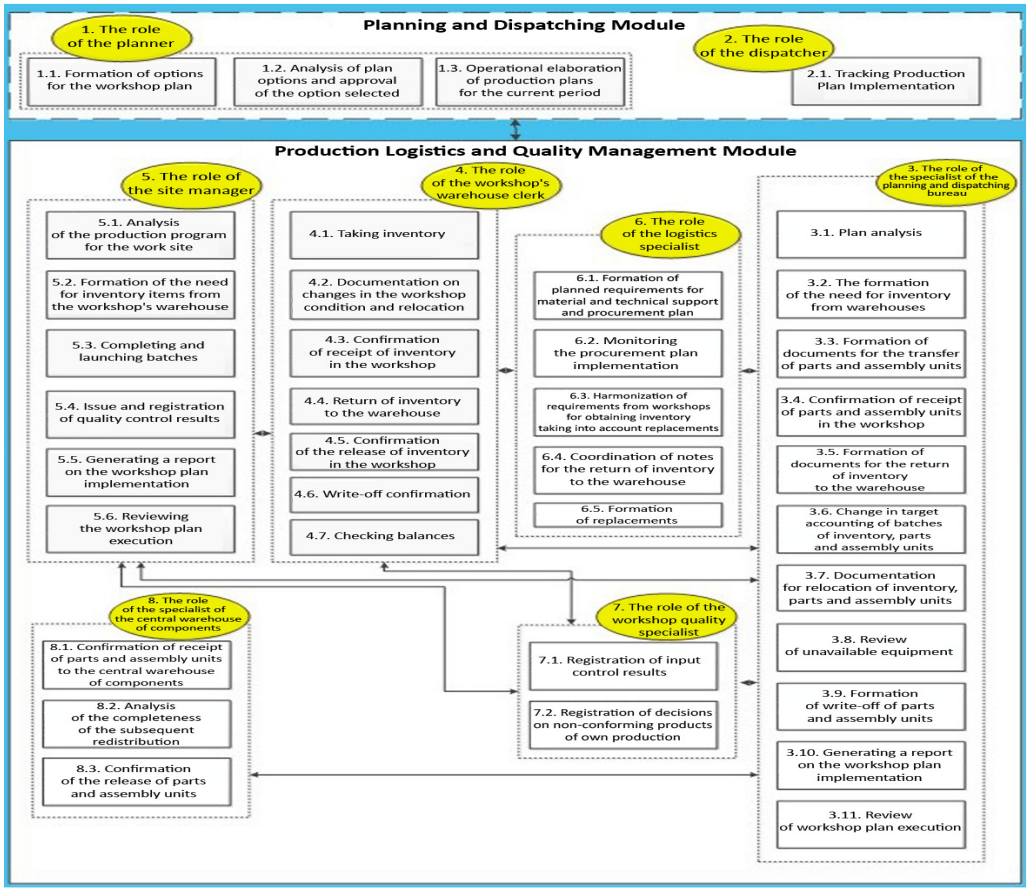

Fig. 1: The scheme of dividing the subsystem of planning, management and monitoring of production into components

For the subsystem of planning, management and monitoring of production at the enterprise under study, the following operating modes are defined:

1) regular mode, in which the UIS's subsystem provides users and their functions 24 hours a day, 7 days a week (24×7);

2) service mode, in which the UIS's subsystem does not perform its functions. The UIS subsystem goes into this operating mode in the following cases:

- scheduled subsystem upgrade;
- need for maintenance;
- failure of a hardware-software complex caused by failure of elements of a hardware or software base;
- failure of the data network and other emergency situations.

The Manufacturing Operations Management subsystem consists of one integrated ERP-class software product. Access to the modules of the subsystem of planning, management and monitoring of production is carried out using access settings for specific users.

The Manufacturing Operations Management subsystem is deployed at the enterprise in the form of separate copies of software.

The Manufacturing Operations Management subsystem is associated with other functional subsystems of the UIS indicated in the Table 2.

Table 2: The structure of logical connections between the Manufacturing Operations Management subsystem and allied subsystems

	PDM	PM	BOM	TPP	ILS	MOM	MES
PDM		→ ←	←	→ ←	→ ←	→	→
PM	→ ←		←	→ ←		→ ←	
BOM	→	→		→	→	→	→
TPP	→ ←	→ ←	←			→	→
ILS	→ ←		←			←	
MOM	←	→ ←	←	←	→		→ ←
MES	←		←	←		→ ←	

Table 2 presents the composition of the subsystems directly related to the Manufacturing Operations Management subsystem, including:

PDM – Product Data Management subsystem;
PM – Project Management subsystem;
BOM – Bill of Material subsystem;
TPP – Technological Preparation of Production subsystem;
ILS – Integrated Logistics Support subsystem;
MOM – Manufacturing Operations Management subsystem;
MES – Manufacturing Execution System.
The list of information for the exchange between the UIS's subsystems is given in the Table 3.

Table 3: List of data groups for the exchange between the Manufacturing Operations Management subsystem and allied subsystems

No.	Integrable data	Short name of the Subsystem (Platform)						Data Stream Number (Figure 2)
		Production Management	Asset Management	Operational planning	ERP-system	Product Data Management	Accounting	
1.	Units of measurement	R	N		N	S	N	4
2.	Units of measurement group	R	N		N	S	N	4
3.	Nomenclature (revision of nomenclature)	R	N		N	S	N	4
4.	Nomenclature classifier	R	N		N	S	N	4
5.	Account cost	R	N		S	N	N	9
6.	Project	R	N		N	N	S	2
7.	Project task	R	N		N	N	S	2
8.	Project task performance	S	N		N	N	R	3
9.	Enterprise organizational structure	R	R		N	S	N	4
10.	Subdivision work schedule	R	R		N	N	S	6
11.	Planned staff availability	R	N		N	N	S	6
12.	Operational staff availability	R	N		N	N	S	6
13.	Appointment of financially responsible persons	R	N		S	N	N	9
14.	Staff member	R	R		N	N	S	6
15.	Job title (position)	R	N		N	S	N	4
16.	Type of work	R	N		N	S	N	4
17.	Equipment classifier	R	N		N	S	N	4
18.	Capital asset	N	R		S	N	N	9
19.	Unit of equipment	R	S		N	N	N	7
20.	Requirement for the transfer of inventory to production	S	N		R	N	N	10
21.	Transfer of inventory to production	SR	N	R	S	N	N	9, 11
22.	Note	S	N		R	N	N	10
23.	Confirmation of receiving by the note	R	N		S	N	N	9
24.	Electronic Product Description	R	N		N	S	N	1
25.	Design documentation	R	N		N	S	N	1
26.	Notification of changes to design documentation	R	N		N	S	N	1
27.	Notification of change to PD	R	N		N	S	N	5
28.	Process description (PD)	R	N		N	S	N	5
29.	Material Classifier	R	N		N	S	N	4
30.	Composition of a product	S	N		N	R	N	8
31.	Type of defect	S	N	R	N	N	N	11
32.	Planned (manufacturing) order	S	N	R	N	N	N	11
33.	Execution of a planned production order	R	N	S	N	N	N	12

No.	Integrable data	Short name of the Subsystem (Platform)						Data Stream Number (Figure 2)
		Production Management	Asset Management	Operational planning	ERP-system	Product Data Management	Accounting	
34.	Write-off of inventory for a planned order	**R**	**N**	**S**	**N**	**N**	**N**	**12**

Table 3 applies the following abbreviations:

"S" means Source. In this case, an information system is the source of data group instances.

"R" means Receiver. In this case, an information system is a receiver of data group instances.

"SR" means Source and Receiver. In this case, an information system is the source and receiver of instances of data groups (depending on the content of data group attributes).

"N" means Not involved. In this case, an information system is not involved in processing instances of data groups at this stage of the UIS implementation.

The list of data groups for exchange, their sources and receivers can be clarified as part of building the integration solution subsystem.

The general scheme of interaction the Manufacturing Operations Management subsystem with related systems in terms of the functions performed is presented in Figure 2.

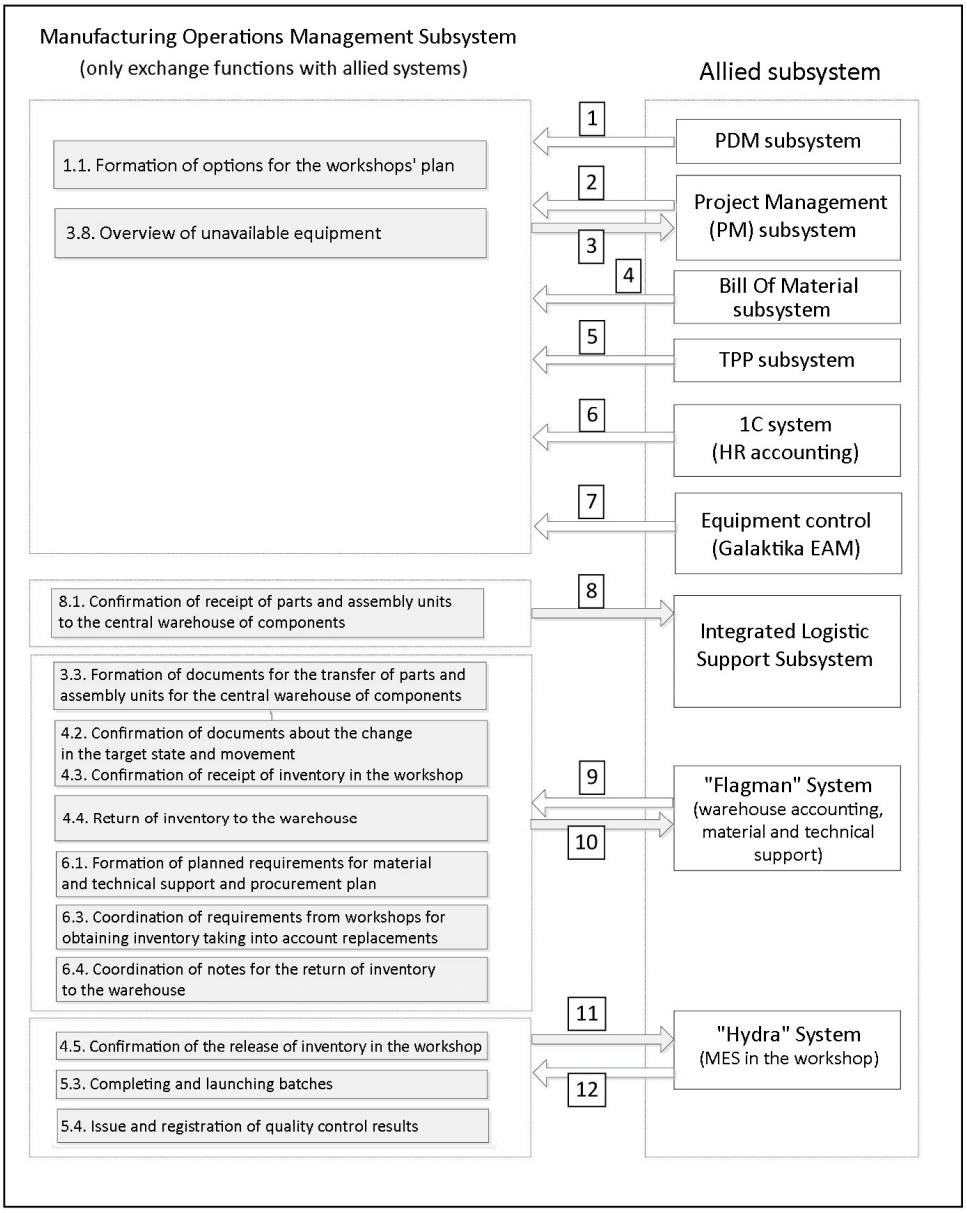

Fig. 2: Input and output information of the Manufacturing Operations Management subsystem

The input and output information of the Manufacturing Operations Management subsystem, which is valid for enterprise subdivisions, will be clarified at the next stage of the study.

The format and method of data exchange will be determined as part of the work on building the subsystem of the integration solution.

Conclusion

A detailed review of integration decisions will be presented as part of future research to build an integration solution subsystem.

The results of the project to introduce a subsystem at the enterprise are:

- a deployed and configured PPMM subsystem;
- a generated data model of the subsystem in the form of a set of files containing the necessary configuration settings and business objects;
- developed supporting documentation for the subsystem;
- conducted tests of the subsystem and trial operation, confirmed by the relevant Test Protocols;
- conducted training of personnel for the use of the subsystem.

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On Forming Shortlists of Attractive Offers from Large Databases: The Example of Purchasing A Flat

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Abstract

The Internet has enabled consumers to find basic information about many offers at very little cost. For example, databases of accommodation for sale contain information about the price, location, number of rooms and size of a flat. This allows purchasers to assess whether an offer is potentially attractive, but due to the variety of factors involved in choosing a flat (e.g. aesthetic considerations) is insufficient to make a final decision on such an important purchase. In such situations, automizing the choice of an initial shortlist using information from the Internet is a useful approach to choosing an attractive offer while constraining search costs. This article describes an algorithm that constructs shortlists of attractive offers from a database on the basis of consumers' preferences. The length of the shortlist is set by the user. Such shortlists can be treated as a list of flats to be physically viewed or as an initial step in defining such a set. This algorithm can be applied in a range of scenarios, e.g. an employer wishing to hire a specialist employee.

Keywords: Shortlist, Job Search Problem, Heuristic Decision Rule, Online And Offline Search, Limited Rationality, Multi-Criterion Decision Making

Introduction

The Internet allows consumers to find information about a wide range of offers at very little cost. However, due to the limited capacity of humans to process information, this can lead to the paradox of choice (Schwartz, 2004), which states that when there is a large set of offers, a consumer should concentrate on a small subset. In this way, a decision maker (DM) might not purchase the best offer, but this loss is compensated for, since less time and effort are required to make a purchase. Due to their limited rationality, consumers often use heuristics that are adapted to the structure of the problem faced (Simon, 1956: 129; Todd and Gigerenzer, 2000: 727-741).

A shortlist is adapted to situations in which a consumer can gain some information about offers at low cost, but the information required to make an accurate appraisal of an offer's value is relatively costly.

This article considers the use of shortlists when the goal is to acquire a single valuable resource, rather than as a means to choosing several options. For example, Durbach and Davis (2012: 99-116) consider the problem of choosing several ways of reducing electricity bills. On the other hand, Belton (1985: 265-274) considers how a final choice is made after a shortlist has been constructed.

Much work has been recently published on the concept of shortlists (Masatlioglu *et al*, 2012: 2183-2205; Lleras *et al*, 2017: 70-85). Borah and Kops (2019: 401-420) consider search processes where DMs construct shortlists using information obtained from peers. The shortlist heuristic is also useful when offers are categorizable (Armouti-Hansen and Kops, 2018: 507-524) or multiple criteria are considered (Dulleck *et al,* 2011: 395-408).

Manzini and Mariotti (2007: 1824-1839) consider a model where shortlists of offers of ever decreasing size are constructed using a sequence of criteria until a final choice is made. Au and Kawai (2011: 608-614) consider a similar model where a shortlist of offers is constructed using initial information and then an offer is chosen from this shortlist based on a richer set of information.

Although the two papers described above describe the properties of such decision rules, little work has been devoted to optimization models involving shortlists. Ramsey (2019: 75-92) presents a model in which a DM uses a shortlist as a means to making a final decision. The DM cannot precisely measure the value of offers, but can rank offers according to the information currently available. Basic information about offers can be obtained at little cost. However, gaining more precise information about the value of an offer is much more costly. The strategy of the DM is defined by the length of the shortlist, k. The k most attractive offers according to initial information are inspected more closely, after which the best offer on the shortlist is accepted. When the search costs are convex in k, the optimal length of the shortlist is the smallest value of k satisfying the following condition: the marginal costs from increasing k (the increase in the search costs from increasing the length of the shortlist from k to $k + 1$) exceed the marginal gain from increasing k (the increase in the expected value of the offer accepted by increasing the length of the shortlist from k to $k + 1$). Olkin and Stephens (1993: 477-486) consider the problem of selecting a shortlist of candidates for a job when the goal is to employ the best of all the candidates available.

The model presented here addresses some shortcomings of the model of Ramsey (2019: 75-92). Firstly, that model does not explicitly consider the fact that decisions are made at each stage on the basis of multiple traits. Secondly, the value of a shortlist in exploring the range of the offers available is not considered. Various approaches to multiple-criteria decision making can be applied. For example, the TOPSIS approach (Technique for Order of Preference by Similarity to Ideal Solution, see Yoon and Hwang, 1995) measures the attractiveness of an offer according to its distance from the ideal offer in a multi-dimensional space defined by an offer's traits. Górecka *et al* (2016: 1097-1136) present the MARS approach (Measuring Attractiveness around Reference Solutions), which may be interpreted as a generalization of the TOPSIS approach. This paper illustrates the algorithm based on the relatively simple SAW approach (Simple Additive Weights). The overall attractiveness of an offer is measured as the weighted sum of scores according to individual traits. Such a score is either a linear or triangular function of a trait. Kaliszewski and Podkopaev (2016: 155-161) argue that decisions made using more complex approaches can be interpreted as choices made using the SAW approach for appropriately defined weights.

The method is illustrated on the basis of the problem of purchasing a flat from a large database of offers. Figure 1 illustrates a non-automated search process based on forming a shortlist.

Given the potentially large size of a database holding quantitative information, the automated construction of a shortlist is of potentially great use to those searching for a flat. The DM must input the minimum, maximum and ideal values of the traits of interest, together with the relative importance of each trait and the required length of the shortlist. Since a database may contain qualitative information about offers (e.g. type of building, photos), this shortlist can be used as a first step in defining which offers should be physically viewed.

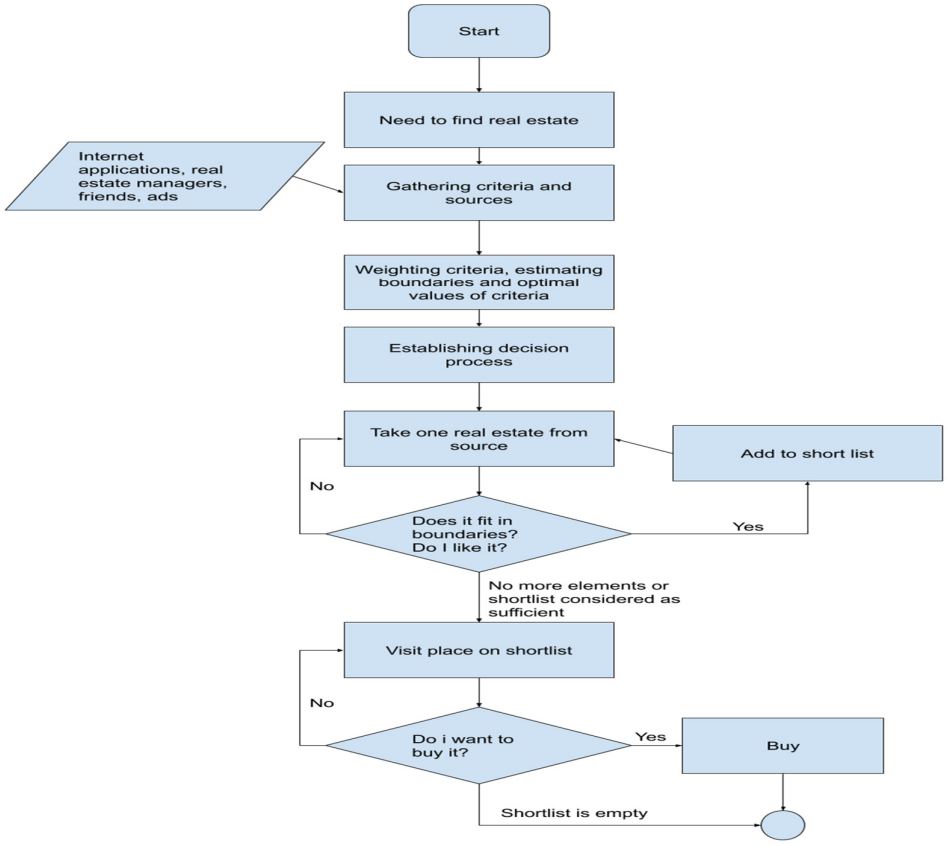

Fig. 1: Flow chart describing the purchase of a flat via the shortlist heuristic.

Section 1 describes the general form of the algorithm. Section 2 presents a simple example illustrating how the algorithm is applied. Section 3 gives results based on a real data set. Finally, some conclusions are made, together with directions for future research.

Description of the Algorithm

This section describes an algorithm for constructing a shortlist of length n from N offers based on k numeric traits, denoted $x_1, x_2, \ldots, x_k$. A shortlist should contain offers that a) are potentially very attractive to the DM, and b) show diversity in their characteristics. The second criterion is particularly useful when a DM has limited knowledge about a particular market. For example, if somebody looking for a flat comes from a different city, the benefits gained from viewing flats with different characteristics/locations may well outweigh those from viewing offers that are all very close to the assumed ideal in terms of size and location, since the DM is likely to make a better informed final choice. We construct a list that maximizes a weighted sum of the average scores of the offers on the list and the average distance between them. To do this, we must define i) a measure of the attractiveness of an offer, ii) a measure of the distance between offers, iii) a measure of the attractiveness of a shortlist [based on i) and ii)]. Note that the raw data required to define the k traits might include more than k variables (to be discussed in Section 2). Let $\boldsymbol{x} = (x_1, x_2, \ldots , x_k)$ be the vector of the values of the traits describing an offer and $\boldsymbol{y} = (y_1, y_2, \ldots, y_m)$ denote the vector of variables in the raw data. By assumption, $m \geq k$ (note that the variables contained in $\boldsymbol{y}$ might precisely correspond to the variables in $\boldsymbol{x}$).

The general form of the algorithm is as follows:

1. The DM states a) the length of the required shortlist, b) the weight of each trait, c) the minimum, maximum and ideal values of each trait, and d) the weight ascribed to the diversity of offers on the shortlist. Since defining the weight of diversity is not intuitive, this could be done by defining the level of knowledge a DM has regarding the market involved as low, medium or high. The possible range of the scores of offers is independent of the number of traits considered. However, suppose that the raw data are standardized to lie in the interval [0,1]. The maximum distance between offers is $\sqrt{m}$. Hence, the weight ascribed to diversity should also take the dimension of the data into consideration (this will be investigated in future research). The minimum and maximum values of each trait are assumed to define hard constraints that an offer must satisfy.
2. The number of offers satisfying the hard constraints is outputted. Based on this, the DM can choose to relax the constraints. If the number of offers satisfying the constraints is sufficient, then any offer not satisfying the constraints is eliminated.
3. The overall score of each offer and the distance between each pair of offers is calculated (see below).
4. If the size of the shortlist is relatively small, an exhaustive search procedure may be used to find the shortlist maximizing the weighted sum of the mean score of the offers and the mean distance between them (this sum is defined below). The algorithm is designed to be used online and the shortlist produced will generally be of at least moderate size (e.g. tens of offers). Hence, the following greedy algorithm is used to find a near-optimal solution in a short time. Initially, the offer with the highest overall score is placed on the shortlist. The algorithm then successively adds offers to the shortlist until the required size has been attained. At each stage the weighted sum of the mean overall score and mean distance between offers is maximized. This is illustrated in Section 2.

Suppose x_i^{min}, x_i^{max} and x_i^{ideal} are the minimum, maximum and ideal values of trait i. The values x_i^{min}, x_i^{max} are called the extreme values of a trait. Let $f_i(x_i)$ be the score of trait i when it takes the value x_i. This score is defined to be one at the ideal value, zero at any extreme value not equal to the ideal value, and vary linearly between the ideal value and any extreme value differing from the ideal value. The function f_i takes one of three forms depending on whether the ideal value is the minimum value, an intermediate value or the maximum. When $x_i^{min} = x_i^{ideal}$, i.e. the minimum value is the ideal value,

$$f_i(x_i) = \frac{x_i^{max} - x_i}{x_i^{max} - x_i^{min}}. \tag{1}$$

In this case, the score according to trait i decreases linearly from 1 at x_i^{min} to 0 at x_i^{max}. When $x_i^{max} = x_i^{ideal}$, i.e. the maximum value is the ideal value,

$$f_i(x_i) = \frac{x_i - x_i^{min}}{x_i^{max} - x_i^{min}}. \tag{2}$$

In this case, the score according to trait i increases linearly from 0 at x_i^{min} to 1 at x_i^{max}. Otherwise, i.e. when the ideal value of a trait is intermediate,

$$f_i(x_i) = \begin{cases} \frac{x_i - x_i^{min}}{x_i^{ideal} - x_i^{min}}, & \text{when } x_i^{min} \le x_i \le x_i^{ideal} \\ \frac{x_i^{max} - x_i}{x_i^{max} - x_i^{ideal}}, & \text{when } x_i^{ideal} \le x_i \le x_i^{max}. \end{cases} \tag{3}$$

In this case, the score according to trait i is a triangular function taking the value of one at the ideal value and the value of zero at the extreme values. Let w_i be the weight of the i-th trait. These weights are non-negative and sum to one. The overall score of an offer is $f(\boldsymbol{x})$, where

$$f(\boldsymbol{x}) = \sum_{i=1}^{k} w_i f_i(x_i). \tag{4}$$

Hence, the overall score of an offer is a weighted average of the scores according to the traits. Let $f(\boldsymbol{x}_j)$ denote the overall score of the j-th offer.

Now we define the measure of distance between offers. Firstly, each variable in the data set is linearly scaled, so that the minimum value is zero and the maximum value observed is one. Hence, the scaled value of y_i, denoted by y_i^s, is given by

$$y_i^s = \frac{y_i - y_i^{min}}{y_i^{max} - y_i^{min}}, \tag{5}$$

where y_i^{min} and y_i^{max} are the minimum and maximum, respectively, of the values of the i-th variable in the data matrix. Let $D(\boldsymbol{y}_j, \boldsymbol{y}_l)$ denote the Euclidean distance between offers j and l according to these standardized values. This is illustrated in Section 2.

The score of the shortlist given by the set of offers S is a weighted sum of the scores of the offers and the mean distance between these offers. Let $\#(S)$ denote the number of offers in S and v denote the weight ascribed to the diversity within the shortlist. The number of pairs of offers in S is $0.5\#(S)[\#(S)-1]$.

We denote the score of the shortlist S by $g(S)$, where

$$g(S) = \frac{1-v}{\#(S)}\left[\sum_{j \in S} f(\boldsymbol{x}_j)\right] + \frac{2v}{\#(S)[\#(S)-1]}\left[\sum_{j,l \in S, l \neq j} D(\boldsymbol{y}_l, \boldsymbol{y}_j)\right]. \tag{6}$$

Note that this algorithm is flexible enough to be applied in conjunction with other approaches to multi-criteria decision problems, e.g. TOPSIS. Also, the algorithm can be used to form a shortlist of attractive offers that satisfy a budget constraint by using price as a variable, but giving it a weight of zero in defining the attractiveness score. The algorithm is designed to use data from continuous distributions. However, it is possible to use discrete variables (as illustrated in Section 3).

A Simple Example

The algorithm uses easily accessible quantitative data. Although the seller decides which information is available, by not taking into account traits significant to clients, the seller would lose business. Dickinger and Mazanec (2008: 244-254) find that for any type of customer looking for a hotel room price, location and ratings from other customers are always important. Hence, Internet search engines for choosing accommodation highlight these criteria. The authors made an overview of real estate databases on the Internet to see how offers are presented (see Table 1). Kok *et al* (2017: 202-211) consider a similar problem from the point of view of an estate agent wishing to value properties in a large database.

Information is always given about price and the number of rooms. Also, nearly all sites give information on size in m^2 and location. Furthermore, in 17 student projects on consumer decisions in the real estate market in Poland supervised by the authors, size and price were always found to be significant and the number of rooms was found to be significant in 16 of the analyses. Location was found to be significant by a large majority of studies. The following example illustrates the selection of a shortlist based on three traits: price, size in m^2 and location. The first two traits are simply two variables from the data set.

Table 1: The main information given about new flats for sale according to geographic region (Based on a survey by the authors)

No.	Geographical region	Number of sites	Main Criteria	Textual description
1	Worldwide	5	price, size in m^2, number of rooms, location, number of bathrooms	Yes
2	Europe (excluding Poland)	8	price, size in m^2, number of rooms, location, infrastructure, number of parking places, information about balconies	Yes
3	North America	2	price, size in m^2, number of rooms, location, number of bathrooms, number of bedrooms	Yes
4	South America	1	price, size in m^2, number of rooms, location, number of bathrooms, number of bedrooms	Yes
5	Australia	1	price, number of rooms, location, number of bathrooms, number of bedrooms, number of parking places	Yes
6	Asia	1	price, number of rooms, number of bathrooms, number of parking places	No
7	Poland	3	Price, size in m^2, number of rooms, location, price per m^2, monthly mortgage payment, floor of building	Yes

The definition of location is more problematic. In a number of projects, location was interpreted as the attractiveness of the district in which a flat is located, while in others it was measured as the distance from the city center. For the purposes of this study, distance from a reference point (to be chosen by the user) is a suitable variable to analyze. However, when considering the distance between two offers, this should depend on the physical distance between the flats and not on the differences between the distances to the reference point. Hence, the data required are the variables (y_1, y_2, y_3, y_4), where y_1 is the price, y_2 is the size in m^2, y_3 and y_4 are the co-ordinates of the flat with respect to the reference point, e.g. distance north and distance east in kilometers. The vector of traits is (x_1, x_2, x_3) where $x_1 = y_1$, $x_2 = y_2$ and $x_3 = \sqrt{y_3^2 + y_4^2}$, i.e. x_3 is the physical distance of the flat from the reference point (e.g. city center or place of work). Instead of measuring the physical distances, e.g. journey time could be used.

Consider the following toy example. A client wishes to buy a new flat at a price between 300 000PLN and 500 000PLN (the ideal price is the minimum price), within 10km of his/her place of work (the ideal distance is 0). The size of the flat should be between $60m^2$ and $100m^2$ with an ideal of $80m^2$. The weights of price, location and size are 0.4, 0.3 and 0.3, respectively. There are six offers meeting the required criteria and we wish to form a shortlist of three offers when the weight ascribed to diversity is 0.3. Table 2 gives the raw data and their standardized values.

Table 2: Raw data and standardized data (in brackets) for the toy example

Number	Price (PLN)	Size (m2)	Distance north (km)	Distance east (km)
1	450 000 (0.60)	84 (0.84)	2.5 (0.70)	-1.4 (0.00)
2	390 000 (0.00)	68 (0.20)	1.4 (0.48)	-0.9 (0.10)
3	440 000 (0.50)	63 (0.00)	-0.8 (0.04)	0.6 (0.40)
4	420 000 (0.30)	76 (0.52)	3.1 (0.82)	1.4 (0.56)
5	410 000 (0.20)	88 (1.00)	4.0 (1.00)	3.6 (1.00)
6	490 000 (1.00)	72 (0.36)	-1.00 (0.00)	1.2 (0.52)

Table 3 gives the matrix of standardized distances between the offers. Table 4 gives the scores according to each trait and the overall score.

Table 3: Distances between the offers

	Offer 2	Offer 3	Offer 4	Offer 5	Offer 6
Offer 1	0.909945	1.145076	0.721388	1.129425	1.072753
Offer 2		0.757364	0.720833	1.326801	1.196829
Offer 3			0.971802	1.540000	0.628967
Offer 4				0.682935	1.090688
Offer 5					1.509967

When no weight is placed on the diversity of offers, then the optimal shortlist of length three simply contains the offers with the highest scores: offers 4, 2 and 1. Assume that the weight ascribed to diversity is 0.3. Applying the algorithm described above, the first offer placed in the shortlist is flat 4 (it has the highest overall score).

Table 4: Scores of the offers using Simple Additive Weighting with weights w1=0.4, w2=w3=0.3.

Number	Price	Size	Distance	Price score	Size score	Distance score	Overall Score
1	450 000	84	2.865310	0.25	0.80	0.713469	0.554041
2	390 000	68	1.664332	0.55	0.40	0.833567	0.590070
3	440 000	63	1.000000	0.3	0.15	0.900000	0.435000
4	420 000	76	3.401470	0.4	0.80	0.659853	0.597956
5	410 000	88	5.381450	0.45	0.60	0.461855	0.498557
6	490 000	72	1.562050	0.05	0.60	0.843795	0.453139

In the second stage, we select the shortlist of length two including flat 4 that maximizes the weighted average of the mean score and diversity. These calculations are illustrated in Table 5.

Table 5: Choice of the second offer to be placed on the shortlist

Shortlist	Overall Scores	Av. score	Distance	Weighted sum
{4, 1}	{0.597956, 0.554041}	0.575998	0.721388	0.619615
{4, 2}	{0.597956, 0.590070}	0.594013	0.720833	0.632059
{4, 3}	{0.597956, 0.435000}	0.516478	0.971802	0.653075
{4, 5}	{0.597956, 0.498557}	0.548256	0.682935	0.58866
{4, 6}	{0.597956, 0.453139}	0.525547	1.090688	0.695089

Adding offer 6 maximizes this weighted average over such shortlists. At the final stage of the algorithm, we consider shortlists of length 3 that include offers 4 and 6. These calculations are illustrated in Table 6. The shortlist generated consists of offers 4, 5 and 6.

Table 6: Choice of the third offer to be placed on the shortlist

Shortlist	Scores	Av. score	Distances	Av. Distance	Weighted sum
{4, 6, 1}	{0.597956, 0.453139, 0.554041}	0.535045	{1.090688, 0.721388, 1.072753}	0.961610	0.663014
{4, 6, 2}	{0.597956, 0.453139, 0.590070}	0.547055	{1.090688, 0.720833, 1.196829}	1.002783	0.683774
{4, 6, 3}	{0.597956, 0.453139, 0.435000}	0.495365	{1.090688, 0.971802, 0.628967}	0.897152	0.615901
{4, 6, 5}	{0.597956, 0.453139, 0.498557}	0.516550	{1.090688, 0.682935, 1.509967}	1.094530	0.689944

Note that in the *i*-th step of *n* in the algorithm, the best of *N-i+1* shortlists is chosen. Hence, the total number of shortlists considered is

$$\sum_{i=1}^{n} N - i + 1 = Nn - \frac{n(n-1)}{2}. \tag{7}$$

Exhaustive search over all the possible shortlists must consider $\frac{N!}{n!(N-n)!}$ possible solutions. In this example, the greedy algorithm considers 15 shortlists, while exhaustive search compares 20 shortlists of length three. Hence, there is little to gain from using the greedy algorithm. However, when *N* is very large and *n* reasonably large, the reduction in run time can be significant. Exhaustive search indicates that the optimal shortlist consists of offers 2, 5 and 6.

Using a Real Data Set: Searching for A Flat in Wrocław, Poland

This Internet site https://www.otodom.pl/ (accessed 14/4/2020) contains information on approximately 10 000 properties in Wrocław. Suppose that the length of the required shortlist is six. Three traits were considered: price, surface area and number of rooms. The associated criteria, together with their weights, are

1. Price: minimum 200 000 PLN, maximum 500 000 PLN, ideal value 200 000, weight 0.6.
2. Area: minimum 50 m^2, maximum 100 m^2, ideal value 80 m^2, weight 0.3.
3. Number of rooms: minimum 2, maximum 4, ideal value 3, weight 0.1.

Note that number of rooms is a discrete variable and the score ascribed to this trait is a 0-1 function. Flats with two or four rooms are acceptable, but obtain a score of zero according to this trait. Flats with three rooms obtain a score of one according to this trait.

There were 195 properties satisfying the criteria. The algorithm was applied five times with differing values of the weight, *v*, ascribed to diversity: 0, 0.3, 0.5, 0.7 and 1. The weight 1-*v* is ascribed to the mean score of offers. When *v*=0, the algorithm returns the six most highly ranked offers based on the SAW method. When *v*=1, the algorithm returns the most diverse range of offers satisfying the criteria and including the one with the highest score. The results are illustrated in Tables 7 and 8.

Table 7: Shortlists constructed for different weights ascribed to diversity, v. The offers are placed in the order that they are added to the shortlist

v = 0					v = 0.3					v = 0.5				
Pos.	**P**	**A**	**R**	**Score**	**Pos.**	**P**	**A**	**R**	**Score**	**Pos.**	**P**	**A**	**R**	**Score**
1	200612	82	4	0.8908	1	200612	82	4	0.8908	1	200612	82	4	0.8908
2	202343	82	4	0.8873	3	219984	86	4	0.8760	3	219984	86	4	0.8760
3	219984	86	4	0.8760	4	254377	90	4	0.8312	4	254377	90	4	0.8312
4	254377	90	4	0.8312	5	205707	80	3	0.8186	5	205707	80	3	0.8186
5	205707	80	3	0.8186	6	214728	81	3	0.8065	8	281312	93	4	0.7954
6	214728	81	3	0.8065	7	206586	78	3	0.8048	12	231370	84	3	0.7913

Key: Pos. – ranking according to the SAW method, P – price, A – area in m^2, R – no. of rooms.

Table 8: The shortlists constructed according to the weight ascribed to diversity, v. The offers are placed according to the order in which they are added to the shortlist

v = 0.7					v = 1				
Pos.	**P**	**A**	**R**	**Score**	**Pos.**	**P**	**A**	**R**	**Score**
1	200612	82	4	0.8908	1	200612	82	4	0.8908
8	281312	93	4	0.7954	84	358598	98	2	0.5708
12	231370	84	3	0.7913	141	436392	75	4	0.3772
5	205707	80	3	0.8186	81	262997	51	4	0.5800
22	310269	98	4	0.7675	109	348997	63	4	0.4800
28	262037	88	3	0.7539	16	289794	93	4	0.7784

Key: Pos. – ranking according to the SAW method, P – price, A – area in m^2, R – no. of rooms.

For this problem, when the weight ascribed to diversity does not exceed 0.5, then the algorithm returns a shortlist of offers that are all very highly ranked (in the top 12 of the 195 offers satisfying the criteria). Future research will investigate how to determine a suitable value for this weight according to the preferences and knowledge of the DM.

Results and Conclusions

This article has presented an algorithm for producing shortlists of offers from a large database, which may be used when DMs are looking for a unique and valuable resource (e.g. a flat or second-hand car). Such shortlists present a diverse set of potentially attractive offers by maximizing a weighted sum of the mean scores of the offers on the shortlist and the mean distance between them. The weights ascribed to each trait (at the level of determining the score of an offer) and the diversity of offers (at the level of determining the attractiveness of a shortlist) have a significant effect on the set of offers placed on the shortlist. Hence, future research will investigate the robustness of such approaches with respect to these parameters. In particular, the weight ascribed to the diversity of a shortlist should be adapted to a) the clarity of the preferences (or market knowledge) of the DM, and b) the number of variables in the data matrix.

Future research should also consider how robust the algorithm is to the distribution of the raw data. For example, the coefficient of variation of the variables observed may be very different. This can lead to problems in the standardization procedure, e.g. if a city lies in a long valley running from east to west, then a physical distance between two offers in the north-south direction will have a much larger standardized value than the same physical distance between two offers in the east-west direction.

The algorithm presented here is flexible enough to be implemented using any of the wide range of methods available for assessing offers based on multiple traits (e.g. TOPSIS, MARS). Hence, future

research should also compare the effectiveness of such methods when adapted to the problem of choosing a shortlist of offers.

Although the algorithm is designed to be applied to continuous traits, discrete traits may also be considered. Future research will consider in more detail how discrete traits should be incorporated into the algorithm.

Another aspect that should investigated lies in the fact that there may be a conflict of interest between the DM and an organization that gives access to such an algorithm. For example, an Internet site providing data about flats for sale might be more interested in selling flats from a particular developer or those that have been on the market for some time. Such problems are intrinsically game theoretic.

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Machine Learning for Condition Monitoring: Latest Trend and Review

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Abstract

In condition monitoring, tracking the health, state and characteristics of a hardware equipment is an expensive task. The target of this article is to recommend an alternative way of monitoring the equipment by using artificial intelligence, in order to minimize maintenance costs. An important aspect therein is to detect faults in the rotating equipment, in particular bearings. We will use the vibration signals of the bearing and different techniques within the Digital Signal Processing field (Mel-frequency cepstral coefficients, Fast Fourier Transform, Short Time Fourier Transform) to pre-process the input signal and extract important features in an appropriate way as to train machine learning models. Dimensional reduction techniques (such as Principal Component Analysis) are used to diminish the time and complexity of training. The trained models will be able to recognize different states of the bearing, like fault states (inner, outer, ball) states or a normal state. Finally, we will test the performance of the models on other data sets, different from the one we trained and then save the results to make some statistics regarding the accuracy of the models.

Keywords: Condition Monitoring, Machine Learning, Frequency, Mel-Frequency Cepstral Coefficients, Short Time Fourier Transform.

Introduction

Ball bearings represent the essential component of any rotary machine, making the application range of this hardware huge. Any type of failure can slow down, put pressure on other components or even cause the machine to fail. Due to the widespread applicability of bearings, any malfunction is an expensive task, especially in the case of large machinery (e.g. wind turbines, planes, production machines, etc.) and may even involve further safety risks (e.g. plane and car bearings) for the people who are in charge with their control. Condition monitoring comes as a valid solution to these problems. Wind turbines are a valuable example, since without any predictive maintenance turbine bearings may fail, resulting in complete halt of the system, and thus, costing the responsible maintenance company a fortune to troubleshoot the mechanism in due time. With condition monitoring, the maintenance company has real-time access to the health state of the bearing, and so they can schedule remedial works/component replacement dates prior to a possible, yet inevitable failure, hence reducing the expediting expenses for repairs and loss of profit caused by the defective machinery.

Different popular methods which have been applied to handle and analyses data on the parts of any rotary machine cover traditional computation methods, close to simple thresholding techniques and statistical methods, see the research study by Vanem (2018). Nevertheless, all these solutions are conditioned by the fact that they require a specialist with expertise in the field for a correct system diagnosis. This is the main reason why it is important to acknowledge the value of artificial intelligence therein.

Though until the present days, a wide variety of computational intelligence techniques have been used for condition monitoring, in this paper we aim at presenting an effective condition monitoring technique which can be achieved in only a few steps - by using a data acquisition sensor, applying a suitable method to interpret and pre-process data (feature extraction) and setting a type of neural network for result classification.

Data acquisition can be achieved in multiple ways: by means of a vibration sensor, a microphone with electrical signals measured directly on the engine/ or a turbine which spins the bearing. By far the most popular method of data acquisition is using a vibration sensor, because the data is relatively easy to measure and it provides plenty of useful health state information. Raw data is measured in time/amplitude domain, making it almost impossible to generalize over a wide range of bearings, since the predictive accuracy is influenced by multiple test dependent variables (the rotation speed and size of the ball bearing). This kind of raw data predictive test was already tested by creating a 20 X 20 vibration image from 400 data signals and classifying results by means of a CNN (Convolutional Neural Network), see the study of Hoang et al (2019). In order to generalize our prediction model (to remove bearing size, and rotation) we needed to transform the time/amplitude domain into a frequency/amplitude domain, and so we started using Digital Signal Processing (DSP) methods.

Feature extraction is accomplished by DSP methods, to generate a valid input for artificial intelligence models. Most well-known DSP methods are Fast Fourier Transform (FFT), Short Time Fourier Transform (STFT), Mel-frequency Cepstral Coefficient (MFCC). For classifying the health state of the bearing, different types of machine learning procedures were used, due to the powerful pattern recognition that such algorithms have.

The first objective of this enterprise is to provide an accurate prediction for the health state of a bearing using DSP techniques. From the vast literature available in the field, we chose to begin by replicating the work from Hoang et al (2019) research, where an approach with CNN was tested using a method for creating vibration images from raw signal data.

In this paper, we focused on providing diversity to condition monitoring (namely, we chose to test the multiple scenarios of the suggested methods), and on recommending different approaches to the source study. Our aim was to study the reaction of various traditional machine learning classification methods in updated contexts, such as condition monitoring.

Distribution of bearing classes on different data sets

Real-life applications often come with incomplete, imprecise or fluctuating data sets. Therefore, within our test, we focused on different datasets characterized by distinct and specific features.

Our testing approach involved three data sets: Case Western Reserve University Bearing Data, for different details see Case Western Reserve University Bearing Data Center Website, NASA Ames Prognostics Data Repository, see the work of Lee et al (2007), and Bearing vibration data collected under time-varying rotational speed conditions, details in Huang et al (2018) research. These data sets which provide vibration data at different sample rates, bearing sizes and testing conditions, served at seeking to generalize the classification efficiency of our models.

The Case Western Reserve University Bearing Data is our main data set. The fact that within the data set there are four classes of possible health states and behavior with four bearing stress (load) tests, make our NN training efficient, and provide us with a better understanding of possible frequencies generated by a bearing. This data set description is as follows, the testing bench 1 with a 2hp motor on the left, a encoder in the center and a dynamometer on right, two SKF bearings, FE (Fan End) and DE (Drive End). Faults were introduced using electro-discharge machining with fault diameters of 7, 14, 21, 28, and 40 mm, detailed on Case Western Reserve University Bearing Data Center Website. The bearings were tested under different load conditions (0, 1, 2, 3hp) with each fault type that was induced (ball, inner raceway, outer raceway and healthy). Each test of this type was sampled by the acquisition sensor (vibration sensor) at 12k and 48k samples for about 20 seconds (normal) and 40 seconds (fault types). The first round of tests were conducted with the four possible health states on DE bearing with the FE bearing healthy, and the second round was with DE bearing healthy and FE bearing with all four possible health states. More than that, Case Western Reserve University Bearing Data is a clean data set with no NaN values, the data files contain the vibration values for DE and FE bearings. The normal health state has registered over 240.000 values (approximately 20 seconds of acquisition) and for the 3 fault states over 480.000 values (approximately 40 seconds) for each state.

Introduction in Digital Signal Processing

Machine condition monitoring is the technology which consists in measurements (by sensors for obtaining necessary data), followed by the data pre-processing stage (which can be missing in some cases), feature extraction (the mechanism of presenting a signal as a set of characteristics that easily discriminates between pattern classes of the original signal; this is also the fundamental component of any classification procedure) and the classification question (or the identification of the operating state of the machine and the type of failure).

Aspects about the Fourier Transform

The Fourier Transform is a mathematical method that it is used to transform a signal from time to frequency domain. This process usually makes the signal easier to understand, see different characteristics in the article of Siemens community, 'What is the Fourier Transform?'.

The idea behind this theory is that any signal can be decomposed as a series of sine waves with different amplitude and phase. For example, in the Fig 1. is shown how a signal (purple) is decomposed in three sine waves (red, gray and green) with different amplitude. The vertical lines represent the frequency.

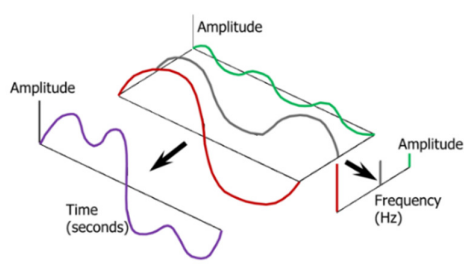

Fig. 1: Decomposing a signal into a series of sine waves

From a mathematical way of looking at it, the Fourier Transform is:

$$S_x(f) = \int_{-\infty}^{+\infty} x(t)e^{-j2\pi ft}dt$$

where $S_x(f)$ is the result in frequency, $x(t)$ is the input in time domain. The result comes in complex number (ex. $a + bj$ where a is the real part and b imaginary part). The complex numbers contain information about the amplitude and phase of the related frequency.

Using the following formula:

$$ampl = \sqrt{a^2 + b^2}$$

we can find resourceful information about the signal.

In practice, we used STFT which is a Fourier-related operation. The main difference is that a signal is framed into smaller segments (usually the size of a segment is a power of two, for computation reason). Each frame then is converted into the frequency domain by using the Fourier formula. Another big difference is the appearance of overlap term. Each window has some information from the passed windows. As a result, we will have more information about the signal, more resolution and accuracy.

Mel-frequency Cepstral Coefficient

Looking in 'Mel Frequency Cepstral Coefficient (MFCC) tutorial' you can see that MFCC is a feature extraction technique used in speech recognition. Cepstrum represent a sequence of numbers that gives information about a frame, being similar to an auto-correlation sequence. It is the result of process where the power signal is log compressed (Inverse Discrete Fourier Transform of the log power signal).

$$IDFT\left(log\left(P(k)\right)\right) \longrightarrow C(n)$$

An important aspect is going in the Mel Scale. This new scale perceives the frequency to in a logarithmic way, being similar to the way humans understand sound. We are far better at discerning small changes at low frequencies rather than at high frequencies.

Using the below formula, we can convert to Mel scale:

$$M(f) = 1125 * \ln\left(1 + \frac{f}{700}\right)$$

The MFCC feature extraction technique basically includes:

- Divide the signal in windows.

  This step is about framing the signal into smaller segments because on short periods, the information doesn't variate too much, making us able to retain as much information as we can.

- Estimate the periodogram of each frame.
- Filter the result using Mel filters.

  These two steps are motivated by the way a human perceives the sound. A human doesn't discern the difference between two closely spaced information. Here comes handy the Mel-filterbank. This filter is very narrow at low frequency, meaning we will have more information on this kind of frequencies and less details as it gets higher (the filter will become wide).

- Apply log on the filtered data.

Applying logarithm on the filtered result is motivated by the human hearing (humans don't perceive sound linearly). In the final step, the sequence is correlated because of the overlap in the filter bank.

- Decorrelate the data using DCT (Discrete Cosine Transform).

  Therefore, we apply Discrete Cosine Transform to decorrelate the data (have more information about the signal).

- Keep 2-13 coefficients from the DCT and discard the rest.

  We store only a small part of this result because it has fast changes as the sound degrades.

  This is the step that we've done for our approach as well.

Condition classification problem. Overview of artificial neural network.

Data-based models are the most elastic approach to automated condition monitoring. Data-based models apply when the process model is not known in the analytical form and expert knowledge of the process performance under faults is not available. Designing successful machine learning technique for a here and now problem might only be possible by incorporating the knowledge acquisition flexibility from each new consideration. This is possible by entirely reproducing a new knowledge base from the new observation to which all previous considerations are added. It is constructive that the system should learn from each newly available observation, while preserving the already acquired knowledge.

Artificial neural network are highly capable data processing systems, able to learn elaborate input - output connections from given data. Any typical neural network incorporates a great amount of simple processing elements called neurons which are interconnected in an architectural structure.

As an artificial neural network, we’ve selected Multilayer Perceptron (MLP) which is “feed-forward neural network”, also see details in Wikipedia website, meaning that the data only goes in a single way through the network. In a nutshell, from an architectural point of view an MLP is built with minimum three layers: input layer, minim one hidden layer and one output layer.

- The input layer where the data is mapped as features in neurons.
- The hidden layers where the weights are updated.
- The output layer where the class/result is predicted.

In this section, we are going to describe the flow of MLP that we used. First of all, as input data we had two different kinds of features: the frequency extracted from STFT and the coefficients from MFCC. To note that we didn't combined these two kinds of data because they're totally different. Having this data, the activation function RELU (Rectified Linear Unit), see the next formula:

$$y = max(0, x)$$

was used to activate the most "excited" neurons and go forward through the hidden layers. After applying loss function (Cross Entropy):

$$los = -\frac{1}{n}\sum \log y' \, y$$

where n = number of entry data, y' = predicted label and y = true label) we use backpropagation to calculate the gradient and update the weights of each neuron according to the true label. In the end, on the output layer, the predicted label (types of fault on the bearing) are the results of activating the neurons using SoftMax function:

$$softmax(x) = \frac{e^x}{\sum e^x}$$

The detailed architecture of the ANN for our tests is shown in Fig. 2, where:

- dense_1_input: represents the first input layer (13 is the number of MFCC coefficients obtained with digital signal processing techniques after preprocessing the vibrations emitted by the bearing). For our STFT tests we used a different input layer (2048 coefficients);
- dense_1: is a 32 neurons hidden layer, the rectifier neuron function is ReLu;
- dropout_1: is a layer under dropout, which randomly cutting 0.2 (20%) network connections between layers during each iteration. The function of dropout is to increase the robustness of the model and also to remove any basic dependencies between the neurons;
- dense_1: is a 64 neurons layer, with ReLu activation function;
- dropout_2: is a layer under dropout, cutting again 0.2 network connections between layers;
- dense_3: The last/output layer, with 4 neurons (healthy, inner_race, outer_race, ball). We used softmax function, regarded as the probability of belonging to a certain class.

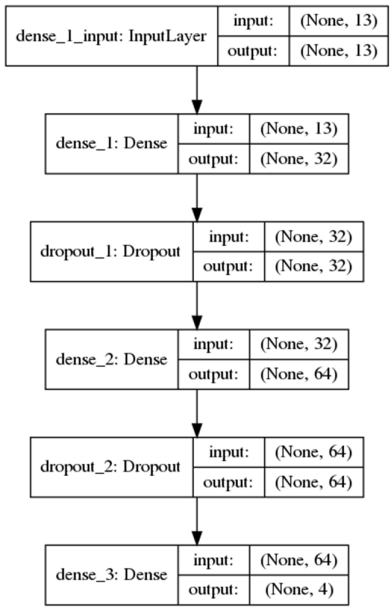

Fig. 2: The detailed network graph of the ANN tuned for MFCC, Keras's API

Since we have a classification problem, in terms of cost function, we chose categorical_crossentropy. The used optimizer was Adam due to the 'adaptive' way of changing the learning rate.

Experimental Results and Discussion

As mentioned in the introduction, the starting point for our research was the study of Hoang et al (2019), so firstly, we tried to replicate the experiment. Our results were in some measure successful, Table 1.

Table 1: Our results when we've repeated the experiments from Hoang et al (2019). Trained on DE bearing and tested FE bearing using Raw Vibration Images on a CNN

Trained/Tested	0hp FE	1hp FE	2hp FE	3hp FE	0, 1, 2, 3hp FE
0hp DE	61%	63%	62%	63%	70%
1hp DE	71.93%	72.45%	67%	78%	77%
2hp DE	70.97%	81.35%	71%	77%	76%
3hp DE	69.48%	71.32%	69%	78%	74%
0, 1, 2, 3hp DE	69.32%	70.87%	68.39%	67.34%	70.12%

The method used for creating the necessary input for a neural network was the following: split the raw vibration sensor data into 400 samples chunks, create a 20 X 20 image based on each 400-sample chunk, feed the CNN directly with this image. There are some limitations to this pre-processing method of. First of all, this technique is heavily dependent on the rotation speed of the bearing, and secondly, it depends on the sample rate of the acquisition sensor. This means that the method described in Hoang et al (2019) works only on the current type of bearing, the same that the CNN is trained. Using this method will provide unsatisfactory results when tested with a different configuration (e.g. bearing, rotation speed or sample rate).

A test strategy (I) – STFT

In this approach, as a preprocess tool, we used STFT to frame the signal into smaller segments in order to train a machine learning model, in our case MLP, to recognize the states of a bearing. Our idea to generalize was by looking at the fundamental frequencies of a ball bearing, see 'Rolling element bearing components and failing frequencies'. We noticed that there are specific frequencies emitted by the inner/outer cage and the ball. Thus, we tried to see if we can extract a recurrent pattern from raw vibration data from Fig 3 and Fig 3' using DSP methods, more precisely FFT, STFT, see Fig 4 and Fig 4'.

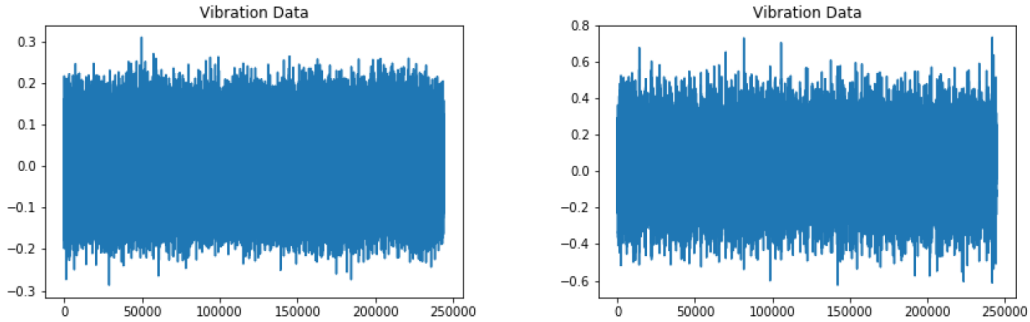

Fig. 3: Signal plots of raw data in amplitude/time domain (Normal signal - left, Ball fault state signal - right)

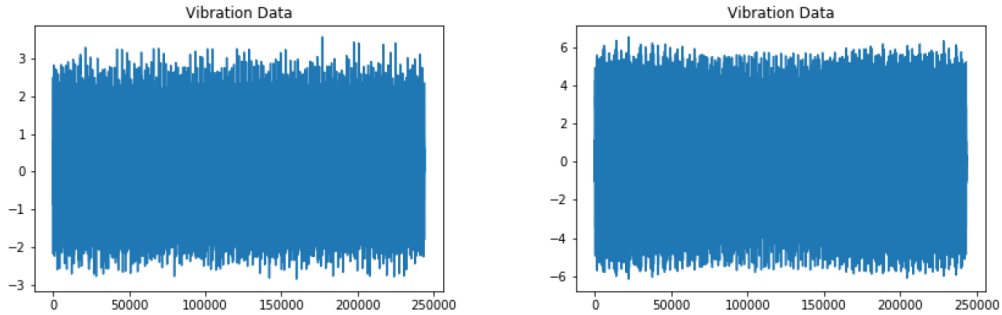

Fig. 3': Signal plots of raw data in amplitude/time domain
(Inner race fault state signal - left, Outer race fault state signal - right)

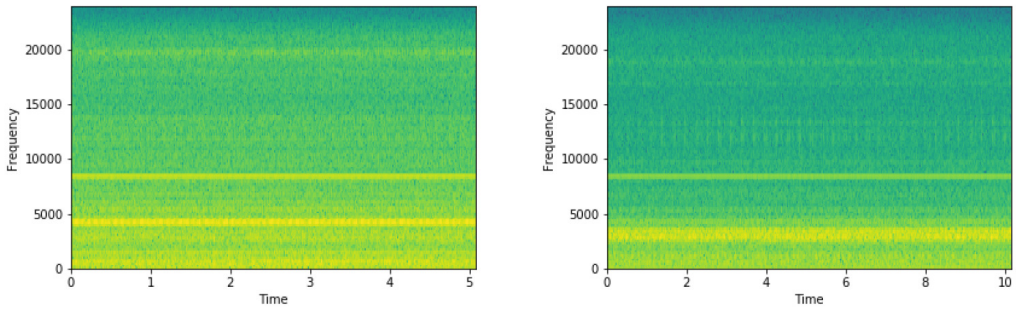

Fig. 4: The same signals transformed with STFT in amplitude/frequency domain
(Normal state spectrogram - left, Ball fault state spectrogram - right)

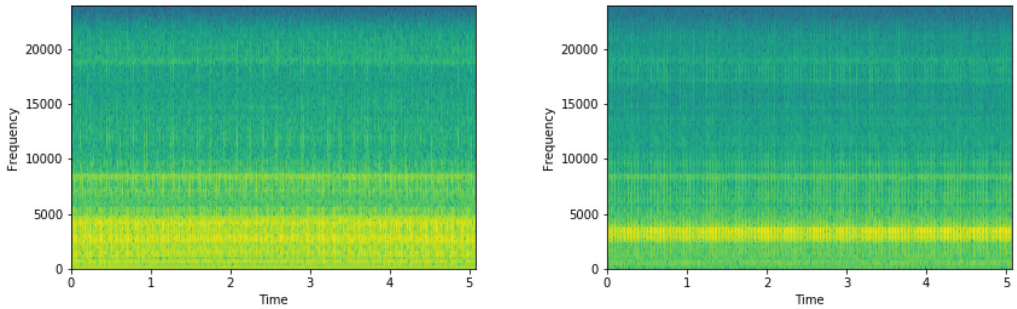

Fig. 4': The same signals transformed with STFT in amplitude/frequency domain
(Inner race fault state spectrogram - left, Outer race fault state spectrogram - right)

Obviously, a pattern emerged, a pattern that is not dependent of the sample rate, nor the rotational speed (since the Fourier Transform changes the domain into amplitude/frequency), in contrast with the starting article, Hoang et al (2019), their method of creating the data heavily depends on the sample rate and rotational speed of the bearing (e.g. if the sample rate or the rotation speed increases, the vibration image will get distorted and the ANN won't be able to recognize the pattern). The pattern is persistent on all load types (0, 1, 2 and 3hp). Afterwards, we started to analyze the data set using most popular DSP methods. To see explicitly if the health state (prediction classes) are separable we used Principal Component Analysis (PCA), a statistical procedure that reduces the dimensionality of the given data to project it in a lower dimensional space, thus, it resulted Fig 4 for Fourier Transform.

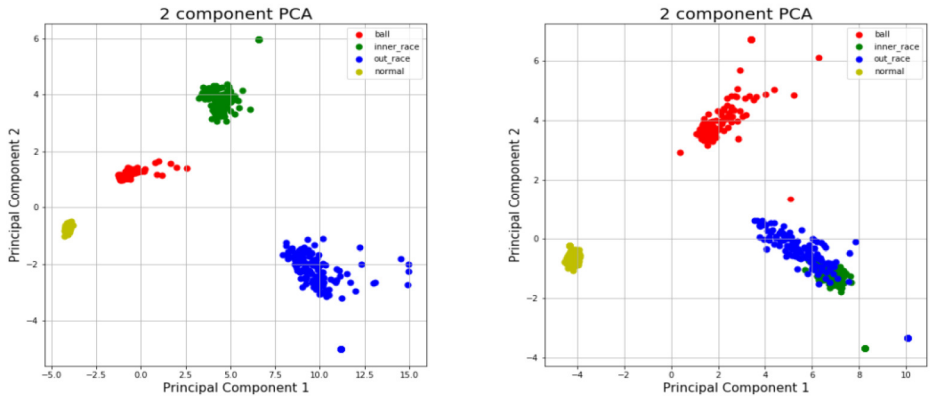

Fig. 5: FFT components resulted using PCA
(PCA of FFT for DE bearing - left, PCA of FFT for the FE bearing - right)

Consider that using the FFT/STFT extraction method from Fig 5, the PCA components and training accuracy depend on the FFT size and window, see results in Table 2.

Table 2: Trained on DE bearing and tested FE bearings with STFT frames

Trained/Tested	0hp FE	1hp FE	2hp FE	3hp FE	0, 1, 2, 3hp FE
0hp DE	80.13%	71.56%	71.46%	71.70%	70.46%
1hp DE	70.26%	74.93%	71.70%	71.70%	72.05%
2hp DE	80.13%	72.28%	70.98%	71.70%	72.44%
3hp DE	80.13%	74.45%	84.24%	71.80%	72.89%
0, 1, 2, 3hp DE	80.63%	75.42%	72.66%	71.22%	71.86%

With this data, we trained our neural network, having, much of the same success, around 98% when training and testing on the same bearing, where with ANN method described in Hoang et al (2019) gave in our tests around 80% accuracy on training and testing on the same bearing.

Some clusters from Fig 5 are overlapped so the training on one bearing and testing on another will not have a perfect prediction on faults as it can be seen in the confusion matrix in Fig 6 (last class represents the "healthy" state), but will have very good prediction on classifying if the bearing is anything other than the "normal state".

```
[[ 52   0 185   0]
 [  0   0 236   0]
 [ 11   0 226   0]
 [  0   0   0 836]]
```

Fig. 6: Confusion matrix of the results (test strategy (I))

Most certainly, the results can be improved using a variable Fourier Transform window size with frequency tracking (when there is a variable RPM for the bearing).

A test strategy (II) – Mel Frequency Cepstral Coefficients

In the second approach, we exploited MFCC as a preprocess DSP tool because it emphasizes the bearing sound in a logarithmic scale (more closely to the way a human perceives sound) and also giving us a reduced input for our model (MLP) due to a small number of decorrelated features extracted. As indicated in Fig 7, using PCA technique on the MFCC features, the classes of bearings faults can be identified as clusters.

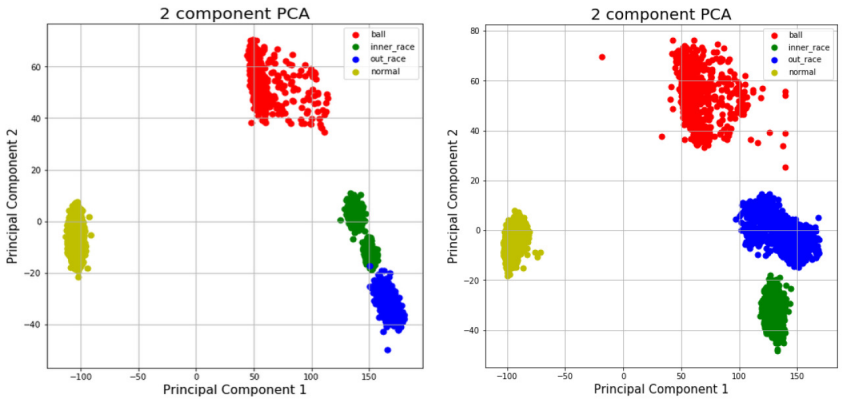

Fig. 7: MFCC components resulted using PCA
(PCA of MFCC for DE bearing - left, PCA of MFCC for the FE bearing - right)

From the input signal of bearing, we kept an average of 12 MFCC, because of the degradation sound mentioned in the MFCC section and then normalized the data. Another important aspect of our testing is that the FE (Fan-End) and DE (Drive-End) bearing are different models (the size is not the same), but even with that condition, the PCA on MFCC has the same components in roughly the same place, making our ideal of generalizing neural network on classifying bearing faults closer to reality.

At the start, we trained our AI model on one kind of bearing and tested on the same but with different loads(hp). We had very good results, accuracy around 98% (comparing to the vibration image method that has an accuracy of about 80% in our testing) because the MFCC rather it is based on the extraction of features from the way a bearing sounds while STFT extracts the prominent frequencies. Following this, we trained our MLP with normalized data of a bearing and tested on the other bearing (situated in opposite parts of the working bench), see Table 3.

Table 3: Trained on DE bearing and tested on FE bearing using MFCC features

Trained/Tested	0hp FE	1hp FE	2hp FE	3hp FE	0, 1, 2, 3hp FE
0hp DE	80.67%	85.45%	83.11%	84.13%	83.14%
1hp DE	79.92%	85.35%	84.69%	85.03%	84.83%
2hp DE	79.89%	83.03%	82.15%	82.28%	84.63%
3hp DE	74.39%	84.66%	80.48%	82.37%	76.65%
0, 1, 2, 3hp DE	79.97%	82.11%	78.77%	80.91%	83.71%

The results could have been better, but the main reason of this accuracy is that two classes are confused between them. It's about the inner race and outer race. This type of behavior can also be observed in Fig 7. The green and blue label representing these two classes are switched between them. This act can also be seen in the confusion matrix from Fig 8.

```
[[ 929    9   10    0]
 [   3    0  949    0]
 [  53    0  898    0]
 [   0    0    0 3320]]
```

Fig. 8: Confusion matrix of the results (test strategy (II))

This is not a problem to say the least, our neural network will still identify the inner/outer race condition as "not normal" even with the confusion of these two classes. Having in mind the fact that a prediction requires as input low number of samples (in order of milliseconds), we can repeat the test many times (predict more parts of the signal) in order to give a confident result on the health state.

A test strategy (III) – Evaluation on NASA bearings set

As a way of final testing for the proposed criteria of "reaching a general prediction of the state with any given ball bearing" we did the following test: we trained a neural network using MFCC from first data set from Case Western Reserve University Bearing Data Center Website, and tested on some parts of NASA Ames Prognostics Data Repository, research details of Lee et al (2007). We took two large samples based on their description of health state, one chunk of is comprised of healthy bearing data, the second chunk is based on faulty bearing data (must pe precised that the fault type was not given). We processed those chunks using MFCC and then feed it to our neural network. The results were unexpected, when the state of bearing was stated as healthy, our neural network gave a prediction as "normal" state, and when the state was given as faulty our network gave the "outer cage" state (which is a fault state).

Apparently processing with MFCC got rid of all working variables and successfully predicted a normal and fault state (based on their description of data set) on other data with a completely different bearing and rotational speed.

Conclusion

Due to digital drive technology, a great amount of data is available, and it allows operators to keep the state of a drive or machine under constant observation. When combined with the fitting analytical tools, it may also be used for predictive maintenance. Traditional maintenance methods, in which systems are monitored at regularly set intervals, are not based on the actual condition of the systems in question. This means that the inspection of the systems may be scheduled too early or too late for proper intervention.

While premature maintenance is acceptable and has little effect on expenses, belated maintenance could involve serious machinery damage or even failure. In other words, it could have consequences which are both risky and costly. Thus, condition-based maintenance of drives is necessary in order to avoid such perilous outcomes.

While mixing DSP and neural networks is not yet popular technology, it could be a solution to problems that cannot be resolved in any other way. Condition monitoring on mechanical components is possible, since most, if not all components exhibit a behavior that fluctuates when faults arise, and such behaviour can be registered with a microphone or a vibration sensor. Data recorded in such manner can be transformed into patterns using techniques from DSP field and then classified by means of neural networks. The result is a quick and efficient response on the real-time state of the component.

When taking into account the condition monitoring problem, we must bear in mind the necessary prediction that a bearing is "healthy" or has a fault, but what we obtained in our tests before is much more than just that. We tried to specify the defect cause of the bearing, with good results in the configuration train and test on the same kind of bearing with mild success on other configuration train on one type of bearing and testing on another. The results in Table 1, Table 2 and Table 3 were obtained with tests with the train on one type and the test on different type.

In the end what is emphasized by our tests is the fact that we can truly predict between "healthy" and "faulty" states of a bearing using Digital Signal Processing field and Neural Networks.

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Development of European Stock Markets: Cluster Analysis

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Abstract

In the literature concerning stock exchanges authors often refer to the concept of market development. At the same time, in most cases they do not provide a precise definition of this term and measures for distinguishing between developed and emerging markets. In fact, there is no single criterion that can be used to measure and assess stock market development. We provide a list of indicators capturing its different aspects and apply them in a comparative analysis of the European stock exchanges. For this purpose, we apply two clustering methods – the *K*-means and the Ward hierarchical algorithms. We conduct the study aimed at reducing the set of the proposed indicators to the most informative ones and find the optimal clusterization.

Keywords: Stock Markets Development, Clustering, Development Indicators.

Introduction

In times of increasing financialization, effective financial markets are one of the most important factors for economic growth. They help to efficiently direct savings and investment in the economy, enabling optimization of the accumulation of capital and the production of goods and services. One of the most critical to modern financial market is a well-developed stock market. The term "developed stock market" is often used in the literature, although in most cases it is not precisely defined. Broadly speaking, it can be understood as a stock market's ability to fulfill its main functions in an economy. It means that there is no single criterion that can be used to measure stock market development. Consequently, only one or two indicators will not be enough to capture all of its aspects (El-Wassal, 2013). For this reason, in the literature one can find several propositions of such indicators, which can be grouped according to some specified main aspects of stock markets development they capture, including market size, liquidity, volatility and concentration, however other attributes can be additionally considered as well (cf. Demirgüç-Kunt and Levine, 1996; El-Wassal, 2013; Bayraktar, 2014 and references therein).

To compare objects in terms of several different indicators which characterize their features, one can apply cluster analysis. Clustering can be considered one of the most important unsupervised learning problems. It involves multivariate methods which aim to classify individuals on the basis of a set of measured variables into subsets (clusters), such that those within each cluster are more closely related

to one another than objects assigned to different clusters. The result of clustering is satisfactory if obtained groups are homogenic and well-separated.

The purpose of this paper is to cluster European stock markets in terms of their development level. In the study we apply two clustering methods – the *K*-means and the Ward hierarchical algorithms. We provide a list of indicators capturing different aspects of stock markets development and conduct the study aimed at reducing the set of the proposed indicators to the most informative ones.

The rest of the paper is organized as follows. Section 2 provides an outline of the cluster analysis and describes the *K*-means and the Ward clustering methods. Section 3 presents the empirical research – data applied, detailed description of the study and its results. Section 4 provides the conclusions.

Clustering Methods

Most clustering methods are based on two popular techniques known as hierarchical and partitional clustering. Algorithms of hierarchical clustering generate a cluster tree (dendrogram) by using heuristic splitting or merging techniques. By contrast, partitional methods usually require that the number of clusters and an initial clustering be specified as an input to the procedure (cf. Omran et al., 2007; Clarke et al., 2009).

In the paper we apply two clustering algorithms: the *K*-means and the Ward methods. The *K*-means method is one of the most popular partitional clustering technique. It is designed to find clusters that minimize the intra-cluster distances, calculated using the within-cluster sum-of-squares:

$$\sum_{k=1}^{K} \sum_{i:x_i \in C_k} (\|x_i - \mu_k\|^2), \tag{1}$$

where K is the number of clusters, C_k $(k = 1,2,\dots,K)$ denote clusters, μ_k are centroids (usually described by the mean of points in the cluster C_k). In order to find the best clustering, the iterative algorithm is performed. It starts with randomly selected (or derived from *a priori* information) initial *K* centroids. Then each point in the data set is assigned to the closest cluster (i.e. to the closest centroid), based on the distance function. Next, based on the absorbed cases, new centroids are calculated. This process is repeated until convergence is achieved.

The Ward method is a technique of hierarchical clustering. Like other agglomerative technique, it builds nested clusters by merging them successively. The obtained hierarchy of clusters is represented as a tree (dendrogram). This method starts with all the data points assigned to their own clusters. Then two clusters are merged into the same cluster. To find which clusters should be merged on each step, the criterion of minimization of the error sums of squares (1) with $\mu_k = \bar{x}_k$ is applied. In the end, the algorithm terminates when there is only one cluster left.

Obviously, the results of clustering depend on the applied method and the values of its parameters (e.g. the analyzed number of clusters). For this reason, the validation measures should be applied to assess obtained clusters. Such measures not only validate clustering but additionally can be used as the tool for choosing the best clustering method and its parameters. One of such method, often used in the literature, is the silhouettes analysis (Rousseeuw, 1987). Silhouettes measure similarity of each point to its own cluster compared to other clusters. For each point x_i they are defined by:

$$s(i) = \frac{b(i) - a(i)}{\max(a(i), b(i))}, \tag{2}$$

where $a(i)$ is the mean dissimilarity between x_i and the points in the cluster C that contains x_i, i.e.:

$$a(i) = \frac{1}{|C|-1} \sum_{x_j \in C, j \neq i} d(i,j) \tag{3}$$

and $b(i)$ is the smallest average dissimilarity between x_i and all points in any other clusters, i.e.:

$$b(i) = \min_{C_k \neq C} \frac{1}{|C_k|} \sum_{x_j \in C_k} d(i,j). \tag{4}$$

If $|C| = 1$ then Eq. (3) cannot be calculated, therefore in such cases it is assumed that $s(i) = 0$.

By definition, silhouettes have a range of $\langle -1,1 \rangle$. A large value of $s(i)$ (close to 1) means that the point x_i is well classified, i.e. it has been assigned to an appropriate cluster. A value of 0 indicates that x_i is close to the decision boundary between two neighboring clusters and negative value indicates that it might have been assigned to the wrong cluster.

The Eq. (2) allows to calculate the silhouettes for single points. However, to assess the quality of all K clusters, one should calculate the average coefficient for the entire data set:

$$\bar{s}(K) = \frac{1}{N}\sum_{i=1}^{N} s(i), \tag{5}$$

where N is the number of points. The value SC given as the maximum value of $\bar{s}(K)$, taken over all K for which the silhouettes can be constructed, is called the silhouette coefficient. According to Kaufman and Rousseeuw (2005) the silhouette coefficient can be interpreted in the following way:

- $SC \leq 0{,}25$: no substantial structure has been found,
- $0{,}26 \leq SC \leq 0{,}50$: the structure is weak and could be artificial,
- $0{,}51 \leq SC \leq 0{,}70$: a reasonable structure has been found,
- $0{,}71 \leq SC \leq 1$: a strong structure has been found.

Empirical Study

In our study we performed a comparative analysis of European stock exchanges to identify markets with a similar level of development. Twenty-three European stock exchanges were examined, including stock exchanges of individual countries as well as exchanges resulting from the merger of stock exchanges of several countries (see Table 1).

Table 1: List of stock exchanges used in the study

Stock exchange	Country/Countries
Athens Stock Exchange	Greece
BME Spanish Exchanges	Spain
Borsa Istanbul	Turkey
Bucharest Stock Exchange	Romania
Budapest Stock Exchange	Hungary
Bulgarian Stock Exchange	Bulgaria
Prague Stock Exchange	Czechia
Vienna Stock Exchange	Austria
Cyprus Stock Exchange	Cyprus
Deutsche Börse AG	Germany
Euronext	Belgium, France, Ireland, Netherlands, Portugal
Kazakhstan Stock Exchange	Kazakhstan
Ljubljana Stock Exchange	Slovenia
LSE Group	United Kingdom, Italy
Malta Stock Exchange	Malta
Moscow Exchange	Russia
Nasdaq Nordic and Baltics	Sweden, Denmark, Finland, Iceland, Estonia, Latvia, Lithuania
Oslo Stock Exchange	Norway
SIX Swiss Exchange	Switzerland
Ukrainian Exchange	Ukraine
Warsaw Stock Exchange	Poland
Zagreb Stock Exchange	Croatia
Luxembourg Stock Exchange	Luxembourg

Two clustering methods, the *K*-means and the Ward hierarchical methods were used to conduct the study. In both these methods, the selection of the appropriate number of clusters into which data should be divided, consisted of maximizing the silhouette coefficient, calculated for the number of clusters from 2 to 10. All calculations were made using own computer codes written in Python. For clustering algorithms and the silhouette coefficient, the Scikit-learn library was used.

The level of development of the examined stock exchanges was described by means of various indicators (explanatory variables) closely related to the stock market and macroeconomic data of individual countries (see Table 2). The data used come from the end of 2019 and were compiled on the basis of statistical databases of the following institutions:

- World Federation of Exchanges (WFE),
- Federation of European Securities Exchanges (FESE),
- European Statistical Office (Eurostat),
- Organization for Economic Cooperation and Development (OECD).

Table 2: Indicators used in the study

Indicator	Description
Market capitalization	The sum of the total market capitalization of each domestic company and exclusively listed foreign companies. Indicator type: monetary. Source: WFE, FESE.
Market capitalization to GDP	The total capitalization of the stock market in relation to the country's GDP. In the case of stock exchanges covering several countries, the sum of GDPs from all component countries is applied. Indicator type: percentage. Source: own calculations based on WFE, FESE (Market capitalization) and Eurostat, OECD (GDP).
Total value traded	The total number of shares traded (domestic and foreign companies) multiplied by their prices. Trades effected automatically through the exchange's electronic order book (EOB). Indicator type: monetary. Source: WFE, FESE.
Turnover ratio	Total value traded to market capitalization (see above). Indicator type: percentage. Source: own calculations based on WFE, FESE data.
Total value traded to GDP	The total value traded in relation to the country's GDP. In the case of stock exchanges covering several countries, the sum of GDPs from all component countries is applied. Indicator type: percentage. Source: own calculations based on WFE, FESE (Total value traded) and Eurostat, OECD (GDP) data.
Foreign value traded to total value traded	The percentage of total value traded generated by foreign companies. Indicator type: percentage. Source: own calculations based on WFE, FESE data.
Total number of listed companies	The number of domestic and foreign companies that have shares (including several classes) listed on the stock exchange. The number does not include investment funds, unit trusts, ETFs and companies whose sole business purpose is to hold shares of

	other listed companies, such as holding companies and investment companies. Indicator type: full number. Source: WFE, FESE.
Foreign listed companies to total number of listed companies	The percentage of foreign listed companies in the total number of listed companies. Indicator type: percentage. Source: own calculations based on WFE, FESE data.
Average company capitalization	Market capitalization to total number of listed companies. Indicator type: monetary. Source: own calculations based on WFE, FESE data.
Number of listed companies per million of population	The total number of listed companies per million inhabitants. Indicator type: decimal. Source: own calculations based on WFE, FESE (Number of listed companies) and Eurostat, OECD (Population) data.
Total number of trades	The actual number of transactions (domestic and foreign companies) which have occurred during the year. Trades effected automatically through the exchange's electronic order book (EOB). Indicator type: full number. Source: WFE.
Number of initial public offerings (IPO) to total number of listed companies	The total number of companies whose shares were admitted to listing during the year through an offer of subscription or sales of shares divided by total number of currently listed companies. Indicator type: percentage. Source: own calculations based on WFE, FESE data.
Capital raised from initial public offerings to market capitalization	The aggregate value of the money raised through IPO divided by market capitalization. Indicator type: percentage. Source: own calculations based on WFE, FESE data.

To ensure a balanced effect of all variables on the grouping result, the data has been standardized prior to clustering. Lack of standardization gives a greater impact on the result obtained by variables expressed in larger numbers. For this purpose, all the variables were normalized using the *Z*-score formula, defined as:

$$z = \frac{x-\mu}{\sigma}, \tag{6}$$

where μ is the mean and σ is the standard deviation (Jain and Dubes, 1988). After the normalization process, all the transformed variables have the mean of 0 and the variance of 1.

First, we investigated stock exchanges using all variables listed in the Table 2. In this case, both the *K*-means and the Ward methods led to low values of the silhouette coefficient (see Fig. 1). In the case of the *K*-means algorithm the silhouette coefficient had the highest value (0.357) when dividing the stock exchanges into two groups. As the number of groups increased, the silhouette coefficient deteriorated. In the case of the Ward method, it took the highest value (0.337) for ten groups. According to Kaufman and Rousseeuw (2005) the structures indicated by both methods should be considered as weak and can be artificial.

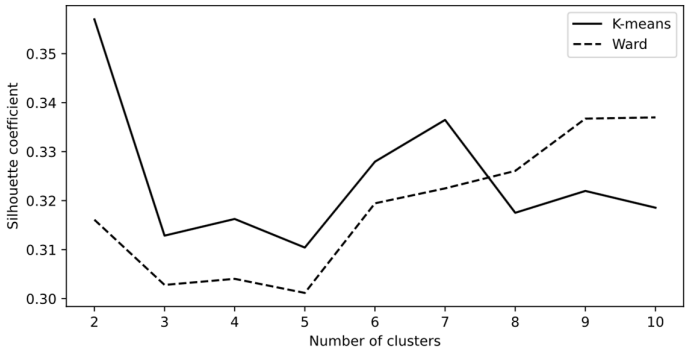

Fig. 1: Silhouette coefficients for the *K*-means and Ward methods – all variables

Poor clusterizations obtained can be caused by the excessive number of variables, which can contain spurious or duplicated information. Such variables may prevent providing a good division of the investigated stock exchanges into homogenic and well-separated groups. To avoid this problem, additional steps have been taken to eliminate part of the variables. First, we decided to incorporate to the reduced set of indicators three variables which are most often used in the literature to quantify stock exchanges development, i.e.: market capitalization to GDP, the turnover ratio and total value traded to GDP (cf. Demirgüç-Kunt and Levine, 2004; Lakštutienė, 2008; Beck et al., 2010; Nyasha and Odhiambo, 2016; Tasmaganbetov et al., 2018). Then all other combinations of additional explanatory variables were consecutively added to these three basic ones and the corresponding silhouette coefficient was calculated. According to the criterion of the silhouette coefficient maximization, the following six explanatory variables were selected that made up the final model:

- market capitalization to GDP,
- turnover ratio,
- total value traded to GDP,
- foreign listed companies to total number of listed companies,
- average company capitalization,
- total number of trades.

It turned out that this reduced set of indicators led to the much better clusterization. For both the *K*-means and Ward methods, the silhouette coefficient indicated the split of the investigated markets into five groups. In this optimal case, both methods resulted in the same allocation of the individual stock exchanges to obtained clusters. Figure 2 presents the way in which the silhouette coefficient for both methods was shaped depending on the different number of clusters. The maximum silhouette coefficient (obtained for five clusters) equaled 0.545.

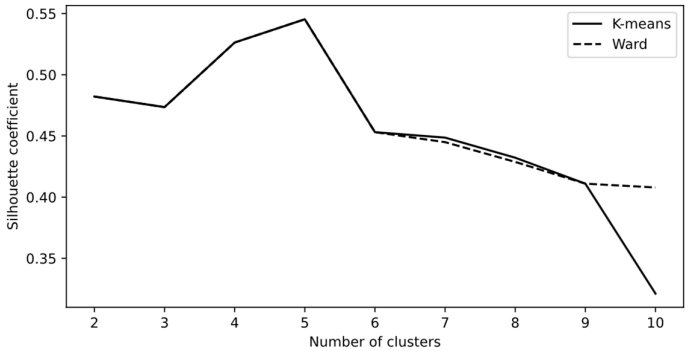

Fig. 2: Silhouette coefficients for the *K*-means and Ward methods – six selected variables

The obtained optimal division of the investigated stock exchanges into groups is presented in Table 2. The silhouette for each stock exchange has been shown in brackets - next to the stock exchange name.

Table 3: Results of clustering for six best performing variables

Group 1	Group 2	Group 3	Group 4	Group 5
SIX Swiss Exchange (0.000)	Borsa Istanbul (0.000)	Deutsche Börse AG (0.403)	Prague Stock Exchange (0.608)	Athens Stock Exchange (0.729)
		Euronext (0.557)	Vienna Stock Exchange (0.719)	BME Spanish Exchanges (0.366)
		LSE Group (0.454)	Luxembourg Stock Exchange (0.664)	Bucharest Stock Exchange (0.760)
		Moscow Exchange (0.185)		Budapest Stock Exchange (0.729)
		Nasdaq Nordic and Baltics (0.347)		Bulgarian Stock Exchange (0.762)
				Cyprus Stock Exchange (0.684)
				Kazakhstan Stock Exchange (0.539)
				Ljubljana Stock Exchange (0.762)
				Malta Stock Exchange (0.756)
				Oslo Stock Exchange (0.319)
				Ukrainian Stock Exchange (0.722)
				Warsaw Stock Exchange (0.729)
				Zagreb Stock Exchange (0.751)

Two investigated markets, namely the Swiss and the Turkish stock exchanges were indicated as outliers. The SIX Swiss Exchange was placed in the single group because it clearly stands out from the other stock exchanges. It has the highest capitalization ratio, the highest total value traded to GDP and is also distinguished by the highest average capitalization of listed companies. Therefore, it can be assumed that the Swiss stock exchange presents the highest level of development among all the analyzed European stock exchanges. The second identified outlier is the Turkish stock exchange, which is characterized by the highest turnover ratio, therefore Borsa Istanbul can be considered the most liquid market.

The third group consists of highly developed five stock exchanges, including: Deutsche Börse AG, Euronext, LSE Group, Moscow Exchange and Nasdaq Nordic and Baltics. The stock exchanges representing this group are distinguished by the highest values of most of the explanatory variables used. It should be noted that Euronext, LSE Group and Nasdaq Nordic and Baltics consist of more than one stock exchange. These are all three markets of this type in our study and all of them they have been placed in the same group. This shows that the merger of stock exchanges can contribute to their growth

and market position. The market that is on the verge of this group is the Russian stock exchange, which has the lowest value of the silhouette coefficient comparing to other markets forming this group.

The fourth group consists of three stock exchanges, which aspire to be highly developed stock exchanges. They are characterized by the highest share of foreign listed companies in the total number of listed companies. All these three stock exchanges have high and relatively similar silhouettes, which means that they constitute the homogenic and well-separated group.

The fifth group consists of the exchanges that can be treated as emerging markets. Most of them are characterized by a high silhouette, which indicates that they are well suited to this group. However, there are two exchanges with outlying silhouettes – BME Spanish Exchanges and Oslo Stock Exchange. In consequence, both these stock exchanges can be regarded as slightly standing out from this group.

Summary

In the study two clustering methods were used to assess the level of development of European stock exchanges: *K*-means and Ward hierarchical methods. In the first stage, both methods were applied using all prepared indicators. However, the use of so many indicators resulted in a poor division of the examined stock exchanges into groups, which was reflected by the low value of the silhouette coefficient. For this reason, in the second stage, the elimination of redundant variables was performed to identify the set of indicators which maximizes the silhouette coefficient. Based on the identified variables we were able to substantially increase the quality of obtained clusters.

The conducted study allowed to indicate the division of European stock exchanges into groups in terms of their level of development. Apart from two outlying stock exchanges, they can be divided into three groups, i.e.: highly developed, aspiring to the status of highly developed and emerging ones. The study also clearly confirmed the impact of merging stock exchanges of different countries on their level of development. This consolidation has a very good impact on the level of development and on the position of the stock market on the international stage. Merging exchanges is a very good opportunity for all exchanges that are at the development stage, so that in the near future they can aspire to a group of highly developed exchanges. This would undoubtedly bring a lot of benefits for a given stock exchange as well as for the participants of a given market.

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Social Factors Supporting the Image of The Organisation on The Example of TOP 500 Companies – Poland

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Abstract

In the economic situation of today, businesses are required to take various actions to increase their attractiveness or to distinguish them from the competition. The need for competition affects typical marketing areas, as well as those related to the acquisition and maintenance of the company's strategic resources, in particular – employees. Companies build and cater to their image, not only as an attractive products or services provider, but also a reliable employer. An employer branding strategy can be a tool supporting the organisations in these activities. The organisations, aware of their impact on society and the environment, increasingly take into account the principles of corporate social responsibility (CSR) in connection with their business.

The aim of the study is to draw attention to issues related to shaping the image of the organisation as an attractive employer, particularly with the use of social factors.

Keywords: Organisation Image, Employer Branding, Corporate Social Responsibility

Introduction

The economic situation of today, including the growing need to compete for a place on the market, means that organisations must consciously and purposefully cater to their own image. The need for competition affects typical marketing areas (recognizing and satisfying the needs of customers, increasing sales, making profit), as well as those related to the acquisition and maintenance of the company's strategic resources, in particular – employees. Therefore, it becomes crucial for the organisation not only to take care of its image as a provider of products or services, but also (and perhaps even most importantly) to shape the image of the company as an attractive employer. As a result of such activities, we increase the attachment, commitment and loyalty of employees, who become promoters of the organisation on the outside. The image of a good employer is also important at the recruitment stage, as it can effectively help to attract the best and most appropriate candidates for the company.

One effective tool that comprehensively supports companies in building and maintaining such a desired image may be the employer branding (EB) strategy. Human Resources (HR) specialists consider it important to build such an employer's position to not only attract the desired employees, but also to retain them for longer periods. To intensify competition for talent, organisations must distinguish their messages from those of their competitors. This is why EB is becoming such an important element of human resources management and success of the organisation. In all this, organisations must not forget that their activities have a significant impact on society and the environment. Businesses aware of these relationships should take into account the principles of corporate social responsibility (CSR) in their decision-making processes.

The aim of the study is to draw attention to issues related to shaping the image of the organisation as an attractive employer, particularly with the use of social factors. Therefore, the following main research problem was adopted: Do the surveyed companies from the TOP 500 – Poland list perceive a need to support the organisation’s image with social factors?

The Image of An Organisation – Concept and Essence

Each organisation carrying out activities on the market is perceived and evaluated by other entities, also operating on the market, in a subjective and complex manner. The impressions and feelings created in the consciousness of market players, forming a certain image of a given company, are referred to as an image. In the literature on the subject, an image is defined as "a collection of beliefs, thoughts and impressions of a given subject (person or group) about an object, whereby an object can be understood as a company, product and its brand, location or person" (Kotler 1994, p. 549). On the other hand, an integrated image of a company is a notion and feeling which is aroused in the consciousness of various entities (both external customers, i.e. market ones, and internal customers, i.e. employees), and can be used as a tool of competition between organisations (Dewalska-Opitek 2010, p. 221). Therefore, the image of an organisation is a subjective notion of this organisation in other persons – it is exactly what others think about it (Budzyński 1998, p.73). The nature of the image is heterogeneous, it includes many different elements, depending on the context, sphere of activity of the organisation and its audience (Wójcik 2005, p.73).

Employer image should be separated from its familiarity, realization, awareness and reputation. The employer familiarity and awareness are essential and fundamental elements to initiate employer image and reputation. This is because these elements make it possible to perform a cognitive assessment of whether or not particular job seekers are aware of the existence of the organisation (Cable and Turban 2001, pp. 115-163, Collins and Kanar 2013, pp. 284–297).

Looking through reputation definitions in different domains, an article proposed by Highhouse et al. (2009, pp. 782-789) can be found that referred to employer reputation as an universal, temporally stable, critical assessment about an organization that is common to the general public. Thus, reputation differs from image in that reputation mainly involves the affective aspects. The other, but not less important, differences are that reputation is a more lasting judgment, which is reflected, among other things, what is the general public's opinion about the organisation. Therefore, it is possible that the general public has positive opinions about an organisation (positive reputation) but that an individual applicant may have a more negative opinion based on concrete experiences (negative image), or vice versa. Rynes et al. (1991, pp. 487–521) emphasized that there is a possibility that a company having a good reputation among jobseekers suddenly loses its positive image through inadequately conducted recruitment or rude employees of the HR department.

A concept associated with reputation is the phenomenon of a firm celebrity defined as a company that meets with great interest from the public opinion with a positive response. It is characterized by having an evaluative and even often emotional component (Rindova et al., 2006, pp. 50–71). Despite these differences, employer familiarity, employer reputation, and employer image are also related. Hence, Cable and Turban (2001, pp. 115–163) placed them under the general concept of employer knowledge.

In accordance to Highhouse et al. (2009 pp. 782-789), employer image is determined as an combination of transient perceptions about specific aspects of an organisation as an employer who has particular components. This definition refers primarily to the four most important elements such as:

- the image is stored by individuals instead of the public,
- the image may fluctuate instead of being relatively stable,
- the image only applies to certain aspects instead of the overall view,
- the image is characterized by cognition in nature.

In general, HR practice also uses the terms of employer's brand and employer branding. At this point, constructing clarity is a purposeful tool. It is suggested to link the employer's brand constructions with the definition framework set out above instead of using other terms for similar constructions. Then it allows to link the external employer brand with the organisation's employer image (outsider's mental representations of qualities linked to the organisation as an employer) while the internal employer brand is associated with an organisation's identity (insider's mental representations of qualities linked to the organisation as an employer). Thus, the external employer branding is considered to be a synonym for employer image management and the internal employer branding for identity management. (Lievens and Slaughter 2016, pp.407-440)

Activities undertaken by companies to build their image as employers are referred to in the literature as employer branding (EB). EB is a fairly new (introduced in the 1990s) concept of organisation management, related to the practice of talent management, as well as the need to ensure and maintain talented employees in contemporary organisations. (Ober 2016, pp. 345-356)

Kozłowski (2012, p. 14) defines employer branding as: "all activities undertaken by the organisation, addressed to current and potential employees, aimed at building its image as an attractive employer and supporting its strategic business goals".

A broader definition is proposed by Francis and Reddington, according to whom EB is an attempt to better specify the terms of the psychological contract between the employee and the organisation in terms of the values provided to the employees. The expression of the employer's image provides employees with practical cognitive structures that give meaning to their employment in the organisation. The importance of the employer's image can be seen in the context of the social exchange theory, according to which employees make carry out a form of a profit and loss account of their employment with a particular employer. (Francis, Reddington 2012, p. 269)

The concept of EB is based on the assumption that the company, as an employer, is treated as a product to be sold. However, it is worth noting that EB is significantly different from recruitment marketing. (Albrychiewicz-Słocińska, Robak 2017, pp. 147-161)

The implementation of EB programmes supports the recruitment process as it attracts valuable candidates to the organisation, reduces turnover and positively motivates employees to work. This, in turn, translates into an increase in commitment and, as a result, contributes to the quality of work and generating a competitive advantage. As a result, the company enjoys financial benefits, in particular resulting from lower employee turnover due to their satisfaction, efficient communication within the organisation, as well as good relationships with superiors. (Barrow, Mosley 2006)

The image of an organisation is greatly influenced by both internal activities (for example, those related to investing in human capital, caring for a healthy work environment and good interpersonal relations or work ethics) as well as those directed to the outside and related to broadly-defined advertising and PR areas. Both are important parts of the concept of Corporate Social Responsibility (CSR).

Basics of the concept of Corporate Social Responsibility

The activity of an organisation and the business decisions it makes not only have an economic or efficiency dimension, but also a social and ethical one. This is why we observe a constantly growing interest in the concept of Corporate Social Responsibility (CSR). The terms used to describe an organisation within this paradigm include: responsible organisation; ethical business; civic organisation, or social environment of the organisation (Bevan et al. 2004, p. 13).

Since CSR affects all aspects of the functioning of an organisation – financial, technical and human, it can be described as a management philosophy. According to the assumptions of the concept of

CSR, an organisation takes responsibility for its impact on society and the environment. CSR is, therefore, a form of awareness, acceptance, as well as management of the implications and results of decision-making processes in organisations. (Skiba et al. 2017, p. 669-671)

The concept of CSR makes it possible to make the unknown known and achieve balance in the organisation, both in relations with the environment and its own employees (Debeljak et al. 2011, pp. 5-22). The social dimension of the activity of the organisation in the area of human resources refers, among others, to: ability to adapt, empathy, openness, integrity and honesty in mutual relations between the management, employees and stakeholders; models and standards of employee behaviour towards customers, consumers and all entities participating in the company's activities; shaping the image of the organisation on local community level through employee narrations, as well as declared and actual value systems forming the basis for the operation of the employees (Bevan et al. 2004, p. 18; Turner 2004)

Corporate Social Responsibility as defined by the European Commission means that organisations take responsibility for their impact on society (European Commission 2011). CSR in the modern economy should mean: conducting activities based on similar values, taking into account persons in the processes of production, distribution and consumption, as well as implementing the principles of social responsibility in all areas of business operations (Kacprzak). Various programmes, guidelines or initiatives that set out the directions of responsible business activity are used to implement these principles. CSR is a voluntary strategy taking into account the social, economic, ethical and ecological aspects in business activity and in contacts with the environment (e.g. with employees, customers, shareholders, suppliers, local community). In practice, this concept is most frequently manifested in such activities as: social campaigns, employee volunteering, sponsoring cultural events, sales products combined with allocating a part of profit for a specific social purpose, creating codes of ethics or eco-labelling the products.

There are many benefits in including the idea of CSR in business activities, however these advantages should be considered in a long-term perspective. These are, above all:

- increased interest by investors;
- increased loyalty of consumers and stakeholders;
- improved relationships with the community and local authorities;
- increased competitiveness;
- improved level of the organisational culture of the company;
- shaping a positive image of the company among employees;
- attracting and retaining the best employees (CSR Encyclopedia).

Social responsibility becomes a sign of the times, an element desired in the image of the company, a distinguishing feature which serves as proof of modernity, maintaining the standard of activity reserved for the best companies which emphasise comprehensive partnerships in their activities. (Pisz 2010, p. 13)

Methodology

The research results presented in the study are part of a nationwide quantitative survey of the representatives of businesses carried out under the project “New trends in human resources

management in large companies". The project was implemented in 2019 with the participation of a specialist third party company – MRW Market Research World. The objective of the survey was to identify:

- social and psychological factors supporting staff development in organisations,
- intangible assets in the organisation,
- processes of management of social capital and trust in organisations.

The study was conducted using quantitative research methods using mixed techniques: CAWI (Computer Assisted Web Interview) and CATI (Computer Assisted Telephone Interview). The combination of these two quantitative methods served to increase the response data. The study group consisted of the largest companies in Poland, the so-called TOP 500 group (according to the ranking of the Rzeczpospolita portal for 2018). The survey company used random sample selection. If a company refused to participate in the study, another business was selected at random. The survey was conducted on a representative sample, with the following parameters: general population size 500, estimation error 6%, confidence level 95%.

The applied research tool is a standardised questionnaire consisting of questions and statements, both closed and semi-open. The Likert scale was used in the answers (so-called Likert scaling), which enables measuring the relative intensity of the answers (Babbie, 2004, p.192). The personal information questions were proprietary, formulated by members of the research team – employees of the Department of Psychology, Sociology and Communication in Management of the Faculty of Management of the Czestochowa University of Technology.

The respondents (companies that took part in the survey) were: 179 companies including the following business activity profiles: 41.8% production, 14.5% production and service, 27.4% service, 8.4% trade and 7.8% production and trade. The revenues of the majority of the surveyed organisations ranged from PLN 51 to 200 million (68.1%), followed by companies with revenues of PLN 5 to 50 million (17.9%); the least numerous were those with revenues exceeding PLN 200 million (14%). Companies also differed in terms of size, measured by the number of employees. Employment at the level of 201-500 employees was demonstrated by the majority surveyed companies (73.18%), the remaining organisations (26.82%) demonstrated employment at the level of over 500 employees.

STATISTICA software was used to examine and describe the significance of differences with respect to the aforementioned independent variables, as well as the remaining correlation variables. The evaluation of the strength of the correlations occurring between the variables was made using Spearman's rank correlation coefficient. The analysis of the obtained statistical data was based on the publication by A. Stanisz (2006, pp.369-391).

The following problem was raised within the framework of the study: Do the surveyed companies from the TOP 500 list perceive a need to support the organisation's image with social factors?

The following three detailed research assumptions were formulated:

A1 In building their image, the surveyed organisations emphasise work ethics.

A2 Whisper marketing concerning relations with superiors is very important for building EB.

A3 A healthy work environment is an important part of the organisation's emotional message concerning EB.

The study adopted numerous statistical hypotheses examining the relations between selected indicators describing the organisation on the market (these included: comparison with the competition in terms of: implementation of new technologies (I1) and increasing the company's resources (I2)) and the social factors supporting the organisation's image (A1, A2 and A3).

Results and Discussion

In the course of the survey, the respondents were asked to respond to the proposed statements, which in this study were used as detailed research assumptions – Z1, Z2 and Z3. A five-step scale was used for the responses: 1 – I strongly disagree, 2 – I rather disagree, 3 – I neither agree nor disagree, 4 – I rather agree, 5 – I strongly agree. For the purpose of the analysis, the responses were grouped into three main categories indicating the respondent's attitude to the proposed statement: negative – sum of responses 1 and 2, neutral – sum of responses 3 and positive – sum of responses 4 and 5. Tables 1–3 contain the lists of responses in the survey.

Table 1: Results of the survey regarding the Z1 assumption

	responses quantity	responses cumulative quantity	responses percentages	responses cumulative percentage
I strongly disagree	9	9	5.02793	5.0279
I rather disagree	12	21	6.70391	11.7318
I neither agree nor disagree	28	49	15.64246	27.3743
I rather agree	53	102	29.60894	56.9832
I strongly agree	77	179	43.01676	100.0000
no answer	0	179	0.00000	100.0000

Source: own study

The analysis of the data (table 1) clearly demonstrates that the respondents, as entrepreneurs aware of the labour market trends, pay attention to work ethics when building their image (over 70% of positive responses). They realise that being ethical is not only an obligation imposed by certain laws and norms, but also an obligation of a moral nature. An ethical business is a more attractive employer on the labour market.

Table 2: Results of the survey regarding the Z2 assumption

	responses quantity	responses cumulative quantity	responses percentages	responses cumulative percentage
I strongly disagree	7	7	3.91061	3.9106
I rather disagree	27	34	15.08380	18.9944
I neither agree nor disagree	50	84	27.93296	46.9274
I rather agree	61	145	34.07821	81.0056
I strongly agree	34	179	18.99441	100.0000
no answer	0	179	0.00000	100.0000

Source: own study

The responses presented in table 2 also indicate a positive approach of the respondents to the studied issue. More than half of the representatives of businesses from the TOP-500 Poland list participating in the survey (53.07%) admit that it is important for the EB message to use whisper marketing to disseminate information on employee-supervisor relations in their companies. Reaching the recipient with the information through a direct and seemingly "spontaneous" verbal message makes the image of an attractive employer even more credible.

Table 3: Results of the survey regarding the Z3 assumption

	responses quantity	responses cumulative quantity	responses percentages	responses cumulative percentage
I strongly disagree	7	7	3.91061	3.9106
I rather disagree	9	16	5.02793	8.9385
I neither agree nor disagree	27	43	15.08380	24.0223
I rather agree	52	95	29.05028	53.0726
I strongly agree	84	179	46.92737	100.0000
no answer	0	179	0.00000	100.0000

Source: own study

The last of the analysed statements received strong positive confirmation in the opinions of respondents (table 3). As many as 75% of entrepreneurs believe that a healthy work environment is an important part of the organisation's emotional message related to EB. A friendly atmosphere at work can translate into increased employee satisfaction and, as a result, an increase in the level of their loyalty and commitment, or reduced staff turnover. Positive feelings and emotions of the employees also positively affect the productivity and efficiency of performed tasks.

As a result of the conducted statistical analyses, a significant statistical dependence was confirmed for only four hypotheses (Table 4).

Table 4: Relationships found between the indicators

Elements of the EB offer supporting the organisation's image	Selected indicators describing the organisation on the market	
	I1	I2
A1	-	Yes
A2	Yes	-
A3	Yes	Yes

Source: own study

Table 5 presents the value of Spearman's rank correlation coefficient (R) for the pairs of variables selected for analysis. Although the values of indicators do not show strong relationships between variables (the value of R is between 0.199698 and 0.218103), the analysis of the p-values of statistical significance indicates the occurrence of statistically significant relationships.

Table 5: The value of Spearman's rank correlation coefficient (R) for the pairs of variables selected for analysis

Pairs of variables selected for analysis	Spearman's rank-order correlation for p<0.05 N=179		
	R	t(N-2)	p
A1 – I2	0.216449	2.94959	0.003612
A2 – I1	0.218103	2.97325	0.003357
A3 – I1	0.199698	2.71143	0.007360
A3 – I2	0.207222	2.81807	0.005381

Source: Own study

The following part of the article shall only present those hypotheses for which statistical verification enables the rejection of the zero hypothesis concerning the lack of dependence between variables and adoption of an alternative hypothesis.

The first of the analysed hypotheses assumes that:

H_0: no correlation is found between increasing the company's resources and the assumption that an organisation emphasises work ethics when building its image,

H_1: a correlation is found between increasing the company's resources and the assumption that an organisation emphasises work ethics when building its image.

With regard to the defined statistical hypothesis, it was found that the value of Spearman's rank correlation coefficient R=0.216449 and the test probability level p=0.003612 enable the rejection of

the zero hypothesis and concluding that the companies which increased their resources by building their image emphasise work ethics.

The next statistical hypothesis assumes that:

H_0: no correlation is found between the implementation of new technologies and the assumption that whisper marketing concerning the relations with superiors in the organisation is very important for shaping the EB offer,

H_1: a correlation is found between the implementation of new technologies and the assumption that whisper marketing concerning the relations with superiors in the organisation is very important for shaping the EB offer.

The value of Spearman's rank correlation coefficient R=0.218103 and the test probability level p=0.003357 enable the rejection of zero hypothesis and adoption of an alternative hypothesis about the occurrence of relationships between the indicated variables. The analysis shows that modern companies are convinced that whisper marketing concerning relations with superiors in the organisation is of great importance for shaping the EB offer.

The following hypothesis was also adopted:

H_0: no correlation is found between the implementation of new technologies and the assumption that healthy work environment is an important element of the emotional message within the EB offer,

H_1: a correlation is found between the implementation of new technologies and the assumption that healthy work environment is an important element of the emotional message within the EB offer.

Spearman's rank correlation coefficient R=0.199698 and test probability level p=0.007360 warrant the rejection of another zero hypothesis and accepting the alternative. Thus, it can be concluded that there is a statistically significant correlation between the implementation of new technologies and caring for good work environment, as an important element of the emotional message contained in the EB offer.

The last of the hypotheses assumes that:

H_0: no correlation is found between increasing the company's resources and the assumption that healthy work environment is an important element of the emotional message within the EB offer,

H_1: a correlation is found between increasing the company's resources and the assumption that healthy work environment is an important element of the emotional message within the EB offer.

Once more, Spearman’s rank correlation coefficient R=0.207222 and test probability level p=0.005381 enable us to reject the zero hypothesis and adopt an alternative hypothesis regarding the relationship between increasing the company's resources and the impact of a healthy work environment on the emotional message contained in the EB offer.

Conclusion

As a result of the research and analysis of the collected material, it should be stated that the businesses from the TOP 500 Poland list consider building the image of the organisation to be an important and often demanding task. It requires a comprehensive approach and a strong commitment of the entire staff. Awareness of the market situation and the need to compete for a place on it makes it necessary for entrepreneurs to fight for their position all the time. For this purpose, companies use

various tools that comprehensively support them in building and maintaining their desired image. Such instruments can be the employer branding (EB) strategy as well as the Corporate Social Responsibility (CSR) concept.

Creating a strong and consistent employer's brand enables attracting and retaining the most suitable candidates and employees. It is worth remembering that creating and utilising unique brand values as well as building a positive employer image leads to very specific benefits.

The success and prosperity of a modern organisation is to a large extent related to such factors as commitment, satisfaction and contentment of its employees. On the other hand, lack of trust among employees, poor communication, unhealthy work environment or unethical attitudes and behaviours lead to employees not identifying themselves with the organisation.

Reliability and honesty are crucial in building the image of an organisation, and those responsible for creating and communicating this image must not forget about this.

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Impact of Socioeconomic Inequalities on Social Cohesion – Theoretical Approach

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Abstract

The purpose of this paper is to examine the relationship between socioeconomic inequalities and social cohesion. The paper consists of three parts. The first part introduces the subject matter of social cohesion. The second part outlines different approaches to socioeconomic inequalities. The final part demonstrates how the two issues overlap and examines the relationship between socioeconomic inequalities and social cohesion. The paper is theoretical and is based on a critical literature review.

Keywords: Socioeconomic Inequalities, Social Cohesion.

Introduction

Sustainable development is development that seeks to balance the economic, social and environmental needs. Sustainable development aims to achieve a permanent improvement in the quality of life. However, in practice, the social dimension is less discussed and researched than the economic and environmental dimensions. The essence of sustainable development is to ensure a continuous improvement in the quality of life for the present and future generations. Sustainable development entails the lessening of social inequalities on the one hand, and on the other, increasing social cohesion. What is important, we should not treat social cohesion as another pompous but empty word, but rather accept and cherish the mindset underlying this concept, and do our best to implement it.

The discussion about the relationship between social cohesion and socioeconomic inequalities springs from the assessment of potential development mechanisms which enable convergence of socioeconomic systems. Deepening of social and economic disparities, observed all around the globe, is one of the biggest obstacles on the path to sustainable development. At the same time, as inequalities rise, social cohesion is decreasing. Passing on of social and economic inequalities across generations hinders the achievement of sustainable development goals set by the European Union.

The pursuit of social cohesion is rooted in a conceptual framework that defies the excessive competition, individualization, disintegration of communities, social exclusion, marginalization and the *homo oeconomicus* approach, and the effects of incorporating business values into other areas of life. The pursuit of social cohesion is also driven by the need to counteract the effects of the ever-growing social and economic divides.

The paper explores the issue of social cohesion in the context of socioeconomic inequalities. The main goal of the paper is to identify the relationship between social cohesion and socioeconomic disparities. The paper provides a review of theoretical literature on the subject.

Social cohesion as the EU's Statutory Goal

The concept of "cohesion" gained more prominence in international politics of the European Union towards the end of the 20th century. The concept was used for the first time in the Single European Act adopted in 1986, i.e. in the Economic and Social Cohesion Charter which expressly pointed to the need to reduce disparities between various regions of the European Community. This goal became enshrined in the 1992 Treaty of Maastricht, in particular, in Art. 130a which postulates that in

order to promote overall harmonious development, the Community shall develop and pursue its actions leading to the strengthening of its economic and social cohesion. The 1997 Treaty of Amsterdam reinforced the adopted provisions and widened their scope. It provided that the Community will promote high level of employment and social protection, gender equality, the raising of the standard of living and quality of life, and economic and social cohesion. (Gawlikowska-Hueckel, 2002; Głąbicka, 2004; Gawlikowska-Hueckel & Zielińska-Głębocka, 2004).

In result of the Treaty provisions, instruments and policies aimed at reducing developmental disparities were established. A good example here of the systemic efforts made is the Cohesion Fund and cohesion policy.

The EU documents from late 1980s list the following reasons:

- need for harmonious development of the EU regions,
- pursuit of economic integration of the entire Community,
- development of multicultural identities of individual EU member states (the need to integrate immigrants),

for distinguishing the three kinds of cohesion:

- social cohesion,
- economic cohesion.
- territorial cohesion.

In the late 1990s these three dimensions of cohesion merged and started to be treated as one, referred to as "social cohesion" or "cohesion policy" in the EU documents. Social cohesion understood in such a broad way encompasses the following dimensions (Golinowska, 2011):

- social – it emphasizes the importance of leveling disparities in the standard of living and quality of life of EU citizens, and providing adequate standard of public services for populations,
- economic – it underscores the importance of reducing territorial inequalities for promoting sustainable development of the EU,
- environmental – it focuses on the concern for natural resources and environmental health factors,
- political – it focuses on political stability, further development of democracy and promotion of European integration,
- cultural – it underlines respect for Europe's common cultural roots and heritage, and at the same time promotes openness towards universal values.

Approaches to socioeconomic inequalities in economic theory

Socioeconomic inequality, depending on the conceptual premises, is treated either as a way a social system operates or as an undesirable problem (Zwiech, 2013). Conceptual premises derived from the elitist, meritocratic and egalitarian theoretical strands give rise to three different approaches to inequality (Zwiech, 2016):

- legitimization of inequality as an inherent element of free market economy accompanied by acceptance of inequalities at any level and scale,
- no acceptance of inequality (in particular its effects) based on an assumption that systemic solutions are necessary to eliminate such divides,
- conditional acceptance of inequality accompanied by establishing conditions that limit the rise of inequality and determining what is the acceptable threshold of inequality.

Theories that legitimize economic disparities suggest that economy should be desocialized and argue that inequalities are ethically legitimate, although we cannot assess ethical legitimacy without putting aside the norms and values adopted by society. In this case, expectations of social justice are boiled down to entitlements and property rights, therefore legitimization of inequality favours well-to-do people as it justifies the wealth they have accumulated.

Theories based on the lack of acceptance of unequal economic and social outcomes did not hold up and were discredited after the collapse of communist systems. They turned out to be utopian, and definitely did not bring more social justice to the world.

The approach based on conditional acceptance of economic disparities contends that inequalities can be accepted only to a certain extent, as long as certain conditions are fulfilled, such as: guaranteed minimum income, equal opportunities, efforts to maximize the welfare of the least privileged individuals. These theories draw attention to the inequality of wealth and distribution of wealth, and concentrate on an individual's responsibility for their own decisions, commitment, talents or efforts. What emerges in this approach is the lack of acceptance of the ever-growing income inequalities. Existence of excessive economic inequalities hinders socioeconomic development and makes it impossible to increase (or maintain) social cohesion (Zwiech, 2016).

Conditional acceptance of economic inequalities within societies forces us to determine what are the conditions that limit the growth of inequality, what are the acceptable thresholds of these inequalities and what is their optimal size. This issue has been approached in different ways:

- acceptance of inequality accompanied by respect for the principle of guaranteed minimum income (decent, dignified or biological, existential) for every member of the society (e.g. L. Hobhouse's theory (Hobhouse, 1922));
- acceptance of such level of inequality that makes the less privileged group as rich as possible, that is acceptance of inequality as long as it maximizes the position of the less privileged group in the situation of inequality (e.g. J. Rawls' maximin principle (Rawls, 1994));
- acceptance of inequality under the condition that equal opportunities are guaranteed, including an equal starting point for everyone (e.g. J. Roemer's theory (Roemer, 2000));
- acceptance of inequality under the condition that every member of the society has equal capabilities (real opportunities) (e.g. A. Sen's conception of capabilities (Sen, 2000)).

Legitimization of social inequality and Social Cohesion

Pursuant to fundamental assumptions of classical economy, allocation of resources comes first. The issues of distribution and equality are pushed aside and marginalized. Pareto argued that regardless of the distinct difference between efficiency and equality, economic policy can be formulated just on the basis efficiency (Blaug, 2000), without the need to consider the issues of equality and distribution. Pareto optimum, that is a situation when no further improvements as to the allocation can be made, allows to skip the question of income distribution in economic considerations on the assumption that the achievement of maximum welfare is possible with a certain set of production factors and certain income distribution, and changes in the structure of demand and adjustment changes in the structure of supply will occur until the moment comes when no market entity is able to make its situation better off without making at least one other entity worse off. A situation in which the status of wealthy people improves significantly and the situation of poor people does not change is understood as a benefit by Pareto. This approach puts aside the issues of social cohesion and growing inequalities.

In turn, utilitarianism contended that actions are morally right if they maximize utility understood as welfare or pleasure of a community. Such an approach is also based on the belief that distribution of benefits is irrelevant. It is not important which individual gains more benefits and which gains less if only the overall welfare is maximized (Rawls, 1994). The utilitarian approach operates from an aggregate perspective in which aggregate welfare maximization is equated with efficiency. Any

values other than efficiency are significant only to the extent in which they contribute to the maximization of social welfare. According to Brandt (1996), in the utilitarian agenda equality is subordinate to welfare and should be sacrificed in exchange for even the smallest increase in general welfare.

On the other hand, Kuznets claimed that rising income inequality is inevitable. Kuznets suggested that income inequality is inevitably expected to follow an inverse U-curve, first rising with industrialization and then declining at a higher level of social welfare. He argued that in the first period of accelerated economic growth income inequality rises very fast, and then, with the increase of income *per capita*, it declines (Kuznets, 1955). Increase in income inequality is a prerequisite of economic growth since it enables accumulation of capital necessary to stimulate GDP growth. Accumulation of capital happens through concentration of income, in consequence of which income inequality rises (Domański, 2009).

The Washington Consensus also pointed to increasing inequality as an inevitable consequence of modern technology, international competition and globalization. The Washington Consensus policy agenda minimized the role of the state and emphasized privatization, trade liberalization (import in particular) and capital market, deregulation and guarantees for private property. The role of the government was narrowed down to maintaining macroeconomic stability and price stability, with no responsibility for the stability of production, employment and growth. In reality, the Washington Consensus underplayed the issues of social inequality and social cohesion (Stiglitz, 2007; Stiglitz, 2006).

Another conception that legitimizes the growing inequalities is Nozick's theory of justice. Nozick claimed that a fair distribution takes place when every member of the society is entitled to what he has. It is important how the distribution happened, and not the final results it brings about. Hence, economic inequalities result from entitlement and belong to the past. According to Nozick, neither social justice not social cohesion can justify any violation of absolute rights to private property (Morawski, 2001). Nozick legitimized inequality as a natural phenomenon and pointed out that a transfer of property from rich to poor constitutes a violation of entitlements and there is no justification for redistribution of goods. The only redistribution admissible is one that rectifies past injustices arising from a crime or offense.

Hayek, a libertarian ideologue, defined equality from the perspective of individualism. He claimed that equality can only be conceived as equality before the law. However, natural differences between people justify the existence of economic disparities. Economic differences are thus a natural and desirable phenomenon (Rutkowski, 2009). In contrast, Friedman argued that freedom is more important than equality, and economic policies should focus on freedom as a primary value and be careful never to jeopardize it. He claimed that growing economic inequalities are necessary and are the inevitable result of exercising freedom.

Income and wealth inequality is also legitimized by the theory of public choice which claims that redirecting individual's activity from production to redistribution activities generates additional social costs. Economic disparities are thus legitimized with the use of such arguments as the need to avoid additional costs. The redistribution process is perceived as a socially costly race of various social groups to take over income and property belonging to others. According to Buchanan, the issues of wealth and income distribution between people can be solved through a "constitutional contract" subject to "continuous renegotiation" which would redefine the rights of an individual.

Various conflict theories that explain socioeconomic inequalities are jointly referred to as the Social Conflict Theory or, to quote Sztompka (2004), as theory of "cumulative advantage". According to this theory, once a social agent gains a small advantage over other agents, that advantage will compound over time into a larger advantage, i.e. the high-status holders will continue to climb up the ladder while the less fortunate ones will continue to be degraded. In other words, privileges tend to multiply. This theory refers to, on the one hand, the "Biblical truth" or "Mathew effect" which is embodied in the adage "the rich get richer and the poor get poorer", and on the other hand, to the

inheritance of social status. Inheritance of social position between generations, i.e. the passing on of advantages and privileges on the one hand, and disadvantages and poverty on the other, depends on access to education. In modern societies education is perceived as the main means of securing better jobs, higher earnings, influence or prestige. Costs of education can be borne with ease by wealthy families, but not the poor ones, which perpetuates the mechanism of inheritance. Apart from economic inheritance, there is also cultural inheritance (cultural capital) and social inheritance (social capital).

The power elite theory claims that in every society there is a single elite (power elite), not a multiplicity of competing groups, that holds the highest positions and decides life-and-death issues for the entire nation. The first power elite theories (Paveto's and Mosca's) claimed that power elites appear regardless of a society's structure and organization, and that men differ in their capabilities and skills. Historically, hereditary aristocracies were the most talented and gifted people, and as such were the governing elite. However, new sociological conceptions rejected this point of view and treat elites as an offshoot of social structure and socioeconomic inequalities. How power is organized depends on institutional structures rather than personal traits or skills, and it is the system of social organization that decides on who belongs to the elite and what criteria they have to meet. Mills argued that elites emerge in the wake of a specific economic, social and political situation, in result of internal workings of these institutions (Mills, 1961). Status of an individual in the society depends on his access to institutions and the position he holds in the institutions, and not on his personal traits.

To recapitulate, theories that legitimize economic inequality (or increase thereof) argue that such inequality is inevitable on the grounds of neoliberal paradigms. Free market economy seems to carry in itself some inherent economic inequality and the division of society (and resulting inequality and lack of cohesion) plays a secondary role to production and allocation, or even, is completely insignificant. These theories claim that inequality is a natural phenomenon, hence, any limitation of inequality is unjustified. Inequality is perceived as the effect of "tough" economic laws, treated almost as natural law. According to the aforementioned theories, there are values (e.g. freedom) that are more important than equality and cohesion, and limitation of socioeconomic disparities could also restrict these values. Theories that legitimize economic inequality focus on such factors as efficiency, motivational action, additional costs related to redistribution, the functionality of inequality and the society's operating principles.

Theories seeking to legitimize economic inequality argue that, on the one hand, economy should be desocialized, and on the other hand, that inequality is morally right (overlooking the fact that when assessing ethical righteousness we cannot put aside societal norms and models). In this light, it is important to pay attention to how these norms and models are established and shaped. One may venture to say that legitimization of inequality is convenient for the well-to-do people as it justifies the wealth they accumulated, allowing them to easily reduce the expectations of social justice to a discussion about entitlements and property rights. Concurrently, it should be added that the optimistic belief in the gradual upward social mobility in the context of free market has turned out to be extremely naive (Woźniak, 2014).

Lack of acceptance of economic inequality understood as inequality of outcomes and social cohesion

Another approach postulates no acceptance of economic disparities in societies. From the economic perspective such standpoint can be understood in many ways – also, in the extreme, as contention of outcome inequality. Understanding of economic inequality as outcome inequality is typical of utopian socialists. When expanding the famous labour theory of value, Marx developed a theory of additional value and the concept of exploitation of labour power by capital, or the labourer by the capitalist. Analysis of the views of utopian socialists inspired his idea of a classless society in which the value of private means of production being the source of conflicts and antinomies will be done away with. In result of labour, goods of a certain value are produced, which then become objects for sale for a specific price. The issue with transformation lies in the difficulty of explaining the transition from the mode of production when a value is created, to the mode of distribution, when the price is

determined. According to Marx, the amount of labour that goes into producing a good is the source of the good's value, in short, labour is the source of value. If so, the profit gained by the capitalist comes *de facto* from the value produced by a labourer, i.e. the labourer is exploited. The additional value, also called the "surplus value", appropriated by the capitalist is the difference between the value of the good produced and the value of labour force used to produce the good (Sobiech, Woźniak, 2007). Marx emphasized how little of the labour value itself was taken into account in income distribution, exposing ideological reasons behind the income distribution gap. For capitalists, the accumulation of capitals and technological progress become primary goals. The consequence of accumulation is concentration of capitals and wealth in the hands of a few which leads to increasing economic inequality and meltdowns driven by the contradiction between the social nature of production and private appropriation of the surplus value. Therefore, it is necessary to create new economic relationships based on social ownership of the means of production and fair income distribution.

Friedman tried to refute the view that capitalism and free market economy contribute to the increase of economic inequality by arguing that the more capitalist a country is, the less has to be paid for the use of capital and the more income is allocated to the financing of services provided by people. Friedman believed that the capitalist system generates a relatively small divide between the rich and the poor, and that the development of capitalism lessens the inequality gap. As it comes to changes over time, he argued that economic development of capitalist countries was clearly accompanied by continuous, significant reduction of social differences. What can be observed in capitalist societies is rather short-term inequalities which are caused by dynamic changes and social mobility, as well as inequality of opportunities. In economies other than capitalist, one may observe a more frequent occurrence of long-term inequalities which shape the social status of individuals in a more permanent way. Hence, capitalism gives more opportunities to change the social status of individuals (Friedman, 2008). Also Hayek (2007) pointed out that socialism is not the solution to growing inequalities as it does not lead to higher social justice but rather gives rise to a new, arbitrary and rigid social hierarchy. In theory we may envisage a classless society, however, the most radical attempt to create such a society (USSR) was a failure. In spite of the efforts to create a classless society, classes just changed places, with one replacing the other (Lane, 1984).

To recapitulate, for theorists who do not accept economic inequality understood as outcome inequality, capitalism and free market economy enhance economic disparities, whereas socialism lessens them. Marxist economics questioned the liberal conviction that the workings of market forces guarantee equality. Marx believed that the biggest problem was the conflicting economic interests of different social groups.

Theories concentrated on inequality of outcome did not prove right, and after the collapse of the communist systems, they were discredited – therefore, in this paper they have only been mentioned in passing, without focusing on the solutions they proposed. They turned out to be a utopia, and they failed to produce more social justice or social cohesion.

Conditional acceptance of economic inequality and social cohesion

At present, lack of societal acceptance of economic equality is not understood as disapproval of inequality of outcome, but rather as disapproval of inequality of opportunity (or of an "equal starting point in life") and possibility. Inequality of opportunity and possibility create such institutional conditions in which elimination of the economic divide is simply not possible. A society cannot get rid of inequalities without allowing the least advantaged people access to certain offices or positions. Fair Equality of Opportunity theory requires that social positions be open and meritocratically allocated, but also that each individual should have a fair chance to attain these positions. In other words, economic inequality is acceptable only if every individual has a fair chance, and their success in the pursuit of social position is a function of their talent and willingness to use the talents, and not a function of social class. Economy should be supported by a system of political and legal institutions that would ensure fair prospects for success and participation of individuals with similar talents and motivation (Rawls, 1994).

Yet another theory proposes a guaranteed minimum income for all people, regardless of their welfare status. That minimum income should be decided by the society.

In this approach, theorists focus on the least advantaged individuals. They believe that the only type of economic inequality that can be accepted and justified is one that leads to life for the worst off being made better (Rawls, 1994). In brief, this view allows for economic inequality under certain conditions.

It was the Theory of Justice authored by John Rawls that drew economists' attention to conditional acceptance of economic inequality in societies (1994). According to this theory all primary social goods (liberty and opportunity, income and wealth, and the bases of self-respect) should be distributed equally unless an unequal distribution of any, or all of these goods are to the benefit of the least advantaged. Basic points of Rawls' theory can be summed up as follows (Kowalik, 2002):

- the principle is equality of all primary goods (not just the income, but also wealth). So it is not about income redistribution, but the primary distribution. Hence, property owning is also one of the primary social goods which should be distributed equally;
- each deviation from the principle of equality (of both income and health, as well as basic liberties and opportunities) must take into account the benefit of the least privileged individuals.

In short, according to Rawls, inequality is acceptable as long as it brings benefits to the worst off part of the society.

Sen tried to form a bridge between Rawls' Theory of Justice and a perception of inequality defined in economic terms. Amartya Sen's works show no acceptance of the inexorably rising inequality. Sen made a break with the traditional notion of *homo oeconomicus* driven by self-interest, and brought to light the ethical dimensions of economy and the malfunctions of "moral economy". He emphasized that market economy can bring various outcomes depending on how material goods are distributed. Market is only one among many institutions that contribute to the final situation. The starting point of Sen's reflections was the assumption that people are not equal in their capacities and they differ is many respects. Sen wasn't concerned so much with the distribution of goods (as Rawls), but focused on the equality of possibility. He pointed out that negative socioeconomic phenomena (e.g. famine, poverty) are not the result of shortage of goods, but of inappropriate distribution. Sen promoted the notion of "*entitlement*" understood as the right to goods and services or the right to access (Sen, 2000). The rights to have access determine distribution of goods and depend on incomes, social position or education. Sen expanded the theory of equality by adding two concepts: "*capabilities*" which manifest themselves in "*functionings*" (possibilities to realize the capabilities), shifting the focus from resources that define capabilities to the possibilities of using them. He also formalizes that reasoning by means of a conversion function which converts resources into functionings, and stresses that this conversion rate should be equal. Sen advocated that economic decisions should be taken by as many different social groups as possible to ensure development and prosperity. In his belief, poverty was the result of bad governance, in particular bad governance of these few social groups that hold the power and abuse it by having no concern for the interests of other groups.

Dworkin (2002) claimed that "fair" economic distribution has to be ambition-sensitive and at the same time, endowment-insensitive. When discussing equality of resources as an egalitarian distributive mechanism, he emphasized the importance of external and internal resources and pointed to an alternative to the equality of resources – equality of welfare. Dworkin contended that full equality of opportunity for welfare is not possible. In turn, Roemer (1998, 2000) believed that inequality of assets was the key culprit in existing inequality and that the fundamental cause of exploitation was inequality of ownership of productive assets. Roemer formulated a theory of equal opportunity which postulated to compensate persons for "bad luck in the birth lottery", and at the same time hold them responsible for their choices and efforts. Equal opportunity is achieved if the society protects people from bad outcomes that happen because of certain circumstances or bad luck, but does not release them from the responsibility for their autonomous choices and their consequences. Thus, an equal opportunity policy has to equalize outcomes in so far as they are the

consequences of causes beyond a person's control, but allow differential outcomes in so far as they result from autonomous choice.

To recapitulate, conditional acceptance of economic inequality justifies the existence of inequality provided that some threshold conditions are met. These conditions are: guaranteed minimum income, equality of opportunity, equality of capability or the right to social position of a weaker individual. These theories emphasize inequality of assets, inequality of ownership of means of production or unequal distribution of goods, and at the same time shift the focus from resources to the possibility of using them. On the other hand, they assert the responsibility of an individual for his decisions, commitment, talents and efforts. They underline that market is only one of many institutions able to either eliminate economic disparities or deepen them.
It is clear that in this approach there is no acceptance for growing inequality and social divide. In this approach, inequality is accepted conditionally, which means that the conditions of acceptance (threshold conditions) and the acceptable amount of economic inequality are defined. This approach buys into the assumption that excessive economic inequality hampers socioeconomic growth.

Impact of socioeconomic inequality on social cohesion

The term "social cohesion" is not a unanimous concept, and it has no single, commonly approved definition. The notion of "cohesion" is usually used to determine the level of inequality and is understood as degree to which socioeconomic disparities between different regions or socioeconomic groups are politically and socially tolerable (Molle, 2000; Amin&Tomaney (ed.), 1995).
Jenson (1998) identified five dimensions of cohesion that enabled social cohesion:

- affiliation – social isolation,
- insertion – exclusion,
- participation – passivity,
- acceptance – rejection,
- legitimacy – illegitimacy.

In Jenson's theory there is no reference to inequality. However, in a work published a year later Bernard (1999) completed Jenson's proposal by introducing the dimension of quality – inequality which is essential to social cohesion.

The definition of "social cohesion" provided by the European Committee for Social Cohesion (2004) in the Revised Social Cohesion Strategy links it to the elimination of socioeconomic disparities. According to the Committee, social cohesion is defined as a society's capacity to ensure wellbeing to all its members, minimize disparities and avoid polarization.

Hence, to ensure wellbeing to all members of society the following objectives must be achieved: almost full employment, decent wages, social security benefits in case of sickness, poverty and temporary unemployment, assistance in achieving minimum wages, consumption subsidies for people below a certain income level, free use of public goods (Pfaller, 2000). Nevertheless, minimizing economic disparities between members of society manifests itself in the attempts to reduce the gap between the extreme poles of wealth and poverty. This means that economic inequalities in both areas, that is income and expense inequality, as well as asset inequality should be eliminated (Zwiech, 2016). Wealthiness can be analyzed from different points of view. A wealthy person is a person considered wealthy by others, a person who considers himself wealthy and his opinion is confirmed by symbols of wealth or is a person who meets some specific economic criteria (with regard to the wealth threshold). The wealth threshold (in contrast to the poverty threshold) has not yet been unequivocally determined. Wealth has not been studied exhaustively in literature (although lists of wealthy people are available, the wealth indicator being the total value of assets or annual income). It is just the contrary in the case of poverty. There are many definitions and classifications which try to capture poverty and provide a multifaceted understanding of the issue. The answer to the question of what poverty is depends, to a large extent, on a researcher's perspective. It is a multidimensional phenomenon which cannot be described with the use of a single

indicator. On the one hand, poverty is a condition in which a person lacks the essentials and financial resources for a minimal standard of living, thus it is a material deprivation, and on the other hand, poverty is also the lack of opportunity conducive to development (Zabielska, 2007). There are many different measures that try to capture poverty (social minimum, poverty line, Sen's poverty index) in its different dimensions (absolute, relative, subjective, secondary etc.). It must also be underlined that attempts to avoid polarization in the way poverty is perceived are reflected in efforts to refrain from bipolar terms. Polarization means a division (of groups, systems, forces) into two sharply contrasting parts (Kuttner, 1983; Thurow, 1984). On the grounds of economic inequality theories this concept refers to the reduction of the percentage share of "middle class" for the benefit of the "poor class" and/or "rich class" (Kot, 2008).

Analyzing social cohesion through the lens of the society's capacity to ensure welfare to all its members, minimize disparities between them and avoid polarization, socioeconomic inequalities gain special significance as – apart from the prerequisite of social cohesion being to raise the standard of living – the remaining aspects indicated in the *definiens* are to limit inequality and social exclusion.

In addition, the EU Committee for Social Cohesion enumerated factors that threaten social cohesion – income disparity, poverty, unemployment, social exclusion and marginalization, and exclusion from information. All these factors are embedded in a social order according to which some people have limited access to different types of goods, whereas others use them without any limitations. Thus, in short, such phenomena result from asymmetric access to various areas of human activity, i.e. from socioeconomic inequalities.

It should be emphasized that socioeconomic inequality weakens social cohesion not only with regard to the social aspect (divides that are too big entail social costs and negative social phenomena) and economic aspect (too big inequalities adversely affect economic growth, economic efficiency and welfare) (Zwiech, 2016), but also affect the environmental aspects of sustainable development since inequalities put more pressure on the limited resources of the natural environment.

Conclusion

The paper presents the links between social cohesion and socioeconomic inequality, and proves that socioeconomic disparities are one of the key dimensions of social cohesion. In other words, for social cohesion to be achieved, excessive socioeconomic equalities must be eliminated. Socioeconomic disparities weaken social cohesion in its social, economic and environmental aspect.

Moreover, when one looks at social cohesion through the lens of a society's capacity to ensure welfare to all its members, to minimize disparities between them and avoid polarization, elimination of socioeconomic inequalities gains special significance as it limits two out of three aspects that definitely require limitation.

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Equal Treatment in Employment in Poland in Companies of the West Pomeranian Voivodship

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Abstract

The purpose of this paper is to present the issues of equal treatment in employment and of discrimination of employees in companies. The layout of the paper is dictated by the implementation of the objective. The first part introduces the subject matter of equal treatment and basic kinds of discrimination in employment. The study characterizes basic dimensions of unequal treatment and discrimination in companies, in particular: wage, employment, profession-related, post-related and training discrimination. Then results of a research conducted on 601 employees from the West Pomeranian Voivodship in Poland are described.

Keywords: Equal Treatment, Discrimination, Poland

Introduction

Equal treatment in employment assumes that an entrepreneur will take into account the good of his own employees in his activity, having regard to social justice and absolute prohibition of infringing human dignity. A derivative of the obligation to implement the indicated values in economic activity involves equal treatment of various categories of employees and counteracting discrimination, both direct and indirect.

These rules also refer to creating such conditions for work (Zwiech, 2013a; Zwiech, 2013c), in which employees would have the opportunity to fully use their different skills and diverse potential for the implementation of the company's objectives and mission. Thus it seems very important to eliminate existing inequalities and potential discriminatory behaviours which take the form of both direct and indirect discrimination, towards different categories of employees in companies.

The problems of non-equality and discrimination occur in companies on a daily basis. For instance, women, migrants, youngest and older people, national, sexual or religious minorities or disabled persons face a more difficult and worse position on work's ground.

The aim of this study is to present basic problems that may arise in companies, associated with equality policy. The study characterizes basic dimensions of inequality and discrimination in companies, in particular: wage, employment, profession-related, post-related and training discrimination and it presents results of research conducted in Poland concerning discrimination of individual employee-related discrimination.

The question of equal treatment in companies - current state of knowledge

International institutions have been dealing with issues of employee equality on the labour market for over 70 years (Zwiech, 2011a). The mere expanding of anti-discriminatory legislation, however, is not enough to change the differentiation of positions of individual categories of employees on the labour market, and in companies themselves. Therefore, it is necessary not only to pass adequate legal solutions and transplant provisions of the law onto the ground of community life, but to raise social awareness, too.

The United Nations was one of the first international organizations that took up the question of discrimination. The UN took a stand on equality issues in the *Universal Declaration of Human Rights* as early as in 1948. Then the UN announced in Article 26 of the *International Covenant on Civil and Political Rights* of 19 December 1966 that "*the law shall prohibit any discrimination ... on any ground such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status*".

Given the guaranteed employee rights, one can identify the following forms of discrimination which may occur in companies causing the emergence, anchoring or deepening of inequalities in the sphere of work (Zwiech, 2011b):

- wage discrimination – referring to the right to equal remuneration for work of the same value;
- employment discrimination – referring to the right to the same opportunities of employment and equal criteria of selection;
- profession-related discrimination – referring to the right of choice of a profession and employment and to permanent work and equal work conditions;
- post-related discrimination – referring to the right to take top positions and to the right to be promoted;
- discrimination in access to training – referring to the right of access to training.

Wage discrimination involves differentiating remuneration of persons performing the same tasks or tasks of the same value. We are dealing with it when wage differentiation results from premises other than the employee's performance. Most often this concerns the difference in the pay of men and women. Focusing attention on equal pay of men and women results from the fact that it is in this classification where the disproportions between sexes occur most vividly. Differences in the pay of men and women less frequently occur on the same posts as it is contrary to the law, they often concern work of the same value.

The Eurobarometer survey conducted in September and October 2009 in 27 countries of the European Union among 26,663 respondents showed that in the Europeans' opinion removing the pay gap between men and women is, next to counteracting violence against women, the main priority of combating gender inequality. 82% of respondents believed that urgent action needs to be taken to remove the pay gap between men and women. At the same time, 62% of respondents believed that gender inequality is common in their country (Eurobarometer, Report 326).

Differentiation in remuneration may be substantiated by reasons referring to market factors since the employer has the right to pay more to employees who provide work for which there is demand. The employer may also differentiate remuneration due to work quality and efficiency. The differentiation due to special requirements towards employees also has an objective character. Length of service may be treated as an objective criterion only in the case of work in which such experience is required. In other cases, it leads to discrimination of an employee on grounds of gender since women enter the labour market later than men or interrupt their employment for maternity reasons (Gick, Tarczyńska, 1999). The above objective factors cannot, however, in any way directly or indirectly refer to attributes that directly characterize individual employees, such as gender, age, race, nationality, marital status, having children, religious or political views, etc.

Wage inequalities and wage discrimination expressed in a significant difference in pay, occur e.g. as a result of professional segregation (Zwiech, 2013b), inadequate valuation and biased assessment of work and as a result of socialization and existing stereotypes and cultural norms.

Valuation of work is a systematic process of establishing a relative value of individual posts. In other words, it is a process of analysis and assessment according to set criteria, allowing a comparison of the difficulty of work and its valuation (Czajka, Jacukowicz, Juchnowicz, 1998). Valuation at the same time involves gathering information that allows the establishment of the post's contribution to the implementation of the company's objectives and the establishment of related qualifications

requirements or the post's profile (Sajkiewicz, 2002). From the point of view of wage discrimination, it is important to compare posts in order to ensure equal pay for work of the same value. Particular emphasis must be given to the principle of not judging the value of the post through the lens of the person holding it.

The range of professional segregation often hinders the comparison between different types of work, though roughly of the same value, performed by different categories of employees. Besides, the very methods of valuation of work may be discriminatory in the selection of criteria and weight attributed to them, as well as in the process of appointing people to posts which may reflect the discrimination happening in the company. Valuation of posts should not attach false objectivity to the existing state of affairs.

Employment assessment may also entail discriminatory problems. The very criteria of employment assessment should not have the nature of indirect discrimination and therefore should not be applied to "universal" criteria which cannot be met by a large group of individual categories of employees. Selection of adequate methods of employment assessment should be free of discriminatory prejudices.

Pay inequalities also result from socialization and existing stereotypes and cultural norms. For example, different socialization of boys and girls is a consequence of the division of spheres of activity accepted in society into male and female activity. These stereotypes are passed on by i.a. one's family, school or mass media. In the socialization process men and women are being prepared to holding specific roles associated with gender, mainly traditional ones. Consequences of different socialization of both sexes involve different professional choices. They weaken women's professional opportunities, at the same time lowering their wages. One cannot omit either the cultural norms and values or beliefs and stereotypes on femininity and masculinity. Thanks to these beliefs, gender inequalities and discrimination of women seem right and the resulting differentiation of social roles and positions according to gender in the sphere of professional work seems to be a "natural state of affairs" (Reszke, 1991).

Employment discrimination means lesser opportunities of employment for discriminated groups and occurs when all qualifications- and profession-related and demographic features are comparable and the discriminated persons have a greater share in unemployment. This type of discrimination entails greater difficulty in finding work and greater risk of losing a job.

In the employee selection process employment discrimination may concern inadequate specification of post-related requirements (inadequately prepared descriptions of posts, including posts' qualifications profiles), inadequate specification of personal requirements, inadequate arrangement of conditions and principles of employment and selection criteria, asking certain categories of employees additional discriminatory questions, being guided by stereotypes in recruitment and selection documents and absence of the opportunity to demonstrate one's skills.

Washington State Human Rights Commission has identified thematic areas which should not be addressed in the process of staff selection for it is deemed to be discriminatory activity. These areas include, i.a., change of surname (it may reveal nationality, marital status); place of birth of the candidate, spouse, parents (it may reveal nationality); religious orientation; political orientation; candidate's skin, eye or hair colour (it may reveal nationality, race); affiliation with organizations, clubs and associations (it may reveal political or religious interests, sexual orientation); age; childcare system (it reveals having children); requirement to provide a photo (it may reveal race, nationality, age); question about criminal record (unless required by work's special character); gender (unless a given type of work may be performed by only one of the sexes); current pregnancy, history of previous pregnancies; spouse's surname, his or her place of work (it reveals marital status) (Aldag, Stearn, 1987).

Another issue associated with employment discrimination involves greater exposure to the risk of losing a job. Unjustified dismissal occurs when the employer is not able to prove that the main reason for dismissal is one of those enumerated below (Armstrong, 2002):

- insufficient skills, talents, health status (which does not allow one to continue working in a given post);
- inappropriate behaviour;
- lack of qualifications crucial to a given post;
- legal reasons making it impossible for a given person to continue work (e.g. a court judgement);
- employment surplus – provided laying off is conducted in accordance with a specified legal procedure and all employees are subject to the same rules;
- employee's participation in an unofficial strike.

Profession-related discrimination occurs where there are arbitrary limitations of access to certain professions as a result of which certain groups are crowded in other professions and where there is differentiation of situations of different categories of employees in the field of employment terms. Profession-related discrimination entails the phenomenon of professional segregation (Zwiech, 2013b), which may take the form of horizontal segregation involving, for example, a fact that in the case of gender discrimination professional activity of women focuses mainly on a few fields of employment (e.g. education, services, health care), whereas men's activity is spread evenly in much more fields. Women are allocated mainly to low-paid professions with little opportunity for career progression and with low status. Such a situation is called "sticky floor". Profession-related segregation leads to relative handicapping of women in awards for work and contributes to discrimination of women in the sphere of professional work (Gawrycka, Wasilczuk, Zwiech, 2007).

Apart from this, discriminated groups encounter one more problem. As fewer in certain professions and in certain posts, they are noticed more and as a result of which they must work harder and their failures are more noticed and observed. As people with a "token" status they feel greater pressure to demonstrate their competences (World Bank Report no. 29205, 2004).

Discriminated groups, being aware that they stereotyped and that others perceive them through the lens of prejudices and negative stereotypes, are at risk of a stereotype which makes them not be able to fully focus on their tasks. A threat of a stereotype, that is fear of confirming negative stereotypes on one's own group, makes it difficult for them to use their potential and to achieve maximum performance. A threat of a stereotype may also affect de-identification with fields in which society stereotypically expects them to fail (Kenrick, Neuberg, Cialdini, 2002).

Post-related discrimination occurs when there are arbitrary limitations to access to managerial or decision-making positions. Post-related discrimination entails profession-related segregation on a vertical plane, which is expressed by the fact that the proportion of persons from discriminated groups is lower in managerial and other decision-making positions. In gender discrimination, this phenomenon is defined as a "glass ceiling" through which women can only observe the higher storeys of power practically inaccessible to them.

Vertical profession-related segregation concerns hierarchy of positions according to levels of qualifications, professional autonomy and knowledge. It involves the fact that employees from discriminated categories reach higher professional positions, that is hold managerial positions (especially top ones), much less frequently and less frequently work in posts requiring higher level of qualifications and reflecting greater professional autonomy which is automatically associated with higher pay.

Post-related discrimination entails lesser opportunities for promotion and movement in the hierarchy of posts in companies for discriminated categories. Such a phenomenon can also be observed in feminized professions – the few men can count on quicker career advancement, which is defined as a "glass escalator".

Another problem associated with inequalities and discrimination in companies is training policy. Professional training is a basic tool of staff development. This covers the processes of learning adopted in a company directed at supplementing qualifications with new elements of knowledge, skills and behaviours. Thus, it ensures an adequate standard of performing one's work, raises flexibility and availability of human resources, facilitates implementation of new techniques and technologies, encourages integration and involvement of staff and understanding of values which the organization pursues and of changes it implements.

Discrimination in access to training may involve application of inadequate criteria when selecting training candidates (which is demonstrated in more frequent delegation to training of young people and men than older employees and women, which is explained by economic reasons since a possible gap in employment may result in the effects of this training being impossible to put to use) and subject-matter of this training. Such an approach reveals discriminatory practices and leads to the emergence of inequalities between various categories of employees in companies.

Research Methodology

This paper presents results of a survey of human resources management systems in companies of the West Pomeranian Voivodship in Poland carried out in the Institute of Human Capital Management of the University of Szczecin on a sample of 601 employees of the surveyed companies (primary sources; for the adopted significance level (0.05) and admissible maximum error of estimation (+/- 4%) it was established that 598 units were the minimum sample size ensuring reliability of research). The time frame for the research covered the period between March and May 2017, and the territorial scope – the West Pomeranian Voivodship in Poland. The subject of the survey involved company employees. An individual company employee was the sample unit where the questionnaire could reach many employees in individual companies. Data from units qualified to the sample was gathered by means of a questionnaire consisting of 78 questions, including 10 in the demographics segment. A random sample unit selection method was applied. In the analyses of differentiation of declarations in selected groups of respondents, four categories of differentiation were identified for the purpose of this study: size of the entity, gender, position and length of service. Respondents' answers to survey questions referring to the implementation of an equal treatment policy in employment were used in this paper. The following six manifestations of implementation of this policy were selected for an in-depth analysis:

- do job candidates have the same employability?
- do employees get similar pay for work of the same value?
- do employees have similar chances for being promoted?
- is employee assessment free of discriminatory prejudices?
- do companies implement programmes that facilitate reconciling work with private life?
- do companies implement a gender equality policy?

Equal treatment in companies of the West Pomeranian Voivodship – research results

Referring to **employment discrimination**, the survey presented in this paper, carried out in companies of the West Pomeranian Voivodship in Poland, asked respondents whether different employee categories in their companies have equal employability. The factors significantly differentiating respondents' declarations turned out to be gender, position and length of service. Table 1 presents the structure of respondents' answers in reference to these criteria.

Table 1: Structure of respondents' answers to the question whether all candidates have identical employability in general and in groups of entities distinguished due to size and in groups of respondents according to their post, length of service and gender (in %)

The same employability	yes	no, employment was down to connections	no, there were discriminatory criteria (age, gender, nationality)	I don't know
total	33.2	28.0	11.6	27.2
criterion: entity size				
micro	36.4	24.6	7.6	29.7
small	32.6	28.2	15.5	23.8
medium-sized	27.5	33.6	10.7	28.2
large	36.9	27.0	10.6	25.5
criterion: post held				
regular worker	31.3	28.9	11.2	28.6
lower-level manager	45.5	15.2	10.6	28.8
mid-level manager	31.4	39.2	13.7	15.7
higher-level manager	46.4	32.1	10.7	10.7
criterion: length of service				
up to 0.5 year	36.1	29.5	6.6	24.6
0.5 to 1 year	34.1	25.9	14.1	25.9
1 to 2 years	37.6	25.9	8.2	28.2
2 to 5 years	34.2	19.2	17.8	28.8
5 to 10 years	33.3	30.9	11.1	24.7
more than 10 years	28.3	36.3	7.1	28.3
criterion: gender				
man	32.6	39.9	12.3	15.2
woman	33.4	24.7	11.0	30.9

Source: author's own compilation on the basis of research results.

Employment dependent on connections was pointed out by 28%, discriminatory criteria – 11.6% of the respondents. At the same time men more often than women pointed to importance of connections in the employment process. Similarly, people with the longest and the shortest length of service pointed to this factor. As regards the post held, connections were attributed great weight by managers of the higher and medium level. For discriminatory criteria, their role in the employment process was pointed out mainly by persons with the length of service between 2 to 5 years.

In reference to **wage discrimination**, a question about remuneration for work of the same value was asked. Table 2 presents the structure of respondents' answers to the question about remuneration for work of the same value. The size of the company was a factor that statistically differentiated respondents' declarations.

Table 2: Structure of respondents' answers to the question whether employees get similar pay for work of the same value in general and in groups of entities distinguished due to size and in groups of respondents according to their post, length of service and gender (in %)

work of the same value – similar remuneration	yes	no
total	60.5	39.5
criterion: entity size		
micro	61.5	38.5
small	68.1	31.9
medium-sized	48.8	51.2
large	60.6	39.4
criterion: post held		
regular worker	58.9	41.1
lower-level manager	69.8	30.2
mid-level manager	48.0	52.0
higher-level manager	70.4	29.6
criterion: length of service		
up to 0.5 year	52.6	47.4
0.5 to 1 year	62.0	38.0
1 to 2 years	59.7	40.3
2 to 5 years	64.9	35.1
5 to 10 years	60.8	39.2
more than 10 years	58.7	41.3
criterion: gender		
man	59.1	40.9
woman	61.2	38.8

Source: author's own compilation on the basis of research results.

Almost 40% of the respondents pointed out that work of the same value is not paid similarly. It is unlawful under Polish law and requires in-depth research. This question is assessed worst in medium-sized companies – in such entities over half of the respondents declared existence of this practice. Similarly high percentages were observed for mid-level managers.

Analysing **post-related discrimination** two issues were investigated – chances for promotion and criteria of work assessment. Table 3 presents the structure of respondents' answers to the question whether all employees have the same chances for being promoted. The size of the company and the post held were factors that statistically differentiated respondents' declarations.

Table 3: Structure of respondents' answers to the question whether all employees have the same chances for being promoted in general and in groups of entities distinguished due to size and in groups of respondents according to their post, length of service and gender (in %)

The same chances for promotion	yes	no	No possibility of promotion
total	32.5	52.0	15.5
criterion: entity size			
micro	37.9	34.5	27.6
small	33.1	55.6	11.2
medium-sized	29.1	55.2	15.7
large	28.4	59.6	12.1
criterion: post held			
regular worker	28.4	54.7	16.9
lower-level manager	41.8	43.3	14.9
mid-level manager	39.2	52.9	7.8
higher-level manager	53.8	30.8	15.4
criterion: length of service			
up to 0.5 year	50.0	41.7	8.3
0.5 to 1 year	34.1	55.3	10.6
1 to 2 years	30.6	54.1	15.3
2 to 5 years	30.3	53.1	16.6
5 to 10 years	28.0	54.9	17.1
more than 10 years	29.2	48.7	22.1
criterion: gender			
man	29.4	56.6	14.0
woman	33.1	50.9	16.0

Source: author's own compilation on the basis of research results.

As many as 52% of the respondents pointed to lack of equal chances for promotion. Taking into account the division of the investigated population according to the criterion of entity size, similar percentage can be identified for answers pointing to lack of equal chances for promotion in small, medium-sized and large companies. Besides, such lack was most often noted by regular workers and mid-level managers – by over 25 pp more often than higher-level managers.

In turn, Table 4 presents the structure of respondents' answers to the question whether criteria for employee assessment are free of prejudices. None of the factors differentiating respondents' declarations proved statistically significant.

Table 4: Structure of respondents' answers to the question whether assessment criteria are free of discriminatory prejudices in general and in groups of entities distinguished due to size and in groups of respondents according to their post, length of service and gender (in %)

Assessment criteria free of discriminatory prejudices	yes	no
total	72.7	27.3
criterion: entity size		
micro	75.2	24.8
small	71.1	28.9
medium-sized	75.0	25.0
large	71.3	28.7
criterion: post held		
regular worker	71.5	28.5
lower-level manager	72.9	27.1
mid-level manager	78.6	21.4
higher-level manager	84.6	15.4
criterion: length of service		
up to 0.5 year	70.7	29.3
0.5 to 1 year	80.0	20.0
1 to 2 years	74.3	25.7
2 to 5 years	77.6	22.4
5 to 10 years	71.6	28.4
more than 10 years	62.7	37.3
criterion: gender		
man	76.0	24.0
woman	71.7	28.3

Source: author's own compilation on the basis of research results.

In general terms, 27.3% of the surveyed respondents declared that employee assessment was not free of prejudices in their organization. In small and medium-sized entities the percentage was slightly higher – it exceeded 28%. Besides, the lower the post, the greater the extent to which respondents declared the existence of discriminatory criteria in assessment. Also, persons with the longest service most often pointed to the existence of such criteria.

In addition, the research focused on whether companies are trying to **solve discriminatory problems** offering organizational solutions such as programmes facilitating reconciliation of work with private life or implementation of a gender equality policy. Table 5 presents the structure of respondents' answers to the question whether their companies implement programmes facilitating reconciliation of work with private life None of the factors differentiating respondents' declarations proved statistically significant.

Table 5: Structure of respondents' answers to the question whether their companies implement programmes facilitating reconciliation of work with private life in general and in groups of entities distinguished due to size and in groups of respondents according to their post, length of service and gender (in %)

Implementation of programmes that facilitate reconciling work with private life	yes	no
total	51.3	48.7
criterion: entity size		
micro	54.1	45.9
small	52.1	47.9
medium-sized	49.2	50.8
large	50.7	49.3
criterion: post held		
regular worker	51.3	48.7
lower-level manager	56.1	43.9
mid-level manager	46.8	53.2
higher-level manager	52.2	47.8
criterion: length of service		
up to 0.5 year	48.3	51.7
0.5 to 1 year	55.7	44.3
1 to 2 years	53.8	46.2
2 to 5 years	50.4	49.6
5 to 10 years	51.9	48.1
more than 10 years	49.5	50.5
criterion: gender		
man	48.5	51.5
woman	52.2	47.8

Source: author's own compilation on the basis of research results.

About half of the respondents admitted that their companies implemented programmes that facilitate reconciliation of work with private life, with women pointing to it marginally more frequently than men (52.2% and 48.5%, respectively). Implementation of such programmes was also statistically more often pointed to by employees of micro-companies, lower-level managers and employees with the length of service between 0.5 to 1 year.

Respondents of the research in the companies of the West Pomeranian Voivodship presented in this study were also asked whether their organization implemented a **gender equality policy**. None of the factors differentiating respondents' declarations proved statistically significant. Table 6 presents the structure of respondents' answers in reference to the analysed criteria.

Table 6: Structure of respondents' answers to the question about implementation of a gender equality policy in general and in groups of entities distinguished due to size and in groups of respondents according to their post, length of service and gender (in %)

Implementation of a gender equality policy	yes	no
total	78.8	21.2
criterion: entity size		
micro	81.7	18.3
small	76.8	23.2
medium-sized	72.7	27.3
large	85.1	14.9
criterion: post held		
regular worker	81.0	19.0
lower-level manager	76.6	23.4
mid-level manager	64.4	35.6
higher-level manager	80.8	19.2
criterion: length of service		
up to 0.5 year	81.7	18.3
0.5 to 1 year	82.5	17.5
1 to 2 years	77.9	22.1
2 to 5 years	80.3	19.7
5 to 10 years	83.5	16.5
more than 10 years	69.8	30.2
criterion: gender		
man	82.7	17.3
woman	77.4	22.6

Source: author's own compilation on the basis of research results.

In general, 78.8% of the respondents declared that a gender equality policy was implemented in their companies, where this percentage was slightly higher among men than women (82.7% and 77.4%, respectively). The highest percentage of people declaring their companies implemented this policy was noted for large companies and micro-companies. As regards the post held, regular employees and higher-level managers noticed implementation of this policy to a similar degree, while mid-level managers noticed it to the smallest degree – the difference was as big as 15 pp. As regards the length of service, the percentage of employees with the longest service confirming such a policy was approximately 10 pp higher than among other groups.

Conclusion

Companies whose principal objective is, by definition, to gain profit or to maximise their own value should take measures for their employees, treating them not as cost but investment which will result in the achievement of the above goals. Building appropriate employment relations, including combating inequality and discrimination, should play a key role in operating an economic activity.

The research shows that an equality policy must be constantly implemented as the assessment of the current state in companies of the West Pomeranian Voivodship does not inspire optimism. 40% of the respondents pointed to unequal treatment in pay for work of the same value, unequal treatment in employment was pointed out by approximately 40% (28% of employees pointed to the importance of connections in the employment process and 12% to discriminatory factors) and the lack of equal opportunities for promotion was pointed to by as many as 52% of the respondents. Employee

assessment turned out best against this background – in this case only 27% of the respondents pointed to irregularities in this regard.

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Trends and Externalities of Urban Environment Development in Regional Systems of Russia

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Abstract

The article presents the results of a study of the relationship between the development of the urban living environment and the influx of human capital at the level of regional systems in the center of Russia. It is established that regions that have sufficient financial security and developed infrastructure, socio-cultural and educational facilities are more attractive for life. Urban agglomerations is a complex socio-economic system, the development of which must take into account the preferences of all groups of the population. The closest cause-and-effect relationship is between the influx of population and the volume of construction of residential real estate, hospitals, schools, and other socio-cultural facilities. To a lesser degree, the influx of people into regional systems is associated with the development of the commercial real estate market. To assess the development of the urban living environment at the regional level, it is advisable to use ratings and indexes. The urban environment development index, which takes into account the most significant areas of urban agglomerations, can be used as a tool for providing an objective comprehensive assessment of the regions of the Russian Federation.

Keywords: Urban Environment, Human Capital, Region, Assessment

Introduction

The problem of creating a modern urban environment that meets all the requirements of modern society is currently relevant both for Russia and for all developed and developing countries. Today people are the least attached to a particular place of residence and are ready to move to other cities and even countries if they see the potential for such move. Wages and good working conditions attract people, but the habitat is also important. Large corporations are mostly looking for places where human capital is concentrated.

Migration flows are directed to large cities with developed infrastructure, with a need for skilled labor, low crime, lack of barriers for doing business, and accessible urban space for all people, regardless of age, race or gender.

Thus, the centers of human capital become cities that are adapted to human needs and contribute to the generation of new knowledge, technologies, and comprehensive development of the individual. In cities are mostly concentrated people with higher incomes, higher education level, and with higher human and social capital.

A new type of economic system imposes new requirements on the urban environment as a space for the population to live and conduct business. In the conditions of a market economy and increase of digitalization, one of the priority goals of the state should be to attract educated professionals from all over the world. The largest Western companies Google, Apple, GM, Facebook, Uber are no longer

mono-national companies, but their success is ensured by citizens of various countries and continents, and due to the integration of different people, cultures, and different forms of education, they continue to be leaders of the world economy.

The main capital of these companies are not lands, real estate or fixed assets, it is not even technology itself (because they are constantly outdated) or the brand – it is human capital. At the same time, companies, trying to retain and increase human capital, expand the range of additional amenities for their employees – from medical services and insurance to comfortable living for their employees. At the same time, a comfortable urban environment is a necessary condition for ensuring the quality of life and attractiveness of the city. The purpose of the research is to analyze the impact of externalities of urban agglomerations development processes on the inflow of human capital to the regional systems of Russia.

Methods

The study used methods for calculating and comparing the quality of the urban living environment, which is based on the collection, description and evaluation of quantitative and qualitative indicators. The source of information was the official data of statistical yearbooks for the regions of the Russian Federation on such indicators as: the volume of housing construction, commissioning of commercial real estate, highways, etc.

The study uses a rating method of assessment in order to compare urban agglomerations with each other, as well as to identify strengths and weaknesses in the development of the urban environment of the regions.

Results and Discussion

The manifestation of externalities of human capital within the urban environment occurs due to the fact that the city is the "habitat" of the economically active population and it is the activity of this set of economic entities that mediates the boundaries of urban space. Urbanized territories have more developed infrastructure (education, health, information, and finance), so the formation of human capital and its redistribution occurs more intensively in the urban environment.

In Russia, there is a slight increase in the population (Fig. 1), while the maximum number is in the Central Federal district. The population of Russia has been increasing in recent years due to both natural and migration growth. The amount of natural growth is insignificant (no more than 0.2%), and the main growth factor is migration growth, which provides about 90% of the total growth.

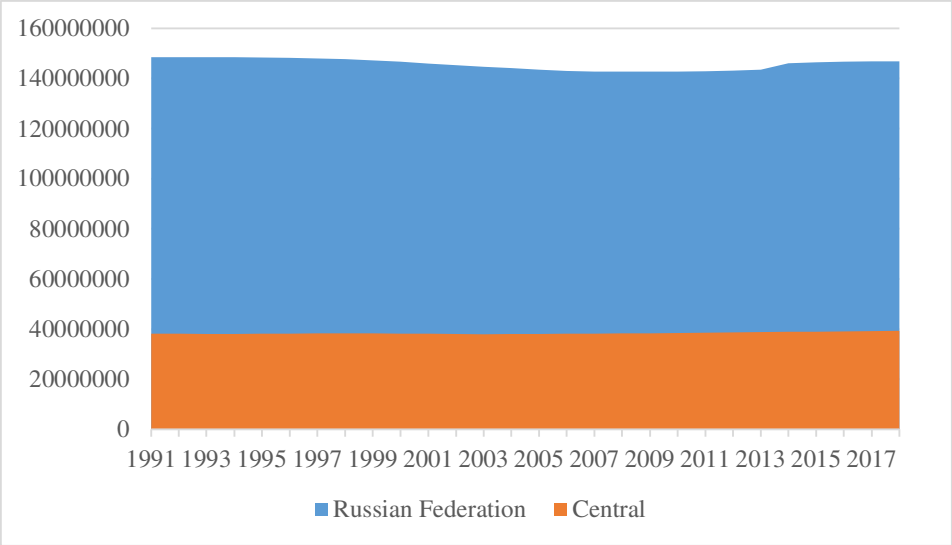

Fig. 1: Population dynamics in Russia and the Central Federal district

Russia is characterized by significant regional differences in population trends. By population size, the Central and Volga Federal districts are distinguished, where almost half of the inhabitants of Russia live (Fig. 2). the population of the North Caucasus Federal district increased mostly in 2011-2019, while the population of the North-Western, Ural, Central and southern Federal districts increased to a lesser extent. The population of the Siberian Federal district has increased the least.

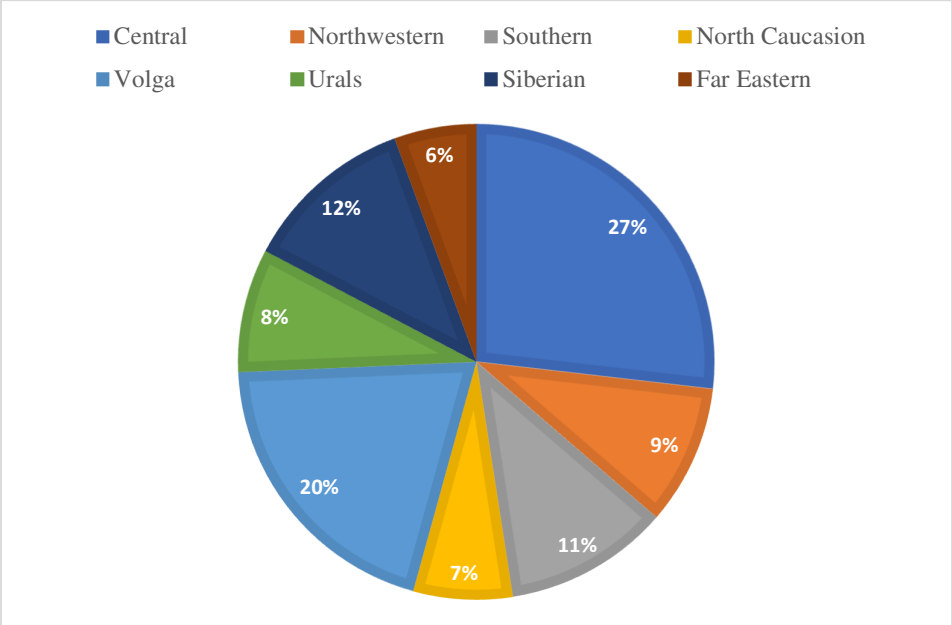

Fig.2: Population by Federal districts as of 01.01.2019

The Central Federal district, which includes the largest agglomeration of the country, Moscow and the Moscow region, is the most numerous, followed by the Volga Federal district is not far behind. The remaining Federal districts generally have a comparable population.

It is characteristic that the population of the Central and southern Federal districts is growing due to migration growth, which not only compensates for the natural decline, but also provides a General increase. As a result of Russia's urbanization, its urban population has grown rapidly both absolutely and relatively, while the rural population has steadily declined since the mid-1920s. The Total population of Russia as of January 1, 2019 is 146,780,720 according to data, with 109.4 million people living in Russian cities. The impact of urban agglomerations on human capital is twofold.

On the one hand, the city is an innovative environment due to its inherent concentration of socio-cultural organizations and institutions, rich social and information environments, which in general creates more favorable conditions for human socialization, the formation of its labor and human capital.

On the other hand, urbanization leads to a deterioration of the environmental situation, an increase in air pollution, and a shortage of green areas and land. It is statistically proven that with the increase in the overall well-being of cities, the population is sharply stratified by income level, which is the reason for the growth of social conflicts and is a brake on economic development. In this part, it is justified to form new approaches to the organization of urban development.

The experience of developed countries shows that in order to achieve these goals, all city stakeholders (government, business, science, ordinary citizens, etc.) should take an active part in the development of the city. For example, we have an impact of the construction industry on the environment due to many factors. Stakeholder theory suggests that stakeholder pressure is one of the most important forces that determines the implementation of CSR and can provide organizations with motivation to adopt a corporate social responsibility strategy. In Russia there is a different situation at the moment, when most of the responsibilities for shaping the image of urban space are assigned to the mayor's office. Which in turn leads to lack of transparency of decisions of the bureaucracy and a large number of constraints. However, the task of the city authorities in this process is not to limit, but rather to create opportunities for expressing constructive, and sometimes not so much opinions and implementing the best of them in practice, and sometimes simply not to interfere in the already developing processes. This tells us that in order to build a successful sustainable city, we need to invest in effective partnerships. Such partnerships will depend on the sense and willingness of all sectors to engage in genuine social entrepreneurship and dialogue, while also recognizing the independent roles, responsibilities and special capabilities of each of them.

In this case, the city will become attractive for life, citizens will have incentives to realize themselves in this agglomeration, there will be less reason to think about both internal migration and emigration from the country as a whole. On the contrary, a comfortable urban environment can become an important stimulus for economic growth of the city and as a result, the city will become a magnet for educated, qualified citizens from other regions and countries.

Sometimes, the implementation of even one successful project, for example, significant architectural project, can lead to significant economic growth and increase the attractiveness of the city. There are plenty of such examples in urban studies, including the construction of the Museum of modern art in Bilbao, the Sydney theatre in Australia, the Eiffel tower, Times Square, and many others. The example of these agglomerations shows that it is not necessary to have huge resources for the development of urban space, it is important to invest in promising areas of urban development.

This example is significant for Russian cities and regional systems that, due to their historical specifics, tax legislation, and high levels of government centralization, do not have a large number of resources. The poor quality of the urban environment in Russian cities is largely due to the consequences of the Soviet model of urbanization.

More broadly, the reasons for migration should be looked on the level of the Federal districts of the Russian Federation. The analysis of the population dynamics of the regional systems of the Central Federal district made it possible to establish that in the period from 1995 to 2005 in all regions of the Central Federal district there was a decrease in the population. However, in the following years, a number of areas experienced population growth. The Belgorod, Voronezh and Kaluga regions have the highest growth rates (Fig. 3). Below there are considerations regarding the factors that contribute to the influx of population into these regional systems.

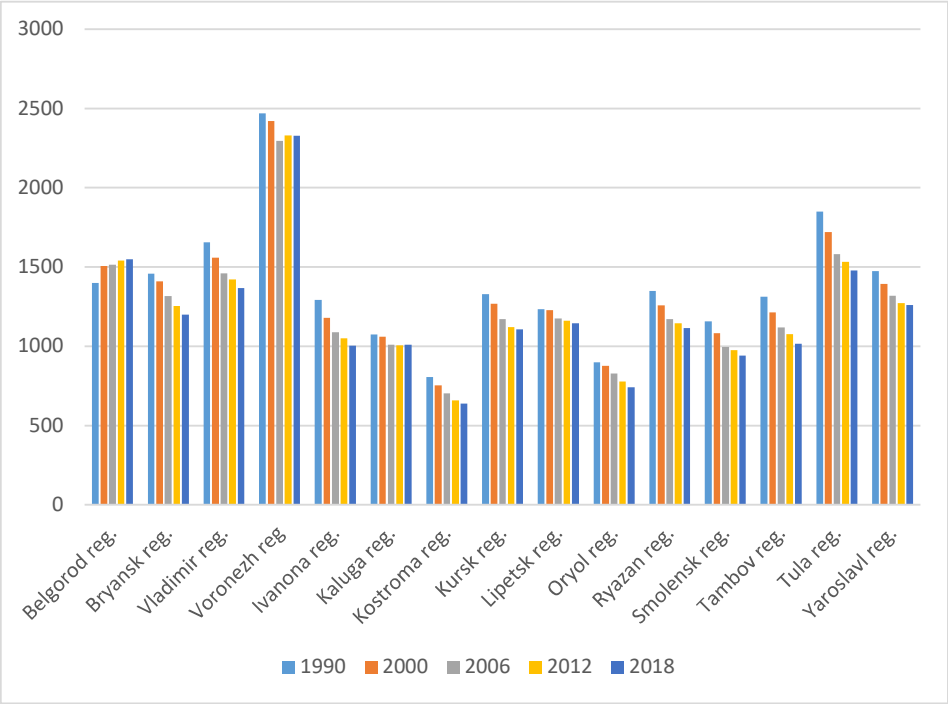

Fig. 3: Dynamics of population changes by region of the Central Federal district

It should be noted that the attractiveness of an urban agglomeration requires not only the presence of attractive urban objects, but also high-quality infrastructure, logistics and the presence of socio-cultural objects.

Different attractiveness of cities and of regional systems reflects the changes occurring in their economies and construction. Transport infrastructure is the most important component in assessing the quality of the environment. The influence of the location and development of the road network is significant for all urban centers, but an example of divergence in the development trajectories of Northern cities, whose remoteness acts as a barrier to economic modernization, is indicative. The top three regions with the highest level of provided roads are Belgorod, Voronezh, and Smolensk regions.

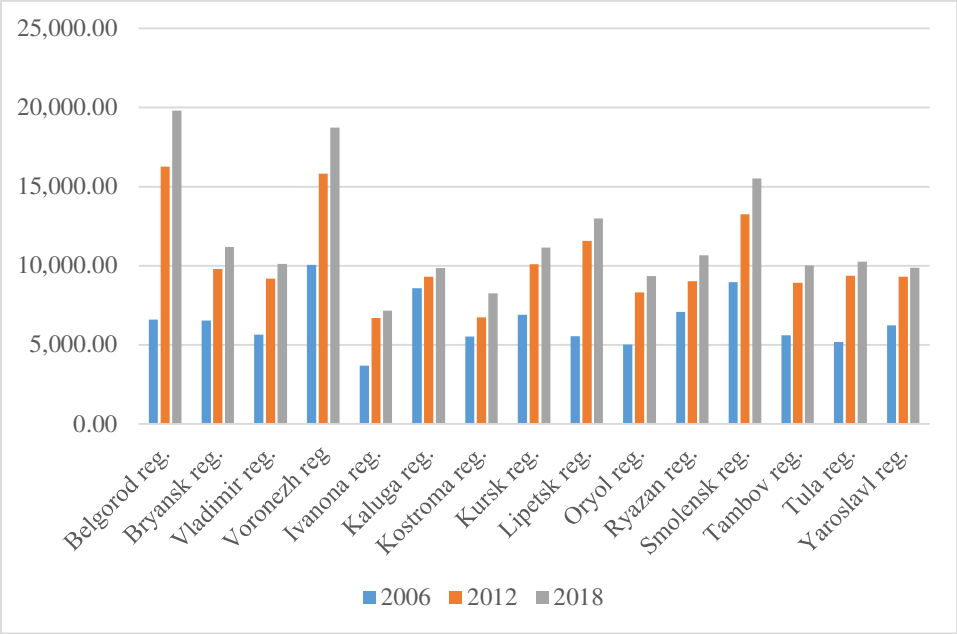

Fig.4: Length in km. Roads in dynamics, paved by region of the Central Federal district.

In terms of the number of areas for housing per 1000 people, the leading position is also maintained by Belgorod, Lipetsk, and Kaluga regions.

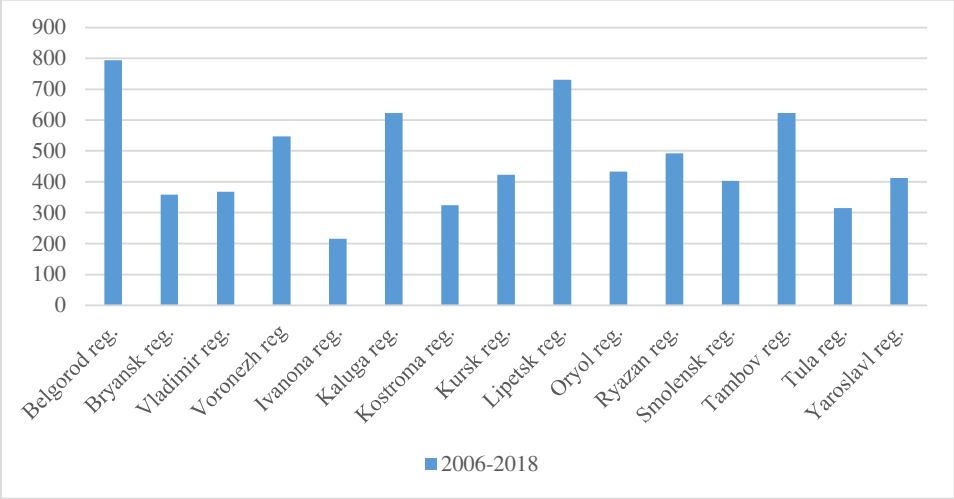

Fig.5: Average value of entering residential real estate per 1000 people for 2006-2018 by region of the Central Federal district

The top three in terms of commercial real estate are Yaroslavl, Kursk and Voronezh regions.

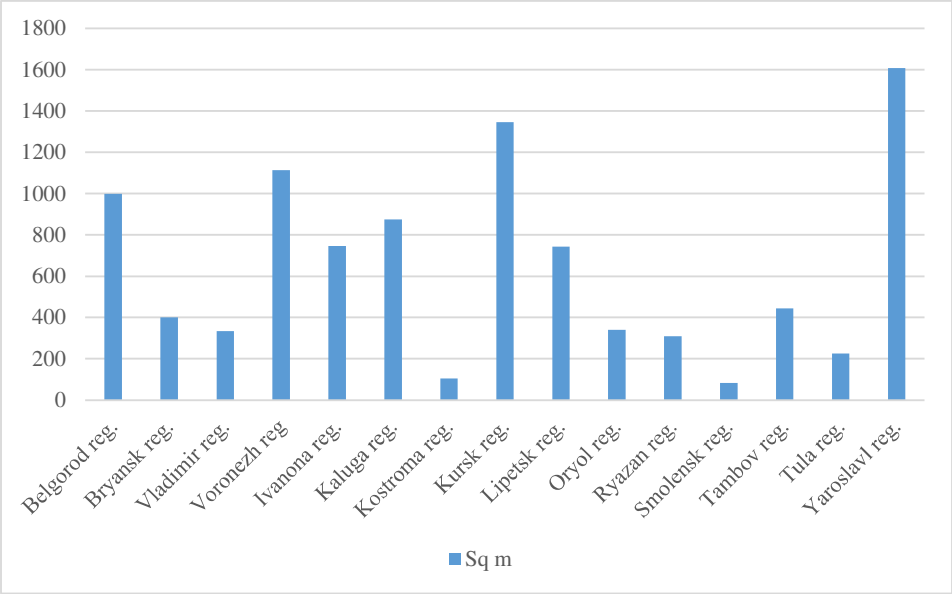

Fig.6: Volume of commercial real estate commissioning in thousand square meters by region of the Central Federal district

In terms of the volume of construction of health facilities and schools, following regions can be identified: Belgorod, Voronezh and Ryazan (fig. 7).

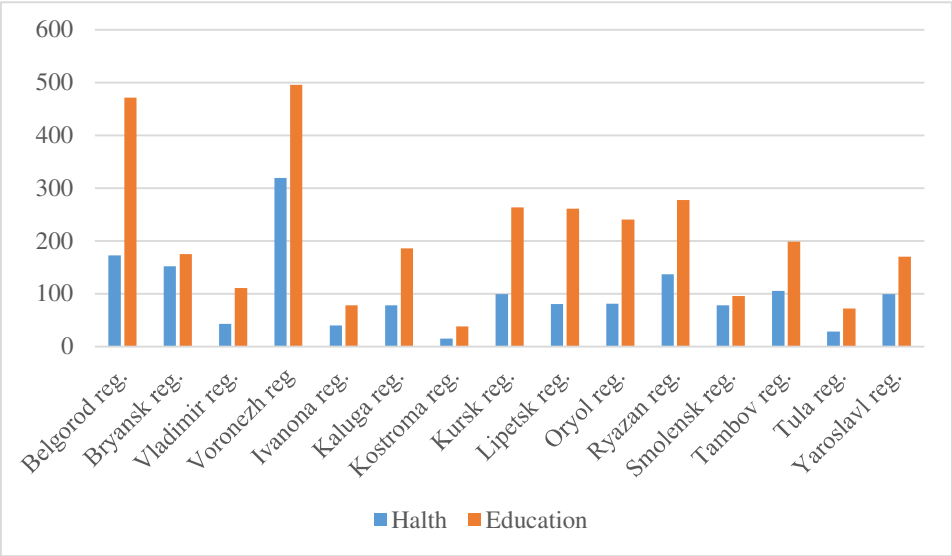

Fig.7: The volume of commissioning of health facilities and educational institutions in thousand square meters by region of the Central Federal district.

The given graphs and diagrams allow us to conclude that there is a close connection between the influx and consolidation of the population and the development of the urban environment. Under the urban living environment, we understand the totality of conditions created by man and nature within the boundaries of a locality, which affect the level and quality of life.

To confirm this, we calculated the level of development of the urban living environment and ranked the regions of the Central Federal district by the level of development of the urban living environment (table 1).

The level of development of the urban living environment was defined as:

$$\text{Угсо} = \frac{\sum P}{\sum n} \quad ,$$

P – place in regional systems in the rating by a separate indicator;

n – an indicator that is used to assess the level of development of the urban living environment.

The indices of urban environment development in the regions of the Central Federal district which are shown in the table, allows to build a rating on such important indicators as the length of highways, the introduction of residential and commercial real estate, the volume of construction of health facilities and schools. Note that the largest volumes and, as a result, the highest rating have Belgorod, Voronezh and Lipetsk regions. In the number of outsiders can be attributed to Tula, Ivanovo and Kostroma region.

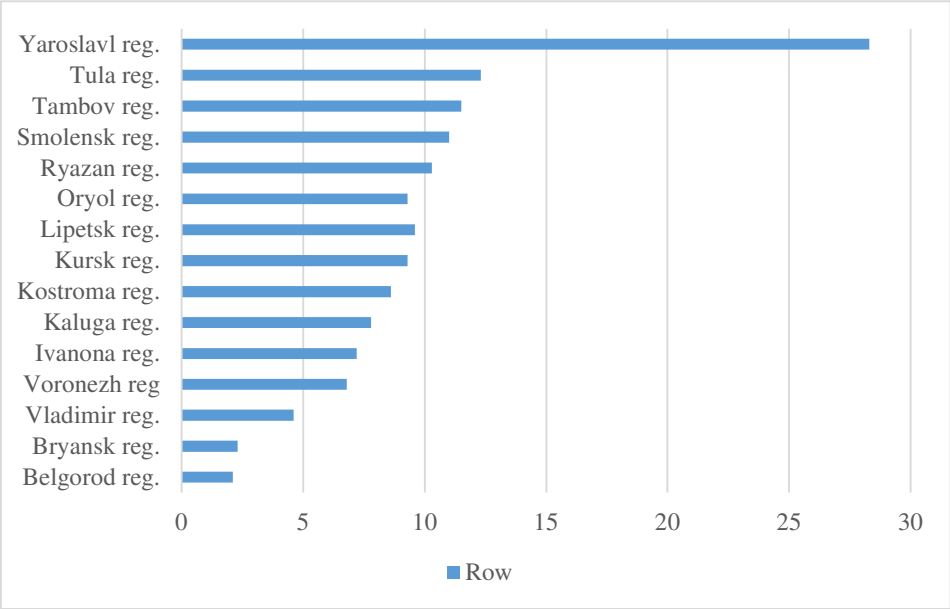

Fig. 8: Ratings of regions of the Central Federal district on the provision of the population with a living environment

Using official statistics, we have distributed regions according to the degree of development of the urban environment, but for a full assessment, we need to take into account not only absolute values, but also relative values that characterize the population's housing supply, socio-cultural purpose, etc.

To do this, we calculated the coefficients of provision of the region's population with paved roads, residential and commercial real estate, hospitals, schools, and other socio-cultural facilities (table 1).

Table 1: Rating of the Central Federal district regions by the level of urban environment development

Region	Numerator – coefficient of provision of a resident of a region with construction objects Denominator - place in the ranking						The level of development of the urban living environment	Ranking place
	Paved roads	Residential real estate	Commercial real estate	Hospital Area	School area	Provided paid services		
Belgorod	0,12/3	0,8/1	0,65/5	0,11/3	0,30/3	53,8/2	2,8	1
Lipetsk	0,11/4	0,73/2	0,64/6	0,07/6	0,22/5	57,4/1	4	2
Kursk	0,10/5	0,42/7	1,2/2	0,08/5	0,23/6	49,2/5	5	3
Voronezh	0,08/9	0,55/4	0,47/7	0,13/1	0,21/7	55,3/3	5,1	4
Oryol	0,12/3	0,43/6	0,45/8	0,11/3	0,32/2	46,5/10	5,3	5
Kaluga	0,097/6	0,60/3	0,86/3	0,07/6	0,18/9	48,7/7	5,7	6
Tambov	0,10/5	0,6/3	0,43/9	0,10/4	0,19/8	48,6/8	6,1	7
Ryazan	0,09/8	0,49/5	0,27/11	0,12/2	0,24/4	44,2/14	7,3	8
Yaroslavl	0,076/10	0,40/8	1,27/1	0,07/6	0,13/11	47,2/9	7,5	9
Bryansk	0,093/7	0,35/10	0,33/10	0,12/2	0,14/10	44,0/11	8,3	10
Tula	0,07/13	0,31/11	0,15/14	0,01/10	0,48/1	49,0/6	9,2	11
Smolensk	0,16/1	0,40/8	0,087/15	0,08/5	0,10/12	36,7/15	9,3	12
Vladimir	0,074/11	0,36/9	0,24/12	0,03/8	0,08/13	50,8/4	9,5	13
Ivanovo	0,071/12	0,21/13	0,74/4	0,04/7	0,08/13	43,4/12	10,2	14
Kostroma	0,13/2	0,3/12	0,16/13	0,02/9	0,06/14	42,3/13	10,5	15

These tables allow you to identify the leading regions in terms of population availability of paved roads, residential and commercial real estate, hospitals, schools, and other socio-cultural facilities. Such regions are Belgorod, Lipetsk, and Kursk regions, while Vladimir, Ivanovo, and Kostroma regions have become outsiders to a greater or lesser extent.

The data obtained have a high convergence with the graph in figure 3. It is Belgorod region that has been the center of migration attraction in the Central Federal district for a number of years. The above data shows that regions that have sufficient financial security and develop infrastructure, socio-cultural and educational facilities are attractive to live in. This is also confirmed by expert surveys showing that the worst urban factors for Russian cities are congestion of the road network and provision of kindergartens and schools.

Conclusions and Recommendations

Thus, in the Russian Federation, the development of the urban environment determines the influx and consolidation of the population in urban agglomerations. At the same time, urban agglomerations are a complex socio-economic system, the development of which must take into account the preferences of all groups of the population.

The saturation of real estate supply in developed regions of Russia, such as Moscow, Saint Petersburg, Ekaterinburg and Krasnodar, is an incentive for the construction organizations of these regions to change their business models. Increasing competition and a wide choice of real estate on the market forces companies to look at the real estate market from a different angle.

The closest correlation is between the influx of population and the volume of construction of residential real estate, hospitals, schools, and other socio-cultural facilities. To a lesser extent, the influx of people into regional systems is associated with the development of the commercial real estate market.

To assess the development of the urban living environment at the regional level, it is advisable to use ratings and indexes. The urban environment development index, which takes into account the most important spheres of life in urban agglomerations, can be used as a tool for providing an objective comprehensive assessment of the regions of the Russian Federation.

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Importance of the Sales Force for Effective Communication of SME in the B2B Sector

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Abstract

SMEs today operate in an increasingly demanding environment. Societal and economic changes are creating more dynamics, complexity and stronger competition. One cause is globalisation, which is generating increasing competitive pressure. Another reason is the new expectations that legislators and stakeholders are placing on companies. Small and medium-sized companies, in particular, are at risk of being squeezed out by large market players. This forces SMEs to increase their competitiveness. In this context, the sales structure is of particular importance. On the one hand, it must ensure that the market's potential is fully exploited. In doing so, all relevant customer groups must be developed and an economic margin must be achieved in the sale of products and services. On the other hand, it is important to make sales as efficient as possible by minimizing costs. In the course of progressive digitalisation, SMEs are also increasingly relying on direct sales. Nevertheless, there are still numerous companies, especially among family-run SMEs, which continue to rely on a personal sales force. The present research study uses the example of a financial services provider to clarify whether significantly better sales figures can be achieved in the B2B sector with field sales representatives. To this end, the sales successes intended by sales representatives are examined on a three-month basis with the help of a one-sided t-test. The method is based on the author's assumption that better sales results are achieved with field sales representatives than with mere direct sales.

Keywords: SME, Sales Management, Marketing, Marketing Communications

Introduction

Distribution, i.e. the sale of products or services, is a discipline of business administration. The sales policy makes all design decisions on the way from supplier to customer. (Schmalen & Pechtl, 2019, p. 411) One of the decisive tasks of distribution policy is the selection of distribution channels. (Bagusat, Schlangenotto, & Büteröwe, 2016, p. 165) Homburg (2017) (Homburg, 2017, p. 865) and Winkelmann (2013) (Winkelmann, 2013) unanimously assign two functions to sales policy. These are logistical activities on the one hand. On the other hand, market-oriented, acquisition-related activities. Bruhn attributes to corporate communications the task of influencing decisions of target group members in the interests of the company. (Bruhn, 2010, 3 ff) Based on this, Homburg (2017) specifies that marketing communication is geared to the realization of sales transactions. At the same time, he emphasizes the special corporate significance of marketing communication. After all, interaction with potential customers or existing customers is of central importance for sales. (Homburg, 2017, p. 865)

At the same time, the rapidly advancing digitalization is changing customer relationships. Car manufacturers, for example, are now able to send messages to the multi-media systems of vehicles. Without the involvement of an authorised workshop, drivers can be reminded of a necessary inspection. (Helmrich, 2017, p. 92) In agreement with Helmrich, Schmitt/Hitschler state that digitalisation has led to a change in purchasing behaviour. Customers today increasingly decide for themselves via which contact points they find a product, brand or company. (Schmitt & Hitschler, 2020, p. 19) This changed behaviour is increasingly leading to a redistribution of advertising budgets. (Holtkamp & Bange, 2020, p. 388) While established communication channels are suffering losses, advertisers are increasingly investing money in digital advertising. (Gründel, 2017) Nielsen, for

example, predicts that online advertising will grow by 7.3 % year-on-year in 2020. The losers, on the other hand, include newspapers, magazines and cinema. (Weidenbach, 2020) These shifts are based on scientifically sound communication strategies. (Schildhauer et al., 2019, 9 ff) Their focus, as Zerfass/Volk (Zerfass & Volk, 2019, p. 9)and Kainz/Haupt/Schnaderbeck (Kainz, Haupt, Herberth, & Schnaderbeck, 2018)and Haas/Bowen (Haas & Bowen, 2016, p. 29) agree, is often on achieving cost savings.

Meanwhile, the counterpart to digital distribution is personal sales. According to Zupancic, this is the most expensive communication channel. (Zupancic, 2012) At the same time, there are traditionalists like Reinhold Würth who still attributes 90 % of the company's success to the sales force. (dpa, 2020)

In general, it can be said that communication research is currently mainly concerned with the marketing communication of large companies and corporations. The special needs of SMEs are not taken into account. They rarely have large communication budgets in which reallocations are possible. Furthermore, SMEs often operate in geographically limited business areas where not all communication channels are available.

This research aims to examine whether a sales force for SMEs can still be useful in today's world. This would be the case if regions served by a sales force could deliver significantly better sales results than sales units without personal support. The clarification of this question is particularly important because the management of SMEs is faced with constant changes. It is important to react quickly and flexibly to changes. Without, however, losing any advantages or unique selling points. (Maříková, Rolínek, Vrchota, & Řehoř, 2018) More effective sales communication can be one such advantage, otherwise, a sales force in the field means a large cost pool.

Methodology

According to Bruhn, a company's sales policy deals with all decisions relating to the supply of corporate services to customers. (Bruhn, 2019, p. 253) Against this background, sales policy is defined as an instrument of marketing. (Zerres, 2017, p. 10) However, according to Binckebanck, previous research results suggest that the importance of sales in comparison to the other instruments communication, product and price is higher than often assumed. (Binckebanck, 2018, p. 654) To optimally influence the target group's actions, it is necessary to integrate all marketing activities. (Bruhn, 2017, p. 5) Against this background, all communication channels of a company can be defined as sales policy instruments. (Gartner, 2018, p. 158)

The salesforce plays a special role in the round of communication channels. On the one hand, because they are considered to be particularly cost-intensive. (Meffert, 2017, p. 1012; Nold, 2020, p. 123) On the other hand, the sales force enables face-to-face communication. This is interactive and enables a higher level of involvement than impersonal or asynchronous communication. Moreover, personal interaction enables immediate sales. In contrast, the effect of other channels generally sets in with a delay. (Dan, 2018, p. 89; Moriarty, Mitchell, & Wells, 2015)

The focus of quantitative methodology is on making objective statements about the acceptance or rejection of hypotheses (Kuss, Wildner, & Kreis, 2014, p. 52). The research project presented here is based on the following hypothesis:

Hypothesis 1: Distribution performance is not dependent on the season.

Hypothesis 2: The sales performance is significantly higher after the visit of a sales representative.

In the context of this research project, the effect of field sales force visits on the sales performance of different regions is examined. For the results to be used later as a basis for decision-making in SME management, a precise description of the setting is required. (Foran & Lebel, 2012; Škodová Parmová, Líšková, Sdrolias, & Kain, 2017) By describing observable facts it should be possible to make assumptions about connections, relationships, typical and untypical. Through the targeted search for confirmations and refutations, it is possible to recognize on an abstract theoretical level under which conditions certain statements are true and which limitations exist. (Akremi, 2019, p.

328) This theoretical generalization is also called logical inference. (Beierle & Kern-Isberner, 2019, 20 ff; Seale, 2000, p. 109)

Object of Observation

The object of the present research project is a company from the financial services sector operating throughout Germany. Measured by the number of employees and annual turnover, it is to be assigned to the group of SMEs. However, there is no international agreement on how the SME group is to be defined in concrete terms. (Dar, Shafique, & Raziq, 2017, p. 48) The European Union recommends its member states to measure the size of a company according to the number of employees and turnover or balance sheet total. According to the current interpretation for SMEs with between 11 and 250 employees and turnover between EUR 2 and 50 million. (European Commission, 2003) The author of this paper agrees with the EU definition. Specifically, the company under investigation is to be classified as medium-sized, as it has more than 50 employees and annual turnover is above EUR 10 million. The sales force of this company looks after 2,500 independent agents. (VW editorial office, 2017) These are divided into 34 sales regions.

Data Basis

Primary data can be obtained and evaluated to test the hypotheses made. (RAUCH, 2019, 88 f) Alternatively, secondary data can also be used. However, these must be available and must meet specific requirements for a particular research project. (Zeh, 2017, p. 147) For the planned research project, the effect of the sales force on the distribution power of the sales force partners will be investigated. The necessary data will not be collected specifically for the research project. Instead, existing data from sales controlling will be accessed. This means that secondary data is evaluated.

For the present research work, all financial statements from 2016 to 2019 inclusive are analysed. Also, all dates of the sales force introduced in 2017 are examined. Since all units of the population are taken into account, this is a full survey. (Handl & Kuhlenkasper, 2018, p. 306) This allows the hypotheses to be examined directly for durability using descriptive statistics. (Tachtsoglou & König, 2017, p. 259) The evaluation aims to identify deviations in the sales performance of units serviced by sales representatives and units not serviced. Quantitative methods must be applied for this purpose. (Liebig, Matiaske, & Rosenbohm, 2017, p. 5)

Results

The task of every company is to achieve goals that will enable the company's long-term existence through economic success. (George, Labros, & Sotiris, 2014, 11 f) It should be noted that companies are closely linked to the companies in which they are active. (Koukoumpliakos, Řehoř, Sdrolias, & Škodová Parmová, 2019, p. 81) This economic and social environment is increasingly characterised by complexity, dynamism and, ultimately, competition. (North, 2007, p. 167) The reason for this is globalisation, the consequences of which are causing increasing competitive pressure. (Schomaker, Bernstorff, & Nachtwei, 2013, p. 320) Lee/Wainwright/Glassman (2017) (Lee, Wainwright, & Glassman, 2017) Falvey/Greenaway/Silva (2018) (Falvey, Greenaway, & Silva, 2018) Schymik (2018) (Schymik, 2018) But also increasing stakeholder expectations concerning social responsibility (Koukoumpliakos et al., 2019, p. 81), the sustainable development of habitats and the careful use of natural resources make unpleasant work more demanding. (Škodová Parmová, Dvořáková Líšková, Sdrolias, & Aspridis, 2019, p. 177) SMEs, in particular, run the risk of being squeezed out of the market by large companies, as they usually have sufficient financial resources to survive in cut-throat competition. This pushes SMEs to optimise their processes and use existing potential to improve their productivity and thus their competitiveness. (Hanzal & Beranek, 2016, 161 f) Neacşu (Neacşu, 2017, p. 108) Gunduz (2018) (Gunduz & Yetisir, 2018)

At the same time, it can be observed that the share of business processes supported by information technology is continuously increasing. (Brettreich-Teichmann & Grötecke, 2016, p. 1) Against this background, Rump/Eilers even attest digitization a central role in the canon of trends and developments that will shape the future world of work. (Rump & Eilers, 2017, p. 78) According to Lister, this even leads to a situation where the development of new products is geared to the

restrictions of digitization. Suppliers strive for a lean product range and simple offers that require little explanation. (Lister, 2020, p. 26) At the same time, however, it has been proven that customer focus is essential for sales success. (Reichmann, 2019, XV; Teuchert, 2019) This is the area of conflict in which the sales force finds itself. Therefore, it must be clarified whether the high personnel and financial expenditure can still be justified today.

Literature Review

The literature review makes it clear that the sales organisations at SMEs are facing a structural change. (Schweiger & Kump, 2018, p. 293) However, family businesses, which make up a large part of SMEs, are often unwilling to adapt existing sales structures. (Kammerlander & Prügl, 2016, p. 11) Kammerlander/Ganter see this as a decisive competitive disadvantage for family-run SMEs. After all, sticking with old sales structures can result in the loss of margins as well as the loss of entire customer groups. (Kammerlander & Ganter, 2015) Young customers, in particular, expect digital shopping opportunities. The lack of suitable online offers harms the purchase decision. (Gieselmann & Gremmer, 2018, p. 433) Eggers/Hollmann and Sonntag agree that the informed customer already prefers to buy online. (Eggers & Hollmann, 2018, p. 244; Sonntag, 2011, 19 f) Overall, the trend toward online purchases has been steadily increasing since 2000. While e-commerce sales in Germany amounted to EUR 1 billion, the figure in 2018 was EUR 65.1 billion. In 2019 the previous record of EUR 72.6 bn was finally reached. (Furchheim, Wenk-Fischer, & Groß-Albenhausen, 2020) A development that can also be observed in other countries. In the Czech Republic, for example, e-commerce sales rose from EUR 2.4 billion in 2017 to EUR 2.8 billion in 2019, with a volume of EUR 3.6 billion forecast by 2024. (Statista GmbH, 2020)

In the future, however, aligning the entire sales force to virtual channels does not necessarily have to be target-oriented. After all, new generations of customers will not commit themselves to one channel. Rather, as Barnes/Correia (Barnes & Pavao, 2017, p. 7) and Mosquera/Ayensa/Pascual/Murillo (Mosquera, Juaneda Ayensa, Pascual, & Murillo, 2019) agree, they behave as multi-channel shoppers and want to be addressed as such. At the same time, changes in the economy, as can be expected after the Corona crisis, are likely to result in changes in household spending and consumer habits. Thus, a recession can lead to a reduction in income. As a result of the associated restructuring of consumer spending, impersonal or digital distribution channels may become increasingly important for consumers who have preferred personal contact in the past. This happens when alternative distribution channels offer more favourable conditions. (Faltová Leitmanová, Petrách, & Beran, 2019)

From these imponderables, Eggers/Hollmann feels the need to distribute the sales budget sensibly. (Eggers & Hollmann, 2018, p. 243) Up to now, Wollenburg/Holzapfel/Hübner/Kuhn criticize, the evaluation of the meaningfulness of distribution channels is mainly done from the marketing perspective. They advocate steering the customer into distribution channels that make sense from a business perspective. (Wollenburg, Holzapfel, Hübner, & Kuhn, 2018)

Whether the use of a channel makes sense for a company is not a general question. It is not a question of integrating new CRM tools, social media or data analytics. It is also not decided whether a customer feels the channel is modern or whether all industry trends are followed. (Bokeria, Biehl, & Radloff, 2020) From a business perspective, the only question that matters is what contribution margin a channel of marketing communication can deliver. For example, a channel can be superficially effective because it has low contact costs. However, if additional sales potential is lost, for example, because needs remain undiscovered or cross-selling does not succeed, efficiency also suffers. The same applies to market exploitation. If a communication channel has a significantly higher closing rate, this option can pay off, even if it initially appears cost-intensive.

Data Analysis

As explained in 2.2, the present research work is based on the analysis of secondary data. Secondary data are all data that were not collected by the researcher himself. (Bergener, Clever, & Stein, 2019, p. 57) This is possible because all positions required for the analysis are available in sales controlling. In general, as Hausmann and Hartmann/Amine/Klier/Vorwerk (Hartmann, Amine, Klier, & Vorwerk,

2019, p. 48) agree, the use of secondary data is only possible if it meets the concrete information requirements. (Hausmann, 2019, p. 36)

In principle, the present research work pursues the goal of identifying or rejecting the existence of differences between regions serviced by the sales force and those not serviced. For this purpose, the sales successes of the years 2016, 2017, 2018 and 2019 are analysed. The measured values originate from different sales regions, which, however, were assigned by a third party variable. The criterion month could be considered as a third variable that is not the focus of the analysis. Dependent samples would, therefore, be available. (University of Zurich UZH, 2018) For a hypothesis test in such a setting, the t-test for paired samples has established itself as a generally accepted procedure. (White, Redford, & MacDonald, 2020)

Dependence of sales performance on the season

The sales performance is recorded monthly. If the season affected sales performance, the sales results would depend on the month in question. Since the date "month" is not a numerical value, a numerical coding is necessary. An evaluable nominal scaling is then available. (University of Zurich UZH, 2016) This allows the verification of correlations utilizing cross-table analysis. (Leibinger & Sander, 2017, p. 262)

The analysis of correlations for two characteristics is defined as bivariate data analysis. A crosstab table provides a simple and illustrative option for examining the relationships between two variables. (Thousand pounds, 2019, p. 58) On the x-axis of the cross table, often referred to as the contingency table, (Perret, 2019, p. 51), the present years are plotted. On the y-axis, the months January to December are deducted. The absolute sales figures are noted in the table itself. There are regularly particularly high final figures in certain months and particularly low final figures in certain other months. This indicates a correlation between the closing rate and month. Whether this is a coincidental association or a systematic correlation must be examined within the framework of a contingency analysis. The most popular instrument for this is the Pearson's chi-square test. (Backhaus, Erichson, Weiber, & Plinke, 2016, p. 358; Leibinger & Sander, 2017, p. 263)

The Chi-square test checks whether two random variables are stochastically independent. If the absolute frequencies in the population are the same as the expected frequencies in the population in the case of independence, there is no correlation between the two variables X and Y. (Kosfeld, Eckey, & Türck, 2019, 342 ff) The derivation of the expected distribution is based on the idea of a squared standard normally distributed random variables. Accordingly, the square of an N(0;1) distributed random variable follows a chi-square distribution with one degree of freedom (Cleff, 2019, p. 78):

$$Z^2 \sim X_1^2.$$

According to Cleff, the sum of the squares of two independent and standard-normally distributed random variables Z1 and Z2 follows a x^2 distribution with two degrees of freedom: (Cleff, 2019, p. 78)

$$Z_1^2 + Z_2^2 \sim X_2^2.$$

In general, the sum of the squares of n independent and standard-normally distributed random variables, an x^2-distribution with n degrees of freedom can be observed: (Cleff, 2019, p. 79)

$$Z_1^2 + Z_2^2 + \cdots + Z_n^2 \sim X_n^2.$$

The hypothesis test utilizing the chi-square test goes back to Pearson and is generally accepted. However, the reliability of the chi-square test depends on various conditions. Reliability only exists if no more than 20 per cent of the cells have an expected frequency of less than 5. Besides, the smallest expected frequency must not be less than 1 (Backhaus, Erichson, Plinke, & Weiber, 2016, p. 315; Bühl, 2016, p. 306; Hartung, Elpelt, & Klösener, 2009, p. 416) If these prerequisites are not met,

further procedures such as the exact test according to Fisher are to be preferred. The exact test according to Fisher is based on simulations and does not know any prerequisites. Therefore, it can also be used for very small samples and low expected frequencies. (University of Zurich, 2017) This is not necessary for the present research project since the decisive basic conditions are fulfilled. This is shown in Table 1.

Table 1: Dependence on year and season

Theoretical frequency						
	2011	**2012**	**2013**	**2014**	**2015**	**2016**
Jan	807,873	878,551	900,045	921,358	902,960	817,528
Feb	552,573	600,915	615,617	630,195	617,611	559,177
Mar	612,476	666,059	682,355	698,513	684,564	619,795
Apr	602,186	654,869	670,891	686,778	673,064	609,383
Mai	606,669	659,744	675,885	691,890	678,074	613,919
Jun	616,042	669,937	686,327	702,579	688,550	623,403
Jul	646,299	702,841	720,036	737,086	722,368	654,022
Aug	666,572	724,887	742,623	760,208	745,027	674,538
Sept	620,422	674,700	691,208	707,575	693,446	627,836
Oct	821,423	893,286	915,141	936,811	918,104	831,239
Nov	1257,450	1367,459	1400,916	1434,089	1405,452	1272,477
Dec	1060,015	1152,752	1180,955	1208,919	1184,779	1072,683
Total	8870	9646	9882	10116	9914	8976

Theoretical Frequency

	2017	**2018**	**2019**	**Total**
Jan	823,903	899,681	978,100	7930,000
Feb	563,537	615,368	669,006	5424,000
Mar	624,629	682,079	741,531	6012,000
Apr	614,135	670,620	729,073	5911,000
Mai	618,707	675,612	734,500	5955,000
Jun	628,265	686,049	745,848	6047,000
Jul	659,123	719,745	782,480	6344,000
Aug	679,798	742,322	807,025	6543,000
Sept	632,733	690,928	751,152	6090,000
Oct	837,722	914,770	994,505	8063,000
Nov	1282,401	1400,349	1522,408	12343,000
Dec	1081,048	1180,477	1283,371	10405,000
Total	9046	9878	10739	87067

This allows the dependence of the distribution capacity on the season to be tested. The established hypothesis (H0) states that there is no dependence between the achieved sales performance and the

month in which it was achieved. This hypothesis is tested with Microsoft Excel using the XLSTAT statistical plug-in. A chi-square test is performed automatically. The results of this test are shown in table 2.

Table 2

Chi-Quadrat (Observed Value)	1190,343
Chi-Quadrat (Critical value)	110,898
FG	88
p-Value	< 0,0001
alpha	0,05

Since the calculated p-value is smaller than the significance level alpha = 0.05, the null hypothesis must be rejected. Instead, the alternative hypothesis (Ha) must be accepted. This states that the two variables are dependent.

Increase of the sales performance by a field service

The primary objective of the present research work is to examine whether a significant increase in sales figures is possible through a sales force. For this purpose, the sales results in regions with field sales force support (region A) are compared with the performance of regions without field sales force support (region OA). As demonstrated in 3.3, sales performance is dependent on the season. For this question, a t-test for two dependent samples is suitable for testing a hypothesis. The elements of the two groups Region A and Region OA are assigned to each other in pairs. Thus, the two groups are not considered independently of each other. The pairs of measured values or their differences are examined. (Witte, 2019, 67 f) Thus, for the t-value:

$$t = \frac{\overline{x_\Delta} - \mu_{d\,\Delta}}{\hat{\sigma}_{x\,\Delta}}$$

For the hypothesis test of the null hypothesis, the simplification results as a quotient from the mean value of the differences and the expected value of the difference mean: (Witte, 2019, p. 68)

$$t = \frac{\overline{x_\Delta}}{\hat{\sigma}_{x\,\Delta}}$$

For smaller samples, the t-test can only be applied if the differences in the population are normally distributed. For Bortz, this condition is already given if an approximately normal distribution is given. Such a small sample is given if n is smaller than 30. (Bortz, 1993) Since the present research project has 47 pairs of cases for this question, this problem can be disregarded.

A special feature of the company under investigation is that the sales force is not directly involved in sales. Rather, it fulfils the role of a sales trainer to enable the customers it serves to sell more. This concept is based on the insight that sales success is no coincidence. Good results result rather from necessary sales and product knowledge. (Unger, 2020, p. 1) The performance of a salesperson is not determined by him or her alone. (Wunderlich, Hinsch, & Olthoff, 2019, p. 184) Jensen & Pfaff see even 70 per cent of sales performance as being dependent on sales management. (Jensen & Pfaff, 2013) The concept of coaching independent sales staff via the sales force to increase productivity makes sense from a scientific point of view. For Zupancic, real coaching requires a certain distance and independence from the responsibility for results. (Zupancic, 2019, p. 125)

However, product-oriented financial distribution has now given way to a demand-oriented approach. This is also actively demanded by legislators and regulatory authorities. (Sommese & Eberhard,

2020, 53 f) A salesperson activated by the field sales force must therefore first identify suitable customers and arrange appropriate appointments.

Besides, the sales territory of the investigated company covers the whole of the Federal Republic of Germany. Different school holidays and the associated vacation periods make it difficult to directly compare sales regions. Also, the sales regions differ greatly in terms of their size and the number of customers served.

Because of the above, the observation period for sales performance is set at three months. The three months following a training date by the sales force are taken into account. The comparison is not made based on actual sales. Instead, the percentage share of the observed months in the annual sales performance of the respective sales region is considered. This setting allows the limiting factors of "holiday periods" and "varying customer base" to be effectively compensated for.

Table 3

	without FS			**FS**
Erfurt Mai 2018	7,1278826		Braunschweig Mai 2018	6,382978723
Karlsruhe Dez 2018	6,301369863		Dresden Dez 2018	12,9740519
Bielefeld Feb 2019	3,743961353		Dresden Feb 2019	9,780439122
München Jun 2019	6,74556213		Hamburg Jun 2019	6,972788986
Düsseldorf Aug 2019	12,37745098		Hamburg Aug 2019	12,24489796
Berlin Sep 2019	10,73446328		Hamburg Sep 2019	13,94557823
Essen Okt 2019	13,23283082		Hamburg Okt 2019	14,3469501
Gießen Feb 2019	6,647116325		Freiburg Feb 2019	6,069651741
Lübeck Jun 2018	6,984126984		München Jun 2018	6,220506221
Bremen Mai 2018	5,421686747		Nürnberg Mai 2018	9,043112513
Mönchengladbach Apr 2019	6,162464986		Nürnberg Apr 2019	5,956907478
Münster Mai 2019	7,511737089		Nürnberg Mai 2019	5,703422053
Köln Jun 2018	6,340057637		Stuttgart Jun 2018	7,547169811
Potsdam Aug 2019	9,595959596		Stuttgart Aug 2019	10,21505376
Saarbrücken Okt 2019	11,44927536		Arnsberg Okt 2019	12,8485783
Münster Feb 2019	4,761904762		Arnsberg Feb 2019	6,637806638
Berlin Mär 2018	4,539007092		Dortmund Mär 2018	6,156156156
Bielefeld Dez 2018	7,359307359		Dortmund Dez 2018	8,052101835
Erfurt Feb 2018	3,354297694		Aachen Feb 2018	3,993055556
Dortmund Jan 19	6,335109532		Hannover Jan 19	4,6875
München Mai 2019	6,07495069		Hannover Mai 2019	7,291666667
Hamburg Feb 2019	5,102040816		Leipzig Feb 2019	4,972375691
Düsseldorf Feb 2018	5,525846702		Bremen Feb 2018	5,321285141
Gießen Sep 2019	10,65493646		Bremen Sep 2019	13,81642512
Lübeck Nov 2018	9,237213404		Magdeburg Nov 2018	9,432371571
Erfurt Feb 2019	5,472636816		Magdeburg Feb 2019	6,700167504
Freiburg Apr 2018	6,461538462		Würzburg Apr 2018	6,039488966
	without FS			**FS**

Gießen Jun 2018	5,419222904		Würzburg Jun 2018	7,084785134
Erfurt Jul 2018	7,505518764		Würzburg Jul 2018	8,130081301
Koblenz Apr 2019	6,610407876		Würzburg Apr 2019	6,788247214
Oldenburg Mai 2019	6,390977444		Würzburg Mai 2019	7,294832827
Münster Jul 2019	8,048289738		Würzburg Jul 2019	8,510638298
Mönchengladbach Feb 2019	5,78898226		Ulm Feb 2019	5,898720089
Karlsruhe Mai 2019	5,753424658		Ulm Mai 2019	5,676126878
Gießen Sep 2019	10,65493646		Ulm Sep 2019	13,13299944
Düsseldorf März 2019	5,147058824		Frankfurt März 2019	5,384615385
Lübeck Jun 2019	8,024691358		Frankfurt Jun 2019	6,752136752
Koblenz Sep 2017	11,82033097		Kassel Sep 2017	13,98210291
Mönchengladbach Sep 2019	12,6984127		Kassel Sep 2019	10,89494163
Köln Mai 2018	6,051873199		Oldenburg Mai 2018	6,507936508
Bielefeld Feb 2019	3,743961353		Potsdam Feb 2019	5,050505051
Arnsberg Aug 2018	9,543568465		Rostock Aug 2018	14,41860465
Nürnberg Jun 2019	8,111533587		Rostock Jun 2019	8,538587849
Arnsberg Aug 2019	9,543568465		Rostock Aug 2019	10,01642036
Dresden Sep 2019	7,784431138		Rostock Sep 2019	9,688013136
Münster Mär 2018	5,056980057		Koblenz Mär 2018	6,718346253
Köln Mai 2019	6,501182033		Saarbrücken Mai 2019	9,347826087

The hypothesis test is performed as a t-test for dependent samples and is calculated with the analysis tools of Microsoft Excel. Data pairs must be formed for this purpose. On the one hand, the average percentage sales performance of a region in the three months following salesforce training is used. On the other hand, the average percentage sales performance of a region without a date in the same period is used.

The null hypothesis (H0) says that there is no dependency between a sales force appointment and the later sales success. However, the author assumes that there is a dependency. For this reason, the analysis is carried out using a one-sided t-test for dependent samples. The significance level is set at 0.05. The result of the analysis is shown in Table 4.

Table 4

Two-sample t-test for dependent samples (pair comparison test)		
	Without FS	*FS*
Mean value	7,350086974	8,365296926
Variance	6,119094591	8,916401113
Observations	47	47
Pearson correlation	0,797925263	
The hypothetical difference in the mean values	0	
Degrees of freedom (df)	46	
T statistics	-3,86200827	
P(T<=t) one sided	0,00017496	
Critical t-Value for one-sided t-Test	1,678660414	
P(T<=t) second sided	0,000349921	
Critical t-Value for second sided t-Test	2,012895599	

The one-sided P-value is 0.00017496 and thus significantly below the significance level of 0.05. The value of the t-statistic is 3.86200827. It is, therefore, greater than the critical t value for the one-sided t-test. This is shown with an amount of 1.678660414. The null hypothesis (H0) must, therefore, be rejected. Instead, the alternative hypothesis (Ha) must be accepted. This says that there is a connection between appointments of the sales force and an increased sales performance by the customer advisors.

Conclusion

The literature analysis in the context of the research work presented shows that more and more business processes are also being digitised in SMEs. (Ristuccia, 2019; Stentoft, Jensen, Philipsen, & Haug, 2019, p. 5155) The driving force is the quest for greater efficiency. This is necessary because globalisation and sustainable thinking are putting increasing pressure on local actors. (Stejskalová, Štrach, & Rolinek, 2018) Connected with digitisation is the hope of achieving an advantageous position in the market through cost-effective organisational structures. (FRANK, Schumacher, & Tamm, 2019, p. 127) This also leads to changes in the distribution structure. (Asheq & Hossain, 2019; Hennart, Majocchi, & Forlani, 2019, p. 761) For example, technical innovations are increasingly being used to replace cost-intensive personnel sales. (Schröder, Schlepphorst, & Kay, 2015, p. 9) The aim is to distinguish oneself positively from competitors in an environment where it is becoming more difficult to create and maintain competitive advantages. (Fuka, Vrchota, & Rolínek, 2018)

Using the example of an SME in the financial services sector, this paper shows that the use of a traditional sales force in the B2B sector can still make sense. Using descriptive statistical methods, it was shown that sales areas with a sales force achieve significantly better sales results than unsupported sections. Thus, traditional sales are not automatically inferior to new, digital channels.

The investigation only covered the number of units sold. Contribution margins were not taken into account, nor was the value of the better sales performance concerning the costs associated with the sales structure. Thus, the present research work provides evidence that established sales structures in SMEs should not be abolished without further ado. Rather, the different channels of marketing communication must be carefully weighed up before making adjustments. The present paper shows

that there is a need for further criteria for the entrepreneurial evaluation of the sales force - and thus provides the impetus for further research projects.

The subject of the present study is an SME in the financial services sector operating throughout Germany. The result cannot be easily transferred to companies with a geographically limited business area or other industries. On the one hand, because financial products usually require a lot of explanation. On the other hand, because financial products are not visible - which places special demands on sales. Against this background, the present paper can also serve as a suggestion to examine the effect of personnel sales in other industries.

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Staff Turnover as A Dysfunction of Human Resources Management in Hotel Enterprises in Poland

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Abstract

Staff turnover is the inflow and outflow of employees in an enterprise. Many enterprises have problems not only with finding suitable employees but also with retaining them. The objective of the article is to present an impact of staff turnover on the operation of hotel enterprises. Method: A theoretical part of the study is a result of the use of the desk research method. Unique entity's influence (i.e. hotel enterprise's personnel) and the executed processes of human resource management mean that human resource dysfunction has to be assessed individually for each entity. Therefore, the author used case studies in the empirical part aiming at exemplifying human resource activities in the hotel industry. There are results from surveys and interviews with human resource managers conducted in 250 hotels in Poland. The research has shown that high staff turnover rate is a significant problem for hotel managers in Poland. Due to a limited number of research entities, the research findings cannot be generalized with regard to the whole industry. However, they can serve as the basis for a discussion on the phenomenon of human resource management dysfunction in the hotel industry and its impact on work efficiency, thus the functioning of the whole organization.

Keywords: Hospitality, Human Resources Management, Threats

Introduction

Cooperation and commitment of the whole staff are needed for the survival and development of a hotel enterprise's in an increasingly more competitive environment. The way how the personnel treat their duties depends on motivational activities undertaken by a hotel enterprise. Wrong decisions in terms of motivation may lead to a high employment fluctuation rate. Staff turnover (fluctuation) is the inflow and outflow of employees in an enterprise. In practice, the issue of employment fluctuation is still valid. Many hotel enterprises have problems not only with finding suitable employees but also with retaining them.

The aim of the article is to present the reasons for staff turnover in hotel enterprises and their potential effects. The main problem in the functioning of modern hotel enterprise's is the fact that there is no certainty with regard to activities. Threats that occur when conducting business activity may lead a company to bankruptcy and the list of dysfunction factors is long and diverse. Their common characteristic is the fact that they directly affect the financial situation of an entity. By contributing to generating specific types of costs or increasing sales revenue, they imply the level of effectiveness of human resource and investment decisions which is reflected in the company's situation. Therefore, it is of great significance to identify dysfunction factors which may affect the functioning of enterprise (Becker & Smidt, 2016; Bhattacharya &Wright, 2005).
One of the types of threats is the dysfunction connected with an organization's social system. It can be defined as "involvement under conditions of uncertainty in activities concerning personnel which may

prove unsuccessful" (Lipka, 2002). Depending on speed and accuracy of the undertaken human resource activities, it can pose a threat (loss for) to or be an opportunity for business activity (Dionne, 2013; Elahi, 2013).

Dysfunction of human resource management is not a homogenous category which means that many types of dysfunction can be distinguished, namely (Tokarz-Kocik 2012;):

- recruitment dysfunction - failure to adjust labour demand and supply in quantitative and qualitative terms;
- selection dysfunction - is a decision-making situation which involves threats arising from employing a given person on the basis of wrong criteria of selection;
- evaluation dysfunction connected with the process of developing employee's behaviour at work and the results they obtain;
- dysfunction of investment in employees' development, including: the of the lack of expenditure on human capital; the threat of leaving work by employees who the company invested in; the dysfunction of a gap between personnel's knowledge and skills;
- motivational dysfunction – consequences for a company resulting from a wrong selection of motivational tools towards particular employees.

Human resource activities are subject to the threats arising from the changeability of phenomena in the labour market. The above phenomena build up due to the growing mobility of society, and thus recruitment threats become increasingly multidimensional and changes dynamically over time. Labour market expansion due to the Polish membership in the European Union provides more possibilities of searching an attractive job by employees and intensifies economic migration. For Polish companies, it is a challenge in terms of a growth of competitiveness which goes beyond national borders and also makes it necessary to open up to immigrants from other countries (Bizon-Górecka, 2009).

Selection dysfunction is connected with the lack of certainty in terms of the choice of employees as people who should enrich the human resources of a hotel enterprise's. Therefore, it includes a threat that instead of multiplying human capital qualitatively it will lead to its impoverishment with all related consequences.

The next function of human resource management, that is evaluation, is subject to a special threats due to difficulties with a selection of relevant evaluation techniques. Nevertheless, resigning from evaluation to not make mistakes is not a right solution as evaluation results are known to constitute a starting point for various human resource decisions. When determining the level of evaluation dysfunction , the level of objectivity of evaluation procedures performed in a company should be taken into account.

Motivating may also be dysfunctional. The highest dysfunction level corresponds with obtaining a result which is the opposite of motivational activities, that is the state of employees' demotivation, despite particular expenditure on satisfying employees' needs in a better way. Leading to that may result from well as improperly targeted managers' efforts aiming at developing attitudes and behaviours of employees may be harmful. An incentive scheme should be not only consistent with the general strategy of a company (including: sub-strategy of cost development), but also compatible with the requirements of the company's environment (i.e. attracting right job candidates). Failure to meet any of the above requirements that modern incentive schemes face increases motivational dysfunction, thus the threats for hotel enterprise's as an employer (McGee, Rennie, 2012).

Nature of work in Hotel Enterprises

A hotel enterprise consists of a team of people, as well as tangible and financial assets that form a separate entity with its own economic, technical, spatial and legal nature, and is engaged in professional business activities of offering accommodation (rooms) against payment and providing services related to it. The work process in a hotel enterprise is of a different nature than the one found in production enterprises. This dissimilarity is mainly a result of the specific nature of hotel services as they cannot be made-to-stock, stored or delivered to clients' places of living.
Hotel services are quite specific services and providing them often poses a great challenge for hotel staff. Guests who spend longer periods of time outside home expect that many of their needs will be satisfied, i.e.:

- subsistence needs (food, hygiene, sleep),
- additional needs (entertainment, recreation, sightseeing),
- emergency needs (medical assistance, change of plans).

Such numerous types of guests' expectations require from hotel staff to be highly available and engaged.
The simultaneity of production and consumption of services is a factor that influences the employment structure and work organization in hotel enterprises. This characteristic means that work in the hotel enterprise's is continuous, multi-shift and includes the whole week, with Sundays and holidays. Thus, it is hard to standardize the work time and limit it to 8 hours a day. Hotel enterprise's must operate 24 hours a day and, additionally, the tourism movement is intensified during the tourism season, what increases the workload of operational staff. Despite the technological development, machines cannot replace humans in the process of providing hotel services. The essence of hotel work is still a direct contact of a staff member with a tourist and this entails the necessity of employing relatively large personnel.

Attitude and predispositions of guest service employees have a decisive influence on the quality of a hotel product. Therefore, it is of a vital importance that personnel carry out their duties with the utmost engagement. This will be possible if they are properly motivated.

Motivational activities limiting a Staff Turnover Rate

The basic aim of a motivation system is to stimulate people to fulfil their company missions and reach the company goals, while taking account of the needs and expectations of employees. People are motivated to work if they expect that their actions will lead to achieving a goal and getting a valuable reward – one that will satisfy their needs.

Effective employee management in a hotel enterprise requires many activities. The most important is motivating and training employees.

Motivating employees to work involves a range of individually personalized motivational instruments. Salary is considered to be one of the most important and often dominating motivator. Therefore, developing a salary structure is one of the basic processes through which motivational function is being implemented in hotel enterprise's. Apart from direct compensation, the effectiveness of a motivation system is determined by offered perks and benefit packages. They may include such elements as a corporate mobile phone, laptop, private health insurance, additional life insurance, coupons for free lunch in a hotel restaurant, holiday vouchers, coupons for free stay at one of hotels of the chain. Nonfinancial motivating tools also include: intangible rewards (letters of commendation, diplomas, commemorative medals and cups), in-kind rewards (albums, books with dedications), work-life-balance (Grobelna & Tokarz-Kocik, 2016). These instruments are most often less expensive than financial incentives and, under some conditions, they are more effective. Creating opportunities for employees to develop their qualifications is also part of efficient motivation. As a result, it is essential to develop a comprehensive

training programme that is tailored to the expectations of workers and the goals of a hotel enterprise. Proper motivation of employees contributes to their satisfaction with work.

Voluntary redundancy is a symptom of lack of job satisfaction. Job satisfaction is most commonly understood as positive attitude and emotions towards the work environment and professional duties performed by a person. Research on direct relations between job satisfaction and employee behaviour allowed determining the correlation between an increase in job satisfaction and staff turnover at the level of -0.40, which means that the increase in job satisfaction lowers a staff turnover rate (Tokarz-Kocik, 2017; Grobelna et al., 2016). Job satisfaction depends on the balance between what a person invests in their work (e.g. time, engagement), and what they receive in return (promotion, development opportunities, friendly relations), which are a motivational activities (Staples & Higgins, 1998).
In order for them to be efficient, it is necessary that managers in a hotel enterprises recognize the employees' needs and adapt the motivation methods to them (Grobelna et al., 2016). The feedback to this will be increased employee engagement in the process of carrying out duties and staff loyalty. The main benefits of employee loyalty for a company are:

- employment retention,
- increased work efficiency,
- customer retention.

The advantage of employee loyalty is that the longer an employee works in a given company, the more work experience they gain. Staff with more experience in a hotel enterprises have a unique knowledge about the individual customer preferences or product characteristics, thus they provide better customer care. Employee loyalty also determines customer loyalty. Employment stability is significant for positions which require from employees to know individual client needs and preferences. The result of changing staff in a hotel enterprises (e.g. receptionists, waiters, chefs, masseurs) is a gap in customer service, which leads to customer dissatisfaction and a discrepancy between the client expectations and real experience (Hill & Alexander, 2003).

Therefore, it is of the utmost importance to properly develop employee loyalty through the use of appropriate motivating stimuli. These should be adjusted to the needs and expectations of employees. A hotel enterprises should take into account that not only needs evolve due to age, new qualifications or occupied position, but also their hierarchy and the preferred method of satisfying them.

The multitude of factors that differentiate personal goals of each employee in a company requires that a company develops such a motivation system that enables all employees to fulfil their individual personal needs and simultaneously ensures that an organization reaches its own goals.

Employers have to change their approach to building relationships with employees. One solution may be to personalize the career path and replace the so-called corporate ladder with a corporate network. A corporate ladder includes traditional hierarchy, promotion path and assumes that employees' needs do not change with time. On the other hand, corporate network gives employees multiple career paths that allow them to maintain work-life balance (Grobelna & Tokarz-Kocik, 2016). Career path personalization, which is based on an individual career development pace of an employee, gives a possibility to choose workload and work time, as well as a position and the scope of responsibilities.

Staff turnover in Hotel Enterprises in Poland

The nature of work in hotel enterprises means that the high staff turnover makes its operation very difficult, is a significant problem for hotel managers. In 2019, was conducted surveys on staff turnover in hotel enterprises. Managers from 250 hotels, across all sixteen voivodships, participated in this research. The largest group of survey respondents (85%) consisted of managers from three-star hotels.

The next group size-wise (12%) managed four-star hotels. Other respondents represented one-, two- and five-star hotels. The research shoved, that rate at which employees resign from work varies depending on the position held (Fig. 1).

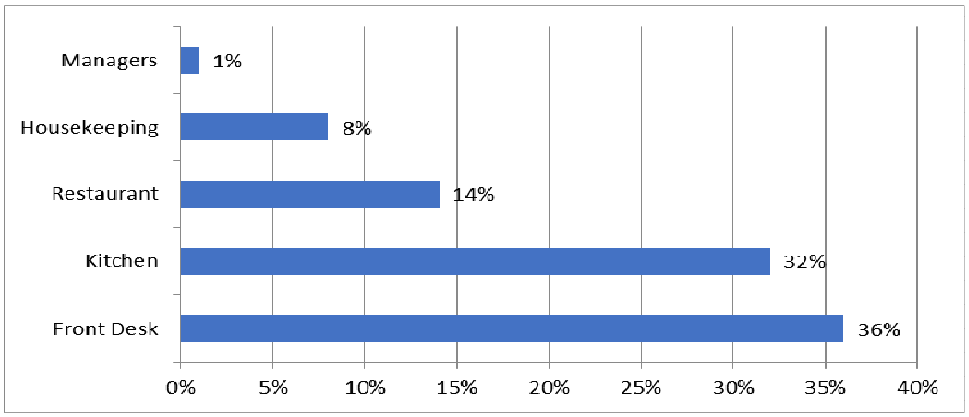

Fig. 1: Hotel departments in which the staff turnover rate is the highest

Source: own work

According to 36% respondents, a high turnover rate (over 50%) can be most often found at the Front Desk. Other hotel departments with high staff fluctuation rates are Kitchen and Restaurant (32% and 14% of responses, respectively). It is also quite common in hotels that housekeeping employees resign (8% of responses). A rather high retention (loyalty) rate is observed on the managerial positions, as only 1% of the researched businesses indicated a high turnover rate in that workforce group. None of the surveyed hotels registered voluntary turnover among the administration employees.

We may look at staff fluctuation as an involuntary phenomenon, which results from legal regulations or employer's will (e.g. contract expiration, reduction in force, retirement), or a voluntary one. There are much more reasons behind voluntary resignation and they mainly depend on an individual approach of an employee or may be a sign of mistakes in the human resources management process (Fig. 2.).

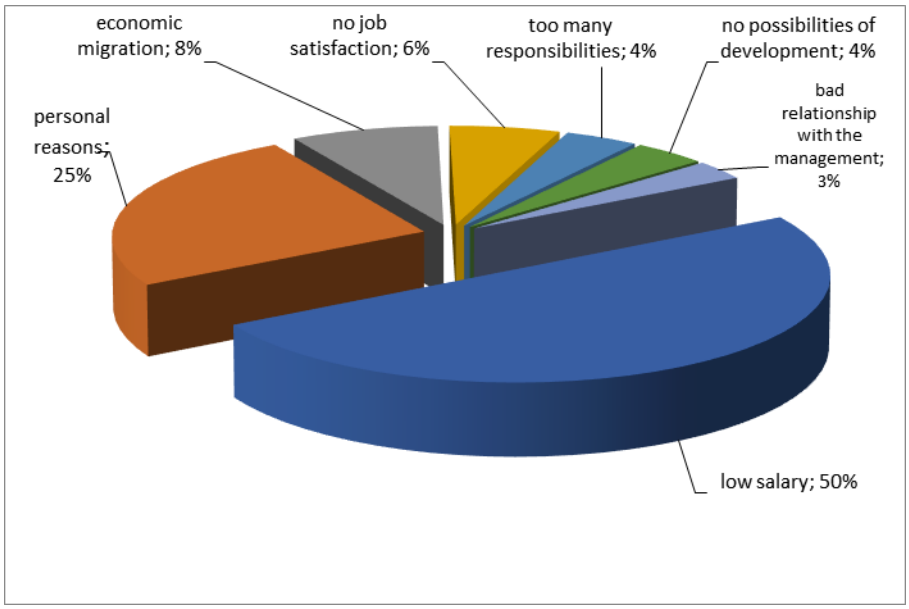

Figure 2: The reasons for staff turnover

Source: own work

The research showed that the main reason behind resignation from work for 50% respondents is unsatisfactory compensation. Among other factors indicated by respondents were personal reasons, economic migration or lack of development possibilities.

Employee salary is one of the most neglected motivational functions in hotel businesses. Salaries in the hotel enterprises in Poland are lower than the average ones in this economy. Median salary in the hotel enterprises in 2018 was PLN 3300 gross in comparison to PLN 4500 gross in the national economy (Report, 2018). In addition to the fact that salaries in the hotel enterprises are relatively low, one may find dysfunctional activities occurring in terms of compensation in hotel enterprises. These are connected with not informing employees about the compensation methods. Other problems related to a pay policy are:

- delayed salary payment,
- disproportionately high compensation of relatives and their acquaintances in relation to workload;
- no payment for overtime.

Apart from low salaries, the research findings point to the limited promotion and career development opportunities as well as lack of respect and support from a superior as significant reasons for employees leaving a company. All of these factors demotivate and contribute to high staff fluctuation in hotel enterprises.

A high staff fluctuation rate brings a range of negative consequences for a hotel enterprises and its workforce (Taylor, 2006; Clausen & Borg, 2010), namely:

- additional responsibilities for remaining hotel personnel,
- costs of a new recruitment and selection process,
- loss of employee's knowledge and experience for the benefit of competition,
- negative image of a hotel enterprises as an employer,

- lower quality of service,
- loss of regular customers.

If an employee resigns from work, it reflects negatively on the hotel remaining personnel who have to deal with additional responsibilities while simultaneously carry out tasks planned earlier. Some workers see this as an opportunity to stand out, but others cannot cope with the new situation and are unhappy. It is often the case that these employees are required, irrespective to their regular responsibilities, to help with training new staff. If this only happens occasionally, the necessity of taking up additional workload does not become a problem. However, if a staff turnover rate is too high and results in an almost permanent workforce deficiency than the morale of staff may go down and they might be less engaged in their work.

The staff fluctuation phenomenon involves the need to hire new employees and this in turn means additional costs for a business. Their largest component is most often expenses related to the recruitment process, which are fees and charges for placing job advertisements in the press or work agency fee. Another element is work time cost of managers involved in the recruitment and selection process for the replacement of a departing employee. It may turn out that several job interviews have to be conducted or the Assessment Centre method have to be used in order to fill some positions. There are also costs of induction to a position and proper training of a new employee, as well as administrative costs related to introducing a new person in the organization (preparing a job contract, setting up personal files, etc.). While the abovementioned procedures are being executed, the position remains vacant. For a company, it means that productivity will be lower for a few weeks. Furthermore, workers need to be paid for overtime. That is why it is difficult to estimate a total cost of this process. The scale may vary a lot and depends on the position.

Besides generating direct costs, employment fluctuation causes loss of other resources, especially if an employee undergoes intensive training in a hotel enterprises and resigns from the position before the employer gets return on this investment. The situation is even worse when this employee resigns in order to be hired by the competition. In such a case, a hotel enterprises not only loses such resources as knowledge and experience, which an employee usually obtains at the hotel's expense, but it must also consider that they will be used by another employer to gain a competitive advantage

A high staff turnover rate is also disadvantageous for a company because of the competition on the labour market. If a hotel enterprises cannot retain employees, it will quickly gain a reputation of a bad employer. As a result, job-seeking professionals will not consider a particular hotel enterprises as a viable option in their career plan (Helm, 2011).

It should be noted that employment fluctuation may be also negatively perceived by customers. This aspect may be very important for positions which require from employees to know individual clients' needs and preferences as it has a key impact on the reputation of an organization. If staff are dismissed or changed too often in a hotel enterprises (e.g. front desk staff, waiters, kitchen staff, masseurs), in the best case scenario, it will result in lower customer loyalty but, in the worst case, it will lead to a general opinion that the service levels are significantly lower, which in turn means a negative company image on the market.

Conclusion

The presented research findings confirm that human resource activities in hotel enterprises are not always conducted properly. Instead of making full use of employees' potential, they result in excessive turnover. It poses a serious threat to the smooth functioning of hotel enterprises.

A high staff turnover rate remains one of the fundamental problems of the hotel enterprises. It is partly caused by a high increase in numbers of hotel enterprises and demand for experienced employees. However, the main reason behind this phenomenon is not competitive enough remuneration and motivational rules applied by hotel enterprises.

Usually, only some general human behaviour patterns are taken into consideration when building a motivation system in a hotel enterprises, while it is necessary to analyse many different conditions related to the characteristics of a person to whom various motivators are applied.

A variety of motivational tools may be used to influence employee engagement. It is important that they are accurately selected, tailored to the type of employee's tasks and value system and that cohesion of motivational activities is ensured, or even that they enhance each other. Employee motivation and engagement in achieving company goals is most efficient when employee and organization goals are identified. In order to increase the efficiency of a motivation system in a hotel enterprises, it is necessary to regularly verify motivational activities connected with identifying irregularities. Therefore, hotel enterprises should:

- devise individual procedures for assessment of the efficiency of a motivation process,
- identify dysfunctionalities of a motivation process using the results of periodic employee evaluation,
- conduct a regular analysis of employees' expectations and aspirations.

It is obvious that employees' expectations are changing, while the principles of a motivation system are formal and are of a static nature. Therefore, the assessment of a motivation system should be conducted on a regular basis and its principles and enforcement should be adjusted by correlating them with the changing expectations of employees.

One should remember that there are differences between employees in terms of their qualifications and engagement within each company. That is why the repercussions of their resignation from work may vary. Some people can be easily and cheaply replaced, while others are difficult to replace, especially if the same level of efficiency is to be achieved. For that reason, each group of employees should be treated differently. Motivational activities should be focused on employees that possess extensive professional knowledge and whose resignation may cause most problems for an organization and generate high costs.

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Real Estate Mortgage Risk Management on The Eve of The Global Covid-19 Coronavirus Pandemic

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Abstract

The purpose of this paper was to analyse the risk of mortgage loans that finance the real estate market for management purposes. It presents an analysis of Poland's economic situation in the years 2014-2018 and its macroeconomic indicators as well as a forecast for the years 2020-2022 (the study was conducted from 8 November 2019 to 6 December 2019). They showed that the situation on the mortgage market reflected the good economic situation of the country and its banking system. The profile of an average borrower with respect to mortgage loans in the period 2016-2018 is presented against the background of the promising macroeconomic situation and the economic standing of the country, considering data on the structure of mortgage loans and borrowers. For the purposes of this paper, it has been calculated that in relation to the total value of residential mortgage loan agreements active in 2019, the share of loans in default amounted to PLN 15.51 billion. This initiated the research on mortgage loans risk analysis presented in this paper. It indicates the impact of the main factors determining credit risk as well as ways of its reduction and minimisation. It was concluded that banks need to introduce modern methods of risk management that involve risk modelling, including based on derivatives, which may suggest the direction of further research. Due to the current situation of the global health and economic crisis related to in this paper refer to February 2020 only. It was also pointed out that the crisis triggered and the deepening recession COVID-19 it should be emphasized that the analyses of the economic and macroeconomic situation as well as forecasts of macroeconomic indicators of Poland's economic situation presented by the coronavirus would result in banks introducing restrictions with respect to mortgage.

Keywords: Mortgage Loan, Real Estate Market Situation, Borrower's Profile, Mortgage Loan Risk, Management, COVID-19 Pandemic

JEL Classification: G21, G51, O16, R31, I15, I18,

Introduction

In recent years, Poland has seen a very dynamic increase in household debt on account of loans taken out for residential purposes, which due to the type of collateral that is used are commonly referred to as residential mortgage loans (or residential mortgages) (Nalepka, 2011).

The banks' lending activities are accompanied by risks. As regards risk, particularly noteworthy are the works of Knight (1921), who published the theory of measurable uncertainty (as risk) and unmeasurable uncertainty (as uncertainty in a strict sense). Systematic research on risk led Harry Markowitz (1952) to propose the first modern measure of risk. In his 1952 essay *Portfolio Selection*, he presented a mathematical concept of the modern portfolio theory (MPT), that is a mean-variance analysis of the asset portfolio so that the expected return is maximised for a given level of risk. For this essay he later received the Nobel Prize in Economics. Terje Aven (2010), on the other hand, devoted almost his entire book *Misconceptions of Risk* to presenting and discussing a dozen incorrect, imprecise and inaccurate definitions of risk.
In order to minimise risk, effective risk management uses various statistical tools or econometric models (Deloitte, 2018; Eurostat, 2018; Gorzeń-Mitka, et al., 2016).

The credit risk assessment is concerned with the financial credibility of the borrower (scoring method) and the quality of the real estate to be purchased with the loan (loan monitoring) (Gąsowska, 2000). Moreover, in order to limit the risk of losses, before issuing a credit approval, banks often use publicly available statistical data about the real estate market (European Federation of ..., 2017; Eurostat, 2018; Zasoby..., 2018).

The main factors influencing the security of the bank's operations related to mortgage lending are the degree of development and knowledge of the real estate market. and related risk with them (Główka, 2008).

Due to the risks associated with mortgage loans for residential investments, which stem from:

- the persistently low level of interest rates,
- the systematic increase in wages and social transfers,
- and the increase in apartment prices (Geng, 2018),

it becomes necessary to effectively manage the risk of mortgage-backed receivables. Therefore, the purpose of this paper is to analyse the risk of mortgage loans that finance the real estate market for management purposes. It presents an analysis of Poland's economic situation in the years 2014-2018 and its macroeconomic indicators as well as a forecast for the years 2020-2022. The paper also analyses the mortgage loan as an instrument for funding residential investments in the real estate market. Based on borrowers' preference for mortgage, it presents the profile of an average borrower in 2016-2018. It also mentions the share of defaulted loans, which in 2019 amounted to PLN 15.51 billion. The Author’s research points to the analysis of the role of mortgage loans and the risk associated with them, the economic situation and the macroeconomic conditions in which they are granted as strong motivators for the introduction of modern methods of risk management in order to minimise it.

Research Methodology

The paper analyses the role of mortgage loans in investment management in the real estate market in Poland in 2016-2019. It is motivated by the assessment of the economic situation and the banking sector in Poland in terms of residential mortgages.

This study aims at analysing the risk of mortgage loans that finance the real estate market. Its objective was achieved using especially data of Statistics Poland, EFC, EMF, HRE, reports of ZBP and KNF, as well as current literature. The analysis of the existing data made it possible to present the economic situation of Poland and the banking sector in Poland in 2016-2019 and residential mortgage loans as instruments of financing investments in the real estate market. The data concerning the mortgage loan portfolio come from two banks and take the form of randomly selected information concerning loan applications and borrowers' information cards and interviews with bank employees.

Based on the economic situation in Poland and the analysis of the mortgage loan market, the paper presents some threats related to the growing level of credit risk. It also points out to the need of effective risk management, especially in order to minimise it.

Real Estate Market Situation

Nearly 23 years have passed since the transformation of Poland’s economy, including its real estate sector, into a market economy.

Real estate, as compared to other goods, is characterised by considerable uniqueness, having a number of different essential attributes, such as physical, economic and institutional-legal features, important for understanding its essence. Among the economic characteristics that are essential in a market economy, high capital intensity and low liquidity should be especially emphasised. Particularly high capital intensity dictates the necessity of financing investments in real estate

especially through external sources, i.e. loans. In the Polish reality, with a shortage of flats (about 2.1 million (ZBP, 2019)), their deficit is one of the strongest factors supporting the high demand for real estate.

Not long ago (in 2016 and 2017), in terms of growing housing prices, Poland was a stable country in a dynamic (in terms of housing price increases) Europe. At present, Poland stands out from Europe in terms of their relatively rapid growth. The policy of the European Central Bank resulted in a significant reduction of credit costs through low interest rates, encouraging western investors to buy flats in Central European countries (including Poland). Rapid price increases of houses and apartments also resulted from of individual factors specific to a given country. Table 1 presents a ranking of the rate of housing price changes in selected European countries in Q2 2018 - Q2 2019.

Table 1: Ranking of selected European countries in terms of housing prices growth rate (Q2 2018 – Q2 2019)

Country	Rate of change in housing prices (including inflation)	Rate of change in housing prices (without inflation)	Average change in housing prices caused solely by inflation
Hungary	increase by 14%	increase by 10%	4.0 %
Latvia	increase by 9%	increase by 5.5%	3.5 %
Poland	**increase by 8.2%**	**increase by 5.6%**	**2.6 %**
Netherlands	increase by 8.3%	increase by 5.8%	2.5 %
Belgium	increase by 3.1%	increase by 1.4%	1.7 %
Ireland	increase by 2.5%	increase by 0.2%	2.3 %
Sweden	increase by 2.2%	increase by 0.1%%	2.1 %
United Kingdom	increase by 1.4%	increase by 0.3%	1.1 %
France	increase by 3.2%	increase by 2.1%	1.1 %
Italy	decrease by 0.2%	decrease by 0.8%	- 0.6 %

Source Author's own elaboration based on data of ZBP (2019), EFC (2019), EMF (2019)

As shown in Table 1, Hungary can serve as an example of a country where prices of flats and houses significantly increased due to the shape of its social policies. Because of high state subsidies for flats and houses, in terms of the housing prices growth rate, Hungary occupies the leading position. Table 1 also shows that a large part of the increase in housing prices in different countries has been caused by inflation (Hungary - 4%; Latvia – 3,5%).

According to AMRON-SARFIN Report 41 (ZBP, 2019), in Poland only in Q3 2019 the average transaction prices (an increase in the average price of 1 m2 of residential units) in the largest Polish cities increased significantly by more than 4%. However, since 2014 these increases have reached almost 10% (depending on the agglomeration).

Therefore, it should be recognized that in the period of Q2 2018 - Q2 2019, the increase in apartment prices was mainly stimulated by a high domestic demand (which in 2018 amounted to 5.3%) - including the demand for residential real estate, the improvement of the financial situation of families and, in particular, the good economic situation of Poland and most other countries.

Changes in economic activity are manifested in changes of basic economic indicators that describe the condition of the economy. Therefore, Table 2 presents selected indicators of Poland's economic situation together with indicators characterising the condition of the banking sector in terms of mortgage loans for the years 2014 – 2018.
Table 3 presents selected macroeconomic indicators for 2018. These indicators were based on data included in Table 2 and EFC data (2019), and can be used in attempts to forecast the prospects for Poland's further development.

Table 2: Selected indicators of the economic situation in Poland and the banking sector for 2014-2018

	Poland 2014	Poland 2015	Poland 2016	Poland 2017	Poland 2018
Real GDP growth (%)	3.3	3.8	2.7	4.6	5.1
Unemployment rate (LSF) annual average (%)	9.0	7.5	6.2	4.9	3.9
Inflation measured by HICP (%)	0.1	- 0.7	- 0.2	1.6	1.2
Outstanding housing loans (€ million)	82 500	90 901	92 015	93 111	100 579
Outstanding housing loans per person above 18 (€)	2 656	2 921	2 957	2 991	3 234
Outstanding housing loans per person to disposable income (%)	33.3	35.8	35.8	33.6	246.0
Gross annual growth of housing loans (%)	3.7	3.7	23.1	13.9	10.4
Average annual mortgage rate (%)	4.1	4.4	4.4	4.4	4.4
Owner-occupied dwellings (%)	83.5	83.5	83.7	84.2	84.0
Nominal real estate price dynamics (%)	1.8	1.1	2.5	4.7	11.2

Source: Author's own elaboration based on data of EMF (2019), EMF (2018), EMF (2017), HRE (2019)

Table 3: Overview of selected aggregated macroeconomic indicators of Poland's economic situation 2018-2019 and for their forecasts (2010-2022)

INDICATOR	MEASURE	2018	SURVEY RESULTS (FORECASTS)			
			2019	2020 P	2021 P	2022 P
GDP (y/y; %)	average; deviation	5.1	**4.25;**0.10	**3.33;**0.36	**2.95;**0.45	**3.15;**0.25
Domestic demand (y/y; %)	average; deviation	5.3	**4.26;**0.31	**3.72;**0.31	**3.00;**0.35	**3.09;**0.47
Individual consumption (y/y;%)	average; deviation	4.3	**4.17;**0.17	**3.92;**0.29	**3.05;**0.45	**3.17;**0.27
Gross fixed capital formation (y/y; %)	average; deviation	8.9	**7.48;**0.83	**3.65;**0.87	**2.82;**0.99	**3.73;**1.48
Gross wages in the national economy (y/y;%)	average; deviation	7.2	**6.98;**0.24	**7.07;**0.96	**6.25;**1.32	**6.17;**0.99
Unemployment rate (BAEL: (as of year-end, %)	average; deviation	3.8	**3.43;**0.26	**3.55;**0.45	**3.71;**0.69	**3.60;**0.59
Inflation (CPI; annual average, %)	average; deviation	1.6	**2.32;**0.11	**2.95;**0.38	**2.55;**0.41	**2.47;**0.47

Source: EFC (2019), HRE (2019).

The analysis of the data presented in Tables 2 and 3 and the information contained in EMF, EFC and HRE publications allows for a summary of the situation of the Polish economy and the banking sector as well as the mortgage financing. The data submitted include:

- EMF estimates (2019) and data estimates of Eurostat show an increase in real GDP in 2018 by 5.1% compared to 2017,
- according to the EFC (2019), among all components of domestic demand, is was investment expenditure that recorded the highest increase in gross fixed capital formation - it increased by 7.3% in 2018.

- construction is one of the main branches of the economy, aimed at meeting the basic material needs
of citizens. The sector recorded a 17% increase in gross value added compared to the previous year, when an increase of only 6.5% was recorded,
- the average annual unemployment rate in Poland amounted to 3.9% in 2018, compared to 4.9% in 2017,
- at the end of December 2018, the inflation rate in Poland was 1.1% compared to 2.1% in December 2017. The average annual inflation rate was 1.2% y/y in 2018, compared to 1.6% in 2017,
- as regards the banking sector, the main source of funding for mortgage loans, even in the long term, are especially deposits,
- the situation on the mortgage loan market reflects the good situation in the economy, the increase in wages, low unemployment and low NBP interest rates, which result in a low cost of mortgage loans,
- EFC experts' forecasts for GDP, domestic demand, investment expenditure, unemployment rate and inflation for the period 2020-2022 clearly indicate that the rate economic growth would slow down.

The forecasts presented by EFC experts are the result of a study carried out between 8 November and 6 December 2019 (Pawłowicz et al., 2019). However, a global COVID-19 pandemic was declared in February 2020, and has been developing very dynamically since then. In view of this situation and the deepening recession both in terms of human health and economy, all the studies and analyses presented can only be considered relevant for the period up to February 2020.

As a result of the global changes related to the pandemic, so far the following has been observed:
- a rapid deterioration of the health condition of citizens,
- an increase in unemployment,
- closures of businesses,
- a strong inflation,
- an expected significant reduction in GDP and gross expenditure,
- significant restrictions by mortgage banks,
- restrictions on economic freedom.

Mortgage Loan as an Instrument of Funding Housing Investments in the Real Estate Market

Poland's accession to the European Union has awakened the housing needs of Polish families. In this period, an important part was played by the rapid development of the sector that would finance housing construction. Apart from people’s own capital, a residential loan became a common instrument enabling households to purchase their own flat. And the housing deficit (calculated at about 2.1 million by the HRE (2019)) is one of the strongest factors sustaining high demand for real estate.

Banks engage in financing the real estate market by granting loans for the purchase of real estate, financing developers and large construction companies, using real estate as collaterals for loans or investing directly in real estate. A mortgage loan is a liability incurred to finance the purchase or renovation of a property. It differs from other loans in that it is secured by real estate.

A residential loan is a typical loan earmarked for the purchase of a flat, house or garage. A residential loan is always a mortgage. A residential loan is a sub-type of mortgage loan. It is one of the cheapest and most popular ones on the market.
As a result of a strong drop in NBP base interest rates to 4.75% at the end of 2005, a profitable offer of mortgage loans appeared and was followed by a rapidly growing demand for this type of loans. Moreover, a significant economic revival, a drop-in unemployment (Table 2) and a real increase in salaries (Table 3) resulted in a strong increase in the number and volume of mortgage loans granted,

especially mortgage housing loans. Table 4 and Table 5 present the indebtedness of households to the banking sector in recent years.

Table 4: Situation in the market of residential loans in 2015-2019

	2015	2016	2017	2018	2019
Number of active mortgage loan agreements (in thousands).	1994.677	2057.170	2140.896	2246.296	2389.311
Total debt on account of residential loans (in billion PLN)	374.082	393.367	388.795	415.538	444.121
Number of new residential loans granted annually	181 325	178 409	190 634	212 596	225 073
Value of new residential loans granted annually (in billion PLN)	39.320	39.496	44.574	53.852	62.629

Source: ZBP (2019, pp. 9, 10)

The analysis of data presented in Table 4 shows that in relation to the result recorded at the end of 2018, the portfolio of housing loans in Poland increased by 143,015 agreements, i.e. 6.37%. In comparison to the result recorded at the end of 2018, it was higher by 6.74% (nominally PLN 27.963 billion). In addition, 225,073 new residential loans were granted throughout 2019 with a total value of PLN 62.629 billion, i.e. 5.87% more (12,477 agreements) in terms of quantity and 16.30% more (nominal PLN 8.777 billion) in terms of value as compared to the results in 2018.

Table 5: LTV structure for newly granted residential loans per year (2015-2019)

	2015	2016	2017	2018	2019
below 30%	7.64	12.45	14.22	13.92	15.00
from 30% to 50%	7.22	6.76	6.90	6.27	6.19
from 50% to 80%	36.02	35.44	33.08	38.15	35.45
above 80%	49.12	45.35	45.80	41.66	43.36

Source: ZBP (2019, p. 17)

Comparing the structure of the LTV ratio of newly granted loans on an annual basis (Table 5), one can see a slight increase in the share of loans with an LTV ratio up to 30% and above 80% by 1.08 and 1.70 percentage points respectively. On the other hand, the popularity of mortgage loans with LTV between 50% and 80% decreased - the share of this segment in 2019 amounted to 35.45%, which represents a decrease by 2.70 pp. as compared to 2018. The criteria currently applied by the bank were consistent with the economic situation until February 2020.

In the great global health and economic crisis (COVID-19), banks are likely to take new, binding decisions with regard to managing mortgage-backed credit exposures. According to Recommendation S (KNF, 2019), those applying for a mortgage loan in the largest Polish bank will have to present a standard own contribution of at least 20%. As of 1 April 2020, PKO BP changed the terms and conditions of mortgage loans and no longer offers the possibility to increase LTV over 80% by meeting additional conditions, e.g. insurance of the missing own contribution (HRE, 2018).
The data from tables 2 and 3 show a stable growth rate of economic processes in Poland and favourable macroeconomic situation. The borrower's preferences were previously presented at work (Sitek, 2019).

Assuming that the highest borrowing activity was reported for borrowers aged 30-35 years, (considering only data from 2019):

- considering Table 4,
- and information on the share of non-performing loans (ZBP, 2019, pp. 10-12)

calculated that in four quarters of 2019 the share of loans in arrears reached 3.35%.
Only for newly granted loans this represents a value of PLN 1.485 billion in 2019. In relation to the total number of active residential mortgage agreements, the share of loans in arrears in 2019 will amount to PLN 15.509235 billion.
And this is already a clear signal to undertake research into the hazard associated with growing credit risk levels and the need for effective management to minimise it.

While the dominant demographic of borrowers is aged 25-35 and a significant part of them migrates for work, they are still the group with the least financial possibilities to invest in their own housing (Zadłużenia..,2017; Kredyt hipoteczny, 2019). In this situation, the need to support the borrowers in solving their housing problems stimulates the search for new, alternative sources of funding.

In a very good economic and macroeconomic situation of the national economy, a change in formal requirements for the assessment of creditworthiness will not suffice to popularise residential mortgage loans,especially for the generation of young people in the 30-35 age group. With the current restrictions imposed on the execution of residential mortgage activity, even the best strategy of managing residential mortgages will not result in their popularisation to satisfy people's housing needs (Skibiński, 2019).

The risk analysis of mortgage loans in the real estate market presented in this paper only refers to the period until February 2020. Due to the present COVID-19 pandemic, a global economic crisis is to be expected. It is estimated that around 5-25 million people worldwide could lose employment as a result of its economic consequences. Job losses for some 25 million people would mean that in terms of its effects the pandemic has surpassed the 2008-2009 financial crisis, and it is estimated that, like the 2008-2009 crisis, some 30 million people will find themselves below the poverty line. In view of such prospects, one should stress that this is not only a global health crisis, but also a huge global labour market crisis and economic crisis, which will have enormous consequences.

In Poland, we are witnessing a significant recession related to the threat to citizens' health, a significant economic downturn, the suspension of micro and small businesses, a sharp rise in unemployment, inflation and restrictions on economic freedom. Currently, the main objective of the government is to prevent the spread of the pandemic, and for the economy, the rapid introduction of the so-called antivirus shield, which translates into credit holidays, support for entrepreneurs and farmers to maintain employment, and especially support for the Social Dialogue Council.

Management of Mortgage Loan Risk

Description of the bank's loan portfolio, considering their impact on risk and its minimisation, has been prepared on the basis of such features as: type of loan, lending period, type of real estate, loan amount, LTV ratio, repayment method, amount of liabilities, age, education, years of employment, number of people in the household and income. Additional information was obtained on the basis of interviews with employees of the bank. The information gathered has led to the following conclusions:

- purpose of the loan. The majority of loans taken out by customers were intended for the purchase of a flat.
- loan duration. Loans are taken out for an average period of 30 years, but there is a clear decreasing trend.
- the average amount of credit granted since 2008 has been systematically decreasing, currently ranging from 200 to 300 thousand PLN. (KNF, 2019; HRE, 2018).
- for a bank, a potential borrower's creditworthiness is particularly affected by their income and the value of their liabilities.

- collaterals used in mortgage loans granted by banks are especially: mortgage entered in the mortgage register as the basic collateral of the loan, civil surety, bill of exchange or insurance as a form of collateral.
- by changing the parameters of the main factors that influence credit risk (age, loan amount, loan duration, loan purpose, available resources, LTV ratio), the bank achieves its reduction and minimisation.

In addition (Jajuga et al., 2017; Tofil, 2007; Wagner, 2016) the correlation of the real estate market and the loan system in terms of risk, indicates that the main problem of the housing market is short and medium-term demand (as a result of demographic growth, changes in the number of households, migration and income changes) in combination with inelastic supply (as a result of a long construction and administrative cycle, attachment to location - as a consequence of the lack of mobility, capital intensity of the project, the necessity of collecting the capital as a long-term savings or moving the construction process forward when funds inflow), with a large share of

- strong links with the financial (banking) system,
- low liquidity of properties,
- high susceptibility to external factors such as the economic situation, interest rates or the capital market.

From the bank's point of view, the consequence of these interactions is the risk of pledge value. This applies to overly optimistic valuation of properties as the subject of loan security. Also too liberal banking practice in the field of investment project evaluation, based on the value of property and not taking into account micro- and macroeconomic threats. These threats relate to the income generated by these properties. For example, in the case of real estate for rent, a carefully determined ratio of debt service to income generated by the property, and not the ratio of debt to the value of property, is of fundamental importance for the bank's security.

In light of the above, effective management of the mortgage market requires constant monitoring of risk-taking determinants of both the real estate market and the banking sector.
In view of the above, effective mortgage market management requires constant monitoring of risk-taking determinants of both the real estate market and the banking sector

It can be concluded that a residential mortgage loan, its size and the associated risk, as well as the economic situation and the macroeconomic conditions in which it is granted, can be treated as a strong incentive to introduce modern methods of risk management in order to minimise it (Sitek, 2016). With a fixed risk weight and probability of loan default it is possible to model the risk (Miles, Pillonca, 2008) based on derivatives (credit derivatives hedging against credit risk, interest rate derivatives hedging against interest rate changes and foreign exchange derivatives, which may constitute an important element of risk management). These can complement mortgage insurance (own contribution), constituting an important element of risk management (California Department..., 2018; Zasoby..., 2018).

Summary

Due to the considerable shortage of flats in Poland and the fact that mortgage loans are the main source of external funding for the purchase of residential properties in Poland, the development of the mortgage loan market is an important instrument supporting residential construction and stable development of this market. The aim of this paper is to analyse the risk of mortgage loans financing the real estate market for management purposes. It attempts to determine the role of mortgage loans in the management of investments in the real estate market.

Analysing Poland's economic situation in the years 2014-2018 and macroeconomic indicators of the economic situation as well as its forecast for the years 2020-2022, it shows that the situation of the mortgage market reflects the good economic situation of the country and its banking system.
The analysis of the role of mortgage loans in the management of housing investments and the impact of the main credit risk factors on its reduction and minimisation showed that:

- borrower’s profile (age, education, years of employment, income),

- loan type, loan duration, loan amount,
- type of collateral such as mortgage and insurance,
- LTV level,
- type of property and amount of liabilities,

as features of a bank's loan portfolio, describe it and have a significant impact on risk reduction and minimisation.

The analysis of the role of mortgage loans in the management of investments in the real estate market clearly points to the need of introducing modern risk management methods by modelling them on the basis of derivatives. At the same time, it is stressed that derivatives such as loan, interest rate and foreign exchange derivatives may complement mortgage loan insurance and become an important element of mortgage loan risk management. In light of the above, we view the objective of this study as achieved.

The paper underlines that all the analyses and deliberations on housing loans only refer to mortgages until the COVID-19 pandemic emerged (February 2020).

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Human Resources Management in The Light of The Changes in The External Environment Based on The Example of Chosen EU Countries

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Abstract

Due to the COVID-19 pandemic, a great number of enterprises worldwide were forced to limit its activity. In the lifecycle of every organization, a crisis is an exceptional situation. On the one hand, the risk of a crisis may cause damaging threats and, as consequence, the fall of the organization; on the other hand, however, a crisis may boost a positive renewal and bring further growth opportunities. Undoubtedly, the volatility of the environment and crisis situations such as ageing and shrinking of potential labour resources, a global financial crisis, or epidemiological threats are determinant in terms of a change of approach in modern organizations, in particular with regard to human resources management. Therefore, the principal goal of this publication is to present selected risk factors in the external environment and their influence on today's organizations in terms of HR, based on the example of countries in the Visegrad Group. Quantitative and qualitative analyses presented herein were conducted based on Eurostat's existing data. Dynamic row change methods were applied, for example a dynamics index. In turn, the pace of ageing of the population was defined based on the demographic ageing index (DAI) based on scoring differences between younger and older population shares.

Keywords: COVID-19, Population Ageing, Labour Market, External Environment, Economic Crisis

Introduction

This paper was inspired by the outbreak of the COVID-19 pandemic, which is being battled by governments of almost all countries in the world. Pandemics are one of the potentially largest negative global risks, in particular in the contemporary highly globalized world. They may result in high morbidity and mortality rates, and trigger adverse social and economic effects, which cannot be estimated at the moment. Undoubtedly, the outbreak of the coronavirus pandemic brought an increased probability of a global economic recession, including tensions and dynamic changes in the external environment. Almost every single organization is facing a dilemma concerning running personnel processes that will affect the state and structure of HR resources in the organization. Considering that the human capital is the most valuable intangible resource, it is of utmost importance to maintain high-level resource management, observe quality standards in this regard, and appropriately react to crisis situations because a high quality of management processes decreases the possibility of adverse risk effects. Therefore, the public is asking about the date of organizations returning to their normal functioning after the pandemic. In addition, the author of this publication will attempt to assess the period of „recovery" of macroeconomic indices relating to the labour market, in consideration of the 2007-2009 global financial crisis, although aware that economic effects of the present humanitarian crisis cannot be easily quantities, especially since the historical sample is small.

Study Methodology

At the EU level, statistical data registers are harmonized to a large extent; this allowed achieving a certain degree of their comparability. Therefore, quantitative and qualitative analyses presented in this publication were conducted based on Eurostat's existing data (the *Population and Social Conditions*

section). The author would like to emphasize that this article is an introduction to more detailed research as soon as current quantitative data are published to ensure their comparability. Dynamic row change methods were applied, including the dynamics index. In addition, in the context of the influence of the external environment on the functioning of an organization, most highly developed countries – including countries in the Visegrad Group – are facing a real demographic crisis related with decreasing population (depopulation) and ageing of the society. Therefore, the dynamics of the population ageing process was defined in accordance with the Demographic Ageing Index based on scoring differences between younger and older population share (Długosz, 1998):

$$\mathbf{DAI = [U(0\text{-}14)t - U(0\text{-}14)t{+}n] + [U(\geq 65)t{+}n - U(\geq 65)t],} \qquad (1)$$

where:

U(0-14)t – share of population aged 0–14 at the beginning of the analysed period;
U(0-14)t+n – share of population aged 0–14 at the end of the analysed period;
U(≥65)t – share of population aged 65 and over at the beginning of the analysed period;
U(≥65)t+n – share of population aged 65 and over at the end of the analysed period.

The starting point of the comparison is the year 2007 – the occurrence of the global financial crisis. Presented analyses and obtained study results were derived from a critical review of source literature and the author's side marks.

Theoretical Background

Every organization operates in a defined environment. Environment means both the organization's external and internal environment including all dependencies therein (Griffin, 2017; Gupta, 2013; Wong et al., 2014). For the purpose of this publication, the author concentrates on the external environment, characterized by significant dynamics of changes, which, on the one hand, constitute the drive to develop, but, on the other hand, they pose a certain threat for the organization's functioning. In this context, significant is both the economic dimension as well as the social/cultural dimension of the external environment, which includes: the unemployment rate, prosperity, and demographic characteristics of the population. The functioning of modern organizations in turbulent conditions and permanent uncertainty forces an increase in their flexibility and adaptability, in particular during a crisis (Legg et al., 2012; Kuraś, 2013; Sitek, 2019). According to P. Drucker, a crisis in an enterprise is a consequence of life-cycle phases of individual sectors, in particular in regard to specialized companies; investments in clinical trials, which are assumed to ensure innovation, do not constitute a guarantee of the crisis disappearing and the company holding through (Drucker, 1999). In turn, Oldcorn emphasizes that a crisis is a result of unplanned events, which hinder or threaten normal functioning of an organization (Oldcorn, 1989). In Barton's opinion, a crisis means an unforeseeable event, which has potential negative effects that may substantially restrict the company's operation in the areas of production, services, employment, financial condition, or reputation (Barton, 2001). In connection with the above, it may be concluded that human resources management may be considered from both the perspective of situational conditions as well as a context perspective, which takes account of environmental factors, including the effects of social, economic, institutional and political environment on HR processes (Urbaniak, 2019, Vardialier, 2016). Therefore, the HR system depends, amongst others, on the environmental context often understood as a combination of factors determining the external and the internal situation of the organization, which affects HR management policies and practices in the organization. In this regard, it seems important to pay special attention to the influence of global changes, such as, amongst others, the particularly intense ageing of the population occurring in Visegrad countries. In the light of the dynamic changes on the labour market, caused by demographic processes amongst others, there is a strong need to adjust activities in the area of human resources management (Zeuch, 2016; Cowling and Mailer, 2013; Listwan et al., 2016) Two important concepts were developed in the context of human resources management, namely diversity and age management. The first concept relates to the diversities and individual differences of employees, as well as preventing situations where employees would be discriminated due to their diversity. The second concept concerns undertaking defined activities and initiatives allowing rational and effective management of human resources available in the organization, including in regard to employees in older age groups, in such

manner so that individual works brings profit to the organization and satisfaction for the employee regardless of age (Walker, 2005, Negele and Walker, 2006). Referring to the influence of currently observed demographic trends on contemporary organizations, special attention should be paid to the organization's HR policy; human resources managers face a challenge relating to generation diversity. Undoubtedly, the above-mentioned demographic factors of the external environment (e.g. ageing of the population), as well as economic factors (e.g. economic fluctuations, the situation on the labour market), or random factors (e.g. epidemics) force the application of adjustment processes in the light of changes occurring in the environment. Table 1 presents the chosen typology of changes and the criteria for their distinguishment in the context of crisis situations such as a pandemic or a financial crisis.

Table 1: Typology of changes, conducted on various levels in the organization

Criterion	Types and characteristics of changes
Co-dependence of the time of organizational changes and environment changes	**Reactive change** – a reaction to a change in the environment, conducted when needed, thus often fairly ineffective; **Changes in advance** – in anticipation of future changes of conditions; prepare the organization before the need for organizational changes arises; this gives the organization an opportunity to eliminate the time-distance between the occurrence of the need for change, and the reaction to change.
Change strategy	**Changes directed at the structure** – for example a change of the mode of work, decentralization, a change of the level of formality; **Changes of technology –** working operations, procedures, technical equipment etc.; **Changes regarding people** – their qualifications, approaches, motivations, relations.

Source: own materials based on: K. Kmiotek, T. Piecuch, Zachowania organizacyjne teoria i przykłady. Wyd. Difin, Warsaw 2012, p. 131

It may seem that the concept of change has two dimensions. The first one is the result of the change – its content. This refers to human resources and tangible resources, including technique and technology, as well as various types of social, economic or political relations. The second dimension is the manner of conducting the change, which is closely related with execution methods and techniques and it is defined as the change process (Mikołajczyk, 2005). Therefore, it should be noted that the external environment of the given organization plays the key role in crisis to trigger change-related activities, and the forces derived at its source determine the flow and the final success of these activities.

Result of Research

It seems that an important context factor in human resources management is the changeability of demographic conditions, in which organizations operate and will operate. These conditions determine the changes on the demand side of the labour market in particular. The effectiveness of the execution of the organization's strategic goals will depend on the manner, in which managers will be able to face the challenges resulting from demographic changes (Urbaniak, 2019). Demographic changes, in particular ageing of the population and its consequences, received a lot of attention in the previous years (Reher, 2011; Wellekens, 2015; Mason, 2005; Van de Kaa, 1987). It may be concluded that a visible decrease of working-age population may be expected in the coming years, in particular in Visegrad Group countries, along with an increase in the percentage of post-working age population. Table 2 presents the changes in the working-age population and indicates the pace of general population ageing.

Table 2: Changes in population according to economic age groups in the Visegrad Group countries

	Population share by economic age groups [in%]			DAI
	0-14	15-64	65+	
	Poland			
2007	15.8	**70.8**	13.4	-
2009	15.3	**71.2**	13.5	**+0.58**
2018	15.2	**67.6**	17.2	**+4.25**

	Czech Rep.			
2007	14.4	**71.2**	14.4	**-**
2009	14.3	**70.8**	14.9	**+0.69**
2018	15.7	**65.1**	19.2	**+3.41**
	Hungary			
2007	15.2	**68.9**	15.9	**-**
2009	14.9	**68.8**	16.3	**+0.72**
2018	14.5	**66.6**	18.9	**+3.65**
	Slovakia			
2007	16.2	**71.8**	12.0	
2009	15.6	**72.2**	12.2	**+0.92**
2018	15.5	**68.9**	15.6	**+4.19**

Source: own calculations based on: Eurostat database (access: 10.04.2020)

Data presented in Table 2 indicate that during the analysed period from 2007 to 2018 the share of 65+ population has increased substantially, along with a decrease in the share of working-age population in the analysed countries, in particular after the year 2009. The pace of population ageing may be assessed using the DAI. If DAI numbers are positive, then this means a very intense flow of the population ageing process. In turn, negative DAI values mean rejuvenation. The DAI analysis confirms that in the Visegrad Group countries DAI was positive during the period covered by the analysis (2007-2018), which means that the process of population ageing is progressing. However, in Poland and Slovakia this process is more intensive, as proven by higher DAI numbers. Differences in DAI values in these countries may result from the changes in the shares of subpopulations of children and older citizens, which may be occurring in a slightly different manner. In this context, it should be expected that employers would be likely to reach for employees in older age groups. For them, the determining factor in making decisions about engaging and retaining such employees would be unit labour costs, meaning the relations of nominal costs of employment vs. performance. The observed reluctance to employ older people strongly affects the connection, assigned to this subpopulation, between the average growing remuneration and the alleged decreasing productivity related, amongst others, with an increased risk of diseases thus greater absence at work (Skibiński, 2018; Sipa, 2018; Gorzeń – Mitka, 2018). In this context, it is essential to take account of migration processes because intensified migration constituted a significant factor affecting the shrinking of potential labour resources. This process was especially visible after the accession of the Visegrad Group countries to the EU and during the 2007-2009 financial crisis, as confirmed by the data presented in Table 3.

Table 3: Balance of migration and changes in emigration

Country	**Emigration**							
	Year						**Dynamic Index**	
	2007	2009	2010	2011	2012	2018	**[2009/2007]**	**[2018/2009]**
Poland	35 480	229 320	218 126	265 798	275 603	189 794	**6.46**	**0.83**
Czech Rep.	20 500	61 782	61 069	55 910	46 106	26 742	**3.01**	**0.43**
Hungary	4 500	10 483	13 365	15 100	22 880	48 178	**2.33**	**4.60**
Slovakia	1 831	1 979	1 889	1 863	2 003	3 298	**1.08**	**1.67**
Net migration plus statistical adjustment								
							Absolute Growth	
							[2009-2007]	**[2018-2009]**
Poland	-20 485	-1 196	5 027	-11 841	-2 726	22 147	**19 289**	**23343**
Czech Rep.	79 193	25 378	14 334	16 889	10 293	38 629	**-53 815**	**13251**
Hungary	14 568	17 321	11 519	12 755	16 044	32 165	**2 753**	**14844**
Slovakia	2 316	-295	-4 929	2 966	3 416	3 955	**-2 611**	**4250**

Source: as in Table 2

The above table suggests that the largest increase in migration in the years 2007-2009 was reported in Poland and the Czech Republic, and the smallest in Slovakia and Hungary. The decreasing trend of emigration was reported in countries other than Hungary post 2009. It should be noted that labour

migration and the dynamic growth of demand for labour, especially in the post-crisis period, resulted in intensified shortages of labour in most Central and Eastern Europe countries, e.g. in Poland and in Slovakia. Therefore, the sector of small, medium and large enterprises is experiencing increasing problems with recruitment despite opening the labour market for immigrants from Eastern Europe or Asia. In this context, the role of migration policy is extremely important, and its main aim is to take actions to mitigate effects of population ageing, among other things.

Table 4: Selected characteristics of migration in the Visegrad Group countries

Country	Effects of migration	Migration type	Net migration	Selected causes
Czech Republic	In-flow of immigrants with high qualifications. Mitigation of population ageing effects.	Dominating economic migration	Prevalence of immigrants - increased share of immigrant work force in employment	Favourable situation on the labour market. Salary relation Economic situation Liberal migration policy Population policy. Dominant role of attracting factors.
Hungary	In-flow of immigrants with different level of education. Selective outflow of highly qualified human capital. Filling the gap in work force in the different sectors of the economy. Mitigation of population ageing effects. Strengthening of the position of immigrants of Hungarian origin Improving the labour market situation and filling in shortages of work force.	Dominating economic migration Repatriation prevalence of immigrants of Hungarian origin Reemigrations	Prevalence of immigrants - increased share of immigrated work force in employment	Dominating role of administrative and political pull factors Lack of a coherent migration policy, partly connected with migration crisis Economic situation
Poland	In-flow of immigrants to fill in shortages of workers on the labour market in the different sectors of the economy industry, construction, agriculture, medical services. Improving situation on the labour market. Selective outflow of human capital with varied level of skills and education. Emigration of medical staff	Dominating economic migration, reemigrations	Increasing share of immigrant work force	Economic situation. Salary relation. Structural mismatches on the labour market Migration policy
Slovakia	In-flow of immigrants to mitigate effects of population ageing and fill in employee shortages in the different sectors of the economy, industry, agriculture Selective outflow of human capital with varied level of education.	Dominating economic migration Reemigrations to a lesser degree	Increasing share of immigrant work force	Economic situation. Migration policy. Salary relation

Source: own work based on: Skibiński A. (2017). The migration processes and their consequences for the labour market in the Visegrad Group Countries - selected aspects. Olsztyn Economic Journal 12 (1/2017)

Thus, migration processes are a very complex issue, and none of the existing migration theories is able to explain the changeability of complex migration processes in a fully convincing way. Due to the interdisciplinarity of migration analyses as a research subject and complexity of this phenomenon, there is no one unambiguous research method or a common way of explanation. Therefore, works on migration show multitude of approaches to and interpretations of this process.

Migration processes become more intense usually in situations of crisis (Van Mol, 2016). This is well illustrated on the labour market, which reflects the economic situation of the given country or region. Table 5 presents the basic macroeconomic indices, which diagnose the situation on the labour market for the selected group of EU countries.

Table 5: Registered unemployment rate and employment indices

Country	Total employment (resident population concept - LFS)								
	Year						Dynamic index		
	2007	2009	2010	2011	2012	2018	**2009/2007**	**2010/2007**	**2011/2007**
Poland	57.0	59.3	58.9	59.3	59.7	67.4	**1.04**	**1.03**	**1.04**
Czech Rep.	66.1	65.4	65.0	65.7	66.5	74.8	**0.99**	**0.98**	**0.99**
Hungary	57.0	55.0	54.9	55.4	56.7	69.2	**0.96**	**0.96**	**0.97**
Slovakia	60.7	60.2	58.8	59.3	59.7	67.6	**0.99**	**0.97**	**0.98**
	Unemployment (Percentage of active population)								
Poland	9.6	8.1	9.7	9.7	10.1	3.9	**0.84**	**1.01**	**1.01**
Czech Rep.	5.3	6.7	7.3	6.7	7.0	2.2	**1.26**	**1.38**	**1.26**
Hungary	7.4	10.0	11.2	11.0	11.0	3.7	**1.35**	**1.51**	**1.49**
Slovakia	11.2	12.1	14.5	13.7	14.0	6.5	**1.08**	**1.29**	**1.22**

Source: as in Table 2

Two significant detailed conclusions may be drawn from the data presented in Table 5. Firstly, during the 2007-2009 crisis employment indices dropped in Hungary (4%), Slovakia, and the Czech Republic (1%), which was reflected in an increase of the registered unemployment rate in this group of countries. In turn, in Poland the situation was slightly different because the decrease in the employment dynamics and a clear increase of the unemployment rate occurred post 2009 due to, amongst others, intensified external migration. Secondly, an improvement of the situation on the labour market, reflected in growing employment indices and a drop of the registered unemployment rate occurred after two years from the end of the crisis, i.e. in 2011, in all analysed countries. Considering that the labour market somehow constitutes a barometer of economy, it may be stated that the economies of these countries started to emerge after the economic slow-down two years after the crisis, as opposed to certain southern EU economies such as Greece or Portugal, which were affected by the 2007-2009 financial crisis for much longer.

In regard to the global COVID-19 pandemic, it may be observed that there is a lack of current quantitative data from the labour market, which could be used to estimate the approximate date of moving to recover. This results, amongst others, from the fact that the current crisis caused by the coronavirus pandemic does not derive from the banking sector as the 2007-2009 financial crisis, but it is an effect of the influence of an external shock on the economy. Although the banks in many countries in, for example, the Visegrad Group, are much better prepared to support the economy, the scale of the problem is definitely greater and forces organizations to start preventive actions and modify their strategies in the areas such as human resources management. Table 6 presents exemplary crisis strategies in organizations.

Table 6: Exemplary crisis strategies

Strategy of survival	**Strategy of decreased profitability**
General characteristics	
Temporary solutions aimed at quick cost reduction and maintaining financial liquidity. Decrease of salaries, technological breaks, budget freezing	Long-term solutions aimed at operating in conditions of decreased profitability. Cutting costs to ensure minimum profitability.
Employment policy	
Employment maintenance policy. Terminating civil law contracts, outsourcing contracts or consulting contracts. Personnel movement freeze.	Redundancy limited to the minimum ensuring profitability. Outplacement. Personnel movement freeze. Reduction of the skills overpotential.
Salaries	
Decrease of salaries – usually equal decreases for everyone. Blocking any and all salary raise.	Suspending salary raise. Very rare salary raise, only to retain key employees. In case of a very difficult situation – decrease of salaries.
Role and situation of the HR in the company	
The HR role in the area of development decreases. The role of the personnel director as a management	The HR role in the company decreases. HR is responsible for the process of reducing personnel costs.

adviser increases. HR is responsible for the process of reducing personnel costs.	
Personnel shortages	
Assessment of demographic threats in the organization: - assessment of physical fitness and monitoring the health of employees, in particular in older age groups - identification of areas in the organization threatened by a labour force deficit, in particular in younger age groups	Assessment of the level of inter-generation cooperation in the organization through a diagnosis of: - the transfer of knowledge between employees from various age groups; - inter-generation relations.

Source: own material based on: Smolska M. (2009). Kapitał ludzki w dobie kryzysu. Ekonomiczne problemy usług nr 46, pp. 289-300, Skibiński A. (2019) The Concept of Demographic Management as an Element of Human Resources Management in Organizations. IBIMA Business Review. Vol.2019 p. 9

Conclusion

The dynamic changes in the external environment in contemporary enterprises are the generators of crisis situations and have substantial influence on operation of these enterprises as well as their human resources policy and human capital. Undoubtedly present demographic trends which increase the heterogeneity of work resources, and changes of structures and relations between demand and supply for work substantially increase the unforeseeability of the environment, thus increase the situational uncertainty. Therefore, the principal threat faced by organizations is related with personnel problems due to the ageing and shrinking of potential labour resources in the countries where increased emigration and population ageing were observed in the last years. The analysis of existing data also demonstrated that economies of developing countries such as those in the Visegrad Group were quite effective in recovering after the 2007-2009 financial crisis. Will the situation be similar in case of the crisis triggered by the COVID-19 pandemic? In the author's opinion, there are many uncertainties because all sectors of economy, particularly services and production, will be negatively affected in the coming months. According to the estimates of experts from the European Commission, economics of some UE countries may shrink even to approximately 5% GDP. Therefore, the pace and efficiency with which organizations will react to the approaching threat and implement appropriate preventive mechanisms, amongst others in the area of human resources management, will be the decisive factors in recovering after the crisis. Summing up, it is worth to invest in human resources because they are most valuable for the organization, especially in situation of a crisis when many business try to reduce the costs of operation. It must be remembered that every crisis is followed by economic recovery, and it is then that the employer's image and its ability to handle crisis will decide about the company's success.

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Assessment of Selected Aspects of Business Operational Security Based on The Example of a Small Transport Company

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Abstract

Outsourcing can greatly contribute to the efficiency of business processes and generate multiple benefits. However, it requires a detailed business case for a change of the pursued operational model. As is evident from the literature, especially in relation to small-sized businesses, such decisions are often made imprudently, based on general trends and recommendations. Businesses tend to make individual, very subjective analyses of their conditions, to implement a concept of outsourcing almost instinctively, not always choosing the right criteria. This is is made worse as there are no readily available methods and tools dedicated to such businesses. Most of the research relates to large corporations and is based on advanced methods and techniques that are difficult to implement in smaller establishments. This problem became the starting point for this publication, which presents considerations regarding the justification for implementing of transport service outsourcing in a small-sized manufacturing plant. The method of assessment and analysis of possible scenarios as well as universal recommendations for all enterprises are presented.

Keywords: Financial Security, Outsourcing, Transport, Logistics

Introduction

The term “outsourcing” means the use of external resources. Is an abbreviation for outside-resource-using. Outsourcing has also been defined as a procedure involving the separation of certain functions of a business from its organizational structure and their transfer to other economic operators (Setamanit, 2018). The basic benefits of outsourcing selected business functions suppliers include (Zhu et al., 2017):

- cost minimization and control,
- business focus on the core activity,
- quality improvement of outsourced functions,
- access to resources that the customer does not have,
- capital increase,
- transfer of functions that are difficult to implement, operate or control,
- transfer of risk to the service provider.

The literature distinguishes between two forms of outsourcing, internal sourcing (insourcing) and external sourcing (outsourcing). Insourcing consists in the assignment of part of the functions to a business partner, a subsidiary or a company, a shareholder of which the enterprise is. These companies are separate and independent but share capital with the service provider. On the other hand, external sourcing is about delegating some of the business functions to an outside enterprise (Zhu et al., 2017).

The function areas outsourced most often include:

- IT technologies and systems,
- customer service,
- marketing,
- finance and accounting,
- HR management,
- logistics,
- manufacturing.

The area covered in this paper is logistics. Logistics services outsourced by enterprises include, among others:

- transport,
- storage,
- shipping,
- palletization, packaging,
- customs procedures,
- waste and returnable packaging management,
- finance and accounting services (invoicing, insurance, payment services)
- supply chain management,
- distribution,
- sales.

The options to boost competitiveness through the use of resources, knowledge, experience and professionalism of a logistics operator, to increase the quality of services or reduce employment and costs are undoubtedly an advantage that outsourcing offers (Setamanit, 2018). It also lets the company to focus on managing its core business. However, it is not an ideal solution and brings with it some difficulties, which can include:

- problems with selection of the right business partner,
- difficulties in communication and coordination of activities at the initial project stages,
- risk that the expected requirements and the conditions for cooperation are not met,
- consequences of partnership: control of access to all information and insight into company data, loss of full control over certain key processes, organizational changes.

Logistics outsourcing generates benefits from cooperation not only for the outsourcing company but also for the service provider. The outsourcing company can get a lot of profits, such as the cost reduction, increased quality of services or more efficiency in the core business, as mentioned above. On the other hand, the service provider can make profits from its operations, build its knowledge and experience, and thus enter a higher segment in the market.

In the literature, outsourcing is presented from various perspectives. As regards transport, these include, for example, route optimization (Tang, 2018, 2020), supply chain network design (Cortinhal et al., 2018), service provider assessment (Zhu et al., 2017) or risk assessment for outsourcing of such functions (Zhu, 2016; Tian & Guo, 2019). Most of the research relates to large enterprises; for example, the efficiency of the supply chain is analyzed in terms of outsourced functions in a group of large companies (Kalinzi, 2016), multisourcing in the telecommunications (Mehmet, 2013) or healthcare sectors (Jeremy et al., 2013).

Publications concerning small-sized enterprises are available (Agburu et al., 2017; Mageto et al., 2018), but these are few. In contrast, those dealing with large companies most often use advanced tools, such as simulation models (Yang & Chen, 2019), fuzzy logic (Ljubojević et al. 2019), multi-criteria models (Bidani & Frikha, 2018) or time series (Papana, 2013). These can be difficult to implement in companies with a smaller vehicle fleet. Therefore, such businesses often carry out individual analysis

of their own conditions and make almost instinctive decisions regarding the benefits of outsourcing, not always to choose the right criteria for the adopted business strategy (Baeza et al., 2019).

In recent years, entrepreneurs have understood the need to separate extra functions from the organizational structure and transfer these to outside economic operators, which will take care of them more efficiently and effectively. The concept of outsourcing, including transport services, can be an important factor in the projects for minimization of costs while increasing the company's economic potential. However, outsourcing of transport services alone does not guarantee a better financial performance and can seriously affect the company's financial cash flows. Therefore, the profitability of such decisions must be assessed in each company before deployment. Only once the results are available, the question can be answered whether outsourcing of transport services will fulfil its role in the company and contribute to the cost and process optimization.

This paper presents such an analysis. Based on collected empirical data regarding transport processes, the operations of the transport department in a manufacturing company were assessed, to make a proposal with a view to increasing its profitability through the use of external service providers. Also, the paper demonstrates the importance and role of outsourcing in the enterprise, its advantages and disadvantages, as well as the factors that most affect profitability.

The aim of this paper is primarily to indicate a method of testing a small-sized enterprise, in response to the deficiency found in the literature, as well as to emphasize the importance of analyses preceding any outsourcing project and to show how any changing factors (in this case, lease agreement fees) can affect the final decision.

Research object and methodology

The analysis was based on data obtained from a manufacturing company whose business covers the production and assembly of furniture, based in Poland, in the eastern part of the Mazowieckie Province. Innovative ideas, customer satisfaction and continuous development of production technology all let the company to deliver orders in a comprehensive manner. The company has created furniture systems and solutions mainly designed for chain stores. Many years of experience in the industry allows the company to meet customers' expectations from the design and visualization stage, through the selection of appropriate materials, to the attractive lead time and professional assembly on the site. A sample project is presented in Fig. 1.

Fig. 1: Furniture manufactured by the assessed company
Source: Company's materials

The company experienced a dynamic growth in 2011. Automation of the manufacturing plant and provision of capacities for comprehensive order delivery, including the processing of raw wood, furniture board, glass, plexiglass, metal and stone, and upgrading of the machinery, which increased the scope of possible material processing, including printing and varnishing, allowed the company to

enter new markets. In view of this, in order to improve transport efficiency, a decision was made in 2017 to replace the transport fleet. Until then, the company had vehicles made in 2008 and in 2009, with mileage ranging from 400,000 km to 640,000 km, which was associated with high unreliability rates due to frequent failures. This not only generated extra cost but also affected the company's reputation especially where deliveries were late.

New vehicles were highly reliable and additionally met the stringent ecological and safety criteria, showcasing the values of the company. In this way, the company established a fleet of 12 light-duty trucks and one tractor unit with a semi-trailer.

The data collected by the company concerning the transport tasks, the revenues generated by them and the costs incurred allow not only to consider the functioning and profitability of the company but also to assess the improvements which can be implemented. The method of analysis, comparison and finally synthesis used in the article does not require any advanced mathematical or IT tools and therefore can be implemented in any company. Determining the seasonality of the process, assessing expenses, development opportunities and calculating profitability of potential improvements ought to be incorporated into management of every company.

Assessment of the Transport Department Operations

The first aspect of the analysis was the assessment of transport intensity expressed in the number of kilometres travelled. Fig. 2 presents a monthly summary of orders delivered in 2019 by LDVs and the tractor unit. As is evident, it fluctuates by calendar month.

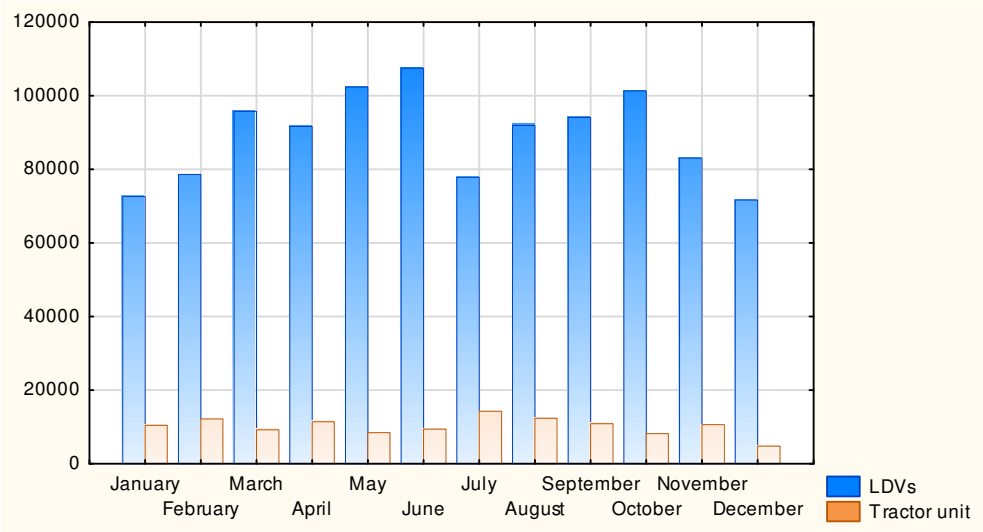

Fig. 2 : Number of kilometres travelled by vehicles by month 2019

The shortest distance travelled was in December, while May and June, as well as October were the most favourable months. Next, the financial situation of the transport department was analyzed in 2019, taking into account:

- all costs of transport orders delivered, including: fuel expenses; road tolls; insurance costs; driver salaries; lease costs; repair and spare part costs; consumable fluid costs; technical inspections; and office costs, which included: salaries of office employees, electricity, Internet connection, telephone subscriptions, insurance, taxes and accounting;

- revenues from transport services rendered, calculated as the product of the number of kilometers travelled and the rate of 3.3 PLN/km for the tractor unit and 1.9 PLN/km for LDVs. The summary is presented in Table 1

Table 1: Balance sheet of the company for 2019

Month	Revenues [PLN]	Costs [PLN]	Profit/loss [PLN]
January	172,532.20	195,141.93	-22,609.73
February	189,599.50	200,510.62	-10,911.12
March	212,606.90	214,055.39	-1,448.49
April	211,958.10	211,192.12	765.98
May	222,544.90	219,346.77	3,198.13
June	235,295.70	223,819.87	11,475.83
July	195,119.30	200,442.25	-5,322.95
August	215,483.30	211,631.45	3,851.85
September	214,516.10	213,016.80	1,499.30
October	219,392.20	218,327.23	1,064.97
November	192,912.70	203,840.51	-10,927.81
December	151,827.00	192,903.29	-41,076.29
Total	2,433,787.90	2,504,228.21	-70,440.31

As the table above shows, the transport department of the analysed company posted a loss of PLN 70,440.31 in 2019. However, it is also clear that negative results are not posted in every month. There are periods such as June, in which profit amounted to PLN 11,475.83. The above financial picture was conditioned by the number of kilometers travelled in the delivery of transport services and the high value of costs incurred, the percentage share of which is shown in Fig. 3.

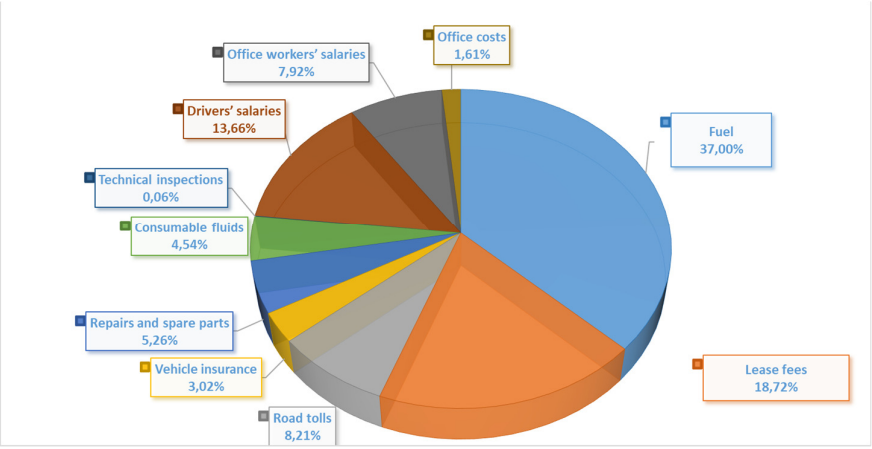

Fig. 3: Percentage share of cost types.

Fig. 3 shows that apart from fuel, the second largest group among all expenses consists of lease fees. As this cost item significantly influences the assessment of the transport department operations, in Table 2 the summary is presented without lease fees.

Table 2: Profit in 2019 by month excluding lease fees

Month	Revenues [PLN]	Costs [PLN]	Profit/loss [PLN]
January	172,532.20	156,499.53	16,032.67
February	189,599.50	161,868.22	27,731.28
March	212,606.90	175,412.99	37,193.91
April	211,958.10	172,549.72	39,408.38
May	222,544.90	180,704.37	41,840.53
June	235,295.70	185,177.47	50,118.23
July	195,119.30	161,799.85	33,319.45
August	215,483.30	172,989.05	42,494.25
September	214,516.10	174,374.40	40,141.70
October	219,392.20	179,684.83	39,707.37
November	192,912.70	165,198.11	27,714.59
December	151,827.00	154,260.89	-2,433.89
Total	2,433,787.90	2,040,519.41	393,268.49

The summary shows that the transport department of the analysed company is able to generate profits. Additional costs resulting from the use of lease arrangements in the company have a huge impact on annual profit. As this is a cost that can be avoided when using outsourcing, a decision was made to analyze this option by looking at how it would impact the company's financial cash flows.

Analysis and assessment of the profitability of transport service outsourcing

A robust business case for outsourcing of transport services requires that the profitability of such a solution is examined. To this end, current profits from the transport department were compared to an outsourced-transport scenario. It was assumed (based on a review of offers posted on the Internet) that the cost of an external service for LDVs is PLN 1.8 and for the tractor unit PLN 3.6. The results obtained are presented in Table 3.

Table 3: Monthly profit statement with outsourced services for the two transport vehicle types

Month	January	February	March	April	May	June
Total profit	4,127.80	4,199.50	6,802.10	5,742.90	7,704.10	7,941.30
July	**August**	**September**	**October**	**November**	**December**	**Total**
3,505.70	5,491.70	6,158.90	7,679.80	5,122.30	5,739.00	70,215.10

The calculations show that using an external service provider would let the company to generate profits in each month, with the total figure for 2019 with outsource transport services amounting to PLN 70,215.1, which, compared to the loss incurred, is an impressive result. However, as the high lease payments have a significant impact on this result, a comparison of profits without these costs would be more useful, as shown in Table 4.

Table 4: Monthly profit statement 2019 for outsourced transport services and use of own transport excluding lease fees.

Month	Profit with outsourcing [PLN]	Profit with own transport [PLN]	Difference [PLN]
January	4,127.80	16,032.67	11,904.87
February	4,199.50	27,731.28	23,531.78
March	6,802.10	37,193.91	30,391.81
April	5,742.90	39,408.38	33,665.48
May	7,704.10	41,840.53	34,136.43
June	7,941.30	50,118.23	42,176.93
July	3,505.70	33,319.45	29,813.75
August	5,491.70	42,494.25	37,002.55
September	6,158.90	40,141.70	33,982.80
October	7,679.80	39,707.37	32,027.57
November	5,122.30	27,714.59	22,592.29
December	5,739.00	-2,433.89	-8,172.89
Total	70,215.10	393,268.49	323,053.39

Table 4 shows that profit in 2019 would be higher by as much as PLN 323,053.39 in the case of using own transport if the company had not been burdened with lease payments compared with outsourced transport services. It is also clear that both options would generate profit in 2019 for the analysed company.

Summary

The aim of this paper was to present the aspects of decision making regarding the form of transport services based on the example of a selected manufacturing company. The analysis showed that these decisions must be preceded by a detailed profitability analysis, taking into account multiple factors. For the selected company, the decision to use outsourcing seemed favorable, compared with the loss incurred in 2019 in the amount of PLN 70,440.31. However, lease fees, which amounted to PLN 463,704 had a huge impact on the result. In this scenario, outsourcing of transport services compared with transport orders delivered by own means would bring the company a profit of PLN 140,655.41. With the knowledge on the share of lease costs in the total costs, another analysis was made. The potential profit with outsourced transport services was compared with the option of own transport, but after excluding lease fees, which showed how high a profit can be generated by the transport department using its own fleet of vehicles. In view of the research carried out and the fact that the analysed manufacturing plant will pay the last lease fees in May 2020, it can be concluded that the company would not profit from outsourcing transport services.

However, it should be noted that the results obtained can only be applied to this specific company. Nevertheless, the method of analysis, comparison and synthesis used is universal. Simple calculations that can be done in any spreadsheet software should precede the implementation of new solutions in any company. The method of conducting such analysis may be implemented in any given company. Moreover, the decision to outsource is influenced by other factors in addition to the discussed revenues.

The use of own transport offers more flexibility and freedom from issues related to coordination and communication with an external service provider. Moreover, the business owner has a strict control over the transport process. An essential disadvantage of outsourcing is the risk of errors on the part of the service provider, which may result in a detriment to the principal's reputation and loss of customers.

Therefore, such a decision must be thoroughly considered on a case-by-case basis, also in the long-term, and supported by reliable calculations, as presented in this paper.

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Faecal Sludge Management Through Monitoring the Septic Tank Desludging Period (Case Study Kelurahan Pademangan Barat, North Jakarta)

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Abstract

Domestic wastewater management in Jakarta pays special attention to the faecal sludge management. Millions of inhabitants in Jakarta still use septic tank technology as on-site household domestic wastewater treatment system. Considering that most of the population in Jakarta still uses septic tank technology, providing good operational standard of faecal sludge infrastructure is an effort that must be done by the Jakarta Provincial Government to reduce pollution of domestic wastewater. Actions taken to reduce environmental pollution caused by domestic wastewater in the community with local system management. Based on existing standards in Indonesia, septic tanks must be routinely desludging every 2-5 years for those which meet the SNI 2398-2017. The scheduled desludging aims to pollution prevention due to septic tanks because it has a proper range of desludging period. This study was conducted with a quantitative approach using descriptive methods. Involves as many as 1,322 respondents filling out closed questionnaires. The results of this study, 60.8% of respondents knew of the existence of a suction hole in their septic tank, and the rest don't know. Most of the respondent's houses or buildings in Kelurahan Pademangan Barat (67.2%) had never desludged their septic tanks at all. As much as 51.9% of respondents have septic tank suction holes that cannot be opened and only 48.1% can be opened. For desludging according to standard, there are 13.8% of houses or buildings in the Kelurahan Pademangan Barat that have implemented it while the remaining 19% are still using designs are not in accordance with standard.

Keywords*:* Faecal Sludge Management; Desludging Period; Septic Tank; Water Pollution

Introduction

In several studies conducted by Il (1989), Tilman and Lehman (2001), Miller & Spoolman (2015) show that activities carried out by humans produce a variety of influences on the main systems of life when viewed in terms of social, political, economic and cultural. Rani and Dahiya (2008), Putri et al (2016) and Wijaya et al (2018) mentioned increasing population and development is one indicator of the economic success of urban communities but the use of resources will produce new problems, namely the presence of waste. Another research by Tchobanoglous et al (1977), Salvato (1982) and Metcalf & Eddy (2014)'s book state in addition to industrial waste, domestic household liquid waste is a major contributor to urban waste and triggers a variety of water problems. The domestic wastewater management system in urban areas is one of the important indicators related to the development of proper community sanitation, because poor sanitation can have an impact on the economic system and the running government. BPS DKI Jakarta (2018) mentioned Jakarta has 10.46 million inhabitants. As many as 85% of those number still use septic tank technology as a local scale household wastewater treatment system.

The regional government has prepared significant facilities and infrastructure to meet the target of universal access for the community, one of which is to provide a local wastewater treatment system that starts from the disposal of feces in facilities such as septic tanks and then faecal sludge is aspirated and transported for further processing in the faecal sludge treatment plant known as *Instalasi Pengolahan Lumpur Tinja* (IPLT). According to Worldbank (2016) as many as 67.5% of Indonesia's population in 2025 will live in cities. ASEAN Secretariat (2019) give a view Jakarta as the first most populous city in Indonesia contributes to the count of 30.7% in areas that do not yet have proper sanitation management. Urban domestic wastewater management in Jakarta pays special attention to the faecal sludge management.

Based on data shown by the DKI Jakarta Provincial Statistics Agency (2018), the city of Jakarta has an area of 662.33 km^2 and has a population density of at least 158.04 inhabitants/hectare. The increase in population figures accompanied by a rapid growth in settlements has made the city of Jakarta experience a drastic reduction in environmental status. From a total of 10.46 million inhabitants in Jakarta, according to the DKI Jakarta Provincial Government's Regional Wastewater Management Company (PD PAL Jaya) in 2018, only 3% are served by sewerage or domestic sewage piping systems. commonly called a centralized system (off site system), 12% through access to sanitation with local individual processing systems (on site system) and the remaining 85% still use *sepiteng* which refers to the existence of septic tank technology. The rest are still practicing open defecation so there are various triggering factors for river pollution and the inadequate quality of ground water in Jakarta. Although almost 100% of the people of Jakarta have access to sanitation, data from the Ministry of Health (2020) show there are 25 *kelurahan* that have been verified by Open Defecation Free (ODF), but 535.62 thousand people are still doing open defecation.

A fact that most of the people in Jakarta still use septic tank technology, so providing a good operational standard IPLT infrastructure is one of the efforts that must be effort by the Jakarta Provincial Government to reduce pollution of domestic wastewater in the community. Contribution of pollution from faecal sludge can be estimated from the rate of pollution load that can be reduced per unit time in g/day or kg/day or tons/year, so that according to Anggraini and Nuraeni (2016) after multiplying the daily sludge volume that is processed (m^3/day) with the content of the pollution load (mg/L) in the faecal sludge will get the rate of reduction of the pollution load. Looking at the data on the number of residents in Jakarta who still use septic tanks, the potential quantity of faecal sludge entering the IPLT should be quite high, but in fact the PD PAL Jaya (2019) mentioned daily average volume of sludge is very small ie 104.4 m^3/day and cause IPLT to have a significant iddle capacity, like research conducted by Subhan U et al (2017), due to desludging based on community demand (on-call based) so as to monitor the performance of septic tanks and improve operations IPLT, a faecal sludge management activity is made regularly. Regular desludging is aimed at reducing pollution due to domestic wastewater.

Based on existing standards in Indonesia, septic tanks must have desludging period. It should be routinely desludging every 2-5 years. The determination was carried out on septic tanks that meet the SNI 2398-2017 specifications with an estimated septic tank having a combined and separated systems. It is also mentioned in the previous standard i.e. SNI 03-2398-2202, a septic tank with a separate system measuring about 1 m3 is intended for one house or building with only 5 inhabitants. Sludge desludging of septic tanks is carried out more frequently than the standard range of periods generally due to the inclusion of household wastewater other than feces into the septic tank, or the capacity of the septic tank is too small. Whereas desludging is performed less frequently than the standard period range, it is likely that damage to the septic tank will seep out and pollute the soil so that the impact on active groundwater used. In addition, if the tank capacity used is too large, the desludging will have a long time span, but this rarely happens.

Study from BPLHD on 2015 shows several points in Jakarta groundwater pollution caused by coli bacteria. As a case study, the coli bacteria value in groundwater samples in Kelurahan Pademangan Barat, North Jakarta reached a pretty high number of coli bacteria values, ie 370,000 MPN/100 ml. The general aims of this research is to provide a new perspective that controlling pollution caused by domestic wastewater can not only be done by optimizing the treatment of faecal sludge in the IPLT

like previous study by Oktiawan and Priyambada (2007) but also by conducting local system management (on-site) domestic wastewater by having a good desludging period. An analysis of social problems was carried out through collecting respondent data so that the frequency of community sludge desludging and emptying of septic tanks could be generated.

Methods

The study was conducted in Kelurahan Pademangan Barat, North Jakarta, Indonesia in 2016. It was conducted with a quantitative approach using descriptive methods through a survey of respondents by distributing closed questionnaires so that the percentage of suctioning frequency data was obtained. In this study closed questionnaires were distributed to 1,322 respondents who were a list of questions in the form of multiple choice. Hypothesis testing is not carried out but only describes the state of some variables, symptoms or conditions that occur in the study area. The survey included questions about the technical specifications of the local wastewater treatment system owned by respondents to determine the conditions of fulfilling the requirements if desludging is to be done. The case study in this research was carried out in Kelurahan Pademangan, where in this case the city government was assisted by the working group at the kelurahan level to implement the Scheduled Sludge Service program. The results can be used as capital for the city government to control the sustainability performance of the management of sludge in the future.

Result and Discussions

Existing Conditions

The community has understanding that septic tanks that are not managed or desludged regularly for years mean that they have no problems, even though according to data released by the *Dinas Lingkungan Hidup* in 2018, most rivers in Jakarta have been contaminated with faecal bacteria Eschericia coli (E. coli). Delinom (2008), Kosasih BR et al (2009), and Kooy et al (2016) mentioned biological contamination have an impact also on the quality of ground water in the city of Jakarta. Cases of septic tanks leaking to the ground, direct disposal of greywater or non-toilet domestic wastewater resulting from washing baths into drains and water bodies are the main factors of water pollution. Through the total coliform parameter which is an indication that the water is contaminated with feces, water pollution in Jakarta has exceeded the 99,000 MPN/100 ml sample of the maximum allowable level of 0 MPN/100 ml, which is regulated in Permenkes No. 492/Menkes/Per/IV/2010 concerning Drinking Water Quality Requirements.

Table 1: drinking water quality requirements are regulated in Permenkes No. 492 of 2010

Parameter	Units	Maximum allowable number
E. Coli	Number per 100 ml sample	0
Total coliform bacteria	Number per 100 ml sample	0

Jakarta's groundwater pollution is dominated by manganese, iron, organic, coliform, and faecal bacteria. The high concentration of these pollutants indicates that there is still a lot of ground water in Jakarta that is polluted by domestic wastewater from septic tanks. Based on research by BPLHD Jakarta (2015), that has been conducted twice at various sample points in 197 *Kelurahan* in Jakarta, the biological contamination rate of Coli bacteria parameters in ground water in Kelurahan Pademangan Barat, North Jakarta is in the range of 0-370,000 MPN/100 ml and is the area with the highest pollution compared to other municipalities.

Analysis of Respondents' Survey

In this research, data obtained from a survey of 1,322 respondents regarding the ownership status of on-site domestic wastewater treatment namely septic tank at the research location, the existence of

suction holes in the septic tank and the conditions can be opened or not to then be connected to the range of desludging periods carried out by each house or building. The existence of suction holes facilitates the implementation of septic tank desludging.

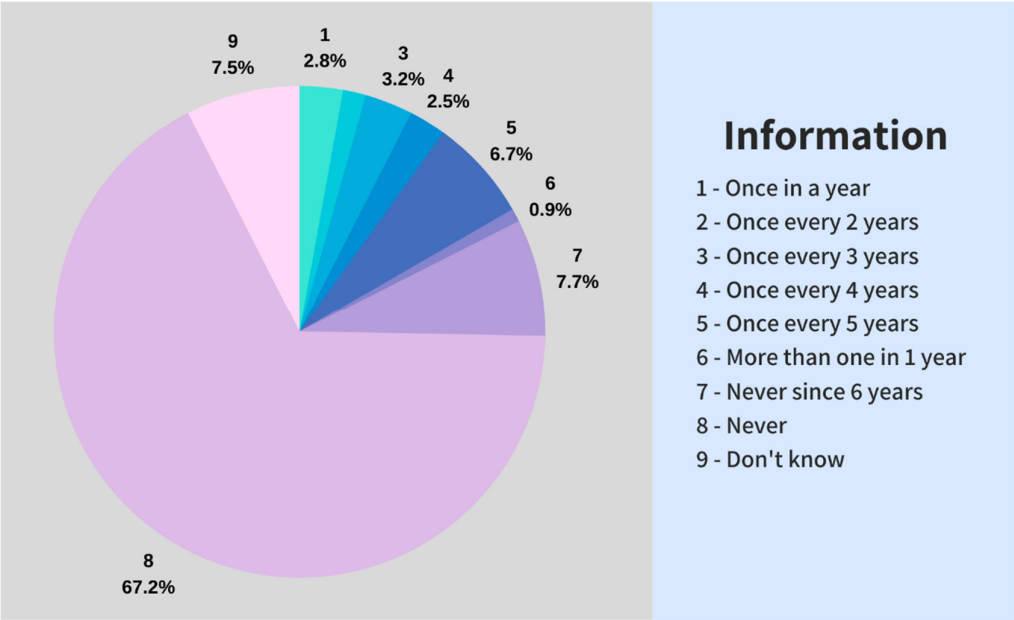

Fig. 1: Respondents desludging period in Kelurahan Pademangan Barat

Ignorance of the position of the desludging hole will require searching and dismantling the estimated location of the septic tank so that desludging can be carried out, leading to additional costs and effort in addition to desludging. The survey found that only 60.8% of respondents knew of the existence of a suction hole in their septic tank, the rest don't know. The existence of suction holes is not enough, because many suction holes are rarely or even almost never used, making it difficult to open. If the desludging hole cannot be opened, it must be dismantled so that the septic tank below can be accessed for desludging. The demolition requires additional time, money and energy outside the desludging activity. Based on the survey results obtained as much as 51.9% of respondents in the Pademangan Barat Kelurahan have septic tank suction holes that cannot be opened and only 48.1% can be opened.

Regulation Requirement

Technical requirements for septic tank systems are combined and separated systems commonly used at the household scale are for a minimum number of users of 5 people per household, detention time (td) or residence time is 2-3 days with an estimated sludge basin of 30-40 L/person/year and drainage period 2-5 years. To avoid the case of sepiteng seeped in the middle of community settlements, the Research and Development Center for Housing and Settlements, the Research and Development Agency of the Ministry of Public Works and Housing recommends a percolation test to determine the soil's absorption capacity. This needs to be done before the infiltration pipeline or well from the septic tank is built so that it can be carefully estimated the area of infiltration needed.

Sludge desludging in septic tanks which is carried out more frequently than the period of 2-5 years is generally caused by the entry of household wastewater other than feces into the septic tank, or the capacity of the septic tank is too small. Whereas desludging is carried out less often than 2-5 years generally due to damage to the septic tank so that wastewater seeps out and contaminates ground water, or the capacity of the septic tank used is too large. It can be seen (see Fig. 1) that the majority of respondents' houses or buildings in Kelurahan Pademangan Barat, which is 67.2%, have never desludged their septic tank at all. For the desludging period according to SNI, there are 13.8% of houses

or buildings in the Kelurahan Pademangan Barat that have implemented it. While the remaining 19% are still using septic tanks whose designs are not in accordance with SNI so that it requires replacement and further socialization of information about the necessity of desludging regularly in accordance with established standards.

Field studies show that the status of a house or building in Kelurahan Pademangan Barat is self-ownership so it is considered easier to do desludging compared to houses or buildings with contract, lease, and joint ownership status. Houses or buildings with contract and rental status require coordination and approval from the official owner, whereas joint ownership status requires agreement between co-residents consisting of various families and backgrounds. But in reality this is not in line with the amount of desludging. The location of the septic tank is one of the determinants of whether or not routine septic tank desludging is carried out. Septic tanks will be easily accessed if they are located in the front or yard, while septic tanks located inside the house and backyard require special effort because there is a possibility of being blocked by a room or an object.

Find out the availability and exact position of the septic tank will facilitate the implementation of desludging. Do not know the position of the desludging hole resulted in the need for searching and dismantling the estimated location of the septic tank, causing additional costs and effort in addition to desludging. USAID Indonesia in *Pedoman LLTT* (2016) announced the condition of septic tanks that are not suitable for desludging or emptying by truck units provided and the position of houses that are difficult to reach by the suction hose due to the dense living space becomes an obstacle for implementing scheduled desludging. To facilitate desludging, it is recommended to make a manhole, the aim is not only for physical control but also for routinely desludging, so that the septic tank does not need to be wrecked.

Conclusion

It can be concluded according to the research conducted, from a survey of 1,322 respondents regarding the ownership status of on-site domestic wastewater treatment namely septic tank at the research location, found that only 60.8% of respondents in Kelurahan Pademangan Barat knew of the existence of a suction hole in their septic tank, the rest don't know. The survey also shows that 51.9% of respondents have septic tank suction holes that cannot be opened and only 48.1% can be opened, so wrecking of the septic tank must be done when desludging implemented. Majority of respondent's houses or buildings in Kelurahan Pademangan Barat, which is 67.2%, have never desludged their septic tank at all. For the desludging period according to SNI, there are 13.8% of houses or buildings in the Kelurahan Pademangan Barat that have implemented it. While the remaining 19% are still using septic tanks whose designs are not in accordance with SNI so that it requires replacement and further socialization of information about the necessity of desludging regularly in accordance with established standards.

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Inter-Group Income Inequality Among Polish Households. The Theil Approach

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Abstract

The research objective of the article is to examine the extent to which various characteristics of household are related to income inequality and to verify whether the decline in overall inequality is accompanied by the decrease in inter-group inequality. The contribution of our article consists in employing recently available microdata from EU-SILC to the analysis of income inequality for three types of income. In this study, we use the Theil index and its property of being additively decomposable. The following six factors have been chosen as the possible drivers of income inequality: the type and size of the household, labour market status and educational level of the household head as well as the degree of urbanisation and region of its residence. Our results indicate that the characteristics related to the labour market are the most influential factors of income inequality in Poland. The characteristics describing the household composition contribute to the overall level of inequality but to a smaller extent. Our study also revealed that the relatively low overall inequality hides more serious income inequality between household groups.

Keywords: Income Inequality, Inter-Group Inequality, Theil Index

Introduction

The issue of income inequality that started to take shape during the economic transformation in Poland has been clearly visible after Poland's accession to EU in 2004. In 2005, Poland belonged to the EU countries with the highest income inequality. Since 2007 a gradual decrease in inequality of income before and after social transfers has been observed in Poland. Looking at these overall inequality patterns, the relative stability in the level of inequality over the past decade can be seen. This allows us to assume that inequality in Poland is not a pressing problem.

At the same time, Poland has experienced significant changes in the socio-demographic situation and stands apart when compared to the rest of the EU countries in terms of demographic changes. Poland is a country with one of the lowest total fertility rates, one of the largest increases in life expectancy, extremely intense population aging and a very large emigration abroad (Gołata and Kuropka 2016). Furthermore, a sharp increase in education attainment and a significant decrease in the unemployment rate to its lowest levels since 1991 has been observed during the last decades.

The research objective of the article is to examine the extent to which the socio-demographic characteristics of household and personal attributes could help explain income inequality in Poland. Moreover, the paper attempts to answer the following questions: does the impact of social transfers on the reduction in income inequality respond to the diminishing differences between average incomes of household subgroups? How does the inter-group inequality and the driving forces behind it vary over time? We employ a Theil decomposition to examine the impact of various factors on the level of income

inequality. The contribution of our paper consists in employing recently available microdata from EU-SILC to the analysis of income inequality for three types of income.

Studying inequality between different socio-demographic groups and its determinants is highly relevant. We focus on dimensions of inequality suggested in the existing subject literature as important sources of income inequality and social discontent. The choice of these dimensions is based on a classification of socio-demographic categories, as well as on the hypothetical characteristics of disadvantaged households described in the literature.

A study that is pretty close to our investigation is that of Papatheodorou (2000), who applied the decomposition of income inequality by subgroups of Greek household classified by characteristics such as, for instance, the type and size of the household, the occupational status and the educational level of the household head, region of residence and the degree of urbanisation. Medgyesi (2014) analysed the contribution of population characteristics (*e.g.*, education level, household composition) to income inequality and its change during the 2004-2010 period in EU countries, including Poland. He evidenced that the importance of education tends to be relatively high in EU12 countries and relatively low in EU15 Member States. Chongvilaivan and Kim (2016) and Biddle and Montaigne (2017) used decomposition analysis to study the role of the degree of urbanisation in explaining the income disparities between household groups.

Data and Methodology

In order to empirically explore the sources of income inequality, our study employs data from the EU-SILC survey conducted by Eurostat. The micro-data were obtained under a project entitled 'Income and inequality of income of European households' (RPP 162/2018-EU-SILC) and cover information about incomes achieved by individual members of Polish households in 2006, 2012 and 2018. In the first year of the study, the sample consisted of 14,914 households, *i.e.,* 45,122 individuals. For 2012 and 2018 the samples included 13,116 households (with 37,123 persons) and 15,214 households (39,922 persons), respectively.

The study reports on three concepts of income: household disposable income (abbreviated to DPI), household disposable income before social transfers except old-age benefits (abbreviated to IWB), and household disposable income before social transfers (abbreviated to IBT).

IBT consists of the sum of gross personal income components for all household members and gross income components achieved at the household level. It mainly covers earnings, incomes from self-employment, incomes from rental of a property or land as well as interests, dividends, profit from capital investments, so IBT can be identified with market income.

In comparison with IBT, IWB includes also old age benefits and survivor' benefits, while DPI covers all of the above-mentioned incomes and benefits as well as unemployment, sickness and disability benefits, education and family/children related allowances, social exclusion and housing allowances. In the study, all incomes were reduced by taxes on wealth, inter-household cash transfer paid and tax on income and social insurance contributions.

In our analysis, household is used as a unit of the study. Therefore, in order to take into account differences in the household size, all of the above-mentioned incomes were adjusted using the equivalence scales. Income was divided by the number of equivalent adults in the household, and then equivalised value was assigned to each household members. When adjusting, we used the OECD-modified equivalence scale.

All inequality measures presented in the paper were calculated using the personal cross-sectional weights thus they are equivalent to an extrapolation of the measures to the whole population.

When analysing income inequality, we assume that the inequality in a population split into groups can result from the unequal distribution of income 'between' the groups as well as from the unequal

distribution of income 'within' each group. We consider six household attributes that constituted the basis for identifying groups of households as possible drivers of income inequality, *i.e.,* the type and size of the household, the labour market status, the educational level of the household head, the degree of urbanisation, and the region of residence of the household.

Based on the household type, we have created seven household subgroups, distinguished based on the composition of the household, *i.e.,* the number of adults and dependent children.

When analysing the size of the household, we consider six subgroups separated on the basis of the number of household members - from one to six persons. Households consisting of more than six members were included in the last subgroup.

According to the EU-SILC methodology, the head of the household is a person whose income creates the dominant source of household income. Based on the personal characteristics of household head, such as the labour market status or the level of education, we have divided all households into subgroups.

Considering the prevailing source of income of a household head, we recognised the following subgroups of household:

- employees,
- the self-employed,
- the unemployed,
- retirees living on old-age benefits,
- pensioners living on survivor's and sickness benefits.
- persons living on disability benefits.

When creating subgroups of households based on the highest educational attainment of the household head, we have considered the following six levels of education: pre-primary, primary, lower secondary, upper secondary, post-secondary non-tertiary, and tertiary.

In the study, we analysed income inequality in regions identified at NUTS1 level and classified households into six groups.

In our analysis, we also take into account the degree of urbanisation of the household location area. Based on this feature, according to the EU-SILC methodology, we have distinguished households situated in a densely populated area, moderately-populated area and thinly-populated area.

To assess income inequality, our study employs the Theil coefficient, which represents a special case of the Generalised Entropy (GE) type measure. The class of GE measures can be described by the formula:

$$GE(\alpha) = \frac{1}{n(\alpha^2-\alpha)} \sum_{i=1}^{n} \left[\left(\frac{y_i}{\bar{y}} \right)^{\alpha} - 1 \right], \qquad (1)$$

where y_i is the equivalised disposable income of household i, $\bar{y}$ is the population mean income, and n is the number of households in the population. The parameter α indexes the members of the class and summarises the sensitivity of $GE(\alpha)$ to income differences in different parts of the income distribution (Cowell, 2006, p.5).

GE(α), for $\alpha = 1$, is called the Theil index. Since the expression (1) is not defined for $\alpha = 1$, because the denominator $n(\alpha^2 - \alpha)$ equals 0, the Theil index is obtained using the *de l'Hôpital rule* and can be described by the formula:

$$T = \mathrm{GE}(1) = \frac{1}{n} \sum_{i=1}^{n} \frac{y_i}{\bar{y}} ln \frac{y_i}{\bar{y}}. \qquad (2)$$

The values of the Theil index ranges between 0 and $ln(n)$, where 0 represents complete equality and $ln(n)$ points to complete inequality (Chongvilaivan and Kim, 2016, p.85).

Our choice of the Theil index is justified by two facts. Firstly, it satisfies the four main principles that any inequality metric should meet in order to be considered a reliable measure, namely: anonymity, mean independence (or income-zero-homogeneity), the principle of population replication (or population-size independence) and the Pigou-Dalton principle of transfers (Bourguignon 1979;

Shorrocks 1980, 1984). Secondly, an appealing feature of the Theil index is its property of being additively decomposable.

According to Bourguignon (1979), an inequality measure is considered to be additively decomposable if total (overall) inequality can be expressed as the sum of between groups inequality and within a group of inequality.

Assuming that all households are partitioned into *m* non-overlapping groups, the Theil index can be decomposed into the two components as follows:

$$T = \sum_{j=1}^{m} s_j T_j + \sum_{j=1}^{m} s_j \, ln\left(\frac{s_j}{p_j}\right) = T_w + \mathrm{T_b}\,, \qquad (3)$$

where s_j is the income share of a group *j* in total population income, p_j is the population share of a group *j* in total population. T_j is the Theil index corresponding to a group *j*, T_w and T_b denote within-group and between group components, respectively.

The first sum in the expression (3) measures a part of overall inequality that results from inequality within subgroups. The within-group term is a weighted average of group inequalities where the weights depend on income shares. The between-group component states the extent of inequality due to differences in the group mean income. It expresses the level of inequality that would be observed if the income of each household is replaced by the mean income of the respective subgroup. T_b can be interpreted as income inequality between the groups separated on the basis of household attributes, which comprise the total inequality, and this allows to appoint the nature of the causes of income inequality. The importance of attributes in explaining income inequality is assessed as a ratio of the inequality between subgroups to overall inequality.

Trends in Income Inequality in Poland

Our empirical analysis focuses on income inequality in Poland for the period 2006–2018. In order to present the dynamics of inequality we decided to use various proxies of income inequality: the Theil index, which is the basis measure of our analysis, the Gini coefficient, and the percentile ratio P90/P10. The Gini coefficient was chosen because it seems to be the most commonly used measure of income inequality and can easily be found in official statistics. The selection of P90/P10 ratio was determined by the fact that it describes the relation of the income of the richest households to that of the poorest. More precisely, it presents the relation of the minimum level of income attained by 10% of the richest households to the maximum level of income achieved by 10% of the poorest ones. Table 1 reports the above-mentioned inequality measures for three types of income.

Table 1: Measures of income inequality in Poland

IBT	Gini	Theil	P90/P10
2006	0.530	0.364	17.598
2012	0.475	0.284	8.238
2018	0.463	0.244	7.289
IWB			
2006	0.387	0.243	6.406
2012	0.342	0.197	4.792
2018	0.327	0.171	4.612
DPI			
2006	0.333	0.190	4.579
2012	0.309	0.169	4.001
2018	0.278	0.132	3.514

Source: Authors' own calculation using EU-SILC data.

When analysing the measures of income inequality presented in Table 1, two main conclusions can be drawn: about a regular decline in income inequality in Poland and about the equalising effect of transfers.

Firstly, all measures of income inequality reflect the trend of decreasing income inequality in subsequent years. The most striking example can be the P90/P10 ratio for IBT in 2006, when the minimum income of 10% of the richest households was almost eighteen times higher than the maximum income of 10% of the poorest. In 2012 and 2018 this relation was much lower.

The highest level of inequality was observed in IBT, mainly consisting of wages, self-employment income and capital income. This can be the confirmation of wages and self-employment income being the main source of income inequality.

Secondly, all of the measures consistently indicate that the level of inequality in Poland is decreasing when household receive further social transfers. However, it should be noticed that the equalising effect of old-age and survivors' benefits is stronger than the effect of other transfers.

Since 2007, the income inequality in Poland has been decreasing monotonically. However, it seems important to examine whether the decline in overall inequality is accorded with the decrease in inequality between groups of households.

Decomposition of income inequality by population subgroups

Decomposition of IBT inequality

This section presents and analyses the results of the decomposition of income inequality by subgroups. In the first step of our discussion of the results we focus on the inequality of equivalised disposable income before social transfers including old-age and survivor's benefits (IBT). Income IBT can be equated to market income reduced by taxes and social insurance contributions, which consists of salaries, self-employment income as well as savings, property and investment income. Therefore, the level of inequality on IBT income is shaped mainly by salaries and self-employment income inequality. As mentioned in the previous section, inequality on IBT income decreased substantially between 2006 and 2018. We observe that there has been a decrease in inequality on total IBT together with a corresponding drop in within-groups inequality (Table 2).

Table 2: Decomposition of income inequality by subgroups

		IBT		IWB		DPI	
	Year	Between group	Within-group	Between group	Within-group	Between group	Within-group
Degree of urbanisation	2006	0.02731	0.33650	0.02125	0.22215	0.01687	0.17355
	2012	0.02007	0.26442	0.01633	0.18073	0.01389	0.15482
	2018	0.01592	0.22783	0.01190	0.15909	0.00860	0.12296
Household size	2006	0.02109	0.34272	0.01651	0.22689	0,01310	0.17731
	2012	0.01461	0.26988	0.01034	0.18672	0.00876	0.15995
	2018	0.01483	0.22892	0.00929	0.16171	0.00488	0.12668
The educational level of the household head	2006	0.09228	0.27152	0.05586	0.18754	0.04657	0.14385
	2012	0.06178	0.22270	0.04263	0.15443	0.03765	0.13106
	2018	0.03782	0.20593	0.02768	0.14331	0.02238	0.10918
Household type	2006	0.02180	0.34201	0.01597	0.22743	0.01298	0.17743
	2012	0.01600	0.26849	0.00991	0.18715	0.00838	0.16034

	2018	0.01391	0.22984	0.00964	0.16136	0.00541	0.12615
The labour market status of the household head	2006	0.09241	0.27140	0.02621	0.21718	0.01089	0.17953
	2012	0.05438	0.23011	0,01301	0.18406	0.00889	0.15983
	2018	0.04595	0.19780	0.01397	0.15702	0.01141	0.12014
Region of residence	2006	0.01014	0.35367	0.00713	0.23627	0.00512	0.18529
	2012	0.00406	0.28042	0.00319	0.19387	0.00265	0.16607
	2018	0.00647	0.23729	0.00422	0.16677	0.00338	0.12817

Source: Authors' own calculation using EU-SILC data.

The main causes of income inequality were the educational level of the household head and the labour market status of the household head. Between 2006 and 2018 the ratio of the inequality between subgroups to overall inequality decreased in both cases from 25.4% to 15.5% and from 25.4% to 18.9%, respectively (Figure 1). Our research shows that there is a positive correlation between the level of education of the household head and the level of household income. The fall of the effect of differences in household income based on the education level of household head resulted, among others, from the rising education level of Poles. Likewise, the fall of the effect of differences in household income based on the labour market status of the household head resulted, among others, from the decrease in the unemployment rate. Out of the six analysed factors, income inequality due to the labour market status of the household head contributed most significantly to overall IBT inequality in 2018.

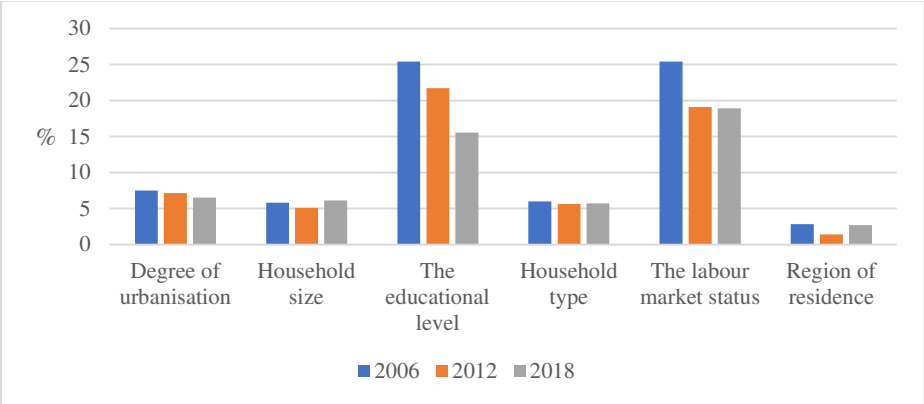

Fig. 1: The ratio of inequality between subgroups to overall IWT inequality
Source: Authors' own calculation using EU-SILC data.

Chongvilaivan and Kim (2016) suggest that the urban versus rural income inequality is central to the debates on increases in income inequality. In Poland, as can be seen in Table 2, the degree of urbanisation had some importance. The breakdown by degree of urbanisation produced somewhat identical results in the years 2006-2018. This factor explained roughly 7.5–6.5 % of overall income inequality.

The household size and household type are further demographic variables used in this study. The share of the inequality between subgroups in total inequality was equal to 5.1% - 6.1% and 5.6% - 6.0%, respectively. This appears to indicate that, the type and size of household were less significant. As shown by the differences of the above mentioned characteristics between the analysed years, the basic pattern of the contribution of household size and household type remained unchanged.

Intuitively, economic inequality among different regions may serve as a driving force of income inequality. The central region in Poland tends to experience a faster pace of economic and social development. However, our results show that differences in income between households in different regions of residence contributed insignificant to the overall inequality and it is of negligible importance

in Poland. Only about 1.4-2.8% of the income inequality can be explained by the location of the household.

Decomposition of IWB Inequality

In the second step, the study covers six variables for different social and demographic household characteristics with a possible influence on IWB inequality. Table 2 and Figure 2 show how between groups inequality, within a group inequality and total inequality changed over the 2006-2018 period for total disposable household income before social transfers other than old-age and survivor's benefits.

Differences in the level of education had the highest impact on the extent of IWB inequality during the 2006-2018 period. The level of education of the household head was particularly important in 2006, where it accounted for around one fourth of overall inequality. It should be highlighted that the addition of old age and survivor's benefits to IBT did not reduce the ratio of the inequality between subgroups to overall inequality. This is due to the fact that the level of education affects not only labour income but also pensions.

The labour market status of the household head contributed to the overall inequality to a smaller extent than education attainment during the period 2006-2018 (Figure 2). The addition of old-age and survivor's benefits to IBT significantly reduced the effect of differences in household income based on the labour market status. In 2006 the labour market status of the household head accounted for 10.8% of overall IWB inequality. Our results showed that 93.4% and 91.8% of inequality, in 2012 and 2018 respectively, could be explained by within-groups disparities, while the rest could be attributed to differences between groups.

The income sources related to the degree of urbanisation were quite significant determinants of household income inequality. Between 2006 and 2018 the degree of urbanisation accounted for 7.0%-8.7% of the overall IWB inequality and this effect was larger than the effect on IBT's distribution. It can be discerned that the average annual pension in the urban areas was higher than that in the rural territories. Therefore, the inclusion of old-age and survivor's benefits did not diminish the ratio of the inequality between subgroups to overall inequality.

As for household structure, it had a minor impact. For the household size and household type the results are less impressive and similar to the obtained ones for the previous decomposition. More specifically, the observed inequality comes overwhelmingly (from 93.2% to 94.8%) from heterogeneity within the groups based on the household size and from 5.0% to 6.6% of the overall inequality can be attributed to the differences in the type of the households. It is also interesting to note that the inclusion of old-age and survivor's benefits did not change the ratio of the inequality between subgroups to overall IWB inequality.

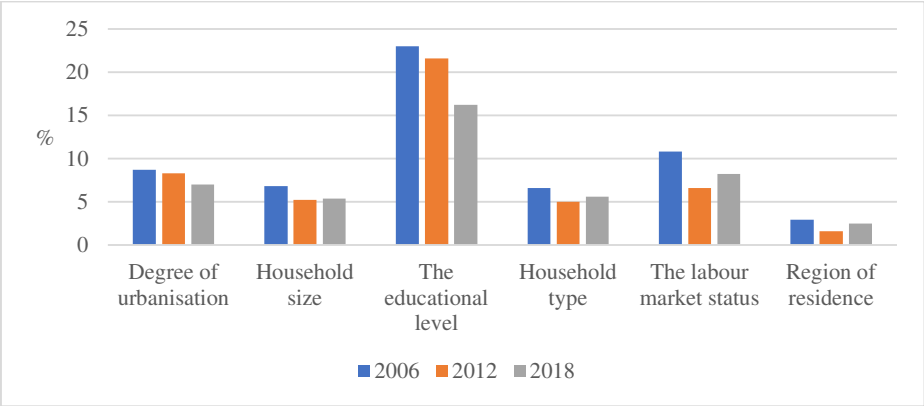

Fig. 2: The ratio of inequality between subgroups to overall IWB inequality
Source: Authors' own calculation using EU-SILC data.

As in the case of decomposing IBT inequality, the region of residence factor was the least significant in explaining IWB inequality. The decomposition of the Theil indices by region of residence predicts that the contribution of region inequality to IWB inequality was low since the between-group component constituted merely 1.6% and 2.9% of overall income inequality.

Decomposition of DPI Inequality

In the next step we investigate whether the inclusion of social transfers (*e.g.,* unemployment benefits, family/children related allowances, housing allowances, sickness and disability benefits) changed the fraction of total inequality that results from the differences between average incomes of different subgroups of households. In order to evaluate the impact of different household characteristics we decomposed the Theil index of equivalised disposable income (DPI).

As with the two previous types of income, the main cause of income inequality concerned the educational level of the household head (Figure 3). The between-group component attributed to 17.0%-24.5% of the observed inequality in differences in household income based on the education level of household head, which is larger than what we obtained for the two previous decompositions. Social transfers reduce market income inequality, but the Theil gap is not enough to explain income redistribution since it says little about the extent to which social transfers accrue to the least affluent households. Not all kinds of social transfers (*e.g.,* family/children related allowances) accrue to the low-income households headed by a person with a lower level of education.

The degree of urbanisation was the next significant household characteristic related to income inequality. The evidence reveals that between 2006 and 2018, the impact of degree of urbanisation on DPI inequality diminished from 8.9% to 6.5%. The decline in the inequality within the subgroups distinguished based on the degree of urbanisation coincided with the reduction in inequality between the subgroups. It is also interesting to note that the ratio of the inequality between subgroups to overall inequality increased as a result of the inclusion of social transfers in household income.

The inclusion of social transfers significantly reduced the differences in income between subgroups distinguished on the labour market status of the household head. Between 2006 and 2018 the differences in income between subgroups accounted for from 5.7% to 8.7% of overall DPI inequality. It is also clear that inter-groups inequality contributed less to total inequality when looking at equivalised household income (DPI) than at disposable household income before social transfers (IBT and IWB). The decrease in the ratio of the inequality between subgroups to overall DPI inequality makes sense since social transfers such as unemployment benefits and disability benefits accrue to the poorer households.

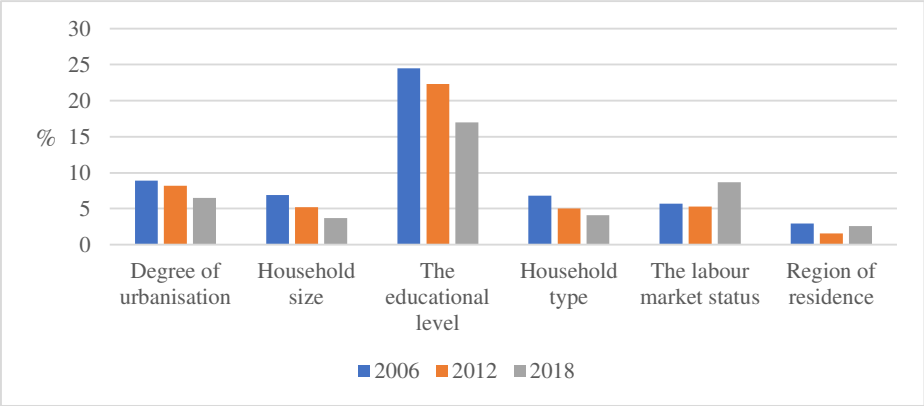

Fig. 3: The ratio of inequality between subgroups to overall DPI inequality

Source: Authors' own calculation using EU-SILC data.

The breakdowns by household size and household type produced the somewhat identical results. Between 2006 and 2018, the contribution of differences in the household size and household type to overall DPI inequality decreased monotonically from 6.6% to 3.7% and from 6.8% to 4.1%, respectively. Moreover, the inclusion of social transfers had an equalising effect on the differences in income between the subgroups distinguished based on the household size factor in 2018. The ratio of the inequality between subgroups to overall IBT inequality was equal 6.1%, while the ratio of the inequality between subgroups to overall DPI inequality was equal to 3.7%. This result points to the likelihood that the differences in income between subgroups decreased as a result of the additional transfers of family benefits (*e.g.,* The 'Family 500+' programme).

Evidence suggests that between 2006 and 2018 there were no significant differences between average incomes of different subgroups of households based on the region of residence factor. The observed DPI inequality came overwhelmingly (97.1%-98.4%) from heterogeneity within the subgroups; the between-component accounted for a modest part (1.6%-2.9%) of the total. This finding points to the relatively limited contribution of the region of residence dimension to overall DPI inequality.

Conclusions

Previous studies, which analysed the distribution of income inequality in Poland, most often concerned only one type of income. In this article, we made use of the additively decomposable nature of the Theil index and recently available detailed survey data to look at to analyse how different social and demographic factors are related to the extent of income inequality for three income types. Old-age and survivors' benefits as well as social transfers decrease income inequality. Our intention was to verify whether the equalising effect of transfers corresponds to the diminishing differences between average incomes of household subgroups.

IBT inequality decreased significantly between 2006 and 2018 when measured by the Theil index and by the Gini coefficient. The educational level of the household head was the main cause of IBT inequality during the 2006-2018 period. This conclusion is clearly in line with theoretical (see, for instance, Green *et. al.* 2016) and empirical research regarding the existence of important differences between average incomes of education subgroups (Muszyńska and Wędrowska 2018), (Medgyesi 2014). Income gaps between different education groups narrowed in the years 2006-2018 but the income inequality among households within each education groups increased. The labour market status of the household head also played a greater-than-average role in shaping the level of inequality. However the contribution of differences in this factor to overall income inequality decreased in 2012 and 2018 compared to 2006.

IWB inequality decreased between 2006 and 2018. Therefore, the decline in within-group inequality was an expected result, since the inclusion of old-age and survivor's benefits had an equalising effect on income distribution. While within-group inequality declined, inter-group inequality also decreased, however the change in the within-group inequality was much larger in magnitude than the change in the inter-group inequality. Studies analysing the impact of benefit instruments on the reduction in income inequality find that public pensions are responsible for most of the reduction in income inequality (Fuest *et. al.* 2010), (Amarante 2016). However, the inclusion of old-age and survivor's benefits reduced the ratio of the inequality between subgroups to overall IWB inequality only for the subgroups identified based on the labour market status of the household head.

Social transfers such as unemployment benefits, family/children related allowances, housing allowances, sickness and disability benefits constitute an important source of household income inequality reduction. The most striking result to emerge from our study is that the inclusion of social transfers had an equalising effect on the differences in income between the subgroups identified based on the size and type of household in 2018. The addition of social transfers to IWB income significantly reduced the effect of differences in household income based on the labour market status in 2006. The differences in the level of education had the largest impact on the extent of DPI inequality. Green (2016, p.34) suggests that a key difference between a low- and higher-income household may be the extent to which they value education.

In conclusion, between 2006 and 2018 the dispersion of salaries and self-employment income as well as disposable income inequality declined in Poland. However, the relatively low overall inequality hides more serious income inequality between various social and demographic groups.

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Integrated Approach to Risk Analysis and Mitigation in Polish Construction Industry Capital Groups

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Abstract

The main objective of this study was to identify factors influencing the effectiveness of application of the integrated approach to risk analysis and mitigation, the so-called GRC (Governance, Risk management, Compliance) and to assess the degree of preparation of Polish construction companies to implement this approach. In the research, an idiographic approach, a case study procedure, were used. The analysis was carried out on the two largest Polish capital groups in the construction sector, BUDIMEX and UNIBEP. The carried out case studies made it possible to describe the practices applied by construction companies which are important for the effectiveness of the GRC. These practices were shown in five groups of factors, such as: corporate policies and procedures/supervision, communication and training, ethical organizational culture, responding to and preventing future incidents, risk management. The research shows that although BUDIMEX and UNIBEP's approaches to the GRC differ in several respects (BUDIMEX shows greater diligence in fraud prevention), in general the degree of preparedness of both groups to implement the GRC can be considered as satisfactory.

Keywords: Risk Management, Compliance, Construction Industry, Governance.

Introduction

Nowadays, it is hard to disagree with the viewpoint that any organization that cares about achieving its goals and building a competitive advantage must pay attention to the needs and expectations of its stakeholders, respond flexibly to changes in the environment, create an effective system of internal and external communication and set the boundaries of its operations. These boundaries will be determined not only by the external regulations, established by the state, international institutions (e.g. the European Union) or trade associations, but also by internal regulations in the form of policies, procedures, a set of key standards and values, often included in codes of conduct. Moreover, it should also consider the risks and uncertainties that can be a source of both business losses and benefits. The concept that integrates all these aspects is GRC (Governance, Risk management, Compliance).

The main objective of this study was to identify factors influencing the effectiveness of application of the integrated approach to risk analysis and mitigation in a company (GRC) and to assess the degree of preparation of Polish construction companies to implement this approach. In the study, the idiographic approach and case study procedure were used. The analysis was carried out on the two largest capital groups in the Polish construction sector whose parent companies are listed on the Warsaw Stock Exchange and included in the WIG-Budownictwo Index. The choice of the qualitative approach was dictated by the intention not only to state the fact of occurrence but also a synthetic description of selected practices, important for the effectiveness of GRC.

The essence and conditions for the effectiveness of the GRC approach - literature review

Until recently, a silo approach to management, risk and compliance activities prevailed, which, as a result of their considerable dispersion within the organization, negatively affected the transparency and effectiveness of the decision-making process (Vicente, Mira da Silva 2011). Nowadays, the need to integrate these three functions is increasingly recognized, due to their strong interdependence. This is the birth of the GRC, which is an integrated approach focused on risk analysis and mitigation in

line with internal and external regulatory requirements (Salido, Voon 2010). According to N. Racz et al. (2011) the GRC is a holistic approach to governance, risk and compliance across the organization, ensuring that the organization acts ethically and in accordance with its risk appetite, internal policies and external regulations . The Open Compliance and Ethics Group - OCEG (2009) defines the GRC as a system of people, processes and technologies that enables an organization to: understand and prioritise stakeholder expectations; set business objectives that are consistent with values and risks; achieve objectives while optimizing its risk profile and protecting values; operate within the boundaries of external and internal, legal, social and ethical regulations; provide relevant, reliable and timely information to relevant stakeholders. As C.S. Switzer and his team (2015) rightly concluded, the GRC provides the right people with the right information at the right time, the right goals are set and the right actions are taken, including controlling activities, necessary to solve the problem of fraudulent behavior.

For the GRC to live up to its hopes, appropriate conditions must be created. Thus, people who are responsible for compliance management should be able to participate in the development of the strategy of action. All members of the organization, regardless of their position in the organizational structure, should be aware of the importance of applying not only the relevant legal standards but also ethical criteria in the decision-making process. McNulty (2007) believes it is necessary to establish corporate governance mechanisms, such as independent audits of corporate activities, and to design an information and reporting system that provides management with timely and accurate information sufficient to make informed decisions about the organization's compliance.

Table 1: Factors affecting the effectiveness of the GRC

Factors affecting the effectiveness of the GRC	Description
Policies and procedures/corporate governance	written policies and procedures to prevent and deter fraud; they should provide guidance to staff on how to deal with potential compliance problems, the process of communicating and reporting compliance issues and the conduct of investigations by regulators; they may take the form of codes of conduct;
Communication and training	regular communication of standards and procedures throughout the organization; regular training and evaluation of their results through e.g. knowledge testing
Ethical organizational culture	placing ethics at the centre of the organization; fraud is not tolerated; whistleblowers will not be punished; risks are systematically reduced by established controls; promotion of an ethical organizational culture
Responding to and preventing future incidents	Update rules to prevent abuse on an ongoing basis; document procedures to prevent, detect and respond effectively to incidents; review incidents and threats and develop corrective action plans; having suitably qualified human resources (e.g. compliance officer, compliance team), technical resources (e.g. GRC software, confidential internal reporting of breaches of compliance in the form of a staff hotline)
Risk management	identifying regulations that affect the organization; reviewing internal policies and procedures; identifying, analyzing and monitoring risks with the approval and support of senior management

Source: Own study based on (McNulty 2007), (Mulugeta 2016)

The analysis of the literature on the subject, in particular B.M. Mulugeta (2016) and McNulty's (2007) studies on the effectiveness of compliance management systems, allowed the author of this study to create a reference list of five groups of factors which, in her opinion, are of key importance for ensuring the effectiveness of GRC. These will be: appropriate corporate policies and procedures/supervision, communication and training, an ethical organizational culture, responding to and preventing incidents in the future (including having the resources to exercise due diligence in preventing and detecting misconduct) and risk management (Table 1). This list was used by the authors as a reference point in the process of collecting and analyzing empirical data.

Own Research Methodology

The research was conducted in January and February 2020. The largest Polish capital groups from the construction industry in terms of revenues were selected for the research. The selection of entities was based on Deloitte's report (2019) "Polish Construction Companies 2019 - the most important players, key growth factors and prospects for the industry". It seems that the top players in terms of capitalization and revenues, and in addition the listed companies, will be particularly well placed to apply the GRC approach effectively. The basis for such an assumption is the observation that they have adequate resources (human, material, financial and informational) to invest in mechanisms for this effectiveness. What is more, the growing number of regulations to which they are subject and the transparency of their activities, resulting from information obligations, provide a strong incentive to respect both legal obligations and the so-called soft low in the form of various self-regulatory solutions.

The research was carried out in two main stages. The first stage consisted of in-depth studies of the literature in order to identify the key factors of GRC effectiveness. In the second stage, the content of the 2018 reports was analyzed. These were management reports on the activities of BUDIMEX and UNIBEP groups, BUDIMEX's integrated report and UNIBEP group's sustainability report.

The rationale for undertaking the research was to see a research gap. Most studies currently available focus on one of the three functions of the GRC, without showing systemic interdependencies between them. Moreover, the analysis of the literature on the subject has revealed a deficit of industry analyses concerning the GRC, in particular those devoted to the construction industry. Existing analyses usually concern the financial and IT sector, while construction is of great importance for the development of the economy. In Poland, the direct and indirect impact of the activity of the building materials sector accounts for 3.5% of GDP, and in the case of construction services it is even 16.8%. Almost every fifth working Pole finds employment thanks to the construction sector. The total impact of the construction materials and services sector creates 20.3% of GDP and almost 2.6 million jobs (Deloitte 2016).

Problems of The Construction Industry in Poland

Construction in Poland is very fragmented. The engineering construction industry is dominated by large companies, while the majority of construction works on the specialist construction market (plumbing, electrical works, etc.) are performed by companies with less than 9 employees. According to EMIS Company Database (2018), the sales of the 10 largest companies in this sector in 2016 accounted for just under 17% of the sector's sales. In the non-residential construction sector, several large entities such as BUDIMEX, Strabag, Skanska, PORR, ERBUD and UNIBEP (Deloitte 2019) dominate. WIG Budownictwo, one of the Warsaw Stock Exchange's largest construction companies indexes, has been in a downward trend for over a year. Decreases do not only apply to those companies which have a diversified business profile or are suppliers of construction materials. There are many reasons for this. One of them is the mismatch between the tender system and the changing market situation. Large construction companies, which are faced with a tender for a construction that will last several years, usually bear the risk of an increase in the cost of labour and construction materials and, as a result, a reduction in the final margin realized on the contract.

Undoubtedly, the indexation system, i.e. the dependence of payments on changing market conditions, could be a security for their interests; however, in the Polish conditions, it is not very widespread. Another problem is the lack of qualified employees. Problems with obtaining employees translate into an increased risk of delays in the execution of construction contracts. The Polish Association of Construction Industry Employers drew attention to such problems that afflict the construction industry in Poland as the growing reluctance of financial institutions to provide construction guarantees, lack of postponement - record-breaking since 2012. - The Polish Association of Construction Industry Employers pointed to such problems as the growing reluctance of financial institutions to provide construction guarantees, the lack of translation of the record-breaking revenues into increased profitability of enterprises and problems with financial liquidity or payment bottlenecks (Rozkrut, Kowalczyk, Boguszewski 2020).

The construction market in Poland is regulated in quite a detailed way. In the opinion of the companies that operate on it, the legal regulations that apply to it are often ambiguous, which leads to their different interpretation. The amendments to the Construction Law and to the Act on Planning and Spatial Development, which were announced for a long time and were supposed to speed up and facilitate the execution of construction investments, have not been implemented. At the same time, new regulations have appeared recently, which made it difficult for some construction companies to operate. These include, among others, payments in the split payment system (the so-called split payment mechanism - MPP), Employee Capital Programmes, which generate additional costs or an increase in the minimum wage in 2020.

The Results of Surveys

Budimex Group

The identification of factors affecting the effectiveness of GRC in the BUDIMEX Group was carried out on the basis of the Report of Activities for 2018 (*Sprawozdanie zarządu z działalności 2018 Budimex*) and the Integrated Report for 2018 (*Budimex zmieniaj świat. Zintegrowany Raport Roczny 2018 Budimex*) in GRI Standards version, verified by an independent auditor.

Policies and Procedures / Corporate Governance

The key areas for the group are: life and health protection, ethical behavior, environmental protection and energy performance improvement, high quality of works and services, responsible information and prudent decision making, integration of management systems. The BUDIMEX Group and its member companies operate on the basis of the Integrated Management System, consisting of the following standards and certificates: PN-ISO 26000: 2012 - Social and environmental responsibility management system in the company; ISO 9001:2015 - quality management system; ISO 14001:2015 - environmental management system; PN-N-18001:2004 and OHSAS 18000:2007 - occupational health and safety management system; ISO/IEC 27007:2013 - information security management system; AQAP 2011: 2009 - Quality management system; SO 50001 - Energy management system; ISO 10001 - Management system for codes of conduct related to customer satisfaction; ISO 20000-1 - IT services quality management system; NCAGE2 - NATO Commercial and Government Entity - awarded to entities whose activities are related to the range of defense products or services.

The following policies have been implemented in the BUDIMEX Group: risk management policy, anti-corruption policy and anti-monopoly policy, which are binding in all companies. The strategic approach to corporate social responsibility is defined in the responsibility policy and CSR strategy.

Communication and Training

All information about the Code of Ethics and Compliance Policy is available on the BUDIMEX Group's BUDIMEX intranet. Each new employee of the Group is familiarized with the Code of Ethics as part of the introduction, and since 2016, ethics has been an element of cyclical trainings for employees.

The Group applies the principle of conducting dialogue in a decentralized manner, which means that direct relations with stakeholders prevail. The frequency of contact depends on the nature of a given group and its needs. Communication channels with stakeholders are adjusted to a given target group. These include supplier surveys, meetings and conferences, social media, chat bot, social projects, participation in external initiatives, e.g. Agreement for Safety in Construction. The Communication Department and Press Spokesman and the Strategic Analysis Office are responsible for dialogue with the external environment. All employees will familiarize themselves with the applicable anti-corruption procedures during regular trainings.

Ethical Organizational Culture

BUDIMEX's mission is to carry out construction investments - including real estate development projects - in a manner worthy of the market leader, with respect for the natural environment and principles of ethics, care for customer satisfaction and user comfort, which the company wants to achieve thanks to professionalism and passion for building, high efficiency of operation, as well as partnership relations with suppliers and subcontractors. The key values of the group include: ethics, cooperation, responsibility and ambition. BUDIMEX operates under conditions of extended responsibility. When concluding a cooperation agreement, each contractor of the BUDIMEX Group is obliged to comply with: occupational health and safety requirements, environmental protection requirements and the "Code of Conduct for Contractors". During the cooperation, constant monitoring of subcontractors is carried out, and finally a summary evaluation takes place.

The BUDIMEX Group is bound by the Code of Ethics and the compliance policy is implemented. The main principles of this policy are: respect for the law, ethics and honesty in the conduct of business, transparency of the activities of the companies in the Group, zero tolerance for activities that do not comply with the applicable law or the Compliance System. As part of its efforts to promote diversity, in November 2016 the BUDIMEX Group signed the Diversity Charter. For many years, BUDIMEX has been a signatory to the "Agreement for Safety in the Construction Industry", whose mission is to reduce the number of accidents on construction sites by promoting a safety culture, raising awareness of the dangers associated with work on the site and preventing risks and accidents.

Responding to And Preventing Future Incidents

All employees of the BUDIMEX Group have access to information and tools enabling them to report violations of the Code of Ethics or Compliance Policy. The report can be made in person or anonymously, in writing, by e-mail. Everyone is assured of the lack of professional consequences related to the fact of reporting. Employees also have an emergency phone at their disposal. Upon detection of irregularities, they immediately take corrective action. The implementation of the IMS Policy, as well as other policies, procedures and processes, are subject to regular external audits from the economic, social and environmental point of view, so that their effectiveness can be continuously monitored. Annual internal audits are also carried out by the so-called internal auditors - employees of the BUDIMEX Group, with appropriate competences and experience. Each time internal audits are additionally confirmed by an external audit.

The Ethics Committee is responsible for compliance with the Code of Ethics and monitoring the compliance of the standards of professional ethics with the Code of Ethics. Each year the Ethics Committee prepares a report on its activities, which is then forwarded to the Management Board and the Audit Committee of the Supervisory Board. The Internal Audit Office is responsible for identifying and analyzing risks in the Group and preventing factors that cause them. The role of the Office is also to take preventive measures and build awareness of BUDIMEX employees about the risk itself and the actions that may lead to it. The correct application of the Compliance Policy is supervised by the Chief Compliance Officer appointed for this purpose by the Management Board of the Company, the Deputy Compliance Coordinator and the Compliance Committee established at the request of the Compliance Coordinator. It consists of representatives of each organizational division of the Company. The CSR Committee is responsible for the implementation of the principles of corporate responsibility, consisting of representatives of the Company's Management Board and representatives of organizational units.

Risk Management

The companies of the BUDIMEX Group providing construction services monitor technical, organizational, legal and financial risks related to the planning and current progress of works on individual contracts. The business model and its implementation are related to business risks which have been defined for each of the six capitals (financial, human, organizational, intellectual, social

and natural capital). In order to eliminate the risk in the management area, the Group's parent company - BUDIMEX Co. - uses a set of corporate governance principles entitled "The Corporate Governance of the Group". "This set of rules defines, among others, the principles of information and communication policy with investors, internal systems and functions, relations with shareholders. As part of risk monitoring in the supply chain, BUDIMEX audits its subcontractors.

The UNIBEP Group

The identification of factors affecting the effectiveness of the GRC in UNIBEP Group was carried out on the basis of the 2018 Activity Report (*Sprawozdanie zarządu z działalności 2018 UNIBEP*) and the 2018 Sustainability Report (*Raport zrównoważonego rozwoju 2018 UNIBEP*). This report was prepared in accordance with GRI guidelines in the core version. It was verified internally by the Company's Management Board and individual organizational units directly involved in its preparation. The report was not subjected to the external verification.

Policies and Procedures/Corporate Governance

Priority areas of interest for UNIBEP Co. are: customer needs, employee competence, work safety, environmental protection, compliance with applicable laws and ethical standards and cooperation with the local environment. The UNIBEP Group manages its environmental aspects, occupational safety, quality of construction works and manufactured construction products using the Integrated Management System including ISO 14001, OHSAS 18001, ISO 9001 and PN-EN 13108-21. Seven procedures of conduct in the area of occupational health and safety have been introduced within the IMS. These procedures are defining roles and responsibilities and the manner of conduct in the area of occupational risk assessment at workstations, accidents and potential accidents, employee prophylaxis, occupational health and safety training, occupational diseases, and assessment of compliance with legal regulations in the area of health and safety. The Group has an environmental declaration stating that UNIBEP Co. not only meets the legal requirements but also takes additional voluntary actions to minimize its impact on the environment. In order to create and maintain a comprehensive and effective risk management system, UNIBEP applies a Risk Management Policy.

Communication and Training

In 2018, nine trainings on environmental issues were conducted. These were both practical training courses, such as environmental simulations, as well as theoretical training related to the implementation of ISO 14001. There is an internal intranet in the group, where all the necessary pieces information about the current activities of the company are posted and a quarterly magazine entitled "The environmental simulations" is published. The quarterly "Uniwieści", in which news related to the current activity of the company, are posted, profiles of employees are presented, reports from company events are described, etc. The periodical is available in paper and digital versions. All members of the management bodies of the UNIBEP Group have been informed and trained on anti-corruption procedures and responsibilities. Each newly hired employee is required to pass the e-learning training and become familiar with the applicable regulations. Procedures, internal regulations and the most important health and safety documents are posted on unibep.net.

Ethical Organizational Culture

UNIBEP has a document called „A Community of Principles and Objectives" document which defines the identity of the group and its three main values (which indicate specific values). These values are knowledge (specific values are professionalism, quality and openness), passion (specific values are commitment, pride, courage and consideration) and trust (specific values are teamwork, responsibility, society). Each newly hired employee signs a commitment to comply with the rules and procedures in force in the UNIBEP Group, including a declaration of respect for human rights. A policy of partnership has been developed in the management of subcontractors. All contracts (100% of construction sites) are monitored on an ongoing basis for proper implementation, including the risk

of corruption. The progress of construction works is monitored on a monthly, bi-weekly or sometimes weekly basis. Training courses are conducted, during which procedures and internal instructions are discussed. So far, the Group has not developed a formalized diversity policy document, nor does it have a code of ethics. UNIBEP is a signatory of the "Agreement for Safety in Construction".

Responding to And Preventing Future Incidents

In the case of sudden environmental incidents, an appropriate procedure is launched, which verifies the environmental aspects of a given activity and immediate remedial and corrective actions are taken in order to avoid future environmental incidents. The buildings are controlled by external bodies, including the Voivodship Inspectorate of Environmental Protection, the Municipal Guard, and the Municipal Offices. During the inspection, the person representing the company is the Site Manager, who is in possession of relevant environmental documentation. In case of any infringements, immediate actions are taken in order to comply with the recommendations of the inspection body. The employees of the Audit and Internal Control Office continuously verify the IMS by performing audits and internal controls according to annual plans. IMS is also periodically reviewed by top management. As part of the Integrated Management System, the group carries out monitoring of non-conformity and corrective actions.

Risk Management

In order to systematize and facilitate the risk management process, areas for which separate risk registers and maps have been created and maintained have been defined. These are: offering, production, bituminous mixtures, house production, IT, finance and accounting, legal team, export, purchasing and logistics, HR, quality and health and safety and warranty service. In UNIBEP cyclical risk reviews are held using the following risk identification techniques: review of existing risk registers for a given area, analysis of the course of internal organizational processes on the basis of previously prepared descriptions and process maps, analysis of information and reports on events that occurred in the past. Current risk identification is performed by all UNIBEP employees regardless of their position in the organizational structure and function. They identify internal and external factors of the nature of threats or opportunities that may significantly affect the possibility of achieving the set goals.

The Conclusions of The Study

The research shows that both capital groups consider safety at work, compliance with law and ethics and environmental protection as their priority. This is evidenced by their integrated management systems, which include standards of effective management of the social and environmental responsibility of the company. Both groups have written policies and procedures aimed at preventing abuse, and maintain an open dialogue with internal and external stakeholders using modern information and communication technologies (social media, intranet, web portals). Senior management exercises appropriate oversight of compliance and attaches great importance to identifying and meeting the needs and expectations of key stakeholders. Both BUDIMEX and UNIBEP define the key risks and then monitor them. They introduce systemic solutions in the field of occupational health and safety and conduct intensive training activities in this area. They also develop an ethical organizational culture by defining clear and explicit ethical principles, setting the framework for fair and responsible behavior of all their members.

What makes them different is the extent of the responsibilities they assume, the approach to the institutionalization of management ethics and the type of audits carried out. Thus, responsibility at BUDIMEX is extended, i.e. it includes not only subsidiaries but also external suppliers and sub-suppliers. This demonstrates the responsible management of the supply chain by BUDIMEX. The responsibility practiced in UNIBEP has the characteristics of direct responsibility, covering mainly subsidiaries. BUDIMEX has a CSR policy and strategy, a code of ethics, a compliance and diversity policy. UNIBEP has not yet developed such documents. Only BUDIMEX has a practice of confirming internal audits with external audits. Conducting an independent external evaluation gives

it the opportunity to verify the compliance of the internal audit function not only with international and national standards and recommendations, but also with best market practices. What distinguishes BUDIMEX is also the establishment of numerous committees (Ethics Committee, Audit Committee, CSR Committee, and Compliance Committee) to develop awareness of the importance of compliance and prevent any abuse.

Summary

The conducted case studies made it possible to describe the practices applied by large Polish construction companies, important from the point of view of GRC effectiveness. These practices were shown in five groups of factors, such as: corporate policies and procedures/supervision, communication and training, ethical organizational culture, responding to and preventing future incidents, risk management. The research shows that although the approaches to the GRC of BUDIMEX and UNIBEP differ in several aspects (BUDIMEX shows greater diligence in fraud prevention), in general the degree of preparedness of both groups to implement the GRC can be considered satisfactory. Their solutions can provide a solid foundation for the effective implementation of an integrated approach to risk analysis and mitigation. What they have in common is a specific culture of responsibility, whereby the achievement of business objectives respects the limits set by law and ethical standards.

The author is aware of the limitations of the empirical research. These include, for example, the static nature of the conducted analyses, which does not allow to identify trends in time appropriate for the groups or industries under investigation. Moreover, due to the fact that the research covered only two largest construction groups, generalization of conclusions for the entire industry, in particular for the SME sector, might be taken as a serious abuse. Moreover, the fact that the parent companies of the analyzed groups are public companies certainly influenced the nature of applied practices in the GRC area. The use of the GRC approach by companies from other industries and sectors could be a further aim and direction of the future research. An interesting area of exploration seems to be the set of similarities and differences in approach to GRC between construction industry players and financial sector companies.

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Place and Role of Controlling in A Business Unit - Didactic Approach

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Abstract

The aim of the research presented in the article was to develop a new approach to the implementation of the topic "The role and place of controlling in a business unit" in the classes about controlling implemented at economic universities in Poland. During the lecture, as well as computer exercises, students were presented with various aspects related to controlling that are important for the functioning of the enterprise's information system. The presentation uses a simple and short example of the task of allocating costs in a construction and service enterprise. Based on the example, the following issues were presented: cooperation between controlling and accounting services in the field of building cost recording systems, the process of analysing and reporting cost data, the role of controlling in modifications of the organisational structure and cost objects (including cost centres), support by controlling accounting services in cost allocation for cost objects, and improvement of accounting and accounting processes. The example and its solution were implemented into the spreadsheet environment. To assess the adopted approach, there was employed a questionnaire whose task was to determine the degree of mastery of the issues presented, as well as opinions on the form of conducting classes and the presentation of content. Based on the results of the survey, it was possible to confirm the thesis stating that the issue of the place and role of controlling in a business unit can be effectively presented using the example of cost calculation and computer techniques.

Keywords: controlling, the role and place of controlling in business, teaching at economic universities.

Introduction

Controlling is one of the concepts supporting the management of an enterprise. According to Szychta and Dobroszek (2017), "the concept of controlling is ambiguously interpreted, and for a synthetic expression of what controlling is, there are used terms such as 'management system', 'management subsystem', 'management method', 'management tool', 'management model', 'supra-functional management instrument', 'element of the management system', 'management support system', 'control process', 'coordination system'." Due to the scope of the issues of this study, its authors propose to assume that controlling is the same as the concept of management accounting. Its origin dates back to distant times. According to Nesterak, the basics of controlling date back to the 15th century (Nesterak 2002). Due to the dynamically changing environment and current trends in the global economy, controlling tools still constitute significant support for the management. This tendency may be manifested by a considerable interest in programs of studies / specialisations related to supporting the management process.

Teaching controlling at the higher education level takes place for full-time and part-time studies at all levels: bachelor's, master's and post-graduate. Due to the links between controlling and accounting, finance, management and economics, the main area of interest for the authors of this study is the educational process taking place at Polish economic universities. Syllabuses of subjects related to controlling contain various issues implemented in auditoriums and computer laboratories. The analysis of the content, the taught forms and hourly dimensions of these syllabuses became a reason to pose a research question regarding the ways and possibilities of improving the educational process of controlling at Polish economic universities.

A number of students have difficulties in grasping the concepts of controlling. This paper assumes that it is not the subject matter that is dry, but rather the methods in which controlling fundamentals are usually presented. Departing from traditional approaches such as standard lectures and engaging computer-based learning environments can result in a higher level of students' understanding of the subject. Presenting controlling principles with the use of computer simulations can help demonstrate the practicality and necessity of the subject. This should both make controlling attractive and enlightening for students, as well as improve their knowledge on the subject.

Hence, the purpose of the research presented in this article was to develop a new approach to the subject of "the role and place of controlling in an economic unit" in class with students, and to examine the level of mastery of the presented issues, as well as opinions on the form of conducting classes and content presentation using a questionnaire.

The authors of this study drew attention to the issues raised during classes about the role and place of controlling in a business unit. Due to the specifics of this topic as well as its multithreading, a case study was prepared in which there was used an example of the cost calculation of a construction and service enterprise. Based on this example, there were presented issues which showed the role and place of controlling in relation to cost information processing.

Due to the need to implement modern teaching measures, individual study points were developed in a spreadsheet environment. This means that the classes can be conducted as lectures (using a multimedia projector) or in the form of exercises in a computer laboratory.

In the adopted research procedure, there was adopted a thesis which stated that the issue of the place and role of controlling in an economic unit can be effectively presented using the example of cost calculation and computer techniques. Surveys and quantitative methods were used in the study. The study was conducted in 2019 at public economic universities among students from the fields in which controlling classes were conducted.

Changes in Learning Accounting

The twenty-first century can be called a century of continuous change (McGrath and Bates, 2013). Changes are also related to education and teaching methods used (Singer and Wiesner, 2013). Educators can no longer rely only on traditional, passive forms of teaching; they need to do more to keep up with the rapid change in business. One of the solutions is to modernise traditional teaching methods to provide students with a rich and meaningful learning experience and thus keep them engaged (Jaijairam 2012).

Accounting has traditionally been a rather conservative discipline (Leventis, Dimitropoulos and Owusu-Ansah, 2013), which includes the utilisation of standard lectures and exercises. Students are not taught to apply their acquired accounting knowledge to managerial decision-making in business, even though it can be successfully applied in the decision-making process (Hall, 2010; Silviu-Virgil, 2014). This is confirmed in the study by Burnett (2003), who furthermore underlines that accounting education programs must innovate the employed methods (Stejskalova et al. 2019). Alternative teaching techniques and methodologies for accounting include the use of Twitter (Osgerby and Rush,

2015) or IT technology in accounting courses, which include digital games (Carenys and Moya, 2016) and educational computer learning programs (Chan et al., 2016). Štrach and Stejskalová (2015) advocate the concept of real-life case studies in teaching accounting.

While adopting a new teaching method, it is important to note how educators introduce the new approach to students. Duhigg (2013; 2016) emphasizes that the new procedures cannot be simply ordered. The rules should be accepted by participants. Some students who are already familiar with a certain way of teaching may not be inclined towards a change in the teaching process. They may need a different explanation to see the new method as a chance and not a barrier to studying accounting.

Teaching of the Controlling Subject at Polish Universities

The beginnings of teaching controlling at home universities coincide with the implementation of this concept in Polish enterprises during the transformation period in the 1990s. A lot of work was devoted to the educational issues of controlling at Polish universities. The evolution of the teaching of this subject at economic universities is recognised by such works as (Kes 2017), (Kes 2008). The thematic scope of subjects related to controlling implemented at post-graduate studies was presented by Z. Kes at the conference on Didactics in economic sciences, organised by the Agricultural University in Szczecin in 2005. The presented study was entitled "Selected aspects of the organization of post-graduate studies << Management Accounting and Controlling >> at the Wroclaw University of Economics." Regarding the use of computer techniques, Z. Kes and M. Kotłowska determined the level of work skills in a spreadsheet of finance and accounting students as well as computer science in business. Based on the research, the authors concluded that students know the functions and tools that are used during classes, at least at a basic level (Kes and Kotłowska 2013).

The evidence of this convergence are the results of Z. Kes' research on subjects conducted at the Department of Cost Accounting and Management Accounting at the Wroclaw University of Economics. The collected information shows that the subject named "Controlling" appeared in the field of finance and banking at extramural studies of the Faculty of Management and Computer Science in the years 1994/95, with eight hours of lectures and fourteen hours of practical classes. In contrast, 1996 should be considered the peak year when it comes to the presence of controlling topics in the full-time curriculum of the Faculty of Management and Computer Science. A mandatory block was introduced to the program of finance and banking, and it was entitled "Information support for controlling". The subjects implemented under this block included: accounting in the controlling information system, and operational controlling, both consisting of 30 hours of lectures and 30 hours of classes conducted in a computer laboratory.

Currently, many universities in Poland have faculties or specialisations which teach subjects covering operational, strategic or functional controlling. As part of collecting materials for this research, there was conducted an internet query to determine the thematic scope of subjects related to controlling, forms of classes, and hourly dimensions. Due to the relationship between controlling and the economic, management and accounting areas, the analysis covered Polish public economic universities. The query was carried out in 2019. Due to the possibility of conducting classes at three-year studies, the researched period is 2017-2019.

As part of the preliminary research, it was found that the name of the vast majority of items related to the subject of the query contains additional terms. For example, there were found items such as: operational controlling, strategic controlling, production controlling, incentive and bonus systems in controlling, IT tools in controlling, controlling and finance of enterprises, controlling logistics, controlling marketing, sales controlling, personnel controlling, value controlling, project controlling and investment, eco-controlling etc. Due to the fact that the issue of the place and role of controlling in an economic unit should be included in the basics of the analysed area of knowledge, only subjects which were called "controlling", "operational controlling" or "operative controlling" were further evaluated. Assuming that Master's studies are an extension of undergraduate studies, it was

additionally assumed that, in order to analyse the content of syllabuses, only subjects realised at the first degree of study were taken into account.

The analysis of the content of individual syllabuses shows that the first classes are devoted to, among others, the origin, essence and role of controlling in an economic unit. This means that the origins, definitions, tasks and functions of the concept need to be presented to students. In order to present what controlling does, it is possible to use examples of implementations or case studies of controlling systems. Since students who took part in controlling classes had previously completed accounting and cost accounting courses, tasks which have already been processed can be used for this purpose. Such a scenario was prepared as part of the search for directions for improving didactics in controlling classes. Detailed information on the prepared example is provided in the next section of this study.

Description of The Case Study "Role and Place of Controlling in A Business Unit"

The purpose of the study was to show the role and place of controlling in a business unit as part of one of the first classes on controlling. These classes are directed to full-time and part-time undergraduate students who have had previous classes in accounting and cost accounting. The presented case is adapted to both lectures (90 min) and classes in a computer laboratory (120 min). The canvas for this example was an item from a set of tasks (Kowalak 2013) regarding cost grouping in a construction and service enterprise.

The company described in the task carries out the activity of laying fibre optic lines using its own resources. The following cells were separated in the organisational structure:

1) construction department,
2) equipment and transport base,
3) fibre optic lines department,
4) supply department,
5) production preparation and costing department,
6) analysis department,
7) human resources and organisation department,
8) the company's management board.

The task is to allocate functional and subjective costs determined by 11 distributors. The operations included in the content relate to the costs of material consumption, energy, external services, salaries, employee benefits, and other costs by type. As mentioned earlier, the task, which is known to students and whose solution should be considered short and simple, allows to focus the attention of listeners on the important elements of controlling functioning in the field of cost information processing. Table 1 lists individual issues developed in the case study.

Table 1: The role and place of controlling in the processing of cost information

No.	Role and place of controlling	Implementation in lectures and practical classes
1	Acquiring data from the financial and accounting system (AS)	Import of data from txt and xlsx files using the text import wizard and Power Query.
2	Cooperation in the construction of generic cost records	Presentation and discussion of the contents of the table with the numbers and names of generic cost accounts appearing in the task.
3	Analyses by type costs	Based on the data from item 1, a pivot table is generated showing the percentage structure of costs by type.

No.	Role and place of controlling	Implementation in lectures and practical classes
4	Cooperation in creating organisational structure	Presentation and discussion of the contents of the table with the numbers and names of organisational units appearing in the task.
5	Cost allocation by organisational unit	In the table with transactional data (from item 1) a column with a selection list containing the names of organisational cells (from item 4) is inserted. Subsequently, individual cost items are assigned to the appropriate entities.
6	Cost analysis by subject	Based on the data from point 5, a pivot table is generated, showing the percentage structure of costs in the subject system.
7	Participation in creating cost centre structure	Presentation and discussion of the contents of the table with the numbers and names of cost centres related to the objects present in the task.
8	Improving recording processes	In the table with transaction data (from item 1), a column with cost centre numbers and the appropriate formula is added, allowing for automatic reading of the cost centre number based on the content of business operations.
9	Cost analysis in cross-section of cost centres	Based on the data from point 8, a pivot table is generated, showing the costs according to cost centres.
10	Participation in the creation and modification of billing procedures	Based on the content of the task, a list of costs to be settled is created along with the definition of the order of settlements and distribution keys.
11	Construction and modification of the information base constituting the basis for calculation and settlement procedures	There is prepared a presentation of tables containing the data needed for the settlement of common costs, e.g. for the purposes of settling the costs of the transport base, a table containing a record of the working time of individual vehicles.
12	Carrying out settlement procedures not covered by the AS system	Based on the table with transaction data regarding the costs of the transport base (point 1) and the recording of the working time of individual vehicles (point 9), the cost mark-ups for individual carriers are calculated.
13	Participation in the costing process	Based on all collected and processed data, direct and indirect costs related to the calculation objects presented in the task are presented.
14	Cost analysis in a spreadsheet system	Based on the data from point 13 a pivot table is generated, showing direct and indirect costs according to the carried out orders.

Source: own

The aspects of controlling operation in an enterprise presented in Table 3 can constitute both the content of the lecture and the exercises in the computer laboratory. Thanks to this, it is possible to present an important part of controlling during classes, focused on cost data. Showing how controlling is involved in the processing of cost data, by using a simple and short numerical example, allows to easily understand its role and place in a business unit.

The use of a spreadsheet in the presentation and exercises provides the opportunity to visualise accounting issues, as well as to remind students of the algorithms used in the cost calculation process. Additionally, it is possible to draw attention to the fact that the amount and diversity of data processed by controlling requires efficient use of IT tools.

The Analysis of Answers Regarding the Improvement of The Educational Process

While attempting to use new content in controlling classes, the authors of the article decided to conduct a survey on student opinions on the implementation of the topic "place and role of controlling in a business unit" in accordance with the assumptions presented in the previous section.

The classes were addressed to the 3rd year students of the first degree full-time and part-time studies in finance and accounting, as well as post-graduate studies in accounting. At the first meeting about controlling, there was prepared the topic entitled "The role and place of controlling in a business unit". The topic was introduced both during the lecture (part-time and post-graduate studies) and during practical classes (full-time studies).

Due to the need for continuous improvement of the teaching process, students were asked to complete a short anonymous survey whose purpose was to collect opinions and suggestions about the classes. The survey was prepared in Google Forms and included four questions plus a question about the study mode. Table 2 presents the sample size and answers, including the form and mode of classes.

Table 2: Sample size and response structure

Type of studies	Number of students enrolled	Number of completed surveys	Return rate
[1]	[2]	[3]	[4]=[3]/[2]
part-time studies	181	68	38%
full-time studies	85	72	85%
Post-graduate studies	36	26	72%
Total	302	166	55%

Source: own

As presented in Table 2, the majority of students participating in controlling classes attended part-time studies. The return of surveys was also the lowest in this group. The average score for the return ratio was 55%. The structure of the survey questionnaire is presented in Table 3.

Table 3: The structure of the questionnaire

No.	Question	Type of answer
1)	How do you assess your knowledge about the topic "place and role of controlling in a business unit" after the class?	5-point Likert scale: 1 – no understanding of the topic 5 – extensive understanding of the topic
2)	After completing the class, can you take a stand regarding the place and role of controlling in a business unit?	5-point Likert scale: 1 - I can't say anything about this topic 5 - I can explain exactly what this topic is about
3)	Assess individual issues raised in class from the point of view of the level of your understanding of their content:	
a.	role of controlling in cooperation with the accounting department	5 percentage ranges presenting different degrees of understanding the topic of the class: 0% - 20% 20% - 40% 40% - 60%
b.	the role of controlling in building data access	
c.	the role of controlling in the construction of data processing systems	

No.	Question	Type of answer
d.	the role of controlling in conducting settlement and calculation procedures	60% - 80% 80% - 100%
e.	the role of controlling in providing data to managers	
4)	How do you assess the usefulness of MS Excel during classes on "Place and role of controlling in a business unit" in relation to other forms of teaching, e.g. MS PowerPoint presentations or lectures using a blackboard?	5-point Likert scale: 1 - Very bad 5 - Very good
5)	Provide comments and suggestions regarding your expectations related to these classes.	Open question
6)	Choose your form of studies.	Single choice question full-time studies part-time studies post-graduate studies

Source: own.

Based on the collected responses, it was established how the students assessed their level of knowledge after classes conducted in accordance with the presented case study. The first question concerned the assessment of knowledge regarding the topic – "Place and role of controlling in a business unit" after the classes. Figure 1 presents the distribution of answers to this question together and by type of study.

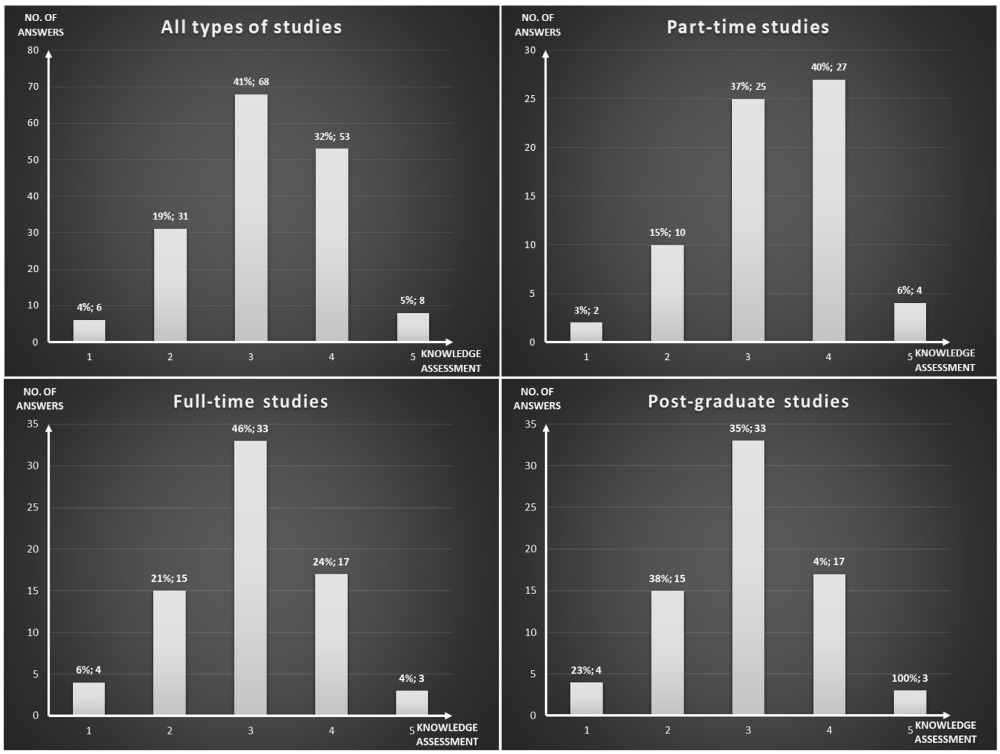

Figure 1: Distribution of answers to the question "How do you assess your knowledge about the subject of 'place and role of controlling in a business unit' after the classes have been completed, in total and for each type of studies

Source: own.

The graphs presented in Figure 1 show that the average level of knowledge about the role and place of controlling in a business unit after classes was indicated by 41% of respondents, with a good and very good level being indicated by 38%. Only six students marked the answer indicating a lack of understanding of the topic. Regarding the distribution of answers depending on the type of study, it should be noted that part-time students indicated a good understanding of the topic (40%) at higher levels than the respondents from full-time (24%) and post-graduate (35%) studies.

In order to determine the impact of the type of study on the assessment of the degree of knowledge, statistics χ^2, its theoretical value for the significance level of 0.05, p-critical value and Cramér's V contingency coefficient were determined. The results are presented in Table 4.

Table 4: Assessment of the relationship between the type of studies and the assessment of the level of knowledge

Parameter	Value
χ^2 coefficient	6.73
χ^2 theoretical	15.51
Critical level of significance	0.57
Cramér's V	0.14

Source: own

The results presented in Table 6 indicate no relationship between the type of studies and the assessment of the level of knowledge. Thanks to this, it can be concluded that the presentation of the role and place of controlling in a business unit, by means of the case study described in point 3 of this study, is similarly assimilated by students of all types of studies.

The second question in the survey concerned the respondents' answers regarding the possibility of expressing a position on the place and role of controlling in a business unit after classes. Figure 2 presents the distribution of answers to this question in total and for each type of studies.

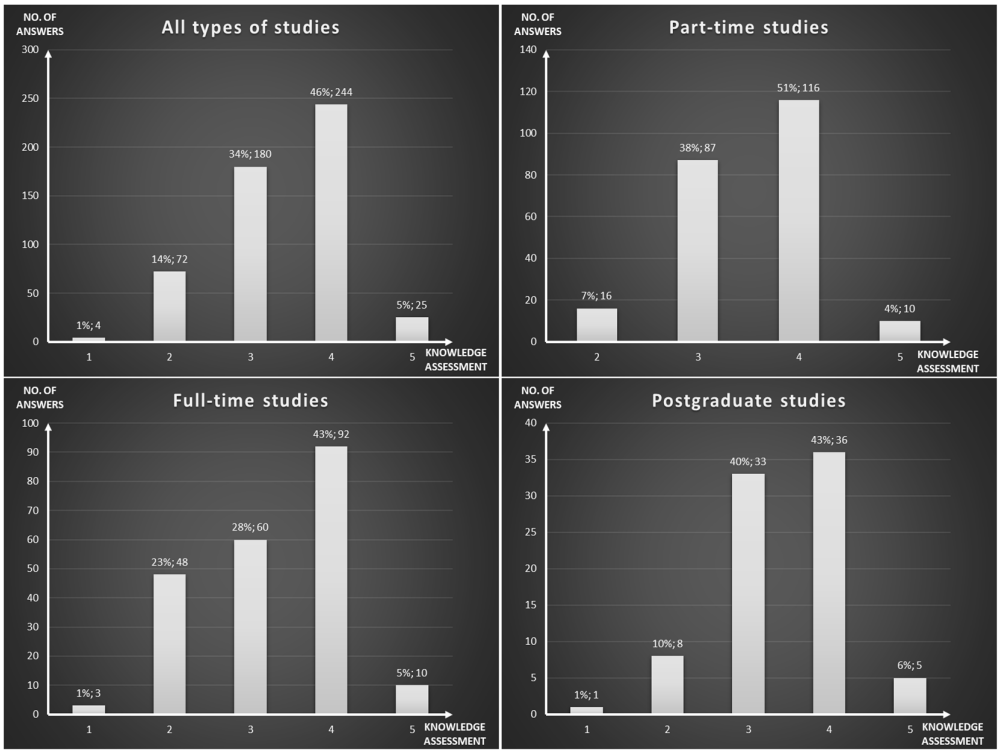

Figure 2: Distribution of answers to the question of whether the student can take a stand regarding the place and role of controlling in a business unit after classes, in total and for each type of studies

Source: own.

The data presented in Figure 2 show that 46% of respondents can take a position on the place and role of controlling in a business unit at a good level (4), with the average level being marked by 34% of students. In contrast, the answer "I cannot say anything about it" was marked by four students, of which three attended full-time studies. Regarding the distribution of answers depending on the type of study, there is no differentiation among full-time and post-graduate students. A good level was selected by 43% of all respondents, while 53% of those answers belonged to part-time students.

In order to determine the impact of the type of study on the assessment of the possibility of taking a position on the topic discussed in class, $\chi 2$ statistics, its theoretical value for the significance level of 0.05, p-critical value, and Cramér's V contingency coefficient were determined. The results are shown in Table 5.

Table 5: Assessment of the relationship between the type of studies and the assessment of the possibility of taking a stand regarding the topics covered in class

Parameter	Value
χ^2 coefficient	14.52
χ^2 theoretical	15.51
Critical level of significance	0.07
Cramér's V	0.21

Source: own.

The results presented in Table 5 indicate no relationship between the type of studies and the assessment of the possibility of taking a stand regarding the topics covered by the case study. Following the assessment in the previous question, it can be concluded that the presentation of the role and place of controlling in an economic unit, using the case study described in point 3 of this study, is similarly remembered by students of all types of studies.

Since the role and place of controlling can be considered in various aspects, students were asked to indicate the degree of understanding of the role of controlling:

- in cooperation with the accounting department,
- in the construction of the access to data,
- in the construction of data processing systems,
- in the scope of conducting settlement and calculation procedures,
- in the field of providing data to managers.

Answers in individual aspects have a similar distribution (Figure 3).

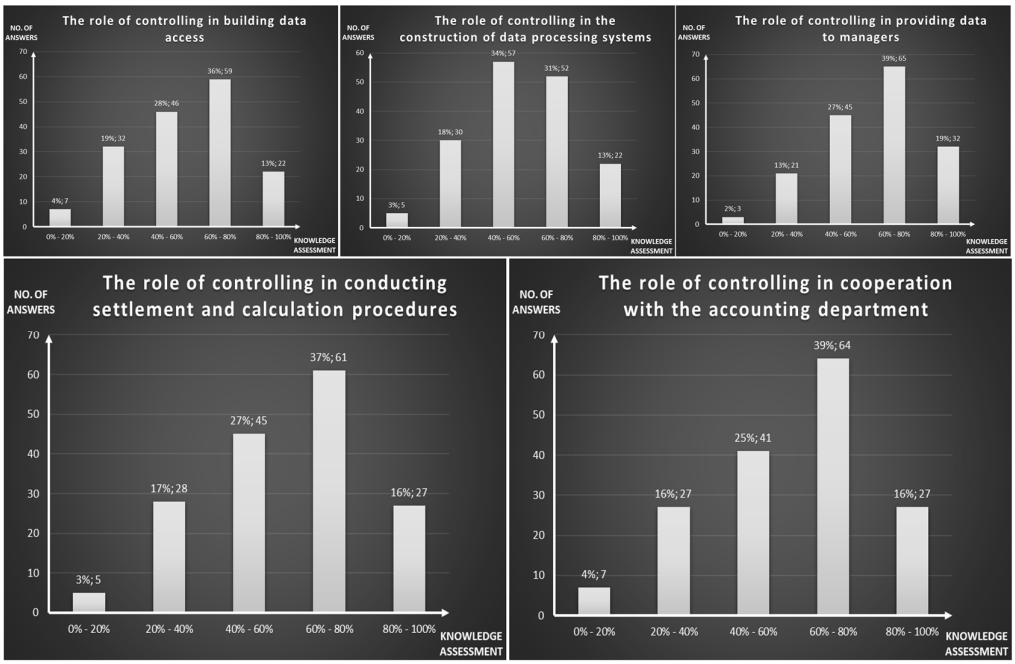

Figure 3: Distribution of students' understanding of individual issues

Source: own.

From the point of view of the form of conducting classes and directions for their improvement, an important issue is the assessment by students of the usefulness of MS Excel during classes in relation to other forms of teaching, e.g. MS PowerPoint presentations or lectures using a blackboard. Figure 4 presents the distribution of answers to this question in total and for each type of study.

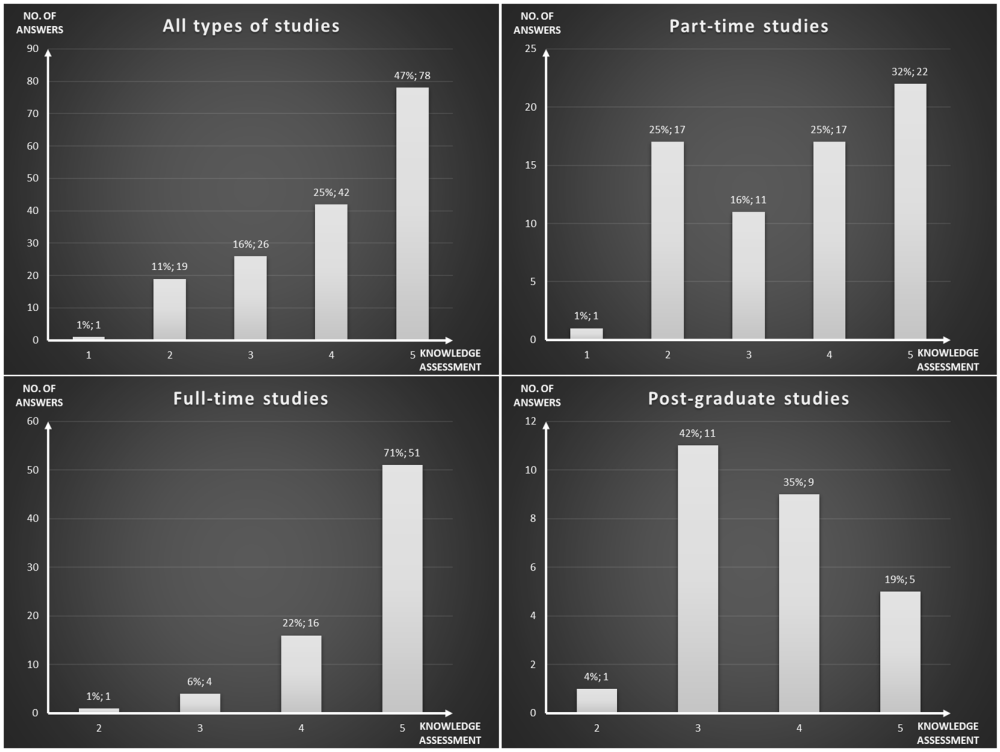

Figure 4: Distribution of student assessments regarding the usefulness of MS Excel during classes in relation to other forms of teaching in total and for each type of studies

Source: own.

The data presented in Figure 4 show that over 70% of students consider the usefulness of Excel in controlling classes to be good and very good. Distributions of answers to the question about the usefulness of a spreadsheet show diversity. For part-time studies, 57% of respondents gave good and very good reviews; 49% was the result for post-graduate studies, and 93% for full-time studies. These results are confirmed by the analysis of the impact of the type of study on the opinion on the usefulness of Excel (see Table 6).

Table 6: Assessment of the relationship between the type of studies and the opinion on the usefulness of MS Excel during classes in relation to other forms of teaching

Parameter	Value
χ^2 coefficient	53.76
χ^2 theoretical	15.51
Critical level of significance	0.00
Cramér's V	0.40

Source: own.

Data presented in Table 6 indicate a significant relationship between the type of studies and student opinions regarding the usefulness of MS Excel during the classes described in this study. Cramér's V coefficient of 0.4 means a strong correlation between variables. The lowest average grade was given by post-graduate students and the highest by full-time students.

Among the comments and suggestions made by students, there were repeated voices suggesting that it would be beneficial to do the presentation of Excel-based solutions at a slower pace. This means that more time should be allocated to this kind of class. One opinion of the students was particularly noted by the authors of the survey. It is reflected in the following quote: "An Excel file is a very good alternative to a presentation – this form has conveyed the theory in a much more attractive way than a presentation which is read. In this way, it is possible to remember many more elements than from the presentation. In addition, it emphasizes that controlling is not only knowledge in the field of finance (which was my previous conviction), but also the skill, cleverness of data organisation, and the need to cooperate with the IT department".

Conclusion

The aim of the research presented in this article was to develop a new approach to the implementation of the topic "The role and place of controlling in a business unit" in the classes on controlling implemented in higher education. To assess the adopted approach, there was employed a questionnaire whose task was to determine the degree of mastery of the presented issues, as well as opinions on the form of conducting classes and content presentation.

The new approach to the implementation of the course was to show students various aspects of controlling relevant to the functioning of the enterprise's information system processing cost data. For this purpose, there was used a short and simple example of the task of allocating costs in a construction and service company. Using the example, it was possible to present the following issues related to the role and place of controlling:

- cooperation with accounting services in the construction of cost recording systems
- creating and sharing cost analyses,
- participation in modifications of the organisational structure, cost objects (including marginal capital product),
- support for accounting services in the allocation of costs to cost facilities and improvement of accounting processes.

The above-mentioned process of data processing and organisation for management needs is an important role of controlling. However, as the place of controlling in an economic unit, it indicates the location between transactional systems (e.g. financial and accounting system, production, warehouse, personnel system, etc.) and managers at various levels.

The presented example was implemented into a spreadsheet, where it was possible to illustrate the individual stages of the data processing process. The prepared file in MS Excel format also created the possibility of performing the calculation process by students in computer rooms.

Based on the results of surveys conducted among students of various degrees and teaching modes who participated in the classes using the discussed approach, the thesis was confirmed that the issue of the place and role of controlling in an enterprise can be effectively presented using the example of cost calculation and computer techniques.

The presented method helps students understand how controlling interacts with the daily world of business. Students will learn that its principles can be applied to each company, both formally and informally. Preparing a family budget or a corporate one are both examples of controlling put into practice. Computer techniques can help grow this understanding by relating material to common situations.

Acknowledgments

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The Relationship between BATNA and the Choice of Strategy in Trade Negotiations

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Abstract

The BATNA, i.e. the Best Alternative to a Negotiated Agreement, is - besides issues such as hierarchy, mental strength and resources - an element that can determine power in negotiations and thus determine their course and outcome. "Plan B", as BATNA can be otherwise called, can actually be given a decisive role, which means that correcting it can provide a significant advantage and can often lead to a better outcome. Due to its importance and the links with the various components of the negotiations, the BATNA is a frequent subject of research in the literature on the subject. This paper attempts to identify the relationship between three different types of the BATNA (strong, weak, non-existent) and the negotiating strategies chosen by negotiators during trade negotiations. The conclusions were drawn from an experiment conducted under university conditions with the participation of those students who, due to their experience and knowledge and in line with the consensus reached among researchers on this issue, were granted the status of experts for the purposes of the study. The concept of the experiment was taken from the literature on negotiation. The study confirmed some of the initial research hypotheses on the impact of BATNA on the choice of one of the two known negotiation strategies, namely the strategies of cooperation and competition. It was found that there is a link between the strategy chosen by the negotiator and - not so much the BATNA itself as - the difference in the assessment of the BATNA by the two negotiating parties.

Keywords: trade negotiations, BATNA, negotiation strategies

Introduction

The concept of BATNA is one of the central concepts in theoretical research on negotiation and is well known to practitioners. It was first used by Fisher and Ury in 1981 in their fundamental work on negotiations, i.e. *Getting to Yes: Negotiating Without Giving In*. They defined it as a best alternative to a negotiated agreement, which is the answer to the question of how I would achieve my interests if the negotiated agreement did not meet expectations. (Fisher and Ury, 1981). Since then, research on BATNA has been one of the main themes of research on negotiation. This paper attempts to identify the relationship between three different types of the BATNA (strong, weak, non-existent) and the negotiating strategies chosen by negotiators during trade negotiations. An experiment method was used, the concept of which was taken from the literature on negotiation.

BATNA is extremely important in trade negotiations because it is closely linked to the powers of the parties. In such negotiations, the power of the parties is measured primarily by their economic potential (Rządca 2003). However, it can be increased by developing good alternatives. BATNA is also a tool for evaluating a potential agreement. If a BATNA is very good, there may be no need for negotiations, because an agreement may not give anything better than the available alternative. For the authors of this concept, BATNA is a benchmark against which every negotiation result is compared.

The knowledge about BATNA is crucial for the negotiation processes conducted by companies. On a global scale, economic practice shows an increase in the scope and dynamics of cooperation and competition. Economic negotiations are becoming increasingly important and their scope is

expanding, and the risk in terms of assumptions, conditions, tools and negotiation results is increasing, which consequently places very high demands on managers. (Kozina, 2012, p. 10). Since negotiations have become an important tool in company management (Biesaga-Słomczewska, 2009), they should be considered in a broader context, as an element of a longer relationship, and not as a one-off event. Managers may be interested in increasing their negotiating power in order to increase their effectiveness in reaching negotiated agreements. This is particularly the case where power is unevenly distributed on both sides, which may be due, for example, to the different sizes of companies negotiating with each other. Knowledge of the mechanisms that govern BATNAs can help to balance the powers and avoid reaching agreements that are rather unfavourable to either party.

Literature Review

The beginnings of research on BATNA and its relationship with the behaviour of negotiators date back to the 1990s. In particular, they confirmed that it affects the power and position in the negotiations and that these values are directly proportional and that the stronger the BATNA, the more extreme the negotiator's expectations of an acceptable outcome will be. If the negotiator has a weak BATNA, he or she will be reluctant to give up negotiations. Having a weak BATNA or none at all results in less negotiating power and more dependence on the outcome of the negotiations, and thus in a greater willingness to accept a less favourable outcome. (Pinkley et al., 1994)

Research into the link between BATNA and a negotiating strategy adopted by negotiators has a certain tradition already, although consensus has not been reached on all issues. The research has focused mainly on recommendations on the strategy to be followed by buyers and suppliers. (Patton et. al. 2010) Negotiating strategy means "interaction patterns used by parties in conflict to achieve resolution". (Ganesan, 1993, p. 184). The theory of negotiation assumes that there are two fundamental negotiating strategies, i.e. strategies of cooperation and competition (Krause et al., 2006; Zachariassen 2008), also known as a cooperative and competitive attitudes (Necki, 2005) The strategy of cooperation in negotiations is meant to achieve a result that is mutually beneficial, while the negotiator pursuing a competitive strategy seeks to maximise his or her profits and secure a winning result. It is generally believed that a cooperative, i.e. collaborative strategy is more effective in building longer and more sustainable supplier-buyer relationships in supply chains, although there is no empirical evidence to support this thesis, yet (Thomas et al. 2015). The choice of negotiation strategy depends on the importance of the negotiation issue, the existing relationship between the parties but also, to a large extent, on the availability of other solutions, i.e. one's BATNA. (Habib et. al., 2015)

However, there are still conflicting views on how BATNAs affect the outcome of negotiations. McAlister et al. have proved that negotiators who have equal power in negotiations more often reach integrative agreements (i.e. agreements that maximize the joint profit of the two parties by taking advantage of trade-offs between differently prioritized issues) than those secured under conditions of unequal power among disputants. (McAlister et. al., 1986). An opposite conclusion was reached by Rolof and Daliley, who have shown that pairs of negotiators with unequal power reach agreements based on a greater mutual benefit than pairs with equal power. (Roloff, and Dailey, 1987). In view of the fact that the results quoted are the result of studies that have become rather distant in time and the fact that there are no studies on the impact of BATNAs on the choice of negotiating strategy, a certain research gap can be said to be present here.

Research Hypotheses and Methodology

The aim of the study was to draw a conclusion on the relationship between BATNA and one of the two strategies chosen by negotiators - cooperation or competition. The hypothesis was formulated that a too good BATNA causes a competitive attitude in negotiators, while a weak BATNA makes them cooperate. In other words, there is a relationship between BATNA and strategy.

The essence of the study was an experiment with the participation of students based on previously prepared scenarios, in which the participants were supposed to predict the behaviour of negotiators.

Both the concept of the experiment and the participation of students in the experiment were taken from the literature on the subject, in which this method is very often used and accepted as a method of research on negotiations. It is very well suited to isolating cause and effect relationships and provides a great deal of control over variables, and is also particularly useful in the case of negotiations which, due to their specific nature, are difficult to study in "natural" conditions and for which it is difficult to obtain information, due to managers being frequently reluctant to share such knowledge. (Thomas et al., 2006). Moreover, in research on negotiation, students with some experience in negotiations and who have done a negotiation course are regarded as comparable to professionals and many questions in the field of negotiation research can be effectively tested by using trained students as experimental subjects. (Herbst, Schwarz, 2011). Due to a large size of the experiment, for the purposes of this study, it was decided to present here only part of the results that prove one of the hypotheses formulated a priori on the basis of the literature on the subject. According to this hypothesis, a strong BATNA results in the choice of a competitive strategy in trade negotiations.

With reference to the literature on the subject, scenarios of situations with dyads i.e. with the participation of two negotiators were prepared. In each situation, each negotiator was free to use one of the three types of BATNAs, which - in line with the assumptions made by Ury and Fisher - determined the strength of the negotiator. Thus, for each of the two negotiators it was possible to have a "strong BATNA", a "weak BATNA" or to remain "without a BATNA", which consequently generated 9 different situations.

Table 1: The situations in the experiments in terms of the strength of the negotiators' BATNAs

		Negotiator no. 1		
		STRONG BATNA	WEAK BATNA	NO BATNA
Negotiator no. 2	STRONG BATNA	situation 1	situation 2	situation 3
	WEAK BATNA	situation 4	situation 5	situation 6
	NO BATNA	situation 7	situation 8	situation 9

Source: author's own compilation

The scenarios were descriptions of situations invented by the author of this study in relation to authentic situations occurring in economic life known to her from practice in enterprises known to her, so they contained a large element of realism and were presented for review to two persons experienced in negotiations. In each scenario, the situation of the two parties, i.e. the negotiators who were preparing for trade negotiations, is described. Based on the description of the situation (e.g. a restaurateur looking for a supplier of products for their restaurant vs. a thriving local cold meat supplier, a retail company preparing to talk to its supplier about an inevitable price increase, a representative of a large retail chain looking for a supplier of organic vegetables among local producers, etc.), the participants in the experiment were expected to determine the powers of both parties on a scale of 1-5 and then determine which of the two strategies - cooperation or competition - would be chosen by the first negotiator justifying their answer.

The survey involved 56 students of a university in southern Poland in the last year of their Master's studies in logistics in both full-time and extramural studies. The average age of participants was 26.5. Of all the participants, 11 declared that they had no experience of any kind in negotiations. Out of the remaining 45 students, 15 declared a job-related negotiation experience of almost 2.5 years on

average and the remaining 30 students had some occasional experience, i.e. negotiating a sale or purchase for private purposes. All the participants in the experiment had completed a course in negotiation, included in the curriculum of their studies as an obligatory subject called Commercial Negotiations. As part of the experiment, the participants received a description of 9 situations with the questions about the power of the negotiators and predictions about the strategy to be chosen by negotiator no. 1. On average, it took the students about 45 minutes to provide answers to all the questions.

For the analysis and verification of the hypothesis made, answers were chosen for situations 1, 4 and 7, i.e. those in which, according to the assumption of the experiment, negotiator no. 1 had a strong BATNA, while the second negotiator had - respectively - a strong BATNA (situation 1), a weak BATNA (situation 4) and no BATNA (situation 7), leaving the remaining situations to further consideration due to the limited size of the present study. In this way, 168 responses from the participants (56 participants x 3 situations) were obtained for the analysis. The responses to the three situations were then grouped in a matrix in which the starting point was the negotiating strategy chosen by the participant and an assessment of the powers of the two negotiators, which could be either prevailing in negotiator no. 1, equal in both negotiators or prevailing in negotiator no. 2.

Table 2: Matrix of the arguments in the choice of the negotiating strategy and assessment of power of both negotiating parties

	prevailing power of negotiator no. 1	**With the balance of powers**	**prevailing power of negotiator no. 2**
Collaborative strategy chosen	- argument 1 - argument 2 - argument 3 - …	- argument 1 - argument 2 - argument 3 - …	- argument 1 - argument 2 - argument 3 - …
Competitive strategy chosen	- argument 1 - argument 2 - argument 3 - …	- argument 1 - argument 2 - argument 3 - …	- argument 1 - argument 2 - argument 3 - …

Source: author's own compilation

In each of the six groups of the responses given, on the basis of the explanations and rationale provided by the participants, a list of arguments used to justify the choice of strategy was made on the basis of a semantic analysis. Further analysis was of a qualitative nature.

Results and Discussion

The participants in the majority of cases interpreted all three situations similar to the intention of the author of the experiment, i.e. with the exception of 9 participants, they all stated that in the situations described, negotiator no. 1 has a strong negotiating position. On a scale of 1-5 they rated it on average at 4.05; 4.6; and 4.23, respectively, while the power of negotiator no. 2 was rated at 3.4, 2.56 and 3.17, respectively. When asked to specify the type of the strategy chosen by negotiator no. 1, most of the participants (66%) indicated a cooperative strategy in situation no. 1, in the case of situation no. 4 - a competitive strategy predominated (87.5%) and in the case of situation no. 7 it was also a competitive strategy that prevailed (59%). For a better clarity, the results are shown in Table 3.

Table 3: Average powers of negotiators nos. 1 and 2 on a scale of 1-5 in the opinion of the participants of the experiment and indications of the participants as to the expected negotiation strategy

		Negotiator no.1 STRONG BATNA
Negotiatior no. 2	STRONG BATNA	Situation no.1 1. Negotiator: 4.05 2. Negotiator: 3.4 Difference: 0.96 anticipated strategy: **cooperation 66%,** competition: 34%
	WEAK BATNA	Situation no. 4 1. Negotiator: 4.6 2. Negotiator: 2.56 Difference: 2.04 anticipated strategy : **competition 87.5%,** cooperation 12.5%
	NO BATNA	Situation no. 7 1. Negotiator: 4.23 2. Negotiator: 3.17 Difference: 1.39 anticipated strategy : **competition 59%,** cooperation 41%

Source: author's own compilation

For a deeper analysis of the relationship between the anticipated strategy and the negotiating power of both sides, a difference in the perception of the negotiators' powers seems to be important. It turns out that the greater the difference, the more frequently a competitive strategy was indicated as the one chosen by the negotiator with a stronger position. This means that when a negotiator is convinced that he or she has the upper hand over the negotiating partner, he or she is more likely to adopt a competitive strategy.

This conclusion is confirmed by the analysis of the arguments that the participants in the experiment gave as the explanation and rationale for the choice made by negotiator no. 1 (the one with a strong negotiating position) of a cooperative strategy or competitive strategy, respectively. The willingness to choose a cooperative strategy when negotiator no. 1 has the upper hand or his or her power is equal to that of negotiator no. 2 was justified by the students in a number of ways. The graph shows, respectively, the arguments and the number of times a given argument appeared in the participants' answers (some people provided more than one argument).

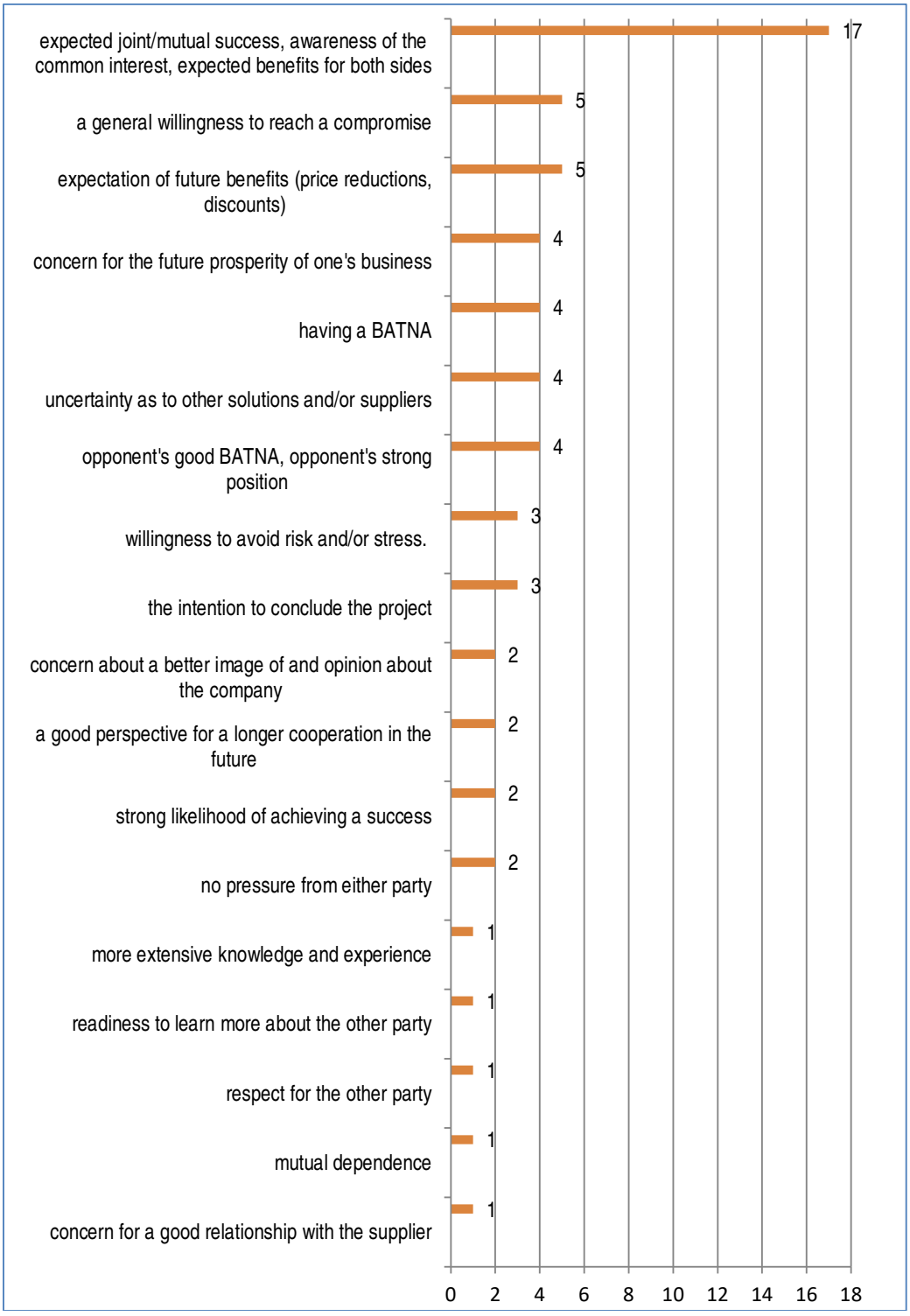

Fig. 1: Arguments supporting the choice of a cooperation strategy with a subjectively perceived stronger or equal negotiating position of negotiator no. 1.
Source: author's own compilation

The most frequent motive given for choosing a cooperative strategy proved to be the expected joint success of both negotiating parties, which can be regarded as the same as the provided motives including awareness of the common interest and expected benefits for both parties. This means that the choice of a cooperative strategy is based on "noble" motives, a "we" perspective and a problem solving approach in which both sides identify themselves with each other and are inclined to see the negotiating partner as a partner in an attempt to solve a given problem. Slightly less emphasis was given to the argument of a general willingness to find a consensus and expected future benefits in the form of reduced prices and discounts - the latter may be expected as a "reward" for engaging in a cooperative strategy when holding a stronger position. These were followed by arguments and motives such as caring for the future prosperity of one's own interest or having BATNAs. The latter motive may seem a little surprising, because - as will be shown below - a strong BATNA leads rather to choosing the strategy of competition. Further revision of the list of reasons why negotiators should choose a cooperative strategy makes it possible, above all, to draw conclusions as to their number and diversity. It can be noted that there are arguments resulting from both business practice, such as uncertainty of other solutions, willingness to avoid risk, or care for having a better opinion and image of the company, which can be achieved by using a cooperative strategy, as well as "social" arguments, such as the desire to get to know the other party, respect for the opposing side or mutual dependence.

Meanwhile, the explanations for choosing a competitive strategy form a short list, in which the possession of a strong BATNA, also called by the participants the possession of an alternative, appears as the main motive, and the resulting opportunity to set conditions in negotiations - this argument appeared as a justification 61 times, which means that it appeared in 36.3% of all justifications (168 situations examined). This does not mean, of course, that in other cases the participants did not see negotiator no. 1's good BATNA. This may mean that they did not give a decisive importance to the BATNA in the negotiations. In 4 cases, the participants actually pointed to a good BATNA as a basis for choosing a cooperative strategy.

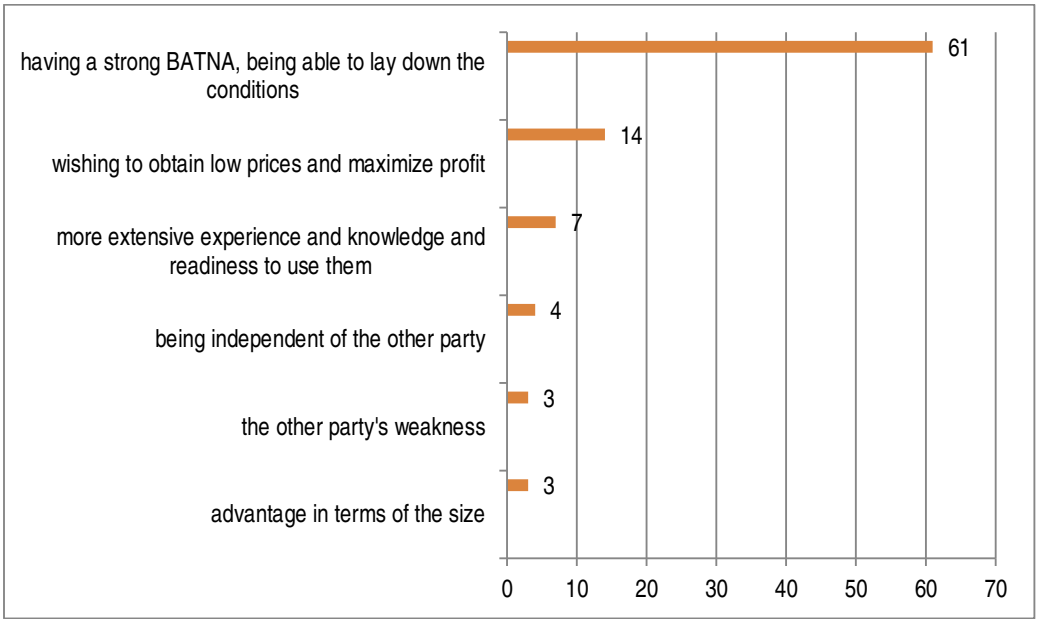

Fig. 2: Arguments justifying the choice of the competitive strategy with a subjectively perceived stronger or equal negotiating position of negotiator no. 1.
Source: author's own compilation

However, a vast majority of participants, anticipating the negotiators to follow the strategy of competition, believed that this choice will be dictated by having good alternatives and the very possibility of making tough demands - or else - the negotiators will play hard, because they simply can afford to do so. Any failure of the negotiations and failure to reach an agreement will not be a great loss for them, as they will then have to choose one of several good alternatives. The motive driven by the desire to be granted low prices and maximize profit, which did not appear too many times, but still frequently enough to be regarded as relatively numerous (14 times), was given as an argument that was supposed to encourage negotiators to adopt a competitive strategy. This is interesting because a related argument of expectation of future benefits in the form of reduced prices and discounts appeared as a motive for choosing a cooperative strategy. It should be noted, however, that in the case of the competitive strategy, the profit motive refers to one-off negotiations and means focusing on achieving profit in a given negotiation process, while in the case of the cooperative strategy, profit appears as a reward that can be expected only in the future. A short list of motives for adopting a competitive strategy is completed successively by various types of advantage, e.g. that related to knowledge, experience, size, as well as being independent of the negotiating partner and the outcome of negotiations, which in a sense may also be associated with having alternatives, i.e. BATNAs.

Conclusions

A short list of reasons with a significant dominance of the strong BATNA as an argument justifying the choice of a competitive strategy and a long and varied list of arguments supporting the choice of a collaborative strategy allow to draw several conclusions concerning the mutual dependence of the negotiation strategy on the type of motives that drive the negotiators. The choice of collaboration strategy is dictated by an attitude which, according to the literature on the subject, can be called cooperative. This involves seeing the negotiation process as part of a longer relationship, not as a discrete event, and then the negotiating partner is seen as an ally in achieving a common goal. This finding is known in the literature on the subject.

The conclusions concerning a competitive strategy allow for positive verification of the research hypothesis presented in the introduction. This means that a list of well understood alternatives to a possible unfavourable agreement (BATNA) leads to the choice of a competitive strategy. In other words, not only may the negotiator's awareness of various good alternatives result in a lack of motivation to enter into negotiations, as has already been shown in earlier studies, but also in the choice of a competitive strategy based on a lack of willingness to make concessions, on high demands and closed positions and a lack of flexibility. Negotiations may then take the form of a competition or lead to a win-lose outcome. A good, i.e. strong BATNA gives the power and willingness to make use of it through a competitive attitude. This power does not have to be objectively large at all - the strategy chosen depends on the perception of one's position in relation to the other, as well as the perception of the difference between one's position and that of the opponent: the greater the subjectively perceived advantage of the negotiator, the more confrontational his or her approach might be.

Knowledge of this relationship has some useful implications for the management of relationships, particularly in the area of business negotiations. For if numerous and good alternatives to the possible outcome of negotiations (i.e. a strong BATNA) cause the adoption of a competitive strategy, the question should be asked about the scope of knowledge that the negotiator should have on this subject. On the one hand, preparation for negotiations requires good preparation of alternatives to the negotiated agreement, which is common knowledge and practice among negotiators. On the other hand, good alternatives compromise the capacity for cooperation. For this very reason, negotiating companies should consider whether negotiators should actually be fully aware of all possible alternatives and thus of the power that the negotiating company has at its disposal. If the negotiator has an extensive and in-depth knowledge of the BATNA, one could also consider raising his or her awareness of acceptable strategies and preparing himself or herself more carefully for negotiations also in terms of techniques facilitating cooperation so that he or she could represent a cooperative approach. It is also possible not to equip the negotiator with the awareness of a strong negotiating

power, which should make him or her more cooperative and encourage him or her to adopt a strategy of collaboration in negotiations. Nevertheless, knowledge of how the BATNA influences the behaviour of negotiators requires greater understanding and preparation on the part of the company, extending beyond their negotiators and including senior managers. This should be particularly emphasised in situations where the company intends to treat negotiations as a tool to create long-term business relationships.

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History Management in Public Space – How to Support Contemporary Reenactment in Poland To Preserve Its Historical and Educational Value

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Abstract

The matter of the article is the issue of management of history in public space through activities directed for support of reenactment in Poland in the mission of preserving its historical and educational values. Historical reconstruction is an element of *public histor*y which has enormous educational power due to huge contribution of humans' passion as well as an attractive and engaging form of disseminating knowledge. Adequate management guarantees the experience of emotions that are bought by modern consumer and also transfers knowledge in such a way which creates engaged recipient, not only a passive observer. Education is one of the lifebloods of initiatives undertaken by these organizations, and its lack completely precludes reconstruction from the area of popularizing knowledge. The professionalization of groups is a guarantee of reliable knowledge transfer. It would allow to go beyond the boundaries of amateur hobby and start professional activities. It will make you to learn the history according to your own original scenario.

Keywords: Management, Public History, Education, Reenactment

Introduction

Interest in the concept of Public History in Polish research has been becoming more and more noticeable for several years. The most important ones should be highlighted research works: J. Wojdon (2015) and (2018); T. Szlendak, J. Nowiński, K. Olechnicki, A. Karwacki, W.J. Burszta (2012); W. J. Burszta (2016); R. Traba (2014); K. Deskur (2009); M. Řeznik, M. Saryusz Wolska, S. Stach, K. Stoll (Kraków 2017). Thus, it reflects the development of this phenomenon abroad, where there is an increase in initiatives to promote historical themes: F. Sayer (2015); D. Dean (Hoboken 2018); T. Cauvin (2016) The story becomes present in social media, where it is disseminated to a wide range of interested parties in various interesting ways via websites such as YouTube. As an example of programs that are associated with the dissemination of history it should be mentioned, especially popular among young audiences channel ”History without censorship”, ”History in 5 minutes”, as well as professional programs referring to the discipline such as, for example, ”Good Idea. Radosław Gajda & Natalia Szcześniak”. In many cases, these channels are very professional and successfully serve as additional educational material. In this case, especially young people are the main and demanding reception that postulates for an interesting, multimedia and interactive form of communication. At the same time, history becomes present in many TV programs and channels. Increasingly, the lot of many TV series and movies is set in the past. Internet own productions in some gaining popularity stations and rentals such as HBO, Netflix Inc., Showtime, Amazon Prime Video etc. again and again fund their viewers educational entertainment in the form of historical documents or production, or whose script is based on actual events, biographies of famous people whose actions take place in the former historical space. An example could be "Chernobyl" popular among Polish audiences, the Golden Globe winner in the best limited series or television movie category, and Emmy Awards for the best limited series. On the largest and most visited Polish film site Filmweb (https://www.filmweb.pl/) it was rated by consumers at 9.0. on a scale of 1.0-10.0. History's activity in the media and in the virtual world also applies to computer games (there are

many titles here: Assasin's Creed (serie Europa Universalis since 2001), *Civilization* (serie since 1991), *Total War* (serie since 2000), *Europa Universalis* (serie since 2001), in which the created world, often, even if it does not reflect historical facts directly, is built on solid foundations, which provide historical knowledge, and what's more, it makes sense. One of the best Polish products of recent years can be used as an example: the game *The Witcher 3 The Wild Hunt*, the label of the CD Project Home capital group. Its success was so huge that in 2019 CD Project was one of the highest-rated Polish companies on the Warsaw Stock Exchange. The game is a creation of a fantastic world, however, following the article by P. Jankowski (2018) on historical foundations in relation to the fiction of the virtual universe, the fact that its foundations create representations of real world societies from the past is clearly visible. The gam eis based on the cultural specificity of the European Middle Ages, as well as progressive pre-industrial eras. They draw inspiration from both Slavic and Norse mythology as well as real political events. In the public space, the nature of places related to collecting and distributing knowledge about the past among recipients is also changing. Until recently, ossified and not very public friendly places are turning into real centers of culture and education. Museums, archives and libraries are experiencing renaissance today. A world that our parents' generation still admired only through the glass, or which they often did not have access to, becomes available not only digitally, but also at your fingertips. Museums and libraries have become specialized places of not only historical education for contemporary recipients (an example would be: Museum of the History of Polish Jews POLIN in Warsaw, Wroclaw City Museum, Silesian Museum in Katowice, History Center Zajezdnia).

The origins of *public history* can be traced in the 70s in the USA. According to the contemporary opinions the history "for the public, by the public, with the public, of the public" was completely different from the stubbornly stuck one in stiff scientific debates academic history – J. Wojdon (Warszawa 2018). In addition, it quickly turned out that university studies are not fully sufficient in the process of transferring knowledge in the form of popular science, available to the society whose needs were completely different than meticulous scientific analysis. For the first time the question arose: how skillfully manage history in public space so as to convey knowledge that was previously focused on a small group of specialists in a competent, attractive and accessible way. Public history (german historiography is inclined towards the term "applied history", but recently there are also publications that use the name public history in some publications the term is even treated as a synonym) undertakes the problem of examining historical consciousness primarily in order to address society's demand for historical education and, in accordance with this analysis, compose the means and content of the message in a flexible and methodical way that will allow effective reach to the recipient. The task of history in public space is to shape and educate society. In this case, one can also successfully refer to R. Traba's (2014) opinion on applied history and use its elements to define the intention of public history. In his opinion, the fundamental task of applied history is to shape historical imagination and acquire workshop competences consisting in the critical analysis of various and extensive source material. Thanks to this, using new research methods and technologies, people operating in the field of history, acquire new competences and are able to respond appropriately to the changing needs of recipients. That ability to respond flexibly, to transform in the way society expects, has given the opportunity to enter history into the sphere of management and marketing activities. Previous history graduates have become not only scientists, but managers managing original projects. The scale and type of these projects vary enormously. However, their main goal is to contribute, through developing historical marketing, to education as well as to the protection and saving of endangered cultural heritage. However, not only historians are responsible for the public presence of the past in our surroundings. History reaches us through the aforementioned most popular forms, which are entertainment games, movies, TV series. In addition, games, outdoor events, reconstructions. It is present in applications dedicated to urban tourism, and more and more often also related to exhibitions or historical objects often on an impressive scale. Actually, you don't need much to see it in every element of space. It is accompanied by reflection on the purpose and role of history in social life. Not only historians, but also publicists, politicians, people involved in promoting culture, but also citizens – enthusiasts take the floor in this matter. This group will interest us above all.

As a A. Mikos v. Rohrscheidt (2008) wrote one of the common and unconventional forms of leisure travel is living history tourism which is a variation of historical tourism and is included in the forms of universal cultural tourism. The phenomenon of reenactment has good literature abroad, e.g.: V. Agnew, *(*2007); L. McCalman, P.A. Pickering (2010); C. Schroeder (2013). In Poland, it is also increasingly described in publications that are happy to deal with related problems, including e.g.: A. Mikos v. Rohrscheidt (2011); M. Bogacki (2008), (2010) and (2018); K. Majtas (2012); K. Baraniecka-Olszewska (2015); L. Gardeła (2016); P. Wojnarowicz, J. Małysiak (2018); P.T. Kwiatkowski (Warszawa 2008); As M. Widzicka (2015) and K. Rojek (2009) wrote the origins of the historical reconstruction movement in Poland, one should look in the actions of Zygmunt Kwiatkowski, the president of the local branch of the Polish Tourist and Sightseeing Society (Polskiego Towarzystwo Turystyczno-Krajoznawcze), who from 1977 organized knight tournaments at the castle in Golub-Dobrzyń. The breakthrough moment was certainly the organization of the first staging of the Battle of Grunwald in 1998, which resulted in the increased interest of Poles in this type of events. As with stack history and public history, a terminological problem also arises in the case of the concept of historical reconstruction. Researchers such as M. Bogacki (2010), referring to the translation of the English term historical reenactment, opted to use the concept of ”historical reproduction” and not ”historical reconstruction”, because the latter should be reserved for those groups that actually tend to most faithfully reconstructing the past, a fragment of it. Therefore, in this case, the essence of knowledge and relevant education for the quality of these productions cannot be avoided. However, not every researcher approaches this problem so rigorously. Examples include A. Mikos v. Rohrscheidt and K. Rojek, who often use these terms interchangeably. Observations made among survey respondents who work in historical reconstruction groups (which is often important for many years) show that activists themselves do not pay too much attention to this. In their opinion, those who have been dealing with reconstruction for a long time, devoting it to participation in shows, activities for their group, spent a lot of money on the best possible reproduction of the character being reproduced, and also intensively explored literature and historical sources in order to best know the area what they are like are professionals. Perhaps a compromise should be sought here. However, it is undeniable that the group’s expertise can often be seen at first glance. The most reliable in terms of the workshop are much more often considered as a partner for cooperation with cultural institutions, they receive an offer to engage in films etc. It should be emphasized that historical reconstruction or reproduction is not a cheap occupation. Professionalisation often takes years. People are always the most important foundation. Only a properly managed team is able to engage in increasingly ambitious forms of activity and jointly achieve these long-term goals. Most historical reconstruction groups focus on doing hobbies, but in each of them there will be people whose activity takes on the character of paid work. As M. Pstrocka-Rak and M. Nowacińska (2013) rightly observed, the exact Polish scale of historical reenactment in Poland is unknown. Researchers A. Mikos v. Rohrscheidt and T. Jędrysiak (2011) estimate that it concerns 600 reconstruction groups covering about 12.5 thousand people. However, it is difficult to refer to these data as definitive and certain. Also in the often quoted by the authors of the publication ”The Great List of Robert Bagrit” (www.bagrit.pl) there is information that from 2001 about 600 groups of historical reconstruction have registered. However, it does not take into account both the activity of these groups and the profile of their activities. The opinions of reconstructors tend to double this sum, because not every organization operates on the basis of professional marketing, promotes itself in the media, participates in historical reconstruction events or even wants to go beyond the sphere of hobby. As noted A. Mikos v. Rohrscheidt (2011) reconstruction groups usually function as registered associations or informal groups whose regulations are based on internal arrangements. The most common source of learning about the reconstruction environment are websites and internet forums. Among the numerous should be mentioned among others (in Polish): ”FREHA. Forum Rekreacji Historycznych”, ”dobroni.pl Portal historii ożywionej”, ”HALLA Forum wikińskie” ”militarni.pl Portal-militarno-historyczny”, ”reenacting.eu”, or appointed via Facebook ”Rekonstrukcja Historyczna”, ”Odtwórstwo historyczne”, ”Odtwórstwo historyczne – Historical reenactment”.

Events with historical reconstruction groups have undoubtedly gained popularity over the past few years. Events involving ”live history shows” in their program have become an attractive spectacle for recipients, both intellectually and emotionally. The number of various events, shows or festivals referring to history is growing dynamically, and both the private sector and cultural institutions have

noticed the huge potential of this form of marketing. The scale and impact of these events on public space are beginning to be further analyzed. A recent article about one of the most popular events from the 14th to 15th centuries in Poland and one of the most recognizable medieval festivals in Europe – the ”Siege of Malbork” (http://oblezenie.zamek.malbork.pl) perfectly showed how through efficient management of museum events one can lead lively education and effective promotion aiming at building a long-term loyalty relationship – J. Hochleitner, I. Rekuć (2017). It turns out that it is education that is emphasized each time as the primary goal of all, even the most commercial shows. The problem of historical education in the field of historical reconstruction was raised, among others in the book: K. Olechnicki, T. Szlendak, A. Karwacki (2016). In research co-financed by the Ministry of Culture and National Heritage regarding activities for the promotion of national culture, carried out in 2016 and published in a specially prepared report (Warszawa 2016), the phenomenon of historical reconstructions and their impact on public space as well as their function in the process of propagating patriotism were just looked at. One of the study segments was to raise the issue of education. The first respondents surveyed were a group of viewers participating in these events. The study involved 400 people during events from July 10, 2016 to August 27, 2017 in events in 15 cities in Poland. Respondents were asked to provide goals, which in their opinion are the main reason for organizing historical reconstructions (In this and other questions more than one answer could be chosen, therefore the answers do not add up to 100%). Practically ¾ of the respondents (73.1%) indicated education. Over half (52.8%) said that the purpose of the reconstruction is to popularize history. However (30.6%) of the respondents indicated entertainment. Only (4.7%) of the respondents indicated the function of motivating organizing these undertakings. In addition, the respondents were also asked to assess the phenomenon of reenactment. (79.2%) of respondents considered them to be one of the most interesting forms of history teaching. For (57.5%) historical reconstruction is a combination of science and education, for (30.8%) an element of historical politics, and for (25.4%) an interesting entertainment event. Similarly, similar questions were asked to historical reconstructors / performers. It turned out that in their opinion, the phenomenon of reconstruction primarily serves education and promoting history. The subjects were asked to define the right purpose of historical reconstructions in their opinion. The survey was conducted on a group of 204 people representing various groups of historical reconstruction. As many as (61%) respondents indicated the mission of popularizing history and (60.5%) education. (38.5%) of the respondents were in favor of entertainment. Indeed, from the perspective of the public history mission, education is of the greatest importance here. This truth makes us aware of one basic problem that should be considered key in the effective management of history in public space. Namely, the question of how to support contemporary reenactment in Poland to preserve its historical and educational value? Many authors in their publications on historical reconstructions pointed out that the level of education was very different, often unfortunately dramatically poor. At the time, as the lesson was showing, the show whether the historical festival was quickly turning into an entertainment festival, and thus its educational value was losing importance. It is not surprising, therefore, that M. Bogacki’s opinion on the suggested naming of most projects that instead of ”reconstruction” should be called ”reproduction”.

Certainly, the professionalization of groups promotes a more reliable message and makes the image look professional, arousing greater confidence of the recipient as to the correctness of the transmitted content. Also, cooperation with cultural institutions affects the viewers' conviction as to the right substantive competence. Financial issues and the possibility of support from local authorities and other sources that would enable the development of historical reconstruction groups are also significant here. In Poland, as rightly noted by M. Bogacki, the group of "reconstructors – professionals" is small and consists mainly of people with extensive experience and experience in reproduction. These include groups such as: Legio XXI Rapax (http://www.legioxxirapax.com), Association Kaperska Kompania (http://kompania-kaperska.pl) Smocza Kompania (http://www.smoczakompania.pl) Jomsborg Vikings Hird (http://wioskawikingow.pl) or Opolskie Bractwo Rycerskie (https://opolskiebractworycerskie.pl.tl) whose members participated in the study carried out for the purposes of this article. These groups are involved in the reconstruction of various historical periods from antiquity to Napoleonic times. However, their activity is over 5 years of activity ”in the industry”. In total, 234 respondents from at least 62 historical reconstruction groups took part in the study (providing the name of the group in the survey was not mandatory):

Table 1: List of historical reconstruction groups whose members took part in the study (Most groups have a page on social media on Facebook, only a few the website.)

Group name	Website / page on social media
Bractwo Rycerzy Ziemi Sztumskiej	https://www.facebook.com/RycerzeSztumu/
Ogólnopolskie Stowarzyszenie Braci Rycerskiej Malleus Maleficarum	https://www.facebook.com/Malleus.Maleficarum.Poland/
Elbląskie Bractwo Historyczne	https://cutt.ly/vtNLh82
Chorągiew Piastów Śląskich	https://www.bractwo.net.pl/
Sekcja Rekonstrukcji Historycznej im. Gen. Józefa Chłopickiego Akademii Wojsk Lądowych	https://cutt.ly/stNLfBT
Płocka Grupa Rekonstrukcyjna	https://www.facebook.com/pgrplock/
Legio XXI Rapax	http://www.legioxxirapax.com/
Chorągiew Zaciężna Ziemi Kujawskiej	https://www.facebook.com/chzzk2018/
Chorągiew Piastów Śląskich	https://www.bractwo.net.pl/
Stowarzyszenie Kompania Kaperska	http://kompania-kaperska.pl/category/wydarzenia/
Rebel regiment	https://www.facebook.com/Rebel.Regiment.Poland/about
Świdnickie Bractwo Rycerskie	https://www.facebook.com/sbrswidnica/about
Rycerze Gniewu	https://www.facebook.com/rycerze.gniewu/about
Chorągiew husarska województwa Kujawsko - pomorskiego	https://www.facebook.com/husaria.kujawsko.pomorska/
Stowarzyszenie "Odwach"	https://cutt.ly/vtNLk6J
Bractwo Rycerskie Zamku Olsztyńskiego	http://www.brzo.olsztyn.pl/historia-brzo
Smocza Kompania	http://www.smoczakompania.pl/
Bractwo Rycerskie Zamku Bolków	https://www.facebook.com/bractwo.rycerskie.zamku.bolkow
Chorągiew Ziemi Międzyrzeckiej	https://www.facebook.com/chozmie/
Bractwo Rycerskie Ziemi Górowskiej	https://www.facebook.com/BractwoRycerskieZiemiGorowskiej
GRH Routiers	https://www.facebook.com/GRHRoutiers
Drużyna Rycerska Komturii Ostródzkiej	https://cutt.ly/etNLzUe
Żółty Regiment Piechoty JKM Gustawa II Adolfa	–
Poczet Rycerski Herbu Sobol	https://www.facebook.com/poczetsobol/
Kondotier	https://www.facebook.com/stowarzyszenie.kondotier/about
Stowarzyszenie Kłodzkie Bractwo Rycerskie	https://www.facebook.com/biuro.kbr/
G.R. H Gawra	https://www.facebook.com/gawraslask
Grex Venalium	https://cutt.ly/1tNLxV6
Pospolite Ruszenie Szlachty Ziemi Krakowskiej	https://www.facebook.com/PospoliteRuszenieKrakow
Bractwo Rycerzy Ziemi Sztumskiej	https://www.facebook.com/RycerzeSztumu/
Zespół Muzyki Dawnej ViatoreS	https://www.facebook.com/ViatoreS.zespol/about/
Grupa Rekonstrukcji Historycznej Księstwa legnicko-brzeskiego	https://grhklb.pl.tl/
Kiemlicze i Kompania	https://cutt.ly/ftNLvim
Projekt Wisłoujście	http://projekt-wisloujscie.pl/index.php/page-d-exemple/
Poczet Rycerski Herbu Fastolf	https://poczetrycerski.wordpress.com/

Krąg Rycerski Nowa Sól	https://www.facebook.com/KragRycerskiNowaSol/
Tarnowskie Bractwo Rycerskie "Gladia Amici"	https://www.facebook.com/tbrga/
Stowarzyszenie Rekonstrukcji Militarnych "MASURIA"	https://www.facebook.com/ketrzynmasuria/
Jomsborg Vikings Hird	http://wioskawikingow.pl/pl,jomsborg-vikings-hird,2,61,64.html
Stowarzyszenie Artylerii Dawnej "Arsenał"	http://www.oldartillery.pl/strona/pl/
Neustadt Bande	https://www.facebook.com/NeustadtBande/
Bractwo Rycerskie Zamku Lubawa	https://www.facebook.com/bractworycerskiezamkulubawa
Rota Zaciężna Strażnicy Miasta Sensburg	https://cutt.ly/mtNLbTd
Zakon Rycerski Rudenband	https://www.facebook.com/Zakon-rycerski-Rudenband-599023666828320/
Bractwo Rycerskie Joannitów Strzegomskich	https://www.facebook.com/BractwoRycerskieJoannitowStrzegomskich
Chorągiew ziemi malborskiej	https://www.facebook.com/bractwo.chzm/
Chorągiew Rycerstwa Ziemi Lwóweckiej	https://cutt.ly/HtNLnMn
Działdowskie Bractwo Rycerskie	https://www.facebook.com/DzialdowskieBractwoRycerskie/
Bractwo Zamku Grodno	https://www.facebook.com/bractwo/
Bractwo Rycerskie Zamku Kurzętnik	https://cutt.ly/CtNLQbo
Opolskie Bractwo Rycerskie	https://opolskiebractworycerskie.pl.tl/
Zastęp Rycerski z Chełmna	https://www.facebook.com/zastepchelmno/
Chorągiew Księstwa Ziębickiego	https://cutt.ly/4tNLWDz
Swawolna Kompanija Ziemi Łęczyckiej	https://www.facebook.com/SwawolnaKompanija
Zastęp rycerski zamku Jaschnitz	https://www.facebook.com/Jaschnitz/
Drużyna Wojów Bolesławowych Białozór	https://cutt.ly/AtNLE6s
Chmurnicy wojowie grodu Łekno	https://cutt.ly/atNLTof
Bractwo Rycerskie Komturii Nidzickiej	http://rycerze.org/
Drużyna Drabów Pieszych z Pruszkowa.	_
Rota Zaciężna Strażnicy Sensburg	https://cutt.ly/rtNLYaK
Drużyna Najemna Miecza i Strzały Denemis Częstochowa	https://cutt.ly/8tNLUeI
Stowarzyszenie Historyczno Eksploracyjne Księstwa Legnickiego	https://cutt.ly/ItNLIbN

Source: own elaboration

The majority of respondents were men, a total of 74.8% of respondents (175 respondents), women 25.2% (52 respondents). In the aforementioned research report (Warszawa 2016) in part of the quantitative study, the percentage of men constituted 72% of respondents, women 28%, which is a very similar statement to the one presented today. According to the interviewers, this diversity could be due to the fact that the phenomenon of reconstruction is more popular among men, which they believe: "It is conditioned culturally and historically. Part of the reconstruction concerns battles, wars or historical periods in which the role of women was not dominant. Therefore, they less often participate in reconstructions. " This phenomenon is not fully researched, therefore this opinion does not prejudge the fact that it is mainly a male occupation. It is worth noting that in this environment there are several groups consisting of women themselves, such as: Morskie Suki – female crew Orła Jumne, which are not necessarily engaged in the craft of ”typical for a woman” (https://www.facebook.com/femeagle), also many women take active part in battle shows (most often as light infantry, archers etc.).

The largest group among the respondents were people aged 27-35 (50%), respectively between 35-51 years (21.8%) and (20.5%), between 18-26 years of age. People between the ages of 52-60

constituted (6%) of the respondents, and only (1.7%) of the respondents gave the age above 61 years. It follows that historical reconstruction groups are mainly made up of young people up to the age of 35, i.e. in the most creative and leisure-free period that can be spent on hobbies, or attempts to implement original or innovative ventures. The low participation of people over 61 in historical reconstruction can be explained by the fairly short period of presence of this form of activity in Poland, which was not so popular in past generations, as well as its very nature. Camping in the open, increased physical activity, activity in the group's life: trainings, trips (several days, monthly) etc. are not particularly attractive for older people.

The vast majority of respondents have been working in historical reconstruction groups for a long time. Membership in the group over 5 years declared (70.1%) 164 people, (21.4%) 50 people belong to the group from 2-5 years, (6%) 14 people from one year to 2 years, and only (2.6%) 6 people under one year. The group of respondents therefore concentrates mainly people who have been involved in reconstruction for a long time, thanks to which, as you can suppose, they can better define their needs and correctly emphasize the principle of problems that the reconstruction environment must face in Poland.

Regarding the professional situation, as many as (86.1%) or 199 people declared themselves as working persons. Only 22 people (9.5%) as learners. And only (3%) 7 people as unemployed and (1.3%) 3 people as pensioners. This result can be compared with the question about the extent to which belonging to historical reconstruction groups is related to practicing hobby. As many (38.5%) 90 people indicated hobby as the only motivation and exactly the same number of respondents (38.5%) 90 people as one of the main reasons for engaging in this form of spending free time. (13.2%) 31 people indicated that this is not the only interest they engage in so much (6.8%) 16 people definitely do not see their activities as hobby, and only (3%) 7 people see in it a hobby and additional gain value. The combination of these two answers to the questions asked shows that the reconstruction community is primarily people seeking development for their passions. Most of the respondents are professionally employed who are not forced to maintain reconstruction activity. This is very important because the group of these people, constituting 86.1% in this case, will not necessarily motivate funds, and what is more, they will not necessarily engage in education-oriented activities, and even if it results only from their individual desires or beliefs. Interesting is the same question 5 from the survey, in which respondents were asked about how much belonging to historical reconstruction groups is related to the desire to educate society. 15% of respondents said that this is the basic value of what they do. 37.6% were in favor of the fact that education is largely important in their activities, but it is not expansive. 34.2% admitted that they readily educate recipients, but only if they see their interest. 12.4% of respondents said that they do this to a small extent because they do not feel predisposition in this regard. However, only 0.9% admitted that they did. It does not have sufficient historical knowledge. It follows that the reconstructors rather belong to people willing to share knowledge, and what they expect from the recipient is primarily interest. This comparison shows that the reenactors will respond to the needs of the recipients in a positive and willing way, but they will not rather be the initiators of this activity. Rather, it is expected from the participant and the viewer. This is important in composing the event space, its narrative, and script to plan a place for the recipient's emotions, whose enthusiasm and desire to acquire detailed knowledge would motivate the reconstructor to get involved and want to draw the viewer into a more specialized area of knowledge.

Chart 1 : How much my belonging to historical reconstruction groups is related to the desire to educate society?

Source: Own elaboration based on the research results

In the next question, respondents were asked whether they perceive the need for intensified educational activities on the part of historical reconstruction groups that would complement the performances at historical festivals. As many as 52.6% of respondents said that this form of education is very important, while 32.9% – rather yes. 8.1% have no opinion on this subject, 6% said that they are rather not. Only 0.4% of people were of the opinion that they definitely did not see such a need. The high percentage of people who were in favor of intensifying education to which historical reconstruction groups would be the sender shows that, according to the reenactors, it is needed. For recipients, these additional initiatives, enriching larger events such as historical festivals, could become an opportunity to deepen knowledge not only in relation to the main staging (usually a battle scene show), but to learn about the era, social history, cultural history, and above all with microhistory. Shifting the center of gravity to the latter could greatly contribute to developing the concept of modern man about the past. A microhistory bypassing great processes and addressing the problems of everyday life could become a narrative and more accessible narrative than discussing only the main issues, the understanding of which requires knowledge of a series of political or social events (this is not possible to achieve in the time allocated for the presentation).

Chart 2 : Do you see the need to intensify educational activities (exhibitions, lectures, etc.) on the part of historical reconstruction groups that would complement the performances at historical festivals?

Source: Own elaboration based on the research results

The process of professionalizing historical reconstruction groups is long and often very difficult. As a result, many groups only stop for hobby activities. A barrier to development is primarily a problem

with financing activities, as well as a lack of support from cultural institutions or local authorities (this is especially visible in small towns where groups often have a problem finding a cooperator, e.g. a museum located in a historic building, behind through which you can easily start long-term operations). Most of the money that goes to the budget of historical reconstruction groups is obtained independently. Groups usually set up associations for this purpose. On the other hand, many group members decide to run their own business, which allows them to sell services in the form of event services, demonstrations, or sale of craft products, etc. Respondents asked about whether they receive external support for conducting reconstruction activities for the most part, because as many as (59.4%) replied that they did not – they do not receive such support. (26.1%) of the respondents answered yes. However, 14.5% that they do not have such information. Another question was directed to people who answered yes to the question about receiving financial support. Respondents indicated three main sources of such financing. These include the municipalities (49.4%), self-government cultural institutions (48.3%) and independent sponsors (44.9%). Co-financing of actions by foreign capital is only (6.7%). Thus, it turns out that historical reconstruction groups are mainly supported by Polish capital, including institutions and local authorities focused on the development of culture and local promotion. Unfortunately, the problem of lack of co-financing may concern more than 2/3 of historical reconstruction groups.

Chart 3 : Does my group receive external support for reconstruction activities?

Source: Own elaboration based on the research results

Chart 4 : If yes, what are the most common sources of funding?

Source: Own elaboration based on the research results

Another question concerned the exploration of ways of obtaining financing for historical reconstruction groups by themselves. First, the respondents were asked whether the groups of which

they are members obtain external financial support for conducting reconstruction activities? (44.9%) of respondents replied that they obtained money in this way for actions. (43.6%) admitted that they did not. However (11.5%) admitted that they did not have information on this subject. In the second supplementary question, the respondents were asked to indicate the most common sources for such financing. The vast majority, as much as 65.2% indicated the sale of services (organization of paid shows) and goods produced by the group (jewelry, clothes, tools). Subsequently (38.5%) own proprietary project submitted by the group, e.g. as an association, business entity as part of competitions related to the development of culture. (20%) respondents indicated independent sponsors, (11.9%) other sources, only (11.1%) co-financing from European Union funds. Most groups seek sources of financing on their own, focusing primarily on selling services. The commercialization of historical shows may be partly the result of the reconstruction groups' pursuit of development, which in this way can easily offer a "product" that provides them with cash. Unfortunately, the choice of this form carries many dangers related to the quality of the message focused on educational value.

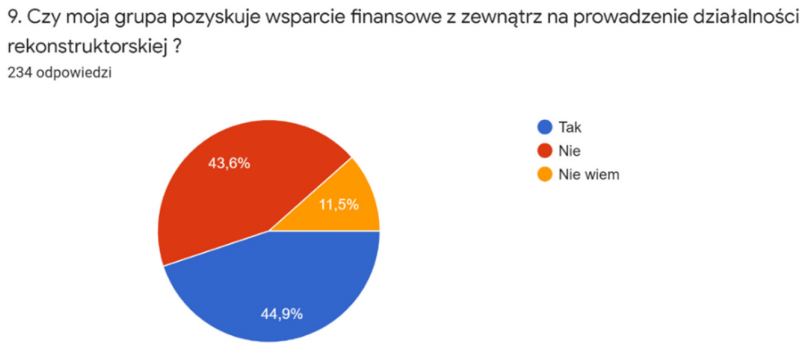

Chart 5: Does my group get external financial support for reconstruction activities?

Source: Own elaboration based on the research results

Chart 6 : If yes, what are the most common sources of such funding?

Source: Own elaboration based on the research results

Lack of financing in the process of professionalizing the group is undeniably one of the main barriers. In the question in which the respondents were asked to indicate the basic problems in the process of forming a group of historical reconstruction and to start action not only in the private – hobby, but

public sphere – the largest number of respondents, as many as 57.7% of those surveyed. Another significant problem, according to respondents, is the lack of places that the commune would make available free of charge for groups to organize trainings, workshops, lectures and meetings (48.3%). The third is the ratio of financing bodies treating reconstruction groups as a product providing entertainment for the masses (38.5%). In addition, the respondents pointed out problems such as: seasonality of reconstruction festivals or the unattractiveness of the place of action, the group preventing the development of activities and making it the main gainful activity (21.8%), other (16.2%) and: inability to receive a good contract due to the lack of experience in organizing shows (6%).

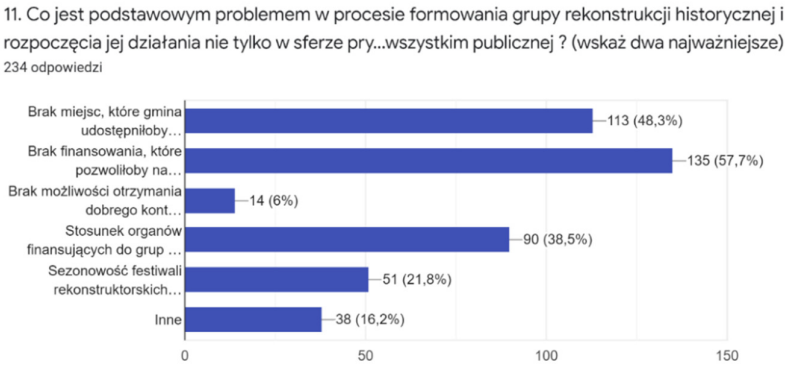

Chart 7 What is the basic problem in the process of forming a group of historical reconstruction and starting its operation not only in the private (hobby) and above all public sphere? (indicate the two most important)

Source: Own elaboration based on the research results

An important question addressed to reenactors was a request to indicate the greatest barrier to cooperation between cultural institutions and historical reconstruction groups. Their role in the process of introducing groups into public education-oriented public spaces is enormous. Actually, thanks to mutual cooperation, it is possible to carry out many projects, which for museums, cultural centers or libraries are an excellent promotion, a strategy to attract customers and tourists, and often a way to attract lucrative financing. The main problem that accompanies this cooperation is the issue of remuneration for demonstrations or museum lessons (33.3%). Cultural institutions are poorly funded, which is why gratification is often only symbolic. The second barrier indicated by the respondents was: lack of agreement on participation in the education process, treating historical reconstruction groups only as curiosities for enriching the program, ignoring the competences, knowledge and education of its members (32.9%). On the other hand, the third problem pointed out by the respondents was the form of the institution, which is non-progressive and is not interested in new forms of disseminating history (28.6%). The perception of historical reconstruction groups as a competition that is prevented from establishing lasting cooperation was indicated only by (5.1%) people.

Chart 8 : What in my opinion is the biggest barrier to cooperation between cultural institutions and historical reconstruction groups?

Source: Own elaboration based on the research results

The last two questions served as an attempt to indicate areas of cooperation that would allow support for historical reconstruction groups in their public education-oriented activities by a) cultural institutions (Figure 9) and b) local authorities (Figure 10). In the case of the former, the reenactors would most likely see their role in cooperation as guides or storytellers providing additional, professional service for exhibitions (they have experience about what they are talking about, they used objects known from exhibitions, etc.). 37.6% of the respondents were in favor of this solution. Another interesting solution would be the possibility for the institution to provide a place that groups could use for their own needs (shows, workshops) (29.5%). Interesting to the respondents was also the offer to create a database shared between institutions in order to use groups for the needs of current festivals, exhibitions, etc. enabling the transfer of historical reconstruction groups within a cultural institution (18.8%). The proposal to create channels in social media in cooperation of historical reconstruction groups and cultural institutions promoting each other only interested (6%) respondents. (8.1%) also indicated ”other” solutions. For the second chart, the most interesting way to support local authorities would be to create a program dedicated to historical reconstruction groups that would provide funding for educational activities (32.5%). As the second most attractive form of support, respondents indicated promoting the participation of historical reconstruction groups in education by organizing and financing meetings with school youth (27.4%). The third - free access to rooms in community centers / communal premises etc., where meetings for historical reconstruction groups could be held with open access for those interested (22.2%). Only (4.3%) of respondents indicated the possibility of co-financing groups dealing with ancient crafts and promoting them in museums by dedicating dedicated exhibitions. However, a small percentage in this case may be related to the fact that only a small percentage of reenactors deal with real craftsmanship. On the other hand (2.1%) the respondents chose the answer ”other”.

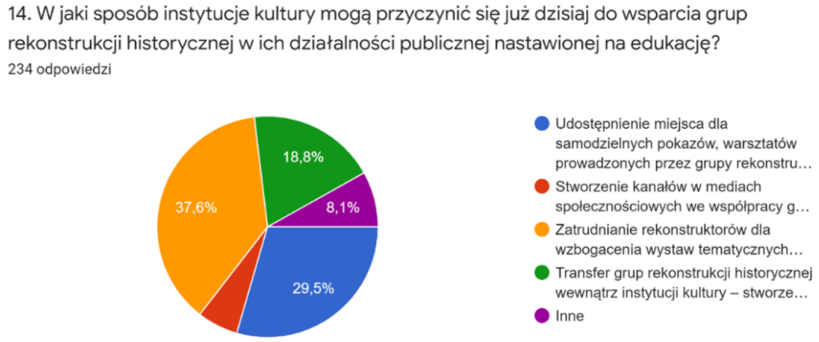

Chart 9 : How can cultural institutions contribute today to support historical reconstruction groups in their public education-oriented activities?

Source: Own elaboration based on the research results

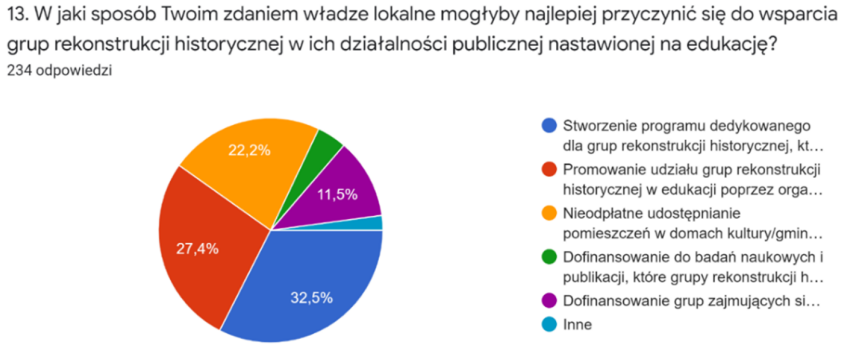

Chart 10 : How do you think local authorities could best contribute to supporting historical reconstruction groups in their education-oriented public activities?

Source: Own elaboration based on the research results

The activity of history in public space is not only more and more visible, but most importantly, this phenomenon is subject to in-depth reflection on the further possible perspectives of its acceleration and the necessary evolution. Efficient management of history in public space guarantees the experience of emotions that the modern consumer willingly becomes a buyer, and also transfers knowledge in such a way that a person becomes an engaged recipient, and not just a passive observer. Historical reconstruction (activities around reconstruction is an element of public history, which has definitely a huge educational potential thanks to both the huge contribution of passion of the members of the reconstruction movement, as well as an attractive and engaging form of disseminating knowledge. The only condition that must be met for this education to work properly is support for reconstruction groups in the process of their professionalization, as well as increasing confidence in their competences. Research carried out on members of reconstruction groups showed that education is one of the basic foundations of initiatives undertaken by these organizations, and that the lack of this foundation completely excludes reconstructive activity in the area of science popularization. Cultural institutions and local authorities are of particular importance in the process of professionalizing groups, because it is primarily their initiative and openness that favor cooperation ensuring the possibility of obtaining funding and facilities necessary for further development. The area of cooperation is very extensive, ranging from the most anticipated financial

assistance to the proposal of cooperative activities or free rental of rooms to support independent initiatives.

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Leadership in Crisis – A Practical Approach

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Abstract

In general, the concept of crisis is attributed to a negative value, most often perceiving threats only, and the opportunities associated with positive change are not recognized. In addition to the difficulties of functioning, the crisis can be a source of significant changes and unexpected benefits. Skalik (1990) mentioned. When an organization is in crisis, there is a need for consistent leadership. Russel E. Pallmer (2010) mentioned. There is not much time to deliberate and endlessly discuss what decisions to make. The leader must take the lead and take personal responsibility for what is happening. It is known that managers are people who properly perform tasks, while leaders perform the right tasks. In the book by Kotter (1990) While managers acquire the ability to perform tasks well, leaders are focused on doing good tasks. The article presents the structural leadership framework in the face of crisis and a model of leadership maturity in the empirical dimension. Due to the cyclical nature of the research process, further research in the area of interest could be heading in the below mentione directions: developing a leadership model using the deductive method (i.e. by deriving from their one or more sentences some of their succession, i.e. a logically derived sentence) in a research study by Nachmias Ch.F., Nachmias D.(2001), building a leadership model using quantitative methods, identify other leadership contexts, shaping leadership flexibility ,measuring changes in leadership.

Keywords: Leadership, Crisis, Company

Introduction

Although interest in practice and developing leadership skills has been going on for thousands of years, leadership is nowadays both the most widely studied and the least understood issue in social sciences. In the book by Kosy, Ksiażek (2014), Książek, V. Motzko, Ch. Motzko, S. Kaiser, D. Schmitz (2014). According to Ph. Kotter, leadership is about coping with change. It has become so important, among others, because companies operate in a turbulent environment, i.e. an environment in which changes are disordered, chaotic, multidirectional and multilevel. Lichtarski (1992) mentioned. This environment is characterized by complexity and variability. Complexityis determined by the amount and variety of elements that make them up, which the company should consider in the course of its activity. In a research study by Puszko-Machowczyk (2007) The variability of the environment occurs as a result of changes occurring within individual components of the environment as well as as a result of relationships (connections) between them. Changes occurring in the modern enterprises environment: are caused by many reasons (they can come from various sources), are rapid, discontinuous, both in structure and directions of activity, have a wide range, are difficult to predict, identify, can affect the whole enterprise or its individual parts, may be an opportunity or a threat to the other enterprises, are of great intensity, depth and multitude. And the more changes, the greater need for leadership. In the book by Galata (2007) The need for leadership is relatively important in a crisis situation. The aim of the article is to identify the possibilities of

implementing the leadership demand and to develop a leadership model in the face of the crisis in the light of economic practice.

Characteristics of the research

Empirical research covered companies representing the construction industry. The aim of the study was to recognize the current state of leadership and leadership maturity in terms of crisis. In the course of research, verification of the following hypotheses was assumed:

1.The larger the size of the company and the broader scope of activity, the greater the propensity to resolve protective problems in leadership in a crisis through adaptation.
2.The smaller the size of the company and the narrower the scope of activity, the greater the tendency to take up anticipative transgressive leadership problems in the face of crisis.

The choice of enterprises was conditioned by the specifics of the construction industry (e.g. product real estate, product and crew mobility, participation of the contracting authority in the production process, employment fluctuation, climatic seasonality of production, aesthetic significance of the product, artistic qualifications of the designer and parts of contractors, longevity and capital intensity of structures, complexity of the production process) and industry characteristics from the market demand side. In a research study by Gorynski (1981), Jerzak (1990), Pabian (2001), Smialowski (2000), Uchma (1998), Puszko-Machowczyk (2007). Empirical research was conducted with the useof the survey method. Surveys were conducted in enterprises located in Lower Silesia in the first half of 2020. The scope of research included: recognition of the essence, current state and mechanism of the leadership phenomenon in the light of the crisis. The time horizon of the research covered the years 2000-2020 (i.e. it was equal to the period of the company's operation on the market). Nominated leaders answered the questions in the survey. 12 leaders were examined to obtain research material. The criterion for selecting a sample was the consent of the respondent. The sample thus formed does not meet the criterion of a statistical sample. It is also not a random sample.In the light of the above presented conditions, the study should be treated as a case study. Detailed information on the methodology of empirical research is presented in Ledzianowski (2012).

Leaders represented enterprises classified according to the following criteria:

1.Enterprise size**:** Ustawa z dnia 2 lipca 2004 o swobodzie działalnosci gospodarczej, (2004) mentioned. From the point of view of size, the research was attended by: 8% of large enterprises (marked as D in the remainder of the article), 17% of medium-sized enterprises (**S**), 33% of small enterprises (M) and 42% of micro enterprises (Mi) (Table 1).

Table 1: Structure of enterprises in terms of their size

Enterprise number	Enterprise size
8	Largeenterprise
4, 10	Middle sizeenterprise
1, 5, 6, 7	Smallenterprise
2, 3, 9, 11, 12	Micro-enterprise

2.Basic type of activity. From the point of view of the basic type of activity, the research was attended by: 100% of enterprises whose basic type of activity is the erection of complete buildings or their parts; civil engineering (P). The structure of enterprises from the basic type of activity point of view is presented in Table 2.

Table 2: Structure of enterprises from the basic type of activity point of view

Enterprise No.	Basic type of activity
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	Enterprises whose main activity is the construction of complete buildings or parts of them; civil engineering.

Results of the Empirical Research

Leadership is: the actions or behavior of a leader to change a group (16% including 8% of D, 8% of Ś; 16% of P), interpersonal relationships with others based on willingness, not on forms of pressure Merton (1969) mentioned (8% including 8% of S; 8% of P), the ability to go beyond a specific organizational culture and then initiate the process of evolutionary changes generating an increase in adaptability Shein (1992) mentioned (8% including 8% of M; 8% of P), the process of creating the sense of cooperation necessary to understand the essence of action In the book by Drath and Palus (1994) (32% including 16% of M, 16% of Mi; 32% of P), using non-compulsory influence to shape the goals of the group or organization, motivating behaviors focused on achieving those goals and helping to define the culture of the group or organization (16% including 8% of M, 8% of Mi; 16% of P) and the term of dealing with change Griffin (2002) mentioned (16% including 16% of Mi, 16% of P) (Table 3).

Table 3: Defining leadership

Definition	Leader No
1. Leader's actions or behavior aimed at introducing changes in a given group	8,4
2. Interpersonal relationships with others based on willingness, not pressure	10
3. The ability to go beyond the specific organizational culture and then initiate the process of evolutionary change generating an increase in adaptability	1
4. The process of creating a sense of cooperation necessary to understand the essence of action	2,3,5,6
5. Using non-compulsory influence to shape the goals of a group or organization, motivating behaviors focused on achieving those goals and helping to define the culture of the group or organization	7,9
6. Leadership is dealing with change	11,12

Based on the information presented in Table 3, it can be seen that understanding the concept of leadership in empirical terms correlates with the definition of this term in the literature. Leadership is both a process and a certain property. As a process, leadership relies on the use of influence skills, without resorting to coercive measures, with the intention of shaping the goals of the group or organization, motivating behaviors focused on achieving those goals, and helping to specify internal procedures for implementing the project. On the other hand, leadership defined as properties can be treated as a set of unique and specific features attributed to individuals that are perceived by the environment as the qualities of a leader. Leadership understood this way is relatively important in the face of the crisis.

The concept of crisis in relation to leadership in an organization is difficult to define due to its multidimensionality and various subject references. Zakrzewska-Bielawska (2008), Zawila-Niedzwiecki (2008) mentioned.

This is confirmed by economic practice, which understands the crisis as:

1. The main, unpredictable event that has potentially negative effects, significantly limiting the organization's activities in the field of production, services, employment, financial condition and reputation: (8% including 8% of M; 8% of P),
2. The state of internal imbalance caused by a critical event. He is characterized by very high emotional tension, fear of losing control, a feeling of terror and a sense of helplessness, as well as various forms of behavior disorganization and somatic symptoms. It is a turning point requiring appropriate action to be taken: (8% including 8% of M; 8% of P),
3. Any event or activity that may have a potentially negative impact on the credibility and efficiency of a business and which is typical remains or will soon be beyond the control of that business: (8% including 8% of D; 8% of P);
4. Consequence of the sectors life cyclephases, especially for specialized enterprises, while innovationsare not a guarantee for the disappearance of the crisis and the survival of the enterprise: (8% including 8% of Mi; 8% of P);
5. A situation or condition in which, as a result of accumulation of difficulties, the implementation of the basic functions of the enterprise is at risk, while limiting the organization'sability to eliminate the existing situations or condition: (8% including 8% of Mi; 8% of P);
6. A condition that threatens the survival of the company and the achievement of its goals, limits the time available for remedialaction and surprises decision makers with its appearance, thuscreating conditions of strong pressure: (8% including 8% of Mi; 8% of P);
7. The effect of the appearance of unexpected disruptions in the organization'soperations, including internal and external factors of a randomnature: (8% including 8% of S; 8% of P);
8. A situation in which the organization (s) found them selves face to face with critical problems and in which they experience unrelenting external pressure and deep internal pressure: (8% including 8% of Mi; 8% of P);
9. Result of unplanned events disturbing or threatening the normal functioning of the company: (8% including 8% of Mi; 8% of P);
10. A certainpathology in enterprise development, often caused by the disproportion between the goals and resourcesused to achievethem. It is a specific decision-making situation: (8% including 8% of S; 8% of P);
11. The situation of a greatthreat to the organization as a whole, in which due to the accumulation of various difficulties and intensification of conflictphenomena, the implementation of its basic functions is at risk: (8%, including 8% of M; 8% of P);
12. The consequence of disturbances in the existence or implementation of one orseveral factors determining the existence and development of an enterprise, boththose with external and internalimpact, depending on the efficiency of management: (8% including 8% M; 8% P) (Table 4).

Table 4: Defining the crisis

Definition	Leader No
1. The main, unpredictable event that has potentially negative effects, significantly limiting the organization's activities in the field of production, services, employment, financial condition and reputation	1
2. The state of internal imbalance caused by a critical event. He is characterized by very high emotional tension, fear of losing control, a feeling of terror and a sense of helplessness, as well as various forms of behavior disorganization and somatic symptoms. It is a turning point requiring appropriate action to be taken	5
3. Any event or activity that may have a potentially negative impact on the credibility and efficiency of a business and which is typical remains or will soon be beyond the control of that business	8
4. Consequence of the sectors life cycle phases, especially for specialized enterprises, while innovations are not a guarantee for the disappearance of the crisis and the survival of the enterprise	2

5. A situation or condition in which, as a result of accumulation of difficulties, the implementation of the basic functions of the enterprise is at risk, while limiting the organization's ability to eliminate the existing situations or condition	3
6. A condition that threatens the survival of the company and the achievement of its goals, limits the time available for remedial action and surprises decision makers with its appearance, thus creating conditions of strong pressure	9
7. The effect of the appearance of unexpected disruptions in the organization's operations, including internal and external factors of a random nature	4
8. A situation in which the organization (s) found themselves face to face with critical problems and in which they experience unrelenting external pressure and deep internal pressure: (8% including	11
9. Result of unplanned events disturbing or threatening the normal functioning of the company	12
10. A certain pathology in enterprise development, often caused by the disproportion between the goals and resources used to achieve them. It is a specific decision-making situation	10
11. The situation of a great threat to the organization as a whole, in which due to the accumulation of various difficulties and intensification of conflict phenomena, the implementation of its basic functions is at risk	6
12. The consequence of disturbances in the existence or implementation of one or several factors determining the existence and development of an enterprise, both those with external and internal impact, depending on the efficiency of management	7

The causes of the crisis are exogenous and endogenous. External causes of the crisis mainly come from the micro-environment and concern: adverse changes in commodity prices (100% including 42% of Mi, 33% M, 17% of Ś, 8% of D; 100% of P), adverse changes in the condition of business partners (48% including 16% of Mi, 16% of M, 8% of Ś, 8% of D; 48% of P) and a decrease in demand for the company's products or changes in its structure (48% including 16% of Mi, 24% of M, 8% of Ś; 48% of P). On the other hand, macro-environment is caused by changes in legal regulations (16% including 16% of Mi; 16% of P) and random factors (8% including 8% of Ś; 8% of P).Internal causes are seen as:

•In terms of people: no identification of employees with the enterprise, which limits their activity, entrepreneurship and the strength of the incentive effect of incentives (8% including 8% of Mi; 8% of P), indecisiveness in management and decision making (16% including 8% of Mi, 8% of M; 16% of P), other (i.e. lack of qualified laborforce) (16% including 8% of Mi, 8% of M; 16% of P);
•In relation to the organizational structure: deficiencies in organization management (8% including 8% of S; 8% of P), incorrect organizational solutions (8% including 8% of M; 8% P), mismatch with the strategy (8% including 8% of M; 8% of P) and poor information flow (16% including 8% of M, 8% of Ś; 16% of P).

In turn, the low quality of the material and production base (8% including 8% of Mi; 8% of P) is the cause of the crisis in the domain of technology.

Tables 5 and 6 presents the most important causes of the crisis.

Table 5: External causes of the crisis

External causes	Leader No.
Macro-environment	
• changes in legal regulations,	2,9
• random factors.	10
Microenvironment (competitive environment)	
•adverse changes in the condition of business partners,	2,4,5,6,8,11
• decrease in demand for the company's products or changes in its structure,	1, 3, 4, 6, 7, 12
• adverse changes in commodity prices.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

Table 6: Internal causes of the crisis

Internal factors	Leader No.
1. People	
• lack of identification of employees with the enterprise, which limits their activity, entrepreneurship and the strength of the incentive effect of incentives,	11
• indecision in management and decision making,	5,9
• other (i.e. lack of skilled labor).	1,2
2.Organizationalstructure	
• deficiencies in management organization,	10
• incorrect organizational solutions,	6
•strategy mismatch,	7
• bad information flow.	7,4
3.Technique	
•low quality of the material and production base.	3

Most leaders agree that an organization's crisis is a difficult situation. This concept is characterized by actual or apparent loss of control over its activities, disturbance of the internal balance of the organization, threat to the existence of the organization or its part (function), deterioration of the financial condition of the organization, limiting its development opportunities, threat to the company's strategic goals, ambivalence of development and repair opportunities, possibility violation or loss of public confidence and internal faith in the organization, which deteriorates its image, short decision-making time, high risk, a high degree of uncertainty causing employees' fears and fear, low predictability, disrupted organization's activities. It means a state in which action may face serious obstacles, which undoubtedly causes a special decision-making situation for them (leaders).

Considering the information presented so far, it can be expected that as a result of leadership actions overcoming the symptoms of the crisis, there will be a return that will prolong the functioning of the enterprise or the enterprise will be liquidated.

Figure 1 in a research study by Gopinath (1991) shows how to overcome the crisis in the enterprise.

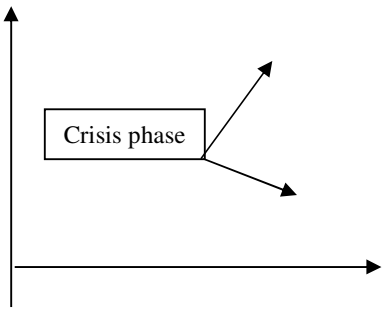

Fig. 1: Overcoming the crisis in the enterprise

Model of leadership maturity in the face of a crisis

Taking into account the difficulties associated with measuring leadership and the attributes of a crisis and the basic criteria accompanying crisis phenomena such as time and risk, the authors propose a model of leadership maturity in the light of the crisis. Considering the problems that leadership faces in a crisis and taking into account the classification proposed by J. Kozielecki (1991) mentioned, there can be distinguished:

- protective problems, i.e. those which–resolved as part of decision-making processes–take the form of a set of alternatives and their results do not go beyond the normal limits of previous activities (accomplishments). They are so-called routine choices that are every day problems,
- transgressive problems, i.e. those requiring the search for a set of alternatives whose effects go far beyond the limits of previous activities and achievements. These problems are unique, unrepeatable, poorly identified, but encouraging reforms and at the same time causing resistance to change.

Risk should be treated not only as a threat but also as a chance of success. The essence of the risk is taking action, the effects of which may be different. It is a dynamic element because it is related to human activity. However, human activity is caused by something. Therefore, risk must create some opportunities so that human action can be inspired. Risk, in fact, is something positive and causes a person to try to improve their knowledge so that the actions and decisions they make are innovative and effective. The necessity to make a choice requires the acceptance of a risk take or rejection criterion (cost-effectiveness criterion). Such a criterion should take into account all factors affecting the quality of the decision taken. Therefore, the cost-effectiveness criterion should be as uniform as possible for all the decisions. Uniform character should be understood as a technique common to various situations in the area of constructing the criterion from components specific for those situations. The formulation of the risk profit ability criterion will be different in the case of a one-way effect (loss) and different in the case of the possibility of a multidirectional effect (profit, loss). For the first situation, the main criterion for the cost-effectiveness of risk will be the minimization of the consequences of a loss. In the seconds situation, the decisive criterion will be the choice of the option with the largest positive surplus of profit over loss. Next to the profitability of risk, another factor very important for the leader is the belief that the actions taken are right. Fairness means absolute conviction about the optimal choice in given conditions. The concept of equity therefore requires knowledge of the circumstances and possible effects of using alternative solutions. The feeling of equity is, however, a reward in dealing with risk and usually acquires an objectified character only in retrospect. At the same time, equity is important because it gives more faith in the sense of own risk analysis and a positive attitude to the situation related to the lack of absolute certainty. Risk should be useful. The usefulness of risk means its positive role that it plays in achieving positive results from activities associated with it. The postulate of taking advantage of the risk is not enough, however, for the risk to become practically useful. An indispensable condition for the usefulness of risk is the

ability to control and control its elements and the risk as a whole. In a research study by Jedynak, Szydło (1997).

Science does not yet fully understand the nature of time. It is known that it can be considered in the categories of objective, measurable, and subjective in the sense of experiencing specific periods of time as acceleration or delay (depending on individuals and situations experienced) Szewczuk (1979) mentioned. In a free market economy, time is considered from a financial point of view. Improper use of working time as an important instrumental value in companies (i.e. being a necessary condition for the implementation of tasks) is treated as a potential crisis factor. In turn, appreciating time means that it can become not only anally, but even an advantage Lipka (2001) mentioned. The leader may underestimate the basic ownership of time, namely its unidirectionality (”time passes, never stepping back”), may not plan time at all (considering that it kills his creativity), not differentiate between working time, time off work and leisure time, set priorities in correctly (dealing with many, often marginal and not achieving the main goal matters) or fail to keept imearrangements or take into account the necessary reserves (or on the contrary: set them too broadly). Therefore, he does not comply with the principles of: economy of operation, division of labor, intensification of work or complexity of the organization. This takes revenge on the economic (resulting from non-performance of tasks in various fields of activity) and psychological (in the form of so-called time stress, i.e. stress, the source of which is ”he lack of time necessary to perform specific tasks”). Leadership in the light of the crisis should here fore be seen in terms of the degree of anticipation and the pace of implementation.

Developed leadership maturity in the face of crisis is shown in Figure2.

Leadership maturity model		Self-assessment of the maturity level
0: unconsciousness	Not realizing the existence of crisis and risk.	
1: skeptical	Disbelief, doubt on the occurrence of crisis, crisis phenomena; underestimating the crisis and risk.	
2: neutral	Awareness of the crisis and indifference in eliminating the crisis, avoiding risk by choice and necessity.	
3: diagnostic	Recognition of the crisis and emergency response; risk avoidance of choice, acceptance of risk out of necessity.	1,2,3,5,6,12
4: diagnostic	Extinguishing the symptoms of a crisis; dealing with difficulties that may threaten the functioning of the enterprise; defensive actions and reaction to vents that have already occurred; using compensation and repressive methods of risk manipulation (hedging in terms of covering the value of possible losses by creating a specific amount of financial reserves in the event of adverse fortuitous events, such as self-insurance and insurance).	4,7,8,9,10,11
5: proactive	Crisis prediction, actions aimed at avoiding crises; shaping active attitudes in catching phenomena that can lead to a crisis and seeking the best solutions to counteract the crisis; the use of preventive risk manipulation methods (which are intended to prevent and prevent random events), risk catalog, point analysis of threats, point analysis of potential opportunities and benefits.	

6: feedback	Crisis turning point; treating the crisis as an opportunity to take revitalizing activities, enabling the survival and development of the company and achieving economic results even better than before the crisis; risk manipulation through risk transfer to entities other than the insurer (risk transfer, for example, factor), risk sharing and risk community (involvement of a partner who, along with a profit perspective, accepts the possibility of loss or risk reduction through its segmentation), risk compensation (statement of the company's activities in such a way that during a possible lost here would also be a relatively high probability of profit that would cover these losses).	

Fig. 2: Leadership maturity model

The developed model enables the option of choosing a leadership ceiling. On the basis of self-evaluation, it enables placing leadership at an optimal level. It can be a kind of signpost to help you orient yourself on what to do to improve leadership. The proposed model was developed by the inductive method (i.e. by reaching general laws based on experiments and experimentally established facts). In the book by Nachmias and Nachmias (2001).

Self-assessment of the level of leadership maturity shows that the majority of respondents said that they are at level 3, i.e. crisis recognition and immediate response in a crisis situation, avoiding risk of choice, which appears as a brake on the initiative of the leader and accepting the risk of necessity, which it shows his excellence by accepting risk out of necessity.

Half of the respondents rated their maturity at level 4, i.e. extinguishing the symptoms of the crisis; dealing with difficulties that may threaten the functioning of the enterprise; using defense activities and responding to events that have already occurred, using the opportunities offered by compensation and repressive methods of risk manipulation.

It can therefore be concluded that the hypothesis 1 (the larger the size of the company and the broaderscope of activity, the greater the propensity to resolve protective problems in the field of leadership in a crisis through adaptation activities), hypothesis 2 (the smaller the size of the company and the narrowerscope of activity, the greater the tendency to take up anticipative problems of transgressive leadership (facing the crisis) has not been confirmed.

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Air Transport Management: Analysis of Airport Financial Activity

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Abstract

The air transport industry has undergone a lot of changes over the years. These changes were primarily caused by rapidly progressing globalisation. Customer preferences and needs change year to year, hence, the struggle is constant to achieve ever better quality of the provided services. The aviation services market must be considered as a multi-stratum aspect. The objective of the present article is a diagnosis the revenue of airports and the identification of costs that airports must bear to optimise customer services and to fight global competition. The empirical analysis uses statistical data collected by airlines and airports. The data was processed and is presented using tables and diagrams.

Keywords: Aviation Infrastructure, Air Transport, Airport, Costs, Revenue

Introduction

The air transport services market is one of the fastest-growing branches across the entire transport industry of the world. In a time of dynamic globalisation and the so-called „distance reduction" we are seeking ever greater problems related to transport. The air transport services market is evolving very quickly, and thanks to this we are able to deliver cargo to the most distant places on Earth (Kabus, Srtulak-Wójcikiewicz et al. 2016: 156-157).

The operation of airports is very complex. A very high number of factors influences their operation. Two types of airports may be discerned between in the air transport market. The first are commercial airports, which are profit-oriented and operate in the industry successfully. The second are also commercial ones, but operate with government aid, operating around breakeven or not generating profit at all.

Airports around the world operate using certain organisational and management structures. According to data of the ACI (Airport Council International), ca. 14% of all airports in the world are, to some extent, privatised, beginning with corporate management all the way to various kinds of public-private contracts (Glaeser and Gotlieb 2008: 158-159). The steady rise of passenger counts in the world and numerous development trends make the option of privatisation of airports ever more attractive. Year after year, the pressure grows on airport managers to adapt to developments in the air industry and to invest more and more in infrastructure expansion (Precoco 2010: 2428) . This is steadily becoming less and less possible for local budgets and fore the state sector, which continue to represent the vast majority within airport management structures. Currently, over 50% of all European airports are privatised in some form, and this trend is developing (Pels, Njegovan et. al 2009: 341).

Airports, like all enterprises, generate revenue and costs. Naturally, in economy, revenue should be higher than costs, however, this is not always possible [1. Online]. For the most part, revenue generation by airports depends on such factors as: directions of air traffic routes, passenger flow volumes, the volume and type of handled air craft, local legal provisions and world economic trends [10. Online].

The objective of this article is to diagnose the development of revenue at airports and to identify costs that airports must bear in order to optimise customer services and fight global competition.

Research Methodology and Sample Description

Globalisation and digitalisation influence endless possibilities of travel and movement around the world. The continuous development of large air carriers such as small, *low cost* types, make ever more people choose air transport as the means of getting from A to B. Continuously increasing competition influences the innovativeness of the services offered, the establishment of a carrier brand and market services availability. These components determine the level of development (Piersiala, 2018, p. 790). Air transport is referred to as the direct entity that causes globalisation and at the same time, undergoes processes of globalisation. Very quickly-developing air transport and innovative technical solutions that are quickly introduced into daily use determine that aviation participated in the main stream of globalisation from the very beginning. Aviation companies that still want to develop, increase passenger numbers, the quality of provided services and, what is more, improve their turnover, must actively participate in globalisation processes, hence transforming their globalisation strategies.

The issues presented in the paper focus on the characteristics of profits and costs of airports. The authors of the paper attempted to analyse strategies used by airports to improve their revenue, all the while minimising the costs borne.

The paper was prepared on the basis of foreign-language literature studies concerning management, logistical infrastructure as well as air transport, Polish and European documents in this area, analyses of statistical data collected by airports and airlines.

The present paper uses the following research tools and methods:

- analysis of available knowledge on the basis of management and logistics literature;
- analysis of acts of law;
- statistical data of airports;
- statistical data collected by airlines.

Results

On the basis of business models, research and prognoses, airlines develop very quickly. The market includes carriers that aspire to be giants, other airlines must continuously develop to stay on top. In the year 2018, the largest airline by passengers served was the carrier American Airlines. This is an example of a big player in the air industry who, despite their achieved position, must continuously watch out for the competition. The largest low-cost carrier turned out to be Southwest Airlines, only offering flights within the United States. Europe's largest carrier is also a low-cost operator, Ireland's Ryanair [16. Online]

Table 1: Ten largest air carriers in the year 2018.

Rank	Airline	Seat	Passengers served
1	American Airlines	United States	198.700.000
2	Delta Airlines	United States	183.700.000
3	Southwest Airlines	United States	151.800.000
4	United Airlines	United States	143.200.000
5	Ryanair	Ireland	119.800.000
6	China Southern Airlines	China	84.900.000
7	China Eastern Airlines	China	80.900.000
8	easyJet	UK	73.100.000
9	Turkish Airlines	Turkey	62.800.000
10	Lufthansa	Germany	62.400.000

Table no. 1 shows the list of the largest passenger air carriers in the world. The data clearly shows that the United States are the market where the largest number of passengers is transported, with the first four places belonging to airlines from the United States. There is a clear difference in terms of passenger counts between the largest airline, American Airlines, and even Europe's largest carrier or airlines from emerging markets.

The aviation services market could not exist without modern and developed airports. There is an enormous number of airports in the world, managed by state or private bodies. All categories of airports, however, are generally aimed at making profit due to very high competition. Airports must be attractive with their offer, not only for passengers, but also for airlines and other entities supporting the activity of the entire industry. The world's largest airports have for years been struggling to be the largest in terms of passengers served. This is influenced by several factors, e. g. the location of the largest urban centres, demographics and attractiveness of the region for tourists (Grothaus and Helmes 2009: 4-5).

The air transport services market sees so-called commercialisation of activities and services. Airlines, airports and other entities in the industry are mainly aimed at generating profit and growing. The company Airbus expects for the aviation services market to grow over the next 20 years to the value of USD 4.6 trillion. Airbus divides the segmentation of the entire market into three parts:

- aircraft-focused lifecycle services, incl. technical service;
- flight operations services – airlines and their services;
- passenger experience.

Commercial operations of aviation entities are, however, burdened by certain regulations and provisions. An example of broad and extensive legal provisions is the profession of the commercial aircraft pilot. In order to become a commercial pilot, one goes through a range of training seminars, tests and exams. For instance, in the UK, one can discern between four basic licences that are acquired in order to finally reach the status of pilot and to be able to fly commercial routes. These are [10. Online]:

- Commercial Pilot Licence – CPL-A aeroplanes;
- Commercial Pilot Licence – aeroplanes with a CPL-A IR instrument rating – concerning aircraft able to fly according to on-board instrument readouts;
- Airline Transport Pilot Licence – ATPL-A aeroplanes – licence to handle commercial aircraft in airlines;
- Multi Pilot Licence – MPL – licence to work as pilot in a multi-person crew.

Studies on commercial aviation show the trend, in which aviation industry companies are primarily aimed at the improvement of passenger comfort and amenities. Airlines focus on improving the equipment on both their short-range as well as long-range aircraft, training of on-board personnel so that the customer would be as satisfied as possible from the service [16. Online].

In terms of economic operation of airports, one can list two fundamental sources that contribute to the revenue of an airport as an enterprise. These are (Bruecner 2003: 1147):

- Aeronautical activity
- Auxiliary activity

Sources of revenue in aeronautical activity are mainly influenced by operation fees, fees per aircraft parking on the tarmac according to the airport tariff, fees per departing passenger, tariff fees per aircraft landing at the airport, fees for terminal navigation and other airport fees related to operations, meaning, lighting or additional services (Schlenker and Walker 2016: 774-775). Auxiliary activity is made up of revenue sources such as: licence fees, fees for land lease by the airport, rental of office, storage and hanger space, fees for services at the airport, meaning, restaurants, stores, parking lot fees, fees for the display of advertisements and posters at the airport, fees for other types of activity such as hotels or the rental of conference space (Halpern, Graham 2013: 115-116). Every airport has their own rates and fees for diverse services that are provided. This is mainly governed by the location of the airport, by its popularity, competitive capacity and the amount of taxes that the airport has to pay for their operation (Graham 2018: 144).

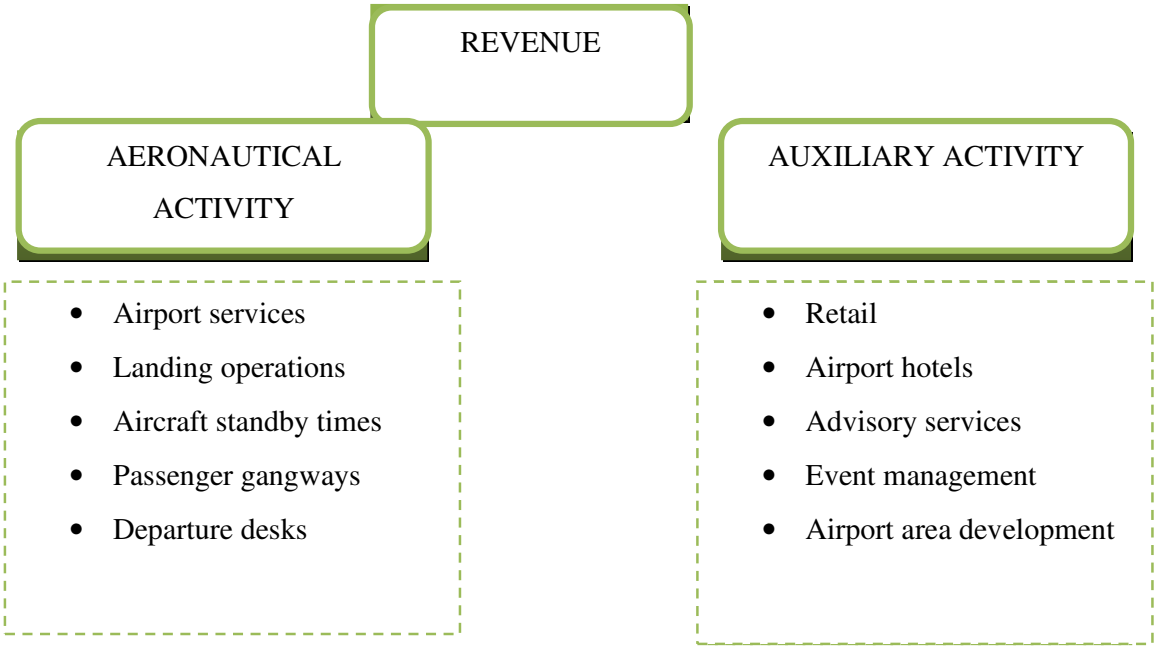

Fig. 1: Revenue structure using the example of the Kuala Lumpur airport

Fig. no. 1. the revenue structure for aeronautical and auxiliary operations for the Kuala Lumpur airport. The figure shows that main revenue from aeronautical activity are landing, standby and aircraft handling fees, while in terms of auxiliary activity revenue is mainly generated by services, sale and relevant management of the airport space.

Discussion

Every airport in the world, however, has its own details of revenue amounts. The most revenue is, of course, generated by the handled passengers; the amount of this revenue is based on the number of passengers served and the fees per passenger. One of the largest airports in the world, London Heathrow Airport, generates a profit per passenger of ca. USD 13.32 (Graham 2018: 178). To compare, Washington Dulles airport makes USD 5.68 per passenger, with Paris' Charles de Gaulle airport making USD 10.92 for handling a single passenger (Cidell 2015:1136). A large part of revenue for aeronautical activity are, of course, flights. The fees depend on the aircraft size and the time the aircraft will be using the ground services at the airport. At Heathrow Airport, for instance, a small Bombardier Dash-8 craft will pay USD 999 for operations, and a Boeing 747 – USD 11,600 (Vasigh and Fleming 2016: 278-280). Departing aircraft is also burdened by fees, depending on passenger counts.

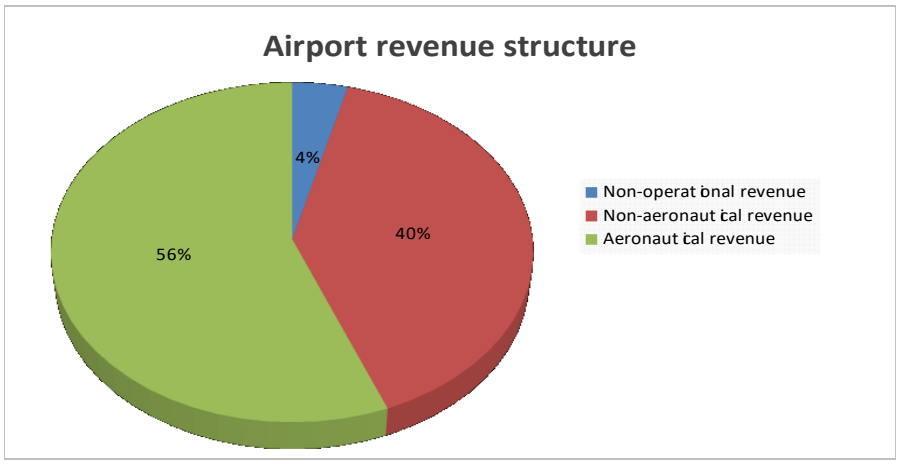

Fig. 2: Airport revenue structure, %.

Figure no. 2. shows the percentage share of revenue by generation source. The diagram shows that most revenue of an airport is generated by aeronautical activity.

Table 2: Sample table of fees for certain operations at Wrocław Airport

AIRCRAFT LANDING	MAXIMUM AIRCRAFT TAKEOFF MASS (MTOM)	RATE, PLN
Domestic and international traffic	Up to 3 t	80.00
	Over 3 to 10 t	275.00
	Over 10 to 30 t	600.00
	Over 30 to 50 t	975.00
	Over 50 to 100 t	1,560.00
	Over 100 to 150 t	3,000.00
	Over 150 to 200 t	7,000.00
	Over 200 to 250 t	12,000.00
	Over 250 t	20,000.00

PARKING FEE (For each commenced ton of maximum takeoff mass (MTOM)	RATE, PLN
First four hours of parking	0.00
Every commenced 24 hour period	6.00
DEPARTING PASSENGER at passenger terminal	RATE, PLN
Domestic and international traffic	32.00
DEPARTING PASSENGER from General Aviation terminal	RATE, PLN
Domestic and international traffic	150.00
ADDITIONAL FEES	RATE, PLN
Aircraft security by a selected guard for each commenced hour of work of each guard	150.00
Special lighting of parking space for each commenced 24-hour period for one light source	50.00
Fence for parking space	500.00
Security by the airport fire service for fuel filling/ drainage from the plane during passenger boarding/ disembarking or when passengers are on board, per operation	100.00

Table no. 2 shows the rates for basic services, take-offs and parking of an aircraft, as well as additional services provided on the tarmac at the international airport in Wrocław.

The financial structure of airports is not just revenue, but also costs that it must bear for its operation. One can discern between basic costs borne by the airport, and these are: personnel costs, rental of operational space, telecommunications and media costs, repairs and maintenance, administrative costs, material and supply costs, depreciation, security costs, energy and heating costs and other operating costs (Barett and De Vita 2015: 49-50). At an airport, the largest part of the costs are those related to personnel. They are related to the number of passengers that keeps rising year after year. Technological development shall most probably never allow the complete elimination of the human factor from airports, hence, a continuously rising number of passengers shall also cause in creases in personnel counts.

Over the years, airports have become ever better managed, and one sees this in depreciation costs, which, in official statistics, are dropping year on year (Graham 2018: 210). A rising tendency over the years is seen in security costs, which are mainly the result of the New York attacks of September 11, 2001 (Vasigh and Fleming 2016: 267-268). Airports around the world will in the coming years face energy source diversification so as to reduce costs borne in this regard. Energy costs vary for airports depending on size and geographic and administrative location in the world. Energy costs are generally different than fuel costs as most airports in the world use conventional energy sources, meaning, power plants (De Vos, Cumming, Moore et al. 2016: 137). Simulations of use of renewable sources such as hydroelectric plants, wind power plants or biomass combustion energy continue to be attempted, however, these technologies still do not secure the generation of sufficient amounts of power to provide uninterrupted operation of a gigantic airport 24 hours a day, seven days a week (Barett and De Vito 2015: 50-52).

Administrative costs also belong to the category of costs dependent on an airport's location. An airport is burdened by various taxes and fees imposed by local authorities and legal provisions in a given country. In order to attract customers and new passengers, every airport must be appropriately

present in the media. For this purpose, qualified marketing specialists are employed to design advertisements (Halpern and Graham 2013: 113). An airport must in this case bear costs related to the promotion of the enterprise. An airport would not be able to function without suitable maintenance and cleaning personnel for places such as terminals. In the operating structure of an airport, a lot of pressure is put on passenger comfort, and every airport must bear relevant costs in order for terminals and buildings within the airport infrastructure to always be clean and well-maintained [1. Online].

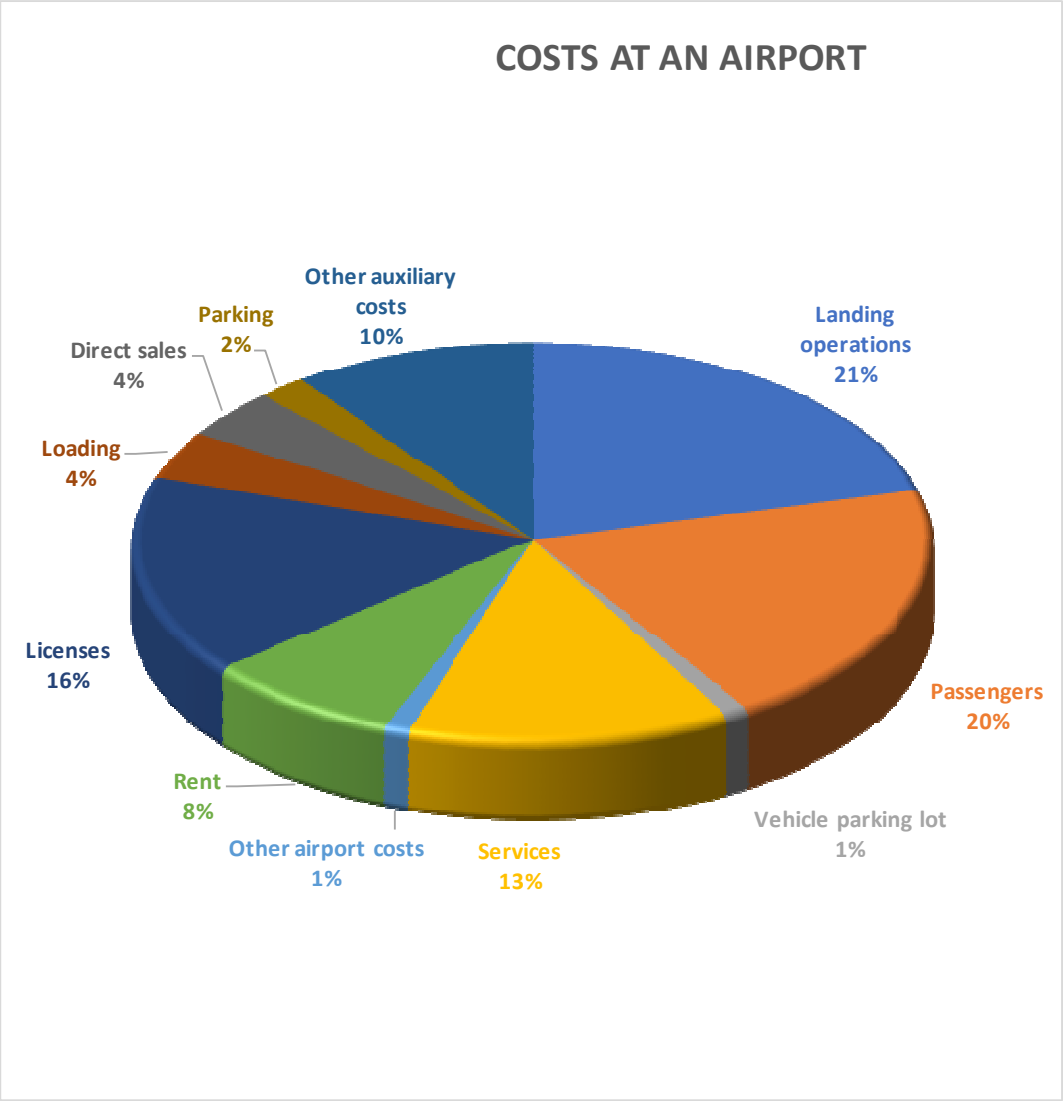

Fig. 3: Example percentage share of costs of an airport

Figure no. 2. presents the example costs at an airport. The diagram shows that clearly over half of the costs, up to 55%, are aviation operations, meaning aircraft landings, costs related to passengers and service costs. 45% are non-aeronautical costs, such as rent or licences related to the operation of the airport.

Airports in the world are primarily aimed at improving profit and reducing costs related to operations, however, this is not always possible for instance due to the world market situation or the fuel price increase trend.

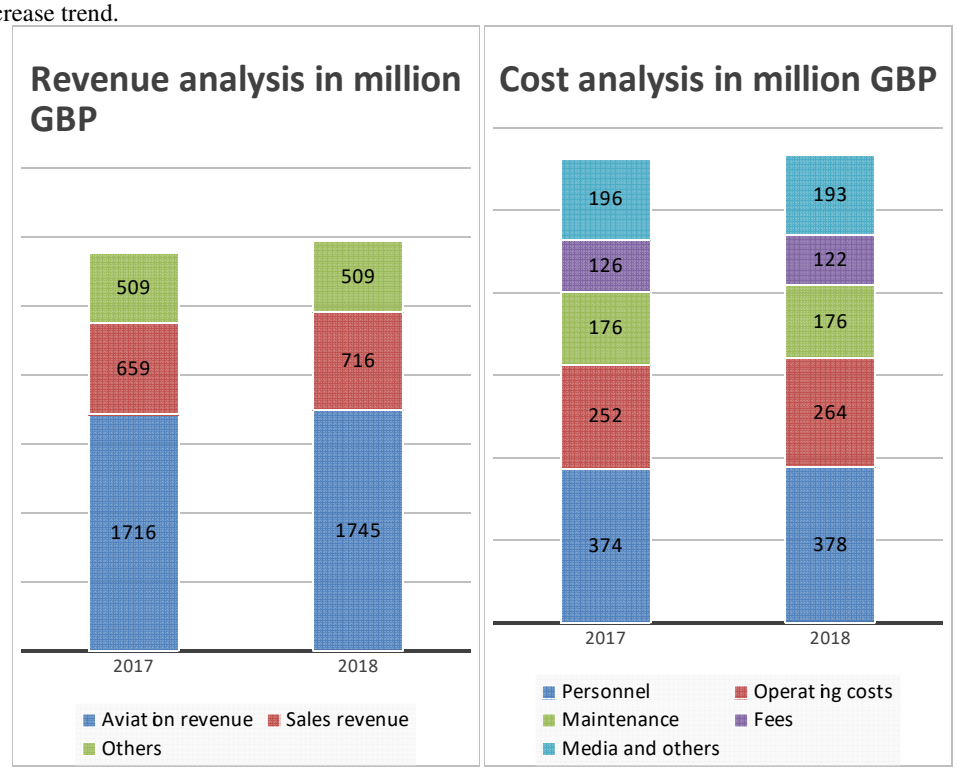

Fig. 4: Financial analysis of London Heathrow airport for the years 2017 and 2018.

Figure no. 4. shows changes in revenue and costs over the span of one year at one of the largest airports in the world, London Heathrow. The above data shows that both revenue and costs increased, however, revenue increased by much more – good news for the company. Revenue in the year 2018 increased by 3% year on year. The costs borne increased by just 0.8%, rather the result of increases in prices of raw materials in the world than of mismanagement.

Operating in such a highly competitive market, airports must maintain very good management of the structure of their expenditures and revenue. Properly balanced and smart investments provide for the largest airports in the world higher profits than expenditures year after year.

Summary

One can note a continued increase in the popularity of aviation in all respects in the air services market for several years now. Ever more people are choosing aircraft as their preferred mode of transport, causing new airlines to emerge and the offers to be ever better adapted to customer needs. It is estimated that until the year 2050, the population of the world could reach nine billion, doubtless a challenge for air carriers. Ever more airports are being constructed around the world. The financial structure of airports is not only revenue, but also costs that the airport must bear for its operation. Airports, operating on such a competitive market, must manage their expenditures and revenue very well. Proper balancing and smart investments enable the world's largest airports to register higher profits than losses.

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Green Controlling in Enterprise Management – Perspective of Reporting in Polish Construction Companies

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Abstract

Green controlling in modern management conditions is growing in importance; in general terms, it relates to reporting the impact of the company's operations on the environment. The main objective of the theoretical and empirical investigations of this study is to analyze and assess the applied meters and indicators of sustainable development within the framework of controlling and to build the path of their system to support management in this field. In order to achieve the intended objectives, the methodology of measurement of green controlling areas was used and leading meters in green controlling were determined. The value of the research consists in the presentation of the areas of environmental controlling of Polish enterprises and their potential to achieve the success of future results. Moreover, the postulated system of eco-controlling meters represents a new quality in information resources of enterprises for efficient and effective management of their activities.

Keywords: Controlling, Green Controlling, Business Model, Enterprise Management, Performance Measurement.

Introduction

The growing complexity and dynamics of the environment in connection with globalization imply the search for and implementation of tools supporting management processes, appropriate for this environment. One of these tools is controlling, which ought to be adjusted to the business model conducted by the company. The concept of the business model in management science comes from the 1950s and 1960s; the dynamic growth in the interest in this concept in the subject literature was recorded at the beginning of the 21st century. In this study, the genesis of the 1st stage of development of the business model concept is omitted; it is extensively and comprehensively presented in the foreign and Polish literature (Lindner, Cantrell, 2004), (Rappa, 2004), Cyfert, Krzakiewicz, 2011), Floden, Sorkina, 2014),(Fehrer, Wieland, 2020). In this study, the attention is drawn to environmental reporting using the tools of controlling (Nesterac, 2019),(Broadbent et al, 2008).

Modern enterprises increasingly need to possess not only the ability to deal with market mechanisms, direct regulations but also to disclose information concerning environmental and social issues (Rossignoli and Lionzo,2018).. The observation of changes taking place in the environment of enterprises increasingly implies the qualitative development, i.e. the one in which environmental and social loses will be limited (Zalewska-Turzyńska, 2018). In the activities of enterprises, planning, control and information supply systems should be implemented, particularly in order to prevent the components of the natural environment from destruction to eliminate unproductive use of natural resources, furthermore, to be able to reuse waste, to prevent working conditions that are excessively hazardous for health in connection with the reduction in the investment attractiveness of the enterprise and the region in the area of which the company operates (Kochalski, 2016).

According to the International Group Controlling (IGC), controlling is a tool accompanying economic activities; it is an information service for managers directed to planning and monitoring their activities (Nowak, 2011),(Nowak and Nita, 2010), (Serfling, 1993). It is pinpointed that the primary function of controlling is coordination. Furthermore, coordination as a controlling function relates to secondary coordination aimed at, i.e. mutual adjustment of individual management subsystems, i.e. planning, control and supplying information. According to J. Weber, the basic function of controlling is to ensure

rationality in enterprise management (Weber, 2002, cited after: Skoczylas, 2009),(Baum, 1999), (Szulte, 1998),(Ziegenbein, 2001). In general, it should be stated that the task of controlling is to mutually agree upon the system of planning and control as well as supplying information (Giraud, 2011). This coordination is essential, it is impossible to provide, through the information system, the demand for information reported by the planning and control systems of individual enterprises (Schultz, 2015). The subject of the concept of controlling may be generalized and its segments may be indicated, which include:

- uncertainty in decision-making due to the extent and diversity of the company's activities and an increase in own complexity in connection with the dynamics and complexity of the business environment,
- external and internal supervision of the company's activities,
- ability to adapt to the variable environment and to anticipate,
- overcoming external and internal complexity using information processing, planning and control as well as
- maintaining flexibility by ensuring the ability of adaptation and anticipation (Hopfenbeck, 2000, cited after: Skoczylas, 2009), (Nowak, 2018).

The system of planning, control and supplying information in order to preserve environmental and social benefits and the one which is oriented to the accomplishment of broadly understood environmental tasks is green controlling, known as environmental and/or eco-controlling. As it is emphasized in the subject literature, green controlling is the latest type of controlling; its main task is to establish environmental objectives of enterprises, planning and control of the use of resources and any burdens for the environment and society and to provide managers with information on environmental and social aspects (Nesterak, 2015), Balicka, 2015), (Meyer, 2005).

In economic practice, enterprises have a different approach to bearing responsibility for the use of the natural environment; they consider the observance of the rules of environmental protection as a necessity arising from, imposed by state and EU authorities, principles of environmental protection due to the imposed legal regulations or social pressures. However, there are enterprises which take a range of actions aimed at increasing the rational management of natural resources and reducing their environmental impact on the natural environment(Bucholc, 2010), (Langevin, 2013).

The issue of controlling pro-environmental activities will be verified in construction companies operating in Poland. On the basis of the EU research, it should be stated that the impact of construction on the natural environment is substantial. The construction sector directly uses about 1.8 billion tons of primary raw materials; thus using 25% of a total demand for primary raw materials. About 40% of energy is consumed indirectly or directly in the construction sector, mainly when using buildings. As a result of the energy demand of construction, 36% of total carbon dioxide emissions in the European Union is generated. It is also noteworthy that construction generates more than 0.6 billion of waste, i.e. 36% of a total amount of waste. In the light of the above data, conducting the empirical research in the field of eco-controlling in this group of enterprises is fully justified.

Theoretical Background

Controlling Dimension of Environmental Issues in Activities of Enterprises

In economic practice, one may come across different solutions in terms of environmental reporting. Having analyzed the available empirical materials, three basic groups of reporting can be distinguished in this field, such as:

- description of pro-environmental activities; reports contain the description of the environmental policy and the activity of enterprises in terms of emissions, control and energy saving,

- numerical information about the impact on the environment where, in addition to the environmental policy, the market share of environmentally friendly products is given or the size of resources used by the company and their efficiency,
- financial environmental reporting where, in addition to the environmental policy and quantitative information concerning the impact of the company on the environment, financial data in this field are reported in the form of: the value of environmental commitment, environmental protection costs with the indication of, among others: disposal and pollution reduction costs, pollution prevention costs and environmental charges, investment expenditure on ventures in the field of environmental protection (Schaltegger and Muller, 1996), (Desai, 2009), (Paszkiewicz, Szadziewska, 2011), (Michalak, 2016).

Table 1: Historical review of environmental reporting by enterprises

Years	Activities of companies	Extent of reporting
1970s and 1980s	Enterprises present what is available within the framework of their information systems	Presenting primarily qualitative information; information systems of enterprises contained very few disclosures on environmental activities. The first environmental reports
Mid 1990s Late 1990s	Business managers ask stakeholders what they ought to present in reports Business managers begin to use reporting standards	Extending environmental reporting using indicators in environmental performance imaging; enterprises gain greater experience in reporting social activities; environmental reports are much more extensive and contain the analysis of the results. Environmental and social reports
Early 2020s Future	Business managers address their requests to others to verify what has been presented in the reports Managers are convinced of the benefits due to more rigorous comparison and evaluation of the results.	A significant proportion of indicators and reports are of high quality and they may be subjected to the external verification of attestation; however, there is still the need to provide benchmarks for comparing activities with other companies. Environmental and social reports. Sustainability reports. Sustainability reports included in the annual report.

Source: Own study based on A.M. Fet, J.K. Staniskis, V. Arbaciauskas, (2009), Indicators and reporting as a driving tool for environmental activities in the region, 'Environmental Research Engineering and Management', 2009, No.1 (47), p.70, cit. in: A. Paszkiewicz, A. Szadziewska, (2011). Reporting on ecological aspects of operations in energy and chemical enterprises, Scientific Notebooks of the University of Szczecin, No 625, Finance, Financial Markets, Insurance No 32..

The first guidelines providing the global framework for reporting on sustainable development – the so called GRI Guidelines – were published in 2000. Two years later, GRI G2 arose as well as the concept of the partner network and the status of the organizational stakeholder (OS). In 2005 the organization already had 225 partners (OS), also including the Association of Chartered Certified Accountants (ACCA) 11. Since the activities conducted by GRI are the subject of the research and constant improvement, in years 2006–2013 the subsequent versions of the guidelines entered into force – respectively G3, G3.1 and G4 (Bucholc, 2010). In November 2016 the Global Sustainability Standards Board (GSSB) announced the latest version of the guidelines – the so called GRI Standards. It is worth

pinpointing that 2017 was transitory in its nature. Since the guidelines GRI G4 were no longer in force only on 1 July 2018, the reports for 2017 could be compiled according to both new and "old" guidelines(Dumay and Guthrie, 2010).

The global development of the framework for reporting published by GRI in chronological order is presented in Table 1.

Table 1: Global framework for reporting in a historical order published by GRI

Year	Name of the reporting framework
2000	GR 1 Guidelines
2002	GRI G2 Guidelines
2006	GRI G3 Guidelines
2011	GRI G.3.1 Guidelines
2013	GRI G4 Guidelines
2016	GRI Standards- the latest version of guidelines
2017	Transitional period, GRI G4 were no longer in force on 1 July 2018; the reports for 2017 could be compiled according to both new and old guidelines

Source: Own study based on information available at: https://www.globalreporting.org, accessed on 07.04.2020.

In the subject literature, it is widely emphasized that green controlling leading to the compilation of environmental reports by entities operating in the market and their publication is to:

- disclose information being the basis for the evaluation of enterprises from the point of view of their social responsibility,
- provide useful data to the owners to take appropriate decision as a result of the response to the reported information,
- popularization of environmental initiatives taken by enterprises,
- conduct activities to improve the environmental policy, objectives and planned activities in designated areas for the benefit of the natural environment in enterprises,
- motivate both managers and employees to take decisions for the benefit of the environment. (Raines, 2002), (Hopfenbeck, 2000).

Green controlling based on the controlling paradigm, which combines the idea of management by goal with management by deviations, uses the basic principles and functions of management, is compatible with other types / types / types of controlling and gives the possibility of wide application from the point of view of practical diversification of ecological issues in individual sectors of the economy.(Vollmuth, 2007),(

In the literature, it is pinpointed that green controlling raises a number of objections. It has both supporters and opponents. It is usually emphasized that green controlling is responsible for growing expectations of stakeholders and supports the company in the dialogue with the environment by showing specific effects of its involvement. Moreover, environmental controlling makes it easy to satisfy future demands in terms of eco-friendliness and thus contributes to the reduction in the future environmental commitments. The attention is also paid to the activities against green controlling. They mostly include incurring significant costs associated with the preparation of this type of information; the organization of green controlling requires the involvement of specialists, the change in the company's organizational structure. The opponents of reporting question their suitability in the

processes of communicating with the environment: the poorly prepared report may bring effects opposed to the intended one. The one which is too extensive will be found too difficult to verify, having exclusively the marketing direction (Bartels, Iansen-Roger, 2008, cited after: Paszkiewicz, Szadziewska, 2011), (Rowbotton and Schroeder, 2014),

Hypothesis Development

These considerations are the voice in the discussion and, in the course of the above, the following research hypothesis was formulated: green controlling can bring a number of benefits to the construction companies, and it determines their business model.

In the conducted empirical research, it is assumed that environmental reporting provides an opportunity of confronting own achievements of individual enterprises with the achievements of the best enterprises in the analyzed sector. Furthermore, it allows for providing a wide group of stakeholders with the information on the impact of decisions and actions taken by managers on the society and the environment. The implementation of the assumed goal required a review of source materials, which are literature on controlling, enterprise management and internal materials of the surveyed construction enterprises.

Methodology and the Sample

The implementation of the research tasks formulated in this way imposed the use of the following research methods: literature studies, case study analysis, surveys, content analysis as well as induction and synthesis methods used when formulating the conclusions.

It should be pinpointed that content analysis belongs to the most frequent methods used in the measurement of environmental and corporate social responsibility of enterprises (Stray, 2007) and (Jose, Lee, 2006). In this research method, there is a multifaceted interaction between: a set of knowledge of the subject, previous beliefs.(Yin,2003). The research model on green controlling in enterprises results from the adopted research mode. The first stage was the critical analysis of foreign subject literature. The literature primarily related to green controlling, meters and indicators used in it for the purposes of management. On the basis of the above, the problem areas, relevant from the point of view of the analyzed research topic, were identified. The second stage of the research model was the selection of the research subject as well as characterization of the research sample, determination of the scope of the research and an attempt to measure research areas. In total, 35 enterprises were subjected to the analysis: 70% of the respondents amounted to large enterprises, the other 30% amounted to small and medium enterprises. The research period was the 4th quarter of 2019. The reasoning was based on the objective and systematic assessment of the content of the identified environmental areas of the activities of enterprises. The respondents of the survey on green controlling reporting were the managers of the surveyed enterprises. The number of the surveys corresponded to the number of the surveyed enterprises; their feedback amounted to 91%.

The empirical research relates to construction companies. According to the studies presented in the documents “Lead Market Initiative for Europe”, prepared by the European Commission, the construction market is responsible for 42% of the final energy consumption in the EU, 35% of the total greenhouse gas emissions to the atmosphere; it is also responsible for the significant consumption of non-renewable raw materials, such as water or aggregate. A significant problem in construction is also the demolition of old buildings: cleaning them up. Thus, the need to develop innovative products and technologies in construction is pinpointed. The European Commission defines four attributes of sustainable construction, such as:

- ✓ innovativeness,
- ✓ responding to social needs,
- ✓ environmental friendliness,
- ✓ economic efficiency (see also Teece, 2010).

For the needs of management in eco-controlling, the attention was drawn to analytical meters and indicators used for these purposes; the concepts of *meter* and *indicator* are often used interchangeably but their range of meaning is not the same. The meter is a nominated number expressed in any unit. The indicator is a nominated number compared to another and the one which is the basis for the reference of a nominated number. Therefore, indicators may take both nominated and non-nominated values (Kochalski, 2011), (Bode, 2008). In environmental activities, meters and indicators ought to meet a number of requirements, such as: low costs of data collection, simplicity of calculation and interpretation of results, significance for management decision-making, temporal and spatial comparability, understandability for different groups of recipients, usability for individual areas of the company's operation, information capacity adjusted to the policy of disclosure of confidential information and consistency with applicable legal requirements (Schwarz et al., 2002; Bossel, 1999). The correctly constructed meters and indicators allow for reliable identification of events and building a forecast of future volumes and trends. In green controlling, they allow for the presentation and assessment of activities occurring at individual stages of management along with the relationships between them and their strength.

Analysis of the meters and indicators of green controlling in Polish construction companies

The considerations in this part of the study will be preceded by the general characteristics, assessment of the development and barriers encountered by construction companies in Poland. In the overall assessment, the construction sector indicates an upward trend. The representatives of construction companies, however, see the situation of the construction sector rather unfavorably. About 59% of those questioned assess that the situation in the sector is bad, and only 26% that it is good; 15% of the respondents have no opinion concerning this issue. The ratings vary, however, depending on the size of the company. The situation is particularly negatively assessed by enterprises operating in the road and railway segment (about 60% of negative ratings) and large enterprises (about 55% of negative ratings). Interestingly, 51% of the respondents admit that in 2019 the value of sales revenues increased; it should be pinpointed that, in the whole construction sector, the level of the value of sales revenues was the highest in the six years and it amounted to PLN 115 billion. As indicated by the conducted research, there was a very high level of capacity utilization in the surveyed enterprises until the fourth quarter of 2019 (about 90% in November 2019). The previously recorded sales revenues do not translate, however, into an increase in the profitability of the construction sector which has indicated a downward trend since 2018. About 80% of the respondents claim that an increase in the prices of building services provided by enterprises is accompanied by a decrease in gross profit; 57% of those questioned recorded a decline in gross profit. This decline was mainly due to an increase in prices of aggregates, asphalts, steel and steel products and concrete products. It was not, however, the only factor determining the economic situation in the construction sector. The group of negative factors also included the issues such as: unprofitable contracts, rising labor costs, difficulty in maintaining financial liquidity and difficult access to external financing. One of more important challenges for construction companies is employees; more than 75% of the surveyed companies experienced problems with recruitment of new and/or outflow of existing workers in 2019, primarily specialists and unskilled workers. In terms of ad hoc measures, in the light of the problems with staff, managers raise wages and employ foreign workers, mainly from Ukraine and Belarus. Construction companies are coping with maintaining financial liquidity (74% of indications). The main reasons for problems in this area are primarily: long payment terms from investors, difficulty in claiming remuneration for additional work (more than 70% of indications). The surveyed enterprises also indicate difficulties in access to external financing, both in the form of credits and loans (respectively about 80% and 70%).

The analysis of the environmental and energy policy of large construction companies indicates that they show the awareness of the improvement in their environmental activities; they see commercial

and economic benefits in this area. Most construction companies from this group, for the purposes of success of their business activities and satisfaction of their stakeholders, define environmental responsibility as a priority area of their strategy. Furthermore, they take actions to reduce the negative impact of their activities on the environment to the extent which is technically possible and economically justified (Adner, 2017).
It should be pinpointed that there is always the control of the environmental and energy policy by management staff in order to establish its relevance and effectiveness and to ensure its observance (Brillinger, 2018). In general terms, construction companies emphasize the following issues in their environmental reporting:

- implementation and maintenance of an effective environmental and energy management system,
- avoiding environmental pollution by analyzing both indirect and direct impacts affected by their activities,
- minimizing the consumption of natural resources, energy, raw materials,
- avoiding waste,
- supporting recycling whenever it is possible.

Large construction companies implement the Environmental and Energy Management System based on ISO14001 and/or ISO 50001 and/or EMAS or other regulations and maintain this system. Their activity in terms of environmental reporting is already at the stage of planning. Enterprises fully support the environment as well as prudent and economical use of natural environment. Moreover, consistent rules and definitions of minimum standards in terms of fuel management are created to allow responsible operational units at all levels and the departments of central concerns for efficient and effective monitoring of fuel consumption. To ensure the further development of the environmental management system, in the enterprises of the analyzed sector, the people in charge are appointed as well as their agents. Generally, it should be noted that, in large construction companies, environmental reporting is based on the certified management system (Berllinger, 2020).

A number of subcontractors are employed in construction, thus large construction companies using their services, provide training for subcontractors in terms of the observance of principles of environmental protection; the attention is also drawn to the observance of procedures, having experience and well-functioning equipment.

In the survey, managers indicate environmentally friendly activities, such as:

- minimizing tree felling as much as possible, removing plants to other locations as well as planting new trees and other plant species,
- protecting trees in the area of the impact of construction against mechanical damage,
- organizing the construction camp mainly in the already developed and transformed areas, away from housing developments and valuable natural areas,
- water tanks are protected against pollution from construction,
- monitoring the construction by environmentalists,
- the construction cycle is correlated with the natural cycle,
- striving to ensure that the top layer used for finishing works is of local origin,
- preparing construction sites for unforeseen emergent situations and equipping them with the necessary equipment in the event of contamination.

Environmental reporting is very extensive, and it is difficult to present it comprehensively in one study. From the point of view of environmental controlling, the aforementioned areas of environmental activities in construction require quantification in the form of specific meters and indicators (Table 2).

Table 2: Selected meters and indicators of green controlling in Polish enterprises of the construction sector

Specification	Stages in management cycle in environmental controlling of enterprises			
	Initiating	Planning	Implementation	Control
Cost meters	x	x	x	x
Benefit meters	x	x	x	x
Resource meters	x	x	x	x
Variance Analysis				
Eco-efficiency meters: resource consumption to value of production and/or sales	x	x	x	x
Indicators of water/ energy consumption	x	x	x	x
Amount of waste taken to landfills	x	x	x	x
Volume of consumption of recycled materials	x	x	x	*
Amount of renewable energy used	x	x	x	*
Degree of water, soil, air pollution	x	x	x	x
Impact on biodiversity	x	x	x	x
Environmental management systems	x	x	x	x
Packaging reduction meters	x	x	x	x
Level of contamination and erosion of soil	x	x	x	x
Ocean of suppliers in environmental terms		x	x	x
Number of environmental complaints	x	x	x	x
Value of investment in environmental protection	x	x	x	*
Value engineering	x	x	x	*

x-applied
**postulated, need to report*
Source: Own study.

The presented scope of green controlling in the surveyed enterprises is diversified and identifies economic, environmental and social activities (Chow, 2006). At the stage of initiating and planning,

the meters and indicators of green controlling give the grounds for planning, setting objectives or conditions of their implementation; they help to operationalize financial and non-financial objectives. They provide the basis for the construction of the business model.

At the implementation stage, meters and indicators of green controlling perform the communication function. At this stage of management, it is important to promptly and accurately transfer specific tasks in the field of environmental activities for the effective use in relevant decision-making situations; they also relate to the verification and implementation of works on the compliance with time, schedule and scope while monitoring financial discipline according to the adopted budget records.

At the control stage, meters and indicators allow for the assessment of the degree of the accomplishment of objectives in relation to the applicable standards or activities of competitors. The results of this comparison are the basis for the submission of proposals of necessary measures to avoid or reduce adverse deviations or to use favorable deviations. On the whole, the results of this analysis are the basis for the adjustment of implementation or even the adopted plans. Meters and indicators trigger learning processes. The control is related to the supervision function; it is particularly important in large enterprises, where managers participate in management. Meters and indicators enable decision-making and monitoring the behavior of employees.

The conducted empirical research on green controlling in the surveyed enterprises indicates that there is no coordination of information in this field. The problem concerns the issue of waste management, so important in construction. It could take the form of the so called reports on problems; they are created as independent reports in a situation where managers recognize that the problem of waste violates the budgetary discipline of the implemented tasks, the level of contingency reserves or generates the problem associated with the financial liquidity of the company (Bukłacha, 2019).

In green controlling, it is essential to constantly search for new, more effective forms of measurement to increase the reliability of information enabling the management of this aspect of enterprise activity in relation to the determinants of construction of the future; they include the issues associated with eco-construction. Eco-construction consists of a number of issues. They include the issues, such as: increasing the energy efficiency of facilities, searching for new building materials, applying alternative sources of energy. Moreover, the environmental construction of the future is to reduce the amount of building waste, which is indicate in this study in the light of the conducted empirical research, and to minimize the consumption of energy related to the production and transport of building materials. All in all, it should be stated that energy saving, environmental science and humans are the main factors which will determine the development of the construction sector by 2025, which gives an incentive for further and continuous optimization of green controlling functioning in construction companies (Raport, 2019).

Discussion

The conducted empirical research concerning meters and indicators of green controlling in construction companies indicate that they are multicriteria. In fact, they were identified at all stages of the implementation of construction ventures.

An open problem is, however, the controlling concerning waste. In the case of construction, it is the key aspect adversely affecting the local biosphere. Waste arising from the construction site, coming from renovation and dismantling of buildings and road infrastructure (brick debris, asbestos) is an important environmental problem. The surveyed enterprises, in their statements, guarantee that the works related to the disposal of waste are carried out with due diligence, and hazardous waste is properly managed. The managers of the surveyed enterprises in general descriptions of the environmental activity, indicate that about 65% of waste is transferred to natural persons for reuse in accordance with the principles specified by the provisions; however, there is no accurate reporting in this field.

In the surveyed enterprises, the process of value engineering is used, which allows for the optimization of the use of materials and reduction in their negative impact on the environment. The scale of processing and reuse of raw materials, which are production waste in the construction sector and other sectors of the economy, such as mining, energy and metallurgy, is not reported, though. An important discussion problem is currently the cooperation of construction companies with municipalities in the area of which various investments are being realized. This would make it possible to achieve individual objectives and also allow synergies in terms of environmental and social issues.

Conclusions, Limitations and Directions for Further Research

The assessment of the content and the system of green controlling of construction companies was one of the main theoretical empirical aspects of the conducted research.

The environmental reporting enables long-term strategic decision-making, measurement and increasing the efficiency of operations in important areas not analyzed so far; the inclusion of management boards in important issues of sustainable development also takes place. The area of green controlling is an integral part of more extensive reports, concerning sustainable development.

The analysis of the applied meters and indicators of green controlling in construction companies indicates the necessity of their use also at the stage of controlling. This problem, due to the specificity of the analyzed sector, primarily concerns waste management. The conducted identification of the meters and indicators of the economic, social and environmental development does not constitute their complete list; however, this may be the basis for their further improvement and orientation, taking into account a broader diagnosis of waste management, which would be very useful from the point of view of the controlling services of enterprises of the analyzed sector. Moreover, environmental reporting at the stage of initiating and planning cannot be merely the component of building the image of enterprises in relation to their stakeholders.

In the further research in the field of green controlling, the attention should be drawn to the holistic approach to their system (Epstein et al, 2014), (Stal and Corvellec, 2018), (Kochalski, 2019). The integration of all areas of sustainable development in the system of meters and indicators is necessary for the enterprises which intend to use green controlling in the processes of planning, control and supplying information supporting management and also the future business model.

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Artificial Intelligence for Cognitive Competitive Purposes

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Abstract

The businesses transmit not only products and services, but also other resources presented by beliefs, perceptions and ideologies... These resources enrich competition through constantly evolving business models. In this article, we analyze this new competitive regulation based on cognition. Then we study the business model and its evolution in favour of an intelligent competitive environment.

Keywords: Artificial intelligence (AI), cognitive competition, business model, competitive intelligence.

Introduction

In a constantly changing competitive environment, the company is faced with the obligation to set up an environmental monitoring system, which measures the innovative strategic actions carried out by the company and its competitors. At this stage, the development of an effective competitive strategy must be consistent with the different dimensions of the strategy, namely structure, leadership, culture and technology.

In the 21st century, the businesses are seen as a center of innovation and wealth creation. In this context, each company is supposed to understand the movements of competitors. Any action, whether strategic, such as a joint venture or operational action, such as a massive recruitment, downsizing of staff or a publicly announced change of management that could be exploited by competitors to bring out valuable information.

In a highly competitive environment, it is almost impossible to monitor all kinds of information. For example, competitors' product pages, customer reviews of competing products, product review sites, success stories and customer testimonials, social media channels, scheduled blogs and webinars. All of these resources can also create a wealth of information about the products or marketing resources that your competitors are using.

In this context, according to Alsheibani et al (2020) in-depth analysis techniques serve businesses as a strategic technology for organizations. The world's leading producers of technology Google, Amazon, IBM, Apple and others have all taken advantage of artificial intelligence (AI) to deliver a better customer experience Brynjolfsson and Mcafee (2017), improve productivity Varian (2018), and developing commercial collaboration methods Hunter (2018).

Faced with this new competitive environment, the rules of competition are constantly evolving. A new environmental state based on cognitive resources which makes it possible to understand this environment. In this article, we analyze the foundations of cognitive competition and how will the competition be intelligent in the era of AI?

This paper is divided into three parts. The first is a staging on the concept of cognitive competition. The second part presents the permanent changes planned in the business plan following the integration of AI. The last part presents how companies can make competition smarter.

Motivation

The business is looking for the ways to reach a strategic position that ensures its survival and growth. A competitive status that brings opportunities must be reinforced by an effective strategic decision system. In this regard, the companies seeking a position must develop their means of investigation and competitiveness by introducing in-depth analysis methods.
This study opens the doors for Small and medium-sized enterprises to fight in this competition by exploiting their cognitive capacities. The companies using the advanced technological means will be able to dissect each competitive action by highlighting any cognitive resources developed during the competition.

Cognitive Competition: What Is It About?

Today, the competition is not limited only to managerial or organizational theorems, beyond sociology; social psychology and psychoanalysis also see their importance in the competitive world. In this stage, the company has become a cognitive development entity. The cognition is mainly based on a set of theorems such as the theory of strategy based on resources and competences Penrose (1959); Hamel and Prahalad (1990); Barney (1995), also the organizational learning theorem Argyris and Schön (1978) which emphasizes on the cognitive capabilities of organizations.

A competitive environment based on cognition, is an environment that transfers not only products and services, but also other resources such as ideologies, perceptions, values and beliefs… In this context, highly competitive companies are looking for ways to take into account the cognitive phenomena of competition. This type of business brings together research and development centers as well as institutional players around innovation projects with regional, national and international vocation Laroche and Nioche (2015).

The cognitive competition is measured in terms of the cause and effect relationship between phenomena. At this level, the decision maker analyzes each cognitive action, in order to highlight information that enriches the identification and deliberation phases of the strategy. Contrary the traditional approach, the cognition looking to detect what initiates strategic change, not just strategic outcome. The decision maker can understand the strategy as a set of connected actions which reveals a set of information and knowledge on the state of competition which can be converted to competitive opportunities.

A competitive environment brings together all atomic competitors, homogeneous products Cabral (2000), incomplete information on the environment and all companies will have equal access to technology and resources. The position in a competitive environment will not happen outside of a unique and distinctive resource base. Certainly, some benefit from unique resources, such as patents, and others can win the competition through strategic actions such as merger, absorption and alliances. In this context, two types of cognitive skills essential to compete (see Figure 1).

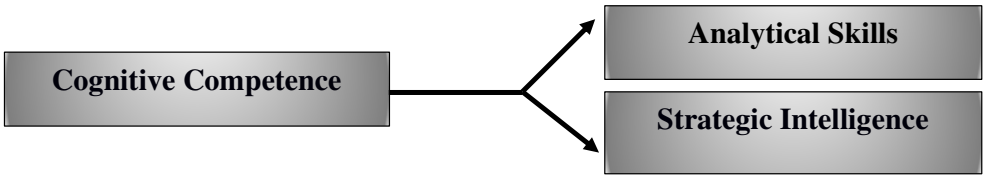

Fig. 1: The foundations of cognitive competence, Source Levine et al (2017)

The competing companies measure their potentials via two types of skills, namely analytical skills defined according to the ability to reason through abstract problems. The second is presented with intelligence strategic which favors companies to anticipate the behavior of competitors. In a first plan, the analytical skills carry two dimensions of use. The inside dimension, seems likely to make better decisions during the optimization and the coordination between the different activities. This has been confirmed by Helfat and Martin (2015) the companies that have a reservoir of analytical skills are those that can achieve better management and synchronization of its activities. In this context, better management and optimization of the company's value chain are reflected in the control of how and by what means individuals perceive and think during the design and implementation of the strategy. This strategic reasoning is achieved through a set of skills known as social cognition Frith and Singer (2008).

The external analysis dimension is used to detect threats and seize opportunities. This possibility is materialized by the dynamic capacities defined by Teece (2007) 'the capacity of the company to integrate, develop and reconfigure its internal and external skills to cope with a rapidly changing environment'. Such an expression can be measured by direct observation of the individual behavior of each actor involved in the competition. This facilitates the environmental analysis process and therefore clearly defines the competitive model that will be adopted by the company.

The strategic intelligence is the second basic resource in a competitive market based on cognition. The strategic intelligence is a set of actions and activities used to find, analyze and evaluate all commercial information in order to achieve a competitive objective Abd et al (2019). According to the Intelligence Report (2020), the strategic intelligence is designed to provide leaders with critical information to effectively define and adjust strategy. The concept of strategic intelligence is close to other concepts such as economic intelligence and competitive intelligence. According to Huyghe (2010), strategic intelligence is based on methods intended to clarify reality and discover projects and resources in a situation of competition or conflict. On the contrary, the economic intelligence is based on research, processing, dissemination and protection of information useful to economic actors. In a nutshell, the economic intelligence is a subcategory of strategic intelligence. All of these mechanisms make competition smarter and use open source of information management techniques to gain an advantage over the competition.

The strategic intelligence process is based on an effective strategic intelligence system. The company does not only seek to collect information on the competition, but also to create a competitive network based on resources. This is in order to clarify the facts of competition Levine et al (2017). The following figure illustrates the structure of an industry that uses the strategic intelligence profiling tool during the implementation of the strategy.

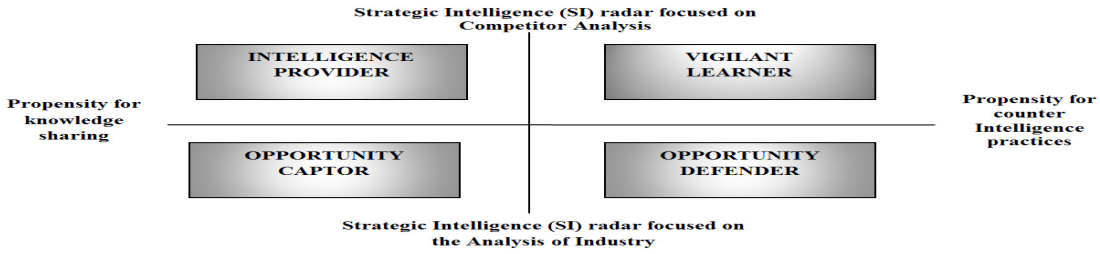

Fig. 2: Strategic Intelligence Maturity Model, Source : Bleoju and Capatina (2015)

- ***Intelligence Provider***

The intelligence providers are those who demonstrate their ability to harness strategic intelligence and transfer it into new methods and technological tools. The suppliers who feed the managerial context with new organizational, cultural and human approaches aim to involve all employees in

technical, social and environmental performance. This privilege offers the option to present knowledge in models intended to understand, solve and analyze new environmental situations.

- ***Vigilant Learner***

The learning companies present the second style of companies that contradict spy practices. This type of business is more flexible to deal with new competitive situations. At this level, learning companies are those that constantly challenge their business models, in order to clarify and deepen the overall vision of the organization. In this context, any decision processed becomes a space for sharing and collaboration.

The learning companies can set up collaboration and sharing channels with the various environmental players. The channels are presented by a network which encourages the business actors to engage in the process of developing the competitive environment. In this context, the organizations are also able to react quickly and in a timely manner to a rapidly changing environment. According to Hassan et al (2017), the organizations engage in the search for new knowledge (exploration) in order to ensure current viability, in parallel while devoting our resources to the development of things already known (exploitation). In this regard, learning increases competition via two learning modes, adaptive and generative Luo, (2020); Escrig et al (2019). The first generally increases performance in the form of increased profitability, return on investment and growth in the market share. The second increases reliability by enabling companies to develop sustainable business models, thereby providing products and services that are superior to the competition.

- ***Opportunity Captor***

The third category of companies is presented by companies that capture opportunities. An opportunity is a favourable circumstance. The concept of opportunities bring together a set of companies around different approaches: Loilier and Tellier (2020); Germain, (2010)

- ***Strategic Approach***

In the Harvard model, the notion of opportunity takes into account any external factor likely to favourably influence the prospects for growth and the trajectory of an organization. In a strategic context, the managers are more sensitive to the search for threats and have a strong feeling of mastery of the environment. The strategic approach makes it possible to analyze the competition by using the competition rule which says: "behind every promising opportunity lies a destructive threat".

- ***Praxeological Approach***

In the praxeological approach, the discovery and construction of opportunities are integrated with the strategic process. According to Andrews' approach, the opportunity makes it possible to identify strategic and operational actions. These actions make it possible to exploit the strategic potential of the organization. Once the business idea is issued, the exploration and evaluation process is displayed.

The process of discovering and building of opportunities is divided into two phases. A phase of reflection focused on determining the goals and general orientation and a more operational phase focused on the seizure of opportunities. The reflection phase is included in the strategy formulation approach which leads to identify the distinctive skills of the company. In this phase, the discovery of opportunities requires a better combination of resources.

- ***Generating Approach***

The identification of opportunities requires strategic resources that aim either to strengthen the organization's capacity to resist in the face of unprecedented disruptions, or to build the capture of strategic opportunities. In this context, the companies project themselves into an evolving and

proactive competitive status. The realization of such an approach consists in making innovation a determining factor of competition. At this stage, the companies define competition according to exogenous and endogenous parameters. For example, the technology which defines the new efficient conditions of production imposed on firm. Likewise, the inspirational approaches indicate that competition is accentuated by the effect of internal factors. For example, the organizational performance, in particular the quality of organizational routines that have been developed to compete in an innovative context.

- ***Opportunity Defender***

The latest style is presented by the protectors of opportunities. At this level, the companies defend their interests against proactive spies. The concept of redirecting competition only functions with a good diagnosis of the internal and external environment. In this context, the opportunities defender uses different ways of circumvention in order to protect their benefits and develop others. First, false alarms distort competition. The companies disclose misleading information about their strategic protocols to competitors in order to contradict the behavior of competitors. The second strategic action very heavily used by protective companies is to invest well in micro niches which require very specific and sometimes scarce resources and means. The third aspect frequently used by companies is to explain part of their business plan in order to create interoperability channels between the operating systems of competitors and that of the company.

In similar circumstances, the competitive environment takes on a more rigorous dimension. In this context, many companies are looking for ways to explore all the information from different data sources by manipulating and directing very precise information on the environment and on the behavior of each actor. But how can businesses succeed in the same competitive environment?

AI For Competitive Purposes

With the advent of advanced technologies that increase the ability of companies to respond proactively to competition, the strategic and operational system of companies is growing and becoming more complex. A competitive decision-making system is based on technological tools that carry the strategic dimension. The strategic dimension is presented through an analysis of the movements of each player where, why, what, how and by what means this competitive action will be carried out.

The competitive trends have transformed the competitive methods and protocols adopted by companies. The companies are oriented towards the angle which sees AI as a support for the development of business capacities of the company Davenport and Ronanki (2018). In this context, Tripathi and Parmar (2019) indicate that AI projects the company to a higher level of thinking. From a decisional point of view, AI transforms and makes machines, procedure and decisions more intelligent.

AI-Based Business Plans

According to Wright and Schultz (2018), the recent advances in robotics, artificial intelligence and machine learning allow machines to automate activities that once seemed immune to disturbance. These activities including tasks based on thinking, tacit learning, detecting emotions and even deciphering the behavior of competitors. Overall, AI can meet three important managerial needs: automate business processes, obtain competitive information through data analysis and interaction with customers and employees Davenport and Ronanki (2018). Generally, the automation of the activities is related to the most complex tasks are which requires a resource base which is constantly developing.

The technology with its different variants is no longer used as a tool for sharing and transferring knowledge, but rather considered as an instrument of cognitive investigation. From an operational tool to a strategic tool that can make the company smarter in managing its business portfolio. A study

was conducted with 250 business leaders who knew perfectly how to use AI in businesses. More than half said their main goal was to continually improve the product line to offer the best products to their customers. (See Fig 3).

Fig. 3: The Business Benefits of AI, Source: Deloitte (2017)

According to studies conducted by Vinogradova et al (2019), the exploitation of advanced technologies in the business world has contributed to the development of innovative manufacturing approaches. This new situation is the consequence of the development of new trades, new knowledge and new skills that will be increasingly requested by business leaders. In fact, according to Global Revenue for Enterprise Applications (2019) the annual revenues from the use of artificial intelligence applications will increase from $ 7.6 billion in 2018 to $ 107.3 billion in 2025 and by 2030, the global economy could reach $ 15.7 trillion.

All are based on information; the design of an intelligent industrial system is a process which not only includes the production procedure with its possible requirements such as quality standards, production measurements, flow measurement, logistics flow and capital flow ... Etc, but requires an automatic detection of each change affecting competition, collaboration, learning, analysis, cognition, decision-making and control of the decisions process.

According to Li et al (2017), AI technology presented by deep learning techniques, automatic natural language processing, partitioning and automatic classification, learning machines, pattern recognition and predictive techniques ... etc., has changed the concept and the way which a business can be classified as a competitive business. A business model refers to a set of interdependent activities covering the whole of the company Gassmann et al (2017). A business model will never be fully explained to the public. Leaders are looking for the ways to innovate and differentiate themselves from the competition. An innovative multidisciplinary business model is one that creates significant change in strategy, organization, culture and leadership. The manifested interest in AI has been underscored by the business community. The study conducted by Columbus (2017) with more than 3000 interviews with business leaders. As a result, the study found that 84% believe that AI will allow the company to acquire and maintain its competitive advantage and 75% said that AI will have access to new business concepts. In this context, we need to think about how AI could invent a distinctive business model?

The development of advanced technologies has opened up commercial channels that can act anywhere with anyone, anything, anytime and on any medium, be it physical, digital or virtual Lindgren and Rasmussen (2016). Indeed, the companies must constantly know how their business plan works and how is it built? In this part, we travel in the world of AI and we analyze how to do and act when advanced technological tools are integrated into the strategic system of the company.

First, the companies need to familiarize themselves with the language of the business world in order to feel in harmony with the expected technological developments Lindgren (2017). In this regard, Valter et al (2018) presents a conceptual model that examines the relationship that connects four integral parts, namely: the human intermediary; the machine intermediary; analysis of business models and the business plan ecosystem. (See Fig 4)

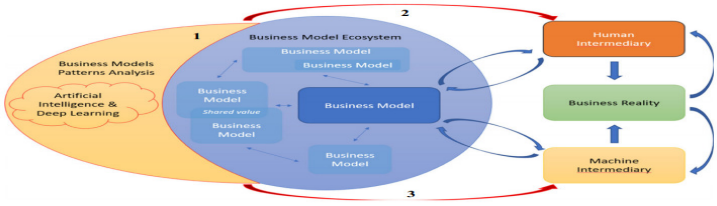

Fig. 4: The montage of an AI-assisted business plan, Source: Valter et al (2018)

The development of a business model is a mission by a thousand miles. First, the human action which brings together any interaction that joins the business reality to the business model Valter et al (2018). The business model is a perceptual representation of business reality. The human factor updates the model with his understanding how things act in business reality. This interpretation will never be put outside the business environment. The model has undergone interactions that generate a new knowledge from different areas of expertise. This situation opens the door to new styles of potential understanding that offer opportunities for exploring cross-border knowledge.

The technology slides provide opportunities during developing a transparent and effective business plan. A machine presented by data entry robots, heat maps…Etc, which continuously observes the reality of business. We cite devices that analyze customer behavior via machines installed in sales areas. In this context, a business model triggers one or more events on the intermediate machine. If a business owner wants to have a number of customers in his store within a specific period of time, then this event triggers a business model that at one time treats a limited number of customers in the store. The business model considers price as a determining factor, contributing to the decrease or increase in the prices of specialized offers displayed via automatic display panels.

The third impact factor describes the relationship between artificial intelligence via deep learning models that reflect the intersection between the human factor, the machine and the desired business plan. The AI and deep learning algorithms analyze the ecosystems of business models in order to optimize existing business models and suggest new models based on the success of others that operate in various competitive contexts. The deep learning algorithms offer the possibility of building improved business models using an artificial intelligence tools. For this purpose, each design phase corresponds to a particular state of competition. Consequently, the deep learning algorithms transform business plans into hierarchical structures. For example, the lowest level consisted only of lower-class customers versus the higher levels reserved for the most important customers in terms of quantity of purchases and who require specific negotiation approaches.

In the section below, we describe perfectly how the company can transform the competition and make it more intelligent?

How to Make Competition Intelligent?

The company is looking for a way to strengthen its competitiveness through better quality provided, better delivery times and greater flexibility in adjusting costs. In this context, the development of an effective operational strategy that reflects the planning, design and implementation of strategic decisions is the only path to the development of a distinctive competitive status. At this level, the analysis of the competitor's behavior offers a precious opportunity to develop a competitive intelligence system. This system based on a strategic method which constantly anticipates the movements of competitors Guo et al (2017).

The competitive analysis is powered by advanced technologies allowing efficient access and analysis of large data sets. According to Kraus et al (2020) the deep learning and deep neural networks

promise to maintain improvements, performance and make better predictions compared to traditional methods. However, the neural networks have changed the way we compete in a market. Accordingly, hundreds of layers and millions of complex neurons He et al (2016) hide sophisticated information and resources about the competition.

The deep learning has not only been very successful in natural language processing, but also in image classification, object detection, object localization and image generation Kraus et al (2020). As a result, large companies around the world like Google in 2016 launched an update to its translation system that uses deep learning to improve the translation accuracy that accompanies the human performance approach. Moreover, Amazon and Netflix use deep neural networks in their recommendation system. In this respect, each competitive action carried out receives treatment based on the competitive intelligence approach (see Fig 5).

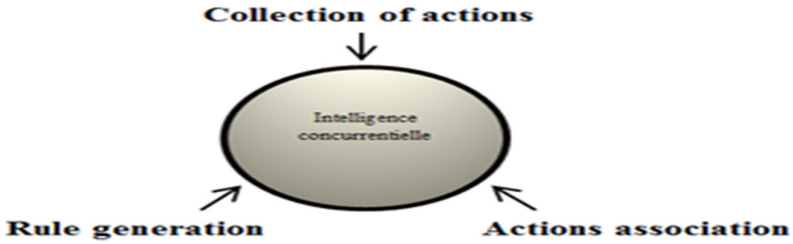

Fig. 5: The three pillars of competitive intelligence system, Source: Sassi et al (2016)

- ***Collection of actions***

The competitive actions are made by the competition. Its actions are reflected in the company's decision-making system. Often, the company's strategic decision-making system is encrypted, which makes the collection process quite difficult. In this context, the identification of the strategic source of information requires fairly powerful means of collection. The WebRadar is a powerful tool that offers companies the ability to follow market trends. For example, we cite the WebRadar that assess the reputation of the company. Several advantages on the horizon namely: I) it discovers the influences that impact the reputation of the company; II) it monitors your image in real time and III) analyzes your image with the public. Especially since, according to Chaveesuk et al (2019) in the digital age, companies leave behind so much information regarding their online activities such as research, purchases and reading articles, etc. These informations are produced daily and used by companies for commercial purposes.

For this reason, several applications have been developed to provide information and news about the competition. Adthena (2018) continuously monitors millions of keywords around the world. This technology allows you to see on what terms your competitors are bidding and the resulting impact on your campaigns. With Adthena (2018) Greenlight was able to instantly analyze the performance of competitors via a device that quickly scans advertising copies, a task that used to take hours and days. Therefore, by eliminating these delays, Greenlight was able to provide information to customers earlier and spend more time in the design and execution of their plan.

- ***Actions association***

The actions collected must be grouped in such a way that the reactions of competitors to the launched offer are in the same cluster. The competitors' reactions focus on internal and external competitive criteria. We cite the cluster that combine both internal and external factors, namely the style of marketing communication and the perceived of higher quality. The companies are oriented towards the use of a brand communication method that disseminates imaginary concepts about the product. This creates specificity in the use of this product and a difference in its brand and its nature.

- ***Rule generation***

This step is reserved for the generation of competition rules in the form of an algorithm (if… .. then). In this respect, the rough set theory which can be considered as an intelligent mathematical tool offers

the option of extracting and defining competitive rules from the observation of approximate and inaccurate data. The rough set theory is applied to generate rules and predict the actions of competitors based on the history of the competition (see Fig 6).

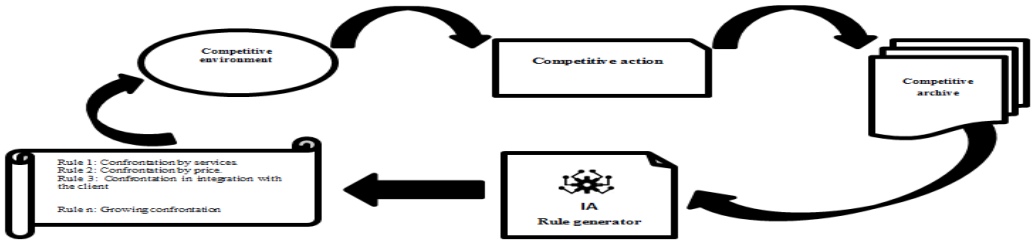

Fig. 6: The system generating the competition rules, source: Author developed

The generation of a competition rule is subject to an algorithm which instantly connects to the competitive archive store. As an example, we simulate the rule of "confrontation by services" in a telecommunications market structured by a set of companies (C1, C2 ... C8). The system generator of competition rules acts according to the algorithm presented below:

Rule 1: A1: If (actor= Concurrent 1) and (actor= Concurrent 2) and (Type of service=2Go communication bonus line) and (target= Actual customer, Prepaid line) then (Owen company will react with action A5 and A8 respectively).

Conclusion

The competition is defined by a set of actions presented in a business plan. The Knowing of the state of competition is the unique way to develop an effective competitive system. At this stage, the cognition and the perception of competition have been accompanied by the development of methods and big data techniques analysis. In this regard, the combination between the human factor (thinking), machine (power) and the business plan ecosystem (environment) presents the three basic foundations for the development of the intelligent competitive system. The latter is put into operation as soon as a competitive action appears. This action is the subject of an advanced strategic analysis in order to generate new competition rules.

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Impact of The Financial Recovery Plan on Financial Management in The Municipality of Curitiba

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Abstract

With the recent economic crisis in Brazil, many local authorities found it difficult to balance their budgets, pay employees' salaries and make payment to suppliers. Curitiba, a local authority in the south of Brazil, faced similar problems in this period. This study analyses two electoral cycles that coincided with the national crisis. The aim is to analyse whether the Curitiba's Financial Recovery Plan, launched to contain the increasing imbalance of municipal finance, had a positive impact. For the analysis, a quantitative approach was adopted corresponding to two electoral cycles (2013-2016 and 2017-2020). The measures sought to raise municipal income from taxes, contain expanding expenditure on staff and consider the civil servant welfare system. Measures to raise income were positive, although coinciding with a period of national economic recovery. Those to restrain the growth of payments were found to be effective.

Keywords: Financial Recovery Pan, Financial Management, Fiscal Responsibility, Local Finance.

Introduction

Following the Brazilian Federal Constitution of 1988, Brazilian local authorities were elevated to a third federate entity and benefited from political decentralization, as opposed to the previous period marked by authoritarian centralization and concentration of income with the military regime. The autonomy granted allowed local authorities to establish their own governments (Soares and Melo, 2016).

Recently, Brazilian local authorities have experienced an economic crisis caused partly by the economic depression affecting the whole country. The effects of this crisis were shown in a study elaborated by the National Confederation of Local Authorities (2018), where 35,3% of local authorities claimed they were not able to finalize their accounts in 2017, with 77,1% depending on the Financial Support for Local Authorities (FSLA) to do so. The study also showed that delays in paying employees and suppliers were the aspects most affected and many local authorities were not able to finalize their accounts in the accounting year.

However, local authorities' expenditure on investment grew by 41,6% between 2017 and 2018 according to the "Financial Report of Sub-National Entities" from the National Treasury Department (2019), which could represent financial recovery. In addition, it is worth noting that 2018 was an election year, when there tends to be increased expenditure (Vasconcelos and Nogueira, 2013).

In the context of a national crisis, this study reveals the situation of Curitiba where the management in charge of the local authority in the period between 2017 and 2020 claimed that municipal finance was severely jeopardized and with an imminent risk of paralysis of various services and inability to meet

payments (Curitiba, 2019). Therefore, a financial recovery plan was established, which will be analysed in this study. Curitiba is situated in the Southern Region of Brazil and is the capital of the State of Paraná. According to IBGE[1] it has an estimated population of 1,9 million, has one of the best quality of life indices in the country (10th position) and has the 5th highest Gross Domestic Product (GDP) in the country, estimated at approximately 84 billion *reais* (base year 2016).

The question this study aims to answer is the following. Which measures adopted (by Curitiba) to achieve financial balance can be relevant for adoption by other local authorities also experiencing financial stress? The intended contribution is to present such measures and how they can help other cities to balance local finances.

Financial Recovery Mechanisms

Financial recovery plans generally emerge from the need to balance accounts due to excessive debt and governments' consequent inability to meet their financial commitments. Some studies by various authors identifying possible causes of municipal debt are presented below:

- The electoral cycle can contribute to municipal debt, as election years can raise municipal expenditure. However, laws passed to restrict such action, as in the case of the Law of Budget Stability in 2001 in Spain, have contributed to lessening the impact of the electoral cycle on local finances (Bastida, Beyaert and Benito, 2013).
- In a study of Portuguese local authorities, alternation of the executive, governance by right-wing parties, high expenditure on staff and having a greater amount of capital revenue can contribute to municipal imbalance (Nogueira, Basílio and Ribeiro, 2019).
- Over-budgeting, i.e., when much greater income than what is actually taken in is forecast, can also be a reason for debt. When this difference is significant, and occurs in successive years as an intentional practice that allows local authorities to increase their expenditure without the capacity to support this, budget imbalance can be the outcome (Furtado, 2016)
- National crises also have a direct effect on local authorities, since public finance is subject to major restrictions due to the reduction in taxes collected, these being the main source of income. For that reason, the Brazilian Federal Government reduced the funding for all sectors (Silvestre, 2019), jeopardizing local authorities' economic situation.

The term fiscal responsibility is generally associated with governments' prudence in limiting expenditure and managing public debt, but it is also related to governments' measures and processes in managing fiscal matters (Cruz, 2015). Financial recovery mechanisms are understood to be financial rebalancing measures in order to increase income, reduce expenditure and restructure debt (Nogueira et al 2019).

A study by Jimenez (2019) showed that planning is associated with greater budget solvency, but its effectiveness can vary from one city to another, since planning helps most cities with financial difficulties but not those facing extreme fiscal decline.

The first alternative for municipal administrations is improvement of their management indices. Leite Filho and Fialho (2015) and Ribeiro and Jorge (2015) concluded on a positive and significant relation between indicators of municipal public management and those of municipal development. Here, Netto and Monaco (2017) indicate that the adoption of indicators is fundamental, as these can quantify the result of public policies, helping the manager to make decisions to improve them. The same authors (2017) also indicate that management by results, effective communication and the structuring of a controlling authority are important to increase the efficiency and rationalization of public expenditure.

For Carvalho Junior (2018), in a scenario of great dependence on transfers, it is fundamental for local authorities to widen the base of their own income to ensure service provision and investment in infrastructure. In this context, the Urban Building and Land Tax (UBLT) is indicated as having the potential to extend that income, since it is a tax that causes few economic distortions and can be

progressive. The author (2018) made an assessment based on an equation of property tax performance, concluding that average income could increase from 0,48% to 0,83% of municipal GDP, which would correspond to an average increase of 10,8% in local authorities' current income.

Among the main measures evaluated in the study by Carvalho Junior (2018) to be adopted to widen the income base are those of a legislative and administrative nature: (i) modernize and update the physical base and that of property tax payers; (ii) carry out technical property assessments close to the market value; (iii) minimize exemptions and review the level of tax rates, opting for selective, progressive tax rates when the aim is to protect the poorest; (iv) adapt tax rates to budget needs and the results of administrative reforms, principally when they are very low or very high; and (v) incentivise tax-payers' voluntary compliance through financial assistance and strongly restrain non-compliance by recording the outstanding debt at the registry office.

Therefore, faced with the financial and economic crisis experienced worldwide, it is increasingly fundamental for management to find partners to combat the effects caused on the control of public accounts (Santin, Pereira and Camargo, 2017).

One of the main mechanisms to control public accounts in Brazil is the Law of Fiscal Responsibility[2] (LFR), passed in 2000 with a view to controlling public expenditure and providing transparency in financial management. At the same time, it aimed to avoid opportunistic behaviour at the end of a period in power (Araújo, Santos Filho and Gomes, 2015; Linhares, Penna and Borges, 2013; Santolin, Jayme Junior and Reis, 2009). This law defined 60% of Net Current Income (NCI) as the limit of expenditure on staff and the relation between net consolidated debt and current income should not exceed 1,2. In addition, sanctions were established for those not complying with the norms.

Santolin, Jayme Jr. and Reis (2009) concluded that the LFR was important in reducing municipal deficits. However, imposing rules can lead to limiting the government's effective participation in anti-cyclical fiscal policy. In addition, by allowing high expenditure on staff (up to 60%), this led various local authorities to increase this type of expenditure and reducing the relation between investment expenditure and income through taxes. The authors concluded that in a climate of macro-economic depression, the strict rules and severe sanctions foreseen in the LFR end up limiting expenditure on public investment, as this is the area most susceptible to cuts in order to achieve financial limits. Other expenditure presents a more rigid structure and is not so easily changed. Araújo et al (2015) reached similar conclusions in a study on the impact of LFR on local authorities in Alagoas, also finding that local authorities most dependent on transfers are the ones that suffer most impacts on investment capacity to carry out public works and provide residents with services.

For Cruz (2015), although the LFR states that planned, transparent action and efficient control mechanisms are necessary to achieve balanced public accounts, most empirical studies are based on the pillar of responsibility as regards complying with the goals and limits imposed. Other mechanisms of financial responsibility contained in the LFR are little explored in these studies, namely: planning, transparency and control.

Methodology

Analysis of the methods adopted in Curitiba's Financial Recovery Plan (FRP) was carried out through a quantitative approach referring to two electoral cycles (2013-2016 and 2017-2020). The aim was to determine the impacts of municipal budgetary measures coinciding with a period when the Brazilian economy changed from positive growth in 2013 and 2014, to recession in 2015 and 2016 and a slow recovery from 2017 (IBGE, 2019). Currently, in 2020, due to the COVID-19 pandemic, the economic scenario is not yet clear, although many publications indicate another world recession.

The secondary data collected are based on material available on the Curitiba Local Authority Transparency portal[3], having selected files containing the Annual Budget Law (ABL) of each year studied, besides the "Budget balance sheets", "Statements of Expenditure by Function/Sub-Function" and "Statement of Net Current Income" relating to the 6th two-monthly period of each year due to these

contemplating evolution of real income and expenditure for that year, allowing comparison with the budget forecast by the ABL. The basis for comparison did not consider intra-budget income[4]. To update budget values, the General Consumer Price Index (GCPI) was used, between December 2012 and December 2019. This index was considered in other studies for this purpose, as it is the Federal Government's official price index, used even to define and control the goals for inflation in Brazil's monetary and fiscal policy (Farias, 2009; Teresinha and Souza, 2012). The budgets were standardized so that the database would always consider the same sources of income and expenditure, for example, to calculate the comparison of Service Tax (ST), up to 2017 income from fines, interest, current debt, discounts and deductions were considered separately from the actual ST collected, whereas from 2018 a single amount of income was considered. This study follows the methodology adopted from 2018. All the actions of the FRP were implemented according to specific legislation.

Results and Discussion

This section will discuss some points of Curitiba's FRP contained in the Curitiba Prefecture Report (2019), such as:

- Creation of the Municipal Fiscal Responsibility Law– MFRL;
- Launch of the "Curitiba Receipt" programme, updating of the Service Tax (ST) Law;
- Simplification and adaptation of the tax rate on the Inter-Personal Transmission of Fixed Property and Real Rights (ITFP);
- Alterations to the civil servant welfare regime.

Evolution of the municipal budget in the period 2013-2019

In the period analysed, between 2013 and 2019 and with correction of values according to the GCPI, Figure 1 reveals that forecast income was practically stable growing by 1,5% in the period, consolidated income increased with a positive variation of 6,8% and expenditure grew with a positive variation of 4,9% in the same period.

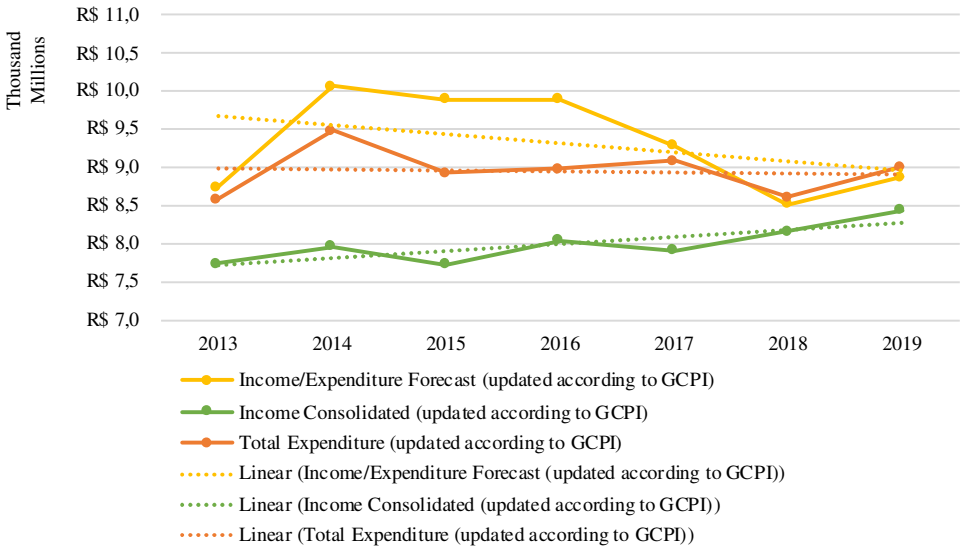

Fig. 1: Evolution of Income and Expenditure in Curitiba Between 2013 and 2019
Source: Own elaboration based on data Curitiba Prefecture Transparency portal

Without considering updated figures for 2019, in the period analysed income increased by 46,5% and expenditure by 40,9%. The difference between income and expenditure was compensated for by intra-budgetary income that is not analysed in this study. However, it is important to note that since 2014 the budget forecast has been falling in the search for balance and seeking to avoid the phenomenon of over-budgeting, and even in the years of national recession (2015 and 2016) there is growth in consolidated income.

Municipal Fiscal Responsibility Law

The MFRL approved in the domain of municipal legislation, tends to be more restrictive than the Federal FRL, referred to in the previous section, with differentiation, for example, in relation to the following aspects:

- Civil servants' welfare is now included in the local authority's financial management;
- The MFRL introduced a mechanism limiting the growth of expenditure on staff, linking that growth to levels of income. Article 17 of Law 101/2017 stipulates that the nominal variation of total expenditure on staff employed, in each period, cannot exceed 80% of the nominal variation of net current income received in the previous period;
- The Council of Fiscal Management and Responsibility was set up, responsible for decisions of optimizing and classifying public expenditure. The Council is for consultancy and deliberation and should advise on various matters, among them career planning, forming agreements, arranging credit, granting salary increases and re-adjustments. The council is formed of various municipal departments.
- Obligatory reduction of expenditure on staff when this reaches 50% of the NCI, preventing the local authority from exceeding legal limits. This reduction refers to expenditure on the executive authority, with the FRL stipulating a limit of 54% for this authority and 6% for the municipal legislative authority. Article 19 of the MFRL stipulates that if "total expenditure on staff in each authority exceeds 92,6% (ninety-two point six percent) of the limits established in this Complementary Law", there must be a reduction in expenditure on commissions and remunerated functions, overtime granted, Full-Time Work (FTW) contracts and contracting services from third parties. This measure is particularly interesting given what has been observed by various authors regarding the high limit allowed by the FRL for mayors to use on expenditure on staff – 60% of the NCI (Araújo et al 2015; Linhares et al 2013; Santolin et al 2009). Then again, the reduction of expenditure on staff and contracts with third parties can jeopardize the provision of services to the community.
- The MFRL limited expenditure on publicity to 0,6% of the NCI, which in 2019 would represent 46,5 million *reais*. However, in the two periods analysed, only in 2014 was an amount greater than 0,6% of the NCI allocated to expenditure on "social communication". After approval of the MFRL, average expenditure was 0,267% of the NCI, indicating that the limit of 0,6% adopted could be reduced.
- The requirement to provide costing resources for the implementation of new public equipment.

Review of taxes and incentive to extend income

Service Tax (ST) formed the main income of Curitiba Local Authority and between 2013 and 2019 on average accounted for 16,41% of its sources of income. Launching the "Curitiba Receipt"[5] programme, as part of Complementary Law 102/2017, aimed mainly to encourage residents to request the Tax Receipt for the services they use in the city hoping to diminish tax evasion and contributing to increased income from ST. This is encouraged by holding monthly lotteries with prizes that can reach 150 thousand *reais* and allow a reduction of up to 30% of the annual amount of UBLT. Analysis of the income from this tax between 2013 and 2019 revealed whether the measure resulted in benefits for local finances. Figure 2 presents the evolution of income regarding the amount forecast and received. A fall is noted between 2015 and 2017 and recovery between 2017 and 2019. Considering the figures without using the GCPI, between 2017 and 2019 there was a growth of 12,1% in this period, but

considering the updated figure, the amount collected in 2019 did not exceed that of 2013 (first year of analysis), i.e., the programme contributed to recovery, as the growth is greater than the growth in Brazil's GDP (between 2017 and 2019 GDP grew by 3,6%), but the level of income collected has not yet exceeded the figure recorded in 2013.

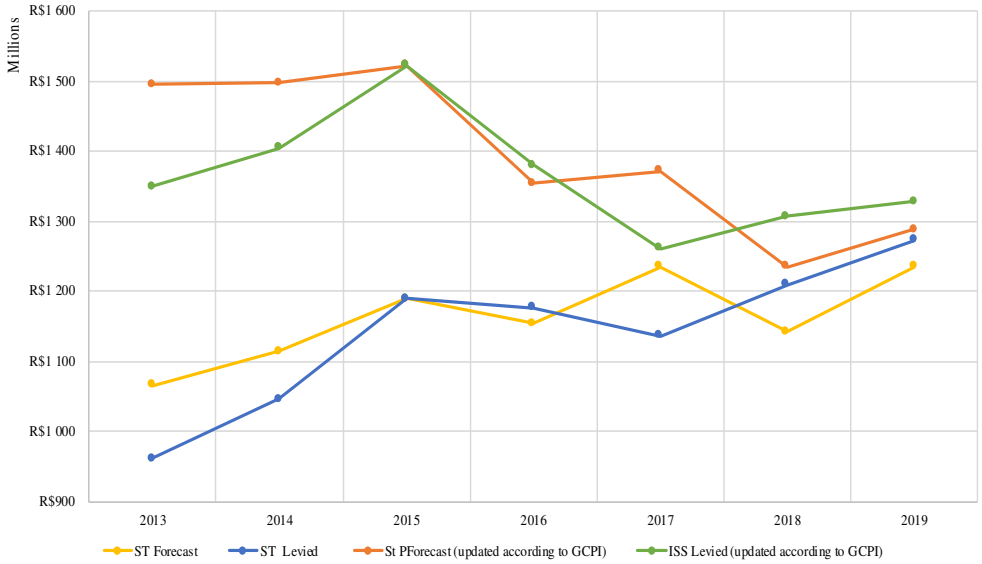

Fig. 2: Evolution of ST in the Period 2013-2019

Source: Own elaboration through analysis of the budget balance sheets provided by Curitiba Local Authority.

Concerning the Urban Building and Land Tax (UBLT) in the period between 2013 and 2019, there was an average annual growth of 5,86% (considering correction of the values by the GCPI), which is slightly greater than average inflation in the period, which was 5,76% per year.

Curitiba's Fiscal Recovery Plan (FRP) simplified and applied correction to the tax rates of the ITFP, as income from this tax had fallen significantly before the Plan, as demonstrated in Figure 3. From 2017, the year of implementing the FRP, the tax started to grow, but only in 2018 did it exceed the forecast. This tax's participation in total municipal income declines until 2016, representing 3,58%, and grows thereafter, reaching 3,95% of total income in 2019. Therefore, the tax is seen to have recovered, albeit slowly, its share of the contribution to municipal income.

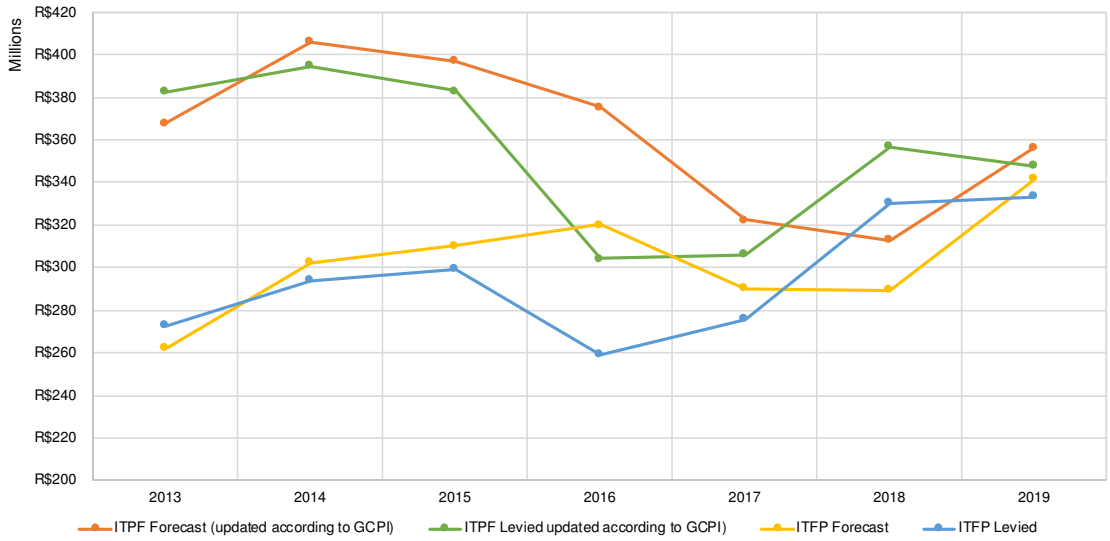

Fig. 3: Evolution of ITFP Between 2013-2019
Source: Own elaboration from analysis of the budget balance sheets provided by Curitiba Local Authority.

Alteration to Civil Servant Welfare and Freezing of Career Plans

With payment of salaries being the main local authority expenditure, the FRP acted consistently in this area (Curitiba, 2019). Considering the limits imposed by the Federal LFR, from 2017 the local authority adopted a series of adjustments to restrain the growth of payment on salaries, these measures including the freezing of career plans (Law 15.043/2017) and temporary suspension of staffing re-adjustments, which occurred again from 2018. The Federal LFR indicates that expenditure on staff should not exceed 60% of the local authority's Net Current Income (NCI), with 54% being for the Executive and 6% for the Legislative Authority. The situation of the executive's salary sheet generates most discussion and for that reason Figure 5 presents the relations between expenditure on staff (Executive Authority) and NCI.

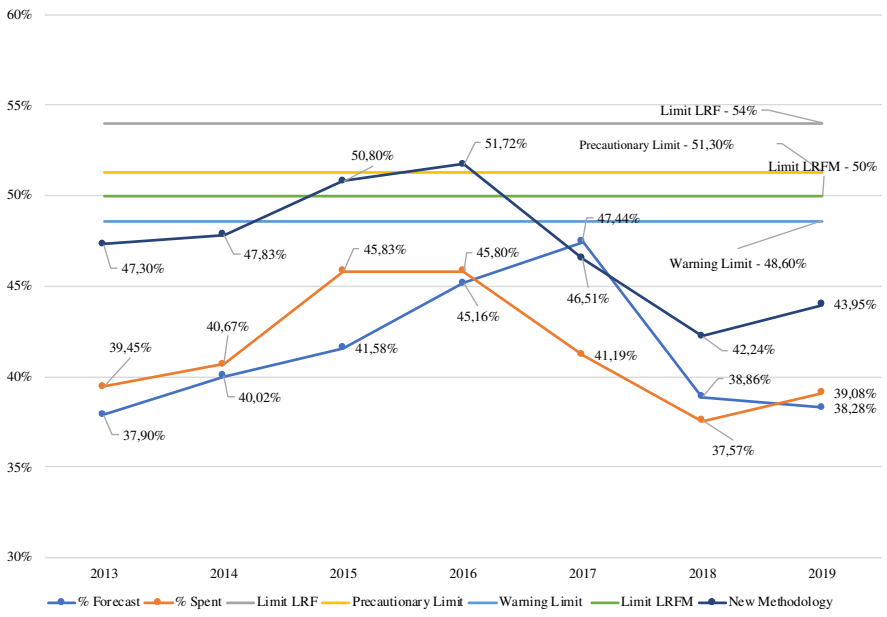

Fig. 5: Relation Between Expenditure on Staff (Executive) and NCI
Source: Own elaboration based on budget balance sheets provided by Curitiba Local Authority

Figure 5 shows that expenditure on staff grew from 2013 and reached a peak of 45,80% of NCI in 2016. The forecast for 2017 was for that tax rate to increase to 47,44%, but with the implementation of the FRP in that year the amount spent on staff represented 41,19% and fell to 37,57% in 2018. There was a slight increase in 2019 and the forecast was exceeded. An ascending curve is noted in the expenditure on staff/NCI relation, but the local authority never reached the Warning Limit of 48,60%. Besides the amounts forecast and spent, Figure 5 presents the relation considering the new methodology applied by the local authority, which deducts from the amounts the service income from the public transport system of the Curitiba Urbanization Fund (CUF) according to Municipal Complementary Law n° 101/17 (MFRL). With this new methodology, the NCI is less than that considered previously (in 2013-2016) and therefore the local authority would have exceeded the precautionary limit in 2016. However, Net Current Income, defined by both the MFRL and the FRL is the same, and the justification for withdrawing the income quoted in the NCI calculations would be greater fiscal accountability. Irrespective of the methodology applied, it is noted that expenditure on staff was growing and that the measures adopted by the plan were important in rebalancing and improving the path of expenditure. The year 2019 should be assessed over time as to whether this is a new expansion of expenditure on staff or an isolated point in the curve. The reduction in expenditure on staff is also related to the increased number of employees requesting retirement and not replacing them at the same rate.

The question of welfare was worked on in two ways: the increase of the percentage contribution to the welfare regime and the creation of a complementary welfare system. With the approval of Law 15.042/2017, for civil servants who were already within the Administration framework, the percentage contribution changed from 11% to 14%, with an annual increase of 0,5% until reaching the new limit (14%). This measure took into consideration the deficit in the municipal welfare system (Curitiba, 2019).

Through Law 15.072/2017, for new employees entering from September 2017 a Complementary Welfare Foundation was created, CuritibaPREV. In this regime, classified as hybrid by the FRP, civil servants were now protected by Curitiba Municipal Welfare Institute (CMWI) up to the limit of the General Regime of Social Welfare, and above that, the complementary welfare system came into effect (financed by capitalization). "That means that for every real you invest in your welfare account, the local authority will invest one more real. It is an indirect salary, going towards your pension"[1]. As the

changes in the welfare system are recent, it was not possible to evaluate the impact on local authority finance.

Conclusions

This study aimed to answer to the question: Which measures adopted (by Curitiba) to achieve financial balance can be relevant for adoption by other local authorities also experiencing financial stress? This study aimed to assess some measures implemented by Curitiba's Fiscal Recovery Plan. Considering the fall in municipal income, increased expenditure on staff and the crisis affecting the country from 2014, in fact the adoption of some measures were important in rebalancing municipal accounts and avoiding some situations found in other local authorities, such as delayed payment of salaries. In updated figures, income and expenditure grew at a similar rate, according to the data analysed and available on the balance sheets provided by the local authority on its Transparency Portal.

Of the measures analysed, increased ST and ITFP taxes are found to be important in improving income and that charging taxes on transport applications, although a small proportion of the budget, contributed to municipal income.

Implementation of the MFRL with mechanisms for stricter control of expenditure on staff than the Federal FRL agrees with what various authors presented in their studies and can be an important measure to be replicated in other local authorities. Despite a change in the calculation methodology to establish net current income, the growth tendency of this item was significantly reduced from implementation of the FRP. Considering that expenditure on staff represents a large share of the municipal budget, the adoption of measures in this area is fundamental for any government seeking to balance its books. Not replacing civil servants at the same rate as they retire is a factor to analyse in maintaining the public service provided to the population.

Other mechanisms of the FRP were not analysed in this study, such as the Municipal Information Record (CADIN) and the Fiscal Recovery and Stability Fund (FUNREC), approved in June 2019, which aims to use budget surpluses to create financial reserves for use in emergencies, as well as checking whether the measures already implemented continue to provide results for the local authority.

Notes

[1] Data provided by IBGE at https://cidades.ibge.gov.br/brasil/pr/curitiba/pesquisa/38/47001?tipo=rankingandano=2016

[2] The Brazilian LFR refers to Complementary Law nº 101, of 4 May 2000 – It establishes norms of public finance directed to accountability in financial management and makes other provisions.

[3] Curitiba local authority has a Transparency portal containing financial and other information, accessible at https://www.transparencia.curitiba.pr.gov.br/

[4] According to the Treasury of the State of São Paulo, intra-budget income includes current income from organs, local authorities, foundations, dependent companies and other entities belonging to financial budgets and social security, when the income originates from expenditure of the organ, local authority, foundation, dependent company or other entity involved in those budgets, in the same sphere of government.

[5] "Curitiba Receipt" is the local authority's programme to encourage people to request a tax receipt whenever they "consume" any service related to the Service Tax (ST). The most common ones are those provided by schools and nursery schools, further education and language courses, gymnasiums, health plans, beauty salons, mechanical workshops, car parks, pet shops and several others.

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Risk Assessment and Characterization of The Constraining Factors of The Russian Transport Sharing Market

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Abstract

Russia has a high concentration of population and consumer demand concentrated in several large metropolises. This is reflected in the current state of the transport sharing market, many of whose services have gained widespread use in large urban areas. The development of the Russian transport sharing market allows solving environmental issues, helps reduce transport infrastructure costs and reduce transportation costs in general. At the same time, international experience has shown that the sharing economy provides favorable conditions for startups and attracts venture investors, recognized players in the transport industry. And the combination of consumer trends and technology has allowed the transport industry in developed countries to become one of the leaders of the global economy. However, the analysis performed showed that the Russian transport sharing market is not competitive if compared to foreign counterparts. This is prevented by a number of constraining factors. The paper identifies these risks, detects the factors and causes behind them, and also gives helpful suggestions on how to mitigate their adverse effects.

Keywords: world transport sector, transport sharing, risk matrix.

Introduction

Transport plays a special role in the development of the global economy and people's lives in a diverse and multifaceted fashion. Supporting and accelerating the vigorous interaction of all branches of the economy, the transport sector is inevitably in a state of continuous development and improvement. The systemic changes that are characteristic of the processes of global production and international trade exist due to evolutionary leaps in the world transport sector. The trends of this market follow their own laws. Nevertheless, the laws of this economic sector tend to constantly change under the influence of an endless number of various factors.

At the current stage of economic development, the transport sector is one of the key globalization factors for both international trade and the international division of labor, mass tourism and cultural exchange. Transport affects favorably changes in the world economy as a whole, culture and international relations.

Understanding such a close interaction of the transport sector with many economic sectors, we cannot help but note the influence of many contradictory trends on it, since as an infrastructure sector, transport has a overwhelming ascendancy on the regional and international distribution of production

capacities, is involved in the global reproduction process and assumes the role of one of the most important parts of the economic relationship system.

The urgency and variety of problems that arise due to certain laws and current trends in the development of the world transport services market, and their direct impact on the Russian economy, have determined the research topic.

Lots of research papers that are focused on this area of the world economy pay great attention to the fundamental principles and basics of the transport market, its impact on a variety of macroeconomic processes, and the impact on the country's internal welfare (M.P. Gordon, 1993) (J.C. Johnson, D.F. Wood, D.L. Wardlow, 2002) (A.U. Albekov, 2002). We cannot help but note that these papers also considered the actions of governments aimed at increasing the competitiveness of their countries in the world market of this economy sector (D.S. Nikolaev, 1984) (V.S. Lukinsky, V.I. Berezhnoy, E.V. Berezhnaya, 2004) (L.B. Mirotin, 2003) (V.S. Novitsky, 2016).

It is worth noting that, despite the plurality of various research in this area, significant changes in the development of the world transport services market have not yet been fully and comprehensively covered in the papers of modern researchers. At this stage in the development of the global economy, the transport services market is changing and supplemented based on the emergence of new trends in economic development.

One of the trends in the modern economy that has embraced the transport services market is sharing. The sharing economy could get widespread use due to the emergence of specific services that combine resource owners with those in need of this resource. A weighty argument in favor of the sharing economy is that people in the 21st century desire greater mobility, understand that temporary access to a certain good is much more convenient and profitable than owning it permanently and personally. However, it will not be entirely correct to say that the phenomenon of sharing is a modern trend of the economy only.

This area was rather common and popular in the Soviet Union. On the other hand, the Internet could make it possible to monetize and achieve such a large scale, which makes us describe the sharing economy as a competitive economic model. The sharing model itself has created entire areas in the sectors of goods and services, making money from which was previously considered impossible.

Based on the above, there is a need to choose an optimal development strategy for Russia, which will increase the overall competitiveness of the domestic economy, its long-term and sustainable growth, which means the inevitable enhancement of the sharing economic system. The latter, in turn, is prevented by a number of barriers.

In view of the above, this paper is aimed at determining the constraining factors and risks in the development of the transport sharing market in Russia, as well as searching for tools to mitigate their adverse impact on the Russian transport sharing market.

Methodology

During the study, the following general scientific methods were used: a content analysis method intended to analyze the semantic content of text arrays and products of communicative correspondence related to the subject of the study, as well as tools for inductive and deductive analysis, which allowed combining the authors' individual conclusions on this issue and state the authors' vision of the issue. During the study, we also used special methods: absolute and relative statistical indicators, behavior indicators, methods of visualization for the results of the study. When constructing and describing models, the authors tried to follow the principles of a package approach, which allows establishing the most significant relationships and trends of phenomena and processes in the transport sharing market and formalizing the most significant effects.

The information base of the study consisted of formal statistical and analytical materials of the Russian Ministry of Internal Affairs, RosBusinessConsulting, TADviser, and the Organization of Economic Cooperation and Development.

Results

The results of the study of Russia's position in the transport sharing market makes it possible to conclude that the transport rental market in the Russian Federation has stupendous potential for further development. Most of the transport sharing service platforms are in million-plus cities and in large Russian tourist centers.

And the Russian transport sharing market faces high competition and good consumer demand. One of the growth drivers characterizing the vehicle sharing market in the Russian Federation is high Internet connectivity (Skripkin, 2019). Large distances between cities and the non-uniform development of rail services makes the Russian road carriage market really outstanding in the world transport services market, indicating great potential for growth.

In 2018, the Russian transport sharing market amounted to 7 billion rubles (US$ 107.7 million) versus US$ 3 billion on the world transport sharing market (Samsonova, 2019) (Makarenko, 2018).

The main constraining factors to the development of the transport sharing market in Russia are:

1. Damage or complete destruction of vehicles by users
2. Fraud at the registration
3. Traffic accidents
4. Low level of user engagement
5. High operating expenses
6. Poorly developed urban infrastructure
7. Intoxicated drivers
8. Acts of vandalism by transport sharing users

To better understand the issues affecting the containment of the transport sharing market, we propose to matrix risk information as a “risk matrix”, allowing us to list the risks in descending order of characteristics of their importance.

It is worth noting that the importance of risks in transport sharing is determined not only by one specific parameter, such as, for example, large financial losses, but also by the probability (frequency) of adverse effects.

		Scale of the effects of risk realization				
	Description	Minor	Small	Medium	High	Extremely high
Probability of adverse effects	Almost reliable	5				
	Very likely	4	8	2		3
	Possible		7		1	
	Unlikely					
	Extremely unlikely				6	

Low risk	Medium risk	High risk	Extremely high risk

Fig. 1: Risk matrix of the Russian transport sharing market (Source: compiled by the author).

Consider each of the presented risks in more detail.

1. Damage or complete destruction of a vehicle by the user.

This problem of sharing companies falls into the high-risk category involving financial costs for the lessor. Damage to a vehicle during its operation is rather common in the transport sharing market. This can happen not only through the fault of the renter, but also due to circumstances beyond their control. For example, damage to vehicles by a third party or weather events (Novitsky, 2016). However, these are isolated cases; most often it is the user's negligence that carries the direct risk of damage to the rented vehicle. Here, the lack of rental culture among Russian consumers of services plays an adverse role.

The mind of the Russian user viscerally reckons that we bear less responsibility for other people's property than for our own property. Therefore, sharing companies often note the negligence of national users towards damage to rental vehicles. (see Fig. 2).

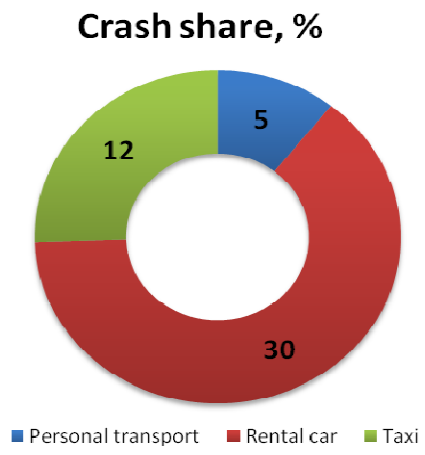

Fig. 2: Statistics of accidented transport in Russia (Source: compiled by the author).

Quite often, aggregators noted cases of dodging responsibility for damage to vehicles caused during rental. And even tightening the terms of the rental contract does not help minimize the financial costs of remedying the consequences of such damage. There are several causes behind this: from the mere

inability to recover the amount of damage from a particular user to the underdeveloped legislative and regulatory framework.

2. Fraud at user registration on the platform.

The existence of a black market of accounts for using rental cars with other people's particulars is a problem not so much of a financial nature as of a reputational one for aggregators. Indeed, the violator does not bear any responsibility either to the sharing platform, or to other road users.

According to Konstantin Semenov, the head of technical audit at Group-IB, there are two main ways for violators to use fraudulent data when using rental vehicles: firstly, when registering on a sharing platform, the user uses other people's data acquired on external Internet resources. Secondly, fraudsters use already existing accounts, records of people who have been successfully verified, but did not secure their personal data (Moskalenko, 2016).

With such access, violators can feel free to drive a rental vehicle at other people's expense, cannibalize vehicles, and not bother with abidance by traffic regulations. (see Fig. 3).

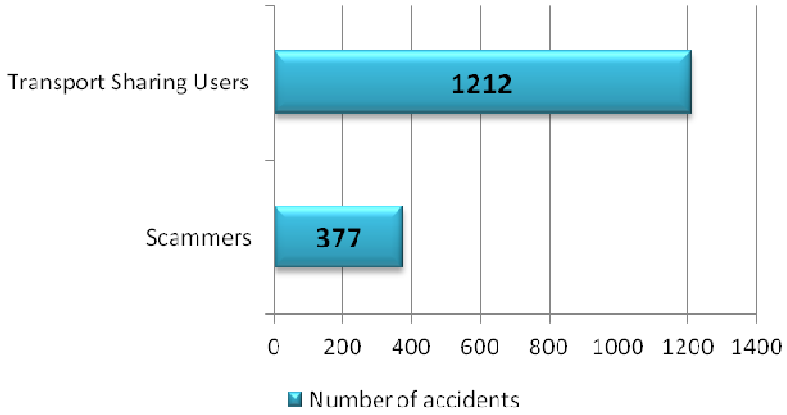

Fig. 3: Statistics of traffic accidents involving sharing transport in 2019 (Source: Compiled by TASS News Agency according to the Ministry of Internal Affairs).

According to data published by Dr Web, it has been known that Russian aggregators have different levels of protection, but each of them has the same weakness, namely, poor protection from MITM attacks, which are used to received the contents of sharing platforms' databases.

3. Traffic accidents. Vehicles provided by sharing platforms are one of the most dangerous road users, both in terms of the frequency of accidents users get into, and in terms of the severity of financial losses for aggregators. Complete destruction of a vehicle happens much more often in this segment than in other areas of transport services in the Russian region.

Insurance claims are mainly due to traffic accidents, where the guilty party is most often a sharing platform customer. On average, the frequency of losses is 3-4 times higher than the average one. This is due to several reasons: firstly, due to the high usage rate of sharing vehicles, with an average mileage of more than 45 thousand km in year; secondly, from the demographic data of Russian users of transport sharing, it becomes clear that the average age of the customer is 18-25 years, which means they have small real driving experience, which adversely affects the driving pattern (Vavilin, 2005).

4. Low level of engagement of transport sharing user.

The Russian transport sharing market is short of users of its services. On average, there are 1,082 users per vehicle, which is very few with a fleet of 120,000 vehicles. Since the sharing industry in the transport segment of the Russian market is at the start, people are poorly informed about this service. Most of the Russian people still believe that the sole car ownership is more profitable and comfortable compared to sharing (Ulitskaya, 2014).

However, according to the Ministry of Transport, major metropolises in the country are experiencing an overload of the transport system by about 30%; in view of this, a number of actions are being taken to limit the number of private vehicles. A perfect example of these measures is the introduction of paid parking areas in major cities of the country, an increase in property taxes and other fees and levies.

In addition, according to statistics, vehicles are used by owners during only 5% of the time, they are simply idle during the remaining 95% (Semenikhin, 2011), which involves enormous financial costs in the form of taxes, maintenance, payment of insurance premiums, fuel costs, payment of parking areas.

In addition, for most Russian people, the cost of transport sharing services is unbelievably high (the average monthly cost of car rental is about 4 thousand rubles), lots of people who have no private vehicle would like to use rental ones, but reject this due to high rates and high liability for damage to the vehicle (the average amount of liability for damage to the vehicle in an insured event is 50 thousand rubles) this.

5. High operating expenses.

Most of sharing companies in transport services in the Russian region incur huge financial costs due to high operating expenses (Gordon, 1993). They include leasing costs related to the acquisition of the required number of vehicles in the aggregator's fleet, since a small number of vehicles will not allow the operator to profit from its services and occupy a market share necessary for this. (see Fig. 4).

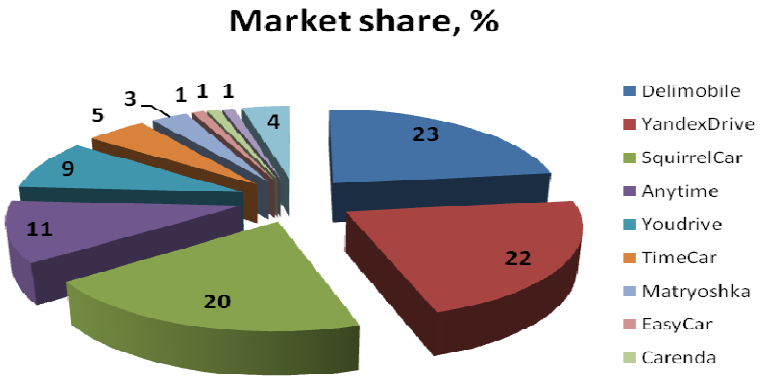

Fig. 4: Shares of transport sharing services in Russia by the number of vehicles (Source: compiled by the author).

Another source of costs for transport sharing aggregators is vehicle maintenance. The Russian laws clearly regulate the timeframe for technical checkup and violation of these standards entails considerable penalties. In addition, the maintenance and repair of vehicles is very costly: it includes both the replacement of consumables and the purchase of the necessary spare parts to replace already worn-out parts.

Costs related to purchase of fuel and payment for parking facilities are also included in the operating expenses of sharing services (Sutyagin, 2009). This also includes the costs related to insurance policies, without which it is simply impossible to provide services in transport rental.

6. Underdeveloped transport infrastructure.

As noted earlier, large distances between cities and the non-uniform development of rail services makes the Russian road carriage market really outstanding in the global transport services market, indicating great potential for growth. However, Russia's transport infrastructure is underdeveloped compared to the European market (Ulitskaya, 2014). About 70% of road pavements in the Russian region are in disrepair and require major repairs. In addition to the technical state, the system of traffic interchanges and connections is also a problem. It is not designed for such a number of vehicles, which results in a periodic overload of traffic arteries leading to large financial and tourist regions. (see Fig. 5).

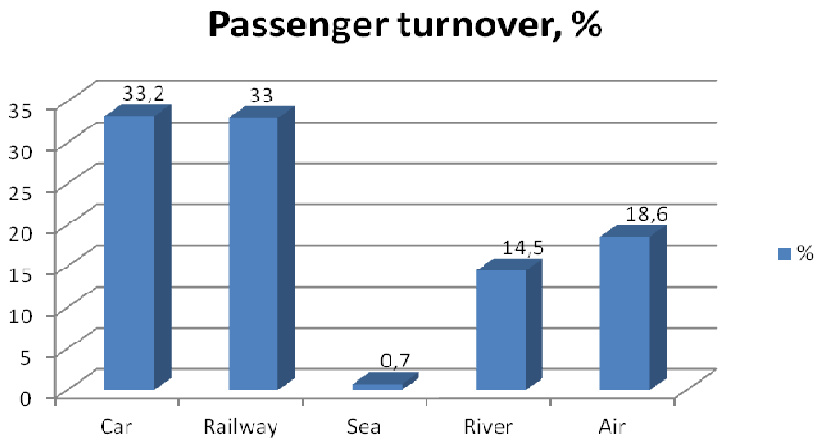

Fig. 5: Load on the transport infrastructure of Russia in 2019 (Source: Based on the research data from RBC)

As noted earlier, urban infrastructure is currently experiencing an overload of vehicles of about 30% in large metropolises. Poor integration of urban and public transport does not allow sharing transport aggregators to function optimally within a city (Afontsev, Belova, 2019).

7. Intoxicated drivers. This problem falls within the group of medium risks of sharing services and is within the tolerance limits.

Despite this, intoxicated drivers create certain reputation risks for sharing aggregators. Such extent of driving under the influence is, perhaps, characteristic of the Russian region only. The high level of irresponsibility of such users is often dangerous not only for the road users around them, but also for themselves.

Russian transport sharing services include into their rental agreements a ban on driving under the influence and on carriage of intoxicated passengers, violation of this clause of the contract entails large punitive measures up to blocking the user by the aggregator.

In addition to the service fines provided for by the service company, where a traffic accident occurs through the fault of an intoxicated driver, the insurance policy of the company does not cover the losses incurred and such a user pays all costs by themselves.

8. Acts of vandalism by transport sharing users.

Cases of vandalism by users in relation to the aggregator's property fall within the group of medium risks and cause minor financial losses to companies. However, with a small scale of the consequences of such actions, there is another risk parameter – their frequency, which places this financial risk to the area of increased control by the aggregator (see Fig. 6).

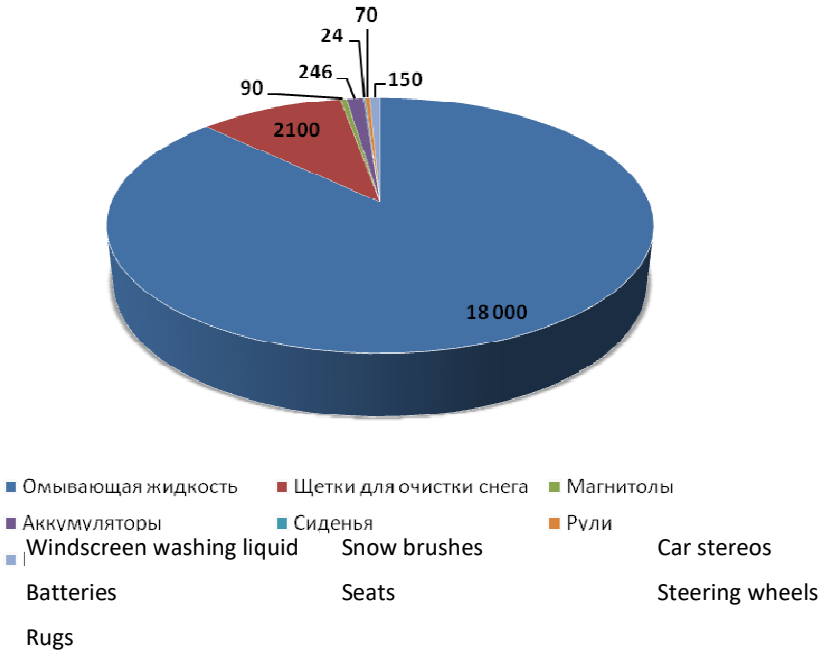

Fig. 6: Statistics of small thefts from rental vehicles in 2019 (Source: Compiled by TASS News Agency according to the Ministry of Internal Affairs).

With an insufficient culture of rental, most of the Russian users of transport sharing services feel free to inflict small-scale damage to the property of the service.

Conclusions

Based on generalized assessments of the above adverse factors, it may be concluded that the Russian transport sharing market is low competitive as a whole. As of today, Russia has no opportunity to change its position in the system of the world transport sharing market, since a number of identified problems should be solved in order to switch to an innovative development path.

Conclusion

Despite the fact that currently, the development model of the Russian transport sharing market can hardly be called ideal, based on the analysis of the identified risks and constraining factors of the Russian transport sharing market, recommendations on strengthening Russia's position in the global transport sharing market can be made:

1. The general culture of rental should be increased among the people of Russia by influencing users through a package of measures aimed at improving the quality and safety of the service;

2. It is necessary to ensure that vehicles are equipped with telematics sensors, devices for control of user road behavior and actions with the property of the rental company; the introduction of the

gamification process and the deep penetration of digitalization in the infrastructure of cities with a population of over 1 million people should be considered as priority tasks for Russian transport sharing market;

3. It is worth paying attention to the decrease of the number of personal vehicles or to the attraction of a bigger number of these vehicles in the sharing system within 5-10 years in order to decrease the adverse impact on the environment, as well as in connection with the trend of universal urbanization to decrease the load on transport infrastructure.

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Role and Significance of Crisis Management in Enterprises

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Abstract

Dynamically changing environment, necessity to adjust to the growing demands of customers and emerging crises in the organisation force the enterprises to verify their hitherto modes of operation. A crisis is a unique situation which determines the mode of functioning of an organisation. A crisis is often perceived as a pejorative phenomenon, which adversely affects the organisation's development and is a threat for the meeting of its goals and, in case no steps or incorrect steps are taken, may lead to the fall of the enterprise. However, it may also be a stimulus to act and it may constructively affect the company's operation. A company, reacting to a crisis, has to assess the conditions both in its environment, as well as internally and verify the artefacts, the system of values and the major principles which form the basis of building its organisational culture. Therefore the management, apart from taking steps related to current operation, should also act in the area of crisis management. This article attempts to present complex issues of crisis management in the micro-, small and medium-sized enterprises taking into account the fact that the situation of crisis is inseparable element of the operation of each enterprise. While conducting the research (from December 2019 to February 2020), 33 companies were surveyed. The statistical analysis of the data showed statistically significant differences between the size of the enterprise and getting the company into crisis. The results of the conducted research indicate, among others, that the susceptibility to crisis situations decreases as the size of the enterprise increases.

Keywords: Crisis Management, Enterprise, Crisis in Organisation, Crisis Situation Management

Introduction

Theoretical Bases of Crisis Management

The issue of crisis management involves the necessity of discussing the aspects which are the source of organised thinking and acting with respect to this matter. This source is a crisis-type situation, i.e. crisis situations and crises which may have an adverse effect on the operation of an enterprise. They may also include phenomena that have a positive impact on the organisation, yet on account of their sudden, unexpected and thus difficult character, they disrupt the continuity of social, political, economic and other processes (Kitler, Wiśniewski, Prońko, 2000, p. 133).

Literature devoted to the issues related to management in crisis situations contains numerous endeavours at defining the phenomenon known as a crisis. A crisis is identified as a quite unexpected and strong phenomenon, changing the hitherto state of affairs and processes occurring within an organisation in an unexpected and undesired direction, thus threatening the hitherto transformations. Etymology of the of the verb krinein, which derives from Greek, means to separate, to sieve off, to decide, to judge, whereas the noun krisis that stems from it means a choice or a decision. Thus, in the most common understanding, a crisis is a breakthrough moment, a turning point at a time most dangerous to an organisation in the current situation, which is the least advantageous for it among any other possible ones. It is generally believed that a crisis situation emerges as a result of a specific state of threat. Its culminating moment is materialisation of a possibility of realisation of specific threats, should it be impossible to counteract the intensification of individual elements that co-determine it. The beginning of a crisis situation takes place at the moment of appearance of signs

indicating rapid materialisation of actual threats which, in general, are perceptible in a given organisation.

Therefore, the goal of crisis management is to counteract the potential, as well as the actual threats and to get prepared for their occurrence, along with keeping or restoring the original status. The intention of crisis management is to ensure safety for an organisation by fostering conditions for all entities within a specific area of possibilities to develop and to accomplish a sense of certain control over the potential threats, including their monitoring, early detection and accumulating measures to counteract them.

The principles of counter-measures may encompass procedures and incentives prepared by the management of a given organisation to grasp control over the already existing crisis, reducing its effects, which is called crisis reaction (Sienkiewicz, Górny, 2001, p. 28). This may also be a process of actions undertaken by an organisation which is aimed at preventing a crisis situation and, in case of its materialisation, at attempts intended to counteract dangerous phenomena. Such actions are commonly known as crisis situation management (Wróblewski, 1996, p. 39).

Review of Crisis Management Definitions in Organizations

In the life of every organisation, crisis is a unique phenomenon. On the one hand, the possibility of its occurrence may become the source of destructive threats and, in consequence, lead to the collapse of the organisation, yet on the other hand, it may stimulate it to positive renewal and offer it an opportunity for further development. The inevitability of crises phenomena in the modern organisations gives rise to the necessity of their early detection, diagnosis and subsequently overcoming. This, in turn, induces the necessity of understanding the core of the crisis phenomenon and its premises.

The concept of a crisis in an organisation is difficult to define on account of its multidimensionality and various subjective references. This term may be referred not only to economic phenomena, but also to social, technical, organisational and legal aspects, to individual persons and communities with pre-defined internal organisation and management systems. In the common understanding, a crisis in general means a difficult situation which either exists or may happen. In the universal sense, the term crisis is understood as a turning point in any course of events, a decisive moment, a breakthrough moment, a stage or an event after which a change happens.

Reference books on the subject include a number of definitions of crisis management. An interesting definition of crisis management is provided in a study entitled “Generic Crisis Management Handbook” in line with which crisis management is to be perceived in a broad perspective, taking into account such procedures and activities that are intended to take-over control over a crisis situation by crisis managers and which allow them to shape the course of the crisis via preparatory activities (Wiśniewski, 1014, p. 79).

According to M. Madej (2010, p.102), “in the world of business where crisis management is understood in line with the definition deriving from its cradle - the United States - it constitutes a set of organisational, logistic and financial measures the aim of which is to prevent emergence of crisis situations, ensure efficiency of decision-making structures on all levels of management, continuous readiness of authorities and measures to take action, efficiently react to and liquidate the effects of the existing situation”. Thus, crisis management consists in: counteracting the threats, both potential and current ones; preparing for the occurrence of threats or reacting to the existing crisis situations and subsequently preserving or restoring the original status. On the other hand, R. Barton (1993) believes that a crisis is a major, unpredictable event which has potentially adverse effects, significantly limiting the operation of an organisation in the area of production, services, employment, financial condition and reputation. In turn, according to J.R. Caponigro (1998), a crisis is any event or action that may have a potentially negative impact on the reliability and efficiency of business and - typically - remains or will soon get out of control of such business. I. I. Mitroff (2001) defines a

crisis as an effect of emergence of unexpected disturbances in the operation of an organisation, including internal and external (fortuitous type) factors. For Ch. F. Herman (1963), a crisis is a status that threatens the survival of a company, meeting the company's goals, reduces time available for commencement of repair actions and surprises the decision-makers with its emergence, thus creating the conditions of strong pressure.

A crisis may also be examined as a stage in the cycle of an enterprise. And thus, P. F. Drucker (1992, p.138) believes that a crisis is an inevitable and ineluctable event accompanying organisations. According to him, a crisis in an organisation is a consequence of stages in the life cycle of sectors, in particular specialist companies, whereas innovations cannot offer a guarantee for disappearance of crisis and survival of a company. In turn, R. Oldcorn (1989, p. 237) defines a crisis as an ineluctable, repetitive process resulting from stages in an organisation's cycle. He presents it as the "product of unplanned events, which may disrupt or threaten the normal operation of a company".

Based on the review of crisis concepts, a crisis definition was adopted for the needs of this paper where a crisis is understood as a state of threat, where - as a result of accumulation of various difficulties - performance of basic functions of an organisation is at risk.

Crises have various sources, their impact encompasses both individual parts and entire organisations. Their duration may vary, along with their effects. However, it may be noted that they always affect the organisation, either indirectly or directly. Only the company can determine whether a crisis will have a positive or adverse impact on it. A. Zelek (2003, p. 40) attracts attention to the fact that in spite of the variety, the multiple meanings and the ambiguity in interpreting crisis phenomena in an organisation, it is possible to indicate their basic features, which include: durable disturbed operation of the organisation; actual or alleged loss of control over the operation; disrupted internal balance of the organisation; threat to the existence of the organisation or its part (function); aggravation of financial condition of the organisation; threat to the meeting of strategic objectives of the company; ambivalence of the possibilities of development and repair; possibility of infringement or loss of public trust and inner faith in the organisation, which aggravates its image; reduced time of decision making; high degree of uncertainty causing fear and anxiety among the employees and low level of predictability - an element of surprise.

The analysis of the researches of crisis situations in Polish enterprises lead to the conclusion that their causes lie both in the environment and in improper management (Wawrzyniak, 2002, pp. 53-56). Surveys conducted by A. Zelek (2002) on a sample of 117 West Pomeranian enterprises in 2002 indicate that the main causes of the external crises in Polish enterprises include: the recession in the Polish economy (67.6%); the increase in competition level (65.0%); the recession in a given industry (44.2%); payment gridlocks (42.5%); the unemployment rate (41.3%); high interest rate (35.2%); inflation (11.5%) or frequent changes in managerial positions (8.8%). On the other hand, the internal causes include the following: mismanagement (38.2%); lack of capital (35.3%); low efficiency (18.5%); lack of development strategy (18.0%); personnel conflicts (17.5%); random events (14.7%) or wrong pricing policy (11.8%). Hence, the most common reasons for the emergence of the crisis in Polish enterprises were: recession in the national economy and a given industry, growing domestic and international competition, lack of capital and payment gridlocks as well as poor management. In contrast, the results of the surveys conducted by A. Zakrzewska-Bielawska (2008, pp. 65-92) on a sample of 65 large (employing over 249 people) enterprises from all over Poland in 2001 show that the enterprises which have undertaken restructuring activities also indicate such internal reasons as: excessive employment and too high labor costs, changing customer expectations and the need to introduce new products, excess of fixed assets and the resulting high financial burdens, while also insufficiently developed marketing activity. Therefore, presented considerations show that there are numerous reasons for the crisis of enterprises. In general, it can be stated that any negative phenomena for an organization, regardless of the area which they concern, may constitute a reason for crisis.

The purpose of crisis management is thus striving to minimise the potential threats and efficient performance of activities in case of their occurrence, the efficiency of which depends, to a significant degree, on skills, competence and rights both of persons managing such activities, as well as units taking part in a crisis situation. In this case, capacity means the ability to accomplish the goals that were set, whereas efficiency - the degree of accomplishing them (Sienkiewicz-Małyjurek, Krynojewski, 2010). In relation to this, the complexity of the issue of crisis management results from the necessity of taking actions that are adequate to the threat before its emergence, i.e. such actions that do not allow for the materialisation of a crisis situation. On this account, crisis management attaches significant attention to proper identification of materialisation of potential threats and, in case of their occurrence, planning of activities, making a division of obligations and areas of competence of entities participating in it, preparation of measures and technologies for using them, distribution of activities in the field that are adequate to the needs, spatial management and monitoring of existing security systems.

Study Methodology

In the modern economy, enterprises must implement proper action strategies in the conditions of risk and uncertainty, create management scenarios with respect to unpredictable crisis situations and rapid response programmes, as well as reinforce internal mechanisms for balance restoration.

The purpose of this paper is an attempt at showing a complex problem of managing a crisis situation in an enterprise, taking into account the fact that a crisis situation is an indispensable element of operation of every company.

The author of this paper tried to find answers to the following questions:

1. Can a crisis situation be managed, in particular in the conditions of uncertainty and chaos?
2. Is managerial personnel capable of managing a crisis situation when it is difficult to foresee the potential threats?
3. Are companies susceptible to crisis situations?
4. What are the causes of crisis situations in companies?
5. How do companies react to crisis situations?
6. What is the assessment of utility of tools for managing a crisis situation in the opinion of persons managing a small and medium-sized enterprise?

The following hypotheses were adopted for survey purposes in this paper:

1. The awareness of the necessity of managing a crisis situation grows along with the size of an enterprise.
2. Susceptibility to crisis situations is reduced along with the growth of awareness of the necessity of managing a crisis situation.
3. Managing a crisis situation allows for faster identification of problems and, in consequence, for the existing changes.
4. The awareness of the necessity of managing a crisis situations increases with the size of an enterprise.

To receive answers to these questions and research hypotheses, a questionnaire survey was used. The main survey was preceded by a pilot one, thanks to which less significant questions for the examined problem were eliminated. The final version of the questionnaire included: a description of the survey and 23 closed-ended questions with an option of individual response in case the respondent did not find a fitting answer. The questionnaire was divided into four parts. The first part of the questionnaire referred to enterprises which were in a crisis situation. The questions were meant to describe the characteristics of crisis situations which small and medium-sized enterprises encountered and check the degree of preparation with respect to a given crisis situation. The second part referred to the issues of managing a crisis situation. The third part focused on the management of a crisis situation at the stage of current operation. The last part included demographics questions. The questionnaire was carried out by means of telephone interviews and categorised interviews among owners of micro,

small and medium-sized enterprises or their managers. During the survey (from December 2019 to February 2020), 47 interviews were carried out among small and medium-sized enterprises conducting their business in the area of the Silesian Province, out of which 33 companies decided to undergo the survey and passed positive verification.

Microsoft's EXCEL and Word programmes, along with the statistical package, STATISTICA 13.3, were used to analyse the collected research material and graphic presentations.

Survey Results

In the surveyed group of companies, micro-companies (employing up to 9 persons) and small companies (employing between 10 and 49 persons) had the largest share, which amounted to 72.2%. In the discussed group, small companies were definitely dominant, which made up 61.5%. Micro-companies were only 10.7%. On the other hand, the group of medium-sized enterprises (employing from 50 to 245 persons) constituted 27.8%. The largest group of surveyed companied was involved in services (49.2%), subsequently production (27.7%), retail sale (24.6%) and wholesale trade (24.4%). The results of the author's own survey show that almost a half of surveyed companies (48.7%) experienced a crisis situation at least once. Statistical analysis of data showed statistically significant variation with respect to the size of a company and the experience of a crisis situation. In the case of micro-companies, susceptibility to crisis situations was as follows: 67.4% were susceptible, 32.6% were not susceptible; in the case of small companies: 56.2% were susceptible, 43.8% were not susceptible; in the case medium-sized companies: 38.5% were susceptible and 61.5% were not susceptible. Thus, an assumption can be made that the smaller the company, the greater its susceptibility to crisis situations.

In the group of surveyed companies, a crisis situation was most often manifested by a drop in sale (36.5% in the case of micro-companies, 30.2% in the case of small companies, and 27.6% in the case of medium-sized companies), a drop in the market share (18.2% in the case of micro-companies, 17% in the case of small companies and 21.4% in the case of medium-sized companies), aggravating atmosphere at work (19.1% in the case of micro-companies, 15.2% in the case of small companies and 19.8% in the case of medium-sized companies) or loss of financial liquidity (15.2% in the case of micro-companies, 13.4% in the case of small companies and 14.3% in the case of medium-sized enterprises). Only 7.4% of the surveyed companies indicated aggravating company image.

A further part of the survey referred to the determination of the causes of the existing crisis situations in the surveyed companies. The analysis of the author's own survey has shown that as many as over 70% of small and medium-sized enterprises covered by the survey indicated changes in the external environment of the enterprise as the causes of a crisis situation, which included: amount of taxes, rate of economic growth, state policy with respect to entrepreneurs and competitors' activities. On the other hand, internal causes included conflicts among employees, incorrect management, errors made by employees and lack of an adequate strategy.

In turn, the surveyed micro-companies listed the following factors as the external causes of crisis situations: incorrect state policy with respect to entrepreneurs, competitors' activities and problems with business partners. Internal causes listed most often included improper company management, conflicts at work place and lack of capital.

The surveyed companies reacted to a crisis situation most often by implementing the following repair activities: organisational changes: micro-companies 52%, small enterprises: 59% and medium-sized enterprises: 78%; overall cost reduction: micro-companies 75%, small enterprises 68% and medium-sized enterprises 69%; improvement of financial control: micro-companies 32%; small enterprises 39% and medium-sized enterprises 31%; market restructuring: micro-companies 33%, small enterprises 49% and medium-sized enterprises 34%; reduction in marketing expenditure: micro-companies 5%, small enterprises 27% and medium-sized enterprises 34% and replacement of managing personnel: micro-companies 7%, small enterprises 15% and medium-sized enterprises

28%. The received results show that the larger the company, the more often it introduced organisational changes in order to be able to get out of a crisis situation. The above-listed organisational changes often referred to a reduction in employment.

As part the performed survey, the companies taking part in it also took a stance with respect to the applied tools for managing a crisis situation, such as: anti-crisis teams, procedures of conduct in crisis situations, emergency plans in case of a crisis situation or a communication system during a crisis situation. The analysis of received responses has shown that the degree of utility of some tools increased along with the growth of the company's size. The surveyed companies most often apply emergency plans in case of a crisis situation (over 61%); the second element used most frequently are the prepared procedures of conduct during a crisis situation (58%); the third position is taken up by a communication system during a crisis situation (32%). In the last place, the surveyed companies indicated the necessity of using anti-crisis teams (19%). Such teams are most often used in small and medium-sized companies: 46% and 59%, respectively.

On the other hand, factors that according to the surveyed companies most often hinder preparation for a crisis situation include limited possibilities of foreseeing a crisis situation: micro-companies 47%, small enterprises 49% and medium-sized enterprises 56%; external factors of the enterprise: micro-companies 46%, small enterprises 48% and medium-sized enterprises 52%; no experience in managing a crisis situation: micro-companies 44%, small enterprises 42% and medium-sized enterprises 36%; and lack of funds and proper resources: micro-companies 36%, small enterprises 38% and medium-sized enterprises 39%.

Bearing in mind that 48.7% of enterprises experienced a crisis situation at least once, 62% of respondents among small and 61% among medium-sized enterprises declare preparation for a crisis situation at the stage of current operation. Preparation for a crisis situation is different in the case of micro-companies, among which only 39% declared preparation for a crisis situation.

Discussion

Dynamically changing environment, necessity of adjusting to the growing demands of customers and emerging crises in the organisation force the enterprises to verify their hitherto modes of operation. Sources and causes of crisis phenomena may derive from inside the company, as well as from its environment. Crisis situations affect companies in varied degrees. Some enterprises are affected directly and a crisis has burdensome consequences; it has an indirect impact on others, whereas few companies do not feel its influence. A crisis makes companies more aware of the problem of uncertainty, unpredictability and instability of the economic situation (Orłowski et al. 2010, p. 28).

In relation to the fact that every crisis is usually unique on account of its course in reference to a specific company, it is difficult to have ready-made solutions. Therefore, every crisis requires an individual approach.

On account of the broad range of the author's survey, only selected results are presented for the purpose of this paper, which were meant to provide answers to the questions referring to the subject matter discussed in it. And thus, in response to the following questions: can a crisis situation be managed, in particular in the conditions of uncertainty and chaos? The answer is affirmative in reference to these companies that are more aware of the significance of a crisis situation and its potential effects and with respect to the ones which undertake a number of actions as part of a broadly understood process of crisis management. On the other hand, in the case of companies that do not manifest great activity or do not handle the existing situation well, improper management of a crisis situation had adverse effects.

Whilst discussing the management of a crisis situation, it must be remembered that managerial personnel plays a key role in this process. Such personnel is under the obligation of management in

an efficient and professional manner in the existing crisis situation. According to K. Krzakiewicz (2005, s. 22), managerial personnel is required to make professional decisions, the goal of which should be to counteract crisis situations and to focus efforts on selected priorities in order to overcome them and to avoid the consequences of adverse crisis phenomena.. Thus, is managerial personnel capable of managing a crisis situation when it is difficult to foresee the potential threats? The conducted survey shows that over 60% of both small and medium-sized enterprises declare preparation for a crisis situation. It is worth noting that these are the companies that had already dealt with a crisis situation before. On the other hand, micro-companies have a problem. Only 39% declared such preparation. Difficulties with evaluating preparation of micro-companies may result from insufficient knowledge not only within the range of crisis situation management, but also weak awareness of bases of functioning of an enterprise which, as already mentioned, is confirmed by the PARP (Polish Agency for Enterprise Development) study results (Orłowski et al. 2010, p. 17). It should also be remembered that there are no universal solutions and verified reactions to all crisis situations that could be applied as a pattern. Awareness of small and medium-sized enterprises that proper preparation for a crisis situation will allow them to reduce the risk of occurrence of serious consequences is vital. Thus, are the surveyed companies susceptible to crisis situations? Statistical analysis of data showed statistically significant variation with respect to the size of a company and the experience of a crisis situation. The results of the conducted survey show that susceptibility to crisis situations decreases along with the growth of a company.

In the case of small and medium-sized enterprises, the external causes most often included the amount of taxes, the rate of economic growth, the state policy and competition. On the other hand, micro-companies indicate - as external causes of crisis situations - incorrect state policy towards entrepreneurs in the first place; in the second place - often unfair practices of competitors and, in the third place - problems with business partners. On the other hand, as internal factors, small and medium-sized companies most often listed: conflicts among employees, improper management, errors made by employees and lack of a proper strategy. In the case of micro-companies, internal causes indicated most often included improper company management, conflicts at work place and lack of capital.

The surveyed companies reacted to a crisis situation by implementing the following repair activities: organisational changes, overall reduction of costs, improved financial control, market restructuring and reduction in marketing expenditure. The larger the company, the more frequent introduction of organisational changes in order to get out of the crisis situation. It is also worth noting that companies that had experienced a crisis situation before more often consider crisis situation management useful in comparison to companies which had not experienced such situation. Thus, crisis situation management consists in taking specific steps that allow for avoiding crisis and in case of its occurrence enable reduction of its adverse consequences.

Therefore, what is the assessment of utility of tools for managing a crisis situation in the opinion of persons managing a small and medium-sized enterprise? The received results show that larger companies assess the utility of tools used in crisis situation management better. The conducted survey confirmed doubts related to weak preparation of companies for potential crisis situations and a slight percentage of companies using all tools to manage a crisis situation. It showed that slightly over a half of surveyed companies (61%) had emergency plans. Only over a half (58%) of surveyed companies implemented procedures that had to be followed in case of potential crisis situations. Least popular was having anti-crisis teams: only 19% of companied had such teams.

Thus, it may be declared that all of the hypotheses set in this survey were positively verified.

Conclusions

A crisis adversely affects the organisation's development and is a threat for the meeting of its goals and, in case no or incorrect steps are taken, it may lead to the fall of the enterprise. However, it may also be a stimulus to act and it may constructively affect the company’s operation. Managers of small

and medium-sized enterprises believe that crisis situation management, including planning, is less important from their point of view. Some of them assume that insuring a company is going to protect it against any crisis and in relation to this, no additional activities are necessary. Another reason for which some small and medium-sized enterprises do not manage a crisis situation is the absence of proper tangible and intangible resources which facilitate adequate preparation. Furthermore, entrepreneurs indicate lack of time for preparing emergency plans and other activities that are related to the preparation for a crisis situation and do not see the necessity for setting up crisis teams. They explain it by lack of finances and the fact that the future is too uncertain in order to foresee it. Managers of surveyed companies also believe that serious crises happen so rarely that they do not require special procedures and that one has to react to the crisis when it materialises.

On March 4th, after the above-mentioned studies had been completed, the first case of COVID-19 infection appeared in Poland, which significantly affected functioning of the SME enterprises, including those who participated in the above research. In recent days, the large amount of entrepreneurs have been suspending business activity and have been informing labor offices about planned collective redundancies. As a result of the outbreak of the coronavirus pandemic and the restrictions introduced by the government only on March 31st, as many as 9,151 entrepreneurs suspended business activity in Poland and 1,353 closed them down. This is twice as much as in the same period a year ago. According to the Polska Press Information Agency, in March 2020 a total of 58.7 thousand applications were submitted to the Central Registration and Information on Business (CEIDG) regarding suspension and closing down of business activity. The survey conducted among the entrepreneurs by Employers of Poland (Pracodawcy RP) shows that in April the scale of terminations of employment will be enormous. Every fifth company plans to lay off 20% of employees, and every tenth - 30%. In total, up to 66% of companies plan some kind of reductions of personnel. Moreover, the entrepreneurs do not count on the government's so called anti-crisis shield because, according to many experts, it does not solve the most urgent problems which entrepreneurs currently have to face. As many as 78% of entrepreneurs assess the solutions adopted in the anti-crisis shield as very bad (54%) or bad (24%). Only 7% of them judge the solutions positively (https://polskatimes.pl/przedsiebiorcy-masowo-zawieszaja-dzialalnosc-gospodarcza-tysiace-firm-nie-moze-funkcjonowac-przez-koronawirusa-raport-polska/ar/c1-14893619). The pandemic threat has not been taken into account in the area of threats to the small, medium and large enterprises, therefore I believe that this research should be repeated after the end of the COVID-19 pandemic.

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Measuring the Goals of Lean Management Concept Implementation

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Abstract

The purpose of this paper is to elaborate on the issues of efficient implementation of the Lean Management concept in enterprises. Such efficiency was treated very comprehensively; on the basis of several dozen papers available on-line, quantitative measures were identified and thanks to them, areas of implementation were determined, along with objective assessment of progress in implementation and subsequently application of the Lean Management concept. Furthermore, these measures were thematically grouped and assigned to one out of four areas of Lean Management maturity areas. Literature studies carried out as part of this paper seem to be of key importance for the assessment of the functioning of companies in general (not only the ones applying Lean Management), as they indicate gaps and deficiencies along with directions of changes aimed at improvement of efficiency in operating activities in almost every area of the company's operation.

Keywords: Lean Management concept, Lean Management implementation process, Lean Management implementation efficiency, Lean Management efficiency measures, Lean Management maturity.

Introduction

Already at the pre-implementation stage, i.e. initiation and conceptualisation of the implementation process of Lean Management, activities aimed at transforming the needs and benefits into specific and thought-through goals seem to be important; they are going to constitute a point of reference with respect to the monitoring and control activities of both the implementation process as such, as well as the outcomes of such implementation and measurements of the degree of maturity in the application of the Lean Management concept. The role of every well-defined goal is to transform the needs or the expected benefits into specific and clear results. Most frequently, guidelines of the SMART approach are used for correct identification of goals, which assumes that goals should define specific results described with the use of precise measurable indices, which enable evaluation of the degree of success accomplishment; in this case, it is going to be the level of maturity of Lean Management, expressed by the advancement in the application of Lean Management. A vital issue from the point of view of goal determination is the choice of parameters which, in the fullest mode, illustrate the level of goal accomplishment. Thus, a situation must be ruled out where measurement is only made because such possibility exists and not because it is necessary. Basili, Caldiera and Rombach prepared a methodology for identifying and determining goal parameters by asking a set of questions and group answers given to them. Such conduct led to the separation of activities only in areas of key importance for the implementation of Lean (Basili, Caldiera, Rombach, 1994, p. 98). Another feature of a well-defined goal is its feasibility within the scope of cost and implementation time. This feature is particularly important, as lack of faith in the possibility of meeting the goal weakens the employees' morals and reduces faith in the operation of the company as a whole. Overly ambitious goals, instead of being a challenge, too often become the cause of reduced self-confidence of organisation members, thus becoming a basic source of resistance against implementation of Lean Management.

Literature Review

At the implementation stage, monitoring and control processes seem to be of key importance for the efficiency of undertaken activities (Darońń, Górska 2019). Monitoring and control of the implementation process of Lean consists in identifying and subsequently tracing divergences from the plan and taking the necessary corrective actions (Azharul, Kazi 2013, pp. 169-196). In this place, it is worth noting that the ongoing control of implementation determines the planned implementation of the Lean system and allows for identification of all factors (Sanjay 2011 pp. 55-74; Jagdeep, Harwinder 2012, pp. 88-111) affecting its implementation (PMI, 2008). Based on the studies of Kumar and Phrommathed (Kumar, Phrommathed 2006, pp. 104-132), it may be ascertained that lack of specification of measurable outcomes of the implementation process (Podobiński 2015, pp. 5-15), as well as the lack of the continuous monitoring of the process of implementation of Lean Management result in a chaotic transformation (Peter, Anders, Per, Pia 2012, pp. 829-849). Furthermore, broadly conducted control activities ensure maintenance of Lean effects in an extended perspective of time (Todd, Maike, Ian 2011, pp. 587-603). Additionally, continuous control of both the implementation, as well as the subsequent application of the Lean concepts and tools prevents return to previous practice (Mohamad, Hom, Ashraf, Nick 2013, pp. 280-320). Both the implementation and the subsequent application of the Lean Management concepts is supported by a broad array of tools, prepared in the greatest degree by Japanese employees of the automotive industry (Lokman, Lanita, 2014, pp. 83-115). Analytical and control tools that form a basis of such set allow for analysis of the implemented processes (Shah, Ward 2007, pp. 785-805).

Research Question

However, one should be aware that the Lean Management concept, stemming from the Lean Management philosophy, is characterised by a holistic approach (Bhasin 2011, p. 56). Nevertheless, in spite of the fact that there are a number of tools, they are often inadequately used - one tool is used to solve all problems or all tools are used to solve one problem, alternatively the knowledge and experience are missing in the precise matching of a tool to the problem (Pavnaskar, Gershenson, Jambekar 2003, p. 16).

Taking the above into account, the following research questions were set:

1. What are the areas of maturity in the implementation (application) of the Lean Management concept?
2. What are the principles used in the application of the Lean Management concept and how do they correspond to the maturity areas?
3. What are the factors determining the implementation of the identified principles of applying the Lean Management concept?
4. What measures can be distinguished that allow for the verification and assessment of implementation of individual factors that determine the application of the LM principles?
5. What should be the direction of changes in the values of individual measures in order to accomplish maturity in the application of the Lean Management concepts?

Research Design and Methodology

With the aim of answering the research questions that were set, analysis of reference books was carried out, on the basis of which four areas of maturity in the application of the Lean Management concept were distinguished (leadership, people, processes and outcomes). Subsequently, also based on the scientific knowledge, principles guiding the enterprises that apply the Lean Management concept in practice were identified. Another step was determination of factors that allow for the application of the previously identified principles and finally, the factors were assigned to measures along with target values.

In this place, it is worth noting that in spite of the fact that the literature on conceptual premises, determinants of implementation and implementation as such, along with benefits resulting from it, is extensive, yet a systematic approach to such knowledge was missing, along with a breakdown which could be broadly used in the economic practice.

Results

Proper identification of factors determining the implementation of goals that were set is crucial for the formulation of measures. Similarly to goals, measures verifying their accomplishment were also divided into four areas in line with the maturity theory (Pieńkowski 2016, p. 158) in the application of the Lean Management concept (Table No. 1).

Table 1: Measures and desired directions of their formation

Area	LM Principle	Determinant	Measure	Desired directions of measure formation
LEADERSHIP	Decentralisation of liability	Supervisory tasks performed by teams	Leadership in a team is entrusted to its member (e.g. a foreman) Supervisory tasks are performed by a team Separated supervisory level in an organisation	↑
		Leadership in a team	Percentage of employees who are capable of performing leader functions	↑
			Percentage of employees accepting internal leaders	↑
		Hierarchy in organisation	Number of organisational levels in a production organisation	↓
		Area of liability	Number of functional areas for which a team is responsible	↑
	Vertical information system	Manner of information communication	1. Information is displayed in a continuous mode in separate and visible places located directly by the production line 2. Oral and written information is regularly communicated to employees 3. Written information is communicated regularly 4. No information for employees	↑
		Strategic content included in information	Scope of information (number of areas to which the information refers) communicated to the employees	↑
			Time perspective of communicated information	↑
		Operating content included in information	Number of measures used to assess the capacity of teams and their size	↑

		Frequency of information communication	Frequency with which the information is communicated to employees (diversification of content communicated in information)	↑

PEOPLE	**Function integration**	Scope of work performed by a team	Number of task areas implemented by a team	↑
		Support functions (auxiliary processes)	Relation of direct to indirect employees (non-production to production)	↓
	Interdisciplinary teams	Team structure	Percentage of employees working in teams	↑
		Task structure	Number of tasks in a production process performed by teams	↑
		Work position classification	Number of work positions	↓
		Diversity of tasks (rotation)	Employees change tasks in a team 1. Continually 2. Every hour 3. Every day 4. Once a week 5. Once a month 6. Once a year 7. Less frequently than once a year	↑
		Trainings	Number of diverse tasks in which the employees are trained	↑
			Number of functions in which the employees are trained	↑
			Number of training hours per newly-hired employee	↑
	Decentralisation of liability	Supervisory tasks performed by teams	Leadership in a team is entrusted to its member (e.g. a foreman) Supervisory tasks are performed by a team Separate supervisory level in an organisation	↑

		Leadership in a team	Percentage of employees who are capable of performing leader functions	↑
			Percentage of employees accepting internal leaders	↑
		Hierarchy in organisation	Number of organisational levels in a production organisation	↓
		Area of liability	Number of functional areas for which a team is responsible	↑

PROCESSES	**Pull instead of push**	Use of the pull system in relation to the push system	Number of stages in the flow of materials where the pull system is used in relation to all stages of flow of materials	↑
		Degree of implementation of the pull strategy	Percentage of annual value planned for implementation in the pull system	↑
	Reduction of costs that do not add value	Work in progress	Value of work in progress in relation to sale	↓
		Size of batch	Work time between change-overs	↓
		Change-over time	Amount of time necessary for change-over	↓
		Machine downtime	Number of machine downtime hours due to incorrect operation in relation to total machine time	↓
		Transport Parts Waste Manufacturing defects	Frequency of parts transport	↓
			Physical distance (transport path)	↓
			Value of waste in relation to sale	↓
			Value of manufacturing defects in relation to sale	↓

	Just in time	Size of batch	Production time between change-overs	↓
		Work in progress	Value of work in progress in relation to sale value	↓
		Order processing	Time necessary to process every order	↓
		Just in time level	Sequential introduction of JIT Possibility of processing specific supplies in the JIT mode Batches are delivered just in time	↓

RESULTS	**Zero defects**	Liability for identification of defective products	Employees identifying deficiencies and stopping the production line	↑
			Employees identifying deficiencies but not stopping the production line	
			Quality control division identifying deficiencies and informing the production managers	
		Liability for correction of deficiencies	Defective products are handed over to a person responsible for their materialisation Employees identify defective products and repair them Repair division repairs defective products	↑
		Quality control division	Number of persons working in a quality control division	↓
		Process control degree	Processes are controlled by measurements during the process performance Measurement is carried out after every process Measurement is carried out only on the ready-made product	↑

		Autonomous control of defects	Percentage of inspections carried out by an autonomous defect control unit	↓
		Area of repairs and corrections of production defects	Size of the area of repairs and corrections of manufacturing defects	↓

Legend: directions of changes in the value of indices in the organisation's transition towards Lean:

↑ *- should grow*
↑ *- should be reduced*
↑*- practice should change in the indicated direction*

Source: author's own study based on: A. Piasecka-Głuszak, Korzyści z wdrożenia Lean Management w polskich przedsiębiorstwach w dobie kryzysu – wyniki badań ankietowych, Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu No. 315, Wydawnictwo UE we Wrocławiu, Wrocław, 2013, pp. 106-11; C.A. Voss, V. Chiesa, P. Coughlan, Developing and testing benchmarking and self-assessment frameworks in manufacturing, "International Journal of Operations & Production Management", Vol. 14 No. 3, 1994, pp. 83-100; R.H. Hayes, Why Japanese factories work, "Harvard Business Review", July-August 1981, pp. 57-66; P. Lillrank, M. Imai, Kaizen. Klucz do konkurencyjnego sukcesu Japonii, MT Biznes, Warsaw 2007, N. Kano, Continuous Improvement: Quality Control Circles in Japanese Industry, Centre for Japanese Studies, The University of Michigan, Ann Arbor, MI, 1989.; J.F. Krafcik, Triumph of the lean production system, Sloan Management Review, Vol. 30, No. 1, 1988, pp. 41-52.; C. Karlsson, P. Åhlström, Change processes towards lean production – the role of the remuneration system, "International Journal of Operations & Production Management", Vol. 15 No. 11, 1995, pp. 80-99.; Kukowska K., Skolik S. (2013), A Critical Analysis of the Term "Social Capital" in the Context of the Functioning of Organization, [in] People, Knowledge and Modern Technologies in the Management of Contemporary Organizations. Theoretical and Practical Approaches (eds.) Illes C. B., Bylok F., Dunay A., Cichobłaziński L., Szent Istvan Egyetemi Kiado Nonprofit Kft., Gödöllő, pp. 20-34 https://bg.pcz.pl/apisnb/book/41566/A-Critical-Analysis-of-the-Term-Social-Capital-in-the-Context-of-the-Functioning-of-Organization, J.K. Liker, D.P. Meier, Droga Toyoty. Fieldbook. Praktyczny przewodnik wdrażania 4P Toyoty, MT Biznes, Warsaw 2011.

Discussion

In the area of leadership, the fundamental principle is liability decentralisation. The direction of changes towards decentralisation may be determined by identification of places in the organisational hierarchy where supervisory tasks are performed (similarly to measures that refer to the principles of constant improvement and zero defects). The necessity of minimising the organisational levels and maximisation of areas for which a team is responsible is assumed, along with the percentage of employees who are capable of performing leadership functions and, importantly, a growing percentage of employees accepting internal leaders. The last issue subject to measurement in the area of implementation of the Lean principles is application of the vertical information system; in line with this principle, every member of the organisation, starting from the lowest position, should have access to information, both operating and strategic. Therefore, it is necessary to examine and to analyse how individual pieces of information are communicated; the best option would be for the highest percentage of information to be communicated in a continuous mode in places designated for this purpose, directly by the production lines. First and foremost, the information should contain data pertaining to measures used to assess the capacity of teams and their size; in this respect, both the scope of information and the frequency with which the information is communicated are important.

In the area of processes, key principles include application of the pull system instead of the push system and striving for reduction in costs that do not add values to the manufactured products or services which are guaranteed by successive reduction in the value of work in progress in comparison to sale, reduction of the batch size and reduction in the machine change-over time and, in general, the machine downtime as a result of incorrect operation. A significant issue is also reduction in transport (parts, waste,

manufacturing defects), both with respect to distance and the frequency of processed shipments. Whilst determining the level of implementation of the Just in Time principle, it is necessary to primarily focus on successive reduction of the value of measures referring to the units of production time between change-overs, the time necessary for the processing of every order and the level of implementation of Just in Time from sequential introduction of JIT up to delivery of all batches just in time. The Just in Time concept is closely correlated with the application of the pull system in production, which is another principle in companies practically applying the Lean Management concept. The numerical verification of the existence of the pull system consists in presentation of the relation of stages in the flow of materials implemented in line with this principle to all stages of the flow of materials as part of individual processes and the level of annual value planned to its implementation in the pull system.

Within the scope of results, the most significant criterion is the application of the zero defects principle, which consists in continuous improvement perceived as practical application of the Kaizen philosophy. Intensity of ongoing improvement may be defined by analysing and comparing, period by period, the increase in the number of suggestions filed by employees and their implementation, as well as the intensity of pro-quality activity, which may be assessed through identification of the level of organisation of such activity from its complete absence through a formal system of suggestion submission, or existence of multidisciplinary teams up to quality circles. The principle of zero defects is in practice determined as the level of liability for product defectiveness, which is assessed via identification of a person indicating defects (it is assumed that it is optimal when the deficiencies are identified in the place of their emergence), liability for correction of deficiencies (deficiencies should be corrected by persons responsible for their emergence), with such assumptions that the number of employees in the control division should decrease, similarly to the size of the repair area or the percentage of inspections carried out by the autonomous defect control.

The “people” area focuses on creation and operation of interdisciplinary teams, both in the realm of conceptualisation and implementation of projects streamlining the hitherto processes, as well as performance of processes as such. The optimum form of production organisation in Lean organisations is production in manufacturing cells, which should encompass maximally comprehensive parts of the process that may be performed by the minimum number of employees. Thus, the percentage of employees working in teams should be growing; they should be characterised by significant flexibility and competence that authorises them to continually change tasks in the team. At the same time, it is worth emphasising that the number of trainings for organisation members should be growing, both with respect to task diversity, as well as functions. Similarly, indicators refer to the principle that stipulates that integration of functions is significant in the LM organisations, which is also expressed by the number of task areas performed by the team; furthermore, whilst verifying this principle, also the relation of direct employees to indirect ones is identified by indicating that the number of tasks and even auxiliary processes has to be reduced to the minimum.

Study Limitations and Conclusion

A significant limitation in the proposed breakdown is the lack of possibility of comparing it with other similar breakdowns, as they are simply missing in the literature on the subject which, on the other hand, may define its uniqueness. Another limitation is the lack of practical confirmation and practical verification of the proposed solutions, which may constitute tool support for leaders responsible for implementation of the Lean concept in companies that they manage.

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Evolution of Korean Direct Investment in CEE since Global Financial Crisis

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Abstract

Korean direct investment has been developing quite intensively since the last decade of the 20th century, and Europe has become one of the major investment areas. In the 1990s, Korean investors also became interested in the markets of Central and Eastern Europe (CEE). Gradually, the value of Korean investments in CEE countries increased. The global financial and economic crisis of 2008 became a significant turning point for investment activity. The author of this study focuses on the analysis of changes that have taken place in the investments of South Korean corporations in Central and Eastern Europe after the crisis. The study aims to indicate the characteristic trends occurring in the inflow of Korean FDI to CEE and their interpretation. To achieve the goal, the method of statistical data analysis, inference method, and analytical-descriptive method were used.

Keywords: FDI, South Korea, Central and Eastern Europe, Transnational corporations

Introduction

Korean direct investment in Central and Eastern Europe appeared on a larger scale in the 1990s. As a result of establishing diplomatic relations with the transforming post-socialist countries, the conditions in which South Korean corporations could function have improved. The first enterprises focused their activities mainly in industries related to manufacturing, the electrical and electronic industries as well as the automotive industry. In subsequent years, along with the growing strength of the country's economy, Korean investments developed even more intensively, and Europe was one of the most important investment locations. The global financial and economic crisis initiated in the United States in 2007 was a significant turning point for investment activity in the world.

Therefore, some questions about changes taking place in the investments of Korean corporations arise. Has the level of their investment decreased after the 2008 crisis? Has Central and Eastern Europe become a more/less critical area of investment? What factors influenced the activities of Korean corporations in CEE? The author of this study tries to answer the above questions. The primary purpose of the study is to present changes and indicate the main tendencies that took place in Korean direct investment in the CEE countries. The structure of the study was subordinated to the achievement of the above objective. The second section presents an outline of the basic theories explaining foreign investments. The analysis of the development of Korean FDI in Central and Eastern Europe is covered by section three. Part four presents selected conditions for the development of investments in Central and Eastern Europe. The study ends with a summary section.

Several research methods were used in the study: a method of analyzing statistical data (UNCTAD, Korea Eximbank, World Bank), an inference method, and an analytical and descriptive method. The subject scope of the study concerns foreign direct investment. The time range generally covers the period 2007-2018, but wherever possible, the latest data were used.

Theoretical Debates on Foreign Direct Investment

The evolution of foreign direct investment theory illustrates the historical process of developing international business operations. The first FDI theories explained investments made by corporations from developed countries, while later, investments made by enterprises from developing countries. Theories of FDI for developed countries emphasize the role of non-price qualitative factors influencing investment decisions. At different stages of economic development, they have a different character. In turn, theories for developing countries emphasize more the importance of the marginal competitiveness of price factors, resulting from the political and institutional environment in developing countries (Kim and Choi, 2018, p. 17). South Korea, which only at the turn of the 1980s and 1990s became more involved in global investment flows, could be treated as a transforming country. On the one hand, it was a developing country, but on the other, it also had the characteristics of a developed country (Tolentino, 2005, p. 264). Consequently, the growth of Korean investments in the world in the 1990s could not be comprehensively explained using traditional theoretical concepts describing the activities of corporations mainly from developed countries. It was particularly evident in the studies of Korean researchers who either critically assessed existing theories or created their own concepts, which they believed were more adapted to South Korean conditions. Nowadays, when Korea is classified as a high-income country (The World Bank, 2020c), the concepts of investments made by corporations from developed countries are more widely used to explain South Korean investments.

Until World War 2, the international production by national enterprises was attempted to explain using neoclassical theories of the international flow of goods and factors of production. However, due to unrealistic assumptions about perfect competition in the markets for factors of production and goods, this concept could not explain satisfactorily international production. Concepts closer to reality, i.e., assuming that international production (investments) is undertaken as a response to market imperfections began to appear in the 1950s and 1960s. In his work, S. Hymer stated that companies operating within imperfect markets can develop an advantage that will give them a competitive advantage over rivals in both domestic and foreign markets (Hymer, 1976, pp. 41–46). Possession of advanced technology or high management skills can be treated as a firm-specific advantage that will overcome the costs of 'foreignness' on the investment location market. In 1966, R. Vernon (1966) formulated the theory of product-cycle, also used to explain foreign direct investment. According to him, some enterprises will be innovators within a given industry, even if all of its competitors would have equal access to knowledge on the basis of which innovations are created. Vernon described the sequential process of product development from the innovation phase to the maturity phase to the standardization phase. In maturity phase, when the company begins to meet with strong competition on domestic market, it decides to invest and start production abroad. In the 1970s and 1980s, attempts were made to have a more holistic approach to explaining FDI. The theory of internalization by P. Buckley and M. Casson claims the company's activity is not only production but the entire range of activities, including research and development, marketing, training, raising funds, or managing financial assets (Cherry, 2013, p. 8). These types of activities are connected by flows of intermediate products, including knowledge, technology, production, and sales experience, as well as materials, parts and components and semi-finished products. Effective coordination of these activities is key to the company's success. Therefore, if organizing and acquiring intermediate products on external markets is difficult, then it is advisable to create internal markets. All this provided that the benefits outweigh the costs (Casson, 1993, p. 361). Nevertheless, like enjoying specific firm-advantage, the mere possibility of internalizing transactions was not a sufficient reason to start production abroad. These issues were researched in the 1980s by J. H. Dunning. According to his Eclectic Paradigm of International Production (2002a, p. 176), the company must possess three types of advantages to engage in FDI: ownership-specific (O), location-specific (L), and internalization incentive advantages (I). The propensity to engage in foreign production will be higher, the greater its comparative advantage over other enterprises, and the more profitable it is to create or add value to existing advantages as a result of choosing a foreign location. Dunning also pointed to the basic categories of motives that guide companies undertaking FDI. These are resource-seeking, market-seeking, efficiency-seeking, and strategic asset or capability seeking motives. An enterprise engaging in FDI can be motivated by the influence of one or more of these factors, changing over time. Without deeper analyzing the exact

motives, it can be concluded that they are mainly of economic nature. However, today, apart from those mentioned above, political and institutional factors are playing an increasingly important role.

One of the theories describing investments made by corporations from developing countries is the concept of the investment development cycle by J. H. Dunning (2002b, pp. 214–216). It argues that along with the country's economic development, its foreign investment position will go through specific phases. At first, there will be no investment activity. In the second phase, along with the improvement of infrastructure, economic structure, and government policy, intermediate products are beginning to be imported to the country. However, high transaction costs mean that foreign investment is flowing into the country, resulting from the ownership advantages of foreign enterprises. In the third stage of development, the country's ability to create its ownership-specific advantage appears. Some companies may already attempt to invest abroad. The fourth phase of investment development means that the country becomes a net investor. Another concept describing the development of investment from developing countries is the theory proposed by Luis T. Wells. Investments from developing countries reflect a product life cycle phase or technological gap. The development of FDI shows an analogy to the development of production and export of countries what depends on the level of technological development. The countries that currently produce goods have an innovative and cost advantage. They export these goods to countries that have not yet established production bases, i.e., they are further down the pecking order.

Similarly, FDI also follows such a pattern (Tolentino, 1993, p. 43). The same author (Wells) also pointed to the motivations that guide corporations from developing countries. He pointed to the policies of governments, and measures aimed at promoting external investment, restrictions on the internal market, expected higher rates of return on investment abroad. Also, companies can invest in securing supplies of raw materials, establish bases for raw material development, circumvent import restrictions, and develop products that meet local conditions (Cherry, 2013, p. 15). The above analysis and review of the literature show that foreign direct investment in developing countries is motivated mainly by institutional and political factors: these are 'push' variables in home countries and 'pull' variables in host countries (Kim and Choi, 2018, p. 22).

Because South Korea was treated as a country in transition from the status of developing economy to that of a developed economy, its foreign direct investment exhibited the features of theory for both developed and developing countries. At the same time, Korean researchers criticized existing concepts, sometimes creating their own (Cherry, 2013, pp. 25–33). Without analyzing these concepts, one can point to such Korean theories as Integrated Theoretical Model (Yun Tong-jin), Structural Market Defence Theory (Jun Yonkwook), Post-Product Cycle Model (Yun Tong-jin) or Competitive Advantage-Representative Specialization Zone Theory (An Se-yong).

At the current stage of South Korea's economic development and based on the analysis of its investment activities, it can be concluded that the investments made by Korean corporations are more in line with the assumptions of theories intended for developed countries. Important factors encouraging the firm to invest abroad are intangible assets, internalization as well as localization. Additionally, government policies can influence positively activities undertaken by corporations.

Development of Korean foreign direct investment in Central and Eastern Europe

The 2008 global economic crisis is a significant turning point for international capital flows around the world. Until then, foreign direct investment developed intensively. In 2007, the annual FDI outflow reached a record high of 2.168 USD billion (UNCTAD, 2020). From that time to the present, the value of world outflowing FDI did not reach the level from 2007. By 2009, the value of investments had fallen to half of the 2007 level (to 1.099 USD billion). In the following years, by 2015, global FDI was slowly growing (1.683 USD billion), but in the next three years, the value was regularly dropping. In 2018, the FDI value was 1.014 USD billion, i.e., 53.2% lower than in 2007.

Against the background of global trends, quite positive changes took place in investments made by Korean corporations. In the years 2007-2018, the value of investments increased from 21.8 to 38.9 USD billion, which meant an increase of 78.3% (UNCTAD, 2020, p. 55). In general, Korea showed a positive upward trend. After a slowdown in 2012-2015, since 2016, Korean corporations have again undertaken intensive foreign activities. In 2016, the value of Korean FDI increased by 26.2%, the following year by 14%, and in 2018 by 14.2%. Over the entire period, the average growth dynamics of Korean FDI exceeded that for the world, which allowed increasing the country's share in the global FDI outflow from 1% to 3.84%, i.e., almost four times (UNCTAD, 2020). This is an achievement that should be assessed positively.

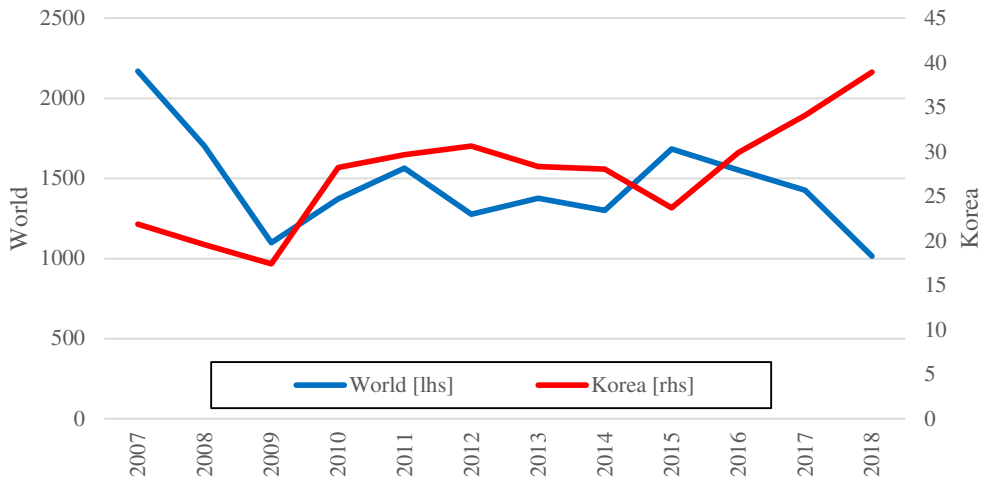

Fig. 1: Outgoing Foreign Direct Investment in the World and Korea, USD billion

Source: Own preparations based on (UNCTAD, 2020).

Korean investments were located mainly in Asia, North America, and Europe, although significant structural changes occurred in the analyzed period. In 2007, the total share of these three destinations stood at the level of 89.2%, which was due to the high share of Asia (53.6%) and smaller Europe (19.6%) and North America (16.3%) (Korea Eximbank, 2020). In 2019, the total share decreased to 80%, but the share of Asia dropped significantly to 32.3%, while North America and Europe increased to 25.8 and 21.9%, respectively. The importance of Europe fluctuated because, in 2008, the share dropped to 14.1%, while in 2009 and 2010, it was around 25%. In subsequent years, a decline in the importance of this continent could be observed (to even 11.4% in 2016). This was partly due to a negative assessment of the volume of demand in the EU affected by the sovereign debt crisis. At that time, corporations such as Hyundai were considering an increase in production in non-European countries (UNCTAD, 2013, p. 55). Since then, Europe's share has increased, which was seen in 2018 (23.1%) and 2019 (21.9%). It can, therefore, be concluded that Europe was a relatively attractive place for Korean investors, which was confirmed by the growing number of Korean companies operating in Europe (Korea Eximbank, 2020). According to data from the Korean Eximbank, the value of investments in the European Union in 2007 amounted to 3.322 USD billion, to increase to 10.899 USD billion by 2019. Most of the investments were directed to the EU15, while investments in CEE ranged from 2.9 to 24.5% of the total Korean investment to the EU.

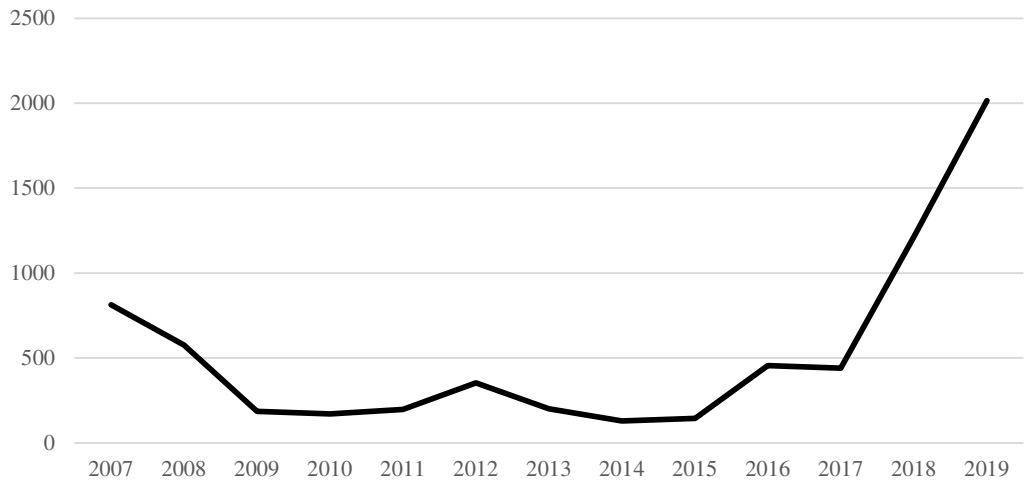

Fig. 2: Korean FDI in Central and Eastern Europe, 2007-2019, USD million

Source: Own calculations based on (Korea Eximbank, 2020).

According to the data (Figure 2), in 2007, Korean investments in CEE did not exceed 1 USD billion. However, in subsequent years they fell quite sharply to the level of 185.6 USD million in 2009, which was in line with the global downward trend. In 2010, Korean companies invested only 171.2 USD million in CEE. In subsequent years, until 2015, the value of investments did not exceed 200 USD million, except for 2012, when inflows increased to the level of 352.6 USD million. Investments began to grow from 2016, particularly intensively in 2018 (by 176%) and 2019 (by 65.8%). This was associated with large investments in Poland, Hungary, and, to a lesser extent, Czechia. The geographical structure of Korean investments in CEE countries is shown in Table 1.

Table 1: Korean direct investment in CEE countries, geographical breakdown, %

Country	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Bulgaria	0.3	0.0	0.0	21.1	28.9	16.9	2.2	0.0	0.1	0.0	0.1	0.0	0.0
Croatia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	3.5
Czechia	65.9	40.0	50.6	7.9	6.2	0.8	59.2	3.5	4.6	17.4	22.4	20.1	3.2
Estonia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hungary	1.9	0.5	4.2	8.0	0.6	0.1	19.8	0.7	5.9	8.7	3.0	32.4	36.7
Latvia	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lithuania	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Poland	14.6	16.3	16.1	32.3	45.5	7.6	10.9	42.4	27.2	11.9	49.1	44.0	53.2
Romania	0.5	22.6	0.4	17.6	2.7	14.5	0.0	41.9	54.4	59.7	10.8	1.6	1.7
Slovakia	16.5	20.5	28.6	13.0	15.9	60.1	7.9	11.2	6.2	2.0	14.3	1.8	1.6
Slovenia	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.1	0.3	0.1	0.0

Source: Own calculations based on (Korea Eximbank, 2020).

Based on the data from Table 1, it can be stated that Korean corporations are strongly focused on selected markets. The primary investment location countries were: Poland, Czechia, Slovakia as well

as Hungary, and Romania. Depending on the year, investments in these five countries reached as much as 99.9% of total Korean investments in the group of eleven CEE countries. In 2018-19, when the total value of investments increased significantly, the main recipients were Poland (44% in 2018 and 53.2% in 2019), Hungary (32.4% and 36.7 %), and Czechia (20.1% and 3.2%). This situation resulted from, among other factors, the high popularity of these directions as locations for manufacturing investment.

Korean investments in Central and Eastern Europe are concentrated in manufacturing, especially in consumer electronics and in automotive industry. In the years 2007-2019, the share of this sector ranged from 70.1% to 98.3%. In some years, investments were invested in other industries, such as in 2010 and 2011, when investments in Slovakia were made in electricity, gas, steam and air conditioning supply. Another industry that was sometimes chosen by Korean corporations was whole and retail trade. However, here the highest share occurred in 2008 when a one-time investment of 40 USD million in Slovenia gave the industry a share of 8.4%. In the remaining years, the value of investments in whole and retail trade remained at a low level.

Conditions of the Korean direct investment development in CEE countries

Korean direct investments in CEE were undertaken in conditions created by several groups of factors. It is impossible to list and fully describe all of them in such a short study, but the basic ones can be indicated: 1) economic situation in the world, Korea, and CEE markets; 2) investment climate in CEE countries; and 3) Korea's investment policy.

The global economic situation immediately after the outbreak of the crisis in 2008 was unfavorable. The decreases appeared in world production, international trade, and foreign direct investment. The majority of developed countries experienced a sharp recession. GDP fell by 2.5% in the US, 4.3% in the EU, and 5.4% in Japan (The World Bank, 2020b). Against this background, the situation of South Korea was relatively good, because, in the worst year, the country maintained a positive growth rate of 0.7% in 2009. After 2010, the global economic situation improved. The average GDP growth in the world ranged from 2.5 to 4.3%. In 2010, South Korea recorded an increase of 6.5%, and in subsequent years the dynamics also remained positive and relatively high (2.3-3.3%). In the years 2011-2013, the economic situation in the EU became even more complicated. Excessive public finance deficits in some EU countries have led to the sovereign debt crisis, which in 2012 reduced EU GDP by -0.4%. In 2013, the increase was only 0.3%. In the following years, the situation improved slightly, and the highest level of GDP growth in the EU was achieved in 2017 (2.6%).

The analysis of the economic situation in the countries of Central and Eastern Europe gives quite differentiated results. Among the analyzed group of countries, only Poland in the whole period showed a positive economic growth rate. Other countries suffered quite severely from the effects of the 2008 crisis. All countries recorded a decline in absolute GDP, and in the Baltic republics, a decrease exceeded 14% (The World Bank, 2020b). The sovereign debt crisis in the following years affected Croatia, Slovenia, and Czechia profoundly, as these countries recorded a negative GDP growth rate in 2012-2013. Other countries survived the crisis relatively well.

The changing economic situation in the CEE countries did not have the same impact on Korean FDI since Korean corporations' investments were focused on selected markets only. The dynamics of economic growth and the inflow of Korean FDI to the five most essential destinations in CEE are presented in Table 2.

Table 2: GDP growth and inflow of Korean FDI to Czechia, Hungary, Poland, Romania, and Slovakia, 2007-2018, % and USD millions

Specification		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Correlation coefficent
Czechia	GDP	5.6	2.7	-4.8	2.3	1.8	-0.8	-0.5	2.7	5.3	2.5	4.4	3.0	0.34
	FDI	536	231	94	13	12	3	118	5	7	80	98	245	
Hungary	GDP	0.2	1.1	-6.7	0.7	1.8	-1.5	2.0	4.2	3.8	2.2	4.3	5.1	0.37
	FDI	15	3	8	14	1	-	40	1	8	40	13	394	
Poland	GDP	7.0	4.2	2.8	3.6	5.0	1.6	1.4	3.3	3.8	3.1	4.9	5.1	0.49
	FDI	119	94	30	55	90	27	22	55	39	54	216	535	
Romania	GDP	7.2	9.3	-5.5	-3.9	2.0	2.1	3.5	3.4	3.9	4.8	7.1	4.0	0.34
	FDI	4	130	1	30	5	51	-	54	78	272	48	19	
Slovakia	GDP	10.8	5.6	-5.5	5.7	2.9	1.9	0.7	2.8	4.8	2.1	3.0	4.0	0.21
	FDI	134	118	53	22	31	212	16	15	9	9	63	22	

Source: Own preparations based on (The World Bank, 2020b) and (Korea Eximbank, 2020).

Calculated linear correlation coefficients indicate weak relationships between the inflow of Korean FDI and GDP dynamics, even in the case of the most important investment markets in CEE. The highest statistical correlation was recorded for Poland (0.49, which means moderate correlation). In other cases, the correlation was even lower and amounted to 0.37 for Hungary; 0.34 for Czechia; 0.34 for Romania, and 0.21 for Slovakia. Based on the above description, it can be concluded that in the analyzed period, the dynamic of economic growth was not the most important determinant in Korean FDI development in Central and Eastern Europe. The economic situation of the country is only one of the elements of the investment climate. The others are social, administrative, and political climates.

The assessment of investment climate by investors gives a basis for decisions about a localization. The annual assessment of the climate for business is presented in the annual Doing Business Report. Figure 3 presents the transformed ranking covering only Central and Eastern Europe countries.

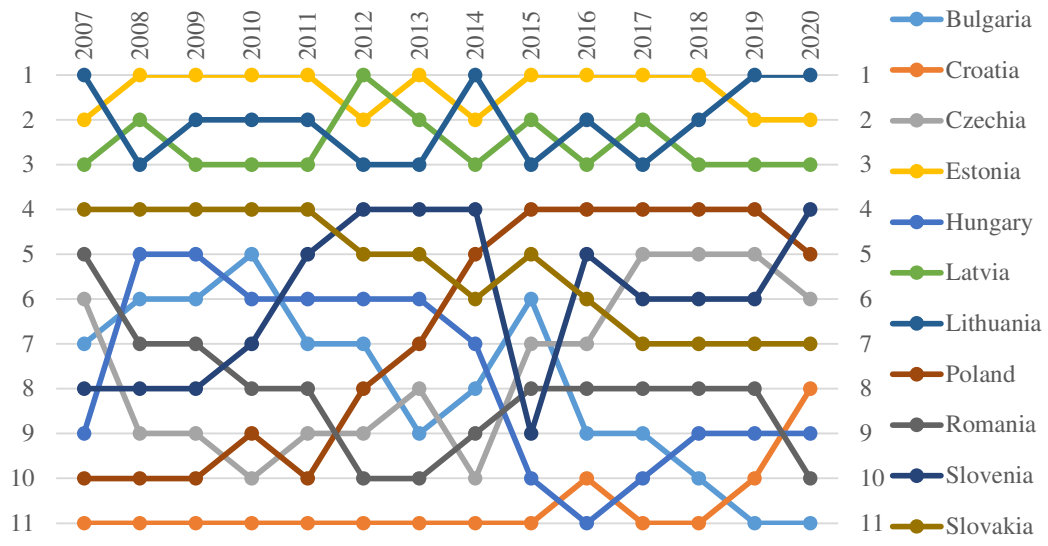

Fig. 3: Ease of Doing Business Index – ranking within a group of CEE Countries, 2007-2020
Source: Own preparations based on (The World Bank, 2020a).

Figure 3 shows that the highest positions in the ranking were taken by countries whose markets were not priority destinations for Korean corporations. Investments were directed instead to countries with lower positions in the ranking, i.e., Poland, Hungary, Czechia, and Romania. This means that there existed other, more critical factors prompting Korean corporations to be active in selected markets of Central and Eastern Europe. In Poland, the advantages could be a large market, relatively low labor costs, or a favorable location. In Czechia, there were factors related to the condition of the economy and the importance of the country in the export of cars, parts and electronic products (Szunomár and McCaleb, 2015, pp. 13–18; Dorożyński and Kuna-Marszałek, 2016, p. 129).

Other institutional factors related to the investment attractiveness of the CEE countries can be connected to the creation of special economic zones. Almost all countries receiving Korean investments have actively supported the industrial sector through investment incentives and by the opportunity to operate in special economic zones (Dorożyński and Kuna-Marszałek, 2016, p. 130). CEE countries are also the primary beneficiaries of assistance under the EU structural funds, which can positively influence the perception of these countries as an attractive investment destination. Another institutional factor that is worth pointing out is the entry into force (2011) of the free trade agreement between Korea and the European Union (KOREU FTA) (Pasierbiak, 2013). Since trade cooperation between countries is strongly related to capital flows (Michalski, 2018, p. 12), then the development of treaty relations results in a positive assessment of the investment climate. This is particularly important in countries that have recently undergone socio-economic transformation processes.

The last element of conditions for Korean FDI inflow, which will be indicated in this study, is the country's policy towards investments undertaken by Korean corporations. Over time, this policy has strategically evolved to reflect various stages of the country's economic development (Nicolas, Thomsen and Bang, 2013, p. 28). In 2005, there was a reorientation in policy towards outgoing FDI. Since this year, the government has been actively promoting outgoing FDI, encouraging domestic companies to invest abroad and to build business alliances with foreign corporations operating in Korea. In 2007, the Policy for Supporting Koreans Firms to Invest Abroad was initiated, creating the Committee for Global Business Operation. The rank of this committee is evidenced by the fact that the Prime Minister became its chairman. The committee coordinated activities between agencies dealing

with services for Korean investors (including KOTRA), various governmental organizations (including banks), and ministries responsible for FDI outward policy (Nicolas, Thomsen and Bang, 2013, p. 30).

Conclusion

South Korean corporations are active players in the contemporary global economy. Their investment activities cover all major world markets, also those in Central and Eastern Europe. Based on the analysis of this study, several summary conclusions can be drawn.

1. Since Korea was treated as a transforming country, following the path from developing to a developed one, Korean investments were explained by theories specific to both developed and developing countries. Today, factors such as intangible assets, internalization, localization, as well as governmental support, are used to explain Korean investments.
2. Korean investments after 2007 showed different trends than global investments. While the value of global investment outflows did not reach the level of 2007 by 2018, Korean investments increased by 78% to reach 38.9 USD billion. The share of Korea in world outflow grew from 1 to 3.84%.
3. The share of Central and Eastern Europe was relatively small in total investment located in the European Union. In the years 2007-2019, it ranged from 2.9 to 24.5% of the investment value. The value of Korean investments in CEE increased from USD 814 million (2007) to USD 2 billion (2019).
4. Korean investments were very unevenly distributed among the CEE countries both in geographical and sectoral terms. Countries such as Poland, Czechia, Slovakia, Hungary, and Romania played a dominant role, attracting even 99.9% of the total investment in selected years. High concentration was also observed in the sectoral structure of investments. The share of the manufacturing sector ranged from 70.1 to 98.3%. Other sectors were electricity, gas, steam and air conditioning supply, and whole and retail trade, but the value of these investments was low.
5. Analysis of the conditions for Korean direct investment in CEE reveals their differentiated significance. Also, it confirms that a more in-depth analysis of the investment climate is needed.
   - The economic situation does not seem to be the most crucial factor in encouraging corporations to invest in a given location. Among the analyzed countries, only in the case of Poland, the correlation between incoming FDI and GDP dynamics was relatively high (0.49).
   - Korean corporations do not necessarily invest in those countries that demonstrate the highest ease of doing business. The share of Baltic republics in Korean investments in CEE, despite high positions in the Doing Business rankings, is negligible. In turn, such economies as Poland, Czechia, or Hungary, which are on further positions in the ranking, were the more often chosen as investment spots.
   - Korean corporations can enjoy the support of the government and various Korean institutions. The state's activity in this area increased, especially after 2005.

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Accounting Policies of Russian Organizations As a Tool for Interest Conflict Management in Economic Crisis

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Abstract

In the context of the structural adjustment of the world economy and changes in the balance between economic centers, the increasing role of regional economic unions and the spread of digital technologies, the demand for finding effective tools for managing economic interests and conflicts of the economic activities' participants is growing. Conflicts of interests of various stakeholders' groups arising both in the public and private sectors in many countries are increasingly viewed as direct threats to social stability. To solve the indicated problem, it is necessary to comply with the standards that minimize the risks of conflict appearance and provide high probability of its resolution. Today, in the Russian Federation, the provisions on the accounting policies of organizations can be used as a base for such standards because in accordance with the current legislation, their adoption is mandatory. The article presents the evidence base for the inconsistency of the strategic intentions of corporate organizations and the socio-economic policy of Russia, which gives rise to conflicts of interest for various groups of stakeholders. The authors' vision of the goals and objectives of accounting policies as a tool for managing conflicts of interest of Russian corporations is demonstrated. The content of control and analytical procedures at the main stages of the accounting policies formation in order to effectively manage conflicts of interest is disclosed.

Keywords: Accounting Policies, Stakeholders, Conflict of Interests, Corporate Management.

Introduction

Amid structural transformation of the world's business and changed balance between economic centers, increased role of regional economic alliances and spread of digital technologies, there is a higher demand for the search of efficient tools to manage economic interests and conflicts of players involved into the reproduction process and the process of added value generation. It is known that such players belong to different social groups and trade unions.

Conflicts of interest of different stakeholders occurring in the public sector of economics and private business in many countries of the world are more often considered as direct threats to the social stability. It is no coincidence that today the issues of managing conflicts of interest at the level of corporate structures become subject to the state policy and legislation.

Considering the need to overcome the effects of new threats and challenges of the planet, today it is more important to solve the problems of protecting economic interests not only of stakeholders, prospective investors, banking agents, senior executives and employees of the business, but also there is a higher

demand for instruments and mechanisms of non-infringement of the interests of other social groups whose living depends on the government's budget revenues.

Unsolved problems in the management of conflicts of interest deepen social opposition in the society and give rise to corruption. In this respect, it is extremely relevant to develop tools and mechanisms to prevent conflicts of economic interest between the participants of the process of the added value generation. To solve this issue, in our opinion, it is important to follow certain rules and comply with the standards eliminating risks of emerging conflicts and ensuring high probability of their resolution. Today accounting policies of Russian organizations which must be adopted according to the current legislation of the Russian Federation (RF, 2011) can be used as such standards. By adopting certain provisions of the accounting policy of the corporate structure, its management can deliver an optimal balance of economic interests of the following social groups: shareholders, bank agents, government, employees, suppliers of resources and services, senior executives.

Development of the accounting policy is a complex and diversified process, the results of which influence the choice of methodological approaches to the corporation's reporting procedure for, at least, the next year. This brings up the question: what are the goals of the corporation's management and to what extent do they correspond to the innovative scenario of the Russian development outlined by the Russian Government which assumes that our country quite rapidly becomes the world's leading power?

Literature Review

Kotler, Maon and Lindgreen (2016) emphasize that the circle of modern corporation stakeholders is much wider than the circle of its shareholders, and also includes all those who are interested in the success of the corporation - owners, employees, customers and the public.

Demski (2003) argues that conflicts of interest in corporations are usual and cannot be completely eradicated, so the question should be raised primarily about tools and mechanisms for conflict management, and, emphasizing the importance of understanding the roles of the parties, he believes that the system of counterbalances cannot to be absolutely effective. In this study, as well as in (Barrya, Lepetita, Strobelb and Trana, 2017), attention is focused on the organizational mechanisms for managing conflicts of interest, but not on their sources reflected in the financial statements.
In (Carney, Gedajlovic and Sur, .2011) the authors note that stakeholder value concept and inclusive stakeholder approach predominate in the conflict management literature.

The issues of the interest conflict management and the accounting policies are tied through many logical relations and are inherently embedded into the economic activity of the organization.

IAS 8 (IAS 8, 2003) determines the accounting policies as the specific principles, bases, conventions, rules and practices applied by an entity in preparing and presenting financial statements and states that changes in the accounting policies is an adjustment of the carrying amount of an asset or liability, or related expense, resulting from reassessing the expected future benefits and obligations associated with that asset or liability.

Nevertheless Len and Glivenko (2019, p. 26) argue that till the moment “the research has not led to an unambiguous interpretation of the concept of "accounting policy" and its components” and find it reasonable to include organizational components as well as past and future events into the concept of accounting policies.

Kuznetsov; Demidenko and Malevskaia-Malevich (2019) argue that the substantiated construction of the economic model is a powerful tool for effective organization’s activities management. The appropriate use of resources creates the reliable base for productiveness and efficiency increase (Sokolitsyn, Ivanov

and Sokolitsyna, 2017) and forms the requirements for the adequate accounting policy and representation in the accounting system focused on minimizing the accounting risks (Domnin, Makarova and Martynenko,, 2019) and the errors of audit (Yurevna, Mikhailovna and Robertovna, 2018; Yurevna, Robertovna and Mikhailovna, 2018; Kochinev and Antysheva, 2019).

Dvas and Dubolazova (2019) point out the increasing role of the risk management in the Russian organizations and Iakovleva, Ignatiev; Aksenova, Iakovleva and Vanicheva (2019) highlight the importance of the proper analytical base including, in particular, the accounting policies, for the risk management purpose. The appearance of the new sources of risk multiplies the potential of interest conflict occurrence both inside the organization and in its outer surrounding (Demidenko, Gorovoy and Malevskaia-Malevich, 2017). In (Julianto, Yasa, Pasek, and Ekawati, 2019) the interest conflicts are studied taking into account gender factor of the conflict parties.

The ability of the accounting policies to serve a tool for managing conflict depends on its ability to produce information corresponding to the interests of stakeholders. (Brennan and Merkl-Davies, 2018) consider the issues of providing information to stakeholders in the context of communication channels.

Alayemi (2015), discussing the possibility of adequate financial statement understanding in the context of accounting policies, shows its direct and indirect impact on financial coefficients, ROE and gearing and points out that the difference in the accounting policies constrains the comparability of these indicators. The influence of accounting policies on the financial performance of an enterprise is also studied in (Smokvina, Kavierina and Lihanenko, 2016). Discussing accounting policies in the context of corporate social responsibility (Azim and Ara, 2015) believe that all the stakeholders should perform their best to uphold the accountability.

Studying the listed firms in South Asia, (Ali and Ahmed, 2017) find no significant relation between accounting policies and indicators they investigated, in particular, profitability. However they argue that accounting policies allow shifting income value and insist that diminishing the number of alternatives provided by accounting standard will improve reporting quality. Study of (Zicke and Kiy, 2017) identified that the changes in the German accounting standards gave ambiguous effect on the financial reporting of the companies.

Vergoossen (1997) raises the question about how investment analysts interpret the changes in accounting policies, and connects such interpretation with the type and character of change.

Ding, Jeanjean and Stolowy (2017) write that the decisions on the accounting policy within the boundaries of the standard result from a trade-off between the information needs of various stakeholders. And the findings of the mentioned authors “contradict the conventional wisdom in which shareholders should prefer dynamic conventions of accounting over static conventions while from its inception, the International Accounting Standards Board purposely decided to favor investors over other stakeholders and promoted dynamic options of accounting choices”.

Bowen, DuCharme and Shores (1995) show that long-lasting implicit claims between a company and its customers, suppliers, employees and short-term lenders create incentives for management to choose long-term accounting methods aimed to increase income.

The large importance of the issue in the context of Russian economy was noted and substantiated in the recent works of the authors (Dedyukhina, 2011; Guzikova and Belyakova, 2019).

Methods and Data

Alongside with the analysis of opinions on the issue represented in the scientific publications and requirements of legislation, we surveyed the heads of accounting services and chief financial officers of the corporate structures of St. Petersburg and Leningrad Region to identify the goals that management sets in developing of accounting policies. The survey was conducted in the form of a questionnaire of students of the Training Center for Certification of Professional Accountants. When asked about the goal pursued by the management of your organization in the development of the accounting policy, it was suggested to choose options for possible answers (one or more), or to formulate own point of view that is different from the proposed answer options. 622 respondents were involved in the survey.

Main Provisions and Results

The results of our studies show that, despite the uniform methodological principles for regulating of the accounting policies of Russian corporations, provided by the law (RF. 2011; MF RF, 2008), the goals of its developing are very different. Among them, we highlight the following: restructuring of cash flows, increasing profitability of the remuneration of senior management, reducing complexity of accounting procedures, convergence with International Financial Reporting Standards and others. This situation in Russia has not changed for a sufficiently long time, despite the growth of social tension.

The results of the undertaking survey are represented in the Table and show that today the accounting policy of the organization is not generally considered by its management as a tool for managing conflicts of economic interest of various groups of stakeholders. It is not also aimed at solving of strategic objectives of long-term industrial and regional economic development.

At the same time, 91% of respondents agreed that one of the main reasons for economic crisis phenomena lies precisely in the inconsistency of the development strategy of the organization with the social and economic policy of the government, which is one of the reasons for the conflict of interest. The correct choice of methodological techniques and methods for taking into account the facts of economic life in the process of developing an accounting policy of the corporation not only can, but also should be considered as an efficient means to ensure flexibility and efficiency of managing economic interests of all parties that secure directly or indirectly the organizational health.

A deeper study of the current situation allows us to identify another phenomenon: the accounting policies of Russian corporations are not aimed at determining of the priorities of economic interests of stakeholders and their best balanced combination, which is especially important for achieving the goals of long-term social and economic development of the Russian Federation. This is evidenced by the results of the survey, line 12 of the table.

On this occasion, Sokolov (2007) notes that “the whole point of the accounting policy is that officially every company is allowed to choose accounting methods and thereby generate both taxable and accounting profit”. That is, the accounting policy of the organization is considered by the scientist, first of all, as a tool that provides a reasonable combination of economic interests of several parties involved: owners, creditors, personnel, government and senior management of the enterprise by achieving the desired indicators of the financial statements at the end of the year.

Table - Questionnaire survey on the goals of developing and regulating accounting policies of Russian organizations

Response wording options for the organization's accounting policy goals	Distribution of respondents by response options	
	number of respondents	specific weight of respondents in their total number, %
1. Optimization of the organization's tax payments	211	33.9
2. Resolution of inconsistencies in the current accounting and tax laws	93	15.0
3. Reducing complexity of accounting procedures	131	21.0
4. Restructuring of cash flows to provide sources of financing for certain processes (activities) of the organization	62	10.0
5. Restructuring of cash flows to achieve the desired figures of the financial statements	37	5.9
6. Ensuring (increasing) of the current return on investment of capital owners	19	3.1
7. Convergence of national reporting approaches with IFRS	19	3.1
8. Ensuring (increasing) of the current solvency of the organization and repayment of obligations to the bank	19	3.1
9. Ensuring of the increase of net assets of the organization and (or) equity	6	1.0
10. Increasing of the market value of the organization	19	3.1
11. Ensuring of the attractiveness of the organization for potential investors (owners and creditors)	6	1.0
12. Optimization (minimization) of the asymmetry of economic interests of the parties involved in the organization's business (capital owners, creditors, government, personnel, administration)	0	0
13. Total	622	100

Source: composed by the authors

It follows that the accounting policy of the organization can be used by its management as an anti-crisis tool for managing agent relations and optimizing economic interests of various groups of stakeholders, ensuring organizational health. The provision that agent relations are carriers of potential contradictions, conflicts of interest and give rise to the crisis phenomena is also determined by the modern theory of agent relations (Agency theory) (Vernimmen, 2010).

Commenting on the development of agent relations and their significance in modern conditions of social and economic development of the society, Sokolov (2007) notes that “the history of this relationship dates back to the end of the 19th century, when joint-stock companies appeared in increasing numbers,” and it was during this period that “the great German lawyer R. Jäger (1818-1892) said that joint-stock companies ruined people much more than all wars together. Our country (Russia, author's note) is no exception”.

Considering the multivariance of modern views on the goals and objectives of the organization’s accounting policy in Russian practice and the severity of social and economic problems, we present in this publication another point of view on this issue. In our opinion, in corporate structures the main goal for delivering an accounting policy cannot be separated from its strategic intentions, including the need to

increase investment attractiveness and ensure new capital inflows. Moreover, all other tasks of the corporation can be considered in the context of this specified goal. An approximate list of such tasks formulated by us is presented in Figure 1.

Note that the highest effect of using accounting policies as a tool for managing conflicts of interest can be achieved if the results achieved are monitored on a regular basis and analytical procedures are used. Depending on the stage of the accounting policy developing, analytical procedures will be used within one of three areas of economic analysis: assessment, diagnostics or (problem-oriented) search (Figure 2).

CORPORATION'S ACCOUNTING POLICY

GOAL
Ensure the investment attractiveness of the corporation
and optimize (minimize) the asymmetry of economic interests
of the parties involved

OBJECTIVES

A. If the market for products (goods, works, services) is saturated:
● Ensure the necessary level (increase) of gross profit and financial strength by minimizing current costs (expenses) and flexible contract (pricing) policies with suppliers and customers, taking into account stabilization of demand for products
● Restructure cash flows aimed at diversifying investment activities

B. If the market for products (goods, works, services) is not saturated:
● Ensure the necessary increase (level) in gross profit and financial strength by increasing sales volumes and flexible product portfolio policy, taking into account the increase in demand for products
● Restructure cash flows aimed at expanding investment activities, increasing economic potential and market share.

C. Other objectives:
● Maximize net profit and ensure the level of financial profitability not lower than the average rate on bank deposits;
● Maximize gross profit and ensure the level of profitability of sales not lower than the industry average
● Increase (maintain) the value of net assets to the value sufficient to provide property guarantees to owners in the event of closing down of the business
● Increase (maintain) equity capital to the size sufficient for on-going financing of the core business of the enterprise and (or) full replacement of loan capital
● Increase market value of the organization
● Maintain the current solvency of the enterprise sufficient to fulfill obligations to creditors
● Minimize information asymmetry and optimize economic interests between the parties involved ensuring the maximum feasibility and high reliability of the financial statements intended for external users

Fig. 1: The goals and objectives of the corporation's accounting policies as a tool for managing conflicts of interest

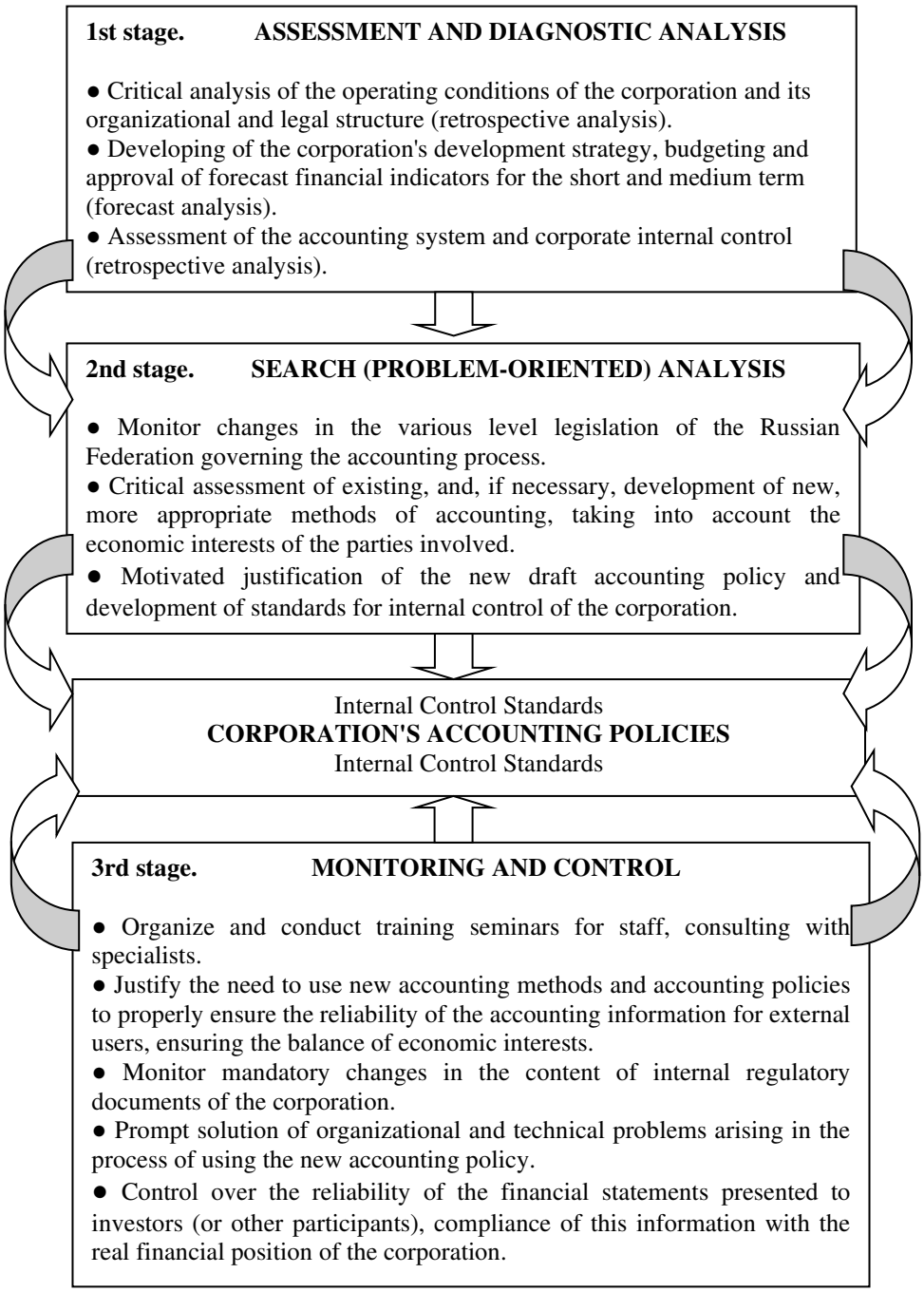

Fig. 2: Use of control and analytical procedures at the main stages of developing of the accounting policy of the corporation

At the first stage, the assessment and diagnostic analysis provides for a comprehensive examination of the accounting system that has developed in the corporation, including document flow, bookkeeping and reporting, study of business conditions, areas of activity, and organizational structure. Accounting

policies should be developed in parallel with the budgeting process, in which the management forms the main indicators of the business plan for the nearest period and long-term perspective.

Compliance with this condition, in our opinion, is especially important, since the accounting policy is not a formal attribute of the corporate governance, but a document that performs certain functions to justify ways to implement investment decisions and prevent conflicts of interest. Assessment and diagnostic analysis allows us to assess the quality of the procedures for preparing financial, tax and statistical reporting for external users, including assessing compliance with legal requirements, strategic goals and ensuring the balance of interests of various social groups of people.

At the second stage of the accounting policy developing, the Russian legislation is monitored. In case of changes in the legislation governing the accounting procedure, the accounting policy of the corporation is also subject to changes. Such changes are binding in accordance with the Federal Law No. 402-FZ “On Accounting” (RF, 2011). At the same time, the corporation's management can initiate changes in the accounting policy, considering the possibility to choose any accounting methods defined by the law, and thereby generate the desired indicators of the financial statements. Since changes in accounting policies affect the comparability of financial indicators for different periods, the Russian legislation provides for mandatory written notification of such changes for the coming year in an explanatory note to the annual corporate financial statements.

It is known that ensuring the reliability of the financial statements is one of the factors influencing the investment attractiveness of business entities and ratings of investment activity of industrial and geographical segments. In this regard, at the final step of the second stage of developing the corporation's accounting policy, it is planned to use search analysis procedures and at the same time develop internal control standards that will act as corporate financial management tools.

The third stage involves the use of monitoring and control procedures for the implementation of the requirements enshrined in the order "On the accounting policies of the organization".

The main task of the corporation's management and accounting policymakers at this stage is to promptly resolve issues and control reliability of the accounting information if it becomes necessary to choose new accounting methods to balance the interests of the parties involved.

Conclusions

The regulatory legal acts of the Russian Federation determine the basic requirements for the reporting indicators and developing of accounting policies for corporate structures in order to protect the interests of users from inaccurate information about the results of financial and economic activities.

Thus, using the capabilities of the Russian legislation the management of corporate structures has a real opportunity to use the efficient management controls for conflicts of interest of various social groups of people, to hold back extending social contradictions and reduce the risks of irreversible consequences of economic crises.

Acknowledgment

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Consumer Behavior in the Conditions of Slovak Online Market – The Study on Gender and Generation Characteristics

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Abstract

The aim of this paper is to map the current situation in online shopping in Slovakia using secondary data. Consequently, based on primary data, the aim of this paper is to identify the frequency of online shopping via large screens (PC/laptop) and mobile devices in terms of gender and generational characteristics of consumers on a sample of 627 Slovak respondents. The results of this study show that Slovaks prefer to buy through larger screens, but it is not possible to dispute frequent shopping through mobile devices, too. In particular, women and consumers of the Generation Z make purchases several times a month. Although shopping via mobile devices shows a rapidly growing tendency, it is still questionable to what extent online shopping using mobile phones is widespread in the Slovak population. However, it is certain that online shopping is already a common part of lives of most consumers in Slovakia.

Keywords: E-Commerce, M-Commerce, Consumer Behavior, Frequency Of Shopping

Introduction

E-commerce is a revolution in business practices (Ohidujjaman et al. 2013, Bauerová 2019). Khan and Mahapatra (2009) state that information technology can play an important role in the development and improvement of services in the business sector, and that today, after the agricultural and industrial revolution, the Internet is considered the third revolution.

The SWOT analysis of e-commerce by Awais and Samin (2012) highlights ubiquity, low operating costs, improved customer interaction and time savings as unique strengths of e-commerce. The ubiquitous nature of the Internet has allowed e-commerce to overcome geographical boundaries and penetrate different markets to generate demand in peri-urban and rural areas after successfully exploiting its potential in metropolitan cities (Gangeshwer 2013; Weberová et al. 2016). Dobbs et al. (2013), Štefko et al. (2015) noted that online stores often sell products at a low price, which the consumer sees as an advantage. Goldsmith et al. (2005) revealed that some consumers shop online just to avoid direct interaction with sellers. They are more comfortable when dealing with a seller if the contact takes place in a virtual space (Gburová and Marchevská 2017; Mura et al. 2018).

In many studies, researchers have found that mobile commerce is a next step of the development of e-commerce. As m-commerce makes use of the Internet via mobile or tablet, scientists categorized m-commerce as a sub-group of e-commerce. Both concepts are similar to each other and share basic business principles (Fong and Wong 2015; Štefko et al. 2017). In another view, mobile commerce is a new element of e-commerce, where all transactions are connected via mobile devices and use the wireless network. Therefore, it could be stated that mobile commerce is a part of the e-commerce that is carried out through a mobile phone (Li a Dong 2010; Bucko et al. 2015).

M-commerce is an umbrella term encompassing several types of mobile commerce, while m-shopping concerns only those activities related to the purchasing process, especially in B2C and C2C environments. In this case, mobile shopping can be defined as searching, browsing, comparing and purchasing goods and services online via wireless handheld computers or mobile devices, in particular smartphones and tablets (Groß 2014).

The Internet and the rapid development of technology have revealed a new global market where there are no time and space barriers (Hečková et al. 2019). In addition, this progress has led to the emergence of a new consumer called the "online consumer" (Racolta-Paina and Luca 2010, Gavurová et al. 2018). These consumers play an important role in e-commerce and have different purchasing habits compared to traditional consumers. Companies must pay attention to the needs, habits, lifestyles and characteristics of online consumers to meet them in a more global, competitive and dynamic environment (Svatošová 2013).

According to Zhou, Dai and Zhang (2007), online purchasing behavior was defined as the ratio of online buyers to the total population of the nation, and the economic status was measured with GDP per capita. However, such data did not reveal the consumer's intent, which is an extremely important resource for online retailers. Pavlou and Fygenson (2006), Dejan, Bačík and Fedorko (2014) argue that online shopping behavior is very closely related to information technology, because the web system primarily provides the means to make a purchase.

The current state of the issue

The rapid penetration of mobile phones into everyday lives reflects the fact that people browse the Internet mainly on mobile devices. We are social (2019) tracked the time people spend on the mobile Internet and found that while in 2014 26% of the total daily time on the Internet was spent using mobile devices, this share has been increasing steadily year on year. According to the company's data, we conclude that in 2019 we spent almost half of the total time spent on the Internet using a mobile device.

Mobile website statistics also showed great results. More than half (52,48%) of website traffic comes from mobile devices. Worldwide Internet traffic is dominated by mobile devices (Stat Counter 2019).

The situation on the Slovak e-commerce market also reflects the current developments. Today, the vast majority of Slovaks (85%) between the ages of 12 and 79 has access to the Internet. Year-on-year, these numbers continue to grow. In December 2019, IAB (2018) saw a further increase in the overall Internet population to 3,5 million and the mobile Internet population to 2,8 million. Moreover, according to the Ecommerce Foundation (2018), up to 59% of Slovak consumers shop online. One of the measures of the growth of e-commerce in Slovakia is also turnover, which reached EUR 1,130 million in 2018, thus representing a year-on-year increase of up to 23%.

The number of visits made from mobile devices is also provided by the IAB report (2018), according to which the average monthly visit rate by Slovak PC users reached 3,4 million users in 2018, a slight year-on-year increase compared to 2017. This trend mirrors the global trend, while it is evident that people are increasingly using mobile devices to access the Internet. The average monthly traffic via mobile devices in 2018 was 2,6 million users.

In addition to the aforementioned, IAB (2018) reported also the time spent by Slovak users on individual devices browsing media. According to the report, in 2018 Slovaks spent 7 hours a month on average (across all platforms - PC, Mobile, Tablet) on the Slovak media. Men spent 1 hour and 28 minutes more on PCs than women. In 2018, users spent 1 hour and 3 minutes more per month on a mobile phone than on a computer.

Interesting statistics are also provided by a report carried out by Picodi (2018) on how Slovaks shop online. For this report, the internal data of the global e-commerce platform Picodi.com for the year 2018 was used. The statistics mapped 35 countries of the world. For currency conversion, the company used the average exchange rate for March 2019. According to the company's data, while global mobile shopping is on the rise, Slovaks still prefer to make their purchases through computers. Based on Picodi's data, it can be concluded that in 2018 31% of transactions were made by mobile,

which is 25% less compared to transactions carried out using computer. In addition, the average value of an order made via mobile is slightly lower. While Slovaks spend an average of € 54 on mobile purchases, the value of purchases is € 4 higher when shopping using computer.

In terms of mobile trading, m-commerce's share in the total Czech e-commerce was up to 10% in 2014 - almost 300 million euros, as confirmed by Lelák (2016) from the website Pricemania Academy. Slovakia is above average, it is doing even better than the Czech Republic, says Braverman (2016), CEO of Heureka. When comparing the number of mobile visits, according to him, the figure is better for Slovaks - 37% compared to 30% for its western neighbors. In 2018, the share of mobile phone visits of Slovaks was 52%, an increase by 15% (Heureka 2018).

Methodology

The main aim of this paper is to identify the purchasing behavior of Slovak consumers in terms of demographic differences. Specifically, the paper focuses on describing the frequency of online shopping via large screens (PC/laptop) and mobile devices, comparing the frequency of shopping in men and women, as well as comparing the frequency of online shopping across generations. The input data were obtained from a questionnaire survey. The questionnaire was divided into three parts.

The first part of the questionnaire contained items for sorting the research sample according to demographic characteristics, the second part of the questionnaire monitored subjective answers of respondents in connection with shopping using a mobile phone and the last part of the questionnaire examined the frequency of online shopping. We focused on shopping via large screens and shopping via mobile phones. Respondents could indicate one of the options (1 = At least once a week, 2 = At least once a month, 3 = Several times a year, 4 = Maximum 2-3 times a year and 5 = Maximum once a year). Only respondents with at least one online shopping experience were eligible to participate in the research.

The research sample consisted of part-time students regardless of further specifications. We also decomposed the sample of respondents born in 1966-2000 into three generation cohorts: Generation X (1966-1976), Generation Y (1977-1995) and Generation Z (1996-2000) according to Duh and Struwing (2015). After discarding irrelevant responses, we created a data file with sample n = 627. The only condition for participation in the research was the experience with online shopping. The following table describes the characteristics of the research sample.

Table 1: Characteristics of the research sample

Characteristics		Frequency	Percentages
Gender			
	Female	394	62,84%
	Male	233	37,16%
Generation			
	Gen X	45	7,18%
	Gen Y	330	52,63%
	Gen Z	252	40,19%
Economic status			
	Employed (full-time)	383	61,08%

	Employed (part-time)	50	8,97%
	Self-employed/ entrepreneur	73	11,64%
	Unemployed	69	11,00%
	Parental leave	34	5,52%
	Other	18	2,87%

Results

Figure 1 below illustrates the frequency of online shopping, using a desktop or laptop computer, in terms of gender. It is evident that most consumers make online purchases at least once a month. Surprisingly, the numbers of women are twice as high as men at this frequency, but this may also be due to the disproportionate number of respondents in terms of gender. However, the numbers are approximately the same at a higher frequency of purchases (at least once a week).

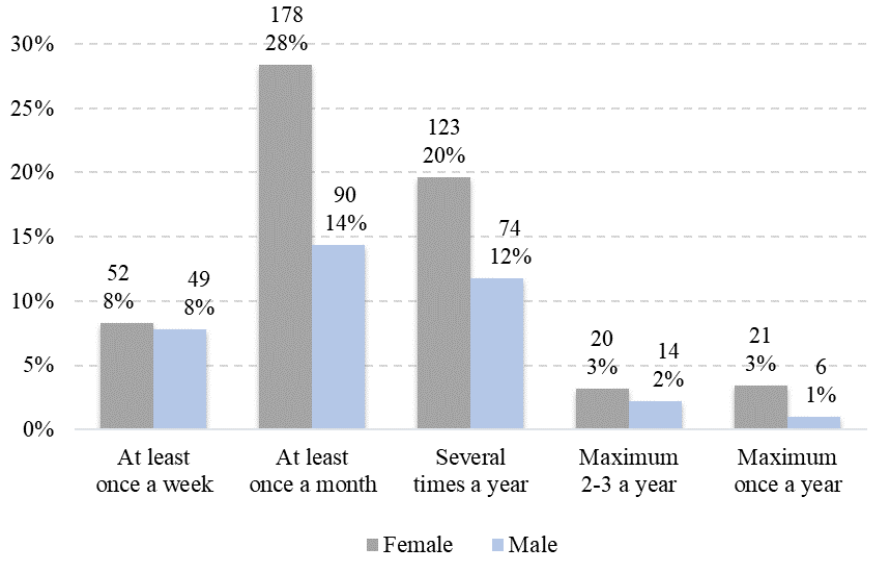

Fig. 1: The frequency of online shopping via a PC/laptop from a gender perspective

The following part of the paper captures the outcomes of frequency analysis of online shopping via mobile phone from the perspective of generations (Figure 2). In this case too, it is clear that the highest numbers are recorded for the option "at least once a month" in Generation Y (n = 149) and Generation Z (n = 111). The option "several times a year" was chosen by 15% of people aged 1997-1995 (Generation Y) and 13% of people aged 1966-2000 (Generation Z).

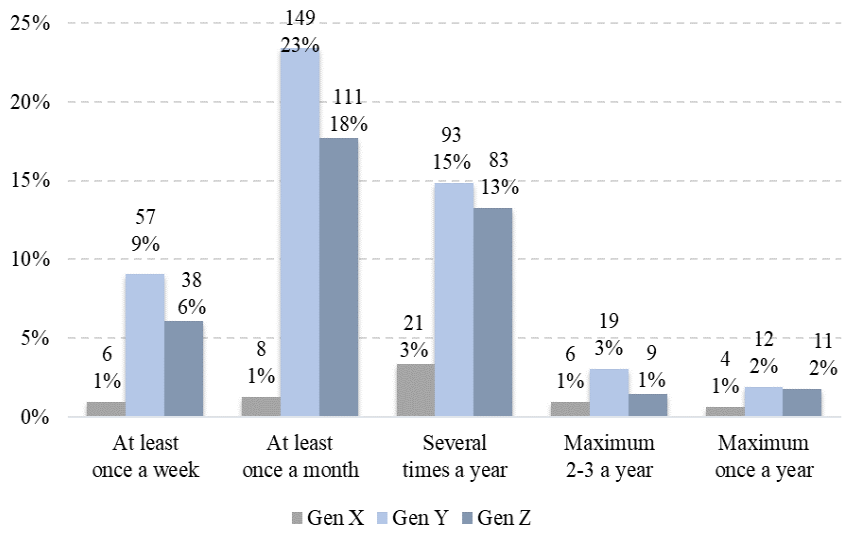

Fig. 2: The frequency of online shopping through a PC / laptop from a generational perspective

Figure 3 below shows the frequency of mobile shopping from a gender perspective. It is evident that the numbers in this case are much more proportional than the outcomes of larger screen purchases. The figure shows that most purchases made using mobile phones are done once a month for women (n = 129) while men shop at these frequencies at less frequently. The largest group of mobile shoppers shops via their mobile device at a frequency several times a year (n=79).

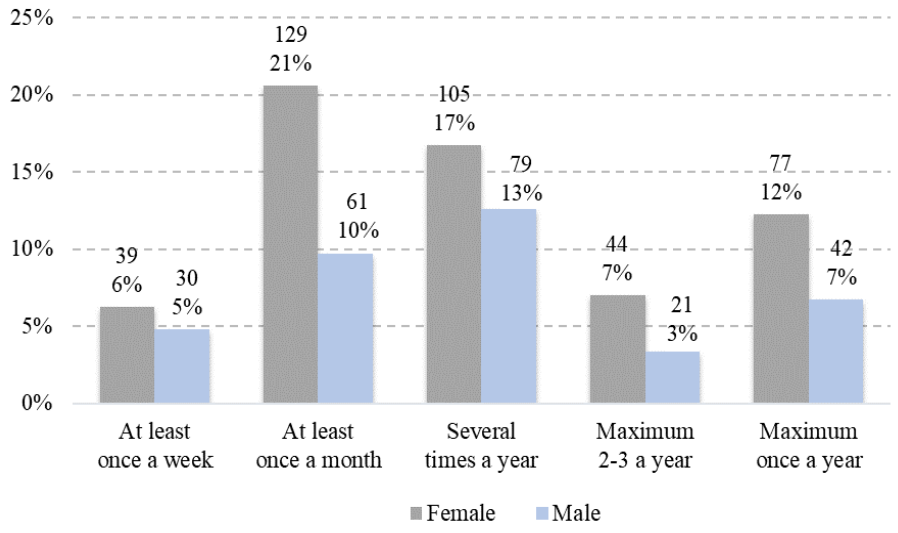

Fig. 3: The frequency of online shopping using a mobile phone from a gender perspective

Figure 4 illustrates the frequency of purchases carried out via mobile devices from a generation perspective. Even in this case, the highest numbers for Generation Y (n = 149) and Generation X (n = 111) are recorded for a frequency "at least once a month". Surprisingly, Generation Y shows high numbers even at the lower frequency of purchases – "maximum once a year".

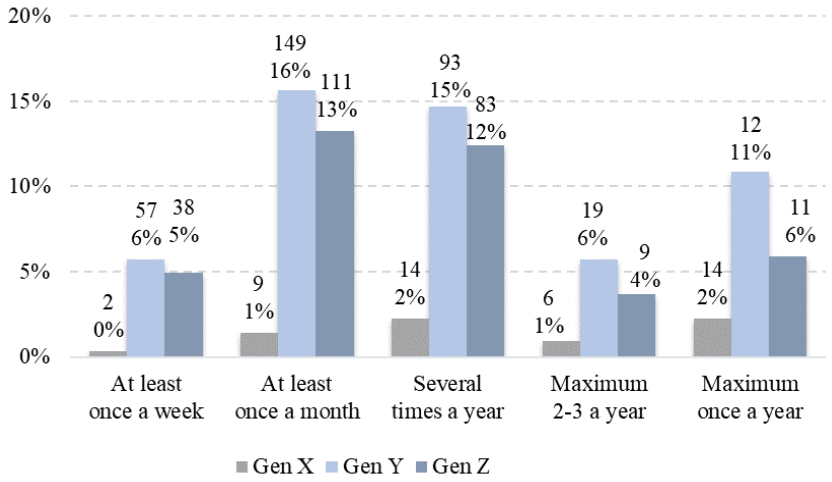

Fig. 4: Frequency of online mobile shopping from a generational perspective

Conclusion and Discussion

Given the huge expansion of the Internet network, it is no surprise that every second person in the world uses the Internet (eMarketer (2017a). At the same time, e-commerce statistics from Statista (2019) point to the fact that there are 1,92 billion digital customers, representing 63% of the total Internet user base and about a quarter of the total global population. Interesting figures are also reported by GSMA Intelligence (2019), according to which in 2018 there were 3,6 billion people using the mobile Internet. At the same time, these figures represent 47% of the total global population.

The above results of various research agencies and website underline the importance of addressing the issue of online shopping. Mobile commerce shows a rapid growth tendency in the global concept, but it is questionable to what extent mobile shopping will be popular among the population of Slovakia. However, the amount of time Slovaks spend on these devices, combined with the current trends, mobile phones can prove to be a powerful tool that should not be left unnoticed by no business.

The main aim of this paper was to identify the frequency of online shopping via large screens (PC/laptop) and mobile devices in terms of gender and generations among Slovak consumers. The survey showed that most women shop online at least once a month, and the same frequency was also seen for women using mobile devices, although the results showed that a large group of women shop at lower frequencies through these devices (several times per year). Conversely, most men shop using a mobile phone several times a year. From the perspective of generations, it is clear that larger screens are still very popular with Slovak consumers. Most often, Slovaks make purchases at a frequency of several times a month, except for the oldest generation. The frequency of mobile purchases for individual generations ranges from several times a month to several times a year.

It should be emphasized that the research is limited, as it focused on a sample of Slovak students. Therefore, the results cannot be generalized to the whole population of Slovakia. Another limitation of the research is the disproportionate representation of respondents from the perspective of generations, especially in relation to Generations X, as these were underrepresented. For future research, it would be useful to target a more heterogeneous group of people, such as all mobile phone users with proportional representation of different age and gender groups, or to monitor the purchasing behavior of consumers from different neighboring countries.

Acknowledgement

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Management of The Aviation Transport Services Market

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Abstract

The aviation transport services market is one of the fastest-growing branches of the entire transport system across the world. The aviation transport services market has undergone many changes over the years. In a time of dynamic globalisation and so-called „distance reduction" we are dealing with ever greater transport-related difficulties. The market for aviation transport services is evolving very quickly, and thanks to it we are able to deliver cargo to the farthest corners of the world. The aviation transport services market has for several years shown continuous increases in the popularity of aviation in all respects. Ever more people are choosing aircraft as their mode of transport, contributing to the establishment of new airlines and offers ever more suited to customer needs. The aviation transport services market must be considered as a multi-layered phenomenon. The objective of the present article is to diagnose development plans of airports and identify the development of key components of the air transport services market. Particular attention is drawn to the influence of globalisation and airline alliances to the character of the air transport services market. The empirical analysis uses statistical data collected by airlines and airports. Data is analysed and presented in the form of tables and diagrams.

Keywords: Aviation Infrastructure, Air Transport, Airport, Services

Introduction

The contemporary aviation market is developing very dynamically, is innovative and modern. Aviation transport is also a fairly young discipline, and its origin reach back to the beginnings of the 20th century. On exactly December 17th, 1904, the event that changed history took place, ushering in true aviation. Aviation pioneer and inventor Wilbur Wright made his first flight that day at Kitty Hawk; even if it did last just 12 seconds, it sounded the beginning of a new era in aviation. Wilbur cooperated with his brother Orfille for years, and they are considered the fathers of aviation (Ruciński, 2013: 13-13).

The period just after World War I is considered the beginning of civil aviation. During the war, aircraft were constructed for military purposes, however they could now be transformed into machines for civilian use. Production also commenced of aircraft meant purely for passenger transport, which could take between six and eight people aboard. Such was e. g. the Junkers F13. This aircraft initiated the first commercial connections. In the 1920s, the first airlines were founded and the first connection networks were developed. The end of the 1920s are also the beginnings of the first large passenger aircraft like the Junkers G38, which flew regular connections between such cities as London, Copenhagen, Rome or Stockholm (Sandela 2009: 13-14). The period after World War II spans dynamic development and evolution of airline connections as well as passenger aircraft and their engines themselves. The first jet airliner was the British De Havilland Comet 1. Ever bigger aircraft and ever greater speeds made the passenger numbers rise year to year, with the aviation services market becoming global. Such quick development and such transport capacities of aircraft allowed aviation to completely displace transatlantic ocean liners, which ferried passengers between the Old Continent and America for years, from transport. The end of the 1960s is the beginning of brief yet very intense history of supersonic flights. There were two representatives: The Russian Tupolev Tu-144 and the British-French Concorde. The first was, however, quickly removed from service following two catastrophes. The Concorde continued to fly over the Atlantic for a quarter century more, until 2003.

It was removed from services due to environment protection, as these planes were fuel-hungry, and for economic reasons. The beginning of the 21st century means the development of large airlines, the emergence of great alliances and the market appearance of so-called low-cost carriers (Ruciński 2013: 17-19).

The objective of the present article is to diagnose the development of airports and to identify the development of key components of the aviation transport services market. Particular attention is drawn to the influence of globalisation and airline alliances on the character of the aviation transport services market.

Research methodology and sample description

The aviation transport services market is made up of intertwined many components. This market is an environment, in which relations occur between entities and resources flow that support distinct structures. The aviation services market must be considered in the regional and global context; it is made up of elements that describe the mutual relations on this market. The market, as the name suggests, is the place where transactions are performed with consent of the participating entities. In the aviation services market, the dominant entities are passengers, travel agencies, airports and, of course, airlines. There also exist external entities that also create the market and influence its functioning; these entitiXs include, among others, marketing advisory agencies, local authorities, banks or insurance companies. In order for the market to develop dynamically, competition must exist between service providers. Two types of competition on the aviation services market may be indicated: inter-branch and intra-branch competition. Interbranch competition occurs between markets that offer substitute products, meaning those that constitute a response to the same kinds of needs. Depending on the country or region, customers will choose various modes of transport. In terms of intrabranch competition, the customer is fought for between service providers within the market, meaning, between aviation transport companies.

The issues presented in the paper focus on the development characteristics of airports and the shaping of key components of the aviation transport services market. Hence, particular attention was also paid to the influence of globalisation and airline alliances on the aviation transport services market.

The paper was prepared on the basis of studies of Polish and foreign-language literature concerning management, logistics infrastructure as well as air transport, domestic and European documents in this area, analyses of statistical data collected by airports and airlines.

The present paper shall utilise the following research tools and methods:

- analysis of available knowledge based on management and logistics literature;
- analysis of acts of law;
- statistical data of airports;
- statistical data collected by airlines

Discussion

Changes on the aviation transport services market proceed very dynamically; this is influenced by diverse competitive instruments. Long-term analytical research estimates that until the year 2037, the aviation services market will see growth of over 5% (US Department of Transportation :Online 14).

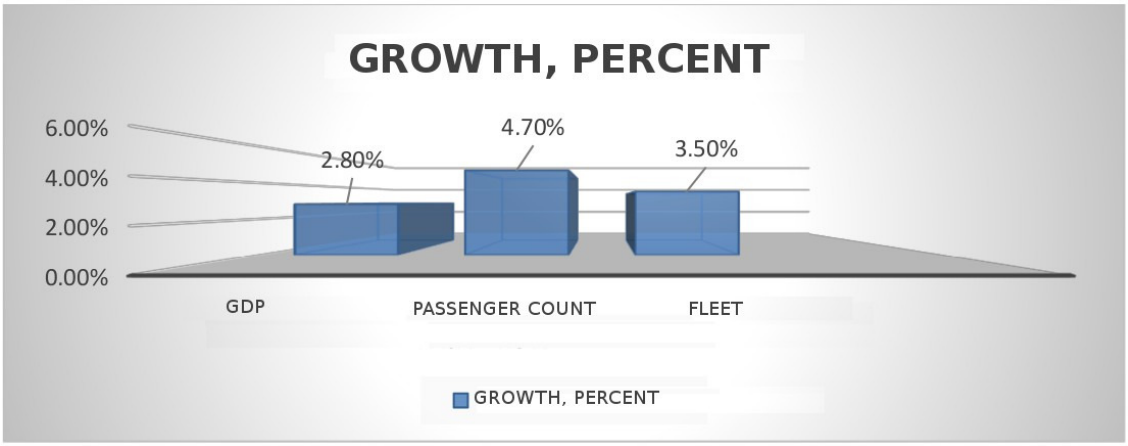

Fig. 1: Estimated development of the aviation transport services market until 2037.

Figure no. 1 shows the estimated aviation transport services market development until 2037. The data indicates that the world GDP may rise by 2.8% as compared to the year 2018. The number of passengers transported shoul rise by 4.7%, and the aircraft fleet is to grow by 3.5% as compared to the year 2018. This growth concerns the entire world aviation market (US Department of Transportation :Online 14).

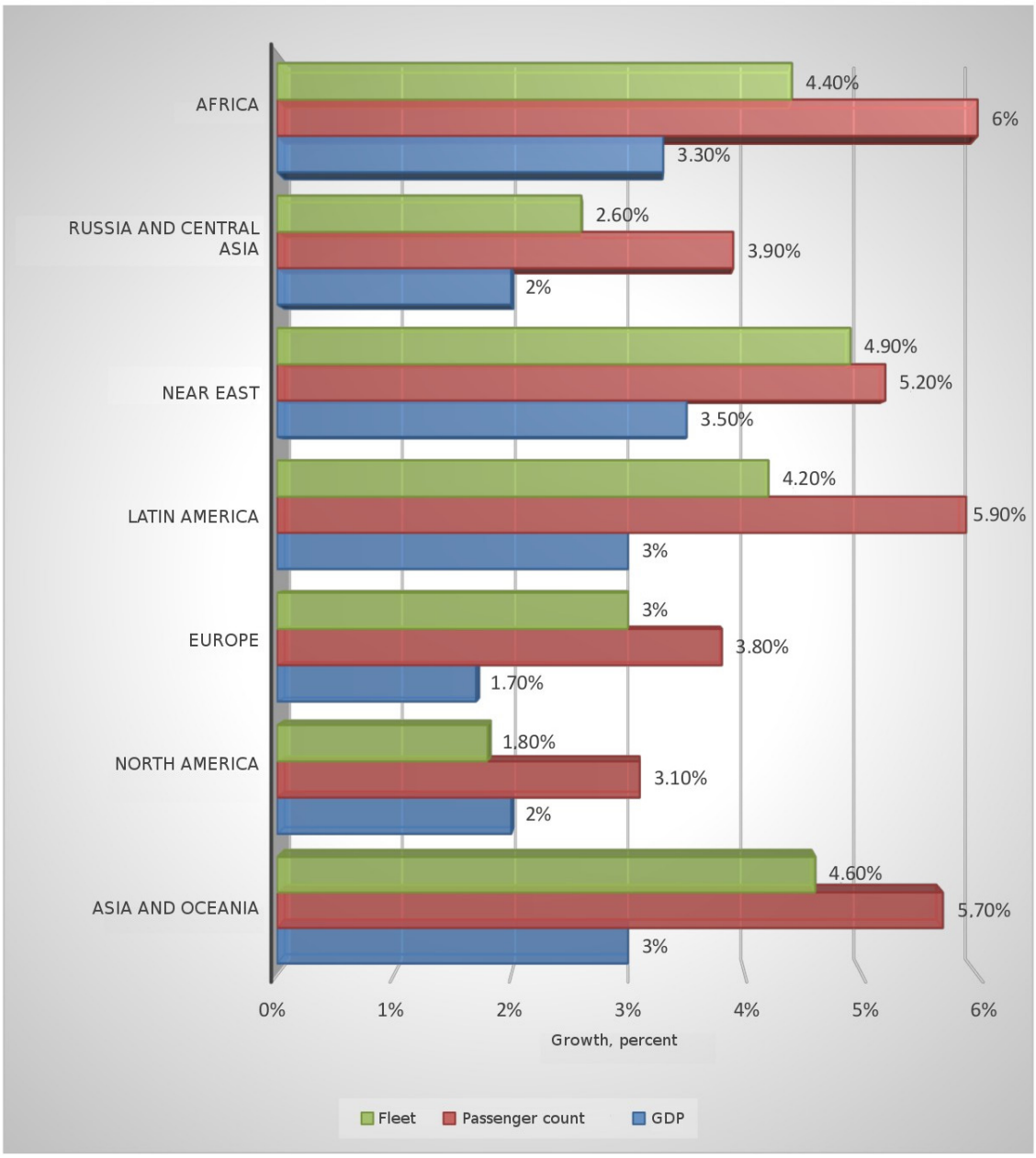

Fig. 2: Estimated growth level of the aviation services market until 2037, subdivided by world regions.

Figure no. 2 shows the estimated growth level of key components of the aviation transport services market subdivided into the individual regions of the world.

According to the data, the largest growth should be seen in Africa, up to 6% compared to the year 2018 in terms of passengers served. Latin America will also see high growth as compared to 2018. of up to 5.9%. The biggest growth of the fleet, or the number of aircraft, will be experienced by the Near East, seeing a value of 4.9% (Albalate, Bel et al. 2015: 167-168). This will be the result of fast-growing airlines such as Emirates or Qatar Airways. Considering the GDP, in turn, the Near East shall also see

biggest growth of 3.5% as compared to 2018. The diagram shows in turn that smallest overall growth of aviation transport services is expected in Latin America (US Department of Transportation: Online 14).

The increases in passenger counts, services and fleet sizes also mean an increase in value of the entire market. It is estimated that until 2037 the entire market value could even reach USD 6.3 trillion.

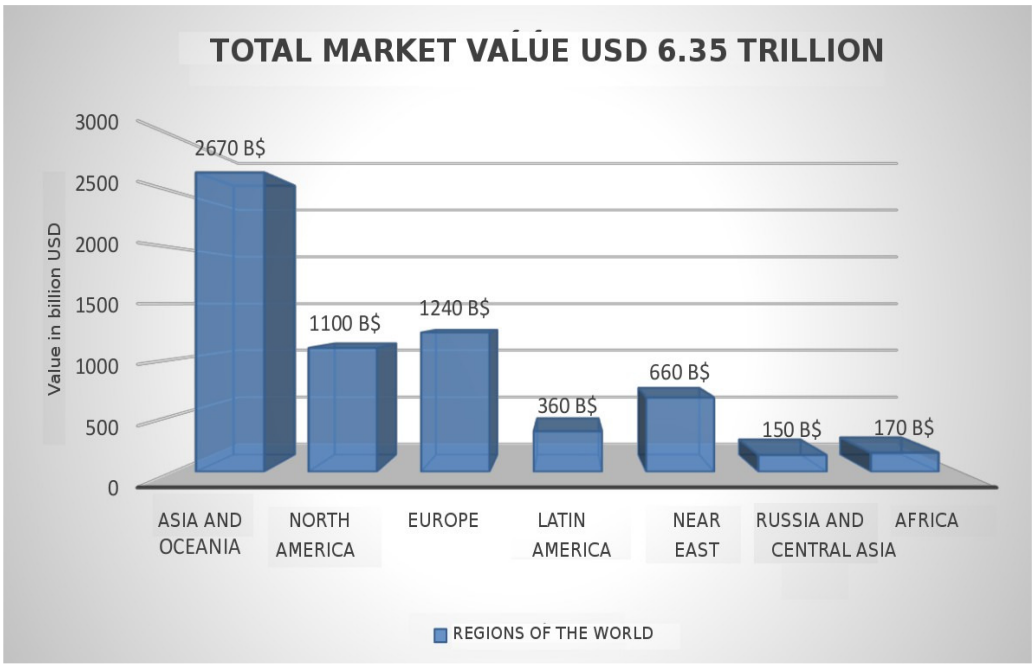

Fig. 3: Market value broken down by world regions.

The data in fig. no. 3 shows the subdivision of the entire market value estimated for 2037. The above data shows that the highest value of the aviation services market will be shared by Asia and Oceania – USD 2,670 billion. Europe will also have a high market share of USD 1,240 billion. The lowest value is estimated to be reached by Russia and Central Asia, just USD 150 billion (US Department of Transportation :Online 14).

Results

One of the most significant components that influence the growth of the aviation transport services market is continuing globalisation. Globalisation has a real influence on the development of the world and of civilisation, it influences the shape of markets, is the driving force behind the competition and expansion to new markets. The influence of globalisation causes economic and social changes. The dynamics of growth of glbalisation are multidirectional. This development is influenced by aspects such as (Dobruszkes, Giovani et. al. 2017: 52):

- the financial condition of the individual economies;
- the performance capacity of goods and the quality of their technological capacities;
- large management teams and the quality of their knowledge and skill resources;
- broadly understood societal mobility and wealth.

Globalisation and digitalisation influence unlimited capacities of travel and movement across the world. The continued development of large as well as small, *low cost* carriers makes many people choose aviation transport as a mode of getting from A to B. Ever expanding competition influences the

innovation capacity of the services offered, the expansion of carrier brands and the market availability of services. These components determine the growth level. Aviation transport is described as the direct subject that creates globalisation, and that at the same time, undergoes globalisation processes (Kabus, Srtulak-Wójcikiewicz et. all 2016: 156-157).

Fast-growing aviation transport and innovative technological solutions quickly introduced into daily use determine the fact that aviation was the mainstream of globalisation from the very beginning. Aviation companies that want to continue to develop, increase passenger numbers, the quality of the provided services and, hence, that want to increase financial turnover, must be participating factors in globalisation processes, transforming their globalisation strategies. This applies mainly to regional carriers who, failing to participate in globalisation processes, may be pushed to the edge of the market, and, as a consequence, disappear from it altogether (Cidell 2015:1136). Small and regional airlines are starting more and more frequently to initiate long-haul connections, e. g. flights between Europe and North America. It is the already mentioned globalisation that forces minor carriers to undertake activity aimed at testing new trends – whether they are even economical to begin with (Percoco 2010: 2429). The main barrier for transatlantic flights is certainly a certain monopoly developed over the years by large flag carriers such as British Airways, KLM, Lufthansa or even Poland's PLL LOT. Intercontinental flights are, however, burdened with cost. Taxes and diverse fees mainly influence the prices of transcontinental flights. The largest carriers have a mechanism to balance out their prices, with an economy-class ticket being relatively cheap, yet very high in business class. Thanks to such discrepancies, they are able to balance out the costs borne in terms of taxes and fees. Low-cost carriers continue to study the possibility of long-haul connections, however, from the economic point of view this seems uneconomical. *Low cost* carriers earn most on individual connections. Within Europe, a single airplane is able to make even eight flights per day, and each of these generates separate revenue from diverse fees and low operating costs. A transatlantic flight is a single connection performed at the same time, and there is no way to avoid costs related to e. g. fuel or en-route (ENR) fee (Barett and De Vita 2015: 49-50).

The dynamic development of the aviation services market is also stimulated by strategic airline alliances. Alliances are concluded between airlines mainly for the purpose of expansion. Airlines operating within an alliances cooperate on certain levels, however, continue to be competitors. Every carrier has their own *know-how*. Cooperation within an alliance allows carriers to implement good solutions of the partner within their company, and to provide their own good practices to others (Schlenker and Walker 2016: 774-775). This creates the possibility of improvement of one's own competitive position on the market and to operate a more dynamic expansion policy to new markets. In order for cooperation to be successful, conditions of balance must be maintained. An example of cooperation and mutual benefits is the Sky Team airline alliance, which developed a collocation system at London Heathrow's terminal four. This entails the sharing of all ticket sales and departure handling desks by all alliance carriers. This helps to improve the flow of passengers and reduces operating costs by alliance members. These desks also allow the passengers to change reservations to any flight with a carrier belonging to Sky Team. Heathrow terminal four also offers the world's first SkyTeam Exclusive Lounge (SKY Team: Online 12). Airline alliances are hence the key mode to ensure most competitive and better services on markets. The expansion of connection networks thanks to alliances allows individual carriers to offer flights to new airports. Airlines have most advantages on their local markets, with respect to which they have knowledge and experience, they know the specifics and expectations of customers in those markets. In order to enter a new market, airlines require knowledge about them, and it is here where local airlines come to aid (U.S. Department of Transportation 1999: 7-11).

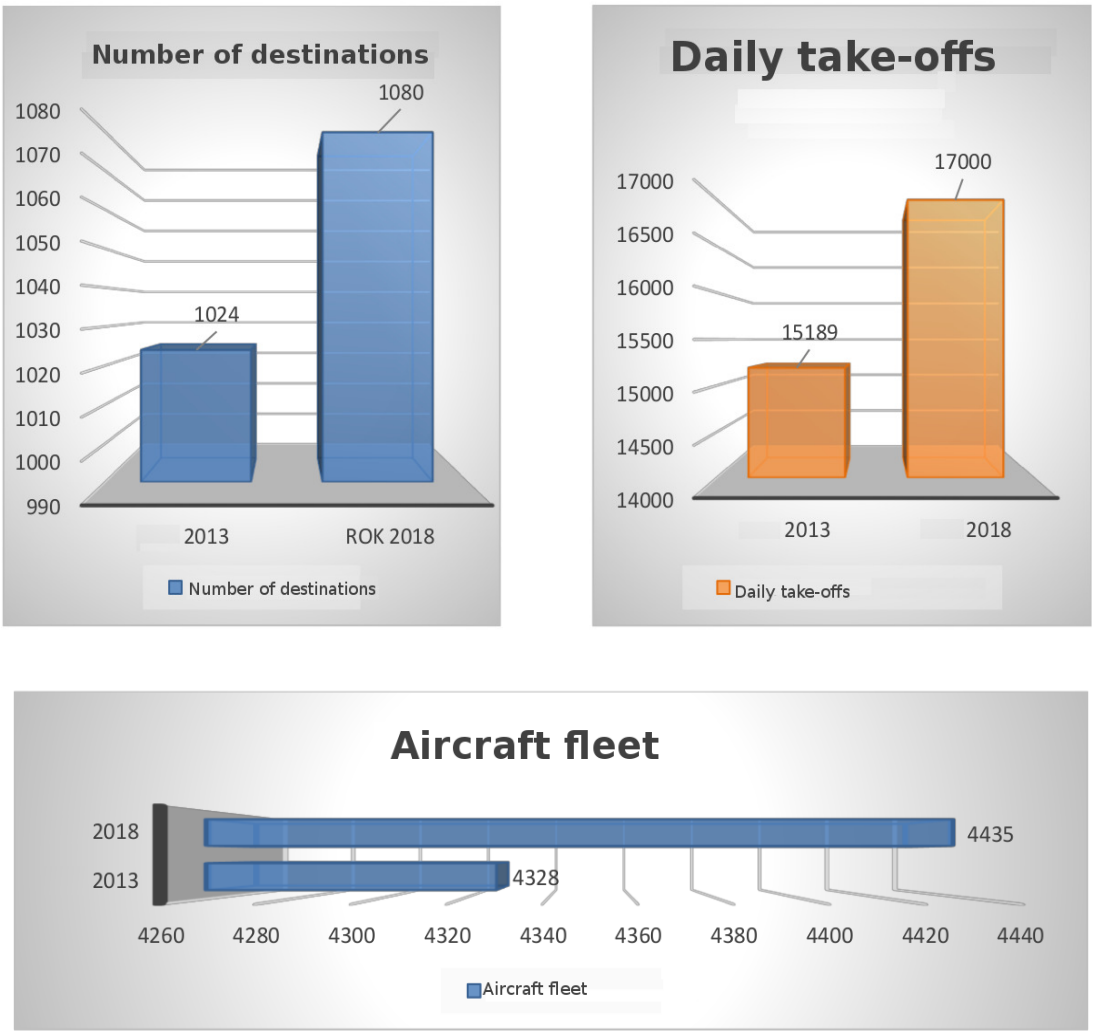

Fig. 4: Example development of an alliance using the example of SkyTeam in the years 2013-2018.

Figure no. 4 presents the development of the SkyTeam alliance over five years between 2013 and 2018. The diagram clearly shows that the alliance experienced clear growth at this time. Alliance members created new connections, and as compared to the year 2013 the number of destinations increased by 56. The aircraft fleet of the carriers also expanded by just over 100 units, with a significant increase of operations, up to 17000 in 2018 (SKY Team :Online 12).

The quickly developing aviation transport services market over the years forced the creation of international organisations that would control aviation market activity. The largest such authority is the „International Air Transport Association", or IATA. This organisation was formed in Havana, Cuba, on April 19th, 1945. to promote air services safety, with passengers in mind, naturally. At the moment of formation, the IATA included 57 members from 31 countries of the world, mainly North America and Europe. Over the years, the organisation expanded, and at the end of 2018 it included 290 airlines from 120 countries, giving a share of 82% of the world's entire air transport. It is a vision of the organisation to work to represent and service the world's entire aviation industry. It develops global business standards, on which the entire aviation market is based. This organisation helps aviation

carriers in terms of business and to work on the basis of clear-cut rules. For the year 2019, the IATA has assumed several priorities such as (IATA: Online 13):

- improvement of legal rules;
- reduction of fuel and airport fees and taxes;
- continuation of audits aimed at improving safety;
- increasing member numbers and their satisfaction;
- removal of barriers against commercialisation of alternative fuel and energy sources.

The second largest aviation body is the ICAO, the „International Civil Aviation Organisation". This is a UN agency created during the international convention on civil aviation in Chicago in the year 1944. 54 member states called the ICAO into existence to promote cooperation. The ICAO today cooperates with 192 member states to develop consensus on normative issues in civil aviation, recommended operating practices and in terms of balanced economic development in aviation. The ICAO also develops forecasts for the aviation market and conducts detailed statistics for the entire aviation industry. It monitors diverse safety and performance indicators for the aviation transport sector. The chief vision of the organisation is the permanent development of the world civil aviation (IATA:Online 13).

Summary

Considering the development of humanity, air transport remains a very young area. In reality it has been in existence for just over 100 years. Beginning with the first wooden aircraft, whose flight lasted just a few seconds, all the way to the enormous aircraft able to reach any corner of the world. The development of aviation completely changed the perception of globalisation, and transformed the approach to civilisation development. The aviation services market is nowadays the main driving force behind global development. It is the development of aviation that contributes to the development of „contraction" of time and space. Thanks to aviation services, we can reach the farthest corners of the world within a matter of several hours. New technologies enable the aviation transport services market to continue to develop at a great pace.

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Does Share Capital Influence the Success of IPOS?

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Abstract

This paper examines the impact of share capital on the success of new issues during initial public offering (IPO) The study is based on a sample of IPO firms which went public on the Warsaw Stock Exchange from 1998 to 2013. The paper shows that share capital which was created to protect corporate creditors against the "extra" risks associated with limited shareholder liability – interacts with investor behaviour and can be used to improve the success of a share issue.

Keywords: Par value, Share capital, Signalling, Creditor protection, Corporate law, IPO, WSE

Introduction

The concept of par value was conceived in order to counteract fraudulent practices that became widespread after shareholders were released from company obligations (Cook, 1921). These consisted of issues and public sale of shares that were not reflected in assets. Therefore, the concept of par value assigned each share a value reflecting cash payments or assets contributed by each shareholder and reflecting the scope of their liability for the company's obligations (Shares, 1921). The share capital corresponding to the par value of one share multiplied by its quantity reflects the capital that company must maintain in order to satisfy the claims of their creditors. Share capital is the main element of the capital maintenance principle, because shares cannot be sold below par value and the capital accumulated in this way cannot be distributed as long as the company exists. However, the concept of par value has been criticized since its birth. It has been accused of not being able to effectively protect creditors against the defrauding behaviour of shareholders.

Although the concept of par value has become the cornerstone of company law in many countries, nowadays there is a clear tendency to abandon it. The exception to this is the European Union and the European Economic Area. Its strong position in Europe stems from the support that the concept of par value has in the Second Council Directive of 13 December 1976. Subsequent analyses, such as Reforming Capital – Report of the Interdisciplinary Group on Capital Maintenance (Rickford, 2004) and a feasibility study on an alternative to the capital maintenance regime established by KPMG on behalf of the European Commission (KPMG, 2008) did not find unambiguous reasons for abandoning it. Therefore, it should be expected that this concept will continue to function in the company law of many countries, which justifies further research into its functioning in practice.

Although the concept of par value was created to protect society and creditors, it may also have an impact on financing companies (Rickford, 2004). Share capital can be a signalling tool showing the degree of shareholder involvement in the company (Mulbert & Birke, 2002). Therefore, it can be expected that it will be well invested. The purpose of the article is to examine the usefulness of share capital as a signalling tool, which contributes to improving the company's position on the capital market. The contribution of the article to the literature is its examination of the impact of share capital on the success of a new issue during its IPO. According to the author's best knowledge, this aspect has not been studied to date. The concept of par value already has over 200 years of history, but previous considerations of its functioning are theoretical and carried out in the field of law and accounting. This

article enriches this discussion with empirical research which, to the best of my knowledge, is a new aspect.

The remainder of the paper is organized as follows. Section 2 provides a literature review and the hypothesis for my investigation. Section 3 describes the data, variables used in this study, and research methods. In Section 4, I present and discuss the empirical results, and Section 5 concludes the paper.

Literature Review and Research Hypothesis

Background

The concept of par value was conceived over 200 years ago as a response to the fraudulent behaviour of shareholders after their release from personal responsibility for the company's obligations. This exemption was of great importance for economic development, because it created conditions for public sale of shares and accumulation of capital (Cook, 1921). However, it also resulted in the appearance of negative phenomena involving the sale of shares that did not have adequate coverage in assets, which were hence called 'watered stock'. The concept of par value consists of assigning each share a nominal value reflecting cash payments or assets contributed by each shareholder (Ho & Lan, 1999). Due to the fact that the share capital contributed during the establishment of the company is stable and reliable – because companies cannot redistribute it to shareholders as long as the company operates and new shares can not be sold below par value – it is a convenient criterion for measuring the extent of shareholders' liability. Share capital can be considered the first legal capital because it began the maintaining capital principle created to protect the company's creditors against the extra risk related to the limited liability of shareholders for the company's liabilities (Armour, 2000). Par value paid by shareholders for their shares is the price required by law for the advantages of limited liability companies (Mwenda, 1999). Legal capital fulfils a similar role for creditors as a financial cushion which acts in the same way as financial adequacy provisions for financial institutions (Bachner, 2009; Handschin, 2012).

Legal capital has been criticized from its inception. Enriques and Macey (2001) believe that the capital maintaining principle does not bring any benefits to creditors; on the contrary, in some cases it even harms them. Consequently, the accompanying burdens of this principle on companies and societies are completely unjustified. The authors are convinced that maintaining this principle in European law, despite its ineffectiveness, results only from the influence of interest groups that benefit from the functioning of legal capital. These include incumbent management boards representing the interests of controlling shareholders, accounting officers providing required share valuation services, and lawyers assisting managers in navigating the maze of unnecessarily complicated laws regarding legal capital. Also, Ho (2017) claims that the principle of capital maintenance contributes to reducing the flexibility of the financial structure and burdens it with cumbersome procedures that force companies to pay for 'useless expert reports and legal advice' (p. 19). Similarly, Mulbert and Birke (2002) consider that the utility of the capital maintaining principle for the protection of creditors is small and there is a nontrivial likelihood that this principle does more harm than good. In turn, Mwenda (1999) remarks that the value of assets may increase or decrease over time and, for this reason, this value ceases to correspond to the value of the originally contributed share capital. Therefore, any cash-based equity valuations used as a signal for a market about the value of shares in the company's equity are usually fictional and may be both meaningless and misleading. Therefore, in contrast to Bebchuk (1992), Ho (2017) is convinced that in the real world creditors do not pay attention to legally maintained capital which should reflect the value of collateral, because they often protect their interests by covenants.

However, there are also authors who see the benefits of the capital maintaining principle. Bonbright (1924) points out that par value does not reflect the value of a company subject to constant change and cannot be determined on the basis of share certificates; it only reflects the capital that shareholders

agreed to contribute. In addition, Pennington (1990) emphasizes that the concept of par value is useful when declaring dividends in percentage of par value, as well as determining the voting rights at the general meeting or determining the amounts due to privileged shareholders in the event of the company's liquidation. According to Mulbert and Birke (2002), the most important positive effect of the capital maintenance principle is limiting harm actions to creditors by distributing capital, in particular by way of 'hidden distributions'. Therefore, the principle of maintaining capital can be a way to reduce post-contractual opportunism by shareholders (Armour, 2000) and the same mechanism can be used to reduce agency conflict (Panetsos, 2016), because – for example, as reported by Boubakri and Ghouma (2010) – covenants may be ineffective in protecting creditors if the ultimate owners are a family. Cascino et al. (2013) are advocates of a continental accounting model which focuses on creditors and requires highly codified reporting (Joos & Lang, 1994), and empirical evidence from Europe shows that creditors prefer conservative accounting valuations.

Although the purpose of the par value regime is to protect creditors against fraudulent behaviour of shareholders, it can be used as a tool to influence the financing of the company (Rickford, 2004). This impact results both from the properties and mechanism of the par value regime. Generally, two types of interactions can be distinguished. The first behavioural interaction results from the number of shares and the nominal value of the stock determined by it. By appropriately shaping these parameters, there is a possibility to incline investors towards committing perceptual biases. The second type of interaction results from the value of the entire share capital and the consequences of the capital maintenance principle.

The main purpose of this article is to test the impact of the entire share capital on the success of issuance during an IPO.

Hypothesis

Share capital is subject to the principle of capital maintenance, which means that it is inviolable during the functioning of the enterprise. According to Mulbert and Birke (2002), it can serve as a 'seriousness' test and as a signal that shareholders have confidence in their company and intend to work hard towards its success. Therefore, this capital should be located in the most valuable assets, as opposed to other types of equity, such as reserve capital or retained earnings. Reserve capital and retained earnings are more transitory in nature and therefore may be invested in short-term assets with lower efficiency. From this, one could expect that when there is more equity capital in the equity structure, this is a strong positive signal for investors, improving the company's position on the capital market. On this basis the following hypothesis have been formulated: *H: Share capital is an effective signalling tool contributing to the success of the new issue.*

Sample Description and Research Method

Sample

The study is based on a sample of IPO firms which went public on the Warsaw Stock Exchange from 1998 to 2013 (total number of IPOs reported in Panel A of Table 1). This initial sample of 496 IPOs was reduced by excluding:

a) financial institutions (e.g., banks and insurance companies),
b) IPOs which were not connected with new common stock issuance,
c) IPOs for which data was incomplete.

The final sample thus consists of 259 IPOs. Panel A of Table 1 shows the variations in the sample number of IPOs over the 16 years.

The primary source of data used in this study was Notoria Service; however, because there are sometimes incomplete or incorrect data in the database, other sources of data were used to supplement these, such as IPO prospectuses, and annual reports available on the companies' websites and at www.gpwinfostrefa.pl.

The main focus of this study is the impact of share capital on the success of issuance during IPO and profitability after IPO. Panel B of Table 1 reports the basic characteristics of the sample firms one year before IPO, such as total assets, total sales, and financing parameters. The variables used in this study are defined in Table 2.

Research Methods

In the first step, three models were built in which the dependent variables were parameters which characterized the issue success. Three parameters were selected: the relation of the issue price to the book value of the shares, the percentage increase in equity, and the ratio of the percentage increase in equity to the percentage number of shares sold. The following variables were used as control variables: indicators showing the financial condition of the company, such as ROE, ROS, CR, S/A, E/FA, D/A; parameters illustrating the economic situation, such as WIG, WIG percentage change, and GDP growth; and SC/E was used as a measure for the share capital. The sector was added. The number of issued shares was strongly related to the size of the company and the nominal value of the shares. In order to increase the symmetry of the distribution, most parameters were shown as a logarithm. The explanation of the parameters used is presented in Table 2. Therefore, the models used are as follows:

$$Y_t = \alpha + \beta_1 sector + \beta_2 ROE_{t-1} + \beta_3 ROS_{t-1} + \beta_4 Ln\frac{S}{A_{t-1}} + \beta_5 \frac{D}{A_{t-1}} + \beta_6 LnCR + \beta_7 Ln\frac{E}{FA_{t-1}} + \beta_8 GDP + \beta_9 LnWIG + \beta_{10} WIG[\%] + \beta_{11} LnNP + \beta_{12} \frac{SC}{E}_{t-1} + \beta_{13} NrSh + \varepsilon_t$$

Results

In Table 3, Panel A, we can see that IPO companies obtain very large amounts of capital. The trimmed average shows that the capital increase is above 150% (Proceeds/SE_{t-1} [%]), investors pay more than PLN 4.8 for each zloty of the book value (IP/BV_{-1}), and the sale of one percent of shares allows you to increase equity capital more than 6% ((Proceeds/SE_{t-1})/(% shares sold)). It can be concluded that IPO companies generally succeed during the issue, allowing them to multiply their capital. This success is determined by profitability (ROE) (Table 3, Panel B) which was also reported on in previous studies (Dudycz & Brycz, 2017).

A good signal for investors is also the possession of large amounts of cash (CR) and high indebtedness (D/A), which is a signal for investors that the banks, as a third party, have rated the company well (Brycz, Dudycz, & Kowalski, 2017).

Table 1: Sample characteristics

		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	1998–2013
Panel A																		
Total number of IPOs		51	20	11	7	5	6	36	58	63	81	31	13	34	38	19	23	496
Sample number of IPOs		25	15	9	5	2	5	24	22	25	52	22	9	21	12	4	7	259
Sample number of IPOs to total number of IPOs [%]		49.0	75.0	81.8	71.4	40.0	83.3	66.7	37.9	39.7	64.2	71.0	69.2	61.8	31.6	21.1	30.4	52.2
GDP growth [%]		5.0	4.5	4.3	1.2	1.4	3.9	5.3	3.6	6.2	6.8	5.1	1.6	3.8	4.3	1.9	1.6	74.5
WIG		12,795.6	18,083.6	17,847.6	13,922.2	14,366.7	20,820.1	26,636.2	35,600.8	50,411.8	55,648.5	27,228.6	39,986.0	47,489.9	37,595.4	47,460.6	51,284.3	
Change in WIG [%]		-12.8	41.3	-1.3	-22.0	3.2	44.9	27.9	33.7	41.6	10.4	-51.1	46.9	18.8	-20.8	26.2	8.1	
Panel B																		
Assets $_{-1}$ [PLN million]	Mean	44.8	142.5	596.2	43.1	86.1	134.9	130.5	1 044.6	118.9	97.9	496.1	2,719.5	129.7	115.2	312.9	183.3	331.9
	SD	35.9	172.4	1 158.3	33.8	52.8	57.0	212.7	3 134.6	168.5	152.6	1,868.1	7,160.0	146.2	85.6	253.5	123.5	1,736.8
	Median	34.8	52.5	39.4	41.7	86.1	122.0	74.2	52.4	55.9	52.1	29.0	69.9	93.9	96.3	329.3	161.6	54.7
Sales $_{-1}$ [PLN million]	Mean	91.4	235.8	174.0	47.5	269.4	162.8	107.3	966.3	144.5	118.3	343.6	1,243.6	90.6	98.1	144.0	82.0	253.5
	SD	101.9	260.9	249.5	67.7	299.5	85.1	221.2	2,215.7	256.9	130.9	1,072.9	3,190.0	114.5	88.5	156.8	141.8	961.8
	Median	52.8	78.5	63.1	23.1	269.4	189.3	49.2	77.7	50.0	62.5	26.8	36.5	53.7	69.2	120.7	8.0	54.9

Table 2: Variable definitions

Variable	Definition
Ln NP	Natural logarithm of nominal price of share
Ln Assets	Natural logarithm of total assets
Ln Sales	Natural logarithm of net sales
Ln SC/E	Natural logarithm of share capital to the total shareholders' equity ratio
Ln S/A	Sales to total assets ratio
ROE	Return on equity defined as net income divided by shareholders' equity calculated as the difference between total assets and total liabilities
ROS	Return on sales ratio
D/A	Debt ratio defined as total debt (the sum of current liabilities and long-term liabilities) divided by total assets
Ln CR	Natural logarithm of cash ratio defined as short-term investments divided by current liabilities
Ln E/FA	Natural logarithm of shareholders' equity-to-fixed-assets ratio defined as shareholders' equity to total fixed assets
Ln NrSh	Natural logarithm of number share issued
IP/NP	Ratio of issue price to the nominal value of shares
Ln IP/BV	Natural logarithm of ratio of issue price to the book value of shares
Ln WIG	Natural logarithm of value of the Warsaw Stock Exchange Index, which comprises all companies listed on the main market; the initial value of the WIG Index on 16 April 1991 was 1,000 points
WIG [%]	Rate of return on WIG Index
GDP growth	GDP growth rate defined as the percentage change in gross domestic product during one year
Sector	Sector of the economy. A variable used to control for the sector effect, which is coded as: 1 – architecture; 2 – chemical industry; 3 – energy; 4 – mining and metallurgy; 5 – trade; 6 – information technology; 7 – media and telecommunications; 8 – heavy industry; 9 – light industry; 10 – food industry; 11 – services.
Ln NrSh	Natural logarithm of number share issued
Proceeds/SE_{t-1}	Percentage increase in shareholders' equity through the issuance of primary shares calculated as the IPO proceeds from the sale of primary shares divided by total shareholders' equity at the beginning of the IPO year (calculated as the difference between total assets and total liabilities)
(Proceeds/SEt-1)/ (% shares sold)	Percentage increase in shareholders' equity to the percentage of shares sold via the issuance of primary shares

The success of the emission is also influenced by timing, especially measured by GDP growth. However, apart from the financial condition and timing, the impact of which has already been reported in the literature, the success of emissions is also influenced by a triad of factors determining the emission parameters. As we can see in Table 3, Panel B, the impact of the success of the issue is to emit a small number of shares (NrSh) with low NP, the book value of which is characterized by a large share of SC in Equity (SC/E). Issuing a small number of shares increases the probability such that the demand for shares will exceed supply, which will positively affect the price of shares. Low NP means that the remaining types of share values (book value, issue price) are also relatively low, so they induce investors to make perceptual biases such as the 'face value' effect or 'charm price', whereas, the positive impact of SC/E ratio on the success of the issue shows that, for investors, share capital is a measure of investor involvement that promises better management of the company and, consequently, higher efficiency of the company. This confirms the hypothesis that share capital can be used as a signalling tool to improve the company's position on the capital market.

Table 3: Regression analysis of the determinants of IPO success

	IP/BV $_{-1}$	**Proceeds/SE$_{t-1}$ [%]**	**(Proceeds/SE$_{t-1}$)/ (% shares sold)**
1	2	3	4
Panel A: Mean value			
Mean	5.96	188.0	7.61
Trimmed mean 5%	4.81	151.7	6.38
SD	7.74	247.2	8.99
Median	3.72	109.0	4.96
Panel B: Regression analysis			
	Ln IP/BV $_{-1}$	Ln Proceeds/SE$_{t-1}$	Ln (Proceeds/SE$_{t-1}$)/ (% shares sold)
Sector	-0.065 (0.043)	-0.067 (0.051)	-0.082 (0.045)
ROE $_{-1}$	0.253*** (0.048)	0.203*** (0.058)	0.265*** (0.051)
ROS $_{-1}$	-0.061 (0.049)	-0.043 (0.059)	-0.051 (0.051)
Ln S/A $_{-1}$	-0.055 (0.057)	0.086 (0.069)	-0.050 (0.060)
D/A $_{-1}$	0.212*** (0.056)	0.325*** (0.067)	0.243*** (0.058)
Ln CR $_{-1}$	0.171*** (0.048)	0.097* (0.058)	0.143*** (0.051)
Ln E/FA $_{-1}$	-0.079 (0.051)	0.048 (0.061)	-0.045 (0.053)
GDP	0.175*** (0.047)	0.238*** (0.056)	0.200*** (0.049)
Ln WIG	0.241*** (0.054)	0.094 (0.064)	0.168*** (0.056)
WIG [%]	0.026 (0.045)	0.068 (0.054)	0.054 (0.047)
Ln NP	-0.511*** (0.061)	-0.141* (0.073)	-0.474*** (0.064)
Ln SC/E $_{-1}$	0.402*** (0.053)	0.249*** (0.063)	0.406*** (0.056)
Ln NrSh	-0.288*** (0.047)	0.098* (0.056)	-0.198*** (0.049)
R^2	0.602	0.427	0.561
Adjusted R^2	0.581	0.396	0.538
F	28.388	13.988	23.997

*Panel A reports the mean values of each variable Y_t . Panel B reports the results of the regressions models. The constant term is not reported. The standard errors that are robust to heteroscedasticity are reported in parentheses. *, **, and *** indicate that coefficients are significant at 10, 5, and 1 per cent levels of significance, respectively.*

Conclusions

The par value regime imposes on companies the obligation to create and maintain capital in order to secure the claims of the company's creditors. The effectiveness of such security has been questioned from the inception of the par value concept. However, there are reports in the literature that the par value regime can affect the financing of the company both positively and negatively. A positive impact may result from investors' perceptions of share capital as a measure of shareholder commitment and as a kind of 'seriousness test'. On the other hand, a negative impact may be the result of low flexibility of equity consisting largely of share capital.

The research presented in this article shows that, in fact, equity capital is a positive signal for investors, contributing to the success of a new issue. Apart from good financial results of the company, this success is also determined by issue parameters such as the number of issued shares and their unit value. The number of issued shares of the new issue affects their supply. Too high a number has a negative impact on the success of the issue. The question arises whether this factor is global or only appears in small markets where a limited number of active investors operate. However, answering this question would require expanding the research. The low unit price of shares, in turn, contributes to investors making perceptual biases, which are manifest in the separation of the share price from its fundamentals. In this context, par value can be seen as a manipulation tool contributing to the success of the issue.

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Key Trends in the Global Car Sharing Market Development

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Abstract

Today, the car sharing market is gaining global popularity. This service is actively used in all megalopolises of the world countries, and even now experts predict a vast huge evolutionary leap in this innovation. The ability to use any type of vehicles anywhere in the world, without actually owning it and bothering with property costs, is one of the main advantages of the Sharing Economy. Today, there are three main regions of the global car sharing market growth – the Asia-Pacific region, Western Europe and North America. The analysis of the dynamics and key trends in car sharing development in three largest regions in question allowed identifying the key factors of intensive development of the car sharing market in these areas, as well as forecasting further growth opportunities for this segment of the transport market.

Keywords: World Transport Sector, Car Sharing, Maas System.

Introduction

The term "collaborative consumption" was first used by American economists Marcus Felson and Joe Speth, in an article published in 1978 in the American Behavioral Scientist journal entitled "Community Structure and Collaborative Consumption: a Daily Activity Approach." 33 years later, the TIME magazine named the collaborative consumption as one of the ten ideas that will change the world (Komarova I.P., 2017). The Sharing Economy has provoked one of the largest social and economic shifts, comparable in importance to the industrial revolution. As a consequence, a new large-scale business trend of the present time has emerged. It is difficult to imagine a sector or a category of business interests that will not be affected by the sharing economy (Ulitskaya N.M., 2014).

As compared with traditional economic model, the sharing economy of the car sharing has a range of obvious advantages:

1. The openness of the collaborative economy makes the entrance of new participants more accessible. The user sets its priorities depending on the available personal time and resources. Such participants can interact in several areas of activity. The user's ability not to limit itself to a single country or city, to be mobile, while earning income.

2. Increasing the benefits for those who offer the resource and those who need it involves the ability to raise the standard of living, while eliminating the social and physical burden of ownership.

3. In no small way, the sharing economy affects the environment. It is essential to recall that one of the drivers of the sharing economy onset was the constantly growing global population. The car sharing allows limiting the number of vehicles in personal use.

4. Restriction of monopolies leads to consumer benefits, which imply an increase in the quality of services and lower prices.

The use of all advantages of the sharing economy in the transport industry makes it possible to make a revolutionary surge, allowing users to have access to a wide range of vehicles without need to bear the costs and other expenses associated with its ownership (V.S. Lukinsky, V.I. Berezhnoy, E.V. Berezhnaya, 2004). At the same time, the sharing economy provides a favorable environment for startups and entices venture investors, recognized transport industry players, both direct vehicle manufacturers and rental companies, turning on strengthening of their positions, especially in the car sharing sector. The transport industry has acquired momentum to become one of the world's leading economies by combining consumer trends with technology, while providing users with a unique sense of personal use. Therefore, it is not surprising that the transport industry is closely connected to future mobility concepts such as car sharing, association of transport manufacturers, MaaS mobility and electric mobility services, as well as other cutting-edge innovations in digitalization and autonomous driving that are in the offing. Over the past few years, the share of users was constantly on the rise in arithmetical progression, especially in large cities, where more and more people bear the expenses associated with the cost of personal transport ownership (E.S. Zemskova, 2019).

Due to the above, the purpose of this work is to analyze the development trends of the main regional car sharing markets, the spotting of which will allow predicting the dynamics and growth directions of the global car sharing market.

Methodology

During research, the following general scientific methods were used: the content analysis method, designed to analyze the semantic content of text arrays and products of communicative correspondence on the research subject, as well as inductive and deductive analysis tools, which allowed us to combine individual authors' conclusions on this problem and formulate the author's vision of the problem. Special methods were also used during the research: absolute and relative statistical indicators, dynamics indicators, and research finding visualization methods. When constructing and describing models, the authors tried to adhere to the principles of an integrated approach that allows establishing the most significant relationships and trends of events and processes in the car sharing market and formalize the most significant effects.

The research database consisted of official statistical and analytical materials from the University of California, the New York Stock Exchange, and the Brookings Institution.

Results

The key players in the global market for car sharing services are the Asia-Pacific Region, Europe and North America. This is due to the following reasons:

1. due to the growth of population in these regions, the car sharing industry has become one of the most prominent sectors in the transport fleets;

2. the car sharing significantly helps to rein in the pollution level by reducing the volume of sales of business-owned vehicles.

3. with the growth of air traffic and trends of online booking of vehicles, the vehicle rental is the preferred option for travels, since the car sharing becomes the most economical and fastest type of transport services.

4. increase in disposable income of people in such countries as the USA, countries of the Western Europe, and Southeast Asia, as well as improvement of road infrastructure in these regions, contribute to exponential increase in the car sharing industry.

5. another market growth resource is the expansion of the Internet usage trend.

Let's take a closer look at three main transportation regions and their growth dynamics: North America, Europe, and the Asia-Pacific region.

North America is the third world largest transportation market following Asia and Europe, and its vehicle fleet and the number of participants have grown significantly since 2010. The fleet increased by more than 2.5 times, and the number of participants increased by 3.5 times from 2010 to 2018 (see table 1).

Table 1: Regional trends in the car sharing market in North America (Source: Brookings Institute, Global Market Insights, NYSE)

Period	2008	2010	2012	2014	2016	2018
Participants	117,656	318,838	516,100	908,584	1,625,652	1,837,854
Participants' growth rate	0.00%	65.00%	27.00%	33.00%	34.00%	7%
Vehicles	3,337	7,505	10,420	15,795	24,210	26,691
Growth rate of fleets	0.00%	50.00%	18.00%	23.00%	24.00%	5%
Factor	35.3	42.5	49.5	57.5	67.1	68.9

It is estimated that the growth of car sharing in the United States hovers around 17% for companies that manage vehicle fleets over the next 7 years (A. Samsonova, 2019).

The portion of this growth is associated with several incentives implemented by the US Government. Some of these incentives operate at the municipal level, while others have been implemented in different states. The state legislation generally focuses on transport taxation and incentives to use transport fleets. Examples are Washington state tax incentives, special programs increasing co-location between transit hubs and vehicle parking space in California, or partnership relations between public transit operators and car service providers in Oregon, and, in particular, special vehicle parking permits in several states.

While Canada is a smaller market compared to the US, its population is located mainly in metropolitan areas, accounting for more than 85%, and boasts some of the busiest car sharing markets. This is why some CAGR estimates for companies and private users are closer to 20-23%. The example of a thriving car sharing market is Vancouver: it has four operators - 2 based on a fixed service and 2 in free movement, and citizens have access to a fleet of almost 3,000 vehicles. As of 2018, almost 1/3 of the adult population of Vancouver had one or more memberships on car sharing platforms (see table 2). This is about 200,000 people.

Table 2: Growing share of cars in Vancouver (Source: Global Market Insights, Pew Research)

Period	2015	2016	2017	2018
Percentage of Vancouver's adult population using the car sharing, %	13	20	26	29

For both countries, governmental and municipal incentives are expected to increase, especially for programs encouraging the use of electricity and transport in low-income districts or rural neighborhoods.

In fact, in April 2018, the city of Los Angeles, in partnership with the French group Bolloré, has launched an all-electric vehicle separation operation where vehicles were strategically placed in low-income areas. The company expects that 100 cars will be available in 40 locations by the end of the year, and by 2021, the number will triplicate. One more program that is currently in BETA stage is Hui in Hawaii. Hui solves the transportation problems of Honolulu, a city with less dense public transport infrastructure compared to some typical vehicle markets such as Paris, London, New York. This is a partnership between Toyota and the large dealer network Servco. The involvement of dealers to manage the vehicle fleet allows creating a unique system that will open up new opportunities in small provincial localities.

Europe is the second world largest transportation market (following Asia), partly because of its densely populated cities and partly because the European Union pays great attention to the implementation of environmentally friendly technologies and greenhouse gas emission reduction (S.N. Bobylev, P.A. Kiryushina, O.V. Kudryavtseva, 2019). This led to an explosive increase in the number of operators and transportation fleets. In 2018, Europeans had 3.5 times more vehicles available for sharing compared to 2010. This also led to an incredible increase in the number of users: eight times between 2010 and 2018 (see table 3).

Table 3: European development trends in the car sharing (Source: The research was implemented by RAEC together with the TIAR-Center)

Period	2008	2010	2012	2014	2016	2018
Participants	212,124	334,168	552,868	691,943	2,206,884	4,371,151
Participants' growth rate	0.00%	26.00%	29.00%	12.00%	79.00%	49%
Vehicles	7,491	10,833	16,779	20,464	57,947	57,857
Growth rate of fleets	0.00%	20.00%	24.00%	10.00%	68.00%	0%
Factor	28.3	30.8	32.9	33.8	38.1	75.6

According to the CAGR (Compound annual growth rate), the growth of share of transportation business in the UK is 18-20% for companies and private users over 7 years. Partially this growth is related to improved broadband infrastructure and very unstable economy, which leads to the fact that people look for alternatives to owning a vehicle.

Evaluations of market growth dynamics for Germany are slightly higher than for the UK - the CAGR for companies and private users is between 21-23% (Pazderova V.Yu., Thagapso R.A., Hot F.T., 2016). This is not surprising since Germany is currently the largest European transportation market. At the beginning of 2018, more than 2 million people signed up for the car sharing service, and more than 677 cities and localities offer the car sharing service, which is 80 more than in 2017. There are several main reasons why Germany is so quick to accept the car sharing mode. One of the main factors is that some of the largest vehicle manufacturers have submitted their own car sharing offers (Daimler, BMW). One more important factor is that Germany has proposed a unique legal framework to support clean energy solutions. In 2017, the German Bundestag approved the so-called personal car sharing law: initially, it governs the creation of parking spaces specifically for the car sharing throughout Germany (N.A. Maratkanov, 2018).

The law makes it incredibly easy to obtain public parking spaces for a fixed separation of transport, and allows local authorities to reduce or cancel charges for common access transport parking.

The implementation of a large-scale electric vehicle fleet is one of the biggest opportunities in Germany with ongoing investigations of Dieselgate scandals. Currently, 10% of the German fleet consists of electric vehicles. Although this is actually 100 times more than the number of personal vehicles, Gunnar Nehrke, the President of the German Car Sharing Association, believes there is a potential for more growth. However, he also states that support programs and incentives from the Germany are necessary to increase the economic viability of electric vehicles in fleets.

The growth potential for France is within the same range as for Germany, but France is a particularly hot market for peer-to-peer companies. Drivy is a very successful French version of Touro; in fact, France is the most successful P2P market throughout Europe with more than 1 million users. Another major provider of car sharing services in France is Réseau Citiz, which operates in more than 80 cities and has 18 different local platforms. In France, it is profitable to use the services of companies involved in car sharing, whose fleets have electric cars, because this country is particularly strict about the rules for the separation of vehicles, especially with regard to freely moving vehicles. All of them must be fully electric or at least hybrid. As in Germany, the implementation of a large fleet of electric vehicles is a great opportunity for the platforms presented in France. If the operator satisfies this condition - EV/hybrid fleet - it is very easy to get necessary parking permits. However, the problems are also similar - only cities with sufficient infrastructure are financially viable for this model (N.A. Maratkanov, 2018).

As of 2018, Asia is the largest world transportation market (see table 4). In addition, the fleet size more than triplicated in just 2 years, from 2016 to 2018. The number of participants is 8.7 million, which is twice as much as in Europe % (Pazderova V.Yu., Thagapso R.A., Hot F.T., 2016).

Table 4: Growth dynamics of the car sharing in Asia (Source: The research was implemented by RAEC together with the TIAR-Center)

Period	2008	2010	2012	2014	2016	2018
Participants	15,700	12,546	81,817	160,500	955,880	8,722,138
Participants' growth rate	0.00%	-11.00%	155.00%	40.00%	144.00%	406%
Vehicles	608	810	4,315	6,155	20,344	67,329
Growth rate of fleets	0.00%	15.00%	131.00%	19.00%	82.00%	115%
Factor	25.8	15.5	19.0	26.1	47.0	129.5

Rapid industrialization and urbanization were the main factors that contributed to this growth. In addition, such countries as Taiwan and India have underdeveloped transport infrastructure, and China has a high percentage of air pollution. The first means that countries in the Asia-Pacific region exercise very strict control over personal vehicle ownership. The latter encourages governments in these regions to make better use of their road network and add new electric vehicles.

China's motor fleet and its users are ready for further growth. Roland Berger, a German consulting company, which has been involved in transport for many years, estimates an annual growth rate of 45% by 2025. Despite this huge growth prediction, China remains a difficult market to enter, especially for foreign operators. There are several initial conditions that must be met to startup a car sharing business in China, but none of them can be easily achieved, especially in cities with strict restrictions on license plates and a lack of parking space (S. Klein, 2010).

It is not surprising that 90% of all transport companies in China operate locally. Car sharing service providers operating in China can be divided into three groups: OEM owners, third parties supported by OEM, and third-party technology companies. It is also worth noting that most car sharing

operators in China rely on government grants and exclusive partnership relations, which help them to secure a foothold in the market before creating a more profitable business model. All of this proves the difficulty of entering the Chinese car sharing market for foreign companies.

Conclusions

As a result of the research it is possible to draw the following conclusions:

1. The countries of the Asia-Pacific region represent the largest share in the global car sharing market. This is due to the high degree of urbanization of this region, the improvement in the transport infrastructure, the presence of protectionist measures for national sharing companies, and the availability of socio-economic opportunities for its further growth;

2. In all regions reviewed, public transport providers and municipalities are increasingly open for evaluation of MaaS options for their citizens. Mobility as a service means fully integrated mobility, as well as integrated public transport, even in the largest cities. The goal is a seamless user experience that can increase the number of people who have elected not to own vehicles, since MaaS offers the same convenience and freedom. It is still unknown who will be the last MaaS operator and provider: it may be a public transport authority that will ensure the transportation fairness for all. Or it may be the private sector, which will more probably implement innovate faster.

3. despite the fact that the scope of transportation business in all regions of the world has increased significantly over the past few years, experts believe that the car sharing market is only at the beginning of its journey. In North America, this industry is expected to grow due to the development of tourism and Internet technologies, in Europe - due to the active implementation of "green" technologies, in Asia-Pacific countries - due to the transport markets of India and Taiwan that are not yet involved in this process.

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Effects of Covid-19 Virus on Air Transport

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Abstract

Through this article, we aimed to analyze the main effects of the global crisis caused by the new coronavirus - Covid 19 in passenger air transport services. Passenger air transport services were one of the first industries to experience the worldwide transmission of Covid-19. Even though the last crisis that also affected this field is about a decade since it ended, no one predicted the financial decline that this industry was going to go through. Major global players have adapted new strategies with immediate application, aimed at limiting the effects of passenger slag, transforming part of the fleet for passenger transport into cargo planes and seeking to operate transports, mainly at the request of governments, from Asian countries to all globe.

Keywords: air transport, Covid-19, financial effects, air routes.

Introduction

Epidemics and diseases have always affected the Earth, differentiating the spread, the number of victims and the effects on economies, more or less advanced. The virus that appeared at the end of 2019 in China had unsuspected implications, spreading in less than two months around the globe. The first effect noted was the slowdown in the global economy and the decline in industrial production, with an imminent crisis expected.

Recessions are not considered by specialists in the field as natural actions of the economy, although most tend to follow a specific type and an inevitable cyclicality. In most situations, periods of recession are preceded by economic growth. At the level of 2020, the researches identified a series of methods meant to anticipate and counteract the occurrence of such situations through risk management.

The freezing of liquidity manifests a first response given to the potential state of recession because both the entities and the population seek to hold as large amounts as possible. This desire helps to block the cash flow, causing bankruptcy or mass layoffs. The result is translated into a series of unprecedented economic measures that the government and central banks are trying to solve by providing liquidity or

spending where they did not do until recently. The main problem is that the economy is starting to grow again, with a boom expected.

Implications of COVID-19 in the Air Transport industry: A Theoretical Approach

The COVID-19 pandemic is shaping up as a crisis and not a financial crisis started by the years of artificial growth of some sectors. Many elements were not foreshadowed, and that may appear in the coming years, being caused by these disasters. The current recession is very different from previous recessions, with exact causes and about which we can say precisely how it happened or how it was caused. The economy is declining because of COVID-19 and its growth potential, but current policies are meant to protect everyone's health. From the perspective of economic policy, unprecedented results have been obtained: all economists - regardless of the degree of confidence given to government policies, have concluded on the measures to be taken in this regard. An exchange usually measures the level of economic activity. People pay in exchange for goods or services, and the purchases of one person become payments of another. The amount of income defines this exchange, and if they are high, by default, the level of exchange will be higher. The situation of the COVID-19 pandemic will cause the economy to decline through lower revenues and lower expenditures. Expenditures tend to make us happier than not; our economic well-being is affected by recessions. The reduction of economic activity is manifested by the decision that we want to spend less on specific services; in this case, the use of air travel to travel on vacation to produce things meant for sale. If that happens, no matter how much they might want those things, there will be shortcomings. If there are fewer people around the payment, there will be fewer payments.

The spread of the new coronavirus COVID-19 globally has had far-reaching effects on the entire economy, but one of the most affected sectors is air transport. A large part of the business trips and all the tourist trips were canceled. With the spread of this pandemic, people were advised to stay in their homes, and the entire economy slowed down. The way money is spent changed radically in just three months. The big online stores recorded record sales, taking advantage of the fact that the population was restricted from travelling.

In the current crisis, economists have an essential role to play in their expertise in shaping management and planning strategies. From the COVID-19 pandemic, it is too early to say definitively what lessons will be learned which from the current mistakes will not be repeated. However, some aspects may be relevant, for example, if we look around the world today, the countries that were closest to previous outbreaks developed plans long before the others. One thing is sure: the global economy is interconnected, the proof being the fact that for many goods, the Asian market was the only supplier. Even if only a few countries properly manage pandemics, this does not prevent a significant drop and a painful recovery.

The global economic crisis caused by COVID-19 has affected all sectors of the economy, but as we well know, one of the most affected sectors is the travel sector. There are several pieces of evidence of cooperation between actors in the air transport industry, both in a particular subsector (eg air industry) and not only (e.g. between airlines and ground airlines) which are dependent on some other. From the experiences of previous events, aspects have highlighted that show that tourism and business travel have led to the full development of the airport's capacity worldwide, developing millions of jobs in developed and developing countries. The global economy is now increasingly dependent on air travel, also with an increasing share of goods, in value, transported by air. In the situation caused by the COVID-19 pandemic, many companies have adapted their strategy, reorganizing their passenger transport fleet into a cargo fleet.

Analyzing in comparison with the economic recession manifested in 2010, it is highlighted that then for the first time; the corporate segment was affected in the air transport whose profit started to decrease.

Then, the travel agencies declared a decrease in turnover of 20%, and the market trend was not at all favourable. Finally, the market tourism crisis has affected the hospitality industry, and that of small private entrepreneurs who have been linked to this area and forecasts do not indicate that the market continues to contract. The crisis caused by COVID-19 did not aim at a slowdown in the economy, in this case of air transport services, for 1-2 years, but a sudden fall by applying government policies to ban most flights and limit exit from homes.

Implications of COVID-19 in the air transport industry: a practical approach

Estimates of the impact of COVID-19 on scheduled international passenger traffic for the period January - September of the year 2020, compared to the reference line (currently planned flights) indicates:

- A general reduction of between 41% and 56% for seats on aircraft traded by airlines;
- A decrease between 705 to 963 million passengers;
- Losses between $ 160 billion and $ 218 billion in airlines' gross operating income;
- If the global economy can recover quickly, in semester three or later, the specialists' estimates are the following;
- A general reduction of between 57% and 67% for seats on aircraft traded by airlines;
- A decrease between 961 to 1.17 million passengers;
- Losses between $ 218 billion and $ 253 billion in airlines' gross operating income;

The impact that this pandemic will have on air transport services depends on the duration and magnitude of the outbreak and retention measures, the degree of consumer confidence in air travel and economic conditions.

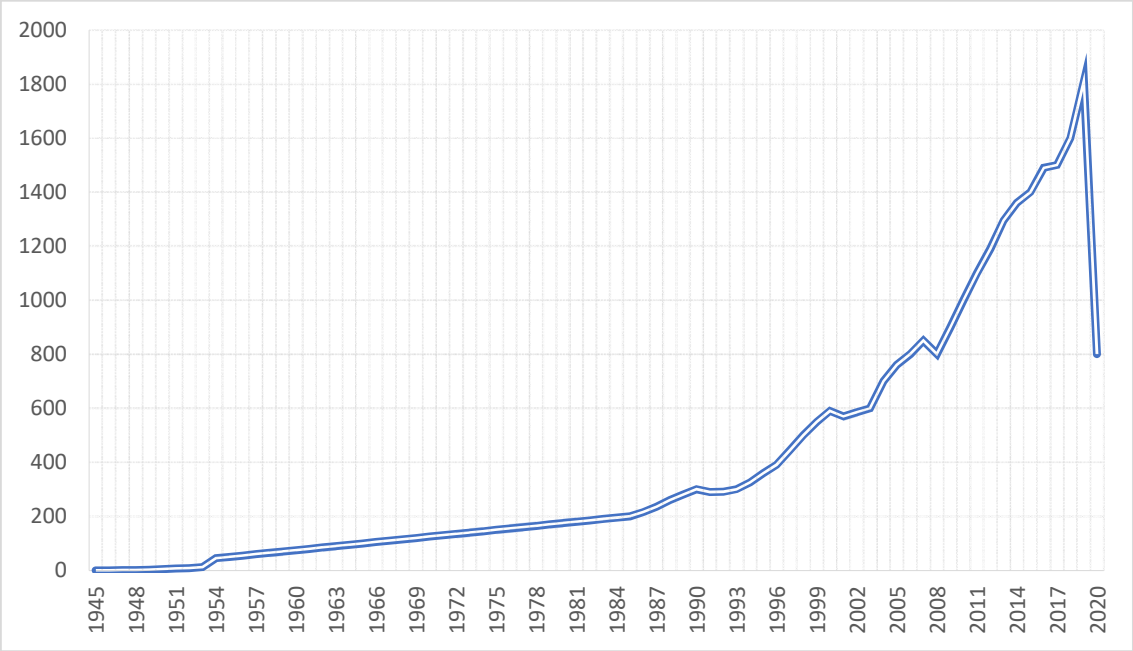

Fig.1: The international evolution of passenger traffic between 1945-2020

Source: interpretation according to the IATA 2020 report

Iit It may be noted that globally, since 1945 the number of passengers using air transport ervices has been steadily increasing, with few exceptions in the early 1970s, during the Oil Crisis, in the 1980s during the Iraq War. , in the 2000s after the September 11 attack and in 2020 due to COVID-19. From the decrease

in the number of passengers, the crisis at the beginning of 2020 is the most pronounced with a value between 33% and 74% compared to 2019. The losses suffered by airports reach approximately 76 billion USD, and most have been closed or are operating at a reduced volume. Experts also predict a sharp decline in tourism, as people will no longer travel and spend money on other destinations. 96% of world destinations with travel restrictions. Although freight transport has continued to operate, the volume of world trade in goods is expected to decrease by between 13 and 32% in 2020 compared to 2019.

Fig. 2 : Air traffic 2019

Source: IATA 2020 Report

Fig.3: Passenger traffic in 2019 and 2020

Source: IATA 2020 Report

Analyzing the two traffic structures comparatively, it shows its low level in the first quarter of 2020. Also, except for the decrease in traffic values, there is an intensification of races to Asian countries, large producers of goods in the field of hygiene and care.

Conclusions

The year 2020 is certainly described as a time marked by significant changes, starting from individual attitudes and reaching the changes brought to the global economy. The crisis caused by the slowdown in consumption has been difficult to anticipate, and it is hard to believe that the final moment is known. As in other industries, air transport services have suffered significant losses that can be clearly defined after the global economy recovers. It is expected that the traffic levels that air transport services reached in the first month of 2020 will be comparable to those of mid-2023.

It will be necessary to develop new strategies, meant to cover the new needs of the people, to maintain a level of social distance, reduced prices or various technical adaptations in order to reduce the risk of illness in airports and aircraft.

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Impact of Cashless Payments on Legalization of Tax Base of Personal Income Tax in Russia

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Abstract

The impact of digital financial instruments on the legalization of illicit financial flows has remained under-investigated so far, which makes this study relevant. The study aims to analyze the impact of the level of cashless payments on the legalization of the tax base for personal income tax in Russia. The study proceeds from a hypothesis that an increase in cashless payments should have a positive impact on the legalization of the tax base for personal income tax. Possible causes of the increase in personal income tax payments were verified. An analysis of statistics showed that wages (including shadow wages) grew insignificantly between 2014 and 2018, so this factor could not have the determining role. The authors supposed that the main trigger of higher tax payments was the shrinking of unreported pay. Further analysis confirmed a correlation between an increase in bank card transactions and a higher assessed amount of personal income tax. The key conclusion of the study is that the legalization of the tax base for personal income tax happened as a result of greater transparency of financial flows thanks to the spread of cashless payments and the adoption of online cash registers.

Keywords: Shadow Economy, Digitalization; Payment Card, Legalization of Tax Base.

Introduction

The shadow economy has been the subject of numerous studies. Economic activities that develop outside the state's control and accounting, and, therefore, are not registered by official statistics causes damage to the real economy. First and foremost, this shows in slower economic growth, lower state tax and non-tax revenues, a deterioration of living standards, growing crime rates. A growing shadow economy affects not only the state of economy but also the social situation.

Today, as digital technology is penetrating economic processes, an opportunity appears to study the impact of digitalization on the level of the shadow economy. Unreported economic activity poses a threat to economic security and has a destructive effect. The impact of digital financial instruments on the legalization of illicit financial flows has not been properly investigated, which makes this study relevant and timely.

The study aims to analyze the impact of the level of cashless payments on the legalization of the tax base for personal income tax in Russia.

The hypothesis of the study is that an increase in cashless payments should have a positive impact on the legalization of the tax base for personal income tax.

The findings should help reduce the level of information uncertainty as to the impact of digital financial instruments on the legalization of tax bases and the state of the shadow economy.

Literature Review

The majority of the reviewed studies focus on the causes behind tax avoidance, methods of measuring the informal economy, the implications of illicit schemes, and impact models for various factors.

For example, F. Schneider and D. Enste (2000) look at the theoretical framework of the problem. Their study describes the causes and implications of the spread of the informal sector, assess its size, and gives a definition of shadow economy.

M. Allingham and A. Sandmo (1972) designed a classical model for assessing the impact of various factors on tax evasion. Among such factors are the likelihood of a tax audit, the size of the penalty, tax rates, the tax payer's income. M. Spicer (1974) designed a behavioral model of tax evasion that considers the influence of several non-economic factors on taxpayers' propensity to evade tax and the impact of penalties on evasion.

Using various methods, researchers assess the volume of the shadow economy in various countries. L. Medina and F. Schneider (2018) present the data on the size of the shadow economy in 158 countries between 1991 and 2015. The authors also explore the causes determining the shadow economy.

R. Goel and M. Nelson (2016) found that the bureaucratic complexity of taxation has a major impact on the size of the shadow economy.

G. Yaniv (2019) studies businesses that generating cash for envelope wages. Among such businesses he investigated so-called cash-intensive businesses (that receive a large portion of its receipts in cash).

A. Kireenko et al. (2019) discovered sector-specific characteristics of tax crime in Russia and showed that fiscal crime is more pronounced in lower-paying industries. These authors (Kireenko A. et al., 2018) also estimate that the level of unconditional voluntary tax compliance varied between 25 and 35%.

Scholars see two development trends in the accelerated digitalization of the economy. On the one hand, digital financial instruments considerably curtail the potential of the unobserved economy to spread further. Such instruments help make transactions more transparent and controllable, thus mitigating the likelihood of the adoption of illicit schemes. On the other hand, scholars look at the digital space as an area of illicit activity. R. Remeikiene et al. (2018) gave a definition of digital shadow economy. As a result of their study, the authors concluded that the digital shadow economy is an unlawful activity that is carried out online in breach of existing legal norms with a pursuit of illegal mutual interest and material benefits. R. Remeikiene and L. Gaspareniene (2016) also drew up the characteristics of entities engaged in the digital shadow economy. In collaboration with V. Navickas (Gaspareniene L. et al., 2016), they described consumers' attitude to that phenomenon.

Some experience has been gained of shadow economy studies, including the design of methods for assessing the size of the shadow sector, causes behind its appearance, as well as the implications of its impact on the real economy and identification of the determinants of the shadow economy. A theoretical framework was created for conducting research under the conditions of economy digitalization.

The problem of tax avoidance is being actively researched, along with the problem of the shadow economy's expansion. We have not found, though, any studies examining the positive impact of financial instrument adoption on the legalization of tax bases.

Methodological Framework

We analyzed assessed personal income tax reports by the Federal Tax Service[1]. The analysis covered data for the years 2014 to 2018. Assessed personal income tax includes income tax at the rates of 13, 30, 9, 35, 15%, as well as at other rates applied by tax agents.

We factored in the influence of income growth on the amount of assessed tax. Income was calculated as total annual wages, including unreported wages between 2014 and 2018. The data was retrieved from reports by the Federal State Statistics Service of the Russian Federation[2]. The impact of income growth on the amount of assessed tax was studied through comparison of the growth in the two indicators.

The volume of payment card transactions was estimated on the basis of data published by the Central Bank of the Russian Federation[3]. The analysis covered the period 2014 through 2018. The analysis of the ratio and growth in cash withdrawals and transfers for the purchase of goods or services in the total volume of transactions over the studied period was also performed on the basis of Central Bank data.

We compared the growth trends in assessed personal income tax and the volume of transactions to purchase goods and services in 2014-18. We also compared the growth in the amount of assessed personal income tax and the growth in payment card transactions in 2014-18.

Analysis of Results

Personal income tax serves as an indicator of trends in the size of the shadow sector as regards wages. This is why revenue from personal income tax can be viewed, with a good deal of reservation, as indicative of the shadow economy situation (Fig. 1).

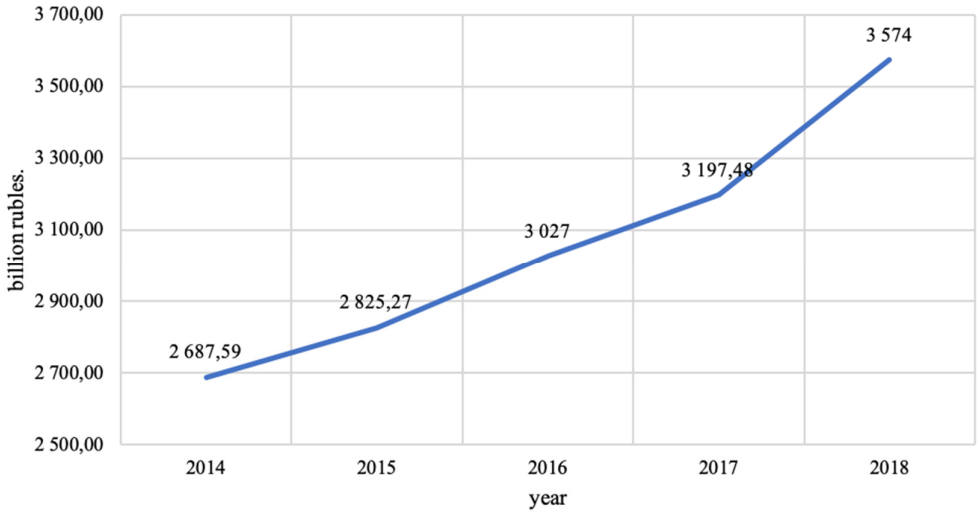

Fig. 1: Assessed personal income tax in 2014-18, billion rubles

The volume of assessed personal income tax grew by around 33% over the five-year period. The increase might be due to higher personal incomes as well as a larger share of reported wages.

Personal income growth can fully explain the increase in personal income tax revenues over the studied period. To examine the impact of changes in personal income on personal income tax revenues it is necessary to understand the ratio of the growth of personal income relative to the growth in the amount of assessed tax. If personal incomes grow slower than the amount of assessed tax, the increase in personal income tax revenue might be associated with the legalization of the tax base. This allows for a hypothesis that personal income tax revenue has been growing thanks to a bigger share of reported wages in the total amount of wages paid (Fig. 2).

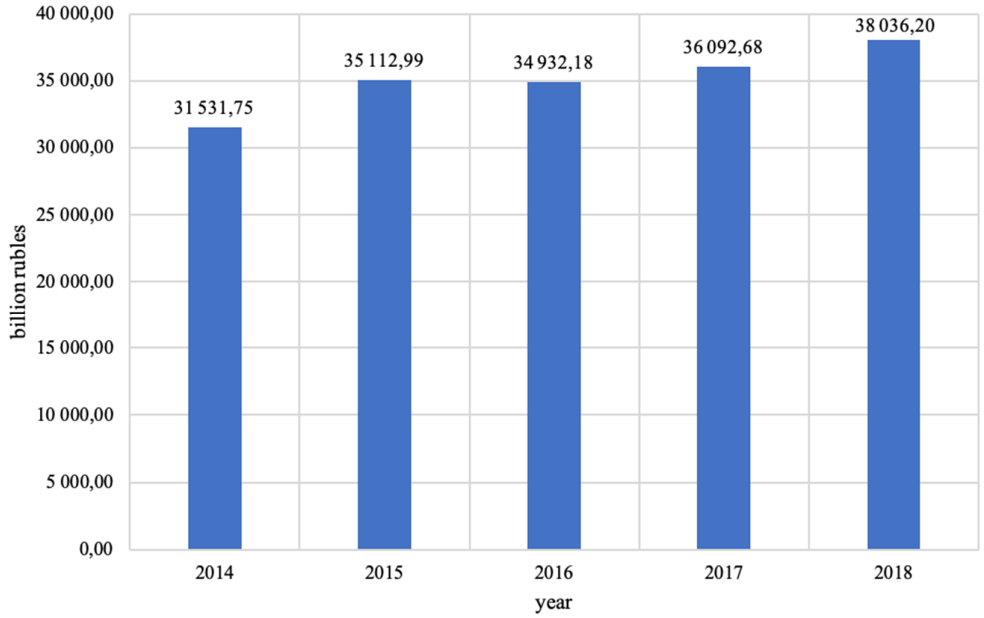

Fig. 2: Wages, including unreported wages in 2014-18, billion rubles

Aggregate personal incomes increased by 20% over the five-year period. The figure is 13% smaller than the growth of assessed personal income tax. Consequently, income growth is not the only factor of influence. At the same time, in 2016, personal incomes decreased by 0.5% year-on-year, while assessed personal income tax did not decrease. On the contrary, personal income tax revenues grew 7%. The accelerated growth in assessed personal income tax against the background of slower personal income growth enables one to suppose that the shadow economy might have shrunk in terms of wages.

Growth in cashless turnover could be one of the reasons for employers to start to pay wages on the books or to decrease the share of unreported wages in the total pay to employees (Fig. 3).

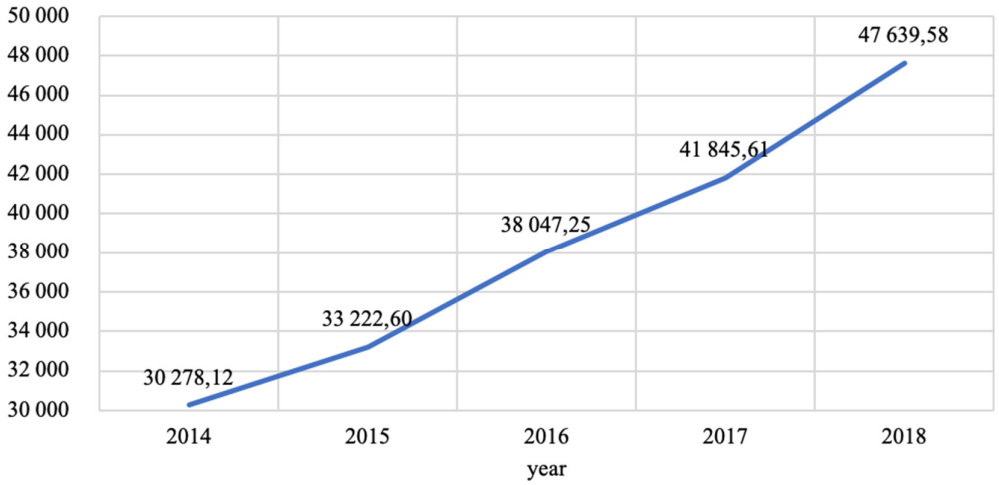

Fig. 3: Volume of payment card transactions in 2014-18, billion rubles

The curve clearly shows a trend towards cashless payments. The growth in such transactions exceeded 57% over the studied period. It has to be observed that the type of cashless transactions must be

analyzed to understand a relationship between cashless transactions and the legalization of the tax base for personal income tax.

Transactions through payment systems are divided into cash withdrawals and payments for goods and services (Fig. 4).

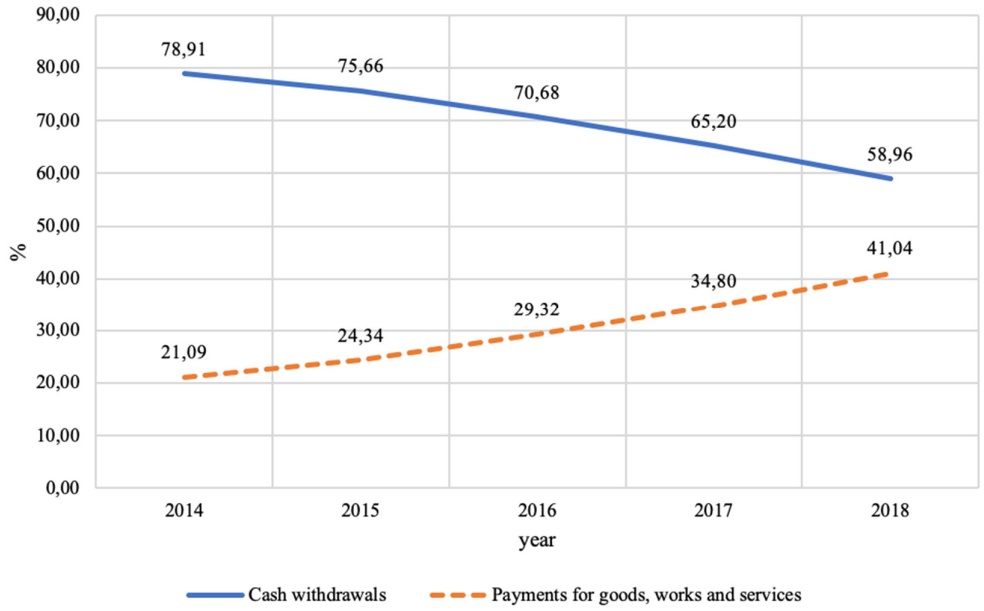

Fig. 4: Shares of payment card transactions in 2014-18, %

In 2014, cash withdrawals made up almost 79% of all transactions, whereas in 2018 the share of such transactions decreased to 59%. There is also an obvious trend towards cashless payments.

We shall compare the growth in assessed personal income tax value with the changing volume of payment card transactions. There is an upward trend in both cases (Table 1).

Table: Changes in volume of payment card transactions and assessed personal income tax in 2014-18, %

Indicator	Relative deviation, %			
	2015 against 2014	2016 against 2015	2017 against 2016	2018 against 2017
Payment card transactions	109,72	114,52	109,98	113,85
Assessed personal income tax	105,12	107,15	105,62	111,77

It is possible to conclude that there is a correlation between the two indicators. On the one hand, an increase in cashless payments has an impact on the shrinking of the shadow sector in terms of wages. On the other hand, a higher share of wages paid on the books results in a bigger volume of payment card payments because officially paid wages are usually transferred to workers' bank cards. Consequently, when the volume of cashless payments for goods, works and services grows,

organizations are left with less money that can potentially be converted into cash. Funds are credited to a current account. They become visible to oversight authorities. A reduction in cash leaves the company with fewer options for withdrawing money to pay underreported wages. When cash is used, it is practically impossible to trace cash flows, while current account transactions and bank card transactions are recorded in files that oversight officers can access.

The mandatory use of online cash registers is a limiting factor for organizations and private entrepreneurs. Online registration of all transaction with the tax authorities together with a transition to cashless payments considerably limits the options for off-book sales. When an online cash register is used for recording payment for goods, works or services, it is impossible not to issue a receipt. When there is little cash on hand, cash withdrawal schemes have to be used in order to pay "envelope" wages to employees. Private entrepreneurs thus remove funds from official money turnover while legal entities use flight-by-night firms or affiliated private entrepreneurs to withdraw cash. In such a case, illicit schemes become a regular occurrence. When all transactions are recorded in bank statements and other documents, the likelihood of being penalized grows, encouraging companies to abandon the practice of paying unreported wages.

Conclusion

The hypothesis that an increase in cashless payments should have a positive impact on the legalization of the tax base for personal income tax in Russia has been confirmed.

The reduction of the shadow sector as regards wages and the legalization of the tax base have been identified as a factor of growth for assessed personal income tax has been identified. Statistical data confirm a trend towards a preference for cashless payment for goods and services over cash withdrawal. A correlation has been detected between payment card growth and an increase in the value of assessed personal income tax.

The key conclusion of the study is that the legalization of the tax base for personal income tax has been the result of greater transparency of financial flows thanks to the spread of cashless payments and the adoption of online cash registers. These processes make it more likely that tax officers will reveal illicit schemes thanks to comprehensive transaction reporting.

Acknowledgements

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[1] URL: https://www.nalog.ru/rn77/related_activities/statistics_and_analytics/forms/
[2] URL: https://gks.ru/folder/13397
[3] URL: https://cbr.ru/statistics/nps/psrf/

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The Buying Process on Hospitality Services and Its Implication to Loyalty Behaviour

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Abstract

This research aims to explore hotel brand loyalty by analysing what are the main factors that lead to it and explain the individual's reasons that lead guest decision towards a specific hotel service since operational knowledge indicates that new consumption trends as well as new market segments in tourism have specific consumption behaviours and arises with the evolution of the industry. The main goal of this paper is to provide relevant information to improve hotel marketing strategies and keep the knowledge on consumer habits updated because their motivations and actions will determine and influence the ability of hotels to adapt to new consumption realities. In this context, this research focus on service hotel marketing, quality of service and hotel brand loyalty and allowed the implementation of applied consumer research in scientific methodology, using questionnaires filled out by consumers who made hotel reservations. The authors applied a statistical inferential test, a binary logistic regression model, looking up to understand if customer loyalty behaviour may be explained by our predicted and studied variables, specially emotional and rational factors, the knowledge of guests' preferences and habits, employees' performance and the existence of a loyalty programme.

This research allowed to conclude that there are five main dimensions that influence loyalty behaviour: knowledge of guests' habits and preferences, contact with hotel employees, existence of a loyalty programme, room rate and rational factors, which is an important information to improve hotel marketing strategies as hotel industry becomes more competitive each year.

Keywords: hotel consumer behaviour; hotel management; brand-consumer relationship; brand loyalty; hotel consumption cycle.

Introduction

The most challenging thing when dealing with tourism and the hospitality economy is trying to measure up to the guests' expectations as global demand inspires diversification of supply, expanding into new types of accommodation from luxury resorts to simple apartments or local accommodation. The number of people traveling is increasing, with a variety of motivations ranging from leisure, culture, work, health, family, etc. The movement of people has become easier over the years considering that online information allows us to easily desire any product/service (Pickett & Pritchard, 2015). Another

decisive factor was the globalization of business that boosted the growth of business tourism and incentives, currently known as MI (Meeting Industry).

In recent years, the curiosity of researchers strengthened the relationship between the consumer and the brands, as the daily goal of hotels is to reduce the number of customer defections, allowing the relationship to perpetuate in time, an element that is believed to be essential for brand loyalty (Cohen, Moital & Prayag, 2014). Hospitality organizations that work on customer retention often find it to be a more solid process because they are marketing to customers who already have expressed an interest or experience in their service, facilitating the engagement with the brand and making it easier to capitalize on their experiences with the company. In fact, it is considered that retention is a more sustainable business model that is a key to sustainable growth.

Background and Literature Review

The starting point to investigate hotel buying decision cycle starts with the analysis of the companies as service companies and, therefore, understanding that the tourist/client is an integral part of the service provided, influencing it and being influenced by it, which will automatically affect the quality of that same service. Since the economic success of these hotel companies depends on the above relationship, providing excellence in customer service should be the mission of the entire hotel organization, including its top managers (Hudson & Hudson, 2013). In the past few years, as travelling develops and, consequently, hotels supply increases, a growing number of empirical investigations have shown that satisfaction and repeated business are influenced by consumers' emotional experiences and if it implies a change for a "better emotional state" of the customer – he proceeds from indifference and instability to satisfaction and trust – the provision of service is enhanced and, therefore, an increase in customers' perception of value (Back, Barret & Han, 2008).

Thus, building "intimate" relationships is currently considered as a very profitable and compensatory customer loyalty strategy, regarding the costs that personalization of the service requires to set our brand in the guest mind as a reference in quality of service, measured by the difference between service performance and customers' expectation.

Udofia's research (2019) suggests different scientific research methodologies that include several variables to evaluate and measure quality of service and customer satisfaction. Based on this investigation model and objective, the authors oriented their vision to that variables that match their operational understanding.

Hotel Consumer Behaviour

Nowadays, the client, has numerous tools to check the arguments of the companies in their promotion and to look for alternatives that suit their desires, besides being better informed than ever. The analysis of buying decision process is, thereby, truly important to determine buying behaviour as the first step to understand what's their deep motivation and behavioural triggers that encourage the potential customer to became hotels' next guest. Besides, this attentive and critical thinking allows marketeers to redesign their strategies and by improving their knowledge of the segment they pursuit and guest service.

The purchase decision may go over the service that is able to create positive expectations on the costumer, standing out as a reliable proposal to meet their needs. So, the hotel must present itself as a captivating experience so that the customer realizes our difference to the competitor (Bai & Yoo, 2013; Cohen, Moital & Prayag, 2014).

The literature review indicates that there are three sets of key factors influencing consumer behaviour: cultural, social, and personal factors (Bowen, Kotler & Makens, 2010). In the hospitality industry, due to its variety of reasons that feeds their motivations locations, we describe a global market influenced by several cultural, social and economic factors which include different and correlated processes preventing a individual analysis. So, a complementary approach for hotel behavioural study allows

researchers to build an better understanding, improving sharp and wise business strategies, identifying the internal force that leads to desire and buy and all the mechanism that sustains it – motivation. This theory reinforces that there is no formal categorization of the factors that motivate the tourist to consume and tourist motivations: it results from the combination of several factors and may differ between market segments (Udofia, 2019).

Throughout the process of personality formation, the child absorbs certain values and preferences of his family that will influence his options, including in terms consumption. Regarding to social factors, the authors explain that consumer behaviour can be influenced directly by their reference groups, family and social and professional roles, whether their administer a direct or indirect influence (depending on the intensity and frequency of interaction). Consumer decisions can still be influenced by their personal characteristics, such as age, stage in the life cycle, economic availability, lifestyle, etc. Thereby, consumer needs are at the basis of the marketing work dwelling on the fact that companies do not create needs, only on a few occasions they seek to awaken unnoticed needs and desires in the consumer (Manhas & Tukamushaba, 2015).

Customer Loyalty to the Hotel Brand

When analysing the relationship between brand and consumer loyalty, it is possible to conclude that hotel consumer experience shapes the brand image through associations that are later activated by rational (eg. price) or emotional factors (employees and other symbolic reasons), motivating them to their consumption decisions and influencing brand loyalty. These feelings directly influence customer respect to your brand and drive customer loyalty behaviours (Crosby & Johnson, 2007).

An hotel visit become an experience loaded with expectations when a costumer decide to invest in a company to enjoy a period of quality time. Traditionally, one of the best hotel quality indicator and service variety is the stars classification and rates as a standard reference. However, this system has been losing ground and influence as modern tourists rather trust in on-line opinions based on previous experiences (Buhalis, Law, Leung & van Hoof, 2013). Perception, consumer's feelings and their experience with the brand is something that differentiate it as well as selling quality service and maintaining high price will increase its reputation from a company and also increase brand loyalty (Djati & Rumambi, 2007).

Finally, the literature suggests that loyalty to the brand will be related to the degree of consumer involvement and as satisfaction with the service and its buy-back increases, research on alternatives is reduced, that is, positive and negative emotions have positive and negative effects on consumer satisfaction as well as on their intention to repurchase (Cohen, Moital & Prayag; Grisaffe & Nguyen, 2011; King, So & Sparks, 2013).

Factors That Lead to Hotel Brand

A strong brand may become the most important intangible asset for the company and an important barrier to the entry of new competitors into the market (Manhas & Tukamushaba, 2015). These authors state that perceived service quality directly determines the perception of brand image and service experience is important in establishing performance of different organizations, however, subliminal factors have not been clearly delineated in the existing literature and this study aims to fill this gap.

In Hotel management, there is a direct relationship between marketing strategies and operations. If on one hand marketing reaches the consumer and promises to meet their needs, the operation must be prepared to exceed that promise, otherwise the brand image and consumer perception will be negatively affected. Thus, the strength of a hotel brand lies in the positive image of the customer in relation to their quality of service and facilities, so that it is perceived in the market as "more" than competition, providing customer satisfaction and leading to loyalty behaviour (Crosby & Johnson, 2007; Djati & Rumambi, 2007).

The role of the hotel employee is so loaded with expectations: the promise given by the hotel that the moment that will be with us will be perfect, being committed to provoke unique experiences confirming that your choice was the best (Lee & Ok, 2012). The prestige of the brand is factor of perceived quality and is related to social status, wealth or power because it represents products/services consumed infrequently and that fulfil the need for social fulfilment, influencing the decision to buy the consumer (Grisaffe & Nguyen, 2011; Kim & Yu, 2010).

In order to understand hotel experience, an investigation was developed to identify the factors that guests consider as the most important. Results identify two groups that marketing strategies should focus on (Manhas & Tukamushaba, 2015): *concentrate here* – the first impression, helpful and friendly staff, quality of restaurant food, hotel experience matters in choosing the particular hotel, dealing with complaints-, as extremely important for guests in hotel performance; *keep up the good work* – prompt room service, the room comfort, the quality of service, the value for money of the hotel, value for money of the room service, the overall quality of food, the overall quality of beverages -, as attributes that contributes to a comfortable hotel experience.

In their study, Bai & Yoo (2013), categorized the factors that may allow hospitality companies to influence their consumer loyalty in two groups: internal factors and external factors. Internal factors are described as the set of factors that affect the company in its operation, customer service and the ability to create strategies to reach consumer: product/service (brand), quality of service, marketing mix and costs. External factors are presented as external conditions to the organization and are related to the way that consumers recognize the brand toward competition: the costs that the consumer incurs when changing brands, situational factors, perceived value, satisfaction, commitment and brand trust.

Internal Marketing and Quality of Service

There is never a strong and successful brand without having, on the one hand, a loyal and satisfied customer who is respected and, on the other hand, an employee who believes in the brand and who is motivated to provide the service. Although technological innovation has brought transformations for companies, the human element continues to be a cornerstone (Hwang, Lee & Ok, 2016; Manhas & Tukamushaba, 2015).

The strategic importance of hotel employee lies in the fact that it plays the leading role in consumer-oriented experiences, suggesting special attention from the management to these resources because of the commercial and communication results (WOM or e-WOM) that they can generate, which means that employees with high personal qualities are an important asset for the company and for its profitability (Ginsburg et al., 2014; Lee & Ok, 2012). Hotel staff performance concerns to the ability of hotel employees deliver the expected service and it is indicated that in a long-term service (during a long period of time), the emotional characteristics of the staff gain importance to the guest, having a more intense impact on him (Lee & OK, 2012).

The nature of hotel service may be described and characterized by the intense interaction between hotel staff and guests. Hotel experiences are dynamic and complex systems providing services where they interact with each other in different ways and, thereby, this interaction should be a source of positive and comfortable experiences, pursuing high levels of customer satisfaction. A study by McKinsey and Company shows that a positive experience with our staff results in an 85% likelihood of the customer repurchasing the product or service, while 70% of customers have reduced their intention to buy when displeased with the service (Beaujean, Davidson & Madge, 2006).

Methodology

In the previous section, the conceptual framework for the research was discussed.

The main purpose of this study was to investigate what leads to customer satisfaction and what are the factors that relate to and influence hotel guests' loyalty, focusing on emotional and rational factors. Thus, it becomes necessary to evaluate a selection of variables that

influence customer loyalty in hotel industry as well as other dimensions referred to in the previous section, allowing the authors to continue the work started by Campos & Oliveira (2018).

Based on a standardized methodology, a single questionnaire survey instrument was used as the data gathering technique for this investigation. The questionnaire was tested before publishing.

In this quantitative research, the authors have collected data using a questionnaire survey applied to Portuguese tourists, from August to October 2017, obtaining a total of 302 questionnaires.

It is considered pertinent to use a survey with a selection of closed-ended questions, including different types of questions: dichotomous questions, multiple-choice questions and scaled questions since it may be appropriate when we seek to know the ways of life of the population, their behaviours, opinions and even their attitude towards subjects, emphasizing the descriptive type of the investigation (Mason, 2014).

The questionnaire was divided into three sections. Section one was designed to obtain data relating to individual profile. Section two, sought establish buying decision choices and determine the intensity of the two sets of factors: emotional and rational. section three of the survey intended to identify aspects of the guest preferences using a 4-point Likert item with categories 1 = "totally disagree" to 4 = "strongly agree".

About the sampling method, once authors are not able to access an hotel guests' data base due to ethical questions, an exponential non-discriminative snowball sampling was used. Snowball sampling is the most popular in business studies focusing on a specific company that involve primary data collection (Dudovskiy, 2018).

Collected data were analysed by using SPSS software version 25. This software allows for timely and effective computation of statistical analysis.

To achieve the goal for this investigation, statistical tools were employed in the analysis, namely binary logistic regression and descriptive analysis were used along with testing reliability and validity. Throughout the analysis, a significance level of 5% will be assumed for making decisions about the validation of the research hypotheses. For the calculation of the final sample, account was taken of the non-violation of the assumptions for the application of a multivariate analysis. Thus, a final sampling error of 5.6% was assumed for a 95% confidence level.

To assess and analyse the factors that influence hotel loyalty, a binary logistic regression function was used. We dichotomized the response variable hotel loyalty taking account of the ordering by using cumulative probabilities. In using binary regression, hotel loyalty was used as a dependent variable based on "yes/no" answer to a questionnaire survey. After the analysis of the state of art, hotel loyalty was regressed against a set of independent variables to determine which factors explains guests' behaviour: knowing the guest profile (as his preferences and habits), existence of a loyalty programme, rational factors, emotional factors, contact with hotel employees, price, reservation channel, hotel awards, gender, marital status and travel motivation. The statistics of the output include the odds ratio, z-score and p-value (the significance level of reference for this test was $\alpha = 0.05$).

Results

First, some descriptive statistics are presented regarding the characteristics of the sampling and the independent variables (Table 1).

The sample of this research includes 69.4% female and 30.6% male respondents, an average age close to 35 years (34.66 years, SD = 10.8) and the majority of the respondents were single (57.1%) or married (33.3 %). In terms of travelling habits, the survey respondents travel on average about 3.61 times a year during 6.17 days (SD = 3.52). The majority of the individuals (89.9%) has "Recreation and

holidays" as their main motivation for the trip and when the consumer decides to travel, the first decision he makes is clearly related to the destination which accounts for 71.9% of the answers.

In relation to information to help the consumer to decide, 55.9% of individuals search the hotel's website for information about facilities and services, 41.9% examine online opinions, 40.4% check in social media, 29% ask family and friends for advice, 27.9% follows travel bloggers, 17.6% ask the travel agent for advice and 6.3% trust newspapers and magazines as a source of information.

Regarding the way the reservation is made, we can confirm the tendency to use the internet: 53.3% of the respondents reserves using online travel agencies, 33.4% of the respondents book directly with the hotel unit and 13.2% hire a travel agency.

Table 1: Descriptive Statistics for Independent Variables used in the Logit Model.

	Knowledge of guests' habits and preferences	Existence of a loyalty programme	Emotional Factors	Rational Factors	Contact with hotel employees	Room Rate	Hotel Awards
Mean	2.37	0.01	1.7483	2.8079	2.85	2.73	2.40
Std. Deviation	1.097	0.115	1.2239	1.6086	0.871	0.861	0.941

Source: Own elaboration based on SPSS output

On a descriptive analysis, accordingly to our sample, the respondents based their decision on 1.75 emotional factors (SD = 1.22) and 2.81 rational factors (SD = 1.61), on average and just a really small part of the respondents belongs to a hotel loyalty programme.

The remaining variables were measured using a Likert scale (using a 4-point Likert item with categories 1 = "totally disagree" to 4 = "strongly agree"):

- Knowledge of guests' habits and preferences with a mean on 2.37 indicates that, on average, our sample did not based its decision on that factor;
- Contact with hotel employees reports a mean on 2.85 which means that our sample agrees that this is important to decide on a hotel service;
- On average, our sample disagrees that the room rate is one of the most important factors to decide;
- Hotel awards presenting a mean on 2.4 indicates that this is not a key element that influences their decision.

Logistic Regression Analysis

The logistic regression model was applied to establish the relationships and examine the significant influence of knowledge of guests' habits and preferences, existence of a loyalty programme, emotional factors, rational factors, contact with hotel employees, room rate, reservation channel, travel motivation, hotel awards, gender and marital status on hotel loyalty of the guest.

Some sociodemographic variables were included as independent variables in the model, because it was assumed that the sociodemographic variables of the questionnaire could directly or indirectly influence the hotel loyalty of the customers.

In this model, there are 11 independent variables and the probability of these variables are examined. These probability values are the values of the Wald test to determine whether the parameters are meaningful. The reference category of the qualitative variables was made according to the interpretations determined as the first category.

First of all, we may realize if this Regression Model fits this investigation data. To test the significance of the model adjustment we use the Omnibus Testes of Model Coefficients.

The model is considered a good predictor of "hotel loyalty" as indicated by the Omnibus Tests of Model Coefficients ($\chi^2_{(15)} = 47.889$; $p < 0.001$) and the Hosmer and Lemeshow Test ($\chi^2_{(8)} = 4.769$; $p = 0.782$).

Considering the Omnibus Tests of Model Coefficient, it is possible to conclude that there is at least one independent variable in this model which can predict "hotel loyalty behaviour" and allows to reject the null hypothesis that all of the coefficients are null.

The significance of the adjustment Test of Hosmer & Lameshow admit the authors to verify that the estimated model has an acceptable adjustment quality once the null hypothesis of the model is not rejected. This relation may be confirmed by percentage of the classification capacity of the model which describes that the model classifies 78.2% of the cases correctly.

Since the preconditions to analyse the significance are valid, it is possible to apply our Regression Model which enables to obtain the results presented in Table 2.

Table 2: Binary Logistic Regression of Determinants of "Hotel Loyalty"

Independent variables	B	S.E.	Wald	Df	Sig.	Exp(B)
Knowledge of the guests' habits and preferences	0.512	0.141	13.103	1	0.000	1.669
Existence of a loyalty programme	2.813	1.262	4.965	1	0.026	16.652
Emotional Factors	0.109	0.133	0.677	1	0.411	1.115
Rational Factors	-0.304	0.099	9.384	1	0.002	0.738
Contact with Hotel Employees	0.329	0.188	3.083	1	0.079	1.390
Room Rate	-0.335	0.171	3.832	1	0.050	0.716
Reservation Channel			0.194	2	0.908	
OnLine Travel Agency(1)	-0.137	0.312	0.192	1	0.661	0.872
Travel Agency(2)	-0.098	0.464	0.044	1	0.833	0.907
Gender(1)	-0.211	0.301	0.490	1	0.484	0.810
Marital Status			1.097	3	0.778	
Single(1)	0.205	0.320	0.409	1	0.522	1.227
Married(2)	-0.327	0.504	0.421	1	0.516	0.721
Divorced(3)	-20.423	40192.970	0.000	1	1.000	0.000
Travel Motivation			2.737	2	0.254	
Work/Business(1)	0.067	0.852	0.006	1	0.938	1.069
Leisure/Holidays(2)	-0.656	0.715	0.842	1	0.359	0.519
Hotel Awards	-0.157	0.163	0.925	1	0.336	0.855

Source: Own elaboration based on SPSS output

Results of logistic regression analysis have shown that emotional factors, gender, marital status, reservation channel, travel motivation and hotel awards no statistical significant influence (logistic p-value > 0.05) exists on "hotel loyalty".

On the other hand, the knowledge of hotel guests' habits, hotel loyalty programme, rational factors, previous experiences with hotel employees and room rate statistically explain our dependent variable hotel loyalty (considering a significance level of 5%).

As it was indicated before, the model predicted 74.8% of the hotel loyalty behaviour. However, only four out of the eleven predictor variables were significant in predicting hotel loyalty behaviour at the level of 5% and one at the level of 10%.

This data indicate several interesting conclusions:

- The probability to become loyal to an hotel brand increases 67% if the hotel get to know the preferences and the habits that satisfies its guests;
- The odds of an existence of a loyalty programme encourages a guest to become loyal is approximately 16:1 (1565%);
- Regarding rational factors, the odds decrease 26.2% of bringing a new repeated guest to the hotel;
- The probability of conquering a new loyal guest improves 39% if he/she had already experienced pleasant moments with hotel employees' or had positive recommendations about the staff of the hotel unit.
- An hotel guest becomes 28.4% less likely to a loyal behaviour facing a price increase.

Focusing on rational/emotional factors, it is possible to conclude that the more rational becomes the decision, the less likely it is to the guest become loyal to the hotel. Analysing Figure 1, this information is corroborated once it is possible to identify that loyal guests count rational factors in a significantly inferior way.

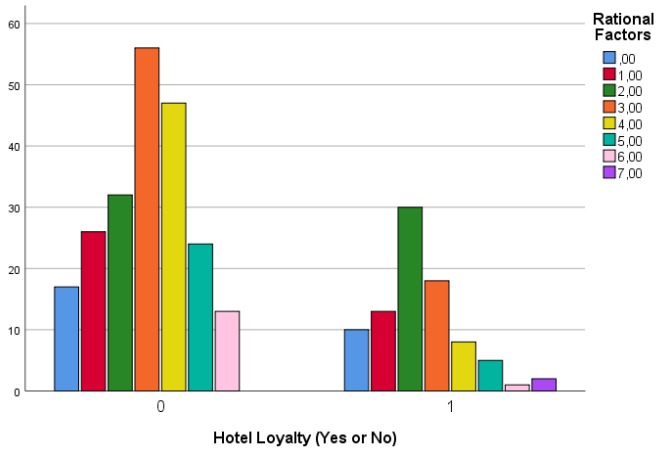

Figure 1: Clustered bar chart - Hotel loyalty and Rational Factors

Conclusions

The aim of this paper was to understand what are the different factors that lead Portuguese customers to hotel loyalty based on an investigation built and developed on a descriptive and inferential study: a questionnaire was developed based on the information gathered in the literature review.

Results of the empirical study indicated that there was a five variables that, accordingly to our sample, influence hotel loyalty: knowledge of guests' habits and preferences, contact with hotel employees, existence of a loyalty programme, room rate and rational factors.

Based on literature review, it was said that by consistently delivering a quality of service against those brand expectations at every touch point, you can provide the reinforcement necessary to inspire repeat purchasing decisions and other loyalty behaviours. Besides, and as this research have indicated, individual's expectations also depends on customer's previous experiences in the hotel, based on satisfactory memories of the that period of time once it is possible to find a match between customers interest, profile and preferences and the hotel service. (Crosby & Johnson, 2007; Ariffin & Maghzi, 2012).

This research conclusion on influence of rational/emotional factors, led directly to what was suggested by literature review (and to what it was empirically expected) because it was indicated that the impact of emotional factors on loyalty supplants rational factors at a ratio of about 5 to 3, and surprisingly, this victory of emotional factors is felt in both B2C and B2B markets, suggesting that business operation should be oriented to the consumer experience. In the hotel case, this study indicates that its intangible characteristics are the factors that most affect the emotions of the guests: smile, non-verbal language, facial expression and recognition, tone of voice (Crosby & Johnson, 2007).

This may happen because the intangibility is associated with a greater risk in the purchase of an hotel service. Thus, building a strong brand on the market can become a facilitator of economic profitability by simplifying the consumer decision-making process by providing guarantees of good service.

Hotel operations try to meet guest satisfaction by finding out his expectation, needs and interests but, due to the easiness of information access and other people's opinion, requires an individualized service, special and appropriate to their profile and desires. Besides, it is interesting to understand if future guest decision result from rational or emotional way because, on account of the high competition, the hotel service should trend to engage the customer in an emotional way. Since a hotel service is defined by its intangibility, corporations must understand hotel experience in its whole cycle, since the decision of travelling until they leave the hotel, aiming for a repeated visit by tailoring their marketing strategy to their preferred segment (reflecting on experience, exclusivity, emotion and engagement), reaching the desired success and high customer satisfaction levels (Gustavo, 2013).

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Humanization of International Law As Seen in The Example of International Economic Law (Economic Legal Order)

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Abstract

Despite the fundamental influence and multidimensional impact of the phenomenon of humanization on international law, the concept of humanization of international law has not been subject to quantity-wise extended analysis by legal scholars and commentators. As much as T. Meron's findings addressing humanization of international law *explicite* have inspired a broad scholarly discourse in the literature, research focused on the impact of humanization on particular branches of international law remains overwhelmingly in minority. International economic law also called economic legal order is one of the branches which holds the status of the system of the law - international law. And although categories such as "law", "legal order" or "system of the law" do not have an equal scope of reference, linguistic distinctions between them do not have major significance in this study. However, they outline the background of reflections, in their assumptions devoted to the system of international law as such and international (including EU) economic law as the former's component. The discussed humanization of international law, in general terms revealing the impact of human rights on international law and thus outlining the area of research and bringing its scope onto international ground, is a specific binding link of these analyses. The essence of humanization of international law *per se* is a substantive justification of leaving out the subject-matter of internal law in this study.
Referring to the above, the adopted research methodology, proceeding from the general to the detail, with particular emphasis on the case study (international (including EU) economic law), orders one to assume that the main aim of this study is to demonstrate the influence (impact) of humanization of international law on the international economic order. The culmination of the research involves the formulation of the research hypothesis according to which humanization in the context of international economic law should be examined in two dimensions, as humanization of law and humanization in the law. Introduction of these categories is a *novum* in current research addressing this subject-matter and verification of the hypothesis outlines the scope of observations carried out on the basis of the analytical method and the method of interpretation of applicable law.

Keywords: International (EU) Economic Law, Economic Legal Order, Humanization of International Law, Human Rights

Introduction

Despite the fundamental influence and multidimensional impact of the phenomenon of humanization on international law, the concept of humanization of international law has not been subject to quantity-wise extended analysis by legal scholars and commentators. As much as T. Meron's study (Meron, 2006; and also earlier: Meron, 1989; Meron 2000) addressing humanization of international law *explicite* has inspired a broad scholarly discourse in the literature, research focused on the impact of humanization on particular branches of international law, for the needs of this study understood as such sets of legal norms which by being identified due to the subject of regulation govern a specific area of community life, remains overwhelmingly in minority. To simplify, branches of international law understood in such a way, in summary analogies of internal law branches, constitute basic elements of the system of international law, which *a priori* imposes on them a status of sub-regimes in the system of international law.

International economic law, also called economic legal order, is one of the many branches of international law (apart from the above-mentioned international humanitarian law) which without a doubt meets the above criteria. And although categories such as "law", "legal order" or "system of the law" do not have an equal scope of reference (Lang, 2008, p. 13; Wasilewski, 2004, p. 47; Gourgourinis, 2011, pp. 996-997), linguistic distinctions between them do not have major significance in this study. However, they outline the background of reflections, in their assumptions devoted to international law as such and international (including EU) economic law as the former's component. The discussed humanization of international law, in general terms revealing the impact of human rights on international law and thus outlining the area of research and bringing their scope onto international ground, is a specific binding link of these analyses. The essence of humanization of international law *per se* is a substantive justification of leaving out the subject-matter of internal law in this study.

Referring to the above, the adopted research methodology, proceeding from the general to the detail, with particular emphasis on the case study (international (including EU) economic law), orders one to assume that the main aim of this study is to demonstrate the influence (impact) of humanization of international law on international economic order, at the same time confirming or falsifying the research hypothesis according to which humanization in the context of international economic order should be examined in two dimensions, as humanization of law and humanization in the law. Introduction of these categories is a *novum* in current research addressing this subject-matter and verification of this hypothesis will outline the scope of further observations carried out on the basis of the analytical method and the method of interpretation of applicable law.

Humanization of international law and humanization in international law - semantic distinctions

As signalled above, the subject-matter of humanization of international law has been addressed on the one hand in the shadow of research on general international law (The Impact, 2009; Pronto, 2007, pp. 753-765) and on the role human rights play in it (examples here are provided by for instance general courses at the Hague Academy of international judges by B. Simma (Simma, 1993), T. Meron (Meron, 2006) or A.A. Cançado Trindade (Cançado Trindade, 2014, especially the chapter addressing The Humanization of International law, pp. 99-196; Cançado Trindade, 2013) and secondary publications of the same authors), on the other, due to the concept of fragmentation of international law or even its constitutionalization, i.a. on the forum of the International Law Commission (Report of the Study Group of the International Law Commission, 2006; Ajevski, 2014, pp. 87-98). Without going into an in-depth analysis, legal scholars and commentators have attempted to outline the function of human rights in the development of international law, which, by running in parallel to the sets of unrelated legal norms of the system of the law, leads to a change in the structure and nature of the current international legal order. In T. Meron's approach, it is norms and institutions concerning human rights that brought about a revolution in the system of international law, radiating onto other branches (Meron, 2006) and confirming that human rights law is part and parcel of the general law (Pronto, 2007, p. 764).

The review of ways of approaching humanization of international law done for the needs of this study reveals that the concept of humanization of this law is presented in the following semantic contexts, which - by way of ordering - may be approached *sensu largo* and *sensu stricto*.

In the first approach, humanization of international law to a smaller or greater degree in associated with constitutionalization of this law. However, it must be reserved at the outset already, that if constitutionalization of international law were to be identified only with the process aiming to adopt a constitution as an act of fundamental importance to a legal system (which from the international law perspective would have to entail attributing the Charter of the United Nations signed at San Francisco on 26 June 1945 (United Nations, 1945) the status of a constitution of an international community (The United Nations Charter, 2009), the humanization of international law would fit into the discussed approach faintly. The Charter, as is emphasized in the literature, in not a constitutional

primary source of the entire international law, neither is the entire international law subject to law-creating control of the United Nations (Doyle, 2009, p. 113). Moreover, international human rights law is based on other regulations than the said Charter of the United Nations. Pursuant to its provisions (specifying in Article 1 the purposes of the United Nations), even though the need to promote human rights and to encourage respect for these rights and for fundamental freedoms for all without distinction as to race, sex, language, or religion was expressed, this, undeniably significant, normative category was not elaborated on. It was done in a number of other documents adopted under the auspices of this or other international organizations.

The search for the meaning of the concept of humanization of international law, at the same time rejecting the above approach to perceiving constitutionalization of this law - as a process aiming to adopt a constitution in the formal meaning - implores reaching for the root of the word "constitution". This word, deriving from Latin *constituere*, in its verb form means "to arrange", "to order". Adopting this as a basis, constitutionalization of international law should be understood as an introduction (collection or ordering) of the rules of shaping of the system (rules shaping the system) within which various constitutional processes harmonize. Humanization of international law also fits within such a complex of phenomena which in J. Zajadło's approach are proof to certain constitutional processes of the international community (Zajadło, 2011, p. 12). It is enumerated along such processes as e.g. increase in the number of *ius cogens* norms and *erga omnes* obligations, hierarchy of international law or signing international agreements of the nature of a mini-constitution (Widłak, 2010, pp. 53-54). In this meaning, the theory of humanisation can be seen as contiguous or, to a certain extent, complementary to the other relevant 'big' theory, namely, the constitutionalisation of international law (Tzevelekos, 2013, pp. 62-63).

Speaking of rules shaping the system, presenting human rights within the framework of the concept of humanization of international law is particularly important. Human rights, being a source of unity of the international law system, affect this system in a shaping manner. On the one hand, classified as part of general international law, they confirm the systemicity of this law, on the other they reflect the role and significance of general principles of law (including the principle of respect for human rights), which by specification are applicable in individual branches of international law, strongly affecting these branches and combining them into a cohesive whole. In this approach, individual sub-systems of international law are, both substantively and formally-legally (systemically), immanently related to this law.

This last observation points to the second semantic context of humanization of international law suggested above - the *sensu stricto* context. Within this context humanization of international law is nothing more that radiation, impacting or transferring legal-human regulations to other branches of international law. For example, V.P. Tzevelekos sees humanization in this way, highlighting that "in the theory of the humanisation of international law, [one can observe] a narrative purporting to depict 'the law as it is', that is, to identify the ways positive international law is changing because of human rights, to capture the evolution that its humanisation has generated and, mainly, to illustrate the influence the latter has on the international legal order" (Tzevelekos, 2013, p. 63).

However, it is difficult to stop at a statement that the impact of human rights on other branches on international law occurring within one system of the law proceeds in a one-way fashion. The occurring noticeable feedback is described by M. Özkan Borsa who points out that international public law influences human rights and humanitarian law, but these two fields also have a reforming effect on public international law which even extends to its other subdisciplines (Özkan Borsa, p. 83-84). It is because it is impossible to separate within one system of the law the impact the legal norms it is composed of have both on one another and on the common part that is general international law.

Summing up the above findings it needs to be noted that the essence of humanization of international law cannot be understood by narrowing the concept of humanization of this law only to one of the indicated semantic contexts. Therefore, it may be proposed as a postulate that one should see in humanization, which in its essence is a process, state, phenomenon, on the one hand as such an impact of human rights on the system of international law which by shaping this system binds it into

a whole (humanization *sensu largo* - humanization of international law), on the other, as an impact which aims to introduce to individual branches of international law (that is specialized sets of legal norms) legal-human regulations (humanization *sensu stricto* - humanization in international law), taking into account the jurist nature of these branches.

Humanization of international law and humanization in international law versus international (including EU) economic law

Being a domain of the current international law, the specialization of this law occurring in parallel with a multifaceted development of international relations in specific areas of community life, has led to the shaping of international economic law as a branch of international law. This branch is characterized by a far-reaching specific nature (Menkes, 1988, pp. 21-23), translating into difficulties in defining the concept of international economic law. Leaving them out of the scope of these reflections, one needs to conclude that due to the criterion of norms' origin, the legal international economic order is composed of "all norms governing economic affairs as long as their basis is in the sources of law of an international nature, irrespective of between what entities they regulate relations" (Białocerkiewicz, 1987, p. 43). And even though the definition raises some controversies (for example one may encounter a thesis according to which international economic law includes norms regardless of their origin as long as they regulate international economic relations (Ziemblicki, 2014, p. 183), as seen in the example of international economic order the assumption that it is a person and his needs (i.a. those of an economic nature) that should be the subject of protection from an international legislator is emphasized in a particular way. It is because we are talking about a material legal order only in the context of international law, including also European law as law separated due to its regional scope of application of legal norms of the legal order. Remembering that the law of the European Union is the most universally cited exemplification of the latter, the EU economic law *in extenso* fits within the above definitional determinants.

Legal norms creating human rights are an immanent part of any legal order. Noticing currently the rank of economic rights (as second-generation rights), one does not depreciate in any way fundamental rights (forming first-generation human rights) to which economic rights are a specific supplementation with another dimension, i.e. a dimension that is translatable onto the human material existence within the so-called states' positive obligations. However, there is no doubt that both from the perspective of the system of international law and from the perspective of its individual components - branches of this law, human rights (including those of an economic nature) are a collection of legal norms that have a special meaning. It is because the dual character (proposed above) of perceiving humanization of international law is revealed in it, which allows looking through the lens of human rights not only at international law as such (humanization *sensu largo*), but also at individual branches of this law, including international economic law (humanization *sensu stricto*).

In the first of the outlined contexts, human rights forming part of general international law, are reflected in numerous legal international acts. Narrowing the enumeration down to those which directly include economic rights, without a doubt one can point to the International Covenant on Economic, Social and Cultural Rights signed at New York on 16 December 1966 (UN General Assembly, 1966). The catalogue of economic rights included in it covers i.a.: the right to work and the right to decent remuneration (Article 6 and 7 of the Covenant), the right to strike and to form trade unions (Article 8 of the Covenant) or the right to an adequate standard of living (Article 11 of the Covenant). And although the provisions of the Covenant, which forms part of the achievements of the United Nations, are not a *novum* in this scope, they are attributed a leading role in shaping the described category of human rights. Duplicating regulations already known to the international community from the European Convention for the Protection of Human Rights and Fundamental Freedoms signed under the auspices of the Council of Europe on 4 November 1950 (Council of Europe, 1950), the Covenant introduced the so-called sectoral protection according to individual categories of human rights.

In the light of the above, it can be noticed that contemporary international law does not stray away from human rights (including from economic rights) whose main beneficiary is a person - individual. Therefore, it does not surprise, as pointed out by T. Meron, that the humanization of public international law under the impact of human rights has shifted its focus above all from State-centered to individual-centered (Meron, 2006, introduction, p. 1). This shift towards an individual is even more expressly described by Z. Drnas de Clément who writes that "by centralizing the human being as a point of concern and calling for the humanization of international relationships, new international thinking gives relevance to the human being and the role of the individual in the fulfillment of international law principles" (Drnas de Clément, 2010, p. 407). This thought reflects fullest the essence of the process of humanization of international law, making the category of human rights not only a part of law common to all its branches, but also a binding link of the system of international law.

In the second approach to the context, it is worth noting the fact that apart from international economic law "using" general international law and human rights inscribed in its scope (in this meaning, these right of a general nature), primarily it is a branch of international law in which one can observe the phenomenon earlier called humanization in law. This phenomenon is revealed in a particular way in the context of the EU economic law. What is interesting, initially the European Communities and since 1992 also the European Union did not take up the legal-human subject-matter in their treaty provisions, adhering to a general statement that they are based in their functioning on respect for human rights, contributing to their protection. However, the development of this legal order, demonstrated even in signing at Lisbon on 13 December 2007 of the Treaty of Lisbon amending the Treaty on European Union and the Treaty establishing the European Community along with the annexed Charter of Fundamental Rights (O.J. C 306, 17.12.2007, p. 1–271) caused the subject-matter of human rights to permeate on the normative ground of the European Union. For example, in Article 16 of the Charter of Fundamental Rights the freedom to conduct a business was proclaimed and in Article 36 access to services of general economic interest was guaranteed. If additionally one were to take into account that "fundamental rights of citizens of the European Union were considered an integral part of general rules of community law, among which protection of privacy, ownership right, freedom of choice and performance of a profession, economic freedom are of particular importance" (Cieśliński, 2009, p. 16) then the fact that the EU economic law did not stop only at using the legal-human regulations forming part of general international law but by extending the catalogue of these rights they were adapted to its needs, has non-trivial importance for he research hypothesis formulated in the introduction. Then analysing, in the legal-human scope, the structure of the described legal order, one needs to conclude that it includes not only "general human rights", but also rights which through this order were shaped somehow for its own needs, at the same time reflecting the attribute (specific nature) of this order. The rights in question (like the right of access to services of general economic interest) are an expression of far-reaching specialization of the EU economic law.

Conclusion

The above findings allow a look at human rights as a source of unity of international law (Cohen, 2012, p. 382), at the same time giving rise to a conclusion that human rights have given an entirely new, human face to what has traditionally been a sovereignist legal order (Tzevelekos, 2013, p. 75). Without a doubt the above-mentioned "human face" of international law is a consequence of dually understood humanization of international law (humanization of law and humanization in the law), reflecting the order's legal and international development. It is enough to remind that initially the subject-matter of human rights was reserved only to national legislations. Thus transferring it (after World War II) onto an international ground cannot be left underestimated also on the ground of research, proving the unquestionable development of both the international law itself and its legal-human subject-matter under the rule of this law.

Looking at human rights dually as a component of general international law and as a component of individual branches of the system of international law (including the international economic law undertaken as a case study), it is possible to confirm the research hypothesis posed in the introduction

according to which humanization - in the context of this legal order - must be perceived as humanization of law and humanization in the law. On the one hand, human rights (including those of economic nature) shape the system of international law, combining it into a whole under general international law (humanization of international law). On the other, introducing to international (including EU) economic law legal-human regulations, taking into account the specific nature of this branch, proves its far-reaching specialization which is a manifestation of humanization in international law. Noticing this phenomenon is all the more essential since this specialization implicates further development of this branch, not on the general international law plane any more, but on the plane of multiplication of legal norms forming this branch.

The above fully implements the postulate of "human face" of international law, which, especially in the context of economic rights as international economic law, should protect a human-individual as a beneficiary of these rights and values created by the law. It is the individual juxtaposed with the institution of the state that is an entity protected less, whereas economic rights and their development under the international (including EU) economic law are a chance to compensate and level away the individual's weaker position.

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The Solution of Economic Quasi-Professional Problems by Means of Mathematical Modeling

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Abstract

Today, the Russian Federation needs qualified specialists who can quickly solve professional problems in different ways, find the optimal solution. Therefore, knowledge and skills in the field of mathematical modeling are demanded in the study of natural sciences, technology, economics and most other professional disciplines. As a result, a working hypothesis was put forward: the level of acquisition of knowledge and skills by students of the economic direction determined by the formed competences in the process of studying the discipline "Methods of optimal solutions" will be higher if these skills are formed in the process of solving economic quasi-professional problems by means of mathematical modeling. A large amount of heterogeneous information, uncertainty and ambiguity of mathematical modeling of economic processes, data variation are significant factors in attracting economic problems to research. They can be solved by means of various methods based on probability theory, mathematical statistics, elements of automation theory, as well as software tools for performing accuracy of calculations and automation of operations. One such approach is described in the article. Based on the pedagogical experiment carried out, conclusions can be formulated, stressing the validity of the proposed hypothesis and the possibility to use methods and means of linear programming in mathematical models of quasi-professional tasks. Knowledge of mathematical models contributes to a better understanding by students of the causes of different economic situations, as well as allows them to understand and compare emerging patterns and correctly predict the consequences of economic decisions in professional activity.

Keywords: Mathematical Modeling, Economics, Linear Programming Problem, Information Technologies.

Introduction

Today the graduates of the economic direction will be in demand on the labor market, if, when faced with solving real production problems, they have the ability to make a reasonable optimal solution, based on normative government and local documents and mathematical models of solving this problem.

The term "optimal solution" has a long history in the field of linear programming. It applies to different subject areas. In the modern comprehension, the optimal solution is called a solution based on objective analysis (knowledge, experience, experiments and calculations) and subjective understanding of the value and effectiveness of solutions (Prokhorov, Frolov, 2011).

The Relevance of Research

According to the State policy of the Russian Federation in the fild of improving higher education, one of the priorities of its development is to improve the quality of mathematical education in all areas of students' training.

Therefore, it is no accident that mathematical education is the most important component of the entire system of fundamental training of a graduate of higher education. Much research is devoted to studying the content of training of graduates of economic direction and methods of their professional competencies' formation. Nevertheless, the topic continues to be relevant for modern education, as a unified approach to the problem has not yet been developed. This problem is particularly relevant in the field of formation of ability to solve economic problems by means of mathematical modeling: what kind of technologies, methodologies, software tools are needed by the graduates, what professional competences, methods of their formation and assessment of the level of their development they should possess. The main reasons for this problem, on the one hand, are the sharp increase in the volume of knowledge both in the field of economics and in the computer environment, as well as the rapid change of technology and digitalization of business, and on the other hand, the system of higher education does not always have time to respond to the demands of society and employers.

The analysis of the ability to model economic systems in various organizations showed that the main problem is not insufficient knowledge of young professionals, but the lack of practical skills and experience in modeling economic and socio-economic processes in specific professional activities, transfer of theoretical provisions, methods of information processing to practice (Ural, 2020). Having sufficient knowledge within the professional cycle subjects, graduates are not always ready to solve difficult and extraordinary production problems, which require integration of knowledge and skills from different fields. Therefore, the quality training of students in higher education institutions requires significant improvement of training, especially within the disciplines of the mathematical and general natural science cycle, which allow to train specialists with a wide outlook, able to adapt to changes in technology.

The theoretical-methodological basis of the study was the works of domestic and foreign authors, such as D.L. Andrianov, A.I. Anchishkin, K.A. Bagrynovsky, A.O. Baranov, A.G. Granberg, V.P. Maksimov, R.I. Ostapenko, V.V. Poladova, A.N. One of the directions of increasing the efficiency of formation of ability to solve economic problems in students is methods of mathematical modeling and IT-technology.

Problem statement

The purpose of this study is to select and build components of the methodology of training students of economic direction to solve quasi-professional economic problems by means of mathematical modeling, accompanied by finding an effective solution to their provided data. Such a rule is often called an optimality criterion, and a preference measure is called quality indicators. The best option is possible only if two conditions are met: at least one reasonable criterion; at least two options to compare (selection required) (Prokhorov, Frolov, 2011; Semerikov, 2013).

There is a mismatch in the level of development of the problem of student training in the field of mathematical modeling, as well as a contradiction between the need of society for economists with a sufficient level of digital literacy in solving economic problems. They are the ones that make up the study's problem. The pedagogical opportunity to solve quasi-professional economic problems by

mathematical modeling methods in order to improve the professional training of graduates of economic direction in universities and the scientific justification of its implementation, obviously, requires special study.

The hypothesis of the study is that the process of improving the professional training of future economists when studying the discipline "Methods of optimal solutions" will become more effective if:

- the methodology of mathematical modelling skills will be applied to economic quasi-professional tasks in the educational process;
- the linear programming software of Mathematica, MathCad, Matlab, Maple, Derive and their partial counterparts Scilab, GNU Octave, Maxima, SMath Studio Cloud will be used.

Research Questions

The search for optimal solutions is carried out through mathematical methods of quantitative analysis of variants, which allows to exclude subjective, emotional and psychological factors, thus putting planning and management on a scientific basis. The use of mathematical methods, the introduction of information technologies, the complication of technologies and production processes, the operation of big data for decision-making, the creation of qualitative analysis allows to fully investigate the problem, to study the emerging new additional possibilities in the theory and practice of management decisions.

The analysis of federal educational standards of economic direction showed the absence of mathematical modeling as a necessary component of professional competence of the future specialist.

The object of the study is the process of forming in students of economic direction the ability to use mathematical modeling to find the optimal solution at changing parameters of components of the production process.

The subject of the study is the methodology of teaching students of economic direction to solve quasi-professional problems with economic content in conditions of use of computer mathematical systems.

The nature of the scientific and pedagogical problem, the degree of development of its various aspects, largely determined the goals and objectives of the present study.

Purpose of the study. In order to get acquainted with all possible ways of finding the optimal solution of the problem and forming competences for students in the field of system analysis, we have developed and introduced into the practice of training bachelor 's degrees in the direction 38.03.01 "Economics" profile "Accounting and finance" the discipline work program "Methods of optimal solutions». In the course of pedagogical research we monitored the success of development in students of bachelor's degree of ability to carry out mathematical modeling in solving quasi-professional problems of economic content.

Research Methods

The model, object, modeling, modeling stages, modeling methods, system and system approach act as the basic concepts of discipline "Methods of optimal solutions». The application of mathematical methods implies the use of linear programming models in solving problems of an economic nature, when it is necessary to design and study new systems, abstracting from the insignificant parameters of the system in question, to analyze and systematize the properties of the system, to select and justify optimal conditions for their functioning, etc.

Among the researchers involved in the description of formalized economic and mathematical models, it is worth noting the works of K. Marx (Extended production model), L. Walras (statistical model of

the farm known as the general economic equilibrium system), V. Pareto (pattern of distribution of income of population in capitalist countries in the form of hyperbola ("Pareto curve")), V.K. Dmitriev (cost-output relationship equations), V. Leontiev (Balance of costs and output), L.V. Kantorovich and M.K. Gavurina (mathematical methods of organization and production planning), J.B. Danzinga (study of simplex method), A.N. Tolstoy (optimal transportation plan), F. Hitchcock (transport task), etc. Today, economic and mathematical models are in demand in various theories, including inventory management theory, mass service theory, game theory, statistical decision theory, network planning and management methods, and mathematical programming.

During the system study, several models are created, which leads to the need to identify the best model with qualitative characteristics. This activity allows in-depth study of model properties based on the results obtained. Thus, on the example of solving the transport problem it is possible to distinguish several criteria indicators, which include monetary and time costs for transportation, volume of transport works. In general, the solution is called permissible if it satisfies restrictions: resource, legal, moral and ethical. The solution is called optimal (best) if it provides an extremum (maximum or minimum) of the selection criterion in an individual or satisfies the principle of matching in a group context.

The modeling process creates conditions for the technological development of the activity, when the development of the model is carried out in a step-by-step manner strictly in accordance with the intended purpose, with an adjustment, if necessary, to the existing model (or the development of a new model) with the correlation of the obtained results with the real conditions of the model operation under the specified conditions. If the obtained model meets the set goal, has a complete or sufficient correspondence with the original, then the fields of its application and introduction into theory or practice are determined in the future.

In other words, the generalized characteristic of the solution of an economic-mathematical problem is its efficiency, depending on the proportional degree of achievement of the goals to the cost of the whole solution (the total cost of resources for making and implementing the solution). On this basis, it can be concluded that the solution to such a problem is the more effective, the higher the degree of achievement of the goals and the lower its cost.

The study of mathematical modeling opens up wide opportunities for understanding the connection of computer science with all sciences, including mathematics. Formal and abstract modeling with the help of computers – verbal, informational, mathematical – nowadays became one of the information technologies in the organization of educational and cognitive quasi-professional activities when students master the main educational program (Kraineva, Shefer, 2017).

Any mathematical model reflecting essential features of an object or process can be given by the language of equations and other mathematical means. Based on the theory of description of formal grammars (according to N. Chomsky) (Volkova, Rudenko, 1999), a generalized scheme of solving mathematical problems (Setyaningsih, Nining, Juniati, Dwi, Suwarsono, 2018) and requirements to the formation of a management solution (Sierksma, Zwols, 2015), the linear programming problem (LPP) can be defined in the form of an interconnected chain of the following objects:

$$\text{LPP: } \langle S_o, T, Q \mid S, A, B, Y, f, K, Y_{opt} \rangle,$$

where to the left of the vertical line there are known elements, and to the right there are unknown ones of the task: S_o - the problem situation; T - is the decision time; Q - resources available for decision making; $S = (S_1, ..., S_n)$ – the set of alternative situations clarifying the problem situation S_o; $A = (A_1, ..., A_k)$ – multiple objectives pursued in decision-making; $B = (B_1, ..., B_L)$ – multiple constraints; $Y = (Y_1, ..., Y_m)$ – the set of alternative solutions; f is the preference function; K is the criterion for choosing the best solution; Y_{opt} is the optimal solution.

Verbally, the description of the mathematical model of the SNR can be given in the following: based on the specified operating conditions of a system of some problem situation S_o, time T, and resources

Q, it is necessary to clarify the situation S_o with a plurality of hypothetical situations S, to form the sets of goals A, constraints B, and alternative solutions Y, to evaluate the preferences of solutions f and to find the optimal solution Y_{opt}, based on the formulated selection criterion K (Schrijver, 1998a; Schrijver, 1998b; Aleksandar, Velinov, Vlado, Gicev, 2018; Samuel Chiabom Zelibe, Chika Ugwuanyi, 2019).

Thus, when solving LPP, it is necessary to select a method that will find the largest (or smallest) linear function value of several variables if there are constraints in the form of linear equations and inequalities imposed on these variables.

As methods of LPP are chosen: simple and directed methods of alternative situations, graphic (or geometric) method, simplex method, dual task, potential method, artificial basis method (M-method), "north-west angle" method, minimum cost method, rectangle method (jordan transformations), Vogel and Gomori methods (for integer calculations), Hungarian method (Orlov, 2004; Samarov, 2009; Vanderbei, 2014; E. Klafszky, Tamás Terlaky, 2007; Ahmed, Khan, Ahmed, Uddin, 2016).

The process of solving LPP by the simplex method is reduced to four stages (Fig. 1).

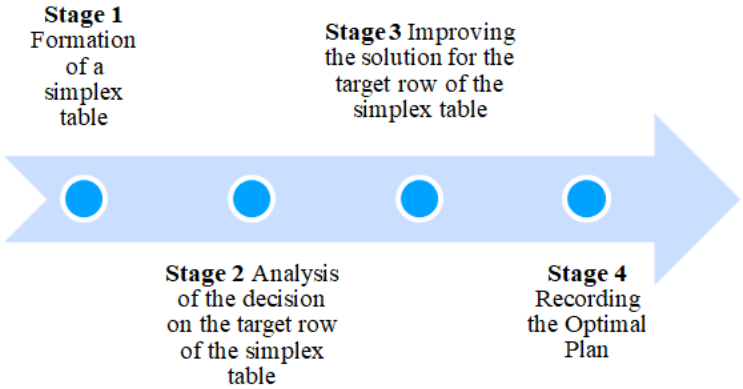

Fig. 1: The process of solving LPP simplex method

By means of information technologies it is possible to carry out modeling at different criterion indicators by means of the optimization solution by means of automation of mathematical calculation, obtaining the final result in numerical, formula, graphical forms (Bimal Das. Effect of graphical method for solving mathematical programming problem. Daffodil International University Journal of Science, 2010).

Currently, there are various computer mathematics systems that have the necessary instrumentation to build mathematical models and solve linear programming problems, such as Mathematica, MathCad, Matlab, Maple, Derive and their partial counterparts (Scilab, GNU Octave, Maxima, SMath Studio Cloud, etc.). Familiarization with licensed and freely distributed packages of programs makes it possible to increase the level of training of students in the field of digital literacy by organizing their own educational and cognitive activities in the study of various disciplines (Kraineva, Shefer, 2017).

Let us give an example of a quasi-professional problem offered to students of economic direction, finding the optimal solution of which is carried out on the basis of linear programming using various means.

The fish shop uses various resources to produce its products. It is known that the production of fish in own juice requires 2 units of fish in Class I, 1 unit in Class II; pate – 1 and 3 units, respectively. The total quantity of each fish species is 400 and 600 tons. Labor intensity of fish production in own juice is 4 units, pate – 5 units. Total amount of labor intensity – 1237 units. It is necessary to determine

how much fish in own juice and pate the plant needs to produce in order to achieve maximum profit from sale of products, if the price of fish in own juice is 6 rubles per unit of product, pate – 9 rubles.

Let us formalize the task condition by specifying a simplex table or function entry and inequality system (Table 1).

Table 1: building a simplex table

Resources	**Resource consumption rates per product**		**Total resources**
	Fish in own juice	**Pate**	
Fish, in Class I	2	1	400
Fish, in Class II	1	3	600
Labor intensity	4	5	1237
Profit from sales of one product	6	9	?

In the construction of the mathematical model, we will designate through x_1 and x_2 the produced units of various types of products (fish in own juice and pate). On a statement of the problem x_1 and x_2 variables are not negative, i.e. $x_1, x_2 \geq 0$.

The profit from the sale of such a number of products will be $F = 6x_1 + 9x_2$ rubles. Need $F = 6x_1 + 9x_2 \rightarrow max$ is necessary.

Let us set restrictions of a task. It is known that to make x_1 fish in own juice and x_2 pate, $2x_1 + x_2$ fish, in Class I, will be required. Stocks of fish in Class I are made by 400 tons, therefore $2x_1 + x_2 \leq 400$.

Similar for fish in Class II: $x_1 + 3x_2 \leq 600$.
Similarly to set labor intensity: $4x_1 + 5x_2 \leq 1237$.

Under the specified constraints, the overall appearance of the linear programming task is as follows:

$$\begin{cases} 2x_1 + x_2 \leq 400 \\ x_1 + 3x_2 \leq 600 \\ 4x_1 + 5x_2 \leq 1237 \\ x_1, x_2 \geq 0 \end{cases}$$

Solving MS Excel, it is necessary to use the built-in analysis and search for solutions by specifying the change cells of the x_1 and x_2 variables and constraints. In this case, the original data of the task should be presented in the form of a table, which contains formulas reflecting the dependencies between the data (Figure 2).

Basic variables and the objective function

	Fish in its own	Paste		Objective function	
Profit	6	8		0	max

=SUMPRODUCT(C4:D4;C5:D5)

Required from production (restrictions)

Fish, in Class I	2	1	<=	400	0
Fish, in Class 2	1	3	<=	600	0
Laboriousness	12	15	<=	3711	0

=SUMPRODUCT($C$4:D4;C11:D11)

Fig. 2: Formulas used in calculations

The greatest difficulty for the user is usually the task substitution itself, i.e. the selection of such inputs and constraints that MS Excel issues a valid solution to the task (Figure 3).

Basic variables and the objective function

	Fish in its own	Paste		Objective function	
	101,5714	166,143			
Profit	6	8		2104,71	max

Set limits

Required from production (restrictions)

Fish, in Class I	2	1	<=	400	389,286
Fish, in Class 2	1	3	<=	600	600
Laboriousness	12	15	<=	3711	3711

$C$4 >= 0
$D$4 >= 0
$G$11:$G$13 <= $F$11:$F$13

Fig. 3: Solution of the LPP in MS Excel

In Figure 3, you can see that the result of these actions is to find x_1 = 101.5717 and x_2 = 166.143 for maximum profit at the specified resources and constraints. By adding another constraint that the resulting x_1 and x_2 vaues are integers, we get 103 and 165 that satisfy the task condition.

B. V. Bukhvalova presents an automated software FinPlus designed to solve problems of linear and quadratic programming (training version), written in the programming language VBA (Bukhvalova, 2019). The package provides the user with additional capabilities (compared to the search for a solution): various ways of entering data, the possibility of saving conditions and solving the task, access to simplex tables, the possibility of performing post-optimal analysis. It is also possible to generate conditions of linear and quadratic programming tasks of given dimension. A detailed solution to the problem with this package is shown in Figure 4.

A report on the decision

Return to the task

c=	6,00	9,00			
				b=	y=
A=	2,00	1,00	<=	400,00	0,00
	1,00	3,00	<=	600,00	0,86
	12,00	15,00	<=	3711,00	0,43

Decision

				max
X=	101,57	166,14	<c,x>=	2104,71

Number of iterations 3 Time to solve the problem 0:00:01

2	0	1	2	3	4	5
1	0,00	6,00	9,00	0,00	0,00	0,00
3	400,00	2,00	1,00	1,00	0,00	0,00
4	600,00	1,00	3,00	0,00	1,00	0,00
5	3711,00	12,00	15,00	0,00	0,00	1,00

2	0	1	2	3	4	5
2	-1800,00	3,00	0,00	0,00	-3,00	0,00
3	200,00	1,67	0,00	1,00	-0,33	0,00
2	200,00	0,33	1,00	0,00	0,33	0,00
5	711,00	7,00	0,00	0,00	-5,00	1,00

2	0	1	2	3	4	5
3	-2104,71	0,00	0,00	0,00	-0,86	-0,43
3	30,71	0,00	0,00	1,00	0,86	-0,24
2	166,14	0,00	1,00	0,00	0,57	-0,05
1	101,57	1,00	0,00	0,00	-0,71	0,14

Fig. 4: The decision of LPP means of the FinPlus

For the solution of this task it is also possible to use the Mathematica system (Dyakonov, 2008) in which, having set the Maximize function for the solution of a problem of linear programming, in designations of variables x and y: Maximize [{6x + 9y, 2x + y <= 400 && x + 3y <= 600 && 4x + 5y <= 1237 && x> = 0 && y> = 0}, {x, y}], we will receive the decision in various options – analytical and graphic (Fig. 5).

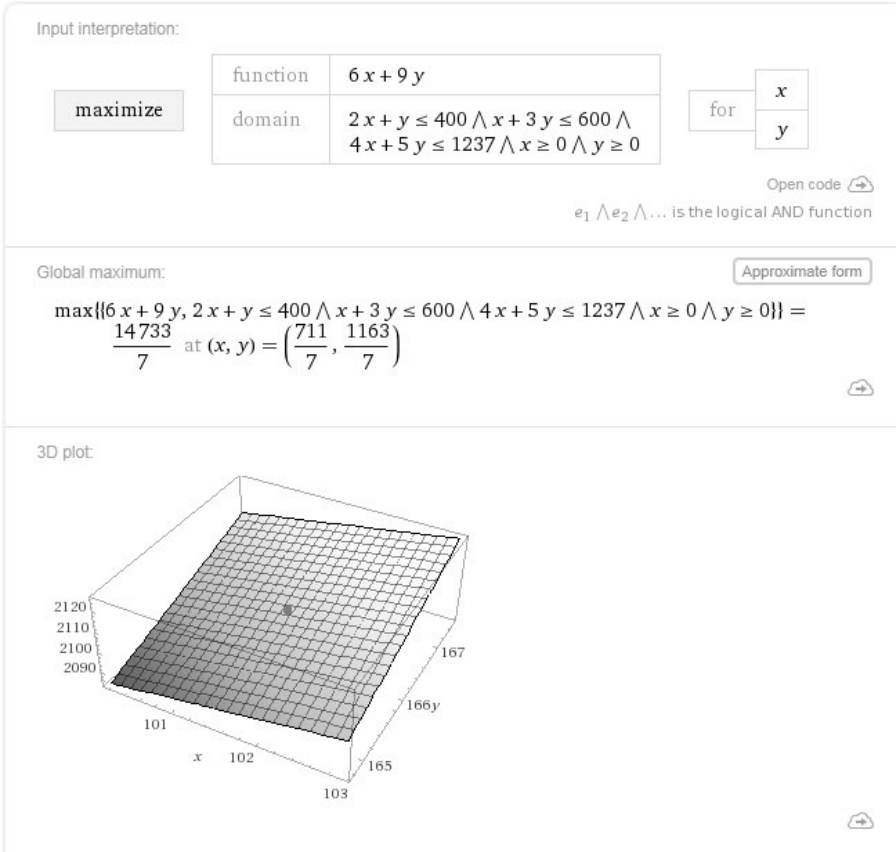

Fig. 5: The solution of LPP in the «Mathematica» system

The values found for the variables x and y are presented in fractional form. By making changes to the presentation format, you can get a response in the form shown in Figure 6.

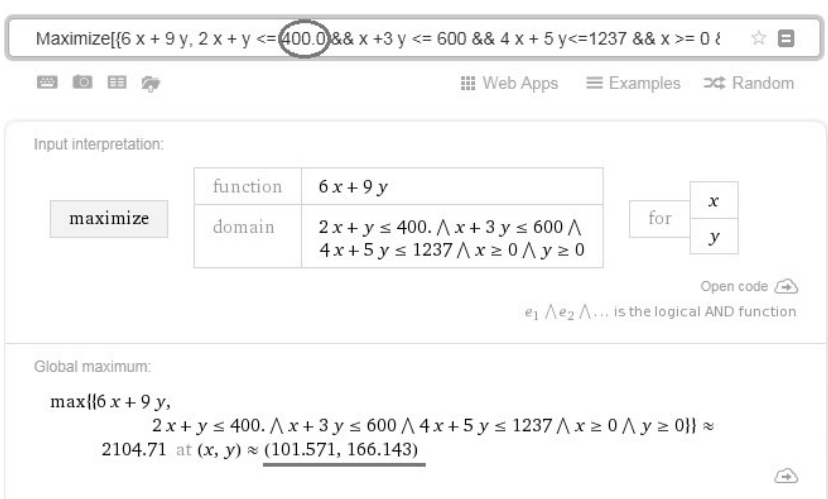

Fig. 6: The amendment of the data presentation format in «Mathematica»

A similar result can be obtained by changing the Maximize function to NMaxmize, which is used for integer calculations (Figure 7).

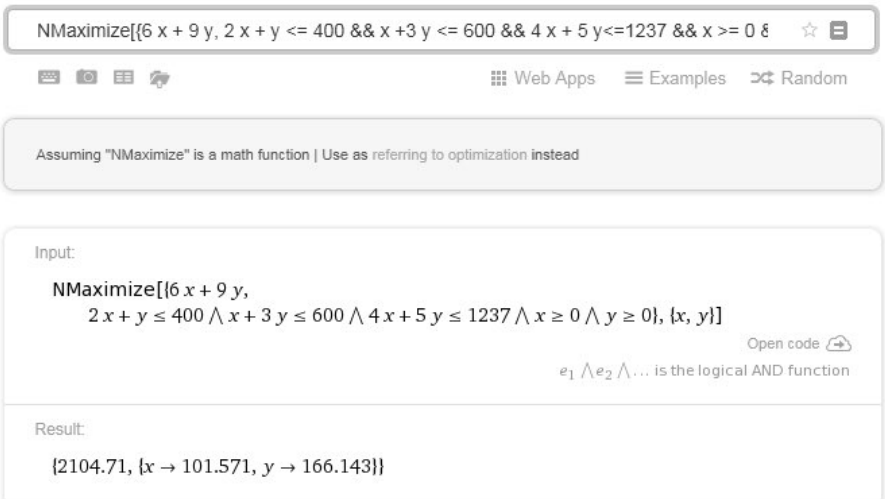

Fig. 7: Using the NMaximize function to solve the LPP using the «Mathematica» package

Online systems of computer mathematics also allow to solve problems of optimization (The World of Mathematics, 2019; an online resource for solving the linear programming problem by the Gomori method, 2019), which allows to perform calculations based on various methods, to save the obtained solutions in MS Word (* .doc) and MS Excel (* .xls) format.

We will use the Gomori method (an online resource for solving the linear programming problem by the Gomori method, 2019) to solve this problem. To do this, we specify the number of variables and constraints, as well as the formula constraints used in the description of the formalized mathematical model (Figure 8).

Fig. 8: Setting task conditions for a Gomory method

The result of the calculations is shown in Figures 9, 10.

Оптимальный план можно записать так:

$x_1 = 101^4/_7$, $x_2 = 166^1/_7$

$F(X) = 6 \cdot 101^4/_7 + 9 \cdot 166^1/_7 = 2104^5/_7$

Fig. 9. Fractional result of calculations

Оптимальный целочисленный план можно записать так:

$x_1 = 103$, $x_2 = 165$

$F(X) = 6 \cdot 103 + 9 \cdot 165 = 2103$

Fig. 10: Integer result of calculations

Findings

To get acquainted with all possible ways to find the optimal solution of the problem and to form competences of students in the direction 38.03.01 "Economics" profile "Accounting and finance" in the field of system analysis, we have developed working programs of discipline "Methods of optimal solutions».

Testing on the implementation of the program was carried out in three stages on the basis of South Ural Institute of Management and Economics, in which 157 students participated in the training direction 38.03.01 "Economics" profile "Accounting and finance" face-to-face and correspondence form of training. The division into control (C) and experimental (E) groups was based on the determination of the mean score in mathematics and computer science, which was 0.1 higher in the control groups than in the experimental ones. Surveys and questionnaires of teachers, students, development of the content of the discipline work program, search of information technologies providing mathematical modeling of economic tasks were carried out at the reporting stage. At the initial stage we tested the content of the topic developed, which reflects the study of the foundations of linear programming, funds of evaluation funds aimed at identifying the level of formation of competences. At the analytical stage, a post-operational analysis of the works of the students of the economic direction was carried out, which allows to determine the success factor of their ability to carry out mathematical modeling in solving economic problems (Table 2), based on the method developed by A.V. Usova (Usova, 1969); formulation of conclusions, formulation of recommendations.

Table 2: the success development rate of the students' ability to perform mathematical modeling in solving economic problems

Number of tests	Groups	Skill Formation Rate $\overline{P} = \frac{\sum_{i=1}^{N} P_i}{NP}$	Skill Success Rate	
			$\bar{j}_Э = \frac{\overline{P}_{Э3}}{\overline{P}_{Э1}}$	$\bar{j}_K = \frac{\overline{P}_{K3}}{\overline{P}_{K1}}$
I	E	0,56	1,38	1,26

	C	0,41		
II	E	0, 68		
	C	0, 46		
III	E	0, 77		
	C	0, 52		

Conclusion

1. The pedagogical experiment confirmed the validity of the hypothesis and showed that students of economic directions of training will have perfect knowledge of mathematical apparatus, be able to analyze and interpret the obtained data, find optimal solutions, changing various parameters of components of the production process.

2. These skills are formed in the process of solving economic quasi-professional problems by means of mathematical modeling and information technologies.

3. The experiment determined the possibility of using linear programming methods in mathematical models, which allow to optimize the decision-making process in economic problems presented in quasi-professional tasks.

4. Solving economic problems by means of mathematical modeling is one of the important conditions of linear programming for solving professional problems, the indicator of which is the transfer of knowledge and skills in the discipline "Methods of optimal solutions" into mastery.

5. The study confirmed the positive impact of our system of economic problems on the degree of formation of students' ability to work with linear programming tools (MS Excel spreadsheet, FinPlus program, Mathematica mathematical packages, MathCad, Matlab, Maple and online services) in solving economic problems and expanding the range of opportunities in the teacher-learner and learner-learner dialogue.

The scientific novelty of the study is that:

1. a methodology for training in solving quasi-professional economic problems in Mathematica, MathCad, Matlab, Maple has been developed in the context of the applied orientation of economic training for students;

2. a set of didactic conditions has been identified, which contribute to the effective expansion and deepening of the applied direction of the discipline "Methods of optimal solutions" by solving quasi-professional economic problems in Mathematical, MathCad, Matlab, Maple environment;

3. a set of methodological techniques has been developed to solve problems with economic content in Mathematica, MathCad, Matlab, Maple environment in the process of students mastering the discipline "Methods of optimal solutions": presentation of educational information according to the levels of formation of digital literacy; the usage of intra and inter-business linkages to effectively solve quasi-professional economic problems using Mathematica, MathCad, Matlab, Maple.

In summary, it is necessary to note the special role of linear programming in mathematical models, as it contributes to the most effective decision-making in serious economic problems. Any modern economist is obliged to understand economic and mathematical methods, as it is knowledge of mathematical models that contributes to a better understanding of the causes of economic situations, as well as allows to understand and compare patterns and correctly predict the consequences of economic decisions.

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ESD Model Development in Indonesia

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Abstract

The ESD concept developed by the United Nations should be able to encourage students' skills, perspectives and values for a sustainable future. The purpose of this research is to develop an existing ESD model and combine it with the concept of the authentic experience to produce an ESD model that is adapting to the values and wisdom of the implementation of education in Indonesia. The ESD model developed in this research is a hypothetical model in which the development of the ESD model in this research based on the ESD model developed previously by Shohel and Howes. The results obtained from this research are the ESD model produced by combining the components of the school, ESD awareness circle, local wisdom, service-learning, community engagement, and evaluation. In the future, this model is expecting to be a basic model for sustainable development education that involves local wisdom in Indonesia.

Keywords: ESD, model, education, school

Introduction

In a research study by Dannenberg and Grapentin (2016) mentioned the crucial issues concerning sustainable development are included in ESD to enable people to get used to living and to act sustainably. Skills and knowledge are also needed to build relationships and cultural concerns of the community, democratic values and processes, theories that explain the socio-historical context of learners, and processes of action that continue to reflect on structure and dynamics (Aguilar, 2016), and develop and maintain sustainable society (Laurie et al, 2016).

ESD implementation cannot be done alone by schools. Building partnerships with various parties, value orientation, holistic, complex, and useful is the basic principle of ESD (Fadeeva and Galkute, 2012). Fadeeva and Galkute's (2012) explanation is in line with Bruns et al (2019) that the implementation of SDGs in schools influenced by stakeholders from inside and outside the school, as well as the design and implementation of quality reforms. Potential schools can develop through various positive activities, following the targets and goals of education for sustainable development. The ESD integration approach in the Quality Criteria for ESD-Schools document (Guidelines to enhance the quality of Education for Sustainable Development) (Breiting et al, 2005) explains that involvement in ESD should not be considered as an additional burden on teachers and principals, but instead used as opportunities to enhance learning and teaching activities and increase innovation for all schools. Effective school programs must be able to support students' knowledge, attitudes independently, and skills in real life for complex situations (Cincera and Krajhanzl, 2013). Schools must also create an atmosphere of learning that is authentic, meaningful, creative, and based on students to enable sustainable development practices (Goldman et al, 2018).

Lewin (2019) explain that ESD curriculum must aim at better learning management, cumulative in nature, encouraging changes in consumption and promoting environmental insights, social cohesion, and changes in consumer preferences. ESD implementation in schools requires close-thinking

thinking to think about complexity and overcome uncertainty (Julien et al, 2018) and emphasises participation and interaction between students and their student-centred environment, collaborative, inquiry-based approach (Uitto et al, 2018). Normative competence is also essential to implement, negotiate, and reconcile norms and principles (Ploum, 2018) in addition to developing students' multi-perspective for action taking and supported pedagogically in the practice of sustainability (Kater-Wettstädt, 2017). Explanation of Ploum (2018) and Kater-Wettstädt (2017) in line with Dlouhá and Pospíšilová (2018), which states that students' competencies must be able to be used to improve their skills and potential to be creative, confident, and to engage participants with the community to manage and make a decision. Rogers (2019) also explained that education to achieve sustainable development goals does not only go through the formal sector, but must go through non-formal education with flexible, contextual, and participatory learning programs. Knapp (1980) explains that learning experiences are designed for cognitive and psychomotor purposes, so the development of environmental ethics needs to be considered following the values, planning, and evaluation goals.

Teachers can support student competencies in individual, social, and institutional activities to realise collective action and transformation towards sustainability (Sahakian and Seyfang, 2018). The pedagogical approach must be adapted to the teaching resources so that ESD learning becomes relevant, timely, and useful (Cahill and Warwick, 2019). Vare and Scott (2007) explain that clear learning strategies, openness, and the existence of evaluations are needed to carry out ESD. Teise and Roux (2016) mentions values, critical thinking skills, and conceptual clarity in the implementation of ESD in order to recognise as part of the ethos and culture of education.

Shohel and Howes (2011) grouped the ESD model into three, and each containing three sub-levels of achieving sustainable development, namely education about sustainable development which contains transmitting information, changes attitudes, changes behaviours. Education for sustainable development which contains taking action, builds awareness and practical understanding, results in a practical commitment to sustainable living. Critical education towards sustainable development which contains generating knowledge through critical action, reflection, changes policy, develops active and critical citizenship. This change model from Shohel and Howes was chosen because this model contains three kinds of sub-models which can be adjusted to the conditions of achieving sustainable development in the country concerned. Education about sustainable development can be applied to areas that are just starting to step towards sustainable development, education for sustainable development can be used for countries that already have the initial foundation for implementing sustainable development, but still, need efforts to maximise resources for achieving sustainable development. Education towards sustainable development can be applied to countries that have all elements of society have understood the importance of sustainable development so that they need universal elaboration at the national level.

Indonesia already has a program called Adiwiyata where the Adiwiyata program can be used to develop students' attitudes and responsibilities to protect and manage the natural environment through school governance that supports sustainable development (Prabawa-Sear, 2018). The program, managed by the Ministry of Environment and Forestry in collaboration with the Ministry of Education and Culture, aims to realise schools that care about and are cultured in the environment using participatory principles (all school components are involved) and sustainable with all activities carried out in a planned and comprehensive manner (Chaeruddin as cited in Maryani, 2016). Therefore, education for sustainable development from Shohel and Howes is suitable to be developed in Indonesia, considering that Indonesia has already begun the initial steps towards achieving sustainability with the Adiwiyata program.

The development of the ESD model can use to fill the gap between Environmental Education and ESD itself through ecopedagogy to determine socio-environmental boundary situations and to carry out transformative actions through deep and broad reflection (Misiaszek, 2019). At present, there is no systematically developed ESD model for high schools in Indonesia. Based on these facts, the question arises: How can the ESD Model for SMA in Indonesia be prepared based on the Shohel and Howes models? For this reason, this research aims to develop an ESD model based on the ESD

model from Shohel and Howes by adding components that are appropriate and can be implemented in Indonesia.

Methods

The method used in this research is through a literature study in several related research papers to develop the existing ESD model. Field observations were also carried out by researchers at two Adiwiyata (green school) recipient schools in Jakarta, Adiwiyata School in Indonesia, which is an environmentally friendly school that has started an education that supports environmental awareness. These observations are used to support the preparation of this ESD model.

Result and Discussion

The development of the ESD model by the author is to develop the Shohel and Howes ESD model in Figure 1. The Shohel and Howes ESD model is grouped into three, and the authors develop the ESD model of the Shohel and Howes "*education for sustainable development*". The ESD model change was examined to determine the strengths, weaknesses, and material needed for the development of the ESD model for high schools. The results of the Shohel and Howes ESD change model study are presented in Table 1

Table 1: The result of Shohel and Howes ESD change model study

advantages	disadvantages
1. The interaction between school and community is very beneficial for student development. 2. It can accommodate complexity and incorporate social action into practice. 3. The orientation that is strong on the principle of human welfare. 4. The curriculum problems integration. 5. Lifelong awareness and practices were changing action. 6. It contains practical and contextual learning for a better life.	1. Study results in Bangladesh may not be applicable in other countries, including Indonesia, due to differences in social systems, education systems, budgets, and financing. 2. The application of the model is based on research results in non-formal education and does not explain how this model can also be practised in formal schools, especially in high schools. 3. It does not contain learning strategies.

Based on the study of the strengths and weaknesses of the Shohel and Howes ESD change model, it is necessary to adjust the material requirements for the ESD model to be developed. The material needed is:

1. A clear learning strategy that places the learning process as a process as well as an outcome;
2. Openness to unplanned directions (uncertainty);
3. Evaluation (Vare and Scott, 2007);
4. Settling conditions related to social systems, education systems.

Based on the results of the previous ESD model literature review, the Shohel and Howes Model, the authors make an ESD model development table for high schools in Table 2

Table 2: ESD model for senior high school development

Model ESD Shohel and Howes	Developing a model	ESD model for senior high school
Take action	1. Adjustment to local situations and conditions; 2. Competencies (teachers and students); 3. Environmental awareness.	*1. ESD Awareness* *2. Circle Local wisdom*
builds awareness and practical understanding	1. School interactions with the community 2. School potencies.	*1. Service-learning* *2. Community engagement*
results in a practical commitment to sustainable living	1. Learning as a process and result; 2. Evaluation.	*1. ESD school* *2. Evaluation*

Based on the ESD model development in Table 2, the resulting ESD Model development for SMA is presented in Figure 1.

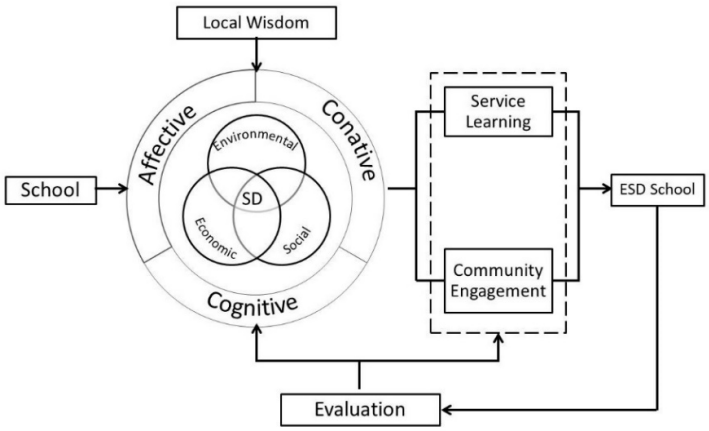

Fig.1: ESD Model for senior high school

1. *Sustainable Development Awareness Circle*

The Education for Sustainable Development Goals Learning Objectives document by UNESCO in 2017 explains the learning objectives which divide into three domains: cognitive domain, socio-emotional domain, and behavioural domain. These three domains are fundamental to instil environmental awareness. Sustainable Development Awareness Circle is a circular model part which contains the terms Cognitive which are defined as knowledge, Affective which is defined as an attitude, Conative which is defined as a behaviour, three circles that are interconnected with each other that symbolise the three pillars of sustainable development namely Environmental, Social, Economic, and sustainable development. Gatti et al (2019) mentioned that the focus of achieving ESD is cognitive, affective, behavioural learning and the ability to solve compound sustainability-related problems. The opinion of Gatti et al (2019), not in line with the findings of Olsson et al (2019), which states that ESD-certified schools have less impact on students' knowledge, attitudes, and behaviour towards sustainability. The integration of environmental, social, and economic aspects can be adjusted to the ability of the school, meaning that not all aspects are integrated at one time, but can be done according to scope and sequence vertically or horizontally. The intended vertical scope here is between levels ranging from tenth grade to twelfth grade and horizontally is only one level.

2. *Local Wisdom*

Local wisdom in this model is interpreted by the writer as the local wisdom of the local community so that education for development is carried out with the inclusion of insights that include indigenous insights, local culture in environmental management, social life, thinking patterns and behaviour that characterise the local area. Nguyen (2017) explains that the ESD Model adapted to

the conditions, priorities, and educational actions of the countries concerned, in order to get a comprehensive picture of ESD that is in line. Nguyen's explanation (2017) is not in line with the statement of Sandoval-Rivera (2019), which states that ESD does not pay attention to the importance of local and indigenous knowledge even though local knowledge can found incomplete information on environmental management including ecological development and maintenance to strengthen the achievement of SDGs. The direction of the local wisdom arrow that leads to the ESD Awareness Circle is intended that in the ESD learning process, teachers and school leaders include elements of local wisdom or use the concept of local wisdom as a foundation as well as enrichment in this ESD learning model.

3. Service Learning dan Community Engagement

The teacher chooses the most direct learning method in the field in the research location. Direct learning in the field can be interpreted as participatory activities with students being able to practice the theories obtained in the classroom for certain subjects, as well as learning service to the environment and community (service-learning) through direct engagement with the community (community engagement). This activity is in line with Uitto, who stated that ESD emphasises participation and interaction between students and their environment. This participatory activity is also following what was conveyed by Dlouhá and Pospíšilová and Kater-Wettstädt which explained that participation to the community could be used as knowledge development, enhancement of students' skills and potential in sustainable practice efforts. Shohel and Howes mentioned that in the change in the ESD model they developed, namely education for sustainable development, there must be an element of taking action, which is used to build awareness and practical understanding so that it will produce a commitment to live sustainably. (results in a practical commitment to sustainable living). While from the two schools observed, it has not been programmed to build the character of students to think critically so that no awareness and understanding has been built to commit to living sustainably.

4. Education for Sustainable Development School and Evaluation

Education for Sustainable Development School in this model is a school that has run ESD learning and as an output of the ESD learning model developed by the author. This ESD School is not a title given to a school like the Adiwiyata award because there is no official institution in Indonesia that provides an assessment for schools that run ESD. Schools that have reached this stage are expected to be able to carry out the principles of sustainable development and can drive changes in knowledge, skills, values, attitudes, and empower the community and equip present and future generations to meet their needs in a balanced and integrated way. Schools running ESD must meet indicators ESD competence. Assessment must be done to evaluate the understanding of students' big picture (Kopnina, 2012), the application of local wisdom including indigenous knowledge including its development and synthesis in sustainability education (Koehn and Uitto, 2013), and to reflect on the implementation of ESD in schools which raises an argument due to trends and contradictions between goals and implementation on the ground (Kopnina, 2020). The author intends evaluation in this model as a self-evaluation activity or an independent evaluation of one's abilities. This independent evaluation is due to the lack of institutions that carry out assessments for the implementation of ESD in schools. This independent evaluation is carried out by schools related to the implementation of ESD learning in schools at the ESD Awareness Circle and participatory Service Learning and Community Engagement activities.

Conclusion

The ESD model developed by the authors in this research is hypothetical. The model developed by this author is expected to increase environmental, social, and economic awareness to support sustainable development. This model can be used in high schools to raise environmental awareness for the initial stage, followed by incorporating social and economic aspects in learning activities in schools so that it is expected to support the implementation of education for sustainable development for high schools. Specific studies need to carry out to develop learning techniques in the ESD Awareness Circle section so that schools can adapt this model to the conditions and abilities of the school. If schools want to implement this ESD model, then preparations need to be made

appropriately related to the readiness for implementation time, budget, teachers, students, and other school residents. The implementation of the ESD model can be adjusted to the situation and condition of the school concerned.

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Selected Factors Pertaining to The Management of Road Transport Development in Poland

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Abstract

This article analyses the current situation as well as projections for the future of road transport in Poland, as well as setting the appropriate strategy of developing this area of activity. The starting point is the role of transport in the economy. This paper also includes characteristics of forms of shipping according to the transport branch concentrating on road transport, in account of data on carriage, cargo, and average shipping distance.

Keywords: Economic Development, Transport, Transport Management

Introduction

Today, the world is developing in a multidimensional fashion. The highly developed transport infrastructure influences creating a competitive edge. Transport is the social/economic activity, which determines any and all other activities of people and businesses. Transport is characterized by an organizational/legal complexity, diversity of processes relating to movement of cargo and people, as well as a complexity of technical correlations. Transport enables the economic development of every country, foreign trading, and market integration; it ensures accessibility to different regions; efficient transport influences regional and local economies.

The social role of transport is also important. Firstly, we have economic benefits resulting from effective operation on the job market, which, in turn, influence the expansion of this market. This contributes to reduced unemployment, an increase in the wealth of the society and, what follows, a decrease of the level of poverty. The social role of transport also comprises improving all types of services. Additionally, the transport sector play an important role in the area of support – charity activities and humanitarian actions.

Obviously, negative external aspects of the transport sector should also me mentioned. These include: pollution (contamination of water, soil, and air), significant accident rate, costs of congestion, increasing levels of noise and vibrations, over-consumption of energy, and reducing the green areas.
Road transport is the most popular transport branch. Its advantages include: flexibility and fast pace of deliveries, possibility to reach every place on the globe, carriage of various goods, long- and short-distance shipping. Whereas disadvantages include: pollution, significance accident rate, long delivery time on long distances in case of road jams or traffic bans, delays in deliveries.

Literature Review

The universal term of transport is referred by Tarski in his definition (1973, p. 11), according to whom "in the broadest etymological sense, transport means a technological process related with movement at distance, meaning movement of persons, items or energy". In account for the logistic aspect, Kauf (2016, p. 140) defines the transport process as a "group of coordinated activities pertaining to a time- and space-related transformation of articles and information, in accordance with the terms and conditions of a contract between the carrier and the contracting authority". According to Tomanek (2004, p. 11) the work "transport" is used in the three following meanings: subjective – as a separate area of the national economy; activity-related – as the act of moving (in this context, carriage is related with forwarding, logistics, and the transport process); tangible – as material

equipment meant for moving. Transport constitutes an important part of the logistics concept, as it directly contributes to implementation of its primary goal, which is supplying a particular product to a particular place and in specific time (Mesjasz-Lech, Włodarczyk, 2019, p. 93).

Transport affects economic development, division of work, specialization of production, and it increases the reach of the market. It is decisive in terms of success of not only one economic sector but the economic success of the entire country (Button, 2010, p.23). Transport cannot be replaced by other services. Existing and planned transport networks and the volume of shipping constitute important factors for city and region development, and determine the locations of investments and businesses. Transport facilitates exchange of goods and services, realization of social goals (meeting communication needs, ensuring access to education, as well as health, cultural and sports facilities). Transport significantly affects the Gross Domestic Product (GDP) and the development of national economy sectors (Button, 2010, pp.21-23). There is a close correlation between the growth in gross domestic product (PKB) and an increase in the demand for transport, both the transport of goods and passengers. It is predicted that the level of transported goods and thus the level of pollution from transport will increase regularly until 2050. The total demand for freight on a global scale can be up to three times higher than nowadays (ITF Transport Outlook 2017).

Transport cannot be executed without a technical infrastructure. The development of every transport branch and their cooperation depend on this infrastructure. Transport literature defines infrastructure as a group of principal institutions and equipment essential for proper functioning of the economy (Wojewódzka-Król, Rolbiecki, 2018, p.14). It should be noted, on the basis of the presented definitions, that infrastructure plays a substantial role in the execution of transport processes (Benassi et all, 2015, pp. 47-50). It conditions their timeliness, efficiency, effectiveness, reliability, and the level of costs and safety. Infrastructure is to ensure proper flow of merchandise. The level of development of transport infrastructure conditions overcoming time- and space-related deviations between demand and supply (Skorobogatova, Kuzmina-Merlino, 2017, p.319, Maroto, Zofío, 2016, pp. 145, Kadłubek, 2015, 496). Characteristics of infrastructure are presented in table 1.

Table 1: Characteristics of transport infrastructure

Attribute	Description
Technical indivisibility	Occurrence of certain technical characteristics, which prove the usability of the technical infrastructure; executing the undertaking in such manner so that individual elements reach their usable capacity; the need to build additional infrastructural facilities;
Economic indivisibility	Incurring expenses for the development of infrastructure, which leads to recurring fixed costs
Long term of execution of infrastructural facilities	This is affected by the long duration of planning and designing infrastructural facilities; time-consuming project preparation due to taking into account elements such as: compliance with transport and regional policies; environmental effects of the investment; attributes and specificity of the infrastructure of defined transport branches; coherence of transport systems; law regulations
Long term of use	The necessity to conduct a detailed analysis of future transport needs, because improperly conducted forecasts and adopted technical and spatial solutions may prevent the development of transport systems
Priority of transport outlays	Funds assigned to transport infrastructure and other infrastructural elements should have priority over consumption expenses
Immobility	There is no possibility to move the elements of the infrastructure
Effects on the natural environment	Direct or indirect negative effect of facilities and equipment on the environment e.g. exhaust emissions

Source: prepared on the basis of: I. Urbanyi-Popiołek, Podstawy organizacji i ekonomiki transportu – wybrane zagadnienia [in:] edited by I. Urbanyi-Popiołek, Ekonomiczne i organizacyjne aspekty transportu, Wydawnictwo Uczelniane Wyższej Szkoły Gospodarki w Bydgoszczy, Bydgoszcz 2013, pp. 11-13.

The characteristics of the transport infrastructure include economic and technical indivisibility. These characteristics result directly from the high asset and capital absorption of the transport infrastructure. Moreover, transport infrastructure is characterized by functional and spatial immobility, as well as sustainability of use (Rolbiecki, Wojewódzka-Król, 2013, p.37).

Road transport, also referred to as vehicle transport, currently constitutes the dominant method of carriage of persons/ cargo. Shipments are transported by roads using motor vehicles. Road transport in Poland is regulated in the Act on Road Traffic. Road transport is characterized by substantial flexibility and availability, favoured by a developed road network. Every shipment can be delivered door to door. Receipt of shipments may be conducted at any place or time. In addition, duration of transport (in case of short distances) is relatively short (Leończuk, 2011, pp.99-100).

Analysis of The Functioning of Vehicle Transport in Poland

Vehicle transport was developing slowly during the interwar period. This changed after signing a contract with the Italian FIAT in 1932. The production of Ursus trucks and Fiat passenger vehicles has started. After the 2nd World War, truck factories in Lublin and Starachowice were established, as well as bus factories in Sanok and Jelcz, and a passenger car factory in Warsaw; the production of motorcycles was commenced, and this transport branch started developing. The role of transport after 1989 has grown significantly. The vehicle cargo transport became demonopolized. The Polish vehicle transport market constitutes an integral part of the EU transport market. It is subject to numerous EU and national regulations. The market of vehicle transport services is analysed in the context of individual carriers, buyers of transport services, as well as in the sectoral and macroeconomic dimensions.

Based on the level of accessibility and area services, the following categories of roads are distinguished: motorways, public roads, and express ways. Motorways are roads designed for vehicle traffic only. They were specially designed, and equipped with two separated one-way roadways. They have multi-level crossroads with intersecting roads. Express ways are also meant only for motor vehicles; they have two separated one-way roadways. As at the end of 2018, there were 3 730.7 km of express roads in Poland, of which 1638.5 km are motorways and 2092.2 km are express ways. In total, in 2018 the length of roads was at 424 563.9 km. it should be underlined that although the length of this type of roads increased in Poland in the past years, the country is still well behind other European countries. Figure no. 1 presents the network of roads in Poland in 2019.

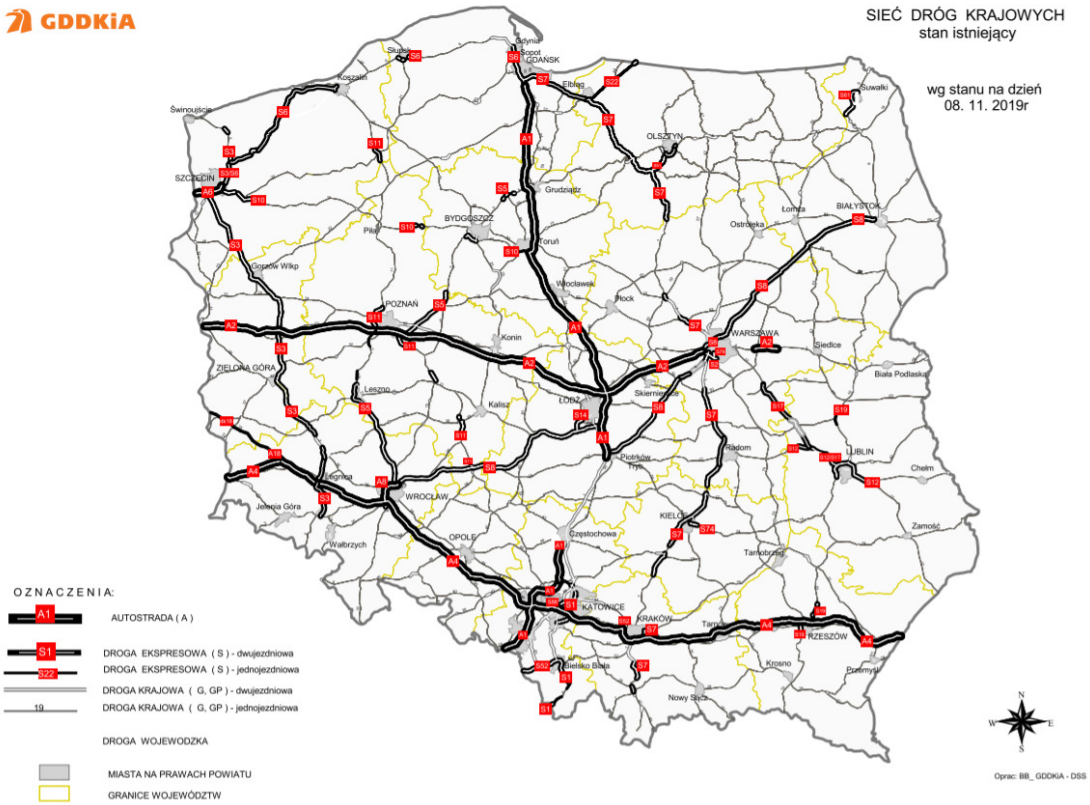

Fig. 1: Network of trunk roads in Poland in 2019

Sieć dróg krajowych	Network of trunk roads
Stan istniejący	Current status
Wg stanu na dzień 08.11.2019	As at 08.11.2019
Oznaczenia:	Legend:
Autostrada (A)	Motorway (A)
Droga ekspresowa (S) – dwujezdniowa	Express way (S) – two lane road
Droga ekspresowa (S) – jednojezdniowa	Express way (S) – one lane road
Droga krajowa (G, GP) – dwujezdniowa	Public road (G, GP) – two-lane road
Droga krajowa (G, GP) – jednojezdniowa	Public road (G, GP) – one-lane road
Droga wojewódzka	Voivodeship road
Miasta na prawach powiatu	Poviat towns
Granice województw	Voivodeship borders

At the end of 2017 the total length on public roads in Poland amounted to 422.3 ths. km, of which 71% were hard surface roads, and 29% – dirt roads. The proportion of hard surface roads 2018 was 97.2 km/100 km^{2}. Most hard surface roads are located in Silesia, Mazovia, Lower Silesia and Świętokrzyskie. Least hard surface roads are located in voivodeships in the North and in the West of Poland, meaning Lubuskie, West Pomerania, Pomerania, Warmińsko-Mazurskie and Podlaskie. Since 2005 the length of hard surface roads has been gradually growing thanks to continued works aiming at adjusting the road infrastructure to the current needs of road users. The diagram below presents the number of kilometres of motorways and express ways in Poland in the years 1989-2018.

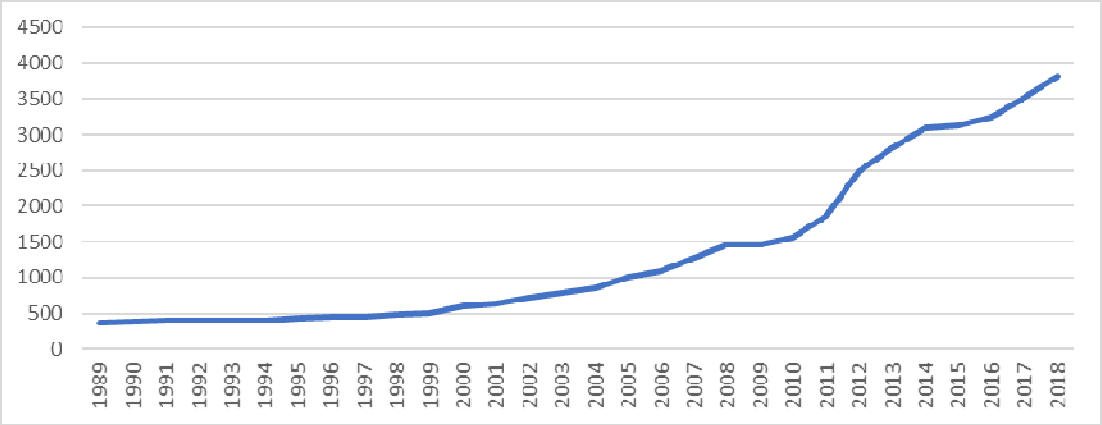

Fig. 2:Number of kilometres of motorways and express ways in Poland in the years 1990-2018

The line infrastructure of road transport is also assessed in terms of quality. The Polish roads network has significantly improved in the last decade, although it is still behind the quality of roads of other European countries. There are no roads enabling unobstructed traffic, in particular transit traffic – bypassing cities. The quality of bridges, flyovers, tunnels, and underpasses is low. In 2017 it was assessed that over a half of roads in Poland was in a good state. However, still over ¼ of road surfaces in the country was unsatisfactory, and 14.5% were in a poor state. 1.4% were under renovation. According to the *Report on the technical status of the surface of public roads at the end of 2017*: unequal course of roads, meaning that there are areas with significant density of roads networks, as well as areas where this network is poor, which hinders fast transportation of cargos, insufficient number of transit roads, too little roads linking individual municipalities, insufficient number of city bypasses, tunnels, bridges, car parks, parking places, pedestrian routes, bicycle lanes, a low technical quality of bridges and surfaces.

Another factor conditioning the development of the transport market in Poland is the number of vehicles. Based on statistical data, Poland is noting a systematic increase in the number of motor vehicles (Table 2).

Table 2: Number of motor vehicles in Poland in the years 2010-2017 [ths.]

Types of vehicles	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Passenger vehicles	17 240	18 125	18 744	19 389	20 004	20 723	21 675	22 504
Trucks and road tractors	2 982	3 131	3 178	3 242	3 341	3 429	3 542	3 640
Buses	97	100	100	103	106	110	113	116
Motorcycles	1 013	1 069	1 107	1 153	1 190	1 272	1 356	1 427
Other	1 706	1 764	1 746	1 796	1 832	1 875	1 915	1 948
Total	23 037	24 189	24 876	25 684	26 472	27 409	28 601	29 635
Mopeds	922	1 033	1 100	1 163	1 217	1 259	1 292	1 328

Source: https://www.pzpm.org.pl/Rynek-motoryzacyjny/Park-pojazdow-zarejestrowanych/Tabele-Park-pojazdow-zarejestrowanych-w-Polsce-1990-2017 [12.04.2020]

The increase of the number of vehicles includes all groups. In comparison to 2010, in 2017 the number of passenger vehicles increased by 30%, trucks and trailers – by 22%. The lowest growth was recorded in buses – 19.6%, and highest in motorcycles – almost 41%. Taking into account all vehicles, their number increased in the analysed period by 28.6%. Significant growth was also noted

in mopeds – 44%. In addition, ¾ of the motor vehicle park in 2017 covered passenger vehicles. 12.3% were trucks and road tractors. Less than 5% of vehicles on Polish roads were motorcycles, and 6.6% - other (including specialist vehicles). The growth in the number of vehicles is also confirmed by the data from the Polish Automotive Association (PZPM) for Q1 2019. In the period from January to the end of March 2019, the following numbers of vehicles were registered (Quarterly report entitled: *Branża motoryzacyjna, Raport kwartalny PZPM i KPMG*, Warsaw 2019, p. 4.): 17 030 passenger vehicles (increase by 11.1% in comparison to 2018); 7 453 trucks (increase by 4.2%); 7 414 semi-trailers and trailers (increas by 7.8%); 532 buses (decrease by 15.2%); 3521 motorcycles (increase by 68.2%), 3 022 mopeds (increase by 83.6%). Analysing the presented data it should be noted that only registration of buses dropped in Q1 2019. In account of percentage values, the largest increase was report in mopeds and motorcycles.

Apart from the line infrastructure, there is also the point infrastructure, which is analysed in terms of passenger services, cargo handling and means of transport. A transport point is a properly equipped place, where movement of persons/cargo may start or end, or where the mean of transport is changed. Whereas a transport hub is every such point, where lines from at least three directions intersect. These are the lines of one or more transport branches (Grzybowska, 2009, p.196).

Carriage of goods by vehicle transport requires an infrastructure that guarantees loading, reloading and unloading of shipped cargo. These works are related with the shipping process. Currently, for vehicle transport, there are public unloading platforms, stations or factory stations, as well as reloading points. In addition, there are business units operating at the verge of the vehicle transport / roads / automotive sector, which are also included in the transport infrastructure. They include gas stations, vehicle service centres, workshops, technical facilities of transport companies (Wojewódzka-Król, 2010, pp. 464).

Subsequently, an analysis of cargo carriage in transport branches was performed based on available statistical data. The analysed data cover the years from 1995 to 2015 and originate from the Main Statistical Office.

Based on the analysis of the volume of cargos in the examined period, it may be confirmed that the volume was systematically growing (apart from the year 2005, when a minor drop in vehicle cargo transport was reported). Considering the structure of cargo carriage according to cargo mass expressed in tons it may be stated that the share was between 75.8% in 2005 up to 84.3% in 2010. This period saw a dynamic growth of shipping. This was caused by a substantial increase in the number of vehicles and the number of shipping companies. In subsequent years, the volume of shipping increased due to construction of new express ways and motorways (they were built because of the EURO2012 championships taking place in Poland and in Ukraine). In the analysed years there was also a constant average increase noted in the distance of shipping 1 ton of cargo (a growing trend with average annual growth of the distance of carriage at 6.8 km). This is an important parameter from the point of view of competitiveness of the given transport branch. Table 3 presents data concerning transport in Poland in account of the distance of cargo carriage.

Table 3: Distance of cargo carriage in Poland

Year	Up to 49 km	From 50 to 149 km	From 150 to 499 km	Above 500 km
2017	606 995.3	325 173.0	262 540.3	22 109.6
2018	548 246.0	293 334.4	261 593.4	20 226.5

Source: Przewozy ładunków i pasażerów w 2018 roku, GUS, Warsaw 2019, p.3.

Presented data demonstrate that most shipments on the national market were executed at a distance of up to 49 kilometres. Least shipments were executed at a distance of over 500 kilometres.

The analysis of the volume of cargo shipments expressed in ton-kilometres, which takes account of both the mass of cargo and the carriage distance, demonstrate that this indicator was also continuously increasing (from 51 000 in 1995 to 273 107 ton-kilometres in 2015). In 2018, cargo

transport expressed in thousands tons increased by 7.2%, and in million tons – over 8%. Most frequently transported cargo includes: extracted minerals (including coal), food products, furniture, agricultural products, construction products, and waste.

When discussing the road infrastructure, an important issue is its excessive overload, which results from various causes. Mostly, we are observing a significant increase of the number of vehicles on roads, and an expansion of road transport. On some roads and transport hubs the infrastructure is overloaded. This happens in particular in urban areas, and on routes linking tourist towns (Borck, 2017). The construction of new bypasses or roads is often protested against by ecologists. In their opinion, exploitation of the transport infrastructure will result in pollution, disintegration of the area, violation of existing ecosystems, security risks, and excessive noise (Cai, Zhou, 2015, pp.1-7). However the progressing globalization and economic development forces the expansion of the transport infrastructure (Levinson et. All, 1996, p. 2-10). There must be new road networks, reloading points and stations, to make transport of cargo and people more efficient.

State's Transport Policy

The main goal of the transport policy is a clear improvement of the quality of the transport system and its expansion according to the principles of sustainable development, the quality of the transport system is one of the key factors affecting the quality of life of residents and the economic development of the country and regions. The development of the country's transport policy means: improvement of transport availability and quality of transport as a factor improving the living conditions and removing economic development barriers, supporting the competitiveness of the Polish economy as an important instrument of economic development, improvement of the effectiveness of the transport system, integration of the transport system in both branch structure and territorial structure, improvement of safety leading to a radical reduction of accidents and eliminating their effects, and – in terms – improvement of personal safety of road users and cargo protection, elimination of the negative effect of transport on the environment and living conditions. In the transport policy, emphasis is placed mainly on the undertakings, the effects of which could significantly influence the economy of the country or a given region, and would be tangible for the largest possible number of transport users. According to the Polish transport policy, priority is given to projects aimed at: improvement of the state of all roads, development of the network of motorways and express ways on most overloaded routes, including links with the trans-European network; railway modernization through an expansion of competition between operators to adjust them to market needs and retain their role in transport, with a simultaneous improvement of the effectiveness; improvement of safety in transport; improvement of the state of the railway infrastructure and limiting the costs of access; improvement of the quality of transport in cities, metropolitan areas and regions, including the conditions of pedestrian and bicycle traffic, and taking account of the needs of the disabled; development of intermodal systems; development of the market of air services, in particular lifting the barriers for small carriers and regional airports; increase of the role of seaports and airports and improvement of access to these ports in local and national scale (Kabus, Strulak-Wójcikiewicz, Nurzyńska, 2016).

The currently valid strategic document relating to transport policy is the strategy prepared in 2017 entitled: "Sustainable Transport Development Strategy up to 2030" (Ministry of Infrastructure, 2017). According to this principal document, the national transport policy aims at increasing the availability of transport and improvement of safety of traffic participants, as well as ensuring the effectiveness of the transport sector by way of creating a coherent, balanced, innovative and user-friendly transport system in national, European and global dimensions. It should be indicated that Poland's link with European and global transport systems as well as the improvement of territorial accessibility in the national scale requires inter-branch integration. Reaching cohesion of the entire transport system is related with both a dynamic expansion of the missing infrastructure elements, to allow completing this system as soon as possible, and using modern technologies, including intelligent transport systems to facilitate the functioning of transport and to improve the safety of not only users of the infrastructure but also traffic participants. The principal goal of the Transport Development Strategy is to create an integrated transport system through, amongst others, investing in transport

infrastructure and creating advantageous conditions for the efficient functioning of transport markets, as well as development of effective transport systems to ensure creating links that allow performing deliveries of products and raw materials to enterprises and facilitate the movement of users of the infrastructure. The main goal of the "Sustainable Transport Development Strategy up to 2030" is presented in Figure 3.

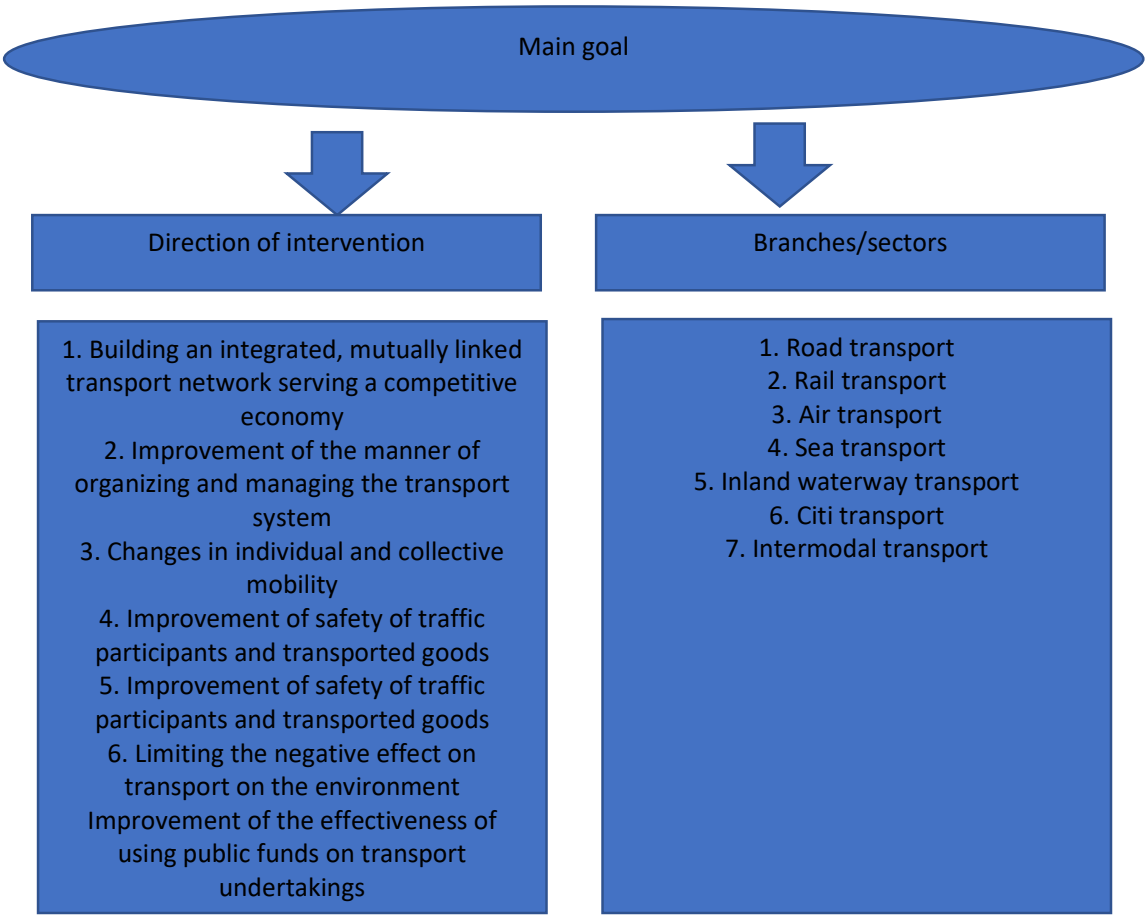

Fig. 3: Main goal and detailed goals of the "Sustainable Transport Development Strategy up to 2030"

Conclusions

Transport affects sustainable development, which refers to social, ecological, economic, spatial and functional factors, and the growth and effective functioning of the transport system allows conducting business operations. Moreover, the level of development of the transport system is the factor, which decides about the availability of transport (so called communication accessibility) in the given area.

The systemic transformation and its resultant economic changes significantly contributed to the improvement of the state of the transport system in Poland. Along with the systemic changes and economic transformations the transport policy has also changed. After the end of the command and control economy in Poland, legal regulations were being loosened, and general business became liberalized. This process also related to transport, which was reflected in the transport policy. Currently, the transport system is regulated by both national and EU laws. In addition, as from 1989 Poland started to prepare and implement (with different effects) strategic documents pertaining to the

transport policy. The Polish transport policy was changed numerous times due to a lack of a coherent concept of long-term transport development, and a lack of systemic solutions relating to financing these investments at the national and self-government level.

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Innovation in Russian Regions: Use of Incremental Analysis

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Abstract

The article is devoted to assessing the dynamics of innovative productivity of regions and the effectiveness of capital expenditures on technological innovation. The structural shift index and the incremental capital output ratio were used as assessment tools. The assessment was carried out in the context of the federal districts of Russia and the regions of the North-West of the country. The analysis revealed a tendency to relatively small shift the structure of innovative products and a tendency to increase the discrepancy between the structure of products as a whole and the structure of innovative products by regions. Regions were identified where the increase in capital expenditures for technological innovation exceeds the increase in innovative products, which is not clear evidence of the ineffectiveness of capital expenditures, but requires a thorough analysis of the situation. The approach used in the work and the conclusions drawn can be used in innovation management at the regional level.

Keywords: Region, Innovation, Structural Shifts, Incremental Capital Output Ratio.

Introduction

This section In February 2019, the Strategy for Spatial Development of the Russian Federation for the period until 2025 was approved. This document, undoubtedly, should become a significant milestone in the formation of state regional policy. However, in (Valentey, Bakhtizin and Kolchugina, 2019) it is indicated that the Strategy did not actually take into account the differences between the Russian regions both in terms of their socio-economic development and in their innovative potential, and its substantial refinement is necessary to specify its basic provisions and to create the mechanisms for enhancing the role of constituent entities of the Russian Federation in strategic development, taking into account differences in their development levels and potential.

The interconnection of regional development with innovation is currently not in doubt, however, questions of assessing the innovation effectiveness in the regions have not yet received comprehensive answers.

Effectiveness is the most important economic category that allows measuring the results of economic activity in comparison with its implementation costs. Based on the effectiveness indicators, areas for improvement are selected and optimal investment options are determined. The most important indicator of the region's economy effectiveness characterizing its economic power is the annual amount of products, work and services produced in the region and shipped to the consumers.

To assess the effectiveness of the region's economy and its innovative component, often use such characteristics as the amount of innovative products and their change over time, the share of innovative products in the total production, as well as indicators of innovation costs.

The most important type of innovation is technological innovation, which means the final result of innovation, embodied is a new or improved product or service introduced on the market, a new or improved process or method of production (transfer) of services used in practice. The costs of technological innovation are the actual costs represented in money units associated with the implementation of various types of innovative activities carried out at the enterprise's, industry's, region's or country's level. As part of the costs of innovation, statistics take into account current and capital costs. It is capital expenditures that constitute investments forming the material basis for the production of innovative products in the medium and long term, so their effectiveness should be the priority subject for analysis.

According to the methodology adopted in statistical accounting, capital investments (long-term investments) are annual expenses for the creation, increase in size, and the acquisition of non-current long term (over one year) assets not intended for sale, carried out in connection with the development and implementation of technological innovations . They consist of the cost of acquiring machinery, equipment, other fixed assets, as well as constructions, land and nature management facilities necessary for carrying out innovative activities.

This study sets the task of identifying trends in the structure of the regional economic space based on the examining of structural shifts in the indicators of regional innovative products, and assessing the effectiveness of capital costs for technological innovations.

Literature Review

An analysis of the strategic approach to the innovative development of the Russian regions is the content of the work (Aleksandr, Svetlana, Irina abd Elena, 2017). In (Karelina, 2015), significant interregional differences in the main indicators characterizing the innovative activity of the Russian regions are noted, and it is emphasized that in conceptual documents the allocation of specific zones of priority development is considered as an important aspect of the regional policy of the Russian Federation. .

Rodionov and Rudskaya (2017) conclude that the prerequisite for the economic development of Russia as a whole is the creation of an innovative environment in the regions, and in (Rodionov, Rudskaia and Degtereva, 2017) the significance of the regional foresight as the basis for the formation of national development plans is substantiated (Figure 1). Smirnova (2019) believes that regions objectively become a special space that allows an active implementation of innovative process. Gospodarchuk (2006) provides a number of reasons, due to which the regions become such a specific space.

The introduction of innovation in the regions is ensured by regional innovation systems, which should provide the dissemination of new knowledge, skills and best practices in the region (Cooke, 2002; Liu and Chen, 2003; Agrawal, Cockburn, Galasso and Oettl, 2014; Pino and Ortega, 2018).

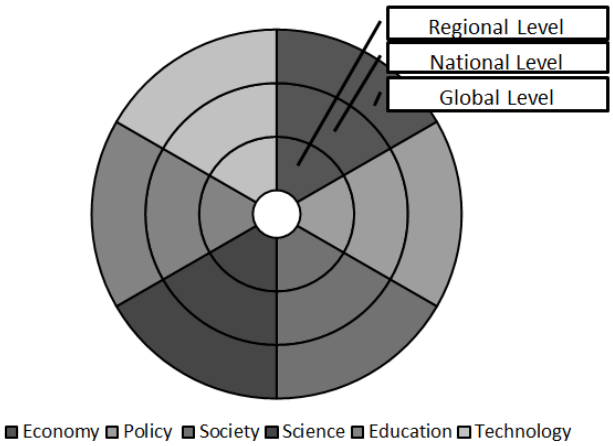

Fig. 1: The regional foresight in the context of global development

The presence of significant regional differences is demonstrated in (Valentey, Bakhtizin and Kolchugina, 2019). The works (Nosonov, 2014), (Rudskaia, 2017), (Goncharova, Degtereva and Sopilko, 2018), (Nikonova, 2019) are devoted to identifying problems that reduce the innovative activity of Russian regions and proposing measures to overcome them. There are a number of works exploring the problems of innovative development in certain strategically significant regions of Russia, for example, (Komkov, Selin, Tsukerman and Goryachevskaya, 2017), (Shestak, Shcheka and Klochkov, 2019). As possible drivers of innovative development of the regions the following are studied - active foreign trade (Tkacheva, Osadchuk, Kapustina, Kobersy and Litvinova, 2017), strengthening ties between business and science (Dvas, Malinin and Velichenkova, 2019), development of financial institutions and improving access to credit resources (Rozanova and Tishkov, 2019), level of informatization (Guzikova and Panteleev, 2015). The effectiveness of innovation in the context of investment flows was analyzed in (Ruyga, 2016).

An analysis carried out in (Kharitonova, Bondarenko, Yudina and Tanina, 2017) makes it possible to establish the presence of a very close dependence of the gross regional product per capita on innovation factors. The mentioned authors conclude that the possibilities for improving the regional economies' effectiveness determine the development of their innovative potential, the creation and introduction of innovation. At the same time, in (Kharitonova, Bondarenko, Yudina and Tanina, 2017) it is said that effectiveness must be considered from two sides - quantitative and qualitative. In the context of regional development, the quantitative side means saving resources, time for achieving the goals of the region, and the qualitative side reflects the nature of the resources, technologies and production methods used.

It should be noted that the problem of finding indicators adequately reflecting the results of innovation cannot be considered resolved. This is pointed out in (Bortnik, Zinov, Kotsyubynsky and Sorokina, 2013).

In (Moiseeva andArkharova, 2019), a comprehensive analysis of the organizations' costs of technological innovation as one of the indicators characterizing the innovation spillover within a country is undertaken and an increase in the share of R&D costs and costs of development new products and production methods against a background of reduced acquisition costs of machinery and equipment purchasing is denoted. Thus, the emphasis is on the development of innovation, rather than their scaling.

Data and Methods

The analysis is based on the regional data on total production, innovative production and costs of technological innovation for 2016-2018 represented in the website of Federal Statistics of Russian Federation (gks.ru).

To measure the strength and depth of the transformation, which manifests in structural changes, special methods are used in statistics, specific indicators are calculated. Within the research, to assess structural shifts Ryabtsev indices (Ryabtsev and Chudilin, 2001) were calculated. These indices make it possible to conclude about the sustainability of the economic system's development and allow economic interpretation without the use of comparative analysis (Elkhina, 2015) due to the presence of a scale for assessing the significance of structural changes and applicability to any set of statistical data. The meaning of the Ryabtsev index consists in the ratio of the actual measure of the discrepancy between the components of two structures with its maximum possible value. The index is calculated by the formula:

$$R = \sqrt{\frac{\sum_{i=1}^{N}(d_i^2 - d_i^1)^2}{\sum_{i=1}^{N}(d_i^2 + d_i^1)^2}},$$

where N – the number of components in the structures under comparison, d_i^j –component i of the structure j, j=1,2.

The scale for assessing the significance of differences between structures allowing recognizing the shifts is given in Table 1. 8 grades of structural difference are distinguished starting from the identity near to complete to the exact opposite. The changes in the structural difference allow concluding about the directions of changes occurring. The sharpness and strength of structural changes depend on the fluctuations (variations) of the absolute growth indices and specific gravity growth rates.

Table 1: Scale for assessing the significance of structural differences by Ryabtsev index

Interval of index values	Measure of structural differences
0,000 – 0,030	Identity Structures
0,031 – 0,070	Extremely low structural differences
0,071 – 0,150	Low structural differences
0,151 – 0,3	Significant structural differences
0,301 – 0,5	Medium significant structural differences
0,501 – 0,7	High significant structural differences
0,701 – 0,9	Opposite type of structures
0,901 and more	The exact opposite of structures

Source: (Ryabtsev and Chudilin, 2001, p. 46-47)

To evaluate the effectiveness of capital expenditures on technological innovations, the incremental capital output ratio (ICOR) was calculated:

$$ICOR_t = \frac{\Delta K_t}{\Delta V_t} = \frac{I_t}{V_t - V_{t-k}},$$

where ΔK_t is the growth of capital (investment) in the year t, ΔV_t is the growth of production in the year t, k is the number of years in the analyzed period..

It should be clarified that this indicator is commonly used in assessment the investments influence on gross product (Hayes, 2019). Given that capital expenditures do not always give effect in the current year, the analyzed period can be several years (m). In (Gulhati and Datta, 1983) it is noted that ICOR

depends on the pace of scientific and technological progress, the development of professional and managerial skills. ICOR is influenced not only by income from new investments, but also by income from existing assets. Since existing assets usually exceed capital investment, the performance of existing assets has a greater effect on ICOR than the quality of new investments. Thus, a decrease in capacity utilization will raise the ICOR, even if new investments are highly productive.

ICOR can be interpreted as the capital intensity of the increase in the volume of production, therefore it is a kind of "measure of ineffectiveness" - the lower is the indicator's value with an equal value of the increase in production volume, the more effective is the investment (Wai, 1985).

Results

The results of the analysis of structural shifts in the context of federal districts (FD) are represented in Table 2. It can be seen that the structure of shipped products in 2018 remained virtually unchanged compared to 2016. The Central FD is the leader in volume of production, the Volga FD is in second place, the Ural FD is the third, followed by the North-Western, Siberian, Southern, Far Eastern and North Caucasian FDs in descending order of production. To the 2018 the changes had place in the structure of innovative production: the leader has changed - the Volga FD took the largest share in the volume of innovative products, and the Central FD, the leader of 2016, took second place. In 2018, the difference between the structures of the volume of total production and the volume of innovative products which was already significant in 2016, increased.

Table 2: Coefficients of structural shifts by FDs of Russian Federation

Structures compared	Value	Interpretation
Correspondence of the structure of the volume of total products in 2016 and 2018	0,020	Identity Structures
Correspondence of the structure of the volume of innovative products in 2016 and 2018	0,147	Low structural differences
Correspondence of the structure of the volume of total products and the volume of innovative products in 2016	0,219	Significant structural differences
Correspondence of the structure of the volume of total shipped products and the volume of innovative products in 2018	0,249	Significant structural differences

Source: calculated by authors

Russian statistics do not allocate data on capital costs as a part of technological innovation costs. Therefore, to calculate ICOR, it's necessary to refer the structure of technological innovation costs by type of activity. This structure is presented in Table 3, where the costs that can definitely be attributed to capital are shown in bold. Thus, the lower estimate of the average share of capital costs in the total amount of costs on technological innovation may be taken equal to 37.2%.

Table 3: Cost structure for technological innovation in 2017

Types of innovation	Share, %
Research and development of new products, services and methods for their production (transfer), new production processes	42,3
Industrial design, design and other developments (not related to scientific research and development) of new products, services and methods of their production (transfer), new production processes	1,2
Acquisition of machinery and equipment related to technological innovation	34,1
The acquisition of new technologies	1,1
Software Acquisition	2,0
Other types of production preparation for the release of new products, the introduction of	10,1

new services or methods of their production (transfer)	
Education and training related to innovation	0,1
Marketing research	0,3
Other technological innovation costs	8,8

Source: (Moiseeva, Arkharova, 2019)

Figure 2 shows the ICOR values for 2 years. The only FD, where in the period under consideration, the indicator is less than 1, which means the excess of product growth over investment, is the North-West FD. In three districts - Siberian, Southern, and Central - the indicator values are negative, which is associated with a decrease in the volume of innovative products despite the fact of capital expenditures on technological innovations carried out.

Combined with a high aggregate share of these regions in the total volume of innovative products, this led to a very large ICOR value for the country as a whole.

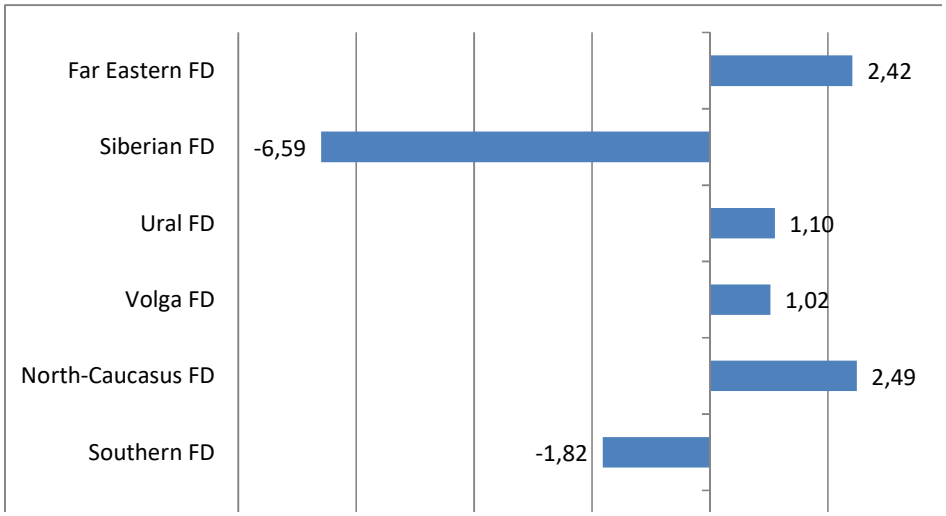

Fig. 2: ICOR for the FDs of Russia for 2016-2018

Similar estimates were made for the only effective North-Western FD in the period under consideration. As is evident from Table 4, over two years, no significant changes in the structure of innovative products had place in North-Western FD. The differences between the structures of total products and innovative products are significant, and in 2018, the differences intensified compared to 2016.

Table 4: Coefficients of structural shifts by region of the North-West FD

Structures compared	Value	Interpretation
Correspondence of the structure of the volume of total products in 2016 and 2018	0,028	Identity Structures
Correspondence of the structure of the volume of innovative products in 2016 and 2018	0,057	Extremely low structural differences
Correspondence of the structure of the volume of total shipped products and the volume of innovative products in 2016	0,271	Significant structural differences
Correspondence of the structure of the volume of total products and the volume of innovative products in 2018	0,279	Significant structural differences

Source: calculated by authors

The ICOR for the particular regions are shown in the Figure 3. In the North-West region, the Arkhangelsk region, the Republic of Karelia, the Pskov region and St. Petersburg were efficient in ensuring growth in the volume of innovative products greater than that of capital costs of technological innovations. In 2018, their total contribution to the production of innovative products constituted 87%. A decrease in the production of innovative products was observed in the Murmansk region, Novgorod region, Komi Republic and Vologda regions.

In the Kaliningrad and Leningrad regions, the volume of innovative products did not exceed the volume of capital costs for technological innovations.

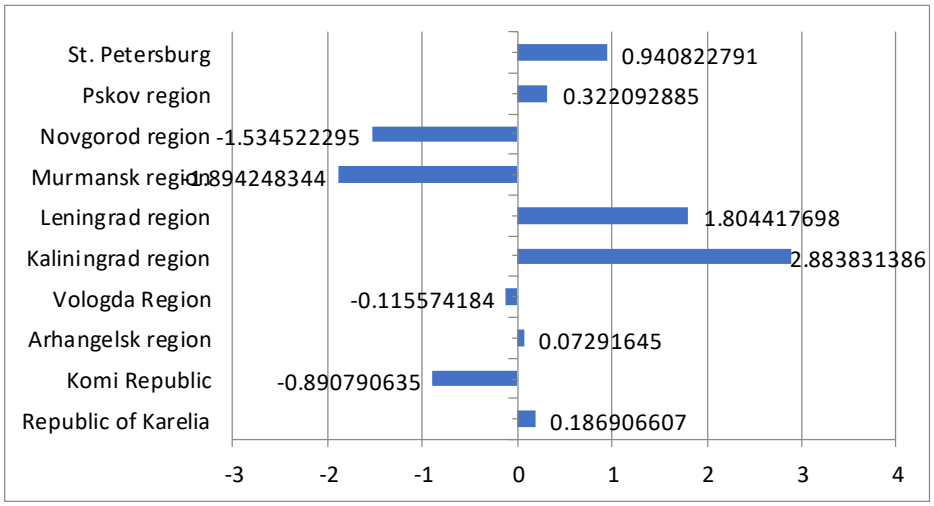

Figure 3: ICOR for the regions of North-Western FD for 2016-2018

Conclusions

The analysis undertaken made it possible to draw a number of conclusions significant to understand the investment situation in the regions of Russia.

1. The structure of production in total remains almost unchanged both in the context of FDs and in the regions of the North-West FD.

2. There is a tendency to shift the structure of innovative products by FDs, manifested in particular in the leadership in innovative products of the Volga FD in 2018 instead Central FD in 2016. The shift in the structure of innovation production in FDs is more pronounced than the shift in total output.

3. The values of the ICOR in the context of federal districts vary widely, and a deeper analysis is needed to explain the reasons. The decrease in the volume of innovative products can be attributed to the following reasons: 1) the general economic crisis, which undermined the demand for products and caused the departure of a number of innovative enterprises from the market; 2) the expiration of the period after which products manufactured by new technologies are considered as innovative in statistics; 3) against the background of the reasons mentioned above in certain combination, the capital expenditures on technological innovations have not yet reached the stage of payback.

4. In the North-West FD, there is a tendency to shift the structure of the output of innovative products, the discrepancy between the structure of total products and that of innovative products is intensifying.

5. In the North-West FD, there are 4 out of 10 regions where, in the period under consideration, capital expenditures on technological innovations were effective in terms of the growth of innovative products. Such a situation gives these regions the opportunity to expand capital expenditures in

technological innovations, provided they are carefully substantiated and the availability of promising projects, as well as make investments in science and education.

6. There is no homogeneous innovative space in the Russian Federation neither in the terms of FDs, nor within North-Western FD. The incremental analysis shows the significant difference in the effectiveness of the capital costs in technological innovation between the components to the moment and this confirms their being in different stages of innovative process.

Acknowledgment

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Project Managers and Cultural Intelligence in Lebanon

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Abstract

Globalization has had a significant impact on all businesses and industries including construction. It reduced distance and time between all points of the world in near real-time which stimulated international projects. Lebanon plays an important role in international business activity due to its strategic location on the Mediterranean Sea. Lebanese engineers and construction companies for example, work in different countries throughout the Middle East and the Arab world. Working with people from different cultures can present a unique set of problems and challenges. The concept of Cultural Intelligence (CQ) looks at the ability of effectively adapting to different cultures. On the surface, it would seem the Lebanese people and industries should have a high CQ due to Lebanon's culturally diverse population and its history as a trade portal between Europe and the Middle East. The aim of this paper is to understand the level of awareness of CQ and determine if it is being used to solve cross-cultural complexities in Lebanon's construction industry. An online survey was developed and administered to project managers who have worked in Lebanon. The paper concluded that Lebanese project managers (PMs) have a high level of CQ and they have experienced the need for CQ awareness and training.

Keywords: Cultural Intelligence, Project Management, Construction, Middle East.

Introduction

Messner (2008) explained that project-based industries including construction are becoming more and more globalized. That is caused by different reasons and mainly because firms are now seeking to acquire and implement international specialized knowledge from around the globe as per MacDuffie (2007). For such companies, effective interactions that are meant to facilitate the flow of geographically distributed information and knowledge, are the main requirements behind project success as mentioned by Ioro et al. (2014). For globalized firms, successful project outcomes require effective work interactions that can facilitate the transfer of geographically distributed information and knowledge.

Lebanon has been and still is a socially and economically liberal country. The service sector is the most developed of Lebanon's economic sectors. It is known that Lebanon has always been a prime location for most of the Arab countries investments, tourism and personal recreation for several reasons. Lebanon has beautiful scenery with its mountains, valleys and the ocean which aren't available in most Arab countries. It has a well-developed banking sector. Culturally it is a hybrid of the East and the West. Finally, and most importantly, its geographic location allows it to serve as a trade key portal between Europe and the Middle East.

After gaining independence in 1943, the country implemented a liberal economic system giving it a huge competitive advantage over other countries in the region. Shehadi et al. (1988) mentioned that new trade agreements with Arabian countries helped the economy grow faster. During the Lebanese civil war (1975-1990) the country was destroyed and the economy collapsed including the construction sector. After 1990, the government started a huge construction wave in order to rebuild what was destroyed. This construction plan was catalyzed by the governments plan that was based on foreign

investment and the Lebanese diaspora money. Therefore, the construction industry grew rapidly and soon it boomed in all of the country.

Throughout its history, Lebanon has been the destination for people migrating from poorer countries such as Egypt, Syria, Ethiopia, the Philippines, Bangladesh and others. Despite its small size, Lebanon has a large number of people from different cultures, religions and ethnicities living within its borders. According to the UNDP's 2016 report, "A labor needs assessment for Lebanon", stated that the percentage of foreign workers in the construction industry, outside the managerial and professional positions, is around 55% and most of them are Syrians. The report presented statistics retrieved from the Lebanese Contractors' Union and Syndicate of Construction Contractors showing the total number of workers, including all occupational levels, in the construction sector was 460,600 of which 350,000, 75%, were Syrians.

The objective of this paper is to investigate the awareness of cultural differences and the level of cultural intelligence among Lebanese project managers.

Literature Review

Cultural Intelligence

Project management can be traced back historically to ancient times. It can be logically deduced that the successful completion of ancient mega-projects must have required activities such as planning, managing, coordinating, controlling and others. Wu (2010) stated that projects such as the Pyramids of Egypt, the Great Wall of China, the Taj Mahal of India and others, couldn't have been delivered without project management skills. From another angle, ancient civilizations such huge structures in order to express their power and were often built by culturally mixt labor force, formed by the conquered civilizations. Although they might have never been culturally sensitive, yet they definitely operated in multicultural settings. Culture comprises the different behaviors, beliefs and concepts (e.g., music, cuisine, religion, interpersonal relationships, ethics, habits, business practices) unique to a specific group of people. People working in multicultural settings must understand these factors can positively and negatively affect communications and interpersonal relationships. According to Ang et al. (2008, 2015), Cultural Intelligence is the capability to function effectively across various cultural contexts (e.g., national, ethnic, organizational). Ng et al. (2006) refers to CQ as the ability to effectively adapt to new cultural settings. According to Livermore (2010), CQ is an acquired skill and not innate.

As businesses enter the globalized economic and industrial world, their employees must learn how to manage and relate to multiethnic team members and contacts. For example, a firm in China may be designing or managing a project in South America with team members from both, or even other, countries. Globalization has created a critical need for competencies and skills to help people deal with those from different cultures and backgrounds and to effectively and efficiently manage these differences in order to insure project success.

Cultural Intelligence in Engineering & Construction:

Just as any other profession or field, the engineering and construction fields need cultural intelligence skills to achieve success. For instance, the American Society of Civil Engineers' Civil Engineering Body of Knowledge for the 21st century stated that civil engineers must be trained to "work alongside and report to people from other cultures" (Page 134) and "meet challenges that cross cultural, language, legal and political boundaries while respecting critical cultural limitations and differences" (page 144). Parkinson (2009) stated that for engineering graduates to be globally competent, they must be able to "communicate across cultures", "appreciate other cultures" and "work in teams of ethnic and cultural diversity". In an important study by Warnick (2010), representatives from the engineering industry were asked to rank by importance several qualities to hire engineers. Among the top eight global qualities, were: "communicate cross-culturally", "work in international teams" and "appreciate and understand different cultures".

Cultural Intelligence Structure:

Du Plessis (2011), looked at articles on CQ (Early et al. 2003; Van Dyne et al. 2005 and Ng et al. 2006) and identified four components of CQ:

- Meta-cognitive CQ: the person's awareness of the differences during intercultural interactions. It is a high class mental ability to think about others and to anticipate the outcome of cross-cultural interactions which helps the person to amend his mental model during the experience.
- Cognitive CQ: the person's knowledge of resemblances and differences between cultures. It includes the norms, practices and conventions in different cultures which can be learned by experience or education. It is a very important prerequisite as it helps the person to adapt effectively.
- Motivational CQ: the person's willingness to adapt and learn about other cultures. In other words, it can be explained as the reason why the person is doing the interaction. It can be cause by personal enjoyment to interact with different cultures or by a tangible benefit that will come out of this interaction.
- Behavioral CQ: the person's ability to change his verbal and nonverbal behavior during intercultural interactions. Most importantly, adapting a behavior that is acceptable by other cultures, especially that behaviors are interpreted differently between cultures.

Methodology

A survey was prepared and shared with project managers (PM) who had hands-on experience in managing construction projects in Lebanon. The survey consisted of 25 questions divided into two categories: 6 questions covered general demographic profiling of the participant, 19 questions dealt with CQ. The questions were formulated based on previous questionnaires available online, the researcher's experience and the Cultural Intelligence Scale (CQS), a CQ measuring tool developed by the Cultural Intelligence Center. A seven-point Likert scale was used as recommended in the literature. Lewis (1993) found that a seven-point scale resulted in a stronger correlation with t-test results. Symonds (1924) was the first to suggest using a 7-points scale as it optimizes reliability.

An online survey was used given that it reaches a bigger audience and gather data more quickly. The online survey was sent to 285 professionals from Lebanon and the Arab Gulf. Out of the 81 responses only 41 worked in Lebanon. These 41 were accepted as respondents in this study. The survey was validated using pilot testing and trustworthiness. In addition, resulting data reliability was validated using SPSS software.

Results Presentation & Discussion

Population Demographics

The first six questions covered the demographics of the respondents (e.g., gender, age, education, experience. Five respondents (12.2%) were female and the remaining were male (87.8%). This clearly indicated that project management was mainly a male occupation in Lebanon. The lack of gender equity was also apparent during the original online search for respondents. While there can be many reasons for the gender disparity, two main reasons were proposed. First, Lebanese social structures reflected those of male dominated Arab communities. Second, Lebanon retained gender stereotypes in (e.g., women should only raise families, the engineering profession is only restricted to males).

Table 3 – Respondents' age brackets

Q2 - Age Brackets		
Category	Frequency	Percentage
18 - 24	2	4.88%
25 - 34	25	60.98%
35 - 44	7	17.07%
45 - 54	3	7.32%
55 - 64	4	9.76%

Participant age was divided into 5 groups (Graph 1). Twenty-five respondents (61%) were between the ages of 25 and 34. The remaining 39% were scattered between the other groups.

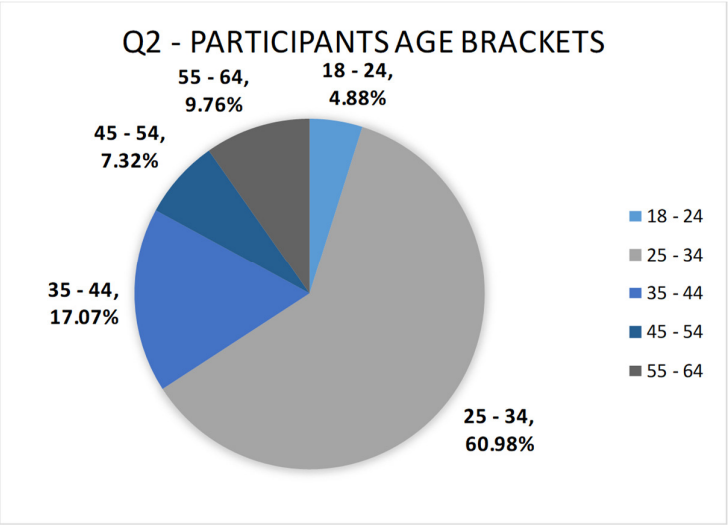

Graph 1: Respondents' age brackets

Education level varied with 46.34% having a Bachelor Degree, 46.34% a Master's degree, 2.44% a PhD and 4.88% a high school diploma. Five respondents (12.2%) acquired a Project Management Professional (PMP) certificate (Graph 2).

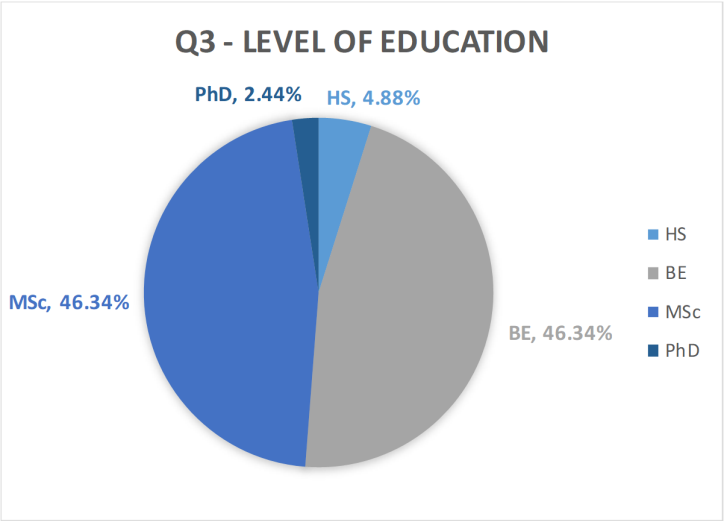

Graph 2: Respondents' level of education

Experience was assessed by two variables: number of years on the job and approximate total value (in million dollars) of the jobs each participant had managed. Two different factors were used to examine experience in order to reflect the complexity of bigger projects and how they affect experience. For example, a manager with only five years' experience could have spent these years working on a project with a value of $50 million. Another manager with 10 years' experience could have spent this time on smaller projects with a total value around $15 million. In other words, a PM can work on a megaproject (worth billions of dollars) for 3 years while another can work on much smaller projects for 10 years.

Table 2: Respondents' years of experience frequencies and percentages

Q4 - Years of experience		
Category	Frequency	Percentage
1 - 3 years	8	19.51%
3 - 5 years	6	14.63%
5 - 10 years	9	21.95%
10 - 15 years	7	17.07%
15 + years	11	26.83%

Years of experience was divided into 5 categories. Table 2 and Graph 3 provides the results: 1-3 years, 8 respondents (19.51%); 3-5 years, 6 respondents (14.63%); 5-10 years, 9 respondents (21.95%); 10-15 years, 7 respondents (17.07%); more than 15 years, 11 respondents (26.83%).

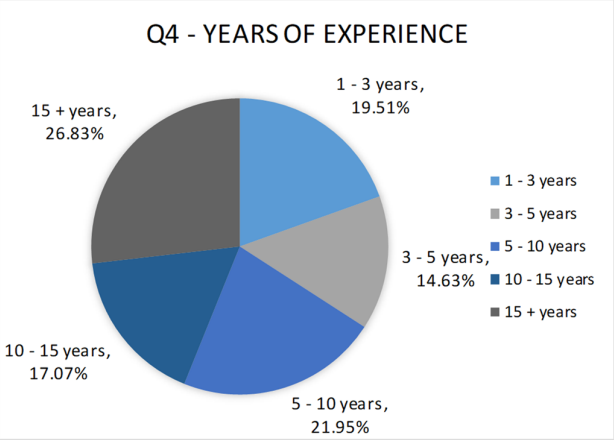

Graph 3: Respondents' years of experience

Total value of jobs was divided into five categories. Table 3 and Graph 4 provides the results for question five: less than 5 million $, 6 respondents (14.63%); 5 to 10 million $, 6 respondents (14.63%); 10 to 25 million $, 3 respondents (7.32%); 25 to 50 million $, 3 respondents (7.32%); more than 50 million $, 23 respondents (56.10%).

Table 3: Respondents' projects total value frequencies and percentages

Q5 - Projects Total Value		
Category	Frequency	Percentage
Less than 5 million $	6	14.63%
5 - 10 million $	6	14.63%
10 - 25 million $	3	7.32%
25 - 50 million $	3	7.32%
More than 50 million $	23	56.10%

Results were close in each category for years of experience. This was not true for total value of jobs where more than half of the respondents (56.1%) had worked on more than $50 million dollars' worth of projects.

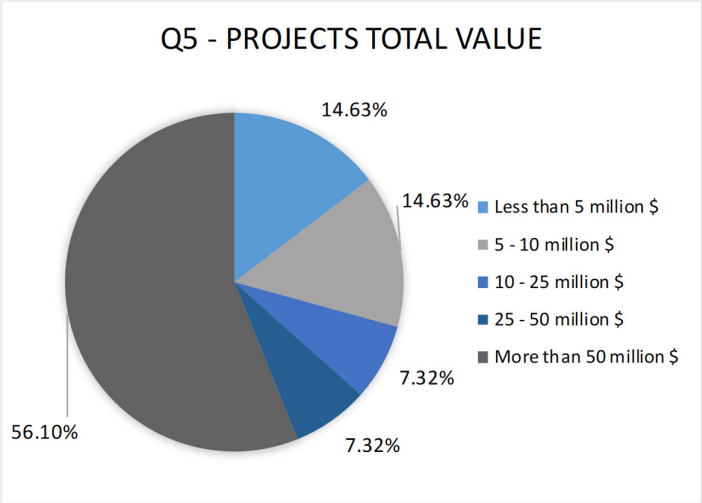

Graph 4 : Respondents' projects approximate total value

When comparing the results of questions 4 and 5, it can be seen that 23 respondents (56.10%) have worked on projects of more than 50 million dollars while only 11 respondents (26.83%) have more than 15 years of experience. This implies that the 7 respondents (17.07%) having between 10 and 15 years of experience and some of the respondents having between 5 and 10 years have worked on projects of value more than 50 million dollars. This proves the validity of using both questions to examine experience that was previously explained.

In addition, when comparing the age brackets (question 2) and the years of experience (question 4), we can also identify a discrepancy. 11 respondents (26.83%) have more than 15 years of experience against only 4 respondents (9.76%) being between 55 and 64 years old. This implies that all of the respondents between the ages of 45 and 54 have more than 15 years of experience and 4 of the respondents between the age of 35 and 44 have more than 15 years of experience. The biggest percentage of respondents were between 25 and 34 years old and were scattered between 1 and 15 years of experience.

Cultural Intelligence

The remaining 19 questions covered the concept of Cultural Intelligence through yes or no questions and questions using seven=point Likert scales.

General knowledge

Questions seven through nine looked at general knowledge of CQ (Graph 5). In other words, general knowledge describes if the respondents understood the concept of CQ, if they have solved any problem using CQ and if they were able to easily identify cultural differences.

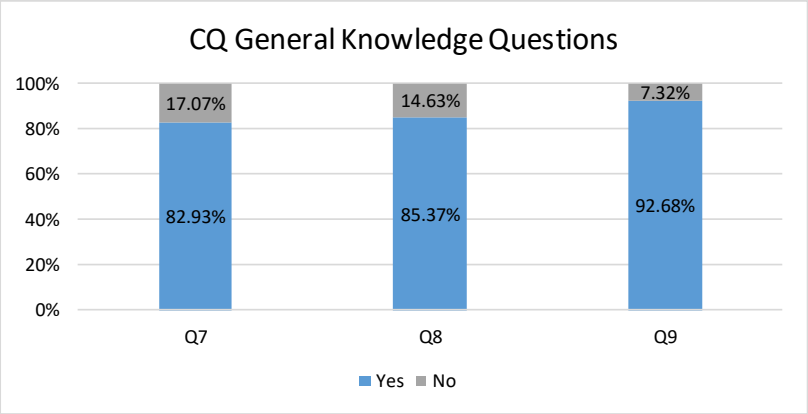

Graph 5 : CQ general knowledge, Q7 to Q9

Q7 indicated 82.93% of the respondents understood the concept of CQ while 17.07% did not.
Q8 showed 85.73% had solved at least one problem at work using CQ at some point in their career while 17.07% hadn't solved any problems using CQ. While some of the respondents recognized the term Cultural Intelligence, some of them confirmed that they do understand and apply the concept without knowing its name and the fact that it became a well-established line of research.

Q8 indicated some of the respondents had unknowingly used CQ solutions based on their experience in working with different cultures.

Q9 showed that 92.68% of the respondents could clearly identify cultural differences in their jobs while 7.32% were unaware of them (Graph 5). The differences in the results of Q8 and Q9 posed an interesting question. If the majority of respondents were able to identify cultural differences what prevented them from using culturally related solutions to solve problems? Most likely, this difference in percentages is due to the lack of professional training for PMs in CQ.

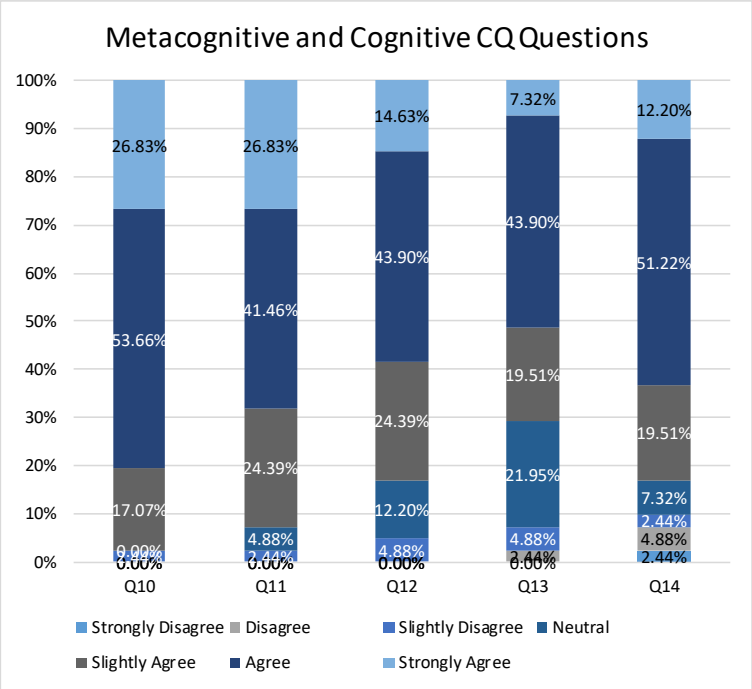

Graph 6: Metacognitive CQ (Q10, Q11) and Cognitive CQ (Q12 to Q14)

Metacognitive CQ

Q10 and Q11 covered metacognitive CQ by looking at the cultural knowledge of PMs (Graph 6). 97.56% of the respondents fell on the positive side of the Likert scale when asked if they adjust their cultural knowledge in cross-cultural interactions in Q10. 26.83% strongly agreed, 53.66% agreed, 17.07% slightly agreed and only 2.44% slightly disagreed. When asked in Q11 if they checked the accuracy of their knowledge during interactions with new cultures, 26.83% strongly agreed, 41.46% agreed, 24.39% slightly agreed, 4.88% were neutral while 2.44% slightly disagreed. These numbers indicated that PMs in Lebanon were well aware of the existence of differences between cultures and were aware of their cultural knowledge.

Cognitive CQ

Three questions (Q12, Q13, and Q14) covered cognitive CQ (Graph 6). Q12 asked if they were familiar with cultural values, religious beliefs, traditions and arts of other countries. 14.63% strongly agreed, 43.9% agreed, 24.39% slightly agreed, 12.2% were neutral and 4.88% slightly disagreed. In Q13, respondents were asked if they were familiar with the rules of verbal expression in different cultures. 7.32% strongly agreed, 43.9% agreed, 19.51% slightly agreed, 21.95% were neutral, 4.88% slightly disagreed and 2.44% disagreed. Q14 asked if respondents were familiar with the rules of nonverbal expression in other cultures and if they changed their expression when necessary. 12.2% strongly agreed, 51.22% agreed, 19.51% slightly agreed, 7.32% were neutral, 2.44% slightly disagreed, 4.88% disagreed and 2.44% strongly disagreed. The results of these three questions indicate that the majority of the PMs in Lebanon are culturally educated and try to use their knowledge as much as possible. In other words, the respondents try to add to improve their cultural knowledge and data base as needed. For example, when encountering people from unfamiliar culture on a job, Lebanese PMs tend to engage with them in cultural discussions to further understand their background and culture.

Motivational CQ

Two questions, Q 15 and Q16, studied the motive behind the CQ (Graph 7). Some people succeed in multicultural settings because they enjoy it, others because they are obliged to do it and others do not succeed. Q15 asked if the PM enjoyed living and interacting with different cultures. 31.71% strongly agreed, 29.27% agreed, 17.07% slightly agreed while 19.51% were neutral and 2.44% slightly disagreed.

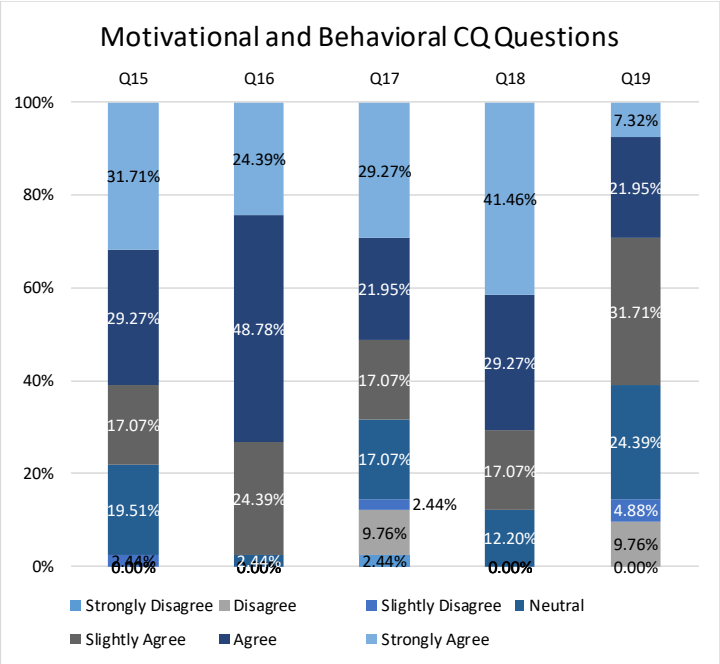

Graph 7: Motivational CQ (Q15, Q16) and Behavioral CQ (Q17 to Q19)

Q16 asked if the PM was confident in his or her ability to socialize with people from different cultures. 24.39% strongly agreed, 48.78% agreed, 24.39% slightly agreed and only 2.44% (1 person) was neutral. These numbers indicate PMs in Lebanon enjoy interaction with different cultures and are willing to adapt and learn about them.

Behavioral CQ

Three questions (Q17, Q18, and Q19) looked at behavioral CQ by asking about participants' behavior in cultural interactions (Graph 7). Q17 asked if they changed their verbal behavior (e.g., accent, tone) in cross-cultural interactions. 29.27% strongly agreed, 21.95% agreed, 17.07% slightly agreed, 17.07% were neutral while only 2.44% slightly disagreed. Q18 asked if they changed their speed of speaking and used pauses and silence in cross-cultural interactions. 41.46% strongly agreed, 29.27% agreed, 17.07% slightly agreed while only 12.2% were neutral. Q19 asked if they changed their facial expressions during cross-cultural interactions. 7.32% strongly agreed, 21.95% agreed, 31.71% slightly agreed, 24.39% were neutral, 4.88% slightly disagreed and 9.76% disagreed. These responses showed a marked difference from the previous questions. Although the majority changed their facial expressions the distribution of responses was very different. The results of the behavioral CQ questions indicate PMs can adapt their verbal and nonverbal expressions as needed during interactions with people from different cultures.

CQ Training

This section looked at CQ training (Graph 8). Q20 asked if they were trained on the importance of CQ and the importance of their roles in cultural interactions. 32 were self-trained, 7 had professional training and 9 were never trained. Q21 asked if they were trained to develop an open mind towards cultural differences. 37 were self-trained, 6 were professionally trained and 3 were never trained. Q22 asked if they were trained to appropriately address people from different cultures. 38 were self-trained. 5 were professionally trained and 2 were never trained. Q23 asked if they were trained to learn basic terms or new languages to easily interact. 30 were personally trained, 7 were professionally trained and 9 were never trained.

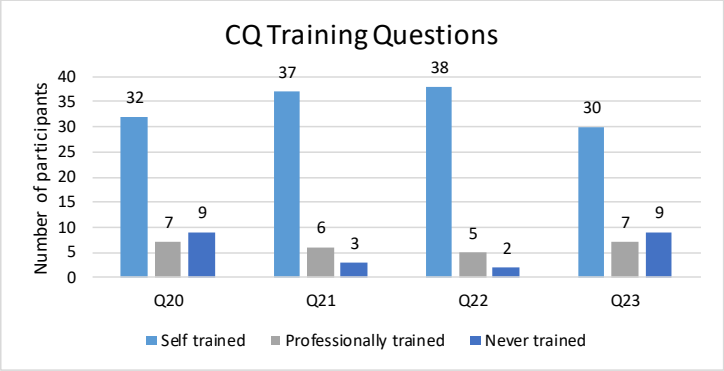

Graph 8: CQ training questions, Q20 to Q23

It is very important to point out that a person can be professionally AND/OR self-trained. The questions were formulated in such way in order to understand if PMs are self-trained on CQ, professionally trained or never trained. The reason behind this examination is that PMs could've experienced cultural differences and the need for CQ however they were never trained by their company. As a result, they resorted to self-training in order to keep up with the workplace challenges.

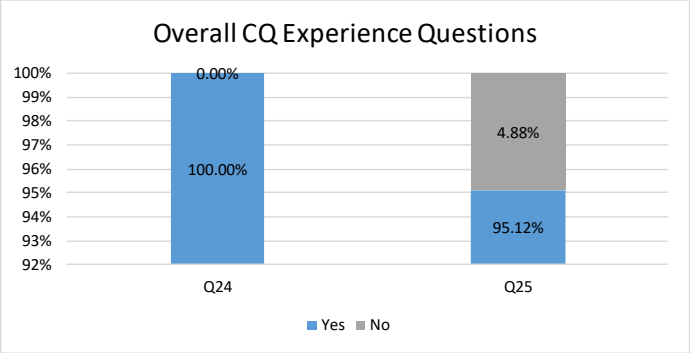

Graph 9: Overall CQ experience questions, Q24 and Q25

The most interesting finding in this section was the high number of self-trained PMs versus the low number of professionally trained PMs. This indicates that people have experienced cultural differences and felt the need to educate themselves in order to succeed in the multicultural workplace. At the same time, it points to a lack of professional acknowledgement of the need for training on CQ requiring PMs to find the information on their own.

The final section looked at how CQ affected participants' careers (Graph 9). Q24 asked if they learned that people from different cultures have different orientations and expectations; 100%, 41 respondents,

responded yes. Q25 asked if CQ improved their own productivity and the overall performance; 95.12%, 39 respondents, agreed.

Conclusion

This paper indicates CQ's importance based on the experience and feedback of PMs with hands-on experience in Lebanon's construction and engineering industries. The concept of CQ was familiar to the PMs although some of them understood the concept without knowing the term. Second, the findings indicate that PMs in Lebanon have a high level of CQ. PMs have experienced cultural differences and, therefore, the need for CQ training. Since they were not provided with training through their professional organizations, they often trained themselves. Finally, it was evident that CQ was a very important factor in improving the overall productivity and professional performance of PMs.
In conclusion, CQ is a relatively new but extremely important concept in business and industry practice. As with any other new topic, it can suffer from a lack of credibility. This study shows the need for CQ training and education in the construction industry. It also indicates the positive impact CQ training can have on individuals' performance, project management and therefore, project success. For companies, project success is highly related to company profits. For this simple reason, companies should look more into CQ and include it in their professional training programs.

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Conceptual Model of An IoT-Based Enhanced Living Environment for Elderly

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Abstract

The world's population is aging and the number of elderly people is constantly growing. Healthcare systems need to be rethought to meet these challenges. With IoT technology, systems for monitoring the health of the elderly can be developed. RO-SmartAgeing, a remote health monitoring system based on IoT, is presented as a case study for the development of a smart living environment for elderly. There is no global standardization yet, thus developers have trouble setting up an efficient way to transmit, store, administer, secure and provide data from this smart environment. An IoT platform would solve these difficulties through the efficient and adequate management of medical devices, implemented with several technologies, protocols, microcontrollers, sensors, actuators belonging to different entities.

Keywords: IoT, enhanced living environment, health monitoring, IoT platform.

Introduction

The continuous evolution of medical sciences and related technologies is one of the main growth factors of life expectancy worldwide, a phenomenon that is expected to continue in the future (World health statistics, 2019). This tendency is a trigger for profound societal changes due to an expected growth, with a rapid rate in the number of elderly people (World population prospects, 2019). These demographic projections are often correlated with an inevitable multiplication of health issues and impairments that older adults will have to face in the daily life. Based on these perspectives, the increase in medical expenses puts a strong pressure on traditional centralized healthcare systems, affecting their level of sustainability in the medium and long term, with predictable negative consequences on the quality of life (QoL) for the elderly and people with disabilities. Therefore, there exists an increasing demand for developing elderly care services utilizing novel assistive technologies, with the aim of providing efficient remote elderly monitoring services to support an active and independent living (Azimi et al. 2016).

Starting from the necessity to maintain and foster the autonomy of elderly people and, thus, to improve their QoL, various research programs were operationalized, ambient assisted living (AAL) being the most important initiative at UE level. AAL represents an emerging multi-disciplinary field and is strictly related to an ecosystem of different technologies and applications for personal healthcare monitoring and pervasive and ubiquitous computing (Dohr et al., 2010). In this sense, AAL encompass all of the new assistive technologies that underpin the development of intelligent systems, capable of providing integrated services not only for data collection, event monitoring, or environmental sensing, but also for healthcare assistance through supporting smart decision and recommendation, based on the user behavior understanding (Koleva et al., 2015).

Enhanced Living Environments (ELE) is another concept closely related to AAL area, mainly associated with all information and communication technologies (ICTs) used in maintaining an active and independent life for a wide category of people (e.g. elderly people, people with disabilities, etc.). For this purpose, ELEs promote a broad range of healthcare services and applications that help to maintain these vulnerable categories more autonomous as long as possible within their preferable living environment (Marques et al., 2019). Currently, most efforts are converging towards the

development of ELE / AAL solutions able to provide continuous monitoring and control of the environment, based on pervasive devices and use of ambient intelligence to mix these devices. This ecosystem offers the possibility for an increasing quality of life (QoL) and better living conditions for elderly and disabled people, improving their health and safety in an effective and often pervasive manner (Goleva et al., 2017).

According to different analysis (Dimitrievski, et al., 2016), (Zdravevski et al. 2019) there are several research directions falling within this scope. Most of the efforts are directed towards the development of ALE / ELE systems that aim to monitor daily activities, detect specific events (e.g. falls, or false alarms), automate assistance, and decrease caregiver burden (Trajkovik et al., 2015). Another important area of application, but insufficiently explored, refers to the continuous monitoring and supervision of some more serious health issues, such as accidents and vital signs by means of sensors especially developed for this purpose. Sensor devices are supported by various algorithms and computational techniques, context modeling, location identification, and anomaly detection (Poon et al., 2015). Thus, ELE incorporates the latest technological achievements related to the sensor design and material science: wireless communications and data processing, as well as machine learning, cloud, IoT, edge, and fog technologies, which extend traditional sensing and monitoring systems, opening the way to the implementation of cost-effective and easy to use remote health, activity and environment parameters monitoring, as an efficient method to improve individuals' independence and facilitate healthcare assistance for elderly people at home (Angelov et al., 2019; Pombo et al., 2015).

In line with different AAL/ELE perspectives regarding the use of new and innovative solutions for an active and independent ageing, this paper proposes a complementary approach in this field, by proposing a conceptual model of an IoT-based enhanced living environment for elderly and disabled people, as a useful reference for future practical development of a AAL/ELE system for continuous health monitoring and supervision. Next, the paper is organized as follows. Section II presents a state-of-the art of different ELE technologies aiming to construct safe environment and provide better healthcare services for elderly and disabled people. Section III presents a conceptual model of an IoT-based enhanced living environment for elderly and disabled people, viewed as a support for a new architectural development of a healthcare, environment parameters and activity monitoring system. Section IV briefly presents some of the results obtained by the research team of the project "Non-invasive monitoring system and health assessment of seniors in an intelligent environment (RO-SmartAgeing)", which demonstrates the potential, efficiency and usefulness of advanced IoT based ICT solutions in the field of healthcare. The final section presents the conclusions and subsequent approaches.

Related Work

In the last decade, the development and integration in consumer devices of a wide range of sensors for healthcare, well-being, and fitness, have led to the availability of a vast amount of personal health data (Suciu et al., 2015). This has generated a huge opportunity in both healthcare and healthy lifestyle, to provide cost-effective, personalized, and real-time monitoring, detection and recommendations services. In this context, many of the AAL/ELE research and development initiatives aim to support these efforts, both for the end users and healthcare providers.

Despite the progress made in development of sensing technologies, vital signs monitoring techniques, risk and accident detection methods, activity recognition techniques, communications technologies, etc., there are several open issues in implementing efficient solutions, especially in the field of active and independent aging. Most of the current efforts still do not fully meet the general needs of the older adult for safety in carrying out daily activities, social connections, or more personalized healthcare assistance. Other issues concern the implementation of these solutions and are related to usability, user interface, data structure, ubiquitous design, ergonomics, and data access (Koleva et al., 2015), while others are related to ethical and social aspects such as user acceptance, privacy and confidentiality of information (Azimi et al., 2016).

As part of the effort to address these challenges, Karvinen et al. (2019) explore the RDF storage solutions with the aim of finding a specialized database, capable of storing and processing RDF data,

which sufficiently meets the ELE storage needs. More specifically, they focus on a Smart Space platform aimed at running on a cluster setup of low-power hardware that can be run locally entirely at home with the purpose of logging data for a reactive assistive system involving activity recognition or domotics. Based on literature analysis of RDF stores, the authors suggest different relevant aspects of RDF storage systems that need to be considered in AAL/ELE environments and provide a comparison of available solutions.

Vogiatzaki et al. (2019) focuses on finding cost-efficient solutions to support mental well-being as methods for physical and mental rehabilitation for the elderly at home, combining progress in applied clinical "know-how" with stimulating engagement through entertainment and "real feeling" of gaming environment. For this, an automated home ICT system is envisaged by the authors for utilization by patients, care providers, and family members for the effective use of rehabilitation procedures in familiar environment. The authors propose a full system solution that integrates a set of state-of-the-art technologies, such as augmented/virtual reality gaming, multi-modal user interfaces, and innovative embedded micro-sensor devices, combined together in a Personal Health Record (PHR) system, supporting the delivery of individual, patient-centered electronic health (eHealth) services both at home, at hospital, or on the move.

In the context of anticipated demographic changes, Angelov et al. (2019) emphasize the necessity for development of cost-effective, real-time, remote sensing and health-status monitoring solutions for elderly and disabled people, in order to support their QoL improving and create better living conditions in the environment of their choice. The authors provide an overview of relevant sensing technologies, vital signs monitoring techniques, risk and accident detection methods, activity recognition techniques, communications technologies, etc., and conclude that new types of network paradigms, such as the Internet of Things (IoT), will extend traditional sensing and monitoring systems giving an advantage to control the environment.

Zgheib et al. (2019) address some interoperability issues in IoT-based AAL/ELE heterogeneous environments, suggesting the use of semantic middleware architectures (consisting of both technical and semantic components) as a complete interoperable solution. The authors present an overview of the existing semantic middleware proposals that address many of the research challenges regarding the interoperability in IoT systems that still remain open, such as scalability, real-time reasoning, provision of a simple application programming interface (API) usable in various application domains, provision of a complete ontology that is able to describe both domains and sensors in IoT, etc. The authors consider the recently proposed Web of Things (WoT) architecture as one of the major candidates for solving the interoperability issues in IoT in general.

Koleva et al. (2015) provide a comprehensive overview of the main challenges in the design and realization of an effective Ambient Assisted Living (AAL) system. Authors propose solutions to overcome those challenges during the development of "eWall for Active Long Living" (eWALL) project. The goal of the eWALL system is to offer a personal health monitoring system combined with positive reinforcement, medical reminders, connection to social networks for enhancement of social relations, in addition to home security and alerts for medical personnel in case of emergency.

Rajini (2019) presents the advancements in the IoT based healthcare methodologies and investigates the individual IoT security and privacy characteristics such as security needs and threat models from the health care aspects. Additionally, the author explains the way how various technologies like big data, ambient intellect, and wearable can be influenced in a healthcare framework; it resolves different eHealth policies and IoT guidelines globally to identify how they support economy and society with respect to sustainable development; and allows new research directions on IoT based healthcare sector.

Xu et al. (2019) propose a framework concept that support behavior monitoring through noninvasive and privacy preserving sensing. Collecting data are transmitted and used for analyzing sensing information with low richness. This framework aims to increase the users' perceived privacy in existing monitoring systems, avoiding data over-collection and over exposure of problems.

Conceptual model for an Enhanced Living Environment

IoT devices give direct, all time access to the patient in a less intrusive way than other alternatives. They empower individuals in attending to their own health, and allow providers to deliver better care to patients. This results in fewer accidents from miscommunication, improved patient satisfaction, and better preventive care (Tutorials Point, 2016). Continuous monitoring offers an analysis of real-time vital parameters of the patient, which proactively uses IT tools to associate data from many sensors, estimate risk levels (Alexandru, Ianculescu, 2017). Given the global aging of the population, it is necessary to objectively identify the specific health problems, living conditions and life experiences of the elderly and to ensure effective and safe real-time communication between health professionals and patients. The active and healthy ageing domain includes the following services and activities:

- Continuous monitoring of the activity with the purpose of detecting conditions or risk events;
- Emergency detection;
- Early detection of cognitive fall;
- Social connection assistance;
- Physical activity and home rehabilitation consultant;
- Attendant for outdoors activity.

The physical environment where these services are taking place are known with the name of Smart Living Environments. The functional architecture of this conceptual model is presented in the figure 1.

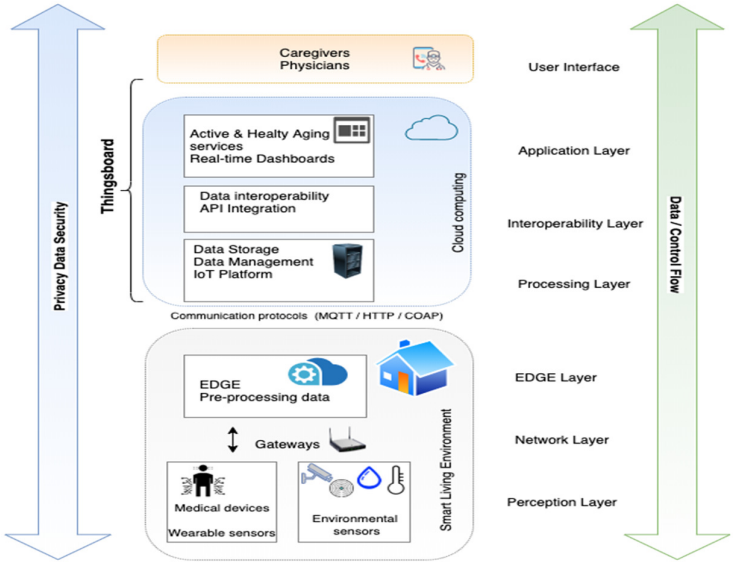

Fig. 1: Functional architecture of conceptual model for an enhanced living environment

The perception layer is the place where the smart things interact with the physical world. In this layer, intelligent sensors are used to gather real time data. Medical sensors measure patient's vital signs while environmental sensors (ambient devices, humidity, temperature, proximity, light, smoke sensors) measure indicators, which influence patient's condition, such as room temperature, smoke, light, movement (Angelov et al., 2019). This layer has a main task in collecting data from sensors. Afterwards, the data is transmitted to the network layer. For instance, many sensors may be connected to the patient's body to make sure that there is a monitoring to the patient's condition and provide help when its needed (Azza, 2019).

The network layer works as a communication layer, where data coming from the sensors are compressed, prepared, secured, and transferred via the Internet to the cloud domain. This Level includes hardware equipment and network software that make possible any type of connection with the cloud. The devices used in this layer are: Wi-Fi systems, radio communication devices with low power that are using radio spectrums like 3G, LTE and Bluetooth. For more computing power it can be intercalate EDGE layer between network layer and cloud. This layer brings more benefits: reducing data sent to the cloud, data analytics execute at the edge, quicker intervention for risk situations and enhance data protection.

The processing layer is found in the cloud. The cloud computing infrastructure is dedicated to provide Internet access, to process, to analyze and to store the data.

The application layer provides tools for data management, security, data access control to upper layers applications, data analysis, big data. In this layer is found the IoT platform, that is a mediator between the smart devices /sensors and edge computing and application layers. The IoT technology enables to connect all types of things to the network and develop applications to control and manage smart devices using Internet transfer protocols. All the complexity of enabling connectivity, services and cloud commuting for these devices is the job of the IoT platform (AIOTI, 2019). IoT platforms include the integration of sensors with different communication protocols (HTTP, MQTT, CoAP), abstract all those intricacies and make available simple APIs to communicate with any sensor over any network. Via, APIs, data management, and algorithms, an IoT platform allows elements of a network to connect, monitor, and communicate with each other with more flexibility. The platform can enable also data prioritization, a feature of highest importance at one time when sensors and other physical objects starts to generate new amounts of data.

The interoperability layer contains several application programming interfaces (APIs). The data is stored through cloud technologies providing access to patient's health data and health records.

The application layer acts as an interface for interaction for end users (caregivers, physicians). Based on the data that is collected different methods and analysis can be applied in order to evaluate the quality factors of IoT-based smart wearable devices (e.g. DANP method), this contributing to the better understanding of users' needs with regard to design criteria and also to develop strategies to improve the quality of IoT-based smart wearable devices (Balog, Bajenaru, Cristescu, 2019). This layer uses the results of the data analysis processed and stored in the cloud domain. Application layer is also responsible for sending abnormality alerts. This layer converts extracted knowledge into visualization using real-time dashboards. Monitoring the daily activity routine can be used to achieve active aging service models.

The conceptual model for an enhanced living environment is used for the RO-SmartAgeing project. In **smart living environment** we have on the one hand the medical sensors connected to e-Health Sensor Shield V2.0 together with Arduino and Raspberry Pi and on the other hand we have environmental sensors. Cloud operations for processing, viewing and sending alerts for data collected from sensors are performed by the Thingsboard platform. Collected data from sensors is pushed via MQTT over WiFi to ThingsBoard for storage and visualization (real-time web dashboard). The environmental sensors are connected to Wifi microchip ESP8266, that push data to ThingsBoard server via MQTT protocol by using PubSubClient (Pubsubclient, 2019) library for Arduino. ThingsBoard has data collection API and visualization capabilities for almost any IoT device.

IoT based ICT solutions for RO-Smartageing System

Creating an *enhanced living environment* at home for elderly people ensures optimal conditions to continue life in an independent and active way, with maximum benefits in terms of preventing and limiting degenerations and diseases associated with aging. This involves taking into account a number of challenges throughout the development process. Such challenges address different categories of issues related to remote health and environment monitoring (acquisition of data and information about the elderly, housing, etc.), communication technology (reliability of real-time data transmission), choosing optimal intelligent processing technologies (analysis, relevant decisions, etc.) and the provision of personalized services.

The project *"Non-invasive monitoring system and assessment of the health of the elderly in an intelligent environment" (RO-SmartAgeing)"* is a research effort funded by the Romanian Ministry of Research and Innovation whose main objective is to demonstrate the potential of ICT (Internet of Things - IoT, Instant Data Computing - Edge, Dew, Fog computing, Cloud computing, Big Data, predictive analytics) to transform the way which health care services are provided to the elderly people.

The main objectives of the project refer to the development and validation of a *health monitoring and evaluating system* for elderly people that integrates non-invasive motion and physiological sensors for collecting medical parameters, as well as an *intelligent environment* based on discrete environmental sensors for monitoring daily activities and lifestyle. In support of these results, a dedicated cloud solution is developed for data storage and aggregation, including for the presentation of the results obtained from the advanced data analysis.

Achieving the proposed objectives will lead to the following benefits:

- Increasing the quality of life of the elderly and their family members by providing intelligent non-invasive remote services such as monitoring, diagnosis, assistance for daily activities, alert in case of accident;
- New scientific knowledge in the field of non-invasive intelligent services for the elderly, health and quality of life analysis and modeling, evaluating the acceptance and usefulness of proposed healthcare technological solutions.

The IoT environment used to monitor the elderly health consists of four main components: things (medical sensors, smart medical devices), connectivity (allows connection between things and applications; in most cases it is a gateway), software (located in cloud and responsible for data collection, device management, configurations, security, identity management, etc.) and applications (real-time dashboard, rule engine, analytics, alerting). IoT platforms are called middleware because they manage interactions between the hardware and the application. An open source IoT platform will support the components described above.

This type of platform is essential for the provision and processing of data, around which business models can be developed, such as IoT-based environments for aging well. The platform allows the collection, processing and viewing of data from medical sensors or other monitoring devices as well as their remote management. In figure 2 are depicted the main technologies considered for the realization of the RO-SmartAgeing ecosystem.

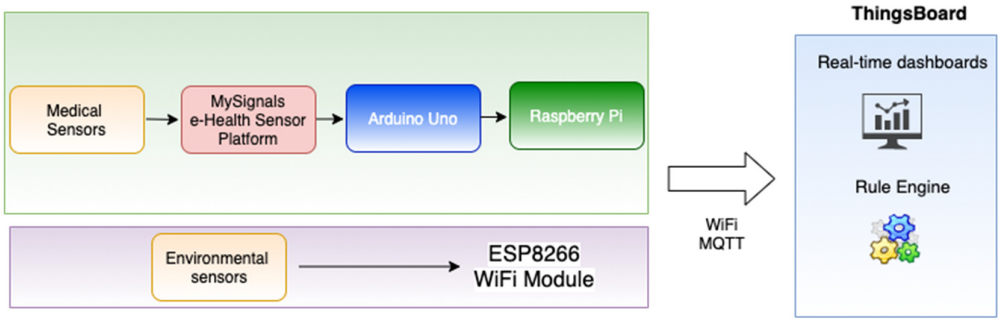

Fig. 2:RO-SmartAgeing ecosystem

e-Health Sensor Platform, Microcontrollers and Microcomputers

ThingsBoard is an open-source IoT platform, used to collect, process, view and manage data collected by smart devices (ThingsBoard: Open-source IoT Platform, 2020). This platform supports device connectivity using standard IoT protocols, such as MQTT, CoAP, and HTTP. ThingsBoard is a multi-tenant solution with multiple customers who have multiple users with multiple devices. The

product has a set of ready to use widgets and dashboards that can be easily customized. The platform is installed in a Docker container located in the cloud (Bica, 2019; Docker, 2020).

The sensors analyze various medical parameters that are connected to the Arduino Uno and Raspberry Pi via MySignals, an e-Health Sensor Platform. MySignals platform supports the following analog sensors we use: temperature, skin conductivity (Galvanic Skin Response—GSR), position detection, and breathing airflow sensor, electrocardiogram (ECG) and electromyogram (EMG). The board connects to an Arduino UNO like a shield and uses the Arduino SDK IDE. (e-Health Sensor Platform V2.0 for Arduino and Raspberry Pi, 2020). The Raspberry Pi microcomputer is connected to the Internet and acts as a server that sends the data received from the Arduino Uno to the ThingsBoard platform installed in the cloud.

Wearable Monitoring Sensors

A wide range of sensors, both wearable and environmental will be used in the RO-SmartAgeing system. Wearable sensors are smart electronic devices (electronic device with micro-controllers) that are worn close to and/or on the surface of the skin, where they detect, analyze, and transmit information concerning e.g. body signals such as vital signs, and/or ambient data and which allow in some cases immediate biofeedback to the wearer (Düking et. al, 2018). Through a range of over 16 sensors, RO-SmartAgeing offers the possibility to detect biomedical parameters and transmitting values to IoT health monitoring platforms through microcontrollers and microcomputers: Pulse oximeter; ECG; AirFlow sensor; Blood Pressure monitor sensor; Glucometer; Body temperature sensors; Electromyography Sensor; Spirometer sensors; Galvanic skin response; Body position sensor; Snore sensor; Body parameters sensors (body mass, body fat, bone mass, muscle mass, visceral fat, body water, BMI - body mass index and BMR - basal metabolic rate).

Environmental Monitoring Sensors

Sensors from this category provide various types of information: location, position, the individual's movements and contextual elements which can be compared to data collected via sensors embedded on or implanted in the individual, including the validation of alarms, like in the case of falls (Noury et. al., 2018; Coardos et al., 2020). The RO-SmartAgeing system is designed to manage the following range of environmental sensors: dust, temperature and humidity, motion, depth, distance.

Conclusion

Remote health monitoring in an IoT-based smart living environment will improve the assessment of physical parameters of elderly and will eliminate many visits to hospital. Conceptual model of an IoT-based enhanced living environment in which the elderly can be monitored remotely, while carrying out their daily activities safely at home serve as the basis for the development and implementation of the RO-SmartAgeing project. The data provided to healthcare professionals will allow them to adjust their treatment correctly. Physicians will be able to accurately diagnose the patient's health to improve emergency response. IoT offers new techniques, architectures, and platforms for enhanced healthcare systems with the chance to improve medical treatments for personalized healthcare.

Thingsboard platform ensure security features, scalability, and capacity for collecting, storing, and analysing data. This platform can be integrated to develop a conceptual model based on the convergence of care objectives and processes along the healthcare process.

Acknowledgement

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Agricultural Policies and Risk Management Strategies: What Solution for Guarantee Food Security?

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Abstract

Natural disasters and climate shocks are major factor driving emergency levels of food insecurity. Studies on risks have underlined that poor household are less able to satisfy their basic needs when faced with unexpected shocks. Despite the importance of food security especially in developing countries where large share of population relies on agriculture for their livelihood, the scientific community has not completely considered the role of the resilience capacity in order to curbing the negative impact of natural disasters. This paper contributes to understanding the validity of build a resilient food system to withstand shocks and stresses at different temporal and spatial level. In relation to that it has been necessary to highlight the agricultural concerns of natural disasters and risk management, and to introduce them to the factors determining the needs of build resilience. On these bases the methodology employs content analysis of selected scientific literature and reports of International Organizations in order to bring out the key issues for the adoption of resilience in the frame of strategies for guarantee food security. The results have shown that resilience could be the key, but it is required a holistic approach by reorganizing adapting and evolving into new configuration the adopted plans and policies.

Keywords: Resilience, Food Security, Natural Disasters, Agriculture

Introduction

The purpose of this paper will concentrate on agricultural policies and risk management strategies to increase food security and build natural disasters resilience.

Stating the impact of natural disasters on agriculture and recognizing the rural poor as the most affected and kept by the occurrence of natural disasters itself into poverty traps, the contribution will then identify a possible solution into building resilient livelihoods. This so as to render the affected communities able to recover and eventually escape the poverty trap, in line with the approach endorsed by many actors involved in efforts against natural events consequences, from small Non-Governmental Organisations (NGOs) to United Nations (UN) Organizations.

In the first part the paper introduces natural disasters and their impact on agriculture focusing on the specific effects that such terrific climate variability has on this particular sector.

Then outline levels of intervention on the part of various actors to address the impacts of natural disasters on agriculture: the farmer level in order to describe the risk management strategies they have at their disposal; the national level of governmental intervention, underlying the crucial role of the state in assisting affected communities; the international level in which international organizations perform the key task of providing guidelines and promoting coherence and integration of global actions. The analyses put evidence on the fact that despite constrained to an unequal socio-economic class, disasters still disproportionally affect individuals in the relief and recovery phase.

The third part of the paper will concentrate on approaches and tools for building disasters resilience in agriculture. In the last section, the paper put evidence on several aspects emerged from the investigation led.

The paper concludes that any possible strategy to cope with natural disasters and tackle food insecurity needs a holistic approach that takes into consideration a concentrated effort to build resilient livelihoods and free affected communities from vicious cycles of poverty and hunger. In the conclusion the prevention of disaster is considered to be a matter of managerial administration, rational prediction and organizational readiness.

The method used for the investigation has been based on the use of the information coming from selected literature which satisfy the following eligibility criteria:

- key words: resilience, food security, natural disasters, agriculture;
- type of paper: articles published in international peer-reviewed academic journals and report of International Organisations.

Literature Review

Natural Disasters and Agriculture

The number and frequency of recorded natural disasters, along with the associated impact and damage to livelihoods and economies has increased significantly in the last decades. Natural disasters often destroy critical agricultural assets and infrastructure, disrupting production cycles and trade flows. This affects food security[i] and causes additional disruptions throughout the value chains. In addition, disaster impact on agriculture has a direct effect on livelihoods. In fact, disasters can cause unemployment and/or a decline in wages and therefore income among farmers and farm laborers. They diminish the availability of food commodities in local markets, leading to food inflation. These pressures restrict households' purchasing capacity, limiting the access to food, deplete savings and can force the sale of vital productive assets and erode livelihoods.

The phenomenon wrecking the agricultural world is huge and it seriously jeopardizes development hindering the path towards reaching the Sustainable Development Goals (SDGs) by 2030[ii].

Such disasters may slow overall economic growth, especially where agriculture and food production still account for a large share of gross domestic product and employment.

Even though the phenomena of natural disasters concern all strata of society and involves all different types of actors, the most affected are always developing countries and the poorest people of the world. In particular, those who depend on the agricultural sector and on natural resources for their living are the most severely damaged by disasters and crisis. They make up 75 % of the poor and insecure people in the world (FAO, 2015).

During the last decade, the quantity and quality of food consumption are weakened and food insecurity and malnutrition increase, particularly among the most vulnerable households. Between 2005 and 2014 approximately 93 billion dollars were lost as a result of contractions in crop and livestock production after natural hazards and disasters occurred in developing countries (FAO 2015).

Specifically, floods have been responsible for 37% of the cumulative production losses in crops and livestock, amounting to just under 34 billion dollars.

During the same time span, droughts provoked 19% of agricultural losses, which amounted to over 17 billion dollars, while other climate events such as high temperatures, storms and wildfires, causing damages for over 21.5 billion dollars (FAO 2017).

FAO revealed that in developing countries, the damage to the agricultural sector represents an average of 22% of the total damage and losses caused by disasters triggered by natural[iii] . This percentage rises to 25% if only climate-related disasters, such as droughts, floods, hurricanes, typhoons and cyclones are considered.

Of all-natural disasters, the link between drought and agriculture is particularly significant as 84% of the damage and losses arising from droughts is critical for the agriculture, while the remaining burden is typically, on sectors such as health and nutrition, energy, water and sanitation.

Within the agricultural sector, the crop subsector absorbs over 42% of the total damage and losses caused by disasters, while the livestock subsector sustains nearly 36%. The fisheries subsector is severely affected by tsunamis and storms such as hurricanes and cyclones, while most of the economic impact to forestry is caused by floods and storms. The consequences are that the production losses can cut the agricultural value added or sector growth, with consequences for national GDP (FAO 2015).

Notwithstanding the many efforts at national and international level, there is still limited systematic data and information on the impact of disasters and hazardous events in agriculture and its subsectors (FAO ,2017).

Concerning the specific characteristics of the phenomena a natural disaster is characterized by being both unexpected and overwhelming. Such sudden crises represent a departure from the natural order of everyday life. The artificial separation between everyday life and crises cloak the real nature of disasters which affect vulnerable people who are exposed to a wide range of risks (IFRC, 2006). People, indeed, face risks that are a combination of both vulnerability and hazard (Blaikie et al 1994). The relation between natural and human is so tightly connected in all disaster circumstances which render impossible to consider disasters to be entirely natural in any straightforward way.

People's actions, which have a negative impact on climate change, represent a factor which disproportionally affects farmer communities (Hopkins and Red Cross Red Crescent ,2008). Since agricultural yield is subject to seasonal rainfall and specific climate conditions, farmers are the first actors at risk. As stated by O'Keefe et al. (1976) it would be necessary to take the naturalness out of natural disasters. However, natural disasters have not the arbitrary power to affect people in the same way.

Although climate change is supposed to influence and hit all countries, its impact seems to intensify the vulnerable food security conditions of the more disadvantaged. The vulnerability of such people arises from severe malnutrition, migration, and from diseases coming from dry seasons which might result in loss of livestock, loss of crops, lack of rangeland forage for livestock, and water shortage including water contamination. Vulnerabilities are the characteristics of people and their situation influencing their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard(Wisner et al.,2004). Only by conceiving both vulnerability and natural hazard would it be possible to generate a disaster (Blaikie et al. ,1994). Permanent emergencies in agriculture are hence produced by the connection between risk and adverse weather, together with weather-related plant pests and diseases and fall in the price of commodities, to which a population is exposed(Stubbs, 2018). The production of such constant emergency is produced by the unequal allocation of risk among its citizens by the state. It is the state, indeed, that generates a discriminating social order and a marginalized category of vulnerable people who are mainly represented by the agricultural population which find themselves at the end of the societal order (Bankoff ,2001). Disasters can be interpreted as the extreme situation which is implicit in the everyday condition of the population (Braid et al. 1975; Wisner et al.,1993).

By apportioning income and assets in a disproportional way, welfare creates forms of discrimination among society. As a consequence, natural disasters occur in a political space and mirror the power relations which represent the root causes of the malfunctioning of the economic and political systems(Cohen et al., 2008). This means that if a country is not economically able to cope with a drought for example, herders and farmers – the first and worst hit when drought strikes – will become even more vulnerable. In addition, as previously stated, the economic marginal individuals, who are forced to live in dangerous environments, become to be seen as of marginal significant to those who have political and economic power. Therefore, the question that arises spontaneously is: does natural disaster exists that are not the result of exploitative and economic processes? Some disasters might be considered 'innocent' in nature since they involve a risk which arises from class-neutral socially -

constructed processes (Cannon ,2008). From this perspective, the disaster is not handmade but happens when a vulnerable population gets in the way of a hazard; no one is made vulnerable. The location in which they live, and the possible exposure to risk, is the result of an individual choice. The Indian Ocean tsunami, for instance, might exemplify such narrative.

Being the society relative uniform for what concerns the class-based socio-economic variations, the tsunami can be considered a relatively innocent disaster since inequality had not made some people more vulnerable than others.

The concept of innocence applies to the type of social construction: there is no actor, group, institution or other figure involved towards whom blame can be directed.

However, while this may be true of the immediate impact of the hazard, it is entirely plausible that economic and political forces that differentiate between various groups can have an impact on the relief and recovery phases (Cannon, 2008).

These people's situation and risk exposure is exacerbated in particular by the current climate change situation, due to the connections between climate change and agriculture.

Exposure to more complex, frequent and intense climate extremes is threatening to erode and reverse gains made in ending hunger and malnutrition. In addition to conflict, climate variability and extremes are among the key drivers behind the recent uptick in global hunger and one of the leading causes of severe food crises. The cumulative effect of changes in climate is undermining all dimensions of food security(FAO, IFAD, UNICEF, WFP and WHO 2018).

Countries where large shares of the population rely on agriculture for their livelihoods and with agricultural systems that are significantly affected by climate factors, such as rainfalls, droughts, or temperature variability, are the most affected by hunger and malnutrition.

Risk Management Strategies and Agriculture

Broadly speaking, risk management is the process of identification, evaluation, and prioritization of risks ,defined as the effect of uncertainty on objectives, followed by the development of strategies to govern such risks. Risk reduction instead reduces the severity of the damage or the probability that it will occur. A risk analysis is at the basis of plans of actions to reduce or manage damages caused by adverse events. Disaster risk reduction (DRR) is the policy objective of anticipating and reducing risk, while disaster risk management (DRM) can be considered to be the implementation of DRR, since it is about the actions that attempt to achieve the policy objective (UNSIDR 2015).

In the literature risk management is part of a broader risk governance framework that typically includes at least three stages: risk assessment and evaluation, risk management and risk communication. What should be underlined is that the link between these three components cannot be considered liner. As a result, agricultural risk management is an interconnected structure where both government actions and markets interact with risks and farmers' strategies.

Concerning farmers, they cannot control atmospheric conditions, economic developments and further circumstances even if they have a direct influence on the farming's profits. It is in this framework that the farmer must manage farming risks within a wider plan of farming system (OECD 2009). Without knowing what will happen in the future, farmers must find appropriate actions to deal with risk in order to protect themselves from decisions taken today. This process of reducing the chance of a 'bad' outcome occurring is indeed incorporated into risk management strategies (Kahan 2008). The possible negative effect of these unpredictable occurrences pushes farmers to implement various risk management strategies in the sphere of their production plans, the available portfolio of physical, financial and human capital, and on the degree risk aversion (OECD 2009). Since every factor of climate mutation result into communities' food insecurity, farmers find themselves into the position of managing risks by following a series of steps which unfolds as follows. First of all, they need to

determine the possible sources of risk and comprehend the different consequences. Then they have to choose the various strategies which may be selected and evaluate the effects of each possible result. Finally, they must analyse the trade-offs that might arise between the cost of the risk and the profits that can be made (Bazza et al., 2018). As a result, farmers must try to reduce the happening of an unfavourable outcome or they must prevent the harmful effects of an unfavourable event every time possible (Kahan,2008). It is due to these risks hence that more individuals are herding and farming on smaller plots of land, which leads to both an increase in the use of marginal soils that are sensitive to erosion and to a rise in competition between livestock and cropping (Bazza et al.,2018). Despite it is impossible to predict climate change and natural disasters events, the best actors to assess the availability of various strategies to deal with these risks are the farmers. In more concrete terms, as stated by Holzmann et al. (2001), risk management strategies can be divided into three levels: prevention strategies to diminish the possibility of a destructive event from happening, mitigation strategies to decrease the consequences of an unfavourable event, and coping strategies to alleviate the effects of the risky event once it has occurred (OECD 2009). Within this division, it is possible to analyse generic strategies to reduce risk.

The first one is known as risk sharing which deals with the diffusion' of risk among various agents instead of focusing it on one actor only. For example, share-cropping system is based on the idea of spreading production risk between the tenant/worker and the owner of the property, in order to reduce the total costs of the sum of their risk premiums. The second method is risk pooling which pulls together the returns on risk of two farmers that will then divide the resulting outcome. Insurance firms work by bringing together the risks and then spreading them among different people. The last one is called diversification strategies which follows the same premise. In this context, diversification means that the farmer will not concentrate all his resources on a single activity but will employ them in different ones. Diversification spreads risk and is a successful risk management strategy because not all farm enterprises and operations are likely to be affected in the same way by changing situations (OECD 2009). This approach may consist in administrating and managing different farm enterprises together at the same time , engaging in different physical locations in the same farm business, working in the same farm enterprise over successive periods of time, or generating income from off-farm activities (Kahan, 2008). Another example is intercropping, which is a common form of crop diversification. For instance, in the case of drought soils, more resistant seeds may be planted together with food crops to guarantee that some gains are produced from the effort put into land cultivation. In many cases and in different countries, maize and sorghum are planted together; maize has some probability to fail in a drought situation but is resistant to animal damage, on the other hand sorghum is very resistant to drought but more sensitive to bird damage. Furthermore, in low rainfall areas of Southern Africa, farmers commonly use the mixed broadcast farming which is an example of intercropping. Through this practice, the farmer plants at the same time three or four different seeds on the same plot of land in order to guarantee the domestic food supply in case of drought. Although one or two crops may fail, the other ones might resist and provide food to the household (Kahan, 2008).

Concerning the governmental level, the transformative capacity (governance mechanisms, policies/regulations, infrastructure, community networks and formal safety nets)requires the intervention of governmental actors.

Many countries have national platforms, legislation and policies on disaster risk reduction, but few address agriculture, food security and nutrition with sector specific disaster risk reduction policies and objectives. Several existing global policies provide guidelines to national and regional government in their action to support affected populations. Nevertheless, it is important to bear in mind that different types of environments give rise to different types of disasters across countries and regions, and different types of disasters affect in significantly diverse ways agriculture and its subsectors. Different countries deal with different challenges across the world, and each government must therefore apply precise disaster-tailored interventions.

Despite a consistent increase in average government spending on agriculture in the last decades, such expenditure is far from being adequate to the needs of the sector, especially when it is considered the devastating effects of natural disasters.

Building Resilience

Resilience[iv] has emerged not so much as a new conceptual construct but rather as an organizing framework that integrates humanitarian and development efforts(IFPRI,2014).

Building resilience means helping people, households, communities, organizations and countries, and global institutions prevent, anticipate, prepare for, cope with a recover from shocks and not only bounce back to where they were before the shocks occurred, but become even better-off(Ulrichs et al,2019).

Prevention is the core objective. It addresses the root causes of vulnerabilities, focuses attention on emerging risks and emphasizes early action. It strengthens local capacities to build resilience.

Measures of resilience must distinguish between the *ex-ante* (preshock) capacity of resilience and the *ex post* time path of the outcome (food security, nutrition and so on) after the shock has occurred.

Studies on risk and vulnerability have shown that in general, poorer household are less able to guarantee their basic needs when faced with unexpected events as natural disasters, often disposing of assets to assure consumption, but with negative consequences for future well-being(IFPRI,2014).

Resilience focuses attention on the idea that short-term shocks are malign not just because of their immediate effects but also because of their adverse long-term consequences.

Despite the growing recognition that effective social protection is important to help poor and vulnerable household avoid long-term descent into poverty, there is still relatively little awareness of the differential vulnerabilities of men and women within households. Men and women may be exposed to different types of risk because of a combination of biological, economic, and cultural factors, including gender roles – the socially determined relationships between women and men. Men and women may also have different ways of insuring against and coping with risk. Not only do shocks and stressors such as have immediate effects on preschool children's nutritional status but that these effects persist into adulthood. Children in household with greater resilience are likely to be better nourished and better schooled; in turn, as adults, these children will likely be more resilient to the shocks and stressors the face.

Build resilience in agriculture means diversifying a portfolio of activities: adopt good practices, integrate disaster risk reduction in agricultural interventions and strengthen the governance framework for early warning and action(FAO,2018).

A resilient food system[v] is able to withstand economic and environmental shocks and stresses at different temporal and spatial levels(Misselhorn *et al*,2012).

Resilient food system can help countries transition from a relief stage to a development path(Babu and Blom,2014)
At the same time agricultural and food systems themselves need to be resilient to shocks, both large and small, to help availability and access event when disaster strikes.

Food security level is determined from the resilience level and vice versa . In fact, food security and resilience are strongly interlinked: food security is both an input to and on outcome of strengthened resilience.

Climate resilience requires context-specific interventions aimed at anticipating, limiting, and adapting to the effects of climate variability and extremes and building the resilience of livelihoods, food systems and nutrition to climate shocks and stresses.

Results and Discussion

The recurrence of natural disasters and crisis causes havoc and snares countries – especially developing countries - into poverty traps, undermining their efforts to eradicate hunger and malnutrition and contributing to increased food insecurity, as well as future vulnerability to natural shocks. In fact, a country which has been hit by a natural disaster is more likely to be hit again and with severe consequences. Prolonged or recurrent natural disasters decrease the resilience and coping capacity of affected peoples, provoking mortality as well as livelihoods assets and economic losses. In addition, disasters severely damage not only individuals, but market structures through changing production and consumption patterns, critical public infrastructure and housing - all fundamental factors for economic growth and development.

The focal point is still on how agriculture can recover from a natural disaster rather than on being less sensitive to it.

All this due to inadequate funding, readiness and coordination which is still very constrained.

What is needed then is to modify the perception and management of risks, by shifting the approach from an emergency response towards a more pro-active policy capable of taking into consideration a long-term planning to decrease risks and build better resilience. This means that natural disasters exist, but they might be exacerbated by human actions and inactions which are consequences of climate change. On this line of thought, in order to reduce the vulnerabilities of people – being them socially constructed or not – the different nations and actors are increasingly envisaging a multi-hazard and comprehensive approach to disaster risk reduction.

It is important to underline that, despite there are three dimensions – the individual, the national and the international – constant feedbacks among all the factors lead to both the assessment of risk and to the management of risk strategies and policies.

These three levels must hence work together by identifying sectoral and ecosystem approaches which are adequate for the most vulnerable situations due to natural disaster,
In order to significantly reduce and mitigate the impact that disasters have on the community, farmers' risk management strategies must be accompanied by policies and decisions constructed around farmers and their needs.

In fact, farmers and local communities alone are not able to deal with the effects of natural disasters on their own, and governmental assistance is fundamental in devising the right policies and planning the adequate financial investments in prevention and ex post recovery response.

what actions can be taken against such Reducing risks and building resilience within agriculture requires a policy environment that is conducive to the full mainstreaming of disaster risk reduction within the sector. Sector-specific disaster risk reduction planning is needed to proactively reduce disaster losses in the sector, enable sector growth and protect the food security and nutrition of vulnerable populations

In a holistic approach, disaster risk management and reduction plans need to be incorporated into agriculture sector development plans and policies, and not treated in separated agendas, especially in disaster-prone countries with population that are highly dependent on agriculture for their living.

Through the implementation of a holistic approach is possible optimize actions that can be taken against the climatic variability effects.

Conclusions

Agriculture is fundamental to help communities recover from natural disasters. It plays a critical role in the aftermath of disasters in that it can absorb both economic and environmental shocks and ensure

access to food and livelihoods to affected people, as well as help them recover and adapt over time. It is therefore crucial to invest in agricultural policies and disaster management programs to increase food security and disaster resilience, and action must be taken at various levels: global, regional, national and local, involving a wide range of actors such as governments, international organizations, NGOs and members of local communities. It is fundamental to involve small farmers and local communities living in highly exposed countries in programs dealing with disasters and their consequences, so that they have access to knowledge and technologies, and strengthen their tenacity and resilience to such events. It is fundamental to concentrate investments in preventive action, rather than devoting all resources to measures dealing with the aftermath of events. Contribution demonstrated that preventive action has been deemed to be four times more effective than reactive emergency response.

In view of holistic and comprehensive approach, measures of disaster risk reduction (DRR) should be integrated into agricultural development policies and socio-economic development plans, and vice versa agriculture should be included into DRR programs.

Consistently with the notion of an integrated approach, climate change adaptation plans and policies shall be considered together with disaster risk reduction and management programs, due to the crucial relationship between the two.

What is needed to enable the achievement of sustainable development and ensure food security and nutrition, is to build the disaster resilience, the ability of a socio-ecological system to withstand and overcome stresses due to changes in the earth's climate, as well as respond to such stresses by reorganizing, adapting and evolving into new configurations that can more effectively absorb environmental shocks. Natural disasters resilience building should be integrated by national and local governments into short, medium, and long-term policies.

Implementation of natural disasters resilience means refitting tools and intervention.

In order to bring about actionable results, increased financial resources for DDR and DDM in the agricultural sector and subsectors are needed both at the national and subnational level.

Local and regional governments must therefore increase significantly their investment in the agricultural sector and its subsectors, especially in countries where agriculture is a vital source of livelihood, due to the crucial role the sector has not only in ensuring food security and eradicating hunger, but in sustainable development and economic growth for the country as a whole. In this effort, national governments should be supported by the private sector and development assistance.

The availability of specific databases which thoroughly describe disasters and their impact on the agricultural sector within the Countries is an indispensable necessity for adapting plans to the Country specific strategy.

Improving resilience will require better data and information on risks and responses, better approaches to monitoring and measuring resilience.

In addition to that in order to achieve a development to be climate-resilient, it will require greater access to technologies, markets, information and credit for investment to adapt production systems and practices.

For the future the efforts of investigation must to be concentrated on how to measure resilience by, among other things ,settling on the concept, theory and implications of resilience.

Resilience could be a natural overarching theme of post 2030 agenda, encompassing poverty eradication, food security, and nutrition security. It could also be seen as a way of connecting people-centred development goals with the planet-cantered sustainability goals.

[i] the FAO(Food and Agricultural Organisation) widely accepted definition affirms that food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

[ii] the 2030 Sustainable development agenda ,adopted by the United Nations in September 2015,defines 17 sustainable development goals(SDGs),169 individual targets, and 25 global indicators for monitoring the progress towards the goals and targets.

[iii] the term is used to identify phenomena like droughts, floods, hurricanes, typhoons, cyclones, earthquakes, tsunamis and volcanic eruptions that, because of their geographic location, severity and frequency, have the capabilities to affect humans, their structures, or their activities adversely. The qualifier natural eliminates made phenomena as war, pollution, and chemical contamination.

[iv] comes from the Latin word *resilire*, which means "to rebound or recoil". Its earliest usage was in 19 th. century shipbuilding, and it is used extensively in civil and mechanical engineering.

[v] A food system is the process by which institution, organizations, and individuals transform inputs into food and nutrition outcomes.

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Artificial Intelligence and IoT:
The Future of Remote Health Monitoring is in Machine Learning

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Abstract

Artificial intelligence (AI) is currently one of the most controversial and discussed topic and the first question that is raised every time is "will it be helpful or not for a human being?". Several types of AI will increasingly be applied in the healthcare domain due to the complexity and rise of data in this field. Machine learning, an important subset of AI, provides a way to make the healthcare system more dynamic and robust. This article presents some applications of machine learning in the healthcare domain. It also provides the role of Internet of Things (IoT) systems through vital signs monitoring for elderly patients and it highlights the impact of machine learning in diagnosis management, treatment prediction or reducing errors with the help of remote health monitoring.

Keywords: Artificial Intelligence, Internet Of Things, Machine Learning, Remote Health Monitoring.

Introduction

Nowadays, a lot of technologies are currently widespread in business or other domains and more and more are being implemented in healthcare. Such technologies, as artificial intelligence (AI) and IoT, have the potential of changing a lot of aspects of patient care, as well as the administrative processes behind it. A lot of studies suggest that, sometimes, AI can perform as well as or even better than most of the doctors at key healthcare tasks, such as diagnosis management or treatment prediction and it can also help radiologists in spotting different types of tumors. However, there will be some years before AI can partly or totally replace humans for most of medical processes, but, at the moment, it surely helps to automate a lot of aspects of healthcare.

The development of medical equipment and the ubiquitous availability of data networks make it possible to monitor more patients through telemedicine and Internet of Things (IoT) systems. The remote healthcare monitoring of a person can be used to identify physiological changes in the human body, therefore, enabling early intervention. Thus, it is necessary to develop a smart healthcare monitoring system capable of observing patients' health, especially the elder ones.

The continuous growing of the elderly population, followed by the increasing exposure to chronic diseases associated with ageing, will have more and more repercussions in the future for the healthcare system (Efraim et al., 2017).

However, the interpretation of the collected data has become a challenging situation. Machine learning, an important subset of artificial intelligence, learns from experience or from the amount of data that is given and predicts events in the future based on the provided instructions. In the healthcare domain, it helps to analyze thousands of different data points and present specific outcomes, provide timely risk scores, precise resource allocation and has a lot of applications.

This paper is intended to present the influence artificial intelligence has in the healthcare domain and it also provides how machine learning can help in predicting certain diseases or treatment specifications based on an IoT system for remote health monitoring.

For demonstrating the added-value brought by machine learning to remote health monitoring, it is introduced a brief presentation of the system that is developed inside RO-SmartAgeing (Ianculescu et al., 2019) project, aiming to monitor and evaluate an elder patient's health and eventually alert the medical professionals if there are any significant changes in his vital signs.

Artificial intelligence in healthcare

When it comes to artificial intelligence, it is assumed that it is not only about one technology, but a collection of them. Their relevance to the healthcare field is really significant, but the processes behind them differ from one another.

The healthcare industry is in a continuous development and artificial intelligence, machine learning and deep learning are helping more and more in increasing the profits. More and more organizations claimed that will implement artificial intelligence solutions as they think AI-driven applications in the healthcare industry are generating revenue (Davenport et al., 2019).

Types of artificial intelligence and their relevance to healthcare

- *Machine Learning – from neural networks to deep learning*

As we live in an era of new computing technologies, machine learning, one of the most important branches of AI, is a method of data analysis in which computers can learn from data, identify patterns and make decisions based on minimal human intervention (Choy et al., 2018).

In the healthcare domain, one of the most common applications of machine learning are prediction and deciding the treatment suitable for the patient based on what the algorithm is learning (data from the patient's health and his medical history). When we are talking about prediction, it is preferably to have more data for training (supervised learning) therefore the accuracy of the outcome would be better as well as the treatment prediction.

A category of machine learning algorithms which has grown faster for the last years is the neural network. Neural networks are a set of algorithms, inspired from the human brain connectivity, designed to recognize patterns and have significant applications in clustering and classification (Howard et al., 2019). Thus, in the healthcare domain, they are used to determine if a patient can get a certain disease or not. Neural networks are based on inputs, outputs and certain weights of variables or "features" that link the inputs with the outputs and the accuracy resulted provides whether the model classifies the input correctly or not.

With the constant growth of AI in the healthcare field, Deep Learning, a more complex form of machine learning has become more and more successful in diagnosis. Deep learning for computer vision provides a more accurate method for medical imaging, cancer diagnosis and treatment. With the help of Electronic Health Record (EHR), a patient's data (demographic information, laboratory results and medical history records) is stored and, using deep learning algorithms, it can provide a correct diagnosis and also reduce the waiting time for this result. Based on the data EHR systems stores, these algorithms detect certain patterns in the patient's health and give some results related to the patterns they identify. Nowadays, researchers use data in EHR systems to build deep learning models to predict some health-related outputs (for example, the probability of a patient to develop a particular disease).

- *Natural Language Processing*

Natural Language Processing (NLP) is a subset of AI which is focused on the interpretation, manipulation and automation of human-generated speech or written data (Velupillai et al., 2018). It includes a lot of applications such as speech recognition, text analysis or different translation methods.

In the healthcare domain, there are a few promising NLP approaches and applications that can be used such as comparing and detecting in clinical guidelines and lab reports, extracting clinical history

(symptoms, diagnoses) from EHR, map clinical history with codified clinical guidelines and develop some machine-to-human natural language systems.

- *Physical robots*

It is well known that physical robots are more and more being used in factories or warehouses and perform a lot of tasks such as lifting, welding, moving or assembling different objects. Recently, robots have become more user-friendly and it is easier for humans to train them into doing a certain task.

As an important application of physical robots into healthcare industry, surgical robots have become a helpful tool for a surgeon as they improve the ability to see, create precise and minimally invasive incisions or stitch wounds (Haidegger et al., 2017). The common procedures done by the surgical robot include gynecologic, prostate or head and neck surgeries.

Applications of Machine Learning for diagnosis and treatment prediction

As the world population is constantly growing and the life expectancy is still increasing, most of the health systems are becoming overwhelmed and less equipped for the challenging tasks they face. More and more researchers have been working on machine learning models that can predict the susceptibility of a disease or help to early diagnose a certain illness so that could help the medical system manage more patients' health (Ahmed et al., 2020). It is likely to have a growing number of machine learning applications in healthcare in the near future as data, analysis and innovation could work side by side to aid more patients. Thus, the efficacy of finding new treatment options and the early prediction of certain diseases based on ML applications could be quite common in different healthcare systems in multiple countries.

- ***Breast Cancer Diagnosis***

Breast Cancer is the most common invasive cancer in women and the second leading cause of cancer death in women after lung cancer (Sharma et al., 2018). To reduce breast cancer deaths, one of the most effective ways is to have an early diagnosis. This requires a precise and feasible diagnostic procedure that can allow physicians to differentiate benign breast tumors from malignant ones without surgical biopsy.

One of the machine learning techniques is presented in (Sadhukhan et al., 2020). The authors obtained some feature values based on the analysis of a FNA image and proposed a model to predict if the tumor-infected cell is cancerous or not. The method included a part in which the authors proposed a methodology for computing the features based on a FNA image (including various image processing techniques) and the second part in which it is described the techniques of classification used for prediction (K-Nearest Neighbor and Support Vector Machine models with the best accuracy for the KNN classifier with 97.4893%).

Another screening method for detecting breast cancer is represented by mammography. It is considered to be the most effective imaging tool for detecting breast cancer in its earliest and most treatable stage, recommended for women aged 40-74 years old (Qin et al., 2018). Since mammography is quite difficult to interpret, more and more scientists have developed deep learning applications in mammography since 1996. The method presented in (Carneiro et al., 2015) in 2015, developed a significant improvement for mass and microcalcification based on deep learning networks pre-trained on ImageNet, a collection of 14 million annotated real-life images. Later, in 2017, it (Kooi et al., 2017) was published a deep learning-based approach with a bigger training dataset of 45,000 images focused on the detection of small malignant lesions. A study further showed that this algorithm had similar patch-level performance as three experienced readers.

A lot of deep learning models have developed recently based on mammograms and are designed to develop an automated system designed to assist radiologists in future mammographic screening.

- ***Pneumonia Diagnosis***

The lung is one of the most vital organs in the human body and its illness in it can have a lot of repercussions towards the health conditions. One of the diseases that lead to life-threatening complications, especially for children or for elderly individuals if it is not diagnosed early, is

pneumonia. It is normally detected with a variety of imaging methods, such as X-Ray, CT and MRI. Chest X-Ray are the most effective tool for diagnosing pneumonia, but actually diagnosing it correctly based on this imaging method is quite difficult and necessitate highly skilled radiologists as these images often overlap with other abnormal conditions of the lungs. Even though the detection of pneumonia is a time-consuming process, it can also lead to differences in diagnosis if the X-Ray images are vague. That is why, more and more Computer-Aided-Diagnosis applications are trying to implement machine learning and deep learning for automated detection of pneumonia. The method proposed in (Bhandary et al., 2020) is suggested for spotting pneumonia in X-Ray radiographs using AlexNet which led to a classification accuracy of 87% for a set of test images of 1000 normal and 1000 pneumonia X-Rays. But, with a Modified AlexNet deep learning technique and with a Support Vector Machine (SVM) classifier, it is obtained an accuracy of 96.8% which is very good for a precise detection of pneumonia on an X-Ray image.

- ***Personalized Medicine***

In the recent years, more and more researchers have been attracted to personalized medicine and the influence of deep learning in this field. Personalized medicine refers to providing a suitable medical treatment to each patient based on common features such as genetics, inheritance and their lifestyle.

As an important field of personalized medicine, drug development is focused on predicting the effectiveness of drugs. Considering the fact that patients have different profiles, their reactions to various drugs vary as well and it is very important to administer the proper medical treatment. Current advancements in the field of drug sensitivity focus more on genetic variations in patients with cancer. The researchers are working on multiple datasets that include details like molecular features, tissue origin, mutation information and responsiveness (Zhang et al., 2018) which are useful to evaluate the performance of machine learning algorithms to generate personalized medical treatment.

Also, disease recurrence is an important topic of discussion as many patients with cancer suffer from repeated onsets. Traditionally, this recurrence has been predicted based on physician's clinical experience and patient's risk factors. But, as the development of machine learning continue to grow, more algorithms can assist this process by identifying key risk factors and make relevant predictions. In (Tseng et al., 2014) the method was based on SVM, decision tree C5.0 and extreme learning machine to select risk factors and predict recurrence for patients with cervical cancer with an accuracy of 68%, 96% and 94% respectively.

Remote Health Monitoring System for Elderly Care

Motivation

As the worldwide aged population is constantly growing and there is always an immense increase in the demand for healthcare services, remote monitoring of physiological parameters provides an efficient method to overcome different emergencies.

Most of the elderly people, unable to take care of themselves, choose to go to a hospital or call for a family member, a nurse or the ambulance. Taking care of elderly people in hospitals, nursing homes or hiring professional nurses to take care of them at home is very expensive and not everyone can afford the specific costs.

An innovative solution that reduces most of these costs is to take care of patients in their personal homes with the help of telemedicine and IoT systems. Telemedicine represents a tool that provides the remote delivery of healthcare services. It involves the use of electronic communications and software to provide clinical services to patients without an in-person visit (Vranas et al., 2018). Therefore, in the recent years, telemedicine and IoT have helped in creating remote connections between the patient and the medical staff.

As people become older, most of them have some common old-age-related problems such as arrhythmias, high blood pressure, high cholesterol and many more. That is why it is necessary to implement real-time monitoring system that could ensure the quality of life, safety and well-being of elder patients. Monitoring the vital signs can be done without the intervention of a doctor, but when a

certain physiological parameter exceeds a threshold, the system can immediately send an alarm to the medical personnel to intervene quickly. This system can reduce the costs of healthcare and improve the quality of life of the elderly.

An example of a remote monitoring system for elderly care

In the context of underdevelopment Ro-SmartAgeing project, an IoT system for remote health monitoring intends to be used for the elderly and it can become an essential tool as engaging technologies such as healthcare sensors and wearable devices with our healthcare system can lead to a safer and convenient environment for everyone to live in.

The proposed system can enable continuous monitoring of elderly people's health to prevent falls or other abnormalities of health parameters and trigger an alarm every time a certain parameter exceeds a threshold.

The system consists of different types of wearable medical devices (sensors or actuators), smartphones, computer networks and software applications which are interconnected to transmit data and the main purpose of the system is to monitor physiological data collected from the patient, send it to a data center and, finally, provide access for authorized care-giver and doctors to see the data anytime and anywhere.

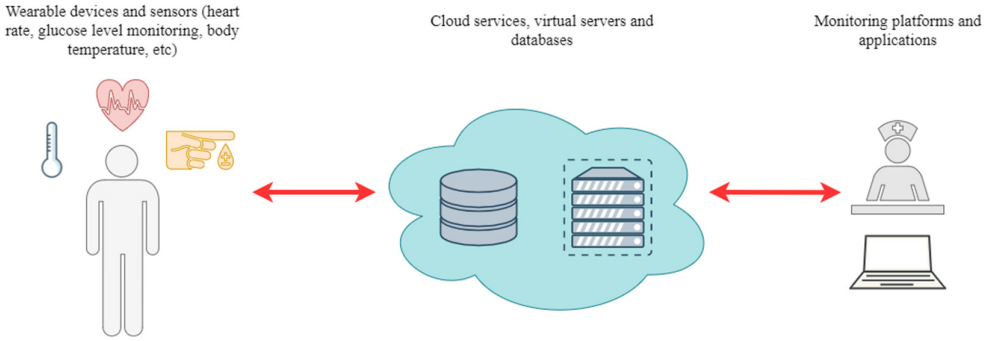

Fig. 1: Main components of RO-SmartAgeing remote health monitoring system.

Figure 1 emphasizes the main components of RO-SmartAgeing remote health monitoring system. It is shown that the data collected from wearable devices and sensors is sent to the Cloud over the internet (through a smartphone or a computer) and, then, it is transmitted and can be visualized, through a monitoring platform, by a clinician.

- ***Wearable Devices***

Wearable health devices provide the acquisition of vital signs and health status monitoring over extended periods and outside clinical environments. These devices can both have fitness and medical purposes targeting the human body monitoring and can measure from electrical to biochemical signs, biosignals that are possible to be extracted and used to better understand the health status and reaction to external factors.

RO-SmartAgeing project intends to use wired and wireless sensors for detecting valuable signs, such as heart rate, blood pressure, respiratory rate, blood oxygen saturation, body temperature, glucose level monitoring, the electrocardiogram, the electromyogram, galvanic skin response or body position in order for a correct diagnosis to be made.

Many more physiological parameters can be detected using wearable sensors and can be used to determine the health status of a patient. This amount of data is then sent to the medical personnel if there are any dysfunctionalities through the help of a smartphone or a computer with access to the internet.

- ***The Cloud***

The Cloud represents the place in which all the data collected from the sensors are sent, stored and processed. Cloud receives the data from the patient's smartphone or computer over the internet to be sorted and to be available for the doctor and/ or caregiver. All data is processed in Cloud and, based on the patient status and diseases, the abnormal changes will be categorized, and the information will be reported to the doctor's platform and/ or the emergency unit depending on the patient health status. A solution used in the project as a Cloud platform is represented by Windows Azure, developed by Microsoft. It is used for building, developing, testing and administrating web applications and services through Microsoft data centers. It is also an efficient tool for IoT projects as it helps users to collect and monitor IoT data from sensors and other devices.

Therefore, Cloud is a bridge that enables collaboration, through its infrastructure, which allows medical professionals to host information, diagnostics about patients, available to be seen by any other clinician as the data can be accessed and updated in real time with faster prescriptions and treatments.

- *Monitoring platforms*

Monitoring patient's records and sensory data has to be done through a platform available to the doctor or hospital. The doctors will be able to visualize the patient's electronic medical records in real time and they can take action if necessary. Developing a monitoring platform for our project consists of a combination of some programming languages, such as Java, C++, Python and NoSQL database. They are used to develop certain user-friendly web applications and to process the data from the IoT devices.

Keeping doctors up to date with the patient health status is essential for an elderly person and it helps a paramedic to take early action in case of an emergency before the situation is getting worse.

4. Applications of machine learning for a remote health monitoring system

The recent developments in technology and innovation in the healthcare domain have become more complex, and artificial intelligence can offer the support of improving clinical processes. The way to use new innovations in therapies as personalized treatments in accordance with the patient's profile or automated detection of a certain disease based on a medical image are some of the applications of machine learning in the healthcare domain.

Moreover, as the aging population is constantly growing and it is difficult for elders to go to the hospital, there is the need for remote communications and connections which creates a remote healthcare interaction between the patient and the doctor. Artificial intelligence could help in addressing this need by developing an intelligent environment in which clinicians could interact, maintain a virtual real-time record of the health status of a patient and alert if there are any imbalances in his/ her health based on the data received.

One application of patient health monitoring using machine learning is presented in (Priyadharsan et al., 2019) and it emphasizes that technological tools such as Internet of Things (IoT), Machine Learning and Artificial Intelligence with Big Data facilitate the job of physicians when putting a diagnostic and predicting the seriousness of a disease using these modern algorithms. The system uses machine learning algorithms to remote monitor the health conditions of patients. In this research, Priyadharsan et al. used the UCI dataset for training and validation of machine learning algorithms and the testing phase was performed on the collected data from heart rate, blood pressure and temperature sensors through the IoT framework and it was designed to estimate the prediction of any abnormalities in the health status of the patient. It was also performed a statistical analysis from data accumulated into the Cloud from the IoT system and it resulted in estimation of the accuracy in prediction percentage. The machine learning algorithm used in this system is K-Nearest Neighbour classifier which is a non-parametric supervised learning technique in which the data is classified to a given category with the help of training set and it obtained an accuracy of 98.02% (for K=1). The conclusion was that for this type of IoT system which continually monitors in real time the human health conditions, machine learning algorithms can play an essential role.

Another study presented in (Lin et al., 2019) proposes a system for electrocardiogram analysis and cardiac disease detection. As arrhythmia is one of the leading causes of heart disorders, it is likely to have a system that could detect this cardiac disease. A front-end IoT-based hardware, a user interface

through an application, a Cloud database and an AI platform are integrated in this system. The hardware part consists of a wearable ECG patch that could detect ECG signals of a patient staying at home. The application displayed on the smart device could show the real-time ECG signals and could also label the abnormalities and detect the disease in real time. Furthermore, the ECG signals are then sent to the Cloud database which is used to store each user's ECG signals and form a big-data database for the AI algorithm that could detect cardiac dysfunctionalities. For the AI algorithm used for classification, Lin et al. proposed a pre-processing method for preparing the signals and a convolutional neural network model with four convolutional layers and three fully connected layers which resulted in an average accuracy of 94.96%.

More and more applications based on the data collected from the sensors continue to be developed and automating the continuous monitoring of health parameters through IoT and Machine Learning techniques could help in estimating an early prediction of abnormalities and could save lives in a much faster way.

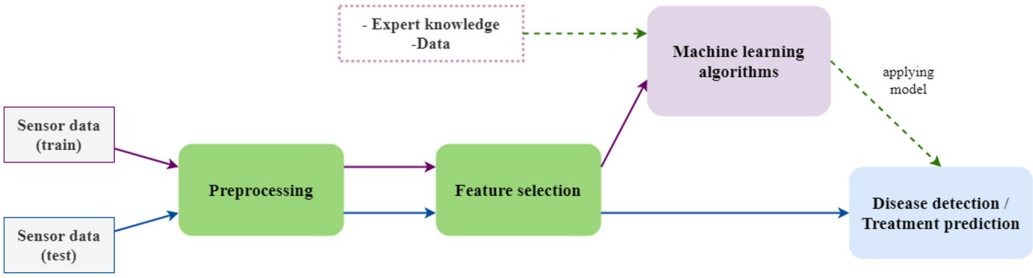

Fig 2. Architecture for a machine learning approach using wearable sensor data

As a further application for RO-SmartAgeing project, a general and simplified architecture for a possible machine learning approach using data from the sensors is given in figure 2. The data is collected from the sensors as for both training (in order for the system to learn) and testing (in order for the system to be used by anyone). Both training and testing data are being preprocessed due to the occurrence of noise, motion artifacts and sensor errors. Feature selection part is very important as it aims to discover only the main characteristics of both raw training and testing data. The machine learning algorithms collect the training data and, based on previous knowledge and the data collected up to that point, they provide a specific output. The algorithm is being applied on the testing data after it had been trained and it can detect a certain disease or predict a personalized treatment depending on the tasks applied.

As healthcare system becomes more digitalized and the modern transformations continue to ripple throughout the industry, AI technology will, in turn, grow in importance as an enabler of better elderly care.

In the context of the Ro-SmartAgeing project, we plan to develop a system that could monitor and evaluate an elder patient's health using an appropriate sensor for data acquisition, transmitting the data from patient to clinician, integrating the data with the patient's medical history and sending an alarm if there is an escalation in the care of the patient. As a future perspective, it would be a great opportunity to integrate a Machine Learning algorithm that could predict, based on the collected data from the wearable devices, if there are any abnormalities and eventually alert the medical personnel if there are any significant changes in his vital signs. The algorithm is previously trained for certain problems based on the data received as input. It could be developed to automatically detect arrythmias or other cardiovascular diseases based on the ECG signals, high/ low blood pressure through the pulse sensor, a high temperature based on the body temperature sensor and many more abnormalities also based on the patient's medical history and automatically inform the doctor in such a case without having someone constantly spending time watching the screen.

5. Conclusion

Artificial intelligence is an on-going research area and it has an important role to play in the healthcare domain, especially in the form of machine learning as for precision medicine. Even if the constant

challenges of providing diagnosis and treatment recommendations have not finished, it is expected that AI will master this domain soon. In the context of medical image analysis, machines will most likely be able, at some point, to examine most of the radiology and pathology images, speech and text recognition being already used for communication and capturing medical notes.

Remote health monitoring systems, through wearable health devices, have become a tool worth being integrated in the medical health systems, especially for the elderly patients. The principal value of such a system is to implement and integrate biosensors, intelligent processing and alarms to support medical applications and to predict and detect certain abnormalities and diseases that could help early diagnosis of a patient.

Combining artificial intelligence and Internet of Things can offer a significant contribution in terms of predicting diseases or a treatment based on the data collected from wearable devices through an IoT platform. Unlike humans, AI-based systems never lack motivation or drive and they will never be tired on putting a certain diagnostic, but they require a substantial learning phase which can achieve reliability after a solid amount of time. Therefore, we plan to develop RO-SmartAgeing project with the integration of a Machine Learning algorithm to easily detect certain diseases, predict suitable treatments for the patient and reduce the time-consuming factor thus helping the clinicians to better manage their patients.

Acknowledgement

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On the Issue of Improving Export Development Mechanisms in Industrial Regions of Russia

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Abstract

The article is devoted to improving mechanisms for the development of export activities of enterprises in industrial regions of Russia. The authors analyzed instruments for coordinating the interaction of regional export development measures between federal and regional authorities. The mechanisms of financial support for the export of industrial products at the federal level were identified and evaluated, a set of measures to support regional exports was proposed and justified, including taking into account its country specificity. The paper presents proposals for the development of regional educational programs aimed at export development, as well as an action plan for promoting brands of industrial regions of Russia.

Keywords: Regional Economy, Regional Foreign Economic Activity, Enterprises Export Activities, Export Activities Marketing, Regional Export Support.

Introduction

The development of export activity is one of the most important tasks of the Russian economy, but this problem is especially urgent for the industrial regions. Most regional industrial enterprises currently have insufficient experience in international cooperation. Despite the intensification of their efforts in recent years to present their products on the global market, the issues of developing regional exports cannot be completely resolved.

The development of instruments to stimulate export activity in the regions, the formation and implementation of measures to support novice exporters are given serious attention by public authorities at various levels. Both at the federal level and at the level of a number of subjects of the Russian Federation, a set of measures operates to stimulate regional exporters. However, at the present time, among theorists and practitioners, a unified approach to this issue is not observed, which determined the relevance of the study undertaken by the authors of the paper.

In the course of studying the problem, official documents of the Ministry of Industry and Trade of Russia, Internet resources, materials of the Federal Statistics Service and the results of monitoring the socio-economic development of the regions of the Russian Federation were analyzed. The “Strategies of socio-economic development for the period until 2035” approved by a number of subjects of the Russian Federation were thoroughly studied and evaluated. The authors' conclusions are also based on a generalization of the practical experience of the Russian regions in the field of providing

exporters with comprehensive support for their foreign economic initiatives. During the study, general scientific methods of synthesis, generalization, system and comparative analyzes were used.

Results and Discussion

A study conducted by the authors showed that presently Russia is widely represented in foreign markets - there are 72 trade missions in 56 countries of the world. Their objective is to represent the country's interests in foreign economic issues, including free assistance to Russian companies and regions that are going to export their products.

At the same time, the creation of export support centers is an important mechanism for export development at the regional level. The main purpose of their activities should be, according to the authors, the provision of financial and non-financial support measures to regional exporters. For this, coordination of efforts with the following Russian organizations is extremely important:

- Russian Export Center, which includes the Russian Agency for Export Credit and Investment Insurance and ROSEXIMBANK, which allows regional exporters to receive comprehensive assistance;
- trade missions of Russia in foreign countries.

At the level of the subject of the Russian Federation, according to the authors, interaction of centers with the following organizations is necessary:

- funds for support and development of small and medium enterprises;
- regional business incubators;
- business microfinance centers;
- multifunctional business development centers, etc.

It should be noted that currently the basis of state support for the export activities of regional enterprises is financial assistance carried out in accordance with the Concept for the development of state financial support for the export of industrial products in the Russian Federation. The financial support mechanisms include:

- compensation for part of the cost of transporting food and agricultural products (up to 50% of the costs incurred);
- tax regulation of foreign economic activity (VAT for exported goods is 0%);
- state guarantees in foreign currency, subject to the compliance of export products with the list approved by the Government;
- concessional lending to foreign buyers and financing of export operations (subject to the compliance of products with the priorities of Vnesheconombank's investment activities);
- export credit insurance (the Russian Agency for Export Credit and Investment Insurance covers up to 95% of losses in case of political and up to 90% of commercial risk);
- financing the export of high-tech goods;

- increasing the effectiveness of Russian expositions at foreign exhibitions, etc.

According to the authors, the main directions of regional export development should be:

- dissemination of information about export opportunities of enterprises through trade missions of the Russian Federation, business councils, investment bureaus, chambers of commerce and industry of foreign countries;
- providing support to exporters through interaction with the Russian Export Center;
- formation of a catalog of region exporters;
- organization of participation in business missions to foreign countries, as well as in meetings with foreign entrepreneurs in the region;
- organization of participation in international exhibition-fair and congress events in the Russian Federation and abroad;
- Search for international partners using the Enterprise Europe Network (creating English language company profiles in the Enterprise Europe Network);
- providing advice on export issues with the assistance of relevant experts;
- translation of information materials into foreign languages;
- creation of websites of exporting enterprises in foreign languages;
- improving goods and services in accordance with export requirements;
- training of representatives of small and medium enterprises, etc.

Given the country specifics of the foreign economic activity of industrial regions of Russia, the authors consider it necessary:

- creation of regional representative offices in countries with the highest growth rates of exports of goods and services from this region;
- creation of inter-regional representative offices in countries with high export values of similar goods;
- sending representatives of regional exporters to work in trade missions of Russia in countries that are key in terms of non-oil exports;
- organizing and conducting internships for regional export specialists in trade missions of Russia in foreign countries to study consumer behavior, products in demand, etc.

According to the authors, the development of the region's export activity will be facilitated by the creation and maintenance of a public register of regional exporters, including: the name and contact details of companies, ranking them by industry, according to the HS codes, and export countries. Updating and clarifying the registry should be done at least once every six months.

To increase non-oil exports, it is necessary to use various debt settlement schemes, including:

- in exchange for obligations of foreign partners for the Russian products procurements;
- to provide preferences to Russian suppliers on market access to the public procurement system;
- to convert debt obligations of partners into equity participation in projects to promote Russian exports, etc.

An important direction in the development of regional exports is the introduction of an online resource dedicated to exports. It should be focused on supporting export-oriented small and medium enterprises, providing advice on conducting foreign trade operations, training on export operations technologies, conducting online conferences for businesses, etc. The resource should contain information on the socio-economic situation of countries and their regions; on the volumes, commodity and geographical structure of exports and imports; foreign trade, tax, investment legislation; organizations promoting the development of foreign economic relations; links to trade and diplomatic missions of foreign trade partners and credit agencies.

A significant direction in developing the export potential of the regions is the introduction of training programs for novice exporters. From the point of view of the authors, there should be the following topics of educational programs:

- role of export in the development of an industrial enterprise strategy;
- effective marketing technologies for exporters;
- basics of business communications in export activities;
- legal support of export activities;
- management of financial resources in export activities;
- documentation support for export activities;
- specifics of customs clearance of export operations;
- logistics technologies in export activities;
- tax support for export activities;
- basics of e-commerce;
- use of the project approach in export activities;
- intellectual property in foreign markets: use, registration, protection.;
- monitoring of export performance.

Training courses must be varied depending on the needs of exporters and built on a modular basis. Access to training courses, including in online format, should be available to any representative of a small or medium enterprises interested in export operations. The implementation of educational programs will allow enterprises to obtain specialists who possess the competencies necessary for exporting and scaling up a business by entering the foreign market.

An important direction in the development of export activities of the regions is the development and promotion of their brands. As the study showed, in many subjects of the Russian Federation, systematic work to promote regional brands is not carried out; efforts are insufficient to create the image of the regions among foreign partners and consumers. An analysis of the image characteristics of the Russian regions allows us to conclude that there are a number of negative stereotypes (unfavorable ecology, economic depression, low solvent demand, limited opportunities for residents to develop themselves, etc.) that hinder the formation of demand in the tourism, food industry, and other export-oriented industries. At the same time, it was revealed that the image of the regions of Russia is formed to the greatest extent due to large-scale sports, cultural and political events.

The described situation reduces the competitiveness of Russian regions on the world market and hinders the development of the export potential of industrial regions of Russia. The action plan for

promoting brands of industrial regions of Russia should include, according to the authors, the following steps:

- study of the image of the region among stakeholders (local population and business, the population of neighboring regions and Russia as a whole, foreign partners);
- analysis of the weaknesses and strengths of the region in the main areas of activity;
- development of a regional brand platform, its positioning strategies;
- development of brand visualization involving a wide range of participants;
- implementation of a brand promotion program in Russian and foreign markets.

The implementation of the proposed export development mechanisms in the industrial regions of Russia will increase their competitiveness in the world market.

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The Foreign Economic Activity Development as A Direction for Improving Russian Regions Marketing Strategy (Based on The South Urals Example)

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Abstract

The article is devoted to the study of ways to improve foreign economic activity as a key area for the implementation of the marketing strategy of the Russian regions. The authors identified the main directions of diversification of regional exports, including natural-production and innovation component. The article explores the export structure of Russia and its industrially developed regions, analyzes industry guidelines for the development of federal and regional exports, and explores the possibilities of expanding the geography of export supplies. As a result of the study, a list of economic sectors promising for export development was formed and justified, the use of which will optimize the marketing strategies of the subjects of the Russian Federation and increase their global competitiveness.

Keywords: Regional Economy, Regional Foreign Economic Activity, Export Operations, Place Marketing, Regional Marketing Strategies.

Introduction

The development of foreign economic activity is an important area of improving the marketing strategy of the Russian regions. To solve this problem, it is necessary to intensify the export efforts of the subjects of the Russian Federation, which, in turn, is impossible without identifying and optimizing their export benchmarks, analyzing the export structure of industrialized regions, as well as promising sectors of the economy in terms of export. The described factors determined the relevance of the study undertaken by the authors of the paper.

In the course of studying the problem, official documents of the Ministry of Industry and Trade of Russia, Internet resources, materials of the Federal Statistics Service and the results of monitoring the socio-economic development of the regions of the Russian Federation were analyzed. The strategies of socio-economic development of the subjects of the Russian Federation for the period until 2035 were studied. The authors' conclusions are also based on an analysis of the practical experience of a number of Russian regions - the Perm, Chelyabinsk, Sverdlovsk, Novosibirsk and Tyumen Regions - in the field of comprehensive support of foreign economic initiatives of exporting enterprises. During

the study, general scientific methods of synthesis, generalization, system and comparative analyzes were used.

Results and Discussion

One of the targets for the development of foreign economic activity of the Russian economy until 2035 is its entry into the top five world exporters and qualitative changes in the structure of exports due to the outstripping growth in exports of high-tech, knowledge-intensive goods and services. An effective tool to achieve this goal at the level of the subjects of the Russian Federation is the formation and subsequent implementation of a strategy for export diversification, which helps to reduce trade, political, commercial and other risks of foreign economic activity.

According to the authors, the key areas of the regional export diversification strategy include:

- natural-production component, including the development of the existing regional competitive advantages: this diversification is the generator of the region's resources and provides it with "quick wins";

- innovative component, which implies the establishment of new competitive industries, focusing on the final stages of the technological cycle and ensuring a high level of innovation.

The authors believe that the strategy of export diversification should be combined with the traditional export specialization of the region, and not act as its alternative, which will solve the following problems:

- increase in the share of non-oil industries' goods and services of small and medium enterprises;

- increase in the share of exporters who regularly carry out export operations;

- increase in the share of companies that expanded their export assortment or entered new country markets.

Let us analyze the industry benchmarks for the development of federal and regional exports. The leading branches of the Russian economy from the perspective of expanding foreign economic activity are presented in table 1.

Table 1: Perspective in terms of foreign trade branches of the Russian economy

#	Branch of the economy	Share of total exports, %	Share of non-oil exports, %
1	Fuel and energy complex	62.5	34.5
2	Metallurgical complex	7.5	12
3	Agro-industrial complex	4.5	8
4	Transport complex	3.5	6.5
5	Production and processing of precious metals and stones	2.5	3.5
6	Military-industrial complex	2.5	4.5
7	Petroleum and gas chemistry	2	4
8	Tourism	2	4
9	Transport engineering	1.5	3
10	Timber industry complex	2	2.5

#	Branch of the economy	Share of total exports, %	Share of non-oil exports, %
11	Nuclear complex	1.5	2
12	Information and communication sphere	1	2
13	Non-nuclear power engineering	0.3	0.6

From the data in table 1 it can be seen that the listed sectors of the economy account for about 94% of the total and over 87% of non-oil exports of Russia.

As part of the study, the authors conducted a comparative analysis of the sectoral structure of the Russian economy and the economy of the Russian industrial region (using the example of the Chelyabinsk region). The state of export in promising sectors of the country's economy is presented in table 2.

Table 2: The state of export of the Chelyabinsk region

#	Perspective in terms of foreign trade branches of the Russian economy	Share in the total export of Russia, %	Share in export of the Chelyabinsk region, %
1	Fuel and energy complex	62.5	0
2	Metallurgical complex	7.5	80.2
3	Agro-industrial complex	4.5	2.84
4	Transport complex	3.5	2.3
5	Production and processing of precious metals and stones	2.5	0.12
6	Military-industrial complex	2.5	2.55
7	Petroleum and gas chemistry	2	0.44
8	Tourism	2	0
9	Transport engineering	1.5	2.3
10	Timber industry complex	2	0.21
11	Nuclear complex	1.5	no data available
12	Information and communication sphere	1	0.33
13	Non-nuclear power engineering	0.3	0.1

Thus, based on the data in Table 2, the sectoral export structure of the Chelyabinsk region is significantly different from the Russian one, and a similar picture is observed in other regions of the Russian Federation, which requires an appropriate emphasis from them.

According to the authors, indicators recommended by the Regional Export Standard approved by the Government of the Russian Federation can be used to assess the effectiveness of mechanisms for implementing the strategy of the regions of the Russian Federation. They are presented in tables 3 and 4.

To assess the possibilities of expanding the geography of export activities of the regions, we will analyze (using the example of the Chelyabinsk region) the main trends in the development of foreign trade. The rating of countries in terms of exports from Russia over 5 years is presented in table 5. These same countries occupy the first lines in the integrated ranking of the importance of export markets for Russia.

Table 3: The main export guidelines of regions of the Russian Federation

#	Indicator	Recommended value
1	Twofold increase in the volume of non-oil non-energy exports of the subject of the Russian Federation in 2020 relative to 2016	100%
2	Share of exporting companies from all companies in the region in 2020	2%

Table 4: Additional export guidelines of regions of the Russian Federation

#	Indicator	Recommended value
1	Number of small and medium Exporters	At least 500 pcs.
2	Annual increase in the number of small and medium exporters	At least 5%
3	Diversification of non-oil exports (maximum share of one industry)	No more than 40%
4	Diversification of supply geography (number of export countries)	At least 25

Table 5: Rating of countries in terms of exports from Russia over 5 years

#	Country	Export volume	Share, %
1	Netherlands	230.2	12.5
2	China	149.8	8.1
3	Germany	133.4	7.3
4	Italy	116.7	6.3
5	Turkey	92.2	5.0
6	Belarus	78.0	4.2
7	Japan	69.3	3.8
8	Republic of Korea	64.2	3.5
9	Ukraine	60.3	3.3
10	Poland	59.9	3.3
11	Kazakhstan	57.7	3.1
12	England	46.6	2.5
13	United States of America	46.6	2.5
14	Finland	43.2	2.3
15	Latvia	38.2	2.1

Table 6 shows a comparative analysis of the structure of exports from Russia and the region over 5 years (2013-2017).

The data presented in the table take into account the current state of exports in the region, including the deviation from the indicators of export activity in the country. At the same time, countries demonstrating positive deviation values should, according to the authors, become an object of promotion on the part of exporters in the region.

Table 6: Comparative analysis of the structure of exports from Russia and the Chelyabinsk region

#	Country	Share of exports from Russia, %	Share of exports from the region, %	Deviation, %
1	Netherlands	12.5	6.5	-6.0
2	China	8.1	0.4	-7.7
3	Germany	7.3	1.0	-6.3

#	Country	Share of exports from Russia, %	Share of exports from the region, %	Deviation, %
4	Italy	6.3	5.1	-1.2
5	Turkey	5.0	7.8	2.8
6	Belarus	4.2	3.8	-0.4
7	Japan	3.8	0.7	-3.1
8	Republic of Korea	3.5	0.5	-3.0
9	Ukraine	3.3	3.2	-0.1
10	Poland	3.3	0.9	-2.4
11	Kazakhstan	3.1	18.7	15.6
12	England	2.5	0.6	-1.9
13	United States of America	2.5	0.8	-1.7
14	Finland	2.3	1.5	-0.8
15	Latvia	2.1	0.0	-2.1

Consider the results of a comparative analysis of the geography of exports of two similar in a number of indicators (geographical location, structure of gross regional product, etc.) of subjects of the Russian Federation - Chelyabinsk and Sverdlovsk regions. Table 7 presents the export volumes of these regions over five years (2013-2017) relative to the rating of the countries of the Sverdlovsk region, since the export volume of the Chelyabinsk region during this period of time is about 60% of the export of the Sverdlovsk region.

Table 7: Export volumes of two regions (2013-2017)

No. in the rating of Sverdlovsk region	Country	Sverdlovsk region, $ billion	Chelyabinsk region, $ billion	Deviation, $ billion
1	United States of America	6.64	0.175	-6.465
2	Netherlands	3.1	1.4	-1.7
3	Kazakhstan	2.62	4.031	1.411
4	Germany	1.74	0.207	-1.533
5	Turkey	1.71	1.676	-0.034
6	Algeria	1.61	0.076	-1.534
7	Azerbaijan	1.32	0.698	-0.622
8	China	1.08	0.083	-0.997
9	Switzerland	0.983		-0.983
10	India	0.938	0.216	-0.722
11	Greece	0.935	0.11	-0.825
12	France	0.855		-0.855
13	Czechia	0.789		-0.789
14	Italy	0.747	1.11	0.363
15	England	0.733	0.129	-0.604
16	Uzbekistan	0.694	0.998	0.304
17	Belarus	0.673	0.83	0.157
18	Ukraine	0.655	0.68	0.025
19	Republic of Korea	0.645	0.12	-0.525
20	Canada	0.518		-0.518

The table shows that the maximum export lag of the Chelyabinsk region corresponds to such countries as the United States of America, the Netherlands, Germany, Algeria, China, Switzerland

and France. Similar data were obtained based on industry and geographical analysis of exports from other regions of the Russian Federation - Perm, Novosibirsk and Tyumen Regions.

According to the authors, in order to optimize the foreign economic activity of the regions of the Russian Federation as part of the implementation of their marketing strategies, it is important to develop a program for the development of exports in the short, medium and long term. It should include the following key objectives:

- identification and reduction of administrative barriers;
- creation of a center for enterprise export support;
- creation of advisory infrastructure for export support;
- maintaining a public register of regional exporters;
- creation and promotion of an information resource dedicated to export;
- promotion of a regional brand in foreign markets, including through official visits of senior officials of the region abroad;
- creation of trade representations of the region abroad;
- training for beginner exporters, etc.

The program, according to the authors, should take into account the targets laid down in the Main directions of export development of the Russian Federation. This will allow to increase the export performance of subjects of the Russian Federation, optimize the marketing strategies of the regions and, ultimately, increase their global competitiveness.

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Development of The Construction Complex of The Russian Federation in The Context of Digitalization of The Economy

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Abstract

The development of the construction complex in the context of digitalization of economic processes is discussed in a number of research works. It was found that the construction complex is developing cyclically, which is reflected in medium-term Juglar industrial cycles, Kuznets construction cycles, and Kondratiev long waves considering industries in terms of scientific, technical, innovative and digital development. The article discusses the digitalization of the construction complex of the Russian Federation through the BIM-design process, identifies its advantages and disadvantages for the building organizations. One of the main drawbacks of the development of BIM technologies is the lack of a regulatory framework in this field. The article proposes a scheme for the development of the digital potential of the construction complex in the regions of the Russian Federation, with the main focus on the regulatory framework at the federal and regional levels. Based on the proposed scheme, a multi-level structure for the development of the construction complex of the Russian Federation is built in the context of the economy digitalization, indicating the following development levels: 1) the formation of human capital through training and development, and the formation of the scientific and technological base; 2) the base of information and communication technologies; 3) the innovative development base; 4) digital development processes; 5) the controlled structure of digital development. Control indicators are selected for each level, which in the future will provide an assessment of the developmental degree of digital processes in the construction complex of the Russian Federation throughout its subjects.

Keywords: Construction Complex, Digitalization Of The Economy, Economic Cycles, BIM-Design.

Introduction

The construction industry contributes to the development of infrastructure of a particular region at various levels, which provides functioning of its economic systems. The construction industry also provides other sectors of the national economy with the necessary facilities (buildings, roads, bridges and tunnels, etc.), therefore, the digitalization of the construction industry can provide a more intensive development of the whole economy of a region. Let us assume that the construction process that implies activities from dealing with project documentation to the commissioning of an object and involves construction organizations dealing with various aspects of construction should be referred to as a construction complex.

Considering the development of digital processes in the construction complex in the Russian Federation, we should point out an upward trend based on the survey of BIM use in Russia, Report on the study (Website, accessed April 20, 2020). So, the survey conducted in the Russian Federation in 2019 with 174 participants, revealed the following advantages of BIM-design in construction organizations: 1) high quality of the project - 74% of the respondents; 2) better awareness of the project by all participants - 72%; 3) information availability, fast data transfer and information

exchange - 61%; 4) reduction of design time - 46%; 5) 3D and 4D visualization of the construction site - 36%; 6) cost reduction - 33%; 7) increase in profit and profitability of construction production - 32%; 8) efficient use of resources - 25%; 9) reduction of construction time - 24%. At the same time, respondents noted a number of reasons that impede the development of BIM in construction organizations in the Russian Federation: 1) lack of qualified personnel, mentioned by 73% of the respondents; 2) high cost of implementing new technologies - 52%; 3) lack of state standards for the implementation of projects using BIM technologies - 49%; 4) lack of a legal framework for the introduction of BIM-technologies - 49%; 5) lack of investors and customers' requirements - 47%. Hence, the development of the construction complex of the Russian Federation in the context of modern digitalization trends is quite relevant, which is confirmed by the aforementioned survey in terms of the advantages, but the focus should be made on the development of the regulatory framework.

Conducting the analysis of scientific research into the development of digital processes in the construction industry, a fairly large scope of research can be seen: Alaloul et al. (2018), Borremans et al. (2018), Fateeva et al. (2018), Lepekhin et al. (2018), Li (2017), Mesároš et al. (2016), Pertseva et al. (2017), Safronova et al. (2018), Volkov (2018), Zaychenko et al. (2018) and other. For example, Li and Yang (2017) propose a new production scheme for the industrialization of construction, which is based on BIM-design technology. In work Safronova et al. (2018) discuss the digitalization strategy for a construction company to increase its performance in compliance with current trends. Volkov (2018) in his work considers the original systemic engineering scheme for digital modeling of creative activity in the construction industry, and describes seven levels of digital modeling. The study conducted in work Alaloul et al. (2018) reflects the general idea of the industrial revolution 4.0 with the description of important aspects of the construction industry development. In the article Mesároš et al. (2016), the authors consider the development of managerial and digital competencies in the construction industry using BIM-technologies.

Construction complex, like any other economic system, is subject to cyclical processes, and this fact must be taken into account when forming the development tools of the construction complex in the context of the economy digitalization. The relationship between cyclical processes and the development of the construction industry is discussed in a number of works: Allan et al. (2008), Bennett (2005), Gornig et al. (2014), Slueva (2017), Zavadskas et al. (2017) and other, for example, the Zavadskas et al. (2017) of the article reviewed the publications relating to the efforts to harmonize construction processes based on the Web of Science Core Collection database. In some studies the authors consider: 1) the marketing reactions of construction companies to cyclical conditions using the example of the UK, Bennett (2005); 2) the main factors determining the upward and downward cycles in the construction industry of New Zealand, Allan et al. (2008); 3) the stages of the construction complex development in relation to the indicator of the construction volume on the example of Germany, Gornig et al. (2014).

Based on the foregoing, the object of this study is the construction complex of the Russian Federation, and the subject is the development of digital processes of the construction complex at the federal level. The aim of the study is to structure the development of the Russian Federation construction complex in the context of digital economy. In accordance with the purpose of the study, it is necessary to solve the following problems: 1) to analyze the relationship between the development of the construction complex of the Russian Federation and the cyclical nature of the selected socio-economic indicators through diagrams; 2) build a scheme for the digital development of the construction complex in the regions of the Russian Federation; 3) build a multi-level structure for the development of the construction complex of the Russian Federation in the context of digitalization, indicating the levels of development; 4) determine control indicators to assess the identified levels of the Russian Federation construction complex development in the context of the economy digitalization.

Methods of Research

The study is based on the comparison of the theories of economic cycles (J. Kitchin, K. Juglar, S. Kuznets and N.D. Kondratiev) with the development of the construction complex in the Russian Federation through the use of quantitative methods of assessment and analysis. A quantitative research method involves the collection and processing of statistical data with the dynamics of their change over time using the diagrams. Statistical data were selected in the state statistics database for the following indicators: commissioning of residential and non-residential buildings, thousand m^2; GDP per capita, rubles; volume of innovative goods, works, services, million rubles; number of organizations conducting research and development, units.

The qualitative analysis methods are also used in the work and they include the construction of the «Scheme for the development of the digital potential of the construction complex in the regions of the Russian Federation» and the «Multi-level structure of the Russian Federation construction complex development in the context of the economy digitalization». Control indicators are selected in accordance with a multi-level structure.

The relationship of the development of the Russian Federation construction complex with socio-economic indicators

Studying the historical retrospective of the development of digitalization processes on the territory of the Russian Federation, it was found that it is possible to trace the cyclical development of sectors, which is reflected in the innovative and digital development of a specific economic system, Kuzyk (2008) and Loskutova (2009). The regularity of cyclic processes should be considered through the prism of economic cycle theories, Tsvetkov (2013).

When analyzing the cyclic development of industries, the synthetic cycle theories should be highlighted as they represent the main group of economic cycle theories according to Tsvetkov (2013). These theories include studies of the economists on the cyclical nature of economic development conducted since the beginning of the 19th century. The economists describe common stages of economic cycles, but at the same time these cycles are different due to such parameters as amplitude, length, etc. There are different types of economic cycles: 1) short-term 3-4 year cycles (J. Kitchin cycles); 2) medium-term, industrial and business 7-12 year cycles (C. Juglar cycles); 3) construction, reproduction, demographic or long cycles of 16-25 years (S. Kuznets cycles); 4) long waves of 40-60 years (N.D. Kondratiev cycles).

The development of the construction industry is reflected in medium-term industrial cycles of Juglar, construction cycles of Kuznets and in Kondratiev long waves that consider the industry in terms of scientific, technical, innovative and digital development. In this connection, it seems appropriate to analyze the relationship between the dynamics of the indicator characterizing the development of the construction complex of the Russian Federation (commissioning of residential and non-residential buildings, thousand m^2) with such key economic indicators as GDP per capita, rubles, and population, million people. In particular, it is necessary to consider the relationship with the indicators that characterize innovative and scientific-technological activities: the volume of innovative goods, works, services, million rubles; number of organizations conducting research and development, units. It should be noted that the indicator «The volume of innovative goods, works and services» has been collected by the state statistics service since 2004, Federal State Statistics Service (Website, accessed April 10, 2020). The indicator was earlier (1998 to 2003) called «The volume of innovative products by innovation degree» and was collected in two groups: 1) products that underwent significant technological changes or were reintroduced; 2) products that have been updated. In this connection, this indicator in the early period (1998-2003) is considered in this study as the sum of subgroups.

The relationship of the dynamics of the selected indicators of state statistics is shown in Fig. 1-4 for the period from 1998 to 2018, with the reliability indicator of approximation (R^2), which will allow us to attribute indicators to a specific type of economic cycle. It should be noted that the development

of the construction complex in modern Russia is rather difficult to evaluate in terms of Kondratiev long waves because of the lack of data for previous periods (before 1998), therefore, it is difficult to assess the dynamics of innovative processes related to the development of the construction industry over a long period of time (40-60 years). However, the medium-term industrial cycles of Juglar and the construction fluctuations of Kuznets are available for the assessment.

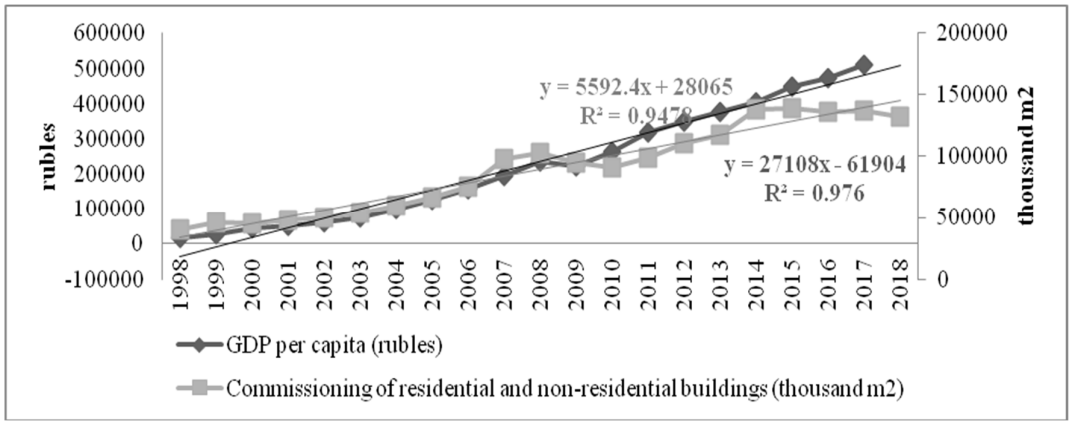

Fig. 1: Relationship between the dynamics of the commissioning of residential and non-residential buildings (thousand m^2) and GDP per capita (rubles, before 1998 - thousand rubles)

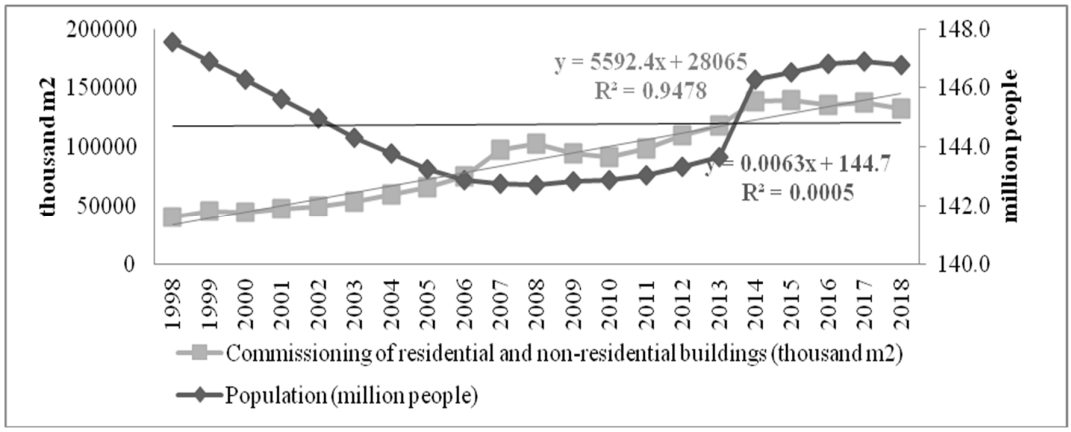

Fig. 2: Relationship between the dynamics of the commissioning of residential and non-residential buildings (thousand m^2) and population (million people)

Considering the dynamics of key economic indicators, it can be seen that the development of the Russian Federation construction complex varies in proportion to the change in the level of GDP per capita, hence productivity at construction companies has an upward trend. The indicators of approximation accuracy of R^2 presented in Figure 1 also indicate the interconnection of the indicators dynamics. Based on the indicator of the resident population on the territory of the Russian Federation for the considered period of time (Fig. 2), it can be noted that the relationship between the selected indicators has been observed since 2010. The trend line in terms of the population indicator is not accurate due to a low level of the approximation accuracy $R^2 = 0.0005$, since the time lag of the initial value is small, and the population growth cannot be traced in short-term and medium-term industrial and construction cycles.

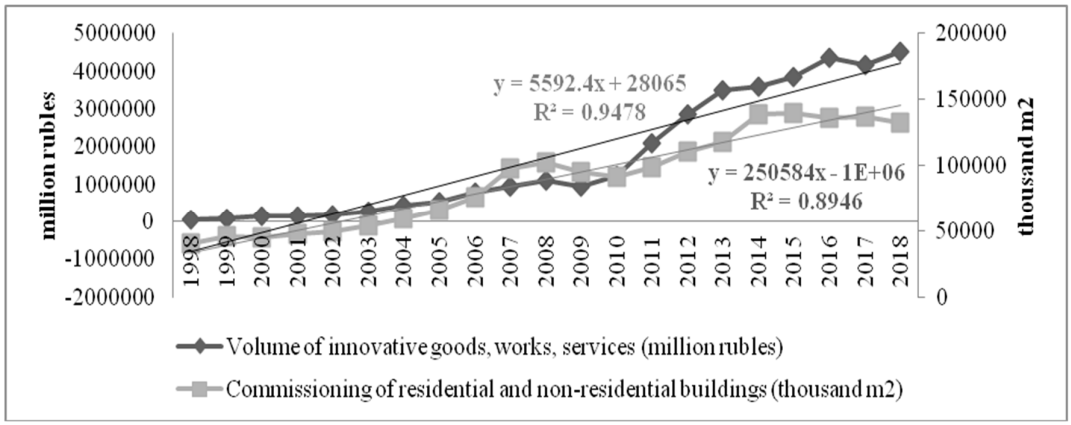

Fig. 3: Relationship between the dynamics of the commissioning of residential and non-residential buildings (thousand m^2) and the volume of innovative goods, works, services (million rubles)

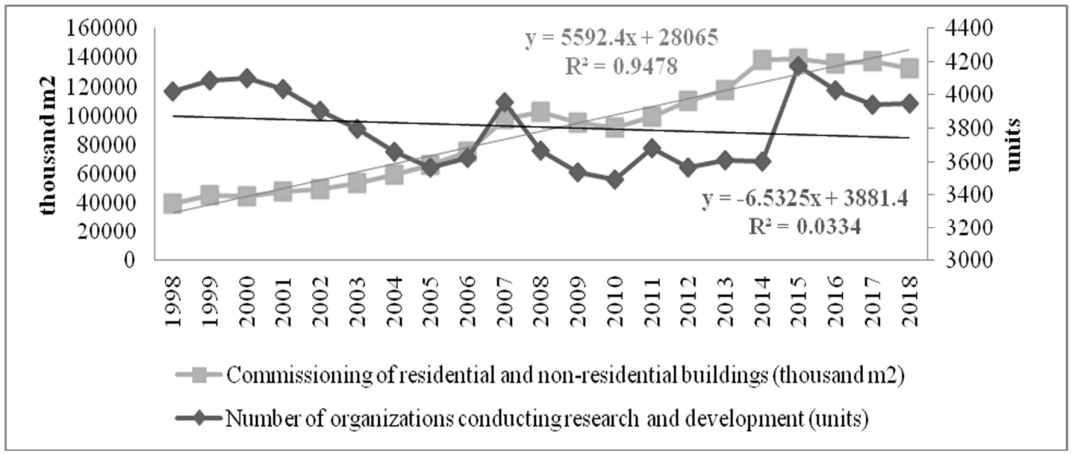

Fig. 4: Relationship between the dynamics of the commissioning of residential and non-residential buildings (thousand m^2) and the number of organizations conducting research and development (units)

Analyzing the charts reflecting the relationship between the dynamics of the construction complex of the Russian Federation and the indicators of innovative and scientific and technological development, we conclude that there is a relationship of the indicator dynamics with the amount of innovative goods and services. Thus, the trends reflected in Figure 3 reveal the interconnected growth of indicators, and high R^2 indicators demonstrate their development over time in accordance with medium-term industrial cycles. The indicator of the volume of innovative goods, works and services over time varies in accordance with the selected indicator of the development trend of the construction complex, since the digital and innovative processes as well as BIM-design technologies are widely used in the construction complex. There is also a correlation with the number of scientific organizations, since the innovative and digital processes of the construction complex are being actively studied.

Research Results and Discussion

The development of the construction complex of the Russian Federation in the context of the economy digitalization should be addressed through the formation of interconnected management

structures aimed at the holistic development of the digital potential of the construction complex through the prism of individual subjects of the federation, Kudryavtseva et al. (2019). It seems appropriate to formulate a set of measures that contribute to the development of the construction complex in the regions of the Russian Federation through the implementation of regulatory mechanisms and interconnection of regional authorities, business structures and local population. The activities of the actors should be coordinated and aimed at the development of digital potential within the subject of the federation. The digital development within the regions will be provided by the construction industry through the development of the digital potential of the construction complex of a particular region. To achieve this goal the regional authorities ought to take into account the regulatory and legislative documents of the federal level, namely: 1) the Strategy for socio-economic development of the Russian Federation, About strategic planning (Website, accessed April 20, 2020); 2) the Strategy for the development of the information society of the Russian Federation, Strategy of development N203; 3) the Strategy for scientific - technological development of the Russian Federation, Decree of the President N642; 4) the Development Strategy of the construction industry of the Russian Federation, Ministry of construction of the Russian Federation (Website, accessed April 20, 2020); 5) the list of programs and projects, for example: GOST R 57310-2016, GOST R 57563-2017, SP 331.1325800.2017, SP 333.1325800.2017, SP 404.1325800.2018, Program N1632-R, Order of the Ministry of construction N854/PR, aimed at developing innovative and digital potential of industries and sectors of the Russian Federation, as well as control, including the construction complex. The following documents are also required for development of the digital potential of the construction complex:

1. Strategies for the socio-economic development of the region. This document should reflect the planned development of the subject of the federation with the allocation of priority zones and programs.

2. Strategies for the development of the regional construction complex. The document should be developed in accordance with the characteristics of the territories including the measures necessary for the development of the construction complex. The strategy should be an integral part of the program for socio-economic development of the region, and it should be interconnected with the development strategy of the digital potential of the region's construction complex. A strategic initiative should be taken within the segments «Training, Development and Innovation», «Industry and Entrepreneurship», «Society and the Market», «Finance of the Region», Kozlov et al. (2018) and Kozlov et al. (2019).

3. Development strategies for the digital potential of the region's building sector. The document should be developed in accordance with: 1) the development of human capital, which consists in the collection of the necessary knowledge and skills for the implementation of the projects for the development of the construction complex as well as the scientific and technological base; 2) the base of information and communication technologies that already exist in the region and can provide the digital development of the construction complex; 3) the base for the innovative development of the industry, which will allow for the transition to the implementation of interconnected digital processes within the construction complex of the region. The strategy should be an integral part of the strategy of socio-economic development of the region, and it should be interconnected with the development strategy of the digital potential of the region's construction complex.

In the framework of these regulatory documents of the regional level, it will become possible to form the structure of the regional innovation system (RIS), Rudskaya (2017), with the main factor for its development - the digitalization of the construction complex. The characteristic features of the development of the digital potential of the construction complex in the regions of the Russian Federation are shown in the form of a diagram in Fig. 5.

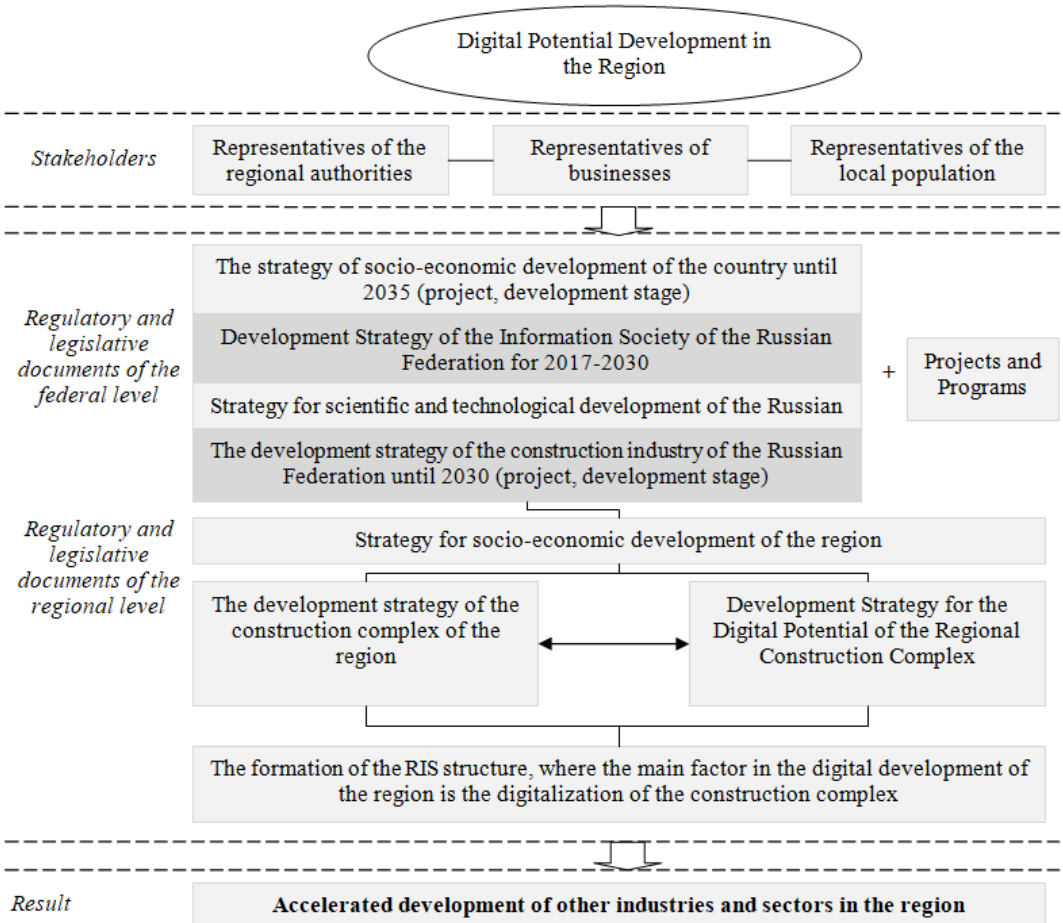

Fig. 5: Development of the digital potential of the construction complex in the regions of the Russian Federation

The scheme above characterizes the development of a particular region of the Russian Federation in the context of the digital potential of the region's construction complex. In the framework of this approach rapid development can be expected in other sectors of the economy, given the horizontal structure of the construction complex.

Based on the analysis, we can build a multi-level structure for the development of the construction complex of the Russian Federation in the context of the digitalization of the economy (Fig. 6). The structure will reflect the necessary levels for the transition to an interconnected control system for the digital development of the construction complex in the Russian Federation. The multi-level structure includes: 1) the growth of human capital through training and development, and the formation of the scientific and technological base (1st level of development); 2) the base of information and communication technologies (2nd level of development); 3) 3) an innovative development base (3rd level of development); 4) digital development processes (4th level of development); 5) the manageable structure of digital development (5th level of development). This structure of development on the territory of the Russian Federation should be defined as a complex of the generated digital potential of the construction complex in its constituent entities.

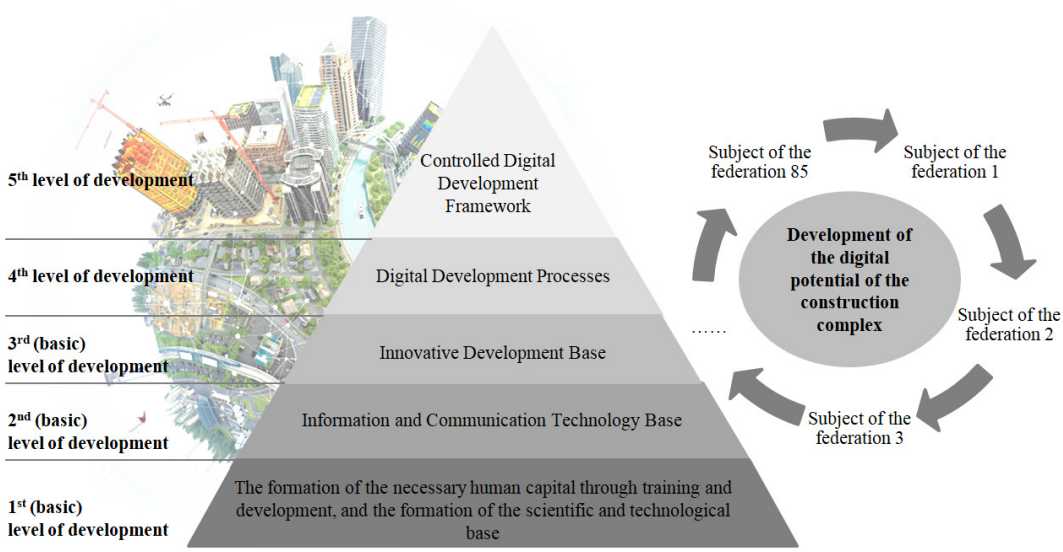

Fig. 6: Multi-level structure of the development of the Russian Federation construction complex in the context of the economy digitalization

In accordance with the structure shown in Fig. 6, we can determine the control indicators that will reflect the degree of development of the region at a particular level of the construction complex development in the context of the economy digitalization. At the first basic level, it is necessary to take into account indicators in two groups: 1) education; 2) research and development. The first group includes indicators such as:

- human development index;
- the number of bachelors, specialists and masters, thousand people;
- the number of graduate students, people;
- the number of Doctors of Philosophy, people;
- the number of Doctors of sciences, people.

The second group «Research and Development» should include:

- the number of organizations conducting research and development, units;
- the number of personnel engaged in research and development, people;
- the number of researchers with advanced degrees, people;
- internal costs for research and development in the field of engineering, million rubles.

At the second basic level, you should focus on the following indicators:
- the percentage of organizations using information and communication technologies (personal computers, servers, local area networks, «cloud» services),%;
- the percentage of organizations using the Internet in organizations,%;
- the percentage of organizations using electronic document management,%;
- the percentage of organizations using electronic data exchange between their and external information systems, %;
- the use of personal computers per 100 employees of organizations, units.

Within the framework of the third basic level, the focus should be made on the following industry indicators:

- level of innovative activity of enterprises,%;

- the percentage of innovative goods, works, services in the total volume of goods shipped and work performed,%;
- innovative goods, work, services, newly introduced or updated over the past three years, million rubles;
- the number of advanced manufacturing technologies used, units;
- the number of advanced production technologies, units;
- the number of advanced production technologies new for Russia, units;
- the number of brand new advanced production technologies, units;
- the number of new technologies (technical achievements) and software acquired by organizations, units.

At the 4th development level, the development process of the construction complex should be regulated according to industry indicators, divided into 2 groups: 1) the digitalization level of the construction industry; 2) the level of BIM development. The first group includes the following indicators:

- the percentage of organizations using cloud services in the total number of organizations in the Russian Federation,%;
- the percentage of organizations with the Internet access at a speed of at least 2 Mbps, in the total number of organizations in the Russian Federation,%;
- the percentage of organizations using CRM systems, ERP systems, SCM systems, in the total number of organizations in the Russian Federation,%.

The second group «Level of BIM development» should include:

- the percentage of construction organizations using BIM-technology,%;
- the number of implemented projects using BIM-technologies, units;
- costs of introducing BIM-technologies, mln. rub.;
- the number of personnel involved in the BIM design process, people.

At the 5th level of development, it is necessary to formulate indicators at the federal level, within the regulatory framework concerning the regulation and development of digital processes in the construction complex, in the field of BIM design, in particular. The indicators of this level can include the quantitative data on the programs of the Russian Federation that are being implemented and ready to be launched with regard to the development and regulation of the digital transformation of the construction complex, as well as BIM design.

Conclusion

The observed interconnection of the cyclical development processes of the construction complex (in terms of the indicator «Commissioning of residential and non-residential buildings, thousand m^2») with socio-economic indicators highlighted the trends in the construction complex development in the context of economic cycles, and determined the dependency of the construction complex development on medium-term industrial cycles - Juglar cycles, Kuznets cycles and Kondratiev long waves which consider the industry in terms of scientific, technical, innovative and digital development. Consequently, the development of the construction complex in the context of the economy digitalization is feasible and necessary, as the volume of construction was growing in the period from 1998 to 2018 and demonstrates an upward trend now, which is supported by a high value of the approximation accuracy $R^2 = 0.9478$.

So, the given analysis allows us to conclude that the digital processes of the Russian Federation construction complex must be developed with the focus on the regulatory framework. The proposed scheme for the development of the construction complex digital potential in the regions of the Russian Federation reflects the key positions that should be taken into account when forming the policy of the industry digital development in the regions. In this connection, a multilevel structure for the development of the construction complex of the Russian Federation in the conditions of economy

digitalization determines the development levels. In accordance with each level, control indicators have been selected, the analysis of which in the future will allow for the comprehensive assessment of the development degree of digital processes in the construction complex of the Russian Federation throughout its subjects. Also, it will become possible to assess the subjects of the Russian Federation regarding the formation of RIS with the main development factor - the construction complex.

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The Employee's Potential as A Factor Determining the Effectiveness of Implementing the Management Concept

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Abstract

The purpose of this article is to present the author's model, thanks to which it is possible to adapt tasks and functions between various members of teams implementing the concept of Lean Management in enterprises to their personal preferences and psychological conditions. In this model, four perspectives were identified based on which four Perception Styles (perception, specific phenomena and situations) were identified, followed by four Activity Styles. Research under the article was first of all conducted on scientific knowledge and the broad practice of one of the authors in the field of human potential management in organizations. In the next phase, psychologists were invited to research, who focused on developing an analytical and verification tool that could be useful in business practice in the long-term. The tool prepared in this way was then verified as part of the pilot studies carried out.

Keywords: Lean Management concept, Lean Management implementation process, perspektywa poznawcza, style percepcji, style aktywności, model RFCS.

Introduction

High efficiency and, consequently, the successful implementation of the Lean Management concept is determined by many factors, among which the human factor deserves special attention (Baskiewicz 2019, p. 224). A number of studies indicate that employee favor, and thus minimization of resistance, is an important criterion for the success of the process of implementing various management concepts (Morgan, Levitt, Malek 2010, p. 95; Bhasin, Burcher 2006, p. 56) In scientific knowledge, there are a number of ways to limit or even exclude resistance. (Eckes 2011, 34; Koenigsaecker 2000, pp.171-172) According to the authors, appropriate identification and analysis of the psychophysical features of organization members, followed by their targeted involvement at specific stages of work related to the implementation of the Lean Management concept, can significantly increase the efficiency of implementing the concept. Identification of personality traits allows defining the Perception Style and the Activity Style. Perception Style shows what kind of information is most important and useful to a particular member of the organization when they come into contact with a new situation. The Perception Style indicates why priority is given and which areas concentrate thoughts, as well as which mental processes are most efficient. The Perception Style translates directly into the Activity Style, which indicates activities in which each individual member of the organization is the most effective.

Literature Review

Hippocrates has already identified four personality types, followed by abilities, temperaments, interests and needs, and even physiological traits. The above-mentioned features create a set of elements of the psyche and behavior, through which people differ from each other. Sociable sangwinist, imperious choleric, melancholic thinker or observing phlegmatic are personalities identified by Hippocrates. Sangwinists have the gift of being attracted to each other, they are talkative, have a great sense of humor, are energetic, spontaneous, strengthen their contact with listeners through touch, they are simplistic.

Negative features are the lack of consistency and determination in the implementation of plans, very often they do not notice their disadvantages. They are the best employees in terms of contacts with others, they are great as salesmen. Choleric is also an extrovert who is characterized by independence and self-sufficiency. He is a born, dynamic and active leader who has an irresistible need for change, he is not moved, but inspires confidence. Choleric is hard to discourage, he likes to work for the needs of the group and works in unexpected situations. He does not feel the need for a stronger friendship, he is a compulsive workaholic, loves to have control over everything, does not allow others to make decisions and organize actions, because he assumes that only he is right and others are wrong, in addition, he is a master of manipulation. At work, the choleric is a born manager who hates opposition. He is a man quick in action. Among introverts, phlegmatics stands out, which is characterized by restraint, calmness and cool composure. He is patient and balanced, kind and polite, basically does not have bouts of bad humor, does not fall into depression and is easy to have sex. He is a good and caring listener. On the other hand, the phlegmatic looks lazy and postpones his work for later, he assumes that he can avoid it at all, hates coercion and avoids performing daily duties. At work, he is a competent and solid person, calm and consistent. He has administrative capacity, mediates in solving problems and finds easy ways out and avoids conflicts, can be a negotiator, likes routine work that does not require initiative. The last personality type is a melancholic who is also an introvert. Melancholic is a thinker and a pessimist. His temperament is full of extremes, highs are the most important and depression is the deepest. But on the other hand he is analytical and conscientious, serious and determined, distinguished by his artistic abilities, he is sensitive to beauty, philosophizing and poetic. He is a born idealist. At work, the melancholic obeys the regulations, he can easily see the problem and solve it. His place at work looks perfect and professional. Melancholic works best alone, values silence, always finishes the tasks he starts, likes charts, diagrams, numbers.

Based on many years of research and observation, Jung concluded that differences in people's attitudes and preferences are not accidental. He created the well-known division into extroverts and introverts today (Sharp 1987, pp. 25-31). Extroverts are people who generally draw energy from the outside world, i.e. contacts with people, things and events. (Sharp 1987, pp. 37 – 64) The opposite of extroverts are introverts, who draw energy from the inner world and only later transfer it to the outside world, they need space only for themselves. The extroverts are the sanguine and choleric of Hippocrates, while the group of introverts are phlegmatic and melancholic. In addition, Jung distinguished four personality functions, which are two pairs of opposites: perception-intuition and thinking-feeling. (Witzig 1978, pp. 315-331; Richek, Bown 1968, pp.57-65) He also determined that in each of these pairs one of the functions dominates. Jung came to the conclusion that the dominant functions of each person are permanent and independent of external conditions, and their resultant is the type of personality. (Meier 1995, pp.13-27)

In 1938, two American psychiatrists Horace Gray and Joseph Wheelwright, created the first personality test based on Jung's theory, enabling the determination of dominant functions in three dimensions described by him: extraversion-introversion, perception-intuition and thinking-feeling. (Wheelwright., Wheelwright., Buehler 1964; Sato 2017, pp1-7; Wheelwright, Wheelwright, Gray 1964) This test became an inspiration for other researchers. In 1942, also on American soil: Isabel Briggs Myers and Katharine Briggs began to apply their own personality test, extending the classic three-dimensional model of Gray and Wheelwright by a fourth dimension: assessment-observation. (Myers, Briggs 1998) Most later typologies and personality tests referring to Jung's theory also include this fourth dimension. These include American typology published in 1978 by David W. Keirsey (Keirsey 1984, pp. 156-189) and a personality test created in Lithuania in the '70 of the twentieth century by Aušra Augustinavičiūtė. (Augustinavičiūtė 1998) In the next decades, researchers from different parts of the world followed in their footsteps, creating subsequent four-dimensional typologies and personality tests adapted to local conditions and needs.

Research Question

The implementation of process of the Lean management concept is extensive, multifaceted and extended in time. It is worth emphasizing at this point that, in principle, every member of the

organization finds a place in this process so that they can demonstrate their specific abilities, perception and style of activity. Considering the above, the following research questions were posed:

1. What can we distinguish Cognitive Perspectives focused on identifying employee attitudes?
2. What are the characteristics of each perspective?
3. What Activity Styles are there?
4. What are the characteristics of each Activity Style?
5. What activities can be involved in people characterized by individual Perception Style or Activity Style?
6. How do differences in the perception of individual members of an organization affect group communication?

Research Design and Methodology

Based on scientific knowledge in the field of psychology and sociology, four Cognitive Perspectives were identified, which were further characterized in detail. The identified Cognitive Perspectives were developed in detail, taking into account the strengths and weaknesses of each of them, and the relationships between them, especially in the aspect of communication. The developed characteristics of these Cognitive Perspectives were then subjected to empirical verification, which confirmed the accuracy of their identification. The verification was carried out in January 2020 in a group of 24 psychologists who had previously learned the theory regarding each of the perspectives, then in teams of six, identified areas of perception and activities characteristic of each perspective. In the next step, each team presented the features of the perspective being developed - this step was to exclude possible repetition. Then, a survey was developed in which examples of situations were presented, and solutions typical of each of the four perspectives were given in the solution variants. The effect of this work was a tool enabling the identification of individual attitudes in the respondents. The tool prepared and developed in this way was verified by conducting pilot studies among 43 employees of the Częstochowa corporations who were asked to answer the questions posed regarding specific attitudes as well as confrontation and assessment of the veracity and compliance of the analytical description.

Specific Cognitive Perspectives have enabled the development of a model that, through the detailed identification of individual characteristics, enables them to be assigned to specific tasks and operations coinciding with their personal preferences and capabilities, both on the level of cognition and activity.

Results

The RFCS model name is an abbreviation of the first letters of the words Reality-Feeling-Concept-System. They define four Cognitive Perspectives, which in turn are used to describe Perception Styles and Activity Styles. The Perception Styles results from what kind of information, realities, feelings, values or systems, is the most important and useful for a particular person at the moment of encountering a new situation. In addition, the Perception Styles indicates why it is given the highest priority and also which mental processes are performed most efficiently. The Activity Styles, as previously noted, results from the Perception Style and the degree of use of other perspectives and determines the situation in which a person is the most effective. Individual perspectives define in detail the scope of perception of the situation, thus becoming the key to recognizing and characterizing individual types of employees, which directly translates into giving roles and functions in the process of implementing the Lean Management concept.

People in whom REALITY PERSPECTIVE prevails focus on those elements of the situation that appear to be objective and indisputable. In addition, they are characterized by efficient recognition of cause and effect relationships. They can quickly and accurately assess the situation based on facts regarding the effectiveness of implementing a new project, e.g. the Lean Management concept. People with FEELING PERSPECTIVE predominate show the highest tendencies to empathy, these people focus on feelings and interpersonal relationships to the highest degree. Those with a predominance of fellings perspective are guided in their actions by the heart and good of people, often not caring for the good of the organization itself. Their priority is always interpersonal relationships and dependencies in

which they operate. People who, based on research, show most of the features consistent with the CONCEPT PERSPECTIVE are characterized by the ability to perceive the situation globally as a starting point for creating new own ideas. These people are creative and independent, full of ideas, characterized by unconventionality in moving beyond the current state of affairs, which they perceive as one of the possible alternatives. Members with a predominance of concept perspectives freely question current and binding values / norms and discover new, non-obvious relationships. From the SYSTEM PRESPECTIVE a characteristic feature is reaching out to the basics and causes of the situation by analyzing its components. People diagnosed with the predominance of features consistent with the concept of structures penetrate deep into the essence of the problem to get its complete and coherent picture.

As previously emphasized, RFCS defines the Perception Style, revealing the strongest sides of the respondent's mind, sources of perception, and various ways of using information, responding and solving problems. It is worth noting that the RFCS model does not value. Instead of dividing people into better or worse functioning, it emphasizes the uniqueness of each way of thinking. Each style is different and results from the natural predisposition of man and can manifest itself both in the ease of applying procedures and guidelines as well as outstanding abilities. Depending on the dominant perspective, we can divide all members of the organization into players, visionaries, partners and researchers (tab. 1.)

Tab.1: Cognitive perspectives and personality types

Dominant perspective	Dominant way of thinking	Personality type	Personality characteristics
Reality	Logical	Player	Approach to problems: defines one overarching goal, simplifies the problem, finds one simple and practical solution, quickly pursues it. Appreciated for: logic, goal orientation, quick decision making, practicality and concreteness. Criticized for: literality, lack of diplomacy, schematicity, categoricality.
Concept	Lateral	Visionary	Approach to problems: considers the problem globally, finds many completely different alternative solutions, willing to change strategies, also at the stage of operation. We appreciate: flexibility and unconventional thinking ingenuity and original concept of progressiveness. Criticized for: chaoticness, ignoring principles, asymmetrical, generalizing.
Feelings	Intuitive	Partner	Approach to problems, when defining its goal, takes into account with who it is connected, finds several versions of the same solution, intuitively chooses the one that takes into account the most factors. We appreciate for: empathy, showing personal commitment, compromise, awareness of social relations. Criticized for: hypersensitivity, sensitivity to moods, emotionality, changeability of decisions.

System	Analytical	Researcher	Approach to problems begins by collecting a large amount of information, categorizes and analyzes it, strives for an optimal solution taking into account all possible cases. We appreciate: perceptiveness and insight balanced judgment, methodical attention to detail Criticized for: perfectionism, complicated meticulousness, long decision making.

Source: own study based on the example of Research

The Activity Style results from the Perception Style and the degree of use of the other three RFCS perspectives. Indicates situations in which a person is most effective.

The Activity Style results to a large extent from the Perception Style, but the choice of strategy is also influenced by experience, values, habits and operating conditions (including the professional situation) taking into account the combined impact of these factors on the results. The Activity Style shows what perspectives complement the Perception Style in action and determines in which situations and how it can be most effectively used. Experiences and preferences may change over time, which results (unlike in the case of the Perception Style) of a possible change and development of the Activity Style. When defining a person's Activity Style, we divide four RFCS perspectives into visible and invisible in action. The composition of these elements determines both the Perception Style and other preferences. Each Perception Style can adopt one of seven styles of action, depending on the results obtained for the other three RFCS perspectives.

Tab. 2: A way of constructing the Activity Style

A way of constructing the Activity Style		
Concept	**Reality +Feeling +System**	
Perception Style +	Additional preferences =	Activity Style
The style of perception determines the first most natural reaction: 1. Describes how to receive information and how to solve problems. 2. It is a lasting preference from childhood and does not change significantly during life. 3. Describes internal processes, most visible in new situations. 4. Reveals the natural strengths of the mind	Resulting from experience, preferences, habits, conditions, requirements, situations expressed in the perspectives of the RFCS model	This determines how you use the Perception Style: 1. Includes additional preferences, experiences, likes, etc. 2. Develops and may change during life. 3. It can easily be determined by observing a person in action 4. Composes the results of all RFCS components. 5. Reveals the situations in which it is the most effective.

Source: own study based on the example of research

The results show the level of preference for each component of the RFCS model. The clarity of the results depends mainly on the consistency of the answer and the number of "hard to say" answers. The more of them, the less unambiguous the result.

For example, Visionaries who are extroverted tend to be inspirational speakers. Those more introverted - valued advisers. However, working with a Visionary can sometimes be difficult. The visionary tends to share his ideas before he even thinks about them and easily changes the strategy carried away by a new idea, which can reduce his credibility in the eyes of others. When talking to a Visionary, discomfort may be caused by his tendency to change the subject frequently, generalize and expect others to know what he means. The Visionary contributes the most to the team venture at the initial stage of determining the vision of the strategy.

Visionary Communication with other Perception Styles:

Reality - a Visionary's discussion with a Player is a clash of two completely different points of view: "what can be" and "what actually is." A Visionary Player may perceive as unpleasant, criticizing and unimaginative. Player will be annoyed by saying that you have to act, not fantasize. It should be noted that Players actually often achieve their goals and maybe the Player is the person who will know how to implement the Visionary's ideas.

Feelings - a conversation with a Partner can be a pleasure for the Visionary, because he listens kindly about the Visionary's ideas, he is less critical than other Perception Styles. Note that the Partner avoids conflicts, so if he considers the Visionary's plans to be wrong, he often doesn't talk about it or uses a very veiled method. However, there is no better person to cooperate in the team and to persuade others to participate in the Visionary's venture.

Concept - two Visionaries is a recipe for hours of discussion about the problems of the universe. Great agreement, dozens of ideas and inspiration, of which, however, little comes later to the implementation phase. Cooperation with the second Visionary is extremely valuable at the beginning of the venture, when the vision and strategy are clear. At further stages, it is worth involving people with different Perception Styles who will be more motivated to act.

System - Researcher as soon as you hear the ideas will ask a lot of questions about details that are probably not yet thought out. You can be impatient with the fact that he underestimates the novelty of the idea, but breaks it down into prime factors and focuses on insignificant issues. It is worth appreciating, however, that it is the Researcher who is able to change a strict concept into a well-thought-out action plan, project or prototype.

Communication and relationships in other Cognitive Perspectives were similarly described.

Results

Knowledge of their own personality profile allows people to fully use their potential and work on areas that can cause them problems. It is an invaluable help in everyday life in solving problems, building valuable relationships with other people and making decisions regarding education and career.

Personality type determination is not an arbitrary and mechanical process. Everyone, as the recipient and user of their personality, is fully competent to determine which type they belong to. (Chrapek, Kukowska 2015, pp. 11-18) His role in this process is therefore crucial. Such self-identification can be done by analyzing personality types and gradually narrowing down the check box. It is worth emphasizing that honesty towards yourself plays a key role, because the test result depends on the answers given.

Identifying personality types helps you get to know yourself and others, but it should not be treated as an oracle for the future. A personality type can never justify our weaknesses or bad relationships with other people (although it can help to understand their causes).

Discussion

In cognitive psychology, the dominant view is that cognitive styles operate on the basis of established habits, which are clear already in preschool and for the rest of life do not change significantly.

The most important tool of RFCS diagnoses natural predispositions and gives hints in which actions a given person works, how he can approach problem solving most effectively. In addition, it was indicated how it should best communicate with people with the same or different styles of perception. Another determinant of the work of individual employees on themselves is a detailed report focused on the identification of areas that are worth strengthening and on which it is worth working with indications of how to work on them. What's more, thanks to RFCS tools, problems in communication between individual cognitive perspectives are explained.

You can extend the use of this model and the tools that help in its empirical application to the analysis of the entire team. The analysis is then used to develop a map of the team's potential. Each person is assigned a style of perception of activity and attitude, which he most often adopts in the team. The study should consider factors affecting cooperation and communication guidelines. This study may form the basis for identifying the employees' potential, then for assigning individual employees responsibility for the implementation of functions and tasks focused on the effectiveness of the process of implementing the Lean Management concept in the business practice of a specific enterprise.

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Assessment of Regional Brand Attributes Influence on Its Perception by Young Residents (Using the Example of a Cultural Institution)

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Abstract

The article explores the possibility of increasing the loyalty of the youth audience - generation Z - to regional brands using the example of the Perm State Academic Opera and Ballet Theater named after P.I. Tchaikovsky. The authors substantiated the use of the SERVQUAL methodology as a key method for studying the influence of the main branding indicators on attracting the attention of young people and increasing their loyalty to the region of residence. Using the SERVQUAL methodology, the authors undertook a study and assessment of the impact of the theater brand on young consumers - representatives of the Z generation.

Keywords: Place Marketing, Region Branding, Brand Quality Attributes, Consumer Preferences.

Introduction

In the current economic and geopolitical situation, cities, as subjects of brand management, regardless of their location, are actively involved in competition for human resources and welfare. This situation is also characteristic of large Russian cities and regions. In this situation, the municipal authorities have the task to characterize their personality as brightly as possible, find a marketing niche, create long-term loyalty of residents and, thereby, take their rightful place in the competition.

In the described situation, increasing the youth's loyalty to the region of their residence is of particular importance. Note that currently all cities are fighting to attract and increase the loyalty of young people born in 2000-2019, and characterized by marketers as generation Z. Entering the stage of active consumption, it is generation Z in the coming years that will become the main workforce, key taxpayers and bearers of city values and, in addition, will determine key consumption trends for at least 20 years.

Based on the foregoing, an important theoretical and practical importance are:

- development of strategies for the territorial development focused on youth audiences;

- formation of the brand management concept in the region;
- creation and promotion of branded economic, sports and cultural objects;
- organization of significant large-scale events and actions, etc., within the framework of campaigns to promote the brand of the region.

Therefore, the authors of the paper attempted to study the basic tools and the degree of influence of the brand on young residents of generation Z of a large city. The study was conducted on the basis of a large regional center - Perm and included a study of the attitude of young people to one of the region's key brands - Perm State Academic Opera and Ballet Theater named after P.I. Tchaikovsky.

Results and Discussion

To study the degree of brand influence on residents of the city belonging to generation Z (not older than 2000 year of birth), the authors consider it appropriate to use the SERVQUAL methodology (V. Zeytaml, L. Berry, A. Parasuraman). It is based on the "expectation minus perception" model and is a questionnaire of 22 pairs of questions with possible answers on the Likert scale - from "completely disagree" to "completely agree". Questions are divided into subgroups depending on the following parameters (each of which, in turn, has 4-5 attributes):

- reliability - the ability to accurately and quickly provide a service;
- responsiveness - the willingness of staff to help consumers;
- assurance - competence of staff;
- empathy - degree of attention to consumers;
- tangibles - physical objects used in the process of providing a service.

The first part of the questionnaire includes questions that reveal the expectations of consumers regarding the brand, and the second part - the level of relevant qualities in the brand. After filling out the questionnaires, the resulting service quality indicator is calculated as the difference between the levels of perception and expectations.

The features of the influence of the city's brand on its young residents were studied by the authors using the example of the Perm State Academic Opera and Ballet Theater named after P.I. Tchaikovsky. The theater is one of the region's brands - it is the center of cultural life, one of the main newsmakers, the venue of the Diaghilev Festival of the world-famous conductor Theodor Currentzis, etc.

As part of a study conducted by the authors in the fall of 2019, representatives of generation Z were interviewed - university students from 17 to 26 years old. The sample was 296 people, including 72% of girls and 28% of boys. The obtained data were processed using the SPSS 22 program. The results of the study are presented in table 1.

In accordance with the method used, negative values indicate that the level of consumer expectations exceeded the level of real perception, and positive values indicate that the level of perception was higher than expectations. Thus, positive and zero values of the indicators are good, satisfactory are negative, but as close to zero as possible indicators, and unsatisfactory are indicators with values well below zero.

Table 1: Average brand service quality indicators

Quality parameter	Perception, points	Waiting, points	Service quality (SQ)
Tangibles (T1-T4)	5.5	5.4	0.1
Reliability (RL5-RL9)	5.7	5.8	-0.1
Responsiveness (RS10-RS13)	5.5	5.9	-0.4
Assurance (A14-A17)	5.6	5.7	-0.1
Empathy (E18-E22)	5.1	5.4	-0.3
Total for the sample:	4.6	4.7	-0.1

From the data in table 1 it follows that representatives of generation Z evaluate the quality of the theater brand quite high, since consumer expectations and real perception showed close values - the differences between them do not exceed 0.3. At the same time, only one parameter showed high results - “tangibles” (SQ = 0.1), to which the modernity of equipment, the attractiveness of interiors and information and advertising materials were classified as part of the study.

Other parameters during the study showed satisfactory values of the service quality indicators. At the same time, respondents positively assessed the “reliability” parameter, which incorporated the efficiency of solving emerging problems, the convenience and clarity of the theater website, and other attributes. When evaluating the “empathy” parameter, respondents, as follows from Table 1, praised the personal participation of employees in solving problematic issues, the availability of specially equipped places for people with disabilities, and the opportunity to visit the theater with children.

Note that the most disturbing results during the survey showed the “responsiveness” and “assurance” parameters, which included the responsiveness to customer requests, the level of information support, courtesy, the friendliness of the staff and other attributes. Obviously, the theater will have to work on their improvement.

The next stage of the analysis was the calculation of the service quality indicator relative to consumer expectations Q1. According to the methodology used, the lower the Q1 value, the more high-quality services the brand represents. Table 2 shows the data for each attribute.

Based on the data in table 2, the highest value of indicator Q1 shows the parameter RS12 “responsiveness”, understood in the framework of the study as constant assistance to the audience. The parameters RL8 and E22 were evaluated as less qualitative - accessibility, unhindered purchase of tickets and the availability of interesting promotions for schoolchildren and youth, respectively.

The theater believes that attractive advertising (T3) is its advantage, however, respondents rated this attribute low (-3.9%). Meanwhile, the personal participation of employees in solving the problems of the audience (E18), the convenience of visiting people with disabilities (E20) and the availability of activities for children (E21) showed high results. In general, it can be argued that the theater provides these services at the level at which a young audience expects them to see.

Table 2: Service quality indicators relative to consumer expectations for each attribute

Quality para-meters	Q_1, %	Quality para-meters	Q_1, %	Quality para-meters	Q_1, %	Quality para-meters	Q_1, %	Quality para-meters	Q_1, %
M1	-0,8	H5	2,2	O10	2,4	У14	3,4	Э18	-0,3
M2	0,0	H6	-0,4	O11	3,4	У15	1,9	Э19	1,4
M3	-3,9	H7	3,8	O12	5,4	У16	1,9	Э20	-1,2
M4	-0,7	H8	0,5	O13	2,6	У17	3,5	Э21	0,3
		H9	2,6					Э22	3,9

Another indicator, Q2, shows the relationship between the perceived quality of the brand and the maximum expectations of the respondents. In this case, it is advisable to take the maximum possible value of expectations equal to seven as the reference value of the indicator. The lower the Q2, the higher the quality of the brand. In other words, brand quality is higher when the respondent's expectations are as close as possible to the standard.

The results of the study showed that the maximum average rating of respondents' expectations about the quality of theater services is 6.2 points (out of 7), which demonstrates its reliable reputation.

So, the study showed that the "reliability" (the brand's ability to provide service accurately and quickly) parameter received the highest ratings of respondents. This indicates a high level of consumer confidence. "Responsiveness" and "assurance" received good marks, indicating that the staff is competent and ready to help the audience. At the same time, these parameters demonstrate a significant discrepancy between expectations and real perception. This can be explained by the fact that employees do not always provide services promptly.

"Tangibles" parameters (advertising materials, employees 'appearance, interior, etc.) received lower but positive ratings, but respondents' expectations in this case were confirmed. The lowest ratings of the respondents received the attributes "sympathy" and "personification of communication with the audience". According to the authors, this is largely due to the lack of conditions for people with disabilities, as well as the lack of options for viewers with children.

Thus, the results of the study showed that the attitude of students as representatives of generation Z to the theater is generally positive. The theater has a good reputation, but attracting young people is one of its targets. In this regard, overcoming the deficiencies identified during the study will help strengthen the theater brand, and, ultimately, the brand of the region.

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Innovative Technologies at The Modern Stage of Activity of Russian Commercial Banks

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Abstract

This article discusses the issues associated with the high cost of applying innovative technologies in banking in the Russian Federation, explores the main trends in the development of bank management in the innovative aspect, and assesses the importance of using innovative technologies both in individual commercial banks and in the banking system countries. The most promising innovative products in Russia are currently investigated. Based on the statistics of the Bank of Russia and Markswebb agency, an analysis of the efficiency rating of Internet banks for individuals was carried out. The methodology of applying innovations such as blockchain, cloud storage, API, NFC technologies, the integration of bank accounts with electronic payment systems (EPS) and cryptocurrencies is considered. As a result, the information considered in the article is generalized and conclusions are drawn on the application of innovative technologies not only in the activities of commercial banks, but also their role in improving the efficiency of the country's banking sector in the face of constant progress.

Keywords*:* Banking Innovations, Banking Products, Innovation Management, Internet Banking, Blockchain Technology, Fintech Startups, Cloud Data.

Introduction

In the conditions of continuous development and implementation of the latest technologies in various spheres of life, they are given special importance in the field of banking systems of the world. This interest is due to the desire to improve the efficiency of the banking sector. The main obstacles to the introduction of innovative products are their high cost and the risk of a long payback.

The banking sector of the Russian Federation provides for the accumulation, movement and redistribution of significant cash, taking into account the interests of economic agents. Failures in these processes will entail large-scale problems, such as a threat to the economic security of the state and failures in the functioning of payment systems.

The banking sector of modern Russia is characterized by the following processes:

- toughening competition in the banking services market;
- the impact of the effects of the crisis, resulting in a decrease in the financial stability of enterprises;
- strict supervision of the Bank of Russia over the activities of banks.

In the current conditions, commercial banks need not only to expand the scale of enterprises, but also to progress in the field of business performance. This goal in Russian practice is achieved by bringing the banking services and technological systems being implemented closer to international standards. Absolute competitive advantage in such competition is already established by credit institutions with sufficient resources to invest in new products and services and to introduce new technologies. The creation of conditions allowing customers to feel most comfortable belongs to the same category. The implementation of this direction is achieved through the creation and successful functioning of mobile banks and online services. These forms of interaction with consumers are beneficial to both parties due to the reduction of costs for such elements as service time and maintenance of staff and offices for them. The result of such actions are banking innovations.

Materials and Methods

The first bank in Russia that did not have a retail service office at the time of its establishment was Tinkoffbank. The official creation of the organization dates back to 2006, it was positioned as the first bank that has a remote control at its disposal, referred to as Tinkoff Credit Systems. Over more than a decade of activity, the organization's assets have increased significantly, namely, in 2007 this indicator amounted to 2.4 billion rubles, in 2018 it amounted to 377.7 billion rubles. As of 01/01/2019, the bank ranks 21st in net assets among Russian credit organizations, actively implements its activities and is positioned as the first innovative bank aimed at entrepreneurs in the Russian Federation.

In addition to offering the latest technologies at the time of creation, the bank serves as an example of the development and implementation of a joint business, the basis of which is the provision of services with a minimum of investment with a virtual absence of own assets. Other banks are actively working in this direction, making serious competition.

The main obstacle to the implementation and operation of innovative banking systems in Russia at the present stage is significant costs, the implementation of which is available to a small circle of system-forming enterprises. In the process of their implementation, many medium and small banks are absorbed by larger ones, which inhibits competitiveness.
One of the main goals of introducing innovative developments is to increase the competitiveness of not only individual banks, but also the entire banking sector of the country.

The processes of introducing such technologies are carried out in two directions:

1) development of financial products;
2) the introduction of financial products.
The range of banking products, taking into account constantly evolving technologies, is being actively marketed by large banks in Russia, includes Internet banking, online trading, quick money transfer systems, a system for linking cards to bank accounts, NFC system and other services. However, many banks do not put into practice Internet trading and a quick money transfer system.
Based on the statistics provided by the international analytical agency Markswebb, a list of eleven Internet banks operating most efficiently and conveniently for users in 2019 is presented in Table 1.

Table 1: Performance rating of Russian Internet banks in 2019

№	Internet bank	Performance rating (0-100 points)	Functionality (0-10 points)	Convenience (0-10 points)
1	Tinkoff Bank	78,7	8,4	7,3
2	Bank Left Bank	68	6,9	6,7
3	AK Bars Bank	64	6,4	6,4
4	Uralsib Bank	61,7	6,6	5,7
5-6	Post Bank	60,5	6,1	6
	Raiffeisenbank	60,5	6,1	6
7	Promsvyazbank	60	5,9	6,1
8	Bank opening	59,5	6,7	5,1
9-11	Corn Map	58	5,8	5,8
	Russian standard	58	5,9	5,7
	Internet bank	58	5	6,5

In 2019, Tinkoff Bank became more convenient for users in terms of functional component and interface. Achieving a leading position was possible in connection with the implementation of many functions, namely:

1) automatic determination of the issuing bank and payment system based on the used bank card number has become available;
2) the search form for such debts as fines of the GIBLL and various taxes has been improved;
3) it is possible to implement user limits on the card by type of operation and the ability to block cards has been improved;
4) it became possible to open current accounts and issue cards online without having to visit a bank branch and contact a contact center.

At the development and improvement stage, such common functions as customer support in online chats and platforms for receiving information on the amount of debts on public services and utility payments are currently underway.

According to the data of the National Agency for Financial Research in 2019, more than 81% of all online users in the world prefer the services of online banking rather than mobile banking. In Russia, 69% of the population turn to the help of a mobile bank, of which 52% use its services one or more times a month, 17% - once a month or less.

According to statistics, this service is more in demand among women than men. This ratio is 72% and 66%, respectively. In addition, the largest share of users is a young audience aged 25-34 years, namely 76%. The most popular functions of mobile and Internet banking include crediting funds to pay for mobile communications (76% of users of these services) and monitoring the status and operations of cards and accounts (67% of users). Such types of services as transfers to other individuals, payments for using the Internet and transfers between own accounts carried out via the Internet bank were carried out by 61% of respondents. Payment of online purchases through a mobile bank was carried out by 38%, and through online banking 53% of users of these services. Services on investment transactions are of minimal demand. Similar operations are performed by approximately 2% of users.

The growing popularity of online banking is due to several reasons:

1. Low cost charged for various operations, or its complete absence. Using the services of a mobile bank requires certain costs, such as servicing bank cards, SMS notifications and fees for using the bank itself. These factors encourage users to increasingly turn to Internet banks;
2. Accessibility and ease of use;

3. The quality of service offered by mobile banks is inferior to Internet banks in this category because the latter has a wider range of services. Certain operations are either imperfect in their execution or not available in the mobile application.

Research Results and Discussion

The advantages of mobile and Internet banking are actively exploited in the banking services market. Significant consumer demand stimulates the introduction of the latest technologies in these platforms, otherwise their stagnation, combined with the advent of alternatives in the market, will lead to a massive outflow of customers and, consequently, lower profits. For this reason, most existing banks practice the introduction, development and improvement of these technologies.

Particular attention in Internet platforms is given to transactions - quick money transfer systems. There is a tendency to introduce information technologies for transferring to the "cloud". “Cloud” technologies are a multifunctional environment, consisting not only in the storage and processing of information, but also combining licensed software, hardware, communication channels and operational technical support for users. Their feature and at the same time their advantage is the lack of attachment to certain devices and territories. This means that it is possible for the user from any technical device, regardless of geographical location, having access to the Internet, to be able to manage funds and use banking services.

One of the successful examples of the implementation of "cloud" technologies was Sberbank PJSC, on the account of which the introduction of three products in the field of API (platform of ready-made templates for creating new information tools):

1. Fintech API - a set of methods and tools for corporate clients to integrate affiliate services and products;
2. Internet Acquiring API - providing the ability to quickly integrate Internet acquiring into a bank's product, that is, selling goods and services through the Internet and bank cards through Apple Pay and mobile applications and sites;
3. API DomClick - a tool designed for developers and real estate agents. Its goal is to integrate the accounting system with the DomClick platform. This method allows you to automate the process of applying for loans and checking the current statuses of these applications.

Additionally, it is possible to observe bank statistics.

An important role in the implementation of technologies is played by the use of artificial intelligence, the introduction of which may become mandatory in the activities of commercial banks. The constant change in the market, technology and customer base requires in-depth personalization, the implementation of which is impossible without the latest technology.

A good example of the effective use of artificial intelligence is the project of Sberbank PJSC under the name Iron Lady. Its function is to notify individuals about their loan debt. The introduction of this system allowed Sberbank of Russia to close more than 1.3 thousand branches in the country in 2018. However, it is not planned to reduce the growth rate of their closure. A similar practice applies to employees of a commercial bank. According to the chairman of the board of PJSC Sberbank, by 2025 their number is planned to be reduced by more than half. The obvious advantages of artificial intelligence in comparison with an ordinary employee are the ability of the former to work for 24 hours a day, his lack of tendency to psychological disorders and the possession of an unlimited amount of knowledge that contributes to the solution of many issues. This tool is very successful in managing the costs of the organization.

Currently, the development and implementation of blockchain technologies that contribute to the improvement of transaction services and accreditation are actively underway. Blockchain is a new technology direction, namely a database with specific rules for constructing transaction chains and access to information that excludes data theft and any cyber attacks. The blockchain base can be a

platform for the concentration of any open registries that record transactions. Payment verification will be provided by the resources of the system itself. When using blockchain technology, any operation requires a confirmation request, in parallel with which all data will be encrypted with a code, and the user's personal information will not be publicly available.

Initially, this technology was adopted on the territory of the Russian Federation ambiguously, but after some time it took positive prospects in the country's banking system.

Distribution in the field of innovation development management is currently received by fintech startups acting as developers of alternative solutions to improve the quality of services provided by banks. As competition in banking services is increasing, a greater number of credit institutions are approaching venture investments, where domestic fintech startups are the objects of investment of financial resources. The main objective of the interaction of banks with them is the development of innovative products.

In 2016, with the assistance of the Bank of Russia and the Ministry of Finance, a competition of fintech startups was launched. The main objective of the event was to search for startups offering the most promising technologies in the field of finance. The victory was won by the Oz Photo Expert project, whose specialization is express analysis and identification of fake photographs and documents in electronic form.

An important innovation system used in Russian banking is the merger of bank accounts with cryptocurrencies and electronic payment systems. Payments in the electronic system allow cashless payments, conclusion of contracts and transfer of funds via the Internet. To implement this process, automatic information processing and encoding are used. This system creates convenience for customers of the bank, but at the same time does not exclude the risk of data theft.

The main task of innovation management at present is not only the introduction of the latest technologies, but also in predicting their payback. The average technology implementation period is from 1 year to 5 years, and in some cases exceeds these values. The complexity of the process itself, the price of technology and the services of its implementation, the availability of space for its application can affect this.

Table 2 presents the positive and negative aspects of the application of innovations in the activities of commercial banks.

Table 2 - Advantages and disadvantages of the application of innovations in the banking system

Positive aspects and prospects	Disadvantages and possible negative consequences
1. Improving the usability of banking services by customers of a commercial bank	1. Increase the likelihood of theft of cash
2. Reducing the cost of banking operations	2. The increase in the total cost of introducing technology
3. Expanding the customer base and increasing the competitiveness of the bank	3. Continuous investment in new technologies
4. Reduction of time for banking operations	4. Tighter control of operations

5. Increasing the number of banking services and products, increasing the efficiency of their provision	5. Dependence on technology updates
6. Improving the functional component of banking applications and developing the service	6. The increase in bank costs for the study of consumer needs
7. Reducing the cost of labor and rental premises	7. Increased likelihood of unemployment due to job cuts
8. The implementation of new investment ideas, improving the efficiency of banking	8. The unpredictability of the consequences of the introduction of technologies and forecasting their payback, high investment risks

Based on the data presented in table 2, it can be concluded that innovative technologies have significant advantages for bank customers, namely they help simplify banking operations, increase the ability to use more profitable services, and reduce the cost of their implementation. The main advantage is the ability to access all over the world.

Conclusion

For commercial banks, the introduction of innovation is a time-consuming process that requires significant costs. It includes the involvement of all participants in the banking process, starting from the issuer and ending with manufacturers of electronic devices that ensure the operation of relevant programs. However, in the context of globalization, innovative technologies in the banking sector are an integral requirement for the activities of domestic banks and an important factor in the choice of their customers. The lack of data from the implemented technologies has a negative impact for the bank, which is expressed in a reduction in the number of customers, a decrease in income and profits from the implementation of core activities and, as a result, a decrease in the financial stability and solvency of the organization.

However, it should be borne in mind that not all innovations are effective for commercial banks. So, for example, based on an assessment of the benefits from start-ups sold by Russian banks, the profitability from their implementation is about 2% of the total profitability of bank products. Against the background of such results, fintech startups look most profitable.

The most promising areas in Russia are the areas of blockchain technologies and “cloud” data that can not only increase the efficiency of the banking sector in the country, but also use the experience of the banking sectors of the world.

Rapid development is carried out in the field of implementation and functioning of artificial intelligence, which occupies the position of the basis for the implementation of innovative projects.

In general, the introduction of innovations has a greater positive effect on the country's banking sector. In a short period of time, technologies have qualitatively transformed the bank management system, simplified the process of using the bank for customers and allowed it to reach an international level. Innovation is an integral element of the country's banking sector, and without their use, commercial banks will not be able to fully satisfy the growing rapidly needs of customers, to secure financial stability. At the same time, the use of innovations increases the risks of lowering financial security; for this reason, a number of measures should be taken aimed at strengthening the protection

of customer data. In the case of ensuring financial security and better selection of the most profitable innovative projects, the efficiency of the Russian banking system will be significantly increased.

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Evaluation of The Unequality of Socio-Economic Development of Subjects of The Central-Black-Earth District

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Abstract

The role of socio-economic indicators as the main indicators of the level of economic development of the regions is determined in the work. On the example of the subjects of the Central Black Earth Region, the analysis of the main socio-economic indicators (GRP, population, unemployment, foreign direct investment, etc.), as well as indicators characterizing the industries of the regional economies, in order to identify priority areas and study the situation in the regions generally. Based on the study, conclusions are drawn about the development of the regions of the Central Black Earth Region.

Keywords*:* Regional Economy, Investment Climate, Foreign Direct Investment, Economic Development.

Introduction

The development strategy of the regional economy is based on ensuring the optimal development of regional economic complexes, improving the specialization of the territory of the subject, efficient use of production capacities, labor resources, as well as maintaining the general well-being of the population. Indicators of regional development are socio-economic indicators that characterize the economic phenomena and processes taking place on the territory of a subject at a given point in time. It is the assessment of basic socio-economic indicators that helps to evaluate:

- the level of development of the national economy;
- the degree of provision of labor resources and the level of their qualifications;
- the unique properties of the region, having value on a national scale and by global standards;

- the degree of provision of the region with natural resources;
- socio-political stability in the region;
- the geopolitical position of the region.

Materials and Methods

Using the example of the regions of the Central Black Earth Region, we will evaluate the main socio-economic indicators in order to identify leaders and outsiders among the subjects under study for overall economic development.

The Central Black Earth Economic Region (Chernozemye) is one of the 12 economic regions of the Russian Federation, which includes the regions of the southern part of Central Russia: Belgorod, Voronezh, Kursk, Lipetsk and Tambov regions. Currently, the largest industrial and economic center of the region is the city of Voronezh. Entered in 2000 As part of the Central Federal District, the Central Black Earth Region specializes mainly in the mining, metallurgical, machine-building, chemical, food industries, as well as in agricultural production and the production of certain types of building materials. The sectors complementing the territorial complex and serving the immediate needs of the population of the region include various sectors of light industry and the service sector.

Research Results and Discussion

The main socio-economic indicators of the Black Earth regions for 2019 are presented in table 1.

As can be seen from the data in table 1, the highest level of GRP in the regions belongs to the Voronezh region - about 30% of the total GRP in the regions of the Black Earth Region. She owns a high population of 2.3 million people, as well as an area of the whole territory (52,216 km²), the average wage in the region (24,001 rubles) and a high unemployment rate (4.5%) among all regions. Despite the high level of GRP, the leader in the highest per capita GRP is Belgorod Oblast, which exceeds the Voronezh Oblast by almost 42%.

Table 1 - Socio-economic indicators of the regions of the Central Black Earth Region for 2019

	Belgorod Region	Voronezh Region	Kursk Region	Lipetsk Region	Tambov Region
GRP, Million Rubles	785647	865223	387577	497981	300554
Per Capita GRP, Rub.	369139	260410	243268	271125	219948
Population, Thousand People	1548	2331	1117	1158	1062
Area, Km²	27134	52216	29997	24047	34462
FDI, Mln.	236,2	261,8	66,2	842,9	13,6
Average Salary, Rubles In Month	23895	24001	23099	23133	20757
Unemployment, %	4	4,5	3,9	3,7	4,3

Belgorod region also has a high level of GRP, occupying 2nd place in the regions of the Chernozem region. She takes the same position in terms of average salary per month: for 2019, she is 23,895 rubles.

The Lipetsk region has average indicators of GRP, population and average wage per month. This region has the highest foreign direct investment among all regions: in the reporting year they amounted to $ 842.9 million, which is almost 62 times higher than the minimum value among other regions of the Black Earth Region. This is due to the implementation of existing large-scale foreign projects in the region, as well as the construction of new large complexes and the development of a special economic zone as a whole. In addition, this entity is one of the three regions of the Central Federal District for foreign direct investment, second only to Moscow and the Moscow region. In addition, the Lipetsk region has the lowest unemployment rate of 3.7%, as well as a high per capita GRP of 271,125.4 rubles.

The lowest socio-economic indicators are in the Kursk and Tambov regions. The Kursk region has indicators slightly better than the neighboring Tambov region: unemployment here is lower by 0.4%; GRP and FDI are 87 million rubles higher. and 52.6 million dollars. respectively; the population, per capita GRP and average wages are also higher than the indicators of the last region, but lower than the average values for the entire Central Chernozem Region. The only criterion by which the Tambov region surpassed the Kursk region is the area area: it is 4465 km² larger than the territory of the Kursk region. In addition, the Tambov region is the only region in which over the past years there has been an abrupt change in the level of GRP: its decrease in 2018 and an increase in 2019.

To assess the general economic situation of the regions of the Central Black Earth Region, it is advisable to analyze the dynamics of indicators of sectors of the economy, namely, indicators characterizing production, construction, agriculture, and also the sphere of trade.

The dynamics of industrial production indices in the regions of the Central Black Earth Region is characterized by a decrease in indicators in almost all areas: the largest drop in indices in 2019 is typical for the Tambov Region - by -43%, although in the previous year it reached its maximum value of 137.2%. In the Kursk region, over the entire studied period, a tendency to a decrease in the indicator is observed: in 2018, it decreased by 9.6%, and in 2019 - by 2.5%. The growth rate in the reporting year was recorded only in the Lipetsk region: after the fall, the index grew by 2.5%. The general tendency to reduce the indicator under consideration may indicate a general decline in production in the regions, which negatively affects the investment climate in the region. Also, a decrease in industrial production indices indicates an increasing dependence on imports and less orientation on own goods.

The volume of work performed by the construction activity in all areas of the Black Earth Region in 2019 exceeded 304.4 billion rubles, which is 4.4% higher than the previous year. Of these, the largest share of work is in the Voronezh region (31%), and the smallest - in the Tambov region (11.4%). In the first, there is a steady decrease in the studied indicator over time over the years. A steady growth in construction work is characteristic of the Kursk and Lipetsk regions: in the reporting year, growth in these regions amounted to 8.4% in each. The growth in construction volumes in the regions is associated with the implementation of large agricultural projects, as well as with an increase in the commissioning of residential buildings.

Agriculture in the Central Black Earth Region is a leading industry in the economy of the region. Having favorable conditions for the development of agriculture, the agro-industrial complex of the regions of the Black Earth Region annually sets records for the gross production of various types of agricultural products. The leading place in agricultural lands is occupied by cereals - 55%, 28% under fodder crops, 12% under industrial crops and 5% under potatoes and vegetable and melon melons. In addition, large livestock complexes are located here, providing products not only to the regions of Russia, but also to other countries.

As for agricultural products, the Belgorod region remains the permanent leader in production over the years: in 2019, the total share of production in this region amounted to almost a third of the total agricultural production. High growth rates are characteristic of the neighboring Kursk region, which increased the volume of agricultural production, first by 15%, then by 12%. The Lipetsk region in the reporting year showed the highest growth among all regions of the Central Black Earth Region, increasing the indicator by almost 18%. In other regions, mainly in 2018, a decline in the studied indicator was observed: in the Voronezh region, the decline was 3%, in the Tambov region - 6.5%.

Non-food and food products, including drinks and tobacco, predominate in the macrostructure of retail trade in the regions of the Central Black Earth Region. The main volume of retail turnover was formed by trading organizations and individual entrepreneurs operating in a stationary trading network (outside the market).

In terms of retail trade in monetary terms, the first place is occupied by the Voronezh region, where according to the results of the last year the total turnover amounted to 552.3 billion rubles. In addition, this region is steadily increasing its performance, first by 6%, then by 7% compared to previous years. The second place belongs to the Belgorod region with a turnover of 336.1 billion rubles. The outsider in this rating is the Lipetsk Region, whose turnover in the reporting year does not exceed 120 billion rubles. It should be noted that in all regions of the Central Black Earth Economic Region, without exception, the dynamics of retail trade turnover is positive. The highest growth rates in the reporting year are characteristic of the Kursk and Lipetsk regions: 8% each, and the lowest - in the Tambov region: over the years, the growth rate does not exceed 3%.

Conclusion

Thus, a comprehensive analysis of the main socio-economic indicators helps to assess the current situation in the region, identify development trends in various sectors of the economy, and also make a macroeconomic forecast for the future.

The regions of the Central Black Earth Region, located in the very center of the European part of Russia, have the entire set of characteristics for successful socio-economic development. However, all of them have significant multidirectional vectors and economic development priorities. Belgorod and Voronezh regions remain the leaders in the main indicators characterizing the socio-economic situation, which indicates the high development of the sectors of the economies of these regions and a favorable environment for attracting investments for the further development of entities. The remaining regions have a less “weighty” set of characteristics in comparison with the leading regions, which indicates the insufficient development of some sectors of the economy and the ineffective implementation of the state strategy for the development and regulation of the socio-economic situation in the regions.

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Project Audit Organization as A Management Function Based on An Example of a Voivodeship Labor Office in Katowice

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Abstract

Deliberations presented in the article pertain to the issues of project management with special consideration to the organization to project auditing within the Human Capital Operational Programme. The article is intended to indicate the organizational aspects of project auditing in Voivodeship Labor Offices as part of the Human Capital Operational Programme carried out in Poland between 2007 and 2013. The assumed research hypothesis is the auditing procedures condition the project management efficiency by establishing the principles to act and implement any remedial measures. A research method employed in the research was the existing data analysis, so-called desk research.

Keywords: Management, Auditing, EU Projects, Voivodeship Office.

Introduction

Accession to the European Union and adoption of the Act on the principles of development policy of 6 December 2006 allowed Poland to take part in economic development process and economic competitiveness in establishment of appropriate conditions on the labor market and a higher standard of live and social progress (European Union, 2012).

By initiating a number of activities related to socio-economic growth support for the member states, the European Union places particular stress on priorities listed in the EU cohesion policy in terms of supporting the development of the open society. Undertakings related to the process of applying for EU grants and their efficient implementation are becoming more and more important. Correctness of the planned undertakings guarantees rational management of EU funds allocated to entities and minimizes the risk of resources dispersion. Effectiveness of EU funds management depends on the efficiency of the whole management process, namely planning, implementing and auditing of particular projects. Financial management in the European Union may be compared to the process of financial resources management in individual states. An EU budget is established each year, which as a consequence allows to support the member states within 7-year financial perspectives.

The notions presented in the article are focused on characteristics of project management, with special emphasis on the auditing process according to the Operational Programme Human Capital under implementation between 2007 and 2013, which is one of the operational programmes of the European Social Fund (ESF). The essence of the auditing apparatus operation is supervision over the use of the funding from the ESF pursuant to the procedures established in the regulations. The legal foundations for the schemes for management and auditing of the projects co-financed from the ESF is the legislation of both the European Union and Poland.

ESF belongs to five major EU funds through which the European Union support the socio-economic growth in each member state in order to compensate for the differences in their development. The financial resources from the ESF are invested first of all in people, in particular those, who have difficulty finding employment on the labor market (Meredith, 2002, p. 89). One of the operational programmers within ESF is the Human Capital Operational Programme (HCOP) intended to adapt enterprises and their employees to a new and dynamically changing economic and market surroundings by increasing the level of education, improving health and eliminating areas of social exclusion.

Literature Review

In management sciences, auditing poses one of the key management processes within an organization, apart from planning, organizing and managing (Hejduk, 2016, pp. 33-34). Auditing which the function of management consists in checking and correcting the organization's operations in order to ensure that the undertaken tasks will be implemented, and the plans are developed to ensure that they are carried out correctly. In the simplified version of management cycle, auditing is the last stage. Management means auditing to a large extent, namely determining the standards of particular processes and actions as well as continuous supervision over their implementation (Surowiec, 2015, pp. 181-190), as well as intervening when auditing suggest any deviations from the assumed standards (Kirsch , 1996, pp. 1-21, Snell, 1992, pp. 292-327). Meanwhile, project management is a collection of actions performed in order to achieve objectives determined by the project management, both the main and the intermediate ones, in a specific time and using particular resources (Kisielnicki, 2014, p. 227). According to Turner (Bredillet, Engwall, 2003), project management is the art and science of transforming vision into reality. In other words, this is a process based on principles, tools, resources and techniques which allow efficient implementation of the assumed undertaking in conditions of repeated constraints (Miciuła, 2015). Projects and project management pose a key element in implementation of an organizational strategy (Morris, Jamieson, 2005, p. 5). Also within the EU operations, the project groups that form programmes or project portfolios play a key role (European Commission, 2019). They pose a component of larger undertakings, namely the European programmes (Bonikowska et al., 2006, p. 8). The project management practice is moving away from a traditional approach based on predictability and customary planning towards a flexible approach that emphasizes adaptivity, creativity, rapid and customer-oriented actions.

When considering the notion of auditing in project management, it is worth extending this aspect by this type of audit that is performed within the management of EU projects. Legal grounds for management and auditing systems for the EU funds spending can be found both in EU and Polish regulations. One of the key Polish documents that govern the main auditing principles for the EU funds spendings are *"National Guidelines on the Eligibility of Expenditure under the Structural Funds and the Cohesion Fund for the 2007-2013 Programming Period"*. Regulations significant from the perspective of project auditing are presented in the *"Guidelines for the Auditing Process within the Responsibilities of the Managing Authority of the Operational Programme"*. This document points to the auditing procedures carried out by the authorities that manage a particular operational programme (Rydzewska-Włodarczyk, 2011, pp. 296-305).

Research Methodology and Analyses

The Marshal's Office of the Silesian Voivodeship is the Implementing Authority within the framework of the Human Capital Operational Programme 2007-2013 in the area of the Silesian Voivodeship. One of the key actions laying in the scope of responsibility of this institution is to audit the source of project implementation under the programme in question and to explore the achieved deliverables. The Implementing Authority takes care of not only the implementation of various tasks that are directly related to coordination of the implementation of HCOP in the region but also of all issues related to supervision over the use of financial resources by the Intermediate Body (IB).

The function of the Intermediate Body of 2nd degree for selected actions from Priorities 6-9 for the regional component of HCOP is held by the Voivodeship Labor Office in Katowice for the Silesian Voivodeship.

The HCOP in the Silesian Voivodeship was a tool for socio-economic transformations. The positive changes, thanks to the EU funds, were visible in the whole region of the voivodeship (Project Management Institute, 2013). Thousands of people made use of the rich selection of advisory, training and internship programmes, as well as from non-repayable grants to start their own businesses.

The auditing process management in the Voivodeship Labor Office in Katowice requires conscious involvement of intellectual capital, identification of its key resources, strengthening of its value and determining conditions of its resources management. Implementation of priorities adopted by the Voivodeship Labor Office related to both implementation and auditing of the HCOP between 2007 and 2013 required some effective work organization, development of methods and techniques that consider the held resources so the created team of employees, both the management and executive staff, was open to acquisition of knowledge, adaptive and able to transfer the personnel competences to the whole institution (WUP, 2014). Quality of the projects at the selection and afterwards implementation state in the Silesian Voivodeship was borne by the qualified team of officers of the Voivodeship Labor Office in Katowice. The Voivodeship Labor Office employees should be aware that there are numerous resource dimensions that condition the effectiveness and competences in the performance of the official duties. The psychological-consciousness layer helps to identify the direction of changes necessary for self-improvement and self-fulfillment.

Identification of the key intellectual capital consisting of among others knowledge, experience, qualifications, intelligence, reliability, energy, age, etc., allows the managerial staff to correctly delegate the tasks so the natural predisposition of employees helped them in implementation of objectives of the whole institution (Miciuła, 2016).

Diagram 1 presents actions that stimulate development of intellectual capital in the Voivodeship Labor Office, includes training, improvement of qualifications, selection of employees, effective system of recruitment, evaluation of employees, planning of individual development of an employee, team work, advantage of oral communication, strict cooperation with the managerial staff, consultation between units and individual Voivodeship Labor Offices, transfer of knowledge among employees, time for thinking and evaluating one's own work, shaping of effective organizational structure and culture, management of knowledge, education of employees, loyalty, care of reputation, monitoring of needs and expectations of beneficiaries, computer hardware and software.

The Voivodeship Labor Office management factors presented in the below diagram influence the effective management process for an institution and its individual departments. Correct interpretation of the listed determinants is a source of success of the office and its staff.

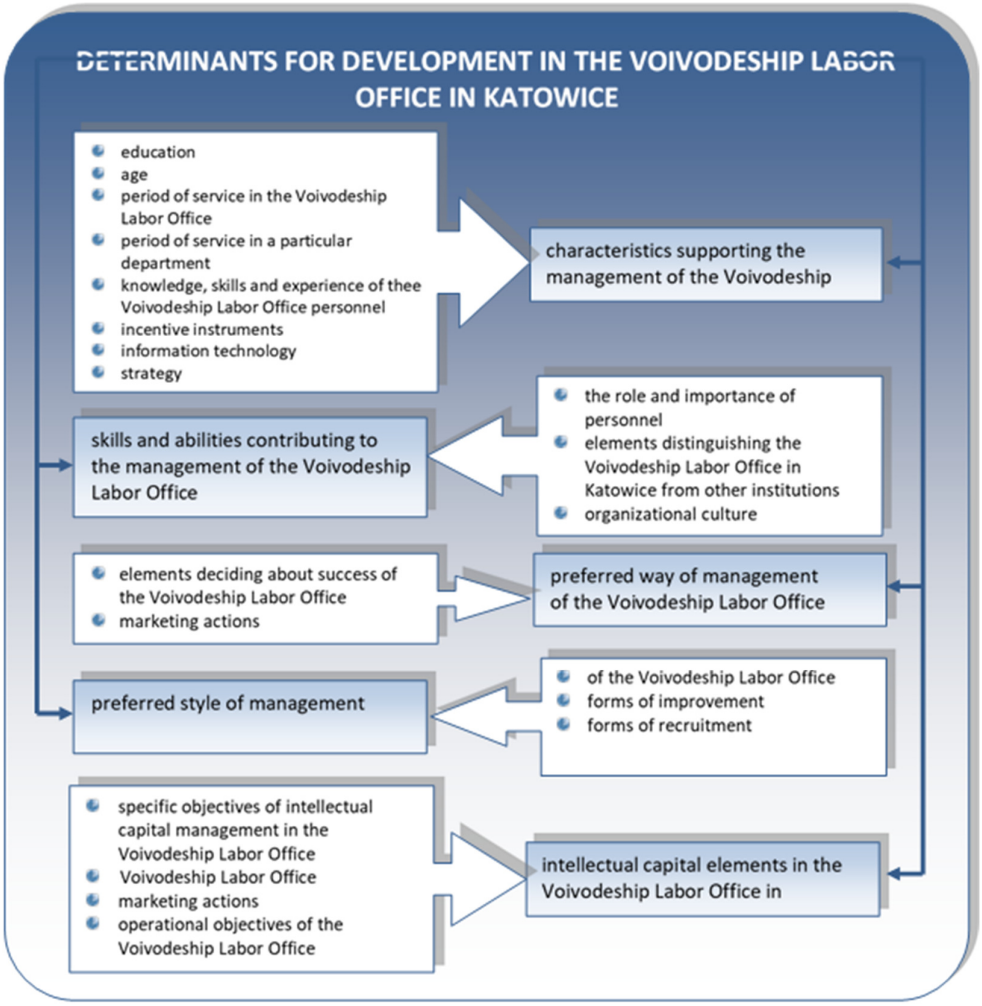

Source: Own work on the basis of: D. Bubel, Intellectual capital management in non-profit organizations. Case study for public libraries, WZ Publishing House of the Częstochowa University of Technology, Częstochowa 2016, p. 174.

Dedicating tasks to an appropriate group of employees, an individualized process of knowledge acquisition and identification of their competence become crucial in achieving the intended strategic objectives. This concerns in particular the adopted from of recruitment of the project auditing employees, who apart from official contacts inside the office with persons with similar professional competence and clients, also cooperate with entrepreneurs, beneficiaries, often in untamed and uncomfortable places. It must be borne in mind that specificity of auditing creates a natural distance between the auditor and the audited, therefore it is impossible to fulfill the official duties of auditing without specific skills, experience and adaptability.

Ultimately, implementation of actions related to HCOP was related to separation of 118 functions (including Director / Deputy Director of the Office, Chief Accountant and Heads of the following departments: Project Selection and ESF Monitoring, ESF Projects Management and ESF Audit). The units directly involved in the implementation of HCOP are:

- Project Selection and ESF Monitoring Department with 33 full-time employees,
- ESF Projects Management Department with 31 full-time employees,
- ESF Audit Department with 36 full-time employees,
- ESF Projects Financial Support Team with 10 full-time employees.
- The remaining organizational entities conducted only some supporting activities within the implementation system for HCOP 2007-2013.

While analyzing the organizational scheme of the Voivodeship Labor Office in Katowice, the following organizational entities can be distinguished within the scope of ESF along with the area of their activities (developed based on *Opis Systemu Zarządzania i Kontroli dla komponentu regionalnego Programu Operacyjnego Kapitał Ludzki 2007-2013 w województwie śląskim*, August 2014, pp. 6-10):

1) The Promotion and Information Team, which dealt among others with:

   - implementation of the Annual Information and Promotion Plans,
   - conducting information and promotion activities for HCOP,
   - service of the ESF Information Point,
   - implementation of Technical Assistance in the field of promotion and information,
   - coordination of projects implemented in the Office within the framework of Technical Assistance,
   - receiving and registering incoming applications for funding.

2) The Call for Proposals Team, which carried out tasks in the scope of, among others

   - announcing competitions,
   - conducting calls for proposals,
   - formally assessing the applications related to funding of competition projects,
   - organizing the works of the Project Evaluation Committee,
   - drawing up ranking lists of projects,
   - carrying out the appeal procedures, with the exception of those persons who carried out formal or substantive assessment.

3) The Monitoring of Actions and Programming Team, whose main tasks included among others:

   - developing the assumptions for implementation of actions,
   - developing of materials necessary to prepare the Action Plans,
   - preparing and updating of detailed procedures related to HCOP 2007-2013 implementation based on information and data handed over by the remaining organizational units of the Voivodeship Labor Office in Katowice,
   - developing the competition documentation for the implemented actions,
   - preparing the reports on the implementation of actions and quarterly information to the Intermediate Body, in this case the Silesian Marshal's Office,
   - collecting of aggregate data which were related to individual projects, necessary for on-going and ex-post evaluation,
   - responsibility for substantive support for IT systems.

4) Competition Projects Team, taking care of, among others:

   - preparing contracts related to funding of the competition projects,
   - analyzing changes in the projects,
   - annexing the contracts,
   - formal and substantive verification of the beneficiaries' applications for payment,
   - handling the personal data of project participants,
   - on-going cooperation with the beneficiaries.

5) The System Projects Team, which was entrusted with tasks in the following areas, among others:

- preparing assumptions which were related to system projects,
- formally and substantively verifying the applications related to funding of system projects,
- preparing of framework contracts for system projects,
- analyzing of changes occurring in system projects,
- annexing of framework contracts,
- formal and substantive verification of the system beneficiaries' applications for payment,
- handling the personal data of project participants,
- on-going cooperation with the beneficiaries,
- formally and substantively verifying the applications related to funding of system projects of the Intermediate Body, in this case the Silesian Marshal's Office, IB and the Intermediate Body of 2nd degree, namely the Voivodeship Labor Office in Katowice,
- preparing the principles for implementation of system projects of the Silesian Marshal's Office and the Voivodeship Labor Office in Katowice,

6) The ESF Projects Financial Support Team undertook actions related to, among others:
   - making payment to beneficiaries,
   - keeping the accounting records of expenditure in relation to the implemented measures,
   - preparing thee forecasts of expenditure related to the implemented measures,
   - preparing information on any irregularities for the ESF Audit Department,
   - recovering of sums unduly paid as a result of the taken administrative decisions,
   - entering the Beneficiaries in the register of those excluded from the possibility to apply for funding.
   - The Budget and Accounting Team, whose task was to provide financial services for projects implemented in relation to Technical Assistance. The organizational scheme provides for 1 full-time function for implementation of this measure.
   - Legal Counsel, who supervises the process of HCOP implementation in the Voivodeship Labor Office in Katowice in legal terms, *"including formal and legal verification of documentation related to the implementation of ESF Programmes, opinions and initialing of agreements and annexes to agreements on project financing under ESF Programmes, ongoing cooperation and legal consultations with organizational units dealing with the implementation of ESF Programmes"*- 1 full-time function is foreseen.
   - Department of Logistics, IT and Public Procurement, the role of which was to perform tasks in the field of Technical Assistance, concerning the provision of necessary logistic and hardware resources for the personnel of departments dealing with the HCOP implementation. The organizational scheme provides for 1.5 full-time function for implementation of this measure.
   - The IT Team dealing with on-going maintenance of IT systems - 1 full-time function is foreseen.
   - Human Resources and Training Team, the role of which was to ensure HR development, prepare and implement the plan of trainings and implementation of Technical Assistance in terms of HR and training support. The organizational scheme provides for 1 full-time function for implementation of this measure.
   - A stand-alone Internal Audit function, the task of which was to collect and develop information on irregularities and risk assessment. Significantly, *"the staff member holding this function is engaged in an independent and objective evaluation of management control and advisory activities in accordance with the internal audit plan for the year in question"* - 0,5 full-time function provided for in the organizational scheme.
   - The Labor Market Programs Department, the task of which was to prepare and implement projects within the European Union programmes.
   - Directors of the Branch Offices of the Voivodeship Labor Office in Bielsko-Biała and Częstochowa, implementing tasks related to, among others, servicing thee Information Point and exercising official supervision over Control Teams in individual units. Furthermore, *"they are responsible, among others, for day-to-day cooperation with the Promotion and Information Team, in particular for carrying out activities within the scope of promotion and information of the ESF and provide employees, subordinate directly to the*

heads/managers of organizational units, with substantive tasks defined by heads/managers of these units (including the ESF Audit Department)".

The auditing of projects within the Human Capital Operational Programme 2007-2013 carried out by the Intermediate Body of 2nd degree was based on the audit of documentation and on-site audits of project implementation. The Voivodeship Labor Office in Katowice audited the project implementation with reference to the guidelines provided for by the Intermediate Body in a contract as well as based on instructions of the Management Authority and the Intermediate Body. The Voivodeship Labor Office in Katowice audited the system projects and competition projects in parallel. Furthermore, it audited sustainability of operations/deliverables.

Two teams were responsible for auditing documentation in accordance with the procedures: Competition Project Team and System Project Team. In the case of the audit in question, the applications for payment posing a part of the project documentation were audited. The content of those applications included eligible expenditure incurred under the project with consideration of the description of material progress. Three teams were responsible for on-site audits of the projects: Audit Team in Katowice, Audit Team in Bielsko-Biała and Audit Team in Częstochowa. They operated within the ESF Audit Unit. Their activities regarded a particular project and were intended to verify the compliance of project implementation with its initial assumptions as well as the funding contract.

The essence of these audits was the fact that they were carried out in accordance with the Annual Audit Plan of the Voivodeship Labor Office in Katowice, verified and approved by the Marshal's Office of the Silesian Voivodeship. The plan covered the methodology of selecting a sample of projects to be audited and was approved by the Director of the Voivodeship Labor Office and then submitted to a higher instance for approval. Furthermore, the information related to the performed audit were handed to the Intermediate Body not only after each quarter in a given calendar year in a form of a report, but also in annual reports from implementation of Annual Audit Plans of IB2.

Sustainability checks of operations/deliverables are carried out in connection with the obligation to maintain the sustainability of operations/results within the implemented projects. The selection methodology was included in the Annual Audit Plan. Verification was employed in the case of those documents that confirmed fulfillment of obligations related to maintaining durability of operations/deliverables considering the sample of documents chosen based on the sampling procedure included in the Annual Audit Plan. Checklists were used during the audit and at least 10% of documents concerning project participants as well as financial documents were verified. In other areas, at least 5% of documents were subject to auditing.

The Voivodeship Labor Office in Katowice, holding the function of IA/IB2, was also obliged to carry out auditing at the end of the project implementation, namely after the beneficiary had submitted the request for final payment, but before the request was approved. The audit focused on the problems of verifying the completeness of the documentation and its compliance with the rules and procedures, in particular with regard to the expenditure included in the Beneficiary's payment requests, which is a prerequisite for an adequate audit trail. The ESF Audit Department conducted some monitoring visits in the place of direct implementation of a specific form of support. Another form of the audit were the monitoring visits, carried out with the participation of employees of the Voivodeship Labor Office in Katowice, at least once for all projects included in the Annual Audit Plan. Depending on the staff capabilities and legitimacy, the number of visits may have increased. This type of audit was carried out with the participation of two employees of the Audit Department, without informing the beneficiary of the intention to carry it out beforehand.

Summary

The article was intended to indicate the organizational aspects of project auditing in Voivodeship Labor Offices as part of the Human Capital Operational Programme carried out in Poland between

2007 and 2013. The assumed research hypothesis was the auditing procedures condition the project management efficiency by establishing the principles to act and implement any remedial measures.
The EU funds are a tool for searching for innovative solutions to known and identified problems, but they can also serve to identify areas that have been neglected so far. The EU funds pose an opportunity for development not only for individual regions or states, but first of all for the residents, because their key objective is to improve the social cohesion. Both the ESF and the ERDF create a kind of bridge between social groups, between children, adolescents, senior citizens, the unemployed, workers and entrepreneurs.

It is significant that the financial activities of the European Union are directly related to member states' initiatives, including Poland, when it comes to the possibilities of risk arising from both frauds and other illegal actions and operations that have adverse impact on the EU budget. Therefore, in order to counteract any undesirable actions on the part of beneficiaries, numerous regulations concerning project auditing have been introduced, which allow to minimize the level of occurrence of fraud and irregularities. In addition to the European Commission, the European Anti-Fraud Office and the European Court of Auditors are the institutions authorized by the EU to carry out project audits, while in Poland it is the President of the Public Procurement Office and the Supreme Audit Office. The Voivodeship Labor Office in Katowice participated in the audit process of the projects co-funded by the European Union as the Intermediate Body of 2nd degree and at the same time the Implementing Authority. In relation to the Human Capital Operational Programme 2007-2013, personnel of the Voivodeship Labor Office in Katowice performed almost 1900 audits of projects implementation. These were planned, ad hoc audits and monitored visits. Furthermore, there were also verification audits in relation to post-audit recommendations issued by the Voivodeship Labor Office in Katowice within almost 950 audits. They were intended to eliminate irregularities and infringements, which were identified by the auditors during verification of the documents presented by the project beneficiaries. The researched entity performed adequately the planned audits of projects.

The audits are performed in relation to the obligation of sustainability based on the methodology included in the Annual Audit Plan. The considerations undertaken in this article allowed for a positive verification of the hypothesis, thus it can be concluded that development of methodology determines the efficiency of EU project management in relation to auditing as one of the management functions.

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The Dynamics of Community Participation on The Development of Tourism Potentials in An Ex-Gold Mine Area – Evidence from West Java, Indonesia

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Abstract

This article discuss community participation in the local tourism development at an ex-gold mine area . The locals that were enjoying mining-based economy through informal jobs were losing their job. However, they find a new opportunity through a tourism-based economy that is initiated by the local ellites and the gold-mine company. The local community is thriving to participate in the development of the village tourism potentials. However, community participation is unequal among the locals. The local elites use their previous connections with mining sponsors to build a new tourism businesses. The village officials also have the advantage to participate in developing and operating new tourism business by using the district official resources.Local participation in tourism development is low due to the lack of access to information, network, and resources.

Keywords : community-based development, community participation, tourism impact

Introduction

Bantarkaret village is like many other villages in a mining area. The villagers are enjoying prosperity life under a non-formal economy generated from mining activities. Since the beginning of gold extraction by a gold-mine company in 1992, there were hundreds of illegal mining activities by the *gurandil,* the local word to say illegal miner. Even though both the legal and illegal mining activities involve the locals. The gold-mine company hire the locals as labor, security personnel, catering, or other services. However, illegal mining activities give more economic advantages to the villagers. The conventional mining technique that is used by illegal miners requires a lot of labor that usually done by the locals.

However, the mining activity is coming to its end. The concession of the gold-mine company to extract gold in the area only valid until 2021. Meanwhile, illegal mining activity done by the *gurandils* is already prohibited since the end of 2015. This development gives a significant impact on the Bantarkaret village, especially in economic terms. There are a lot of villagers who lost their source of income. This social phenomenon indicates that the local community has a strong dependency to natural resources (John, et al, 2014; Delgado-Serrano, 2017). However, the villagers have a new aspiration to continue their economic life. The early development of tourism potential by various parties in the village has inspired the villagers of Bantarkaret to participate in the tourism businesses.

The transformation of ex-mining area into a tourism destination has become a common practice of sustainable mining (Hidayati and Delianto, 2016). The mining area usually left critical after a long

period of natural resource exploration and exploitation. One of the methods to revitalize a critical land is by altering the land use, which in this case is to turn it into a made-up tourism destination.
The gold-mine company corporation has announced the plan to transform the gold mining site into a tourism destination that is ready to operate in 2021. Specifically, the gold mining site, which is in Bantarkaret village, is in a process of alteration into a gold mining museum. As part of the plan, the gold-mine company already builds two tourism destinations near the area, namely the Kawasan Wisata Cikaret (Cikaret Tourist Area) and the Taman Buah Nusantara (Nusantara Fruit Park). Both tourism destinations are designed as a tourism destination for family and group. The construction of both facilities is finished; however, the commercial opening is yet to be decided by the gold-mine company. The Bogor District officials has launch a tourism development initiative called as the Geopark Pongkor (Pongkor Geopark). The initiative consist a series of tourism destinations around the Pongkor Mountain, including the tourism potentials in the Bantarkaret village.

This working paper is aiming to depict the struggle of the local community in Bantarkaret village to participate in tourism development. For many years the local community of Bantarkaret village depends on their economic life to external parties through the mining activity. To get the benefit of tourism activity in the village, the local community has to participate actively since the early development of tourism potentials (Patanaude and Lewis, 2014).

Literature Review

Several studies have confirmed the effectiveness of transforming an ex-mining area into the tourism area to support the community and the environment sustainability. Research in Bojonegoro regency by Suprayoga in 2008 depicted the process of social change, from a coal mining economy to the tourism economy. The process was running smoothly and in a fairly short time. This happened because the coal mining company was leading the process, and the local community was taking the advantage to participate in a new economic creation in the tourism business (Suprayoga, 2008). Another study in the same regency also confirm how tourism potential could be harness from the natural richness, namely the local forest (Soedarso, Nurif and Windiani 2014).

Several studies also suggest the possibility to revitalize a critical land by transforming it into tourism destination. One of the example comes from Pangkal Pinang, where an ex-copper mine was revitalized by creating a made-up tourism destination (Hidayati and Deliyanto 2016). The ex-copper mining activity leaves a critical land that is no longer productive. To generate a new source of economic, tourism objects were built on that land as a new economic driver. The local people then attracted to participate in their way to support the tourism business as their livelihood. Similar conclusions also come from a study by Carl Cater in 2011. He describes the local community participation to support the tourism business in the Mount Rinjani National Park. The locals provide various services to support the tourist, including lodging, local guides, and transporters of tourist goods or commonly called as porters (Cater, 2011). These studies imply that local community always seeks the way to adopt to the change in the area where they live.

Sustainable development requires the local community participation because negative opinions from the community may hinder the local development. Community participation in tourism development is influenced by their level of awareness toward the development process (Cardenas, Byrd, and Duffy, 2015). One of the ways to upgrade community awareness is by involving them start from the planning sequence to the commercial sequence (Byrd, and Gustake, 2007). Even though it is almost impossible to involve all members of the community in the process, local stakeholders' commitment to the planning process could generate positive opinions regarding tourism development. The involvement also creates supportive perceptions and actions of the community to the development process (Torn, et al, 2008).

The element of tourism village is its whole potential, which can be a space that convertable to be a tourism destination, such as waterfall, hills, agriculture, or simbolic things such as arts and culture (Sugianto, 2016). To develop a tourism business, it is important to form a good tourism management that is to form an organizational structure, creating a conducive organizational climate, capable human

resources in managing organizations, technology that can support business development and most importantly the tourism potential itself (Ghorbani, Amir et all. 2019). Community-based tourism management is not separated from the first four main principles, there are the principle of community participation, natural resource conservation, local economic and the principle of socio-cultural conservation (Wiwin, 2019). These four principles encourage the development and direction of community-based tourism.

Method

This study combines both qualitative and quantitative data collection techniques. The qualitative method is implemented through a series of focus group discussions and interviews with the local officials and community members. The data are used to depict how the community member participates in tourism development.

The quantitative method is used to represent the physical condition of the village, especially the progress of tourism facility development. The data obtained from aerial imagery and field surveys. Spatial data is obtained from aerial imagery downloaded through the Geospatial Information Agency (BIG) portal. Meanwhile, the attribute data which is the tourism object location as the main information in the map is obtained from field survey.

Data processing techniques to produce a map using geographic information systems (GIS), a computer-based system for storing, manipulating geographic information (Syam'ani, 2016). The stages of processing map in the ARC GIS application, starting with the basic map input, there are the village administration and the coordinate point of each attraction. Then, map processing continued by digitizing the location of tourist objects, roads, and supporting facilities in the village. Digitization is the conversion of analog to digital (Savic, 2019). Lastly, is the layout process which purposed to display the scale, the legend, and the map inset.

Finding and Discussion

Bantarkaret village is amid social and economic change. In the past 20 years, the villagers were highly depending on illegal mining activities. The illegal mining was using simple technologies and involved a quite number of unskilled labors. As the gold reserve is depleting, and illegal mining activities are significantly decreasing, the locals can no longer depend on the mining activities. Improving the local engagement with tourism activity could be the main solution to prevent the locals from being excluded from the ongoing process of tourism development in the village.

The development aims to create a better living for the community. A development that is enjoyed by a small number of community members is considered as a partial development. The impact of development should be enjoyed by all. The participation of community members in tourism development, in general, is low. Only local elites who manage to open and run the tourism business. They use their social capital to convince their network to invest in the tourism business under their supervision. These group of local elites are villagers who are previously involved in mining activities.

The gold-mine company can maintain its influence even though its mining business is about to end. Like many other mining companies, the gold-mine company obliges to maintain the sustainability of the environment and community. Thus, they plan to alter the mining site into a tourism destination in the form of a gold mining museum. Their plan is already in motion. The gold-mine company is creating a new family park called with the Taman Buah Nusantara and the Kawasan Wisata Cikaret. These two tourism destinations are located at the access road to the mining site in Bantarkaret village which have made Bantarkaret village become a part of the Pongkor Geopark tourism development initiated by the Bogor Regency government.

There are positive responses from the local community to the ongoing process of tourism potentials development in the Bantarkaret village. However, community participation is considered low because of the lack of access to information and resources. Only a few people that represent the local community and participate in the tourism potentials development, they are local elites.

The local elites that are involved in tourism development can be classified into three groups. First, the local elites who previously involved in illegal mining activity. Second, the local elites who are involved in the village district office. Third, the local elites who are involved in the gold-mine company. gold mining activity. These three groups could involve in the planning and management of the tourism destinations. However, they are still working on the coordination among them, especially in setting their position to the gold-mine company, as the prominent source of tourism development in the Bantarkaret village.

Table 1: The typology of community elites that actively involved in the tourism development

No	Community Grouping	Informant	Testimony in interview sessions
1.	Involved in Illegal Mining	Mr O	Even if I have to prepare the paperwork to legalize my tourism business, I am ready. I have already prepared the land for the parking lot, only about 2 - 2.5 hectares, here near the village. I am building an Off-road area in the mountain. ... that Kawaci [The Taman Wisata Kawaci] was built by the gold-mine company and they had wanted to give the management to Bumdes [the village business entity], so that it becomes money. Because the company doesn't want to receive a ticket at any time. Because he doesn't want to be wrong
2.	The gold-mine company Corp partner	Mr D	Especially if the communication is better with the company people ... This is what the company is willing to give. So yesterday I left the village to approach the company. The result the company is willing to build the Taman Buah Nusantara up here. That's was also my idea. I encourage them to propose the central board to issue its CSR. Now the company is processing the transfer of management to the community...
3.	Village district official	Mr H	We are still organized our business entity ... But hopefully with some people we keep going. Because the village office is very supportive. Hopefully the results have already been seen in 2020. We had wanted to clear it first with the company. With the direction of the village head, we cleared it with the company so that it could be managed by us so it would be nice to clarivy with the people

The first two groups of community elites are represented by individuals. Mr. O and Mr. D are only one of the members of each group. They are very cooperative with the company, and always try to maintain a close relationship with the companys'officials, especially those who are responsible for the Corporate Social Responsibility (CSR) program.

The third groups are more organized because it is also part of the village district office. The village officials build a business entity to manage tourism destinations in the village. This business entity is called with Badan Usaha Milik Desa (Bumdes), and Mr. H is acting as the chairman. Currently, the Bumdes is still organizing themselves to prepare to manage several tourism destinations, including the one that was built by the gold-mine company, especially the Kawaci Park.

The statements from each group representative depict the prominent role of the company in the endeavor to build tourism potentials in the village. This finding is similar to several studies about the

alteration of the ex-mining area to tourism destinations (Hidayati and Deliyanto, 2016), (Suprayoga, 2008), Soedarso, Nurif and Windiani (2014). The gold-mine company corporation also prepares the community to adapt to the new source of the economy by inviting the community representative in the meeting, training, and other occasions (Byrd and Gustake, 2007).

The field survey to observe and tag the location of tourism destinations in the village has managed to track 13 tourism destinations in the village. This finding shows that the community also inspired to actively involved in developing a tourism business, no matter the scale of their business is.

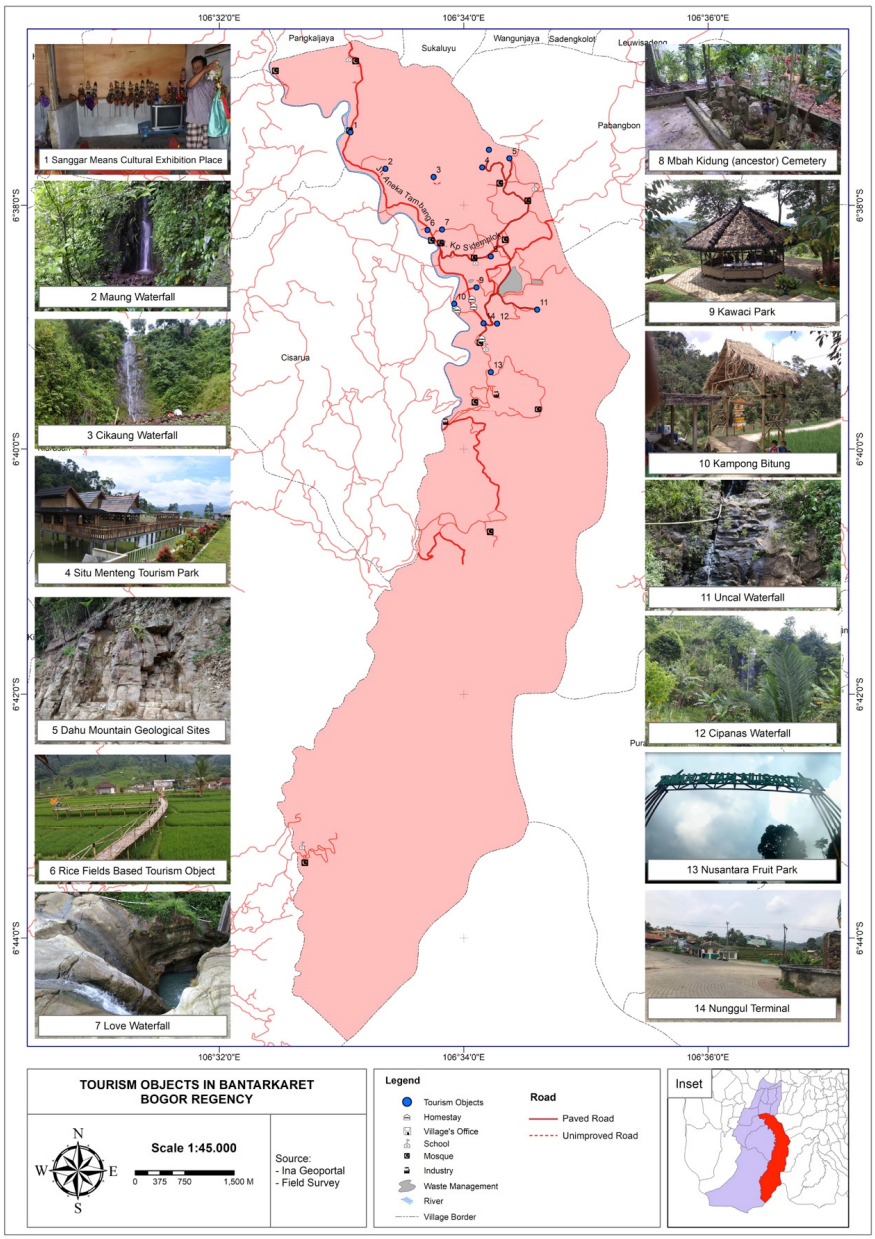

Figure 1: The geotagging result of Tourism Potentials in the Bantarkaret Village

There are 13 tourism destinations which are fully constructed in Bantarkaret village. The detail coordinate locations of those destinations are mapped in figure 1. However, some of the sites are still organized individually by some locals who are respected by the others, or who owns the land where the tourism sites or the road to access the sites are located. Only some of the tourism sites are managed under the Bumdes. Managing tourism business with Bumdes has a huge advantage because it is a business entity that is legally recognized by the state. Therefore, it is possible to seek support and cooperation with the Bogor regency officials.

Conclusion

The potentials of tourism development in Bantarkaret village give the villagers a new hope. They have a new inspiration now, which is participating in the new tourism business although the development in the village is still in its early stages. The finding shows that local community has the intention to participate in the tourism development potentials (Patenaude and Lewis, 2014; Cater, 2011). But the significance of their participations are varies based on their bargaining position in the development process.

This makes community participation in tourism development is relatively low. Only the local elites who have access to information and resources can participate in the creations of tourism destinations. The rest of the villagers are yet to get involved in the tourism business.

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Shopaholic Phenomenon, Choice of Shopping Place and the Development of Megamalls in Ibadan, Nigeria

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Abstract

Shopping activities in the 21st century is taking a social dimension rather than mere commercial activities. This is quite evidence in the importance consumer attached to shopping and their choice of shopping place which has necessitated the increase in the number of megamalls in many cities of the world including Nigeria. This study examined the shopaholic phenomenon, choice of shopping place and the development of megamalls in Ibadan, Nigeria. The study was empirical using both quantitative and qualitative method for data collection. 216 copies of questionnaire were administered to mall customers while In-depth interview was conducted for 6 mall operators cut across malls in Ibadan. Statistical Package for Social Sciences using frequency tables, percentages and histogram chats were used for analysis. The study revealed that most respondents choose megamall as their shopping place and there is a connection between shopaholic phenomenon, choice of shopping place and the development of megamalls. Conducive and serene environment which megamalls portrays have wooed many customers in the urban areas to choose it as their priority as it concerns shopping and that have gone a long way to enhance the development and sustainability of megamalls in Nigeria. For most customers, they patronize malls because of their innate love of shopping, ostentatious life and showy life just to impress friends and well-wishers. The glamour and fascination which megamalls displays cannot be gotten in retail shops or in the open markets. Customers are highly satisfied with their experiences in the megamalls that accounts for their continual patronage of the megamalls over other shopping alternatives.

Keyword: Megamall, Shopaholic, Shopping place, Retail Stores

Introduction

Shopping is a viable business endeavour which is not only limited to consumption but also entails social dimension. It is a social practice which reflects in people's life-style. Megamalls creates a serene environment similar to urban centre with social activities in a different arrangement where shopping activities takes place. The essence of megamall can be found in the variety of choices that individuals make in their daily life. Street life is exciting, but people look for different things in megamalls. Megamall has become the most significant and popular interface where consumers and producers meet. It is a place that attracts huge throngs of people (Rousseau, and Venter, 2014).

Trading activities remain a major key factor for the development of cities and towns as well as of the intensification of their desirability. The right to pursue commerce is very pivotal to this development. Market places seemed to be and are still persistent urban feature (Cohen, 2006). Essentially, people's lives centres around work and leisure. Various individuals by design must of necessity stop and exchange money for products and services which makes possible work and play. Small shop centres connect lives together in a more pleasant way as it has been the usual practice since the olden days till now, this grows into stable or semi-stable dwelling edifices and commercial arenas (Busari, Olonade & Asamu, 2019).

Megamalls are usually a spacious arena with a blend of in and out doors services with great investment in seats, air conditioning, large space and beautiful decors (Njoroge, 1995). Sourcing for markets and patrons are largely by advertisement, special offers and sponsorship with the aim of creating brand-loyalty among customers. Operators of shopping malls generally established arrangement for franchise with multinational organizations which will also be in control of the supply of raw materials used for goods, items, menu and the manner of presentations and arrangement in sections. One of the implications of the continuous development of megamall is that proceeds made from sales by foreign-controlled chains are usually repatriated back to their countries. By implication, the proceeds and large income made are transferred out of the host economy, thereby amounting to labour loss for the country at large (Busari et al, 2019).

Home-made foods with the arrangement of family dinner table is progressively giving way for fast food takeaway consumption which are easily purchased at the megamalls (Wikipedia, online dictionary, 2018). Most importantly, studies have shown that fast food consumption is connected to many diseases which among others include colorectal cancer, obesity, high cholesterol, and depression (Talwar, 2003). Many fast foods tend to be high in saturated fat, sugar, salt and calories (EurekAlert 2018). Critics of the mega malls have long warned about the perils of addiction to processed food, canned items, foreign products, expired materials and consumptions etc. Although the development of megamalls serves as important places for shopping, entertainment and social interaction in Nigeria, the centres are faced with dynamic shoppers' attitude and changeable competitive environment. Since most shoppers are adventurous in nature, they tend to change with the lasts centre in town. In such unstable situation, it is important to understand and be able to predict shopping mall performance. Thus, megamalls are faced with demands to adjust their marketing mix strategies to fit latest market trends. These have originated from the changes in consumption patterns of urban dwellers, citizens' choice of shopping place, which have brought about irregular purchase decisions and extreme competition among the shopping malls and its development in different locations and environment.

Review of Literature

Sharma, Narang, Rajender and Bhatia (2005) assert that shopaholism is a medical term for the uncontrollable craving for shopping activities. It is the same with the term 'onionmania', which is gotten from the Greek words onios (for sale) and mania (insanity). It is described as 'impulse control disorder'. Ridgeway, Braga, Tita and Pierce (2011) submits that approximately 8.9% of the people in America experience this condition. Ostentatiousness is "a pretentious display meant to impress others" or a "boastful showiness" (Perkins, 2008). It is attracting or seeking to attract attention, esteem, or envy often by flamboyance or obviousness. It is excessively elaborate or noticeably characterized by, fond of, or evincing ostentation. People, things, wealth or knowledge portrayed as ostentatious seem to have put themselves on display; they are practically begging to be looked at. Ostentatious applies to items or buildings which are luxurious, mansions and fancy high-rises with marble columns. Some set of people are ostentatious; they have lifestyles which connotes spending extravagancy. Their consumption depicts impressive things they buy. They attract attention not only because of quality but also for an implied luxury. It simply depicts show off. And, in fact, any amount of ostentatious is wrong during the tough economic times like these, it is more wrong than usual (Bhatia, 2005).
Megamall depicts conglomerates and chains of businesses in goods, services, vacation and voluntary acts. It is array of shops and wares lined up for purchase, fun catching, sight-seeing, relationship building and business transacting (Omoniyi, 2018). Megamall can be defined as set of buildings that provide walkways for the public to walk from one unit to another as they go about their business of

exchanging goods and services for money. They are a very large shopping area containing very many shops, cinemas, and restaurants. They are a very large shopping area containing very many shops, cinemas, and restaurants. It is a particular shopping type and pleasure arcade which is commonly in open air and connecting walkways end to end (Munich, 2004).

Common practices in many Nigerian cities such as; Port Harcourt, Lagos, Uyo, Abuja, Umuahia, Jos, Akure etc is the construction of commercial precincts above or under the old road network. The implication of this is that the rich people in the society are disconnected from the paths of urban center areas, and the physical interaction among diverse cultural and social groups as well as their lifestyles and values become more irregular. For the attainment of individuals' sense of consumption in outdoor settings, most mega malls have been planned to ensure adequate security, traffic, attention and fashion-oriented rather than interaction between individuals (Creel, 2006). Megamalls denote a different type of street or arcade in metropolitan commercial areas focused on pedestrians and helped by public transit. It depicts an environment void of traffic situations that turns into a place where people can walk, sit, eat, and observe the various human activities taking place around them (Ferdman, 2018). A number of continuous blocks along a shopping street, which is used by people on foot, have consisted of pedestrian malls. They are formed by closing a street for vehicular traffic and improving the pedestrian street with new paving, street trees, street furnishings, and other amenities such as sculpture and fountains. The full fledge mega mall provides visual continuity, a special character, and help to create an image and sense of place for the consumers or people (Gürçel, 2003).

With most of capital cities with one form of modern megamall or the other, developers have increasingly targeted secondary cities in order to gain first mover advantage in these locations. Bidandi and Williams (2017) opined that developers are now concentrating on building well situated rather than mega-malls as it is suitable with the policy of land economy. It also affords shoppers, patrons and fun seekers a complete and holistic opportunity to shop, play, catch fun, take shots as well as do business with modern and easy-to use technology and all within a time being. Indeed, Megamall development plays a key part in determining the future landscapes of Africa's growing cities.

Before the ideas of megamalls emanated, it is apparently clear that people subscribe to the old conventional means of doing trading activities. The buying and selling takes place within the street through various forms and styles which includes; kiosk/stands, ware display, floor marketing, fast food centre, hawking, stoas, stores, arcades, open or closed bazaars, hans, pedestals, passages, quick service restaurants etc (Chukuezi, 2010). This occurrence has stayed for a very long time and it appears to be growing silently. It is called street vending or selling. Street vending can be defined as an easy, unorganized and frequently non-registered economic activities in the fast growing cities of the developing world. It is an imoprtant part of urban economies across the globe, offering easy access to a wide range of goods and services in public spaces (Egharevba, Eguavon, Azuh, Iruonagbe & Chiarzor, 2016). Street vending micro-economies are crucial for the economic planning and development of many communities. They are involving in many trading activities like fresh vegetables to prepared foods, from building materials to garments and crafts, from consumer electronics to auto repairs to haircuts (Rousseau, and Venter, 2014).

Creel (2006) asserts that street vending businesses are usually owned and operated by individuals or families. Street food enterprises are generally small in size; require relatively simple skills, basic facilities and small amounts of capital. Marketing success of the street food vendors depends exclusively on location and word-of-mouth promotion (Ferdman, 2018). The contribution of street vendors to the economies of developing countries has been vastly underestimated and neglected (Rousseau, and Venter, 2014) and replaced with megamall which provides a total, comprehensive buying and fun experiences for people at a go within the same arena. The significance of the street vending has often been ignored because it is seen only as a prevailing and distinctive component of a broad informal sector. There is increasing recognition that street vending plays an important socio-economic role in terms of employment potential, providing special income particularly for women and provision of food at affordable costs to mainly the lower income groups in the cities (Chukuezi, 2010). Most street vendors offer the main source of revenue for their families, providing food for their households and payment of children school fees. However, in spite of their immense impacts on socio-

economic wellbeing, street vendors are confronted with myriads of difficulties. They are mostly unrecognized as critical stakeholders in the economy and when compared to other enterprises, they are limited instead of been given enabling environment to thrives. Concerns of cleanliness and freshness usually discourage many persons from eating street food or buying items there off (Mukhola, 2007). It is apparently clear that people due reasonable number factors, such as; safety, hygiene, conducive and scintillating environment for play, fun and excitement, holistic buying, business expansions and connections, bulk buying, prefer patronising megamalls than street vending economies.

With the advent of modernization, there is evolution of arcades to malls and department stores into malls also. Small scale retailers and business owners wind up their trade activities as people are opting for megamall to buy cheap and foreign products as well as enjoy quality time with their families and friends. White and Sutton (2001) affirm that characteristics of urban culture includes unfamiliar relations, competitive behaviour and distant bloodlines. This unprecedented migration of people is predicted to continue and in a more intensified level during the next few decades, escalating cities to sizes unimaginable only about hundred years ago. Consequently, the growth of world city population curve has up till recently followed a quadratic-hyperbolic pattern. Urbanisation occurs because people move from rural areas (countryside) to urban areas (towns and cities). This usually occurs when a country is still developing. This applies to the people abandoning small street stores, groceries kiosk to urban areas where megamalls thrive.

Theoretical Framework

Modernization refers to a model of a transition from an orthodox era to a modern society. It came up from the works of sociologist Max Weber (1864–1920) and a shift in paradigm propounded by Harvard sociologist Talcott Parsons (1902–1979). The theory looks at some internal factors and mechanism of a country in a new dimension. It identifies social factors which are capable of contributing to societal growth of societies and seeks to explain the process of societal evolution and development. It can be equated with the processes of urbanization, westernisation and industrialization. Kendall (2007) notes, Modernisation is an overarching process of rationalisation which sees economic conditions are heavily determined by the socio-cultural and political values in such society.

Modernisation theory submits that the wave of buying and selling in an organised, conducive and friendly environment is not negotiable as the world is turning into a more relaxed and social-oriented settings. Due to the nature of people work and non-availability of time, it becomes more convenient to shop, relate and relax in an open arena. The society is presenting an atmosphere which makes people to acclimatized, feel secured and homely as well as purchase goods as at relatively cheap prices. In the same vein, people are capturing this offer and turning the privileges in opportunities for themselves and family. Rather than toe the part of traditional societies, modernisation has made human being see reasons to change their choice of shopping place and move to the trendy place of shopping. There is apparently nothing that cannot be purchased or found in a mega mall or relaxation centres. People pay obeisance to these centres on weekend and privilege holidays to unwind, celebrate, relate, meets people and exchange business or relationship contacts. Unlike the traditional display of goods or local stores which does not make provision for serenity and freedom to relate and relax. Even in core oldies, goods were lined up by the road side with symbols or price tags and buyers pick and drop their pay without interaction and negotiation. Modernisation frowns at this.

More so, critics of this theory submit that modernisation has eroded traditional core values and practices. It has done more harms than goods. It has preached westernization more than the orthodox and conventional means of getting things done devoid of crises, fraud, stealing, fighting and other anti-social behaviours.

Methods

This exploratory study was conducted in Ibadan South West Nigeria. Ibadan was selected for this study because of the preponderance of megamalls in Ibadan metropolis and the increase patronage of people

in megamall over retail shops in Ibadan. The targeted population for this study were selected retail shop owners, megamall costumers and megamall managers in Ibadan metropolis. Both primary and secondary data were gathered. Secondary data were gathered through scholarly articles. Primary data were gathered through quantitative and qualitative techniques. Quantitative data were gathered with 216 copies of questionnaires were administered active megamall users (who must be been using the megamalls in the past 12 months consecutively) while qualitative data were gathered with 6 IDIs (In-depth interviews) from megamall operators who are in the managerial cadre in the selected shopping malls in Ibadan. The study captured the views of both megamalls' customers and operators/managers of megamalls. Purposive and accidental sampling technique was used to select 216 respondents for the quantitative data in various megamalls in Ibadan Metropolis. Quantitative data was analyzed at univariate level using SPSS while the qualitative data was analysed through content analysis and presented as ethnographic summaries. All the ethical issues were strictly adhered to. The principles of voluntary participation, anonymity and confidentiality were observed. The respondents' right for confidentiality and privacy were taken into consideration during the data collection.

Findings and Discussions

Table 1 below presents respondents socio-demographic characteristics of the respondents. The table shows that higher percentage of the respondents 46.8% falls between 25-34years. This shows that 85.2% of shopping mall customers are youths which confirm the fact that the youths are the main megamall users because they want to enjoy the glitz and glamour of the moment. Senior citizens will prefer to patronize small retail shops than going to megamalls, this is because senior citizens may see such outing as a waste of time, energy and resources. They will question the rational of going to a mall which maybe in long distance than purchasing whatever the need in the retail store next door. However, on the contrary, youths see megamall shopping as an adventure, meeting point, sightseeing, dating places etc. On gender, majority (55.6%) of the respondents are male. The above findings are in tandem with the findings of Kuruvilla and Ranjan (2009), when the opined that men visited malls more than women and it refuted the assertions of Dholakai, Pedersen and Hikmet (1995) as they opined that the ratio of shopping centre usage between women and men is 2:1; which implies that shopping malls often to appeal to more to women than male. Most of the people observed in the shopping malls during the study were usually in two (male and female) who are just hanging out and having fun. Most customers of megamall use it as a form of leisure. On level of education, majority of the respondents (80.1%) falls in the category of tertiary level of education and ranked the highest. This finding confirms the fact that megamall is a major part of the modernization process with people who had formal education/western education being oriented towards it. On monthly income, higher percentage of the respondents (32.4%) of the respondents earn #20,000-#40,000, this shows that higher percentage of the megamall users are not really affluent. This could be explained by the fact that some of them could be students and unemployed graduates, apprentices or self-employed youths who are trying to make earns meets. Majority of the megamall customers earned below #80,000 monthly. Ordinarily, such people should make use of the local shops/markets for their daily needs but because of the need to 'feel among' and "show off"; they still spend their meagre income on frivolities at the mall. Most of the youths wants to impress their friends, relatives and fans by going to the megamalls. Some of the megamall users just go there to take pictures and post on the social media, so that they too will be admired and approved. This also reveals by Sohail (2015), Jih and Lee, (2004) and Jewel, (2001). Megamalls depicts a lifestyle that is endearing to everyone as a desirable place to be. Hence, every individual irrespective of their socio-economic status want to be part of it.

Table 1: Socio-demographic characteristics of the respondents

Variables	Frequency	Percentage
Age		
15-24	83	38.4
25-34	101	46.8
35-44	18	8.3
45-54	8	3.7
55 and above	6	2.8
Total	**216**	**100**
Gender		
Male	120	55.6
Female	98	44.4
Total	**216**	**100**
Educational Qualification		
Primary	3	1.4
Secondary	16	7.4
Tertiary	173	80.1
Others	23	11.1
Total	**216**	**100**
Respondent's monthly income		
Less than #20,000	42	19.4
#20,000-40,000	70	32.4
#41,000-60,000	33	15.3
#61,000-80,000	21	9.7
#81,000-above	50	23.2
Total	**216**	**100**

Source: Authors' Fieldwork, 2018.

Table 2 below presents response to time frame of respondents visit to mall, 23.1% of the respondents have only visited the mall in less than a year, 27.3% of the respondents had been visiting the mall for the past 12-24months, 17.1% of the respondents opined that they have been visiting the mall up to 36months now, while 32.4% of the respondents opined that they have been visiting the malls for more than 36months now. This implies that higher percentage of the respondents (32.4%) have been visiting the malls.

Table 2: How long respondents have been visiting malls

Time frame of respondents visit to mall	Frequency	Percentage
Less than one year	50	23.1
12-24months	59	27.3
25-36months	37	17.1
36months and above	70	32.4
Total	**216**	**100**

Source: Authors' Fieldwork, 2018.

Figure 1 below respondents' choice of shopping place, the result shows that 89% of the respondents opined that malls is their choicest place shopping, 7% of the respondents opined that retail shops while 4% of the respondents opined that they prefer to shop in the open market. This implies that majority of the respondents (89%) opined that they prefer shopping in the malls. The above findings are in tandem with the assertion of Omoniyi (2018), megamall depicts conglomerates and chains of businesses in goods, services, vacation and voluntary acts. It is array of shops and wares lined up for purchase, fun catching, sight-seeing, relationship building and business transacting.

Figure 1: Percentage of respondent choice of shopping place

Source: Authors' Fieldwork, 2018.

Table 3 presents respondents' rationale for their above choice. The result shows that higher percentage of the respondent (38.4%) opined that they choose shopping malls because it provides quality and affordable goods at your door step, other rationales includes opportunity to have fun/hangout, opportunity to meet different people from different places, serves as recreational centre, gets almost all you want in a single location amongst others. By implication, respondents are getting value for their time and shopping experience on every visit to the mall. Megamalls provides all these opportunities which retail shops and open markets does not offer. It gives them the opportunities to exhibit their shopaholic and ostentatious lifestyles. The above finding is further collaborated with the qualitative data as some of the respondents interviewed had this to say:

> We stocks consumable goods and non-consumable goods, basically food, beverages, household goods, toiletries and liquor drinks. We offer recreational services like film house, game arcades, bar and launch restaurant services and shopping mall. Other sides' attractions include fast food restaurants, superstores

> and the likes. We sell clothes, shoes and bags while the fifth participants gave a detailed description of what they sell in their mall. So virtually everything you need can be gotten in the mall. (Male/IDI/Mall operators/2018).

Another response by another respondent succinctly captures the distinction of malls and why people patronize malls more than retail shops, this was her direct words:

> Whatever you buy here you can be sure they are genuine and original. It is very rare to find fake things in the mall unlike all these shops in the neighborhood or local markets. Shopping malls have names they want to protect so people have the benefits of getting original stuffs here at affordable prices. Also, there is enough space to accommodate the crowd coming here, malls have sitting arrangement where people can wait and relax. Malls, also have many toys in their children section where children who comes with their parents can stay while the parents go shopping. There is also a large parking lot that can accommodate many of their customers' cars. All these are hardly found in many of these neighborhood shops. Also, the goods and services are reliable, you can't come across fake things and they are all affordable. Malls keep their environment safe and serene for customers to enjoy their shopping. This is a one stop destination where you can get all your goods in a single place at affordable prices. Hence, megamall provides shoppers the opportunity to get all they need in one place than what you can get in retail shops. (Female/IDI/Mall customer/2018).

The above assertion connotes that due to the fact that customers have the opportunity to buy several and diverse items in a single shop goes a long way to influence their choice of malls than retail shop or open markets. Most times costumers' buy items they didn't even plan to buy in the first place because they saw such items and it was appealing to them.

Table 3: Respondents rationale for their choice of shopping

Rationale for choice of shopping	**Frequency**	**Percentage**
Malls provide opportunity to have fun/hangout	53	24.5
Malls provide opportunity to meet different people from different places	31	14.4
Malls serves as a recreational centre	17	7.9
Malls provides quality and affordable good at your door step	83	38.4
In malls you get almost all you want in a single location	32	14.8
Total	**216**	**100**

Source: Authors' Fieldwork, 2018.

Figure two above presents how often respondents visit malls in Ibadan metropolis. The result shows that 24.5% of the respondents' visits malls very often, 22.7% of the respondents opined that they visit the malls somewhat often, 33.4% of the respondents visits the mall often, while 19.4% of the

respondents visit the malls not very often. This is an indication that majority of the respondents visits the mall often.

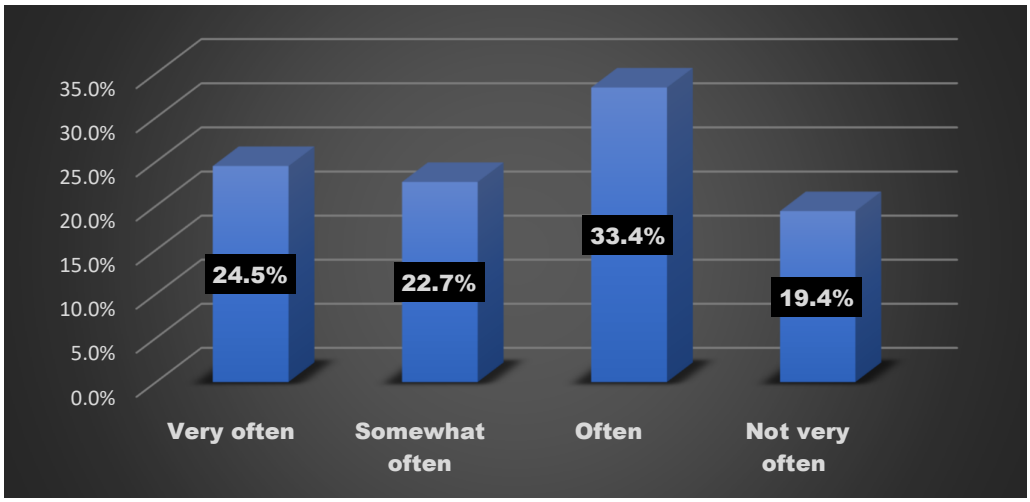

Figure 2: Percentage of respondents' response on how often respondents visit to mall

Source: Authors' Fieldwork, 2018.

The experiences of the megamall's users were ascertained in the cause of the study. Respondents rated their experiences in the megamall based on their past outings and visits to the megamalls. Table two below presents the respondents opinion on what they experience about the megamalls. The experiences of the respondents in the malls, majority of the respondents (87%) of the respondents opined that they were highly satisfied with their experiences in the malls. This satisfaction could be explained by the fact that apart from shopping most customers visit the shopping malls to have fun and meet people. The above assertion is collaborated with the qualitative finding as the mall operators/managers, one of the respondents interviewed had this to say:

> We maintain good customer service. Customers are our priority here. We make sure that they are satisfied and if the customers make any complain we treat it as urgent and make sure that such thing do not occur again. (IDI/Mall operator/2018)

From the above assertion, the place of good customer service is priority in the mall. This follows the saying that "customers are king" That could explain why malls are experiencing large patronage unlike the small retail shops. Move over, people like to go where they are treated well, places they are appreciated and valued unlike places.
Another respondent interviewed had this to say:

> We make sure we stock quality good here, we keep our environment clean, we have business card for every of our clients and we also sponsor TV shows on celebrities and lifestyles. Also, we make sure that customers and their properties are safe. We cherish our customers and we offer promotional activities periodically especially in our film house. We are also very active on social media to showcase what we have in the mall. (IDI/Mall operator/2018)

From the above assertion, malls endeavours to sell quality goods and that is one of the attractions of the customers. When people trust your products, they will keep coming. This is because people want

value for their "hard earned" money in Nigeria. Also, mall operators ensure that their customers and their properties are safe, that is a good strategy to ensure continual patronage to the mall. People will not continue to go to megamalls if such environment is unsafe and unsecured, invariably, megamall customers keep going there because they consider it safe and secured. In addition, one of the customers interviewed had this to say about her experience in the mall.

> This mall is very helpful to people as it eases them the stress of struggling in the local market. What I mean is that here in this megamall you come in and you get all you need in a place. Unlike the open market where you walk from one end to another on a rough, dusty and bad road, here even if you will walk around, everywhere is clean and tiles, you are inside an air conditional environment, everywhere in the mall is cool and clean. So, I think that is why many people prefer to come here than other places. (IDI/Mall customer/2018)

The above assertion explains why customers patronize malls more. The conducive and serene environment is one of the major factors why people patronize mall. Shopping in the mall exposes customers to less stress than shopping in the open market where one has to move from one location to another before one could complete his/her shopping. The stress of moving from location to another under hot weather condition to shop is prevented and needless when shopping in the malls as the whole shopping malls are air-conditioned and conducive. The above finding could also explain why respondents choose megamall to other shopping alternatives because they are satisfied with the services offered by the megamalls.

Table 3: Response of respondents on their experiences in the malls

Response	**Frequency**	**Percentage**
Highly satisfactory	188	87
Not too satisfactory	26	12
Below satisfaction	2	1
Total	**216**	**100**

Source: Authors' Fieldwork, 2018.

Figure 2 above presents percentage of respondents' perception of how innovative they think the malls are, the result shows that 20.8% of the respondents, higher percentage (46.3%) of the respondents opined that malls are very innovative, 25% of the respondents are somewhat innovative 7% of the respondents opined that malls are not so innovative, while 0.9% of the respondents stated that malls are not innovative at all.

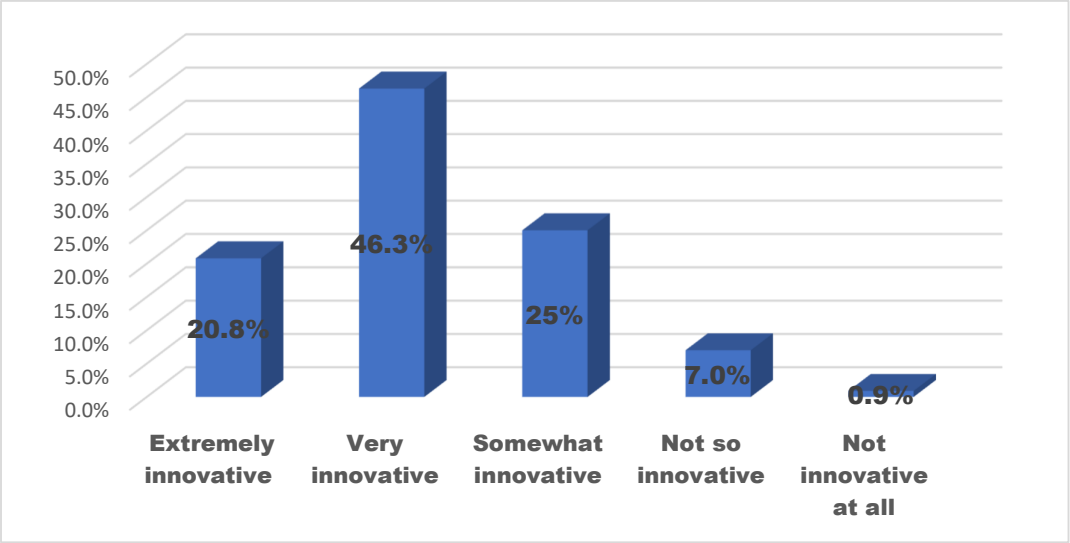

Figure 2: Percentage of respondents' perception of how innovative they think the malls are

Source: Authors' Fieldwork, 2018.

Conclusion

Based on the findings of this article, megamalls have developed due to the shopaholic nature of most urban dwellers. Conducive and serene environment, is one the major factors why people chose megamall against retail shops and open markets which has contributed to the development of the megamalls in no small measure. Be that as it may, that does not mean that urban residents have stopped patronizing retail shops and open markets but they have minimized their patronage of retail shops and open markets and increased their patronage of megamalls. patronise mall. Moreover, shopping in the megamall exposes customers to less stress than shopping in the open market where one has to move from one location to another before one could complete his/her shopping. The stress of moving from location to another under hot weather condition to shop is prevented and needless when shopping in the malls as the whole shopping malls are air-conditioned and conducive.

Customers of megamall chose megamall against other shopping alternatives because megamall have the opportunity to buy several and diverse items in a single shop and this goes a long way to influence their choice of malls than retail shop or open markets. Most times costumers' buy items they didn't even plan to buy in the first place because they saw such items and it was appealing to them. Shopping malls also provide quality and affordable goods at your door step, other rationales include opportunity to have fun/hangout, opportunity to meet different people from different places, serves as recreational centre, gets almost all you want in a single location amongst others. By implication, customers of megamalls are getting value for their time and shopping experience as they visit the malls. Megamalls provides all these opportunities which retail shops and open markets does not offer. It gives them the opportunities to exhibit their shopaholic and ostentatious lifestyles. Although megamall is contributing to the socio-economic development of Ibadan metropolis, the importance and contributions of retail shops and open markets should not be downplayed.

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The Essence of Environmental Safety in Road Transport

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Abstract

Environmental safety is a vitally important issue that should be taken into account during human economic activities, including road transport. The objective of the article is to present the threats related to the harmfulness of pollution and noise emissions caused by road transport. An attempt was made to indicate pro-environmental solutions within the transport policy in Poland and the entire European Union.

Keywords: Gas Emissions, Noise, Sustainable Development, Environmental Safety

Introduction

Human need for movement resulted in the invention of car in the 19th century. It is historically accepted that the first in the world car propelled by an internal combustion engine was a vehicle created by Carl Benz in 1885. On a specially designed chassis, a single-cylinder four-stroke engine was horizontally mounted. The fascination with the automotive industry has been the driving force of continuous progress.

The development of cars with combustion and electric engines continued towards the end of the 19th century. The first electric car was built in 1834 by an American, Thomas Devenpont. The vehicle was powered by Volta's galvanic cell. The first electric vehicle in use was a tricycle equipped with 45kg batteries. (https://businessinsider.com.pl/motoryzacja/pierwszy-samochod-elektryczny-na-swiecie-historia-motoryzacji/2jxm5w0) The change occurred in 1859, when Gaston Plantė invented the lead-acid battery. (http://info-car.pl/infocar/artykuly/historia-samochodu-elektrycznego.html)

In the late 19th century, the importance of two-track internal combustion vehicles continued to increase, and the interest in electric ones began to decrease. The discovery of new crude oil deposits largely affected the development of the refinery industry which resulted in a decrease in petrol prices. Consequently, increasingly more petrol stations were built. The growth of oil industry stimulated also the development of the automotive business. More comfortable cars with more efficient engines began to be designed and manufactured. The growth of electric cars was much less dynamic. The works on electric vehicles began to progress soon after 1945. In 1959, Henney Kilowatt introduced an electric car based on transit technology. Kilowatt's maximum speed was 96 km/h and it had a one-hour autonomy on a single charge. (https://businessinsider.com.pl/motoryzacja/pierwszy-samochod-elektryczny-na-swiecie-historia-motoryzacji/2jxm5w0) At the end of the 1990s, the automotive industry suffered from the effects of the fuel crisis. The increase in air pollution with exhaust gases and the growing environmental awareness of potential buyers made the manufacturers reconsider the concept of electric cars. General Motors engineers were the first to present in 1990 the GM Compact model design, and soon the manufacture of EV1 began. The maximum speed of EV1 was 129 km/h. That model could travel about 257 km on one battery charge. At the end of the 20th century, some other electric cars were introduced, including Škoda Favorit ELTRA, Honda EV Plus or Chevrolet S10 EV, but the problem of charging outside cities continued to exist, since the batteries of those models were sufficient to travel a distance of only 100 to 180 kilometres. Electric cars were also a more expensive than the internal combustion ones. All that meant a small number of buyers interested in cars with

that kind of drive. In 2008, the Tesla Roadster was introduced which was the first mass-produced car equipped with lithium-ion batteries, with a maximum speed of 210 km/h and a range of 354 km.

(https://www.politykainsight.pl/_resource/multimedium/20106685). That gave rise to the development of electric cars. (http://info-car.pl/infocar/artykuly/historia-samochodu-elektrycznego.html) In the recent years, electric vehicles have become increasingly practical means of road transport. In 2012, the presentation of the Tesla S model by Tesla Motors was a game-changing development. The maximum speed of the most powerful version is 249 km/h and it is able to cover a distance of 509 km. Moreover, the Tesla S has room for seven passengers. All those features have caused Tesla S to find a large group of buyers despite is high price of USD 70,000 (ca. PLN 276,000) (http://info-car.pl/infocar/artykuly/historia-samochodu-elektrycznego.html). From that moment on, the number of electric-driven passenger cars began to increase.

The figure below shows the evolution of cars over more than 100 years. Not only the looks, but also the manufacturing technologies have changed.

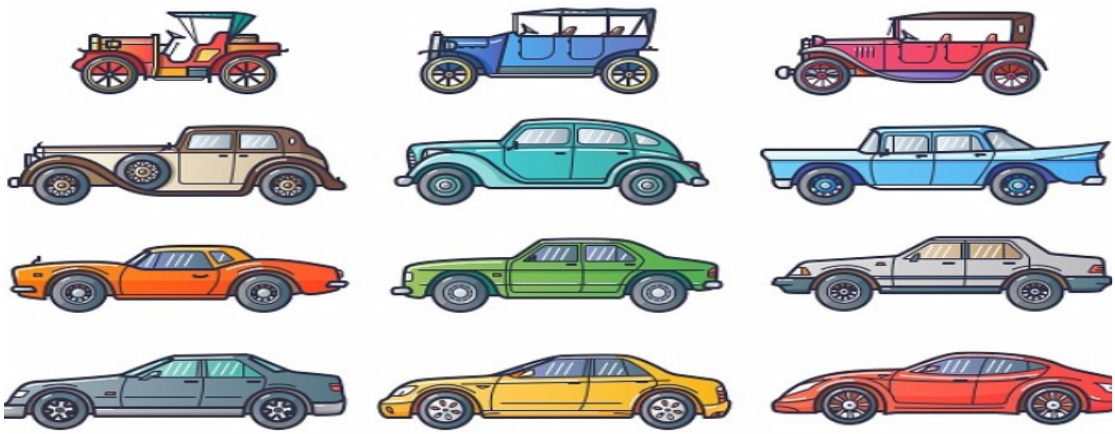

Fig. 1: Evolutionary path the cars have gone through
(https://www.howardsgroup.co.uk/news/group/how-much-have-cars-changed-in-the-last-ten-years)

The dynamic growth of the automotive industry was not only quantitative but, above all, qualitative, i.e. innovative design solutions were constantly developed and implemented, new materials and components were added, and technologies and various operation modes were introduced. New solutions were also introduced to the traffic management.

Safety problems associated with the use of cars have not, for many years, been taken into account which took a toll of the environmental pollution. Therefore, saving the environment from the effects of using motor vehicles started from protection against emissions from cars.

Promoting proper communication attitudes in urban communities is a long-term process. (Świniarska, 2016) This means that it is impossible to immediately depart from internal combustion vehicles in all countries and replace them with the greener ones. An important aspect is also to spread environmental awareness in society, it is hence essential to consistently promote proper education.

Threats Related to Road Transport

The main threats related to environmental safety in road transport relate to air pollution, including exhaust emissions.

As it is well known, the exhaust gases emitted by motor vehicles, especially heavy goods vehicles, release to the atmosphere highly toxic and hazardous substances which have a destructive effect on

the entire ecosystem. The condition and amount of air pollutants from road transport depends, among others, on the type of fuel, type of vehicle and its technical condition. Air quality is affected by so-called primary pollutants, which include nitrogen oxides, carbon dioxide, sulphur dioxide, lead and suspended dust. (Walendzik, Łepkowski, Nowacki, 2016)

The main issues faced by highly developed countries include primarily reducing the overall level of carbon dioxide emissions and the global consumption of non-renewable energy sources such as crude oil, coal and natural gas. The current transformations tend mainly to reduce burning of fossil fuels, as it leads to emission of harmful compounds into the atmosphere. This is particularly important in large cities due to high pollution and traffic intensity, as well as exposure of numerous groups of people living in city centres. The presence of harmful gases and dust in the atmosphere, e.g. carbon dioxide, can have serious health effects, such as cardiovascular or respiratory diseases and contribute to increasing the number deaths, particularly among older people. (Fuć, Lijewski, Siedlecki, Gallas, Szymlet, Sokolnicka, 2017) In addition to carbon dioxide particles, the real threat is posied by the suspended dust PM10 and PM2.5.

Note that the PM2.5 is most dangerous to human health.

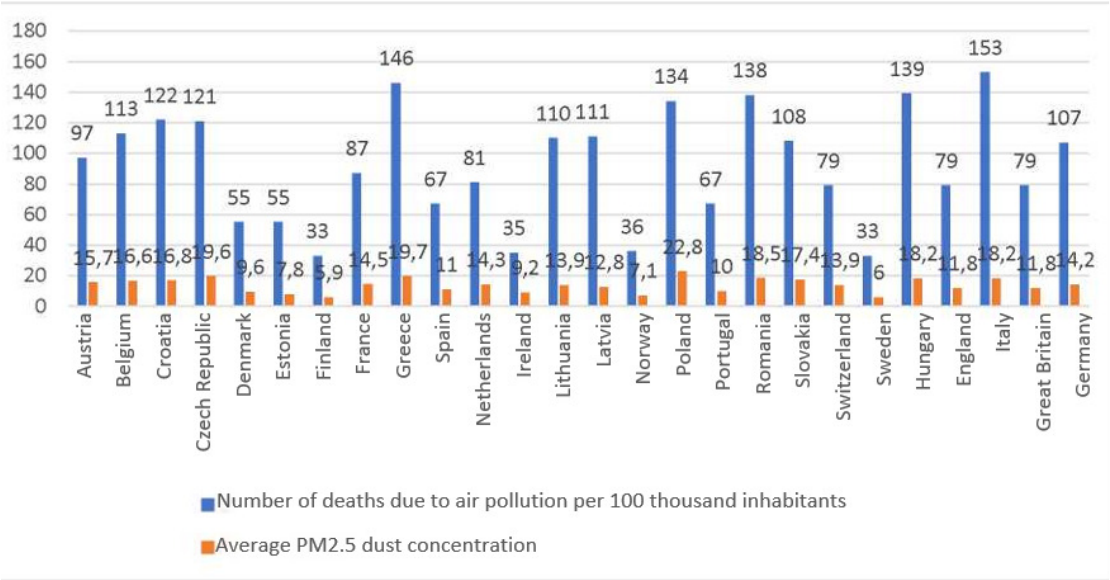

Fig. 2: The number of deaths due to air pollution per 100,000 inhabitants and average PM2.5 dust concentration in European countries in 2016. (http://wyborcza.pl/7,75400,21017490,blisko-50-tys-polakow-co-roku-przedwczesnie-umiera-z-powodu.html)

As shown in the graph above, high concentration of the PM2.5 dust (fig. 2) affects the number of deaths. For example, in Poland, 134 people per 100,000 die due to air pollution. The concentration of harmful dust in Poland is also very high. In 2016, eleven Polish cities, Rybnik, Kraków, Nowy Sącz to name a few, ranked among 15 most polluted cities in Europe because of the PM2.5 dust, which is a very negative result (fig.3).(https://wyborcza.pl/7,75400,21017490,blisko-50-tys-polakow-co-roku-przedwczesnie-umiera-z-powodu.html?disableRedirects=true)

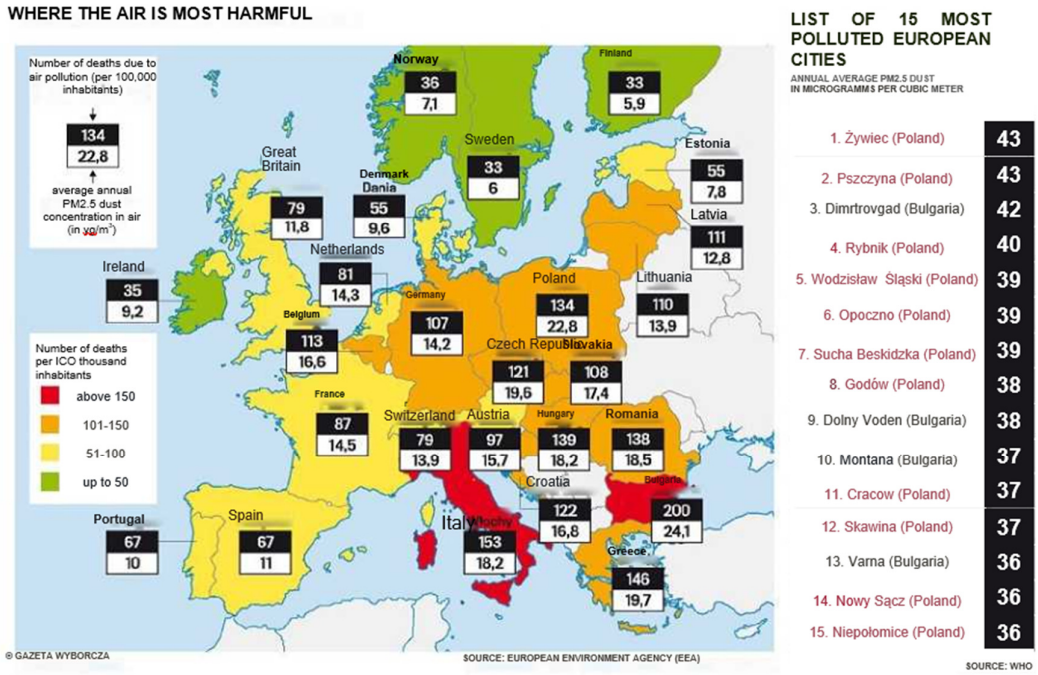

Fig. 3: 15 most polluted cities in Europe

(https://wyborcza.pl/7,75400,21017490,blisko-50-tys-polakow-co-roku-przedwczesnie-umiera-z-powodu.html?disableRedirects=true)

In Northern Europe, the concentration of dust is much lower, in particular in Scandinavian countries, e.g. Norway and Finland, while it is increasing in Southern Europe. The number of deaths due to air pollution is the highest in such countries as Greece and Italy.

Current European statistics show that, despite significant reductions in emissions over the past decade, air pollution from all sources is to blame for a large number of premature deaths.

Car exhaust gas is a source of nitrogen oxides, dust (PM10 and PM2,5), sulphur oxides, carbon monoxide and various heavy metals, e.g. cadmium, lead and mercury. Moreover, chemical precursors in exhaust gases may react in the atmosphere, leading to the formation of ground-level ozone. As tires and brake pads wear out, particulate matter and heavy metals are released into the atmosphere which, after falling on the road surface, can thrown into the air again by the passing cars. Exposure to those pollutants can have very specific health effects, while, in general terms, they affect body organs, nervous system and blood circulation, causing or exacerbating such ailments as lung diseases, leading to breathing difficulties, and also heart attacks, asthma, anxiety, dizziness and fatigue.

In 2016, in the European Union, the transport sector accounted for a 25.8% share in the greenhouse gas emissions.

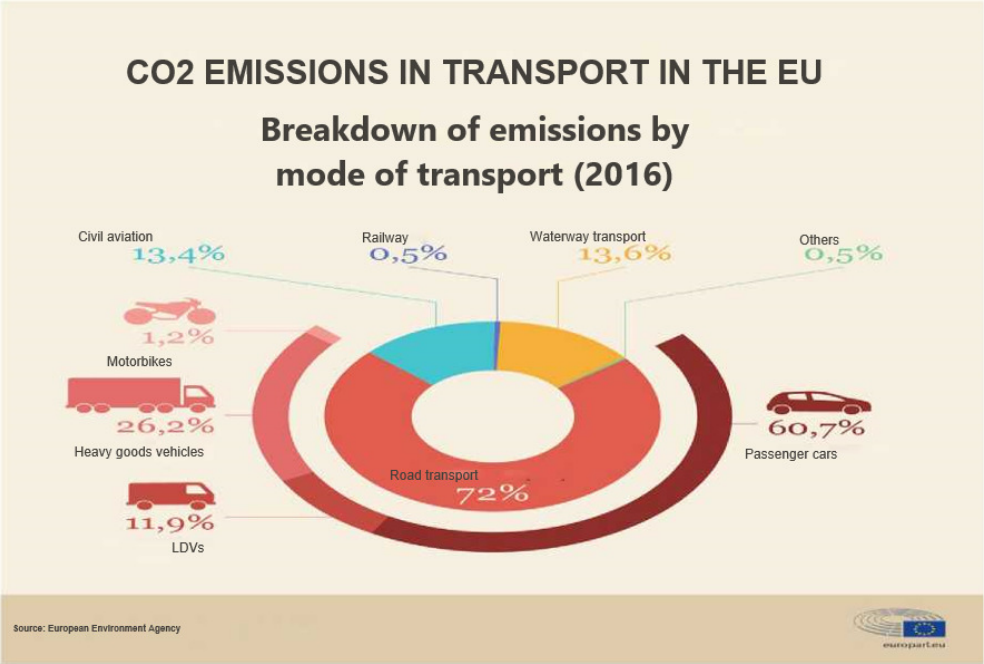

Fig. 4: CO2 emissions in transport in the EU
(https://www.europarl.europa.eu/news/pl/headlines/society/20190313STO31218/emisje-co2-z-samochodow-fakty-i-liczby-infografika)

The road transport generated around 72% of total greenhouse gas emissions from transport (including international air transport). 60.7% of the gases were emitted by passenger cars, and 38.1% by goods vehicles and buses. (Gis, 2017) Although in 2016, compared to the previous year, greenhouse gas emissions from international transport in the EU decreased by 1.1%, by 2050, they have to be reduced by more than 28% in order to achieve the objective of reducing that emission by 40% compared to the 2005 levels. (https://www.eea.europa.eu/data-and-maps/indicators/transport-emissions-of-greenhouse-gases/transport-emissions-of-greenhouse-gases-10)

Exhaust gas generated by vehicles, including airplanes, trucks or passenger cars, are toxic compounds adversely affecting the natural environment and human health. Car exhaust gases are also very harmful due to rapid spread at low altitudes and in high concentrations of toxic particles, which means that people are exposed to them directly. Air pollution brings also detrimental effects on the condition of buildings, crops and forests.

Another significant aspect is the problem of noise emissions, as it may affect the well-being and lead to changes in human behaviour.

The main causes of exposure to excessive noise in the vicinity of roads include:

- heavy traffic of vehicles;
- large percentages of heavy goods vehicles in traffic;
- high vehicle speeds;
- poor technical condition of road surfaces;
- lack of proper categorisation of the road network and too late identification of the problem of accessibility regulation – a large part of national roads pass through towns in the vicinity of densely populated residential areas;
- ineffective urban planning and lack of explicit provisions in the spatial planning legislation to take into account the noise criterion (Gierasimiuk, Motylewicz, 2014).

Individual means of transport emit different levels of sound, e.g. (Leśnikowska-Matusiak, Wnuk, 2014):

- train 79-95 dB;
- airplane 74-108 dB;
- tram 70-95 dB;
- tractor 85-92 dB;
- bus 86-92 dB;
- goods vehicle 83-93 dB;
- passenger car 75-84 dB;
- motorbike 79-87 dB.

Exceeding the 55 dB threshold has adverse effects on health. It causes mainly loss of concentration, fatigue, headaches, irritability, blood circulation problems and insomnia. (Łebkowski, 2016) Prolonged exposure to noise during the day can lead to an increase in blood pressure and cardiovascular diseases. Majority of Europeans live in urban areas near transport infrastructure such as airports or motorways, so most of them are exposed to noise. A significant number of people, including school children, are also affected by noise in addition to road noise caused by flying planes near airports. (https://www.eea.europa.eu/signals/signals-2018/articles/every-breath-we-take).

Road transport generates noise. It is estimated that, in Europe alone, around 30 million people are exposed to excessive noise. (Walendzik, Łepkowski, Nowacki, 2016)

The noise level should not exceed 85 dB, therefore in areas where it exceeds or remains within that limit, the expansion of zones protecting people from harmful noise should be limited. (Czerwiński, Strzelecka, Bucza, Pecyna, 2018).

It is not only people who are exposed to noise. It is worth noting that the existing communication routes form a complex network that extends throughout the country. Therefore, it crosses the areas inhabited by animals. Noise changes the behaviour of birds as well as other animals. Construction of roads near animal habitats puts their lives at risk, e.g. they are at risk of being hit. (Leśnikowska-Matusiak, Wnuk, 2014)

Causes of pollution in road transport

The reasons for the significant percentage of road transport in emissions, i.e. so called linear emissions, include a rapid increase in the number of cars, poor technical condition and age of vehicles, removing diesel particulate filters (DPF, FAP) from new diesel vehicles, ineffective control of exhaust gas emission, and the lack of adequate road infrastructure.

Pollution caused by transport is much more harmful to people than that from industry as it spreads in high concentrations at low altitudes in the immediate vicinity of people. One of the main sources are cars with diesel engines, but it is worth mentioning that only a small percentage of dust generated by cars is the so-called pipe emission, a dozen percent of it comes from abrasion of tires and brake pads, and as much as 80% is the secondary dusting, i.e. picking up dust deposited on the road surface by car traffic.

On a national scale, road transport is accountable for approximately 5-15% of all pollutants, mainly soot, particulate matter, nitrogen oxides and carbon monoxide (in areas with heavy traffic those values are higher, e.g. in Warsaw transport is responsible for over 60% of harmful gas dusts). (https://superflavon.eu/unikanie-zanieczyszczen) There are numerous reasons for the road transport contribution to emissions. Unfortunately, there are increasingly more cars on Polish roads and, moreover, older cars, which unfortunately has a huge impact on the emission of toxic gases.

Strategy of sustainable development of transport in Polish and European policies

In the framework of transport policy, the European Union undertakes actions to counteract the negative effects of the transport sector, which is a sort of a compromise between the environmental, social and economic topics. As part of such activities, detailed methods to reduce negative impacts of transport on the environment by 2050 were presented.

(https://ec.europa.eu/commission/sites/betapolitical/files/biala_ksiega_w_sprawie_przyszlosci_europy_pl.pdf)

The European Union has first of all set the objective of reducing the global climate changes so that the temperature rise does not exceed 2°C compared to the period before the industrial age. To meet that objective, the level of emissions by 2050 has to be cut down by around 90% compared to the 1990 levels. (Motowidlak, 2015)

In order to achieve the necessary emission reductions, policies and actions should be implemented at the EU Member States level in all sectors of the EU economy. While emissions from other sectors are decreasing, road transport is one of the few industries where emissions have rapidly increased. The road transport sector is in the second place among those emitting the most greenhouse gases within the EU, and emissions from this sector, including cars and delivery vehicles, are still growing. Further increase in emissions from road transport can significantly weaken the efforts of other sectors to combat climate change. To counteract that, in a document endorsed in 2011, a strategy was set out to achieve a 60% reduction in greenhouse gas emissions in transport by 2050. Those challenging objectives require appropriate and rapid actions on many levels, including continued decarbonisation of road transport. To accelerate and support those activities, the European Union has developed the recommendations and guidelines planned for 2020 to achieve the target reduction of CO_2 emissions from new passenger cars and new delivery vehicles.

Changing economic models towards more efficient use of natural resources and reducing greenhouse gas emissions has become one of the key challenges of the civilisation. Despite the uncertainty accompanying the long-term forecasting and the increasingly widespread belief of the international community that, without transformation of economic models of the use of resources, including natural resources, the global economy will be increasingly exposed to the consequences of climate change, irreversible loss of some resources and rising prices of energy resources. Despite the controversy regarding human impact on climate change, it is difficult to question the position that reasonable management of natural resources and environmental protection are the prerequisites of sustainable development. (Motowidlak, 2015)

The European Union supports international efforts to solve such problem. As part of those international aspirations, the EU has implemented a policy to facilitate the transition to a low-carbon economy.

In the context of those and other proposed solutions, emissions of air pollutants from transport are expected to continue to decrease which will be beneficial to human health. Nevertheless, 87-90% of city residents in the EU are still exposed to high levels of air pollution which WHO considers harmful. Meanwhile, it is estimated that reducing those levels of pollution in the case of the PM2.5 dust would avoid about 144 thousand premature deaths. In the long run, further integration of measures and political actions in Europe will be essential to reduce air polluting emissions and create conditions for improving citizens' health, as well as to avoid the effects of momentary high concentrations of pollutants similar to those to have occurred in London and Paris.

The world is slowly moving away from internal combustion cars. From 2025 on, it will not be permitted to sell them in Norway and from 2030 in Sweden or Ireland. Currently in Europe, diesel cars are being slowly eliminated. In Hamburg, streets have been marked out with restricted access of diesel vehicles not meeting Euro 5 standards. (Kozłowski, 2019) Euro standards are European

emission standards which are different for petrol and different for diesel engines. They were introduced in 1992. Today, Euro 6 (established in 2013) is the valid standard. Euro standards are primarily intended to reduce emissions of particulate matter PM and other harmful compounds. (Rzędowska, 2018) Reducing emissions from transport would certainly improve air quality, particularly in urban areas.

Even more challenging is the noise situation. Noise in Europe is a widespread harmful factor, and the quality of the European sound environment will continue to be threatened by economic development, industrial production, urbanisation and related transport needs in the future. This will adversely affect the health of Europeans. The greatest threat will continue to be the noise emitted by road traffic, while the noise associated with airport operations will continue to be a nuisance to residents in the immediate vicinity. Improving the reporting on noise is essential to obtain a more holistic insight into the effects of noise on health.

While encouraging countries to further develop noise action plans, the focus should also be on reducing noise at the source, which is a far more effective way of addressing the problem. (Bruyninckx, 2018)

Noise and exhaust gases have harmful consequences for human health and the environment. The EU Member States endeavour to ensure that the new laws being implemented take into account aspects related to environmental protection and sustainable development. However, the continental Europe is a small part of the entire globe so, in order to actually reduce the level of pollution on a global scale, close international cooperation of all countries is essential.

Potential for Limiting Pollution in Road Transport

The society should play an important role in developing transport policies, and the planned transport network should also take into account protected areas, in particular national parks, landscape parks and other natural values. An example of that is building the TEN-T transport infrastructure network where the EU policy emphasises the issues related to biodiversity and protection of the nature. During road construction, tunnels or footbridges are also built to allow animal populations to move across transport routes.

Many cities in Poland and throughout the EU encourage the citizens to change cars to bikes. Care is also taken about the public transport as an alternative to the use of passenger cars. Examples are mobile applications for ticket sales, WiFi on buses or all-day tickets.

There are also websites, e.g. promoting car sharing instead of driving alone, advertising the possibility of partial reimbursement of the cost of transport from those travelling in a similar direction. Unfortunately, people are reluctant to implement changes which often lower their present life comfort. One of the possibilities is also to restrict entry to cities, which may force the public to change their means of transport, namely the passenger cars, to public transport.

The use of older cars, without the appropriate catalysts and exhaust gas filters, could also be prohibited or, following the example of the Chinese authorities, introduce financial penalties for those who heavily pollute the air, which is inextricably linked with a ban on using cars on particular days of the week. However, the constitutions of democratic order states do not allow for restricting human freedom. Citizens should not be deprived of their right for transport. The only solution to this difficult situation is therefore to improve this particular sector of transport.

The first aspect to improve could be a more effective travel planning in a logistics context. The creation of a global system to manage the exchange of goods between different carriers and between different rolling stocks would also be beneficial for the reduction of empty runs, which would directly affect environmental pollution.

The work on expanding the possibilities of greater use during intermodal or multimodal transport, i.e. combining many modes of transport, e.g. road transport with rail transport, where rail transport would be used on long distances of the planned route, and road transport only at the initial and the final sections. In Poland, unfortunately, there are limited possibilities of using multimodal or intermodal transport. One of many reasons is the insufficient number of rail connections between cities, as well as the poor technical condition of the railway infrastructure. In addition to rail transport, transporting containers on barges could also be considered, but there is currently no sufficiently upgraded infrastructure available in the country, e.g. channels that would regulate water levels throughout the year.

Analysing the logistics solutions, an important aspect of road transport organisation is continued optimisation of routes. In their work to optimise truck traffic, logistic staff of large corporations or smaller enterprises should also take into account the environmental aspect but, as it is commonly known, the crucial factor in choosing a route is primarily lower delivery cost, time and end customer satisfaction. However, there are new opportunities for logistics specialists in the field of road traffic optimisation, e.g. the adaptation of urban transport to the needs of society, e.g. closing down rarely used bus lines on an ongoing basis, and increase capacity of those used more frequently, which could reduce empty bus runs at times when the demand for given lines drastically decreases. Due to the need to create an overall bus and tram route schedule, it is impossible to introduce so flexible departure plans without changing the entire public transport management system in Polish cities.

Another category in which enterprises can have their contribution to the reduction of pollution in road transport is upgrading their transport fleets. This is associated with high financial outlays, however, corporations are able to allocate funds for such purposes. An argument that speaks for it is that older vehicles may become more expensive to maintain due to the environmental standards increasingly enforced and implemented by the EU, which can make the cost of transport dependent on the amount of exhaust gas emitted by a given type of vehicle. Although newer cars are more expensive they are equipped with platinum catalysts and have engines of a better design (Dybalski, 2018), while trucks emit various chemical pollutants to the atmosphere, so increasing the number of new vehicles on the streets could bring more satisfying effects.

An interesting fact about the reduction of harmful factors in road transport is the innovative approach to road construction initiated by the Dutch in the city of Krommenie. The road was commissioned in November 2014. Photovoltaic panels were used on the pavement surface.

(https://www.salon24.pl/u/energetyka/953874,w-europie-powstaja-drogi-z-ogniw-fotowoltaicznych-czy-budowanisolarnej-drogi-sie-oplaca) Although it does not directly reduce the CO_2, SO_x and NO_x or PM emissions, the use of solar energy for powering roadside lights and the nearby homes is important in the overall energy balance of the region. The more clean energy is produced using solar radiation, the more the effects of burning fossil fuels and refined petroleum products can be reduced. Moreover, the technology that uses the pressure of passing vehicles on the road to generate energy can be implemented, using piezoelectric materials which produce electric charge carriers under stress. (Stramberky, 2015/2016) Conceptual work is underway and the effects would be similar to those of the PV panels.

Noticeably, there are links between environmental protection, power engineering and road transport thanks to which such activities can contribute to an increase in energy security, reduce the level of atmospheric pollution, and increase public awareness of eco-related topics.

A promising proposal of a solution to the current situation in road transport is also the use of alternative fuels. The automotive industry is currently focusing on combining the benefits of using classic diesel engines in turns with electric motors, but attention should also be drawn to such fuels as hydrogen, which can be used for direct combustion as well as for the direct production of electricity in fuel cells, which can propel electric motors.

Another eco-friendly solution are electric (zero-emission) cars. Electricity can be generated from biomass, fossil fuels or renewable energy sources (e.g. wind). The drawback of electric vehicles, however, is long battery charging time, which requires frequent and long stops, particularly on longer distances. In 2015, electric cars in Poland accounted for an imperceptible 2% of the market, much less than in such countries as Germany, Sweden or Norway. The reasons for such a small percentage include high operating costs of these vehicles and a small number of charging stations, particularly in Poland. Those cars also have a shorter range than the traditional internal combustion ones. (https://www.autotesto.pl/blog/najwazyszne-zalety-i-wady-aut-elektricznych/, 2018) Owners of electric cars in Poland and other European countries have numerous benefits, e.g. in some cities, electric car owners are offered free parking at the city car parks, access to areas restricted for other vehicles or using lanes for public transport, e.g. buses. However, the price of electric cars and a small number of charging stations (although it is expected to increase within a few years) are still among the factors inhibiting the increase of the percentage electric cars in the overall number of vehicles. It is therefore possible to focus more on the use of hydrogen in fuel cells. As a rule, this solution requires installation in the car of a set of cells with a capacity of about 100kWe (equivalent to 130 HP) along with a set of cylinders for compressed hydrogen, which allows for travelling a distance of 500 km. It is a technology that does not release exhaust gases. The only limitation to its widespread use still too high price of cells and uncompleted research stage. If the road transport management system could be combined with hydrogen powered vehicles, a road traffic program could be created in which cars would run on specific routes between hydrogen charging stations and could transport people and cargo at the same time. It is the cleanest and most economically viable solution due to the lack of consumption of fuels which release harmful compounds in the combustion process, and a vehicle traffic optimisation solution. (Pater, 2016)

Pro-environmental activities also include introduction of new car manufacturing technologies, making them more economical, safer and more environmentally-friendly. To this end, hydraulic systems are replaced by more efficient electrical and electronic solutions which eliminate the need for fluids, oils and have no leaks. New cars use increasingly less fuel and are equipped with many comfort solutions (e.g. electronic control of the braking system and ABS drive mechanisms, electronic power steering, EBS electropneumatic brake control, GPS system). In addition to that, works are underway to improve fuel efficiency and minimise exhaust gas emissions, as well as to equip vehicles with comprehensive pollutant removing solutions and a new generation of on-board diagnostic systems reporting e.g. when the vehicle exceeds air pollution standards, analysing the composition of exhaust gases and liquids to indicate the need of an inspection.

One of the ways to reduce the adverse impacts of road transport are also appropriate legal regulations regarding, among others exhaust gas purity standards or fuel consumption checked during the vehicle technical inspection. To register a new vehicle, the OBD II on-board diagnostic system is required and it should also check the quantity and quality of exhaust gases emitted by motor vehicles and control engine operation.

Transport infrastructure is also an important issue. Due to the increasing traffic intensity, there is a need to build and maintain good technical condition of transport facilities (filling stations, service and repair workshops) and roads (mainly bypasses and motorways to take over the heavy goods traffic), which involves both costs and excessive noise. Some countries solve this problem partly by developing cleaner, cheaper and safer rail transport. For example, in Switzerland, in order to promote railways, a mandatory vignette was introduced and fees fordriving to intermodal terminals were withdrawn, driving at night, Sundays and holidays was banned, and part of the receipts from road tolls is used for financing railway infrastructure and protection from noise.

In Austria, however, road carriage of a selected groups of goods is prohibited, and in Tyrol, the speed on motorways at night is limited to 60 km/h. Driving at night and on bank holidays has also been banned (depending on the state), a driving ban for cars with trailers and for trucks put into service before 1992 has been introduced, and a weight limit of 38 tons has been imposed on trucks.

In Germany, the role of rail transport has been strengthened by increasing the capacity on lines important for goods carriage, a special fund has been created to support the construction, extension and restarting of private sidings (financing up to 50% of investment costs), restoration of infrastructure for goods carriage to distances over 50 km is co-financed, subsidies are granted for the construction and development of transhipment facilities, and motorways tolls have been introduced with the intention of extending them to all roads. (UTK, 2017)

The last example of activities reducing harmful factors, e.g. high noise levels, are sound absorbing screens built along motorways and expressways, however, the activities intended to suppress noise are not yet sufficient. There are far less of them than those aimed at eliminating exhaust gases.

Conclusions

Environmental pollution is a global problem nowadays. It has adverse effects on human health and, according to environmentalists, it may also threaten the existence of life on our planet in the future. Transport, including the road transport, is among the factors contributing to air pollution. However, the need for the use of transport is inevitable People nowadays travel on shorter or longer distances using various means of transport. Therefore, actions should be taken to minimise their negative impact on the natural environment and human health. They can include the implementation of modern technologies for reducing emissions (hydrogen-powered cars or hybrid vehicles) and a common and unanimous European policy on sustainable transport.

Introducing modern environmentally-friendly solutions also requires a change in society's thinking and attitudes. The public should be made aware of the need to take care of the environment, which may be reflected by the use of public transport or city bikes. Promoting the public (urban) transport can significantly reduce the environmental impact of cars. However, this requires making the society aware of the benefits of caring for the environment, but also of the need for such activities, as further degradation of the environment will have a negative impact on the future generations. Regulations aimed at protecting the environment, introduced by individual countries or the entire European Union, should not be implemented as the necessary evil, but considered as a manifest of care for our future.

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Intellectual Rent as A Necessary Element in The Transition to Noonomics

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Abstract

Socio-economic trends around the world are determining the need to move towards innovative technologies that can optimize production processes and make significant shifts in the structure of the economy. Unfortunately, Russia's technological development, despite significant progress, leaves much to be desired. To reduce the scientific and technological backwardness it is necessary to increase the intensification of intellectual processes taking place in the economy. The aim of the study is to consider existing opportunities to increase the level of intellectual rent and its impact on the transformation processes in the economy and society. It is assumed that such processes will allow in the future to create a completely new society, in which maximization of knowledge and satisfaction of non-economic needs will become the main dominants. The research is based on the analysis of scientific works on intellectualization, noonomics and quasi-rent. The urgency of forming a sufficient level of intellectual rent is increasing day by day. It is through sustainable growth of its volume that it is possible to build a knowledge economy capable of competing in the world market. Nevertheless, without government intervention and effective economic policy it is impossible to increase the intensity of intellectualization, which will provide a technological breakthrough and, in the future, will create opportunities for a gradual transition to innovation. It can be concluded that the departure from material production is the only rational way of long-term development of human civilization, and the steady increase of intellectual rent will be the first step to the transformation of not only the existing system of management, but also social relations in general.

Keywords: Intellectual Rent, Noonomics, Knowledge-Based Economy, Intellectual Capital, New Industrial Society, Intellectualization, Knowledge Intensity, Nooproduction.

Introduction

Economic relations in the conditions of globalization are unstable, and their dynamics lead to unpredictability of forecasting market environment. This fact indicates the need to maintain the competitiveness of the national economy, which cannot be ensured only by the material and financial factors on which the rational economic theory is based.

Considering the practice of economic development of post-industrial countries, it is necessary to note the fact of obtaining additional income and super incomes by introducing intellectual property objects

into economic turnover. All over the world there is an upward trend in the use of intellectual technologies in economic activity, commercialization of which brings not only increased profitability, but also allows to obtain additional competitive advantages in the market environment (Degtereva et al, 2019; Popkova, Sergi, 2020).

It can be assumed that the trends of not only social and economic but also universal development determine the necessity of transition to innovative technologies, which will make the first step to qualitative structural changes in the economy and society. It is impossible to optimize production and build relationships based on non-material components without activating innovation processes at the national level.

Considering the Russian aspect, it is necessary to note strong scientific and technological backwardness of the domestic economy. It is considered that significant progress is observed in the technological development of Russia, but from the author's point of view, the observed macroeconomic dynamics shows the presence of many problems, without the solution of which there is little opportunity to increase the intensification of intellectual processes occurring in the economy.

The relevance of the study lies in the need to find ways to bridge the gap and dependence on more developed countries. To this end, it is proposed to consider possible ways to increase the level of intellectualization as a way to achieve economic competitiveness and ensure better quality of life. Intellectualization of the economy leads to the formation of intellectual rent, which represents additional profit and super profits through the use of human capital, knowledge, innovation and other achievements of technological progress (Jona-Lasinio et al, 2019; Quarchioni et al, 2020).

However, it is necessary to realize that the reduction of scientific and technological backwardness and innovative development of social and economic relations should not be the ultimate goal. It is necessary to think over further ways of development, which may become a transition to innovation.

The conditions of modern production are undergoing serious transformations and affect the qualitative increase of such elements as "intensity of knowledge" and "capacity of knowledge". With the increasing intensity of knowledge use in the economy, the boundaries between different production operations at the expense of intellectual technologies and human capital are eroding. In turn, the increase in the knowledge capacity of the economy is due to a combination of factors such as the revolution in information and communication technologies and the acceleration of scientific and technological progress (Shpurov, 2016; Bodrunov, 2018).

The authors have suggested that the processes of intellectualization will allow in the future to create a completely new society, in which maximization of knowledge and satisfaction of non-economic needs will become the main dominants, which in the scientific environment is commonly called the new industrial society of the second generation.

Such trends should lead to changes in the structure and content of the needs of individuals, as well as in the way production processes are organized. The displacement of human resources from the sphere of material production should lead to a transformation of economic rationality, which today does not allow for many externalities to be taken into account, such as environmental degradation under technological pressure, the widening gap between the poor and the rich, the inability to meet the growing needs of the population, a demographic disaster (uncontrolled fertility in undeveloped countries and the extinction of the population in advanced intellectual countries) and many others.

On the basis of the listed factors it is necessary to provide a non-economic way of organization of industrial and economic activity, which will be a novelty. In these conditions the production activity will be regulated by people from outside as an external sphere in relation to them. Since human resources should leave the direct production process, then in the future social relations of people will no longer be determined by their participation in production activities (Kondratyev, 2017; Schwab, Werker, 2018; Bodrunov, 2019).

The object of the study is intellectual rent received by the national economy and determines the vector of long-term socio-economic development. The subject of this work is the economic relations arising from the use of intellectual capital at the national level to enhance innovative development.

The aim of the study is to justify the need to increase intellectual rent in order to reduce scientific and technological backwardness and to consider it as a necessary element on the way to a new industrial society of the second generation.

For this purpose, the following tasks are proposed in this paper:

- Consider existing opportunities to improve intellectual rents at the national level;
- to study the impact of intellectual rent on the transformation processes in the economy and society;
- analyze the possibility of transition to a new industrial society of the second generation by obtaining sufficient intellectual rent.

Research Methodology

The research is based on the analysis of scientific works on intellectualization, innovative development, noonomics and quasi-rents. The set of researches will allow to form the material necessary for construction of author's sight at a problem of maintenance of intellectual development and transition to new level of development of social and economic relations.

Many researchers have addressed issues of innovative development, for example, I. Shpurov (2016), J. Albanese (2016), L.V. Nikolova, A.M. Malinin, D.G. Rodionov, M.D. Velikova (2017), I. Rudskaia (2017), D. Mamrayeva, A. Stybaeyeva, L. Tashenova (2018), N. Goncharova, V. Degtereva (2018) and many others. It was found that the formation of an innovation economy is impossible without the use of intellectual capital, which becomes a central resource for digital transformation. The problems of intellectualization were studied by P.P. Vetrenko, E.A. Chernysheva, I.Y. Levitina, O.V. Voronkova, D.G. Mikheeva (2017), E. Zhilenkova, M. Budanova, N. Bulkhov, D. Rodionov (2019), R.V.D. Jordão, J. Novas, V. Gupta (2019) and others. The issues of resource productivity improvement through innovation are presented in V.B. Kondratyev (2017), A. Zaytsev, O. Kichigin, M. Kozlov (2018) and J. Zwiers, M. Jaeger-Erben, F. Hofmann (2020).

Intellectual processes launch processes not only on the economic level, but also on the social level, which leads to the reconstruction of the social and economic formation prevailing in modern society. Most authors consider innovations as a key element of sustainable development of the national economy in the long term. In the future, such relations lead to the formation of a new culture based on non-economic elements, i.e. noonomics.

S.D. Bodrunov (2018; 2019) is engaged in the development of the theory of noonomics and reindustrialization. From his point of view, it is reasonable nouns production that will be the next stage of production development, which will be connected not only with economic aspects of life, but also integrates cultural aspects. Such a relationship can be represented as a sequence (Figure 1).

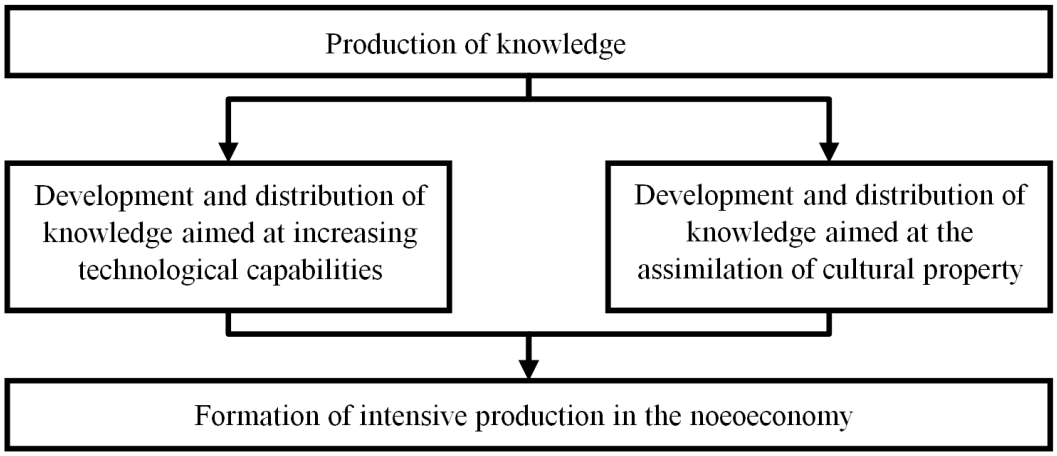

Fig. 1: Production development in novelty

Nononomics is the result of intellectual change. And if such transformations may not lead to the formation of a new industrial society of the second generation, the transition to such a society without intellectual resources is not considered possible in the scientific environment.

The importance of the processes of intellectualization of modern society requires a more complete study of the role of intellectual capital in the development of industrial relations, since increasing the share of the intellectual component is an integral factor in building an innovation economy, as noted in the works of B.V. Salikhov (2018), G.I. Senchenia (2019), D. Rodionov, A. Zaytsev, N. Dmitriev, O. Kichigin (2019), C. Jona-Lasinio, S. Manzocchi, V. Meliciani (2019), E.G. Popkova, B.S. Sergi (2020).

It may be noted that the development of intellectualization requires a significant injection of investment resources. It is the activation of investment processes and the creation of a sufficient level of investment attractiveness makes it possible to create innovations and systematically improve the quality of human capital. Investment issues were considered in the works of such authors as E.A. Avduevskaia, Y.Y. Kuporov, E.M. Chepikova (2018), S.A. Ciupitu, M. Niță (2018), O. Kichigin, V. Degtereva, A. Zaytsev, N. Dmitriev (2019), G. Onofrei, J. Prester, B. Fynes, P. Humphreys, F. Wiengarten (2019).

Competent investment policy in the field of innovative development and ensuring the increase of intellectual components of economic development gives impetus to the emergence of such a qualitative phenomenon as quasi-rent.

Y.V. Yakovets (2003), A.V. Latkov (2006), T.M. Nazarycheva (2013), L. Fishman, D. Davydov (2015), R. Gaisin (2017), Schwab, E. Werker (2018) and V. Degtereva, N. Dmitriev, A. Zaytsev (2019) studied rent relations, intellectual rent and quasi-rentals. Researchers agree that the urgency of forming a sufficient level of intellectual rent increases every day. It is through its steady growth that it is possible to build a knowledge economy that can compete in the world market.

In particular, in book K. Schwab (2017) describes the technological, economic, and social revolution, as well as the main factors shaping the modern post-industrial economy. It is at this level of development of economic relations that intellectual rents are increasing on a larger scale than at the industrial level. The main elements of the post-industrial economy include the high-tech sector, which was discussed in V.A. Plotnikov (2018).

Activation of innovation processes should start at the level of economic entities. For this purpose, it is necessary to monitor the current trends in the field of scientific and technological progress and introduce relevant innovations into production. For example, block technology or corporate

information systems (Nikolova et al, 2017; Ciupitu, Niță, 2018).

The next level is the qualitative development of the intellectual capital of the territorial association. A competent government policy in this area will ensure the reproduction of intellectual resources in the conditions of building an innovation and digital economy (McAdams, 2016; Zhilenkova et al, 2019). We can conclude that without government intervention and effective economic policy it is impossible to increase the intensity of intellectualization, which will provide a technological breakthrough and in the future will create opportunities for a gradual transition to innovation.

Research Results

In the history of human civilization, globalization processes have been of key importance. In different epochs they distinguished their elements of global civilization dimension. Today such element is intellectual capital, which allows to form intellectual rent, which ensures the development of civilization and domination of one nation over another in the global world scale (Yakovets, 2003; Latkov 2006; Gaisin, 2017).

Civilizational development faces many social and economic problems in the modern world that hinder the advancement of the fourth industrial revolution (Fishman, Davydov, 2015). Such problems include:

- crisis of the existing world order due to the complexity of relations between certain geopolitical forces and the existence of regional conflicts;
- Increasing social inequality and social stratification at regional and national levels;
- huge opportunities for technological development, but lack of opportunities to realize this potential and so on.

The presence of many contradictions prevents the formation of intellectual rent. The products produced under the conditions of transformation of economic relations along the intellectual path contain, in addition to the material basis, the so-called "intangible element" - knowledge that is present in all components of the production process, from materials to human labor. Accordingly, knowledge is, along with the material basis, an integral part of the product of production and makes it possible to obtain intellectual rent (Salikhov, 2018; Bodrunov, 2019).

The increase of intellectual rent is suggested to be considered from the point of view of building a modern economic complex, which is considered in Figure 2.

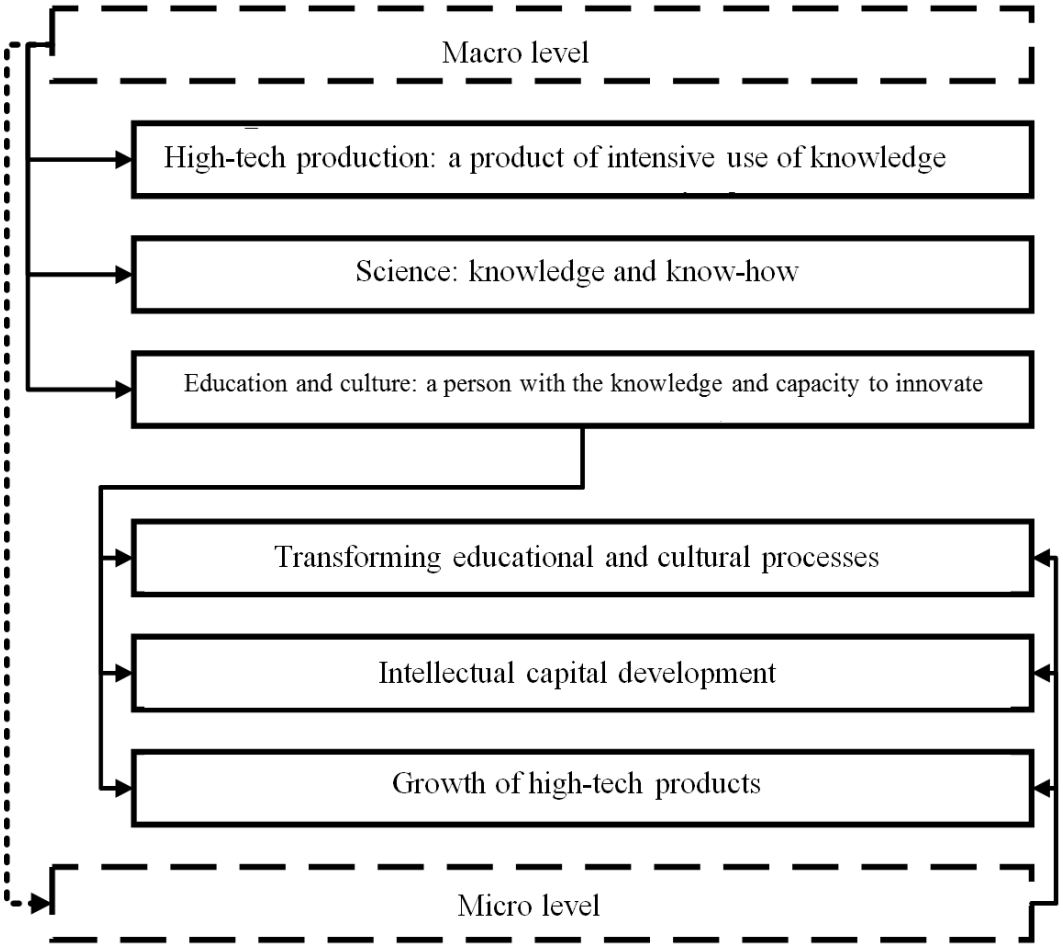

Fig. 2: Development of modern economic complex

On the basis of the given structure it is possible to draw the following conclusion: development of intellectual processes at macrolevel in the field of development of knowledge intensive production, increase in volume of scientific knowledge and educational processes demands attraction of considerable volume of investments. It is the increasing intensity of these processes that makes it possible to obtain intellectual effect at the micro level and transform educational, cultural and other processes of social and economic character (Schwab, 2017; Bodrunov, 2018).

Thus, intellectual rents at the national level can only be achieved with significant investment. Consideration and projection of intellectual rents can be calculated mathematically.

To date, the use of mathematical analysis and modeling has become one of the main forms of economic research. It is correct to speak not just about the application of mathematical achievements in economic science, but to perceive their synergetic interaction as a necessary component for the rise of economic theory to a higher level (Kichigin et al, 2019; Zwiers et al, 2020).

Economic theory in interrelation with mathematical science allows to make calculations and model intellectual rent flows at all levels of management. If it is possible to calculate intellectual rent, it is practically impossible to determine the boundary of its volume for the shift of the economic paradigm.

In order to consider the possibility of raising the level of intellectual rent at the national level, it is proposed to consider the share of "knowledge-intensive" industries in the structure of gross domestic product, as demonstrated in Table 1 (Plotnikov, 2018; Bodrunov, 2019).

Table 1: Share of "knowledge-intensive" industries in GDP structure (2017), %

Industry	Middle G7	Russia
RESEARCH AND DEVELOPMENT	2,6	1,1
Education	6,0	3,5
Information and communications technology	8,0	2,5
Biotechnology and health care	13,0	4,0
Total	30,0	11,0

Based on the tabular data, it can be seen that Russia lags far behind the leading countries in relative terms. It can be said that only sufficient investment in the most significant industries from the intellectual point of view will allow gaining competitive advantages at the level of the national economy.

Activation of innovative processes demands intervention of the state structures both in investment, and in educational processes. If with investments all is clear, questions concerning maintenance of educational processes are poorly studied. In the early stages of education, individuals should develop entrepreneurial competencies and skills necessary for the quality return on human capital in the future. Educational standards in many developing countries, including Russia, do not meet these requirements, which makes it urgent to find a solution in the near future (Vetrenko et al, 2017; Akhmetshin et al, 2019).

Education, science, post-industrialization and other factors should lead to a revolution in social and economic relations, reflected in an increase in intellectual rent. In turn, the sufficiency of quasi-renta will allow the national economy to generate super profits in the long run. However, sustainable development is only possible if a multitude of innovative contradictions are solved, which should be considered in separate territorial units (Rudskaia, 2017; Goncharova, Degtereva, 2018).

Throughout human history, there has been a shift in production processes from material to non-material. Due to the increase in intellectual rent, the development of humanity along the knowledge-intensive path increases, when the share of "knowledge" in production relations exceeds material components (Bodrunov, 2018; Mamrayeva et al, 2018). This fact leads to an increase in the share of intellectual labour in total costs, which is illustrated in Figure 3, where: 1 - knowledge capacity; 2 - material capacity; 3 - fund capacity; 4 - energy capacity; 5 - resource capacity.

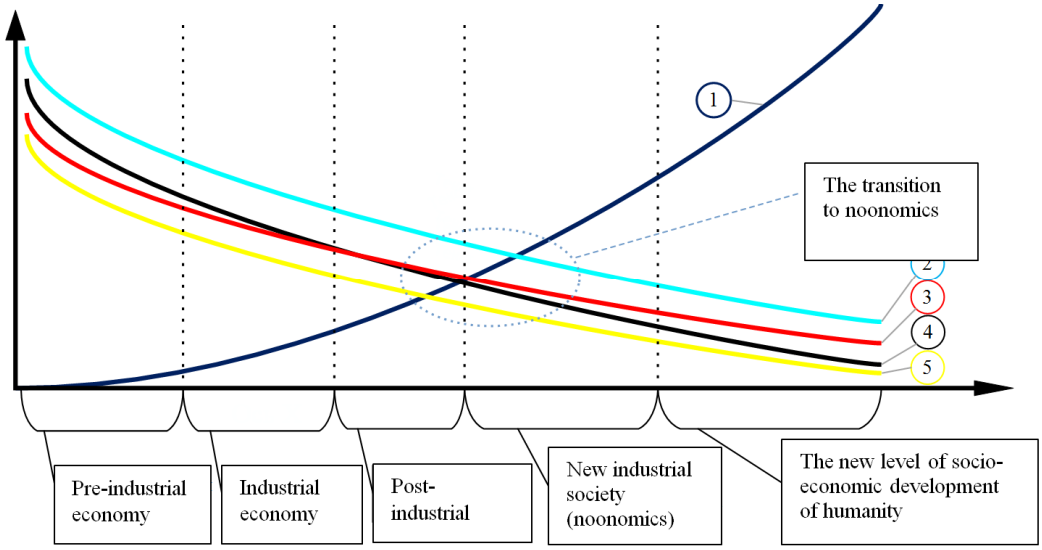

Fig. 3: Changing capacitive parameters in historical process

The structure in Figure 3 is idealized, in practice the boundaries between epochs are very blurred. Unfortunately, the modern humanity is moving towards the rise of more and more needs that do not correspond to human development. Such needs are simulated. Their formation goes along the following chain: 1) satisfaction of needs with reserves; 2) surpluses in satisfaction of needs due to reinsurance and prestigious considerations; 3) consolidation of this surpluses at the expense of market demand bloat; 4) increasing needs that cannot be fully satisfied but require resources (Bodrunov, 2019).

These trends have a strong negative impact on all of humanity. However, management of intellectual processes in the economy will transform social and economic relations in society and will lead to qualitative structural shifts in the economy.

Such shifts are an important element in overcoming many of the crisis factors of civilization's development, for example: uncontrolled growth of simulative needs at the expense of quality needs; increasing man-made threats to the environment; humanity's dependence on technological development; international integration and globalization processes cause serious damage to civilization; the presence of a cultural threat due to a moral shift, and much more.

Control over the movement of social development and the activation of intellectual processes from the author's point of view will allow to move from modern society to the era of nooproduction.

Relationships in modern society are based on the following relationship: Individual → Sphere of production → Individual. Under such conditions, production is a link between individual individuals, which prevents quality development and leads to serious stratification in society.

The era of novelty consists in interconnection of separate individuals among themselves, whereas the sphere of novelty or technosphere is not a link, but a certain control element.

The principal difference between noonomics and the usual system of economic relations is the reduction of people in the process of material production. A possible transition to a new industrial society of the second generation by obtaining sufficient intellectual rent will lead to structural shifts in employment. Such shifts are proposed:

- the development of artificial intelligence technology;
- growing demand for research and development;
- increasing employment in the intellectual sphere;
- the development of robotics;
- reduction in the employment of production workers;
- freeing up work resources.

It may be noted that the release of human resources may not lead to the growth of the intellectual sector of the economy, but may lead to mass unemployment, especially in underdeveloped countries. However, it can be assumed that the qualitative returns from human capital may increase and that intensive production methods may emerge. A shift away from the familiar capitalist way of life and the realization of multiple externalities will lead to increased non-economic needs.

Conclusions and Recommendations

Humanity is in a difficult situation, where solutions to global problems can no longer be postponed for the future and maximum efforts must be made to create mechanisms for their resolution. Progress in science and technology could be an important factor in the transition to a new way of life.

From an author's position is caused by necessity of working out of methods and ways of a direction of intellectualization on a way of qualitative development of innovative processes and a departure from rational economy. Exactly intellectual rent acts as a determinant of appearance of possibilities on transformation of social relations.

Despite the difficulties in defining intellectual capital, it has long been one of the most effective competitive advantages in the information economy. In this regard, the existing methods and approaches to intellectual capital in the future will only be improved in order to obtain the most adequate assessment of intellectualization (Rodionov et al, 2019). One of the perspective methods can be the use of normative-dynamic models in calculations (Zaytsev et al, 2019).

However, existing mechanisms for the development and distribution of rent revenues, which allow for sustainable economic development by maintaining socio-economic and political stability, need to be more fully developed at the moment (Degtereva et al, 2019).

In the author's work the interconnection of intellectual rent and the possibility of transition to noonomics are considered. The necessity of management of innovative processes and their direction in the direction of qualitative civilizational development is determined. Also the main problems faced by humanity and which can lead to significant development problems were listed.

It is possible to draw a conclusion that departure from material production is the only rational way of long-term development of human civilization, and steady increase of intellectual rent will be the first step to transformation not only existing system of management, but also social relations as a whole.

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Increasing Security Awareness of Green IT Initiatives

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Abstract

Organizations aim to employ green IT solutions to help lessen the negative environmental impact of technology, reduce costs, limit waste and energy consumption. However, implementing these initiatives and adding related devices to networks to monitor energy usage and waste into various IT systems raises security concerns. In this paper, we highlight our initial research highlighting these issues related to green computing initiatives and the need to increase security awareness. This paper also discusses the next steps in our study leading to an in-depth analysis of green IT initiatives and potential security vulnerabilities.

Keywords: Security Awareness, Security Risk, Green IT

Introduction

There is a growing need to consider the environmental impact of the technology we use every day. This includes technology development, usage, disposal, maintenance and production in today's world. Green Computing is seen as the practice of using computer resources wisely, including cost and resource efficiency, along with social responsibility. As we are increasingly becoming dependent on various types of computer technologies, we continue to consume more and produce more e-waste. To help mitigate these negative environmental impacts, multiple techniques and changes in how we interact with, use and build computing technology have been encouraged through various Green IT initiatives.

Even though there is excellent potential in lessening the impacts of our technology usage, there are, however, inherent security concerns in implementing these systems. Organizations aim to employ these new technologies and incorporate them into their networks and IT systems; however, they do not often consider possible security implications. In this paper, we highlight some ongoing research highlighting these issues and discuss the next steps in our research related to green IT initiative and potential security risks.

Green IT Initiatives and Security Risks

There have been many green IT initiatives over the past several years aimed at reducing negative environmental impacts, energy usage and e-waste. As a simple example, consider an organization that decides to digitize their older paper-based records. Not only can these paper records become damaged, lost or destroyed in the process of scanning, one needs to be mindful of who is handling these documents. What data is contained in the documents and who has access? It is highly probable that access to these documents would not be as controlled or monitored the same as in a computerized environment. It is also common to outsource scanning or data entry of these documents which would take potential sensitive data outside of the control of an organization. Green IT often involves virtualization, reorganization of data and the recycling of hardware which raises some security concerns (Gorge, 2008). Specific to the recycling of hardware, some businesses and individuals in their efforts

to recycle or donate equipment fail to erase data properly. These efforts can lead to confidential information becoming compromised. Many organizations have guidelines on how often equipment is upgraded or replaced, leading to many devices becoming a risk every year. As noted by James (n.d.) data on hard drives that have been erased can be potentially recovered even by novice users with the right software.

Another shift relates to the inclusion of automation, sensors and other connected devices through the Internet of Things (IoT). IoT can be understood as devices (things) that exchange data and can communicate with each other or have an Internet connection. Some estimates place the number of IoT devices globally at around 10 billion devices by 2020 and 22 billion by 2025 (Lueth, 2018). Advances in the ability to create and modify sensors have led to the proliferation of devices in a multitude of homes, offices and other environments. Homes and offices equipped with smart energy management can assist with making better decisions on settings based on time of day, outdoor and indoor temperatures and adjust when we are not at home (Anvari-Moghaddam, Monsef, & Rahimi-Kian, 2015). Although having these devices to monitor, automate and collect various data, this connectivity opens doors to security vulnerabilities. Many of these devices are connected to networks unsecured, use and connect to external applications and remain untested for security vulnerabilities. Hossain, Fotouhi and Hasan (2015) present an analysis of IoT attack surfaces, threat models, and challenges.

On a much larger scale, automated systems aimed at making more informed choices and reducing energy consumption via smart cities also pose challenges and risks. Attacks on these systems can cause larger-scale disruptions and loss. As an example, through a study conducted by Ghena, Beyer, Hillaker, Pevarnek and Halderman (2014) has discovered several vulnerabilities in traffic light systems. They point out that it is not the fault of one particular device but however, a combination of lacking security issues. Ghena et al. noted three significant weaknesses in the road agency's traffic infrastructure deployment that was evaluated (2014):

1. The network is accessible to attackers due to the lack of encryption.
2. Devices on the network lack secure authentication due to the use of default usernames and passwords.
3. The traffic controller is vulnerable to known exploits.

Although these weaknesses are specific to traffic systems, these concerns are valid for other systems as well, including connected IoT devices, where there may be known exploits, unchanged default settings and lack of encryption. It has been noted that IoT devices are not always integrated with traffic policing mechanisms of the overall network, designed to be open to new devices, involve automated communications, and often involve cloud or grin computing (Zhang & Green, 2015).

Conclusions and Future Work

Overall, there needs to be an increase in both security awareness and research into the mitigation strategies related to green IT initiatives. Organizations of all kinds can not only benefit from green IT but can benefit from improved security measures. To assess this area of research, we are in the process of examining numerous Green IT initiatives and various related threat models as well as mitigation strategies. The next step in our study is to investigate major green technology solutions of many kinds (e.g. using collaborative tools to reduce travel, life-cycle assessment models for recycling concerning data cleansing, IoT, environmental sensors, energy reduction, etc.) As part of this research, we are identifying what companies are doing to be more "green" and what technologies are being used as part of this practice. How has going green changed business practices, and how have these changes impacted security measures? Have there been cases of security breaches or concerns related to green technologies? We plan to compile this information and make recommendations for various green IT strategies to enhance best practices and encourage ongoing research in this area.

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Safe Exploitation of Delivery Vehicles in Transportation Companies

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Abstract

The specificity of the exploitation of delivery vehicles in transportation companies is associated with high environmental pressure resulting from the necessity of often express delivery of loads to the customer on time. This may have a negative impact on the safety of the driver, the loads transported and other road users. The research confirms that on Polish roads there are delivery vehicles that exceed their permitted total weight, which according to the vehicle's construction is 3.5 tons. By law, a vehicle's owner does not have to install tachographs in his vehicles, which also affects exceeding by the driver his permitted work time. The aim of the article is to analyze the issues of safe exploitation of delivery vehicles in transportation companies To achieve the objective, a characterisation of the threats and potential risks of dangerous situations endangering the lives of the driver, other road users, the vehicle and the load carried, was necessary. The technical characteristic of the selected delivery vehicle was carried out and the functioning of the systems and installations increasing its safe exploitation was verified. The analysis of the discussed issues allowed to formulate methods and principles of safe exploitation of delivery vehicles in transportation companies.

Keywords: Safe Exploitation, Delivery Vehicles, Exploitation Of Vehicles

Introduction

The dynamic development of the Polish transportation industry and the constantly changing social, economic and legal conditions mean that the results of transportation companies are influenced by many factors. One of the most important areas to be identified and assessed is the safe exploitation of delivery vehicles in transportation companies.

The issue of safe exploitation of vehicles is an extremely important element of transportation systems in companies providing transportation services; unfortunately, it is often overlooked or neglected in many aspects [4].

In 2018, 3,338,166 trucks, including delivery vehicles, transported 1,183,750 thousand tonnes of loads and 377,778 million tonne-kilometres were driven [7]. Every month there are more and more heavy goods vehicles on the Polish roads, which especially on the part of passenger vehicle drivers increases the feeling of danger, unforeseen events or the risk of collisions and accidents.

Referring to the literature on the subject [1], [13], the exploitation of motor vehicles is defined as a set of intentional organisational, technical, social and economic activities of people with a motor vehicle and mutual relations between them from the moment of buying the vehicle to its intended use to its liquidation. These areas of activity are intended to enable the vehicle to fulfil the required functions, together with the need to adapt to constantly changing external conditions. External conditions means, among others, legal, ecological and social requirements for the provision of services and also environmental conditions.

The theory of exploitation pays particular attention to identifying exploitation through two basic elements, which include the vehicle utilization process and the vehicle handling process [3]. Therefore, the security issues to be analyzed will be related to these areas [11].

The research subject of this study are delivery vehicles, whose percentage in Poland in the years 2014-2018 amounted to 81% in relation to all heavy goods vehicle designed to carry loads (Fig. 1) [6].

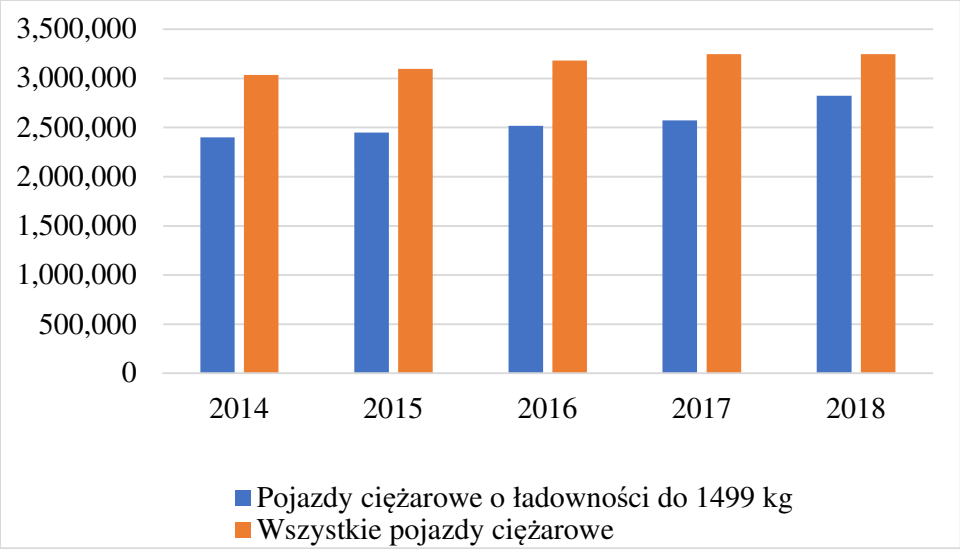

Fig. 1: The number of delivery vehicles in relation to the number of all heavy goods vehicles between 2014 and 2018 [6]

Recent studies carried out in 2018 also confirm the use of older delivery vehicles. According to the statistics of the Polish Main Statistical Office (GUS), over 65% of all delivery vehicles are over 12 years old.

Analysing the issue of operational safety of delivery vehicles, the results of road inspections carried out by the Inspectorates of Road Transport and the resulting fines for exceeding the permitted load capacity (Fig. 2) [6].

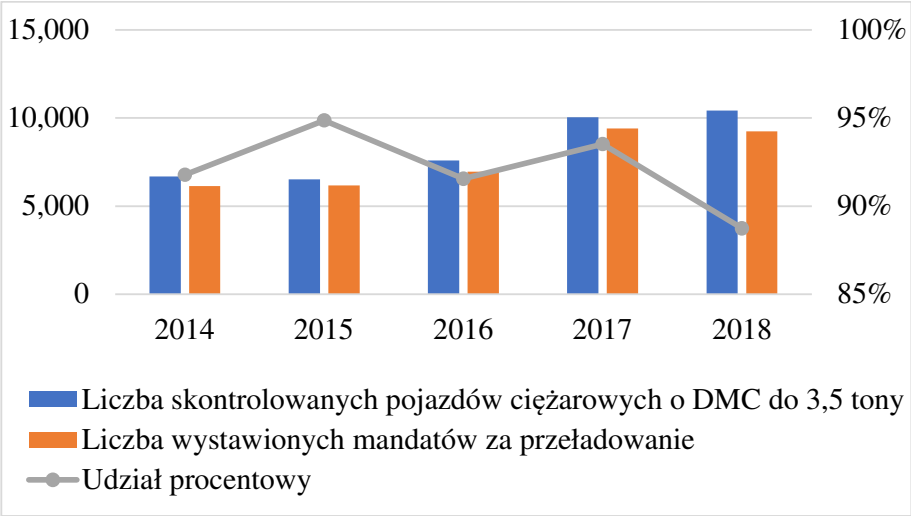

Fig. 2: Results of inspections of delivery vehicles [6]

The Inspectorates of Road Transport legally inspects only heavy goods vehicles with Permitted Total Weight exceeding 3.5 tonnes, while this government office inspects delivery vehicles only if considers there is a clear suspicion that a specific offence occurred. Taking into account the year 2018, out of 10,426 delivery vehicles inspected, overloads were found in 9,251 vehicles. This figure, in relation to the number of all such vehicles, i.e. 2,823,241, represents only 0.33%, but it strongly suggests that there are vehicles on the roads that pose a serious threat to road users.

The aim of this study is to characterize the issues of safe exploitation of delivery vehicles in transportation companies. The analysis has identified the risks associated with the improper exploitation of vehicles, as well as the potential risks of unreasonable exploitation of vehicles. The article presents the detailed technical characteristics of the selected delivery vehicle and the functioning of the systems and installations increasing its safe exploitation was verified. The analysis of the discussed issues allowed to formulate methods and principles of safe exploitation of delivery vehicles in transportation companies.

The ever-growing requirements for transportation companies with delivery vehicles, specialising mainly in express shipments, force transport companies to act often beyond permitted standards, i.e. to overload vehicles, exceed driving and work time of the driver, exceed driving speed, as well as to inadequately fix and secure loads in a load box [3]. These situations pose a potential threat to the life of the driver and other road users, as well as to the proper exploitation of the vehicle.

Technical Characteristics of Delivery Vehicles

Special technical requirements are imposed on motor vehicles, especially on those, whose purpose is to transport loads. The identification of the needs to be met by such vehicles determines certain technical requirements, which in turn are aimed at meeting exploitation requirements

The subject matter of this study indicates interest in delivery vehicles, which, according to the type homologation and the Attachment No 2 to the Road Traffic Law Act, are vehicles designed and constructed for the transportation of goods and having the PTW *(Permitted Total Weight)* not exceeding 3.5 tonnes.

In practice, a delivery vehicle is classified as a light goods vehicle intended for the transportation of small and light loads. Due to the 3.5-tonne total permitted weight, the category B driving licence is sufficient to drive a delivery vehicle in Poland, which means that drivers do not have to undergo special medical and psychological examinations and acquire additional skills to drive a vehicle with a load placed in a load box, and there is no mandatory training to teach safe driving behaviour or the proper and safe arrangement of cargo in load boxes.

As a rule, commercial vehicles are much more mileage intensive than passenger cars and are therefore also more vulnerable to accidents. Only a dozen or so years ago, manufacturers of delivery vehicles used the simplest suspensions, not very efficient brakes, and passive safety equipment was limited to safety belts and soft steering wheel padding. Meanwhile, the fastest delivery vehicles drive on motorways at up to 170 km/h [15]. In the era of rapid technological development, focusing on driving comfort, safety and quality requirements of customers, brakes with ABS and airbags, and even ESP electronic stability programs, have gradually been adapted in delivery vehicles.

Manufacturers of delivery vehicles offer many body and equipment versions which differ very clearly not only in terms of engine power, but also in terms of dimensions, weight, suspension design and type of tyres. Each variant requires completely different software for active and passive safety systems. A perfect example is the ESP system in the Mercedes Sprinter, where each of the several dozen versions of the vehicle must have different software driver. The Electronic Stability Program (ESP) has access to both the brake system and the engine control system [10]. This system continuously in real time analyses measurement data from the steering angle sensor, wheel speed sensors, transverse acceleration sensor and gyro sensor, assisting the driver when the vehicle is in danger of losing stability while

driving. In fractions of a second, ESP reacts precisely by interfering with the engine and brake electronics and supports the driver by actively generating braking forces to stabilise the driving track. The system also contains additional functions that can increase driving safety in certain situations. These systems include the ABS system to prevent wheel lock during braking, the ASR system to prevent drive wheels from slipping and the BAS brake assistant, which can increase the braking pressure if an emergency brake is detected and thus shorten the stopping distance. In this case, the only risk factor in the exploitation of the vehicle is the driver and his actions or failures to act.

Even the best suspension, brakes and safety systems cannot repair mistakes of a driver of vehicle. In the case of delivery vehicles with a total weight not exceeding 3.5 tonnes, these occur relatively frequently. The reason for this is a lack of experience in driving heavy goods vehicles as well as unsystematized legal regulations concerning the utilization of delivery vehicles. Although the cabs of modern commercial vehicles are more and more modern, safe and comfortable, the exploitation of delivery vehicles varies greatly in comparison to exploitation of passenger vehicles. Modern turbo-diesel engines provide excellent performance for delivery vehicles, while the high position at the wheel provides an illusion of full control. However, in violent manoeuvres, a high kerb weight and a high centre of gravity make themselves felt, which poses a serious threat to the safety of the driver, the vehicle and third parties.

The characteristics of a delivery vehicle may be presented by means of technical features referred to in the literature as constructional, structural, physical, geometrical features resulting from the design and construction calculations of the manufacturers. They relate to a set of information specific to a particular class of objects identified by the same construction, e.g. a vehicle model [12].

As with all heavy-duty vehicles, the delivery vehicles have a clearly identified undercarriage in the form of a load-bearing frame. Engines, driving systems and parts used to carry the load are attached to the frame. The location of the engine compartment in different solutions is shown in Fig. 3 [14].

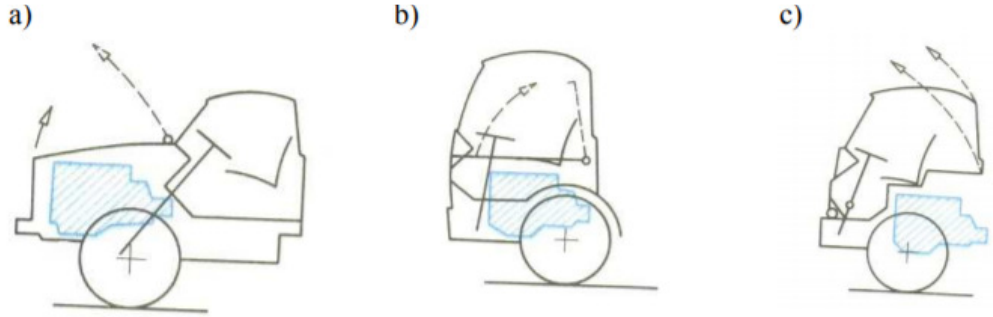

Fig. 3 : Location of the engine compartment: (a) in front of the driver's cab, (b) and (c) inside the driver's cab

The most important element of a van is its bodywork, which is a cargo space that is adapted to carry a specific group of loads and whose detailed technical specifications are created by specific manufacturers.

The example may be the delivery vehicle, Fiat Ducato, designed and manufactured for the transportation of foodstuffs with a refrigerated bodywork is shown in Fig. 4 [5].

Fig. 4: Fiat Ducato with a refrigerated bodywork [5]

A refrigerated vehicle with a container-type bodywork allowing to maintain a controlled temperature in the range from +30°C to -30°C. There is a refrigerator on the front wall, allowing to cool or heat the container. The technical specification of the vehicle shown in Fig. 4 includes a set of individual technical characteristics as shown in Table 1.

Table 1: Technical specifications of Fiat Ducato (own elaboration)

Year of manufacture	2010
Mileage	199,000 km
Engine displacement	2,300 cm^3
Maximum power	140 KM
Maximum torque	350 Nm
dimensions [L x W x H]	5,988 mm x 2,050 mm x 2,764 mm
Type of chassis	Refrigerated vehicle
Transmission	Manual gearbox
Fuel type	Diesel
Exhaust emissions standard	Euro 5
Drive	Front-wheel drive
Payload	950 kg
Permitted Total Weight	3,500 kg
Vehicle Kerb Weight	2,550 kg
Wheelbase	4,035 mm
Permitted axle load	20.00 kN
Maximum speed	162 km/h
Fuel consumption by New European Driving Cycle (NEDC)	7.1 – 7.4 l/100 km
CO2 Emissions by New European Driving Cycle (NEDC)	186 – 195 g/km
Front suspension	Independent MCpherson type wheel suspensions with suspension arms attached to the auxiliary beam, spiral springs and telescopic shock absorbers and stabiliser bar
Rear suspension	Rigid tubular bridge with parabolic leaf springs, telescopic shock absorbers, flexible side bumpers

Safety equipment	ABS - H-1 dual circuit brake system: front and rear disc brakes; EBD - electronic brake force corrector; ASR - traction control; ESP - stabilisation of the driving track; Central lock, Alarm, Immobilizer, Driver airbag
Other equipment	CB radio, On-board computer, Twin rear wheels, Sliding door, Cruise control
Location of the engine	In front of the driver's cab

The technical characteristics, already determined in the needs formulation phase and the production phase, condition and determine the operational capability of a delivery vehicle, the rational exploitation of which is intended to ensure an adequate level of safety.

The Issues of Safe Exploitation of Delivery Vehicles in Transportation Companies. Analysis of Threats and Risk.

The number of delivery vehicles on Polish roads is constantly growing. They are treated by law as passenger cars, so they can travel much faster than heavy goods vehicles, i.e. outside urban areas at speeds of up to 90 km/h, while a heavy goods vehicle can travel at speeds up to 70 km/h, whereas delivery vehicles can travel up to 140 km/h on the motorway unlike heavy goods vehicles, which should not exceed 80 km/h.

Excessive speed of the vehicle carrying the load is a danger not only for the driver and the load being carried, but above all for other road users. The specificity of the exploitation of delivery vehicles indicates frequent exceeding of the permitted standards on the maximum weight of the transported load. This is a breach of basic safety rules. An overloaded delivery vehicle is not only unfair competition, it is above all an irresponsible businessman who is not aware of the dangers of overloading a vehicle that poses a huge risk to other road users when bypassing an obstacle or suddenly braking. An overloaded vehicle also has a much longer stopping distance. The construction of the delivery vehicle is adapted to carry loads up to a maximum of about 1,500 kg, so any exceeding the standard increases the risk of losing control over the vehicle.

The unreasonable exploitation of commercial vehicles poses a number of serious risks, which can result in a number of undesirable situations directly affecting the lives of drivers and other road users. A list of the most important threats and risks associated with them is presented in Table 2.

Table 2. Threats and risks associated with the unreasonable exploitation of delivery vehicles (own elaboration)

Threat	Risk
Overloading	Damage to the frame Tyre breakage Failure of suspension, brake, steering systems; Loss of control over the vehicle; Exposing other traffic participants to danger; Accidents, collisions; Communication damage.
Inadequate securing a load in the cargo space	Damages to the cargo space; Loss of control over the vehicle; Accidents, collisions; Communication damage; Exposing other traffic participants to danger.

Driver's work time exceeded	Low level of concentration Accidents, collisions; Exposing other traffic participants to danger.
No driver experience	Accidents, collisions; Exposing other traffic participants to danger.
No safety systems installed in vehicle	
Excessive speed	
Rapid manoeuvres of a vehicle loaded with a load	Loss of control over the vehicle; Accidents, collisions; Communication damage; Exposing other traffic participants to danger.

Threats arising during the unreasonable exploitation of a delivery vehicle increase the likelihood of undesirable and dangerous situations. The highest level of risk concerns exposure to danger for the driver and other road users. Improper exploitation of a delivery vehicle can expose the owner of the transportation company to breakdowns and damages to the vehicle, which results in unplanned downtime and additional costs associated with restoring the vehicle to its operational condition. A careful assessment of the risk of undesirable situations indicates that the risks presented require control and implementation of preventive measures on the part of the transportation company manager.

Methods and rules of the safe exploitation of delivery vehicles

Vehicle constructors strive to design their delivery vehicles in such a way that they are fully safe when exploited. The specific construction of delivery vehicles, the quality of which is constantly being improved in accordance with users' preferences and legal requirements, increases the safety of transport services provided. Properly adapted cabs with good visibility, effective brakes, driving comfort and driver experience significantly reduce the risk of accidents, breakdowns or damage to the load. Safety systems, i.e. ESP systems that precisely correct drivers' mistakes, allow a higher level of safety [2]. Some cars are also increasingly equipped with systems that warn of obstacles and automatically brake or signal when they leave the lane marked by lines, and have the ability to warn of vehicles that are in the so-called blind spot. Each of these modern technologies takes care of the safety of the driver, the load transported and other road users [9]. Of course, these systems are not able to protect the driver from every event.

The driver using the vehicle is primarily obliged to observe the rules of safe exploitation of delivery vehicles. Such a driver should have basic experience in driving loaded vehicles.

The basic rule of safe exploitation of delivery vehicles is, above all, not to accept loads that would cause exceeding the permitted total weight of a vehicle. The load shall be properly secured, fixed and placed as low and as close to the rear axle as possible. The attachment shall use handles on the walls and floor of the load box. The correctsecuring of the load prevents it from shifting, tipping and related problems and possible damage to the vehicle [15].

Each user of a delivery vehicle is obliged to check the technical condition of the vehicle before setting off on a route. Special attention should be paid to the condition of the tyres and their pressure.

Correct exploitation of vehicles forces users to comply strictly with maintenance intervals and deadlines and to immediately report any noted faults or anomalies in order to prevent further damages. It is also the responsibility of the vehicle user to adapt the vehicle to the specifics of its utilization and designation, including the physical protection of any elements that may be damaged or destroyed, e.g. the floor in the cargo space, engine guards, protecting the vehicle against the permanent action of other adverse factors and taking actions to prevent the deterioration of the vehicle.

The driver's behaviour has a huge impact on the safe exploitation of the vehicle, careful driving with the transported load in mind, concentration and forced rest are the basis for safe driving. Rational

adaptation of speed to the current road situation, observing speed limits and no time pressure is a requirement for the safe exploitation of vehicles adapted to carry loads [8].

All the above rules and recommendations increase the level of safe exploitation of delivery vehicles, the driver, the load transported and other road users. Disregarding the threats arising from the delivery vehicles' exploitation that is improper or is not in line with regulations and the manufacturer's recommendations, increases, in particular, the risk of dangerous situations. This also has implications for the costs incurred in connection with using and servicing commercial vehicles.

Summary

The issue of safe exploitation of delivery vehicles is particularly important due to legal conditions and the specificity of their use. Statistical data confirm that overloaded delivery vehicles drive on Polish roads. Of the 40 vehicles inspected, 36 of them are overloaded. The consequence of unreasonable exploitation of delivery vehicles may be damages to individual parts of the vehicle, breakdowns, the driver may lose control over the vehicle, thus putting himself, other road users and the cargo carried in the cargo space at risk.

Safe exploitation also requires regular maintenance in accordance with the requirements and instructions of the vehicle manufacturer. The Daily handling of the delivery vehicle is also one of the rules that must be met to ensure the safe exploitation of the delivery vehicle in transportation companies.

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The Role of The State in Solving Some Problems in The Formation and Development of The Economy on An Innovative Basis

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Abstract

Relevance. Modern trends in the development of the economy of Kazakhstan remembered with complex changes. On the one hand, these changes are one of the conditions of the process of globalization, which has already covered the entire world, and on the other, one of the ways of successful development of the country and a worthy place in the world community. If the twentieth century was the age of technology, the century of the twenty-first century is the age of education and science, as well as innovation. Therefore, the peculiarity of the research is that it fully meets the modern needs of society's development. Thus, the processes of innovative development require constant regulation and support from the state. **Research objective:** conduct a scientific analysis of issues of state regulation of innovative economic development, to prepare theoretical and practical recommendations for improving the competitiveness of the national economy. **Methods:** The research tools used in this research systematic analysis, empirical research, synthesis and comparative analysis of theoretical and practical data. **Results achieved:** theoretical problems of innovation are comprehensively studied, foreign experience and mechanisms of state regulation of innovative development are scientifically analyzed, and the current state of innovation development in Kazakhstan is analyzed. **Practical significance and applicability of the results:** The problems of development and technological modernization of innovation processes in Kazakhstan have been comprehensively studied, adapted for innovation and recommended for use at the stage of transition to applied research.

Keywords: innovations, innovative programs, investments, innovative infrastructure, competitive products.

Introduction

Innovation occupies a large place in the system of economic relations. Because developed countries understand earlier that it is impossible to get competitive products without applying innovative

experience in production. In this regard, can be formulated on the basis of studies in competitive stage of the market economy is reducing the cost of product innovation, increase investment, the formation of image production and transformation of new markets, including external.

Innovation permits the organization to achieve increased productivity (Adams, 2006) and better match the needs of its clients by matching its organization fit to its environment (Schneckenberg, 2009).

Based on the theoretical analysis, two approaches to the interpretation of innovations are identified:

- first, as regards innovation as new ideas and trends, and as a socio-technical and economic process that leads to the creation of the best quality products and technologies with its application (B. Twiss, F. Nixon, B. Santon, etc.).);

- second, it explains innovation as changes in order to introduce and apply new types of consumer goods, new production and transport means, organizational forms in markets and in industry.Innovation is not only a new introduction, it is a new production activity. It is based on the need to change production technology, introduce innovations in organizational, financial, research and other areas (Message to the people, 2015).

1.The availability of a large opportunity to use the results of scientific activity in the market economy has led to the life of the economic category "Innovation". This phenomenon, which arose in public relations, was called the word" innovation" (Yakovets, 2004), meaning"introduction of innovations".

The word "Innovation" originated from the word" innovation", meaning "rebirth and a new"curtain".

The term " Innovation "is closely related to the concepts of" novelty "and"discovery". The concept of "novelty" is explained by new tools, mechanisms, and equipment produced by humans. The concept of "disclosure" is explained by the process of obtaining previously unknown information and the manifestation of previously unknown natural phenomena. In contrast to innovation, the term disclosure is made at the earliest stage and is not intended to generate any revenue.

Materials and Methods

Modern theories of economic relations that reflect the innovative features of modern entrepreneurship have been developed by the following foreign researchers. This Is: Y. Schumpeter (2014), P. Samuel, Campbell, S. Brew, E. Rogers and R. Shoemaker, R. Nelson, L.Vodacek, P. Drucker, K. Freeman,J. Researchers include Dosi, K. Peres and others.

Among our compatriots, the issues of managing innovation activities, innovation strategy, state and industry innovation policy, as well as innovation processes are academicians R. Alshanov, U. Baymuratov, A. Satybaldin, K. Sagadiev, A. Koshanov, O. Sabden, as well as A. Markov, V.Goncharov, F. Dnishev, K. Kazhymuratov, D. Mukanov, S. Abdygapparova, N. Barlybayeva, A. Sattarova, K. E. Kubaev, T. Kupeshova, A. N. Turginbayeva, N.N. Adekenov, N. Kakharman, G. A. Myrzalieva, A. A. Bulasheva, G. K. Zambinova.

Results

The development of the economy on an innovative basis and the introduction of new technologies do not produce the necessary results without state regulation. In other words, what are the main signs of an innovative economy? By stopping. An economy is considered innovative if the society has the following conditions:

- in any place of the state, any individual, ADM group and enterprise can get access to the necessary information about new or known knowledge, innovations (new technologies, materials, machines,

organization and management of production, etc.), innovation activities, innovation process through an automated and telecommunications system;

- access to the above-mentioned information via modern information technology and computer system;

- develop the national information infrastructure that is necessary to maintain the constantly accelerating scientific and technological progress and information development and provides the socio-economic development of society with extensive information, scientific information;

- speed up the process of automation and computerization of all areas of management and production; changes in social structures that carry out innovative activities, etc.

- wide application of innovations for various activities at the necessary time in practice, as well as good use of new ideas, knowledge and technologies;

- development of an innovative infrastructure that can develop innovations based on modern technologies and carry out innovative activities at the right time, and this infrastructure should be able to develop any industry and any production;

- formation of a system of training and retraining of qualified specialists who are able to develop domestic production and effectively implement complex projects in the field of innovation and innovation activities.

The founder of the world's first technology Park is Stanford University in the United States (in the early 50s). In 1997, there were about 160 technoparks in the United States, which made up 30% of the world's technoparks. And in Europe, technoparks appeared only in the 70s of the last century (Freeman, 2015).

Therefore, the formation of an innovative economy requires an effective policy on the part of the state. In this regard, we can highlight several issues that are waiting to be resolved in the country's economy in the context of integration and globalization into the world economy. Solving these issues requires state regulation. It mcleland are among the:

- raw material orientation of the economy;

- weak intersectoral and interregional integration in the country;

- lack of connection between science and production;

- lack of demand from consumers for new goods and services in the domestic market;

- underdeveloped industrial and social infrastructure;

- low level of innovation activity of domestic enterprises and perception of innovations;

- insufficient allocation of funds for research and development;

- lagging enterprises at the technical and technological level;

-the regulatory framework for innovation, science and technology, and other issues are not sufficiently developed.

Among the issues that cause a contradiction between potential and results, the following main ones can be identified: the issue of stability, the problem of the competitive environment, institutional and managerial. As we have noticed, there are a lot of issues that need to be resolved as soon as possible in order to move the country's economy into an innovative direction. The role of the state in solving these problems is special. These issues cannot be resolved without effective government regulation. The

state, in turn, regulates the innovation sphere by providing legal support and various benefits to economic entities engaged in innovative activities (Zhansykbaeva, 2008; Grigorieva, 2017).

Kazakhstan is still considered on the world market only as a producer of oil, gas, ferrous and non-ferrous metals, rare and precious metals, and so on. But in the context of modern globalization, this is not enough to be competitive in constantly changing technologies and commodity markets (Mutanov et al., 2019).

Having started its innovative development path, Kazakhstan allows developing at a faster pace for a young state with a high potential for innovative development and becoming one of the most competitive, politically stable countries in the world community (Turginbayeva, 2012).

Innovative development of the country's economy, its financial support and state regulation require an effective investment climate. According to this process, the country is developing well. Thus, at the end of 2017, the volume of foreign direct investment attracted in the country amounted to $ 14.1 billion. US$, which is 5.9 times more than in 2016. Of this amount, foreign investments attracted for non-resource amounts amounted to $ 1.5 billion. USA. The Netherlands is among the countries actively involved in improving the country's competitiveness and sustainable development ($27.0 billion). of the total, or 22.1% of respondents), the United States ($20.0 billion or 16.3%), the United Kingdom ($10.1 billion or 8.3%), France ($7.0 billion or 5.7%) and Italy ($5.2 billion or 4.2%). In order to increase the number of such foreign investors, a national investment web portal has been launched in 12 languages. The results of such analyses provide a complete basis for deciding that the country has the right investment climate and can believe in the future of our country, that is, to create an innovative economy .

One of the main tasks of the country is the development of domestic production and export of goods. To do this, it is necessary to develop the non-resource sector. The amount of support for the non-resource sector in 2016 amounted to $ 12.3 billion. The United States, and in 2017 this figure amounted to 15.2 billion. In comparison with the previous year, an increase of 23.5%.

Currently, there is a need for innovative dynamics in the diversification of the country's economy and the production of high-quality and scientific products. The globalization of modern markets has begun to impose its own rules and requirements in this area, and in the conditions of instability of global financial markets, the only solution is to choose an innovative direction by the state. The government, the national Bank and the Agency for regulation and supervision of the financial market of the Republic of Kazakhstan in 2016-2017 worked in the following areas::

-stabilization of the financial sector;

-solving problems in the real estate market;

-support for small and medium-sized businesses;

-development of the agricultural complex;

-implementation of innovative, industrial and infrastructure projects.

To Finance this plan, 10 billion us dollars were allocated from the National Fund. USA. Of these, $ 4 billion. sectrda financial stabilization of the United States, 3 billion for the development of the housing complex, 1 billion dollars. for the development of small and medium-sized businesses, $ 1 billion. for the development of the agricultural complex in the amount of $ 1 billion. The United States was used to Finance innovative, industrial, and infrastructure projects. The basis for effective development of the economy of Kazakhstan is the development of innovative activities in the country and the promotion of technological modernization. To date, five branch design bureaus have been created for the technological modernization of the economy of Kazakhstan (Mukhtarova et al., 2017). Specially

allocated funds for the creation of such industrial design bureaus were gradually allocated to JSC "transfer of engineering and technology" and JSC "national innovation Fund".

Financing of innovation activities in the country is also developing independently. Innovative grants have started to be provided in this direction. For the first time in 2016, us $ 7.3 billion was allocated for the provision of innovative grants and innovative technologies and development work.tenge. This year, the total volume in Kazakhstan amounted to 55.4 billion dollars. 679 applications were accepted for the amount of 679 tenge.

In addition, the volume of innovative products in the country in 2017 amounted to 145525.8 million dollars. tenge. The volume of innovative products by region for 2010-2017 is shown in table 1.

Table 1: Volume of innovative products by regions of Kazakhstan. million tenge

Regions	2014 year	2015 year	2016 year	2017 year	2018 year
Akmola	31947,9	41235,6	4 316,9	1 039,0	8125,2
Aktobe	6450,4	11680,0	14 056,9	4 428,3	12892,3
Almaty	10370,2	8577,4	334,0	419,5	700,8
Atyrau	1940,1	186,9	1 598,4	55,3	158,4
WestKazakhstanRegion	2327,9	2343,8	390,6	728,5	1054,5
Zhambyl	1575,1	2241,6	6 286,1	2 190,4	1575,1
Karaganda	59871,8	37986,5	16 473,8	728,7	13747,5
Kostanai	861,6	1344,8	4 084,0	14 412,4	2235,9
Kyzylorda	2,0	8,0	30,3	1 848,3	89,7
Mangistau	6639,6	7353,0	5 002,9	66,7	391,4
SouthKazakhstanRegion	5522,4	2715,1	1 451,4	133,0	5522,4
Pavlodar	1249,7	2002,7	38 060,2	35 420,1	70448,1
NorthKazakhstanRegion	2789,4	959,9	3 228,6	2 751,0	3005,2
EastKazakhstanRegion	13747,5	26015,4	5 118,2	4 422,5	11411,9
TheCityOfAstana	2866,8	13,0	13,2	31,1	110,5
Almatycity	7877,5	7836,9	11 085,6	7 711,5	14 056,9
Note: http://www.ifk.kz/index					

From the table above, we noticed that in some regions, compared to 2014, the volume of innovative products decreased in most regions compared to 2018. In General, in Kazakhstan in 2014, the volume of innovative products amounted to 152500.6 million us dollars. tenge, in 2015-111531.1 million dollars. tenge, in 2016-82597.4 million dollars. tenge, in 2017-142166.8 million dollars. in 2018, this figure was $ 145525.8 million. tenge. We see that the volume of innovative products in the country reached its maximum in 2014 and gradually decreased in the following years. The decline in these indicators indicates that the national innovation policy of state regulation of enterprises producing innovative products, support and stimulation of scientific research is still insufficiently developed in the country. (www.stat.kz).

In recent years, the share of innovative products in GDP has been decreasing. These indicators are shown in figure 1.

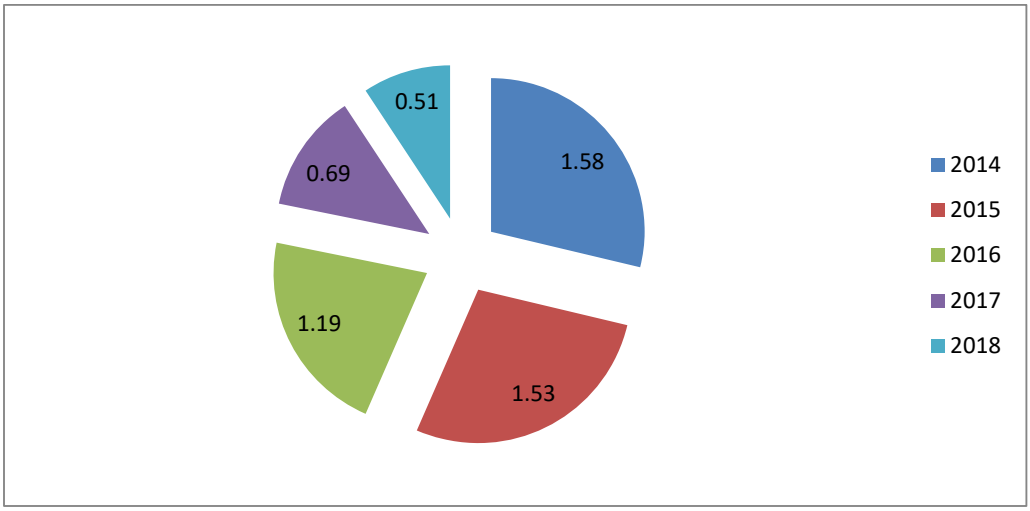

Figure 1: share of innovative products in gross domestic product %

Note: according to the statistics Agency of the Republic of Kazakhstan for the period from January 1, 2017 to January 1, 2017

As can be seen from the figure, the volume of innovative products in the country is very low and its share in GDP does not reach 2%. The highest indicator of innovative products in 2007 was 1.58% of GDP. This is, of course, a requirement of modern times. Without increasing the volume of innovative products in the country and increasing the activity of enterprises in the perception of innovation, we can not produce competitive products.

Improving the quality of domestic products and ensuring the country's competitiveness, increasing the innovative activity of our country's enterprises. Currently, the number of enterprises that have implemented innovations has reached 399 units. Most of them are located in Almaty (37.8% of the total number of enterprises with innovations). This indicator is 14.0% in Karaganda, 11.8% in East Kazakhstan, 4.8% in Pavlodar, 4.0% in Aktobe, 3.8% in South Kazakhstan and 3.8% in Astana (shown in table 2).

Table 2: Number of innovative active enterprises in the regions of the Republic of Kazakhstan as of 01.01.2018

Regions number of	Respondents number of	Enterprises innovative	Activity of enterprises %
Akmola	589	7	1,2
Aktobe	397	16	4,0
Almaty	695	10	1,4
Atyrau	276	8	2,9
WestKazakhstanRegion	800	47	5,9
Zhambyl	320	14	4,4
Karaganda	267	12	4,5
Kostanai	908	56	6,2
Kyzylorda	600	9	1,5
Mangystau	275	4	1,5
SouthKazakhstanRegion	440	6	1,4
Pavlodar	500	19	3,8
NorthKazakhstanRegion	378	10	2,6

EastKazakhstanRegion	687	15	2,2
TheCityOfAstana	705	15	2,1
Almatycity	2 259	151	6,7
Akmola	589	7	1,2
Note: according to the statistical Agency of the Republic of Kazakhstan, 2019.			

In the following years, the number of innovative enterprises gradually decreases. This means that the country's enterprises have a low level of perception of innovation.

One of the main reasons for the activity of the national economy in the perception of innovations is the problems of development of fundamental and General science in Kazakhstan.

According to scientists, fundamental science plays an important role in the modern state and highlights the following tasks::

– the level of science and education in the country is the main indicator of the state. The country's authority abroad is demonstrated by domestic scientists. As an example, the CIS countries currently have a high level of education of the vast majority of the population next to other developing countries. In Kazakhstan, as of January 1, 2018, about 80% of employees engaged in scientific research have higher professional education.

If we compare the innovative activity of enterprises in Kazakhstan with previous years, the best activity is observed in 2014. This year, the number of innovative enterprises has reached 526. These indicators are shown in figure 2.

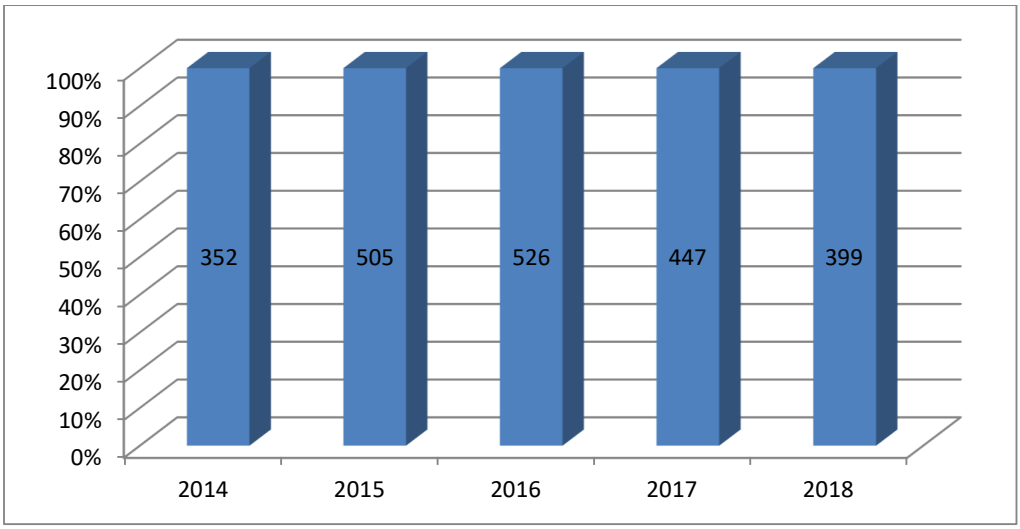

Figure 2: innovative activity of enterprises in Kazakhstan

Note: separate website of the National innovation Fund. URL: www.nif.kz

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important role in the modern state and highlights the following tasks:

– the level of science and education in the country is the main indicator of the state (Gafurov et al., 2020; Safiullin et al., 2019). The country's authority abroad is demonstrated by domestic scientists. As an example, currently the countries that are part of the group of independent countries have a high level of education of the population, which prevails next to other developing countries. In Kazakhstan, as of January 1, 2018, about 80% of employees engaged in scientific research have higher professional education.

– in countries where basic research is not conducted, there will be no quality education, and only higher education institutions, where most of the teachers are engaged in research, can train qualified specialists with quality education. In 2017, about 30% of the employees engaged in 15,793 scientific research are working in the pedagogical direction (Yankovskaya et al., 2019).

- the prospective economic activity and competitiveness of the state, the development of domestic products with scientific capacity is determined by the availability of highly qualified specialists and the level of scientific research.

Conclusion

Innovation is effected by people and their desire to increase and benefit from change (Walker & Cooper, 2010). A resilient leader of innovation needs to follow a rapid innovation strategy because organizational innovation is critical to the productivity, adaptability, and existence of educational organizations (Bhamra, Dani & Burnard, 2011).

The direction of the economy towards innovation and its development based on new technologies has created serious problems for any state. Especially in the process of integration to the world market and export-oriented products, current market competitive environment, as well as the reduction of time intervals of innovative renewal of production in each industry put before the government issues requiring rapid and complex decision. One of the main problems of each stage, which has characteristic difficulties, is the organization of production of competitive and export-oriented innovative products, through which the renewal of domestic production and the introduction of new technologies, the development of innovative infrastructure and the formation of links between science and production. Addressing these issues requires effective government regulation.

Research results have shown that Kazakhstan is currently developing an innovative industry. Several development institutions and funds have been established in the country to develop the innovation sector. The state, in turn, supports and controls the activities of these institutions (Bexultanov et al., 2018). The development and regulation of innovation infrastructure is carried out by the state through the creation of technology parks, business incubators, technopolises, banks, economic associations and financial groups. Innovation infrastructure institutes provide support for innovative projects of various levels and mass production of products with export potential. Low sensitivity of infrastructure institutions and increased demand for services of development institutions in the event of a crisis affected the development of infrastructure development institutions in the excitement of the production cycle.

Therefore, it is necessary to pay attention to science, science and technology and innovation policy of the state. Only when issues requiring state regulation in this area are resolved will the country achieve high-quality and sustainable development.

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The Problems of Project Teams Functioning in Supply Chains – The Results of Empirical Research

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Abstract

The interoperability of various actors in the supply chain is based primarily on a variety of standardized processes, but more and more often also on projects. The research conducted by the authors shows that the tool for merging and joint operations of supply chain entities is setting up and the maintaining the operation of cross-functional and above all cross-organizational project teams therein. The results presented in the article are the result of empirical research carried out in 2019. The subject of the article concerns problems in creating, coordinating and integrating work within the appointed project teams. The considerations made in the article are of literature and empirical character.

Keywords: Project Team, Supply Chain, Supply Chain Integration, Project Management.

Introduction

The success of supply chains is primarily dependent on the ability to integrate and coordinate the activities of the network participants, in particular, the flow processes of products, information and financial resources from the acquisition of raw materials, to the places of consumption, which (as is stressed in the literature of the subject) contributes to the creation of a competitive edge of a supply chain and its customers. The interoperability of various actors in the supply chain is based primarily on a variety of standardized processes, but more and more often also on projects. The research conducted by the authors show that the tool for merging and joint operations of supply chain entities is setting up and the maintaining the operation of project teams therein. However, in the practice in their activity, there are many significant problems that cause disruptions in the creation, coordination and integration of their work. The aim of the article is to present these problems - while the considerations undertaken here are of literature and empirical character.

Project Teams in A Supply Chain - Theoretical Considerations

In the literature on the subject and in business practice it is postulated to create teams at various levels of management and operating within various functions - this is reflected in the creation of, among others, problem teams, local teams responsible for the sphere of production, management teams and project teams focused on the implementation of specific tasks. The analysis of literature and the results of empirical research shows teamwork as a fundamental source of learning and organizational effectiveness (Leonard - Barton 1995; Nonaka and Takeuchi 1995, Senge 1990). Nowadays in turbulent, multinational, and technologically sophisticated environment, the work group has reemerged as a business concept and its unified team performance is now regarded as crucial to project success (Thamhain and Wilemon 1998).

The nature of project teams, regardless of whether they are monofunctional or interdisciplinary, is characterized by temporariness, concentration on a specific goal, a departure from power based on

formal authority in favor of expert power and the lack of strict division of labor within the team (Pinto, Pinto and Prescott 1993, Zmund and McLaughlin 1989). The specificity of the project team is also often characterized by going beyond functional boundaries, and sometimes even organisational ones, as in the case of a supply chain. To successfully achieve the project's goal, project leaders need to build fast, flexible project teams that can dynamically and creatively work to achieve the set goals in a changing environment (Jasswalla and Sashittal 1999). This approach requires effective networking and cooperation between people involved in the project - people from different organizations.

A supply chain is a special type of network organization whose participants - mining, production, commercial, service companies and their clients cooperating in various functional areas – making the streams of product, information and financial means flow (Cooper et al. 1997; Fisher 1997). The cooperation of individual entities of the chain begins at the stage of planning products and the demand for them, and ends with the delivery of orders and service to final customers - thus it relates to various functional areas. The effectiveness of an enterprise operating in a network increasingly depends on the effectiveness of its cooperation with partners. This leads to supply chain management and relations with entities that form its structure. Supply Chain Management is the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders (the definition by The Global Supply Chain Forum) (Lambert et al 1998). This not only reduces costs, but also creates added value for customers by increasing the efficiency of deliveries and the quality of products offered, which results in the fact that more and more often not individual companies but supply chains compete in on market (Hwang and Rau 2007). Therefore, it is increasingly emphasized that effective and synergistic supply chain management can be an underestimated source of competitive advantage (Ketchen and Hult 2007). This approach provides shape and expression to theoretical considerations and empirical research focusing on supply chain management. To a large extent they are devoted to chain integration focusing on two perspectives (Pandey, Bhattacharyya and Kaur 2012):

- the ways to achieve supply chain integration,
- the impact of supply chain integration on its efficiency / effectiveness.

Integration is generally understood as the process of joining parts into a whole. The increase in its level in the supply chain ensures quick access to required information, increases sensitivity to customer needs and shortens the response time compared to competitors (Sezen 2008), which in turn creates value for shareholders by reducing costs and increasing market share (Lee 2000). The literature points to examples of Japanese supply chains as those that achieve the highest degree of integration and lead to building partnerships between individual enterprises. For example, Liker and Choi (2004) describe the Japanese supply chain (Toyota and Honda) as a "partnership model" in which a network of suppliers learns and improves processes in cooperation with producers. Similarly, Iyer, Seshardi and Vasher (2009) describe Toyota's supply chain in terms of close and long-term relationships with a high level of information exchange and cooperation to solve common problems.

Most empirical research on supply chain integration focuses mainly on operational management, the use of information systems and information technologies. However, the cooperation of supply chain entities, leading to the integration of its participants, can also be implemented through selected practices in the field of human resources management (Pandey, Bhattacharyya and Kaur 2012; Menon 2012), including by establishing teams in the network structure. Importantly, it is worth emphasizing at this point that among the criteria indicated for deepening ties between business entities are, among others staff exchange activities (Menon 2012). Moreover, research shows that communication and teamwork were the most important competencies for successful SCI (Prajogo and Sohal 2013). The analysis of this issue, conducted in the earlier papers of the authors, provides the basis for distinguishing two levels of ability to integrate a supply chain by project teams (Jagoda and Kołakowski 2016):

- Level 1 (low) - internal integration variant - project teams are established mainly as a part of a supply chain leader enterprise.

- Level 2 (high) - external integration variant - a supply chain leader enterprise is the initiator in establishing inter-organizational project teams bringing together members from partner organizations.

Within level 1, a project team made up of members of the leader's organization can carry out tasks for the same enterprise as well as for activities implemented in the supply chain. Research carried out by other authors (the Delphi method involving 13 expert practitioners and scientists) shows that the condition for external integration between organizations is internal supply chain integration (Menon 2012). Detailed expert recommendations aimed at its achievement focus on the use of inter-functional teams and building matrix structures. Organizations need to develop a culture that is focused on horizontal workflows, as opposed to traditional functional hierarchies.

In turn, level 2, assuming the establishment of inter-organizational project teams within the supply chain, is a higher stage of integration. Thanks to this solution, in addition to the integration of the individual functional areas within the supply chain, the transfer and the diffusion of knowledge are ensured to the places where there are actually carried out individual tasks of the project. In addition, this option allows a more accurate selection of project team members from the point of view of their knowledge and competences -there is a range of specialists from many, and not a single organization. Importantly, individual organizations (links) of the supply chain will more easily (in comparison with the option from level 1) accept decisions / solutions developed within the project team in which their representative participates (due to the representation of their interests).

These considerations seem indisputable regarding the establishment of project teams as a supply chain integration tool. Importantly, however, attention should be paid to possible problems that are associated with the creation and functioning of these teams.

Research Methodology and General Characteristics of The Studied Enterprises

The results of the empirical research presented in the article were obtained during a three-stage research process. A nomotetic approach was adopted to obtain them in order to present an overall picture of the analyzed problem, which was the identification of human flows in supply chains. The first stage of the research process was the initial stage aimed at identifying the literature gap of the analyzed problem, the second concerned the identification of the research sample. The third, essential stage of the research process was the actual research carried out in autumn 2019. The authors, starting to build the interview questionnaire, analyzed literature from global online databases such as World of Science and Scopus. To determine the research sample, industry reports from Poland were analyzed to distinguish the types of enterprises selected for analysis, which assumed the existence of human flows in supply chains. Therefore, the industries representing this type of enterprise are: home appliances, construction, chemical, wood industry, electrical machinery industry, metal industry, electrotechnical, energy, retail, wholesale trade, medical/pharmaceutical, oil and gas, clothing/textile, food, telecommunications, transport /rail /logistics, armaments and other enterprises. Considering the size of the enterprise, it was decided to examine medium-sized and large enterprises. Over 100 employees was assumed for medium-sized enterprises as the minimum employment size. This choice resulted from the authors' belief that in smaller business entities situations related to the flow of people in supply chains are not frequent. The situations when human flows occur are as follows: quality control, IT systems integration, audit, training, supplying the supplier's workforce in case of insufficient production capacity, replacement, accident, joint tasks/ projects. The spatial scope of research has been limited to Poland. The structured interview questionnaire was used in computer assisted telephone interview (CATI) studies. An attempt to conduct the research was made in 2469 enterprises, of which 1232 agreed to participate in the study. In this group, 500 respondents declared that there were flows in the supply chain, and 732 enterprises denied their occurrence. The interviewees who provided interviews were HR managers in enterprises that are the leaders in supply chains. One type of identified flows was the implementation of joint tasks /projects by the enterprise of the supply chain leader and the enterprise of its suppliers/customers. This situation has been identified in 485 cases. Nearly ¾ of the entities in this group were enterprises employing from 100 to 249 employees. The remaining part (25.6%) are

entities employing 250 people or more. As for the sector of activity, entities from the industry/ construction sector (228 entities - 47%) and services sector 212 responses (43.7%) prevailed. In 45 cases (9.3%) they were enterprises from the agriculture / forestry / fisheries sector - Figure 1.

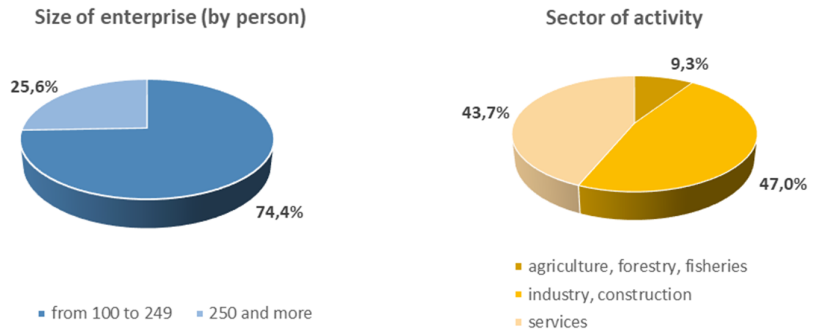

Fig. 1: The characteristics of surveyed entities - size and sector (in%, n = 485).
Source: own elaboration

As part of the research, an analysis was also made of the branch of the company's activity. Out of 485 entities, over 1/5 of them are retail trade enterprises (103 entities - 21.2%). Food industry entities constituted a fairly large group (61 entities - 12.6%). Out of 18 industries defined, each was represented by at least one entity, with the least numerous being: enterprises from the oil and gas industry (1 entity), armaments and household appliances /electronics (3 entities each) and the mining industry (4 entities). The details in this regard are presented in Table 1.

Table1: Number of entities surveyed by industry (n = 485)

Branch	Number of entities	Branch	Number of entities
Household appliances / electronics manufacturers	3	Retailers:	103
Construction enterprises	28	Wholesale trade enterprises	45
Chemical enterprises	24	Medical / pharmaceutical enterprises	39
Wood industry enterprises	27	Oil and gas enterprises	1
Electrical machinery industry enterprises	20	Clothing / textile / textile enterprises	11
Metal industry enterprises	35	Food businesses	61
Mining industry companies	4	Telecommunications enterprises	11
Electrotechnical enterprises	23	Transport / rail / logistics enterprises	30
Energy enterprises	17	Armaments enterprises	3

Source: own elaboration

Main Problems of Project Teams Creating and Functioning, With Particular Emphasis on The Supply Chain Perspective - Research Results

As indicated earlier, one of the research areas included in the structure of the questionnaire was the problems in the field of creation and functioning of teams /cells /departments within the framework of joint tasks/projects carried out by the enterprise of the supply chain leader and the enterprise of its suppliers/customers.

Respondents answering the question regarding the identification of the main problems in the creation and functioning of such teams had the opportunity to choose a minimum one of the 6 proposed answers, i.e.

- difficulties in reconciling daily duties with tasks of teams/cells /departments (P1),
- difficulties in choosing the right people (P2),
- communication difficulties between team /cell /department participants (P3),
- different views and positions represented by individual participants (P4),
- no material or non-material incentives to participate in teams /cells /departments (P5),
- problems in integrating and coordinating the work of team/cell /department participants (P6).

In addition to the above, respondents had the option to provide their own answer.

Among the surveyed entities, respondents made 670 choices within six proposed answers. Three of them obtained a relatively similar result oscillating around 20%. The most frequently indicated problem is communication difficulties between team /cell /department participants. Almost every fourth entity indicated this answer (155 responses, 23.1%). The next two answers are difficulties in reconciling daily duties with tasks of teams/cells /departments (145 responses, 21.6%) and difficulties in choosing the right people (139 responses, 20.7%). The respondents the least frequently pointed to the issue related to the lack of material and non-material incentives to participate in such teams (30 responses, 4.5%). In no case did the respondents indicate their own answer. Figure 2 presents the exact distribution of answers given in this respect.

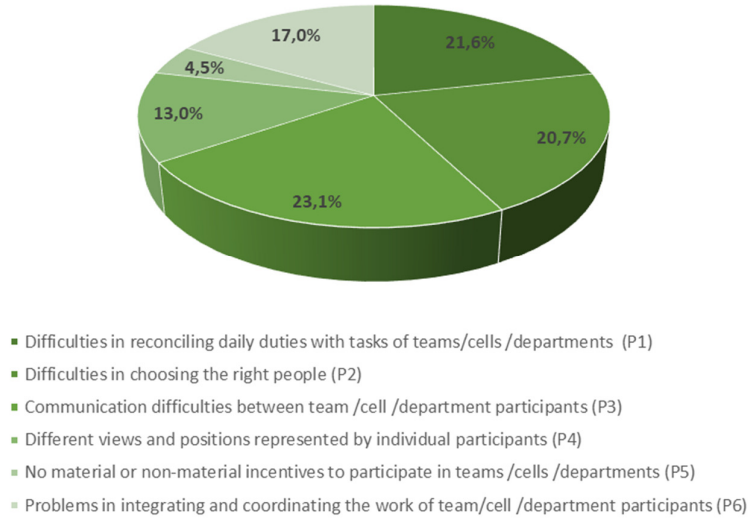

Fig. 2: Percentage of responses regarding the type of problem occurring in connection with the creation of project teams (total number of indications = 670)

Source: own elaboration

It follows from the above that the main problems relate to organizational and communication aspects among team members. Definitely, the main problem should not be considered low motivation resulting from the lack of material or non-material incentives. In addition, the fact of indicating as the main problem the difficulties in reconciling daily responsibilities with the tasks of the project team can be explained by the need to carry out part of the project tasks outside the headquarters of the given team member, which is related to the specificity of projects implemented in supply chains.

In addition to the global review of the obtained results, an attempt was also made to provide a more detailed analysis, taking into account such characteristics as the size of the enterprise, sector or industry. Below, Figure 3 presents graphically the percentage of answers given depending on the size of the entity, and Table 1 summarizes the percentage of answers received, having considered such features as the size of the entity and the type of sector.

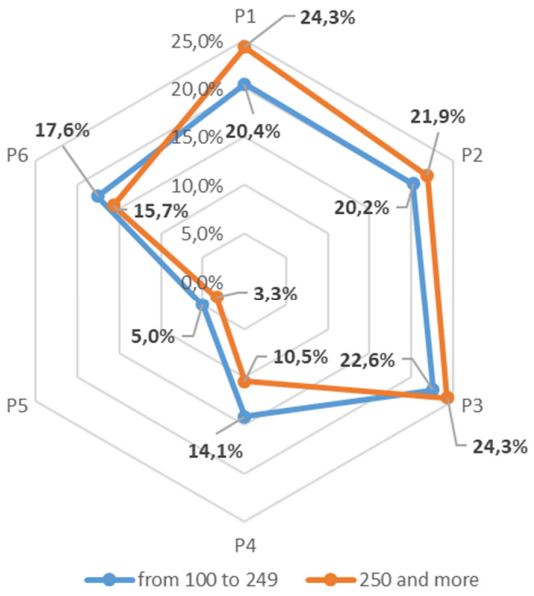

Fig. 3: Main problems (P1 - P6) in the creation and functioning of project teams – the percentage of answers given in terms of the size of the enterprise.

Source: own elaboration

Analyzing the correlation between the size of the entity and the type of problem, it can be seen that those resulting from reconciling daily duties with the team tasks of in the field of communication and the selection of appropriate people are more often indicated by larger entities, i.e. employing over 250 people. Interestingly, the problem concerning the coordination and integration of work of the project team is more often indicated in smaller entities, as well as the difference of views and represented position, whereas it would seem that these are problems that should rather occur in larger organizations.

Table 2: Main problems in the creation and functioning of project teams – the percentage of answers given due to the size of the enterprise and the sector of business activity

Size of the enterprise (employment in persons)	Difficulties in reconciling daily duties with tasks of teams / cells / departments (P1)	Difficulties in choosing the right people (P2)	Communication difficulties between team / cell / department participants (P3)	Different views and positions represented by individual participants (P4)	No material or non-material incentives to participate in teams / cells / departments (P5)	Problems in integrating and coordinating the work of team / cell / department participants (P6)	Total number of indications in a given group
from 100 to 249, including:	**20,4%**	**20,2%**	**22,6%**	**14,1%**	**5,0%**	**17,6%**	**460**
industry, construction	21,0%	20,5%	21,9%	11,4%	5,2%	20,0%	**210**
agriculture, forestry, fishing	21,9%	28,1%	18,8%	21,9%	3,1%	6,3%	**32**
services	19,7%	18,8%	23,9%	15,6%	5,0%	17,0%	**218**
above 250, including:	**24,3%**	**21,9%**	**24,3%**	**10,5%**	**3,3%**	**15,7%**	**210**
industry, construction	27,2%	20,4%	21,4%	9,7%	3,9%	17,5%	**103**
agriculture, forestry, fishing	23,1%	38,5%	30,8%	0,0%	0,0%	7,7%	**13**
services	21,3%	21,3%	26,6%	12,8%	3,2%	14,9%	**94**

Source: own elaboration

In turn, analyzing the problems through the prism of the sector, it should be noted that relatively high indications regarding the difficulty of selecting the right people are indicated in the agriculture, forestry and fisheries sectors, regardless of the size of the entity. This may be conditioned by a narrow specialization of employees representing this sector and difficulties in their availability on the market. In turn, the industry and construction sector, in particular in the group of entities employing up to 250 people, is characterized by a relatively high percentage of responses regarding the problem of integration and coordination of the work of team participants. It is also important to note that the problem of reconciling daily responsibilities with team tasks is characterized by a relatively even distribution of responses regardless of the sector and the size of the entity.

In addition to analyzing the links between the type of problem and the size of the enterprise and sector of activity, the analysis of the occurrence of problems was made, acknowledging the industry in which the entity operates. The table below summarizes the percentage of responses given by the representatives of individual industries.

Table 3: Main problems in the creation and functioning of project teams - the percentage of answers given in terms of the branch of the enterprise

Branch	Difficulties in reconciling daily duties with tasks of teams / cells / departments (P1)	Difficulties in choosing the right people (P2)	Communication difficulties between team / cell / department participants (P3)	Different views and positions represented by individual participants (P4)	No material or non-material incentives to participate in teams / cells / departments (P5)	Problems in integrating and coordinating the work of team / cell / department participants (P6)
Electrical machinery industry enterprises	25,8%	29,0%	22,6%	12,9%	3,2%	6,5%
Household appliances / electronics manufacturers	50,0%	0,0%	0,0%	0,0%	50,0%	0,0%
Construction Companies	22,6%	17,7%	24,2%	12,9%	1,6%	21,0%
Chemical companies	27,0%	16,2%	29,7%	8,1%	2,7%	16,2%
Electrotechnical enterprises	28,1%	21,9%	12,5%	9,4%	6,3%	21,9%
Energy companies	20,0%	10,0%	35,0%	5,0%	10,0%	20,0%
Retailers:	18,3%	20,2%	23,1%	18,3%	2,9%	17,3%
Wholesale trade enterprises	18,1%	25,0%	30,6%	8,3%	5,6%	12,5%
Medical / pharmaceutical companies	19,3%	19,3%	26,3%	10,5%	3,5%	21,1%
Clothing / textile / textile companies	21,1%	15,8%	15,8%	15,8%	10,5%	21,1%
Wood industry companies	22,9%	22,9%	22,9%	12,5%	2,1%	16,7%
Metal industry enterprises	23,5%	20,6%	17,6%	8,8%	8,8%	20,6%
Mining industry companies	25,0%	0,0%	0,0%	25,0%	0,0%	50,0%
Food businesses	25,4%	28,4%	22,4%	11,9%	0,0%	11,9%
Telecommunications companies	26,9%	11,5%	19,2%	15,4%	3,8%	23,1%
Transport / rail / logistics companies	14,9%	19,1%	19,1%	19,1%	10,6%	17,0%

Armaments enterprises	12,5%	25,0%	12,5%	37,5%	12,5%	0,0%

Source: own elaboration

According to the obtained data, the industry with a relatively flattened distribution of responses is the clothing/textile /textile industry as well as in the field of transport and logistics. This means that in these industries there is no single leading problem in the creation and operation of project teams, and a more complex, diverse structure of problems needs to dealt with there.

In turn, the most flattened distribution of responses from the perspective of individual problems occurs, as it did in the case of the analysis of the size of the entity and the sector, in the event of difficulties in reconciling daily responsibilities with tasks in project teams. This problem is the only one indicated by all the analyzed industries and is quite significant therein.

Conclusions and Summary

The analysis of the research results allows to indicate several important conclusions:

1. main problems related to the functioning of project teams in supply chains concern the issues of communication, the reconciliation of daily duties with team work and the selection of appropriate people, so they are of organizational and personal nature,
2. these problems are indicated more often by large entities, i.e. employing over 250 employees,
3. the lack of material or non-material incentives for a member of the project team is not recognized as the main problem of operation in the described project structures,
4. Interestingly, the problem concerning the coordination and integration of work of a project team, as well as the difference of opinions and represented position, is more often indicated in smaller entities (up to 250 entities),
5. the problem of reconciling daily responsibilities with team tasks is characterized by a relatively even distribution of responses regardless of the sector, branch and the size of the entity.

Based on the above, it can be concluded that the perception of the project team and its problems from the perspective of the implementation of various projects in the supply chain, mainly applies to communication between its members, representing different entities, very often with a different organizational culture, using different terminology, procedures or management tools and the reconciliation of daily duties with work in such a team. This state of affairs may cause that in many entities and projects implemented by them, there may be additional problems regarding delegating tasks to team members by project managers / stem cell managers or assigning them responsibility for performed tasks.

These problems may, as a consequence, lead to conflicts between employees, both at the level of project teams organised within a supply chain and within stem cells. This means that problems from the level of inter-organization projects can be transferred to the internal level of individual enterprises - the links of a supply chain

The obtained research results seem to confirm that building project teams and implementing projects within the supply chain require a different and very thoughtful approach in their management. The rather intense problem of temporary "detachment" of an employee from the stem cell for work in a project team may suggest the need to use different management instruments and the influence on such a team. The main emphasis in the functioning of inter-organization teams should be on proper communication and integration of the work of its participants, often representing links from different levels of a supply chain.

Acknowledgments

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Eu State Aid Policy in The Context of Covid-19 Crisis

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Abstract

As shown by the international economic and financial crisis from 2008, state aid policy may prove a flexible tool for providing financial help in the affected economic sectors from the Member States, hence reducing the negative spill over effects in the EU. This article outlines the European Commission's response to the crisis, in implementing State aid policy, after the outburst of COVID-19 crisis. Taking into consideration the need for a coordinated response in the EU, a New Temporary Framework for state aid was adopted, allowing Member States to support directly or through the banking system most affected economic sectors has been adopted by the European Commission. Our research aims to analyse the state aid schemes implemented by the Member States, on the legal base brought by the New Temporary Framework, also highlighting some similarities with the special regulatory framework adopted during the international economic crisis from 2008. The methodological approach is based on a series of case studies regarding measures and schemes adopted in the Member States immediately after the outburst of the COVID-19 crisis. In the final part of our paper we will present a comparative approach of state intervention in order to support SMEs during the current COVID-19 crisis, followed by some recommendation concerning the state aid adoption for preventing a serious disturbance of free competition in EU.

Keywords: State Aid, Fiscal Aid, Loans, Subsidised Grants, Competition Policy, Economic Crisis

Introduction

The main objectives of this research are: to explain how state aid can become an essential financing tool in economic crises using a comparative approach between the 2008 crisis and the COVID-19 crisis, while highlighting the different types of state aid used by the Member States since the onset of the COVID-19 crisis.

The research methodology is based on both a comparative approach between the types of aid granted under the Temporary Framework adopted in 2009 in order to cope with the negative effects of the international economic crisis and the types of aid allowed during the COVID-19 crisis (based on State Aid Scoreboard statistics), as well as on the use of case studies based on the evidence provided by DG Competition. Through the case studies presented, we aimed to highlight the diverse and flexible way in which EU state aid policy has been used by Member States to support the economic sectors that have been and are most severely affected by the effects of the COVID-19 pandemic.

The outbreak of the COVID-19 crisis prompted EU authorities to urgently adopt exceptional measures and new regulations in the field of state aid policy, some analysts pointing out that the urgency and seriousness of the situation forced Europe to adopt a true "anti-disaster plan" even in the field of competition policy (Baldwin, Weder di Mauro, 2020). The magnitude of these measures was similar to those applied during the international economic crisis of 2008 (Mateus, 2009).

The new regulations in the field of state aid sought to transform these state interventions (state aid measures and schemes) into a useful tool by which Member States to support their most affected companies, citizens and economic sectors.

Given the magnitude of the economic effects that the COVID-19 crisis will trigger in all Member States and the shock wave produced in the EU economy, the support measures cannot be taken only from the EU budget, but must be granted also from the national budgets of the Member States in the form of state aid. All these aids may be implemented both through sectoral schemes and individual measures targeting the affected companies (see Figure 1).

As regards to direct state aid (targeting certain companies affected by the COVID-19 crisis), such aids may be granted on the basis of the GBER Regulation (General exemption regulation for categories of state aid) immediately, without the involvement of the European Commission.

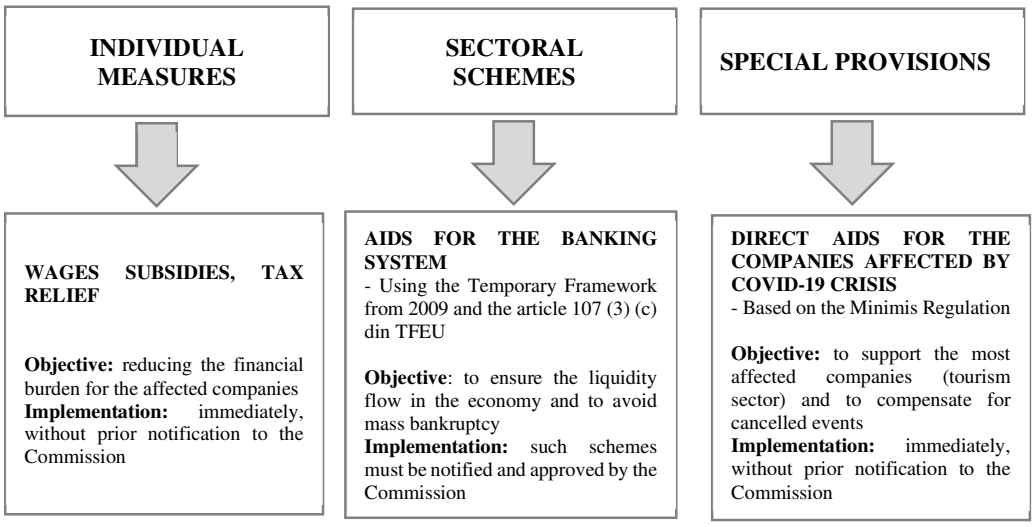

Figure 1: Types of state aids that may be granted for mitigating the COVID-19 crisis negative economic effects

Source: Authors, based on EU regulations.

Note: The Minimis Regulation on state aid allows support measures limited to a minimum financial ceiling and exempted from the obligation to be notified to the European Commission. The maximum amount is 200,000 euros for each company over a period of 3 years.

Moreover, taking into account the impact of COVID-19 crisis, this situation allows to the Member States to fully use the Article 107 (3) (b) TFEU granting state aids to remedy a serious disturbance of the economy of a Member State.

The New Temporary State Aid Framework – a comparative approach with the measures adopted during the international economic crisis

Some analysis (Lowe, 2009; Drăgoi, 2016) are showing that while state aid policy had a restrictive approach in EU before the international crisis from 2008, the need to support the banking system in order to prevent its general collapse in EU lead to the adoption of special regulation in 2009.

Recently, the European Commission has published the New Guidelines on the measures that Member States can take to mitigate the COVID-19 crisis (European Commission, (a), 2020). Within this document, some principles are set to be used when considering the implementation of such state aid schemes by the Member States. These principles concern: the transport of goods and services, the

supply of goods, health-related measures, measures at external borders and measures at internal borders. As regards to the transport of goods and services, the European Commission document states that any schemes and measures that would lead to a restriction of transport between Member States must be notified in advance to both the Commission and to all EU countries, before be implemented.

For the banking sector, the Commission Guidelines are stating that, given that banks support the necessary flow of liquidity in the economy, and a possible collapse of the banking sector would have catastrophic domino effects in the whole EU, Member States can now grant aid based on the Old Framework Temporary (guarantees, capital injections, aid for rescue and restructuring, while respecting the Single Resolution Mechanism imposed by the Banking Union). Although at present, more than a decade after the international financial and economic crisis, the European banking system is consolidated, the current consequences of the COVID-19 crisis will spread rapidly in the capital markets, and a coordinated action is needed for the Member States in order to effectively support the financial sector.

Being aware of the imminence of this phenomenon, the Community authorities have adopted a New Temporary Framework for State Aid to guide Member States to take appropriate measures to meet their objectives without disturbing free competition in the internal market. Based on the New Temporary Framework, state aid schemes and measures must support SMEs in need of liquidity, provide direct aid to individuals (independent artists, for example) who have suffered major economic losses as a result of cancelled events. The latter type of state aid (as an individual measure and not a scheme) can be granted, based on the regulations in force, without the approval of the European Commission.

Such a Temporary Framework, having an exceptional character in relation to the current regulations in the field of state aid policy, was adopted only in the case of the international economic and financial crisis of 2008, some analyses explaining, however, that that framework was mainly directed towards supporting the banking sector in the EU and only marginally towards the real economy (Drăgoi, a, 2019) .If, in the case of the 2008 crisis, the state aid schemes were directed to the banks and credit institutions affected and suspected of insolvency risk, determining the preponderance of the state aid in the form of guarantees (see table 1).

Table 1: State Aid granted in the EU based on the Old Temporary Framework[1] (EUR billions)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Recapitalization	269.9	110	184	37.5	150.8	29.6	20.3	18.8	8.5	25.7
Compensation for impaired assets	4.8	338.5	78	6.3	157.5	14.7	3.5	1	0	0
Guaranties	3097.3	87.6	54.8	179.7	275.8	76	38.7	165.4	310.7	328.5
Other liquidities measures	85.5	5.5	66.8	50.2	37.5	9.7	1.7	0	0	14.2

Source: Authors calculation based on State Aid Scoreboard (2018).
*[1] See "**Temporary Union framework for State aid measures to support access to finance in the current financial and economic crisis",** Official Journal C6, 11.1.2011*

Note: The data show state aid (approved and used) to financial institutions in the period 2008-2017 and include both the maximum aid amounts that Member States have been authorized to grant (approved state aid) and the amounts actually paid (used state aid).

While all the capital and liquidity measures being subject to the regulations of the BRRD Directive (Drăgoi, b, 2019), in the current events with destabilizing economic potential, triggered by the COVID-19 crisis, the New Temporary Framework aims to grant direct aids to the real economy. Regarding the measures that should have encouraged investments, the previous Temporary Framework showed that the aid schemes adopted by the Member States are subject to the legislative provisions establishing a limited compatible amount of the aid. This provision was introduced in the old Temporary Framework as an extraordinary measure to provide Member States with an additional instrument during the most

acute period of the financial crisis. Such aid could be granted on the basis of Article 107 (1) TFEU because they exceeded the threshold of EUR 200 000 per company (indicated in Commission Regulation (EC) No 1998/2006 on "De minimis" state aid). In times of severe economic crisis, there is always a risk that competition policy will not come top of the political agenda. In the context of the COVID-19 crisis, governments' immediate focus must be on measures to keep the real economy afloat or maintain employment, and they sometimes believed that these measures could be divorced from competition policy. However, the past month has shown that the EU competition and state aid rules are a crucial component to any recovery plan in any member state.

On March 19, 2020, the New Temporary Framework for State Aid was adopted, through which Member States can offer direct grants of € 500,000 to a company, state guarantees for bank loans and interest rates subsidized to mitigate the effects of COVID-19 (EC, (b), 2020). Member States are obliged to notify the European Commission of such state aid schemes, as in the case of those adopted during the crisis of 2008. Subsequently, after the approval of the European Commission, these schemes can be implemented. There are also exceptions to this general prohibition that allow certain types of aid to be granted under special circumstances without prior notification to the European Commission. Such an exception refers to aid schemes that "help to remedy economic damage caused by natural disasters or exceptional events". This exception allows granting compensation to airlines for losses suffered due to the COVID-19 crisis. Another exception applies to aid schemes aimed at "remedying a serious disturbance in the economy of a Member State" provided that the aid granted is compatible with the internal market. This exception is discretionary and requires to the Member State to notify the Commission of the proposed aid scheme with the obligation to delay the granting of aid until official approval is received. The current Temporary Framework is based on this second discretionary exception to allow Member States the widespread use, but for a limited period, of certain categories of State aid. In fact, this exception has been used extensively by the Member States in the case of the 2008 crisis, and as a result the existence of the previous Temporary Framework has facilitated a faster drafting of the new framework, although the context is different.

The main objective of the New Temporary Framework is to help the real economy and just in the case of necessity, the banking sector. An important clarification is that under the New Temporary Framework the aid granted to banks for maintaining the credit flow to companies will be considered as indirect aid for companies (since they will have the objective of ensuring liquidity and supporting a harmonized fiscal response to EU level). The new Temporary Framework will allow various types of aid for companies that have suffered financial losses after December 31, 2019 (see Figure 2).

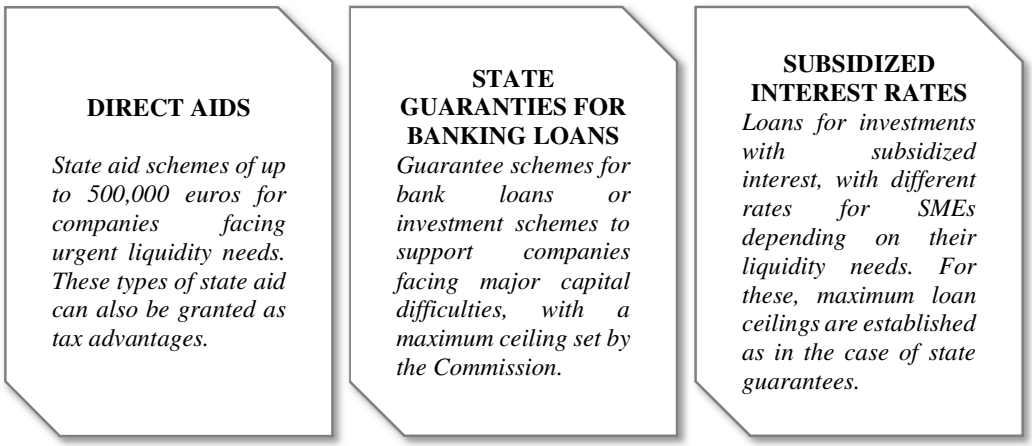

Figure 2: Main types of state aid under the New Temporary Framework
Source: Authors, based on EU regulations.

As concerning the state aids for the banking system Member States will be able to help banks and financial companies directly as they are considered to be aids to the real economy. Practically the

Commission will consider any aid directed by the Member States through the banking sector to the real economy as aid delivered directly to help companies rather than as state aid to the banks themselves. However, aid ceilings are introduced to limit undue support or residual financing for the banking sector.

It is very important to notice that the direct aid to banks to compensate for losses directly incurred as a result of the COVID-19 crisis will not be evaluated under the New Temporary Framework, but as a separate exception provided in article 107 (2) (b) . If, because of the COVID-19 crisis, banks would need direct support in the form of liquidity measures, recapitalization or support measures for impaired assets the European Commission will assess whether those measure meets the conditions set out in article 32 (4) (d) of the BRRD Directive. If the eligibility conditions are fulfilled the bank will receive the requested support. Also, to the extent that these state aids address the issues related to the COVID-19 crisis, they are considered eligible under the article 45 of the Banking Communication which sets out an exception to the burden-sharing requirement between shareholders and subordinated creditors.

Exceptionally, some state aids may be temporarily granted as direct loans, repayable advances or tax exemptions based on Article 107 (3) TFEU. Such aids may be granted to businesses and small companies that are suddenly experiencing a lack of liquidity if the member state considers that such measures are appropriate and necessary in the current exceptional circumstances caused by the COVID-19 crisis. Such aids must meet the following simultaneous eligibility criteria: the state aid does not exceed 800,000 euros (before applying tax exemptions or other tax burdens) per company; the aid is granted in the form of a scheme with an estimated budget; the aid can also be granted to enterprises that were not in "difficulty" as of December 31, 2019, but are currently in "difficulty" as a result of the effects of the COVID-19 crisis, the aid is granted until December 31, 2020.

Comparative view of state aid approved in the Member State under the New Temporary Framework

Given that they currently have the legal framework necessary to grant state aid related to the COVID-19 crisis, the Member States have not been late in submitting requests for notification and approval of such schemes. On March 21, 2020, France was the first Member State to notify an aid scheme to support the financial security of companies affected by the COVID-19 crisis. The objective of the scheme is to ensure the continuity of the economic activities and to provide adequate financial support to the companies affected by the economic shock induced by the COVID-19 crisis.

The aid measures under the scheme will be: measure A - a guarantee subsidized by Bpifrance Financement S.A. (public credit company owned by the French state) for investment loans; measure B - a guarantee subsidized by Bpifrance Financement for the confirmed credit lines; measure C - granting of a guarantee subsidized by the French state for eligible credit portfolios containing specific contractual provisions.

For measures A and B the French state estimated a budget of 700 million euros, and for measure C 300 million. Measures A and B apply to all SMEs in France regardless of the sector of activity, and measure C is applicable for a maximum of six years to all French companies in difficulty regardless of size.

Subsequently, a number of Member States (United Kingdom, Denmark Germany, Italy (EC, c 2020), Luxembourg (EC, d, 2020) and Latvia) submitted notifications to the European Commission regarding the granting of state aid schemes to mitigate the negative economic effects produced by the COVID-19 crisis. All of these schemes are intended for financing needs facing the real economy (see table 2).

Table 2: State aid schemes notified by the Member States under the New Temporary Framework

Member State	Beneficiaries	Conditions	Amounts
Germany	Loans for all undertakings that	Based on appropriate justification and self-	The loan amount is less than EUR 1 billion per beneficiary

Member State	Beneficiaries	Conditions	Amounts
	require liquidity for their activities in Germany	certification of the beneficiary of its liquidity needs	and limited to either twice the annual wage bill for 2019, 25% of the annual turnover 2019, or the specific liquidity needs of a beneficiary for the next 12 months (18 months for SMEs). In addition, for loans above EUR 25 million, the loan amount may not exceed 50% of the total debt volume on the beneficiary's balance sheet
Italy	Companies producing medical equipment	Creating new production facilities or extending the existing ones	EUR 50 millions
Latvia	Subsidized loan for investments and lucrative capital	All Latvian companies if they were not in difficulty on 31 December 2019	EUR 50 millions for investments, 200 EUR millions for lucrative capital
Luxemburg	All undertakings (small and medium-sized enterprises, large undertakings) and liberal professionals affected by the economic repercussions of COVID-19 and having temporary financial difficulties. The Luxembourg authorities estimate that there will be over 1000 beneficiaries.	Eligible costs are the staff and rent costs of the beneficiary for the months falling within a period determined by the Luxembourg Government (maximum until 30 September 2020).	The support shall take the form of a repayable advance5 and will be granted in one or more instalments. The maximum aid intensity is 50 % of the eligible costs and the total amount of aid may not exceed the maximum aid amount of EUR 500,000 per single undertaking.
United Kingdom	All SMEs affected by the economic repercussions of COVID-19 and having temporary financial difficulties. The UK authorities estimate that there will be 5.9 million beneficiaries. Subsidized loans up to 80% for SMEs Direct subsidies for IMM	Turnover up to 49 EUR millions	EUR 654 millions
Denmark	Wage compensations for independent artists and liberal profession	If they cannot register revenues due to COVID-19 crisis	26 000 DKK/ per month

Source: Authors based on European Commission's data base on case studies of approved state aid.
See : the Commission Decision SA.56709 regarding « Plan de sécurisation du financement des entreprises » ; the Commission Decision SA.56794 regarding Coronavirus Business Interruption Loan Scheme Grant (CBILS grant);

the Commission Decision SA.56791 regarding Temporary compensation scheme for self-employed financially affected by the COVID 19; the Commission Decision SA.56714 regarding – Germany's COVID-19 measures; the Commission Decisison SA.56722 on Latvian loan guarantee scheme and subsidised loan scheme related to COVID-19.

As a recent OECD study (OECD, 2020) shows, most states have chosen to support SMEs because such companies were most severely affected by the COVID-19 crisis. The measures taken were diverse (either through direct support or by facilitating access to subsidized loans (see table 3).

Most Member states have directly or indirectly support their SMEs, but in order to ensure a return to normal market functioning the value of the subsidy per company is related to the market sector in which the company is active as stated in the New Temporary Framework.

Table 3: Support for SMEs in the Member States

Facilities to reduce working hours and support employees	Fiscal facilities	Banking support	Direct subsidies
Several countries have actively supported SMEs through new regulations on how to reduce working time providing aids for workers and companies and payments for temporary redundancies (Belgium, France, Netherlands, Switzerland). Italy has even implemented further measures on compensatory payments for redundancies.	Various countries offer possibilities for temporary tax exemption or deferment of taxes (Belgium, France) or even tax credits (Italy). Several countries have introduced indirect financial support to SMEs such as: new loans granted by public investment banks (France sectoral support) or loans for tourism industry (Italy). Others have granted public guarantees facilities (Austria) or facilities for SMEs wishing to renegotiate credit conditions (France).	Commercial banks in several countries have introduced support packages that include emergency loans to support their clients who are SMEs. Many banks in the Member States also provide flexibility for existing repayments. In Italy, the Italian banking association has decided to grant one Moratorium on debt repayments. The moratorium applies for the following debts: mortgages and small loans.	Belgium grants direct subsidies to SMEs, especially to those companies that are in difficulty because their supply chains are directly affected. Denmark grants a subsidy package that includes a DKK 125 million credit facility that allows SMEs to defer payment of VAT and taxes.

Source: Authors based on European Commission's data base on case studies of approved state aid.

While we are now in the midst of an even worse economic crisis, compared with the one from 2008, many analysis are underlining that the state support is mandatory for the real economy (Bofinger et al., 2020; Bénassy-Quéré et al., 2020) especially because "beyond its public health dimension, the unfolding coronavirus epidemic also represents a severe economic stress test for Europe that comes from a totally unexpected side".

Conclusions and Recommendations

In order to assist Member States to take urgent and effective measures to preserve economic stability and to provide legal certainty, the Commission adopted the New Temporary Framework for state aids granted in order to reduce the negative economic effects generated by the COVID-19 crisis. Since the adoption of the New Temporary Framework, until now, the Member States have provided a series of support measures, in particular to support SMEs. Due to the fact that Member States have extensively

resorted to state aid, additional support possibilities for other types of support measures would be needed.

According to the current developments in the COVID-19 crisis, new types of state aid would be useful: support for research and development of a vaccine or treatment against coronavirus (research and development state aids), support for the construction and modernization of testing facilities or for products relevant to the outbreak of outbreaks.

Coronavirus such as protective materials and disinfectants, as well as targeted support in the form of deferred tax payments and / or suspensions of employers' social security contributions to helps avoid massive unemployment. The COVID-19 crisis highlighted, as in 2008, the importance of a quick, coordinated and coherent response at Member State level, as well as the fact that state aid is an indispensable tool in situations of major economic difficulty.

However, in our opinion it is absolutely necessary that state support to be clearly defined and limited in scope to what is necessary to address the acute economic crisis generated by the COVID-19 pandemic while excluding unjustified benefits for companies or banks at the taxpayer's expense.

For better mitigate the negative effects of COVID-19 crisis is necessary an appropriate contribution by the private sector by way of an adequate remuneration for the introduction of general support schemes (such as a guarantee scheme) and the coverage by the private sector of at least a significant part of the cost of assistance granted, so as to ensure that there are incentives to return state money).

Also, in order to transform the state aid into an effective tool for supporting the real economy across EU, it is mandatory to impose sufficient behavioral rules for beneficiaries that prevent an abuse of state support, like for example expansion and aggressive market strategies on the back of a state guarantee.

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The Formation of Information About the Social Responsibility of Cooperatives for Integrated Reporting

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Abstract

The article is devoted to the development of methodology of accounting social responsibility indicators of consumer cooperative organizations. Interest in participation of companies in society development and other social indicators is shown not only by state authorities and public organizations, but also by private investors, which indicates a change in the previously established paradigms of the perception of commercial organization only as a source of profit. The concept of sustainable development has been adopted, based on its concepts of non-financial reporting [1] and integrated reporting [2]. In accordance with these documents and trends in the development of information content of organizations' reports to society, it becomes necessary to develop methods of accounting and reporting, allowing to accumulate and summarize indicators of social responsibility of business to society.

Keywords: Social Responsibility, Integrated Reporting, Integrated Accounting, Social Reporting, Social Indicators, Management Accounting.

Introduction

In recent years, there has been a lively debate in accounting journals about Integrated Reporting (IR) and sustainability reporting. There is no doubt that these two seemingly different concepts overlap. What is common is the desire of developers speaking on behalf of society to be informed about the environmental impact of business in a broad sense. The concept of integrated reporting requires disclosure of various aspects of business impact on the environment: social, environmental

and economic. The idea was put forward in late 1990. Since then, almost three decades have passed. Integrated reporting is produced by a limited number of organizations. John Dumay, Cristiana Bernardi, James Guthrie, Paola Demartini [3], dedicated their research "Integrated reporting: A structured literature review" to the study of publications on integrated reporting. They also studied the application of integrated reporting in the world. It may well be agreed that most scientists are studying the normative rationale, but not the practice of integrated reporting. In addition, there is a logical explanation for this. Integrated reporting goes beyond financial reporting. However, the credibility of the part of reporting that is not based on accounting remains a big problem. Many researchers write about it: Cristiana Bernardi, Andrew W.Stark [4], Vera Palea [5], Warren Maroun [6] and others. Warren Maroun [6] approaches integrated reporting from the perspective of ensuring the correctness of information. This is a serious challenge for an audit. The solution lies in the standardization plane of integrated reporting, which at present is not quite realistic. In South Africa today, integrated reporting is necessary, it is the only place in the world. Kathleen Hertz, Rupley Darrell, Brown Scott Marshall [7] draw attention to the inherent limitations of such reporting due to its voluntary nature. In this regard, they believe that few American companies disclose environmental, social and governance aspects. They do not believe that this information is of interest to investors. We do not share this approach because integrated reporting is necessary for the society, not so much for investors. GAAP and IFRS reports are generated for investors. Vera Palea [5] also wonders to what extent IFRS and sustainable development ideas converge and whether there is a possibility of standardization of reporting for all at the global level. In 2009, it was decided to converge integrated reporting (IR), sustainability reporting (G4) and the Global Reporting Initiative (GRI). The idea of reporting on financial and non-financial information in such a way as to show their impact on each other was further developed.

They reflect the social responsibility of business to society. The section on business social efforts is one part of integrated reporting. The types of social responsibility indicators vary. Some can be obtained from accounting and management accounts, while others can be obtained through public surveys. What are these indicators and which ones sufficiently and fully disclose the social contribution of the organization, whether the indicator is relevant. These questions have not been studied. There is not enough publication on this topic.

Social responsibility of business is inherent in any company, the scale and scope of social programs and projects may vary, but to some extent, they are implemented in any economic entity. Information on the extent to which the social mission is fulfilled is reflected in insufficient volume. Information on the social mission is practically not generated in accounting.

In our opinion, barriers to social accountability in cooperative organizations are:

- the traditional idea of low importance of information on social responsibility of business, established by managers, owners and external users;
- lack of a methodology for recording social indicators and underdeveloped management accounting;
- absence of unified standards for the preparation and presentation of social reporting and the formation of social indicators;
- unsystematic information on the implementation of the social mission, insufficient financial assessments and their subjective nature, incomparability and weak verifiability of the information received, as well as the inability to compare financial and non-financial reporting indicators;
- insufficient qualification of the personnel of economic and accounting services and managers, as well as the lack of culture of public information presentation;
- weak accounting process software;
- quite high cost of developing and implementing an integrated management and financial accounting system and additional non-financial reporting.

The works of Russian economists offer various options for solving the problem of reflecting the aspects of socially responsible behavior in reporting. A significant contribution to the study of the

possibilities of integrated reporting in forming social indicators was made by H. Drager [10], M. King [11], L. Roberts [12] Despite the wide polemics about the classification of social indicators and how they are reflected in companies' reports, no consensus has been reached among scientists.

At this time, problems also remain with the format and legislative framework for social reporting indicators. In this regard, the development of a terminological framework, a unified approach to defining the structure of the social report, a minimum set of indicators and their classification, the relationship between different types of internal (management) reports and social reporting are the most important tasks of accounting and economic services of consumer societies.

All the above problems require detailed research, and the development of appropriate methods to solve them is the purpose of this work. The tasks are to develop theoretical substantiations and form organizational and methodical provisions of management accounting and internal reporting that characterize the social responsibility of consumer cooperative organizations.

Research Methods

The methodological basis for research was the objective principles of scientific knowledge, the basic provisions of accounting theory and economic control. When proving the theoretical provisions and practical results, general scientific and special research methods were used: system approach, analysis, synthesis, abstraction, modeling, economic-statistical, etc. The methodological basis of the research was the objective principles of scientific knowledge. The complex approach will manifest itself in the aggregate of accounting, planning and control in the formation of a model of socially-oriented accounting. Scientific works of domestic and foreign scientists and specialists on the problems of theory and methodology of accounting management and financial accounting, financial and management reporting, management control, analysis, segment accounting and reporting, budgeting, international and Russian accounting standards, materials of periodicals, scientific conferences served as a theoretical basis. The research was based on objective principles of scientific knowledge, basic provisions of the theory of accounting and economic control. At the proof of theoretical positions and generalization of practical results the general scientific and special methods of research were used: analysis, synthesis, abstraction, modeling, economic-statistical and others. The system approach was used to clarify the conceptual apparatus of management and financial accounting, their interaction, development of the concept of forming information on segments in the internal and external reporting of cooperative organizations. The complex approach to a problem has caused carrying out of the researches covering management and such its components, as the account, planning and the control.

Results

There have been studied theoretical bases of management accounting, its parts: budgeting, production accounting, internal reporting; financial accounting and principles of accounting objects disclosure in reporting, including by segments; there have been studied discussion points of conceptual apparatus of management and segment accounting; theoretical aspects of development of management accounting and its concepts, order of its organization and methodical support, formation on its basis of internal and external financial reporting, principles of information disclosure on the center. A large amount of work falls on issues related to the social mission of consumer cooperation, declared as a priority by the Central Union of the Russian Federation, the existing theoretical research in the field of information disclosure about the social responsibility of organizations in integrated reporting, the assessment of the need and possibility of disclosure of such information by organizations of consumer cooperation, the development of methodology for the collection, accounting and control of socially-oriented information to manage the social function of the consumer cooperation. The organizations of medium and small businesses of the consumer cooperation system of the Chuvash Republic and the Republic of Mari El were surveyed. All this made it possible to substantiate the necessity to organize management accounting of socially-oriented information for the purpose of more complete formation of management information both

in internal reports of organizations and for its presentation in financial statements for external interested users, to put forward the thesis that socially-oriented accounting can be considered as a set of segment and management accounting by responsibility centers for a group of companies of district consumer societies, considered in the framework of the program. There was developed a conceptual model of management accounting on the centers of segmentation and responsibility as a result of research of communication links of financial and management accounting and their value for the unified economic information system of consumer cooperative organizations in the context of full and reasonable generalization and disclosure of economic and social components of integrated reporting, which was not previously proposed for use as a holistic methodology. With this formulation of the issue of social responsibility accounting, a system of indicators characterizing social activity in rural areas was developed, with the allocation of accounting and unaccounted for indicators, methods of management accounting of such indicators by segments and centers of responsibility were classified, for the purposes of such accounting a system of budgets, centers of responsibility, their interfacing with segments, a chart of accounts was developed, which details the information required to obtain reporting data on social responsibility, including the real data on social responsibility.

The financial accounting system is designed primarily to summarize monetary accounting indicators, which are formed in the financial statements intended for external users. Reporting by segments includes primarily monetary indicators identical to those in the financial statements, but grouped by segments of the organization, in addition, it may include natural indicators that are formed not in synthetic accounts of financial accounting, but in the management accounting system or analytical accounts of financial accounting.

Underecorded figures can be calculated both in monetary and in-kind terms, contain descriptions of activities or be based on a professional assessment of the situation. The first part of them (cash unaccounted indicators) can be obtained in the system of financial or management accounting, but subject to the introduction of additional analytical positions in the accounts and accounting registers.

Data that contain a description of activities (e.g., communication development, participation in educational activities, charitable activities) or indicators based on the assessment of the situation (e.g., the company's reputation, customer loyalty, customer satisfaction, the degree of social security of employees, the company's image) cannot be generated on a continuous basis in the system accounting. They are determined by accountants-analysts, marketers, other specialists periodically, on the instructions of managers based on a survey of consumers, customers, other stakeholders, personnel, study of the market situation, evaluation of competitors, research Internet portals, etc. The purpose of these indicators, the frequency of their collection, the methods of obtaining information and their approximate nature make it impossible to obtain information in the financial statements. From the point of view of forming social indicators, it is fair to note that part of these indicators in cooperatives is traditionally formed in the system of internal statistical accounting, which is a departmental affiliation. The purpose of such accounting is the compilation of internal statistical reporting, in which social and labor indicators are reflected in significant amounts. These indicators are also partly formed in the financial accounting (primarily monetary).

In line with traditional indicators of the performance of cooperative organizations and their financial situation, it is important to report on the fulfillment of the main purpose of cooperatives - the fulfillment of their social mission.

In terms of content, the social indicators can be grouped as follows: 1) indicators that characterize preservation of natural capital; 2) indicators that characterize the use of labor resources; 3) indicators that characterize the level of social security of employees; 4) indicators aimed at fulfilling the social mission; 5) indicators that characterize the state of the system of labor protection and safety; 6) indicators that characterize the implementation of social programs; 7) indicators aimed at strengthening the reputation of consumer society. Table 1. presents the recommended composition of these indicators.

Tab1: System of social indicators and their disclosure in internal and external reporting of cooperative organizations

Indicator orientation	Indicators Group	Character of indicators	Name and calculation of indicators
Environmental activities	Preservation of natural and productive capital	monetary, thousand rubles	environmental protection costs, payments for pollution of fixed assets
		natural, tons	pollutant emissions, waste volume, waste disposal
		activity overview	participation in environmental restoration, environmental and awareness-raising activities, activities aimed at reducing environmental impact
Social responsibility	Use of labour resources	natural, hour, %	number of employees, working time spent as a whole and per unit of production, labor productivity growth rate
		situation-based	staff demographics, staff education, qualifications
	Level of social security of employees	monetary, thousand rubles	average salary in the consumer society as a whole (software) and by categories of personnel, change (increase, decrease) of average salary, amount of expenses for voluntary medical insurance of employees and life insurance
		natural, %	the relation of the average software salary to the average level in the region
		activity overview	internal communications and corporate culture
	Fulfilling the social mission of consumer cooperation	situation-based	staff loyalty level, software rating among other trade and catering companies in the region, stability of relations with contractors, number of newly built children's and sports grounds
		monetary, thousand rubles	expenditures for charity events (tea tables for the poor, holiday gifts for veterans and pensioners, services at a price below market value, payment of the "cooperative pension" to honored veterans of the PO), expenditures for construction of children's and sports grounds
		natural, pcs, %	number of newly created jobs, share of young specialists, minors and pensioners in the personnel structure, number of charitable events
	Occupational Safety and Health and Injury	natural, pcs, person.	number (absolute and relative) of industrial accidents and occupational diseases, number of accidents, number of employees injured (including fatal accidents), number of lost working days in connection with the said accidents
		monetary, thousand	Occupational health and safety, accident and illness material assistance expenses

		rubles	
	Social programs	monetary, thousand rubles	level of expenditures for staff training, professional upgrading, payment for travel to the place of rest, health-improving vouchers, compensation for meals for employees, loans issued for the purchase of housing and other property, material assistance
Interaction with the external environment	Enhancing Software Reputation	situation-based	level of satisfaction of customers of shops and catering companies with the level of service and the range of products offered
		monetary, thousand rubles	charitable expenses
		activity overview	work on protection of human rights, promotion of consumer cooperative values among the population

In our opinion, the information base for the formation of these indicators can be a management accounting system integrated with financial and internal statistical accounting. As we noted in earlier works, accounting for the purposes of management can be implemented in the framework of accounting, which in this context, we understand the totality of production accounting (accounting system for the formation of internal reporting on cost and production costs) and financial accounting, which is legally regulated and defined as an accounting system for external reporting. Statistical accounting in this integrated accounting system is designated due to the fact that certain social indicators are reflected in statistical reports.

Disclosure of social indicators in the internal and external reporting of consumer societies will lead the management and staff of the organization to rethink their role in society, compliance with the principles of social responsibility of business, understanding the relationship between the process of creating value for themselves and the process of creating socially significant values and products.

Conclusion

There were formulated theoretical provisions for socially-oriented accounting of groups of related consumer cooperative organizations to manage the social mission of consumer cooperative societies in rural areas due to their non-profit legal status. Disclosure of socially oriented indicators in the internal and external reporting of consumer societies will lead the management and staff of the organization to rethink their role in society, compliance with the principles of social responsibility of business, understanding the relationship between the process of creating value for themselves and the process of creating socially significant values and products. Social responsibility indicators should make it possible to assess the cost and usefulness of the organization's activities for society as a whole and for its employees. The proposed methodology for recording and summarizing socially oriented indicators can also be used by agricultural cooperatives.

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The Model Accounting for The Risk Assessment of Business

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Annotation

With the growth of the enterprise's economy, a need for use of a risk-oriented approach to many management processes emerges. The control is not an exception. Control based on risk is based in its turn on risk management. Risk management means accounting and analysis of such risks. Risks are advisable to identify for each level of management and process. Processes at all levels are reflected in the accounting. The idea is to extract the necessary information from the accounting data to identify business risks. It is proposed to use the principle of "triple accounting" by Yuji Ijiri. At the same time, it seems useful to expand it to quadro-accounting. The proposed methodology is implemented in the environment of automated information systems (AIS), since the necessary detail can be obtained only with the use of computer technology. The main idea is that the change of capital is analyzed by changing the balance sheet data, and then by revenue and expenditure. The results are presented in formats 1 and 2. The results of factor analysis of capital due to changes in property and liabilities are presented in Format 3. The effect of changes in the components of profit on capital is presented in Format 4. The results of the analysis are used for identification and primary assessment of risks.

Keywords: accounting, analysis, risks, control, management, automated information systems

Basic theses

The proposed methodology for identification and primary risk assessment allows:

1. To use data of accounting systems on a systematic basis to identify business risks;
2. To ensure a continuous approach for identification of risks.
3. Provides a clear picture of the factors that affect capital gains.

Introduction

With the growth of the enterprise's economy, a need for use of a risk-oriented approach to many management processes emerges. The control is not an exception. Control based on risk is based in its turn on risk management. There are risk management models, for example, COSO ERM[1], ferma[2], ISO 31000[3] and others.

They describe the processes of risk management in different ways. But none of them contains methods of using accounting and management accounting data. At the same time, the accounting itself contains the most complete informational base on the economic activities of organizations, which can serve as a basis for any control actions, including risk control.

Work connected with the identification of risks is largely based on economic analysis. It is built on financial and management accounting data. Due to that it seems interesting to explore the possibilities of accounting and economic analysis for identifying and assessing risks. Risk management issues are studied by many scientists. Risks are considered from various positions, e.g. to ensure the security of IT systems built into ISO 31000 [2]. The other examples are: risks and their minimization associated with the activities of managers embellishing the state of the organization in case their revenues depend on profit [19] and business risks, arising in connection with social networks. [3, 20] Many authors consider risks from the quantitative side for various technical nonstandard situations; these issues are also related to management problems. [5, 14, 10]

Some authors explore the nature of risks, its tools and effectiveness. Then they form methods of using risks for business management according to their new experience. [1, 11, 12, 13 18] In the article "Is Risk Analysis Scientific?" [6] Hansson, S.O., Aven, T. raises very topical questions about whether the doctrine of risk analysis is scientific. Does this area of knowledge have inherent attributes of science: subject, method, own field of research, methodology, public needs? The authors make an affirmative conclusion, linking it with socially claimed phenomenon, holistic concepts, methods and applied tools. In general, we can agree with this conclusion. However, it should be noted that risks, especially in economic processes, are highly subjective at the stage of identification and forecasting. That is why the theory about risks should possess reliable methods of their estimation and analysis. In addition, objective methods for identifying, assessing and analyzing risks allow to use them in automated risk management systems and to control them.

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[1] URL: http://www.pqm-online.com/assets/files/lib/std/iso_31000-2009%28r%29.pdf

[2] URL: http://www.ferma.eu/app/uploads/2011/11/a-risk-management-standard-russian-version.pdf

[3] http://www.valtars.ru/files/upload/Actual_info/coso_upravlenie_riskami_organizacii_integrirovannaya_model.pdf p. 41.

Meanwhile, accounting is a quite reliable and objective informational system. It can be used for risk management purposes, for their assessment and analysis. Accounting possesses sufficient objectivity, degree of automation, it can be a basis for constructing objective and sufficiently unambiguous universal methods of working with risks on the basis of IT systems. First of all, these financial and economic risks have internal nature. However, the risks of marketing, currency, etc. can also be identified.

The purpose of the survey is to develop and justify the methodology of using automated accounting systems to identification, evaluation and analysis of business risks. The objectives of the survey are the research of accounting capabilities for identifying risks, the building of a principled model of working with accounting risks and the developing of main ways of risk analysis.

Methods

In modern conditions there are two possible basic principles of accounting, which can be distinguished as a result of scientific and practical activities of accounting specialists:

- uniographic;
- digraphic.

Uniographic principle is the accounting in the form of a usual register entry in a list form. Digraphic principle is the accounting based on a double register entry.

In recent decades, a new paradigm has appeared in accounting theory, the so-called triple-entry, which is influenced by Yuji Ijiri. [7, 8] Ijiri believes that “double bookkeeping is not an absolute system and can be logically expanded” [7, p. 745].

The triple-entry accounting principle means that all accounts are divided into static, dynamic and impulse. Static accounts keep records of assets and liabilities, using the usual accounts, but entries are made on a debit basis. Dynamic accounts take income and expenses into consideration, entries are made on a credit basis. Impulse accounts keep records of the rate of change in income and expenditure in a certain section, on special accounts called 3D. The accounting proposed by Yuji Ijiri is very indicative for managers, since it visually and intelligibly reveals the growth of capital over the period; moreover, it is demonstrated in comparison with the growth of property. Thus, it becomes clear what types of assets are used for incremental capital investment and also how has this capital multiplied. The situation associated with loss is similar.

Like any new theory, the concept of triple-entry has its limitations, among the main and most important one is the lack of universality in the set and the types of factors that affect capital with a positive or negative effect. In fact, the accounting on the 3D accounts (literally in the third dimension, considering the power of impulse) is very conditional, since the result of the analysis of the influence of the factors of growth (or reduction) of capital is taken into account. Many forces cannot be determined from accounting data, since the change in capital is influenced by numerous external and internal factors, for example economic and political situation in the world and in the country, the professionalism of management, the state of the market in which the organization operates etc. Factors that can be arithmetically calculated and recorded on a 3D basis, reflect the consequences of market conditions influence on the growth of capital through changes in the composition of assets and profitability of sales.

On the one hand, a set of indicators that can be disclosed using information from accounts is limited. On the other hand, it is not universal, frequently subjective and will depend on the training of personnel involved in such accounting. Many researchers of accounting pointed to all these and other shortcomings in their surveys [4, 9, 15, 17, 21]

We believe that the technique described by Ijiri cannot be recognized as the accounting one. It can be used to construct analytical calculations because it is more about the form of presentation of accounting data and the analysis that follows from it. It is quite possible to agree with S.A. Samusenko, S. N. Karelskaya and E.I. Zugoy [9, 15] that 3D is convenient to take into account the influence of factors. It will allow to disclose the magnitudes and causes of the change in capital - the most important information for the accounting model based on profit management. In our opinion, this model should be recognized at the same time not so much as accounting, but analytical; model of presentation and disclosure of analytical information according to accounting data. This is why we support the conclusions of S. N. Karelskaya, E.I. Zugi on the availability of additional accounting information capabilities of triple accounting, along with significant limitations, contained in the article “Triple Accounting by Ijiri” [9],

It is necessary to note one more shortcoming. The records that are proposed for 3D reveal the influence of factors on the dynamic index of the organization’s performance. They characterize the change in capital. Factors that change the "static" data on assets and liabilities, that also affect capital, remain aside. A situation where revaluation of assets emerges with the attribution of its value to additional capital can be a good example. The capital increases, but does not form the financial result of the activity. In addition, changes in the composition of the organization's resources can influence subsequent events that directly affect the organization's capital change in the future. Such changes can be judged only by changes in the accounts of assets and liabilities. Using the terms of Ijiri, the change in the structure of resources through the change in the values of certain assets and liabilities is a consequence of reveal of impulses and forces. They can also be measured the same way. It is important for the organization to analyze their size and composition.

In our opinion, the model of the triple accounting of Ijiri gives additional possibilities based on the fact, that it fits well into automated accounting systems. Accounting and management accounting is a subsystem of the organization’s AIS. It implements the possibility to build special form of report, which transmits information to users automatically. In this case it is possible to receive the following results without changing the essence of accounting and standard financial statements: 1) the balance sheet, with an emphasis on the "capital" indicator, 2) the report on the financial results (profit and loss), indicating capital gains, 3) transcription of main factors that influence the capital. This allows management to look in a new way at the familiar data. By forming standard operations to determine the influence of the most objective factors it is possible to provide the necessary unification, which can be detailed in the future.

Such an analytical layout is convenient in many cases as a "starting point". We believe that it is possible to organize accounting in order to obtain information for risk management and risk control. At the same time, we believe that such information is analytical by its nature. This does not contradict the idea of accounting the risks after analysis, because the identification of risks is based on analysis.

Results

On the one hand, factor analysis is an instrument of control, because managers always need to monitor the results of their management on key indicators, among which there will be factors that change profit. On the other hand, control is inextricably linked to risk management, since risk management, as well as analysis, is part of the monitoring toolkit. Therefore, it is possible to obtain objective information for risk assessment by monitoring the components of the financial result from the standpoint of their dynamics and the reasons for changing capital, assets, liabilities, incomes and expenses.

Depending on which model of presentation of data on the financial state of the organization (at historic value or at fair value) is recorded as an accounting one, the change in capital will reflect the increment in the organization's resources based on the actual mass (historical value) or fair value at the submission date - in any case, the change in the capital will be the key indicator characterizing the activity of the organization at a specific moment (at the reporting date). In order to understand the

existing risks of not achieving capital gains in the established amounts (calculated at historical or fair value), it is necessary to analyze the influence of various factors on its magnitude.

In our opinion, based on the idea of the triple-entry of Ijiri, there is an opportunity to improve it in the framework of the AIS. It is more expedient to construct a **quadro-model** that can be successfully applied as an analytical technique in order to manage the risks that are seen from the results of accounting and indicators of financial statements. We regard accounting in this context as accounts and generalization in the system of accounts by the principle of double-entry. Accounting reports are regarded here as reports compiled from the data of accounts in any format, including financial and managerial.

The model of such an analysis can look like this.

The first format characterizes changes in resources. An increase in monetary terms is determined for all accounts of assets. It can be expressed as a positive value or negative if there is a decrease in the asset in the sum expression. Similarly, the amount of change in the debtor indebtedness can be determined. Obligations also participate in calculations, but their changes should be taken into account with the opposite symbol. For example, the increase in liabilities will have a negative value, and their decrease will be taken into account with the symbol "+". Thus, capital gain will be determined for the analyzed (reporting) period as a result of the first calculation.

The second format characterizes the changes in the use of resources. It is built on the basis of information on the accounts of sales, profit and loss. Income and profits will be positive values, costs and losses will be negative ones. The resulting value is the financial result of the period (the reporting (analyzed)). This value will be equal to that obtained in the first calculation, in other words - to the capital gain of the organization for the reporting (analyzed) period.

The third format characterizes the changes that have occurred in the accounts of property and liabilities. Changes in property accounts are affected by two objective factors: quantity and price. The influence of these factors should be specified for each type of property. Thus, risk management will have information about the reasons for the decrease (increase) in assets for use in risk analysis. It is necessary to determine the factors that affect the magnitude of the change in liabilities. Here, turnover in the comparison of the initial and final values for understanding the trend and other factors can be considered as objective factors.

The fourth format reveals the change in capital under the influence of various reasons. Since the change in capital is the financial result of the reporting (analyzed) period, the influence of factors can be realized through the simple formula of balance sheet linkage. However, for the purposes of control and risk management, it is preferable to have calculations related to the assessment of the effect of factors on sales, on cost, on other income and expenses. It is possible to use a multiplicative formula describing the dependence of the main indicator on several factors. In this case, however, it is possible to use the idea of Ijiri: the generalization of sales in terms of price / quantity factors for aggregated groups, specific products (types of work), cost of sales in terms of cost elements, and within them, regarding more specific factors. The main idea is that the change in capital must be fully disclosed in terms of the factors that affected its magnitude.

Such accounting cannot be done manually it makes no sense without the use of accounting automated systems because of the great complexity that will not be justified by the value of the information received. As a result, we will receive automated calculations based on the accounting data and the working balance. This is how the most preferable scheme of the quadro-model will look like (Figure 1).

Source of information			
Accounting balance		**Statement of financial performance**	
Format 1	Format 3	Format 2	Format 4
Increase in assets and liabilities for the period	The impact of factors on asset growth	Total income for the period (by type of business and product type)	The influence of factors on the total income of the period (by type of business, quantity / price factor)
Addition:			
Change in stocks (by types) over the period	Influence of quantity and price factors	Sales revenue	Option 1: Influence of price and quantity factors Option 2: The impact of factors of profitability of sales and profit
Change in debtor indebtedness for the period	Influence of turnover factors	Cost of sales (minus)	Influence of factors depending on the costing items (quantity and price of material costs, the size and productivity of the personnel costs, etc.)
Change in monetary funds for the period	Influence of turnover factors	Commercial expenses (minus)	
Subtraction:		Administrative expenses (minus)	
Change in liability	Influence of turnover factors	Other income	Factors of interest rate, unplanned income
		Other expenses (minus)	Factors of interest rate, unplanned income
		Taxes (minus)	Factors for changing the taxable base
		Changes in capital that are not included in the financial result of the period (+/-)	Factors influencing the emergence of such income/expenses
Capital gains for the period	**Capital gains for the period**	**Capital gains for the period**	**Capital gains for the period**
	F i n a l d o c u m e n t		
Report on changes in assets and liabilities	Report on the reasons for changes in assets and liabilities	Report on total capital for the period	Report on the impact on total capital

Figure 1: Conceptual scheme of the quadro-model of risk identification

Discussion

How will the future work with the results of calculations to identify and assess risks look like? We can suppose that the “Report on changes in assets and liabilities” contains information on the growth of finished goods for certain types in a warehouse, while the growth is possible due to a quantitative factor, as can be seen from the "Report on the reasons for changes in assets and liabilities". In order to understand the danger of the current situation, it is necessary to study the data of the "Report on total capital for the period", from which it was clear whether there were sales of this type of finished goods, in what quantity and at what cost. It can be seen in the "Report on the Effect on Total Capital" what is the trend in sales of this product in comparison to the past period. Perhaps the growth in

inventories is due to the growth in sales in general. At the same time, it is necessary to study the production program and the portfolio of orders for these products, as well as the state of the market.

There may be another situation where the "Report on total capital for the period" and the "Report on the impact on total capital" in comparison with the data of the same reports for the previous period show that: 1) the share of sales of a certain product is declining; 2) the selling price of this good decreases; 3) the quantity of a certain product decreases. The external market risk can be seen, and it can be minimized by reducing the production of this product. For a full assessment of the situation on the " Report on changes in assets and liabilities", we can see the scale of stocks of this product in warehouses, as well as the materials necessary for its production. How does the cost of materials and goods behave in relation to the selling price of this product on the market? This information needs to be evaluated in order to understand the quantitative and qualitative characteristics of the risk, as well as to develop management tactics for the identified risk: to take no restrictive actions, to develop measures to reduce the risk to an acceptable level etc.

The resulting documents help to identify the various risks of the organization. "Report on changes in assets and liabilities", "Report on the reasons for changes in assets and liabilities" and "Report on total capital for the period" are more helpful in identifying market risks, while "Report on the impact on total capita" also helps to identify market and financial risks, especially in comparison with such the same report for previous period.

The proposed final documents should be built in electronic form with the ability to print out the necessary fragments due to their comprehensiveness. In addition, signaling documents should be issued in connection with the emergency situations, for example, a decrease in sales with a simultaneous increase in stocks etc. Forming a list of situations that indicate risks is a long and difficult process. Signal documents should be used as primary documents for registering risks. This should be a push for the registration by the Internal Control Department.

It is necessary to understand which accounting reports are appropriate for the purposes of the quadro-model. According to the financial reporting standards, various reserves are formed in the account. The need for this is caused by the uniformity in the displaying of the financial result by periods. It is necessary to use reporting compiled at historical cost for the purposes of accounting of risks. That kind of reporting contains the financial result not distorted by additional leveling procedures.

Reporting that reflects fair value can be investigated separately. The value of the proposed model is that it can be used in both valuation at historical cost and in valuation at fair value. The increase in capital in the second case will not always correlate with the financial result, since not always the fair value is attributed to the financial result. [16] This moment is taken into account in the model: the line "Changes in capital not included in the financial result of the period" was added, and the increment for the period in the value of aggregate capital rather than net profit is also considered.

The format of the quadro-model built on the basis of the "Cash Flow Report" is of particular interest. Such a report provides information on the financial result of the paid sale. In comparison with the reports constructed on shipment, the financial risks caused by the gaps between shipment and payment, as well as the risks of project financing, can be identified.

Further research should be aimed at carefully developing the signal indicators to establish the identified risks for automatic recording.

Conclusion

Risk management and control become the need for systems that operate with significant information flows. Control under such conditions is possible only with the use of automation. Moreover, it is possible to speak about risk management and their accounting and analysis only in the context of information technology.

Automated risk accounting systems require objectively generated algorithms based on specific data collected in the AIS. The source of such data is accounting systems.

The source for risk identification is economic analysis. These risks are further assessed and monitored through analysis. It is necessary to separate the analysis in different processes.

In order to identify risks on the basis of accounting, it is necessary to receive reporting forms containing the result of analytical calculations suitable for identifying risks.

A simple analysis of the indicators that form the capital can be the starting point. Augmentation of capital is the goal of business. The threats to this goal and the associated risks should be determined. The model of presentation of capital from accounting reports is the most reliable. This is the meaning of the quadro-model of risk identification.

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Implementation of the Possibilities of Regional Specialization in the Agricultural Sector of the Russian Economy

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Abstract

The problem of regional specialization as the most important factor in the economic development requires close attention, since it largely depends on improving the efficiency of public production. The article deals with the conditions for implementing the possibilities of regional specialization in the agricultural sector. To them the authors refer general market conditions for the functioning of the agricultural economy – a feature of the consumer's assessment of food products, conjunctural macroeconomic fluctuations as well as structural factors – the possibility (or lack thereof) of product differentiation, entry into and exit from the product market. The article describes conditions specific to the agricultural sector that lead producers to take the role of "price takers". To overcome them for the purpose of ensuring successful regional specialization in the agricultural sector it is necessary to implement a number of conditions related to the availability of production resources, the nature of product demand, general conditions for the functioning of agricultural enterprises.

Keywords: Regional Specialization, Product Differentiation, Pricing Policy, Agricultural Production, Agro-Industrial Complex, Production Resources, Dualistic Economy, Agro-Industrial Integration, Agricultural Production Cooperative.

Introduction

Interregional integration into the national economic system is carried out through the effective specialization of regions. This process has objective prerequisites, which are manifested in the presence of certain conditions for the development of a particular industry in the region. Being a phenomenon of the macrolevel of the economy, interregional integration occurs as a result of the interaction of many phenomena of the private level of specialization of specific production units of industry, agriculture, and other sectors of the economy. Therefore, interregional integration can be

called a concentrated expression of the specialization of individual economic units and its consequences. It leads to the natural integration of the region into the national economy.

Materials and Methods

The object of the research is the process of regional specialization in the modern domestic economic system and its most important consequences in the agricultural sector.

The subject of the research is stable, consistently recurring prerequisites, cause-and-effect relationships and consequences of the regional specialization in modern conditions of management of the agricultural sector of the Russian economy.

The theoretical basis of the research has been based on scientific developments, conceptions of the representatives of the classical, neoclassical, and institutional directions of economic thought in the theory of the territorial distribution of production, territorial problems of the economy, and regional specialization. The concept of comparative advantages of D. Ricardo and the factor concept of E. Heckscher – B. Ohlin are recognized as the fundamental provisions in this area. Among the foreign authors of recent decades in this field of knowledge, we can distinguish the works of W. Izard on the territorial problems of the economy; the works of M. Chishholm, describing various areas of the theory of regional economic development; also the works of A. Lesh, H. Bos, S. G. von Tyunen, R. Faini, P. Diken, P. V. Lloyd, P. Krugman, M. Obsfeld and others.

The Soviet scientists P. P. Bondarev, G. I. Granik, S. G. Grodsky, V. I. Gromov, N. N. Nekrasov, A. S. Novoselov, V. E. Rybalkin, V. P. Chernykh, S. I. Sharapov, R. I. Schniper and others made a great contribution to the field of theoretical and practical development of territorial and regional problems of economics and specialization.

The theory of the territorial distribution of production and specialization is currently being developed by Russian scientists V. N. Arkhangelsky, P. S. Zavyalov, A. S. Marshalova, A. S. Novoselov and others.

The methodological basis has been formed by historical and logical, formal and content-related, individual and general approaches, deductive and inductive research methods.

Research Results and Discussion

Transformation of international economic relations in modern society has revealed the difficulty of achieving one of the main goals – increase of the efficiency of public production. This fact is particularly evident in the territorial aspect. Territorial division of labor, coupled with regional specialization and accompanied by a parallel process of industrialization, can affect this dangerous trend and turn it to equalize the conditions for the growth and development of regions and increase the efficiency of public production in general.

At the same time, the study of the process of regional specialization, identification of its prerequisites, regularities, principles can help to solve the practical problem of deriving a maximum profit from the general process of public, private, and individual division of labor, as well as to develop measures of state influence on this process.

In this connection, consideration of the region's ability to specialize in agricultural production should be based on the conditions created in the economic system that is developing towards industrialization. The conditions for working on the market of agricultural production, complicated by a number of general and particular circumstances, require detailed consideration.

The general market conditions for the functioning of the agricultural economy include, first of all, the peculiarity of the consumer's assessment of food products. Unlike most industrial products, food products have a sharp decrease in marginal utility when consumption increases. This feature of the

consumer's assessment of the marginal utility of the product is due to the low elasticity of demand for food, both in terms of price and consumer income.

The aggregate demand responds to agricultural products and macroeconomic fluctuations in a peculiar way. During the recovery phase, the growth of food demand may occur very slightly or may not occur at all. This is also due to the rigid nature of demand for it, as well as the fact that in the conditions of growth, when there is an increase in consumer incomes, the share of population spending on food in their total expenditures inevitably decreases. As a result the demand for food becomes even less elastic in price; in some cases, it does not respond to prices at all. These special demand factors create the conditions for a relatively small increase in supply that cause the market price of food in general, and especially raw food, to fall sharply.

Under such conditions, that is, in the absence of a significant increase in demand, a good harvest in crop production, as well as an increase in livestock and livestock productivity in animal husbandry, can act not in favor of agricultural farms, but to their detriment. In practice, everything depends on the supply: on the change (rate of change) of its volume and the ability of producers (sellers) to influence the volume of the supply and pricing. In some industries, inelastic demand creates excellent market conditions for product sales. These are usually industries where the structural features of the market allow producers (sellers) to manage the volume of supply and set the right prices. This is the case, for example, in the markets of pharmaceutical products (the point refers exclusively to manufacturers).

In terms of the number of sellers, it is characterized by an oligopolistic and often monopolistic structure, which allows it to act very actively in pricing. The product type also gives the manufacturer of this product a good opportunity to influence prices. The product is homogeneous in its class, and often unique and irreplaceable. Freedom to enter and leave the market, or, on the contrary, the difficulty of entering and leaving it plays an important role in the supply and pricing of products in the market with strong demand. It is very difficult to enter the pharmaceutical markets and leave the industry due to the specifics of technologies and a number of other circumstances. This gives additional opportunities for companies operating in the industry. Operating firms can safely, without fear of increased competition due to the emergence of other firms, conduct their pricing policy.

Thus, for successful (we can say, guaranteed successful) activity in an industry where products by their market nature have a strong demand, a set of favorable conditions is needed to create a market form of imperfect competition giving the manufacturer monopoly power. It is equally important that these conditions coincide with the nature of the consumer's product evaluation and the rigidity of demand for it.

In the food market, however, with almost the same rigidity of demand for products as in the pharmaceutical industry, the situation is different with the product supply and its dynamics. An increase in the volume of supply, if it occurs on the scale of the country's market space, even if this growth is relatively small, is nevertheless able to sharply reduce the market purchase prices for agricultural products. The volume of supply of raw food, the main product of agricultural farms, is determined by factors, most of which do not depend on the economic entity. Because of this, the volume of supply of agricultural products is subject to significant fluctuations.

The structural factors of agricultural markets are combined in such a way that they become similar in structure to the model of pure competition. With a comparable rigidity of demand for products, unlike the pharmaceutical industry, the raw food market is characterized by a very large number of producers. According to this indicator, it can not be attributed to any type of imperfect competition, and this feature already deprives the producer of agricultural products of the slightest opportunity to influence prices, fix them on the basis of production costs, and act as a price finder.

It is known that differentiation of products in all possible parameters also gives power over the market and pricing. This differentiation is widely used in many industrial sectors, especially in light industry. In the food industry, there are fewer opportunities to differentiate products than in other

industries. They are limited by the fact that consumption is physiological by nature. However, agricultural producers are particularly deprived in this regard, since they have no possibility of differentiation under normal conditions (if it appears, it is minimal and only under special conditions, for example, when new varieties of plants or new breeds of animals appear). Entry into and exit from the market for raw agricultural products is almost free of obstacles due to the small costs associated with them. The ease of entering and exiting the market dramatically increases competition in the industry, completely depriving manufacturers of any influence on pricing.

In the domestic economy, the factor of misconceptions is often in considerable force in agricultural production, which also contributes to the rapid growth of supply in the agricultural market with constant demand. Since in practice there is no reduction in the overall price level, it is advisable to consider relative prices (price ratios) in the context of an increase in the overall price level. Agricultural farms are quick to notice an increase in purchase prices for grain, vegetables, meat, and milk. However, as a rule, they pay little attention to the increase in prices for most consumer goods and services. It affects the rationality of actions of economic entities in the agricultural sector and leads to its decline. They increase production, considering that payment for labor and manufactured products has increased. This situation takes place at present time and recurs from time to time. Manufacturers with a fair delay reappraise the market situation and take the appropriate economic decision.

Consequently, all the structural features of the market are aimed at making the producer of raw agricultural products a price taker who does not have any opportunity to proceed from his interests in pricing. Having a natural and inevitable in market conditions tendency to increase the supply of agricultural products, combined with a sluggish response of demand to prices, this means a constant threat of a collapse in prices for it.

Agricultural production as a branch of specialization is also characterized by internal factors. These farms are characterized by higher survivability as producers, which is maintained in market conditions and confirmed by practice. Many agricultural farms in the current conditions work, manufacture products for the market when the revenue does not only make any profit, but even does not cover costs. Nevertheless, the agricultural sector continues to function as a producer of commodity output. And this is certainly due to the fact that the inertia of the traditional consciousness of the agricultural producer continues to operate.

Survival in these extreme market conditions occurs at the expense of the labor part of income, that is, the employee's share in it – remuneration of labor. It is lost, not returned by the market in part or in full. And the worker, whoever he is, the owner of a peasant farm, a member of a cooperative organization or an employee of a large agricultural association, does not receive part of the payment for his work. The non-return of part of the labor share in the income of the agricultural economy is a characteristic feature of the dualistic economy, when the economic system of the country consists essentially of two subsystems with different conditions of production and distribution of income.

In theory, the model of the dualistic economy is described and usually associated with the name of V. Levis. It is described in relation to countries with high population density, limited natural resources and poor capital on the basis of the study of the real labor market of such countries as India, Egypt, Pakistan, and others. The industries of these countries develop at a high rate, acquire, use the achievements of scientific and technological progress, create modern infrastructure, integrate into the world economy. Wages in industry and other industrial sectors of the economy are formed according to the marginal product of labor. In this case, the law of marginal productivity applies. At the same time, the agricultural sector of these economies retains many features of the pre-capitalist economy in the forms of production and distribution. The supply of labor is excessive, and the level of wages in agriculture does not respond to the growth of demand for it. The law of marginal productivity in wages does not apply. It is dominated by customs and traditions. Wages and their level are nothing more than an institutionally defined minimum oriented to the average product of labor. In the Russian economy there are all signs of such dualism, especially with regard to agriculture.

The dualistic economy itself is a product of this peculiarity of the agricultural economy as a production unit – to work to the last possible stage of survival. In the case of the dualistic economy, this is essentially due to the refusal of the agricultural sector worker from part of his wage and his consent to work for a much lower wage than in other industries.

The phenomenon of the dualistic economy is characteristic of Russian agriculture and raw food production almost to the same extent as of the economies of the above countries. The survival rate of agricultural farms is also enhanced due to the fact that they can exist, in contrast to the industrial enterprise, in some mode of self-sufficiency. It can, under certain conditions, consume its own products.

The specialization of the farm in the agricultural sector may not be as narrow as in industry. Natural conditions of production make it possible, moreover, profitable its structural diversity. An agricultural farm can produce several types of products at the same time, using the advantage of alternating crops. It can simultaneously engage in crop production and animal husbandry. This provides significant benefits because it allows to use by-products of crop production.

The biological nature of the product in agriculture is due to a special rhythm of production, which can not be changed with relative ease, as in industry. In industry, the company can vary the production cycle at its discretion. In agriculture it is impossible: in crop production the rhythm of production is dictated by the changing seasons and the ripening period, in animal husbandry – by physiological limits of the periods of gestation, growth of young animals, fattening.

Since the agricultural farm operates in conditions of seasonal production, this has a number of consequences in the use of fixed assets. Some types of machinery are operated only a few days in a year, but their physical and, in particular, moral wear and tear occurs even when it stands idle.

In agriculture, rationalization of production combinations and response to market price signals also meet difficulties and obstacles. Compared to industry, the possibilities of rationalizing resource combinations are very narrow and there is no room for maneuvering. The agricultural producer cannot forecast his future costs with the same accuracy as in industry. It's impossible both in crop production and animal husbandry. Much depends on specific weather conditions, natural phenomena, the spread of diseases, always unpredictable, sometimes having the nature of epidemics.

Many of these factors are particularly strong in the agricultural sector of such economic systems as Russia, with its extremely risky for agriculture and difficult for animal husbandry natural and geographical conditions.

Thus, under normal conditions, specialization in the production of agricultural products for many Russian regions, although highly desirable in economic, social, demographic, and ethno-cultural terms, is associated with a number of difficulties and it is necessary to make significant efforts to turn negative factors into positive ones. However, the conditions of production activity in the agricultural sector in modern economy are changing rapidly and in many cases they contribute to the solution of the problem of adaptation.

These changes should be considered in the following areas:

a) conditions for the availability of production resources;

b) the nature of demand for products;

c) general conditions for the functioning of agricultural farms.

The most static indicator is the availability of production resources, in modern domestic economy it has a tendency to change, and not for the better. The indicator of labor supply is deteriorating due to incomplete reproduction of the labor force, and a decrease in the working-age population. The quality

of the labor force is declining, and its degradation is the result of the long lack of demand. At the same time, the quality of the labor force is better in peasant (farm) enterprises, since their labor potential has been formed mainly by specialists of agricultural enterprises, and the least competitive labor force has been concentrated in the households of the population.

Many employees of working age are willing to work in agriculture, if this industry creates tolerable conditions for price ratios and wages. In recent years, the share of officially employed people in agriculture has significantly decreased. This trend is typical not only for the Chuvash Republic, but also for the entire national system as a whole. Previously, those who worked in various sectors of the rural economy were displaced into the households of the population, in so doing they lost all types of social support, most of them are forced to survive by subsistence farming – that is, there is a big social problem here.

The paradox of the rural economy is that with significant unused labor resources in rural areas, agricultural farms often lack labor. The main reason is extremely low wages in this sector of the economy.

As a result of non-use, the quality of another basic production resource – land – also deteriorates. Erosion occurs, soil fertility deteriorates, and agricultural land is overgrown with shrubs, forests.

The problem of successful functioning of the agricultural sector within the strict framework of modern market conditions indicates that the industry is forced to adapt to such conditions, which are becoming more complicated.

For crop production, it can be expected that farms will look for an opportunity to extend the period of production use of land, reduce the duration of vegetation, and increase the shelf life of both raw and processed products.

The extension of production use of land is possible by creating greenhouses. At the same time, the reduction in the relative price of energy carriers creates favorable opportunities for highly profitable activities of greenhouse farms.

The duration of vegetation can be reduced, and this reduction is carried out by planting hybrid varieties, genetically modified plants, etc. But this possibility has a very strict limitation, regulated by nature. This direction towards change and adaptation is inevitably accompanied by a change in product quality, and not just its worsening, but a mutation of the natural parameters of plants and their fruitage.

Extension of the shelf life of the raw product as well as shortening of the ripening period of the product has natural limitations, but not as severe as it has. At least, practice shows that this problem is successfully solved in the regions and countries where the main market flow of fruits and berries comes from.

The increase in the shelf life of processed products is successfully carried out for all food groups. As a rule, increase in the shelf life through canning and adding preservatives is combined with a diverse differentiation of food products. This gives a considerable gain not only in the possibility of more profitable sales. The lengthening of the shelf life, combined with product differentiation, also brings changes in market structures, particularly by product type. The agricultural sector passes from the category of producer of identical products into the category of producer of differentiated products. For him, the market is characterized not by the position of a purely competitive price taker, but by the position of a price finder, i.e. he gets some opportunities to influence the formation of market prices.

Due to the fact that product differentiation actually separates the product into a special unit of competition, the number of producers with whom it is necessary to compete is limited and reduced. This also improves the market position of the food producer.

Product differentiation and longer shelf life also change the conditions for entering and exiting the market. It becomes more difficult due to the fact that deep processing with subtle differentiation increases the costs of entry and exit. This leads to further reduction in the number of competing manufacturers.

Also, the demand for differentiated products with a long shelf life becomes more elastic both in price and in consumer income.

Changes that occur as a result of product differentiation both from the supply side and from the demand side soften the overall market position of the food producer when production volume increases. More elastic demand and more manageable supply prevent a possible collapse of market prices.

When the region specializes in agricultural production, it should be assumed that the livestock sub-sector of agricultural production has its own adaptation features. In modern conditions, livestock farms are increasingly cooperating in agricultural holdings. In animal husbandry it leads to the dominating position of the largest associations and complexes that produce their products on an industrial basis.

In this case, crop production to a great extent becomes an appendage of animal husbandry, working mainly for animal husbandry. The reason for this is the fact that from the point of view of the stability of the market functioning of the enterprise, animal husbandry is a more convenient and promising occupation than crop production. It is easier to overcome those obstacles that are more difficult for or beyond the power of crop production: seasonality, limited differentiation of products, the need to create artificial conditions, the problem of year-round income.

In terms of technology, based on the accumulated experience of industrial countries and according to the rational basis of market integration of animal husbandry, we should expect the process of raising livestock and its fattening to become simpler. On the other hand, the desire to reduce the time is evident. It seems that it is less difficult to do it in animal husbandry than in crop production, at least there is no such strict dependence on the annual natural cycles. There is also a huge experience in this regard, for example, in the production of poultry, eggs.

This evolution of the food market, agricultural production is an objective phenomenon. Although they are carried out by people, in essence, they do not depend either on the will of organized groups of people (collectives) or on the will of an individual. They are dictated by the world order in the sphere of material goods which is established by the market-capitalist system and which they are forced to obey, under the pressure of which economic entities and entire industries are forced to operate, including the agricultural sector we are considering.

The division of the food market into two parts, consisting of products that differ in quality, natural purity and price, has already taken place in many countries. The domestic food market also very intensively implements this differentiation. This fact puts regional food producers before a choice: in the production of which products they will specialize.

The problem of entering the market of a certain type of product forces enterprises to pay attention to the prospects for such adaptation and integration into the national as well as international market. The adaptation of the industry does not mean that this will happen en masse. The most important result of changes in the conditions of the agricultural sector, which has not only economic but also social significance, is the reduction in the number of farms and enterprises due to their enlargement. It is obvious that small and medium-sized enterprises will strive to find an opportunity to stay in the industry, settle down in it in new conditions and work as a full-fledged, competitive market economy. It seems to us that they can get this opportunity when organized in the form of a production cooperative as an association for joint production, processing, and sale of agricultural products.

Here begins the sphere of organizational forms of management of the agro-industrial complex of the region, which is as important for the adaptation of the industry to the changing conditions of functioning and specialization as the sphere of market units and the division of food market into consumer and high quality products sectors.

In the 80s of the XX century, the main organizational forms of agro-industrial integration were agro-industrial enterprises (collective farms, state farms, poultry farms, etc.), agro-industrial complexes (where the role of integrator was performed by enterprises, mainly processing fruits and vegetables) and agro-industrial associations (the role of integrator was performed by agricultural enterprises). In the 1990s, all these state-owned enterprises were reorganized into joint stock companies that transferred the controlling stock to labor collectives of mainly processing enterprises, whereas agricultural producers received insignificant stock. As a result, agricultural enterprises had no power or dividends, since the management of the processing enterprise controlled production.

Of the existing forms of integrated agro-industrial units (agricultural firms, agro-industrial complexes, holdings and cooperatives) participating in the implementation of all of the above opportunities to gain from the specialization of the region and the country as a whole, such type of organization as agricultural production cooperatives can be successfully used. They should be organized taking into account the new realities in the economy, when they do not and cannot have non-working members and absentees, when everyone is interested in the results of the collective's activity and takes the most active part in production and sale. In this case, cooperatives can compete with holdings in efficiency.

In practice, two types of agricultural cooperatives can be observed: vertical producers' cooperatives and horizontal production cooperatives. In cooperatives of the first type, each participant retains his legal, economic and economic independence, can maintain on an equal footing processing enterprises, maintenance departments, etc. Vertical cooperatives make it possible to satisfy to maximum the needs of their farms. Members of cooperatives of the second type unite only for the production of agricultural products and do not have independence.

The main task of agricultural cooperation is to form an organizational and legal system to protect the interests of agricultural producers by creating self-governing forms of management. To date, the main needs of agricultural farms are the sale of raw agricultural products of crop production and animal husbandry at prices that cover costs and provide the necessary rate of return, as well as timely high-quality processing which enables to differentiate these products and to increase demand elasticity by the price. Cooperation provides agricultural producers with timely sales, transportation, and processing of products. The agricultural farm can independently set selling prices, and not accept low prices of intermediaries and processors of agricultural raw materials.

The development of cooperative relations between agricultural producers and processing enterprises will strengthen the influence of the latter on agricultural production in the region – the requirements for the professional level of personnel, for the quality of raw materials, for the rhythm and continuity of supply will increase. This relationship also has the opposite direction – at present, it is becoming profitable for agricultural producers to switch from the gross approach in growing products to point production on orders of processing enterprises, this approach allows producers of agricultural raw materials to solve the acute problem of selling products. The establishment of cooperative and integration relations will help to smooth out seasonality in the use of labor and material resources and turn agricultural work into a variety of industrial, as well as significantly affect production efficiency, as it will enable a more rational use of land resources and technology and integrated use of auxiliary and general services.

The main problem is modernization of the existing production base and reequipment. Its solution requires search for new mechanisms and tools. Under present conditions agricultural enterprises cannot solve this problem on their own – the problem of increasing the level of technical equipment. Financial resources as well as production resources are insufficient. And here, cooperatives get an

incomparable advantage as larger units in lending, and also appears a possibility of more effective capital management within the cooperative itself.

Judging by foreign experience in this field, in countries with market economies, farmers' cooperatives play a very significant, and in some cases decisive role in the system of relations between the agricultural sector and related industries, in the development of the agro-industrial complex as a whole. Almost one hundred percent participation of agricultural producers in cooperatives is traditional for Northern Europe, the Netherlands, Ireland, Japan. In the European Union countries, farmers' cooperatives produce up to 60% of food products, i.e. they play an important role in ensuring food security, and in Japan – about 90%.

The importance, wide distribution and efficiency of such cooperatives is explained by equal partnership of farmers, their economic independence and responsibility for making management decisions. In addition, they allow us to take into account the effect of the scale of production. They are a successful form of interaction between large-scale production and small-scale farming. There is a successful combination of the advantages of small agricultural producers historically established in the regions with their maneuverability in market conditions, economically feasible larger processing enterprises and well-organized supply and marketing system. The specificity of these relations lies in the fact that agriculture is the root cause here, plays a major and even decisive role in the entire system.

Conclusion

Thus, cooperation is currently not only a socially-oriented system that protects the interests of the most economically weak members of society (which is undoubtedly important in rural areas), but also a kind of core that concentrates the agro-industrial complex of the region and makes it possible to achieve maximum effect when specializing in this area.

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Prospects for The Use of Computational Methods of Algebraic Risk Theory in The Financial Sector

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Abstract

The accuracy of risk assessment inherent in the financial sector is of great importance in modern realities. Gross volumes of operations today are such that even seemingly insignificant increase in the accuracy of calculations, for example, of reserves of funds, the insured share of assets, insurance premiums, etc. can bring a noticeable profit for the owner, seller or buyer of volatility. The algebraic risk theory created in the last two decades offers effective computational methods for assessing the risks of financial instruments and their portfolios, which are characterized by increased accuracy. The computational experiments presented in the work demonstrate the promise of the proposed risk assessment methods against the background of the results obtained using the Monte Carlo method even when the latter utilizes huge computational resources.

Keywords: Algebraic risk theory, Monte Carlo methods, Value at risk.

Introduction

Today, the term “risk” has firmly taken up positions in a huge number of economic, technological, political, etc. constructs. The first scientific approaches to the study of the risk phenomenon date back to the 18th century, to the work of the Swiss mathematician Daniel Bernoulli, who studied the paradox of a game with a coin toss, called the “St. Petersburg paradox” (1738). Since then, the number of publications on the topic of risk has shown explosive growth. At the end of the 20th and the beginning of the 21st centuries, in the works of Ulrich Beck (2000, 2008, 2009), Anthony Giddens (2004) and Niklas Luhmann (1994, 2004) they completely formulated the integral concept

of the "risk society" and, even, "world risk society", Beck (2008). Public awareness of the significance of the risk concept has led, as a result, to standardization processes in the field of risk management, GOST (2012).

However, in spite of such a long history of the formation of the concept of risk, the breadth of the corresponding discourse in society, the use of risk management processes at the industrial level, a universal concept of risk has not yet been formulated, a mathematically rigorous formal idea of risk has not been formulated, as well as ideas about properties of risk as a mathematical object. The situation is no better in the field of risk assessment.

So in the financial sector, risk assessment is often based on the assumption of a certain canonical distribution of one or another key characteristic of the process under study, respectively, the parameters of this distribution are estimated by the sample values of other characteristics, in some way related to the key characteristic. At the same time, the reality is that the distributions discussed can be very different from the canonical ones. This is a typical situation for portfolios containing a small number of financial instruments. The connections between the characteristics of the economic system may have stochastic nature which is difficult to identify. The described situation often leads to low accuracy of risk assessments or, sometimes, to obtaining generally absurd results. The approaches based on the ideas of the Monte Carlo method are often productive in such cases, but require very large computational resources and very careful stability control, especially with extremely large test volumes, Borodin (2014), Urazaeva and Smirnova (2016).

This work proposes a fundamentally new solution to the problem of risk assessment in the financial sector, based on the computational methods of algebraic risk theory, Urazaeva (2017). The proposed approach, on the one hand, easily copes with noncanonical distributions of random variables describing the economic system, and on the other hand, has a number of advantages with respect to the Monte Carlo method.

Elements of the algebraic theory of risk

Assume C as the set of transformations of the state of the economy corresponding to each option of closing a position for each financial instrument, their portfolio or sub-portfolio, which are present in the studied economic system. Further, assume, $\mathbf{I} = [0,1] \subset \mathbf{R}$, where $\mathbf{R}$ is the set of real numbers. Consider the set of multisets defined as follows:

$$\mathsf{A} = \{ \boldsymbol{X} : \operatorname{Supp} \boldsymbol{X} \subset C \times \mathbf{I} \}.$$

Note that for an empty multiset

$$\varnothing = \left\{ k_{\varnothing}(x) * x : \ \forall x \left(x \in C \times \mathbf{I} \right) \left[k_{\varnothing}(x) = 0 \right] \right\},$$

where $k_{\boldsymbol{X}}(x)$ – multiplicity function of element x of the multiset, $\boldsymbol{X}$, $\varnothing \in \mathsf{A}$ is true. Define on the A operation of addition:

$$\boldsymbol{X} + \boldsymbol{Y} = \left\{ k_{\boldsymbol{X}+\boldsymbol{Y}}(x) * x : \ k_{\boldsymbol{X}+\boldsymbol{Y}}(x) = k_{\boldsymbol{X}}(x) + k_{\boldsymbol{Y}}(x), x \in \operatorname{Supp} \boldsymbol{X} \cup \operatorname{Supp} \boldsymbol{Y} \right\}$$

and multiplication:

$$\boldsymbol{XY} = \left\{ \ k_{\boldsymbol{XY}}(x) * x : \ k_{\boldsymbol{XY}}(x) = \right.$$

$$= \sum_{(c_X \circ c_Y,\, p_X p_Y)=x,\, (c_X,\, p_X)\in \mathrm{Supp}\, \boldsymbol{X},\, (c_Y,\, p_Y)\in \mathrm{Supp}\, \boldsymbol{Y}} k_{\boldsymbol{X}}\left((c_{\boldsymbol{X}},\, p_{\boldsymbol{X}})\right) k_{\boldsymbol{Y}}\left((c_{\boldsymbol{Y}},\, p_{\boldsymbol{Y}})\right),$$

$$x \in \left. \bigcup_{(c_X,\, p_X)\in \mathrm{Supp}\, \boldsymbol{X},\, (c_Y,\, p_Y)\in \mathrm{Supp}\, \boldsymbol{Y}} \{(c_{\boldsymbol{X}} \circ c_{\boldsymbol{Y}},\, p_{\boldsymbol{X}} p_{\boldsymbol{Y}})\} \right\}.$$

For the set A and the operations of addition and multiplication defined on it, the following statement is true.

Statement 1. If the binary operation of composing transformations over a set C is commutative:

$$\forall c_1, c_2\ (c_1, c_2 \in C)\left[c_1 \circ c_2 = c_2 \circ c_1\right]$$

then the algebraic system $\langle \mathsf{A}, +, \square \rangle$ is a *commutative semiring with identity element 1*.

To describe the risk in the economic system under conditions of probabilistic uncertainty, we will use multisets of the following form:

$$\boldsymbol{R} \in \mathsf{A},\ \Sigma_{(c,\, p)\in \mathrm{Supp}\, \boldsymbol{R}}\ p k_{\boldsymbol{R}}\left((c,\, p)\right) = 1,\ c \in C,\ p \in \mathbf{I}$$

Each element of this multiset represents a variant of economic development. The element is the essence of the pair: the transformation of the state of the economy corresponding to this option for its development, and the likelihood of this option being implemented. The sum of the probabilities for all options is 1. Consider the set of multisets of the form:

$$\mathsf{R} = \left\{ \boldsymbol{R}:\ \boldsymbol{R} \in \mathsf{A},\ \Sigma_{(c,\, p)\in \mathrm{Supp}\, \boldsymbol{R}}\ p k_{\boldsymbol{R}}\left((c,\, p)\right) = 1 \right\}$$

Obviously, $\mathsf{R} \subset \mathsf{A}$, and, therefore, the same operations of addition and multiplication are defined for R elements. However, note that the R set is absolutely not closed with respect to the addition operation:

$$\forall \boldsymbol{R}_1, \boldsymbol{R}_2\ (\boldsymbol{R}_1, \boldsymbol{R}_2 \in \mathsf{R})\left[\boldsymbol{R}_1 + \boldsymbol{R}_2 \notin \mathsf{R}\right].$$

At the same time, for the R set and the multiplication operation defined on it, the following statement is true.

Statement 2. If the binary operation of composing transformations over C set is commutative, then the algebraic system $\langle \mathsf{R}, \square \rangle$ is a *commutative monoid.*

The obvious interpretation of the operation of multiplication by R is the understanding of the product of risks of two financial instruments as the risk of a portfolio composed of them. Thus, the set of risks, with the operation of multiplication defined on it (calculating the joint risk), form an algebraic system that is a commutative monoid.

For elements of a commutative monoid, as a special case of a semigroup, a natural degree is defined. An interpretation of the *n*-degree of risk of a financial instrument is the risk of a portfolio consisting of *n* of the same such instruments, $n \in \mathbf{N}$, $\mathbf{N}$ - a set of natural numbers. Significant relief in calculating the natural degrees of the elements of the R set (risk of homogeneous portfolios!) can be obtained by using the results of the following theorem.

Theorem 1. Assume the binary operation of composition of transformations over a C set is commutative, and assume, further, the predicates be defined:

$$\pi_1 = \wedge_{i=1}^{m} \left[(c_i,\, p_i) \in \operatorname{Supp} \boldsymbol{X} \right],\ \pi_2 = \left(\Sigma_{i=1}^{m} l_i = n \right),$$

$$\pi_3 = \left[\left(c_1^{l_1} \circ c_2^{l_2} \circ \ldots \circ c_m^{l_m},\, \Pi_{i=1}^{m} p_i^{l_i} \right) = x \right],$$

Then

$$\boldsymbol{X}^n = \left\{ k_{\boldsymbol{X}^n}(x) * x :\ k_{\boldsymbol{X}^n}(x) = \sum\nolimits_{\pi_1, \pi_2, \pi_3} \frac{n!}{\Pi_{i=1}^{m} l_i!} \Pi_{i=1}^{m} \left[k_{\boldsymbol{X}}\left((c_i,\, p_i) \right) \right]^{l_i},\right.$$

$$\left. x \in \bigcup\nolimits_{\pi_1, \pi_2} \left\{ \left(c_1^{l_1} \circ c_2^{l_2} \circ \ldots \circ c_m^{l_m},\, \Pi_{i=1}^{m} p_i^{l_i} \right) \right\},\ m = \left| \operatorname{Supp} \boldsymbol{X} \right| \right\}$$

for any $\boldsymbol{X} \in \mathsf{A}$.

Theorem 1 is valid for elements of A set; however, in the context of this paper, the properties of narrower sets, such as, R set, are important.

Many R multisets are many possible risks in the economies under study or, otherwise, many descriptions of the complete groups of events in these economies at the time of closing any positions. However, quite often it is necessary to consider incomplete groups of events or, even, individual events. Within the framework of the risk paradigm used, incomplete groups of events will be associated with parts of the risk. To describe the parts of risk in the economic system under conditions of probabilistic uncertainty, we will use multisets from the following set:

$$\mathsf{P} = \left\{ \boldsymbol{R} :\ \boldsymbol{R} \in \mathsf{A},\, \Sigma_{(c,\, p) \in \operatorname{Supp} \boldsymbol{R}}\ p k_{\boldsymbol{R}}\left((c,\, p) \right) \le 1 \right\}.$$

It is obvious that $\mathsf{P} \subset \mathsf{A}$ and, therefore, for P elements from the previously introduced operations of addition and multiplication are defined. However, note that the P set is not closed with respect to the addition operation:

$$\exists \boldsymbol{R}_1, \boldsymbol{R}_2\ \left(\boldsymbol{R}_1, \boldsymbol{R}_2 \in \mathsf{P} \right) \left[\boldsymbol{R}_1 + \boldsymbol{R}_2 \notin \mathsf{P} \right].$$

The interpretation of the addition operation on P is the aggregation of risk parts. For the P set and the multiplication operation defined on it, the following statement is true.

Statement 3. If the binary operation of composing transformations over C set is commutative, then the algebraic system $\langle \mathsf{P}, \square \rangle$ is a *commutative monoid.*

We introduce two more classes of sets of multisets that are useful in further constructions:

$$\mathsf{P}_{\alpha} = \left\{ \boldsymbol{R} :\ \boldsymbol{R} \in \mathsf{A},\, \Sigma_{x \in \operatorname{Supp} \boldsymbol{R}}\ k_{\boldsymbol{R}}(x)\, \mathrm{pr}_{\mathbf{I}}\, x = \alpha \right\},$$

$$\mathsf{P}_{\le \alpha} = \left\{ \boldsymbol{R} :\ \boldsymbol{R} \in \mathsf{A},\, \Sigma_{x \in \operatorname{Supp} \boldsymbol{R}}\ k_{\boldsymbol{R}}(x)\, \mathrm{pr}_{\mathbf{I}}\, x \le \alpha \right\},$$

$$0 \le \alpha \le 1 .$$

For the introduced classes, the following statement can be proved.

S t a t e m e n t 4 . The following statements are true:

$$\forall \alpha, \beta \left(0 \le \alpha \le 1, 0 \le \beta \le 1\right) \left[\boldsymbol{R}' \in \mathsf{P}_{\alpha}, \boldsymbol{R}'' \in \mathsf{P}_{\beta} \;\Rightarrow\; \boldsymbol{R}'\boldsymbol{R}'' \in \mathsf{P}_{\alpha \cdot \beta} \right],$$

$$\forall \alpha, \beta \left(0 \le \alpha \le 1, 0 \le \beta \le 1\right) \left[\boldsymbol{R}' \in \mathsf{P}_{\le \alpha}, \boldsymbol{R}'' \in \mathsf{P}_{\le \beta} \;\Rightarrow\; \boldsymbol{R}'\boldsymbol{R}'' \in \mathsf{P}_{\le \alpha \cdot \beta} \right],$$

$$\forall \alpha, \beta \left(0 \le \alpha \le 1, 0 \le \beta \le 1\right) \left[\boldsymbol{R}' \in \mathsf{P}_{\le \alpha}, \boldsymbol{R}'' \in \mathsf{P}_{\beta} \;\Rightarrow\; \boldsymbol{R}'\boldsymbol{R}'' \in \mathsf{P}_{\le \alpha \cdot \beta} \right].$$

Statement 4, in particular, regulates the risk hierarchy in the following sense. Assume there is a decomposition of risk into several parts. Each part of the risk contains one or more outcomes of economic development and corresponds to some logically selected development scenario. If the further analysis of one of these scenarios reveals the presence of previously unaccounted risk in it, then the part of the risk corresponding to this scenario (the element of the P_{α} set, $0 < \alpha < 1$) is simply multiplied in the above sense by the identified risk (the element of the R set) and a new part of the overall risk is obtained (the element is again of P_{α} set).

Now we can formulate an important purely algebraic result: *the set of risks and their parts forms a commutative monoid (with respect to the operation of calculating the joint risk) embedded in a commutative semiring with identity element 1 on which the partial (semiring) operation of addition (risk aggregation) is defined.*

We introduce a number of constructions. We say that the relation r on the groupoid $\langle A, * \rangle$ *is stably (regularly, or uniformly) on the right (on the left)* if $x r y$ $(x, y \in A)$ entails $x * z \, r \, y * z$ $(z * x \, r \, z * y)$ for every $z \in A$. A stable right (left) equivalence relation on A is called a right (left) *congruence on* A. *A congruence on* A is an equivalence relation that is both a left and a right congruence, Clifford (1972).

We introduce a map $\kappa : \mathsf{A} \to \mathsf{A}^1$, where

$$\mathsf{A}^1 = \left\{ \boldsymbol{R} : \boldsymbol{R} \in \mathsf{A}, \forall x \left(x \in \operatorname{Supp} \boldsymbol{R} \right) \left[k_{\boldsymbol{R}}(x) = 1 \right] \right\}.$$

We define it as follows:

$$\kappa(\boldsymbol{R}) \underset{Def}{=} \left\{ 1 * \left[\sum_{\substack{x \in \operatorname{Supp} \boldsymbol{R}, \\ \operatorname{pr}_C x = \theta}} k_{\boldsymbol{R}}(x) \operatorname{pr}_{\mathbf{I}} x \right] \theta \in \bigcup_{x \in \operatorname{Supp} \boldsymbol{R}} \left\{ \operatorname{pr}_C x \right\} \right\}. \tag{1}$$

Using the map (1), we define the relation k on A:

$$\boldsymbol{R}_1 \, k \, \boldsymbol{R}_2 \underset{Def}{\Leftrightarrow} \kappa(\boldsymbol{R}_1) = \kappa(\boldsymbol{R}_2), \; \boldsymbol{R}_1, \boldsymbol{R}_2 \in \mathsf{A} .$$

The following theorem can be proved.

T h e o r e m 2 . A relation k is a congruence on a semicircle $\langle \mathsf{A}, +, \square \rangle$.

In other words, from a probability-theoretical point of view, risks and their parts in a commutative economy are distinguishable up to congruence k .

Let us construct one more congruence that is important for the subject area under consideration. We introduce a map $\tilde{\sigma}:\ \mathsf{A} \to \mathsf{A}_{>0}$ where

$$\mathsf{A}_{>0} = \left\{ \boldsymbol{R} \in \mathsf{A}:\ \forall x \left(x \in \operatorname{Supp} \boldsymbol{R} \right) \left[\operatorname{pr}_{\mathbf{I}} x > 0 \right] \right\}.$$

We define it as follows:

$$\tilde{\sigma}(\boldsymbol{R}) \underset{Def}{=} \left\{ k_{\boldsymbol{R}}(x) * x:\ \operatorname{pr}_{\mathbf{I}} x > 0,\ x \in \operatorname{Supp} \boldsymbol{R} \right\}. \tag{2}$$

Using the map (2), we define the relation σ on A :

$$\boldsymbol{R}_1 \,\sigma\, \boldsymbol{R}_2 \underset{Def}{\Leftrightarrow} \tilde{\sigma}(\boldsymbol{R}_1) = \tilde{\sigma}(\boldsymbol{R}_2).$$

For this relation, the following theorem can be proved.

T h e o r e m 3 . A relation σ is a congruence on a semicircle $\langle \mathsf{A}, +, \square \rangle$.

Thus, from a practical point of view, risks and their parts in a commutative economy are distinguishable up to congruence σ .

Using the notation introduced, we can determine two types of residues: the smallest (simplest) residue:

$$|\boldsymbol{A}|_k \underset{Def}{=} k(\boldsymbol{A}),\ \boldsymbol{A} \hat{\mathrm{I}}\ \mathsf{A},$$

and a significant residue:

$$|\boldsymbol{A}|_\sigma \underset{Def}{=} \tilde{\sigma}(\boldsymbol{A}),\ \boldsymbol{A} \in \mathsf{A}.$$

Accordingly, we can talk about risk arithmetic modulo k and modulo s . Each of these arithmetic allows in its own way to increase the performance of calculations in direct calculation of the risks of discrete systems. The question naturally arises: Is it possible to combine the advantages provided by each of these arithmetic systems?

It can be shown that the answer to this question is positive and this is connected with the result expressed by the following theorem.

T h e o r e m 4 . A relation $\kappa \cdot \sigma$ is a congruence on a semiring $\langle \mathsf{A}, +, \square \rangle$.

The results of Theorem 4 allow us to introduce the concept and natural notation of the *least significant residue* or residue modulo $\kappa \cdot \sigma$:

$$|\boldsymbol{A}|_{\kappa\sigma} \underset{Def}{=} \tilde{\sigma} \circ \tilde{\kappa}(\boldsymbol{A}),\ \boldsymbol{A} \in \mathsf{A}.$$

The properties of all introduced residues are represented by the following theorem.

Theorem 5. On a commutative semiring with identified element 1 $\langle \mathsf{A}, +, \mathrm{g} \rangle$ for any $\boldsymbol{A}, \boldsymbol{B}$ Î A, the following relations are true:

$$\left| \left| \boldsymbol{A} \right|_{\alpha} + \boldsymbol{B} \right|_{\alpha} = \left| \boldsymbol{A} + \left| \boldsymbol{B} \right|_{\alpha} \right|_{\alpha} = \left| \left| \boldsymbol{A} \right|_{\alpha} + \left| \boldsymbol{B} \right|_{\alpha} \right|_{\alpha} = \left| \boldsymbol{A} + \boldsymbol{B} \right|_{\alpha}$$

and

$$\left| \left| \boldsymbol{A} \right|_{\alpha} \square \boldsymbol{B} \right|_{\alpha} = \left| \boldsymbol{A} \square \left| \boldsymbol{B} \right|_{\alpha} \right|_{\alpha} = \left| \left| \boldsymbol{A} \right|_{\alpha} \square \left| \boldsymbol{B} \right|_{\alpha} \right|_{\alpha} = \left| \boldsymbol{A} \square \boldsymbol{B} \right|_{\alpha},$$

where $\alpha \in \{\kappa, \sigma, \kappa\sigma\}$.

In conclusion of the review of the basic concepts of algebraic risk theory, we note that Theorems 1 and 5 allow us to implement effective direct calculations over risks in many interesting applications to the financial sphere.

Currently, the computational algorithms proposed by the algebraic risk theory are implemented as part of the MultiMIR application package, Urazaeva (2016).

Computational Experiment

Consider the task of assessing the risk of a retail loan portfolio. The credit risk management process includes qualitative and quantitative aspects, Lobanov et al (2003). The qualitative aspect is to determine the creditworthiness (reliability) of the borrower or counterparty. The modern approach to quantifying credit risk is based on the concept of "Value at Risk", Holton (2003) and, Jorion (2006), which has become the generally accepted standard for assessing market risks. The application of this approach to risk assessment at the level of the loan portfolio involves the construction of a distribution of a random amount of financial result over the portfolio on any planning horizon and calculation of the corresponding distribution quantile. The calculation of the quantile is a measure of the risk associated with the randomness of the magnitude of the financial result.

The approach to modeling the bank's loan portfolio has traditionally been based on the idea of independent creation of scenario models of individual loan agreements with subsequent joint analysis of an arbitrary set of such models, Borodin (1998).

When analyzing the credit risk of most loan portfolios, it is convenient to use the model of a standard loan agreement, which includes the following four scenarios, Urazaeva (2017):

1) the course of the loan agreement without complications;
2) a single or multiple occurrence of eliminated arrears;
3) the success scenario of the collateral sale procedure in case of unrepaired overdue debt;
4) write-off of bad loans.

Each scenario implements the calculation of the corresponding amount of discounted payment flows under the contract. The discount rules are determined by the objectives of the analysis (market value risk, portfolio book value risk, etc.). Moreover, in the second, third and fourth scenarios, cash flows corresponding to the additional costs incurred are taken into account.

Suppose that at the time of closing a certain position for each of the independent assets, the reduced balance of payments is represented by a random variable X_i, $i = 1, 2, \ldots, n$. These random variables will be considered pairwise independent. The total reduced balance of payments at the time of closing the position in this case will be:

$$S_n = \Sigma_{i=1}^{n} X_i .$$

It is known, Loeve (1962), that if $X_1, X_2, \ldots, X_n$ are random variables with finite mathematical expectations, then the mathematical expectation of their sum exists and is equal to the sum of their mathematical expectations:

$$E\left(\Sigma_{i=1}^{n} X_i\right) = \Sigma_{i=1}^{n} E\left(X_i\right). \quad (3)$$

This immediately implies the linear dependence of mathematical expectation, as one of the measures of risk, on the volume of the portfolio.

It is also known, Loeve (1962), that if $X_1, X_2, \ldots, X_n$ are random variables with finite variances and at the same time they are pairwise independent, then the variance of their sum is equal to the sum of their variances (Bienaimé equality):

$$\mathrm{Var}\left(\Sigma_{i=1}^{n} X_i\right) = \Sigma_{i=1}^{n} \mathrm{Var}\left(X_i\right). \quad (4)$$

Since in our case the independence of credit agreements is assumed, the linear dependence of variance, as a measure of risk, on the volume of the portfolio also immediately follows from Bienaimé equality.

Unfortunately, for the risk measure “Value at Risk”, simple ratios similar to (3) and (4) are not known. One of the traditional approaches to an approximate assessment of this risk measure is based on the use of the Monte Carlo method, Aleskerov et at (2013). For the case when the portfolio is homogeneous, in other words, it consists of (approximately) the same tools, algebraic risk theory offers a method of accurately assessing the risk measure “Value at Risk”. This circumstance, on the one hand, makes it possible to verify new approaches, and on the other hand, objectively investigates the behavior of the Monte Carlo method.

Using the Monte Carlo method to model a loan portfolio in this statement is trivial. Each test involves generating one pseudo-random number uniformly distributed over a segment $[0,1]$ per contract. After that, it is checked that this number falls into one of the intervals of the cumulative probability constancy for the contract model. The financial result is the balance of payments according to the contract scenario corresponding to the right end of the interval (cumulative gap). When summing up financial results for all contracts, the final balance of payments for the entire portfolio is calculated. That is, a financial result is formed from one test of the Monte Carlo method. Given the uniformity of the initial distribution, the tests represent a selective distribution of the financial result for the portfolio, according to which you can evaluate any measure of risk, including “Value at Risk”. The more tests, the closer the sample distribution to the theoretical one.

As an example, we will examine a homogeneous portfolio of loan contracts for urgent needs. The average volume of one loan is 90 thousand rubles. The annual rate is 19%. The system of payments under the contract - annuity in arrears. The probabilities of scenario implementation are 0.63, 0.12, 0.11, and 0.14, respectively. The average costs associated with the elimination of overdue debts under one contract are 5 thousand rubles. When writing off bad loans under an unfulfilled loan agreement, along with losses, additional costs arise associated with the corresponding operating activities. These costs for such an agreement amount to an average of 18 thousand rubles. We will use the listed initial data in all numerical experiments related to the Monte Carlo method.

Consider the dependence of the risk measure “Value at Risk” at a probability level of 0.01 on the number of instruments in this portfolio against the background of the Monte Carlo method tests (see

Fig. 1). The exact values of the "Value at Risk" risk measure were obtained using the MultiMIR application package, Urazaeva (2016). The figure shows that estimating the quantile on the left tail of the distribution is not a trivial task. Indeed, it is enough to note that the substantially (multiple times) predominant part of the volume of the carrier cone, located below the concentration of dots corresponding to the tests, is almost empty. This is a sure sign that a significant amount of testing will be needed with sufficient accuracy to evaluate the Value at Risk measure.

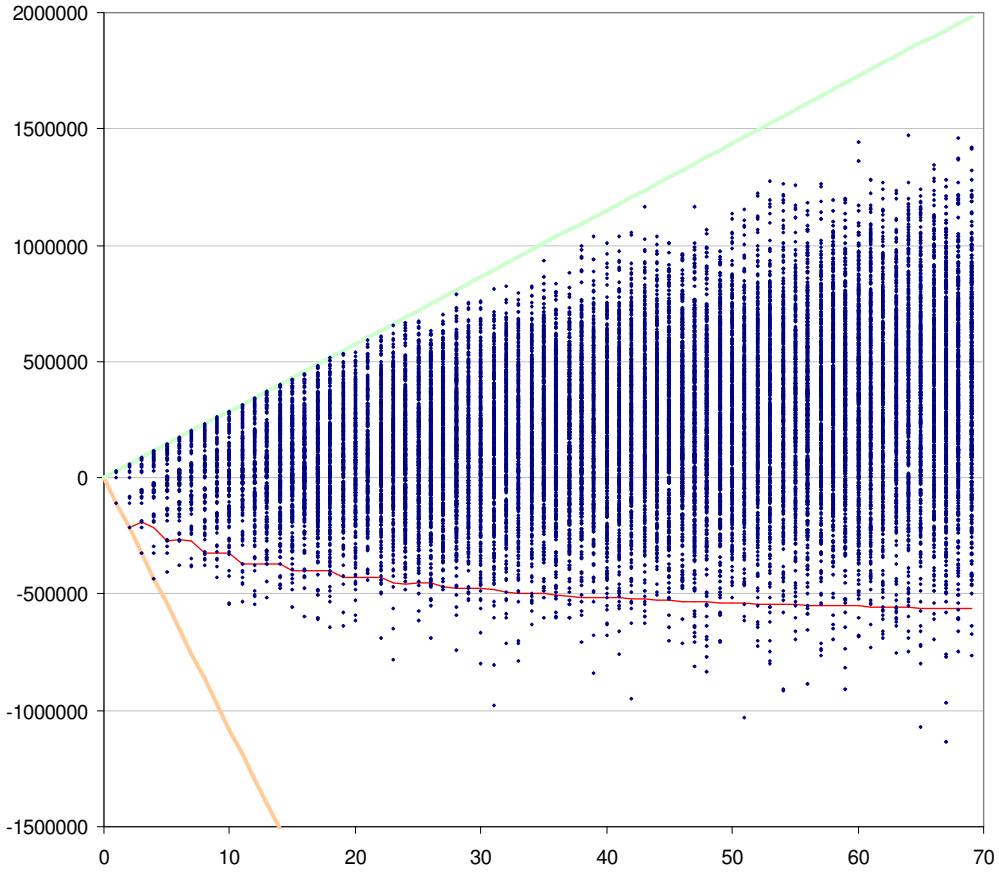

Fig. 1: Dependence of the risk measure "Value at Risk" on the number of instruments in the portfolio (red curve calculated using the MultiMIR software) against the background of Monte Carlo tests (blue dots). Tests are limited by carrier cone. The carrier cone is defined by a brown beam from below and a green from above.

Consider a homogeneous portfolio consisting of 256 loan agreements described above. The choice of number 2^8 is associated with the desire to exacerbate the problems that arise when using the Monte Carlo method with the pseudo-random number generator of the Microsoft Office programming system. Why this choice in the indicated sense is effective will be clear a little later. As a result of the first numerical experiment, the dependence of the assessment of the risk measure "Value at Risk" on the number of tests of the Monte Carlo method in the range from 2^{10} to 2^{16} was obtained, see Fig. 2.

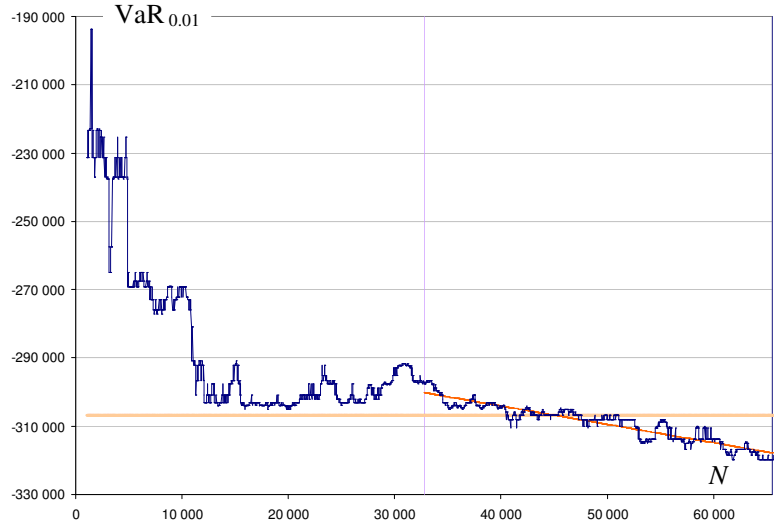

Fig. 2: Dependence of the assessment of the risk measure "Value at Risk" on the number of tests of the Monte Carlo method (blue curve) for the model portfolio. A light brown horizontal line indicates the exact value of the risk measure being evaluated. The inclined red line segment in the second half of the diagram shows the presence of an obvious trend in the assessment.

If the first half of the graph shown in Fig. 2, does not raise any special questions, then something strange happens in the second half of the graph: the assessment of the target risk measure gradually reaches the exact value (calculated using the MultiMIR software), and then it moves away from the exact value at approximately the same rate. This trend is linear, its coefficient of determination $R^2 = 0.88$. What's happening?

To answer the question posed, it was decided to conduct a second numerical experiment in which the right border of the number of tests was pushed back to a value of 2^{18}. This computational experiment required a significantly larger amount of processor time. This and the subsequent resource-intensive tasks described in this article were solved relatively quickly by parallelizing the calculations. The results of the second numerical experiment are shown in Fig. 3.

Fig. 3 sheds some light on the situation. Let's combine the segments $\left[2^{16}, 2^{17}\right]$, $\left[2^{17}, 2^{17}+2^{16}\right]$ and $\left[2^{17}+2^{16}, 2^{18}\right]$ domain of dependence of the assessment of the target risk measure on the number of trials and look at the corresponding parts of the graph of this dependence from areas II, III and IV (Fig. 4). The presence of autocorrelation in the studied dependence is obvious. Based on the data obtained, it is possible to put forward a hypothesis: the period of the sequence of numbers generated by the pseudo-random number generator of the Microsoft Office programming system is $2^8 \times 2^{16} = 2^{24}$. The repetition of the period easily explains the invariance of the assessment of the target risk measure at the end of the I, II, III and IV areas of the graph in Fig. 3 (or, otherwise, the impossibility of further improving the assessment in areas II, III and IV).

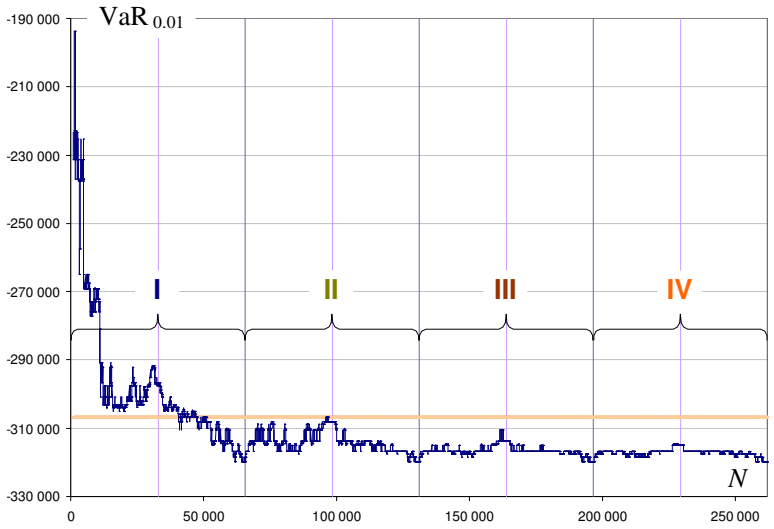

Fig. 3: Dependence of the assessment of the risk measure "Value at Risk" on the number of tests of the Monte Carlo method (blue curve) for the model portfolio on the quadruple interval of the number of tests. A light brown horizontal line indicates the exact value of the risk measure being evaluated.

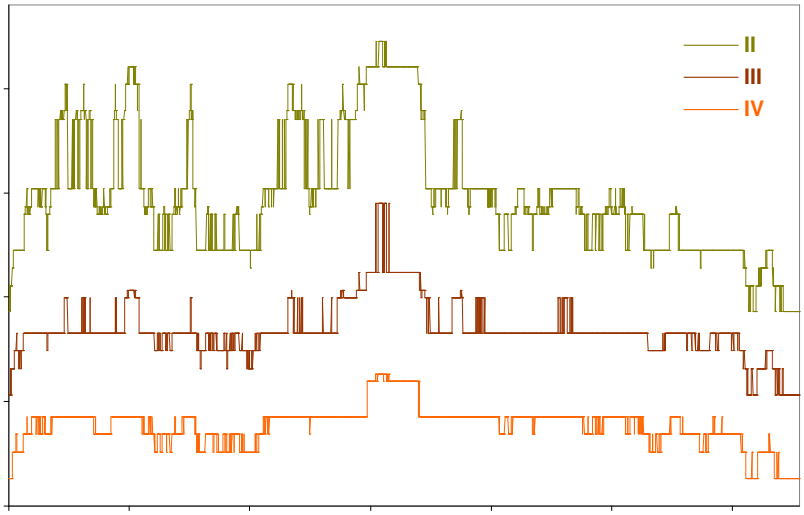

Fig. 4: Combined graphs of the dependence of the risk measure "Value at Risk" on the number of tests from areas II, III and IV of Figure 3. For clarity, the graphs are shifted along the ordinate relative to each other by an amount equal to 4 thousand rubles.

At this stage of the numerical experiments, we were convinced of the limited capabilities of the built-in pseudo-random number generator of the Microsoft Office programming system for solving some problems by the Monte Carlo method. In this regard, the problem arises of selecting a more promising alternative to the full-time pseudo-random number generator. Moreover, as the selection

criteria, one should take into account both the statistical properties of the generator and the possibilities of effective implementation in the corresponding programming system.

In 1997, Japanese mathematicians Makoto Matsumoto and Takuji Nishimura proposed a pseudo-random number generator based on the properties of Mersenne primes and, in this connection, it was called the "Mersenne twister", Matsumoto (1998). One of the variants of this PRNG, called MT19937, has a huge period equal to the Mersenne prime $2^{19937}-1$, provides a uniform distribution of the generated pseudorandom numbers in 623 dimensions (for the best known linear congruent generators, this number of measurements does not exceed four, see table II in papers Matsumoto (1998)) and can be relatively efficiently implemented on 32-bit computers.

Using the MT19937 implementation on VBA (2012), a numerical experiment was conducted to solve our problem of assessing portfolio risk measures. The results of this numerical experiment are shown in Fig. 5.

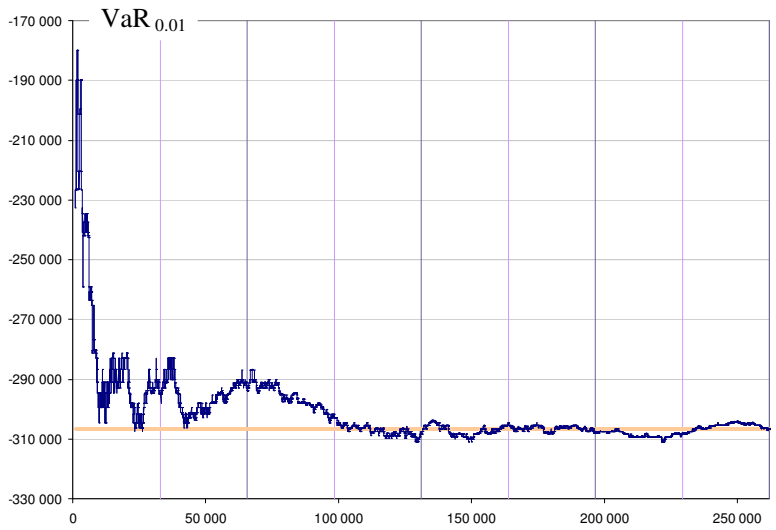

Fig. 5: Dependence of the assessment of the risk measure "Value at Risk" on the number of tests of the Monte Carlo method with PRNG MT19937 (blue curve) for the model portfolio. A light brown horizontal line indicates the exact value of the risk measure being evaluated.

Discussion

The Monte Carlo process shown in Fig. 5 fully complies with the theoretical concepts of the functioning of this method and, thus, demonstrates the feasibility of using the MT19937 PRNG instead of the PRNG implemented in Microsoft Office VBA in solving problems of at least the class in question.

On the other hand, the result presented is, in fact, a confirmation of the adequacy of the methods of the algebraic risk theory regarding the needs of risk analysis in the financial sphere, at least for some classes of problems.

It is also important that the application of the Monte Carlo method in dimensional problems comparable to our example requires a researcher to carefully monitor the stability of the method and the quality of the PRNG.

Conclusion

Summing up, we note that the results presented in the article are of serious fundamental importance for understanding the nature of risk. They demonstrate the organic connection of the risk phenomenon with well-known and well-studied modern algebra constructs. This kind of knowledge allows you to attract the full power of the apparatus developed by modern abstract algebra to solve the practical problems of risk analysis and assessment.

On the other hand, the work presented reflects the practical side of the theory presented. The article presents the results of evaluating the risk measure “Value at Risk” of a real retail loan portfolio based on the algorithms proposed by the algebraic risk theory, and based on the Monte Carlo method. It is important that both results are consistent with each other, however, the latter method demonstrates the potential presence of "pitfalls", which are important to monitor and ignoring of which can lead to obtaining absurd results.

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Financial Security in Chemical Industry Organizations: Topical Issues

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Abstract

The contribution considers the essential characteristics of financial security in relation to the macro, micro and industry level (for the chemical industry), the main factors that hinder the development of the industry and its entities (technological backwardness of a number of sectors, limited access of Russian products to foreign markets, fierce competition, inconsistency of the level of development of transport infrastructure with export conditions of chemical products, etc.) and have a negative impact on the provision of economic and financial security of organizations. The authors pay particular attention to the characteristics of threats to economic and financial security in relation to organizations of the chemical industry, as well as a system of indicators (including threshold values) to assess their level of financial security.

Keywords: Chemical Industry Organizations, Economic Security, Financial Security, Threats to The External and Internal Environment, Indicators for Assessing the Level of Financial Security.

Introduction

Financial security as a derivative of the economic security category is associated with threats to economic security in the financial sector of the economy and in the financial activities of business entities. We will use this concept in relation to the study of the activities of chemical industry organizations to ensure economic, including financial, security.

The factors of economic and financial security that influence the emergence of threats and risks, the financial stability of business entities, for the most part, are described in the works of foreign experts A. Damodaran (2012), S. Bragg (2007), G. Wang (2019), T Wang (2019), T. Jeitschko (2014), J. Li (2019), S. Linz (2014), S. Myers (2020), C. Nkeki (2018), J. Noguera (2014), A. Otero (2015), H. Tao (2019), L. Haar (2019), S. Chun (2016), P. Atrill (2009) and others.

Materials and methods

The study is based on the fundamental principles of economic science, the works of scientists in the sphere of economic security management. The methodological tools are based on the dialectical method of cognition providing a systematic approach to the problem under study; general scientific methods: induction and deduction, analysis and synthesis, grouping, economic and statistical analysis, etc. The information base is made up of official data of federal and regional state statistics bodies of the Russian Federation, Internet resources, accounting (financial) statements of organizations of the chemical industry of the Republic of Tatarstan, Chuvash Republic and the Republic of Mari El.

Research Results and Discussion

The essence and principles of the organization of financial security at the macro and micro levels

The tiered approach in which the definition of financial security can be given for the state, a subject of the Russian Federation, an economic entity is well substantiated in the scientific literature. It provides the utmost clarity in determining specific areas and tasks of national security in the financial and economic sphere. Identification of threats to financial security involves the determination of criteria and requirements of economic security in terms of:

- ability of the economy to function in the expanded reproduction mode under the influence of a group of threats: decline in production, deformation of the structure of the economy, its raw materials orientation, the upcoming shortage of energy resources, lack of motivation to increase production efficiency, worsening conditions for organizing and conducting business, etc.;

- ensuring a decent standard of living and the possibility of its preservation. Threats: rising unemployment, a crisis in the demographic sphere, deteriorating public health, increasing crime, decreasing the number of able-bodied people, etc.;

- stability of the financial system. Threats: the growth of the shadow economy, insufficient investment, a crisis in the monetary system, a decrease in the efficiency of organizations in the real sector of the economy, an increase in the budget deficit, limited and underdeveloped financial markets, dependence on world oil prices, etc.;

- rationality of the structure of the foreign economic sphere. Threats: disproportions in the foreign trade balance, outflow of capital abroad, discrimination in foreign economic relations on the part of foreign partners, imperfection of the legislative framework and mechanisms for the formation of political and economic development, the spread of corruption and corrupt business schemes, etc.;

- possibility of accelerating the technological and innovative development of the economy.

Threats: technological lag, reduction in the competitiveness of the innovation system, dependence of the economy on imports of machinery and technologies, insecurity of innovative development programs with funding sources, reduced investment attractiveness of priority research and development segments compared to countries with developed intellectual property markets, etc.

The list of threats to financial security can be classified according to different criteria, but more often they use classifications developed in accordance with applicable laws and strategic documents of socio-economic development. All classification groups of threats, no matter by what criteria they are combined, can manifest themselves under appropriate conditions at all levels of government of a state, regions, interfere with economic growth, which of course affects the sustainability of the economic development of the real sector of the economy.

When working out strategic directions of development, all commercial organizations in their financial and economic activities form a system of key indicators, which they are guided by in the short and long term. Most of these indicators are financial: revenue from product sales, production costs, profit, shareholders' equity, liabilities, business value, etc. Sustainable development is ensured upon reaching the established threshold level of the system of financial indicators and determines the organization's security from threats.

The definitions of financial security at the micro level are widely represented in the economic literature from the standpoint of different approaches:

- as a system of quantitative and qualitative parameters of the financial condition with the help of which a comprehensive assessment of the level of financial security of the organization can be obtained;

- main element or part of economic security;

- differentiated level of quantitative and qualitative parameters of the protection of the financial interests of the organization and the basis for measuring and evaluating its financial security.

All of the above characteristics are successfully, in our opinion, summarized by I.A. Blank in the following definition: "The financial security of an enterprise is a quantitatively and qualitatively determined level of its financial condition ensuring stable protection of its priority, balanced financial interests from identified real and potential threats of an external and internal nature, the parameters of which are determined on the basis of its financial philosophy and create necessary prerequisites for financial support for its sustainable growth in the current and future period" [Blank, 2004].

Ensuring financial security in organizations of the chemical industry

In accordance with the strategic documents developed by the Russian Federation, doctrines and the Economic Security Concept, scientists and specialists build their research in the field of economic security mainly around the five methodological provisions formulated by prof. O.A. Mironova [Mironova, 2016]. In one of them areas of economic security are determined based on the presence of external and internal threats - factors affecting the state of economic security of entities whose sources can be established with varying degrees of accuracy. Therefore, any threat and its established source require a quick response from those entities against which they are directed. To classify threats to economic security as well as to classify certain types of economic security (for example, financial), it is necessary to establish safety criteria. They are:

- the ability of the economy to function in the expanded reproduction mode;

- a decent standard of living and the possibility of its preservation;

- stability of the financial system;

- the rational structure of the foreign economic sphere;

- acceleration of technological and innovative development of the economy.

The Forecast of the Long-Term Socio-Economic Development of the Russian Federation until 2030 indicates that the chemical complex in the GDP structure accounts for about 2%, organizations in this industry provide about 5% of the total Russian foreign exchange earnings, and the average annual number of workers in the industry exceeds 600 thousand people. Factors that hinder the development of the industry include technological backwardness of a number of sectors of the chemical industry, limited access of Russian products to foreign markets, fierce competition, inadequate transport infrastructure and its level of development for the export of chemical products, etc. These factors

affect the economic security of organizations, and to overcome this impact it is necessary to eliminate the risks of reducing business performance through ensuring legality and expediency of using labor, financial, industrial and land resources. The concept of "security threat" reflects such changes in the external and internal environment of the organization that lead to negative changes in it.

Threats may include an increase in investment risks and a decrease in the investment attractiveness of ongoing projects, inefficient optimization of the supply chain "raw materials supply - production - sale of products to consumer" considering regional characteristics of the development of counterparty organizations, a decrease in the technological level of the material base and a decline in innovation, inflationary risks due to inefficient diversification of production and (or) unreasonable price improvement policy (Table 1).

Table 1: General description of economic and financial security threats for chemical industry organizations

Threats to economic security	Threats to financial security
Increased investment risks and reduced investment attractiveness of ongoing projects	Reduced investment
Ineffective organization of the supply chain "raw materials supply - production - sale of products to the consumer" considering regional characteristics of counterparty organizations	Disruption of delivery and default
Inflation risks with inefficient diversification of production and (or) unreasonable price improvement policy	Failure to meet production and sales volumes and, as a result, financial situation deterioration and organization default
Decrease in the level of technological development and innovative activity in the organization	The decline in the quality of products and in sales, the inefficiency of innovation and, as a result, the deterioration of the financial situation and default

The main goal of financial security regulation is to develop a system of mandatory financial prerequisites for the sustainable development of the organization in the short and long term. In the short term the main goal of financial security is to improve the financial condition of the organization, in the long term - to ensure financial stability as an adaptive ability to respond quickly to threats to the internal and external environment, including threats to financial security (see Table 1), while ensuring the appropriate liquidity and solvency level on the basis of a balanced risk management policy, and to solve its strategic tasks together with interested parties in order to reach sustainable success and increase the market value of the company.

Ensuring financial security is becoming one of the main tasks of managing organizations of the chemical industry the activities of which involve risks. Risks as carriers of threats to financial security in relation to organizations of the chemical industry can be classified in different ways. For each group and a specific type of risk it is necessary to determine the conditions for their identification and select the tools for their assessment. This will provide an opportunity to effectively manage risks arising at all stages of production. Management risk factors are especially pronounced in such areas as supply, sales, production management, planning and forecasting of sustainable development indicators, management of certain types of activities and structural units.

To determine the financial security level of chemical industry organizations a reasonable choice of systems of indicators from the entire possible data set of all types of reporting is necessary, to which not only financial and comprehensive economic analysis methods can be applied but also methods that expand the range of obtaining the necessary information for making informed decisions in the sphere of countering threats and reducing (neutralizing) risks. In this regard, risk indicators are also indicators based on which reasonable decisions can be made to ensure financial security in the current and strategic perspective.

Having taken an accounting and analytical data system that includes various types of accounting and generated reports as an information base for the formation of indicators for assessing the level of financial security of chemical industry organizations we obtain the indicators shown in Table 2.

Table 2: Scorecard for assessing the financial security level of chemical industry organizations

Indicator	Characteristic	Threshold value
1. Personnel safety indicators		
1.1. Quantitative staffing level	Is defined as the ratio of the organization's full-time employees to the average number in the reporting (planning) period	100 %
1.2. Qualitative staffing level	Is determined by the ratio of employees of the appropriate qualification level to the number of jobs (positions) according to the staffing table	100 %
1.3. Staff turnover rate	Is determined by the ratio of the number of laid-off employees in the reporting period to the average number of employees	10 %
1.4. Average annual wage	Is determined by the ratio of the annual employee payroll to the average number of employees in the reporting year	Not lower than the average industry wage
1.5. Average monthly wage	Is determined by the ratio of the monthly wage fund to the average number of employees in the reporting month	Not lower than the average industry wage
1.6. The proportion of workers in the total number of employees	Is determined by the ratio of the number of workers (in accordance with the number of jobs in the organization) to the average number of employees in the reporting period	50-90 %
1.7. Profit per employee of the organization	Is determined by the ratio of profit in the reporting period to the average number of employees	Not less than 10% of the average monthly wage per employee
2. Investment security indicators		
2.1. The ratio of own and borrowed funds	Is determined by the volume of loans and borrowings to the total volume of own sources (capital, profit, target financing, etc., reflected in Section 3 of the balance sheet)	50/50
2.2. The ratio of the volume of investments to the total volume of own and borrowed sources of funds	Is determined by the volume of investments received to the total amount of own and borrowed sources of funds	50/50
3. Indicators of tax security		
3.1. Tax burden	Is defined as the ratio of the total amount of accrued (paid) taxes to the amount of revenue (income) received for the period	30-40 %
3.2. The growth dynamics of the aggregate tax base in relation to the growth in revenue (income)	Is determined in relation to each tax paid by the ratio of the amount of payments on this tax to the total amount of revenue (income) over several periods. Dynamics is analyzed	positive
4. General indicators of financial security		
4.1. Organization profit	The methodology for calculating indicators is traditional, based on the data of financial statements for the period. Indicators are	Set in organization planning documents
4.2. Shareholders'		

equity volume	considered in dynamics. The dependence of each indicator on a certain group of factors is determined, which can serve as the basis for determining the integral indicator of financial security	
4.3. Working capital volume		
4.4. Production profitability		

All indicators in the process of the financial and economic activity of the organization are subject to the influence of risks, therefore, to ensure financial security it is necessary to develop appropriate requirements in order to prevent possible risks and to adequately respond to their appearance.

Conclusion

The selection of indicators can be carried out:

- to identify key success factors in the strategic development of the organization and increase its competitiveness;

- to determine the level of sustainable financial development of the main activities of the organization in the current and strategic perspective taking into account the prevailing conditions for the development of the sub-sector of the chemical industry to which this organization belongs (mining, inorganic chemistry, organic chemistry, production of chemical reagents, paint and varnish, pharmaceutical, household chemicals, microbiology);

- to strengthen specific areas of management to achieve the overall financial security of the organization.

When establishing the acceptable level of the selected system of indicators, risks that are carriers of threats to financial security can be assessed by traditional methods with their classification in a specific zone: acceptable, critical or catastrophic risk.

Allowable risk is determined by the level of actual indicators below the threshold values; catastrophic can be qualified exactly the opposite, and its actual values will indicate the excess of the established threshold values and the onset of the threat of bankruptcy of the organization. When the system of planning and control is effectively organized risk assessment is of significant informative value allowing making informed management decisions in order to successfully implement contractual relations between producers and consumers of chemical products.

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Regional Aspects of Rural Social Infrastructure Development

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Abstract

The article discusses current issues of the state and development of the social infrastructure of the rural areas. The necessity of state support of rural social development is substantiated. The main directions of the state program of the Chuvash Republic "Integrated development of rural territories of the Chuvash Republic" are considered.The current social situation and the lack of socially acceptable living conditions in rural areas are a brake on the formation of socio-economic factors for the sustainable development of rural territories.These provisions determined the following tasks of scientific research:
- to assess the social consequences of ongoing agricultural reforms and the current level of development of rural social infrastructure in general in the Russian Federation and in the Chuvash Republic;
- to identify the trends with the construction and commissioning in rural areas of the social infrastructure of the agricultural sector;
- to analyze the directions and volumes of financing the objects of the social infrastructure of the agro-industrial complex in the Chuvash Republic in accordance with the target programs;
- to substantiate possible ways to improve the social development of the village on the basis of the study of theoretical principles and scientific concepts, generalization of domestic and foreign experience, Russian agricultural history;
- to develop new approaches and priority areas for the development of rural settlements, taking into account the integrated solution of economic and social problems to increase the competitiveness of the region.

Keywords: Social Infrastructure, Program-Targeted Method, Sources Of Financing.

Introduction

At present, the role of social infrastructure in the economic and social development of society as a sphere of production of services and spiritual goods is growing, this role is also expressed in the fact that social infrastructure forms the quality of life of the rural population and helps to stimulate investment activity in the agro-industrial complex by creating favorable infrastructure conditions in the countryside.

The current social situation and the lack of acceptable living conditions in rural areas hinder the formation of socio-economic factors for sustainable rural development.

The relevance and need for the development and implementation of a long-term federal target program for rural social development is determined by the socio-political urgency of the problem and its federal significance, determined by the wide range of functions performed by the village - demographic, labor-resource, cultural, recreational, and environmental.

For the emergence of competitive markets in the sectors of the national economic complex, a carefully prepared social infrastructure is required, the role of the state in this is growing.

The need to create equal social conditions for residents of the village compared with the townspeople of the Chuvash Republic and other Russian regions together makes the chosen topic of scientific research extremely relevant and determines the objective need for a comprehensive study of the consequences of agrarian reforms, employment and social protection of the rural population in unity with socio-economic development of rural areas.

Materials and Research Methods

The research was attended by teachers and staff of the Chuvash State Agricultural Academy and the Cheboksary Cooperative Institute (branch). The scientific problem was studied using data from the Federal State Statistics Service (Rosstat) and the Territorial Authority of the Federal State Statistics Service for the Chuvash Republic, the Ministry of Agriculture of the Chuvash Republic, and data provided in scientific publications.

In the course of the work, widely tested reliable research methods were used - general scientific methods of dialectics, analysis, synthesis, induction, deduction, analogy.

Research Results and Discussion

One of the effective ways of state regulation is program-targeted planning. Since 2003, the main target tool for the development of rural areas has been the federal target program "Social development of the countryside." In 2018, the federal target program was transformed into the subprogram “Sustainable Development of Rural Areas” of the general State Program for the Development of Agriculture and Market Regulation, and then into the departmental target program, which reduced the level of attention to this topic.

The need to develop programs at the level of the constituent entities of the federation (Fig. 1) is explained by the fact that regional programs allow taking into account the structural and production features of the agro-industrial complex and, based on this, reasonably coordinate its development.

The priorities of state policy in the field of agriculture are defined in the Federal Law "On the Development of Agriculture", decrees of the President of the Russian Federation dated January 30, 2010 N 120 "On approval of the Doctrine of Food Security of the Russian Federation", dated May 7, 2018 N 204 "On national goals and strategic objectives of the development of the Russian Federation for the period until 2024, "Decree of the Government of the Russian Federation of July 14, 2012 N 717" On the State Program for the Development of Agriculture and Market Regulation s agricultural

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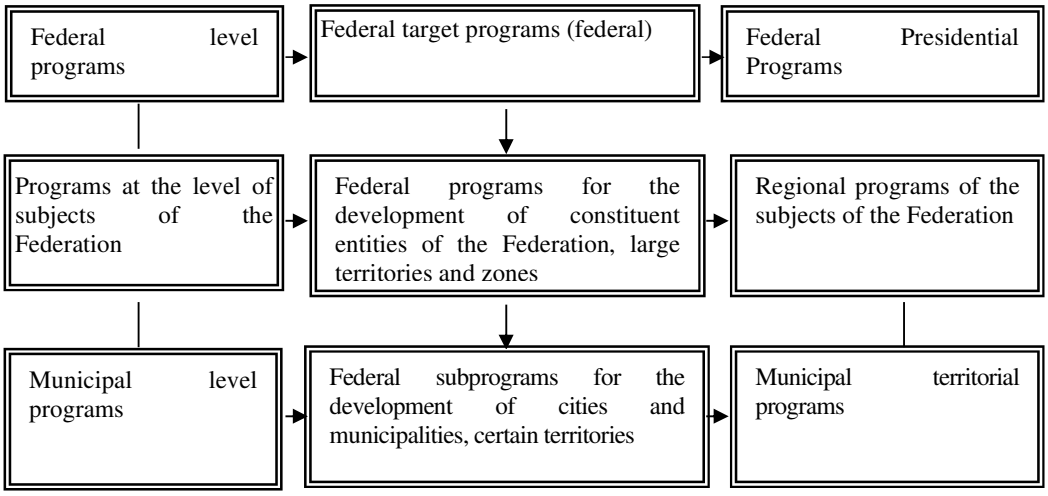

Fig. 1: The relationship of regional and federal target programs.

The use of the program-target method in relation to the development of the social infrastructure of the agro-industrial complex proceeds from the need to give the highest possible level of specificity, quantitative certainty of setting program goals. At the same time, it allows setting goals in a qualitative formulation that do not have a clear numerical expression, but are clear enough to represent targets that can be used to establish the required orientation of program actions.

The application of the program-target approach allows you to implement a comprehensive approach to the development of the object, linking of social goals and objectives with the resources of all types necessary for their implementation becomes real.

Next, we will try to derive a model of the relationship of the main social factors with the competitiveness of the agricultural enterprise. Our studies have allowed us to make assumptions about the existence of significant relationships between the variables in terms of the presence of social infrastructure in a given territory, personnel management (especially young personnel), organization of production and the final results of the enterprise, which we tried to show on a graphical model in the form of an increasing crisis pyramid (Fig. . 2).

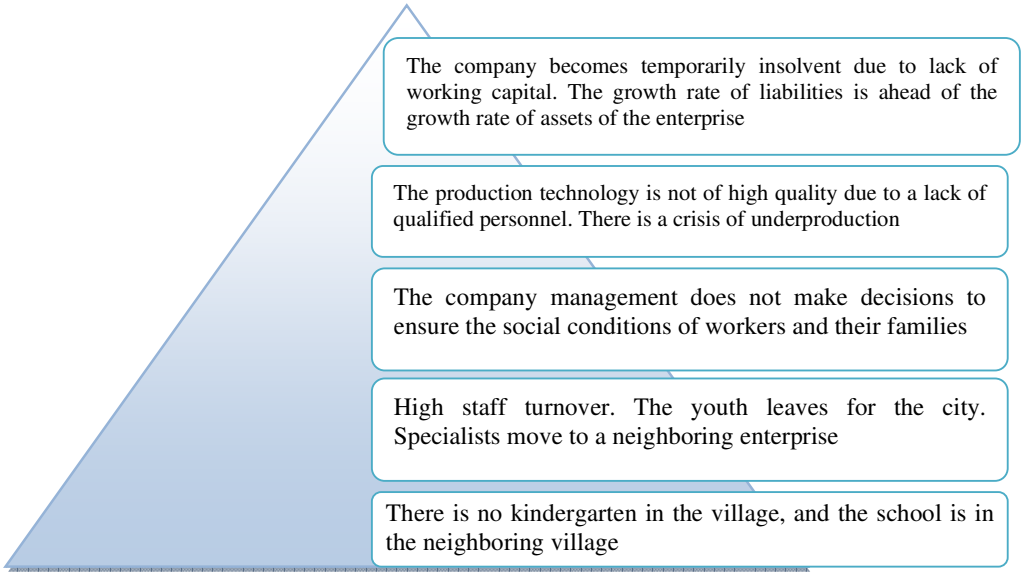

Fig. 2: The growing crisis pyramid of the agricultural enterprise

Acceleration of the crisis began from an insignificant factor - the absence of a kindergarten and school. The need to take children to these educational institutions and bring them back distracts parents from work, creates nervousness and dissatisfaction of workers with social conditions. Gradually, the social crisis develops into a personnel crisis - their departure from the enterprise or even from the village. If the management of the enterprise does not notice the emerging trends and does not take measures, a crisis of underproduction is inevitable, and in the future a financial crisis. The deepening financial crisis will lead to insolvency of the enterprise.

The current state and development of social infrastructure is characterized by the following main factors and trends (Table 1, Table 2, Figure 3):

- the widespread network of state and municipal institutions of the social sphere with low capital-labor ratio and outdated equipment;
- inconsistency of the existing network of institutions of socio-cultural sphere and the volume of services rendered by them to the needs of the population;
- a reduction in the number of these institutions, both as a result of structural changes in sectors and the limited financial resources for their maintenance and maintenance of the material and technical base;
- a decrease in the volume of capital investments in the social sphere, a slowdown in the rate of commissioning of facilities, and an increase in construction in progress.

Table 1: Provision of facilities and services of social infrastructure to the rural population of the Chuvash Republic

Indicators	per 1000 rural population							
	2011	2012	2013	2014	2015	2016	2017	2018
The Number of hospitals	0,097	0,099	3,802	3,804	0,080	0,030	0,040	0,040
The Number of beds in hospitals	7,290	7,254	0,095	0,087	6,416	5,094	7,316	6,328
The The number of outpatient facilities	0,198	0,203	6,921	6,545	0,226	0,028	0,038	0,038

Capacity of outpatient clinics, shift visits	16,695	17,018	0,215	0,217	17,787	12,318	21,745	22,099
The number of state educational institutions	1,022	1,016	17,493	17,502	0,898	0,884	0,784	0,864
The Number of libraries	1,147	1,143	0,971	0,931	1,128	1,172	1,077	1,003
Library Fund, thousand copies	11,360	11,350	1,143	1,136	11,430	11,587	10,924	10,479
The Number of cultural and leisure facilities	1,839	1,840	11,438	11,533	1,744	1,810	1,603	1,554
The number of telephone sets of the public network	73,884	76,163	1,812	1,776	86,990	97,749	91,521	97,521
The number of delivery sections of the postal service	2,722	2,716	79,202	82,811	2,703	2,827	2,589	2,589
The Number of main broadcasting points	191,073	178,727	2,707	2,701	88,509	43,709	0,000	-

Table 2: Comparative provision of municipal amenities of the urban and rural housing stock in the Chuvash Republic (at the end of the year, in percent)

Indicators	Years							
	2011	2012	2013	2014	2015	2016	2017	2018
Rural Housing Fund								
The proportion of the area equipped with: plumbing	13,2	14,0	15,0	15,6	16,5	19,9	22,0	19,8
sewer	9,8	9,9	10,7	11,0	11,5	12,0	15,7	13,0
central heating	62,5	64,8	66,5	68,1	70,4	76,7	82,3	81,7
bathtubs (shower)	6,7	7,1	7,5	7,5	7,5	7,7	11,1	8,1
gas	82,3	84,8	87,2	87,6	88,5	87,6	90,3	90,8
hot water	3,4	4,2	4,6	4,8	5,2	5,5	7,1	6,1
floor electric stoves	0,8	0,8	0,6	0,5	0,3	0,4	0,4	0,3
City Housing Fund								
The proportion of the area equipped with: plumbing	88,5	88,5	88,6	88,6	89,1	89,7	91,7	89,8
sewer	87,7	87,8	87,7	87,7	88,2	88,9	90,8	88,9
central heating	95,0	95,3	95,5	95,6	96,2	96,4	97,1	96,9
bathtubs (shower)	83,6	83,7	83,7	83,8	84,5	84,8	87,4	85,4
gas	92,5	92,9	92,8	91,3	91,4	91,7	91,6	91,5
hot water	75,3	75,6	75,8	76,1	76,6	79,0	82,4	79,2
floor electric stoves	5,1	5,3	5,3	6,9	7,0	6,9	7,2	7,1
Village in% to the city								
The proportion of the area equipped with: plumbing	14,92	15,82	16,93	17,61	18,52	22,19	23,99	22,02

sewer	11,17	11,28	12,20	12,54	13,04	13,50	17,29	14,62
central heating	65,79	68,00	69,63	71,23	73,18	79,56	84,76	84,31
bathtubs (shower)	8,01	8,48	8,96	8,95	8,88	9,08	12,70	9,48
gas	88,97	91,28	93,97	95,95	96,83	95,53	98,58	99,23
hot water	4,52	5,56	6,07	6,31	6,79	6,96	8,62	7,70
floor electric stoves	15,69	15,09	11,32	7,25	4,29	5,80	5,56	4,23

The existing conditions for the functioning and development of social institutions require a government policy aimed at the rational use of limited investment resources. The negative impact on the rural population is compounded as a result of a further decline in the quality of social services and infrastructure, the development of which in the Russian Federation as a whole is significantly behind the city.

There was a sharp reduction in the volume of investments in the social and engineering infrastructure of the village, the only exception being the laying of networks for the supply of natural gas.

Despite the positive dynamics of changes in the indicators of the provision of communal amenities to the rural housing stock, it is obvious how far the village is behind the city by this criterion. Only the gasification of the housing stock of the village corresponds to the city. This is due to the fact that the main work on gasification of settlements of the Chuvash Republic has been completed. There is water supply in 22 percent of rural houses, central heating in 82.3 percent, sewage in 15.7, hot water in 7.1 percent of houses.

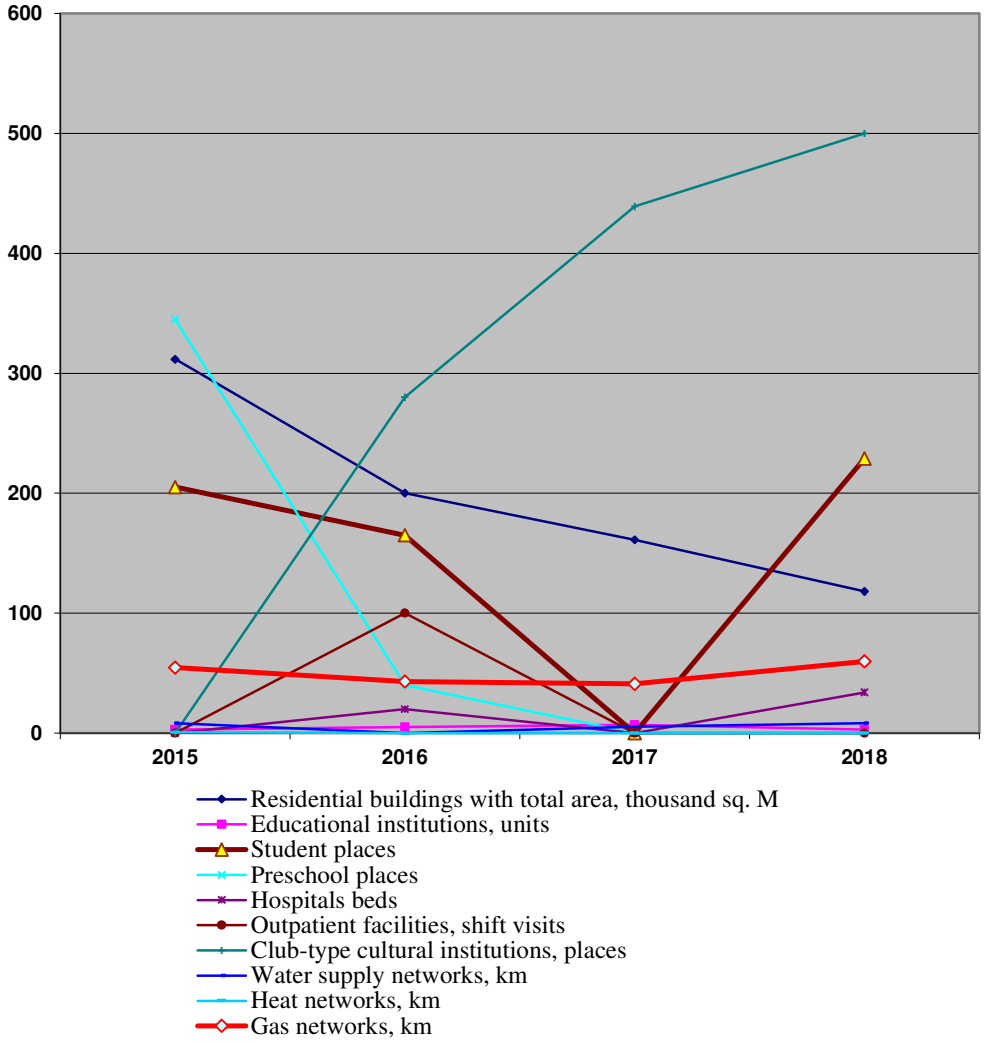

Fig. 3: Commissioning of social facilities and public utilities in rural areas in the Chuvash Republic

It is also obvious how controversial the situation is in rural areas with the security of the population living there with social infrastructure facilities. The provision of rural residents with hospital and outpatient clinics has significantly decreased, while the number of beds and the number of visits per shift of outpatient clinics has increased, which means an increase in the remoteness of these objects of social infrastructure from people's places of residence and their concentration in larger settlements, most often in district centers. The number of educational institutions decreased. Most indicators have a negative trend.

Such trends are of great concern, as they indicate that the gap between the city and the village in relation to the development of social and engineering infrastructure is not narrowing, but widening. The current situation in rural Russia, in addition to implementing a coherent program of agrarian reforms, requires urgent measures.

As a result of insufficient investments, the volume of construction of social facilities and engineering infrastructure in rural areas decreased, the excess wear and tear of their fixed assets increased, accompanied by an intensive reduction in existing social facilities and life support systems.

When determining the need for objects of social infrastructure in rural areas, it should be borne in mind that the most important factor in the accessibility of social institutions to the population is the degree to which these objects are far from the places of population living. The determination of the need for social infrastructure facilities for the rural population should also be carried out taking into account specific conditions affecting the organization of social services for the population in certain areas, cities, regions, territories, republics (population density, road conditions, transport, climatic conditions).

In the Chuvash Republic, program planning methods are priority and are used to justify the development of economic and social sectors in the medium and long term.

The system of goals that ensure a stable increase in the quality of life of the population is presented in Fig. 4.

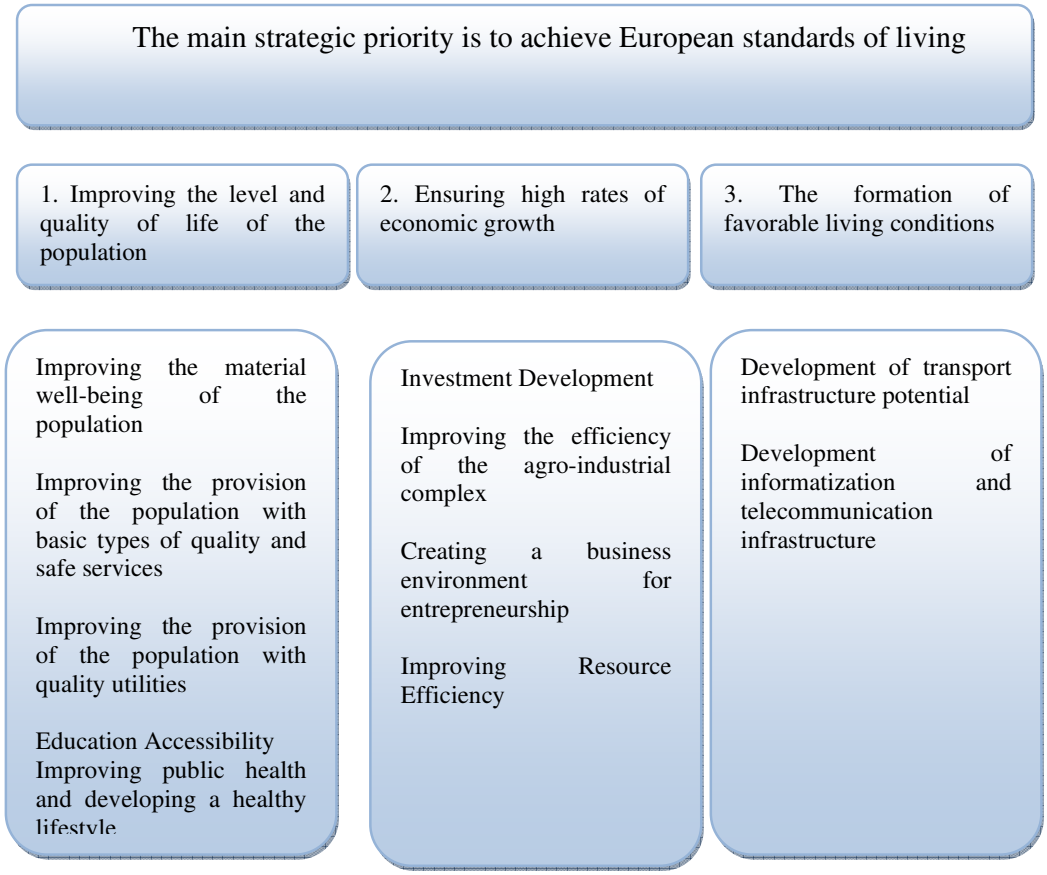

Fig. 4: The system of strategic goals to achieve European standards of living

Economic and social indicators of these goals are presented in table 4.

Table 4: The system of indicators for the implementation of the state program "Integrated development of rural territories of the Chuvash Republic"

Indicators	2019	2020	2021	2022	2023	2024	2025
Creating conditions to provide affordable and comfortable housing for the rural population							
The volume of input (purchase) of housing for citizens living in rural areas, sq. meters	6300,0	2300,0	846,0	2170,0	2200,0	2300,0	2300,0
The share of families who improved housing conditions, in the total number of families registered as needing housing and eligible for state support in the form of social benefits,%	9,3	2,8	1,3	4,0	4,1	4,1	4,1
The number of housing (mortgage) loans (loans) granted to citizens for the construction (purchase) of a dwelling (residential building) in rural areas (in rural agglomerations), units	x	75	100	331	331	331	332
The volume of commissioning housing provided to citizens under rental contracts, sq. meters	x	0,0	0,0	0,0	110,0	110,0	110,0
Creation and development of infrastructure in rural areas							
Commissioning of gas distribution networks, km	7,4	2,1	x	x	x	x	x
The number of objects for which design estimates have been developed, a positive conclusion has been received from the state examination of design documentation and the reliability of determining the estimated cost of a capital construction project, units	x	80	x	x	x	x	x
Number of settlements located in rural areas in which projects are implemented for the comprehensive arrangement of sites for compact housing development in rural areas, units	x	1	x	x	x	x	x
Commissioning of local water supply systems, km	5,5	4,7	0,4	x	x	x	x
The number of implemented projects for the integrated development of rural territories or rural agglomerations, units	x	x	x	x	3	3	4
Commissioning of paved public roads leading from a network of public roads to socially significant objects of settlements located in rural areas, production and processing facilities, km	2,1	7,9	3,0	3,0	10,0	10,0	10,0
The number of implemented socially significant projects for the	x	6	x	x	14	15	15

improvement of rural territories, units							
Number of implemented public infrastructure development projects based on local initiatives, units	620	620	620	620	620	620	620
The number of completed projects to equip engineering infrastructure and landscaping sites located in rural areas for compact housing, units	x	0,0	1,0	0,0	3,0	3,0	3,0

The catalyst in the social development of the village of the Chuvash Republic is the republican budget (Table 5).

Table 5: Directions and sources of financing the activities of the state program "Integrated development of rural territories of the Chuvash Republic", thousand rubles

Financing Areas	Total	Including by sources of financing			
		Federal budget	republican Budget	Local budgets	Extra-budgetary sources
Creating conditions to provide affordable and comfortable housing for the rural population	595822,1	224605	13733,3	238338,3	103211,5
Improving the living conditions of citizens in rural areas	343064,9	224605,0	13733,3	1515,1	15248,4
Creation and development of infrastructure in rural areas	3945474,4	1461619,7	1994726,6	246008	243120,1
Complex arrangement of settlements located in rural areas with objects of social and engineering infrastructure, as well as construction and reconstruction of roads	3814045,2	1370739,4	1993618,6	226287,5	223399,7
Implementation of measures for the improvement of rural areas	131429,2	90880,3	1108	19720,5	20828,5
Development of the labor market (human resources) in rural areas	2810,4	834,7	8,3	0	1967,4
Assistance to agricultural producers in providing qualified specialists	2810,4	834,7	8,3	0	1967,4
Total	4291349,7	1687059,4	2008468,2	247523,1	348299,0

The predominant funding from the republican budget as compared to the federal budget illustrates the uneven distribution of the burden on the corresponding budgets for financing the social sphere in rural areas: 1.19 rubles (2008468.2 / 1687059.4) from the republican budget were allocated for 1 ruble from the federal budget.

Since the republic has a reputation as a good borrower, Chuvashia is given a fairly high rating, combined borrowing schemes, issuing republican securities, and guaranteeing social projects to international organizations are actively used.

The establishment of clear and transparent rules in intergovernmental relations with municipalities, and the implementation of municipal finance reform programs also served to develop the social sphere in the countryside.

Extrabudgetary sources are attracted to the financing of investment program activities on the principle of social partnership, on a contractual basis by adopting legislative and other acts at the republican and local levels that ensure the attractiveness of investments by business entities in the development of the social sphere and engineering infrastructure of rural municipalities.

Personal funds of citizens are directed to individual housing construction, water supply, gasification and telephone installation of houses (apartments).

Conclusion

Having considered the implementation of targeted programs for rural social development at three levels of government - federal, republican and local, the following conclusions are suggested.

Because of lobbying in government bodies to support and protect the interests of some groups, regions, industries, enterprises when dividing one pie - the state budget, state (public property), the public law of some groups is infringed in favor of others. This is especially evident in the examples of the agro-industrial complex and the social sphere of the village.

The level of state support for agriculture in general and rural social development is very low. Budget expenditures for social development in rural areas during the years of reform are the subject of constant disagreement between the Government and deputies of the State Duma of the Russian Federation. In the Duma, the interests of the social sphere are not consolidated, which is why it is not possible to significantly increase the appropriations allocated for the development of the socio-cultural and engineering infrastructure of the village. The initial allocations proposed by the Government of the Russian Federation in the draft budget do not increase. Arguments in favor of a significant increase in allocations for social development of the village, as a rule, are not accepted.

In addition, in the process of disbursement of funds, something like sequestration occurs, aimed at a systematic reduction of costs. Thus, the total amount of federal budget expenditures on the social sphere is determined to a large extent during the political process, and not economic justification. A serious drawback of the budget process in the social sphere is the isolation of the annual budgeting process from the medium-term concepts of the strategic development of the agro-industrial complex. Although the leadership of the Chuvash Republic, in contrast to the Russian Federation, seeks to support the agro-industrial complex from the republican budget, however, due to the small size of the budget itself and the need to finance other areas of the region's activities, village financing as a whole remains insignificant.

The main reasons that hinder the implementation of program tasks include:
1. The allocation of funds from the federal budget to the full extent provided for by the program does not allow the commissioning of capacities and the incentive to attract funds from the constituent entities of the Russian Federation and extrabudgetary sources.

2. Untimely and incomplete fulfillment by the constituent entities of the Russian Federation of obligations to co-finance program activities for the social development of rural territories. There is sequestration by executive authorities of the constituent entities of the Russian Federation of the expenditures of regional budgets for the financial support of events.

3. The schemes of interaction between the constituent entities of the Russian Federation with respect to the choice of a state customer for the implementation of program activities and insufficient coordination of the agro-industrial complex management bodies in the constituent entities of the Russian Federation with the regional public health, education, culture, building complex, physical

education and sports, consumer cooperatives are not fully developed. That does not allow you to make operational decisions on the current management of the implementation of program tasks.

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The Importance of Psychological Support In Companies In Poland Based On The Results of The Survey "New Trends In Human Resources Management In Large Companies"

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Abstract

The article presents selected results of the research as part of the project: "*New trends in human resources management in large companies*". The project assumed the identification of social and psychological factors supporting the development of personnel in organizations, identification of intangible assets of the organization and social capital and trust management processes in organizations.

Purpose: The study aimed to illustrate the need for monitoring the mental health of employees from the standpoint of the company representatives and to present the extent to which different forms of psychological support are available in companies.

Methods: *Sample***:** The survey involved 179 representatives of companies randomly selected from 500 largest companies in Poland. *Measures*: Quantitative methods of measurement were used: CAWI *Computer Assisted Web Interview*) and the CATI telephone survey (*Computer Assisted Telephone Interview*). *Procedure***:** The CATI or CAWI surveys were addressed to the representatives of companies with substantive knowledge in the field discussed in the study.
Findings: Of the respondents, 63.7% stated that psychological problems of employees should be monitored in relation to their effect on the functioning of the company, while 6.2% think that there is such a need for such monitoring, but it is the employee who should take responsibility for their problem. When asked about forms of psychological support used in their companies, 60.1% of answers indicated the lack of such support. Among the forms of support available in companies, the most (14.8%) of the choices concerned training oriented at specific skills or problems, while 12.8% concerned support for individual employees.
Practical implications: The results of the study show a clear discrepancy between the need to monitor psychological problems in employees and the actual psychological support in companies. Therefore, it is necessary not only to increase the entrepreneurs' awareness of the benefits of taking care of the mental health of employees for the company's interest, but also to encourage the implementation of such forms of support in practice. This should be achieved by systemic solutions aimed at increasing the availability of mental health programmes for employees.

Keywords: Companies, Mental Health, Psychological Support, Work, Workers

Introduction

According to a report of the World Health Organization (WHO), mental disorders will have been the second in the ranking of diseases that affect the world population by 2020 (WHO, 2001). This problem seems similarly serious in Poland. In a study conducted in accordance with WHO standards in the Polish population of people aged between 18 and 64 years ("Epidemiology of Psychiatric Disorders and Availability of Psychiatric Health Care - EZOP Poland"), as many as 23.4% of the respondents suffered from at least one mental disorder during their lives (out of the 18 categories of disorders according to the diagnostic criteria of the ICD-10 International Statistical Classification of Diseases

and Related Health Problems and DSM-IV Classification of Mental Disorders of the American Psychiatric Association) (Kiejna et al, 2015; Kalbarczyk, Murawiec, Kalbarczyk, 2016). Furthermore, according to the report from the Global Burden of Disease 2015 Study, which analyzed the causes of years lived with disability (YLDs) in the case of the Polish population, depression was in third place among the ten most important causes, whereas anxiety disorders were in eighth place (GBD 2015 Disease and Injury Incidence and Prevalence Collaborators, 2016). Given their prevalence, mental health problems in the working environment become particularly important and topical. For people who are employable, work is an important way of improving their well-being, but also that of families and societies (Waddell, Burton, 2006). Furthermore, for workers with mental health problems, maintaining or returning to employment can be an important part of the recovery process that influences self-esteem, confidence and social inclusion (Perkins, Farmer, Litchfield, 2009. These arguments emphasize the need to guarantee the necessary protection of workers' mental health not only outside the workplace but also in the working environment.

Research Background

Based on a survey conducted by the American Psychological Association (APA) among PhDs in the field of psychology, it can be concluded that more than 6% of psychologists are employed in private companies and government institutions (Zimbardo, Gerrig, 2016). Furthermore, according to the forecasts of the American Bureau of Labour Statistics, the employment of industrial-organizational psychologists will have increased by about 53% by 2022 (Richards, Terkanian, 2013). It is worth considering what this trend is related to. The current changes in the labor market, expressed in terms of increased competitiveness of companies or the increasing requirements of international corporations, very often impose a rigorous pace of work, excessive work standards or expectations of above-average employee commitment. Growing competition and demands in the workplace correlate with the demands and problems of private life. At the same time, in recent years, the long-term absence of employees (particularly stress-related) is increasing. (Henderson, Glozier, Elliott, 2005). An important problem is the economic consequences. In 2010, the estimated global cost of mental disorders was $2.5 trillion, of which $1.7 trillion (68%) were indirect costs (lost productivity from absenteeism and presenteeism) (Trautmann, Rehm, Wittchen, 2016). It is estimated that the annual cost of depression will have increased to $6.1 trillion by 2030. In 2012, the total costs of depression in Poland incurred by the Social Insurance Institution (ZUS) amounted to ca. PLN 320 million, of which the costs of sickness absenteeism caused by this problem amounted to ca. PLN 255 million, while the costs of disability benefits were PLN 37 million (Kalbarczyk, Murawiec, Kalbarczyk, 2016). These are probably some of the causes that generate the need to employ psychologists in the business sector, not only as trainers or recruiters but also as experts focused on the mental health of employees (Hauk, 2010). Increasingly, the work of a psychologist translates into the therapeutic work aimed at maintaining the well-being of the employee, minimizing and counteracting employment problems (e.g. workaholism, occupational stress, mobbing, burnout, etc.), and interventions in case of personal difficulties of the employee. Although the measurable benefits of providing psychological support to employees are unquestionable, it still seems to be a practice underestimated by entrepreneurs.

The article presents selected results of the research as part of the project: "*New trends in human resource management in large companies*" illustrating the needs for the monitoring of mental health of workers from the standpoint of representatives of large companies and the range of different forms of psychological support actually offered to workers.

Methods

The research was conducted as part of the research project "*New trends in human resources management in large companies*". The project aimed to identify social and psychological factors supporting the development of personnel in organizations, intangible assets of the organization and social capital and trust management processes in organizations.

Sample

The sampling frame was a database of the 500 largest companies in Poland classified based on the ranking of the *Rzeczpospolita* daily by revenue category for 2018. Random sampling was used. In the case of refusal of an company to participate in the project, another entity was sampled. The sampling yielded a representative group of 179 companies with the general population size of 500 entities and a confidence interval of 95%.

Measures

The research within the project was carried out with the use of quantitative research methods using mixed techniques: CAWI (*Computer Assisted Web Interview*) and the CATI telephone survey (*Computer Assisted Telephone Interview*). The combination of the two quantitative methods was used to increase the response rate.

Procedure

The survey with the representatives of companies was started by using the CATI method. Those who refused to participate in the survey, interrupted the survey, or declared another deadline, were given the option to complete the survey via a dedicated web platform (CAWI). The survey was addressed to employees with knowledge in the field discussed in the study. The survey was conducted in the first half of 2019.

Results

This research was based on selected results of the survey concerning the scale of monitoring of psychological problems of employees and the forms of psychological support used in companies. The results are presented in Tables 1 and 2, respectively.

Table 1. Monitoring of psychological problems of employees

Do you see a need to monitor the psychological problems of the employee (e.g. occupational burnout, emotional control disorders, other stress-related disorders)?	**n=179**	**%**
Yes, this is an important factor that affects productivity and the working atmosphere	114	**63.7**
No, it is outside the company's area of interest	31	**17.3**
Yes, but it is a personal employee's problem that he or she should take care of in his free time	11	**6.2**
I have no opinion	21	**11.7**
No answer	2	**1.1**

Of the 179 representatives of companies participating in the survey, the most (63.7%) claimed that the psychological problems of employees should be monitored in relation to their effect on the functioning of the company. A significant minority (6.2%) believes that it is necessary but it is the employee who should take responsibility for his or her problem. Furthermore, 17.3% of respondents believed that it is not necessary as this was not the company’s problem.

Table 2. Forms of psychological support offered to employees in companies

Which forms of psychological support does the company offer to employees? (choose all matching answers)	**number of choices**	**% of all choices**
Individual employee support	26	**12.8**
Support groups for employees	3	**1.5**
Training on communication, motivation, conflict solving, coping with stress, professional burnout, dealing with organizational pathologies (e.g. mobbing, discrimination, sexual harassment)	30	**14.8**
Workshops on developing diverse competences, coping with stress, professional burnout, dealing with organizational pathologies (e.g. anti-mobbing workshops)	14	**6.9**
Other	1	**0.5**
We do not offer such support to employees	122	**60.1**
I have no opinion	7	**3.4**

When asked about the forms of psychological support in a given company, the respondents most often (60.1%) answered that psychological support for employees is not offered in their company. On the other hand, the largest number of indications of the representatives of companies (14.8%) with regard to the forms of support offered concerned training focused on specific skills or problems. The second form of psychological support in the order of occurrence was individual support for an employee (12.8%), while respondents indicated support groups for employees relatively rarely (1.5%).

Discussion

The article presents selected results of research as part of the project *"New trends in human resources management in large companies"* concerning monitoring of psychological problems of employees and forms of psychological support used in companies. The results show a clear gap between the need to monitor employees' mental health and how effective the practice of supporting employees in companies is. More than 63% of company representatives admit that the psychological problems of employees need to be controlled in the workplace because of their relation to work efficiency, but when asked about the forms of support offered, as many as 60.1% of the choices concerned the option *"We do not offer such support to employees"*. A similar relationship was presented in an UK study presented by Weinberg et al. (2019), where awareness and implementation of *National Institute for Clinical Excellence* (NICE) guidance on workplace psychological health was analyzed. Of the 163 companies surveyed (public, private and non-profit sectors), 37% were familiar with the guidelines, while only 12% implemented them in practice. Furthermore, according to a survey carried out by the Confederation of British Industries (CBI) with over 800 companies, as much as 98% of respondents said they thought the mental health of employees should be a company concern and should be part of company policy. However, less than one in ten of the companies sampled had an official policy (Sinclair, O'Regan, 2007).

So why is there such a discrepancy? There seem to be at least a few explanatory factors. This research shows that in the perception of the representatives of companies, there is an awareness of the relationship between an employee's mental state and his or her functioning at work and thus the importance of this relationship for the overall functioning of the company. Similar studies by Kaszyński and Cechnicki (2011) found that employers notice difficulties resulting from mental problems. According to 56.4% of the employers surveyed, mental illness limits an employee's ability to perform paid work. However, the conviction about the strength of this effect may vary. Perhaps the representatives of companies assess this effect not as an essential determinant of the company's success, but more as a factor which may slightly increase or decrease an employee's efficiency at work. Meanwhile, many empirical data indicate that mental health problems significantly worsen the functioning of employees at work. As indicated by Gilmour and Patten (2007), as many as 79% of the

employees with symptoms of depression admitted that the depression affected their ability to work, with ca. 19% considering this effect to be significant. In another study, 30% of employees with anxiety disorders confirmed a decrease in productivity over the previous 4 weeks compared to 0.5% observed in employees without such disorders (Harder, Wagner, Rash, 2014). It is worth noting that emotional disorders and overall mental health are strongly associated with so-called presenteeism, which significantly reduces productivity at work (Burton et al., 2008; Collins et al., 2005). Furthermore, the problem may be particularly pronounced when mental health disorders are of a prolonged nature. In a study of a group of employees by Lerner et al. (2000), 22-49% of employees with chronic health problems showed difficulties in meeting physical requirements at work, and 27-58% failed to meet psychosocial requirements. Another explanation may be related to the perception of the costs of psychological support at the workplace. It is likely that investment in various forms of psychological support seems not as profitable for entrepreneurs as an investment in other assets essential for the company's direct profit. Investment in broadly understood psychological support for employees may not be profitable for the company at first, but in the long run, it may prove very profitable. The authors of the British report published by the Department of Health in London presented estimates indicating possible savings for the company resulting from the implementation of various forms of mental health support for the employee (McDaid et al., 2011). In the case of an company with 500 employees, where the support for mental well-being is provided to all employees, it is estimated that an initial investment of £40,000 will result in a net return of £347,722 in savings mainly due to a reduction in presenteeism and sickness absence. In explaining the discrepancy obtained in the present study, reference can also be made to the general reluctance to finance mental health initiatives. Interesting research in the German population was conducted by Schomerusa et al. (2006). The respondents stated that if they were to choose the health care sector whose budget should be reduced, they would choose the care for the mentally ill. Polish health care reports highlight the underfunding of psychiatric services (Łozy, Gryglewicz, 2015; Moskalewicz, Kiejna, Wojtyniak, 2012). Other countries around the world have also struggled with the problem of insufficient investment in psychiatric care (Ormel et al., 2008). Perhaps this general social trend, in which human resources related to mental health are not given as much attention as other resources (e.g. physical health), also translates to some extent into entrepreneurial attitudes.

The results of the survey show that in some companies, however, some forms of psychological support are emerging, i.e. training and workshops aimed at different types of employee skills, and individual support and support groups for employees. To the author's knowledge, no studies have presented statistical data on the prevalence of various forms of mental health support in companies. However, it is possible to compare the results obtained in this study to other test results with slightly different methodological properties. The result obtained in terms of individual employee support (12.8%) can be compared to the results of the implementation of employee assistance programs (EAP) among American worksites (Hartwell et al., 1996). The aim of the EAPs is to identify 'troubled employees' (e.g. those at risk of alcohol problems), motivating them to resolve their troubles, and providing access to counseling or treatment for those employees who need these services. The results of this survey indicated that 33% of the more than 32,000 private, non-agricultural worksites in the USA with more than 50 employees offered EAP services to their employees. Importantly, the use of the EAPs was linked to the size of the workite. Among the companies employing more than 1,000 employees, this ratio was approximately 76%. This means that psychological support systems for employees may be more common in larger companies. An interesting point of reference for the problem of mental health promotion at the workplace may be the opinion of workers themselves. The National Employee Mental Wellbeing Survey conducted in the UK provided this perspective. This report is based on the key findings from a YouGov panel survey of more than 4,000 full and part-time employees (Mental Health at Work 2019 Report, 2019). When asked "*Are any of the following available where you work or through your employer*?" among the various categories of support, the category of counseling or psychotherapy services covered 13% of employee indications, while workload or time management training and training on common mental health conditions yielded 8% and 6% indications, respectively. Furthermore, 7% of the answers concerned the categories: peer or colleague led support group or network. In this study, the highest number (25%) of employee indications concerned the category of employee Assistance Programme in the form of a confidential helpline.

In this study, most of the choices made by entrepreneurs (14.8%) concerned the organization of training as a form of psychological support for an employee, while slightly fewer choices (6.9%) concerned the workshop form. Although the differences between these forms of psychological support in terms of the objectives or areas of the problems to be addressed seem insignificant, some problems may be generated by the lack of a clear definition of the terms discussed here. It is, therefore, necessary to take into account a certain likelihood of not fully adequate distinctions within the two categories. It is assumed that training is a process aimed at acquiring and developing knowledge and skills related to the performance of specific tasks at work, carried out through formal, structural and guided measures (Rakowska, Sitek-Lutko 2000). Training can also be understood as a series of lectures on a given subject organized to extend someone's knowledge of a given field (Doroszewski, 1958-1969). Furthermore, the workshops, which can be a part of the training, mean a form of group activities, where participants actively, e.g. through problem-solving in a group or designing proposals for solutions, acquire practical skills (Kowolik, 2006). It is worth noting that the approach to the role of training in the company has changed over the years (Łaguna, 2010). It is increasingly seen as a potential for long-term business benefits. However, in some companies, training can still be viewed as a necessary expense and fit into a wider corporate policy, conducted according to mandatory official arrangements (e.g. anti-mobbing training). They are implemented as a consequence of formal regulations, regardless of the individual assessment of their suitability form the standpoint of the representative of a given company. It is also possible that the form of training (or workshop) is the most preferred form of support in companies, as it can simultaneously cover a larger group of employees, and its subject matter is most often very clearly and directly related to the effective functioning as an employee (e.g. coping with professional stress, conflicts in the workplace, preventing occupational burnout, etc.). These features may argue for approaching training as the most optimal and cost-effective form. This is in contrast to the individual support, as it concerns selected employees and can take into account a very wide range of individual problems and not just the focus on those directly related to work. Therefore, these can be problems such as coping with the stress of crisis events, depression, or employee addiction. Similar forms of group support are those that can play a therapeutic role for employees with similar difficulties, or for workers who found themselves in a similar situation (e.g. they witnessed a fatal accident of a colleague). Support groups received the least number of choices in the group of the entrepreneurs surveyed. Perhaps this results from the above-mentioned causes (individual problems of only a certain group of employees, lack of a clear link between the nature of the problems and the perspective of the professional role, costs incurred by the company, resistance to dealing with mental health problems), which make up the assessment of this form of support as not being in a clear, strong, direct relationship with the interests and responsibilities of the companies.

Several limitations of this study should also be mentioned. The survey was of a questionnaire character and was therefore based on subjective assessments of the representatives of individual companies. This involves the likelihood that those who completed the questionnaire had incomplete knowledge of the situation in the company or misinterpreted the questions. The representatives of companies were not always top-level managers, whose knowledge, especially when asked about the need to monitor employees' mental health problems, can be presumed to be the most substantial. The research was conducted only in the group of the largest companies in Poland, and therefore its results should not be generalized to the population of all companies. Further research on the prevalence of psychological support systems for employees should also take into account the perspective of small and medium-sized enterprises. Other variables should also be considered, such as the company's business profile, the nature of the work performed by the employees or the number of employees.

Conclusion

The scale of the prevalence of mental health problems in Poland and worldwide is reaching worrying proportions. Consequently, the problem is becoming increasingly clear in all areas of human functioning. An area of particular importance is the working environment and professional activity, which can play a health-promoting role or become additional burdens on mental health. As a result, there is a growing demand for psychologists working in the business not only as HR staff, but also as mental health professionals.

The article presents selected results of a survey conducted as part of the project "New trends in human resources management in large companies". The demand for monitoring of mental health problems of employees and the level of support offered in the group of representatives of 179 largest companies in Poland were analyzed. The results revealed that more than 60% of the respondents saw the need to monitor the mental health status of employees due to its possible effect on productivity and atmosphere in the company. However, in relation to the question about the forms of support offered in the company, most (60.1%) of the respondents' choices concerned the category "We do not offer such support to employees". This discrepancy may be due to various factors. It is likely that in some companies, the effect of mental health problems on the employee's work efficiency and further on the productivity in the entire company is underestimated. This may also be associated with a general social reluctance to deal with mental health problems. Furthermore, the implementation of psychological support systems requires financial resources which are not necessarily considered as a profitable investment from the perspective of the company. Nevertheless, some of the companies surveyed offer their employees psychological support in various forms. Of the above-mentioned forms of support, the largest number of choices (14.8%) concerned the category of support in the form of training. This form most often covers issues directly supporting the functioning of an employee in his or her professional roles, e.g. training in coping with professional stress, which may constitute its significant advantage over other forms of support. Training can also cover a large group of employees at a time. A similar approach may be applied to workshops (choice rate of 6.9%), which may also be part of the training, and a fair distinction between the two categories in the study could cause some difficulties. The individual support of the employee was characterized by slightly fewer indications (12.8%). It is likely that as a form that typically concerns individual problems, individual support is not perceived as lucrative for the company as is the case with training. It is also likely that the nature of these problems does not oblige the company to take particular responsibility for them, leaving them to the employee. The fewest indications concerned support groups for employees (1.5%), which may be related to the aforementioned arguments, where the nature of the problems solved with this form of support seems to be the most important.

The results of the study form an important basis for practical implications. It is important to raise awareness of the importance of mental health systems at the workplace among entrepreneurship. This concerns the importance, which is not only related to the interests of the employees but also the interests of the company. Entrepreneurs should be convinced that an investment in the mental well-being of employees is a profitable investment in the long term and that the relationship of employee well-being with productivity and the company's atmosphere is strong. Furthermore, it is important that this conviction should also be followed up by concrete actions related to the support implemented. Systemic support offered by specific standardized psychological support programs for employees and through increasing the availability of such programs (e.g. advertising, legal regulations, funding assistance) may be irreplaceable. There is still a lack of such solutions in Poland, and it seems that they could effectively encourage companies to take on responsibility for the psychological well-being of employees.

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State Defense Readiness as The Support for The National Security System

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Abstract

The states of defense readiness of the state are an extremely important issue related to maintaining security in the state. Individual entities, in order to be properly prepared to respond to various types of threats to national security, are obliged under the state's permanent defense readiness to perform specific tasks. This is to properly prepare them for efficient functioning in changed crisis and war conditions. The appropriate level and implementation of the tasks of permanent defense readiness of the state is very important and will have an impact on achieving higher states of defense readiness of the states, i.e. during a crisis and a war.
Due to the variety of contemporary threats related to their unpredictability, volatility and surprise in the state's defense readiness, it is extremely important to maintain the ability to quickly make decisions and respond to growing threats, which is why it is so important to properly prepare the individual entities responsible for state security.

Keywords: State Defense Readiness, Constant State Defense Readiness, Defense Readiness During The Crisis, Defense Readiness During The War, State Security

Introduction

The state's defense readiness depends on many different external and internal factors. The external ones include the threat to national security resulting from the development of the geopolitical situation in the region and in the world. Keeping the defense potential of the state in constant readiness is extremely expensive, therefore in Poland a defense readiness system has been organized, which will be launched at the time of changes taking place in the event of a threat to national security.

Analysing the state's defense readiness as a research problem, it should be expressed in the form of the following question. *How and through what actions does the state prepare its resources to counteract threats to its security?* The author presents an attempt to solve this problem in the following study, by specifying the tasks and undertakings regarding individual states of defense readiness of the state.

In the literature on the subject of research, the state's defense readiness is defined (Pawłowski, 2009) "as a state of stability of the elements of the state defense system to maintain national security and to act effectively in emergencies and the ability to oppose any crisis and war threats". The appropriate level and implementation of the tasks of permanent defense readiness of the state is very important and will have an impact on achieving higher states of defense readiness of the state (time of crisis and time of war). The ability to quickly make decisions, act within the framework of various threats to national security, which today are characterized by volatility, unpredictability and surprise, is crucial in ensuring national security.

The purpose of the state's defense readiness is to maintain security in the state, its trouble-free functioning, and in the event of a crisis, to respond appropriately to this situation to prevent its escalation and large-scale conflict.

This goal is achieved by performing:

- crisis management projects and procedures (Journal of Laws of 2020, item 148, 284, 374);
- undertakings included in the Defense Response Plan (DRP), which is the basic document of political and strategic defense planning, prepared in order to counteract potential threats to national security of a political and military nature;
- implementation of tasks under Host Nation Support (HNS) contracts, aimed at securing the admission, stay and movement of allied forces through the territory of our country;
- tasks related to maintaining and creating strategic reserves (Journal of Laws of 2020, item 374);
- tasks related to the mobilization of the economy and armed forces;
- political and diplomatic activities aimed at peaceful resolution of conflicts and preventing crises.

The state's defense readiness concerns all entities forming the state's defense system (public administration, business entities, services, guards, inspections), it has a nationwide scope and significance for the existence of the entire nation and its security, its task is to counteract threats and, in the event of their occurrence, to appropriately react to them.

Professor Jan Wojnarowski (2010) emphasizes in his book that "the state's defense readiness is a kind of a system that consists of individual elements, which include:

- readiness of the military subsystem, i.e. combat readiness and mobilization of the armed forces;
- readiness of the state defense management subsystem – defense and security management positions;
- readiness of the non-military subsystem".

State Defense Readiness

Currently, pursuant to the Regulation of the Council of Ministers of September 21, 2004 on state defense readiness (Journal of Laws of 2004, no. 219, item 2218), the following three states of state defense readiness apply in Poland:

- state of constant state defense readiness;
- state of defense readiness of the country during the crisis;
- state of defense readiness during the war.

Increasing the state's defense readiness in situations of external security threat is accomplished by introducing higher states of defense readiness of the aforementioned Regulation of the Council of Ministers.

Constant defense readiness of the state is a state in which there are no significant threats to the external security of the state, but at the same time forces and means are ready to perform defense tasks. The essence of this state is to keep the defense system ready for an efficient transition to a higher state of defense readiness in the event of a threat. The tasks that state bodies and institutions perform as part of permanent state defense readiness are related to planning, organizing, training and controlling. As part of constant defense readiness, conditions for the implementation of defense tasks are created, force and rescue measures are kept to eliminate the effects of accidents, catastrophes and natural and ecological disasters, to clean the area of hazardous and potentially explosive objects, constant monitoring of potential threats is carried out.

The main undertakings of constant defense readiness of the state include tasks related to:

- monitoring and assessing potential threats;
- operational planning and programming of the state's defense and protection tasks;
- organization of defense preparations and their provision with material and financial human resources;

- maintaining the armed forces in constant combat and mobilization readiness to enlarge them during the war;
- maintaining the readiness of the remaining forces and resources forming the defense system of the state in readiness to develop in the event of a crisis or war;
- conducting trainings, schoolings and inspections;
- introducing permanent duty hours in public administration bodies (Journal of Laws of 2004, no. 219, item 2217 and 2218) in order to ensure adequate, efficient and rapid response of the state to threats to its security and alert levels (Journals of Laws of 2016, item 1101), introduced as part of permanent defense readiness of the state.

Constant defense readiness of the state aims to ensure the safe development of the state, the possibility of rapid and smooth change of state, depending on the occurrence, scale and nature of the threat.

Defense readiness of the state during the crisis will be introduced (Journal of Laws of 2004, no. 219, item 2217 and 2218) in the event of an external threat to the security of the state requiring the activation of selected elements of the defense system or implementation of tasks set for this state.

The implementation of the tasks of defense readiness during the crisis is associated with the preparation of forces and means to counteract external threats to national security and remove the effects of their occurrence.

These tasks are carried out by developing selected elements of the state defense system and consists of:

- implementation of tasks resulting from the introduction of a state of emergency;
- securing the mobilization and operational development of the armed forces;
- preparation to develop management positions;
- review and update operational plans;
- intensification of civil-military cooperation;
- preparation for the mobilization of state defense resources;
- mobilizing strategic reserves (Journal of Laws of 2020, item 374);
- preparation of organizational units for militarization (Journal of Laws of 2009, no. 210 item 1612), (Wojnarowska-Szpucha, 2019);
- adopting and securing the regrouping of allied reinforcement forces;
- protection of critical infrastructure, facilities of particular importance to security and defense, of the population.

The state of defense readiness of the state during the war is introduced in order to repel a direct military attack on the territory of the Republic of Poland or when international agreements show a commitment to joint defense against aggression.

As part of introducing the state of defense readiness of the state during the war, universal mobilization is carried out and martial law is introduced (Wiśniewski and Szyłkowska 2017), (Journal of Laws of 2017, item 1932), and the state's defense system is fully developed to repel military aggression directed to the territory of the Republic of Poland or to another allied state.

In the state of defense readiness during the war, the state defense system is fully developed, the following tasks are carried out:

- resulting from the introduction of martial law;
- securing the needs of the armed and allied reinforcement forces;
- launching the main and spare positions for managing national defense;
- launching operational plans at all levels of administration and entrepreneurs;
- launching tasks included in the Mobilization of Economy Program (PMG – a planning document setting out tasks related to the preparation of the national economy for increased defense services during a period of threat to national security and during war) (Polish Armed Forces, 2020);

- using strategic reserves for the defense of the state;
- militarization of organizational units of public administration and selected enterprises of the national economy;
- minimizing losses and damage;
- protection, evacuation of people;
- fighting against crime.

Summary

The state's defense readiness depends on the development of the political and military situation of the state, the emergence and escalation of the crisis, and on the allied obligations of the state. In each state, they are defined by the ordinance of the Council of Ministers of September 21, 2004 on the state's defense readiness to carry out tasks, depending on the emerging crisis conditions. Planning and implementation of defense tasks related to increasing the state's defense readiness are coordinated by (Journal of Laws of 2004, no. 16, item 152) ministers with respect to tasks performed in government administration departments, as well as by heads of subordinate and supervised organizational units and voivodes in relation to tasks performed in the voivodeship by the managers of subordinate and supervised organizational units, entrepreneurs, for which they are founding bodies, local government bodies, entrepreneurs who are not organizational units subordinate to or supervised by ministers, social organization authorities.

Maintaining the state's defense readiness depends on the state defense system prepared for launch, the possibilities and conditions for the mobilization of armed forces that constitute the basic link in the state's defense potential, and on the Economy Mobilization Program prepared for launching, as well as on a number of other tasks included in the defense system of the state (concerns the militarization of organizational units, protection of particularly important facilities, medical and transport security, and complaints from citizens of military service during the war). However, in order to effectively counteract carious types of non-military threats, the Polish Armed Forces must cooperate with other entities of the national security system.

Higher states of defense readiness of the state are introduced in order to launch appropriate undertakings, depending on the scale and nature of threats, aimed at preventing the emergence of crisis situations and, consequently, their development. States of defense readiness are implemented sequentially or selectively, depending on the development of the political and military situation.

In the case of introducing higher states of defense readiness (state of defense readiness during the crisis and state of defense readiness during the war), tasks included in the "Defense Response Plan of the Republic of Poland" will be implemented, which is developed on the basis of the Regulation of the Council of Ministers of June 15, 2004 on conditions and the mode of planning and financing tasks performed as part of the state's defense preparations by government administration and local government bodies, this is the basic document of political and strategic defense planning in the Republic of Poland.

The above study presents tasks that are/will be implemented by all entities (Świerszcz, 2016), whose duty is to care for broadly understood national security. The sentences implemented in the state of constant defense readiness of the state are extremely important, because by properly preparing for various threat scenarios in their free time, the state's ability to effectively counteract them or minimize their effects is increased.

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Sociology of Security as an Opportunity for Social Security

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Abstract

The article refers to that idea of the fathers of sociology, postulating the need to develop a sociological reflection on human security. This new security research paradigm known as "sociology of security" has appeared recently and needs to be developed for many theoretical and practical reasons. The authors of this article refer to previous publications and present new thoughts on two problems: 1) the presence of sociology of security in scientific discourse; 2) and an opportunity for developing of social security. According to the authors opinion sociology of social security is very important direction of the research but, as a science, still needs theoretical justifications.

Keywords: security, human security, threats, sociology of social security

Introduction

Sociology, in the intention of its creators (August Comte, Herbert Spencer, Emil Durkheim) was to be a panacea for the chaos or disorder observed in social life. The establishment of sociology as a science was to serve the purpose of creating social order. During the period of about two centuries, the area of research interest in sociology increased immeasurably. The author of this article has long referred to that idea of the fathers of sociology and postulated to separate, from the extensive and dispersed in various specific fields of sociology and other social sciences, a sociological reflection on **human** security or more precisely on the security of humans as social beings. In the opinion of the author of this article, shared by many experts on security issues, such a new subdiscipline of sociology may be a subdiscipline called ***sociology* of security** (K. Clements, 1990, Z. Zagórski, 1999, A. Kołodziejczyk, 2001, 2007, 2017, L. Stampnitzky, 2013).

Presence *Sociology of Security* in Scientific Discourse

Analysis of the literature on the subject has made it possible to formulate the thesis that three approaches undoubtedly dominate in research on security: philosophical approach, political science approach and recently, an approach presented especially in security sciences: the interdisciplinary and transdisciplinary approach. This analysis also makes us aware of the fact that there is no clearly defined sociological cognitive perspective. Some elements of the sociological theoretical reflection on security are already present in Polish scientific literature, however, they are quite few and limited to some selected, generally subjective or objective aspect of security. A much broader reflection on security, with regard to sociological perspective, is practiced by Anglo-Saxon authors in the field called "security studies".

A review of literature and the author's many years of personal participation in international security research allows the following initial theses to be formulated. First, in security research should more attention should be paid to the sociological approach, because in its nature security is a social phenomenon, and more specifically a socio-cultural phenomenon (A. Kołodziejczyk, 2007). Secondly, the current practice of research on broadly understood security should be expanded and ordered to include various sociological dimensions (levels/ entities/ areas/ contexts) of collective life security. Already in the 1990's, such targeted research appeared, which may include sociology of dispositional

groups (J. Maciejewski, 2012] and since recently the anthropology of security (S. Jarmoszko, 2015) related to sociology.

And finally, and thirdly, and in connection with the above, a new paradigm should be developed for practicing the sociological theoretical and methodological reflection on security within the new sociological discipline called "sociology of security" (A. Baranowska, 2016). It is not only about a certain ordering and classification effort in the area of the current reflection on collective security, but also development of coherent, multi-year inter-national research programs empirically oriented but based on the foundation of sociological theory modeled on the inter-national German-Polish-Czech research "Security, Nation and Partnership" (Report SOWI, 1998).

It should be noted that the introduction of a new sociological subdiscipline does not automatically mean discovery of a new field of phenomena, entities or regularities, nor the implementation of a new science methodology or previously unknown research methods into research of security phenomenon. It is, above all, a rational application based on sociological imagination of the existing theoretical and methodological output of social sciences, in particular of sociology for study of security and its absence.

It is worth noting that although the issues of security and threats has accompanied human kind since the dawn of its history, it is present in scientific theoretical reflection since recently (J. Świniarski, 1998). Only after the fall of communism can one speak about a separate philosophical reflection on security and about the introduction of a "security philosophy" into the language of science (R. Rosa, 1995, J. Świniarski, 1997). While strictly sociological studies and research on collective security have an even shorter history. The name "sociology of security" so far has been used incidentally and without a broader justification (K. Clements, 1990). In Poland, this name was used for the first time by Zdzisław Zagórski in 1998 (Z. Zagórski, 1998) and repeated in 1999 as the title of a paper delivered at a conference on sociological problems of national security (Z. Zagórski, 1999). During the 11th National Sociological Congress in Rzeszów - Tyczyn, in September 2000, the concept of "sociology of security" appeared in the title of the paper: “Od socjologii wojska do socjologii bezpieczeństwa narodowego? (From sociology of the army to sociology of national security?)” as a postulate to practice sociology of the army within the framework of sociology of national security (A. Kołodziejczyk, 2001).

Then, in the late 90's of the 20th century, called a decade of the dividend on peace, an analysis of security issues led me to the conclusion that the current demand for sociology of war and of the army gives way to the need for general and non-military reflection on security, including sociology of national security and a more general sociology of security of collective life. From the discussions held during the sessions devoted to sociological issues of security, one could get the impression that this idea and its justification met with a favorable reception among sociologists dealing with these issues. This was also reflected in the papers submitted to me as the organizer of the session, devoted to theoretical problems of national security and the problems of studying it using empirical methods. A clearly articulated postulate to establish a new field of sociology can be found in the papers of Janusz Świniarski (2001) and Marian Cieślarczyk (2001) submitted for publication.

Many years have passed since then and security, although it is already the subject of research in numerous scientific disciplines such as "security science" (M. Lutostański, 2015; E. Nowak, M. Nowak, 2015) or securitology (L.F. Korzeniowski, 2012). Despite these and many other valuable publications deepening security issues, it is still being discussed in the periphery of sociology. This is despite the widespread awareness that security is one of the most important needs of social entities: individuals, groups, nations and wider (international) communities, organizations, structures and systems. What's more, interest in this subject is increasing from other disciplines of science and its importance in the practice of social life is growing. When it comes to interest in this problem on the side of sociology-related sciences, traditionally the most attention to security is paid by representatives of political science, philosophy, psychology, law, ecology and history. Interdisciplinary security studies/research ("security studies") are already so far developed and complicated that in this case the problem of their systematization remains open, also in terms of the strictly sociological aspects of their content.

The postulate to separate sociology of security from the conglomerate of security studies is a manifestation of a more general trend in modern science called specialization. In order to say something more about the emancipation of sociology of security, undoubtedly, the previously suggested review of the existing scientific reflection on this subject should be made. It is not about a mere re-evaluation or questioning of the existing research directions, but about extracting, from the multitude of interpretations, those that capture security in a sociological or socio-cultural perspective.

A separate issue, undoubtedly, are the various specific cognitive inspirations derived from security-oriented research conducted in Poland since the early 1990's of the twentieth century at the National Defense University, especially interdisciplinary research, and study work on the issue of education for security and security research methodology (R. Stępień, ed, 1994; P. Sienkiewicz, H. Świeboda, 2012a, 2012b, 2013). Despite these achievements described and not described here, in my opinion these works have not resulted in works synthesizing the research achievements in this field yet, and the multitude of research teams, various competences of research participants and various research approaches have generated a phenomenon of secondary disorder, which is common in modern science.

In our opinion, from the point of view of contribution to scientific achievements, the highest methodological and theoretical level have works in the field of "security philosophy", especially those aimed at determining of the nature of security and personal and structural security, as well as works from the borderline of psychology and sociology focused on psychosocial risks of national security and concerning a certain category of groups working for social security called dispositional groups ("dispositional groups") or, in a narrower sense, "uniform groups" ("uniform groups"). While, a more pragmatic and strictly military point of view is revealed in a number of valuable studies on the "security system" (S. Koziej, 2006) and its elements in which the security system is understood in a classical way.

From the mid-90s of the twentieth century, there has been a dynamic development of sociological studies on security focused on the so-called dispositional groups at the University of Wroclaw. A significant advantage of the scientific and research activity of the Wrocław environment are systematically organized (since 1997) conferences devoted to broadly understood security issues and special issues of the scientific journal "Forum Socjologiczne: (*"Sociological Forum")* titled *Specjalne Zeszyty (Special Notebooks).* An important source of inspiration in determining the status of sociology of security for me were the reflections of Zdzisław Zagórski on the paradigm of contemporary sociology and studies of Jan Maciejewski on dispositional groups. They made it possible to put forward and verify many theses regarding the relationship "security - sociology", which resulted in my conviction that the most promising paradigm of modern sociology is "sociology of security". (A. Kolodziejczyk, 2001, 2007, 2017).

The reflection on security mentioned above and the advancement of the institutionalization of sociology of security are not sufficient, according to the author of this article. In particular, further constant improvement of the methodological systematization of research areas, development of conceptual apparatus, theories, methods and techniques of studies and, above all, systematic, programmatic study of this attribute of human existence is necessary due to its social significance, dynamics of civilization, social and cultural changes. The implementation of the sociological perspective for security studies seems to be very interesting and promising also for practical reasons. Namely, such studies can contribute to a better diagnosis of many problems, better penetration into their nature, more accurate determination of the *metaphors* of security indicating to us alone the answer to the question "what do we live by" (G. Lakof, M. Johnson, 1980) and, thus, to constructing of concepts, educational programs, scenarios and strategies as well as organizational structures and activities for the benefit of social order and improvement of the quality of collective and individual life that are more adequate to the threats, opportunities, risks and challenges.

Everything that I have presented above increases the significance and even the need for permanent study of human security and its "nurturing", like health, adequately to the changing social, historical, cultural and civilization-and-technical circumstances. It can also be said without a risk of exaggeration that security, like health, must be thought of in advance and taken care of in advance, guided by the

sociological imagination suggested *explicitly* by another outstanding thinker Charles W. Mills (P. Sztompka, M. Kucia, 2006) Because what ends the lack of reflectiveness and imagination on the part of the international community is shown by the events related to the war in the Middle East, Afghanistan, Iraq and Syria, as well as the situation in North Africa and in the East of Ukraine. Recently, the consequences of ill-considered actions concerning refugees and economic immigrants from Syria, Iraq, Eritrea and other countries in crisis or fall (like Yemen) show the importance of an accurate and reliable recognition, monitoring and response to the emerging and developing threats to the security of states and nations.

The Subject of The Sociology of Security

Attempts to define the concept of security, and therefore the content corresponding to this concept, are taken from various positions. Therefore, we can talk about the large number and variety of approaches in defining it (J. Stańczyk, 2017) To prevent chaos from creeping in here, some general, logical criteria should be adopted for (re)constructing of the content of the definition of security. The proposal of K. Ajdukiewicz postulating the use of pragmatic logic principles seems to be useful in this regard. From this point of view, there are three options for organizing the content of any concepts (K. Ajdukiewicz, 1975, pp. 50-51) that can be related to the content of the concept of *security*.

First of all, one can reconstruct the content of the concept according to a fixed, finite set of its designations, i.e. by listing the set of all features associated with the name "security". The content understood in this way is deemed to be the cited *full and comprehensive content* of this concept of *security*. In the case of this phenomenon, this approach is unreliable, because the content describing the term of security is sometimes very extensive and beyond the scope of presentation in a scientific article or even a book. Therefore, when reconstructing the content of this concept, some simplifications are made, omitting many less important features and emphasizing only the set of features that is considered significant - *characteristic* for its designations (S. Koziej, 2006, p. 6). As a result, *the characteristic content* for the term of security determines the scope of its name.

However, even here, a reservation should be made that the set of characteristic features for the name of security often turns out to be extensive and unnecessary from the point of view of the problem being analyzed, especially when a particular type of security is discussed, such as political, economic, community, social, cultural or military security. Therefore, from the available set of characteristic features only those that are necessary and sufficient for the determination of the scope of the defined concept are selected. In addition, based on Ajdukiewicz's suggestion, one can define the concept of security by grasping such a set of features that are necessary and sufficient for the determination of the scope of the name of security, and thus constitutes its *constitutive content,* that is, a certain minimum definition necessary to determine it.

The approaches mentioned above can be very useful because they make you aware of different ways of constructing the concept of security, especially when taken from different theoretical, methodological and practical positions. Such logic in constructing of the content of the definition of security is also useful in the secondary analysis or reconstruction of the content of various theoretical concepts (and doctrines) of this socio-cultural phenomenon. Thanks to this approach, it is possible to distinguish, within each terminological proposal of a definition of security, its comprehensive, characteristic and constitutive content. Awareness of these matters can be important for the organization and rationalization of the debates on the scope of a conceptual category of *security* (J. Stańczyk. 2018, pp. 17-84).

The problems mentioned in the beginning, related to the definition and understanding of the meaning of the concept of security prompt to review the definitions of security contained in the literature, to reconstruct their content, to take into account a new, socio-cultural look into its essence and sense, and therefore to adopt the approach appropriate for sociology and to adopt such a view of security, in which it is treated as a peculiar socio-cultural phenomenon. As part of the suggested review of definitions of the term security, one can use the following logic: the review should begin with definitions of generalized security found in colloquial language and included in dictionary studies, belles-lettres and

social philosophy since the 1990's of the twentieth century within the frameworks of philosophy of security, securitology and other social sciences, especially political science (J. Stańczyk, 2018, pp. 90-180, J. Zalewski, 2015a).

Etymologically speaking, the term security comes from the Latin "sine cura" or "securitas", which meant "no custody" (Słownik wyrazów obcych, 1980, p. 673). Such archaic meaning of the term security is very general and focused on its objective and practical dimension. This approach to the term security, however, has some current value, because it draws attention to its colloquial and collective sense, in which, according to John L. Austin, "a common set of words embodies all distinctions that people found worth carrying out, and relationships that during lifetimes of many generations people recognized as worthy of meaning" (J.L. Austin, 1993, p. 243). Starting from the review of the colloquial (dictionary, literature) understanding of security issues, one can determine the first components of the general problem field of security, treated here as a socio-cultural phenomenon associated with various forms of human thinking and activity.

Today, even in general dictionary terms security is already presented as a social phenomenon, i.e. a characteristic specific to social relations, in which one of the parties "does not threaten anything" and others "does not feel threatened". Security is also gradable. It is said that someone is "safe", "safer" or "not endangered." (Słownik poprawnej polszczyzny, 1980, p. 40). Yet another general property of security as such is provided by D. Lerner in Dictionary of the Social Science, according to which "In the most literal sense, security is actually identical to the term <safety> and means no physical threat <danger> or protection against it" (A Dictionary of the Social Sciences, 1964, p. 629). In this case, the sense of the general term of security has dual nature, because on one hand it is the antithesis of physical threat, and on the other hand it is practical, because it postulates the need or the necessity to protect against this type of threat.

Colloquial knowledge and fiction can provide interesting examples of the general understanding of the term security. It can also be provided by philosophical literature, or more precisely social philosophy. An example of such a general, philosophical definition of security is the definition by Janusz Świniarski, according to whom "Security is a form of existence of a given state of affairs achieved by eliminating, avoiding and counteracting threats in order to prolong this existence" (J. Świniarski, 1997, p. 173). The author here identifies the general concept of security with each form of existence ("life") and extends it to other, non-human, forms of existence. In addition, he emphasizes different types of ways to counteract threats in order to protect (prolong) his existence.

Among the general scientific definitions, the definition of security proposed by J. Kukułka is frequently referred to in the literature on the subject, especially in political science literature. According to this author, "security is not so much a specific state of affairs as a continuous social process." In connection with this, "social entities are trying to improve mechanisms that provide them with a sense of security." The lack of satisfaction of the need for security, according to Kukułka, "causes damage to an individual or a human group, because it destabilizes his identity and functioning. Therefore, they tend to act to change the existing state of affairs, e.g. to resist unfavorable changes in their external-objective sphere and to use protective measures that can restore their sense of security" (J. Kukułka, 1995, pp. 198-199, J. Zalewski, 2015b).

An analysis of the content of the above mentioned definition implies that the concept of security has de facto nature of a sociological category, because it is one of the basic needs of social entities, besides it is also a specific state and social process (J. Kukułka, 1994, pp. 40-41). In addition to the dominant descriptive approach here, Kukułka clearly emphasizes the valuative approach to term of security. Security as a need is treated by him as value, which is something that is worth the efforts and sacrifices. As a value, it can have the status of real value or at least of desired value. In this approach, security is perceived as a need that is an important goal and stimulator of activity of organized social entities focused on its preservation or restoration. Security, according to the same author, is a state of the "spirit" of certain social entities, the subjective or conscious feeling of one's own existence, i.e. of "being" (J. Kukułka, 1994, pp. 40-41).

According to another expert on this issue at the level of international relations - Ryszard Zięba, security is first and foremost the need of a broadly understood subject. The subject can be not only a man and a social group, but also the state structure and the international system. Zięba extends the notion of a social entity to include *social structure* and *social system* (also international). Similarly to Kukułka, he notes that the lack of ensuring the need for security has some negative consequences for the (individual or congregational) subject, which may be "anxiety, fears, concern and uncertainty" of people, and their "tendency to influence their environment and the internal sphere, in order to dismiss the threat or at least reduce the negative feelings." Security in this interpretation therefore has twofold social character: *objective* and *subjective*. It is an inalienable need of various social entities and structures, and - more importantly - it is also a conscious need of these social entities. R. Zięba specifies the basic determinants of the most general meaning of the term contained in scientific and journalistic literature. The author mentions eight such general, constitutive designations of the term security given in general definitions of this word. These include: "existence, survival, wholeness, identity (sameness), independence, peace, possession and certainty of development" (R. Zięba, 1997, p. 3).

It is noteworthy not only the rather narrow range of designations of security, but their sequence. Undoubtedly, the first designation of the concept of security "existence" is the most important, and less important, though not insignificant, are the last designations. However, are such security properties and their ordering appropriate for all cultures? This cannot be prejudged without reference to empirical research, especially intercultural research. Because of the relationship to the social entity to which *security* is assigned, many authors consider the distinction - at a general level - between "internal and external security" justified. "Internal security - writes R. Zięba - means stability and harmony of a given organism or system (collective entity), while external security means no threat from other entities. Together, both aspects, according to the quoted author, constitute the general security of a given entity" (R. Zięba, 1997, p. 4]. For this reason, the sense of the concept of the security of such collective entity e.g. a nation or a state, may be considered from an internal and external point of view, or taking into account both these points of view in common communication.

Becoming aware of which meanings of the term *security* the authors apply is extremely important for a sensible debate on security and, which seems to be the most important, for rational practical solutions and implemented policies. It is also an important supplementation to the review of the considerations contained in this article on security so far, as a socio-cultural phenomenon by two new aspects: *internal aspect* and *external* aspect (J. Zalewski, 2017). The latter is the result of external influences and relations, existing circumstances and influence of the environment, in particular interactions with other subjects of international life.

The examples of definition of the term *security* presented above are not formulated by sociologists. However, it can be assumed that at least the last two proposals formulated on the basis of political science and international relations are characterized by a general and at the same time close to sociological approach to this phenomenon. Each of the authors treats *security* like a sociologist as a social phenomenon, focuses on its social essence, social features and dimensions. Based on the definition proposals cited above, a general sociological model of studying security can be derived, which is presented in the table 1.

Table 1: General concept of security, its subjects and defining features.

Definition feature of security / **The subject of security**	**State** (Existence)	**Process** (trend, development, progress)	**Need** (value)	**Identity** (integration, consistency)	**Relation** (interaction)
Individual	+	+	+	+	+
Small social group	+	+	+	+	+

Large social group, organisation	+	+	+	+	+
Social structure	+	+	+	+	+
Social system	+	+	+	+	+

Source: author

As it follows from the above, even generally understood *security* belongs to the class of social phenomena with quite diversified connotations. The methods of defining (understanding) security are distinguished with regard to the possibility of creating various configurations of entities and related potential definition features marked with a plus (+). According to the author of this article, this model can be a starting point for developing the classification of various types of definitions of security and presenting various levels and dimensions of security (e.g. subject-object-spatial) (A. Kołodziejczyk, 2007, pp. 244-245) as a part of sociology of security.

Based on the data collected as a result of the review and reconstruction of approaches in defining security and its absence, a cognitive attitude, which emphasizes multidimensional thinking about security and its absence, can be adopted as valid. Definitions of security presented above emphasize various aspects of this social phenomenon and varying degrees of generality. In general, in such approaches the subject of security is clearly defined. However, its definition features include very different features that reflect the preferences of its author or authors. This creates a sense of chaos in defining the concept of security. Therefore, it seems necessary to derive a general model or a comprehensive approach to security that would introduce a certain order by establishing key subjective aspects of security and its absence, basic defining features and relationships. An attempt at such a general and comprehensive approach to security of a social entity and its absence is presented in the table 2 below.

Table 2: Model of a general, comprehensive approach to human security and its absence

Basic defining features / **Entity**- its aspect	**Security as**:			**Absence of security** (uncertainty, threat)
	No danger	Opportunity	The challenge	
Objective (objective state)				
Subjective (state of consciousness / psyche)				
Practical (purpose of the action)				

Source: author

In this sense, at the general level, security, in the broad sense of the word, consists not only of its basic components, but also of absence of security. Each of these basic definition features of security can be considered in an objective, subjective and practical (organizational) aspect. In addition, there may be relationships (couplings) between the specified security components (definition features) and aspects

that may give security a new quality, whether in the form of its strengthening (synergy) or in the form of its weakening.

The above-mentioned concepts constituting the definiens of the general concept of security are partial and secondary in relation to the subjective criterion. However, they reflect the various aspects and possibilities of classification of security that exist in social sciences, and some in international relations. Because security, in the broadest sense of the term, belongs to the group of subjective needs, the division according to the subjective criterion is a priority here. On the basis of sociology, security of an individual is also an important cognitive issue, but in relation to social issues. Other, non-subject, approaches to security significantly enrich the description of this dominant approach in social sciences, and therefore they must not be underestimated. Therefore, the typology of defining security as a social phenomenon must necessarily be based on different classification criteria

Conclusion

The above, quite general reflection on human security indicates the usefulness of sociological reflection and its conceptual grid in the study of this socio-cultural phenomenon. Next, sociology can demonstrate its huge role in the study of human security issues, showing at least the usefulness of sociological theory for establishing the foundations for the study of such security; determining of cultural imponderables of security; analyzing varieties and dimensions of security as a socio-cultural phenomenon, performing sociological analysis of institutions - structures and systems - security; determining the impact of social change, including the globalization process, on human security, etc.

An analysis of the literature on the subject shows that a sociological approach to the study of human security issues can be heuristically promising. Also, confronting the sociological approach with the achievements of other social sciences may reveal new cognitive possibilities. Such an example can be the issue of a subjective approach to security issues at the macro (state, nation) level and in relation to other entities of the same kind. Because analyses of definitions of security have shown that it is a convenient starting point for the study of communities of various scales: smaller than the state and nation, and larger ones. The whole range of security subjects from a sociological perspective can be an appropriate basis for developing policies more relevant to the challenges of the modern world that take into account real and potential problems in the field of human security.

Developing and institutionalizing of the paradigm *sociology of security*, according to the author of this article, will depend on the ways and directions of education in this field of social knowledge. One of the conditions for obtaining the scientific status of sociology of security will certainly be the fact whether the proposed security research concept will be developed as a socio-cultural phenomenon. For now, the prognosis seems to be very optimistic.

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Determinants of Military Mobility in The Aspect of Military Security of The State

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Abstract

The article presents the results of research on the impact of transport infrastructure on the military mobility of Polish troops, especially allied forces, equipped with military equipment increased in size and weight, which requires engineering structures of increased load-bearing capacity (road and railways) as one of the basic determinants ensuring Poland's military security. The article presents a verification and assessment of the impact of transport infrastructure on military mobility. Factors determining the development of military mobility were presented, including the increased presence of allied forces on NATO's eastern flank. The article describes and verifies infrastructure, legal and legislative barriers as well as transport infrastructure requirements.

Keywords: Military Security, Transport Infrastructure System, Military Mobility, Host Nation Support.

Introduction

The subject of research described in this article is transport infrastructure in Poland and its impact on the mobility of the transport system of the Polish Armed Forces as one of the basic elements of ensuring military security in Poland. The reason for writing this article was an attempt to assess the functioning of the military transportation system in the conditions of limited possibilities of the transport infrastructure in Poland. The purpose of the article is to check, verify and assess the impact of transport infrastructure on military mobility in the aspect of the capacity of non-military sector to create conditions enabling free movement of troops on the territory of Poland. Detailed research problems were formulated as follows: What factors and to what extent determine the development of military mobility? What is the role of the increased presence of allied forces on NATO's eastern flank in the development of military mobility? What are the barriers which hamper military mobility, taking into account various modes of transport?

When preparing the article, the following research methods were used: diagnostic survey conducted using the uncategorised interview technique, statistical data analysis method, critical analysis of the research literature and documents concerning the subject of article. The article describes and verifies infrastructure, legal and legislative barriers, transport infrastructure requirements as well as the state of transport infrastructure and insufficient means of transport in individual modes of transport. On this basis, determinants of military mobility in defence logistics have been verified. The structure of military transport in the assessed period is presented in Table 1, after the occurrence of military threats related to the security of NATO's eastern flank.

Table 1: Structure of military transport in the multi-branch system in the years 2014-2018

Type of transport	2014	2015	2016	2017	2018	Remarks
Maritime transport	7	5	1	2	0	
Air transport	239	170	224	281	231	Flights carried out including NATO programs (SALIS and SAC)
Rail transport	122	187	198	411	314	Operational and supply transports
Road transport	8618	9440	10225	11835	12852	Based on the number of permits issued for road transport

Source: in-house elaboration compiled on the basis of [5].

The implementation of tasks arising from the obligations of the host country requires the preparation of elements of Polish defence system for the purpose of using as national defence resources. This is a new challenge for our country as a host country. The total number of allied forces stationed in Poland in the form of rotational stays, military training and transits is presented in Figure 1.

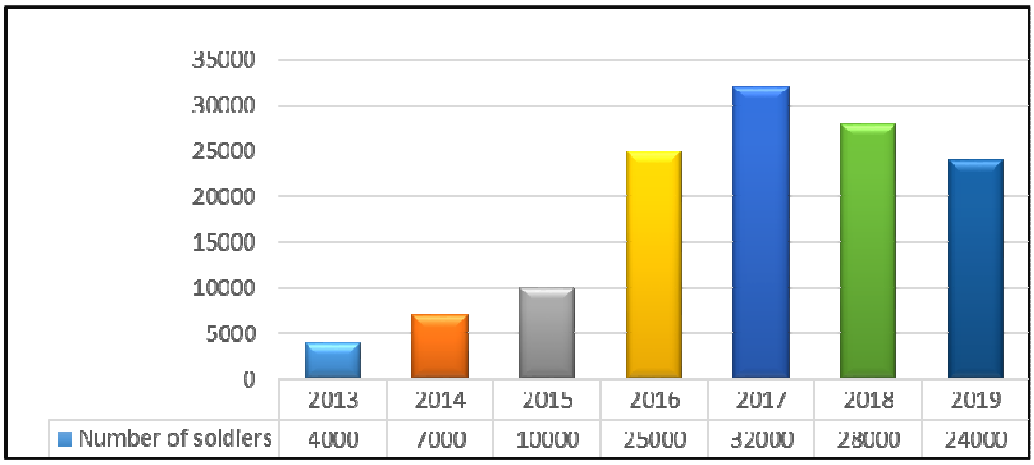

Fig. 1: The number of allied soldiers staying in Poland

Source: in-house elaboration compiled on the basis of [1-2; 7–10].

The conducted research shows an eightfold increase in the number of soldiers stationed in Poland in various forms in 2017, in comparison to the period before the Ukrainian crisis. It is also the highest number of troops stationed in our country since the end of the Cold War in 1989. A significant increase in the number of allied troops is also planned in 2020, when the "Defender-20" military exercise related to the movement of the American military forces to Poland will take place [9-10; 12]. A formal requirement for the arrival of allied troops to the territory of the Republic of Poland is to obtain a residence permit or a transfer permit [5, 15].

Table 2: Tasks of the road transport subsystem implemented by the Chief of the Movement and Transportation Division-National Movement Co-Ordination Centre Polish NMCC (STiRW-CKRW) in the years 2014-2018

Name of the project	2014	2015	2016	2017	2018
"Permission for road transport" of military columns, non-standard vehicles and of hazardous goods by the Polish Armed Forces	8618	9440	10225	11835	12852

Permission for the Polish Armed Forces vehicle to leave the country	757	1269	1141	1793	2459
Permission for the transfer of foreign troops on the territory of the Republic of Poland	477	854	930	1225	1494
Securing the piloting of non-standard vehicles and military columns by traffic regulation companies	624	692	982	806	1511

Source: in-house elaboration compiled on the basis of [5, 6, 10].

In case of non-standard vehicles, the existing limitations of road infrastructure always require consultations with relevant infrastructure managers, i.e. establishing contact with about 2,900 civil infrastructure managers of the public road network in Poland. In addition, there are customs procedures as well as tax forms regarding exemptions on imported equipment and military materials [10]. In the next stage of the RSOM process, i.e. further transfer of troops, further physical obstacles can be encountered, related to the transport network capacity (road, railway, port terminals or airports) to support heavy military equipment of non-standard sizes, as well as limited means of transport.

Selected examples of the implementation of transport tasks as part of the support of the host country - results of the research

In NATO during international military exercises tasks of support are carried by the host country, concerning transport and movement of troops for the benefit of military units of allied and partner countries based on the "HNS STANDARD" program [9], which envisages access to transport infrastructure, including sea and air ports and road and rail border crossings as well as access to air, sea and railway military reloading points, free of seaport and airport charges, which are not directly related to the services requested and received. The number of military exercises that have been organised in Poland in recent years is shown in Figure 2.

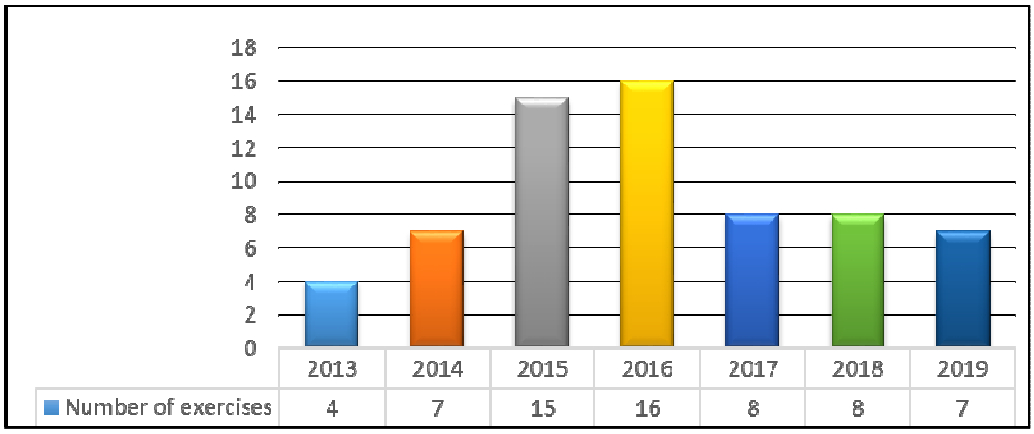

Fig. 2: The number of multinational military exercises in Poland with the participation of allied forces

Source: the in-house elaboration.

The research, presented in the figure in the form of a summary, shows the increased effort of the transport authorities of the Armed Forces of the Republic of Poland, associated with the dynamic increase in the number of military exercises in Poland that took place after 2014. The increase in the number of military exercises is NATO's response to the increase in the military threat on NATO's eastern flank, resulting from Russia's armed aggression against Ukraine. A similar trend occurs in case of the increased number of permits issued in Poland for the transport of allied troops through the

territory of our country, which is shown in Figure 3 and the number of soldiers of allied troops transported through the territory of our country (Figure 4).

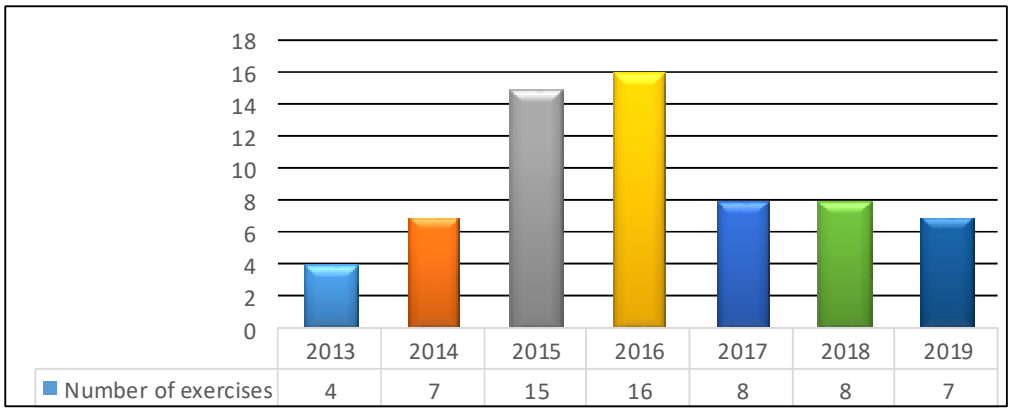

Fig. 3: The number of permits issued for the transport of allied troops through Poland
Source: the in-house elaboration.

Another indicator of the burden on the military transport system resulting from additional tasks as part of support of allied forces is the number of permits issued for the transfer of allied forces through the territory of our country. The conducted research shows that during the analysed period there was more than a twenty-fold increase in the number of permits issued (2058%), which was associated with a huge effort of the military transport authorities issuing permits (Military transport and movement coordination centres).

Similar conclusions can be drawn on the basis of the increase in the number of NATO soldiers who are deployed through our territory (Figure 4).

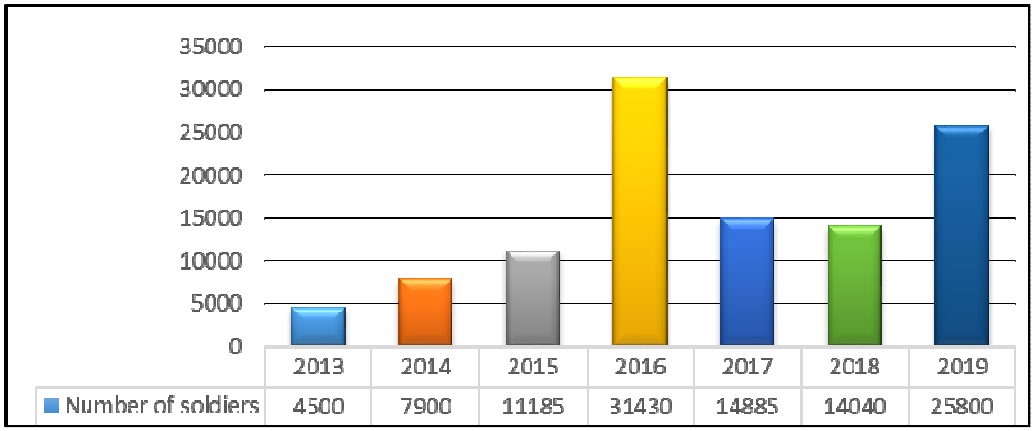

Fig. 4: The number of soldiers of allied troops transported through the territory of Poland
Source: the in-house elaboration.

The highest increase in comparison to 2013 was recorded in 2016, which results from the record number of military exercises performed in Poland.

"ANAKONDA-16" Exercise

"Anaconda-16" was the third edition of the multinational military exercise which involved representatives of the armed forces from 24 allies and partner countries. The complexity of the exercise consisted in providing logistics support of many complicated operational activities, conducted in seven different locations. The above-mentioned determinants influenced the scope of

tasks of the army transport and movement system. The main functional areas of HNS in the transport subsystem included providing access to airports and seaports of unloading as well as assistance in crossing the border, in moving and deploying allied troops in exercise areas. In this respect, the Military Transport and Movement subsystem provided transport for a total of about 31,000 soldiers, including as part of HNS for 18,192 allies and 454 partner nations soldiers [1-2].

Poland as the host country was responsible, among others, for: welcoming NATO troops on the state border, supervising the movement of troops in Poland, coordinating deployment to exercise areas and monitoring the movement of troops, using about seven thousand pieces of military equipment [3, 13]. The equipment for military exercises was transported to Poland by air, sea, rail and road (Figure 5). First of all, heavy military equipment was transported by sea, including, among others, from the USA (1,400 pieces), from Spain (400) and from Great Britain (200). Lightweight military equipment and pallets with military equipment as well as soldiers with equipment reached the exercise area by air [11-12].

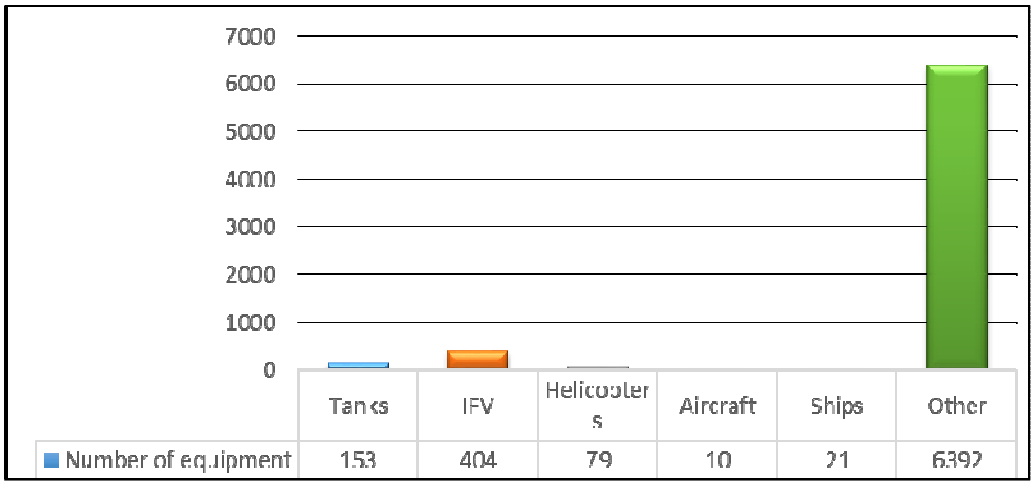

Fig. 5: The number of military equipment delivered to Poland for the "Anakaonda-16" exercise
Source: in-house elaboration compiled on the basis of [1,2].

First of all, military equipment from Germany arrived in exercise area by rail and road. As far as transport is concerned, Poland under RSOM was responsible for transport of approximately 3,000 pieces of allied military equipment to the exercise areas, including: Abrams tanks, Leopards 2A4 and 2A5, Patriot missile batteries, aircraft, including: F-16 aircraft, C-17 Globemaster, C-130 Hercules and C-295M, and Apache and Blackhawk helicopters as well as 21 naval ships. In terms of operations, the "Anaconda-16" exercise was a test of the ability to conduct joint operations for the Polish Armed Forces. However, for the Military Transport and Movement subsystem it was primarily a test of the state's ability to secure the reception, displacement and deployment of allied troops in the host country.

"SABER STRIKE -18" Exercise

"Saber Strike" is a series of exercises organised within the territory of the Baltic States and in Poland by American troops stationed in Europe. The main purpose is to increase interoperability and mobility as well as to project military power. Over 18,000 soldiers from 19 countries took part in the "Saber Strike-18" exercise. Exercise took place mainly in Poland and Estonia, and some operations were also carried out in Lithuania and Latvia. The most numerous forces delegated to participate in the exercise were the American forces, while Poland was the second nation in terms of the number of soldiers involved. Multinational battalion battle group that have been stationed from 2017 on NATO's eastern flank played an important role during "Saber Strike-18".

A great undertaking for Poland as the host country was the reception at the borders of a large number of equipment and soldiers and their displacement to the exercise area. The biggest challenge was to organise the acceptance and displacement of a large number of military equipment that was delivered to the exercise area by various means of transport. The number of transports is shown in Figure 6.

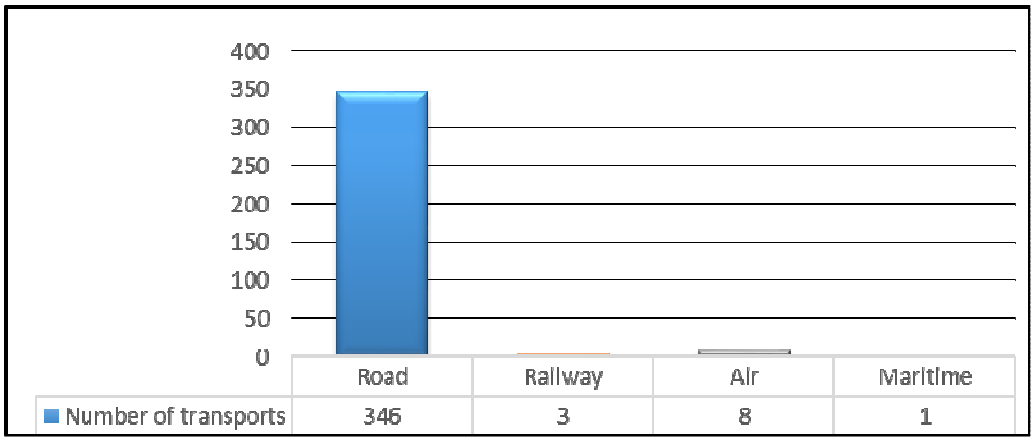

Fig. 6: The number and type of operational transports delivered to the exercise area of "Saber Strike-18"

Source: in-house elaboration compiled on the basis of [5, 6, 10].

The research shows that the majority of equipment was transported to the exercise area by road. However, it should be considered that - unlike other modes of transport - one transport by sea is a one-time delivery of up to several hundred pieces of heavy equipment. Road and rail transport, by which mainly heavy equipment was transported, played a significant role in the effective transfer of equipment. On the other hand, air transport was used primarily to displace soldiers along with their equipment.

The largest number of military equipment used during the exercise was recorded on 6.06.2018, when almost 2,000 foreign army equipment pieces and almost 1,150 pieces of Polish military equipment were located in the training grounds. This required a significant involvement of the transport subsystem and movement of the troops both during the transfer to the operational area of destination (to participate in military exercise) and during the return to the places of permanent dislocation in the home countries. The largest number of soldiers participating in the exercise was recorded on 6 June 2018, there were over 7,200 soldiers of allied countries and almost 4,500 Polish soldiers took part in exercises at training grounds. This required a lot of organisational effort from the transport subsystem to ensure efficient movement for such a large number of people.

"TESTEX-17" Exercise

Before the trial road transport of heavy tracked equipment, a network of defence-important routes was designated for the army. The routes selected in this way were tested as part of relocation of allied forces. Practically as part of"TESTEX-17" exercise a relocation of a heavy equipment with a weight of approx. 120 tons and loads of approx. 115 kN/axle was planned, including the British CHALAGER 2 tanks with a weight of approx. 80 tons. A total of fifty soldiers and fifteen vehicles participated in the trial transport, including 5 sets of low loader equipment of the HET 1070F type [10]. The following military equipment was designated for the transport:

- Challenger 2 MBT,
- AS-90 self-propelled howitzer, caliber 155 mm,
- vehicle for technical support.

Figure 7 shows the planned route for moving a column of British vehicles transporting oversized cargo from the border crossing in Świecko, on the German-Polish border, to the border crossing in Budziska on the Polish-Lithuanian border.

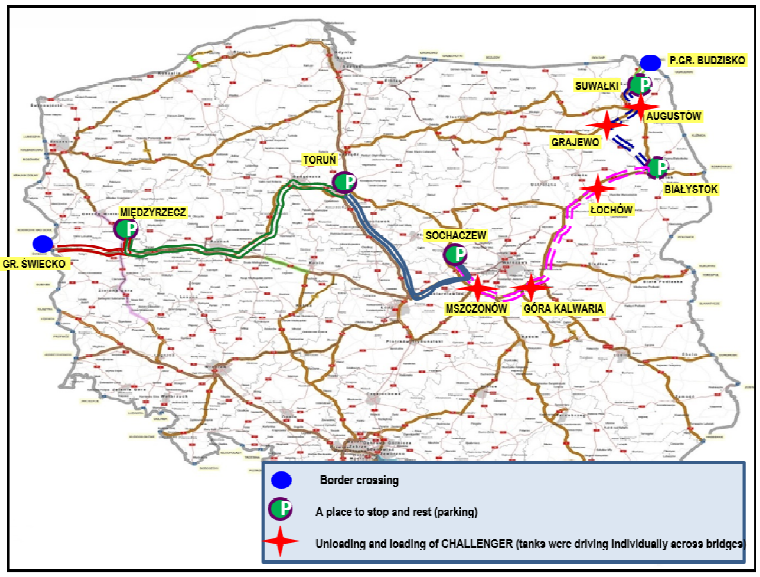

Fig. 7: Transportation route of heavy military equipment via Poland

*Source: in-house elaboration compiled on the basis of [**Error! Reference source not found.**1].*

On the route, five parking and resting places have been prepared (respectively in the following towns: Międzyrzecz, Toruń, Sochaczew, Białystok, Suwałki). During the determination of the route, it turned out that due to the fact that two engineering facilities on the A2 motorway did not meet the technical requirements, the column was forced to drive off the A-2 highway towards Bydgoszcz to the A-1 highway. However, the biggest obstacle to the efficient transport of the column was the insufficient load-bearing capacity of bridges along the route, as compared to the total weight of the equipment. The fact that bridges were not adapted to the transport of heavy equipment resulted in the need for additional unloading and loading of equipment five times in order to enable the tanks to drive through bridges individually. On these sections, the convoy had to move separately and after crossing the engineering facility, the equipment was reloaded onto a low loader semi-trailer.

The UK Armed Forces jointly presumed that it would take three days to relocate soldiers from a base located in Germany to a base in Estonia. In fact, the movement of troops through the territory of Poland took four days. As a result of the rules on drivers' working time, the convoy was forced to stop for a total of three days. The research shows that tractor units play a very important role in ensuring military mobility, especially that in Poland, as part of fulfilling its obligations of the host country, an increased number of NATO forces has been deployed since 2017.

Infrastructure Barriers - Research Results

Road Infrastructure

During the design and construction of road infrastructure, taking into account the national defence requirements, many restrictions and barriers may be encountered. At present, in the era of modern construction methods, when planning a wide range of earthworks, it is possible to design and build roads without taking into account unfavourable terrain conditions. Modern routes have minimal gradients, facilitating the journey and allowing higher speeds than before.

The removal of barriers in the road transport infrastructure is associated with the improvement of technical parameters of roads and all facilities located on them, including bridges, viaducts, tunnels and even roads at water dams. From the point of view of improving military mobility, the following parameters should be taken into account [11]: width of the horizontal clearance; height of vertical clearance in tunnels and under railway viaducts; load-bearing capacity of engineering objects (calculated in tonnes) and load-bearing capacity of the road adapted to the vehicle load (expressed in tonnes per axle).Military requirements in terms of improving the technical parameters of the road infrastructure are presented in Table 3.

Table 3: Improvement of technical parameters of the road network

Parameter	Value	Examples of technical parameters of bridge structures
Load-bearing capacity of a bridge	150 t	7 t
MLC load-bearing capacity of a bridge	MLC 120 tracked vehicles MLC 150 wheeled vehicles	
Turning radius for heavy equipment	25 m	20 m
Maximum vehicle height	4.5 m	2.4 m
Maximum vehicle width	5.0 m	4.0 m
Vertical clearance	4.5 m	

*Source: in-house elaboration compiled on the basis of [**Error! Reference source not found.**1].*

Railway Infrastructure

The conducted research shows that one of the most important limitations in the use of railway infrastructure for defence is the slowdown of traffic caused by insufficient network capacity, because heavy traffic on selected railway lines and railway stations, in an emergency situation, may lead to delays in military operational transport.

Another barrier is disproportionate density of the railway transport network in the country, which is not particularly conducive to the functioning of the transport network during a crisis or war, because not all loading/unloading stations are properly adapted for reloading works, according to the intended use for army. The location of front and side ramps on railway lines is also extremely important.

The research also shows that additional reloading equipment such as cranes, forklifts or container lifts is more and more often used during railway reloading. Their access to the reloading location is limited by the low parameters of the access road to the reloading station. Moreover, during railway transport of heavy tracked equipment or oversized equipment, significant shortcomings in the railway infrastructure were found, where the large vertical and horizontal clearance on railway tracks is particularly important.

Airport Technical Infrastructure

The basic barrier limiting the use of airports for defence purposes is ensuring convenient communication with other modes of transport. From the point of view of ensuring military mobility, the following issues should be taken into account: Is there convenient access by public roads with the required capacity? Are there any alternative access roads? Are there any access roads for freight traffic designated for vehicles with heavy mass and large sizes? Is there any railway connection capable of handling passenger and freight transport?

When assessing air transport infrastructure in Poland, the research shows that the technical parameters of runways and aprons determine the size and number of aircraft using an airport.

Strength and size of aprons is also an important issue, which must be taken into account during the design phase. Prosperous international airports are constantly expanding their ground infrastructure by adding new parking spaces. The main and the only goal is to increase capacity, which in case of the army means increasing military mobility. Military requirements for improving airport infrastructure are presented in Table 4.

Table 4: Improvement of technical parameters of airports

Parameter	Value
Runway	3000 x 60 m
Apron	66.500 m^2
Horizontal clearance (tunnel)	6.5 m
Platform axle pressure	40 t / axle

*Source: in-house elaboration compiled on the basis of [**Error! Reference source not found.**1].*

It is equally important to have an appropriate number of reloading equipment, because in recent years the use of air transport for movement of military equipment (vehicles, power generators) that needs to be unloaded from the aircraft has increased. Equipment transported on pallets also frequently needs storage. It is often necessary to secure and store hazardous materials, most often it concerns ammunition or explosives. They require separated zone, located at a safe distance from the runways, with enhanced protection.

Technical infrastructure and equipment of seaports

The infrastructural barrier in the use of seaports is, among others, communication of ports, often hindered by the direct proximity of city centres, for example Szczecin or Gdańsk. Communication of the port with the road network may be limited by narrow and built-up streets or frequent junctions causing delay in reaching the port. As in the case of airports, reloading devices and equipment adapted to the highest number of types of transported cargo play a key role here. From a military perspective, sea containers as well as military wheeled and tracked equipment are most often transported. Technical parameters which should be applied to seaport infrastructure are presented in Table 5.

Table 5: Improvement of technical parameters of seaports

Parameter	Value
Wharf length	310 m
Maximum draught of a vessel	12 m
Number of wharves	3 / port
Load-bearing capacity of wharves	MLC 100

*Source: in-house elaboration compiled on the basis of [**Error! Reference source not found.**1].*

The most effective solution for unloading vehicles is the use of "ro-ro" ramps, enabling the equipment to be individually transported from the vessel to the wharf. Moreover, the load-bearing capacity of the "ro-ro" ramp and wharf should be taken into account so as to enable transport of even the heaviest equipment. The possibility of reloading and the availability of warehouse infrastructure for storage and warehousing of hazardous materials is also crucial for military transport.

Challenges to Minimise Infrastructural Restrictions and Improve Military Mobility

Overcoming Infrastructure Barriers

The challenge that the Ministry of National Defence faces is to identify critical infrastructure elements that are already affecting the duration of transfer. The awareness that during the war they will pose a real threat to the timely transfer and relocation of forces imposes the necessity to take actions to eliminate them. In order to improve mobility, the focus is mainly on the implementation of rail and road infrastructure projects. It includes the renovation and modernisation of existing road infrastructure, including engineering structures in road routes, railway lines, loading and unloading stations on railway lines used for the purpose of military transport. It should be beneficial, allowing for smooth and timely land transport of troops.

The first way to improve military mobility is to invest in the development of transport infrastructure using European funds under the CEF Connecting Europe Program, which is intended solely for dual-use transport infrastructure. Another condition that must be met in order to apply for funding is the need that roads or rail lines correspond to the infrastructure of the trans-European TEN-T transport network. As part of efforts undertaken by Poland to obtain co-financing of transport infrastructure, sections of rail and road routes have been designated that meet the above conditions. Decisions on the granting of financial assistance have not yet been taken. The release of funds for the implementation of investments under the "Connecting Europe" Program is planned for 2021-2023 [14].

Due to the increasing needs of military transportation or resuming railway traffic in the directions not used for a long time, there is a need to modernise or restore the use of sections of railway lines or loading/unloading stations. For example, railway line No. 239 between Lębork and Maszewo Lęborskie, its revitalisation was financed from the PRPO Program funds.

Additional challenge is constantly growing number of allied troops stationed in Poland. This involves the expansion of military bases and thus the need to improve the condition and parameters of access roads. This can be exemplified by the expansion of the air force base in Powidz and providing access road to the base for wheeled vehicles. Local Government Road Fund established at the end of 2018 is another financing possibility, which provides funds for investments in poviat and commune roads. Table 6 presents the required technical parameters of reloading facilities and equipment in terms of shortening military equipment reloading time.

Table 6: Reducing the time of reloading military equipment and materials at airports, seaports and railways

Parameter	Value
Reloading area for Armed Forces	240 m^2 /parking space 100 m^2
Number of wharves	2 / port
Reloading capacity	50 TEU / day
Fixed or movable front rail ramp	100 t
Reloading capacity	300 TEU / day
"Ro-Ro" ramp	2 x MLC 100
"Lo-lo" crane	2 x 100 t

*Source: in-house elaboration compiled on the basis of [**Error! Reference source not found.**1].*

Loading and unloading time of military equipment and personnel can be shorter due to modernisation of reloading ports, providing space and manoeuvring areas for heavy reloading equipment or mechanisation of works. At sea ports, the technical infrastructure is currently equipped with the best specialised reloading equipment. Parking spaces and manoeuvring spaces necessary for creating marching columns constitute an obstacle in the fulfilment of the army's needs. Table 7 presents military requirements for the improvement of transport and storage capacity in air and sea bases.

Table 7: Improvement of transport and storage capacity of air and sea bases

Parameter	Requirement	Parameter	Requirement
Increasing transport capacity		Increasing storage capacity	
Direct access to roads	Motorways and national roads	Storage area	100 m^2
Direct access to the railway line	2 x railway ramp	Permanent Warehouse	2 x 1000 m^2
Direct access to the railway line	1 x railway ramp	Permanent Warehouse	100 m^2

*Source: in-house elaboration compiled on the basis of [**Error! Reference source not found.**1].*

An equally important problem in ensuring military mobility by the infrastructure of sea and air force bases is the provision of parking spaces and rest areas for convoys, which in addition to parking spaces should also provide manoeuvring areas suitable for low-loader units.

Elimination of Legislative Barriers

In terms of eliminating legislative and regulatory barriers related to crossing the borders, the deadline for issuing permits for transfer on designated roads has been reduced so far for vehicles of foreign armed forces to 5 working days and to 3 days for High Readiness Forces.24-hour (24/7) dispatcher services were established to supervise the movement of troops [10].Works were undertaken aiming at:

- reducing the deadline for submitting applications for permission to enter Polish territorial waters (from 30 days to 5 days) for NATO and EU vessels;
- adapting the provisions regarding the entry of EU military aircraft which should be treated equally to NATO aircraft.

Other elements of mobility are transport networks, whose technical parameters do not always meet high military requirements. So far, as part of activities related to the elimination of physical barriers to the road network, roads dedicated to military movements have been selected as well as technical parameters were analysed in relation to the minimum technical and defence requirements developed by the EU Military Staff in correlation with NATO requirements.

Conclusions

The results of research presented herein show that the defence system in Poland only to a limited extent satisfies the transport needs of its own and allied troops, enabling the movement of troops and maintaining continuity of supply during missions conducted on Polish territory. The following conclusions can be drawn on the basis of the research:

1. Despite undertaking many actions improving the functioning of the transport infrastructure in Poland, there are still numerous critical points limiting the free movement of troops on roads, especially in case of non-standard vehicles.
2. The current capabilities of the road transport infrastructure do not fully take into account the needs of Polish troops, and especially allies, in ensuring the freedom of movement on roads within our territory. Among other things, the main shortcomings include the lack of an adequate number of bridge structures which comply with the technical parameters required by the army. Among others, there is insufficient load-bearing capacity of some engineering structures, which

requires designation of long detours. The army's requirements in ensuring transport of military equipment weighing up to 120 tons are not met as well.

3. An important limitation of military mobility results in the need for special procedures concerning the transport of heavy vehicles over bridge structures that causes delay in troops movement. For example, the duration of movement of column of British military vehicles in autumn 2017 lasted three times longer than expected.

4. In view of the existing barriers in Polish transport infrastructure, especially the road infrastructure, it is difficult to comply with the assumed time regime for the movement of troops from A to B.

Recommendations

The aim should be to enable the use of designed devices and civil structures (objects of the state transport infrastructure) for defence purposes, even if it would go beyond the needs of the civil (commercial) market. At the same time, when designing weapon systems and military equipment civil needs and standards should be taken into account, where possible. In order to ensure military mobility, the requirements and needs of the Ministry of National Defence should be taken into account when preparing transport infrastructure to meet the defence needs of the state. It is required to build new roads as well as to expand and rebuild the existing road network, enabling the determination of convenient road routes for heavy military vehicles. Moreover, the transport capacity of Abrams, Challenger and Leopard tanks should be improved by adapting to the technical and operational parameters of the road network designated for high readiness VJTF forces and by increasing the number of railway rolling stocks.

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Safety of The System of International Relations in The Context of The Coronavirus Pandemic COVID-19

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Abstract

Contemporary international relations are built on the relationships between geopolitical entities belonging to specific alliances of political, economic and military nature. International safety and security is defined by joint projects and activities that define the achievement of the objectives. In the situation of the crisis caused by the coronovirus COVID -19 pandemic, there are strong voices of disapproval for the actions taken by the community of European countries. This is particularly important because of the risk of undermining the system of cooperation between democratic states which have been established for years and which have relied on the principles of consolidated democracy in favour of a particular system of nation states. The purpose of this article is to present the risks that may arise in the area of erosion of the European Union caused by autocratic decisions of individual European decision-makers. This threat is all the more worrying because the destabilisation of the system of international relations between the countries of the European Union and the United States of America is a clear realisation of Russia's foreign policy objectives.

Keywords: International Relations, Security, Safety, Nation States, Pandemic

Introduction

The experience of social unrest and of individual realization of political assumptions of representatives of autocratic countries causes the conclusion that it is necessary to build international relations based on a liberal background, rejecting at the same time particular trends of realism. Following Joseph Nye's position, for example, it should be stressed that international institutions play a particularly important and positive role in international relations, since they are a tool to facilitate cooperation and indirectly guarantee stability, safety and security. In international relations they are a corrective element in relations between states. The high degree of institutionalisation of international relations ensures a constant flow of information, the possibility of exchanging views and allows the creation of norms and standards that reduce the risk attributed to an anarchised international environment. The economic and political interdependence of countries leads to a high probability to maintain world peace. This position is justified by the view of Richard Rosecrance, who argued that the source of prosperity of highly developed countries was not wars, but trade contacts conducted at a high economic level (Ostaszewski, 2008, 2010, p. 25-26). The opposite view of the indicated functioning of the international community are the references to a realistic vision of the international order, as well as the views of Russian representatives of the “Russian order”. It should be noted that in the era of information struggle as a tool of soft power to influence individual geopolitical objects, as well as the decisions of their representatives, there is an extremely high risk of achieving the Kremlin's political goals.

Leszek Sykulski in his book *“Russian Geopolitics versus the Information War”* points out that from the point of view of the realization of the Russian conservative paradigm, opposite to the values of the Western world, it is important to strengthen radical circles that are capable of destroying the existing political and economic order in Europe. At present, the radical right wing using conservative slogans is an ally of execution of the Russian world order assumptions. The message, the sources of which are anchored in the Kremlin, raises anti-Western values criticising liberalism, and at the same time pointing to the United States of America as its greatest enemy. The author, referring to the Manifesto of the Global Revolutionary Alliance - GRA (a network organization set up to realize the goal to fight for the

awareness of radical Western societies), points to a particularly dangerous aspect of the realization of this ideology, because it refers to the usage of any means depending on the needs, which can pose a very high threat to European safety and security. This narrative is not only present in the identity of circles declaring a connection with neo-imperial ideas, but is also promoted by part of the liberal circles. The GRA warns against a so-called world government based on a world oligarchy, in which monopolists become the core of this entity. The above-mentioned Manifesto underlines that the method of fighting against the global dominance of the USA and against the global West is to support revolutionary forces that do not agree with the values of the capitalist Western world. To this end, every military conflict in the world should be used to fight the United States and its allies (Sykulski, 2019, pp. 119-127.).

The current situation of the global crisis caused by the epidemic gives the supporters of the Global Revolutionary Alliance a convenient situation to achieve the goal, i.e. to weaken the potential of liberal Western countries. Although the COVID-19 virus is not a military conflict, it certainly destabilises the political situation and, as indicated above, all means should be used to achieve the objective, depending on the needs. Of course, it can be accused that the position of the Global Revolutionary Alliance - GRA is not an official postulate of Russia's foreign policy, but it should be noted that they follow the ideology presented by Alexander Dugin, whose activity is identified with people associated with the decision-making environment of the Russian state.

Nationalism and Nation States

The analysis of the assumptions accompanying Russia's vision of the world order allows us to conclude that the subjects of Russia's direct interest are radical right-wing circles practising populist policy. As Benjamin De Cleen notes in his article "Populism and nationalism", nationalist populism manifests itself, among other things, in rejection of ethnic and cultural diversity. The radical right-wing parties, i.e. the French party, the French Front National, the Austrian Freiheitliche Partei Österreichs and the Belgian party Vlaams Belang, are the groups that are particularly concerned about the rejection of ethnic and cultural differences, but it should be noted that these values are also rejected by other right-wing parties. Right-wing parties point out that they care about the interests of all social groups, raising the fact that ordinary people are the main victims of multicultural society and suffer from immigrants. In this respect, they point out that immigrants deprive them of work, contribute to the reduction of pension benefits and commit criminal offences. The members of these parties accuse the political elite of strengthening the rights of foreigners and immigrants to the detriment of their own interests, and thus do not sufficiently represent the entire nation, but selected social groups, leaving aside those most in need. Nationalists, by using populism, also fight for national autonomy, accusing liberals of cutting themselves off from authentic national identity. This kind of articulation can be found in German nationalism, as well as in Eastern and Central European nationalist movements fighting for national identity in the past, and which is nowadays transferred to the extreme right. Nationalist populism also touches on antagonistic issues concerning both national and foreign elites. Populist political movements articulate national interests, which contradict the vision of transnational organisations. In the populist rhetoric of the right, the antagonism manifested itself mainly around the defence of national identity against the multicultural and globalist policies imposed by community organisations. According to nationalists, these threats threaten the identity, culture and economic interests of the nation. In Europe, the European institutions in particular are accused of undermining cultural identity and national interests through lenient migration policies and of promoting integration and globalisation. Right-wing groups also accuse decision-makers of allowing the movement of workers from other countries and of losing the possibility to take national economic and social decisions to the benefit of Community actors (Benjamin De Cleen, 2017, pp. 10-17).

Rogers Brubaker in the study *"National Minorities, Nationalizing States, and External National Homelands in the New Europe Notes toward a Relational Analysis"* points out that nationalism remains central point of the policy of nation states and the relations between them. Europe faces a potentially explosive dynamic of international relations, as many nation states promote heterogeneous values (Brubaker, 1993. p. 4-15).

A different understanding of nationalism is proposed by Aleksanr Dugin and Alain de Benoist (the main theorist of the French New Right movement), who, while advocating a rejection of populism, assume a different understanding of right-wing values. Observers of the European political scene already at the beginning of the nineties of the last century, finding in the nationalistic concepts of Dugin and de Benoist a threat to safety and security of Europe, led to a sharp criticism of the ideologies of these thinkers, creating a media campaign against this threat. Noting, of course, the discrepancies between Dudin's and de Benoist's thoughts, for example, in their different approaches to traditionalism, there are common patterns of the classical right-wing advocating glorification of nationalism. Both thinkers have criticised nationalist views in their countries, raising errors in distinguishing this phenomenon by both the left and the right. However, Dugin and de Benoista, urging the revitalisation of nationalist thought, assumed that political conquest first requires the capture of cultural power. Dugin, by drawing on the assumptions of the French and Belgian right-wing thought, and using Jean François Thirart's view, among other things, expressed his opinion about the need for a national-community movement, whose common value would be to strive for a limited democracy at the service of the national community. Such a democracy, by promoting political unanimity, encourages a return to a natural social hierarchy in which there would be no place for people from outside the designated social group. The racial arguments of nationalistic assumptions (of people outside the social hierarchy) also remain important in the views of Western political thought. Coming back to Dugin, it should be emphasized that his texts abound in references to the classical consequences of racial ideology and the idea of superiority of whites, i.e. the concept of Eurasia of Indo-European Slavs. Dugin, proposing a postmodern understanding of the nation, calls for the restoration of all ideas, both religious and ethnic, that were lost by the modernists. The ethnic issue is used against globalised liberalism, which causes destructive differences between nations. The ideology of Eurasia has a strong influence on the ideology of the great Russian power seen through the eyes of Putin's establishment, as well as on traditionalism and other religious doctrines addressed to both Russian and foreign intellectual circles (Laruelle, 2006, pp. 9-19). When analysing the collected research material it should be unequivocally assumed that the vision of the nation state is not only promoted by Russia, it is present in the opinions of many political circles in France, Belgium, Germany or Poland.

Information appearing in the media space in connection with the fight against coronavirus COVID-19.

In a press release on 1 April 2020, the Director General of the Word Health Organization, informing the world's views on global action against the coronovirus, stresses that 74 countries have joined the process of finding effective solutions to combat the pandemic, including attempts to develop a vaccine against the disease. In addition, it stresses the need for intergovernmental cooperation to increase the production of personal protective equipment for medical personnel and the public. The communication of 1 April was complemented by a media statement by the WHO Director General on 3 April, informing that 1 million confirmed COVIDs-19 and 50,000 deaths were reported to WHO. At the same time, it stresses that the situation is somehow bigger than a health crisis because it causes huge social and economic changes. It also stresses the need to reduce debt in pandemic countries in order to avoid an economic collapse. Close cooperation between the World Health Organisation, the World Bank and the International Monetary Fund is being established in this area. The WHO calls on all countries to provide full funding for basic public health actions. This Communication points out that if all countries were to rush to lift restrictions too quickly, the virus could revive and cause even greater disruption to many countries' economies (WHO, 2020).

The fight against the pandemic also gives rise to worrying examples of the use of the crisis situation by many circles which, under the guise of the fight against the coronavirus, are striving to implement their political undertakings. In this context, there are credible assumptions that opponents of a Community policy built on the line of European-Atlantic consensus will use social unrest to undermine the foundations of the EU and international organisations, undermining their incompetence and effectiveness. Declarations of Russian policy on the reform (liquidation) of the UN, destabilisation of the EU, or Russia's imperialist aspirations, are real security threats that increase in proportion to the amount of negative information. Bearing in mind that nowadays information is the basic tool of the

information struggle conducted in order to destabilize the system of international political-military relations, it is necessary to accurately identify and neutralize the message resulting from manipulation or disinformation. Other forms of information struggle used by Russia are not insignificant, such as influencing by means of influence agency or using reflexive management. In this context, one can critically assess the behaviour of individual political decision-makers who, by pursuing their own goals, deform the democratic system of EU countries and thus fulfil (consciously or not) the Kremlin's assumptions.

The Hungarian Parliament, taking up the fight against the coronavirus, approved a law that gives Viktor Orban, according to the opposition, unnecessary and unlimited power. The solution adopted allows the state of emergency and the associated powers of government to be extended indefinitely by decree without parliamentary approval. The new regulations also provide for a prison sentence of up to five years for disseminating false information about the pandemic or against government actions taken to fight the virus. According to commentators of political life in Hungary, the regulations implemented on the grounds of the fight against the pandemic significantly limit the freedom of the Hungarian media and the right to reliable information. Orban's rhetoric towards these accusations, addressed to the "European screamers", is credible in the need to fight against the virus. In a similar vein, Hungarian justice minister Judit Varga said that the criticism of the adopted solutions is based on conjecture and does not correspond to reality (Malinowski, 2020). Commenting on the events in Hungary, Professor Kim Lane Scheppele from Princeton University claims that Orban is moving away from governance with even a seemingly constitutional democracy and a tri-partite power, because any regulation of the law will be able to be changed by the Prime Minister according to his vision. In Hungary, in the context of the pandemic, immigrants and independent media informing about the event became the target of attacks. In March 2020, the V-dem institute, in a report examining the quality of democracy, for the first time in the history of the study, classified a European Union country - Hungary as undemocratic, indicating that it has an electoral autocracy system. The Chairman of the European Parliament's Civil Liberties Committee, Juan Fernando López Aguilar, informed Hungarian parliamentarians that all actions taken by EU members in the fight against the pandemic must comply with the principles of democracy, the rule of law and human rights. Thus, he announced that he would propose to the European Commission to challenge the Hungarian law to the EU Court of Justice for violation of Article 2 of the EU Treaty (Wójcik, 2020).

Rhetoric about the actions taken by the European Union also takes place in Poland. Publicist Grzegorz Jankowski used Twitter to ask questions about the EU's involvement in the fight against the virus, declaring that the entire burden of counteracting the pandemic fell on national governments. It should be noted that this entry has received four thousand liked ones and nearly a thousand further applications (these data are important because the information published in modern media is of particular value to the informational fight - author's note). In a similar tone, Marcin Palade wrote on Twitter, asking about European actions, pointed out the special role of nation states, not bureaucratic Eurofederalism in the fight against pandemic. A politician from the United Right, Janusz Kowalski, criticized the actions of the European Union. He accused the EU of being ineffective in fighting any crisis, raising the role of the Polish government in the fight against the coronavirus. In addition, he stressed the need to reconstruct the EU in order to strengthen nation states and to move away from centralisation. At this point, it should be noted that Russian propaganda is not inactive in this regard, as the mass media, such as Russia Today (RT), report on the European Union's lack of capacity to fight the coronavirus and the news of the imminent end of European unity. The authors of the articles published by means of RT communicate to the recipients of the content about the burnout of all European Union funds in the fight against the coronavirus and using the slogan "First Brexit, ...then CorExit?" suggest that the misguided EU reaction to the pandemic may be the last nail in the coffin of European unity. Russia's use of soft power against the European Union has also been identified by the EU's East StratCom Task Force, which, by analysing Russian disinformation and manipulation, reports on individual examples, which include the presentation of coronovirus as a tool of Western imperialism and American biological weapons used against China. A separate theory of Kremlin propaganda refers to the designation of NATO as an organisation deliberately spreading the virus within the European Union (Jabłonowski, 2020). The Polish media coverage also includes statements by Prime Minister Mateusz Morawiecki, who stated at a press conference on 18 March 2020, "It is known that here the EU does not act as fast

as the nation states, not as fast as Poland. We have built a significant shield today". This type of narration is also visible in the pro-government media (Pankowska, 2020). A wave of criticism of the European Union was denounced by a letter sent on 12th March to the largest editorial offices in Europe by the deputy director of the Italian newspaper "La Repubblica", in which he accused Brussels of having a minimalist approach to the fight against the coronavirus. This narrative was also taken up by Polish Television, which reports that no effective methods of fighting the pandemic have been developed (Pankowska, 2020, 13.03).

The mistakes made by the EU administration are also spotted by Western commentators. Charlotte McDonald-Gibson in the Times notes that when the coronavirus epicentre moved from China to Europe in the first half of March the pillars of the European Union collapsed because the free movement of people and goods was stopped, border controls were put in place, and governments of individual countries were gathering medical supplies without paying attention to their neighbours. At the same time, he argues that during the EU's efforts to find aid mechanisms to combat the epidemic, populist and nationalist forces, just as in the eurozone and refugee crises, are also trying to use coronovirus in this situation. Mateo Salvini, leader of the Italian political party Northern League, suggested that immigrant boats brought coronavirus and Orban accused illegal immigrants of spreading infections (McDonald-Gibson, 2020). Katya Adler in her editorial *"Coronavirus: Can EU get a grip on crisis?"* points out that Italian Twitter has been flooded with posts from politicians who have expressed negative opinions about the role of the EU in preventing coronavirus. He also points out that French President Emmanuel Macron told the leaders of the Member States that a political response after the crisis could mean the end of the European Union. It should be mentioned that despite the negative narration adopted in the initial version of the article, the author summarizes the wide range of solutions taken by the European Union to fight the coronavirus (Adler, 2020).

The Russian narrative of events related to the fight against the coronavirus is in the sphere of accusing the European Union of failing to take appropriate and effective solutions. Nadim Zouauaui, in his editorial "*В Европарламенте оценили меры ЕС по борьбе с коронавирусом"* published in the RIA Novosti, referring to an interview with Virginie Jordan, a Member of the European Parliament, states that the European Union could not cope with the crisis and provide the necessary assistance for the spread of the pandemic on the territory of the Member States. In addition, indicating the words of his interlocutor, he states that the situation around the Coronavirus has shown an uncivilized globalization that undermines nation states. In the publication the author also refers to the failures of the Union related to talks with Erdogan on the migration crisis. In the interview there was also room for a critical assessment of the virus prevention by the American administration (Зуауи, 2020). Aleksandr Nosovich in his editorial *"Коронавирус поставил под вопрос существование Евросоюза"* states that Europe has become the world's leading distributor of coronavirus, while China has coped with the outbreak of new infections and Russia and other pro-Soviet countries are successfully fighting against the spread of the virus. Europeans, according to the author, are increasingly seen as the spreaders of the disease, and the European Union as an institution that does not deal with the problem must reflect on its existence (Носович, 2020).

Yuri Sheikhko, in the editorial *"Какие фейки о коронавирусе распространяют из России в ЕС"*, brings the reader closer to the examples of "fake" information about coronovirus, which are to come from Russia. The Sheikh, citing the words of EU spokesperson Petr Stano, argues that Russia is not the only source of misinformation about Coronovirus. In addition, based on the words of Johannes Barke (associated with Stano), he adds that most of the pipes are generated and distributed by the users themselves. On the other hand, President Dmitry Pieskov's spokesperson called the disinformation report prepared by the EEAS (European External Action Service), a Russophobic obsession and accused her of spreading unjustified accusations (Шейко, 2020).

Summary

Problems in relations between Member States became apparent long before the COVID-19 coronovirus pandemic. The differences of opinion between European countries should not be a cause for concern, since the overriding objective of international policy is to achieve the intended objectives. However, care should be taken with the relationships that are not built on the basis of accepted diplomatic solutions, but which refer to historical past, religious superiority, political emotions or claims not supported by normative sources. Any failure is an excellent excuse to accuse the European Union authorities of being incapable of conducting political dialogue. The arguments of the opponents of European integration are perfectly well placed in the field of Member States' misunderstandings. The current pandemic situation is an unimaginable challenge both for each country and for the community administration and other international organisations. In the opinion of political commentators, the pandemic is compared with military actions that have not taken place in the European arena since the end of World War II. In the era of extraordinary struggle, differences of opinions and interests of countries are born, which is also a recurring and predictable phenomenon. However, the disruption of the structure of political relations arises when an attempt is made to annihilate the political order based on accepted legal regulations and customary norms. The deformation of inter-state relations triggered by the pandemic crisis is an excellent opportunity for external interference aimed at breaking the existing division of the international political system. Recognizing the current information struggle, one cannot help but notice the hostile undertakings aimed at the current weaknesses of EU solutions. An additional challenge for the European Union is the promotion by Russian propaganda centres of activities aimed at deforming and disrupting the system of EU states by fuelling the values of nation states as advocates of cultural and religious values, opposite to spoiled liberal democratic values. The lack of understanding of contemporary security principles based on political and military alliances may cause serious problems with stabilizing Community solutions for nationalist movements, which in the end will fulfil the assumptions of Kremlin's international policy.

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Foreign Direct Investment,

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Abstract

Foreign direct investment stimulates the modernisation of economic activity, exports, local employment, and economic growth. Decisions to invest abroad are determined by a complex set of factors. The objective of this article is, in a first stage, to establish structural relations among several determinants of foreign direct investment recognized in the literature through exploratory factor analysis, in two different sub-samples, composed, on the one hand, by countries with high foreign direct investment net inflows and another with low, in a total of 128 countries. With the results obtained a cluster analysis was performed for each subsample. The results of the exploratory factor analysis suggest the predominance of one factor integrating indicators of good governance, information and communication technologies development and market size. It was possible to find three significant distinct clusters in each sub-sample, and in the group of high foreign direct investment, clusters with a higher share of foreign direct investment in GDP have higher institutional quality, information and communication technologies, market size and higher economic growth. Governments must have the ability to formulate and implement sound policies to foster FDI.

Keywords: Foreign Direct Investment, Governance, Information and Communication Technologies.

Introduction

Foreign direct investment (FDI) is a fundamental constituent of a system of globalisation and a stimulus to economic and sustainable development, providing social and environmental benefits. For the Secretary-General of the United Nations, António Guterres, "Inclusive sustainable development depends on a global policy environment that is conducive to cross-border investment" (UNCTAD, 2019: iii). The global FDI inflows reached 1.3 trillion of dollars, mainly directed towards developing economies (54.4%), followed by developed economies (42.9%) in 2018 (UNCTAD, 2019). Despite the magnitude of FDI, it fell by 13% compared to 2017, which represents the biggest drop since the global economic crises. Increasing foreign investment inflows is crucial, since they drive technological spillovers, enhances human capital through training and on-the-job learning, foment the international trade integration and set up a more competitive business environment, contributing to economic growth (OECD, 2002). The interest of countries in capturing FDI is recognized in the economic literature, however, the decision to invest abroad usually submits to a set of factors, which may influence it, such as institutional quality, diffusion of Information and Communication Technologies (ICT), market size, economic growth, human capital, and fiscal policy, among others.

Based on indicators traditionally recognized as influencing decisions on the location of foreign investments and on the division between countries with high and low FDI net inflows, the objective of

this article is to establish a structural relationship between these indicators for each subset and, based on the results obtained, to determine homogeneous groups of countries.

Literature Review

Foreign direct investment is very important for international development. The main determinants of FDI in literature can be classified into locational or pull factors and push factors. Among the pull factors, the traditional group of economic variables are the size of the market and the growth rate of Gross Domestic Product (GDP), economic stability, degree of openness of an economy, infrastructures, as well as several institutional variables. The push factors are related to the conditions in the source country.

Among the more traditional economic variables explaining FDI inward flows, mainly market-driven, is usually highlighted the size of the market of the host country in both absolute (GDP) and relative terms (economic growth). Host countries with higher per capita income and higher economic growth provide advantages not only for market-seeking FDI projects but also for those that are export-oriented due to the economies of scale that can be achieved and spillover effects. Empirical evidence suggests a positive effect of economic growth on FDI inflows (Gani, 2007; Saidi et al., 2018; World Bank, 2002). Empirical evidence also reveals that the market size of the host country has a positive relationship with FDI (Chakrabarti, 2001; Mohamed and Sidiropoulos, 2010; Salike, 2016), but in others the results are inconclusive (Vijayakumar et al., 2010)

Economic literature, either theoretical and empirical, emphasizes the relationship between international trade and FDI. Higher trade openness allows for greater specialization of economies, economies of scale, greater efficiency (Yazdana and Sadr, 2013), and through imports of intermediate inputs and equipment potentially enhances technology transfer. FDI is fostered when there is greater freedom of international trade since multinational companies have a higher propensity to export (Beven and Estrin, 2004). Open trade regimes mean that more markets are available for exporters and resource allocation is more efficient, providing economic welfare gains (Castro and Nunes, 2013), but it also allows to contribute to integrating the host economy in the worldwide economy (OECD, 2002). However, the relationship between FDI and openness to trade is complex as some mechanisms and policies influence that relationship, such as free trade preference agreements, tariff reductions and other incentives for FDI (Castro and Nunes, 2013; Ponce, 2006). Several authors found a significant positive relationship between FDI inflows and the degree of openness (Agiomirgianakis et al., 2006; Gani, 2007; Habib and Zurawicki, 2002; Iamsiraroj, 2016; Mathur and Singh, 2013). Liargovas and Skandalis (2012) analysed the importance of trade openness for attracting FDI inflows in a sample of developing countries. Using several indicators for the degree of trade openness, the results suggest a positive relationship in the long run.

According to UNCTAD (2000), governments are increasingly seeking to attract FDI, notably through tax incentives, to influence location decisions by foreign investors. Given the competition between countries to attract FDI, the tax burden could play an important role in this process (Bieltvedt Skeie, 2017; De Mooij and Ederveen, 2003; Desai et al., 2004; Janský and Palanský, 2019).

ICT can "improve the performance of businesses and the efficiency of markets, empower citizens and communities, increase their access to knowledge, and help to strengthen and redefine governance at all institutional levels" (United Nations, 2006, in Economou, 2008:2). Access to different ICT is crucial for businesses to benefit from the digital economy and enable enterprises to become more efficient and better connected, allowing them to perform complex online tasks (UNCTAD, 2017). According to UNCTAD (2007), the globalization of production occurs simultaneously with the growth of ICT. For Economou (2008) countries that are perceived as more attractive for foreign investors score relatively high in ICT.

ICT can be seen as a determinant of the FDI either directly as a locational factor, or indirectly through the effect on other determinants. ICT directly affect FDI because it increases efficiency, productivity,

reduces search time and its costs, allows enterprises to perform more complex online tasks, and can be considered a "pull factor" (Clarke et al., 2015; Economou, 2008; Gani and Sharma, 2003; UNCTAD, 2015). Choi (2003) using data from 14 source countries and 53 host countries found that the internet induces more FDI since it improves productivity. But ICTs can also have positive impacts on other influencing factors of FDI, such as innovation and transparency. Besides, they can facilitate exports by providing logistical support and attract foreign export-oriented investors (Overby and Min, 2001; Rhee, 2005). Nevertheless, Kotnik and Hagsten (2018) in a study for 11 EU countries didn't found a relationship between ICT use and export propensity for all of the countries included in the analysis, denoting different roles of ICT in exports dynamics. ICTs also reduces the distance effects, enabling new organizational models of international production (Economou, 2008).

The new institutional economics emphasises the role of institutions for the proper functioning of market economies (Rutherford, 2001), which currently figure, in most of their dimensions, in good governance. The World Bank (2002: 59) considers that a climate favourable to FDI flows requires, among others, fair and efficient public sector administration, low corruption and effective law enforcement, sound regulation, and measures to ensure the health and education of the workforce. The nature and quality of institutions in the host countries influence FDI since they provide opportunities or constraints for developing economic activities (Nielson et al., 2017). Institutions with low quality bring additional costs of doing business resulting from high levels of bureaucracy, corruption, political instability, and inefficient legal systems. Several studies highlight the role of institutions on FDI inflows (Ali et al., 2010; Jude and Levieuge, 2017; Rodriguez-Pose and Cols, 2017; Ross, 2019). Several studies found a negative impact of corruption on FDI, not only in level (Lambsdorff, 2003) but also in its quality (Habib and Zurawicki, 2002, 2010). Habib and Zurawicki (2010) also show evidence that differences between the level of corruption in the host and home countries impact FDI inflows.

Access to a skilled workforce is essential for multinational investors. Previous work reflects the role of the quality of human capital in the host country to attract foreign investment since it enhances the workforce productivity and boosts the return of the business, facilitates innovative activities, and the adoption of new technologies in the production process (Rizvanolli, 2012). Noorbakhsh et al. (2001) consider that, in developing countries, human capital is not only an important determinant of FDI but has also increased over time. Other studies found a positive relationship between the level of human capital and FDI inflows either in developed and developing countries (Bellak et al., 2009; Habib and Zurawicki, 2002; Shatz, 2003) while in others the relationship is not robust (Rodríguez and Pallas, 2008; Castro and Nunes, 2013).

Methodology

The empirical investigation is carried out on a sample of 128 countries for which all the necessary information was available. The list of the countries included is reported in the Appendix. Data were collected from 2014 to 2018 and the average values in this period were used to avoid specific or temporary shocks in a particular year that could influence the FDI net inflows. For the FDI inflows, it was used the FDI net inflows as a percentage of GDP. Foreign direct investment is the net inflows (new investment inflows less disinvestment) of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor (World Bank, 2020).

The choice of the determinants of FDI was guided by previous empirical studies on the determinants of FDI, discussed in the literature review, and includes the market size, economic growth, indicators of good governance, ITC and human capital. The market size was proxied by GDP per capita in constant 2010 US$, economic growth was measure by the annual growth of real GDP per capita, and trade openness by the ratio of total exports plus imports to GDP. The source of data was the World Development Indicators of the World Bank. Human capital was proxied by Secondary school enrolment ratio, collected from Unesco – Institute for Statistics.

For measuring ICT, following Latif et al. (2018), it was constructed an ICT composite index using five indicators: the number of internet users, secure internet servers, fixed telephone subscriptions, fixed broadband subscriptions, and mobile cellular subscriptions, all per 100 people. Data were collected from the International Telecommunications Union, ITU.

Institutional quality is measured by the Worldwide Governance Indicators, developed by Kaufmann, Kraay and Zoido-Lobaton (1999) to the World Bank: Voice and Accountability, that capture the perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media; Political Stability, that measures the perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism; Government Effectiveness, that captures the perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies; Regulatory Quality, that captures the perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development; and Rule of law, that captures the perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. These indicators range approximately from -2.5 to 2.5, with higher scores denoting better government performance.

From the variable FDI in percentage of GDP, a binary variable was defined – FDIbin – based on the mean value. Countries with low mean values of FDI are categorized as Low FDI economies while countries with high mean value are categorized as High FDI economies:

$$\text{FDIbin}_i = \begin{cases} \text{High FDI economies} & \text{if } \dfrac{\text{FDI}_i}{\text{GDP}_i} \geq 4.085\% \\ \text{Low FDI economies} & \text{if } \dfrac{\text{FDI}_i}{\text{GDP}_i} < 4.085\% \end{cases} \quad \forall i \qquad [1]$$

As a result, the sample was divided into two sub-samples according to whether the average value of FDI as a percentage of GDP is above (high FDI) or below (low FDI) the average.

The analysis will be performed in two steps: first, it was made an Exploratory Factor analysis to look at the structural relationship between the variable in each sub-sample; second, with the factors extracted, a cluster analysis was carried out to identify homogeneous subgroups of countries within the two subsamples. ANOVA was applied to examine how well the used variables discriminate among clusters.

Results and Analysis

Sub-samples characteristics

The sub-sample of countries with high FDI consists of 33 countries, of which 6 are European, 11 are African, 8 are Asian and 8 are from Latin American and the Caribbean. According to the classification of economies by per capita GNI in June 2018 by the United Nations, 30.3% of those countries belong to the *High-Income* group, 21.2% to the *Upper Middle Income*, 24.2% to the *Lower Middle Income* and 24.2% to the *Low Income*. The other sub-sample includes 95 countries, from which 24 are European, 2 American, 31 African, 24 Asian, 12 from Latin American and the Caribbean, and 2 from Oceania. 38.9% of those countries belong to the *High-Income* group, 21.2% to the *Upper Middle Income*, 23.2% to the *Lower Middle Income,* and 16.8% to the *Low Income*.

Figure 1 and Figure 2 reports the level of FDI net inflows and the values for the FDI in percentage of GDP (mean values in the period 2014-2018) in the two sub-samples.

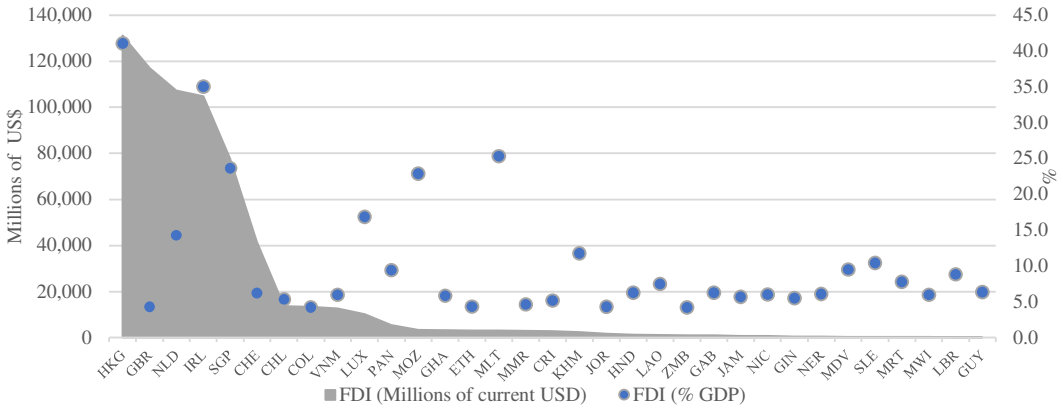

Fig. 1: FDI net inflows (average values in the period 2014-2018) in countries with high net inflows in percentage of GDP

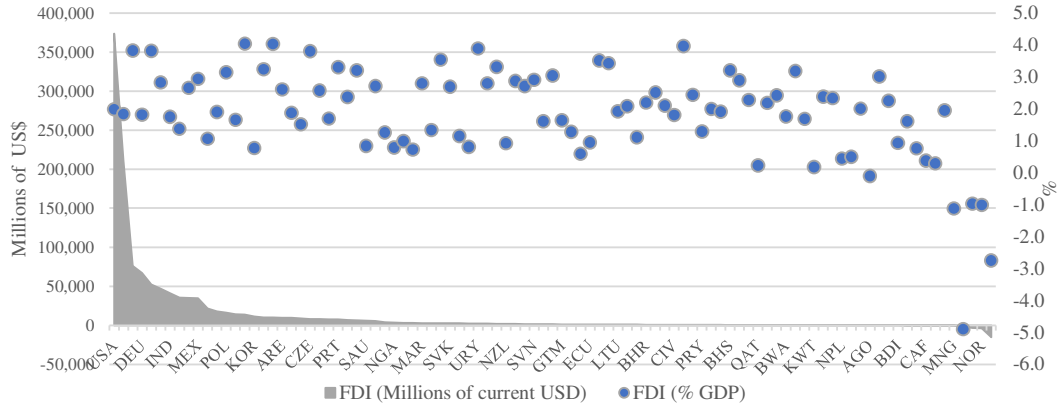

Fig. 2: FDI net inflows (average values in the period 2014-2018) in countries with low net inflows in percentage of GDP

Factor Analysis

To assess the validity of the EFA it was used the Keiser-Meyer-Olkin criterion, having an observed value of 0.781 and 0.891 for the sub-samples of high and low FDI, respectively, denoting sampling adequacy, and Bartlett's test of sphericity (χ^2=467.22 for the high FDI sample and χ^2 =1215.08 for the other), significant at (p<0.0001) in both sub-samples, concluding that the variables are significantly correlated, so the AEF has proceeded. The relational structure of several FDI determinants recognized in the literature was evaluated by the Exploratory Factor Analysis of the correlation matrix, with the extraction of factors by the method of principal components with varimax rotation. For the subsample of low FDI economies, human capital was removed since the communality value was below 0.5. Common factors retained were those who had eigenvalues greater than one and according to the screen plot. Loadings are high, all over 0.70. As reported in Table 1, the factor analysis for the countries with high FDI led to four factors that explain 88.22% of the variance. Factor 1 (F1), which explains 59.39%

of the variance, includes all the dimensions of good governance, the level of digitalization, openness, and GDP per capita. Factor 2 (F2) is related to corporate taxes and explains 10.42% of the variance, Factor 3 (F3) to economic growth (explains 9.23% of variance), and factor 4 (F4) to human capital (9.18%).

Table 1: Factor analysis for countries with high FDI net inflows (in % of GDP)

	Component Factor Loadings				Communalities
	F1	F2	F3	F4	
Regulatory Quality	**0.974**	0.056	0.039	-0.08	0.960
Rule of Law	**0.970**	0.076	0.011	-0.064	0.951
Control of corruption	**0.963**	0.067	-0.004	-0.133	0.949
Government effectiveness	**0.962**	0.118	0.09	-0.079	0.953
ICT	**0.896**	0.123	0.07	0.092	0.831
Market size	**0.867**	0.244	0.089	-0.044	0.820
Voice and Accountability	**0.842**	-0.211	-0.237	-0.135	0.828
Political Stability	**0.834**	0.268	0.063	0.271	0.844
Openess	**0.637**	0.377	0.304	0.099	0.649
ProfitTax	-0.127	**-0.939**	0.075	0.079	0.910
Economic growth	0.034	-0.06	**0.962**	-0.048	0.932
Human capital	-0.064	-0.067	-0.043	**0.973**	0.958
Percent of variance explained (%)	59.390	10.421	9.227	9.182	
Cumulative percentage (%)	59.390	69.811	79.038	88.22	

For countries with low FDI inflows in percentage of GDP, three factors were retained that explains 83.42% of the total variance (Table 2). F1 includes all the dimensions of good governance, the level of digitalization and market size, and explains 58.52% of the variance. F2 includes taxes and openness (14.48% of variance) and F3 is composed of economic growth.

Table 2: Factor analysis for countries with low FDI net inflows (in % of GDP)

	Component Factor Loadings			Communalities
	F1	F2	F3	
Rule of Law	**0.969**	0.149	0.067	0.966
Government effectiveness	**0.952**	0.178	0.08	0.944
Control of corruption	**0.949**	0.114	0.043	0.915
Regulatory Quality	**0.938**	0.172	0.105	0.920
Market size	**0.858**	0.093	-0.304	0.837
Voice and Accountability	**0.820**	-0.036	0.277	0.749
ICT	**0.815**	0.38	-0.019	0.810
Political Stability	**0.802**	0.234	-0.004	0.699
ProfitTax	-0.027	**-0.865**	0.012	0.749
Openess	0.300	**0.733**	0.067	0.631
Economic growth	0.064	0.045	**0.974**	0.955
Percent of variance explained (%)	58.516	14.477	10.429	
Cumulative percentage (%)	58.516	72.993	83.422	

Comparing the factors obtained for the two sub-samples, it should be noted that F1 (which explains a higher percentage of the total variance), includes the indicators of governance, market size and ITC (and degree of openness in the case of countries with high FDI). However, the contribution of each variable to the factor, as measured by the absolute value of the loadings, is different in the two sub-samples. While in countries with low FDI the Rule of law, Government effectiveness and Control of corruption are the variables that most contribute to the factor, in countries with high FDI are Regulatory Quality, Rule of Law, and Control of corruption.

Cluster Analysis

Based on the factors obtained on EFA and the values of FDI as a percentage of GDP it was made a cluster analysis to group countries in each sub-sample with similar patterns. A hierarchical cluster analysis was applied, with the nearest neighbor method using the squared Euclidean distance as a measure of dissimilarity among countries. After the analysis of the dendrogram, a three clusters solution was decided according to the R^2 criterion. Subsequently, the analysis was refined from the K-means technique and the three-cluster resolution provided the most interpretable result for both sub-samples. Table 3 reports, for the three clusters retained, the average values for the variables in the subsample of countries with high FDI net inflows. The analysis of the F-value of a one-way ANOVA allows concluding that the clustering variables' means differ significantly for the FDI (Sig.<0.001), Factor 1 (Sig.<0.05) and Factor 3 (Sig.<0.10), and the variables that allow greater discrimination among the clusters are FDI and Factor 1. Cluster 2 (C2) has the highest average values for FDI, flowed by Cluster 1 (C1) and Cluster 3 (C3).

Table 3: Cluster centers and ANOVA for countries with high FDI

Variable	Final Cluster Centers			ANOVA				
	Cluster 1 (C1)	Cluster 2 (C2)	Cluster 3 (C3)	Sum of Squares	df	Mean Square	F	Sig.
	n=5	n=2	n=26					
FDI (% GDP)	20.584	38.024	6.443	2451.640	2	1225.819	173.393	0.000
Factor 1	1.111	1.513	-0.330	13.585	2	6.792	11.065	0.000
Factor 2	0.068	0.197	-0.028	0.122	2	0.061	0.057	0.944
Factor 3	0.265	1.489	-0.166	5.496	2	2.748	3.111	0.059
Factor 4	0.017	0.190	-0.018	0.082	2	0.041	0.039	0.962

The economies with the highest net inflows of FDI as a percentage of GDP (C2) perform best in F1, i.e. in good governance, ICT, GDP per capita, and openness. This pattern is also visible for C2, with an average FDI of 20.58% of GDP, the second-highest, compared to C3, where that ratio is only 6.4%. Except for Mozambique (C1), the clusters with the highest share of FDI in GDP are high-income countries. Of the countries in C3 where FDI varies between a minimum of 4.2% and a maximum of 11.7% of GDP, 30.8% belong to the Lower middle-income group, 26.9% of upper middle income, 26.9% of low income and 15.4% of high income (Figure 3). Almost all (92.3%) are developing economies and 38. 7% are African, 30.7% are from Latin America and the Caribbean, and 23.1% from Asia.

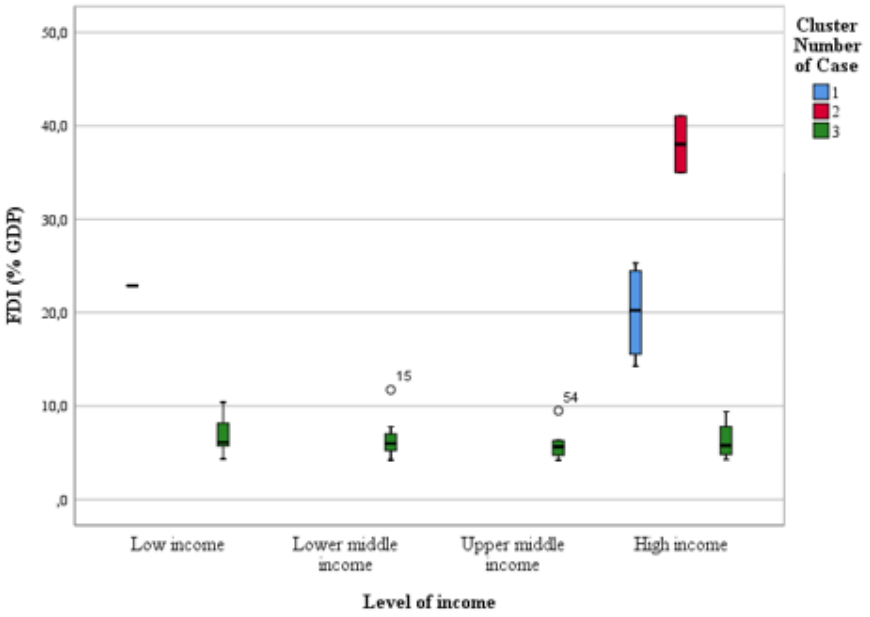

Legend: The line in bold represents the median, framed between the 1st quartile (lower end of the box) and the 3rd quartile (upper end of the box). The lower and upper bars represent, respectively, the minimum and maximum distributions.

Fig. 3: Boxplot of FDI net inflows (% GDP) by cluster and level income in countries with high FDI

For countries with FDI ratios in GDP below the sample average, 3 clusters were obtained, and FDI values, F1 and F3 differentiate more the groups of countries. The largest cluster (C2), with 68 countries, has the highest average FDI value of 2.38% of GDP and Standard Deviation (SD) of 0.936, ranging from 0.30% to 4.05% (Table 4). On the contrary, in C3, the FDI net inflows are negative. Contrary to the sub-sample of countries with high FDI, the same pattern is not found for F1. However, for F3, which is among the three factors that most discriminate the clusters, it is found that the subgroup (C2) with higher FDI also perform better in economic growth.

Table 4: Cluster centers and ANOVA for countries with low FDI

Variable	Final Cluster Centers			ANOVA				
	Cluster 1 (C1)	Cluster 2 (C2)	Cluster 3 (C3)	Sum of Squares	df	Mean Square	F	Sig.
	n=5	n=68	n=22					
FDI (% GDP)	-2.148	2.375	1.169	108.860	2	54.430	59.911	0.000
Factor 1	1.318	0.147	-0.754	22.674	2	11.337	14.623	0.000
Factor 2	0.224	-0.097	0.250	2.263	2	1.132	1.135	0.326
Factor 3	-0.225	0.394	-1.168	40.854	2	20.427	35.360	0.000

In C2 most countries are developing (63.2%), and investment flows are mainly to Europe (29.4%), Africa (22.1%), and Latin America and the Caribbean (14.7%). In this group, 38.2% are high-income and 25% low-middle-income economies. C3 only includes developing economies, of which 27.3% are high-income and 27.3% low-income and concentrated in Africa (54.5%) and Asia (36.4%) (Figure 4).

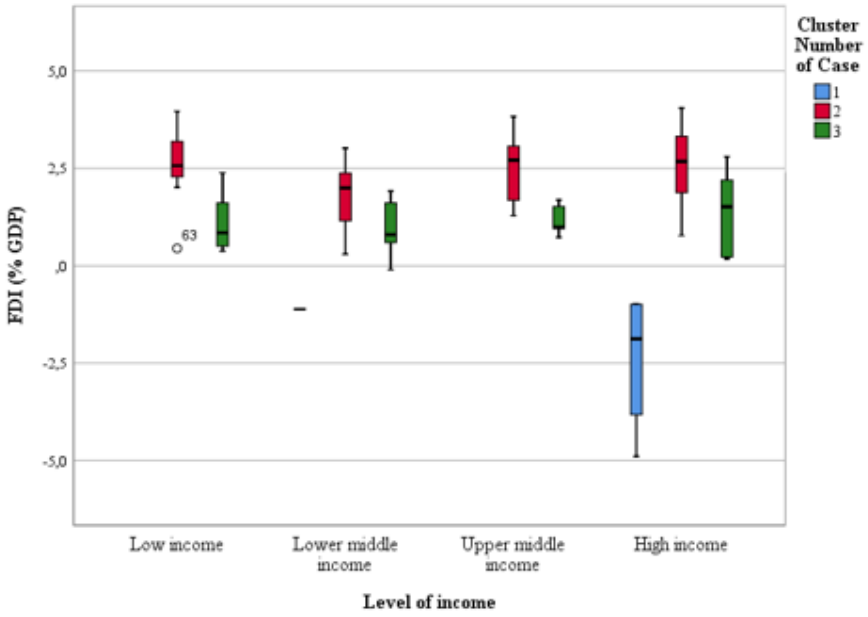

Legend: The line in bold represents the median, framed between the 1st quartile (lower end of the box) and the 3rd quartile (upper end of the box). The lower and upper bars represent, respectively, the minimum and maximum distributions.

Fig. 2: Boxplot of FDI net inflows (% GDP) by cluster and level income in countries with low FDI

Conclusions

In today's globalised world it is difficult for some countries to maintain their competitiveness without FDI. Foreign investment inflows not only promote and transfer production technology and know-how as well as contribute to competitiveness and allow access to international trade networks.

In a sample of 128 countries divided between economies with FDI as a percentage of GDP above and below the average, this article investigated the structural relationship between several determinants of foreign direct investment in each sub-sample, namely, the six key dimensions of governance present in the Worldwide Governance Indicators (regulatory quality, rule of law, control of corruption, government effectiveness, voice and accountability, political stability and absence of violence), ICT, market size, economic growth, openness to international trade and human capital. The findings show that the institutional environment is crucial as it creates favorable or discouraging conditions for foreign investment. To invest abroad is fundamental to find an enabling environment in the host country that is “investor-friendly” (OECD, 2002). Good governance with a solid rule of law, efforts in controlling corruption, with political stability and policies and regulatory frameworks to foster a well-functioning business sector is crucial to attracting foreign investors. Access to different ICT also allows businesses to benefit from the digital economy favoring FDI.

Attract foreign investment to endorse economic diversification and structural transformation in developing countries is a growing need, but FDI must be a sustainable investment to promote social and environmental developments as well.

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Appendix

List of countries in the sample

Afghanistan; Algeria; Angola; Argentina; Australia; Austria; Bahamas, The; Bahrain; Bangladesh; Belgium; Benin; Bhutan; Botswana; Brazil; Brunei Darussalam; Bulgaria; Burkina Faso; Burundi; Cambodia; Cameroon; Canada; Central African Republic; Chad; Chile; China; Colombia; Congo, Dem. Rep.; Costa Rica; Cote d'Ivoire; Croatia; Czech Republic; Denmark; Dominican Republic; Ecuador; Egypt, Arab Rep.; El Salvador; Equatorial Guinea; Estonia; Ethiopia; Finland; France; Gabon; Gambia, The; Germany; Ghana; Greece; Guatemala; Guinea; Guinea-Bissau; Guyana; Honduras; Hong Kong; Hungary; Iceland; India; Indonesia; Iran; Ireland; Israel; Italy; Jamaica; Jordan; Kenya; Korea, Rep.; Kuwait; Lao PDR; Latvia; Lesotho; Liberia; Lithuania; Luxembourg; Madagascar; Malawi; Malaysia; Maldives; Mali; Malta; Mauritania; Mauritius; Mexico; Mongolia; Morocco; Mozambique; Myanmar; Nepal; Netherlands; New Zealand; Nicaragua; Niger; Nigeria; Norway; Oman; Pakistan; Panama; Paraguay; Peru; Philippines; Poland; Portugal; Qatar; Romania; Rwanda; Saudi Arabia; Senegal; Sierra Leone; Singapore; Slovak Republic; Slovenia; Solomon Islands; South Africa; Spain; Sri Lanka; Sudan; Sweden; Switzerland; Tanzania; Thailand; Togo; Tunisia; Turkey; Uganda; United Arab Emirates; United Kingdom; United States; Uruguay; Vietnam; Zambia; Zimbabwe.

ICT Diffusion, Governance Performance and Economic Growth

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Abstract

Information and Communication Technologies (ICT) developments, in many different strands, are growing continuously with high rates, and are seen as an engine of growth for the world economy. The objective of this article is to analyse the non-linear impacts of ICT on economic growth in large panel data covering 126 countries over the period 2002-2017, by employing data on ICT diffusion, particularly internet, mobile and fixed phone subscriptions, and two indexes purpose-built. The results suggest that ICT diffusion has a positive effect on economic growth, but the marginal positive effect lessen as ICT diffusion enlarges and Internet penetration has greater effects than the mobile phone. The quality of governance is also a crucial determinant of economic growth. Some countries need to develop strategies to promote and increase the effects of ICT diffusion on economic growth.

Keywords: Information and Communication Technologies, governance, economic growth, human capital.

Introduction

Information and Communications Technology (ICT) is "one of the most potent forces in shaping the twenty-first century … [and] is fast becoming a vital engine of growth for the world economy" (G8 Information Centre, 2000: 1). The traditional version of the neoclassical theory of economic growth is that differences in economic growth rates are the result of exogenous technological differences (Cass, 1965; Solow, 1956; Swan, 1956) and sustained exogenous growth in the input supply (such as population growth). Romer's (1986) article on endogenous growth gave a great boost to economic growth theory and subsequent empirical work on the determinants of economic growth. The theoretical literature emphasises the positive effects of ICT on economic growth (Acemoglu and Robinson, 2012; Hanclova et al., 2015), although negative effects are also presented in the literature (Kenny, 2003). Vu et al. (2020), in a literature survey of the papers that analyse the link between ICT and economic growth, summarises the main effects in: 1) learning, technology diffusion, and innovation; 2) quality of decision making; cost reduction and increased choice that has positive effects on demand and supply. ICT diffusion can be an enabler of productivity growth by enhancing the efficiency in the uses of production factors and facilitating the adoption of other technologies (Cirera et al., 2016). However, empirical research suggests inconsistent results. While some revealed positive effects (Inklaar et al., 2005; Latif et al., 2018; Myovella et al., 2019; Pradhan et al., 2018; Vu, 2011), others found negative or mixed, (Bojnec and Fertő, 2012; Maurseth, 2018; Wamboye et al., 2015). This may result from the non-linearity of the ICT effects on economic growth.

The extent of the contribution of ICT towards economic growth is an ongoing debate. This study aims to contribute to the existing empirical literature on the impact of ICT on economic growth, analysing the non-linear effects of ICT diffusion on a large panel data of countries to determine if positive effects

of ICT only can be achieved after a certain threshold or if its impact only occurs up to a certain critical level beyond which it ceases to have positive effects. The effects of internet, fixed and mobile phone usage on economic growth will be estimated and also through two indexes constructed from those indicators. It will be also analysed the importance of governance quality to economic growth.

The remainder of this paper is designed as follows: in the next section, a comprehensive review of literature is performed on the theoretical effects of ICT diffusion and governance on economic growth and of previous empirical research. The proposed methodology, the model to be estimated and the data will be presented afterward, followed by the presentation and discussion of the results. The paper closes with conclusions and discusses future work.

Literature Review

This section aims to review the existing literature on the determinants of economic growth, focusing on ICT and governance, and whether there is consensus among researchers on their effects on economic growth. Since our study is based on panel data, the review of the empirical literature will emphasize papers using panel data. The reviewed papers are from academic journals, mainly indexed on Web of Science or Scopus, selected by their impact (number of citations) and if possible published recently, and other influential publications. There was also the concern to integrate papers with different perspectives and findings.

In the neoclassical growth model, economic growth, in the long run, is explained by exogenous changes such as in population growth or technological progress (Solow, 1956). With the developments in economic growth theory, in particular endogenous growth theory (Lucas, 1988; Romer, 1986), and subsequent works (Aghion and Howitt, 1992; Grossman and Helpman, 1991) technological change has been endogenized. Several studies have emerged investigating the endogenous factors that determine economic growth. Technological changes, including ITC, can boost economic growth (Acemoglu and Robinson, 2012; Gwilliam et al., 2008). Theoretical studies suggest that ICT change the way how transactions are made, facilitates access to the global market, reduces the costs of doing business, allows enterprises to produce better and helps in decision-making, creates important spillovers and externalities, enhances market transparency and reduces information asymmetry (Bojnec and Fertő, 2012; Cheng et al., 2020; Röller and Waverman, 2001; Vu, 2011, Vu et al., 2020). Hofman et al. (2016) claim that ICT contributes to economic growth since it satisfies the demand for digital products and increases the productivity and investments in sectors that use ICT. Furthermore, ICT supports human capital development through training, education, and better health care (Dahlman et al., 2016; Myovella et al., 2019). Besides the benefits on economic growth, it also improves life expectancy, level of democracy, health outcomes and reduces literacy and poverty (Gwilliam et al., 2008; Myovella et al., 2019). There are also theoretical arguments of negative effects on economic growth. Kenny (2003) pointed out that although the use of the internet may provide better functioning of markets and firms may also bring lower returns for the less developed counties due to the negative externalities associated with e-commerce.

The existing empirical studies vary in the proxies of ICT, other independent variables, sample, and estimation methods, thus making it difficult to compare the results. However, empirical research leads to inconsistent results. Myovella et al. (2019) found a positive contribution of ICT (mobile phone subscriptions, internet users, fixed broadband subscriptions) to economic growth in the two groups studied, 41 Sub Sahararian Africa and 33 OECD countries. Niebel (2018) analyse the impact of ICT (information technology equipment, communication technology equipment and software) on economic growth in developed, emerging and developing countries and confirm the positive link, and that there aren't significant differences among the three group of countries. On the contrary, Bojnec and Fertő (2012), in 34 OCDE countries over the period 1998-2009, found a negative and significant effect of total broadband per 100 inhabitants on growth, while growth is significantly positively associated with access channels per 100 inhabitants, and insignificant associated with standard access lines per 100 inhabitants. Also, Maurseth (2018) found that Internet has negative and significant effects on economic growth on data for 207 countries from 1991 to 2015, while Choi and Yi (2009) with the same data but

for the period 1991-2000 had found a positive role on economic growth. Previous research has also investigated the presence of non-linear effects of ITC on economic growth (Bahrini and Quaffas, 2019; Roller and Waverman, 2001; Sassi and Goaied, 2013; Wamboye et al., 2015; Vu, 2011). These non-linear effects can reflect the network effects if ICT levels need to reach a certain threshold to boosts economic growth. In this case, economic growth results from the direct network effects derived from the sharing of data, and indirect effects that emerge from the use of complementary services (Wamboye et al., 2015). Sassi and Goiaed (2013) also found significant non-linear effects of internet users, mobile users, telephone lines, and ICT imports on economic growth. However, telephone lines and ICT imports need to achieve a certain threshold to impact positively economic growth. In contrast, also in the presence of non-linear effects, the marginal positive change on economic growth can be at an ever slower pace as the diffusion of ICT increases (Vu, 2011). In a panel data of 102 countries for the period 1996-2005, Vu (2011) found that ICT penetration boosts economic growth, and the marginal effect of the penetration of internet users is larger than mobile phones and personal computers. Wamboye et al. (2015), in Sub-Saharian African countries, found a linear negative impact of ICT (mobile phones, internet, and fixed telephone lines) but a robust non-linear effect of fixed-line telephones and mobile cellular on labor productivity growth. Other studies analyse the non-linear effects (Albiman and Sulong, 2017; Bahrini and Quaffas, 2019; Röller and Waverman, 2001), but the contribution of ICT towards economic growth is still under debate.

Governance is the "manner in which power is exercised in the management of a county's economic and social resources for development" (World Bank, 1992: 1). Good governance matters for economic growth since if there is accountable and efficient management by the public sector it provides a framework for market development and economic growth. Several econometric studies tested the relationship between governance performance and economic growth and found a positive relationship (Bota-Avram et al., 2018; Islam and McGillivray, 2020; Kim et al., 2018; Law and Azman-Saini, 2012; Olson et al., 2000).

Model, Methodology and Data

This section presents the theoretical framework based on an extended version of the standard economic growth model, the reduced form to be estimated, and data to determine the effects of ICT and governance on economic growth. The empirical investigation on the impact of ICT on economic growth is examined for a panel of 126 countries, for which all the necessary information was available, in a period of 16 years (2002–2017). The model specification will include a quadratic term for the ICT variables to capture potential non-linear effects of ICT on economic growth, and a set of control variables. Several indicators of ICT will be included, and we will set up two indexes of ICT, one of them employing Principal Component Analysis. It will be presented some descriptive statistics of the main variables used to analyse the performance of the countries. The empirical analysis will be conducted employing alternative econometric techniques, such as pooled OLS, fixed effects (which allows the intercept to vary for each cross-section), and random effects (where intercepts are treated as random variables) models. It will be performed diagnostic tests to decide between pooled or panel data, and the Hausman test will be used to determine the appropriate model to use (fixed or random effects model).

To capture the impact of ICT on economic growth, we consider a Cobb-Douglas production function (Mankiw et al., 1992):

$$Y_{i,t} = A_{i,t} K_{i,t}^{\alpha} H_{i,t}^{\beta} L_{i,t}^{1-\alpha-\beta} \quad [1]$$

Where Y is Gross Domestic Product, *K* represents the physical capital, *H* the human capital, *L* the labor force, *i* each country in the panel and *t* the time. Taking the logarithms of eq. [1]:

$$lnY_{i,t} = lnA_{i,t} + \alpha lnK_{i,t} + \beta lnH_{i,t} + (1-\alpha-\beta) lnL_{i,t} \quad [2]$$

Considering that technology varies over time, according to the following expression, where $\theta_{i,t}$ represents a country technological growth:

$$A_{i,t} = A_0 e^{\theta i,t} \quad [3]$$

After log transformation is given by:

$$lnA_{i,t} = \ln A_0 + \theta_{i,t} \quad [4]$$

Supposing that ICT can boost technological progress, a relationship between these two variables can be expressed through (Majeed and Ayub, 2018):

$$\theta_{i,t} = \delta_1 + \delta_2 ICT_{i,t} \quad [5]$$

Replacing eq. [5] in [4] and considering $\beta_0 = log\ A_0 + \delta_1$, we obtain:

$$lnY_{i,t} = \beta_o + \beta_1 ICT + \beta_2 lnK_{i,t} + \beta_3 lnH_{i,t} + \beta_4 lnL_{i,t} \quad [6]$$

The model will be estimated including some determinants that are traditionally recognized in the literature to influence economic growth, and takes de following form:

$$\ln Y_{i,t} = \beta_1 ICT_{i,t} + \beta_2 ICT_{i,t}^2 + \beta_3 GOV_{i,t} + \beta_4 INV_{i,t} + \beta_5 HC_{i,t} + \beta_6 LF_{i,t} + +\beta_7 ITRA_{i,t} + u_i + \varepsilon_{i,t} \quad [7]$$

Y represents GDP per capita in constant 2010 USD and data were collected from the World Development Indicators from the World Bank. The variables for ICT are: number of internet users, fixed telephone subscriptions, and mobile cellular subscriptions, all per 100 inhabitants. Data were collected from the International Telecommunication Union. To measure ICT diffusion it was also established two indexes: one obtained through an unweighted average of the three indicators (ITC Index) (Majeed and Ayub, 2018), and other using the Principal Component Analysis (ICT Index (PCA)) (following Latif et al., 2018; Rath and Hermawan, 2019). In this case, the eigenvalue rule higher than one was used as a criterion to choose the components, and according to the screen plot. One component was retained that explains 75.70% of the total variance. All the variables are used to analyse the robustness of the results. We explore the non-linear effects by including polynomial terms in ICT variables into the regression model. Considering the non-linear effects of ICT on growth, the extreme point will be calculated through:

$$\frac{\partial lnY_{i,t}}{\partial ICT_{i,t}} = \beta_1 + 2\beta_2 ICT_{i,t} = 0 \ \wedge \ \frac{\partial^2 ICT_{i,t}}{\partial ICT_{i,t}^2} = 2\beta_2 \quad [8]$$

If $\beta_1 < 0$ and $\beta_2 > 0$ there will be a threshold that a country must achieve to have growth effects from ICT, and the hypothesis of network effects occurs. On the contrary, if $\beta_1 > 0$ and $\beta_2 < 0$, the second-order condition will be negative, and marginal positive effects of ITC on economic growth will lessen as the ICT penetration increases. At the margin, the total effect of the variation of ICT diffusion on the logarithm of GDP per capita can be calculated by the partial derivates:

$$\frac{\partial lnY_{i,t}}{\partial ICT_{i,t}} = \beta_1 + 2\beta_2 ICT_{i,t} \quad [9]$$

and the percentage change on GDP per capita would be given by $\left(e^{\beta_1 + \beta_2 ICT} - 1\right) \times 100$.

Good governance was measure by the six governance indicators developed by the World Bank: Rule of Law, Regulatory Quality, Government Effectiveness, Control of Corruption, Political Stability and Absence of Violence, and Voice and Accountability. These dimensions identify how "governments are

selected, monitored and replaced; the capability of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them" (World Bank, 2020). They range approximately from -2.5 to 2.5, with higher scores denoting better government performance. Since these indicators are highly correlated, and for reasons of multicollinearity they cannot be considered simultaneously, it was made an unweighted average of these six indicators (GOV), as Bota-Avram et al. (2018) and Law and Azman-Saini (2012).

The model includes other variables that traditionally are recognized to influence economic growth. The differences in the accumulation of human capital are also fundamental for explaining the growth differences between countries (Barro, 1991; Rath and Hermawan, 2019; Wamboye et al., 2015). Human capital (HC) accumulation, proxied by secondary school enrolment, can enhance labor productivity and provide efficiency gains, which can have positive effects on economic growth. Labor was measured by the growth rate of the labor force (LF). Investment in physical capital is recognized in the literature as a determinant of economic growth (Barro, 1991; Levine and Renelt, 1992; Maurseth, 2018; Pradhan et al., 2018), and it was proxied by gross fixed capital formation per capita (INV). According to the Export-Led Growth hypothesis, exports foster economic growth (Balassa, 1978) through greater efficiency in the allocation of resources, higher investment and international revenues. The model has included measures of country-level trade intensities (ITRA) such as exports divided by GDP (EXP) and imports divided by GDP (IMP). Data were collected from the World Development Indicators from the World Bank.

Results and Discussion

The sample is formed by 126 countries for which all the necessary information was available and 29.4% are developed economies, 62.7% developing and 7.9% in transition, according to the classification of UNCTAD. 15.1% belongs to the low-income group, 23.8% lower middle, 24.6% upper-middle and 36.5% high income (according to the World Bank analytical classification), which is very similar to the percentages observed in the world (15.5%, 21.6%, 25.7%, and 37.2%, respectively). The results of the descriptive statistics (Table 1) show that the average for GDP per capita is USD 14,900, ranging from a minimum of USD 214 (Burundi, 2017) to a maximum of USD 112,000 (Luxemburg, 2007). For the variables of ICT, the highest observed average value is for mobile cellular subscriptions per hundred of persons, of 82.7 (Standard Deviation (SD)= 47.50), with a minimum of 0.00 (Buthan, 2002) and a maximum of 328.79 (Macau, 2017). The share of internet users is very different among countries. The average value was 36.2 per 100 inhabitants (SD=29.7). Tajikistan reported the minimum value in 2002 (0.055) while in Iceland has the highest number of users per 100 people in 2017. There are statistical differences in the use of the internet, fixed telephone and mobile phone subscriptions among countries by levels of income (Through one-way ANOVA F test equals to 1031.962, 1483.760 and 322.089, respectively, with a p-value<0.0001). The mean values for the internet, fixed telephone and mobile cellular penetration are, respectively, 5.3, 1.1, and 37.4 in low-income countries, 16.4, 6.8, and 63.4 in lower-middle-income, 31.9, 17.5 and 85.9 in upper-middle-income, and 64.5, 40.1 and 112.9 in high-income. Tukey's multiple comparison tests reveal significant differences (p-value<0.0001) among all income groups for the ICT variables. Figure 1 plots the regression between ln GDP per capita and the ICT Index by the level of income, in 2017.

Table 1: Descriptive statistics

Variable	Mean	Median	SD	Minimum	Maximum
GDP per capita (constant 2010 USD)	14900	5690	19800	214	112000
Gross Fixed Capital Formation per capita (constant 2010 USD)	3460	1445.8	4449.2	18.23	24856
Labor force growth (%)	1.43	1.39	1.78	-6.77	10.40
School enrollment secondary (%)	82.70	89.70	29.30	6.55	164.00
Exports (in % of GDP)	43.80	35.80	31.90	4.69	229.00
Imports (in % of GDP)	46.80	39.80	27.90	10.80	221.00
Governance	0.09	-0.15	0.92	-1.72	1.97
ICT Index	46.827	48.760	28.143	0.22549	144.71
ICT Index (PCA)	1.889e-015	-0.056	1.507	-2.332	4.173
Individuals using the Internet (% of population)	36.20	30.00	29.70	0.06	98.30
Fixed telephone subscriptions (per 100 people)	20.80	15.90	18.90	0.00	74.60
Mobile cellular subscriptions (per 100 people)	82.70	88.90	47.50	0.00	328.79

SD – Standard Deviation

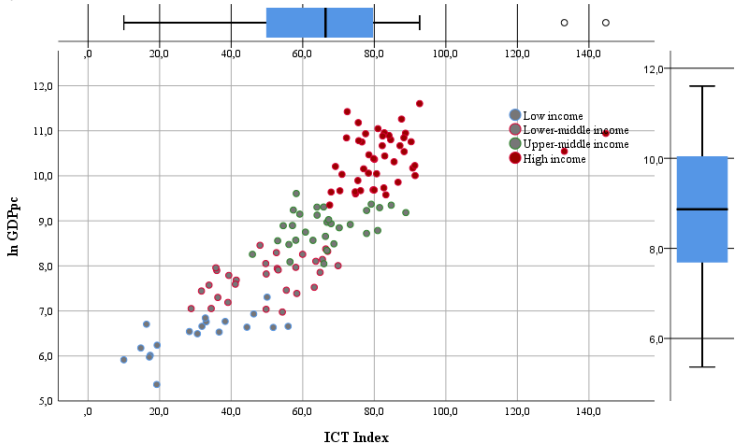

Fig. 1: Regression between ICT Index and GDP per capita (ln) by the country's level of income, 2017

Regarding governance indicators, in 2017, high-income economies have positive median values for all six dimensions, although there are countries with negative estimates in Control of corruption, Political stability and Voice and accountability (Figure 2).

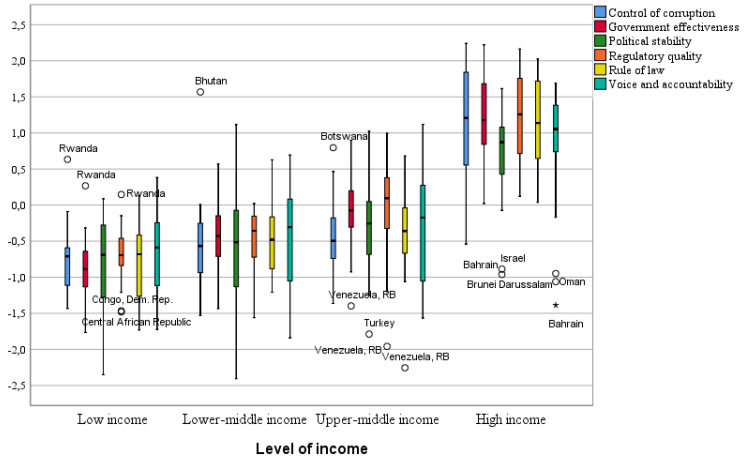

Legend: The line in bold represents the median, framed between the 1st quartile (lower end of the box) and the 3rd quartile (upper end of the box). The lower and upper bars represent, respectively, the minimum and maximum distributions.

Fig. 2: Governance indicators by country's level of income, 2017

In the upper-middle-income group, only Botswana, Costa Rica, and Mauritius score positively in all dimensions of governance and more eight countries in, at least, three dimensions. In lower middle-income countries Buthan has positive estimates for all dimensions, except Regulatory quality, and 79% of the countries have poor governance performance in all the dimensions.

The panel data regression was run for pooled ordinary least squares (OLS), fixed effects (FE), and random effects (RE). Tests diagnosis showed that OLS would produce inconsistent estimates (χ^2 =657.279, with p<0.0001), indicating that panel data is more appropriate. Using the Hausman test to guide the choice between fixed and random effects, the null hypothesis was rejected, implying that the individual effects are correlated with the explanatory variables (χ^2 =601.585, with p<0.0001). So, we concluded that the RE estimator is inconsistent and that the FE estimator is more appropriate. Therefore, we resorted to the fixed-effects estimator, allowing us to control for unobserved heterogeneity. The discussion of the results is based on the findings of the FE model, which are reported in Table 2.

Table 2: Results of panel data regression analysis Model FE, considering the robust covariance matrix computed with the Arellano method

Dependent variable: ln GDP per capita

Variables	Coefficient		Coefficient		Coefficient		Coefficient		Coefficient	
	(1)		(2)		(3)		(4)		(5)	
Constant	8.241090	***	8.551440	***	8.172850	***	7.984420	***	8.308140	***
	'(137.800)		'(148.100)		'(113.800)		'(72.130)		'(133.100)	
INV	0.000026	***	0.000028	***	0.000030	***	0.000038	***	0.000024	***
	'(4.267)		'(4.409)		'(3.813)		'(4.167)		'(3.780)	
HC	0.001503	***	0.001751	***	0.003289	***	0.007682	***	0.001623	***
	'(2.719)		'(3.214)		'(4.758)		'(7.650)		'(2.689)	
LF	0.002616		0.002510		0.001220		0.002334		0.002616	

	'(1.034)		(0.9579)		'(.469)		'(.982)		'(1.101)	
EXP	0.002845	***	0.002929	***	0.002281	*	0.002394		0.003079	***
	'(3.285)		'(3.091)		'(1.788)		'(1.512)		'(3.637)	
IMP	-0.002844	***	-0.002752	**	-0.001903		-0.002314		-0.003161	***
	(-3.022)		(-2.611)		(-1.422)		(-1.393)		(-3.675)	
GOV	0.233916	***	0.227037	***	0.221006	***	0.227982	***	0.237525	***
	'(5.982)		'(5.816)		'(4.735)		'(4.293)		'(5.862)	
ICT Index	0.008363	***								
	'(11.060)									
ICT Index square	-0.000025	***								
	(-3.140)									
ICT Index (PCA)			0.133921	***						
			'(13.790)							
ICT Index (PCA) square			-0.013555	***						
			(-3.386)							
Internet					0.009409	***				
					'(10.370)					
Internet square					-0.000060	***				
					(-6.465)					
Fixed telephone							0.001989			
							(0.4365)			
Fixed telephone square							-0.000017			
							(-0.3260)			
Mobile cellular									0.003607	***
									'(11.850)	
Mobile cellular square									-0.000005	***
									(-3.149)	
Number of observations	1482		1482		1485		1487		1488	
Within R-squared	0.7157		0.7058		0.6187		0.3972		0.7009	
F test	54.3844		51.6069		32.4627		13.0703		51.6192	
p-value (F test)	0.0000		0.0000		0.0000		0.0000		0.0000	

*Notes: The t-ratios are in parentheses; *** denotes significance at 1% levels, ** at 5% levels, and * at 10% levels.*

The variables used for control and that are significant in the model at the level of 0.05 have the expected sign. The estimated coefficients for Gross Fixed Capital Formation per capita in all regressions are, according to the theoretical predictions, positive and statistically significant. An increase of 1 USD in per capita investment increases GDP per capita by 0.002% to 0.004% ($(e^{\beta_k} - 1) \times 100$). The importance of external trade for economic growth comes through the benefits resulting from economies of scale, comparative advantages, and increased exposure to knowledge diffusion and competition (OECD, 2000). The estimated coefficients denote the positive and statistically significant impact of exports in models (1), (2), (3) and (5), while the expected impact of the import rate is negative, although not statistically significant in all models. The labor force was not statistically significant as in Pradhan

et al. (2018). According to the results, governance performance is a very important determinant of economic growth. An increase of 0.01 points in this indicator could allow an increase in per capita GDP of 0.22% to 0.24%. The results also show evidence of the relevance of human capital to economic growth and is significantly positive in all regressions.

The estimated coefficients of ICT diffusion (β_1), when ICT is evaluated by the indicators considered, are positive and statistically significant, except for fixed telephone subscriptions that are not statistically significant although with positive signs.

The coefficients of the quadratic terms of ICT variables and indexes (β_2), are negative and statistically significant, except for fixed telephone subscriptions. These findings suggest on one hand that the effects of ICT are positive up to a certain limit or critical value, and on the other hand that the marginal effects of ICT on economic growth are positive but are decreasing as the ICT diffusion increases. These results are in line with Vu (2011). For the ICT index, this critical value is 167.26 (given by eq. 8), which is higher than the maximum observable until 2017, of 144.71, which takes place for Macau. As Figure 1 shows, for 2017 figures, all countries in the sample are below the threshold. These findings imply that although each unit increase in ICT index, GDP per capita grows lessen, countries can benefit from ICT diffusion. For ICT Index (PCA) the critical value is 9.94, which is higher than all the values obtained for each country. Regarding the number of internet users, the critical value is 78.41 per 100 inhabitants, and beyond that, the increase in the number of users ceases to have a positive impact on the growth of GDP per capita. This result shows that there are countries that can benefit from the increase in the number of Internet users. Specifically, and taking the 2017 figures as a reference, in all low-income and lower-middle-income countries, 94% of upper-middle-income countries and 17% of high-income countries, would benefit from the increase in the number of internet users. For mobile cellular subscriptions, the threshold is 360.7 per 100 inhabitants which exceeds the maximum value that is verified for Macau in 2017.

From the results of Table 1, it is also possible to calculate the marginal effects of ICT, given by eq. [9]. These marginal effects depend on the value of the variable. Considering the average values in 2017 of 31.25 for ICT index, 17.24 for internet users, and 75.65 for mobile users the marginal effects on GDP per capita growth would be 0.682%, 0.737%, and 0.285% respectively. It is worthwhile to notice that the marginal effects of ICT diffusion are larger for internet penetration than for mobile phones, as in Vu (2011) and Majeed and Ayub (2018).

Finally, since $\beta_1 > 0$ and $\beta_2 < 0$ and the marginal effect depends on the level of ICT diffusion, it is possible to conclude that the lower the level of ICT diffusion the larger are the marginal effects. Therefore, countries with lower levels of ICT could benefit more from ICT development.

Conclusions

Structural changes in socio-economic development processes, which have an impact on economic growth, occur in a society with advances in ICT, and which change the way citizens, organizations and institutions work. New technologies and greater access to information enable decision-making, support human capital development, creates important spillover and economic growth.

The main objective of this paper was to analyse the non-linear impacts of ICT diffusion on economic growth, when controlling with other variables, namely governance performance. The main findings from this empirical analysis in panel data with 126 countries over the period 2002-2017 can be highlighted in the following points. Based on the estimations, good governance is crucial to promote economic growth. The quality of governance determines the level of efficiency in providing public goods and the definition of sound policies that create a favourable climate for stable economic growth. Human capital, physical investment, and exports are also sources of economic growth.

Regarding ICT diffusion, firstly, it should be highlighted the positive influence on growth in GDP per capita. In particular, it is observed that, except for fixed telephones subscriptions that were statistically insignificant, other ITC such as internet and mobile phone usage have significant effects on growth. Secondly, and due to the non-linear effects that resulted in a concave function, a threshold was found for each indicator of ICT, beyond which there would be a marginal negative contribution to GDP per capita. However, these thresholds are far from being attained, except for the internet in some countries. Thirdly, the marginal effect of ICT on economic growth is higher through internet usage than mobile phones. Finally, the marginal effect depends on the level of ICT diffusion and the results suggest that the countries with low levels of ICT diffusion could benefit more.

The findings suggest the countries with lower levels of ICT need not only to define strategies to promote their diffusion but also to increase the effects of ICT on economic growth. Although governance resulted in a source of economic growth it would be important to understand its effects on economic growth, namely through e-government developments.

If ICT has been regarded as an engine of productivity and economic growth, in the present context of the Covid-19 pandemic it has revealed decisive. In the situation of social distancing measures that have been widely adopted, the functioning of the economies is essentially due to the use of digital technologies. It has ensured business continuity since it is helping people to communicate. The outbreak has strengthened the importance of an interconnected world, thus the need to reinforce ICT infrastructure to drive economic growth. In future research, it would be interesting to estimate the impact of ITC usage in economic performance during the pandemic.

In the severity of the situation the world is living in, good governance is central to an effective response to the crisis. But if governments need to take critical actions, some coercive in the name of the common good, they must be taken ensuring democratic principles such as transparency and accountability. This crisis highlights the need to reflect on the effectiveness of governance systems and the strengths and weaknesses of the different models of governance.

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Appendix

List of countries

Albania; Algeria; Armenia; Australia; Austria; Azerbaijan; Bahamas; Bahrain; Barbados; Belarus; Belgium; Benin; Bhutan; Bolivia; Botswana; Brazil; Brunei Darussalam; Bulgaria; Burkina Faso; Burundi; Cambodia; Cameroon; Canada; Central African Republic; Chad; Chile; China; Colombia; Congo, Dem. Rep.; Congo, Rep.; Costa Rica; Cote d'Ivoire; Croatia; Cyprus; Czech Republic; Denmark; Dominican Republic; Ecuador; Egypt; El Salvador; Estonia; Eswatini; Finland; France; Gabon; The Gambia; Germany; Ghana; Greece; Guatemala; Guinea; Guyana; Honduras; Hong Kong; Hungary; Iceland; India; Indonesia; Iran; Ireland; Israel; Italy; Jordan; Kazakhstan; Kenya; Korea, Rep.; Kyrgyz Republic; Lao PDR; Latvia; Lithuania; Luxembourg; Macao; Madagascar; Malawi; Malaysia; Mali; Malta; Mauritania; Mauritius; Mexico; Moldova; Mongolia; Morocco; Nepal; Netherlands; New Zealand; Niger; Nigeria; North Macedonia; Norway; Oman; Pakistan; Panama; Paraguay; Peru; Philippines; Poland; Portugal; Romania; Russian Federation; Rwanda; Senegal; Singapore; Slovak Republic; Slovenia; South Africa; Spain; Sri Lanka; Sudan; Sweden; Switzerland; Tajikistan; Tanzania; Thailand; Togo; Tunisia; Turkey; Uganda; Ukraine; United Kingdom; United States; Uruguay; Vanuatu; Venezuela; Vietnam; West Bank and Gaza.

Global and Recent Trends in Halal Tourism

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Abstract

The destinations, worldwide, have seen a progressive increase in international arrivals, consolidating their position in the international context, on the one hand, but also diversifying the source markets. The United Nations World Tourism Organization predicts 69 million Halal tourists for 2020, representing an average annual growth rate of 6.7% between 1995 and 2020.
Halal tourism has seen a growth in total number of tourists, in receipts volume, and a growth of niches, such as women and some generations, promoting a special interest in DMO's. Considering these aspects, it is a constant challenge for tourist destinations to adapt to the Halal market, thus reinforcing their competitiveness and developing the branding and image of the destination. Destinations should prepare their offer, considering the specificities of each of those niches, ensuring good performance in terms of satisfaction, and behavioural intentions, to recommend and return to destination.
This article intends to present a diagnosis regarding Halal tourism in a global perspective, considering several emerging niches, and presenting opportunities concerning tourism destination management.

Keywords: Tourism – Halal – Muslim – Women

Introduction

Exploring recent trends in the tourism sector, rapid growth in tourism in areas such as Asia, Africa and the Middle East has been visible in recent years. In these areas consumption is growing at an accelerated rate, and for this reason they are considered long-term emerging economies dominated by young populations and the middle class. A large percentage of the population in these areas is of Islamic origin and has mostly a strong purchasing power. The Islamic economy currently grows twice as fast as the world economy's pace, as more than a fifth of the world's population is of Islamic origin. According to this conjuncture, this is a factor that is considered a strong catalyst for the global economy because it is considered a market recognized for its strong purchasing and consumption power, especially in the sectors of catering, finance, tourism, fashion, media, and also in the pharmaceutical and cosmetic industry. Consequently, the Islamic market, as it is constantly growing and developing, is a strong promoter of the growth of global tourism demand, giving rise to a link with the Halal tourism segment.

As for the tourism sector, Halal tourism represents a solid growth over the last few years and is recognized as one of the sectors with the greatest impact on the global tourism balance, being recognized as an increasingly large travel market (Oktadiana, Pearce, Chon, 2016), becoming, for this reason, a very recent research area, especially in non-Islamic context (Jia & Chaozhi, 2020), from both the perspectives of practitioners and researchers (Battour & Ismail, 2016). Concerning these considerations, any strategy to develop or market Halal tourism products services must be guided by Islamic law (Shariah) (Battour & Ismail, 2016). According to the previous authors, the two concepts, 'Halal Tourism' and 'Islamic Tourism', used as being the same, in several research, are vague, presenting definitional ambiguities in terms of the Islamic law, the target customers (i.e. Muslims or non-Muslims), the location of activity (i.e. destination attributes), the product and service offered (i.e. food, facilities), and the purpose of travel (Battour & Ismail, 2016). To Jia & Chaozhi (2020), travel motivation of Islamic tourism is religious in nature, while Halal tourism is not limited to the religious motivation.

The Halal tourism market encompasses countries such as Bahrain, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates, Malaysia, Indonesia, Brunei and residents in Europe, South Asia, the United States of America and the United Kingdom. Global tourism spending in 2015 reached $145 billion, expected to rise to $300 billion by 2026. Projections for 2020 predict a value of $233 billion concerning tourism expenditure by Halal tourism. Although the trend of Halal tourism is directed mainly to the countries of Asia and the Middle East, Europe and the United States of America are notably the ones that benefit the most in terms of revenue from Islamic tourists (Global Muslim Travel Index 2019). The World Tourism Organization forecasts 69 million Halal tourists, only for tourism in the Middle East by 2020, representing an annual growth average of 6.7% between 1995-2020, placing above the global average (Battour & Ismail, 2016). In 2018, there were 140 million international Muslim visitors, being projected to reach 230 million by 2026. Halal tourism is considered a very specific market with characteristic needs due to religious and cultural conditions. One of the main motivations of Halal tourism is of a religious nature associated with the Islamic faith, but other motivations are also evident such as visiting family and friends, leisure, business and cultural tourism. There are factors of preference on the part of Halal tourists that will be addressed throughout this section, which proves that Halal tourism is constantly developing, and industries and tourist destinations feel the need to adapt to the characteristics of this trend. In view of these aspects, it is a constant challenge for tourist destinations to adapt to the Halal market, thus strengthening their competitiveness and developing the branding and image of the destination. Some of the most relevant terms are presented in table

Table 1: Halal Travel Glossary

Concept	Definition
Muslim travel	Muslims travelling for any purpose.
Muslim tourism	Muslims travelling for tourism.
Halal travel	Muslim travellers, who do not wish to compromise their faith-based needs while travelling for a purpose, which is permissible or it can also be defined as Halal conscious travellers, travelling for any purpose, which is Halal (permissible).
Islamic travel	Muslims travelling mainly for religious reasons and/or to visit Islamic religious sites.
Muslim-friendly destination	Destinations catering to the needs of the Muslim travellers.
Muslim friendly facility/service	The service or the facility has considered some faith-based needs of Muslim travellers. Although Halal-friendly facility/service may also convey the same meaning, the term Muslim friendly service/facility is more appropriate.
Shariah-compliant services/facility	The service or the facility not only caters to all the key needs of the Muslim travellers, but also strictly adheres to many other Islamic requirements. This includes adhering to company governance and operations, which consider several Islamic requirements such as Halal non-interest based financing, among other aspects.

Source: Crescent Rating (https://www.crescentrating.com/online-halal-travel-glossary.html), Adapted

The current situation regarding travel by tourists from countries of the OIC (Organization of Islamic Cooperation) is constantly growing. In 2014 there were 116 million arrivals of Halal tourists valued at $121 billion, and in 2020 180 million arrivals are estimated, representing $212 billion in receipts.

Table 2: Arrivals of Islamic tourists (2010-2020)

(Millions)	Year 2010	Year 2014	Year 2020	Growth Forecast (2015-2020)
Total Muslim Visitor Arrivals	98	116	180	54.50
Total Muslim Visitor Arrivals to OIC	53	64	98	51.87
Total Muslim Visitor Arrivals	45	52	82	57.75

Source: CrescentRating, 2015, Adapted

By 2020, a growth in tourist arrivals in OIC member countries is expected, estimated at 98 million tourists, representing a growth rate of 51.87%. The growth rate, comparing to the arrival of Islamic tourists in countries that are not members of the OIC is about 57.75%, being the effort of countries that are not members of the OIC to attract Halal tourists, recognized. Traditionally countries like Singapore, the United Kingdom, Germany and France attract Halal tourists, however new trends such as Japan, Korea and Australia are current players in the competitive sector. The growth of Islamic tourists will represent 76.3% between visits in OIC member countries and non-OIC countries.

As CrescentRating (2019) refers, while Muslim travellers in general will appreciate destinations and facilities which cater to their faith-based service needs, a combination of culture, demographic, budget requirements and purpose of travel will result in unique Muslim travel segments with different preferences, being these aspects an opportunity to personalize service offerings according to their unique profiles, presented in table 3, as follows:

Table 3: Muslim key traveller profile

Key Traveller Profile	Preferences
Purpose	Leisure; Ramadan; Business
Demographic	Millennials; Females; Families; Senior Citizens
Budget	Luxury; Average Budget; Low Budget
Culture	GCC; South East Asia; Western Europe

Source: Global Muslim Travel Index 2019

The countries leading the outbound tourism of Islamic visitors are Malaysia, Indonesia and Turkey. Halal tourism worldwide accounts for more than 10% of spending. The United States of America and Europe represent the markets with the highest demand for Halal tourism, accounting for 44% of the global market corresponding to $64 billion of receiving tourism spending. Asian and Middle Eastern countries are a strong trend and account for more than a third (37%) of world spending. For OIC countries, this market represents 60% of the global market, resulting in $60 billion of issuing tourism spending. Muslim tourists contribute to the world economy not only through tourist revenues and expenditures, but also through the resulting tax impact during their travels. Halal tourism contributes to the payment of fees and taxes on their trips abroad, as most countries charge tourists a fee when buying goods and services. Halal tourism contributes to the payment of fees and taxes on their trips abroad, as most countries charge tourists a fee when buying goods and services. These industries benefit from tax rates in the sense that they earn revenue on their expenses as well as property taxes, licenses, among others. These taxes paid by tourists also contribute to the payment of wages to workers in the tourist industry. Analysing from an overview and through the data presented above, the destinations that distinguish themselves as leaders in the market of halal tourism demand, are Malaysia, Turkey and the United Arab Emirates as well as Indonesia, Saudi Arabia and Qatar. Recently, one of the emerging destinations is Japan which stands out equally for the demand for Halal tourism. Malaysia is currently and since 1974 the most popular destination on the part of the demand for Halal tourism, especially due to the

attention of the Malaysian government with the foundation of the "Research Centre for the Islamic Affairs Division", a department specialized in Halal needs. Tourists from the Middle East represent a lucrative niche market in Malaysia's tourism industry as they have strong purchasing power. For the same reason, the Malaysian government has joined initiatives such as "Feel-at-Home" and "Ain Arabia", these are advertising campaigns that promote Middle Eastern culture and advertise services such as restaurants and tourist information presented in Arabic language. Tourist establishments adhere to the growth of Halal tourism by adapting their multilingual menus and hiring employees fluent in Arabic both in catering and in accommodation and commerce (Shafaei & Mohamed, 2015). The emergence of the Halal tourist market in Japan is due to the combination of several factors, that is, the efforts made to adapt services to the Halal tourist market. Examples of this adaptation are visible at airports with prayer rooms with adequate space, as well as hotel units and the restaurant sector. Other influencing factors that attract Halal tourists is the devaluation of the Japanese currency and the ease of obtaining visas, a measure adopted in 2013 comprising 66 countries, some of them members of the ICO. Another attractive factor for Halal tourists is the provision of applications for smartphones that indicate which Halal restaurants are closest, as technology plays an important role in this tourist segment. The interest on the part of Halal tourism for this tourist destination is sustained not only by presenting itself as a recent trend in the "Halal friendly" market, but also due to the historical connection that remote to the period between the fifteenth and eighteenth centuries where this region was ruled by the Ottoman civilization. Croatia is one of the European destinations that has been adhering to the Halal certificate and is considered a "Halal friendly" destination. More and more tourist industry service, including hotel units, restaurants, and travel agencies, are interested in obtaining a Halal friendly certificate granted by the Center for Halal Quality Certification of the Islamic Community.

Literature Review. Defining Halal Tourism and its niches

Halal has become an area of interest for tourism academics and industry professionals in recent years mainly due to the increasing global Muslim population. According to Kim, Im & King (2015), Al-Ansi, Olya, & Han, (2018) and Al-Ansi & Han, (2019), the halal-friendly environment and availability of Muslim friendly attributes are very important aspects to attract Muslim tourists. To Duman (2011) "Islamic tourism" can be defined as “the activities of Muslims traveling to and staying in places outside their usual environment for not more than one consecutive year for participation of those activities that originate from Islamic motivations which are not related to the exercise of an activity remunerated from within the place visited”. Sureerat (2015) defines Halal tourism as the offer of packs and destinations that are particularly designed to meet Muslim needs. Osman (2015) defines Muslim tourism being based on Islamic education that encourages individuals, especially women and children, to travel with their muhrim, that is, someone who has a blood relationship with them to provide them with protection. The Islamic Tourism Centre (ITC) defined Islamic tourism as "an activity, event and experience absorbed in a state of travel that is in line with Islam. Not making the distinction between these two types of tourism may not be well accepted in Muslim culture perspective. The term halal is defined as "That which is permitted, with respect to which no exists, and the doing of which the law-giver, Allah, is allowed" (Al-Qaradawi, 2010), i.e. the term is understood as permitted/authorized according to Islamic teachings (Sharia law). Halal is also one of 5 actions that categorizes the morality of human action in Islam, the other being Fard (mandatory), Mustahabb (recommended), Makruh (poorly seen) and Haram (forbidden) (Al-Faruqi, 1992). From the Islamic perspective, Halal, as already defined, refers to any practice or activity in tourism that is allowed according to Islamic teachings. On the other hand, the term "Islamic" is precisely applied only to what relates directly to faith and its doctrines (such as Shariah law, Islamic values, principles and beliefs), (Douglass & Shaikh, 2004). These points of view suggest that Muslim men, women and countries are not necessarily Islamic, and Islamic man and Muslim man have different definitions. Halal tourism is considered a very specific market with characteristic needs due to religious and cultural conditions. One of the main motivations of Halal tourism is of a religious nature associated with the Islamic faith, but other motivations are also evident such as visiting family and friends, leisure, business, and cultural tourism.

Halal tourism is a subcategory of tourism targeted at Muslim families who obey Islamic rules. Hotels in such destinations do not serve alcohol and have segregated pools and spas. Malaysia, Turkey, and more countries are trying to attract Muslim tourists from all over the world by offering amenities according to their religious beliefs. Currently, there are no international standards for Halal tourism. The Halal tourism industry also provides flights where there is no alcohol service or pork products, hours of prayer are announced, and religious programmes are broadcast as part of the on-board entertainment pack. Many international hotels serve halal dining options, prepared according to the teachings of Islamic Sharia and free from any substance prohibited by Islam, such as pork and alcohol. Some hotels have employees from Muslim culture for the purpose of service translations and other types of assistance that Muslim tourists may need.

Recent research, presented in table 4, demonstrates the recent and growing interest in halal tourism, degree of satisfaction regarding the offer of tourist product, values, attributes of halal-friendly hotels, tourists' behavioural intentions, motivational factors for travel, identification of trends and opportunities, quality attributes regarding the services provided, and analysis of the opinion of tourists on social networks.

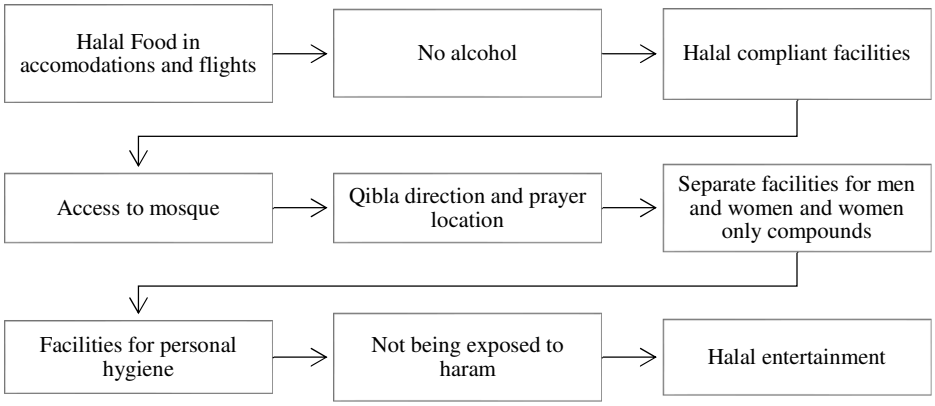

Figure 1: Key Islamic consumption values

Source: Rodrigo &Turnbull (2019), Adapted.

Table 4: Recent Research in Halal Tourism

Author	Goal	Research project	Notes and results
Abror Abror, Yunia Wardi, Okki Trinanda & Dina Patrisia (2019)	To find the relationship between Halal tourism, religiosity, customer engagement, and tourist's satisfaction.	The population of the study were Muslim tourists who visited West Sumatra, Indonesia. The data were 393 respondents.	Halal tourism and customer engagement have significant impacts on the tourist's satisfaction. Religiosity is a significant moderating variable on this relationship.
Padmali Rodrigo, Sarah Turnbull (2019)	Understand the perceived values considered by Muslims when undertaking a halal holiday.	Application of 21 semistructured interviews conducted among Sri Lankan Muslims.	Islamic values captured by Iman play a significant role in customer expectations regarding perceived consumption values. Thus, tourism and hospitality organizations need to develop products and services that are Sharia-compliant. Such initiatives would enable tourism and hospitality firms to demonstrate their responsiveness to specific cultural needs.
Yoksamon Jeaheng, Amr Al-Ansi & Heesup Han (2019)	To identify the attributes of a halal-friendly hotel and evaluate the role of these attributes in motivating the behavioural intentions of Muslim customers	Qualitative and quantitative approaches identified 30 validation and reliability items involving five distinctive dimensions, which included halal-friendly service, facilities, foods and beverages, privacy, and customer-service equality.	The findings showed the variance in intentions; three attributes were positively related to cognitive evaluation, four attributes had significant influence on affective evaluation. Cognitive and affective evaluation worked as mediators.
Amr Al-Ansi, Heesup Han (2019)	To observe the intricate procedures involved in Muslim tourists' behaviour toward a non-OIC ('Organization of Islamic Cooperation') destination. Analyse the relationships among halal-friendly destination performances, perceived value, destination satisfaction, destination trust, destination loyalty.	A psychometric analytical process was employed to achieve this goal.	The findings of the structural analysis revealed that halal-friendly destination performances highly and positively associated with the responsiveness developed constructs, which significantly contribute to predict Muslim tourists' attitudes and future desire toward a destination. In addition, the moderator effect of an overall halal-friendly destination image was evaluated on the conceptual model.
Naeem Akhtar, Jin Sun, Wasim Ahmad, Muhammad Nadeem Akhtar (2019)	Developed a research model of Halal restaurants' non-verbal messages to tourists that lead to their offensiveness and their interaction adaptation, which determine their behaviors.	Examines how non-verbal messages—defined as those that are not delivered face-to-face—trigger consumers' interaction adaptation; how experience and credence attributes moderate the relationship between interaction adaptation and consumers' offensiveness; and the relational outcomes. This model is applied to Chinese settings, where data were collected from 622 Muslims tourists who visited Halal restaurants in three of China's cities (Beijing, Shanghai, and Xian).	A positive effect of visual and audio messages on Muslim tourists' interaction adaptation and the likelihood of their offensiveness. Also found that tourists responded to their offensiveness in the form of negative electronic word-of-mouth (e-WOM) and lowered continuance purchase intentions. The experience and credence attributes positively moderate the relationship between interaction adaptation and consumer offensiveness.
Heesup Han, Amr Al-Ansi, Mehmet Ali Koseoglu, Pearl M. C. Lin, Jinah Park, Jongsik Yu & Wansoo Kim (2019)	To identify halal-friendly travel motivation factors and unearth their role in Muslim customer retention process in Korea.	Qualitative and quantitative procedures were used to achieve research objectives. A comprehensive structural model was developed to distinguish the role of all proposed indicators.	Halal-friendly travel motivations are significantly associated with customer return on investment and satisfaction, and such relationships contribute to improve customer retention. The effectiveness of higher-order structure of halal-friendly travel motivations was demonstrated. The formation of Muslim customers' post-purchase decisions was significantly moderated by the sense of belonging to a tourist destination.
Tareq Rasul (2019)	To clarify the ambiguity surrounding the concept of halal tourism. To standardise some	A systematic literature review.	The theoretical contribution of this study includes characterising the conception, definition and principle of halal tourism, and the practical

Author	Goal	Research project	Notes and results
	dimensions of halal tourism, such as conceptions and definitions, principles, scope and impacts, trends, and opportunities and challenges.		contribution includes economic, socio-cultural and environmental impacts.
Junaidi Junaidi (2020)	To depict the halal tourism concept, its business process, and investigate dilemmas faced by tourism industry and proposes strategies to resolve the constraints based on the best practice from the tourism business operators. In addition, this study tries to investigate the influence of various factors on halal tourism.	Triangulation method used by combining personal in-depth interview, documentation/literature review and field observation to generate the discussion and conclusion. Interview process was conducted by selecting four tourism operators in Indonesia who won the best halal category award by The World Halal Travel Award in Dubai. Additionally, for the empirical analysis, a questionnaire was also developed, and data collected from a total sample of 313 Muslim tourists in the region of Indonesia.	A significant and positive influence of quality and certification of halal food, male serving in the restaurants, halal activities and separate recreational facilities on halal tourism industry.
Yoksamon Jeaheng, Amr Al-Ansi & Heesup Han (2020)	To examine the critical associations among service quality attributes, perceived price, satisfaction, trust, and revisit intention.	A robust structural model was developed to achieve this objective, and a two-step analytical approach was used to test the construct measurement and the proposed structural models.	A significant relationship between the study variables directly and indirectly either as predictors or mediators. The study also evaluated the role of the moderating effect of involvement. The results supported the significant relationship on satisfaction and revisit intention only when the hotel's Muslim guest has a high level of involvement.
Sulaiman Ainin, Ali Feizollah, Nor Badrul Anuar, Nor Aniza Abdullah (2020)	Examines halal tourism trends by analysing posts (known as 'tweets') on the social networking service Twitter.	A total of 85,259 tweets were examined. Nineteen keywords (English and Bahasa Malaysia) were used in the extraction process. Using the extracted tweets, the study examined the origins of tweets among the global population related to halal tourism, identified the major populations around the world that are engaged in halal tourism tweets, analysed the sentiment valence in relation to halal tourism, and identified the popular destinations in tweets.	The findings showed that Japan is the most-tweeted-about halal tourist destination, followed by Malaysia and Indonesia. The findings can be used by the various halal tourism stakeholders to plan their future strategies in relation to halal tourism.
Erhan Boğan, Bekir Bora Dedeoğlu, Orhan Batman, Recep Yıldırgan (2020)	Investigates work- and halal-related predictors of job pursuit intention in Muslim-friendly hotels in Turkey.	Data were collected through a questionnaire of 474 hospitality students. The proposed model was tested via partial least squares structural equation modelling.	Job attractiveness and person–organization fit were both significant predictors of organizational attractiveness and job pursuit intention. Negative perceptions of Muslim-friendly tourism negatively affected organizational attractiveness. Organizational attractiveness was the most significant predictor of job pursuit intention. Organizational attractiveness complementarily mediated the effects of job attractiveness and person–organization fit on job pursuit intention.
Xiong Jia & Zhang Chaozhi (2020)	To explore Muslim tourists' needs and tourism practitioners' responses in China.	A qualitative approach, specifically in-depth interview, was adopted. This research conducted 32 in-depth interviews during July 2018, including 15 tourism practitioners and 17 Muslim tourists.	Muslim tourists' needs include six aspects, namely food, hotel, transportation, entertainment and shopping, toilet, and service staff. Regarding religious-related needs, they only demand for halal food, water-friendly toilets and prayer facilities. This research suggests halal tourism attributes developed in Islamic countries cannot be applied to non-Islamic countries.

Source: Authors

Also, Jia & Chaozhi (2020), found in their research, that Muslim tourists' needs include six aspects, namely food, hotel, transportation, entertainment, and shopping, toilet and service staff, demanding, regarding religious-related needs, halal food, water-friendly toilets and prayer facilities, being considered several changes in Muslim travel market, as shown in table 5, namely the connectivity with destinations, through smart technologies such as Artificial Intelligence and skilled human resources in the hospitality industry, reporting to this special growing market.

Table 5: Primary Halal Travel 1.0 level and a new Halal Travel 2.0 phase

	HALAL TRAVEL 1.0	HALAL TRAVEL 2.0
Objective	Sell products and services to Muslim Travellers	Engage with travellers to co-create better solutions
Enabling forces	Globalization, Technology	New technologies, Social Activism, Millennial Demographics
View of Muslim Travel Market	Travellers looking for solutions for their faith-based needs	Dynamic travellers who are active citizens in the travel space
Key concept	Adaptation	Activation
Company guidelines	Sell product and service features to Muslim travellers	Converse and engage with Muslim travellers
Value proposition	Functional and Spiritual	Connectivity and experiences
Interaction with Muslim Travellers	Transactional	Managing relationships

Source: Global Muslim Travel Index, 2019

Also, according to Crescentrating (2019), in 2018, there were 140 million international Muslim travellers - a number projected to nearly double by 2026, being almost half of these Muslim travellers (63 million – 33% less than 20 years; 34% between 20-40 years), women who spent an estimated $80 billion on their journeys. Muslim women plan their trips between 1-6 months in advance, 65% prefer free and independent travel, only 5% opt for customized guided tour; the average trip length is 4-6 days, and the majority travel about 2-3 times a year; 80% look for family-friendly attractions, 71% look for kitchen facilities and 49% look for children-friendly amenities. Considering data obtained from the previously mentioned document, two-thirds of this population were 40 years of age or younger, indicating the growing power Muslim women – particularly young Muslim women – have in the global travel market. Muslim women travellers generally seek the same things that all female travellers worldwide want, which are: - safety and security, healthy food options and good retail experiences, to incorporate their faith into their travels – whether through halal dining, accessible religious facilities, single-gender spas or beauty salons that enable them to practice modesty, practicing also eco-friendly tourism as a priority. During the pre-trip phase, during the planning phase, there are some important topics searched, such as: child-friendly options, halal food options, payment methods, shopping places, modes of transportation, special events, family-friendly attractions, accommodation, learning opportunities, adventure activities, cultural activities, and spa & wellness. Concerning Muslim women traveller faith-based service needs regarding Halal travel 2.0, it is important to analyse which aspects are included in several considered categories, as presented in table 6.

Table 6: Muslim traveller faith-based service needs 2.0

Need to have	**Halal food service**	**Salaath (prayer) facilities**	**Water friendly washrooms**	**No Islamophobia**
	Healthier halal options; Halal children meals	Prior to performing a prayer, Muslims are required to take wudhu (ablution) using water; Women areas	Muslims require water to clean themselves after using the toilet or to take wudhu; Cleanliness of wudu facilities for women	Safety has become a primary concern for Muslim travellers; Safe Travel Climate for Muslim Women Travelers
Good to have	**Social Causes**	**Ramadan (Fasting) services & facilities**	**Local Muslim Experiences**	
	Social causes (eco-friendly practices); Volunteer Groups; Social causes for women-only beneficiaries; Women-only volunteer groups.	Suhoor and iftar arrangements at restaurants; Suhoor and iftar room service; Suhoor and iftar served by female staff	Islamic heritage Tours; Interacting with local Muslim communities; Interacting with local female Muslim communities; Islamic heritage tours for females	
Nice to have	**No Non-Halal Activities**	**Recreational spaces with privacy**		
	Facilities with no non-halal services: drinking of alcohol, gambling and discotheques	Women-only spas/beauty/hair salons Women-only pools/hours Women-only gym/gym hours Women-only beaches Women-only floors in hotels		

Source: Muslim Women in travel (CrescentRating), 2019, Adapted

Conclusion

Through several platforms that provide information on Halal tourism in other countries, demand and supply are not always synchronized. The countries where this trend has been felt most recently are Malaysia, Japan, and Croatia. Answering the question "Is it a growing trend?", we proved that in fact this typology of tourism is growing worldwide. In the future, since this market is one of the potential holders of one third of the world's tourists, it makes perfect sense to increase the knowledge concerning this tourism niche market. As Salam Standard (2016) states, DMO's must identify stakeholders representing the government, local authorities, infrastructure managers (e.g. airport and train station operators) as well as businesses including tour operators, hotels, airlines, eateries, shopping centres, tourist attractions and event organisers, visioning the value proposition of the Muslim travel market. The deeper knowledge of this niche challenges the creation of diversified tourist products but meeting the specificities and needs of halal tourists:

- Develop awareness strategies to ensure healthy growth of Halal tourism.
- Nurture values of diversity, integration, and tolerance in different cultures.
- Create connections at the level of religion to find and value similarities rather than differences, thus contributing to greater reception and promotion of Islamic tourism.
- Innovate in new technologies with Muslim friendly applications creation, as well as the use of social networks and marketing programs according to geographic location.
- Plan specific tours for Halal tourists, offering Halal catering services, an itinerary designed to respect prayer hours, visits to mosques and other places of historical interest that identify themselves of Islamic origin and tour guides fluent in Arabic.
- Staff training to raise awareness and understand the needs of this market segment and the best way to receive Halal tourists.

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Factors Affecting Attitude Towards Online Shopping: A Case Study Among University Students in the Southern Region of Malaysia

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Abstract
The development of the online shopping in Malaysia is expanding each year as a type of e-commerce, turning to a main concern by the government. Students have been recognized as an important role in building and maintaining this type of shopping. Thus, the purpose of this study was to identify the factors affecting university students' attitude towards online shopping. The second objective was to determine the relationship between factors such as quality, prices, saving time, wider selection & trust and the attitude toward online shopping. One variable from the Theory of Planned Behavior (TPB) was adapted in this study. This study followed the quantitative method which used the questionnaires for data collection purposes. The respondents of this study were the university students. The data then was analyzed using the Statistical Package for Social Science (SPSS). The findings of this study showed that wider selection of products, saving time, cheaper prices and trust were the most influential factors that affect the students' attitude towards online shopping. The findings also showed that all the independent variables are corelated with the dependent variable.

Keywords: Online Shopping, Attitude.

INTRODUCTION

JARING is the first Malaysian network access supplier (ISP) in 1990 and later TM Net in 1995 (Ramlan & Omar, 2011). From that time onwards, the usage of internet is expressing a huge expanding each year. The internet usage for the commercial purposes has started in 1993 with the development of the World Wide Web (Vladimir Z., 1996). The rise of the Internet and World Wide Web (WWW) as a vehicle for business exchanges, web-based business has started to become common turning into the main concern of the global communities (Harn et al., 2006). This important shift changed the way the sellers and the clients interact and conduct electronic transactions; the process has become easier, simpler, and cheaper compared to the traditional trading (Margherio L., 1998).

The internet has recently become more than a social media; it is the means of doing business as a new trend of shopping in the global market (Choudhury D., & Dey A., 2014). Online shopping is a type of

electronic trading that gives customers the chance to get their goods or services from the seller over the internet (Jusoh and Ling, 2012). With the advanced development in the internet, the physical shops have become online, and online shopping is no longer rare (Manwaluddin, I. I. et al., 2018). According to a survey that was done in France, Germany, UK and U.S. by Periscope by Mckinsey (2018), most of the consumers around the world are reaching and purchasing packaged goods through the internet.

Today, online shopping is the trend of shopping in all the countries, both developed and developing. The number of internet users in Malaysia has grown to 87% at the national level (Malaysian Communications and Multimedia Commission, 2018); and Malaysia has the highest penetration of online shoppers in Asian countries, 67% of Malaysians online (The Sundaily, 2017).

Attitude is the most important variable that influence the students' intention, which in return translated into the actual action, the online shopping. Students' attitude is affected in many ways. For example, students will have good impression when they find that online shopping is cheaper than the physical stores. This is what will give them good attitude toward the online shopping. Moreover, since the e-commerce market is growing, there is a need to identify the factors that play an important role in this development and determine the relationship between the factors and the attitude toward online shopping for the online sellers and the government to be under their concern.

This type of shopping is gaining popularity among the university students. Both undergraduate and postgraduate students are impacted by many factors like quality, prices, saving time, wider selection, and trust when ordering online. Online purchasing is cheaper than the traditional shopping since the online venders do not need the expenses of the normal operations done by the offline vendors. Furthermore, online shopping minimizes the transaction costs which is an advantage for the buyer and seller (Chandra and Sinha, 2013). Some product quality during the online purchasing is different from the real quality needed by the students. This lowers the level of trust in the online stores. The majority of the students are affected by the late delivery of the products. It happens that sometimes a student orders a product and discover that the product has been delivered to the wrong place or branch. This certainly result in the student losing his time waiting and contacting with the online vendor.

Moreover, online shopping provides students with a wider selection of products. This makes students confused for selecting the suitable product they are looking for. A recent study conducted in 2017 by Citizens Advice on some 2,000 online shoppers shows that although customers are satisfied with the online shopping, about 66% of the customers have had at least one issue with a product delivery in the previous 12 months (Consumer Rights for Parcels Delivery, 2017). Based on the problems mentioned above, there is a need to investigate whether or not these issues influence attitudes of university students toward online shopping. This paper will fill the gap found in literature review. It focuses on the five factors because the studies on factors that influence the attitude to purchase online among the university student consumers are still lacking.

Moreover, despite having a considerable number of Internet users, students are using online purchase only for small number of categories the most like booking hotels and flights. Thus, it is important to understand the factors that influence the Online shopping which is still lacking. Delafrooz et al., (2010) stated that the research on the attitudes toward online shopping is still lacking since the e-shopping is still the early stages. “The influence of the attitude was by far the most influential variable and the focus of future studies should be on the underlying factors of the attitude”, (Norshazliza, 2018). More importantly, Malaysia is one of the pioneers countries in Asia that has stablished a ministry that is related to the electronic trade development, and the popularity of shopping online is rapidly increasing. Despite this, the number of the companies which adopt e-commerce is still low. Thus, this paper aims to determine the factors affecting the university students’ attitude toward online shopping.

Review of Literature

Online Buying has been one of the subject matters for researchers in both Marketing Sciences and IT as the e-business is expanding. Rastogi (2011) discovered that online shopping nowadays is an important part of our life because of the technological advances in internet and our hectic life. This has resulted in customers going for easier, cheaper, and secure shopping. Online shopping has provided many advantages as it saves their valuable time and give them the chance to select from a range of products with the best price. Out of the many research in the related area, some of the literature related to this study is discussed here.

Kaur & Kochar (2018) attempted to analyze the factors influencing the behavior of customers toward online shopping. It was found that customers have more satisfaction with e-shopping because they are able to shop in any place and anytime with safety and ease of payment options. They are also able to compare the available products by saving their time and money. The provided information of online product facilitates the process of comparison of the products content and quality of website and the security measures taken by the retailors all affect the attitude of customers to purchase online. Jadhav V. & Khanna M. (2016) have conducted a qualitative analysis on the factors affecting college students' purchasing behaviors in Mumbai, India. The most affecting variables for online purchasing were determined as variety of products, low price, promotions, comparison, convenience, ease of use, attitude, time saving, trust and availability. The results matched the outcomes of Usha Vaidehi (2014) as they both found that cheap products and saving time are the most influential variables. Budiharseno R., (2017) conducted a study on the college student in South Korea trying to explore the factors influencing the internet buying among the respondents. The respondents agreed that internet shopping is cheaper than traditional shopping. Moreover, all the respondent satisfaction with the time efficiency of internet shopping since the students are having many classes to attend.

The study of (Delafrooz et al., 2010), has identified the items that affect the attitudes of the students when shopping online in Malaysia by conducting a survey and based on literature. It was revealed that customers' attitudes toward online shopping are affected by many factors like convenience, wider selection and price. According to the same study, the graduate students' attention to internet shopping is relatively high and the attitude of the respondents is also positive. (Kim, 2010), in his study found out that privacy, security and trust, time saving, ease of use, convenience, enjoyment provided by shopping, company reputation and tactility are the most significant factors that influenced the customers who buy online.

Other researchers have also concentrated on other factors which affect the behaviors of online shopping customers. The paper of Gupta & Khincha (2015) aimed at studying the factors that affect the customer behavior. This paper has concluded that time saving and delivery facility are what influence the customers and make them happy. Choudhury D., & Dey A., (2014) studied the factors affecting online shopping attitude among the university students. The researcher has studied factors of gender, internet literacy, and the price. The results showed that there is no significant impact of these factors on the attitude of students. Another factor was studied is the quality. This factor prevents the customers from online shopping as they cannot touch the products. The study recommended that the online sellers should provide cheaper prices to promote the online shopping.

Methodology

This study is quantitative in nature because it aimed at studying the factors affecting the university students' attitude towards online shopping. The random sampling was utilized, and the unit of analysis is individuals (the university students), both the undergraduate and postgraduate. Data was collected from September 2019 until October 2019. Based on Morgan (1970) model, the sample size of this research was determined as 375. This research depends on two main methods to get the data. The first

and main method was the hard copy questionnaires that were distributed at the university (286 questionnaires), out of which 280 questionnaires were returned. The second method was the online soft copy questionnaires. Sum of 90 questionnaires were collected from the second method. Only 6 questionnaires were not accepted as it seems that the respondents did not have the interest to fill them out completely. In total, 369 sets of questionnaires were returned and represented about 98.7%. "IBM Statistical Packages for Social Science (SPSS) Statistics" version 22.0. was used to analyze the data. The types of analysis methods used in conducting this study includes pilot test, normality and validity analysis, descriptive analysis, frequency analysis, correlation analysis, and regression analysis. Table 1 represents the return survey rate.

Table 1: Survey Return Rate

Population	Sample Size	Questionnaire hard copy returned	**Questionnaire online returned**	Total Questionnaire returned	Return rate (%)
14593	375	280	90	370	98.7

ANALYSIS AND DISCUSSIONS

Reliability for Actual Study

Reliability analysis for actual study was conducted after the data has been completely gathered by the researcher. Table 2 shows the reliability analysis for the actual study.

Table 2: Reliability for Actual Study

No. Of Respondent	*No. Of Questions*	*Croncbach's Alpha*
370	28	0.721

The overall Cronbach's Alpha value of the real study is 0.721. Thus, referring to Sekaran (2003) it can be inferred that the overall Cronbach's Alpha for real study was having a good reliability level.

Respondent's Demographic Characteristic Analysis

The frequency analysis of all demographic analysis is represented clearly in the following tables.

Table 3: Respondents' Gender

Categories	*Frequency*		*Percentage*
Male	191	51.6	
Female	179	48.4	
Total	370		100.0

Table 4: Respondents' Age

Categories	*Frequency*	*Percentage*
18-22	217	58.6
23-27	123	33.2
28-32	25	6.8
Above 32	5	1.4
Total	370	100.0

Table 5: Respondents' Education Level

Categories	*Frequency*	*Percentage*
Bachelor	304	82.2
Master	60	16.2
PhD	6	1.6
Total	370	100.0

Table 6: Respondents' Race

Categories	*Frequency*	*Percentage*
Malay	239	64.6
Chinese	57	15.4
Arab	40	10.8
Indian	27	7.3
Pakistani	1	0.3
Somali	6	1.6
Total	370	100.0

Table 7: Respondents' Percentage of Shopping Online

Categories	*Frequency*	*Percentage*
Weekly	38	10.3
Monthly	126	34.1
Once in Three Months	94	25.4
Once in Six Months	56	15.1
Yearly	35	9.5
Never	21	5.7
Total	370	100.0

Demographic data is summarized in the previous tables. There were 191 (51.6%) male respondents who took part in the questionnaire, while 48.4% (48.4) participants were female. Second is the analysis of the respondents' age. Huge number of the participants aged between 18 - 22 years old; their number was 217 (58.6.4%). The participants aged between 23 - 27 years were 123 (33.2%). However, those who are between 28- 32 years were only 25 respondents (6.8%). Finally, a small number of the respondents were above 32 years old who recorded only 1.4% (5 respondents). Third is the education level. 304 respondents (58.6%) were Bachelor students. About 60 respondents (16.2%) were master students. However, participants who are in their PhD level were only 5 respondents, and they accounted for (1.4%). Fourth was the race of the respondents. Most of the participants were Malay (239 respondents, at 64.6%). This was followed by the Chinese respondents as they were 57 respondents (15.4%). Next was the Arab respondents. They were 40 respondents and they account for about 10.8% of the total number. Indian respondents also participated in the questionnaire and their percentage was 7.3% as they were only 27 respondents. The smallest numbers were from the Somali and Pakistani respondents. Fifth is the respondents' frequency use of online shopping. A huge number of respondents (126 respondents at 34.1%) mentioned that they use online shopping monthly. This was followed by those who stated that they use online shopping every three months whose number was 94 and their percentage 25.4. Others also mentioned that they use online shopping once in six months (56 accounting for 15.1%), weekly (38 accounting 10.3%) and yearly (35 accounting for 9.5%), and never (21, amounting 5.7%).

Findings of Objective 1

The main first objective in this study was to identify the main factors affecting university students' attitude toward online shopping. This has been first achieved through the literature review. However, this section will stress more on the of significance of this factors. The factors that were determined in this study were (Quality, Cheap prices, Saving Time, Wider selection of products, and trust). In fact, the mean analysis was used to find the central tendency. The results of the mean analysis are shown in table 8. The five factors were considered in the high central tendency, except for the quality of the products the central tendency of which is moderate.

Table 8: Descriptive statistics

	Factors	*Average Mean*	*Std. Deviation*	*Total Average mean*	*Mean score interpretation*
Attitude	Q7	4.12	.696	3.74	High
	Q8	4.07	.747		
	Q9	3.04	.933		
Quality	Q10	3.32	.992	3.64	Moderate
	Q11	3.46	.892		
	Q12	4.10	2.214		
	Q13	3.70	.855		
Cheap Prices	Q14	3.96	.834	3.84	High
	Q15	3.26	1.095		
	Q16	4.31	2.191		
Saving Time	Q17	4.27	.760	4.00	High
	Q18	4.40	3.019		
	Q19	3.63	2.292		
	Q20	3.72	.833		
Wider Selection	Q21	3.86	.791	4.22	High
	Q22	4.21	2.186		
	Q23	4.06	.711		
Trust	Q24	3.54	.865	3.76	High
	Q25	3.48	.827		
	Q26	4.22	.711		
	Q27	3.81	.758		
	Q28	3.75	.756		

The mean and standard deviation values were analyzed by using SPSS Version 22.0. Each variable for this study was stated in Table 8. The variables were measured using a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Thus, if the mean score was between 2 and 4, it was rated as average. Meanwhile, a mean score was greater than 4, it was considered as high. Table 8 shows the mean, standard deviation and Cronbach‟s Alpha values of variables as below. The dispersion of the variables from their standard deviation is measured by the standard deviation. A good example can be Q7 with the value of 0.671 is one standard deviation below the mean in the above example in which

the variable, has a mean of 4.47. This mean indicates that most of the respondent have agreed on the statement.

The mean scores for the variables ranged from 3.64 to 4.22, with standard deviation value ranged from .030 to 0.708. The highest mean value was Wider Selection of Products with 4.22 (Std. Dev: 1.22), followed by Time Saving with 4.00 (Std. Dev: 1.22), Trust with 3.76 (Std. Dev: 0.791), Attitudes with 3.74 (Std. Dev: 0.792), and lastly Quality with 3.64 (Std. Dev: 1.23). we can conclude that most of the respondents chose rank 4 (agree) based on Likert scale questions in the questionnaires provided to them.

Thus, objective one was achieved with the careful analysis. The findings show that all factors affect the attitude of the student with a little change in the degree of the affect. Wider selection of products was the most significant factor with an average mean of (4.22). This was followed by the saving time factor with an average mean of (4.00). the third factor was the cheaper prices, and the fourth factor was trust, with average means of (3.84 and 3.76respectively). Finally, the last significant factor was the quality of the products with a moderate average mean of (3.64).

Findings of Objective 2

The second objective of this research was to find the relationship between the dependent variable (attitude toward online shopping) and the five factors that affect the attitude of university students towards online shopping. Normality test was conducted to know whether the data was distributed normally or not and to determine which test was effective to test the relationship between the variables.

Normality Test

Since the sample of this study was more than 200 questionnaires, to test the normality, Kolmogorov-Smirnov was used. The result indicated that the data was not distributed normally because the significant values are less than 0.05.

Table 9: Normality Test

Variables	*Kolmogorove-Smironv Significant*	*Shapiro-Wilk Significant*
Attitude	.000	.000
Quality	.000	.000
Cheap Prices	.000	.000
Time Saving	.000	.000
Wider Selection	.000	.000
Trust	.000	.000

Correlation Analysis

Table 10 shows the results for the correlation analysis of the study. It is clear that the strongest relationship is between the wider selection and the attitude (r = .440, P-value = 0.000), while saving time has the weakest relationship with the attitude toward online shopping (r =.2.33, P-value = 0.000).

H1a: There is a significant relationship between quality and attitude toward online shopping.
The study hypothesized that the relationship between quality and attitude toward online shopping is positive. According to Table 10, the p value of Spearman correlation between quality and attitude toward online shopping is 0.000 which is lower than the 0.01 level. The r value is .292. This indicates that there is a positive relation between the dependent variable and quality of products.

H2: There is a relationship between price and attitude toward e-shopping.
The hypothesis posits that there is a relationship between cheap prices and attitude towards e-shopping. According to Table 10, the p value of Spearman correlation is .000 which is smaller than the 0.01 level, while the r value is .296. This indicate that there is relationship between the cheap prices and the attitude toward e-shopping among university students.

H3: There is a relationship between saving time and attitude toward e-shopping.
The research hypothesis posits that there is relationship between saving time and attitude towards e-shopping. According to Table 10, the p value of Spearman correlation is .000 which is smaller than the 0.01 level, while the r value is .233. This indicates that there is a relationship between the saving time prices the attitude toward online shopping among university students.

H4: There is a relationship between wider selection and attitude toward online shopping.
It is hypothesized that there is a relationship between availability of variety of products and the attitude towards online shopping. Based on Table 10, the p value of Spearman correlation is .000 which is lower than the 0.01 level, while the r value is .440. This indicate that there is a positive relationship between the availability of variety of products and the attitude towards e-shopping among university students.

H5: There is a relationship between trust and attitude towards e-shopping.
The hypothesis states that there is a significant positive relationship between trust and attitude toward online shopping. According to Table 10, the p value of Spearman correlation is .000 which is lower than the 0.01 level, while the r value is .311. This indicate that there is a positive relationship between the trust and the attitude toward e-shopping among university students.

Table 10: Correlation Analysis

Attitude		*Quality*	*Cheap Prices*	*Saving Time*	*Wider Selection*	*Trust*
	Correlation	.292**	.269**	.233**	.440**	.311**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	370	370	370	370	370

Multiple Regression Analysis

To test the effect of Independent variables "Quality, Price, saving time, wider Selection, and Trust" on the dependent variable "Attitude Toward Online Shopping" this study used the multiple regression analysis. The results of the multiple regression analysis are shown in Table 11. If the significant value is less than .05, it means that there is a significant relation or impact. However, when the sig. value is more than .05, it means there is no impact on the dependent variable.

Based on table 11, the standardized coefficients for quality .162, Price -.009, saving time .045, wider selection of product .227, and trust .212. Besides, the results showed that not all the independent variables significantly related to the dependent variable. Quality, wider selection of products, and trust are the only variables that are significantly related to the university students' attitude towards e-shopping because their value is less than .05.

Thus, according to the T test, there are two factors that are not relevant to the equation. The hypothesis of cheap price and saving time were not supported. This was strengthened by the R Square (.175) which is very low. The R Square result shows that all the factors can express only 17.5 % of the changes in the attitude. This is an accepted figure in the social research.

Attitude= a + B1 Quality + B2 Price + B3 Time saving + B4 Wider Selection + B5 Trust

The given regression analysis model summary in table 12 illustrates that the R value is (0.419). This mean that there is a positive correlation between the attitude toward online shopping and the independent variables, namely quality of products, cheap prices, saving time, wider selection of product and trust.

The results of ANOVA of the regression analysis in Table 13 shows that the overall model is significant because p sig. value (0.000) is less than 0.05. And thus, the model has accomplished a satisfactory level of goodness of fit in predicting the variance of attitude toward online shopping in relation to the fifth factors. According to the F-test, the equation regression analysis is correct.

Table 11: Coefficients for Relationship between Dependent Variable and Independent Variables

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.014	.783		6.405	.000
	Quality	.103	.031	.162	3.318	.001
	Price	-.006	.032	-.009	-.174	.862
	Time	.020	.021	.045	.947	.344
	Wider	.147	.032	.227	4.553	.000
	Trust	.142	.035	.212	4.058	.000
a. Dependent Variable: DV						

Table 12: Regression Analysis Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.419[a]	.175	.164	.54478
a. Predictors: (Constant), Trust, Time, Quality, prices, Selection				

Table 13: ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	22.964	5	4.593	15.475	.000[b]
	Residual	108.028	364	.297		
	Total	130.992	369			
a. Dependent Variable: Attitude						
b. Predictors: (Constant), Trust, Time, Quality, prices, Selection						

FINDINGS

Based on the data collected from the 370 respondent and was analyzed, wider selection of products is the main factor that made them purchase online as this variable scored the highest mean (4.22). From

the findings, the respondents have highlighted that they are motivated to buy online as they are able to find different products and brands that satisfy their needs and desires. In addition, the respondents have also showed that online shopping is a popular method of shopping among them as it enables them to get the products that may not be available in the nearby market. The results support the studies of Delafrooz, et al, (2010) and Harn et al. (2006).

The second significant factor was saving time. The average mean for this factor was 4.00 which is considered high. Most of the respondents agreed that online shopping saves the time and save them from the traditional market crowded chaos of traffic. Interestingly, most of the respondents also agreed that the delivery of the products takes long time. This is a negative effect.

Cheap prices came in the third place as a factor that affect the Students' attitude toward online shopping. This factor scored a mean of 3.84 which is considered high. This factor has three questions in the questionnaire. The mean of this factor illustrates that the respondents believe that online shopping is cheaper than traditional shopping. The results also show that online shopping enables the respondents to control their expenses by the function which link the online website to the students' bank accounts. This function has made it easy for them to track how much they have spent on a particular product and compare prices easily. The finding is consistent with previous studies done by Jadhav & Khanna (2016), and Ferri et al., (2010).

The fourth factor was the trust. This factor scored an average mean of 3.76. This mean is also considered high. The results of this factor show that most of the respondents agree on the safety of the online transaction. The result of this study is consistent with previous studies which claimed that trust is a very influential factor (Veena & Rajkumar, 2017; Usha Vaidehi, 2014; Chandra and Sinha, 2013)

The fifth significant factor was the quality of the products. This factor scored average mean of 3.64. This mean is considered as moderate, with less influential effect to motivate students to buy through online than the other factors. This is probably because the students are disappointed by the quality of products they have bought from online websites. It can also be related to the respondents' background since most of them are in their twenties and from a business background, so they are more aware of this issue.

Regarding objective two, the correlation analysis Results showed that all factors have relation with dependent variable. The p value of Spearman correlation between all the factors and attitude toward online shopping was 0.000 which is lower than the 0.01 level. This result can be strengthened by the fact that all the majority of the respondents are coming from the business and technology management background. More than that they are all educated and are aware of the benefits they gain from using online shopping. The results are similar to the finding of Delafrooz, et al (2010) who has studied the online shopping orientation and the perceived benefits from this type of the e-commerce. In his study, it was stressed that there is a strong relationship between the attitude towards online shopping and the perceived benefits gained from online shopping such as wider selection and cheap price.

In addition, the strongest relationship was between the wider selection and the attitude towards online shopping (r =.440, P-value = 0.000). This was followed by the relationship between the trust and the attitude towards online shopping while saving time has the weakest relationship with the attitude toward online shopping (r =.311, P-value = 0.000). However, the relation between saving time and attitude towards online shopping was the weakest relation (r =.233, P-value = 0.000).

On the other hand, regression analysis was used to determine the effect of the independent variable on the dependent variable. The regression analysis showed different results. Only three variables were determined as having strong effect on the attitude toward online shopping which are the quality of the product, wider selection of products and the trust with a Sig. value of .001, .000, .000 respectively. However, cheaper prices and saving time were found to have no effect on the dependent variable as their Sig. value scored .862 and .344 respectively.

Conclusion

This study was on the factors affecting the university students' attitude toward online shopping. The results of this study have shown that wider selection of products has the highest value among the factors that affect the participants' attitude toward e-shopping. The study also has shown that quality, cheap prices, saving time, wider selection of products and trust are positively corelated with the dependent variable. It is recommended that should apply this study in other states in Malaysia throughout many states, using interview technique to obtain in depth data.

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A Review of Green Business Practices: Its Significances and Challenges to Multinational Companies

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Abstract

The increasing of environmental awareness and the requirement of sustainable economic development has led to implementation of green business practices (GBP) to minimize the destructive impact of business on local and global environment, society, community and economy. Nevertheless, the concept of GBP itself is ambiguous and underexplored especially tin the context of multinational companies. The objective of the study is to review green business practices articles specifically tackling on the issues of contradictory definitions, significances, issues and challenges faced by the multinational companies. Recent articles have been reviewed using a systematic literature review method. This paper contributes to the thorough understanding of the concept and how it bring significances and pose challenges to companies. Certain managerial implications have been highlighted to the multinational companies to bring GBP effectively on board on their strategic planning process.

Keywords: Green Practices, Green Business, environment, multinational companies.

INTRODUCTION

In recent years, the rapidity of economic growth to fulfil increasing customer consumption worldwide has caused negative impact to the environment. Chuwuka (2018) mention that developing the economics of worlds was having a greater percentage on environmental problem and it attributes to activities of profit driven entrepreneurs. Over consumption of resources for earning the profit is causing environmental issue such as haze, global warming, pollution, climate change, ozone layer depletion and so on. Rahbar (2011) states that global warming, air pollution, ozone depletion and overpopulation are the major problems which increase the importance of saving the environment. The impact of environmental makes the consumers feels that is important to concern about environmental and consciousness towards the cause of perish natural resources (Pino, Peluso, and Guido, 2012: Prakash

and Pathak, 2017). Mukthar (2016) states that increasing of environmental awareness and the requirement of sustainable economic development has led to implementation of green business practices to minimize the destructive impact of business on local and global environment, society, community and economy.

Brown and Ratledge (2011) states that green business refers to an establishment that produces green output. Slovik (2013) defines green business with a broader view which is a green business refers to an organization uses renewable resources and persist in responsible to human resource aspect of their activities. Nowadays, the environment has been polluted by multiple factories and buildings that have sprouted a lot over the years. Big corporate companies have started to invest in building new offices, exploring new areas for gaining resources as well as expanding their manufacturing factories thus causing them to resort to deforestation in developing countries. This can cause numerous disadvantages especially to the inhabitants in the forest as well as human beings alike. Factory emissions releases carbon dioxide into the atmosphere causing an increase in air pollution. Unregulated factories have also managed to pollute the rivers and seas by dumping hazardous chemical waste. Manufacturing companies and factories has enabled this to happen and it has created multiple threats to all life forms. Human beings and animals have started to contract all kinds of diseases such as flu and asthma caused by harmful gases as well as pollutions such as air pollution, water pollution etc. Therefore, existing businesses as well as future businesses will have to take certain actions in preserving and improve the current environment by practicing green business (Peterson, 2018).

According to Slovik (2013), a green business defines as an organization that uses renewable resources which is environmentally stable and is also able to hold itself for the human resource aspect of their activities which is to say that they are also socially responsible towards the environment whereas Čekanavičius et al (2014) states that a green business is an organization that is committed to the principles of environmental sustainability in terms of its daily operations and strives to utilize renewable resources as well as minimizing the negative environmental impacts of its operations. For instance, Nestle in Indonesia implemented green marketing and are able to regulate their factories in utilizing raw materials, water and energy efficiently as well as apply environmentally friendly principles to benefit the society (Riduan, 2016). Hence, the objective of the study is to review green business practices specifically tackling on the issues of contradictory definitions, significances, issues and challenges by the multinational companies.

Contradictory View of Green Business Definitions

By today, the substance concept of the green business is still ambiguous because it was defined by different definitions that could be found in different sources, the green business practices may differ among industries and organizational, it depends on what kind of good and service they produce. So, it is impossible to have one process is the same that used by different organization. In addition, green business practices are still far from universally accepted and applied by the business environment around the world. This is due to several reasons, first, the 'green business practises' is still perceived as an extra burden in terms of increasing of cost or losing in revenue. Second, it is related with cultural, political, and economic difference (Čekanavičius et al, 2014).

According to Mukthar (2016) green business fundamentally involves the implementation of sustainability concepts to business operation. Green times (2013) define green business as "being concerned with and supporting environmentalism" and "prone to maintain environmental quality". Green business refers to "Organization that preparing a plan and implementing an action to reduce environmental impact on current concern area" (Sustainable Green, 2013). Calling Green (2011) define green business as "Business activities that do not have negative impact on environment." Lina, Rugile and Agne (2014) were summaries that green business refers to an organization that obligate to environmental sustainability concept on operation, attempt to use renewable resources and endeavour

to minimize business activities that cause negative impact to environment. Besides that, green business also relate with green business practice which is the action taken by company in business activities to reduce the negative impact of environment.

Green business practice defines as all related projects has an explicit purpose to help company in saving money and also reducing the environmental impact of their business operation (Chukwuka, 2018). Muhktar (2016) believe that green business practice includes the environmentally friendly activities that commence by organization to become more sustainable. In other words, organization that apply environmentally friendly concept on business activities such as operation, marketing, production and so on consider as a green business practice. The example of green business practice are includes green packaging, eco label, carbon management, green logistics and so on.

Furthermore, green business practices involve five environmentally friendly models which are Reduce, Reuse, Recycle, Repair and Rethink (Chukwuka, 2018). Reduce model means that reduction in using natural resources and waste accumulation. Reduce model refer to create a mechanism that fulfil the current demand and future demand. Recycle model define as process to transform waste to a reusable material. Repair models are referring to maintenance a damage product and transfer it into reusable material while the rethink model refers to the process thinking again to acquire an innovative and creative alterative to solve the environmental problems. According to Mukthar (2016), an environmentally awareness organization should involve in any 4R which is Reduction, Reuse, Recycle and Recovery. 4R can be achieved via some of practices such as reducing power waste, energy saving, using renewable and natural ingredient and products, green packing, green building, eco-cleaning, eco labelling, reduce printing for less using paper, green packaging, using public transport, waste sorting and spreading consciousness about green business.

Nevertheless, we can conclude that green business is a business practice aim to minimize the negative consequence towards the environment and ensure the sustainability. This will lead us to understand the characteristic of green business. In general, a business can be classified as a green business if they have these criteria (Green Business Network, n.d.). First, the business is responsible for social and environmentally. The main principle of green business is to protect the people (social) and planet (environment). Therefore, the green business will ensure they involve all the goals such as justice of social and economic, health and development of community as well as environmental sustainability into their operation activity.

Significances of Green Business Practices

Green business practices can be implemented in all areas of the organization such as at production site, in the office, towards suppliers, in the marketing and sales as well as to the organization's product design. These green practices can be used to reduce pollutions that comes with the daily activities conducted in the organization. For instance, the basic switching off the lights if the room is unused is an effective way of saving energy. These small steps can eventually save the environment in the smaller scale, but it will undoubtedly impact the environment greatly. One of the biggest wastages in an office is the unlimited usage of papers. Trees are known to be cut down and used to create papers for office daily usage. Most organizations use excessive amounts of papers to print minute meetings, memos, and reports.

According to Esty and Simmons (2011), organizations find it difficult to switch from paper-based systems to electronics systems as the electronics systems are costly compared to paper – based ones and it is also difficult for the employees to adapt to new changes. However, change is inevitable when it comes to going green. Organizations should aggressively adapt green practices in their working place in order to reduce wastage. By adopting electronic systems such as Adobe Live Cycle and Adobe Acrobat, these applications can generate, authenticate and disseminate documents electronically. Etsy

and Simmons (2011) also stated that not all company documents needed to be printed plus unnecessary paper equals to unneeded expense.

This is an important step which an organization has to overcome by regulating the amount of papers used in the organizations as these simple interventions can be of great significance towards the environment and also increase efficiency. The organization can benefit greatly from this as switching to electronic system can reduce costs of purchasing heaps amount of papers. On the other hand, if the electronic systems such as printers, fax machines and scanners are old, it considered inefficient as it uses large amounts of ink and consumes more electric energy. Hence, by prompting the organization to invest in new and smart devices as well as encouraging the staff to practice double sided printing, it can eventually boost efficiency and reduce wastage. At the same time, there are other green practices that an organization can adopt such as going digital whenever possible, encourage usage of public transportations, practicing recycling in the workplace and many more.

The positive effects of these green business practice are that it can directly save cost and increases revenue of an organization. According to Čekanavičius et al (2018), a business can obtain two kinds of benefits by going green which are revenue rising and cost saving. Revenue rising refers to product differentiation and brand image, customer communication, additional value as well as higher productivity. As an organization that goes green, they can appeal towards the customers and other businesses that prefers green products. This shows that customers are willing to purchase more green items alongside the added value to the product. In terms of saving cost, an organization that practices green approach can save energy related cost, boost workforce morale and innovations as well as have a societal impact (Lagas, 2015). Electric energy and water costs are the main concerns for a manufacturing company. This is because machines and products require resources to continuously produce non-stop. Hence, by switching to energy-efficient lighting and flexibility adjustments following the production schedule it can ultimately reduce an organization's long-term electrical cost.

Issues and Challenges faced by Multinational Companies in adopting Green Business

Multinational companies play an important part in implementation of green business practices in the workplace. Multinational companies are considered international as they have grown out of their domestic corporate framework and expand their boundaries in host countries by purchasing branches through mergers and acquisitions (Ishak et al, 2017). Multinational companies in host countries have manage to exercise their green practices by upholding certain criteria's and benchmarks in par with environmental standards in their host countries. For instance, Unilever has cut off several of its palm oils suppliers for failing to meet its rainforest protection standards. This shows that these companies are aware of their responsibilities towards the current environment hence it is vital for multinational companies' business strategy in facing the challenge of environmental pollution and natural resources management.

Most of multinational companies have principles on Corporate Social Responsibility (CSR) whereby they have to help the communities in the development process. According to Abels and Martelli (2012), the definition of corporate social responsibility is a voluntary way for a company to improve its public image and reputation by incorporating responsible activities that satisfies a need of society beyond its legal requirements. Corporate social responsibilities are beginning to play an important part in the current business world. Multinational companies should care about their stakeholders' interests but at the same time, they have to emphasize on other areas such as adopting green business practices apart from solely making profits.

For example, IKEA cares about its responsibilities towards maintaining sustainability hence the IKEA range of products shall comply with the strictest laws and safety standards in all their markets and has detailed requirements on the use of chemicals and other substances in the manufacturing process. If

one country tightens its rules, IKEA introduces new regulations in all IKEA markets where and when possible. This shows that multinational companies have the ability to be flexible in wherever they are conducting businesses.

Patagonia is one of the companies that well known for its environmentally friendly way of doing business. Patagonia is an outdoor apparel and gear company has been champion of environmental stewardship and social responsibility (Matthews, 2013). They publish advertisement by encouraging people not to buy things that are unnecessary for them, even though for their own products. Wetsuits are made of natural rubber and plastic bottlers are turned into parkas. In reducing the unnecessary consumption, Patagonia always make sure their product does not end up in landfills. They always responsible well in buying their materials.

Seventh Generation is a decent green company and the most popular green companies in the consumer market. Seventh Generation provide environmentally friendly household product that help consumer to reduce their impact for the planet (Seventh Generation n.p., 2018). They were the first companies that self- declared "socially responsible" as they come out with many of the eco-friendly products. Their packaging mostly made with recycled material, almost all of their packaging can be easily recycled (Jennifer, 2010). Even now the brand like Clorox have created greener version for their product, so that can easily meet the demand from environmentally conscious consumer.

International Business Machine (IBM) was another early adopted of sustainability and eco-friendly business. Approach for IBM is twofold: to make their existing products and processes more efficient and develop new innovation that can help the world. IBM ensure their company is alert in protecting the environment across all of the operations they applied and utilized. Today, IBM's efforts include smart building that reduce resource demand, green procurement, and water resource management (Viles, 2016).

In conclusion, with climate change a growing problem, there are important for the individuals, corporation and business concern for the environment. With innovative technology, not only can increase accountability, improvement of operation whilst can take care of the planet as well. Together, we can improve the sustainability of business and our planet.

According to Eccles et al (2012), stakeholders in multinational companies are not only concerned about profits as their interest also includes corporate social responsibility aspects of a company such as environment, ethic, governance, and human rights. These factors affect the fate of the company in a long term. It is proven that there is a competitive advantage for corporations that have a higher reputation and are more socially responsible and they also result a higher return on investment. Consumers prefer a company that is aware of its surroundings and cares for the environment and with added value of green practices in producing their products, it can boost the company's sales and increases profit. If a company fails to comply and resort to irrational and backwards way, it can damage the reputation hence will end up being criticized by the public.

Other than that, within a multinational company, the functional management has also an important role to play in practicing green business practice. Because without these departments, the company will face dangerous risk. The role of each functional department in terms of production, logistics and procurement as well as marketing and sales to its building facilities all play a part in ensuring that the company uses green practices. This can showcase to the stakeholders that the company is capable in making the environment eco-friendly and convinces them that the company really takes its corporate social responsibility seriously.

The role of multinational company is important in introducing to the developing countries of how professional they can be at producing their product at the same time keeping the environment clean and healthy. Educating small and medium enterprises by looking towards how multinational companies conducts its business can also inspire them to go green no matter the type of businesses.

Big companies have begun their awareness towards new regulations and policies that they need to obey in order to protect the environment from harmful pollutions. Organizations cannot afford to ignore the rules or environment challenges that already is at their doorstep. Failure to comply with the rules has definitely resulted in the companies paying a loads of money for fines. Environmental issues that pose as a risk to the organizations needs to be managed cautiously. According to Esty and Simmons (2011), the risk come in forms of:

a) Accidents or fuel spillage either chemicals or any hazardous materials
b) Liability for products linked to environmental harm
c) Shifts availability of natural capital such as water and land
d) Tougher regulation
e) Political disfavour and new laws
f) Public backlash
g) Withdrawal of the social license to operate

These risks can be dangerous towards the organization's reputation and performance. Multinational companies such as Apple were not aware that some of their products are made up of environmentally unacceptable materials thus receiving backlash from NGO's. Eco-related risks have caused organizations to limit their materials as they need to acquire them from different alternatives. For instance, plastic bottle companies have been banned from using chemical BPA as this chemical material was the one of the components in producing plastic bottles (Bauer, 2016). BPA is known to be found in polycarbonate plastics and epoxy resins. Now they resort in finding a substitute chemical to replace BPA.

The environmental factors have caused other organizations certain risks and cost whereas for others it creates opportunities. In addition, those who wish to survive must learn how to deal with the challenges of adopting green business practices. It is considered very complex in understanding the pros and cons of incorporating green business practices in an organization. However, in spite of changing and shifting towards a greener perspective, the industry would definitely thrive in the long run. According to the Kolk et al (2016), enhancing a corporate reputation for environmental responsibility has become an important aspect for multiple multinational corporations today. Companies that are able to adopt green practices are more resilient in the market and has more competitive edges compared to the companies with ordinary practices (Ishak et al, 2017).

While company increase their importance for the further greening of business and the enhancement of a sustainable future, it often met with many kinds of challenges.

The challenges that company faces is lack of internal capital. Company that lack of internal capital like financial and human resources will be barriers for the company to develop or implement green business. Implement green business require large amount of investment, where the payback period is long as well, thus customers or shareholders refuse to invest in the company that are high degree of uncertainty. Indirectly it will affect the company for expand their business.

Furthermore, the challenges that company met is lack of well-aligned team. Financial team and sustainability team are often do not effectively engage together. Employees that come from different background and education are the common causes lead to team members were not aligned on a common path in order to achieve the company's goals. Everyone have their own department's strategy, objectives and goals, so when they are sitting in a chair for discussion, will occur intensive argument among themselves. They normally lack of communicate to each other as they are come from different cross-functional department. Therefore, when they need to participate in a new program like green business, it will cause a dispute among them. For an example, when sustainability team complete the project planning too late and this will cause problem for the financial team to make decision making within the time given. All this was result from lack of communication between them.

Resistance to change is one of the challenges that will stop the company to enhance their performance. The reason people resistance to change because they are unwillingness for a change and sharing of information and material, fear of the unknown and misunderstanding about the need for change. Some of them are used to with old method or processes, thus when company want to change to latest technology, they are resistance to change as some of them are fear of the unknown. They fear they do not understand about how to use the technology, so when they feel something are threaten their job, they immediately reject for the case of switching existing materials for greener option in their company. Some of the employees are traditional mind-set to business. They always maintain the repetitive routine without expect of doing something changes.

Although green business practice had been proven can reduce the negative impact towards the environment at the same time ensure the sustainability of the business, however, how to implement it effectively to reach the win-win situation for both environment and business isn't an easy process. This section will discuss a few challenges during implement the green business practice.

The first challenge to implement green business practice is engaging top management and employees to carry out green business practices. According to a survey done by a firm that provide sustainability consulting service – 2 Degrees Sustainability Consultants (2DSC) (University of Colorado Boulder, 2018), they found that 65% from 700 business agree that the greatest challenging to implement green business practice is to persuade the leader and top management to accept it. The survey also shows that if an organization's leaders or top management are successfully persuaded, then they will be committed to the mission of creating green business practice environment in organization. There is a reason why convincing leader or top management is important for green business practices because the mission and objective of a company are determined by top management.

After the top management has been persuaded, another challenge will be going to engage employees involve in green business practice. Based on the survey, 47% of respondents agreed encourage the involvement of employees is the greatest challenge. This is because from the view of human being, most of the people prefer to stay at their comfort zone rather than change to or adapt with new approach. That is why encourage the employee will be the greatest challenge. However, company can use some ways such as incentives, communication with employees, employee education or even through the company disciplinary committees to encourage involvement of employees.

Other than engaging top management and employees to carry out green business practices, the next challenge is how to set indicators to evaluate the plan. Setting the indicators is very difficult because as mentioned before the concept of green business is still ambiguous. So, they don't have a standard to help in developing the indicators, all of the indicators must determine by organization itself based on what kind of objectives they want to achieve. For instant, if a company is planning to use energy efficiency, monitor the monthly costs is the useful ways. The indicators must be easily understood by employees, otherwise, the goal is not going to implement successfully. In addition, before setting the indicators, don't just consider the profitability, but also need to consider the impact towards environment and community surroundings.

Last but not least, the business objectives also become a challenge in implement green business practice. Normally, when talk about green practices, it will surround with increased of operation costs. This is definitely opposite with the main objectives of organization which is maximizing the profit. However, this kind of rhetoric is totally wrong. Green business practice will increased the efficiency in usage of operation resources and energy usage. These will result in operation costs decreasing at the same time protect the environment. The misunderstanding and ambiguous towards green business practice towards business objectives cause the green practice not accepted by most organization.

In a nutshell, in order to develop green business practices, businessman must find effectively ways to overcome all these barriers. So that, they can adapt to the strategies and techniques in order to improve

the environmental in processes.

CONCLUSION

It can be concluded that green business practices bring significances and pose challenges to companies. The companies must first start to take the first initiative to implement these practices internally thus affecting their reputations in the eye of the world. Even though the simple step such as switching off the lights when space is unused, it can conserve energy and save the environment. On the other hand, the issues of implementing green business practices have its own pros and cons and it can affect the company one way or another. It's the companies' willingness to commit and face the actual reality as the consequences can be highly devastating if not being done promptly. Furthermore, the role of multinational companies in bringing in their green practices of standards according to their host countries influences how they deal with local suppliers as well their stakeholders. This enables the host country suppliers to be educated and comply with the rules and regulations in order to ease their business dealings with the multinational companies. Multinational companies that are aware of its corporate social responsibilities can eventually influence other companies to follow their step in doing green business practices. This topic is very interesting to read on about and it is definitely useful for the current and potential future businesses who wish to adopt green business practices.

In conclusion, green business practices should not be a barrier towards an organization. It is proven to be beneficial in the long term and along the way each green step taken can definitely save the environment. Green business practice should be adopted step by step as our climate is changing every day and new issues will arise hence new policies will be implemented for the businesses to follow. As fellow human beings, it is important that we are allowed to consume natural resources only as fast as it can be renewed. Businesses no matter big or small enterprises play an important part as they are the pillars that fuels our everyday needs. Companies should take initiative to reassess their strategies in order to use green practices as well as refining their plans for future use. With the increase in all types of pollutions and diminishing of natural resources, it has caused most companies to take a critical step in adopting green practices in order to reduce cost while at the same time increasing their profit margin.

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The Impact of Lifelong Learning on The Process of Contemporary Digitization

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Abstract

We are witnessing another civilization revolution, most often characterized by the term *digital*. The resulting changes will affect the society, economy, culture and politics - practically all areas of the surrounding reality. The world that is being created will be subject to constant change. Digital destruction will affect each of us. Employers' expectations towards employees and, more generally, the expectations of the environment towards our skills, habits and ways of doing things will change quickly and profoundly. This will require constant adaptation to the changing world. The previously acquired skills and knowledge will quickly become obsolete. The importance of lifelong learning (LLL) will increase considerably. The aim of the article is to analyze the relationship between digitalization processes and LLL in EU countries, with particular emphasis on Central and Eastern Europe (CEE). This analysis shows a low level of LLL in the countries of this region. Already today, it is a barrier to the digitalization of CEE countries and in the future it may prevent them from fully participating in the civilization transformations and escaping the middle-income trap.

Keywords: Information Economy, Lifelong Learning, Adult Participation In Learning, Digital Multiverse, E-Metrics.

Introduction

For historical and cultural reasons, the level of development of the CEE region has been notably different from the rest of Europe. The last decades have been marked by a continuous effort to reduce this gap. The effects of these efforts deserve recognition. The achievements are remarkable but there is still much to be done, also in the area of digitization. Technological, financial and organisational barriers have been relatively easy to overcome. The CEE countries have access to the same, state-of-the-art solutions. In some areas, their infrastructure is even more modern than in other European countries. The CEE countries have taken advantage of the necessity of making a rapid transition to newest technology, leapfrogging certain stages of development and implementing the latest solutions immediately. Often greater difficulties are associated with social and cultural limitations. One of such limitations is the low level of acquiring and updating knowledge after leaving formal education. The article attempts to describe the relationship between the level of digitization and the level of LLL in CEE countries.

Digital Multiverse and the Methods of Measuring It

The ascertainment that we are entering a new stage of civilisational development is widespread. The transformations taking place are revolutionary in nature and their scale and intensity correspond to the great civilisational transitions known from history. The main factor of the transformations taking place is, undoubtedly, the exponential development of information and communication technologies (ICT).

The discourse is abundant in terminology that describes the impact of ICT on our contemporary times. Recently, the most frequently used terms are *digital society* or *digital economy*. However, they do not fully reflect the extent to which ICT alters our whole reality. To reflect the complexity and

multidimensionality of the research area, the author suggests using the term *digital multiverse*. For the purpose of this article the author's definition of the term will be used.

Digital multiverse (DM) is a network of people, organizations, communities, devices, systems, applications and data and their relationships of a global nature, whose main driving force is the exponential scientific and technological progress. The constitutive elements of DM are: intensive use of ICT, integration of physical and digital systems, hyperconnectivity forcing interdependence and cooperation, automation of information exchange and data analytics, unpredictability of development, disappearance of barriers and the resulting new development opportunities and, in the economic sphere, new business models. The driving forces determining the nature of DM are the processes of digital destruction and digital transformation. The described phenomena determine the characteristics of DM, such as: flexibility of structures and processes, high level of innovativeness, increasing efficiency, globalisation, speed of reaction to signals generated by the environment, creation of new consumer needs, intensification of business interactions, creation of intelligent products and services, progressing servitisation of the economy and rise of new occurrences and phenomena. The emergence of DM generates new opportunities, but also new threats in practically all areas of human existence.

Modern technological progress is exponential, digital, and combinatorial (Brynjolfsson and McAfee 2014). These generate the phenomenon of *digital disruption*, which is responsible for the collapse of the organisations, industries or phenomena unable to adapt to the changes taking place. Today, however, it affects not only the economy but the whole reality in which we exist. This means a constant change of the existing rules and an unremitting necessity to adapt. The most important issue in these deliberations is the need to constantly update the skills, knowledge and experience gained to date. It is unavoidable. This means the collapse of the current idea of education and the necessity of lifelong learning.

The Issues Regarding Measuring Digital Multiverse

Quantitative DM studies are derived from traditional telecommunications statistics. They concentrated on the development of infrastructure, skipping social aspects. Disadvantages of such approach became increasingly apparent. An analysis limited to the technical infrastructure was becoming insufficient in explaining the DM phenomenon. The use of ICT is inextricably linked to capabilities, skills and motivations of people using these technologies. The role of information in a society is an economic, social, technological, political and cultural phenomenon. If the research topic is DM, the sphere of social and human factors cannot be ignored. This growing interdependence of ICT and the social sphere increasingly requires the incorporation of new tools, allowing assessment not only of the access to ICT and its use, but also its impact as well as barriers to its adoption.

Majority of existing empirical studies have focused on three fields: infrastructure, its use and indispensable skills. Skills and education can be characterized by the prevalence and level of: general education as a result of participation in formal educational structures, skills needed to use information products and services, dedicated skills to develop and create ICT solutions and lifelong learning. These areas are represented in quantitative DM studies to varying degrees. Lifelong learning is underrepresented. According to the author, the continuous improvement of skills throughout one's professional activity is essential for DM. LLL is crucial already today and its role will increase in the future. The analysis of these issues may allow to identify the areas in the society or economy that are jeopardized by civilization and social exclusion.

Lifelong learning

Constant change, digital destruction and exponential development of ICT are constitutive features of DM. They result in annihilation of many patterns of behaviour. This also applies to the education model and acquiring skills and knowledge. The former model assuming education up to about 25 years of age (for higher education), and then applying the acquired knowledge for four or five decades is irretrievably lost.

Markets, economic sectors and employers' expectations are changing dynamically. An increasing wave of automation will affect many of the largest professional groups. The effects of automatization of work will be far-reaching; according to MGI estimates (2019): "Nearly 40 percent of current US jobs belong to professional categories that could shrink between now and 2030. Other estimates maintain that in 60 per cent of jobs at least 30 per cent of activities could be automated (MGI 2017). Even if we assume that emerging occupations will replace those that will disappear so as to mitigate the rise in unemployment, we still face fundamental changes that may reach further than previous technological revolutions. The scenarios developed by MGI suggest that by 2030, 400 million people will have their jobs automated. The remaining 75-375 million workers (3 to 14 % of the global workforce) will have to change professional categories (MGI 2017).

All employees will face the change of the nature of their work. This will often require a higher level of education or new skills, such as teamwork, creativity or emotional intelligence and other soft skills (MGI 2018). This means major changes for millions of employees.

The technologies used to automate work will bring a considerable increase in productivity. They will irreversibly alter the nature of many jobs and this process will only intensify. Some professions will disappear and be replaced by new ones, unknown today. Many professions will become niche and others will emerge. The nature of tasks and work will transform fundamentally. It is becoming a huge challenge to equip people with the knowledge and skills that will help them move into new roles and adapt to new challenges. As Brynjolfsson and McAfee (2014) state: "(...) it's becoming harder and harder to have confidence that any given task will be indefinitely resistant to automation. That means people will need to be more adaptable and flexible in their career aspirations, ready to move on from areas that become subject to automation, and seize new opportunities where machines complement and augment human capabilities."

At the first stages of education, formal educational establishments are responsible for preparing people for the upcoming changes. However, their effectiveness is naturally limited. Young people - up to 25 years old, at the most - are within their "reach". Those who have completed their education and work or are unemployed are not covered by these establishments. In the "good, old" economy this was not a major problem. A well-educated engineer, manager or doctor could use their knowledge effectively for years. The forecasts presented earlier show that this is no longer the case. There arises the need for continuous learning.

The concept of lifelong learning is not new. However, at the end of 20th century it was becoming increasingly important, which led to its recognition by the Ministers of Education of the OECD countries as a policy framework (OECD 1996) in 1996. Eurostat defines LLL as follows: "Lifelong learning encompasses all learning activities undertaken throughout life with the aim of improving knowledge, skills and competences, within personal, civic, social or employment-related perspectives. The intention or aim to learn is the critical point that distinguishes these activities from non-learning activities, such as cultural or sporting activities. (Eurostat 2020a). Eurostat also distinguishes adult education, which it defines as follows: "Adult learning refers to the participation of adults in lifelong learning. Adult learning usually refers to learning activities after the end of initial education. The policy indicator on adult participation in learning refers to the age group 25-64". And it is this group that will be the subject of further analysis.

The attention that the EU pays to LLL is emphasized by establishing the Strategic Framework - Education & Training 2020 as a forum for Member States to exchange best practice and learn from each other. It defines specific benchmarks for Europe to meet by 2020. Some of them concern the scope and quality of youth education and will not be discussed here. The postulate that at least 15 % of adults should participate in learning by 2020 (ET 2020) is key to the subject of this paper.

The relationship between LLL and DM is bi-directional. The changes caused by ICT evoke the need

of continuous education. At the same time, only ICT is able to provide implementation of the concept of LLL for a significant number of people. The number of those who will require training will likely significantly exceed the capabilities of traditional educational structures. The only possible solution from a technical and organizational point of view is the use of e-learning techniques.

Digital Multiverse and Lifelong Learning

Methodology

DESI - Digital Economy and Society Index (EU2020a) will be applied as a measure of DM development level. The DESI is a composite measure created by Directorate-General for Communications Networks, Content and Technology (DG Connect) to assess the degree of the implementation of the Digital Single Market strategy (DSM 2020).

Eurostat data concerning the field of "Education and training" (Eurostat 2020b) will be used as a measure of adult education activity. A measure of lifelong learning is the participation rate in education and training of all kinds. Adult education activity is described by the "adult participation in learning" (APL) indicator, which refers to persons aged 25 to 64 who stated that they received education or training in the four weeks preceding the interview.

In the study – for all characteristics – the values from 2018 are used.

Selected APL characteristics related to DM development are presented in Table 1. Next figures show the relationship between these APL characteristics and DM. The following indicators were selected as relevant for further considerations:

- As a measure of DM, the DESI indicator (values and rankings) was chosen: Table 1 - rows 1-2.
- Four groups of indicators were chosen as measures characterizing the participation in APL:
- Overall adult participation in learning (APL) - rows 3-4,
- APL by educational attainment level - rows 5-10,
- APL by labour status - rows 11-14,
- APL by degree of urbanization - rows 15-20.

The following figures provide a graphic representation of the relationship between DM and APL. DM (Y-axis) is captured by DESI. APL issues (X-axis) are captured in the following figures by the characteristics listed in table 1. Each figure shows two characteristics divided according to UE average values. This allowed the division of the countries into four groups:

- DM development above the average value and the characteristics corresponding to APL above the average value - the right, upper part of the figure – "digital learners",
- DM below the average and APL above the average - the right, lower part – "analog learners,
- DM below the average and APL below the average - the left, lower part – "analog non-learners",
- DM above the average and APL below the average - the left, upper part – "digital non-learners".

Table 1: DE and APL

No.	COUNTRY	Austria	Belgium	Bulgaria	Croatia	Cyprus		Czechia	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy
	CODE	**AT**	**BE**	**BG**	**HR**	**CY**		**CZ**	**DK**	**EE**	**FI**	**FR**	**DE**	**EL**	**HU**	**IE**	**IT**
	VARIABLE																
1	DESI	51,9	56,6	35,5	43,8	43,2		47,6	66,1	57,2	66,3	47,7	51,8	34,9	43,2	57,0	38,9
2	DESI - rank	12	9	26	21	22		17	4	7	3	16	13	28	23	8	24
3	APL total	15,1	8,5	2,5	2,9	6,7		8,5	23,5	19,7	28,5	18,6	8,2	4,5	6,0	12,5	8,1
4	APL total - rank	8	15	27	26	19		16	3	4	2	6	17	24	22	10	18
	APL by educational attainment level:																
5	levels 0-2	5,6	3,2	0,7	0,5	1,5		2,4	14,8	7,4	15,6	7,1	4,3	0,8	2,9	4,4	2,0
6	levels 0-2 - rank	9	15	25	26	22		19	3	5	2	7	12	24	16	11	21
7	levels 3-4	11,2	6,1	2,1	2,1	4,3		6,4	21,5	14,7	23,8	14,8	7,0	4,6	4,7	9,3	8,8
8	levels 3-4 - rank	9	18	26	27	22		17	3	6	2	5	16	20	19	13	14
9	levels 5-8	25,7	13,7	4,3	6,1	10,9		16,1	29,7	28,8	36,4	29,3	12,4	7,5	11,1	18,1	18,7
10	levels 5-8 - rank	7	17	27	26	23		16	3	5	2	4	19	25	22	14	13
	APL by labour status:																
11	employed	15,8	8,5	1,9	2,4	6,5		9,2	23,3	21,5	30,0	20,4	7,8	4,3	6,6	12,6	8,7
12	employed - rank	9	17	27	26	23		15	3	4	2	6	18	24	22	11	16
13	unemployed	16,3	12,3	:	1,5	5,7		5,1	28,6	20,1	24,7	14,3	8,4	3,9	2,7	16,0	5,0
14	unemployed - rank	7	13	26	25	18		19	3	5	4	9	15	22	24	8	20
	APL by degree of urbanisation:																
15	cities	20,6	10,0	3,9	5,1	8,0		11,4	27,9	24,0	33,7	20,1	11,0	6,2	8,1	15,3	10,1
16	cities - rank	6	17	27	26	22		14	3	4	2	8	15	25	21	9	16
17	towns and suburbs	13,5	8,0	1,6	1,8	6,0		7,9	22,5	16,1	25,9	18,3	7,0	4,5	5,4	12,1	7,4
18	towns and suburbs - rank	9	15	27	26	20		16	3	7	2	4	18	24	21	10	17
19	rural areas	11,7	7,9	0,9	1,9	4,1		6,7	20,0	16,4	23,8	16,8	6,0	2,1	4,7	10,2	6,2
20	rural areas - rank	9	14	27	26	22		16	3	6	2	5	18	25	20	11	17

No.	COUNTRY	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	United Kingdom	EU - 28
	CODE	**LV**	**LT**	**LU**	**MT**	**NL**	**PL**	**PT**	**RO**	**SK**	**SI**	**ES**	**SE**	**UK**	**EU**
	VARIABLE														
1	DESI	46,9	49,2	59,5	56,6	66,8	38,8	46,8	35,4	44,5	47,9	53,2	66,9	58,8	49,8
2	DESI - rank	18	14	5	10	2	25	19	27	20	15	11	1	6	-
3	APL total	6,7	6,6	18,0	10,9	19,1	5,7	10,3	0,9	4,0	11,4	10,5	31,4	14,6	11,1
4	APL total - rank	20	21	7	12	5	23	14	28	25	11	13	1	9	-
	APL by educational attainment level:														
5	levels 0-2	2,5	2,4	7,3	4,1	9,9	1,0	4,7	:	:	2,8	3,7	22,0	5,8	4,3
6	levels 0-2 - rank	18	20	6	13	4	23	10	27	28	17	14	1	8	-
7	levels 3-4	4,6	3,3	13,5	10,8	18,5	2,8	11,2	0,9	3,0	8,5	10,8	25,9	12,3	8,8
8	levels 3-4 - rank	21	23	7	11	4	25	10	28	24	15	12	1	8	-
9	levels 5-8	11,3	11,4	26,3	22,5	25,5	12,6	20,7	2,2	7,8	19,5	17,6	39,7	20,6	19,0
10	levels 5-8 - rank	21	20	6	9	8	18	10	28	24	12	15	1	11	-
	APL by labour status:														
11	employed	6,9	7,2	19,7	12,7	20,6	6,7	10,4	0,8	4,3	12,4	10,3	30,1	16,0	11,8
12	employed - rank	20	19	7	10	5	21	13	28	25	12	14	1	8	-
13	unemployed	6,8	2,9	29,7	6,1	18,6	4,9	13,2	:	:	12,0	12,8	47,3	13,1	10,7
14	unemployed - rank	16	23	2	17	6	21	10	27	28	14	12	1	11	-
	APL by degree of urbanisation:														
15	cities	7,6	9,0	21,5	9,9	20,6	9,4	12,0	1,3	6,9	15,0	11,8	34,7	14,9	13,5
16	cities - rank	23	20	5	18	7	19	12	28	24	10	13	1	11	-
17	towns and suburbs	7,0	5,1	16,5	11,9	17,3	4,8	9,4	1,0	3,7	11,3	9,4	30,4	14,3	9,8
18	towns and suburbs - rank	19	22	6	11	5	23	13	28	25	12	14	1	8	-
19	rural areas	5,3	4,5	17,7	10,9	16,4	3,0	8,2	0,5	2,9	9,9	7,6	28,0	13,5	8,8
20	rural areas - rank	19	21	4	10	7	23	13	28	24	12	15	1	8	-

Data source: DESI (2018a) and Eurostat (2020a)

Results

In the category of digitization, Sweden is the leader (which, in a somewhat irritating way, is the leader in all, both digital and educational characteristics). Among the CEE countries, only Estonia exceeds the EU average. Slightly below the EU average are Lithuania and Slovenia, ahead of France or Italy. Bulgaria, Romania and Greece bring up the rear (see table 1 - rows 1-4 and figure 1).

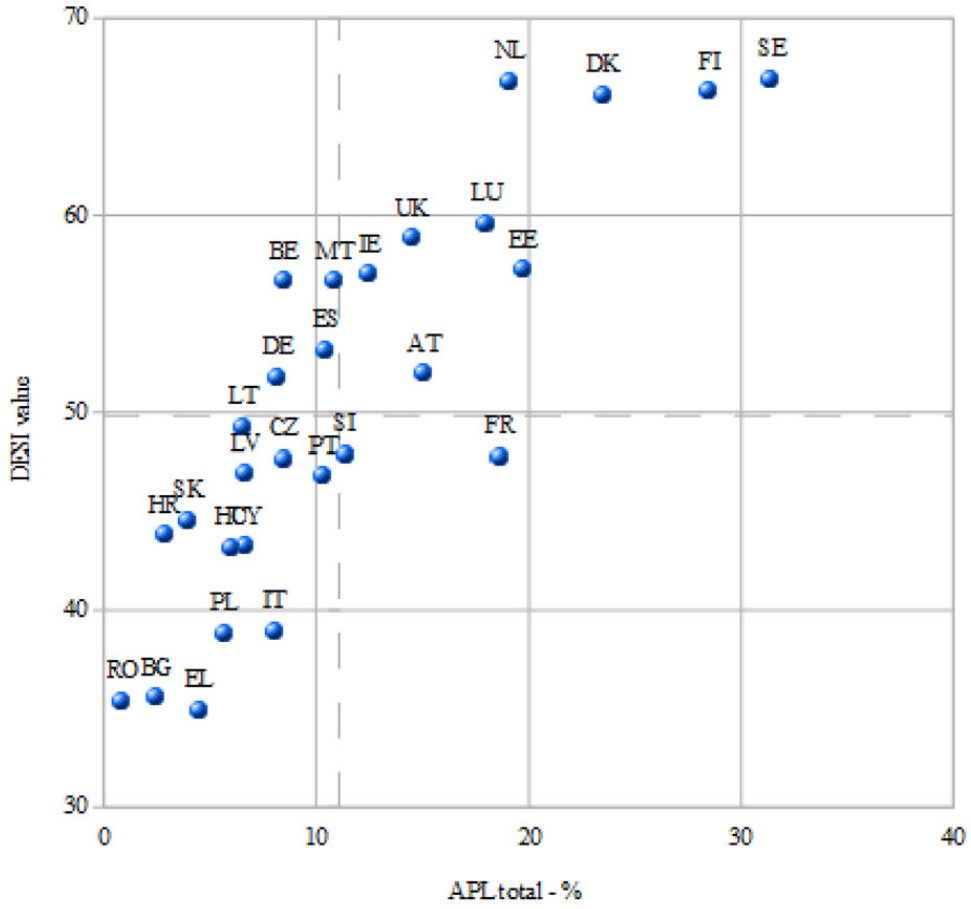

Fig. 1: DM and APL

Data source: DESI (2018a) and Eurostat (2020a)

In the adult learning category, Sweden is the first and Romania is the last. However, the values diverse enormously - only 0.9% of all adults in Romania improve their qualifications, compared to 31.4% in Sweden. The EU average is slightly exceeded by Slovenia and Estonia. The lower left part of the chart is occupied by the remaining CEE countries and southern European countries.

The low EU average of 11.1% should also be emphasized. The Strategic Framework - Education & Training 2020 includes the requirement that in 2020 at least 15% of adults participate in the learning process. The data presented here concern the year 2018. However, it does not seem likely that this parameter will increase so significantly within two years that the target will be reached.

The left bottom part of the chart - "analogue non-learners" - is the majority of CEE countries and part of southern European countries. The "digital non-learners" group consists of Germany and Belgium. The group of "analogue learners" - Slovenia and France. The elite group of 11 "digital learners" consists

of highly developed Western European countries and Estonia, with clear leadership of the Scandinavian countries.

Figures 2 and 3 show the relationships between DM and APL analyzed in terms of education (tables 1 - rows 5-10). In all three groups Sweden is the leader. In the group of the least educated, Croatia is the last one, and among the CEE countries only Estonia exceeds the EU average. In the middle group, Romania takes the last place. Estonia is the only CEE country that exceeds the EU average. In the group with the highest level of education, Romania is the last one. The EU average is exceeded by Slovenia and Estonia.

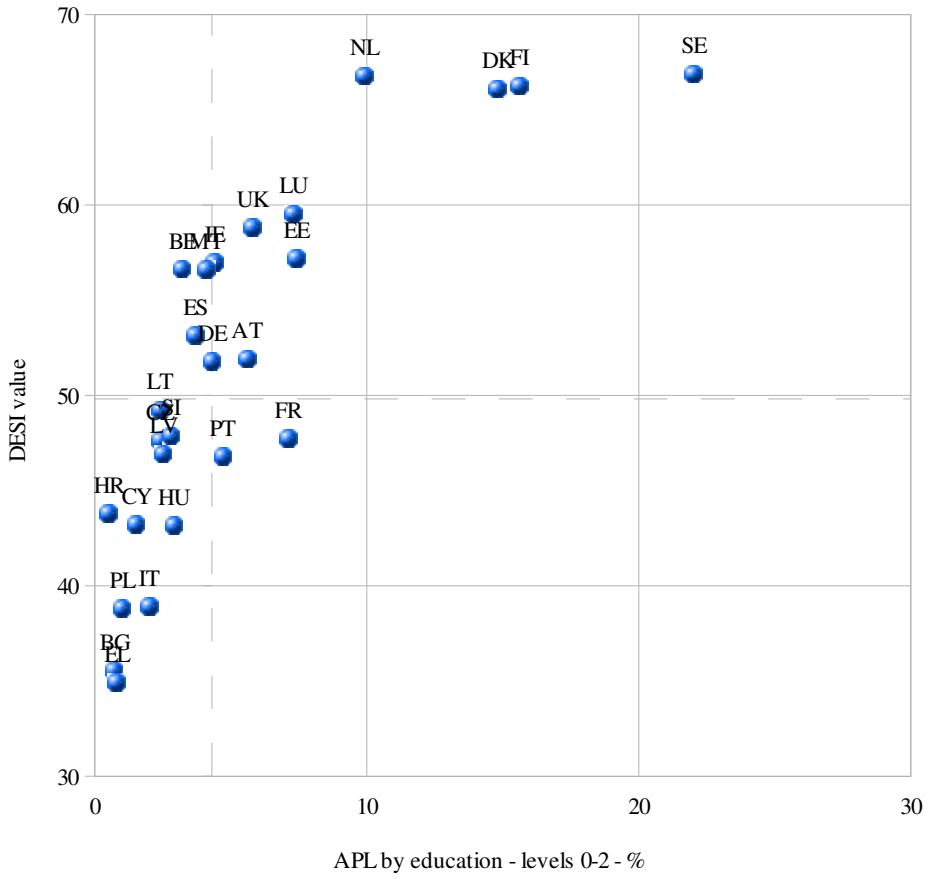

Fig. 2: DM and APL by education – levels 0-2

Data source: DESI (2018a) and Eurostat (2020a)

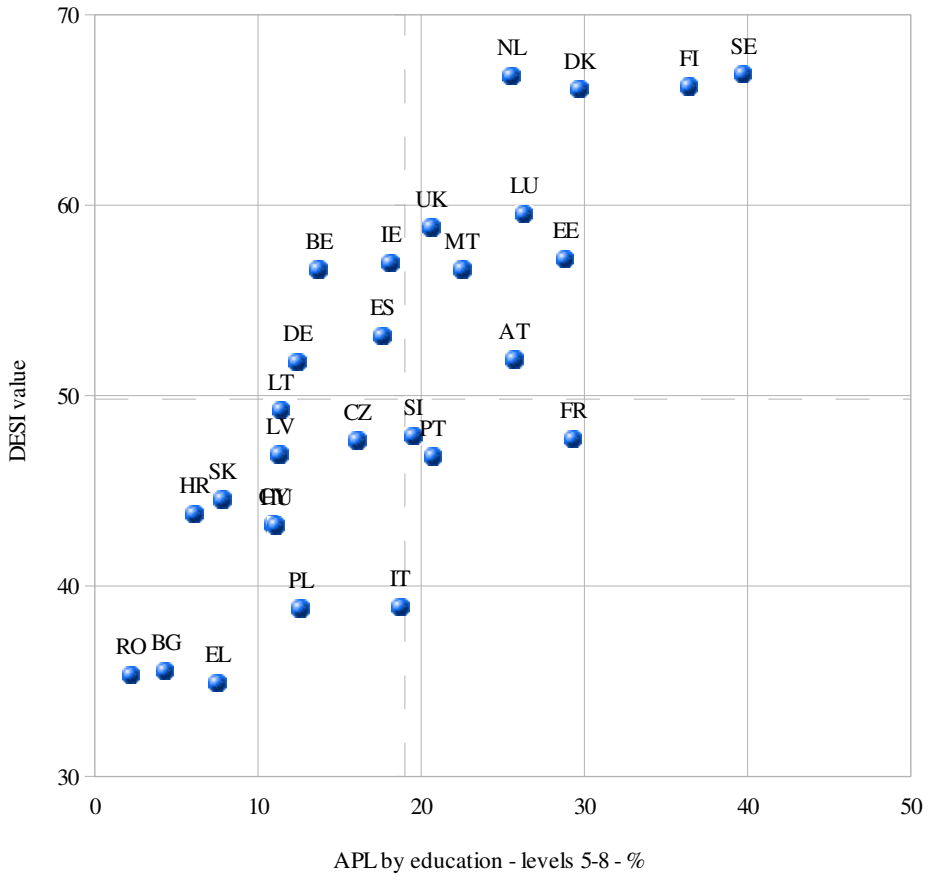

Fig. 3: DM and APL by education – levels 5-8

Data source: DESI (2018a) and Eurostat (2020a)

An increase in APL along with an increase in education is an important phenomenon. In the EU, 4.3% of people with the lowest level of education, 8.8% of people from the middle group and 19% of people with the highest level of education continue their education. Thus, the number of people continuing their education approximately doubles in every next group. Interestingly, in the highly developed countries of Western Europe this trend is, roughly speaking, maintained. The values for different groups do not vary noticeably. In the CEE and Southern European countries the opposite is true. In Greece, participation in further learning of people from the middle group is almost six times higher than that of the least educated. In Poland, the number of the best-educated is 4.5 times higher than the number belonging to the middle group. These are specific records in the surveyed group of countries. This gives rise to the danger of further widening of the educational gap in poorer EU countries.

Figures 4 and 5 show the relations between DM and APL analyzed in terms of labour market activity (table 1 - rows 11-14). On average, in the EU, 11.8% of the employed and 10.7% of the unemployed continue their education. Sweden is the leader in both categories, an impressive 47.3% of unemployed adults participate in some forms of education. This result is by almost 20 p.p. better than the value for

Luxembourg, in the second place. For the unemployed Croatia takes the last place, and for the employed - Romania. Among the CEE countries, only Estonia and Slovenia are above the EU average.

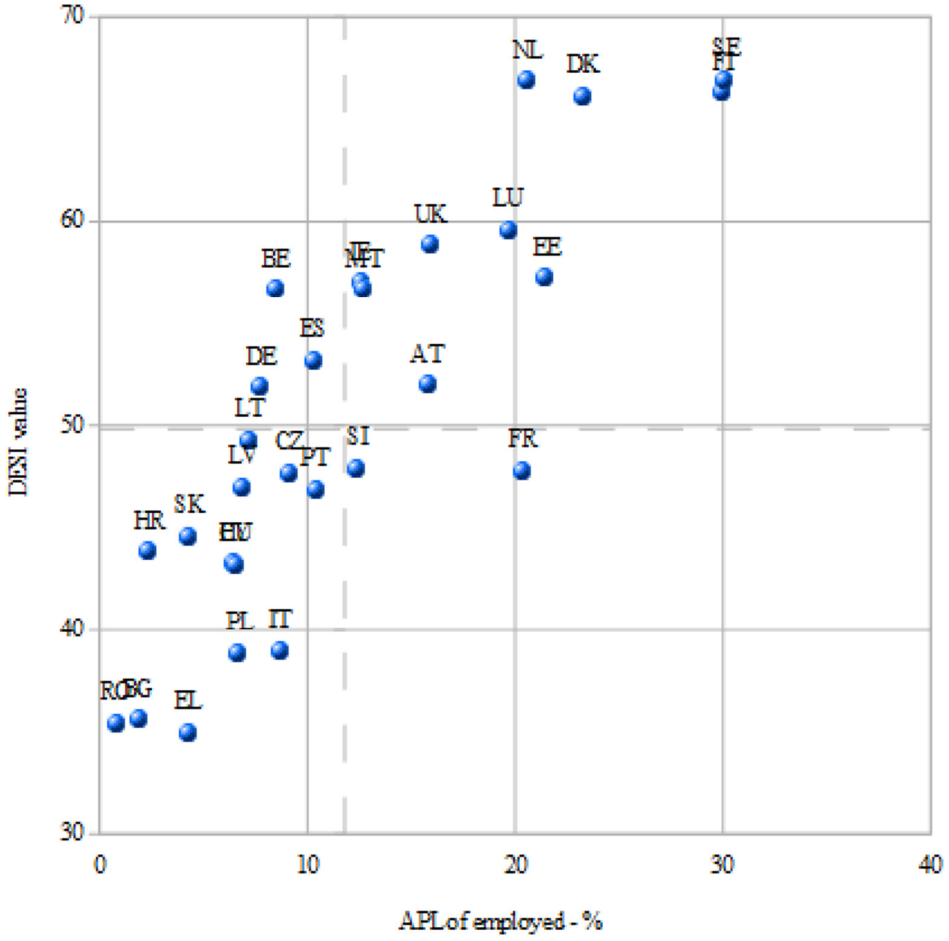

Fig. 4: DM and APL of employed

Data source: DESI (2018a) and Eurostat (2020a)

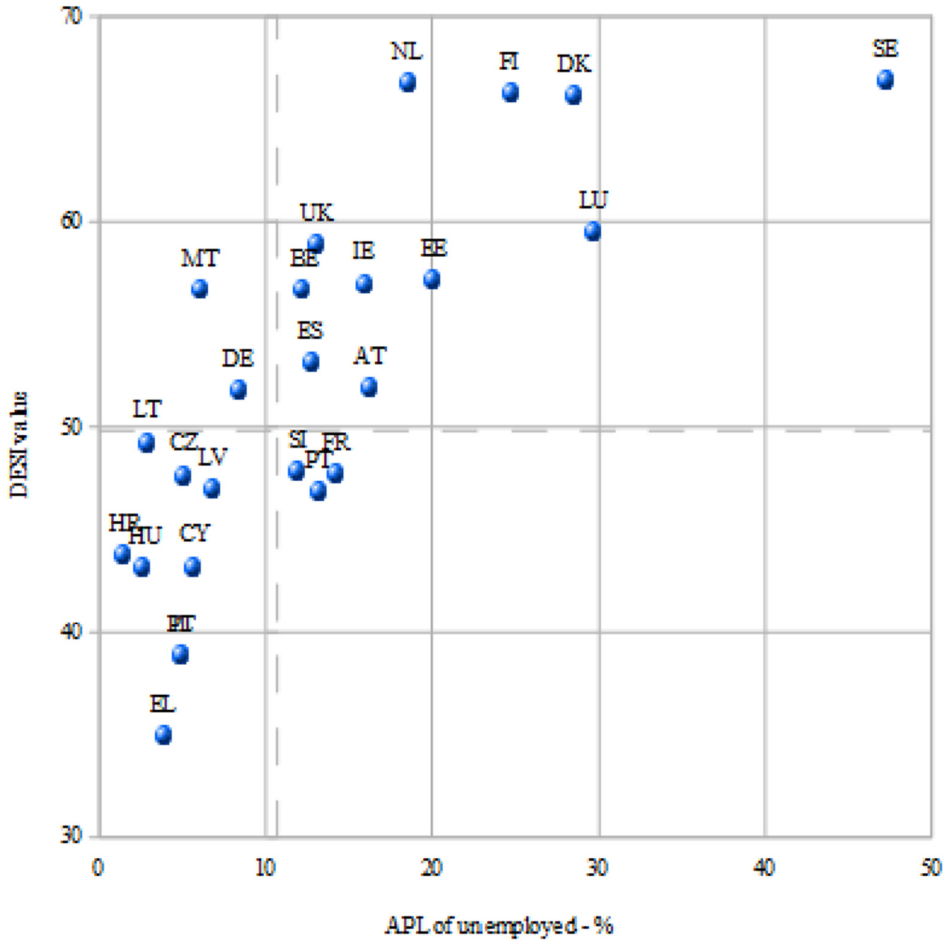

Fig. 5: DM and APL of unemployed
Data source: DESI (2018a) and Eurostat (2020a)

Both for the EU as a whole and for most of the countries surveyed, the share of adults continuing their education is similar among the employed and unemployed. The most observable preponderance of the unemployed in education over the employed is noted for Belgium, Luxembourg and Sweden. This indicates a conscious use of APL to fight unemployment. Lithuania, Hungary, Malta, the Czech Republic and Italy show the opposite proportion. There are considerably more working people continuing learning than in the case of the unemployed. This seems to be a negative trend. It further increases the skills of those who already have a job, worsening the chances of those who are out of work,

Figures 6 and 7 show the relationships between DM and APL analyzed in terms of the place of residence (tables 1 - rows 15-20).). On average, in the EU 13.5% of the inhabitants of cities, 9.8% of the inhabitants of towns and suburbs, and 8.8% of the inhabitants of rural areas continue learning. In all three categories Sweden is the leader and Romania is the last. Among city dwellers, only Estonia and Slovenia are above the EU average, also in the category towns and suburbs and rural areas.

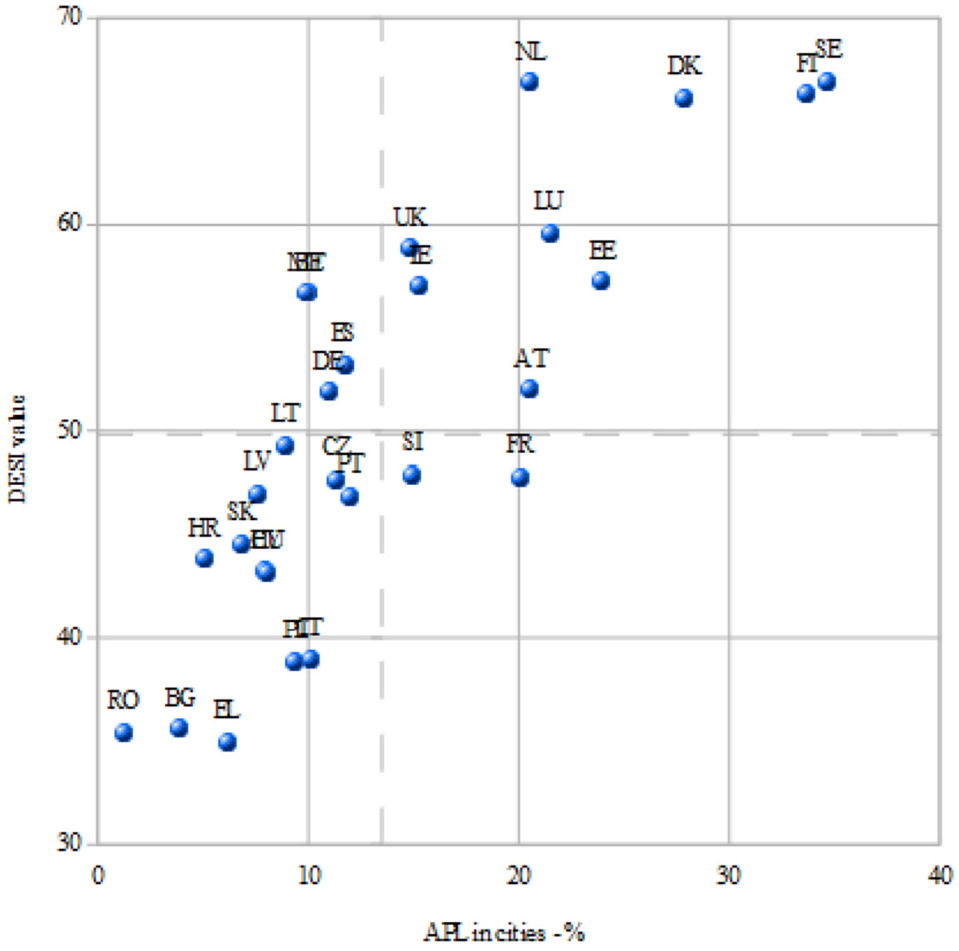

Fig. 6: DM and APL by degree of urbanisation – cities

Data source: DESI (2018a) and Eurostat (2020a)

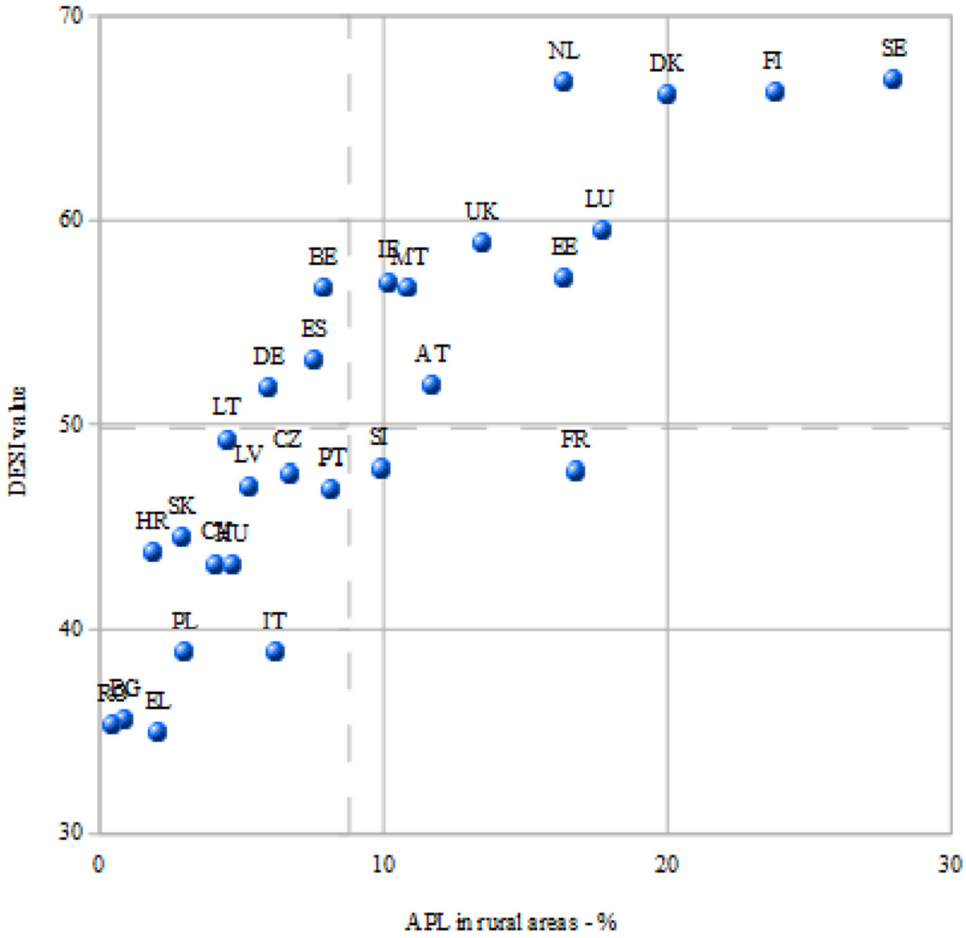

Fig. 7: DM and APL by degree of urbanisation – rural areas

Data source: DESI (2018a) and Eurostat (2020a)

The level of APL is clearly linked to the place of residence. On the EU scale, adult participation in learning in cities is one and a half times higher than in rural areas. However, there is a group of countries where the advantage of urban over rural areas is significant. The highest disproportions are reported by Bulgaria (more than 4 times), Poland (more than 3 times) and Greece (3 times). This seems to be a dangerous tendency, which is conducive to progressing civilisation marginalization of rural areas.

These figures show a disquieting picture of APL in CEE countries. Practically, in all tested characteristics values for CEE are significantly lower than the EU average. This means that CEE countries did not use the challenge and opportunity of APL. Estonia is a proud exception. The positions it occupies in particular characteristics predispose it to "abandon" the CEE group and join the Scandinavian leaders.

Conclusion and Further Research

The importance of the APL issues for DM development justifies, in the author's opinion, the inclusion of this subject in the quantitative analysis of DM. It is supported by significant interdependence between DM level and all APL characteristics (correlation coefficients between 0.78 and 0.87). These

characteristics have been selected arbitrarily by the author. The choice of appropriate indicators and specific solutions may, of course, be the subject of further discussion.

Many empirical studies of DM support the idea that success is determined by infrastructure and education. Less recognized (albeit essential and interesting) are social and cultural aspects. It seems to be a reasonable argument that, at a certain level of DM development, such issues can become crucial. The social and cultural context of DM is quite a broad and complex area. The research object may encompass a broad spectrum of problems. One of the most relevant topics is the issue of APL. In addition to education in the formal educational structures, continuing education plays a crucial role. An example of the CEE countries has shown that this issue requires improvement and activation.

In many CEE countries there are large differences in adult participation in educational processes in the areas analyzed earlier. Those less educated, unemployed and dwelling in rural areas are less active in APL, which is a very dangerous trend.

A large proportion of these groups may be prevented from active participation in DM. This, obviously, does not concern the use of ICT. Easily accessible, increasingly intuitive devices, providing attractive user experience, will provide these people with the digital content they need. The problem will lie in the lack of the ability to consciously and actively participate in the changes taking place, which can often mean a lack of opportunities to find a job and participate more broadly in the society.

A growing percentage of ineffective and unproductive people will constitute a huge social problem and an excellent breeding ground for populist political movements, which we already witness today. As a consequence, the social cohesion of many countries and the European Union as a whole may be threatened.

The considerations presented in this paper are of groundwork character. However, the discussed topics seem to be interesting and worth of further study. Such studies will help determine which characteristics should be analyzed and which indicators should be used in order to better analyze the relationship between DM and APL. The complexity of digital multiverse will increase exponentially. The answer to the question what tools to use to measure such a complex reality will become a great challenge for the researchers involved. The limitations of the analysis presented in the paper should be clearly indicated. First of all, it is subjective and the views expressed in it are those of the author. It is an invitation to discussion, rather than a final assessment.

Low level of APL in the CEE countries is the result of interplay of many cultural, social and historical factors. Their detailed analysis would go far beyond the scope of this paper. Improving the situation in the APL will reduce the gap across Europe and allow the CEE countries the realization of the vision of the digital multiverse. This is one of the conditions for these countries to avoid the middle-income trap and continue their civilization development.

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The Impact of Coronavirus on The Hospitality Market of St. Petersburg

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Abstract

A revenue from activities in the hotel market significantly depends on a few external factors. One of the most important is the number of tourists arriving at the destination. The authorities make effort to prevent coronavirus spreading in Russia that led to the closure of the country's borders and the cessation of transport links for tourism. The authors study a spreading of coronavirus in the regions of the Russian Federation and its impact on the hotel market in St. Petersburg. The analysis of seasonal rates in St. Petersburg hotels allows us to conclude about the possible catastrophic consequences of a decrease in the number of tourists for the hotel services market in the eve of the high season of White nights. Based on the analysis of the recommendations of experts in the sphere of hospitality and examples from the practice of world hotels, hotels are needed in strategies for actions in COVID-19 environment.

Keywords: Coronavirus, Hotels, Hospitality, Hospitality Market, Hotel Strategies, St. Petersburg

Introduction

The analysis of foreign and local experience shows that the development of tourism as a service industry sector is influenced by a significant number of factors in the external and internal environment. However, tourism does not belong to the basic needs of the population, therefore industry has a significant decrease in the number of tourists with adverse changes in the environment. The development of tourism at the global level brings not only global opportunities, but also global problems. One of the significant global problems is the spreading of coronavirus, that affects national economies. The tourism as one of the sectors of the economy has experienced a significant decrease of income because of the restrictive measures of the governments of different countries. The hospitality industry, being one of the most important elements of tourism, also has felt a strong influence of the coronavirus spreading.

This article will present the results of a research about coronavirus impact on the activities of hotels in St. Petersburg.

Materials and Methods

The research materials were scientific articles, opinions of experts in the field of hospitality, and statistical information. The main methods were analysis and synthesis.

Literature Review

In the Russian Federation, tourism development has significant regional differences (Degtereva, V.A., Zaborovskaia, O.V., Sharafanova, E.E., 2018, Tanina, A., Zaborovskaia, O., Shabunina, T., Yakishin, Y., 2018)). These specifics must be considered how to plan an income from the activities of organizations of the tourism industry and tourism infrastructure (Khadra, J.B.; Goncharova, N.L.; Radwan, Y., 2019, KUZNETSOV Sergey V., SELENTYEVA Tamara N. and MIKHEL Ekaterina A., 2019). The pronounced seasonality of touristic attractiveness in most regions of Russia due to geographical location (Korchagina, E., Shignanova, R., 2018, Tanina, A.; Mudrova, E.; Sigov, V.).

The hospitality industry among other elements of tourism has a number of features (VEREVKA Tatiana V., 2019, Skhvediani, A.E., Kudryavtseva, T.J., Kravchenko, V.V., 2017, Rodionov, D.G., Rudskaya, I.A., 2017), including the need for significant expenses when any hotel tries to enter in the market (buying or renting real estate, repairing, buying furniture and equipment, etc.), and during ongoing activities (remuneration, taxes, purchases for food, cleaning and other hotel services). Therefore, the receipt of a fixed income from activities is the main condition for the existence of the hotel business. According to crisis conditions, the main task of hotel management is to find the optimal balance between reducing costs and maintaining the required level of service (Verevka, T.V., 2019, Saenko, N.R., Prokhorova, V.V., Ilyina, O.V., Ivanova, E.V., 2017).

Results

The end of 2019 was remembered by the world community because of the news about the emergence of a new type of coronavirus in China. Soon enough, from a local outbreak the disease has spread almost in all over the world. The absence of visible symptoms among patients did not allow to prevent the spreading of infection, therefore virus spread primarily in the countries that have a common border. Due to international flights Covid-19 has got to other continents.

In Russia for quite a long time (compared with European countries) there were no cases of infection with coronavirus of a new type. The first two cases in the country belonged to Chinese citizens and in fact they were in relatively sparsely populated regions in the east of the Russian Federation.

Nevertheless, from February 1st flights with China were limited, and all remaining flights (only flights to Beijing, Shanghai, Guangzhou and Hong Kong) were transferred to one terminal of Sheremetyevo Airport in Moscow. Russian Railways canceled direct Moscow-Beijing trains. The evacuation of Russian citizens began from Hubei province, Hainan island and Wuhan city. The regions of the Russian Federation with a common border with China (Amur Oblast, Khabarovsk Krai and the Jewish Autonomous Oblast) have closed border crossing points (The first cases of a new coronavirus have been identified in Russia, 2020).

From March 18 to May 1, entry into the Russian Federation is restricted for all foreign citizens and stateless persons without exception (like the external borders of the EU). On March 19, due to the threat of the spread of coronavirus, the mode of high alert was introduced by the authorities for all 85 regions of Russia. Mass events were canceled in all subjects, universities and schools switched to distance learning.

On March 20 Rostourism recommended for Russian citizens temporarily to refrain from traveling outside the country until the epidemiological situation gets normalized. Beginning from March 30, traffic through all border checkpoints, including road and rail, was restricted (Komarova A., 2020).

On April 9, 2020, the number of infected people was 10,131 people, 76 people who died, 698 people who recovered (About confirmed cases of a new coronavirus infection COVID-2019 in Russia, 2020). The sick is in 50 regions, most of them are in 10 regions (table 1).

Table 1 : Regions of the Russian Federation with the maximum number of patients with COVID-19 (as of April 9, 2020)

Region	Number of cases		The population of the region as of 01.01.2019	% of cases from the population of the region
	Absolute, pers.	Relative,% of the total number of cases		
Moscow	6698	66,11	12615279	0,0531
Moskovskaya oblast'	748	7,38	7599647	0,0098
Saint-Peterburg	373	3,68	5383890	0,0069
Republic Komi	150	1,48	830235	0,0181
Leningradskaya oblast'	112	1,11	1847867	0,0061
Krasnodarskiy kray	105	1,04	5648235	0,0019
Bryanskaya oblast'	97	0,96	1200187	0,0081
Nizhegorodskaya oblast'	87	0,86	3214623	0,0027
Tul'skaya oblast'	66	0,59	1478818	0,0045
Ivanovskaya oblast'	60	0,59	1004180	0,0060

Source: compiled by the author according to (Grouping of subjects of the Russian Federation by population as of January 1, 2019, Confirmed infections by region of Russia, 2020)

From the data of table 1 the vast majority (83.8%) of cases are in only 10 regions out of 85 in the whole country. Moreover, most cases in the capital are logical, because of the significant passenger traffic in Moscow, including transit traffic. The capital also leads in the proportion of cases in the population, although this rate (0.0531%) cannot be named threatening. Nevertheless, the city leads in the growth rate of infected people and make the rules more tough for a population being in the megalopolis

In St. Petersburg, which is often called as the second capital of Russia, the situation with the coronavirus spreading is more favorable. Due to the smaller number of people entering from abroad (Pulkovo airport rather quickly limited, and soon stopped sending and receiving air traffic) and as well as more stern and restrictive measures by the city leadership that were taken at the initial stage of the pandemic. Thanks to this, the number of cases is almost 18 times less than in Moscow, although it continues to grow.

Let us consider how the spreading of coronavirus affected tourism in St. Petersburg and the activities of hotels. For this it is necessary to consider the features of the development of the hotel services market in St. Petersburg.

Unlike Moscow, where the seasonality of tourist flows is not so pronounced, in St. Petersburg there is a pronounced peak of the season that appears only during “white nights season”. In the narrow sense, white nights mean the period from June 11 to July 2, in a broad sense - from May 25 to July 17. During the white nights, the loading of hotels in St. Petersburg is the highest, and the tariffs are maximum and can significantly exceed prices in the low season. Table 2 shows the prices for double occupancy in a standard room for the weekend (Friday - Sunday, 2 nights) in St. Petersburg hotels of various categories. Breakfast is included in the booking. There are hotels that have been chosen for comparison and located in the historic center of the city, which is popular among tourists for a walking.

Table 2 : Prices in high and low season in hotels of St. Petersburg

Hotel	Category	Rating on booking.com	Price, rub.		Price difference, %
			19-21.06. 2020	16-18.10. 2020	
Belmond Grand Hotel Europe	5*	9.3	65040	31200	208
The State Hermitage Museum Official Hotel	5*	9.3	37800	31600	19
Corinthia Hotel St Petersburg	5*	8.9	45600	25800	77
Pushka INN hotel	4*	9.5	54000	25000	216
Crowne Plaza St. Petersburg-Ligovsky	4*	9.2	40320	25920	56
Rossi Boutique Hotel	4*	9.3	30400	23800	28
Metropolis Hotel	3*	9.5	24798	16398	51
Kaleidoscope on Moika	3*	9.4	30470	9000	339
Grand Apart near Nevsky	3*	10.0	11897	9981	19

Source: compiled by the author according to booking.com

Table 2 shows that in hotels of different categories (despite the difference in tariffs), similar trends in pricing are observed. Some hotels set tariffs for accommodation during the white nights a few times higher than in the low season (from 2.08 times for Belmond Grand Hotel Europe 5 * to 3.39 times for Kaleidoscope on Moika 3 *). The pricing of other hotels is insignificant (from 19% at The State Hermitage Museum Official Hotel 5 * and Grand Apart near Nevsky 3 * to 28% at Rossi Boutique Hotel 4 *) differs in seasons. In general, hotels in St. Petersburg tend to increase prices in the high season within 50-100%.

The holding of international events has a strong influence on the pricing of St. Petersburg hotels. The city is a major center of international tourism, including congress type and every year it holds political, economic, sports, cultural and other events of global and national level.

June 2018 did not meet the expectations of St. Petersburg hotels for a large increase in revenue. Overpriced (even compared to the usual high prices of the "white nights season") prices did not allow to attract traditional tourists, and the guests of the mundial provided a loading of only 71%. At the same time, the June load in 2016 was 82%, and in 2017 - 78%. It should be noted that the traditional growth of the June loading is provided not only by tourists who came to enjoy white nights, but also by guests of the St. Petersburg International Economic Forum, which was held in May 2018. As a result, prices in luxury rooms in June were much lower than in May and amounted to 38 thousand rubles in the most expensive hotels of the Northern capital. The loading of high-level hotels amounted to only 65%, and prices were two times lower than in Moscow (JLL: all segments in two capitals increased prices, while Petersburg scared off some tourists, 2020)

Despite the fact that from loading point of view the high season of 2018 did not meet to the expectations of St. Petersburg hotels, the holding of the World Cup had a strong influence on the promotion of the city and the improvement of its tourist image on a world level. The increase of the loading occurred in accommodation facilities of all categories. Mid-level hotels, mainly large hotels with many rooms, oriented towards group tours, became the leaders in the growth of loading. These hotels have the highest RevPAR growth (20%), while the tariff and loading are growing equally. Other segments of the hotel services market showed an average loading growth of 3%, RevPAR growth was 6-17%. At

the same time, almost all market entities show a more active growth in ADR, but not loading (which is the opposite for Moscow hotels).

The following main trends contributed to the growth of tourist flow to St. Petersburg in 2019:

- a recognition for several years as the best urban tourism destination in Europe.
- the successful holding of notable events on the international level (the World Cup, the Assembly of the World Tourism Organization, the St. Petersburg International Economic Forum, etc.).
- free electronic visa introduction to visit St. Petersburg and Leningrad Region from October 1, 2019.
- an active promotion of the territory, including the official city tourism portal of St. Petersburg "Visit Petersburg".

According to the results of 2019, the tourist flow exceeded the number of tourists per year during the Championship by 10% and amounted to 9.1 million (Petersburg in 2019 for the first time in history received more than 9 million tourists, 2020).

Favorable trends in 2019 allowed us to hope for a further increase of the tourist flow, especially since 1.10.2019 after the start of the operation with electronic visas, the city was visited by over 60 thousand people from 52 countries.

In 2020 the World Congress of Chefs, SCO and BRICS Summits, 4 matches of the European Football Championship and other global events were planned in St. Petersburg. The "open skies" mode in Pulkovo would increase the flow of foreign tourists.

But the spreading of coronavirus has become a source of great losses for tourism and the hospitality industry in general.

The first loss was the closure of borders for Chinese tourists, whose number in the total tourist flow in St. Petersburg has grown steadily in recent years. The total number of hotels in St. Petersburg is estimated at about 30 thousand rooms. In 2019, 750 thousand Chinese tourists visited St. Petersburg, therefore the average monthly flow in St. Petersburg amounted to 62.5 thousand guests. It is easy to see that the lack of tourists from China greatly influenced the loading of rooms.

Mid-range hotels (3 *) were the most suffered, in which group tourists came from China. The share of Chinese tourists in such hotels could be 70-90% therefore, to attract customers such hotels significantly reduced prices. In January-February the most hotels kept the standard loading for this season on the average at 40-55%, but hotels could not raise tariffs (at least by inflation rate) due to a decrease in tourist flow and the cancellation of reservations of the guests from Europe (Coronavirus: how are things really in hotels in St. Petersburg?, 2020).

The beginning of March brought cancellation due to COVID-19 of Russia's largest business event - the St. Petersburg International Economic Forum (SPIEF). The lost income because of cancellation is estimated at between several hundred million and 3 billion rubles. The forum has been held since 1997 and received the unofficial name "Russian Davos". In 2019, SPIEF was visited by over 19 thousand people from 145 countries. Due to the large number of delegates and accompanying people, hotel rooms, halls in restaurants and venues for organizing events were booked six months before the start of the forum. Some service providers receive up to 20% of annual income for 4 days of the event.

Undoubtedly, the cancellation of SPIEF will significantly affect the operational indicators of St. Petersburg hotels. Even though the forum itself lasts only four days, it affects the hotel industry of the city for 2-3 weeks - technical experts and support services are placed in hotels in advance. The cost of standard rooms for the days of SPIEF is usually at least 3-4 times higher than the tariffs for other days.

Hotels of the highest price category suffered the most, because their loading is provided by delegates, representatives and participants of the forum. The number of five-star hotels rooms, which traditionally

host SPIEF participants, is almost 2500. In the period of such a huge demand, hotels can sell rooms at premium prices when they are fully loaded with a significant depth of sales. The best hotels during the SPIEF could offer the presidential suite for 2.5 million rubles per day. Moreover, for this period a number was not being sold by the day, but as a package for all days of the forum. The luxury hotels received additional income from the maximum use of hotel services such as restaurants, car rentals and conference rooms. According to experts of the hotel industry, the loose from the cancellation of SPIEF for the most popular hotels of this category will be as minimum 60-65 million rubles in a day. The cancellation of the forum has reduced the income not only luxury hotels. 4 * hotels also suffered from losses. Their main guests are journalists and other categories of visitors not related to the participants (Melnikova K., Zhitkova V., Gaysina I., 2020).

In early March 2020, even after the cancellation of SPIEF, hotel representatives hoped that the summer loading will be remained, primarily due to the European Football Championship. The possibility of holding matches without spectators was considered, but on March 17 UEFA announced the postponement of Euro 2020 matches to 2021 (UEFA postpones EURO 2020 by 12 months, 2020).

A closure of the transport connection and restricting of the entry for foreign citizens into the Russian Federation by May 1, 2020 (with the possible extension of restrictions) does not allow to predict favorable results for the high season of hotel enterprises in St. Petersburg.

The situation is complicated by the fact that by the beginning of the season (May-June) about 2,000 rooms in service apartments will have to enter the market. The owners of the apartments are mainly private owners who invest in the construction of apartment hotels to generate income. To ensure the owners' income, management companies can significantly reduce prices, which will result in dumping among three- and four-star hotels (Coronavirus: how are things really in hotels in St. Petersburg?, 2020).

In such conditions, hotel organizations need to develop a plan of actions. But actions during the period of the coronavirus spreading should differ from measures that level the influence of only economic factors.

A lot of hotel industry experts (Pierre Verbeke, Alisa Voitika, Catala Thibault, Erulin Aymeric) agree that big discounts will not be able to attract customers during a pandemic if tourists do not travel due to border closures or concerns about their own safety. A significant discount can change the target audience of the hotel, but such guests cannot bring the expected income due to the inability or unwillingness to pay for additional services other than the accommodation itself.

The examples during the financial crisis of 2008 clearly showed that when the discount is being used, demand gradually recovered after 6-8 months, but ADR took more than 3 years to return to the pre-crisis level (Pierre Verbeke, 2020).

Another recommendation is to maintain a budget for marketing activities. To attract customers, the best thing is not to reduce prices for all without exception, but to develop package offers and promotions to save current guests and attract potential customers. The standard options are Stay 3 Pay 2, free breakfast, room upgrades, free spa services, etc. During a crisis, it is important to maintain the loyalty of the target audience.

For a few hotels, new marketing approaches have been shown to be effective, for example, segmenting customers for other reasons and developing personal offers with additional value for guests. A significant impact on the behavior of guests can have a unique offer that competitors do not have.

Hotels that spend more on marketing during a downturn can get RevPAR in 18.5% higher than hotels that cut their marketing costs (Alisa Voitika, 2020). Although all hotels in crisis may expect less loading, the data shows that there is a strong positive correlation between marketing costs and efficiency in times of crisis. Investing a digital marketing budget in revenue sources, such as meta-

searches and retargeting, can help the hotel to achieve returns not only in difficult times, but also in the long running .

Despite the decline in revenue in a pandemic, it is unacceptable to lower hotel standards. Oppositely, guests must receive additional value through information on ensuring the safety of accommodation and upon receipt of services. The cost saving is acceptable in those areas of the hotel that minimize the quality of service and the image of the hotel. If you need to cancel any services or reduce their quality, the hotel must warn the guests in advance.

A special importance in crisis conditions are the conditions of the reservation, especially the cancellation. Now it is impossible to predict whether the trip will take place not only in the long, but also in the short term due to the rapid change in the situation with the incidence in different territories. Clients are waiting for a flexible approach to canceling or reserving, regardless of the recognition at the national level in each country of the consequences of coronavirus force majeure.

The most acceptable for customers is cancellation of the reservation without penalty regardless of the initial conditions of the tariff. For a hotel, cancellation of the reservation (especially with a refund of the deposit) is not the best option, as it implies a loss of income not only in the present, but also in the future. Therefore, hotel companies should focus their efforts not on cancellation, but on transferring the reservation to another time, encouraging guests with additional bonuses, services for their consent. Instead of refunding money for failed trips, a few European airlines give vouchers for a ticket price valid for 1 year. Perhaps for hotels, such practice (considering seasonality) will also save customers.

Non-refundable options should be excluded from the tariff options of the reservation. The best way is the “book now, cancel later” option without prepayment or cancellation penalty (Petrova M., 2020). A modern digital service allows you to implement deferred payment by credit card. Due to the impossibility of long-term planning in the current conditions, many clients, having a vacation in the summer months, look at suitable options, but do not make a reservation. The hotel may offer deferred payment by credit card as a payment method. When the reservation makes, the guest does not need to make an advance payment immediately, but in the confirmation letter with the reservation he will receive a link to pay by credit card. The hotel itself determines how long this link will be active. If during this time the guest does not make an advance payment, the reservation will be automatically canceled.

A support is needed not only for customers, but also for a staff. To maintain the proper level of service and loyalty in the organization, it is necessary to pay attention to the moral and awareness of the staff in difficult conditions. The safety must be provided not only for guests, but for the staff. It is necessary to foresee a plan of actions for all people in identifying a case of illness of a guest or employee and to observe it strictly. If staff reductions are needed, support must be considered for employees (Sundareva E., 2020).

If it is not possible to provide enough loading to pay for current expenses, hotels are forced to choose one or more strategies:

- temporary preservation of the hotel.
- closing part of the hotel for guests.
- bankruptcy of the hotel.
- accommodation in the room fund of doctors working with patients with coronavirus.
- the provision of single rooms to keep with the isolation.

It should be noted that the period of crisis associated with the lack of customers can bring benefits to the hotel, not economic, but social. A creative approach, for example, the formation and maintenance of relationships with other local hotels in difficult times to create partnerships or the foundation of a community for participants in excellent events at the hotel can demonstrate leadership positions for all market participants (Nicki Graham, 2020).

The support of the territorial community when placing in rooms for medics or persons, who are needed in the isolation, significantly improves the image of the hotel enterprise among not only customers, but also society, including government agencies.

For example, hotel companies, including members of ITP Caesars Entertainment and the NH Hotel Group, distribute food packages to local food banks and charities. Hotel Wyndham offers facilities for workers who cannot go to work and need professional space outside the home (Madhu Rajesh, 2020).

However, the choice of such strategies requires large financial resources, which is possible in the following cases:

- compensation of expenses by owners at their own expense.
- availability of reserves within the international hotel chain.
- payment of expenses by local or state authorities.

What strategies do the hotels of St. Petersburg choose? The vast majority significantly reduced costs by eliminating the use of outsourcing staff, reducing working hours and bonuses. But the lack of a significant part of the hotel's financial reserves and a catastrophic drop in loading can lead to bankruptcy of enterprises.

The closure of the air traffic and the borders of the Russian Federation made inbound tourism impossible; the further closure of museums, theaters and other objects of touristic interest also stopped domestic tourism. As a result, the average loading in March amounted to 15-20%, and in April it is planning at the level of 8% (against the planned 65%). The lack of income led to the closure of hotels. On March 19, the Finnish company Sokos Hotels closed one of three hotels in St. Petersburg - Original Sokos Hotel Olympia Garden. The RA hotel chain stopped four of the six hotels - on Nevsky, 102, Ligovsky, 87, Rybinsk, 7 and Tambov, 11.

Other hotels have accepted the way of optimization, conserving part of their number of rooms. So, the Oktyabrskaya Hotel now has only two floors and half of the rooms are serviced. The loading does not exceed 20%, and room prices have fallen because of the absence of demand by half. At Rossi Hotel & Spa 35–40% of rooms are available. Helvetia decided to stay just one floor, decommissioning about 90% of the number of rooms.

Preservation means that linen and bedding are being cleaned, pillows and blankets are being packed, minibars are being taken apart, and the rooms themselves are no longer being serviced. This allows you to reduce operating costs and survive these difficult times.

According to market participants, business travelers who continue to come to St. Petersburg save them from complete collapse. Some hotels are doing well targeting such clients. For example, The Kempf Hotel, which opened on Kamennoostrovsky Prospekt 12 in January 2020, is now almost 100% full. The main customers of the company are PJSC Gazprom, which continues to send employees on business trips from Moscow as well as Rossiya Airlines, which removes numbers for its crew members: although international flights have ceased, the carrier continues to serve domestic flights (Boyarkova G., 2020).

Among the guests there are delayed European guests who did not have time to leave before the cancellation of flights and the closure of borders. Another group of tourists is coronavirus dissidents who specially come to the deserted city, mainly from Moscow. Residents of the Northern capital rent rooms for a night or two if they want to diversify their lives in self-isolation.

To survive, hoteliers are trying to beat the coronavirus trends. For example, Helvetia launched a self-isolation service for a pandemic. The hotel offers to rent a room for a month at the price of renting a business-class apartment.

To prevent collapse, hotels are also trying to get discounts on rent. One part of the landlords gives a 50% discount, another part provides an instalment plan, as it understands that even for a year hotel cannot compensate lost profits.

Unofficially, market participants admit that they are still forced to work at a loss and can only survive with the support of the owners. Those, who do not have such a financial pillow, have a risk of receiving a lot of legal actions from clients soon, because they must return the money they have already spent. A significant seasonality of demand leads to the fact that in winter hotels exist by prepayments of the summer season. Booking.com's decision to refund unilaterally for canceled, even non-refundable reservations increase customer loyalty, but not all hotels can afford to think about loyalty in the absence of funds for current activities.

The gradual normalization of the situation with coronavirus in China gives hope for the restoration of pent-up demand and the return of Chinese tourists to the city (some hotels have increased the number of bookings by the Chinese for the summer season). But no one can guarantee the growth of the tourist flow soon.

Discussion

The situation in the hotel services market remains tense. A professional message in the field of hospitality in the Russian Federation is only being formed and does not have a significant impact. Nevertheless, the existing professional associations of hoteliers jointly developed an appeal to the Government of the country with proposals to support the industry and prevent the closure of hotels and the dismissal of staff.

The market players are asking to introduce a moratorium on taxes before the end of the year, to subsidize utility bills, to exempt hotels from payments to social funds, to help ensuring credit breaks for existing hotel loans, to compensate employees for wages, to allocate funds for promotion and advertising of St. Petersburg for abroad (The current situation with the hotel business in St. Petersburg: figures and facts, 2020).

The Government of the Russian Federation has not yet voiced real measures to support the hotel industry, even though hotel associations and federations have proposed taking effective measures to avoid mass layoffs and ruining of market players.

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The Influence of Direct Payments on The Production Value of Agricultural Branch in Romania

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Abstract

In this paper it is desired to investigate whether the direct payments, granted through the EAGF, in Romania, can have implications on the economic situation of agriculture, respectively on the value of production in different sectors of agriculture or even the value of the production of the whole branch. The research hypothesis is that, in Romania, given the structure of the agricultural sector, direct payments positively and with an average intensity affect the value of agricultural production. With the help of statistical data on the values of agricultural production and direct payments and by correlating them and determining a simple linear regression, it was found that, indeed, direct payments positively and with a medium to strong intensity, influence the value of the production of the whole agricultural branch in Romania.

Keywords: the vegetal sector, the animal sector, the value of agricultural production, direct payments, Romania.

Introduction

In this paper it is desired to establish whether the direct aids granted by the European Union, taking over the EAFRD fund have any influence on the economic state of agriculture, respectively on the value of the production, either in sectors or of the whole agricultural branch.

From the literature, one can see a broad approach regarding the impact of direct payments on a large and diverse number of variables, thus, Kropp and Katchova (2011), stated that the direct payments could improve the liquidity position of the farmer or the repayment capacity which to allow farmers to obtain more favourable credit conditions. Under more favourable credit conditions, a farm could remain in business or expand production. Given how direct payments are calculated and managed, direct payments are likely to affect beginner and more experienced farmers differently. A significant positive relationship was found between the level of direct payments (in dollars) and the debt coverage ratio for experienced farmers, which suggests that direct payments improve the repayment capacity.

El Beni et al, 2012 conducted a research with the purpose of examining the effects of agricultural policy reform, in particular the transition from market to direct payment support - on the variability of Swiss farm incomes. They found that the shift from market-based support to direct payments decreased the variability of farm incomes and household incomes.

Constantin, 2019, emphasized through his research the role of public support in agricultural development and how direct payments have influenced agricultural production and especially farm incomes. The author considers that the development of agriculture depends strongly on the intervention of the public power by granting direct payments, along with the market measures that aim to ensure the stability of the farmers by supporting agricultural incomes and increasing productivity. Among the conclusions of the study is the assertion that granting direct payments to

Romania after 2008 has led to the improvement of the economic situation of the agricultural sector. Thus, the agricultural income increased by more than 70% during the analysed period, on the one hand, as a result of rising prices for production and agriculture and, on the other hand, because of direct payments.

AgriFood economics centre created a report by Bray et al, 2017, on the impact of direct payments. In Chapter 4 of the report, certain scenarios were developed using the CAPRI model, to investigate how direct payments affect agricultural land use, income, production and other factors. To determine this impact, a comparative analysis was performed between the baseline scenario (ie the one in which the current policies are continued) and an alternative scenario without direct payments. Among the results, the authors point out that direct payments contribute to maintaining the use of agricultural land. If they were missing, land use in the EU would fall by 6.5%. Another result would be that direct payments increase agricultural incomes by 21% in the EU as a whole.

Some authors believe that direct payments can have less positive effects. Such research is presented by Cionga et al, 2008, which evaluates who is likely to benefit, in the short term, from the implementation of the CAP in Romania, focusing on the distributional impacts of agricultural subsidies within the CAP. Preliminary results reveal an extremely uneven distribution of farm subsidies. As a result, the difference between Romanian low-income and high-income farms will become larger, the most vulnerable hardly benefit from the introduction of direct payments.

Another more pessimistic approach is also found in the study of Latruffe et al, 2008, which investigated the relationship between CAP direct payments and managerial efficiency for French vegetable and beef farms. The authors are adamant that there is a substantial component of inefficiency that is due to adverse conditions. Moreover, there is a significant negative relationship between managerial efficiency and CAP direct payments for vegetable farms and a positive relationship for livestock farms. Area payments and less favoured areas reduce the efficiency of vegetable crops, but head / animal and agri-environment payments increase the efficiency of farms for raising beef.

Kozar et al, 2005, conducted a study as soon as the country joined the EU, regarding the effect of direct payments on incomes. Its findings also include the fact that the estimated benefits are greatest in the case of the standard direct payment scheme, followed by the lump-sum payment option (fully decoupled). The results of the model also show that the reform of the policy will have redistributive effects in favour of agricultural households engaged in extensive agricultural production.

The importance of small farms is given by ensuring food security, ensuring viability in predominantly rural areas and ensuring employment, so supporting this sector is a strict necessity. In this regard, Volkov et al, 2019, presented a research on a system of indicators on quantifying the effects of direct payments on the economic and social sustainability of small farms. This research had Lithuania as a case study, the results showing that in this country the direct payments system did not contribute to improving the sustainability of small farms from a social and economic point of view.

Taking into account the characteristic of the agricultural sector in Romania which is divided into two categories, in terms of agricultural production, namely semi subsistence farms and large farms, and taking into account their share, and the fact that large farms represent less than 10% of the number of farms realizes half of the agricultural production, the hypothesis from which this paper starts, which wants to answer the research question formulated in the first paragraph, is that according to which the direct payments positively influence the value of the production of the agricultural sector in Romania.

Material and Method

The study aims to demonstrate the dependence of agricultural production on direct payments in the agricultural context in Romania. For this purpose, the hypothesis was defined that there is a statistically significant dependence between the quantity of agricultural production and the volume of

direct payments. Secondary data published by the National Institute of Statistics (INS) and EUROSTAT data were used to achieve the objective. The available data presented are for the time horizon 2008-2018. In the analysis is used the simple linear regression model that describes the linear relationship between direct payments and the value of agricultural production. The intensity of the dependence was measured by the correlation coefficient. For the calculation, the Pearson correlation coefficient was used, which determines the direction and rate of the statistical dependence force of the two mentioned numerical variables. The Pearson correlation coefficient has values between -1 and 1 and was determined based on the following calculation formula:

$$r_{x,y} = \frac{\sum_i (x_i - \bar{x}) * (y_i - \bar{y})}{\sqrt{\sum_i (x_i - \overline{x})^2 * \sum_i (y_i - \overline{y})^2}}, \text{ where}$$

x, y ... xn, yn are the measured values of the independent random selection of size n of the two random variables X, Y from the two-dimensional normal distribution; sample mean.

The correlation coefficient (r) was interpreted as follows (Colton's Rules, 1974)

- 0.25 <r <0.25. A correlation coefficient from -0.25 to 0.25 means a very weak or no correlation.
- -0.5 <r <-0.25 or 0.25 <r <0.5. A correlation coefficient from 0.25 to 0.50 (or from -0.25 to -0.50) means a weak correlation (acceptable degree of association)
- -0.75 <r <-0.5 or 0.5 <r <0.75. A correlation coefficient from 0.50 to 0.75 (or from -0.50 to -0.75) means a moderate to good correlation
- r <-0.75 or r> 0.75. A correlation coefficient greater than 0.75 (or less than -0.75) means a strong correlation (very good degree of association).

The Pearson correlation coefficient also indicates the direction of a linear relationship as follows.:

- r> 1 there is a direct linear relationship between the variables;
- r <1 there is an indirect linear relationship between the variables;
- r = 0 variables are not linearly dependent.

The analysis continued with the elaboration of a statistical model based on simple linear regression, with which the connection between the two variables will be determined, in order to determine the influence between them. To test the variation of y explained by the regression equation, the analysis of the variant (ANOVA) was used. Also by analysing the variant, the ratio between the variant explained by regression and the variant of residuals (F) is calculated.

Results and Discussions

The agricultural production in Romania is a primary one, respectively made up of raw products, which cannot have a high added value, considering that the processing component is not so common. This aspect can be verified by analysing the value of agricultural production by sectors, as divided into national statistical databases.

Thus, in order to determine the level and evolution of the value of the production of the agricultural branch, all the components of this branch will be analysed, according to the nomenclature of the National Institute of Statistics of Romania.

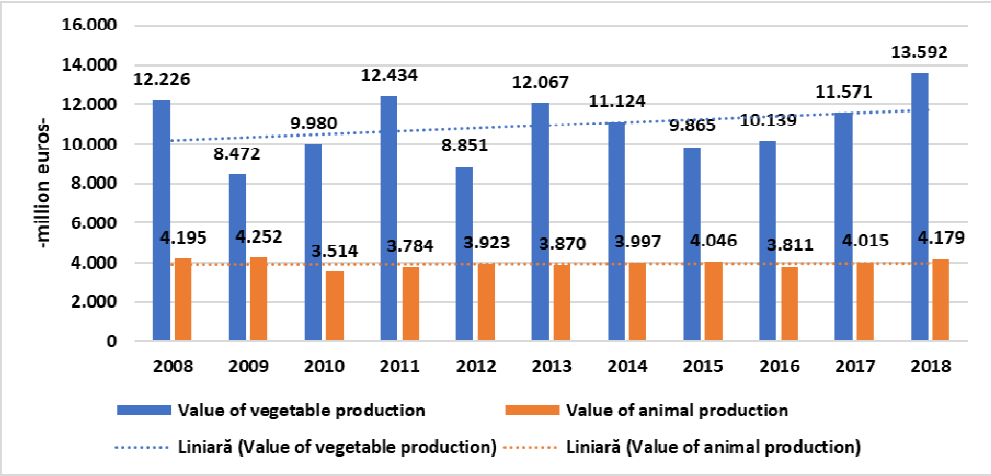

Figure 1: Evolution of the value of plant and animal production

Source: own processing based on NIS data

Figure 1 shows the production values for the two main sectors of the Romanian agriculture, respectively the plant and animal sector. The data provided by the NIS were converted from the national currency of Romania, using the average annual exchange rate, in euros. Thus, with regard to the value of the agricultural crop production, it can be observed that it has recorded fluctuations from year to year, considering that this sector is greatly influenced by the climatic conditions, so the obtained production has varied during the analysed period. On average, each year the value of plant production was 10.9 billion euros, with a standard deviation from this average of 1.6 billion euros, which resulted in a coefficient of variation of 14.7%. During the period analysed (2008-2018), the evolution of the value of the vegetal production registered a slight growth, having an average growth rate of 1.06% per year.

Regarding the value of the animal production, its evolution was more constant, registering an annual average value of 3.96 billion euros, registering an average deviation from this value, of 214 million euros, which causes a variation of 5.4%. As for the evolution of the value of animal production, this is almost constant, registering a slightly negative annual average rate of -0.04%.

By summing the two values of the production (the plant and the animal), the value of the agricultural production of goods results according to NIS. This is shown in Figure 2.

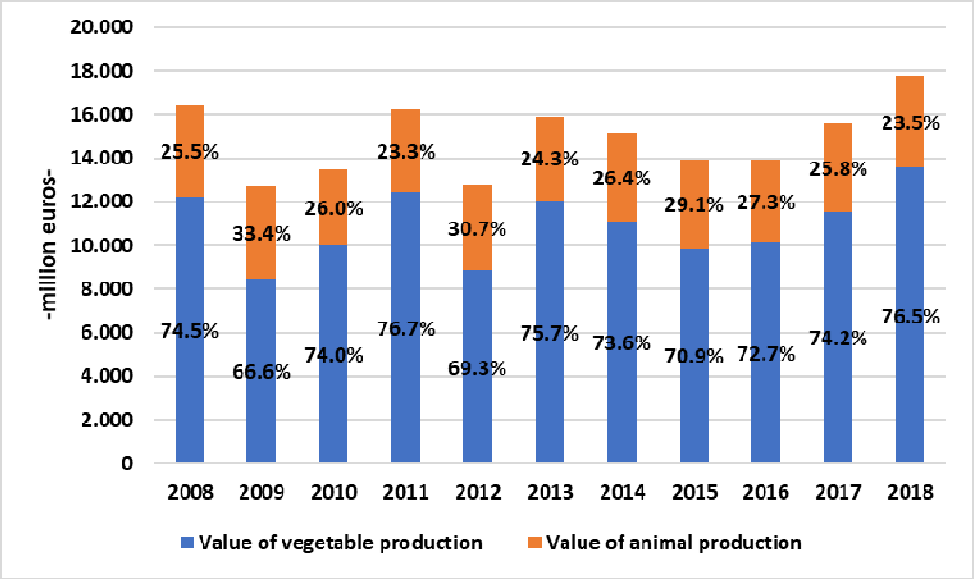

Figure 2: Evolution of the value of agricultural production of goods

Source: own processing based on NIS data

The evolution of the value of the production of agricultural goods, is given, in large part by the evolution of the value of the vegetable production, considering that, on the one hand, the evolution of the value of the animal production is a constant one, and on the other hand the share of the vegetable sector in the agricultural production. of goods, as shown in figure 2, occupies values between 66.6% and 73.1%. On average between the two sectors the weight is thus distributed, 73.1% representing the value of the plant production, and 26.9% representing the value of the animal production. On average, the value of agricultural goods production in Romania was during the analyzed period, of 14.9 billion euros, annually, with a deviation of 1.63 billion euros, which determines a coefficient of variation of 11%.

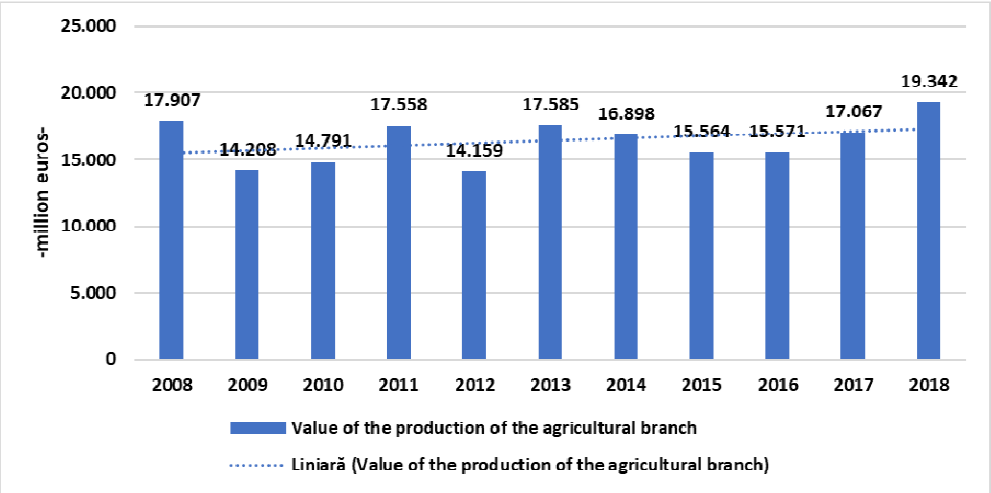

Figure 3: Evolution of the production value of the agricultural branch

Source: own processing based on NIS data

If the value of agricultural services and the value of processing products are added to the value of agricultural goods, the value of the production of the whole agricultural branch can be determined. The evolution of the value of the production of the whole agricultural branch is represented in figure

3. As can be seen, it recorded values for the period 2008-2018, ranging from 14.16 billion euros to 19.34 billion euros. On the one hand, these values are largely influenced by the level of production obtained in the respective sector, and on the other hand the prices of agricultural products or services can have a significant influence on this value. The average annual value of agricultural production in Romania was, during the reference period, of 16.42 billion euros, with an average deviation from this value of 1.68 billion euros, which resulted in a coefficient of variation of 10.2%. On average, over the period the evolution of the value of agricultural production was slightly increasing, registering an average growth rate of 0.77% per year.

Considering that the purpose of this study is to determine the influence that the subsidies can have on the economic indicators analysed previously, it is considered necessary to analyse the evolution of the subsidies granted in agriculture. In this respect, with the help of the annual reports of the European Commission on accessing the European Agricultural Guarantee Fund, the evolution of the support granted to Romania regarding direct payments could be realized.

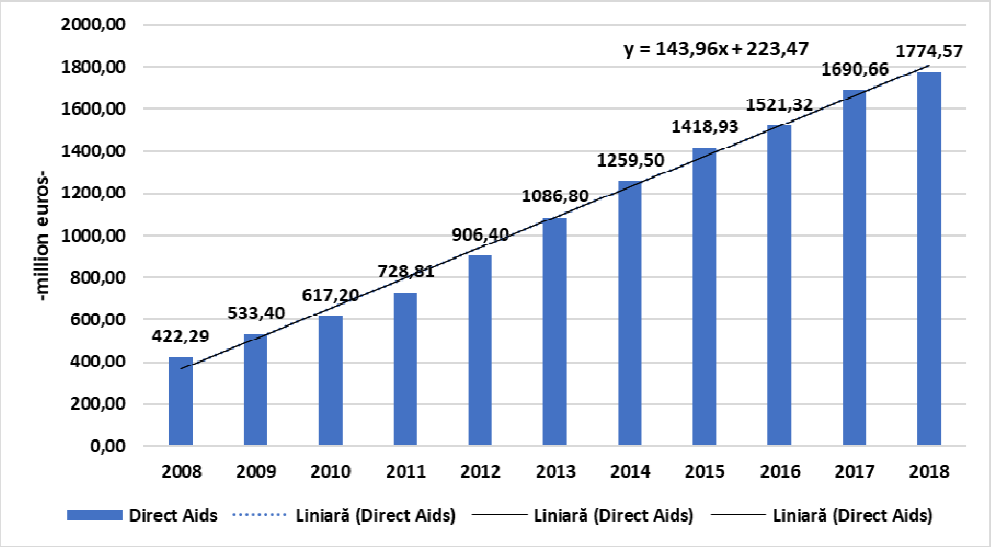

Figure 4: The evolution of direct payments in Romania

Source: own processing based on the annual reports of the European Commission

Regarding the evolution of the direct payments made in the Romanian agricultural sector, in figure 4, we can observe a significant and continuous increase of them from one year to the next. If in 2008, through the EAGF fund, grants of 422.3 million euros were granted, they increased from year to year, reaching in 2018, direct payments worth 1.775 billion euros, being 4.2 times larger, as in the first year.

On average, each year, direct payments amounting to about 1.09 billion euros were granted; from this value, there was a rather large average deviation of 479 million euros, which resulted in a coefficient of variation of 44.1%, which indicates that the data string is not homogeneous. The reason for this situation is recorded, the quite large increase from one year to the next of the allocated amounts, on average the annual growth rate was 15.4%, and if we refer to the absolute difference, from the equation of the line of trend can be seen that, on average, the value of direct payments increased by 144 million euros from year to year.

Considering the hypothesis of this research, namely that direct payments influence the value of agricultural production, in conjunction with the objective of the paper to determine this influence, it is considered necessary to determine the dependent variable, respectively the one that the total value of direct payments most influences. In this sense, further, with the help of the additional data analysis program, more correlations will be made between the independent variable (direct payments) and a number of possible variables.

Table 1: Determination of the dependent variable using Pearson correlation

	Agricultural production of goods	*Agricultural production*	*Production of the agricultural branch*	*Direct Aids*
Agricultural production of goods	1			
Agricultural production	0,9998	1		
Production of the agricultural branch	0,9966	0,9975	1	
Direct Aids	0,6445	0,6543	0,6883	1

Source: own calculations

Table 1 determines the Pearson correlation coefficients, between direct payments and the value of agricultural production. These calculations were made on the basis of the national currency, so that the exchange rate does not affect the statistical model. Thus, between the direct payments and the value of the agricultural goods a positive coefficient of 0.6445 is registered, which denotes a close and directly proportional connection between these variables. A similar link is registered between direct payments and the value of agricultural production (0.6543), but the highest correlation coefficient is recorded between the direct support and the value of the production of the whole agricultural branch, this being of 0.683, which causes a connection close and directly proportional between these two variables. Thus, the value of the output of the whole agricultural branch will be used as a dependent variable.

Table 2 Determination of the link between variables through the simple linear regression model

Regression Statistics	
Multiple R	0,6883
R Square	0,4737
Adjusted R Square	0,4152
Standard Error	6610,9820
Observations	11

ANOVA						
	df	*SS*	*MS*	*F*	*Significance F*	
Regression	1	354021495,2	354021495,2	8,100	0,019	
Residual	9	393345746,7	43705083,0			
Total	10	747367241,8				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	59346,509	4870,262	12,185	0,000	48329,211	70363,807
Direct payments million lei	2,610	0,917	2,846	0,019	0,535	4,684

Source: own calculations

Table 2 presents the statistical linear regression model in which the value of the production of the agricultural branch is correlated with the value of the direct payments. Thus, as mentioned above, the correlation coefficient (multiple R) between these two variables is 0.668 which denotes a close link between the variables and positive, respectively when one grows, grows and the other. The coefficient of determination (R Square) is 0.473, so it can be considered that the dependent variables are explained by the independent variables in proportion of 47.3%.

Moving on, to determine if the model is statistically significant, it can be said that yes, because the sig. (signifiance F) is 0.019 lower than the maximum allowed threshold of 0.05, so it can be considered that the model is statistically valid.

As far as the coefficients of the function are concerned, they are also statistically valid considering that sig. (P-value) is also below 0.05, and the confidence intervals do not contain the null value. Thus, by determining the coefficients of the function it can be written in the following form:
Y = a*x+b: Agricultural branch production value = 2,61 * Direct payments + 59346,5

Therefore it can be said that direct payments significantly influence the value of the agricultural branch, and quantifying this aspect, when the value of direct payments increases by one unit, the value of the whole agricultural branch will increase by 2.61 units.

Conclusions

Taking into account the necessary caution in interpreting the results, we can draw some general conclusions on the paper that aimed to determine the influence of direct payments on the value efficiency of the agricultural branch in Romania. Following the analysis of the results, it was found that the agricultural sectors with a higher share of direct payments on the value of production presented a variable value efficiency, this variability being given by the weights occupied by the vegetable (73.1%) and animal production sectors (26.9%) in the value structure of agricultural production. The value of the vegetal sector, in the period 2008-2018, registered an annual growth rate of 1.06%, and for the animal sector the average annual rate is negative, of about 0.04%. The average annual growth rate for direct payments was 14.5%, which suggests that the Romanian agricultural sector is dependent on direct payments, payments that have contributed to ensuring the efficiency of the agricultural sector.

The evolution of the value of production of the entire agricultural branch means that as the amount of direct payments increased from one year to another, the value of production was directly proportional to the increase in subsidies (r = 0.6888) at a moderate pace, due to price volatility of the demand and supply of agricultural products. Also, direct payments provided as support for farmers' incomes contribute to maintaining agricultural holdings to remain in agriculture in the idea that they can improve their technical efficiency and productivity, but those farms produce goods for self-consumption and do not contribute to the value chain.

Through the developed statistical model, which includes a simple linear regression, its function was determined and implicitly the influence that the independent variable (direct payments) has on the dependent variable (the value of the production of the agricultural branch). Thus, the linear function recorded a regression coefficient of 2.61, which indicates that when direct payments increase by one million, the value of production of the entire agricultural sector increases by 2.61 million.

Acknowledgment

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- NIS – National Institut of Statistics – www.insse.ro

Diversification of Farm Liquidity in the EU

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Abstract

The aim of this study is to analyse and evaluate the diversity of liquidity of agricultural holdings in the EU. The financial liquidity of agricultural holdings was examined by time, by EU countries, as well as by economic size of holdings (ESU) and farm type (T8). The studies used statistical data from the EU Farm Accountancy Data Network (FADN).
The average level of current farm liquidity in the EU countries ranged from 4.4 to 6.6, while the average level of fast liquidity from 2.9 to 4.9. Thus, in the light of the normative values, it is a high level of financial liquidity.
The optimum levels of liquidity presented in the literature are not applicable to agricultural holdings. There are very large differences in the level of liquidity of farms between the EU countries. Liquidity is dependent on the economic size of farms - both the current and quick liquidity is lower the higher the economic size of the farm. There is a significant variation in the financial liquidity of agricultural holdings by type of farming.

Keywords: Financial Liquidity, Agricultural Holdings, EU.

Introduction

The topic addressed in this article is financial liquidity of agricultural holdings. Liquidity is one of the most important factors that determines the existence of an enterprise on the market, and its loss is the main cause of financial problems and bankruptcy of many enterprises (i.a. Masdupi, Tasman and Davista, 2018; Khan and Guruli, 2015; Jędrzejczak-Gas, 2013; Mokhova and Zinecker, 2013). On the other hand, the overliquidity may limit the development possibilities of an enterprise by reducing its ability to generate profit, which should be the main source of development financing. Therefore, the issue of financial liquidity is widely analysed in the literature on the subject, but most often in relation to non-agricultural economic activities (i.a. Kontuš and Mihanović, 2019; Almeida, Campello, Cunha and Weisbach, 2014; Liua, Niu and Zhang, 2019; Jędrzejczak-Gas and Kużdowicz 2016). However, it is addressed to a definitely limited extent in relation to the agricultural sector. Yet, agricultural enterprises must function as any other economic entity (Kułyk, 2013; Kułyk 2019) and it is necessary to manage financial liquidity in such a way as to enable timely payment.

The research shows that there is an exceptional situation in the case of the liquidity of agricultural holding entities. They maintain liquidity at a higher level than in other sectors (i.a. Bieniasz and Gołaś, 2008). Therefore, there is a need to undertake further research on the liquidity of agricultural holding entities. As a result, surveys have been carried out which attempt to answer the question: How does the financial liquidity of agricultural holdings in the EU (in the time profile, in particular EU countries, in the system of economic size of holdings (ESU), by farm type (T8)?

The aim of this study is to analyse and evaluate the diversity of liquidity of agricultural holdings in the EU. The article consists of two parts. The first part, based on the literature, present the most important issues concerning the concept and measurement of financial liquidity. The second part presents the results of the study on the variability of financial liquidity in EU agriculture. The financial liquidity of agricultural holdings was examined by time, by EU countries, as well as by economic size of holdings (ESU) and farm type (T8). The studies used statistical data from the EU Farm Accountancy Data Network (FADN).

Concept and Measurement of Financial Liquidity - Literature Analysis

A company is liquid if it has sufficient financial resources to meet its financial obligations in a timely manner at minimum cost (Maness and Zietlow, 2005, p. 31).

In the literature on the subject one can find various definitions of financial liquidity, which indicate its various aspects. Most often, financial liquidity is defined in terms of asset,asset and capital and cash flow (Kosińska and Cicirko, 2010).

In terms of assets, liquidity means the ability to convert individual assets into cash in the shortest possible time and without any impairment of their value (Wędzki, 2003, p. 32; Gajdka and Walińska, 1998, p. 465; Grzywacz, 2014, pp. 11-12). Assets that can be quickly converted to cash without a significant decrease in their value are defined as liquid assets (Helfert, 1997; Brighman and Houston, 2004, p. 77).

In terms of asset and capital, liquidity is the ability of an enterprise to meet its short-term liabilities on time. This aspect therefore concerns the mutual relationship between the assets that secure the timely repayment of liabilities and the liabilities that finance the asset (Wędzki, 2003, p. 33). Therefore, financial liquidity is closely related to the size and structure of current assets. The company's current assets are most easily converted into cash, which makes them the main source of cash to cover maturing liabilities (Shapiro, 1990, p. 734).

In terms of cash flow, financial liquidity is the ability to cover expenses resulting from current liabilities and necessary future expenses with expected current cash inflows (Kusak, 2004, p. 10; Wojciechowska, 2001, p. 14; Dudycz and Wrzosek 2000).

Liquidity in terms of assets andasset and capital is static. It is calculated on the basis of assets and liabilities that the entity has at a given time. In turn, financial liquidity in terms of cash flows is dynamic - it shows financial processes streamlined in the form of cash receipts and expenses.

To sum up, financial liquidity is a function of current assets and current liabilities and their structure. The level of a company's liquidity depends on the amount of cash and other assets that can be quickly converted into cash, the amount of liabilities that will need to be repaid in the near future, and the company's ability to raise cash by issuing securities or borrowing money (Chambers and Lacey, 2011 , p. 489).

Liquidity assessment is carried out primarily on the basis of financial reporting and should take into account indicators of a static nature (asset and asset-equity aspect) and indicators of a dynamic nature (cash flow aspect). In practice, this measurement is most often carried out on the basis of static indicators.

There are many different static liquidity ratios in the literature (Brigham and Houston, 2012, pp. 99-101; Dyson, 2010, pp. 222-225; Correia, Flynn, Uliana and Wormald, 2001, pp. 5-13). These indicators most often include: current liquidity ratio, quick liquidity ratio and instant liquidity ratio (see Abraham, Glynn, Murphy and Wilkinson, 2008; Atkinson, Young and Kaplan, 2004).

Current ratio - indicates how many times current assets cover current liabilities. It informs about the ability of the company to settle its current liabilities with the global volume of current assets as quickly as possible. In the literature there are discrepancies as to the optimal level of this ratio. For example, the optimal range of the value of this index according to E. Nowak is 1.5-2.0 (2008, p. 205), 1.3-2.0 according to B. Olzacka, R. Pałczyńska-Gościniak (2007, p. 56), 1.6-1.9 according to P. Kralicek (1995), 1,2-3,4 according to A. Niemiec (2014). The optimum level of financial liquidity does not apply to all industries. In agriculture, the current liquidity ratio is generally higher, which is a result of a long production cycle and the need to accumulate stocks of means of production (Ziętara, Kosiorek, Tchorzewska, Kondraszuk 1994, p. 98). The research indicates that in agricultural holdings

the value of current liquidity indexes is higher than the optimum one from literature (Wasilewski, Zabolotnyy, 2016; Mańko, Sobczyński and Sass, 2008, p. 10-20).

Quick ratio - indicates how many times assets with a high degree of liquidity exceed current liabilities. It is most often assumed that the optimal level of the ratio is between 0.8 and 1.2. However, it should be noted that similarly to the current liquidity ratio, there are discrepancies in the literature on the subject as to the optimal level of this ratio (Kreczmańska-Gigol, 2015, pp. 37-38).

Cash ratio - indicates how much of the current liabilities can be repaid immediately if they become suddenly due. It is most often assumed that this ratio should take values from 0.2 to 0.3, but similarly as in the case of the two previous ratios, there are discrepancies in the literature on the optimal level of this ratio (Kreczmańska-Gigol, 2015, p. 39).

Liquidity in EU Agriculture

The results of the study on the diversification of liquidity in EU agriculture are presented below. Statistical data of the EU Farm Accountancy Data Network (FADN) from the years 2004-2017 was used. The financial liquidity of agricultural holdings was examined by time,by European Union (EU) countries, as well as by economic size of holdings (ESU) and by farm type (T8).

The literature presents many different indicators on the basis of which the financial liquidity of enterprises can be assessed. However, due to the lack of data in the FADN accounting database, two indicators, i.e. the current liquidity index and the quick liquidity index were the subject of research.

The current liquidity ratio is presented in Table 1, while thequick liquidity ratio for EU-25 for 2004-2006, EU-27 for 2007-2012 and EU-28 for 2013-2017 is presented in Table 2.

Table 1: Indicators of current financial liquidity in EU agricultural holdings in the years 2004-2017

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belgium	122,6	105,6	122,0	87,5	90,7	86,0	152,4	95,3	108,7	81,3	19,6	6,2	14,3	11,0
Bulgaria	-	-	-	5,9	5,0	4,3	3,7	4,2	3,9	4,3	2,8	3,0	2,8	2,6
Cyprus	15,0	50,0	236,3	998,0	158,3	193,0	222,4	-	107,6	128,5	148,3	458,1	483,8	102,0
Czech Republic	2,5	2,6	2,6	2,9	2,7	3,1	2,8	3,1	3,1	3,1	3,1	2,8	2,9	2,8
Denmark	4,0	4,2	4,5	5,1	3,9	4,7	5,0	4,8	4,5	4,3	4,5	4,5	2,1	2,2
Germany	2,2	2,3	2,3	2,3	2,1	2,5	2,5	3,5	2,6	2,6	1,9	1,9	1,9	1,9
Greece	23,5	26,0	22,3	27,9	30,6	17,8	21,4	26,6	38,5	40,6	120,0	294,0	376,7	1097,3
Spain	123,7	112,4	138,1	159,1	170,9	127,6	125,4	101,4	52,7	83,7	30,1	36,9	37,3	33,9
Estonia	2,7	2,3	2,0	2,3	1,8	1,7	1,9	2,2	2,4	1,9	1,9	1,9	1,7	1,9
France	2,9	2,9	2,9	3,0	2,9	2,8	3,0	3,1	3,1	2,9	2,6	2,5	2,5	2,6
Croatia	-	-	-	-	-	-	-	-	-	159,2	27,4	2,3	24,1	15,2
Hungary	3,2	2,8	2,9	2,3	2,8	3,0	3,0	3,0	3,2	3,7	3,4	3,7	5,3	4,8
Ireland	12,7	15,3	10,3	13,5	11,5	12,8	14,2	19,8	15,7	14,9	35,9	37,3	33,5	44,3
Italy	49,0	114,6	81,3	52,7	350,1	397,4	506,9	727,6	1581,5	1498,6	177,1	338,0	571,7	488,6
Lithuania	7,6	7,2	6,6	4,9	4,9	4,5	4,9	4,7	4,1	4,1	4,0	4,2	4,3	4,3
Luxembourg	7,2	7,5	8,0	8,2	7,1	7,1	6,0	5,7	5,0	3,8	2,7	3,0	2,8	4,2
Latvia	4,3	3,8	3,6	3,3	3,3	3,6	3,6	3,5	3,7	3,4	2,6	2,3	2,4	2,5
Malta	20,7	7,3	5,0	5,2	6,2	5,2	6,5	5,7	7,1	6,9	12,6	13,8	11,1	9,7
Netherlands	2,3	2,4	2,9	2,7	2,8	2,7	3,3	3,4	3,4	3,7	4,6	4,4	3,8	4,6
Austria	7,8	7,9	9,9	8,8	9,6	7,6	8,2	6,9	7,8	7,7	140,2	157,1	116,4	123,3
Poland	5,3	5,4	5,4	5,6	5,3	5,3	6,2	6,7	7,5	7,6	7,0	6,8	7,5	7,6

Portugal	10,4	11,8	10,2	11,0	9,5	15,1	12,5	9,6	8,7	15,1	8,9	7,7	8,9	7,7
Romania	-	-	-	12,2	13,5	13,9	19,8	21,3	38,2	44,6	13,9	9,3	12,9	14,2
Finland	10,3	10,5	12,3	12,8	12,9	10,1	10,5	10,0	10,5	9,6	8,6	8,9	7,6	8,0
Sweden	2,8	3,1	4,8	4,5	4,6	5,0	4,6	4,4	4,4	4,4	3,5	3,6	3,9	3,6
Slovakia	13,4	8,3	7,5	6,2	5,4	4,3	5,6	5,5	6,2	5,1	1,5	1,3	1,2	1,3
Slovenia	97,6	95,4	113,0	106,5	57,4	67,2	38,3	120,7	34,0	108,3	28,2	18,2	29,8	38,9
United Kingdom	1,9	1,9	2,2	2,1	2,3	2,4	2,5	2,5	2,6	2,5	2,1	2,0	4,2	2,4
UE	4,4	4,7	5,3	5,4	5,3	5,1	5,7	6,6	5,8	5,9	5,6	5,5	5,9	5,9

Source: Own study based on FADN (https://ec.europa.eu/agriculture/rica/database/database_en.cfm).

The data presented in Tables 1 and 2 show that in the years 2004-2017, the average level of current farm liquidity in the EU countries ranged from 4.4 to 6.6 and the average level of fast liquidity from 2.9 to 4.9. Therefore, in the light of the normative values, it is a high level of liquidity. In the analysed period there was an increase in the liquidity of EU agricultural holdings. In the years 2004-2005, the current liquidity index amounted to about 4.5, in the years 2006-2010 - increased to about 5.5, while in 2011 it reached its highest value in the whole analysed period - 6.6. In the following years, its value decreased slightly, but was not lower than 5.5, and in the last analysed years it amounted to about 6.0 (Table 1.). A similar increase is observed in the case of the quick liquidity index - its value increased from 2.9 in 2004 to 4.9 in the years 2010-2011, while in subsequent years it slightly decreased, but did not go below 4, and in the last years under study it amounted to about 4.6 (Table 2.).

Table 2: Indicators of fast liquidity in EU agricultural holdings in 2004-2017

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belgium	39,1	32,9	38,3	26,2	29,3	26,1	44,0	29,9	31,9	25,3	7,2	2,7	9,5	7,4
Bulgaria	-	-	-	4,5	3,7	3,3	2,6	3,0	2,8	3,3	1,9	2,0	2,0	1,7
Cyprus	12,8	43,3	202,7	878,3	136,3	172,2	194,6	-	93,0	111,1	121,1	427,6	442,9	85,9
Czech Republic	1,5	1,6	1,7	2,0	1,9	2,2	2,0	2,2	2,3	2,3	2,2	2,1	2,1	2,1
Denmark	2,6	2,7	2,9	3,4	2,6	3,1	3,2	3,0	2,8	2,7	3,4	3,3	1,6	1,6
Germany	1,5	1,5	1,5	1,6	1,5	1,7	1,8	2,5	1,9	2,0	1,2	1,2	1,3	1,3
Greece	11,6	11,8	10,2	13,3	15,0	8,8	10,6	12,9	21,1	24,7	71,0	176,8	238,2	655,5
Spain	114,8	105,0	132,5	151,3	163,3	121,4	119,2	95,8	48,0	76,7	28,0	34,3	34,9	31,9
Estonia	1,4	1,2	1,0	1,1	0,8	0,8	1,0	1,3	1,4	1,1	1,1	1,1	1,1	1,2
France	1,6	1,5	1,6	1,6	1,6	1,5	1,7	1,7	1,7	1,6	1,3	1,3	1,4	1,4
Croatia	-	-	-	-	-	-	-	-	-	78,3	9,2	0,7	9,8	4,1
Hungary	2,2	1,9	2,1	1,7	1,9	2,2	2,3	2,2	2,4	2,8	2,4	2,8	4,1	3,8
Ireland	3,8	4,7	3,3	4,3	4,1	4,9	5,4	7,4	5,9	5,7	25,0	25,9	23,3	30,6
Italy	25,7	84,4	61,0	38,9	261,3	300,4	422,3	653,4	1422,1	1371,7	164,1	316,6	534,5	463,7
Lithuania	4,9	4,7	4,3	3,3	3,4	3,2	3,6	3,2	2,9	2,8	2,8	2,9	3,2	3,1
Luxembourg	4,8	5,1	5,5	5,5	4,6	4,8	4,3	4,1	3,6	2,7	1,6	1,9	1,8	2,9
Latvia	2,9	2,7	2,6	2,3	2,4	2,6	2,7	2,6	2,7	2,5	1,7	1,5	1,6	1,8
Malta	12,3	3,5	2,3	2,7	3,0	2,9	3,8	3,3	4,0	4,0	7,5	8,4	6,8	6,0
Netherlands	1,7	1,7	2,0	2,0	2,0	1,9	2,3	2,4	2,3	2,6	3,8	3,6	3,0	3,6
Austria	6,4	6,8	8,5	7,1	7,8	6,1	6,6	5,6	6,3	6,4	118,1	134,2	98,9	103,7
Poland	2,1	2,2	2,5	2,4	2,2	2,4	2,7	2,8	3,2	3,4	2,9	3,0	3,5	3,5
Portugal	6,1	6,9	6,1	6,4	5,2	9,9	8,4	6,2	5,1	11,0	4,8	4,3	4,7	4,0
Romania	-	-	-	9,1	10,7	10,7	13,9	16,2	29,7	34,3	10,5	7,0	9,6	11,0
Finland	7,2	7,6	8,6	8,4	8,9	7,0	7,2	6,9	6,2	5,8	5,3	5,7	4,9	5,2
Sweden	1,9	2,1	3,6	3,3	3,4	3,7	3,4	3,2	3,2	3,3	2,3	2,5	2,6	2,5

Slovakia	8,7	4,9	5,2	4,1	3,4	2,9	4,4	4,0	4,6	3,7	1,1	0,9	0,8	1,0
Slovenia	5,8	4,7	4,3	3,9	2,0	1,9	1,0	4,4	1,1	3,7	8,8	5,0	9,6	22,8
United Kingdom	1,1	1,2	1,3	1,3	1,4	1,4	1,5	1,4	1,5	1,4	1,0	1,0	2,4	1,4
UE	2,9	3,2	3,9	4,7	4,5	4,4	4,9	4,9	4,2	4,3	4,2	4,1	4,5	4,6

Source: Own study based on FADN (https://ec.europa.eu/agriculture/rica/database/database_en.cfm).

The research shows that there are very large differences in the level of liquidity between EU countries. In the whole analysed period, the highest levels of liquidity ratios occurred in such countries as: Italy, Spain, Cyprus, Slovenia, Belgium, Greece, Austria, where often liquidity ratios were even over 100, and in some years even over 1000 (e.g. in 2012-201 in Italy, in 2017 in Greece). The lowest value of the ratios was reached in countries such as: Germany, Great Britain, France, Estonia, Czech Republic, Bulgaria, Hungary, Latvia, Denmark, Sweden and the Netherlands. In addition, it should be noted that in many countries liquidity has changed significantly over the period considered. A very large increase in liquidity took place in countries such as Greece (from about 12 to about 200 or even over 600), Austria (about 7 to about 100) or Ireland (from about 4 to about 25-30), while a decrease was observed in countries such as: Belgium (from about 40-30 to about 9-7), Luxembourg (from about 5 to about 2-3) or Slovakia (from about 8-5 to about 1).

The very high diversity of liquidity of agricultural holdings in the EU is also confirmed by basic descriptive statistics (Table 3). In all the years of the analysed period, the variability indicators calculated for the financial liquidity indicators were very high, in some years their value exceeded even 300%.

Table 3: Descriptive statistics on the current and rapid liquidity of EU farms in 2004-2017

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Indicator of current financial liquidity														
AV	4,4	4,7	5,3	5,4	5,3	5,1	5,7	6,6	5,8	5,9	5,6	5,5	5,9	5,9
Min	1,9	1,9	2,0	2,1	1,8	1,7	1,9	2,2	2,4	1,9	1,6	1,3	1,2	1,4
Max	123,7	114,6	236,3	998,0	350,1	397,3	506,9	727,6	1581,5	1498,6	177,1	458,1	571,7	1097,3
CV	164,2	155,7	180,3	332,5	213,0	226,5	240,4	308,0	394,0	349,0	171,9	226,9	236,4	303,5
Indicator of fast liquidity														
AV	2,9	3,2	3,9	4,7	4,5	4,4	4,9	4,9	4,2	4,3	4,2	4,1	4,5	4,6
Min	1,1	1,2	1,0	1,1	0,8	0,8	1,0	1,3	1,1	1,1	1,0	0,7	0,9	1,0
Max	114,8	105,0	202,7	878,3	261,3	300,4	422,3	653,4	1422,2	1371,7	164,1	427,7	534,5	655,5
CV	204,0	190,5	229,2	384,1	242,1	255,3	273,2	376,6	429,0	401,6	195,3	243,7	254,3	282,4

AV - average value; Min - minimum value; Max - maximum value; CV - coefficient of variation (%).
Source: Own study based on FADN (https://ec.europa.eu/agriculture/rica/database/database_en.cfm).

Analysing the data for the sector of agricultural holdings by economic size, it can be seen that with an increase in the economic size of an agricultural holding, liquidity decreases. For example, in 2017, for micro farms, the current liquidity amounted to 43.4 and quick was 34. For very large farms, the former amounted to 3.0 and the latter to 1.8. The differences in the level of financial liquidity between micro and large farms are very clear because their liquidity ratios differ even 20 times.

The survey showed that in all groups of farms distinguished by economic size (ESU), except for micro farms, there was a decrease in financial liquidity during the surveyed period. The greatest decrease took place in very small, small and medium-sized farms - their ratios decreased about 2 times.

Table 4: Indicators of current and fast liquidity by economic size of agricultural holdings (ESU) in the EU in the years 2004-2017

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Indicator of current financial liquidity														
Micro 2000 - < 8000 EUR	45,2	44,0	42,0	18,2	54,9	65,2	64,5	62,1	72,6	66,7	43,0	56,2	52,8	43,4
Very small 8000 - < 25000 EUR	41,5	41,9	36,5	39,2	36,1	29,9	24,8	29,4	26,1	26,1	26,8	27,7	24,0	22,1
Small 25000 - < 50000 EUR	13,2	14,3	12,8	11,8	11,1	9,8	11,1	9,9	9,7	9,4	9,6	8,8	8,1	7,2
Average 50000 - < 100000 EUR	8,9	8,3	7,7	8,0	7,4	7,5	8,0	7,0	6,2	6,2	6,1	5,9	5,5	5,1
Large 100000 - < 500000 EUR	4,9	4,8	4,6	4,5	4,8	4,8	5,4	4,5	4,0	3,8	4,0	3,9	3,5	3,3
Very large >= 50000 EUR	3,5	3,6	3,3	3,4	3,8	3,8	3,9	3,5	3,2	3,0	3,1	3,3	2,9	3,0
Indicator of fast liquidity														
Micro 2000 - < 8000 EUR	28,9	28,4	26,6	13,0	41,1	48,9	50,5	47,8	58,9	53,0	33,5	48,0	43,5	34,0
Very small 8000 - < 25000 EUR	35,7	35,8	30,8	33,1	29,6	24,6	20,3	24,1	21,2	21,2	21,9	22,8	18,9	16,4
Small 25000 - < 50000 EUR	11,0	11,8	10,3	9,3	8,5	7,4	8,8	7,8	7,4	7,1	7,3	6,7	5,9	5,1
Average 50000 - < 100000 EUR	7,2	6,7	6,2	6,2	5,6	5,6	6,1	5,2	4,5	4,5	4,5	4,3	3,8	3,4
Large 100000 - < 500000 EUR	3,7	3,5	3,3	3,3	3,5	3,4	3,9	3,1	2,6	2,5	2,6	2,6	2,3	2
Very large >= 50000 EUR	2,6	2,6	2,3	2,4	2,6	2,6	2,7	2,4	2,1	2,0	2,1	2,2	1,8	1,8

Source: Own study based on FADN (https://ec.europa.eu/agriculture/rica/database/database_en.cfm).

The analysis of financial liquidity by type of farming indicates that there is also considerable variation in this arrangement. Four groups of farms can be distinguished, which differ in their financial liquidity.

The first group is made up of one type - other permanent crops - in which there is high liquidity in the whole analysed period (the current liquidity ratio was between 18.3 and 28.7, the quick liquidity ratio - between 16.6 and 25.7). Moreover, the difference between the level of current and quick liquidity in this type was between 0.9 and 2.0. Taking into account that the liquidity ratios in this type were very high, it can be concluded that the difference is not big.

The second group consists of two types: wine and other grazing livestock. Their current liquidity was about 5-9 and fast 2-6. This group showed the biggest difference between the current and quick liquidity (2.5-3.3). This means that farms belonging to these types have a liquidity determined to a relatively large extent by stocks. In the analysed period, both the indicators of current and fast liquidity decreased, while whether the biggest drops were recorded by fast indicators and in 2017 they were at a level similar to the other types (except for the Other permanent crops type).

The third group consists of three types, i.e. fieldcrops, horticulture, milk, with anmild level of liquidity, compared to the other types. Their current liquidity was about 3-6.4 and quick liquidity was 2.7-5.3. In the period under study, both the current and quick liquidity ratios decreased to a similar extent. In the case of this group, the difference between the level of current and quick liquidity was at the lowest level. This means that in the case of these farms, inventories are at a relatively low level and are not significant in shaping the financial liquidity.

The fourth group consists of two types with the lowest liquidity, i.e. granivores and mixed. Their current liquidity was at the level of about 3.4-5.2 and quick liquidity was1.7-3.3. Farms belonging to

these types are characterised by a relatively high level of stocks (this group takes second place in this respect), which means that their financial liquidity is to a large extent determined by stocks.

Moreover, it should be noted that in the last years of the analysed period (2016-2017) there was a decrease in financial liquidity in all the examined types of agricultural holdings, with the greatest decrease taking place in 2 types: horticulture and wine. In these farms, the current liquidity index decreased by about 43% and 33% respectively, and the quick liquidity index by about 51% and 60% respectively. These changes resulted in the fact that in the last years of the analysed period the differences in the level of financial liquidity between particular types of agricultural holdings have decreased.

Table 5: Indicators of current and quick financial liquidity by type of agricultural holdings (T8) in the EU in the years 2004-2017

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Indicator of current financial liquidity														
Fieldcrops	5,1	5,2	4,9	5,1	6,0	5,8	6,4	5,6	4,9	5,1	5,1	5,0	4,2	3,9
Horticulture	5,3	4,6	4,2	3,5	4,4	4,7	5,0	4,2	3,6	3,9	3,8	3,8	3,0	3,0
Wine	8,0	7,3	6,7	6,9	7,3	6,5	6,4	5,8	5,5	6,0	5,5	5,4	5,4	5,3
Other permanent crops	21,8	18,7	19,3	21,2	20,2	20,6	27,2	25,9	21,1	28,7	27,5	27,6	18,7	18,3
Milk	5,6	4,9	5,2	5,1	4,9	4,8	6,4	4,9	4,4	4,2	4,6	4,5	4,2	3,8
Other grazing livestock	8,4	9,7	8,0	7,6	7,5	7,1	8,2	7,1	6,8	6,8	7,1	7,5	6,7	6,0
Granivores	4,1	4,4	3,9	4,1	4,2	4,3	4,6	4,1	4,0	3,6	4,0	4,1	3,7	3,4
Mixed	4,0	4,1	3,9	4,2	4,5	4,6	5,2	4,9	4,3	4,3	4,6	4,1	3,7	3,7
Indicator of fast liquidity														
Fieldcrops	4,4	4,5	4,1	4,3	5,1	4,8	5,3	4,7	4	4,2	4,2	4,2	3,5	3,1
Horticulture	4,9	4,3	3,8	3,2	3,6	3,8	4,1	3,4	2,9	3,3	3,1	3,1	2,4	2,4
Wine	5,3	4,5	4,1	4,2	4,4	3,6	3,5	2,8	2,5	3,0	2,6	2,4	2,1	2,1
Other permanent crops	20,8	17,8	18,3	20,0	18,9	19,2	25,7	24,4	19,9	27	25,7	25,6	17,0	16,6
Milk	4,5	3,8	4,0	3,8	3,6	3,5	4,9	3,6	3,1	3,0	3,4	3,4	3,1	2,7
Other grazing livestock	5,9	6,8	5,5	5,1	4,7	4,3	5,5	4,5	4,2	4,2	4,4	4,9	4,0	3,3
Granivores	2,9	3,0	2,6	2,8	2,6	2,8	3,0	2,6	2,5	2,2	2,6	2,5	2,0	1,7
Mixed	2,6	2,6	2,4	2,6	2,9	2,9	3,3	3,1	2,7	2,7	2,9	2,6	2,3	2,2

Source: Own study based on FADN (https://ec.europa.eu/agriculture/rica/database/database_en.cfm).

Discussion

The topic of financial liquidity is the subject of many studies and publications, but most often in relation to non-agricultural business activities. However,this issue is less addressed in relation to the agricultural sector. The published studies on the financial liquidity of agricultural holdings most often concern studies conducted in individual countries (i.a. Odalo and Achoki, 2016; Tóth, 2013), but there are few studies on the financial liquidity of agricultural holdings in the EU. The topic of diversification of financial liquidity of agricultural holdings in the EU was the subject of research by Bieniasz and Gołaś (2008) and Ryś-Jurek (2013, 2018). This article complements and continues the analyses presented by the above authors to some extent.

The conducted research also confirmed (cf. Bieniasz and Gołaś, 2008; Ryś-Jurek, 2013, 2018) that there are huge differences in the level of liquidity of agricultural holdings in individual EU countries.

Compared to previous years, there has been an increase in the average level of liquidity in EU farms. In the years 1997-2004 the liquidity indices did not exceed 3-4 (Bieniasz and Gołaś, 2008, p. 47),

whereas the presented studies show that in the years 2004-2017 the current liquidity index amounted to 4.4-6.6 and the quick liquidity index to about 2.9-4.9.

The study confirmed that high fluidity occurs in countries such as: Belgium, Spain, Slovenia (cf. Bieniasz and Gołaś, 2008; Ryś-Jurek, 2013, 2018) and Austria, Cyprus, Italy (Ryś-Jurek, 2013, 2018). Low liquidity occurs in countries such as: Czech Republic, Estonia, France, Germany, Hungary, Latvia, the Netherlands, as well as Bulgaria, Denmark, Sweden (cf. Bieniasz and Gołaś, 2008; Ryś-Jurek, 2013, 2018). Moreover, the research shows that the group of countries characterized by high liquidity in recent years has also been joined by Greece, while Croatia should not be rather included in this group (very high liquidity ratios reached only in 2013).

The research also confirmed (cf. Bieniasz and Gołaś, 2008; Ryś-Jurek, 2013, 2018) that financial liquidity decreases with the increase of the economic size of the farm.

Taking into account the type of farming, four groups of farms were distinguished in the presented studies, which differ in their financial liquidity - unlike Bieniasz and Gołaś (2008) and Ryś-Jurek (2013, 2018).

Conclusions

The presented analysis of the diversity of financial liquidity of agricultural holdings in the EU in the years 2004-2017 allows to conclude the following:

- The average level of current farm liquidity in the EU countries ranged from 4.4 to 6.6, while the average level of fast liquidity from 2.9 to 4.9. Thus, in the light of the normative values, it is a high level of financial liquidity.
- The optimum levels of liquidity presented in the literature are not applicable to agricultural holdings. In EU agriculture, liquidity ratios are higher, which is a result of, among other things, long production cycles and the need to accumulate stocks of means of production.
- The average level of financial liquidity of EU agricultural holdings increased in the period under consideration. The current liquidity increased from about 5 to about 6, while the quick liquidity increased from about 3 to over 4.
- There are very large differences in the level of liquidity of farms between the EU countries. The highest value (more than 100, and in some years even more than 1000) of liquidity ratios were reached in such countries as: Italy, Spain, Cyprus, Slovenia, Belgium, Greece, Austria. The lowest value (about 1-3) of these indicators was reached in such countries as: Germany, Great Britain, France, Estonia, the Czech Republic, Bulgaria, Latvia, the Netherlands, Hungary, Denmark and Sweden.
- In many countries, liquidity has changed significantly over the period considered. A very large increase in liquidity took place in countries such as Greece, Austria or Ireland. A decrease was observed in countries such as Belgium, Luxembourg or Slovakia.
- Liquidity is dependent on the economic size of farms - both the current andquick liquidity is lower the higher the economic size of the farm.
- In all groups of farms distinguished by their economic size (except for micro farms), there was a decrease in financial liquidity in the examined period. The greatest decrease took place in very small, small and medium-sized farms - their indices decreased about 2 fold.
- There is a significant variation in the financial liquidity of agricultural holdings by type of farming. Four groups of farms can be distinguished which differ in their financial liquidity (1.other permanent crops, 2. wine and other grazing livestock, 3. fieldcrops, horticulture, milk, 4. granivores and mixed).
- In the last years of the analysed period (2016-2017), there was a decrease in financial liquidity in all the examined types of agricultural holdings, with the greatest decrease taking place in 2 types: horticulture and wine.

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Managing Logistic Customer Service on The Example of An Enterprise

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Abstract

For any business, the correct flow of information is extremely important. The condition for the smooth functioning of today's enterprises is use of the potential of modern technologies, aimed at supporting efficient and efficient work in every department. Currently, one of the most important aspects of doing business becomes elements of logistics customer service. The success of the company on the market is mainly dependent on quality and handling. Efficient and satisfactory service significantly increases the company's prospects and can be a guarantee of future success. The aim of the article is to present modern information technologies and analyze the possibilities resulting from their use during customer service logistics processes on the example of the company.

Keywords: logistical customer service, information flow, enterprise, logistics process.

Introduction

All logistics activities that play a very important role in meeting needs and thus representing customer satisfaction when purchasing a product (good or service) are closely intertwined. Thus, the completeness of the customer service logistics process can be determined at its last stage, starting with placing the order, and ultimately ending with the delivery of the product to the customer or the execution of the commissioned service (Grzybowska 2009). In other words, logistical customer service includes all the elements of contact between the supplier of goods and their buyer (Crochet 2012). Logistical customer service can also be understood as meeting customer expectations by adapting the service to its requirements. Logistics activities are primarily skills based on the development and satisfaction of the needs that are taken to maintain a high level of service, result in priority customer satisfaction (Grabowska 2013).

Activities in The Logistics System of Customer Service

Multidimensionality in the concept of customer service affects the interpretation of this issue in a broad sense. It consists of various elements, both in the fields of logistics and marketing, finance and many others. This service primarily consists in meeting a variety of needs as well as customer expectations. Customer service in logistics is based on meeting certain aspects that are a positive course of sales. The most important of these is to provide the customer with a properly selected product, in accordance with his expectations, at the right time and in the right place. If any of these aspects are disturbed and the product is not available to the customer at any given time, as well as the place, then it will not be right or worth (Christopher 1998).

Despite the emergence of many logistical customer service formulations and their diverse description by many authors, we can all classify into one of the three methods of defining this field. The first of

the three possibilities is based primarily on activities closely related to the execution of the order process, where it can be distinguished (Long 2006):

- preparing the company for service,
- acceptance and confirmation of orders,
- maintaining a relationship with the customer,
- internal contract development,
- inventory management,
- completeand release of the ordered product,
- dispatch and carriage of goods,
- transfer of the product to the recipient,
- invoicing and handling payments,
- installation of certain products,
- warranty and post-warranty service,
- accepting possible complaints or returns,
- packaging.

Nevertheless, the number of activities performed related to the transfer of the product to the target customer does not constitute the completeness of all the characteristics of logistics customer service (Skowron-Grabowska 2010). Another method of showing customer service concerns the supplier's guarantee of a certain quality of service by maintaining high standards or the level of implementation of its essential components, i.e. the fixed delivery time and its timely compliance, completeness of the order, as well as the availability of the offered products (Kempny 2009). The last method of perception of logistical customer service is based on meaning as a target point of the company. In order to be able to do so, all activities taken by the company should focus on the needs of customers and the methods by which these needs can be met. Thanks to such an organized level of customer service and its orders, the company can achieve and most importantly- maintain a high position in the market (Listwan 2009).

The main objective of existing and emerging enterprises is to achieve the highest possible level of customer service, together with the lowest possible total expenditure, which is the sum of the costs, which consists of any activities taken related to the implementation of the requirements, regarding the quality of service. Obtaining economic benefits when trying to meet such assumptions requires a very good organization of the entire customer service process, as well as satisfactory actions taken for the good of the company and the consumer itself. All elements of such a operating system should form a coherent whole by defining the purpose and its benefits, ways and means to meet it. The entire customer service is formed (Kauf, Tłuczak 2018):

- a strategic part linked to decisions taken by the management staff, which presents the characteristics typical of the undertaking in order to distinguish it from the competition. The main elements that determine the individuality of a given company are the mission, philosophy of operation, logo and marketing activities. At this stage, key purchasing factors are developed and evaluated, aswell as the definition of employee satisfaction with their work,
- the organisational part responsible for bringing together the activities of employees around the most important elements, i.e. the mission, targets and procedures to meet the highest standards of service and customer satisfaction. In order for all these activities to form a coherent whole, it is very important to communicate employees and decision-makers in the company efficiently, as well as organizational culture based on openness, commitment, decision-making skills and cooperation.
- the operational part is an extremely important stage of customer service, based primarily on the knowledge and motivation of trained staff responsible for direct contact with the client, where their high qualifications allow to create long-term relationships. In order for the service of a potential customer to be successful, sellers should be positive about work, confident, their skills, as well as well-educated in the company's activities and the products or services offered. (Szymszal, Gajdzik, Piątkowski 2011).

The essence of a very prosperous customer service process is to orient the company to the needs of the consumer, to adapt the product to its expectations, and to ensure its availability. Meeting these criteria, the customer will be satisfied and, consequently, will be loyal to the brand, so that the risk of making a purchase from the competition will be relatively low(Kauf, Tłuczak 2018). There is therefore no doubt that customer service is one of the most important aspects of the company's operation and, like other processes, should be continuously improved and audited.

Activities in The Logistics System of Customer Service

In order to establish a well-functioning information and decision-making system in an enterprise, the focus should be on analysing meaningful information from multiple sources. Organizing such a system in terms of communication between the marketing department and the logistics department, allows a more conscious and more advantageous adaptation of the product to the customer's needs(Nowakowska-Grunt, Chłąd 2015). This also entails the company's distinction from competition and an increase in market position, meeting certain production conditions. Each company must create such a system for the flow of marketing information to decision-makers in this department in order to meet their needs and bring mutual benefits (SIM) (Unold 2001). As regards the definition, this system consists of people, equipment and techniques for collecting, organizing, analysing and evaluating, and then providing timely necessary and accurate information to marketing decision makers. (Nowicka-Skowron 2000).

The company's logistics systems are complex and require many activities, both inside and around the organisation (Grabara 2004). Coordination of such activities requires cooperation between all departments of the company, which makes it possible to achieve a specific strategic objective. The system approach, which allows you to choose the right solutions for your business, significantly increases its market prospects. It is essential for today's existing traders (Harrison, van Hoek 2018).

The research group consisted of 100 randomly selected consumers, which included men and women between the ages of 20 and 60. The aim was to indicate whether there are relationships between age and perception of the company's activities and to help with possible actions that tailor marketing campaigns to the appropriate group of people. The age structure of respondents is shown in Figure 1.

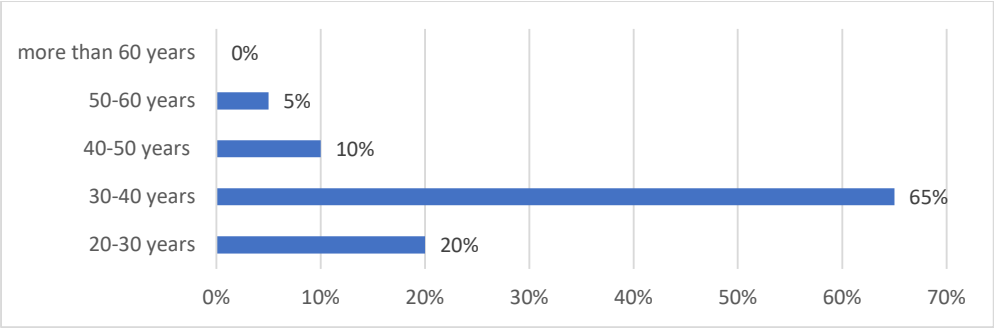

Figure 1: Age structure of respondents

(studyon the basis of studies carried out)

According to the age structure of those surveyed, the largest group of respondents was the one connecting customers between the ages of 30 and 40, representing 65% of the group of respondents. The second group in terms of numbers were those surveyed aged 20-30 (20%), while the third group concerned respondents aged 40-50 (10%). The last smallest group turned out to be customers in the age range 50-60 years (5%). People over the age of 60 did not participate in the survey. A larger group were women with a combined share of the study of 85%. Men made up 15% of those surveyed. This disproportion is due to the fact that randomly selected customers of the companywere asked to take part in thestudy.

Another aspect of the audited aspects was the issue of obtaining information about the company. These messages allow you to detect unused areas that can be used from enterprise advertising processes. The sources of obtaining information about the company are presented in the next chart.

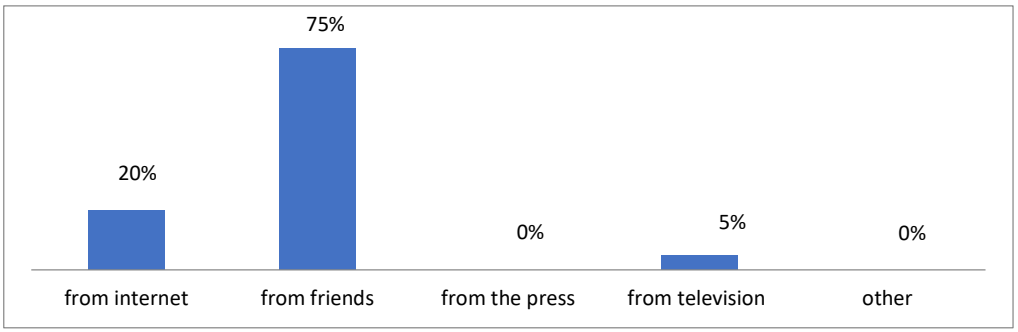

Figure 2: Source of information acquisition
(Study on the basis of studies carried out)

When asked "From what sources did you find out about our store", about 75% replied that "from friends" 20% "from the Internet", while 5% of respondents replied that "from television". In the survey, the press and others were not taken into account. It is also important for the company to attach the customer to its brand. Figure 3 shows how often you use your business services.

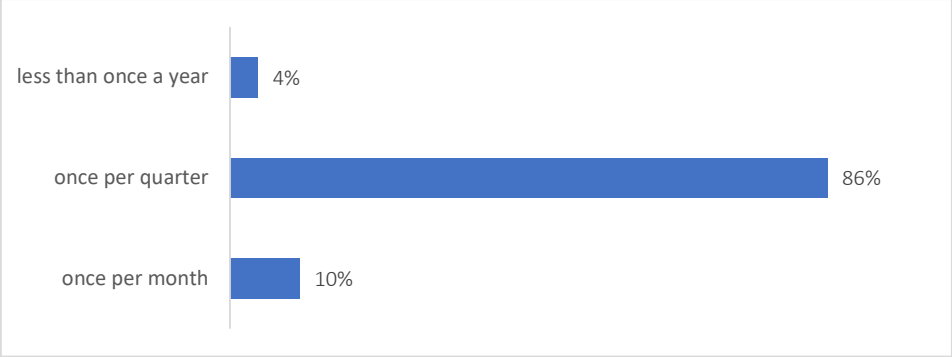

Figure 3: How often you use your business services
(Study on the basis of studies carried out)

Another question in the questionnaire of the survey concerned the frequency of use of the company's services. Respondents most often pointed to the "quarterly" option, compared to 86% of respondents, the answer "once a month" was 10%, while "less than once a year" only 5% of respondents said. In companies where customer contact is a daily occurrence, it is often repeated that when the wrong product is delivered, 20% of customers will cease to use the services provided to them. However, in case of dissatisfaction with the service, as many as 80% of buyers will not return to the point. For the company, therefore, a very important aspect is the feedback of customers regarding their satisfaction with the service. Figure 4 shows a subjective assessment of customer service in your company.

Figure 4: Subjective assessment of customer service in the enterprise
(Own study on the basis of studies carried out))

Two people (5%) marked the option "I have no opinion". Nearly 15% of respondents responded "well". The biggest score, hovering around 80% was the answer "very well", which will certainly have a positive impact on the final result of the survey. Another aspect assessed by customers was the overall quality of the product and the punctuality of execution of orders. The observations resulting from this assessment are shown in Diagram 5 and 6.

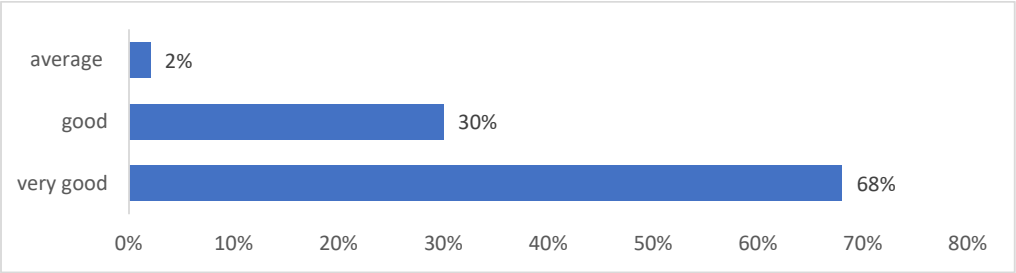

Figure 5: Product quality assessment
(Own study on the basis of studies carried out)

The quality of the company's products was appreciated. 68% of respondents rated them as very good, 30% indicated that somehow services are good. The average rating was given by 2% of respondents surveyed. This type of customer opinion is satisfactorily influenced by the research and for the owners of the company.

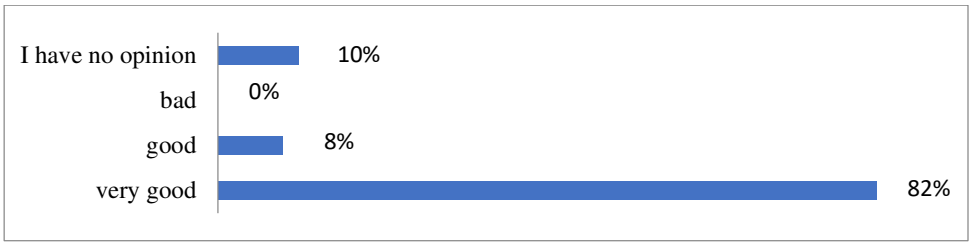

Figure 6: The timeliness of execution of orders
(Own study on the basis of studies carried out)

Another question in the questionnaire of the survey was about the timeliness of the execution of orders by the company. Respondents largely rated the answer "very well" on 82%, 8% were the "good" answer, while as many as 10% of respondents indicated the option "I have no opinion", which certainly does not positively affect the reputation of the company, as it is a production company that tries to fulfill orders using the "Just in Time" method. When consumer assessment of the company, it is important how the company implements its after-sales policy. It is very important for the buyer how the possible complaint process proceeds, as it may result in loss or increased confidence in the selected brand. In Figure 7, the company's customer feedback on the implementation of possible complaints.

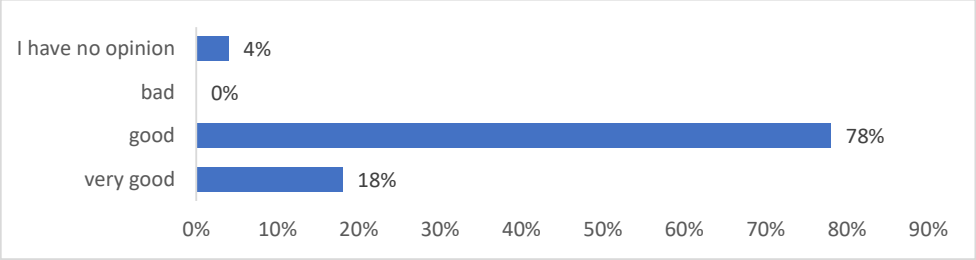

Figure 7: Method and time of execution of the complaint
(Study on the basis of studies carried out)

When asked about how and when the complaint was completed, the most, that is, about 78% indicated the answer "well", about 18% "very good", 4% "I have no opinion". This question is very important, for this type of activity, especially for this company, this will be described in detail in the following sections. Nowadays, online shopping plays an important role. The company, based on these trends, strives to develop electronic sales as best as possible. Chart 8,which isabout visiting an online store,can help you assess the popularity of this method ofshopping.

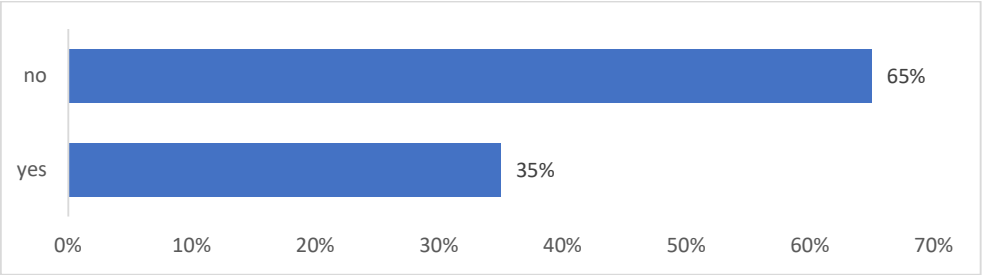

Figure 8: Using online store services
(Study on the basis of studies carried out)

In a question aimed at determining whether customers also use the company's online store, a larger number of people representing 65% of respondents answered in the negative, while 35% of respondents indicated the option "yes" as they use the services of the company's online store. In addition to the issue of the electronic store is Chart 9,which more accurately indicates the issue ofthe assessment of satisfaction with online purchases.

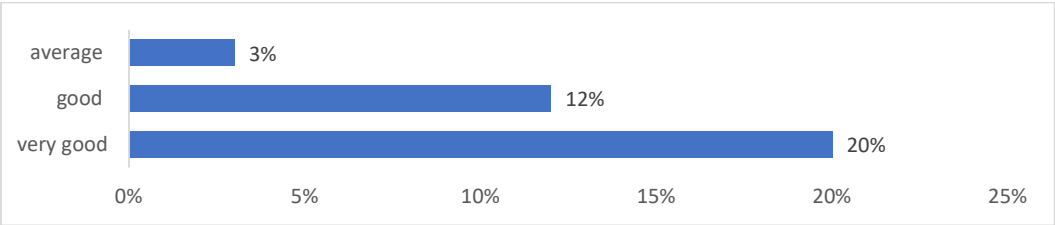

Figure 9: About theprice of quality and time of online orders
(Study on the basis of studies carried out)

Another question in the questionnaire of the survey concerned the quality and time of online procurement. This question was answered only by respondents who, in the preceding question,

indicated the answer 'yes' that they used the services of an online store they made up 35% of the respondents. Of these people, 20% responded "very well", 12% "well" and 3% "average". The time and quality of order fulfillment depends on courier companies with whom the company cooperates. As mentioned earlier, it is very important for the company to attach the consumer to a particular brand. A satisfied customer who wants to reuse the services of the company is today an indicator of success. Figure 10 indicates feedback on how to reuse the company's services.

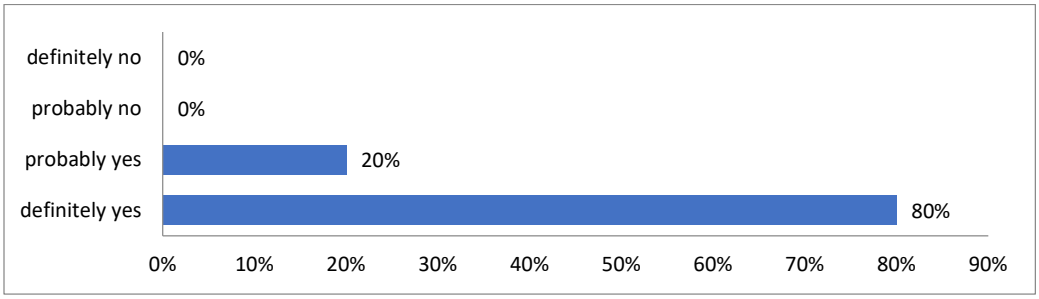

Figure 10: Willingness to reuse the services of the company
(Study on the basis of studies carried out)

Given the data in the chart, it can be concluded that, for the most part, respondents would be happy to benefit once again from the services of the store, because as many as 80% of those surveyed, while 20% replied 'rather yes', which is also a very good result, the answers 'rather not' and 'definitely not' were taken into account. The last issue raised was the declaration of the service offered by the company to other customers. Figure 11 provides feedback on how to communicate brand products to a wider audience.

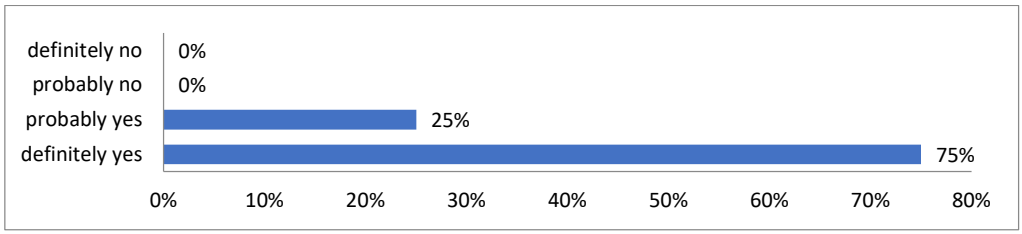

Figure 11: Willingness to recommend the company to other customers
(Study on the basis of studies carried out)

The final question in the survey was "would you recommend the*company to other customers?"* As in the previous question, the overwhelming number of people 75% answered 'definitely yes' and 25% 'rather yes'. The 'rather no' and 'definitely not' responses were also not taken into account by respondents.

Conclusions of the Studies Carried Out

According to a survey conducted among the company's clients, the gender advantage that answered the questions were women. The survey focused on the satisfaction of retail customer service at the manufacturer of children's shoes of the brand. From the above studies, it can definitely be concluded that customers of this brand rate it at a very good level. When asked about the frequency of product purchases, most people responded "quarterly", which is very important for the company, as this means that customers buy at least two pairs of shoes per season.

The question of the level of customer service has largely been assessed satisfactorily. Customers rated the level overwhelmingly as "very good". This is probably the result of hard work, both from the store's

employees and their involvement, as well as the owners of the company themselves, who place great emphasis on very good training of employees, both from service and from product knowledge. Product quality is also becoming a very important aspect. For customers of this brand, this is very important and answering the question are definitely satisfied with its quality. The company focuses on the high quality of the product, and therefore the price, which is quite high for children's shoes, but consumers often explain this so that "the quality and method of workmanship is adequate to the price of the product"

Another quite important aspect is the way and time of implementation of the complaint by the company. Here, the sentences were divided between "very good" and "good". The vast majority responded "well", for this company the subject of complaints is quite "delicate", as as a rule, complaints are unfounded, as they have mechanical damage not subject to repair/replacement or reimbursement, which customers often ask customers to avoid unpleasant situations, recognizes complaints "politely" by repairing the customer's shoes. However, not every customer appreciates this and often considers it to be mistreatment of the company by reading in the complaint form "the complaint has been dealt with politely". The company strives to make every customer satisfied and gives them a discount for subsequent purchases. Through this type of marketing, such a customer will always return to the product of this brand.

The survey questionnaire also asked whether customers also use their online store. The vast majority do not use the online platform, but there were those surveyed who answered the question in the affirmative and rated quality and time as "very good". This type of service depends largely on courier companies with which companies sign contracts. If these companies comply with their contract and deliver packages on time, the customer of the company is satisfied. Unfortunately, however, it happens that couriers do not deliver shipments to a given place and make it difficult to pick up, so that for equally courier companies and their contractors lose trusted customers. On the basis of the analysis of the study carried out and the conclusions, it is certainly possible to see the correctness of the findings:

- Good knowledge of the product, leads to customer satisfaction with the service – if you, the employee knows theproduct well, it can also sell it well. What was shown in the above studies. Customers rated the level of service satisfactorily.
- The price of the product always goes hand in hand with its quality - customers, often ask a question about the price of the product, which is quite high. In this case, on the other hand, the price is adequate to the quality, as also confirmed by the respondents.
- The method of handling the complaint does not always have to be received negatively by customers - enterprise for several years has been conducting a policy of dealing with complaints so-called. "courtesy", which has caused herself to gain fans of this brand and who often return for the product. The marketing they applied by granting a discount to customers certainly encourages them to reuse the company's services.

The company, thanks to the use of information technology and modern methods of communication with the customer, established its position as the most popular supplier of children's footwear on the regional market. The survey was aimed at identifying customers' opinions additionally and identifying further potential opportunities for brand development.

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Value Relevance of Comprehensive Income and Net Income

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Abstract

The issue of reporting comprehensive income generally derives from the long-standing debate about reporting income via the "current operating performance" or the "all-inclusive" concept (Brief, Peasnell, 1996; Khan et al., 2018). It itself triggers discussions on the usefulness of accounting information about earnings. The key actors in this dispute are net income and comprehensive income. The paper contains a broad review of studies on value relevance of comprehensive income and net income. It also contains a proposal for a classification framework of value relevance studies on comprehensive income, which is based on methodologies developed by various authors. The paper discusses the results of 31 value-relevance studies on the issue of usefulness of comprehensive income as well. The multidimensional analysis is aimed at answering the question, whether the comprehensive income is a more useful (more value relevant) measure of the company's performance for investors. The conclusions of the analysis indicate that it is not clear which measure is more useful (more value relevant). One of the factors influencing research results may be the fact that it still remains unclear what items could be presented in other comprehensive income and what their economic nature is. Unfortunately, the new Conceptual Framework for Financial Reporting (2018) has not resolved the issue.

Keywords: Value Relevance, Financial Reporting, Net Income, Comprehensive Income

Introduction

The issue of reporting comprehensive income generally derives from the long-standing debate about reporting income via the "current operating performance" or the "all-inclusive" concept (Brief, Peasnell, 1996; Khan et al., 2018). Officially, the theoretical concept of comprehensive income issue emerged with the publication of the Statement of Financial Accounting Concepts (SFAC) No. 3: Elements of Financial Statements of Business Enterprises by FASB in 1980 (FASB, 1980). The definition developed in this document was similar to the one presented today in IAS/IFRS. Under IAS 1, comprehensive income reflects "the change in equity during a period resulting from transactions and other events, other than those changes resulting from transactions with owners in their capacity as owners" and basically is a sum of net income (profit or loss) and other comprehensive income (IAS 1 §7), which includes revenues, expenses, gains and losses that have not yet been realized (for example changes in revaluation surplus and gains and losses arising from translating the financial statements of a foreign operation). As stated by Frendzel and Szychta (2013), by assumption the comprehensive income should be a more comprehensive measure than the net income, as it also includes capital gains and losses. The concept has been implemented into accounting standards in 1992 (Great Britain), 1994 (New Zealand), 1997 (the U.S.), 2005 (Canada) and in 2007 for companies under IFRS (Szychta, de la Rosa, 2012).

The debate on the usefulness of accounting information about earnings is still ongoing and the main actors are net income and comprehensive income. Value relevance (usefulness) studies on comprehensive income are one of the key research areas on this issue. The importance of this kind of studies is crucial. First of all, they may provide insights into questions of interest to standard setters and other constituents. Value relevance studies can be used to examine the relation between equity values and various accounting figures. They are also tailor-made for assessing whether accounting amounts reflect information used by investors in process of valuing enterprises' equity. What is more,

value relevance studies employ well-established methods for mitigating the effects of various econometric issues. These features clearly demonstrate the usefulness of such research in principle for almost all stakeholders (Barth, 2001). Therefore, the purpose of this paper is to examine which measure – net income or comprehensive income – is more useful (more value-relevant) on basis of the existing value relevance studies.

The paper is structured as follows. Section 1 is a broad review of studies on value relevance of comprehensive income. In this part literature review method was used. Section 2 contains a proposal for a classification framework of value relevance studies on comprehensive income and it is based on methodologies developed by various authors. Section 3 is based on the results of 31 value-relevance studies on the issue of usefulness of comprehensive income and it answers the key research question presented in the previous paragraph.

Literature Review

There is a wide scope of research related to the value relevance of comprehensive income. Definitely more studies on value relevance of comprehensive income were performed in American context, which is probably due to the fact that comprehensive income concept has been brought to those standards almost 10 years earlier than in IAS/IFRS. This section of the paper outlines the key conclusions derived from the selected studies.

There are several studies which have found the net income to be more useful (more value relevant) than the comprehensive income. For example, by using a 1972-1989 sample of US companies, Cheng et al. (1993) came to the conclusion that net income is much more useful than comprehensive income in terms of the explanatory power of earnings for returns. Similar to Cheng et al. (1993) the study conducted by Dhaliwal et al. (1999) does not support the hypothesis that comprehensive income is a more useful measure of the company's performance than the net income. Brimble and Hodgson (2005) also came to strong conclusions by conducting a study on 920 observations from the Australian market from 1988-1997. The results showed that the value relevance of net income is higher than value relevance of comprehensive income which, “at best is irrelevant or, at worse, confusing”. A study carried out by Wang et al. (2006) indicates that both the net income and comprehensive income are measures associated with rates of return, but the value relevance of net income is higher. Kubota et al. (2007) also failed to prove that comprehensive income is more value relevant than net income on the basis of 4,994 observations concerning companies listed on the Tokyo Stock Exchange in 2000-2005. However it should be noted that they succeeded in proving that the some other comprehensive income components – changes in cumulative foreign currency translation adjustments and changes in the balance of unrealized gains and losses on securities available-for-sale – have significant incremental information content. In an attempt to answer the question whether the comprehensive income is a more useful measure of the company's performance for investors than the net income, Goncharov and Hodgson (2008) carried out an analysis of 56,695 observations from 1991-2005, which was the most extensive study found in terms of the research sample. As the authors have pointed out, the finding that net income as a core valuation metric dominates comprehensive income in terms of value relevance were not surprising. Taking a research on 647 observations from the Iranian market, Dastgir and Velashani (2008) concluded that the value relevance of comprehensive income is lower than the value relevance of net income, both when considering the research sample as a whole and when dividing the research sample by industry sectors. Azzali et al. (2010), also failed to prove that, in general, comprehensive income is a more useful measure than net income. An interesting analysis was conducted by Kabir and Laswad (2011) too. Authors examined four key factors of net income and comprehensive income – persistence, variability, predictive ability, and value relevance. In terms of value relevance, net income was the dominant measure. The conclusion that the comprehensive income is less relevant than net income was also drawn by Tsuji (2013) and by Jahmani et al. (2017).

There are also several studies which have found that the comprehensive income may be considered as a measure more value relevant than net income. One example is an article conducted by Cahan et al.

(2000), in which authors pointed out that the comprehensive income is a more useful measure than net income at aggregate level. However, they also emphasized that particular components of other comprehensive income are not value relevant. The study carried out by Kanagaretnam et al. (2005) on a sample of 25,073 observations also shows, that aggregated comprehensive income is more strongly associated with both stock price and returns compared to net income. Similar conclusions were also reached by Lin (2006), who examined 3,836 observations from 1993 to 1998. Lin et al. (2007) concluded that on an aggregate level, the comprehensive income is a more value relevant measure than the net income. This means that disclosing aggregate information about other comprehensive income positively influences the usefulness of the financial statements. Kanagaretnam et al. (2009) on basis of 203 observations from 1998-2003 from the Canadian market also came to the conclusion of previously cited studies, that the aggregated comprehensive income is information perceived by investors as more useful than net income. A study conducted by Takahashi and Wong (2012) on the basis of a sample of 24,949 observations from Japanese market from 1998 to 2010 emphasized that the net income plus aggregated other comprehensive income is a more value relevant than the net income alone. The conclusion of Pereira (2015) study is that, on an aggregate level, the comprehensive income is a more useful (more value relevant) measure, while on a disaggregated level, other comprehensive income items do not show any added information value, which may be due to a lack of understanding of this category by investors. The evidence that comprehensive income is more value relevant than net income were also presented by Acar and Karecaer (2017) and Khan et al. (2018).

For some studies, due to various circumstances, it was difficult to clearly assess which measure – net income or comprehensive income - was more value relevant. This refers in particular to studies conducted by Dehning and Ratliff (2004), Biddle and Choi (2006), Choi et al. (2007), Devalle and Magarini (2012), Xu and Qi (2017), Park (2018) and Sajnóg (2018). The following section presents a detailed research process and outlines a classification framework for value relevance studies.

Research Design

The analysis was based on four key stages. Under stage one, using worldwide scientific databases, including in particular: Google Scholar, ScienceDirect, Scopus, ResearchGate, ProQuest and Web of Science, the literature review on empirical research on comprehensive income was conducted. The keywords used to generate a wide database of research papers were the following phrases and their Polish equivalents (together with a wide range of variations, the use of which slightly increased the number of results):

1. comprehensive income;
2. other comprehensive income;
3. net income vs. comprehensive income;

Next, after an initial review of the articles found by using the above keywords, the scope of the search was extended. The following phrases were added as part of this process:

1. value-relevance;
2. informational content;
3. predictive ability / predictive power;
4. usefulness;
5. volatility;
6. reporting;

Within this research strategy, a total of 151 scientific papers were identified. These papers were subjected to critical analysis in the next step, which resulted in the rejection of 17 papers going significantly beyond the topic of relation between net income and comprehensive income. Thus, 134 scientific papers were included in the next stage of the research.

As a part of the second stage of the literature study, the articles were re-analyzed, which was aimed at separating strictly theoretical papers (not containing the empirical element) from the papers in which the empirical study was carried out. As a result, 96 empirical articles were included in the next stage of analysis.

In the third stage a multidimensional review of the papers was carried out. It was aimed at identifying key research concerning comprehensive income issue. These included (see also Fig 1):

1. value-relevance research (research on the relationship between changes in variable values and share price or rates of return) – 52 papers (54%);
2. studies on the impact on the value of net income based indicators (whether there are significant discrepancies between net result based indicators (EPS, ROE) and the same indicators based on comprehensive income and which measure better reflects the financial standing of the enterprise) – 7 papers (7%);
3. studies on the form of presentation of the statement of comprehensive income (whether companies present the statement of comprehensive income as a single bottom-line statement of comprehensive income or in two statements containing (a) bottom-line net income and (b) bottom-line comprehensive income, and how this affects the perception of the market) – 17 papers (18%);
4. other studies not falling into any of the above categories (for example a content analysis of letters sent by constituents in standard-setting process) – 20 papers (21%);

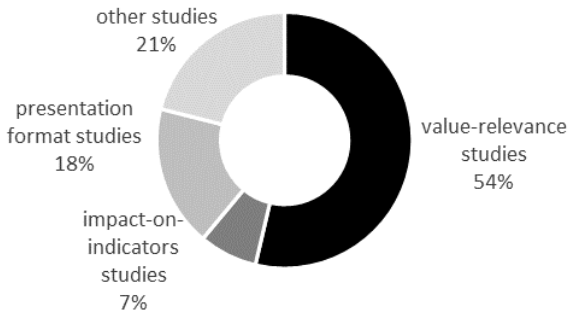

Fig 1: Classification of studies on comprehensive income issue

Source: own elaboration.

The value relevance studies were by far the most popular direction to examine the issue of the comprehensive income, so this paper is aimed at a detailed analysis of this issue. As part of the fourth stage of the study, value-relevance studies on comprehensive income were classified according to the seven criteria indicated below:

1. data used in research (van Cauwenberge and de Beelde, 2010);
2. type of value relevance test (Biddle et al., 1995);
3. approach in running relevance test (van Cauwenberge and de Beelde, 2010);
4. econometric model used in the analysis;
5. number of models applied in the analysis;
6. number of variables used in applied models;
7. size of sample;

According to the "data used in research" criterion, value-relevance studies on comprehensive income may be classified as:

1. studies using data from the period before implementation of comprehensive income reporting (as-if data).

2. studies data after the implementation of comprehensive income reporting (as-reported data).
3. studies using as-if and as-reported data.

In studies using as-if data, financial measures concerning years before implementation of comprehensive income into standards are arbitrarily adjusted to the reality after the implementation. In other words, financial data prior to the introduction of the standards is brought to a state of comparability with financial data presented after the introduction of these regulations. Studies using as-reported data take into account only "reported" data, i.e. including the provisions of the standards in the period to which they relate. Studies with as-if and as reported data applied are aimed at capturing the conclusions from both as-if and as-reported studies and comparing the value relevance before and after implementation of the comprehensive income concept into standards.

Value relevance studies on comprehensive income may be classified by “type of value relevance test” criterion too. Value-relevance tests may be either relative or incremental. According to van Cauwenberge and de Beelde (2010), relative association studies examine the association between stock market prices (or returns) and alternative bottom-line measures. In case of examining the usefulness of comprehensive income, the comparison is performed mainly between net income and comprehensive income. Incremental value-relevance studies may be considered as these comparing whether one accounting measure (for example comprehensive income) provides information content beyond that provided by another (see also Biddle et al., 1995).

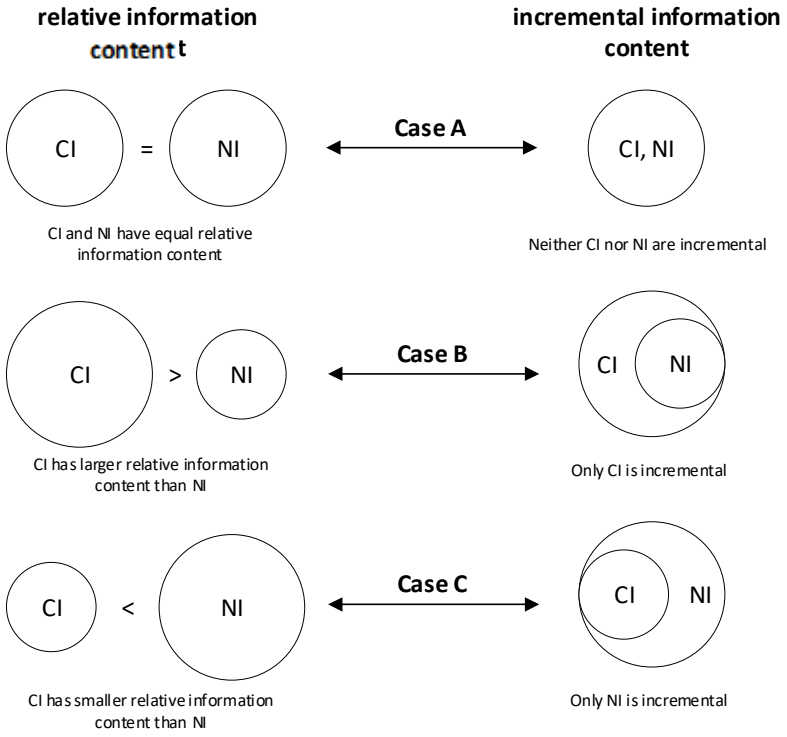

Fig. 2: Relative vs. incremental information content

Source: own elaboration based on Biddle et al. (1995).

Value-relevance studies on comprehensive income under the “approach in running relevance test” criterion may be categorized into measurement perspective studies and informational perspective studies (see also Barth, 2000; Barth et al., 2001). Measurement perspective studies provide a link to a valuation model (mostly Ohlson, 1995) that expresses firm value as a mix of accounting

measures such as book value, income etc. Conversely, the informational perspective studies are focused only at accounting figures and consider whether accounting data is useful to investors (see also Lev, 1989).

Another criterion for the classification of value relevance studies may be the econometric model used in the analysis. Within this criterion three types of studies were distinguished: studies in which linear econometric models were applied, studies in which logarithmic econometric models were applied, and studies in which other econometric models were applied. These studies could be also classified in terms of number of models applied in the analysis, number of variables used in applied models as well as in terms of sample size used.

After the rejection of papers going beyond the subject of value relevance of comprehensive income, as well as excluding papers for which the full texts were not available, 31 empirical papers were scrutinized and classified according to the criteria indicated above. Five of them contained a value-relevance analysis of other comprehensive income only, so they were excluded from the conclusions due to the fact that the analysis was aimed at answering the question whether the comprehensive income is a more useful measure than net income.

Research Design

At the beginning of the in-depth analysis, the studies were reviewed from the perspective of the period they covered. The result of the analysis is a summary presented in Table 1. The key conclusions were as follows:

1. the average period analyzed in studies was about 6 reporting years, which may be assumed as the lower limit of the time span to be adopted in value-relevance studies.
2. the average span between the last analyzed period and publication of the study was 3 years, which may be considered as the lower limit of 'freshness' of data on which the analysis should be based.
3. the longest period covered by the study was 15 reporting years (Louis, 2003; Goncharov, Hodgson, 2008), while the shortest period covered by the study was 1 reporting year (Kabir, Laswad, 2011; Jahmani et al., 2017), which, using also the coefficient of variation at the level of 58%, indicates a significant variation in the periods analyzed in the selected studies;

As presented in Table 2, the selected value-relevance studies on the comprehensive income have covered nearly 28 markets. However, it should be noted that a significant number of markets appear in the list as a result of their inclusion in by far the widest research conducted by Goncharov, Hodgson (2008). It covered the largest sample (56,695 observations) and sixteen countries of the European market (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom). This means that the characteristics taken from Austria, Belgium, Denmark, Finland, Germany, Greece, Ireland, Italy, Norway and Switzerland appear in the analysis only on the basis of a study that aggregated many different markets and may overlook certain country characteristics. The remaining studies mostly included a smaller research sample (usually one, maximum two markets).

By analyzing the articles according to “data used in research” criterion, it can be considered that there is a certain research niche concerning the application of both as-if and as-reported data. This means that, in principle, there are a very few analysis of the usefulness of comprehensive income before and after the introduction of standards that implemented this measure into accounting reality. The analysis of the superior usefulness of comprehensive income or net income did not provide a clear results. On the one hand, the as-if studies presented the net income as a more useful category than comprehensive income to a slightly greater extent, however, due to the nature of these studies (in studies using as-if data financial measures in years before implementation of comprehensive income into standards are arbitrarily adjusted to the reality after the implementation.), it is not appropriate to conclude on their basis (see also Fig 3).

Table 1: Time span covered by selected value-relevance studies on comprehensive income

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Dhaliwal et al. (1999)										X	X																							
Cahan et al. (2000)									X	X	X	X	X																					
Louis (2003)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																			
Dehning i Ratliff (2004)														X	X																			
Brimble i Hodgson (2005)				X	X	X	X	X	X	X	X	X	X																					
Kanagaretnam et al. (2005)										X	X	X	X	X	X	X	X	X	X															
Pinto (2005)							X	X	X	X	X	X																						
Biddle i Choi (2006)										X	X	X	X	X																				
Lin (2006)									X	X	X	X	X	X																				
Wang et al. (2006)				X	X	X	X	X	X	X	X	X	X																					
Choi et al. 2007										X	X	X	X	X	X	X	X	X	X															
Kubota et al. (2007)																X	X	X	X	X	X													
Lin et al. (2007)								X	X	X	X	X	X	X	X	X	X	X	X	X														
Dastgir and Velashani (2008)																	X	X	X															
Goncharov and Hodgson (2008)							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X													
Kanagaretnam et al. (2009)														X	X	X	X	X	X															
Azzali et al. (2010)																			X	X	X	X	X	X										
Kabir and Laswad (2011)																										X								
Devalle and Magarini (2012)																					X	X	X											
Ringstrom, Ekstrom (2012)																									X	X	X							
Takahashi, Wong (2012)																X	X	X	X	X	X	X	X	X	X	X								
Tsuji (2013)																									X	X	X							
Pereira (2015)																													X	X				
Acar, Karecaer (2017)																									X	X	X	X	X					
Jahmani et al. (2017)																														X				
Xu and Qi (2017)																									X	X	X	X	X	X	X			
Yousefinejad, Embong (2017)																											X	X	X					
Khan, Bradbury (2018)																			X	X	X	X	X	X	X	X								
Park (2018)																							X	X	X	X	X	X	X	X				
Sajnóg (2018)																									X	X	X	X	X	X	X	X		
Veltri and Ferraro (2018)																									X	X	X	X						

Table 2: Markets covered by selected value-relevance studies on comprehensive income

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Australia				X	X	X	X	X	X	X	X	X	X																					
Austria							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X													
Belgium							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X													
Canada										X	X	X	X	X	X	X	X	X	X															
China																									X	X	X	X	X	X	X			
Denmark							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X													
Finland							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X													
France							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											
Germany							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											
Great Britain									X	X	X	X	X	X	X	X	X	X	X	X	X													
Greece							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X													
Iran																	X	X	X															
Ireland							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											
Italy									X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
Japan																X	X	X	X	X	X	X	X	X	X	X	X							
Malaysia																											X	X	X					
Mexico							X	X	X	X	X	X																						
Netherlands							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											
New Zealand								X	X	X	X	X	X						X	X	X	X	X	X	X	X								
Norway							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X													
Poland																									X	X	X	X	X	X	X	X		
Portugal							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								X	X				
South Korea																							X	X	X	X	X	X	X	X				
Spain							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											
Sweden							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X							
Switzerland							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X													
Turkey																									X	X	X	X	X					
USA										X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X				

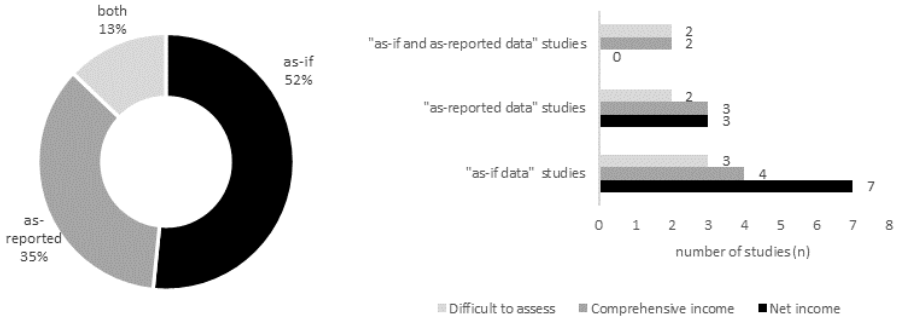

Fig. 3: Value-relevance studies on comprehensive income classified by "data used in research" criterion

Source: own elaboration.

The analysis by "type of value relevance test" criterion demonstrates that it is hard to distinguish one leading direction of this kind of value-relevance studies. It can therefore be concluded that researchers are interested in both the question of which measure – net income or comprehensive income – is more useful for investors and which of these measures has a higher information value (and therefore offers an information "surplus" over a competitive measure). However, it seems very interesting to analyze the results of the studies itself. Analyzing only the results of relative information content studies, i.e. studies based mainly on aggregated values, the net result is the dominant measure for reasons of usefulness. The opposite relation occurs in the case of incremental information content studies, which were performed to a greater extent on disaggregated (more analytical) measures. None of the studies classified in this category confirmed a higher usefulness of the net result than comprehensive income, which indicates that, in principle, components of other comprehensive income have a positive impact on the usefulness of company performance information. In the case of studies that take both of these types of value relevance into account, the significant differences in determining the usefulness of the financial measures are generally blurred, so it is not possible to determine from them which measure is more useful to investors (see also Fig 4).

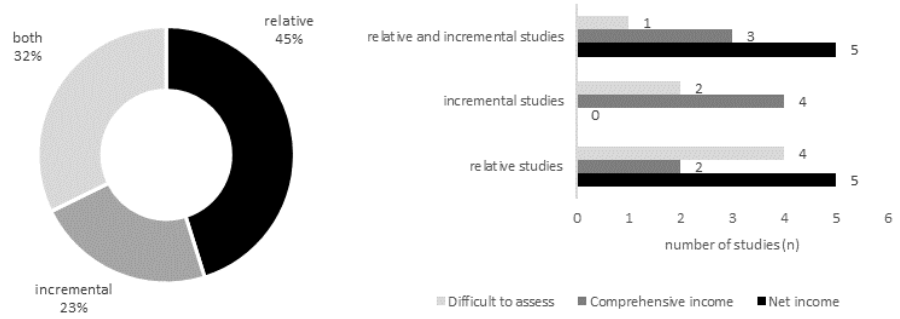

Fig. 4: Value-relevance studies on comprehensive income classified by "type of value relevance test" criterion

Source: own elaboration.

Considering the "approach in running relevance test" criterion, the advantage of informational approach studies is clearly established. They account for nearly 55% of studies identified in value-relevance studies on comprehensive income. Therefore, it can be concluded that there is a certain research gap in the measurement approach to testing the overall result of usefulness of comprehensive income. The analysis of value-relevance studies according to the criterion of the

"approach in running relevance test" also does not allow to draw any unambiguous conclusions about the higher usefulness of comprehensive income or net income (see also Fig 5).

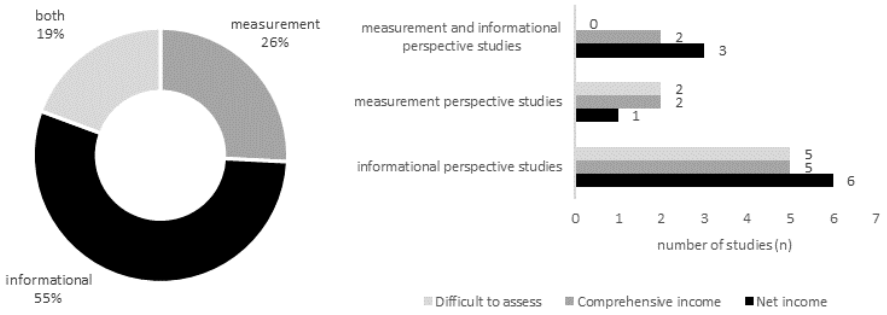

Fig. 5: Value-relevance studies on comprehensive income classified by "approach in running relevance test" criterion

Source: own elaboration.

Value relevance studies are generally covering many different economic relationships, as evidenced by the fact that 6 and more econometric models have been applied in the vast majority of studies on comprehensive income (most of them - about 94% - were linear models). This indicates that in most cases researchers try to test as many economic relationships as possible. Taking into consideration "number of models applied in the analysis" criterion, it is difficult to distinguish which measure – comprehensive income or net income - is more useful (see also Fig 6).

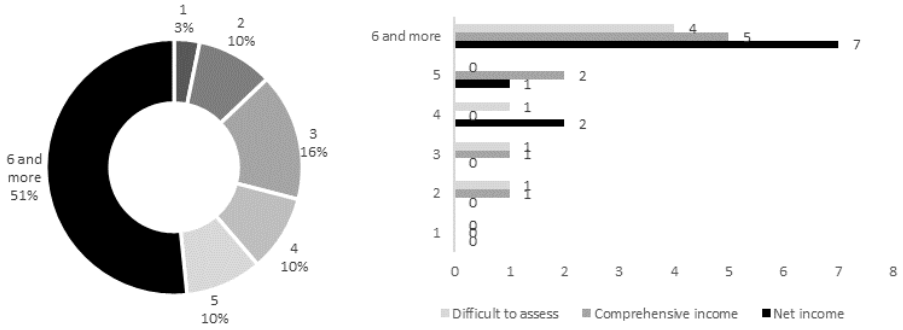

Fig. 6: Value-relevance studies on comprehensive income classified by "number of models applied in the analysis" criterion

Source: own elaboration.

Similar situation applies to the classification of value-relevance studies on the comprehensive income by number of variables criterion. It is difficult to determine which measure is the more useful (see also Fig 7).

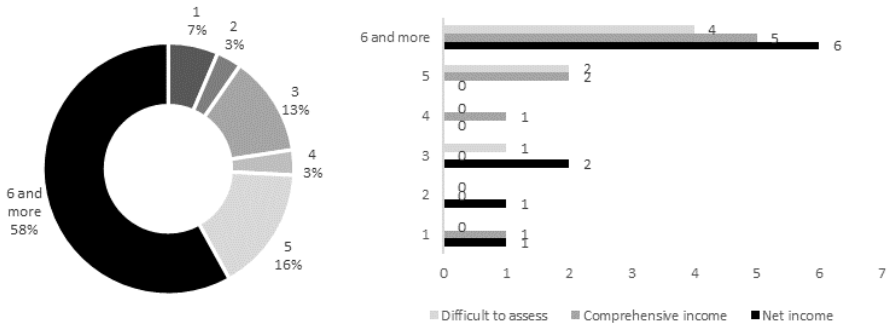

Fig. 7: Value-relevance studies on comprehensive income classified by "number of models applied in the analysis" criterion

Source: own elaboration.

Taking into account the size of research sample adopted for the studies, the conclusions are extremely interesting. In the case of studies based on a relatively small research sample (from 0 to 999 observations), the net income is the rather dominant category in terms of usefulness. A set of studies with medium size samples used (from 1,000 to 9,999 observations) indicates significantly ambiguous results. Finally, studies based on large research samples (more than 10,000 observations; the largest research sample was 56,695 observations) mostly indicate comprehensive income as a more useful category than net income. Despite the fact that the conclusions are placed on a limited sample of selected studies, differences between research sample sizes may indicate that the more "comprehensive" research, the more useful category for investors is the comprehensive income (see also Fig 8).

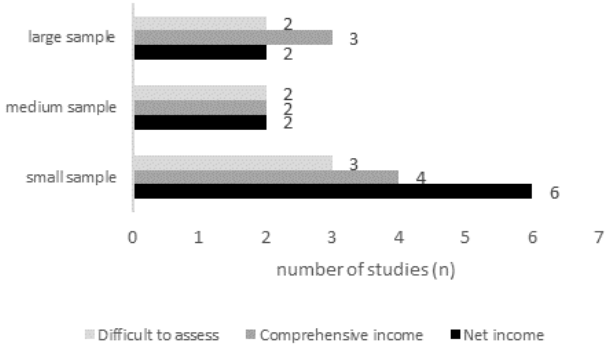

Fig. 8: Value-relevance studies on comprehensive income classified by "size of sample" criterion

Source: own elaboration.

Surprisingly, value relevance studies in general do not indicate which measure – comprehensive income or net income - is more useful. It seems extremely interesting that, given the values presented in Fig 9 below, the authors of the research are nearly equally divided as to the superiority of the comprehensive income over the net income as a more useful (value relevant) category (see also Table 3).

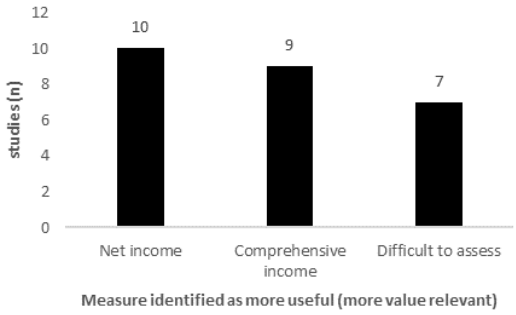

Fig. 9: Value-relevance studies on comprehensive income – which measure is more useful? (overall results)

Source: own elaboration.

Table 3: Value-relevance studies on comprehensive income overall overview – which measure is more useful? (authors)

Net income	Comprehensive income	Difficult to assess
Dhaliwal et al. (1999)	Cahan et al. (2000)	Dehning, Ratliff (2004)
Brimble, Hodgson (2005)	Kanagaretnam et al. (2005)	Biddle, Choi (2006)
Wang et al. (2006)	Lin (2006)	Choi et al. (2007)
Kubota et al. (2007)	Kanagaretnam et al. (2009)	Devalle, Magarini (2012)
Goncharov, Hodgson (2008)	Lin et al. (2007)	Xu, Qi (2017)
Dastgir, Velashani (2008)	Takahashi, Wong (2012)	Park (2018)
Azzali et al. (2010)	Pereira (2015)	Sajnóg (2018)
Kabir, Laswad (2011)	Acar, Karecaer (2017)	
Tsuji (2013)	Khan et al. (2018)	
Jahmani et al. (2017)		

Concluding Remarks

The results of the study indicate that, in general, it is not possible to state clearly which measure – net income or comprehensive income – is more useful. It is worth noting that studies based on a large research sample more often indicated that the comprehensive income is a more relevant measure than net income. However, these results are not convincing enough, as it was not possible to draw firm conclusion on this issue.

As it is not possible to indicate which measure is more useful, at least two key questions should be raised:

1. Is there a potential for improving the methodology of value relevance comprehensive income research?
2. Was it premature to introduce comprehensive income into the IAS/IFRS and other standards?

To answer the first question, there are several areas that have not been addressed by most researchers. Firstly, studies usually include only annual financial data and do not analyze shorter periods of time (e.g. quarters). However, this may be due to a problem with data availability. Secondly, studies involving larger research samples, which are based on observations from markets with different circumstances, are mostly based on the assumption that investors around the world react similarly to disclosure in financial statements. In other words, it is also rare for research to take account of regional specificities. Thirdly, only some researchers see the importance of including sectoral

specificities in their research, but this is a rather rare practice. Undoubtedly, the usefulness of the information on comprehensive income may vary depending on the analyzed industry sectors.

The answer to the second question is very difficult. In order to form an opinion on this issue, the process of introducing the concept of the comprehensive income into IAS 1 was carefully followed. Respondents to Exposure Draft ED/2010/5 "Presentation of Items of Other Comprehensive Income" indicated a whole range of problems related to the introduction of other comprehensive income and comprehensive income issue. More than 67% of respondents highlighted the problem of the lack of any conceptual basis for other comprehensive income. The problem is still present, because the new Conceptual Framework for Financial Reporting (2018) has not resolved the issue. It remains unclear what items could be presented in other comprehensive income and what their economic nature is (Mućko et al., 2019). Moreover, the respondents to Exposure Draft ED/2010/5 notice a whole range of issues related to the other comprehensive income, for example (Hass, 2010):

1. other comprehensive income items are mainly not transitory value adjustments and not financial performance items, so they may be a source of major confusion for the financial markets;
2. other comprehensive income components have no predictive value in terms of predicting future cash flows;
3. other comprehensive income items are rather part of future but not current performance;
4. from the stewardship point of view, management's performance is neither internally nor externally assessed based on comprehensive income;

It should also be stressed that the studies reviewed in this paper have identified only a few value relevant other comprehensive income items (mainly foreign currency translation gains or losses, gains or losses on investments available for sale, and gains or losses on derivatives held as cash flow hedges). The rest of other comprehensive income items are, according to the researchers, not value relevant.

The results of the study and the arguments indicated above are the evidence that the studies on usefulness of comprehensive income and its components should be continued. This applies to both regional and global academic research as well as to standard setters analyses. The next step in the author's research path is to analyze value relevance of comprehensive income on the Polish market.

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The Innovative System of Maritime Lines Between the Challenge of Integration and the Choice of Reinforcement

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Abstract

Maritime logistics is an integral part of global logistics, due to the opportunities for creating benefit and innovation in terms of optimization approaches adapted to specific strategic contexts. Therefore, it would be wise to deal with maritime logistics phenomena from the point of view of Supply Chain Management, which therefore constitutes an opportunity to project the concepts of logistics management in the maritime context and to draw applicable results. In the sense of bringing benefits through the innovation of a number of managerial practices. In this approach, the question of the management of shipping lines, which constitute a major capacity in the field of maritime logistics, is registered. The results show that the cooperation strategy of shipping companies is highly dependent on the supply and demand of ships. The port, which collaborates with the shipping companies, will have a significant reduction in port charges, which creates the advantage of gaining more demand for stopovers, but this will have a limited effect on the load of the other port. Cooperation can result in loss to the port, so reallocation of profits is necessary to maintain the coalition. Consolidation as a strategy involves considerable risk that if the targeted benefits are not achieved, it depends on how effectively the management of the consolidation task is carried out.
According to analyzes it represents both an opportunity and a threat insofar as volumes will increase considerably in certain transshipment ports to the extent that operations will be centralized while other transshipment ports will lose their profits because they are not selected for Hub-key network planning.

Keywords: Maritime logistics, Innovative System, Supply Chain.

Introduction

With the development of the world economy, international trade has become an important factor for the economic advancement of nations. As a key element in the international trade chain, since the two important elements in the maritime industry are; shipping lines and ports so that their performance creates a significant impact on both regional economic development and industry competition. However, after the economic crisis in 2008, the international shipping industry collapsed into a trough. Ports and shipping lines face the challenges posed by the imbalance between supply and demand for shipping, which therefore makes competition in the shipping industry stronger. Following the financial crisis, the shipping industry experienced overcapacity issues. This is due to the wave of orders from container ships before the slowdown observed in the market.

As such, rates on the main route between Asia and northern Europe have risen to unprofitable levels. In order to regain profitability, the consolidation of shipping lines on certain shipping lines and the globalization of shipping companies have become standard practices. The three shipping leaders, the "P3" alliance between *Maersk*, MSC and CMA CGM, have taken steps to engage their fleet in a joint operation that will operate the ships from a center located in London in 2014. In addition, in order to reduce costs, P3 networks have concluded an agreement to consolidate three trade routes: Asia-Europe, Trans-Pacific and Transatlantic. As a result, shipping lines, which previously operated the

majority of their partially loaded fleet, will operate larger vessels that are more fuel efficient and fully loaded (REUTERS, 2014).

In order to maintain a competitive advantage, ports must improve their port facilities and their level of management. Meanwhile, cooperation has become another important means to promote port competitiveness. This manifests itself in cooperation between port operators and cooperation between shipping companies and ports. The competition to become a port hub is so intense that the main ports often find it difficult to form a partnership in a given region, so the predominant form of cooperation between ports is between large ports and small feeder ports. However, cooperation between shipping companies and ports has gradually become a general topic in recent years. The relationship between shipping companies and ports is so special. Managerial decisions made by a shipping line or transshipment port can often change the stage of a region's shipping industry and, by sharing a large share of total revenues in a single supply chain, ports and shipping companies can become mutually beneficial partners. With the implementation of a managerial strategy and a sharing of the profits generated on a chain that is both vertical and horizontal, offering the entire maritime industry a new option for achieving change.

For pure import/export volumes, the volumes will not change. But if the port has several different terminals Consolidation will favor the larger terminals which have the capacity to process the total consolidated volume. So how can we position the question of consolidation between the strategic choice and its business model?

The objective of this research aims to show the impact of consolidation in the liner shipping industry on the port industry; does this consolidation represent a threat or an opportunity for the various port stakeholders?

To this end and in order to better understand the impact of the current organization of the sector, we will be particularly interested in identifying the impact of the evolution of trends in maritime transport on ports.

Literature Review

Vertical And Horizontal Integration

The maritime industry is no longer characterized by competition between individual companies, but by a consolidation trend, that is to say the integration of services, vertically and horizontally (Fremont, 2007). Vertical integration guides cooperation between stages of the supply chain (van de Voorde, 2009), such as handling services within terminals, hinterland and port transport services, warehousing, distribution, etc.

Maersk is the most distinguished example of vertical integration. A typical supply chain will likely look like the image below, including towing activities, the yard as well as land activities within the port, all related to the transportation and handling of cargo. The consolidation of services along the supply chain has led to the creation of "*Third-Party Logistics*" (3PL) or even 5PL or LLP. 3PLs refer to integrated intra-company logistics services, ranging from transport, warehousing and distribution delivered to the wishes of consumers (Selviaridis, 2008). The 3PL offers a certain competitive advantage, namely the value-added aspect of the supply chain, which in the eyes of customers is of paramount importance.

After presenting the vertical integration scenario so far, the attention of this document will be focused on horizontal integration. Horizontal integration refers to cooperation between two or more competing companies in the same sector or market (Hill, 2008).

Besides vertical consolidation, the maritime industry is dominated by horizontal integration, either by mergers, acquisitions, or by strategic alliances.

The bulk shipping industry is not much affected by the presence of an alliance, this document will examine the case of container shipping on regular lines. There are many alliances in this part of the maritime sector, mainly because the maritime industry is a capital-intensive industry (Cariou, 2000).

Strategic Alliances

Due to standardization and containerization, global trade and investment have become possible to a large extent, increasing the coverage of consumer markets. And In order to continue to participate in the maritime industry as a global player, maritime transport companies have decided to conclude strategic transport alliances in order to reduce operating costs, in particular through the asset sharing (Van de Voorde, 2009). In this sense and before starting, what are the alliances? Strategic alliances imply a cooperation agreement, hence a deliberate relationship between two or more companies for current use and the integration of certain assets of the company in order to achieve the mutual objectives defined above (Hung, 1992) . In this sense, alliances include joint ventures.
Research on this subject has divided these strategic commitments into three categories (Harrigan, 1987), as shown in the table below. In strategic relationships, mergers and acquisitions are also included, but the difference between these two and alliances will be highlighted later in this section. According to *Harrigan*, strategic relationships can be broken down as follows: full ownership (for example, mergers and acquisitions), partial ownership (for example, joint ventures) and no ownership agreements (for example, research and development agreements) (Harrigan, 1987).

The way of cooperation as a vector for developing the competitiveness of the maritime chain

The competitiveness of ports from the perspective of shippers

In order to study the competition of shippers, *Nir et al.* (2003) take three regions of Taiwan as cases to investigate the behavior of the choice of ports by shippers. The theory of revealed preferences is applied to build a model of competitive port choice. The results indicate that the negative effects on shippers are compatible with the container travel time. Shippers are ready to choose the nearest port to save travel time. However, frequencies and routes do not have a significant influence on the choice of port choices by shippers. In addition, the value of time for the choice of port will be higher if calculated by the experimental model, compared to this experimental model and the global competitive model, despite the competition between ports. This means that the decision to choose the future port will be affected by the choice of the experienced port. Other factors such as port facilities, port services, routes and frequencies have no significant effect on the choice of port behavior. (Ibid)

Unlike other researchers, *J. L. Tongzon* (2009) divides shippers into three types: the first group shippers are those who have already established long-term relationships with shipping companies. Thus, they do not have to choose a port, but leave this decision to the shipping lines. The second type is the one who cooperates with the *Freight Forwarders*, and the third is the one who is independent. In which *Tongzon* believes that the latter two types of shippers should make such a decision to choose a port and independent shippers often choose a port from the perspective of intermodal or operator selection. Based on this understanding, *Tongzon* surveys *Freight Forwarders* in Southeast Asia, finding that the frequency of ships in port, port efficiency, port location, competitive port charges and rapid response to the needs of *Harbor* users are the most important factors for a Harbor so that the *Freight Forwarders* can compete.

By asking the respondents, *Tongzon* noted that port efficiency was ranked first by the *Freight Forwarders* sampled, followed by the shipping frequency, the appropriate infrastructure and the location.

The Perspective of the ports from the vision of the Maritime lines

However, the factors influencing the choice of ports are different from the perspective of shipping companies. *Tongzon* and *Sawant* (2007) use the survey and preference assessment method to analyze

the main factors in choosing a port from the perspective of shipping companies. Through the survey method, he finds that the efficiency of port operations is the most important factor, and the following factors are the price of the port, the connectivity of the port, the geographic location of the port, the service coverage and the size of the freight. However, he finds the various results that the port price and the efficiency of port operations are the critical factors by the preference assessment method.

Anderson et al. (2008) suggests that shipping companies are primarily concerned with freight volume, port handling costs, dockside conditions, transshipment freight volume and feeder port connectivity. It also indicates that these main lines are more sensitive to the port price than the feeder lines. For practice, the port should treat the main lines and the feeder lines in a different approach. Since value-added services and the price of the port are the main concern of the main lines, the port must provide a more complete range of value-added services to the main lines and lower tariffs as much as possible. At the same time, the port must improve its market scale and optimize the operating environment to attract line vessels from feeders. *Lirn et al.* (2004) applies the Analytical Hierarchical Process (AHP) method to analyze the preference of international shipping lines over the transhipment port. The conclusions are the main concern of shipping companies, the price of the port and the shippers value the position of the port. He notes that the main concern of international shipping companies is the quality of port service. *Yuen et al.* (2012) analysis the preference choice of port, from the perspective of shippers and *Freight Forwarders* by applying the Analytical Hierarchical Process (AHP) method. The conclusions are the main concern of shipping companies, the price of the port and the shippers value the position of the port.

Cooperation in The Shipping Industry

The removal of trade barriers and the liberalization of the market significantly facilitate world trade. Creating an efficiency sector has already become a main driving force in the market where ports and shipping companies operate. In order to meet the substantial challenge raised by the process of globalization and containerization, ports and shipping companies are devoting themselves to the search for an effective strategic compromise. Horizontal and vertical cooperation, as forms of industrial integration, is becoming an important approach to improve the efficiency of the maritime industry.

In this section, an introduction to the horizontal and vertical cooperation that occurs in this market is provided.

The two types of horizontal cooperation are discussed: cooperation in shipping lines, port cooperation and a type of vertical cooperation, Cooperation between ports and shipping companies.

Regular Lines

Shipping lines play a leading role in facilitating world trade. They allow not only the cross-border transport of cargoes, but also the Marketing plan for international trade. Therefore, maintaining the competitiveness of shipping lines to provide an efficient service becomes of crucial importance to the market. However, the existence of high fixed costs, indivisibilities and other aspects of the transmission line, makes it difficult for a single transport line to respond effectively and efficiently to the challenge of the market. Different forms of cooperation, to varying degrees, allow shipping lines to broaden their reach, rationalize their service and reduce their costs (Bergantino and Veenstra, 2002).

The most important example in history is the pricing agreements between shipping companies (Shashi Kumar, 1999) and there is also a plot and fleet sharing agreement (Lu, Cheng and Lee, 2006). Today, a more global and flexible form of cooperation has emerged, which is a global strategic alliance (Bergantino and Veenstra, 2002).

a. The motivation for cooperation in shipping lines

Given the dynamic environment of the shipping market, increasing attention has been paid to economy of scale, cost control, frequency of services and risk control. Horizontal cooperation between shipping companies offers an effective approach to achieve an economy of scale, share risks and investments in order to provide a better service to users with a low cost (Bergantino and Veenstra, 2002).

b. Types of online transport cooperation

The shipping lines alliance can be divided into three types: a strategic or global alliance, a vessel-sharing agreement and a niche charter (Ferrari et al, 2008; Panayides et Wiedmer, 2011).

c. The strategic alliance

The global strategic alliance, which is defined as "*an agreement of two or more companies that attempt to collectively increase their competitive advantages over competitors in a global market*" (Bergantino and Veenstra, 2002) is the type of most important cooperation between shipping companies (Midoro and Pitto, 2000a).
By sharing limited sources and risks, and improving customer service, product quality and market accessibility, partners in a global alliance gain a variety of competitive advantages over others and therefore an improvement in profitability (Bergantino and Veenstra, 2002). However, Alliances do not cover joint sales, price fixing, joint ownership of assets, sharing of management functions or the share of results (Panayides and Wiedmer, 2011). There are three major global strategic alliances in the world, which are CKYH Alliance, Grand Alliance and New World Alliance.

d. Sharing the ship and slots

The vessel sharing agreement, as explained by (T. Heaver, Meersman and Van DeVoorde, 2001), is the cooperation that partner transportation companies work together to fulfill a particular trade route by sharing vessels and performing joint optimization on their departure Deadlines and ordering of shipping orders to ships . An important basis for sharing vessels is the sharing of demand information. In the slot sharing relationship, the partner shipping companies improve the ships deployed on the same route with different timetables. By exchanging a fixed percentage of the vessel's capacity, carriers can reduce operating costs (Panayides and Wiedmer, 2011). However, different types of cooperation exist in the shipping market, there are still a number of shipping lines acting as soloists, such as *Maersk* Line and MSC. The shipping line which is not in a cooperative relationship generally has a large fleet and a large service network itself.
For these large shipping companies, they do not necessarily need collaboration with competitors. Economies of scale can usually be achieved by themselves.

Cooperation between shipping companies and ports

For there to be cooperation between the shipping line and the port, there are natural conditions that must exist to form a coalition. Since the shipping line and the port are two different elements of maritime logistics and there is no direct competition between them, it makes the coalition easier and more profitable. Meanwhile, the vertical integration of the shipping line and the port can effectively satisfy the maritime logistics and improve the level of service. In addition, as shipping lines choose where to drop their vessels, it is increasingly critical for a port to cooperate with one or more shipping companies to ensure long-term prosperity. The shipping lines have taken steps to get more efficiency and reduce costs and In order to achieve improvement, the adoption of large vessels and global strategic alliances were born (Asteris and Collins, 2010).

Because of this, the small shipping companies are struggling to survive, and the shipping companies are getting bigger and fewer. Therefore, being in a cooperative relationship with a major transport line can guarantee the interest of a port for a considerable period of time.

The benefits of shipping lines

Vertical cooperation in the shipping supply chain allows transport companies to expand their activity up and down. By these means, they can reduce the internal cost of the supply chain and provide better service to customers.
Cooperation can help shipping companies reduce costs and get higher profit. In case of port congestion, shipping companies can receive priority for access to the terminal by investing in a port. After the investment, a number of locations and the operating efficiency will be guaranteed at the shipping line so that the transport program of the line is not delayed by the congestion of the port and that the risk will be reduced.

Port investment is a means of diversifying the revenues and risks of the shipping company. By obtaining income from the capital invested in port operations; shipping lines can achieve a stable profit in the shipping industry, which disperses the risk of a shipping line.

Results

Modelization

A model can be defined as a tool with which a problem can be solved can be solved. Models are created to solve problems and are therefore closely linked to the problem they were created to solve (Hägg and Wiedersheim-Paul, 1994). Models exist to represent a certain reality and provide a simplification of this reality. In creating such simplifications, it is essential to identify the basis of the key concepts being modeled. As such, negligible and not indispensable factors of reality can be ignored. It should be borne in mind, however, that there can be no fixed, unchanging and real representation of reality and that it is therefore open to interpretation. As such varied interpretations may exist; models of the same reality may exist in many different forms, without being "correct" or "incorrect". This connection is illustrated in the figure 1.

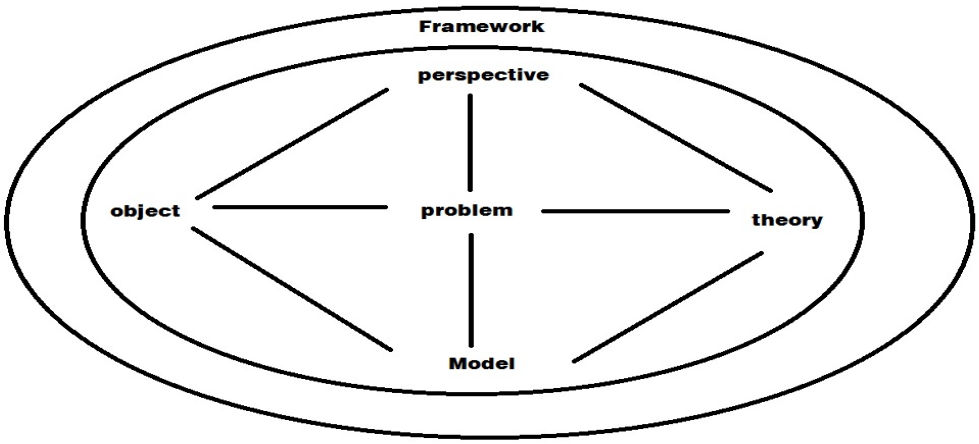

Figure 1: The methodological framework, Source: (Hägg and Wiedersheim-Paul, 1994, p. 12)

In this study, the model is used to describe the influence of factors and the profit of ports and shipping companies. By analyzing the results of this study, a conclusion will be reached. In order to ensure the stability of the results, the sensitivity analysis will also be carried out.

Case study

Another notable aspect of consolidation is to calculate the **Herfindahl-Hirschmann Index (HHI)** for the industry. The HHI is a measure of market concentration and, as a benchmark, the US competition and justice authorities consider that an industry with an HHI greater than 2500 is very concentrated and an industry with an HHI between 1500-2500 as moderately concentrated.
A source of advantage of scale comes from the size of the ship, as we have already seen earlier. What an alliance allows is the creation of advantages of scale as well as flexibility within a network. As a very simple example, consider 4 shipping lines each providing weekly service between Asia and Europe. They cover all cargo from 10 ports in Asia to 10 ports in Europe. A total of 100 pairs of ports to maintain.

Each shipping company may have chosen to make only 5 stopovers only in order to have a competitive transit time. As a result, each transmission line covers 25 pairs of ports directly, and must use local feeders and associated transshipment operations to cover the remaining 75 pairs of ports. If the four shipping companies conclude an alliance, they can collectively design a network composed of 4 weekly services, with the option of providing direct port-to-port service for one of the 100 port-port pairs.

Example: The niche market

First of all, it should be noted that the "niche" carrier must be understood in a relatively broad sense.
With the evolution of the market, a niche carrier in this context is essentially a carrier that is not part of the small grouping of global shipping lines.

The reason that all of the remaining shipping lines can be called niche carriers is that they will face competition in an environment where it will be impossible to match the main lines on the main marketed products they offer. But that does not mean that there is not a margin of competition between them, on the contrary. For each of the main benefits of the major shipping companies, i.e. the scale, standardization and digitalization, let us examine how these can be used as assets for well adapted niche carriers.

On the aspect of the scale, we have already seen how this applies both to the size of the ships and to the range of the network. At first glance, it seems difficult for niche carriers to compete with, but the reality turns out to be different.
First of all, however, it should be borne in mind that niche lines have a high potential for profit compared to using larger vessels. In fact, their relative increase is much more significant than for the large shipping companies.

Discussion

Nowadays, the maritime transport industry knows a perpetual growth that it is because of the technical gigantism by the way of introducing giant ships more and more efficient, of an increasingly high productivity of the ports and terminals or the scale of production sites and emerging markets. However, in order to meet the increasingly increased requirements of this industry, it is essential to deal with the phenomenon of the consolidation of shipping lines so that ultimately the maritime supply chain will have the capacity to manage this important economic flow. This capacity, dynamic of course, presents relevant solutions for the challenge of optimizing logistics costs and increasing the added value generated, however the choice of the business model and the appropriate forms of consolidation will subsequently constitute a real operational problem than strategic.

Better cooperation and closer work between the terminals of a port is a proposed approach, with the idea of creating a single virtual terminal. For example, the ships could be distributed centrally at the first "*berth window*" available at any terminal in the port and the Yard equipment could be shared, depending on how the terminals are contiguous and if they have the same types of equipment (A common mode of operation). However, this presents many challenges, if a number of different

terminal operators have varied goals and interests and knowing that the terminal establishes the *Berth window* which corresponds to each planning of stopover networks with a predefined time interval, which thwarts the option of having the ships start again at the first available *berth window*.

Increased cooperation between terminal operators in a port and efforts to facilitate inter-terminal transfers will help, but to some extent this avoids the real problem. Consolidation is the only real long-term solution that has two aspects:

- Physically strengthen the capacity of the terminals through capital investments and civil engineering works
- Consolidation of the ownership of terminals where there are many players in the same port.

Perhaps the most practical approach, the ability to physically move and combine the capacity of terminals in a port, is this which encourages mergers between terminal operators and thus aligns interests and operational control. In this managerial approach, we identify several key learning points for any shipping company considering consolidation with another player:

- Consolidation between two shipping companies should lead to savings, thanks to synergies and longer-term strategic advantages.
- Consolidation offers a greater advantage if the geographic locations of the two companies are complementary rather than generating additional volumes in the same businesses.
- The main cost savings come from economies of scale and smarter operation opportunities with consolidated volumes, eg. Improving network usage and reducing container costs and imbalances.
- Although additional volumes can support the use of larger vessels, in many cases the benefits of scale in ship systems are already being achieved through membership in the Alliance.
- A key objective during any consolidation must be to retain the customers of the two lines, the loss of volumes or market share can cancel the cost advantages obtained.
- Communication with all parties involved, including staff, customers, suppliers and partners, is essential throughout the process.

Taking into account the increase in containerized freight flows by ports

This increase will have to be taken into account by ports, terminals and ships. The introduction of very large container ships (VLCS Very Large Container Ship) and the planned deployment of ultra-large container ships (ULCS Ultra Large Container Ship) are changing shipping models and require port extensions and upgrades. The mutual relationships between trade, shipping, large vessels and ports should be addressed to assess whether the projected larger trade flows created by fluctuating trends in world trade can be efficiently shipped and supported by ports. US trade is shipped via European ports.

Automation and digitalization

When automation is discussed in the context of line navigation, it is often from the perspective of technological possibilities. It includes subjects such as autonomous vessels, fully automated container terminals. This section will look at automation, but not from the point of view of a specific technology, and therefore not from the point of view of how the technology will work in detail, or who will develop it. Instead, he will look at automation from the point of view of how it will change the dynamics and business models in the industry.

Automation is quite simply the transformation where human work is replaced by computers or robots. When the job is replaced only with software, we would call it scanning. This is possible for all aspects of the workflow related to capturing processing and transferring information. When physical work is replaced by robots, this is called automation.

Conclusion

Container ports and terminals will experience significant changes, in part due to changes in the shipping industry, and in part due to demographic changes, the main development we are likely to see is a significant struggle for market share in the coming years driven by all of the changes mentioned above. This battle will have been largely settled, with a series of larger local ports, the expansion of certain large transshipment centers and a significant drop in the volumes of other transshipment centers. The coming years will therefore be crucial for the future of many ports and terminals.

Faced with this situation, the question of innovation of new Organizational forms at the service of the consolidation of shipping lines and activities related to the shipping industry, turns out to be of strategic necessity in order to respond effectively to the challenges of gigantism and of globalization.

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Students' Opinions About Applying MS Excel In Management Accounting Education

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Summary

The article presents the results of the study of the students' opinions on applying MS Excel in management accounting education. The first part of the article provides a review of literature on MS Excel in education. Then the justifiability of providing classes in management accounting in a form of computer laboratory is given. A substantial part of the article presents the opinions of the students of the Faculty of Management of the UTP University of Science and Technology on the justifiability of MS Excel application in management accounting education. The empirical study used a survey questionnaire. The study results show that the students support delivering those classes in a form of computer laboratory using the spreadsheet. In their opinion the tools learnt in those classes are adequate to the job market requirements. It is proposed to extend the study by a greater number of respondents from other higher education providers which offer management accounting classes. Besides the authors intend to interview the representatives of enterprises employing the graduates to get to know the employers' spreadsheet skills expectations.

Keywords: Management Accounting, Students, MS Excel, Education

Introduction

As for teaching the economics courses, the classes using the MS Excel spreadsheet are very important. The spreadsheet provides a high functionality and it is user-friendly. It allows the user for extensive applications in accounting-related fields (e.g. management accounting, financial accounting, controlling, etc.) if the user knows most of the functionalities offered by the program.

The aim of the publication has been to present the justifiability of providing management accounting classes using the spreadsheet based on a literature review and a survey. The empirical study has been to get to know the opinions of the students on the MS Excel application for the management accounting course in a form of computer laboratory and to verify what MS Excel tools are most frequently used by the students.

The first part of the publication has been a review of literature on the IT skills desired by employers, especially MS Excel, and the professions they are especially important for. Further the article points to the purposefulness of delivering those classes in a form of computer lab. Then there has been discussed the methodology of the preliminary study carried out among the students and graduates of the Faculty of Management of the UTP and the results are presented. Finally, a recapitulation has been made and the directions for future studies have been proposed.

Literature Review

The literature review first makes the analysis of the MS Excel tools skills based on the historical studies. Then the skills desired by the employers and the professions the skills are especially essential for are listed.

To verify how the students and graduates evaluate their knowledge of MS Excel, the Talent Development Foundation (fundacjarozwojutalentow.pl 2018/2019) has performed an applicable study of the students in the academic year 2016/2017, which involved 803 persons. A five degree-scale was proposed, where 0 meant “I do not know”, and 5 “I know very well”. 53% of the respondents have declared that they can manage tables, charts and functions very well, and determined their level as 4. Another 9% of the respondents value their skills even higher and claim that their spreadsheet skills are excellent. The lowest number of the respondents marked their skills as representing 2 and 1 (5% and 1%, respectively). None of the respondents claimed not to know MS Excel at all. In the academic year 2018/2019 the Foundation carried out such study again among the students and higher education graduates. A total of 511 persons were interviewed, where 42% evaluated their MS Excel skills as 3; 19% declared that they know it well. As compared with the study performed in the academic year 2016/2017, one can conclude that the students’ and graduates’ knowledge of MS Excel dropped.

The Provincial Job Centre in Szczecin (wup.pl 2007) conducted a survey e.g. to get to know the factors affecting the selection of the personnel by employers. The respondents, using a seven-degree scale (where 1 stood for "of little importance”, while 7 “very important”) were asked to determine the level of importance of the knowledge of computer programs for lower management positions. 39% of the respondents claimed that it is very important, 13% of the respondents marked it as 6. The lowest number of the respondents selected levels 2 and 3 (2% and 4%, respectively). As for the required knowledge of computer programs, the MS Office package (Excel, Word) and a number of financial programs were pointed to. Most often the employers indicated the MS Excel package (18%). The knowledge of other financial programs scored as follows: accounting (7%), “Płatnik” (4%), financial (3%).

Initially, to young persons the Excel spreadsheet seems complicated and difficult, which is a considerable barrier to learning it. It can discourage due to a considerable number of tools, functions and possibilities offered to the user (Próchnicki 2012). However, once you start working with the spreadsheet, you change your mind. Próchnicki has stressed that currently it is not used only by accountants, finance or controlling experts but everyone uses it in everyday work. It also shows that the knowledge is already an obligation and not an advantage.

The standard requirements from the accounting job applicants include: professional experience, a fluency in accounting problems and fiscal regulations, the accounting law; the knowledge of financial and accounting programs, a very good knowledge of office packages, including the Excel spreadsheet (Chomuszko 2017).

According to another study performed among the employers in the category of “hard’ knowledge, the work organization and an effective time management (self-management) skills, analytical skills and IT tool skills are essential (Budnikowski et al. 2012). It is necessary to keep improving the IT tool skills (namely Excel and other basic programs at advanced level).

Sithole (2015) has investigated the accounting knowledge and skills desired by the employers and the level of satisfaction with the skills demonstrated by the accounting graduates at basic level. The results of the survey questionnaire made among 35 employers (accountants) show that they require the candidates to know e.g. computer techniques and reporting skills. They consider the accounting graduates to be the persons with high skills of measurement, reporting and research skills. The employers have shown that they expect a greater knowledge of accounting packages and spreadsheet competencies from primary school graduates (Sithole 2015).

The study which covered the accounting graduates and employers from Ghana on the required graduates’ accounting knowledge and skills has demonstrated that, as for the IT skills, the use of spreadsheet packages was considered by both groups as most important. The only differences between the two groups were the IT skills for word processing and Windows (Awayiga et al. 2010).

The results of research provide useful information for the scientists and academic teachers responsible for introducing changes in their curricula. Besides, it turns out that a fast and efficient skill of using the Microsoft Office package, especially Excel, is considered indispensable in many professions. Not every enterprise can afford expensive business intelligence solutions and that package is used not only by many enterprises but also by many individuals. MS Excel can automate and speed up the execution of reports, breakdowns and similar tasks, providing the employee with more time for drawing conclusions, analyzing the situation and taking decisions on any potential corrective actions.

MS Excel is an extensive program with a number of extensive possibilities. On the market there are many enterprises offering applicable training addressed, especially, to professionally active people who do or intend to do the office work. It is one of the most frequently used office work programs. It enjoys a great popularity globally, both in small and large enterprises. With a literature review there has been developed a list of some professions in which the spreadsheet knowledge is applicable (projektgamma….; porady.pracuj.pl……; praca.pl 2019;):

- Human resources department: it facilitates an efficient management in the enterprise, it is a link between the management and respective employees. The human resources specialists use the spreadsheet for employee recruitment and for such human resources works as e.g. employee vacation calculation, contract development;
- Secretariat: the secretary's responsibilities often include a development of text documents, developing breakdowns and data collecting and ordering. To do it well, one must know the most important Word and Excel functions;
- Accounting department: the use of the spreadsheet functions speeds up the work considerably, which, in turn, makes analyzing respective data much easier;
- Logistics department: document formatting, data entering and ordering as well as developing reports are just sample responsibilities of the logistics expert. A lack of MS Office competencies, in fact, makes it impossible to work in this profession;
- Production planner; the spreadsheet is an excellent tool for developing the production plan and schedule. It is possible to develop many formulas, interdependent cells and sheets, and the program will perform tens of thousands of calculations within a short time. Production planners with IT personnel can adjust the spreadsheets to the specific nature of the enterprise very well;
- Customer service specialist: collecting and processing the claims and updating databases are impossible without the knowledge of the word editor and spreadsheet;
- Receptionist: he or she takes care of the image of the enterprise, provides information and develops documents, organizes business trips and events held by the enterprise. The knowledge of the MS Office package allows for doing it efficiently and accurately;

Web portal pracuj.pl, where job ads are posted, on 19 March presented 47 job offers in Bydgoszcz where the employers require the knowledge of the MS Office package (there were 197 all intellectual job offers). Most professions which require the knowledge of the MS Excel package are production planners, logistics specialists, process engineers, supplies experts, and calculation specialists (pracuj.pl 2020).

Management accounting course provided as computer lab

There is a gap between what the students learn in terms of accounting at schools and what skills are expected by the employers from the graduates (Weaver and Kulesza 2014; David et al. 2011). The gap is especially a problem for the students looking for accounting and managerial jobs (Cable et al. 2009). The accounting employers often require the candidates to know a specific accounting software. It turned out that few people demonstrate such skills. An employment advantage is found then in the graduates with experience (David et al. 2011). A low level of the students' knowledge of the MS Excel functions is also confirmed by the study conducted at the Wrocław University of Economics (Kes and Kotłowska 2013).

The syllabi at schools of higher education cannot meet the job market needs adequately. They syllabi have been severely criticized as not being adequate to the useful skills required by the corporate employers (Bennis and O'Toole 2005; Seggie and Griffith 2009). Over the recent dozen or so years many leading business schools have followed a wrong model. Instead of measuring the competencies of their graduates or how well their faculty understands the important factors affecting the business results, they measure almost exclusively the requirements of their scientific research. Most practical-profile higher education providers execute a double mission: to educate the practitioners and to create knowledge through research. From a historical point of view the emphasis is made on the first one at the expense of the other.

The application of computer technology for management accounting classes improves the students' results in the final exam both as compared with the results in the mid-term exam and the results in the introductory accounting course (Bawaneh 2011).

As reported by Halabi, who has compared the effectiveness of computer-aided learning with that of a face-to-face lecture, the advantages and disadvantages of applying computer-aided technologies in accounting courses have been noted (Halabi, et al., 2010). A computer-aided study material is, in general, user-friendly as it divides information and skills into small packages, facilitating the student learning at achievable stages. The disadvantages are costs and time limits required to develop and to implement computer learning modules.

Students consider the application of computer-aided learning methods as effective for a better understanding of accounting problems. Considering the differences in the students' characteristics, technology can offer a better learning possibility and help to develop the key competencies (Pittmann and Edmond 2016).

A study performed among the managers and young professionals has demonstrated that the top five skills include the MS Excel skills from intermediate to advanced (Weaver and Kulesza 2013)

Accounting-related jobs most often use the MS Excel tools which include: pivot tables, entering data and cell formatting, plotting diagrams and logic functions (Lee et al. 2015). The least frequently used tool was the Solver. The new employees also mentioned the above tools as most essential. The author has indicated that the most often required program at recruitment was MS Excel.

The technology and IT systems education are of key importance for the future of the students (Ainsworth 2001). As suggested in the literature review, it is expected that the accounting students will enter the job market with a set of basic accounting technology and knowledge-related competences. The fact that Excel is a useful tool also comes from the number of trainings and the number of enterprises offering such training. Having analyzed the available MS Excel management accounting courses, it was found that their prices range from PLN 2100 to 2600. It was also noted that the topic coverage is very similar to the syllabus of the management accounting class provided at the Faculty of Management of the UTP University of science and Technology in Bydgoszcz. The courses include the problems provided in Table 1. Having analyzed the topic coverage, it is about 80% compliant with the class syllabus, which justifies providing classes in a form of computer lab.

Table 1: Topic coverage and the use of MS Excel tool in management accounting class labs

Class topic coverage	**MS Excel tool used**
Price calculation and defining models	Lookup Result
Profit sensitivity planning and analysis models	Scenario manager, Lookup Result
Graphic profitability threshold analysis	Lookup Table
Optimizing management accounting problem	Solver
Multi-dimensional revenue and cost analyses	Pivot tables

Development of multi-stage contribution margin calculations and determining the ranking of product and client profitability	Excel formulas

Source: own study based on: http://wz.utp.edu.pl/wp-content/uploads/2020/02/5_sylabusy_SS_FIR.pdf, as on 31.03.2020.

Since 2017 in Poland there has been operating the social idea "ExcelDay". Together with globally recognized brands, it helps students and graduates to acquire and to develop their professional competencies required to enter the job market. The project is a voluntary organization of competencies. The job-market-experienced volunteers demonstrate a practical use of the spreadsheet to young people thus filling in the diagnosed competence gap (Fundacja Rozwoju Talentów 2019).

The universal nature of MS Excel allows to use it to solve most management accounting problems. For that reason, the educational institutions should stress spreadsheet training for accounting students, if they have not done it yet.

Result of student survey on MS Excel in Management Accounting Courses

Trying to contribute to the existing literature determining the skills expected by the employers when hiring new employees, especially for accounting or managerial jobs, a survey was made among the students of the Faculty of Management, the UTP. The research objective has been to learn the opinions of the students on the spreadsheet application in accounting classes provided in a form of computer lab and to verify what MS Excel tools are most often used by students.

The study included closed-ended questions and one open-ended question. To develop the survey questionnaire, the Google Form tool was used. With it, the results could be saved in MS Excel, which facilitated an efficient analysis of the survey results.

The study involved 52 regular students majoring in finance and accounting who, in the summer semester 2018/2019 (17.31% of the respondents) and 2019/2020 (82.69% of the respondents) participated in the management accounting labs at the Faculty of Management of the UTP University of Science and Technology in Bydgoszcz.

Table 1 presents a breakdown of the topic coverage for the classes together with the respective MS Excel tools used in management accounting course computer labs at the Faculty of Management, the UTP. Next to those tools provided in the second column, the students also used the chart inserting option, entered the data unassisted, formatted the spreadsheet, and used simple formulas, e.g. the sum, product, Vlookup, index, etc.

The aim of the management accounting classes provided in the lab is to get the students to know the key MS Excel functions in terms of data and methods of presentation, facilitating the right decision-making. The students are shown how to use the program for various analysis presentation methods and for automating reporting and graphic presentation of the most beneficial solutions in the enterprise.

During classes the students acquire the practical spreadsheet skills to organize their work and to reduce time considerably to automate the processes of reporting and drawing conclusions.

The present study has shown that as many as about 42% of the respondents were studying and working at the same time. The others (about 58%) were studying only. Most of the respondents were working in the following sectors: accounting (27.27%), commerce (22.73%), food industry (13.64%), and the fewest respondents – education, customer service and administration (4.55% each). The most frequently used MS Excel tools (Fig. 1) indicated by those working were: simple functions, namely the sum, min.k, max.k etc. (about 41%), pivot tables (about 23%) and Solver (14%).

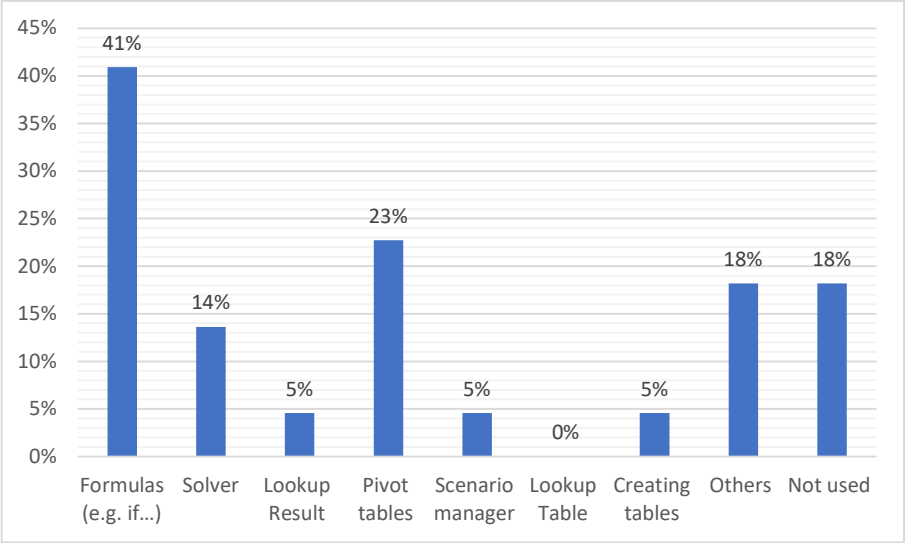

Fig. 1. Tools used at work by working students.

Source: own study.

To answer the multiple-choice question where the students most often use the MS Excel tools, the students indicated the university (88%) and for developing their diploma thesis (80.77%). The students also use the spreadsheet at home and at work (30.77% and 28.85%, respectively).

To answer the question which of the MS Excel tools was most often used by the respondents, they could only indicate a maximum of 3 answers. Most often the answer was: formulas (96.15%) Lookup Result (28.85%) and pivot tables (25%). Scenario manager and Lookup Table were least frequently used (5.77% and 7.69%, respectively).

To verify the students; opinions on the level of MS Excel applicability, a five-degree scale was used, where 1 stood for "not applicable", and 5 "applicable". Almost 67% of the students considered it very applicable and 27.47% - applicable.

98% of the respondents claimed that their level of the knowledge of the tools and spreadsheet increased after the completion of the management accounting classes.

All the students agreed that the management accounting classes should be taught in a form of computer lab. Besides, in the opinion of more than 72% students, delivering the management accounting classes in a form of computer lab complies with the job market requirements.

The last question was open-ended. The respondents could indicate other IT tools which, in their opinion, should be used in management accounting classes. The answers included the SAP and financial ratio analysis software.

Recapitulation

Adjusting the syllabi to the market needs is possible thanks to the cooperation of academic teachers with the practitioners. Adjusting the syllabi to provide the skills desired by the employers will satisfy the demand of the enterprises for qualified employees. The students who will graduate with a specific set of skills will enjoy a competitive advantage over those who do not have it.

The results of the study point to the importance of introducing considerable modifications into student management accounting syllabi. It is evident from the literature review, job ads and from the positive opinions of the students of the Faculty of Management on the spreadsheet application for the classes of the course. As it turns out, the students use the spreadsheet not only at the university but also at work. Everyone has considered the lab as a form of classes which is adequate, and 98 % claimed that

the level of MS Excel knowledge after completing those classes increased. Both the aim of the study and the aim of the article have been executed.

From the point of view of the requirements for the candidates, especially for accounting jobs, one must point to the need to develop a new accounting teaching method to include of the legal, organizational and technological conditions. The article presents the arguments which should encourage a launch of such educational path. Numerous spreadsheet accounting teaching advantages have been provided. Nevertheless, the study covered the students of a single higher education provider and so the results cannot be representative; hence a further such study proposal. The first study worth performing is to verify the opinions of the students and graduates of other higher education providers who have participated in management accounting classes in a form of auditorium and laboratory using MS Excel. It would be then possible to compare the analytical, cognitive and professional skills in the students of two groups: taught with the use of the traditional auditorium form and the lab form. Other study which would verify the purposefulness of implementing the spreadsheet as an accounting teaching tool would be a study among the representatives of the enterprises employing the higher education providers' graduates to find the skills they expect from such persons. The study could help defining the teaching skills most desired by the employers which would supplement traditional education. Besides, it would supplement the results of research provided in this article.

The topic is vast, however, it seems worth considering and implementing. The use of the spreadsheet in management accounting education is adequate to the today's reality and it allows for a better preparation of accounting students for their future jobs.

On top of that, well-educated students with professional skills help the schools of higher education execute their objective; the top job placement of talented students to allow their further development. Thanks to it, they can become a new generation of leaders.

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Vertically Shifted Exponential Best-Fit

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Abstract

Exponentially decreasing data examples can be found all over in the world. While most of these decrease to zero, there are some examples that decrease with a vertical shift. Data in this form can be difficult to fit to a mathematical model. Iterative algorithms, such as Levenberg-Marquardt for nonlinear least squares curve-fitting, exist to fit the data to a curve, but have some constrains that need to be considered, some hyperparameters that need to be tuned and convergence can be slow.

A new method will be presented in this paper that is not using the above mentioned iterative algorithms, while maintaining the accuracy; has no hyperparameters and the only constraint it has is that the data needs to roughly (data can be noisy) follow the exponential decay curve: $Ae^{-\alpha x} + B$ with A, α and $B \geq 0$. This method was tested on both simulated and real data and performed equally well in both cases much like the curve_fit method from the Python library SciPy but having no hyperparameters and converging faster.

Keywords: exponential decay, curve fitting, Least Squares, regression calculation, forecast, interpolation, data mining

Introduction

Exponential decay is common in the natural sciences. It occurs when a quantity decreases at a rate proportional to its current value. Some examples of this are the decay in time of a pendulum swinging in the air (Huang & Huang, 2000) and the growth in time of an initially small bacterial colony (Zwietering, et al., 1990). Data that decays exponentially in the form $y(t) = Ae^{-\alpha t}$ is very simple to fit a model to by simply taking the natural log of each data point and using simple linear regression to fit the transformed data to a line. When the data does not decay to zero, however, it is not as simple. Data in the form

$$y(t) = Ae^{-\alpha t} + B \tag{1}$$

also occurs naturally. Data in this form is not as simple to fit a model to, especially if only a small number of data points are available.

One set of data in this form is hCG measurements in women with Gestational Trophoblastic Disease (GTD). It has been shown in the research study of (You, et al., 2010) and (You, et al., 2013) that hCG levels in these women decrease exponentially according to model (1). Figure 1 shows a sample of hCG measurement. We can observe that the hCG measurement follows an exponential decay, it can be noisy and that there are time samples where there is no hCG measurement (which significantly increases the difficulty of using certain algorithms). If a forecast is desired from the first few measurements, then we must also deal with a slight vertical shift.

The aim of this study is to use the method of least squares to fit the data to the model (1). The method of least squares is a model fitting method in which the best possible parameters to fit a model to data are calculated. This method might prove useful in making predictions about future hCG measurements for women with GTD.

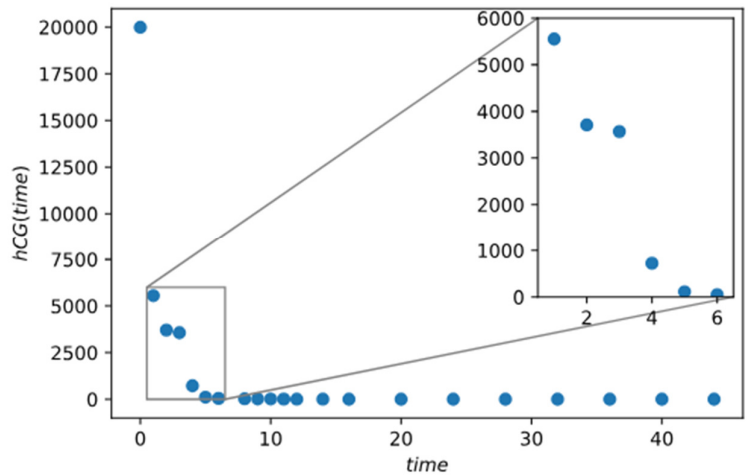

Figure 1: A sample of hCG measurement.

Of the several methods used to fit a model to data, the least squares method is the most commonly used (Forsythe, et al., 1977). There are packages that are used by many mathematical software, however, these methods are not always reliable when fitting a model in the form of (1) to data.

The problem of mathematically modeling hCG in Women with Gestational Trophoblastic Disease was done in a research study by (Costigan, et al., 2016) using logarithmic transformations. The idea presented there was that we can take $n - k$ data point from the beginning of a sample and use them to compute a logarithmic curve in the form of $Ae^{-\alpha}$, then use the remaining k points to compute B. This method works fast, and it gives good results if k is chosen correctly. Later in the paper we will refer to this as the "PseLogLin" algorithm.

Another solution to fit a sample of hCG measurement to a curve would be the "The Levenberg-Marquardt method for nonlinear least squares curve fitting problems" by (Gavin, 2011) in which the errors between the function and the measured data points is iteratively reduced through a sequence of updates to the parameter values by combining two optimization methods, the gradient descent and the Gauss-Newton method. In the case of the Gestational Trophoblastic Disease we can consider the nonlinear function to be the one from (1) with the parameters A, B and α.

An implementation of this algorithm is available in the SciPy python library and it proved to be very accurate. Later in the paper we will refer to this as the "Iterative" method.

The rest of this paper is structured as follows:

1. Section 2 presents how the new solution was built up from mathematical concepts
2. presents what was used to implement the concepts from section 2
3. presents results, comparison of three algorithms in different scenarios and the improvement possibilities
4. presents results, comparison of three algorithms in different scenarios and the improvement possibilities
5. concludes the paper.

Theoretical Concepts

Least Squares Method

When fitting data with n data points to a model with m parameters, the least squares method can be used when $n > m$. In the case when $n < m$ the problem is underdetermined, and the best fit parameters are not unique. Interpolation is a special case of this method and arises when $n = m$ (Forsythe, et al., 1977).

Definition 1. *Given the points* $(x_i, y_i)_{i=0}^{n-1}$ *and the model* $f(x)$ *that has been fit to the data points. The residuals (errors) are the values*

$$r_i = y_i - f(x_i) \tag{2}$$

for each value of $i \in \{1, \ldots, n\}$.

The method of least squares minimizes the sum of the squares of the residuals in order to find the best parameters to fit the model to the data.

When using the least squares method to fit a model, say $f(a_1, a_2, \ldots, a_k, x)$, where $a_1, a_2, \ldots, a_k$ are the parameters to be estimated, to a set of data $\{x_i, y_i\}_{i=0}^{n-1}$, the aim is to minimize the sum of the squares of the residuals

$$\phi(a_1, a_2, \ldots, a_k) = \sum_{i=0}^{n-1} (f(a_1, a_2, \ldots, a_k, x_i) - y_i)^2 . \tag{3}$$

Usually, when using this method ϕ is minimized by solving the system of equations

$$\begin{aligned} \frac{\partial \phi}{\partial a_1}(a_1, \ldots, a_k) &= 0 \\ \frac{\partial \phi}{\partial a_2}(a_1, \ldots, a_k) &= 0 \\ &\vdots \\ \frac{\partial \phi}{\partial a_k}(a_1, \ldots, a_k) &= 0 \end{aligned} \tag{4}$$

for $a_1, a_2, \ldots, a_k$.

Finding α, A and B

In this case of model (1), the function ϕ is defined to be

$$\phi(A, B, \alpha) = \sum_{i=0}^{n-1} (Ae^{-\alpha x_i} + B - y_i)^2 \tag{5}$$

Then

$$
\begin{aligned}
\frac{\partial \phi}{\partial A}(A,B,\alpha) &= \sum_{i=0}^{n-1} 2(Ae^{-\alpha x_i} + B - y_i)e^{-\alpha x_i} \\
&= 2A\sum_{i=0}^{n-1} e^{-2\alpha x_i} + 2B\sum_{i=0}^{n-1} e^{-\alpha x_i} - 2\sum_{i=0}^{n-1} y_i\, e^{-\alpha x_i} \\
\frac{\partial \phi}{\partial B}(A,B,\alpha) &= \sum_{i=0}^{n-1} 2(Ae^{-\alpha x_i} + B - y_i) \\
&= 2A\sum_{i=0}^{n-1} e^{-\alpha x_i} + 2B\sum_{i=0}^{n-1} 1 - 2\sum_{i=0}^{n-1} y_i \\
\frac{\partial \phi}{\partial \alpha}(A,B,\alpha) &= \sum_{i=0}^{n-1} -2(Ae^{-\alpha x_i} + B - y_i)Ax_i e^{-\alpha x_i} \\
&= -2A^2\sum_{i=0}^{n-1} x_i\, e^{-2\alpha x_i} - 2AB\sum_{i=0}^{n-1} x_i\, e^{-\alpha x_i} + 2A\sum_{i=0}^{n-1} x_i\, y_i e^{-\alpha x_i}
\end{aligned} \tag{6}
$$

We define the functions f, g, h and l so we can have a simpler form of the above equations

$$
\begin{aligned}
f_k(\alpha) &= \sum_{i=0}^{n-1} e^{-k\alpha x_i} \\
g_k(\alpha) &= \sum_{i=0}^{n-1} y_i\, e^{-k\alpha x_i} \\
h_k(\alpha) &= \sum_{i=0}^{n-1} x_i\, e^{-k\alpha x_i} \\
l_k(\alpha) &= \sum_{i=0}^{n-1} x_i\, y_i e^{-k\alpha x_i}
\end{aligned} \tag{7}
$$

and rewrite the equations

$$
\begin{aligned}
\frac{\partial \phi}{\partial A}(A,B,\alpha) &= 2Af_2(\alpha) + 2Bf_1(\alpha) - 2g_1(\alpha) \\
\frac{\partial \phi}{\partial B}(A,B,\alpha) &= 2Af_1(\alpha) + 2Bf_0(\alpha) - 2g_0(\alpha) \\
\frac{\partial \phi}{\partial \alpha}(A,B,\alpha) &= -2A^2h_2(\alpha) - 2ABh_1(\alpha) + 2Al_1(\alpha).
\end{aligned} \tag{8}
$$

In order to minimize $\phi(A,B,\alpha)$, we need to solve

$$
\begin{aligned}
\frac{\partial \phi}{\partial A}(A,B,\alpha) &= 0 \\
\frac{\partial \phi}{\partial B}(A,B,\alpha) &= 0 \\
\frac{\partial \phi}{\partial \alpha}(A,B,\alpha) &= 0.
\end{aligned} \tag{9}
$$

and we can say that

$$
\begin{aligned}
2Af_2(\alpha) + 2Bf_1(\alpha) &= 2g_1(\alpha) \\
2Af_1(\alpha) + 2Bf_0(\alpha) &= 2g_0(\alpha) \\
2A^2h_2(\alpha) + 2ABh_1(\alpha) &= 2Al_1(\alpha).
\end{aligned} \tag{10}
$$

Using Cramer's Rule on the first two equations

$$\begin{aligned}\Delta &= \begin{vmatrix} f_2(\alpha) & f_1(\alpha) \\ f_1(\alpha) & f_0(\alpha) \end{vmatrix} = f_0(\alpha)f_2(\alpha) - f_1^2(\alpha), \\ \Delta_1 &= \begin{vmatrix} g_1(\alpha) & f_1(\alpha) \\ g_0(\alpha) & f_0(\alpha) \end{vmatrix} = g_1(\alpha)f_0(\alpha) - g_0(\alpha)f_1(\alpha), \\ \Delta_2 &= \begin{vmatrix} f_2(\alpha) & g_1(\alpha) \\ f_1(\alpha) & g_0(\alpha) \end{vmatrix} = g_0(\alpha)f_2(\alpha) - g_1(\alpha)f_1(\alpha),\end{aligned} \tag{11}$$

we get

$$\begin{aligned} A &= \frac{\Delta_1}{\Delta} = \frac{g_1(\alpha)f_0(\alpha) - g_0(\alpha)f_1(\alpha)}{f_0(\alpha)f_2(\alpha) - f_1^2(\alpha)}, \\ B &= \frac{\Delta_2}{\Delta} = \frac{g_0(\alpha)f_2(\alpha) - g_1(\alpha)f_1(\alpha)}{f_0(\alpha)f_2(\alpha) - f_1^2(\alpha)}. \end{aligned} \tag{12}$$

The value for α can be found by finding one of the roots of the third equation

$$Ah_2(\alpha) + Bh_1(\alpha) = l_1(\alpha) \tag{13}$$

after replacing A and B this becomes

$$\frac{g_1(\alpha)f_0(\alpha) - g_0(\alpha)f_1(\alpha)}{f_0(\alpha)f_2(\alpha) - f_1^2(\alpha)} h_2(\alpha) + \frac{g_0(\alpha)f_2(\alpha) - g_1(\alpha)f_1(\alpha)}{f_0(\alpha)f_2(\alpha) - f_1^2(\alpha)} h_1(\alpha) = l_1(\alpha). \tag{14}$$

Preposition 1. *Given a set of data* $\{x_i, y_i\}_{i=0}^{n-1}$ *and a model*

$$y(t) = Ae^{-\alpha t} + B, \tag{15}$$

the best value for α *can be found by finding a root to the equation*

$$\frac{g_1(\alpha)f_0(\alpha) - g_0(\alpha)f_1(\alpha)}{f_0(\alpha)f_2(\alpha) - f_1^2(\alpha)} h_2(\alpha) + \frac{g_0(\alpha)f_2(\alpha) - g_1(\alpha)f_1(\alpha)}{f_0(\alpha)f_2(\alpha) - f_1^2(\alpha)} h_1(\alpha) = l_1(\alpha). \tag{16}$$

and then using this value of α*, the best values of* A *and* B *are found using the equations*

$$A = \frac{g_1(\alpha)f_0(\alpha) - g_0(\alpha)f_1(\alpha)}{f_0(\alpha)f_2(\alpha) - f_1^2(\alpha)}, \tag{17}$$

$$B = \frac{g_0(\alpha)f_2(\alpha) - g_1(\alpha)f_1(\alpha)}{f_0(\alpha)f_2(\alpha) - f_1^2(\alpha)}. \tag{18}$$

The algorithm to find the best parameters for (1) is straight forward:

Algorithm 1 Finding A, B and α using the nonlinear least squares method

input: $(x_i, y_i)_{i=0}^{n-1}$

α = findAlpha ($(x_i, y_i)_{i=0}^{n-1}$) {find alpha using equation (16)}

A = findA (α, $(x_i, y_i)_{i=0}^{n-1}$) {find A using equation (17)}

B = findB (α, $(x_i, y_i)_{i=0}^{n-1}$) {find B using equation (18)}

output: A, B, α

While *findA* and *findB* are easy to compute, *findAlpha* requires more attention. α can be found by finding one of the roots of equation (16). This means we must solve the following equation:

$$\frac{g_1(\alpha)f_0(\alpha) - g_0(\alpha)f_1(\alpha)}{f_0(\alpha)f_2(\alpha) - f_1^2(\alpha)} h_2(\alpha) + \frac{g_0(\alpha)f_2(\alpha) - g_1(\alpha)f_1(\alpha)}{f_0(\alpha)f_2(\alpha) - f_1^2(\alpha)} h_1(\alpha) - l_1(\alpha) = 0, \tag{19}$$

which depends on the input data $(x_i, y_i)_{i=0}^{n-1}$. This equation does not have a single solution and with mathematical calculus it's not easy to find any of its roots. A more practical approach is to approximate one of its roots using a root-finding method.

Bisection Method

One such root-finding method is the Bisection method which is an iterative root finding method that searches for a root in an interval known to contain a root of a particular function. Starting with an interval (a, b) and a function $f(x)$ the value $f(a) \times f(b)$ is found. If $f(a) \times f(b) < 0$ then, by the intermediate value theorem, the interval contains a root. Assuming the interval (a, b) does contain a root, the next step is to find the midpoint of the interval, say c. Then it is necessary to check which of $f(a) \times f(c)$ and $f(c) \times f(b)$ is negative in order to find which subinterval the root is contained in, then the interval being searched may by redefined to be the subinterval that contains the root. This process continues until the interval being searched is smaller than the required accuracy.

Using the Bisection method to find a root of equation (19) is challenging, because we need to find an interval in which the function is continuous, it contains a root in the given interval and the sign of the function is positive at one end while negative at the other end of the interval. After all this, it's not guaranteed that the found α value is the best that can model equation (1), thus multiple attempts at finding the best value of α could be necessary.

Improvement on finding α for hCG

Equation (19) can be rewritten as a polynomial by making the following substitution

$$e^{-\alpha} = t. \tag{20}$$

This substitution reduces the functions from (7) to a simpler form

$$\begin{aligned} f_k(t) &= \sum_{i=0}^{n-1} t^{kx_i} \\ g_k(t) &= \sum_{i=0}^{n-1} y_i\, t^{kx_i} \\ h_k(t) &= \sum_{i=0}^{n-1} x_i\, t^{kx_i} \\ l_k(t) &= \sum_{i=0}^{n-1} x_i\, y_i t^{kx_i}. \end{aligned} \tag{21}$$

and results in equation (19) taking the following form

$$\frac{g_1(t)f_0(t) - g_0(t)f_1(t)}{f_0(t)f_2(t) - f_1^2(t)} h_2(t) + \frac{g_0(t)f_2(t) - g_1(t)f_1(t)}{f_0(t)f_2(t) - f_1^2(t)} h_1(t) - l_1(t) = 0. \tag{22}$$

One of the useful properties of this equation is that it has a root in the interval (0,1), which makes finding t guaranteed and independent of the data points, with the Bisection method. Finding t helps in finding alpha using the inverse transformation:

$$\alpha = -ln(t) \tag{23}$$

In summary, finding α using equation (19) and the Bisection method is difficult, because we lack the interval in which to search for it, but using (22) we can find t in the interval (0,1), independent of the data points and independent of what should be the value of α, and finally using (23) we can find the best value of α from the value of t.

Implementation Details

The method presented in Preposition 1 together with Algorithm 1 and the improvement from the above section were implemented in Python version 3. The choice for using Python was:

- the capability to run code in a Read-eval-print loop (REPL) which gave a significant boost to developing the final solution and running tests on it
- the vast offer of libraries that can be used for data science

The following libraries were used for developing the final solution:

- NumPy - for storing arrays in memory and for fast computations on them
- Matplotlib - for plotting the results in 2D
- Pandas - for importing the hCG measurements from a CSV file to an in-memory table
- SciPy - for using existing algorithms like the Bisection Method or curve fitting with Levenberg-Marquardt Method

A great deal of effort was put into transforming the mathematical formulas to code in a manner in which we can use NumPy's vectorization, for three reasons:

- to be able to compute in batch mode (feeding a time series at once)
- to better reflect the formulas from the Theoretical Concepts section
- to benefit from the true speed of NumPy

The final solution contains three algorithms to compute the best fit parameters:

- the method from Preposition 1
- the improved version of the method from Preposition 1, described in the above section
- a logarithmic approach presented in (Costigan, et al., 2016)

Real world data was used to validate the usefulness of the method presented in this paper, and although the data cannot be shared in public space, the final solution contains means to generate synthetic data, for the purpose of play-testing.

Source code is available on GitHub at: https://github.com/akerestely/nonlinearBestFit

Results

Simulated Data

In order to test the method for estimating A, B and α some data (see Figure 2) of the form $\{x_i, y_i\}_{i=0}^{n-1}$ was generated using Algorithm 2. Note that $x_i \leq 0$ in this algorithm, but it's just for visualization purpose, to mimic the original data more closely.

Algorithm 2 Generating Random Data

```
import numpy as np
def gen_rand_points(n:int, A:float, B:float,
        alpha:float, noise:float) -> (np.ndarray, np.ndarray):

x = np.random.random(n) * n
```

```
y = A * np.exp(-alpha * x) + B
ynoise = np.random.random(n) * noise - noise / 2
y += ynoise
return x, y
```

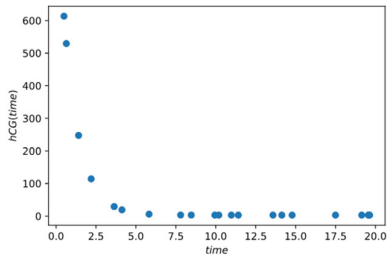

Figure 2 : Synthetic data sample, generated with A, B, α and noise having the values 1000, 3, 1 and 0 respectively

The model was then fit to the data to see if the method for estimating the parameters could find the original parameters. To validate the accuracy of the found model numerically also, not only visually, the *root mean square error (RMSE)* method was used.

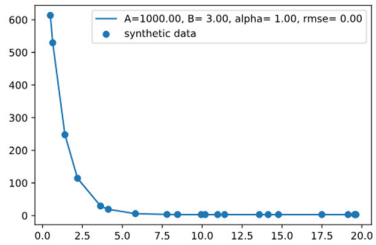

Figure 3 : The curve generated by the found parameters matches the data perfectly.

In Figure 3 we can see: the parameters found by the curve fit method presented in this paper, that they perfectly match the ones used to generate the data and that the $rmse$ is 0.

Next, we tested the robustness of the method. Noise was added to the generated data and different a combination of parameters was tested. Figure 4 shows the data generated by the original parameters salted with noise and the curve defined by the found parameters. Rmse tells how close the match is. From left to right, the noise increases, while from top to bottom the parameters used to generate the data change.

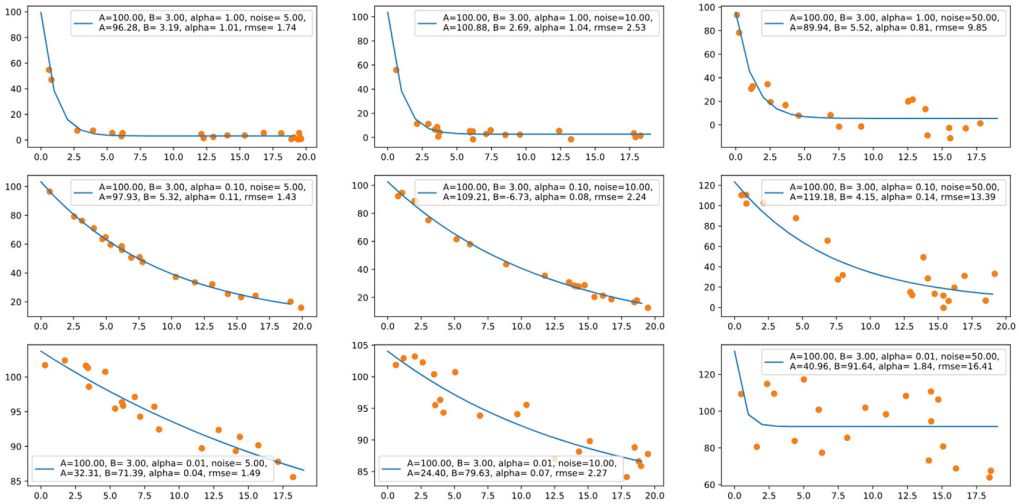

Figure 4 : Curve fitting in different scenarios. The parameters change in each row and the noise in each column.

While the results were already satisfying, we were curious about how well our algorithm would fare against other existing algorithms. In Figure 5, three different datasets were generated and on each, the following three algorithms were run:

- curve_fit from the SciPy python library which internally uses Levenberg-Marquardt, an iterative curve fitting method; labeled 'Iterative'
- the algorithm presented in this paper; labeled 'BestFit'
- the pseudo logarithmic curve fitting approach presented in (Costigan, et al., 2016), labeled 'PseLogLin'

For all algorithms the found parameters and the rmse is shown. The found parameters are shown informatively while the rmse is shown to be able to quantify which algorithm found the best solution. We can observe that 'BestFit' does equally well (overlaps) with 'Iterative', while 'PseLogLin' has the most error in each case.

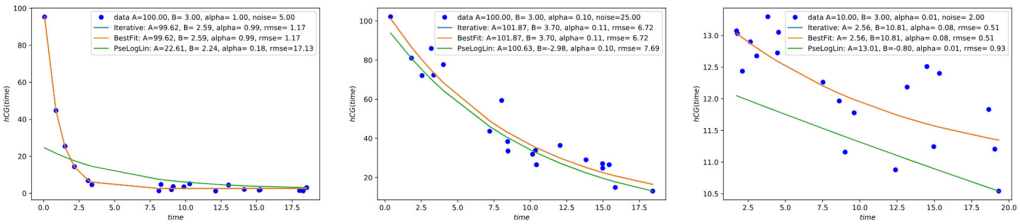

Figure 5: Comparison of three different curve fitting algorithms.

There are some cases where the 'Iterative' algorithm does not find a match while the 'BestFit' and 'PseLogLin' do, as it can be seen in Figure 6. This is because the iterative method uses some initial guesses for each parameter of the searched function, which defaults to 1 in the case of SciPy's curve_fit method if not stated otherwise. These guesses can be thought as the hyperparameters of the iterative method and although the defaults are good enough in most cases, they should be adjusted for each dataset. These initial guesses also determine the number of iterations the algorithm will try until either a solution is found, or the maximum number of iterations has been reached, which by default is 800 in the case of SciPy's curve_fit.

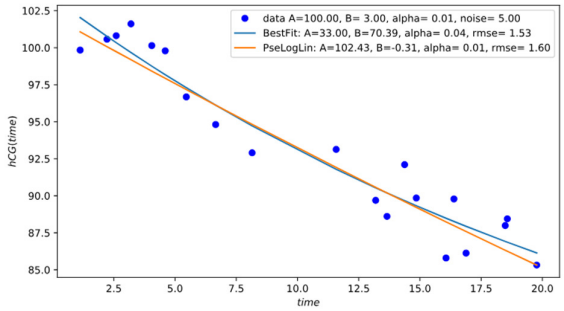

Figure 6 'BestFit' and 'PseLogLin' find a solution while the 'Iterative' method does not.

'BestFit' method compared to the 'Iterative' method does not need any hyperparameters to work properly, if the data is on an exponential decay curve. A second advantage of the 'BestFit' method is that it also converges faster than the 'Iterative' method, almost constantly in all cases; the variation in the convergence time is given only from the bisection method, which iteratively searches for the root of equation (22).

Real Data

Real data comes from hCG measurements in women with Gestational Trophoblastic Disease (GTD). These measurements are normally done periodically. In the beginning, weekly and after a period monthly. In practice there are weeks and months where the patient does not show up for the tests or the doctor decides that a test can be skipped as the progress of the patient is clearly in the good direction.

From the point of view of a data scientist missing measurements pose a serious problem. They need to be set to a constant value, say 0, or the mean of the neighbors, or any other value that helps avoiding them while not potentially modifying the output; or could be left out by careful engineering. In this case the missing measurements were left out leaving the datasets with only valid entries.

The next problem involving the real data was the insufficient measurements in the case of some patients. More precisely, to define a function of m parameters one needs n equations, where $n \geq m$. In this case the parameters are A, B and $alpha$, which make m, the number of parameters, equal to 3, meaning that n, the number of equations, measurements in this case, needs to be greater than 3. Taking this into consideration, any sample which does not have at least 3 data points, is discarded from the dataset.

Figure 7 shows the result of running the three different algorithms mentioned before on three samples of the real dataset. It's worth mentioning that all data points from a sample were used to find the solution.

The algorithm presented in this paper can also work as an extrapolation method. If we feed at least 3 data points to the algorithm, it can learn a model, which we can use to generate future data points i.e. to forecast the normal devolution of the disease. To test the effectiveness of the algorithm on the extrapolation, we used a dataset with all its points to find the model and calculate the rmse. Next, we

used the same dataset but used only the first few points to find the model and again we used all the points to calculate the rmse. Looking at the rmse values we can see how close the extrapolation is from the actual values and we can also see how the quality of the prediction is affected by adding new points to the model fitting. Results can be seen in Figure 8.

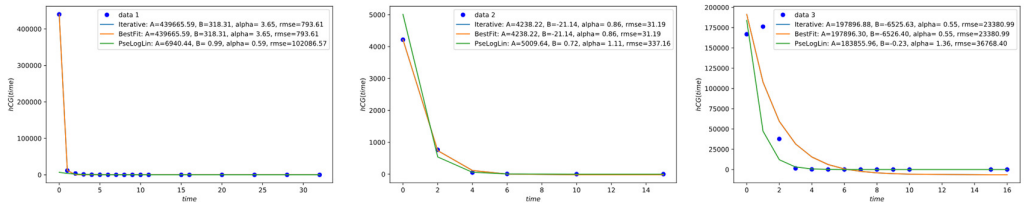

Figure 7 : Results of three algorithms on three samples of the real dataset.

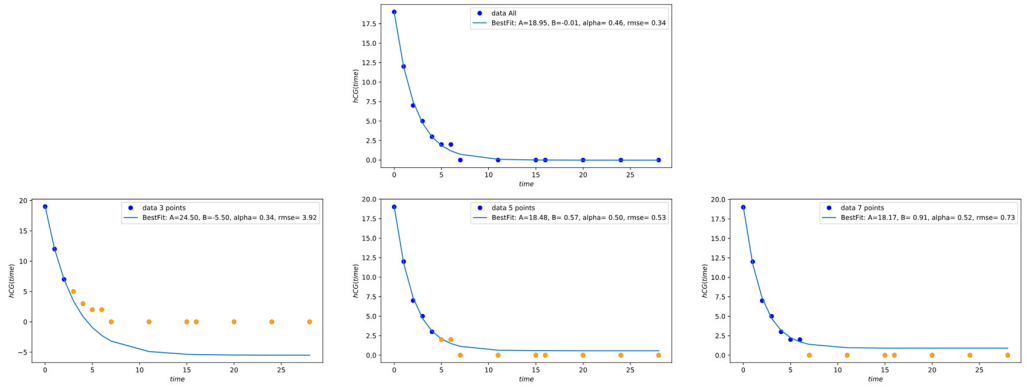

Figure 8 : Fitting the curve on the same dataset with different number of training data points (blue dots).

The model generated by the algorithm can be used to validate new measurements. Having a forecast, a doctor can easily tell if a new measurement is in acceptable thresholds and decide if actions should be taken. The model can also be updated with new data points, making it generate a new forecast. If at any time the algorithm fails to converge to a result, that means that the measurements are too noisy, or that the disease is not devolving. In both cases it should be a warning to the doctor. Figure 9 clearly shows this case. When using the first 3 data points, the algorithm finds that the measurements increase exponentially. The doctor probably notices the same thing and takes action. When using the first 5 data points, the algorithm cannot determine an exponential curve, as there is big uncertainty. After the 10th

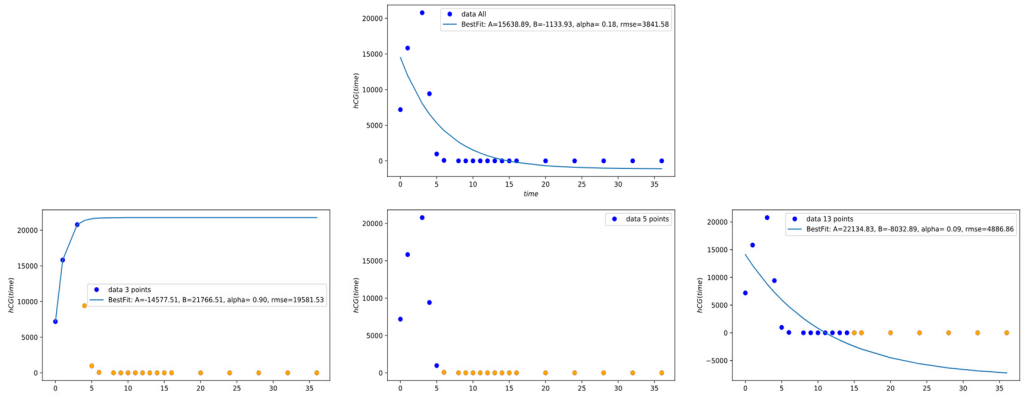

Figure 9 : Three behaviors of the curve fitting algorithm, depending on the moment the prediction was run.

data point the algorithm starts to guess that the measurements decrease exponentially, converging slowly to the form of the final curve.

Conclusion

This paper presented a new method to fit a model to some data points that follow an exponential decay curve in the form $Ae^{-\alpha x} + B$ with A, α and $B \geq 0$. Data of this type appear in women with Gestational Trophoblastic Disease (GTD). This new method uses mathematical calculus to determine what model best matches the data points. It outperforms other existing methods either in accuracy, convergence time or ease of usage, by not having hyperparameters.

Ideas were also presented in this paper as to how the curve fitting could be used in real life scenarios. Extrapolation, forecasting, interpolation or validation of data points are some of these use cases.

The paper comes with an open source code that can be used to reproduce or modify the results presented, using synthetically generated data.

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The Implementation of The Marketing Concept In Industrial Contexts: An Exploratory Study In The North of Portugal

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Abstract

In a period of uncertainty as a result of expected economic recession, great competitive rivalry and increasing demand from consumers, companies are currently facing countless difficulties, namely in understanding which is the most adjusted mode of action in the market. Consumers are also more attentive and participative, demanding higher attention, timely and objective responses from organizations to their needs. In this tricky context, where companies need to strengthen their marketing policies more than ever, market orientation should be reinvigorated and addressed differently focusing consumers. Though this is always the proper approach, nowadays it is even more important, since industrial companies are facing additional surviving and competitive challenges. In this study, a qualitative methodology is proposed using semi-structured interviews as a data collection tool. These interviews were used to understand the relationship between industrial companies and marketing policy implementation. 10 interviews were conducted and analyzed at industrial companies in Barcelos, in the northern region of Portugal. Results tend to indicate a general lack of knowledge by industrial entrepreneurs regarding the concept of marketing as a market orientation. Marketing is seen as a tool more than as a management philosophy. There is also a notorious disinvestment of the companies in question in this area, in line with the lack of recognition of their potential as a source of competitive advantage. Future research should explore deeper the relationship between the demographic profile of individuals and this adoption of the concept of marketing in industrial activities.

Keywords: Market Orientation, Marketing Concept, Competitive Advantage, Industrial Companies.

Introduction

The need for organizations existence arouses from people, whether they are employees or consumers, so their satisfaction should be the main objective. Many Portuguese entrepreneurs, pressed by the need to recover the investment capitalised, despise strategic marketing procedures, which for Silva (2009) is a total mistake. This entrepreneurs despising, causes them to invest on inappropriate products and wrong segments, which leads to a waste of time and money. For this reason, entrepreneurs must "make sure they actually know what their business is, the purpose of their products and the needs they already meet" (Silva 2009: 1).

This study focuses on some of the fundamental aspects of marketing, aiming to perceive its concept and their surroundings and understanding entrepreneurs and companies' profile in industrial contexts. We also identify and understand factors which contribute for entrepreneurs' disbelief in marketing reinforcing the idea that customer and market orientation brings real benefits to the business.

The focus on issues related to the importance of marketing within organizations, has its importance because it makes companies to invest more in marketing in order to see it as something fundamental and not something accessory to its evolution, but also helps to understand the reasons that keep companies away from these kind of strategies.

This research intends to understand the need of adjusting the way marketing is perceived in industrial organizations, and to what extent it will be justified to create a new way of acting and to modify the approach of these companies to the market, looking at consumers as the main focus. The crucial question is understanding whether the process of implementing the marketing concept as a market orientation will lead to better organizational performance. To better perceive this reality, an empirical study will be developed, supported by some research instruments.

In conclusion, the purpose of this work is to perform an analysis / reflection on the importance of marketing within organizations. By the end of this paper, a balance of its real importance and its perceived misperception by industrial entrepreneurs will be presented. It will be possible to conclude why no serious commitment on marketing is made based on the real benefits that its implementation brings as a competitive advantage over the rivalry.

An Approach To Marketing Concept Over Time

Searching for A Marketing Definition

Marketing definition emerges in the early of the XX century and begins to take a greater importance in american universities, where the first courses of sales and distribution were created (Silva et al., 2019). The word itself emerged from the words market and action, which means action for the market or moving market (Ferreira et al., 2015). Some authors, such as Murphy et al., (2008) consider it as a philosophy that aims to achieve companies' goals, thus determining the needs and desires of the market, being able to satisfy those needs and desires effectively and efficiently. It is further "(…) defined as the group of activities aimed at analysis, planning, implementation and control of programs designed to obtain and serve the demand of products and services, which will meet the needs and desires of consumers and / or users, with quality and profit for the company "(Ferreira et al., 2011:19). Therefore, it provides a well-designed market, focused on consumer needs and coordination of all marketing functions in contact with customers. As it turns out, it takes an outside-in, market-to-business perspective. Gama (2011) reinforces to survive in the market, companies should focus their attention on consumers and their surroundings, as well as knowing the competitiveness where the market is inserted.

This concept can also be defined, based on Lindon et al. (2009: 30) in four dimensions: a personal attitude and a company culture supported by the knowledge of the target audience; a strategy based on the marketing strategy itself: objectives, competitors, segments, positioning and marketing mix; a series of techniques and resources reflecting marketing techniques / tools more valuable; and a practice made of anticipation and reactivity, which predicts what may go wrong, realizing the reaction triggered by the competition and what adjustments will need to be developed. In marketing you have to think, evaluate strategies and predict opportunities.

To summarize, most researchers and marketers understand this concept as a policy that aims to find out what the real needs and interests of their target audience are and then how to meet them, meaning, their starting point is to interpret what are the needs felt in the target market and create the conditions for them to be met, as a set of procedures developed to meet the needs of consumers and at the same time create value for the company they represent. In a very simplified way, marketing aims to find out what are the needs and interests of the target audience to fulfill them. That is a group of procedures aimed meet the needs of consumers while creating value for the companies represented.

Market orientation and segmentation should be related with the target audience (Oliveira and Sousa 2020). One must take into account a specific product directed to the needs of the desired segment,

looking at the market uniformly, as it represents a group of people with individualities and individual needs (Sousa et al., 2019).
The target audience, according to Lovelock and Wirtz, (2011) is a segment selected by the company across the market. These are a set of potential buyers with similar needs and particularities that the organization decides to assist (Kotler and Scheff, 1997). It is also based on assessing the potential of segments and choosing those same segments for the organization to serve (Kotler and Armstrong, 2014).

The Implementation Of The Marketing Concept

Marketing, as a core part of any business, needs to be taken into account from the very beginning and should follow the all business planning, it is a crucial tool in this organizational world, bringing to any organization a value aid in achieving their goals since "(…) it helps companies stablishing their competitive leverage against the rivals, in a way that it demands action and gathering of all efforts from all functions" (Ferreira et al., 2009:25). Morgan (1996:20) thinks that "(…) implementing marketing (…) demands keeping a particular direction, (orientation) Kohli and Jaworski (1990) reinforce the concept of marketing shall be understood as a philosophy where the term orientation for the market translates its implementation.

With a market segmentation well established these days, with rivalry growing, products life cycle are shorter, as technological changes and even more demanding costumers demand companies to have an even more competitive strategy (Day, 1990). For this, elaborating a marketing plan can give companies better marketing practices as such: effectively satisfying their costumer; being better than the rivalry; better understanding market development; maximizing income; effectively utilizing resources in order to get the leverage; reducing treats; identifying and understanding the strengths and weaknesses (Simkin, 1996)

Marketing plan, according to Simkin (1996) and Dibb (2002), is a document guiding companies in the implementation and control of marketing activities, so it is the outcome from planning the process, where specific marketing actions should be linked to the planning stage of the company (Cobra 1991). This important document helps to understand the situation of any company, determine companies' objectives, define strategies of marketing and the mechanisms needed to reach pretended goals, stablish deadlines for the execution of defined programs and to define targets e programs such as, predictions and budgets properly quantified (Campomar 1983). On the marketing plan, different aspects should be defined such as: define target audience; company`s strategic mission in the market; the company`s position in that market; the opportunities and the treats; strengths and weaknesses; type of leverage acquired; market strategy adopted; and finally translate the strategic objectives defined for each element of the marketing mix (Lambin 2000).

Reaching this aspect above described in harmony with Campomar (1983) can bring companies different benefits, such as: exact analysis of their conditions; more clarity of the objectives defined; greater environment between departments giving the possibility for teamwork, allowing the creation of new relationships; more emphasis over key factors of success; greater focus on costumers needs.

Market Orientation As A Key Factor On Industrial Performance

Background

Market orientation is defined by three behavioral elements: customer orientation, rivalry orientation and interfunctional coordination (Narver and Slater (2006). Customer orientation and rivalry orientation is based on gathering information about customers and rivalry companies, and also sharing information between the different departments in the company. Rivalry orientation also aims to know the rivalry, manly their strengths, their weaknesses and their strategies. Having the capacity to be the first against rivalry can be the way to get a sustainable and competitive leverage. Interfuntional coordination is the coordinated management of company's resources in order to create superior value

for the costumers, so it wants to follow the orientations previously mentioned, coordinating efforts from different departments, in specific the marketing department, focalizing on the information gathered to create value to target audience (Narver e Slater 2006).

The same authors also perceive this as a concept like an organizational culture more effective and efficient able to create essential behaviors for the creation of superior value to customers, granting this way, a better performance (Narver e Slater 2006).

This behaviors, creators of value to the customers, are characterized based on an organizational culture focused on the customer (Grinstein 2008). Investigations were conducted in order to understand what are the customer's needs. This type of behavior gives companies a better knowledge of their customers, and so it allows adjustments to their necessities, creating superior value for them and contributing for more customer satisfaction.

From the work developed by Heiens in 2000, it is possible to conclude that this concept must be based in two key aspects: customers and rivalry. Companies must understand in details these two agents in an external environment, focusing all the efforts on their behalf. He also believes, though customers are the key element on market orientation, companies neve to adopt a wider perspective.

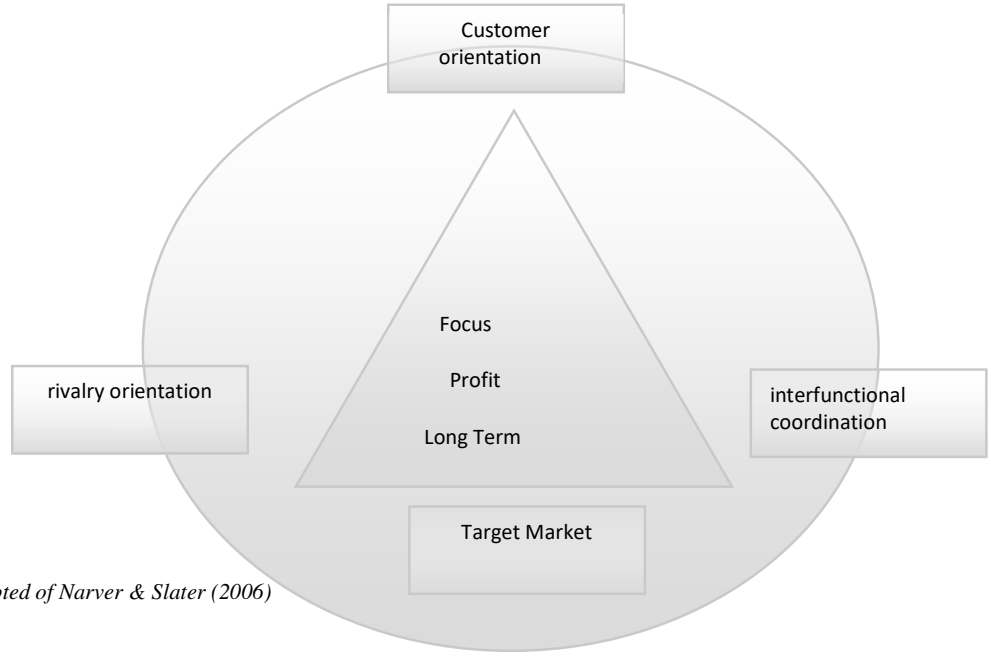

Adapted of Narver & Slater (2006)

Narver and Slater (2006) understand this concept as a more effective and efficient organizational culture, which provides the essential resources for creating superior value for consumables, application, mode, superior performance for an activity. These procedures that provide value creation for consumers, are characterized by an organizational culture directed towards the customer (Grinstein 2008), or are, they are investigated in order to understand what the customer really needs, that is, how their needs. . This type of behavior administered to the company with a greater knowledge of its customers, which, in turn, allows it to adjust its offer to the requirements, thus creating a superior value for them, contributing to their greater satisfaction.

Market orientation "(…) refers to production, dissemination and action accordingly, knowledge of the market for the entire organization" Kohli and Jaworski, (1990: 3). It is therefore "(…) a production, for the entire company, the knowledge of the market that respects the current and future requirements of customers, the dissemination of knowledge across all departments and the performance in accordance,

throughout the company ”(Kohli and Jaworski, 1990: 6). must reinforce the importance of market orientation, encouraging its employees to keep up with market changes, deciphering their needs (Murphy, et al., 2008).

All the theories previously exposed, arising from investigations, are particularly indispensable for understanding the concept of guidance and its real importance in the general perspective of marketing. Even so, in spite of all these scientific tributes, there is no absolute concept. However, the various studies indicate in general that there is a connection between market orientation and the concept of marketing, that is, market orientation, generally results from the implementation of the concept of marketing, although it is also consensual to perspective that market orientation is not the exclusive responsibility of marketing, but of all functions linked to the company. Another homogeneity in theories is the fact that this type of guidance by companies provides, in the long run, greater profitability, an increase in the level of perceived quality, more satisfaction and loyalty on the part of consumers, as well as greater satisfaction of all internal staff, this being the main objective of companies that develop a policy of orientation towards the market.

Finally, to obtain consistently superior market performance, an organization must create a sustainable competitive advantage (Aaker, 1984; Porter, 1985). The organization needs to create added value in a sustainable way for its public, that is, more than satisfying their needs, it is necessary to exceed their expectations. In this way, a market-oriented company is closer to creating that superior value for its customers in a sustainable way, privileging here the possibility of creating a loyalty relationship with them.

Towards a Customer and Marketing Orientation

Customer orientation is “the heart for market orientation” (Narver and Slater, 1994:20). Activities for customer orientation, according to Narver and Slater (2006) they are not based on customer knowledge, but on is chain value comprehension, understanding this way, which are the potential customers, understanding not only their current needs but also their future ones. These authors highlight the success of new products is related with the orientation level that companies present in the market.

Authors Saxe and Weitz (1982) speak about the importance of companies to put customers satisfaction first rather their own interests since is this kind of profile which identifies companies really well orientated for their customers. They try also to show that it can be advantageous to leave short term deals in order to get an increment in future deals, contributing to the loyalty of their public. Trust relationship between buyer and company is stronger when there is a customer orientation, since customer is more receptive when this kind of approach is present.

Customers loyalty, objectively defined, is to make customers to buy regularly company´s products and/or services. Loyal customers, bring money to the companies and increase their sells, notoriety and value. They also bring advantages to customers themselves, like a personalized customer service, rewards, trust in the products, among others (Quintino, 2017).

In order for the products and services offered by companies to be part of customers preferences, it is essential to build a strong brand and put it in the market in an effective way (Colbert, 2003; Vivek et al., 2010). The process begins with the search of things related to the brand, measuring the strength of the connection between the brand and customer auto concept (Alvarez and Fournier, 2016). A strong connection with the brand can facilitate the acknowledgment of it, a loyalty increment and notoriety (Sousa e Silva, 2015).

Marketing orientation has a predominant role in order to get competitive leverage. Authors Kohli and Jaworski (1990:6) emphasize marketing orientation is “creating knowledge about the market referring customers current and future needs, disseminating that knowledge over the different departments and the response given by the organization to that knowledge”. The authors also believe this orientation is based in three behaviors: collection, dissemination and response, in which all departments in a company should focus and not just the marketing department.

The competitive leverage is the leverage of understanding in a proactive way, first their rivalry, market trends and the ability to align the offer based on tis anticipation (Ansoff 1965). From the 70s, with the growth in competition between industries, there was a need to develop strategies focused in competitivity. Competitive leverage, by then, started to occupy an important place in companies' strategies, where planning and leadership became indispensable for any company. A strategy holds two central elements: decide which product to offer and in which market it should be placed and development of a sustainable and competitive leverage (Aaker 1984). This concept, according to Porter (1985), can result from factors related to product innovation, production methods or company´s marketing capacity, recommending three categories for these factors: firstly, he highlights the benefits of the size, respecting to scale economies, being large scale production a possible leverage; secondly, he refers the advantages of privilege access to resources since the access to specific differentiated raw materials, such as, access to new markets, among others, can certainly be a benefit compared to rivalry; lastly he mention the viability for strategical flexibility since the agility over the strategy can also be a leverage factor. The author clearly highlights the competitive leverage is inevitably connected to the strategy adopted, meaning it is connected to the execution of strategical activities more significant to the chain value, being either applicable in a less expensive way or in a way superior to the rivalry (Porter, 1985). In the year 2000, Vasconcelos and Cyrino (20), define competitive leverage, as being an "occurrence of levels of economic performance above market average related to the strategies adopted by the companies", showing, to fill the concept, four theorical chains of investigation: strategic positioning theories, resources theory, theories based on market processes and theories on dynamin competencies.

Based on these comphrension of what is marketing orientation, an empirical research was developed in order to get further the understanding about the perception of north Portuguese industrial companies towards the comprehension and application of marketing concept in their firms. Nedxt chapters will detail metgodology and main results.

Methodology

Investigation methodology, as defended by Pardal and Lopes (2011:10), can be defined as the "guiding body of the research, obeying to a system of norms, where is possible to select and articulate techniques, in order to develop a process of empiric observation".

In this investigation, both primary and secondary resources were used. Primary resources include information obtained by the author about interviews planning and development. Secondary sources come from documental research since the author guides himself through a group of information collected from different authors (Sousa and Baptista, 2014).

This paper uses qualitative methodology, which according to Wahyuni (2012) best fits in the realism paradigm. With this type of methodology, the objective is to give a better understanding, gaining this way, a qualitative knowledge about the reasons and motivations implicit in a specific phenomenon (Malhotra and Birks, 2006). This investigation resorts to a bibliographic and exploratory research, with a qualitive approach, as mentioned before, conducting semi-structured interviews to selected companies' managers, collecting data and then analyzing and interpreting the results. Miles and Huberman (2014:18) mention that "the qualitative researcher starts by focusing on questions from the study, the participants to be observed, data collected and how all that data should be managed and analyzed".

The objective of present research is to unravel whether, in fact, a marketing orientation is a factor that enhances competitive advantages for companies. companies that will be part of this study. It also aims to understand the behavior, profile and functioning of companies and their managers, trying to understand their degree of market orientation in industrial contexts, focusing on a specific geographical area: Pousa, council of Barcelos, district of Braga.

The main purpose is to understand what are your main reasons and / or limitations for implementing the marketing concept. Therefore, with the development of this project, it will be possible to answer some questions, particularly:

• Is there a marketing orientation by companies in the industrial sector?
• What are the main motivations for companies to implement the marketing concept?
• What are the main limitations / barriers to the implementation of the marketing concept?
• Does the implementation of the marketing concept determine competitive advantage?

In the end, it will be determined the impact that the orientation towards the market and the customer has as a determinant in the competitive advantage, and the importance that the implementation of a marketing policy has in this orientation and that advantage, as well as in the relationship management. and customer loyalty in industrial organizations.

Qualitative research, which the main objective was to collect qualitative knowledge over specific phenomenon, specifically its reasons and motivations. Usually, in this type of research, collected data is not structured and its treatment is not statistically orientated. Related to the dimension of the sample, there were used a reduced number of non-representative cases (Malhotra and Birks, 2006), so the instrument used was the semi-structured interview. Wahyuni, (2012), mention that this type of interview provides a sharing of perspectives, histories and experiences related to the peopled being interviewed and also related to the subjected studied by the interviewer. This type of instrument gives the freedom to the interviewee over his speech during the all process of the interview, enabling this way to freely talk about whatever he or she desires. This allows a collection of a more complete and detailed data (Wahyuni, 2012).

As mentioned befor, 10 interviews were conducted and analyzed. industrial companies in Barcelos, in the northern region of Portugal.

The elements of the non-probabilistic sample were chosen taking into account important aspects of the study, such as the choice of companies linked to the industrial sector. The study was developed with 10 interviews with 10 people from 10 companies, all connected to the industrial sector as previously mentioned. We tried to select different sectors of activity, in order to obtain information in different contexts, making the research richer, covering possible influences of the context in question. Thus, for the interviews, sectors were selected, such as: plastic, granites and marbles, laser cutting and engraving equipment, food sector, sector related to imports and finally the textile sector. Top and intermediate level managers were interviewed. The interviews were recorded on audio with the authorization of the participants and, later, fully transcribed.

Results and Discussion

The creation of value for the client goes beyond just focusing on them, as the orientation towards competition is also essential, namely in their identification, in the technology they use, in their target audience, in their strengths and weaknesses and in your way of acting.

The implementation of the marketing concept in an organization is certainly, as was exposed throughout this work, based on several reference authors, an essential tool for organizations to understand what the market needs, thus adjusting their offer. It is fundamental for any business because it is a necessary and adjusted mechanism for any decision to be taken. It is a tool that can make a difference, being able to anticipate the change in the markets and adapt to these changes in order to provide the customer with greater satisfaction and the company a greater profitability. The long-term survival of a company depends on its ability to anticipate in a timely manner the evolution of the markets in which it operates and to adapt its structure to its requirements.

The concept of market orientation highlights the importance of marketing, as it is always supported by marketing, representing a set of activities that reflect the implementation of the concept. It is an

essential determinant in the performance of organizations, regardless of market turmoil or the environment in which it operates, it must be seen as something important to achieve greater business performance.

In this study, a qualitative analysis methodology was proposed using semi-structured interviews as a data collection tool. An analysis of the degree of market orientation by 10 companies linked to the industrial sector was intended, verifying the relationship between this orientation by them and their performance, that is, if the implementation of the marketing concept determines competitive advantage . The objective, in addition to perceiving the behavior, profile and functioning of the companies and their managers, was to understand how these companies belonging to the industrial aspect face the marketing policy regarding their implementation, if they understand that this implementation contributes to the existence of advantages competitive for them and understand what are their main reasons and / or limitations for implementing the concept. In this way, the industrial organizations that participated in the study showed, some of them, that they adopt procedures that imply marketing practices, although in some cases they interpret it as just a means to communicate. Although most companies express a policy of no marketing orientation, many of them develop their relationships according to marketing practices. Marketing planning is in most cases quite simple, or practically nonexistent, and not all officially define your target audience.

Almost all research organizations have demonstrated to realize the importance of orientation towards the market and to the client, however, they made believe that in industrial contexts this orientation may not be significant and does not bring, in the understanding of these, competitive advantages. There is also the importance of perceiving customer loyalty in relation to its customers, as well as the concern to communicate in a coherent and effective way using communication to publicize their products and services.

Table 1 summarizes some of the main results

Table 1: Results

Marketing approach	Results	Illustrative quotes
Market orientation	Great concern with information about competition but few deep tools to get that information	"*As for competition, there is not as intensive monitoring, (…) it will be more of a monitoring in terms of the market, of seeing in the areas that [affect] them (…) in terms of technologies, what progress is there, what changes (…), what's new"…*
Marketing orientation	Devalued the implementation of the marketing policy in industrial companies.	*"(…) Marketing is necessary in a secondary way, and in this case, in a company like ours that does not have its own product for sale, marketing has an extremely secondary role because we work a lot with products that customers want. The customers are the ones who have the marketing, the customers are the ones who make the sale and do all the advertising and we just*

		have to present a price and a proposal for that product"…
Focus on Target market	Have a well-defined target	*"We have a well-defined target market (and they almost clearly identify who that market is"*
Customer orientation	Almost all understand the relationship with the customer as fundamental to the success of their business	*"The main aspect, notice, we have to make a profit, to have a return, we have to provide products as specified by the customers, having specifications, products that correspond to the needs of the customers, products that are in accordance with what the customers have defined, such as the important characteristics of the products…"*
Loyalty	Know the concept of loyalty and recognize its importance in the business world	*"Loyalty is when you can win the trust of a consumer, a customer"*
Communication channels	Although they differ in the way and in the means in which they communicate, they all find communication important to the market and have the perception that they communicate effectively, managing to transmit what they want.	*"We communicate through digital platforms, physical presence at fairs, (…) stores, among others". The means used for this communication focus on "(…) social networks, messages via cell phone, letters ..."*
Marketing policies implementation	Although practically none of the companies bet on the implementation of the marketing concept, almost all assume this policy as very important for the creation of competitive advantage in relation to the others	*"Yes, I think that a market and customer orientation can, in some way, help to understand what the customer and the market need"* *"(...) in practice it doesn't work, (...) in our sector it doesn't work, it's even irreversible, because when a lot of marketing and a lot of information appears, the customer starts to think that we are making a lot of money"*

Final Considerations And Future Research

Implementing the concept of marketing as a guidance to the market, leads, in fact, to a better organizational performance, however it can be concluded that there is a necessity to tune the way market is understood by industrial organizations in question, proceeding afterwards into a new way of acting and modifying the approach from companies of this market sector, looking at customers as the main focus as previously stated during this paper.

It is important to mention there is a tendency from industrial companies in not to invest in marketing, despite not really knowing, in most of the cases, its real concept and importance, meaning, it was noticed companies face difficulties in obtaining cost from something they can not actually see, or touch, making it difficult to believe in its results, betting in such politics, and also in an essential investment through its implementation

Before finishing, it is important to state that as a matter of fact the basic marketing principals are being adopted by the organizations, however, there is still plenty of potential for marketing in an industrial context to develop and for the sector to adopt marketing principals more broadly, still all this conclusion is vague since it mirrors a small research.

It would be pertinent, after this first exploratory, qualitative and comprehensive study, which tried to understand the reasons and motivations of businessmen relatively to the implementation of marketing, to develop a survey not only to the companies of that region but even to the companies in the region, extended to the national context.

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Literature Review Regarding Corporate Entrepreneurship and Human Resource Management Practices in SMES

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Abstract

Within the development of the specialized literature on the culture of corporate entrepreneurship, it is particularly important to understand the relationship between human resources management and corporate entrepreneurship. The general theme of entrepreneurial literature is to understand why some companies are able to generate higher levels of corporate entrepreneurship than others. Human capital (represented by the knowledge, skills and abilities of the employees) is one of the main factors on which a business can be based in its effort to differentiate its products or services and to build a competitive advantage. This article presents the link between human resource management practices and corporate entrepreneurship. In response, we propose a review of the literature that will be based on a conceptual reading of corporate entrepreneurship, human resource management practices and the relationship between them.

Keywords: corporate entrepreneurship, human resource management, Strategic management, SME

Introduction

Corporate entrepreneurship, which has become an important area of management science, has been described as "the presence of innovation, plus the objective of rejuvenating or redefining organizations, markets or industries accordingly, to create or sustain superiority." (Covin, et al., 2000). Corporate entrepreneurship, which is also defined as "the activities an organization undertakes to improve product innovation, risk taking and proactive response to environmental forces" (Miller, 1983) and as "the sum of efforts to innovation, adventure and renewal of a company" (Zahra, 1996) is a facilitator for human resources management practices (Covin et al., 1999). Researchers and practitioners have found that human resource management practices play a vital role in promoting corporate entrepreneurship (Hornsby et al., 2009). Moreover, human resource management is an area of managerial decision making that affects corporate entrepreneurship (Kuratko, 2013). Therefore, human resources practices could have a considerable effect on strengthening corporate entrepreneurship. Chandler et al. (2000) propose that human resource management affects creativity and innovation by creating a supportive culture. A large number of policies related to human resources management can affect corporate entrepreneurship (Burgelman, 1983). In this article, we focus on the relationship between human resource management practices (HRM) and the promotion of corporate entrepreneurship (EC). This article aims to analyze the relationship between human resources management and corporate entrepreneurship by exhaustively studying the specialized literature and the most visible works in the field.

Literature Review

Corporate Entrepreneurship

Even if the concept of corporate entrepreneurship is already several decades old, defining the phenomenon of corporate entrepreneurship is far from giving the authors unanimity. Burgelman (1983) identifies that corporate entrepreneurship refers to the process by which firms engage in diversification

through internal development. Such diversification requires new combinations of resources in order to be able to expand the activities of the company and in other areas that are not related or are marginally linked, to its current field of competence but also to the corresponding set of opportunities. For Vesper (1984), corporate entrepreneurship involves the initiative of employees from the bottom of the organization to do something new. An innovation created by subordinates, without being asked, waiting, or maybe even allowing senior management permission to do so. Three major definitions of corporate entrepreneurship are developed by Vesper, which can be identified as a new strategic direction; a bottom-up initiative and the creation of autonomous businesses.

Jennings et al. (1989) defined corporate entrepreneurship as the extent to which new products and / or new markets are developed. An organization is entrepreneurial if it develops more than the average number of new products and / or new markets. This definition is similar to the definition provided by Spann et al. (1988), who define corporate entrepreneurship as setting up a separate corporate organization to introduce a new product, serve or create a new market or use a new technology. Another definition developed by Zahra, in which corporate entrepreneurship: "refers to formal and informal activities aimed at creating new businesses in setting up companies through product innovations and processes and market developments (Zahra, 1996). These activities can take place at the corporate level, division (business), functional or project, with the unifying objective of improving the competitive position and financial performance of a company. Corporate entrepreneurship also implies the strategic renewal of an existing business". In a global sense, corporate entrepreneurship refers to the development of new business ideas and opportunities within large and established corporations (Birkenshaw, 2003). In this respect, Guth et al. (1990) emphasize that corporate entrepreneurship encompasses two types of phenomena and the processes that surround them: the emergence of new businesses within existing organizations, and the transformation of organizations by renewing the key ideas they are built on, namely strategic renewal.

Schendel (1990) adds that corporate entrepreneurship involves the notion of creating new enterprises within permanent enterprises and the transformation of stagnant, ongoing enterprises that need resurrection or transformation. Ireland et al. (2003) presented corporate entrepreneurship as a process whereby people in a start-up are pursuing entrepreneurial opportunities to innovate regardless of the level and nature of current resources available. It describes the total process by which start-ups are acting in an innovative, risk-taking and proactive way (Zahra, 1996; Dess et al., 1999). From this definition, we can conclude that many terms are used to describe entrepreneurial efforts within the existing organization, including corporate entrepreneurship (Zahra, 1996), corporate entrepreneurship (Biggadike, 1979), entrepreneur (Pinchot, 1985), internal corporate entrepreneurship (Jones et al., 1992), internal entrepreneurship (Vesper, 1984), renewal strategic (Guth et al., 1990), adventure (Hornsby et al., 2009). For Zahra (1996), the outcome of the corporate entrepreneurship process can be innovation, adventure and strategic renewal. Furthermore, Brizek et al. (2007) report that corporate entrepreneurship covers the creation of new business within an existing organization and the strategic renewal that includes innovation and creativity. They described corporate entrepreneurship as "organizational innovation, risk taking, diversification and organizational empowerment" and labeled it in many ways, such as corporate adventure; corporate internal entrepreneurship; and strategic renewal. From these perspectives, Ling et al. (2008) they approached corporate entrepreneurship as the sum of a company's innovation, renewal and adventure efforts.

Hence, it is clear that innovation, strategic renewal and corporate venturing are all important and legitimate parts of the concept of corporate entrepreneurship. Therefore, innovation refers to the creation and introduction of products, production processes and organizational systems. Renewal means revitalizing the company's operations by changing its sphere of activity, its competitive approaches, or both. It also means building or acquiring new capabilities and then creative support to add added value for shareholders (Zahra, 1996), and Adventure and hazard refer to firm behaviors, such as introducing new businesses by creating or acquiring new business organizations (Cheesbrough, 2002).

The importance of corporate entrepreneurship

"Entrepreneurial thinking and action change the way business is carried out at all levels. Companies cannot be static - they have to adapt and redefine continuously "(Morris et al., 2010, p. 3). Indeed, entrepreneurship and innovation - from new start-ups and established corporations - remain the driving

forces for economies (Marcus et al., 2015). Especially in the 21st century, corporate entrepreneurship has become essential for established companies to tackle the problems of rapidly growing new competitors, inefficient traditional approaches to management, leaving top employees for more innovative roles, and productivity and efficiency issues (Kuratko, 2013). Corporate entrepreneurs have been recognized as important factors in organizational-organizational performance by recognizing opportunities, developing a team, gathering resources and creating something valuable. Corporate entrepreneurship has been identified as a critical factor for high levels of organizational performance (Hornsby et al., 2009; Zahra, 1996). Established organizations can use an entrepreneurial strategy to maintain a competitive advantage over rival firms (Covin et al., 2000; Ireland et al., 2003) by rejuvenating, renewing and redefining organizations, markets and markets. of industries (Covin et al., 2000). By diversifying the inputs and outputs generated by internal development, firms focus on new resource combinations to expand their competencies and pursue new opportunities (Burgelman, 1983). This commitment to create new business opportunities through product innovation, process innovation, market evolution and strategic renewal enhances the competitive position and financial performance of firms (Zahra, 1996).

Previous literature has provided a multitude of frameworks for the background and results of corporate entrepreneurship. In the most complete summary so far, Ireland et al. (2003) synthesized three decades of previous research, including nine theoretical models, into conceptualizing the company's entrepreneurship strategy. This model incorporates the precedents, elements and results of the corporate entrepreneurship strategy. Background includes external environmental conditions and individual entrepreneurial knowledge (Ceptureanu SI et al, 2018a). The elements consist of a strategic entrepreneurial vision, a pro-entrepreneurial organizational architecture, processes and entrepreneurial behavior. Important results include competitive ability and strategic re-positioning. This article provides an excellent point of approach for future corporate entrepreneurship research efforts. Hitt et al.(2011) have provided a similar model of entry-process-exit specific to strategic entrepreneurship, making up the input of resources, process orchestration and multi-level results that are central components of strategic entrepreneurial construction. The authors assert that strategic entrepreneurship helps firms "create and sustain a competitive advantage, identifying and exploiting new opportunities simultaneously" (Hitt et al., 2011, p. 57). The input elements of the model include environmental factors, organizational resources and individual resources.

Orchestration processes consist of structuring, packing, leveraging and creating and acquiring values. Important results include creating value for customers, competitive advantage, accumulating resources and benefits for individuals, organization and society. A final remarkable review of the background and results of corporate entrepreneurship was provided by Zahra (1996), in which they discussed the evolution and contributions of previous literature. Important antecedents of corporate entrepreneurship include national cultures (Hayton et al., 2005), industry conditions (Zahra, 1996), organizational structure (Covin et al., 2000), organizational culture, managerial systems and firm ownership (Zahra, 1996). Other internal organizational factors that influence corporate entrepreneurship include managerial support, rewards and consolidation, time availability and organizational-organizational boundaries (Hornsby et al., 2009). On the other hand, critical outcomes of corporate entrepreneurship include competitive advantage, organizational performance, profitability and growth (Zahra, 1996), organizational learning (Yang et al., 2009), knowledge creation (Dushnitsky et al., 2009) and capacity development (Sapienza et al., 2006; Yiu et al., 2007).

Strategic Management of Human Resources

We can hardly find a satisfactory definition of the term "human resources management". Continuing these review manuals, we note that some of them ignore such a definition (Gosselin, 1997), they deal with the management of human resources without highlighting the significance they attach to the concept. Others - most - give the term a very broad meaning: it refers to "man and the social" (Ok, 2011), "structures and people "(Susomrith et al., 2013) or refers to" regulation of work in organizations "(Ok, 2011)" management of work and employment "(Batt et al., 2012)," management of people in organizations "(Hunt, 1992) or in "all the practical planning, direction, organization and control of human resources within the organization" (Susomrith et al., 2013). According to Legall (1996), human resources management is "one of the specialties of the great field of management". It is also, for him, "a

corporate function that aims to achieve efficiency and support over time between employees and jobs in terms of number and qualifications. It aims to further optimize skills for the business strategy". Susomrith et al. (2013) argued that HRM represents the set of measures (political, procedural, etc.) but also activities or practices (training, recruitment, etc.) that involve human resources and target the efficiency and optimal performance of individuals and the organization. From these definitions it is very clear that the importance of human potential is necessary for the proper functioning of a company and that special attention must be paid to human resources, because they value all other forms of company resources.

In the contemporary business environment, human resources (HR) represent an indispensable contribution to organizational effectiveness. Therefore, efficient human resource management plays an important role in the performance and success of the organization (Chung et al., 2008; Ceptureanu SI et al, 2018b). Rapid market change and increased global competition force many companies to re-examine their activities and reprioritize their operations (Ok, 2011). Many organizations strive to find better ways to become competitive in the dynamic environment (Susomrith et al., 2013), planning flexible restructuring and development.

According to Boxall (1998) human resources management represents those activities associated with the management of work and people in companies. Human resources are the only source with which we work together, communicate and transmit information about other sources of an enterprise. Also, other authors have emphasized the importance of human resources in the context of communication in specific fields, such as the medical one (Dutu et al., 2015, Popescu et al., 2019). Human resources are strategic for both basic viability and advantage (Boxall, 1998).

HRM helps to direct the attention and behavior of the employees towards the sustainability objectives of the company through the general approach and through the individual policies and practices that embody this approach (Egri et al., 2002; Ramus et al., 2000; Ceptureanu SI et al., 2018c). Modern human resource processes are grouped into areas of human resource management, as they offer added value to internal and external customers. The main areas of human resources processing are: recruitment and personnel, compensation and benefits, training and development, career development, talent management, leadership development, human resource control (Robbins et al., 2017).

Human resources studies should link the classic HR functions (recruitment, selection, training, performance management and compensation) and the business strategy that covers the role of industry in these functions and explain how these functions work (Batt et al., 2012). Human resources management activities are an increasingly expensive component of the operations of all enterprises (Susomrith et al., 2013). HRM is both a means and a goal of achieving the strategic objectives of a company (Huselid et al., 2011). As a means, HRM policies and practices help to direct the psychological settings of the employees and to the actions necessary to reach the objectives of supporting the firm's capacity (Egri et al., 2002).

Human resources managers have traditionally been responsible for selecting, recruiting, training and managing workforce compensation; they are now expected to be more flexible, responsive and efficient in these activities, as well as to contribute to the strategic decisions of their organizations (Mihajlović, 2016). The different human resources practices within a given organization should complement each other, in order to improve employee performance and improve the competitive advantage of the organization (Stanton et al., 2011). HRM is also one of the key functions in the development and implementation of the strategic process (Sondhi et al., 2013).

Strategic management is intended to ensure that the business needs of the organization and the individual and collective needs of its employees can be met through the practical human resources policy (Armstrong, 2002). According to Koubek (2007), the strategic management of an organization is linked to a personal strategy. The objectives incorporated in the human resources strategy are achieved through a real activity, real efforts - strategic management of human resources. The human resources policy follows the human resources strategy. It focuses on the implementation of the human resources strategy and procedures that define the stages of the different processes in the field of human resources management. Although strategic human resource management (SHRM), as a discipline, has evolved rapidly and has shown relevance in recent decades, inconsistent results on how human resources

contribute to achieving strategic goals are still common (Guest, 2011; Woodrow et al., 2014). Specifically, Huselid et al. (2011) criticize most studies for focusing on human resource content.

Strategic management of human resources represents a link between human resources management and the strategic management processes of a company. Strategically it means that human resources activities should deliberately design and connect to an analysis of the business and its context (Schuler et al., 2001). Strategic management of human resources, therefore, through interventions in the field of human resources, such as employee involvement, suggestion schemes and knowledge exchange is considered as a function of value-added human resources (Cooke et al., 2010). The HRM strategy concept concludes that individual human resources functions, if viewed in isolation, tend to lack congruence in most organizations (McEvoy et al., 2013).

A human resource management strategy is usually defined as the strategic orientation adopted explicitly or implicitly by organizations to manage their human resources. If consistently designed, the HRM strategy provides guiding principles for other HRM initiatives and ensures management consistency (Garcia-Carbonell et al., 2016). On the other hand, an HRM system reflects the coordination of a specific set of practices conceived to implement the HRM strategy (Martín-Alcázar et al., 2005). Success in implementing a human resource management strategy requires that the implemented system be distinctive, consensual and consistent. For this to happen, the human resources management system should not only be designed based on vertical (external matching) and horizontal (internal matching) conditions, but should also be adequately communicated. (Garcia-Carbonell et al., 2016).

Empirical research on HRM in SMEs shows that there is a great diversity of human resources management practices in small enterprises, and the size of firms re-presents a major determinant of their adoption and formalization (Cassell et al., 2002). A research in the Spanish context also offers evidence regarding the variations of HRM practices according to the size of the firm (Urbano et al., 2008). The literature reveals that the majority of studies examine the relationship between HRM and organizational performance (Ericksen et al., 2005; Wright et al., 2005).

Huang (2000) examined the links between human resource strategy and practices, human resources practices and firm performance. The results showed that the overall strategy affects the human resources practices, those having a direct effect on the organizational performance, and the business strategy moderates the relationship between the human resources practices and the organizational performance. He found that firms with a higher level of performance were more likely to adopt certain SHRM practices, such as planning, staffing, evaluation, compensation and training and development. Richard et al. (2001) found that SHRM efficiency significantly reduces turnover, Harris et al. (2001) tested the relationship between SHRM and performance.

Human Resource Management Practices in SMEs

Implementation of certain practices within companies such as human resources planning, the recruitment process (recruitment, selection and reception), compensation, career planning and evaluation, training, information dissemination are in line within human resources management (HRM). Although there are several approaches to define and identify different human resource practices, we will analyze some of the so-called traditional practices presented below. To analyze these human resource management practices, Garand et al. (1992) propose a framework of analysis, both practical and very simple. According to these authors, human resources practices affect different aspects, namely: the acquisition of human resources, the conservation of human resources and the development of human resources.

Acquisition of human resources within SMEs- This goes through the analysis of the recruitment process and the job analysis.

Job analysis- According to Anderson (1999), job analysis consists of collecting, classifying, and examining data on what makes the assignment of specific functions. This serves not only in describing the position for recruitment, but also in determining the qualification of the workforce, that is, in determining the "value" of each position.

Recruitment- This is a very important step in the search for efficiency and performance in any organization, because the consequences of poor recruitment are huge and may be fatal to the company.

Martory et al. (1984) state that "the recruitment process is an essential part of the company's human resources policy; in fact, it can influence directions completely contrary to the state of human potential".

Conservation of human resources- The conservation of human resources goes through the motivation of the employees, good compensation practices, career management and performance evaluation.

Motivation- According to Nadler et al. (1977), motivation is a mathematical combination of effort, performance and results. In this way, the employee will be motivated when he thinks that he is able to make the efforts to work at the required level of performance, that, finally, his behavior will lead to certain results and that the results are really attractive. Consequently, this theory reinforces the forms of performance-related remuneration, forgetting that human behavior is not always rational and that man does not always work just for money.

Human resources development- It refers to the formation of human resources and to the dissemination of information within the company. Human resource development (HRD) is extremely important, as SMEs know that any employee improvement and development is essential to the organization's advancement, and employees are eager for opportunities to develop their skills to ensure the advancement of their organizations. This competitive business world is more focused on the human factor, because the skills of the employees have been distinguished as the most important device for the growth and long-term advancement of an enterprise.

Training / Formation- Training is a vital part of the gear, and human resource management is an essential catalyst for the human development of the company. It aims to develop human resources by anticipating and satisfying the training needs. It enhances its individual capabilities and promotes their development. In addition, training helps maintain the competence and efficiency of human resources through the appropriate position / position.

Information and communication- Communication within the company is all the more important, as information is recognized as a raw material in decision making. The practice of communication within a company consists primarily of the development of information circulation practices. Inform him, get to know him, help him understand; find a balance between lack and excess. There is a gap in both the entrepreneurship and human resources literature, and this gap should be addressed by examining the role of HRM in entrepreneurial firms (Keating et al., 2007).

The link between corporate Entrepreneurship and Human Resource Management practices within SMEs

The practice and theory of human resources management can contribute to the understanding of the problems that the entrepreneurial company faces (Altinay et al., 2008). The entrepreneur operates in contexts used to carry out the project. Its action led to the stimulation of an organization with which it is in a symbiotic relationship, and the organization, which can develop, is composed of resources that crystallize to serve its vision. Moreover, the company is seen as a portfolio of resources and skills (Barney, 1999). From this perspective, the entrepreneur is the first human resource of the national organization. Indeed, the development of the entrepreneurial initiative expressed as in the creation phase than in the existing organizations raises questions regarding the conditions of control and development of human resources.

Human resources management within SMEs and the importance of its practices

The requirement of creating human resources management seems to be more than obvious. The entrepreneur is soon faced with the problem of recruitment, compensation, especially when the project is part of an entrepreneurial team. Entrepreneurship is not just for entrepreneurship alone. Existing organizations, regardless of their size, can favor an entrepreneurial orientation. Developing and maintaining this guideline is an organizational practice in the field of HRM that enables autonomy assessment and risk taking (Stevenson et al., 1990). For each human resources practice there are design options which are, in fact, options for promoting and consolidating the different characteristics and behaviors of the employees (Schuler, 2001). Moreover, he points out that HRM practices can reflect the culture of an organization. Specifically, many authors (Peters, 1990) have suggested that corporate

entrepreneurship requires a culture built around emotional commitment, autonomy, empowerment, earned respect and a strong work ethic.

On the other hand, "companies founded by entrepreneurs who are unable or unwilling to deal effectively with human resources problems find it difficult to attract and retain top employees, they are not able to motivate those who they remain and generally fail to maximize the value of their human resources - often with serious consequences for their survival "(Baron, 2003). Moreover, the ability to identify and pursue new opportunities that can be described as entrepreneurial capacity implies having human resources to understand and exploit such opportunities. In this regard, recruitment, remuneration and promotion policies influence the entrepreneurial potential. Human resources management policies: recruitment, selection, training, performance appraisal and compensation are intended to guarantee employees the characteristics required for effective organizational performance and provide an appropriate behavior index and reinforcement to guide and motivate desired behaviors (Morris et al., 2010). Various human resource management practices need to be in line with each other, while differences in human resource practices are likely to be associated with changes in the level of entrepreneurship observed in organizations, as is consistent with contingency theories of organizations (Dabic et al., 2011).

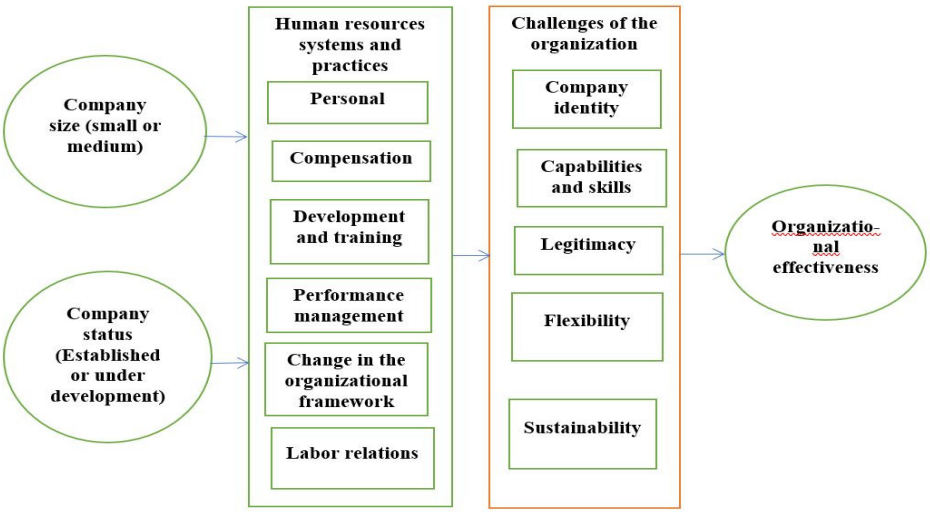

Fig. 1: The relationship between entrepreneurship and human resources management (Cardon et al., 2004, p. 298)

Previous studies on the recruitment practices of entrepreneurial firms have revealed that informal recruitment or, more precisely, recruitment through networks are more frequently adapted and considered more effective than formal practices (Aldrich et al., 1997)

Behaviors and characteristics specific to employers

The founder's abilities, culture, motivation, behavior, learning and experiences are all topics for which the researcher may be interested in human resources. "As new-found organizations grow and mature, their human resource requirements and needs change rapidly, creating a number of challenges for entrepreneurs and organizational leaders at all levels" (Longenecker et al., 2008, p. 23). In this way, an organization must really maintain its entrepreneurial dynamism if it wants to stay alive, to grow, to improve its performance and to renew itself (Randerson, 2013). In this way, there are many factors, related to the practices of human resources management that contribute to the motivation of the employees and to the creation of the entrepreneurial spirit.

Based on its literature review, Schuler recommended that the following employee characteristics be associated with successful entrepreneurial endeavors: creative and innovative behavior, risk taking, long-term orientation, focus on results, flexibility in change, cooperation, independent behavior, tolerance of ambiguity and preference for assuming responsibility (Schuler, 2001; Ceptureanu EG et al.,

2018a). Hayton points out that the two main problems remain those of the role of risk taking and the autonomy of actions ("discretionary behavior") of individuals (Hayton, 2005). The first factor can be encouraged by certain HRM practices, such as recruiting people with tolerance for ambiguity and implementing a compensation system that even recognizes risk taking. When it is the second factor, it can be stimulated by incentives and by supporting middle management.

Table 1: Organizational incentives needed for entrepreneurship

Factors	Objectives
Ideas requested	Employees are encouraged to propose and develop ideas.
Autonomy	Generates the spirit of managing a project, consolidating the initiative in decision making and solving problems
Performance based on a reward system	Employees are encouraged to take the risk of their projects.
Assessing the risks assumed	Employees are encouraged by the company to commit even if there is a risk of failure
Schooling	The opportunity offered to companies to strengthen the desired entrepreneurial culture and mentality
Rotating the workplace	The perception of new business opportunities is stimulated

Conclusions

In today's competitive environment, human capital is becoming a major success factor. People represent the greatest wealth of an organization on the basis of which it creates its basic competitive advantage. The labor market has changed a lot in recent years and is constantly changing and developing. The changes are linked to a number of new trends. Connecting human resource management processes with marketing, public relations, corporate strategy and vision is widely discussed. The human resources strategy is an essential part of the corporate strategy.

Its specific objectives are based on the objectives of the company. The human resources strategy thus contributes to the development of the systematically managed organization, together with the objectives of other departments. The human resources strategy clearly sets out what and how to change human resource processes so that organizations can best achieve their goals.

Many small businesses have fewer than five employees, and therefore the role of human resources in these businesses is one of their minor. In fact, human resources are very important in small businesses because of the significant impact one or a few employees may have on the business (Sheehan et al., 2011; Ceptureanu EG et al, 2018b). Although we could expect the human resources management to be done systematically in SMEs, it seems that even today, only 42% of the Romanian companies are managed using a human resources strategy. Other companies either do not have a human resources strategy or do not pursue it. The managers evaluate the HRM process between 6-7, which is the tip on the 9-point scale. The human resources management process operates at 71% in SMEs, it ranks 5th among other processes. Production is first, followed by quality management and sales.

In particular, small businesses do not have a separate staffing department, so the man-ager manages to work with people, so the operation of this process is no bigger. The human resources strategy is present and followed in particular by such enterprises for which it is important to hire and retain high quality employees and to take care of their development (Pech et al., 2018). Human resource problems are steadily increasing in all types of organizations, young workers want more freedom and a faster career (Westerman et al., 2011). Small and medium-sized enterprises have their own specificities in all areas of existence and, of course, also in the management of human resources. Perhaps the most striking feature is that small businesses rarely have a human resources department or a human resources specialist. The human resources strategy of small businesses is one of the least researched (Mankelow, 2008). Also, small businesses need human resources managers. The strategic performance and efficient management of human resources allows the entrepreneurs to improve the quality of their production.

The carrier and implementer of the human resources strategy and works is usually the owner (manager) of the enterprise. As such a person is especially an expert in other fields, he concentrates his forces mainly on production, sales, technology and neglects the importance of the human factor in the organization. In addition, a small business is more vulnerable to changes in the external environment; it has no long-term resources and reserves. The error of each worker is more visible and may threaten the reputation and competitiveness of the organization in relation to customers and business partners.

The common argument of managers for underestimating the human resources department is that the organization must be very flexible and no strategy is required, including HR. However, it is a priority for the owners of these organizations to focus their attention on human resources, to acquire the necessary knowledge and skills of strategic management and to create a human resources concept that will increase the organization's long-term competitiveness and also , to increase employee satisfaction. A well-defined HR strategy is essential for any organization, because without a strategy HR processes are not efficient and human resources development is impossible.

As the human factor becomes more and more important in business, the importance of the long-term human resources strategy will increase exponentially. Its quality will also depend on the ability of an enterprise to compete in a competitive fight for good quality human resources. Each business should establish its own human resources strategy and have its own human resources policy. Only the right relationship of the human resources strategy with the entire strategy of the organization can lead to long-term success (Yiu et al., 2007). In order to effectively create the human resources strategy, this should be a recurring process. Its location and importance will depend first and foremost on the importance of organizing human resources for achieving long-term business objectives and creating the overall market value of an organization. The increased importance of human capital is also due to easier access to financial capital and material resources.

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Agricultural Radio Programmes In Native Dialects and Marketing of Farm Products in Nigeria

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Abstract

This study explores how farmers' acceptance of radio programmes related to agriculture and broadcast in native dialects have influenced the marketing of agricultural products in Nigeria. The study specifically seeks to ascertain farmers' interest in the radio programmes related to agriculture broadcast in native dialects; determine farmers' acceptance of the radio programmes related to agriculture broadcast in native dialects and establish if the agricultural programmes have influenced the marketing of their farm produce. Using the survey research design, the study was anchored on development media and agenda-setting theories. The questionnaire was administered on 663 randomly selected farmers in Plateau, Nasarawa and Benue states. Findings show that 72.7% of respondents' have an interest in the radio programmes in native dialects and these programmes address the needs of farmers such as marketing and providing links with potential buyers of agricultural products. Findings further show that the programmes *U yivin ikyese I kwaghyan* (Filling the Food Basket); *Mukoma gona* (Let us go back to farming) and *Muryan Manoma* (Voice of Farmers) all broadcast on Harvest FM Makurdi, Nasarawa Broadcasting Service (NBS), and Plateau Radio and Television Corporation (PRTVC) have played an important role in helping farmers to market their products. The study concludes that the critical role these programmes play in the greater efficiency for farmers and other stakeholders in the production chain is sacrosanct. The study, among other things, recommends that agricultural radio programmes in native dialects should continue to be encouraged and sustained. This will help keep farmers abreast of trends in the agricultural sector.

Keywords: Agriculture, Farmers, Native dialects, Marketing, Programmes, Radio

Introduction

Radio programmes related to agriculture broadcast in native dialects play an integral role in the marketing of farm products. This is evident in the language of engagement as it informs farmers on how to improve their agricultural yield and also ensure that their products are adequately marketed and priced accordingly. Over the years, these programmes have provided a kind of engagement between farmers and extension workers as well as farmers and consumers of their products (Adeyeye *et al*., 2020; Hampson, Leclair, Gebru, Nakabugo, & Huggins, 2017).

Marocchino (2009) notes that agricultural marketing is a series of interlinked activities: preparation, production, planting, harvesting, grading, packaging, transportation, storage, farming and food processing, distribution and sale. This operation cannot occur without information exchange between producers and purchasers. Marketing of agricultural products is relevant in the production process as it ensures that harvested agricultural products are transmitted to consumers to give farmers value for the

time, energy, and resources spent in producing these crops. Radio programmes in native dialects have been used successfully in agricultural extension in many countries (Nwammuo & Salawu, 2019; Idiegbeyan-Ose *et al*., 2019; Adeyeye *et al*., 2019). Evidence from previous studies shows that farmers attitude and perceptions are influenced by the media and programmes they are exposed to (Bharti, & Bharti, 2019; Kumar, Ansari, & Singh, 2017).

The peculiarity of these programmes in reaching farmers in a language they understand underpins the need to thoroughly utilize this medium to interact with them on the need to market their products further. This is evident because these programmes which include, *Let us go back to farming* in Nasarawa State, *Voice of Farmers* in Plateau State and *Filling the Food Basket* in Benue State help disseminate relevant agricultural information to different farmers at a minimal cost. Thus, farmers can have access to the required information, especially in hinter communities, where extension workers cannot be easily accessible.

Access to timely information is also essential for farmers' involvement in markets as it lets them learn about market prices and demand for particular products and markets. Information on market conditions and market rates may also help farmers negotiate better on their products' rates. Farmers may also bypass local traders and contacts with traders and therefore directly sell their goods to markets or traders. This knowledge is useful because it is local, timely and reliable, diverse and widely accessible and understood by the rural community as a whole (Magesa, Michael & Ko, 2014).

This study thus examines how farmers' acceptance of radio programmes related to agriculture broadcast in native dialects have influenced the marketing of agricultural products in Nigeria. The study underscores how farmers perceive the information gotten from these radio programmes. The programmes include *U yivin ikyese I kwaghyan* (Filling the Food Basket); *Mukoma gona* (Let us go back to farming); *Muryan Manoma* (Voice of Farmers). These programmes are broadcast on: Harvest FM Makurdi, Nasarawa Broadcasting Service (NBS), and Plateau Radio and Television Corporation (PRTVC) respectively.

Objectives of the Study

The following objectives guide the study:

- To ascertain farmers interest in radio programmes related to agriculture in native dialects understudy
- To determine farmers acceptance of the radio programmes related to agriculture in native dialects
- To establish if the agricultural programmes under study have influenced the marketing of their farm produce

Literature Review/Theoretical Framework

Radio through its programmes is one of the several ways of transmitting knowledge to Nigeria and the rest of the world. The fact that it is cheap to buy, and that it can be worked with or without electricity, cannot distinguish the explanation for its broad and appropriate existence. This explains why its target is not only literate and mainly urban areas but also citizens in the farthest part of the globe, i.e. the citizens of rural areas. As part of the benefit of radio over other media, the target audience may opt to use a language that is peculiar to them. Thus, it's easy for a Hausa man to know via radio that the next things happen in Lagos affect him.

Oyeyinka, Bello and Ayinde, (2014) examined the radio use in Oyo State, Nigeria for the marketing of agricultural products. One hundred and fifty (150) farmers for the analysis were chosen by using a random sampling technique. The findings indicate that the majority (66.7%) were women between the ages of 41 and 50 years. The rest of the respondents were females. A majority of respondents have been married (67.3%) and employed (72.0%), and their use of marketing knowledge has a positive influence. The main occupation (81.3%) of respondents is agricultural work. Many of them (68.0%) are cultivated over 6-15 years. The findings further indicate that the majority of farmers (84.0%) used the agricultural radio program as their source of knowledge on the agricultural market. Inferential statistics indicate substantial connections between farmer usage and education ($X2 = 16.35$; $< .05$) of the farm-radio

service and primary occupation (X2 = 61.25; < 0.05) of selling agricultural commodities. However age (X2 = 5.54; > 0.05) and marital status (X2 = 10.46; > 0.05) had no relevant connection to the usage of agricultural commodity marketing radio programmes related to agriculture. Also, farmers 'awareness results (r = 0,632, p < 0.05) and farm radio use were positive, while the restrictions (R = -0.0256, P < 0.05) had negative relation with farmers' use of farm radio to sell farm commodities. The results also had a positive relationship with farmers. In addition to radio, extension agents and direct communication with fellow farmers are the primary sources of market knowledge for farmers. The crux of Oyeyinka, Bello and Ayinde's study was to examine radio use for the marketing of agricultural products. This study goes a step further to underpin radio programmes aired in indigenous languages as it influences the marketing of agricultural products.

Magesa, Michael and Ko (2014) note that for participating in agricultural markets, access to agricultural and exchange information is essential. The farm marketing chain gains most from a professional and well-equipped member. As rural farmers have limited access to agricultural markets, other actors (traders, customers, and intermediaries) have relied too long on subsistence farming as a benefit for more. They argued that these rural farmers had limited access to markets because of poor road infrastructure, lack of transport means and generally because of the lack of knowledge on the agricultural market. Because of the lack of information on the market, such as market prices, the quality and quantity of products available in the markets, farmers in rural areas are negotiating prices of their produce from information supplied by traders. Due to the absence of market knowledge, including market costs, quality and quantity of goods, farmers negotiate prices of their products based on information received by traders. These factors are substantially rising rural farmers 'bargaining power, thereby fostering the uncompetitive market growth. Rural farmers are required to switch from subsistence farming to the primary economic activity of agriculture if they are given a reasonable share of their goods. Remote rural farmers have not gained much from reliance on radio programmes related to agriculture and mobile calls for information on the demand in agriculture.

This study is guided by the development of media theory and agenda-setting theory.

Development media theory suggests that the mass media would promote developed countries' growth goals. Folarin (2002) outlined the main concepts of the theory that Dennis McQuail originally suggested. The media need to recognize and carry out constructive development activities in compliance with national policies and the right of the press to open up to economic goals according to national policies. He also pointed out that the media should make national culture and languages the focus of their content.

The development media theory is chosen as a relevant frame because these programmes aid agricultural development which eventually brings about constructive development activities in compliance with national policies and the right of the press to open up to economic goals according to national policies. When farmers' adequately market their products and improve economic activities, it brings about the advancement of national culture and languages.

The agenda-setting theory also explains the power of the media to decide which topics will form the basis of public discourse or reflection. The principle of "agenda-setting" does not grant the press the power to determine audience views, according to Folarin (2002, p. 75). Still, it does allow them the capacity to decide what to be aware of. In order for a topic to become important, it should be recorded consistently and given attention to a level of controversy and accumulated media-specific consequences (Folarin, 2002).

Agenda setting theory is relevant to this study because the media through agricultural radio programmes in native dialects provide an array of innovations in agriculture that require farmers to adopt if they desire an improvement in their overall output and also market their products. By emphasizing technological innovations in agriculture, farmers' see it as essential to improve their agricultural yields. On the other hand, media silence on these issues will also make the farmers regard them as unimportant no matter how important they are. Thus, emphasis on these issues will bring about the availability of improved, tested and trusted methods of farming and food security is fully guaranteed. Additionally, they are kept abreast of trends in marketing their farm products.

Materials and Methods

The study adopts the survey research method. This type of research method aims at collecting data on a particular problem from a sample of a given population. Wimmer and Dominick (2000, p.101) argue that it can be used to investigate issues in realistic settings adding that the method is also more economical. The questionnaire was designed to elicit general information about the study objectives from farmers in the selected states. The choice of using the questionnaire was based on the effectiveness of the instrument to obtain diverse opinions and feelings from the sampled respondents. Plateau, Nasarawa and Benue State are selected as the area for this study; the states are located in the Northcentral geopolitical zone of Nigeria. It has an approximate population of 1,150,000 farmers as indicated by the All Farmers Association. The geopolitical zone under focus is acknowledged as the highest contributor to Nigeria's foreign exchange earnings in agricultural crop export (Maroya, Balogun & Asiedu, 2014; Bamiro, Afolabi & Daramola, 2012; Consultative Committee on Agricultural Export Commodity Statistics, 2005). Examples of crops produced by this zone include maize, yam, cassava, soya beans, melon, rice, and tomatoes. The three top states in the geopolitical region known for successful crop farming (Benue, Nasarawa and Plateau States) are examined. Additionally, the States emphasize radio programmes related to agriculture broadcast in native dialects as against other States in the geopolitical zone (Iwuchukwu, Ineji & Inyang, 2018).

A sample of 221 from each of the selected states were chosen randomly, giving a total of 663 farmers. The sample size was ascertained using the Krejcie and Morgan (1970) sample size determination table. Data gathered were analyzed using tables of frequency and simple percentages to show the distribution of results and understanding of analysis.

Results

Six hundred and sixty-three (663) copies of the questionnaire were administered among the farmers across the three selected states who provided the data analyzed in this section.

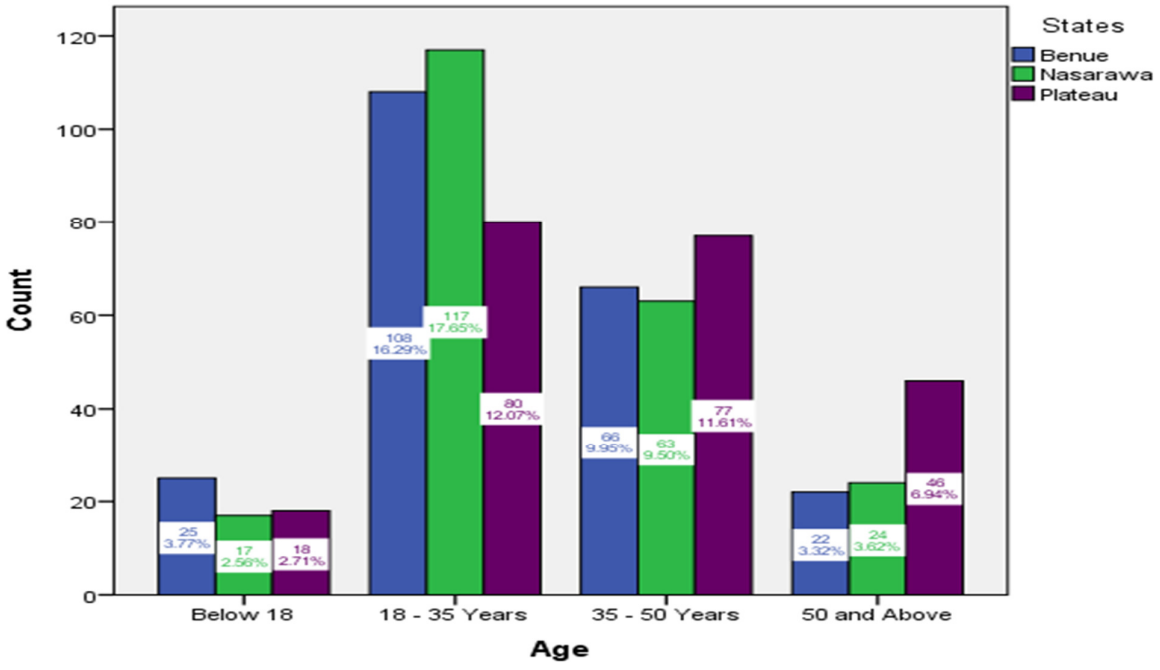

Fig. 1: Age distribution of Respondents

Age distribution of respondents across the three (3) selected states in Nigeria is as presented in Figure 1 revealed that out of 60 respondents that are within the age group of below 18 years in all the three selected states, 25(41.7%) were from Benue, 17(28.3%) were from Nasarawa while 18(30.0%) were from Plateau. Similarly, the total number of respondents from all the three states that are within the age group of 18-35 years was 305 out of which 108(35.4%) were from Benue, 117(38.4%) were from Nasarawa while 80(26.2%) were from Plateau. The findings also revealed that 206 respondents were within the age group of 35-50 years. Out of 206 respondents from the three selected states, 66(32.0%) were from Benue, 63(30.6%) were from Nasarawa, while 77(37.4%) were from Plateau. Also, the total number of respondents that are within the age group of 50 years and above was 92. Out of these 92 respondents, 22(23.9%) were from Benue, 24(26.1%) were from Nasarawa while 46(50,0%) were from Plateau. Sequel to the data presented above, it shows that most of the respondents across the three selected states were within the economically active population of 18-50 years.

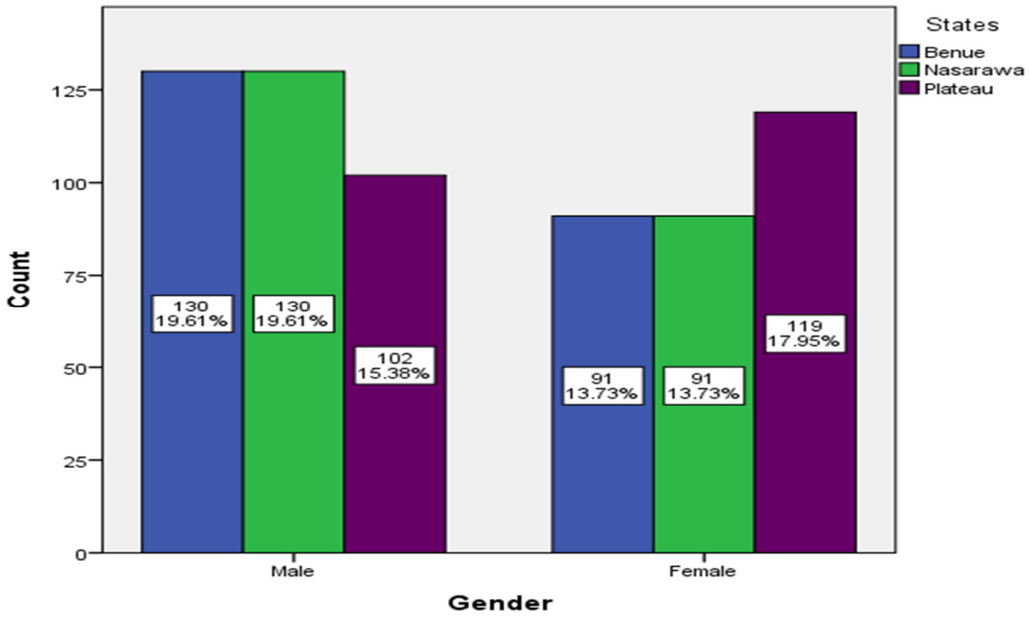

Fig. 2: Gender Distribution of Respondents

The gender distribution of respondents from all the three selected states, Benue, Nasarawa and Plateau as presented in Table 4.2 and Figure 4.2 show that out of the 362 total number of male respondents from all the selected states, 130(35.9%) were from Benue, 130(35.9%) were from Nasarawa while 102(28.2%) were from Plateau. Similarly, out of 301 female respondents, 91(30.2%) were from Benue, 91(30.2%) were from Nasarawa, while 119(39.5%) were from Plateau. The data presented, however, revealed that most of the respondents from Benue and Nasarawa were male while in Plateau, most of the respondents were female. This suggests that women on Plateau are more engaged in farming than their male counterparts.

Table 1: Agricultural Radio Programmes in native dialects vis-à-vis Marketing of Agricultural Products

	SA 5	A 4	U 3	D 2	SD 1	Mean	SD
I have interest in the radio programmes related to agriculture broadcast in native dialects on radio	113 (17.0)	369 (55.7)	92 (13.9)	61 (9.2)	28 (4.2)	3.7210	.99042

The radio programmes related to agriculture broadcast in native dialects on radio address needs of farmers on marketing	107 (16.3)	336 (50.7)	117 (17.6)	61 (9.2)	41 (6.2)	3.6772	1.92335
Experts used in the radio programmes related to agriculture broadcast in native dialects on the radio to explain issues understand modern techniques of farming (marketing inclusive)	95 (14.3)	351 (52.9)	119 (17.9)	74 (11.2)	24 (3.6)	3.6320	.98032
The amount of time the radio programmes related to agriculture broadcast in native dialects is sufficient	83 (12.6)	199 (30.0)	187 (28.2)	154 (23.2)	40 (6.0)	3.2247	1.35057
The time the radio programmes related to agriculture broadcast in native dialects is appropriate	81 (12.2)	250 (37.7)	184 (27.8)	122 (18.4)	26 (3.9)	3.3590	1.03894
I love radio programmes related to agriculture broadcast in native dialects on radio	101 (15.2)	350 (52.8)	109 (16.4)	74 (11.2)	29 (4.4)	3.6335	1.01197
I don't miss the radio programmes related to agriculture broadcast in native dialects for any reason	47 (7.1)	246 (37.1)	177 (26.7)	133 (20.1)	60 (9.0)	3.1312	1.09626
I believe in the practices recommended by the radio programmes related to agriculture broadcast in native dialects	65 (9.8)	351 (52.9)	132 (19.9)	69 (10.4)	46 (6.9)	3.4827	1.03529
I participate in the radio programmes related to agriculture broadcast in native dialects through calls and SMS	62 (9.4)	222 (33.5)	193 (29.1)	120 (18.1)	66 (10.0)	3.1418	1.12690
It is not a waste of time to listen to the radio programmes related to agriculture broadcast in native dialects	132 (19.9)	338 (51.0)	88 (13.3)	80 (12.1)	25 (3.8)	3.7119	1.03560

The acceptance rate of agricultural radio programming in indigenous languages by the respondents in the selected states was measured with nine (9) items on the research instrument using five (5) Likert's scale ranging from strongly agree (5), Agree (4), undecided (3), disagree (2) and strongly disagree (1). The scale addressed the extent at which respondents perceived the items on the research instrument.

To determine the extent the respondents agreed to the items on the research instrument was established by the mean score and standard deviation. The assumptions and threshold of the mean score and standard deviation depict that if mean is between 0.1 and 1.30 it is an indication that it is fragile; 1.31 - 2.40 means score shows that it is very fair, 2.41- 3.45 is regarded as moderate; 3.46 - 4.50 is strong while 4.51 - 5.00 is an indication that the means score is powerful.

Table 1 shows respondents' opinion on acceptance of the agricultural radio programming in indigenous languages. To know if the respondents have interest in the radio programmes related to agriculture broadcast in native dialects, 113(17.0%) of the respondents strongly agreed that they have interest in the radio programmes related to agriculture broadcast in native dialects, 369(55.7%) of the respondents agreed that they have interest in the radio programmes related to agriculture broadcast in native dialects, 92(13.9%) of the respondents were indifferent about the statement, 61(9.2%) disagreed with the statement. In comparison, 28(4.2%) strongly disagreed with (Mean score = 3.7210, Standard Deviation = .9904). Therefore, most of the respondents agreed that they have an interest in radio programmes related to agriculture broadcast in native dialects.

It must also be noted that 107 (16.3%) of the respondents strongly agreed that radio programmes related to agriculture broadcast in native dialects on local radio station address needs of farmers, 336(50.7%) of the respondents agreed that radio programmes related to agriculture broadcast in native dialects on local radio station address needs of farmers, 117(17.6%) of the respondents were indifferent about the statement, 61(9.2%) disagreed with the statement. In comparison, 41(6.2%) strongly disagreed with (Mean score = 3.6772 Standard Deviation = 1.9234). Therefore, most of the respondents agreed that radio programmes related to agriculture broadcast in native dialects on local radio station addresses the needs of farmers. However, 95(14.3%) of the respondents strongly agreed that experts used in the radio programmes related to agriculture broadcast in native dialects on the radio to explain issues understand modern techniques of farming, 351(52.9%) of the respondents agreed that experts used in the radio programmes related to agriculture broadcast in native dialects on the radio to explain issues understand modern techniques of farming, 119(17.9%) of the respondents were indifferent about the statement, 74(11.2%) disagreed with the statement. In comparison, 24(3.6%) strongly disagreed with (Mean score = 3.6320, Standard Deviation = .9803). Therefore, most of the respondents agreed that experts used in radio programmes related to agriculture broadcast in native dialects on the radio to explain issues understand modern techniques of farming.

Similarly, 83(12.6%) of the respondents strongly agreed that amount of time the radio programmes related to agriculture broadcast in native dialects airs is sufficient 199(30.0%) of the respondents agreed that the amount of time the radio programmes related to agriculture broadcast in native dialects airs is sufficient, 187(28.2%) of the respondents were indifferent about the statement, 154(123.2%) disagreed that the amount of time the radio programmes related to agriculture broadcast in native dialects airs is sufficient. In comparison, 40(6.0%) strongly disagreed with (Mean score = 3.2247, Standard Deviation = 1.3506). Therefore, most of the respondents agreed that the amount of time the radio programmes related to agriculture broadcast in native dialects airs is sufficient. Likewise, 81(12.2%) of the respondents strongly agreed that the time the radio programmes related to agriculture broadcast in native dialects airs is appropriate, 250(37.7%) of the respondents agreed that the time the radio programmes related to agriculture broadcast in native dialects airs is appropriate, 184(27.8%) of the respondents were indifferent about the statement, 122(18.4%) disagreed that the time the radio programmes related to agriculture broadcast in native dialects airs is appropriate. In comparison, 26(3.9%) strongly disagreed with (Mean score = 3.3590, Standard Deviation = 1.0389). Therefore, most of the respondents agreed that the time the radio programmes related to agriculture broadcast in native dialects airs is appropriate.

Equally, 101(15.2%) of the respondents strongly agreed that they love the radio programmes related to agriculture broadcast in native dialects, 350(52.8%) of the respondents agreed that they love the radio programmes related to agriculture broadcast in native dialects, 109(16.4%) of the respondents were indifferent about the statement, 74(11.2%) disagreed that they love the radio programmes related to agriculture broadcast in native dialects. In comparison, 29(4.4%) strongly disagreed with (Mean score = 3.6335, Standard Deviation = 1.0119). Therefore, most of the respondents agreed that they love radio programmes related to agriculture broadcast in native dialects. It is equally important to report that, 47(7.1%) of the respondents strongly agreed that they don't miss the radio programmes related to agriculture broadcast in native dialects for any reason, 246(37.1%) of the respondents agreed that they don't miss the radio programmes related to agriculture broadcast in native dialects for any reason, 177(26.7%) of the respondents were indifferent about the statement, 133(20.1%) disagreed. In comparison, 60(9.0%) strongly disagreed with (Mean score = 3.1312, Standard Deviation = 1.0963).

Therefore, most of the respondents agreed that they don't miss the radio programmes related to agriculture broadcast in native dialects for any reason.

It must be noted that 65(9.8%) of the respondents strongly agreed that they believe in the practices recommended by the radio programmes related to agriculture broadcast in native dialects, 351(52.9%) of the respondents agreed that they believe in the practices recommended by the radio programmes related to agriculture broadcast in native dialects, 132(19.9%) of the respondents were indifferent about the statement, 69(10.4%) disagreed. In comparison, 46(6.9%) strongly disagreed with (Mean score = 3.4827, Standard Deviation = 1.0353). Therefore, most of the respondents agreed that they believe in the practices recommended by the radio programmes related to agriculture broadcast in native dialects. Also, 62(9.4%) of the respondents strongly agreed that they participate in the radio programmes related to agriculture broadcast in native dialects through calls and SMS, 222(33.5%) of the respondents agreed that they participate in the radio programmes related to agriculture broadcast in native dialects through calls and SMS, 193(29.1%) of the respondents were indifferent about the statement, 120(18.1%) disagreed. In comparison, 66(10.0%) strongly disagreed with (Mean score = 3.1418, Standard Deviation = 1.1269). Therefore, most of the respondents agreed that they participate in radio programmes related to agriculture broadcast in native dialects through calls and SMS.

Meanwhile, 132(19.9%) of the respondents strongly agreed that it is not waste of time to listen to the radio programmes related to agriculture broadcast in native dialects, 338(51.0%) of the respondents agreed that it is not waste of time to listen to the radio programmes related to agriculture broadcast in native dialects, 88(13.3%) of the respondents were indifferent about the statement, 80(12.1%) disagreed. In comparison, 25(3.8%) strongly disagreed with (Mean score = 3.7119, Standard Deviation = 1.0356). Therefore, most of the respondents agreed that it is not a waste of time to listen to the radio programmes related to agriculture broadcast in native dialects.

Discussion of Findings

The mean score and standard deviation determined the acceptance rate of radio programmes related to agriculture broadcast in native dialects by the respondents in the selected states. Results show that 72.7% of respondents' have an interest in radio programmes related to agriculture broadcast in native dialects. It should also be noted that 67% of respondents agree that radio programmes related to agriculture broadcast in native dialects on local radio station address the needs of farmers. Additionally, most of the respondents agree that experts used in the radio programmes related to agriculture broadcast in native dialects on their local radio station to explain issues understand modern techniques of farming.

Similarly, most of the respondents agree that the amount of time the radio programmes related to agriculture broadcast in native dialects airs is sufficient. Likewise, the time the radio programmes related to agriculture broadcast in native dialects broadcast is appropriate. Furthermore, 68% of respondents agree that they love radio programmes related to agriculture broadcast in native dialects and they don't miss the radio programmes related to agriculture broadcast in native dialects for any reason. Therefore, most of the respondents agree that they believe in the practices recommended by the radio programmes related to agriculture broadcast in native dialects. Additionally, they participate in radio programmes related to agriculture broadcast in native dialects through calls and SMS. It is not a waste of time to listen to the radio programmes related to agriculture broadcast in native dialects.

A study conducted in Northern California by Jenkins and his contemporaries lay credence to this and has shown that mass communication has supplied a lot of helpful agricultural information, and the experience has been quite significant (Donye, 2018). Radio has proven to be an essential instrument for improving agricultural production in rural areas. Radio programmes related to agriculture are a powerful and effective medium for the dissemination of agricultural information and expertise in developing nations (Nakabugu, 2001; FAO, 2005).

According to Sharma (2008), the benefit of radio programmes related to agriculture as a means of communication is that its transmission, presentation and portability are cost-effective. Radio can be an essential tool for teaching farmers if it attracts them to new programmes utilizing modern farming techniques. However, to correctly understand and execute such programmes, indigenous language use

is crucial in ensuring that farmers are educated on new practices in agricultural development (Nazari & Hasbullah, 2010). As rural farmers participate in radio programmes related to agriculture, because of the sensation of ownership, they become more exciting and efficient. This readily gets through the message and information. Nakabugu (2010) confirms that data on enhanced agriculture, seed improvement, planting, agricultural forestry, improved harvesting methods, soil preservation, marketing, processing and diversification after harvest. He added that rural radio offers farmers the chance to interact, through live talk shows, telephone programmes and regional broadcasts, and with each other and with other competent authorities such as the extension staff, plant and animal experts.

Research by the FAO (2005) discovered that acceptance of farm radio programmes related to agriculture have contributed to strengthening social unity, improving communicative capacity, providing historical understanding, maintaining the environment, and solving community issues. The study suggested extensive use of farm radio programmes related to agriculture as an instrument for rural development. The educational role of the radio is first and foremost to assist farmers in embracing current agricultural technology to achieve higher returns and change the age-old low yield ideas. Farmers' willingness to increase their farm income by implementing advanced enhanced farming methods to be considered a most notable change in their behaviour. These programmes broadcast in indigenous languages are instrumental for disseminating credible agriculture-related information to bring about change in farming techniques and thus bring about economic transformation in the nation (Shree, 2011).

Findings from this study also show that farmers have improved their production based on the information gotten from radio programmes related to agriculture broadcast in native dialects. Findings also show that 66.9% of respondents embrace innovations which have improved their capacity as a result of radio programmes related to agriculture broadcast in native dialects. Farmers also affirmed that they employ technology in farming based on radio programmes related to agriculture broadcast in native dialects. They are also exposed to new markets for their produce because of radio programmes related to agriculture broadcast in native dialects.

The statistics presented also revealed that 66.4% of the respondents agree that radio programmes related to agriculture broadcast in native dialects on local radio station have appreciably improved farmers' knowledge and productivity. Furthermore, most of the respondents agreed that farmers are exposed to agricultural funding through radio programmes related to agriculture broadcast in native dialects. Sheila and Hezron (2017) corroborated the findings in this study. They found that access to information from media outlets have managed to improve farmers yield over time. Their argument supports this study in the area of geopolitical zonal radio application for keeping farmers abreast of innovations radio which has improved their productivity. Njoku (2016) focused on the efficacy of the RAF programme in technology transfer to rural farmers and discovered that the RAF programme was efficient in technology transfer to rural farmers. The study supports this present research because it recognizes that radio is useful in transmitting technological expertise in the state understudy to rural farmers. Ango, Illo, Abdullahi, Maikasuwa and Amina (2013) also confirm the role played by agricultural radio programmes related to agriculture in raising awareness among farmers. Their research discovered that the information disseminated via radio was adopted by farmers, which was found to be extremely applicable to the agricultural operations of farmers. Farmers have acquired an understanding of farm management methods, prevention of post-harvest losses and adequate fertilizer implementation, and this has been discovered to be very crucial and efficient for most farmers ' economic operations. This research is an open-minded one about the role of agricultural radio programmes related to agriculture in raising awareness among farmers

Conclusion/Recommendations

The findings in this study portray the potentials of agricultural radio programmes in native dialects in improving the marketing of farm products through effective agricultural communication via the programmes studied. The study underscores the critical role of these programmes can play in greater efficiency for farmers and other stakeholders in the production chain. It shows that the programmes *U*

yivin ikyese I kwaghyan (Filling the Food Basket); *Mukoma gona* (Let us go back to farming) and *Muryan Manoma* (Voice of Farmers) all broadcast on Harvest FM Makurdi, Nasarawa Broadcasting Service (NBS), and Plateau Radio and Television Corporation (PRTVC) have played an essential role in helping farmers to market their products. This is evident from the results of this study in the way these programmes educate farmers by consciously telling them to produce beyond consumption and to sell to the right people at the correct prices.

The study showed that farmers have an interest in radio programmes related to agriculture broadcast in native dialects and confirmed that the programmes address the needs of farmers. Experts used in the radio programmes related to agriculture broadcast in native dialects on the radio to explain issues understand modern techniques of farming (marketing inclusive)

The following recommendations are, therefore made:

a. Agricultural radio programmes in native dialects should continue to be encouraged and sustained. This will help keep farmers abreast of trends in the farming sector.

b. Successful farmers with large scale farmlands should be engaged in these programmes to serve as a reference point to others who are coming up.

c. With the diversification in native dialects in hinter communities, agricultural radio programmes in local dialects should further be decentralized to meet the needs of such areas.

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Job Satisfaction Vs Competitive Position of Small and Medium-Sized Enterprises in Poland

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Abstract

Due to the fact that one of the most important resources held by contemporary economic organisations are people, the employees' satisfaction is of a great importance for the functioning of the whole organisation irrespectively of the size thereof. It influences both, the organisation's results, as well as the development and the competitive position. This article describes issues regarding job satisfaction of small and medium-sized enterprises' (SMEs') employees by indicating factors shaping satisfaction and specifying its influence on the competitive position of enterprises. The main aim of this paper is to attempt indicating determinants influencing the professional satisfaction of employees of small and medium-sized enterprises in Poland in the context of developing the advantage of those enterprises. The research has been conducted among employees of the Polish SME sector. The empirical research had a quantitative character. The diagnostic survey, where a research tool was an independently developed survey questionnaire, was adopted as the research method. The main research question was the following: What are the main factors influencing the satisfaction of SME employees in Poland? Therefore, it has been attempted to indicate factors influencing employees' satisfaction with various aspects of their work. The assessment covered, among others: systems of motivating and remunerating employees, communication, relations in the company and the sense of permanence and stability of employment. The research hypothesis had the following wording: Satisfaction of SMEs' employees influences the competitive positions of those companies. The conclusions reflect not only the main ideas discussed herein, but also the aim of the article. The research results confirmed that satisfaction of the SMEs' employees influences the competitive position of those companies, whereas, the higher the level of job satisfaction, the better the competitive position of the company.

Keywords: job satisfaction, competitiveness, human capital, SME.

Introduction

Nowadays, maintaining a competitive position is not an easy task. Entrepreneurs have to deal with more and more difficult and complex conditions of development. In the knowledge-based economy, the main source of development constitutes intangible assets (knowledge assets) (Ejrami et al., 2016). Employees, their knowledge, skills and qualifications become more important than material resources, the driving force of development of economic entities (OECD, 1997). As underlined by Prahalad (1983), market leaders are distinguished with human capital and not physical or financial capital.

Employees, their competences and attitudes, as well as engagement constitute a foundation of functioning, development and results achieved by the enterprises (Feeman et al., 2006), through the agency of which a positive image of an enterprise can be created (Leoński, 2015). However, the level of engagement in the organisation is significant, since engaged employees are the key factor of success of each organisation. High engagement of an employee, loyalty, long-term employment and low absence strongly correspond with the high level of job satisfaction. Swarnalatha & Prasanna (2013) underline that employees with a higher level of engagement work harder, are more loyal and more often "take a step further" than non-engaged employees. They generate results by 20% better than non-engaged employees and are by 87% less prone to leave the organisation. Whereas, Rucci et al. (1998)

indicated that per each 5% of an increase in the employees' engagement the customers' satisfaction increased by 1.3%, and a company noted an increase in revenues by 0.5%. Therefore, entrepreneurs face a challenge of creating a working environment favouring effective work and increasing the level of employees' satisfaction. As underlined by Ulric (1991), strategic human capital management is of bigger and bigger significance.

Issues related to human capital management have been present in the literature for many years. The research conducted by scientists oscillate around various problems, often resulting from the dynamically changing situation in economies. Deliberations of many authors focus on the significance of human capital in developing competitive advantage of enterprises (Matejun et al., 2010; Piecuch, 2010; Durany, 2016; Rybak, 2003; Rosińska, 2007; Lawler, 2008; Nahapiet, 1998), underlining, among others, that the human capital constitutes a significant factor of reinforcing the market position and developing the competitive advantage of enterprises. However, the literature review indicates a certain shortage in the scope of the research concentrating on the competitive position of enterprises and the level of satisfaction of those organisations' employees. Therefore, the authors attempted to study the correlation between the satisfaction of employees employed at small and medium-sized entities and the competitive position of this scale of companies. The research covered employees of small and medium-sized entities, since this is the most numerous group of entities making the contemporary economy. While building the competitive position on the market, they have to use features which are characteristic for them and give advantage over other entities.

Literature Review

Employees are one of the most important resources of companies in the fight for maintaining the market position (Dubra, 2010). The combination of knowledge, skills, innovativeness and individual possibilities of employees makes the human capital (Edvinsson & Malone, 1997), which has a particular significance for small and medium-sized entities (Matejun et al., 2010), influencing their effectiveness and wining the competitive battle (Piecuch, 2010). Employee empowerment enables companies to design a culture that helps to build and sustain unique competitive advantages (Durany, 2016; Gorzeń-Mitka, 2018). The human capital is indicated as the source of enterprises' competitiveness (Rybak, 2003; Jagódka, 2011). Employees generate uniqueness thus, they can constitute the factor of the competitive advantage (Rosińska, 2007; Lawler, 2008).

Human capital is owned by the organisation's employees and they decide how much should be invested in the organisation, at which they are employed. As underlined by Abun et al. (2019), persons engaged in work feel a part of the team to a larger extent and are ready to make greater efforts to achieve the aims of this team. The research conducted by Singh (2017) indicated that there is a causal link between job satisfaction and employees' engagement. For many satisfaction from performed work is the priority and factor increasing engagement, which, in turn, translates into generated profits and organisation's market position (Baradaran et al., 2008).

The concept of job satisfaction has been discussed in the subject literature for many years (selected definitions have been presented in table no. 1). According to Hellriegel et al. (1995), it is a product of what an employee receives at work and what they believe they should receive. Satisfaction is a positive affective (emotional) state resulting from the assessment of work (Judge & Bono, 2001), attitude to the work environment and performed professional duties (Staples & Higgins, 1998). This is an element of broadly understood motivation or a person's wellbeing, which results from satisfaction of needs and aspirations. It may be a positive or negative feeling, yet, it is subjectively conditioned.

Table 1: Defined job satisfaction

Author/s	Definitions
Vroom (1964)	positive attitude towards work;
Locke (1976)	result of perceiving own work as allowing achievement of important values from work, provided that these values are compliant with the person's needs or help in achievement thereof;
Wexley & Yukl (1984)	set of the employees' feelings and attitudes towards work;
Agho et al. (1993)	combination of factors related to the performed work, environmental factors and personality factors (positive affect);
Stamps (1997)	the extent to which employees like their jobs;
Saari & Judge (2004)	product of many factors resulting from, among others, employee attitudes, a positive or negative approach to the performed work and the manner of measuring satisfaction;
Schultz & Schultz (2006)	subjective assessment of positive and negative feelings and attitudes that refer to the professional duties performed by employees;
Czarnota–Bojarska (2010)	emotional attitude toward the employing organisation, tasks performed at work and other aspects important for the professional and social functioning;

Source: own study.

As underlined by Abdullah & Ramay (2012), professional satisfaction influences not only the organisation's profitability, but also its competitiveness. Competition is defined as an activity of individuals who seek to achieve the benefits that others want to gain at the same time and in the same conditions (Grzebyk & Krynski, 2011). Business competitiveness describes the ability of a business to regularly and successfully yield products or services that meet the requirements of an open market and enable the business to stay operational by gaining market share (Sipa et al., 2015), the ability to remain in the competitive, fair market for a long period of time (Fathi & Ahmadian, 2016).

According to Saari&Judge (2004), the product of factors determining the employees' satisfaction makes up the result of the enterprise's activities. Higher satisfaction of the employed contributes to their higher engagement and productivity. According to Mrówka (2010), job satisfaction is a motivator, which used as a management tool gives competitive advantage to managers and their organisations. In the case of small and medium-sized enterprises, due to their high heterogeneousness, there are many models of measuring their level of competitiveness. Among sets of factors taken into consideration in measuring the level of competitiveness, human resources are also enumerated (Stoner, 1987; Bambergera, 1989; Slevin & Covin, 1995; Chaston & Mangles, 1997; Chawla et al., 1997).

Judge & Kammeyer-Mueller (2012) and also Iaffaldano & Muchinsky (1985) indicated that higher job satisfaction contributes to lowering: the level of absence and rotation of employees, the number of reported complaints of job dissatisfaction. A satisfied employee performs their duties more diligently and with higher engagement (Reijseger et al., 2017), increasing organisational effectiveness (Hanaysha, 2016).

In the case of SME, the work environment is especially important (Sousa-Poza & Sousa-Poza, 2000; Gazioglu &Tanselb, 2006; Skalli et al., 2008). Without the work environment supporting engagement of employees, rotation thereof will increase and the productivity will decrease, which will lead to the worsening of the relations with customers and decreasing value for stakeholders (Swarnalatha & Prasanna, 2013). The organisation's management should maintain the achieved level of satisfaction or strive for a higher level and not to allow lowering this level. Higher satisfaction level of SMEs' employees decreases the risk of them leaving the company (Basma et al., 2017). High level of job satisfaction is achieved with flexible working hours, lower workload, proper approach to teamwork and management's support. Employees can become more engaged in their activities, more motivated to work hard, which can generate benefits for the enterprise in the long term. Thus, job satisfaction at

SMEs has a direct and positive impact on the internal entrepreneurship (Sehunoe et al., 2015). Job satisfaction is shaped by many factors, among which, the following are enumerated: systems of motivating and remunerating employees, communication, relations in the company, as well as the sense of permanence and stability of employment (Vlosky & Aguilar, 2009; Lewicka, 2010; Gros, 2012). Jun et al., (2006; Wyrwa, 2019) notice that in small and medium-sized enterprises employee trainings are significant for job satisfaction. However, one of the most important elements of the sense of job satisfaction is the remuneration (DeVaney & Chen, 2003; SHRM, 2017).

Methods and Materials

The aim of this study is to attempt indicating determinants influencing the professional satisfaction of employees of small and medium-sized enterprises in Poland. The research results presented herein are the fragment of the project witch concerned the issue of development of small and medium-sized enterprises in CEE countries. This project implemented in the period from February to July 2019. The conducted empirical research was of a quantitative character. Using the survey questionnaire as the research tool allowed a percentage combination of collected answers constituting subjective opinions of respondents covered with the survey. The survey questionnaire included questions on job satisfaction factors grouped into five areas. While assessing the factors affecting job satisfaction, relationships in the company, communication, systems of remuneration and motivating employees as well as a feeling of constancy and employment stability were analyzed.

All surveys were correctly completed and used during the research. The survey was completed by 209 employees from various companies. Due to the small sample size, the following results should be treated as a pilot study. For the purposes of this study, enterprises conducting business activity in Poland have been separated. Detailed characteristics describing the research sample have been presented in table no 2.

Table 2: Characteristics of the research sample

research sample = 209 (100%)		
Characteristics describing respondents participating in the survey:		
sex of respondents	Women	27.8%
	Men	72.2%
age of respondents	up to 25 years old	11.5%
	26-35 years old	16.7%
	36-45 years old	29.7%
	46-55 years old	34.0%
	over 55 years old	8.1%
education of respondents	Higher	37.3%
	Secondary	42.6%
	Vocational	20.1%
seniority	up to 5 years	11.5%
	5-10 years	14.8%
	11-20 years	46.4%
	21-30 years	19.1%
	over 30 years	8.1%
Characteristics describing enterprises covered by the survey:		
company size by number of employees	micro-enterprise (0-9)	48.3%
	small enterprise (10-49)	43.5%
	medium enterprise (50-249)	8.1%
Year of establishing the company	…-1989	21.1%
	1990-2000	23.4%
	2001-2010	41.1%

	2011-…	14.4%
The range of the company's activity (prevailing market)	national	16.3%
	local	39.2%
	regional	34.9%
	international	9.6%
Localisation of the company's registered office	urban municipality	54.1%
	urban-rural municipality	32.5%
	rural municipality	13.4%
Competitive position	very good	1.9%
	good	33.5%
	average	4.3%
	low	29.2%
	very low	31.1%

Source: own study

The following research question was asked: What are the main factors influencing the satisfaction of SMEs' employees in Poland? The research hypothesis has been formulated in the following manner: Satisfaction of SMEs' employees influences competitive positions of those companies.

Discussion and Results

At the beginning of the research respondents were asked if they feel satisfaction from performed work. As many as 72.7% of respondents answered "yes" and "rather yes", which has been presented in figure 1.

Furthermore, respondents were asked if they feel satisfaction from various aspects of their work. The assessment covered, among others, systems of motivating and remunerating employees, communication, relations in the company and the sense of permanence and stability of employment.

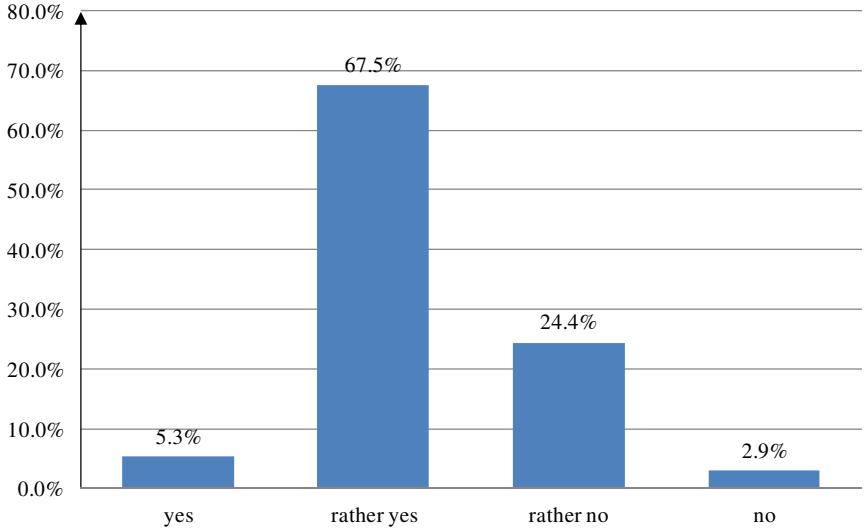

Fig 1. Satisfaction with the work performed

Source: own study

The basic issue studied in the research was the employees' satisfaction with motivation systems binding in a company (fig. 2). A lack of job satisfaction of studied employees from binding motivation systems is clearly visible. There were as many as 87.6% of negative responses and only 5.7% positive responses.

The employees' motivation system covers many various factors, which are to guarantee a properly high level of employees' motivation. It provides grounds for proper use of the human capital for the organisation's development irrespectively of the size thereof. Proper motivation may also contribute to the increase in innovative behaviours of employees and can translate into achieving better results and better competitive position of companies.

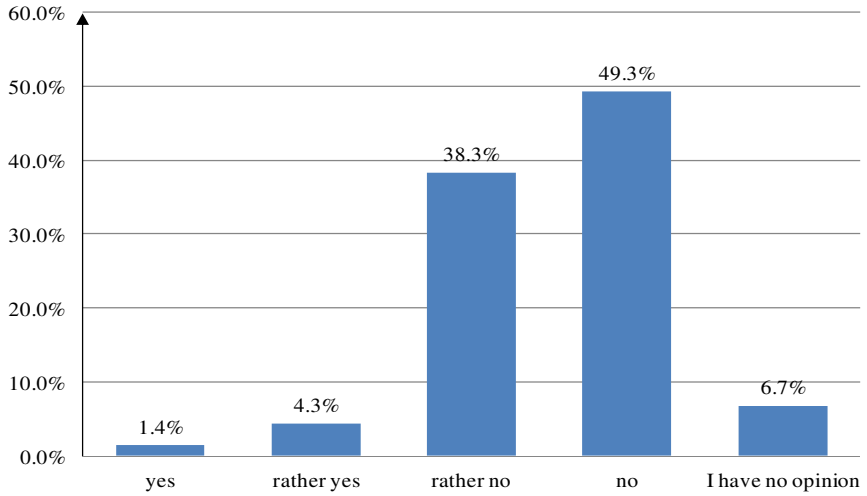

Fig. 2: Satisfaction with incentive systems in force in the company
Source: own study.

Motivation systems in companies were assessed with regard to selected elements that shape them (table 3). As can be seen in the studied SMEs, motivation systems are not only clearly defined, but also understandable. Whereas, the issue of direct motivation of employees by their superiors has positive implications. Every employee, irrespectively of a held position, expects the effects of their work to be noticed. Noticing small achievements, expressing recognition and respect constitutes a very important (though, not always appreciated) manner of cost-free reinforcement of motivation of employees. Work should also give an employee a possibility of development, that is, satisfy the need for self-development. It is an extremely difficult task for managers, since individual employees understand self-realisation differently. However, what is important is for work to give the employees the opportunity to use their potential and take the initiative (Sidor-Rządkowska 2004).

Table 3: Factors influencing the assessment of the satisfaction with the motivation system

Specification	Yes	Rather yes	Rather no	No	No opinion
The rules of the motivation system are clearly defined and understandable	0.5%	14.4%	47.8%	32.5%	4.8%
My superior motivates me to work better	7.2%	22.5%	47.4%	23.0%	0.0%
What I do is noticed at the company	3.8%	42.1%	31.1%	23.0%	0.0%
I am praised for good work	2.4%	43.5%	42.1%	12.0%	0.0%
The periodical assessment is used for planning my professional development	1.0%	1.0%	23.0%	67.5%	7.7%

Source: own study.

Satisfaction of studied employees with binding remuneration systems achieves a slightly higher level than in the case of satisfaction with motivation systems (fig. 3). In this case, there were only 19.6% of positive answers, which indicates a significant dissatisfaction with systems of remunerating SMEs' employees.

Currently, with generally low salaries in the SME sector, the majority of employees treat money as the main motivation measure. However, small and medium-sized enterprises often deal with financial problems and they cannot afford to motivate with higher monetary incentives, therefore, they resign from positive motivation to the benefit of negative motivation, that is, threatening what the employee has already achieved. It is often manifested with used threats.

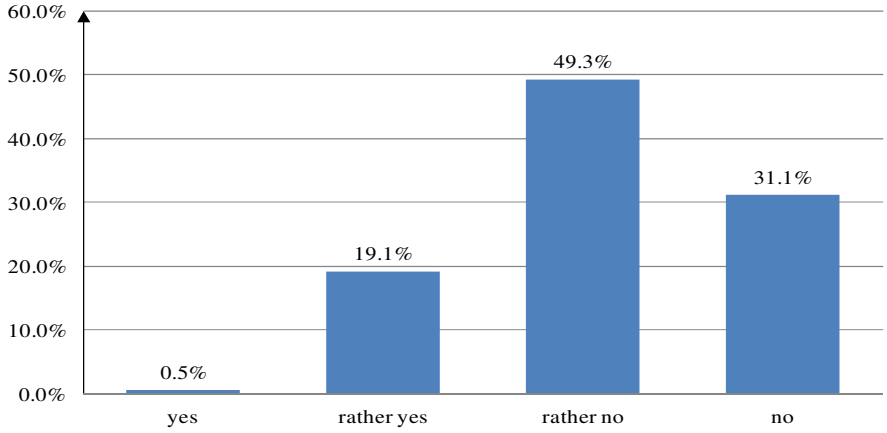

Fig 3. Satisfaction with the remuneration systems in force in the company
Source: own study.

The tactics of "threat-based motivation" is currently very popular. Implying that employees should be happy with the fact that they even have a job is a short-term solution, which works only in the case of employees with low level of education and low self-esteem. It results in the sense of the employee's frustration and performing duties at the lowest cost possible. In this situation, shortages in the scope of non-material motivation are especially visible (Smolarek, 2017).

Another issue studied during the research was the issue of feeling satisfaction with the amount of received remuneration (fig. 4). Over half of the respondents are not satisfied (61.2%) with the amount of received remuneration.

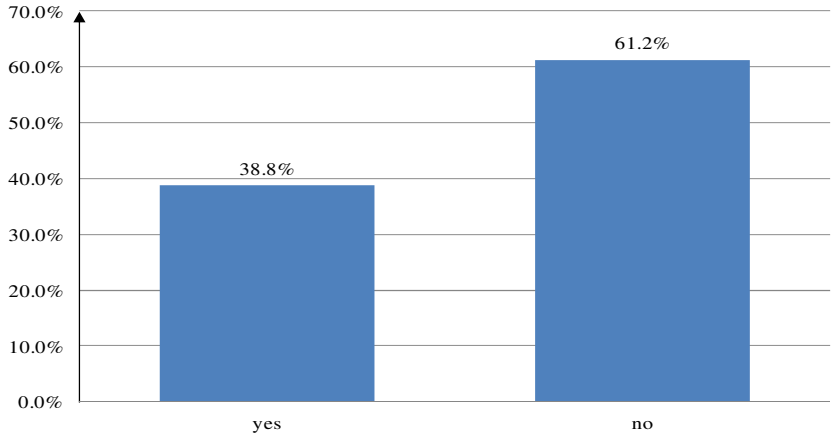

Fig 4. Employee satisfaction with remuneration received
Source: own study.

In the case of the remuneration, the respondents were asked to assess it in comparison with other economy sectors (fig. 5). Slightly over a half of respondents – 51.7% indicated that it is at a lower level. Only 17.2% of the respondents stated that it is at a higher level.

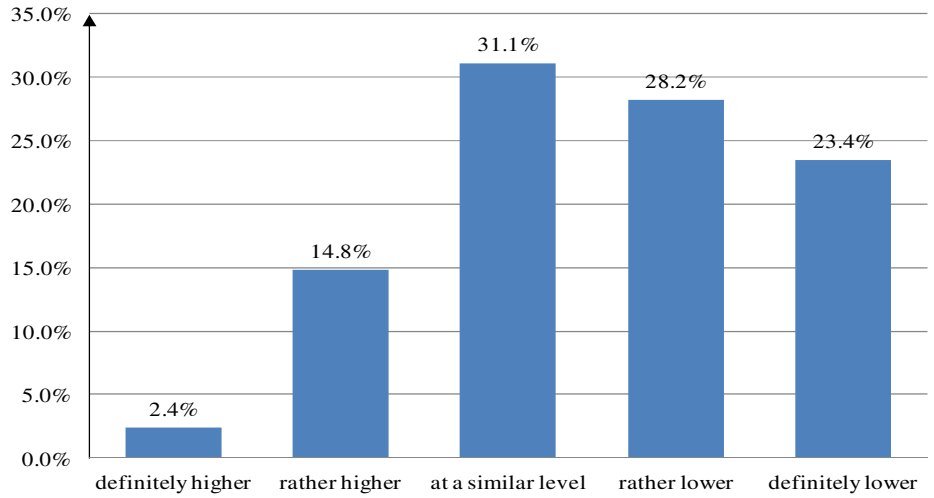

Fig 5. Salary assessment compared to other economy sectors

Source: own study.

Remunerations in companies were assessed with regard to selected elements that shape them (table 4). The basic problem of the majority of human resources managers and management specialists, especially in SMEs, consists in using obsolete human resources management tools e.g. in the scope of remuneration and connecting them incompetently with work results. These factors are often related to the dissatisfaction of employees, which disturbs the atmosphere and relations at work and influences lower work results, which is also proven by other research results (Dzieńdziora, Smolarek, 2016).

Table 4: Factors influencing the assessment of the satisfaction with the remuneration system

Specification	Yes	Rather yes	Rather no	No	No opinion
My remuneration is adequate to the effort made in performing duties	0.5%	13.9%	37.8%	47.8%	0.0%
Results generated by me influence the amount of my remuneration	0.5%	18.2%	52.2%	29.2%	0.0%
Improved skills are reflected in the amount of received remuneration	0.5%	5.7%	13.9%	79.9%	0.0%

Source: own study.

Each organisation should be characterised with an effective communication system and its internal atmosphere, since satisfied employees are able to deeply engage in the organisation's matters and, as a result, lead to full satisfaction of customers. Therefore, another studied issue influencing job satisfaction was the contentment with the communication at the company (fig. 6).

Communication in a company was assessed with regard to selected elements that shape it (table 5). Superiors' skills of communicating with subordinates have a significant impact on the in-house communication processes and effective implementation of changes thereto. As noticed by the respondents, the communication rules do not hinder the everyday work and employees do not have bigger problems with obtaining necessary information. Unfortunately, the company's mission and strategy are known to employees to a small extent. Also the issue of expressing their own opinions is problematic. Furthermore, employees do not have an impact on what is going on in a company.

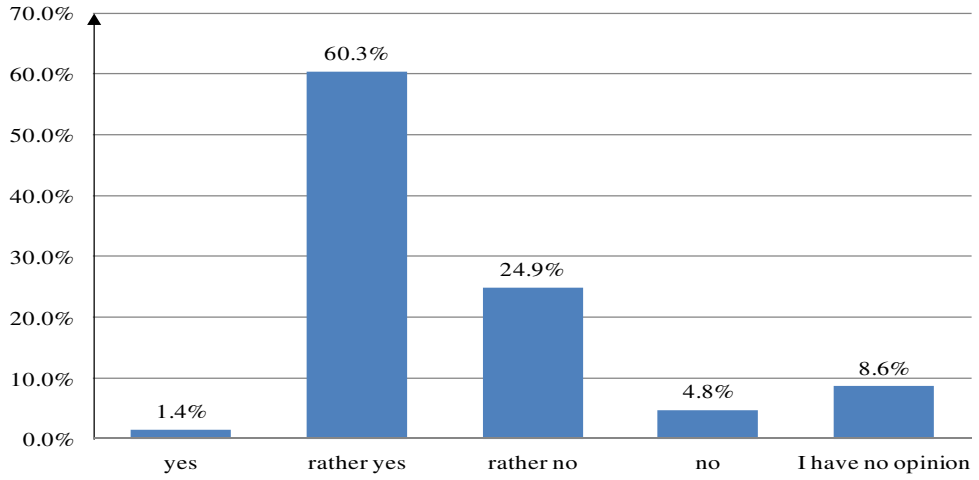

Fig. 6: Satisfaction with communication in the company

Source: own study.

Table 5: Factors influencing the assessment of the satisfaction with the communication in a company

Specification	Yes	Rather yes	Rather no	No	No opinion
I know the mission of the company for which I work	0.5%	15.8%	47.8%	35.9%	0.0%
I know the basic strategy assumptions of the company for which I work	0.5%	16.7%	51.2%	28.2%	0.0%
I am informed of the economic and financial situation, development perspectives and chosen directions of changes at the company	6.2%	15.8%	13.4%	64.6%	0.0%
Rules and procedures binding at the company do not hinder everyday work	11.0%	53.1%	31.1%	4.8%	0.0%
I control the course of my work independently	9.1%	41.6%	26.3%	23.0%	0.0%
I admit making mistakes without fear	1.9%	15.3%	45.0%	37.8%	0.0%
I have access to the information necessary to perform my duties	1.0%	42.1%	6.7%	50.2%	0.0%
I know, where I can find information necessary to perform my duties	1.4%	43.1%	26.3%	29.2%	0.0%
All information reaches me on time	1.0%	42.6%	8.6%	43.1%	4.8%
I can freely express my opinion on what is going on at the company	0.5%	12.0%	31.6%	50.7%	5.3%
I am convinced that I have influence on what is going on at the company	0.5%	5.3%	21.5%	66.5%	6.2%

Source: own study.

The relations in a company have been similarly, positively assessed by employees (fig. 7). As many as 68.9% of the respondents assessed these relations that way.

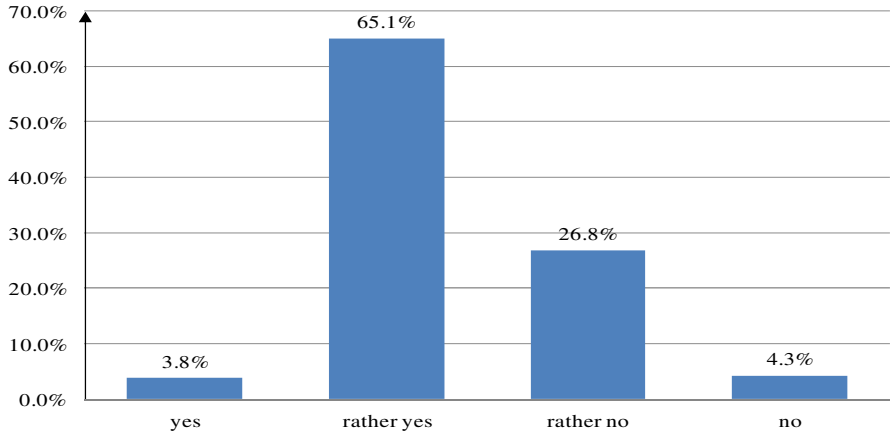

Fig. 7: Satisfaction with relations prevailing in the company

Source: own study.

Relations in a company were assessed with regard to selected elements that shape them (table 6).

Table 6: Factors influencing the assessment of the satisfaction with the relations in a company

Specification	Yes	Rather yes	Rather no	No	No opinion
I like the management style of my superior	5.3%	57.9%	33.0%	3.8%	0.0%
I trust my superior	6.7%	47.8%	18.2%	27.3%	0.0%
I receive support from my superior in the scope of performed tasks	5.7%	42.6%	21.5%	30.1%	0.0%
My superior is open to new suggestions and ideas	8.1%	52.2%	20.6%	19.1%	0.0%
It is possible at the company to openly express own ideas and opinions	10.0%	46.9%	19.6%	23.4%	0.0%
I can always talk to my superior about my professional problems	9.6%	38.8%	26.8%	24.9%	0.0%
I am not afraid to talk to my superior about difficult matters	8.6%	36.8%	33.0%	21.5%	0.0%
The superior gives criticism without participation of third parties	16.3%	68.9%	9.1%	5.7%	0.0%

Source: own study.

Job satisfaction is influenced by the employees' feelings regarding the permanence and stability of employment. This feeling among respondents is very high, since as many as 90.9% indicated occurrence of this factor in their professional work (fig. 8).

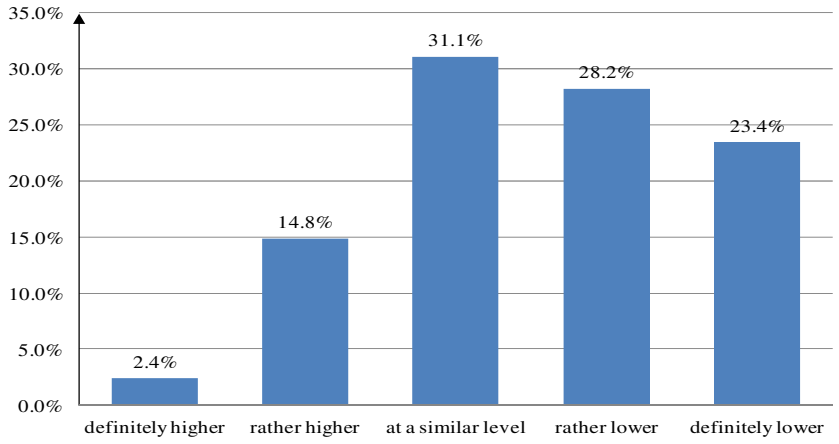

Fig. 8: Workers' feeling of constancy and job stability

Source: own study.

Verification of the research hypothesis. In the further part of the analysis, employees' job satisfaction has been analysed in the context of the enterprise's competitive position according to the opinions of respondents. To this end, the sample has been divided into two groups: first group includes respondents, who assessed that the competitive position of their companies are good or very good, and the second group includes respondents assessing the competitive position as average, weak or very weak (fig. 9). The first group included 74 respondents, whereas, the second group - 135.

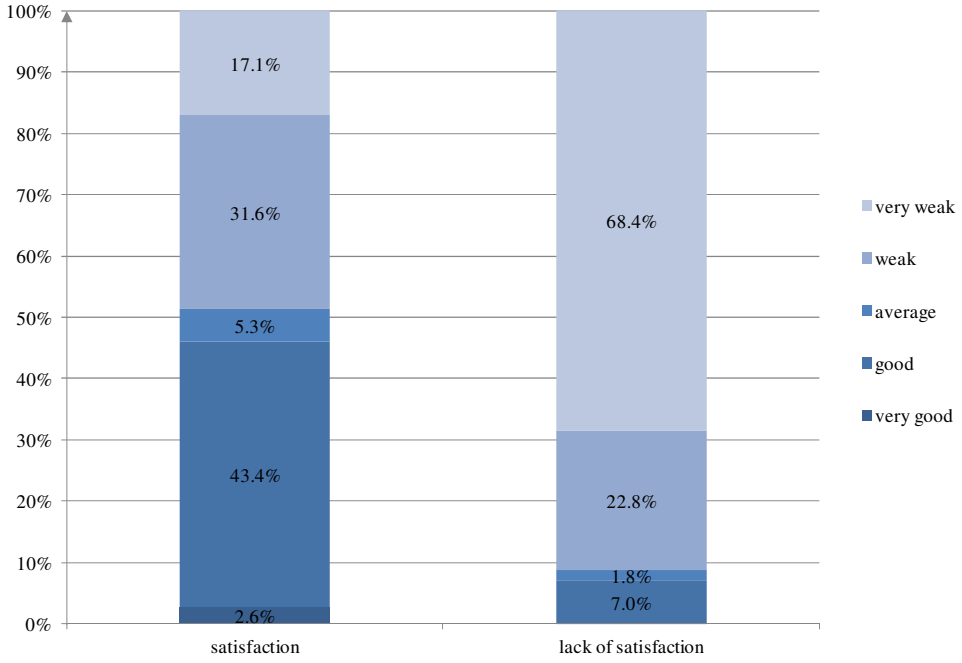

Fig. 9: Job satisfaction vs competitive position of the enterprise in the employees' opinion

Source: own study

The following assumptions have been made:

- H_0: structure of the level of job satisfaction in the sample and in both groups is the same (non-significantly different),
- H_1: structure of the level of job satisfaction in the sample and in both groups is not the same (is significantly different).

As a result of the conducted calculations t_e=3,82. Having verified that $t_\alpha < t_e$, at the level of significance of α = 0,05, the assumption H_0 (structure of the level of job satisfaction non-significantly different) is rejected, that is, structure of the level of job satisfaction is significantly different. Therefore, the structure of the level of job satisfaction has an impact on the group with the good competitive position and weak competitive position, and is significantly different. Studying the similarity of structures is difficult in the case of fragmentation of the feature and requires in such a case applying the structures' similarity indicator, which, in this case, amounted to 0.53, which proves the lack of similarity of studied structures. Moreover, the results of selected tests concerning the verification of the assumed research hypothesis on the grounds of methods based on testing parametric hypotheses, in particular, testing equality (difference) of means, have been presented in table 7. Thereon, it can be stated that the level of job satisfaction influences the competitive position of small and medium-sized enterprises.

Table 7: Test values (F_e, t_e) and critical values (F_α, t_α from tables) in tests of equality of means and tests of equality of variances

Specification	Value
Value F_e	1,146
Value F_α	1,642
Value t_e	4,498
Value t_α	1,972

Source: own study

Values of correlation coefficients have been presented in table no 8. These results prove the clear correlation between the competitive position and job satisfaction of the company's employees.

Table 8: Values of correlation coefficients

Specification	Value
χ^2_e with the level of significance of α = 0.05	14,618
χ^2_α with the level of significance of α = 0.05	3,841
φ – Yule	0,264
r_{AiBj}	0,264
Q-kendall	0,714

Source: own study

While summing up the received results, it can be stated that the higher the level of job satisfaction, the better the company's competitive position.

Conclusion

Employees' satisfaction has an immense significance for the functioning of the whole organisation irrespectively of the size thereof. It translates both, into the results and development of the company, therefore, the issue of job satisfaction becomes the aim and, at the same time, the measure of organisational effectiveness. Satisfied employees are especially valuable due to the initiative taken by them, loyalty to the employer, favourable atmosphere at work created by them and significantly lower level of absence. The increase in the work effectiveness is one of the most desirable results of the

professional work, as it leads to increasing effectiveness of the whole organisation and thus, influences the achieved competitive position.

Employees of the studied SMEs feel satisfaction from performed work, but they assess factors influencing this satisfaction differently. One may notice positive assessment of the communication system, relations in companies and the sense of stability and permanence; whereas, it should also be noticed that, while the communication rules do not hinder everyday work and employees do not have bigger issues with obtaining necessary information, the company's mission and strategy is, unfortunately, known by employees only to a small extent. Also the issue of expressing their own opinions is problematic. Furthermore, employees do not have an impact on what is going on in a company. Also, relations in companies and the sense of stability and permanence of employment were positively assessed by employees. Simultaneously, the analysis of research results indicated negative assessments in the scope of binding motivation systems and remuneration systems of SMEs' employees.

The research results also allowed indicating a relation between employees' satisfaction and the competitive position of those companies; whereas, the higher the level of job satisfaction, the better the competitive position of the company. Professional satisfaction does, in fact, translate into engagement in work, employees' loyalty, trust in the organisation, customers' satisfaction of the organisation, as well as creativity and innovativeness, which, in turn, leads to better results of the whole organisation (Sipa, 2018; Sipa 2019).

To sum up, it is worth ensuring maintenance thereof at a high level, since high work results are identified with employee's satisfaction. The significance of satisfaction is also manifested in the fact that it influences attitudes towards work, profession and organisation, being an important component of employees' competence potential. Therefore, taking care of maintenance of the professional satisfaction of SMEs' employees at a high level may, in consequence, lead to strengthening the employer's role on the market and increasing the company's competitiveness.

Limitations

The basic limitations of the research include: dependence of conducting the research on the voluntary cooperation of respondents and limitation of the research to selected factors of job satisfaction. At the same time, searching for factors conditioning job satisfaction is hindered by, among others, personalised attitude of employees to entrusted duties and individual job satisfaction.

Perspectives

While considering in details the factors conditioning achievement of satisfaction, studies could focus on, among others: particular workplaces, characteristics of work, type and character of activity conducted by the employer, as well as respondents' age, gender, life situation etc. Therefore, further research could focus on better recognition of the process of shaping the employee's satisfaction and thus, on the attempts to specify the influence of the level of employee's satisfaction on their behaviours. The scope of such research could be interesting, yet, vast.

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Environmental Disclosure, Earnings Management and Share Prices of Quoted Firms in Nigeria

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Abstract

This paper examines two discretionary activities utilized by managers to influence share prices. These discretionary activities are referred to as environmental disclosure and earnings management. In a sharp contrast to earlier studies, the study's goal is to ascertain the influence of environmental disclosure and earnings management on firm share prices. The study adopts agency and signalling theory in providing a theoretical background to explain the relationship. The ex-post facto design was employed, which involved 70 non-financial firms for a 7-year period from 2011-2017. The study utilised a panel regression analysis to analyse the data and found environmental disclosure was positively related to firm share prices while earnings management appeared to have an inverse relationship. The results have implication for the signalling theory as well various stakeholders who wish to understand the dynamics surrounding the firm's share price. The findings also suggest that investors in developing economies are well-informed about earnings management activities. The study recommends mandatory reporting of environmental information as well as improved standards to minimise earnings management and enhance earnings efficiency.

Keywords: Accounting; Disclosure; Environmental disclosure; Earnings management; Panel regression; share prices; Nigeria.

Introduction

Accounting research on the capital market has developed over time with the utilization of accounting fundamentals that can affect share price behaviour. It is well established that the share price reacts to information released especially earnings announcements, which result in a huge impact on the price of a company's stock. In this light, researchers, investors, the academia and other stakeholders have in recent times given increased attention to information relating to earnings and corporate disclosures. This appears logical considering non-financial disclosure is beginning to also generate stock market reactions. In addition, market participants have become increasingly sensitive to investors sentiments, financial, non-financial information and indeed any other type of information that can cause reactions in the market.

Corporate annual reports still remain a veritable tool for obtaining information on firm performance. Therefore, the corporation's reported earnings are retained to satisfy management's interest and ensure it attracts investment (Nuryaman, 2013). Managers are thus encouraged to exploit accounting rules to provide the investors with a good image of the business (Butt, Rehman, Khan, & Safwan, 2010). Managers, also influence the behaviour of their company's share prices by the use of earnings management tools. Earnings management (EM) is said to occur when management employ their discretion in preparing the annual report such that they are able to conceal the true economic situation of the firm in an attempt to profit from the purported numbers (Healy & Wahlen, 1999; Uwuigbe, Uwuigbe & Okorie, 2015). A well diverse board is recommended for better quality in financial reporting and timeliness. (Uwuigbe, Damilola, Uwuigbe, Teddy and Irene, 2018). The board attributes also have a role to play in reducing the activities of EM (Obignemi, Omolehinwa, Mukoro, Ben-Caleb & Olusanmi, 2016).

Environmental disclosure refers to information regarding environmental activities made available at the discretion of managers. In developing countries, there are usually little or no regulatory requirements. According to Caroll (1999), environmental disclosure refers to commitment to making contribution towards the environment. Organizations disclose environmental activities in other to improve their reputation. They promote their environmental friendly actions to attract the interest of stakeholders (Lyon & Maxwell, 2011).

Environmental disclosure (ED) and earnings management (EM) have been described as opportunistic behaviours or variables utilized by managers to influence performance (Chih *et al,* 2008; Orlitzky, 2013; Muttakin, Khan & Azim, 2015).

Several publications in the last few decades have attempted without success to arrive at a consensus on the stock market reactions and activities. These studies have utilized macroeconomic determinants, technical analysis, fundamental analysis or models (Ita & Joe, 2013; Muhammed & Luqman, 2013; Onakoya, 2013; Orlitzky, 2013; Cyprian, 2017; Osaze & Nosakhare, 2017). The decision by a significant number of investors (usually termed irrational investors) on which stocks to acquire is influenced by bias or perception (Ambrose & Vincent, 2015; Orlitzky, 2013). Hence, the traditional finance theories have failed to sufficiently explain the pattern of share price movement for these irrational investors. This suggests a limitation of earlier studies and the gap in explaining share price movement.

A plethora of earlier studies have examined environmental disclosure and share performance (Aggarwal, 2013; Bowerman &Sharma, 2016; Odetayo, Adeyemi, Sajuigbe, 2014; Uadiale & Fagbemi, 2012; Uwalomwa & Egbide, 2012). Some other studies have examined Earnings management and share price behaviour (Chan, Jegadeesh & Lakonishok, 2006; Cahan, Emmanuel & Sun, 2009). A noteworthy deficiency in the literature is that the collective influence of environmental disclosure and earnings management on share price activity is yet to be sufficiently evaluated by prior studies.

Furthermore, this study aims at discovering the implied effects of environmental disclosure and earnings management on share prices. The significance of this study stems from its ability to enable managers understand the impact of the opportunistic behaviours (environmental disclosure and earnings management) on share prices considering the opportunity cost between the concerned variables. The study extends the frontiers of knowledge on market efficiency by combining these variables to ascertain their role in influencing share price behaviours. The remaining part of the paper is organised in this manner. The review of literature and hypothesis development is discussed in Section 2. Section 3 presents a breakdown of the methodology adopted. Section 4 reports and analyses the findings emanating from the analysis. Finally, section 5 concludes and provides recommendations.

Literature Review and Hypotheses Development

Environmental Disclosure

Environmental disclosure is an umbrella term that described diverse ways by which firms report their environmental impacts to the stakeholders. Corporate environmental disclosure or reporting is an instrument for communicating a firm's performance in terms of environment activities. According to Crowther (2002) the primary purpose of environmental disclosure is to examine and incorporate in the company annual reports, issues that bother on environmental hazard that are not taken cognizance of in traditional accounting. This information is utilized by stakeholders in decision making. Disclosure of corporate environmental activities highlight the necessity for a close monitoring of natural resources and the corporation's harmful effect on the society it operate.

The United Nations (UN) published the Systems of Integrated Environmental and Economic Accounting (STEEM), in 1993, spelled out guidelines and procedures for environmental accounting. The STEEM came after several efforts by UN, World Bank and European Union (EU) and other international organizations to develop a uniform framework and methodological approach to environmental accounting. Zakimi and Hamid (2004) posit that environmental disclosure is used by firms to express to the public the cost implications of their activities, which has impacts on the society.

Hassel *et al.,* (2005) singled out two perspectives on the financial and environmental performance link. The first perspective is the cost-concerned perspective which purports that extreme environmental impacts demand high monetary costs and will thus result to a reduction in the reported earnings and overall market value. The second perspective referred to creating worth. This perspective opines that environmental (green) approaches embarked upon by firms translates to an edge for the organisation over its competitors, which increases the pecuniary worth of the firm. The work of Hassel *et al* (2005) examined the relationship between market value and overall environmental performance. The study using a sample of 71 companies listed on the Swedish stock exchange found that environmental efficiency and equity value are inversely related. Therefore, it was seen that firms rated high in terms of environmental activities are not well rated by stakeholders. This is because firms that perform well environmentally attract huge cost and have an inverse effect on the reported earnings and overall market value.

Gozali, How and Verhoeven (2002) also examined the benefits of environmental disclosure in improving corporate value. Data for the study involved a collection of financial reports of top 500 firms quoted in the Australian Stock Exchange. The list of disclosing firms was arrived at after exploring the available annual reports for the period of January 1998 to December 2000. The results indicate that firms that have positive information to show perform a lot better than those firms that have little or nothing to disclose.

Aggarwal (2013) carried out a review on the association between environmental performance and profitability. The study revealed that most of the prior research found a positive association. King and Lenox (2001) conducted an investigation on the link between environmental performance and profitability performance measures. The research made use of a sample of 652 manufacturing firms quoted in the US covering a time frame of 10 years from 1987 to 1996. The study found profitability to be related to pollution reduction. There was also evidence to show that companies operating in

alleged cleaner industrial sectors have higher values for Tobin's Q, even though the study failed to control for corporate attributes. The result revealed a positive association between going green and profitability.

Flammer (2015) examined CSR and stock prices of quoted firms in the United States from 1980 to 2009. The study found firms that had been seen and perceived to have executed their operation in an environmentally friendly manner had a boost in their stock prices. The study utilized event study methodology and regression-based approach to analyse stock data obtained via relevant press coverage of wall street journal.

Cormier and Magnan (2007) presented arguments showing the association between environmental performance and financial performance to be contingent on the structure of the regulatory environment the company has to deal with. The data collected comprised 237 observations made up of French, German and Canadian firms. The result of the investigation revealed that the reporting context experienced by the firms affected the nexus between their stock performance and corporate social environmental disclosure. Jacobs *et al*., (2010) set out to identify catch words generally used in announcing environmental efforts, rewards, moves and certifications displayed in various publications in US and within Europe. The study covered 780 announcements for 340 distinct organisations. It was discovered that there were no signals from the market with respect to announcements tied to aggregate Environmental Initiatives exercised by corporate entities as well as awards and certifications for environmental activities. A number of cases of reactions occurring for certain CEI and EAC subgroups. In specific terms, announcing the donation of gift items to aid the pursuit of environmental causes are positively related to the occurrence of market reaction, voluntarily reducing emissions are related to an inverse reaction from the market, on the other hand, ISO 14001 environmental certifications provides for positive reaction in the market. In summary, it can be said that the market selects in the manner it reacts to announcements of environmental concerns. This relationship can be regarded as mixed or not significant.

The work of Gonzalez-Benito and Gonzalez-Benito (2005) investigated a sample of 186 firms in the industrial sector selected from a pool of 50,000 largest firms as provided by 2002 Dun & Bradstreet census possessing over 100 employees in their payroll. The research showed no association between proactiveness on environmental concerns and performance of business. The study opined that environmental consciousness and environmental activities embarked on by management could put the firm at an advantage over its competitors although some of these activities could influence the performance of the business negatively. On a final note, there was no proof to back up the claim that environmental proactivity thus enhances profitability in the short term.

Bramer, Brooks and Pavelin (2006) examined the association between CSP and stock market returns in the UK. The study utilised a number of items that aggregate into indicators that capture efforts towards the environment, employee welfare and community supporting activities, the study findings reveal that firms performing better with regards to their social performance scores achieved a much lower return, while those firms having extremely low of zero were outstanding in the market. The work of Benlemlih *et al*, (2016) investigated environmental and social performance and financial risk using data gathered in the UK. The results reveal that firms that made higher environmental and social disclosures exhibited distinct competitive advantages. These advantages included better recognition in terms of their contributions to the environment and society in general. In addition, maintaining a genial relationship with stakeholders which has an inverse relationship to the company's idiosyncratic risk.

Hamilton (1995) shows a significant inverse abnormal earnings for firms having toxic release inventory (TRI) emissions at the time of initial disclosure. Konar and Cohen (1997) observed that the companies having large reaction to the TRI disclosed also experienced large reduction in emissions in the subsequent years. Konar and Cohen (2001) employed the same measurement of environmental performance as the previous study and found that, a below par environmental performance inversely affects the value of the firm's intangibles.

Therefore an insight into the literature shows that most existing literatures have shown stock price and environmental disclosure to be positively related though there have been instances of negative, mixed or inconclusive results. In line with these discussions, the study hypothesises thus:

H_1: environmental disclosure has a positive effect on share prices

Earnings Management

The effect of earnings management (EM) on share prices has been discussed at international gatherings in recent decades. A study by Gill, Biger, Mand, and Mathur (2013) on firms listed in the manufacturing sector the Bahrain Stock Exchange (BSE), highlighted the effect of increasing EM on the profitability of the firm in the subsequent period and the resultant decline in the price of the stock in future periods as a consequence. They argue that investors have greater urge for shares that exhibit positive in relation to shares that exhibit negative earnings surprises varies with time. However, the study had methodological limitations in that it only utilized a small sample size.

Tabassum, Kaleem and Nazir (2013) carried out a study on the Manufacturing sector in Pakistan. The research studied the impact of real earnings management on subsequent profitability of the firm. The result found out that real activities manipulation and future financial performance relationship is negative. Hence, firms with steady increased earnings do not necessarily translate to better compensation for stockholders. This work was centered on the manufacturing sector and failed to utilize the panel regression, which has both periodic and cross-sectional dimensions. In addition, account for explicit individual-specific heterogeneity Similarly, the study of Tang and Williams (2014) found an inverse association between earnings manipulation and share prices.

An avalanche of previous studies has revealed another methodological limitation in the statistical technique adopted for measuring EM. Some of these studies failed to adopt robust statistical techniques like the Panel Regression analysis which is multidimensional in nature with both time or periodic dimension and also cross-sectional dimension. In addition, some of the studies failed to take account of individual-specific heterogeneity, and eliminate collinearity. For instance, Nuryaman (2013) examined the effect of EM and the return of stock as well as the role of auditor quality serving as a moderator. The study utilized a multiple regression analysis based on 149 manufacturing based companies quoted on the Indonesia Exchange in 2010. He stated that it was observed that earnings management has an inverse relationship with stock returns. The reliance on accounting information by stakeholders in the valuation of stocks encourages managers to influence earnings upwards to boost the share price. Management therefore pays attention to the response by participants when EM is discovered.

The work of Oraby (2017) which involved a sample of 113 companies quoted in Saudi Arabia Exchange market cutting across five years from 2012 to 2016 employed a panel data structure and panel regression analyses which revealed that accounting accrual-based EM was not significant on share price. Furthermore, investors in the Saudi Arabia capital market are knowledgeable enough not to allow the impact of Management manipulating real activities in an attempt to enhance income affect the net income of the firm. However, it was observed that the investors were knowledgeable about this feat and reacted by shrinking the earnings value.

Hashim, Salleh and Arif (2013) on the reasons why director manage earnings noted that directors are interested in the benefits of the company. They try to meet market expectations and show interest in corporate reputation. Yang, Chi and Young (2012) documents that the practice of manipulating earnings in China is influenced by shareholders holding majority of shares. They found that

management feel obliged to attain projected earnings as the market does not reward companies that do not meet such target.

Some other studies either utilized multiple regression analysis or survey method to assess the association between the practice of manipulating earnings and stock market behaviour. However, these studies are not recent and were done in more advanced economies such as the United States. For instance, Chan *et al.,* (2006) examined the relationship between Earnings Quality and Stock Returns. The sample consisted of quoted firms listed in the New York Stock Exchange, American Stock Exchange (AMEX) and NASDAQ markets. However only domestic, primary stocks were considered (including observations at the tail end of April between 1971 and 1995). The authors carried out the study on both US and UK stocks using Regression analysis and observed that poor reported earnings are associated with future returns.

Similarly, Sloan (1996) investigated whether information on Stock prices is fully reflected in Accruals and Cash Flows on subsequent earnings. The study documents that the level of standardized accruals is inversely associated to abnormal returns in the subsequent year. Hence the market tends to overreact to earnings with large accrual component (whether positive or negative accrual). When the market learns that reported earnings of the previous year are not real or cannot be sustained, the overreaction is subsequently reversed. His conclusion that shares with high positive (income-increasing) accrual in a particular year exhibits lower returns in subsequent year.

According to Graham *et al*., (2004), achieving or even going beyond targets is crucial. Their study involved a survey of 401 executive officers regarding indicators that could possibly influence the extent of reported earnings and disclosures in the organisations they operate. The study noted that management presented a trade-off between the short-term target to "deliver earnings" and the future objectives of embarking on investment decisions that increase value. In addition, management are of the opinion that arriving at earnings target provides for a credible position in the market and thus leads to a positive share price and increases the management team's external credibility. Management are always striving to catch up with and even surpass earnings standards to gain stance in the capital market amidst their competitors; to have a steady or even surpass share price; and boost the reputation of its management team in the eyes of the outside world. The findings revealed that 78% of the management staff surveyed showed an intention of sacrificing its economic value to manage outsiders' perception. In other words, poor performing firms face the temptation of utilizing earnings manipulation to meet market expectations (Wokukwu, 2015).

Park and Jung (2017) examined the relationship between the ability of management and the risk of future crash in the stock price in Korea. The study noted that the influence of managers is usually powerful in Korea when comparisons are made with more advanced countries. This is because management and ownership are usually the same in Korean firms. A sample involving 3944 listed firms' observations for the period of 2002 – 2014 utilized a logistics regression analysis which revealed a negative relation between managerial ability to disclose and subsequent stock price crash risk.

Consequently, there has been heightened interest in the quality of firm's earnings. (Chan *et al.,* 2006; Darjezi, 2015; Machdar *et al.*, 2017). Chapman and Steinburgh (2010) examined earnings target and the various marketing expenses used to arrive at it. The study which utilized the OLS and Logistic regression model involved data collected between 1985 and 1988 which revealed that managers sacrifice the long run earnings for the forecasted earnings. In other words, they found an inverse association between manipulation of firm's expense and future performance.

In another research on Impact of EM on Stock Returns, which was carried out on publicly listed firms in Philippine covering a five - year period (2009 – 2013). Cruz and Luiz (2015) found out that EM does not significantly affect short-term stock returns. Wokukwu (2015), using the plethora of literature found out that firms manipulate the market price by inflating profits via EM. The work of Luiz and Cruz, 2015 also revealed that investors see through real earnings management practices. Based on this literature, it can be inferred that the link between the practice of EM and Stock Market Behaviour is strongly connected to the reputation of these firms in the capital market or shareholders' perception. Following from the discussions above, the following hypothesis is specified

H_1: earnings management has a negative effect on share prices

Theoretical Framework

The foundation and structure of this research is premised on the Agency and Signalling theory. Jensen and Mecking (1976) defined the type of relationship existing in an agency theory as a contract under which one party (the principal) hires another party (the agent) to perform a certain service on their behalf. As part of this, the principal will delegate certain decision-making powers to the agent. Nevertheless, issues with the firm occur because of the difficulty of contracting ideally for every possible action of an agent whose decisions affect both his own welfare and the welfare of the principal. The big question therefore is how to convince the agent to act in the best interests of the Principal. There is no gain saying that information unevenness exists between the two parties. Similarly, the primary focus of the signalling theory is to reduce unevenness between concerned parties. (Spence, 2002). Spence demonstrates this theoretical concept by utilizing the labour markets to explain the manner in which job seekers with higher educational qualifications embellish their resumes to distinguish them from less qualified job prospects. This pattern creates a signal to employers on the suitability of the candidates. Thus reducing the information unevenness that obstructs the selective ability of employers.

In line with Jensen and Meckling's Agency Theory (1976), the management's most common goal is to maximize shareholder capital that should be expressed in the firm's valuation. The stock price could be seen as one of the primary objective measures of how effective management is in achieving this goal. Particularly, in situations where managers of bonus plan is tied to the performance of the firm's market value, managers have very high incentives to more likely choose procedures in accounting that improve reported earnings in the current period (Watts & Zimmerman, 1990) and thus improving investors demand for the firm equity, which pushes up the stock price values. In addition, such managers are likely to employ accounting methods that increases the income of the current period when their bonuses is tied to it (Setyorini and Ishak, 2012). Capital market motivation for earnings management is to generate positive stocks price increases by manipulating disclosed accounting information to reflect investor's preferences (Healy & Wahlen, 1999). Thus managers have the opportunity to exploit reported earnings which are released to pose the firm as a "delight to investors" and hence heighten the demand for the firm's stock prices which then increases the firm market value

Also, Following the Signalling theory attributed to Spence (1973), several scholars have premised the relationship between environmental disclosure and share price using the theory. King *et al*., (2005) argues that the practice of ED transmits a signal that conveys a firm's unobservable characteristics to stakeholders and investors. In this regards, ED could pass as a sign that presents more information to stakeholders concerned, particularly in developing countries. The adoption of CSER activities satisfies two criteria for a good signal (Spence 1973). Firstly, it requires a huge financial burden to engage in CSER behaviours for poor performing organisations than for better performing organisations. Secondly, the reward margin for organisations engaging in CSER is only adequate to cater for the expenses of high-performing organisations.

A firm that carries out CSER practices sends signals to stakeholders concerned that the internal qualities that provides the firm the capacity to fill institutional voids and satisfy the general society (Miller et al. 2009; Rivoli & Waddock 2011). If the stakeholders consider these qualities to be important, then stakeholders concerned could increase investments in the organisation that have taken to CSER practices (Ramchander *et al.,* 2012). Prior research have shown that by carrying out CSER, firm signal to stakeholders and hence these entities demand positive responses from the investors in the capital market, which can improve the firm's stock price (Luo *et al*., 2014)

Methodology

The study employed the ex-post facto research design which involves the researcher predicting the possible causes behind an effect that has already occurred. The design is suitable considering this research intended in finding the effect of environmental disclosure, earnings management on share prices. The sample comprised 70 firms randomly selected out of a population of 112 companies quoted on the Nigeria Stock Exchange for the period 2011-2017. This period was chosen because of the improved disclosure in financial reporting as a result of the issuance of the code of corporate governance in Nigeria in 2011 and the adoption of International Financial Reporting Standards in 2012.

This study argues that the behaviour of share prices cannot be accurately predicted using the traditional finance theories, hence certain accounting information on opportunistic behaviours by managers are required to further explain the pattern of share price. The information is contained in environmental disclosure and earnings management. Analyses of panel regression are used to check the hypotheses of the sample given that the collected data has elements of both the cross-section and the time series. The utilization of panel data has several advantages over cross-sectional and time series data. In particular, panel data enables the estimation of consistent parameters while controlling for non-observable cross-sectional heterogeneity, thereby avoiding biased results (Ahn, Lee & Schmidt, 2013). The use of panel data also allows for more insightful data, addresses the problems of multicollinearity among variables, greater volatility, greater degree of freedom and, in general, greater efficiency (Baltagi, 2005; Rustam, Rashid, & Zaman, 2013).

In addition, this statistical technique more efficiently measures effects that are not detectable in pure cross-sectional or time series data (Baltagi, 2005). The data is sourced from the annual reports of the sampled companies. Secondary data sourced from the annual report of selected quoted companies are utilized. Secondary data from annual reports of the quoted companies is preferred because in addition to providing the researcher with already audited corporate information, it has been described as a reliable and consistent medium in communicating with shareholders (Belal, Abdelsalam & Nizamee, 2015). Specifically,data on share prices is collected from the Nigeria Stock Exchange fact book. Data on environmental disclosure is collected from the director's report, environmental reports and governance reports, while data on EM, firm size and profitability are acquired from the entities financials and NSE fact book.

Research Model

The empirical analysis involves estimating the relationship between environmental disclosure and earnings management on share prices. The study also included some variables (firm size and profitability) that have been found in the literature to be related to share price to serve as control in the model. The functional specification of the share price model is as seen below:

SP=*f* (ED, EM, FSIZE, PROF)……..1
The explicit form of the model is expressed in equation 2 as follows
$SP_{it}=\beta_0 + \beta_1 ED_{it} + \beta_2 EM_{it} + \beta_3 FSIZE_{it} + \beta_4 PROF_{it} + \mu_{it}$.....2

Where
SP= share price
ED= environmental disclosure
EM= earnings management
FSIZE = firm size
PROF= profitability
μ is Error term that represents other independent variables that affect the model but not captured.
t is year or period
i is firm
β is the intercept

Measurement of Variables

The dependent variable share price is measured using the market price per share (Omoike, *et al.,* 2018; Ohlson, 1995). The independent variable of environmental disclosure is measured using content analysis disclosure index approach. This approach is selected because it is a valuable research technique for gathering and analysing environmental data. It measures the reporting value from the size of disclosure reported on specific topics or categories (Beattie, Mcinnes & Fearney, 2004). The study utilizes an unweighted disclosure index which incorporates a nominal coding scheme in quantifying the reporting of environmental facts in corporate annual reports (Hanniffa & Cooke, 2002, the 2005). A checklist is adopted and followed to allow for replicable performance of content analysis. The research adapts the Haniffa and Cooke checklist (2005) to suit the Nigerian case. The environmental disclosure index contains 3 items (environmental information, sustainability information and health & safety information). Where a firm report on a particular environmental item, a score is given. A maximum score of 3 is given to a company that reports on all 3 environmental items and a minimum score of zero to a company that did not report on any environmental item.

Dechow, Richardson and Tuna (2003) suggest "that a very common model for estimating discretionary accruals (DISAC) is the modified Jones model (MJM). They assert that DISAC clearly displays manipulation of earnings. and that companies with high DISAC earnings get lower future earnings and less future return on stock. Hence DISAC are obtained as follows:

DISAC is ToACC – NDISAC
ToACC is NDISAC+ DISAC
Where ToACC is Total accruals
NDISAC is Non-Discretionary Accruals
DISAC is Discretionary accruals
$ToACCit = a (1/ASSETSit -1) + a_1 (\Delta REVit - \Delta RECit) + a_2 GPPEit + \mu it$
Where ToACCit is the sum of accruals in year t for firm i
Δ REVit is revenues in year t -1 for firm i deducted from revenues in year t
ΔRECit is receivables in year t less receivables in year t -1 for firm i
GPPEit is gross property, plant and equipment in year t for firm i
μit is error term (residuals) in year t for firm I"

The control variable of firm size is assessed using the natural log of total assets (Ugwuanyi & Ibe, 2012) while profitability is measured using the ratio of return to total assets.

Results

Descriptive Analyses

Table 1 presents the descriptive statistics for the dependent variable share prices (SP) alongside the independent variables of environmental disclosures (ED) and earnings management (EM) as well as the control variables of firm size (FSIZE) and profitability (PROF). From table 1 below, the mean for the share price is 37.79, with a standard deviation of 126.32. The standard deviation is a sign of volatility in the stock prices data. The price of the share ranges from a minimum of 0.5 to a maximum of 1555.99. The quality of environmental disclosure is based on the index as used by Haniffa and Cooke (2005) which has been modified to suit the Nigerian context. On the average, the degree of disclosure on environmental issues by the sampled companies is 0.43 (43%). The mean value for earnings management as captured using discretionary accruals is -0.07 with a standard deviation of 0.13 also suggesting stability of the data. The description of the control variables are also shown in table 1. The mean for firm size (FSIZE) as measured using the log of total assets is 7.12, with a standard deviation of 0.78. The assets amount range from the minimum of 5.4 to a maximum of 9.2. The mean total asset is comparable to Che-Ahmad and Osazuwa (2015) that reported a mean total assets of 7.65. The average value for profitability is 0.03, with a standard deviation of 0.11, ranging from the minimum of -0.53 to a maximum of 0.54.

Table 1: Descriptive Statistics of Variables

VARIABLE	**MIN**	**MAX**	**MEAN**	**STD. DEV**
SP	0.5	1555.99	37.85	126.32
ED	0	1	0.43	0.22
EM	-0.63	0.54	-0.07	0.13
FSIZE	5.4	9.22	7.12	0.78
PROF	-0.53	0.54	0.03	0.11

SP=Share prices; ED= Environmental disclosure; EM =Earnings management FSIZE=firm size; PROF=Profitability

Correlation Analysis

The correlation analysis from table 2 below shows clearly that there is no problem of multicollinearity as the relationship between the variables are quite low, below 0.5 while the relationship between a variable and itself is 1 as expected. The variance inflation factor (VIF) also confirms this position as it shows that multicollinearity is not present among the variables under study with a mean VIF of 1.18 which is less than the maximum acceptable value of 10

Table 2: Correlation Analyses

	SP	**ED**	**EM**	**FSIZE**	**PROF**
SP	1.00				
ED	0.37	1.00			
EM	-0.02	0.09	1.00		

FSIZE	0.33	0.30	0.00	1.00	
PROF	0.26	0.24	0.40	0.19	1.00

Notes: SP= share prices; ED= environmental disclosure; EM= earnings management; FSIZE= firm size; PROF=profitability

Panel Regression Analyses

Table 3 below shows the output of the share price model estimation. The Breusch and Pagan Lagragian multiplier test with Chi 2 values of 839.71 and probability values of 0.00 clearly indicates that there is presence of effects in the model thus jettisoning the pooled OLS model. This indicates that we have to go further and test between the fixed effects model and random effects model. The output of the Hausman test with p- values of 0.96 indicates preference for the random effect model as against the fixed effect model. The model is then tested for the occurrence of the problem of heteroskedasticity and auto correlation. The result of the modified Wald test for group wise heteroskedasticity with probability values ($P<0.01$) and serial correlation test with probability values ($P<0.00$) shows the presence of both problems in the model. The panel model is then rectified of autocorrelation and heteroskedsaticity problems using the robust standard error estimates based on the stata command "xtgls" (Hoechle, 2007).

The robust random effect model shows that environmental disclosure is significant and positively related to share prices ($\beta=156.01$, $p<.01$). The result provides support for the prediction in hypothesis 1which states that environmental disclosure has a positive effect on share prices. The result suggests that an increase in the environmental disclosure leads to higher share prices. It suggests that environmental performance disclosures are relevant to the investing public and financial analysts, considering the effect it has on the value of the firm. Furthermore, an improved social and environmental performance could result in enhanced stock returns by means of cost reductions and improved productivity, or by way of improving the firm's position that would encourage analysts in recommending the stock and also making it attractive for investors to keep despite the expenses and what the firm will benefit (Brammer *et al*., 2005). The result also agrees with studies by Gozali *et al* (2002) that showed that firms having positive information performed better in terms of performance. Also, the study agrees with Flammer (2015) that found that firms that were perceived to have carried out their operations in an environmentally friendly manner had a boost in their stock prices. The result differs from the finding of Hassel *et al* (2005) that found environmental performance and value of equity inversely related. The results also agree with the signalling theory that show that by disclosing environmental information, firm signal to stakeholders and hence these entities may demand positive feed back from the investors in the capital market, which can improve the firm's share price (Luo *et al*., 2014).

Furthermore, from the results of the robust random effect regression analysis, earnings management was found to be significant and inversely related with share prices ($\beta=-127.33$, $p<.01$). The result suggests that as firms manage their earnings the lower will be the share price. The result is in tandem with Gill *et al.* (2013) that posited the more pronounced the occurrence of earnings management, the more the side effects on the company's return on asset in the subsequent year and also the market participants react by lowering the share price in the future period as a consequence. Also the results agree with Tabassum *et al.* (2013) and Tang and Wilson (2014) that found an inverse relationship between earnings manipulation and share prices. Lastly, the results for the control variables firm size and profitability were also positively related in line with prior studies (Che, Ahmad & Osazuwa, 2015)

Table 3: Results of the Regression Analyses

VARIABLE	POOLED	RANDOM EFFECT	FIXED EFFECT
C	-284.97 (0.0000)	-284.97 (0.0000)	-403.70 (0.005)
ED	156.01 (0.000)	156.01 (0.0000)	-5.31 (-0.33)
EM	-127.33 (0.003)	-127.33 (0.003)	6.07 (0.78)
FSIZE	33.45 (0.0000)	33.45 (0.00)	62.08 (0.002)
PROF	249.50 (0.000)	249.50 (0.000)	62.44 (0.097)
R-squared	0.2236	0.1384	0.1173
F-statistic/ Wald Chi^2	34.77	140.52	3.57
Prob(F-statistic)	0.0000	0.0050	0.007
Lagragian Multiplier Test			839.71 (0.0000)
Hausman		0.61 (0.962)	
Observations	488	488	488

Source: Researchers Computation (E-views) 2019
(All variables are significant at the 5% level. The coefficient values are reported; probability values are in parenthesis)

Conclusions and Recommendations

The research investigated the effect of environmental disclosure and earnings management on share prices in quoted firms from the Nigeria Stock Exchange. The panel regression indicates that environmental disclosure has a positive effect on share prices. Also, earnings management was found to have an inverse effect on share prices. The positive effect of environmental disclosure on share prices has theoretical implications for the signaling theory that purports firms using disclosures of good news such as environmental information to send signals to the market of good performance which would have a ripple effect boosting their share price.

Consequently, the study provides an understanding as to the combined effect of environmental disclosure and earnings management on share prices thereby extending prior studies on this relationship from an emerging economy. These findings are of relevance to investors (potential and existing), management, board of directors, government, policy makers and shareholders who wish to understand the dynamics surrounding the firm's share price. Policymakers need to push for mandatory reporting of environmental information, as well as enhanced standards to minimize earnings management and improve the quality of preparing financial statements. Also, addressing the issue of earnings management there is need for development of accounting standards by standard setting bodies to provide for standards that are geared towards improving the quality of earnings for proper guidance of all stakeholders who rely on the reported earnings for their decisions as they participate in the market.

However, this study has some limitations. First, the sample is based on companies listed on the NSE and thus due to unavailability of data for unlisted companies, they could not be examined. Also, the study considers only companies listed in the non–financial sector of the NSE. Therefore, the results from this study should be interpreted with caution.

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La Conurbación Como Factor Estratégico Para Alcanzar La Ecoeficiencia De La Región De Girardot, Ricaurte Y Flandes

The Conurbation as a Strategic Factor to Achieve Eco-Efficiency in The Region of Girardot, Ricaurte and Flandes

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Resumen

En los municipios de Girardot, Ricaurte y Flandes presentan, por su cercanía, unas condiciones estratégicas de interacción, permitiendo la generación inercial de condiciones de conurbación, al ser prestadores y generadores de bienes y servicios mutuamente, como son los de capital, tierra y trabajo como fundamento económico; a través de la historia cada una de estas concentraciones demográficas, han sido representativas y de importancia, al encontrarse asentados en las riveras del río grande de La Magdalena. El estudio muestra, a través del análisis de la información recopilada, la necesidad que las empresas, aprovechando las oportunidades de inversión de multinacionales y corporaciones llamadas holding, evidencien las bondades de la infraestructura y la disponibilidad de mano de obra calificada y no calificada, permitiendo a la región ser generadora de una gran dinámica de creación de valor, así como el establecer o dimensionar políticas y acciones ecoeficientes para propender por un desarrollo sostenible y en lo posible sustentable, amigable con la sociedad, los recursos renovables y el pensamiento en la reutilización o usos alternativos de los residuos, que es uno de los detonantes de las sociedades modernas, al generar grandes volúmenes de bienes que no son aprovechados y se disponen sin ningún tipo de reflexión ni preocupación, en usos alternativos o de reindustrialización.

Palabras Clave: Factores de ecoeficiencia, desarrollo sostenible, conurbación

Abstract

Due to their proximity, the municipalities of Girardot, Ricaurte and Flanders present strategic interaction conditions, allowing the inertial generation of conurbation conditions, being mutually providers and generators of goods and services, such as capital, land and labor. as an economic foundation; Throughout history, each of these demographic concentrations have been representative and

of importance, as they are located on the banks of the large river of La Magdalena.

The study shows, through the analysis of the information collected, the need for companies, taking advantage of the investment opportunities of multinationals and corporations called holding companies, to demonstrate the benefits of infrastructure and the availability of skilled and unskilled labor, allowing the region to be the generator of a great dynamic of value creation, as well as establishing or dimensioning eco-efficient policies and actions to promote sustainable development and, if possible, sustainable, friendly to society, renewable resources and thinking about reuse or alternative uses of waste, which is one of the triggers of modern societies, by generating large volumes of goods that are not used and are disposed without any kind of reflection or concern, in alternative uses or reindustrialization.

Keywords: Eco-efficiency factors, sustainable development, conurbation.

Introducción

Los procesos demográficos en la concentración de ciudades revelan el crecimiento de los asentamientos urbanos y la necesidad imperante de alianzas sociales y económicas dentro de los territorios. Estas dinámicas conllevan a repensar en formas eficientes de organización para estas ciudades encontrando las áreas metropolitanas, donde se establecen relaciones de empleo, generación de ingresos, consecución de recursos, planificación y desarrollo territorial y financiamiento.

Estas relaciones y su realidad generan fenómenos urbanos conocidos como conurbación, donde ciudades similares y cercanas generan alianzas para incorporar infraestructuras que garanticen las condiciones ambientales, económicas que permitan la sostenibilidad y uso de los recursos sin presentar costos ambientales que determinen la deficiencia en el desarrollo y crecimiento económico y social para la región.

El desarrollo empresarial es una de las preocupaciones existentes en los modelos de gestión del estado, academia y el sector productivo, al tener como condicionante, factores y fuerzas del mercado, en un escenario dinámico y de fuertes cambios dados por las diferentes variables de influencia al determinar la relación costo – beneficio en busca de la productividad y la competitividad.

Dentro de este contexto, se desarrolla la propuesta de la creación de un centro de desarrollo empresarial, con capacidad para generar escenarios de diálogo de las partes interesadas para generar conocimiento y capaz de atender las necesidades existentes en la práctica del ejercicio profesional de los futuros profesionales, condicionados por el mercado laboral y las necesidades del sector productivo, teniendo como garante, las políticas y las normatividades en el componente ambiental, social, cultural y legal.

Girardot, Flandes y Ricaurte, como área conurbada, trae consigo situaciones problema no pensadas desde la planeación estratégica de los municipios en diferentes aspectos demográficos, sociales, económicos y de infraestructura, al presentarse la saturación de los espacios geográficos por el asentamiento, migración y visita de personas a esta área territorial y geográfica, como es los periodos de vacaciones, semana Santa, días feriados y hogar para personas de retiro de grandes metrópolis como Bogotá, Ibagué o Neiva y ciudades intermedias como Agua de Dios, Tocaima o Nilo, siendo el escenario para atraer inversionistas y garantizar la viabilidad económica de los proyectos de construcción como se ha venido presentando en estos municipios conurbados.

El centro demográfico está dado por situaciones como el alto crecimiento de construcción en los tres municipios, sin haberse dado los estudios y la planificación para la estructuración de unas condiciones

ajustadas a esa realidad en cuanto a infraestructura de movilidad para la zona, manejo de residuos sólidos, consecución de recursos, plantas de aguas residuales, manejo y disposición de escombros, gestión de impacto sobre el cambio de la vocación del uso de suelos, zonas dedicadas a la agricultura que pasan a ser utilizadas en la construcción de condominios, hoteles e infraestructura relevante para el sector turístico de la región y así atender la cantidad de habitantes de la zona y población flotante.

Fundamento Teórico

Antecedentes: Desarrollo Tecnológico, Innovación, Eficiencia Y Sostenibilidad

Colombia es un país eminentemente urbano. "Se calcula que alrededor de 32 millones de habitantes viven actualmente en zonas urbanas (representando el 72% de la población nacional), población que alcanzara los 40 millones en los próximos 10 años" (CONPES 3305. 2004)

El documento Visión Colombia 2019 brindó datos acerca de la importancia de estas, al establecer que "El futuro de los colombianos dependería, en buena medida, del futuro de las ciudades. Para 2019 cerca de 77% de la población colombiana viviría en los centros urbanos, y en ellos, en los próximos quince años, tendrían lugar importantes transformaciones a nivel económico, social y ambiental" (DPN 2005)

Es evidente la necesidad de la adopción de modelos de desarrollo que propendan por la sostenibilidad de las ciudades: iniciativas como la Agenda 21 Local son un ejemplo de ello (considerada el Plan de Acción Global para el Desarrollo Sostenible, consensuado y suscrito por 178 gobiernos en la Conferencia de las Naciones Unidas sobre el Medio Ambiente y Desarrollo, celebrada en Río de Janeiro, en el año 1992). Estas iniciativas persiguen como objetivo aplicar criterios de sostenibilidad en el ámbito local, propendiendo por una eficaz gestión municipal; concibiendo la sostenibilidad local como resultado del equilibrio entre la sostenibilidad ambiental, sostenibilidad económica y la sostenibilidad social.

A nivel nacional, la tendencia sigue a las disposiciones mundiales, ejemplo de ello es el Plan Nacional de Desarrollo "Pacto por Colombia, Pacto por la Equidad", que tiene un enfoque regional a través de nueve pactos regionales para atender de manera directa las necesidades particulares de cada región y cerrar las brechas sociales (Departamento Nacional De Planeación 2019).

El PND identifica las potencialidades de cada región así: Pacífico, potencia ambiental y logística; Caribe, transformación para la igualdad de oportunidades y equidad; Seaflower Region, región insular próspera, segura y sostenible; y, Central, para la innovación e integración productiva nacional e internacional. Incluye la región de Santanderes como eje logístico para sostenibilidad y competitividad; Amazonía viva con desarrollo ambiental sostenible; Eje Cafetero y Antioquia, conectando para la competitividad y el desarrollo; Llanos y Orinoquia, conectando y potencializando la despensa sostenible del país y, Océanos, Colombia como potencia bioceánica".

Estas nuevas realidades de la urbanización llevan a repensar la planificación de las urbes a mayor escala pensando en dinamizar la productividad, incrementar el crecimiento económico, mejorar los procesos ecoeficientes y así lograr la equidad en las aglomeraciones urbanas, teniendo en cuenta que la relación entre las grandes ciudades y los municipios cercanos a ellas son funcionales y superan sus límites político-administrativos. Sin embargo, el ordenamiento territorial no ha incorporado de forma efectiva la planeación y gestión a escala supramunicipal. (Departamento Nacional De Planeación 2019)

Área Metropolitana Y Conurbación

El término fue utilizado por primera vez en Estados Unidos a principios del siglo para referirse al territorio en el que aparece una ciudad de más de 200.000 habitantes que no incluye el área de influencia de ninguna otra gran ciudad.

Y aunque actualmente este término cuenta con cierta ambigüedad y amplitud en su uso, según la CEPAL "… surgió cuando el termino ciudad dejo de ser equivalente a urbano y fue necesario encontrar otro que diera cuenta de las áreas urbanizadas en torno de la ciudad central".

Este proceso urbano, característico de finales del siglo XX, es entendido como "…la intensificación de las relaciones físicas, económicas y sociales, entre entidades territoriales vecinas, como resultado del crecimiento de una ciudad, generalmente capital nacional o regional, que actúa como núcleo del fenómeno" (MONTAÑEZ 1998).

Dichas ciudades están en la capacidad de conformar Áreas Metropolitanas que se definen como "…entidades administrativas formadas por un conjunto de dos o más municipios integrados alrededor de un municipio núcleo o metrópoli, vinculados entre sí por estrechas relaciones de orden físico, económico y social, que para la programación y coordinación de su desarrollo y para la racional prestación de sus servicios públicos requiere una administración coordinada" (Ley 128 de 1994, ley Orgánica de las áreas Metropolitanas)

Esta descripción teórica se ajusta perfectamente a la dinámica socio económica que vive la ciudad de Girardot y sus municipios vecinos. La subregión del Alto Magdalena (Cundinamarca) y el Yuma y Sumapaz (Tolima), a la que pertenece la conurbación, se extiende 2409 km2, del que ésta comprende el 14% con una densidad de 469 habitantes / km2. En los 354 km2 de la conurbación habitan 165.981 habitantes. El acceso a la subregión es diverso. Desde Bogotá hay tres vías directas. 1: Fusagasugá – Melgar. 2: La Mesa – Anapoima – Tocaima y 3: El Colegio – Viotá – Tocaima. En la actualidad se encuentra en operación el eje vial Girardot – Cambao – Puerta Bogotá – Puerto Salgar como parte de la estrategia de desconcentración del crecimiento de Bogotá y como alternativa para la comunicación y salida de productos a la costa caribe. [Plan de competitividad de Girardot 2007 - 2019].

La influencia regional de la ciudad y el papel que cumple al ser foco de desarrollo económico y social, y que presentan una continuidad física, permite la extensión en actividades agrupadas por clúster como turismo, académico, infraestructura, entre otros, que alientan la competencia y la cooperación, extendiéndose a otros municipios aledaños y que transforman de manera importante dinamizando la economía, el desarrollo social, empresarial, ambiental de la conurbación.

Los procesos que viven las ciudades colombianas han aportado conocimiento a las problemáticas que presentan y el análisis de ellas. El alcance real y a profundidad de los fenómenos urbanos y su impacto en la problemática ambiental de una ciudad es indispensable para presentar soluciones efectivas y de largo plazo. Este entendimiento permitirá dar alcance a los objetivos propuestos y ver a las ciudades conurbadas como una entidad agrupada que mira hacía la misma dirección para crecer y desarrollarse de manera sostenible. La CEPAL 2001, realiza la siguiente afirmación: "Cuando la aglomeración sobrepasa los límites administrativos de la ciudad se generan suburbios autónomos y conurbaciones institucional y administrativamente fragmentadas. Esta fragmentación tiene repercusiones institucionales, políticas y económicas…"

Contexto metropolitano Del Desarrollo Económico Y Empresarial

Factores De Ecoeficiencia

La ecoeficiencia se entiende a partir del concepto de desarrollo sustentable, entendido como "el desarrollo que satisface las necesidades actuales, sin comprometer la capacidad de que generaciones futuras puedan satisfacer sus propias necesidades". La dinámica económica, social, ambiental, requiere el entendimiento del desarrollo sustentable bajo premisas que cumplan con los objetivos empresariales de desarrollo sustentable, generando el concepto de ecoeficiencia se obtiene como "el suministro de bienes y servicios a precios competitivos, que satisfagan las necesidades humanas y proporcionen calidad de vida, mientras progresivamente reducen los impactos ecológicos y el consumo de recursos a lo largo de su ciclo de vida, por lo menos hasta un nivel acorde con la capacidad de carga estimada de la Tierra" (LEHNI 2000).

Dentro de los factores de ecoeficiencia puede encontrarse la eficiencia económica relacionada con la disminución de costos y el incremento de ingresos, permitiendo la maximización de beneficios y el aprovechamiento de ventajas competitivas. La eficiencia ecológica hace referencia a los procesos de impacto medio ambiental que desarrollan las organizaciones y se incluyen el consumo de recursos naturales, consumo de energía, generación de residuos, generación de vertidos, generación de emisiones atmosféricas y las tasas de reutilización.

Los factores que influyen en la eficiencia funcional están directamente relacionados con la eficiencia y eficacia de los procesos que influyen en el producto a lo largo del ciclo de vida. Puede entenderse como la calidad que se imprime para el desarrollo de las actividades propias del negocio.

Inicialmente Ricaurte, demostrado al ser el municipio más antiguo, concentrando su relevancia en la producción agrícola, contando con una extensión territorial amplia y riqueza de suelos, siendo productora de Quina, tabaco, maíz, en las últimas décadas, algodón y sorgo. En la actualidad retoma su importancia en el crecimiento del contexto en la construcción al ofertar proyectos urbanísticos ajustados a las necesidades de vivienda para turistas con deseos de tener una propiedad tipo apartamento para los tiempos de descanso y veraneo como son fines de semana.

Flandes por su ubicación estratégica de acceso al sur y occidente de Colombia, para acceder a las rutas de Neiva, Caquetá y Putumayo, y la otra ruta importante, Ibagué, Armenia, Cali, Costa Pacífica y Tumaco, como también vía a Ipiales y Ecuador y malla vial de toda el área Andina.

Girardot, por su infraestructura de Comercio, financieros e infraestructura en Educación Básica y superior e instituciones prestadoras de servicios de Salud y turismo, demostrando ser la de mayor concentración demográfica y mayor dinamismo, por su relevancia en la mitad del siglo pasado, al contar con la ruta fluvial y férrea para proveer de bienes importados como también la exportación de productos agrícolas y manufacturas del país.

Metodología

El desarrollo de la investigación está fundamentado en la información suministrada por las instituciones gubernamentales y no gubernamentales, las personas inmersas en el fenómeno de estudio y la población ubicada en las ciudades de Girardot, Flandes y Ricaurte; donde se asume el riesgo de presentar posibles negativas de algunos de estos entes en suministrar información generando posibles márgenes de error o sesgos en el análisis y procesamiento de esta. Se optó por un enfoque de tipo

descriptivo, el estado actual de las variables ambientales y de ecoeficiencia que hacen parte de los municipios que pertenecen a la conurbación, procediendo a definir en términos claros y específicos las características del problema. Las observaciones se realizaron de manera técnica usando la estadística utilizando como instrumento el desarrollo de encuesta para la recolección de datos.

La metodología aplicada es de tipo cuantitativo, dentro de este componente se incluyeron la caracterización e identificación de problemáticas medioambientales de las zonas identificadas. El método analítico fue aplicado al presente estudio al buscar identificar las variables y dimensiones de las condiciones de ecoeficiencia que influencian la conurbación de Girardot, Flandes y Ricaurte; y presentar la sistematización, permitiendo servir de soporte para la formulación de la política y planes de desarrollo territorial requeridas. Para el desarrollo del presente análisis se obtuvo información de la población asentada en los municipios de estudio del Área conurbada según el DANE a 2018

El proyecto surgió dentro de la iniciativa por la creación del área metropolitana en el 2015 y los intereses de las diferentes comunidades como la académica en estudiar la dimensión, a través de los diferentes estudios realizados como el proyecto denominado “Fenómeno de conurbación y su impacto ambiental, área Metropolitana de Girardot, Cundinamarca” por los autores María del Pilar Pájaro M y Cesar Augusto Ramos R y la investigación “Identificación de las Variables socioeconómicas como aporte para la estructuración de la conurbación en Girardot, Ricaurte y Flandes” autores Marlén Deyanira Melo Zamora y Cesar Augusto Ramos R, haciendo énfasis en la identificación de los diferentes problemas e impactos ambientales y la incidencia en el desarrollo social y la proyección económica de la región.

En el presente estudio se retoman estas dimensiones y se recopilan las directrices e indicadores de ecoeficiencia establecidas por las comunidades y entes como la Organización para la cooperación y el Desarrollo Económico (OCDE), El Consejo Empresarial Mundial para el Desarrollo Sostenible (CEMDS), El Banco Interamericano de Desarrollo (BID), el Fondo Multilateral de Inversiones (FOMIN).

Resultados

Se desarrolló un instrumento aplicado a empresarios y comunidad académico-científica, propendiendo por el conocimiento de los diferentes factores que inciden en la ecoeficiencia de las empresas existentes en la conurbación de Girardot, Ricaurte y Flandes, arrojando los resultados que se relacionan a continuación:

Connotaciones sociales, económicas y ambientales de la conurbación:

El 62% de la población manifiesta no tener conocimiento de políticas o programas en las empresas de la región para uso eficiente de servicios públicos como el agua y la energía, por ejemplo el uso de baños con sistemas que permiten el ahorro de agua, reductores y limitadores de caudal, aprovechamiento de aguas grises, campañas de información y formación para promover el ahorro de energía, aprovechamiento de la luz natural en los puestos de trabajo, utilizar luminarias y artefactos con la máxima eficiencia energética.

Al analizar el diseño e implementación de estrategias de conservación y uso de los recursos naturales renovables, el 84% de la población encuestada considera que en el municipio es necesaria la formulación, diseño e implementación de planes de seguimiento y control al estado de recursos naturales renovables, formulando indicadores de desarrollo sostenible en los municipios, incluyendo éstos en los planes de desarrollo propuestos desde el gobierno local.

El 76% de los encuestados cree relevante la incorporación de planes, directrices, condicionamientos y

criterios ambientales en los planes y programas de vivienda y construcción, mejoramiento de barrios, renovación urbana, mejoramiento de infraestructura vial entre otros, presentada en los municipios pertenecientes a la conurbación, de manera que implementen y atiendan a la protección y el uso sostenible del espacio público.

La población objeto de estudio en un 76% considera que es conveniente unificar el sistema de manejo de residuos sólidos con un solo operador y así especializar la actividad, aplicando buenas prácticas para lograr disminuir la cantidad de residuos generados en su disposición final.

Para el 83% de la población encuestada reviste importancia sustancial el implementar programas, incentivos y estrategias para el aprovechamiento de residuos y su disposición final, así como la disminución de residuos de alto impacto y gran volumen como son los plásticos, empaques, vidrio, papel, entre otros.

Connotaciones políticas y empresariales del área conurbada:

Al consultar la percepción de si las empresas de Girardot y la región emplean mano de obra calificada para el desarrollo de las diferentes actividades productivas, el 48% relacionan que no lo hacen, al tener como referentes el incremento en los costos y gastos financieros que de ello derivara, así como la consecución y facilidad de mano de obra no calificada.

Las organizaciones empresariales consideran fundamental el tener como pensamiento dentro de las reglas del mercado para la competitividad, la dimensión ambiental e ir ajustándose a las condiciones del escenario en un mundo globalizado, siendo el 85% el nivel de percepción frente a esta dimensión estratégica para ser referente en los planes de desarrollo y políticas gubernamentales a nivel local, regional y nacional.

La utilización de tecnología de punta para el 71% de la población encuestada, es considerado como relevante, en especial en los bienes de capital, informática y bases de información comercial, son necesarios de ser fundamento en la filosofía de inversión en las empresas, al tener desigualdad para competir y estar en el ambiente de los cambios tecnológicos condicionados.

Gestionar la sostenibilidad ambiental en los procesos productivos desarrollados en las áreas urbanas de los municipios conurbados, es una variable de importancia a tener en cuenta para la sostenibilidad ambiental para el 61% de las personas, quienes aducen que las políticas por parte del gobierno local, deben estar claramente determinadas en los planes de ordenamiento territorial con programas y acciones que permitan el control en temas como la contaminación generada por las empresas en el desarrollo de su actividad.

Para el 72% de los encuestados, aspectos como la deficiencia en la adopción de prácticas de producción y consumo sostenible por parte de las empresas en los municipios de Girardot, Ricaurte y Flandes, afectan el desarrollo sustentable y la aplicación de la ecoeficiencia para la región, generando problemáticas directamente relacionadas con el sector productivo.

Conclusiones y Discusión

Es necesario formalizar la conurbación de Girardot, Flandes y Ricaurte, con el fin de establecer mecanismos de planificación y de orden territorial del área que atienda las necesidades futuras de esta población y su comportamiento de crecimiento y desarrollo, sin generar lesiones y daños a los ecosistemas y enrutados a los indicadores de ecoeficiencia establecidos, según las comunidades internacionales y la necesidad inherente de la gestión para evitar el agotamiento de los recursos y atendiendo la filosofía de la sostenibilidad ambiental y económica.

El crecimiento de la población y los residuos, está acortando el tiempo de vida útil del centro de disposición de residuos sólidos o relleno sanitario, requiriendo el incorporar prácticas de reciclaje y cultura hacia la sostenibilidad y sustentabilidad, que disminuyan la generación de diferentes tipos de residuos y repensar en crear modelos de aprovechamiento de los diferentes materiales usados como materias primas de muchos productos que en la actualidad se disponen como basura, a pesar de conocerse o tener desarrolladas tecnologías blandas para el aprovechamiento de diferentes tipos de materiales que son consideradas residuos en una cadena productiva pero que podrían aprovecharse en otra cadena productiva.

El uso del suelo debe ser asignado de conformidad con las actividades que se pueden desarrollar, debiendo ser clasificados como principales, complementarios, conexos y restringidos. Toda aquella actividad que no se encuentre acorde a esta clasificación deben ser denominadas actividades prohibidas, usos inadecuados o prohibidos

Generar las condiciones necesarias para que las empresas localizadas en el territorio de conurbación incrementen la productividad disponiendo de las ventajas específicas del territorio, dando la oportunidad en términos de creación y capacitación del capital humano acorde a las necesidades de la dinámica empresarial y económica existente, garantizando los factores de producción y dinamizando los entornos físicos y paisajísticos, acorde a la existencia de instituciones y propendiendo por la calidad de vida.

El aprovechamiento de las mesas de competitividad como escenarios para la disertación y orientación de las diferentes acciones y procedimientos para la generación de unas condiciones y escenarios de urbanismo ajustado a las condiciones de infraestructura de movilidad para la explotación de las vocaciones económicas y productivas de la región, propendiendo por la protección, conservación y recuperación de los bienes de valor patrimonial, basados en la creación y atracción de capital humano y empresarial acordes a las tendencias de innovación empresarial y la clasificación de las diferentes actividades de carácter social, ambiental y económica para un crecimiento inteligente en la generación de empleo, la promoción y fortalecimiento del turismo, con el propósito de la generación de valor agregado y la estabilización de la infraestructura para garantizar la vida urbana y rural en iguales condiciones de calidad.

Garantizar la capacidad de articular responsable y eficiente la ocupación y el proceso de crecimiento del área de conurbación, monitoreando y estableciendo la curva de crecimiento de la huella ecológica, permitiendo fortalecer y restaurar los ecosistemas y permitir el aprovechamiento de los recursos naturales en armonía con el desarrollo urbanístico, en busca de la resiliencia a través de las acciones fundamentadas en la gestión del riesgo y todos estos factores considerados como factores medioambientales de incidencia directa, en esencia las generadas por el cambio climático. La esencia es priorizar la calidad de vida actuales y por las siguientes generaciones la sostenibilidad ambiental bajo los lineamientos de establecer y modelar la ocupación del territorio diseñando condiciones de bajo consumo energético, estableciendo condiciones y compromisos en la gestión ambiental de las instituciones, las empresas y la comunidad como una cultura de sustentabilidad.

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Influence of Regulatory Agencies on Creative Accounting Practices in The Pre And Post FRCN Act 2011 In Nigeria

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Abstract

There have been divergent views on the necessity for regulating financial reporting and with many cases of financial shenanigans in the recent years; the pressure from the public for more stringent rules and regulation became more prominent. Hence, the new legislative initiatives and other reforms came from the demands by the society. In Nigeria, FRCN Act 2011 replaced NASB Act 2003 to address corporate governance weaknesses, particularly in financial reporting and provide opportunity for the adoption of FIRS. Despite the various regulatory initiatives, the managers still play smart in managing earnings to the detriment of other stakeholders. The study investigated the influence of regulatory agencies on creative accounting practices in the pre and post FRCN Act 2011 in Nigeria. The paper covered the six-year period (2005-2011) before FRCN Act and six-year period (2012-2017) after FRCN Act. For the purpose of the study, we employed descriptive and survey research design. Data was collected from the primary source, using structured questionnaire. The study distributed questionnaires to 405 respondents and 241 copies were returned. The pair samples t-test was utilized to test the hypothesis. The results of the study showed that the effectiveness of the regulatory agencies in curtailing creative accounting practices was better in post-FRCN Act than in pre-FRCN Act. The FRCN Act 2011 facilitated the adoption of IFRS, the effect of the adoption is what is reflected in the outcome. The study, therefore, concludes that the enactment of FRCN Act 2011 has significantly improved the effectiveness of regulatory agencies in curtailing creative accounting practices in Nigeria. The study recommends that the regulatory agencies must do more in making sure that companies comply with the relevant legislations and standards, and the FRCN should be proactive in its approach to issues relating to weaknesses in the financial reporting in Nigeria. It is also imperative to consider the review of Companies and Allied Matters Act 2004 with aim of eliminating areas of conflict with IFRS.

Keywords: Creative Accounting Practices, Earnings, Regulation, Regulatory Agencies

Introduction

The corporate failures of recent years in the big companies like, Skye Bank, Cadbury, Intercontinental Bank (Nigeria), Dynegy (USA), Carrillion (UK), Nortel (Canada), Banco Espinto Santo (Portugal), Schlecker (Germany), Kingfisher (India) and Dick Smith (Australia) have given the subject of creative accounting a place of prominence than it used to be in accounting research. This is, first, because of its impact on the quality of accounting information and second, because most of the financial scandals are traceable to unethical accounting practices and bad corporate governance resulting from non-compliance and non-enforcement of relevant standards and rules due to weak institutional and regulatory framework (World Bank, 2004; Adegbite 2012). Corporate failures do not only undermine the value of the firm, but also the interest of other stakeholders. When they occur, the stability of the stock market is affected and by extension, they reduce foreign direct investments (FDIs). Current events reveal that the prevailing accounting practices create opportunity for social injustices through the existence of ill-informed capital market. The trust that arises from the properly informed capital market continues to be impaired by the manipulated accounting information (Clarke, Dean, Oliver & Oliver, 2003). Creative accounting refers to the accounting practice that follows the letter of rules of standard accounting practices, but certainly deviate from the spirit of those rules (Assif, Junaid, Yu & Md, 2016). It arises from the abuse of flexibility, which exists in the accounting regulations. While it may not be against any law, it is immoral because it often misleads the investors and other users of accounting information on the true economic performance of the firm.

Many reforms have taken place at both governmental and professional levels to address the weaknesses in financial reporting. High quality financial reports will facilitate international financial architecture, key in improving transparency, secure investors' confidence, mobilize investments and ensure the stability of the capital market (UNCTAD ISAR, 2012). However, high quality financial reports cannot be secured in an environment where earnings management exists and information is asymmetric and unreliable. The entrenchment of legal, regulatory and institutional frameworks are important to addressing imperfection in the market and fostering economic stability. Therefore, formulating and executing national financial reporting strategy is essential in preventing the companies from using distinct accounting rules or methods in preparing financial statements that lack uniformity and comparability. While regulation and regulatory agencies have been found to be good external mechanisms that complement corporate governance mechanisms, they have not been able to perfectly reduce unethical practices among the preparers of the accounts. Thus, frequent releases of accounting standards and rules and their mandatory compliance have not addressed the problem of accounting irregularities. Attempts at curbing the corporate failures in the form of more stringent legislations and regulation do not appear to have had the desired impact (KPMG, 2016). Iyoha, (2011) observed that the main concern of the various stakeholders is whether the rules and standards by the regulatory agencies create more transparency in reporting or whether they create a situation whereby the managers look for loopholes and the regulators have the task of frequently revising the rules and standards. Regulation can prevents certain type of behaviours and at the same time facilitates some activities. For instance, where there are stringent sanctions against unscrupulous behaviours, the culprits could device cleverer means of circumventing the rules or use cosmetic approach for compliance (Jamal, 2009).

The primary objective of the study is to empirically assess the influence of regulatory agencies on creative accounting practices in pre and post FRCN Act 2011 in Nigeria. The essence is to test the impact of FRCN Act, 2011 in assisting the regulatory agencies in reducing creative accounting practices and thus, improving the quality of financial reporting in Nigeria. The studies on regulatory agencies and creative accounting practices in Nigeria, particularly the impact of FRCN Act 2011 in Nigeria have been relatively few.

The rest of the paper is structured as follows: Section 2 discusses literature review and theoretical framework. Section 3 focusses on research methods. Section 4 presents data analysis and results, while Section 5 concludes the paper with recommendations.

Literature Review

Concept of Creative Accounting

Creative accounting is a pervasive phenomenon and it has become controversial following the collapse of many large companies around the world. There are arguments for and against it. For instance, Scott (2003) stated that it is good when it coveys appropriate information to the market and makes share price reflect future prospects of the company. Good creative accounting occurs when changes in the economic, social, and political environments are reflected in the financial statements to show a better fair view. This enhances the value and usefulness of accounting information. In the process, shareholders benefit from the price/earnings that are augmented through the reduction of uncertainty that often occurs and improved projection of future earnings (Beidleman, 1973; Lipe, 1990). On the other hand, it becomes bad and injurious when unethical practices are used in window dressing the accounts to deceive the providers of capital (Viadu &Matis, 2010). In this case, the preparers of the accounts are the beneficiaries, while the interest of the other stakeholders are jeopardized. Most of the financial scandals of recent years are traceable to the unethical behaviours of the directors who are the preparers of the accounts (Adedipe, 2004; Bakre, 2007).

Creative accounting describes a situation where the preparers of the accounts use their accounting skills to manipulate earnings without the breach of accounting standards and relevant legislations. Jameson (1998) affirmed that creative accounting practices do not usually contravene any rule or standards. In fact, such practices comply with the letter of the law, but fails to conform to the spirit of the law. For example, a review of the economic growth recorded by companies in the United Kingdom in the 1980s showed that the major proportion of the growth was manipulated, using creative accounting, indicating that the report did not reflect real economic growth (Smith, 1992). The current accounting practice that allows for the use of discretion in the choice of methods for measurement and criteria for recognizing costs and revenues encourages managers to engage in earnings management with the obvious consequence of increasing information risk for the users of accounting information.

In this study, creative accounting is examined from the negative perspective because most of the corporate failures have been attributed to the bad behaviours of the preparers of the accounts who use accounting numbers to mislead the users of accounting information.

Accounting and Regulation

The financial reporting provides useful accounting information to an extensive number of users in making complete, timely and reliable economic decisions (IASB, 2010). Most often, this information is asymmetric and unreliable. This phenomenon makes the regulation of accounting practice inevitable. However, the regulatory framework goes beyond the information to the directors who are the preparers of accounts. As such, the era of self-regulation by the accounting profession has been taken over by government regulation with the oversight supervision being given to the regulatory agencies (Iyoha, Ojeka & Ajayi, 2014; Gaffikin, 2005). Accounting also relies on subjective judgements and choices in the treatment of transactions. Accounting regulations in the form of rules, standards and legislations are introduced to enhance uniformity and comparability in the construction of financial statements. Baldwin and Cave (1999) expressed that rules are formulated to prevent ‘‘unexpected gains, profit skimming and free rider effect’’. Besides, most of the interventions by government and other relevant agencies were prompted by corporate failures (Banner, 1997; Reinhart & Rogoff, 2008). In his study, Lev (1998) defined the term ‘‘financial reporting regulation’’ to include all regulatory instruments such as laws, rules and standards. They have been instituted to increase the usefulness of accounting information to the users. Regulating financial reporting goes beyond prescribing disclosure requirements. It involves providing mechanisms for compliance with the disclosure requirements. In most countries, there are two ways of regulating accounting. First, by local legislations and second, by the accounting standards both local and international. This is what is obtainable in Nigeria before the adoption of IFRSs in 2012. The accounting profession was self-regulated for most part of 20th century. At the initial stage, accounting professional bodies did not favour the imposition of external regulation on the accounting practice. Consequently, they attempted to develop first, GAAPs and second, a conceptual framework which serves as basis for the formulation of accounting theory. There was

confidence in the operation of the market and the use of regulation was an exception to correct the slight imperfection in the market. On the other hand, some believe that rules, principles and standards should be used to develop accounting theory, while accounting practice only needs 'minor corrections' to work efficiently.

The divergent opinions on the essence and modality of regulation have always been contentious and with many cases of financial scandals around the world, the pressure for more stringent rules and regulation became more prominent. It is the concern by the public that paved way for new regulations. For example, in 2002, the USA introduced Sarbanes - Oxley Act following Enron's financial debacle and other corporate failures. In Nigeria, FRCN Act 2011 replaced NASB 2003 to address corporate governance weaknesses in the system and provide opportunity for the adoption of FIRS. However, it appears some of the prevailing practices of accounting require a critical look by a more critical eye than the regulators appear to have given them. The government plays an essential role in regulating the practice of accounting and this is more visible in an emerging economy like Nigeria, which does not have a matured political culture. The way government responds to the effectiveness of any profession will normally be determined by the type of government, societal demands and developmental needs, social interactions and the amount intellectual capital the profession possesses (Uche, 2000:472). It is therefore not out of place for the government to provide the necessary support to any profession with the intent of bringing it under the control of a state through the enactment of appropriate laws and regulations (Wallace, 1992:34). Thus, direct intervention by government in view of the financial malfeasances of the recent years becomes inevitable. Nevertheless, what is the extent of government intervention that will not jeopardize the efficiency of the market? This has become a controversial subject in literature.

Financial Reporting and Setting of Standards in Nigeria

Accounting rules and reporting are developed to limit choices in the treatment of transactions in the accounts. The choice, scope and responsibility for regulation varies between countries. The responsibility to set accounting rules is often delegated by government to an agency through the enactment of law to give the agency legal authority to operate. In order words, the government has the sole responsibility for setting standards as part its role for regulating the market. This is what is practised in Nigeria. For example, the defunct NASB was an agency charged with the responsibility for setting accounting standards. At the initial stage the ICAN midwife and accommodated NASB for ten years after which it became a parastatal of the Federal Government in May 1992. NASB received a full legal backing for all its activities through the enactment of NASB Act No. 22 of 2003. The Act empowers the Board to establish an Inspectorate Unit that monitors and enforces compliance with accounting Standards. In addition to the Act that establishes NASB, Section 335(1) of CAMA 2004 gives recognition to accounting standards issued by NASB. As such, all financial statements prepared by the companies must be in agreement with the standards. Between 1982 and 2011, NASB issued thirty accounting standards and this greatly improved financial reporting framework in Nigeria. However, to address the weaknesses in the NASB Act 2003 and pave way for the adoption of IFRS, Financial Reporting Council of Nigeria (FRCN) was established under the FRCN Act No.6 of 2011. The Act replaced the NASB Act 2003. The FRCN Act creates a quasi-governmental agency with main aim of ensuring that financial reports are timely, relevant, and reliable, and conform to the International standards. The Act also amalgamates the existing heterogeneous regulatory agencies hitherto in control of financial reporting and corporate governance.

Regulatory Agencies in Nigeria

The under listed regulatory agencies have been found most suitable and relevant for the study. Hence, regulatory agencies in Nigeria are not limited to those discussed in this section.

Securities and Exchange Commission (SEC)

The apex regulatory institution in Nigeria responsible for the capital market is Securities and Exchange Commission. This regulatory agency was established through the enactment of SEC Act 1979 (replaced by SEC Act of 1998), while the Investment and Securities Act 1999 (replaced by ISA

Act 2007) facilitated its activities (World Bank, 2011). The Commission specifies and regulates corporate reporting in the public companies in Nigeria. In addition, Section 63 of ISA 2007 empowers the auditor of a public company to review the internal system and report on the strength (World Bank, 2011). The ISA 2007 also gives SEC the right to regulate investments and securities business, and ensure the prompt filing of periodic and annual accounts.

Professional Accounting Organizations (PAO)

There are two professional accounting organizations in Nigeria. The Institute of Chartered Accountants of Nigeria (ICAN) and the Association of National Accountants of Nigeria (ANAN). The ICAN Act No. 15 1965 established ICAN, while ANAN received its legal status from the ANAN Act No. 76 1993. The establishment of ANAN broke the monopoly of ICAN. Although the two organizations were established at different times and by different Acts, they have similar charter. Their responsibilities include the regulating the accounting profession, educating and training of members, reviewing and issuing of auditing standards and discipline members for unprofessional conduct.

Financial Reporting Council of Nigeria (FRCN)

The FRCN came into existence by the enactment of FRCN Act No. 6 of 2011 after NASB Act No. 22 of 2003 was repealed. The establishment of FRCN among other reasons was to overcome the weaknesses inherent in NASB Act, harmonize the regulatory capacity, foster the adoption of IFRS and promote cross border listings. According to the FRCN Act, the council shall develop and publish corporate governance codes, accounting standards, enforce compliance with accounting standards and corporate governance codes, and promote compliance with the IFRSs issued by IFAC and IASB and for other related matters.

Corporate Affairs Commission (CAC)

The regulatory agency received its legal status through the CAMA 1990. CAC took over the responsibilities of the department of Companies Registry of the Federal Ministry of Industry, Trade and Investment. The Commission supervises the formation, registration, incorporation and winding up of companies. It is also responsible for the timely filing of returns, including annual reports and accounts. Where it is necessary, the commission may also conduct and investigate the affairs of any company.

Central Bank of Nigeria (CBN)

The BOFIA 2004 empowers the CBN to regulate the banking and non-banking financial activities in Nigeria. To complement the financial reporting requirements of CAMA 2004, the CBN Act 2007 requires the apex bank to ensure prompt submission of audited and periodic accounts, and to examine periodically the books and affairs of the banks. The banks cannot publish their accounts in the national newspapers, except the governor of the CBN has given approval. Where it is necessary, the governor can commission an investigation of the books and affairs of the banks. The auditors of banks are also to report cases of irregularities and non-conformity with the appropriate legislations and accounting standards to the Central Bank.

National Insurance Commission (NAICOM)

The Commission came into being in 1997 by the enactment of National Insurance Commission Act 1997. The NAICOM by the Act plays a supervisory role in regulating and controlling insurance business in Nigeria. The insurance regulator ensures timely submission of financial returns and audited financial statements, reviews them for compliance with minimum paid-up capital, liquidity and long-term solvency requirements. The commission also imposes sanctions, where there are deviations.

Review of Previous Studies

The previous works on the influence of regulatory agencies on creative accounting practices are relatively few. Nevertheless, the studies on related works have been reviewed and the empirical findings are presented below:

Okoro and Okoye (2016) studied the impact of IFRS on creative accounting in Nigeria. They used questionnaires to collect data from 120 respondents made up of investors, stockbrokers and auditors. From the Pearson correlation analysis, the study discovered that IFRSs could be used to curtail creative accounting practices. They also observed that negative creative accounting occurs because of the incompatible interest between the shareholders and the managers. However, Jamal (2009) observed that regulation could have both positive and negative consequences. Where there are strict penalties against unethical behaviours, the culprits can device cleverer means of escape and by so doing engage in more serious fraudulent practices. This proposition does not contradict the fact that many of the extreme financial debacles in the world (Enron, Worldcom and others) took place in a highly regulated environment like, the United States of America. Adetoso and Ajiga (2017) investigated effects of IFRS adoption on creative accounting practices in the banking sector in Nigeria. They used questionnaire to collect data from the 10 sampled commercial banks. They tested the hypotheses using multiple regression model and their results showed that the implementation of IFRS significantly constrains creative accounting practices in the commercial banks. Taiwo and Adegoke (2014) in their work concluded that the adoption of IFRS showed a positive impact on the quality of financial statements and inverse relationship with earnings management. Leventis, Dimitropoulous and Anandarajan (2011) reviewed European Union listed banks from 1997-2008 and observed that managing earnings through the provision for doubtful loans is reduced after the adoption of IFRS in 2005.

Chen, Li, Liang and Wang (2011) in their work concluded that government regulations (high political costs) have significant influence on earnings quality among companies in China. This is because Chinese companies engage in earnings management practices to reduce high political costs in the economic transitional period. Okoye and Alao (2008) in their work examined the ethics of creative accounting and the challenges of regulatory agencies in Nigeria. They used a survey research design and administered structured questionnaire to a sample of 80 firms. They tested the relationship between creative accounting reporting and corporate fraud using Pearson's correlation and the relationship between creative accounting reporting and regulatory control using bivariate correlation. Their findings showed that the manipulation of transactions and accounting policy choice abuses have significant effect on financial reporting. The outcome of their work also revealed that an effective regulation of accounting tends to limit earnings management. Guenther (1994) provided an empirical evidence of a decrease in the level of creative accounting practices among some large firms in the USA following a tax reduction policy by government. Almasarwah (2015) investigated the relationship between corporate governance and earnings management in Jordan. His work showed that government regulations greatly reduce earnings management among the firms, while increase in tax rates encourages manipulation of figures. The results also revealed that ownership structure exhibits greater influence in constraining earnings management than board characteristics or audit process. He also observed that Peasnell, Pope and Young margin model (2000) was stronger than accrual models in explaining earning management.

Iyoha, et al. (2014) examined state agencies and the practice of accounting practice in Nigeria. They used multiple regression analysis and concluded that state agencies have positive and significant relationship on the quality of accounting practice in Nigeria. They added that regulations alone could not guarantee high quality of accounting practice. Odia and Ogiedu (2013) studied the effect of corporate governance and regulatory agency on creative accounting practices in Nigeria. They employed survey research method and questionnaire to collect data. The data was analysed using linear regression. The outcome of their work indicated that NASB has a negative and insignificant relationship with creative accounting practices, while corporate governance has a stronger relationship. Naranjo, Saavedra and Verdi (2013) considered the impact of financial regulatory reforms on financing decisions, following the adoption of IFRS in financial reporting. They observed that modifications in the financial reporting template increases the firms' ability to access fresh funds due to improvement in transparency and, reduction in agency cost and information asymmetry. Madawaki (2014) studied

regulatory framework, environment factors and accounting practices in Nigeria. Using literature review strategy, he observed that regulatory and institutional framework have direct influence on accounting and reporting practices, while political factors indirectly affect accounting reporting practices, particularly during civil rule.

Hypothesis of the Study

The primary purpose of the study is to investigate the influence of regulatory agencies on creative accounting practices in the pre and post FRCN Act 2011 in Nigeria.

$\boldsymbol{H_0}$**:** The regulatory agencies have no significant improvement in their effectiveness in reducing creative accounting practices since the enactment of the FRCN Act, 2011.

Theoretical Framework

Public Interest Theory

The study adopts public interest theory because it assumes that regulation became necessary because of complaints from the public in respect of the inefficiency and inequality in the market, especially the problem of information asymmetry and the need to correct them. It has become foundation of the contemporary public economics and compass for the socialist politics. Shleifer (2005) attributed the growth recorded in the public ownership regulation in the 20th century to the theory. The key factor here is that, regulation is set to achieve public interest. This proposition is a normative view, which the positive accounting theorists will always object to because they believe that the aims of regulation are very difficult to determine. Consequently, the basis for objectively identifying the public interest is often not feasible. Other flaws against public interest include, issues relating to objectivity and competence of the regulators. This approach also underestimates the economic and political power that may influence regulation.

The theory is found suitable for this study because it holds the view that regulation becomes necessary when there is a market failure and the public interest is undermined. Thus, regulation is set to defend the interest of the public, who are the stakeholders.

Research Methods

The study employed descriptive and survey research design in fulfilling the purpose of the study. The study consists of three (3) sets of population and they are the preparers of the accounts, users of the accounts and the regulators. The study used a multi-sampling technique in selecting the sampled size of companies and preparers of accounts. The investments analysts represents the users because they are the primary users of accounting information (Clement & Tse, 2003; Mangena, 2004). The sample size of the investment analysts is determined by applying Kothari (2004) to the list of Capital Market Operators and the study purposively selected seven regulatory agencies based on their relevance to the financial reporting and corporate governance. Data was collected from the primary source, using structured questionnaire. The study distributed questionnaires to 70 preparers of accounts, 300 users of accounts and 35 regulatory agencies, making 405 respondents. The copies of questionnaire returned by the preparers were 56 (80%), users were 158 (53%) and regulators were 27 (77%), translating into 241 respondents (60%). A 5-point Likert type scale was used to measure the variables in the questionnaire. Reliability and validity tests were carried out to avoid measurement challenges and preserve the integrity of the data.

For the hypothesis, the study used multiple cross section. This is because the sample used was more than one sample of respondents and in this study, three sets of respondents (preparers of accounts, users of accounts and the regulators). In carrying out the hypothesis test, two tests were conducted. These tests are Levene's test and t-test. Levene's is a test of homogeneity of variance, while t-test is a test of significance.

Data Analysis and Discussion of Results

Analysis of Data

In carrying out the hypothesis test, two tests were conducted. They are test of homogeneity of variance and test of significance, using Levene's test and t-test respectively. Tables 1 and 2 presents the results of the two tests:

Table 1: Levene's Test of Equality			
Levene Statistic	df1	df2	Sig.
f 5.333	1	480	0.021

Source: Field Survey (2018)

The result from table 1 indicates that the f value is 5.333 with a significant value of 0.210, which is above 0.05. Hence, the variation in the variances is not significant. By implication, there is no deviation from the assumption of homogeneity of variance. Therefore, we conclude that the ANOVA test can be carried out on the data set.

Table 2: Paired Samples Test on FRCN ACT 2011

	Mean	N	Std. Deviation	Std. Error Mean	t –value	Sig
Before the legislation of FRCN Act, 2011 (under NASB Act, 2003)	3.53	241	0.803	0.052	-6.544	0.000
After the legislation of FRCN Act, 2011	3.90	241	0.876	0.056		

Source: Field Survey (2018)

The hypothesis is tested based on the paired samples test of significance and the results are shown below:

Decision

Hypothesis

$\boldsymbol{H_0}$**:** The regulatory agencies have no significant improvement in their effectiveness in reducing creative accounting practices since the enactment of the FRCN Act, 2011.

The post FRCN Act 2011 period has a mean of 3.90, which is higher than pre-FRCN Act 2011 period with a mean of 3.53. Since the t-value is -6.544 and p is 0.0000, the difference is significant at 1%. The null hypothesis, which states that the enactment of the FRCN Act, 2011 has not significantly improved the effectiveness of the regulatory agencies in reducing creative accounting practices is rejected. In other words, the regulatory agencies have significant improvement in their role of curtailing creative accounting practices since the enactment of the FRCN Act, 2011.

Discussion of Findings

The Hypothesis examined the impact regulatory agencies on creative accounting practices, since the enactment of FRCN Act 2011. From the findings, the null hypothesis is rejected. Thus, implying that the introduction of FRCN Act 2011 has significantly improved the effectiveness of regulatory agencies in reducing creative accounting practices in Nigeria. This does not come as a surprise because the FRCN Act 2011 was enacted to overcome the weaknesses in the NASB Act 2003, entrench National Code of Corporate Governance and pave way for the adoption of IFRS. The voluntary self-regulation by the professional accounting organisations ceased with the enactment of FRCN Act 2011 and marked

the commencement of formal, mandatory oversight by the quasi-government agency, which should have positive significant effect on quality of accounting information.

Conclusion and Recommendations

Conclusion

Following the results of the study, the impact of the regulatory agencies in reducing creative accounting practices was better in post-FRCN Act than in pre-FRCN Act. The FRCN Act 2011 facilitated the adoption of IFRS, the effect is what is reflected in the findings. The study, therefore, concludes that the enactment of FRCN Act 2011 has significantly improved the effectiveness of regulatory agencies in reducing creative accounting practices.

Recommendations

Sequel to the conclusion of the study, we recommend as follows:

1. Although the effectiveness of the regulatory agencies is better in post-FRCN Act period that in pre-FRCN period, creative accounting practices are still prevalent among firms in Nigeria. Therefore, the study recommends that the regulatory agencies should exert more energy in ensuring that companies comply with the relevant legislations and standards.
2. In view of the dynamics in the business environment, the FRCN should be proactive in its approach to issues relating to weaknesses in the financial reporting system in Nigeria, particularly to checkmate the activities of those who take advantage of the lapses in the existing laws and standards to cause infractions.
3. The Companies and Allied Matters Act (CAMA) 2004 should be reviewed with the aim of amending the areas of conflict with International Financial Reporting Standards (IFRSs) and accommodating major reforms on financial reporting and corporate governance.

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Software Package for Cloud Storage Development and Visualization of a Laser Scanning Point Cloud for Natural and Technical Systems

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Abstract

The paper presents an overview of trends in research and development in the field of laser scanning. The analysis of existing algorithms and methods for visualizing and storing the results of laser scanning and photography data is carried out. The features of methods for storing and visualizing the results of laser scanning and photography are revealed. A complex of high-performance algorithms for processing, storing and visualizing the laser scanning point cloud has been developed. Field and camera work was performed to obtain laser scanning data and take photos of cultural and historical heritage sites and road infrastructure. The features of data acquisition and further data processing of air, mobile and ground laser scanning are revealed. The system architecture and functional scheme were developed, and the software package was designed. On the basis of the developed set of algorithms, separate software modules of the software package were developed and their integration was performed. An experimental sample of the software package for cloud storage and visualization of laser scanning point cloud for natural and technical systems has been developed. Testing and refinement of an experimental sample of the software package for cloud storage and visualization of the laser scanning point cloud for natural and technical systems were performed.

Keywords: Laser scanning, Point cloud, Visualization, Software package.

Introduction

Currently, the field of application of digital technologies and creation of digital duplicates of products and processes is actively developing. The result of this development is the emergence of devices that allow one to collect spatial information about terrain objects, structures at a new level of quality. This information can be used to solve design, engineering, geodetic, surveying, and other tasks.

One of the most promising methods of collecting spatial information is currently laser scanning (hereinafter – LS). The main advantages of LS devices are high accuracy and the ability to automate the data collection process. Based on information about the scanner location and pulse direction coordinates of the point that reflected the pulse can be determined. The result of this process is a three-dimensional point cloud that describes the measurement object with high accuracy.

A significant drawback of LS, which certainly limits its use, is the non-converging gap between the rapid development of LS technology and the ability to process results (point cloud processing). Currently, there are almost no universal tools for processing point clouds. Thus, the task of increasing the efficiency of LS point cloud processing systems for building geometric models of natural and technical systems is urgent. In such systems new structural and algorithmic solutions in the field of LS data storage and visualization, hybrid processing of LS data and photography are used.

Problem Statement

The development of an experimental sample of the software package for cloud storage and visualization of LS point clouds for natural and technical systems was carried out in two stages.

At the first stage, algorithms for storing and visualizing LS and photography data were developed. The analysis of existing algorithms for visualization and storage of LS and photography data is carried out. Algorithms for storing and visualizing LS data have been developed, as well as a set of algorithms for processing, storing and visualizing LS and photography data.

At the second stage, an experimental sample of the software package for cloud storage and visualization of the LS point cloud for natural and technical systems was developed. For this purpose the architecture and user scenarios of the software package of the cloud service for storing and visualizing the LS point cloud were designed. In addition, a functional diagram of an experimental sample of a cloud service for storing and visualizing a cloud of LS points has been elaborated. Software modules and an experimental sample of the software package were developed, tested and refined.

Research Questions

The analysis of existing modern world-class developments affecting the scientific and technical problem studied in the following areas was carried out:

- visualization of LS and photography data
- storage of LS and photography data.

The analysis of trends in research and development in the field of LS was made in quite a large number of Russian and foreign scientific works. For example, Gorohova (2016), Gospodinov et al (2016), Klepko et al (2016), Guan et al (2016), Kukko et al (2012), Rudenko et al (2016), Sarychev (2014), Shevchenko (2016), Shevchenko et al (2016), Mukupa et al (2017), Lienhart (2017), Wang et al (2017), etc.

Currently, three-dimensional (3D) LS technology attracts a lot of attention due to its simplicity and speed. For example, it is discussed in the works of Yang et al (2017) and Dore et al (2014). This technology is used in a wide range of applications: road management, urban modeling, industry research, preservation of architectural monuments, monitoring not only the condition but also the construction process, etc. Some of the examples are given in the scientific works of Aljumaily (2015), Chen et al (2015), Kamnev (2017) and Soilán et al (2018).

3.1 Analytical Review of the Literature on the Topic of Research and Development

Ground-based LS is the most common and relatively cheap technology in which shooting is performed from ground objects or from the ground in discrete mode.

Mobile LS is one of the most technologically advanced and productive methods of surveying the area. To make measurements, a mobile LS consisting of several laser sensors and several cameras is used, which are installed on a car or any other vehicle.

Among the advantages of aerial LS, compared with other methods, we highlight the ability to perform mapping of hard-to-reach areas where the use of other methods of point shooting will be

time-consuming and expensive. Aerial LS is characterized by high accuracy of planned and high-altitude measurements that do not depend on the human factor.

The standard methods used for geoprocessing data and image analysis, as well as high requirements for computing resources, do not allow the full use of LS capabilities. Currently LS and processing of results are often associated with the developer/manufacturer of laser scanning equipment and software for processing results, and there are almost no universal tools for communicating and processing LS results from different sources.

In order to use scanning in various areas, it is necessary to develop data processing techniques that allow obtaining spatial information in on-line mode. This allows us to conclude that today there is an urgent and significant problem of bringing the speed and accuracy of LS technological operations in line with the requirements of storing, processing and presenting the results of point shooting. This problem can be solved by improving the theoretical and methodological foundations of LS technology.

The analysis of existing algorithms for visualization of LS and photography data was carried out. One of the dynamically developing areas of practical application of data visualization and pshotography is to provide full information about the building and the actual conditions (see, for example, Gao et al (2015)).
The combined visualization of LS data and photography allows to reach a compromise between obtaining a more complete set of geometric information by combining all the point clouds of interest and reducing the file size, combining only a subset of point clouds that can provide all the necessary geometric information for the components of interest.

Currently, fully automatic generation of a high-quality three-dimensional model is still difficult due to interference in both laser data and photos, as well as due to the strong change of lighting from image to image, especially when cars and trees are located in the area with the building, the fully automatic method can not provide a satisfactory result. Structuring the original 3D point data is an essential component of the visualization system, since selecting visible points and accessing specific details requires efficient spatial queries on the surrounding area.

Thus, while photogrammetry focuses better on small details, LS gives a more complete overview of the geometry of the entire scene.

One of the most interesting developments of the knowledge-based modeling tool is the ability to create the shape of an object, an organized structure of the corresponding dimension, as it is described by Pătrăucea et al (2015).

Generating accurate built-in parametric models of objects obtained from PM point clouds is a complex task that is of paramount importance for existing building projects. This problem was discussed, for example, in the work of Son et al (2015).

In order to ensure efficient operation of the created digital layout, the discussed approach provides for the organization of the model in parts and the identification of their mutual relations, in order to ensure compliance between the hierarchical description of the object model and its geometric representation. The structuring tool developed in this way is based on simple grouping operations using a graphical interface that allows you to visualize labels and connections between model elements. The method is described by Jung et al (2017).

Analysis of Existing Approaches and Problem Statement

The analysis of existing algorithms and methods for storing LS and photography data was carried out. Space partitioning algorithms can be used to implement technologies for efficient storage of large amounts of data and taking photos. Algorithms for splitting LS results that work with individual

points require significant computational resources. Another approach to building a spatial index for storing geometric primitives is the R-tree approach.

There are three main problems with existing approaches:

- very low performance due to the fact that the operation was completely manual
- low geometric accuracy of 3D model production due to reduced data applied to the source data
- the huge size of imported data often leads to system failure.

A semi-automatic procedure is offered that guarantees better performance, higher accuracy, and data reduction without loss of performance and accuracy.
The semi-automatic modeling system is designed to provide the operator with a reduced number of points required for manual modeling, without losing accurate geometric information.
Storing large-scale volume models requires a lot of memory, which implies the use of compression methods (see Reference 'Types of Cloud Computing' (2018)).

The analysis of approaches to the processing of photographic data is carried out. The considered features and functionality of special point detection methods do not allow making a reasonable choice of a method for forming a single image at different times of the day, so the main task of the experimental study is to obtain data for performing a comparative analysis of methods for detecting special points in images at different lighting levels.

To manage the results of LS and photography, a study was conducted to find ways to solve the problems of managing the storage system depending on the architecture of information systems of companies based on advanced methods and technologies for data visualization.

All elements of cloud-based applications are deployed and run entirely in the cloud. Applications are either created directly in the cloud or migrated from an existing infrastructure so that you can continue to take advantage of cloud computing. Cloud applications can be built on low-level infrastructure components, or they can use higher-level services that allow you to avoid thinking about the management, architecture, and scaling requirements of the underlying infrastructure.

For a more flexible organization of the structure of the computing center, which expands the capabilities of users, the integration of data storage systems into a local network is used. This organizational structure has high performance and scalability and can be expanded vertically (by adding additional disks and expansion shelves to a single disk storage), or horizontally with the addition of new storage to the network infrastructure).

The appeal of cloud storage is due to some of the attributes that define other cloud services: pay-as-you-go, flexibility, and ease of use and management.

The largest number of technical solutions in the field of research relate to the processing of scan data, and are aimed at optimizing the process by reducing processing time, reducing cost, and increasing efficiency.

The leading countries that develop new technical solutions are China (47%), the Russian Federation (17%), and the United States (6%). It should be noted that only computer programs were included in the search in the Russian database. If they are excluded, the second position in patenting in the field of research will be taken by the United States.
During the analysis of the relevant documents found, development trends in the field of research are identified. The largest number of technical solutions relate to the processing of data scanning, and are aimed at optimizing the process by reducing processing time, reducing cost, and improving efficiency. It is also revealed that the patenting dynamics reflect the growth trend during the study period. The largest number of patent documents for a priority application are filed in China.

It is recommended to use the results of patent research when planning further developments in the field of LS, as well as commercializing the results of the work.

Research Methods

In the field of visualization using three-dimensional LS data, many approaches have been proposed in the computer vision and computer graphics communities over the past two decades.

A widely accepted method for determining the surface model based on three-dimensional data is the marching cubes algorithm for scanning data. There is also an algorithm for reconstructing a three-dimensional surface from a set of unorganized points scattered on or near the surface, regardless of whether there is a boundary. The approach was based on the idea of defining a zero set of the estimated distance signal function (a set of levels).

In 2003 an automated method for reconstructing a textured three-dimensional model of the urban environment using a vehicle-based system equipped with a GPS navigation system was proposed, it was described by Zhao et al (2003).

An open graphics library (OpenGL) is used for visualization LS data. OpenGL is a software application interface (API) that has access to graphics hardware.

However, the above mentioned algorithms are not sufficient for processing the point cloud. There is a need for a set of algorithms and a system that implements it, allowing executing these algorithms on various computing devices, managing memory, loading and caching data, calling visualization subsystems and managing the point cloud.

The main features of such a system are as follows:

- Loading / saving the point cloud into common data formats
- Spatial partitioning of an unorganized point cloud that allows you to quickly search for neighbors and select points located in a specific region
- Point cloud data buffering that allows data to be mapped to a file, RAM, and video memory
- Support for various point representation formats in the cloud
- Creating and executing a processing algorithm in the form of a filter applied to a point cloud or a section of it
- Combining filters into a chain that is a point cloud processing pipeline
- Create filters that run on both the CPU and GPU, without affecting any other filters in the processing pipeline
- Control of the filter execution, its memory consumption, and stopping and restarting the filter.

Support for the above features allows to present a wide range of algorithms in the form of filters, and use it as a standard component of a LS data processing system. Standardizing the filter format will allow to add third-party algorithms.

One of the most well-known approaches for recognizing and representing surfaces and volumes is to process data based on a three-dimensional rectangular grid as a set of zero-level functions. In this approach, a three-dimensional grid can be rebuilt into a two-dimensional (2D) grid, where data is compressed and saved as a gradient.

Another option is the method of restoring surfaces from a given sampling point based on Delaunay Tetrahedralization and Voronoi diagrams, which has been used for a long time. This method was described by Xie et al (2017).

Currently, many automated grid generation methods cannot accurately place objects with complex typologies or curved shapes. To overcome this, Várady et al (2017) developed a shape reconstruction

algorithm consisting of the following elements of hierarchical complex segmentation, object skeleton construction, calculation area boundaries, surface structure creation, and surface fit.

LS collects three-dimensional geometric points of object surfaces, called point clouds. While point clouds are often used solely for visualization or simple measurement of distance or angles, their potential value is much greater, as can be seen from their use for road infrastructure mapping, emergency management, and building reconstruction.

In addition to these approaches, there are commercial programs specifically designed to transform the point cloud of LS. The examples of such software are described by Patil et al (2017).

Thus, when shooting buildings and structures LS is useful for working with objects of complex geometry or when you need to get measurements of many points visible from a single station.

Selection of the visualization algorithm is an important task for transmitting all essential characteristics closest to the real object.

Development of algorithms for storing and visualizing laser scanning data

Description of the Developed Algorithms for Storing Laser Scanning Data

In the course of the work, a comparative analysis of the main point cloud storage formats was performed:

- ASCII point cloud (xyz), a common point cloud file format where data is spatially represented with using three-dimensional coordinates
- LASer (LAS), the most common point cloud storage format that is supported by most point cloud-oriented software
- Compressed LAS is a variant of the LAS format obtained by lossless compression of the original LAS file
- Point Cloud Data (PSD), a data storage format used in the PCL library, which can be either text or binary.

Based on the prevalence, file size, and supported number of attributes, the LAS format was chosen for use in this work.

Development of a Memory Management Algorithm for Storing a Cloud of Laser Scanning Points

When scanning industrial objects, the point cloud is too large and cannot be placed entirely in RAM. At the same time, loading smaller cloud points can lead to excessive use of RAM if it is not controlled. In addition, the processing uses video memory, which is necessary for visualization and parallel processing, the size of which is even smaller than the operational memory. Moreover, a number of application tasks may meet requirements for maximum RAM/VRAM consumption, which also need to be taken into account.

If the processing algorithms used do not require random access to the data of the point cloud, the problem is solved by the introduction of streaming – sequential reading of points from the file and processing in small parts. But the situation is complicated if we cannot predict which points from the cloud we will need to perform calculations (i.e. random access to memory is required), and the cloud itself is not placed in RAM.

A solution to this problem was proposed by introducing a dedicated memory Manager in conjunction with the point cloud data caching system. The memory Manager is a simple system that contains a

pool of buffers in RAM/VRAM memory, and allows you to get or release a piece of memory on request. Moreover, the memory used by the Manager is strictly limited from the top.

The caching system (see Fig. 1) is designed to synchronize point cloud data between a file, RAM, and video memory (see Fig. 2). If the volume of the processed point cloud is too large, it makes sense to cache the intermediate calculation results in a file.

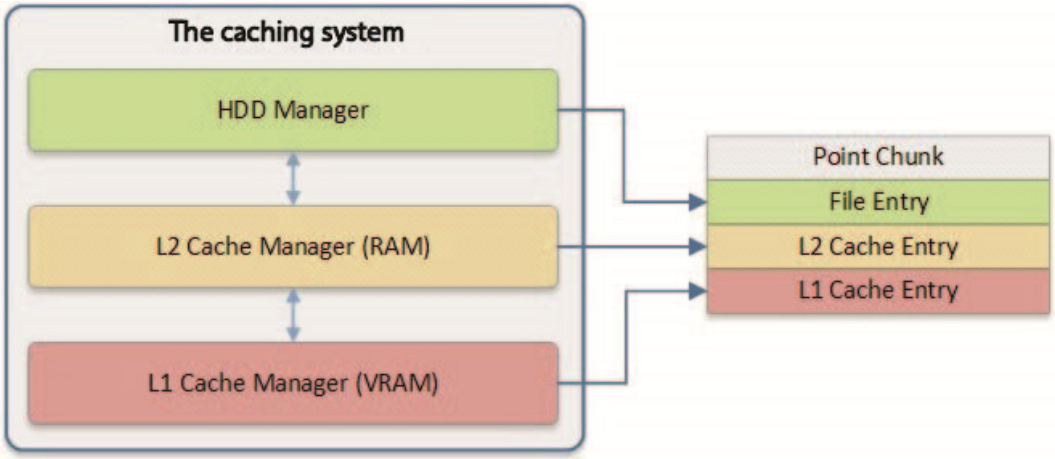

Fig. 1: Proposed structure of the caching system

The developed caching system splits the point cloud into pages (Point Chunk) of a fixed size, and allows you to display such a page on a file, RAM, or video memory. In fact, such a page must be in at least one type of memory at one time (usually in a file). If necessary, the page can be loaded from the file to RAM, and from RAM to video memory. When you change the page data, the result is saved down the chain accordingly. If the amount of allocated memory is approaching its limit, the pages that were accessed the longest time ago are the first to be unloaded

To improve the efficiency of the proposed caching system, it was proposed to use pagination according to the spatial location. This approach is necessary if the algorithms need to select points in a specific spatial region of the point cloud to work. In this case, if you divide the point cloud into pages sequentially (increasing the number of points in the cloud), then when you select points by spatial characteristics (for example, inside a parallelepiped), the affected points will be distributed throughout the point cloud, which will significantly reduce the efficiency of the caching system, since in the worst case, you will have to load the entire page for one point. In this case, it is advisable to use pagination according to the spatial feature (see Fig. 3). The point cloud is paginated depending on the hierarchy level in the structure used for splitting the space (Octree or K-d tree).

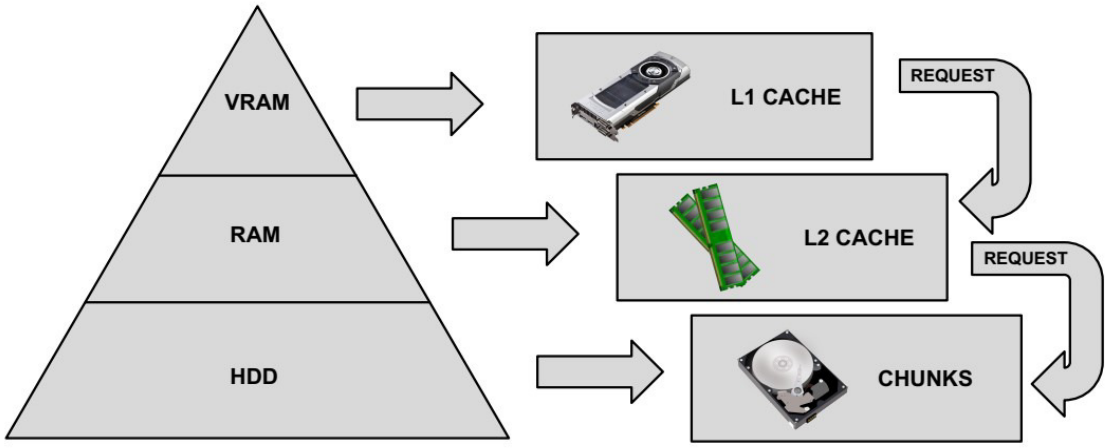

Fig. 2: Memory hierarchy in the caching system

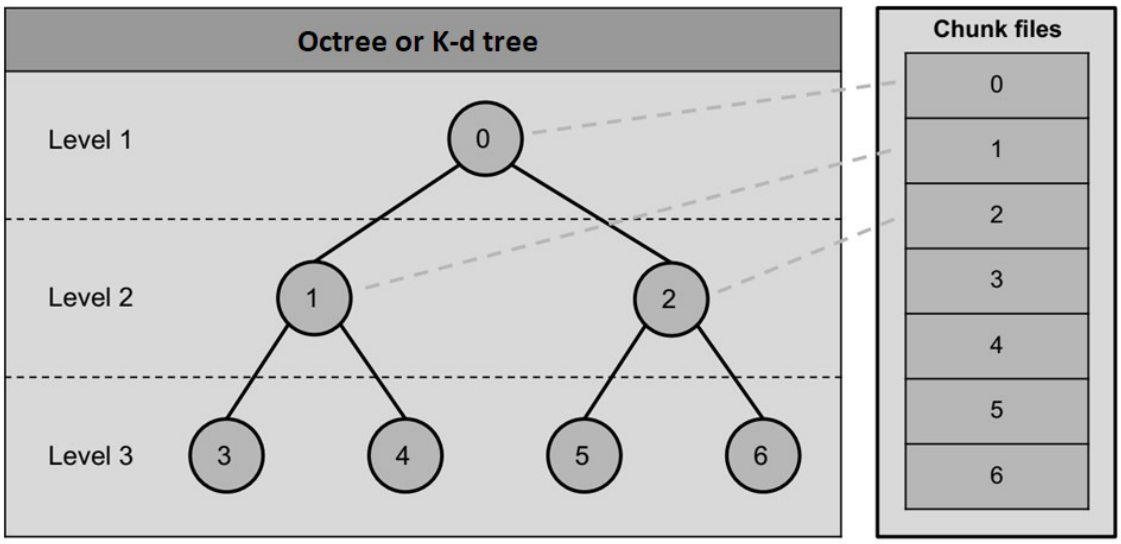

Fig. 3: Pagination according to the spatial location of points

To implement control of point cloud parameters, a filter structure was proposed that has a set of inputs, a set of outputs, stop and start functions, and a number of diagnostic functions.

As described above, splitting the space of the LS point cloud into blocks is necessary for fast data sampling based on spatial features, which leads to faster computing and reduced memory consumption.

Based on the results of a comparative analysis of options, it is proposed to use the octar tree (see Fig. 4) to implement the possibility of caching points by spatial feature.

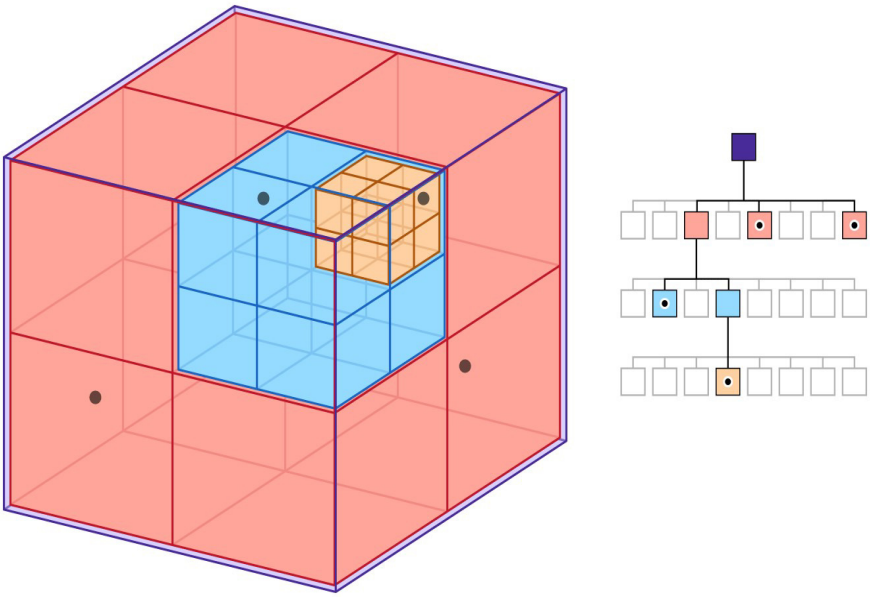

Fig. 4: Example of an octar tree

If an octar tree is used in conjunction with the caching system, the minimum number of points in the node will be set as *PS* * *N*, where *PS* represents the page size. A scale is a scaling factor for balancing the ratio between the number of octar tree nodes and the number of stored pages.

As a result of processing, the output should be a scan in the form of an image, as well as an index file for matching the pixel in the image to the source points from the point cloud. Working with the point cloud takes place in two passes. In the first pass, the program reads the original point cloud into an intermediate buffer. When reading the next point, it is projected onto a cylindrical surface, after which it is written to the file in the scan coordinates. In the second pass, the program reads the next cell from the file (already in the scan coordinate system), and converts the received points to pixels in the final image.

The main result of the work is developing of the high-performance algorithms set for processing, storing and visualizing the LS point cloud. The developed software package for the cloud storage and visualization of the LS point cloud for natural and technical systems consists of the following elements:

- Authentication service
- API Gateway service
- File upload service
- File download service
- File directory service
- Converter
- Queue of conversion tasks
- Inter-service communication message queue
- File storage
- User database
- File directory database.

The software module includes the following components:

- graphical user interface
- user authorization module

- point cloud storage module.
-

The program performs the following tasks:

- user authorization
- view the list and select a point cloud file
- creating a file with a point cloud
- deleting a file with a point cloud
- uploading a file with a point cloud
- download a file with a point cloud.

Conclusion

In the course of this work, algorithms for visualization and storage of LS and photography data were studied. The analysis of existing algorithms for visualization and storage of LS and photography data was carried out. Methods of visualization and storage of LS and photography data were studied, their features were identified, and options for recognizing and representing surfaces and volumes for visualization of LS and photography data were analyzed.

Algorithms for visualization and storage of LS and photography data have been developed. Methods of data import and export are defined, and an algorithm for memory management when storing the result of LS and photography data is developed.

3D models of cultural and historical heritage objects and infrastructure objects were obtained using data from aerial, mobile and ground-based LS and photography.

The software package for cloud-based storage and visualization of LS point cloud was developed. The proposed software complex can be used for natural and technical systems, it includes custom scripts and use of the service, system architecture, functional diagram.

Software modules for storing and visualizing LS point clouds were developed and integrated into a single cloud service. The software complex for cloud-based storage and LS point clouds visualization was tested. Based on the testing results the software was updated. to eliminate detected errors and to complement the functionality of the service.

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Puskesmas, The Third Level of Indonesia Healthcare: Current Electronic Medical Record (EMR) Status and Readiness in Meeting Industry 4.0 Challenges

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Abstract

The current world of health is inseparable from computer technology and information technology. The processing of medical data that used to be done manually is now made automatic with information systems to speed up the work process of doctors in obtaining medical data. In hospitals, of course many have "Electronic Medical Record (EMR) Information System (IS)" but there are still many Puskesmas (the third level of Indonesian healthcare institution) that do not have such a system in Makassar City. Patient medical data at the health center at this time in the city of Makassar, is done manually or using a computer but has not been supported by the information system. The number of problems that often occur due to recording medical records is done by recording on the medical record card, resulting in human errors, searching medical records data that takes a long time and recording disease reports that are sometimes inaccurate. In addition to the patient's medical data, the illnesses suffered by patients vary greatly and the drugs recommended for each patient are also, in many cases, not the same between patients with the same disease. Based on the description above, it is considered very urgent to design and design an EMR information system at one of the Puskesmas in Makassar that can be used as a reference by other Indonesian's Puskesmas.

Introduction

To find out the level of accuracy of a drug for each patient, a system is needed to handle this problem, namely by creating an information system to make it easier for doctors to enter patient data, search for patient data, medical record data and others quickly. So it is expected that with a computerized information system for recording medical records that can facilitate the process of

recording medical records, search for patient data that checks at the health center. According to Bjering et al. (2018) The use of computers for electronic medic record services in public health services, especially for data processing in the patient registration section, recording medical records and patient examination sites is very appropriate, because it can provide several advantages and conveniences in patient services including: speeding up service, more accurate information, and faster data searching and searching.

Based on the description above, it is considered very urgent to design and design an EMR information system at one of the Puskesmas in Makassar that can be used as a reference by other Puskesmas. With the design of this system, it is expected to make it easier for doctors to find out patient information, diseases, drugs, know the level of influence of certain drugs on certain patients and get reports clearly and quickly and can make it easy for patients to find out personal data information, and check data.

Research Problems

1. What is the real condition (status) of the data management of road patient medical records at the Makassar City Health Center at this time?
2. How to design a patient's integrated EMR information system at the Puskesmas in Makassar City?

Research Objectives

1. Knowing the current status of patient data management to determine the EMR information system that suits your needs.
2. Analyzing and documenting the draft of the information system design of the target Puskesmas EMR in Makassar City.

Research Limits

1. Designing a web-based and also android-based EMR Information system (only for the doctor module), this is done so that the distribution and publication of information is quickly conveyed to those in need, so that health services are carried out properly and efficiently.
2. Information system which includes entering medical record supporting data such as patient, doctor, laboratory assistant, reference letters and also medical reports.
3. The patient queue process is also used to check whether the patient data that want to check already exists or not at the target health center.

Research Importance

Data management in all Puskesmas in Makassar City is one of the important components in realizing an EMR information system, where data management is still manual even though it is already using a computer (not based on information systems) has many weaknesses, besides requiring a long time, less accurate, so the possibility of error is very large. With the support of current information technology, the work of managing data manually can be replaced with an information system that is not only faster and easier, data management is also more accurate.

The increase of both inpatient and outpatient patients in all Puskesmas causes difficulties for staff in registering patients, both old patients and new patients so it is very helpful if in this case there is a special information system to handle the medical record system at the Puskesmas in Makassar City .
The benefits expected in this study are:

1. For the research team, this research is expected to be able to increase empirical research finding in healthcare domain based IT.

2. For university stakeholders, this research is expected to be able to add references for relevant further research.
3. For the target Puskesmas, this research can provide facilities for the development of an information system for the regestration of patient visits and to facilitate online reporting.

Theoretical Foundation

Basic Concepts of Information Systems

According to Jensen (2016), Information systems are a combination of four main parts. The four main areas include software (software), hardware (hardware), infrastructure, supported Human Resources (HR). Meanwhile, according to Bang et al. (2005) that the information system is a system within an organization that meets the needs of daily transaction processing that supports organizational operations that support managerial with the strategic activities of an organization to be able to provide reports needed by certain outsiders. From these two theories it can be concluded that the resolution of information systems is a relationship of various interrelated information and one linkage to another for specific purposes and objectives.

Benefits of Healthcare Information System

Users of information systems in this era are increasing along with the rapid development of computer technology (software, hardware), the internet and the awareness and interest of the public to use computers to facilitate their work. An information system provides many benefits including the following: (Jensen, 2016; Su and Shih, 2003):

1) Data centered.
2) Ease of Accessing Information.
3) Time efficiency.
4) The scope and dissemination of information becomes wider and faster.
5) Facilitating business and work processes.
6) Low cost for access and provision of information.
7) Cheap, economical and reliable communication solutions.
8) Data storage can be developed as needed.

Electronic Medical Records

Electronic medical records are files containing records and documents about patient identity, examinations, treatment, actions, and other services that have been provided by doctors to patients, both inpatients and outpatients (Ladden et al., 2013; Patwardhan, 2012; Jansen, 2016). These records and documents are very important for patient care, because they can provide information in making decisions, both for treatment, treatment and other medical measures. Patient medical record information must be kept confidential by doctors, leaders of health service providers, certain health workers, and management officers, but can be disclosed in certain cases. As regulated in the Minister of Health Regulation No. 269 of 2008 concerning Medical Records Chapter IV article 10, information on identity, diagnosis, disease history, examination history and treatment history can be disclosed in terms of:

1. For the benefit of the patient's health,
2. Fulfill the request of law enforcement officials in the context of law enforcement according to a court order,
3. Request and / or the patient's own consent,
4. Request for institutions / institutions based on statutory provisions, and
5. For the purposes of research, education and medical audits, as long as they do not mention the patient's identity.

Benefits of Electronic Medical Record Information Systems

The benefits of the EMR information system according to Joynt et al., (2011); Winpenny et al., (2016), can be mentioned, among others as follows:

1. Management can see reports issued by hospitals (Puskesmas), such as drug data reports, employee data reports, visit history reports, and medical record reports.
2. Administrative staff can manage patient data, manage head of household data, add visits, print queuing numbers, print medical treatment cards, and make reports.
3. Poly officers / nurses can manage the results of physical examinations.
4. Doctors can manage data from disease examination results (diagnoses and medical actions), manage prescription drugs and make referral letters.
5. Pharmacists can manage drug data, view prescription drugs, and ACC prescription drugs.
6. Patients can see the visit history and medical record of the patient himself.
7. Admin manages poly data, employee data, user access data, and view Hospital reports.

Research Methods

Framework

To assist in the preparation of this study, it is necessary to have a clear framework for the stages. This framework is the steps that will be taken in solving the problem to be discussed or a series of ideas arranged systematically, logically, clearly, structurally and regularly.

Plan for System Design Recommendations

In analyzing the needs of this outpatient service information system, researchers will use the basic method of developing the System Development Life Cycle (SDLC) system with the waterfall model reference for the benefit of recommendations.

This reference model can be explained in 4 (four) stages, namely:

First, the analysis phase. This stage is the process of identifying and evaluating the problems that occur, and the expected needs of the Type C Hospital in Makassar City. The ongoing system analysis process is described using:

1 Literature Study
At this stage a search for theoretical foundations is obtained from various books and journals to complement the vocabulary of concepts and theories, so that they have good and appropriate foundation and knowledge.

2 Data Collection
At this stage the data collection process is carried out by interview and observation methods to make observations and analysis of the actual state of management of outpatient information data in Makassar Type C Hospital so that data and information are needed by researchers for information system development needs.

3 Old System Analysis
At this stage identification of problems in the current system (manual or computerized) is carried out. Thus, researchers are expected to find solutions to problems and needs.

Second, the design stage. This stage determines the overall system architecture, design of making software programs, and coding procedures. At this stage system design is carried out which consists of designing ERD (Entity Relational Diagram), software architecture, interface design using UML

tools. After that the interface design for web-based information systems was carried out until the Beta version.

In the system design recommendation stage, follow these steps:

1 Process Modelling. Modelling information systems outpatient services using system use case and activity diagrams. system use case which is a more detailed description of what the actor does in the outpatient service information system. While the activity diagram is a detailed description of the procedures perfoEMRd in the outpatient service process.
2 Data Modelling. Data modelling in the outpatient service information system includes the description of entity relationship diagrams, designing the tables needed in the database, and making relations between tables. Entity Relationship that is made has a relationship between data one with the other data. The tables that have been designed are then realized between tables with one another to support the smooth processing of data.
3 The interface design, the application interface design is used to provide an overview of the outpatient service information system designed. Interface design Check function to enter patient check data. In the patient interface design check, the user can search data, add data, save data, edit data and delete data.
4 Implementation of the system, the hardware needed to develop an Outpatient Patient Information System is a desktop computer. The testing method used is black box testing, which is by giving input from the user to the system that is already running and observing the output of the system.

Third stage of coding. At this stage, software design is realized as a set of programs or program units. System implementation is done using the PHP, HTML, java script, and PostgreSQL database languages.

The fourth stage of testing. At this stage, software testing is carried out to ensure that all system requirements are met and ensure that the output gives results that match the needs. In this study system testing was carried out using black-box testing. To compare the test results according to the functional that has been determined.
The system development method that will be used on the recommendations of the analysis of information system development needs is the System Development Life Cycle (SDLC).

Conclusion

It is expected that the research finding will build a unique framework addressing the following issues (1) the existing conditions of patient data management, and (2) current manual registration system. By analysing the need assessment, EMR information system that beneficial for accessing information regarding to patients, doctors and pharmacies, will be more easy to be implemented. This conceptual assessment will guide the planning for identifying system development life cycle in the perspectives of modern outpatient information system.

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Influence of Selected Internal Transport Technology in The Picking Area on Improving Work Safety and Picking Time

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Abstract

The subject of work safety coupled with the reduction of working time work has been studied extensively for a long time. Every work is known to pose certain risks and hazards. Work in warehouse facilities particularly abounds in safety issues. There is no way to avoid risk situations at work completely, yet they should be kept away or their likelihood should be diminished. It is essential to be aware of possible threats and, above all, know what to do to reduce them. A standard warehouse facility has four functional zones, one of them being a picking area. The picking area is primarily served by internal transport. Most operations in that area are handled in this way. If a warehouse facility is expected to run properly, its picking area must be organized properly. This article attempts to prove that properly organized work of means of internal transport and the proper selection of internal transport technologies have a direct impact on expediting operations in the picking area of a warehouse and on reducing the likelihood of hazardous situations.

Keywords: Picking, Warehouse, Security, Technology

Introduction

According to reports by the Chief Statistical Office, there were 4433 accidents related to warehouse management and handling operations in the period from January to September 2019. Many of them affected staff working in the picking area. They are exposed to numerous risks due to the need to reach, lift, pick, move, work at heights, high intensity of warehouse traffic, use of inadequate equipment, etc. All threats that occur in warehouse processes also apply to the picking area. It is essential to reduce the possibility of undesirable incidents, i.e. accidents, damage or bodily injuries. According to the information from the Chief Statistical Office covering the period from January to September 2019, out of all 4433 accidents, as many as 16 were fatal and 13 were severe. It should be noted that a natural consequence of an accident at work is the affected employee's absence from work on following days. In the period mentioned above, absenteeism caused by accidents at work totalled 153,323 days. As a result, the efficiency of picking processes in the warehouse is reduced as some staff members may be missing. Consequently, the time needed to complete the same tasks shrinks. Nowadays, due to the rapidly growing logistics market where commodity flows are intense and regular, it is vital that goods are delivered to recipients as soon as possible. This situation has caused warehouse-internal transport to grow in importance, especially in the picking area. In many companies, manually operated pallet trucks are still the basic work tool. The time of operations and the burden of manual work are extensive. It is therefore important to select such a technology of internal transport that would best match the warehouse capabilities and processes with a view to streamlining operation time and the volume of manual work. There are three basic internal transport technologies: manual, mechanized, and automated.

- **Manual** - people's work is assisted by simple devices, and the human factor is decisive. This technology is marked by relatively low efficiency and effectiveness. It is mainly used in smaller warehouses where automation is not justified business-wise. The use of the manual technology generates lower unit costs due to the application of simple equipment that does not require advanced software. Such means of internal transport are easy to use. No permits or certificates are required to work with most devices. It reduces the need to hire certified personnel or to invest in extra training;

- **Mechanized** - in this technology, people are an important factor, but the means of internal transport are even more relevant. Truck and other wheeled equipment operators are required to have a permit or licence. The variety of equipment available in this technology is an advantage because it affords a wide range of possibilities. The efficiency and effectiveness of mechanized internal transport process is superior to those in the manual technology: the equipment used has greater capacity and carrying limits. More advanced tools are used, which requires the warehouse operator to hire highly qualified personnel and offer them specialized training. The use of this technology is justified in larger warehouse spaces compared to the manual technology and it must be justified business-wise;
- **Automated** - this technology relies on fully automated processes; people merely control operations but do not necessarily take part in them. Employees must be trained in advanced software and warehouse operations. Automation significantly increases process efficiency and effectiveness but increases costs. The use of this technology should be economically viable and should be preceded by a detailed analysis. A factor that must not be ignored is that storage space must be accommodated to fully automatic means of transport. Given the reduced human factor, the number of human errors diminishes significantly.

Thus, the selection of the most relevant technology in the picking area will have a direct impact on increasing work safety in the warehouse and the time of completing warehouse operations.

Warehouse Safety

The question of warehouse safety is of utmost importance. Where the internal transport technology is a warehouse is already established and no modification is possible, the existing internal processes should be examined. Such processes must be organized in a way that ensures work safety and efficiency. If no transport technology has been selected yet, then a series of analyses should help in making the right choice. Internal transport plays a very important role in the entire warehouse, especially in the picking area. It offers multiple benefits but also poses some hazards. To talk about safety, first, it is necessary to identify threats that can occur. The most frequently highlighted threats that are directly related to internal transport include:

- Lack of designated picking routes/paths. This can result in hitting a person, bumping into a rack when passing by quickly, colliding with another means of internal transport, and delaying operations.
- Inappropriate selection of a means of internal transport for picking operations. This can result in overloading the vehicle and its overturning; it poses a threat to life of the operator and other employees nearby and a risk of damage or complete destruction of picked goods.
- Inappropriate distances between racks. This can result in a difficulty in manoeuvring the means of internal transport, which significantly delays the time of picking and creates a risk of collision or personal injury.
- Poorly selected means of internal transport generating greater workload for warehousemen. In addition, the employee is exposed to excessive fatigue, forced to work in an uncomfortable position or lift too heavy packages, etc. It can result in an injury.
- Lack of targeted training for employees operating internal transport equipment. This may result in hitting a person, colliding with another means of internal transport, bumping into a rack or other object, etc.
- Incorrect use of forklifts for two-dimensional picking can result in a person's falling from height or dropping a load. Such threats may result in damage to other employees, means of transport or goods, etc.

Warehouse space also abounds in other life-threatening situations, risks of damage to the goods or internal means of transport. Each adverse event may lead to many dire consequences, including, for example, bodily injury, death, damage to the goods, damage to the storage facility, etc. All this has a direct impact on the time of performance of picking operations. The use of an appropriate technology adapted to a specific warehouse facility can significantly facilitate work, increase safety and minimize

losses. Based on market monitoring and analysis of materials from the warehouse industry, it becomes evident that the most commonly used internal transport equipment in the picking area is picking trucks operated by an operator and falling under the definition of mechanized technology. This does not mean that the use of this type of trucks does not carry risk or threaten the safety of employees and goods. As a result of analysis of many studies and reports, it appears that many personal injuries and damage to goods are caused by operating picking trucks. The presence of pedestrians or other internal transport equipment in the same areas can result in collisions and hits. Additionally, if more than one truck takes part in the picking process, congestion and hold-ups may occur. They may result in delays, downtime, nervosity, or distraction, which may additionally increase the risk of collisions, falls, hits, etc. Based on classification contained in the analysis of accidents and dangerous technical damages covered by technical supervision, the following are regarded as categories of causes of accidents related to internal transport means:

- Design/construction errors - this includes defects within the internal transport equipment, drive system, control system, braking system, improper selection of materials for specific components/devices, inadequate safeguards, etc.
- Manufacture defects - faulty connections, material processing defects, failure to comply with the conditions contained in the operation and maintenance documentation, etc.
- Material causes - this group includes hidden defects in materials, material fatigue, the action of corrosive substances or corrosion.
- Operating errors - improper maintenance or inspection of the device and its systems, poorly conducted repairs and alterations, improper organization of the workplace, failure to comply with the technical supervision requirements, poorly trained personnel operating the means of transport.
- External factors - natural disasters, fires, etc.
- Unexplained causes.

According to the analysis of the available literature on the subject, the most common causes of accidents are operating errors, followed by bad design and defects in manufacture. The following risk can be identified when working with a truck:

- Getting hit by a moving truck.
- Lifting a person on forks.
- Truck overload.
- Loss of truck stability during cornering.
- Collision with another truck.
- Getting burned while in a truck.
- Catching a fixed element with forks.
- Truck fall from a loading dock.
- Crushing with a truck or truck accessories.
- Hitting with transported load.
- Running over or hitting by a truck.
- Hitting by a reversing truck.

The main causes of accidents involving trucks include:

- Lack of skill or competence.
- Operator's inattention.
- Operator’s recklessness.
- Poor condition of equipment.
- Mechanical failure of equipment.
- Design defect of any part of equipment.

The most common threats to employees related to the use of trucks are:

- Getting hit by a truck.
- Crushing/hitting a truck operator/pedestrian by goods falling from height.
- Too quick or careless stepping out of the truck cab.
- Truck overturn.
- Truck collision with another truck or a fixed object along its route.

If is it already known what risks may occur, what their cause is and what consequences they may produce, all possible action should be taken to eliminate such risks or, if not possible, minimize them by increasing work safety and reducing picking operations time. If a warehouse facility is at the design stage, the designer should allow for all measures aimed to improve work safety, for example: design wider corridors, design routes accommodating internal transport means, determine the method of traffic management by, e.g. separating pedestrian and mechanized transport routes, reducing the number of intersections, etc., allow for more and more visible warning signs, spherical mirrors or sound and visual signalling devices. The basic measures necessary to reduce the risk of hazardous situations occurring in internal transport include, for example:

- Organization of pedestrian movement and internal transport.
- Setting the maximum possible speed of internal transport means in the warehouse facility.
- Reducing the number of truck meeting points including intersections.
- Limiting the number of blind spots to improve visibility: the use of spherical mirrors, reversing cameras, audio signals.

In internal transport, it is crucial to separate pedestrian traffic from wheeled transport completely. However, before such separation is made, the relevant transport routes must be carefully designed. According to the Regulation of the Minister of Labour and Social Policy of 26 September 1997 on General Occupational Health and Safety Regulations, a warehouse facility operator is required to:

- Label all traffic routes, transport routes, pedestrian roads and fire access roads in accordance with applicable Polish Standards.
- Roads must be maintained in a condition that does not pose a threat to their users.
- In places where hazards to pedestrians exist, e.g. gates, doors, passages, effective protective measures should be applied.
- There should be no thresholds or steps on carriage and storage routes.
- The dimensions of roads and passages must correspond to the potential number of users and the type and size of internal means of transport and loads.

The importance of picking operations time and the choice of internal transport technology

The need for fast handling of a large number of orders requires highly efficient warehouse processes, among them picking. This fact necessitates the use of more means of internal transport. The prevailing trend to reduce warehouse space translates into designing spaces with a maximum storage area at the cost of transport routes. Because of the need to handle a large number of orders, any warehouse facility is filled with numerous means of internal transport and pedestrians, which creates a serious risk of collisions, accidents involving pedestrians, hold-ups, etc. All this makes picking operation times significantly longer. This, in turn, causes delays in the handling of orders for customers. It can therefore be concluded that optimum and well-organized movement of personnel (pedestrians) and trucks in the picking area has a direct impact on the efficiency of the entire logistics chain in the enterprise. The picking process is not only vital but also consumes most time allocated to warehouse operations. Analysis of the share of individual activities in the total time needed for picking processes shows that nearly half of this time is spent on movement, as shown in Fig. 1.

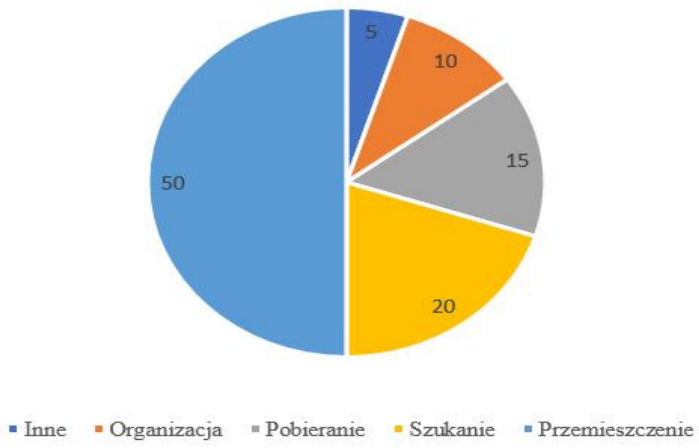

Fig. 1: Percentage share of warehouse activities in the assembly process

Fig. 1 demonstrates that the time spent on movement in the picking area is incomparably long compared to other activities. A consequence of this is higher costs of operations. Therefore, it is essential to minimize this time by choosing the right technology and organizing the movement of all picking process participants in the most optimum way. This will not only reduce working time but also increase work safety. To ensure a proper, efficient, effective and safe functioning of a warehouse facility, selection of the best internal transport technology is a priority. This choice is closely linked to economies of scale. This means that high material flow rates in warehouse facilities justify the use of transport technologies that are expensive to acquire and maintain. These technologies prove efficient and effective not only in the processes that they support but also benefit the entire warehouse. If a large number of operations is carried out in a warehouse facility, even small time savings at each handling stage will generate measurable savings across the board. Expecting the top efficiency of the internal transport process, it is necessary to analyse available and necessary data to be able to make an informed choice between automated, mechanized, and manual technologies. Before making a decision, an in-depth analysis must be made of the structure and flow rate of load in the warehouse (or in a specific functional area) as well as the costs of human labour and equipment performance. Given the above, the selection of best internal transport technology is regarded as a complex and challenging process. However, a properly organized internal transport should ensure the handling of warehouse streams at reduced use and wear of means of transport and minimum time of operations along with streamlining operational and operating costs. The analysis of the selection of internal transport technology in a warehouse should cover criteria that are relevant from the viewpoint of operations in a logistics facility. Each enterprise has different possibilities and requirements. Sometimes, warehouse operators wish to get automated but after a careful analysis they realize that it is not economically viable. In order to gain a competitive edge, many companies streamline their operations through automation (wanting to reduce costs without compromising the quality of rendered services). Every customer expects their deliveries on time and at the right quality and expects transport services at the lowest possible price. Warehouses where goods are stored or transshipped are one of the links of the logistics chain. Therefore, before selecting the optimum internal transport technology, it is vital to perform an analysis based on a number of criteria. These criteria should also be chosen very carefully and should reflect the actual capabilities. They are:

- availability of technologies on the market;
- selection of the method of storage/picking/issuing;
- type of existing warehouse equipment;
- specifications, advantages, disadvantages and general guidelines regarding the use of specific technologies.

Some more criteria what should be followed are:

- technical:
    - warehouse area (large/small);
    - spatial dimensions the warehouse facility (small due to restrictions for low-rise buildings or large without restrictions);
    - capacity of functional areas;
    - process efficiency (maximizing the efficiency of processes carried out with a particular technology - storage, picking, internal transport);
    - level of process automation (determining which processes carried out within the facility need automation and to what extent).
- commercial:
    - investment in technology (profitability ratio);
    - operating and operational costs (costs related to the use of a specific technology in performing logistics operations, e.g. picking, movement, and others).
- additional:
    - selective character of stored goods (whether it is necessary to ensure access to each loading unit at any time or only to one type of assortment);
    - universal character of technology (whether it can handle multiple tasks, whether the means of internal transport can carry out different operations in the warehouse, whether the technology allows easy reconfiguration and expansion of the internal transport systems);
    - safety (of personnel and equipment).

Internal transport technology is a way of implementing the transport and storage process related to a logistics objective in logistics facilities. To do that, the following relationships must be taken into account existing between:

- load streams described by item, number, dispatch and collection points, available time and buffer locations;
- information streams related to material flows;
- efficiency of the transport and storage system components;
- unit operating costs of used resources;
- the facility and its surroundings.

Other means of transport selection criteria are also found in the literature on the subject. They are grouped into technical and commercial. The technical criteria are:

- external factors which cover: the type of load (properties, technical vulnerability, number, etc.), type of transport task, the extent of carriage contract between suppliers and recipients, dispatcher’s and recipient’s infrastructure, carriage time and cost;
- internal factors which cover: loading machines and their performance of required tasks, personnel and their qualification, work organization, technical facilities.

The commercial criteria are divided based on the perspective of each participant of the transport process:

- carrier's perspective: proper use of the vehicle's capacity/carrying capacity, adequate securing of load, ensuring the lowest transport costs;
- dispatcher’s and recipient’s perspective: to preserve the functional parameters of loads, to maintain desired quality at reduced costs;
- producer’s perspective: the volume of demand based on operations, minimization of inventory, delivery of components indispensable for operations, warehouse size, performance of transshipment equipment at the beginning and end of the process, daily delivery and dispatch volume, JIT deliveries, delivery time, etc.

Currently, there is a tendency to automate logistics processes. The same trend is reported in transport. However, it should be noted that before making a decision on the use of automated means, it should be preceded by an analysis of the structure of material streams within the logistics system. The basic conditions for internal transport automation are:

- logistic form of loads - unified, repeatable, standard sizes, packages properly and well protected;
- high-quality material carriers;
- material flow volume - the criterion of cost-effectiveness of using automation technology;
- justification for using automation in place of manual (human) work;
- high quality of logistics services - high price of handled goods, goods requiring special conditions (e.g. medicine or electronics);
- special working conditions, e.g. cold, required sterility, meaning impeded access;
- low assortment variability index;
- ability to integrate new solutions with existing systems.

The selection of internal transport technology can be shown as an algorithm.

Start.

Step 1 - Beginning of the process.
Step 2 - Modelling the warehouse process: describing how the warehouse process will be carried out in a specific logistics facility.
Step 3 - Identification of a single transport routine; many transport routines can be carried out simultaneously or one after another in a warehouse facility; chose one and analyse it to make it serve as a model.
Step 4 - Identification of conditions imposed by technologies for selected routines; the following parameters describing the logistics facility should be provided:

- width of working aisles;
- required lift height;
- method of operating wheeled equipment (control);
- work equipment;
- applied automatic solutions.

Step 5 - Identification of travel starting points; define factors closely related to a routine carried out at the logistics facility:

- single pick-up location;
- a list of warehouse locations where pick-up can take place.

Step 6 - Identification of travel end points; as in Step 4, specify routines carried out in the logistics facility:

- single drop point;
- a list of warehouse locations where drops can take place.

Step 7 - Identification of a transport routine repeatability; based on available historical data, determine the frequency of a transport routine:

- high daily/hourly repeatability;
- low daily/hourly repeatability;
- no daily/hourly repeatability.

Step 8 - Identification of the size of material streams on a given route (in Step 2 a single transport routine was specified). Next, specify what volume of material stream will be handled on the route:

- significant/minor/insignificant.

Step 9 - Identification of even material flows:

- even flows;
- repetitive grouped flows;
- irregular grouped flows;
- irregular flows.

Step 10 - Identification of the types of storage units (moved); specify what types of units will be handled by the means of internal transport:

- one type of standard unit (e.g. pallet);
- many types of units (custom - picking);
- bulk materials (liquid, loose, etc.);
- materials that require specialized manipulators.

Step 11 - Identification of automation requirements; determine the options of use and needs for automation solutions in the logistics facility in order to handle a specific logistics routine:

- high level of routine automation;
- low level of routine automation;
- mechanical routine;
- manual routine.

Step 12 - Selection of the method of operator's movement with the unit; determine how the operator will perform their routines in the logistics facility:

- device operator moved and lifted together with the unit (control and manual work, e.g. picking);
- device operator moved with the device (control);
- device operated remotely or automatically (without operator).

Step 13 - Identification of requirements concerning the universal character of technology (modification of the working area); determine the options of using various means of internal transport or limiting their use to a small number of more universal equipment; adapt to the area size and business capabilities of the logistics facility:

- universal technology with flexible applications and easy modification of the working area;
- specialized technology without the option of modifying the working area.

Step 14 - Requirements for method of movement - vertical/horizontal; define the type of equipment to be used:

- horizontal movement (lifting);
- vertical and horizontal movement (with lifting);
- vertical movement (lifting only by, e.g. lifts).

Step 15 - Identification of travel distance; determine how far the means of internal transport will travel in a specific routine in the logistics facility:

- large (travel between departments/sections);
- small (movement within the area/zone).

Step 16 - Identification of transport and safety conditions; define the basic conditions of operation of the means of internal transport in the logistics facility:

- temperature and humidity;
- precipitation and dust;
- surface type (if required) and inclination;
- employee and unit safety, exhaust emission;
- equipment maintenance conditions (poor/good).

Step 17 - Identification of the need to track material flow (automatic flow registration); determine whether it is necessary to track a load unit as it travels within the logistics facility:

- unit tracking required;
- unit tracking and identification required (mass, dimensions, label);
- no tracking and identification required.

Step 18 - Identification of the options of replacement of human work with automated work; in this step, the possibility of automating human labour (or vice versa) should be analysed. Based on the required data, decide on the right solution best matching the logistics facility where a specific routine is carried out:

- high/low human labour costs;
- availability of qualified staff.

Step 19 - Identification of available financial resources; in this step, carefully analyse all the above factors and determine the ultimate resources equipped with the knowledge about the financial capabilities of the logistics facility.

Step 20 - Choice of the selection criteria; each decision-maker will choose options based on other criteria, depending on the needs, financial resources and the volume of material flows.
Step 21 - End of the process.
Stop.
The algorithm is shown in Fig. 2.

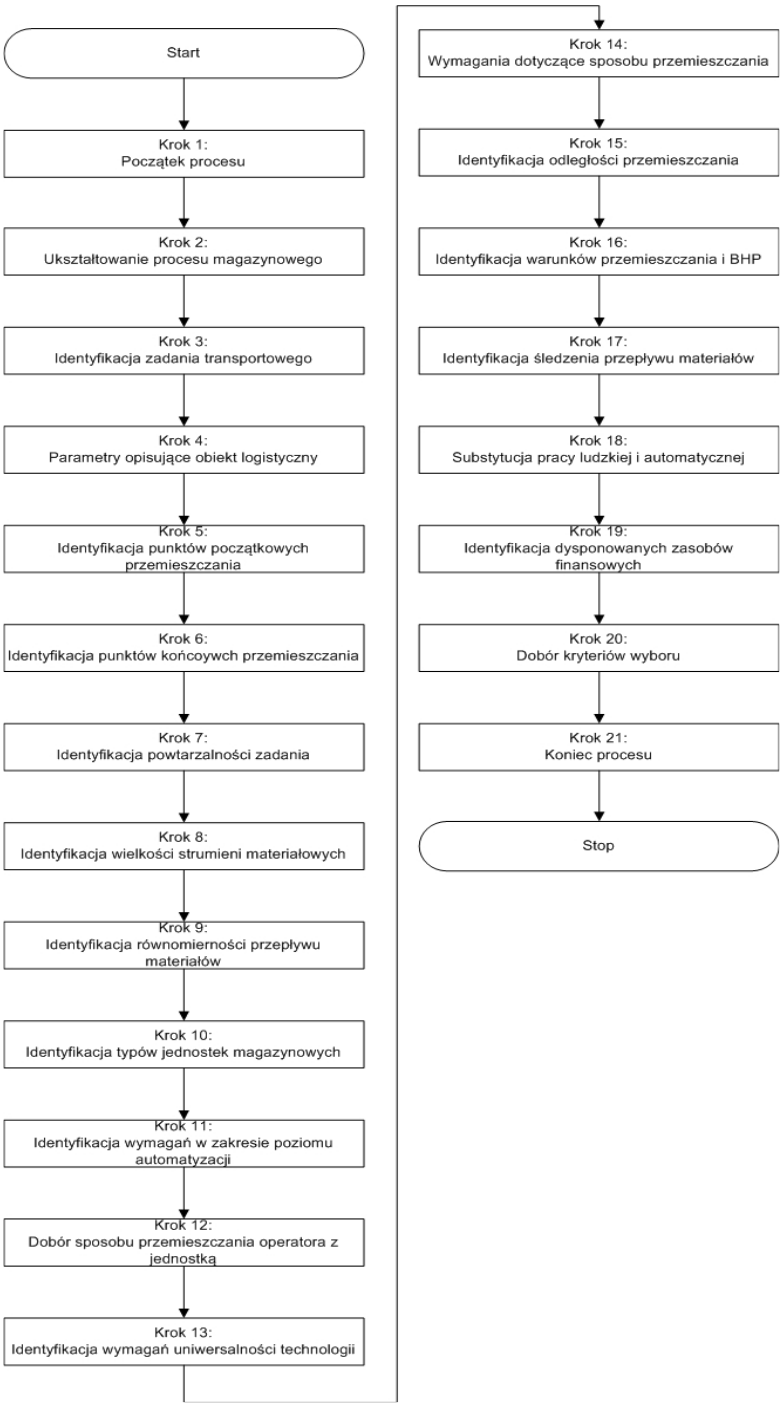

Fig. 2 : Algorithm for the selection of internal transport technology

1. Simulation of the picking process

For research purposes, a computer simulation was designed with FlexSim to show how the selection of appropriate technology can help reduce the time spent on moving the means of internal transport in the picking area and increase work safety. The following assumptions were made (Fig. 3):

- The picking area is separated from the storage area; they are separate zones.
- The test case has nine racks in the storage area (R1-R9).
- The assortment weights are the same for each tested variant.
- Three picking orders are defined dropped on three intermediate storage places (PO1-PO3).
- Tested technologies: manual (human work with a pallet truck), mechanized (a human-operated truck), automated (AGV truck, with a human a controller and not the executor).
- An 8-hour work shift was adopted; one shift with breaks in accordance with the regulations.
- Movement speed for AGV: 1.5m/s; forklift 3.1m/s; operated pallet truck 1.4m/s.
- Distances between racks, width of transport aisles, etc. in accordance with the applicable regulations.
- Two cases for each technology were put to test:
    - The method of movement of the means of internal transport was determined (routing).
    - No method of movement of the means of internal transport was determined (no routing): every means moves in such a way so as to complete the routine as quickly as possible.
- During the simulations, there are also variants adopted in which there is no simultaneous movement of the human-operated pallet truck, forklift or AGV. For one simulation, only one type of means is used.
- Due to the fact that a human moves slower than a forklift, the following equivalent numbers were adopted: forklift type (mechanized technology) - 1, employee with a pallet truck (manual technology) - 6, AGV truck (automated technology) - 4.

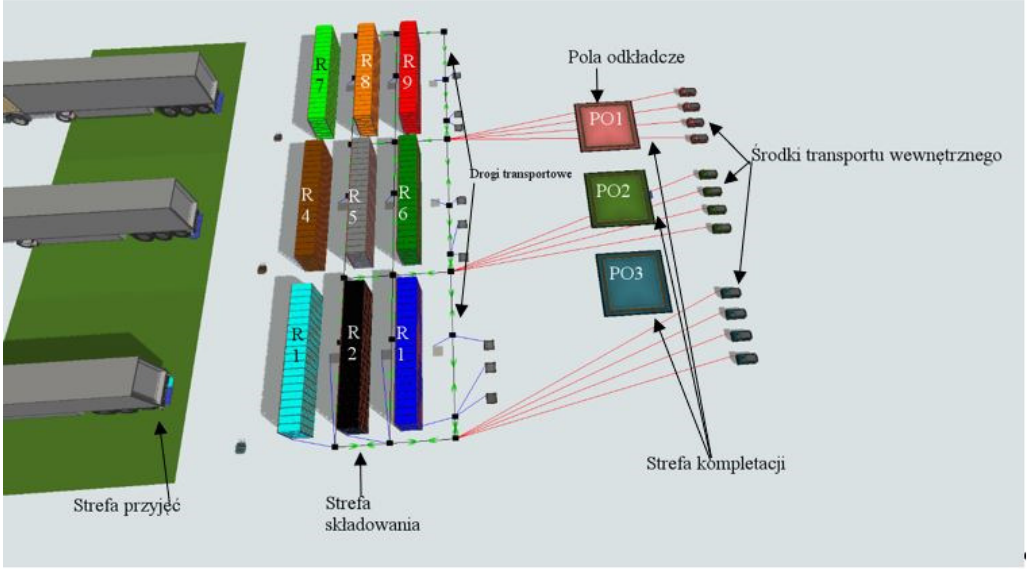

Fig. 3: Model of the warehouse picking zone

The completed simulations yielded results for the first variant, i.e. lack of work organization and no hold up and collision avoidance system in place (collision of a means of internal transport with another means and hitting a standing object as a result of fast travel or a large number of vehicles at a time in one space). The results are given in Table 1. Table 2 shows the results of organized work for the same conditions as in Table 1.

Table 1: Work not organized – results

Number of means of transport	4	8	12	1	2	3	6	12	18
Technology	automated			mechanized			manual		
Working time [s]	18976	20536	21536	18240	18781	19231	19561	21550	21600
Number of collisions [pcs]	18	24	31	4	6	9	22	45	55
Number of hold-ups [pcs]	2	4	6	0	0	1	5	11	16

Table 2 : organized work – results

Number of means of transport	4	8	12	1	2	3	6	12	18
Technology	automated			mechanized			manual		
Working time [s]	17939	19158	19974	16890	17272	17670	18627	19082	20442
Number of collisions [pcs.]	10	13	16	1	1	2	14	21	31
Number of hold-ups [pcs]	0	2	3	0	0	0	3	5	8

Analysing the obtained results, proper organization of movement of the means of internal transport should no doubt be a priority as it significantly reduces the risk of hazardous situations, such as collisions, accidents, pedestrian incidents, etc. In addition, the choice of the most appropriate technology to satisfy the needs of the studied warehouse facility may not only improve work safety and minimize the risk of bodily injury or damage to transported and shelved goods but also minimize the time spent by internal transport means on movement. The results presented in Tables 1 and 2 and, above all, the time of movement of internal transport means are influenced not only by work organization but also by the number of collisions, hold-ups, etc. Therefore, the conclusion is that the selection of the best technology and proper work organization have a tremendous impact on the time of performed routines and work safety in the picking area.

Summary

Conducted simulation and analysis of literature on the subject demonstrate that despite the visible trend of improving work quality by employing measures to minimize risk in the workplace, in particular in logistics facilities, work-related risks and threats are still there. In the times of continuous upgrades and improvement of the means of internal transport, working with a forklift or AGV cannot be regarded as 100% safe and it still threatens the life of warehouse personnel due to pressure to reduce the time of performed operations. There is a noticeable reduction in the number of occurring threats and a significant improvement in the duration of completed routines. However, work in a warehouse facility still generates hazards for the personnel. Therefore, it is of paramount importance to try to avoid the risk of hazardous situations or, if not possible, minimize its occurrence. The simulation tests discussed in the article lead to the conclusion that good work organization is a key to success in terms of work safety and time of performed routines. It is noted that the more collisions, pedestrian incidents or hold-ups, let alone poor work organization, the more time is needed for completing picking operations. Ultimately, the final recipient will receive their goods later than scheduled. Such situations can entail to the loss of customers and may tarnish the company image, thus leading to financial losses. Well-

chosen technology, well-done preliminary and extensive analysis and appropriate work organization can contribute to the company's gaining of competitive edge on the market.

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Innovations and Sources of Their Financing in Russian Economy Sectors

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Abstract

The paper considers theoretical aspects of innovation concept, its common features and possible sources of financing in organizations. It studies innovative activity of enterprises in various sectors of Russian economy, the dynamics of indicators for 2010-2018, the volume of innovationactivity, the share of innovative products of economic entities as well as the costs of innovation, including technological. Priority financial sources are highlighted, suggestions are made to stimulate innovative activity of economy and improvement of innovationfinancingmechanism.

Keywords: innovation, funding sources, business entities, innovative activity, branches of economy.

Introduction

In today's dynamically developing world innovation is an integral attribute of successful functioning of any organization in all sectors of economy. A company's activities related to innovations is understood as a type of work at development and implementation of scientific and technological achievements, creation of new, more competitive products, their implementation at a high-tech level in order to obtain a maximum possible reward. At present, without innovations it is practically impossible to create competitive products with a sufficient degree of high technology and novelty. All this allows toconclude that innovationsare an essential element of anenterprise functioning, which ensures its survival and financial stability. They determine effectiveness of an industry as a whole, provide for a faster development.

In this regard,it is importantto understand whatis innovation. Some scientists formulate this concept as a process, some believe that it is an idea, practice or product that is perceived by an individual as new. The rest emphasize the use of innovation in human activities. All interpretations of innovationconcept share a common feature - a new value of a product created in the process of innovative activity.

Research Methods

The object of the research is an innovative processin Russian economy sectors, financial sources of its implementation. Sources of analytical information are the Federal State Statistics Service`s data, data of legislative and executive bodies of the Russian Federation, our own research. The methodological basis is formally informative, individual and is based on general approaches, deductive and inductive research methods. In the process of observing, collecting, summarizing and processing information various techniques of analytical, economic-statistical, graphical and other research methods have been used.

Research Results and Discussion

In the course of our study the analysis of innovative activity of Russian companies in various industries was carried out, which revealed its rather low level. Positive is the fact that in the period of 2011-2013 there was a noticeable upward trend in the share of organizations engaged in technological, organizational, marketing innovations in the total number of economic entities studied. At the same time, it can be seen that since 2014 the activity began to decline steadily and according to the results of 2016 stopped at the level of 8.4%. The growth of most indicators in 2017-2018 isdue to the refinement of Methodology for calculating criteria for determining innovation activity of an organization based on a new edition of the international manual on statistical measurement of innovations implemented by the OECD together with Eurostat. According to the Federal State Statistics Service`sdata calculated in accordance with the new methodology at the end of the study period (2018), one fifth of all organizations carried out technological innovations, marketing and organizational innovations were carried out on a small scale (Table 1).

Table 1: Indicators of innovative activity of organizations by type of economic activity of the Russian Federation for 2010–2018

Indicators	Years								
	2010	2011	2012	2013	2014	2015	2016	2017*	2018
1. The proportion of organizations implementing technological, organizational, marketing innovations in the reporting year, in the total number of organizations examined, total	9,5	10,4	10,3	10,1	9,9	9,3	8,4	14,6	12,8
- mining	7,8	8,4	8,2	7,6	7,5	6,9	7,4	8,9	7,9
- manufacturing industries	13,0	13,3	13,4	13,3	13,6	13,3	13,3	26,2	23,2
- production and distribution of electricity and gas	5,4	5,6	5,6	5,3	5,1	4,9	4,8	8,4	6,9
- activities related to the use of computer technology and information technology	10,0	9,2	9,4	9,6	8,8	8,0	6,3	7,1	5,0
- research and development	-	29,8	30,1	31,0	33,3	32,2	30,7	66,7	61,4
- agriculture	-	-	-	-	-	-	4,5	5,2	3,8
2. The proportion of organizations implementing technological innovations in the reporting year	7,9	8,9	9,1	8,9	8,8	8,3	7,3	20,8	19,8
3.Share of organizations implementing organizational innovations in the reporting year, in the total number of organizations surveyed	3,2	3,3	3,0	2,9	2,8	2,7	2,4	2,3	2,1
4. The proportion of organizations implementing marketing innovations in the reporting year, in the total number of organizations surveyed	2,2	2,3	1,9	1,9	1,7	1,8	1,4	1,4	1,3
5. Share of organizations implementing environmental innovations in the reporting year, in the total number of organizations surveyed	4,7	5,7	2,7	1,5	1,6	1,6	-	1,1	-

** In 2017, the data change was due to the refinement of the Methodology for calculating the criteria for determining innovative activity of an organization based on the new edition of the international manual on the statistical measurement of innovations implemented by the OECD together with Eurostat (fourth edition of the Oslo Manual).*

Analysis of innovation activity of organizations by type of economic activity showed that the highest level of innovation is seen in companies conducting research and development (more than 60%), in the manufacturing industry (about 25%). At the same time, it should be noted that for Russian economy, focused on the development of digital technologies in all areas of activity, 5% of organizations engaged in innovations in the field of computer and information technology are not permissible. The most difficult situation is in the agricultural sector, where only less than 4% of agricultural organizations introduce innovations.

Table 2: Indicators of innovative activity of organizations by constituent entities of the Russian Federation for 2010–2018

Indicators	Years								
	2010	2011	2012	2013	2014	2015	2016	2017*	2018
1. CentralFederalRegion	8,6	10,2	0,9	10,7	0,9	0,9	10,3	18,5	16,2
2. NorthwesternFederalRegion	9,4	11,2	11,0	10,7	10,3	9,6	8,3	15,9	15,9
3.SouthernFederalRegion	7,5	6,5	7,4	7,2	7,7	7,6	7,1	11,9	9,5
4. North Caucasus Federal Region	6,2	5,2	6,4	5,9	6,5	4,7	2,9	7,5	4,4
5. VolgaFederalRegion	12,3	12,7	11,9	11,7	11,4	10,6	9,4	14,3	13,3
6. UralfederalRegion	11,5	11,5	10,6	9,6	8,9	7,9	8,2	15,7	14,9
7. SiberianFederalRegion	8,2	8,8	8,5	9,1	8,8	8,0	6,9	12,3	9,9
8. FarEasternFederalRegion	8,6	11,2	10,8	9,5	8,9	7,2	6,4	10,5	8,9

In order to identify the most active regions of Russia in terms of introducing innovations the level of innovation activity in the regions was evaluated (Table 2). So, in the Central Federal Region the highest activity is observed in the Lipetsk Region, where the share of organizations implementing innovations is 23.6%. In the Northwestern Federal Region only the city of St. Petersburg stands out with a level of innovative activity of 28.3%, in the Southern Federal Region - Rostov Region - 13.2%. The lowest indicators of innovation activity were recorded in the North Caucasus Federal Region, where the highest rates were recorded in the Republic of Ingushetia - 10.5% and the smallest - in the Chechen Republic - 0.2%. Among all the regions the Volga Federal Region is noticeably distinguished, in which a fifth of all organizations carry out technological, organizational and marketing innovations. So, in the Penza Region innovative companies account for 20.9%, in the Republic of Tatarstan- 21.5%, and in the Chuvash Republic - 30.4% innovations.

Analysis of innovative activity involves an assessment of dynamics of volume of innovative productssales. As can be seen from the data presented in Fig. 1, during 2010-2018 there was a constant increase in the volume of shipped innovative products, which occurred mainly due to an increase in the volume of sold innovative products in manufacturing. As mentioned above, the role of the agricultural sector in the innovation process is very small, so by the end of 2018 agriculture

accounted for only 0.75% of the total volume of shipped products.

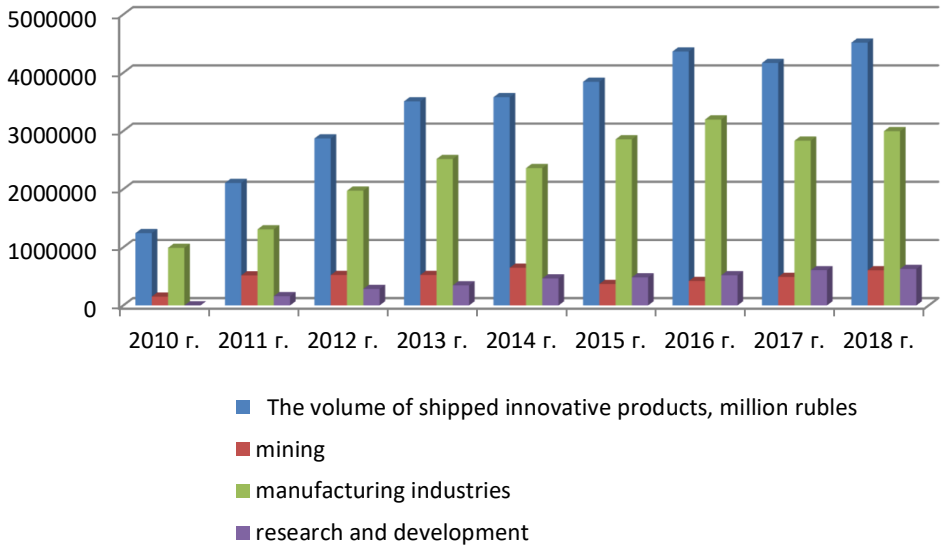

Figure 1 – Dynamics of the volume of shipped innovative products of organizations of the Russian Federation for 2010-2018, million rubles

As noted above, technological innovations prevail in the structure of innovations carried out by Russian companies despite the fact that their share fluctuated strongly from 73% to 33% during the entire study period from 2008 to 2011 and at the end of 2018 it amounted to more than 80%.

Due to the fact that the share of innovative products that have undergone significant technological changes or are newly introduced is significant, it seems interesting to study the costs of technological innovations. The costs of technological innovations increased from year to year, theygrew especially significantly in 2011 when they increased by 83% compared with the previous period, a slight decrease was observed only in 2015 (Fig. 2). In general, over the entire period of study the costs of technologically innovative organizations increased 3.7 times. Assessing the costs of innovation of organizations by type of economic activity, it should be noted that manufacturing industry accounts for the greatestcosts. Innovationcostsof agricultural organizations are small, their share being only

1.5%.

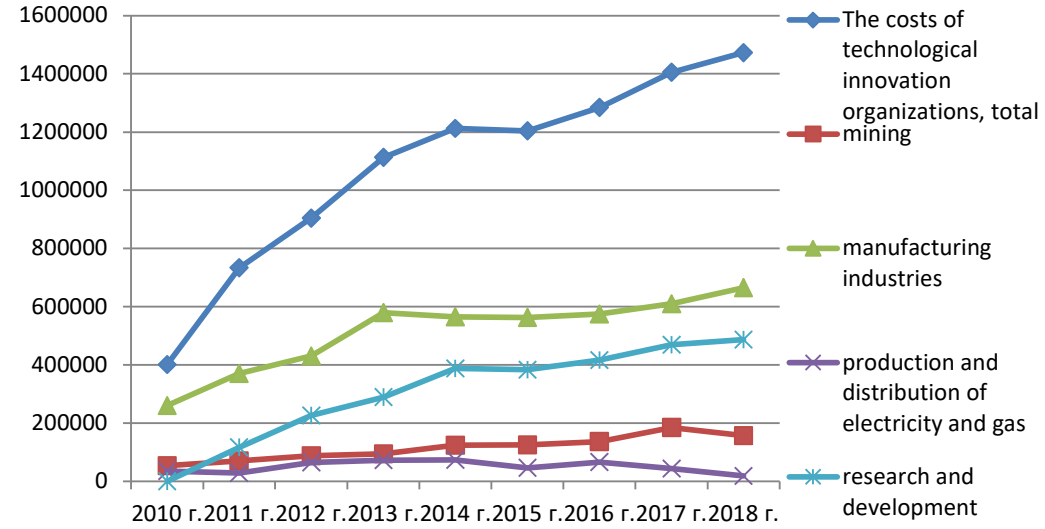

Figure 2 – Dynamics of costs of technological innovations of organizations by type of economic activity in the Russian Federation

for 2010–2018, million rubles

An assessment of the structure of sources of financing technological innovation showed that the main source of financing innovation in all sectors is organizations` own funds. Their share in all sources of financing in Russian economy in 2017 amounted to 53%, ranging from 68% in industry to 100% in construction. The share of budget funds has increased significantly in recent years and amounted on average to 27%. The highest share of budget subsidies for innovations is observed in the service sector, where it amounts to 56%, about 11% - in agriculture and 9% - in industry.

One of the most important constraints on the implementation of innovations by organizations is significant cost of research and development, unbearable for a significant number of business entities. In this regard, the study analyzes modern tools of state support for research and development available in Russia. We determined the most effective ones, among which:

- state assignments to scientific institutions subordinate to the Ministry of Education and Science of Russia;
- The federal target program “Research and development in priority areas of a scientific and technological complex of Russia for 2014-2020”;

- Fund for Innovation Promotion;

- Russian Science Foundation;

- RussianFoundation for Basic Research;

- Federal scientific and technical program for agriculture development for 2017-2025;

- Decrees of the Russian Federation Government of April 9, 2010 No. 218 and No. 220.

The largest amounts of funds to support scientific research during the study period were allocated to the federal target program, approximately the same amount of funds -to the Russian Science Foundation and the Innovation Promotion Fundtofinance scientific research.

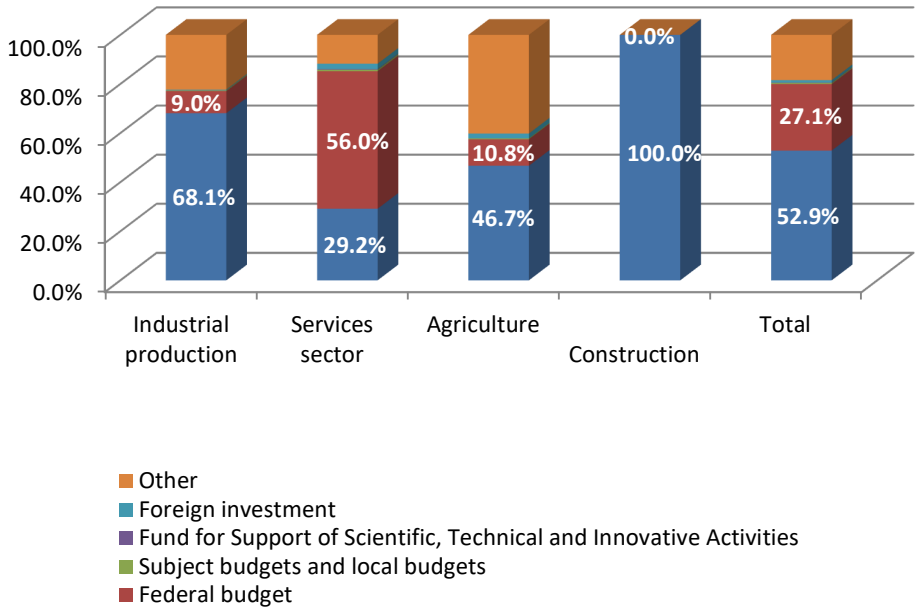

Figure 3 – Structure of innovation financing sources, %

Difficult financial situation of organizations in most sectors of economy causes an urgent need to improve the mechanism of financing innovative processes in the real sector of economy. The analysis ofvarious scientists` points of view showed that the following development directions are most timely:

- development of the credit sector of economy;

- use of resources received in the stock market;

- use of funds of non-state pension funds (NPFs) and insurance companies;

- accumulation, distribution, coordination and setting restrictions on the use of financial assets through development banks; development agencies; financial corporations; investment, venture and sovereign funds; credit cooperatives; microfinance organizations; investment companies;

- development of financial market: stock market, banking services market, foreign exchange market;

- issue of infrastructure bonds, which can be issued in the following forms: corporate bonds issued by a special company, created to implement an infrastructure project; targeted public bonds, intended for implementation of specific projects, launched by public companies;

- development of a system of innovation financing and investment process (SFIIP), which is based on the mechanism of public-private partnership and provides for innovationfinancing and investment

projects in three ways - exclusively by the state, mixed way, on the basis of public-private partnership, on the basis of investment only on a private initiative ;

- development of targeted "operational" financing of the real sector of economy directly by the constituent entities of the Russian Federation;

- state support of innovative component of the real sector of economy by creating conditions tosupport development of innovative activities.

Conclusion

Thus, organization of innovation financing should be focused on a plurality of sources of financing and suggest a quick and effective implementation of innovations in terms of their commercial value, which ensures significant growth of financial returns from innovation. Additional sources of innovation financing may be funds of institutions which supportfinancial innovations, venture capital funds, business “angels” and banks. Improvement of mechanism of innovation financing in the real sector of economy has enormous potential and its realization will improve the overall efficiency of Russian economy.

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Prospects for the Integration of Extracurricular Education into a Single Educational System: Management Aspect

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Abstract

Inevitable succession of generations and necessity to preserve inner potential of the state presupposes the mandatory transfer of accumulated positive experience, knowledge, traditions, mentality from ancestors to their descendants. The state as a universal regulator of social relations plays a leading role in these processes, subject to the harmonious interaction of school and family, which contributes to harmonious development of personality. The study is devoted to the problems and prospects of developing a system of additional education for children in modern environment. The authors analyze the management activities of the region's administration to create the designated system; consider certain aspects of providing educational services as to relevant administrative decisions. The understanding of the system of additional education for children as part of a single educational environment has been updated.

Keywords: Educational Environment, System of Additional Education, Social Effect, Educational Policy.

Introduction

Human education is an extremely complex and controversial process that is directly related to learning, but at the same time it represents a focused activity on the formation of a personality through the perception of cultural traditions, spiritual and moral values, the implementation of communication skills in society. As the paradigm of teaching changes, the educational process should be aimed at achieving new pedagogical results, which will enrich learning, enhance its socio-pedagogical effect, unleash the potential of an emerging personality and adapt it in a high-tech, competitive world.

Traditionally, the organization of the educational process was the prerogative of the school, but in these times of change in our country, the "character-building component" gradually fades into the background, is shifted from secondary school to the institutions of additional education. Over the past decade, educational system has been largely modernized and the results of these modernization processes have been the subject of discussion by the general scientific community. Consideration and

prediction of social effects of such modernization, especially in part as they concern and affect parents, children, teachers, etc. are particularly topical.

The situation was complicated by the global algorithmization of educational activities. Such concepts as testing, performance monitoring, all-Russian tests, State Final Examination, and Unified State Exam have firmly entered into Russian reality and have focused the attention of educators on narrow subject-based instruction, which features a strict technological focus. Two decades of work of the reformed school resulted in not very pleasant, but quite pronounced trends:

– the authority of collective education has been largely discredited in the pursuit of the satisfaction of individual needs;

– excessive attention to the implementation of an individual approach in teaching, the growing role of the teacher, has several paradoxical consequences:

– on the one hand, it provokes the development of egocentric personality traits. Today, the opinion that young people are considered only as consumers, but not creators, has become commonplace. At the same time, the personality maladaptation in society results in infantilism in children and adolescents; the fact that significantly affects the effectiveness of the entire educational process;

– on the other hand, individual education is combined with the universal knowledge testing methods and the depersonalization of the process of monitoring learning outcomes, which often does not correlate with students' expectations;

– the transition to averaging monitoring technologies, including “calculating of the average grade”, is based on the automation of the process when the individual achievements of the child are no longer crucial, which partially eliminates the very attempts to achieve individual high results, which, in turn, reduces the motivation for learning and causes a number of psychological problems;

– the traditions of collective labor education have actually been lost, as a result of which the number of socially unadapted, psychologically immature graduates of educational institutions who are unable to independently and fully organize their living space, plan further education, start building careers, etc., is increasing.

Leading teachers and practitioners note negative trends that appear in Russian school, but are forced to obey the administrative decisions and have to comply with the requirements in their activities. Unfortunately, the educational component of pedagogical activity and character-building activities cannot be fully realized in the current conditions. In this regard, multidisciplinary institutions of additional education take much more responsibility for organizing a personality-oriented approach in developing a harmonious, valuable personality than before.

The purpose of the study is to determine the whole complex of organizational conditions that can ensure the integration of additional education of children into a single educational system.

Methods

The object of the research is the organization of the educational process in the period of reformation considering general and additional education as a single system.

The subject of the research is the organization of the educational environment in the region, the prerequisites for the formation of social effects as a result of implementation of general and additional education.

The theoretical basis of the research is scientific developments, philosophical concepts considering an individual to be the highest value of society and progressive ideas of humanistic pedagogy. The key points for this study are the propositions of the supporters of the general systems theory (P.K. Anokhin, I.V. Blauberg, etc.), as well as the theory and practice of pedagogical systems (V.P. Bespalko, V.G. Bocharova, V.A. Karakovsky, G.I. Legenki, A.V. Mudrik, L.I. Novikova and others). A significant contribution to the study of the theory of modeling pedagogical systems was made by V.P. Bespalko, I.V. Bestuzhev-Lada, B.S. Gershunsky, V.V. Kondratiev and others. V.A. Berezina, A.K. Brudnov, O.S. Gazman, V.P. Golovanov, V.A. Gorsky, I.P. Ivanov, M.B. Koval and others developed the theory of additional education. In the context of this study, the provisions of the theory

of personal development were applied (A.G. Asmolova, I.V. Abakumova, L.S. Vygotsky, P.N. Ermakova, A.R. Luria, A.N. Leontiev and others).

The methodological basis is the cultural, historical, systemic and activity-based approaches to education, a set of scientific concepts about the socio-historical conditionality of the educational process, the laws of creative activity as a factor in the upbringing and socialization of children.

Results and Discussion

A fairly long period of systemic changes in education has been accompanied by research and systematic assessment of the socio-economic consequences of its modernization and social effects produced. Theoretical understanding of even intermediate results is necessary for development of future scenarios for education evolution.

The Federal Law "On Education in the Russian Federation" states "the importance of additional education aimed at meeting individual needs of the population in intellectual, moral, physical improvement, health promotion and the organization of free time".

Considering the features of the organization of the educational process, it can be noted that one of the main features of the Russian education system as an object of management is the concentration of efforts on the management of individual elements of the educational system, and above all, educational institutions, as well as setting of standards for various types of activities. However, taking into account the diversity of reforms taking place in the sphere of education today, it would be irrational to single out only a specific outstanding process. Despite many years of tradition and rich Soviet experience in understanding the educational process as a cohesive whole from the perspective of a systematic approach, where the education and character-building of an individual were considered interrelated elements, the situation is different in the modern practice of providing pedagogical services while the system of additional education stands alone here. Today, at different levels of power, the necessity to integrate the system of general and additional education into a single whole is considered. Based on the need to solve the problems of managing the educational process in the Russian Federation, the implementation of additional education is considered as an integral part of modern education. The intellectual, spiritual development of an individual is facilitated by the activities of the network of institutions of additional education, which are actively developing and gaining new significance in the changed conditions of social contract.

So, the main social effect of the implemented educational policy and, accordingly, of all the ongoing modernization processes, is to achieve high quality and accessibility of additional education as a necessary condition for the likelihood of further social differentiation of society. This approach, having a political, strategic and ideological character, is recorded in the main documents of the Government of the Russian Federation, the Ministry of Education and Science of the Russian Federation.

According to the findings of V.V. Lobanov, the essential characteristics of the additional education of children, which determined its successful development in multidisciplinary extracurricular institutions, are:

– comprehensiveness, which is the focus of additional education on the education, character-building, development, enlightenment, wellness, socialization and vocational guidance of children;

– subjectivity, understood as providing children with opportunities to fulfill their individual needs, interests and needs, compensating for the insufficient variability of school education;

– self-government, understood as a variety of forms of children’s influence on the life of an educational association;

– humanism, which is organization of the educational space of an out-of-school institution, allowing children to choose the forms and level of their participation in the activities of the team.

Modern social contract, introduction of new education quality standards and financial and economic mechanisms for managing this system predetermine a significant change in the attitude to the organization of extracurricular activities for children by teachers, officials, recognizing the

importance of the work of additional education organizations, making their work important and relevant. This point was repeatedly mentioned by the President of the Russian Federation V.V. Putin both in official statements and speaking at various civil forums - the All-Russian Popular Front, the All-Russian Pedagogical Assembly, etc. It is necessary to note that it is impossible to achieve the goals set by the President of the Russian Federation and solve the designated strategic tasks without changing approaches to the formation of a new, progressive infrastructure of educational environment. This fully applies to both general and additional education.

Changing system of additional education began to offer a wide range of diverse programs designed for the widest range of children - additional programs of artistic and aesthetic, cultural, intellectually-developing, environmental orientation, programs for children with disabilities and a number of others. In 2018-2019, regions of the Russian Federation continued their efforts to create modern conditions for character-building and education in the system of general and additional education.

So, according to statistics, the share of municipal educational institutions that meet modern educational requirements amounted to 77.2% (compared to 2014 - 76.6 %) in the Tambov region. In modern conditions, when developing concepts for organizing the educational process, it is necessary to focus not on the requirements of today, but to take into account all the trends in the development of education that will require appropriate infrastructure in the future.

Today it is believed that the role of the additional education system, as the main institution of personality socialization, which can contribute to the weakening or elimination of the risks of social differentiation, will be recognized and appreciated by society in the event that every child will be able to maximize their potential, regardless of place of residence, health or material wellbeing. In this regard, one cannot ignore the positive experience of the administration of the Tambov region: the recently launched regional project “Equal rights for children to receive a quality education”, scientifically supported by the Higher School of Economics. This project has developed due to the need to support schools operating in complicated social contexts, thereby reducing the inequality of educational opportunities and differentiation in the quality of education between schools.

One of the reasons for differentiating of the quality of education in schools is the difference in the conditions of their functioning, human resources, and social characteristics of the contingent. If this situation is ignored and specially organized measures are not taken to change it, then there is a risk of a negative social effect: differentiation of schools will lead to differentiation of human capital and ultimately affect the investment attractiveness of individual territories. Of course, one cannot expect a quick change in the situation for the better, but the processes have started and now it is very important for schools not to stop, but to work systematically and purposefully to improve the quality of both general and additional education.

The system of general and additional education as full-fledged parts of the educational process can successfully integrate into each other, as it is mentioned in the fundamental documents providing for a plurality of options for every person, “in which his personal and professional self-determination is actively formed” - in the Law on Education, the Concept of Long-term Socio-Economic development for the period until 2020, the National Strategy for Children, the Concept for the Development of Additional Education, etc.

The system of institutions of additional education is controlled by municipal and regional authorities acting in accordance with federal and regional legislation. The activities of the Office of Education and Science of the Administration of the Tambov Region and the Education Committee of Tambov, as well as their subordinate organizations in recent years have been aimed at achieving goals and solving system tasks according to the decrees and instructions of the President of the Russian Federation, decisions of the heads of the Administration of the Tambov Region and the Administration of the city of Tambov. It should be emphasized that the tasks in the field of education were solved in accordance with the indicators of the socio-economic development of the region and the effectiveness of various levels of government, available potential and resources, taking into account changes in legislation in the field of education and strategic guidelines for public policy in the framework of the introduction of federal state educational standards for the new generation.

The Tambov Region Administration has created an organizational-functional model for managing the regional priority project "Accessible Additional Education for Children in the Tambov Region", which is currently functioning quite efficiently at the regional level (Fig. 1).

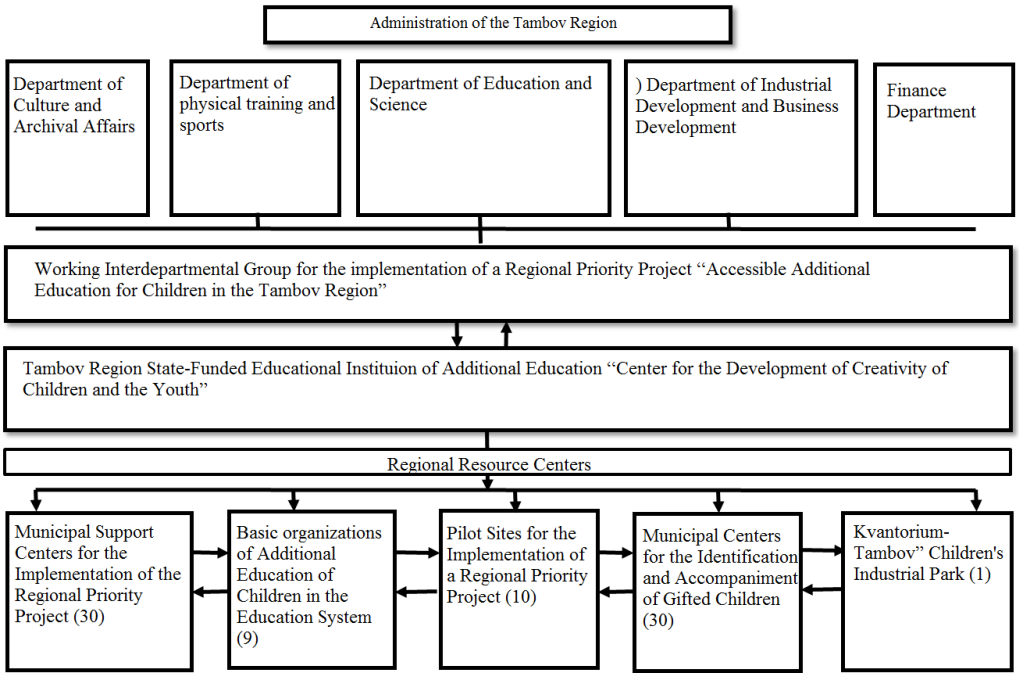

Fig. 1: Organizational and functional model for managing the regional priority project "Accessible Additional Education for Children in the Tambov Region"

In turn, the educational system of the city of Tambov is a developed network of educational organizations covering the following levels of general education: primary general education; basic general education; secondary general education and additional education. The municipal education system of Tambov has 35 institutions that do not only carry out educational activities, but also provide their support.

Obviously, the current educational system does not generate specific goals on its own (they are formed on the basis of external factors, ideally, a national doctrine of education, which takes into account both state and civil orders for education). Through standards, the social expectations of an individual, family, society and the state with respect to education are realized. Thus, taking the interpretation of the educational standard as a social contract, we can talk about the need to construct social norms of trust towards each other of various social, religious and national groups of the population. This is another social effect of the modernization of education, manifested as a result of increasing the openness of education, strengthening the social component in the management of educational organizations, the introduction of courses and subjects aimed at creating civic patriotism, tolerance, and peacefulness.

Often, at the level of a purely departmental approach, standards are perceived as a set of norms that determine the structure, content, results of the educational process, and the resources necessary for its implementation. But it should be noted that the social effect of the introduction of the standard is much deeper and wider. It consists in the formation of civic identity, which, in turn, is a prerequisite and condition for strengthening Russian statehood. It is the standards that act as a tool for constructing a civil (state) identity.

Indeed, new educational standards include programs aimed at creating civic, ethnocultural, and universal human identities. Considering the implementation of standards in terms of addressing organizational issues, training of personnel, logistics, the aspects of upbringing and socialization of the younger generation are often undeservedly ignored. In the new standards, qualitatively different meanings of educational activities are stated, which leads to an increase in the importance of extracurricular forms of organization of the educational process. However, no general standards for additional education were adopted in our country, and this, on the one hand, is a kind of positive point, as it allows children to be developed in accordance with regional specifics, to a greater extent find a personalized approach to a child, on the other hand, allow to properly unify the quality of the services provided. But without the implementation of the individual paradigm of personality development, it is impossible to get a harmoniously developed person, a member of society, capable of self-fulfillment in the future, to feel like a successful person and be valuable to society.

Therefore, today it is impossible to ensure a decent quality of education without attracting the resources of the additional education system. Of course, not at the same pace as in the system of general and preschool, but in additional education, significant infrastructure changes are also taking place that contribute to improving the quality and accessibility of additional programs. In accordance with the Decree of the President of the Russian Federation dated May 7, 2012 No. 599 “On measures to implement the state policy in the field of education and science,” the task was set to increase by 2020 the number of children aged 5 to 18 years studying in additional education programs up to 75 %. According to the results of a survey conducted among children and parents of the Tambov region last year, 96% of respondents are satisfied with the quality of additional education.

In the Tambov region, the integration of interdepartmental resources of education, culture and sports is actively developing: there are 417 “outreach classes” on the basis of schools, more than 30 network interdepartmental projects and initiatives are being implemented, such as “My Little Homeland” (educational tourism), “School Forestry”, “Tambov Region is the Territory of Ecological Culture” (nature conservation, ecology), “Youth Reserve” (work with leaders of the children's social movement). Today, socially oriented programs are extremely relevant, participation in which forms a sense of nationhood, legal and informational culture and tolerance among schoolchildren and students. Such programs and projects are actively implemented in the network of socially active schools, volunteer movement, and search activities. For example, last year 12 schools became participants in the All-Russian project “School of Literate Consumers” aimed at creating competent relations between members of the local community, including students and teachers, with the housing and communal services sector.

The conscious and objective choice of the future profession is also evidence of how successfully school contributes to the socialization of the individual, which is especially important for high school students. Pupils, and in particular graduates, must clearly understand not only the basics of the professions, but also how the economy of the country and the region is developing; know the priority, including high-tech industries; popular professions and specialties.

Very ambitious tasks set by the federal authorities for additional education teachers on involving children in early pre-vocational training at the level of interest groups, clubs, and study groups are being carried out quite actively today, with the annual growth rate. It has been repeatedly emphasized that the crucial importance of orienting a growing and emerging personality towards those professional areas that are in demand by the state today, is future oriented and will play a key role in the development of the country's economy. We have to admit that in the system of both general and additional education insufficient attention is paid to career guidance, in contrast to the system of vocational education. This is understandable: institutions of higher and secondary vocational education are interested in attracting applicants, so this type of work is vital for them. The time has come to change the situation in the general education system as well.

In this regard, the experience of organizing career counseling and pre-profile training for a number of constituent entities of the Russian Federation is very important, including the experience of Togliatti, in which for several years the organization of this activity has been extremely effective based on a specially developed automated information system. The expected effect of this work is to build organizational and technological ties between the school, vocational education organizations, enterprises and, as a result, students could make an informed choice of their future profession.

Particular attention in terms of socialization is required by orphans and children left without parental care. In general, in the Tambov region, a system for the prevention of social orphanhood has already been built, the development of which is ensured by:

– implementation of the project of creating a social cluster “Regional innovative system of child protection in the Tambov region”;

– reprofiling the network of orphanages into centers for family support and child care.

Another group of children that is constantly in the focus of public attention is children with disabilities and children with special needs. In 2018-2019, regions continued to create an accessible universal barrier-free environment and develop inclusive education as part of the implementation of the state program “Accessible Environment”. The organization of real, not pseudo-inclusive education is not an easy task, requiring special knowledge of school administrations and all teaching staff, and most importantly, the conscious adoption of the ideas and principles of inclusive education by all participants in the educational process, including children and parents. These principles are simple and understandable: children with health problems should receive comprehensive education, corresponding to their real capabilities, in order to live a full life. They have the right to communicate, they need support and friendship of their peers. However, the implementation of inclusive education raises many questions and problems regarding organization of such education, content of educational programs, relationship between children, and training of teachers for work with children with disabilities.

In the Tambov region, the Accessible Environment program will continue, the list of facilities for creating a barrier-free environment will include kindergartens, boarding schools and vocational schools. In each of these educational organizations, clear, well-founded plans for the organization of inclusive education should be developed, including, inter alia, work with parents and children. There is a category of disabled children who are educated at home for medical reasons. For these children, the implementation of the project “Distance Education of Disabled Children in the Tambov Region” continues, under which 161 disabled children studied at home in the academic year 2018-2019, and 145 network teachers worked with them. Along with mastering the educational program, children have the opportunity to study additional programs, they participate in contests, festivals, communicate with each other on the site and demonstrate very good learning outcomes.

In 2018, the implementation of an interesting experience of the city of Donetsk began - the new project “Live for Real”, aimed at preparing orphan graduates for independent life. During the project, participants take an interactive course to get acquainted with the basics of social project management, develop and implement their socially significant projects, and form a volunteer team for further activities. Now new projects are being implemented in the region aimed at: implementing a strategy for continuous spiritual and moral education and character-building, implementing an e-learning model, introducing a new model for vocational guidance for schoolchildren, updating school libraries turning them into information and library centers, developing a system of continuous professional growth for teachers, approbating professional standard “Teacher of additional education”. The implementation of a professional standard cannot be considered in isolation from the real activities of educators. Despite the high importance of introducing new approaches, changing the requirements for training and professional qualities of teachers, it is necessary to take into account that on average there is a leadership of 5-6 children's associations for each teacher, which indicates a sharply increased academic load on these institutions and their actual overload in the current situation. As in the general education system, aging and staff shortages are observed here, as well as an insufficient influx of young specialists.

Summing up and listing the positive aspects of the integration of additional and general education into a single educational environment, it is necessary to highlight the problems of organizing the activities of educational institutions. The activities of the Tambov Oblast administration in recent years have been aimed at solving this problems:

– insufficient level of access to quality supplementary education for children with various educational needs and opportunities (including gifted children, children from rural areas and children in difficult situations);

– insufficient level of competence of the teaching staff of the system of additional education;

– insufficient material and technical equipment of organizations for additional education of children;

– lack of competition mechanisms and lack of new approaches to the implementation of educational programs.

Despite the difficulties, primarily associated with the general problems of the development of the Russian state, the immediate prospects for the development of the system of additional education and its further integration in the modern educational environment are clearly visible:

– preservation and development of a network of organizations for additional education of children;

– updating the content of additional education;

– development of modern competencies of teaching staff;

– expansion of the private sector in the regional system of continuing education;

– participation in competitive events held by the Ministry of Education of Russia;

– attraction of extrabudgetary sources;

– formation of a system of early career guidance for children using digital technology;

– development of innovative models of continuing education (technopark, center of modern competencies).

Conclusions

The new realities of the Russian school provide for the formation of not just a creative personality, but a personality that can prove itself and achieve results in the modern world. Exploring the organizational conditions necessary for the full development of the system of additional education, we would like to note the following trends. The implementation of innovative approaches to the organization of the process of training and education in educational organizations is based on the analysis and forecasting of development trends in the system of general and additional education.

There is a departure from the management of individual elements of the educational system and the formation of the idea of the need for a unified educational system that allows you to get the planned results of professional pedagogical activity, where the child should not be perceived as the object of influence, the child in the new education system is a full-fledged subject of diverse educational activities.

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Problems and Prospects for the Development of Audit in Russia at the Present Stage

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Abstract

The article analyzes the state of the Russian market of audit services at the present stage; identifies the main trends of its development, summarizes the factors affecting its functioning. The author formulated directions for the development of audit based on the needs of customers of audit services, the competitiveness of audit entities and the increasing role of audit in the national financial control system. Proposals for improving audit activities will ensure the stability of the audit institution in our country.

Keywords: Audit Activity, Auditor, Financial Statements, Market of Audit Services, International Audit Standards (ISA)

Introduction

Audit, playing an important role in the national system of financial control, is at the same time a type of entrepreneurial activity, so its further development and improvement require in-depth study of the relationship between professional and entrepreneurial elements in this sector of the Russian economy. Despite the fact that the history of auditing in our country has been going on for more than thirty years, questions of the development of its theory are especially relevant at the moment in connection with the transition of Russia to the direct application of international auditing standards since 2017 and the problems encountered in their practical application. The inconsistency of the terminology in force in the legislation of the Russian Federation and international standards, the conceptual approaches to the audit methodology laid down in the ISAs, the imperfection of the self-regulation system in professional activities have caused existing problems in the development of auditing in our country and the need to solve them both from the theoretical and practical aspects.

Materials and Methods

The object of the research is the development of audit in Russia as a type of entrepreneurial activity and the field of scientific knowledge, the main problems and the most important directions for its improvement.

The subject of the research is the regulation of auditing in Russia, cause-effect relationships and the consequences of the state of the market for audit services at the present stage.

The theoretical basis of the study was the scientific development and concept presented in the works of R.Kh. Montgomery, R. Adams, J. Robertson. A. Arens, J. Lobbeck. The fundamental principles developed by these scientists are relevant at the present time and are the object of further analysis for modern researchers and specialists in the field of audit.

A significant role in the development of audit theory was made by Russian scientists K.K. Arabyan, M.A. Azarskaya, S.M. Bychkova, E.M. Gutzeit, Ya.V. Sokolov, V.Ya. Sokolov, A.D. Sheremet, V.P. Suits, etc.

A significant contribution to the field of theoretical and practical aspects of audit is made by modern research by E.V. Zubovoy, Yu.Yu. Kochineva, E.A. Lashchinina, V.F. Massaryginoy, E.L.Skvirskaya and others.

The methodological basis was the historical and logical, formal and substantial research methods. The research methodology also includes analysis, comparison, systematization and generalization of modern scientific literature on the topic of research, legislative acts in the field of accounting and auditing, international audit standards, standards in the field of accounting and financial reporting.

Research Results and Discussion

The situation in the market of audit services is largely determined by the general economic conditions in the Russian Federation. The development of audit in our country is generally characterized by negative trends. According to the Ministry of Finance of the Russian Federation, the market volume in 2018 amounted to 59.8 billion rubles. and over the past five years (2014-2018), its annual growth was from 1.8% to 5.5%, and in 2017 there was a negative trend. If we analyze the volume of audit revenue per 1 million rubles of customers' revenue, we can talk about a stable decrease in profitability in the audit market (from 313 rubles in 2014 to 276 rubles in 2018). The number of business entities in the audit market is declining annually. So, if at the beginning of 2016 there were 4400 organizations operating in the field of audit, as of 01.01.2020 only 3859 audit firms remained in the control copy of the registry. There is a high level of concentration in the audit market: Moscow and St. Petersburg account for 78% of the total volume of services rendered and 44.5% of the total number of audit organizations. Regional auditors have a much lower level of income per auditor.

The number of auditors is also steadily decreasing: from the figure of 38 thousand people at the end of the 90s of the XX century to 18826 people in January 1, 2020. The average number of specialists entering the profession is 250 people per year, which does not even compensate for the losses incurred due to leaving the profession for objective reasons (mortality and retirement). On the one hand, this indicates a decline in the prestige of the audit profession, and on the other hand, it can speak of problems in the current system of training auditors. It is possible that the new concept and procedure for conducting the qualification exam, which will be applied in our country from the second quarter of 2020, can positively affect the development and strengthening of the audit profession.

Undoubtedly, the factors that negatively affect this segment of the market include the state of the business and investment environment of the national economy as a whole, including a decrease in the

influx of new and outflow of existing customers, a decrease in the solvency of customers, and a reduction in budgets for attracting auditors and consultants. practice of holding open tenders for the procurement of audit services and price dumping. All this, ultimately, leads to a decrease or fixing at a constant level of prices for audit and consulting services.

However, in our opinion, the main factors affecting the functioning of the audit market include a low level of demand for audit services. Economic entities in most cases continue to consider mandatory audit as an excessive administrative burden imposed by the state. The low interest in audit services by the state, as one of the investors, often leads to the fact that owners and other users of financial information underestimate the value of audit services and their results. At the same time, government agencies do not take targeted actions to use the audit results to ensure the sustainable development of the financial system and the effective conduct of economic activity.

The Institute of Audit is developing in close connection with the theory and practice of accounting. In educational publications A.D. Sheremet (2014) notes that the subject of audit must be correlated with the subject of accounting. In our opinion, the development of the audit is also significantly affected by issues of the formation and presentation of financial statements, as well as modern corporate governance systems. Starting January 1, 2020, the state information resource of financial statements will be formed in the Russian Federation, the operator of which is the federal tax service. The structure of this resource, in addition to the financial statements themselves, includes an audit report regarding the mandatory audit. We believe that the effectiveness of this resource will directly depend on the quality of financial information and the reliability of the submitted statements. Despite the fact that, in October 2016, the legislation of the Russian Federation was amended to oblige to publish data on the conduct of the mandatory audit and its results on the Fedresurs website operated by Interfax, economic entities do not always comply with these requirements, as there is no liability for not posting this information. Therefore, in our opinion, the state should take measures to strengthen the administrative responsibility of economic entities for the reliability of their accounting (financial) statements, as well as evading the mandatory audit of these statements.

The publicity and accessibility of information contained in the state information resource will improve business transparency and will help reduce the risks of doing business.

A significant impact on the development of audit in Russia, in the author’s opinion, will have a change in corporate legislation from July 1, 2020 regarding the mandatory creation of audit committees that are part of the boards of directors (supervisory boards) of public joint-stock companies. One of the main activities of such a committee is interaction with the external auditor of the company, a preliminary review and assessment of its independence, the absence of a conflict of interest, an assessment of the quality of the audit of the company's financial statements by the external auditor. In the context of international standards, the audit committee refers to those responsible for corporate governance in the company. Auditing standards impose on the auditor a number of responsibilities for active interaction with the audit committee, with the aim of monitoring the implementation of the policy of public companies, which determines the principles for the provision and combination by the external auditor of the company of audit and non-audit services to the company. The application in Russia of the best world practices in the field of interaction between external auditors and audit committees will ensure the confidence of shareholders, as the main users of the audit report, the independence and quality of audit services. In addition, this practice can also be used by non-public joint-stock companies and other economic entities.

A limited range of services offered by audit organizations also has a negative impact on audit development. In our opinion, the functioning of the market for audit services is associated with the need to clarify the subject and scope of audit activities. For a long time, the development of this market segment in Russia was associated with a mandatory audit and the provision of consulting services in the field of accounting and taxation. According to the Ministry of Finance of the Russian Federation, 50% of revenues come from the mandatory audit of financial statements, almost 44% are consulting and only 6% are related services. Most of the tasks performed by auditors are associated with the audit of annual financial statements, the results of which give reasonable assurance of the

reliability of historical financial information. This understanding of the audit proceeded from the definition of the term "audit" is reflected in the law "On Auditing". However, in December 2014, lawmakers changed the definition of an audit to include "other financial information" as an audit object. It should be noted that the new wording did not lead to an actual expansion of the types of audit tasks performed in practice, since the concept of "other financial information" is too vague, and the implementation of audit services was regulated by federal audit standards that consider only audit of financial statements. An attempt to differentiate audit services in the absence of a methodology for their implementation and clear terminology in the legislation could not have a positive effect on the development of audit in our country.

From the point of view of K.K. Arabyan (2017) "the problem of the subject of audit is particularly acute in the audit activity and gives rise to numerous interpretations in terminology, the emergence of new types of audit, the subject field of which is also not clearly identified." The need to develop scientifically based approaches to the definition of audit was previously considered in the works of E.M. Gutzeita (2002), M.A. Azarsky (2009).

The current Russian law on auditing indicates that the types of audit and related services are established by the authorized federal body regulating audit activities. This list was approved by the Ministry of Finance of the Russian Federation three years later (in 2017), however, as the study shows, its adoption did not significantly affect the development and size of the audit services market in 2018-2019.

The recognition on the territory of the Russian Federation of international audit standards has further aggravated the problem of determining the composition of audit services, since the classification of these standards actually establishes the types of audit services. However, the list of services approved by order of the Ministry of Finance of the Russian Federation and the classification of audit and related services based on standards are not unified.

Undoubtedly, the development of audit activity is connected, first of all, with permanently changing information needs of users of audit services, and only, secondarily, depends on changes in legislation. However, the ambiguous formulations of the current Russian law on auditing undoubtedly hamper the development of this segment of the economy. In this regard, the author believes that the norms of the law on audit activities should be changed and the terminology regarding the definition of the nature of the audit and types of audit services brought into line with the provisions of international audit standards.

It is relevant to expand the subject of audit activity by completing tasks that provide limited confidence. Over the past six years, such services have been provided in the form of conducting reviews of interim consolidated financial statements of organizations prepared in accordance with international financial reporting standards. However, with regard to interim reporting prepared in accordance with Russian standards, such checks are practically not carried out. Users of such interim reporting most often use data not confirmed by the auditor, which increases their risk when making economic decisions. In our opinion, one of the tasks of professional organizations of auditors is to educate and inform the business community and users of audit services, aimed at improving the reliability and quality of financial information used in making business decisions.

The diversification of services provided by audit organizations can be carried out, in particular, by expanding the practice of completing tasks that provide reasonable or limited assurance regarding the reporting or its part containing financial information systematized according to special rules. We believe that such services may be in demand by economic entities in relation to tax reporting, including small businesses.

The expansion of the subject of audit activity may be related to the provision of services related to the confirmation of forward-looking financial information (business projects) and non-financial information. In recent years, outsourcing of accounting has become more widespread in our country.

Users of accounting services must be sure that their quality can be ensured only if the organization and effective functioning of the internal control systems of the accounting services provider are properly organized. The auditor's opinion regarding the controls of accounting companies may be provided as a result of the provision of services in relation to non-financial information. However, as the study shows, at the moment, audit tasks regarding the confirmation of non-financial information are practically not found.

The Ministry of Finance of the Russian Federation, as priority areas for the development of audit activities for the period up to 2024, also considers issues of improving the practice of auditors performing additional work during the mandatory audit of socially important organizations, in particular, checking statements of the management of such organizations on the effectiveness of risks and internal control management systems created and supported by them (based on normatively established criteria for such systems), checking the compliance of the activities of such organizations with their strategic documents (2019).

The basis of the institutional structure of the audit profession in most countries is its self-regulation. In the Russian Federation, the legislative obligation for the membership of audit entities in a self-regulatory organization of auditors arose after the adoption of the law of 30.12.2008 No. 307-FZ “On Auditing Activities”. Initially, 6 professional audit associations were created in Russia, but by 2017 their number had dropped to two. However, their activity, as practice has shown, was more focused on solving narrow corporate issues and tasks that did not have public significance. The main problems of the industry - the decline in the prestige of the profession, unfair competition, dumping and, as a result, poor quality of services, have not been resolved by the professional community.

Given the foreign experience and international obligations of the Russian Federation, the activities of this institute, in our opinion, should be focused on conducting research in the field of auditing and developing methodological materials aimed at improving the quality and effectiveness of audit services.

At the end of 2019, the country sharply raised the question of completing the process of consolidating the audit profession and creating a unified self-regulatory organization of auditors, which was supported by the Ministry of Finance of the Russian Federation and the largest 30 audit companies. It is difficult to predict what effect this situation will have on the further development of the market for audit services, given that at present more than 90% of audit organizations are small businesses.

One of the directions for the development of audit is the harmonization of the legislation of the Russian Federation with the unified principles for conducting audit activities in the territory of the Eurasian Economic Union (EAEU). At present, audit companies resident in the Russian Federation cannot provide audit services to economic entities registered in other countries of the former Soviet Union. This is due to different legislative requirements in force in these countries. If we analyze the practice of the European Union, it can be noted that directives have been adopted in the EU that establish uniform requirements for mandatory audit for EU member states. We believe that this practice can also be used in the EAEU, given that the preparation of a draft audit agreement has been completed, according to which it is assumed that from 2022 a single market for audit services in the EAEU will begin to function. To this end, over the next two years, the legislation of the EAEU Member States should be brought into line with this agreement. Removing barriers and restrictions on access to national audit services markets will undoubtedly have a positive effect on audit development in Russia. In addition, it is necessary to establish effective information exchange and cooperation between the auditing regulators of the EAEU member states, bodies supervising audit organizations and professional auditor institutes. This will contribute to improving the quality of audit services and the competitiveness of Russian audit companies.

Conclusion

The research shows that improving the fundamentals of the functioning of the market for audit services is associated with the implementation of a set of measures aimed at further developing the system of regulation of audit, supervision and responsibility in the field of preparing financial information. The recognition of international audit standards in Russia is, of course, an important step in the development of audit theory and practice, but does not solve all existing problems of the industry. The need to amend Russian legislation to clarify the conceptual framework and terminology, as well as the consolidation of the professional community within a single self-regulatory organization of auditors, are just the first step to solve existing problems in the industry.

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Adaptation of First-Year Students to The Conditions of Higher Education

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Abstract

The paper deals with the issues of adaptation of first-year students to the conditions of higher education, socialization of students, the process of formation of a new system of values. It studies the process of adaptation of first-year students to the changes they face in the new social environment, development of a new strategy of behavior.

Keywords: Adaptation, Maladaptation, Adaptability, Maladaptivity, Adaptation of A First-Year Student at A University.

Introduction

The most important psychological task in working with first-year students is an active work of a psychologist and teachers, which is aimed at successfully adapting to the new system of education, to the new social status, social conditions. We can say that for a first-year student adaptation is a process of socialization. The process of socialization of children is a period of change in their lives, it is a process of assimilation and acquisition of new skills necessary for interaction within a new social role, which implies a range of certain adaptive situations that affect elements of a personal structure of a first-year student.

In this period the forming of a personality, getting aware of “self”, which is accompanied by feelings and finding the meaning of life take place.

Research Methods

The research was conducted by the teacher in collaboration with first-year students. This problem was studied on the basis of Chuvash state agricultural Academy, which provides access to open information resources. The objects of the study were first-year students of the faculty of Economics. In the course of the study, widely tested reliable methods of dialectics, analysis, synthesis and analogy were used. To solve analytical problems we used the following methods: comparisons,

analytical groupings and so on. The information received was processed by use of WORD and Microsoft Excel.

Research Results and Discussion

First-year students have life difficulties that can be attributed to: the level of claims to their social status, the discrepancy in communication styles that they face in higher school communicating with teachers and in the family communicating with parents, the contradictions associated with the fact that on the one hand there is a desire to be independent on the other hand the opinion of peers still remains important.

Therefore, a survey is conducted among first-year students, which is of practical value as it is necessary to develop strategies for higher school employees behavior for successful adaptation of first-year students.

According to Nikitin E. P., Kharlamenkova N. E. social adaptation is understood as a system of techniques and methods aimed at providing social support to people during their socialization or adaptation to new social conditions, in connection with changes in social status, life losses and failures as well as to unadapted individuals [1]. This concept fully reflects the process of adaptation of first-year students to the conditions of socialization in a higher educational institution, because the social environment into which a freshman gets is somewhat different from that in which he dwelt earlier in school, where he was a senior and had a higher status by age; getting into walls of higher institution he becomes a freshman almost like " the first time in first class ".

There are authors who consider social adaptation in two ways: on the one hand it is a process of integration of the subject into society and on the other hand they consider it as a result of this process [2]. Many authors who are engaged in studying the phenomenon note certain features of social adaptation: connection with the social environment, which is expressed in relationship of an individual with the environment, awareness of the need for adaptation by an individual himself which is aimed at entering an individual into a new group [3, 4-7]. Therefore, the socio-psychological adaptation of a first-year student can be understood as a process of an individual's entry into the system of social and psychological connections within the framework of emerging relationships in a new social environment.

Along with the concept of adaptation, most authors also distinguish maladaptation, which includes a loss of previously existing adaptation in a familiar environment. Exclusion is manifested in the form of dissatisfaction with the situation in which an individual is accompanied by anxiety and may be accompanied by violations of somatic health (F. B. Berezin, 1988; J. A. Alexander, 1991).

In the process of adaptation first-year students, according to T. A. Babakova, face the following problems:

- lack of free time;
- large amount of work, not convenient schedule;
- insufficient attention on the part of the Dean, curators;
- inability to organize oneself, lack of finance;
- lack of familiar circle of friends;
- lack of opportunity to choose an activity to one`s liking, an interesting occupation;
- negative sanitary conditions;
- difficulties in getting used to a new environment, to new people.

The main difficulties for first-year students are also related to the transition from the school system (lessons) to the university system (lectures). This transition assumes the presence of specific skills (quick note-taking, independent search for necessary information), without which a first-year student does not have enough free time [3, p. 32].

One of the probable ways of success of adaptation process is to solve the problems of productivity and quality of the educational process during the period of first-year students adaptation. The special role of educational process is also in the fact that teaching, being a reflective and transformative activity, is aimed not only at perception of the necessary material, but also at forming the first-year students` attitude to the educational and cognitive activity itself [3, p. 39].

But at the same time, educational process by itself even at the highest level of its organization, cannot ensure proper adaptation of students to the characteristic study conditions of higher education[4, p. 102].

A significant role in adaptation of students is assigned to the curators of the groups. From the first days of study at a university it is a curator who organizes work to establish a favorable socio-psychological climate in student groups. In most cases the success of student socialization is directly dependent on the nature of relationship between students. The systematic work of curators with first-year students is aimed at:

- study of individual psychological characteristics of an individual;
- assistance to students in adapting to a university;
- raising their cultural level;
- promoting students ' self-development;
- good performance of a group.

Student curatorship undoubtedly has certain advantages and can become one of the ways to ensure an educational resource of a university, which is expressed in the following functionality:

- integration of students into the corporate culture of a university;
- informing about legal acts and events in an institution;
- team building activities;
- assistance in self-organization of studying;
- assistance in planning and organizing time.

Student curatorial projects are mainly aimed at facilitating of first-year students adaptation to their new environment. And with proper careful support from the structure that carries out an educational function in a higher institution this version of curatorship, of course, allows to achieve positive results.

Psychological support of first-year students plays a special role in the success of adaptation. So, in order to create a favorable climate among students, it is advisable to conduct a variety of psychological trainings, where young people through simple games get to know each other better, learn to communicate, find a common language with classmates and older young people. Goodwill and attention of all participants help to reduce time of adaptation to the conditions of a university.

Conclusion

Thus, adaptation and non-adaptation reflects compliance or non-compliance of a certain set of goals that are achieved by an individual in the process of socialization of a first-year student to the new conditions of studying at a university. At the same time, adaptability is expressed in coordination of actions of a first - year student and a team and maladaptivity - in its mismatch.

Therefore, the main goal of psychologists and teachers is to build a system of complex interaction measures to adapt first-year students to the conditions of study at a university. To do this they must:

- surround students with care starting from the first day of study at a university as it is important that a first-year student joins the new reality in the walls of an educational institution as painlessly as possible;
- identify a student's aptitudes and trends that should be sought in the process of studying at a university – to prepare a first-year student for the first midterm examination session.

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Legal and Economic View of the Obligation to Provide Audit Services

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Abstract

Russia's transition to market relations has revealed the need to create new economic institutions that regulate the relationships between various business entities. Among them one of the leading places should belong to auditing whose main goal is to ensure control over the accuracy of the information reflected in the accounting (financial) statements. Data on the use of property, cash, commercial transactions and investments from economic entities can be objectively confirmed by an independent auditor. The analysis of practice and theoretical provisions indicate the need to create an effective system of civil law regulation of activities in the provision of audit services at the present stage. It is important to identify the features of the audit services agreement and determine its place in the system of Russian civil law contracts. All of the above determines the choice of the research topic, its relevance and significance from the point of view of theory, legislation and the practice of its application.

Keywords: Contractual Obligation, Audit Services, Principles and Norms of Audit.

Introduction

The most common and diverse type of civil legal relationship is an obligation. Obligations are important to ensure the normal functioning of commercial organizations; the rules governing them form the most important section of civil law - liability law. Russian civil law defines an obligation as a legal relationship by virtue of which one person (debtor) is obliged to perform a certain action in favor of another person (creditor) (for example, transfer property, perform work, provide a service) or refrain from a specific action, and the creditor has the right to demand from the debtor the performance of his duties.

The basis for the occurrence of obligatory legal relations between the auditor and his client is the contract. But in the current legislation there is no definition of contracts for the provision of audit services. Therefore, to determine the legal nature of such an agreement it is necessary to consider the general provisions on the paid services contract and determine the specifics of audit services.

Materials and Methods

The bulk of the total number of civil liabilities falls on obligations under transactions involving legal liabilities. Domestic legislation classifies the following as equivalent objects of civil rights: things, other property, intellectual property and intangible goods, the results of work and the provision of services.

Obligatory legal relations, in contrast to property relations, are characterized by the following features:

• circle of associates - legal relations connect only a certain creditor with a certain debtor, that is, an unlimited circle of persons is excluded;
• subject - the subject of legal relations is not the thing, but the actions of the obligated person;
• special expression of rights and obligations - legal relations presuppose the existence of a right – claim and an obligation – duty;
• special ways to protect violated rights - a claim for damages, payment of a forfeit and the performance of an obligation in kind;
• activity of the parties - the debtor is the active party to the legal relationship - the party opposing the other endowed with the right (the creditor).

From a legal point of view the provision of services differs significantly from the performance of work. In the theory of civil law the ratio of works and services was determined through their differentiation from each other on the basis of the presence or absence of a tangible material result of the activities of the obligated person (the idea of Roman private law). The legislation determines that activities involving the creation of a result and transferring it to the customer are the object of obligations to perform work, but if the object of the obligation is the activity of the contractor itself then such activity is the provision of services.

According to Section 779 of the Civil Code of the Russian Federation, under a paid services contract the contractor undertakes to provide the services (to perform certain actions or carry out certain activities) upon the instructions of the customer, and the customer shall pay for these services. The application of the rules of the paid services contract includes contracts for the provision of audit services.

In the theory of civil law they usually distinguish 4 (four) constituent elements of the obligatory legal relations:

1) the object of the obligation;
2) the subjects of the obligation;
3) the content of the obligation;
4) the legal fact.

We shall describe these elements in relation to the contract for the provision of audit services. The object of the obligation to provide audit services is the audit services themselves. The subjects of the obligation to provide audit services are the auditor (debtor) and the customer (creditor), and the content of the obligation to provide audit services consists of a set of verification actions to study the financial and economic activities of the customer and issue him a specific document (for example, during audit reporting - audit conclusion). The legal fact provides the basis for the occurrence of the obligation, namely the concluded contract for the provision of audit services.

Research Results and Discussion

The legal experience in regulating audit activities in foreign legislation has a long history. Hence, it becomes necessary to study all the positive aspects in this area. The development of the Russian audit was influenced by many factors of a political, economic, social, legal and professional nature. Mostly it developed “vertically” (as an audit activity), in contrast to the countries of the Anglo-Saxon system of law and European countries in which financial control (audit) developed mainly “horizontally”.

However in recent years in Russia some work has been done to establish the institution of auditing. The adopted Federal Law "On Auditing" and other regulatory legal acts confirm the final formation of the Russian audit system and open up prospects for its further development. Today it can be stated with confidence that the regulation of audit activities is focused on international requirements since audit services are carried out in accordance with International Standards on Auditing.

Any entrepreneurial activity has common features enshrined in civil law. We shall consider these features on the example of audit activities.

Firstly, it is an independent activity. This feature means that no one can force the auditor to conclude an audit services agreement since the desire comes from the client (customer).

Secondly, the activity is carried out at your own risk and is aimed at making profit. This means that the audit services are fee-based in nature, but there is always the possibility that the auditor will incur a loss from his professional activities in connection with the presentation of claims by interested users of the accounting (financial) statements.

And thirdly, this is an activity carried out by persons registered in the manner prescribed by law. The legislation clearly articulates the range of entities that can carry out audit activities, and the conditions for doing business. So, this business is available to individuals and legal entities. Moreover, an individual must meet certain criteria, confirm their qualifications by passing the exam and obtaining the qualification certificate of an auditor. In addition, for individual auditors and audit organizations mandatory membership is provided in one of the self-regulatory organizations of auditors, where there are certain requirements for membership. Among the conditions for doing business it can be noted that subjects acquire the right to engage in audit activities from the date when information about them is entered in the register of auditors and audit organizations of the self-regulatory organization of auditors. In addition, the audit legislation does not allow any other entrepreneurial activity, except for conducting an audit and the provision of a certain type of service (services related to the audit, other services related to the audit activity).

For professions that are characterized by increased responsibility to society and certain specific manifestations of this responsibility, their own ethics of professional behavior are formed. For example, it has long been known about medical (medical) ethics, where the basic principles were formulated by Hippocrates. The oath of Hippocrates pronounced by doctors upon receipt of the document on education carries the fundamental moral and ethical principles of the their behavior.

The profession of an auditor is no exception. The activities of the auditor can be compared to some extent with the work of a doctor. In contrast to the latter, the object of the auditor's beneficial effect is not a person, but an economic entity (client organization).

The International Federation of Accountants (IFAC) has developed a Code of Ethics for Professional Accountants, which is used by professional associations of accountants and auditors from different countries to create national codes. In practice public professional organizations develop codes of professional ethics for auditors in great detail and scrupulously trying to foresee all the possible nuances of their behavior.

According to Russian audit legislation, the code of professional ethics of auditors is a set of rules of conduct that are mandatory for audit organizations and auditors to comply with when conducting audit activities. In any case the Code of Professional Ethics of Auditors revised and adopted in June 2019 is intended to maintain the high reputation of this profession and its moral image.

The analysis of theoretical principles and practice allows to compare the principles of audit activity with the principles of civil law, which in turn are reflected in the contract for the provision of audit services.

The most important principle in auditing is independence. When providing professional services the auditor should be independent of the audited entities and of any third parties, that is the auditor when forming an independent opinion should have no financial, property, family or any other interest in the affairs of the audited entity. Independence refers to:

• independence of thinking is a way of thinking that allows the auditor to make a judgment that does not depend on the influence of external factors and to act in good faith and objectively based on knowledge of the law;
• independence of conduct is the avoidance of such facts or circumstances when third parties could reasonably call into question the decency, objectivity of the auditor.

The independence of the auditor should be ensured both on formal grounds and in terms of factual circumstances. The principle of independence is implemented by audit legislation by establishing restrictions on the conduct of audit.

The principle of independence in auditing is closest to the principle of civil law on the inadmissibility of arbitrary interference in private affairs. The legislation provides a general focus on the maintenance and protection of private interests, which is expressed in the prohibition of state authorities and local self-government, as well as other, third parties, in any way interfering in the private affairs of participants in civil relations.

The next important principle in auditing is confidentiality. Confidentiality is the duty of auditors to ensure the safety of documents received or compiled by them during the audit, not to transfer these documents or their copies to any third parties and not to disclose the information contained in them without the consent of the person to whom the services were provided, except stipulated by Russian law. Respect for the principle of confidentiality remains valid even after the end of the relationship between the auditor and the audited entity or auditor and his employer, that is, without a time limit. In audit law, this requirement is referred to as audit secrets.

The principle of confidentiality has common features with the civil principle of non-abuse of civil rights. Most modern scholars consider the category of “abuse of law” based on the ideas of V.P. Gribanov. The essence of these ideas is as follows: abuse of the right is a special type of civil offense committed by an authorized person in the exercise of his right related to the use of unauthorized specific forms within the framework of a general type of behavior permitted by law.

In carrying out his professional duties the auditor should be guided by the principles of professional ethics of auditors. Among these principles can be noted honesty, objectivity, professional competence and integrity, professional behavior.

Honesty is an obligatory commitment of the auditor to professional duty and adherence to general moral standards. In providing professional services the auditor must act openly and honestly. Honesty means not only truthfulness but also impartiality and reliability.

Objectivity is the obligation of impartiality and resistance to any influence when considering professional issues and forming judgments and conclusions. The auditor must be fair, his objectivity should not be influenced by prejudice, bias, conflict of interest, other persons or other factors.

Professional competence and integrity. Competence is the compulsory possession of the necessary amount of knowledge and skills that allows the auditor to provide professional services in a qualified and high-quality manner. The audit organization should attract trained, professionally competent specialists and monitor the quality of their work to ensure qualified audit. Auditors should not provide services that go beyond professional competence and the limits of their authority. The auditor provides professional services with due care and diligence. His duties include the constant maintenance of professional knowledge and skills at a high level so that audited individuals or employers can take advantage of competent professional services based on the latest developments of practice, legislation and technology. Auditors should not exaggerate their knowledge and experience. Consequently, the auditor must approach in good faith in the performance of his professional duties.

In the framework of civil law, the term "good faith" does not have an official definition, but it can be found in the norms of individual sections. When considering the general principle of good faith in the exercise of subjective civil rights and the performance of duties, the content of the category in question can be determined only through ethical and moral components. Here, honesty is diligence and the necessary prudence of the subject of civil circulation. The principle of good faith can be compared with the civil law principle of the actual fulfillment of an obligation, which includes the execution by the proper entities, in the right place, at the right time, with the proper subject and in the proper manner.

Professionalism is the duty of auditors to comply with Russian law, to refrain from committing acts incompatible with the provision of audit services, and to avoid any actions that may discredit the profession or may reduce the respect and trust in the profession of an auditor, and damage its public image. The auditor must act in such a way that it is consistent with the good reputation of the profession. When offering and promoting his candidacy and services the auditor should not make statements that exaggerate the level of services that he can provide, his qualifications and experience gained, or give scornful comments about the work of other auditors or make unreasonable comparisons of his work with the work of other auditors.

The principle of professional conduct in audit can be compared with the method of permissible orientation of civil regulation. This method contributes to the development of a modern market economy by supporting initiative, enterprise, freedom of action and any form of activity in the realm of civil circulation. Moreover, this principle like all norms of civil law is based on the following general rule: "everything is allowed that is not prohibited by law and does not detract from the rights, freedoms and interests of other parties to legal relations".

Table 1: Comparison of the principles of audit and civil law

Audit Law	**Civil Law**
Independence	Inadmissibility of arbitrary interference in private affairs
Audit secrets	Inadmissibility of abuse of civil rights
Good faith	Proper performance of an obligation (subject, place, time, etc.)
Professional behavior	The principle of permissive orientation

We would like to draw particular attention to the observance by the auditor of the principle of professional skepticism since there may be circumstances that can substantially distort the accounting (financial) statements. Professional skepticism means that the auditor should question the accuracy of the statements if the audit evidence obtained contradicts the documents or statements of management. At the same time the auditor should not think that the management of the audited entity is dishonest but should not assume the unconditional honesty of the management.

Conclusion

The study showed that the main document governing the relationship between the customer (client) and the contractor (auditor) is the contract for the provision of audit services. The contract for independent verification (audit) has the following features:

1) the essence of the obligation - the commission of certain actions or certain activities;
2) the result of the fulfillment of an obligation - the result cannot exist separately from the contractor, its material form is missing (intangible nature);
3) the existence of a right to a result - the customer does not have a property right to the result.

Within the framework of the concluded contract for the provision of audit services the auditor is responsible not only to the individual client but also to other interested users of the statements. Acting in the public interest the auditor must comply with certain principles and norms of the audit as well as obey the requirements of professional ethics. The ethics of professional conduct of auditors determines the moral values that are affirmed by the audit community ready to protect them from all possible violations and encroachments. Therefore, there is an objective need to maintain in public opinion respect and trust in the profession of an auditor.

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Directions for Improving Socio-Psychological Climate in the Organization

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Abstract

In modern economic conditions, the formation of a favorable socio-psychological climate in the organization is one of the key conditions for its effective functioning. The authors considered the content and structure of the socio-psychological climate of the organization. Particular attention is paid to the consideration of factors that determine the degree of favorable climate in the organization. Using a number of methods for assessing the socio-psychological climate, the authors assessed the interests of the employees of the organization, the emotional, cognitive and behavioral components of the team under study. The assessment made it possible to generally assess the socio-psychological climate as favorable and highlight individual negative manifestations in the work of the team, as well as the factors that determine this condition. The following recommendations are formulated in the article to improve the socio-psychological climate in the organization's team, including the adjustment of the motivation and incentive system; effective allocation of responsibilities; work with a leader in informal groups; permanent diagnosis of existing relationships. Implementation of the proposed recommendations on the formation of a favorable socio-psychological climate will allow the team to maintain an even more friendly and productive atmosphere.

Keywords: Human Resource Management, Socio-Psychological Climate, Assessment Of The Socio-Psychological Climate.

Introduction

Currently, the effectiveness of the team depends not only on technical conditions, but also on the level of group development, the state of interpersonal relations, as well as the cohesion of its members. Each person is part of the team in which he is a member and influences his psychological climate.

Most authors who consider theories and approaches to determine the socio-psychological climate believe that the formation of a favorable socio-psychological climate in the team is a necessary

condition not only for the effective work of the organization, but also for the formation of self-sufficiency of a person, his success. These factors largely affect the work of an employee, since labor productivity depends on the interaction of a person with a team. Therefore, the socio-psychological climate is a key factor in both the professional and personal development of not only the individual, but also the organization as a whole.

The most relevant is the study and assessment of factors that have a key impact on the formation of the socio-psychological climate of the team with the goal of improving it (Figure 1).

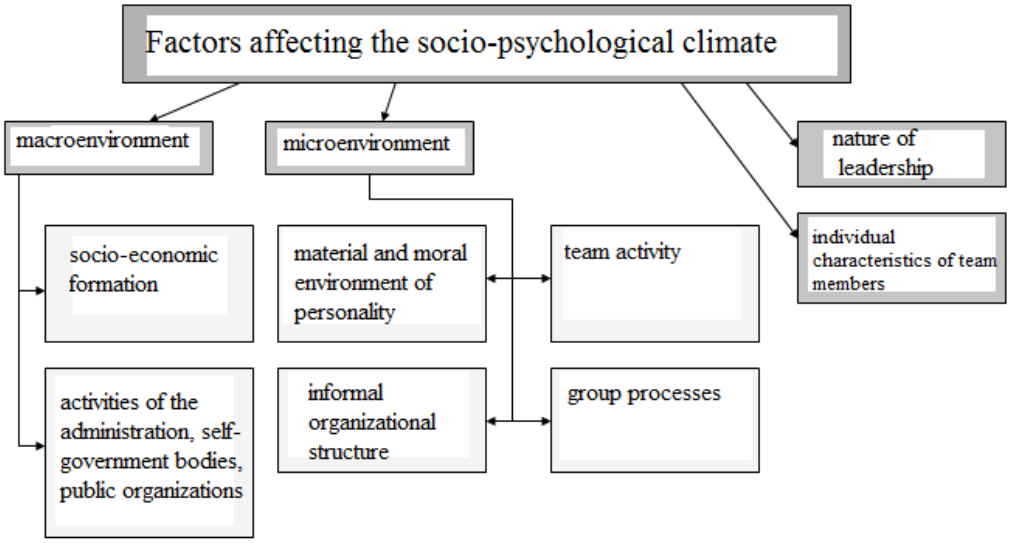

Figure 1 - Factors that influence the formation of the socio-psychological climate of the team.

The structure of the socio-psychological climate is quite broad and diverse, it contains two main components: the attitude of employees to work and the attitude of employees to each other. In addition, the structure covers various aspects of employee relationships in the organization. Also, the structural components of the socio-psychological climate are closely related to its indicators, which are manifested in employee satisfaction with their colleagues, the process and results of work, and mood in the group.

Methods

The object of the study is the socio-psychological climate of the organization, which is engaged in the cultivation of cereals, legumes and oilseeds, and sugar beets, wholesale and retail trade.

The subject of the study is the managerial decisions made by the organization's leadership to create a favorable socio-psychological climate.

The methodological basis of the study was a systematic approach to considering the problems of creating a favorable socio-psychological climate in an organization, in which the socio-psychological climate is considered as a result of the influence of a system of factors of external and internal order.

The methodological basis of the study and the formulation of recommendations on the formation of a favorable socio-psychological climate are the results of its assessment and identification of factors that determine the presence of negative manifestations in the organization.

To analyze the socio-psychological climate, the staff was selected, the number of which is 32 people. A survey was conducted and the characteristics of respondents by age category and length of service were compiled, that are presented in table 1.

Table 1: distribution of employees by age category and length of service

Department	Position	Age, years	Work experience, years
1	2	3	4
Administration	General director	50	5
HR service and accounting	Head of human resources and accounting	51	11
	Chief Accountant	49	4,5
	Human Resources Specialist	37	1
	Accountant	52	21
Average		**47,25**	**37,5**
Agronomic. Service	Chief Agronomist	53	4
	Teller	58	18
Average		**55,5**	**11**
Engineering Service	Engineer	60	21
Warehouses	Warehouse manager	51	21
	Weigher	51	11
	Worker 1	40	1
	Worker 2	50	1
	Worker 3	57	21
	Worker 4	28	5
	Worker 5	61	1
Average		**48,3**	**11,7**
Machine workshop	Head of Machine workshop	54	1
	Electric welder	57	5
	Watchman	41	1
	Electrician	59	21
Average		**52,8**	**7**
Machine operators	Tractor driver 1	44	18
	Tractor driver 2	53	10
	Tractor driver 3	48	15
	Tractor driver 4	50	18
	Tractor driver 5	58	14
	Tractor driver 6	56	5
	Tractor driver 7	52	5
	Driver 1	38	21
	Driver 2	60	21
	Driver 3	27	9
Average		**48,6**	**13,6**
Canteen	Cook 1	55	21
	Cook 2	55	17
Average		**55**	**19**
Vet service	Veterinarian	45	18
Organization average		**50,55**	**17,5**

To analyze the state of the socio-psychological climate in the organization, the authors used: the methodology of O. Nemov, the express methodology for assessing the socio-psychological climate in the workforce - a personnel book, the 'Express Methodology' for studying the socio-psychological climate in the workforce by O. Mikhalyuk and A. Shalyto, the methodology for determining the socio-psychological climate in the group by L. Lutoshkin.

Results and Discussion

As a result of the survey that used the methods specified in the methodological base of the study, the authors obtained the following conclusions.

Firstly, it was revealed that the organization's team has similar interests, since the personnel are in approximately the same age category.

Secondly, the emotional component of this collective is more likely favorable than uncertain. Such an assessment indicates that employees are more satisfied with each other and the emotional state of the group, most consider their team friendly and understanding. At the same time, one can say about certain instability in these judgments, i.e. team members believe that everything depends on the specific conditions and situation.

Thirdly, the results of systematizing the assessments obtained indicate that the cognitive component of the team can be called contradictory, unstable, some employees find it difficult to characterize each other's business or personal qualities, while others, on the contrary, are confident that they are well aware of the qualities of colleagues, can give them appreciation and know the qualities of a friend.

Fourth, the results of processing the questionnaire data obtained during the survey showed that the behavioral component of this team can also be classified as unstable, since most of the employees are not ready to meet with colleagues after hours or are indifferent to this, but at the same time it is interesting for the employees to know about the personal lives of colleagues.

The result of processing the data obtained as a result of applying the methods of L. Lutoshkin showed a result of 7 points. This result suggests that the climate in the study team is not the most favorable, but not openly hostile. Employees consider their team as a whole quite good, but, meanwhile, the team does not have a special friendship between employees.

The results of a survey of team members allow us to draw the following conclusions: the relations of department employees go beyond purely business, employees have known each other for a long time, quickly find a common language, and correctly evaluate the fairness of incentives. Conflicts in the team happen, but are resolved promptly and without consequences. Workers care about the reputation and status of the organization, and personal interests tend to subordinate to the interests of the team.

Answering the questionnaire, the department staff noted that they are well aware of the positive and negative aspects of the team's work, but, mutually complementing each other and interacting, strive to achieve great success in their work.

Workers spend their leisure time in different ways, but there is something that unites them - love for children, for flowers, needlework (there are almost only women in the team), and for car repairs in men. The team is distinguished by a respectful attitude not only to each other, but also to representatives of other units.

It can be concluded that in the analysis of the socio-psychological climate, evaluating the productivity of the organization and studying their relationship, it was found that the generally friendly atmosphere in the group, workers' tolerance for each other and a number of other factors contribute to the high performance of the department, which shows the great importance of a favorable socio-psychological climate and its direct impact on the effectiveness of the team.

Despite the favorable socio-psychological climate, the department has a number of the following problems:

1) although the employees work together quite successfully, they do not know and understand each other well enough;

2) conflicts that arise mainly on business issues are not often resolved to the end, employees harbor resentment and tension remains between some team members;

3) the team is indifferent to various joint activities;

4) inconclusive adaptation of new department employees to the work and team.

Recommendations

Having studied the data obtained in the course of the study, the authors formulated the following recommendations for improving the socio-psychological climate in the team of the studied organization.

When developing these recommendations, the authors took into account that improving the socio-psychological climate in the organization involves the development and practical implementation of a set of measures of a technical, economic and organizational nature. Moreover, most of these recommendations should be aimed not at eliminating the negative manifestations of an unfavorable socio-psychological climate in the organization, but at creating conditions for adjusting the influence of factors of the macro and microenvironment of the organization, improving the content and nature of labor. The important aspect is that the implementation of recommendations should be carried out taking into account the personal characteristics of all employees, which is one of the important factors.

The next aspect, which must be taken into account when creating a favorable socio-psychological climate, is a high differentiation of estimates of the prevailing parameters of the socio-psychological climate by subdivisions, categories of employees and evaluation parameters for the degree of unfavorableness.

In general terms, all the proposed recommendations should be grouped into areas whose content is determined by the composition of the factors determining the negative impact on the staff and determining the adverse nature of the socio-psychological climate in the organization (Figure 2).

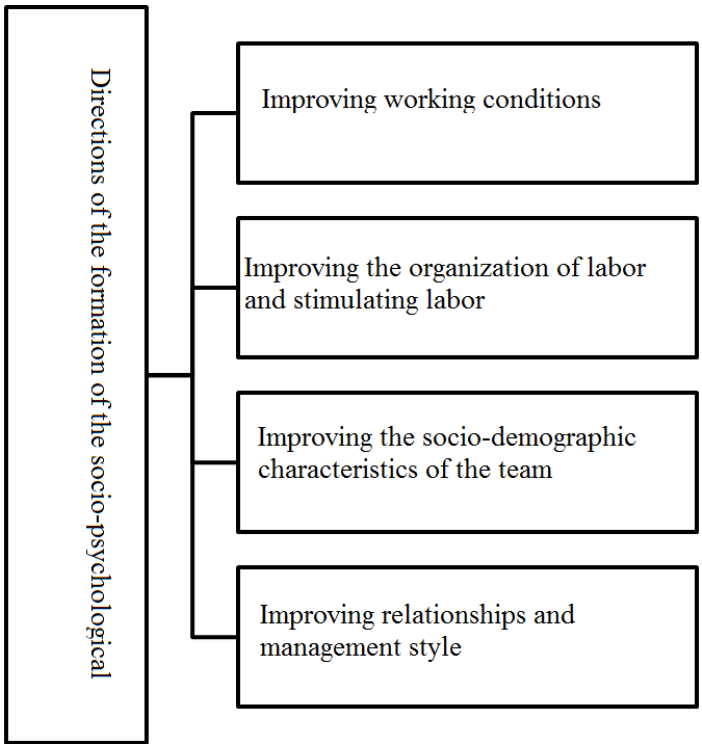

Figure 2 – Directions for improving the socio-psychological climate in the organization.

Firstly, one of the conditions for improving the socio-psychological climate in the team is an effective system of motivation and stimulation. Particular attention must be paid to the relevance of the incentive system to the needs of employees. Particular attention should be paid to the creation of favorable working conditions, as well as to the formation of the career path of employees in the

overall value system of the organization. It is necessary to encourage all manifestations of employee activity in the field of training, retraining, training and self-education.

Secondly, it should be noted that for the effective distribution of responsibilities the manager needs to understand that the motives of all employees are different. This should be taken into account not only in the formation of a system of motivation and stimulation, but also in the formation of a collective and teams. This should be carried out taking into account the needs of the individual in communication and taking into account individual characteristics.

Thirdly, it is necessary to highlight the leader in the informal group, to identify the direction of the leader. It is necessary to identify an informal leader in the team with the aim of delegating authority, attracting him to arranging the events to improve the socio-psychological climate in the team. Identification of leadership qualities can be accomplished using the methodology “Leadership Ability” by R. Nemov. Then the level of development of the group and the causes of conflicts in the group should be determined and socio-psychological methods for their constructive resolution should be applied.

Fourth, it is necessary to diagnose the existing relationships using questionnaires and observation, to develop communication and empathy skills. For the development of empathy skills, you can use the book of F. Burnard "Training counseling skills."

To overcome the isolation of colleagues will also allow the use of methods of democratic leadership style. The most effective tool for this can be the organization of self-government days. This will unite workers under the pretext of a common goal, help to show them their hidden abilities and talents, which in the future can be useful in work. This will make it necessary for interpersonal communication of trainers, where their personal qualities will begin to appear, isolation should gradually be reduced to zero. But in this case, a person is needed who can soberly assess the situation and prevent possible conflicts, since the disclosure of characters can entail the manifestation of not only positive traits of workers, but also provoke the development of direct clashes or internal tension. This person may be the director of the organization, but he should only fulfill the role of a consultant and take managerial functions on the day of self-government, otherwise this event may lose its meaning.

To rally employees in the teams of the organization in which problems were identified, it is recommended to conduct team building - a set of measures that are aimed at creating and rallying a team, which includes various methods and techniques of rallying a team, such as team sports games and events, creative events, active trainings focused on teamwork, quest.

Holding team meetings will allow for the exchange of experience in overcoming unpleasant situations and stress management, which suggests the following:

- the opportunity to ask for advice;

- specify the goals and objectives;

- identify the needs of the target group to provide the most effective assistance that brings satisfaction to employees;

- conduct trainings on relaxation and increase stress tolerance;

- assess their own needs.

It is necessary to note the success of each employee in accordance with his expectations. Gratitude and various letters will be pleasant to the older generation, praise and recognition to young employees.

Next, you should turn to the problems associated with the value orientations of the leader, their assessment by members of the labor collective and the impact on the socio-psychological climate in the organization. The main problem is the distorted perception by employees of the manager’s value orientations, due to his short term in the organization. Employees believe that the number of the most significant values for the leader includes his personal interests and material benefits, but a survey of the leader showed that these values are not priority. In this situation, the most appropriate solution would be to expand personal contacts with employees in order to meet each other, during which the

opinion of the work collective should change and distortions in the perception of the image of the leader will be leveled. This will be possible in a democratized leadership style, where open discussion of issues and frequent face-to-face meetings are appropriate. Also, employees negatively relate to the manifestation of such a value orientation of the leader as creativity, expressed in his intervention in the work of the team. This problem is connected with the fact that each employee applies his own methods and ways of organizing work, his individual approach, putting all his knowledge and experience into it, that is, each of them shows his individuality in work and does not seek to unify his activities. The solution to this problem may be the non-interference of the leader in the activities of employees, which means introducing the features of an conniving style of leadership.

Thus, the solution of the problems identified in the team should be carried out through preventive measures and periodic studies, the results of which will help to improve the socio-psychological climate.

Carrying out the above measures to solve current problems and create a favorable socio-psychological climate made it possible to maintain an even more friendly and productive atmosphere in the team.

Conclusion

The structure of the socio-psychological climate is quite broad and diverse, it contains two main components: the attitude of workers to work and the attitude of workers to each other. In addition, the structure covers various aspects of employee relationships in the organization. Also, the structural components of the socio-psychological climate are closely related to its indicators, which are manifested in employee satisfaction with their colleagues, the process and results of work, and mood in the group.

In the analysis of the socio-psychological climate, evaluating the productivity of the organization and studying their relationship, it was found that the generally friendly atmosphere in the group, the employees' tolerance for each other and a number of other factors contribute to the high performance of the department, which indicates the great importance of favorable socio-psychological climate and its direct impact on the effectiveness of the team.

Despite the favorable socio-psychological climate, the department has a number of the following problems:

1) although the employees work together quite successfully, they do not know and understand each other well enough;

2) conflicts that arise mainly on business issues are not often resolved to the end, employees harbor resentment and tension remains between some team members;

3) the team is indifferent to various joint activities;

4) inconclusive adaptation of new department employees to the work and team.

Based on this analysis, recommendations were developed to improve the socio-psychological climate in the team of the organization under study:

- firstly, one of the conditions for improving the socio-psychological climate in the team is an effective system of motivation and stimulation. Particular attention should be paid to the relevance of the incentive system to the needs of employees;

- secondly, it should be noted that for the effective distribution of responsibilities, the manager needs to understand that the motives of all employees are different;

- thirdly, it is necessary to single out a leader in the informal group, with whom it is necessary to closely interact with the improvement of the socio-psychological climate, since he can give valuable recommendations and one of the first to contribute to the implementation of the proposed activities in practice;

- fourthly, it is necessary to diagnose the existing relationships using questionnaires and observation, to develop communication skills and effective communication skills, taking into account the characteristics of the personal space of employees.

All of the above recommendations aimed at solving current problems and creating a favorable socio-psychological climate made it possible to maintain an even more friendly and productive atmosphere in the team.

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Quality Assurance as a Condition for the Development of Joint International Educational Programs

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Abstract

Joint international educational programs are a complex form of cooperation that deals with a number of challenges: national legislation, institutional boundaries, lack of a clear internationalization strategy, linguistic and cultural problems. This also applies to quality assurance systems within programs. A special place in the development of the European Higher Education Area (EHEA) belongs to joint international educational programs. They are a complex form of cooperation and deal with a number of challenges: national legislation, institutional boundaries, lack of a clear internationalization strategy, linguistic and cultural problems. This also applies to quality assurance systems in programs, which are complicated by contradictions in national approaches. This study is aimed at analyzing approaches to ensuring the quality of joint educational programs and developing recommendations for implementing the provisions of the standards and recommendations of ESG and European Approach for Quality Assurance of Joint Programs.

Keywords: Joint International Educational Programs, Education Quality Assurance, European Standards and Guidelines (ESG).

Introduction

One of the effective export tools of the Russian higher education system is joint programs leading to two diplomas.

The increase in the number of joint international educational programs is due to various factors, the main of which, in our opinion, are as follows:

- changing the educational needs of applicants and students in the context of the globalization of higher education and science;
- formation of a single educational market and the development of international cooperation between universities, the increase in the import and export of educational services;
- increasing the flexibility of forms and methods of providing educational services (distance and on-line training, simultaneous training in various educational programs, parallel training in several educational organizations);
- increased mobility of students and teachers;

- development of new forms of educational services based on strategic partnerships and networking between organizations;
- expanding opportunities for introducing students to the cross-cultural learning experience;
- increase in the attractiveness and demand for higher education in a foreign university without a permanent stay abroad.

Joint international educational programs are a natural result of international cooperation between universities from different countries. In this context, the role of those international projects and programs is increasing during the implementation of which concrete results are achieved in developing innovative models and educational programs, a general conceptual field is developed, non-linear dependencies of the state of education on various cultural, social, economic and political factors are revealed [1] .

A study by the European Consortium for Accreditation in Higher Education (ECA) shows that quality assurance or accreditation of a joint program significantly affects the results of assessment and recognition of qualifications (92% of respondents answered in the affirmative) [2].

In this regard, the problem of creating effective quality assurance systems in the framework of joint programs is relevant for program developers and university officials responsible for the development of international activities.

Materials and Methods

Joint international educational programs as part of transnational higher education began to develop rapidly since 1980s based on the increased mobility of students and teachers, the growing number of educational organizations and programs, the emergence of new forms and methods of providing educational services (opening foreign campuses, the introduction of distance and e-learning, etc.) [3]. It should be noted that the main driver for the development of transnational higher education in general and joint international educational programs in particular is the massification of higher education. As studies show, admission of students to higher education institutions at the global level in 2000 amounted to 97 million people while in 2025 it is projected to reach 263 million people. [4].

The most complete description of all components of a joint educational program is given in the definition of O.N. Oleinikova. A joint program is a program in which:

- partners agree on all its basic elements (such as a curriculum, teaching methodology, quality assurance system, including the European Credit Transfer System (ECTS), assessment rules and principles, requirements for content, teachers and student enrollment);
- mobility is provided, with periods of study abroad (at partner universities) which are automatically recognized;
- joint program management is carried out;
- all partner universities recognize awarded diplomas / degrees.
- comparability is based on learning outcomes.

A similar approach to structuring the main characteristics of joint programs was proposed by the authors of the study “Innovation and transformation in cross-border education. Joint educational programs of universities of the EU and Russia” [4], in accordance with which seven blocks are proposed:

1) the institutional structure of partnership - from weak interaction to strategic partnership;
2) design and implementation of programs - from a fragmented approach to real integrity;
3) student mobility - from single visits to structured trajectories;
4) recognition of studies received abroad - from non- or partial recognition to full recognition;
5) types of qualifications and degrees - joint or double diploma, certificate;

6) program management - from individual (separate) management of a separate program to full integration into institutional activities;

7) quality assurance - internal and external subsystems.

An analysis of the scientific literature shows that quality assurance is the key to the successful implementation of joint educational programs.

In the Paris Communiqué of May 25, 2018, the Ministers of Education of the Bologna Process countries noted that quality assurance is the key to enhancing mutual trust, mobility and recognition of qualifications and periods of study in the countries of the European Higher Education Area (EHEA) [5].

In connection with the dynamic growth of transnational education offered by commercial and non-commercial providers as well as the commodification of higher education, quality assurance issues come to the fore [6]. Back in 2005 UNESCO developed a special document, "Guidelines for Quality Provision in Cross-border Higher Education" [7]. It defines the directions for reforming national systems of quality of education, accreditation and recognition of qualifications (assigned by foreign education providers) in the context of the globalization of the world economy and the development of transnational higher education for different groups of stakeholders: national governments; universities / providers of higher education; student governments; quality assurance / accreditation agencies; bodies (centers) for the recognition of qualifications (degrees); professional associations.

Quality assurance is recognized as one of the serious problems in organizing joint international educational programs [8]. According to J. Knight, quality assurance and accreditation are fundamental but in practice they can pose significant challenges. When universities have their own internal quality assurance procedures the requirements can be met only with respect to part of the joint program implemented in the relevant university. However, it is more difficult to ensure the quality of courses offered by a partner university. Common requirements for inputs and outputs are often used, but it would be more efficient to include in the agreement on a joint program the mutual recognition of relevant quality assurance programs [9]. Taiwanese scientists focus on the fact that joint programs are highly complex and their quality is formed and maintained on the basis of cooperation and coordination of efforts of all partner universities [10].

Research Results and Discussion

The space of higher education is characterized by a variety of approaches and models to ensure the quality of education, the most common of which are the following:

1. Model based on European standards and guidelines of ESG ENQA.
2. Model of a quality management system according to ISO 9001 /
3. The model of Total Quality Management (TQM)
4. Business Excellence Model (EFQM-European Foundation for Quality Management)
5. European model of Common Assessment Framework (CAF) for assessing the quality of the system.

All these models are criticized to one degree or another by specialists in the field of education quality. For example, experts note that the TQM, ISO 9001, and ESG ENQA models focus on the teaching process. However, it is research which is of paramount importance to university. The authors further note that the ESG model [11] pays insufficient attention to systematic improvement. Despite this this model is currently the most common and its development was carried out in the context of the Bologna process. Given the specifics of joint programs, it is advisable to use the European Approach for Quality Assurance of Joint Programs as the basis for the formation of a joint quality assurance system. The demand for the European Approach in the countries of the Bologna process is currently increasing. Its provisions correlate well with ESG ENQA standards and guidelines and take into account the particularities of joint programs. The interrelation of ESG ENQA and the European approach is presented in the Table.

Table - Key elements of a joint quality assurance system according to the provisions of Standards for Quality Assurance of Joint Programs in the EHEA and ESG ENQA

Standards for Quality Assurance of Joint Programs in the EHEA	Standards and guidelines of ESG ENQA
1. Eligibility	-
2. Learning Outcomes	ESG 1.2 Design and approval of programmes
3. Study Programme	ESG 1.2 Design and approval of programmes
4. Admission and Recognition	ESG 1.4 Student admission, progression, recognition and certification
5. Learning, Teaching and Assessment	ESG 1.3 Student-centred learning, teaching and assessment
6. Student Support	ESG 1.6 Learning resources and student support
7. Resources	ESG 1.5 Teaching staff ESG 1.6 Learning resources and student support
8. Transparency and Documentation	ESG 1.8 Public information
9. Quality Assurance	ESG 1.1 Policy for quality assurance ESG part 1 Standards and guidelines for internal quality assurance

From the Table, we see that the European approach to ensuring the quality of joint programs is fully based on ESG standards, supplementing them with the Eligibility standard. For joint international educational programs this standard is extremely important in determining the legitimacy of the program and the qualifications awarded.

Standards for external quality assurance in the framework of the European Approach to Quality Assurance of Joint Programs and ESG also correspond to each other (Table).

Table – Key elements of external quality assurance according to the provisions of Standards for Quality Assurance of Joint Programs in the EHEA and ESG ENQA

Standards for Quality Assurance of Joint Programs in the EHEA	Standards and guidelines of ESG ENQA
1. Self-Evaluation Report	ESG 2.3 Implementing processes
2. Review Panel	ESG 2.3 Implementing processes ESG 2.4 Peer-review experts
3. Site Visit	ESG 2.3 Implementing processes
4. Review Report	ESG 2.3 Implementing processes ESG 2.6 Reporting
5. Formal Outcomes and Decision	ESG 2.5 Criteria for outcomes
6. Appeals	ESG 2.7 Complaints and appeals
7. Reporting	ESG 2.6 Reporting
8. Follow-up	ESG 2.3 Implementing processes
9. Periodicity	ESG 1.10 Cyclical External Quality Assurance

As noted above, the formation of a quality assurance system for joint international educational programs in the countries of the Bologna process is increasingly carried out on the basis of the European approach to ensuring the quality of joint programs. However, not all countries have integrated the European approach into their national legislation (Table).

Table - Integration of the European approach to ensuring the quality of joint programs in the national legislation of the countries of the Bologna process

Integration of the European approach into national legislation	Countries
1. European approach is available for unlimited use by universities	Armenia, Belgium, Bulgaria, Denmark, Finland, Kazakhstan, Liechtenstein, Malta, Moldova, Netherlands, Poland, Switzerland, United Kingdom (13)
2. European approach is available for use by universities with restrictions	Austria, Bosnia and Herzegovina, Cyprus, Estonia, France, Georgia, Germany, Ireland, Lithuania, Luxembourg, Norway, Portugal, Russia, Serbia, Slovenia, Spain (16)
3. European approach cannot be used	Albania, Andorra, Azerbaijan, Belarus, Croatia, Greece, Vatican, Hungary, Iceland, Italy, Kosovo, Latvia, Montenegro, Northern Macedonia, Romania, Slovakia, Sweden, Turkey, Ukraine (19)

Based on: National implementation of the European Approach // https://www.eqar.eu/kb/joint-programmes/national-implementation/?cn-reloaded=1

At the level of educational programs, an important guideline is the concept of Compliance with Clear Goals. It involves a clear statement of the goals of the program, development of its concept, its implementation, monitoring and continuous improvement (Figure 2).

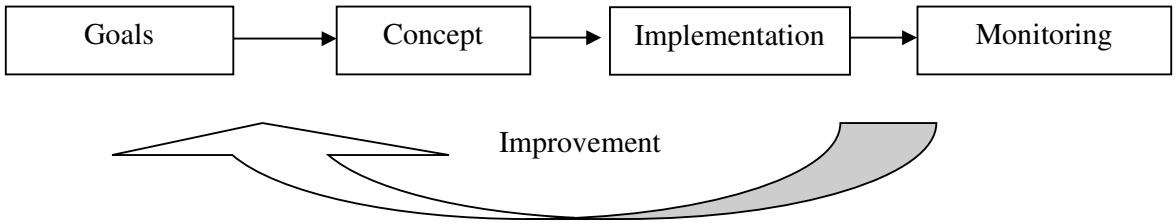

Figure 2: Scheme for the implementation of the concept of Compliance with Clear Goals

The steps presented and the questions related to them should be reflected in any educational program. Joint programs should have common goals and approaches to their achievement. In this regard, from the point of view of the life cycle, educational programs go through the following stages: preliminary assessment of the appropriateness of the program, development of the program, implementation of the program, termination of the program.

Stage 1: preliminary assessment. The goal - together with the selected partners to determine: comparability of the existing areas of training in terms of learning outcomes / competencies and the structure of training; the feasibility and attractiveness of the educational program due to structured mobility between partner universities. The following factors should be taken into account: the main educational programs existing at the university must have proper state accreditation; partner universities should have the legal right to issue relevant education documents; it is necessary that the national legislation and internal rules of partner universities allow entering into partnership agreements, recognize education received abroad and issue education documents; the calendar curriculum of partner universities should allow the implementation of mobility; partner universities should have the support of the administration; it is necessary to determine the financial resources for the development of partnerships, namely for organizing meetings, preparing documents (in different languages), paying for transportation expenses, tuition and other expenses.

Stage 2: program development. The development and approval of a joint educational program includes the following steps:

1. Formation of temporary working groups which include representatives of partner organizations.

2. Joint development by partner organizations of the structure of the educational program with included academic mobility and using distance learning technologies. It is necessary to take into account such conditions for the implementation of a joint program, as material, technical, educational, methodological, informational, personnel and other types of support for educational activities.

3. When developing a joint educational program it is recommended to use a modular structure.

4. It is necessary to develop a procedure for submitting documents, admission and selection criteria, as well as procedures for enrolling students for the program;

5. It is necessary to prepare a Partnership Agreement, which describes in detail the rights and obligations of partners and students, as well as the process of implementing the program with mobility windows and working languages.

Stage 3: program implementation. At this stage, it is extremely important to monitor the quality of the curriculum, as well as the administrative support provided to students and teachers. Particularly noteworthy are aspects such as the attractiveness and sustainability of the program which guarantee a sufficient number of students in each program.

In connection with the recognition and prevalence of ESG standards and the European approach to ensuring the quality of joint programs, we have formulated key priorities for the formation and development of education quality assurance systems in Russia in relation to joint international educational programs in the context of the implementation of these standards.

1. Quality assurance policy. An effective policy should be developed and implemented at the university to improve the quality of education taking into account the resources necessary for it. This policy should be integrated into the overall strategy of the university, including the convergence of educational and research activities.

2. Development and approval of programs. Educational programs should be developed on the basis of dialogue and partnership with teachers, students, graduates and representatives of the labor market. Programs should be based on new learning and teaching methods, so that students receive the most demanded competencies and increase their own competitiveness.

3. Student-centered learning and performance assessment. The state and universities in partnership with all interested parties should improve the system of training, support and counseling of students.

4. Admission, academic performance, recognition and certification. Student performance and progress should be assessed on the basis of clear criteria and consistent learning outcomes, with the full involvement of teachers and students. Universities should introduce a cross- and interdisciplinary approach to learning, develop entrepreneurial skills and innovative thinking among students.

5. The teaching staff. All teachers must undergo continuing education. Continuous improvement of staff competency is a must. The system for assessing the activities of the teaching staff should take into account various factors (possession of modern competencies, the availability and preparation of high-quality teaching materials, the level of social skills, etc.). Talented teachers should be encouraged, educational and research grants should be provided for them.

6. Educational resources and student support system. Universities should develop the competencies of teachers in the field of ownership of various forms and technologies of education in the digital age and provide an improvement in the quality of education based on modern technologies. Universities should provide all kinds of support to students in the face of increasing international mobility.

7. Information management. Universities should provide effective feedback to students in order to identify problems in all aspects of the quality of education and its improvement.

8. Public awareness. Universities should provide stakeholders with complete and objective information about educational activities, the proposed educational programs and learning conditions.

9. Continuous monitoring and periodic evaluation of programs. Universities should ensure the monitoring, analysis and evaluation of their programs in accordance with clear criteria and in a systematic manner.

10. Periodic external quality assurance procedures. Educational programs should be systematically subjected to an independent external quality assessment. Along with compulsory state accreditation, it is necessary to develop new mechanisms for the independent assessment of education (public accreditation, professional accreditation, international accreditation, external examination / audit, etc.).

A description of the above standards within the framework of international joint double diploma programs should be presented in the quality manual. This manual is a system document and contains a description of all procedures, tools and structures of the quality assurance system for partner universities. In the framework of the project "Improving Russian Creative Education: A New Master's Program in Digital Art", a quality manual was prepared, including a description of the implementation of ESG standards in the general part of the document and quality assurance procedures in a particular university, taking into account the peculiarities of internal processes at partner universities. Such an approach allows to take into account both European standards and the best practices of ensuring the quality of specific partner universities.

Conclusion

Thus, the quality assurance system of joint international educational programs requires, on the one hand, the development of a common strategic approach to quality assurance based on recognized and comparable models and, on the other hand, the Russian regulatory framework, as well as the national legislation of the partner university and its local documents.

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Modern Corporate Strategies Based on the Integration of Management and Technological Paradigms

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Annotation

The scale, number and quality of the problems that companies have to solve today are significantly different from the problems of the past. Particularly acute are problems such as global competition, which intensifies against the backdrop of the ongoing escalation of sanctions wars; breakdown of economic integration with Western partners, forcing Russian companies to seek new business contacts; onset of a new technological revolution stimulating the innovative activity of all subjects of economic relations and development of management of the virtual work environment, etc. An operational response to environmental disturbances and an adequate solution to emerging problems, far from exhausting their complete list, is possible on the basis of increasing the resource potential of companies as a result of a synergistic effect from various kinds of cooperation relations between partner companies.

The solution of these problems is most promising in the conditions of transition of the economy to a model of sustainable development. The emphasis of economic policy should be placed on the innovativeness of all spheres and sectors of the economy, which are based on the generation, assimilation and diffusion of new knowledge.

Keywords: corporate strategies, corporate construction, management paradigm, technological paradigm.

Introduction

The beginning of the 21st century was marked by a cardinal transformation that the entire world community is undergoing. There is a growing awareness of the global threat and responsibility for planetary survival, the preservation of the noosphere and the sustainable development of society. The anthropogenic impacts of recent decades are so great in scale that the natural compensation mechanisms developed during the evolution of society have become inadequate. Problems have arisen, their elimination can be ensured only by joint efforts.

Globalization of threats and increasing responsibility for the sustainable development of society require solving urgent problems in the field of transition of the economy into a model of sustainable development. The emphasis in the economic policy of companies is placed on the search for new forms of intercompany cooperation that can consolidate intellectual capital and create conditions for the development of new technologies in order to create competitive advantages in the national and world markets. An important place in the process of moving the economy towards sustainable development and raising the standard of living is occupied by technology transfer, which can be considered a kind of tool for creating companies' value in the form of intellectual capital.

Materials and Methods

The object of research is the process of building strategically oriented corporate strategies based on the integration of management and technological paradigms.

The subject of the study is the organizational and economic relations that are built between corporate structures in the process of choosing strategic development priorities in the context of the large-scale impact of new technologies and other global environmental challenges.

The theoretical basis of the study was the scientific work, which sets out the theoretical and methodological approaches to the organization of corporate development, including on the basis of the consolidation of cooperative ties, improving the quality of corporate governance, improving the activities of corporations in stable conditions of national economies. These works include, first of all, the scientific works of foreign scientists: Mallin C., Goffin K., Kanji G.K., Reidenbach R.E., Robin D.P. A great contribution to the development of approaches to adapting corporate governance to conditions of instability was made by scientists: Hickson D.J., Pugh D.S., who studied the impact of globalization processes; Mendell S., Ennis D., Sawhney M., Wolcott R.C., Arroniz I., Santo B. analyzing the active penetration of innovative ideas in all spheres of life; Lang J.C., who studied the transformation of intellectual assets into increased productivity and efficiency.

The value of scientific works of domestic scientists, such as: Asaul A.N., Dementieva A.G., Belikov I.V., Vinslav Yu.B., Pivovarova M.A. etc., are in the fact that the focus of research is aimed at identifying corporate development problems in modern conditions associated with the instability of the economic situation caused by factors of different genesis, including non-economic one.

To formalize and summarize the results of the study, we used the historical method, methods of comparative and abstract logical analysis, as well as the following methods: general logical, formalization, inductive-deductive, statistical and data visualization method.

Research Results and Discussion

The rapid growth of new technologies against the backdrop of increased competition on a national and global scale has made significant adjustments to all areas of the economic life of companies. At the forefront are the problems which can directly influence the future of companies. Such problems include the construction of a strategic development route for companies that are adequate to the requirements of the market environment and future guidelines, the search for new forms of intercompany cooperation with the goal of creating unique competitive advantages, including those based on innovative proposals.

The choice of the type of organizational transformations of companies is determined, first of all, by their necessity and prospects in relation to building up intellectual capital as a planned result of transformations. In this regard, the most significant mergers and acquisitions, which lead to a long-term increase in the size of the business, including intellectual resources, while the joint venture may exist for a limited time. With a simple takeover, the acquired company becomes a part of the acquiring company, while many of the processes, traditions and culture of the acquired company are usually replaced by the processes, traditions and culture of the acquiring company, although such an outcome does not always occur. Mergers and joint ventures require tighter integration.

Mergers and takeovers have already become a universally accepted method for implementing corporate strategies and redistributing resources in the global economy. Today, many companies believe that it is faster and cheaper to acquire the necessary intellectual resources (or at least get access to them) in this way than to create them by yourself in the process of your own growth. In the past, the motivation for such transactions was related to monetary or material resources, but today they are increasingly aimed at transferring knowledge (with or without their human element), relative resources, strategic capabilities and technologies that bring profitable competitive firms opportunities as they go beyond their current strategic, organizational, and cultural context.

The ability to anticipate a favorable outcome for a merger, takeover, or joint venture is today becoming the chief quality of a leader. The ability to predict success or failure of a union is a rather difficult task. By virtue of this, appropriate reliable tools and methods should be created. They will allow us to analyze such situations when it is expected that key opportunities for creating value should grow out of the effective use of new integrated intellectual resources. Conventional due diligence schemes and methods, as a rule, do not take intellectual capital into account, because it is more difficult to identify and evaluate than tangible assets. Often this is due to the causal uncertainty associated with intangible resources and the time constraints imposed by the upcoming transaction. For this reason, in the event of a merger, takeover, or creation of a joint venture, intellectual capital is at the greatest risk of loss, damage, or failure to achieve its goals.

The strategic importance of mergers and takeovers in a competitive environment requires the creation of a conceptual framework to identify factors that determine their viability or success. Looking through the prism of intellectual capital in such situations is priceless, since it structures the difficulties that arise at such moments and, focusing the analysis on the level of resources, makes the process clearer thanks to which integrating organizations can successfully use the results arising on the basis of their synergy resources. This extends the scope of the traditional legal and financial audit, usually carried out in the course of mergers, takeovers and joint activities. By focusing their attention on the unique intellectual capital which is the basis of the competitive advantage of the companies involved in the transaction, managers are given the opportunity to link the desired results with the processes by which these results should be achieved in the future. Moreover, a look through the prism of intellectual capital can help identify and take advantage of the benefits of synergy, which are not so easy to identify and explain in the process of traditional due diligence. Since both tangible and intangible assets are important from the point of view of intellectual capital, new ways of obtaining value can be discovered. The concept of intellectual capital is fundamentally more comprehensive and more connected with long-term potential.

In this regard, the interconnectedness and interdependence of the concept of intellectual capital and the new technological paradigm of the present century should be assumed.

In modern conditions, the development of technology is carried out under the influence of two processes. On the one hand, they are developed in the course of scientific research and the production of innovations - processes whose course is based on the use and increment of intellectual capital. On the other hand, the needs of society make it necessary to generate and / or acquire, assimilate and disseminate new knowledge - the effectiveness of these processes increases many times in the context of the integration of business structures (Table 1).

Table 1 - The interaction of scientific advances and new needs on technology change

Needs / Inventions	Out of date needs	New needs	Actual needs
Major inventions	Basic innovations → new technological principles	New generation of technology, fundamentally new products	Basic improvement
General inventions	The combination of	New models of	Technology

	well-known goals with new tools	technology	modifications
Small and smallest inventions	Microinnovations	Pseudo-modifications, imitation, improvement of individual technology parameters	Improvement of obsolete technology

Thus, technological innovations can be represented by new combinations of production factors, a new production method, technologies of using a new type of raw materials or semi-finished products, a new organization of business processes, etc. They can correspond to different levels of novelty, international standards, be new to the company or updated, etc.

The innovative technologies that form the basis of the sixth technological structure include, first of all, nanotechnologies, the practical application of which began in the mid-90s. XX century, and the state of which will determine the level of development of the world community in the middle of this century. In addition, the modern technological field is based, in particular, on computer and fiber optic technology, software, telecommunications, information services, robot manufacturing, genetic engineering, biotechnology, and “green” technologies for the production of environmentally friendly energy sources (Fig. 1). Moreover, the share of work performed by man is already steadily declining and by 2025 it will occupy a smaller part - 48% against machine performed work (52%). Turning to the problem of using robots, it should be noted that in the modern world not only the word "robot" does not surprise anyone, but the use of robots has become widespread - from conveyor packaging and mine neutralization to minimally invasive surgery - and the robots themselves have overcome a huge distance from primitive devices to sophisticated devices endowed with artificial intelligence. By 2022, companies equipped with robots will be at their maximum for stationary and industrial robots in the automotive industry, the space sector, and supply chains. Equipment with air and underwater robots is expected in the oil and gas sector. In the financial sector, humanoid robots will be most in demand.

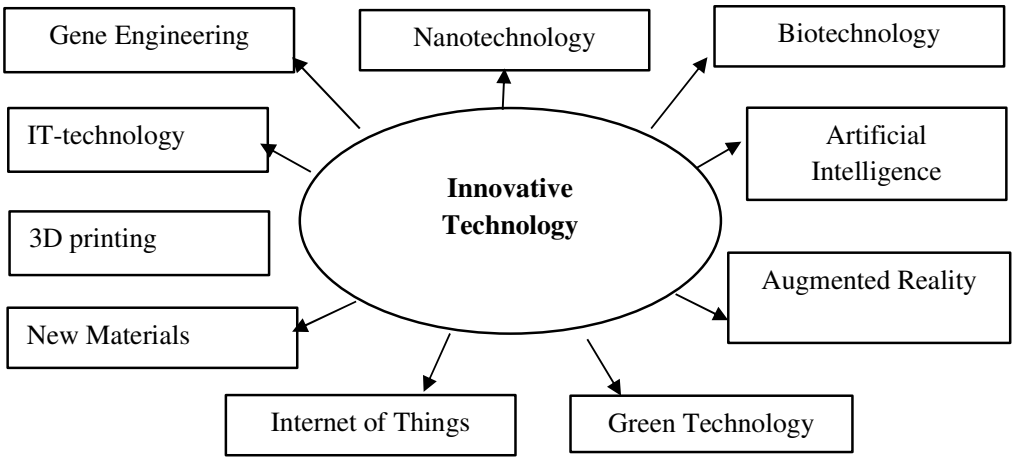

Figure 1: Basic technologies of the sixth technological structure

Characterizing these technologies, two general characteristics should be distinguished - universality and the reduction and / or elimination of market entry barriers.

The universality of new technologies is determined by the possibility of their use in various industries and fields of activity. For example, based on the achievements of nanoelectronics in the form of the production of nanostructured metal, ceramic and polymeric materials with desired properties and the

necessary shape, promising areas for the application of nanotechnology are manufacturing industry, medicine, aeronautics and space exploration, energy and environmental protection, technology in agriculture, etc. (fig. 2).

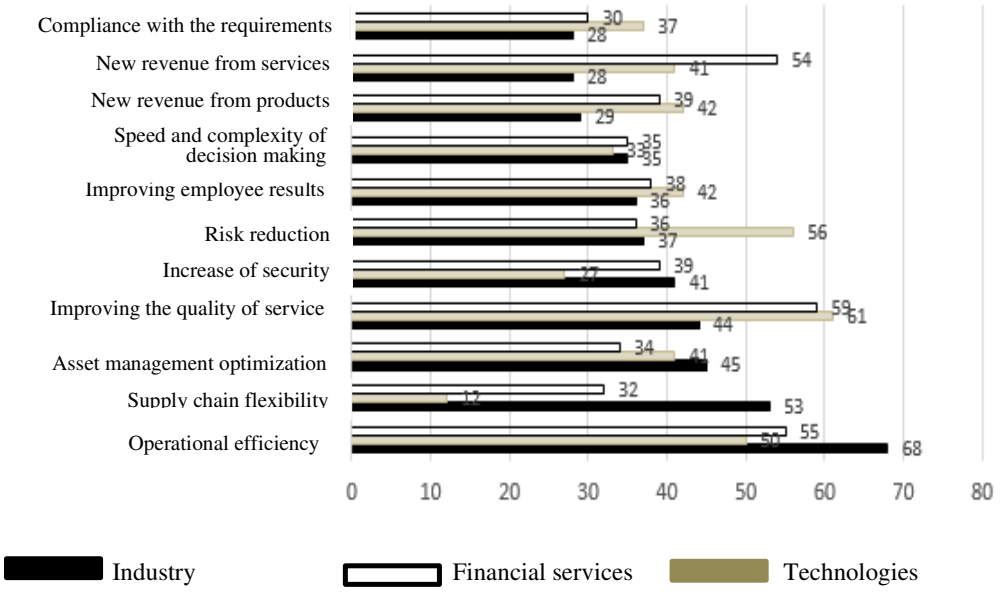

Figure 2: The expected benefits of investing in IT technology

Consequently, the effect of scale characteristic of traditional technologies is complemented by the effect of diversity. Expanding the scope of technology, diversification of offers to the market in the form of various products based on the same technology, are the main means of obtaining savings. According to experts, in high-tech industries such as electronics and telecommunications, savings can increase by expanding the scope of activities, while traditional savings are achieved by expanding the scale of production.

The reduction and / or elimination of entry barriers to markets that provide new technologies are manifested in several aspects:

1. The time barrier of market functioning is being overcome - the use of information and telecommunication technologies allows you to remove time limiters for doing business (you can do it around the clock, any day of the week). So, according to a study conducted in the USA, remote work will continue to remain in trend. So, about 53 million people perform their work remotely, and this is about 34% of the people represented on the global labor market. This indicator will rise to 50% by 2020. Companies will have to learn how to find the right employees and think about creating suitable remote employee management systems.

2. There are types of activities that are partly or in full carried out on the basis of Internet technologies. These activities include: planning and forecasting development, financial management, customer service, business partnerships, marketing research, advertising campaigns, hiring, personnel management, research and development, etc. For example, Internet banking technology has recently gained popularity, which allows you to remotely consult bank customers using the capabilities of the Internet. This system allows you to make non-cash internal and interbank payments and operations with non-cash currency, pay utility bills and Internet service bills and mobile communications bills, transfer funds and monitor all banking operations on your accounts. According to experts, in 2017, 94% of customers of American banks are already conducting transactions on-line, while the annual growth rate of mobile payments in the US is 68%. In Russia, the share of banks offering their customers (individuals) the Internet banking service in 2017 amounted to 86%.

3. Territorial restrictions in conducting market operations are eliminated — based on the use of Internet technologies, the opportunities for companies to quickly enter not only local, but also remote markets with different geographies of the world are expanding.

4. Institutional barriers to entering the markets have been overcome - this is true both for individual companies and the national economy as a whole. The formation of a global electronic environment for economic activity has occurred. The interconnection and interdependence of the active total introduction of new technologies into the business processes and the globalization of the economic space is determined, on the one hand, by the fact that the new technological paradigm stimulated the process of bringing industries and markets to the level of their globalization, and on the other hand, globalization helps increase economic efficiency through the use of new technologies.

5. Decreased logistical barriers. According to experts' forecasts, with the development and spread of nanotechnology, significant progress can be achieved in miniaturization and in increasing the speed and productivity of information processing devices.

But at the same time, the new technological paradigm gives rise to certain problems. The rapid development of new technologies can lead to unexpected effects that have both positive and negative significance for companies and society as a whole.

The first two problems are related to the use of Internet technologies.

First problem is increasing dependence of Internet technology users on the operation of their information systems and the need for their reliable protection against cyber-attacks by hackers and other interested structures. Despite the fact that cybercrimes occupy only fifth place in Russia among the main types of economic crimes, the leaders of Russian companies put cybercrimes in second place among all types of fraud that could potentially harm their business in the next two years. This is an explanation of the fact that the number of companies that have developed operational plans for protection against cybercrime has increased (from 26% in 2016 to 62% in 2018). In addition, every year the problem of reducing the effectiveness of the implementation of Internet technologies becomes acute due to losses caused by malware and unauthorized mailing lists (spam). Experts admitted that in 2008, for the first time, Russia ranked second in the world in the list of countries distributing spam, while the losses of Russian companies from spam in the same year amounted to about $500 million. The most relevant trends are the increase in the number of attacks on platforms other than Windows, diversification of malicious programs introduced in social networks, as well as the steady interest of hackers in mobile payment services. The efforts of business entities of the micro-, macro- and mesoscale levels are aimed at solving this problem, since the problem has turned into a global one.

Secondly, to achieve the real effect of the modernization of business processes based on Internet technologies, certain conditions are required. So, it is necessary that at least 2-3% of the bills should be paid using these technologies. Therefore, the realization of the advantages of new technologies depends both on the number of partners (network external effect) and on the use of "electronic money", which are funds on computer accounts in virtual banks.

The third problem covers the security sphere of all mankind and is manifested in the growing risk of man-made disasters that threaten the safety of both current and future generations. This is due to the fact that almost any technology, along with its advantages, is accompanied to a greater or lesser extent by negative impact on society and the environment. Particularly acute are problems of a non-economic nature affecting the field of psychology, the sphere of moral and ethical values, etc.

Therefore, we can conclude that, in general, the new technological paradigm of the beginning of the XXI century has a significant impact on the object and channels of technology transfer, as well as on the establishment of intercompany interaction in the field of scientific and technical cooperation.

The trend of technology transfer based on intercompany agreements within the framework of scientific and technical cooperation, including the international level, took shape in the late 80sof the XX century. The advantages of scientific and technical cooperation are obvious - it helps to reduce

the degree of uncertainty of the environment, the level of risk and the size of the costs of its participants, makes it possible on the principles of reciprocity to introduce the latest scientific and technical developments, use the potential of highly qualified personnel, removes the problem of obsolescence of knowledge, creates conditions for the dynamic promotion of innovative products.

The development of scientific and technical cooperation is based on long-term inter-company agreements of a strategic nature. In contrast to unidirectional relations in the transfer of technology under license, subcontract, or franchising agreements, this form of cooperation involves cooperation on an ongoing basis, throughout which its participants improve the methods used in research and production. This is made possible through the implementation of personnel exchange programs, allowing the dissemination of best practices.

The evolution of scientific and technical cooperation, starting with the exchange of information, co-production and marketing, begins to gradually cover a fairly wide range of industries. Today, scientific and technical cooperation is aimed at achieving a number of goals: the joint conduct of R&D and other types of innovation; aggregation of disparate technologies and knowledge; improvement of the innovation process; forecasting the prospects of cooperation on the basis of information exchange; expanding the range of technological capabilities within the company and at the national level. Especially observed the active development of scientific and technical cooperation in the sectors of the new economy.

Scientific and technical cooperation is implemented in a wide range of forms, such as strategic alliances, including scientific and technical, technological cooperation, strategic partnership, technological partnership, etc. Of all these forms in the last decade, the most widespread are scientific and technical alliances that are formed to create a fundamentally new technology, product (product, service) or solve priority problems of participating companies. Alliances of this kind are an integral component of the global strategy of TNCs.

World tendencies in weakening trade barriers, which led to an increase in the mobility of factors of production (primarily capital), have led to the expansion of the capabilities of small and medium enterprises in the field of scientific and technical cooperation. Such a form as technological partnership began to actively develop. If earlier scientific and technical alliances were observed exclusively in developed and new industrial countries, recently, agreements on scientific and technical cooperation have been actively concluded between enterprises of developing countries.

Numerous and diverse actors are involved in the field of scientific and technical cooperation - the company interacts with suppliers, customers, and possibly competitors, as well as with educational institutions of higher education and research organizations.

One of the features of this institutional form of intercompany technology transfer is the inclusion of competitors of companies among its participants. This is primarily due to the desire of companies, regardless of their size, to avoid confrontation and to establish cooperation in a hyper-competitive environment and rising costs for research activities. Predicting the stability of this form of cooperation, we can assume two opposite results: 1) similar forms can disintegrate at any moment, and, as practice shows, approximately 50-60% of all strategic alliances do not achieve their goals; 2) such forms can develop into quasi-mergers.

In modern conditions, cross-border mergers and takeovers of companies, including world leaders, are becoming a form of intercompany technology transfer. One of the results of the acquisition of a potential competitor or merger with it is the acquisition by the corporation of the respective research units. In the high-tech field, this is characteristic of industries such as pharmacology, communications, and biotechnology.

Thus,

Conclusion

In a modern society with a knowledge-based economy, an important place belongs to the creation, assimilation and diffusion of new technologies. The invention of innovations, being important from a scientific and technological point of view, may result in a commercial failure in a single company. But at the same time, under other circumstances, it can be very cost-effective and make a tangible contribution to economic growth and development. Therefore, considerable attention needs to be paid not only to the process of creating, mastering and disseminating new technologies, but also to the right choice and development of an appropriate company strategy aimed at increasing the company's intellectual capital using all appropriate methods, including expanding the range of forms of intercompany cooperation and establishing cooperative ties.

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Households in Modern Russia

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Abstract

Currently, households are the largest subject of economy, as they through their finances participate in all macro-regulatory processes of our society and represent the main force in the production and distribution of goods and services. The problem of housekeeping is becoming increasingly relevant due to the constant increase in food prices and other expenses. You must be able to properly allocate your budget to satisfy not only the required benefits, but also other needs. Thus, the importance of proper cash allocation is currently the foundation of housekeeping and requires careful study.

Keywords: households, disposable resources, consumer spending.

Introduction

In recent years, interest in household statistics has increased markedly. Survey data from household budgets are used to analyze the standard of living of the population, calculate the subsistence level, build an index of consumer prices, compile household sector accounts in the system of national accounts.

A household is a group of people living in one or part of a residential building, jointly providing themselves with food and everything necessary for life, that is, fully or partially combining and spending their money. These people may be related by kinship or relationship arising from marriage, or not be relatives, or both. A household can consist of one person living independently and providing himself with food and everything necessary for life. Households are one of the important subjects of economic activity on the results of which not only the welfare of an individual economic

unit, but also the entire population of the country as a whole depends. Having become the largest subject of economy, along with commercial enterprises and the state, households participate in all economic processes. The deep economic crisis and, as a consequence of this, the difficult financial situation of most of the population lead to vigorous activity of the household. Regular surveys of household budgets were organized on the basis of Decree of the Council of Ministers of the USSR of November 3, 1951 No. 4354 “On improving statistics of budgets of workers, employees and collective farmers.

Since 1988 the survey covered all sectors of the country's economy, in addition, the households of retirees who were not able-bodied were examined.

Currently, a sample survey of household budgets is carried out in all subjects of the Russian Federation, it covers 49.2 thousand households on a quarterly basis and is based on the principle of their voluntary participation. The data obtained from household budget surveys have a wide and ever-increasing range of uses. By its nature the survey is multi-purpose and its main tasks were initially defined as studying the level of material well-being of the population. Currently, the main objectives of the survey are: a) obtaining indicators for building a consumer price index; b) obtaining data on cash expenditures and consumption of household groups of different levels of well-being and socio-economic characteristics, sources and structure of food consumption by them; as well as data on income distribution and estimates of the poverty level of the population;; c) providing data for billing of the household sector in the system of national accounts.

The state program of the Chuvash Republic "Development of agriculture and regulation of the market of agricultural products, raw materials and food of the Chuvash Republic" (hereinafter referred to as the State program) provides for the comprehensive development of all areas of activity of the agro-industrial complex of the Chuvash Republic. At the same time, two priority levels are identified. The first level of priorities includes: environmental safety of agricultural products and food; in production - livestock breeding (milk and meat production) as a system-forming area of activity that uses competitive advantages of the republic, primarily the presence of significant areas of agricultural land, as well as crop production as the basis for the development of animal husbandry; in the economic sphere - increasing income of agricultural producers; in the social sphere, the sustainable development of rural areas as an indispensable condition for the preservation of labor resources, the creation of conditions for ensuring the economic and physical availability of food based on rational food consumption standards.

The implementation of measures of the State Program at the 2nd stage should ensure the achievement in 2030 of the following target indicators:

- the volume of agricultural production per capita - 103.4 thousand rubles;
- the index of agricultural production in farms of all categories (in comparable prices) is an increase of 42.1 percent compared to 2018;
- profitability of agricultural organizations (including subsidies) - 18.0 percent;
- labor productivity index - 1.8 times growth in relation to 2018;
- the number of high-performance jobs - 970 units;
- an increase in agricultural exports by 1.9 times in relation to 2018;
- the share of costs for the purchase of energy in the cost structure for the main production of agricultural products is 9.3 percent;
- disposable resources of households (on average per 1 member of a household per month) in rural areas - 21,311 rubles.

Based on the available literature, it can be concluded that economists have different approaches to the issue of households, namely to the issues of disposable resources, consumption, savings, investment and lending.

The most interesting for science is the research of S. Muravyov and Peck T.N. They give arguments explaining the decline in consumption by the presence of adaptive mechanisms used by

most households namely: restrictions on consumption, a decrease in demand for credit resources and the low level of savings of most of the population. In their opinion, there was no transition of households to a savings strategy of behavior during the current recession of business activity.

In the context of a sample survey of household budgets by state statistics bodies in all constituent entities of the Russian Federation, covering only 48 thousand households and subject to their voluntary participation, the works of E. Medvedeva, A. V. Yarasheva, V. B. Toreev, and Kroshilin S.V. under the leadership of Rimashevskaya N.M., Balandin S.V., Ryabov S.G., Petryakov O.L. are valuable in connection with the study of regional statistics of incomes and expenditures of the population.

Foreign scholars Thaler R., Barro R., Zou Heng Fu and Wang Chong-yang study similar processes, establish an effect of tax increase for citizens on reducing household consumption spending and an effect of government actions on consumption which is independent on the method of financing government spending.

Materials and Research Methods

The research involved teachers and staff of Chuvash State Agricultural Academy. The scientific problem was studied on the basis of the Department of Economics, Management and Agro-Consulting throuth the use of available information resources, including reference networks, electronic library networks, official websites of government agencies of the Russian Federation and Russian enterprises. The objects of the study were households of the Russian population.

The used research methods: scientific search, analysis and systematization of statistical data, generalization of research results, forecasting and planning.

Research Results

Disposable household resources are the sum of household cash income, the amount of accumulated savings and borrowed funds and the cost of in-kind income.

In general, the indicator “household disposable resources” is interpreted as the amount of funds (cash and in kind) that households had to ensure all their expenses and make savings during the survey period.

An analysis of the structure of household disposable resources in Russia, according to the Federal State Statistics Service, showed that in 2018 disposable resources increased by 1,191.2 rubles compared to 2017, including 2,350.1 rubles in urban areas and rural areas by 879.4 rubles.

Table 1: Composition of household disposable resources of various socio-economic categories in the Russian Federation (on average per household member) in 2016-2017, rub. per month

	All households		including residents			
			in urban areas		in the countryside	
	2017	2018	2017	2018	2017	2018
Available resources, total	24926,5	26917,7	27206,8	29556,9	18309,1	19188,5
including: cash expenses	21220,9	22926,4	23428,0	25427,2	14816,2	15602,5
Cost of in-kind non-food items and services	177,2	177,9	195,5	190,0	124,2	142,3

Cost of in-kind food	585,0	589,6	395,6	381,2	1134,6	1121,6
Amount of borrowed funds and spent savings	2943,3	3232,9	3187,7	3548,7	2234,1	2307,9

The analysis of the structure of disposable resources of households in the Russian Federation showed that the share of cash expenditures tends to increase. The growth amounted to 786.3 rubles in 2018 compared to 2017.

Table 2: Composition of disposable resources of households of various socio-economic categories in the Russian Federation for 2013-2018 (on average per household member per month, rubles)

	2013	2014	2015	2016	2017	2018
	All households					
Available resources, total	21198,5	22890,1	23084,8	24209,8	24926,5	26917,7
including:						
cash expenses	18089,9	19447,2	19293,3	20583,5	21220,9	22926,4
cost of in-kind food	468,6	490,2	585,2	598,8	177,2	177,9
cost of in-kind receipts, non-food goods and services	148,7	149,5	208,9	167,8	585,0	589,6
amount of savings made	2491,2	2803,2	2997,4	2859,6	2943,3	3232,9
	Urban households					
Available Resources - Total	23645,0	25347,5	25486,4	26719,7	27206,8	29556,9
including:						
cash expenses	20431,5	21788,8	21503,2	22974,5	23428,0	25427,2
cost of in-kind food	302,6	322,3	399,1	415,4	195,5	190,0
cost of in-kind receipts, non-food goods and services	165,9	164,3	241,9	186,6	395,6	381,2
amount of savings made	2745,1	3072,0	3322,2	3143,2	3187,7	3548,7
	Rural households					
Available Resources - Total	14191,7	15802,3	16639,7	16971,0	18309,1	19188,5
including:						

cash expenses	11383,7	12693,1	13313,0	13687,7	14816,2	15602,5
cost of in-kind food	944,1	974,7	1068,9	1127,8	124,2	142,3
cost of in-kind receipts, non-food goods and services	99,6	106,8	119,5	113,6	1134,6	1121,6
amount of savings made	1764,2	2027,7	2118,3	2041,9	2234,1	2307,9

Analysis of the data given in table 2 indicates that in the structure of disposable resources of households in Russia living in urban areas the largest share is occupied by cash expenses, the share of which in 2018 compared to 2013, that is an increase by 5719.2 rubles. The growth in savings in the total amount of household resources available in 2018 amounted to 29.8%, which is 741.7 rubles higher than in 2013.

Table 3 shows the structure of consumer spending in the Chuvash Republic for the 3rd quarter of 2016-2017.

Table 3: The structure of household consumer spending in the Chuvash Republic for the 3rd quarter of 2016-2017, %

	All households		**including residents**			
			in urban areas		**in the countryside**	
	3 quarter		**3 quarter**		**3 quarter**	
	2016	**2017**	**2016**	**2017**	**2016**	**2017**
Consumer spending, on average per household member per month, rub.	10098,8	9266,5	11303,8	10454,0	8190,1	7327,2
including percentage:						
for the purchase of food	36,5	38,3	36,2	35,7	37,2	44,3
eating out	2,6	3,2	2,4	3,0	3,0	3,6
for the purchase of alcoholic beverages	1,9	1,6	2,0	1,7	1,5	1,4
for the purchase of non-food goods	32,1	31,9	28,9	31,5	39,1	32,9
to pay for services	26,9	25,1	30,5	28,2	19,2	17,8

A sample survey of household budgets is one of the main sources of information on the level and quality of the population life. The importance of this survey lies in the fact that information is collected directly from households. The survey covers srata of the population whose main sources of income are wages, social payments and income from personal subsidiary plots.

In the Chuvash Republic the survey covers 500 households.

According to table 3 some changes took place in the structure of consumer spending. In the 3rd quarter of 2017 82.2% of income was spent by residents of the republic on the consumption of goods and only 17.8% on payment for services.

The average per capita consumer spending of households in the third quarter of 2017 amounted to 9266.5 rubles per month and decreased by 8.2% compared to the corresponding period of 2016, in

urban areas these expenses amounted to 10454.0 rubles and decreased by 7.5 %, in rural areas - 7327.2 rubles and 10.5% respectively.

Analyzing the data of Chuvashstat on a sample survey of household budgets for the third quarter of 2017, we can draw certain conclusions. In the structure of consumer spending there was a decrease in the share of expenses for the purchase of non-food goods, alcoholic beverages and payment for services, while an increase was observed in the purchase of food products (including lunching out).

The average per capita household spending on food (including lunching out) increased by 2.3% and amounted to 3839.6 rubles per month.

In urban areas expenses for these purposes amounted to 4042.2 rubles, in rural areas –3508.6 rubles.

The most expensive items of food for home use are meat and meat products (25.5%), bread and bread products (18.3%), milk and dairy products (16.8%).

Compared with the third quarter of 2016, household expenses for the purchase of potatoes increased 2.0 times, fruits and berries - 1.6 times, fish and fish products - 17.7%, meat and meat products - 2.7% .

Expenses for the purchase of non-food items amounted to 2,956.0 rubles per month, which is 8.8% lower than in the third quarter of 2016, in urban areas they amounted to 3290 rubles and increased by 0.7% in rural areas - 2410.5 rubles and decreased by 24.7%.

The cost of services amounted to 2325.2 rubles per month, which is 14.4% lower than in the third quarter of 2016, in urban areas they amounted to 2948.6 rubles and decreased by 14.4%, in rural areas - 1307.1 rubles and 16.7%, respectively. In the structure of household expenses for services the prevailing expenses are those for cultural institutions and recreation services (28.2%), public utilities services (28.1%). Communication services accounted for 10.9%, passenger transport services - 9, 3%, household services 9.2%, other services - 5.8%, services in education –5.3%. Costs of housing and public utilities services increased by 1.8%. In the third quarter of 2017 household expenses for communication services exceeded the level of the corresponding period in 2016 by 4.1%, household services - by 4.3%, other services - by 3.1 times.

Household expenses on cultural and recreational facilities, services in education, medicine and health and wellness services, passenger transport services decreased.

Conclusion

Thus, we can conclude that at present the household is becoming an active participant in the system of economic relations of the society, its importance in solving the most important socio-economic problems is expanding.

The due approach to the problems of household management will allow to establish a system in the money management of households, keep records of expenses and incomes, analyze and plan them, rationally make purchases, increase savings.

Rosstat presents the results of a sample survey of consumer expectations for the first quarter of 2019.

The consumer confidence index, which reflects the aggregate consumer expectations of the population, increased by 1 percentage point in the 1st quarter of 2019 compared to the 4th quarter of 2018 and amounted to (-16%).

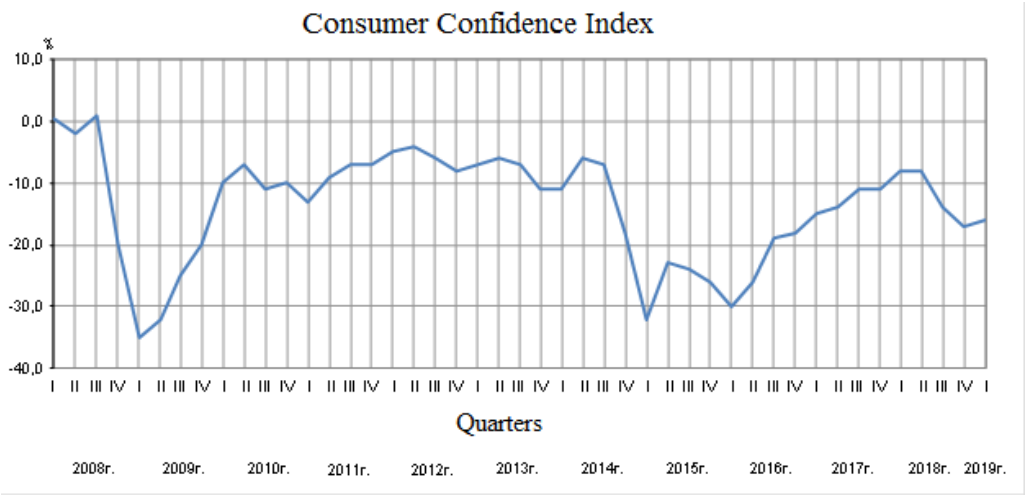

Fig. 1: Consumer Confidence Index

The index of expected changes in personal financial situation increased by 3 percentage points and amounted to (-7%) versus (-10%) in the IV quarter of 2018.

The proportion of respondents who expect improvement in their financial situation over the next 12 months, compared with the fourth quarter of 2018, increased to 11% compared to 10% in the fourth quarter of 2018. The share of negative assessments decreased to 23% (in the IV quarter of 2018 - 26%).

The index of changes in the personal financial situation remained unchanged and amounted to (-14%) in the 1st quarter of 2019.

The share of respondents who positively assess changes in their financial situation during the year in the I quarter of 2019 compared to the IV quarter of 2018 increased by 1 percentage point and amounted to 10%. The share of negative assessments increased to 34% (in the IV quarter of 2018 - 33%).

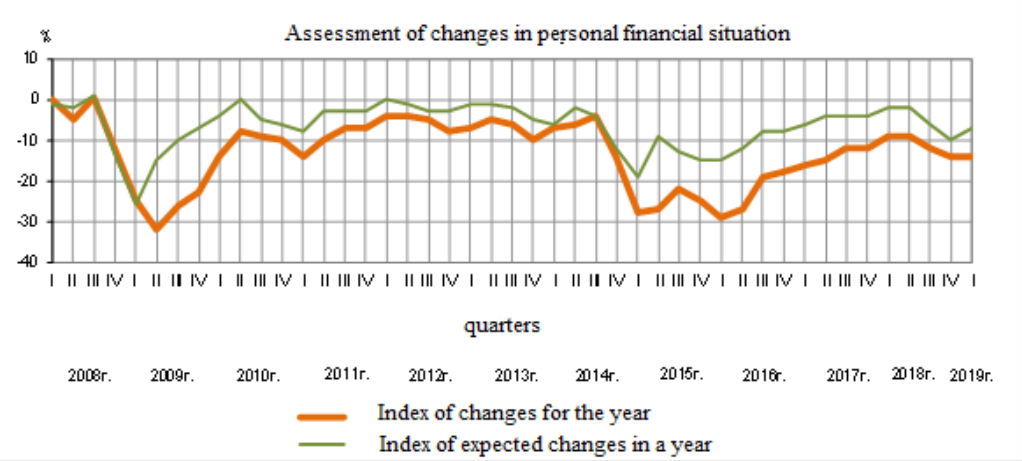

Fig. 2: Assessment of changes in personal financial situation

The favorable conditions index for large purchases decreased by 4 percentage points and amounted to (-29%) versus (-25%) in the IV quarter of 2018. The favorable conditions index for savings decreased by 1 percentage point and amounted to (-37%) versus (-36%) in the IV quarter of 2018.

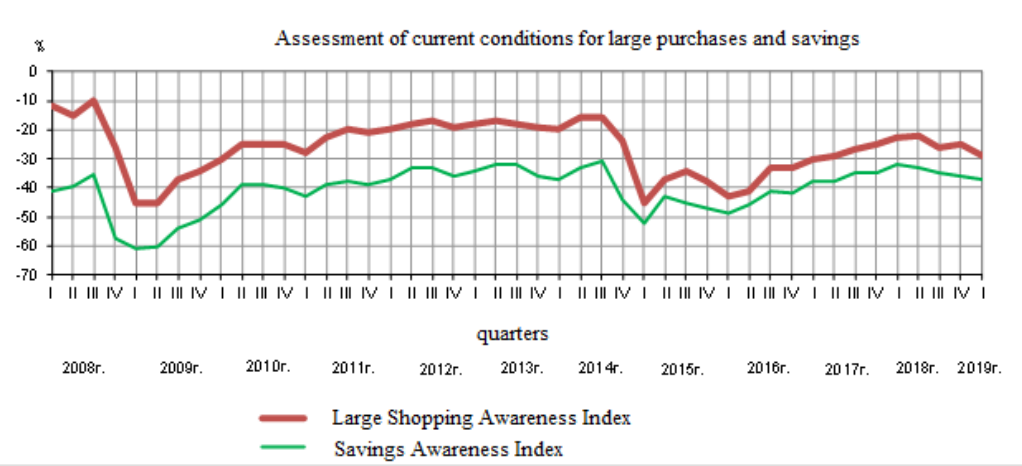

Fig. 3: Assessment of current conditions for large purchases and savings

The consumer confidence index by age groups in the Ist quarter of 2019 compared with the 4th quarter of 2018 increased by 1 percentage point among middle-aged people (30 to 49 years old), decreased by 2 percentage points among the younger generation (aged 16 up to 29 years) and remained unchanged in older people (50 years or more).

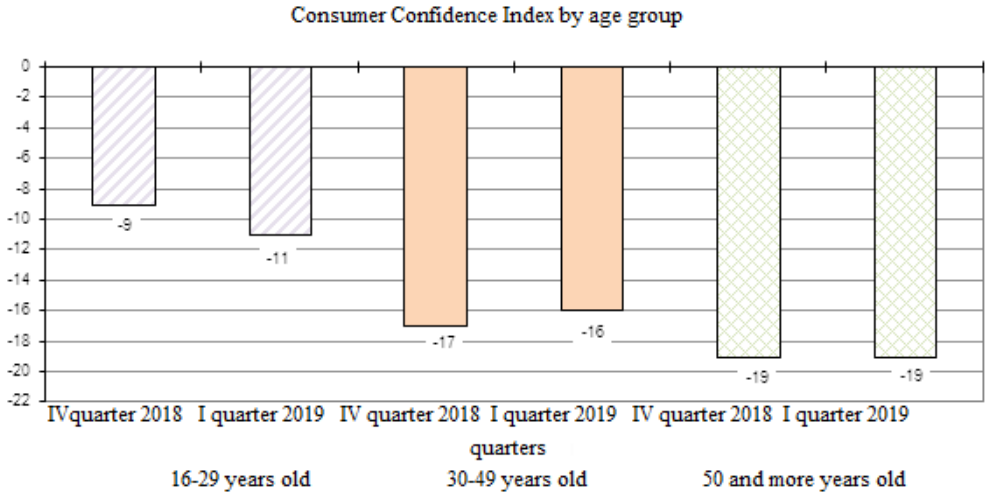

Fig. 4: Consumer Confidence Index by age group

Table 4: Consumer Confidence Index in Russia and EU Countries

	November 2018	February 2019		November 2018	February 2019
Russia	-16,6	-16,5			
Austria	0,1	-1,6	Luxembourg	0,1	-0,7
Belgium	-6,8	-11,1	Malta	9,3	6,4

Bulgaria	-27,2	-26,6	Netherlands	-1,8	-6,3
Great Britain	-8,1	-10,8	Poland	3,7	5,9
Hungary	-5,9	-4,4	Portugal	-4,5	-9,1
Germany	-1,1	-2,2	Romania	-12,9	-14,3
Greece	-32,7	-33,3	Slovakia	-7,8	-7,8
Denmark	5,6	3,1	Slovenia	-8,5	-6,8
Ireland	6,5	-1,3	Finland	2,8	0,4
Spain	-4,9	-5,4	France	-13,9	-11,6
Italy	-10,7	-11,8	Croatia	-5,4	-7,6
Cyprus	-5,8	-7,0	Czech	1,2	3,7
Latvia	-5,9	-6,6	Sweden	1,0	-1,0
Lithuania	2,4	5,2	Estonia	-2,8	0,6

The survey questionnaire includes questions of the subjective opinion of the respondent about the general economic situation and personal financial situation, about the situation in the markets for goods (services) and savings. Respondents' answers are distributed according to the following options:

- definitely positive or definitely negative (very good, very favorable / very poor, very unfavorable);
- rather positive or rather negative (good, rather favorable / bad, rather unfavorable);
- neutral (average, "pluses" and "minuses" are the same).

According to the methodology of the European Commission, the values of private indices and a generalized index of consumer confidence in the population are calculated.

Private indices are calculated based on the balance of respondents' ratings (percent) on the corresponding question of the questionnaire.

The balance of assessments is the difference between the sum of the shares (percent) of definitely positive and ½ rather positive answers and the sum of the shares (percent) of definitely negative and ½ rather negative answers. Neutral responses are not taken into account.

The generalizing (composite) index - the consumer confidence index - is calculated as the arithmetic average of five private indices: the actual and expected changes in personal financial situation (1-2), the actual and expected changes in the economic situation in Russia (3-4), favorable conditions for large purchases (5).

The information obtained as a result of a survey of consumer expectations of the population can be used, along with quantitative statistical data, to analyze the behavioral model of the population in consumer market, as well as to assess the impact of consumer activity on the state of economy as a whole.

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Tax Policy in Russia And Ways to Improve It

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Abstract

The article presents the main ways to improve tax policy of the Russian state, to solve the problems associated with the budget revenues formation, the main purpose of which is economic and social stability in society.

Keywords: taxes, tax policy, ways to improve tax policy, improvement of tax policy, tax policy of the state.

Introduction

Taxes have been an integral part of economic relations in society since the creation of the state. The transformation of the state device always occurs when the tax policy changes. The use of taxes serves as a link between the public and commercial interests of entrepreneurs, organizations, regardless of forms of ownership. Thanks to taxes, foreign business activity is audited, namely attracting foreign investments that increase the organization's profit.

The main goal of tax policy is to achieve fiscal sustainability and a balanced budget system. The tax policy of the Russian Federation should set certain goals and begin to quickly resolve urgent external problems, which, for example, include:

- Sanctions imposed on the Russian Federation;

- Low oil prices.

Materials and Methods

The research involved teachers and students of the Academy. The problem was studied on the basis of the Chuvash State Agricultural Academy, which provides access to open information resources. The objects of the study were the legal framework of tax and budget legislation. In the course of the work, widely tested reliable research methods were used. General scientific methods of dialectics, analysis, synthesis, induction, deduction and analogy, special economic methods were used to solve analytical problems: comparisons, analytical groupings, time series analysis, correlation and

regression. Statistical information is processed in the Microsoft Excel software environment.

Research Results and Discussion

Tax policy for 2019-2020 - this is public information that the Ministry of Finance places on its website (as a rule it happens before the beginning of the coming year). Based on this information, you can understand what fiscal conditions will be created for the development of private business, what set of tools will be used. We want to see if the shadow segment is able to fully balance the budgets and what legislative innovations will be adopted to solve such problems.

The shortcomings of tax policy of the Russian Federation are currently given quite special attention, since the stable functioning of the entire national economy depends on the extent to which the tax system is correctly developed and how the state's tax policy is thought out.

The basic forecast for medium-term economic development for 2018-2020, based on the budget parameters, is based on scenario conditions that assume a gradual slowdown in global economic growth from 3.1 % in 2016 to 2.8 % by 2020, due to the expectation of a slowdown in economic growth in both developed and developing countries. The resulting slowdown in energy demand growth, as well as the increase in the US shale oil production and the completion of the agreement on freezing oil production by OPEC countries will help to reduce the prices of Urals oil and reach the level of $ 40. In addition, the forecast is based on the hypothesis that financial and economic sanctions will continue until the end of the forecast period. (Table 1).

Table 1: Main parameters of the basic forecast of social and economic development of Russia for 2017-2020

	Years			
	2017	**2018**	**2019**	**2020**
Price of Urals crude oil, US dollar per barrel	49,9	43,8	41,6	42,4
Exchange rate of the ruble to the US dollar average annual, rubles per US dollar	59,4	64,7	66,6	68,0
GDP growth rate, percentage of the previous year	2,1	2,1	2,2	2,3
Nominal GDP, billion rubles	92224,0	97462,0	103228,0	110237,0
Consumer price index (average annual)	3,9	3,7	4,0	4,0
Exports of goods, billion US dollars	336,9	324,9	324,2	332,4
Imports of goods, billion US dollars	227,8	234,8	238,0	241,0

In addition, it should be noted that sustainable organizations include companies for power production, transmission and distribution, which have an autonomy coefficient at the level of 0.627 at the end of 2017. Whereas, it was 0.205, steam and hot water – 0.339 in the organizations producing and distributing gaseous fuels. This situation indicates a more favorable financial situation in power industry.

The baseline scenario predicts a gradual increase in the growth rate of Russian economy from 2.1 % in 2017 to 2.3 % by 2020. Sustainable development is expected without significant failures with the price of domestic oil at the level of $ 40-50. However, the dynamics of changes in prices for Russian oil in the world market shows a significant increase, exceeding the expected figure by almost two times. The price of Urals oil has been steadily rising since February 2018 and is currently at the level of $ 75-78 US $ per barrel.

Officials believe that the transition to the new budget rules will reduce the cyclical nature of domestic economy. Excess revenues from oil exports will be used to replenish reserves. As a result budget expenditures will be planned based on the cost of oil at the level of $ 40. This will increase the stability of Russian economy.

The high dependence of the state budget on oil and gas industry makes it necessary to constantly revise the tax policy depending on the cost of hydrocarbons. In addition, in recent years foreign policy conditions have increasingly influenced the formation of tax conditions.

The government of the Russian Federation has prepared the main areas of taxation policy for 2018-2020, which the State Duma will have to take into account in its work. It is planned to solve the following tasks:

1) to reduce the shadow business sector;

2) to further minimize the administrative burden;

3) to stimulate investment activity;

4) not to increase taxes for conscientious taxpayers;

5) to suppress various abuses in the application of tax benefits and special tax regimes.

In the next three years the state plans to adhere to the principle of fiscal neutrality and predictability (in particular, not to raise taxes for legal businesses). However, in order to create an incentive to whitewash wages, which otherwise move to the shadow economy, the possibility of changing the structure of tax burden is being considered, (namely, the rates of direct labor taxes (insurance premiums) may be reduced and the rates of indirect taxes (VAT) may be increased). The authorities also want to increase collection of taxes and non-tax payments, so they are improving their management [1]. Table 2. Shows the main areas of improvement of Russia's tax policy for 2018-2020.

Table 2: Proposals aimed at changing the tax system of the Russian Federation

Scope of changes	The planned measures
Tax administration	Expand the ability of tax authorities to independently clarify tax payments in order to avoid penalties - from 2018 to establish a moratorium on new benefits for regional and local taxes; - combine databases of extra-budgetary funds and the Federal tax service; - combine different information bases into one and automate its analysis in order to simplify interaction with taxpayers and prevent shadow schemes
Profit tax	- Allow to include in the composition of bad debts the debt of a citizen recognized as bankrupt; - provide reduced rates for companies implementing investment projects in the Far East region and create external infrastructure facilities for this purpose; - improve the procedure for taxation of profits of controlled foreign companies
Value added tax (VAT)	- Cancel the exemption from VAT on sales of scrap and waste of ferrous and non-ferrous metals <1> and recognize buyers of such products as tax agents for VAT

income tax on individuals	- Allow tax agents to inform individuals on the inability to withhold personal income tax from them using electronic services; - provide a standard personal income tax deduction for disabled children of group I or II, regardless of their age; - prescribe for income under the trust management agreement the same taxation features that are established for the trust management of securities
Uniform agricultural tax	- Recognize payers with the revenue of more than 150 million rubles as VAT payers. At the same time, despite the fact that they recognize expenses after payment, they will apply VAT deductions before payment
Unified tax on imputed income	- Provide a tax deduction in the amount of expenses for the purchase of cash registers
The patent system of taxation	- Provide a tax deduction in the amount of expenses for the purchase of KKT; - allow reducing the cost of a patent by the amount of insurance premiums; - limit the total amount of ownership; - specify the types of activities that fall under this regime
Insurance premium	- Tax payments under agreements on the alienation of exclusive rights and license agreements regarding any results of intellectual activity
State duty	- Differentiate the amount of state duty for issuing a license to trade alcohol depending on the number of points of sale; - allow individuals to pay taxes and state duties through multifunctional centers
Non-tax payments	- Complete the work on systematization of common rules for setting and collecting non-tax payments in 2017; - provide for the possibility of transferring certain types of non-tax payments to the local level; - if possible, reduce the number of non-tax payments and simplify their administration procedures

Conclusion

Thus, the development of Russian economy remains dependent on the dynamics in the oil market, which remains the main risk factor. A new decline in oil prices may cause another economic crisis, which will be much more difficult to overcome.

An effective stabilization economic policy will help ensure:

1. supporting stability of the budget balance;
2. achieving a stable surplus balance;
3. reducing the deficit balance;
4. the correction of macroeconomic imbalances;
5. reducing dependence on oil prices;
6. improving the economy structure , etc.

The main tax system flaws were attributed to the following:

1. Instability of tax policy.
2. Excessive tax burden imposed on the taxpayer.
3. Tax evasion by legal entities.
4. Excessive distribution of tax benefits.
5. Lack of incentives for the development of the real sector of economy.
6. Impact of inflation tax.
7. Excessive amount of payroll tax.
8. Single tax rate on personal income.

The following main areas for improving tax policy were listed:

1. Supporting stability of the budget balance;
2. Achieving a stable surplus balance;
3. Reducing the deficit balance;
4. Correction of macroeconomic imbalances;
5. Reducing dependence on oil prices;
6. Improving economy structure, etc.

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Development of Agricultural Industry in The Chuvash Republic

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Abstract

The article gives an assessment of agricultural development in the Chuvash Republic, which is of great importance, since the agricultural sector is one of the sectors that ensures food security of the region and the state as a whole. The aim of the study is to determine the ways of agricultural development in the region. The main objectives of the study are: assessment of the development of the main branches of agricultural production; analysis of types of agricultural products produced; analysis of economic entities engaged in the production of agricultural products. The presented indicators of agricultural development show the current trends in the development of the industry, which has a positive dynamic both in terms of types of business activities and in terms of types of agricultural products produced within the framework of the agricultural support program. Based on the conclusions of the study, it is proposed to support those activities that are in greatest demand on the market of agricultural products and to develop the social infrastructure of rural areas.

Keywords: Agriculture, Areas of Agricultural Development, Structure of Agricultural Products Production.

Introduction

Nowadays, the priority area of regional development is the development of agriculture, since it takes a key place in the development of rural areas. After all, it is agriculture that provides food security for

the regions and the country as a whole. Evidence of this direction is the current program of development of the Chuvash Republic "Development of agriculture and regulation of agricultural products market, raw materials and food of the Chuvash Republic" [1], the main goals of this program are:

- development of processing and sales of crop products;

- development of processing and sale of livestock products, meat cattle breeding;

- support of small businesses;

- modernization of equipment, innovative technical and technological development of the agricultural sector;

- comprehensive measures in veterinary medicine;

- sustainable development of rural areas in the region;

- carrying out land reclamation for agricultural purposes;

- scientific and information services for agricultural industries;

- vegetable and seed potato production;

- dairy cattle breeding;

- selection and seed production, support of breeding;

- infrastructure of the social nutrition system;

- general conditions for functioning of agricultural industry;

- export of agricultural products.

In addition, there is an increased interest of the head of the Chuvash Republic in agriculture as evidenced by the message of M. I. Ignatiev, who announced the strategic ways of the region's development, the main vectors of the work of the Government, the State Council, local authorities, enterprises and organizations of the Republic for the short and long term.

Materials and Methods

Teachers of the Academy took part in the study. The problem was studied on the basis of the Chuvash State Agricultural Academy which provides access to open information resources. The objects of the study were agricultural enterprises of the Chuvash Republic. In the course of work, widely tested reliable research methods were used - general scientific methods of dialectics, analysis, synthesis, induction, deduction and analogy; special economic methods were used to solve analytical problems: comparisons, analytical groupings, time series analysis, correlation and regression. Statistical information is processed in the Microsoft Excel software environment.

Research Results and Discussion

Thus, in recent years there has been a positive trend in the development of the agricultural sector of

the Chuvash Republic, as evidenced by the indicators of the development of livestock and crop production (Table 1).

Table 1 - Main indicators of agricultural development of the Chuvash Republic in farms of all categories for 2013-2017, billion rubles

	Years					Deviation (+,-)
	2013	**2014**	**2015**	**2016**	**2017**	**2017 from 2013**
Agricultural product, including:	30,9	37,1	44,0	43,4	45,2	14361,2
- plant growing	14928,6	19663,8	24510,9	23158,5	21955,7	7027,1
- farming	15933,7	17390,5	19444,0	20240,7	23267,9	7334,2

According to the results of the conducted research it can be noted that in general there is a growth of agricultural production in farms of all categories in the period from 2013 to 2017, the increase in agricultural production amounted to 14361,2 million rub, the largest percentage increase is recorded from 2013 to 2017, accounted for the livestock industry production volumes which increased by 7334,2 million rub, in crop production the increase was equal to 7027,1 million rubles, which is less than 307, 1 million rubles compared to farming over the same periods.

The analysis of specific indicators of agricultural production is presented in Table 2.

Table 2 - Indicators of the share of agricultural production in the Chuvash Republic, in farms of all categories for 2013-2017, %

	Years				
	2013	**2014**	**2015**	**2016**	**2017**
Agricultural product, including:	100	100	100	100	100
- plant growing	48,37	53,07	55,76	53,36	48,55
- farming	51,63	46,93	44,24	46,64	51,45

The largest share for the analyzed period falls on crop production, namely, crop production for three years accounts for more than 50% of the total share of agricultural products produced. Thus, the indicators show a positive trend in increasing the volume of agricultural production in the studied region. The Chuvash Republic is one of the regions where agriculture has moderate risks, in addition agriculture is the main type of production on the territory of rural settlements and as shown by the previous analysis the largest share of production falls on crop production (Table 3).

Table 3 - Indicators of gross harvest of crop production in farms of all categories of the Chuvash Republic for 2015-2017, thousand tons

	Years					Deviation (+,-)
	2013	**2014**	**2015**	**2016**	**2017**	**2017 г. from 2013г**
Grains and legumes (in weight after completion)	558,9	561,5	616,6	616,6	707,4	148,5

Sugar beet (factory) in the original registered weight	27,7	20,4	26,5	44,2	37,9	10,2
Potato	519,3	464,5	549,9	448,2	387,2	-132,1
Vegetables	124,7	123,8	130,2	140,2	121,9	-2,8

The dynamics of production volumes indicates that the largest share of production falls on cereals and leguminous crops, the second place is occupied by potato production and the third place is occupied by vegetable crops. We can say that if there is a tendency for grain crops to increase production volumes, then for potatoes and vegetable crops, as the analysis shows, production volumes are decreasing from year to year. Let's look at the situation in animal husbandry (figure 1).

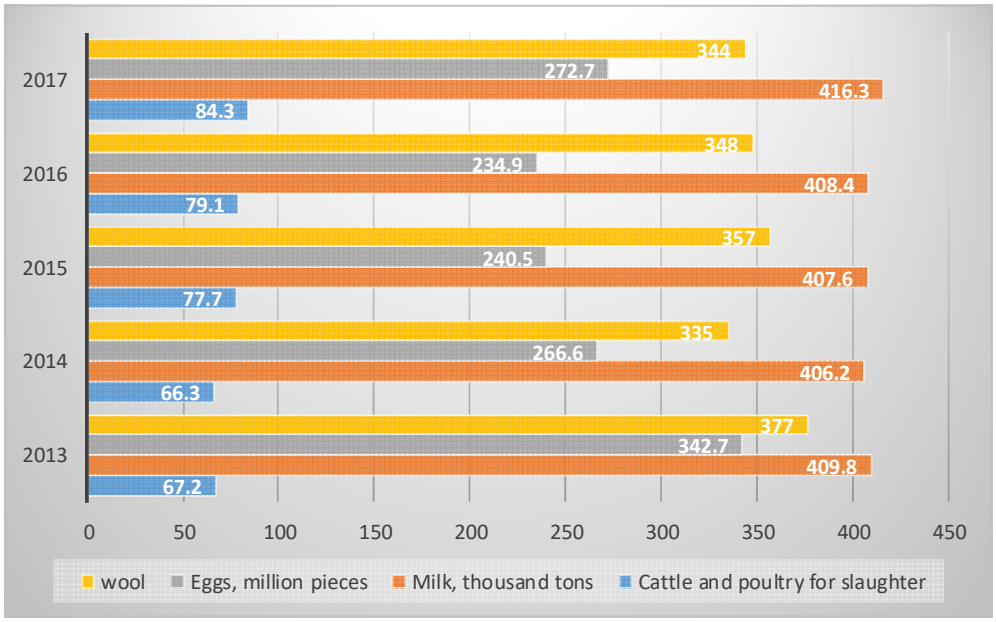

Fig. 1: Indicators of livestock production in farms of all categories of the Chuvash Republic for 2015-2017

According to the results of the study during the analyzed period from 2013 to 2017 there is an increase in the volume of livestock and milk production. Thus, the production of livestock increased by 17.1 thousand tons, milk - by 6.5 thousand tons, the production of eggs and wool decreased, eggs- by 70 million, wool- by 33 tons, the reduction in wool production is associated with a reduction in the number of sheep during the study period.

The analysis of the agricultural sector development requires attention to the development of sectors that most contribute to the agricultural production, since these indicators provide a basis for making proposals for the development of species management in the territory of the Chuvash Republic (figure 2)

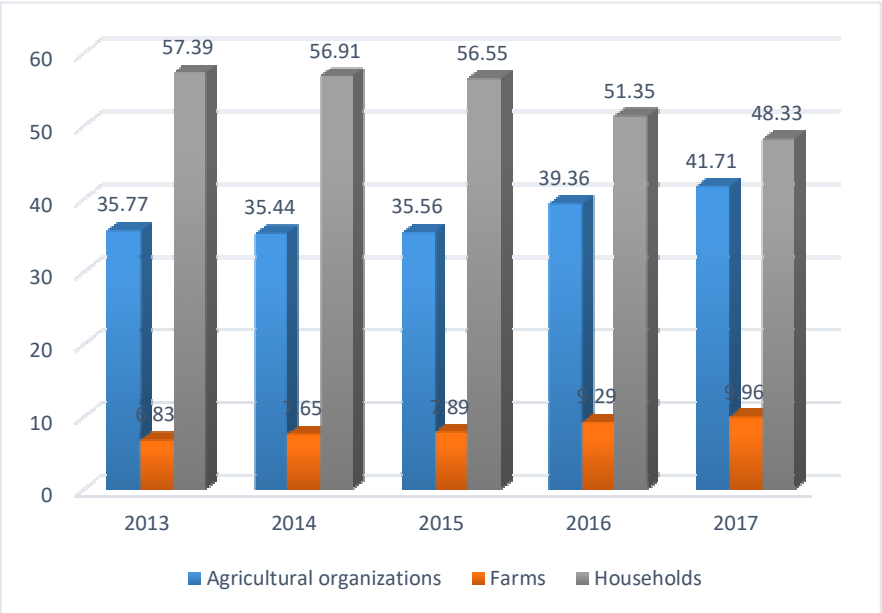

Fig. 2: Indicators of the structure of agricultural production by category of farms in the Chuvash Republic for 2013-2017

According to the statistics of the Chuvash Republic the largest share of agricultural production falls on households. At the same time, it can be noted that in recent years agricultural organizations have increased the volume of agricultural production but still, as of 2017, it is the households that occupy the leading positions. Thus, according to the results of the analysis the share of agricultural organizations in 2013 accounted for 35, 77% and in 2017- 41.71%. Farms accounted for 6.83% in 2013 and 9.96% in 2017. As the results of the study show the leading positions in the volume of agricultural production still fall on households, despite the fact that their production volumes in the overall structure decreased from 57.39% in 2013 to 48.33% in 2017. In our opinion, it is the households that are able to respond more flexibly to the interests of the region's economy, taking into account all conditions of production and sale of agricultural products.

Conclusion

Thus, based on the research materials, the following conclusions and suggestions can be formulated. First, there is a positive trend of an increase in the volume of agricultural production on the territory of the Chuvash Republic, so it is necessary to continue to support those activities that are most in demand on the market of agricultural products. Secondly, the existence of programs for the agricultural sector development has had a positive impact on the growth of production in agricultural organizations, which means that it is necessary to develop the social infrastructure of rural areas, which is still not at a proper level.

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Conceptual Framework for Sustainable Development of Small and Medium Business Structures

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Abstract

The problem of ensuring the sustainability of development and growth of the sector of the national economy occupied by small and medium-sized business entities involves the search for conceptual approaches aimed at increasing the efficiency of functioning of both individual business entities and their collection. Moreover, tasks of this kind are often poorly structured, that is, based on many elements, factors, and functional interactions. This circumstance suggests the paramount importance of constructing heuristic-useful and least risky from the point of view of the possible consequences of various regulatory impacts of small and medium-sized business models, which allow adequately describing and predicting the behavior of this system.
The variety and evolution of types of entrepreneurial structures, due to the processes of complication of social and production systems in the modern world, including diversification and integration interaction, suggests the study of their comparative advantages in terms of opportunities and sustainable progressive development. In this case, a special place is given to the sector of small and medium-sized business structures as the driving force for the sustainable development of the entire national economy.

Keywords: Small and Medium Enterprises, Sustainable Development, System Analysis, Conceptual Approach.

Introduction

Obviously, system analysis is the most effective way to study issues related to ensuring sustainable growth and development of the system of small and medium-sized enterprises, which, as practice

shows, precisely because of the significant stochastic element, are difficult to be evaluated using other methods of assessment and modeling.
Given that the solution to the above problem ultimately comes down to making structural changes to a hierarchical system, this problem can be divided into a number of smaller sub-problems, which determines the semantic content of the system approach in this case: the processes of development and implementation of informed decisions here can be considered by analogy with the corresponding processes of the functioning of the systems, and the problem itself, in fact, is the difference between the desired and actual state of the improved system.

In view of the insufficient elaboration of issues related to assessing the influence of factors contributing to the sustainable development of entrepreneurial structures in the medium and long term, as well as the comparative advantages of various types of entrepreneurial structures in terms of their sustainable development and possible interaction, theoretical and methodological substantiation of the area of sustainable development management of small and medium-sized business structures and improvement of the efficiency of their activities, the proposed topic is quite relevant.

Research Results and Discussion

Today, the economy of the vast majority of countries has a pronounced two-level structure, the upper level is occupied by large monopolies subject to direct state influence, and the lower level is occupied by entrepreneurial structures of small and medium-sized businesses. Moreover, if the formation and development of the system of monopoly enterprises of the first level, as a rule, is determined by a number of natural geopolitical and socio-economic factors, and such a system, being associated with either natural or state monopolies, is in practice outside the competitive environment, then, in the case of the lower level, which includes the small and medium business structures (SMBS) considered in this article, the situation seems much more complicated, the number of influence factors is much bigger, and public administration and regulation mechanisms - mediated and not so unambiguous.

The number of monopolies of the first level in developed countries is usually within a few thousand, organizations of the second level are estimated at millions and tens of millions, in terms of shares, as a rule, exceeding 98-99% of the total number of economic entities operating in the state. At the same time, such important characteristics of the SMBS system as its competitiveness and dynamic development directly depend on the quantitative composition of this system, which in the Russian Federation, according to experts, should exceed their current value by more than 2-3 times.

The total number of small and medium enterprises operating in the country, in addition, is of great importance for ensuring the sustainable development of their system as such. So, the number of subjects of the system of small and medium-sized enterprises, providing the necessary minimum level of stability for sustainable development, in Russia is estimated as 6-7 million units (Fig. 1).

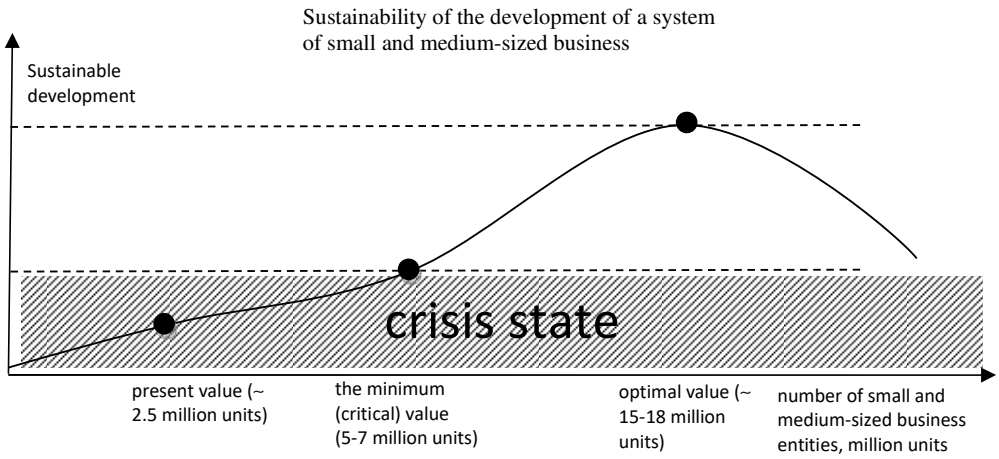

Fig. 1: Dependence of the sustainable development of the system of small and medium-sized business structures on the number of its entities

It is obvious that the dependence shown in Fig. 1 and the current state of the domestic sector of small and medium-sized business structures naturally lead to the conclusion that low number of business entities in the Russian Federation needs to be significantly increased, and this problem can be considered as one of the key problems (Fig. 2).

In this case, the development of set of control, stimulating and other influences that must be exerted on the SMBS system at the national level in order to transfer it from the current state to the desired state 1, characterized by a 2-3-times increase in the number of economically active economic entities of this system, and, in the future, to the desired state 2.

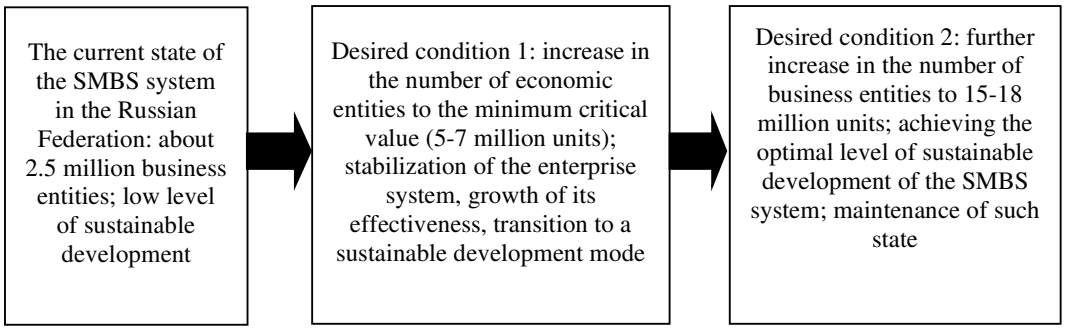

Fig. 2: Problems of transition to sustainable development of small and medium business structures in Russia

Obviously, the currently observed mismatch between the real scale of development of small and medium-sized business structures in Russia and the level required to achieve a stable and effective mode of functioning of this system suggests that the measures taken do not give the desired effect, which may be due to either their ineffective execution, or incorrect theoretical justification. This fact makes the application of a systematic approach to ensuring the sustainable development of the SMBS system even more relevant.

Based on the foregoing, it can be argued that the problems of ensuring the sustainable development of the SMBS system, regardless of the scale at which such problems are considered, implies shold be resolved step by step (Fig. 3).

The key goals assigned to small and medium-sized businesses, acting as an integral system-forming element of the national economy, are divided into meso- and macroeconomic. The main meso-economic goals, which are largely achieved at the level of individual constituent entities of the Russian Federation and associated not only with the state of entrepreneurship in a given territory, but also with many fundamental parameters of the regional economy, are: ensuring a high level of socio-economic development of the regions, smoothing out imbalance in development observed within the regionsraising of the quality of life of the population.

A systematic study of the problems arising from the comparison of the hypothetical state of the SMBS system with its current characteristics indicated by the above objectives can be carried out using system analysis and system synthesis. We believe that in the present case, given the significant complexity of the structural and functional organization of the systems under study, system analysis and system synthesis should be used together (within the framework of the methodology for the development of optimal regulatory influences). This requirement for the formation of appropriate methodological approaches is also confirmed by the complexity of the target management settings available here.
Assessing the effectiveness of regulatory impacts on the development of entrepreneurial structures requires formalization and measurement of both the actual and desired states of this system, each of which, being represented by a significant number of very diverse indicators, should provide an opportunity for their comprehensive analysis. Such indicators, which are essentially the evaluation criteria, must satisfy the functional adequacy requirement - otherwise (especially true for crisis systems with a complex embedded structure) evaluation procedure built on the basis of an incorrect and (or) incomplete system of indicators can lead to unsatisfactory results.

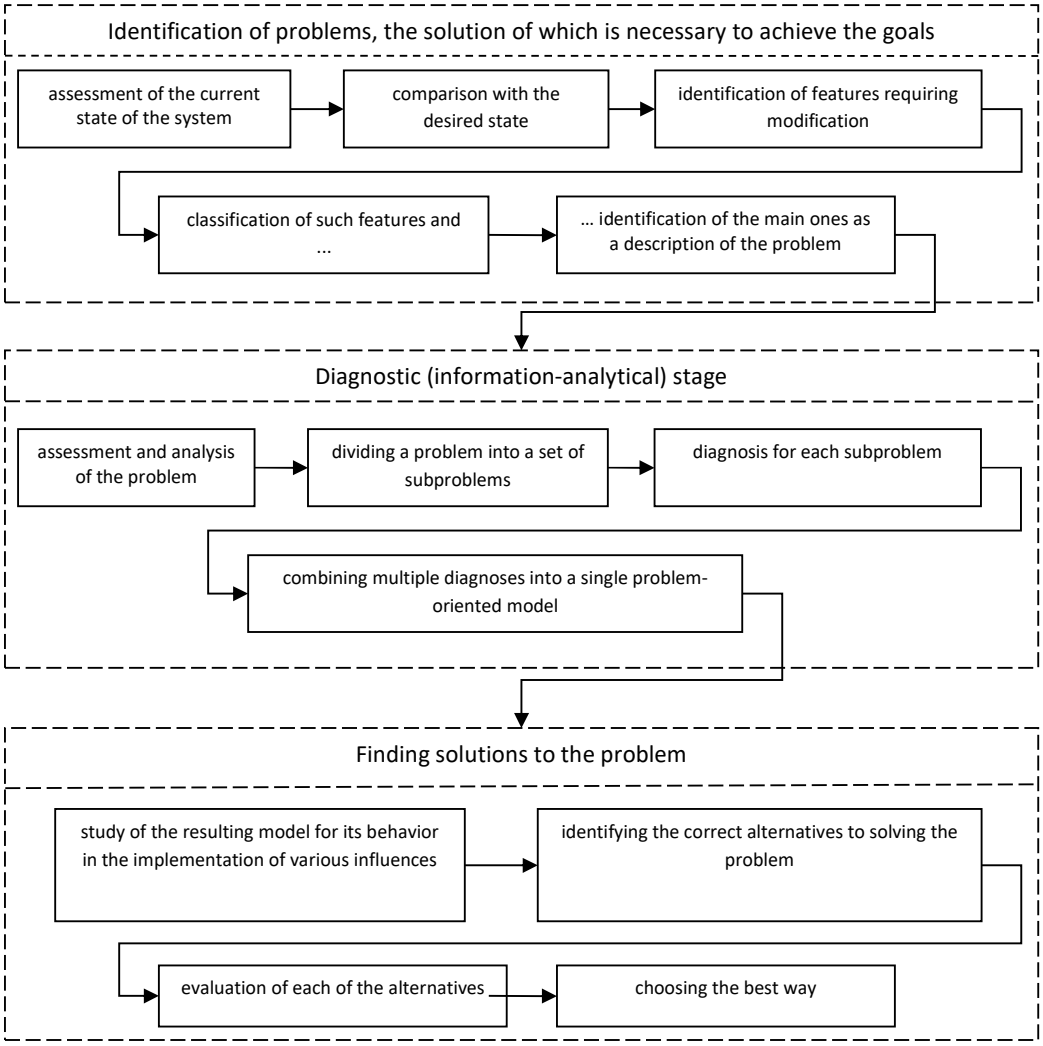

Fig. 3: The main stages of solving the problem of ensuring sustainable SMBS system development

The main function of the criteria for assessing the activities of the SMBS system is to be able to make informed and motivated judgments about the past, present and future states of the system and the causal relationships that exist here, which determine the processes of change of such states under the influence of certain factors. In addition, these criteria can be used to develop an adequate system of motivation and encouragement of the personnel of this system. In this regard, the need for typing such criteria according to two criteria is obvious:

- criteria to evaluate the results of past activities of the system (staff encouragement);
- criteria for forecasting future expectations (staff motivation).

In solving problems of evaluating business performance, regardless of its scale, as a rule, four groups of criteria are used:

1) financial performance indicators of the entrepreneurial structure;
2) non-financial performance indicators of the entrepreneurial structure;
3) criteria reflecting the position of the entrepreneurial structure in financial markets;
4) cost indicators.

The same average indicators can be used to assess the effectiveness of the functioning of the components of the SMBS system.

It should be noted that the use of criteria belonging to the 3rd group in the case of medium-sized and, especially, small businesses is limited, since most small and medium-sized enterprises are not allowed in the financial markets.

In our opinion, it is advisable to select indicators reflecting the effectiveness of the development management of the SMBS system without unduly complicating the model formed using them, using the criteria of various groups.

It is known that the justification and development of almost any system of criteria that describe the effectiveness of a particular set of interconnected objects is a rather complex and multi-stage process, which should be carried out taking into account regional, industry and other features of the structure being evaluated.

In particular, taking into account the significant heterogeneity of the entrepreneurial structures that make up the system of small and medium-sized enterprises in the region, only general, unrelated to their industry affiliation, system properties belonging to the first, second and fourth groups should be presented in such a system of criteria. An example of an organization that meets these requirements, a system of indicators is shown in Fig. 4.

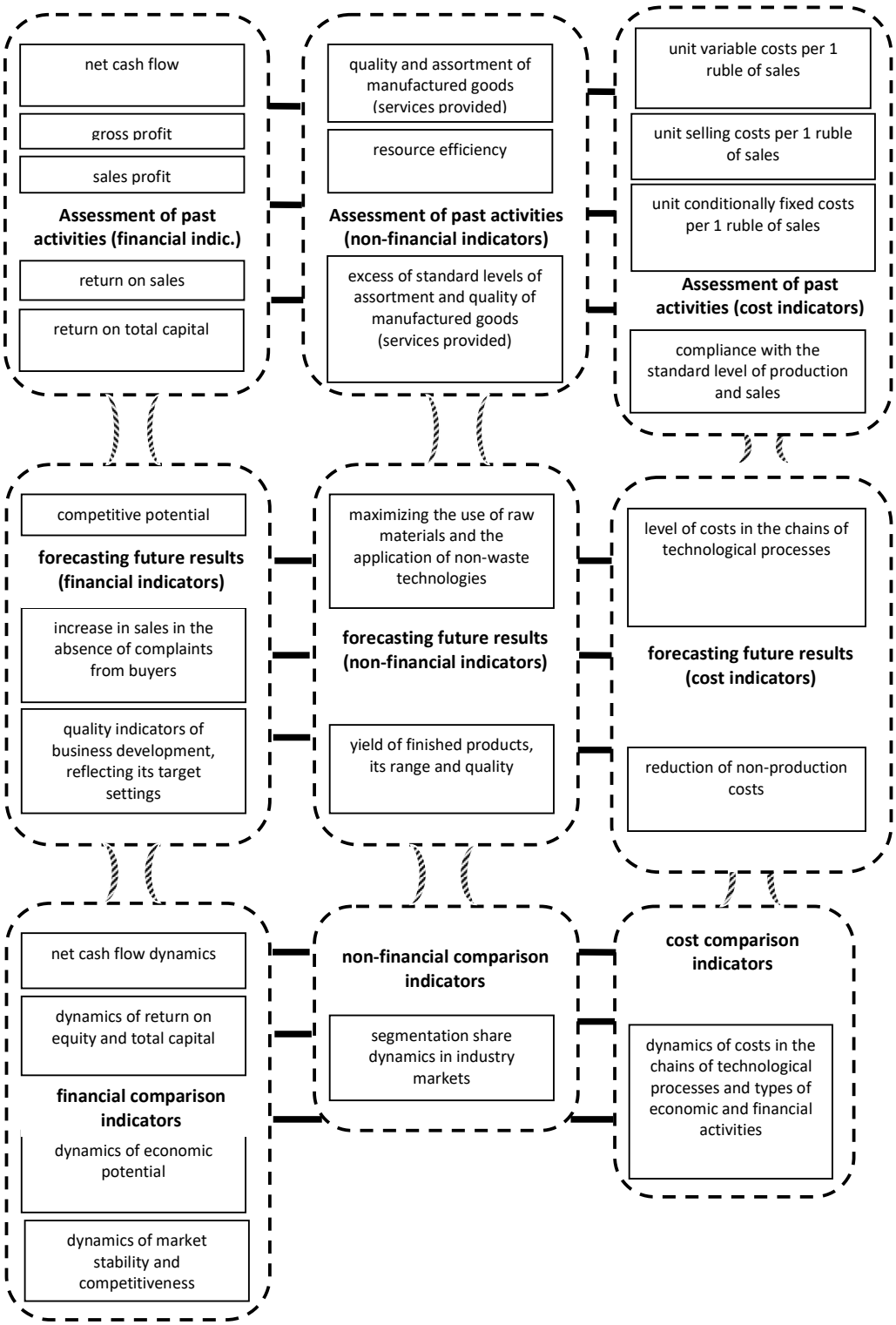

Fig. 4: A system of criteria reflecting the effectiveness of regulation of the development of small and medium-sized business structures

As you can see, the system of criteria shown in Fig. 4 allows you to evaluate not only the characteristics of the relationships that exist between the internal and external environment of the enterprise system, but also contains indicators reflecting the degree to which the system reaches the development goals. It seems that an integral element in assessing the effectiveness of activities and the effectiveness of managing the development of the SMBS system should be indicators that objectively reflect the process of achieving the goals of the system, meeting the needs of external actors - customers of the system, as well as internal influences in the system that generate income and other economic benefits costs. Given that each of the assessment criteria corresponds to only a certain (usually not too large) part of the information about the state or dynamics of changes in the entire system as a whole, the proposed system of indicators presents the most identifying and informative indicators of the development of small and medium enterprises in the context of analysis. Moreover, the control procedures for this process also have a number of characteristic features that distinguish them from the set of algorithms aimed at making managerial decisions.

Significant activity and the ability to control the development of this system, naturally, implies the existence of intra-systemic capabilities to stabilize negative perturbations of the internal environment and level their consequences. This circumstance serves to actualize the change of the existing model of relations in the system to another paradigm based on a high level of business ethics, economic education and financial management.

Thus, from the standpoint of the general theory of systems development, the evolution of the SMBS system can be represented as a sequential change in its state from the current to the desired. The direction and trajectory of such a change essentially consists of modifications introduced into the system in response to the existing problem in it, a reduction in the number of small business structures that make up the system and the unsatisfactory efficiency of their functioning.

Conclusion

The most characteristic processes for socio-economic systems, creating a kind of foundation for all other events occurring here, are the processes of reproduction, that is, production, exchange, distribution and consumption. Therefore, the creation of a conceptual model of the socio-economic system (one of the particular cases of which, as was shown above, is the small and medium-sized enterprises of the region) precisely on the basis of representations that adequately show the characteristic features of these processes, it seems very logical and can provide powerful tools of influence not only on the structure of the socio-economic system itself, but also its inter-component relationships.

A concept is called one of the possible results of cognition, which is reduced to the interpretation and understanding of a particular phenomenon, realized by constructing conceptual models that allow characterizing various aspects of the integrity under study, highlighting its system properties, and predicting the assumed state, which is determined both by the intrinsic nature of such a phenomenon and the set of mutual influences within it exerted on each other by its constituent elements.

In our opinion, it is advisable to formulate a concept that meets the national paradigm of economic growth and development of small and medium-sized business structures, starting from the following principles:

1) small and medium-sized entrepreneurial structures must be considered in a system of different levels of orderliness of managerial relations, complex systems (national economy, regional economy, business sector);
2) study of the problems of the SMBS system should be carried out according to the principle of hierarchical concepts of the theory of entrepreneurship, taking into account the existence of several levels of knowledge of this phenomenon:
- small and medium-sized business structures are one of the elements of the national, regional economies and its lower level;

- the SMBS system is a complex independent system, which includes various subsystems, each of which can be represented as an independent system;
3) the identification of the laws and interconnections of processes occurring in the SMBS system is determined both by the internal features of this system itself and by various environmental factors, can only be achieved through the disclosure of the basic integration mechanisms that determine the behavior of entrepreneurial structures and its integrity;
4) criteria and indicators of the functioning and development of small and medium-sized business structures should be selected from the standpoint of ensuring its sustainable development;
5) a special place in ensuring the sustainable development of small and medium-sized business structures belongs to the state;
6) when determining goals and criteria, it is necessary to take into account not only economic, but also non-economic motives for the activities of business entities;
7) taking into account the advantages and disadvantages of small and medium business structures.
The purpose of the conceptual model of sustainable development of small and medium-sized business structures is the justification and subsequent implementation of a strategy based on the development of citizens' entrepreneurial initiative by attracting them to entrepreneurial activity, giving it impetus and support from the state, providing the state with a stable mode of development of its economy.

Thus, the creation of a conceptual model of sustainable development of the SMBS system, first of all, should be aimed at determining the set of boundary conditions that ensure:

- optimal regimes for the progressive development of national and regional economies;
- improving the common institutional environment for economic systems at all levels;
- involvement of the country's population in small and medium enterprises;
- ensuring the efficient use of resources and existing instruments of state regulation in this area.

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Defense Benefits One of The Forms of Compliance with The Common Obligation of Defense

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Abstract

The Constitution of the Republic of Poland, through the provisions of Article 85, imposes an obligation to defend the homeland on all citizens. This obligation may be fulfilled by military service, service in militarized units, service in civil defense and performance of defense services. Benefits for the defense apply to all Polish citizens, they will be used in situations of natural disasters and as part of the defense of the homeland. The basic legal document regulating the issues of defense benefits is the Act of November 21, 1967 on the universal obligation to defend the homeland, which divides benefits into personal, material and special.

Keywords: State Security, Defense Services, Personal Benefits, Benefits In Kind, Special Benefits

Introduction

State security, defense of the homeland is the responsibility of all state organs and institutions, as well as every citizen of the Republic of Poland, because only the actions of all these entities can contribute to the implementation of this important task (Świerszcz, 2016). In relation to citizens, this obligation can be divided into two main groups, namely the obligation of personal direct participation in the implementation of defense tasks and the obligation of material benefit for defense, also called the obligation of benefits in kind (Wojnarowska-Szpucha, Wojnarowski, 2014). It is the duty of the authorities, if possible, to evenly impose tasks on all citizens. The provision of services is subordinated to tasks that result from the scope of Polish defense and security.

The use of benefits for defense and security-related purposes has been implemented for a long time, only their role, forms and scope of use have changed. Both in the past and presently, the benefits fulfil a service function in relations to entities creating or securing defense and security (Wojnarowska-Szpucha, Wojnarowski, 2014).

The purpose of this study is to attempt to answer the following research question: How can the use of defense services contribute to the performance of tasks related to national security and defense?

Legal Grounds for Defense Services

Before attempting to clarify issues related to the principles of using state defense services, the meaning of this concept should be clarified. According to the Dictionary of Terms in the field of national security (Pawłowski ed. 2009), "defense services are an integral part of system defense solutions. The scope, organizational forms and principles of benefits are set out in the Act of November 21, 1967 on the general obligation to defend the Republic of Poland and the executive regulations issued on its basis. Benefits are divided into personal, in kind and special".

Defense benefits are one of the forms of implementation of the general obligation to defend the Republic of Poland and will be used by various entities related to defense in the country, among others, by the armed forces, civil defense units and militarized units.

The basic legal document regulating the issues of defense benefits is the Act of November 21, 1967 on the general obligation to defense the Republic of Poland, where section VII is devoted to defense benefits. The Act has been amended many times, and issues related to benefits have changed. According to the original version of the Act of 1967, benefits were divided into personal benefits, benefits in kind and the transfer of transport means for the defense purposes. In 1979, the division of benefits changed and included: personal and in-kind benefits, the transfer of transport means for the defense purposes and the special benefits. The last significant amendment to the Act in 2004 divided them into personal benefits, benefits in kind – ad hoc and permanent, and special benefits, and such a division is currently in force.

The Act obliged the Council of Ministers to issue detailed normative acts regarding:

- personal benefits for peacekeeping defense.
- benefits in kind for peacekeeping,
- personal and in kind benefits for defense in the event of mobilization and during war.

The Minister of National Defense was obliged to issue a regulation on military records of defense benefits.

The above ordinances were issued in 2004 and regulate in detail the issues related to the use of services for purposes related to national security and defense.

In addition to the abovementioned tasks provided for the Council of Ministers, the Act also indicates tasks for voivodes, whose task is to coordinate the activities of local government bodies in scope of planning and imposing personal and in kind benefits in the voivodeship. These tasks are performed by the voivode by maintaining aggregate lists of personal and in kind benefits, planning financial expenses in the budget related to imposing the obligation to provide benefits, supervising tasks related to planning and imposing benefits, analysing the needs and possibilities of providing personal and in kind benefits by the municipality authorities in the voivodeship.

Tasks related to planning, imposing personal and in kind benefits are the responsibility of the head of the municipality, mayor (city presidents). The above-mentioned local government administration bodies, by way of administration decision, impose the obligation to provide personal services at the request of authorized bodies (military commanding officer, head of the organizational unit constituting the basis for the formation of a specially created militarized unit (Wojnarowska-Szpucha, 2019), head of the organizational unit performing tasks for the defense of the state, competent civil defense authority.

Issues related to the use of benefits are also regulated by the decree of March 23, 1953 on benefits to combat natural disasters and the Act of April 18, 2002 on the state of natural disasters. Both of these documents relate to the use of benefits during a natural disaster, which consist of (Journal of Laws of 2007, no. 89, item 59, art. 3-6), (Journal of Laws of 2017, item 1897, art. 22) providing first aid to persons who have suffered from accidents, providing access to premises for victims for the time necessary to provide first aid and shelter, receiving the injured and looking after the property of the injured or evacuated, securing the endangered animals (providing feed and shelter), guarding, executing specific works, active participation in the rescue operation or performing other tasks designated by the head of the rescue operation, commissioning of owned real estate or movable property, securing endangered plants or seeds, providing tools necessary for conducting actions, securing endangered cultural goods, securing own sources of drinking water and foodstuffs.

Individual types of benefits may be provided after the approval of the head of the municipality, mayor (city president) or his representative, starost or representative – by order of the ordinance or

administrative decision, voivode or his representative – by way of an ordinance or an administrative decision.

The issue of using benefits also appears in legal acts regarding martial law. The Act of August 29, 2002 on martial law and the competences of the Supreme Commander of the Polish Armed Forces and the principles of its subordination to the organs of the Republic of Poland determines the scope of restrictions on human and citizen freedoms and rights that can be introduced if the President of the Republic of Poland issues ordinances on introducing martial law (Wiśniewski, Szyłkowska, 2017). In the event of martial law, individual types of benefits are introduced and determined by means of decisions of government administration bodies (in the case of imposing tasks on entrepreneurs) or ordinances of the Council of Ministers (in the case of imposing tasks on natural and legal persons running agricultural holdings).

During martial law, a general obligation may be imposed on persons who are capable of doing so (their health condition as well as personal and family conditions allow it) and who are over 16 but not over 65 (Journal of Laws of 2017, item 1932).

Defense Benefits – Basic Aspects

Marian Laprus (1979) defined personal benefits as "a type of defense benefits consisting in the provision of various additional ad hoc work free of charge in the free time for the purposes of preparing national defense". Contemporarily, this term has been defined as "the type of services consisting in calling and including people to various types of work related to securing the mobilization of military units and institutions and achieving higher combat readiness" (Pawłowski, 2009). It follows from the above definition that benefits will be provided for the needs of the armed forces, however, the legal regulations regarding benefits extend the possibilities of using benefits by other entities performing tasks for the purposes of state defense and militarized units.

The obligation to provide personal benefits during peace applies to all citizens who are 16 years of age and under 60 years of age, with the exception of persons intended for other tasks or having a certain health category.

Personal benefits consist in performing, within a set time, various ad hoc works by people who have Polish citizenship for the state defense preparation or combating natural disasters and eliminating their effects (Ministry of National Defense, 2008). Pursuant to the provisions of the Act on the Universal Obligation to Defense the Republic of Poland, the duration of performing personal benefits in peacetime may not exceed 48 hours at a time for couriers and persons providing and entities of in kind benefits, and for other persons – 12 hours. A maximum of two hours is added to the time of performance of services, due to the time that the person performing the service must allocate to travel to the place of performance and return to the place of residence. In addition, the time for resting (8 hours) may be added, but only if you have performed the service for at least 12 hours.

In the event of mobilization and during the war, the duration of personal benefits may not exceed 7 days.

For the performance of personal benefits, remuneration is paid in the form of an hourly lump sum of 1/178 of the minimum remuneration for work in force in December of the previous year, determined on the basis of the provisions of the Act of October 10, 2002 on the minimum remuneration for work, for each hour of work time of performing the benefits. The remuneration is paid by the organizational unit for which the personal benefit was performed.

Among others, persons performing important functions in the state, soldiers, officers of services, guards and agencies are released from the obligation to perform benefits (Journal of Laws of 2019, item 1541).

Benefits in kind are a type of "defense benefits consisting in the provision of premises, means of transport, tools and other equipment as well as the supply of materials held for the purposes of the

implementation of the universal defense obligation, and in the event of a state of immediate security threat being announced, mobilization and during war – on commissioning for the benefit of the armed forces, civil defense formations or other state organizational units performing tasks for the purposes of state defense, for an indefinite period – real estate or movable property needed for the defense purposes" (Laprus, 1979).

Performing benefits in kind is the responsibility of state officers and institutions, organizational units, entrepreneurs and natural persons. The state administration authorities at the municipal, city and district level (by name request) are entitled to impose the obligation to provide benefits in kind. Benefits in kind will be performed for the Polish Armed Forces, organizational units constituting the base for the formation of specially created militarized units, civil defense organizational units and organizational units (among others the Police, Internal Security Agency, Intelligence Agency, Border Guard, State Protection Service, State Fire Service, Prison Service), performing tasks for the purposes of defending the state of combating natural disasters and eliminating their effects (Journal of Laws of 2019, item 1541).

Article 209 of the Act regulates issues related to the time of performing benefits in kind, which depends on the purpose of performing these benefits. In the case of collecting the subject of the benefit to check the mobilization readiness of the armed forces amounts to 48 hours, for tasks related to military exercises or exercises in units intended for militarization it amounts to seven days, and in connection with civil defense exercises or practical exercises in the field of universal self-defence, it lasts up to 24 hours. If the service is performed for 48 or 24 hours, it may be taken three times a year, if it is performed for 7 days – only once. Similarly to personal benefits, the legislator provided for an additional time of 2 hours, intended for delivering the subject of the benefit to the place indicated in the decision and the time of its return to the place of storage or owner. At the time of announcement of mobilization and during the war, the Act allows the armed forces to use benefits in kind until the need to use the objects of these benefits ceases, i.e. to the end of warefare.

As part of using benefits in kind, the Armed Forces of the Republic of Poland may collect from the national economy: motor vehicles, trailers and semi-trailers, machines, aircraft, sea vessels, railway stock, areas and premises necessary for full-time security (Wojnarowski, Wojnarowska-Szpucha, 2016) and ad hoc (Szandrocho, 2013) mobilization needs. Full-time needs are intended to supplement the organizational structures of war, after having been adapted for use by the armed forces. Ad hoc needs will be used during the mobilization development of the Polish Armed Forces, without including them in the organizational structures of individual units. Benefits in kind will be used as part of the development of elements of the mobilization base, evacuation of stocks, maintenance of armaments and military equipment, use of rooms and buildings as well as areas and real estate necessary for the implementation of the mobilization development (Wojnarowska-Szpucha, Wojnarowski, 2014).

Due to the need to ensure efficient, undisturbed functioning of the state, the Act on the universal obligation to defend the Republic of Poland releases certain facilities, premises, areas of means of transport from the obligation to provide benefits in kind. (Wojnarowska-Szpucha, Wojnarowski, 2014).

Payment for the use of items of benefits in kind is paid to the holders by an organizational unit for which the benefit was provided on the basis of a list of flat rates for the use of benefits in kind. The amount of the lump sum depends on the type of transport, the lump sum is subject to annual adjustment.

The last type of benefits are special benefits, which "include specific tasks and obligations carried out by public administration bodies, business entities and other organizational units for the defense and security of the state, including those related to the liquidation of the effects of a natural disaster, or achieving higher states of combat readiness in the armed forces" (Pawłowski ed., 2009).

This type of benefits applies in particular to local government administration bodies, state institutions, local government bodies, as well as entrepreneurs and other organizational units, which may be required to the paid adaptation of their real estate and movable property to the needs of the state defense, adaptation of constructed (rebuilt and expanded) building facilities and manufactured movable items

for the purposes of state defense, collection, storage and maintenance of items necessary to perform the above-mentioned activities (Journal of Laws of 2019, item 1541). Performance of special benefits is financed by the state budget.

The implementation of special benefits by entrepreneurs has been specified in detail in the Act of August 23, 2001 on the organization of tasks for the defense of the state implemented by entrepreneurs, where tasks for defense were defined that may be imposed on entrepreneurs by way of an administrative decision by the appropriate administrative body government.

Ending

Each country is exposed to various types of threats. They may be associated with armed aggression or destructive forces of nature, as well as technical and man-made disasters. In such situations, in order to remove the danger, the state must use the forces and means that perform their civic duties on a daily basis. An instrument that allows the state to deal with the above threats, while protecting the resources of state goods and society are various types of benefits, implemented for defense purposes and in the event of non-military threats, e.g. a natural disaster.

Because state defense in modern conditions is a complex undertaking and by its nature must cover all areas of state, private and social life. One of the elements of the defense preparation are the state and defense benefits. In order to use them properly, cooperation and coherence of all public administration bodies, recipients and service providers are necessary. For both planning and practical implementation of the obligation to provide services requires a willingness to cooperate and a certain understanding of the seriousness of the moment, both military, civilian and individual citizens. From the discussed substantive content of this publication, it can be concluded that the benefits play an important role, both in defense preparations and in the event of emergencies in the country.

Referring to the research problem presented at the beginning, which was: *How can the use of defense benefits contribute to the performance of tasks related to national security and defense?* It should be stated that they are indispensable for performing certain defensive or assistance tasks in the event of a state of natural disaster. Because the constitutional resources of the state in the form of forces and resources may be insufficient, as indicated by past crisis situations – military and non-military.

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The Use of The European Union Funds for Improvement In Innovation of Metalworking Sector – Case Study of Polish Medium-Sized Enterprise

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Abstract

The use of the European Union (EU) funds is an important part of development of innovative technologies of the engineering industry, including the metalworking sector. There is a strict connection between raising EU funds and the possibilities of purchasing modern technological infrastructure which is applied to optimize and improve production processes. An important constituent affecting the possibility of acquiring the EU funds is an overall innovative approach of enterprises to creating research and development (R&D) departments in which the purchased equipment influences the verification and improvement in the quality of manufactured goods and an increase in competitiveness of enterprises both in the domestic and international markets. The main objective of the manuscript is the analysis of the metalworking sector improvement with the support of the EU Structural Funds. The paper presents a case study of Polish metalworking SME enterprise which has implemented process innovation in the manufacturing of large size aluminium high-pressure casting molds by purchasing novel infrastructure, which allows improving the quality of the product and highly reduces costs and time of production. The innovation was financed as part of the European Union's financial perspective programme for years 2014-2020.

Key words: EU funds, metalworking industry, process innovation, OEE index

Introduction

Modern trends in management science strongly emphasize the openness of the organization to changes conditioning the possibility of its survival in a turbulent environment. Creating value for the customer and satisfying their needs increasingly is becoming the foundation for planning, design and implementation of many business activities, enabling the development and competition of the company in global markets. Among these activities there are also identified innovation activities. Innovation is the area of a particular interest of modern industrial companies. In the book by Lam (2004), among the areas of initiation and practical application of innovative solutions in industry there may be listed: products, technologies, organizational methods, improvements in manufacturing processes and products condition for satisfying customer requirements. It is widely recognized that development and innovativeness of the product portfolio determines success and creates the possibilities of survival and development of industrial companies. In a research study by Drucker (1994) the context of survival and development of the company corresponds with the need to achieve efficiency and flexibility in the area of the design of organizational solutions, also in the area of processes. The environment of the operation of the modern company implies the need for openness, dynamism and flexibility of organizational systems, creating unique competences, networking, maintaining social relationships, developing and implementing innovation Relationships and networking increasingly constitute the

specific "strategic motive of the company". Innovativeness as the strategic orientation leads to innovation and reflects the level of the company creativity and ability of initiation, development and implementation of innovative projects. Creating new knowledge, development of technologies, intensification of research and development activities and an extensive use of ICT are only the selected areas of interpretation of innovativeness. Mielcarek (2015) mentioned the environment favourable for innovativeness and innovation is evolving towards the search for opportunities to improve business models, sources and methods of financing, interorganisational cooperation strategies etc. Mobile sale channels and networking create modern business models. While facing the need to involve large financial outlays, particularly on development of breakthrough innovation and the potential investment risk, the basis for financing innovation activities is both public instruments (using public sources) and the market ones (i.e. capital instruments: stock exchange, private equity etc. and debt instruments: obligations, loans, bank loans etc.). The financing of innovation activities exclusively with own funds becomes just unachievable for many industrial companies. An alternative is to diversify the sources of financing towards the involvement of foreign capital and public funds under the Structural Funds and Operational Programs of the European Union. Sundbo (2001) mentioned that inter-organizational relationships, as the source of value creation, become the foundation for the strategy of modern enterprises, aimed at achieving competitive advantage due to cooperation in networks. Broadly understood innovativeness of enterprises is often associated with the problem of organizational intelligence and learning organization, discussed in management science, where there is emphasized the significance of learning processes for the development of organizational, process, product and marketing innovation. It should be pointed that the organizational reconfiguration takes place in an increasingly complex, vague and unpredictable environment, which in turn determines the decision-making process and achieving efficiency of the implemented changes. Research study by Krzakiewicz, Cyfert (2016) and Behnam et al. (2018) proved that in management science, the considerations on innovativeness are also taken into account in relation to the problem of imitative activities of enterprises. Imitation is treated in the category of the adopted operation strategy of the organization, however, the imitative activity does not replace but stimulates innovation activities. In this case, imitation and innovation constitute a harmonized space for the formation and use of innovative capabilities of enterprises and the creation of competitive advantage. In the description of innovativeness of enterprises, there is the concept of innovation activity and maturity. The subject literature by Enkel et al. (2009) and Werynski (2015) disposes of the model of determinants of innovativeness of the company, in which innovation activities and maturity are considered to be two levels of innovation. The basis for the identification of these levels is most of all the scope, nature and frequency of innovation activities undertaken by enterprises. The compliance of these projects with the adopted strategy for development and competition is extremely important as well as their impact on the ability to achieve the financial success. Therefore, innovation activities refer to a narrow range of projects undertaken occasionally. In turn, innovation maturity is understood as ensuring the continuity and complexity of innovation activity and the need to inscribe innovation in the strategy for development and competition. The subject literature by Slusarczyk (2018) and Baskiewicz (2019) indicates that the research into innovativeness of enterprises can be referred to the identification of innovation and its benefits, obtained as a result of its implementation, in the form of, among others, income, competitive advantage, customer satisfaction etc. From the perspective of the achievement of innovation maturity, a very interesting area of empirical considerations is the recognition and identification of the benefits from innovation in the context of the strategy for development and competition adopted by the company and whole sector of industry. The scientific inquiry towards the analysis of development of the process innovation, carried out in the paper, has been rooted in the environment of the exemplary company of the metalworking sector of industry. The objective of the empirical research has been to determine the results of the implementation of innovation in company's R&D unit in the form of an improvement in the final indices of performance, productivity, effectiveness and quality of the implemented manufacturing process and product.

Literature Review

One of the key instruments to support innovativeness and thus economic development of the European Union are the European Funds which Poland has benefited from since 2004. Klimczak et al. (2015) mentioned that due to the objective and thematic scope, an important part of the EU support for

enterprises were the European Funds for years 2007 – 2013 and 2014 – 2020, implemented under the National Cohesion Strategy (NCS).The key objective of the programs was to improve competitiveness and innovativeness of enterprises, including in particular the manufacturing sector of high value added and the development of the professional services sector. Among the operations directed to improving innovativeness of enterprises in the period of 2007-2013 there was, above all, the Operational Programme Innovative Economy 2007-2013 (OP IE) and selected components of Regional Operational Programs (ROP). Under the OP IE, an improvement in innovativeness of enterprises was reflected in products, services, technology and business processes and organization management. The structure of the share of beneficiaries of the Programme for individual innovation activities and the level of funds allocated for these activities is presented in Figure 1.

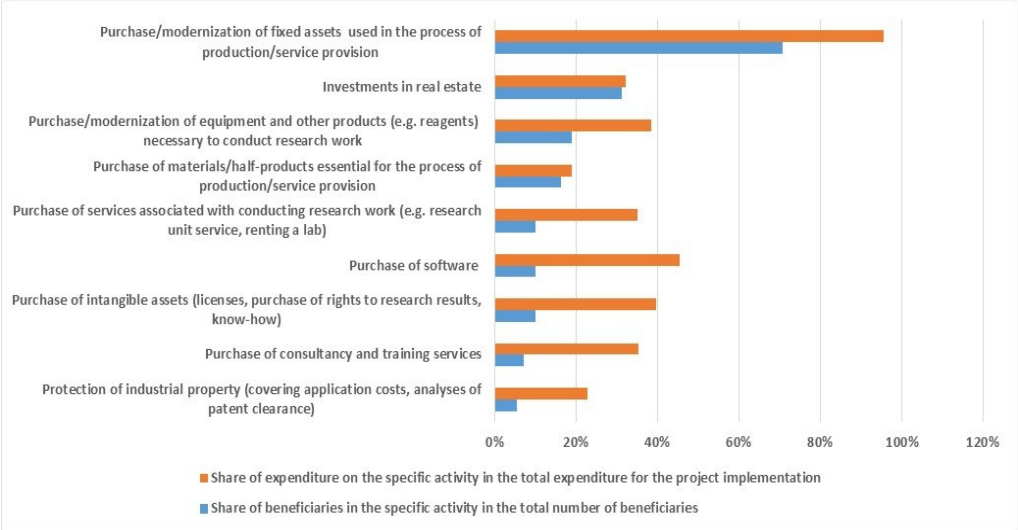

Figure 1: The level of implementation of innovation activities in enterprises in relation to the incurred expenditure in the period of Innovative Economy Programme 2007-2013, Klimczak et al. (2015)

As it can be observed, enterprises benefiting from the funds of the Programme most frequently purchased or carried out the modernization of fixed assets, simultaneously allocating most funds for this purpose under the OP IE (94% of allocations). Among the activities of which there was a significant disproportion between the frequency of implementation and the level of expenditure there was the purchase of software and the purchase of intangible assets in an intellectual form. Finally, in the period of 2007-2013, under the OP EI, 59.0% of the total funds of the Programme (more than 10 billion euro) was dedicated to support entrepreneurs, where, with the breakdown by the sectors, 10% of the total funding was dedicated to improve innovativeness of the metallurgical and metal industry. On the other hand, within the implementation of the priorities of Regional Operational Programs (ROP), in the field of supporting innovativeness of enterprises, there was expenditure of a total of 4.93 billion Euro, which on average amounted to 24% of the share in the total allocation of funds for the specific region (Ministry of Infrastructure and Development, Warsaw 2015, pp. 6 and 26). The most significant funds were allocated for the Opole Voivodeship (37% of the allocation of the specific ROP) and the Łódź Voivodeship (33% of the allocation of the specific RPO).The summary of the results of activities aimed at improving competitiveness and innovativeness of enterprises under National Strategic Reference Framework (NSRF) /NCS for years 2007-2013 is presented in Table 1.

Table 1: Selected indices of enterprises innovativeness under NCS for years 2007-2013

Indices	2007	2009	2011	2013
Expenditure of the corporate sector on R&D activities (% GDP)	0.17	0.19	0.23	0.38
Share of industrial companies incurring expenditure on innovation activities (as % in a total number of enterprises)	31.8	29.6	29.8	29.6
Share of products of high and medium-high technology in marketed production in industry (%)	31.5	34.0	33.6	32.8

Source: Annual report on the implementation of the Innovative Economy Operational Programme 2007-2013 in 2014, Polish Ministry of Infrastructure and Development, Warsaw 2015

As a result of the EU funds obtained in the period of 2007-2013, there was a twofold increase in expenditure of the corporate sector on R&D activities. At the same time, a slightly smaller number of entities allocated funds for innovation activities, which may result from a lower level of sales of products of high and medium-high technology in that period. The continuation of the EU financing of innovativeness of enterprises for years 2014-2020 is provided by the Smart Growth Operational Programme (SGOP) and Regional Operational Programs (ROP). The main objective of the programme is to boost innovation in the Polish economy primarily by increasing expenditure on R&D and innovation by businesses. The programme consists of five priority areas: support for business R&D, support for the environment and capacity of enterprise for R&D&I activity, support for innovation in enterprises, increasing the research potential and technical assistance. Resource efficiency measures can be funded, in particular, from Priority axis III Support for innovation in enterprises, which supports SME projects that involve implementation of technological innovations (Report of the Polish Agency for Enterprise Development, 2019, Statistics of Innovative Activity of Enterprises in the Years 2015–2017, Poland Statistical Office). Within the framework of the Smart Growth Operational Programme it is planned to finance the projects of a total value of 8.6 billion euro. The structure of the allocation of funds by the objectives of the 2014-2020 Smart Growth Operational Programme is presented in Table 2.

Table 2: The structure of the financing of innovativeness of enterprises in the period of 2014-2020

Priority	Objective	EU support [mln EUR]	Number of applications approved for financing	Percentage of funds allocation [%]
Support for R&D works carried out by enterprises	Strengthening scientific research, technological development and innovation	3 034	1644	73.47
Support for the environment and the potential of enterprises to conduct R&D&I activities		787	1367	70.41
Support for innovation in enterprises	Strengthening competitiveness of small and medium enterprises	1 929	1669	76.66

Source: Report of financial progress under the Smart Growth Operational Programme 2014-2020 according to August 2019

Under the SGOP, there have been approved the total of 4680 applications financing so far, among which there will benefit most the priorities concerning the support for innovation (77% of allocations of all funds of the Smart Growth Programme), although more than 90% of funds was allocated to enterprises from less developed regions of Poland. Objectives for of the regions under the Regional Operational Programs (ROP) for years 2014-2020 have been defined on the basis of the so called smart

specializations i.e. the areas of the greatest competitive potential of regions in the domestic and international market, including the ones concerning traditional industries. ROP's funds also support common areas of development, among which there is supported the development of entrepreneurship. The structure of expenditure on the development of individual regions in years 2014-2020 is presented in Figure 2.

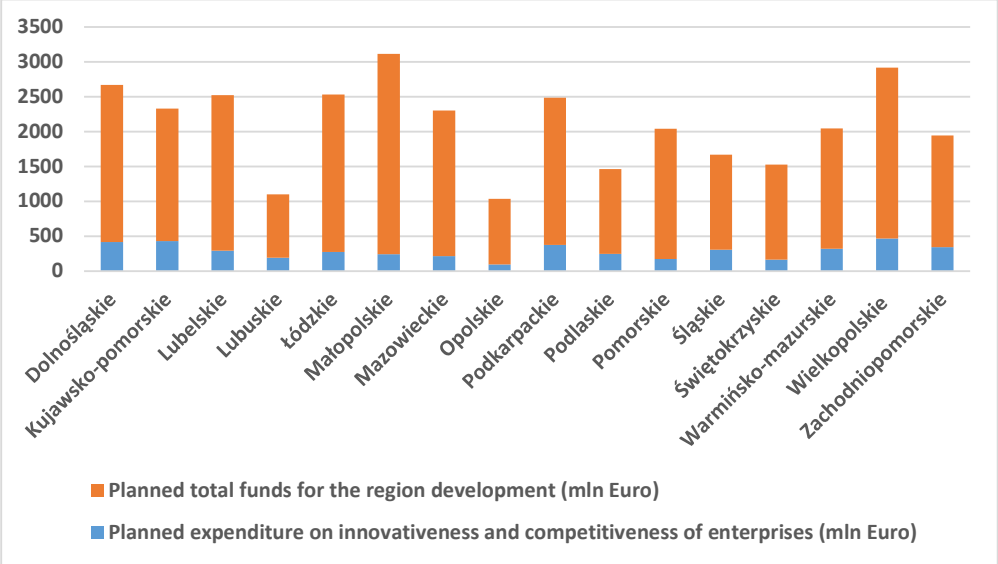

Figure 2: The structure of expenditure under the Smart Growth Operational Programme 2014-2020 on the development of individual regions, including innovativeness and competitiveness of enterprises of the region

Under the ROP, a total of 31 billion Euro has been allocated for the development of individual regions of Poland, including 4.5 billion Euro to support competitiveness and innovativeness of enterprises. The highest level of support for entrepreneurship in relation to the other activities can be seen in the Kuyavian-Pomeranian Voivodeship and the Silesian Voivodeship (respectively 23% and 22% of allocation of funds). At the same time, the largest amount of funds for this purpose have been allocated for the Wielkopolskie Voivodeship – 467 million Euro, which amounts to 10% of all the funds allocated for an improvement in innovativeness of enterprises. The analysis of Smart Growth Operational Programme 2014-2020 data shows that in the years 2016-2018 almost 35.8% of companies operating in Poland were innovation active - they introduced or tried to introduce at least one innovation of any type. Whereas 32.4% of companies can be described as innovative – they introduced at least one innovation (Financial progress under the Smart Growth Operational Programme 2014-2020 according to August 2019)

Research Question

Regarding the subject analysed in the study, it should be considered which factors plays the most important role in the R&D development and innovation improvement of the companies. This issue requires a detailed examination and diagnosis base on the case analysis of such area of the company. The main purpose of the article is to analyze the impact of and purchasing advanced technology infrastructure (large size molds spotting press) from the EU funds for the R&D department of the metalworking sector company to increase the company's innovativeness through the possibility of manufacturing large-scale pressure casting molds (previously not manufactured by the company) for the automotive industry. The analysis of the subject could be realized and evaluated after answering the following research questions:

1. Which external conditions determine the implementation of process innovation in the company ?
2. Was the innovation introduced to the company's R&D department important in increasing the company's competitiveness and opening production to foreign markets ?
3. Has the purchase of the device had a positive impact on increasing the company's productivity and faster execution of contracts, and thus positive relationships with global suppliers and customers ?
4. Did EU funds raised by enterprise lead to the company's development and the acquisition of new funds and opportunities in know-how improvement ?

Research Design and Methodology

The metal industry, due to the support for almost all other production sectors, includes the vast majority of European cities and regions while simultaneously belonging to the most expansive industrial sectors in Poland. In spite of the fact that it concentrates many large enterprises its main driving force is the companies of the SME sector operating as subcontractors in the EU supply chain. According to study by Daron, Gorska, (2019) and Klar D. et al. (2016) nowadays, in the Polish market, there are almost 54 thousand enterprises of the metal industry, which is dominated by micro (about 91%) and small entities (over 6%). It is also one of few sectors whose structure is characterized by high flexibility and innovativeness. Depending on goods, processes and the region, the metalworking sector may implement the activities in the field of

- production of steel and steel alloys,
- distribution of steel and steel products,
- processing (incl metalworking).

The industry, in spite of a wide range of activities, faces the problems concerning both high fragmentation of small and medium companies and its close link with other industries, among others, automotive, construction or the machinery industry. On the other hand, this sector generates high level of employment and exceeds other production sectors in the category of relationship between gross operating production and turnover, it is therefore one of more attractive sectors among foreign investors. The basic raw material manufactured for the metal sector is steel. The world's top producers of steel are located in Asia, North America and the European Union. According to Steel Statistical Yearbook (2017) and BFI des VDEh, (2017) data, the EU countries steel production is dominated by Germany and Italy. Poland occupies the close fifth position in this ranking. The share of Poland in the world's steel production amounted to only 0.56% in 2018 and was almost at the same level as in previous years. At the same time, in Poland, there was observed a dynamic growth in the level of steel production (by as much as 15% in 2018 compared to 2012). In 2018 the level of marketed production amounted to more than 0,8 million EUR in all entities of the industry, however the vast majority generated sales at the level of PLN 0,5 to 1,25 million EUR (a total of 63% of enterprises). The entities manufacturing steel products generate 92% of the total sales in the industry. The companies producing metal indicate the highest level of sales ranging from PLN 0,5 million to 1,5 million EUR and 10 million EUR and more (a total of over 46% of these companies). The metal industry occupies the fifth position on the scale of innovation in the industrial processing sector in Poland. However Peters (2017) indicated the reasons for the unsatisfactory level of innovativeness of the entities of the sector can be seen primarily in limitation of own financial resources:

- too high innovation costs,
- lack of external funds,
- lack of qualified staff,
- lack information on technologies.

According to studies by Romanowska (2016) and Slusarczyk (2019) the development of the metalworking sector, due to rapid development, enforces a substantial increase in the demand for increasingly complex products manufactured using the high-tech infrastructure of tools (eg. for pressure die-casting technology), which satisfies new requirements of the supply chain and industrial trends. In analysed case, for the metal sector company significantly important is ability to manufacture large-size molds for pressure die-casting of light alloys, which weight more than 20 tons and are used for the production of complex and operationally durable parts in the automotive industry. In order to investigate the use of the EU funds in supporting of innovative technologies, there has been chosen the

research object which faced the problem of technological limitations associated with manufacturing of large-size molds, which resulted in a decrease in competitiveness of the company in the area of the provided metalworking services. The contracts and projects of complex molds manufacturing, due to their weight, dimensions and degree of the shape and structure complexity, required the proper technical preparation and development of the specific manufacturing technologies and above all the possibility of verification of technical assumptions, so that the final product meets precisely the customer requirements and maintain the high level of profitability. According to OECD manual innovation is a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software, which has been definitely confirmed by the analysed company through the production improvement and changes in equipment to verify the molds. The overarching company's objective was the strengthening of the economic and innovation activity through implementation into the market, new high-tech products and services which are aforementioned large-size molds. The accomplishment of the formulated objective was also associated with the development and technical upgrading of the research and development (R&D) department with the unique in Poland infrastructure which is die spotting press machine for verification and control of large-size molds dimensions tolerance and quality (Figure 4).

Figure 4: Image of the die spotting press machine for large-size molds purchased by the analysed metalworking sector company with the use of EU funds total cost ca. 0.9 milion EUR, (Millutensil Company (2015)

The die spotting press machine purchased for the company's R&D department, allowed for realization of following technological stages:

- verification of molds closing and fitting during the operation and leveling the surface between individual components of the mold,

- testing the rotation of the upper movable part of the mold to the position required by the operator, specified at the stage of assembling the mold, its control and possible improvement,
- testing and checking of linearity – centering and collision between the movable part and the fixed part in the press,
- testing the modelling and simulation of alloy injection, also using wax composition in order to make measurements of the surface of the prototype part, determine its complementarity and possible porosity,
- shortening of the mold manufacturing by elimination of multiple repetition of fitting and final check of the mold,
- verification of manufacture technology parameters for the large-size casting mold so that the casted component meets all the parameters and functions in operating conditions.

Results

The implementation of the EU project results was mainly associated with the implementation of innovative solutions in the field of the process innovation related to improvement of the production process efficiency and quality control of final product. Research and development carried out by the company in the R&D department using the die spotting press machine allowed, among others for:

- verifying the correctness of geometrical parameters of prototypes and technical 3D documentation of large-size molds
- checking leak tightness of large-size molds in the conditions (temperature / closing force / casting pressure) adequate to the operating conditions of casting machines at the recipient,
- checking allowance on pads and other fitted elements of the large-size mold prototype.

The application of the die spotting press machine by the R&D department of the analysed company allowed for manufacturing more complex molds and, in cooperation with research units for knowledge and technologies transfer for mastering know-how and expanding the service of the demanding customers both domestically and abroad. Purchasing of high-tech infrastructure allowed also for a significant improvement in the competitiveness of the company in terms of technological capabilities of the large-size mold production and places the company in the position of the leader in the ranking of metalworking firms not only in Poland but also among the Europe. The implemented process innovation enabled also for reduction in time of large size molds manufacturing process. Significant decrease of the correction of shapes and dimensions stage is particularly worth pointing as factor determining the attractiveness of the realized implementation, which was possible to realize within the Smart Growth Operational Programme project. To sum up key results of the innovative infrastructure implementation were as follows:

Result 1. Duration of the process of die spotting of the mold with the correction of dimensions and operations of precise finishing grinding is 2 days / earlier: 14 days
Result 2. Production costs of large size mold were reduced by approximately 10 000 EUR per mold
Result 3. Reduction in mold production time by about 30% (duration of production according to the existing technology is approximately 5 weeks).
Result 4. Obtaining a high-quality casting, which is directly associated with ensuring leak tightness and precise linearity of the cooperating components.
Result 5. Significant improvement in the competitiveness of the company
Result 6. Cooperation with foreign markets (automotive, aerospace companies)

Discussion

Obtained results of the research showed that the assumed result index concerning the shortening of production technology was achieved. At the same time, there were calculated the indices of Overall Equipment Effectiveness (OEE) of the new production equipment. According to Oechsner (2003) the OEE index is calculated by multiplying three factors: availability A, performance P and quality Q

$$OEE = A \times P \times Q$$

The index is estimated on the basis of the time of availability of the machine for work, its performance and the quality of manufactured goods. The results of OEE for mold and press-forming die spotting are presented in Table 3.

Table 3: OEE index for the purchased die spotting press machine for large-size molds production

Indices [%]	2014	2015	2016	2017	2018	2019
A	89.2	89.8	90.8	91.2	90.8	90.5
P	92.5	94.0	93.4	94.1	94.3	94.2
Q	96.6	97.3	98.2	98.3	98.2	98.2
OEE	**79.70**	**82.13**	**83.28**	**84.36**	**84.08**	**83.71**

On the basis of the value of the OEE index it can be noted that its highest value was achieved in 2017 (84.36%), the lowest in 2014 (79.70%), which results from the first stage of the infrastructure implementation. The factors of availability, quality and performance confirm that the purchase positively affected both the quality of metal products (an increase by almost 2% in 2017 in relation to the initial year of implementation) and the optimization of the production cycle (an increase in the performance index to almost 2% in the research period). At the same time, compared to the period before the project implementation (2010-2014), the OEE index went up on average by 4.66 %. In the research into innovativeness of the results of implementation – the modern press machine, one may refer to the functionality formula by Stabryła (2015). The author, adopting the interpretation of functionality as the satisfactory degree of implementation of functions in the system – in this case, the process innovation, presents the basic formulas and criteria for assessment in the above area. There is highlighted the cost of performing the function (KF), determined by the following formula:

$$KF = \sum_{i=1}^{m} g_i + \sum_{k=1}^{n} y_k$$

where:

g_i – costs of extracted functions – innovativeness,
y_k - costs of integrated functions – production.

In further considerations, Stabryła (2015) indicates the possibility of calculating an increase in functionality – i.e. innovation and the cost of performing the function of the company, identified with the manufacture of products of increasing quality. As a result, with the implemented process of an increase in productive resources – the purchase of innovative equipment ensuring an increase in the quality of production and a new level of effectiveness of the company is achieved. In the assessment of effectiveness, achieved results arising due to the implementation of innovative technologies to the expenditure associated with the purchase of modern equipment are compared. An increase in the value of assets resulting from innovative processes have generally enabled an improvement in the financial results of the company. This was confirmed by the financial analysis of costs and profits from the production of one mold (the same product) before and after the implementation of process innovation (Table 4).

Table 4: Financial analysis of large size mold production costs (one mold, the same product) before and after implementation of process innovation

	Costs in 2014 [EUR]	Costs in 2017 [EUR]	Costs in 2018 [EUR]	Costs in 2019 [EUR]
Material (Steel 28 tons)	39 069.76	39 534.88	42 325.58	41 860.46
Machine use and depreciation	9 767.44	8 372.10	6 511.62	6 627.90
Tools	3 720.93	2 325.58	1 860.46	1 395.34
Return Logistics for Corrective Actions (Contractor from Belgium 2400 km)	6 046.51	----	----	----
Quality control	1 860.46	697.67	744.18	651.16
Total costs [EUR]	**60 465.10**	**50 930.23**	**51 441.84**	**50 534.86**
		Profit after implementation of innovation [EUR]		
		9 534.87	**9 023.26**	**9 930.24**

Source: own study base on the company's financial data

In the strategy of its operation there has been an improvement in the level of innovativeness, which will determine further directions of development based on detailed results of the project financed with the European Union funds. The purchased die spotting press machine for large-size molds, within the framework of the research of the R&D department, prospective and implemented so far, allowed for introducing the input data into the mold project software, taking into account the use of cyclic spotting as one of the final stages of mold production. The purchase and possession of the die spotting press machine created the conditions, for increasing operational durability of molds through the implementation of testing the correction of dimensions and shape also at the stage of inter-operational mold regeneration.

Conclusions

The environment favourable for innovativeness and innovation is evolving towards the search for the possibilities of improvements in business models, enforcing the need to involve large financial outlays, particularly on development of breakthrough innovation and the potential investment risk. In addition to own capital, an important source of financing is the use of foreign capital and public funds under the Structural Funds and Operational Programs of the European Union. The presented research study is a classic example of the EU support for knowledge and experience in acquiring and expanding the horizon of activities in terms of innovative technological, regional, social and environmental solutions. The use of the EU funds in the field of implementation of innovative technologies in the surveyed entity allowed for creating the conditions for development of a new operational strategy in the market of the metalworking industry with the opportunity to compete not only in the domestic market but also the foreign one. The most important features of innovation are: the strong relationship between market performance and new products means that new products help maintain market share and improve profitability, growth also through non-price factors, the ability to replace outdated products, process innovation that lead to shorter production times and acceleration developing new products compared to competitors. In addition, standards for the production of technological and quality products in the form of large-size molds were raised, which has a significant impact on the acquisition of new prospective economic markets, including automotive, aviation, metallurgy and foundry.

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Robust Generalized Regression Estimation Approach in Small Transport Businesses Analysis

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Abstract

Transport is one of the most important sections in the service sector. Recent years have seen a constant and dynamic growth in the sector of transport enterprises. Under these conditions, only companies with effective management are able to compete on the market of transport services. One crucial requirement in this respect is the ability to monitor the market situation by having access to detailed, regularly updated information. This task is particularly challenging for small companies, which also happen to be the category of companies which receive the least research attention. In addition, they have to compete against large transport enterprises. The use of non-standard methods of estimation that rely on administrative sources can help to extend the scope of information about the transport market. The purpose of the study described in this article is to apply Robust Generalised Regression to estimate characteristics of small transport companies. The estimation process involves delayed variables from administrative registers used as auxiliary variables and is based on small area estimation methods. The variables of interest are estimated at the province level, i.e. at a lower level of aggregation than currently available statistics.

Keywords: Robust Estimation, Business Statistics, Small Area Estimation, GREG

Introduction

Transport services play a very important role in the economy: in fact, they determine its effectiveness and efficiency. Transport is therefore one of the most important sections in the service sector**.** It is strongly connected with market activity (*transport of goods*) and with the the financial standing of the society *(transport of people).* In 2017, in the EU there were more than 1.2 million transport companies. They represented the relatively low share (about 5 %) of the non-financial business economy firms. The *Transportation and storage* sector employed almost 11.5 million persons and recorded value added of EUR 570.0 billion, which represented 8.0 % of those working in the non-financial business economy (Eurostat, 2020). Over 95% enterprises belong to SME, but above half (56 %) of the value added at factor cost in 2017 was generated by some 3 813 large enterprises and these employed 48 % of the total persons employed in the sector. Thanks to its central geographical location, Germany records highest levels in both employment and value added (about 23 %) among EU Member States. It is followed by the France, Italy, Spain and Poland (Fig. 1) (Eurostat, 2020).

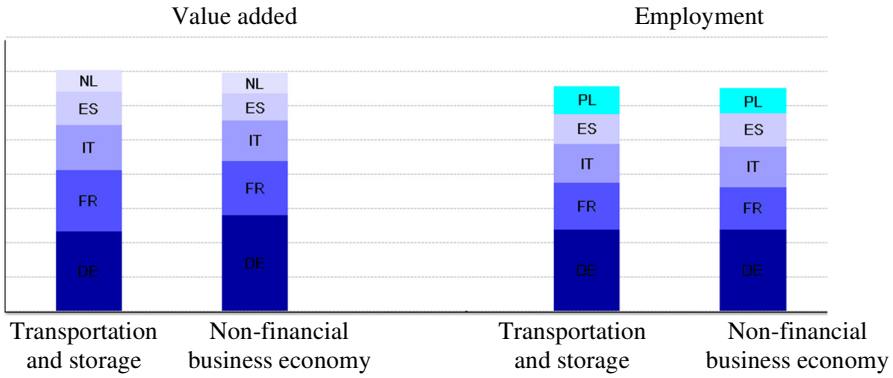

Fig. 1: Concentration of value added and employment, *Transportation and storage* sector, 2017
Source: Eurostat (online data code: sbs_na_1a_se_r2)

Recent years have seen a constant and dynamic growth in the sector of transport enterprises, which is the result of the increasing mobility of the population and the growing volume of goods trade. This leads to the constant growth in the number of transport enterprises (Fig. 2). Although this sector includes some activities which are mainly the domain of very large enterprises, for example, postal services, air and rail transport services, the number of small and medium-sized companies is constantly on the rise (Eurostat, 2020). At present, the SMTE (Small and Medium-Sized Transport Enterprises) sector operates in the logistics chain by cooperating with large, international companies as part of capital groups
(Mańkowski, 2019).

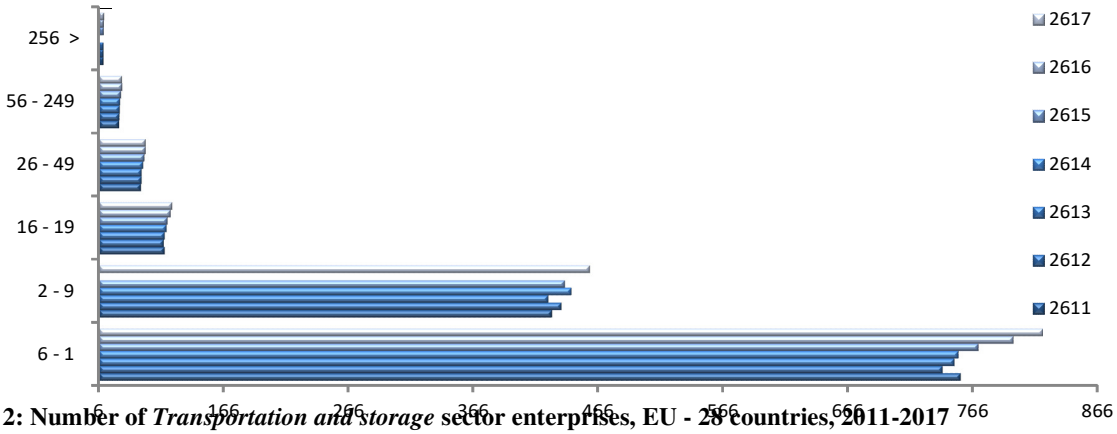

Fig. 2: Number of *Transportation and storage* sector enterprises, EU - 28 countries, 2011-2017
Source: Eurostat (online data code: sbs_na_1a_se_r2)

The growth in the number of enterprises is accompanied by the growth in employment (though at a slightly slower rate). Increases can also be observed in turnover and value added (see Fig. 3, Table 1)

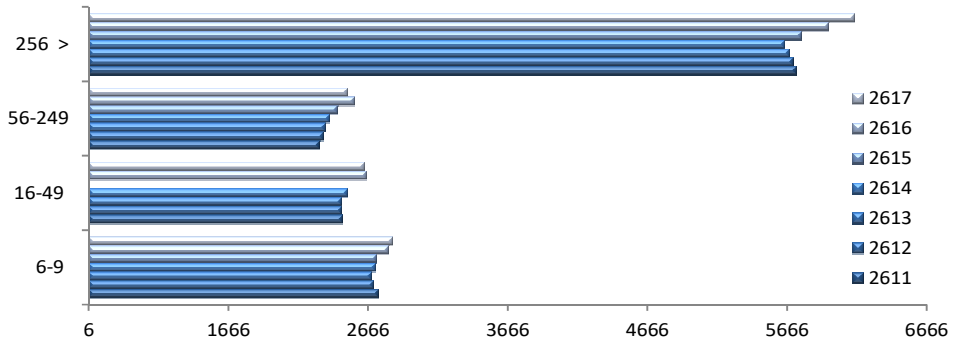

Fig. 3: Number of employed persons in *Transportation and storage* sector, EU - 28 countries, 2011-2017

Source: Eurostat (online data code: sbs_na_1a_se_r2)

Table 1: Indicators for *Transportation and storage* sector, EU-28 countries, 2011-2017

Years	2011	2012	2013	2014	2015	2016	2017
Turnover or gross premiums written (million euro)							
micro	210200	217549	76735	217749	228656	226391	228503
small	234806	243839	243844	251526	258910	256914	256043
medium-sized	239996	243833	240839	251288	268308	280000	285578
large	635000	660000	:	702052	735086	739737	795332
Value added at factor cost (million euro)							
micro	68100	68744	24904	71252	74033	72818	72508
small	74570	78262	79111	81842	85578	84917	84935
medium-sized	78234	78227	80434	84484	91734	95000	95103
large	263000	265000	:	281388	304709	300133	318447

(:) – not available
Source: Eurostat (online data code: sbs_na_1a_se_r2)

Given the development of *Transportation and storage* sector, transport companies have to operate in the conditions of increasingly fierce competition, which forces them to look for other sources of competitive advantage and extending the scope of their activities. This is directly associated with the need to improve and change their offering and forms of transport services. Moreover, in the context of changes occurring in the national economy, transport companies are faced with the challenge of meeting the growing demand for transport services resulting from the increasing volume of production, which in turn depends on the growing degree of specialization and cooperation (Bujak, 2017). Without the development of transport, further output growth is not possible. One could even argue that the rate at which transport develops should actually be faster than that observed in other sectors of the economy (Luft *et al.* 2016). All this shows the importance of this sector and the crucial task of optimizing their operations that transport enterprises have to undertake. To achieve this goal, transport companies need to monitor the market situation and have access to the latest and detailed information. The particularly difficult challenge is facing small companies, which have to compete against large enterprises that dominate the transport sector. To make matters worse, the number of statistical studies devoted to small companies is rather limited as they are usually treated merely as part of the MSE sector. Very few separate analyses are conducted on small companies, especially at lower levels of aggregation.

The study described in this article is an attempt to apply a non-standard method of estimation to extend the scope of information about small transport companies. At present, basic characteristics of companies operating in EU countries are only published annually at country level. The following

study provides estimates at NUTS2 level by applying a *robust version* of Generalised Regression (GREG), which is a method used in small area estimation (SAE). The aim of the study was to estimate one of the basic indicators of entrepreneurship - *mean monthly revenue* in Polish small transport enterprises at the level of provinces. Lagged variables from administrative registers were used to improve accuracy and coherence.

The article consists of six main parts. The first part is devoted to description of the *Transportation and storage* sector in EU, the second part describes data sources used for the estimation. The third part provides more details about the empirical study. The fourth part includes methodological considerations of the analysis. The fifth part contains a summary of the results and their interpretation. The article ends with conclusions.

Data

The study is based on data from the sample survey conducted by the Statistics Poland (Statistical Office in Poznan), which is the main source of information about Polish entrepreneurs. The survey is conducted in the form of monthly reports submitted by all large and medium-sized enterprises and a 10% sample of small enterprises. Its objective is to collect up-to-date information about basic indicators of economic activity of enterprises, such as *revenue from sales (of products and services), number of employees, gross wages, volume of wholesale trade and retail sales, excise tax, specific subsidies.* The sample frame includes 98,000 units, of which 19,000 are medium-sized and large enterprises (with over 49 employees), 80,000 are small enterprises (from 10 to 49 employees). In effect, about 30,000 units participate in the survey every month.

Description of the study

The empirical study was limited to small businesses employing between 10 and 49 people, which were active in 2012 (due to the data availability). The dependent variable in the model was *mean monthly revenue* obtained by small businesses in June 2012. Two auxiliary variables from administrative registers were selected: *revenue* and *the number of employees* in December 2011. The first variable was taken from the register maintained by the Ministry of Finance and the other one from the ZUS register (the Social Insurance Institution). The selection of auxiliary variables was motivated by data availability. The use of administrative data in statistical practice is associated with certain limitations. One of them is the time delay which often occurs when registered data are made available for purposes of official statistics (Dehnel, 2015). *Mean monthly revenue* of companies employing between 10 and 49 persons was estimated for *Transportation and storage* sector and 16 provinces (NUTS2).

The main idea of the study was to estimate the parameter of interest using Robust Generalised Regression Estimation approach. Direct estimates obtained with the classic Horvitz-Thompson estimator, further abbreviated as HT, were used as a point of reference for the results. By comparing direct (HT, GREG) and robust GREG estimates it was possible to notice the change in estimation of *mean monthly revenue* resulting from the modification of some units (outliers) of the sample.

Estimation Methods

The Robust GREG Estimator

The estimation of parameters for domain associated with business entities at the low level of aggregation poses a particular challenge owing to the characteristic distribution of units with respect to the variables of interest. A way of tackling this problem involves modifying sampled units which are classified as outliers. One example of this approach is winsorization (Chambers et al., 2000). The method consists in splitting the sample into two groups using cut-off points. One group contains observations used to build a model, which are left unmodified. The other group contains outliers, which are included in the sample after modification. Model parameters are estimated on the basis of the modified sample using the winsorized estimator. The winsorized estimator bases on direct

estimator. The study involved Generalised Regression (GREG) estimator. The classic form of the GREG estimator is given by the formula (Rao, Molina, 2015):

$$\hat{Y}_{\mathrm{GREG},d} = \sum_{i\in U_d} \hat{y}_i + \sum_{i\in s_d} w_i e_i = \sum_{i\in s_d} w_i g_i y_i \qquad \hat{y}_i = x'_i \hat{\beta}_d. \tag{1}$$

In addition to the variable of interest, the GREG estimator requires auxiliary variables x_i.
The winsorized estimator is given by:

$$\hat{Y}_{\mathrm{win}} = \sum_{i\in s_d} \widetilde{w}_i y_i^* = \sum_{i\in s_d} w_i g_i y_i^* \tag{2}$$

where modified values of study variable y_i^* are calculated by the following formula (Gross, Bode Taylor, Lloyd-Smith, 1986; Dehnel, 2014, 2018):

$$y_i^* = \begin{cases} \left({}^{1}/_{\widetilde{w}_i}\right) y_i + \left(1 - {}^{1}/_{\widetilde{w}_i}\right) K_{\mathrm{Ui}} & \text{if} \quad y_i > K_{\mathrm{Ui}} \\ \left({}^{1}/_{\widetilde{w}_i}\right) y_i + \left(1 - {}^{1}/_{\widetilde{w}_i}\right) K_{\mathrm{Li}} & \text{if} \quad y_i < K_{\mathrm{Li}} \\ y_i \quad otherwise \end{cases} \tag{3}$$

where:

g_i – the g -weight for unit i defined as:

$$g_i = \left(1 + x_i'\left(\sum_{i\in s_d} w_i x_i x_i'\right)^{-1}\left(t_x - \sum_{i\in s_d} w_i x_i\right)'\right),$$

s ($s\subseteq$N) – sample, s_d ($s_d \subseteq N_d$) – sub-sample from domain d,
$U = \{1, \dots, i, \dots N\}$ – finite population of size N
$\widetilde{w}_i = w_i g_i$, $w_i = 1/\pi_i$ – sampling weights
g_i – weights dependent on the value of the vector of auxiliary variables for the sampled units
$x_i = (x_{1i}, \dots, x_{ki}, \dots, x_{Ki})'$ – vector of auxiliary variables X
$t_x = \sum_{i\notin U} x_i$ – population total of x auxiliary variable
K_{Ui} / K_{Li} – upper / lower cut-off value:

$$\widehat{K}_{Ui} = \hat{\mu}_i - \frac{B_U}{(\widetilde{w}_i - 1)} \qquad \widehat{K}_{Li} = \hat{\mu}_i - \frac{B_L}{(\widetilde{w}_i - 1)}$$

$B_U = E\left[\hat{Y}_{winU} - \hat{Y}_{DIR}\right]$ / $B_L = E\left[\hat{Y}_{winL} - \hat{Y}_{DIR}\right]$ - the bias of $\hat{Y}_{winU}$ / $\hat{Y}_{winL}$,
$\hat{Y}_{winU}$ / $\hat{Y}_{winL}$ – the estimate of population total when only upper/lower winsorization is performed.
To estimate cut-off values $\widehat{K}_{Ui}$ and $\widehat{K}_{Li}$ one must determine the values of bias B_U i B_L and the $\hat{\mu}_i$ parameter. Methods used for estimating bias are described in in articles by Preston, Mackin (2002), Dehnel (2014).

In order to estimate the parameter of $\hat{\mu}_i$ various robust methods can be applied. Four of them were used in this study: *Trimmed least squares (TLS), Trimmed least absolute value (ABS), Sample Splitting(SPLIT), Least median of squares (LMS)* (Preston, Mackin, 2002). They were described by Rousseeuw and Leroy (2003).

a. The method of ***Trimmed least squares (LS)*** involves first fitting an OLS regression model to minimise the function:

$$F = \sum_{i\in s} (y_i - \beta^T x_i)^2 \tag{4}$$

Then fitted values and residuals are calculated. In the second step, units with the largest positive and negative residuals are removed. Finally, a new regression model is fitted to the reduced sample in order to estimate the value of μ_i^*.

b. The method of ***Trimmed least absolute value (ABS)*** consists in fitting a regression model to minimise the function:

$$F = \sum_{i\in s} |y_i - \beta^T x_i| \tag{5}$$

After evaluating fitted values and residuals units with the largest positive and negative residuals are removed. A new regression model is fitted to the reduced sample. It is expected that the *ABS* method is a more robust regression model than the *LS* technique because large residuals which are not squared have less influence on the regression parameters.

c. The ***Sample Splitting Technique (SPLIT)*** is based on OLS. It is applied to data that has been randomly split into two halves. A regression model is fitted to each half of the data while the residuals are calculated using the model applied to the half of the data that was not used to fit the model. Then, after merging the data, units with the largest positive and negative residuals are removed. The process is repeated until a certain percentage of data has been deleted. The *SPLIT* technique is expected to be more robust than LS because the residuals used to remove the 'outlier' units are not calculated from a regression model that has been generated using these 'outlier' units.

d. The ***Least median of squares (LMS)*** technique consisted of minimising the median of all sample squared residuals. It was described by Rousseeuw and Leroy (2003). It resembles the bootstrap method. It involves drawing subsamples of size $n-1$ from a sample of size n using *simple random sampling* with replacement. For each subsample trial regression model parameters are calculated and then their squared residuals, which are used to calculate the median. The model with the smallest median of squared residuals is selected. The *LMS* technique should be more robust than *LS* because an OLS regression model is fitted in the absence of "outlier" units, without totally removing these 'outlier' units (Preston, Mackin, 2002).

The LMS technique should be more robust than *LS* because the OLS regression model is fitted in the absence of outlying units, without totally removing them (Preston, Mackin, 2002).

Estimation quality was assessed with reference to estimates obtained using classical direct Horvitz-Thompson (HT) estimator - the most common estimator in survey methodology (1952). Consider sample s drawn from population U, where s_d is a sub-sample from domain d. Counties in domains meet the condition $n_d < N_d$, where n_d denotes the sample size in domain d and N_d is the population size of domain d. Under simple random sampling, each unit i in the sample has been assigned a sample weight – w_i. The estimator of the total in domain d is given by the formula:

$$\hat{y}_d^{HT} = \sum_{i=1}^{n_d} \frac{y_{di}}{\pi_{di}}, \qquad (6)$$

where:

$\hat{y}_d^{HT}$ is the estimated mean of the variable of interest y in domain d,

π_{di} – probability that the i-th unit belonging to domain d is in the sample,

y_{di} – value of the variable of interest for the domain d and i-th unit.

The direct estimator is design-unbiased and design-consistent assuming that $n_d \to \infty$. Nevertheless, it is very ineffective for domains in which n_d is very small and it is impossible to calculate direct estimates for non-sampled domains where $n_d = 0$ (Guadarrama, Molina, Rao, 2016).

Method of Assessing Precision

Precision of estimates was evaluated using the extension of standard bootstrap method, taking into account sampling method (Shao, Tu, 1995). Detailed discussions of this subject can be found in the monograph by J. Shao and D. Tu (1995: 238–250), J. Rao and C. Wu (1988: 231–241), E. Antal and Y. Tillé (2011: 534–543). Estimation efficiency was assessed using the coefficient of variation of the estimator based on results obtained in $B = 500$ samples ($b = 1, 2, ..., B$), following the approach described in (Bracha, 2004):

$$\widehat{CV}(\hat{Y}_d) = \frac{\sqrt{Var(\hat{Y}_d)}}{E(\hat{Y}_d)} = \frac{\sqrt{\frac{1}{499}\sum_{b=1}^{500}(\hat{Y}_{b,d}-\hat{Y}_d)}}{E(\hat{Y}_d)}, \qquad (7)$$

where:

$\widehat{CV}(\hat{Y}_d)$– the estimator of the coefficient of variation of the estimator,
$Var(\hat{Y}_d)$– the variance computed based on bootstrap iterations,
$E(\hat{Y}_d)$– the bootstrap estimator of the expected value.

This ratio indicates the share of the estimation error in the value of the target variable estimate. Smaller $\widehat{CV}$ values are desirable.

Additionally, in order to obtain a more thorough evaluation of the estimates, the analysis focused on differences between values of the estimators obtained from a specific sample and estimates obtained from tax return data filed in December 2012. It was assumed that the following relationship holds: the ratio of *revenue* reported in tax returns by companies in the study at the province level to the value of *revenue* from the monthly enterprise statistical survey is constant (see Fig. 4).

$$\frac{\text{revenue_AR XII2012}}{\text{revenue_XII2012}} = \frac{\text{revenue_est VI2012}}{\text{revenue_VI2012}} \qquad (8)$$

revenue_AR XII2012 - revenue in December 2012 obtained from Administrative Register
revenue_ XII2012 - revenue in December 2012 obtained from statistical survey
revenue_est VI2012 - estimates of revenue for June 2012
revenue_ VI2012 - revenue in June 2012 obtained from statistical survey

This approach made it possible to calculate the approximate value of *revenue* for June 2012.

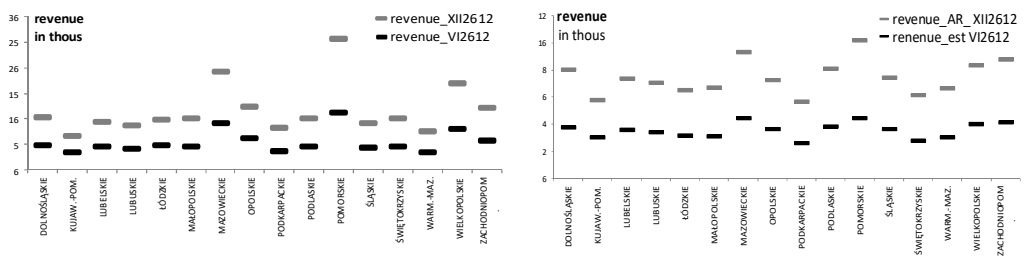

Fig. 4: Value of revenue in June and December 2012 reported in the statistical survey and in tax returns (Administrative Register) for companies classified into the *Transportation* section
Source: based on the CSO study (GUS 2016)

Results of the Empirical Study

The robust GREG estimator makes it possible to exploit information from a small sample or, in special cases, an empty sample, by supporting estimation with data from non-statistical sources - auxiliary variables - without additional costs to provide reliable estimates at a low level of aggregation.

The point of reference for the evaluation of estimation precision was the estimate obtained using the classic HT estimator. The measure of efficiency (CV) indicates that the GREG estimator based on the least median of squares regression and GREG estimator based on the SPLIT method are characterised by the highest variation, even higher than the HT estimator (see Fig. 5). The variation of the classic GREG estimator based on the auxiliary variables from administrative registers is comparable with the HT estimator. The reduction in variation (compare to the HT) is achieved by the application of the GREG estimator based on the ABS and the LS method. In some provinces for ABS and LS methods it can be observed a considerable decline in value of CV. The biggest difference between the HT and robust GREG estimates can be observed for the Pomorskie, Opolskie and Wielkopolskie provinces – a decrease in CV from 57% to 25%, from 28% to 6%, and from 31% to 18% respectively.

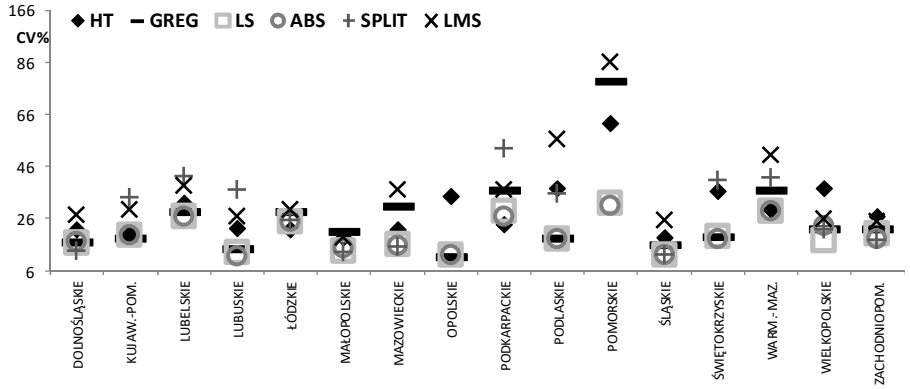

Fig. 5: Comparison of estimation precision for Transport

Source: based on data from the statistical survey and CSO (GUS, 2016)

Some kind of "accuracy" of estimation was also assessed. The reference values for the estimation of *revenue* were calculated using *the ratio* (8) described above. Additionally and as in case of precision assessment, the robust GREG estimator was compared with the HT estimator, see Fig. 6. The results of this comparison indicate that the application of robust GREG estimation has considerably improved "the accuracy" of estimates in comparison with HT or GREG estimation. For nearly all domains of interests (provinces), the HT estimates of *mean revenue* are significantly overestimated; in contrast, the GREG estimator underestimates the parameter of interest for some domains. The largest discrepancy between estimates for different domains can be observed for the provinces for which the auxiliary variables used in the model were characterised by the highest dispersion.

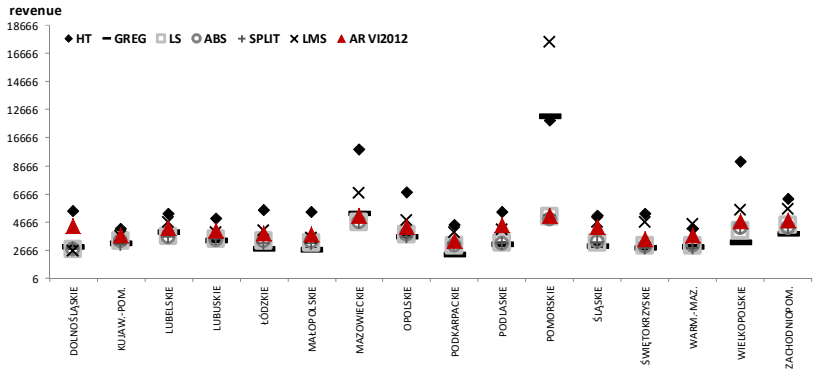

Fig. 6: Comparison of estimates of revenue in June 2012 for Transport

Source: based on data from the statistical survey and CSO (GUS, 2016)

Spatial variation in differences between the estimates and real values is illustrated in maps showing the level of deviation across provinces (see Fig. 7). The results of the study indicate that direct HT estimates for most domains are overestimated compared with values from administrative registers. The biggest discrepancies can be observed for the HT estimator. These conclusions confirm the properties of classical Horvitz-Thomson direct estimation. If the sample size is too small and if the sample contains outliers, the direct estimator is very ineffective and may grossly underestimate or overestimate the population totals. The estimation approach based on the robust GREG method has generally improved the estimates (in terms of comparison with tax registers), but the degree of gain varied.

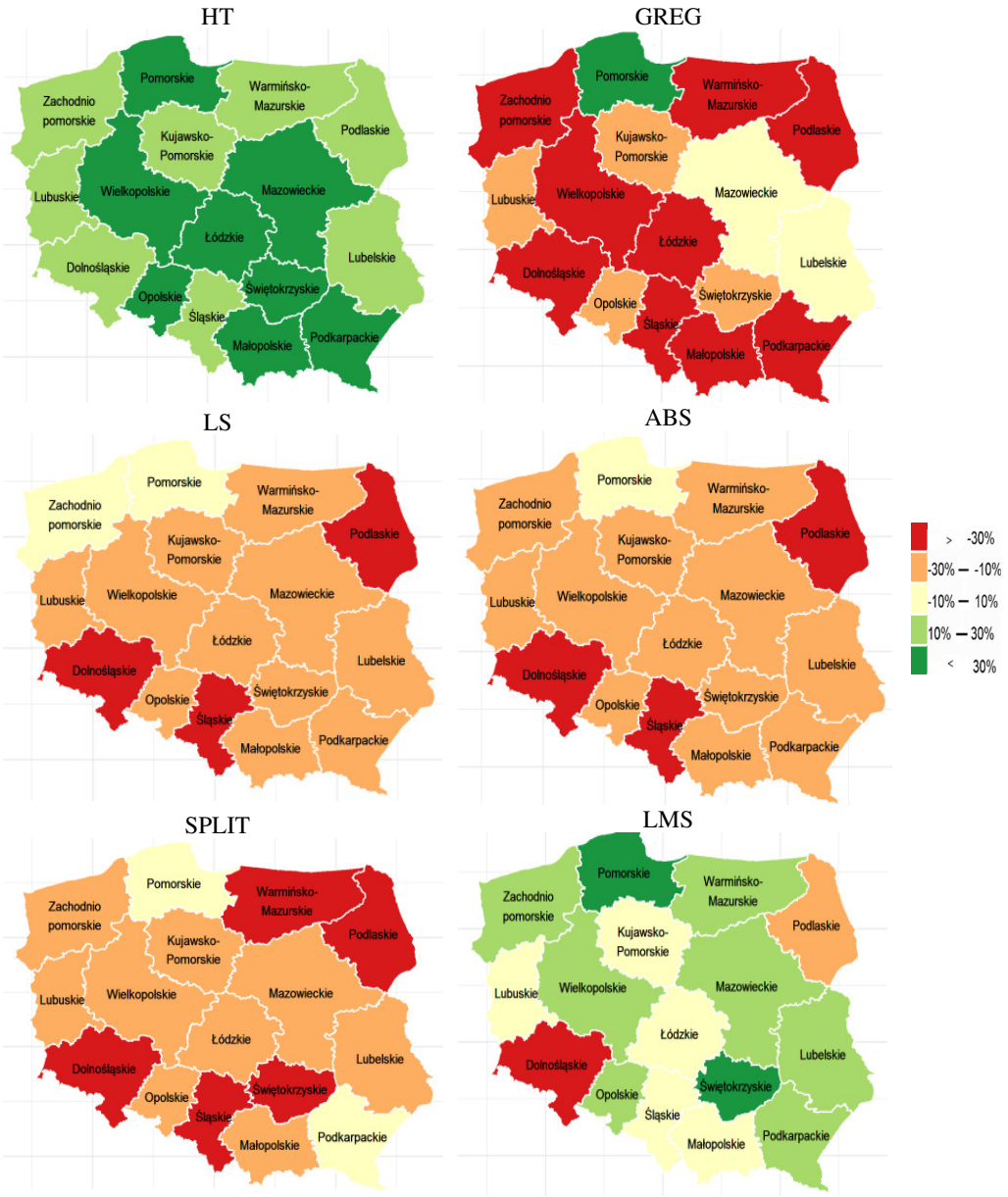

Fig. 7: Spatial distribution of relative differences between values of HT estimator and GREG estimators of revenues for Transport obtained based on data from tax returns

Source: based on data from the statistical survey and CSO (GUS, 2016)

The final results - the spatial distribution of *mean revenue* estimates across provinces for Transport section obtained for the GREG estimator based on the LS method (with the highest estimation precision) is shown in Figure 8. The highest estimates of *mean revenue* were obtained for the Pomorskie (4,404 PLN) and Mazowieckie (3,987 PLN) Provinces. The lowest value of *mean revenue* was estimated for the Dolnośląskie (2,033 PLN) and Warmińsko-mazurskie (2,344 PLN) provinces –

which is almost half of the value calculated for the Pomorskie Province, despite the fact that these are neighbouring regions.

Fig. 8: Spatial distribution of the GREG estimator based on the LS method of mean revenue by province for Transport

Source: based on data from the statistical survey and CSO (GUS, 2016)

Conclusions

The analysis of the regional variation between small transport businesses was conducted using non-standard direct method of estimation - Generalised Regression Estimation. Additionally, the study made use of robust regression - winsorization. The application of delayed auxiliary variables from administrative registers improved estimation precision, both in the case of the classic GREG estimator and its modified version based on winsorization. Each of the four methods of robust regression were characterised by varied precision of estimation. The observed differences resulted from how resistant each method was to the influence of outliers. Besides, the reduction of CV was greater for domains of a relatively smaller size and when the correlation between the estimated and the auxiliary variable was stronger. The use of winsorization not only resulted in a precision gain but also improved "accuracy". The evaluation of estimation quality in terms of "accuracy" has revealed that sample modification using winsorization helps to reduce bias resulting from the presence of outliers. While the HT estimates of *mean revenue* are significantly overestimated and, in contrast, the GREG estimator underestimates the parameter of interest for some domains, the application of robust GREG estimation has considerably improved the quality of estimates.

Acknowledgment

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Multi-Factor Model of Competitiveness of Business Services Subsector in Poland In Changing Economic Conditions

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Abstract

In the 21st century, many changes took place in Poland, which positively influenced the ability to think about the need to adapt the business model of an enterprise to a specific phase of the business cycle. However, this did not translate into preparation of enterprises for changes in the economic situation. This fact and extraordinary events, initiated in China at the turn of 2019 and 2020, influenced the launch of research aimed at developing a concept for the model of functioning of business sub-sector enterprises in changing economic conditions. The choice of the research subsector was determined by its economic significance, measured by its share in GDP creation, value added and employment. The hypothesis was formulated as follows: In the opinion of business owners of the business services subsector in Poland, their entities are relatively poorly prepared for potential changes in economic conditions. The effect of the study, which was conducted on the basis of a questionnaire, is the proposal of a flexible business model of the business services subsector in variable economic conditions based on the principles of clinical economics of J. Sachs.

Keywords: competitiveness, business cycle, business services

Introduction

Competitiveness is the driving force of the global economy and the strategic priority of a business owner. The ability to maintain a good competitive position is also the biggest challenge of the 21st century. This statement is invariably true, especially in relation to the business services sub-sector enterprises, whose functioning is largely determined by the economic situation. The direct inspiration to write the article were extraordinary events, initiated in China at the turn of 2019 and 2020, the development of which clearly indicates quite significant changes in the economic situation. An additional argument for undertaking the study was the significance of the sub-sector, measured by its share in GDP creation, value added and employment. The main aim of the research is to attempt to develop a concept for the business model of the business services sub-sector in changing economic conditions. The hypothesis was formulated as follows: In the opinion of business owners of the business services sub-sector in Poland, their entities are relatively poorly prepared for potential changes in business conditions. The verification of the hypothesis and the implementation of the goal will be carried out thanks to theoretical and empirical research conducted among enterprises of the business services sub-sector.

Theoretical Basics

Along with the industrialization and development of the market, cycles in the economy began to be associated more with human economic activity than with natural phenomena. Wesley Clair Mitchell believed that business cycles appeared in Great Britain in 1790, in the USA in 1796, in France in 1847, and in Germany in 1857. After 1890, business cycles occurred in almost all economies of the world, including the communist economies [Mitchell 1951, pp. 187-198]. According to Nikołaj Kondratieff, these were long cycles and the reason for their occurrence was the wear of the infrastructure and its renewal under the influence of technical progress, as a result of which the development process proceeded in waves [Kondratieff, Stolper 1935, pp. 105-115]. Simon Kuznetz distinguished medium-range swings fluctuations. They were associated with demographic processes, waves of inflow of emigrants, and as a consequence - investments in infrastructure [Kuznetz 1930, p. 558]. Clement Juglar

isolated the classic cycles. The reason for their occurrence were fluctuations in investments in fixed capital. This was related to the activities of banks and an excessive propensity to grant loans during the period of economic expansion [Juglar 1856, pp. 555-581]. This point of view was later adopted by Hyman Minsky, who was responsible for the financialisation of the economy [Minsky 1986]. Józef Kitchin, distinguished the short cycles. The reason for their occurrence are changes in working capital (changes in inventories). They resulted from delays in the flow of information, which influenced entrepreneurs' decisions. These delays caused the fact that the production volume did not match the current demand, an excessive increase in inventories, and as a result a drop in commodity prices and production restrictions [Kitchin 1923, pp. 10-16]. The general economic fluctuations presented are largely of historical importance, although one can find contemporary works referring to them, mainly to the Kondratieff cycles. They arise from the development of theories by Wesley C. Mitchell, Arthur F. Burns and other economists (see Table 1). W. C. Mitchel and A.F. Burns distinguished three phases of economic fluctuations: expansion, recession and reconstruction [Burns, Mitchell 1946]. Joseph Alois Schumpeter referred the cycles of the business cycle to a state of equilibrium and distinguished: the phase of growth, recession, depression and recovery [Schumpeter 1939]. According to John R. Meyer and Daniel H. Weinberg, the business cycle phases (recession, revival, demand inflation, stagflation) are linked to inflation [Meyer, Weinberg 1975]. Ilse Mintz lists two phases of the growth cycle: the accelerated growth phase above the trend and the slow growth phase below the current trend [Mintz 1969].

The financial crisis of 2007-2009 revived the scientific discourse on business cycles. The effect is, among others financial cycle concept developed by Claudio Borio [Borio 2012] and Bernard Landais's Ocean Model [Landais 2017, pp. 97-155]

The cyclical nature of economic development tends to spread to individual world economies. Despite the views on a possible negative correlation of business movements between countries [Baxter, Kouparitsas 2004], most often it is a positive correlation. There is a synchronization of the cycles known as the "contagion effect". This is due to, among others progressing globalization, increased openness of economies, the spread of technological progress and often a common policy of governments and central banks. An example of growth cycle synchronization for the US and EU-28 [OECD 2020]. In many situations, the response of the EU-28 to the US economy may be slightly delayed, which may suggest the direction of the spread of change and the contagion effect. The changes in the activity of European and American economies correspond to classical cycles. This is due to the fact that changes in real GDP on a common basis correspond to data on real GDP values.

Similar synchronization of growth cycles can be observed for EU-28 and Polish economies [OECD 2020]. In many cases a slightly belated response of the Polish economy to the EU-28 economy can be observed.

Due to the "contagion effect" translating into cycle synchronization, the classic business cycle will be used for the Polish economy later in the analysis.

Research Material and Methodology

In March 2020, initial empirical research was undertaken, the subject of which is the competitiveness of enterprises in the business services subsector in Poland in changing economic conditions. The survey covered business services sub-sector companies. Due to the large multifaceted diversity of enterprises in the business services subsector, empirical research was directed to groups of internally coherent entities whose functioning and development are based on professional knowledge. Therefore, based on the targeted selection for empirical research, the following types of activity were qualified (Polish Classification of Economic Activity):

a) other financial service activities, excluding insurance and pension funds (section K, group 64.9),
b) other monetary intermediation (section K, class 64.19),
c) activities auxiliary to insurance and pension funds (section K, group 66.2),
d) legal, accounting and tax consultancy activities (section M, division 69),

e) advertising, market research and public opinion polling (section M, division 73),
f) employment-related activities (section N, division 78).

The choice of types of activities resulted from the fact that the types of services provided were often combined, e.g. accounting office's often also deal with credit and insurance brokerage.

The research was conducted in four randomly selected provinces (Masovia, Pomerania, West Pomerania, Warmia-Masuria), with different levels of GDP per capita.

The research was conducted in March 2020 based on a questionnaire, which gave the opportunity to conduct research in a relatively short time. To prevent any possible artifacts (the subject of the study may not be suitable for measurement using a questionnaire or the subject of the examination may affect the answers it provides), which may occur in the survey conducted on the basis of the questionnaire, significant actions were taken:

1. The questionnaire was designed based on the theoretically and empirically verified model proposed by M. Majchrzak, according to which the competitiveness of an enterprise is a resultant of mega-, macro-, meso- and microeconomic factors of competitiveness.
2. The structure of the questionnaire was prepared on the basis of brainstorming, in which representatives of the world of science and persons performing managerial functions in enterprises of the business services sub-sector were invited to participate.

The respondents were presented with a questionnaire consisting of 21 closed and semi-open questions (6 questions were a record). The survey was anonymous, which resulted from the specifics of the business services sub-sector. Most of them are micro-enterprises not required by law to publish financial data, and a study of this area of activity is also envisaged. There was a fear of reluctance to answer questions in this area.

In the questionnaire, next to the metric, two parts were separated shaping the model of the competitive enterprise's functioning in changing economic conditions:

1. Impact of cyclical changes on the operation of the business services sub-sector company.
2. Assessment of the competitive potential and instruments of competing by the enterprise in changing economic conditions, with particular emphasis on the recession phase.

The questionnaire was sent to 1,600 enterprises (average return rate 22.13%) from Masovia, Pomerania, West Pomerania, Warmia-Masuria Provinces. At the significance level of 0.1 and with an admissible error of estimation of 9%, the necessary sample size was obtained, which allows to generalize the obtained results to the entire enterprise group of the business services sub-sector.

A similar percentage of enterprises from individual provinces took part in the survey (Masovia-25.06%, Pomerania- 23.94%, West Pomerania-26.84%, Warmia-Masuria-24.16%).

In all provinces, enterprises of the business services subsector were mostly run by natural persons as part of sole proprietorship (the average for all provinces is 75.71%), but there were also civil law partnerships (19.22%) and limited liability companies (3.12%) and partner companies indicated by respondents (1.95%). The choice of the form of conducting economic activity was largely dictated by the size of the enterprise. In the studied population, micro and small enterprises dominated (99.78% in total). Medium-sized enterprises constituted 0.22%, while there were no large enterprises.

The size structure of enterprises was additionally verified in the question regarding net turnover from the sale of goods, products and services and financial operations. Over 95% of the analyzed enterprises achieved a net turnover of up to 500,000, and the rest in the range of 500,000. up to 1 million (in this group were mainly enterprises registered in the Masovia characterized by the highest level of affluence of the society). The analyzed entities are micro and small enterprises.

The majority of respondents were enterprises conducting legal and accounting activities, as well as credit and insurance brokerage (over 39%). A smaller group are companies operating in the marketing area (over 17%) and employment intermediaries (less than 5%). The sample surveyed was dominated by enterprises operating for over 10 years, they constituted over 78% of the population. More than 19% are enterprises existing from 5 to 10 years, and only slightly more than 4% are enterprises existing less than 5 years. A high share in the sample of long-existing enterprises (over 10 years) suggests that the study was carried out among people who know the sub-sector and the specifics of operations well, which significantly increases the quality of research. The dominant participation in the survey of enterprises that have been on the market for many years indicates that it is possible to maintain the market position in the sector, and the invitation to research of experienced entrepreneurs will show the ways to achieve competitive advantage, which makes the survey reasonable and confirms the proper structure of the target group.

Competitiveness of Enterprises in The Business Services Subsector in Changing Economic Conditions

Extensive empirical and theoretical research has led to the creation of an integrated ten-factor competitiveness model for the business services sub-sector. It was created based on the concept of a nine-factor competitive model of D. Cho and H. Moon [Cho, Moon 2000, pp. 223], which on the basis of further empirical research was expanded by another factor of competitiveness - threats from the environment (Figure 1).

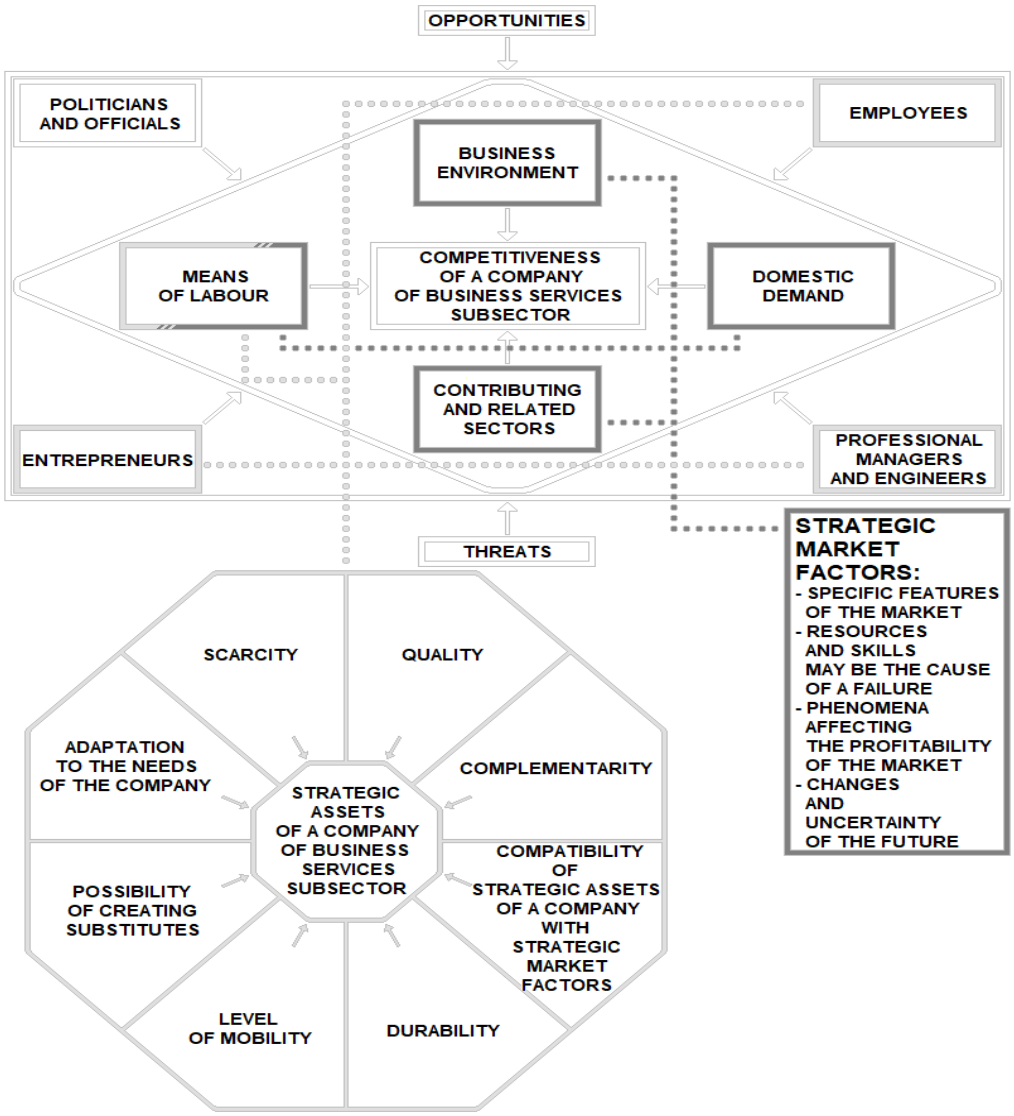

Fig. 1: Integrated ten-factor competitiveness model of the business services sub-sector
Source: M. Majchrzak, Konkurencyjność przedsiębiorstw podsektora usług biznesowych w Polsce. Perspektywa mikro-, mezo- i makroekonomiczna, CeDeWu, Warszawa 2012, p. 183.

The model presented in Figure 1 was modified by the empirical research conducted in March 2020. In the first stage, attempts were made to determine the macroeconomic impact of cyclical changes on the enterprise's functioning model. In connection with ensuring the best possible quality of empirical material in the first part of this stage of research, entrepreneurs were asked to assess the significance of individual macroeconomic factors of competitiveness, assuming a deterioration of business conditions by giving them rank. To this end, entrepreneurs ranked the given factors from the most to the least important (Table 1).

Table 1: Assessment of significance of macroeconomic competitiveness factors in changing economic conditions

No.	Macroeconomic competitiveness factors	Provinces				
		Masovia	Pomerania	West Pomerania	Warmia-Masuria	Total
1.	Business environment	5	4	4	4	4
2.	Business conditions	2	1	1	1	1
3.	Legal regulations	9	9	10	7	9
4.	Stable political environment	11	11	7	11	11
5.	Size and quality of human resources	1	3	2	2	2
6.	Socio-economic infrastructure	10	10	11	10	10
7.	Taxes and other payments	3	2	3	3	3
8.	Access to modern technology	7	7	8	9	7
9.	Modern marketing and management	8	8	9	10	8
10.	Entrepreneur-friendly banking system	4	5	5	5	5
11.	Creating cooperative relationships	6	6	6	7	6

1- the most important factor
11 - the least important factor
Source: own study based on conducted research.

Among the macroeconomic competitiveness factors, the economic situation is the most important for entrepreneurs in the business services sub-sector. In the survey conducted in 2012, this factor was in second place. Therefore, the timing of the survey (pandemic and probability of recession) affected the assessment of the significance of this factor to a small extent.

According to earlier fragmentary research, there is a tendency of the clients to "escape" from the sub-sector in a bad economic situation, who provide services on their own in such a situation. The size and quality of human resources came second. This is explained by the fact that business services are largely based on the professional, extensive knowledge of service providers, and therefore high-quality, accessible, mobile human resources can be a key factor here.

Another important factor is taxes and other payments and the business environment, whose friendliness is rated by most entrepreneurs (87%) at 2 on a scale of 1 to 5, and others - even worse. The assessment of this indicator may be related to the moment of testing. Enterprises of the business services subsector are mainly micro enterprises whose existence and position are particularly at risk in the case of economic recession. Hence high expectations towards the business environment. The least-valued factors were the socio-economic infrastructure and political environment.

When asked about the subsector's resilience to economic changes, most entrepreneurs (87%) answered in the negative. This means that the sub-sector is not resistant to macroeconomic shocks, which may indicate the need to adopt various strategies in different economic conditions, as well as flexibility of actions. Entrepreneurs also see the changes that can be brought about by the economic recession. The task of the entrepreneurs was to assess the significance of the indicated factors on a scale of 1 to 5 (Table 2).

Table 2: Assessment of significance of changes (dominant)

No.	Changes in the subsector	Provinces				
		Masovia	Pomerania	West Pomerania	Warmia-Masuria	Total
1.	Number of competitors	4	5	4	4	4
2.	Number of buyers	2	1	1	1	1
3.	Business strategy of my enterprise	1	2	2	3	2
4.	Competitor strategy	3	3	3	2	3
5.	Strengthening cooperation in the subsector	5	4	5	5	5

1- the most important factor
5 - the least important factor
Source: own study based on conducted research.

In the opinion of most entrepreneurs, a change in the economic situation (recession) may lead primarily to a change (reduction) in the number of buyers, which will necessitate a change in the company's operating strategy. The next places were: a change in competitors' strategy, a change in their number and closer cooperation in the sub-sector. When asked about the preparation of the business services subsector enterprises for economic changes, 87% believe that these enterprises are not prepared, 10% answer in the affirmative, and 3% have no opinion on this topic. Also interesting are the entrepreneurs' answers to the question about possible support in the event of economic downturn. 79% believe that they can only count on themselves, 12% count on the support of family / friends and other people running a business, and only 9% count on the support of the government.

In the second stage, research was carried out to assess the company's competitive potential in the context of changing business conditions. The first question was about the company having an operating strategy in the event of a change in business conditions. 92% of entrepreneurs surveyed do not have such a strategy, and 8% declared that in the event of a recession, their efforts will focus on market survival. Entrepreneurs who do not have a strategy in the event of a change in economic conditions declare its preparation within the next year.

Another task of representatives of the management level was to assess the significance of individual elements of competitive potential. Entrepreneurs ranked the given potential elements from the most important to the least important (Table 3).

Table 3: Assessment of the significance of individual elements of competitive potential (dominant)

No.	Competitive potential	Provinces				
		Masovia	Pomerania	West Pomerania	Warmia-Masuria	Total
1.	Quality of management staff	14	15	15	13	15
2.	Quality of employees	1	1	1	1	1
3.	Cooperation between employees	12	13	13	19	13
4.	Cooperation between management and employees	13	12	19	12	12
5.	Flexible organizational structure	7	5	6	6	6
6.	Equipped with means of work	3	4	4	4	4
7.	Equity capital	2	2	2	2	2

8.	Possibility of financing projects with foreign capital	6	6	5	5	5
9.	Enforcement of payments	4	3	3	3	3
10	Labor and material costs	10	11	10	10	10
11.	Market information	5	7	7	7	7
12.	Marketing activities	16	17	16	16	16
13.	Relations with service recipients	19	14	12	14	14
14.	Long-term contracts	8	9	8	9	8
15.	Enterprise size	9	8	9	8	9
16.	Enterprise location	11	10	11	11	11
17.	Quality of management	17	18	17	17	17
18.	Company image	15	19	14	15	16
19.	Previous professional experience	18	16	18	18	18

1- the most important factor
19 - the least important factor
Source: own study based on conducted research.

According to entrepreneurs in all the provinces, the most important elements of a competitive potential, with changing economic conditions, are: the quality of employees, means of work (the ability to provide services remotely is important for business services) and financial capital (amount of equity, the possibility of financing projects with foreign capital and collection of receivables). Entrepreneurs also recognize the importance of a flexible organizational structure and having complete market information.

The assessment of the significance of individual potential elements may be supplemented by answers to specific questions regarding this aspect of the research. Managers in all provinces assess themselves as far more entrepreneurial and professional than their competitors. They estimate leadership, creativity and innovation at a similar level. The level of self-assessment of the management is the higher the more developed provinces. Employee evaluation is similar. Entrepreneurs believe that the substantive preparation of employees was lower on the day they started work than at the time of the survey. At the same time, entrepreneurs agree that their employees have the opportunity to expand their knowledge, with various forms of further training.

Lower, but at a level close to competition (with the exception of the Warmia-Masuria Province), entrepreneurs assess the equipment with the necessary means of work in changing economic conditions. In each province, shortages in equipment for labor were identified, which gave an indicator of over 27% across the entire surveyed population. The biggest deficiencies were found by the entrepreneurs of Warmia and Masuria Province, and the smallest by those of Masovia Province. No deficiencies were found for cars, telephones and other small office equipment. The greatest needs in all provinces occur in the area of relatively expensive and specialized equipment for marketing agencies. Individual deficiencies also occur in terms of computers, peripherals, software and furniture. This is worrying, given that the services of the business services subsector without access to modern technologies cannot be provided in changing business conditions (e.g. the need to work remotely).

Entrepreneurs also assessed the significance of selected competition instruments in changing economic conditions. To this end, entrepreneurs ranked the given instruments from the most to the least important (Table 4).

Table 4: Assessment of the importance of competition instruments in the business services sub-sector (dominant)

No.	Competition instruments	Provinces				
		Masovia	Pomerania	West Pomerania	Warmia-Masuria	Total
1.	Price of the service	2	1	1	1	1
2.	Quality of the service	1	2	2	2	2
3.	Personalizing the offer	4	5	5	5	5
4.	Enterprise image	8	6	8	9	8
5.	Timeliness of the service	3	3	3	3	3
6.	Comprehensive offer	5	4	4	4	4
7.	Innovation of service	6	8	7	7	7
8.	Service provider's availability	7	7	6	8	6
9.	Marketing activities	9	9	9	6	9

1- the most important factor
9 - the least important factor
Source: own study based on conducted research.

According to entrepreneurs, the most important competition instruments are: price, quality of service, timely delivery and comprehensiveness of the offer. In turn, marketing activities and the company's image are of the least importance. The distribution of responses slightly differed in individual provinces. In the Masovia Province, the quality of the service is more important than the price, while the comprehensiveness of the offer is less important than in other provinces. In the Pomerania Province, the image of the enterprise is more important than in other provinces, the availability of the service provider in West Pomerania Province and marketing activities in the Warmia-Masuria Province.

Redefining the business competitiveness model of the business services subsector using the assumptions of clinical economics

Most business service subsector companies do not have competitive models. The way they operate is often intuitive, and the competition models themselves are informal and imprecise. Perhaps this is the result of a lack of future-oriented thinking and consideration of possible actions in the short term. Direct control of the implementation of the model, possible quick implementation and possible change should encourage its introduction in the enterprise. Implementation of the solution while avoiding threats may also be facilitated by the application of Jeffrey Sachs' clinical economics solutions [Sachs 2005, pp. 74-98]:

Lesson 1. Enterprises/economies, like human organisms, are complex systems. All subsystems must function properly for the entire economy/enterprise to function well.

Lesson 2. Economists, like clinicians, must master the art of differential diagnosis. Clinical economics should teach a much more effective focus on hidden causes of threats and recommendations of appropriate countermeasures, well adapted to the specific conditions of each country (descriptive economics). Similar effects can be caused by various causes, and this requires the use of a different corrective instrument.

Lesson 3. Clinical economy should consider the treatment in terms of "family", not individuals. Tips given, for example, by the World Bank and the International Monetary Fund may prove ineffective if they do not harmonize with the actions of other countries. Similarly, enterprises, while maintaining competition in some areas, can cooperate in others.

Lesson 4. The effectiveness of clinical economics will depend on the control and assessment of the situation. In clinical economics, it is important to carefully compare goals and results. In the event that goals are not achieved, the important question is why, instead of seeking justifications for previously given advice.

Lesson 5. Economists should adhere to strict ethical and professional standards. The economist's work is not undertaken with a sense of responsibility. It is often superficial. Meanwhile, an economist dealing with economic affairs should also be familiar with the history, ethnography and politics of a given region. He/She should speak the truth, even if the solution to the problem lies outside the subject.

On the basis of theoretical and empirical research and principles of clinical economics of J. Sachs, it is proposed to use a model of flexible operation of enterprises in the business services subsector in changing economic conditions (Figure 2).

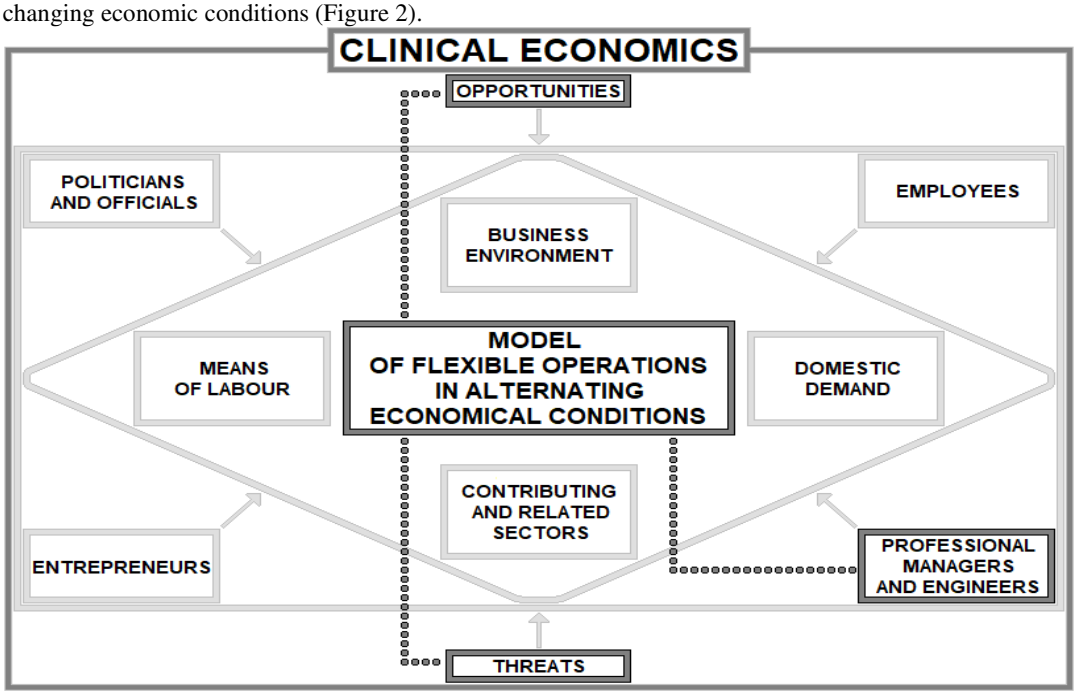

Fig. 2: Model of flexible operation in changing economic conditions
Source: own study based on conducted research.

Empirical studies have indicated the following boundary conditions, which must be met when introducing a model of flexible operation in changing economic conditions:

1. The model is introduced based on the ten-factor competitiveness model of the business services sub-sector enterprise.
2. The introduction of the model is preceded by a thorough analysis of competitiveness factors at all levels.
3. The model is recommended to enterprises at every stage of development, but this model will work more efficiently in enterprises that know the market and the rules that govern it well.
4. The model can be used by both enterprises operating in more and less developed areas.
5. Adaptation of the model in other countries is possible after examining the maturity phase of the business services subsector. In Poland, this sub-sector is at an early stage of maturity.

In addition to the existence of boundary factors for the introduction of the proposed model, the solution can be attributed to success factors that justify the success of the project. These are primarily dedicated

employees and professional managers who have the ability to take advantage of opportunities arising in the environment.

Conclusion

The fluctuation of the business cycles under the influence of many foreseeable and unpredictable threats means that enterprises should be prepared to operate in each phase of the cycle. This applies to sub-sectors particularly sensitive to changes in the economic situation, including the business services sub-sector. An attempt to prepare the enterprise for changes in the economic situation, including recession, may be the proposed model of flexible operation of the enterprise of the business services subsector in changing economic conditions, which uses the principles of clinical economics of J. Sachs. Characteristics of the model:

1. Economic changes may have a significant impact on the quality and diversity of services provided by enterprises in the business services sub-sector, as well as create new attitudes and solutions in the sub-sector.
2. The business services sub-sector is in a favorable growth phase for entrepreneurs, but the economic recession may disrupt their development and reduce competitiveness.
3. A favorable business and tax environment could be an important element of protecting the business services subsector against adverse economic effects.
4. The factor maintaining the company's competitiveness should be entrepreneurs and professionals at the managerial level who are able to take advantage of opportunities coming from the market and minimize the effects of threats.
5. Beneficial changes in the environment can be used to build a competitive advantage, and threats can result in the use of avoidance strategies in the sub-sector.

An inherent element of the model is compliance with clinical economics principles focusing on: perceiving the complexity and diversity of enterprise systems and subsystems, considering problems within the "family" (potential cooperation of enterprises in the business services subsector, also in the recession phase), controlling and ongoing assessment of the situation by ethical and professional economists.

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Characterising the Nigerian Informal Economy Business Cycles

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Abstract

The informal economy in Nigeria is acknowledged to be one of the largest in the global economy, therefore, the dynamics of the informal economy should be central in the formulation of macroeconomic policies. However, evidence from the literature in Nigeria shows that there is scarce information pertaining to the cyclical characteristics of the Nigerian informal economy. Hence, this study attempts to document some of the business cycle facts of the Nigerian informal economy from 1992 to 2018 using the Hodrick-Prescott filter. The results from the analysis suggest that an expansion of the cycle of informal economy coincides with a rise in the level of unemployment and government interference.

Keywords: Informal economy, business cycles, Hodrick-Prescott filter

Introduction

The informal economy in Nigeria is acknowledged to be one of the largest in the world, particularly in relation to its contribution to total employment. According to the harmonised global and regional statistics on the informal economy in 2016 by ILO (2018), as a percent of total employment, informal employment in Nigeria averaged about 92.9 percent. Further evidence reveals that the share of informal employment in Nigeria is much larger than the average in Africa (72.3 percent); Sub-Saharan Africa (73.6 percent); and Developing and emerging economies (91.6 percent), thereby illustrating the importance of the informal economy in creating employment and income opportunities in Nigeria.

From the literature, there are a number of factors accountable for the large size of the Nigerian informal economy. For example, Ogunrinola (2011) noted that due to formal sector not being able to provide job opportunities, most individuals have had to find alternative opportunities in the informal sector. The findings from Ogbuabor and Malaolu (2013) indicated that an increase in state regulation, the unemployment rate and interest rates are among the major factors that have caused the informal economy to expand in Nigeria. Rising urban population growth rate and the number of people considered to be vulnerably employed were seen as the major drivers of the informal economy in Nigeria (Dell'Anno and Adu, 2020). According to Dell'Anno et al. (2018) one major consequence of an expanding informal economy is that it tends to undermine the effectiveness of macroeconomic policies towards maximising the welfare of the people. Hence, it can be said that in the formulation of structural policies, informality should be a major consideration especially for economies with a large size (Elgin et al., 2019).

However, despite the policy significance of the informal economy in the formulation of structural and cyclical policies, in the literature, the dynamics of the informal economy from a business cycle perspective remains largely unexplored. Hence, for a Nigerian economy where the informal economy is recognised to employ a distinct size of the labour force, it is imperative to understand the nature of its business cycles in relation to other key macroeconomic variables, such as inflation and interest rates. Therefore, the main objective of this study is to fill this gap in the literature and document some of the

main business cycle facts of the informal economy in Nigeria. In what follows, the rest of this paper is structured as follows: Section two presents some trend analysis of the Nigerian informal economy and Section three reviews the literature pertaining to the estimation of the size of the informal economy; Section four discusses the method of analysis; Section five highlights the results and discussion of findings; and the conclusion of the study is presented in Section six.

The Nigerian Informal Economy

In this section, we document some facts about the Nigerian informal economy based on the official survey carried out by the Nigerian National Bureau of Statistics (NBS) in 2017. The informal sector in the report is categorized as micro enterprises with an employment size of less than ten people and having an asset size worth less than N5 million (Naira). The survey was undertaken in all the states of the country including the Federal Capital Territory.

a. High presence of informality in Nigeria

The survey covered micro, small and medium enterprises (MSMEs) and from the survey findings, there were a total number of 41.54 million in 2017. Out of which, micro enterprises, representing the informal sector constituted about 99.83 percent (41.47 million). Further evidence shows that there has been a strong growth in the size of informality from 2010 to 2017 (Figure 1). In particular, the number of informal enterprises grew by about 12.11 percent from 2013 to 2017.

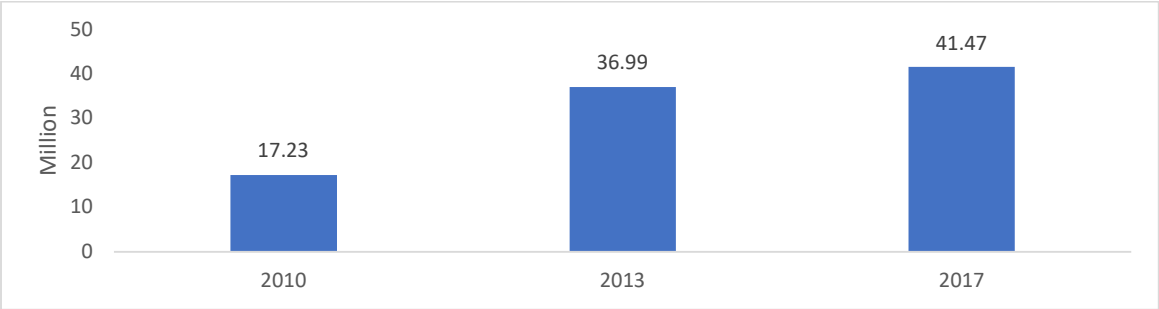

Figure 1: Micro enterprises in Nigeria

Source: SMEDAN and NBS (2019)

b. The informal sector is the largest employer of labour in Nigeria

The findings from the survey reveals that in terms of employment generation, the informal sector employs a larger proportion of the Nigerian labour force. In 2017, Nigeria's labour force was estimated at about 69.11 million, out of which the informal sector provided jobs for about 59.65 million people, implying an employment contribution of about 82.13 percent of the labour force in Nigeria.

c. Wholesale and Retail Trade is the Major Economic Activity of the Nigerian Informal Sector

The results from the report as presented in Figure 2 shows that, in terms of economic activity, a larger proportion of the participants in the informal sector engage in wholesale or retail trade. In particular, about 42.30 percent of micro enterprises engage in wholesale or retail trade. This is followed up by agriculture that accounts for about 20.90 percent. Also, the results indicates that about 9 percent of informal enterprises engages in the manufacturing activities.

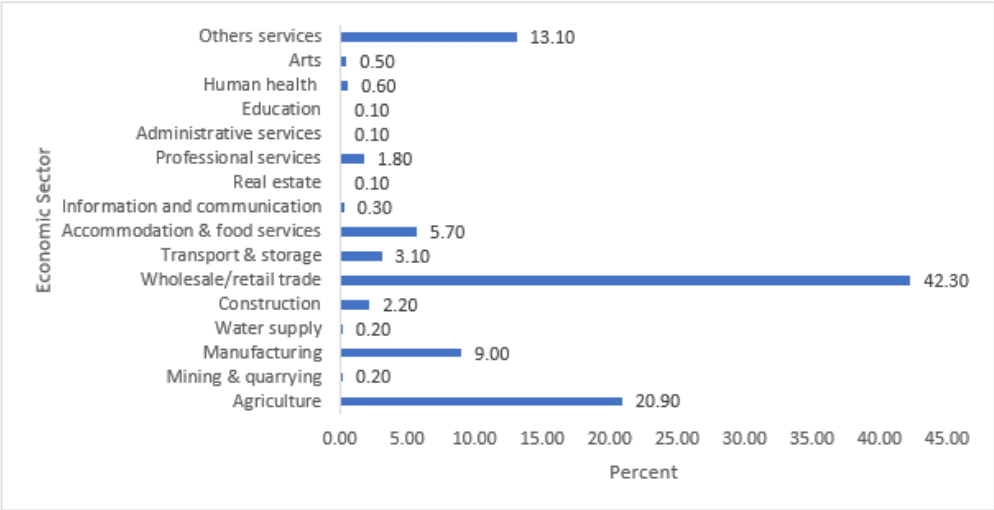

Figure 2: Economic Activities of the Informal Sector

Source: SMEDAN and NBS (2019)

Literature Review: Measurement of the Informality

From a conceptual standpoint, the definition of informality plays a major role in which it is measured. Schneider (2012) asserts that by overcoming issues concerning the definition of informality, a lot of ambiguities can be avoided in relation to the way it is measured. Early descriptions of the level of informality were measured along the line wage-employment dynamics (Hart 1971, 1973; ILO, 1972). The wage-employment concept generalised the informal economy as one that provides low-income and self-employment opportunities to individuals. However, new evidence from empirical studies has shown that the informal economy has evolved encompassing other elements such as employment size and legality issues (Schneider, 2012).

Measuring the informal economy in relation to employment size has become more prominent because of the ease in determination. Often times, informality using the approach is defined in the context of the number of firms with an employment strength of less than ten workers (Amin, 2002; Angel-Urdinola and Tanabe, 2012). Another common, but complex method of defining and measuring the size of the informal economy is by focusing on the legality of economic activity. Schneider and Enste (2000) assert that informality in any economy is characterised by "all legal value-added creating activities which are not taxed or unregistered". Therefore, in terms of legality, the informal economy only focuses on productive economic activities that under normal situations would be included in the national accounts but are not, usually because of tax or regulatory burdens (Schneider, 2012).

From a methodological perspective, there is still an ongoing debate on the appropriate technique to be used. However, there are three major methods: the direct estimation method, the indirect estimation method and the estimation method (Becker, 2004; Schneider and Enste, 2000; and Schneider, 2012). The direct approach is a micro level means of estimating the level of informality. It usually involves the use of a survey method through a set of administered questionnaires or focused group discussions. The advantage of this survey approach according to Krakowski (2005) is that the method allows the researcher to reflect the perceived concept of what the informal economy should be. Conversely, the indirect approach of estimating the size of informality is mostly econometric in nature and involves the use of certain indicators that provide evidence about the growth of informality in an economy overtime. Some of these indicators include: the residual amount between national expenditure and income statistics; the gap between actual labour force and official labour; the transaction approach; the currency demand approach; and the electricity consumption approach.

The statistical approach is grounded on the statistical theory of unobserved variables. In this method, informality is determined based on a factor analysis approach where a set of structural equations

consisting of unknown coefficients are to be estimated within which the unobserved variables cannot be directly measured (Schneider, 2002). This technique is regarded as the Multiple-Indicators Multiple-Causes (MIMIC) approach. Ogbuabor and Malaolu (2013) state that the MIMIC model is used to explain the association that exists between the unobservable variables and the variables considered to be observable in the model by minimising the spread from the covariance matrix to be predicted as against the sample covariance matrix of the model.

The major advantage of the approach is that it allows for the incorporation of several factors that could be considered to influence the level of informality. For example, Ogbuabor and Malaolu (2013) used the approach to evaluate the level of informality in Nigeria using macroeconomic indicators like the tax burden, government spending, unemployment rate, inflation rate, trade openness and broad money. Schneider (2005) also adopted the approach to estimate the size of the informal economy for about 66 economies in Africa, South America and Asia using variables such as employment rate, growth rate of GDP, burden of government regulation, and share of direct and indirect taxation. Dell'Anno and Adu (2020) also made use of the MIMIC approach to evaluate the drivers of informality in Nigeria. The results from the study showed that in Nigeria, the urban population growth rate and the vulnerable employment rate are the major factors accountable for changes in the level of informality.

The study of Medina, Jonelis and Cangul (2017) likewise made use of the MIMIC approach to evaluate the degree of informality in Sub-Saharan Africa (SSA). The results from the paper indicated that there exists a striking difference in the level of informality across the selected countries. For example, in countries like South Africa and Mauritius, the degree of informality ranges from about 20 to 25 percent of GDP as against about 50 to 65 percent in economies like Benin and Nigeria. The MIMIC estimation also revealed that trade openness, rate of unemployment and size of the government are some of the major factors responsible for the increase in informality in SSA. Additional findings from the study also suggested that the degree of informality in SSA compares distinctively to the rest of the world.

In summary, all three approaches are used in the literature, however, each of them has its own limitations and drawbacks. For example, the direct approach has been criticised based on the notion that it only offers a size of the informal economy at the period in which the survey is carried out and undergoing several surveys may be costly. Also, it has been criticised on the grounds that the survey may reflect the researcher's personal bias. In relation to the indirect approach, most of the criticism is based on its rather limited scope, while the statistical approach has been criticised based on the assumptions concerning the calibration of the model. However, the statistical approach is seen as a rather more comprehensive approach in comparison to the direct and the indirect approaches (Dell'Anno et al., 2018). This is because the method is able to take into consideration the different factors perceived to be responsible for the growth of the informal economy.

Methodology: The Business Cycle Approach

Towards the actualisation of the main objective of the study: to document some of the cyclical characteristics of the informal economy in Nigeria, the method of analysis is based on a data filtering technique commonly used in the business cycle literature (Alege et al., 2017). This data filtering technique used for the purpose of this study is the Hodrick Prescott (HP) filter which enables the extraction of the cyclical component of a series from its trend component. Through the use of the HP filter, we study three essential characteristics of the Nigerian informal business cycle: the amplitude of fluctuations; the degree of contemporaneous correlation; and the phase shift as defined in Alege, Oye and Adu (2019).

a. **Amplitude of Fluctuations:** The amplitude of fluctuations reflects the level of volatility inherent in a variable. This is measured using the percentage standard deviation and the relative standard deviation. The former depicts the level of volatility, while the latter is used to compare the volatility of a variable with respect to the volatility of informal GDP. Typically, a relative volatility greater than one suggests that the variable in question is considered to be highly volatile.
b. **Degree of Contemporaneous Correlation:** The degree of contemporaneous correlation is used to determine the cyclical relationship with informal GDP. This is measured using a cross-correlation analysis, where a variable is considered to have either a pro-cyclical, countercyclical or acyclical relationship with informal GDP. A positive correlation coefficient depicts pro-cyclical,

while a negative correlation suggests a countercyclical relationship. On the other hand, a coefficient value closer to zero depicts an acyclical relationship.

c. **Phase Shift:** The phase shift is used in the determination of leading or lagging variables. This is ascertained by observing the absolute cross correlations between two variables overtime. In particular, when the maximum absolute value between variable x and y is on the negative (lag) side, then variable x is considered to be a lagging indicator. Alternatively, when the maximum absolute value between the variables are on the positive (lead) side, then it can be concluded that x is a leading indicator of variable y.

Annual data from the period 1992 to 2018 is utilised to achieve the objectives of the study. The data for the informal GDP in Nigeria is sourced from the study of Dell'Anno and Adu (2020), while for the remainder macroeconomic variables: Unemployment rate, Inflation rate, Government expenditure, GDP Per Capita and the Currency ratio, the data is derived from CBN (2018).

Results and Discussion of Findings

Table 1 presents the result of the business cycle characteristics of the informal economy. Examining the relative volatility of the macroeconomic variables in relation to informal GDP, the results point out that government expenditure, unemployment and inflation all have a relative volatility greater than one, thereby signifying a high degree of volatility. In other words, these variables are subject to a high degree of fluctuations in the advent of shocks to the economy. In contrast, the result shows that GDP per capita and the currency ratio are subject to less degree of volatility.

The contemporaneous correlation coefficient between informal GDP and GDP per Capita is given as 0.08, the 0.08 coefficient indicates that there exist a weak, but countercyclical relationship between the variables. This result implies that a rise in the cycle of informal output coincides with a fall in the average level of income of individuals in Nigeria. Although the strength of the relationship is weak, the negative sign follows expectations such that a rise in the GDP per capita, a measure for income per head, should bring about a fall in the level of informality in the economy. The weak relationship noticed could suggest that the GDP per capita is not strong indicator for the cyclical nature of the informal economy. The phase shift reveals that GDP per capita lags the cycle of informal GDP, hence suggesting that changes in the level of the GDP per capita precedes changes in the informal economy.

Government expenditure is seen to have a strong and pro-cyclical relationship with informal GDP given the contemporaneous coefficient result as 0.59. This result indicates that an increase in government spending or interference in the economy, there is the tendency for the size of the informal economy to expand. The findings from the study of Ogbuabor and Malaolu (2013) provide similar findings when using a regression analysis testing for the effect of government regulation on the size of the informal economy. The strong relationship observed is not surprising given the considerable level of government and state regulation in Nigeria which could drive more individuals into the informal economy to avoid regulatory issues. The result from the phase shift indicates that government expenditure is a leading indicator to the informal economy.

Similar to government expenditure, the results indicate that the unemployment rate has a pro-cyclical relationship with the informal economy. This result implies that a rise in the cycle of unemployment is typically accompanied by a rising level of the cycle of informality. The finding is not surprising as empirical evidence from Schneider (2012) provides similar result and theoretical justification that higher levels of unemployment tends to drive individuals to the informal economy in search of income opportunities, thereby leading to a rise in the degree of informality. From the phase shift, the result shows that rate of unemployment tends to lead the cycle of the informal economy. This implies that changes in the cycle of unemployment is a leading indicator for the behaviour of the informal economy.

The contemporaneous correlation between inflation and informal GDP is given as 0.38, thereby implying that a pro-cyclical relationship exists between both variables. The result implies that a rise in inflationary pressures, the cost of goods and services, the informal economy tends to expand by its facilitation of illegal markets. The contemporaneous correlation between the currency ratio and informal GDP also suggest that there exists a weak, but pro-cyclical relationship. The currency ratio is used to represent the level of currency outside the bank, which is a major driver of economic transaction

in the informal economy. Therefore, an expanding currency ratio should reflect an a rise in the degree of informality (Schneider, 2012). The phase shift result indicates that both the inflation rate and the currency ratio both lead the cycle of the informal economy.

Table 1: Cyclical Behaviour of the Informal Economy

Variable	V	RV	CC	PS
Production				
Informal GDP	10.21%	1.00	1.00	-
GDP Per Capita	3.93%	0.39	-0.08	Lagging
Expenditure				
Government Expenditure	13.74%	1.35	0.59	Leading
Labour market				
Unemployment	28.30%	2.77	0.52	Leading
Prices				
Inflation	42.41%	4.15	0.38	Leading
Monetary				
Currency Ratio	7.28%	0.71	0.03	Leading

Source: Researchers' computation
Note: V denotes Volatility, RV represents Relative Volatility, CC stands for Contemporaneous Correlation and PS indicates Phase Shift

Conclusion

This study attempts to empirically analyse the business cycle dynamics of the Nigerian informal economy with the aid of the HP filter, a data filtering technique. The results from the analysis shows that when unemployment rises, there is the tendency for the cycle of the informal economy to rise. Also, the findings also point out that an increase in government interference in the economy drives people into the informal economy. Although, evidence also suggests that the currency ratio could be a weak indication for the cycle of the informal economy given the low contemporaneous correlation between the variables. Therefore, as counter measures to limit the degree of informality, countercyclical measures such as provision of employment opportunities and ensuring price stability should be the primary focus of policymakers.

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The Impact of Dividend Payout Policy on Stock Return Volatility Of Companies Listed on The Warsaw Stock Exchange

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Abstract

The dividend payout policy has been the subject of extensive research for years. However, the issue of the impact of dividend payouts on the company's stock return volatility remains unsolved. The purpose of the paper was to examine whether the dividend policy of companies listed on the Warsaw Stock Exchange affects the volatility of stock return. The research sample concerns 60 firms included in the WIG20 and mWIG40 indices. Consistent with dividend signaling, it was proved that the dividend payout reduces the volatility of the company's stock return. However, no statistically significant relationship was found between the dividend yield and the firm's risk. The dividend yield illustrates the proportion of the benefits arising from owning the company's stock that the investor receives at the time of dividend payout. It could be expected that the greater the portion of the total value of the company's shares that investor receives instantly, the lower the company's risk. For this reason, the lack of any statistically significant link between dividend yield and stock return volatility seems to oppose the signaling theory.

Keywords: Dividend payout policy, stock return volatility, companies, Warsaw Stock Exchange.

Introduction

After many decades of investigation, the dividend payout policy remains one of the most controversial topics in corporate finance literature. The authors of the most important and influential studies tried to find an explanation for dividends payouts and clarify the effect of dividend payments on firm value. Despite countless research, the debate on this subject is still ongoing and no final consensus has yet been reached. In 1976 Black described this disagreement as a "dividend puzzle" and stated that "The harder we look at the dividend picture, the more it seems like a puzzle, with pieces that just don't fit together". Despite the passage of over 40 years, Black's statement remains valid. There are currently several leading theories explaining the relationship between dividend payments and the company's share price. Some of them take into account the occurrence of information asymmetry between the company's managers and shareholders. According to those theories, dividend payout is perceived by the market as a positive signal about a good financial condition and the company's prospects. Therefore, it can be expected that the dividend announcement will increase the demand for shares and, consequently, increase the share prices of the paying company. Hence the strong market reactions to the news of dividend payment might be translated into increased share price volatility. However, many authors dispute the validity of the signaling theory, arguing that dividends have no information content, so they should not be treated as reliable information about the company. The main purpose of the article is to present the preliminary results of empirical research on the relationship between the dividend payout and the volatility of share prices of companies included in the WIG20 and mWIG40 indices.

Literature Review

Although no definitive solution to the "dividend puzzle" has been found so far, some of the dividend theories are widely discussed and often cited in the literature. These theories provide inconclusive or even contradictory explanations concerning the effects of dividend payout policy and firm value (Al-Najjar, Kilincarslan 2018). Generally, in the literature three main different concepts can be observed.

The first one was proposed in 1961 by Miller and Modigliani (M&M) and is often described as "dividend irrelevance theory" (Miller, Modigliani 1961). According to this hypothesis, under the assumptions of a perfect capital market, dividend payments do not affect the value of the company or the price of its shares. Miller and Modigliani believed that shareholder profits depend on investment decisions made by company managers, not on how the profits are distributed. It means that no dividend payout policy is superior to another. The neutral approach to dividend policy was also supported by other authors, e.g. Black and Scholes (1974), who concluded that the dividend insignificance is also influenced by the so-called clientele effect. They argue that different investor groups have their preferences regarding dividend payments. Some investors particularly value current income, so they prefer firms paying out a high percentage of their profits. However, another group of investors will invest only in companies that reinvest the largest part of their income. This is due to, inter alia, unequal tax treatment between dividends income and capital gains. Investors receiving favorable tax treatment on capital gains would invest in companies that pay low dividends or do not pay them at all. Actions taken by groups of investors with different preferences offset each other, so the dividend payouts do not affect the share price.

A different approach was presented by Gordon (1959, 1963) and Lintner (1962), the authors of another leading theory of dividend policy commonly known as "bird-in-the-hand hypothesis". According to this theory shareholders' profits in the form of dividend payouts are less risky than capital gains, as dividends reduce the uncertainty associated with future cash flows. Investors, having the choice of shares of two identical companies, one of which pays dividends and the other does not decide to buy shares of the dividend company. Investment decisions taken by these investors cause an increase in the stock prices of dividend-paying companies. Thus, dividend payout increases firm value.

Other relevant dividend policy theories have been formulated based on the relaxation of MM's perfect capital market assumptions. Al-Najjar and Kilincarslan (2018) mentioned that most influential studies generally focus on the three big imperfections: the signaling theory, agency cost theory and tax-related explanations. At the core of the signaling theory is the belief that information asymmetry exists between a firm's management and outside investors. Managers are best informed on the company's actual financial condition and its prospects, while other market participants do not have access to such information. A dividend payout is perceived as a signal about a firm's current situation transmitted by managers to shareholders to reduce the information asymmetry. Dividend initiations or increases are considered to be particularly strong signals sent by managers, because such events suggest that the company is in good financial condition and will be able in the future to maintain a higher level of dividend payments. Therefore, receiving information about dividend initiations or increases may prompt investors to purchase shares of the company, which will result in higher share prices. Dividend omission or reduction may be read by the market as information about the deterioration of the company's financial condition and, as a consequence, may cause a drop in share prices. The origins of the signaling theory can be observed in research published by Lintner (1956), who conducted detailed interviews with managers of 28 companies selected at random and analyzed financial data of these companies for the years 1947-1953. Lintner argues that managers are concerned about dividend signaling and they tend to adopt extremely deliberate dividend policies. This is because shareholders care primarily for a stable dividend payout ratio and therefore they can pay an additional premium included in the share price for its stability or gradual increase. Accordingly, managers are very reluctant to cut dividends. Managers' tendency to maintain stable dividend policy in the literature is often referred to as dividend stickiness. Based on Lintner's research, the following conclusions were made:

- firms maintain long-term target dividend payout ratio,
- short-term changes in the level of profits generated by the company do not affect the amount of cash paid to the investors in form of dividend,
- when managers decide to change company's dividend payout ratio, they do so by implementing a policy of gradual, partial dividend adjustments to "smooth" dividend payment streams in the short run. This means that the change in current earnings is only partially taken into account in the level of dividends paid to investors in a given year. Further partial changes in dividends are introduced in subsequent years, provided that the upward trend in earnings continues as expected.

Lintner's conclusions were confirmed by other authors, such as Baker, Farrelly and Edelman (1985) and Baker and Powell (1999). Brav, Graham, Harvey and Michaely (2005) also attempted to verify the hypothesis about management's urge to maintain stable dividend policy. According to them, managers are trying to prevent a reduction in the dividend payout ratio because they are afraid of negative reactions from investors. However, the authors also stated that the relationship between company's profits and the level of dividend paid to shareholders is not as strong as in the time of Lintner's research, and maintaining the stability of the dividend payment ratio is no longer the most important factor determining the dividend payout policy. As far as emerging markets are concerned, the partial adjustment model has been tested, among others, on the Turkish capital market. Lintner's conclusions were confirmed by Al-Najjar and Kilincarslan (2017), who examined the dividend policy of 264 companies listed on the Istanbul Stock Exchange over a period 2003-2012. Earlier studies of the Turkish capital market covering years 1985-1997 demonstrated that companies listed on ISE did not smooth dividends and thus did not maintain stable cash dividend policies (Adaoglu, 2000). However, Adaoglu's research was conducted at a time when these companies were not able to make independent decisions regarding dividend payments. Before 2003, publicly-listed firms were obliged to distribute at least 50% of their distributable income as a cash dividend. This requirement was known as the first dividend. Since 2003, significant reforms have been carried out to the requirements regarding the mandatory payment of dividends. This reform initially introduced reducing the minimum percentage of mandatory dividend payments. However, at the beginning of 2009, another decision of The Capital Markets Board was implemented – the CMB decided not to determine a minimum dividend payout ratio. Thus from this moment, the mandatory minimum dividend payment has been abolished, which provided total freedom for ISE-listed companies to make their own decisions regarding dividend policy. Al-Najjar and Kilincarslan investigated the dividend behavior of publicly-listed companies in the post-2003, i.e. after the relaxation of the first dividend requirement. They find that current earnings per share ratio and lagged dividend per share ratio are positive and significant factors in determining the current dividend per share ratio of the companies listed on ISE. The authors believed that those findings provide empirical support for the validity of Lintner's partial adjustment model. Furthermore, after the introduction of the second mandatory dividend payout policy, which imposed on companies the obligation of a minimum dividend payout that ranged between 20% to 30% (between 2003 and 2009), managers of ISE firms tried to gradually adjust company's dividends payouts by a moderate level of smoothing. After the abolition of the mandatory dividend payment, in 2009-2012 companies listed on ISE tended to slightly reduce their target payouts but still moderately smoothed their dividends. Al-Najjar and Kilincarslan also observed that ownership structure affects the target dividend payout ratio and dividend smoothing of Turkish companies. Firms with family ownership concentration aim the highest payout ratios and they also display the greatest dividend stickiness. On the other hand, companies with non-family blockholders significantly decrease the target dividend payout ratios and abolish dividend smoothing. Empirical research conducted on the Indonesian (Baker and Powell, 2012) and Indian (Baker and Kapoor, 2015) capital markets also prove that there is a substantial evidence supporting Lintner's partial adjustment model and the signaling theory. Baker and Kapoor surveyed managers of 500 dividend-paying companies listed on the National Stock Exchange in India to learn their view on the determinants of dividend payout policy. According to surveyed managers, the most relevant factors affecting dividend payout are earnings (stability of earnings and the level of current and expected earnings) and the pattern of past dividends. Respondents also believed that maintaining an uninterrupted record of dividends is crucial.

Lintner's belief that dividends convey information gave rise to the signaling theory, which was also developed by other authors: Ross (1977), Bhattacharya (1979, 1980), Miller and Rock (1985), Bar-Yosef and Huffman (1986). Although Miller and Modigliani thought that dividend payout policy does not affect shareholder value, they noted that changes in dividend policy are accompanied by abnormal returns surrounding the announcement date. This is because of the so-called dividend information content, according to which investors interpret any changes in the level of dividends as signals that managers have changed their view of the company's future profits. The observations of Miller and Modigliani were therefore a development of the signaling theory initiated by Lintner. The literature on the subject also indicates many other studies confirming the validity of the concept of information

content of dividends. Healy and Palepu (1988) noticed that companies that initiate dividend payout note an increase in profit both after and before the change in the dividend policy. Moreover, they also proved that dividends forecast future earnings changes. Dividend information content is predominantly linked to signals about the company's future earnings. However, many authors show that dividend changes may signal other attributes as well. The research carried out by Yoon and Starks (1995) showed that the increase in the level of dividend paid to shareholders is associated with subsequent significant increases in investment expenditure within three years after the introduction of changes in the company's dividend policy. On the other hand, the reduction in dividend was associated with a significant reduction in investment expenditure. According to Jensen et all. (2010), reduction in the level of dividend paid to investors can be interpreted as a signal of reduction in real growth options. However, in the corporate finance literature there is considerable evidence that does not confirm the validity of the signaling theory. If the signaling theory is correct, then the decisions taken by managers regarding dividend payouts should reflect information on future profits, and therefore dividends and profits should change in the same direction. DeAngelo, DeAngelo and Skiner (1996) attempted to investigate whether this relationship exists on a sample of 145 companies listed on the NYSE. The research sample included companies that after at least nine years of increase in profits noted their decrease. The results obtained by the authors did not confirm that managers' decisions regarding the dividend increase should be perceived by investors as a credible signal of higher profits in the future. In the case of 99 companies whose managers decided to increase the level of dividend paid to shareholders, this decision did not translate into an increase in future profits. On this basis, the authors concluded that changes in the company's dividend behavior are not a reliable signal about the company's future profits and cannot be seen as a factor that distinguishes companies with good prospects from those firms, where profits can be expected to fall. Similarly, Grullon, Michaely and Benartzi (2003) believe that changes in dividend payouts do not contain any information about future profits. They also showed that changes in dividends are negatively correlated with future changes in the level of profitability (measured by the return on assets). Lie (2005) proved that after reducing or ceasing to pay dividends, the companies did not record a decrease in profits.

The separation of management from ownership and differences in the priorities of managers and shareholders formed the basis of agency cost theory – another hypothesis explaining the actual motivation for paying dividends, which also suggests that dividend payments can increase the company's value and shareholder wealth. It was developed by Jensen and Meckling (1976), Roseff (1982), Easterbrook (1984) and Jensen (1986). They argue that company managers (called agents) do not always act in the best interest of the principal (shareholders). In the case of firms with large free cash flow resources, there may be a risk of overinvestment that would reduce the company's value. In such cases, the high level of dividend payout decreases the internal cash flow subjected to management discretion and forces managers to seek outside capital, thus causing them to reduce agency cost as they subject to the scrutiny of the capital market. The use of external sources of financing is also associated with the supervision of outside professionals (such as banks, regulators or potential investors), which should also ensure that managers act in the best interests of the shareholders. The authors of agency cost theory perceive the dividend payouts as a mechanism that limits the freedom of managers to make investment decisions, they also believe that dividend policy may be used to mitigate the agency problems. Therefore companies with high free cash flows should pay larger dividends to reduce the amount of cash under the control of managers and thus enhance the company's value.

The dividend theories discussed so far suggested that dividend policy does not affect the company's value (dividend irrelevance theory) or that dividend payments have a positive effect on the company's value and shareholder wealth (bird-in-the-hand theory, signaling theory, agency cost theory). The last one of the three main contradictory concepts observed in the corporate finance literature claims that dividend payouts may have negative consequences for the company's value due to uneven tax treatment between dividends and capital gains. This theory, widely known as tax preference theory, states that investors are determined to avoid investments that increase shareholders' tax burden, so if the dividend tax rate is higher than the capital gains tax, they will prefer shares with none or low dividend payouts. In this situation, firms should avoid or at least reduce dividend payments to maximize their stock prices. Tax preference theory was developed by Brennan (1970), Elton and Gruber (1970) and Litzenberger and Ramaswamy (1979).

There are also theories in the corporate finance literature that do not fit into these three different concepts regarding the impact of the dividend policy on the firm's value, but they add more complexity to the dividend puzzle by taking into consideration other attributes of the company. These theories concern, among others, issues such as the hierarchy of sources of financing new investment projects, changing investors' preferences or the firm's age. One of them, known as pecking order theory, was proposed by Myers (1984) and Myers and Majluf (1984). This hypothesis posits that companies have a specific hierarchy of sources of financing new investment opportunities. Internal funds (retained earnings, free cash flow surplus) are at the top of the pecking order. After the depletion of internal funds companies resort to debt issuance and eventually to equity issuance. Such a hierarchy of the company's funds implies that better firms should have lower leverage, which is why firms should adjust their dividend policies to new possible investments. In other words, the amount of cash distributed to shareholders should be reduced to prevent external financing of the company's new investment projects. A relatively recent explanation of the dividend puzzle was offered by Baker and Wurgler (2004a, 2004b). According to them, investor preferences regarding dividend payouts may change over time. Therefore managers should recognize and respond by catering to those shifts in investors preferences for dividends. They should increase distributing dividends when investors put a premium on stocks of dividend-paying companies. Whereas at times when non-dividend paying stocks become increasingly popular among investors, managers will probably omit dividends. Catering theory implies that dividend payouts are relevant to the company's value, but in different directions at different times. The maturity hypothesis is another theory explaining the company's propensity to pay dividends. This explanation suggests that the amount of cash distributed to shareholders in the form of dividends is related to stages in the company's life cycle. There are five stages in the classic theory of a company's life cycle: start-up, youth growth, high growth, mature growth, mature stable and decline. In each of these phases, the company has different investment opportunities and a different demand for internal and external financing. In the first phase of the life cycle, the company builds its position on the market and mainly uses internal funds to finance new investments. In the expansion (youth growth) phase, the company implements investment projects with a high rate of return - the younger the company, the greater the range of available investment opportunities with a positive net present value (NPV). The company uses retained earnings and debt or equity issue to finance profitable investment projects. At the beginning of the second stage, dividends may be paid in the form of issued shares. At the end of the expansion phase, the company may pay low cash dividends. In the phase of high growth, the company still incurs large capital expenditure but shows a greater propensity to pay dividends, as external financing is cheaper and more available. As the company transits from growth to a more mature stage, free cash flows are becoming more stable and investment opportunities less profitable, which results in higher dividend increases. The maturity hypothesis (also known as life cycle theory) was developed by Grullon (2002), DeAngelo, DeAngelo, and Stultz (2006) and Bulan and Subramanian (2009). Finally, according to residual dividend policy, the firm should pay dividends only when its internally generated earnings are not completely exhausted for profitable investment projects (with positive NPV). The level of dividend paid by firms following this kind of dividend policy is usually highly volatile and often these companies do not pay dividends at all.

Many explanations of the dividend puzzle emphasize the importance of dividend as a tool for reducing information asymmetry. Scholars associate the high level of information asymmetry with high risk and significant volatility of the company's share prices. Therefore, if the signaling hypothesis is correct, the dividend payout should reduce the asymmetry of information between managers and the market and thus contribute to reducing the firm's risk. Such correlation was observed by many authors of pioneering research on the impact of dividend payments on the company's risk. Dielman and Oppenheimer (1984) stated that beta coefficients decrease for those companies that initiate dividend payout and increase after dividend omissions. Venkatesh (1989) showed that the total volatility of share prices decreases after the company initiates the dividend payout, and this change is primarily due to a decrease in specific risk. Grullon, Michaely and Swaminathan (2002) observed that companies that increase the level of dividend payout record a significant decrease in systematic risk. Lee and Mauck (2016) decided to investigate how initiating or increasing dividends affects the level of non-systematic risk. The authors tried to refer to the research carried out by Eades (1982), who put forward the hypothesis of Relative Signaling Strength hypothesis. The hypothesis proposed by Eades concerns the cost of the signal, which is sent by the company when the dividend is initiated or increased. According

to it, companies with higher volatility experience larger abnormal announcement returns when the dividend decision is announced than companies with the same market value but with lower volatility. When a company with higher volatility of returns initiates or increases dividend, it sends a signal to other financial market participants that is more important than information provided by companies with lower volatility. This is because in such firms there is greater information asymmetry and any information producing event is particularly awaited by investors. Lee and Mauck added that idiosyncratic risk is crucial for signaling strength because it is associated with the level of information asymmetry. They conducted an analysis of the level of idiosyncratic risk and dividend initiations/increases based on the data of U.S. companies (financial and utility firms were excluded) over the period 1963-2013. The research sample included 1 691 dividend initiations and 11 870 dividend increases. The results obtained by the authors were generally consistent with dividend signaling (and also with the Relative Signalling Strength hypothesis). The conclusions drawn by the authors are as follows:

- idiosyncratic volatility changes, not systematic risk changes best explain market reactions to dividends,
- companies with higher levels of idiosyncratic volatility are associated with higher announcement abnormal returns when initiating or increasing dividend payouts. It means that high information asymmetry and idiosyncratic volatility companies record a stronger positive market reaction after dividend initiations/increases,
- firms on average experience an ex-post reduction in idiosyncratic volatility following dividend initiations,
- idiosyncratic volatility declines can be observed after dividend increases as well. However, dividend increases are less volatility reducing than initiations. The effect of reducing specific risk was significant only in case of considerable dividend increases (greater or equal to 12,5%),
- dividend initiations and increases are particularly strong signals in times of high uncertainty (this effect was strongly visible over the period 2008-2009).

In the corporate finance literature a lot of attention is paid to factors affecting the volatility of stock prices, and dividend payout is often mentioned as one of them. D. E. Allen and V.S. Rachim (1996) investigated the impact of the company's dividend policy on the volatility of share prices based on a research sample consisting of 173 companies listed on the Australian Stock Exchange over the period 1972-1985. Using the regression function, they tried to show that the volatility of share prices is affected by factors such as the company’s size, profitability, leverage ratio calculated as the ratio of long-term debt to equity as well as dividend yield and dividend payout ratio. Their empirical studies have shown that earnings variability, leverage and company’s size have a positive relationship to stock price volatility, while there is a negative correlation between the dividend payout ratio and volatility. The dividend payout ratio did not show any significant correlation with the volatility of share prices. Hussainey, Mgbame and Chijoke-Mgbame (2011) published the results of research conducted on the British capital market. They also attempted to determine whether there is a relationship between dividend policy and share price volatility. The control variables included in the study were the company's size, long-term debt and profitability (measured by operating EBIT). The obtained results indicated the existence of a significant negative correlation between the volatility of share prices and the size of the company, which agrees with the generally held view that shares of large companies are associated with lower investment risk. Besides, the research showed the existence of a positive relationship between the amount of debt and the volatility of share price, which confirmed that as the company's debt increases, the risk of investing in its shares also becomes more serious. A positive relationship was also observed between stock price volatility and operating profit volatility. On the other hand, the dividend payout ratio was negatively correlated with the level of the company's risk. Similar studies were carried out by Nazir (2010). The research was intended to determine whether there is a significant statistical relationship between the variables used by Hussainey, Mgbame and Chijoke-Mgbame and the corporate risk. The research sample consisted of 73 companies and it included financial data for the period of 2003-2008. The author used fixed effect and random effect models to determine factors affecting the stock price volatility of companies listed on the Pakistan Stock Exchange. In the random-effects model, the dividend payout ratio, company size, and profitability

showed a positive correlation with share price volatility, while leverage was negatively correlated with the company's risk. However, none of these relationships were statistically significant at the 5% significance level. In the case of the model with fixed effects, the size of the company was positively correlated with the volatility of share prices, while the payout ratio showed a negative correlation with the stock price risk. Both of these relationships turned out to be statistically significant at a 5% significance level.

Characteristics of the Research Sample and Methodology

Companies of the WIG20 and mWIG40 indices were included in the research sample and analysis of the link between dividend payout and stock price volatility was conducted based on the financial data of those companies for the years 2008-2017. During this period, nine out of sixty companies included in the sample did not pay dividends at all. These were: 11 bit studio, Alior Bank, Am-Rest Holdings, CI Games, Dino Polska, Mabion, Play Communications and Play Way. However, it should be noted that these companies debuted on the Warsaw Stock Exchange relatively (among others, Play Communications S.A. and Dino Polska S.A. have been listed since 2017, Play Way S.A. since 2016). According to the results of previously published studies, companies not paying dividends are perceived as entities with a higher level of information asymmetry. Therefore, it can be assumed that shares issued by companies in this group will turn out to be highly volatile. Four companies paid dividends in each year of the analyzed period. They were: Asseco Poland, Eurocash, KGHM Polska Miedź, and WAWEL. None of the sixty companies applied the policy of increasing the dividend yield or maintaining it at an unchanged level. Asseco Poland SA can be perceived as the company with the most stable dividend policy because it paid dividends in each year of the analyzed period and additionally maintained an increasing dividend payout ratio (except for the dividend paid for 2014. However, in this period there was no significant decrease, as the payout ratio in 2013 was 5.2%, while in 2014 5.1%). Besides, the amount of dividend per share of Asseco Poland S.A. grew from year to year throughout the entire period considered. WAWEL also paid dividends every year and applied a policy of increasing dividend per share ratio, and in the years 2014-2017 kept it consistently at the level of 20 PLN per share. Considering the number of dividend payments made by each company in the analyzed period, it can be stated that the most common was the situation in which the company did not pay dividends at all (9 companies), or paid it 9 times in 10 years (also 9 companies). Only three companies paid dividends six or seven times during the entire period considered.

The main purpose of this paper is to examine the link between the dividend policy pursued by the companies included in the WIG20 and mWIG40 indexes and the level of stock return volatility of these companies. The data of the firms included in the research sample was obtained from the stock yearbooks published on the Warsaw Stock Exchange's website. On this basis, 12 econometric models were built. In each of these models daily stock return volatility was the dependent variable and it was measured in three different ways. The first approach was to calculate the relative volatility by the standard deviation of stock return divided by the standard deviation of the WIG index representing the volatility of the entire market (the dependent variable measured in this way was denoted by SD WIG). A second way of measuring the company's risk has been adopted from the paper published by Habib, Kiani, and Khan (2012), who computed stock price volatility using the following formula:

$$MMA\,VOL\,WIG\,SQR = \left(\frac{P_{max} - P_{min}}{\frac{P_{max} + P_{min}}{2}}\right)^2$$

Where P_{max} and P_{min} means the highest and lowest prices recorded during each year. Additionally, a third method of measuring the volatility of the company's stock returns was used. It can be described by the following formula:

$$MMA\,VOL\,WIG = \frac{P_{max} - P_{min}}{\frac{P_{max} + P_{min}}{2}}$$

Independent variables that characterized the dividend policy of the companies included in the research sample were the dividend yield and the dummy variable ANY_DIVIDEND, which takes value 1 if the firm pays the dividend in a given year and 0 in case of dividend omission. It can be assumed that the dividend yield is significant for the stock price volatility because this indicator illustrates the relationship between the investor's current income in the form of dividends and the total value of shares. The higher the dividend yield, the greater part of the benefits emerging from ownership of shares the investor receives instantly. That implies that dividend yield increase should result in a decrease in the company's risk. The size of market capitalization was used as an independent control variable, as well as P/E and P/BV ratios (in half of the models P/E ratio was used as a control variable and in other models P/BV was employed). Previous research shows that there is a clear link between dividend payout and the level of the P/E ratio. Krishnan and Chen (2017) based on the quarterly data of all companies included in the S&P 1500 index from 1995-2016 proved that the dividend payout ratio from the current quarter is positively correlated with the level of the P/E ratio from future periods in case of companies characterized by high market capitalization and firms belonging to the industrial sector. On the other hand, there was a negative relationship between the current dividend payout ratio and future levels of the P/E ratio among companies in the technology industry or consumer goods. According to the authors, the dynamic increase in the dividend payout ratio indicates a lack of development prospects for the company and increased risk and may also cause a drop in the P/E ratio. On this basis, a significant relationship can be expected between the level of the P/E ratio and stock return volatility of the companies included in the research sample.

Results

The results obtained based on an analysis of 12 econometric models are presented in the following tables. The first one of them applies to models using the P/BV ratio as one of the control variables, table 2 includes models employing the P/E ratio.

Table 1: Stock return volatility models employing the P/BV ratio as one of the control variables

Model	1	2	3	4	5	6
Dependent variable	SD WIG	MMA VOL WIG SQUARED	MMA VOL WIG	SD WIG	MMA VOL WIG SQUARED	MMA VOL WIG
const	3.31896 ***	0.63853 ***	0.42781 ***	3.17064 ***	0.62926 ***	0.42222 ***
DY	-0.00763	0.00567 *	0.00322	-	-	-
ANY_DIVIDEND	-	-	-	-0.34487 ***	-0.00065	-0.00108
LN_MCAP	-0.14861 ***	-0.06895 ***	-0.04569 ***	-0.11030 ***	-0.06600 ***	-0.04392 ***
P/BV	0.00747	−0.00414	−0.00264	0.01136 **	−0.00424	−0.00269
R-squared	0.08536	0.05534	0.05820	0.12044	0.05012	0.05411

* p-value<10%; ** p-value<5%; *** p-value<1%

As can be easily seen, the dividend yield (DY) turned out to be a statistically significant variable in only one case (at a statistical significance level lower than 10%). The dummy variable ANY_DIVIDEND was also important in one model. However, it should be noted that this is the model with the highest value of the R squared coefficient.

Table 2: Stock return volatility models employing the P/E ratio as one of the control variables

Model	7	8	9	10	11	12
Dependent variable	SD WIG	MMA VOL SQUARED	MMA VOL WIG	SD WIG	MMA VOL WIG SQUARED	MMA VOL WIG
const	2.63647 ***	0.56523 ***	0.41449 ***	2.60656 ***	0.55681 ***	0.40870 ***
DY	-0.00228	0.00502	0.00269	-	-	-
ANY_DIVIDEND	-	-	-	-0.18949 ***	-0.03305	-0.02530
LN_MCAP	-0.07765 ***	-0.05865 ***	-0.04272 ***	-0.06026 ***	-0.05325 ***	-0.03909 ***
P/E	0.00126	-0.00088 *	-0.00061 *	0.00106	-0.00098 *	-0.00068 *
R-squared	0.04004	0.04829	0.05476	0.06044	0.04452	0.05328

* p-value<10%; ** p-value<5%; *** p-value<1%

In the group of models with P/E ratio as one of the control variables, the dividend yield turned out to be of no statistical significance, while the dummy variable proved to be statistically significant (at a statistical significance level less than 1%) only in the model with the highest R squared coefficient. The P/E ratio was statistically significant in four models.

Conclusion

Based on the analysis of the 12 econometric models presented above, it can be stated that it was possible to prove the existence of a negative relationship between dividend payout and the stock return volatility. Therefore, the assumption that dividend payments reduce the company's risk was confirmed. Two statistically significant models containing dummy variables confirmed the existence of such dependence at a significance level lower than 1%. This is in line with the results obtained by Allen and Rachim (1996) as well as Hussain et al (2011), according to which the dividend payouts are associated with a decrease in the volatility of stock return. The results can also be considered as confirmation of the research published by Venkatesh (1989), Grullon et al (2002) as well as Lee and Mauck (2016). According to these authors, initiating dividend payouts translates into a lower level of risk, which is caused by a decrease in the information asymmetry that exists between shareholders and company managers. Almost all of the presented models did not confirm the existence of any relationship between dividend yield and the level of return volatility. This is in line with research carried out by Allen and Rachim (1996). On the other hand, lack of any statistically significant link between the company's risk and dividend yield (a ratio that determines the amount of benefits arising from ownership of shares that investor receives immediately at the time of dividend payout) seems to contradict the conclusions drawn by Lee and Mauck (2016). According to them, dividend increases also reduce the information asymmetry, which translates into a reduction in the firm's risk. However, they believed that this effect is not as strong as in the case of dividend initiation.

As for the additional explanatory variables, the most significant relationship can be seen between the stock return volatility and the size of the company (measured by its market capitalization). In each of the 12 models, market capitalization turned out to be statistically significant at a statistical significance level below 1%. What is more, this relationship is negative which is consistent with the prevailing belief that large companies with high market capitalization are entities with lower risk. As for the P /BV and P/E ratios, the first one of them proved to be statistically significant only in one of six models, while the four models confirmed the significance of the P/E ratio in explaining the stock return volatility. This can be considered as confirmation of the conclusions of Krishnan and Chen (2017), who believed that the dividend yield influences the future value of the P/E ratio and thus the company's

risk level. The low explanatory power (expressed by the low level of coefficient of determination) of presented models should also be brought to attention. The highest level of R squared coefficient amounts to 0.120435. In the model with the highest level of R squared coefficient the dependent variable, i.e. the company's risk, was expressed by the standard deviation of the company's rate of return corrected for the standard deviation of the WIG index. The independent variables were the firm's size (expressed by the market capitalization), the P/BV ratio and the dummy variable.

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Possibilities of Total Costs of Ownership under the HB-HTA approach

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Abstract

Hospital-Based Health Technology Assessment (HB-HTA) tools seem to be effective in strategic planning in hospitals. The benefit they show in the decision-making phase of medical devices management, in their acquisition, implementation, or the whole life cycle is obvious. Health technology assessment more and more includes an application of the Total Cost of Ownership (TCO) method, but its systematic incorporation into HTA is not complete yet. TCO has many advantages, when the main benefit follows from the fact that it helps identify costs that otherwise would remain hidden. TCO can be applied e.g. in the case of supplier selection, when TCO can be included to the input criteria of the multiple-criteria decision analysis. TCO finds further utilization in investment assessment on the basis of a prediction of future cost items. The last discussed area of TCO application is within evaluations of projects that were already implemented using retrospective data. The paper opens three basic perspectives of the TCO method as a part of HB-HTA, and it systemizes suitable application of this approach providing five case studies. These examples offer procedures specific for healthcare facilities and draw attention to particular "hidden costs" of health technologies.

Keywords: Total Cost of Ownership, HB-HTA, Medical equipment

Introduction

Health technology assessment (HTA) can be viewed as a multidisciplinary approach comprising the analysis of safety, clinical effectiveness and cost-effectiveness of health technologies (Callea *et al.*, 2017) (Ivlev, Kneppo and Bartak, 2014). Recently, interest in applying HTA methods to the level of individual hospitals has grown, as they showed straightforward benefits in the phase of purchase decision-making, implementing, and even determining the end of the life-cycle of health technologies (Rogalewicz, 2015) (Martelli, 2017). The tools of the Hospital-Based HTA (HB-HTA) seem to be effective above all for strategic assessments and management planning of health technologies (Gagnon, 2014) (Avdeyev *et al.*, 2018).

Appropriate evaluation of health technologies using HTA methods depends considerably on the cost calculation perspective and on its adequate quantification. Currently, a real problem in medical device (MD) purchasing is an absence of considerations of further related costs during the whole life cycle. Hospital management may preferentially concentrate on the purchase price, which would lead to a large distortion of the result in MD selection. The purchase price sometimes represents no more than 20-25% of the total costs of ownership (Schmidt, 2019) (Hospodková and Vochyánová, 2019). If the cost-effectiveness calculations fail to consider such connections, the result of the whole study may be misleading. A constructive solution of this situation can be an application of the Total Cost of Ownership (TCO) method.

There are several approaches and methodologies of how to execute a TCO calculation. These approaches can be divided into several categories, when the main one is represented Elram and Siferd (Ellram and Siferd, 1998), Cavinato (Cavinato, 1991), Benett (Bennett, 1996) etc. These authors agree that what is decisive for an effective calculation of TCO is the way of cost items measurement. They consider an application of the TCO concept for effective not only for calculations, but also for the subsequent reduction of overall costs. There is an added value of this research in the classification of TCO models by type as dollar-based or value-based. TCO models can be further divided according to their primary use that can be e.g. supplier selection or supplier evaluation (Ellram, 1995). Other authors completed the findings introducing the idea of life cycle costing. Shields describes (Shields and Young, 1992) a connection between organizational cost drivers, organizational learning, managerial innovations, and product and process innovations. Moreover, he presents examples of how organizational cost drivers can reduce long term costs.

The results of the contemporary research in the healthcare field are focused on the directions shown in Figure 1.

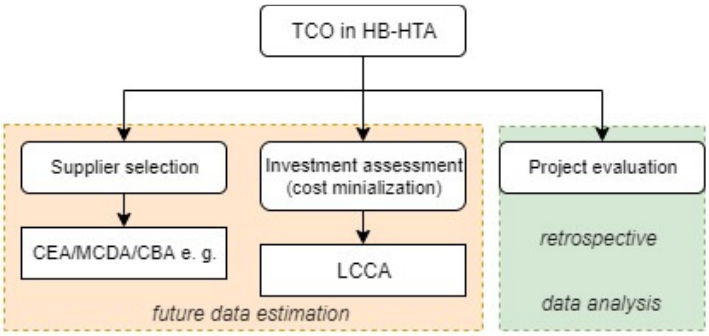

Fig. 1: Possibilities of TCO application within HB-HTA

One of the fundamental problems in hospital management is selection of suppliers. It can be described as a multiple-criteria decision analysis (MCDA) process aimed at optimizing conflicting goals such as quality, price, or term of delivery. The problem of supplier selection is addressed in Chapter 2.1. Based on an estimation of future data, it is investment assessment that is usually applied in the initial phase of projects. A typical example are feasibility studies for purchase of expensive medical equipment. This group includes also provision of other technologies that are not directly related to healthcare performances, which is covered in Chapter 2.2. Further, TCO is often applied in the case of a retrospective assessment of projects. Generally, the results of this phase should be always compared with the original estimations, and possible differences should be explained. This is the only project approach that can guarantee that possible mistakes in the selection will not be repeated in the future. Such cases are discussed in Chapter 2.3.

In our opinion, the combination of rapidly developing HB-HTA and TCO can contribute to the creation of an effective managerial support. The main objective of this paper is to summarize possibilities of TCO application in the frame of HB-HTA, and to demonstrate these options on selected examples of good practice.

TCO applications in healthcare

This chapter gives a series of examples aspiring to show the wide spectrum of possible applications of TCO in healthcare or in facility management in hospitals.

Supplier Selection

This example compares and discusses healthcare costs calculations in different suppliers using a combination of the TCO approach with MCDA, namely the analytic hierarchy process (AHP).

Example 1: Supplier selection problem: a comparison of the total cost of ownership and analytic hierarchy process approaches (Bhutta and Huq, 2002)

While TCO looks beyond purchase price to include all other technology-related costs, AHP uses ratio scales to integrate and then use pair-wise comparisons and the eventual synthesis to find the "best" decision. The main benefit of the TCO method is above all that it helps identify costs that otherwise may remain hidden. On the other hand, it presents a kind of challenge, as it requires extensive tracking and maintenance of cost data. The authors used the primary data to carry out calculations of both approaches, while they compared three suppliers. The costs were divided into the following categories:

- Manufacturing (raw materials, labour, machine depreciations, etc.)
- Quality (quality inspection, rework, cost due to delay, etc.)
- Technology (designing, engineering, etc.)
- After-sales service costs (units shipped, etc.)

Four criteria were chosen to evaluate suppliers using AHP: manufacturing costs, quality, technology being used and service offered. The results both methods differ, however, according to the authors, both approaches can be used in negotiations and in optimizing and concentrating resources where they are most needed.

When suppliers are to be selected for a healthcare facility, nowadays it is usual to apply the MCDA methods. Generally, the "cost" item is one of input criteria. It is usually represented by total cost of (product) purchasing from suppliers including freight costs and product price (Fashoto, Akinnuwesi and Owolabi, 2016). If further cost data are available or if a qualified estimate can be done for further costs that arise during the product life cycle, it is appropriate to use TCO instead, and get an all-embracing view. Such an integration of the TCO results would lead to a considerable shift in the validity of MCDA calculation results.

Investment Assessment

Two following examples demonstrate application of the TCO method for investment decision-making in projects of a special character, where there was a requirement of minimizing the total costs.

Example 2: Analysis of TCO Applied to Processes of Biomedical Technology Acquisition Competitive Intelligence (Barreneche, Hernandez and Garcia, 2015)

Barreneche calls for a standardization (Barreneche, Hernandez and Garcia, 2015) of the process of expensive medical technology acquisition, and defines the variables that affect the total cost of a biomedical apparatus. According to him, the aspects that must be considered in the estimation of TCO of biomedical equipment include initial costs, training costs, warranty, import costs, maintenance, metrology costs, update costs, operation costs, accessories and spare parts costs, requirements for planning costs, and final disposal costs. The study further analyses five basic stages:

1. Indexes definition
2. Acquisition of preliminary information
3. Information reception and analysis
4. Indexes estimation
5. Results analysis and recommendations

The above-mentioned stages are subsequently verified on representative data in a 5-year time horizon for two producers of PET/CT, see Tab 1.

Table 1: TCO with consumables and insurance (Barreneche, Hernandez and Garcia, 2015)

Manufacturer	5-year TCO (USD)	Initial costs (USD)
A	6,583,071,206	2,176,550
B	6,574,699,209	2,584,000

The results prove the existence of significant hidden costs, which means that healthcare facilities should consider these aspects in order to choose a supplier that best adjust to their operation conditions.

TCO can be viewed as a complex analysis comprising technical, after-sale, safety-of-the-patient etc. aspects, and thus it is useful for decision-making about an investment in biomedical technology (Hospodková and Vochyánová, 2019).

Example 3: Proposal to increase efficiency of waste management in the General University Hospital in Prague

The study objective was to compare the current costs of risk waste disposal through a supplying firm with TCO in the case of waste converter acquisition, while the calculations were done over a 10-year horizon. The reason of the projection is an expectation of raising the disposal price in the outsourcing variant.

TCO over the investment´s life time was calculated using the modified formula (Dabbs, 2010) :

$$TCO = Ca + Cc + Co + Cm + Cd, \quad (1)$$

where Ca –acquisition costs, Cc - commissioning costs, Co - the costs of operation, Cm - maintenance costs and Cd - the removal and disposal costs. Selected cost items within the TCO model according Charkravarty and Morfonious (Chakravarty and Debnath, 2015) (A.Morfonious *et al.*, 2011) are shown in Table 2. A 4% discount rate was considered, as recommended for public investment projects co-funded from European funds. The calculation of the discounted TCO proceeds according to the formula (2):

$$dTCO = \sum_{i=0}^{t} \frac{TC_t}{(1+r)^t}, \quad (2)$$

where *dTCO* are discounted costs, *TC* - the expected TCO in individual years, *i* - years of investment, *t* - the lifetime period, and *r* - the discount rate.

It was shown that TCO over a 10-year period amounts to EUR 427,907 in the case of a convertor acquisition, which is unfavourable if compared with waste disposal outsourcing. The purchase of a convertor seems to be the favourable variant if the prices agreed with the third party increased by more than 20%. Table. 2 provides a detailed structure of TCO for the convertor.

Table 2: Discounted TCO of the waste convertor over a 10-year period

	CA	CC	CO	CM	CD	DTCO
EUR	164,445	10,783	155,673	95,466	1,540	427,907
%	38.43	2.52	36.38	22.31	0.36	100

Project Evaluation

The method can be used also for a retrospective evaluation of implemented projects.

Example 4: Problems with systems of medical equipment provision: an evaluation in Honduras, Rwanda and Cambodia identifies opportunities to strengthen healthcare systems (Emmerling, Dahinten and Malkin, 2018)

A good example of analysing retrospective data is the study published by Emmerling et al. (Emmerling, Dahinten and Malkin, 2018). They analysed 3421 pieces of medical equipment in five departments from 64 hospitals, and found that 575 of them were out of service or only partially functional. Marks claims (Marks *et al.*, 2019) that one reason of the low operationality of MDs in developing countries is the absence of serious reflections about TCO in the management, which supports Emmerling´s hypothesis. If the costs of spare parts, tools, attachments, consumables, as well as installations, preventive maintenance, etc. are not taken into consideration already in the time of decision-making about procurement, the following operation would be controversial. This assertion stays valid also in the case of acquisitions through a donation or subsidy, when the problem is often amplified by an unsuitable combination of technical parameters of health technologies (missing compatibility with the other equipment).

The combined costs of disposal of the useless donated equipment and non-warrantied support for useful donated equipment could exceed the cost of purchasing the same equipment new and with warranty support. Based on a literary review, Marks summarizes several key areas that must be taken into consideration in the case of MD acquisition through a donation, and simultaneously it highlights that any guidelines are missing. These areas comprise costs of human resources, environment costs, material resources (ancillary equipment supplied either locally or from overseas etc.), maintenance resources, educational resources, etc. (Marks *et al.*, 2019).

Discussion and Conclusion

Current utilization of TCO is only limited and its strategic potential is not always met, while TCO has a wide use, which is obvious from published results (Fabian, 2017). The current papers describing TCO are helpful, above all if they are outlined as case studies. They offer procedures specific for healthcare facilities that draw attention to particular „hidden costs“ of health technologies (Holckel and Kintner, 2014).

One of the new and current directions in the field of MDs and their evaluation is early stage HTA (eHTA), a method that deals with assessments of MDs that are in the development phase. Such evaluation is very broad and includes, inter alia, a calculation of all cost items that must be taken into account before the technology is purchased, input costs, as well as costs incurred during the operation phase and equipment life cycle (Simonova *et al.*, 2020). Thus, TCO can be a useful tool within eHTA, as it usually includes the purchase costs, costs of energy, installation, regular maintenance, repairs, upgrades, staff training, disposal and personnel costs that are necessary in such a prospective MD evaluation.

Another area offering large possibilities of TCO applications is eHealth a telemedicine. However, within information systems implementation in healthcare, not only that HTA is often missing, but the contractor even does not conduct a feasibility study. Thus, after e-prescription was launched in the Czech Republic, it is impossible to evaluate whether the system implementation was successful (Bruthans, 2019).

Our examples taken mainly from literature show some limitations that can be, however, overcome by slight suitable modifications. Mostly they were focused on a single hospital, no discounting was applied, and very often real data did not exist, so that they had to be replaced by a model or expert opinion. Nevertheless, there is already quite a lot of experience gathered, so that we can recommend calculation of TCO in all HTA studies focused on medical devices.

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Organizational and Legal Aspects of Insurance Cover Acquisition In Municipalities in Poland

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Abstract

Local self-government units in Poland, and in particular municipalities, should be treated as specific clients on the insurance market. In such entities, the process of concluding insurance contracts and shape of such contracts require the solution of several organizational and legal problems. At the initial stage, it is necessary to specify which units in the structure of the local self-government unit (municipality) may be parties to the insurance contract (policyholders) and who may represent them in this legal act. Then it is important to decide whose property interest is insured, and therefore who should be specified in the contract as insured party. Finally, due to the extensive structure of local self-government units (municipalities), decision-makers must determine whether insurance cover will be purchased in a centralized manner (i.e. at the level of the main office of the local self-government unit comprehensive for the entire structure) or in a decentralized manner independently through organizational units. There are many advantages to a centralized acquisition of insurance coverage. The article discusses these all issues. All the above-mentioned problems must be resolved with the knowledge that errors and gaps in concluded insurance contracts may result in property loss in local self-government units. Such a situation may result in reducing the scope of activities carried out by these entities.

Keywords: Municipality, Property Interest, Insurance Policy

Introduction

Insurance coverage in a local self-government unit, and in particular in a municipality[1] as the basic entity forming local self-government in Poland[2], contributes (as a risk management method) to meeting the needs of the local government community as a whole and individual needs. Insurance as an effective method of protection against financial consequences of random events minimizes the disruptions in the implementation of municipal tasks that Ziółkowska (2002) divides into two groups: public services (e.g. maintenance of transport routes, ensuring safety) and social services (e.g. education and health services). Research study by Jastrzębska et al (2014) shows the significant degree of use of the insurance method in the risk management of municipalities[3]. For this reason, the sphere of the way and correctness of concluding insurance contracts by these entities should be thoroughly analysed. This article presents selected organizational and legal problems existing at the stage of acquiring the insurance protection of municipalities.

Identification of the policyholder in the municipality

The parties to the insurance contract are: the insurer and the policyholder. Orlicki (2002) indicates that the policyholder is a natural person, a legal person or an organizational unit without legal personality, which by concluding an insurance contract in its own name undertakes to pay an insurance premium in exchange for the insurance protection provided by the insurer.

In order to formally and legally assess the correctness of the policyholder's declaration of will it is necessary to determine whether:

- the declaration of will was made by an entity authorized to perform such an action (competent entity),

- the declaration of will on behalf of the policyholder was made by the competent authority/person (form of representation).

As Drzewicki (1996) claims "legal capacity for insurance rights and obligations is an issue of quite fundamental importance″ and decides on the existence of insurance capacity, understood by Orlicki (2002) as the possibility of concluding insurance contracts on your own behalf. According to Nowakowski (2004) lack of legal capacity on the part of the policyholder is the reason for invalidity of the insurance contract. In the book edited by Gniewek (2006) indicated that this invalidity is absolute, and the legal act may not be covalidated in any way.

The municipality's capacity to perform legal actions results from its recognition as a legal person under Article 33 of the Civil Code[4]. The legal personality of the municipality results from two regulations: Article 165(1) of the Constitution of RP[5] and Article 2(2)[6] of the Act on Municipal Self Government[7]. Unlike the government administration, which remains within the structure of the state and in civil-law relations acts in the name and on behalf of the State Treasury, the municipality performs civil-law activities in its own name. The municipality may therefore conclude insurance contracts in its own name and on its own account.

However, the issue of the insurance capacity of the municipality's organisational units (budget units, local government budget companies) is problematic. The municipal organisational units do not have a legal personality, as it has not been conferred to them by the Act[8]. As Radwański (2007) states they also lack legal capacity[9]. These units are therefore neither legal persons nor 'temporary legal persons'[10]. Radwański, Panowicz-Lipska (1998) and Kowalewski (1999) are in favor of the admissibility of concluding contracts by such entities, but among other authors Ciepła (1997) is in favor of the impossibility of concluding such contracts. However this discussion was held under the terms of the Act of 28 July 1990 on Insurance Business, which is no longer in force[11] and at the same time before the amendment of the Civil Code of 14 February 2003[12], which introduced art. 33^1. Current Act of 11 September 2015 on Insurance and Reinsurance Activity[13] does not contain a *lex specialis* to art. 33^1 of the Civil Code, and therefore the organizational units of the municipality do not have the insurance capacity.

The above considerations undoubtedly indicate the defectiveness (irregularity) of insurance contracts concluded by municipal organizational units (budget units, local government budget companies). However, the thesis on the invalidity of such contracts would be too radical. Assigning the function of *stationis municipii* to organisational units[14] is close to granting these entities legal capacity[15]. The fact that the municipal organizational units sometimes act as the contracting authority (policyholder) in public procurement procedures seems to confirm this situation[16].

It would also be socially difficult to accept the annulment of insurance contracts concluded by individuals such as schools, kindergartens and municipal institutions. The subject of insurance protection is municipal property, which, after all, contributes to the implementation of public tasks. What is more, on the part of the municipality there is a consent to conclude such agreements in case of allocation of financial resources in the financial plan.

Table 1 identifies particular types of organisational units in the municipal self-government structure in the context of insurance capacity.

Table 1: Policyholder in the organisational and legal structure of the municipality

Type of entity	Legal status	Does it have legal and insurance capacity?
municipality	legal person	yes
budget unit	an organisational unit without legal personality	no
self government budget unit	an organisational unit without legal personality	no
auxiliary unit (housing estate, district, village, town, other)	an organisational unit without legal personality	no
self government cultural institution	legal person	yes
limited joint-stock partnership	an organisational unit without legal personality	yes
holding company	legal person	yes
self-contained public health care facility	legal person	yes
union of municipalities	legal person	yes
poviat-municipality union	legal person	tak
association of local government units	legal person	yes
foundation	legal person	yes

Source: own elaboration

Representation of the policyholder in the organizational and legal structure of the municipality

Article 38 of the Civil Code states that a legal person acts through its bodies. The body is formed by natural persons (or one person). According to Dmowski and Rudnicki (2006), the action of an authority is the action of a legal person, but only if natural persons act in a specific case, explicitly or at least implicitly as an entity and within the limits of its competence[17].

Constitution of RP stipulates that local self government carries out its tasks through the decision making and executive bodies[18]. In the case of a municipality, detailed regulations specifying the manner of representation (organisation of the bodies) should be sought in the Act on Municipal Self-Government. It stipulates that declarations of intent on behalf of the municipality with respect to the management of property shall be made by the head (mayor, governor) or a deputy authorised by him or her alone or with another person[19].

Declarations of intent on behalf of the municipality may be made by the head of the municipal organisational unit. He or she acts individually on the basis of a power of attorney[20] and within its limits[21]. Therefore, the scope of the authorisation granted is important, in particular whether it covers activities related to the conclusion of insurance agreements. These, in turn, fall within the scope of ordinary management of the property transferred to a given organisational unit.

In fact, the circle of persons making declarations of intent on behalf of the municipality is wider. This state of affairs is confirmed by the judicature. The Supreme Court has ruled several times[22] that declarations of intent in the area of property management may be made by a municipal proxy acting on the basis of the power of attorney granted to him or her by persons who themselves had the right to perform the legal act covered by this power of attorney. Such action is based on a power of attorney issued in accordance with the Civil Code.

The institution of countersigning is an additional complication when concluding an insurance contract in the municipality. Namely, when concluding an insurance contract by a municipal body, a countersignature of the treasurer of the municipality or a person authorized by him or her is necessary. However, according to Korzeniowska et al (2004) and Murzydło (2007), the lack of countersignature does not result in invalidity of the contract, but only in its ineffectiveness. In the absence of a countersignature, the insurer may raise an objection of inactivity of the insurance cover, thereby releasing itself from the obligation to provide the insurance benefit, and the municipality is exempted from the obligation to pay the premium.
Murzydło (2007) is of the opinion that the conclusion of an insurance contract by an authority (or by a so-called "false authority") in excess of its powers has no legal effect. If the scope of the power of attorney is exceeded or while acting as a "false proxy", the insurance contract will be affected by the defect of suspended ineffectiveness and thus by the possibility of restoring legal effects by the municipality.

Property interest of the municipality as the subject of insurance

Article 821 of the Civil Code defines the subject of the insurance as any property interest which is lawful and capable of being assessed in money. Szymański (1962) recognizes as the interest such an attitude to an object, event or someone's behaviour that their improper change (course, incident), i.e. against the will, is felt negatively by the subject affected by the change. In Polish contemporary literature such as Byczko (2013) and Krajewski (2016), attention is drawn above all to the far-reaching "economization" of the notion of insurance interest, which makes it possible to accept the insurability of both legal relations and various factual states of affairs.

Adoption of the theory of interest as a determinant of the subject of insurance is very important for the municipality, as it defines very broadly the limits of using insurance as a risk management method. The municipality, in terms of the type of activity, combines the features of:

1) a public entity, i. e. the sphere of *imperium* defined by Skoczylas (2005) and Safjan, Matuszyk (2009) as the executive activities of the administrative law and organizational and ordering activities reserved for municipalities,
2) a private entity, i. e. the sphere of *dominium* including forms of activity in the organizational and ordering area which are not reserved for municipalities and are aimed at meeting the collective needs of the local government community[23].

For this reason, property interests not encountered in the private sector can be identified. The theory of property interest at least makes it possible to negotiate with the insurance company on the insurance of interests specific to the municipality, e.g. related to the risk of claims for:

1) taking administrative decisions,
2) lack of provision or inadequate provision of municipal services,
3) actions of the municipal police,
4) delays in the allocation of social housing to persons evicted from private premises[24],
5) shaping spatial order in the form of adopting and amending the local spatial development plan[25],
6) damage to person or property of members of the voluntary fire service[26]

Identification of the insured in the municipality

Kowalewski (1997) points out that the insurance interest in the context of identification of the object of insurance is subjective in nature as it relates to a specific person or entity. Orlicki and Pokrzywniak (2008) as well as Byczko (2013) conclude that the insurance coverage may be provided only for the account of an entity having an insurance interest.

Orlicki (2006) indicates that the insured may be a natural person, a legal person or an organizational unit without legal personality, but having legal capacity.

The property interest in the organisational and legal structure of the municipality should be related primarily to the right to own municipal property. The entities of municipal property include organisational units with legal capacity, as indicated in Table 1[27]. According to Łętowska (1994), legal capacity is also a condition for bearing material liability and therefore the property interest in liability insurance is dependent on this capacity.

Bearing in mind the comments made, it should be concluded that the practice of concluding insurance contracts for the benefit of organisational units of the municipality without legal capacity [28] is defective. An organisational unit without legal capacity may not be entitled to an insurance benefit. Drozd (1997) makes the thesis that there can be no subjective right (including the right to an insurance benefit) without the subject of those rights. Likewise, it makes no sense to take out liability insurance "for the account" of an individual who is not subject to civil law obligations.

However, a request for a defectiveness of insurance contracts concluded "for the account" of organisational units of the municipality which do not have legal capacity does not lead to a thesis of their invalidity. Such an effect would be too significant. By fulfilling the function of the *stationis municipii*, these units actually fulfil the rights and obligations of the municipality. The technical designation of such a unit as an insured person indicates the intention to insure the property interest of the municipality being "in possession" (disposition) of that unit. In the context of Article 65(2) of the Civil Code, the purpose of such a legal act is understandable.

Insurance policy of the Municipality

From the previous considerations it appears that the municipality is a complex, multidimensional unit. Różycki (2006) describes that from a technical and organisational point of view, it combines the characteristics of an authority, a distributor of public funds, a specific service company, an owner of large assets and a basic entity managing the local economy. These properties influence the complexity of organizational issues related to the way insurance contracts are concluded. The organizational solutions adopted by the municipality in terms of concluding and performing insurance contracts are manifested in the insurance policy.

In the Polish literature such as Handschke (1989, 1998) and Łazowski (1998), the insurance policy is mainly connected with the state, although as Handschke (1989, 1998) points out, the subjects of the insurance policy at the micro level are also recognized: policyholders, insurance agents, insurers. The same author indicates that the condition for considering the actions of the above entities as insurance policy[29] is the setting of insurance objectives and the selection of means and methods for achieving them. Later publications of such authors as Jedynak (1999), Dubiel (2011), Janowicz-Lomott and Łyskawa (2013) stress the role of the insurance policy of companies and local government units.

Taking into account existing views of doctrine described in the abovementioned publications, the insurance policy of the municipality can be defined as an orderly activity of the municipality aimed at satisfying its insurance needs. The subject of the municipal insurance policy is the municipality itself (as an entity insuring its and not only its property interest), being at the same time an object in the implementation of the state insurance policy (e.g. imposing an insurance compulsion on the municipality in specific situations). The insurance policy of the municipality should be determined by the basic objective of its functioning, which is to satisfy the collective needs of the local community, i.e. it should serve to shape the desired reality in the economic and social sphere at the municipality level. Thus, the implementation of an optimal insurance policy should not be the final goal, but only an element enabling the achievement of the basic goal. The implementation of the insurance policy includes such activities as the decision to centralize (decentralize) insurance activities, making employees aware of the scope of insurance cover and their role in the insurance policy, creating an insurance programme and updating it.

Różycki (2002) lists the following premises of the municipality's insurance policy include:

- the multiplicity and specificity of public tasks performed,

- the value of the assets held and their purpose,
- obligation to manage municipal property with special care,
- complex organizational structure,
- the quantity and scope of insurance products used,
- legal conditions, both resulting from legal acts (e.g. being subject to public procurement law, compulsory insurance) and the essence of the insurance contract (regulations of general insurance conditions),
- insurance obligations imposed by the municipality's contractors (e.g. banks).

Since the reactivation of the local self-government units in 1990, it has been common practice for the managers of individual organizational units to make insurance decisions. Nowadays, the insurance policy is conducted centrally by the municipal office and most often it includes the office and other municipal organisational units, but without municipal companies. Liwacz (2010) mentions the following benefits of asset insurance in a comprehensive manner:

- it eliminates gaps in protection (both in terms of coverage and subject matter),
- it eliminates duplication of protection,
- it contributes to the unification of insurance conditions throughout the municipality,
- it saves on premiums,
- it streamlines administrative procedures.

Comprehensive municipal insurance often requires a public procurement procedure when selecting an insurer, which will be discussed later in this article.

Summary and conclusions

The municipalities are characterized by an organizational structure including specific organizational and legal forms, whose functioning on the insurance market encounters certain difficulties. It is in the interest of both the municipalities as a legal entity and the self-government community to conclude insurance contracts without legal defects, while striving to optimize the price through appropriate decisions taken in the field of insurance policy. It should be borne in mind that any incorrect decisions made by municipalities in the area of concluded insurance contracts may constitute damage to their property, the occurrence of which results in limiting the performance of public tasks important for local communities.

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[1] In Polish: „gmina”

[2] See Article 164(1) of the Constitution of the Republic of Poland of 2 April 1997 (Journal of Laws of 1997, No. 78, item 483 as amended), hereinafter abbreviated: Constitution of RP

[3] The survey carried out in 2013 on a sample of 366 municipalities indicated that the insurance of buildings against fire and other random events covered 80% of municipalities, while the insurance of civil liability in connection with business activity and property owned by 68% of municipalities.

[4] Act of 23 April 1964 Civil Code (Journal of Laws of 2019, item 1145), hereinafter abbreviated as: Civil Code

[5] "Local government units have legal personality."

[6] "Municipality has legal personality."

[7] Act of 8 March 1990 on Municipal Self Government (Journal of Laws of 2019, item 506, as amended), hereinafter referred to as: Act on Municipal Self Government

[8] According to Article 33 of the Civil Code.

[9] Radwański (2007) claims that Legal capacity means the competence (ability) to be subject to rights and obligations. The conferral of legal capacity does not require the use of specific language phrases. It is sufficient to adequately indicate the characteristics of a given organisational unit that fall within the concept of legal capacity. Similarly to municipal organisational units, selected organisational units of the Treasury (*stationes fisci*) do not have legal capacity, which only represent the Treasury in terms of its rights and obligations.

[10] Where the provisions of art. 33^1 1 of the Civil Code, the rules on legal persons apply.

[11] Journal of Laws of 1996 No. 11, item 62 as amended.

[12] Journal of Laws of 2003. No. 49, item 408.
[13] Journal of Laws of 2019, item 381 as amended.
[14] "It is reasonable to assign the function of a stationis of the municipality to individual organisational units. In the civil law and in the process they act (excluding municipal legal entities) as a substitute for the municipality. The municipality as a legal person has legal capacity and judicial capacity" (Decision of the Court of Appeal in Wrocław of 9 April 1993, ref. I Acz 200/93).
[15] It can be concluded that this is an intermediate legal construction between the lack of legal capacity and its existence.
[16] Differently Norek (2009) who considers that the contracting authority and the economic operator are technical concepts and not a category of substantive law.
[17] The legal action performed in excess of competence is invalid (Supreme Court's Judgment of 15 March 2002, ref. II CKN 1415/00).
[18] Article 169(1) of the Constitution RP.
[19] Article 46(1) of the Act on Municipal Self Government.
[20] Article 47(1) of the Act on Municipal Self Government.
[21] Such a state is confirmed by the Resolution of the Supreme Court of 19 January 1993, ref. III CZP 160/92 and the Judgment of the Court of Appeal in Białystok of 30 May 1996, ref. I ACr 140/96.
[22] Supreme Court R□solutio□ of 6 Ja□uary 1992, r□f. III CZP 116/91; Supr□m□Court Judgment of 11 Octob□r 2001, r□f. II CKN 327/99; Supr□m□Court Resolution of 3 October 2003, ref. III CZP 63/03.
[23] Judgment of the Supreme Court of 10 June 2005, ref. II CK 719/04.
[24] The basis for the claim is Article 417 of the Civil Code in connection with Article 18(5) of the Act of 21 June 2001 on Protection of Tenants' Rights, Municipal Housing Stock and Amendment of the Civil Code (Journal of Laws of 2019, item 1182, as amended).
[25] The basis for the claim is art. 36 of the Act of 27 March 2003 on Spatial Planning and Development (Journal of Laws of 2019, item 293).
[26] The basis for the claim is art. 26 of the Act of 24 August 1991 on Fire Protection (Journal of Laws of 2019, item 1372, as amended).
[27] Cf. Article 43(1) of the Act on Municipal Self Government.
[28] For example, in a public procurement procedure, where it is often specified that the subject matter of the procedure is the service of insurance of budgetary units or self governing budgetary undertakings. Moreover, insurance documents often indicate that schools, kindergartens or other organisational units without legal capacity are insured.
[29] Handschke (1998) defined insurance policy as “the whole theoretical and practical activity of people aimed at awakening, shaping, transforming and satisfying insurance needs of all kinds of entities”

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Public Data Driven Decisions – Linked Open Data Case

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Abstract

The increasing complexity and amount of data has a significant impact on the functioning of modern organizations, which are increasingly called Data-driven enterprises. Effective data management in enterprises is currently crucial when it comes to formulating a strategy of operation and developing a competitive advantage. The article is an attempt to show why modern organizations should develop the right methodology for managing information resources (especially in case of linked open data) to find their place in contemporary economic reality and survive in the era of big data.

Keywords: Management, Data Driven Enterprise, Linked Open Data, Big Data

Introduction

This work present how useful can be public data and how much information is hidden in public articles which can be found in the Internet. The increasing complexity and volume of data has a significant impact on functioning of modern organizations so called data-driven enterprises. Issues related to data management have crucial importance when it comes to formulating strategy and elaboration of competitive advantage. The article attempts to show why nowadays organizations should develop a suitable methodology of information resources management, especially in case of public data. The paper also presents the use of logistic regression in the assessment of variables describing the quality of articles published on English version of Wikipedia by it's users. Classification of variables because of the results of information value indicator have been presented. Last, but not least benefits of the effective data management have been defined.

Linked Open Data and Information value characteristic

The spectrum of modern sources of business information is nowadays very broad - they are not only internal resources, but also (and maybe above all) data from the environment of the organization, its competition or directly from customers. It should be emphasized that this is not only information related to e.g. purchasing decisions, but also about interests or activities, which creates a complete customer profile, also enriched with behavioral context. Very interesting information can be found in case of public linked open data based on the RDF standards of the semantic web. Access to this data in very easy (many API plug-ins / browsers are available for users, which help to find relevant data). One of the very well-known example based on this vision is DBpedia. As their website says (source: wiki.dbpedia.org) "the English version of the DBpedia knowledge base describes 4.58 million things, out of which 4.22 million are classified in a consistent ontology, including 1,445,000 persons, 735,000 places (including 478,000 populated places), 411,000 creative works (including 123,000 music albums, 87,000 films and 19,000 video games), 241,000 organizations (including 58,000 companies and 49,000 educational institutions), 251,000 species and 6,000 diseases.

The full DBpedia data set features 38 million labels and abstracts in 125 different languages, 25.2 million links to images and 29.8 million links to external web pages; 80.9 million links to Wikipedia categories, and 41.2 million links to YAGO categories. DBpedia is connected with other Linked

Datasets by around 50 million RDF links. Altogether the DBpedia 2014 release consists of 3 billion pieces of information (RDF triples) out of which 580 million were extracted from the English edition of Wikipedia, 2.46 billion were extracted from other language editions. The DBpedia knowledge base has several advantages over existing knowledge bases: it covers many domains; it represents real community agreement; it automatically evolves as Wikipedia changes, and it is truly multilingual. The DBpedia knowledge base allows you to ask quite surprising queries against Wikipedia, for instance "Give me all cities in New Jersey with more than 10,000 inhabitants" or "Give me all Italian musicians from the 18th century". Altogether, the use cases of the DBpedia knowledge base are widespread and range from enterprise knowledge management, over Web search to revolutionizing Wikipedia search."

The growing popularity of Wikipedia has also contributed to the emergence of an increasing number of scientific papers on the issue of public data quality assessment of it's articles. Comparing different parameters of featured articles, one can infer the quality of other (invaluable) articles. On the basis of literature [Lih 2004; Stvilia et al. , 2005; Hu et al. 2007; Wilkinson and Huberman 2007; Blumenstock 2008b; Blumenstock 2008a; Dalip et al. 2009; Lipka and Stein 2010; Dalip et al. 2011; Anderka 2013; Warncke-wang, Cosley and Riedl 2013; Lewoniewski, Węcel and Abramowicz 2015] this research was concerned around what data about articles can be obtained and how one can assess their quality. It should be noted that all data - so. articles and their assessments are public data. Data on articles in the English version of Wikipedia were analyzed. There are two distinctions of articles: "Featured Article" (FA), which means very good publication. There is also a second distinction for articles that do not meet all FA criteria, but come close to their quality and is called "Good Article" (GA). The FA or GA distinction in any language version of the article can get as a result of a positive vote, which usually lasts about a month. However, there are very few such distinguished articles - on average in each language version their share is about 0.07%.

Unfortunately, each language version has its own article quality classification system, all of them use at least two classes for the highest quality articles - FA and GA equivalents. However, a large proportion of articles are not evaluated at all, e.g. in the Polish edition the share of such articles accounts for over 99%. It is therefore worth considering what added value public data assessment can bring, how to do it and what decisions can be made on this basis.

Information Value

In numerous works - including Brotherton, Lund (2013), Finlay (2010), Mays and Lynas (2011), Siddiqi (2006) describing scoring models regarding e.g. creditworthiness (where the explained variable is also binary - granting or not credit, same like good/bad article) to assess the examined features Information Value (IV) is key determinant of data quality. It can be determined by using the following formula:

$$IV = \sum_{i=1}^{n} (g_i - b_i) * ln\left(\frac{g_i}{b_i}\right), \quad (1)$$

where using the Wikipedia example, the interpretation of individual elements is as follows:

bi - is the number of articles assessed as incomplete (bad) taking into account the specific value or range of the value of the explanatory variable in relation to the total number of incomplete articles in the total set X (e.g. how many times articles containing a certain number (or range) of followers (variable followers) were assessed as incomplete in relation to the total number of incomplete articles);
gi - is the number of articles assessed as complete (good) taking into account the specific value or range of the value of the explanatory variable Xi in relation to the total number of incomplete articles in the total set X.
In the case when $(g_i - b_i) = 0$ or $ln\left(\frac{g_i}{b_i}\right) = 0$, the unit information value is zero (it does not matter for the total value). As a rule, the models strive to consider variables with a high IV factor, while

stating that this factor should not be too high, because such variables may dominate the model, which is associated with the risk of weakening the stability of the model and deterioration of its precision. Proponents of using logistic regression to evaluate variables use two approaches. The first is to choose those variables that are characterized by medium and strong predictive ability (ranges of IV values for individual categories are presented in the table below (Table 1). In the second approach, only those variables that are considered as "valuable" for advanced model building are are predictors with an average factor of IV. It is assumed that these are the variables that best characterize the given phenomenon and do not show undesirable features of dominance in the model.

Table 1: Interpretation of the Information Value IV

Information Value	The nature of the independent variable, predictive power
< 0.02	A useless predictor
0.02 - 0.1	Weak predictor
0.1 - 0.3	Medium predictor
0.3 - 0.5	Strong predictor
>0.5	Sometimes treated as still a strong predictor or suspect as a"too good" to be reliable, variable with dominating features

source: own study based on Finlay (2010), Mays and Lynas (2011), Siddiqi (2006)

Research sample and variable selection

Research area was English version of Wikipedia. To get data Wikipedia's API service that provides convenient access to data and metadata to articles via HTTP, via a URL, in various formats (including XML, JSON) was used. This service works for every language version and is available at the address specified according to the template: https: // {language} .wikipedia.org / w / api.php? Action = {settings}, where {language} is the abbreviation for the language version and { settings} are query settings. To assess information value of articles logistic regression was applied. The value of the information contained in the explanatory variables to describe the dependent variable reflects the quality of these independent variables as well as their predictive power.

The number of articles in the training sample amounted to nearly 20,000 articles (where 50% were "complete" and the rest "incomplete"). The test sample in each language is at least 3 times larger than the trainee, in which all articles from FA and GA classes are "complete" and the number of "incomplete" is slightly larger. In the English version - it's about 60,000 articles. The explained variable is the assessment of whether a given article is complete or not, in other words whether it is assessed as a good or bad article (binary review). The calculations concern several selected variables, which, can significantly differ in terms of their informative value and the role of the variable in building predictive models. Efforts were made that the variables were representatives of different types, both primary and complex, as a derived of the originals. Variables such as references, number of followers, number of editions, page views, pictures and derivative reference / number of letters were taken into account.

Research Results

Creating a pivot table allowed to determine the number of incomplete (0) or complete (1) articles. An example of calculation in case of variable *number of images* is presented in the table (Table 2) below:

Table 2: The number of complete and incomplete articles in the English version of Wikipedia depending on the number of images.

Number of images	incomplete (0)	complete (1)	Sum
0	144	0	144
1	269	8	277
2	203	32	235
3	119	62	181
4	85	69	154
5	53	69	122
6	25	71	96
7	16	64	80
8	19	59	78
9	9	56	65
10	10	55	65
11	9	61	70
12	4	60	64
13	5	32	37
14	3	25	28
15	4	41	45
16	2	22	24
17	1	13	14
18	1	25	26
19	1	14	15
20	2	10	12
21	1	11	12
22	2	10	12
23	0	7	7
24	2	8	10
25	0	8	8
26	3	6	9
27	1	12	13
28	1	4	5
29	0	9	9
30	0	10	10
31	0	8	8
32	0	4	4
33	1	7	8

34	1	4	5
35	0	4	4
36	0	6	6
37	0	3	3
38	0	1	1
39	0	1	1
40	0	3	3
41	0	3	3
42	0	1	1
43	0	2	2
45	0	2	2
46	0	1	1
48	0	1	1
51	0	1	1
52	1	0	1
53	0	2	2
55	0	2	2
56	0	1	1
57	1	0	1
58	0	2	2
60	0	1	1
62	0	3	3
65	0	1	1
67	1	0	1
74	1	0	1
75	0	1	1
76	0	1	1
87	0	1	1
Sum	1000	1000	2000

source: own elaboration

The next step was to evaluate the value of information in the case of a variable *images*, using the formula (1) the following results were obtained (Table 3):

Table 3: Information value of images

images	0	1	Sum	% of „0”	% of „1"	% of population	Information value
0	144	0	144	14,40%	0,00%	7,20%	
1	269	8	277	26,90%	0,80%	13,85%	0,917485
2	203	32	235	20,30%	3,20%	11,75%	0,315917
3	119	62	181	11,90%	6,20%	9,05%	0,037163
4	85	69	154	8,50%	6,90%	7,70%	0,003337

5	53	69	122	5,30%	6,90%	6,10%	0,004221
6	25	71	96	2,50%	7,10%	4,80%	0,048015
7	16	64	80	1,60%	6,40%	4,00%	0,066542
8	19	59	78	1,90%	5,90%	3,90%	0,045324
9	9	56	65	0,90%	5,60%	3,25%	0,085922
10	10	55	65	1,00%	5,50%	3,25%	0,076714
11	9	61	70	0,90%	6,10%	3,50%	0,09951
12	4	60	64	0,40%	6,00%	3,20%	0,151651
13	5	32	37	0,50%	3,20%	1,85%	0,05012
14	3	25	28	0,30%	2,50%	1,40%	0,046646
15	4	41	45	0,40%	4,10%	2,25%	0,086109
16	2	22	24	0,20%	2,20%	1,20%	0,047958
17	1	13	14	0,10%	1,30%	0,70%	0,030779
18	1	25	26	0,10%	2,50%	1,30%	0,077253
19	1	14	15	0,10%	1,40%	0,75%	0,034308
20	2	10	12	0,20%	1,00%	0,60%	0,012876
21	1	11	12	0,10%	1,10%	0,60%	0,023979
22	2	10	12	0,20%	1,00%	0,60%	0,012876
23	0	7	7	0,00%	0,70%	0,35%	
24	2	8	10	0,20%	0,80%	0,50%	0,008318
25	0	8	8	0,00%	0,80%	0,40%	
26	3	6	9	0,30%	0,60%	0,45%	0,002079
27	1	12	13	0,10%	1,20%	0,65%	0,027334
28	1	4	5	0,10%	0,40%	0,25%	0,004159
29	0	9	9	0,00%	0,90%	0,45%	
30	0	10	10	0,00%	1,00%	0,50%	
31	0	8	8	0,00%	0,80%	0,40%	
32	0	4	4	0,00%	0,40%	0,20%	
33	1	7	8	0,10%	0,70%	0,40%	0,011675
34	1	4	5	0,10%	0,40%	0,25%	0,004159
35	0	4	4	0,00%	0,40%	0,20%	
36	0	6	6	0,00%	0,60%	0,30%	
37	0	3	3	0,00%	0,30%	0,15%	
38	0	1	1	0,00%	0,10%	0,05%	
39	0	1	1	0,00%	0,10%	0,05%	
40	0	3	3	0,00%	0,30%	0,15%	
41	0	3	3	0,00%	0,30%	0,15%	
42	0	1	1	0,00%	0,10%	0,05%	
43	0	2	2	0,00%	0,20%	0,10%	
45	0	2	2	0,00%	0,20%	0,10%	
46	0	1	1	0,00%	0,10%	0,05%	

48	0	1	1	0,00%	0,10%	0,05%	
51	0	1	1	0,00%	0,10%	0,05%	
52	1	0	1	0,10%	0,00%	0,05%	
53	0	2	2	0,00%	0,20%	0,10%	
55	0	2	2	0,00%	0,20%	0,10%	
56	0	1	1	0,00%	0,10%	0,05%	
57	1	0	1	0,10%	0,00%	0,05%	
58	0	2	2	0,00%	0,20%	0,10%	
60	0	1	1	0,00%	0,10%	0,05%	
62	0	3	3	0,00%	0,30%	0,15%	
65	0	1	1	0,00%	0,10%	0,05%	
67	1	0	1	0,10%	0,00%	0,05%	
74	1	0	1	0,10%	0,00%	0,05%	
75	0	1	1	0,00%	0,10%	0,05%	
76	0	1	1	0,00%	0,10%	0,05%	
87	0	1	1	0,00%	0,10%	0,05%	
Sum	1000	1000	2000				**2,33**

source: own elaboration

It turns out that in case of *images* variable, the informational value is 2.33. The use of logistic regression allows detailed assessment of explanatory variables in terms of information value and, consequently, their importance in the model. Role of logistic regression in the assessment of data quality may be significant in the big data era, where we deal with many variables describing different phenomenon or users behavior that may affect decision making process. Wikipedia isn't the only example. Many Wiki websites, based on public Linked Open Data technologies allow us to follow behavior on the network, e.g. Google trends or Trends map, where we can follow current activity of users and find relevant content of their interest. Here are some examples:

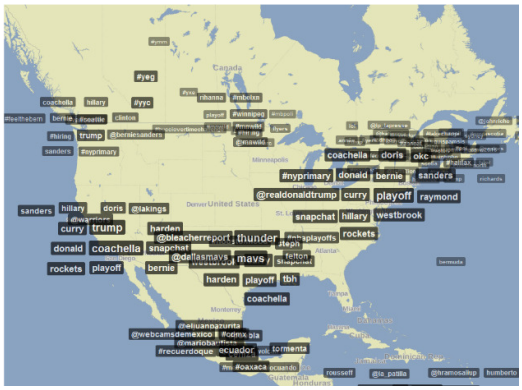

(a)

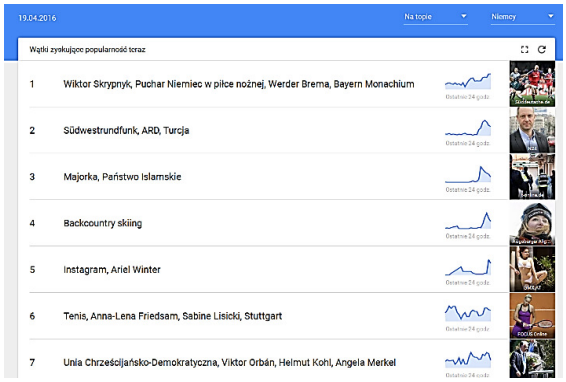

(b)

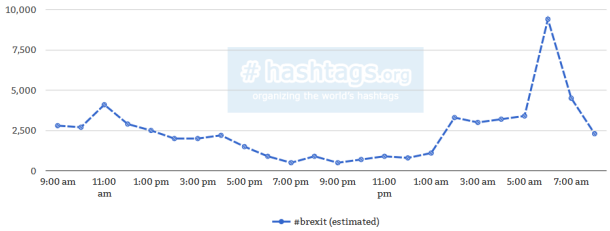

(c)

Fig. 1: Users behavior on network can be easily followed based on Linked Open Data technologies, e.g: (a) Trendsmap.com; (b) Google trends or #brexit hashtag (c) popularity on 11th of July 2019 on www.hashtags.org

Conclusions

According to Gartner, in 2020 year information collected through data analysis will lead to transformation, further digitization or elimination of 80% of business processes or products. Data brokerage will further develop (30% of resources in 2017). The data analysis will be much more customer-oriented in the future. One thing is certain - further evolution of business models and management practices based on data monetization awaits us. Nowadays information takes a leading and crucial role for both - individuals and organizations. In the age of big data, where we are dealing with information overload, the ability to manage information effectively is very important. We are seeing more and more often data-driven enterprises phenomenon, which create innovative business models not only based on assumptions or good practices, but rather on real-time data, adjusted to the individual customer's needs. Much, however, depends on the information potential and analytical skills of the organization. Soon the largest "data warehouse" of every enterprise will not be network itself and a series of information and relationships between them, regarding consumer behavior. What seems to be characteristic in case of data-driven enterprises is the desire to create consistent customer profiles based on one or more data sources in real time. Linked Open Data resources are very broad and they certainly can be used to achieve this goal.

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Effectiveness and Application of Assisted Technology in Italian special psycho-education: a pilot study

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Abstract

Assistive technology allows to remove a number of obstacles to the complex psycho-educational needs of students with disabilities. The purpose of this research is to collect information on the knowledge, skills and perceptions of assistive technology among teachers in the context of Foggia, as a pilot study for a wider national reflection. The data were collected through consultation of official databases and through a survey, submitting to a sample of teachers a questionnaire used in an international context, translated in Italian. The results suggested that teachers do not have an adequate level of knowledge and skills in the use of assistive technology and require pre-service and in-service training to increase their general knowledge on assistive technology implementation and to plan effective actions for students with disabilities.

Keywords: Assistive Technology, Special Needs, Disabilities, Learning Environments.

Introduction

The didactic planning of artefacts and educational environments to return meaningful learning to any student must propose solutions that can be used by everyone and to their full potential (Burgstahler, 2012). Assistive technology (AT) means any product, virtual or real, capable of increasing, maintaining or improving the functional skills of people with disabilities (Young, 2013). In fact, thanks to its primeval innovative nature, assistive technology has spread to the most disparate sectors of human life, not least in training. The use at school, therefore, of technological devices to support students with special needs in learning is a vexata quaestio, which clashes with objective environmental deficiencies and ambiguous cultural heritage, reinforced by actions of resistance to the use of technologies at school (Limone & Toto, 2020). The realization of a truly inclusive education concerns not only the design of personalized didactic interventions, but also through the development of facilitating learning environments. The definition of effective learning present in psychology is affected by the classical theory of Vygotskij (1995), reinterpreted in the light of recent research by Booth & Ainscow (2011), must leverage the social dimension of learning through active and participatory teaching proposals. Continuing to enhance the value of participation in training processes rather than inclusion, as stated in the I*nternational Statistical Classification of Diseases and Related Health Problems 11th revision* (ICD-11), all'*International Classification of Health Interventions* (ICHI), (WHO, 2018). Participation according to this theoretical model is expressed in the social and active dimension of learning. In the contemporary context, technologies are the subject of study of the psycho-pedagogy of special needs to favor the processes of social and educational inclusion.

Unlike the use of assistive technologies in the rehabilitation and medical field, more simply accepted for their main support for motor function, ATs in the school context as a support to cognitive activities still laboriously have free diffusion, although they are encouraged by a vast pedagogical literature (Bonwell & Eison, 1991; Limone, & Toto, 2018). Assistive technology provides students with disabilities the same opportunities to participate in active environments with predictive activities aligned with their abilities.

Table 1: Main technological tools for school disability support.

Disability	Motor	Visual	Auditory
Tools found in schools	- Keyboards (mini, expanded, virtual, etc.); - Pointing systems (trackball, joystick, touch pad, touch, screen); - Scan systems, voice commands, sensors.	- Adaptation of texts; - Sign recognition software; - LIM - Touch monitor - Voice / written conversion software	- Speech synthesis; - Screen reader; - Display and braille printer; - Portable braille devices - Enlargers and video ingraditors; - Scanner and OCR system; - Digital audiobooks and book readers

The technology for disability at school substantially consists of a PC equipped with a suite of software and specific platforms for the different special needs (a separate discussion must be made for visual disabilities where the ATs have reached a high degree of training in training contexts specialization). For example, even in the presence of severe motor disabilities, the use of keyboards, pointing systems, touch screens or voice commands allows to carry out didactic tasks (Limone & Toto, 2019). The software for hearing impairments is in a phase of rapid experimentation, in which the written text, while maintaining the role of the main access channel to external communication, is substantiated in a decrypted text and translated into LIS language through digital devices (van Niekerk, et al., 2018). The greatest results in terms of technology applied to special needs occurred for visual impairments; in addition to the aforementioned speech synthesis systems and screen readers, the research was directed towards specific technological artefacts and software offering a support during the learning process, such as braille displays and printers, video magnifiers, OCR scans and digital audiobooks. The introduction of compensatory tools into the classroom, including information technology and alternative learning methodologies for DSAs, has given a strong boost to the search for applications also in this area.

State of art

The international debate has been asking for more than twenty years on the effective presence of TA in schools and what is the current level of knowledge and skills of teachers in the use of assistive technology (Alkahtani, 2013), research questions that have also addressed the present study. Another dimension investigated is the teachers' perception of the use of assistive technology with their students. For this purpose, we selected and compared for their possible use in the Italian context two (questionnaires) surveys used in the international research context. The first one was drawn up by Chmiliar (2007), structured in its very complex final version on personal information, followed by 13 items on training on the subject of TA and on the type of training followed, a question that asks participants to evaluate the their TA skills and knowledge, (an open question asking participants to identify assistive technology funders, not relevant to this study), 12 questions about the use and satisfaction of using assistive technology, a list of 12 options to evaluate the barriers and obstacles to learning and a list of 10 items to evaluate the importance in the provision of services and in the financing of TA and, finally, numerous opportunities to provide comments. The study also replicated in other contexts (Kutlu et al., 2018) produced the following results: in two researches conducted by the team led by prof. Kutlu (2007, 2018), the support teachers involved (248 in the American context in the first study, 211 in Turkey in the second) said they had not received in-service training on assistive technology and that they did not feel sufficiently adequate in the use of assistive technology, neither software, nor hardware. The degree of dissatisfaction widened 50% of the participants in the research in relation to the contemporary skills and knowledge of technological tools for special needs. This result, according to the authors, is related to the effective availability of equipment in the

schools investigated, therefore the dissatisfaction depended on the environmental deficiency. Finally, in both studies, the teachers indicated innovative teaching strategies as the most important tools available to them in school educational practice.

The second questionnaire developed by Alkahtani (2013) was designed by integrating quantitative research strategies with qualitative interviews, according to the models of Fowler (2008) and Creswell (2008). It is, actually, the screening of quantitative research that naturally selects subjects to deepen the topics of qualitative interviews. The survey respects the guidelines of the Consortium of Quality Indicators for Assistive Technology (QIAT) and consists of a first part structured in six items for the collection of personal information and a second part of 13 items designed to evaluate the use and level of knowledge of assistive technology of by the teachers. Finally, in the first version there is a last question requesting availability to undergo a 15-minute telephone interview on the same issues. The results of this research, conducted on 127 teachers (only 3 of whom gave availability for a telephone interview), showed that the vast majority of the teachers involved do not have an inadequate level of knowledge.

Parte I: Informazioni demografiche
Si prega di completare le informazioni su di te.
1 - Qual è la tua età?
----- Meno di 30 anni.
----- 30-40
----- 41-50
----- 51-60
----- Più di 60 anni.
2 - Qual è il tuo genere?
----- Maschio.
----- Femmina.
3 - Qual è il più alto livello di istruzione che hai completato?
----- Laurea triennale.
----- Master.
----- Dottorato.
----- Altro (prego specificare).
4 - Qual è la tua posizione lavorativa?
----- Insegnante Curriculare.
----- Insegnante di Sostegno.
----- Altro (prego specificare).
5 - Quale degli aggettivi proposti descrive meglio la posizione della scuola in cui insegni?
----- Rurale.
----- suburbano.
----- Urbano.
6 - Quanti anni di esperienza hai nell'istruzione?
----- Meno di un anno.
----- 1-2 anni.
----- 3-5 anni.
----- 6-10 anni.
----- Più di 11 anni.
Parte II: Uso e conoscenza della tecnologia assistiva
Si noti che questo questionario si basa sulla definizione IDEIA 2004 della tecnologia assistiva che include dispositivi high-tech (cioè dispositivi di comunicazione alternativi) e include anche elementi che in genere non possono essere considerati "tecnologici" (vale a dire impugnature a matita).
1 - Hai mai usato o richiesto una valutazione della tecnologia assistiva per uno studente?
----- Sì
----- No
2 - Le esigenze di tecnologia assistiva sono prese in considerazione dal team GLH della tua scuola?
----- Sì
----- No

3 - Gli studenti della tua scuola hanno accesso alla tecnologia assistiva?
----- Sì
----- No
4 - Quali tipi di tecnologie assistive sono disponibili nella tua scuola (scegli tutte le risposte pertinenti)?
----- Dispositivi a bassa tecnologia (penna luminosa per migliorare area di scrittura, pinze, scrivanie adattive).
----- Dispositivi di media tecnologia (tasti appiccicosi, penna Iris, tastiera portatile Neo 2)
----- Dispositivi high-tech (apparecchi acustici e / o di ascolto assistito, programmi di predizione di parole, alternative da tastiera).
5 - Sei pronto a fornire servizi di tecnologia assistiva ai tuoi studenti?
----- Per niente preparato.
----- Scarsamente preparato.
----- Piuttosto preparato.
----- Preparati adeguatamente.
----- Estremamente ben preparato.
6 - Stima il tuo livello di conoscenza della tecnologia assistiva.
----- Nessuna conoscenza.
----- Poca conoscenza.
----- Qualche conoscenza.
----- Buona conoscenza.
----- Ampia conoscenza.
7 - Stima il numero di corsi universitari o di livello universitario che hai svolto in cui la tecnologia assistiva è stata trattata nel dettaglio (cioè più di una sessione di classe).
----- Nessuno
----- 1-2
----- 3-4
----- 5 o più.
8 - Stima il numero di workshop o di formazione in servizio riguardanti specificamente la tecnologia assistiva che hai frequentato nella tua carriera.
----- Nessuno
----- 1-2
----- 3-4
----- 5 o più.
9 - Sei interessato a ricevere formazione e sviluppo professionale nel settore della tecnologia assistiva?
----- Sì, sono molto interessato.
----- Non lo so, ci penserò.
----- No, non mi interessa per niente.
10 - Pensando al tuo stile di apprendimento e alle tue esigenze, indica il tuo metodo preferito per l'apprendimento dell'assistenza tecnologica (scegli tutte le risposte pertinenti).
----- Istruzioni individualizzate individuali.
----- Le istruzioni pratiche nell'impostazione di gruppo.
----- Frequentare workshop o sessioni di conferenze.
----- Corsi formalizzati (vale a dire per il credito universitario).
----- Altro (prego specificare).
11 - Lo studente deve apprendere senza l’uso tecnologia assistiva, dato che il suo utilizzo ne influenzerebbe negativamente lo sviluppo delle abilità?
----- Fortemente in disaccordo.
----- Disaccordo.
----- Neutro.
----- Essere d'accordo.
----- Fortemente d'accordo.
12 - Sei d'accordo che la tecnologia assistiva consente agli studenti di accedere alle attività del loro curriculum?

----- Fortemente in disaccordo.
----- Disaccordo.
----- Neutro.
----- Essere d'accordo.
----- Fortemente d'accordo.
13 - Sei d'accordo che l'utilizzo della tecnologia assistiva richiede così tanto tempo extra e rallenta il ritmo di apprendimento per la classe.
----- Fortemente in disaccordo.
----- Disaccordo.
----- Neutro.
----- Essere d'accordo.
----- Fortemente d'accordo.

Results and Discussion

The analysis carried out on data relating to 855 students with disabilities present in attending the schools of Foggia in the school year of 2018-19 (staff of law and derogations) propose a magmatic situation (Tab. 2).

Table 2 - Distribution of pupils in schools in the province of Foggia.

	Cognitive	Motor	Visual	Auditory
	696	80	49	30
Percentage	81%	9%	5.5%	3.5%

For both pupils with motor and with cognitive disabilities, the PC is the main support tool for those in difficulty; the major drawbacks encountered by the teachers are the slowness of didactic interventions conducted in the classroom and the easy distractibility of the group with respect to individual work. The didactic emergency of multimodal instrumentation for blind people (Tab. 1) has the advantage in the perception of the curricular teacher of not needing intermediaries and of involving the pupil in shared activities for the plasticity of the documents produced. Furthermore, the same type of advantage is found in pupils with hearing disabilities. Finally, almost all of the teachers involved manifest the pedagogical emergency of in-service training through courses for the use of AT in the school. The investigation, in this first pilot phase, did not map all the 427 support teachers in the province of Foggia, however the questionnaire was administered to a representative sample of 81 referents for the disability of local schools. The data presented in conclusion relate to this second sample interviewed.

Conclusions

The educational success of pupils with disabilities is strengthened through effective and proper use of assistive technologies by teachers (Caldin, 2006). The international literature (Laughlin et al., 2018) describes the implementation of skills and knowledge related to rapidly evolving TA as essential for the professional development of teachers, curricular and support. The results of this study confirm the researches conducted so far in this area, that describe on the one hand the inadequacy of skills in the use of assistive technology and on the other a need / need for training on these issues. Teachers' perceptions on the usefulness of training for the use of assistive technology in the school, influence the frequency with which they are used (Canevaro et al, 2011) and represent another vast field of investigation for future research.

The main positive functions of technologies in inclusive education relate, in relation to the specificity of the handicap, to three main purposes: communicative purpose (1) which facilitates access to

educational situations, that participation (2) at a distance, an increasingly used method in all emergency situations and personalization (3) which simplifies the cognitive aspects of knowledge. The technology facilitates the compensation mechanism. With this term we mean that strategy of adaptation to the context activated by technologies. The dialectical mechanics of compensation / insufficiency directs the deficient subject towards two antinomic pathways, one propulsive and the other pathological, both triggered by the context, which restructures all adaptive functions, structures and substitute processes, and creates conditions of proximal development (Vygotsky, 1995). In this perspective, special teaching becomes an element of extreme experimentalism and innovation (Kling et al., 2010; BouCk, 2011). It is precisely the situations of emergency and disadvantage that stimulate the professional growth of educators and pushes them to seek new teaching / learning strategies. The school context becomes a privileged environment in which barriers become accessible and peer collaboration develops. Technology, therefore, becomes the medium of interaction between the inside of the school and the outside of the socio-cultural context of the subject (Toto, 2017; 2018). To develop autonomy and equal opportunities in children with disadvantages, a planned and systemic use of technology is also necessary. The didactic design rethought in this perspective allows the acquisition of life skills.

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Researching the Impact of Indexes to Use an Enterprise Innovative Potential on Its Valuation

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Abstract

The article analyses the innovative development of the Russian Federation enterprises considering the statistical reporting data, as well as the results of researching dependence of industrial enterprise valuation upon different factors of its innovative development using methodologies of correlation and regression analysis. The obtained results could be applied not only to an enterprise valuation but to the innovation development strategies of an industrial enterprise.

Keywords: Industrial Enterprise, Enterprise Innovative Potential, Enterprise Innovative Development, Enterprise Valuation, Innovation Development Strategy.

Introduction

Under the current business environment conditions, one of the main factors of the efficient long-term functioning of an industrial complex is the constant innovation development as an indispensable condition to reduce the dependence of the domestic economy on world market conditions. Additionally, innovative potential and the innovation development pace influence the enterprise valuation as a business.

Currently, the researchers have not completely investigated valuation of the impact of an enterprise innovation development indexes on an industrial enterprise value; it necessitates its further improvement. The importance of this evaluation is due to the fact that the value of the company becomes an indicator of success; a company management obtains an additional motivating incentive to form, strengthen, and use certain indicators of innovation development.

The factors restraining the innovative development of industrial enterprises in the Russian Federation include the following:

- underinvesting technological and innovative development by private investors, associated with the uncertainty of the payback period and economic efficiency of projects in the field of innovative development (fig. 1);

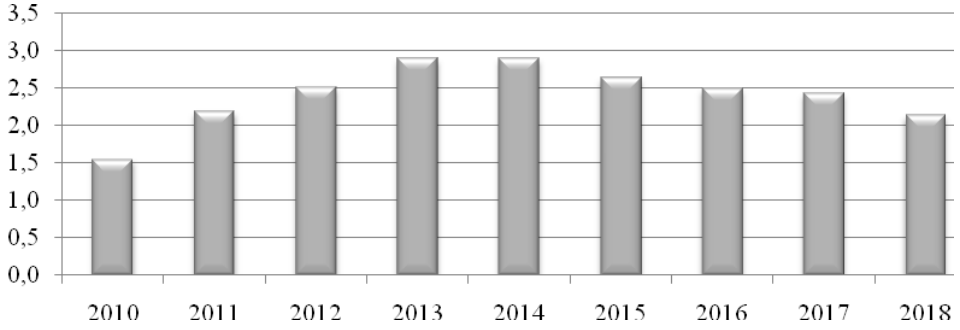

Fig. 1: The cost share for technological innovation in the total volume of goods shipped, work and services performed in the Russian Federation,% [1]

- the deficiency of a systematic approach to stimulating the innovative activity of enterprises at the state level and the insufficient participation of the state in investing innovations (fig. 2);

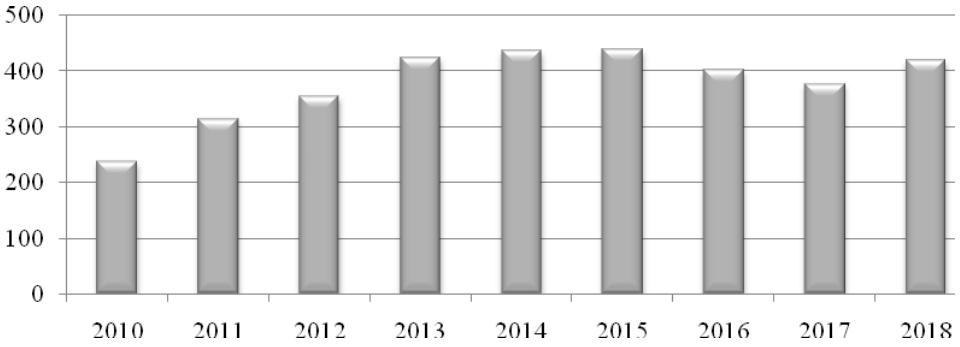

Fig. 2: Financing science from the federal budget of the Russian Federation, billion rubles [1]

- low efficiency of the innovation infrastructure created as a part of the implementation of various development programs and, often, not fulfilling the functions assigned to them;
- the educational system lag from the global trends in high-tech production areas and, as a consequence, a reduction in the number of personnel engaged in research and development in industry (fig. 3).

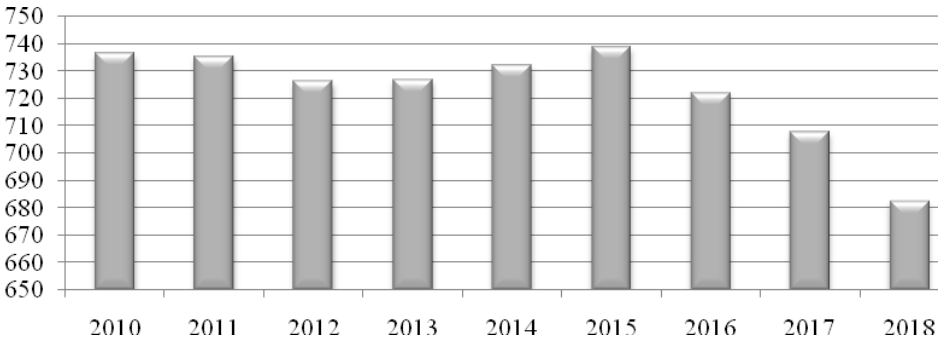

Fig. 3: The number of personnel engaged in research and development in the Russian Federation, thousand people [2]

Decrease in innovation activity resulted in a number of the problems; this lead to decrease in the number of patent applications filed (fig. 4) and the share of domestic patents in the total number of patents granted in the Russian Federation (fig. 5).

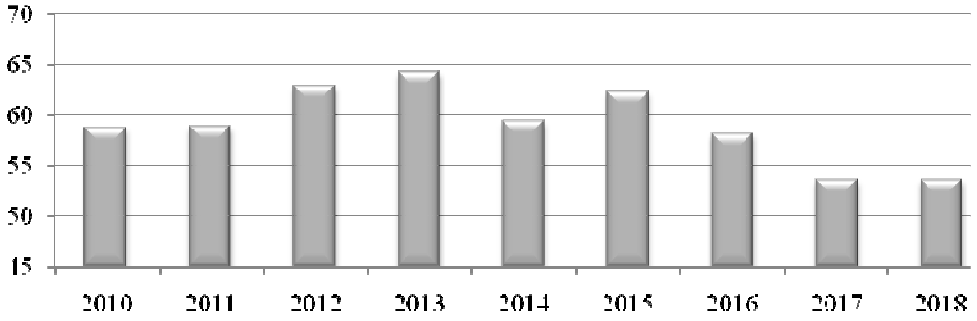

Fig. 4: Patent applications filed in the Russian Federation, thousand items [2]

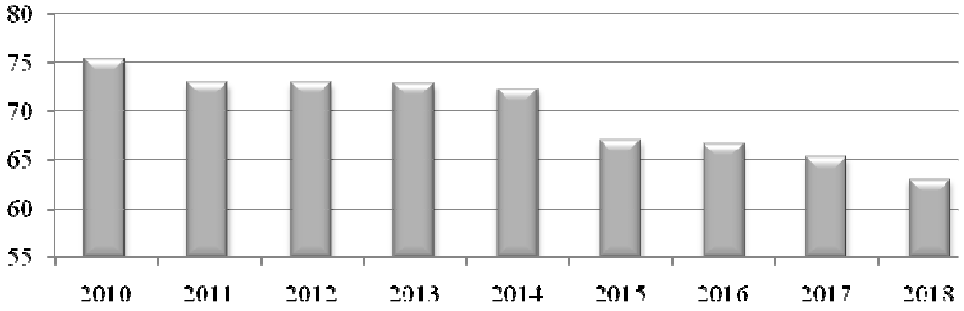

Fig. 5: Share of the domestic patent filed, in the total number of patents granted in the Russian Federation, % [2]

The current trends lead to a decrease in the competitiveness of domestic industrial enterprises and their products in the world market and, as a result, a decrease in the value of these enterprises as a ready-made business.

Choice of Innovation Development Factors Influencing an Industrial Enterprise Valuation

To develop the research base, forming a system of indicators will reflect an innovative development of an enterprise. Since the innovative development directly depends on the innovative potential, it is necessary to form a conceptual apparatus.

Several scientific research formulate the concept of "the innovative potential of an enterprise" (Kravchenko S. I., Kladchenko I. S. (2008), Merzlyakova E. A. (2015), Mingaleva Zh. A. (2013), Mylnikova L. A. (2014)), and M.F. Safargaliev (2011) understands the innovation potential as “a combination of various financial, industrial, technical, intellectual and labor resources that ensure the implementation of innovative activities leading to the creation of fundamentally new products or technology, or modifications to the innovations already proved”.

The concept of "innovative development" is connected to the scientific research of a number of scientists (Dubinin A. S. (2013), Kardash I. N. (2013), Mindeli L.E., Chernykh S.I. (2014), Mironova N. B. (2013)), while the authors share P.N. Dolzhnikov’s (2009) definition, who believes that “innovative development is a business process based on the continuous search and use of new

methods and areas to realize an enterprise potential in the changing environment in the framework of the chosen mission and accepted business motivation, coupled with the modification of existing sales markets and forming new ones".

The values within the composition of the innovative potential characterizing the innovative development of an enterprise are quantitative indicators, reflecting:

- enterprise product manufactured;
- enterprise fixed assets;
- enterprise technology used;
- personnel characteristics;
- finance;
- enterprise organizational structure.

Since the enterprise valuation allows identifying the most likely price, an independent informed customer is willing to pay to an independent informed seller in an open competitive market; the evaluation process itself can be reduced to solving a mathematical and economic problems, and acceptable methods to solve mathematical problems within mathematical modeling sphere of economic and statistical patterns and quantities (14. Bickel P.J., Doksum K.A. (2001)). The current statistical methods to process and analyze data used for the comparison can reduce the impact of subjectivity in the evaluation.

The effective sign in the used statistical model will be the enterprise valuation, and quantitative indicators of the innovative potential of an enterprise are chosen as key factors affecting the innovative development of the enterprise.

To conduct the study, the data are used for engineering companies engaged in research and development in the field of technical sciences. The data used are the annual statistical collections of Rosstat, thematic periodicals, the Unified Federal Register of Information on the Facts of Activities of Legal Entities, Rospatent, the websites of organizations, and annual reports. Some data are confidential, therefore, the authors have decided to conceal the organization names.

Since increasing the enterprise valuation is not feasible proportionally to changing the factors influencing it, it is possible to use a logarithmic model. This model provides a slowing growth of the effective attribute when the factor changes, which corresponds to the economic nature of the change in the enterprise valuation. In this occasion, the regression equation will look like:

$$\hat{y} = b_0 + b_1 \cdot \ln x_1 + b_2 \cdot \ln x_2 + \ldots + b_n \cdot \ln x_n$$

In logarithmic multiple regression, the parameters at *x* are called the "pure" regression coefficients. They characterize an average result change with a change in the corresponding factor by 1% while the value of other factors is kept unchanged and fixed at an average level.

To build a regression model, the following factors are selected:

- share of shipped innovative products of an enterprise in the total revenue (x_1);
- number of registered intellectual property objects owned by an enterprise, as well as used under licensing agreements (x_2);
- share of machinery and equipment aged up to 5 years in the total machinery and equipment cost at enterprises performing research and development (x_3);
- share of research and development cost in the total enterprise costs (x_4);
- share of employees performing research and development in the total number of personnel (x_1).

Table 1 presents the initial data of the model.

Table 1: The initial data of the model

Target of research	Enterprise valuation, million rubles.	Share of shipped innovative products of an enterprise in the total revenue,%	Number of registered intellectual property objects belonging to an enterprise, as well as used under license agreements, items	Share of machinery and equipment aged 5 years old in the total machinery and equipment cost at enterprises performing research and development, %	Share of research and development cost in the total enterprise costs, %	Share of employees performing research and development in the total number of personnel, %
	y	x_1	x_2	x_3	x_4	x_5
Enterprise 1	61,8	74,8	1	13	17,2	76,2
Enterprise 2	64,2	78,2	1	12	19,7	68,7
Enterprise 3	68,2	75,1	2	14	16,8	48,3
Enterprise 4	70,7	75,5	3	12	18,4	54,9
Enterprise 5	73,1	78,8	2	14	17,8	62,5
Enterprise 6	73,3	83,1	2	13	18,3	82,4
Enterprise 7	74,8	80,6	2	17	22,4	63,7
Enterprise 8	75,6	79,8	3	18	23,6	79,1
Enterprise 9	81,0	85,6	2	27	30,3	60,6
Enterprise 10	81,2	83,2	3	25	25,1	83,7

To quantify the degree of deviation of the initial information from the normal distribution, the ratio of the asymmetry index to its error and the ratio of the kurtosis index to its error are used. As a result of checking the initial data, the insignificance of the asymmetry and kurtosis coefficients is revealed; therefore, the data array practically corresponds to the law of normal distribution and they can be used for the correlation analysis.

For the final selection of factors to be included in the regression model, it is necessary to evaluate their multicollinearity using the correlation matrix (Table 2).

Table 2: Matrix of pair correlation coefficients

	y	x_1	x_2	x_3	x_4	x_5
y	1	0,8256	0,7436	0,8435	0,7896	0,1695
x_1		1	0,3107	0,5442	0,7905	0,4298
x_2			1	0,4271	0,3505	-0,0449
x_3				1	0,9085	0,1998
x_4					1	0,2324
x_5						1

The calculated values of the correlation coefficients indicate the following:

- factors x_1, x_2, x_3 and x_4 correlating with an effective attribute indicates their close relationship;
- factor x_4, however, is collinear to factor x_3, while the influence on the resultant trait of factor x_3 is greater, therefore, x_4 must be excluded from the regression model;
- factor x_4 does not practically affect the effective feature.

As a result, three factors should be included into the model:
- share of shipped innovative products of an enterprise in the total revenue (x_1);

- number of registered intellectual property objects owned by an enterprise, as well as used under licensing agreements (x_2);
- share of machinery and equipment aged up to 5 years in the total machinery and equipment cost at enterprises performing research and development (x_3);

Constructing A Regression Model of An Industrial Enterprise Valuation Depending on The Selected Factors

To calculate the coefficients of the regression equation, the initial numerical data should be presented in the form of logarithms (Table 3).

Table 3: Logarithmic initial data

Target of research	*y*	x_1	x_2	x_3
Enterprise 1	61,8	4,314817885	0	2,564949357
Enterprise 2	64,2	4,359269648	0	2,48490665
Enterprise 3	68,2	4,318820559	0,693147181	2,63905733
Enterprise 4	70,7	4,324132656	1,098612289	2,48490665
Enterprise 5	73,1	4,366912997	0,693147181	2,63905733
Enterprise 6	73,3	4,420044702	0,693147181	2,564949357
Enterprise 7	74,8	4,38949865	0,693147181	2,833213344
Enterprise 8	75,6	4,379523504	1,098612289	2,890371758
Enterprise 9	81	4,449685283	0,693147181	3,295836866
Enterprise 10	81,2	4,421247348	1,098612289	3,218875825

Table 4 presents regression statistics.

Table 4: Regression Statistics indicators

Indicator	Value
Multiple R	0,9876
R^2	0,9753
Standardized R^2	0,9605
Standard error	1,0976
Observations	10

Based on the table 4, we can draw the following conclusions:

- multiple correlation coefficient is close enough to 1, which indicates a close relationship of the selected factors with the result;
- coefficient of multiple determination of R^2 indicates that the change in the effective feature by 97% explains a variation of the selected factors.

To assess the statistical significance of the linear regression coefficients, the Student t-test is used (Table 5).

Table 5: Variance analysis indicators

	Coefficients	Standard error	*t*-Statistics	*P*-Value
Y intersection	-201,118157	55,77072014	-3,606160302	0,015442714
x_1	56,87787971	13,67740646	4,158528145	0,008836678

x_2	6,981678595	1,286419008	5,427219707	0,002878291
x_3	7,277529571	2,147457953	3,388904336	0,019484507

Student t-test verification allows highlighting the significance of regression equation coefficients with a probability of at least 0.98. Verification of the regression model adequacy by the Fisher test indicates the determination coefficient significance with a probability of at least 0.9998.

As a result, the logarithmic regression equation is as follows:

$$\hat{y} = -201{,}12 + 56{,}878 \cdot \ln x_1 + 6{,}982 \cdot \ln x_2 + 7{,}278 \cdot \ln x_3$$

Describing the equation requires to interpret correctly the coefficients of the equation during the logarithm. In our occasion, the coefficients b_1, b_2, and b_3 characterize the change rate of a productive attribute under the influence of factorial units while increasing the value x_i by 1% results in y changing by $b_i/100$ in their own units.

Based on the obtained regression model, we could see that an increase in the share of shipped innovative products of the enterprise in the total revenue by 1% results in increasing the enterprise valuation by 0.57 million rubles; with an increase in the number of registered intellectual property owned by the enterprise, as well as used under license agreements by 1%, the enterprise valuation will increase by 0.07 million rubles; an increase in the share of machinery and equipment aged up to 5 years in the total cost of machinery and equipment at the enterprise performing research and development will lead to the enterprise valuation increase by 0.07 mln. rubles.

Conclusion

The regression model constructed as a result of the research reveals the fundamental factors influencing the valuation of an industrial enterprise. Moreover, this approach can be used for any industrial enterprises. In this occasion, the analysis requires to consider a complete set of factors so that the most significant of them become apparent at the selection stage. The composition of factors may differ from the given in this research and will reflect the specifics of the industry. In addition, such a regression model allowing evaluating the enterprise valuation can also be used to develop a strategy for the innovative development of enterprises to determine key areas of the development and make effective management decisions during such a strategy implementation.

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An Approach To The Implementation of Risk Management In Operating Activities of Romanian SMEs

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Abstract

Small and Medium-sized Enterprises (SMEs), like any other organization, face many risks, but tend to reactively perceive risk management activities, greatly reducing the capacity of available resources to mitigate risks. By implementing a structured approach to risk management within the operations of SMEs, benefits such as reducing global risks, reducing costs, organizational alignment with the mission and objectives of SMEs can be achieved. The purpose of this paper is to identify if there is a significant correlation between perception of the possible benefits obtained from implementation of risk management and integration of risk management into operating activities within Romanian SMEs. The results indicate that appreciating the importance of increasing profitability and revenues and identifying and controlling a greater number of risks at entity level, as potential benefits of implementing risk management, have a significant and negative contribution to the extent to which risk management is integrated into operating activities of Romanian SMEs. In contrast, there is a significant and positive association between the extent to which risk management practices are applied in the operating activities of Romanian SMEs and the importance of aligning risk management with company objectives and increasing stakeholder satisfaction and involvement in risk management.

Keywords: Benefits, Implementation, Romania, Risk Management, Small And Medium-Sized Enterprises.

Introduction

Small and Medium-sized Enterprises (SMEs) are essential for the growth of any economy, the advantages they offer consist of the contribution to the production of goods and services, the creation of jobs with relatively low capital, the reduction of income disparities, the formation of qualified and semi-skilled human resources and the reduction of poverty (Rogerson, 2001).

Currently, SMEs play an important role in the Romanian economy. They generate 52.7% of the total value added and 65.8% of the total employment, yet the percentage is lower than the EU averages of 56.4% and 66.6%. The average productivity of Romanian SMEs, calculated as an added value for each employed person, is about EUR 15.100, significantly lower than the EU average of about EUR 44.600. On the other hand, Romanian SMEs employ on average 5.5 people, exceeding the EU average of 3.9 (European Commission, 2019).

The peculiarities of SMEs that make them vulnerable are limited access to finance, inadequate capital, instability, lack of appropriate records, lack of technology, lack of entrepreneurial and management skills, small-scale operations with low growth potential (Mwaniki, 2006).

Like any other organization, SMEs face many risks, but their ability to treat them is lower compared to large firms (Agrawal, 2016). On the other hand, within SMEs it is very difficult to differentiate between the role of manager and owner in terms of managing business risks. (St-Pierre & Bahri, 2006). Risks specific to small and medium-sized enterprises according to the Risk Management Guide for Small Businesses, the first and only guide issued regarding risk management in small organizations, by the Global Risk Alliance (GRA) and NSW Department of State and Regional Development, Small Business Development Division, are: financial, organisational, compliance/legal, operational, commercial, security, strategic, equipment, reputation, service delivery, project, stakeholder management, technology (GRA, NSW, 2005).

The study aims to analyze the extent to which the decision-makers perception of the different benefits of risk management correlates with the implementation of risk management in operating activities. This type of operation was chosen due to the fact that, in general, risk management is frequently used in strategic decisions. The application of risk management at the level of operating activities denotes the fact that the company considers that it has a high importance for the effective conduct of the activities.

Literature Review

The late 1990s is characterized by the publication of several books and articles on enterprise/integrated risk management and the emergence of specialized publications that included the word "risk" in titles (Power, 2004). However, until 2009 there was no accepted global framework or standard that could be used to establish or evaluate risk management activities (Frigo & Anderson, 2011). In 2009, the ISO 31000:2009 standard was issued, which brought more rigor in the areas of risk management implementation and boosted studies on the implementation of risk management in SMEs.

Simultaneously, were studied benefits of implementing risk management in an integrated approach within the organization. The differentiation between the integrated approach of risk management and the traditional one is made in terms of design and effectiveness regarding the creation of value for the organization. While the integrated approach also focuses on opportunities to bring value to the entity, generic risk management aims to eliminate the risks perceived as threats (Acharyya, 2013).

In the literature, the concept of enterprise risk management (ERM) is sometimes replaced by synonyms such as holistic risk management (HRM), integrated risk management (IRM), strategic risk management (SRM) or total risk management (TRM). Enterprise risk management (ERM) has emerged as a new approach to risk management that aims to manage in an integrated manner the risk portfolio that an organization is facing. In contrast to the traditional risk management approach, where individual risk categories are managed from the “in silo” perspective, ERM involves a holistic risk approach, enabling companies to take into account the correlations between all risk categories. (Monda & Giorgino, 2013)

Louw & Com (2007) states, based on DeLoach's study (2005, p. 3), that the ERM focus is on integrating risk management with existing management processes, on identifying future events that may have positive or negative effects and on evaluating the effectiveness of strategies to manage the organization's exposure to possible events.

There are three ways ERM helps the organization to manage risks, so as to protect and increase the value of the company (Protiviti, 2006):

- Establishing a sustainable competitive advantage. ERM supports the transition of the organization from a “in silo” risk management to a strategic one, which concentrates and applies the risk management process to all the sources of value of the entity.
- Optimizing the cost of risk management by aggregating risk acceptance and transfer decisions, eliminating the redundant activities and establishing the level of risk that the organization is willing to accept when running the business model.

- Management support to improve business performance by reducing performance variability and exposure to losses by anticipating future events with major impacts, and developing responses regarding their management.

Institute of Internal Auditors (2009) defines ERM as a structured, solid and continuous process, carried out throughout the organization, in order to identify, evaluate, respond and report the opportunities and threats that have an impact on the achievement of the objectives. EY (2016) creates a scheme that includes the ERM features. This is shown in Figure 1.

ISO 31000 (2009) outlines the integrated risk management approach made up of interdependent components of ERM/IRM, these derive from the way the management administrates the organization and from the way the components are integrated in the management process.

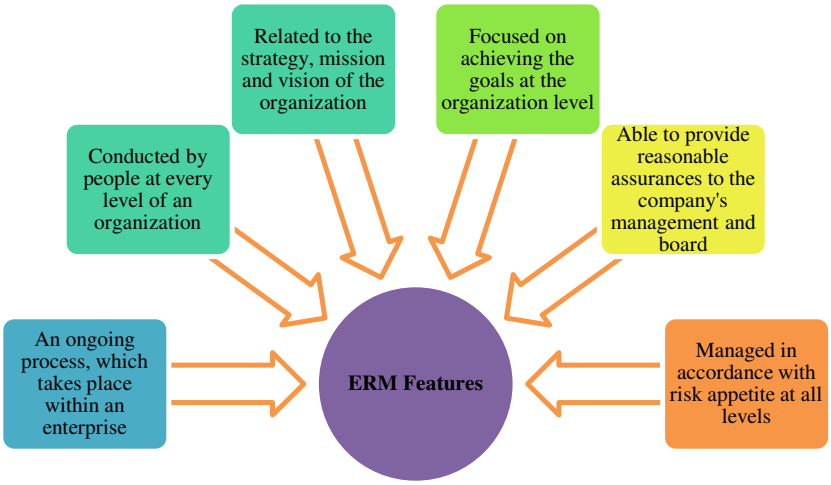

Figure 1: ERM Features

Source: Adapted from EY (2016)

Implementation of integrated risk management is an exercise in change management, there will be people who embrace change and see it as a welcome improvement for the company, but there will be people who consider change as an unnecessary work. When the need for implementation is exposed to management, the focus should be on the benefits granted to the organization, few managers can dispute the benefits of risk management or if the performance of an entity is consistent with the volume of risks managed (Society of Actuaries, 2006). ERM can really reduce risk exposure, improve the decision making process and bring benefits on a large scale, but only if implemented correctly. ERM also allows organizations to become more entrepreneurial, because, once risk management is adequate, they will have the confidence and knowledge to carry out new activities (Howard, 2009). Figure 2 presents the benefits of implementing integrated risk management.

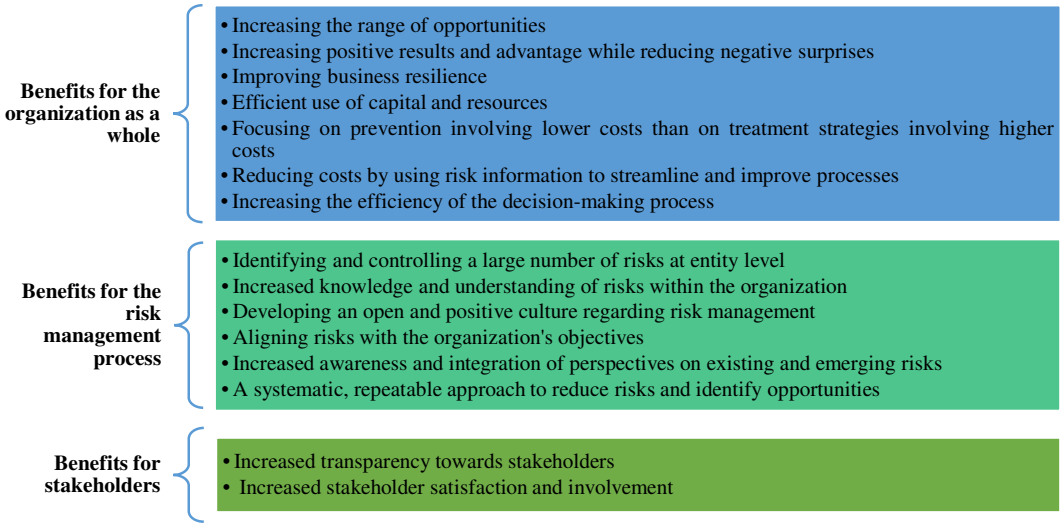

Figure 2: The benefits of implementing integrated risk management

Source: Adapted from Argyrou; Dr. Schanz Alms & Company, (2015), Ciocoiu (2015), COSO (2017), PwC (2016), Standards of Sound Business and Financial Practices (2011)

In practice, implementing risk management has offered organizations various advantages as well: reducing the total cost of risk out of turnover, from 2.7% in 2006 to 2.2% in 2010 (DLA Piper), reducing exposure to risk with 85% for 51 analyzed projects (Nestle), decreasing of financial exposure of significant risks by 70% (Government Agency) (Howard, 2009).

The specialized literature is characterized by a small number of studies in which the issue of perceiving the benefits of implementing risk management is addressed, either they are interpreted as results obtained from the implementation of the risk management program, or as reasons for the companies to engage in the risk management program.

For example, a study conducted on listed companies in Malaysia, evaluates, through exploratory factor analysis (EFA), the intensity and challenges of implementing risk management, but also its benefits such as: improving the clarity of the decision-making process throughout the organization, increasing the profitability of the company, awareness of the risk among employees, improving communication with stakeholders/shareholders, significant contribution to the achievement of the strategic objectives of company (Lai, 2014). Also, Hoyt & Liebenberg (2011) have researched the advantages of ERM in the insurance field, using data for 117 companies listed on the US stock exchange, from 1998 to 2005, and found that there is a positive relationship between the implementation of risk management and the performance of firms.

Methodology of Research

The purpose of this paper is to identify if there is a significant correlation between perception of the possible benefits obtained from implementation of risk management and integration of risk management into operating activities within Romanian SMEs. The benefits category includes a number of elements drawn from previous studies of various authors from Romania and abroad (Ciocoiu, 2015; COSO, 2017; Lai, 2014; PwC, 2016).

The questionnaire was adopted as a means of collecting reliable and quantifiable data at a reasonable cost. The target population was composed of owners, managers, risk managers, project managers of the Romanian SMEs. From a total of 390 owners and managers who were invited to complete the questionnaire online, only 185 representatives of the Romanian SMEs participated, and 164

questionnaires were validated. The first part of the questionnaire contains three questions regarding the size of the organization, the age on the market and the level at which it operates, in the form of checklists. The second part has 7 questions addressed to the extent to which the risk management is used in the operating activities of the company and the perception of its benefits as a factor underlying the implementation. The benefits listed in the questionnaire refer to: increasing profitability and revenue, increasing the efficiency of the decision-making process and the efficient use of resources, developing a culture of risk managemnet in the company,

aligning risk management to the company objectives, identifying and controlling a large number of risks at entity level, increasing satisfaction and stakeholder involvement in the risk management process. The second part of the questionnaire used interval rating scale measurement with three-point Likert-Scale.

To analyze the data was used descriptive statistical methods such as averages and standard deviation, and inferential statistical methods such as linear regression, at the level of statistical significance of 0.01. The following hypotheses will be tested in this study:

H1: There is a significant relationship between increasing profitability and revenues and the extent to which risk management is integrated within SMEs in Romania.
H2: There is a significant relationship between increasing the efficiency of the decision-making process and the efficient use of resources and the extent to which risk management is integrated within SMEs in Romania.
H3: There is a significant relationship between the development of a culture of risk management in the company and the extent to which the risk management is integrated within the Romanian SMEs.
H4: There is a significant relationship between the alignment of the risk management with the objectives of the company and the extent to which the risk management is integrated within the SMEs in Romania.
H5: There is a significant relationship between the identification and control of a greater number of risks at entity level and the extent to which the risk management is integrated within the Romanian SMEs.
H6: There is a significant relationship between increased satisfaction and stakeholder involvement in the risk management process and the extent to which risk management is integrated within Romanian SMEs.

For each hypothesis was defined the null hypothesis H_0: The analysed variables are statisticaly independent (there is no association between the analysed variables) and the alternative hypothesis H_a: There is an association between the analysed variables.

Results and Discussion

The results from the descriptive statistics as presented in Table 1 indicate an average of integrating risk management into the organization's operating activities of 0.216 for the SMEs under consideration. It represents an average percentage (%) distribution of approximately 21%.

On the other hand; increasing profitability and revenue, increasing the efficiency of the decision-making process and the efficient use of resources, developing a culture of risk management, aligning risk management with company objectives, identifying and controlling a greater number of risks at the entity level and increasing satisfaction and involvement stakeholders in risk management have an average distribution value of 0.263, respectively 0.257, 0.245, 0.238, 0.245, 0.237 for the sampled SMEs.

Table 1: Descriptive Statistics

	Mean	Std. Deviation	N
RM integration in operating activities of the company	2.16	0.824	164
Increasing profitability and revenue	2.63	0.638	164
Increasing the efficiency of the decision-making process and the efficient use of resources	2.57	0.710	164
Developing a culture of RM in the company	2.45	0.753	164
Aligning RM to the company objectives	2.38	0.778	164
Identifying and controlling a large number of risks at entity level	2.45	0.720	164
Increasing satisfaction and stakeholder involvement in the RM process	2.37	0.760	164

Source: Own calculations

Conversely, the review of empirical results from the Pearson correlation analysis, presented in Table 2, regarding the relationship between the variable of risk management integration in the operating activities of the Romanian SMEs and the variables represented by increasing the efficiency of the decision-making process and the efficient allocation of resources, developing a culture of risk management in the company, aligning the risk management with the objectives of the company, and increasing the satisfaction and involvement of the stakeholders, shows that the correlations are positive at a probability level of 1% with the following correlation coefficients (r): 0.259, 0.198, 0.324, respectively 0.266.

In contrast, between the integration of risk management in the operations of the analyzed SMEs and the increase of profitability and the identification and control of a greater number of risks at entity level, the correlations are insignificant, being higher than the 1% probability level established.

Table 2: Pearson correlations for selected SMEs

	RM integration in operating activities of the company	Increasing profitability and revenue	Increasing the efficiency of the decision-making process and the efficient use of resources	Developing a culture of RM in the company	Aligning RM to the company objectives	Identifying and controlling a large number of risks at entity level	Increasing satisfaction and stakeholder involvement in the RM process
RM integration in operating activities of the company							
Pearson Correlation	1						
Sig. (1-tailed)	.						
N	164						
Increasing profitability and revenue							
Pearson Correlation	0.000	1					
Sig. (1-tailed)	0.497	.					
N	164	164					
Increasing the efficiency of the decision-making process and the efficient use of resources							
Pearson Correlation	0.259	0.617	1				
Sig. (1-tailed)	0.000	0.000	.				
N	164	164	164				
Developing a culture of RM in the company							
Pearson Correlation	0.198	0.577	0.660	1			
Sig. (1-tailed)	0.006	0.000	0.000	.			
N	164	164	164	164			
Aligning RM to the company objectives							
Pearson Correlation	0.324	0.520	0.665	0.769	1		
Sig. (1-tailed)	0.000	0.000	0.000	0.000	.		
N	164	164	164	164	164		
Identifying and controlling a large number of risks at entity level							
Pearson Correlation	0.143	0.568	0.600	0.701	0.789	1	
Sig. (1-tailed)	0.034	0.000	0.000	0.000	0.000	.	
N	164	164	164	164	164	164	
Increasing satisfaction and stakeholder involvement in the RM process							
Pearson Correlation	0.266	0.549	0.534	0.679	0.668	0.717	1
Sig. (1-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	.
N	164	164	164	164	164	164	164

Source: Own calculations

First, the multicollinearity test was performed before the analysis of the regression model, considering that this may affect the parameters of the regression model. Field (2009) suggests that a tolerance value of less than 0.1 indicates a serious multicollinearity problem between independent variables, and a

value of variance inflation factor (VIF) greater than 10 calls for concern. The regression model parameters in this study do not present problems of multicollinearity, considering that all tolerance values are greater than 0.10 and all VIF values are less than 10.

In Table 3, the results of the linear regression show that the correlation between the dependent variable, which is represented by the degree of risk management integration in the operating activities of the Romanian SMEs analyzed and the predictors represented by the perception of the importance of the benefits of the risk management implementation. (6 variables - increasing the profitability and revenues, increasing the efficiency of the decision-making process and the efficient use of resources, developing a culture of risk management in the company, aligning the risk management with the company objectives, identifying and controlling a greater number of risks at entity level, increasing satisfaction and stakeholder involvement in the risk management process) has a high value (0.479) and in the same direction.

Also, the results of the regression analysis for the selected SMEs, described in Table 3, show that R-Square, which is often referred to as the coefficient of determination of the variables, has a value of 0.230. R-Square indicates that the model is able to explain about 23% of the variability of the integration of risk management in the operating activities of the questioned SMEs. This means that approximately 77% of the variation of risk management integration within the sampled SMEs are accounted for by other factors not included in the model. This result is corroborated by the Adjusted R-Square of about 0.200, which is in essence the proportion of total variance that is explained by the model.

Table 3: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.479	0.230	0.200	0.737	0.230	7.795	6	157	0.000

Source: Own calculations

Similarly, findings from F-statistic test, as reflected in Table 3, it has a p-value less than 0.01; this clearly suggests that simultaneously the explanatory variables are significantly associated with the dependent variable, integrating risk management into the operating activities of organizations.

In Table 4, the results of the linear regression analysis show that, the perceived importance of the benefits of risk management implementation influences the extent to which the risk management practices are integrated in the operating activities within the analyzed SMEs, at the level of statistical significance of 0.01 are represented by increasing profitability and revenues (t-statistics = -3.178; p-value = 0.002), aligning risk management with company objectives (t-statistics = 3.512; p-value = 0.001) identifying and controlling a greater number of risks at entity level (t-statistics = -2.713; p-value = 0.007) and increasing satisfaction and stakeholder involvement in the risk management process (t-statistics = 2.916; p-value = 0.004).

The association between aligning risk management with company objectives (beta coefficient = 0.476), increasing satisfaction and involving stakeholders in risk management (beta coefficient = 0.318) and integrating risk management into operating activities within SMEs is significant and positive, indicating that the greater the importance attached to these benefits of implementing risk management, the greater the extent to which risk management is incorporated. In contrast, the association between increasing profitability and revenue (beta coefficient = -0.307), identifying and controlling of a greater number of risks at entity level (beta coefficient = -0.347) and integrating of risk management within SMEs is significant and negative, indicating that the greater the importance attached to these benefits of the implementation of risk management, the less the extent to which the risk management is integrated into the operating activities of the questioned Romanian SMEs.

Table 4: Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	1.753	0.262		6.692	0.000		
Increasing profitability and revenue	-0.396	0.125	-0.307	-3.178	0.002	0.526	1.899
Increasing the efficiency of the decision-making process and the efficient use of resources	0.301	0.123	0.259	2.450	0.015	0.438	2.285
Developing a culture of RM in the company	-0.148	0.135	-0.135	-1.098	0.274	0.324	3.090
Aligning RM to the company objectives	0.504	0.144	0.476	3.512	0.001	0.267	3.749
Identifying and controlling a large number of risks at entity level	-0.397	0.146	-0.347	-2.713	0.007	0.299	3.341
Increasing satisfaction and stakeholder involvement in the RM process	0.345	0.118	0.318	2.916	0.004	0.412	2.428

Source: Own calculations

Table 5 shows the results of the above analysis, indicating acceptance or rejection of the hypothesis.

Table 5: The results of hyphothesis testing

Hypothesis	t-statistics	*p*	Acceptation of the null hypothesis
H1	-3.178	0.002	NO (there is a connection between the analysed variables)
H2	2.450	0.015	YES (there is no connection between the analysed variables)
H3	-1.098	0.274	YES (there is no connection between the analysed variables)
H4	3.512	0.001	NO (there is a connection between the analysed variables)
H5	-2.713	0.007	NO (there is a connection between the analysed variables)
H6	2.916	0.004	NO (there is a connection between the analysed variables)

Source: Own calculations

Conclusions

This study analyzed the connection between the perceived importance of the benefits of risk management implementation and the extent to which risk management practices are integrated in operating activities within SMEs in Romania.

The results indicate that appreciation of the importance of increasing profitability and revenue as a possible benefit obtained from the implementation of risk management has a significant contribution on the degree of integration of risk management in Romanian SMEs. The study also shows, there is a significant negative relationship between identifying and controlling a greater number of risks at the entity level and the extent to which risk management is integrated. Contrary to expectations, the nature of the relationship between the two variables is negative, that is, an increase in the risk management integration measure will lead to a decrease in the importance of increasing profitability and revenue. This result may be possible in the context of the difficulty of measuring the risk management performances in relation to the resources allocated and the complexity of the specific risk management process.

The research also indicates a positive association between the degree of use of risk management practices and the importance of aligning risk management with the firm's objectives and increasing stakeholder satisfaction and involvement. Therefore, a robust risk management approach provides relevant information to decision-makers, contributing to increasing the possibility of selecting an optimal strategy, and improving communication and stakeholder involvement, by regularly providing reports and taking into account their requirements in the risk management process.

An important limitation of this paper is the size of the sample given the numerous SMEs operating in Romania. To address this limitation, the following research aims to increase the sample size.

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Directions of Changes in Polish ICT Enterprises After the COVID 19 Epidemic - Results of Own Research[1]

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Abstract

In the knowledge-based economy circumstances, the Information and Communication Technology (ICT) sector is the driving force behind the development of virtually the entire economy. Technological solutions stimulate innovation, contribute to the creation of new business models, and have created a new phenomenon in the information society. This picture, which was still valid at the beginning of 2020, presented to the ICT sector participants perspectives of uninterrupted growth, dependent only on the company's ability to follow changing technological trends. The COVID-19 epidemic has shaken the global economy, which has faced technology providers with a natural question about the timeliness of development directions defined so far. The purpose of this article is to attempt to approximate the conditions to which ICT enterprises are currently subject, and to indicate how enterprises respond to changes. The first part of the article defines the concept of the ICT sector, then discusses its evolution and importance for the development of the economy. The general characteristics of changes taking place in the ICT sector are discussed further, and on this basis research hypotheses were formulated. These were subsequently verified in an in-depth interview among 52 managers from 20 companies in the Polish ICT sector. The last part of the article presents the results of research as well as formulated conclusions.

Keywords: ICT market, IT market, strategic directions, covid crisis

Introduction

The ICT sector is described as a driving force for the development of the global economy [Shamim 2007; Garcia-Muniz, Vicante 2014; Sassi, Goaied 2013; WEF 2009; WEF 2015]. Investments in development and innovation contribute to the increase in the effectiveness of enterprises and build their intellectual capital. Enterprises in stock market reports bid on development ideas related to the implementation of new technologies, building a vision of future profits for investors. There is even a new term for an enterprise that builds its competitiveness based on new technologies - the so-called digital leader. This picture presented the participants of the ICT sector perspectives of undisturbed growth, dependent only on the company's ability to follow changing technological trends. The COVID-19 epidemic has shaken the global economy, which has faced technology providers with a natural question about the timeliness of development directions defined so far. The purpose of this article is to attempt to approximate the conditions in which ICT enterprises currently find themselves, and to indicate how enterprises respond to changes.

It should be emphasized that there is currently no detailed data available on the impact of the epidemic crisis on the ICT sector. In the global context, the first forecasts are created in selected market segments, and in the local context preliminary research is being conducted [KIGEiT, 2020; IDC 2020]. They have an undoubted cognitive dimension, but in a practical context they do not have a broader meaning. The

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goal chosen in the article fits in with this trend, while maintaining concentration primarily on managerial rather than macroeconomic aspects, which is typical of most available studies.

The first part of the article defines the concept of the ICT sector, then discusses its evolution and importance for the development of the economy. The general characteristics of changes taking place in the ICT sector are discussed further, and on this basis research hypotheses were formulated, which were verified in an in-depth interview among 52 managers from 20 companies in the Polish ICT sector. The last part of the article presents the results of research and formulated conclusions.

ICT sector and its Economic Importance

ICT sector has already been the subject of many different scientific publications and numerous reports [Shamim 2007; Lombard 2009; Garcia-Muniz, Vicante, 2014; Sassi, Goaied 2013; PARP 2017; IDC 2020]. This has contributed to the creation of very different ways of defining this sector [OECD 2011; Central Statistics Office 2010; PARP 2017; Zuppo, 2012; UNSC 2002]. An overview of the available definitions is not the purpose of this article, therefore, the basic sector definition created by the OECD. According to which, the ICT sector is defined as a set of enterprises conducting production and service activities, which consists in intercepting, sending and displaying data and information by electronic means [OECD 2002]. ICT sector is a combination of the IT sector (Information Technologies) and the telecommunications sector. According to the Gartner report, the size of the global ICT market was $3.7 trillion in 2019. Over the past 10 years, the ICT sector has seen annual value increases of around 3%. Among the most important market segments are: telecommunications services, equipment supplies, software development, data centers, and professional service providers [Gartner 2019]. In Poland, the situation of the ICT sector was described as stable. Since the beginning of 2014, GDP has been growing at a rate of at least 3.1% per year, and the share of the ICT sector in GDP is about 8% [PARP 2017].
ICT solutions are also a significant element of the Fourth Digital Revolution, which was distinguished by the World Economic Forum and Klaus Schwab. According to her concept, the boundaries between the physical world and ICT are becoming blurred and the saturation of IT solutions is constantly increasing [Schwab 2017].

According to the PARP report, the development of information technologies is the foundation of growth not only of the ICT sector, but also of the entire economy and society. The competitiveness of enterprises is largely based on the ability to use ICT sector solutions in the area of providing their own services or products [PARP 2017]. The role played by the ICT sector has been recognized not only in Europe; The World Economic Forum in cooperation with the Business School - INSEAD (INSEAD - The Business School for the World) measures the NRI (Networked Readiness Index), which can be defined as an indicator of readiness to use information technology communication in the economy of states [Stecyk 2009].

In the case of the ICT sector, there is a phenomenon of stimulating the growth of other economic fields, practically regardless of the economic profile of a given country, because the use of information and communication technologies leads to an increase in the efficiency of enterprises. However, this conclusion was not obvious, and was based on observations of the economies of strongly developing countries. In 1978, it was recognized that the widespread use of ICT was a source of success for the Japanese economy, and similar solutions began to be used in France. These activities became the foundation for building European strategies aimed at the development of the ICT sector, which, however, were not started until the 1990s [Grodzka 2009 p. in: Biuro Analiz Sejmowych 2009]. The widening technological divide between Europe, and Japan and the US led to the publication in 1994 of a set of recommendations for Europe and a global information society. Recommendations to the European Council (Europe and the Global Information Society) became the basis for shaping long-term strategies for the development of the ICT sector in Europe [http://ec.europa.eu/archives/ISPO/infosoc/ ..., date of download: 16/12/11].

The importance of the ICT sector for the development of the economy has increased over time, as the ability of enterprises to use products of this sector has increased. At the beginning of 2020, the ICT sector had prospects of almost unlimited growth.

General changes taking place in ICT enterprises in connection with the COIVID - 19 epidemic

The difficult macroeconomic situation related to the COVID-19 epidemic, which became a global pandemic in March 2020, reduces the general willingness of enterprises to spend, instead inclining them to strive to accumulate cash and cut costs. According to The IDC, the situation is not dramatic, however, the increase in spending on ICT in Europe in 2020 will amount to only 1.4%, which, compared to the December forecast that assumed 2.8%, is a 50% decrease. The pessimistic scenario assumes an increase of only 0.2% [IDC 2020].

Quarantine and temporary stoppages of many enterprises caused a degree of stagnation of demand for goods and services. This negatively affects, above all, the sectors whose products are consumer in nature. In the case of the ICT sector, the situation is more complex because, although some development investments of enterprises have been frozen, other purchasing decisions have become even more meaningful during the crisis. This is due to the fact that the use of ICT in enterprises can also be a source of savings and lead to a reduction in human participation in the provision of services. This phenomenon places before the ICT sector not only threats but also opportunities, inaccessible to other sectors, which construct their products and services with a small share of intellectual capital. An important element of transformation will be the marketing strategy of enterprises. It can be assumed that there will be changes in the share of revenues in individual market segments.

Business models of services rendered may also be subject to change in adapting to changing demand conditions.

One of the most important areas of ICT enterprises' activity, thanks to which it is possible to provide services to clients, is project implementation.

One of the results of the aforementioned research conducted by the author in 2011 was to verify the impact of external factors on the success of projects in the ICT sector. Under stable environmental conditions in which the study was conducted, as many as 97% of respondents indicated that "the degree of stability of the environment in the social, economic and environmental dimensions" has a significant impact on the management of project implementation processes [Jasinska, Szapiro 2014]. It can therefore be assumed that the area of project implementation will undergo significant transformation in connection with the epidemic. Changes may include not only the way projects are implemented but also the management of entire portfolios and changes in the perception of value built by projects. The implementation of projects is based on teamwork, in which the competences of members play a special role.

Until now, the ICT market was definitely an employee's market, not an employer's one. The constant shortage of specialists led to above average wages and salaries recorded in the sector. So the natural question arises as to how the crisis will affect staff in the sector. On the one hand, one can observe an increase in the number of projects, and a growing demand for specialists. On the other hand, however, some projects may freeze, which will result in less demand for highly qualified staff.

Leading players in the ICT sector in times of stable development took care of building the image as a professional entity that customers could rely on while implementing key projects for their business. In a crisis situation, building the right image is important for ICT companies. It should be remembered that ICT projects are often high-budget initiatives, forcing large expenses on clients. In the face of the progressing crisis, there is a natural expectation of the involvement of a trusted business partner in helping to solve current problems. In the image sphere, this is related to, for example, the implementation of social responsibility activities by ICT enterprises. Therefore, the question arises as to what type of activities are undertaken by ICT enterprises in the area of shaping their image in a crisis.

In the area of internal organization, the crisis associated with COVID-19 has had an influence in all industries, forcing a change in working methods, e.g. the introduction of telework and transferring

some of the processes previously carried out in a traditional form to the digital environment. An important element for verification is, therefore, how to reorganize work in enterprises and prepare them to adapt to changes.

In summary, in Table 1, areas have been identified that are undergoing changes due to the impact of the COVID-19 epidemics. The areas have been assigned the forecast change trends. In this way, hypotheses were constructed and verified in empirical studies.

Table 1: Areas of the ICT enterprise and its surroundings susceptible to changes related to the COVID-19 crisis

	Area of change	**Hypothesis: expected change trend**
H1	Demand and willingness to spend	Stagnation while maintaining the growth of selected segments
H2	Market opportunities and development	The emergence of new market opportunities. Interruption of previously stable trends
H3	Employment and demand for specialists	Turbulence in the employment market
H4	Implementation of projects	Changes in the scope of projects and portfolios
H5	Company image	Take action to combat the epidemic
H6	Management and work methods	Digitization of processes and teleworking
H7	Willingness to implement changes	High readiness

Hypothesis presented in Table 1 ware built on the basis of market observations described in this part of article, because the article was constructed in beginning of epidemic period.

The Empirical Studies

Trends indicated in the Table 1, expressed in the form of a hypothesis, were verified in empirical studies. This study was conducted from April 10-17, 2020 and involved in-depth interviews with 52 managers representing 20 companies from the Polish ICT sector. Companies were selected form the Polish Agency for Enterprise Development's list, that was presented in report "IT/ICT sector in Poland" [PARP, 2019]. Whole list included 200 companies. Only 20 of them respond. The study consisted of two parts. In the first stage, general questions were asked about the characterization of changes occurring in a given area of the enterprise and the market, and verified probable trends of changes, which are described in Table 1. In the second stage, deeper questions were asked to induce the respondent to think about the opportunities and threats, the reasons for the changes, and long-term impact of the diagnosed events on the enterprise.

The survey was completed by respondents whose characteristics are presented in Table 2.

Table 2: Share of respondents in the knowledge broken down by type of enterprise

Company	**Number of companies**	**percentage share of companies [%]**	**Number of people surveyed**	**Participation of respondents [%]**
Telecommunications operator	2	10%	12	23%
TV and internet provider	1	5%	4	8%
Software - house	2	10%	4	8%

Professional service provider (employee outsourcing)	1	5%	8	15%
Service company	2	10%	4	8%
A technological start-up	3	15%	5	10%
Cybersecurity and software tester	2	10%	6	12%
Data center	2	10%	2	4%
Hardware and software supplier	1	5%	1	2%
Equipment distributor	1	5%	1	2%
IT systems integrator	2	10%	4	8%
Provider of teletechnical systems	1	5%	1	2%

The first stage of the research

The first stage of the research revealed that the situation for telecommunications operators seems to be relatively stable, especially taking into account the mass market. However, a drop in satisfaction can be observed among customers due to the increase in complaints regarding the decrease in the quality of services provided. This problem is associated with a significant load on the data transmission network caused by the widespread use of telework. Real-time audio and video transmission requires stable link quality parameters. Access services provided in the mass segment for the most part do not have guaranteed quality, which significantly affects the quality of transmission in the event of an increase in load. Due to overloading, there are also numerous failures, the removal of which is difficult due to imposed restrictions. In business customer segments, there are decreases in revenues related to the freezing of projects and the desire to accumulate cash for corporate clients. Many of the companies that are clients of the operators are currently struggling with the effects of the crisis because they themselves have seen a decline in revenues. Service enterprises that operate in traditional sectors based on human work at the service point are the worst in this respect.

Respondents indicate that telecommunications operators have the opportunity to develop domain systems that can be provided in the SaaS model, as various telemedicine systems are indicated here as an example. Operator representatives see this trend as a long-term development that will continue even after the crisis. According to the survey, those employed by operators, systems based on M2M and IoT also create development perspectives, because they allow the elimination of human participation in the implementation of services, e.g. they allow reading a specific parameter remotely. Considering teleconferencing systems, respondents are seeing a slight increase in interest. Among the clients, publicly available tools offered by Microsoft (teams), google (Zoom) or Cisco (Webex) are used rather than ordered dedicated project-implemented systems. In the field of project management, respondents estimated that around 70% of customer development initiatives were stopped. However, projects focused on rapid digitization of processes have gained in importance.

The employment situation with operators is assessed as relatively stable. However, staff reduction strategies are implemented which originate for reasons other than the COVID-19 crisis. In the area of sales, recruitment has been suspended, and temporary part-time employment is being implemented. Remote work methods were implemented immediately and readiness to change the mode of work according to respondents was high.

In companies that are television and Internet providers, respondents observed similar trends of change. Unlike operators, a temporary increase in the purchase of internet access services and television packages on the mass market was recorded here. In the business market, however, a significant decrease

in revenues was recorded due to the temporary closure of hotels and the reduction in the purchase of television services. Both television providers and operators have developed remote customer service through electronic channels. According to the respondents, the activities were primarily to increase the infoline throughput and minimize the time of customer service in the electronic channel. It should be emphasized that television operators and suppliers are large enterprises, therefore they undertook large-scale image-building activities. For example, campaigns were carried out to spread knowledge about methods of protection against COVID-19, protective equipment was purchased for hospitals, and subsidies of foundations and purposeful fundraisers for the medical sector were organized. Taking into account local activities, computer equipment was made available to children from rural areas, and free internet access was provided to the poorest.

Subsidiaries of operators are to a large extent service and teletechnical system providers whose mobility has been limited. Respondents emphasized that currently both individual and corporate clients are not willing to contact representatives of enterprises. Thus, service companies and installers are developing ways in which the end users can do some of the work themselves. Similarly, when it comes to equipment, tests are carried out to increase the possibilities of existing models of equipment and reduce the need to replace them. Service companies have modified their strategy and instead of installing, they distribute equipment and other goods (even from outside the ICT sector). On the other hand, in the business segment, due to the large number of telecommunications infrastructure failures, the service department is currently carrying out fewer but more complex orders. Therefore, companies need to acquire more qualified personnel and reduce the number of less qualified service personnel.

According to the respondents, working methods in service companies have hardly changed, while a larger share of work was observed on the basis of remote user support.

According to respondents, an increase in orders was recorded in software houses. A particularly large number of orders appeared in companies associated with one main customer for many years or in those enterprises that form part of the capital group. Representatives of software-houses assessed the situation and concluded that in the event of an epidemic they received a large number of orders aimed at digitizing and developing electronic channels, as well as upgrading programming to adapt to remote work. Due to the decline in the value of PLN, interest in orders from abroad was noted, especially in software testing companies. In one of the surveyed enterprises, the number of traders selling abroad tripled. Both software developers and testers are used to working remotely, therefore the crisis situation did not significantly affect the way the work was organized. According to the respondents, the number of projects related to cybersecurity was limited. This is quite a surprising conclusion because due to the transfer of a large part of the work of companies to the network, the interest in security should grow. Software development is also associated with creating solutions for monitoring the activity of people in quarantine. The applications are used for social monitoring to determine the potential contact of an infected person with other people. Modeling the course of the epidemic, however, is performed using big data and AI analysis, which is also of interest to software developers. However, start-ups that are largely associated with the development of a specific application are in a difficult situation. Currently, the interest of enterprises in new ideas has significantly decreased, due to the strong commitment to the implementation of routine activities related to counteracting the effects of the crisis.

According to respondents, equipment manufacturers and distributors are currently in a quite difficult situation, because orders for equipment were largely related to the propensity of customers to implement large projects. Currently, development efforts have been limited, which resulted in the freezing of orders. Distribution of equipment is not a high-margin service, therefore distributors are counting on the possibility of employment reduction. Orders for subscriber and computer equipment are quite stable, which remained relatively intact due mainly to public sector orders. Equipment distributors and manufacturers have established cooperation with IT systems integrators, striving to stabilize the revenue line by creating cloud-based products. In this way, projects and built environments requiring the purchasing of a large amount of equipment are carried out, while reducing the need for its distributed installation. Data centers benefit from this strategy, which provide disk space for the needs of the systems. Hardware and software suppliers carry out extensive image-oriented activities aimed at providing free tools for the hospital and education sector. This trend has also hit professional

service providers, especially the outsourcing of qualified personnel. Due to the suspension of production and the freezing of projects, there was limited demand for outsourcing employees. The contracts concluded are pronounced and employees employed in this form experience considerable uncertainty.

The results of the first stage of the study are collected in Table 3.

Table 3: Diagnosed changes in ICT enterprises and their environment related to the COVID-19 crisis

Area of change	Hypothesis: expected change trend	Description
Demand and willingness to spend	Stagnation while maintaining the growth of selected segments	The hypothesis was confirmed with a pessimistic forecast regarding future changes in revenues. 40% of respondents reported an increase in revenue, which they treat as temporary. Ultimately, they expect long-term declines in the business segment reaching even 20% - 30%, which is associated with the pursuit of capital accumulation and the implementation of crisis plans in clients' enterprises. Only 2% of respondents expect an increase in revenues (test companies). Companies see significant opportunities for development in foreign markets due to the decrease in the value of the Polish currency (5%).
Market opportunities and development	The emergence of new market opportunities. Interruption of previously stable trends	The hypothesis has been confirmed. Among the main trends in the Industry 4.0 area that have been discontinued are smart-city solutions (currently city investments are directed at co-financing hospitals). The growing importance of ICT enterprises trends will be in: IoT (71%), M2M (24%), specialist services (13%), AI (10%), telemedicine (8%), data protection (5%), non-contact systems (4%), use of robots (4%) biometric auditing (2%).
Employment and demand for specialists	Turbulence in the employment market	The hypothesis has been confirmed. There was a decrease in demand for outsourcing employees in the auto-motive sector (15%). Entire teams of specialists have appeared on the market to be taken over by ICT companies in connection with the freezing of projects (12%) and phenomena such as reduction of salary or full-time employment (6%). Respondents indicate an increase in the amount of current work and fatigue by telework (72%)
Implementation of projects	Changes in the scope of projects and portfolios	The hypothesis has been confirmed by way of observation: freezing of projects in the area of cybersecurity (41%), suspension of projects requiring investment in equipment (31%), reducing the scope of the project (12%), recomposition of project portfolios (10%), increasing the share of foreign projects (3%)
Company image	Take action to combat the epidemic	The hypothesis was confirmed, however, the activities largely concerned the IT area. The products and services were made available for free or at preferential prices (21%), a fundraising campaign was organized to combat COVID-19 (10%), programs aimed at supporting e-education and the medical sector were implemented (8%).
Management and work methods	Digitization of processes and teleworking	The hypothesis was confirmed, although the way of working during the epidemic did not differ significantly from the standards already adopted in ICT enterprises. In particular, the teleworking system was implemented (92%) and the

		digitization of internal processes was deepened (41%). It was indicated that teleworkers do not need special methods of supervision and control (100%). In the respondents' opinion, an important element of changes was the protection of personal data (11%).
Willingness to implement changes	High readiness	The hypothesis was confirmed. The ability to implement changes was rated very high (98%). The high degree of enterprise digitization and possession of IT equipment (100%) facilitated adaptation to new conditions.

The second stage of studies

The results collected in Table 3 were deepened in the second stage of the study. This stage revealed that in large part respondents perceive the current situation in a pessimistic way, practically freezing most development initiatives. At the same time, 72% of respondents confirmed that they must take measures aimed at further development and construction of new products and services that respond to the changing market demand. However, over half of the respondents could not name new solutions yet. Most of them used general terms related to the development of a given market area: e.g. development of SaaS solutions (47%), expansion of call-center services (15%), construction of virtualized environments (15%) and remote monitoring of own employees and clients (12%) or construction of cost control systems (2%). Respondents were asked to characterize the strategy adopted for the crisis. Unfortunately, for the most part, they were unable to provide detailed answers, rather describing operational activities that were a reaction to emerging problems. The answers included: cost cutting (28%), reduction of employees' working time (22%), freezing of development projects (21%), resignation from the organization of conferences (15%), resignation from organization of training, and implementation of on-line activities line (12%). Among the most important opportunities created in the face of the COVID-19 crisis, representatives of ICT enterprises indicated: international expansion (19%), resignation from part of the office space due to the development of telework, and the possibility of reducing current costs (12%), increasing awareness of the need to digitize processes for external clients, which may lead to market development (11%), building an offer related to consulting in addition to providing simple services (2%), and development of new services and specialized products (2%). Among the biggest threats, the respondents mentioned: loss of liquidity (68%), loss of sales opportunities for which they had worked for a long time (54%), loss of work by specialists (21%), sale of enterprises (14%), departure of key personnel (8%), loss of investors (8%).

Summing up the presented research results, it should be emphasized that they relate to a period of high uncertainty among the studies. In many companies analyzed, detailed results related to the loss of orders were not yet known. Opinions were based primarily on a quantitative analysis of contracts that had been lost, projects that had been suspended, and estimates of market segment transformations that had unexpectedly begun to increase. The first quarter in which the full picture of the effects of the crisis will be known is Q2 2020. At that point, it seems as though it will be valuable to repeat the tests on the same research sample. The conducted studies do not meet the criteria of representativeness, although they may illustrate certain trends in the ICT sector.

Summary

Due to the changing market conditions associated with the COVID-19 epidemic, enterprises, regardless of the sector in which they operate, must take remedial action. In the case of the ICT sector, which additionally plays the role of a stimulus for the development of other industries, the negative impact of the crisis may have secondary effects on the entire economy. In this context, it is important to attempt to analyze the scope of changes in the sector and to identify ways of dealing with alarming phenomena undertaken by ICT companies.

The purpose of the article was to attempt to approximate the conditions currently affecting ICT enterprises, and to indicate how enterprises respond to changes. The goal was achieved by analyzing

the results of empirical research conducted on a sample of 52 respondents from 20 Polish ICT enterprises. The research method used was an in-depth series of interviews, which allowed us to confirm seven hypotheses.

The main conclusions are not optimistic, because ICT companies are focused on investment reduction and expect similar actions taken by clients. Only some business segments do not show disturbances. It should be emphasized, however, that enterprises are open to seeking new business models based on SaaS. In addition, expansion appears on the international markets as a chance, which seems justified given the low value of the currency. Generally, enterprises are focused on undertaking anti-crisis measures.

A significant limitation of the research was the deep focus of managers from the ICT sector on dealing with the current crisis. In addition, the enterprises did not have detailed data, therefore the presented conclusions are a qualitative assessment of the situation by the management.

The analysis of changes taking place in the ICT sector is an interesting research area that can be continued as economic conditions continue to develop.

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Key Performance Indicators – Proper Selection and Design from The Human Resources Perspective

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Abstract

Motivation. The connection between human resource management and company's performance is a subject of discussion in the literature. Some practitioners discussed areas in which performance measurement might be useful. However, no widely accepted guideline has been presented to manage business performance so far. There are publications about guidelines for KPI development but this problem is treated in the literature selectively. **Objective.** The objective of this paper is to attempt to integrate knowledge about KPI development guidelines and to propose guidelines for the development of the appropriate KPIs in the human aspect. **Design/methodology.** The objective has been achieved through the literature studies, its critical analysis and the author's practical experience. **Findings.** There are no universally accepted guidelines in the literature regarding the determination of KPIs for employees. The guidelines literature list should be supplemented by the following guidelines: a) the selection of assessment indicators should take into account these guidelines and include within its scope parameters affecting the increase of this value, b) the area that includes indicators should be narrower when determining KPIs for lower positions in the organizational hierarchy and include, for example, the volume of production and waste for direct production employees, c) the bonus percentage should be felt by the employee, d) the bonus should be a reward rather than a permanent salary supplement e) for all employees, and at least for the managerial staff, one of the KPIs should be the company's overall result such as net result, EBITDA, EVA, etc., which synthetically reflects activities at various levels, f) the payment of bonuses to everyone should be dependent on the implementation of a certain general synthetic indicator, such as: the overall result of the enterprise. **Limitations**. There is a study and critical analysis of the selected publication, limited to the SCOPUS database. **Originality/value.** Supplemented literature by guidelines the determination of KPIs for employees.

Keywords: Key Performance Indicators, Human Resources, Human Resources Management

Introduction

Performance control and monitoring is one of the most important management functions. Due to an evaluation of the enterprise's results managers know the current company's situation and they have a basis for making better decisions about a development path and ways to improve the enterprise's performance. Thereby, there is a close relationship between performance control and current goals of enterprises. However, it is not possible to measure all business activities and the measure of everything would be inefficient. Therefore, performance measurements should be prioritized and focused only on the key performance indicators of the enterprise (Wu 2012, p. 305). Employees are one of the most important resources of enterprises because they determine the company's development and activity results. The connection between human resource management and company's performance is a subject of discussion in the literature (e.g. Guest 1997, Wood 1999, Becker et al. 2001, Nankervis et al. 2005). The finding of this research shows that effective people management contributes to enhancing company's productivity, profitability and overall organizational efficiency and effectiveness (Cascio 2003, Zheng et al. 2007 p. 306). To achieve the company's goals, human management needs not only an appropriate organizational structure and shaping responsibility for tasks but also developing indicators that will be the basis of employee accountability. In practice, it turns out that the design of systems for assessing employee performance can be associated with numerous problems, including the selection of the measures themselves, the differentiation of responsibilities of individual persons and at the same time the difficulty in defining common KPIs for a given group, the possibility of their

unequivocal measurement, planning and accounting. There is also a “knowing-doing” gap in the field of explanation the cause-effect relationships on which the value of each KPIs is based (Taticchi 2010, p. 13). “The problem of how organizations should assess their performance has been challenging to management commentators and practitioners for many years” (Sangwa and Sangwan 2017, p.42). Some practitioners discussed the areas in which performance measurement might be useful but no widely accepted guideline has been presented to manage the business performance so far (Neely et al. 2000). The problem of performance measurement and management is also of interest to researchers. Although research on this subject seems to be mature in terms of citations and number of publications, the subject is still vivid (Taticchi 2010). There are publications about guidelines for KPI development but this problem is treated in the literature selectively. Bridging this research gap seems to be especially important in the human resources management area because employee’s activities enable an organization to achieve its goals.

In this context the aim of this paper is to attempt to integrate knowledge about KPI development guidelines and to propose guidelines for the development of appropriate KPIs in the human aspect. Achieving this objective is based on the systematic literature study (limited to the SCOPUS database) and the author's practical experience. First, the research methodology is presented. Secondly, there are considerations about the background of KPIs in the context of performance measurement, management and human resources. Third, there are considerations about the proper selection and design of KPIs. Finally, the discussion and conclusions are presented.

Research Methodology

In the first part of this study, a critical literature review of 43 research articles has been conducted to analyze the available literature on key performance indicators in the aspects of employees. The SCOPUS database was used as a search engine. The following keywords were defined: “key performance indicators” and “human resources management” or “human resources” or “human management” (in Article title, Abstract, Keywords). There were 161 documents results. They were limited according to the following criteria: a) the subject areas are “business, management and accounting” (39 documents), “decision sciences” (16 documents), “economics, econometrics and finance” (10 documents) b) the literature search was constrained to works available in English language only, c) the articles published in peer-reviewed journals as well as gray literature were included. There were 46 documents results. Citations were excluded from the literature search. Initially, papers were selected by assuring the relevance of the article to the subject of research through manual analysis and reading the title and abstract of an article and then through an analysis of the complete article. Additional articles were searched by forward/backward snowball approach to find more documents related to subject KPIs in the human aspects which do not contain the predefined keywords in the title, abstract or keywords of article. There were 43 documents results. The review methodology is presented in table 1.

Tab. 1: Review methodology

Filter type	Characterization	Results
Keywords (in Article title, Abstract, Keywords)	“key performance indicators” and “human resources management” or “human resources” or “human management”	
Keywords search	The SCOPUS database was used as a search engine Articles containing above mentioned keywords in the title, abstract, keywords of the article	161
Inclusion criteria	Topic: articles related to key performance indicators in the human aspects	
	Subject areas:	

	"business, management and accounting"	39
	"decision sciences"	16
	"economics, econometrics and finance"	10
	Language: English	46
Exclusion criteria	Citations are excluded	
Consolidation I	Elimination by manual filtering and reading the title and abstract of the articles to check the relevance of subject KPIs in the human aspects	30
Consolidation II	Further consolidation by reading complete articles	18
Snowball approach	Additional articles added by forward/backward snowball approach	25
Final sample size		43

In the second part of this study an exemplification of the part of the KPI system of one company has been conducted to present the practice of KPIs development in the human aspect. This presentation is the result of the author's work as a consultant.

Background of KPIs

Performance management is based on the goal-setting theory of Locke (1991) and is administered through performance assessment and feedback (Kairuz et al. 2015, p. 884). Performance measurement supports performance management (Keegan et al. 1989). These two activities cannot be separated. "Performance management precedes and follows performance measurement, in a virtuous spiral and performance management creates the context for measurement" (Lebas 1995, p. 34). It is generally accepted that performance is about past achievement but in the context of management it is also about the future, about the enterprise's capabilities to achieve future goals. Thus, two types of performance measurement can be identified: a) related to results, b) related to determinants of future results (Fitzgerald et al. 1991). There are five main reasons why managers want to measure performance. They are constantly looking for answers to the following questions: a) where have we been, b) where are we now, c) where do we want to go, d) how are we going to get there, e) how will we know we got there (Lebas 1995, p. 24, Pariba and Tretten 2017, p. 35). The answers for these questions are useful not only for managers but for many different stakeholders of the company, including its employees.

Many models or frameworks have been developed in the literature (Sangwa and Sangwan 2017, p.46, Korenkova et al. 2019, p.52-53). Bititci et al. (1997) considered a performance measurement system as a reference model and Neely et al. (2000) reported that a system approach theory and an organizational structure approach are two basic approaches for designing the performance measurement system. The first approach is used to measure the horizontal flows of information and materials within the organization. The organizational structure approach is used to measure the vertical flows. From a practical point of view, it can be assumed that the performance management system covers all aspects of performance that are relevant to the existence of an organization as a whole (Flapper et al. 1996).

Various models have been developed to measure the performance of companies such as the BSC, the BEM, the Capability Maturity Model (CMM), the Six Sigma and the KPI (Konsta and Plomaritou 2012, p.143). There are many examples that the use of these models resulted in the improved performance of different sectors of organizations but the KPI model is more popular with financial management practitioners (Meng and Minoque 2011).
The concept of performance must be operationalized before it can be measured (Lebas 1995, p. 24). Key performance indicators are an expression of this operationalization. Generally, KPI is a measure of performance that focus on critical aspects of inputs and outcomes.

KPI embodies a strategic objective and measures performance against goals that are multidimensional (Eckerson 2009, p.6). The strategic business goals need to be broken down into targets at an operational level and the operational outcomes link back with KPIs at the strategic levels (Aditya and Chattopadhyay 2007). KPIs are modern tools that help managers to keep the enterprise's performance at a high level (Kaganski et al. 2017, p. 283) but it doesn't mean that PKIs are constant. They are dependent on many contributing factors. For this reason, they can be changed (Bortoluzzi et al. 2018, p. 282).

KPIs have been categorized as a) leading or lagging, b), strategic or operational c) social or technical, d) quantitative or qualitative (Sangwa and Sangwan 2017, p.42-43), e) tangible or intangible (Kaplan and Norton 1992). Leading indicators are also called performance or value drivers and they measure activities in their current state or a future state. The leading indicators have a significant impact on outcome KPIs. The outcome KPIs that are known also as lagging KPIs measure the output of past activity. This type of KPIs are often financial in nature (e.g. revenues, margins, return on equity), but sometimes they are non-financial in nature (e.g. customer satisfaction, employee retention) (Eckerson 2009, p. 11). It should be emphasized that from the practical point of view a distinction between these two types of KPIs could be difficult. There isn't often a lot of difference between leading and lagging indicators in practice because one factor's outcome measure is another factor's value driver in a reall company's life (Eckerson 2009, p. 11). How performance indicators in one area affect performance indicators in other areas is displayed also in the literature (Aranda and Arellano 2010, Banker 2004).

In turn the identification of a strategic and operational category of KPIs is important and useful in practice. Eckerson distinguishes also a tactical type of KPIs. These three categories of KPIs allow to understand how the matrix of KPIs is integrated across different departments and levels within a company. The following conclusions can be drawn from the consideration about levels of KPIs: a strategic matrix comprises outcome KPIs, an operational matrix shows driver KPIs and a tactical matrix has a mix of outcome and driver KPIs.

Some KPIs are based on quantitative data and others are based on qualitative data. The first are the basis of financial KPIs ant the second are the basis of both non-financial and financial KPIs (Eckerson 2009, p. 12-13). The PM was based mostly on financial measures in the past. The balanced scorecard, with its four perspectives, focuses on financial aspects, customers, internal processes, and innovation and learning has changed the perception of KPIs (Kaplan and Norton 1992). Kaplan and Norton have pointed out that both tangible (financial) and intangible aspects of the business process are important. Consequently, both tangible and intangible KPIs are currently used.

KPIs could refer to social or technical dimensions of an enterprise's activities at last. KPIs of human resources are especially important because employees determine all aspects of the company's performance.

An enterprise's productivity is closely correlated not only with its strategy but also with its people (Tabassi and Abu Bakar 2009, p.471) because employees' activities and engagement determine the company's efficiency and effectiveness (Cascio 2003). There are many theoretical models that discuss the relationship between HRM and company's performance (e.g. Guest 1997, Wood 1999, Paauwe 2004, Nankervis et al. 2005). KPIs help employees better understand how they contribute to the overall achievement of the organization (Wu 2012, p. 307). KPIs translate the company's strategy and goals into concrete actions that employees can take on a daily basis. Employees should know what's being measured and how it's calculated (Eckerson 2009, p. 20). This is the basis of understanding KPIs. The understanding of KPIs determines the positive impact of employees on the company's performance. This is why managers should train employees on KPIs. It's also crucial that employees accept the KPIs that are to measure the results of their work. This acceptance requires a lot of talk and cooperation between managers and employees at the stage of KPIs design. The task of KPIs is not over-control over an employee but their focus on a daily improvement of the company's performance. Using KPI shapes performance-based culture in the company that can increase human resource efficiency and also benefit the company (Suseno et al. 2016).

The collected data of performance can be unmanageable when it is to huge (Aditya and Tretten 2017, p.35). Traditional methods have been proposed and new approaches are being proposed to prioritize KPIs in the literature (Shahin and Mahbod 2007). Enterprises should pay attention to identifying and selecting the right KPIs because measuring a wrong indicator wastes productive times in improving something that isn't important for achieving the company's goals (Addis and Beshah 2017, p. 380). Key performance indicators are a measure of performance that focus on critical aspects of outputs or outcomes (Kosta and Plomatitou 2012, p. 145).

Proper selection and design of KPIs

The proper selection and design of key performance indicators is important for the measurement and improvement of performance. Išoraitea (2010) suggests that the choice of KPIs have impact on the operation and the development direction of an organization. Selection of the wrong metrics for KPIs can significantly damage or destroy a performance management initiative and demoralize employees (Gabcanova 2012, p. 119). This proper selection and design require the application and compliance with given principles. KPIs are an integral part of PMS; this is why they must have the following characteristics (Maskel 1991):

1) they should be directly linked to an overall business strategy and the company's critical success factors,
2) they should combine both financial and non-financial measures,
3) they should use different measurements for different departments of the company,
4) they should be modified over time to reflect changes in strategy and operation,
5) they should be simple and easy to use by employees,
6) they should give a fast feedback to managers and other employees,
7) they should be intended to teach employees rather than monitor & control them,
8) they should enable benchmarking to set target characteristics of performance measurement systems found in world class companies.

It should also be noticed that a KPI should follow the SMART criteria, i.e. specific (S), measurable (M), attainable (A), realistic (R) timely (T) (Aditya and Kumar 2006, p. 245). "Specific" means that KPI should be clear and focused to avoid misinterpretation. It should also include measurement assumptions and definitions and be easily interpreted (e.g. cost/ton). "Measurable" means that KPI can be quantified and compared to other data. "Attainable" means that KPI should be achievable, reasonable, and credible under the expected conditions. "Realistic" means that KPI should fit into the organization's constraints and be cost-effective. And finally, "timely" means that KPI should be obtainable within the time frame given. SMART is a solid framework for making decisions about KPI selection.

Except that, KPIs should have the following characteristics (Parmenterg, 2007):

1) financial and nonfinancial nature,
2) frequently measured,
3) acted on by the CEO and the senior management team,
4) understood by all staff,
5) responsibility assigned to the individual or team,
6) has a significant impact on an enterprise's activity,
7) has a positive impact on staff engagement.

Wang and Hao distinguish the following basic principles of KPI design (Wang and Hao 2013, p. 894-895):

1) KPI must be able to effectively support the strategic objectives,
2) KPI should be timely adjusted to reflect the strategic shift,
3) KPI must have a clear definition and calculation methods,
4) KPI must be easy to obtain reliable and unbiased data,

5) KPI should be able to distinguish between objects of different performance evaluation at different levels to distinguish good and bad results of work of different individuals, the principle of refining,
6) the number of KPI should not be too high,
7) KPI design should be simple, refined, to the reasonable control of the number of KPIs,
8) the staff should be fully able to control the outcome of the index, if staff don't have this control, then this index can't be used as key performance indicators.

The problem of proper selection and design of KPIs was also taken up by Eckerson (2007). This author has described what characterizes "good" KPIs. Summing up Eckerson's considerations effective KPIs are:

1) "Sparse: The fewer KPIs the better.
2) Drillable: Users can drill into detail.
3) Simple: Users understand the KPI.
4) Actionable: Users know how to affect outcomes.
5) Owned: KPIs have an owner.
6) Referenced: Users can view origins and context.
7) Correlated: KPIs drive desired outcomes.
8) Balanced: KPIs consist of both financial and non-financial metrics.
9) Aligned: KPIs don´t undermine each other.
10) Validated: Workers can´t circumvent the KPIs" (Eckerson 2007, p. 18).

Literature studies indicate that there are no generally applicable principles for the selection and design of KPIs. Performance measurement is determined as specific to the company and to the situation factors (Lebas 1995, p. 27). The matrix of KPIs is therefore decision-maker specific. However, the design of KPIs isn't easy in practice. Many organizations struggle to define accurate performance indicators. It isn't possible to identify KPIs without cooperation between managers at different levels of an organization's structure and employees. The starting point in KPIs design should be a brainstorming session in which a group identifies desired outcomes and then asks "What behaviors or activities will drive or lead to that outcome?" Each time the group identifies a new driver, it should ask the same question: "What behaviors or activities will produce that result?" (Eckerson 2007, p. 11). Finally, the group will find root causes that have the most significant impact on the outcome or value driver. Further KPI design process will be discussed through an example presented in the next section of this paper.

Discussion and Conclusions

There are no universally accepted guidelines in the literature regarding the determination of KPIs for employees. Different authors pay attention to selected elements. Some of them are vague/ too general (for example: "they should be directly linked to overall business strategy…" or "acted on by the CEO...") or obvious (for example: "they should use different measurements for different departments of the company …" or "KPI should be timely adjusted to reflect the strategic shift..."). From a practical point of view, it seems that special attention from mentioned in literature should be given to the following KPI features / principles:

1) be simple, easy use by employees, understood by staff at particular levels of measurement / have a clear definition and calculation methods - indicators should be constructed so that they be determined in a relatively easy / fast way - both the values in the plan and realized for a given period. Their definitions must be precise to avoid data manipulation. This allows good communication and avoids potential disputes.
2) the number of KPIs should not be too high – The settlement of KPIs should not be too complicated, i.e. based on a maximum of several parameters for a given group of employees. Too many of them unnecessarily hinder both the planning and settlement processes.
3) follow the SMART criteria – for example setting goals that are unrealistic in advance deprives you of a motivation to achieve them. However, for the enterprise to grow, the indicators should be raised in subsequent periods.

4) give a fast feedback to managers and other employees - Employees must receive information on planned KPIs and feedback on the achievement of their goals. An example may be boards / screens on a production site informing about the volume of production, waste, time of performance of tasks, etc.
5) be not only financial but also nonfinancial nature in some cases – for example satisfaction of clients very important in the long term
6) have a significant impact on an enterprise's activity - One should strive to choose the most synthetic indicators that allow optimization of their quantity and scope. Often, to e.g. account for production, it is necessary to monitor many parameters, but most often the key ones that are most important can be identified. On the other hand, the individual parameters are dependent on each other and there is no need to include all quantities in the KPI, just choose the ones that are most important from the point of view of assessment. It is also important that indicators are not mutually exclusive, such as a production volume / deadline and quality.
7) must be able to effectively support the strategic objectives - indicators, where possible, should be directly linked to the financial plan and complement it. Consequently, it will facilitate their subsequent settlement.

In addition, this list should be supplemented by the following guidelines:

1) in the light of financial management theory and practice, the owner's goal is to maximize an enterprise's value. Therefore, the selection of assessment indicators should take into account these guidelines and include within its scope parameters affecting the increase of this value. An example may be the volume of production directly related to the different distribution of fixed costs, which is determined by the amount of waste, weight of products, speed of machines, their downtime, productivity of employees, etc. Regarding sales, it is the amount of sales, price, level of receivables collection, etc. Referring to the definition of free cash flow, key parameters shaping an enterprise value include: net result, changes in net working capital, level of investment outlays and cost of capital. Thus, the selection of KPIs that allows:
    a. an increase in revenues,
    b. lower costs,
    c. minimize working capital and the cost of obtaining financing sources,
    d. selection of investments characterized by the highest NPV

    and then their implementation allows the company to increase its value.
1) the area that includes indicators should be narrower when determining KPIs for lower positions in the organizational hierarchy and include, for example, the volume of production and waste for direct production employees. In turn, for the Production Manager / Director, in addition to the quantities listed, e.g. production cost per unit or departmental costs. An example for a Salesman is revenue and quantity of sales (also the price if they can shape it), and for the Sales Director - margin.
2) the bonus percentage should be felt by the employee. Setting it at 5% of the basic salary is a relatively low incentive to achieve the goals.
3) the bonus should be a reward rather than a permanent salary supplement. Therefore, assuming the feasibility of goals, it should be paid if they have been achieved. Of course, it is up to the Management Board to decide on its payment in cases where due to independent factors, the tasks have not been completed.
4) for all employees, and at least for the managerial staff, one of the KPIs should be the company's overall result such as net result, EBITDA, EVA, etc., which synthetically reflects activities at various levels. The discussed result will not always directly show all areas that affect the value of an enterprise, but it is one of its most important elements in the long run. This solution allows the introduction of shared responsibility for the overall results of operations.
5) the payment of bonuses to everyone, unless the Management Board decides otherwise, should be dependent on the implementation of a certain general synthetic indicator, such as: the overall result of the enterprise realized at the level of at least 80% of the plan, which is the determinant for its payment.

The above considerations indicate that the construction of KPIs is a complex process. It requires the ability to link the company's goals with tasks for employees. These indicators must fulfill a number of criteria to be effective.

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Guidelines for An Eco-Driving Business Model In the Case of Short-Term Rental Cars

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Abstract

Short-term car renting is becoming an increasingly common form of realizing the need to move. It is especially popular in large urban agglomerations. As shown by the observations, drivers often drive in a dangerous way: exceeding the speed limit and using more fuel. The aim of the paper is to identify factors which has an influence of driving style of a people who rent a car for a short time period. To analyse the collected telematics data statistical methods which include correlation analysis, regression analysis and testing of statistical hypothesis using the ANOVA method were used. The analysis of the collected telematics data allowed to indicate the relationship among: difference between real fuel usage and declared by producer and capacity and power of engine; exceeding the speed limit and capacity and power of the engine. The conducted research allows to set guidelines for building a business model that encourages renters to drive in economic and ecological style. Thanks to the identified dependency, it is possible to build a more efficient business model, the offer of which will be targeted at those drivers who currently drive in the most dangerous way.

Keywords: Eco-Drivng, Business Model, Short-Term Rental

Introduction

The problems of excessive emissions of substances harmful to the atmosphere are one of the most frequently raised issues regarding the transport process. Due to the fact that car transport generates the largest quantity of carbon dioxide, countries belonging to the European Union are obliged to reduce emissions of harmful substances by 2050 (European Commission, 2011). Although the majority of transports performed in Europe is planned be transferred to other modes of transport, in particular railways, the issue of the harmfulness of road transport remains unsolved due to the huge amount of passenger transport. Due to the increasing number of cars, moving in particular in large cities, the problem, concerning not only the quantity of generated fumes, but also the intensity of traffic in large agglomerations, is a challenge for the European Community countries, whose one of the main purposes is to fulfil the requirements of sustainable development, in the European Union's understanding of the ability to execute the necessities of one generation in such a way that it is possible to ensure adequate living conditions to execute the requirements of future residents of the European Union.

The aim of the paper is to identify factors which has an influence of driving style of a people who rent a car for a short time period. Authors analysed the impact of engine capacity and power in a rented car on increasing fuel consumption (and thus CO2 emissions) and exceeding speed (increasing road risk). Based on the analysis of literature and own observations, four research hypotheses were developed:

H1: The larger the engine capacity in the rented car, the greater the difference between actual fuel usage and the declared by the car producer.
H2: The greater the engine power in the rented car, the greater the difference between actual fuel usage and the declared by the car producer.
H3: The greater the engine capacity in the rental car, the greater the number of exceeding the speed limit.
H4: The greater the engine power in the rental car, the greater the number of exceeding the speed limit.

In the next part of the paper, the research hypotheses presented above will be verified on the basis of data analysis. Data coming from sensors installed in cars rented by one of the companies operating on the European market.

Theoretical Background

The need to reduce the emission of harmful substances into the atmosphere arise clear from reports prepared by the European Union, showing that 25% of pollution is generated as a result of the transport process. The transport of goods as the only economic activity in Europe is characterized by an increase in carbon dioxide emissions into the atmosphere in the last 30 years (Cichosz and Pluta-Zaremba, 2019; Yu. et al. 2018; https://ec.europa.eu/clima/policies/transport_en, 21.08.2019). Limiting the quantity of harmful substances released into the atmosphere by vehicles traveling on European roads is also the subject of many EU directives constituting the legislative basis for the regulations on the intensity of road transport use. For example, these EU documents include: Green Paper on Transport – indication an access to modern technology and inappropriate driving style due to lack of awareness drivers as key factors affecting ecological and economic driving style (European Parliament, 2009) or White Paper on Transport – focusing on reducing the use of crude oil as fuel for motor vehicles which should be achieved by changing the approach of drivers and technological support (European Commission, 2011).

In addition, according to the European Commission regulation of March 2019, EU Member States are required to reduce their carbon dioxide emissions by 37.5% for passenger journeys and by 31% for freight transport by 2030 (Yang et al., 2018; https://europa.eu/rapid/press-release_IP-19-1869_en.htm, 28.08.2019).

The quantity of harmful substances emitted into the atmosphere in the case of road transport depends on several factors, which primarily include the level of technological advancement of vehicles traveling on European roads or the combustion standard that characterizes a given vehicle or the way of driving a car. The European Union distinguishes six basic standards, from Euro 1 to Euro 6, granted to vehicles depending on the quantity of harmful substances emitted into the atmosphere. These standards (see Harrison, 2014) also differ depending on the type of engine, gasoline or Diesel (Tietge et al., 2017).

The European Union, which indicates economic style of driving as important factor in emissions reduction, assumes that vehicles that do not fulfil the required standards will not be allowed for urban traffic because of their excessive harmfulness to the natural environment. In particular this is a matter raised for diesel cars that do not execute the Euro 6 standard. Therefore eco-driving should indicate both the economic aspect in terms of lower fuel consumption costs and the environmental aspect resulting from the reduction of emissions of substances harmful to the atmosphere. Compliance with eco-driving rules is associated with a change in driving style by training certain model behaviours resulting from the principles of economic and ecological driving style which, compared to the development of the market of electric or hybrid vehicles, is a much easier and more cost-effective solution to be implemented (Barth and Boriboonsomsin, 2009). The most important behaviours that influence the style of driving in relation to the principles of economic and ecological driving include: driving at a relatively constant speed. braking with an engine. taking care of aerodynamics or using the highest possible gear (Sciarretta and Vahidi, 2019; Padillaa et al., 2020). Research conducted so far indicates that by changing the driving style of drivers bestirring in a congested agglomeration fuel use

can drop by up to 10% (Barkenbus, 2010) while exhaust emissions can be reduced by 5 to 20% (Jeffreys, Graves and Roth 2018).

Due to the increase in the number of cars moving in urban areas (resulting from their development) problems related to excessive exhaust emissions arise not only from the combustion standards imposed on vehicles but also from the volume of traffic. It should be also noticed the analogy between eco-driving and safe-driving whose main purpose is to adapt the style of driving a car to the rules increasing the level of safety on the roads of the European Union. The use of an economical driving style allows you to reduce fuel consumption but also to reduce the number of accidents (Kacar et al., 2018; Leontyeva and Mayburov, 2017). The need to achieve the requirements of the European Union relates to both the use of modern technologies that help reduce emissions of substances harmful to the atmosphere the desire to change the behaviour and habits of both experienced and inexperienced drivers in accordance with the principles proposed by the concept of eco-driving but also the use of car rentals and car-sharing. The main purpose of car-sharing was to replace private cars with shared vehicles to which every resident of a given agglomeration had access (Arena, Azzone and Bengo, 2017; Skjelvik, Erlandsen and Haavardsholm, 2017).

The development of large urban agglomerations, the lack of traffic capacity on roads, the limited number of parking spaces or technological development have contributed to the growing interest in using both mobile car-sharing services and traditional rental companies offering short-term car rental services. Resignation of the very own car for short-term rentals can not only reduce operating costs (e.g. insurance) but also reduce congestion as part of using the same vehicle by many passengers which automatically translates into a reduction in the number of vehicles moving in cities and motion (Lei et al., 2017). Car rentals are able to execute the expectations of various customers. due to the wide range of vehicles available which also proves the flexibility of solutions to which car-sharing belongs. thus guaranteeing the efficiency of its use (Stajniak and Koliński, 2016).

According to research carried out in different countries one should notice the relationship between the use of short-term car rental companies and the reduction in the use of private vehicles, CO_2 emissions or fuel consumption (Wang and Boggio-Marzet, 2018). The use of car-sharing while maintaining the current level of mobility of residents translated into a reduction in the number of private cars by 33% in the US and by 10% in Portugal. Research conducted in Milan showed a decrease in the use of private vehicles by 30.000 while emissions of harmful substances to the atmosphere declined by 18%. In Paris, since 2011, the quantity of carbon dioxide released into the atmosphere has decreased by 15.000 tons while by 2023 it is estimated that the demand for private cars will decrease by about 36.000 which will translate into a reduction of CO_2 emissions by about 75.000 tons (Bondorová and Archer, 2017; Adamczak et al., 2019).

Research executed in Germany indicates that the use of mobile car rental companies will save about 800l of fuel per one car-sharing user while in Ireland CO_2 emissions have dropped by 86 kilotons per year. In the case of Switzerland short-term vehicle rentals have contributed to a 26% decrease in fuel consumption which translated into a reduction of CO_2 emissions by 290 kg per resident (Baptista, Melo and Rolim, 2015). In addition. J. Rifkin claims that the use of one vehicle for short-term rental allows the replacement of 20 private cars and saves about 44% of kilometres travelled by city vehicles (Rifkin and 2011). Shirazi and Keivani assume that depending on the region and research sample the use of car-sharing allows for a reduction in the number of cars traveling in large urban agglomerations with a value between 4 and 23 vehicles (Shirazi and Keivani, 2019).

Car-sharing has experienced a significant boom in recent decades (Zhou, Zheng, Whitehead, Perrons, Washington and Page, 2019). According to study developed by Mindur et al. (2018) number of users of rental cars (in whole world) will increase till 2026 6 times in compared with 2015 and more then 50% in compare with 2020. Not only number of users will increase. Expected revenue of car-rental companies will increase. In example in India increase of revenue of car-rental companies is forecasted on about 7,3% annually till 2023 (More and Rakshit, 2020).

However the effective use of both mobile and stationary rental companies providing short-term car rental services requires adaptation of the city's infrastructure e.g. increasing the number of parking spaces intended solely for car-sharing (Fiedler, Cap and Certicky, 2017).

The European Union strives to reduce emissions of substances harmful to the atmosphere especially in the road transport sector indicating both technological development and social aspects as elements necessary to be fulfilled on the way of a more ecological and economical transport process. Both EU regulations and the use of short-term rental of motor vehicles contributes to reducing congestion in European cities. and thus reducing CO_2 emissions to the atmosphere.

Methodology of the study

The aim of the research is to determine the relationship between: engine capacity, engine power and the difference between real fuel usage and the norm set by the car producer and exceeding the speed limit. Thus, four research hypotheses were developed:

H1: The larger the engine capacity in the rented car, the greater the difference between actual fuel usage and the declared by the car producer.
H2: The greater the engine power in the rented car, the greater the difference between actual fuel usage and the declared by the car producer.
H3: The greater the engine capacity in the rental car, the greater the number of exceeding the speed limit.
H4: The greater the engine power in the rental car, the greater the number of exceeding the speed limit.

The verification of the above research hypotheses will be carried out in accordance with the methodology presented in Figure 1.

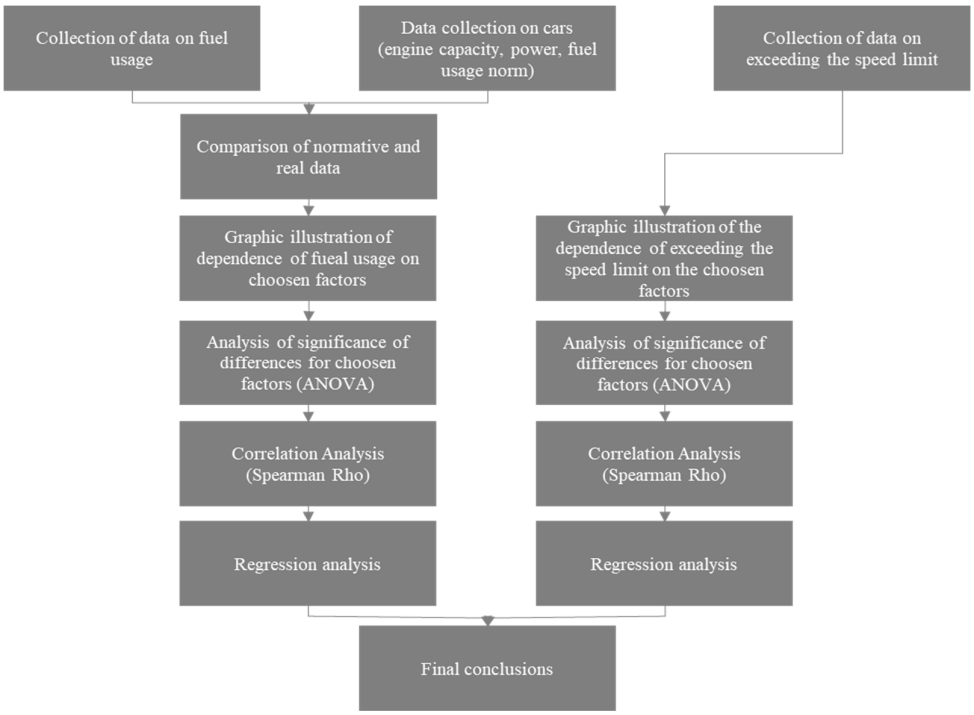

Fig. 1: Research methodology

Data for verification of hypotheses was collected from sensors installed in cars rented by one of the companies specializing in short-term rental of vehicles. Data was collected in April and May 2019. Details on the collected data are presented in Table 1.

Table 1: Number of cars and kilometres driven during data collecting

	Fuel usage	Exceeding the speed limit
No of cars	618	248
No of km	5 955 872	1 722 608

The different number of cars from which data on fuel usage and exceeding the speed limit was cellected is due to the fact that the cars were equipped with sensors with different functionalities. Importantly, from the point of view of that research, all sensors had the same component responsible for collecting data on fuel usage.

As part of the analysis, the actual fuel usage was compared with the fuel usage declared by the car producer (according to the WLTP procedure). The normative fuel usage was assumed to be usage calculated on the basis of a weighted average, in which urban had a weight of 60% and extra-urban 40% (weight proportions were calculated on the basis of analysis of data on the actual position of vehicles).

For the aim of determining the relationship between exceeding the speed limit and selected factors, two weighted units were created: second kilometre per hour [s km/h] and second percent [s %]. A second kilometre per hour is a unit showing how many seconds the vehicle (and thus the driver) exceeded the speed limit. Therefore, if the driver exceeded the speed limit by 15 km/h for 20 seconds, then the value of this unit will be 300 s km/h. On the other hand, the second percentage [s %] shows how many seconds and how many percent of the driver exceeded the speed limit. So if the driver exceeded the speed limit for 30 seconds by 20% (compared to the current limit), the value of this unit was 600 s %.

Fuel Usage Data Analysis

In accordance with the research methodology, in the first step, a graph was drawn up of the relationship between the difference between the actual fuel usage (determined on the basis of data from sensors installed in cars) and the declared by the car producer and engine capacity. Figure 2 illustrates this relationship.

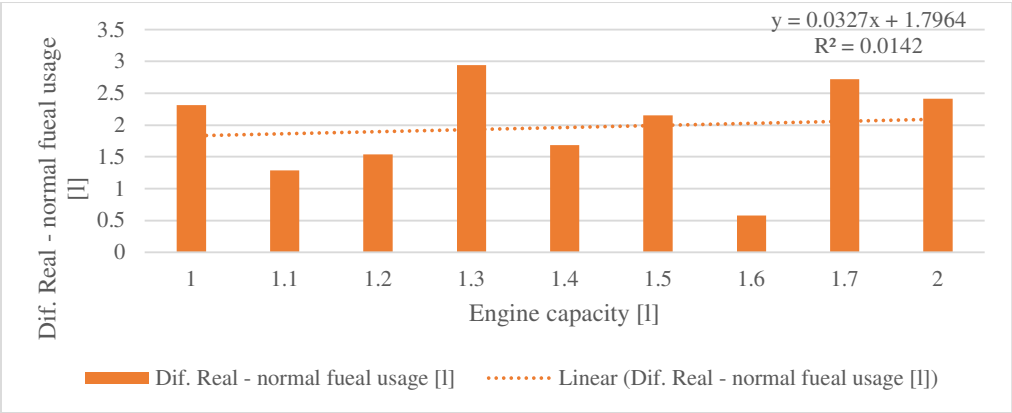

Fig. 2: Relationship between the difference between the actual fuel usage and the declared by the car producer and engine capacity

From the analysis of chart presented on figure 2, it cannot be clearly concluded whether there is any relationship between the two examined features. Although linear regression analysis has a positive directional coefficient. In addition, the value of R^2 remains at a very low level. It is therefore worth checking if the differences in fuel usage in cars with different engine capacities are different. For this purpose, ANOVA analysis (significance level $\alpha = 0.05$) will be used. For ANOVA analysis statistical hypotheses were made:

H0: The average values of the difference between the actual fuel usage and the declared by car producer for cars with different engine capacities are equal.
H1: The average values of the difference between the actual fuel usage and the declared by car producer for cars with different engine capacities are different.

The results of the ANOVA analysis are shown in Table 2.

Table 2: Results of ANOVA analysis (engine capacity vs difference in fuel usage)

Source	DF	Adj SS	Adj MS	F - Value	P - Value
Engine capacity	8	165.4	20.673	14.88	0
Error	609	846	1.389		
Total	617	1011.4			

The results of the ANOVA analysis presented in Table 2 show that the null hypothesis may be rejected. Thus, the average values of the differences in fuel usage in cars with different engine capacities are different. Grouping information using the Tukey method and 95% confidence has shown that it cannot be clearly stated that there is a relationship between difference in fuel usage and engine's capacity. Therefore, a correlation analysis was carried out using the Spearman rho coefficient (engine capacity data is not continuous). The value of the Spearman rho coefficient for the relationship between the difference in fuel usage and engine capacity is 0.014 (P-value = 0.734), which clearly shows that there can be no relation between the difference in fuel usage and engine capacity.

The second of the vehicle's features analysed for the impact on the difference between real fuel usage and declared by the car producer r was the engine power. Figure 3 presents the relationship between these two values.

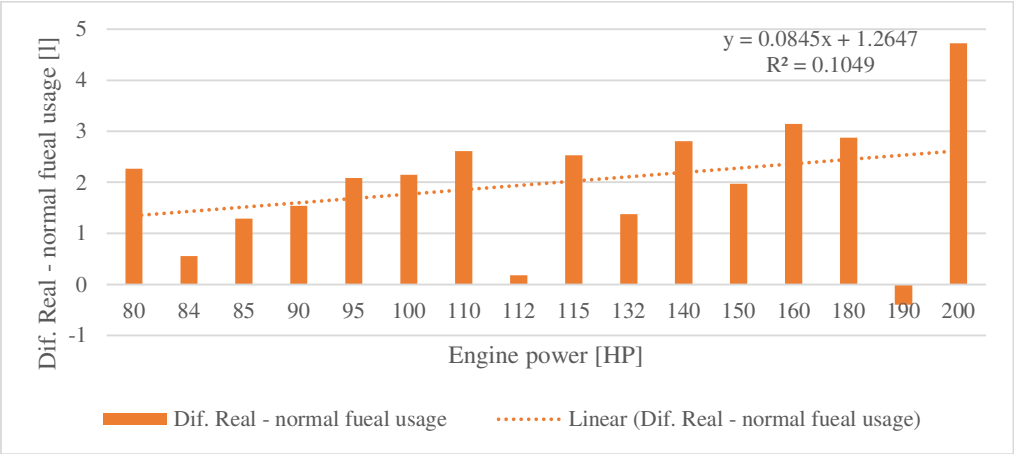

Fig. 3: Relationship between the difference between the actual fuel usage and the declared by the car producer and engine power

As can be seen from the analysis of Figure 3, the relationship between the difference in fuel usage and engine power can be seen. R^2 coefficient value of the linear regression is really low. There is impossible to declare dependencies between these values at this stage. Therefore, it was checked whether the differences in fuel usage in cars with different engine powers differ from each other. For this aim, ANOVA analysis (significance level $\alpha = 0.05$) will be used. A statistical hypotheses were developed:

> *H0: The average values of the difference between the actual fuel usage and the declared by car producer for cars with different engine power are equal.*
> *H1: The average values of the difference between the actual fuel usage and the declared by car producer for cars with different engine power are different.*

The results of the ANOVA analysis are shown in Table 3.

Table 3: Results of ANOVA analysis (engine power vs difference in fuel usage)

Source	DF	Adj SS	Adj MS	F - Value	P - Value
Engine power [hp]	11	313	28,457	26,72	0
Error	585	622,9	1,065		
Total	596	936			

The results of the analysis presented in Table 3 show that the null hypothesis can be rejected. Thus, the average values of differences in fuel usage for different engine powers are different. What is important from the point of research is whether there is any relationship between these two features. Grouping information using the Tukey method and 95% confidence showed that only 200HP vehicles have a statistically significant biggest difference (on average over 4.7l more fuel consumed than declared by the car producer). To determine the relationship for other powers, a correlation analysis was carried out using the Spearman rho coefficient (engine power data is not continuous). The Spearman rho value shows that there is a relationship between engine power and the difference between the real and declared by the car producer fuel usage.

Exceeding the speed limit data analysis

Figure 4 shows the relationship between exceeding the speed limit and engine capacity.

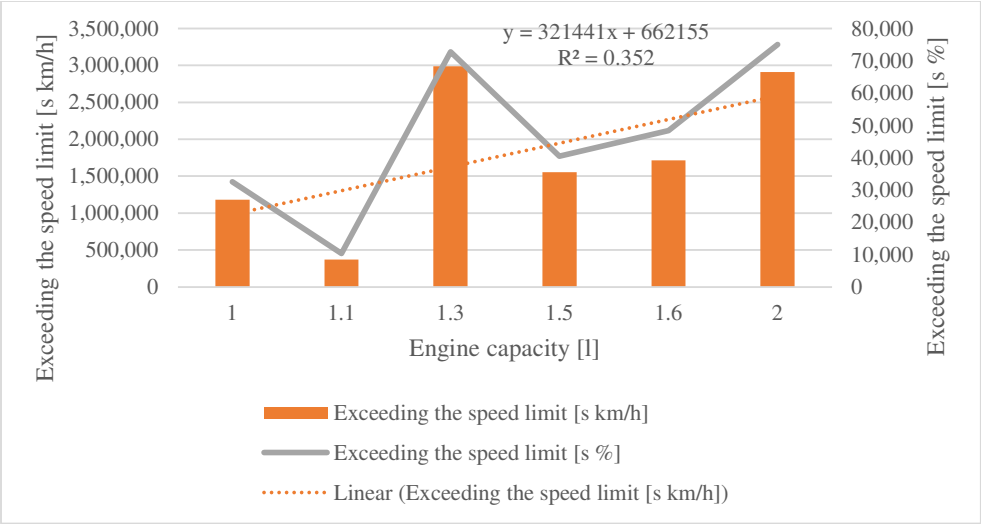

Fig. 4: Relationship between the exceeding the speed limit and engine capacity

Analysis of chart presented on the figure 4 shows that the values of exceeding the speed limit expressed in both weighted units [s km/h] and [s %] are dependent on each other. The value of the Pearson correlation coefficient was 0.964 (P-value = 0.000). This clearly shows that these values are dependent on each other. It can therefore be concluded that speeding drivers exceed it in proportion to the speed limit. By determining the correlation between these two values, the analysis will be carried out only for the value expressed in the [s km/h]. The exceeding the speed limit from engine capacity graph shows that there may be a relationship between these two values (this is also indicated by the value of R^2 - relatively high compared to the fuel usage analysis).

In the next step, it was checked if the average value of the exceeding the speed limit for car with different engine capacities were different. For this purpose, ANOVA analysis (significance level α = 0.05) was used. A statistical hypotheses were developed:

> *H0: The average values of exceeding speed limit [s km/h] for cars with different engine capacities are equal.*
> *H1: The average values of exceeding speed limit [s km/h] for cars with different engine capacities are different from each other.*

The results of the ANOVA analysis are shown in Table 4.

Table 4: Results of ANOVA analysis (engine capacity vs exceeding the speed limit)

Source	DF	Adj SS	Adj MS	F - Value	P - Value
Engine capacity	5	1,80E+14	3,61E+13	9,74	0
Error	242	8,96E+14	3,70E+12		
Total	247	1,08E+15			

The results of the analysis presented in Table 4 show that the null hypothesis can be rejected. Thus, the average values of exceeding the speed limit for different engine capacities are different. Grouping information using the Tukey method and 95% confidence has shown that there are two groups of results, for capacities 1.3 and 2.0 and 1.0, 1.1, 1.5 (capacity 1.6 does not give the possibility of explicit assignment to the group). In order to determine whether there is a relationship between these values, a correlation analysis was made. The Spearman rho value (engine capacities are not a continuous value) for the relationship between exceeding the speed limit and engine capacity is 0.276 (P-value = 0.000). This shows that there is a relationship between exceeding the speed limit and engine capacity.

The second studied feature is engine power. Chart presented on figure 5 presents relationship between exceeding the speed limit and engine power.

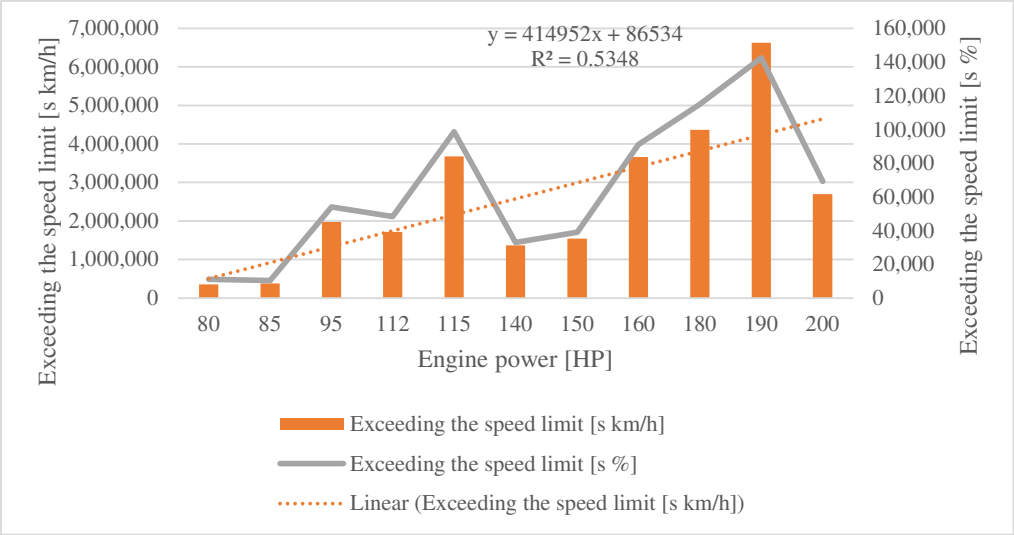

Fig. 5: Relationship between the exceeding the speed limit and engine power

Analysis of graph presented on the figure 5 shows that there is a fairly clear relationship between the values exceeding the speed limit and engine power. The value of R^2 for linear regression is 0.535.
In order to ensure that the average exceeding the speed limit values for cars with different engine powers differ from each other, an ANOVA analysis (significance level $\alpha = 0.05$) was made. A statistical hypotheses were developed:

> *H0: The average values of exceeding speed limit [s km/h] for cars with different engine powers are equal.*
> *H1: The average values of exceeding speed limit [s km/h] for cars with different engine powers are different from each other.*

The results of the ANOVA analysis are shown in Table 5.

Table 5: Results of ANOVA analysis (engine power vs exceeding the speed limit)

Source	DF	Adj SS	Adj MS	F - Value	P - Value
Engine power	10	3,31E+14	3,31E+13	10,51	0
Error	237	7,45E+14	3,14E+12		
Total	247	1,08E+15			

The results of the analysis presented in Table 5 show that the null hypothesis can be rejected. Thus, the average value of exceeding the speed limit for different engine powers are different. Grouping information using the Tukey method and 95% confidence did not clearly indicate groups of results for different engine powers. In order to determine whether there is a relationship between these quantities, a correlation analysis was made. The Spearman rho value (engine power is not a continuous value) for the relationship between exceeding the speed limit and engine power is 0.335 (P-value = 0.000). This shows that there is a relationship between exceeding the speed limit and engine power.

Conclusions

The results of the analysis carried out allow to state that as the engine capacity increases, the difference between real fuel usage and that declared by the car producer does not increase. Thus, the first research

hypothesis *H1: The larger the engine capacity in the rented car, the greater the difference between actual fuel usage and the declared by the car producer*. can be rejected. However, engine power shows relationship with difference between real fuel usage and that declared by the car producer . Therefore, it is possible to confirm the second research hypothesis *H2: The greater the engine power in the rented car, the greater the difference between actual fuel usage and the declared by the car producer.*

In the case of exceeding the speed limit, both research hypotheses have been confirmed.

H3: The greater the engine capacity in the rental car, the greater the number of exceeding the speed limit.
H4: The greater the engine power in the rental car, the greater the number of exceeding the speed limit.

It should be noted that the relationships between exceeding the speed limit and engine capacity and power are much stronger than in the case of fuel usage.

The results of the presented study are an important guide for developing business models that encourage customers to drive in eco-friendly mode and respect road traffic regulations. The analysis clearly shows that these incentives should be targeted at customers taking out cars with a higher engine capacity and higher power. They consume much more fuel than the norm specified by the car producer (thus they generate more CO2) and they driving at a speed above the limit (they cause danger on the road). Achievement of the goals described in EU directives is also possible by consciously shaping offers for car rental persons. The short-term rental market is still growing. The number of rented cars driving on the road is also growing, which shows even more clearly what the importance of deliberately shaping the offer encouraging ecological and economic driving to reduce CO2 emissions and improve road safety.

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Study on Resources Influencing Organizational Resilience

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Abstract

Constantly increasing customer's requirements, more demanding markets and unstable social and economic situation forces organizations in recent years to care more about sustainable development and face both foreseen and unpredictable challenges. On the basis of such experiences term organizational resilience was developed. However, despite dozens of researches, still there is lack of knowledge in regards to solid definition of the term, way of measuring resilience or identifying particular resources which play role in increasing the resilience. This paper was developed to further explore knowledge within the area of organizational resilience and types of resources which can impacting the level of organizations' resilience. Therefore authors have defined following hypothesis which was checked within the paper: perceiving types of resources' influence on organizational resilience is different depending on employment level within the organization. Topic of organizational resilience is comparatively novel when being considered within the area of different types of organization's resources . Therefore the paper is complementing studies conducted hitherto. Within the paper authors are using both theoretical and empirical data. Main sources of data are researches so far available and author's broad literature review. As an empirical data authors are using results from survey which they have carried out amongst 216 business representatives from 13 countries across the world.

Keywords: Organizational Resilience, Organizations' Resources, Human Resources.

Introduction

Worldwide process of interaction and integration among people, companies, and governments – globalization and constantly increasing customer's requirements, more demanding markets and unstable social and economic situation are impeding organizations in recent years to stay competitive.

Therefore organizations are looking for effective and novel concepts which are supposed to support their business and management processes. Lean management (Kisiel, 2016, p.325), agile management (Aitken et al., 2002, p. 65) or tools defined as part of Industry 4.0 (Odważny et al., 2018) are only few examples of popular concepts which are being implemented by organizations in recent years. However on the market not only organizations are competing but also whole supply chains (Christopher, 2000, p.40). Out of the supply chain, producers are in very challenging position. They are leading their business in cooperation with wide variety of partners, both suppliers and clients. Turbulent market however is interfering smoothness and stability of the business. Therefore producers need to be able to react fast and follow all important changes. Unfortunately organizations very often do not identify all risks or can't predict upcoming changes. What is more, eventual consequences are not known or well described (Christopher, Peck, 2004, p.5; Pereira, 2009, p.375). In globally connected world organizations, societies and individuals are exposed to turbulent environment and threats appearing from outside and inside the group or organization (Gundel, 2005; Gibson, Tarrant, 2010; Bhamra, 2015).

Situation described above and desire to become stable as an organization led to developing the term of organizational resilience. Organizational resilience as an idea is getting more and more popular. Especially within the years of uncertainty, short-lived opportunities and unpredictable customers organizational resilience seems to be a very relevant topic which stimulates multiple scientists and entrepreneurs (Linnenluecke, 2017, p.23).

Review of available papers in Web of Science database has shown that after searching for the phrase "resource management" 44 379 results were found. Top five papers were referring to human resources, with more than 1000 citations each. Authors cross-checked results in Scopus database. Research has shown 15 808 results for "organizational resources" and 435 results for "organizational resilience" however when connecting two terms only 85 results were listed. What is more, in the context of organizational resilience most of the authors are focusing on immaterial resources (human resources, information resources) (Lengnick-Hall et al., 2011; Triatmanto, Nursyamsi, 2011; Ho et al., 2014; Wilson, 2016; Fatma, Zouhour, 2018; Al-Ayed, 2019, p.184). This is a common trend lately proven by authors of this paper.

Nevertheless authors would like to underline that material resources might be playing significant role in becoming resilient organization. What is more material resources are gaining importance due to the age of automation, robotics and artificial intelligence.

Organizational Resilience

Organizational Resilience Theme

Organizational resilience has not yet been defined in a unequivocal way and discussions in this area are constantly underway. It is still a relatively novel term however its origin is based on other well-known concepts. When one is aware about the context and source of organizational resilience it simplifies understanding of the term itself. Other terms which are referring to organizational resilience are:

- risk management (Engemann, Henderson, 2014);
- ERM (enterprise risk management) (Oh, Teo, 2009);
- financial control based on Turnbull report (Page, Spira, 2004);
- BCP (Business Continuity Planning), which mainly refers to organization's recovery after disruption (e.g. natural disaster or act of terror) (Sahebjamnia, Torabi, Mansouri, 2015).

Above listed terms are only examples of related with organizational resilience concepts. They are all however strongly connected with the topic of risk and organization's continuous functioning before, during or after disruption.

First attempt to define organizational resilience was made in 1973 by Holling who has described engineering resilience as a capability of organization to face disruption and recovery afterwards and ecological resilience as the magnitude of the disruption that can be adopted by the organization without major destruction (Holling, 1973). Afterwards numerous scientists and researchers have been elaborating on the topic of resilience including: Staw who focused on influence of uncertain disruptions on risk management (Staw et al.,1981) or Meyer who have extended Staw's thesis basing on hospitals case studies (Meyer, 1982, p.521). Following years were even more intense within this matter involving topics like risk management, crisis management, emergency planning, business continuity management (Smith, Elliot, 2006) or enterprise risk management (Siang Meng et al., 2017, p.44). Despite many attempts and wide researches focused on organizational resilience still the term is not defined unequivocally which is visible within literature review and confirmed by other researchers (Annareli, Nonino, 2016; Ribeiro, Barbosa-Povoa, 2018). Within this paper authors have chosen the definition provided by Bhamra (Bhamra, 2015) which seems to be describing well the essence of the term. Bharma is referring not only to the stage when organization is facing disruption but is also describing the stage before disruption has emerged as well as period of time when organization has overcame all difficulties (recovery phase). In authors' opinion such tridimensional definition should be seen as an essence of organizational resilience. What is more Bharma sees organizational resilience as a

constructive mechanism to build organization's competiveness which supplements well the general definition.

Independently from the definition and its interpretation, authors would like to draw attention to the fact of dependencies between organizational resilience and organization's resources which are defining, characterizing and building its strength (Barney, 1991; Penrose, 1995; Czerniachowicz, 2012; Flaszewska, Zakrzewska, 2013; Sładkiewicz, 2015). Main factors which are influencing organizational resilience are:

- culture of an organization and leadership (Farrar, 2017);
- partnership within supply chains (Spiegler, 2012);
- available resources and knowledge (Hills, 2015);
- organizational unity (Ates, Bittici 2011);
- planning strategies and change management (Crichton et al., 2009).

On the basis of Farrar's paper (Farrar, 2017) clear connection between organization's resilience (in this case UK police) and leadership exists. Farrar underlines in his conclusions that clear plans for both individuals and organization are required to strengthen resilience through leadership especially within times of diminishing resources and growing expectations. Not only leadership plays a key role in building resilience as other authors suggest supply chain (Spiegler, 2012) as one of the key factors influencing the level of organizations' resilience. It is important due to delays and feedback information in the system and also impacts costs of the organization. As of the list above it is visible that organization's resources are essential for building resilience within organization and sustaining its level throughout years, regardless of disruptions and uncertainty.

Ambiguity within defining the term is also leading to different concepts of measuring organizational resilience. One, universal scale was still not yet developed (Kantur, Iseri-Say, 2015). Hence several papers have been describing different approaches towards measuring the level of resilience. One of such examples would be OrgResTool build by New Zeland's government. The tool is using questionnaire and subjective evaluation of 13 different factors: leadership, staff engagement, situation awareness, decision making, innovation and creativity, effective partnership, leveraging knowledge, breaking silos, internal resources, unity of purpose, proactive posture, planning strategies and stress testing plan. Another worth mentioning approach amongst others was developed by Tierney (Tierney, 2003) and was based on September 11, 2001 events (World Trade Center attack). Tierney underlines four factors indicating organization's resilience: robustness, redundancy, resourcefulness and rapidity. She considers resilience as a matrix of four dimensions: technical, organizational, social and economic.

This leads to analogy to different types of resources: technical, human, financial and information resources.

Resources within resilience

Organizations nowadays are looking for tools and activities to prevent themselves from negative influence of the environment. To make the best out of the challenges of the market and emerging opportunities organizations are willing to integrate all departments inside. Connections between production departments and other departments supporting production indirectly (e.g. financial department) or directly (e.g. internal logistics department) is valuable to reassure stable process. This is also granted thanks to other integrated processes like preventive maintenance, predictive planning, stoppages management or materials management. All those processes are at least minimally connected with resources. Managing resources in an effective way is key to organization's success which means to drive a profitable business. To manage well resources each organization needs firstly to identify them, set up business targets and finally to control resources accordingly. It is also important to mind all the potential risks appearing throughout the process of resources management what is also emphasized within ISO 9004:2009 norms (Quality management systems – Guidelines for performance improvements).

Resources in an organization can be classified according to different criteria: types, source, area of interpretation, treating resources as a competitiveness factor or key strategical agent (Matwiejczuk, 2014). Typically resources are divided into two main types: (Godziszewska et al., 2011)

- material resources (understood as all goods posessed by an organization e.g. lands, real estate, machines, materials),
- immaterial resources (e.g. human resources, knowledge, know-how).

From resource based theory point of view, despite classifications, the most important resources are resources valuable (meaning which are improving efficiency and effectiveness of the organization), rare (usually described as resources are described as rare as long as the number of firms that possesses the resource is less than the number of firms needed to generate perfect competition dynamics) and difficult to imitate (due to unique historical conditions, social complexity or casual ambiguity). If those three categories are matched the next step is to organize the company in a way to exploit these resources. This was concluded within VRIO framework which a business analysis framework that forms part of the firm's larger strategic scheme (Barney, Clark, 2007; Keuper et al., 2011; Brem et al., 2016).

Resource-based theory suggests that resources that are valuable, rare, difficult to imitate, and irreplaceable can position a firm for long-term success. Whenever organization will identify key resources and start protecting and developing them, organizational resilience should be strengthen as well. Hereby an undisputed question appears which type of the resources is most critical for building resilience.

Study

Authors of the paper have carried out a survey to achieve following targets:

- check respondents' understanding and interpretation of organizational resilience term,
- identify key organization's areas and resources influencing resilience,
- check if there is a correlation between respondents' level of employment and chosen factors/resources important for organizational resilience.

Survey has been carried out between May and July 2019 on the basis of previously completed literature review. Authors have reviewed definitions of organizational resilience, so far described factors influencing organizational resilience as well as different approaches towards measuring resilience. Authors have also reviewed available papers referring to resources management and different types of resources in the context of resilience. On that basis questionnaire was built. 647 business representatives were asked to answer questions. Questionnaires were available in two languages: Polish and English and were distributed online. Authors received 216 answers coming mainly from Poland (157 surveys) and Germany (31 surveys). Other answers were coming from Ireland, Netherlands, Mexico, Austria, China, Iran, Serbia, USA, UAE and Romania. Survey has not checked however in which countries, represented organizations were registered. 168 respondents were representing big organizations (employing more than 249 people), 29 respondents were employed in medium-sized enterprises (between 50 and 249 people employed), 13 were representing small-sized organizations (10-49 employees) and remaining 5 respondents were representing micro-enterprises (less than 10 employees). Conducted studies served as pilot studies and helped finding out relations between different types of resources and organizational resilience. Further on, results can help defining the model that depicts how resources influence organizational resilience which is also suggested as one of next steps and following studies.

One of the questions within questionnaire focused on indicating types of organizational resources which are critical to organizational resilience. Respondents were asked to assign importance level (choosing from: very important, important, less important and irrelevant to organizational resilience) to four given types of resources:

- human resources,
- financial resources,
- technical resources,
- informative resources.

Each importance level had particular number of points assigned which helped in further mathematical analysis. Assigning "very important" was equal to 3 points, important – 2 points, less important – 1 point and irrelevant – 0 points.

On the basis of this question authors were able to check if perceiving of different resources' types strength influencing organizational resilience is different depending on employment level within the organization. Respondents were divided into three groups:

- first employment level - specialists level (consisting of other individual positions eg. specialists).
- second employment level - leadership level (consisting of mid-level managers and team leaders),
- third employment level - top management level (consisting of consortium and organization's top management).

Correlations between respondents' answers and their management groups were further analyzed.

Results

The test results were analyzed in accordance with the methodology presented in Figure 1.

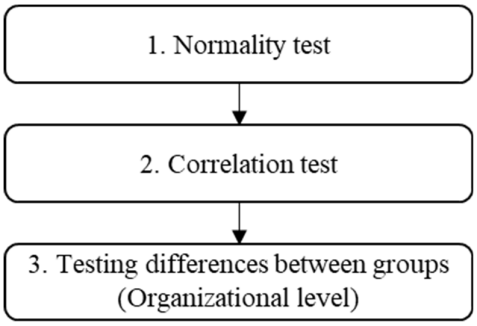

Fig. 1. Methodology of the analysis

Source: ow□study

Step 1: In the first step of the analysis, a normality test was carried out for the significance levels of individual types of resources indicated by the respondents. Knowledge about the distribution of results will allow selection of appropriate methods for verifying statistical tests. Normality test was carried out using the Anderson-Darling method. For the significance levels assessments for each of the analyzed types of resources, statistical hypotheses were made:

H0: The data follow a normal distribution.

H1: The data do not follow a normal distribution.

Thus, four pairs of hypotheses were created for the answers given for each type of resource. Testing was carried out assuming $\alpha = 0.05$. The results of the normality test are presented in Table 1.

Table 1: Results of normality test

Type of resources	**Human resources**	**Financial resources**	**Technical resources**	**R&D resources**
P-Value	<0.005	<0.005	<0.005	<0.005

Source: own study

According to the results presented in Table 1 P-Value is smaller than the assumed α, thus the null hypotheses should be rejected. The distribution of significance levels for each type of resource is not normal. Therefore authors were in position to use nonparametric tests in the next steps of the analysis.

Step 2: According to the presented methodology, in the second step, the correlation analysis between the responders' employment level within the organization and the assessment of the significance of the impact of a given type of resource on organizational resilience was performed. To assess this correlation Spearman's rho index was used. Following statistical hypotheses have been made for each type of resource:

H0: There is a correlation between organizational level and chosen type of resources.

H1: There is not a correlation between organizational level and chosen type of resources.

Testing was carried out assuming $\alpha = 0.05$. The correlation test results are presented in Table 2.

Table 2: Results of correlation test

Type of resources	Human resources	Financial resources	Technical resources	R&D resources
Spearman rho	0.189	-0.115	0.030	-0.073
P-Value	0.005	0.092	0.661	0.284

According to the results presented in Table 2 statistically significant correlation between employment level within the organization and types of resources was determined only for human resources. It should be noted that the value of this coefficient is very low and in this situation it cannot be concluded that a correlation exists.

Step 3: On the basis of a conclusion from former, second step of the analysis (no simple correlation between perceiving types of resources influence organizational resilience on different employment level within the organization), authors have conducted a more detailed analysis of the results. It is necessary to check whether the perceiving of the significance of resource types on organizational resilience is the same for each of the employment levels within the organization. Authors took under consideration that data analysis might show a different results than expected. For the purpose of detailed analysis, the Kruskal-Wallis analysis was carried out assuming $\alpha = 0.05$. Following statistical hypotheses for each of the types of resources were made:

H0: All medians are equal

H1: At least one median is different

The results of hypothesis testing for human resources are presented in Table 3.

Table 3: Results of Kruskal-Wallis test for human resources

Organizational level	N	Median	Mean Rank	Z-Value
1	140	3	101,3	-2,30
2	58	3	117,5	1,29
3	18	3	135,4	1,91
Overall	216		108,5	

The P-Value for this test was 0.017, which allowed authors to reject the null hypothesis. This means that the median of perceiving strength of influence of human resources on organizational resilience is different depending on responder's employment level within the organization.

The results of the Kruskal-Wallis test for financial resources are presented in Table 4.

Table 4: Results of Kruskal-Wallis test for financial resources

Organizational level	N	Median	Mean Rank	Z-Value
1	140	1	113,3	1,55
2	58	1	101,6	-0,99
3	18	1	93,1	-1,09
Overall	216		108,5	

The P-Value for this test was 0.235, so the null hypothesis could not be rejected. This means that the median of perceiving strength of influence of financial resources on organizational resilience does not differ according to previously defined employment levels within the organization.

The results of the Kruskal-Wallis test for technical resources are presented in Table 5.

Table 5: Results of Kruskal-Wallis test for technical resources

Organizational level	N	Median	Mean Rank	Z-Value
1	140	1	107,4	-0,36
2	58	1	109,2	0,10
3	18	1	115,1	0,47
Overall	216		108,5	

The P-Value for this test was 0.871, so the null hypothesis could not be rejected as well for technical resources. This means that the median of perceiving strength of influence of technical resources on influencing organizational resilience does not differ according to previously defined employment levels within the organization.

The results of the Kruskal-Wallis test for R&D resources are presented in Table 6.

Table 6: Results of Kruskal-Wallis test for R&D resources

Organizational level	N	Median	Mean Rank	Z-Value
1	140	1	111,6	0,99
2	58	1	103,9	-0,66

3	18	1	99,3	-0,66
Overall	216		108,5	

The P-Value for this test was 0.559, which does not allow rejecting the null hypothesis. This means that the median of perceiving strength of influence of informative (R&D) resources on organizational resilience does not differ according to previously defined employment levels within the organization.

To sum up step 3 of the research methodology, it should be noted that the impact of employment level within the organization on perceiving types of resources influencing organizational resilience can be observed only in the case of human resources. Investigating this phenomenon, the authors have stated a scientific question: Are human resources perceived as more important in building organizational resilience by responders on higher employment level within the organization? In order to answer the research question posed in this way, two research hypotheses should be verified. Assuming that:

η_1: median of perceiving human resources' impact strength on the organization's resilience indicated by people employed on the first level within the organization,

η_2: median of perceiving human resources' impact strength on the organization's resilience indicated by people employed on the second level within the organization,

$\eta 3$: median of perceiving human resources' impact strength on the organization's resilience indicated by people employed on the third level within the organization.

The first research hypothesis is: perceiving human resources influencing organizational resilience is higher in case of people employed on the second level within the organization than by people employed on the first level.

H_0: $\eta_1 - \eta_2 = 0$

H_1: $\eta_1 - \eta_2 < 0$

The hypothesis was verified using the Mann-Whitney method assuming $\alpha = 0.05$. P-Value was 0.030, which means that the null hypothesis can be rejected. Median of perceiving influence strength of human resources on organizational resilience indicated by people employed on the second level within the organization is higher than people employed on the first level within the organization.

The second research hypothesis is: perceiving human resources influencing organizational resilience is higher by people employed on the third level within the organization than by people employed on the second level.

H_0: $\eta 2 - \eta 3 = 0$

H_1: $\eta 2 - \eta 3 < 0$

This hypothesis was also verified using the Mann-Whitney method assuming $\alpha = 0.05$. P-Value was 0.074, which means that you cannot reject the null hypothesis. Median of perceiving of human resources' impact level on the organizational resilience indicated by people employed on the second level within the organization is not significantly different than indicated by people employed on the third level within the organization.

Conclusion

Within the paper authors have defined following hypothesis: perceiving types of resources' influence on organizational resilience is different depending on employment level within the organization. Throughout the paper authors could not prove fully the thesis however the results of carried out analysis are leading to following conclusions. On the basis of conducted survey and tests authors found out that employees from 1st level of employment within organization (specialists and individual position) are perceiving human resources as less important for building and strengthening organizational resilience. This finding comes along the other conclusion which considers other employees working on leadership and top management level. Those two groups are perceiving human resources as more important in the scope of building organizational resilience. Growth of importance of human resources is however not in direct proportion to employment level so there is no real difference between 2nd and 3rd group of employment.

Despite authors' expectations, there are no evidence for existing a correlation between level of employment and perceiving strength of other types of resources for strengthening organizational resilience. This could lead to a conclusion that informative, financial and technical resources are evenly important on each level of employment however further studies on bigger group should be carried out. This paper was developed to assess resources which play a main role in building and increasing organizational resilience however such type can't be clearly indicated on the basis of carried out study even though human resources showed highest interest within leadership level.

Topic of organizational resilience is comparatively novel when being considered within the area of resources. The paper is complementing studies conducted hitherto. Despite presented analysis authors suggest further line of studies which should focus especially on the areas of:

- resources management methods to strengthen organizational resilience through more effective use of particular types of available resources,
- further analysis of correlations between level of employment and type of resources influencing organizational resilience,
- deep dive on specific types of human resources (eg. resources on different level of employment, skills, know-how) and how they are influencing resilience of an organization,
- further studies on specific types of material resources types in relation to organizational resilience,

What is more authors are recognizing a gap in the area of unification of resilience definition and measurements tools for organizational level assessment as well as benchmarking tools for organizations active in different branches. Broader studies focusing on those topics are recommended and should involve representatives of different branches as well as different employment levels.

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The Use of The Repetitive Method of Rapid Assessment of a Company's Ability to Automate Production Processes – Case Study

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Abstract

The turbulent environment in which production companies operate today has forced them to constantly improve processes. Fast-paced technological advancement brought us new and strong wave of disruption. Implementation of such solutions requires knowledge of not only the technological and IT areas, but also requires a broader insight into the management, finance and human resources. Based on the company's study, authors of the article present the rapid and repeatable method of assessment of all of the indicated areas above. Authors created the audit method based on lean management, six-sigma, change management and theory of constraints problem identification, using interviews and observation mixed with data gathering and analysis from the ERP class system. Considering speed and repeatability of the Automation Readiness Check method in data gathering and analytical areas, it brings clear view of constraints and risks that are presented to the enterprise in a manner, that gives a clear direction of the process and management improvement efforts.

Keywords: industrial automation, audit, process improvement, Industry 4.0, change management

Introduction

This article is presented as a business case. Business means that the organization is pursuing goals measured by its performance, for example using EBITDA or any other measure commonly related to profit (Paris, 2017). One of the key ingredients to become and stay profitable is to utilize the innovative technological advantage related to company's strategy goals (Bisack, 2013). Decision about technological advancement should be considered after ensuring that there is no other known option to reach company's goals in the quicker and more efficient manner, including: maintaining older technologies (Chambers, 2004), efforts targeted at internal operations, for example Six Sigma (Antony, Brennan, Dempsey, Farrington, Forthun, McFarlane, Trakulsunti, 2019) or meeting the market demands by changing the product portfolio. When company's management board comes to the conclusion that they should choose technological advancement instead (such decision can be accelerated by implementing OODA loop (Eisenbart, Ranscombe and Vettorello, 2019)), they should proceed with momentum and ensure that the decision is made considering finances, human resources, processes and IT readiness. The Automation Readiness Check method presented in this article gives the company fast and clear answer what and when should be improved to start efficient technological change and to achieve benefits in line with strategy goals.

Automation readiness check (ARC) method

Description of the method

The purpose of the analysis is to indicate what and when should be changed to achieve readiness for automation. Value for the entrepreneur is not only the assessment of the current state, but also the ability to verify progress and the possibility of comparative analysis with other companies. For this reason, the entire analysis has been reduced to one rating showing the current level of readiness for automation. This rate is the average derived from the assessments of five main areas studied by the ARC method: management, people, processes, IT and finance. Individual ratings are in the range of 0 to 5 with one decimal, where 5 is the top score indicating that organization is in the state of readiness to rapidly implement automation of processes and 0 means that organization has to work through the whole spectrum of organizational and management changes to be able to invest in industrial automation without losses in profit and without putting morale of the whole crew at risk (Band, Blanchard, Dressel, Korbelak, 2018). Description of each of the strengths and weaknesses of the company is attached to the assessment of each category. The next part of the article will present in detail the research methods used in each category. In addition to quantitative assessment, one of the main elements of the report's results is the automation road map. It indicates specific actions in the above-mentioned five main categories. Combining these actions in one document gives a holistic view of the required changes in the enterprise along with their placement on the timeline. The automation roadmap (Grünewald, Jürgensmeyer, Kohnke, Lier, Reise, Reitze, 2018) is prepared as the last element due to the required expertise of professionals involved in business transformation. Automation road map does not affect the assessment of mentioned above five categories.

Description of areas analyzed

Management

The rating on a scale of 0-5 in the area of management is calculated on the basis of the average of ratings of four sub-areas analyzed within this category: strategic goals, main problems, main initiatives and new opportunities (Wadström, 2019). The assessment of this area is based on the correlation between goals, problems and current and planned initiatives, as well as the presence of indicators assessing their effectiveness. Gathering information about new opportunities is done by means of unstructured interview and brainstorming, which results in a list of ideas for ways of using future automated production. The assessment of this area is based on a range of ideas that define the senior and middle management awareness of the benefits resulting from automation (Burduk, Grzybowska, Safonyk, 2019).

People

The key factor to any change is people. People have their own limits in regard to participation in a change (Georgalis, Kimberley, Lu, Samaratunge, 2015). Therefore, when launching subsequent initiatives, it is necessary to specify where the limit is, whether and when it will be exceeded, and how to regulate its level (Bridgman, Brown, Cummings, 2016). To answer these questions and assess people's willingness to change on a scale of 0-5 the study draws an average of the ratings of individual areas such as: the limit of assimilation of changes, method and frequency of communication, readiness to work with machines, readiness to change position and work mode, termination of employment process (Wyonch, 2018). In addition, to show broader perspective, ARC shows the type and impact of change resistance (Campbell, Carmichael, Naidoo, 2015) using the tree map chart. Each area is assessed during structured interview.

Processes

Processes are assessed in terms of: process automation potential on a 0-5 scale, the financial potential of automation on a 0-5 scale. The results are presented in form of a simplified layout of the hall with marked workstations. The average of ratings of both areas indicated above for each workstation is calculated. From the individual assessments obtained this way, an average is derived, representing the overall assessment of the process area. To assess the process potential of automation, each workstation is rated on a 0-5 scale for various elements, which are presented in Table 1.

Table 1: Description of workstation processes' elements analyzed

Value	Range of rating	Obtaining method	Description
Stability	0 - 5	Observation	Existence of a process management system such as: standards, change management, process maps, visual management, 5S, CI, TQM, WCM, Lean, 6S, PDCA, exceptions management. Result also consists of: number of failures, downtimes (Chassapis, Ibrahim, 2017).
Repeatability	0 - 5	IT system and observation	The number and duration of changeovers for another type of the same product and for another product.
Flow efficiency	0 - 5	IT system and observation	How long it takes to process stock (work in progress) accumulated before and after the workstation, determining whether the workstation was working during the observation. Inventory data is used in a comparative form between workstations, where a high stock of work in progress before the workstation indicates a potential bottleneck (Kot, Kovács, 2017).
Need for improvement	0 - 5	Observation and evaluation results of stability	Expert assessment regarding the need to introduce organizational changes to optimize work in a given work position (Antony, Dahlgaard, McLean, 2017).
The level of automation	0 - 5	Observation and interview with factory workers	Automated - no human intervention (rating 0-1). Semi-automated - human working with the machine (rating 2-3). Manual - no machine involved (rating 4-5). Data gathered was later used in the assessment of financial potential for automation: the number of employees per workstation and average employee cost.
Maintenance	0 - 5	Observation and IT production system import	Presence of KPI's (Maintenance Department), what do these KPI's indicate, how are they managed, ways of receiving information about a failure, time from failure to notification, queueing these notifications (including priority), response time, ability to operate automated workstations, whether the maintenance process is outsourced and if so, is there a fixed response time and how is it checked.
Process ergonomics	0 - 5	Observation, interviews and IT system import	Impact of the environment on employees' health (harmful body position during work, noise, dustiness, etc.), accidents in the production hall, the number of days on sick leave expressed as a percentage of available working days, salary supplements related to harmful working conditions. The better the conditions, the lower the rating of automation potential (Del Fabbro, Santarossa, 2016).
IT infrastructure (workstation)	0 - 5	Observation and interview	Presence of sensors, controllers, control cabinets, IT connections at the workplace. Assessment of the ability to connect IT infrastructure.

The results of the automation potential are presented on a matrix where columns represent the elements described above, and the rows represent specific processes. For better presentation of key areas to change, different colors corresponding to the rating scale were used, where: 0 - red, 5 - green.

The financial potential of automation for each workstation is assessed on the basis of variables:

- Data collected during the assessment of automation potential: number of employees, average salary of the employee and assessment whether the workstation may be a potential bottleneck.
- Data collected from the IT system: assessment whether products processed at the workspace constitute a high share in turnover (using pareto chart) or have a significant difference between the purchase price of raw materials and the sale price of the finished product.

The assessment of the elements above, together with expert assessment of the automation potential carried out in the previous step, enables assessment on a 0-5 scale of each of the analyzed workstations.
IT area

The assessment of readiness of the IT area for automation is based on the interview using three variables, included in Table 2.

Table 2: Description of IT elements analyzed

Value	Range of rating	Obtaining method	Description
System readiness for data acquisition and processing:	0 -5	Interview with the IT director	Existence and use of IT systems in the enterprise, efficiency and experience in the integration of existing systems with production machines and methods of data presentation are assessed (Nwankpa, 2015).
IT infrastructure	0 - 5	Interview with the IT director	Assessed are: speed and compatibility of cabling and hardware, existing security procedures, backup of the most important hardware components.
IT-Production-Maintenance Department cooperation:	0 - 5	Interviews separately with each manager of individual departments	The following are evaluated: the precision of determining the needs for data collection and presentation, meeting these needs during investments in equipment requiring data transmission via IT infrastructure.

Finance

The assessment of financial readiness is based on the assessment of two variables. The average of the following two values gives the final result of the finance area. The values are shown and described in Table 3.

Table 3: Description of financial elements analyzed

Value	Range of rating	Obtaining method	Description
Readiness to invest	0 - 5	Financial data and interview with the financial director	Two values are defined: the minimum and maximum amount of money the company is ready to gather with an acceptable level of return on investment (Frank, Shen, 2016). The minimum level is determined assuming that the engagement of employees whose knowledge of company processes is required to carry out the investment is not part of the calculated costs. The result is presented in the form of a graph, with lines of minimum and maximum investment cost estimated using the expert method based on a previous examination of the readiness of processes for automation. The higher the estimated maximum investment value exceeds the maximum level of readiness for investment, the lower the score.
Fundraising	0 - 5	Interview with the financial director	It is determined which investments over the last 3 years have been co-financed with the help of external sources, such as loans, leasing or co-financing from government programs. The greater the experience gained in raising funds, the higher the expert rating.

Automation Readiness Check report ends with automation road map. This is one-page blueprint for obtaining organizational readiness. Each category: management, people, processes, IT and finance represents separated pool of actions. Each step is designed to bring company closer to the point where investment in automation could be implemented rapidly, with strong economic value and correlation with strategic goals and people's development.

Results of the automation readiness check (ARC) – case study

Main Score

The company's main activity is producing and selling lighting products and sub-products. Production process includes among others: cutting, injecting, painting, assembling and packing. Some of the sub-processes are outsourced. Sales are international. The company is managed by two co-owners and is divided into 6 departments: sales, production, logistics, quality, marketing and finance with outsourced IT. The company's growth is stable and management is actively looking for new ways to accelerate their business. In ARC, analyzed company received an overall score: 2,7. Details of the score are presented on the figure 1.

Fig. 1: Overall score of main areas

Table 4 presents ratings for specific elements of each analyzed area. The reasoning behind those ratings is described in further sections (2.3. – 2.7.).

Table 4: Scores of specific elements

Area	Element	Score	Overall score
Management	Strategic goals	1,0	2,5
	Main problems	3,0	
	Main initiatives	2,0	
	New opportunities	4,0	
People	Initiatives impact on people	2,0	2,3
	Quality and frequency of messages	3,5	
	Readiness to work with machines	2,0	
	Readiness to change the workstation	2,0	
	Outplacement	2,0	
Process	Automation potential	2,5	2,5
	Financial potential	2,0	
IT	Readiness of systems to gather and process data	2,0	2
	IT infrastructure	2,0	
	IT - Production - Maintenance Department cooperation	2,0	
Finance	Financial readiness for investment	3,0	4
	Fundraising	5,0	

Strengths and weaknesses regarding potential automation

Strengths:

- Management – openness to changes and the ability to react quickly, ongoing process of delegating tasks and permissions, market knowledge and knowledge of processes within the company at all levels of implementation.
- People – a relatively large group of employees ready to take on new roles in the company, high frequency of messages about changes within the company.

- Processes – processes with high repeatability and stability, knowledge of processes among employees.
- IT - internal resources for developing hardware infrastructure inside the company, some of the workstations equipped with controllers.
- Finances - high readiness to invest in new technologies, experience in obtaining funds in the form of leasing, loans and EU grants.

Weaknesses:

- Management – lack of organizational structure consistent with the number and burden of implemented processes, different management styles of company's owners which create a sense of instability among employees.
- People – a sense of overload with implementation projects that are imposed by the management, lack of standard for effective implementation of new employees.
- Processes – lack of consistent method for assessing the effectiveness and profitability of processes, lack of maintenance structure.
- IT - little experience in designing IT solutions, the needs related to obtaining information at various levels of the organization do not translate into the IT systems used.
- Finances - lack of experience within the company with assessing the financial legitimacy of investments in integrated management systems.

Management Readiness Score

On figure 2 strategic development tree for analyzed company is presented.

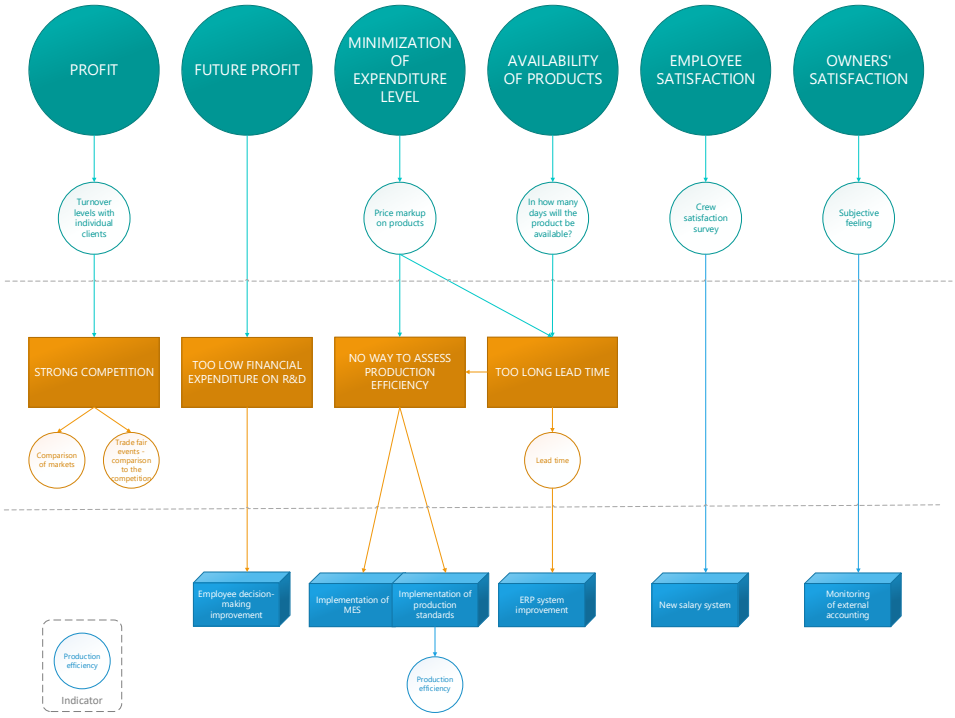

Fig. 2: Strategic development tree

Strategic goals (score 1 / 5)

Strategic goals are expressed in measurable form (such as profit) and in the form of course of action. Measurable goals are not directly translated into individual management levels. Recommendations for strategic goals are: strengthening the structure of setting, delegating and monitoring strategic goals.

Main problems (score: 3 / 5)

High awareness of the company's problems. Lack of effective mechanisms indicating priorities in relation to the new projects. Recommendation for main problems is adding a processing index based on a bottleneck analysis to calculations based on revenues, costs, margin (sales price - production cost).
Main initiatives (score: 2 / 5)

Accurate selection of started projects to solve the main problems affecting strategic goals. The recommendation for main initiatives are: maintaining the direction of work on the roles and rights in the company; treating these changes as a priority, because most of the initiatives launched are based on the emerging coherent management system, employee involvement and new competences related to automation and IT systems; implementation of the internal project management method (including the resources assigned to them) due to project overload and lack of ownership of implementations by implementers, which affects the unused potential of initiatives and projects, and reduces the efficiency of operational tasks.

New opportunities (score: 4 / 5)

High awareness of senior- and middle- level managers about the benefits of automation. The benefits listed are:

- Quality and time repeatability of the product.
- Enforcing standardization.
- Processes easier to manage, organized.
- The crew is more competent.
- Changing the nature of the crew from production to maintenance.
- Changing the character of the production crew from more to maintenance.
- More people at middle management level (instead of senior level).
- A more balanced, multi-stage recruitment method - employing people with higher competences (people who have already worked in the company will be trained).
- Supervision of real efficiency (it is more difficult with a human).
- Easier determination of production capacity and capabilities, production planning.

Recommendation for new opportunities is using automation projects and understanding their benefits as tools of internal marketing (promotion of new technologies) as well as external (image of a modern company).

People readiness score

Initiatives impact on people (score: 2 / 5)
On figures 3-5 limitations of assimilation to change are presented.

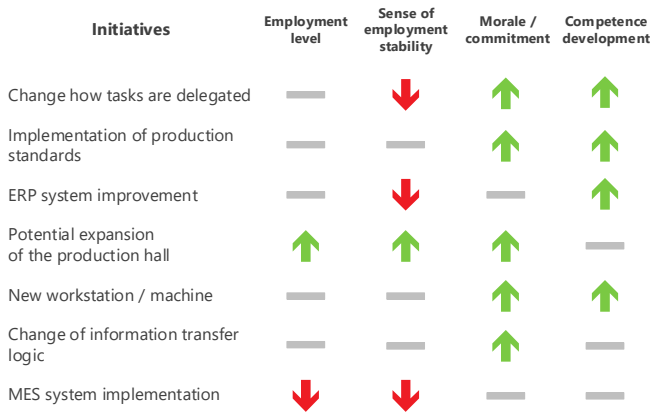

Fig. 3: The limit of assimilation to change – impact on employees

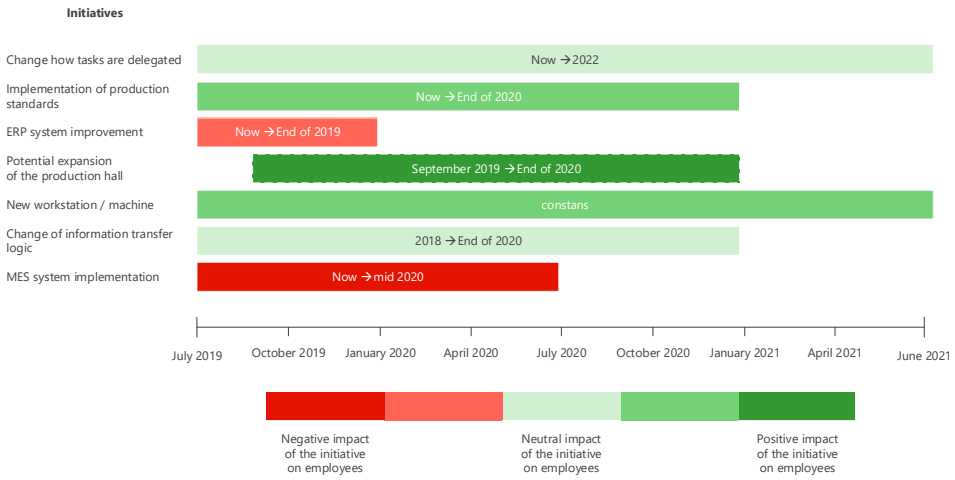

Fig. 4: The limit of assimilation to change – impact timeline

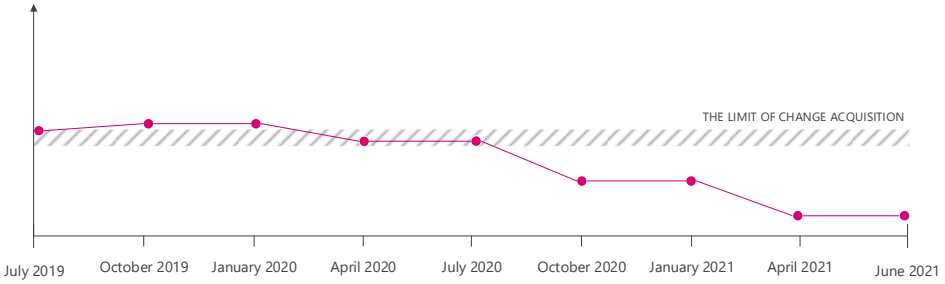

Fig. 5: The limit of assimilation to change – stress point

Quality and frequency of messages (score: 3,5 / 5)
On figure 6 communication matrix is presented.

The colors of individual circles on the matrix determine the impact of a given initiative on people (same logic applied as on the previous graph). The frequency of messages regarding ongoing changes and projects in the company is at a high level. Employees regularly receive information about ongoing projects. Figure 7 shows the reasons, why automation may encounter resistance from workers' perspective.

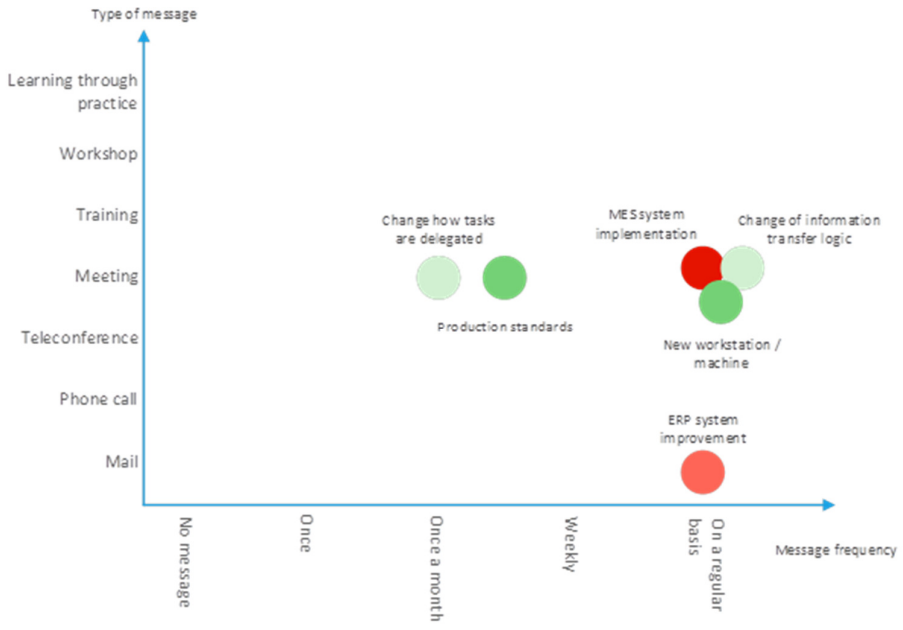

Fig. 6: Communication matrix

Fig. 7: Resistance tree map chart

Orange color represents management resistance, dark blue: individual resistance, light blue: organizational resistance and green: technical resistance.

Particular attention should be paid to the resistance resulting from the management method. Seemingly obvious human fears of something unknown resulting from the fact that: they are not the authors of changes, their time commitment will increase or they will hear rumors about new initiatives that do not always coincide with reality, should not occur in the face of the upcoming change, if effective way of managing not only change, but also the entire organization is applied. Lack of this efficiency is manifested by imposing changes on employees, without determining the purpose and benefits of these changes, or by excessive interference in the activities of employees, especially resulting from their own initiatives. The change management should be based on a clear, understandable message for employees, which will limit resistance at source.

Readiness to work with machines (score: 2 / 5)

There is a high probability that people who will have to work with a new machine will not be satisfied by that. The employees themselves have the potential to undertake new initiatives, but their fear of taking responsibility and decision-making in connection with new tasks is limited. The company has people competent to operate new devices, willing to "absorb" new knowledge, but they only constitute about 30% of the crew - the rest would prefer to stick to simple work, as is the case today.
Readiness to change the workstation (score: 2 / 5)

The company lacks the preparation of employees to change positions and work mode. There is no specific standard for conducting operator training. Employees are implemented through initial training, during which they become acquainted with the threats and the basics of work in a given position. The advantage is the implementation of the employee through practice - the leader of the workstation gradually introduces a new person to the new position, starting with simple work, then implementing him in ever newer areas.
Outplacement (score: 2 / 5)

The company implemented the process of transferring employees to another position and provides dismissed employees with a security package. However, it lacks outplacement process and does not cooperate with employment agencies.
Processes readiness score
Automation potential (score: 3 / 5)

Figure 8 present the automation potential of workstations matrix.

Workstation / Parameter	P1	P2	P3	P4	P5	P6	P7	P8	P9		SCORE
W1	3	2	2	3	2	2	2	2		W1	2,2
W2	3	3	5	2	2	3	4	3	0	W2	3
W3	2,5	2	2,5	2,5	2	3,5	2	2		W3	2,3
W4	4	3	4	3	2	3	3	2		W4	2,9
W5	4	3	4	3	2	3	3	2		W5	2,9
W6	2,5	4	3	3	2	5	3,5	2	1	W6	3,2
W7	4	4	3	4	2	5	4	2,5	1	W7	3,6
W8	2	1	5	2	2	4	3	2	1	W8	2,7
W9	4	2	3	4	2	4	3,5	2,5	1	W9	3,2
W10	5	4	2,5	5	2	2	3	2	1	W10	3,2
W11	3	4	5	5	3	3,5	2	5	1	W11	3,8
W12	2	5	1,5	1	2,5	2	2	3		W12	2,3
W13	3	5	3	4	2	2	2	3		W13	2,9
W14	3	5	1	4	2	2	3	2	0	W14	2,7
W15	3	3	5	2	2	3	2	2		W15	2,7

Fig. 8: The automation potential of workstations matrix

Legend:

- P1 - Stability
- P2 - Repeatability
- P3 – Flow efficiency
- P4 – Need for organizational improvements
- P5 - Maintenance
- P6 – Process ergonomics
- P7 – IT infrastructure
- P8 - Transport
- P9 - Employees' knowledge about the process

Financial potential (score: 2 / 5)

Table 2 present the financial potential of automation per workstation

Table 2: Financial potential of automation per workstation

Workstation	Number of operators	Bottleneck score	Sale price - price of material Score	Turnover score	Arithmetic average
W1	3	1	-----	-----	1,4
W2	5	4	5	-----	4,7
W3	3	1	-----	-----	1,4
W4	1	3	-----	-----	1,4
W5	1	3	-----	-----	1,4
W6	1	1	5	-----	2,4
W7	1	1	-----	5	2,4
W8	1	0	-----	-----	0,4
W9	1	1	-----	-----	0,7
W10	1	1	-----	-----	0,7
W11	5	4	-----	-----	3,0
W12	3	0	5	-----	2,7
W13	3	1	-----	-----	1,4
W14	3	0	5	-----	2,7
W15	3	5	5	-----	4,4

Financial potential assessment logic is as below:

- Number of operators: range 0-5. If only one operator had been working at a specific workstation, this workstation got 1 point. If there had been two operators working there, it got 3 points and for 4 people operating at the specific workstation, it was rated with 5 points.
- Bottleneck score: range 0-5. Expert assessment, taking into account the stock before and after the specific workstation at the time of observation and management indications regarding potential bottlenecks. A rating of 0 means, that the workstation is not very likely to be a bottleneck, while a rating of 5 indicates workstations that are likely to limit production.
- Sale price – price of material score: 5 points were assigned to workstations which process products that had been indicated by the management as having the largest difference between the product sale price and purchase price of raw material.
- Turnover score: 5 points were assigned to workstations which process products that had been indicated by the management as generating the highest turnover for the enterprise.
- Arithmetic average: the sum of points from the previous 4 columns was divided by 3 (just for analysis in this specific enterprise): the rating of number of operators, bottleneck score and either price difference score or turnover score (whichever is rated). Additionally, the program that was used to calculate the score rounded it up to the first decimal place.

IT Readiness Score

Readiness of systems to gather and process data (score: 2 / 5)

There is readiness and need to collect and analyze data from production workstations. The existing ERP system is not integrated with existing machines, there is no information on the data exchange protocols used. The data is entered manually into the system at production stations. The MES class system is being implemented. Recommended is introducing competences related to the implementation and maintenance of integrated management systems focused on integration with machines.
IT infrastructure (score: 2 / 5)

High ability to prepare cabling, easy to connect to individual stations. Although, infrastructure should be strengthened in case of a failure (spare data transmission devices) and in the area of network security. For some of the workstations at which there is no infrastructure to collect and transfer data, the company will have to install sensors and controllers.

IT – Production – Maintenance cooperation (score: 2 / 5)

The company has a common understanding of the objectives related to data collection and analysis, and expectations in area of production are clearly defined (listed: determination of production capacity, capabilities, standards, a visible pool of orders assigned to workstations, scheduling and prioritization). Previous implementations of systems and new machines / production lines were based on the competence of external experts. There is also lack of experience within the company in the field of automatic data collection and analysis. Dedicated IT positions, maintenance department in the field of automation of technological processes and data processing are recommended to be created.

Financial Readiness Score

Financial readiness for investment (score: 3 / 5)

In a short time, the company is able to assign sufficient financial resources to prepare the organization for automation and introduce technological changes so that the return on investment is at a level acceptable to the management. However, it is not able to cover the maximum assumed investment cost from its own resources. The maximum assumed cost of investment is determined by the expert method of estimating the level of costs associated with technological changes that will not only ensure an acceptable return on investment, but will fully use the organization's ability to absorb changes.
Fundraising (score: 5 / 5)

The company is able to successfully raise funds for investments through loans, leasing, co-financing for infrastructure and machinery. Recently, funds for development have been obtained several times. In addition, the organization has experience in obtaining financial support from the European Union with an external company.

Automation roadmap

Last step of the methodology is developing an automation roadmap. Map is presented on the figure 11.

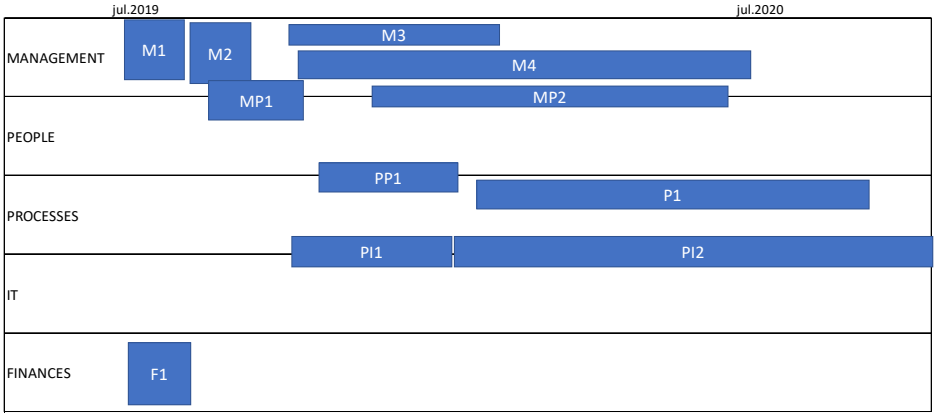

Fig. 11: Automation roadmap

Legend:

- M1 - Creating a one-card company status overview for owners.

- M2 - Preparation of company's development plan according to strategic goals: what and when to do, how to measure the result.
- M3 - Redefining management structure and standards.
- M4 - Implementation of a system for monitoring the realization of goals and projects at various management levels .
- MP1 - Analysis of the required resources to achieve the objectives, including required vs possessed skills and competences among the crew.
- MP2 – Creation of transparent method of communicating goals, progress, changes and rules for starting new projects.
- PP1 - Concept of monitoring process efficiency and rewarding employees.
- P1 – Automation of selected processes: W15, W11, W2.
- PI1 - Creation of positions with IT and Maintenance skills in the field of production and development of integrated management systems.
- PI2 - Continuation of implementations according to a coherent strategy: MES system, production standards and rewarding system.
- F1 - Financial preparation for the investment related to the change in the management structure.

Conclusive Remarks

The automation readiness analysis has been designed for companies that want to quickly:

- Diagnose the current state of the company in the context of preparation for automation processes.
- Assess financial and organizational costs resulting from process automation.
- Make the necessary changes to fully utilize the potential of automation.
- Reduce the risk of unsuccessful investments and a decrease in employee involvement and morale.

The ARC study involved employees of the company for eight hours and was conducted by three researchers. The transparent structure of the study allows to identify areas for improvement and simplifies business decisions. Expert, quality assessment requires knowledge of research and management methods, the ability to communicate and empathize, knowledge of process improvement strategies, tools and techniques in the form of work organization, material and information flow, as well as in the form of modern technologies. For this reason, the range of applications of the method is limited by the availability of experts with specific knowledge. A potential solution is to conduct the analysis by a company using a leading auditor in the person of an employee with high communication skills, who will gather a team consisting of employees from the area of senior level management, HR, finance, production, maintenance and IT.

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List of abbreviations used

ARC – Automation Readiness Check
ERP - Enterprise Resource Planning
EBITDA - Earnings Before Interest, Taxes, Depreciation, and Amortization
OODA – Observe – Orient – Decide - Act
CI – Continuous Improvement
TQM – Total Quality Management

WCM – World Class Manufacturing
MES – Manufacturing Execution System
HR – Human Resources
KPI – Key Performance Indicator
PDCA – Plan – Do – Check – Act

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Formation of Productive Employment of Labor Potential by Diversifying the Rural Economy

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Abstract

The rural labor market in Ukraine is characterized by limited employment, the spread of all forms of unemployment, and the concentration of a large part of the population in the informal economy. The diversification of the rural economy is one of the strategic priorities for creating new jobs in the countryside, creating an alternative to the dominant agricultural sector and ensuring productive employment for the peasants. Its promising directions are identified, among which, along with the diversification of the agricultural production itself, the accelerated development of the rural non-agricultural sector is equally important.

Keywords: Diversification, Labor Potential, Employment, Agricultural Sector.

Introduction

Employment is one of the key indicators, the level of which characterizes the development of not only individual territories, but also the national economy as a whole, and also reflects the degree of its social orientation. A characteristic feature of rural Ukraine is the dominance of the agricultural sector. Transformations in the agricultural sector of the Ukrainian economy in recent decades have led to a significant reduction in the scope of employment, which, in the absence of employment alternatives in rural areas, has caused intense unemployment and the concentration of a significant part of the economically active population in the informal economy. New threats to the rural labor market are associated with the formation of a free trade zone and the weakening of migration legislation with EU countries, which may lead to a weakening of the position of national producers in the domestic food market, a reduction in export volumes of uncompetitive agricultural products on the one hand, and an outflow of the most active and qualified labor - on the other. All this can lead to an increase in the rate of decline in employment in the agricultural sector of Ukraine and aggravate the already acute problem of unemployment in rural areas. The diversification of economic activity in rural areas is a strategic direction of creating new jobs, forming an alternative to the dominant agricultural sector and ensuring productive employment of the rural population in this regard.

A study of the theoretical, methodological and applied aspects of diversification, as well as an increase in rural employment on its basis, are in the field of scientific interests of a whole galaxy of domestic and foreign scientists and economists. The aggravation of rural unemployment, the reduction in the number of jobs and the spread of employment in the informal sector of the economy led to the intensification of scientific research on this important socio-economic problem and the development of mechanisms for its legalization, in particular, are devoted to work. (Libanova and Bandur, (2000); Bondarchuk, (2014) etc.). One of the key problems of the rural labor market of Ukraine, like most post-Soviet countries, is its traditional, over-reliance on the development of the agricultural sector of the economy. Studies are devoted to substantiating ways to resolve this issue and the need to develop non-agricultural employment in rural areas. (Vishnevskaya, (2011); Paskhaver, (2015); Sieczko и Parzonko, (2015)). It is noted that the development of diversification of the rural economy contributes not only to increasing the level of employment and solving the social and material problems of rural residents, but also guarantees the regularity of income generation and increasing the profitability of the activities of producers, the implementation of national priorities for ensuring the country's food security. That is why Yu.A. Lupenko and V.Ya. Mesel-Veselyak (2012) define the diversification of economic activity in rural areas by stimulating entrepreneurship in the productive and non-productive sectors as one of the strategic directions of agricultural development of Ukraine.

The objective need for further study of diversification, in particular in relation to the rural economy, is to determine the possibilities of its use as a tool to solve employment problems, create new jobs, ensure high social standards of rural development.

Aims

The purpose of the study is to evaluate the current trends in the formation of employment of the village's labor potential and to substantiate the directions of ensuring its productive level on the basis of diversification of the rural economy of Ukraine. Of particular relevance is the research and development of effective ways of solving this complex socio-economic problem in the context of a significant exacerbation of the problem of employment in rural employment, the spread of unemployment and informal employment, increasing social tension, the need for development and growth of rural economies.

Material and Methods

The theoretical and methodological basis of the research were the dialectical laws of knowledge of economic processes, theoretical provisions of modern economic theory, scientific developments of domestic and foreign scientists on the formation and use of labor potential, legislative and regulatory acts. The research is based on data from state statistical observations characterizing the socio-economic condition of agriculture in Ukraine and its regions (Agriculture of Ukraine 2018. Statistical Yearbook (2019)), indicators of enterprises on labor statistics (Labor of Ukraine in 2018 year. Statistical yearbook (2019)) and data on economic activity of the population obtained from a sample survey (households) on economic activity (Economical activity population of Ukraine 2018. Statistical yearbook (2019)). Abstract-logical, economic-statistical and other methods were used in the research process.

Results and Debate

The current state of the rural labor market

The crisis processes in the functioning of the economic mechanism and the economic management system of Ukraine, as a result of which the volumes of production and consumption of products and services of all sectors sharply decreased and, accordingly, the demand for labor fell, led to a decrease

in employment due to a reduction in employees. The largest volumes of the release of labor potential in rural areas occurred due to the reduction of employees of agricultural enterprises (Table 1).

Table 1: Economic activity of the rural population of Ukraine (thousands persons)*

Indicators	2000	2005	2010	2015	2018
Average annual population	16031,3	15161,7	14387,5	13215,9	12996,0
Economically active population	6894,6	6987,0	6967,7	5 667,5	5 604,7
Unemployed	465,3	400,9	493,5	533,3	515,5
Employed population	6429,3	6586,1	6474,2	5 134,2	5 089,2
Employed in agriculture, forestry and fisheries	4334,1	3986,3	3094,5	2 870,6	2 937,6
of which employees	2752,8	1418,1	794,7	568,5	533,6

** Hereinafter, information for 2015-2018 given without taking into account the temporarily occupied territory of the Autonomous Republic of Crimea and the city of Sevastopol, as well as without a part of the temporarily occupied territories in Donetsk and Luhansk regions.*

Source: Data of the State Statistics Service of Ukraine (calculated, developed and presented by authors)

The basis for it was a significant reduction in labor demand as a result of a sharp decline in agricultural production and a decrease in its saturation with labor-intensive types of products. Despite the growth of production in agricultural enterprises that has been outlined in recent years, the downward trend in workers continues. The production direction of most agricultural enterprises has become strongly oriented towards the development of those sectors that, with the lowest labor and capital costs, can guarantee guaranteed profitable activities. Such transformations in the industry structure, against the background of a rapid increase in labor productivity, caused not only a reduction in the need for labor, but also led to an increase in the seasonality of labor, and contributed to the spread of underemployment of workers in agricultural enterprises. In most cases, the bulk of the workers are part-time, they are hired for the period of seasonal work, and upon completion they are fired. So, in 2018, 55.1% of the average number of full-time employees were laid off from agricultural enterprises of Ukraine, and 53.9% were accepted (Labor of Ukraine in 2018 year. Statistical yearbook (2019). Thus, laid-off workers are deprived of a permanent source of income for a year and do not have guarantees of employment in the next season.

The situation in the rural labor market is aggravated by the rapid development of new holding-type agri-food structures in the agrarian sector of Ukraine in the last decade. This process is accompanied by a number of negative consequences, as capital-intensive and low-efficient agricultural sectors and enterprises are eliminated, the need for labor is reduced, and rural infrastructure is destroyed. The vast majority of agricultural holdings specialize in the production, processing and sale of highly liquid and low-cost crop products. Having the ability to apply the latest technology and highly productive equipment, they do not need significant amounts of labor. This makes it possible to widely use the practice of mobile mechanized detachments that carry out the whole complex of agricultural work from sowing to harvesting. At the same time, the local rural population is practically not involved in work.

An intensive reduction in labor demand has led to the spread of all forms of unemployment in the countryside. However, given the real volume of the reduction in labor, the current level of its fixation does not reflect the true dimensions of this phenomenon. Many peasants who find themselves unemployed do not apply to the employment service due to the lack of prospects for getting a job in the countryside, low unemployment benefits, difficulties in registering and the need for frequent re-registration, which is associated with the time and money spent in conditions of remoteness organs. The bulk of the peasants, freed from agricultural and other enterprises and organizations, are compelled to replenish the group employed in the informal sector of the economy. The number of

rural residents employed in this sector of the economy in 2018 amounted to 1941.7 thousand people, or 38.2% of the total number of employed rural population of Ukraine aged 15-70 years (Table 2).

Table 2: Employment of the rural population of Ukraine by type of economic activity in 2018 year

Indicators	In total	Including:	
		Formal employment	Informal employment
Employed population - total, thousand people	5089,2	3147,5	1941,7
including by type of economic activity,% of total agriculture, forestry and fisheries	39,7	21,8	68,9
Industry	10,8	15,3	3,6
Construction	6,9	3,4	12,4
wholesale and retail trade; vehicle repair	10,8	13,4	6,7
transport, warehousing, postal and courier activities	4,7	6,6	1,6
temporary accommodation and catering	1,6	2,0	1,0
other types of economic activity	25,5	37,5	5,8

Source: Data of the State Statistics Service of Ukraine (calculated, developed and presented by authors)

With the aggravation of the situation on the rural labor market, the informal sector of the economy, for a relatively short period of time, accumulated a significant part of the rural labor potential, acting as a depreciation factor (Libanova and Bandur, (2000); Bondarchuk, (2014)). It reduces to some extent the level of social tension and mitigates the negative impact of unemployment, primarily on the least protected layers of peasants. In the absence of employment alternatives, informal employment became the only way to generate income and provide livelihoods for the least competitive part of the rural labor potential - youth, people of pre-retirement and retirement age, people with a low level of education and qualifications.

Informal employment in rural areas covers unregistered production units of households, individuals and legal entities that work without concluding labor contracts in various areas of economic activity (Bondarchuk, (2014). However, the dominant part of the informal sector of the Ukrainian economy is employment in agriculture, which is implemented in the form of conducting personal peasant farming. In 2018, 68.9% of all informally employed rural residents were concentrated in it (Economical activity population of Ukraine 2018. Statistical yearbook (2019)), Based on low-productivity manual labor, with a low level of efficiency of production processes, such employment does not ensure the full use of labor potential and does not guarantee a sufficient level of income. Given this, the forced nature of informal employment and the absence of even minimal social guarantees, there is every reason to consider it one of the forms of hidden unemployment in the countryside.

Ways to Diversify Agricultural Employment

Among the strategic directions of creating new jobs, forming alternatives to the dominant agricultural sector and ensuring productive employment of the rural population, the leading place belongs to diversification of the economic activity of rural territories (Lupenko and Mesel-Veselyak, (2012). Diversification is the process of developing new production or expanding the range and range of traditional types of products that are produced by the enterprise, which allows to more fully realize the existing natural, biological, resource, labor, production potential and helps to strengthen financial, economic and environmental security, increases competitiveness and the effectiveness of business entities.

Among the directions of diversification of the rural economy we highlight the paths associated with the diversification of activities proper in the agricultural sector of the economy and the paths associated with the development of non-agricultural activities in rural areas (Table 3).

Table 3: Directions for diversification of the economy of rural areas of Ukraine

<table>
<tr><th colspan="4">DIVERSIFICATION OF THE ECONOMY OF RURAL AREAS</th></tr>
<tr><th colspan="3">DIVERSIFICATION OF ACTIVITY IN THE AGRICULTURAL SECTOR OF ECONOMY</th><th>NON-AGRICULTURAL ACTIVITIES IN RURAL AREAS</th></tr>
<tr><th>Diversification of agricultural production</th><th>Development of production services</th><th>The development of industrial sectors (industries)</th><td rowspan="2">industrial location (production of biofuels, building materials, furniture, containers, packaging materials, sewing clothes, shoes, etc.)</td></tr>
<tr><td>the development of crop production based on a rational combination of crops</td><td>the provision of land cultivation and crop care services, harvesting to other enterprises or the population</td><td rowspan="6">processing, storage and sale of agricultural products (production of flour, cereals, bakery products, butter, canned vegetables, fruits, juices, meat and dairy products, etc.)</td></tr>
<tr><td>livestock development on an efficient basis</td><td rowspan="5">provision of services to the population for the harvesting of agricultural products</td><td>development of industrial and commercial infrastructure, consulting and service organizations</td></tr>
<tr><td>growing energy crops</td><td rowspan="3">development of small and medium-sized businesses in the field of green tourism, local folk crafts, the creation of a system of services, in particular restaurant, hotel business, etc.</td></tr>
<tr><td>organic production</td></tr>
<tr><td>horticulture and vegetable growing</td><td rowspan="3">revival of the social infrastructure of rural territories (education, medicine, electricity, water and gas supply, communications, trade, utilities, transport, etc.)</td></tr>
<tr><td>production of non-traditional types of agricultural products</td><td>transport services, etc</td><td>material and technical providing and agricultural service</td></tr>
</table>

Diversification in the agricultural sector of the economy implies the effective development of large-scale agricultural production on an innovative investment basis with a rational combination of crop and livestock industries, the revival of the traditional beet, vegetable, horticulture, livestock, pig and sheep breeding industries in Ukraine. Naturally, this process is possible and advisable only under the condition of ensuring high efficiency and competitiveness of these sectors, which involves the use of intensive technologies with a high level of mechanization of production processes and high labor productivity. As B. Paskhaver (2015) notes, “in the historical perspective, farmers are a highly qualified, highly productive, and highly profitable professional group with a relatively low specific weight in the total population”. Therefore, the revival of large-scale production in agricultural enterprises should not be regarded as a panacea, since the need for labor, if it does increase, is not on the scale that guarantees full employment in the countryside. There are potential opportunities to expand the scope of services that agricultural enterprises can provide to the population or other enterprises. Among them are technological operations for cultivating the land and caring for crops, harvesting, transportation, etc.

Today, the question is urgently needed to change the raw material nature of the agrarian sector of the Ukrainian economy, and to orient it towards increasing the output of industrial processing of agricultural raw materials. This will allow not only to obtain greater added value, but will provide the creation of additional jobs, will contribute to the growth of incomes of the population, increase the income of budgets of all levels. In this regard, an important area is the organization and development in rural areas of activities for the harvesting, storage, sale and processing of agricultural products (the production of flour, cereals, bakery products, butter, canned vegetables, fruits, juices, meat and dairy

products, etc.).

We should not forget that a significant part of agricultural products is produced in the informal sector of the economy. According to the State Statistics Service of Ukraine, in 2018, 98.1% of potatoes, 85.6% of vegetables, 78.4% of fruits and berries, 72.6% of milk, 34.9% of meat, 44, 8% of eggs, 87.6% of wool and 98.8% of honey were produced in private farms of Ukraine (Agriculture of Ukraine 2018, Statistical Yearbook (2019)). Therefore, informal employment should be considered not only as a specific social shock absorber, but also as a kind of business incubator. When creating certain conditions for the legalization and support of private farms, ensuring their access to investment and credit resources, developing infrastructure for the procurement and marketing of products, these entities can become the basis for the development of rural areas. Naturally, small producers cannot compete with large enterprises in traditional agricultural sectors. Therefore, an orientation toward the production of products with a high level of laboriousness, environmentally friendly organic products, "niche" agriculture, and the production of non-traditional types of agricultural products may become a possible way of developing personal farms.

Non-Agricultural Rural Development

The strategic direction of diversification and ensuring productive employment should be the development of non-agricultural activities in rural Ukraine. This will minimize risks from adverse events of an agrotechnical and weather-climatic nature, unforeseen changes in market conditions and reduce the dependence of the rural economy on the results of agricultural production. Numerous studies and experience of advanced economies indicate a positive relationship between effective non-agricultural employment and growth of rural families' incomes, better diversification of income sources, and high labor productivity (Vishnevskaya, (2011); Paskhaver, (2015); Sieczko and Parzonko, (2015); www.ier.com.ua). Among non-agricultural activities, priority should be given to the deployment in rural areas of industrial enterprises for the production of building materials, furniture, containers and packaging, biofuels, the development of appropriate industrial and commercial infrastructure, and service and agricultural service enterprises. A significant source for the development of non-agricultural employment is the need for a radical improvement of rural living conditions, the creation of a modern social infrastructure in rural areas (education, medicine, electricity, water and gas supply, communications, trade, utilities, transport, etc.). There are great prospects for the development of small and medium-sized businesses in the field of green tourism in the countryside, the creation of a system of services, in particular sports, health, hotel, restaurant business, local folk crafts.

The proposed areas will contribute to the productive employment of the rural population, increase the level of its material well-being and improve social standards of living, and will also ensure economic growth and increase the investment attractiveness of rural areas.

Conclusion

The study found that the current state of the labor market in rural areas of Ukraine is characterized by a reduction in official employment, an increase in various forms of unemployment, the dominance of agricultural employment and the concentration of a significant part of the labor potential in the informal sector of the economy. The necessity of diversifying the economy of rural territories as a strategic direction for creating new jobs, providing alternatives to the dominant agricultural sector and creating productive employment of the rural population are substantiated. Key ways to diversify the rural economy are proposed, among which are ways to diversify the agricultural sector of the economy itself and, more importantly, ways related to the development of non-agricultural activities in rural areas.

The first group, along with the development of large-scale agricultural production with a rational combination of crop and livestock industries, provides for the expansion of services that agricultural enterprises can provide to the population or other enterprises and the organization of procurement, storage, sale and processing of agricultural products and production of industrial products (building

materials, containers, packaging materials, tailoring, shoes, etc.).

Stimulation of non-agricultural activities should be aimed at the location of industrial enterprises in rural areas, development of appropriate production and commercial infrastructure, service and service enterprises, social infrastructure, services, tourism, restaurant and hotel business, handicrafts.

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Features of Formation of Organizational-Integrative Processes In Horticulture

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Abstract

The article describes the main reasons that hinder the application of the cluster model in the region. Highlights the theoretical aspects of the formation fruits and berries cluster and identifies the main stages of its creation. It justifies the concept of development of innovative fruits and berries cluster and proposed it organizational structure. The advantages of clustering and generalized mutually beneficial relations between its participants.

Keywords: fruits and berries innovative cluster, members of the cluster, cluster structure, the advantages of clustering, the effectiveness of cluster.

Introduction

In today's environment, improving the efficiency of the gardening industry is possible by translating it into an innovative model of development, which would combine science and entrepreneurship into one balanced complex and contribute to improving the competitiveness of enterprises. The formation of integrated market-type structures in the industry plays a strategic role in implementing innovative processes. In this context, it is important to create a fruitful cluster that is not only a means of achieving economic development goals, but also a powerful tool for stimulating regional development, which, as a result, will increase employment, wages, budgetary contributions to various levels, increase competitiveness and sustainability of the domestic horticulture industry.

A significant contribution to the development of theoretical, methodological and practical aspects of cluster formation belongs to such scientists as T.V. Bozhidarnyk, V.I. Zakharchenko, M.F. Kropyvko, Yu.O. Nesterchuk, O.M. Odintsov, V.V. Rossokha, P.G. Sabluk, S.I. Sokolenko, V.I. Chornodon.

The issues of development of regional product clusters taking into account the peculiarities of individual territories of the country remain insufficiently investigated. At present, there is no single approach to the formation and efficient functioning of the fruit-bearing cluster, which has necessitated the need for a separate study.

Material and Methods

The methodology of the process approach to the development of a structural model of an innovative fruit-bearing cluster is applied in the study.

Aims

To substantiate the conception of formation and organizational structure of the regional innovation fruit-bearing cluster.

Results and Debate

Prerequisites and principles for the formation of an innovative fruit-bearing cluster

Based on the research of foreign and domestic scientific works, devoted to the creation of a comprehensive system of effective management of innovative activity of enterprises, we agree that its main components are now considered human capital and scientific and technological development, clusters, which are closely related to each other, since they act on a voluntary basis, characterized by a high degree of use of information and provide effective favorable conditions for the realization of human capital and innovation (Bakum, (2009)).This will contribute to the high economic and social performance of these associations, as well as the territories in which they are located. The formation of an innovative fruit-bearing cluster will provide an increase in the production of fruits and berries and increase the level of competitiveness of domestic gardening products.

An innovative fruit-bearing cluster is an amalgamation of different economic entities (horticultural enterprises, processing enterprises, research centers, public authorities), which envisages the benefits of two ways of coordinating the economic system - the intra-enterprise hierarchy and the market mechanism, which allows faster and to effectively acquire new knowledge, scientific discoveries and inventions (Tupchiy, (2013); Tupchiy, (2014)).

The stages of construction and development of the fruit-bearing cluster were determined (Fig. 1). It is important that each cluster participants made their contribution in making strategic and operational decisions, thus realizing the exclusivity of cluster initiatives.

A prerequisite for the creation of an innovative fruit-bearing cluster is the system of principles on which its activity is based. They reflect the experience of cluster formation and operation. The system of principles to be followed when organizing an innovation cluster is characterized (Chaliapina and Solomakhin, (2008)):

- Comprehensive support initiatives from below;
- advantages of private ownership;
- financial and legal independence of each cluster member;
- making optimal use of everyone's opportunities for successful implementation of joint projects;
- clear fulfillment of contractual obligations for project implementation;
- maximum interaction with local authorities, involvement of scientific potential in planning, development and implementation of modern technologies and materials;
- exceptional understanding, mutual support and trust in one another.

Fig. 1: Formation of conditions for creation of innovative fruit-bearing cluster

Formation of organizational structure of an innovative fruit-bearing cluster.

The formation of the organizational structure of an innovative territorial fruit-bearing cluster is a rather complicated process, encompassing not only horticultural, but also a number of other enterprises, organizations of territories and objects belonging to related industries (Fig. 2).

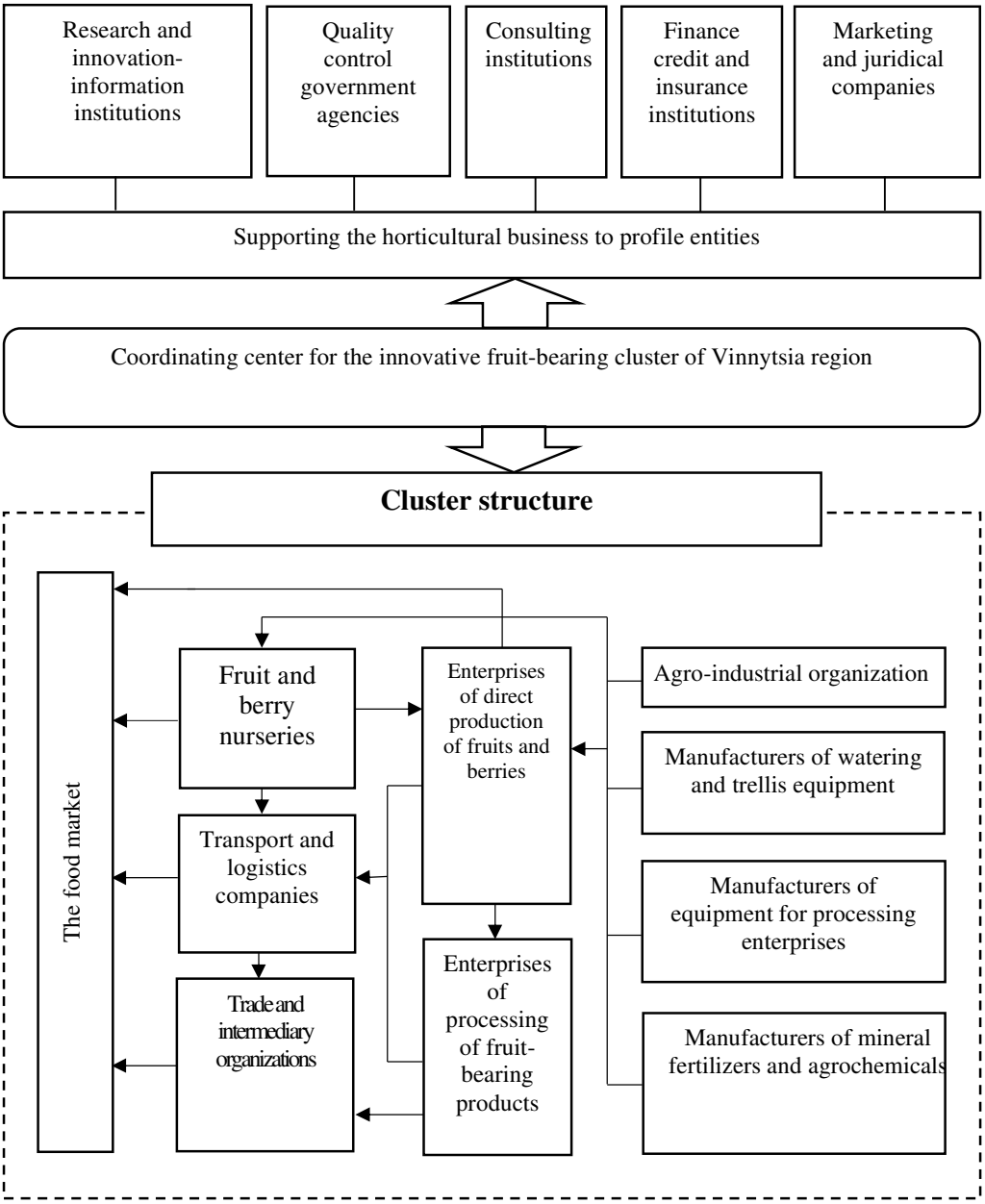

Fig. 2: Organizational structure of innovative territorial fruit-bearing cluster

In order to coordinate the work of the members of the fruit-bearing cluster, it is proposed to form the Coordination Council, as the highest management body, at its meetings strategic goals and tasks of regional production development will be solved. The work of the Council should be organized in the following areas: planning and innovation; monitoring and analysis; marketing and marketing; financial and accounting activities; information and counseling.

Implementation of cluster initiatives is possible only if the state regional policy in the field of clustering and formation of a favorable macroeconomic, information and legal environment is possible. There is a need to build a reliable information platform for cluster development, to carry out

a careful analysis and adjustment of cluster policy at each stage of the cluster process, to combine efforts of the state, private sector and public organizations to effectively develop regional and interregional clusters in Ukraine, and to take the following measures (Kropyvko, (2010):

- contribute to the revitalization of the process of approval of drafts of the Concept of Cluster Creation in Ukraine, the Concept of the National Target Program of Industry Development of Ukraine, the National Strategy for the Formation and Development of Transboundary Clusters and Cluster Development with the purpose of normative definition of the concept of "cluster", as well as the formation of institutional environment for the implementation of the cluster model of development in Ukraine;
- create conditions for increasing the productive capacity of enterprises through the introduction of tax incentives scheme cluster cooperation, including;
- development of projects, targeted programs and mechanisms for implementation of tax holidays for small and medium-sized enterprises within the cluster;
- provision of benefits, subsidies in taxation of the cluster, which provides funding for projects, programs that depend on the directions and strategy of the industry development;
- implementation of initiatives of private agricultural enterprises and state bodies on the functioning of the cluster by creating a mechanism for involvement of small and medium-sized business entities in cluster programs and projects, using public-private partnership models to increase the efficiency and competitiveness of agribusiness.

The benefits of using national and regional policy measures to create a fruit-bearing cluster are based on the fact that they allow a comprehensive analysis of the situation in a group of interconnected enterprises belonging to different industries. For the state it is the latest, most convenient tool in economic and tax policy. This is fully explained by the fact that one of the goals of the fruitful cluster is the formation and implementation of new technologies, products, services. Benefits for the members of the fruitful cluster are objective in nature, that is, they do not depend specifically on any of them, so they are potentially more resilient than mergers of another type.

Improved state and regional policy should become a solid basis for investment and innovation development, enhancing the country's competitiveness in foreign markets (Khabirov and Sitdikova, (2009). The decisive role in this process is the formation of regional and inter-regional clusters that will optimize the activity of production systems, will promote the development of high-tech and high-tech industries, will allow to take advantage of specialized companies, creating on this basis a strong synergistic effect of socio-economic growth, at the regionally and national level.

Benefits of combining enterprises into an innovative fruit-bearing cluster

Combining enterprises into an innovative, fruit-bearing cluster provides participants with numerous competitive benefits from collaboration and engagement. The main advantages of cluster integration are:

- improvement of the business reputation of the participants of the fruit-bearing cluster, creation of new brands, brands, advantages over competitors;
- increasing the pace of innovation that determines their direction, creating the foundation for future economic growth, that is, the benefits of access to the latest technologies, new components and equipment that will enable the production of fruit-bearing products by world standards;
- effective solution of urgent problems at the level of authorities and local self-government, lobbying of interests;
- improving the productivity of enterprises through better access to highly skilled workforce, specialized information, better motivation of managers and employees and, in particular, achieving social impact (employment orientation, welfare improvement, reduction of social tension, compliance with environmental standards, energy and resource conservation measures);
- joint research, use of managerial experience, information and resources, enabling the expansion of old markets, creation or development of new and effectively displacing foreign manufacturers;

- reducing costs due to the absence of intermediary organizations between cluster members;
- reduction of risk through the possibility of joint implementation of significant projects by participants of the innovation cluster;
- increased flexibility and large scale effect. The result of the creation of an innovation cluster is to improve production, increase the number of small and medium-sized enterprises and increase the competitiveness of enterprises in the domestic and global markets.

The benefits of merging into an innovative fruit-bearing cluster receive not only horticultural enterprises, but also other participants in it (Fig. 3).

Indicators	**State**	**Fruit-bearing cluster**	**Processing enterprises**	**Horticultural enterprises**	**Scientific and educational organizations**	**Financial, insurance, transport and trade organizations**
State	Government interaction in the process of clustering	Provision of conditions for the development of the region	Regulation of imports of processed fruit-bearing products	Regulation of imports of processed fruit-bearing products	Regulation of import of plant breeding achievements (fruit-bearing crops); support in the training of specialists	Supporting the development of small and medium businesses
Fruit-bearing cluster	Ensuring food security for the region's development	Inter-cluster competition	Ensuring conditions for balanced development	Activation of conditions for balanced development	Ensuring conditions for balanced development; support in the training of specialists	Supporting the development of small and medium businesses
Processing enterprises	Providing production of domestic products	Implementation of social programs	Collaboration within the cluster	Setting price parities	Realization of innovative developments; assistance in the training of specialists	Collaboration to protect competitive advantage
Horticultural enterprises	Providing production of fruits and berries from plantations of domestic plant breeding	Improving efficiency, implementing social programs	Providing production of fruit-bearing products	Collaboration within the cluster	Realization of innovative developments; assistance in the training of specialists	Collaboration to protect competitive advantage
Scientific and educational organizations	Providing production of domestic fruit-bearing plantations; effective specialists policy	Increasing innovation and economic activity; providing highly skilled specialists	Increasing innovation and economic activity; providing highly skilled specialists	Introduction of innovations in production and management; providing highly skilled specialists	Partnership within the cluster; assistance in the training of specialists	Cooperation in the development of investment projects; providing highly skilled specialists
Financial, insurance, transport and trade organizations	Ensuring sustainable development of cluster members	Ensuring sustainable development of cluster members	Provision of processing enterprises with sustainable development	Provision of processing enterprises with sustainable development	Ensuring sustainable development of cluster members	Assistance in training specialists

Fig. 3: The matrix of the target interests of the participants of the fruit-bearing cluster association

State administration bodies will be able to find a balance of interests and to establish the optimum relationship between enterprises and the government, creating conditions for sustainable socio-economic development. In addition, the functioning of the innovation cluster contributes to the creation of new jobs, and, consequently, increase employment, population income and reduce social tensions, increase the region's revenues by increasing budgetary contributions.

Research institutions and educational institutions within a fruit-bearing cluster will be able to practically reconcile the range of educational services and the level of training of personnel with the real requirements of enterprises, to restore the system of training and research execution system to the order of enterprises, which will now reflect the necessary combination of scientific and economic interests.

Benefits from participation of financial institutions in the innovation cluster are achieved through work with significant turnover from servicing numerous operations performed by entities of the fruitful cluster; reduction of interest rates on loans for members of the cluster; expansion of practical application of mortgage and leasing loans to enterprises; bringing European development levels to their own levels and sizes.

Small businesses will gain access to significant scientific potential and investment resources from cluster integration, and thus the ability to complete and implement even the most risky and effective projects that they are not always capable of on their own. In addition, they will be able to receive a large number of orders for the supply of raw materials, resources, complete programs and orders of large enterprises, strengthen positions in existing markets or access to new ones.

Mechanism of economic relations in a fruit-bearing cluster

The integration of farmers with processing enterprises and service organizations is a crucial step for the efficient and sustainable development of the horticulture industry. The economic mechanism of relations is based on the set of organizational, economic, motivational, legislative ways of interaction and coordination of interests of all participants of the cluster, so it should be created on the basis of organizational, economic, motivational, legislative mechanisms. The relationships between the cluster entities are governed by the terms of the contracts. They include: volumes, quality and delivery time, processing of raw materials, order of delivery and delivery of finished products, storage conditions, rights, obligations and responsibilities of the parties. Contracts between cluster members allow association members to set conditions for the production and sale of raw materials, to ensure the rhythm and production of high-quality fruit products (Fedorenko, and all (2008)).

The mechanism of economic relations in a fruit-bearing cluster should be based on the following basic requirements: to create conditions for the participants of the interest in expanded reproduction on the principles of equivalent exchange, self-sustainability, which will increase the efficiency of joint production; monitoring and control; creation of conditions for solving consumer problems, creation and maintenance of structure and volume of production, balanced and rhythmic functioning of the market of fruitful products; planned and validity of actions; proportionality of construction; motivational weapons; progressiveness; direction of production-economic relations for increase in efficiency (Yukhymchuk, (2013).

Assessment of economic efficiency of creation of innovative territorial fruit-bearing cluster is based on indicators of use of fixed and circulating means, labor and financial resources. This will ensure that sound management decisions are made to efficiently utilize the cluster's resource potential, optimize costs, and reduce risks. It is proposed to distribute the cluster profits from joint activities in proportion to the resources invested at all stages of production and delivery to the consumer of the final products.

Conclusion

It is advisable to form a fruit-bearing cluster as an inter-economic territorial association of legally independent enterprises and farms for the production of final competitive fruit and berry products, including infrastructure components - government bodies, scientific and research institutions, fruit and berry nurseries, transport and logistics companies, trade and logistic companies, organizations, financial institutions and enterprises of logistical maintenance of horticulture. Their joint activity should be carried out by prior orders and contractual relations. The economic mechanism of relations is based on the totality of interaction and coherence of interests of all participants in organizational, economic and motivational aspects and economic risks and achievement of synergetic effect. The mechanism of distribution of profit of a cluster from joint activity is offered to be carried out in proportion to the invested resources at all stages of production and bringing the final products to the consumer.

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Strengthening the Effect of Creativity of Nigerian Women on Business Competitiveness in Small and Medium Scale Enterprises (SMEs)

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ABSTRACT

The role of women entrepreneurship in small and medium scale enterprises (SMEs) has received increased attention from academics and policymakers in recent years. SMEs have become a more imperative component of women entrepreneurship development. The number of woman-headed businesses and their entrepreneurial activities is quite significant, and this has made women entrepreneurs to be relevant for economic development. Women entrepreneurs have specific individual traits that prompt them to become entrepreneurs, but despite this, they are faced with challenges of identifying their innate abilities to achieve enhanced performance. Therefore, the paper examined the concept of creativity and women entrepreneurs and the resultant effect as it relates to the competitiveness of SMEs. The problem-solving and expertise-based theory of creativity and theory of competitive advantage was considered for this paper. The paper adopts an exploratory and causal study in which the researcher made use of the survey and descriptive design. Five hundred and twenty (520) copies of questionnaire were administered among the selected Nigerian women in Small and Medium-Scale Enterprise in Lagos and Abuja. Findings from the review suggest that creativity is an essential trait required to improve the competitiveness of an SME. Women entrepreneurs have a high tendency to initiate new ideas surrounding the improvement of their businesses. The government was also encouraged to create business enabling environments for women entrepreneurs. Also, managers should identify women in the organization and engage them in attending to creative assignments as this will help them improve on their creative ability.

Keywords: Women, Entrepreneur, Creativity, Business Competitiveness

Introduction

Small and Medium-Sized Enterprises have an essential place in the economic development of any country, which consists of the majority of private business which operates and are widespread from the most prominent cities to the remote areas of the villages (Alba, 2013). According to Temjanovski and Marjanova (2015), SMEs, being a primary critical elements of economic development is acknowledged to be responsible for increasing rate of employment, high living standard, poverty alleviation, production of useful services/products and generally the creator of several developed and developing economies (Agboli & Ukaegbu, 2006). In Nigeria, the importance and performance contributions of SMEs as a employment generation avenue, with reference to low-skilled and sometimes unskilled jobs, is very popular. According to Eniola (2014), Businesses in Nigeria classified under SMEs generates 98% of manufacturing sector, which provides a 76% workforce and 48% of all the industrial output in terms of value-added. In Nigeria, it revealed that SMEs absorbs 87.9% of the workforce in the private sector (Aladejebi, 2018) and 87% of the workforce in the sector are in the agriculture sector, SMEs also contributed about 47.8% to the GDP of the Nigerian Economy (Ebitu, Basil & Juliet, 2018).

The role and importance of women entrepreneurship in venture creation has received increased attention from academics and policymakers in recent years. Several studies, such as Kabir, Ibrahim, and Shah (2017) and Aladejebi (2018), have recognized the place of traits in ensuring effective operation and execution of the entrepreneurial activities demand of women. The study affirmed that women's performance in both business and home front could be attributed to their peculiar traits. In today's business world, entrepreneurs display a certain level of creativity, which will, in turn, culminate in business competitiveness. Creativity is essential because not only does it encourages upward thinking, it adds to the knowledge development that leads to business success (Ibrahim, Che, Mohd & Sharifah, 2015). Creativity is the ability and power needed to come up with new ideas, while competitiveness is a country's share of the world market for its product (Oluwadare, 2015). Hence, there is a need to study the effect of creativity of Nigerian women entrepreneurs on business competitiveness.

Creativity can be a significant determinant of business competitiveness, especially in cases of SMEs. In today's business world, being creative is an essential trait that an entrepreneur must possess which is often reflected in the ability to bring onboard new thinking patterns and develop new ideas, this, in turn, can affect business competitiveness (Geissdoerfer, Martin, Vladimirova, Doroteya, Evans & Steve 2018). Many women entrepreneurs in Nigeria, although motivated to start businesses, have not thoroughly identified the innate abilities in them, especially concerning creativity. The inability of entrepreneurs to identify and make use of their traits appropriately is a major issue as creativity has been identified as a trait that helps businesses to grow competitively and sustainably.

Literature Review

Women Entrepreneurship in Nigeria

Women entrepreneurship views both the societal conditions of women and their role as business owners. About 50% of the total population in Nigeria are women, NBS (2016), and they contribute both to their families and the economic growth of the country by creating jobs and generating revenues (Mahajar and Yunus, 2012). A study found out that women entrepreneurs often relates with customers with more patience and manages their business carefully (Moses and Amalu, 2010).

The study of Aderemi, Ilori, Siyanbola, Adegbite and Abereijo (2008) to examine why more women-run businesses in Nigeria, found out women who engaged in non-technological ventures were motivated by unemployment while the ones who engaged in technological businesses were encouraged by personal convictions and interests. Consequently, when a women's entrepreneurial capacity is developed, it helps greatly in harnessing their ability to identify and capitalize on business opportunities that they discover in their environment which empower them in economic and social perspectives (Eckhardt &Shane, 2003).

Women entrepreneurs are experiencing a constant increase in their market share and customers rapidly, but there is a gap between how men and women business owners operate (Sandberg, 2003). Hemalatha, Mohan, and Jasim (2013) posited few women participates in business in comparison to businesses owned by men and they are involved in specific sets of industries, which are mostly retailing and services. Women entrepreneurs in Nigeria contributes significantly to the economy, in their bit to create major landmarks in the socio-economic arena. Women entrepreneurs are also making an impact in their immediate environment by creating new ideas, and resources, and this leads to employment generation and increased business opportunities for suppliers and other business chains (Iyiola & Azuh, 2014).

Creativity and Business Competitiveness

Creativity is the act of converting imaginations into things that can be seen, and it is the ability to see the world differently, to discover hidden mysteries, to make connections between things that does not seem related to provide solutions to existing problems. The increased importance of creativity and innovation provides excellent ways in the production of goods and services, and this helps to strengthen their socio-economic development enhancing effective delivery to a higher number of people (Dimnwobu, Ekesiobi & Mgbemena, 2016). Competitiveness describes the position of an enterprise

in comparison with the qualities and results of activities that reflect either superiority or inferiority of another enterprise (Reiljan, Inrikus &Ivanov, 2000). Based on the opinion of Adebayo (2010), the main aim of competitiveness is to pin-point the productivity of a nation or business, being the original plan that creates sustainability.

Sustainability of a firm depends on the performance of the highlighted marketing strategies and competitiveness. Unfortunately, many enterprises are facing several difficulty of marketing due to the production of poor quality, unattractive packaging, lack of marketing skills, and tough competition. Sustainable growth of SMEs is as a result of best practices of entrepreneurship that are healthy in the economy (Ismail, Jafri, et al., 2012). It also indicates success for SMEs (Salojarvi, Furu, and Sveiby, 2005), and the overall economic growth. Kwan, Leung, and Liou (2018) posited that culture, creativity, and innovation enriches the findings that creativity is an integral part of innovation. The ability for women entrepreneur to be conscious that they are innovators have a long way to go in determining the business sustainability of an SME. This assertion was further supported by the findings of Barnard & Herbst, (2018) who asserted that pure or raw creativity by itself is certainly not a sufficient factor of entrepreneurship, but a combination of business education that generated good innovations.

Theoretical Perspective

The paper focused on the problem-solving and expertise-based theory of creativity and theory of competitive advantage. The problem-solving and expertise-based theory is rooted in the assumption that creativity is based on expertise (Kozbelt, 2010). This theory puts in perspective the creative person and the creative process, the person, emphasizing the level of expertise, which is a necessary condition to perform the creative act and the process (Kozbelt, 2008).

The problem-solving theory proposed by R. E. Mayer (1990), which explains that in situations where the solution procedure is not apparent, a cognitive process can be exerted on a given state to create a change in the final stage. According to Funke (2010), the ability to decipher the problem is the condition (given state) and the operations or activities introduced to the given state in order to bring up a solution (required final state) with the help of available instruments is defined as the problem-solving theory. This theory indicates that the entrepreneur should be able to identify the existing problems or challenges, suggest and investigate possible solutions, and implement the solution to get the desired result.

Methodology

The paper adopts an exploratory and causal study in which the researcher made use of the survey and descriptive design. Five hundred and twenty (520) copies of questionnaire were administered among the selected Nigerian women in Small and Medium-Scale Enterprise in Lagos and Abuja. The selected Small and Medium-Scale Enterprises considered for this study are registered of affiliated with Association of Micro Enterprise (AMEN), NASME Women Group (NASME), National Association of Small Scale Industrialist (NASSI) and NECA's Network of Entrepreneurial Women (NNEW). Out of five hundred and twenty (520)) copies of questionnaire distributed, only four hundred and sixty four (464) which accounted for 89.2% response rate as depicted in Figure 4.1.

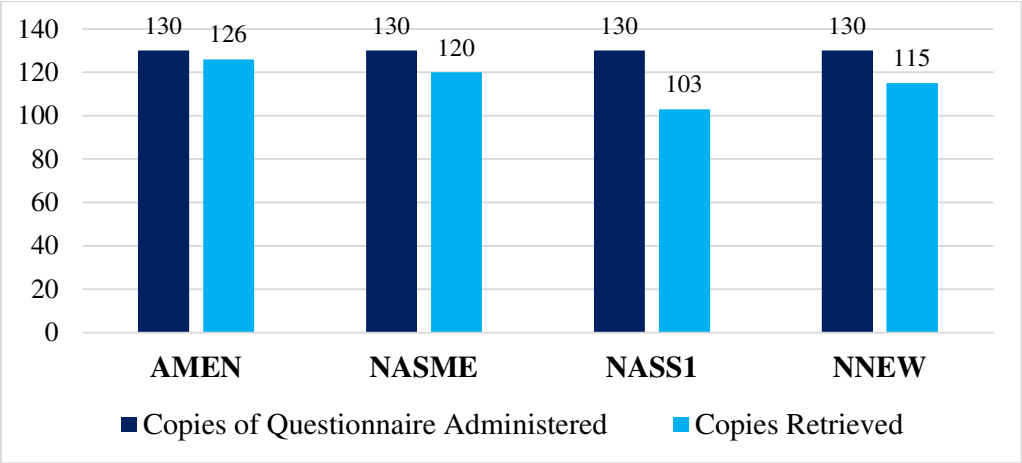

Figure 4.1: Copies of Administered Questionnaire and Response Rate

The study adopted the convenience sampling and the data collected were analysed using the IBM SPSS version 23. The non-probability sampling techniques were used for this study; convenience sampling, judgmental sampling, and quota sampling were employed. The survey questionnaire designed for this study is made up of two parts. Part A consists of questions requiring respondents to answer about their background. Part B comprises of questions related to creativity and business competitiveness of women entrepreneurs. Entrepreneurs were required to indicate the level of agreement by circling on a scale 1 to 4 where 1= Strongly disagree 2= Disagree 3= Agree 4=Strongly agree for each of the respective statements.

Finding and Discussions

Hypothesis: Creativity of women entrepreneurs does not significantly stimulate business competitiveness of an SME.

Demographic Profile of Respondents

Tables 4.1 shows the demography profile of the respondents. This was done in cross-tabulation form with the organisation or association of the respondents. The participating association include Association of Micro Enterprise (AMEN), NASME Women Group (NASME), National Association of Small Scale Industrialist (NASSI) and NECA's Network of Entrepreneurial Women (NNEW).

Table 4.1: Demographic Profile of the Respondents

Variables		Selected Associations				Total
		Ass. #1 Freq. (%)	Ass. #2 Freq. (%)	Ass. 3 Freq. (%)	Ass. 4 Freq. (%)	Freq. (%)
Age	21 - 30 Years	2(2.4)	6 (7.3%)	4 (4.9)	70(85.4)	82 (17.7)
	31 - 40 Years	62 (31.6)	56(28.6)	49 (25.0)	29(14.8)	196(42.2)
	41 -50 Years	62(41.6)	37 (24.8)	34 (22.8)	16 (10.7)	149(32.1)
	50 year and above	-	21 (56.8)	16 (43.2)	-	37(7.97)
Marital Status	Single	7(7.0)	11(11.0)	9(9.0)	73(73.0)	100(21.6)

	Married	119(33.4)	105(29.5)	90(25.3)	42(11.8)	356(55.2)
	Others	-	4(50.0)	4(50.0)	-	8(1.72)
Work Experience	Below 5 Years	7(8.9)	16(20.3)	10(12.7)	46(58.2)	79(17.0)
	6 - 10 Year	79(39.5)	47(23.5)	42(21.0)	32(16.0)	200(43.1)
	10 - 15 Years	40(29.6)	32(23.7)	30(22.2)	33(24.4)	135(29.1)
	15 - 20 Years	-	10(41.7)	10(41.7)	4(16.7)	24(5.17)
	20 -25 Years	-	6(54.5)	5(45.5)	-	11(2.37)
	25 Years and Above	-	9(60.0)	6(40.0)	0(0.0)	15(3.23)
Educational Qualification	SSCE	68(62.4)	19(17.4)	18(16.5)	4(3.7)	109(23.4)
	ND/NCE	52(47.3)	30(27.3)	28(25.5)	0	110(23.7)
	B.Sc/HND	4(2.2)	56(30.3)	44(23.8)	81(43.8)	185(39.9)
	Master	2(3.8)	15(28.8)	13(25.0)	22(42.3)	52(11.2)
	PhD	0	0	0	8	8(1.72)
Business Location	Lagos	126(29.4)	113(26.4)	98(22.9)	91(21.3)	428(92.2)
	Abuja	0	7(19.4)	5(13.9)	24(66.7)	36(7.76)

It was observed from the data presented that most of the respondents were within the economically active population. This implies that the selected associations that participated in the survey have concentration of young talented women that are less than 50 years old. Summarily, most of the respondent across the four selected Indigenous Women Entrepreneur Associations were married. Evidently, most of the respondents had between 10-15 years of work experience. However, the information provided by the respondents can be relied upon by virtue of their work experience. Most of the respondents had B.Sc or equivalent. This implies that the information provided by the respondents can be relied on because it is believed that they were highly educated. In a nutshell, most of the women business owners that participated in this survey were from Lagos.

Table 4.2: Mean Score Criteria for Four (4) Point Likert Scale

Scale	Mean Score Categorization	Level of Satisfaction
1	1.00 – 1.75	Strongly Disagreed
2	1.76 – 2.50	Disagreed
3	2.52 – 3.25	Agreed
4	3.26 – 4.00	Strongly Agreed

Table 4.2 above shows the mean score criteria for the four point Likert Scale which is used to depict the decisions made by the respondents. Table 4.3 below shows the descriptive statistics of creativity and business competitiveness. Each of the variable was measured with four (4) items as indicated in

the table. It is imperative to note that four (4) point Likert's scale that ranges from strongly agree (4) agree (3), disagree (2) and strongly disagree (1).

As depicted in Table 4.3, if the mean score is between 1.00 – 1.75, it suggested that the respondents strongly disagreed with the item on the research instrument, if the mean score is between 1.76- 2.51, it implies that respondents disagreed with the items on the questionnaire and if the mean is between 2.52 – 3.26 it suggests that the respondents agreed while the mean score that ranges from 2.27 – 4.00, it indicates that the respondents strongly agreed with the items. Going by the criteria presented in Table 4.2 and the average mean scores presented in Table 4.3, it shows that all the respondents across the selected associations agreed with the all the items of measurement of business competitiveness.

Table 4.3 : Descriptive Statistics of Creativity and Business Competitiveness

Creativity(C)	**SA**	**A**	**D**	**SD**	**Ass. #1**	**Ass#2**	**Ass#3**	**Ass#4**	**Ave Mean**
	Fre. (%)	**Fre. (%)**	**Fre. (%)**	**Fre. (%)**	**Mean**	**Mean**	**Mean**	**Mean**	
1. Adapt easily to new ideas	181 (39.0)	275 (59.3)	5 (1.1)	3 (0.6)	3.103	3.425	3.388	3.573	3.36
2. Discover new ways of looking at problems	119 (25.6)	335 (72.2)	10 (2.2)	0 (0.0)	3.134	3.266	3.242	3.304	3.23
3. Supportive environment to innovate	85 (18.3)	293 (63.1)	79 (17.0)	7 (1.5)	3.015	2.925	2.922	3.060	2.98
4. Consistently explore new ideas	136 (29.3)	313 (67.5)	13 (2.8)	2 (0.4)	3.039	3.250	3.213	3.539	3.25
Business Competitiveness (BC)									
5. Original outcomes from imaginations	123 (26.5)	312 (67.2)	25 (5.4)	4 (0.9)	3.000	3.141	3.106	3.539	**3.19**
6. Gather competitors information	128 (27.6)	279 (60.1)	48 (10.3)	9 (1.9)	3.047	3.183	3.165	3.147	**3.13**
7. Understand the threat	123 (26.5)	307 (66.2)	32 (6.7)	2 (0.4)	3.063	3.158	3.135	3.400	**3.18**
8. Leverages on the weakness of the competitors	104 (22.4)	313 (67.5)	38 (8.2)	9 (1.9)	3.103	3.041	3.077	3.191	**3.10**

The following findings were made based on the table above:

i. Most of the respondents which accounted for 72.2% agreed that women entrepreneurs discover new ways of looking at problems to sustain the business.

ii. Most of the respondents which accounted for 59.3% agreed that women entrepreneurs adapt easily to new ideas to boost their business.

iii. In order to establish if women entrepreneurs are consistently explore new ideas for their businesses, if we combine the respondents opinion of strongly agreed and agreed together, it shows that 449(96.8%) of the respondents were of the view that women entrepreneurs are consistently explore new ideas for their businesses

iv. This implies that most of the respondents which accounted for 63.1% agreed that women entrepreneurs have a supportive environment to innovate new things.

v. Table 4.2 also shows the mean score of the extent of respondents' opinion on each of the items of measurement. The mean scores were presented according to the association of the women entrepreneurs that participated in the survey. Going by the criteria presented in Table 4.2 and the average mean scores presented in Table 4.3, it shows that all the respondents across the selected associations agreed with all the statements or items that were used for the measurement of creativity of women entrepreneur except item 2 that most respondents strongly agreed.

vi. It was observed that 123(26.5%) of the respondents strongly agreed that women entrepreneurs imaginative activity is fashioned to produce outcomes that are original, 321(67.2%) agreed with the statement, 25(5.4%) disagreed while 4(0.9%) strongly disagreed with the statement. However, most of the respondents which accounted for 67.2% agreed that women entrepreneurs' imaginative activity is fashioned to produce outcomes that are original.

vii. It was also discovered that, 128(27.6%) strongly agreed that women entrepreneurs gather competitors information continuously to boost their business, 279 (60.1%) agreed with the statement, 48(10.3) disagreed with the statement while 9(1.9%) strongly disagreed that women entrepreneurs gather competitors information continuously to boost their business.

viii. However, most of the respondents which accounted for 60.1% agreed that women entrepreneurs gather competitors' information continuously to boost their business.

ix. In order to find out if women entrepreneurs seek to understand the threat associated with their business in order to stay ahead of the competitors, 123(26.5%) strongly agreed with the statement, 307(6.7%) also agreed with the statement, 32(6.7%) disagreed while 2(0.4) strongly disagreed that women entrepreneurs seek to understand the threat associated with their business in order to stay ahead of the competitors.

x. Most of the respondents which accounted for 66.2% agreed that women entrepreneurs seek to understand the threat associated with their business in order to stay ahead of the competitors.

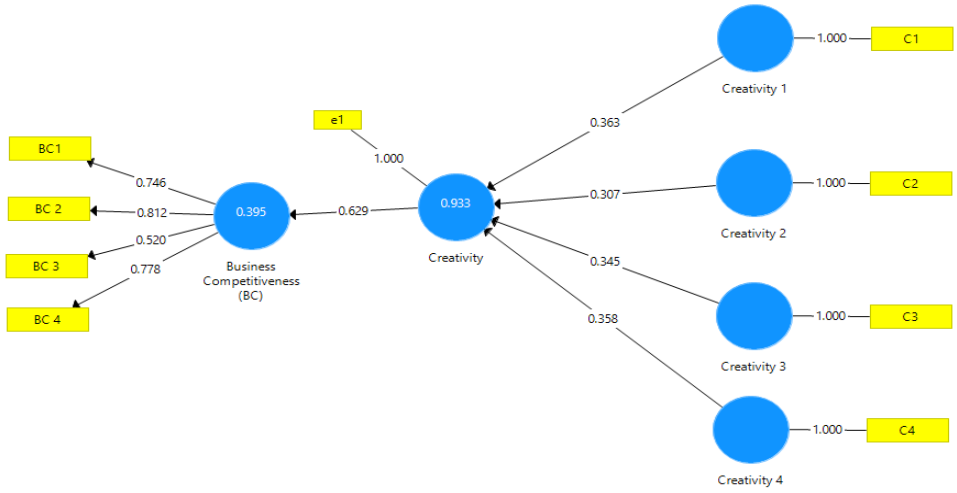

Figure 4.2 : PLS Algorithm Model

C1= Adoption of new ideas, C2= Sustainable business via problem solving, C3=Supportive environment, C4= Exploring new ideas constantly. BC1= Imaginative activities, BC2=Competitors information, BC3=Understanding treats, BC4= Leveraging on weaknesses of competitors

Figure 4.2 shows the PLS algorithm model of creativity of women entrepreneurs and business competitiveness. The path shows the level of relationship between the two variables. R square (R^2) values which is categorised into substantial, moderate and weak with the following values ≥0.75, ≥0.50 and ≥0.25 respectively. Figure 4.1 shows that the R2 = 0.933 for creativity of women entrepreneurs and 0.395 for business competitiveness. This implies that all the factor loading items of business competitiveness substantially explain 93.3% of the variance in creativity of women entrepreneurs. In a related development, the figure also depicts that creativity of women entrepreneurs also explains 39.5% of the variability of business competitiveness. This implies that the items of creativity of women entrepreneurs weakly but significantly explain 39.5% of the variance in business competitiveness

Conclusion and Recommendations

The result from the analysis of the hypothesis shows that there is a significant positive relationship between creativity and business competitiveness. The components of creativity (adoption of new ideas, sustainable business via problem solving, supportive environment, exploring new ideas always) affects business competitiveness. This finding corroborates the study of (Kura, Abubakar & Salleh, 2020), who identified the need for creativity by entrepreneurs as an essential ingredient for business competitiveness. Meanwhile, the findings from the hypothesis also validate that having a supportive environment makes it easy for creative and constructive ideas to be generated, this is also true as it helps the entrepreneurs always to have the opportunity to explore new ideas.

The studies of Sánchez-Gutiérrez, Cabanelas, Lampón & González-Alvarado, 2019 indicated that the ability of entrepreneurs to create customer relations and the way they knowledge of customer needs is converted into specific choices in the market positively effect on customer value creation. Financial performance, optimization of cost, technology, are all indicators of competitiveness, which is a result of creativity. This assertion was supported by the findings where entrepreneurs agreed that they get the competitor's information continuously to boost their business. Likewise, entrepreneurs need to understand the threats, opportunities, strengths, and weaknesses associated with their business.

Understanding their SWOT will put them ahead of their competitors, encourage them to adapt to any upcoming changes, generate new ideas that will sustain their business, thereby culminating in increased performance of their business. This study concludes that women entrepreneurs do not have a supportive environment to create new things and ideas. However, this has also motivated them to discover new ways of looking at problems to ensure the survival of the business. The Nigerian government is encouraged to provide a creative enabling environment for business owners in the country. Based on the study, women have been discovered to have a high level of creative ability, which is a very pivotal entrepreneurial trait.

In essence, already established companies and institutions should encourage women to climb the managerial ladder as research has shown that women-managed business thrives better than men-managed businesses.

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Innovative Educational Method at Practice-Oriented Studies at The Faculty of Logistics

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Abstract

The article describes an innovative universal educational method (form) developed based on modern methods, techniques, and tools supporting the educational process at the Faculty of Security, Logistics, and Management at the Military University of Technology (MUT). The original way of teaching concerns the application of lateral thinking and the so-called "questioning methods" (also known as 5W1H, Five Ws, or Kipling ones) in the process of ordering various goods from suppliers to customers with whom they cooperate in the supply chain. Teams of students in their logistics exercises using the "Six Thinking Hats" method, a concept developed by E. de Bono, analyze the complex problem posed by the lecturer. The key benefits the students received from this type of learning include verification of their existing way of thinking when solving a problem and taking a creative approach to solving the task. The advantage is also its simplicity and universality. Empirical research confirms that the learning methods not only increase the attractiveness of classes (93%), satisfaction with the acquisition of creative thinking skills but also bring contentment with the team solving a complex research problem (91%).

Keywords: Innovative Universal Educational Method, Six Thinking Hats, Reengineering

Introduction

Industry 4.0, where an intelligent information system controls all processes, is becoming a reality; thus, the capacity of universities to react quickly to changes in this environment is essential. Since change is stimulated by innovation, identification of the latter issue is crucial in solving engineering problems.

Peter F. Drucker (2005), the creator of modern management theory and practice, defines innovation as an opportunity to undertake new ventures and services, hence it is a new value or quality introduced to achieve better results. Innovation is, therefore, an integral part of a dynamic, complex world that responds to the growing demand for new technological solutions.

How to bring a university graduate into this world?

How to create or develop in them the skills and competencies necessary in the modern labor market?

The author attempts to answer those research questions in this article, which recommends a positive approach to effective and innovative education in the light of the research results.

The article aims to present an innovative method (form) of conducting practical classes with students at the Faculty of Logistics. It has been used to improve the traditional theoretical way of ordering various goods.

According to the author of the article, the critical aspect of using the developed method (form) in the education of a future engineer - logistician will be the creation of their own learning path. It is monitored by an academic teacher allowing, thanks to the student's involvement, passing to the area of independent work using the available research and academic potential. The future engineer-logistician

should learn about the possibilities, as well as be able to choose the right solution and a decision map in his or her future career. The teacher's role will be to indicate how to read the developed decision map without suggesting and imposing a solution.

In the further part, the article explains the empirical method of group ordering of goods alongside the stages of its realization in detail. Next, the essence, principles, and Business Process Reengineering (BPR) methodology by Hammer and Champy (1993) are presented, as well as a short description of E. de Bono's "Six Thinking Hats" method.

In the central part of the article, the author presents the concept together with instructions for the implementation of the developed innovative educational method (form) and its evaluation using the available research and academic potential and prepared props.

Literature Review

The author reviewed the literature on selected empirical methods whose stages of methodology were used to develop a hybrid innovative educational method. The literature review concerned the following methods:

- ✓ Reengineering (Business Process Reengineering),
- ✓ Group ordering method (Coverage analysis),
- ✓ Process analysis,
- ✓ Six Thinking Hats method.

The Reengineering method drafted by Hammer and Champy (1993) concerns the overall reconstruction of the process, which should be critical for company management. For the reconstruction, quantitative and qualitative auxiliary methods and tools such as benchmarking, the DMAIC cycle, Six Sigma, or SMED technique are generally employed.

Business Process Reengineering (BPR) can be defined as a method of a thorough transformation of overall processes in a company Hammer, Champy (1993). The starting point of this method is an in-depth analysis of customer needs, and the aim is to optimize three fundamental determinants: quality, cost, and cycle times.

Reengineering is based on four general principles:

1. starting with customer's needs,
2. analyzing company process,
3. considering existing constraints,
4. thinking creatively.

BPR is a typical process analysis whose first and at the same time key stage is to define the goal that the team involved in the process reconstruction pursues under the needs of the recipient for whom the reconstruction is conducted.

The pioneers of Reengineering were Hammer and Champy (1993), who proposed the following methodology:

1. the choice of the process to be reconstructed (it should be justified by the shortcomings of the processes carried out, their importance for clients, the probability of obtaining significant effects in the case of using Reengineering);
2. creating a working team (for only one process reconstruction);
3. understanding the process (one must put oneself in the role of clients and specify their requirements and real needs);
4. reconstruction of the process (using the benchmarking support method and three assumptions: the rejection of the established rules, application of Reengineering principles, use of new information technologies).

5. implementation of the reconstruction in practice (it can be realized wholly, or through pilot actions, with attention paid to monitoring implementation in both cases).

The conducted Reengineering process should bring effects in the form of, for instance, reduction of operating costs by 50%, increase of the company's profit by 60%, or shortening the delivery time from 3 (three) months to 2 (two) weeks.

The theoretical method of ordering various goods, the so-called "coverage analysis", is analyzed second. It allows obtaining a scale effect in the process of controlling stocks of assortment groups. Appropriate grouping of goods at suppliers' and delivery execution causes minimizing the average value of inventory at the customer's, and thus lowering the costs of inventory maintenance in the warehouse. Krzyżaniak (2002) and Sarjusz - Wolski (2000) defined the assumptions and limitations imposed on goods group orders:

1. Restrictions related to the supply process (a certain number of deliveries in the replenishment cycle, limitations of warehouse space, limited capital allocated for financing the stocks).
2. The required quality of customer service linked to the simultaneous availability of a group of goods.
3. The cost of ordering (creation - development and realization of delivery) is fixed and results from external limitations.
   Due to the complexity of the problem, the following research problem has been posed:

   How to control the stock of assortment groups to minimize the average value of the stock, on the assumption that the cost of ordering is fixed and results from external constraints? Ślaski (2017).

   The empirical method consists of five sequential stages the implementation of which makes it possible to solve the problem, Sarjusz - Wolski (1998), Krzyżaniak (2000), Murdoch (1965), Brown (1959), Lewis (1975):

1. Calculation of planned purchases for each assortment in the adopted period (1):
   $$W_i = P_i \cdot c_i \quad (1)$$
2. Determination of the square root of these values: $\sqrt{W_i}$
3. Calculation of the sum of square elements from the value of planned purchases of the goods group concerned: $\sum \sqrt{W_i}$
4. Calculation of the constant of coverage "k" (2):

   $$k = \frac{\sum \sqrt{W_i}}{l_d} \quad (2)$$

   where: l_d is the total number of deliveries

5. Determination of the so-called calculation number of deliveries for each good (3):

   $$l_{do} = \frac{\sqrt{W_i}}{k} \quad (3)$$

where: w_i − value of the *i-th* assortment; c_i − unit cost of the *i-th* assortment

In the final stage of the methodology, optimal volumes of supplies of goods for which the value of stocks, and thus storage costs, are minimal are determined.

The methodology is not tricky but labor-intensive. Moreover, it must be remembered that optimal delivery volumes are integers and, importantly, their rounding does not have to result from mathematical, but economic and intuitive rules.

The abovementioned methods are effortful, and their application is at risk of failure in a dynamically changing environment. The difficulty lies in the fact that the quantities determined in the empirical ordering method are not always optimal, and the selection of auxiliary methods makes it impossible for the Reengineering process to run optimally.

Innovation-Based Learning

The author's method is not to solve the problem based on the methodology of coverage analysis, but to propose a simple and less labor-intensive method using the Reengineering method and "Six Thinking Hats", and most importantly, to achieve an optimal effect. The classes conducted in this way will teach students process and creative thinking as well as making independent decisions.

Edward de Bono, the creator of lateral (creative, innovative) thinking, describes in his books how to free oneself from common and stunt thinking (De Bono, 1968), (De Bono, 1969), De Bono (1970), De Bono (1971), De Bono (1972), etc. He teaches conscious reasoning and its various variations, from critical appraisal, idea creation, analysis, and deduction, to the search for alternatives when solving a problem.

The creator's method called "Six Thinking Hats" De Bono (1985) can be helpful in the organization and conduct of the classes.

The objective of the method is to change the way of thinking from the so-called "argument mode" to the mode of developing a creative decision map.

Each of the thinking hats is a different color, which constitutes their identification. Hats, in a sense, reflect the way of thinking through entering into the role of the person wearing them. They are also a form of visualization and a way to distinguish them from each other. Hats have different colors: white, red, black, yellow, blue, or green. The white hat is neutral and presents a "photograph" of the problem in an objective, quantitative, and qualitative way. The red hat allows emotions and feelings to work. It provides a formal and precise way of bringing out the irrational aspects of thinking (e.g., hunch and intuition) in the form of fully-fledged elements of a decision map. The black thinking hat means an evaluation of the adverse effects of the problem. In terms of a black hat, thinking is used to assess the problem from experience gained in the past. The black hat puts harmful elements on the decision map being created to specify errors in the adopted methodology. Thinking in the yellow hat category is constructive and creative. The yellow hat is an evaluation of the positive effects of the problem, and its overriding goal is effectiveness. The blue hat is associated with the control and organization of the thought process. It is responsible for summarizing and reviewing the situation. The blue hat makes it possible to create a thought process leading to a decision map, monitor the process, and oversee the rules of the "game." The green hat is used for creative (lateral) thinking. Its primary role is to find alternative solutions to generate new and creative ideas.

Thinking in the Six Thinking Hats method is a two-stage process. In the first stage, while putting on the appropriate hats, the research teams decide on a map consisting of different types of solutions depending on the color of the hat. It enables them to choose the best way in the second stage.

What are the benefits of using the Six Thinking Hats method and how to use it in practice?

As Edward de Bono (1985) claims, this method provides the following advantages:

1. The ability to play a role. The hat helps to think and talk about issues and problems that are so-called inconvenient and not always addressed in a given environment.
2. The orientation of the attention. Hats help to orient the way of thinking on different aspects of a problem.
3. Simplicity and comfort. The symbolism of six hats makes it easier to perceive the problem in a positive, negative, or emotional way.
4. Possibility of establishing rules of conduct. Thinking hats set rules (games) of thinking, which stands as a decision map.

State of Research

The need to implement innovative educational methods was discussed and emphasized by the Ministers of Science at the Conference of Ministers of the European Higher Education Area (EOSW) in Yerevan in 2015.

The education at the university level is carried out using, among others, the PBL (Problem Based Learning) method, the so-called "seeking education," by the Aalborg University, Maastricht University, Polytechnic University College of Donostia - San Sebastian, Eindhoven University of Technology, Lodz University of Technology, or Warsaw University of Technology. Some of them have additional classes conducted in this methodology, some of the universities have included the seeking education in their curricula as courses, while others, like Aalborg University, have organized the entire training cycle based on this methodology. Aalborg, as one of two centers, has a Centre for Problem Based Learning in Engineering Science and Sustainability under the auspices of UNESCO. An example of the implementation of classes with innovative methods in Poland is the course realized at the Warsaw University of Technology by the Rector's team for innovative forms of education INFOX PW called *Creative Project Semester* (KSP). Students work in teams of 5-8 people and learn to solve real problems commissioned by the Warsaw City Hall and entrepreneurs. Each team is supervised by a lecturer who guides students through the process of task solving. The PBL method is divided into stages, as shown in Figure 1. The work is executed in small groups under the supervision of a lecturer. A team leader/moderator and a secretary who notes down the findings and the information worked out by the group so that nothing is left out, are chosen from among the students.

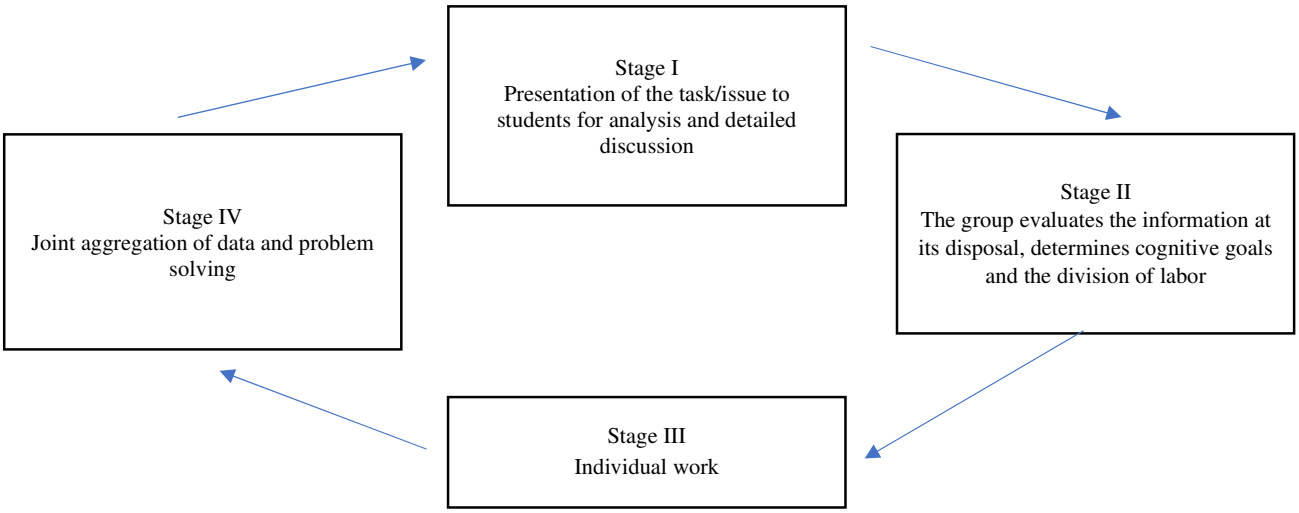

Figure 1: Stages of student group work using the PBL method

Source: Own study.

Stage 1 shows what the group work allowing the development of communication and discussion skills, brainstorming, identifying small tasks, goals, or problems is. Stage 2 is a joint identification of the real state of affairs, a kind of knowledge and experience the team has about the task, and causes and effects of the analyzed problem. Then the cognitive goals are defined, and the division of work is established. Stage 3 of PBL is characterized by searching for answers through individual work on all available channels: materials, library, experts, multimedia, institutions related to the problem, and so forth. Stage 4 serves the purpose of data aggregation during the mutual exchange of information aimed at finding a solution. This approach allows learning not only facts but also requires thinking, searching for solutions, cooperation, constructing conclusions, and feedback, due to which one can learn more through practice and cognitive sessions. It also gives the opportunity to get to know the opinions of others and learn to respect different views.

International experience indicates many variations of PBL: Design based learning, Active Learning, Collaborative Learning, Inquiry-based Learning, Cooperative Learning, Peer Led Team Learning, Team-based Learning, Peer Instruction, Inquiry Guided Learning, Just-in Time Teaching, Small Group Learning.

Organization and Way of Conducting Classes - Instruction for The Lecturer

The author of the method is an assistant professor at the Institute of Logistics at the Faculty of Security, Logistics and Management at the Military University of Technology (WLO WAT). He teaches the subjects of "Inventories in logistics systems" and "Designing logistics processes" at the third-year studies of a practical profile at the Faculty of Logistics.

Other lecturers can use the developed method to conduct classes at universities. Table 1 provides the instructions to follow.

Table 1: Instruction on organization and way of conducting classes

Phases	Stages	Instructions for conducting classes
Preparation phase	Gathering necessary props	The lecturer prepares hats made of paper in six colors.
	Preparation of the lab	Before the classes, the lecturer checks whether the computers have the Microsoft Office with the Excel spreadsheet (the educational version) installed.
		Installing the Solver optimization add-on in the Excel spreadsheet (it enables solving tasks related to operational research, i.e., linear and non-linear programming).
	Creation of research teams	The lecturer divides the student group into research teams. Each team consists of 4 - 5 students.
		The lecturer provides the teams with sets of six-color hats.
Initial phase	Reengineering Method	The lecturer discusses the Reengineering Method by Hammer and Champy.
	Group ordering method, the so-called coverage analysis	The lecturer discusses the empirical method of group ordering of goods.
	Six Thinking Hats	The lecturer explains to the students what hats are used for, what their colors mean and what is the order of putting on hats when solving a problem.
Main phase	Task presentation	Lecturer presents on slides the task to be solved to research teams and formulates the research problem.
	Practical activity in teams	The students in teams develop a thought map using prepared props and research equipment.
		Presentation in teams of the chosen thought path.
	Discussing the results of team work	The lecturer listens to the problem-solving proposals presented by the teams, and then summarizes the classes and presents the original solution.

Source: Own study.

Original Presentation of The Classes

The classes take place in the computer lab at the Institute of Logistics at WLO WAT in the 2x45 min lesson block in three student groups of 30 people in each. Students in groups are divided into six teams of five. Each team has a leader who presents the team's solution to the problem in the final part of the classes. The classes are held within the course: "Stocks in logistic systems." It is a specialist subject for the completion of which passing an exam is required. The theme of the classes is the process of group ordering of goods from suppliers in the logistics chain. Assistant Professor Ph.D. Paweł Ślaski – the author of the method, conducts the classes.

The teacher begins the classes with a discussion of their purpose and research problem. Then, during the presentation, the lecturer defines the input data, assumptions, and limitations concerning the subject matter, as well as explains how to use the Excel spreadsheet and the Solver optimization add-on. Next, students in teams analyze the task set. In the first stage, they put on white hats. The teams solve the task in Excel spreadsheets using the empirical methodology of coverage analysis, the stages of which are described in the literature review section Brown (1959), Murdoch (1965), Kumar (2007), Ślaski (2017), Krzyżaniak (2003). The characteristic feature of this stage is the reproducible application of the theoretical method of group ordering, while the effect obtained is objective and neutral. It is a practical approach to the problem posed and, at the same time, a starting point for the thought map that is being drawn up. Another hat that students wear is red hats. The critical way of thinking in a red hat is to make intuitive decisions. The mode of intuitive thinking applies to the last stage of coverage analysis and is related to determining the optimal delivery volumes. However, they are non-integer values. Therefore, when wearing red hats, the teams have the task of rounding these quantities intuitively (not mathematically) in such a way that their sum is consistent with the assumed annual delivery frequency. Intuitive thinking in red hats allows teams to search for such scenarios that will lead to an optimal solution to the research problem posed. Making optimal decisions based on intuitive thinking is not an easy task. The students have had short internships in companies and do not yet have relevant practical experience. They put on black hats and draw negative conclusions from their previous analysis. They ask questions: Is their delivery plan optimal? Has their intuition let them down? Does the obtained effect minimize storage costs? The lecturer observes the reactions of the students wearing black hats and suggests positive thinking while taking account of the risk of failure and teams' creating the wrong path of thought. The teacher suggests putting on a yellow hat. The students are aware that despite possible failures, they can count on support and guidance from the leader. In yellow hats, they draw definite conclusions from their previous activities and focus on the benefits of teamwork. They also pay attention to the possibility of choosing the right path of thought and, consequently, making the right decisions in their future professional work.

The teacher recalls that the green hat is next and should lead the teams to set the right path on the thought map. With a positive attitude after yellow hats, then came the time for creative thinking. The students put on green hats. The most significant thing in this mode is to change thinking from traditional, established during literature analysis to innovative (lateral). An essential part of lateral thinking may constitute the use of conscious "provocation". One of the effective ways of triggering provocation is the so-called "reversal". It consists in the fact that teams analyze the problem classically and then solve it starting from the last stage (from the end). Therefore, the lecturer suggests that, under the Reengineering methodology Hammer, Champy (1993), the teams should focus on understanding the process and choosing an effective optimization method. The students in teams, following the teacher's recommendations, move to the analysis of the ordering process from the final result, i.e., from determining whether the achieved total delivery volumes meet the expectations of the potential customer.

$$SWZ = 0{,}5 \cdot \sum_{i=1}^{n} \frac{w_i}{l_{di}} \rightarrow min \tag{4}$$

where:

SWZ – average value of stocks
w_i – value of the *i-th* assortment

l_{di} – total delivery volumes of the *i-th* assortment

Then the research problem defined by the formula (4), which is also a function of the target, is saved by the students in the Excel Solver Dialogs. Delivery volumes are treated in the Solver application as decision variables and the limitations and assumptions of the process concern the expected total annual delivery frequency and the adoption of variables as non-negative integers. Starting the application as a non-linear one determines the total optimal delivery volumes with minimum stock value. The students in green hats analyze the task with great interest and commitment. They note with satisfaction that solving the problem in a new way is much faster than traditional and more comfortable to apply.

The last hats that teams put on are the blue ones. In this mode of thought, the students monitor the course of solving the problem at each stage of the design and create a path for optimal decisions. The classes end with a summary and conclusions from the exercise.

Verification and Evaluation of The New Educational Form

Statistical evaluation of the conducted survey was related to the analysis of students' skills and competences of practice-oriented studies at the Faculty of Logistics.

The research focused on the assessment and proposal of organization and method of conducting classes based on the developed innovative method of education.

The result of the survey should be answers to the following questions:

1. To what extent does the educational process include the need to prepare students to be innovative, i.e., initiators and creators of change?
2. Does the academic community recognize the importance of the skills that are components of future innovative competence?
3. Has the new method applied during classes brought an effect in the form of:
   a. Increasing the attractiveness of classes?
   b. Students' satisfaction with the possibility to work in teams?
   c. Satisfaction with acquiring creative thinking skills?

Diagram 1 displays the analysis of the fundamental questions asked to the students in the survey.

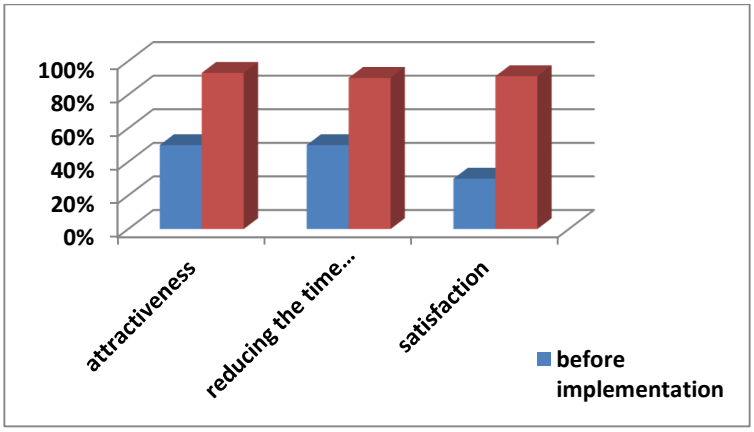

Diagram 1: Analysis of a survey conducted among students

Source: Own study.

A Student's T-Test was conducted for independent tests before and after the implementation of the method into the academic process to verify the developed new method (form) of education. The statistical verification was based on the analysis of the questionnaire for the key question:
Has the new method applied during the classes brought the result in the form of satisfaction (contentment) with acquiring creative thinking skills?

It was assumed that the statistical data used for the verification are of normal distribution character. The survey covered a group of n=30 students of full-time practice-oriented engineering studies at the Faculty of Logistics. The test consisted in determining whether the difference between the obtained averages of tests is statistically significant.

To this end, two research hypotheses were put forward - the H_0 zero hypothesis for equality of averages and the H_1 alternative hypothesis for the diversity of averages (5):

$$H_0 : A_1 = A_2 \; ; H_1 : A_1 \neq A_2 \qquad (5)$$

Then the Student's t-test was carried out for two tests assuming equal variances that gave:

Averages A_1= 72%; A_2 = 93%

The results obtained were as follows:

$t = -1{,}88$
$df = 58$
$p = 0{,}06$
For $\alpha = 0{,}05$ it was determined:

$$t_{critical} = T.INV(\alpha; df) = T.INV(0{,}05; 58) = 2{,}0 \qquad (6)$$

and since $K = (-\infty;\ -2{,}0\rangle \cup \langle 2{,}0\ ;\ +\infty)$, it is justified to reject the H_0 hypothesis, i.e., the difference in averages before and after is statistically significant.

Conclusions

The method described in the article is universal. Although its verification was carried out in engineering studies in logistics, classes with its application can be conducted at various profiles and faculties. The author of the article believes that the developed method is innovative as it employs the mode of lateral (creative) thinking and is also a kind of hybrid. It is a combination of methods such as Reengineering, process analysis, and operational research. The statistical analysis of the questionnaires confirmed that the students solved the task much faster, and the organization and course of the classes were more interesting than reaching solutions in a standard way. An attempt to think creatively with the use of colorful hats and a simple, commonly used and cheap-to-use tool (Excel spreadsheet) enabled the students to develop the right thought maps and make optimal decisions. The current global situation and the dangers of coronavirus result in suspended classes for college students. The developed method enables distance learning, so-called e-learning. Students form groups and connect with each other via Skype. Using the internet platform, they share the conclusions developed in the field of using the thought hat. The Excel spreadsheet used as part of the method enables the transfer of online solutions, thus facilitating distance communication for students. Such classes do not require the use of complex applications and e-learning platforms. Students work at home using their private computer equipment and make the right decisions without much effort. In a situation of risk of being infected with a virus, focusing on interesting activities without the need for contact with the environment is crucial.

Albert Einstein's words: "Everything must be done as simply as possible, but not simpler" has become a fact.

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E-Services in Managing A Territorial Self-Government Unit in Poland

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Abstract

This article presents managing e-administration and e-services on ePUAP and SEKAP platforms in territorial self-government units. In the administration sector it is important to implement Electronic Documentation Management to facilitate, unify and accelerate the work of territorial self-government units. The catalogue of e-services in territorial self-government is growing, and services are becoming more and more mature.

Keywords: E-Service, Management, Territorial Self-Government Unit

Introduction

The need for management always appears during performance of joint activities for the given community. The ability to coordinate and properly manage tasks significantly affects achieving the defined goal. Management is a process conducted in every organized community. Management accompanies human activities. It is a process of impacting the organization's resources in order to achieve its goals.[1] Resources should be selected, collected and used in accordance with defined goals. A goal means a define state of affairs aimed at by the organization. Every organization strives to achieve the goals of owners, employees, as well as people and institutions in the organization's environment. Every organization sees the clash of various aspirations, and management may be seen as the process aiming at reconciling these aspirations, and providing a certain balance between requirements set by the above-mentioned entities.[2]

Management has the following characteristics:

- It has the nature of an informative/decision-making process;
- It combines the attributes of management work and team work;
- It is a system of actions that regulate the process flow in the given organization;
- It is a coordinating process, which harmonizes activities of various persons, institutions and business entities.[1]

The elements of the constructed concept of management may be defined as elements of the organization management system. It is worth noting that management has interdisciplinary nature, and its characteristics and components may be applicable to managing an organization such as a territorial self-government unit.

E-administration in a Self-Government

The concept of a territorial self-government is broad and includes the community of residents, the defined territory, the scope of authorizations, as well as the legal personality.[3]

A territorial self-government is to serve the purpose of building mechanisms of democracy and decentralization of public authority, therefore it includes democratically constituted decision-making

bodies, which enjoy broad autonomy. In legal and economic terms, a territorial self-government plays the role of both a body governed by public law, which has the ability to issue administrative decisions, as well as a body governed by civil law, which is separate from the State Treasury and has own assets. The essence of the process of managing territorial self-government units is that in legal and economic terms the territorial self-government has two roles.

The basic fundament of new management in a territorial self-government unit is to introduce a manager model of public management, which has the following characteristics:

- Citizen-client oriented administration;
- Emphasis on monitoring results and not only procedures;
- Strategic and operational functions are separated;
- Public functions are delegated to competing organizations from outside of the administration;
- Mechanisms of control over decentralized entities are introduced, e.g. through various types of social control; result-based management measured by indicators is introduced; support services are outsourced through public procurement, thus ensuring competitiveness of offers.[4]

Services provided electronically mean that a service is performed without simultaneous presence of both parties (at a distance), through a transfer of data on individual request of the client; the service is sent and receive using electronic processing devices, and it is fully transmitted or received through a telecommunications network.[5] [6]

Electronic services include services provided via the Internet or an electronic network, the provision of which is generally automated, due to their nature, and requires only minimum human participation, and which cannot be performed without information technology.[7]

To perform public tasks, a public entity uses public ICT systems which meet the minimum requirements and ensure interoperability of systems based on rules defined in the National Interoperability Framework.[8]

New rules of entrepreneurship and new technologies are strictly related in the electronic economy; they encroach upon one another and are interdependent. There are three most important entities in e-economy: enterprises, clients, and the administration. These relations should always be two-way. E-services distinguished in territorial self-government units include:

- A2A, meaning administration-to administration relations between public administration offices e.g. in a commune;
- A2B, meaning administration-to-business relations;
- A2C, meaning administration-to-consumer relations.[9]

The Electronic Documentation Management (*pl: EZD*) is implemented in public administration and it is setting the standard for this class of systems. The implementation of the Electronic Documentation Management is taking place within the scope of a project entitled "*EZD RP* – electronic documentation management in public administration". The system, being the final product of the project, will be distributed not-for-profit starting from 2022 to public administration entities. Installation of systems will be executed in own infrastructure of territorial self-government units. To increase the availability of the EDZ system, a possibility to provide it as a cloud service is considered. Public administration entities e.g. communes will use the Electronic Documentation Management system without the need to maintain own infrastructure and resources.

The system will enable preparing comprehensive documentation of the process of handling and resolving affairs in territorial self-government, as well as support:

- Creation, processing and flow of electronic and paper documents (including incoming and outgoing correspondence);
- Management of electronic and paper files and documents, including their transfer and archiving, information management.[10]

Project execution means, on the one hand – an ICT system, and on the other hand – a supra-regional range. Ties are formed within the scope of cooperation, and working on solutions and their possible modifications is supposed to make administration more effective as well as limit or eliminate bureaucratization. The goal of the project is to unify and adjust the system to the needs of public administration. The process is executed on not-for-profit basis, free of charge, using human resources and own means of offices, as well as the "know how" generated and published on the electronic platform at http://ezd.gov.pl. The system has been and is being implemented in, amongst others, thirteen voivodeship offices, in the central government administration, self-governments, universities, courts, and in health care. Currently it covers over 470 offices (status as at February 2020) and over 86000 public officials. The list of entities, which introduce the Electronic Documentation Management is growing, and expands the network of cooperating offices. [11]

E-services on ePUAP and SEKAP platforms

Communication between the citizen, entrepreneurs, and territorial self-government units or central administration can take place through the following platforms:

- ePUAP (Electronic Public Administration Services Platform) – a national ICT platform. [11]
- Regional platforms such as SEKAP (Public Administration Electronic Communication System in the Silesian Voivodeship). [8]

A citizen wanting to use e-administration services must create a trusted profile on ePUAP. The conditions for creating a trusted profile are defined in the Act on the computerization of the activity of entities performing public tasks. The profile includes identification data: first names, last name, date of birth, the number in the General Electronic Population Registration System (*PESEL*). During the profile verification procedure, data is verified automatically against the PESEL data. The ePUAP account is an electronic mailbox to receive official correspondence. The request should include an email address for correspondence with the public office. Creating a trusted profile requires visiting a Confirmation Point and presenting a personal identity card or a passport. The profile serves for logging into public administration systems and using public e-services. Approximately one million people in Poland use ePUAP e-services. After sending or receiving official correspondence, the user receives an Official Confirmation of Receipt; every territorial self-government unit is required to have an Electronic Correspondence Registry (*ESP*). [8]

The following sectors of e-services are available for natural persons on the ePUAP platform:

- Child – child birth, excerpts of birth certificates, child residence registration, the Family 500+ programme;
- General matters – official correspondence;
- Residence registration – permanent or temporary stay;
- Automotive and transportation – driving license, vehicle registration, international register and transport;
- Geodesy and cartography – building numbering, providing data from the central/ poviat/ voivodeship geodesy and cartography resources;

- Environmental protection – declaration about the amount of the fee municipal waste processing, grants for low emission source liquidation, product fee concerning packaging and products;
- Cultural activities, sports and tourism – accepting notifications about organization of a public gathering, entry in the register of facilities providing hotel services for entities which are not hotel facilities;
- Infrastructure – blocking of a road strip, permission to place an advertisement in a road strip, reporting a damage in the surface of roads and pavements, reporting a vehicle damage;
- Judicial enforcement – electronic transfer of titles of enforcement, overlap of enforcement.

The following e-services are available for entrepreneurs:

- Certificate of entry in the register of business activity;
- Conducting and establishing business activity;
- Entry in the Central Register and Information about Business Activity (*CEIDG*);
- Women Loan Fund, Innovation Voucher Programme;
- Registers and licenses for alcohol trading;
- Legalization of taximeters;
- Amount of real estate tax, information about local taxes;
- Permit to operate pharmacies, psychological therapy.

The above e-services are exemplary; not every municipality offers all e-services and this depends on the level of development of the given e-services in the given municipality office.

The goal of the SEKAP platform is to:

- Reduce the costs of providing public services;
- Raising the quality of public services;
- Expanding the offer of electronic services;
- Improvement of the conditions of commencing and operating businesses;
- Increasing the range of use of information technologies by region residents;
- Increase of the region's competitiveness in national and European scale. [12]

User of the SEKAP platform include: citizens, entrepreneurs, and public administration institutions that may communicate electronically with the Silesian voivodeship offices. There are approximately 700 service cards on the SEKAP platform.

The following catalogue of services is offered on the SEKAP platform:

1. Construction, architecture, urbanism – submitting notifications about constructions or construction works relating to advertisements, issuance of decisions on building permits, issuance of building logs, issuance of decisions on planning permits;
2. Personal identity cards, residence registrations, elections – issuance of personal identity cards to: children under 5 years, children aged 5-18, permanent or temporary residence registration, permanent or temporary residence deregistration, residence registration pursuant to an administrative decision, access to a register of voters, list of voters;

3. Business activity – entry in the register of regulated activity consisting in production of registration plates, submitting a request for an entry on the List of Traditional Products (the remaining part of the catalogue of services is identical with the ePUAP platform);

4. Geodesy and cartography – update of the register of land and buildings, soil-science classification of agricultural and forest land, acceptance of measuring documentation;

5. Municipal engineering – entry in the register of regulated activity in the scope of collection of municipal solid waste from owners of real estate, issuance of permits for routing non-standard vehicles;

6. Communication, roads and transport – the following subcategories are distinguished:

- Drivers training center – entries in the register of entrepreneurs operating drivers training centers, entry in the register of instructors / lecturers, and issuance of professional cards;
- Driving licenses – issuance of national, international and army driving licenses;
- Registration of vehicles – first registration of brand new vehicles purchased in the territory of Poland, registration of vehicles previously registered in other town/ starosty, deregistration of vehicles;
- Vehicle technical inspection centers – entries in the register of entrepreneurs operating vehicle technical inspection centers, issuing authorizations diagnosticians to perform technical inspections of vehicles;
- Road transport of merchandise and people, taxis – granting permits to perform the profession of a road carrier of people / merchandise;

7. Cultural activities, sports, tourism, education – Awards of the Marshall of the Silesian Voivodeship in the area of cultural activities, cultural/ sports scholarships, granting the title of a mountain guide, obtaining grants for execution of educational tasks, extracurricular activities for schools, granting or rejecting the title of appointed academic staff, on-line consultations in the psychological & educational clinic, school scholarships;

8. Real estate, residential and commercial premises – the following categories are distinguished:

- Real estate management – permit for construction within the border, update of the annual fee for perpetual usufruct of land, issuance of a decision confirming the division of a real estate;
- Municipal real estate management – lease of real estate owned by the municipality, lending of municipal or poviat land, purchase of real estate from natural persons and legal persons by the municipality;
- Management of State Treasury real estate – transformation of the State Treasury's perpetual usufruct of land into ownership;

9. Environment protection – the following categories are distinguished:

- Geology – providing geological data free of charge / against charge, granting licenses for mining deposits within the competence of the staroste and Marshall of the voivodeship;
- Water and sewage management – acceptance of water and sewer drainage connections, providing water from hydrants;
- Waste – information about products with asbestos, the location of their use or end of use, issuance of permits to generate waste, issuance of a permit for waste processing/ collection;

10. Air and noise – issuance of decisions on the admissible level of noise, issuance of permits to release gas or dust in the air;
11. Taxes and fees – the following categories are distinguished:

- Natural persons – reporting forest and agricultural tax obligations, electronic payment for taxes;
- Legal persons – reporting forest and tax obligation, electronic payment for taxes;
- Enforcement proceedings – request for discontinuation of enforcement proceedings, request for commencing mediation;

12. Citizen affairs – procedure regarding grants to non-government organizations, execution of public tasks within the scope of local initiative
13. Health and social affairs – register of medical doctors authorized to conduct medical tests of persons requesting a driving license, register of psychologists authorized to conduct psychological tests, additional financing from the State Fund for the Rehabilitation of the Disabled (PFRON) for construction works, sports, cultural activities, recreation and tourism for the needs of the disabled, equipping a work station for a disabled person
14. Regional development – the 2014-2020 Regional Operational Programme of the Silesia Voivodeship, Awards of City Mayor for gifted students and for activities in non-government organizations, cooperation with non-government organizations
15. Promotion and information about the region – issuance of materials and promotional publications, consent for using the city's coat of arms.

Each catalogue of services presents exemplary e-services on the SEKAP platform. The overall level of use of the e-service and the possible scope of handling individual matters electronically have been categorized according to a five-trade scale of e-service maturity:

- Maturity grade 1 on-line service - Information: general information about public services
- Maturity grade 2 on-line service – One-way interaction: possibility to download forms and applications
- Maturity grade 3 on-line service – Two-way interaction: processing of forms. Allows for transferring data both ways: from the service provider to the client and from the client to the service provider. A typical manner of execution is downloading, completing and submitting the form electronically.
- Maturity grade 4 on-line service –Transaction: handling transactions, making decisions on-line, provision of services and handling payments. Allows to fully resolve the given official matter electronically, including any payments.
- Maturity grade 5 services – Customization: organization of services in account of the needs of users. Level 5 allows performing tasks in such manner so that apart from the possibility to fully resolve the given matter it also enables to apply e.g. customization mechanisms, meaning adjustment of the manner of performing the service to the client's special conditions and needs (e.g. offering partially completed forms, informing the client in an SMS about the approaching deadline for certain actions). [13]

Various e-services in territorial self-government units achieve different maturity levels, measured in the five-grade scale. Due to applicable laws, some e-services will only reach level 1 or 2. Many e-services reaches full maturity and others are classified at levels 2-3.

Summary

The management of territorial self-government units in Poland entered the computerization stage about ten years ago and shifted many activities to the e-space. Territorial self-government units such as municipalities or poviats are offices that provide varied and complicated services. Moving these activities into the virtual reality as e-services is a long and time-consuming process. The implemented ICT system – Electronic Documentation Management is to help unify e-administration, and it is to be introduced in all territorial self-government units; the system will be offered not-for-profit starting from 2022. Currently units mat join the project entitled "EZD RP – electronic documentation management in public administration". This project aims at developing and introducing the best system solutions within the scope of EZD. According to the data of the Main Statistical Office (*GUS*) approximately 25% Polish citizens took advantage of e-services in 2016, and 35% in 2018. Many people, in particular 60 plus citizens, are excluded digitally, and do not use these services. Some services on ePUAP or SEKAP platforms are characterized by a low level of maturity, and the role of territorial self-government units is to raise this level. Certain services are not available at all as e-services. The level of the service itself sometimes varies between municipalities e.g. in different voivodeships; some services in are not available to citizens of certain municipalities. The territorial self-government in Poland must work on expanding the catalogue of e-services, and encourage citizens to take advantage of e-services, which take the burden off administration staff and are cheaper than traditional services provided in public offices.

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Development of A Network Organization Based on Collaboration in A Supply Chain - How the Implementation of Supply Chain Standards Determines Network Connectedness

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Abstract

Interorganizational cooperation is becoming increasingly important in the modern economy. The daily practice of enterprises is to simultaneously participate in many interorganizational systems, e.g. network structures and supply chains. At the same time, the interdependencies resulting from the impact of various interorganizational systems are, to date, a relatively poorly recognized cognitive and research area. This article aims to present the complexity of relations between enterprises, which are both network organization actors and links in many supply chains in the context of the increasing connectedness of a network. Operation within the network structure is the more attractive for enterprises, the greater its combinational potential, which is understood as the number of possible relations and ties connected to the actors of the interorganizational network. The article underlines that the conditions for the development of network connectedness may relate to the operational nature of cooperation. As a result of empirical research (135 manufacturing enterprises belonging to cluster organizations and cooperating within cluster supply chains), it was established that there is a positive relationship between the use of supply chain standards by enterprises belonging to an organizational network and the intensity of their cooperation in supply chains. Therefore, the use of supply chain standards by enterprises operating within a network organization is a factor determining the development of the network connectedness.

Keywords: Interorganizational Network, Network, Cluster, Supply Chain, Connectedness.

Introduction

A characteristic feature of the modern economy is the high complexity of market connections of enterprises resulting from, among others, adopting a networked form of cooperation. According to the literature, interorganizational relations, understood as an area in management and organizational theory, cover a wide range of socio-economic relations that are based on social networks (Gulati 1998; Toikka, Miettinen & Tuunainen 2016). The functioning of a network organization is described based on such parameters as cohesion, combinational potential, and method of activation (Strategor 1995) or in the latest conception as "3 Cs": cohesion (strong mutual influence among its members), connectedness (high number of ties), and conciseness (low redundancy) (Muller & Peres 2019). The network connectedness is a present number of ties between its actors, while the combinational potential is a possible number of actors relations resulting from all possible connections. The increasing number of relations between actors operating within a network organization results in a greater number of cooperating entities and contributes to the development of a given structure (Turkina & Van Assche 2018; Frankowska 2018, Zhang et al. 2013). That is the reason, why the network connectedness and combinational potential deserve special attention.

A sociological conceptual apparatus, connected to an analysis of relations, is often used to study interorganizational issues occurring in interorganizational networks. However, in order to explain the phenomenon of interorganizational cooperation, a deeper knowledge of the circumstances associated with the flow of physical and information streams is required. This allows multidimensional observation of the conditions of cooperation between entities, especially those belonging to various interorganizational systems. This paper focuses precisely on the situation where the company is, on the one hand, an actor of a network organization (e.g. cluster organization), under which it builds relations

with other entities and whose goal is to intensify these relations, and on the other, a participant in many supply chains.

It should be added that enterprises' participation in many interorganizational systems, for example, network structures and supply chains, is a daily business practice. At the same time, interrelations resulting from the impact of various interorganizational systems are, to date, a very poorly recognized area both from the cognitive and research point of view (Frankowska 2018). Therefore, there exists a research gap, the filling of which requires multidimensional research that takes into account the conditions of operational cooperation.

In today's turbulent environment, entities cooperating in supply chains are looking for different ways of more efficient coordination of cooperation. One of them is a convergence of operation, encompassing organizational, technological, and behavioural factors. Therefore, special initiatives are being taken to develop a common way of operating within supply chains. These include setting and implementing common standards to ensure consistency among enterprises. As already indicated, the literature on the subject uses a mainly sociological approach when conducting research in the field of network cooperation. Hence, the existence of research and a cognitive gap in recognizing the conditions of network cooperation at the operational level, including those covering supply chain processes, should be emphasized.

The article aims to present the complexity and explore relations between enterprises that are both actors of a network organization and links in many supply chains in the context of increasing the combinational potential of networks. In connection with the above, the research problem was formulated in the form of the following questions:

- What is the intensity of cooperation between enterprises belonging to an organizational network in supply chains?
- What is the scope of standards applied in supply chains of enterprises cooperating in supply chains with other organizational network actors?
- Can the possibilities of establishing or intensifying the cooperation of network organization actors be determined by the scope of standards applied in a supply chain?
- Is the use of network organization enterprise supply chain standards conducive to the development of combinational potential?

To achieve the research objectives, the following article structure was adopted. Based on the introduction, the second section describes the theoretical foundations of cooperation in network organizations, with an emphasis on exchange relations realized within supply chains. The third section describes the importance and areas of standardization in supply chain management. The following two sections present the research model and the results of research carried out among manufacturing companies belonging to cluster organizations and cooperating with other network structure actors in supply chains. In the empirical study, the condition of participation in two interorganizational systems was met. The article ends with a section presenting the conclusions of the research, as well as indicating the values obtained as a result of the research and their limitations.

Development of the network connectedness in the context of cooperation in supply chains

The issue of network organizations is characterized by high complexity, which is also evidenced by the fact that this concept is not precisely defined in the literature on the subject and has many synonyms, such as networked organization, network organizations, interorganizational network and network structure (Kiesler & Sproull 1992; Baker & Faulkner 2002; Higgins & Maciarello 2004; Gibson, Hardy & Buckley 2014). The multitude of views on the subject of networks resulted in the need to identify their main distinguishing features, which include, among others: striving for cooperation, use of market coordination mechanisms, increase in the innovation potential, unity of goals, lack of a dominant role of equity links, low level of vertical integration and hierarchy, as well as natural market flexibility (Niemczyk, Stańczyk-Hugiet & Jasiński 2012). A deeper analysis of individual definitions of a network

organization may lead to an understanding of the definition of the network in an operational and attributive sense. Interorganizational networks in an operational sense constitute a structure describing a specific form of cooperation between entities, whereas, in an attributive sense, they are understood as cooperation between entities who do not create a new form of activity at this stage. The subject of this paper is a network organization presented in the operational sense.

Network organizations consist of two main components: network participants also referred to as actors, and relations between them, also known as connections, ties, or dependencies. The literature indicated the following common features of actors in interorganizational networks (Niemczyk, Stańczyk-Hugiet & Jasiński 2012; Toikka, Miettinen & Tuunainen 2016):

- Creating relations based on resource and knowledge flows,
- Making independent decisions about entering or leaving a network independently,
- Achieving synergies as a result of cooperation (strategic, tactical and operational cooperation systems),
- Interdependence of actors, which is based on the implementation of both common and individual objective goal (which may be different in the individual approach),
- Flexible adaptability, based on the ability to enter modular interactions,
- Ability to actively learn from other participants and synergistically use innovation (the so-called teamwork skill),
- Communicating with other network members despite a high degree of heterogeneity,
- Mutual complementarity (mutual provision of competences),
- Ability to enter risky relations.

The analysis of the common features of network actors indicates the importance of exchanges between them. This makes it possible to refer to the concept of organization as an open system presented by E. Yuchtman and S.E. Seashore (1979), who showed that the effectiveness of an organization (a network organization actor) is its ability to use its environment to acquire rare and valuable resources (from other actors). This means that relations and connections between actors become particularly important. In terms of networking, relations can include any interaction, e.g. cooperation, conflict, trust, communication, exchange, or support (Koźmiński, D. Latusek-Jurczak 2014). Relations between network actors can take a different form, i.e. (Strategor 1995):

- Administrative – instructions, applicable standards and procedures,
- Economical – material and/or financial transactions,
- Operational – joint actions and decision making, using the same resources,
- Cultural – shared norms and values, a unity of opportunities and threats,
- Informational – information availability, exchange, and sharing of information.

Relations are the most important constitutive element of a network. Moreover, network analysis assumes that the relations between network participants affect their activities, although the perspective is not limited only to the actors themselves, but also covers the entire network structure. In literature, the importance of relations, connections and dependencies are particularly emphasized, and network organizations are often defined not so much by the actors themselves, but the exchange process taking place between them (Easton & Araujo 1994). This is closely related to the concept of network connectedness, which is a present number of ties between its actors, and the combinational potential understood as a possible number of actors relations resulting from all possible connections. In the development of a network, the number of actors is not as important as the relations between the largest number of actors in a given network structure. The interorganizational cooperation is implemented based on the capital of the social network that is being built and results in exchange relations in supply chains.

Cooperation and exchange as the subject of research of network organizations have so far focused mainly on the relations between network actors. In the analysis of connections in the supply chain system, this would mean focusing only on identifying the cooperation of entities belonging to a given network organization (supply chain links). However, it should be noted that the actors of a network

organization participate in many supply chains (supply networks), and that, at the same time, not all of them interact with each other. The issue is presented in Figure 1.

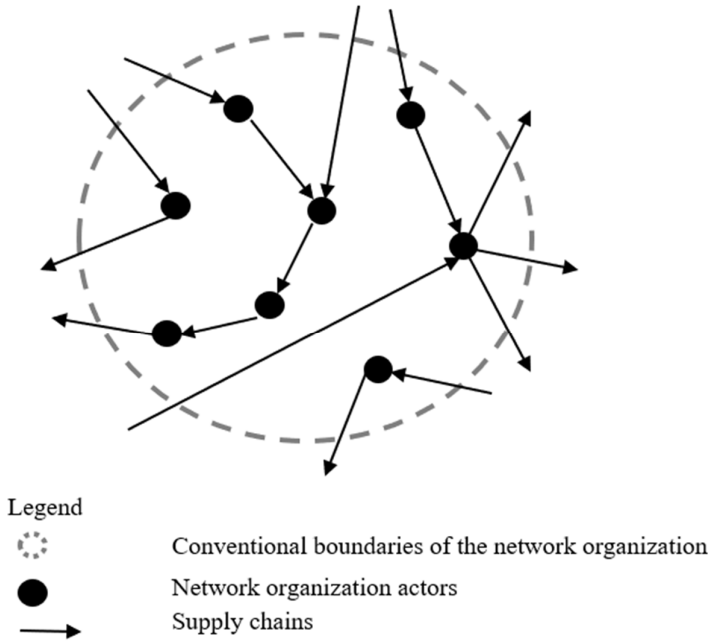

Fig. 1: Supply chains in a network organization

Source. Own elaboration.

In conclusion, the above observations may contribute to the development of the combinational potential of a network organization. It can be assumed that obtaining a higher network connectedness should be associated with the intensification of exchanges within the supply chains of entities participating in this organization.

The issue of cooperation in supply chains is complex, as it includes conditions related to the coordination of supply chains, and concerns, among others, the structure of supply chains, relations between partners, the specificity of physical flows in quantitative and time systems, and the implemented supply chain policy.

The importance and Areas of Standardization in Supply Chain Management

A standard can be characterized as a jointly established criterion that defines common, most desirable features of something, e.g. a manufactured object or human behaviour. In technology, a standard is a set of specific parameters ensuring an appropriate level of quality, safety, convenience, or compatibility with other elements (Fechner 2007). Standards are a voluntary agreement (except for security standards) that structure the activities of entities in both macro and microeconomic dimensions. Standardization is formal, and the scope and purpose of introducing standards result from the needs of a specific group of entities (for example, industry sector, transnational corporation, etc.). Furthermore, it is complementary to applicable law.

If the effect of introducing standards in a supply chain is convergence, i.e. unifying the ways of operation of the chain partners, then this mechanism can be justified on the ground of numerous research streams, including the transaction costs theory, resource-based theory, institutional theory and network theory, which is summarized in Table 1.

Table 1: Supply chain standardization in the light of selected theories of management science

Selected research streams	Description of distinguishing features
Transaction costs theory	Aiming at creating an internal (hierarchical) organization enabling greater control, limiting opportunism, and minimizing transaction costs.
Resource-based theory	Skills associated with socially complex procedures that determine the efficiency of the use and matching of resources play a significant role in the analysis of the value chain.
Institutional theory	The isomorphic mechanism is responsible for the convergence of organizations (partners) remaining in a common organizational field, which increases their effectiveness.
Network theory	The homophily mechanism is responsible for creating new relations between actors in networks that are similar to each other

Own elaboration based on: (Barringer & Harisson 2000; DiMaggio & Powell 1983; McPherson, Smith-Lovin & Cook 2001; Williamson 2002; Frankowska & Czyżycki 2018).

An analysis of the perception of the mechanism of similarity or convergence in selected management theories proves that standardization is a source of competitive advantage, as it increases the efficiency and effectiveness of supply chain management, as well as indicates mechanisms that facilitate the selection of partners. A particularly positive impact of the introduction of standards is indicated by logistics experts who claim that they enable improvement of operational suitability and coordination. The effect of standardization is the practical use of solutions that in consequence result in, among others, reduction in the costs of logistics processes, rationalization of transshipment work, facilitating commercial orders, etc. The logistic standard is a set criterion (series of criteria) that specifies the desired characteristics of, e.g. product or logistics service (Korczak 2013). Whereas, standardization in a broader sense allows connecting individual links (enterprises) into an efficient body, as it facilitates reaching an agreement on several activities that affect the production and movement of products. Thus, it has a significant impact on both the effective integration process and supply chain coordination. Similarly, the unification of solutions or actions allows understanding them better in direct contacts between enterprises and thus performing them efficiently and without errors, while avoiding potential conflicts, which frequently result from misunderstanding or a difference in approach to activities (Fechner 2007). N. Fabbe-Costes et al. (2006) prove that supply chain management standards are a source of information and a coordination mechanism that contributes to improving operational compliance, as well as connectivity, efficiency, and effectiveness in interorganizational supply chains due to clear and unambiguous communication between partners. The reasons for using standards are explained by F. Cafaggi (2016), who noted that setting standards are one of the main management tools in supply chains, especially of a global nature. This is due to the involvement of a large number of entities within the chain that operates on markets with different legal and market regulations. Hence, developing, implementing, and enforcing internal standards across multiple dimensions of the supply chain enables the creation of a common language and collaboration tools that partners use.

Processes of convergence in the context of cooperation in a supply chain are reflected in the issues of standardization and normalization. One of the effects of standardization is unification. The convergence of the behavioural patterns of supply chain partners can be beneficial since it aims at improving operational compliance and coordination. It is recommended that logistics processes and practices implemented within the supply chain should be unified in order to secure a smooth flow of materials from suppliers to customers (Stock, Greis & Kasarda 2000). The potentially wide scope of standard implementation results from the high complexity of supply chains, repeatability of operations, as well as problematic areas requiring the development of a specific permanent solution in the field of cooperation between entities. Thus the attempts to classify areas, where standardization is applicable, are of a framework and contractual character (Table 2). Based on the literature analysis, it was possible to identify three areas of the supply chain where standardization has a significant impact on achieving competitive advantage by enabling coordination and integration of partners in the supply chain. These areas include management, regulation, and logistics processes implemented within the supply chain.

Table 2: Selected areas of standardization in the supply chain

Criterion	Selected areas for setting standards
Functional areas of activity spheres	Supply, production, distribution, returns
Logistics tasks	Transport, inventory management, warehouse management, packaging, order processing, customer service
Management functions	Planning, managing, organization, controlling, coordination
Types of movements	Movement of goods, information, financial resources
Types of structures	Physical, information and communication structures
Entities subject to standardization	Supplier, distributor, supply chain leader, R&D unit, logistics operator
Stages of partner cooperation	Preparation for cooperation, start, maturity, conclusion of cooperation
Implementing a sustainable supply chain strategy	Acquisition and consumption of resources
Regulation	Command, control, compliance, monitoring

Source. (Frankowska, 2018)

a. Supply Chain Standardization Area: Management

The growing complexity of supply chains necessitates the convergence of their operations for efficient management. The response to this demand is developed reference models for supply chains, among which the SCOR (Supply Chain Operation Reference Model), created by the APICS Supply Chain Council (APICS, 2011), is of particular importance. The SCOR model allows the use of the same terminology and standard process descriptions to help all participants understand process management in the supply chain and best practices to improve the efficiency of supply chain management, and then effectively communicate using the reference model (Huang et al. 2005; Li et al. 2011). The SCOR model provides (Stefanović et al. 2009):

- Standard descriptions of supply chain management processes,
- Framework for shaping the relations between standard processes,
- Standard metrics for measuring process effectiveness,
- Management methods that ensure the best performance,
- Harmonization of the feature standards and functionality of the supply chain.

b. Supply chain standardization area: regulation

Regulation in supply chains is gaining importance by extending it to many areas of the chain's activity, from the social and environmental dimensions, through data protection, to customer safety and quality. It takes the form of the so-called transnational private regulation (TPR), which complements both national and international law. As part of this complementarity, it is often assumed that national provisions are mandatory minimum standards, while private regulations often introduce stricter standards for supply chain partners. Commercial contracts are, among others, implementing instruments in global supply chains (Cafaggi 2016). Therefore, private regulatory systems have a cross-border effect in many jurisdictions. Moreover, their goal is to harmonize public national systems. Thus, regulatory instruments enable coordination and ensure supply chain stability. Another goal of contracting is to provide forms of coordination among chain participants that reduce their opportunism while at the same time increasing trust and cooperation.

c. Supply chain standardization area: logistics processes

Movement processes involving the physical movement of all goods and the accompanying flow of information are a particularly important area of standardization of supply chains. Logistics standards have a key impact on the implementation of market transactions, mainly by facilitating the exchange of information, with the most important being (Fabbe-Costes et al. 2006):

- Packaging standards (e.g. EURO-pallet, ISO containers),
- Communication standards (e.g. EDI, RosettaNet, XML),
- Labeling standards (e.g. GS1, GHS),
- Product identification standards (GS1),
- Assessment tools (e.g. Standard Performance),
- Quality systems (e.g. ISO 9000).

In order to optimize supply chain processes, the information should be standardized, updated, and regularly available (Brüggemann & Hübner 2008). However, as the research carried out by Ch. Steinfield et al. (2011) suggests, these standards are necessary, although not sufficient, to solve supply chain transparency problems. On the other hand, according to I. Fechner (2007), the features that are the most important, as well as most susceptible to standard use, are information, communication, and movement of products.

Information standards include identifiers and means that enable automatic identification and acquisition of data. A variety of automatic identification techniques are used in logistics, including:

- Optical - barcodes, graphic and letter recognition, image recognition,
- Magnetic - magnetic ink recognition, magnetic tapes,
- Electromagnetic - RFID radio frequency identification and communication, electronic product code (EPC),
- Biometric - recognition of voice, fingerprints, iris, etc.,
- Voice – headphones, microphones, and IT synthesizers of human speech.

Communication standards are electronic messages that replace paper documents and other traditional forms of communication and information exchange of business partners, and allow them to send such documents electronically. Electronic Data Interchange (EDI) is a form of information exchange in the form of standardized messages between independent IT systems of business partners without direct human intervention.

Whereas, product movement standardization is based on a logistic dimensional chain comprising the following elements (Fechner 2007): warehouse areas, ramps, access roads, gates, cranes, warehouse equipment, internal transport and mechanical handling equipment, loading space of vehicles (railway wagons, lorries, ship, and aircraft cargo compartments, etc.), pallets, individual and bulk packaging, logistics units, packaging machines, packaging materials in sheets. The common element connecting all stages of the process is the design of the individual and bulk packaging, which is the result of dimensional relations. The benefits of using product movement standards include, among others, enabling the mechanization of warehouse and transshipment work, rationalizing transport and storage areas, transport safety, and cargo handling (Korczak 2013).

In conclusion, supply chain standardization can be a source of competitive advantage, like better coordination and greater integration of the chain result in higher efficiency and effectiveness. Thus, identification of the use of supply chain standards by the actors of a network organization can be considered a predictor describing the tendency of enterprises to enter into relations with partners, which in turn should contribute to increasing the combinational potential of the network.

Implementation of Supply Chain Standards and The Development of a Network Connectedness – A Research Model

The study aims to determine the relationship between the use of supply chain standards by companies operating within network organizations and the intensity of their cooperation in the supply chain, which in turn affects the development of the combinational potential of the network. The concept of the research model is schematically presented in Figure 2.

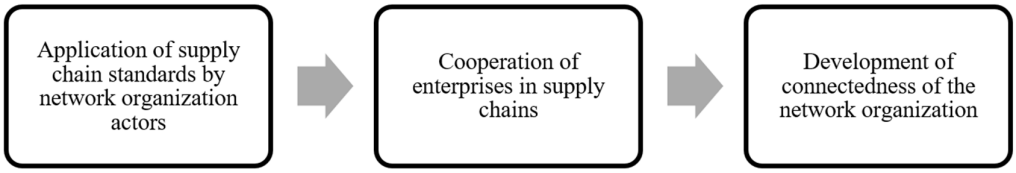

Fig. 2: The concept of the research model

Source. Own elaboration.

The following assumptions were made to conceptualize the research model:

- The application of standards in a supply chain improves the cooperation of partners and is a factor conducive to building cooperative relations and improving their coordination.
- For the study, three supply chain standards will be identified in the area of logistics processes, i.e. standards concerning information, communication, and freight movement.
- In line with the achievements of institutional theory, the emergence and structuring of the organizational field are favoured by the constant nature of cooperation between partners. Therefore, it is assumed that closer cooperation of partners may affect the increase of the network connectedness.

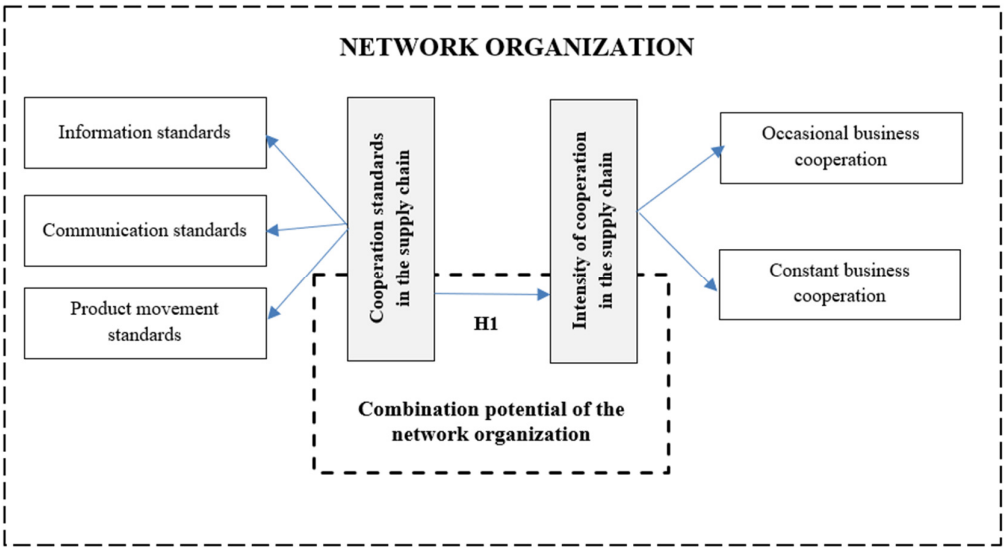

Fig 3: Research model

Source. Own elaboration.

The adoption of the above-mentioned assumptions results in the need to include categories of cooperation intensity (frequency) in the research. Therefore, the conceptualization of the research model should take into account the diverse frequency of cooperation (permanent/sporadic) as factors conducive to the development of combinational potential. The research model is presented in Figure 3. To achieve the research objective, the following research hypothesis was formulated:

H1: There is a relation between the use of logistics standards (supply chain) and the frequency of cooperation between enterprises in supply chains.

Characteristics of empirical research and study results

The study was carried out on a nationwide sample of 135 production enterprises declaring belonging to clusters organizations and simultaneously cooperating in supply chains with other cluster enterprises. Cluster organizations are an example of network structures. In turn, supply chains emerging as part of the cooperation of actors belonging to a cluster are referred to as cluster supply chains (Frankowska 2018). The research was performed using a quantitative research method (a standardized questionnaire comprising applied questions with a five-point Likert scale) and a computer-assisted interview (CAWI). The specific study was preceded by a pilot study among 20 companies.

The data collected during the research was subjected to an in-depth statistical analysis. To verify the hypotheses and the dependency analysis (correlation), a significance test of the chi-square statistic values (assuming that the level of significance for which a given result will indicate a significant dependence is p = 0.05) that is a part of statistical inference was applied, while the strength of such a relationship was determined based on Tschuprow's T, Cramér's V, Pearson's C correlation coefficients. The statistical analysis was carried out in the following order:

- analysis of the distribution of responses by individual research areas,
- study of existing interdependencies to verify the hypotheses presented in the paper.

Analysis of the distribution of answer structure

The respondents were asked about the intensity of cooperation with cluster partners in supply chains (Figure 4).

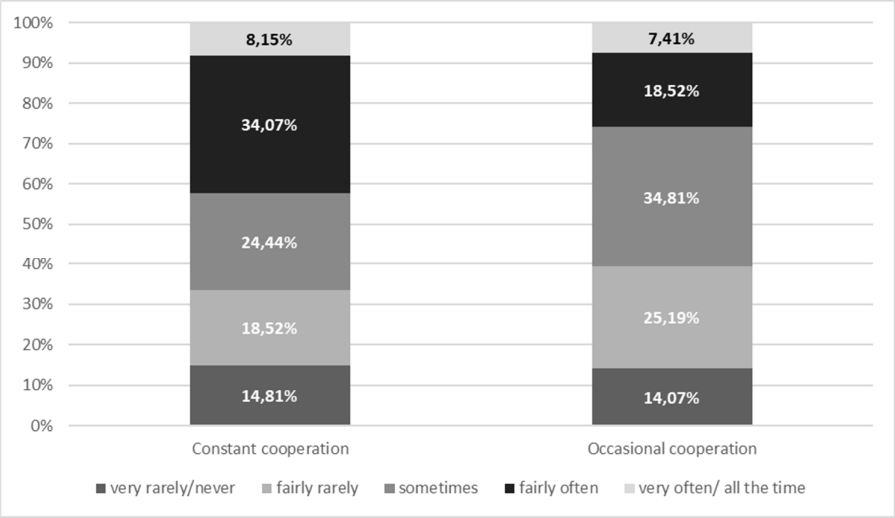

Fig. 4: Frequency of cooperation of partners in a supply chain

Source. Own elaboration.

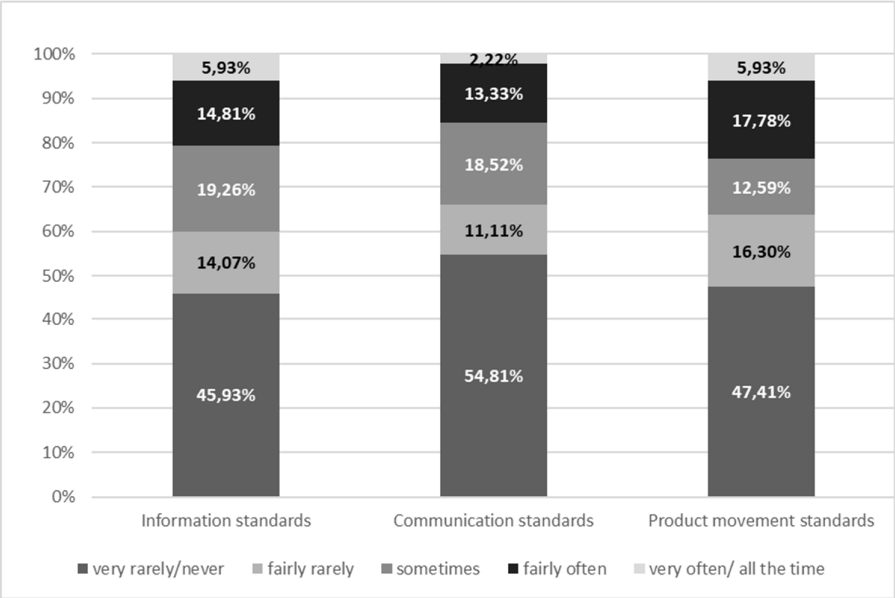

Figure 5: Frequency of applying logistics standards in supply chains
Source. Own elaboration.

Constant cooperation in a supply chain is a factor conducive to the process of its integration and structuring of the organizational field of partners. And so, more than 40% of respondents (42.22%) indicated "fairly often" or "very often" constant cooperation with contractors. About 1/4 of cluster companies declared occasional regular cooperation in supply chains (24.44%), and about 1/3 rarely or never conduct permanent cooperation with cluster partners (33.33%). At the same time, sporadic cooperation of high frequency (often and very often) was noted by about 1/4 of enterprises surveyed (25.93%). Almost 1/3 of respondents indicated that incidental cooperation occurs "sometimes" (34.81%), and more than about 40% that, "fairly rarely" or "never" (39.26%). These results show a large diversity of the scope of cooperation in cluster supply chains.

When assessing the scope of applied logistics standards in cluster supply chains, there is a noticeable similarity of responses characterized by a very low scope of application of individual supply chain standards (about half of the respondents) (Figure 5). Product movement standards are most common, as more than 20% of respondents indicate their very frequent and frequent use (23.71%). Furthermore, every fifth respondent declares the use of information standards in cooperation within cluster supply chains (20.74%). Whereas, communication standards are least frequently used by respondents. Only 15.55% declare their frequent or very frequent use.

Analysis of interdependencies

To verify the hypotheses set out in the article, there was conducted a study regarding the correlation between the degree of standards used by respondents in cluster supply chains and the degree of cooperation with these cluster partners. To detect significant links between the discussed phenomena, the Chi-square test of independence was used, for which *p-value* was determined, i.e. the probability for which there are no grounds to reject the hypothesis stating that there are no relations between the studied phenomena. For the study, it was also assumed that if *p-value* ≤ 0.05 is obtained, the interdependency between the studied phenomena will be considered statistically significant. Furthermore, the strength of this relation will be assessed using measures based on Chi-squared statistics (Tschuprow's T, Cramér's V, and Pearson's C correlation coefficients).

The distribution of assessments regarding the degree of application of standards in the field of information exchange, communication, or the way products are moved, is significantly dependant on the frequency of the respondent's cooperation with other enterprises (Table 3). However, this applies to respondents declaring permanent cooperation with other enterprises. The strength of this relation is moderate. On the other hand, in the case of occasional cooperation, there is no statistically significant relationship between the assessment of the degree of such cooperation and the scope of the standards used (except a positive relationship with the communication standard, whose strength is moderate).

Table 3: *P-value* and the values of basic measures examining the relationship between the assessment of the degree of cooperation and the application of standards in a cluster supply chain

Relation	*p-value*	Tschuprow's T	Cramér's V	Pearson's C
Constant cooperation and information standard	0.000026	0.30324	0.30324	0.51856
Constant cooperation and communication standard	0.000034	0.30106	0.30106	0.51583
Constant cooperation and product movement standard	0.003328	0.25662	0.25662	0.45661
Occasional cooperation and information standard	0.148554	0.20109	0.20109	0.37313
Occasional cooperation and communication standard	0.000348	0.28010	0.28010	0.48873
Occasional cooperation and product movement standard	0.088373	0.21105	0.21105	0.38887

Source. Own elaboration.

Conclusions

In summary, the analysis of the obtained research results supports the research hypothesis. Therefore, it can be concluded that there is a relation between the frequency of cooperation between enterprises in the supply chains of network organizations (cluster supply chains) and the use of logistics standards (H1). However, it should be emphasized that a significant variation was observed in the implementation of logistics standards with a predominance of enterprises declaring the lack or very rare use of them in cooperation with partners in a supply chain. Thus, while enterprises prefer permanent cooperation with partners in a supply chain (Figure 4), the level of integration of these supply chains may be relatively low, as evidenced by the lack or little advanced in the implementation of logistics standards.

This paper fills the research gap and makes a valuable contribution to science by identifying important areas of interorganizational cooperation of network organization actors. Moreover, the paper showed significant deficits in the study area. The very limited scope of application of supply chain standards, including logistics standards, indicates a lack of, or even barriers to cooperation at the operational level. Thus, the development of the combinational potential of a network is blocked. The cognitive value of research indicates the need to raise the awareness of enterprise managers and facilitators of network organizations about the need to unify the conditions of operational cooperation by, among others, implementation of supply chain standards.

The restrictions that have been encountered when carrying out the studies should also be noted. This applies, above all, to the research sample covering only Polish enterprises, as well as the static nature of research. Furthermore, due to the adopted research technique, it was not possible to explore the studied subject. Therefore, it can be assumed that this study is initiating and encouraging further exploration of the issues of developing the connectedness of the network structures through increased cooperation in supply chains.

Summary

Standardization has a significant impact on achieving competitive advantage of a supply chain by ensuring its better coordination and integration of partners, which has its rationale grounded in theory. Thus, it is a determinant for the development of the connectedness of organizational networks, which in the strategic and operational dimensions takes the form of cooperation in a supply chain. This stems from the need to ensure consistency in the supply chain and to harmonize the terms of cooperation between partners. This issue concerns in particular the sector of small and medium enterprises. The literature on the subject proves that these enterprises have more difficulties in joining the supply chains than large companies. Lack of skills, financial resources, knowledge, infrastructure, and trust are identified as barriers for these entities to improve supply chain management in both developing countries and developed economies (Vaaland & Heide 2007).

Hence, further research is required. In the future, it would be particularly important to research the reasons for the relatively low degree of application of logistic standards and based on institutional theory, to deepen knowledge about the adaptive mechanisms of supply chain entities enabling them to cooperate more effectively, which will also contribute to greater efficiency in the functioning of enterprises within network structures.

Acknowledgment

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Medical Tourism in Ukraine And Abroad: Comparative Analysis

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Abstract

The spectrum of definitions of the notion "medical tourism" has been outlined based on the results of the original review, and the authors' vision of the said definition has been proposed. The WMA Statement on Medical Tourism has been analyzed and general principles for the functioning of medical tourism have been identified. The basic provisions for patients receiving services in the field of medical tourism and physicians involved therein have been crystallized on the basis of the said Statement. The experience of foreign countries in which the outlined sphere of tourism is actively developing, and which have the recognition of quality by WHO, has been covered. Authors' axioms for the development of medical tourism, which can be useful for any country that is willing to build legal medical tourism, have been proposed.

Keywords: Medical Tourism, Rights Of Patients, Medical Professionals, Medical Tourist, Cross-Border Health Services Provision, Economy.

Introduction

Nowadays, medical tourism as a type of tourism is especially economically attractive for the countries, because despite the main purpose of travel, individuals combine it with other goals, such as cultural, gastronomic, etc. Accordingly, these factors synergistically have a great impact on the economy and the growth of the local budget (for example, of a specific service provider), as well as nationwide/local. There is no unified understanding of medical tourism legal nature, as the variety of designations of this phenomenon can be met. For example, according to the results of various researches, it can be argued that foreign sources, in particular, use the following notions: "wellness tourism", "health care tourism", "cure tourism", "holistic tourism", "well-being tourism", "spa tourism", "medical tourism", "health and wellness tourism", etc. In the Ukrainian professional literature the terms "treatment tourism", "sanatorium tourism", "health tourism", "medical tourism", "spa tourism", "wellness tourism" and other designations are used (M. Sabat, 2012). As it does not have a proper regulatory basis, medical tourism is connected with a range of different issues: protection of personal data, personnel policy, and quality of services provided, in particular medical, legal liability, contractual regulation.

There are no official statistics for the medical tourism market today, and estimates and projections for its development differ from one research to another. Estimates from various experts range from USD 10.5 billion in 2012 to USD 32 billion in 2019 and USD 3 trillion. in 2025 (D. Myrhorodska, 2018). The study of some analytical data indicates that the volume of the medical tourism market will grow by 15.7% by 2022 compared to 2015, reaching in absolute numbers USD 143.8 billion. (K. Mokanov). According to other data, the market for research is already over USD 439 billion for now. By 2025, up to 3-4% of the world's population will travel the globe to improve their health, physiotherapy, and treatment (Visa, 2014).

According to the State Statistics Service of Ukraine, the analysis of the distribution of tourists served by tour operators and travel agents for the purpose of travel and types of tourism in 2018 looks as follows: the number of tourists for the purpose of treatment, served by legal entities and individual entrepreneurs was 61303 and 19003 persons respectively. This amount includes 3883 and 872 inbound (foreign) tourists, respectively, and 14554 and 1064 outbound tourists, respectively. Accordingly, Ukrainian statistics indicate that there are more tourists leaving Ukraine for medical treatment. As the researchers point out (L. Prodanova, D. Myrhorodska, 2017), the group of economic conditions and factors that affect inbound tourists include the level of socio-economic development of the country as a whole and the sectors of health and tourism in particular, the level of prices for goods and services, exchange rate, level of medicine and tourism financing, investment volumes in the said industries.

However, it is clear that the present conditions, caused by the COVID-19 pandemic, will change the conditions for medical tourism, since the virus has affected not only the healthcare system but also the economic situation in the world as a whole, creating many challenges for various industries, in particular tourism. The whole tourism industry is under COVID – 19 crisis conditions, therefore, a new map of medical tourism will be drawn at the stage of crisis exit. COVID - 19 clearly stated that it is medical conditions that can be decisive, be the factor that would change the paradigm of public life (political, economic, cultural, etc.)

Literature Review

It is important to analyze the sources of literature in order to clarify the definition of the concept, which would allow to understand the essence of the phenomenon and formulate conclusions to the strategy of development of medical tourism. Medical tourism is a specialty tourism destination, which provides for the organization and provision of treatment, diagnosis, disease prevention and other medical services both within the country (domestic medical tourism) and abroad (external one) (O. Hunchenko, 2014). Medical tourism can be also understood as a type of business activity aimed at providing services for the diagnosis, treatment and prevention of diseases outside the country of residence (K. Didenko, V. Zhuchenko, 2016).

Medical tourism is not only a journey to improve health, but it is an economic activity that involves trade in services, which is an amalgamation of at least two sectors of the economy - tourism and medicine (M. Bookman, 2007).

At the 9th National Conference on Health held in Rostock, Germany, in 2013, medical tourism was defined as a health and tourism industry that promotes the maintenance and restoration of health in general and well-being, in particular, through authorized medical services (N. Reznikova, O. Ivashchenko, O. Voitovych, 2018).

In our opinion, medical tourism is a type of business activity that combines tourism and medicine, aimed at creating a tourism product in the field of medicine, organization of providing and providing medical care for visiting and inbound medical tourist (patient).

Main part

In addressing the issue of medical tourism it is necessary to analyze the World Medical Association's Statement on Medical Tourism, adopted by the 69th General Assembly of the WMA in October 2018 (Reykjavik, Iceland) (hereinafter - the Statement) establishing a coordinate system for medical tourism worldwide. According to the Statement, medical tourism is defined as a situation where patients voluntarily travel across international borders to receive medical treatment, often at their own expense. Treatment covers a range of medical services and typically includes: dental care, cosmetic surgery, elective surgery, and fertility treatments. According to the Statement, the following cases do not apply to medical tourism:

1) the national healthcare system or healthcare facility sends the patient abroad for treatment at their own expense;
2) patients from EU Member States who are allowed to seek healthcare in another EU Member State, according to legally defined criteria, and their national health care system bear all the costs;
3) people are outside of their country of residence when they are ill and need treatment.
According to the Statement, it seems that intra-state tourists will not fall within the scope of medical tourism, although various definitions are found in the literature, as discussed above.
The general axioms established by WMA are the following:
1. It is necessary to develop a healthcare system in each country in order to prevent excessive medical tourism resulting from limited treatment options in the patient's country of residence. Financial incentives to travel to a patient for outpatient care should not limit diagnostic and therapeutic alternatives in the patient's country of residence, or limit treatment and referral options.
2. Governments are required to carefully consider all the health tourism implications of the country's healthcare system by developing comprehensive, coherent national protocols and legislation on medical tourism in consultation and cooperation with all relevant stakeholders. These protocols should assess the ability of each country to receive medical tourists, agree on the necessary procedures, and prevent the country's healthcare system from being adversely affected.
3. Governments and service providers need to be assured that medical tourism does not adversely affect the proper use of scarce health resources or the availability of appropriate care for locals in host countries. Particular attention should be paid to treatment with a long waiting time or due to scarce medical resources.
4. Medical tourism should not promote unethical or illegal practices, such as organ trafficking. The government, including executive agencies, should be able to stop selective medical tourism where it threatens the ability to treat the local population.
5. Admission of medical tourists should never allow distortion of the actual clinical need assessment and, where appropriate, the development of waiting lists or priority lists for treatment. After admission to treatment, patients should be treated according to the urgency of their medical condition. Wherever possible, patients should be referred to facilities approved by the national authorities or accredited by the relevant accreditation bodies.
As a result of this Statement, the key tips for healthcare providers and patients involved in medical tourism industry can be crystalised. It is they that can serve as the basis for national regulation and the fixing of these minimum safeguards, which should not be waived by countries. It is a system of safety coordinates for the patient and the activities of the physician in the field of medical tourism.
Therefore, the patients shall:
1) be aware that treatment methods and healthcare laws in host country may be different than in their home country and that medical care is provided in accordance with the laws and practices of the host country;
2) be informed by the doctor / service provider of their rights, including the right to medical care outside the country of residence, as well as information on legal assistance in the event of damage to the patient's health and possible mechanisms for compensation;
3) be informed of the potential risks of combining surgical procedures with long flights and vacations;
4) be aware that privacy laws are not the same in all countries and, in the context of the additional services they receive, their medical information may be provided to non-medical professionals (such as translators);

5) receive documentation indicating services provided by physicians and non-physicians, including translators, and an explanation of who will have access to their medical information;
6) agree that medical information may be disclosed that is necessary to provide them with health care;
7) be informed that a change in their clinical status may lead to a change in the cost estimation, as well as their associated travel plans and visa requirements;
8) be informed of a change in treatment plan arising out of a medical need other than the original agreed plan, the purpose of such change, and consent to any such changes in the treatment plan;
9) receive from a doctor in the host country information about the inability to improve his or her health if the patient suffers from an incurable disease, and the inappropriateness of traveling abroad for treatment;
10) receive information about their treatment in a language they understand, i.e.: a) the right to receive a brief report on the progress and discontinuation of treatment from the attending physician; b) translation of documents as needed;
11) agree on the transfer of test results and diagnostics to their country of residence before treatment starts;
12) receive a copy of their medical records for continued assistance and follow-up in their country;
13) receive, if necessary, a detailed list of medical guidelines and recommendations for the period after their departure, namely: a description of the expected recovery time and the time required for rehabilitation before returning to their country.
In their turn, the persons involved in medical tourism in the host countries shall:
1) develop a treatment plan, including a cost estimate and payment plan, before the medical tourist travels to the host country;
2) ensure that all activities are tailored to the patient's medical needs;
3) be aware of their ethical responsibilities regarding the protection of privacy. Translators and other administrative personnel who have access to the medical information of the medical tourist shall sign confidentiality agreements;
4) provide documentation indicating the services provided by physicians and non-medical professionals, including translators, and an explanation of who would have access to the patient’s medical information;
5) provide the patient who is suffering from incurable disease with accurate information about the treatment options, including treatment limitations, treatment options to change the course of the disease markedly to increase life expectancy and improve quality of life;
6) inform the patient about the impossibility to improve the patient's health, and prsude the patient to refuse from travel;
7) treat each person admitted for treatment, both local and foreign without any discrimination. All responsibilities specified by law and international medical codes of ethics also apply to the physician when trating medical tourists;
8) make medical decisions regarding the patients in cooperation with them;
9) not require the patient to undergo previously performed studies if the information is available and of good quality, unless there is a clinical need for re-diagnosis, but the evaluation is assigned to the attending physician;
10) confirm the diagnosis, prognosis and methods of treatment received by the medical tourist (concerning the doctor who prepares the patient's treatment plan);
11) communicate, as far as possible, with the doctor of the patient's country of residence in order to provide appropriate post-dispensary treatment and clinical monitoring of the medical problems of the patient.

Directive 2011/24/EU of the European Parliament and of the Council on the application of patients’ rights to cross-border healthcare of 09 March 2011 (with further amendments) (hereinafter referred to as the Directive) defines the principles of cross-border healthcare, which is not defined in the Statement as services within the scope of medical tourism. The Directive states that, despite the possibility for patients to receive cross-border healthcare in accordance with this Directive, Member States retain the responsibility for providing citizens with safe, high-quality, efficient and quantitatively adequate healthcare services in their territory. Moreover, the transposition of the provisions of this Directive into national law and their application should not lead to an incentive for

citizens to receive treatment outside their Member States of affiliation. As defined by the Council in its Conclusions of 1-2 June 2006 on Common values and principles in the European Union's healthcare system, the decision on the basket of public health services and the mechanisms used to the financing and provision of such health services, such as the extent to which market mechanisms and competitive pressures to manage health systems are appropriate, should be taken in a national context.

Within the framework of the provision of cross-border healthcare services, the obligation to reimburse the costs of such services is limited to the services to which the insured person is entitled under the law of the Member State of affiliation. For the purpose of reimbursement of costs for cross-border healthcare services, this Directive covers not only situations where a patient is provided with health services in a non-Member State but also prescriptions, leave and supply with medicines and medical devices, if provided in the context of healthcare. The definition of cross-border healthcare services involves the acquisition by a patient of such medicines and medical devices in a non-member Member State and the acquisition by a patient of such medicines and medical devices in a non-Member State, where the prescription was issued.

The wording of the European Court's of Human Rights (hereinafter referred to as the Court) case-law is interesting in the Directive. Member States may require prior authorization for reimbursement by the national system of eligible costs of in-patient care provided in another Member State. The Court ruled that such a requirement was both necessary and reasonable, since the number of hospitals, their geographical location, the way they were organized and the means by which they were equipped, as well as the nature of the medical services they were able to provide, were issues that could be raised. previous planning, which is generally intended to meet a variety of needs. The Court recognized that such planning was necessary to ensure that sufficient and consistent access to balanced high quality treatment was available in the Member State concerned. Additionally, it helps control costs and prevent, as far as possible, any waste of financial, technical and human resources. According to the Court, such a waste would be further detrimental as it is widely recognized that the hospital sector generates significant costs and needs to meet growing needs, while the financial resources available for health services are limited, no matter what method of financing is used.

EU citizens travel from richer countries such as the United Kingdom, Sweden, Germany, the Netherlands and Ireland to seek affordable healthcare in other countries, especially in Eastern Europe.
Until recently, the main healthcare areas for Europeans were the United Kingdom, France, Germany, Italy and Spain. However, as amendments to the Directive were adopted in 2014 (in particular that states that there should be free access to treatment for all EU citizens in the public space), a new market for medical tourism has emerged. Consequently, countries such as Hungary, the Czech Republic, Romania, Poland and Latvia have become popular destinations. According to the Polish Medical Tourism Association, in 2014, 488,000 foreign patients came to Poland for treatment. Medical tourism today accounts for about 5% of the tourism industry in the EU and contributes to about 0.3% of the EU economy. In fact, this is a higher percentage than traditional tourism. Therefore, increasing the share of health tourism may reduce the seasonality of tourism.

In Turkey, which has become a leading and popular destination for people seeking less sophisticated treatments, the government is offering discounts to patients flying Turkish Airlines. The government also plans to introduce tax-free health care facilities for foreign patients. More and more governments and companies are offering cheap flights, open borders and inclusive packages to further fuel this segment of the tourism market.

According to the research of medical tourism in the EU, the statistical data is the following (R. Fink, 2018):

- 64% of patients that traveled for care didn't have health insurance;
- almost 83% of patients traveled with a companion;
- 33% of patients traveled abroad for cosmetic surgery;

- almost 90% of patients or their companions engaged in tourism activities;
- nearly 80% of the demand for medical travel is driven by cost savings;
- medical tourists spend between €6,083 and €12,885 per medical travel trip;
- 48% of respondents would be interested in engaging in medical tourism again at some point in the future;
- the cost of medical treatment and quality were the most important factors in their decision to travel abroad for treatment;
- out of 49 participants that had previously traveled overseas for medical treatment, 36% used a medical tourism facilitator.

A large number of EU citizens (about 49%) are ready to travel for healthcare. This may be linked to the EU Health Directive, which states that Member States should reimburse their citizens for the cost of the services they could get at home (in order to protect the financial soundness of national health systems). This situation has some disadvantages for patients from poorer countries with less developed healthcare systems. For example, healthcare costs far less money in Croatia than in Sweden. Thus, a Croatian patient would have to pay out of pocket for a significant difference in the cost of treatment if he or she sought healthcare. At the same time, as a patient from a more affluent EU Member State can seek help in Croatia or anywhere without paying much of their own money for healthcare. This scenario is particularly advantageous for wealthy Member States as they achieve economic benefits if treatment abroad is cheaper. National policies in some countries, such as Turkey, promote the growth of medical tourism. This indicates that it is an important strategy in the overall tourism planning.

It is worth noting that for the development of medical tourism, it is important to institutionalize, bringing together professionals from different industries, determine the key basis for the development of the industry: from standards of services, protection of patients' rights and responsibility to the formation of legal boundaries of functioning. Nowadays, there exist World Medical Tourism Association, Global Healthcare Travel Council, European Medical Tourism Alliance, in Ukraine there is Ukrainian Medical Tourism Association, which is a member of the World Medical Tourism Association.

Medical tourism issues are regulated in Ukraine exclusively by the Law of Ukraine "On Tourism". Nevertheless, this legal act does not contain the definition of such notion. Art. 4 of this Law enshrines health tourism among the types of tourism. Therefore, for the effective development of the realm, it is necessary to clearly understand the legal essence of medical tourism by enshrining it in national law.

The law on medical tourism exists in Israel (Meidcal tourism law 5778-2018). It regulates the activity of medical tourism entities: it is proposed to create a register of medical tourism agents and determine the prerequisites for registration.

The law establishes ethical standards for medical tourism agents: - they are responsible for protecting the interests of medical tourists. They are also the body that represents the Israeli healthcare system to the medical tourist before their arrival to Israel. The law establishes a medical institution's obligation to comply with certain rules in order to provide medical tourism services. The purpose of these rules is to achieve certain goals:

a) preventing the deterioration of the quality of care for Israeli patients through medical tourism by ensuring that Israeli patients have priority in accessing all the healthcare facilities;
b) filling the health care system with funds for the well-being of Israeli patients, transferring medical tourism revenues there. To this end, there is a recommendation on several steps to increase the transparency of hospitals with regard to their financial activities, the source of which is medical tourism that allows to track hospital revenues from medical tourism and the use thereof.

The attention shall be drawn to the experience of those countries that successfully develop medical tourism. India is one of the key players in the medical tourism industry as it seeks to provide

healthcare with cutting-edge technology. Healthcare in India saves patients between 65% and 90% of the money compared to the cost of a similar services in the US, making India one of the most visited countries for healthcare. Patients visit India not only for the quality and availability of medical services, but also for the beautiful scenery and architecture of the country. In India, medical travel brings a blend of fun and quality health care to travelers.

Many hospitals in India are accredited by the National Hospital and Health Care Accreditation Council (NHHAC) and the International Joint Commission (IJC). Some private hospitals in India provide medical packages for foreign patients, such as airport transfers to hospitals, free Wi-Fi in the room and private chefs. In addition, there is almost zero waiting time in India as scheduling surgery or intervention is done as soon as the diagnosis is confirmed.

The WHO notes that Brazil has the best healthcare locations in Latin America. There are 43 hospitals accredited by IJC in Brazil, and it boasts of having world-renowned surgeons. Brazil is the center of cosmetic and plastic surgery, being the third most visited country, along with the US and China, by patients requiring these procedures. Brazil offers high quality cosmetic and plastic surgery services at affordable prices, bringing more and more medical tourists to the country. Florianopolis and São Paulo are two cities in Brazil best known for their advanced medical technology, medical advances and innovations. Brazil is also a favorite country for patients seeking special procedures such as Brazilian bracing or other special services from world-renowned surgeons. For example, medical travelers from the United States save between 20% and 30% on healthcare costs if they receive medical services in Brazil.

Malaysia won first place according to the International Journal of Medical Travel in the category of Health and Medical Tourism of the Year 2015 and 2016. Malaysia ranks as one of the best health care providers in Southeast Asia. Medical travelers visiting Malaysia save between 65% and 80% on health costs compared to US costs. Malaysia offers superior comfort for patients with five-star rooms that are more like a hotel than a hospital. For example, the Prince Kort Medical Center has indoor pools for hydrotherapy. Both at Penang International Airports and Kuala Lumpur Airports, the Malaysian Tourist Board for Health (MTBC) operates, providing leisure and concierge services to medical tourists to ensure their comfort from the moment they arrive to Malaysia.

The Central American country of Costa Rica has ranked high in dentistry and cosmetic surgery over the past few years, above Canada and the United States. The country is also making a name for itself in the field of ophthalmic surgery, cancer therapy and bariatric surgery. CheTica Ranch, located in San Jose, provides exotic treatments for medical travelers for patients who are enjoying a recovery in a relaxed atmosphere. The cost of medical services in Costa Rica is 45% to 65% lower than in the United States.

Singapore is one of the most developed countries in the world, ranking first in the field of healthcare by the WHO among Asian contries. Gleneagles Hospital is one of Singapore's best hospitals, offering excellent medical services, advanced facilities and well-trained professionals. Medical services in Singapore save the patient 25% to 40% of the similar services cost in the US.

Conclusions

To summaise the above, it is important to note that the common axioms for building legal medical tourism can be the following:

1. Medical tourism as a business shall be value-oriented, ethical, because it has life and health as key values in its essence.
2. The service provider needs to form a recognizable, unique product (for example, Kozyavkin International Rehabilitation Clinic).
3. Intra-state partnership is necessary for leadership, competitiveness of the state on the world map.
4. The service provided shall be of good quality and safe.

5. Multiculturalism, taking into account the diversity of services and specificities of cultures and religions of different countries.
6. Prohibition of illegal and unethical practices (for example, trade of anatomical materials).
7. Establishing clear and understandible intra-state regulatory boundaries with equal conditions for access to healthcare, a balance between the intra-state patient and the medical tourist regarding the quality of services.
8. Establish a proper legal basis for the vulnerable areas of medicine, such as embryo donation, surrogacy, abortion.
9. The vulnerability of the medical tourist in comparison with the national patient shall be taken into account, since it is necessary to remember that, as a rule, the lack of knowledge of the language of the service provider's country, there is often the need to involve a translator. Also, the foreign patient usually does not know the specifics of the law, contractual practice of the host country, etc.
10. A latent market for medical tourism intermediaries should be identified and regulated in order to ensure safety for patient tourists and to avoid unethical activities.
11. Medical tourism has a positive effect on other segments of the economy in the country, because in treatment the patient and/or their accompanying person: a) live in a hotel, in particular a patient dependent on the type of medical services (for example, dental, which do not require hospital care) ; b) visit restaurants, cafes, bars; c) visit the cultural heritage of the host country; d) often combined with rest.
12. Medical tourism activates competition, influences the flexibility of the market, because the patient has an unlimited opportunity to choose: better quality of services, better price, better transport route, better specialist, better medical infrastructure. Fighting for the patient should create a "natural" choice and stimulate states to improve services, and the benefit of this is the economic impact, the improvement of their own healthcare system, and the provision of better-quality medical services to national patients.
13. It is important for Ukraine to develop a national concept of medical tourism and to adopt the necessary legislation to catalyze this type of tourism.

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Some Essential Considerations on the Phenomenon of Early Internationalization and Born-Global Firms

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Abstract

Early internationalization and the phenomenon of born-global firms or global start-ups are a fascinating and evolving aspect of modern entrepreneurship. The literature on the subject certainly constitutes a rich collection of studies on the phenomenon of early internationalization, much has also been devoted to the phenomenon of born-global companies. This article supplements the current knowledge in this area and discusses the genesis of the theory of early internationalization, presents the essence and key attributes of the functioning of born-global companies, and discusses the core strategies for managing an early internationalized company. All theoretical considerations were based on scientific literature sources.

Keywords: Born-Global, Global Start-Ups, Early Internationalization, Management, Company

Introduction

Internationalization is, to a large extent, perceived in terms of a process. It is a phased, evolutionary and gradual sequence of activities of the company preparing it to enter foreign markets. Internationalization understood in this way requires time and, often, considerable experience of the enterprise on the home market. The stage concept of internationalization indicates that only proper and stable market position in their own country and measurable competitive advantage allow enterprises in subsequent stages of their operation to consider expansion into foreign markets, learn these markets, learn about their environment and then gradually plan to expand their activities abroad cautious ventures (Szymczyk, 2018; Otola & Szymczyk, 2017). However, the nineties of the last century proved to be a breakthrough in this matter, as the phenomenon of early internationalisation appeared (Blanke-Ławniczak, 2008). This new phenomenon forced a new approach to internationalisation and a departure from interpreting the internationalisation only in terms of the process.

The origin of the concept of early internationalisation

The concept of internationalisation as a phased process, which is identical to the Uppsala model (Johanson & Wiedersheim-Paul, 1975; Gorynia & Jankowska, 2007), has been criticised by many authors favouring the theories that in internationalisation some of the stages can be omitted using the so-called leapfrogging, i.e. skipping stages (Romanowska, 2009). This type of behaviour was observed by G. Hedlund and A. Kverneland among Japanese companies that were characterised by entry dynamics based on the use of increased resources for rapid expansion, which clearly proved, according to researchers, that internationalisation does not necessarily have to be a slow and gradual process. Three fundamental situations in which one or more stages are missed by an enterprise in the process of internationalisation occur when:

- the company has sufficient resources, especially financial resources, which will protect the company in the event of a disaster, thanks to which it will not feel the negative consequences of entering the foreign market,
- due to the stable situation on the target market, the company is able to operate based on its knowledge,

- the company, thanks to international experience, successfully uses for its expansion purposes into the selected foreign market analogous conditions that prevail in the markets within its operating range.

Skipping stages in the internationalisation process, as well as rapid entry strategies involving larger-than-usual enterprise resources, oppose the sequential, evolutionary internationalisation process in which each stage determines the next (Hedlund & Kverneland, 1983; Brezis et al., 1993; Goldemberg, 1998; Wang et al., 2010). O. Andersen or S. Reid criticised aforementioned Uppsala model, basically the excessive generality of its assumptions, as well as the fact that it is causally related (Reid, 1981, 1983; Andersen, 1993). S. Forsgren (2002) drew attention to the need to expand the scope of knowledge and to learn to explain the forms of internationalisation in the Uppsala model. A broader criticism of the Swedish model was presented by S. Bridgewater (2000), who first noticed that the model does not suit certain products, as well as services, which, in most cases, require the construction of a franchise network. He shared the concept of stages being skipped by national corporations. They, having the opportunity to use substantial resources and skills for expansion, often fail to implement stages in which the necessary involvement is smaller, and more stages will be overlooked by large corporations that use the Internet in the process of internationalisation. P. W. Turnbull (1987) stated that the model could not see clear boundaries between the stages of the process, and, also, that the export or distributor's involvement are not synonymous with less use of resources.

In the literature on the subject, one can also come across the concept of a simultaneous model of internationalisation. In the model, the attention of the so-called convergence of expansion markets in the global dimension, as a result of which national differences, are blurred, hence, customers' needs are unified, which gives enterprises the chance to enter several markets simultaneously, at the same time, bypassing the stages of the conventional Uppsala model. According to M. Gorynia (2007), the above concept is included in the definition of unconventional internationalisation.

The nineties of the twentieth century was a period of emergence of small and medium-sized enterprises that started operating abroad. Their presence in foreign markets was usually based on export of goods simultaneously in several countries. Firms occurred abroad either immediately from the start of the company's operations or up to three years from the establishment of the company. And what is interesting, among these companies were those that ignored their own country as an area of activity. That is how market observers and researchers started debating about born exporters or innate exporters (Ganitsky, 1989). At the turn of the eighties and nineties of the twentieth century, as many as 13% of American small enterprises in the first year of their operations entered international markets (Jarosiński, 2012). In Australia, it was noticed that some young enterprises started their activities on international markets very early, as the period of entering the markets did not exceed two years since the creation of these companies. A quarter of Australian companies turned out to function, according to the adopted literature on the terminology, as born-global firms. In Europe, this type of company had been observed primarily in Denmark. It was noticed there, in the period 1985-1993, an upward trend among companies that started exporting already in the first years of functioning on the market (Christensen & Jacobsen,1996; Christensen, 1991).

Underlying Assumptions of Functioning of Born-Global Firms

The main reason for the emergence of the concept of early internationalisation was the thesis that not all companies succumb to internationalisation processes along individual stages. Some companies are international by design. This means that they did not start their business from one, usually home country and later expanded it by entering foreign markets, but they entered foreign markets immediately, from the very moment of establishing the enterprise. The core business strategy of functioning was a foreign market and usually far away from the company headquarters.
There are many names and definitions for this type of enterprise in the literature on the subject: mentioned so far "born-global", or "global from the beginning", "international companies from birth", "international new ventures (INV)" "global start-ups" (Głód, 2008).

It is generally accepted that the concept of early internationalisation refers to companies operating in foreign markets from the very beginning, as well as companies that have developed or expanded their activities to international markets in less than two or three years from their establishment. However, S. Zahra, R.D. Ireland, M.A. Hitt (2000), as well as R.C. Schrader (2001) or N.E. Coviello and M.V. Jones (2004) also include a six-year period. Furthermore, P.P. McDougall and B.M. Oviatt (1996) consider being born-global the companies that needed up to eight years to enter international markets. Research on the phenomenon of early internationalisation in the literature has been divided into three separate periods (Jarosiński, 2012):

- until 1994 was the time when the first observations about the existence of early internationalised companies appeared,
- 1994-2000 was a period of research on the phenomenon, scale and premises for early internationalisation,
- the period after 2000 has been a time when early internationalisation is a fact, and researchers focus on searching for the most accurate theories explaining the premises for early internationalisation.

It is worth mentioning, the research on the phenomenon of early internationalisation gave birth to attempts to categorise new international enterprises based on the reach of companies in international space. B. M. Oviatt and P.P. McDougall (1994, 2005) developed a division of new international enterprises into four categories:

- new enterprises dealing with import and export within logistics activities in few countries,
- international intermediaries also operating in logistics but in more countries,
- geographically concentrated companies specialised in terms of clients from a given region of the world,
- global, new companies with a large spectrum of activities in a significant number of countries using the network of alliances (Ayadi-Frikha, 2014, 2015).

The observations of the above researchers have become crucial for further interpretations of both the categorisation attempt itself and the definition of the phenomenon itself. However, according to G.A. Knight and S.T. Cavusgil (2004, 2005) the category of born-global firms included the companies which undertook international activities within three years of establishing the company and achieved a minimum of 25% of revenues on foreign markets (see also Knight et al., 2004).

Attributes of Born-Global Firms

Born global companies have been international since the beginning and have a significant share in foreign markets resulting from the sale of products. They have advanced knowledge of international markets, excellent orientation and experience in functioning abroad, a kind of specialised business for a specific customer (Ayadi-Frikha, 2015). They often operate in a specific niche, in which they find the right recipients for their dedicated and selected products, and often use aggressive strategies to achieve competitive advantage. They use of several modern and advanced information technologies, and online communication and online commerce - on the Internet can be the most common form of business. High technology, product innovation, a strategy of intensive modernisation and improvement of goods for the customer, for born-global companies not only underlie the strategy of operation but very often constitute a kind of impulse to found a company. These companies have in-depth knowledge of the foreign market, know the potential of competition, the volume of demand, the scope of needs and preferences of consumers, the size of the niche and undertake business activities in selected foreign markets with a fully prepared, precise and specific product offer. Apparent born-global companies see foreign markets as an opportunity and merit of their functioning in the economy (Morawczyński, 2008; Hollensen, 2011; Sapienza et al., 2006). To emphasise the attributes of born-global companies, it is worth highlighting the differences between the classic and early model of internationalisation (Table 1). These, somehow fundamental, differences between the elements of internationalisation in the traditional evolutionary process and early internationalisation allow summarising the most important issues related to the essence of born-global companies.

Table 1: Classic (phased) versus early internationalisation

Classic Internationalisation (phased)		Early Internationalisation
well-established position and success on the domestic market determine the desire to expand operations beyond the borders of the country	**Domestic market**	local activity is of little importance the company focuses on markets outside the home country
gradually, knowledge is acquired as needed to go beyond the national market	**Knowledge about the foreign market**	knowledge is obtained quickly and often results from the experience of entrepreneurs
inexperience is not perceived negatively possession is not so valuable, it acquires skills by entering foreign markets	**Market experience**	experience in the overseas market determines the start of business often, knowledge of the market lies in the competence of the founder of the company
gradual, step-by-step, country-by-country method	**Entry into the foreign market**	dynamic entry to many countries at the same time often, the company skips the domestic market in its activities
it could be a barrier the company prefers foreign markets culturally similar to its country	**Culture of the foreign market country**	it is not a barrier companies enter markets with a diverse culture
it is crucial in the first stages of internationalisation, but on the further, the company is based on its own resources	**Binding network**	necessary for the speed of internationalisation an extensive system of links determines the activities of born global companies
negligible, insignificant for competitive advantage internationalisation itself is not a determinant of the success of the company	**Dynamics of internationalisation**	an essential and high, elevated degree of internationalisation determines the success of the company, usually achieved within two or three years

Source: Own elaboration based Chetty & Campbell-Hunt, 2004.

The above issues include many factors that characterise early internationalisation, such as market knowledge, financial conditions, innovations and technologies, and the role of managers. Additionally, for many early internationalisation researchers, the phenomenon should be considered in various approaches to strategic management and international entrepreneurship, in a similar way to the classic model of internationalisation.

Strategies of Management of Born Global Firms

The key to managing born-global company is having the right knowledge and skills to adapt, integrate or reconfigure depending on changes in the environment. Specific dynamics, flexibility and orientation towards information technologies distinguishes this type of company from other often hierarchical, bureaucratic or full internal dependencies (Jelonek & Turek, 2016). An important aspect conducive to the functioning of born-global companies in foreign markets is also their size, which facilitates the management and adaptation of the company to the environmental conditions in which it operates. Companies of this type due to their small size are more likely to change quickly and more flexible, because in most cases they are not affected by the problem of too bureaucratic structure. Flexibility and simplicity in the company structure and management allow faster responding to the needs and expectations of customers, a greater focus on innovation and developing more creative solutions to specialise a product or/and service for a specific recipient (Torres-Ortega et al., 2015; Szymczyk, 2018; Otola & Szymczyk, 2017; Blanke-Ławniczak, 2011, 2014; Ulewicz & Kucęba, 2016).

A specialised narrow portfolio of products or services is key in the activity of born-global firms because it completely changes the perception of the global market as a threat or risk but as an opportunity and profit. For many scholars, it turns out to be an accurate observation that born-global companies treat the whole world as one common international market, or as a global resource of opportunities and chances to gain and maintain a competitive advantage. This market is generally available and achievable and remains as the main goal of the company's management strategy. However, it is impossible not to get the impression that, to a large extent, born-global companies are successful in areas that are not within the scope of interest of large enterprises or corporations, because their operation is not essentially directed at mass recipients, expecting large-scale products and services and on a large scale.

A market niche, which is most often used by early-internationalised companies, for many long-term international companies with broad horizons and networks, can be less profitable and even generate unnecessary losses. Large companies, corporations or business conglomerates precede entering a foreign market with meticulous analysis and preparation for a long-term, if not a permanent period of operation. For this purpose, they usually transfer significant financial resources.

On the other hand, born-global companies operate on the basis of an up-to-date profit opportunity, previously well-established knowledge of the foreign market, and they use the existing demand for a specific product or service and knowledge of niches and consumer preferences while remaining flexible when it comes to the product itself. Due to considerable flexibility, born-global firms can dynamically change and re-adjust their portfolio of dedicated products or services due to current demand. Flexibility is certainly a big advantage of these companies. Undoubtedly, it is conditioned by having qualified managerial staff who can equally demonstrate skills swiftly and dynamically in the process of developing the appropriate strategies and methods of operation (Baronchelli, G., Cassia, 2014; Gabrielsson et al., 2008; Yli-Renko et al., 2002; Zucchella et al., 2007).

Conclusions

Summing up the theoretical considerations about the phenomenon of born-global companies and the concept of early internationalisation, it can be concluded that born-global firms are specific entities that conquer foreign markets dynamically, often find themselves in a niche and target the specific customer groups. They operate swiftly and equally quickly achieve market success largely due to the considerable knowledge of these markets, core competencies to use information technology for business purposes, and a range of ideas adequate to the current expectations of markets and their consumers. These are companies that to large extent capture opportunities and moments, in a sense, they catch up with the chances of success and profit without special planning and all stage preparation. Therefore, they also might have a short life span, often take risks and do not fully focus on long-term functioning. Of course, among them will remain on the market those that will be able to appear in foreign markets in a short time to develop further, expand the company and increase its operations. The question remains whether they still should be called born-global companies or already precisely-structured international corporations.

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Project Scheduling Methods Based on Theory of Ordered Fuzzy Numbers

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Abstract

In this the paper we present new methods, called OFCPM, OFPERT, for estimating a project completion time in the situation when activity duration times in the project are given in the form of Ordered Fuzzy Numbers OFNs. Extended Critical Path Method and Project Evaluation and Review Technique have been developed as new methods dedicated to project scheduling, preserving its basic concept. Ordered fuzzy numbers are used to project scheduling under uncertainty. The duration time of each project activity is estimated by experts (experts views of the activity duration time) based on their experience. These new methods will be verify on some examples. The comparison of our fuzzy approaches to existing deterministic sans stochastic ones is under study.

Keywords: Project Scheduling, CPM, PERT, Ordered Fuzzy Numbers.

Introduction

The transformation of business conduct and the differentiation between routine tasks and tasks that are unique (project driven orders treated as projects) in organisations, enterprises, production, logistics and supply chains become necessary. The project is viewed as a task-specific and time-limited form of working. Both the process approach, and the project approach are important for any enterprise or supply chain that wants to maintain its market position (Artto and Wikström, 2005; Artto and Kujala, 2008; Artto et. al., 2011; Blomquist et. al., 2010; Turner, 1999; Whitley, 2006). Project-based business is becoming increasingly more significant (Hartman and Skulmoski, 1998; Morris and Hough, 1987; Söderholm, 2008; Von Dran et. al., 1996; Turner and Müller, 2003; Turner et. al., 2010; Hällgren and Wilson, 2008; Ibbs and Kwak, 2000). In view of the continuously increasing importance of projects, including logistics projects, for organization and supply chains (often termed "projectification") (Midler, 1995; Maylor et al., 2006; Packendorff, Lindgren, 2014), competent project shaping, together with their social environment, are entering the spotlight.

One of the most important aspect of project management is the scheduling of project activities. There are many methods used in project scheduling. Most of the traditional tools for project scheduling are crisp, deterministic, and precise in character. Critical Path Method (CPM), Program Evaluation and Review Technique (PERT) are most popular project scheduling methods. They are usually used to determine the critical path. CPM and PERT play an important role in estimation the project completion time, and are the methods dedicated to modelling the execution of a given project. It has been demonstrated to be a useful tools in the planning and control of complicated projects. These methods have been applied to planning organization projects, software projects, logistics project, engineering projects, construction projects, innovative projects, etc. (Chen, Hsueh 2008; Malakooti, 2014). It is known that duration times of project activities are seldom satisfied. Precise information about the duration of the activities is seldom available in real world (Yakhchali, Ghodsypour, 2010). In project practice, activity duration times are often imprecise and have to be estimated subjectively. The project manager should rather subjectively evaluate the duration and determine a suitable commitment for project completion. The assumption of crisp durations of activities is unfeasible in real projects and these methods include considerable errors to calculations and results.

This paper is organized as follows. The second section provides a brief review of the relevant support state-of-art. The Section 3 is dedicated to the framework methods based on imprecise duration times

as the ordered fuzzy numbers. In next Section we present an illustrative example of applied the proposed methods to project scheduling. The last section includes conclusions and recommendations of the work.

Research Literature

The primary objective of project scheduling is to plan in time the sequences of all activities of a project such as that project duration is minimized and the sequences of all activities is feasible. Classical methods of project scheduling, like CPM, are deterministic and do not take into account the uncertainty related to the unavailability of reliable, precise information (Chen, Hsueh 2008). Methods based on statistics and probabilities such as PERT have been created to solve CPM problems and consider the effect of uncertainty on results. In the PERT, the durations of activities are assumed to be stochastic and they have a mean and standard deviation that covers the uncertainty (Habibi et al. 2018). Another method named Monte Carlo simulation is based on the probability theory have been developed. In the literature we can find many papers that have used these stochastic approaches and search on this area is still carried out (Łapuńka et al., 2016).

Critical Path Method was originally developed by Kelly and Walker in 1959. This method is used to find the minimum overall project duration and identify critical activities and critical paths. The Program Evaluation and Review Technique was developed by Booz, Allen, and Hamilton in 1959. It was developed in a joint with the U.S. Navy to deal with this issue of uncertainty of durations times in project management. In PERT the duration time for each activity is treated as a random variable, each having a random probability distribution (Malakooti, 2014). PERT is used as a tool for large project management. What is essential in the PERT method is that activity duration times in projects are probabilistic. In PERT we use three time estimates for each activity: the shortest - optimistic, the average - most likely and the longest - pessimistic. The objective of this method is to find the minimum project duration while considering probabilistic activity durations. PERT can also be used to provide probabilities associated with different project durations. The shorter the targeted project duration, the less likely the project will completed on the time.

In actual project control decisions, CPM and PERT have successfully been applied to business management, industry production, project scheduling control, logistics support, etc. These methods require a crisp duration time representation for each activity. In practice, this requirement is often difficult for the decision-makers due to the fact that they usually cannot estimate these values precisely.

As we can see, in recent years, some fuzzy CPM and PERT methods have been proposed based on fuzzy set theory for project management. Motivated by management practice in project environment and inspired by results of fuzzy set theory applied in science researchers employed the concept of fuzziness in project management. Fuzzy Set Theory, proposed by professor Lotfi Zadeh (1965), is interested in uncertain and fuzzy data, fuzzy environment including project environment. The uncertainty took significant place in the decision-making processes (Mazlum, Güneri, 2015). In almost every field of management, the widespread use of fuzzy set theory with the new perspectives is used in decision-making process for example in production, logistics, industry, services. The fuzzy set theory is widely used in game theory and network problems in operations research, linear programming, nonlinear programming, goal programming, dynamic programming, transportation models, inventory management (Kahraman, et al. 2006). The study of fuzzy scheduling has been initiated in research undertaken by Hapke and Slowinski (1993). Many techniques particularly the serial and the parallel scheduling schemes (Hapke and Slowinski, 1996), and the resource leveling technique (Leu et al., 1999) were generalized to handle fuzzy parameters. To decide the feasibility of a project schedule, the work load plan is established and compared to the available capacity. In the literature, the majority of authors who work with fuzzy sets in scheduling problems transform the fuzzy scheduling into crisp scheduling by applying either alpha-cuts or a defuzzification technique. Thus, they generate deterministic work-load plans (Hapke and Slowinski, 1996; Leu et al., 1999). On the other hand, Masmoudi (2011) use the possibility theory to define a new concept of fuzzy workload plan in operational level of planning.

In general, researchers use fuzzy numbers instead of crisp numbers in established formulas. For example, the deterministic activity duration times are replaced with the fuzzy activity times. Fuzzy CPM (FCPM) and fuzzy PERT (FPERT) are used in the fuzzy project management, and can be used to improve decision-making process and to plan the complicated, innovative project (Chanas, et al. 2002; Chanas, Zieliński, 2001, 2002, 2003, Kuchta 2001; Slyeptsov and Tyshchuk, 1997, 2003).

However, several authors reported problems connected with using fuzzy numbers. The papers (Gani, Assarudeen, 2012; Kosiński, 2002, 2003, 2009; Prokopowicz et al., 2017) discuss the drawbacks of convex fuzzy numbers. To overcome these issues Kosiński with team developed the concept of ordered fuzzy numbers (OFNs).

An ordered fuzzy number A (OFN) is an ordered pair $A = (f, g)$ of continuous functions $f, g: [0,1] \to R$. There is a great variety of ordered fuzzy numbers, wherein only a small part of them correspond to standard fuzzy numbers. The set of pairs of continuous functions, where one function is increasing and the other is decreasing and, simultaneously, the increasing function always assumes values lower or equal than the decreasing function, is a subset of the set of OFNs, which represents the class of all convex fuzzy numbers with continuous membership functions. We called them proper OFNs. So, the new interpretations offered by the ordered fuzzy numbers approach can be viewed as an extension of classical proposals. The concept of ordered fuzzy numbers has been described in papers (Kosiński, et al. 2002a,b 2003a,b,c; Chwastyk, Kosiński, 2013).

The key aspect of ordered fuzzy numbers is related to the notion of direction (in some papers it also called orientation). This additional kind of information is not represented by standard fuzzy numbers. Only the OFN model offers looking at imprecision from a new perspective. Using ordered fuzzy numbers, it becomes possible to describe a trend of imprecise value of the real-life processes (Kosiński, et al. 2002a,b 2003a,b,c 2013; Prokopowicz, et al. 2017) including durations time of project activities. The direction is a new kind of information and it is marked graphically with an arrow. It can be useful in many real-world scenarios, such as expressing diversity of opinions in social networks, modeling dynamics of financial data, simulating brain functions, and patient diagnostics (Prokopowicz et al. 2017). This aspect can be widely applicable to modeling reality under uncertainty, which makes them particularly suitable for the project environment. The direction of OFNs turned out to be useful in project management, especially in project scheduling. This additional information is very important for project manager. We obtain added information about the planning value - the duration time. According to duration time of the direction of an OFN can be related to the expert's opinion about the time characteristics in the analyzed project. Figure 1a presents a standard fuzzy number which constitutes the interpretation of the expert's opinion about duration time of a project activity – "ca. 60 days". Using ordered fuzzy numbers, it becomes possible to consider the expert's opinion about the dynamics of change in this value: "ca. 60 days with a decreasing trend" – negative direction (Figure 1b) or "ca. 60 days with increasing tendency" – positive direction (Figure 1c). This is an advantage over expressing the expert's opinion using standard fuzzy numbers.

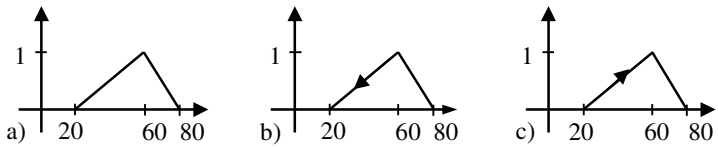

Fig. 1: a) Classical fuzzy number "ca. 60 days", b) The membership function corresponding to the OFN "ca. 60 days with decreasing tendency" c) The membership function corresponding to the OFN "ca. 60 days with increasing tendency".

The proposed methods dedicated to project scheduling with imprecise data

We continue the research began in the work (Chwastyk, Pisz 2017; Chwastyk, Pisz 2018) which concerned the use of ordered fuzzy numbers to estimate activity duration times in a project. We converted the above problem from AOA (Activity On Arc) into AON (Activity On Node) network

and added PERT method with OFNs. The approach is based on idea of the classical Critical Path Method and extended critical path presented by (Chanas, Zieliński, 2001). We have developed the theoretical foundations of a new critical path analysis which can be an alternative to the conventional CPM and PERT method (Chwastyk, Pisz 2018). The duration times are estimated by experts. They estimated each value and expressed using OFNs. We add some basic information about of theory of OFNs in this paper. More we can find for example in papers (Kosiński, et al. 2002a,b 2003a,b,c Chwastyk, Kosiński, 2013, Prokopowicz, 2017).

A linear ordered fuzzy number (f, g) is a pair of linear functions and it is uniquely determined by a 4-D vector $[\mathrm{f}(0), \mathrm{f}(1), \mathrm{g}(1), \mathrm{g}(0)]$ composed of the real numbers. A proper linear ordered fuzzy number (f, g) is called a trapezoidal ordered fuzzy number. If we additionally assume that $\mathrm{f}(1) = \mathrm{g}(1)$ we get the notion of a triangular ordered fuzzy number. Let $A = [a_1, a_2, a_2, a_3]$, $B = [b_1, b_2, b_2, b_3]$ be triangular ordered fuzzy numbers ($a_i, b_i \in R;\ i = 1,2,3$). We distinguish two types of triangular OFNs: with negative direction ($a_1 > a_2 > a_3$) and with non-negative direction ($a_1 < a_2 < a_3$). The operations of addition and subtraction are defined as follows:

$$A + B = [a_1 + b_1, a_2 + b_2, a_2 + b_2, a_3 + b_3] \tag{1}$$

$$A - B = [a_1 - b_1, a_2 - b_2, a_2 - b_2, a_3 - b_3]. \tag{2}$$

According to project scheduling we consider a project model $S = (V, Ar, T)$ which is a directed and connected network, where $V = \{1,2, \dots, n\}$ is a set of n nodes – activities, $Ar \subset N \times N$ is the set of arcs – relations, T_i denotes the activity time of i-th activity. The duration times are represented by triangular ordered fuzzy numbers and crisp numbers $a \in R$ represented by OFN of the form $[a, a, a, a]$.

To draw the network diagram of the project, the precedence relationship of the activities are to be determined. The activities are represented by nodes. Nodes are numbered that for every arc (i, j) the relation is $i < j$. Let us denote by:
$P(i) = \{k \in V | (k, i) \in Ar\}$ – the set of predecessors,
$S(i) = \{k \in V | (i, k) \in Ar\}$ – the set of successors for the activity $i \in V$.

Idea and applied of Ordered Fuzzy Critical Path Method

The proposed algorithm of OFCPM consists of few steps. The steps are as follows:

1. Specify the individual project activities.
2. Determine the sequence of the each activities.
3. Select Zexperts to estimate the duration time.
4. Estimate the duration time using ordered fuzzy numbers by each expert $T_{ij,}$ $i = 1,2, \dots n, j = 1,2, \dots, z$.
5. Calculate average value of the duration time using ordered fuzzy numbers

$$T_i^{aver} = \frac{\sum_{j=1}^{z} T_{ij,}}{z},\ i = 1,2, \dots, n, j = 1,2,, \dots, z.\ , \tag{3}$$

6. Perform calculation of earliest start time of activities (denoted by T_i^e) for each activity $i \in V$ $(i = 2,3, \dots, n)$ according to the formula:

$$T_i^e = max_{k \in P(i)}\{T_k^e + T_k\}, \tag{4}$$

where addition operation is calculated according to the formula (1). Max denotes the choice of the activity time, where the crisp number $\phi_t(T_k^e + T_k)$ of a given activity is calculated according to the defuzzification formula:

$$\phi_t([a_1, a_2, a_2, a_3]) = \frac{a_1+a_2+2a_3}{4} \tag{5}$$

and the value is the biggest one. For the first activity it is equal $T_1^e = [0,0,0,0]$.

7. Use improved backward pass method to calculate the latest start times of activities T_i^l $(i = n-1, n-2, \dots, 1)$ using the formula:

$$T_i^l = min_{k \in S(i)}\{T_k^l\} - T_i, \tag{6}$$

where: subtraction operation is calculated according to the formula (2). Min in this case denotes the choice of activity duration, where $\phi_t(T_k^l)$ is the smallest one. It is assumed that $T_n^l = T_n^e$.

8. Estimate the slack time according to the formula:

$$Z(i) = T_i^l - T_i^e \tag{7}$$

9. Identify the critical path. The activity, where $Z(i) = [0,0,0,0]$ is called critical activity. Let P denote the set of all paths in the network S from the node 1 to n. The path $p \in P$ is called critical when the all activities belonging to this path are critical. The critical path is the longest sequence of activities carried out in a given project. It determines the total duration of the project $T_n^e + T_n$.

Now we will illustrate a numerical example of project scheduling using the proposed method OFCPM. Let us assume a project which consists of 11 activities. The sequences of activities involved in the considered project are listed out to draw the network diagram. The project in practice involves the unpredictable behavior of the market in the project execution timeframe, including weather conditions, prices and costs, availability of resources. We consider 11 activities $V = \{1,2,3, \dots, 11\}$. The relations are defined as follows:

$$Ar = \{(1,2), (2,3), (2,4), (2,5), (3,6), (4,6), (5,6), (6,7), (6,8), (7,9), (8,9), (9,10), (10,11).$$

Using the precedence relationship the network diagram of the project has been prepared and is presented in Figure 2.

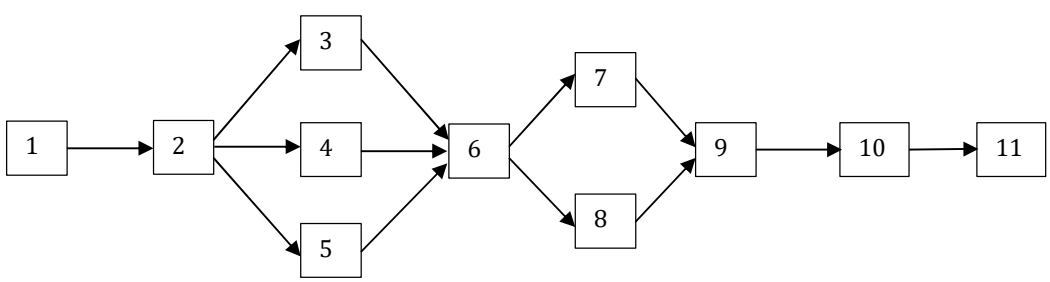

Figure 2: The network diagram of the analyzed project

Table 1 contains the corresponding data of the given project. It presents project activities and their time characteristics. The activity duration time were estimated by group of experts ($Z = \{1,2,3\}$). They estimated each value and expressed using OFNs in Arbitrary Time Units [ATU]. The activities are complex and unpredictable. The duration times are imprecise. For example activity duration time of activity 1 estimated by expert 1 equals ca. 14 ATU with an increasing tendency described as [12,14,14,16] ATU. It means that activity duration time lower than 12 ATU and bigger than 16 ATU is impossible. In this case the activity duration time equal 14 ATU is the most possible, and the remaining values are likely to varying degrees, but the more the closer they are to 14 ATU.

Furthermore, more likely is 16 than 12 ATU. On the other hand some of activities in a given project are characterized by durations with an increasing tendency. In practice, this means that the duration of a given activity may be shortened to no more than the lower value of the ordered fuzzy number which is an interpretation of the activity time. For example activity duration time of activity 7 estimated by expert 2 equals ca. 13 ATU with a decreasing tendency described as [14,13,13,12] ATU. It means that activity duration time lower than 12 ATU and bigger than 14 ATU is impossible. In this case the activity duration time equal 13 ATU is the most possible, and the remaining values are likely to varying degrees, but the more the closer they are to 13 ATU. Furthermore, more likely is 12 than 14 ATU.

Table 1: Project activities with their time characteristics based on OFCPM

Number	Activity name	Expert	Duration time	Average duration time
1	A1	1 2 3	[12,14,14,16] [12,13,13,15] [12,15,15,17]	[12,14,14,16]
2	A2	1 2 3	[22,23,23,24] [22,23,23,24] [22,23,23,24]	[22,23,23,24]
3	A3	1 2 3	[2,3,3,4] [2,3,3,6] [2,3,3,5]	[2,3,3,5]
4	A4	1 2 3	[10,13,13,16] [11,13,13,15] [12,13,13,14]	[11,13,13,15]
5	A5	1 2 3	[12,14,14,15] [11,13,13,16] [13,12,12,14]	[12,13,13,15]
6	A6	1 2 3	[22,23,23,24] [21,23,23,25] [20,23,23,26]	[21,23,23,25]
7	A7	1 2 3	[15,13,13,12] [14,13,13,12] [16,13,13,12]	[15,13,13,12]
8	A8	1 2 3	[8,7,7,6] [9,8,8,7] [7,6,6,5]	[8,7,7,6]
9	A9	1 2 3	[32,33,33,34] [31,33,33,35] [30,33,33,36]	[31,33,33,35]
10	A10	1 2 3	[5,6,6,7] [5,6,6,7] [8,9,9,10]	[6,7,7,8]
11	A11	1 2 3	[15,16,16,17] [15,16,16,17] [18,19,19,20]	[16,17,17,18]

Now, we present applied of OFCPM step-by-step. According to the proposed approach we calculate the earliest start time for particular activity. This data should be determined first by performing operations on ordered fuzzy numbers representing uncertain durations of activities in the project. We present some initial calculations for network activities of the proposed method. According to the assumption of the fourth stage of the proposed method the earliest start time of the first activity is

equal $T_1^e = [0,0,0,0]$. From the project network, it follows that activities 2,3,4 and 5 have exactly one predecessor. Therefore:

$$T_2^e = max_{k\in P(2)}\{T_k^e + T_k\} = T_1^e + T_1 = [0,0,0,0] + [12,14,14,16] = [12,14,14,16],$$
$$T_3^e = T_4^e = T_5^e = T_2^e + T_2 = [12,14,14,16] + [22,23,23,24] = [34,37,37,40].$$

Activity number 6 coincides with the implementation of three parallel activities, i.e. activities 3, 4 and 5. Hence the earliest start time of the first activity is estimated as following:

$$T_6^e = max_{k\in P(6)}\{T_k^e + T_k\} = max\{T_3^e + T_3, T_4^e + T_4, T_5^e + T_5\} = max\{[34,37,37,40] + [2,3,3,5], [34,37,37,40] + [11,13,13,15], [34,37,37,40] + [12,13,13,15]\} = max\{[36,40,40,45], [45,50,50,55], [46,50,50,55]\}.$$

Because we have more than one value we should choose the time for which defuzzification value receives the greatest value. Therefore we calculate crisp value like:

$$\phi_t([36,40,40,45]) = \frac{36+40+2\cdot 45}{4} = 41.5,\ \phi_t([45,50,50,55]) = \frac{45+50+2\cdot 55}{4} = 51.25,$$
$$\phi_t([46,50,50,55]) = \frac{46+50+2\cdot 55}{4} = 51.5.$$

Thus, the earliest start time activity 6 is equal $T_6^e = [46,50,50,55]$. In a similar way we should calculate the values for other activities in the considered project structure.

Step 7 of the proposed approach of OFCPM allows to determinate the latest start times of activity. The calculations at this stage are carried out in the opposite direction (backward pass), according to the formula (6). The value of T_n^l is assumed to be the earliest start time of the last activity, i.e. $T_n^l = T_n^e$. In the present case it means that $T_{11}^e = [119,126,126,135]$.
The latest start times of individual activities in the considered project were subsequently calculated. Activities numbers 9 and 10 have one successor, so we calculate them like:

$$T_{10}^l = min_{k\in S(10)}\{T_k^l\} - T_{10} = T_{11}^l - T_{10} = [119,126,126,135] - [6,7,7,8] = [113,119,119,127].$$

Activity number 9 precedes the implementation of two parallel activities, activity 7 and 8. In order to obtain the latest start date we should select the time for which the defuzification value is the smallest one:

$$T_6^l = min_{k\in S(6)}\{T_k^l\} - T_6 = min\{T_7^l, T_8^l\} - T_6 = min\{[47,53,53,60], [54,59,59,66]\} - [21,23,23,25].$$

Because we have more than one value we should choose the time for which defuzzification value receives the greatest value. Therefore we calculate the crisp value like:

$$\phi_t([47,53,53,60]]) = 55;\quad \phi_t([54,59,59,66]) = 61.25.$$

Then $T_6^l = [47,53,53,60] - [21,23,23,25] = [26,30,30,35]$.

After determining the latest start times of activities, the slack time should be calculated for individual project activities (step 8). The earliest and the latest start times of the considered activities and their slack times are presented in the Table 3.

The critical path is 1-2-5-6-7-9-10-11. The total completion time of the considered project is equal: $[119,126,126,135] + [16,17,17,18] = [135,143,143,153]$ ATU. It means that the total completion time of the considered project is lower than 135 ATU and not bigger than 153 ATU is impossible. In this case the total completion time equal 143 ATU is the most possible, and the remaining values are likely to varying degrees, but the more the closer they are to 153 ATU. The project completion time is equal to 146 ATU (the crisp value) according to OFCPM considering states for the durations of

activities estimated by experts using ordered fuzzy orders with depicted tendency as an additional characteristics of the durations times.

Table 3: The earliest and latest times and slack times calculated with using OFCPM method

Activity	The earliest start times of activities T_i^e [ATU]	The latest start times of activities T_i^l [ATU]	Slack time $Z(i)$ [ATU]	$\phi(Z(i)$ [ATU]	Critical activity
1	[0,0,0,0]	[0,0,0,0]	[0,0,0,0]	0	yes
2	[12,14,14,16]	[12,14,14,16]	[0,0,0,0]	0	yes
3	[34,37,37,40]	[44,47,47,50]	[10,10,10,10]	10	no
4	[34,37,37,40]	[33,37,37,40]	[1,0,0,0]	0.25	no
5	[34,37,37,40]	[34,37,37,40]	[0,0,0,0]	0	yes
6	[46,50,50,55]	[46,50,50,55]	[0,0,0,0]	0	yes
7	[67,73,73,80]	[67,73,73,80]	[0,0,0,0]	0	yes
8	[67,73,73,80]	[74,69,69,86]	[7,6,6,6]	6.25	no
9	[82,86,86,92]	[82,86,86,92]	[0,0,0,0]	0	yes
10	[113,119,119,127]	[113,119,119,127]	[0,0,0,0]	0	yes
11	[119,126,126,135]	[119,126,126,135]	[0,0,0,0]	0	yes

$$\phi_t([135,143,143,153]) = 146 \text{ ATU}.$$

Idea and applied of Ordered Fuzzy Project Evaluation Review Technique

The proposed algorithm of OFPERT consists of few steps. Some of them are similar to the OFCPM. The difference is in estimating the duration times. The steps of OFPERT are as follows:

1. Specify the individual project activities.
2. Determine the sequence of the each activities.
3. Select Z experts to estimate the duration time.
4. Estimate the duration time using ordered fuzzy numbers by each expert $T_{ij,}$ $i = 1,2, \dots n, j = 1,2, \dots, z$. Each expert estimate three values (pessimistic T_i^p, $i = 1,2, \dots n$, optimistic T_i^o, $i = 1,2, \dots n$,, most likely T_i^m, $i = 1,2, \dots n$,) of the duration time using ordered fuzzy numbers.
5. Calculate average value of the duration time (optimistic, pessimistic and most likely) as ordered fuzzy number:

$$T_i^{o_aver} = \frac{\sum_{j=1}^{z} T_{i\ j,}^{o}}{z}, i = 1,2, \dots, n,\ j = 1,2,, \dots, z,$$
$$T_i^{p_aver} = \frac{\sum_{j=1}^{z} T_{i\ j,}^{p}}{z}, i = 1,2, \dots, n,\ j = 1,2,, \dots, z,$$
(8)
$$T_i^{m_aver} = \frac{\sum_{j=1}^{z} T_{i\ j,}^{m}}{z}, i = 1,2, \dots, n,\ j = 1,2,, \dots, z.$$

6. Calculate the expected time as ordered fuzzy number:

$$T_i^{\exp_aver} = \frac{T_i^{o_aver} + 4T_i^{m_aver} + T_i^{p_aver}}{6}, i = 1,2, \dots n. \quad (9)$$

7. Perform calculation of earliest start time of activities (denoted by T_i^e) for each activity $i \in V$ $(i = 2,3, \dots, n)$ according to the formula:

$$T_i^e = max_{k \in P(i)}\{T_k^e + T_k\}, \quad (10)$$

where addition operation is calculated according to the formula (1). Max denotes the choice of the activity time, where the crisp number $\phi_t(T_k^e + T_k)$ of a given activity is calculated according to the defuzzification formula:

$$\phi_t([a_1, a_2, a_2, a_3]) = \frac{a_1+a_2+2a_3}{4} \tag{11}$$

and the value is the biggest one. For the first activity it is equal $T_1^e = [0,0,0,0]$.

8. Use improved backward pass method to calculate the latest start times of activities T_i^l $(i = n-1, n-2, \dots, 1)$ using the formula:

$$T_i^l = min_{k \in S(i)}\{T_k^l\} - T_i, \tag{12}$$

where subtraction operation is calculated according to the formula (2). Min in this case denotes the choice of activity duration, where $\phi_t(T_k^l)$ is the smallest one. It is assumed that $T_n^l = T_n^e$.

9. Estimate the slack time according to the formula:

$$Z(i) = T_i^l - T_i^e \tag{13}$$

10. Identify the critical path. The activity, where $Z(i) = [0,0,0,0]$ is called critical activity. Let P denote the set of all paths in the network S from the node 1 to n. The path $p \in P$ is called critical when the all activities belonging to this path are critical. The critical path is the longest sequence of activities carried out in a given project. It determines the total duration of the project $T_n^e + T_n$.

Below we will present a numerical example of project scheduling using the proposed methods. Let us assume a project which consists of 10 activities. The sequences of activities involved in the considered project are listed out to draw the network diagram. The project in practice involves the unpredictable behavior of the market in the project execution timeframe, including weather conditions, prices and costs, availability of resources. We consider 10 activities $V = \{1,2,3, \dots, 10\}$. The relations are defined as follows:

$$Ar = \{(1,2), (2,3), (2,4), (2,5), (3,6), (4,6), (5,6), (6,7), (6,8), (7,9), (8,9), (9,10).$$

Using the precedence relationship the network diagram of the project has been prepared and is presented in Figure 3.

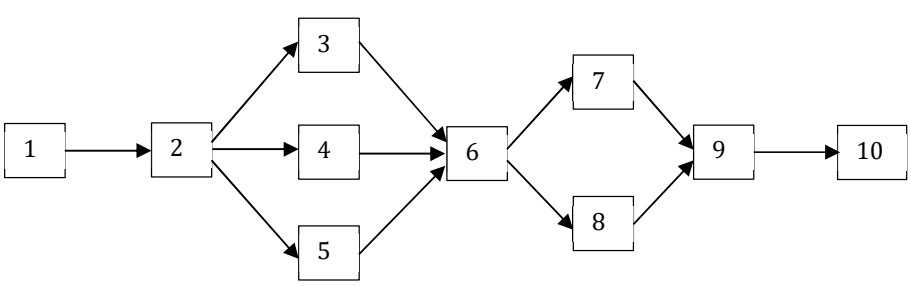

Figure 3: The network diagram of the analyzed project

According to OFPERT we present Table 4 which shows the experts' opinions about durations time of each activities in the optimistic, most likely and pessimistic states as ordered fuzzy numbers. The average of duration times in the optimistic, most likely and pessimistic states were then calculated as ordered fuzzy numbers. The expected value of each activities were also calculated. Table 4 contains the corresponding data of the given project. It presents project activities and their time characteristics. The activity duration time were estimated by group of experts ($Z = \{1,2,3\}$). They estimated each

value and expressed using OFNs in Arbitrary Time Units [ATU]. The activities are complex and unpredictable. The duration times are imprecise. For example activity duration time of activity 1 estimated by expert 1 equals ca. 4 ATU with an increasing tendency described as [2,4,4,6] ATU. It means that activity duration time lower than 2 ATU and bigger than 6 ATU is impossible. In this case the activity duration time equal 4 ATU is the most possible, and the remaining values are likely to varying degrees, but the more the closer they are to 4 ATU. Furthermore, more likely is 6 than 2 ATU. On the other hand some of activities in a given project are characterized by durations with a increasing tendency. In practice, this means that the duration of a given activity may be shortened to no more than the lower value of the ordered fuzzy number which is an interpretation of the activity time. For example activity duration time of activity 7 estimated by expert 2 equals ca. 6 ATU with a decreasing tendency described as [15,13,13,12] ATU. It means that activity duration time lower than 12 ATU and bigger than 15 ATU is impossible. In this case the activity duration time equal 13 ATU is the most possible, and the remaining values are likely to varying degrees, but the more the closer they are to 13 ATU. Furthermore, more likely is 12 than 15 ATU.

According to the proposed method OFPERT we calculate the earliest start time for particular activity. This data should be determined first by performing operations on ordered fuzzy numbers representing uncertain durations of activities in the project. We present some initial calculations for network activities of the proposed method. According to the assumption of the fourth stage of the proposed method the earliest start time of the first activity is equal $T_1^e = [0,0,0,0]$. From the project network, it follows that activities 2 ,3, 4 and 5 have exactly one predecessor. Therefore:

$$T_2^e = max_{k \in P(2)}\{T_k^e + T_k\} = T_1^e + T_1 = [0,0,0,0] + [2,4,4,6] = [2,4,4,6],$$
$$T_3^e = T_4^e = T_5^e = T_2^e + T_2 = [2,4,4,6] + [12,13,13,14] = [14,17,17,20].$$

Tab.4: Calculation of duration times with using OFPERT

Number	Activity	Expert	Duration time				
			Optimistic	Most likely	Pessimistic	Average optimistic/ most likely/ pessimistic	Expected duration time
1	A1	1 2 3	[1,3,3,5] [1,3,3,4] [1,3,3,6]	[2,4,4,6] [2,3,3,5] [2,5,5,7]	[3,5,5,7] [3,4,4,6] [3,6,6,8]	[1,3,3,5] [2,4,4,6] [3,5,5,7]	[2,4,4,6]
2	A2	1 2 3	[11,12,12,13] [11,12,12,13] [11,12,12,13]	[12,13,13,14] [12,13,13,14] [12,13,13,14]	[13,14,14,15] [13,14,14,15] [13,14,14,15]	[11,12,12,13] [12,13,13,14] [13,14,14,15]	[12,13,13,14]
3	A3	1 2 3	[1,2,2,3] [1,2,2,5] [1,2,2,4]	[2,3,3,4] [2,3,3,6] [2,3,3,5]	[3,4,4,5] [3,4,4,7] [3,4,4,6]	[1,2,2,4] [2,3,3,5] [3,4,4,6]	[2,3,3,5]
4	A4	1 2 3	[10,12,12,15] [10,12,12,14] [10,12,12,13]	[11,13,13,16] [11,13,13,15] [11,13,13,14]	[12,14,14,17] [12,14,14,16] [12,14,14,15]	[10,12,12,14] [11,13,13,15] [12,14,14,16]	[11,13,13,15]
5	A5	1 2 3	[12,13,13,14] [11,12,12,15] [10,11,11,13]	[13,14,14,15] [12,13,13,16] [11,12,12,14]	[14,15,15,16] [13,14,14,17] [12,13,13,15]	[11,12,12,14] [12,13,13,15] [13,14,15,16]	[12,13,13,15]
6	A6	1 2 3	[21,22,22,23] [20,22,22,24] [19,22,22,25]	[22,23,23,24] [21,23,23,25] [20,23,23,26]	[23,24,24,25] [22,24,24,26] [21,24,24,27]	[20,22,22,24] [21,23,23,25] [22,24,24,26]	[21,23,23,25]
7	A7	1 2 3	[14,12,12,11] [13,12,12,11] [15,12,12,11]	[15,13,13,12] [14,13,13,12] [16,13,13,12]	[16,14,14,13] [15,14,14,13] [17,14,14,13]	[14,12,12,11] [15,13,13,12] [16,14,14,13]	[15,13,13,12]
8	A8	1 2 3	[7,6,6,5] [8,7,7,6] [6,5,5,4]	[8,7,7,6] [9,8,8,7] [7,6,6,5]	[9,8,8,7] [10,9,9,8] [8,7,7,6]	[7,6,6,5] [8,7,7,6] [9,8,8,7]	[8,7,7,6]
9	A9	1 2 3	[31,32,32,33] [30,32,32,34] [29,32,32,35]	[32,33,33,34] [31,33,33,35] [30,33,33,36]	[33,34,34,35] [32,34,34,36] [31,34,34,37]	[30,32,32,34] [31,33,33,35] [32,34,34,36]	[31,33,33,35]

10	A10	1 2 3	[4,5,5,6] [4,5,5,6] [7,8,8,9]	[5,6,6,7] [5,6,6,7] [8,9,9,10]	[6,7,7,8] [6,7,7,8] [9,10,10,11]	[5,6,6,7] [6,7,7,8] [7,8,8,9]	[6,7,7,8]

Activity number 6 coincides with the implementation of three parallel activities, i.e. activities 3, 4 and. Hence the earliest start time of the first activity is estimated as following:

$$T_6^e = max_{k\in P(6)}\{T_k^e + T_k\} = max\{T_3^e + T_3, T_4^e + T_4, T_5^e + T_5\} = max\{[14,17,17,20] + [2,3,3,5], [14,17,17,20] + [11,13,13,15], [14,17,17,20] + [12,13,13,15]\} = max\{[16,20,20,25], [25,30,30,35], [26,30,30,35]\}.$$

Because we have more than one value we should choose the time for which defuzzification value receives the greatest value. Therefore:

$$\phi_t([16,20,20,25]) = \frac{16+20+2\cdot 25}{4} = 21.5,\ \phi_t([25,30,30,35]) = \frac{25+30+2\cdot 35}{4} = 31.25,$$
$$\phi_t([26,30,30,35]) = \frac{26+30+2\cdot 35}{4} = 31.5.$$

Thus, the earliest start time activity 6 is equal $T_6^e = [26,30,30,35]$. In a similar way we should calculate the values for other activities in the considered project structure.

Step 8 of the proposed approach allows to determinate the latest start times of activity. The calculations at this stage are carried out in the opposite direction (backward pass), according to the formula (12). The value of T_n^l is assumed to be the earliest start time of the last activity, i.e. $T_n^l = T_n^e$. In the present case it means that $T_{10}^e = [93,99,99,107]$.

The latest start times of individual activities in the considered project were subsequently calculated. Activities numbers 7, 8 and 9 have one successor, so we calculate them like:

$$T_9^l = min_{k\in S(9)}\{T_k^l\} - T_9 = T_{10}^l - T_9 = [93,99,99,107] - [31,33,33,35] = [62,66,66,72].$$

Activity number 6 precedes the implementation of two parallel activities, activity 7 and 8. In order to obtain the latest start date we should select the time for which the defuzification value is the smallest one:

$$T_6^l = min_{k\in S(6)}\{T_k^l\} - T_6 = min\{T_7^l, T_8^l\} - T_6 = min\{[47,53,53,60], [54,59,59,66]\} - [21,23,23,25].$$

Because we have more than one value we should choose the time for which defuzzification value receives the greatest value. Therefore:

$$\phi_t([47,53,53,60]]) = 55;\quad \phi_t([54,59,59,66]) = 61.25.$$

Then $T_6^l = [47,53,53,60] - [21,23,23,25] = [26,30,30,35]$.

After determining the latest start times of activities, the slack time should be calculated for individual project activities (step 9). The earliest and the latest start times of the considered activities and their slack times are presented in the Table 5.

Table 5: The earliest and latest start times and slack times obtained with using OFPERT method

Activity	The earliest start times of activities T_i^e [ATU]	The latest start times of activities T_i^l [ATU]	Slack time $Z(i)$ [ATU]	$\phi(Z(i)$ [ATU]	Critical activity
1	[0,0,0,0]	[0,0,0,0]	[0,0,0,0]	0	yes
2	[2,4,4,6]	[2,4,4,6]	[0,0,0,0]	0	yes
3	[14,17,17,20]	[24,27,27,30]	[10,10,10,10]	10	no
4	[14,17,17,20]	[15,17,17,20]	[1,0,0,0]	0.25	no
5	[14,17,17,20]	[14,17,17,20]	[0,0,0,0]	0	yes
6	[26,30,30,35]	[26,30,30,35]	[0,0,0,0]	0	yes
7	[47,53,53,60]	[47,53,53,60]	[0,0,0,0]	0	yes
8	[47,53,53,60]	[54,59,59,66]	[7,6,6,6]	6.25	no
9	[62,66,66,72]	[62,66,66,72]	[0,0,0,0]	0	yes
10	[93,99,99,107]	[93,99,99,107]	[0,0,0,0]	0	yes

The critical path is 1-2-5-6-7-9-10. The total completion time of the considered project is equal: $[93,99,99,107] + [6,7,7,8] = [99,106,106,115]$ ATU. It means that the total completion time of the considered project lower than 99 ATU and bigger than 115 ATU is impossible. In this case the total completion time equal 106 ATU is the most possible, and the remaining values are likely to varying degrees, but the more the closer they are to 106 ATU. The project completion time is equal to 108.75 ATU according to OFPERT considering the optimistic, most likely and pessimistic states for the durations of activities estimated by experts.

$$\phi_t([99,106,106,115]) = 108{,}75 \text{ ATU.}$$

Conclusions

The paper presents the theoretical foundations of new methods named OFCPM and OFPERT. Classical CPM and PERT methods were replaced by new ones. The OFCPM and OFPERT methods allow to define not precisely known duration time, ordered fuzzy numbers are shown to be relevant to the exact nature of the problem rather than deterministic CPM or probabilistic PERT.

These methods are based on classical CPM and PERT methods with using fuzzy logic. The ordered fuzzy numbers are used to estimate duration time of project tasks. The project tasks are estimated by experts on their experience and knowledge. The duration time expressed by experts on their opinions were obtained in the optimistic, pessimistic, and the most likely states and expressed as ordered fuzzy numbers. In according to OFPERT the final estimation was done after averaging data of each project tasks.

The comparison of new ordered approaches to existing deterministic and stochastic ones is under study. Future work will focus on applying these new methods and dealing with the complexity of time-constrained resource availability. The extended developed techniques based on ordered fuzzy numbers can be treated by project managers as a decisional support system to manage a project.

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Work Stress Mechanism in Decreasing Turnover Intention Through Job Satisfaction

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Abstract

Turnover intention is a personal condition where employees actively seek work opportunities in other organizations. One of the causes of turnover intention is work dissatisfaction and the inability of employees to manage work stress. This study aims to test the traditional turnover theory by analyzing work stress mechanisms in reducing turnover intention through job satisfaction. Using 101 employee samples, this study was conducted by distributing questionnaires as the main instrument. The collected data is analyzed using Path Analysis to test the proposed hypothesis. The findings showed all hypotheses were accepted. Work stress has a significant effect on job satisfaction and has a significant effect on turnover intention. Job satisfaction has a significant effect on turnover intention. Furthermore, job satisfaction significantly mediates the effect of work stress on turnover intention. The findings of this study support the traditional turnover theory that employees who feel satisfaction at work tend to prefer to remain in the organization.

Keywords: work stress, job satisfaction, turnover intention

Introduction

Employee turnover that is initiated by the existence of turnover intention has received attention from researchers and is a serious problem in all organizations because it can interfere with organizational performance (Choi et al., 2019). Normal employee turnover if it ranges between 5-10 percent per year and to be high if it reaches more than 10 percent (Gorrell & Langenbach, 1994 and Branham, 2009). PT. Fastrata Buana Denpasar is a distributor under Kapal Api Group which has a high employee turnover rate. Employee turnover data (Figure 1) in 2014 was 10.48%, in 2015 it was 11.27%, in 2016 it was 10.67%, in 2017 was 12.14%, and in 2018 it was 12.23%. Fahrizal and Utama (2017) state that employee turnover should not be above 10 percent in one year because it can interfere with organizational performance. Employee turnover intentions that are not handled properly can quickly lead to more employee turnover (Tripathi and Pandey, 2017). This shows that the intention of employees to leave the organization is in line with the level of employee turnover that occurs.

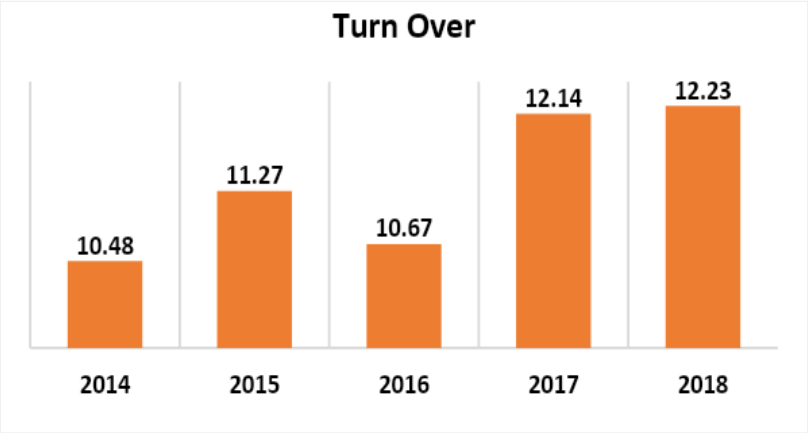

Figure 1: Employee Turnover

Turnover intention is also the intention of employees to leave the organization by showing a less friendly attitude towards the organization (Santhanam et al, 2017) so that it has an impact on the instability of work conditions. Sartika, (2014) stated that turnover can lead to high human resources management costs, such as training and recruitment costs. There are several factors that affect turnover intention, including job satisfaction (Sutanto and Gunawan, 2013). Most employees who wish to leave the organization due to dissatisfaction at work, thereby increasing the intention to leave the organization (Kristanto, et al., 2014). In addition to job satisfaction, work stress can also be a trigger for turnover intention (Siddiqui and Jamil, 2015). Stress at work is the main issue that is most difficult to avoid at work (Parvaiz et al., 2015). Hlatywayo et al. (2014) stated that stress is a condition in which an employee experiences changes in emotions, thought processes, and certain conditions. Employees who are required to work with high achievement often experience work stress. Ongoing work stress can reduce perceived job satisfaction and result in the intention to leave an organization.

Several research findings have indicated that work stress has a significant positive effect on turnover intention (Syahronica et al. 2015; Suciati et al., 2015; Manurung and Ratnawati, 2012). In contrast, research (Dewi and Netra, 2015; Tukimin, 2014; Adelia and Mujiati, 2016) found that work stress has a negative effect on job satisfaction. Other findings suggest that job satisfaction has a negative effect on turnover intention (Foon et al., 2010; Dewi and Wibawa, 2016). Furthermore (Basri, 2017; Indrayani, 2012) stated that the effect of work stress on turnover intention is mediated by job satisfaction. Satisfied employees tend to feel lower levels of work stress (Choi et al., 2019; Alam et al., 2019; Courtney, & Phelan, 2019). This study aims to analyze the mechanism of work stress reducing turnover intention through job satisfaction. In addition, this study aims to analyze the role of job satisfaction mediating the effect of work stress on turnover intention. This study also aims to examine the traditional turnover theory that predicts employee turnover behavior as a result of attitudes at work.

Literature Review

This study examines the traditional turnover theory (Harman et al., 2007) which stated that employees who leave an organization tend to have negative work attitudes. The traditional turnover theory also explains how employees feel dissatisfied with their work and thus find a new job. Zhao and Liu, (2010) asserted that employees who feel satisfaction at work are believed to not leave the organization within a certain period of time, but work stress can reduce job satisfaction. Robbins and Judge (2014: 429) stated that stress is an unpleasant psychological process that occurs as a reaction to pressures from the surroundings. Stress also arises when employees are unable to cope with perceived stresses in their work (Jamadin et al., 2015). Employees who have high work stress tend to experience lower job satisfaction (Dewi et al., 2014; Ariana and Riana, 2016). Research conducted by

(Usyal, 2019; Chichra et al., 2019; Lambert et al., 2018) found that work stress can significantly reduce job satisfaction.

Excessive work stress can also trigger the intention of employees to leave the organization, even potentially leaving the organization in the near future. This opinion shows that turnover intention is the intention to move but has not yet reached the stage of realization. Irvianti and Verina (2015) stated that turnover is a tangible manifestation of turnover intention which can be a serious problem for organizations, especially when employees who have the expertise, ability, experience and who are skilled are moving out of the organization. One of the factors triggering turnover intention is work stress as a result of the inability of employees to cope with work pressure (Jamadin et al., 2015). The high work stress of employees that result in employees' intention to leave the organization is increasing (Parvaiz et al., 2015; Mitchell et al., 2014). Research conducted by (Johartono and Thistle, 2013; Rai, 2015; Putra and Mujiati, 2019) found that work stress has a significant positive effect on turnover intention. Workloads that are felt to be too high can trigger the emergence of work stress that results in higher employee intentions to leave the organization.

In addition to work stress, another factor that can affect turnover intention is job satisfaction. As a work attitude, job satisfaction is an evaluation conducted by employees on the environment at work. Job satisfaction is a positive or negative feeling about a job that is generated towards evaluating job characteristics (Riana et al., 2018; Robbins and Judge, 2014: 46). Job satisfaction is one of the most important work attitudes because employee satisfaction can reduce the level of work stress and turnover intention (Wisantyo and Madiistriyatno, 2015). Research conducted by (Saeed et al., 2014; Candra and Riana, 2017) found that employees who are satisfied with their work tend to wish to remain in the organization.

Employees who feel pressured at work can increase feelings of dissatisfaction with the organization, and consider leaving the organization (Liu et al., 2019). Research conducted by Andini et al. (2018) found that job satisfaction mediates the effect of work stress on turnover intention. Employees who feel pressured in working indirectly feel dissatisfied with their work, which in turn causes turnover intention. Research conducted by (Sheraz et al., 2014; Tziner et al., 2015) suggested that work stress has a positive impact on turnover intention mediated by job satisfaction. Employees who experience high stress can reduce perceived satisfaction at work, causing a intention to leave the organization. Thus, job satisfaction is an important work attitude in reducing turnover intention as a result of work stress.

H_1: Work stress has a negative and significant effect on job satisfaction
H_2 : Work stress has a positive and significant effect on turnover intention
H_3 : Job satisfaction has a negative and significant effect on turnover intention
H_4 : Job satisfaction mediates the effect of work stress on turnover intention

Research Methodology

This study uses a quantitative design by distributing questionnaires using a Likert scale, from scale 1 show strongly disagree to scale 5 which shows strongly agree. The study population was employees of PT. Fastrata Buana Denpasar by using a questionnaire distributed to all employees at one-month intervals. A total of 105 questionnaires were distributed to all employees, 101 questionnaires were filled in completely and declared valid and 4 questionnaires were not returned. Turnover intention measurement was adopted from research conducted by Jehanzeb et al., (2013), work stress was adopted from research conducted by Qureshi et al. (2012) and job satisfaction refers to research indicators of Riana et al. (2018). Furthermore, the data collected was analyzed with Path Analysis to test hypotheses and Sobel Test to test indirect effects (mediation). The profile of research respondents is shown in Table 1 below.

Table 1: Respondent Profile

Age		Education	
21 - 26 years	19.8 %	Senior High School	11.9 %
27 - 32 years	52.5 %	Diploma	42.6 %
33 - 38 years	20.8 %	Bachelor	45.5 %
39 - 44 years	6,9 %	Work Duration	
Gender		< 3 years	30.7 %
Male	36.6 %	3 - 5 years	40.6 %
Female	63.4 %	> 5 years	28.7 %

Findings and Discussion

Validity and Reliability Tests

The validity test is conducted by analyzing the correlation between the scores of instrument items in a factor with the total score. Reliability shows the extent to which a measurement can produce a consistent analysis if it is measured several times on the same object (Sugiyono, 2017: 130). The results of the Validity and Reliability Test are shown in the following Table 2.

Table 2: Validity and Reliability Tests Results

Variable	Item	Validity		Remarks
		Correlation	Cut off	
Work Stress (X) α 0.856 (>0,60) (reliable)	($X_{1.1}$)	0,798	0,3	Valid
	($X_{1.2}$)	0,798	0,3	Valid
	($X_{1.3}$)	0,842	0,3	Valid
	($X_{1.4}$)	0,683	0,3	Valid
	($X_{1.5}$)	0,892	0,3	Valid
	($X_{1.6}$)	0,826	0,3	Valid
	($X_{1.7}$)	0,910	0,3	Valid
	($X_{1.8}$)	0,954	0,3	Valid
Job satisfaction (M) α 0.907 (>0,60) (reliable)	($M_{1.1}$)	0,968	0,3	Valid
	($M_{1.2}$)	0,932	0,3	Valid
	($M_{1.3}$)	0,930	0,3	Valid
	($M_{1.4}$)	0,970	0,3	Valid
	($M_{1.5}$)	0,948	0,3	Valid
Turnover Intention (Y) α 0.890 (>0,60) (reliable)	($Y_{1.1}$)	0,868	0,3	Valid
	($Y_{1.2}$)	0,846	0,3	Valid
	($Y_{1.3}$)	0,906	0,3	Valid

Table 2 informs that the model adequately meets the validity and reliability criteria. This can be seen from all correlation values (r) are showing numbers above the standard that is 0.3. Table 2 also shows the Cronbach's Alpha value is above the standard of 0.6. Based on these results, the model is said to be feasible because it meets the adequate criteria of validity and reliability (Sugiono, 2017).

Direct and Indirect Effect

Analysis of direct, indirect, or total effect, can explain the relationship between research variables. These variables are work stress, job satisfaction, and turnover intention. The direct effect is shown by a line coefficient, in contrary, the indirect effect occurs through the role of an intermediate variable.

Path Analysis

Path coefficient calculation is conducted by regression analysis and the results obtained are shown in the following table.

Table 3: Path Analysis Regression 1 Result

Model	*Unstandardized Coefficients*		*Standardized Coefficients*	t	Sig.
	B	Std. Error			
(Constant)	5,547	0,179		30,956	0,000
Work Stress (X)	-0,620	0,063	-0,706	-9,906	0,000
R^2					0,498
F Calculation					98,138
Sig. F					0,000
dependent	Job satisfaction				

The results of path analysis substructure 1 in Table 3 shows the structural equations according to the following formula.

$$M = \beta_1 X + e_1 \Rightarrow M = -0{,}706X + e_1$$

Table 4: Path Analysis Regression 2 Result

Model	*Unstandardized Coefficients*		*Standardized Coefficients*	t	Sig.
	B	Std. Error			
(Constant)	1,849	0,447		4,136	0,000
Work Stress (X)	0,716	0,067	0,667	10,615	0,000
Job satisfaction (M)	-0,356	0,077	-0,292	-4,643	0,000
R^2					0,805
F Calculation					202,897
Sig. F					0,000
dependent	Intention to leave				

The results of path analysis substructure 2 in Table 4 shows the structural equations according to the following formula.

$$Y = \beta_2 X + \beta_3 M + e_2 \Rightarrow Y = 0{,}667X - 0{,}292M + e_2$$

The coefficient of determination (R^2m) and error (e) calculation

Based on the substructure 1 and 2 models, the final path diagram model can be arranged. Before compiling the final path diagram, the default error value was firstly calculated as follows.

$Pe_i = \sqrt{1 - Ri^2}\sqrt{1 - Ri^2}$ => $Pe_1 = \sqrt{1 - 0{,}498}\sqrt{1 - 0{,}498} = 0{,}709$

$Pe_2 = \sqrt{1 - R2^2} = \sqrt{1 - 0{,}805} = 0{,}442$

Based on the effect of error calculation (Pe_i), the result of the effect of error (Pe_1) is 0.709 and the effect of error (Pe_2) is 0.442. The results of the total determination coefficient are as follows.

$R^2m = 1 - (Pe_1)^2 (Pe_2)^2$

$= 1 - (0{,}709)^2 (0{,}442)^2 = 1 - (0{,}503)(0{,}195) = 1 - 0{,}098 = 0{,}902$

A total determination value of 0.902 indicates that 90.2 percent of employee turnover intention variation can be explained by work stress and satisfaction, while the remaining 9.8 percent is explained by other factors outside the model. Based on Tables 3 and 4 it can also be concluded that the three hypotheses of direct influence are accepted. Furthermore, to analyze the indirect effect of work stress on turnover intention through job satisfaction, the Sobel Test is used as follows.

$$Z = \frac{ab}{\sqrt{b^2Sa^2 + a^2\ Sb^2\ + Sa^2Sb^2}}$$

Information:

a= 0,706; Sa= 0,063; b= 0,292; Sb= 0,077

$$Z = \frac{0{,}706\ \times 0{,}292}{\sqrt{0{,}292^2 0{,}063^2 + 0{,}706^2\ 0{,}077^2\ + 0{,}063^2 0{,}077^2}}$$

$$Z = \frac{0{,}2062}{\sqrt{0{,}0033}}$$

$$Z = \frac{0{,}2062}{0{,}057595}$$

Z = 3,5793 = 3,58

Hypothesis Testing Results

The analysis results of the work stress's effect on job satisfaction obtained are the value of Sig. t of 0,000 with a beta coefficient (ß) -0.706. Sig. Value t 0,000 ≤ 0.05 indicates that H0 is rejected and H1 is accepted. This result means that work stress has a significant negative effect on job satisfaction. The analysis results of the work stress's effect on turnover intention obtained are Sig. t of 0,000 with a beta coefficient (ß) of 0.667. Sig. Value t 0,000 ≤ 0.05 indicates that H0 is rejected and H1 is accepted. This result means that work stress has a significant positive effect on turnover intention. The analysis results of job satisfaction's effect on turnover intention obtained are Sig. t of 0,000 with a beta coefficient (ß) -0.292. Sig. Value t 0,000 ≤ 0.05 indicates that H0 is rejected and H1 is accepted. This result means that job satisfaction has a significant positive effect on turnover intention. Furthermore, the effect of work stress on turnover intention through job satisfaction with the Sobel Test obtained 3.58 results in which the number was greater than 1.96. Therefore, work stress has an indirect significant effect on turnover intention through job satisfaction.

Finding and Discussion

Turnover intention is the desire of employees to leave the organization by showing certain negative work attitudes (Santhanam et al, 2017). There are three indications that employees have the turnover intention (Jehanzeb et al., 2013), such as the intention to leave, find another job, and leave the organization in the near future. For employees to not have the intention to leave the organization,

employees must have a high level of job satisfaction (Wisantyo and Madiistriyatno, 2015). Job satisfaction is a positive or negative feeling about the employee's work environment (Robbins and Judge, 2017). Several indicators can be used to find out the level of job satisfaction (Riana et al., 2018) such as the job itself, salary, promotion opportunities, supervision, and satisfaction with colleagues. In addition to job satisfaction, employees are also demanded to be able to manage work stress levels so as not to cause the intention to leave the organization (Johartono and Thistle, 2013; Rai, 2015; Putra and Mujiati, 2019). Robbins and Judge (2017) stated that stress is an unpleasant psychological process as a reaction to pressures from surroundings. Employees who can control various pressures at work tend to be able to manage work stress thereby reducing the intention to leave the organization.

The findings of this study also found that work stress has a negative and significant effect on job satisfaction (Okumus et al., 2019: Courtney & Phelan, 2019). Employees who feel excessive work stress can reduce perceived job satisfaction, and vice versa (Lee & Kim, 2019). Employees who are given jobs outside their limits can cause various stresses for employees. When employees often feel pressured, the level of job satisfaction felt by employees tends to decrease. The results also found that work stress has a positive and significant effect on turnover intention. Employees who feel pressured at work can increase the level of work stress which leads to cause the intention to leave the organization. The intention of employees to leave the organization has the potential to harm the organization due to employees who have been trained are moving out of the organization.

Research findings also found that job satisfaction has a negative and significant effect on turnover intention. Employees who feel satisfaction at work can reduce turnover intention. However, employees who have low job satisfaction due to salaries and benefits that are not in accordance with the workload and are not satisfied with their work have the potential to have a stronger intention to leave the organization. In accordance with traditional turnover theory (Zhao and Liu, 2010), employees who have high job satisfaction are believed to remain in the organization. The results also prove that work stress can affect turnover intention through job satisfaction. Employees who feel work stress directly have the intention to leave the organization. However, when employees feel satisfied, the intention to leave the organization decreases (Rajamohan., 2019; Johnson & Yanson, 2018; Kim and Kang., 2018).

Conclusions, Implications, And Limitations

The work stress mechanism decreases turnover intention through job satisfaction can be proven. Employees who feel high work stress can reduce job satisfaction and lead to an intention to leave the organization. Furthermore, employees who feel high job satisfaction can reduce the intention to leave the organization, and vice versa if job satisfaction felt by employees is low, then the intention to leave the organization increased. The findings of this study inform that work stress felt by employees can reduce employee intention to leave the organization when employees feel satisfaction at work. In other words, job satisfaction plays an important role in reducing the effect of work stress on intention turnover. Satisfied employees tend to be able to manage work stress levels, reducing the intention to leave the organization.

The implications of this study indicate that work stress has a direct or indirect effect on turnover intention through job satisfaction. Theoretically, the results of this study confirm the Traditional Turnover Theory, that organizations that always pay attention to employee job satisfaction can reduce the intention of its employees to leave the organization. The findings of this study provide implications for human resource development strategies to pay more attention to indicators of work stress and job satisfaction. The high level of fatigue at work that is felt by employees of the existing workload, low satisfaction with colleagues must be a serious concern of management to reduce employee intentions to leave the organization. This research has limitations because it is done in one organization so it must be tested again in another organization. Also, perception research using cross section data tends to experience changes in respondents' perceptions of the statements in the questionnaire.

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Occupational Safety Management in the European Union and Soft Factors in Accident Severity Assessment

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Abstract

The activities of the European Union (EU) in regard to occupational health and safety have its legislative foundations in Article 153 of the EU Treaty (Asfaw at el 2013; Besnard and Hollnagel, 2014). In the 28 member states of the EU (EU-28), 2015 recorded over 3.2 million workplace accidents which invoked at least 4 day work leaves and 3,876 deaths. The authors of this analysis present the issue of workplace accidents based on the examination of incidents in large foodstuff plants of the Lodz voivodship i.e. food processing businesses that have been continuously active for the five year period of 2008-2012. The analysis determines the correlations between months, hours, seniority, workstations, and workplace accidents. In the examined five year period (2008-2012), the incidence of workplace accidents in the foodstuff industry rose by 29%. The analysis results indicate that most workplace accidents occur in March, May and July i.e. the months when the foodstuff sector has its most intensive activity. The majority of accidents occurred to people who were employed at a given position for less than a year. The results further indicated that those workplace accidents happened to individuals employed in physical work positions.

Keywords: Occupational Safety Management, Foodstuff Industry, Workplace Accidents, Sustainability

Introduction

The EU strategy in the area of health protection in the workplace declares that occupational health and safety is one the most important and most advanced aspects of EU policy (Zielińska, 2017).

In the book by Zielińska (2018) in 2015, there were just over 3.2 million non-fatal accidents that resulted in at least four calendar days of absence from work in the EU-28 (Eurostat Statistics Explained). There was a decrease in the total number of non-fatal accidents at work in the EU-28 between 2010 and 2015, some 370 thousand fewer (equivalent to an overall reduction of 10.3 %). A closer examination reveals that the decrease was in fact recorded between 2010 and 2012, after which the number of non-fatal accidents at work was relatively stable, with changes between -1.2 % and 3.0 % each year during the period 2013-2015 (Bellamy, 2015). The decrease in the incidence rate (number of non-fatal accidents at work for every 100 000 persons employed) between 2010 and 2015 (down 10.9 %) was slightly greater than the decrease for the number of non-fatal accidents, reflecting modest growth in the total number of persons employed. In absolute terms, non-fatal accidents in the EU-28 were most common in manufacturing, where 625 thousand people had non-fatal accidents in 2015, 19.5 % of the total (Zielińska and Bajdur, 2019).

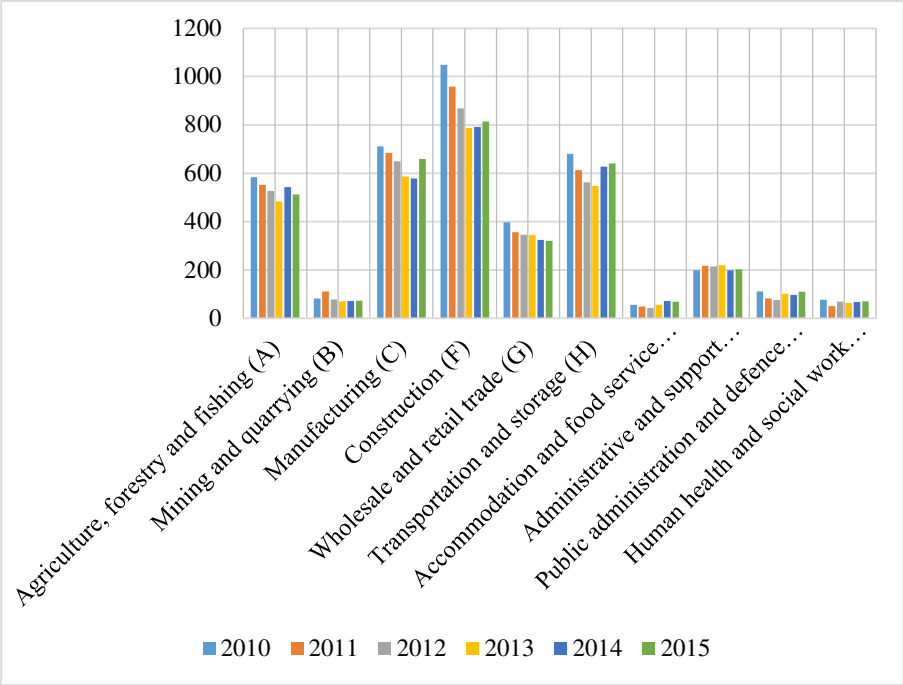

Fig. 1: Fatal accidents at work, by economic activity, UE-28, 2010-2015

In absolute terms, fatal accidents were most common in construction, where 815 people in the EU-28 had fatal accidents in 2015, 21.0 % of the total. Manufacturing (17.0 %), transportation and storage (16.5 %) and agriculture, forestry and fishing (13.2 %) also accounted for more than one tenth of all fatal accidents at work (Eurostat, 2013). In 2015, the highest incidence of fatal accidents at work was observed in mining and quarrying, with 73 fatal accidents, equivalent to 9.5 per 100 000 persons employed. Construction (6.2 per 100 000), transportation and storage (5.8 per 100 000) and agriculture, forestry and fishing (5.7 per 100 000 persons employed) were the only other NACE sections with incidence rates above 2.0 per 100 000 persons employed (Eurostat Statistics Explained). Among the activities shown in Figure 1, the lowest incidence rate was for human health and social work activities, which also recorded the largest decrease in its incidence rate between 2010 and 2015.

The Employers of Poland association has developed a Responsible Business Code which contains the principles of a responsible business (Barwickam, 2011). In it the association stresses the business' responsibility to the community for decisions and activities in reference society and the environment which should be guided by transparency and ethical behaviour (Bird and Germain, 1996). The activity of these companies should take into consideration the opinions of interested parties, act in accordance with the law and international norms and participate in the sustainable development of society (Carrillo-Castrillo et al 2016; Maciołek and Zielińska 2012).

The issue of workplace accidents is current in spite of technical progress and better training of OHS personnel to intercede in order to prevent these events, and the incidence of accidents continues to remain high (Dziekoński and Zielińska, 2017; Zielińska 2017). Workplace accidents are the primary measure of occupational danger occurring in inappropriate environmental conditions (Ordysiński, 2013). They also occur through not observing what is widely considered 'safety culture' i.e. improper employee behavior and poor work organization as defined by OHS [Norimitsu, 2015 and Pracodawcy, 2012).

Proper work conditions and preventive efforts in the area of OHS have a direct impact in reducing the number of workplace accidents (Dziekńsk and Zielińska 2017; Ślawska, 2010). They also serve to protect the health and life of individuals hired in plants (Cellier et al, 1995).

For many years, various plants have applied various material and moral incentives to encourage active participation in forming safe work conditions (Dziekoński and Zielińska, 2017). There are also legal codes defining disciplinary responsibility – official and punitive – for not observing OHS regulations and fulfilling responsibilities in this area (Bräunig, and Kohstall, 2013).

Materials and Methods

The study focuses on the correlations between months, hours, seniority, work station and workplace accidents, which occurred in large foodstuff plants in the Łódź voivodship. The plants considered were those continuously operated during the five year period of 2008-2012.

The research was carried out on large food processing companies that operate in the Łódź province which operated continuously between the years 2008-2012, in which only companies employing more than 50 employees. The main criterion for selection was that the companies' business activity was conducted within the Łódź province in the food industry. Complete data for 116 food industry companies was obtained through questionnaires. The information and source materials were collected during visits to the selected companies with the use of the questionnaire generated by the author, together with observations of labour in the production lines. Verification of collected information was carried out during similar interviews and conversations with OSH specialists at the studied companies.

Analysis of the Results

For the selected group of businesses, there is a marked increase of workplace accidents – from 258 in 2008, to 333 incidents in 2012 – for the study period in that the lowest incidence occurred in 2009 (211 accidents), and the highest in 2011 (358 accidents).

During the study regarding workplace accident tendency rates in the selected plants, a number of external factors were determined which may have impact on the accident rates in said plants. Correlation assessment was made between months of the year, worktime of employees, seniority and length of time at a given workstation, and the number of workplace accidents. Firstly, the dependency between number of workplace accidents and month of said accidents (figure 2).

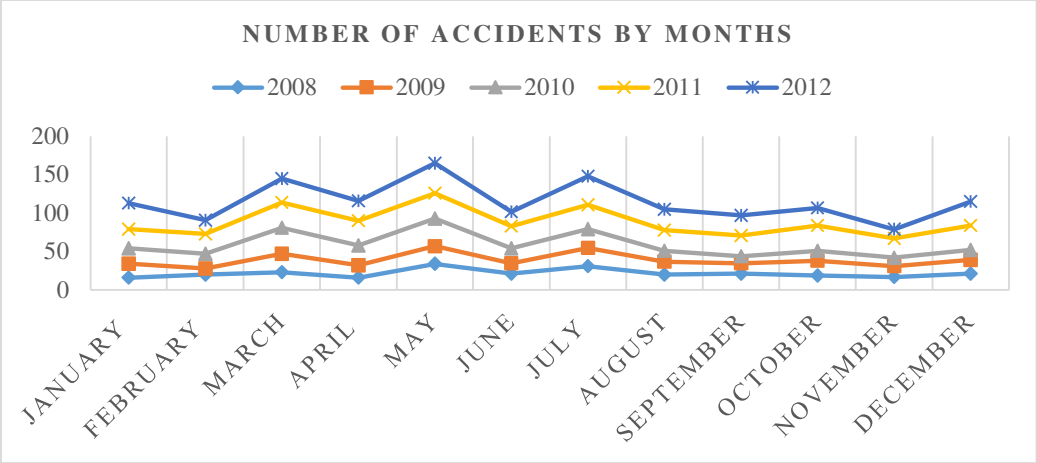

Fig. 2: General Workplace Accident Incidence Structure at Selected Foodstuff Industry Plants by Months (2008-2012)

As shown in Drawing 2, workplace accidents in foodstuff plants most frequently occurred in March, April, May, June, July and August i.e. the months of most intensive production.

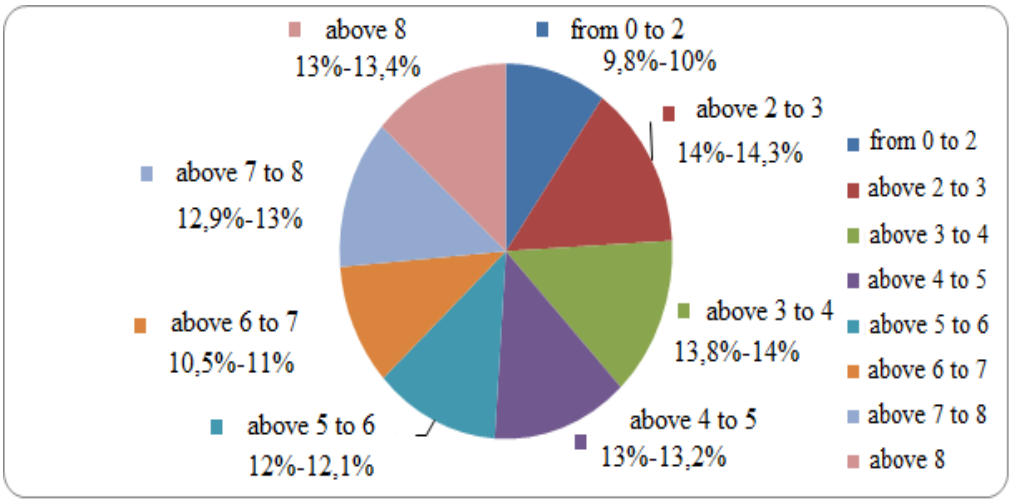

Fig. 3: General Workplace Accident Incidence Structure at Selected Foodstuff Industry Plants by Shift Hours (2008-2012) in average %

The next factor analyzed was the hours worked by an employee during the day. Results indicate (shown in Drawings 3 and 4) most accidents occurred during the early hours of the shift i.e. hours 1 to 4. This may be a result of the preparatory activities of employees during the initial hours of a shift which activities demand a high degree of concentration and attention. However, noticeable is the rise of accident incidence at the end of the shift – hour 7 and up. This may be a result of fatigue after seven hours of work when mistakes in servicing and operating machines are easier to make.

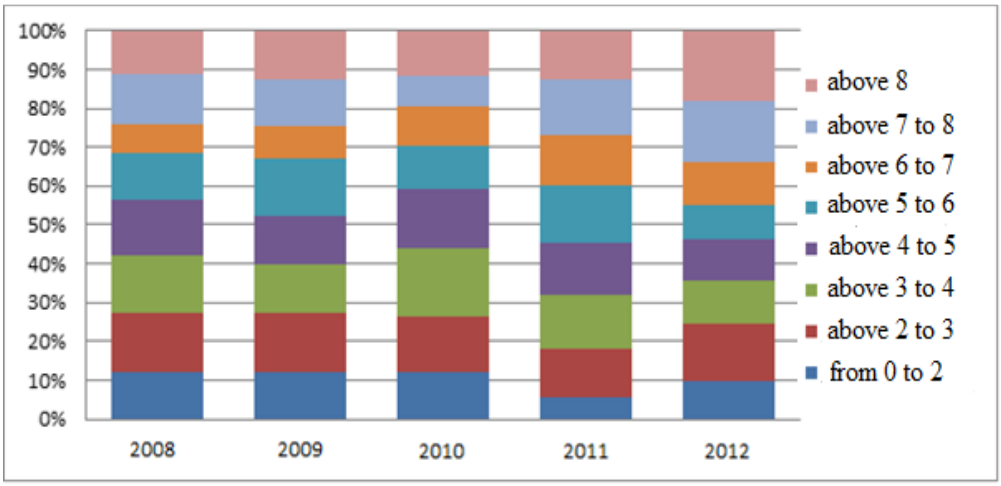

Fig. 4: Workplace Accident Incidence Structure at Selected Foodstuff Industry Plants by Hours (2008-2012) in average %

As shown in Drawings 3 and 4, most workplace accidents in the selected industrial sector occurred between shift hours 2 and 3, which may indicate a need to establish a break so employees may refresh themselves after 2 hours of work.

The next correlation analysis pertained to hours at work, the number of workplace accidents per 100 employees in the selected plants. In plants concerned with processing and preserving meat, and meat

production, there was no observable rise of incidence in any of the hours, whereas the results of Table 1 indicate that all shift hours noted high accident incidence. This condition may be caused by the specific production and preserving processes of the job(s) in the use of sharp tools.

Table 1: Workplace Accident Incidence per 100 Employees in Selected Meat Processing and Preserving and Other Meat Products Plants (2008-2012) on the Basis of Initial Shift Hours

Year	Initial Shift Hours							
	from 0 to 2	**above 2 to 3**	**above 3 to 4**	**above 4 to 5**	**above 5 to 6**	**above 6 to 7**	**above 7 to 8**	**above 8**
2008	0,19	0,34	0,31	0,22	0,36	0,19	0,24	0,22
2009	0,25	0,35	0,23	0,20	0,27	0,07	0,13	0,15
2010	0,25	0,31	0,28	0,23	0,25	0,28	0,21	0,30
2011	0,26	0,37	0,41	0,36	0,45	0,47	**0,49**	0,47
2012	0,26	0,47	0,28	0,26	0,26	0,26	0,31	0,42

Table 2: Workplace Accident Incidence per 100 Employees in Production of Bakery and Cereal Products (2008-2012) on the Basis of Initial Shift Hours

Year	Initial Shift Hours							
	from 0 to 2	**above 2 to 3**	**above 3 to 4**	**above 4 to 5**	**above 5 to 6**	**above 6 to 7**	**above 7 to 8**	**above 8**
2008	0,23	0,23	0,16	0,31	0,08	0,16	0,23	0,39
2009	0,08	0,46	0,15	0,31	0,31	0,15	0,23	0,08
2010	0,16	0,31	0,47	0,16	0,08	0,00	0,08	0,31
2011	0,00	0,45	**0,53**	0,30	0,38	0,45	0,08	0,15
2012	0,07	0,00	0,29	0,22	0,07	0,51	0,22	0,37

The subsequent branch to be considered is the bakery and other grain products branch where analysis results show – as presented in Table 2 – that most accidents were noted between the 3rd and 4th hours of the shift. This may be caused through starting-up machinery after an extensive preparatory to production phase by employees. The fewest accidents occurred during the 2nd hour of the shift when preparation and production organization was undertaken.

Table 3: Workplace Accident Incidence per 100 Employees in Production of Dairy Products (2008-2012) on the Basis of Initial Shift Hours

Year	Initial Shift Hours							
	from 0 to 2	**above 2 to 3**	**above 3 to 4**	**above 4 to 5**	**above 5 to 6**	**above 6 to 7**	**above 7 to 8**	**above 8**
2008	0,39	0,33	0,29	0,36	0,10	0,00	0,23	0,10
2009	0,26	0,03	0,03	0,16	0,00	0,20	0,46	0,53
2010	0,22	0,19	0,51	0,51	0,22	0,06	0,03	0,13
2011	0,12	0,22	0,25	0,43	0,22	0,25	0,34	0,09
2012	0,31	0,18	0,25	0,15	0,18	0,18	**0,65**	0,40

In the segment of dairy product production, results of the analysis indicate (Table 3), most accidents occurred between the 4th and 5th hours of the shift, caused by the very specific nature of the segment.

Table 4: Workplace Accident Incidence per 100 Employees in Production of Dairy Products (2008-2012) on the Basis of Initial Shift Hours

Year	**Initial working hours**							
	from 0 to 2	**above 2 to 3**	**above 3 to 4**	**above 4 to 5**	**above 5 to 6**	**above 6 to 7**	**above 7 to 8**	**above 8**
2008	0,15	0,30	0,30	0,15	0,08	0,15	0,15	0,08
2009	0,08	0,00	0,23	0,08	0,30	0,15	0,00	0,00
2010	0,22	0,22	0,22	0,15	0,15	0,22	0,15	0,07
2011	0,00	0,40	0,16	0,40	0,57	0,16	0,40	0,65
2012	0,08	0,41	0,33	0,08	0,08	0,08	0,08	**0,82**

In the segment tied to processing and preserving fruits and vegetables (Table 4), it bears notice that most workplace accidents occurred during over-time i.e. beyond the 8th hour of the shift, potentially caused by intensified production during the shift.

Table 5 presents the data of the beverage segment and its accident rates where most accidents occurred between the 3rd and 4th shift hours potentially caused by the timing of certain activities by employees' i.e. the preparatory phase for production took up to three hours and then production was initiated which start-up then may have raised concerns indicating that production raised danger factors more than the preparatory and shutting-down phases.

Table 5: Workplace Accident Incidence per 100 Employees in Beverage Production (2008-2012) on the Basis of Initial Shift Hours

Year	Initial working hours							
	from 0 to 2	above 2 to 3	above 3 to 4	above 4 to 5	above 5 to 6	above 6 to 7	above 7 to 8	above 8
2008	0,00	0,00	0,09	0,24	0,05	0,09	0,28	0,24
2009	0,00	0,15	**0,31**	0,10	0,26	0,15	0,00	0,00
2010	0,05	0,05	0,00	0,05	0,05	0,10	0,05	0,05
2011	0,00	0,14	0,29	0,14	0,14	0,10	0,05	0,14
2012	0,18	0,13	0,09	0,22	0,13	0,22	0,18	0,09

In the case of the last examined foodstuff production segment – other food products (such as cocoa, chocolate, coffee, fish, etc.), there was no indication that a relation existed between accident incidence and the shift hours which is shown in Table 6. This may be a result of the variations between the producers and the product production character of the companies qualified for this foodstuff segment.

Table 6: Workplace Accident Incidence per 100 Employees in Remaining Food Products (cocoa, chocolate, coffee, fish, etc.) (2008-2012) on the Basis of Initial Shift Hours

Year	**Initial working hours**							
	from 0 to 2	**above 2 to 3**	**above 3 to 4**	**above 4 to 5**	**above 5 to 6**	**above 6 to 7**	**above 7 to 8**	**above 8**
2008	0,13	0,00	0,00	0,00	0,13	0,00	0,00	0,00
2009	0,00	0,13	0,00	0,26	0,26	0,13	0,00	0,00

2010	0,00	0,12	0,00	0,12	0,00	0,00	0,00	0,00
2011	0,00	0,12	0,12	0,12	0,24	0,00	0,35	0,00
2012	0,00	0,45	0,11	**0,57**	0,11	0,23	0,34	0,23

An interesting correlation surfaced after analysis of accident number in relation to employee seniority for a given workstation, namely the greatest number of workplace accidents happened to people who had the lowest seniority (less than one year) at a given workstation (Drawing 5) indicating that they had the least experience in carrying out their tasks. Conversely, those who had more than 20 year seniority had almost no accidents.

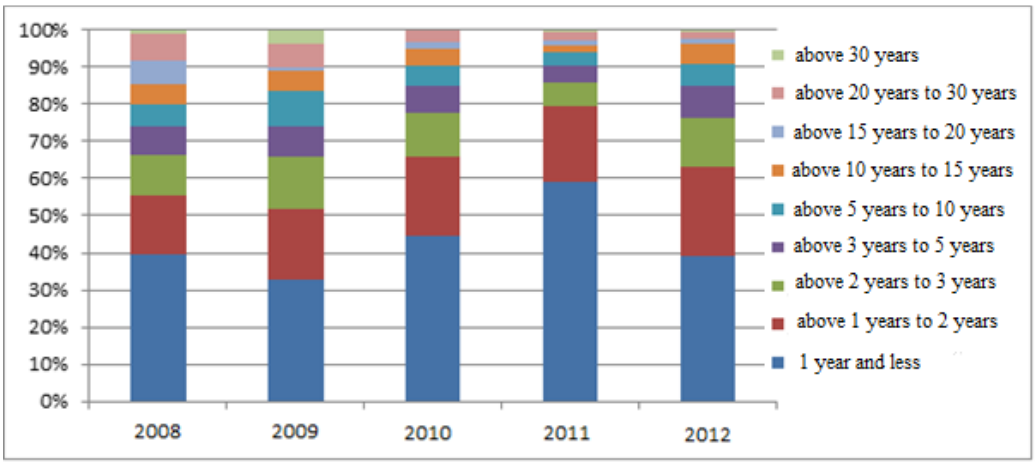

Fig. 5: Workplace Accident Incidence Structure at Selected Foodstuff Industry Plants by Months (2008-2012) in average %

It also bears noting that among the examined plants, over 65% of the workplace accidents occurred to people whose seniority was less than 3 years. This indicates a need to maintaining intensive preventive activities related to performing tasks by relatively new employees as they relate to any given workstation.

Table 7: Workplace Accident Incidence (by count) in Selected Foodstuff Industry Plants in Relation to Employee Seniority (2008-2012)

Year	Initial working hours								
	1 year and less	above 1 years to 2 years	above 2 years to 3 years	above 3 years to 5 years	above 5 years to 10 years	above 10 years to 15 years	above 15 years to 20 years	above 20 years to 30 years	above 30 years
2008	103	41	28	20	15	14	17	18	3
2009	68	39	29	17	20	11	2	13	8
2010	108	51	29	17	14	11	4	8	0
2011	**211**	72	24	16	13	6	5	8	2
2012	131	80	45	29	19	19	4	6	2

Considering both the results of Drawing 5 and Table 7, it remains to be said that the greatest need is employee training before starting any particular job and supplementing same during initial months on

the job. Furthermore, employees with low seniority should experience intensified oversight with the intention of workplace accident risk reduction. It is also essential to minimize employee turnover at given job stations which could be a contributing factor to accident rates.

Table 8 gives the breakdown of the relation between employee work seniority and accident incidence per 100 employees in the various branches.

Table 8: Employee Work Seniority and Workplace Accident Incidence Count per 100 Employees in Selected Branches (2008-2012)

Branch	Year	Initial working hours								
		1 year and less	above 1 years to 2	above 2 years to 3	above 3 years to 5	above 5 years to 10	above 10 years to 15	above 15 years to 20	above 20 years to 30	above 30 years
Processing and Preserving Meat and Meat Product Production	2008	0,90	0,40	0,30	0,24	0,10	0,09	0,03	0,04	0,00
	2009	0,45	0,38	0,25	0,18	0,20	0,12	0,03	0,03	0,00
	2010	0,79	0,49	0,25	0,21	0,15	0,13	0,03	0,05	0,00
	2011	**2,03**	0,65	0,19	0,15	0,13	0,08	0,02	0,05	0,00
	2012	0,91	0,57	0,34	0,23	0,15	0,23	0,05	0,05	0,00
Production of Bakery and Cereal Products	2008	0,93	0,31	0,31	0,08	0,08	0,00	0,00	0,00	0,00
	2009	0,69	0,31	0,31	0,23	0,08	0,00	0,00	0,00	0,00
	2010	0,86	0,47	0,23	0,08	0,08	0,00	0,00	0,00	0,00
	2011	**1,35**	0,60	0,30	0,15	0,23	0,00	0,00	0,00	0,00
	2012	0,95	0,59	0,44	0,22	0,00	0,00	0,00	0,00	0,00
Production of Dairy Products	2008	0,16	0,03	0,00	0,03	0,23	0,26	0,49	0,49	0,10
	2009	0,49	0,07	0,16	0,00	0,20	0,13	0,00	0,36	0,26
	2010	**1,06**	0,22	0,13	0,06	0,10	0,10	0,06	0,16	0,00
	2011	0,99	0,31	0,06	0,06	0,03	0,03	0,09	0,16	0,06
	2012	0,83	0,55	0,22	0,22	0,18	0,15	0,03	0,06	0,06
Processing and Preserving Fruits and Vegetables	2008	0,76	0,38	0,15	0,08	0,00	0,00	0,00	0,00	0,00
	2009	0,53	0,15	0,15	0,00	0,00	0,00	0,00	0,00	0,00
	2010	0,75	0,30	0,30	0,00	0,07	0,00	0,00	0,00	0,00
	2011	**1,62**	0,65	0,08	0,16	0,00	0,00	0,08	0,00	0,00
	2012	0,66	0,33	0,41	0,25	0,25	0,00	0,00	0,08	0,00
Beverage Production	2008	0,66	0,19	0,09	0,05	0,00	0,00	0,00	0,00	0,00
	2009	0,36	0,26	0,15	0,15	0,05	0,00	0,00	0,00	0,00
	2010	0,25	0,15	0,15	0,05	0,00	0,00	0,00	0,00	0,00
	2011	0,58	0,14	0,19	0,05	0,05	0,00	0,00	0,00	0,00
	2012	**0,76**	0,45	0,18	0,04	0,04	0,00	0,00	0,00	0,00
Remaining Food Products (cocoa, chocolate, coffee, fish, etc.)	2008	0,26	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	2009	0,38	0,38	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	2010	0,12	0,12	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	2011	0,47	0,35	0,12	0,00	0,00	0,00	0,00	0,00	0,00
	2012	**1,13**	0,57	0,23	0,11	0,00	0,00	0,00	0,00	0,00

Table 9: Number of accidents at work [pcs.] depending on the position held in the meat processing and preserving industry and the production of meat products (2008-2012)

Year	Position																				
	Packer	Sausage	Slaughterhouse worker	Butcher - sausage (student)	Employee inside the factory	Dealer	Destroyer, cutter	Mechanic	Garmazer	Electrician	Storekeeper	Storekeeper	Butcher	Sales Representative	Conservator	Archivist	Smoker	Auxiliary worker	Driver	Smoker's helper	Smoker of industrial boilers
2008	10	28	23	0	5	24	27	3	3	0	3	0	7	2	0	0	1	1	0	0	0
2009	6	15	14	2	4	23	19	1	2	1	2	0	7	1	0	0	1	0	0	0	0
2010	5	28	**32**	5	2	16	18	0	3	0	3	1	9	2	0	0	2	2	0	0	0
2011	17	27	29	2	6	24	24	6	17	0	6	2	12	11	3	0	3	4	3	2	2
2012	12	20	17	3	6	22	17	1	8	2	7	1	12	8	1	1	8	5	4	0	0

Table 9 presents workplace accident incidence in the meat processing and preserving, and meat products segment. The most frequent incidence of injury were individuals working in meat curing, slaughterhouse, sales, packaging, and meat cutting. The most reasonable explanation for this is the fact that these employees use sharp tools, especially knives.

Table 10: Number of accidents at work [pcs.] depending on the position held in the Production of Bakery and Cereal Products (2008 – 2012)

Year	**Position**												
	Dealer	**Mechanic**	**Sales Representative**	**Conservator**	**Auxiliary worker**	**Driver**	**Smoker's helper**	**Smoker of industrial boilers**	**Economic administrator**	**Production worker**	**Baker**	**Machine and equipment operator**	**Confectioner**
2008	0	0	3	0	1	0	0	0	1	3	11	0	3
2009	0	0	2	2	1	2	0	0	0	3	7	1	5
2010	0	0	0	0	0	2	0	0	0	1	**17**	0	2
2011	2	3	5	0	1	3	1	0	0	6	10	0	2
2012	0	0	0	0	0	4	1	1	1	4	12	1	4

Table 11: Number of accidents at work [pcs.] depending on the position held in the Production of Dairy Products (2008 – 2012)

Year	Position																					
	Employee inside the factory	Dealer	Mechanic	Storekeeper	Electrician	Sales Representative	Conservator	Auxiliary worker	Driver	Smoker's helper	Smoker of industrial boilers	Serovar	Camera powder	Pickup raw material	Operator of dispensing and packaging machines	The driver of the transport trolley	The instructor of raw materials service	Lab	Milkman's assistant	Economic administrator	Production worker	Machine and equipment operator
2008	0	0	2	2	0	0	0	0	**17**	4	3	7	2	4	4	0	0	2	7	1	0	0
2009	0	0	0	5	0	0	0	0	0	4	4	10	5	7	2	0	0	4	6	0	0	0
2010	1	0	3	1	1	3	1	2	7	0	0	4	2	4	7	0	0	1	9	1	6	6
2011	0	0	2	1	0	2	0	0	8	0	0	9	8	6	5	3	1	0	5	2	3	2
2012	0	3	2	3	1	7	1	3	12	0	1	8	1	2	2	1	1	2	2	0	13	10

The milk processing segment shows injuries to drivers, cheesemakers, production workers, and machine and equipment operators more so than those employed in internal transportation or sales.

Table 12: Number of accidents at work [pcs.] depending on the position held in the Processing and Preserving Fruits and Vegetables (2008 – 2012)

Year	Position																
	Packer	Slaughterhouse worker	employee inside the factory	Mechanic	Storekeeper	Electrician	Sales Representative	Conservator	Auxiliary worker	Driver	Smoker of industrial boilers	Pickup raw material	Operator of dispensing and packaging machines	Economic administrator	Production worker	Machine and equipment operator	Fruit and vegetable processing worker
2008	1	0	0	0	0	0	0	0	0	0	1	1	1	0	4	2	8
2009	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	7
2010	0	0	1	2	0	0	1	0	0	1	0	0	0	0	3	3	8
2011	1	1	0	0	1	0	0	0	0	0	0	0	1	0	7	8	**12**
2012	1	0	0	1	2	1	2	1	1	0	0	0	0	1	6	5	3

When considering the segment of processing and preserving fruits and vegetables (Table 12), the most frequently injured workers were those who operated machines and equipment and those who were directly involved in the processing of said fruits and vegetables. As in most previous segments, those having direct contact with machines and equipment were most frequently injured.

Table 13 presents the workplace accident incidence in the beverage segment which indicates that injuries occur most frequently to sales representatives, drivers, production workers, machine and

equipment operators and filling machine operators. The table indicates a high risk in the case these workstations and the need to refit equipment with additions to insure health and life safety.

Table 13: Number of accidents at work [pcs.] depending on the position held in the Beverage Production 2008 – 2012

Year	Position										
	A transport employee inside the factory	Mechanic	Magazynier	Sales Representative	Konserwator	Driver	The driver of the transport trolley	Economic administrator	Production worker	Machine and equipment operator	Operator of bottling equipment
2008	0	0	0	2	1	5	1	0	3	6	3
2009	0	1	2	1	1	4	0	0	3	4	3
2010	1	1	1	2	0	2	0	0	1	0	4
2011	0	0	0	5	0	5	0	0	5	4	2
2012	0	1	3	3	1	6	2	2	**10**	1	4

Table 14: Number of accidents at work [pcs.] depending on the position held in the Remaining Food Products (cocoa, chocolate, coffee, fish, etc.) 2008 – 2012

Yaer	**Position**									
	Employee inside the factoryzakładowego	**Dealer**	**Mechanic**	**Storekeeper**	**Electrician**	**Sales Representative**	**Konserwator**	**Driver**	**Production worker**	**Confectioner**	**Operator of bottling equipment**
2008	0	0	1	0	0	1	0	0	0	0	0
2009	1	0	1	0	1	1	0	0	1	0	1
2010	0	0	1	0	0	0	0	0	0	1	0
2011	0	0	1	1	0	0	0	1	4	0	1
2012	0	1	2	2	1	1	2	3	**6**	0	0

The last production segment analyzed is titled 'other food products' (cocoa, chocolate, coffee, fish, etc.) and here the greatest number of accidents occurred to mechanics and production workers i.e. people directly connected with servicing machines. As shown in Table 14, other workstations in this segment showed little injury and may have not been tied to any workstation. Therefore, in the case of plants in this segment, particular attention should be directed at training of personnel operating said machines.

The association analysis between workstation and workplace accident incidence suggests that injury risks depend on, among others, which industry segment. Furthermore, it was confirmed that regardless of industry segment, the highest risk was tied to workstations directly involved in machine and equipment operation. As a result, additional and focused attention should be made to these positions when considering preventive measures. In the industry segment of bakery and grain products, accidents occurred most frequently to individuals working as bakers, confectioners, production worker, and drivers.

Conclusions

The issues of workplace accidents and prevention have, or should have, essential attention the world over in terms of safe production of products, health protection and work environment development. Union members must strive to realize stated strategic goals including endorsing the general culture of respecting health and minimizing dangers through supporting change in the way employees behave while at the same time encouraging employers to adopt efforts concentrating on health and applying at state and Union levels appropriate economic premiums.

In 2015, there were 3 876 fatal accidents in the EU-28. There was a decrease in the total number of fatal accidents at work in the EU-28 between 2010 and 2015, some 573 fewer (equivalent to an overall reduction of 12.9 %). During this period the number of fatal accidents initially decreased from 4 449 to 3 674 by 2013 (down 17.4 %) before increasing 5.5 % between 2013 and 2015. The decrease in the incidence rate (number of fatal accidents at work for every 100 000 persons employed) between 2010 and 2015 (down 13.3 %) was slightly greater than the decrease for the number of fatal accidents. As such, the number and incidence of fatal accidents fell faster between 2010 and 2015 than did the equivalent indicators for non-fatal accidents.

In the five year period of the study (2008-2012), examining selected foodstuff plants, an increase of workplace accidents was noted of 29%. The study assisted by a survey indicates that the most accidents occurred in March, May and July – the months of highest production in the foodstuff sector. The highest occurrence of accidents was between the 2nd and 4th hours of a shift, which trend continues. This observation may be significant in encouraging a break during this high risk injury period. Most injuries occurred to people who lad less than 1 year's seniority at a given workstation. This may signal the importance of experience in the performance of employees and training new cadres in OHS procedures with additional attention in the first year of employment. The study also indicated that workplace accidents occurred to those employed in physical labor. With this in mind, special attention should be drawn in insuring these employees appropriate work conditions and comprehensive training pertaining to operating and servicing machines, equipment and tools.

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Precision Healthcare, the Next Step for Pursuing Customized Disorder Detection and Prediction Healthcare Systems

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Abstract

Precision Healthcare offers an approach to a personalized and patient-centered care that increases the impact and the adoption of evidence-based preventive interventions. Based on individual patient genetic profile in convergence with clinical, societal, environmental and lifestyle-related data, Precision Healthcare takes fully advantage of the advancements in digital technology and health research to reconfigure the traditional medicine approach by providing customized comprehensive healthcare managements at the right time. Moreover, it encompasses the shift of the patient into an active actor involved in most of the medical procedures and services that target him/her, highly-aware about the importance of personal data and personalized healthcare. In this context, Customized Disorder Detection and Prediction Healthcare Systems are becoming indispensable drivers for leveraging the quality and accuracy of early diagnostic, appropriate therapeutic protocols, prevention strategies and prediction models. This paper aims to present the most important features of Precision Healthcare that sustain Customized Disorder Detection and Prediction Healthcare Systems that are demanded by the current empowered patient. As a practical illustration of the above-mentioned key elements, RO-SmartAgeing system is presented as a case study. As a novel approach, the architecture of a further extension of this system using chatbots is included.

Keywords: Precision Healthcare, Wearables, Chatbot, Patient Monitoring, Disorder Detection, Prediction.

Introduction

Taking into account the enhanced requests for material and financial resources in healthcare systems, as well as the growing and improved engagement of citizens in the self-management of health, it has become necessary to implement a new model of patient-centered healthcare that it is based on patients' tailored services that takes into consideration their specific needs and expectations and the necessity of real communication between the health care professionals and the patients involved in conducting their own health.

Healthcare services are nowadays subject to a dynamic shift from "one-size-fits-all" approach towards a customized one that targets an individualized patient by integrating and connecting information and data about his specificities, needs, and lifestyles, in order to provide and support personalized care and healthcare decisions.

Traditional medicine is based on healthcare services and therapeutic protocols established on large population averages (i.e. “one-size-fits-all”); unfortunately, it is proved that some patients might react unexpectedly bad to the same disease or treatment, mainly because of their personal genetic profile, which it hasn’t been taken into consideration.

The late exponential increase access to huge amount of different data that can be integrated, analyzed and processed, together with the current worldwide societal, economic changes, and digital technology and medicine advances have been leading to the setting of a new type of healthcare: The Precision Healthcare.

Precision Healthcare aims to tailor healthcare services taking into consideration the differences and singularities that may arise among individuals from the point of view of their genes, medical history, way of living, clinical and environmental factors. By consolidating, integrating this data and with the help of analytics tools, each patient has bigger chances to have better evaluated risk factors, more accurate diagnoses, customized disease managements and adapted prevention strategies, at the right time.

The Precision Healthcare is based on the convergence between innovative digital technologies and new healthcare services, having the ability to support and provide better access to care and to offer new opportunities for customized and patient-centered medical acts.

New smart devices and technologies that allow real-time medical / environmental data and information collection, and the availability of massive amounts of patient-related data provide new approaches to customized health care delivery and new health care services.

One way to support the migration to Precision Healthcare is the deployment of heath care systems that gather and integrate a patient's medical data from in and out of a clinical environment in treatment protocols, remote monitoring programs, and preventive actions and measures.

The gradual shift from reactive to preventative healthcare implies not only the way disease detection, diagnosis, therapeutic protocols are changed due to the emerging technologies and tools, but also a dynamic transformation of the patient demands. Placing the patient in the center of the healthcare ecosystem and directions has imposed the burst of tailored medical services, as health applications for a personalized remote support or Customized Disorder Detection and Prediction Healthcare Systems.

This paper aims to highlight the strong impact of the main features of the Precision Healthcare in developing Customized Disorder Detection and Prediction Healthcare Systems. The paper is organized in three main sections:

- “Precision healthcare, the next generation of digital healthcare” – where a comprehensive presentation of the basic concepts of Precision Healthcare together with its benefits, opportunities and constrains are performed;
- “The patient-centered approach driving high request for tailored healthcare services”- the particular features of the current patients that empower them regarding their own health management are briefly reviewed in order to justify the need for developing appropriate healthcare services. The presentation of the key elements of the remote patient care represents a demonstration of the necessity for tailored healthcare services.
- “Customized Disorders Detection and Prediction Healthcare Systems” – after underlining the main characteristics and potential functionalities, the section briefly presents some up-to-date technologies used in precision healthcare as: smart wearables, chatbots, and Big healthcare Data Analytics. The main contribution of the authors is presented in the Case study: RO-SmartAgeing system, an ongoing project that can be classified as a Customized Disorder Detection Systems. Some specific aspects of RO-SmartAgeing that demonstrate its belonging to this category of systems are emphasized. A novel approach discussed in the paper is related to the use of chatbots as personal assistants of elderly people and an architecture is proposed. The authors

plan to provide this facility as a further extension of the system, aiming also at the decrease of related cost associate with seniors' healthcare.
- The paper also includes Conclusions, Acknowledgements and References.

Precision Healthcare, The Next Generation of Digital Healthcare

Digital Healthcare can be defined as an interaction among "mobile computational and connectivity capabilities, genomics, information systems, wireless sensors, cloud computing" (Gouda and Steinhubl. 2018) and Artificial Intelligence (AI) used for supporting the healthcare service delivery. It enables and facilitates more efficient, effective, accurate, safer medical procedures and actions, allowing them to be more personalized and patient-centered.

A person's health is determined by the conjunction of his/her genes/family history, daily behaviors, ambient factors, environmental interactions. Therefore, as each person reacts differently to an event, he/she also has distinct reactions to a specific disease and, consequently, varied responds to the same treatment.

Precision Healthcare acknowledges the unicity of each individual and the fact that all the issues above mentioned have a strong influence on his/her health status. Precision Healthcare is sometimes perceived as another face of Personalized Healthcare. Although they are both patient-centered, there are slightly differences between them: *Personalized Healthcare* aims to provide tailored medical management to a particular patient, considering his/her genetic profile and social context, whereas Precision Healthcare, also fundamentally based on genomics and patient's directly related daily life issues, goes further by building-up improved healthcare models (based on data, informatics, analytics and other computational tools) that go beyond the individual patient.

Precision Healthcare takes all the advantages established by Digital Healthcare (for instance, considering a broad range of digital health data) and expands them towards the most veracious prediction of the most appropriate therapeutic protocol and medical management for a specific disease, both for an individual and category of patients.

Basic Concepts

Traditional medicine relies on standard health related investigations, standard symptoms and drugs. Digital Healthcare has brought the access to huge amounts of processed data and information, due to digital technologies and computational tools.

Precision Healthcare (PH) adds the approach of a tailor-made healthcare service (H. Zhu *et al.*, 2019). Taking into account that each person is uniquely defined from the point of view of genes, relationships with environmental and societal factors and personal responses to the growing numbers of diseases, the core of PH is the vision of the individual patient to which all the healthcare processes and services are directed.

The improved health status and management of a particular patient is also a dynamic driver for PH for identifying better customized healthcare services for specific groups of patients, for preventative strategies and protocols, for supporting decision-making at the public health level by developing prediction models.

Taking into consideration a greater variety of personal determinants of a patient, like his genetic profile, daily routines or habits or interactions with past and current environments, better outcomes of the targeted medical acts undoubtedly lead to a significant cost-efficiency of the healthcare systems, improved access to the best services for larger categories of population.

The rapid advances and transformation for the healthcare system fueled by the outstanding and continuous explosion of the development of new digital technologies have marked out specific

features of Digital, Personalized and nowadays Precision Healthcare, starting with the "3P model" and "4P model" till "7P model" (Horn. 2017), (H. Zhu *et al*., 2019).

An "8P model" can be conceptualized for Precision Healthcare with these specific features: Precision, Personalized, Participatory, Predictive, Preventative, Persuasive, Programmable, and Perpetual:

- *Precision* – the ability of clustering particular patients and diseases into different categories that may have important manifold outcomes to a specific healthcare management (Gameiro et al., 2018);
- *Personalized* – a patient-centered approach that involves distinct medical acts and services adapted according to the health-related determinants of an individual patient;
- *Participatory* – the empowered patients and increased access to health data, information and services due to the broad spreading of digital technologies lead to sharing data, better communication and engaging of medical staff and population;
- *Predictive* – the capacity of envisaging different responses and strategies to therapeutic protocols, disease spreading or evolution through predictive models (Ramos et al., 2019);
- *Preventative* – the stronger accent put on prevention approach and methods, for narrowing the decreased quality of life of the patient and higher cost-efficiency of the healthcare systems;
- *Persuasive* – the ability of persuading the patient to improve his lifestyle and better involve in his/her health management with the help of new emerging tools and smart applications;
- *Programmable* – the competence to involve the digital technology as a main driver for implementing newer, adaptable and improved healthcare processes, decisions or strategies;
- *Perpetual* – the capacity of ensuring a permanent access to health data and information through continuous monitoring, ubiquitous sensing, worldwide data sources, facilitated by technologies like cloud computing, Big Health Data Analytics (BHDA) and AI (Alexandru and Coardos, 2018).

Precision Healthcare wouldn't be possible without the intensive sustain of impressive late advances in domains like sensing technology, networking and communication technologies (Chen et al., 2017), molecular diagnostics, genetic sequencing, BDA, AI, machine learning algorithms that are able to identify as soon as possible and in the most efficient and precise way, the most appropriate diagnosis and treatment options.

In Figure 1 are illustrated the relevance of health data and the most prominent health information technology that provide the power to harness its potential to optimize the patient care.

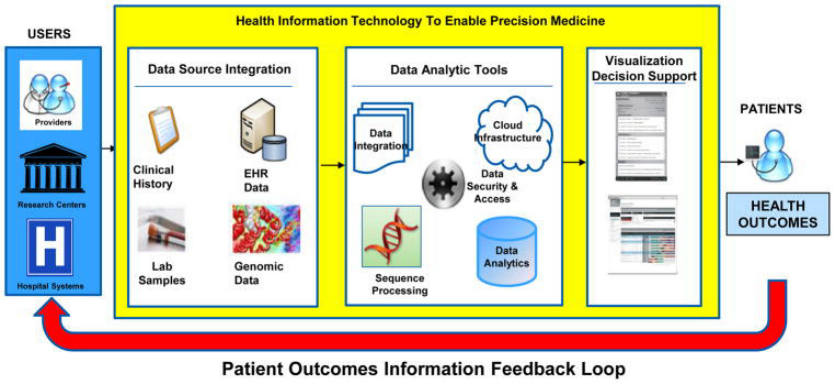

Figure 1: Relevance of health data and health information technology for PH (Ginsburg and Phillips, 2018)

As advancements in medicine and information technology are continuously proving their potential and applicability, it is expected that new opportunities for improved and enlarge capabilities for PH to appear.

Benefits

Precision Healthcare, relying particularly on every patient's genetic profile and the potential of outlining both the individual and specific group specificities, brings important benefits to healthcare services by:

- Identifying the most appropriate and tailored healthcare management;
- Reducing drug adverse reactions, trial-and-errors prescribing, high-risk invasive testing procedures, and cost of healthcare services and treatments;
- Reshaping the reaction approach of the traditional medicine to the preventative one;
- Predicting the probability of getting ill and the disease spreading;
- Improving the capacity of using the patient's genetic information in the daily practice of health practitioners;
- Supporting an improvement of a disease detection at an early stage, both at individual and group level;
- Classifying patients in well-defined groups appropriate for tailored therapeutic protocols and disease-prevention strategies by collecting the genetic profile of individuals;
- Tackling a disease at the molecular level in order to better understand the mechanisms of its occurrence and afterwards generating new drugs and strategies to better control or eliminate it.

Briefly, PH improves many aspects in the healthcare area: *at patient level* through a tailored approach for preventing, diagnosis, treating and sustaining a healthy life, *at medical staff level* through providing capabilities for better manage the health procedures and mitigate side-adverse effects, and last, but not least, *at healthcare systems level* through reducing cost associated to many healthcare processes, trials or error procedures.

Opportunities

Digital technology and research in healthcare domain are continuously evolving; therefore, the opportunities brought by Precision Healthcare are evolving and expanding consequently. Among the most relevant opportunities of PH are:

- Classification of patients into groups with a common biological and molecular basis of disease can enhance the best available medical care, optimize the cost of adverse reactions and treatments by eliminating the errors and the inefficient use of resources;
- More adequate and accurate structuring of diseases into subtypes combined with the use of analytics tools and detection methods have the potential to allow the physicians to foster a much better understanding of the causes, diagnosis, evolution and management for a specific subtype;
- Tailoring the treatment for a particular patient taking into consideration the genes profile, lifestyle, clinical and environmental factors implies augmenting the safety, tolerability of it, together with the best possible outcomes and responses. All these provide knowledge and information that allow a further integration of the patient in a related group that can be better managed inside the healthcare system;
- Provided access to continuously gathered data from a greater variety of sources, comprising the genetic ones, wearables, mobile health applications have enabled powerful technologies like AI, BDA, machine learning, or blockchain to analyze and process it. For instance, AI can be used to predict the drug interaction, to provide insights about hidden patterns, about new correlations among vary data, or for genome sequencing. Blockchain can bring a reliable solution for ensuring the security of data. Machine learning algorithms can be used to find out the genetic risk for individual patients or groups.

Constraints

Besides the benefits and opportunities of Precision Healthcare, there are also some constraints that have to be tackled:

- PH relies strongly on data implies that the quality, the large amount and diversity, the accuracy and privacy of it have a crucial importance;
- Availability of ubiquitous data sources is closely related to security issues and comprehensive IT platforms and technologies able to store, analyzed and provide insight;
- Enlarged computational capabilities and optimized algorithms should be adapted continuously for providing faster and reliable knowledge-based decision-making support;
- Regulatory infrastructure and legal frame can restrain a quick development both at the levels of research and practice in PH (Prince, 2017);
- Ethical issues regarding personal data together with a deeper involvement of the patients in their own health management and awareness about how and where their personal data will be used are critical for the broad adoption of PH;
- Lack of health and IT literacy represents a significant barrier for a constant and appropriate commitment of the patients in providing and giving access to personal health data.

Summarizing, Precision Healthcare is a powerful upgrading of Digital Healthcare, having the patient in its core and sustaining that comprehensive personal, genetic, societal, clinical, environmental data is collected, analyzed and processed with emerging computational tools and technologies, in order to guide healthcare decisions, to detect keenly the health and disease factors and determinants, and most important, to implement tailored health services both for individuals and groups of people.

The patient-centered approach driving high request for tailored healthcare services

The traditional physician-patient relationship, in which the former leads, and the latter subordinates, has been changing in the last years mainly because of a growing number of people with chronic disorders and multiple morbidities – as a consequence of worldwide ageing of population -, because of an increased healthcare literacy of larger numbers of patients and because of the digital society.

Current patients, highly aware of personal needs and expectations

Digital technologies and smart devices have underlain the occurrence of current patients that are characterized by features that make them:

- *Information-savvy*: patients are used to look often for appropriate information and data, thus updating constantly their levels of healthcare knowledge;
- *Empowered*: the expanding availability of health information increase their health literacy, hence the role in the relation with their physicians and health providers;
- *More willing to try out*: patients are more open to adopt in their lifestyle healthier behavior rules and health-related resources;
- *More demanding*: being more aware about a broader range of options, patients are more and more accustomed to ask for personalized, affordable qualitative healthcare services;
- *Better engaged*: being actively involved in the management of their own status of health, current patients are far keener in collecting personal health data, pursuing the healthcare outcomes and diversify the use of personal health devices and tools;
- *Digitally involved*: patients use smart devices, mobile health apps, wearables and online consultations on regular basis.

Appropriate Tailored Healthcare Services

Current patients with the above-mentioned characteristics expect to have better access to patient-centered tailored healthcare services able to provide:

- Affordable, improved and personalized healthcare options;
- The best use and control of their personal data;
- Improved emphasis on prevention methods and protocols;
- Improved dynamic of the patient-healthcare provider relationship;
- Access and openness to healthcare solution based on emerging technologies like: Internet of Things, AI, smart monitoring devices, BDA, Virtual and Augmented Reality.

Remote Patient Care, A Key Trend

The worldwide ageing population and the growing prevalence of chronic disorders have been bringing a serious burning on the healthcare systems from the point of view of financial and specialized human resources. Therefore, the remote patient care has become a reliable alternative for providing qualitative cost-efficient healthcare services (Alexandru et al, 2017), (Manteca et al., 2016).

A remote patient care involves the delivering of appropriate healthcare to patients located in their homes or nursing homes, with the support of digital technologies and smart devices (Dobre et al, 2019).

The *basic elements* of a remote patient care are:

- Appropriate monitoring of health parameters, environmental factors and daily behavior;
- Early recognition of health dysfunctionalities, disorders and deteriorations;
- Quick response to different changes that might appear in the life and status of health of the patient;
- Reduced institutionalization and frequent hospital readmissions;
- Increased quality of a healthier life, independence, self-esteem of the patients;
- Triggered alerts in case of emergencies;
- A reliable smart environment, which is as much as possible non-invasive, that includes sensors for collecting data, technology for communication with physicians, hospitals, caretakers, healthcare providers and for apply analytics in it in order to get adequate insight for supporting tailored healthcare services, (Ianculescu et al, 2018);
- Decreased cost at patient, health and social systems.

Customized Disorders Detection and Prediction Healthcare Systems

Beside personalisation, the enhancement of patient disorder detection combines research in biology, environmental studies and digital technologies in order to facilitate the driving towards “highly accurate predictions” in patient health, costs and necessary resources within hospitals.

Huge integrated data sets are needed for such predictions. In order to put into practice the open medicine paradigm, such data represents a central pillar, attracting and connecting people involved in healthcare systems research and development, public authorities, and patients.

Main Characteristics and Potential Functionalities

The main characteristics of Customized Disorders Detection and Prediction Healthcare Systems are:

- Capabilities to collect data from different data sources such as wearable devices, telematics, social media systems and legacy sources (medical history of the patient, diagnostic and clinical data, etc.);
- Provision of accurate, consistent and relevant and valuable information for healthcare care personnel and patients that is a result of the process of data collection, management, analyze, interpretation and transformation;
- Employment of efficient platforms for data acquisition, processing and presentation, smarter new technologies for data gathering, intelligent computational analysis, storage and visualization techniques towards attaining new knowledge and efficient decision support strategies for different issues in healthcare;
- Use of a web-based architecture with the following characteristics: smart (adaptive, configurable, dynamic, and reactive), context-aware, hierarchical, and secure;
- Assurance of data privacy and security with obligations of responsible parties to avoid accidentally data damage and/or loss.

The potential functionalities of the customized system for disorders detection and prediction are:

- Real-time data acquisition from sensors/wearables devices as well as data gathering from medical and social media documents and data collections;
- Data transformation and transmission;
- Large volumes of data (Big Data) storage in DBMS or NoSQL data bases (Alexandru and Coardos, 2016);
- Data processing and interpretation using BDA;
- Data presentation using up-to-date data visualization techniques and presentation on fix and smart mobile devices.
- Real-time access to data by physicians and other medical personnel.

Types of used technologies: Smart Wearables, chatbots, Big Healthcare Data Analytics

The following types of technologies are largely used in Customized Disorders Detection and Prediction Healthcare Systems:

a. Smart Wearables

Internet of Healthcare Things (IoHT) is a mixture of" medical devices and applications that can connect to healthcare IT systems using networking technologies" (Alliance of Advanced Biomedical Engineering, 2020). According to (Fronst & Sullivan. (2017), the number of IoHT devices is expected to grow to 20-30 billion by 2020.

In healthcare, Smart Wearables SW) are wireless real-time sensors used remotely for acquisition, monitoring and controlling of healthcare data for advanced evaluation and intelligent decision support. Current applications of SW systems work for monitoring patients' vital signs, body movement, location, and fall prevention (Li et al., 2019).

In recent years, due to SW devices and remote health monitoring systems, the patients are empowered with new tools and technologies and are able to continuously monitor and manage their health (Alexandru et al., 2019).

b. Chatbots

"Intelligent virtual agents" (IVAs) or chatbots are now an exciting topic in solving eHealth related problems. A chatbot is a computer program that serves as both an educator and motivator, automatically providing services by conversing and interacting with the patient (using spoken, written,

and visual languages) by various communication channels such as messaging platforms, mobile apps, etc. In the last years, due to the amplified use of AI and of messaging platforms, chatbots have been agreed by the physicians and obtained positive results in being used as virtual assistants helping patients with chronic diseases and comorbidities by playing various roles: symptom checkers (collecting self-reported signs and symptoms) (Symptomate,. 2020), medication reminders (Florence, 2020) or personal data acquisition tools (Forksy. 2020https://getforksy.com/). Chatbots are interacting with chronic patients in the same way that patients communicate with their friends and relatives through their favourite messaging platforms being active chronic patient support.

AI-chatbots are used in order to improve chatbots efficiency of healthcare delivery. Chatbot software architecture should be based on three main columns (Roca et al., 2020):

- Scalability, that enables easy growing of the available services adapted to patients with rising comorbidities,
- Standard data models that support data sharing and reusability,
- Standard conversational modeling that make easier the dialogue between the patient and the chatbot.

c. Big Healthcare Data Analytics

In healthcare sector, data are classified as*: Structured data* (with defined type, format, and structure, such disease terminologies, laboratory results, patient info, etc.), *Semi-structured data* (with a minimal structure, such as data generated from sensors used in patient vital signs monitoring) and *Unstructured data* (with no specific structure such as medical prescriptions, clinical letters, biomedical literature, etc.). There is an enormous *Variety* of data emerging from diversified stakeholders (clinicians, patients, hospitals, pharmacy etc.). Health related data are mainly characterized by *Volume* (big amount of available data), *Velocity* (increased data generation rate from emerging technologies), *Variety* (diverse and multiple biomedical sources) (Palanisamy and Thirunavukarasu, 2017).

Health data analytics aims to analyze data using quantitative and qualitative techniques in order to determine trends and patterns and to create the possibility of obtaining actionable insights and driving long term development for enhanced the management, diagnosis as well as patient involvement in health sector.

There are three types of analytics: Descriptive analytics (that analyze real time and historical data in order to estimate the further evolution), predictive analytics (analyze past data trends in order to predict the future) and prescriptive analytics (advice on predictable outcomes and how act to maximize the results) (Ransbotham et al., 2015).

Case study: RO-SmartAgeing system

a. Short Presentation

"*Non-invasive monitoring and health assessment of the elderly in a smart environment (RO-SmartAgeing*)" ongoing project has as main objective to assist a senior to continue to have an active and independent life in his/her own environment, to delay as much as possible the age-related dysfunctionalities, to prevent disorders and health deterioration and to provide a broader access to improved personalized healthcare.

RO-SmartAgeing is a Disorders Detection Healthcare System that is intended to monitor and assess the health status of the senior by integrating non-invasive motion and physiological sensors for the gathering of health parameters in a smart environment to monitor daily activities and lifestyle. A cloud platform is used for storing and aggregating data, including the presentation of the results of advanced data analysis. The use of the RO-SmartAgeing system creates the possibility to monitor the health

parameters of the senior and to generate alerts when one of these parameters is outside the normal values.

The capabilities and functionalities of this system improve home-based integrated care, having a senior-centred approach sustained by personal physicians, caretakers and senior himself. Personalized interfaces will allow the users to access RO-SmartAgeing system on their personal computer, tablet or smart phone, as suggested in Figure 2.

The amount of heterogeneous data collected inside the senior's smart environment can be used not only for continuously remote monitoring of health and life style, but also for establishing customized predictive models with a strong preventative feature.

b. An example of using a chatbot system architecture as an extension of RO-SmartAgeing system

For a further extension of the RO-SmartAgeing System, a concrete work scheme for a chatbot based solution, suitable for the situation of seniors who need advising and monitoring is presented below.

As mention before in section 4.2, a chatbot is an AI program that "speaks" to the users and informs them about all the things they need to know, acting as a personal assistant of an elderly person. The senior user connects to the chatbot either through a text channel or through a voice channel: In the case of the voice option, from the software point of view, there are two more internal levels that deal with speech recognition and its transformation into text for input and synthesis of text in speech for answers:

– The NLU (Natural Language Understanding) component helps to extract the purpose of the discussion and the entities from the user's request. The NLU component consists of a supervised

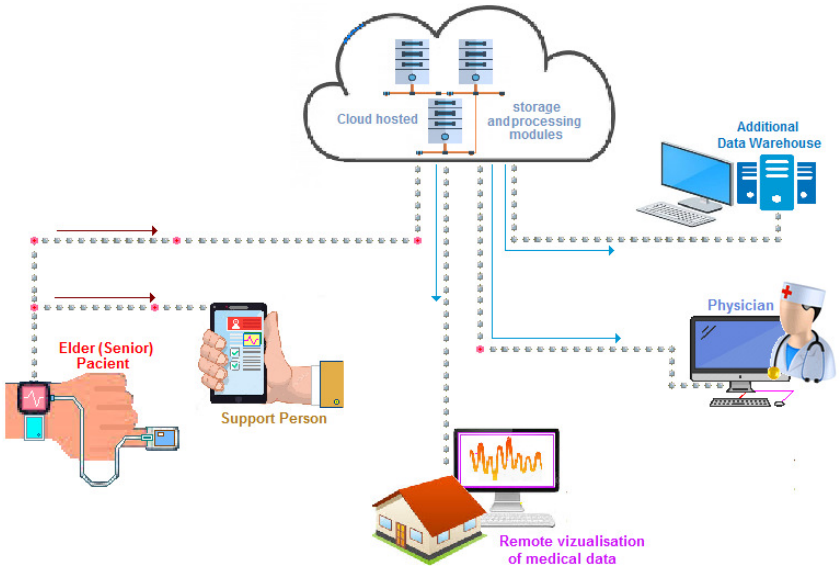

Figure 2: Conceptual architecture diagram of the RO-SmartAgeing System

intent classification model that is driven by a multitude of input sentences and the purpose of the target discussion, and an entity extraction model that can be pre-trained similar to the Spacy model or StanfordNLP libraries. It can be trained using probabilistic models such as CRF (Conditional Random Fields);

- The NLG (Natural Language Generator) component produces responses of the chatbot. The easiest way to achieve this is by using a template mechanism. A more complicated method is to use sentence generators through deep learning.

Dialogue Management Component

It is one of the most important components of the architecture of a chatbot. The basic idea is that the user has to understand what the chatbot has just said.

Missing information: When a user requests something, the chatbot may not have enough information from the user to process the request. The solution is to ask the user for this information. So instead of deciding on the spot what was the user's intention, the system recognizes that certain entities need to be present. If the entities are not present, the chatbot must query the user about these entities until it has all the necessary information. Each purpose of the discussion is a template / pattern that may or may not need certain positions to be filled in with information.

Context of the conversation: In the conversation with a user, all kinds of information must be collected and managed. This is the context of the conversation. The context is built during the interaction with the user and contains all the information needed in the long and short term to manage the conversation.

Initiative: When two people communicate, one of them has the initiative. When does anyone have the initiative? Depending on the intention, a user can signal that he wants to take the initiative. Then a chatbot can decide whether to leave the initiative to the other dialogue partner or take the initiative. The purposes of the discussion can be classified according to the presence or absence of the initiative.

Training Component

Although chatbots can bring significant growth to a people category, they do not appear in context all of a sudden and are very well educated. A chatbot must be created and trained based on a data set. There are several ways to train chatbots:

- Collecting data through all input channels;
- Collecting analytical data in real time;
- Training it to understand semantics. This allows programmers to understand how they can achieve better results by finding what is not working and aligning the purpose of the data with the input;
- Training it to be more personal. A chatbot will interact with many people. The answer must be adapted to the specifics of the transaction, whether it is positive or negative. For example, we can train the data to meet the needs of different groups satisfactorily and productively or for obtain improvements frequently. This training is a long-term process and must be for at least the next few months to one year after launch.

The chatbot architecture example used to assist senior persons is represented in Figure 3.

Discussion

RO-SmartAgeing system is in its third phase of development, i.e. the design of the general architecture. In order to frame it properly in the Disorders Detection Healthcare Systems' category, the main age-related features associated with the system's functionalities are taken into consideration even from this stage of development. In order to obtain a practical supporting digital tool, comprehensive researches and studies have been done in the first phase of development, aiming to frame the current and envisaged future needs and requests concerning the seniors' healthcare, and also the trends of Customized Disorder Detection and Prediction Healthcare Systems for a proper integration in

Precision Healthcare domain. The second phase of the RO-SmartAgeing project targeted to identify the functional, technical, communication and security requirements for the system.

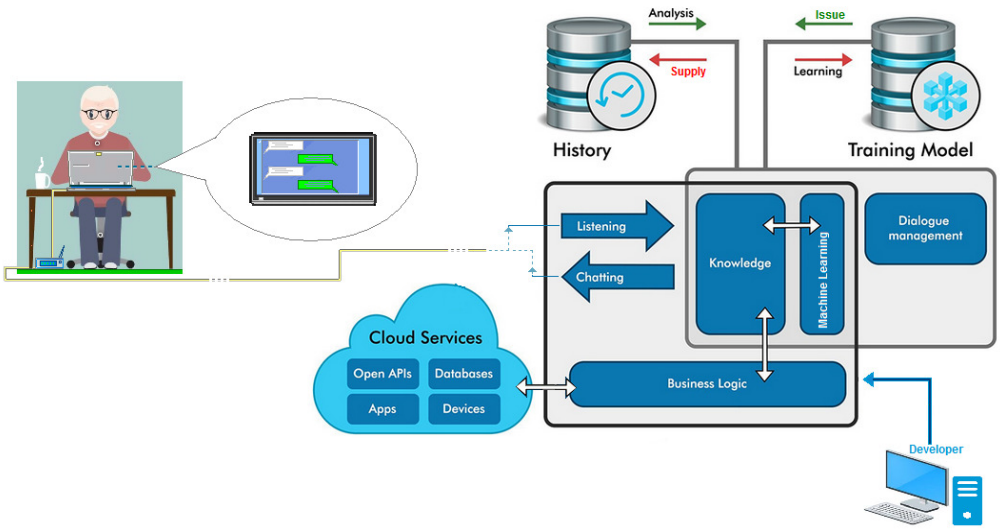

Figure 3: A possible solution for a chatbot architecture used to assist senior persons

Smart wearables, the main part of the smart environment, should be chosen so as to monitor the senior in the least invasive possible way, but in a controlled one, in order to provide accurate and reliable data. As health data has a very sensitive characteristic, a specific attention is given to measures and functions able to ensure the security, privacy and confidentiality of it. A proper senior's remote disorders detection and healthcare monitoring implies considerable amounts of (un)structured, heterogeneous data that come from a great diversity of wearables and from other types of sources – like those in Cloud. For getting the best insights of it, the use of *Big Healthcare Data Analytics* is compulsory. The data collected by the smart wearables and devices is filtered, aggregated, stored, analysed, processed and integrated in personalized applications, such as Behavioural Management, Diagnostic Support, Preventative Lifestyle Assistant, Disorders Detection Support, Predictive Models, etc.

As the seniors are very likely to have mental disorders in different stages and evolution, together with deficiencies and fears concerning the use of digital technology, *chatbots* are taken into consideration in the development of RO-SmartAgeing. They can act like virtual assistants that can be easily accepted by the seniors for supporting them in daily activities and self-healthcare managements.

Till now, some limitations of the chosen solution have been identified, like: the costs associated with the smart environment, the homologation of emerging smart wearables and devices within the Romanian healthcare system, the lack of interoperability among healthcare systems and applications that might be suitable for health data exchange, the lack of well-established standards in eHealth, some legal and ethical aspects related to the involvements of seniors in the next developments phases of RO-SmartAgeing system, a better collaboration with a broader range of doctors from more medical domains.

The diagnostic and monitoring capabilities supported by smart wearables, Big Healthcare Data Analytics, assistive devices that are embedded in Disorders Detection Healthcare Systems (as RO-SmartAgeing system is) represent important issues that clearly contribute to a sustainable implementation of Precision Healthcare.

Conclusions

Precision Healthcare has evolved from Digital Healthcare, taking advantages of computational tools and emerging technologies combined with a patient's genetic, personal medical records and history for developing tailored healthcare strategies, procedures, treatments, preventative methods and prediction models. Customized Disorder Detection and Prediction Healthcare Systems are a response to the expectations of the highly aware and empowered nowadays patient regarding an improved accessibility, efficiency, affordability of personalized healthcare services.

RO-SmartAgeing system is an example of such a system that has the potential to enhance the outcomes of a senior's home-based healthcare by providing personalized monitoring of health, ambient and lifestyle factors in a smart environment, trigger alerts in case of emergency, and preventative measures. Last, but not least, it can be further used in correlation with the senior's genetic profile to tailor better healthcare and more appropriate and efficient medical procedures.

The novelty within the Romanian healthcare domain of the ongoing RO-SmartAgeing project is mainly given by the integrated approach of IoHT, smart wearables, cloud computing technologies in monitoring the physiological and environmental parameters, in order to provide innovative support for personal medical assistance. Cross-cutting patient-centered approaches sustain the effective management of a variety of medical conditions, a greater awareness of a senior regarding his / her own health status, an active and healthy ageing, and a special framework for health professionals in Romania, favourable for further developments of new tackling and therapeutic protocols.

Among the socio-economic effects of implementing RO-SmartAgeing system are:

- Relieving the burden of the social and health systems by reducing the costs associated with short-term or long-term institutionalization of patients, due to the home-based monitoring;
- Improving the quality of life, safety, self-esteem and independence of a senior;
- Improving the range of timely services provided by health professionals;
- Increasing the quality of life of the senior's family members due to the possibility of remote monitoring and preventing his / her health deterioration;
- Increasing the quality of the medical act by detecting, processing and reporting in real-time personalized medical parameters and data, which will allow the current physician to adopt a pro-active and preventative healthcare management instead of the traditional reactive one.

In the next phases of the project, the development of RO-SmartAgeing system will be continuously adapted to the new technologies that are considered the most appropriate for the seniors and thus, due to agility, scalability and flexibility associated with the system, the possibility of an easy customization for seniors' needs will be provided.

Acknowledgements

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Analyzing the Link Between Time Spent Online and Willingness to Take into Account Recommendations of Friends When Shopping Online

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Abstract

This paper focuses on the analysis of the link between time spent online and willingness to take into account recommendations of friends when shopping online (e-commerce). The basic sample for the purpose of the survey is the generation of Millennials of the region of East Slovakia. The total number of respondents (returned questionnaire) in the sample is 484, of which 88 were removed because the findings did not meet the age (generation Y) and smartphone use requirements. Data collection was conducted through simple random sampling in September and October 2019. To verify the hypothesis, we used StatSoft SPSS software. Due to the nature of the analyzed variables we used Kendall's tau-b test. Based on the research findings, most Millennials spend two to six hours a day on their smartphone, and over three-quarters of Millennials take into account recommendations of friends when buying goods online. Based on the result, there is no significant link between the time spent online using a smartphone and the willingness to take into account recommendations of friends when shopping online.

Keywords: M-Commerce, Online Shopping, Time Spent Online, Recommendations of Friends

Introduction

Mobile marketing is a new form of marketing communication that uses mobile communication methods to promote ideas, products and services. Marketing tools provide targeted customer reach, interaction, placement and custom measurement of campaign effectiveness anywhere, anytime (Wiedemann 2010). Mobile devices have tremendous potential for any business, allowing it to reach new customers in a very efficient way (Thangadurai 2016). Mobile marketing is a phenomenon that has been created gradually with the development of networks of mobile operators (Čorba and Nastišin 2015). The progress has been sped up also by a desire of marketers for the most interactive and fast communication with customers (Jakubíková 2012; Litavcová and Vašaničová 2019). Mobile marketing is a new term for one of the methods of direct marketing. The method focuses on the use of mobile devices (mobile phones, smartphones, PDAs, MDAs, rarely laptops) and distribution of both commercial and non-commercial content (SMS, MMS, YAPs, Infrared (IRDA), Bluetooth, WLAN). The popularity of mobile devices continues to grow as mobile marketing is one of the fastest growing marketing methods (mSolutions 2016; Jenčová and Vašaničová 2019). Mobile marketing is a tactical tool of marketing communication that uses mobile technology to present ideas, products or services (Bačík, Mihal and Fedorko 2015). Its advantage is that it enables immediate interaction with the target audience or customers, depending on location or situation in which it is at the time of receiving marketing information. Mobile marketing is an effective tool for self-measuring the effectiveness of mobile campaigns, making it an ideal means of building a true customer relationship, all in terms of accepting individual customer requirements (Štefko and Butoracová Šindleryová 2009). It was created gradually, with the development of networks of mobile operators,

and at the same time with regard to the desire of marketers to create the fastest and most interactive communication tool (Quirk 2017). Mobile marketing can also be defined as a set of procedures that allow organizations to communicate and connect with customers in an interactive and relevant way through a mobile device or network. Mobile marketing creates a connection that blends traditional media and digital marketing (Dodson 2016). Mobile marketing connects stores and their customers on mobile devices at the right time, in the right place and with the right content. At the same time, it requires customers to be actively connected or them to allow specific actions to be carried out (Fvanski 2009; Möslein-Tröppner et al. 2020). Peterson (2014) states that mobile marketing is one of the fastest growing tools of marketing communication. We understand it as a form of marketing that serves to promote sales through mobile communications. Vaštíková (2014) characterizes mobile marketing as a modern form of direct marketing, which cannot exist alone, but is linked to company databases about clients. Communication with customers is then carried out via SMS or MMS, thus helping build a long-term relationship with customers. A great example is notifications of forthcoming events of the company or congratulations on birthdays etc. This marketing communication tool is especially suitable for small businesses (Štefko, Bačík and Fedorko 2014). Mobile marketing or m-marketing is defined by Miklošík (2013) as all marketing activities that are focused on the active use of mobile devices (mostly smartphones and tablets). In addition, however, we must agree with what Sasko (2015) mentions in his video blog and that is the current state of mobile marketing. It is true that users are already part of the modern phenomenon of "second screen" which means they still have another device in their hands when watching TV or working with a computer (mobile phone or tablet). People do some of these activities somehow simultaneously. It is also important to underline the fact that Sasko (2015) reveals that over 60% of all mobile phone users have smartphones. So, there are opportunities to move forward by creating mobile applications and using advanced systems that these modern mobile phones can already handle. The interest in smartphones and tablets is evident from the current statistics, where it has been shown that people access the Internet from mobile devices more often than from computers. It can be said that this shift will have an upward trend in the coming periods (Etherington 2016). The goal of mobile marketing is to provide customers with information that promotes products, services and ideas with the help of wireless media at a given time. This process benefits all parties (Thangaduraia 2016; Shpak et al. 2020). According to Adamek (2013), mobile marketing is an interactive form of marketing that enables an immediate response to customer interest and further communication. In this respect, we talk about any form of marketing, advertising, or activity that is used to raise awareness and promote brands (Mura, Marchevská and Dúbravská 2018). Mobile marketing is also risky to a certain extent, as a mobile phone is seen by people as a private medium. Therefore, marketing communications via mobile devices can also trigger negative responses. However, the answer to this may be localization. This means that an ad text message will only be sent to those customers who are currently in the store (Karlíčka and Král 2011). National and international marketing and advertising associations are now incorporating rules for mobile advertising and mobile marketing into their codes of conduct. Some governments are beginning to outline the legal framework for mobile marketing in new legislation because of the rapid increase in the popularity of mobile marketing (Hagyari, Bačík a Fedorko 2016). However, there are no precise criteria for using mobile devices for advertising. This results in cases of negative use of mobile marketing (Bucko, Kakalejčík and Nastišin 2015). When using mobile marketing, it is necessary to maintain generally applicable moral criteria and principles, and it is also important to respect existing legislation in the country which could indirectly affect the use of the mobile marketing methods (mSolutions 2016). An increasing number of new companies in the world try to use mobile marketing to reach new customers, streamline forms of communication, expand their business and so on (Fedorko 2018). The most important question is which form of mobile marketing can use the potential of mobile marketing to the fullest (mSolutions 2016). According to Vysekalová et al. (2014), mobile platforms (mobile phone or other mobile electronic device) provide one major advantage to marketing research - real-time data collection (štefko and Pollák 2016). Research carried out through mobile devices gives the opportunity to engage customers in research in a variety of situations and get real feedback on how customers experience the situation. It is a unique opportunity to engage respondents in research in a fun way (Štarchoň et al. 2018). The advantage of mobile marketing according to the author Adamko (2013) is especially its efficiency and quick preparedness for various events. We can also use mobile marketing as a more effective alternative to other marketing communication techniques, as it is aimed at stimulating purchases or visits to a point

of sale. Jakubíková (2012) presents two advantages of mobile marketing in terms of communication campaigns. As Adamko (2013) states, one of them is efficiency and quick preparedness for various events. Another advantage is the ability to respond more flexibly to market needs (Mura and Kljucnikov 2018). In addition, mobile marketing also complements and strengthens traditional forms of communication, creating synergies and bringing effective marketing elements to traditional media. Frey (2007) considers flexibility and personality to be an advantage of mobile marketing because mobile phone is a versatile and adaptable medium allowing a wide range of activities. Here are some of the benefits of mobile marketing:

- targeting accuracy,
- speed of preparation,
- interactivity and speed of communication,
- instant measurability of campaigns,
- lower entry and operating costs,
- building a database.

Methodology

The main purpose of this paper is to find out whether there is a significant degree of association between time spent online using a mobile device and willingness to take into account recommendations of friends when shopping online. Based on this objective, we formulated the following research question:

Q: There is a significant degree of association between the time spent on the Internet using a mobile device and willingness to take into account recommendations of friends when shopping online?

The research hypothesis is formulated on the basis of this research question:

H: We assume a significant degree of association between the time spent on the Internet using a mobile device and willingness to take into account recommendations of friends when shopping online.

The first part of the research was devoted to descriptive statistics (abilities, averages, medians, modes, standard deviations, minima, maxima, as well as the 25th and 75th percentiles). This section highlights the preliminary findings of the research. Deeper relationships are shown in inferential statistics, i.e. analysis. In this section, the Kendall's tau-b test was used to analyze the context according to the data type.

For the purpose of this research, the research sample was defined as a new generation of customers represented by the Millennials. As for the definition of the age group of the Millennials, the article follows the methodology of Young (2017) in Ogilvy & Mather. The Millennials are referred to as “Generation Y” from the age 20 to 36.

- C Centennials (2001-2009),
- Y Millennials (1984-2000),
- X Generation (1964-1983),

- S Generation (1963 and earlier).

The inputs were obtained from the primary research carried out using the CAWI (Computer Assisted Web Interview) method. Data were collected through an electronic questionnaire in September and October in 2019. The link to the electronic questionnaire was posted on relevant Facebook pages and was also distributed by e-mail. The sampling method is based on the availability of participants and the voluntary nature of the research project. The processed data were adjusted for the age of respondents not belonging to the given generation (generation Y – the Millennials (20-36 years olds) as well as respondents preferring a device other than a smartphone.

The following table outlines the assumptions:

Table 1: Items determining suitability of respondents to be included in the research sample

Age	Which device do you use most often to connect to the internet?	Which device do you use most often to shop on the internet?
19 and below 60	Smartphone 412	Smartphone 405
Between 20 and 36 396	Tablet 19	Tablet 33
37 and above 28	PC 53	PC 46

The total number of respondents (filled-in questionnaires) was 484, of which 88 were removed because the findings did not meet the requirements of age (generation Y) and smartphone use habits.

Results

The following part of the article presents the outputs of frequency analysis and descriptive statistics. The results only show the outputs of mobile communication platforms used by Millennials. Selected characteristics of descriptive statistics were chosen universally so that they could offer the reader the most accurate picture of the given variable.

Table 2: Time spent browsing the web on a smartphone

	Number	%	Cumulative %
I do not use a smartphone	3	0.8	0.8
An hour a day	99	25.0	25.8
Up to 2 hours a day	132	33.3	59.1

Up to 6 hours a day	96	24.2	83.3
Up to 8 hours a day	30	7.6	90.9
More than 10 hours	63	9.1	100.0
Total	**396**	**100**	

99 respondents (25%) reported they spend an hour browsing websites on the Internet through a smartphone. 132 respondents (33.3%) spend up to 2 hours, 96 respondents (24.2%) spend up to 6 hours, 30 respondents (7.6%) spend up to 8 hours, and 36 respondents (9.1%) spend more than 10 hours. 3 respondents do not use their smartphones for this activity (0,8 %)

Table 3: See reviews, friend recommendations, and more when buying goods over the Internet

	Number	**%**	**Cumulatively %**
2	12	3.0	3.0
3	84	21.2	24.2
4	153	38.6	62.9
5	147	37.1	100.00
Total	**396**	**100**	

This item uses the Lickert scale, where 1 stands for "I do not take into account at all" and 5 "I definitely take into account." On this scale, respondents most often rated their experience as 4 (N = 153; 38.6%). Furthermore, respondents most often chose 5 (N = 147; 37.1%) and 3 (N = 84; 21.2%). Least number of respondents (N = 12; 3%), 2, say they disregard reviews, recommendations of friends and so on when buying goods over the Internet. The option “I do not take into account at all” was not selected by anyone.

Table 4: Descriptive statistics of taking recommendations into account when buying goods over the Internet

Average	**Median**	**Modus**	**St. deviation**	**Minimum**	**Maximum**	**Percentile**	
						25	**75**
4.0984848	4	4	0.8346288	2	5	4	5

From the values of the central tendency, it can be concluded that the willingness to take into account recommendations of friends when shopping online reached an average value of o 4. The deviation is approximately 0.84. This variable does not include the full range of responses, i.e. a minimum of 2 and a maximum of 5. Looking at the 25th percentile, it can be said that 25% of the answers were choices below the level 4 and 75% of answers cover levels between 2 and 5.

H: We assume a significant degree of association between the time spent on the Internet using a mobile device and willingness to take into account the recommendations when shopping online.

H0: There was no significant correlation between the variables analyzed.

H1: There was a significant correlation between the variables analyzed.

Table 5: Link – time spent on the Internet and recommendations

	Value	Asymptotic Standardized Error	Approximate T	Approximate Significance
Kendall's tau-b	-0,037	0,049	-0,745	0,456
N of Valid Cases	396			

In this case, the value is clearly higher than the acceptable α levels (e.g.: 0.1), i.e. we reject the alternative statistical hypothesis H1 and accept the hypothesis H0, as there was no significant correlation between the variables analyzed. Overall, we accept that there is no significant association between the time spent on the Internet using a mobile device and the willingness to take into account recommendations of friends when shopping online.

Conclusion

Mobile devices are a perfect tool that brings products and customer together. Mobile marketing offers high real-time operability, high user convenience, is cheaper, more portable, faster, has personal ad targeting, and even has its own position in the payment networks.

However, there are a number of limiting factors that will prevent customer conversion in terms of mobile marketing, such as a small mobile screen, that people are not yet accustomed to a smartphone interface, the issue of credit card security on a mobile device, smartphone, inconvenient typing on the screen of a smartphone, inconvenient price / purchase comparison, inability to view detailed product or service information, or it takes too long to load a website. Some of these barriers cannot be influenced by the seller, for example the dimensions of the mobile screen. What they can influence, however, is campaign optimization, content, and the overall shopping cycle and user experience (Haringová 2015).

Based on the above analysis, we can conclude that most Millennials spend from two to six hours a day on a smartphone, and over three quarters of Millennials take into account recommendations of friends when buying goods online. Our analysis has shown that there is no significant association between the time spent on the Internet using a mobile device and the willingness to take into account recommendations of friends when buying goods online.

Based on our research, it is possible for the purposes of management and practice to state that traders should pay attention to the quality of products and services they offer. Quality is the basis of business success. Subsequently, it is important to offer customers quality customer care or service. This fact also follows from SEE THINK DO CARE's marketing strategy, in which this necessity follows from the last phase.

The above facts are followed by customer satisfaction, who further reports it to their family and acquaintances through word of mouth in the form of a recommendation, or online in the form of reviews, directly on the website or other portals of sellers.

A similar research was carried out by the authors Stefanska, Knezevic and Stojkovic (2018). The research results are very similar to ours, but limitation of our study is that we focused only on Slovakia. Authors above have compared the online purchase consumer experience through mobile in Poland, Croatia and Serbia as well.

Other limitations of our study can be summarized in the following points:

- our study was conducted on a sample of students
- gender distribution was not even,
- our study was performed on a generation Y sample only,
- in our study, the products that respondents buy were not specified.

As for the possibilities of future research, it is possible to build on the results of our research in terms of the correlation between online reviews and customer shopping behavior as well as the correlation between word of mouth and customer shopping behavior.

There is still the possibility of verifying the correlation between a verbal recommendation from a family and acquaintances versus a verbal recommendation from a stranger and the shopping behavior of buyers.

Acknowledgment

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The Situation of Enterprises Operating in Poland During The SARS-Cov-2 Pandemic

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Abstract

Motivation. Pandemics on a scale like the SARS-CoV-2 have never before affected humanity and the economy in times of globalization. This is why the following question seems to be interesting: what is the situation of business entities during this pandemic?
Objective. The objective of the article is to identify the situation of enterprises operating in Poland during the SARS-CoV-2 pandemic in the context of the VUCA environment.
Design/methodology. The objective has been achieved through the literature studies with critical analysis and empirical research.
Findings. Research results have shown the SARS-CoV-2 pandemic poses serious implications for businesses in Poland. The results show that as many as 62% of enterprises are not able to stay on the market for more than 2 months without generating revenues. The most frequent strategies, the entrepreneurs had chosen was to minimize all costs related to operations (53.9%), implement "safe" actions, for example switching to remote work or selling via the Internet (52%) or looking for new business opportunities and market opportunities (44.1%). Interestingly, as many as 25% of the surveyed enterprises decided not to take any action and apply the strategy of waiting and observing the development of the situation. Results also have shown that the kind of support Polish entrepreneurs expect from the government are:, Social Insurance Institution (ZUS) exemption (85.9%), income tax exemption (69.7%), employees' salaries subsidies (49.3%) and subsidies to other fixed costs of the enterprise (47.9%).
Limitations. Selected findings of empirical research only in the field of the situation of enterprises operating in Poland during the SARS-CoV-2 pandemic have been presented.

Keywords: VUCA world, VUCA environment, SARS, SARS-CoV-2 pandemic, Polish company, crisis, globalization

Introduction

For many years, researchers and practitioners have been saying that turbulence is an immanent feature of the environment. Therefore, you can have the impression that all market participants have become accustomed to this situation and have learned - better or worse - to operate in these conditions. Talking about the fact that modern enterprises operate in conditions of constantly growing uncertainty and complexity of the environment may even seem a truism. However, the beginning of 2020 shows that this is not a truism, but the most important feature of the modern market. Reality shows to us that the global economy may find itself in a crisis that has been initiated by a factor independent of business people. This factor is the SARS-CoV-2 pandemic. It can be said that the SARS-CoV-2 pandemic is nothing extraordinary because humanity has been experiencing epidemics for centuries, e.g. pneumonic plague, Spanish-flu and bubonic plague and not so long ago severe acute respiratory syndrome (SARS). However, pandemics on such a scale have never before affected humanity and the economy in times of globalization. We are witnessing the "butterfly effect", which causes companies in the world face up to the consequences of the pandemic. Thus, the question arises: what is the situation of business

entities during the pandemic? The search for answers to this question has also become an inspiration for the authors of this article.

In this context, the objective of the article is to identify the situation of enterprises operating in Poland during the SARS-CoV-2 pandemic in the context of the VUCA environment. The article is empirical and it is prepared based on our own empirical research. The theoretical considerations are based on a critical literature study. First, there are considerations regarding the VUCA environment with particular regard to the SARS-CoV-2 pandemic. Secondly, research methodology and date sources are described. Next, we show empirical results. Finally, the discussion and conclusions are presented.

The VUCA World

Organizations should continuously balance between "exploration" and "exploitation" activities (March 1991). However, many organizations are concentrating on "exploitation" activities at the cost of "exploration" (Kotter 2001). The concentration on "exploitation" activities renders organizations ill-prepared for unexpected future events and therefore plunge into crisis when such events arrive (Rowe 2010). Enterprises must continuously "explore" their environment because environmental scanning is critical to the survival of an organization in today's world.

The modern world is volatile, uncertain, complex and ambiguous. That is the VUCA world. The acronym VUCA refers to the volatility, uncertainty, complexity and ambiguity of a company's internal and external environment. The acronym VUCA originated in the U.S. military to define conditions military leaders encounter on the battlefield (Whiteman, 1998). Bartscht imagines "VUCA environments as akin to being in a fierce winter blizzard at night; everything is always shifting and one cannot properly see what lies ahead" (Bartscht 2015, p. 254). The VUCA seem to occur together in inseverable combinations (Mason and Mitroff 1981). Volatility, uncertainty, complexity and ambiguity (VUCA) cause that strategic decision making is difficult (Bennett and Lemoine, 2014a). VUCA conditions make that any efforts to understand the future and to plan responses are often ineffective (Bennett and Lemoine, 2014b, p. 311).

Volatility refers to the nature, magnitude, rate and speed of change that occurs within a company's internal and external environments. "The nature of change occurs in the political environment (political instability, terrorism, (de) globalization), the economic environment (financial crises, global shifts in power, emergence of new and decline of established markets), the social environment (demographic changes, ageing society), the technological environment (digital transformation, big data, artificial intelligence, robotization), legal environment (immigration law, discrimination law, health and safety law) and the ecological environment (climate change) with increasing magnitude and speed" (Bader et al. 2019, p. 129-130).

A volatile situation can be defined as one that is unstable or unpredictable although this situation is one in which change is likely. Moreover, change may come quickly and at varying magnitudes (Bennett and Lemoine, 2014b, p. 313-314) and may be of unknown duration. In the opinion of Bennett and Lemoine (2014a) knowledge about it is often available. Volatility also refers to the rate of change. "When volatile change is expected, the best way to prepare is to devote resources toward developing agility" (Bennett and Lemoine, 2014b, p. 314) but investment should match the risk (Bennett and Lemoine, 2014a).

It is increasingly hard to predict the future with increased volatility of the environment (Mack and Khare 2016, p. 6). Thereby, it is problematic to correctly identify enterprises challenges, threats and opportunities. This situation causes enterprises to operate in uncertain conditions. The uncertainty drivers are a high degree of unpredictability, unknown outcomes and potential surprises (Bader et al. 2019, p. 129-130). The cause and effect of some event and factor is known in the case of uncertainty situation but there is a lack of knowledge about the importance of a given event or an influence of a given factor upon the enterprise's activity at present and in the future. (Bennett and Lemoine, 2014a, p. 314). Change mechanisms are also unknown and often unpredictable (Bader et al. 2019, p. 130).

There are three diversities of an environmental uncertainty: a) state uncertainties (parts or the whole business environment is unpredictable), b) effect uncertainties (effects of these uncertainties influence parts of the business or a company as a whole), c) response uncertainties (the consequences of choice in decision making can't be judged) (Nandakumar et al. 2012).

Enterprises should collect, interpret and share information constantly to reduce uncertainty. This is why companies should obtain information from many different sources, both inside and outside the firm. They should create information networks that can reduce ongoing uncertainty (Bennett and Lemoine, 2014a). But, the real business world shows that information is often incomplete or the understanding of available information is inadequate. This situation makes uncertainty a serious problem in the company's decision making.

The identification of cause-effect relationships becomes increasingly more difficult in an interconnected and networked environment (Mack and Khare 2016, p. 6). Some information about the environment is available or can be predicted, but the volume or its nature can be overwhelming because of many interconnected variables. This phenomenon illustrates the complexity of the environment. Thus, complexity can be defined as a situation where the interconnectedness of variables is so high that the same external conditions and inputs can lead to very different outputs or reactions (Mack and Khare 2016, p. 6). This situation relates to the structural dimension of an environment complexity. The second aspect of an environment complexity is the complex behavior (Dittes 2012, p. 3). Complex behavior is characterized by emergence that means "the action of the whole is more than the sum of the actions of the parts" (Holland 2014, p. 1). Thus, complexity refers to the task correlation, multifaceted effects and influencers (Bader et al. 2019, p. 129). The environment complexity has two aspects: the complex structure and the complex entities' behavior.

The level of complexity is constantly growing due to more and faster availability of data (Bader et al. 2019, p. 129). Social media also contributed to increasing the complexity of the business environment. Another area that has contributed tremendously to increased complexity are the social media. In the days of Twitter, Instagram or Facebook information about every company is available all over the world. Finally, knowledge transfer between people and companies has increased complexity as well.
Ambiguity refers to the lack of clarity and misinterpretation. Ambiguity is associated with the equivocality of the situation (Daft and Lengel, 1986) and the interconnection of environmental factors. Situations and environmental factors can be interpreted in a variety of ways and even interpretations could be conflicting. This phenomenon can create confusion (Thorén and Vendel 2019, p. 301). Therefore, the understanding of cause-effect relationships is difficult and this situation has just created ambiguity (Bennett and Lemoine, 2014b, p. 316). In this context, business decision-making is increasingly more difficult. There is more than one possible solution to resolve a problem and there isn't often known which one option should be chosen. (Mack and Khare 2016, p. 6).

The four VUCA elements were structured by Bennett and Lemoine (2014) in a portfolio with the two dimensions concerning knowledge about the situation (How much do you know about the situation?) and the predictability of the results of possible interventions (How well can you predict the results of YOUR actions?). Bennett and Lemoine (2014) assume volatility, uncertainty, complexity and ambiguity are different context types and require different approaches. The perception of these four elements as separated seems to be unreasonable and even wrong in the current conditions because in the economic reality they occur simultaneously. Mack and Kahre (2016) present a more interesting point of view corresponding to real environmental conditions. In their opinion, complexity is the key concept and volatility, uncertainty and ambiguity are the consequences of complexity (Mack and Khare 2016, p. 6). They base their opinion on the Systems and Complexity Theory. From this point of view volatility can be seen as an observable output of a complex system that cannot be easily interpreted any more. The so-called deterministic chaos is in the contemporary world. "Today's economy and environment seems to be more and more in a state "at the edge of chaos"" (Mack and Khare 2016, p. 9). In this state, even small environment changes can cause large and unexpected effects, the so-called "butterfly effect" and an environment behavior anticipation isn't possible anymore (McMillan 2004, p. 54f). This situation makes it impossible to predict the results and this is a sign of uncertainty. Moreover,

it is impossible to find the only “right” solution. Enterprises have to make decisions in ambiguous situations every day.

The current VUCA environment makes organizations continually take advantage of the evolving market along with its opportunities and threats and react very quickly to any change or evolution in the market (Dhir and Mital 2013).

The VUCA world in the SARS-CoV-2 Pandemic Time

The SARS-CoV-2 pandemic shows that we operate in a world that really is a "global village". Unfortunately, this pandemic has proved to us the following: how the economies of individual countries and individual enterprises are strongly dependent on each other, how changes in the economy of one country affect the activities of enterprises in other countries, and how one factor, which is the coronavirus, can have multiple and strong economic and social effects. The environment and global economic complexity are the key factors of huge problems of almost all businesses these days. The reason for this situation is the interdependence and interaction of all economic entities, regardless of whether they are small, medium- or large - sized enterprises or whether they are operating only locally or on an international or global scale.

The duration of SARS-CoV-2 pandemic shows that enterprises can face the extreme volatility of the environment. The change came very quickly and in very different environment dimensions. The SARS-CoV-2 pandemic is extremely painful for many companies in the whole world and how long it will last is unknown. It is also uncertain what path companies will take towards the crisis and how deep it will be.

The general rule is that the further into the future it aims the higher the level of uncertainty (Gordon, 2009). However, the developments of the beginning of 2020, when the SARS-CoV-2 pandemic started across the world, show that uncertainty can occur at the highest level in a very short time. We observe uncertainty in all three dimensions. First, there is a state uncertainty because the whole business environment is unpredictable. Secondly, there is an effect uncertainty. The results of the pandemic are affecting every company. We don't know how a change to the condition of every company will influence the crisis in large. Finally, there is a response uncertainty because the consequences of decision making of companies can’t be predicted. The SARS-CoV-2 pandemic results in the lack of clarity about what decisions enterprises should make about their future. Enterprises expect state aid, report their needs and governments will chaotically respond to them as far as it is possible. Enterprises don’t know if the government’s aid will be sufficient to stay afloat. Thus, enterprises have a dilemma whether they should try to save the company or should declare bankruptcy. The current situation of enterprises is extremely ambiguous.

Research methodology. Data sources.

The research was carried out on a sample of 690 companies, using the online questionnaire. The study lasted for two weeks, in the second half of March 2020 and covered enterprises operating throughout the country. The study used convenient selection using a "snowball sampling", i.e. respondents sent a survey via social media and messengers. The studied sample can be considered quasi representative, due to the diversity of the enterprises participating in the survey and their size (Fig. 1). The most strongly represented are: IT (76), marketing (60), construction (58), consulting (48), traditional trade (47), gastronomy (44), finance (38), beauty (35), education (32) , tourism (29), transport (23), medical and psychological services (21), automotive (18), events (16), e-commerce (15), film and photography (14), other services (31), others (61). The "other" category includes, among others: law firms, logistics companies, manufacturing and telecommunications companies as well as light and heavy industry.

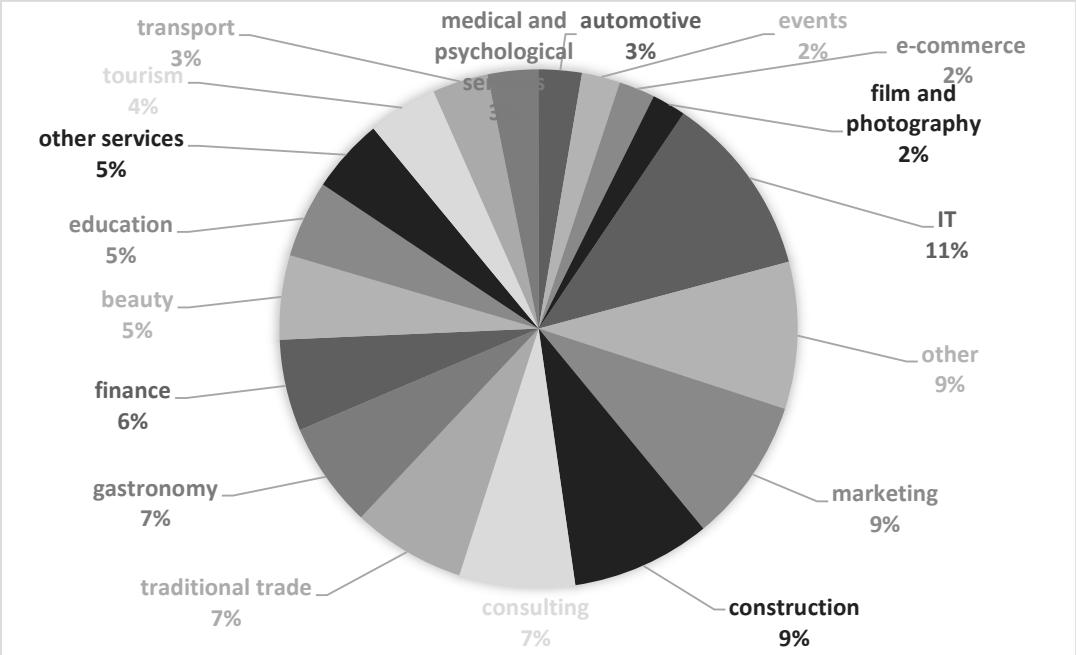

Fig. 1: Percentage representation of individual industries in the research sample

Source: own research

The surveyed enterprises represent almost all areas of activity, 39% operate locally, 40% nationwide, and 21% internationally (Fig. 2). As can be seen from the figure (Figure 3), the research sample includes sole proprietorships (17%), companies cooperating with 1-2 people (19%), with 3-5 people (20%), 6-10 people (15 %), 11-20 people (14%), employing from 21 to 50 employees (7%) and above 50 (8%).

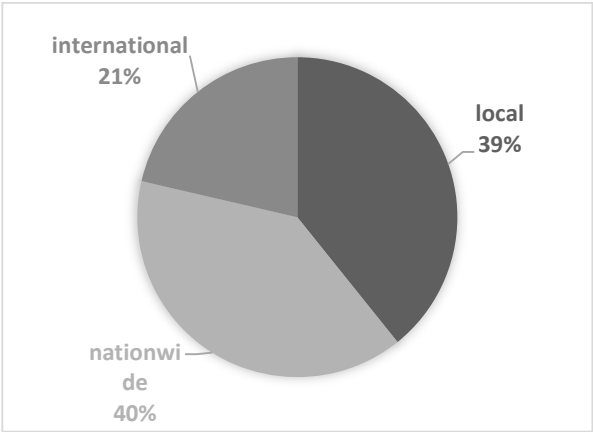

Fig. 2: Area of activity of surveyed enterprises

Source: own study

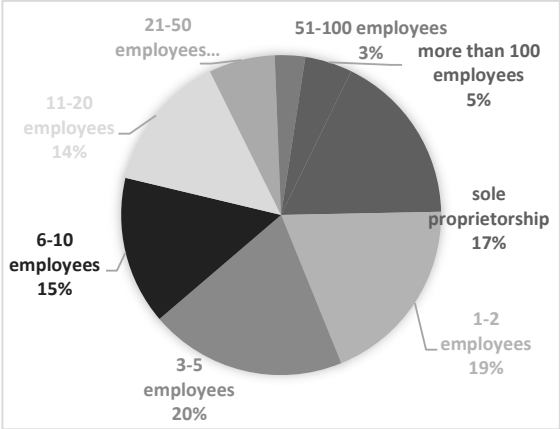

Fig 3: Number of employees/ people cooperating surveyed enterprises
Source: own study

The surveyed companies also had various experience on the market. 8% of surveyed companies have been operating for less than a year, 15% have been present for 1-2 years, 26% have been operating for 3-5 years, 22% have been operating for 6-10 years, and 29% have been on the market for more than 10 years (Fig. 4) .

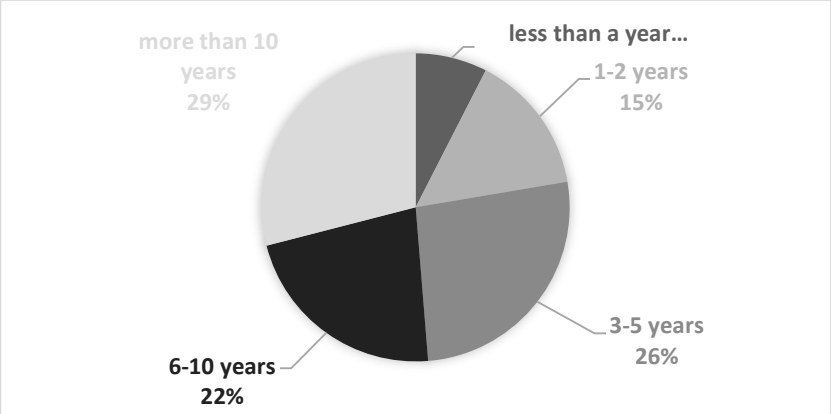

Fig. 4: Period of activity of the surveyed enterprises on the market
Source: own study

Research results

Possibility of running a business in "new conditions"

An important issue in the context of the coronavirus pandemic was to check whether companies are able to conduct their business without direct contact with their clients, and to what extent they are able to switch to remote work mode. Therefore, the respondents were asked whether their activity requires direct contact with recipients, 56% of entrepreneurs answered yes (yes, my activity requires direct contact) (Fig. 5). Most often it concerns entrepreneurs from the beauty services sector, in large part of gastronomy, tourist industry or traditional trade.

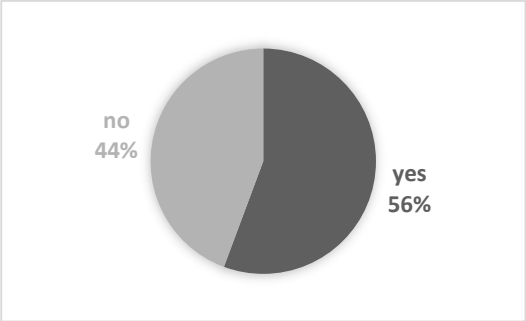

Fig 5. The need for direct contact with clients of the surveyed enterprises
Source: own study

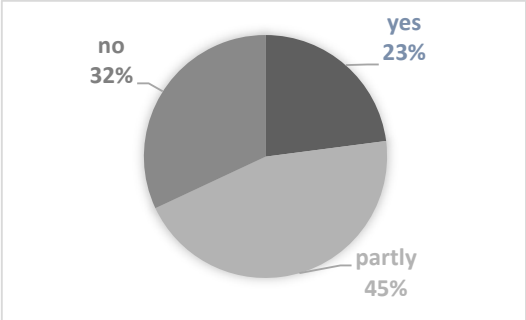

Fig 6. The possibility of switching to a work system in the surveyed enterprises
Source: own study

The next question concerned the extent to which respondents are able to change the mode of their work so that they can work remotely. Only 23% of entrepreneurs declared that they are able to work remotely full-time. 45% of respondents said that they were able to partially switch to remote work mode, and 32% said that in the case of their business it is not possible (Fig. 6). Enterprises which, due to their specificity, are not able to change their mode of operation may be at the highest risk of bankruptcy in the current situation.

Financial Cushion

One of the most important information, on the basis of which one can infer the future of many enterprises in the current situation, is their financial cushion, which is a financial reserve that will allow them to stay on the market without generating revenues. The results show that as many as 62% of enterprises are not able to stay on the market for more than 2 months without generating revenues, of which 20% are not able to stay at all anymore. 22% of the surveyed enterprises will survive for 3-4 months, and only 16% are able to survive over 5 months (Fig. 7). In the context of a protracted pandemic, these results seem to be very worrying.

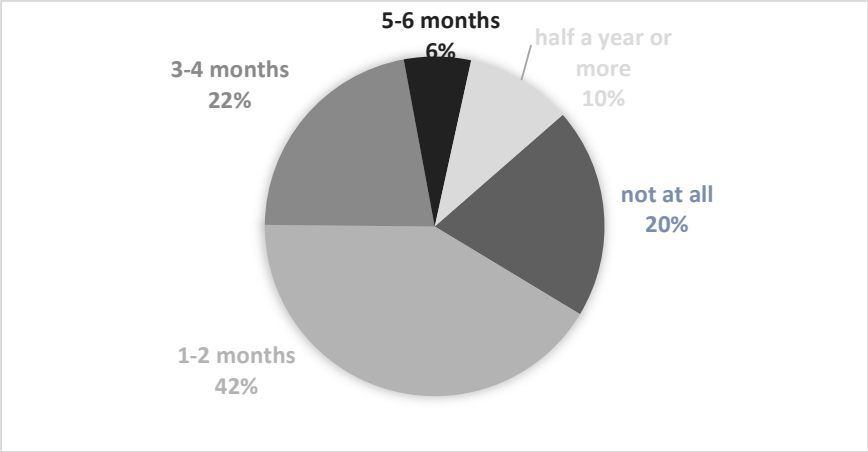

Fig 7. Financial cushion of the surveyed enterprises

Source: own study

Analyzing these results by cross-sectoral sectors, it can be seen that the catering industry seems to be in the worst situation. No company in this industry has declared that it is able to survive for more than 4 months, of which 37% are not able to survive without generating revenues, and 49% will survive 1-2 months. The following industries are also in a very difficult situation: tourism (32% will not survive at all, 43% 1-2 months), beauty (41% will not survive without income, 41% will last 1-2 months) and interestingly medical and psychological services (20% will not last at all and 65% will last 1-2 months). The IT industry seems to be in the best position, in which only 8% of enterprises declare that they will not survive without revenues, and 26% are able to survive for more than half a year. The financial industry is also in a good situation, in which only 11% of companies declare that they will not survive without revenues, and 16% are able to stay longer than half a year. The sectors of e-commerce, consulting, marketing and traditional commerce are also in a relatively good situation (Fig. 8).

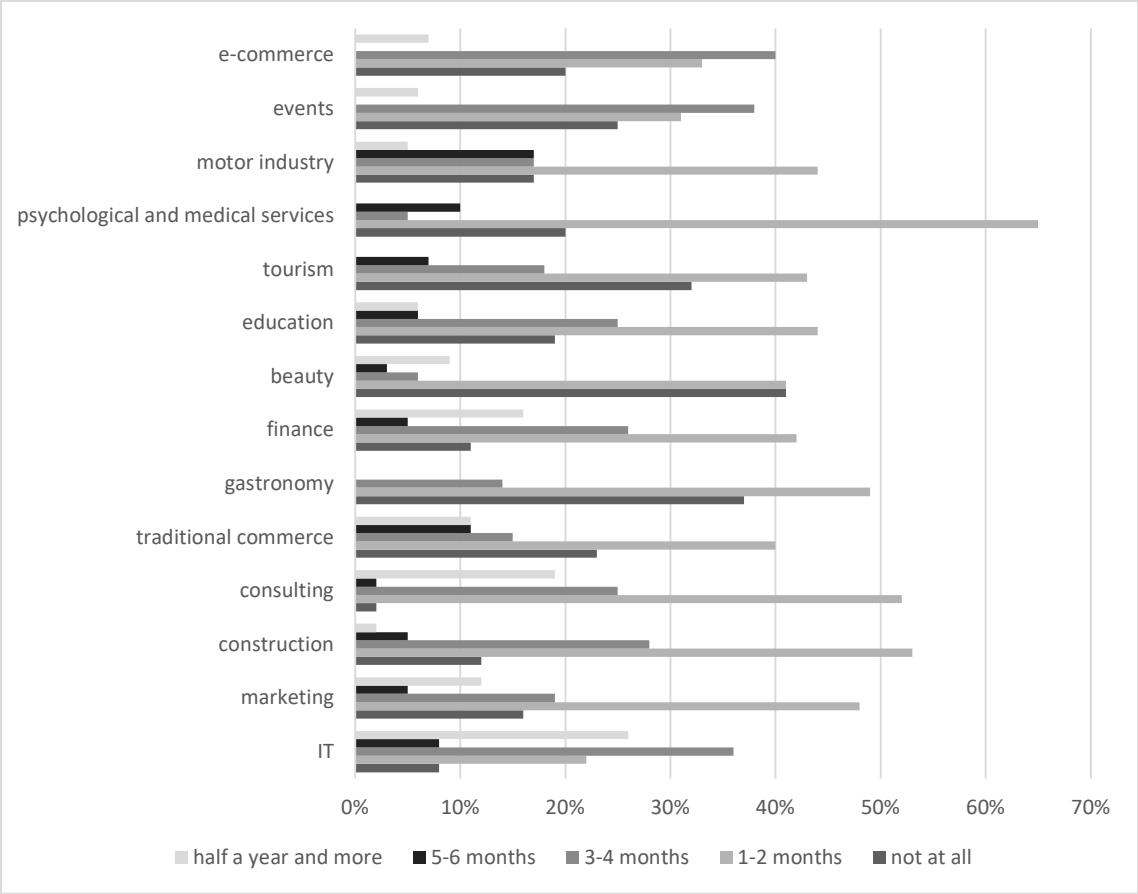

Fig. 8: Period for which the surveyed enterprises of individual industries have a financial cushion

Source: own study

Difficulties and problems faced by Polish enterprises during the coronavirus pandemic

Another important aspect in the study was the identification of problems and impediments associated with coronavirus pandemic noticed by enterprises. The greatest threats are identified by enterprises in the following areas: postponed or canceled orders (375 enterprises), fewer customers than before (369 enterprises), fewer requests for quotations (329 enterprises) and the need to suspend or limit production or provide services (276 enterprises). The enterprises see the least problems in the following areas: the need for cash payments for deliveries (373 enterprises), the lack of competence of employees in the field of remote work (347 enterprises), the refusal or evasion of work by employees (316 enterprises) and the lack of willingness of employees to take leave (313 enterprises). These results show that the problems faced by enterprises are not due to problems in the field of human resources, but rather to problems occurring in other enterprises, due to the interaction and dependence of companies (Fig. 9).

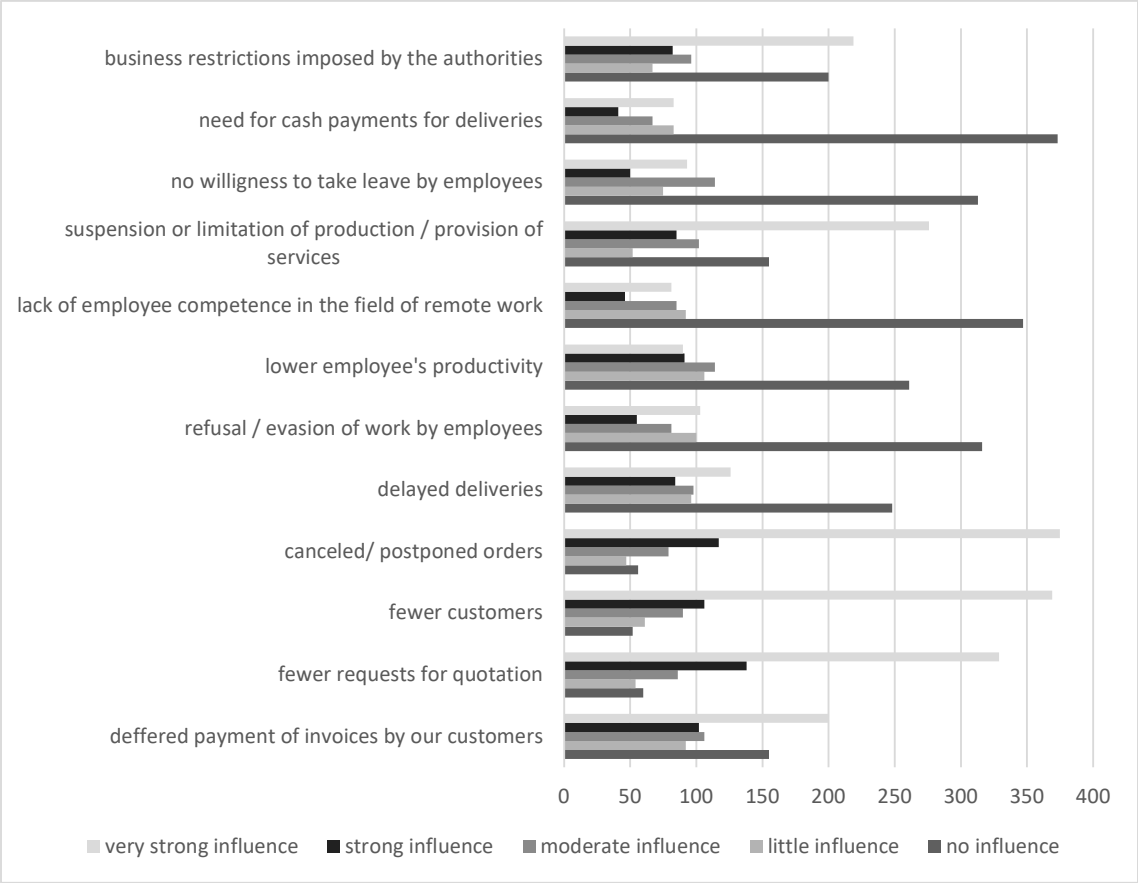

Fig.9: Assessment of the impact strength of the problems faced by the surveyed enterprises during the coronavirus pandemic

Source: own study

Strategies chosen by enterprises during the coronavirus pandemic

An important issue for a full picture of the situation, was to check what actions companies are taking to survive the pandemic. Therefore, entrepreneurs were asked what strategy they had chosen at that time. The most frequently repeated response was to minimize all costs related to operations (53.9% of enterprises). Many enterprises (it can be assumed that those that had such an opportunity) decided to implement "safe" actions, for example switching to remote work or selling via the Internet (52% of surveyed enterprises). A significant group is also looking for new business opportunities and market opportunities (44.1% of enterprises). Interestingly, as many as 1/4 of the surveyed enterprises decided not to take any action and apply the strategy of waiting and observing the development of the situation (Fig. 10). It is also worth mentioning other ideas of enterprises that appeared in individual cases. It was, inter alia: withholding payment of corporate liabilities, reducing full-time jobs, reducing salaries by up to 60%, or taking sick leave.

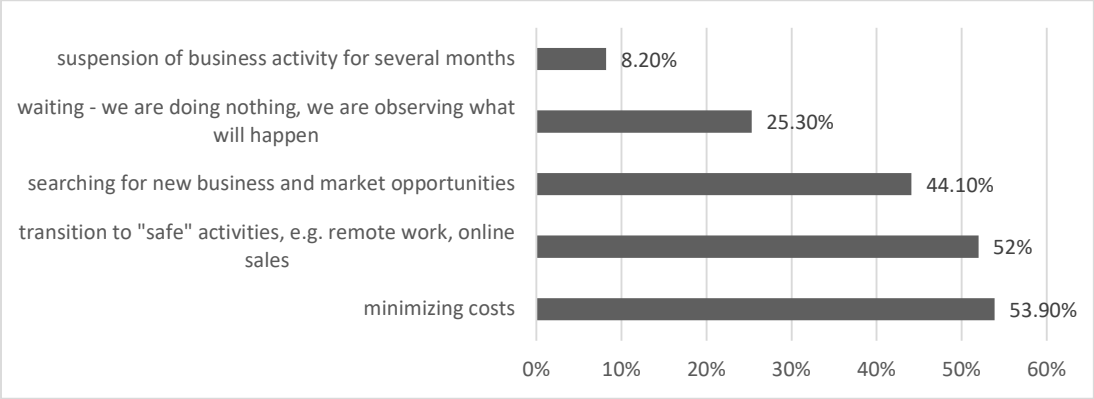

Fig. 10: Strategies implemented by the surveyed enterprises during the coronavirus pandemic
Source: own study

Entrepreneurs' Concerns about the Coronavirus Pandemic

Entrepreneurs' concerns related to the coronavirus pandemic mainly concern: loss of liquidity (514 enterprises), loss of clients (414 enterprises), failure to implement strategic plans (401 enterprises) and the need to reduce jobs (281 enterprises). Moderate fears can be seen in the reduction of labor productivity (275 enterprises). On the other hand, most enterprises are not afraid of: withdrawal of investment from Poland (456 enterprises), employees' demands to remain in remote work after the cessation of the epidemic (424 enterprises), difficult recruitment (382 enterprises) and loss of suppliers (365 enterprises) (Fig. 11).

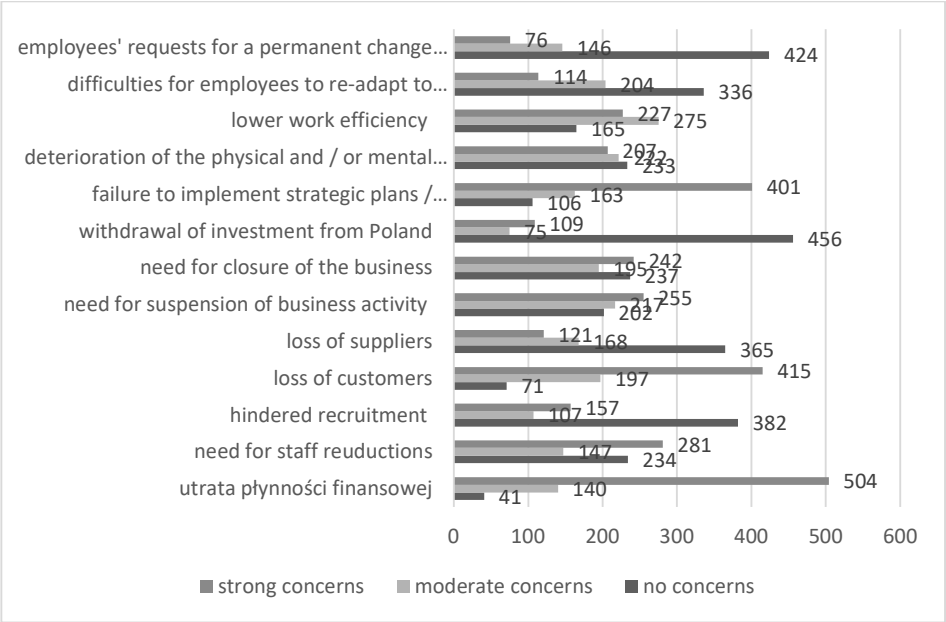

Fig.11: Concerns of the surveyed entrepreneurs related to the coronavirus pandemic
Source: own study

The kind of support Polish entrepreneurs expect from the government

When asked about the help entrepreneurs expect during the coronavirus pandemic, 85.9% declare that it is a Social Insurance Institution (ZUS) exemption, 69.7% expect an income tax exemption, 49.3% would like employees' salaries subsidies, and 47.90% subsidies to other fixed costs of the enterprise. Polish entrepreneurs expect the least real help from the State Treasury guarantees of loans for a short-term improvement in financial liquidity (14.9% of enterprises) and enabling the entrepreneur to consult experts in building a new strategy or restructuring of existing businesses.

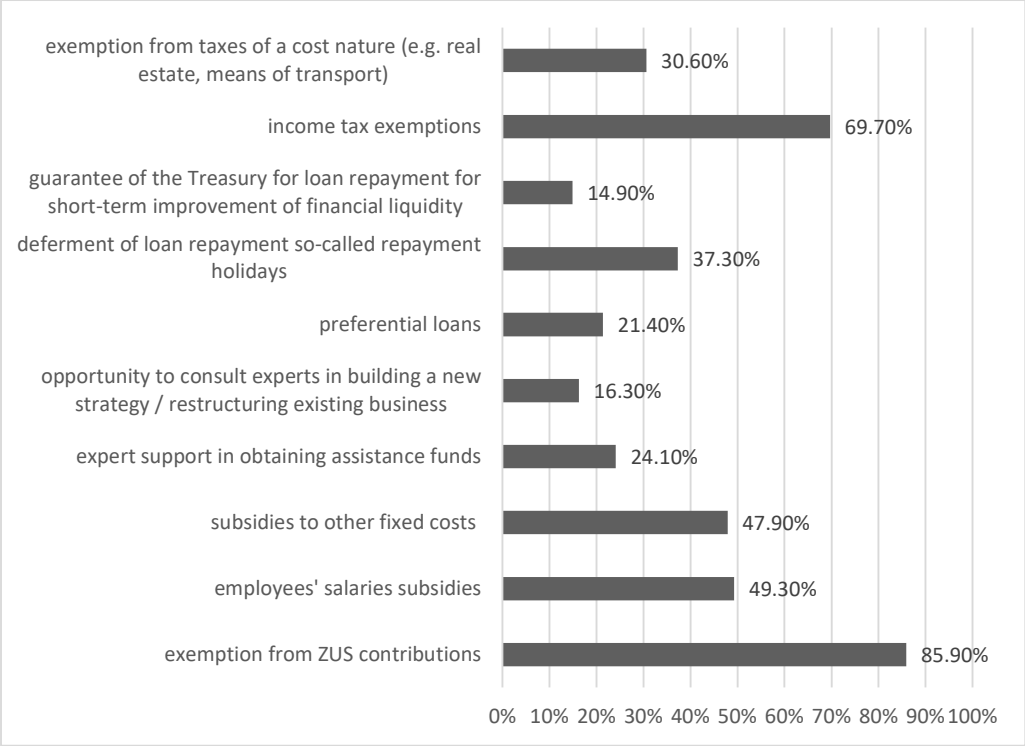

Fig. 11: Concerns of the surveyed entrepreneurs related to the coronavirus pandemic
Source: own study

Positive Effects of Coronavirus Pandemic on Polish Entrepreneurs

Despite the fact that the coronavirus pandemic is associated with a huge crisis for most businesses, it's worth considering whether it also has any positive effects on business. Research results show that 35.8% of enterprises have noticed the emergence or increase of employees' sense of shared responsibility for the company. 32.10% of entrepreneurs experience time savings due to canceled meetings. 26.40% experienced an increase in the competences of their employees in the field of remote work, and 23.60% an improvement in internal and external interpersonal relations (Fig. 12). These results may confirm the assumption that one of the effects of a pandemic will be transformation from the employee's market to the employer's market.

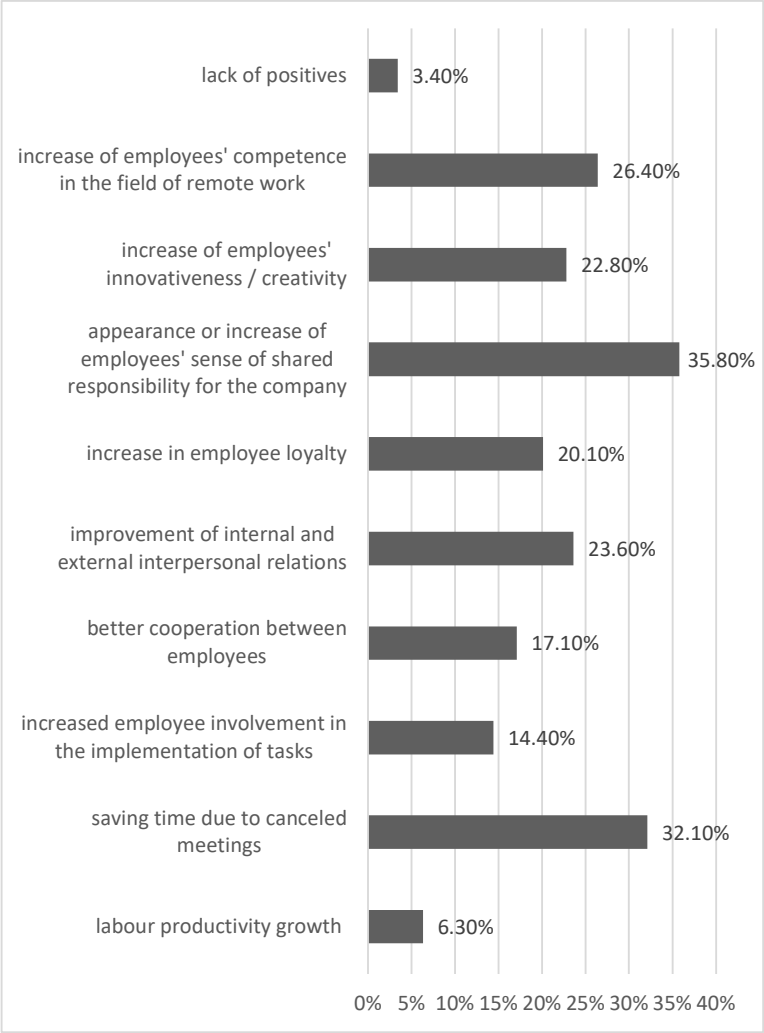

Fig. 12: Positive effects of the coronavirus pandemic on Polish entrepreneurs
Source: own study

Discussion and conclusions

In 2004 Day B., Mckay R., Ishman M., Chung E. wrote that "the world was caught completely off-guard by the SARS outbreak" (Day et al. 2004b, p. 794). At that time, they were right: "As devastating as it was for many businesses, strategic planners would have to be psychic to have anticipated the disease and to incorporate it in the planning process" (Day et al. 2004b, p. 794). But 16 years later, it seems that governments and enterprises should have projected epidemics as an important factor determining the functioning of the world's economy and individual enterprises. However, our research shows that companies still haven't included the epidemic in the business definition of the crisis. Enterprises must include a pandemic to broaden the scope of crisis planning.

In the volatility context, the SARS-CoV-2 pandemic was unpredictable and its duration is unknown. The rate of change is dramatically high across the world. However, a volatile change was expected by enterprises in Poland and an economic crisis had been coming for months. However, most of them did not prepare sufficient financial resources to survive.

Our research shows that lots of companies in Poland have been concentrated on exploitation activity. They have been highly optimized to achieve their goals and very vulnerable and unprepared for future changes in the last few years. Thus, when unexpected future events (the SARS-CoV-2 pandemic) "come" in the present, these enterprises are thrown into crisis that significantly reduces their performance and at worst leads to an organizational collapse in many cases.

Our research has shown the SARS-CoV-2 pandemic poses serious implications for businesses in Poland. The recent SARS-CoV-2 pandemic outbreak has shown how quickly enterprises in Poland can be adversely affected by the global market problems. We have also identified that companies in Poland (very much similar to organizations in other countries) are expecting their government's aid without which they will most likely collapse.

Current events show that future epidemic threats should be considered by enterprises. Organizations should have plans to reduce the impact of the epidemic on their activities, including a "financial cushion". Enterprises should also have procedures to be followed in the event of an epidemic crisis. "There should be no excuse for being caught off-guard" in the future (Day et al. 2004b, p. 802).

We have been observing the development of ICT for years. The pandemic has caused a mega acceleration of their widespread use in work, education and private life. The impact of the technological environment has already had social effects but the scale of this impact (global) and the rate of changes (in Poland within one month) have not been observed so far. What will be the long-term effects of the SARS-CoV-2 pandemic in the technological dimension is certain: we will observe further development of ICT. However, the question remains as to what effects this pandemic will have in the case of private and professional social relationships. It seems highly likely that where home-office work is possible employees and employers will want to maintain this way of working. This requires enterprises to make appropriate changes in their organizational structures, processes and culture.

Unfortunately, now, in 2020, the following opinion: "It may not be SARS next time, but we can safely bet on similar health crises happening in the future. In whatever guise and labeled in whatever name, it will happen again. The question is whether the business community will be better prepared the next time it is around, and based on what we have found, the answer appears to be a resounding no" (Day et al. 2004a, p. 833-834) turned out to be true. Enterprises in Poland are experiencing the negative effects of the SARS-CoV-2 pandemic on the economy. They are not prepared to deal with this problem and the survival of most of them depends on the government and the European Union aid.
The world of today seems to become more VUCA than ever before (Bader et al. 2019, p. 132).

Acknowledgement

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IT System Implementation from Clients' and Supplier's Perspective – A Case Study

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Abstract

As more and more enterprises decide to introduce or to change IT systems, the implementation process becomes an important undertaking in many organizations. However, not all implementations are uniformly successful. The reasons behind problems vary and should be analysed from the perspectives of technology and management. Hence, it is important to understand what is necessary to ensure a successful IT system implementation. The paper takes an in-depth look at the issues behind the process of IT implementation via a case study methodology. It examines four cases of implementation of the fine recovery system, that were successful but not equally assessed by clients. The authors compare these implementations from both the client and the supplier perspective using data collected with a questionnaire survey and interviews. They try to explore the differences between these implementations and to identify their core issues. Some actions that can help improve troublesome implementations are recommended.

Keywords: System, Implementation, Client Perspective, Supplier Perspective

Introduction

A failure of new technology implementation is often caused by treating the implementation process as a technological problem only, while human and organisational issues are not fully born in mind (Eason, 1988). The new technology is likely to change the work processes and, according to Carayon and Haims (2001), to have both positive and negative impacts on job characteristics. An implementation of new technology can, on the one hand, facilitate and accelerate the work but, on the other hand, a technology with usability shortcomings can make the users overloaded by work and hence frustrated.

The nature of the issues that may affect implementation of the IT system can be examined on three levels: macro-, meso- and micro-level. These levels pertain to the inner and outer contexts of the implementation (Greenhalgh et al., 2008). For instance, the macro-level concerns national or regional policies, the meso-level refers to organisational culture, work routine in the client company and support strategies from its board, the micro level touches a behavior and habits in the work place, staff skills concerning IT use, differences between the new system and the previous one (if it existed), users' motivation for the implementation process and use of the new system (Carneiro Mussi et al., 2018). Implementation project can be also described from three main point of views: technology transfer perspective, innovation diffusion perspective, organisational change perspective and project management one (Xu & Cybulski, 2004).

According to Filip (2012) the process of an information system implementing (as well as designing) can be influenced by following factors: people involved, system orientation and its purpose, organizational setting, adopted standards, etc. The management of the client company, just like the

system supplier, should take account of those factors while making a decision on introducing a new system.

Successful IT system implementation cannot be perceived only as a software installation effort. Such an initiative, especially in the case of the ERP system, may affect the whole organization and may involve processes that lead to its broad transformation. It can result in significant changes of the organizational structure and management model (Chang, 2006), but also has implications for employees (Wood & Caldas, 2001). The IT implementation can cause conflicts encompassing the intra- and inter-department levels. Meissonier and Houzé (2010) distinguish five types of such conflicts: the conflict about the system itself, the conflict about definition and execution of the tasks to be fulfilled by the users, the conflict about new required professional skills, the cultural conflicts and finally the conflicts resulting from a loss of power. Several problems may be also caused by the "legacy IT systems" and the operating procedures permitted within the organization (Filip, 2012).

Many authors have analyzed the issues necessary to ensure a successful implementation, often focusing on the ERP system, however most of their findings could be applicable to all types of systems. In consequence, lists of critical factors for a successful implementation have been developed. As an example, Wu (2007) presents 14 factors that can be addressed to three main phases of implementation process: pre-implementation phase, implementation phase and post-implementation phase. The compatibility of system's and company's needs as well as ease of customization are the aspects important during the first stage. The success in the implementation phase can be provided by effective project management from the organizational perspective, and by data and IT infrastructure accuracy from technical point of view (Govindaraju, 2012). User training and education (Wu, 2007) as well as users experiences in their job functions (Krairojananan et al., 2013) are regarded as important factors in post-implementation stage.

According to Calisir & Calisir (2004) perceived usefulness and learnability increase the satisfaction and knowledge level of end-users and determine their acceptance. However, resistance to change is a problem that can be observed during many implementations. The reasons for such an attitude can significantly vary and depend for example on the system type (Jiang et al., 2000). Resistance to change is also identified by Hong and Kim as one of the critical success factors for ERP implementation (Hong & Kim, 2002). Researchers analyze the resistance from different perspectives (people-oriented, system-oriented and interaction-oriented) (Jiang et al., 2000). Different authors underline the role of proper change management, and claim that a troubled implementation may take place when the system is mandated by top management without preparing the organization and adequately managing the change (Motwani et al., 2002), (Beheshti et al., 2014). According to Govindaraju and Indriany (2012) especially top management support is important for mobilizing employees during the project. As a result, staff may adopt the implementation enthusiastically or may reluctantly consider the suggestions and not get involved with the phases of implementation. Users' acceptance of a new system is often recognized as a main aspect of the implementation and it influences the perception of resulted changes (Brito & Nogueira, 2009), (Kwak et al., 2012). System's individual characteristics, its usefulness and ease of use, prior expectations, and magnitude of the change are among the most important factors identified as sources of employees' attitudes toward change (Jiang et al., 2000). A communication between business and IT professionals can be supported by the systems analysis method developed by Alter (2011). It can be used for facilitating the business professionals, who don't possess sophisticated knowledge, their engagement in IT system development and improvement. Moreover the way of perceiving the IT system users should change from technological tool users to human participants in socio-technical work systems.

Two research questions are posed in this paper: (1) what factors facilitate a successful system implementation, and (2) what actions can be taken to increases the chance of the implementation succeeding? This paper attempts to answer the above questions by examining four implementation cases of the same system from both the client and the supplier perspective. In spite of equal experience and skills of the supplier company team, not all implementations were equally successful.

Fine recovery system and its implementation

The fine recovery system was developed with participation of Wroclaw Roads and City Maintenance Office and is destined for companies dealing with mass collection of debts coming from invalidated municipal transportation rides. The data can be introduced manually or via a mobile application that enables recording of data from the ticket inspectors' location. The inspectors can prepare the calls for payment and also verify the data of passengers who refuse ticket validation. The system can also exchange data with external systems like the National Debt Register (KRD) and e-court service.

The main units of the system are as follows (Marszałek, 2017):

- Request unit – enables to manage the data concerning invalidated rides, add new data, browse and analyze the already collected data.
- Renewed request (reminder) unit – enables mail merge pitched at debtors.
- Pre-court/pre-litigation request – the last conciliatory request can be generated and printed. Both successfully and unsuccessfully provided requests should be registered because this step of the debt collection processes is obligatory.
- Court case unit – a lawsuit can be generated automatically on a blanket accepted by Polish courts.
- Procedural path unit – includes all the stages after the lawsuit has been brought.
- Recovery unit – enables sending the requests to the debit collectors.
- National Debt Register unit – the information about the passengers who repeatedly shun from paying off fines can be electronically placed in the National Debt Register.
- Ticket inspectors – the efficiency of each ticket inspector can be determined and used to calculate commissions.

Implementation of a system requires close cooperation between the supplier company tram and the staff of the client company. There are seven following main steps of the implementation of the fine recovery system (Marszałek, 2017):

1. Presentation of the system – the content of the presentation varies depending on the previous stage (tendered contract or a request for proposal).
2. Requirements analysis – during the close cooperation with the client company, core functional and non-functional requirements are identified and described or elaborated and elucidated (according to the previous step). A specification document that has to be approved by both sides is prepared.
3. Installation of the trial version – a demonstrative version is configured in accordance with the recovering procedure applied in the client company and then introduced.
4. General training – a presentation of the units and their operation can be held for one big group of users or several smaller ones. The overall attitude towards the system can be disclosed together with some details of the recovering procedure that can bring about the necessary system modifications.
5. Data migration – the client company might have a set of recovering data from the previous system and want to use it in the new system. Data migration is usually a long-lasting and difficult process. It is repeated until all errors are corrected.
6. On-the-job training – in the form of workshops with individual users or a small group of users. The participants practice operations following their job description.
7. Launch of the system – a new system is launched; it can replace the previous system or work simultaneously with it for some time to compare the results.

System implementations in four companies

The computer system that support activities connected with recovering process was developed by the supplier company and implemented at different companies. Four implementations were taken into consideration and compared from the client as well as from the supplier perspective.

The case of company A

Company A, founded in 1992 in a city with a population of 250,000, was responsible for the organization and management of the public urban transport. The previous computer system was only adapted to support recovering operations and was not effective. Moreover, the external applications

like Excel spreadsheets and mail merge editors had to be used to fulfill a part of the operations. The executive board decided to introduce a new system to automatize part of the work and, for mostly, to avoid any losses caused by delayed prosecution and lapsing of cases. A contract for the new system has been tendered and the general requirements as well as the detailed timescale of the implementation were put in the contract. A certain reluctance towards the new system has been observed among the staff since the general training. They expressed distrust towards the functionalities of the new system and its user-friendly interface and insisted on adjusting it to match the previous system design. Such an attitude hindered the training and – in consequence – the whole implementation. In the end, it was possible to convince the staff to accept most solutions presented in the new system and only tiny modifications were introduced. Nevertheless, a big number of questions from the staff was a serious issue that resulted in the necessity of providing an additional training.

The case of company B

Company B, founded in 2008, was responsible for the organization and management of the public urban transport for one of Poland's largest cities and the surrounding urban region. The previous system was dedicated to this company and supported the basic functionalities of recovering but was not integrated with other entities. The development of this system was impossible, so its users made individual efforts to find a better solution that would allow them to collect debts better than before (especially important were the automated generation of lawsuits and the electronic placement of information in the National Debt Register). Company B has chosen the system basing on several presentations. The requirements for the new system were not listed earlier, thus it was necessary to carry out some interviews and consultations with future users and management. The collaboration was very fruitful due to the positive attitude of the company B staff.

The case of company C

Company C has been operating since 1990 and has dealt with ticket inspection and debt collection that resulted from invalidated rides in the public and municipal transport in one of Poland's largest cities. A supplier of the new system was selected in competitive bidding where partial offers were not accepted. The requirements for the new system were described in detail; they were very complex – the system was expected to enable control and mass debt collection and to be integrated with the ticket inspection system on mobile devices and with other external systems. A special department had been established just so there was no additional expectancies (apart from the description of the subject of the contract). Due to long recruitment process, not all staff members could work with the trial version. Therefore, on-job training had to be very detailed and profound.

The case of company D

Company D, established in 1996, was responsible for the organization and management of the public urban and suburban transport in one of the largest cities in Poland. This company was expected to take over the operations of ticket inspection and mass debt collection. The supplier was chosen based on an order and the client company did not have enough experience and knowledge to determine system requirements.

There was no time pressure in the system implementation at company D, hence all of its phases went calmly. However, there were disadvantages to this situation – the implementation was overrun with a host of suggestions and remarks that were taken into consideration. Quick installation of the trial version has facilitated discussion about the requirements. The activities the staff at company D learned were new for them, so the trainings often took the form of a workshop. Moreover, the employers did not have any previous experience or habits, so they quickly accustomed to the system. There was no data to be migrated, so the new system could start expeditiously and the trainings were organized prior to each phase of recovering process.

It is possible to indicate four main factors that differentiate all the implementations described above. They are presented in Table 1.

Table 1: Main factors differentiating described implementations

	A	B	C	D
Previous system	yes	yes	no	no
Board initiative	yes	no	no	no
Detailed system requirements	no	no	yes	no
Time pressure	yes	yes	yes	no

Source: own work

Research Methodology

Four cases of implementation of the fine recovery system were evaluated from the perspective of both the client and the supplier. In this study, two data collection instruments were used to assess clients' and supplier's experiences related to implementation of new systems. The first one was a user survey and the second – the interviews with the people who were involved in all the four implementation projects from the supplier's side. The staff (86 employees) who participated in the implementation at the clients' companies filled in a questionnaire that evaluated several aspects of the implementation process. The questionnaire consisted of 36 questions (most of them close-ended, with ordinal scale) and was divided into four parts that referred to:

- presentation of the system – raised the questions of the presentation comprehensibility and usefulness, as well as the assessment of skills and knowledge of the training officers.
- analysts' qualities presented during requirement analysis – the staff were asked to assess the level of analyst's expertise, responsiveness and involvement in the process. Later on, the qualities of the alternative solution and how analysts identified and anticipated clients' suggestions were evaluated
- trial version assessment – included questions about the functionality of the trial version (the advantages of the new system, necessary functions), whether it met expectations (was it adequate for the worksite), whether the duration of the trial version and the level of technical support during the tests were sufficient.
- evaluation of the trainings and documentation – the comprehensibility of the general training, as well as the utility of the on-the-job training (was it sufficient for starting unassisted work with the system) and its general assessment. Some questions about the documentation of the system were also posed (regarding its clarity and usefulness).

The supplier staff took part in interviews that were structured, with 34 questions, mostly open-ended. The questions asked concerned the methods of the new system requirements determination, fluctuation of the requirements, initial presentation (its preparation and impact), working with the trial version, data migration (scope, data verification methods), trainings. The analysts were asked about the problems they encountered, about users' behavior and engagement (point-making, questions) as well as about meeting those expectations.

Results

According to the results of the questionnaire, the staff from companies B and D assessed the usefulness of the system presentation positively (100% of participants), at company A the result was distinctly lower (50%). The staff complained that some of their questions were not answered or answered in an incomprehensive manner.

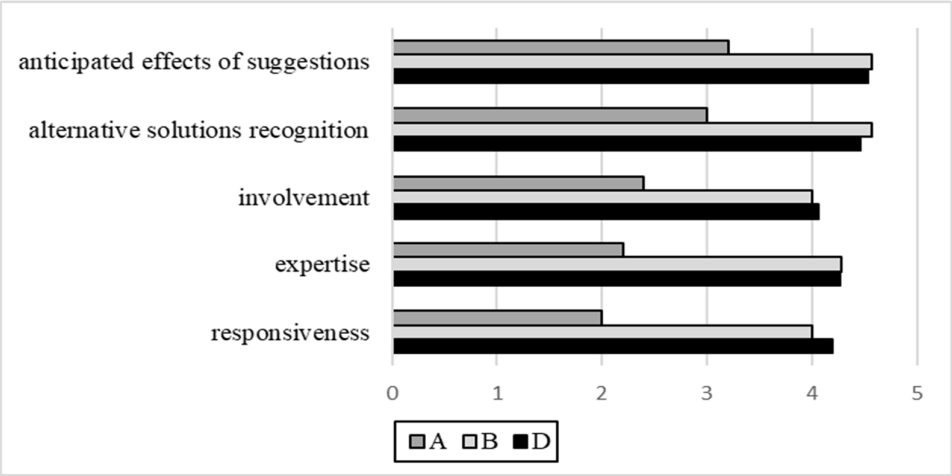

Fig. 1: The assessment of the analysts' qualities

Source: own work

The accuracy of the requirement analysis was assessed high in companies B and D (respectively 4.1 and 4.3 points on a 5-point scale) and low in company A (2.8 points). Requirement analysis was not conducted at company C due to a very detailed description of the subject of the contract. The opinions on the analysts' qualities also varied between companies (see Fig. 1) – the staff at company A evaluated all features distinctly more negative. The analysts' willingness to cooperate with the users was evaluated as the most negative, but the expertise and the involvement also got a very low rating.

The trial version provided functions required on the workplaces by most of the users and the trial version testing period was assessed as sufficient to familiarize with the system's functionalities (company C was the most unsatisfied). The trial version functionalities met the expectations of all the companies, except company A (see Fig. 2 for details). Technical support during the trial period was rated as the worst (especially at company A, however company C was also not satisfied).

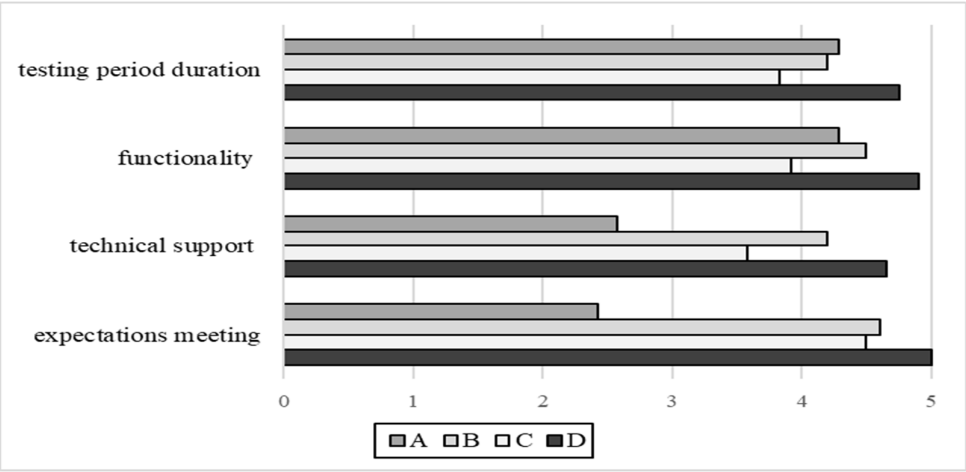

Fig. 2: The assessment of the trial version

Source: own work

Apart from the company A staff, the comprehensibility of the general training was assessed well. The respondents complained about the large amount of information shared in short time and about the fact that most of it focused only on the theoretical aspects of the system. The on-the-job training was assessed slightly better – according to the respondents it was helpful in starting individual work with the system (see Fig. 3 for details).

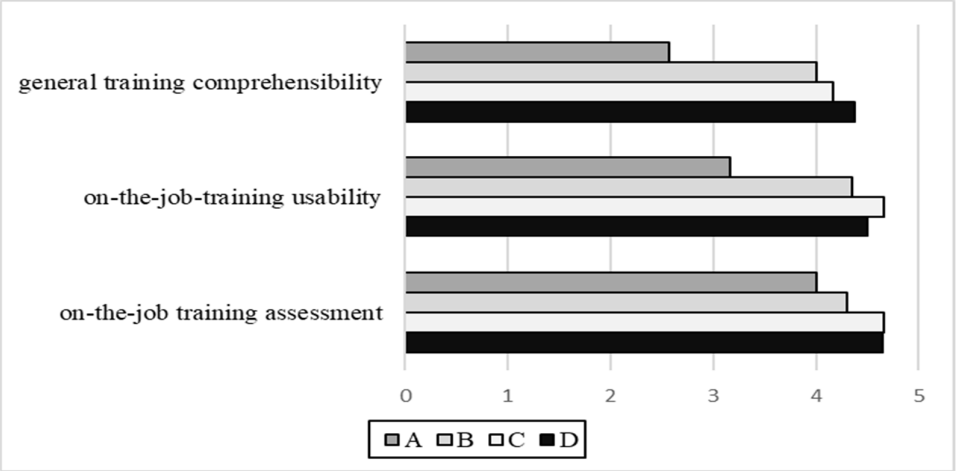

Fig. 3: Training assessment

Source: own work

The documentation of the new system was well-rated but it was used only by a part of the users (mostly because of the technical language; some did not use it as the trainings provided were comprehensive enough). The respondents from companies A and B were also asked to compare the new system with the previous one. The opinion of the majority of the users from company A (67%) was that the old system was better than the new one. In the case of company B, most of the users (83%) appreciated the advantages of the new system.

The employees participating in the interviews mentioned problems that occurred during the implementation of the fine recovery system at company A. The staff members were very much used to the previous system, so a feeling of hostility and a pushback against the new system were observed which resulted in difficulties in determining the details of the functional requirements. The implementation at company B received best assessment and was also the most efficient. The friendly attitude of the staff was an important factor which helped in putting the record straight in a short time. Only at company D there was no time pressure on the implementation of the system (there was no deadline for the task). The users had the opportunity to slowly familiarize themselves with the fine recovery system which reduced their doubts concerning the new system.

Discussion

Although every among the four implementations described in this paper was successful eventually, they were differently assessed by clients. The authors attempt to discover the factors that are expected to improve how implementation process is perceived and assessed by the users of the implemented system. In order to achieve this, several steps have been taken into consideration and analysed: the situation at the company before the implementation, users' evaluation of particular implementation phases and the supplier's staff opinions.

The first identified factor is the source of the initiative behind the change of the system. A bottom-up initiative seems to influence the implementation positively. The implementation at company B was initiated by the employees, who felt the need to change the previous system and were visibly interested in achieving success with this project. The collaboration with the analysts and training specialists run smoothly and all the arrangements were completed flawlessly. The involvement of the above professionals was appreciated, which is reflected in the positive assessment (highest rank) of this implementation by the supplier's staff. Also the client's opinion regarding the analysts' qualities, the training and the trial version period was very positive and the new system was generally appreciated.
On the contrary, the implementation at company A, where the system exchange had been imposed by the management, was assessed as the worst by both the client as well as by the company that

implemented the system. The staff, used to the previous system, was reluctant and did not want to collaborate with the analysts and training specialists. The employees tried to force making adjustments to the new system interface to match the previous design. Their hostility might be the reason of the noticeable lower assessment of the system analysts' qualities as well as the trainings. Moreover, the staff was also dissatisfied with the trial version and technical support, saying their expectations were not met. In the end, they were still convinced about the supremacy of the old system over the new one. The second identified factor is the duration of the implementation. Scheduling sufficient time for the implementation (especially for working with the trial version of the system) eliminates the feeling of rush and may improve the perception of the whole system.

The lack of a set time-frame was observed during the implementation at company D. The staff had enough time for testing the trial version which meant that the users' could adequately familiarize themselves with the system and hence their bias was reduced. Finally, the results of the survey show that this implementation was assessed as the best. The differences could be clearly seen, especially in the evaluation of the trial version.

The results of the questionnaire survey were analysed statistically. The hypothesis concerning the lack of difference between the implementations in the four examined companies was rejected. Variance analysis at the 0.05 level showed significant differences related to the variables described as: technical support during working with a trial, fulfilment of the expectations by the trial, general training comprehensibility, assessment of the on-the-job training and usability of the on-job-training. A post-hoc analysis allowed to identify significant differences between some of the examined companies (see Table 2).

Table 2: Results of a post-hoc analysis

Variable	Pairs of significantly differing companies
fulfilment of the expectations by the trial	D-C
technical support during working with a trial	B-A C-A D-A
usability of the on-job-training	B-A C-A D-A
general training comprehensibility	B-A D-A D-C
assessment of the on-the-job training	D-C

Source: own work

Conclusion

Only four companies case studies were been used to observe how users react to issues associated with a new system implementation. Therefore, we cannot claim any generalisation of the results. Nevertheless, the lessons learned from analyzing four organizations may be helpful for others in their efforts towards a successful system implementation. The most important issue seems to be the attitude of the future users of the new system and their identification with the system. Obviously, when selecting the system a bottom-up initiative is not always possible, yet comprehending the necessity of system introduction (or change) is an essential factor that could help in the efforts of system implementation. Involving representatives of the future users in systems presentations and giving the possibility of expressing their opinion on the system's advantages and disadvantages seems to bring benefits to the process. The next problem to be avoided is allotting inadequate time period for the implementation resulting in undue haste. Special attention should be paid to working with the trial version and to providing training. Moreover, no questions posed (especially during training sessions) should remain unanswered.

Resistance to change as a problem during the implementation is brought up by many authors, who also analyse the importance of top management support and of generating awareness of why change is necessary. However, the relation between the source of system-choosing initiative (top-down versus bottom-up) and the perception of the implementation is not verified.

We would like to recommend that future research to examine the influence of this factor, although finding an appropriate set of companies poses some difficulties.

Planning the duration of implementation needs to be balanced, which the supplier can achieve in cooperation with the client. Taking too much time for the implementation will create unnecessary financial burdens, while too little may leave users unsatisfied. Nonetheless, it is impossible to determine a general rule for the estimation of implementation time.

The main limitation of this study is that it was focused on a relatively small number of companies (it ensured that the supplier's team was the same, so they could compare all the four implementations). The study was intended to set the direction for future research works planned at several IT system suppliers companies.

Acknowledgment

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Decision Making Framework Enabling Sustainable Remanufacturing in Small and Medium Sized Enterprises in The Automotive Sector

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Abstract

The main goal of this paper is to present the decision making framework which is based on the Sustainable Remanufacturing Maturity Model (SRMM). This framework supports the decision makers with actionable knowledge on how to reach the state of multidimensional (economic, ecological and social) resource efficiency in the remanufacturing process, so called sustainable remanufacturing (SR). The originality of the proposed framework results from relating the process maturity level (current state) to the appropriate improvement's actions which can be taken at each maturity level. The framework provides adequate tools that allow to identify the improvement potential and then to prioritize actions which are needed in order to improve the sustainability of the remanufacturing process. The tools are tailored for different levels of the process maturity in a company, namely: low, medium and high.

Keywords: Automotive Aftermarket, Maturity Profile, Sustainable Remanufacturing, Sustainability Assessment.

Introduction

Remanufacturing is an industrial process that transforms core (returned product) into "as good as new" product. Remanufacturing is the most resource efficient recovery option for end-of-use products (Steinhilper, 1998; Yan et al., 2018). Very few previous studies address the problem of the sustainability assessment of the remanufacturing process.

It is often assumed that remanufacturing is a sustainable practice without any further investigation. The previous studies on remanufacturing and sustainability have addressed the topics, as follows:

- remanufacturing, as enabler of Sustainable Operations Management (SOP) (Kleindorfer et al., 2017; Fatima & Biswas, 2016)
- remanufacturing, as enabler of the Sustainable Supply Chain (SSC) (Correia et al., 2017; Yan et al., 2018)
- remanufacturing as enabler of sustainable consumption (Matsumoto et al., 2018; Ardeshirilajimi & Azadivar, 2018)
- eco-design (Pigosso et al., 2013)
- choice of most sustainable recovery option for end-of-life and end-of-use products (Sundin & Lee, 2012; Warsen et al., 2011).

None of the above mentioned approaches focuses on a holistic assessment of the remanufacturing process, as a core business of a company.

Sustainable remanufacturing is defined here as: *a remanufacturing process which transforms a core in a product with as good as new functionality, when maximizing the material recovery rate at a feasible economic cost and minimizing the negative environmental and social impact*.
The sustainable remanufacturing has the characteristics, as follows:

- economically efficient use of resources,
- minimizing waste generation and emissions,

- maximizing the secondary use of car parts,
- ensuring safe and ergonomic work environment, supporting employee's development and generating minimal burdens for the surrounding community.

The operationalization of the sustainability goals at a company level is challenging, especially in small and medium sized enterprises (SMEs). Schrettle et. al. (2014) have stated that companies search for guidelines on how to develop sustainable capabilities and integrate them in their business goals at operational level and include them in their decision-making process.

The maturity model (MM) has been explored by a number of researchers with regard to its potential, as a framework for sustainability assessment in a company (Machado et al., 2017). Correira et. al. (2017), through systematic literature review have identified that most of the existing MMs in sustainability domain only describe the current state and that the application framework is missing.

This paper extends the previous author's studies (Golinska & Kuebler 2013; Golinska-Dawson & Kuebler, 2018) on the application of the MM, in order to provide sustainability assessment criteria of remanufacturing operations. The initial MM hasn't included the application framework, which allows to make changes in the current business practices and eliminate wasteful activities.

The main goal of this paper is to present the decision making framework which is based on the Sustainable Remanufacturing Maturity Model (SRMM). The framework aims for enabling SMEs in the automotive aftermarket the assessment their current maturity profile (as-is state) with regard to sustainable resource utilization. Further the framework provides adequate tools for each of the maturity level and that allows to identify the improvement potential and to prioritize actions which are needed in order to improve the sustainability of the remanufacturing process.

The main theoretical contribution of this paper is the proposal of the decision making framework which is specialized for the organizational conditions that appear in the remanufacturing SMEs in automotive sector. Three set of methods are presented which allow assessing the process in SMEs at: low, medium and high maturity level. The findings from the literature review are combined with the insights from the experts' panel and the case studies.

The remainder of the paper is organized, as follows, first the methodology is described. Then the decision framework is presented, the used tools and methods are described. That is followed by framework testing. Finally in conclusions, the benefits and limitations of the proposed approach, as well as further research are discussed.

Methodology

The previous related studies on the application of a maturity model (MM) for sustainability assessment, focus on the supply chain perspective or the sustainable operations management perspective. They partly include the remanufacturing aspects but they don't allow for a holistic assessment of the remanufacturing process with regards to the sustainability goals. During the literature review only one other maturity model has been identified, which is solely dedicated for the assessment of the remanufacturing process. The Remanufacturing Process Capability Maturity Model" (RPCMM) has been developed by Butzer et al. (2017). The RPCMM focuses on providing the benchmarking tool in assessment of the remanufacturing process efficiency but it has a very limited application framework.

The maturity models allow the decision makers to evaluate the current situations (as-is) with regard to sustainability and to guide them through the improvements path (Correia et al., 2017). They allow for the analyses of the current state of an organization to enable positive transformation towards reference state (to-be).

The design of the maturity models is challenging as "the nature of maturity models has not been theorized well in literature" (Kohlegger et al., 2009). Similar criticism is expressed by Poeppelbuss et

al. (2011) "academic articles often present new MMs, as a rough sketch that would not suffice for practical application".

Operationalization of the objectives of sustainable development at the enterprise level requires providing a framework for managerial decision-making with regard to the assessment of the current state (the level of resource utilization) in the remanufacturing process and then identifying potential for improvement's actions and prioritizing them.

The proposed framework is developed based on the literature review and the output of the case studies conducted in the SMEs in the automotive remanufacturing aftermarket, as presented in Fig.1

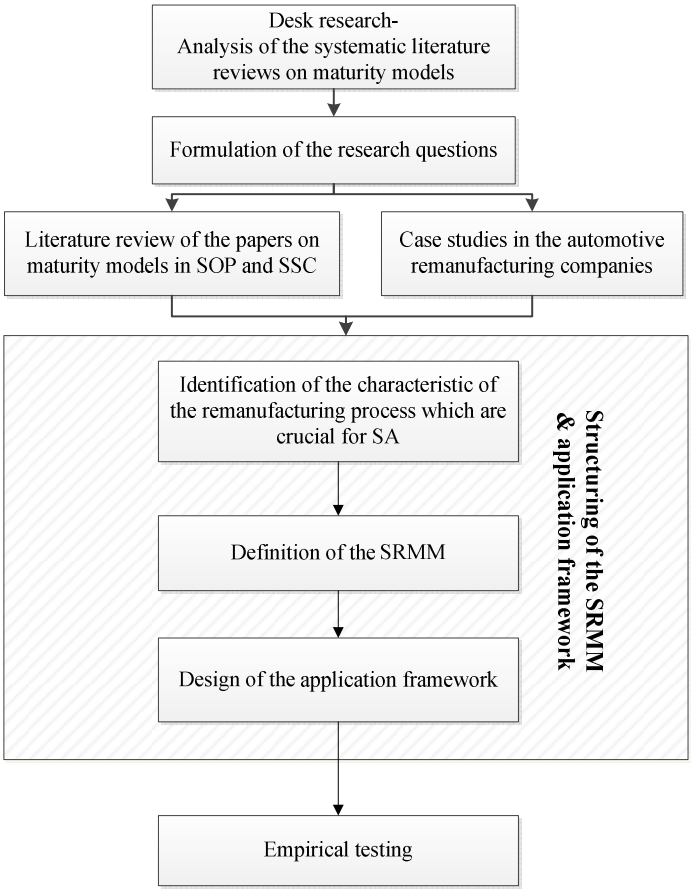

Fig. 1: Methodology, Source: Developed by the author

Based on the concerns about the limitations of the MMs, which have been expressed in the previous studies (Correia et al. ,2017; Marchado et al. 2017; Tarhan et al., 2016; Poeppelbuss et al., 2011) the research questions are formulated, as follows:

- RQ1: What form of the SRMM does allow assessing the current level of sustainability of the automotive remanufacturing process and identifying the areas for improvement?
- RQ2: How to support the decision makers to prioritize the actions which are necessary to transform towards sustainable remanufacturing in automotive SMEs?

In order to address the research questions the decision making framework is designed and it includes the elements as follows:

- the structuring of the SRMM – it provides definition of the maturity levels and it gives guidelines on how to calculate maturity level;
- an application framework – which relates the maturity level with relevant indicators and other sustainability assessment methods in order to identify the appropriate actions, that are necessary to improve the current situation.

Decision framework description

Introduction – Organizational Conditions in Automotive Remanufacturing SMES

Remanufacturing of automotive parts differs significantly from the primary production. The process constitutes of subprocesses, (Golinska-Dawson et al., 2018): core delivery; initial assessment; disassembly; cleaning; inspection and sorting; reprocessing of components; reassembly and testing.

For purpose of the design of the decision framework the organizational conditions in automotive remanufacturing are identified based on literature research and pilot studies among 40 SMEs (for details see: Golinska-Dawson et al., 2018). A summary of the results, which are obtained are presented in Table 1.

Table 1: The organizational conditions in automotive remanufacturing, Source: developed by the author based on (Golinska-Dawson et al., 2018)

	The factors identified based on the literature review	**Implications of a factor appearance in SMEs (based on an empirical study)**
External (core deliveries)	Uncertainty of the process' input (time, quantity, quality)	The uncertainty of the supply stream is limited by processing cores owned by the customer or diversification of sources of supply.
	Proliferation of cores and small size of deliveries	Most remanufacturing orders include only one car part (87.5% of orders).
	Variable Material Recovery Rate (MRR)	Most SMEs achieve the MRR required by APRA standards (82.5% of respondents).
Internal factors (organization & execution of the remanufacturing process)	Uncertain lead times	The duration of the regeneration cycle varies from hours to weeks, depending on the technical condition of the core and the availability of the necessary components.
	Small batches of wide range of product variants and generations	The high proliferation of models and the generation of car parts might cause difficulties in the automation of technological operations and limits the possibility of obtaining cost-effectiveness (scale effect).
	Materials matching restrictions,	Majority of the SMEs produce the missing components on their own.
	Time consuming disassembly, cleaning and reprocessing	SMEs perceived as time-consuming operations typical for remanufacturing process.
	Problems to meet variable quality requirements	Most SMEs do not perceived as significant problems resulting from the need to meet diverse customer requirements.

The definition of external and internal factors (theoretically and empirically) has become the starting point for designing the SRMM and developing a set of methods and tools in the application framework.

SRMM - Definition of The Maturity Levels and Maturity Scoring

Small and medium sized enterprises use ad hoc solutions and experts knowledge (Golinska et al., 2015). The processes have low standardization and the corporate reporting standards are rarely used. There is need for guidance on how to assess the current remanufacturing performance with regard to sustainability (current process maturity level) and how to improve the resource utilization to transform a core (used product) into a remanufactured product in a sustainable way.

The process maturity is defined here, as: *an extent to which processes are defined, managed, measured, controlled and optimized with regards to sustainable resource utilization.*

It is assumed that the model is used for self-assessment, so the Likert- like questioner is used. This assumption is also supported by previous research (Machado et al., 2017).

The initial MM of sustainability in remanufacturing (Golinska & Kuebler 2013; Golinska-Dawson & Kuebler, 2018) includes 5 stages which are created based on the ISO/IEC 15504. The current version is modified according to commonly used in the literature CMMI (Chrissis et al., 2003). The process maturity levels are defined, as follows:

- Level 0 (very low) – the sustainable practices in management of remanufacturing process are not applied or are applied incompletely by a company.
- Level 1 (low) – the sustainable practices in management of remanufacturing process are applied ad hoc (e.g. to solve current problem or to comply with specific customer requirements) in a company, processes are not formalized.
- Level 2 (medium) – the application of sustainable practices in the management of remanufacturing processes is formalized; there some indicators are defined in order to measure the performance towards sustainability.
- Level 3 (high) – the application of the sustainable practices in the management of remanufacturing process is formalized and controlled, the performance indicator are measured and monitored on a regular basis.
- Level 4 (very high) – the application of the sustainable practices in the management of remanufacturing process is used for continuous optimization.

Figure 2 presents the elements of the SRMM. The maturity levels are measure based on the appearance of a management practice in a company.

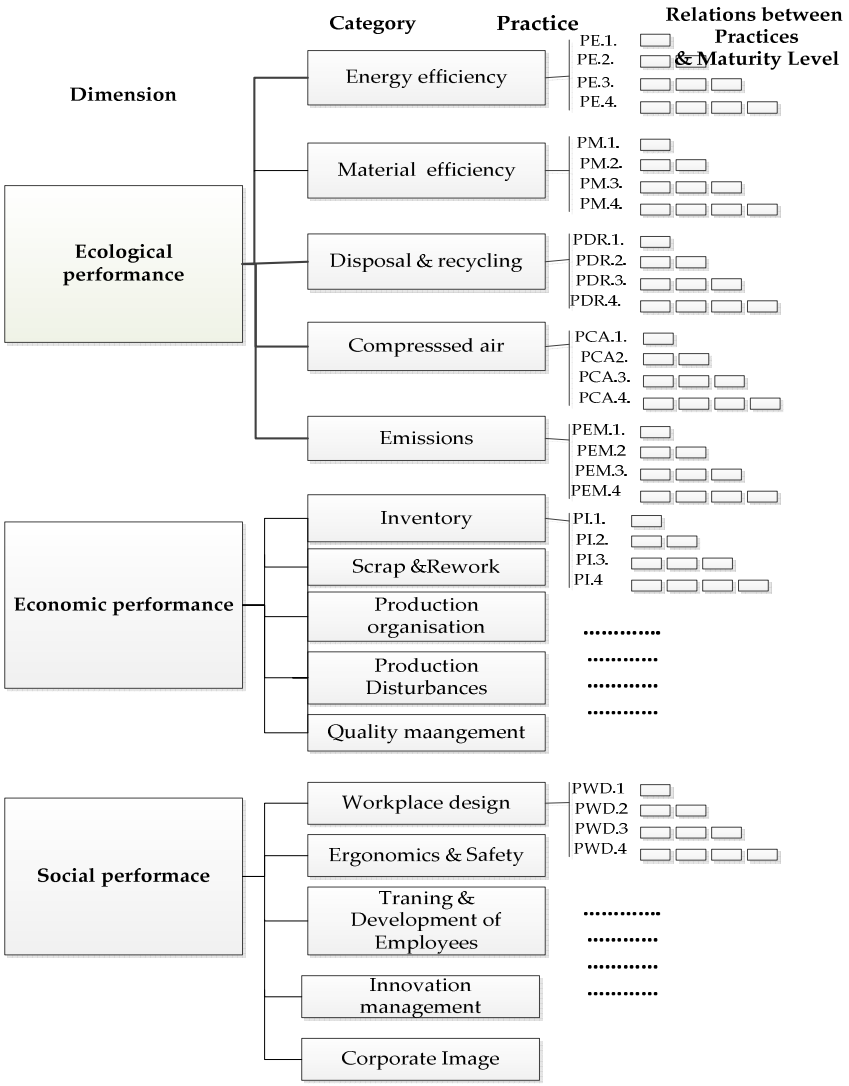

Fig. 2: Structure of the SRMM, Source: developed by the author based on (Golinska-Dawson & Kuebler 2018)

The 60 management practices are structured based on 3 in-depth case studies conducted by the author in remanufacturing SMEs, additional data from interviews with remanufacturing managers and the outputs of the review of the automotive remanufacturing cases described in the literature.

There is no practices' description at level 0 (very low), as if the practice at level 1 is not implemented, and then the maturity value 0 is carried out to maturity profile. All the codes of the management practices are tailored specially to reflect the organization conditions in SMEs in automotive remanufacturing sector.

The practices are assessed on the Likert-like scale in the Sustainable Management Practices Questionnaire (SMPQ). The managers answer the questions "Yes (1 pt.)/No (0pt)". The subsequent maturity level cannot be measured in a category if the previous level is not achieved (e.g. if the company does not apply practice from level 2 in an assessment's category then the question for level 3 is automatically assessed with value "0"). The example of the sustainable process management practices are presented in Table 2.

Table 2: An example of the sustainable management practice – extract from the SMPQ for remanufacturing, Source: developed by the author

Dimension	Code	Process management practice description	Corresponding maturity level
ECO …..	PE1	Ensure that energy usage is taken into consideration in management actives (management staff is aware of it)	1
	PE2	Formulate rules for energy usage measuring and monitoring (e.g. are there separate meters on the machines)	2
	PE3	Incorporate the energy usage monitoring in everyday routines of employees	3
	PE4	Implement an energy management system(e. ISO 50.001)	4

The maturity profile is constructed based on assessment from maturity questionnaire which allows the self-assessment of the current maturity level by the managers. The maturity profile is constructed in graphical form, as a radar diagram.

The Application Framework

Table 3 presents the summary of the developed application framework. The application framework consists of: assessment methods, method for improvements' identification and guidelines for giving priorities.

Table 3: The application framework, Source: developed by the author

SRMM's level	Assessment method	Method for improvements' identification	Method for giving priorities
Very low	Process mapping	ad hoc	ad hoc
Low	RPA and Leanness questionnaire (qualitative assessment) (Kosacka & Golinska-Dawson, 2018)	modified RPA (Kosacka & Golinska-Dawson, 2018)	RMC (Remanufacturing Muda Checklist) (Kosacka & Golinska-Dawson, 2018)
Moderate	Qualitative and quantitative indicators (Golinska et al., 2015)	normalization of indicators using the whitening function (Golinska et al., 2015	GDM (priority index) (Golinska et al., 2015
High	Quantitative indictors (Golinska &Pawlewski, 2015)	Process modelling (DES) (Golinska & Pawlewski, 2015)	Based on the analytics from DES simulation different variants of sustainable resource utilization (Golinska &Pawlewski,2015)
Very high	Systematic monitoring and control of the qualitative indicators	Combination of the optimization methods	Continuous improvement

In the brackets are indicated the author's previous works in each the respective individual methods are described in details. In the previous works these method were not linked to the maturity levels.

The originality of this paper results from categorizing the independent methods and lining them with the maturity level at the SMEs where they can be applied.

The Application Framework For Companies At The Low Maturity Level

For remanufacturing SMEs at a low level of process maturity (P = 1), a decision support approach is proposed based on the lean management concept. It allows for conducting the qualitative analysis of the process of automotive parts remanufacturing in SMEs where it is not possible to use the indicators-based method (quantitative assessment). The "green & lean" approach (Kleindorfer et al. 2005) postulates the use of lean management methods and tools to obtain more efficient use of resources and reduce waste in the remanufacturing process. The assumption is made here that achieving a state of „zero waste" (also called zero Muda) results in obtaining higher degree of sustainability in remanufacturing operations. The main elements of the proposed approach for qualitative assessment are presented in the Fig 3.

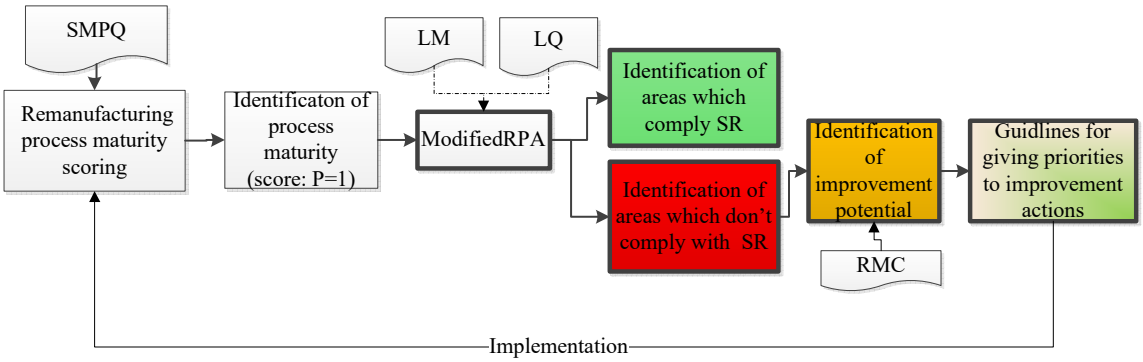

Fig. 3: Framework for low maturity level, Source: developed by the author

The tools LM (leanness matrix) and LQ (leanness questionnaire) are based on of the Rapid Plant Assessment (RPA) method (Goodson, 2002). They allow for a very quick scan of the current state of the remanufacturing process of a SME by internal or external expert. The tools translates expert's linguistic assessment into simple scoring system. The tools help to determine if the plant uses best practice in these categories and helps to identify the categories of strengths and weaknesses. For the identified weaknesses further analysis is conducted. The application of tool RMC (Remanufacturing Muda Checklist) allows translating the generic RPA's weakness into specific actions (so called "potential for improvement"). The final step (in Fig 3) is to develop priorities for the necessary actions.

The Application Framework for Companies at The Medium Maturity Level

SMEs with medium level of process maturity (P = 2) have formalized processes, so it is possible to use indicators-based assessment method. The main elements of the proposed approach for qualitative assessment are presented in the Figure 4.

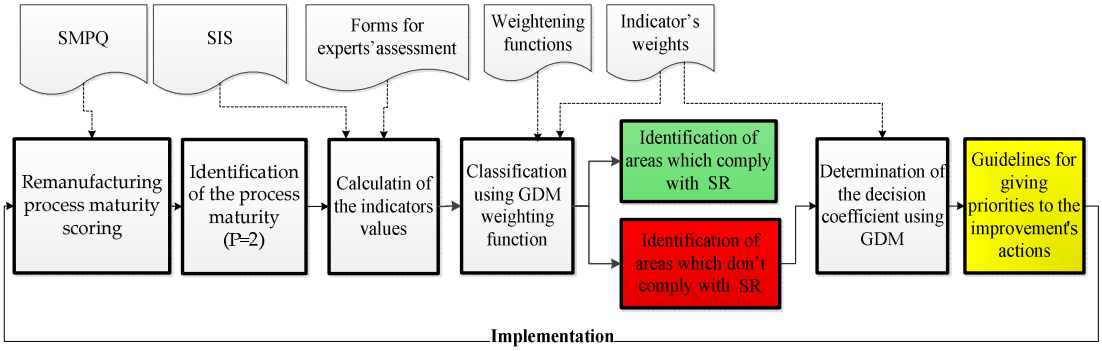

Fig. 4: Framework for medium maturity level, Source: developed by the author

The proposed SIS (sustainable indicator system) uses heterogeneous data sources (numerical data, qualitative data, non-parameterized expert knowledge). The indicators in the SIS (Table 4) are qualitative and quantitative (if data is available). The assumption is made that the application should be possible without an additional reporting effort.

Table 4: Sustainable indicators system SIS, Source: adapted after (Golinska et al. 2015)

N	Indicator	Description	Indicator type and range		
Economic performance			type	range	ref. value
1	OEE	Overall Equipment Effectiveness	quantit.	0-100%	max
2	RPF	Remanufacturing process flow	qualitat.	1-5	max
3	Planning adequacy	Adequacy of reman process planning	quantit.	0-100%	max
4	AMT	Availability of machines and tools	qualitat.	1-5	max
5	Service level	Percentage of executed orders on time	quantit.	0-100%	max
6	OOS	Availability of materials (overall out of stock)	qualitat.	1-5	max
Environmental performance					
7	Energy consumption level (ECL)	Energy consumption per one core	qualitat.	1-5	min
8	Waste generation level (WGL)	Amount of waste generated	quantit.	0-100%	min.
9	MRR	Material recovery rate	quantit.	0-100%	max
10	Generated Emissions level (GEL)	Amount of emissions (CO2, water, sewage) per one regenerated core (product)	qualitat.	1-5	min.
Social performance					
11	Employment	Change in the level of employment in the period	quantit.	0-100%	max
12	Staff Training	Percentage of employees who participated in additional training	quantit.	0-100%	max
13	Harmfulness of the remanufacturing process (HRPP)	Refers to the consequences that are associated with threat to safe and health of workers in the remanufacturing process	quantit	5 intervals	min
14	Comfort level	Identification of waste (Muda) of time of workers due to inefficient workplace design	quantit.	0-100%	max

N	Indicator	Description	Indicator type and range		
15	Innovation level	The number of implemented innovations in the enterprise proposed by employees	quantit.	0-100%	max

The original approach to normalization of the values of indicators using the weighting function derived from the theory Grey Decision Making (GDM) has allow to integrate the heterogeneous sources (Yang & John, 2012).The main advantage of GDM is that the decision can be made when the phenomenon is only partially known (Liu &Forrest, 2010), as it happen in case of the remanufacturing (high uncertainty). The application of the GDM allows performing an integrated assessment of the indicator's value and it enables classification of the indicators values into one of the 3 categories, as follows:

- class 1- acceptable level of sustainability, the allocated resources are used in a sustainable (efficient) way,
- class 2- conditionally acceptable level of sustainability, the utilization of the allocated resources should be improved at the earliest convenience takin into consideration the economic and organizational conditions,
- class 3 - unacceptable level of sustainability, the utilization of the allocated resources is not sustainable and it should be improved immediately.

After the classification is performed then the priority is given to the corrective actions. First the actions should be taken which aim to improve the value of the indicators from class 3, then from class 2. The IT tool is developed for the SMEs, so the proposed framework works as a "black box" which allow assessment and prioritization of the improvement actions necessary in order to move towards sustainable remanufacturing.

The Application Framework for Companies at the High Maturity Level

In SMEs at high maturity level (P=3) the processes are formalized and the sustainable practices are implemented. Therefore the quantitative indicators can be calculated and the formalized optimization methods can be used (Fig.5).

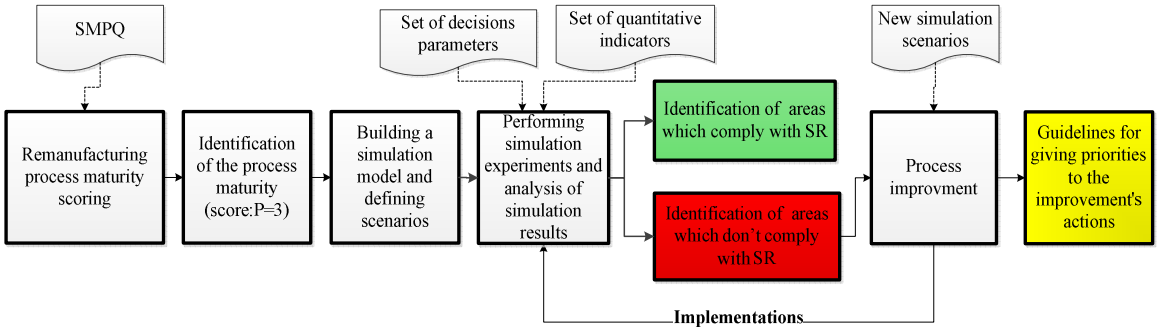

Fig. 5: Application method for high maturity level, Source: developed by the author

The simulation model allows for a dynamic assessment of different process organization scenarios with regards to sustainable resource allocation. The detailed description of the DES simulation model is not presented in this paper due lack of space. The description of the modelling approach used in the framework is presented in (Golinska & Pawlewski, 2015). The simulation experiments are conducted following logic as presented in Figure 6.

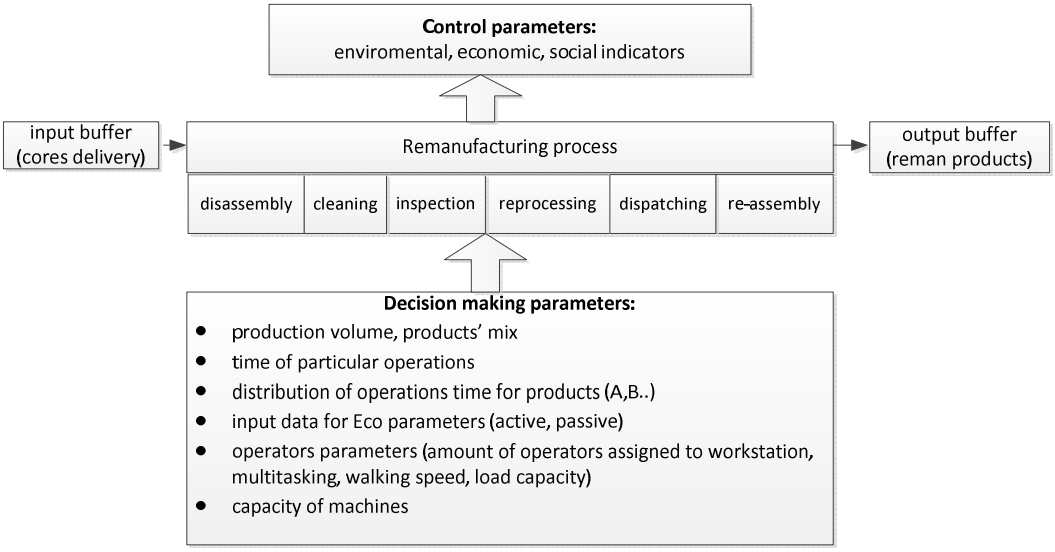

Fig. 6: The logic of the simulation experiments, Source: adapted from (Golinska & Pawlewski, 2015).

The application of the DES model of the remanufacturing process allows for identification of the areas that don't comply with the SR. For these areas, the values of decision variables in the designed scenarios are modified. Then simulation experiments are carried out again and their results are reassessed. After obtaining satisfactory values of the analysed indicators, then the priorities are set for improvement measures to be implemented in the real remanufacturing process. The sustainability assessment is performed through dynamic testing of various variants of the organization of the remanufacturing process and resources allocation. As a result, the continuous improvement of the process allows transition towards of sustainable remanufacturing.

At very high maturity level (P=4) a company has achieved the desired state of the "sustainable remanufacturing". The continuous improvement approach is recommended to maintain the most efficient resource utilization but the "as-is" state is sufficient.

Decision Framework Description Testing

The proposed decision making framework has been tested through multimethod approach:

- case study,
- numerical experiments,
- simulation experiments
- experts' interviews.

Each of the proposed methods: assessment methods, method for improvements' identification and guidelines for giving priorities have been applied with usage of the real life data. The three SMEs are chosen, which refer to the low, medium and high maturity level. The proposed methods have proofed to be feasible accordingly to the existing organization conditions. In the Table 5 is presented the summary of the testing approach.

Table 5: Framework testing, Source: developed by the author

SRMM's level	Assessment method	Method for improvements' identification	Method for giving priorities
Company A (P=1)	RPA, Leanness questionnaire; tested by case study and experts' interviews Result: feasible	Modified RPA; tested by case study and experts' interviews Result: feasible	RMC (Remanufacturing Muda Checklist); tested by case study and experts' interviews Result: feasible
Company B (P=2)	Qualitative and quantitative indicators; tested by case study & experts' interviews Result: feasible	Normalization of indicators using the whitening function; tested by numerical experiments & experts' interviews Result: feasible	GDM (priority index); tested by numerical experiments and experts' interviews Result: feasible
Company C (P=3)	Quantitative indictors; tested by numerical experiments & experts' interviews Result: feasible	Process modelling (DES); tested by simulation experiments & experts' interviews Result: feasible	Prioritizing alternative scenarios of sustainable resource utilization; tested by simulation experiments & experts' interviews Result: feasible

In the next step the results from the application framework testing have been discussed with the 3 academic experts who have over 5 years' experience in automotive remanufacturing domain. They assess the benefits of applying the framework for decision making towards transition to sustainable remanufacturing. On the basis of the obtained results from real life data testing they have provided the scoring on the Likert scale (very low 1-5 very high). The obtain result is over 4, that means that it is high.

Conclusions

The paper presents the decision making framework which allows describing the current state of the remanufacturing process with regards to the sustainability. The focus is placed on the resource utilization. The framework takes into consideration the organization conditions which appear in the remanufacturing of automotive components in SMEs.

The proposed framework includes steps, as follows:

- the maturity scoring
- improvements' potential identification
- prioritization of the required actions.

The originality of the proposed framework results from relating the process maturity level (current state) to the appropriate improvement's actions which can be taken at each maturity level. The framework provides adequate tools that allow to identify the improvement potential and to prioritize actions which are needed in order to improve the sustainability of the remanufacturing process. The main theoretical contribution of this paper is the proposal of the application framework, which provides guidelines on how to improve to current management practices in order to make the remanufacturing process more sustainable. Most of the maturity models provide only the descriptive framework which allows assessing the current state (Gonçalves Machado et al., 2017). However they don't have sufficient prescriptive power, to guide towards improvement actions. The propose framework aims to address that limitation and provide not only the description of the maturity level

but also to propose the application methods which are relevant for each describe maturity level. The decision framework proposes relevant methods for:

- identifying in the synthetic way the current maturity level with usage of the SMPQ questionnaire, and then
- conducting in-depth analyses using methods tailored for the previously identified maturity level, and finally
- providing guideline which actions should be taken first in order to move towards more sustainable remanufacturing practices (prioritizing methods) taking into consideration the limited resources which appear in the SMEs.

The main limitation of this paper is that the proposed decision making framework is elaborated based on the case studies and interviews with the industrial and academia experts. Only the automotive remanufacturing sector is taken into consideration.

The further research will include testing of the proposed framework in remanufacturing SMEs indifferent sectors. The next step will also include elaboration of the catalogue of the improvement's actions which are suitable for automotive remanufacturing SMEs.

The paper has managerial implications. It provides the decision makers with actionable knowledge on how to reach the state of multidimensional (economic, ecological and social) resource efficiency in the remanufacturing process, so called sustainable remanufacturing. The proposed GDM tool is currently developed as web service which allows for the on-line assessment of the current situation and for the identification of the improvement potential. The tool provides also some general guidelines for the implementation of the improvement actions.

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Specification of Processes for Implementation of Robotic Process Automation and Assessment of Maturity – Literature Review

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Abstract

The digital transformation of the industry, automation, robotics also known under the collective term Industry 4.0 have great potential not only in manufacturing processes, but also in business and support processes that are still strongly characterized by manual activities (as opposed to manufacturing processes). The new approach to automate processes manually performed in the administration and back-office brings the technology associated with artificial intelligence, namely robotic process automation (RPA). The aim of this paper is to explore literature and find out in which areas and processes it is possible to use RPA and what characteristics and features can be automated processes, also to determine the maturity of processes for automation and to assess the potential usability of maturity models for the implementation of robot process automation in industry.

Keywords: RPA, robotic process automation, business processes, maturity

Introduction

Industry 4.0 brings a change of the entire market environment. If companies want to be successful in the future, they must accept the innovation challenges and opportunities that brings trend. Enterprises implement especially in their production processes, new technologies and tools of the concept of industry 4.0.

Continuous digitization and automation have great potential not only in manufacturing processes, but also in business and support processes that are still strongly characterized by manual activities (as opposed to manufacturing processes). The new approach to automate processes manually performed in the administration and back-office brings the technology associated with artificial intelligence, namely robotic process automation (RPA). RPA is also called a robot, bot or software robot and is a technological imitation of a human worker to automate structured tasks quickly and efficiently. It is not a physical robot, but a software solution that is configured to work with current data and applications, to respond to events, to handle transactions without human intervention, and to communicate with existing systems. RPAs can automate business process activities that are routine, repetitive, and rule-based, ie where decisions can be made based on clear criteria (Slaby, 2012).

Gartner (Shetty, 2019) reports that the RPA tools are at the Peak of Inflated Expectations in the Gartner Hype Cycle for Artificial Intelligence, because organizations are looking for ways to reduce costs, link older applications, and achieve a high return on investment. There is a growing interest in RPA among software vendors and BPM suppliers who want to take advantage of this new feature. They also find the potential of this software to integrate with the Artificial Intelligence, Machine Learning, feature that enables multiple types of automation.

Methodology of Literature Review

The aim of the literature review is to map and evaluate relevant literature for future research. Literature has been searched through a wider Google Scholar database because RPA is a new technology, further through ResearchGate, Web of Science and Scopus. Key words "RPA" and "Robotic process automation" were selected for the literature mapping that deals with RPA and the automation of supportive, non-production processes. In total, 49 sources were found in the scopus database, 22 in the WoS database, and 20 fulltext sources from Google Scholar and ResearchGate. In the pictures below, you can see the analysis of searched publications (source). As a result, it was noticed that the largest share of publications falls or the years 2015−2019. Most publications have been included in the subject area as computer science, business, management and accounting, engineering see Figure 1. Figure 2 shows the countries that publish the most publications on the topic RPA. Mapped publications are mainly processed by university researchers and most often published at conferences and journals.

After reading the abstracts of the sources, 36 full-text sources were studied to select only those resources that are relevant to the topic. Based on the results of the analyses performed, a research gap was identified, consisting of a small number of publications on measuring process maturity for RPA implementation in the manufacturing industry.

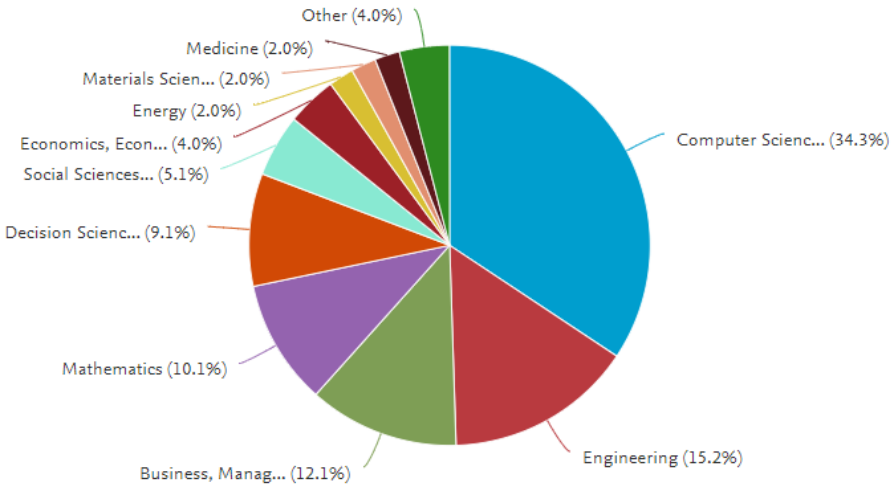

Fig. 1: Publication by subject area (2015-2019), source: Scopus

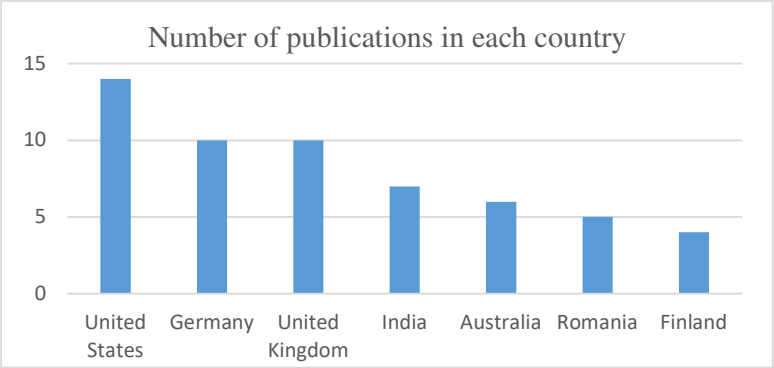

Fig. 2: Number of publications in each country, source: own processing, 2019

Literature Review

Professors Leslie Willcocks and Mary Lacity at London Schoool of Economics, along with Andrew Craig, have published a series of their research work on RPA, then other large companies and researchers have become interested in RPA and RPA has become a trend. The most important RPA suppliers on the market include UiPath Studio (Romania), Automation Anywhere (USA), Blue Prism (UK) [6]. With increasing demand for RPA, smaller software vendors have entered the market, and also existing BPMS (business process management systems) suppliers have expanded their capabilities.

The first definition of the RPA is listed and described by author Slaby (Slaby, 2012) in the introduction.

Major RPA expert Leslie Willcocks defines RPA as follows (Lhuer, 2016): "RPA takes the robot out of the human. The average knowledge worker employed on a back-office process has a lot of repetitive, routine tasks that are dreary and uninteresting. RPA is a type of software that mimics the activity of a human being in carrying out a task within a process." Compared to humans, the robot can perform repetitive activities faster, more accurately, without errors, and actually 24/7 continuously without fatigue. Therefore, workers can focus on tasks that require significant human traits, such as thinking, judgment, emotional intelligence, and customer interaction.

The IEEE Standards Association defines RPA as ("IEEE Guide for Terms and Concepts in Intelligent Process Automation," 2017): „A preconfigured software instance that uses business rules and predefined activity choreography to complete the autonomous execution of a combination of processes, activities, transactions, and tasks in one or more unrelated software systems to deliver a result or service with human exception management."

As in manufacturing processes, the robot replaces the physical work of a person, so RPA as a software robot copies a person in administrative processes while working on a PC. Research (Lacity and Willcocks, 2016) has found that RPA is best suited to replace people in processes where people have received inputs from one set of systems (such as emails and spreadsheets), processed these inputs using rules, and then outsource systems like ERP or CRM. Robots can log into systems using their own usernames, interpret text, tables, drag and drop and click, fill in application forms, check quality, and correct data across systems.

Characteristics of RPA

RPA belongs to IT technology called "Lightweight IT" mainly because it does not interfere with basic computer systems. Lightweight IT is focused on new possibilities, fast pace, quick change, and is usually taken out of control by IT department (Grung-Olsen, 2017; L. Willcocks et al., 2015). RPA is easy to configure. Developers who design the process do not need programming skills (Anagnoste, 2017; Jovanović et al., 2018). The interface works like modeling processes in Visio, dragging and dropping icons that represent process activities. Workers with expert process knowledge, no

programming experience, can work with the robot and can be trained for process automation within a few weeks. If you need to change the process or automate it, it does not have to wait for the IT department to repair or develop (L. Willcocks et al., 2015).

RPA is not considered an isolated technology, it stands on top of existing systems. The robot accesses other enterprise systems as a human, through a user interface, with a user ID and password. RPA does not store any data (Lacity and Willcocks, 2016). RPA plays the role of data integration, process integration and data transformation (Fettke and Loos, 2018). RPA implementation does not require a large investment, after clarification of business processes is almost the only expense the software itself and implementation. RPAs can also be rented, which completely eliminates the input investment. The software can run on a regular PC, on a server, or on a virtualized environment.

Advantages of RPA

A general advantage of RPA is building enthusiasm for digitalization and building local ownership (Osmundsen et al., 2019). More specific benefits of RPA that help improve productivity are (Botar et al., 2018; Reddy et al., 2019), (Grung-Olsen, 2017):

- Easy and fast implementation
- 24/7 continuous operation
- Return on investment of 30-200% in the first year
- Elimination of human errors and greater accuracy
- Increase process speed
- Digitizing the process
- Integration of applications through the user interface, without complicated programming
- Fewer workers
- Easy to set up and change processes

No changes to existing application systems are required to implement RPA. Another advantage is that employees get rid of monotonous, demotivating, repetitive work and can devote themselves to creative, strategic tasks that lead to business development and growth. RPA also includes monitoring and analytics capabilities that enable users to monitor health of their processes (Devarajan, 2018). In the event of an unexpected error, the processes are configured to alert the requested worker to a problem that they will then resolve. All these benefits result in cost savings (despite initial costs), improved service quality, increased productivity and efficiency (Lacity and Willcocks, 2016; Ratia et al., 2018).

Disadvantager and Risks of RPA

The author Kirchmer (Kirchmer, 2017) focused mainly on risks that brings RPA. He claims that RPA has the potential to make mistakes faster and with greater certainty because no control by human is performed before the operation is performed (data quality or inadequate definition of business rules can lead, for example, to order wrong parts - quickly and in large quantities). he use of RPA may involve certain symptoms of the problem without removing the real reasons for the problem. Osmundsen in his article (Osmundsen et al., 2019) also talks about the lack of control mechanisms and Lack of end-to-end process view. Companies do not invest in RPA for the following reasons (Reddy et al., 2019):

- The costs and budget constraints of companies
- The lack of technical skills, as they think that the end user must have considerable technical expertise for RPA
- Fear of replace human workers

Another disadvantage of automation is that it runs across a user interface in multiple applications and is therefore prone to changes and failures in basic applications (Grung-Olsen, 2017).

Possibilities of Using RPA

A large part of mapped publications focuses on the use of RPA in various industry and functions (processes). Available publications provide either short examples of where a robot was used, or a full case study showing process models and effects from RPA deployment. Some publications may describe RPA recommendations for use in certain processes and industries (such as BPO providers and Shared Services –SS). To complete the view, in which industries, functions or processes the research has been addressed and implemented by RPA, a table below is created. It identifies the possibilities of RPA usability and the publications they deal with.

Table 1:An overview of publications showing the possibility of using RPA, source: own processing, 2019

Industry / function	Publications
Telecommunication	(Geyer-Klingeberg et al., 2018), (Lacity et al., 2015a), (Penttinen et al., 2018), (Slaby, 2012)
IT sector	(Zaharia-Radulescu et al., 2017), (Saha et al., 2018)
Finance (accounting, auditing, controling,..)	(Anagnoste, 2017), (Asatiani and Penttinen, 2016), (Botar et al., 2018), (Rozario and Vasarhelyi, 2018), (Devarajan, 2018), (Fernandez and Aman, 2018), (Moffitt et al., 2018), (Cheon, 2017)
Bank	(Reddy et al., 2019), (Devarajan, 2018), (Mager, 2019)
Insurance	(L. P. Willcocks et al., 2015), (Lacity and Willcocks, 2016), (Devarajan, 2018),
Healthcare	(Bhatnagar, 2019), (Lacity and Willcocks, 2016), (Ratia et al., 2018), (Schmider, 2018)
Human Resource	(Anagnoste, 2017), (Anagnoste, 2018a), (L. Willcocks et al., 2015), (Leopold et al., 2018), (Reddy et al., 2019), (Nawaz, 2019), (Gupta et al., 2018)
Energy	(Lacity et al., 2015b)
BPO provider / SS	(Aguirre and Rodriguez, 2017), (Lacity et al., 2015a), (Lacity and Willcocks, 2016), (Anagnoste, 2017), (Asatiani and Penttinen, 2016), (Slaby, 2012), (Lakshmi et al., 2019), (Suri et al., 2017), (Hallikainen et al., 2018), (Zaharia-Radulescu et al., 2017)
Public administration (sector)	(Houy et al., 2019), (Ranerup and Henriksen, 2019)
Manufacturing	(Devarajan, 2018), (Lin et al., 2018)
Education	(Issac et al., 2018)
Tourism	(Tsaih and Hsu, 2018)

The table below was developed by Everest Group, a management and research company. The table shows the industry in which there is a potential for automating of various functions by RPA. Manufacturing is a sector in which it is not yet widely developed the idea of the introduction of RPA and drawing benefits that brings. But the picture below shows that in the manufacturing industry there is a high potential for finance and accounting processes and growing potential in procurement processes. However, these processes differ in manufacturing from the approach to RPA utilization presented by the authors (Lin et al., 2018). Their expectation is that they can use RPA to achieve automatic remote control of the device, thereby achieving the goal of an unmanned factory.

Function	Finance & Accounting	Procurement	Human resource	Contact center	Industry specific processes	
Industry	Accounts receivables, accounts payable, general ledger	Invoice processing, requisition-to-purchase order	Payroll, hiring, candidate management	Customer service		
Banking & financial services						✓ Cards activation ✓ Frauds claims
Insurance						✓ Claims processing ✓ New business preparation
Healthcare						✓ Reports automation ✓ System reconciliation
Manufacturing						✓ Bills of material generation
Hi-tech & Telecom						✓ Service order management ✓ Quality reporting
Energy & utilities						✓ Account setup ✓ Meter-reading validation

Potential for RPA
Low High

Illustrative processes with higher potential

Fig. 3: RPA potential for industry and function, source: (Anagnoste, 2018a)

Specifics of Processes within RPA

The industries described above can use RPA for automation, given that their business processes are characterized by certain common characteristics. Before enterprises start with automation using the RPA must determine whether the process is appropriate for RPA, whether the process meets certain requirements for RPA deployment, or whether it has mature processes for RPA (to ensure that the RPA-mature process is). And this chapter is based on a literature review dealing with specific characteristics, criteria that processes must meet in order to automate and deploy a robot. At the same time, this chapter can serve as an input for identifying process properties for each level of maturity, as a tool for evaluating process maturity within RPA.

It is clear from the above definitions and literature research that the processes to be automated by RPA are characterized by routine, manual and repeatable activities that have digital, structured data and predictable outputs. According to available literature is identified for the simultaneous use of RPA several other key characteristics of business processes.

- The basic characteristics of the process that can be automated, include high levels of standardization and some low cognitive requirements(Aguirre and Rodriguez, 2017; Asatiani and Penttinen, 2016). The process should not require the intervention of a (human) worker to make decisions based on analysis, judgment, perception, or interpretation skills (Slaby, 2012). The author Geyer-Klingeberg (Geyer-Klingeberg et al., 2018) states that when processes are standardized, the highest potential for automation in an organization should be detected.
- It is also essential that the process was stable in a stable environment, without the expected significant changes (Slaby, 2012) These changes will not involve changes of features, updates and error fixes applied systems and applications.

- Minimum process exception handling is required. Process deviations are best manageable by humans. If there are many exceptions in the process, it should not automate the meaning (Lacity et al., 2015b; Slaby, 2012).
- The process and its activities must be based on a predefined business rule so that all process steps can be accurately enrolled, taking into account all possible events and results that occur on the way (Asatiani and Penttinen, 2016; Lacity et al., 2015b).
- Another requirement, which strongly supports the implementation of the robot is to access multiple systems and human interaction with the PC. Implementation is useful when employees are forced to work with two or more existing systems and software applications and transfer data between them (Anagnoste, 2018a; Harmon, 2017; Leopold et al., 2018; Slaby, 2012).
- Another requirement for efficient use of the robot is a large number of transactions and processed data. Thus, processes involving activities that are performed very often (Asatiani and Penttinen, 2016; Slaby, 2012).
- The robot is also recommended for processes and activities that are prone to human error due to manual work (Aguirre and Rodriguez, 2017).
- The suitability of using the robot for the process also depends on the complexity of the process, or the average time it takes to complete the process (Lacity et al., 2015a; Leshob et al., 2018).

Comprehensively we can say that the RPA can be used to automate or to copy the activities of workers in the digital process (Ratia et al., 2018). In this case, the digital process is characterized as a process whose inputs, input formats and data are digitally readable, and data transfer requires access to multiple applications, systems. The digital process can be controlled manually by a person (worker) or robot. At the same time, it is assumed that the process is optimized, standardized and stabilized before automation.

With such a characteristic process the growing importance of process modeling, which is included in the deployment and configuration of the robot. The process modeling also increases the importance of the process analyst (L. Willcocks et al., 2015), whose main functions are identifying, mapping or modeling processes, evaluating processes, process reengineering (Anagnoste, 2018b).

Assessment of process maturity in RPA implementation

Every institution that wants to implement RPA must have its "selected" processes ready for RPA deployment to achieve the highest efficiency. And it can be said that the processes must be mature for RPA. Therefore, it would be appropriate to specify the process levels leading to their automation, or to specify process properties leading to the intelligent process level. The question of whether there is a model of maturity or readiness of administrative processes (referred to as support processes in the industrial enterprises) for digital transformation and industry 4.0 has been addressed in my research (Hořánek and Basl, 2019). Of the reviewed maturity models, few publications dealt with supportive processes. None took into account RPA.

As part of the implementation of RPA, the publication by Willcocks et al. (L. P. Willcocks et al., 2015) pointed out that businesses build the foundations for RPA and use the benchmark for their ability to develop and increase business value. A comprehensive maturity model for RPA was presented and was created by RPA provider BluePrism in collaboration with Horses for Sources (HfS) - Enterprise RPA maturity model. The model consists of three levels. This model does not specialize in processes, but comprehensively to the institution and their RPA strategy and program. The RPA Maturity Assessment Tool created by Automation Anywhere and HfS (Sutherland, 2014) contains the same RPA maturity levels and their model evaluates 10 elements. These tools are designed for BPO providers, RPA software developers or advisors / consultants.

Close to the evaluation of process maturity for RPA is the work of Leshob et al. (Leshob et al., 2018), which focuses on creating business process methodology to identify the most appropriate processes for RPA. Their design consists of several successive steps to identify processes, based on their features

that are appropriate for RPA. The result is the assignment of processes to four groups, depending on how they fit the RPA.

As for the process maturity, in the mapped literature it appears several times as a requirement or property that the process must have in order to deploy RPA. As a mature process, the publication (Lacity et al., 2015a) considers a process that is stable, standardized, then measured and documented, and therefore its costs are also known. That is, a process that is part of BPM (business process management).

Houy, Hamberg and Fettke researchers (Houy et al., 2019) did not directly define the maturity of RPA, but they divided RPA into three successive categories that can also express RPA maturity and are as follows:

- Category 1 - Programmable RPA robots in which programmers must manually define the rules that a bot should perform.
- Category 2 - Self-learning RPA robots who use historical and current data to learn how a user typically interacts with a software system and mimics interaction to perform tasks automatically.
- Category 3 - cognitive RPA robots who can learn the rules of structured and unstructured data to perform the task automatically.

Similarly, the author Anagnoste (Anagnoste, 2018a) presents the development of RPA towards intelligent robotics - IRPA. Where at the beginning (since 2012) RPA stands, cognitive RPA follows and in the future IRPA containing artificial intelligence. The complementary technologies introduced by Grung-Olsen (Grung-Olsen, 2017), such as chatbots, image recognition, speech recognition, various types of machine learning, AI, along with technologies that enhance, augment and compliment human abilities such as big data, IoT / sensors and mobile devices could be part of higher maturity levels.

Summary and Evaluation

Given the large and strong trend of Industry 4.0 and robotics, RPA has great potential for automating supportive administrative processes even in manufacturing companies. Companies are trying to achieve intelligent factory. This includes not only production processes, but always those non-production processes. Software robots, complemented by cognitive tools or artificial intelligence, can help companies easily reach a intelligent factory. This high potential is reflected in the table above and the literature under review. So far, the mapped publications do not provide a case study or RPA assessment in these administrative processes of a manufacturing enterprise, but the publication lists more precise process activities where RPA can be used (see Table 1). Robots would not be massively implemented in this manufacturing industry, as is the case with BPO services and shared service centers. The implementation process RPA and the resulting effects would be significantly different, but with the integration of AI and cognitive tools RPA gaining its importance and effectiveness of the process for the company in the future. In particular, a process analyst would play an important role in this sector and company. A process analyst, as an expert with process knowledge, would also play a role as a developer, as RPA is easy to configure and there is no need for programming skills to design or make further changes.

RPA also plays an important role in the Czech market. Their implementation is growing every year, especially in the fast-growing business services sector. The survey of association ABSL (ABSL, 2019), which brings together business service providers on the Czech market, shows that more than 100,000 people work in this sector and is one of the most important sectors of the Czech economy (ICT Revue, 2019). Furthermore, the survey shows that 72% of companies have already introduced process automation to approximately 29% of their processes. In addition, 46% of companies test robots and the same 46% of companies plan to automate some of their processes. In total, the industry "employs" 4,000 full-time robots. In addition to RPA, companies implement OCR technologies, chatbots, AI tools.

In particular, RPA suppliers have developed maturity models for BPO and SS providers, in particular to help them identify all the elements to be considered in the RPA strategy and the activities they need to do to ensure that RPA is used effectively.

Helping with process automation can provide large and small and medium enterprises with a tool that evaluates their processes, assigns them to a level, and communicates RPA readiness, or steps to reach higher levels. In addition to complex models, there was no methodical tool (model) that specifically focused on assessing of process maturity or readiness of a process for implementing one robot. Based on the results of the analyses performed, a research gap was identified, consisting of a small number of publications on measuring process maturity for RPA implementation in the manufacturing industry. For these reasons, there is a place for the development of new tools generally acceptable.

When designing the model and defining the process properties in each maturity level, it is possible to use the process properties described in the third chapter. When designing a model of maturity can be inspirational publications that focus on the continuing ability of RPA as cognitive ability (Fettke and Loos, 2018) and the ability of artificial intelligence (Reddy et al., 2019), publications that RPA is divided into groups (Anagnoste, 2018a; Houy et al., 2019) or assess the level of process automation (Leopold et al., 2018).

Conclusion

Large companies and major multinational companies have already adopted the RPA to increase productivity and overall efficiency and reduce costs. RPAs implemented as the first banks, insurance companies and telecommunications services. RPA is widely used by business process outsourced (BPO) providers and business service centers, because they include activities with the highest potential for automation in finance, supply chain and human resources departments. The implementation of RPA is riddled with challenges related to both the reality of day-to-day business operations, from SMEs to the center of shared business services and beyond, and the social impacts of a changing labor market.

The aim of this work is review literature for introduction to the topic and for outline the main facts about RPA. The literature review chapter includes the possibilities of RPA usability and lists the industry and processes in which RPA implementation was conducted or recommend. The next chapter is focused on Specifics of Processes within RPA. The aim of this chapter was to identify all the features and characteristics that processes need to meet in order to implement RPA while creating the basis for creating process maturity levels for automation. The fourth chapter is also related to processes and is focused on assessment of process maturity for automation and assessment of company maturity for RPA implementation. The last chapter summarizes the conclusions from individual chapters and presents the possibility of further research.

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Cognitive Agent's Application for The Quality Management of Flexographic Printing on Packages – Sensory Memory and Perceptual Memory

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Abstract

In flexographic printing technology, quality is measured mainly through correct depiction of color. Color quality is checked mainly manually, organoleptically by a person, and/or semi-automatically by measuring optical density with a spectrophotometer. Unfortunately, the effects are not immediately visible, only after the product has left the machine. Therefore it is a time-consuming and costly process. The printer is expected to identify perfectly the cause of the error, but that requires thorough analysis of the situation. A quick and reckless decision not only may not solve the problem, but also increase the costs related to further use of materials and production stoppage. Therefore the method is long-running and labor-intensive. In order to improve quality management it is necessary to automate the process. A cognitive agent can be used in this purpose. The aim of the paper is to develop an approach for cognitive agent's sensory memory and perceptual memory implementation. The agent will be used for improving quality management of the flexographic printing on packages. Such approach has not been developed before, therefore it is the main contribution of this paper. The main findings are as follows: Due to the use of Hierarchical Temporal Memory the Agent will analyze all parameters and their combinations with other parameters. Changes made by perceptual memory will gradually change the representations in a way that the 'winning' columns will be similar in similar signals, however this will occur after many modifications initiated by the learning process. Such approach can improve the quality of prints made and allow for increase in efficiency and decrease in cost of the entire process. It is necessary in the face of growing competition from digital printing. The approach presented in this paper allows for implementation of the remaining modules of LIDA cognitive agent – it is a subject of future works.

Keywords: Artificial Intelligence, Cognitive Agents, Sensory Memory, Perceptual Memory, Quality Management, Flexographic Printing, Printing on Packages

Introduction

In printing technology, quality is measured mainly through correct depiction of color. It is the most important quality of the printing process. In companies involved in flexographic printing, color quality is checked manually, organoleptically by a person, and/or semi-automatically by measuring optical density with a spectrophotometer. This method is closely connected with the knowledge and experience of the printer. Color quality inspection is performed at the end of the process, when the final product is obtained. The printer checks if color quality stays within the tolerance set out by the standard. If unsure, the printer checks the range of visible spectrum with a spectrophotometer. If color quality does not meet the customer's expectations, then a deduction stage begins to identify the process element to blame for the fault. There are several factors in printing technology that may cause a printing error. The main ones include Krzyzkowski et al (2015):

- parameters of order (printing profile),
- characteristics of printing units,
- properties of ink,
- properties of duct tape,
- type of anilox,
- type of printing matrix,

Each of the factors has a number of attributes that may influence print quality. Should color quality inspection reveal that color quality does not stay within the expected tolerance, the production process must be put on hold to investigate what exactly could produce the negative effect. Each of the aforementioned elements is checked. Unfortunately, the effects are not immediately visible, only after the product has left the machine. Therefore it is a time-consuming and costly process. The printer is expected to identify perfectly the cause of the error, but that requires thorough analysis of the situation. A quick and reckless decision not only may not solve the problem, but also increase the costs related to further use of materials and production stoppage. Therefore the method is long-running and labor-intensive. In order to improve quality management it is necessary to automate the process. According to the authors, a cognitive agent can be used to conduct a multi-dimensional analysis of quality much faster, with lower error probability than in the case of manual/semi-automatic analysis conducted by a person. The agent's task would be to improve the quality management process in the production of printed labels on products. It will support the decision making process of the printer, it will also have the authority to automatically correct process parameters in order to improve printing quality in real time. A significant advantage of cognitive agents is their ability to act on their gained experience. In the case of flexographic printing, the agents would remember the properties of each production batch, including those that were completed with no errors and those where color quality did not stay within the tolerance. It will allow for data to be gathered to create a set to be used for learning in order to increase the program's performance.

The aim of the paper is to develop an approach for cognitive agent's sensory memory and perceptual memory implementation. We are using The Learning Intelligent Distribution Agent architecture. The agent will be used for improving quality management of the flexographic printing on packages. Such approach has not been developed before, therefore it is the main contribution of this paper.

Related Works

The history of flexographic printing goes as far back as the 1920s, however some historians argue that it had already been known in the 1860s Hoekstra et al (2019). Subject literature states that flexography is a 'rotary printing process using flexible printing molds with convex relief, which can be attached to printing rollers of different circumference, with the use of liquid printing ink, applied with rollers with cellular surface structure, with or without the use of squeegees, onto various types of substrates' Olmos et al (2019). Picture 1 presents a simplified depiction of the process. The method includes making one imprint each time with the rotation of the printing roller. The squeegee is used to control the amount of transferred ink, specifically to scrape the excess amount of ink. This is an option. Dosing may be performed without the use of squeegees, then the amount of ink is controlled through proper calibration of pressure between anilox roll and the scoop roll.

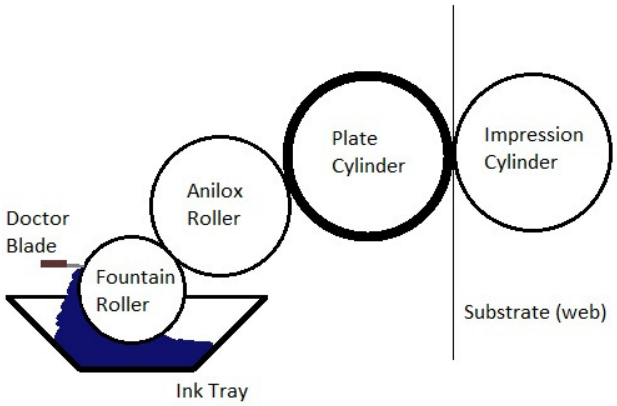

Fig. 1: A simplified depiction of the flexographic printing

There is also a possibility to completely omit the scoop roll. In such case, the ink is dosed immediately to the anilox roll while it rotates, and a partial amount of it remaining in a sealed-off zone where ink is directed under pressure to ink carriers – chambers of correct size, according to the printing requirements, located on the surface of the anilox. The purpose of anilox rollers is to keep the printing molds continuously covered in ink in order to effectively generate new imprints. The molds are in turn located on the printing roller. A convex relief barely touches the anilox roller, transferring ink from one roller to another. The mold, also known as the matrix, is prepared for the process outside the machine, using double-sided duct tape, also known as 'foam', which attaches it to the printing roller. The last element is the pressure cylinder whose task is to create proper conditions for between the mold and the material Olmos et al (2019).

The printing mold, also known as the matrix, which receives the pattern from the design, is made of photopolymers. They are chemicals composed of unsaturated monomers, binders, and initiators of photochemical reactions. They are created in the polymerization process, with the participation of UV radiation. Thus the produced prints are characterized by high quality and accuracy of the depicted image, necessary hardness, high durability, and resistance to light and ozone Barone et al (2017).

The correctness of the print depends on the amount of information about the order to be made. The parameters, or profile, of the order determine the range of colors at the disposal of the printing company and the printing ruling to be made.

Another important factor that influences print quality are parameters of printing units. Depending on the order, cylinders with different diameter and substrate thickness are used. As a result, the machine must be adapted to changes in pressure settings of individual cylinders so that the cylinders are properly spaced against one another. The settings are usually controlled by a computer system that analyzes the location of printing molds against one another. The problem is, this a variable parameter, influenced by such values as foam thickness, type of photopolymer, or theme for given separation. The biggest problem is the increment of photopolymer which swells during the process, increasing its circumference. A change in pressure also influences color intensity. With longer printing processes, the double-sided duct tape is also 'tamped', which also changes the placement Hoekstra et al (2019). Therefore, foam hardness is an important parameter. The selection of foam level depends on the print. Hard tapes are used for large elements and inscriptions, soft tapes – for soft raster and photographs.

Another element influencing the coloring is the anilox roller that transfers a specified amount of ink onto the matrix. The selection of anilox must be compatible with the order. Printing with CMYK ink is done with raster method where small dots, visible under a magnifying glass, are printed, therefore

anilox should be engraved with more density (it should have high ruling), and ink transfer should be scarce, so that an ex-cess amount of ink does not distort the color. The situation changes when larger elements are printed, e.g. backgrounds. In this case, anilox with higher ink transfer and thinner structure should be used. Therefore, using the same ink, but different anilox rollers, extremely different effects may be obtained, that is why the selection of correct roller is so important in obtaining the desired coloring effect Olmos et al (2019). The roller is selected when the order profile is being created.

Another factor influencing the quality is the printing matrix. Normally, two types of technology are used: CTP and KODAK. CTP technology involves the problem of 'swelling', connected with duration of printing process and wear of matrix, resulting in enlarging the raster point which contributes to the intensification of printed raster colors. Thus, an important parameter is the wear of photopolymers. Small changes in print can be found after only an hour of printing. After several hours the changes are clearly visible. The wear is calculated with the number of imprints, because the number of strikes of the matrix against the surface is vital in the calculation.

The presented characteristics of factors influencing the quality of flexographic printing indicates high complexity of the process. In the face of ever increasing expectations from customers, action must be taken to improve the process and raise the quality of printing services.

One of the directions to take when improving the process is to use methods and tools of artificial intelligence whose continuous development has been witnessed in recent decades. They involve different approaches to the realization of a dream that many people have – so that a computer could match our relatively understood human intelligence. A computer has outrun us in many areas of skills, however humans re-main unchallenged in a lot of fields. Plenty of ideas and algorithms exist, but there is still a long way to go to meet such great requirements set for artificial intelligence. One of the attempts to reach closer to the goal is creating artificial intelligence based on cognitive architecture.

Cognitive architecture may be defined as organized structure of processes and knowledge attempting to model itself on cognitive dependence Albus et al (2004). The initial stimulus for building cognitive architectures was their ability to come to human's aid in complex situations where a computer has much quicker reaction time when a large number of variables must be considered in a given situation. Considering human capabilities, we would have a real chance for automated support in actions in which we ourselves are limited Hernes et al (2017).

Cognitive architectures are expected to be able not only to resolve one problem using a selected method, but also to have the ability to analyze the problem from a broader perspective, using a broader scope of solutions. Additionally, using the experience and knowledge, they will be able to implement new solutions in rapidly changing environment. The key here is to learn and use the gained knowledge.

An important common feature of cognitive architectures is the way their learning mechanisms are designed and the way their memory is organized. Different approaches to building cognitive architectures present diverse understanding of the role of memory Hernes et al (2017).

Learning mainly involves storing the gained knowledge and attributing opportunities and situations where it can be used. Efficient design and use of the process is an important step in building higher cognitive systems. The organization of memory is connected with the way the knowledge is represented Hernes et al (2017).

There are many cognitive agent programs that can be attributed to one of three types of architectures. Each type of cognitive architecture may be represented as a series of steps required by the architecture to perform the desired activity. The process of taking these steps is called a cognitive cycle. Although the term 'cognitive cycle' is used to describe most architectures, the cycles differ in terms of types of action taken during each step. This grouping de-pends on the type of presented and processed information, not on different possibilities, properties, and evaluation criteria for a given architecture Kotseruba et al (2018).

Flexography has become a standard used in the packaging industry in America and Europe alike. In the last forty years flexographic printing has experienced impressive growth in terms of quality and productivity Lorenz et al (2015). Flexography has moved from low-quality to high-quality print and at present it is widely used in the production of packaging, involving various applications: flexible packaging, labels, plastic bags, carton and cardboard packaging, shrink-wrap packaging, and many more. It is also used for printing the substrates of notebooks, forms, newspapers, and labels.

Due to its innovative nature and a wide range of possible applications, flexographic print is strengthening its position. According to the report by Smithers Pira, in the year 2017 the market for flexographic print has been valued to 164 billion dollars. It is estimated that it will experience an increase by 2.3% yearly and in 2023 it will reach a value of 187 billion dollars The Future of Flexographic Printing to 2023 et al (2018). Therefore it is legitimate to address the aspects of automation and improving the quality of flexographic print.

Research Methodology

In our researches we use the Design Science Research Process (DSRP) methodology Vaishnavi et al (2017). This methodology involves the realization of research works as process-dependent steps responsible for the implementation of basic tasks and the delivery of basic work artifacts. This methodology is based on five basic steps. The first, "Awareness of problem", focuses on the preparation of a preliminary proposal for a new research topic, which usually results from the analysis of already available achievements and results in related disciplines or disciplines, as well as in industry. The second, development of the proposal ("Suggestion"), follows the initial proposal, and is a creative step aimed at defining new models, methods, functionalities based on new configurations of existing or new elements. The third, development of the proposal ("Development"), is the stage where the initial research is developed and extended. The fourth, "Evaluation", is the stage where the prepared artefacts are evaluated according to the adopted criteria. The fifth, "Conclusion", can be the end of a given research cycle or is the end of the entire research undertaking. As outlined, each stage ends with a specific result, which then forms the basis and allows for the next step in the process. In addition, this methodology assumes that it is possible to return to the previous steps under the observed restrictions. The conception of using the DSRP methodology in this paper, is presented in Figure 2.

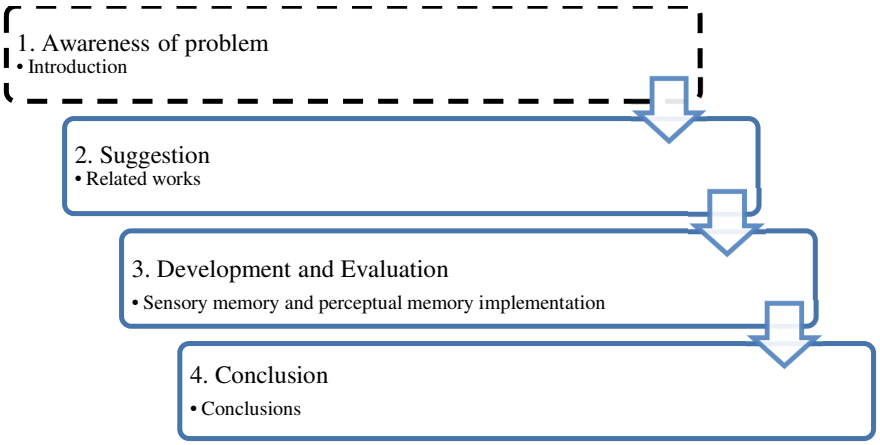

Fig. 2: Research methodology

We use mainly the literature of subject analysis, as research method in the Awareness of problem and the Suggestion stages. The development and evaluation stage are joined in our research. In the development stage, we use such research methods as modeling, design and implementation, and observation of phenomena.

Evaluation: we use case studies on examples. We based the Conclusion phase on synthesis, analysis, induction and deduction research methods.

Sensory memory and perceptual memory implementation

In order to improve efficiency in printing process, the key aspect is monitoring the color, its intensity and hue. This should be done on the final stage of production. It will be the main stimulus reaching sensory memory, based on which the system will attempt to increase efficiency.

The following modules of LIDA agent memory will be used:

- Sensory memory,
- Perceptual memory,
- Declarative memory,
- working memory,
- global working memory,
- procedural memory,
- sensory-motor memory and action structure.

Due to a limited number of pages, this paper will analyze methods of implementing sensory and perceptual memory.

Sensory Memory Implementation

In order to implement sensory memory, the Hierarchical Temporal Memory (HTM) will be used, also known as the automated learning technology that functions using o model of structural and algorithmic properties of neocortex. HTM networks are educated using a lot of data that changes in time and store large sets of patterns and sequences. The network has a hierarchical organization of memory and is based on variation in time. The information is stored in a dispersed manner Numenta Inc et al (2012). In HTM information is represented with Sparse Distributed Representations (SDR). They are bit maps where the bits are Numenta Inc et al (2012):

- dispersed, meaning only activation of many bits can represent something,
- sparse, meaning only a small number is active,

In printing process, input data is as follows:

- order parameters (attributes *Order, Standard*)
- properties of printing units (attributes *Position of pressure cylinder, Speed, Photopolymer wear, Tape wear;* the parameters are grouped in a hierarchy using the parameter *Pressure*),
- properties of ink (attribute *Ink*),
- spectrophotometer reading (attribute *Spectrophotometer*),
- time stamp (attribute *Time*),

Root is the parameter *Colour.*

Based on the data, the hierarchy and regions of HTM will be presented according to Figure 3.

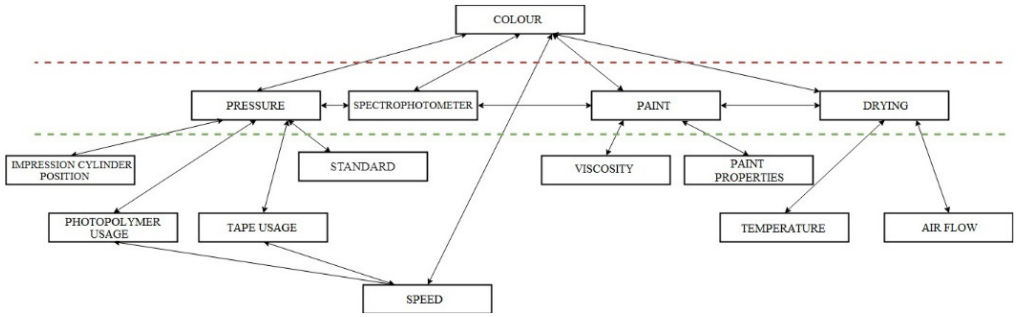

Fig. 3: Simplified diagram of eleven regions of HTM laid out in a three-level hierarchy, relaying information within the levels, between levels, and to/from the hierarchy

Order is the attribute that contains data on the amount and optical density of colors used in print, as well as maximum acceptable tolerance. It is created on the basis of the profile, however optical density may be updated after the first print, should the color turn out to be different than initially assumed, but still satisfy the customer. The attribute *Standard* contains the following data:

- profile – conducted machine test for colors it can generate; therefore the system has the information on optical density of each color to be used in the order,
- printing perimeter – the perimeter of the prepared printing mold which includes: pressure cylinder, duct tape, and matrix; value range from 400cm^2 to 750cm^2.

Position of pressure cylinder is composed of two values: the positioning of the right and left side of the cylinder. They are positioned against the starting position and that involves the necessity to notify the system about a change in the position. System representation will be a combination of these two parameters.

Speed of printing is controlled by the printer processor. Average printing speed is between 200 and 300 meters per minute. Normally the range is between 250 and 280 m/min. Maximum speed is 400 m/min. Attributes *Photopolymer wear* and *Tape wear* are influenced by speed, or the number of imprints made to be exact. The tape is replaced with each change of matrix, however the photopolymer may be reused, so its wear will not be reset upon finishing the printing.

Pressure is an important attribute. It is a component of photopolymer and tape wear data, pressure cylinder position, and standard. This region will be analyzed thoroughly, so it should have a large bit map.

Ink parameter takes values based on the readings from the viscometer – a device that reads ink viscosity in real time. The importance of this information results from the fact that a change in viscosity affects color intensity and must be continuously monitored. The rate of viscosity change is important for the future forecast.

The most important attribute is *Spectrophotometer*. The device measures the optical density of control points located at the edge of the print.

Time is an attribute that enables the system to analyze the repeatability and gathering of data in the declarative memory, while specifying where it took place. It will be divided into time, day, month, and year reading.

The final attribute is color. This region is essential in HTM, because it is where the analysis of all values will take place.

Perceptual Memory Implementation

In perceptual memory the system conducts normalization of incoming input in relation to time so that it can begin learning sequences and patterns appearing in the stream in subsequent steps of the cognitive cycle, and begin drawing conclusions Franklin et al (2016). Algorithms of perceptual memory perform two main functions: keeping the constant of sparseness of incoming bits and the properties of superposition, which is essential for keeping the semantic meaning of signal. Therefore, having two different SDR with high coefficient of superposition, the output representation created in perceptual memory must also have high coefficient of superposition. This mechanism also works in reverse. If two signals are not similar, we will obtain two output representations with low coefficient of superposition. Using this mechanism, the agent attempts to keep the status or context from the past Numenta Inc et al (2012). In perceptual memory, data representation is done using active columns. Each column has many cells that go into three types of status Numenta Inc et al (2012):

- active – one active cell in the column is enough to activate the column which constitutes representation,
- active from side input – status that could be reached in the process of prediction; according to schematics learned by the system the agent awaits a pre-learned pattern,
- inactive – in a situation when all cells are inactive, the entire column remains inactive as well.

Due to the ability of inserting a large number of cells in the column, the system is able to interpret exactly the same input in different contexts. For instance, fifty active columns represents pressure, so if only one cells is required to activate the cells, and there will be four of such cells in each column, then the system has 504 possible interpretations of the same signal. The same input will always result in the activation of the same 50 columns, but in different contexts different cells will be activated in the columns. The agent can determine and remember a given value at a given moment in the process, considering all other parameters and their values in the current status Numenta Inc et al (2012).

Each time a new, unknown signal appears, a new representation of sparse set of active columns is created. Every column connected with all bits in SDR has a weight range of connection between 0.0 to 1.0. Initially, the values are distributed randomly. Regardless of the location of active bits in SDR, a column is able to establish connection with some bits, and unable to do the same with other bits. This is due to the threshold of superposition which indicates minimum value of the weight of connection to be reached for it to exist. If the threshold value is set to 0.7, the columns can only establish connection with bits whose value begins with 0.7. However, the most important connections are made with active bits. The number of active columns representing a specific SDR must be proportional to the active bits of the SDR, following the rule for creating output data of perceptual memory, discussed above. They are ranked from the largest to the smallest number of accurate connections (connections with active bits) (Fig 4) and an appropriate percentage becomes active (according to the proportion). If there are several columns with the same value, but not all of them may become active with proper proportion, then the system randomly activates the appropriate number of columns among those having the same number of active connections Numenta Inc et al (2012), McCall et al (2010).

The value of weight of connections is variable during the process of learning. New information arriving after the cognitive cycle make the connections change their weight, which may result in the occurrence of new possible connections or reduction of existing ones. The forecast created on the basis of input data changes the representation so that it fits the context pf previous input data. Learning makes the agent note the cause-and-effect relations and similarities in incoming stream of data. The system will need time to learn, however it can continue learning later on Numenta Inc et al (2012), Franklin et al (2016).

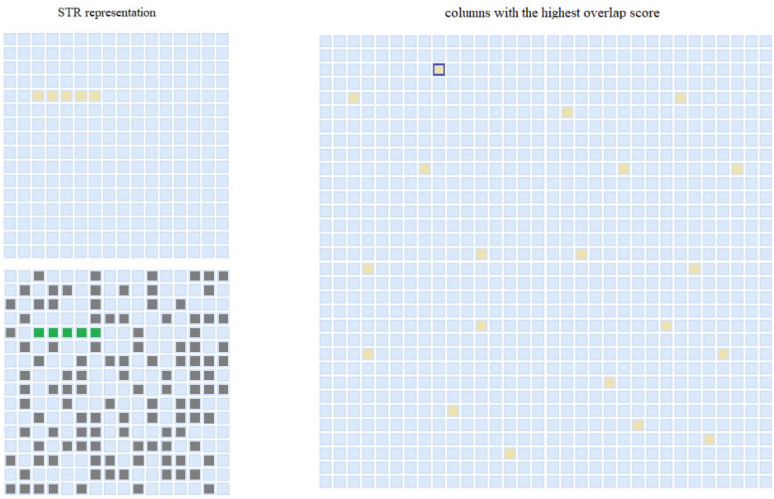

Fig. 4: Connections between the winning column (single selected, blue frame) and SDR representation. Grey bits represent all connections above weight 0.7, whereas green bits represent active connections, according to the SDR representation. The selected column has maximum number of active connections (5)

Conclusions

The authors proposed the implementation of sensory memory and perceptual memory for cognitive agents during the process of flexographic printing on packages. Due to the use of HTM the Agent will analyze all parameters and their combinations with other parameters. Changes made by perceptual memory will gradually change the representations in a way that the 'winning' columns will be similar in similar signals, however this will occur after many modifications initiated by the learning process. For instance, the Agent will be able to differentiate the course of the printing process in a specific configuration of the position of pressure cylinder against the wear of photopolymer and tape. Also, every color read be the spectrophotometer will be a representation of the sum of all relations of regions from lower hierarchies. The agent will remember which parameters affect the color and to what extent. Such approach can improve the quality of prints made and allow for increase in efficiency and decrease in cost of the entire process. It is necessary in the face of growing competition from digital printing.
The approach presented in this paper allows for implementation of the remaining modules of LIDA cognitive agent – it is a subject of future works.

Acknowledgement

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Investment Cycles in Russian Economy, The Empirical Research

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Abstracts

The article deals with the findings of the study that reveals the investment cycles in the Russian economy 1989 to 2019 based on official statistics. This research has been performed in response to the need of theoretical development on interdependence between different kinds of economic cycles, the lack of common interpretation of the 'investment cycle' concept and agreed methods of its analysis; the need for assessment of its current state and forecasting of investment process development, and the need for specification of trends and methods of investment process management in the economic systems of different levels. We also suggest the interpretation of the investment cycle as an important part of business cycle in this article. The methods used to determine the investment cycles involving the spectral analysis techniques are provided in this study. Using the linear filtering methods, the investment cycles in the Russian economy development over two recent decades have been distinguished. The recommendations on the trends of further research in this field are given in the article.

Keywords: Investment Cycle, Business Cycle, GDP, Spectral Analysis Methods, Band-Pass Filter, Hodrick-Prescott Filter

Introduction

Coronavirus pandemic followed by the sharp decline of oil prices in the first quarter of 2020 reminded of the cyclic nature of the world and national economy development. Despite the fact that the economists and scientists recognized it, the research of cycling involving the small periods (15 to 20 years), particularly in the post-Soviet Russian economy, seems insufficient.

The principal research and development activities in Macroeconomics, that form the foundation of the current theory of economic cycles, were introduced at the beginning of the last century in the works of such famous scientists as V. Kondratieff, (Kondratieff waves with a period of 45–60 years), S. Kuznets (Kuznets swing with a period of 15–25 years), K. Juglar (Juglar cycles with a period of 7–9 years), J. Kitchin (Kitchin cycles with a period of 3–4 years), and etc.

Most publications in Microeconomics are devoted to cycles and determiners of investment activity, and perspectives of particular field, company or even project development. It can be easily seen that they have a narrow focus, in general. Herewith, the interpretation of the 'investment cycle' concept varies greatly depending on the goals of the particular study.

In practical terms the research and detection of the so-called business cycles and their components in the economy is of great interest.

The business cycle is a quasi-periodic oscillation characterized by periods of expansion and contraction of the economy, lasting on average from 4 to 40 quoters.

Correct identification of cycles in economy needs to determine its contraction and expansion stages, i.e.

it is based on fluctuations of the economic processes. As a rule, the business cycle consists of the expansion stage, observed in many economic activities, followed by recession and recovery stage, further developed into the next expansion stage. It is a recurrent sequence, although it is not strictly periodic.

Business cycles can be distinguished by their intensity and duration. For example, there was a severe recession in 1981 in the USA, but it did not last long, whereas in 2008 the recession was heavy and long-lasting.

The business cycle research has a long history. Primary definition of the term was given in the publication by Arthur F. Burns et al (1946) and remains valid today. According to this definition: "Business cycles are a type of fluctuation found in the aggregate economic activity of nations that organize their work mainly in business enterprises: a cycle consists of expansions occurring at about the same time in many economic activities, followed by similarly general recessions, contractions, and revival which merge into the expansion phase of the next cycle; in duration business cycles vary from more than one year to ten to twelve years; they are not divisible into shorter cycles of similar characteristics with amplitudes approximating their own."

Business cycle research has been widely conducted in the USA, also in the projects of scientists and specialists of National Bureau of Economic Research – NBER (http://www.nber.org/), and have been further developed in the works of the scientists of different countries.

The identification of business cycles and their components, study of their duration and other features, however, is still urgent, also in terms of timely forecasting of potential financial defaults.

Meanwhile, almost no attention is paid to representation and analysis of individual components of business cycles (investments in fixed assets, household and government consumption, import, export, and etc.) in many countries, and, particularly, in the Russian Federation. However, behavior, phases, duration and other characteristics of business cycles are determined by their dynamics.

The given study deals with the identification of the investment cycles in the Russian Federation economy over two recent decades (1998 to 2019). The study is based on the official statistical information about Russian GDP structure by quarterly expenditure in current prices according to Bloomberg system. GDP component measurement in current prices is used for data comparative analysis and repeatability of the study. The spectral analysis and time series filtering techniques were used to identify the investment cycle periods.

Analysis, processing, visualization, and statistical data modeling were performed in R software environments.

Results

The investment cycles form the most important and integral part of development and business cycles in economy. They produce direct influence on the final results measured by the GDP growth volume and rate.

The dynamics of the GDP (GDP) and investment in fixed assets (INV) reflected in the corresponding GDP expenditure item is provided below (Fig.1). Some statistical characteristics of INV time series are given in Table 1.

Table 1: Statistical characteristics of INV time series INV (mlrd rub)

Name	Data	Value
Min.	1998-03-01	73.6
1st Qu	2003-08-09	586.3
Median	2009-01-15	1975.2
Mean	2009-01-14	2418.7
3rd Qu	2014-06-24	3646.9
Max.	2019-12-01	8717.7

As one can see on Fig.1, the dynamics of change in the GDP and INV absolute values is of seasonal nature.

Since the full business and investment cycles cannot be directly observed on the basis of statistical data sets, the seasonal and trend components shall be provided for their identification and analysis.

The similar procedure was first implemented for the US economy using the method suggested by Bry and Boschan (1971), and, then, adopted for practical use by NBER specialists.

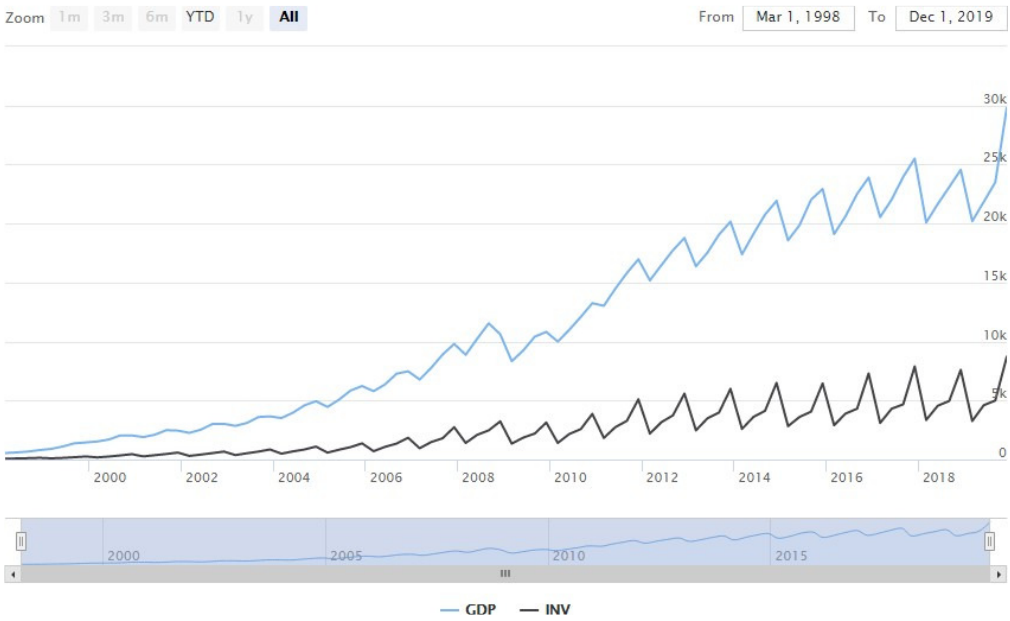

Fig. 1: Dynamics of the GDP and INV for the period 1998 – 2019 (mlrd rub)

The authors use X-13ARIMA-SEATS method (Fig 2) in this study to exclude the seasonal factor influence and detect the trend in the INV time series.

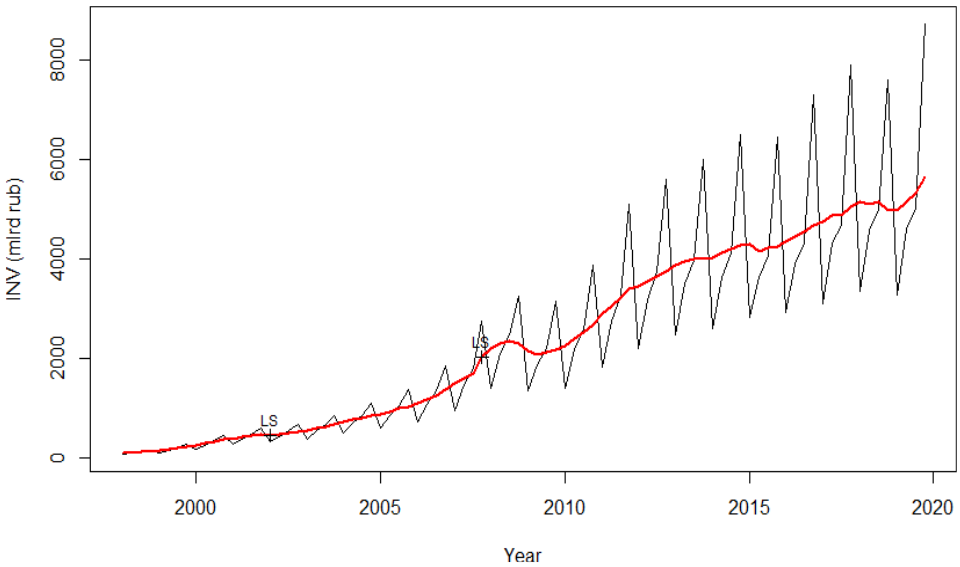

Fig. 2: Dynamics of the seasonal adjusted INV for the period 1998 – 2019 (mlrd rub)

This method is chosen, since it is rather common in the EU countries and it is used by the official statistical services of the Russian Federation. Whereas the statistical agencies in the USA and Canada use the different X11 technique, described in detail in the publication by Dagum et al (2016).

To provide the more detailed analysis of the seasonal component, its quarterly dynamics is plotted below (Fig. 3). Horizontal lines of the graph correspond to the average quarterly investment volume values.

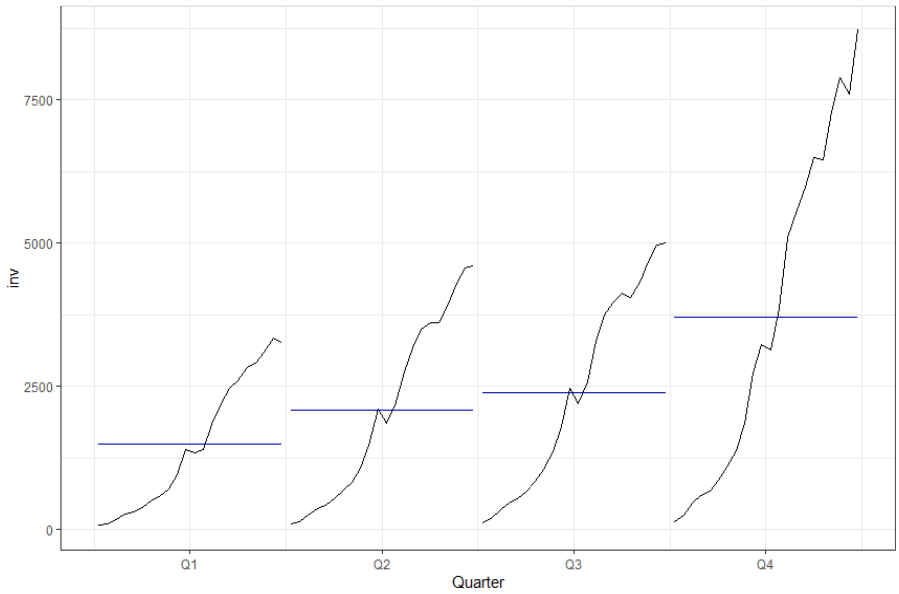

Fig. 3: Dynamics of the seasonal component of INV for the period 1998 – 2019 (mlrd rub)

It can be easily seen that the largest investment volume is observed in Quarter 4 due to the considerable role of the government funds in the investment activity that underlines its specific character in the Russian Federation. Undrawn budget funds are expended and returned to the economy at the end of the year. It characterizes the investment policy of the government as uneven and partially ineffective.

However, the revealed uneven nature is also associated with the investment reporting of the private companies submitted at the end of the corresponding quarter (the financial year in the Russian Federation coincides with the calendar year).

Further research provides for the identification and analysis of the investment growth rate variations, and the initial set was transformed (logarithmic transformation) as appropriate. A periodogram of investment growth rate variations is provided below (Fig. 4).

Proceeding from the periodogram, the investment growth rate variation depends on frequency fluctuations mostly by 2 to 4 quarters (values 1 and 2 on the horizontal (x) axis).

Visual analysis (Fig. 2) suggest the trend as confirmed by growth rate of investments autocorrelation analysis (Fig. 5).

As showed in the book by Box et al (2015) if there is a trend of data, the autocorrelations (ACF) for small lags tend to be large and positive, and observations nearby in time are nearby in size. So, the ACF of trended time series, as a rule, tend to have positive values that slowly decrease as the lags increase. When data are seasonal, like in this case, the autocorrelations will be larger for the seasonal lags (at multiples of the seasonal frequency) than for other lags.

Such conversion in the scientific study often requires the spectral analysis. In particular, the linear filtering techniques are widely used in the economic research, and the so-called HP-filter suggested in the publication by Hodrick and Prescott (1997) is one of the most popular among them.

This filter is applied for decomposition of y_t variable into trend Y_t and cyclic x_t components:

$$y_t = Y_t + x_t, \tag{1}$$

by minimization of the following expression:

$$\sum_{t=1}^{N}[(y_t - Y_t)^2] + \delta[(Y_{t+1} - Y_t) - (Y_t - Y_{t-1})]^2. \tag{2}$$

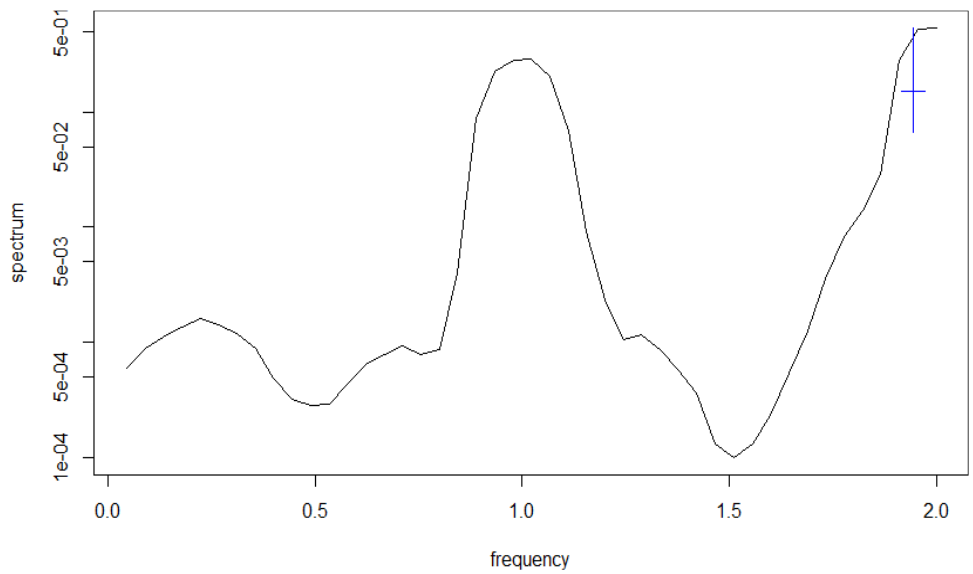

Fig. 4: Periodogram (frequency 4/τ)

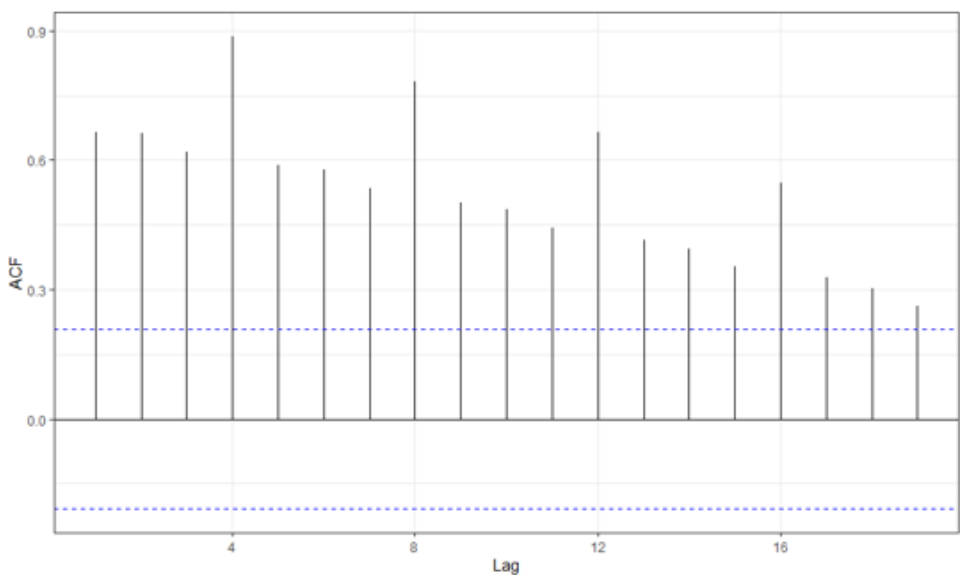

Fig. 5: ACF of quarterly growth rate

First addend in (2) calculates the cyclic component xt variation. Second addend shows the change in the trend Yt component increment in the long-term perspective.

Parameter δ defines the balance for the elements of both components. As Ravn et al. (2002) mentioned, parameter δ value can be calculated by formula:

$$\delta_\tau = 1600(\tau/4)^4, \qquad (3)$$

where τ is the monitoring rate.

It can be easily seen that this parameter is 1600 for quarterly measurement. As mentioned above, the values characterizing the investment growth rate variations were subject to log transformation for the analysis of the investment growth rate using some patterns (1-3). The results obtained are provided on a diagram below (Fig. 6).

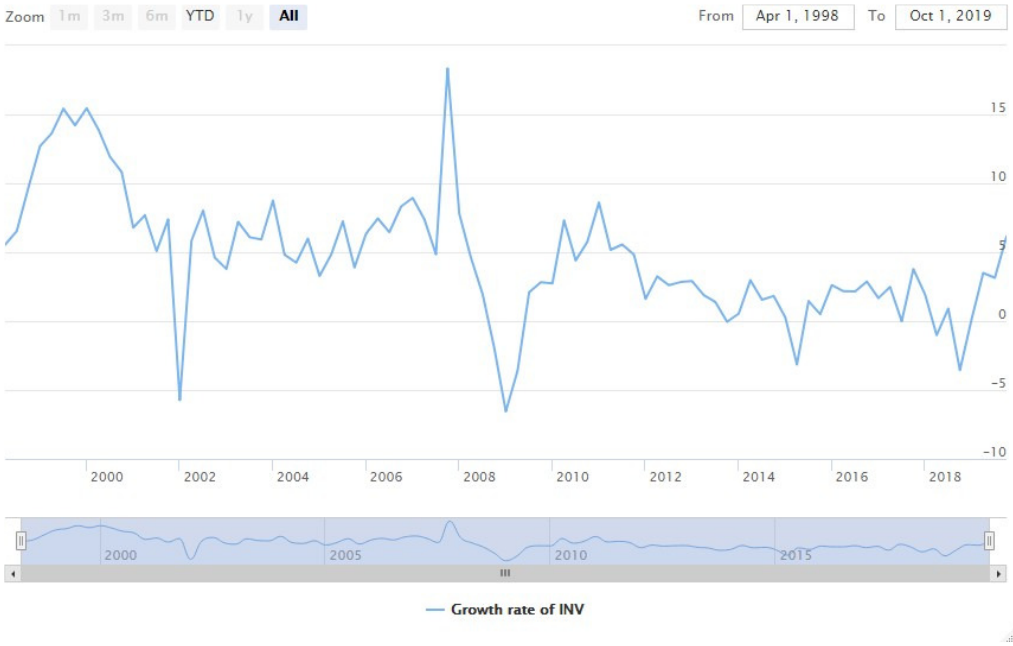

Fig. 6: Cyclic fluctuations of investments in fixed assets in the GDP of Russia over the period 1998 - 2019

Conclusions

As we can conclude proceeding from the results (Fig. 6), the investments in the Russian economy over the period under consideration is considerably uneven. It reached its highest peak (18.3%) the year before the global financial crisis in 2008.

Hence, the biggest decline in the investment rate (-6.55%) was observed in Q1 2009 due to the global financial crisis in 2008.

The next drop in the investment rate (-5.73%) was recorded in Q1 2002 due to the negative impact of the external factors by the end of 2001, i.e. economic recession in developed countries and deterioration in foreign economic environment, primarily, due to a significant plunge in oil price. World price of 'URALS' crude oil dropped to $19.8 a barrel in October, 2011, and to $17.9 a barrel in November. Herewith, the deterioration of economic situation with the other traditional export commodities of the Russian Federation was observed. First of all, it affected ferrous metals (demand for rolled sheet products on the part of main consumers - auto manufacturers and some kinds of structural steel products on the part of machine-building and construction companies) and non-ferrous metals (nickel and aluminum, mostly).

It should be underlined, that this is the current situation (Q1 and Q2 2020), and we recommend business entities, investors and regulatory authorities to learn the lessons from it.

It is an interesting fact that both recession considered led to the drop in investments that exceeded the results of financial default in 1998 in the Russian Federation.

There is a set of full investment cycles of the Russian economy on the plot, e.g. from Q2 1998 to Q1 2002 (i.e. about eight quarters), from Q1 2009 to Q2 2015 (24 quarters), from Q3 2015 to Q2 2018 (12 quarters).

It can be easily observed that these cycles vary by duration and by nature. The reasons of these differences can be determined by various factors, both, external (e.g. global financial crisis, decline in the price of basic goods), and internal (monetary policy, actions of the regulatory authority, social and political processes and the economic reforms carried out, and so on).

Due to the analysis of the reasons of changes in the investment cycles we can better understand their nature and foresee their further behavior, or study the influence of factors, individual or total.

The findings obtained offer the great promises in development of the investment cycle forecasting approaches, that can contribute to more efficient business planning, and timely response to the negative processes and take preventive measures on the part of the regulatory authorities.

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Comparative Analysis of Approaches to Determining the Threshold of Originality in Copyright

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Abstract

The article discusses current issues of legislation and law enforcement practice regarding the establishment of the possibility of copyright protection of the result of intellectual activity by the criterion of its creative origin. In the literature, the corresponding problem is known as the "threshold of originality." The authors analyze approaches to establishing the “threshold of originality” in various legal systems (Anglo-American, continental); they are exploring doctrinal approaches to defining the boundaries of protection of works of science, literature and art; they are examining the current judicial practice in this area. On this basis, they offer their own approach to understanding the “originality” of a work, corresponding to the current legal regime of intellectual property in the Russian Federation. It is concluded that the general conditions for the protection of the result of intellectual activity as an object of copyright in modern Russian law is its attribution to works of science, literature or art created by the intellectual labor of a person acting in conditions of creative freedom.

Keywords: Intellectual Property, Copyright Protection, Creative Work, Protection Of Photographs, Sweat Of The Brow.

Introduction

One of the important issues of intellectual property law is the determination of which objects are eligible for protection and which are not. For different types of protected intellectual property (industrial property, trademarks, means of individualization), various rules are used. With regard to copyright, one of the essential requirements for objects that can be protected as works of science, literature and art is originality.

It is usually claimed that in order to become an object of copyright, a work must possess a sufficient degree of originality, which confirms its character as a creative result of intellectual activity.

In legal literature and judicial practice, the corresponding requirement is called the “threshold of originality”, which is rather arbitrary, since of course there is no quantitative indicator of the author’s creative contribution, therefore determining whether the work is original enough to “overcome” this threshold, is a fairly subjective process based on not arbitrary criteria. The relevant criteria are different

in different jurisdictions, can be quite flexible, evolving over time, and are fixed mainly in judicial practice and the works of legal scholars. There is no unity between the latter: according to Lavik and Gompel (2013), some are calling for an increase in the threshold of originality.

Modern reality poses quite complex tasks for lawyers, such as determining the possibility of copyright protection of works created by artificial intelligence – see Guadamuz (2017) or animals — see Guadamuz (2016). As mentioned by Hua (2017), questions of evaluation of the protection of works of arts and crafts arise as well.

As a result of this, the study of the modern approach to determining the threshold of originality has theoretical and practical importance. Given the processes of globalization in the modern world, the solution to this problem is relevant in a wider context, since it allows us to imagine a possible evolution of the criterion of originality in many legal systems.

Methods

General and special scientific methods, traditional for theoretical and applied legal research, were used, such as formal-legal, system-structural, content analysis of various publications, comparative legal method.

Results and Discussion

Despite the fact that copyright is the subject of regulation of a number of international treaties, the main among which is the Berne Convention of 1886, these documents do not contain clear guidelines on the threshold of originality, and therefore different legal systems use different approaches to determining which works can be considered original, and which are not.

It should also be noted that the question of originality does not apply to all categories of works, but only to those that are close enough to the "threshold of originality". Of course, in situations where the object of rights is a complex literary work, the text of which is not even remotely similar to existing ones and contains a significant number of clearly authorial elements, a picture or other image, when looked at which even an amateur in art will consider their creative work, a complex piece of music, there is not even a minimal doubt that they are original enough so that intellectual property rights may arise in relation to them and.

However, as stated by Kasharin (2010), in practice, often enough, the need arises to determine whether originality criteria for simpler intellectual activity correspond to originality criteria, in particular those representing a combination of elements, each of which is not protected in itself, as well as materials created on the basis of other intellectual activity results, including those in the public domain due to the expiration of the period of protection of intellectual property rights to them or for other reasons.

Based on the analysis of approaches to determining the originality of creative works in different countries of the world, three approaches to establishing the "threshold of originality" can be distinguished with a significant degree of conditionality.

The first, which can be conditionally called based on personal creative contribution, is used, for example, in US law. The guiding principles for establishing the originality of works in this country were determined by the US Supreme Court in a 1991 judgment in Feist Publications v. Rural Telephone Service, which concerned the intellectual rights to the telephone directory. Subject to a number of other court decisions, in particular in cases such as Morrissey v. Procter & Gamble, Bridgeman Art Library v. Corel Corp, Meshwerks v. Toyota Motor Sales U.S.A. etc., the essence of the approach used can be explained as follows.

Any work in relation to which the question of its originality may arise should contain the result of the creative activity of its author, going beyond the exact copying of the existing results of intellectual activity, or using obvious techniques, methods, calculations, actions, etc., aimed at connection or

transformation of already known or trivial elements. Moreover, as concluded by Matveev (2009), the laboriousness of creating a result in itself, the need to apply special knowledge, skills does not matter and cannot be considered a basis for recognizing the original nature of the created object.

For example, a logo consisting of text printed in a regular font and a combination of simple geometric shapes will not meet this criterion of originality, as it is a simple combination of trivial elements, which were not used to create any overlay beyond the obvious techniques of overlapping and relative positioning elements of creative methods. An image that faithfully copies, for example, a picture in the public domain, will not be an original work, since in this case the author does not pursue the task of making his own creative contribution, but focuses on copying someone else's result of intellectual activity as accurately as possible.

On the other hand, even a creative contribution that is quite simple in nature and does not require significant intellectual efforts, which reflects the personality of the author (for example, the almost unconscious choice of composition and angle of shooting for spontaneous photographing of an event) will be considered sufficient to ensure that the result. The activity, as described by Sviridova (2018), was recognized as an object of copyright.

Another possible approach is based on giving greater importance to the novelty of the work. So, for example, in Sweden the following general rule is used: original enough to become an object of protection will be a work for which it is unlikely or even impossible to simultaneously create independently two different people. Of course, this does not necessarily mean complete identity: substantial similarities may be sufficient — see What may be protected (2015). So, for example, the technical drawing was recognized by the Supreme Court of Sweden as a non-copyright item — see NJA 2004 s. 149.

This approach has especially noticeable consequences in relation to photographic works: taking into account the fact that, unlike works of fine art, capturing an image by a photographic method does not require any special creative skills (especially when it comes to modern photographic technique that automatically selects the mode shooting). In many countries of Europe, in order for a photo to be recognized as a protected object, it must have a significant degree of originality, which, as stated by Fisher (2016), is expressed in the choice of the subject, composition, lighting, and other actions that enable the photographer to create an image that could not under similar conditions received by another person. For example, this approach is used in Portugal — see “Bom registo…” (2017) and Switzerland — see “Auszug…” (2004).

Finally, the third approach transfers the consideration of the issue of the workability of a work from the plane of its originality to the plane of considering the nature of the person’s activities in the process of its creation. Usually this leads to an extremely low threshold for originality. For example, it can be said that any work created by creative labor is considered to be protected. Here we can also mention the classical doctrine of “sweat of the brow”, as mentioned by Ramalho and Gomez (2017), used in Anglo-Saxon law: if the creation of a work is time-consuming and requires special skills, it is considered protected, even if it is not in the least innovative. At the same time, another person can also claim protection if he creates a similar work with independent labor, even if it is almost identical to the previous one.

What approach was used in Russia? Until recently, normative acts did not contain any clear criteria for the originality of a work. E.P. Gavrilov (2004), one of the leading experts in the field of legal protection of intellectual property, argued in this regard: “the very fact of the appearance of two identical results, not copied from each other, is clear and indisputable evidence of the lack of originality and the impossibility of establishing legal protection for both of these results”. A similar opinion was expressed by other authors, in particular, A.V. Nesterov (2018) and V.A. Maximov (2017). It is easy to notice that this approach is very close to the model used in the USA.

Of course, this point of view was not the only one, although M.V. Labzin (2007) also notes that “the concept of Professor Gavrilov has not met with serious criticism until recently”. In particular, M.V.

Labzin (2008) justified a different position: according to his opinion, "the object of copyright is even such a work of creativity, in the creation of which the author, expressing himself, showed his own way of thinking, his inherent skills and abilities, but did not reflect their result, as a result of which he is not unique with parallel creativity ", and, therefore," originality is a consequence of creativity, and not a characteristic of the level of novelty of an object ".

Judicial practice was also not unambiguous, and if in the 2000s and early 2010s it was possible to find many examples in which the reason for the refusal to protect the work was the lack of its uniqueness or novelty, then after 2014, when the court intellectual rights, judicial practice has become almost uniform, and originality has been consistently rejected by the courts as a necessary condition for the protection of creative works.

The culmination of this was the adoption on April 23, 2019 by the Plenum of the Supreme Court of the Russian Federation of Decree No. 10 "On the application of part four of the Civil Code of the Russian Federation", which included paragraph 80, which establishes the following rules for resolving by the courts of the Russian Federation issues related to determining the creative nature of a work taking including its originality.

"When resolving the issue of attributing a specific result of intellectual activity to copyright objects, it should be borne in mind that, according to the meaning of Articles 1228, 1257 and 1259 of the Civil Code of the Russian Federation, in their interconnection this is only the result that was created by creative work. It should be borne in mind that, unless proven otherwise, the results of intellectual activity are assumed to be created by creative work.

It is also necessary to take into account that the lack of novelty, uniqueness and (or) originality of the result of intellectual activity alone cannot indicate that such a result was not created by creative work and, therefore, is not the object of copyright.

The creative nature of the creation of a work does not depend on whether the work was created by the author himself or using technical means. At the same time, the results created by technical means in the absence of the creative nature of human activities (for example, photo and video shooting with an automatic surveillance camera used to record administrative offenses) are not object of copyright."

Thus, at present, in Russia, any works created by the creative work of a living author are protected, regardless of their novelty, uniqueness and (or) originality. Moreover, as stated by Mansurova (2017), the definition of "creative work" can be very broad. At the same time, it cannot be argued that the Russian courts accepted the doctrine of "sweat of the brow".

The reason for the impossibility of such a perception is primarily that the legislation contains a list of objects, the creation of which, although it is time-consuming and requiring special skills, but which still cannot be protected by copyright. Their common name is "messages about events and facts that are purely informational in nature." As examples of such objects are named news of the day, television programs, timetables of vehicles and the like. As you can see, the list in the legislation is open, as a result of which recognition of other objects not specified in the law as having informational character is not excluded.

From time to time, courts (especially of the first instance) attempt to attribute various objects, including photographs, to such messages about events and facts. So, the decision of the Moscow Arbitration Court of April 7, 2017 in case No. A40-239418/16 regarding the recognition of photographs as a copyrighted object indicated the following: "the controversial photograph is the result of shooting an architectural structure, contains information about the architectural structure and is for informational purposes only. A shot of such an object is made by the person directly at its location, because the object is located in an area open for public shooting, taking into account the available photographic equipment, that is, in conditions independent of the will of the author, in which the photographer does not select and control neither the quality of the shooting, nor the angle, nor the lighting, nor the filling of the frame, nor the background and / or the context of the shooting, neither the behavior of the shooting

objects and other conditions, but only seeks to fix the structure, carrying out such fixation technically, without realizing an artistic (creative) intention, with a purely informational purpose. Based on the composition, identical photographs could be performed by several persons independently of each other and located in a similar place of photographing and able to capture the same angle of an architectural object. The faces in the frame, obviously, were not models and did not fulfill the plan of the photographer, but only accidentally fell into the frame."

In addition, the trial court noted that "the controversial photograph was not processed in any way, the lighting conditions were not taken into account when photographing, the settings corresponding to the lighting conditions were not selected; the photo does not contain signs of novelty and originality, since it represents a reproduction by photographic display of the famous Perm Gate project by Nikolai Polissky, and as a result, it is not an original work, and the photo angle used is one of the most common camera angles used to capture this artistic project".

However, this decision in this part did not pass the verification by the appellate and cassation instances (Resolution of the Intellectual Property Rights Court dated October 30, 2017 No. C01-812/2017 in the case No. A40-239418/2016), which recognized that despite these circumstances, the photograph is still It must be recognized as the object of copyright. There are other similar solutions by which any photographs taken by the photographer on their own, regardless of their artistic value, are recognized as the object of copyright.

In addition, it should be noted that for the type of objects most in need of protection, the creation of which is time-consuming and requires significant resources, but the protection of which is impossible using existing copyright institutes, Russian civil law provides for specific rules. This is the exclusive adjacent right of the database manufacturer. By default, legislation (art. 1334 of the Civil Code of the Russian Federation) requiring significant costs for creation is recognized as a database containing more than 10 thousand independent information elements. And although protection is provided on the basis of other legal norms, as mentioned by Kalyatin and Voynikanis (2007), the interests of the creator of the intellectual property object remain protected.

However, even taking into account all the above, it has to be noted that a rather unique situation has developed where, on the one hand, the criterion of originality is denied, on the other hand, rather complex works are not recognized as objects of copyright. An example is the Resolution of the Intellectual Property Court of 04.24.2015 No. C01-305/2015 in case No. A46-10011/2014, which recognized the text materials published on the Forbes website, which gave a brief description of Ukrainian cities, as non-copyright items. Despite the fact that these materials are quite voluminous and without a doubt are the result of the intellectual activity of a person who has compiled a selection of facts, the court ultimately came to the conclusion that they are not a work of science, literature or art that has a creative character.

Probably, the last thing played here was that for all the described settlements, the notes were built according to a given structure and have a strictly factographic character, which does not imply the use of any literary creative techniques. Based on this, we can draw certain conclusions regarding modern approaches to determining the threshold of originality in Russian copyright law, taking into account the explanations of the plenum of the Supreme Court of the Russian Federation on intellectual property issues.

Conclusion

It should be concluded that the use of the term "originality" in the context of the necessary property of a work protected by copyright is somewhat different from its commonly used meaning in the language as something unlike the others, peculiar, unusual, original. In the context of intellectual property law, "originality" means that the work is created as a result of independent creativity, comes from a particular author, reflects his personal creative approach to solving the problem.

At the same time, it cannot be said that the novelty of a work and the absence of its similarity with existing works should be completely ignored in the context of copyright. One of the legitimate questions that can be asked when examining whether a work is original is the question of the possibility of another solution to a similar intellectual problem. If several different people who will be assigned the same task, requiring intellectual efforts, cannot create solutions that are any significantly different from each other, the result is not original and cannot be considered the object of copyright.

In modern Russian judicial practice, as follows from the results of the study, just such an approach has been strengthened that differs from that used in other legal systems. Unlike other countries where the key importance may be given to the use of original creative techniques, the novelty of a work or the degree of laboriousness of its creation, the Russian law enforcer, when determining the creative nature of a work, asks whether its creator has creative freedom or is placed in a tight framework, including related to the purely utilitarian nature of the result, which should strictly comply with certain requirements. At the same time, even an object that is modest from the point of view of creative methods, the analogue of which can be independently created by another person, can be recognized as creative and protected, if in principle it was possible to create another, excellent result by a third person who is in the same conditions.

For example, photography, even in an absolutely typical perspective, without using artistic techniques of the composition and subsequent processing, is still an object of copyright, because even if the author did not use such techniques, he could use them as part of the task. On the other hand, if the subject is faced with the task of accurately and concisely fixing facts of a certain nature, then he does not have a proper degree of creative freedom. This does not mean the complete absence of differences between the results of the work of different people performing the same task, simply these differences will not be determined by the individuality of a personal creative approach, but by the available initial information, the degree of diligence of labor, used technical means, etc.

Thus, the general conditions for the protection of the result of intellectual activity as an object of copyright in modern Russian law is its attribution to the works of science, literature or art created by the intellectual labor of a person who acted in conditions of creative freedom. With regard to a number of objects, such as news of the day, television programs, timetables of vehicles, the lack of creative freedom is presumed. As regards other objects, this issue needs to be considered individually in relation to the particularities of each specific situation, however, in the absence of evidence of any other outside the presumption of law, any result of intellectual activity should be considered as created by the author.

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Features of Cost Accounting in Accordance with International and Russian Accounting Rules in The Construction Industry

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Abstract

International Financial Reporting Standard (IFRS) 15, Revenue from Contracts with Customers, which was included in the system of international standards, replaces the previously existing IAS 11 Construction Contracts and IAS 18 Revenue. IFRS 15 introduces new rules for accounting for revenue and expenses under contracts with customers, other requirements for the presentation and disclosure of information about contracts in the financial statements. The paper discusses the costs (expenses) arising in connection with the fulfillment of obligations under contracts with customers for construction work in accordance with IFRS 15 Revenue from Contracts with Customers and the Russian standard PBU 2/2008 Accounting for Construction Contracts.

Keywords: Costs of Contracts with A Client, Costs of Concluding A Contract, Costs of Fulfilling A Contract, Groups of Contract Costs, Cost Recognition Criteria.

Introduction

Starting January 1, 2018, a new international financial reporting standard (IFRS) 15 Revenue from Contracts with Customers was introduced, which stipulated not only a different definition of revenue from contracts with customers, but also defined new regulation in accounting for costs of contracts with customers. This Standard supersedes the previously effective IAS 11 Construction Contracts. In the Russian practice of accounting, an analogue of this standard is PBU 2/2008 Accounting for Construction Contracts. In connection with the innovations there is a need to consider the main changes in cost accounting for contracts with customers in accordance with IFRS 15 (IFRS) Revenue from Contracts with Customers and with the current RSPBU 2/2008 Accounting for Construction Contracts.

Materials and Methods

Construction as an industry is one of the most difficult segments in terms of technical nuances of the implementation of construction work. Accountants in addition to the specifics of maintaining financial and tax accounting in this industry need to understand some specific issues of the construction industry. Such knowledge is necessary for the correct classification of facts of economic activity, organization of accounting work, reliable preparation of accounting (financial) statements.

The specifics of construction management is determined by the features of construction production, which include:

1. immobility and territorial dispersion of construction products;

2. mobility of performers and implements of labor, complication of coordination of activities of construction organizations on sites, sometimes decentralization;

3. long duration of the production cycle;

4. the variety of facilities being built and, consequently, variety of technological, organizational and management solutions, the need for their study and comparison;

5. a large influence of natural factors, which increases the probabilistic nature of the system, the necessary specific management decisions.

These features of the construction industry have a direct impact on the organization of accounting.

The main provisions of the organization of accounting for construction work are formulated in the Accounting Regulation "Accounting for Construction Contracts", approved by Order of the Ministry of Finance of Russia of October 24, 2008 No. 116n (PBU 2/2008). However, this provision applies to organizations acting as contractors (subcontractors) in construction contracts, or as subcontractors in construction contracts in one of the following cases:

1) the duration of the execution of contracts should be more than one reporting year (long-term nature);

2) the start and end dates of contracts fall on different reporting years.

In the event that the contractor performs work within one reporting year or has the right to apply simplified methods of accounting, the rules of this PBU are not applied and the records are kept in accordance with PBU 10/99 Organization Costs.

In the system of International Financial Reporting Standards (IFRS), starting January 1, 2018, IFRS 15 Revenue from Contracts with Customers came into force replacing the previously existing IAS 11 Construction Contracts and IAS (IAS)) 18 Revenue. The new standard regulates accounting rules not only for revenue from contracts with customers, but also for any contracts with customers. So PBU 2/2008 Accounting for Construction Contracts regulates cost accounting only for construction contracts, and PBU 10/99 does not contain any rules that would relate to cost accounting for contracts with customers. It turns out that in Russia at the moment there is no regulatory document accounting for such contracts.

In accordance with IFRS 15 Revenue from Contracts with Customers the costs of contracts with customers are divided into two groups:

1) the costs associated with the conclusion of the contract;

2) costs associated with the fulfillment of contractual obligations.

The standard defines the conditions for the recognition of costs associated with the implementation of the contract, which include:

- costs should be directly related to the existing or specific expected contract;

- costs should form or improve the organization's resources that will be used to fulfill the obligations stipulated by the contract;

- costs must be reimbursed.

Moreover, the costs associated with the contract are classified into two categories:

1. direct costs capitalized as assets if all the criteria listed above are met;

2. costs recognized at the time of their occurrence.

Figure 1 shows a detailed classification of costs for contracts with customers in accordance with the requirements of IFRS 15 Revenue from Contracts with Customers.

The grouping of expenses under construction contracts, set out in the Russian standard PBU 2/2008 Accounting for Construction Contracts differs significantly compared with the IFRS 15 Revenue from Contracts with Customers. The mismatch initially lies in the terminology of the concepts of "costs" and "expenses". Both in PBU 2/2008 Accounting for Construction Contracts and in PBU 10/99 Organization Costs the term "expenses" does not apply.

To date, in the Russian regulatory documents there is no officially fixed concept of "expenses", which is used in a number of other accounting standards. This leads to a variety of its interpretations, both in the economic literature and in various regulations. So, M.S. Koske and Yu.G.Mishuchkova quantitatively described the terms "costs" and "expenses" in Russian accounting standards. In their opinion, the frequency of use of the term "expenses" is equal to or greater than the frequency of use of the term "costs". Of the 24 PBUs currently in force, the term "expenses" is not used in 12 of them, as emphasized in the paper by Koske M.S. and Mishuchkova Yu.G. "Expenses in Russian accounting: the economic nature and regulatory consolidation."

It turns out that in the national accounting standards, the terms "costs" and "expenses", according to the author, are used as synonyms. Let's disagree with this.

In accordance with RAS 10/99 Organization Costs, costs are understood to mean a decrease in economic benefits resulting from the disposal of assets (cash, other property) and (or) the occurrence of obligations that lead to a decrease in the capital of this organization, with the exception of a decrease in deposits by decision of participants (property owners). Based on this definition, costs are one of the central factors influencing the financial result of the organization. It follows that the expenses appear before the costs, that is, at the time the organization acquires economic resources. They can be charged either to assets or to costs. If an entity has an intention to capitalize expenses in order to create an asset, then they are recognized as assets. If such an intention is absent, then the expenses that have arisen apparently reduce the economic benefits of the company without creating any asset and are recorded as costs.

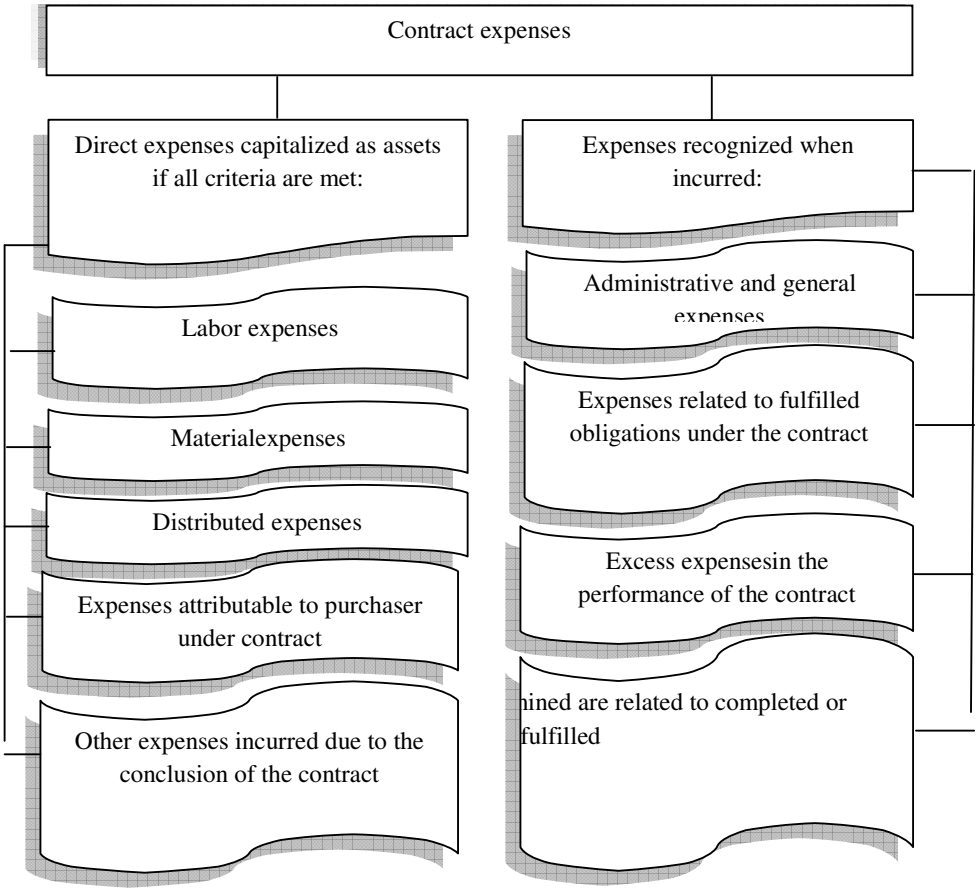

Fig. 1: Classification of expenses for contracts with customers in accordance with IFRS 15 Revenue from Contracts with Customers

It should be noted that in international accounting there is no single standard governing expenses and their accounting, as well as in Russian accounting standards. Each element of expenses is reflected in a specific IFRS.

Returning to PBU 2/2008 Accounting for Construction Contracts, we present the proposed groups of contract costs and the rules for their recognition in accounting (Fig. 2).

Figure 2 shows that the first group of costs includes expenses directly related to the execution of the construction contract. In paragraph 12 of PBU 2/2008 Accounting for Construction Contracts these costs include: actually incurred costs and expected unavoidable costs (anticipated), which are reimbursed by the customer in accordance with the terms of the contract. Expected costs are accepted for accounting either as they arise in the course of construction work, or through the formation of a special reserve to cover such costs. A provision may only be made if such costs can be reliably determined.

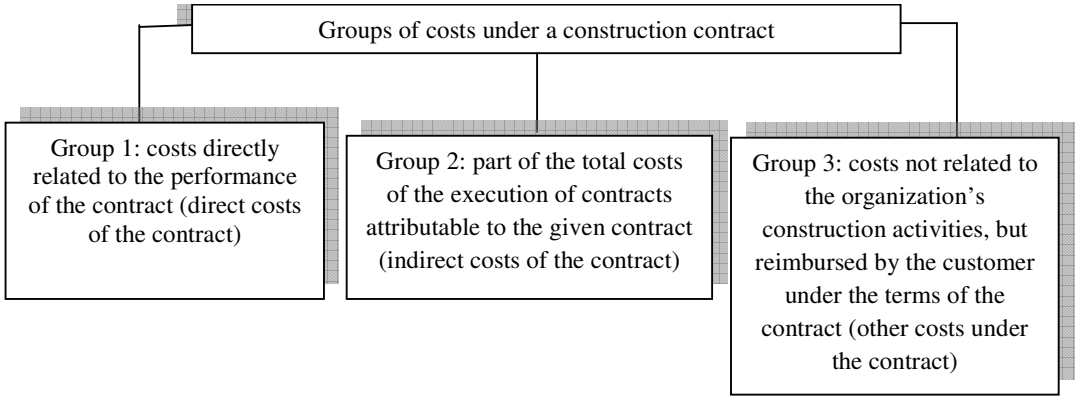

Fig. 2: Groups of costs under a construction contract in accordance with PBU 2/2008 Accounting for Construction Contracts

The second group of costs under the contracts includes indirect costs for each contract with the help of their distribution. Methods of cost allocation are determined by the organization independently and are applied systematically and consistently. The method of distribution of indirect costs must be necessarily fixed in the accounting policies of the organization.

The third group of costs in accordance with PBU 2/2008 Accounting for Construction Contracts includes other costs, which may consist of certain types of costs for the general management of the company, for R&D, the reimbursement of which is provided for in the contract.

As IFRS 15 Revenue from Contracts with Customers PBU 2/2008 Accounting for Construction Contracts provides the costs associated with the preparation and signing of the contract which incurred before the date of signing. Such costs include the costs of developing a feasibility study, the costs of preparing a contract for insurance of risks of construction works, etc. However, in accordance with the Russian standard, such costs are included in the costs of a construction contract only if they can be reliably defined, and if in the reporting period in which they occurred, it is likely that the contract will be signed. If these conditions are not met, such expenses relate to other expenses of the reporting period in which they arose. Unlike PBU 2/2008 Accounting for Construction Contracts, in accordance with IFRS 15 Revenue from Contracts with Customers, the expenses of concluding a contract with a client are recognized as assets regardless of whether or not a contract is signed with the client. They will in any case be reimbursed by the client. To simplify the procedure in practice, the company has the right to recognize the expenses of concluding the contract as costs as incurred if the depreciation period of an asset that the organization would otherwise have recognized would have been no more than one year. We assume that organizations can choose this approach, fixing it in their accounting policies, and in this case, apply it consistently to all expenses of concluding short-term contracts.

Thus, comparing the classification of expenses of the international standard and the Russian one, we can conclude that a certain degree of compliance of the composition of expenses exists. This applies to expenses directly related to the contract.

PBU 2/2008 does not establish criteria for recognizing the expenses of fulfilling a contract. In accordance with paragraph 95 of IFRS 15 Revenue from Contracts with Customers, the following criteria for recognizing expenses are defined:

1) expenses relate directly to a specific contract;

2) the expenses create or improve the quality of the organization's resources that will be used to fulfill future performance obligations;

3) expenses will be reimbursed.

The above criteria are valid for those contracts that fall within the scope of this standard.

Thus, both PBU 2/2008 and IFRS 15 describe a general methodology for expense accounting for contracts with customers, not taking into account the industry-specific activities of organizations. The described regulatory documents have both general and distinctive features, as well as a number of issues that have not been worked out in them. Moreover, it is worth noting that the adoption of IFRS 15 removes Russian rules from international ones.

Having studied the differences between international and Russian rules for expense accounting, we paid special attention to the expenses that will be the basis for the cost of construction work as an asset of the organization. The general methodology for calculating the cost of finished products in accordance with IFRS and domestic accounting standards is almost the same. This relates to expense classification by element.

Much attention is paid to the problems of expense classification in Russian practice, but two signs of expense grouping are disclosed in regulatory documents, in particular, according to economic elements and costing items of labor products. The expense structure used by Russian enterprises is formed under the influence of regulations, industry instructions and the specific features of the business entity. In accordance with paragraph 8 of PBU 10/99 Organization Costs, Russian organizations apply a single expense grouping according to the following economic elements: material expenses, labor expenses, social security contributions, depreciation, and other expenses. Disclosure of information in the context of economic elements in accounting is mandatory regardless of the specifics of activity, industry and other factors of enterprise management.

Today in Russia there is not a single document regulating the composition of expenses and the cost of construction work. Previously, the principles of expense classification, as well as methods of planning and accounting for the cost of construction work were given in the Model guidelines for planning and accounting for the cost of construction work (approved by the Ministry of Construction of Russia on December 4, 1995 N BE-11-260 / 7). This document has now been canceled. However, for practical purposes, construction organizations today are guided by certain provisions of the Standard Methodological Recommendations only in that part that does not contradict PBU 9/99, PBU 10/99 and other documents of the system of accounting regulation. However, the above regulatory documents are common to all Russian organizations and do not reflect the industry-specific activities of organizations.

Taking into account industry instructions and production characteristics in Russian practice, expenses are classified according to calculation items. According to PBU 10/99 Organization Costs "for management purposes, cost accounting is organized according to cost items", each company can independently establish a list of costing items.

Research Results and Discussion

Thus, due to the lack of industry instructions for accounting for production expenses and calculating the cost of products (works, services) in the construction industry, business entities have to independently develop a procedure for accounting for the costs of labor products, fixing their decisions in the accounting policy. However, the lack of regulations does not always contribute to making the right decisions in practice, even if they are taken by qualified specialists.

The practice of construction organizations of the Chuvash Republic shows that in their approved accounting policies very little attention is paid to expenses, their classification, the applied method of cost accounting and calculation of the cost of construction work, the order of distribution of indirect expenses, etc. This is probably due to the fact that the current regulatory documents on cost accounting in the construction industry are absent. Therefore, according to the authors, in order to make the right decisions, at least the following information should be disclosed in the accounting policies of the construction organization:

1. Grouping expenses by costing items. Typically, construction organizations apply the following classification: materials, labor expenses, operating expenses of construction machinery and mechanisms, overhead expenses, other production costs. This list is not final, the organization has the right to expand the range of articles depending on the accepted objects of accounting and economic feasibility.

2. The procedure for accounting for direct and indirect expenses. It is preferable to indicate on which accounts direct and indirect expenses are accumulated.

3. The procedure for the distribution of indirect expenses. First of all, this concerns the costs of operating construction machinery and mechanisms, overhead costs and other production costs. In practice, organizations usually use the basic wages of the main production workers as the distribution base. The costs of operating construction machines and mechanisms should be apportioned by type of production in proportion to the hours worked by each group of machines (machine hours). Overhead costs may be allocated in proportion to direct expenses. The organization can use other bases of expense distribution, which would take into account the causal relationship between the cost item and the basis of their distribution. In addition, the company can organize analytical accounting of overhead expenses, combining them into cost groups and for each establish the appropriate basis for their distribution.

4. Accounting of work in progress. Here the construction company has two accounting options. Either the work is handed over as the entire volume of work is completed, or the work is handed over in stages. In the second case, each delivery to the customer of the work stage is reflected as an implementation. In this case, it is advisable for the company in the working chart of accounts to provide account 46 Completed Stages of Work in Progress.

5. The method of cost accounting and costing of construction costs. Cost accounting for construction work, depending on the cost accounting object, can be organized either using an ordering method, or by the method of cost accumulation for a certain period of time. The main method, of course, is the custom cost accounting method. But, if the construction organization performs homogeneous construction work, creates objects of the same type with a small production cycle, it is advisable for such an organization to keep track of costs using the cost accumulation method.

Conclusion

According to the results of the comparative analysis of IFRS 15 Revenue from Contracts with Customers and PBU 2/2008 Accounting for Construction Contracts, we can conclude that the IFRS regulation significantly alienates us from domestic rules for accounting for expenses under contracts with customers. The difference begins in the terminology used “expenses” and “costs”. It cannot be said that the International Standard and domestic regulatory documents distinguish similar groups of expenses under the contract and the rules for their recognition in accounting. In PBU 2/2008 there is no simplified condition for recognizing the expenses of concluding a contract, as well as criteria for recognizing the expenses of fulfilling a contract as an asset for those expenses that are not within the scope of other IFRS. IFRS 15 does not recognize future expenses as deferred costs. In PBU 2/2008 there are no rules for accounting for assets, which recognize the expenses of concluding and fulfilling contractual obligations that include depreciation of such assets. According to the author, IFRS 15 has

not yet been widely disseminated in practice and perhaps in the future it will be amended in terms of cost accounting for contracts with customers.

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Comparative Analysis of The Competitiveness of Medical Organizations

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Abstract

The article considers the concept of competitiveness in healthcare. It analyzes the strengths and weaknesses of the organization under study compared with competing medical organizations and studies the structure of the Republican Center for Manual Therapy Autonomous Institution (AU RPVL) and competing enterprises in the medical services market for the researched period. The authors assess the competitiveness of medical services. The paper discusses the dynamics and structure of income from the provision of paid services. Recommendations are developed to increase the competitiveness of the medical organization under study.

Keywords: competitiveness, medical services, analysis, factors.

Introduction

The relevance of the chosen topic is determined by the need to increase the competitiveness of medical organizations on the basis of timely and competent analysis. The analysis allows us to study the current problems of the competitiveness of medical organizations, to identify the strengths and weaknesses of competing organizations. Based on the results obtained it becomes possible to develop a strategy to increase the organization's competitiveness.

Materials and Methods

The emergence of new medical organizations caused by the growing demand for their services and growing profitability due to the use of modern management methods and new technologies implies the free choice of their services by the consumer, and therefore higher demands are placed on the quality of services by customers. Health organizations are more often forced to resort to marketing tools in order to understand the needs of consumers not only in the field of treatment but also in services, and to develop a competitive enterprise development strategy.

In modern conditions the problems of the competitiveness of medical services are extremely relevant.

Competition in healthcare is the state and process of the relationship between health care providers and their consumers in which there is a rivalry between health care providers to meet the needs of patients.

From the point of view of the final result competition is divided into constructive and destructive.

Constructive competition provides for a positive outcome in which the patient's choice increases, prices for medical services are reduced without loss or improvement in the quality of medical care.

Destructive competition is aimed at improving financial well-being to the detriment of the quality of services. In healthcare these include: orientation of suppliers only to the local market, struggle for the maximum number of patients, monopolization of the medical market.

The emergence of competition in the modern market of medical services exacerbates the problem of competitiveness of medical organizations.

Competitiveness characterizes the level of development of one organization in comparison with competing organizations in terms of customer satisfaction and performance.

We can distinguish the following approaches to the analysis of the competitiveness of goods and organizations.

Terekhova E.Yu. suggested a method of polling and interviewing in assessing competitiveness. This method allows to determine the competitiveness of both public and private medical organizations; assess and give recommendations for each competitiveness factor; compare the requirements of consumers and experts of insurance organizations for the subjects of the supply in a particular market; determine deviations in the level of development of regional and urban healthcare in relation to national; account for problems in the management of this sphere at all levels. The disadvantages include the fact that competitiveness is evaluated from the perspective of consumers of services as well as insurance organizations.

According to Thompson A.A. and Strickland A.A. it is possible to assess the competitiveness of the organization through the use of indicators of key factors for the organization's success in the industry under study, as well as the main advantages and disadvantages of competitors. Later on the sum of such indicators is formed into a comprehensive indicator of the organization's competitiveness. The positive side of this approach can be considered the ability to assess the enterprise in direct comparison with its competitors in this industry however the methodology does not take into account the specifics of budgetary and paid organizations and there is no possibility of assessing competitiveness within the organization itself.

The American method of analyzing hierarchies is based on an expert assessment of the organization according to certain criteria of competitiveness which are added to the matrix of paired comparisons. In this case competitiveness is determined both separately for each criterion and for the general level based on all parameters. This method is both qualitative and quantitative, i.e. suitable for evaluating several organizations, and allows to organize the indicators in a hierarchical order.

Research Results and Discussion

In order to identify competitiveness factors an analysis of the competitiveness of a medical institution is carried out.

Further we analyze the competitiveness of the researched organization Republican Polyclinic of Rehabilitation Treatment (vertebrology and manual therapy) Autonomous Institution of the Ministry of Health and Social Development of Chuvashia (AU "RPVL"), whose activity is the provision of health services.

The main competitors are Doctor Shumakov Clinic LLC, Similia LLC.

In Table 1 we consider the strengths and weaknesses of competitive clinics.

Table 1: Factors of competitiveness of the AU "RPVL" and its competitors

Name of company	Factors	
	positive	negative
AU «RPVL»	low prices, high quality, flexible discount system	inconvenient location
Similia LLC	convenient location, good interior of the clinic	high prices for services
Doctor Shumakov Clinic LLC	wide range of services	inconvenient location, high prices for services

Level of quality of service as well individual approach to the client in providing discounts favorably differ AU "RPVL" from the competitive organizations. However, the inconvenient location of the organization under study reduces its competitiveness. Similia LLC and Doctor Shumakov Clinic LLC are characterized by a high price for medical services. The positive side of Similia LLC is the good interior of the clinic creating an atmosphere of calm and comfort. The advantage of Doctor Shumakov Clinic LLC is the provision of a wide range of medical services.

One of the components of the competitiveness of a medical institution is its share in the medical services market (Table 2).

The data in Table 2 indicate that in 2016 the share of AU "RPVL" in the medical services market was 23.2%. Doctor Shumakov Clinic LLC held a leading position in the competition, its share was 48.9%. Similia LLC had a 27.9% share.

Table 2: Share of the AU "RPVL" and competing enterprises in the medical services market in 2016-2018

Name of company	Medical services market share,%			Deviation (+,-)	
	years			2017 from 2016	2018 from 2017
	2016	2017	2018		
AU «RPVL»	23,2	27,7	34,3	4,5	6,6
Doctor Shumakov Clinic LLC	48,9	48,3	53,1	-0,6	-5,2
Similia LLC	27,9	24,0	12,6	-3,9	-1,4

Competitive position of AU "RPVL" in the market of medical services in 2016-2018 improved. In 2017 its share increased compared to 2016 by 4.5 percentage points and amounted to 27.7%. In 2017 compared with 2016 this indicator increased by 6.6 percentage points and amounted to 34.3%. The share of Similia LLC in the medical services market has noticeably decreased (from 0.279 to 0.126).

Table 3: Criteria for the competitiveness of the services of AU "RPVL" and its main competitors in 2018 * , (points)

Criteria	AU «RPVL»	Competitors	
		Similia LLC	Doctor Shumakov Clinic LLC
Service quality level	7	5	7
Service popularity	6	4	6
Service uniqueness	4	7	6
Price of services provided	7	5	6
The complexity of services	8	6	6
Total	32	27	31

** The assessment was carried out on a 10-point scale*

The competitiveness of an organization can also be assessed by such indicators as the quality of services, price, novelty of the services provided, etc. The indicator of the quality of services in LLC Similia is 2 points lower than in AU "RPVL" and Doctor Shumakov Clinic LLC. The popularity of the services of AU "RPVL" and Doctor Shumakov Clinic LLC has a rating of 6 points. At the price of the services provided the highest number of points belongs to AU "RPVL". This indicator in Doctor Shumakov Clinic LLC is 1 point lower.

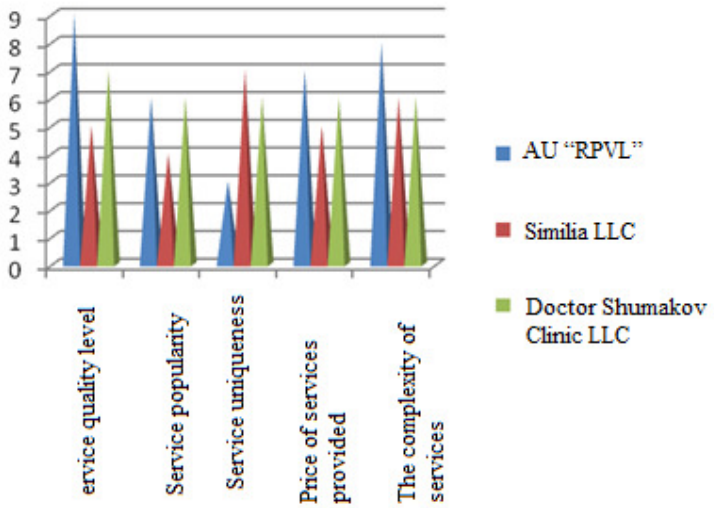

Fig. 1 : Services competitiveness criteria

The advantage of the studied organization over competitors is a higher level of quality and flexible pricing of the services provided.

Table 4: Indicators for evaluating the competitive position of AU "RPVL" and competing clinics in 2018 *, (points)

Indicator	**AU "RPVL"**	**Competitors**	
		Similia LLC	**Doctor Shumakov Clinic LLC**
Availability of developed infrastructure	4	3	7
Information availability	3	2	5
Scientific and methodological documentation	3	2	8
Business and personal qualities of workers, specialists, medical personnel	8	5	6

Compliance of the quality and the range of services provided to customers	7	6	7
Advantages over existing potential competitors	5	4	10
The ability to withstand competition while maintaining benefits for a long time	5	4	6
Total	36	26	49

** The assessment was carried out on a 10-point scale*

According to the assessment conducted in Table 4 Doctor Shumakov Clinic LLC has competitive advantages. The stability of this clinic is due to the availability of developed infrastructure and scientific and methodological documentation worked out in accordance with the standards.

The enterprise AU "RPVL" has a high quality rating, which corresponds to the quality value of Doctor Shumakov Clinic LLC.

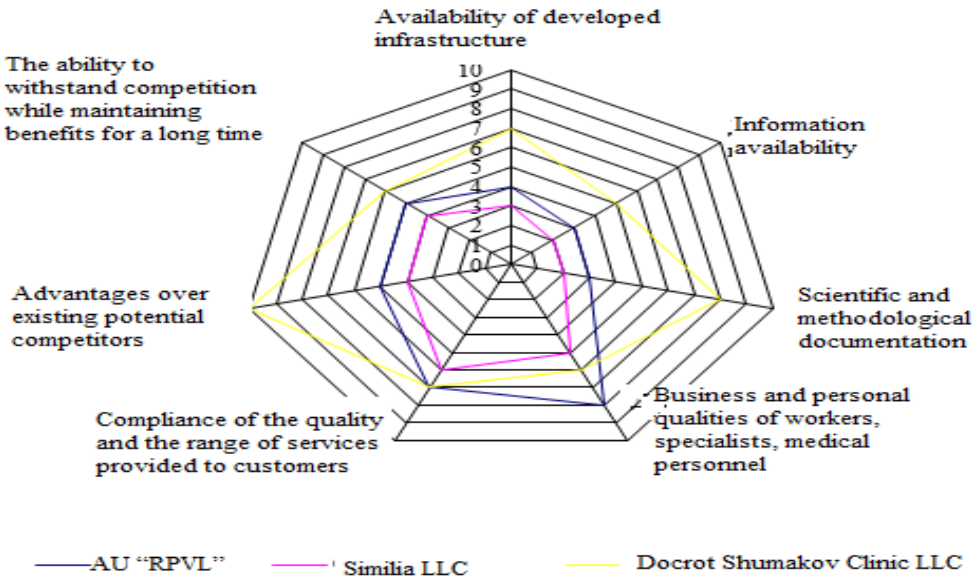

Fig. 2: Indicators for assessing the competitive position of AU "RPVL" and competitor clinics

Clinic activities are financed from budgetary funds and entrepreneurial funds. Recently the amount of budgetary funds received at the institution's account has been moving more and more towards a decrease and the implementation of medical and preventive activities is due to the provision of paid medical services.

Paid medical services are rendered annually at AU "RPVL" for children and adults from the regions of our republic (2/3 of the total) and cities of the republic (1/3).

In Table 5 we consider the dynamics of income from the provision of paid medical services of the AU "RPVL" for 2016-2018.

The data in Table 5 indicate that the income from the provision of paid medical services of the studied organization for 2016-2018 annually reduced. In 2017 compared with 2016 the largest reduction occurred in such revenue items as outpatient medical services, functional diagnostics and consulting medical services.

Table 5: Dynamics of income from the provision of paid medical services at AU "RPVL" for 2016-2018, thousand rubles

Indicators	Years			Deviation (+/-)	
	2016	2017	2018	2017 from 2016	2018 from 2017
Revenues from the provision of paid medical services - total, including	5560	4626	4487	- 934	- 139
- consulting medical services (advisement)	1120	1041	1092	- 79	51
- outpatient medical services (10 days treatment)	3894	3341	3147	- 553	-194
- functional diagnostics	497	201	211	- 296	10
- other	49	43	37	- 6	- 6

In 2018 compared with 2017 outpatient treatment services decreased by 194 thousand rubles, other services by 6 thousand rubles. Positive dynamics is observed in consulting medical services, they increased by 51 thousand rubles. Revenues from functional diagnostics increased by 10 thousand rubles and amounted to 211 thousand rubles.

In Table 6 we consider the structure of income from paid medical services provided to the population by AU "RPVL" in 2016-2018.

Table 6: The structure of income from paid medical services provided to the population by AU "RPVL" in 2016-2018, %

Indicators	**Years**			**Deviation (+/-)**	
	2016	**2017**	**2018**	**2017 from 2016**	**2018 from 2017**
Revenues from the provision of paid medical services - total, including	100	100	100	-	-
- consulting medical services (advisement)	20,1	22,7	24,3	+2,6	+1,6
- outpatient medical services (10 days treatment)	70,0	72,2	70,1	+2,2	-2,1
- functional diagnostics	8,9	4,3	4,8	-4,6	+0,5
- other	1,0	0,8	0,8	-0,2	-

According to Table 6 it can be concluded that for the researched period the main share in the total income from the medical services provided is occupied by the income from the provision of outpatient medical services (more than 70%). Revenues from consulting medical services (advisement) occupy more than 20% of the total income derived from the provision of paid medical services.

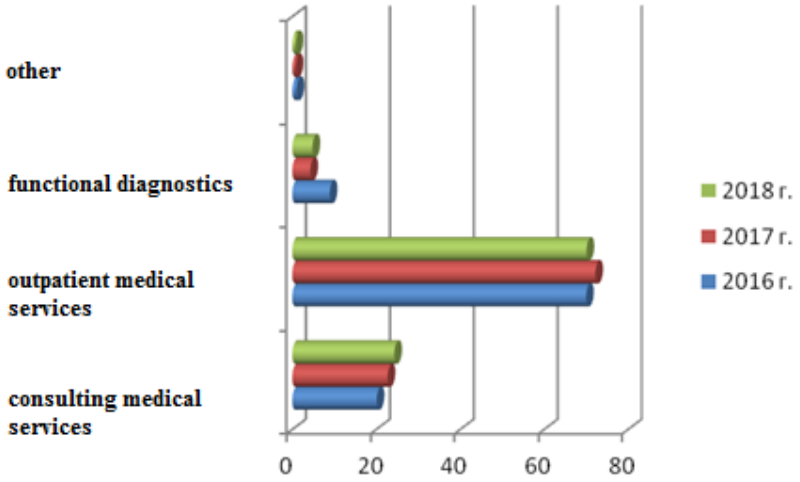

Fig. 3: Structure of paid medical services provided to the population by AU "RPVL" in 2016-2018,%

Less than 10% are income from functional diagnostics and from other services.

In modern conditions to improve the efficiency of the economic entity a timely and competent analysis of revenues, expenses and financial results is necessary.

In Table 7 and Figure 4 we consider the dynamics of the indicators of revenues and expenses of AU "RPVL" for 2017-2018.

Table 7: Indicators of revenues and expenses of AU "RPVL" for 2017-2018, thousand rubles

Indicators	Years		Deviation, (+,-)	Rate of change, %
	2017	2018		
Revenues	14997	16343	1346	109,0
Expenses	16415	17098	683	104,2
Net operating result	-1418	-755	663	-

Revenues of AU "RPVL" in 2018 amounted to 16343 thousand rubles, their increase compared to the same year was 9% or 1346 thousand rubles. Expenses also increased by 4.2% and amounted to 17098 thousand rubles in 2018.

In 2017 and 2018 expenses of AU "RPVL" exceeded revenues as a result of which the organization received a loss in the amount of 1,418 thousand rubles in 2017 and 755 thousand rubles in 2018.

In 2018 compared with 2017 the amount of loss decreased by 663 thousand rubles.

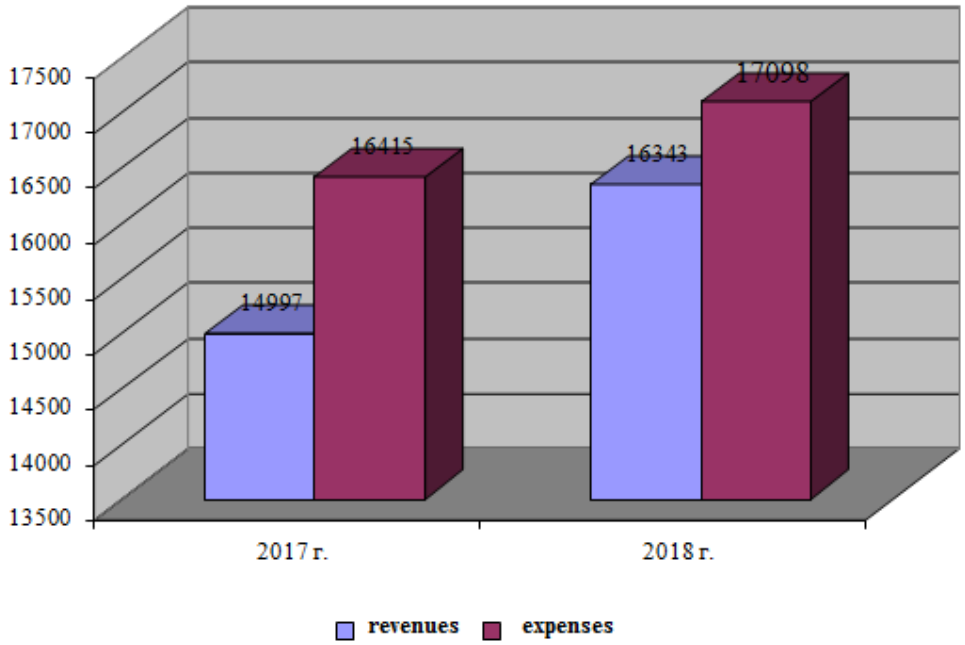

Fig. 4: Dynamics of indicators of revenues and expenses of AU "RPVL" for 2017-2018.

A positive aspect in the activity of the medical institution is the excess of the growth rate of revenues over the growth rate of expenses.

Conclusion

Competition in the medical services market requires improving approaches to competitiveness management and the search for new sources of competitive advantages.

To increase the competitiveness and effectiveness of the activity of AU “RPVL” it is necessary:
- to expand the list of paid medical services;
- to provide the public with information about the clinic and its benefits, about the services provided;
- to develop a system of discounts on paid medical services;
- to accept collective requests for the provision of paid medical services;
- to increase income from functional diagnostics by expanding the list of services provided;
- to optimize costs through the economical use of material, financial and labor resources.

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Corporate Governance Issues in Solving the Tasks of Strategic Development of Russian Companies

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Abstract

The prospect and relevance of corporate governance in Russia is explained by the fact that it is increasingly positioned as a factor in the stability and profitability of a business in difficult conditions of economic uncertainty caused by a series of global challenges. To objectify the choice of managers with the appropriate competence and to avoid principal-agent conflicts, it seems important to study the factors that prompt the process of delegation of company management to professional management and to reveal its specificity that is characteristic of Russian realities.
This study shows that the topic of achieving corporate governance effectiveness does not lose its relevance, its importance increases many times to achieve the strategic goals of the company, increase its competitiveness and investment attractiveness. The success of strategic development depends on many factors, including productive, responsible, and trusting relationships of all corporate governance entities, primarily owners and hired management. In the strategic plan, those companies that have chosen the path of improving corporate governance gain more chances of their own growth, reliable consolidation of previously won leading market positions and acquisition of a global scale.

Keywords: Corporate Governance, Strategic Development, Corporate Sector.

Introduction

Defining the development strategy and formulating the strategic goals of the company, representatives of Russian business are striving to increase profits and ensure business stability in a long-term horizon. Increasing operational efficiency and reducing costs continue to remain important tasks of the corporate sector - this trend has remained relevant almost from the beginning of corporate construction. Company executives note that the main external challenges to Russian business are: geopolitical instability which has a direct impact on the general economic situation; the development of competition in a hypercompetitive struggle; market instability caused by sanction wars; the impact of innovative technologies that increase the vulnerability of activities to new digital technologies and business models. An increasing part of the business community, including large and medium-sized businesses, began to realize that without professional management of the company it is impossible to achieve strategic goals and adequately answer the series of challenges of the current stage of development of society.

Materials and Methods

The object of the study is the corporate sector of the Russian economy, which is in a state of searching for effective tools for managing equity.

The subject of the study is corporate relations that develop between the owners of capital and professional management in the process of delegation of company management.

The paper is based on the conceptual provisions of the modern theory of corporate governance in relation to the study of agent relations taking shape in a company at different stages of its evolution. The authors generalize theoretical and methodological approaches to the organization and to the increase of corporate governance effectiveness described in the works of foreign (Mallin C., Jensen M., Meckling W., Gompers PA, Ishii JL, Metrick A. et al.) and domestic (Asaul A. N., Belikov I.V., Verbitsky V.K., Ivashkovskaya I.V. et al.) researchers.

To justify the applicability of conceptual approaches to building corporate relations in modern conditions of the economic environment, we used the results of empirical studies conducted by the Center for Political Technologies Independent Fund, the PwS audit network in Russia, the Center for Corporate Development with the support of the Moscow Exchange, and the Association of Professional Investors.

The methodological basis of the study was the methods of comparative and abstract logical analysis, as well as the following methods: general logical, formalization, inductive-deductive, statistical. The application of the methods of theoretical, functional and structural analysis made it possible to generalize and structure scientific material on research issues, determine the logical relationship of strategic and operational tasks in the corporate management system, and identify trends in the formation of the Russian corporate governance model.

Research Results and Discussion

In Russia at the present stage of corporate construction the problem of separation of ownership and management is increasingly becoming the focus of scientific discussions. Initially, ownership and management in Russia were strongly connected, at present the process of delegation of real management by owners to professional managers is underway.

It should be recognized that there are a number of objective reasons pushing owners (principals) to delegate management to professional management (agent). Among these determinants is, above all, the growth of companies. Increasing the size of the company and expanding its presence requires a clearer organization of business processes and the use of more standard management schemes - otherwise, a decrease in management efficiency is inevitable. The second important determinant is the continuous increase in the complexity of business processes - this circumstance requires higher qualifications of managers, the presence and constant growth of their professional knowledge corresponding to the specifics of the business and its organization in the current environment of economic uncertainty.

The need to transfer property management to professionals is reinforced by subjective factors. First of all, this is an age factor affecting the problem of generational change in property ownership, and such a psychological factor as fatigue is also quite pronounced. Moreover, only in relatively rare cases can a business be effectively transferred to the owner's children or relatives.

A study conducted in 2016 by PwS, in which more than 2800 owners and heads of companies from 50 countries, including Russia, took part, revealed that a wide list of problems of economic genesis in private and family business is inevitably supplemented by not only commercial, but also emotional problems of relationships. One of the main problems is the transfer of family business management to the next generation. Only 25% of respondents confirmed the active participation of children in the family business, while only 9% of owners plan to transfer control to the next generation. A large

number of companies are likely to change owners over the next 5 years, while a number of executives found it difficult to answer how they see the future of the business in terms of its succession. 39% of owners of Russian private companies plan to conduct an IPO or sell their business in the long term, which is significantly less than in 2014 (50%) (the same indicator in the world is only 17%). 36% of respondents found it difficult to answer about the fate of their business in the future - this is 17% lower than in 2014 (19%). 11% of respondents plan to transfer ownership to the next generation, but with the involvement of professional managers, in 2014 there were only 4%.

It should be noted that a restrained attitude towards family business (in the narrow sense of the word) was also manifested at the stage of the formation of new Russian entrepreneurship, and remains today, but basically, it is associated mainly with small business. Examples of domestic public companies that grew out of family businesses are extremely concise - they include Binbank, Vozrozhdenie Bank, Promsvyazbank, TRIO group of companies, ZAO August and others. In addition, due to the lack of official statistics for family business, their real size in Russia is difficult to imagine.

All of the above gives owners a reason to transfer control to hired professionals with specialized education, who often have diplomas from Western universities and business schools. So, according to PwS data, in 2018, the organization of more professional management of the company was identified as their key task by 50% of respondents, while maintaining business in the hands of family members by only 6% of respondents (in the world this figure reaches 30%). This is primarily due to the impact of modern challenges on business, requiring professional solutions (Fig. 1).

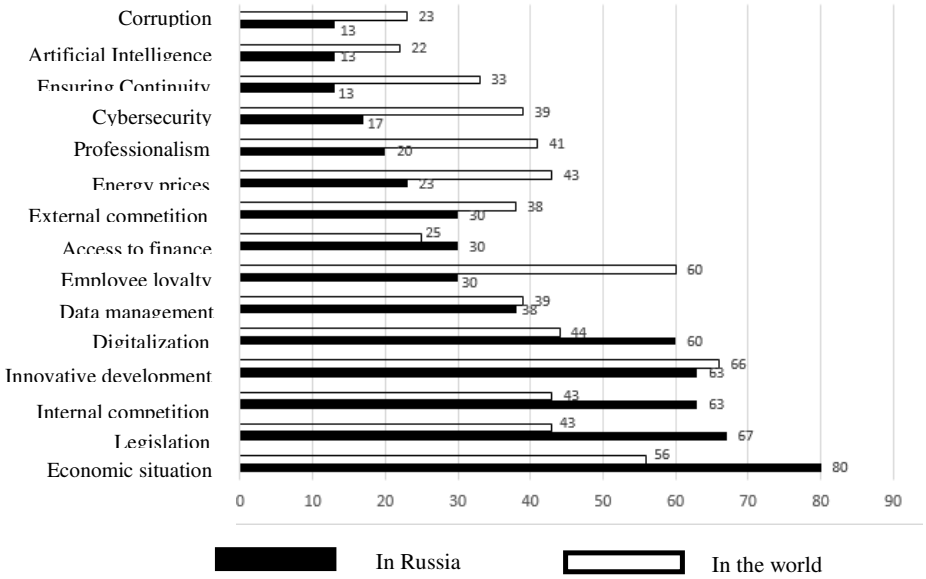

Figure 1: The main challenges for companies during 2020-2022. (in %)

At the same time, despite the increase in the number of professional managers, there is also an acute shortage of qualified managers due to overtaking growth in demand for them.

An analysis of the process of delegating authority to hired management indicates its slowness and high soreness. According to researchers, this characteristic is a consequence of several reasons.

The first reason should be called the fear of losing control of the business, and the loss of control can lead to opportunistic behavior of managers and their pursuit of their own interests which do not always coincide with the interests of the owners. The inevitable consequence of this is conflicts, which, according to studies by the Unity recruitment agency, are the second most frequent reason for the change of top managers - they make up 31%, low productivity (33%) is in the first place. The experience of previous years has constantly demonstrated that such fears are not unfounded.

The source of the second reason is the natural inertia of management processes, because over a fairly long period of time the company's existence, management mechanisms were set up for its leader, who established, maintained and expanded most of his business contacts with the external environment, since Russian business is heavily built on personal connections. Therefore, the transfer of powers cannot be reduced to purely technical procedures for the transfer of cases. And finally, the third reason: we should not forget that many owners do not just combine ownership with management. They are also the founders of their companies - this means that they not only know their company well from the inside, they have a high degree of personal identification with their business. As a result, psychological factors are superimposed on socio-economic motives and calculations, and given the fact that many of the owners are relatively young and fully capable the problem becomes even more tangible.

But despite the difficulties the delegation of authority although slow and inconsistent, but still occurs: in some cases, there is a frequent change of managers who do not fully meet the high requirements of the owner, in others - the owners, unable to stand it, return to the positions of general directors at critical moments. We emphasize that the process of delegation of managerial functions is inevitable, its outcome, speed and depth depend, first of all, on the main owner - his activity, interest in further business development. If the owner does not want to take the risk associated with the delegation the intention to abandon the management of the company is accompanied by its sale.

The degree of delegation of authority largely depends on the market situation in which the company is located. According to experts, during the restructuring period combining the functions of the owner and the manager is beneficial, but after building the system and entering the company in fierce competition in the market, it is necessary to delegate management functions to professionals to a greater extent.

It is important to note that even if the delegation of a substantial part of the powers has taken place the owners reserve the right to sufficiently tight control over the activities of hired managers. If there is a dominant owner of the company the independence of decision-making by top managers is significantly limited and their dependence on the owner grows. As practice shows in large domestic corporations often even very influential top managers cannot make their own decisions. Thus, Russian reality is quite far from the "managerial revolution" proclaimed back in the 1930s as applied to the American economy. Of course with the dispersal of ownership the grounds for the independence of managers are objectively expanding but since the process of such dispersal is not going very fast, this affects the management structure to a small extent.

To reduce pain and prevent negative consequences for the owner, the transfer of authority should be carried out using internal control and audit mechanisms. There is a need to objectify this process using independent external audit tools. In addition, we should also indicate the special status of the corporate secretary who should turn from a technical executor into a special control center, as well as be responsible for disclosing information to the investment community.

The role of independent directors, audit commissions and committees of boards of directors is also growing. At the same time studies conducted by the TopCompetence Corporate Development Center show a decrease in the share of independent directors in the Board of Directors to 3 people in 2017 compared to 2016. In 2018, this trend was suspended: the average number of independent directors in the boards of Russian companies increased slightly - to 3.8 people but this figure continues to be significantly lower compared to European countries. Only in Turkey this figure is even lower and amounts to 32.7%. In Finland, the Netherlands and Switzerland the highest percentage of independent directors on company boards is 84% (Table 1).

Table 1: Share of independent directors on the Board of Directors: by country (in %)

Russia	Belgium	Denmark	Finland	France	Germany	Italy	Netherlands	Norway	Poland	Spain	Sweden	Switzerland	Turkey	Great Britain	USA
36,7	45,9	77,2	84	69,1	60	51	83,6	76,3	49,4	44	69,6	84	32,7	61,4	85

Despite the significance of all the problems of delegation of authority considered, the main one should be recognized as the lack of trust between the owner and management, which has a significant impact not only on the delegation process itself, but also on the further relations developing between them. For this reason, the formation of a team of managers is based on the "friend or foe" principle, based on the experience of collaboration, personal relationships, recommendations of third parties - as a result, top managers and owners continue to be integrated into one team. It should be recognized that business, as a rule, used to be built on a team basis, and this team-based "partnership" principle has been preserved in corporate governance today. Despite the fact that far from all the original teams survived - as they scaled out, they displaced someone, someone left voluntarily as a result of the division of the business - but the team principle of making key decisions involving a limited circle of partners who know and trust each other saved and projected onto relationships with managers.

It should be noted that the selection of managers for purely professional qualities is becoming increasingly common: the ideal professional portrait of a professional manager consists in particular of the willingness to solve new problems (34%), visions of new prospects (21%), salary expectations (16%), stability of the company (11%), etc. This is especially true for large public companies: the general level of management in them is increasing, and in medium and small companies the structure of relations remains more or less the same. At the same time, the requirements of qualified managers are also increasing, more and more intense competition is taking place for them, they often change jobs dictating their conditions as a result of the adoption of more advantageous offers.

Each owner, forming a team of professional managers, must clearly understand what strategic goals the invited top managers should be guided by. The goals can be related both to the objective results of the company's work - increasing the company's capitalization, growth of its net revenue and profit level, shareholder incomes - and to the growth of reputation capital - the importance of achieving positive PR effects is increasingly being declared which was hardly addressed before any close attention.

Moreover the vast majority of researchers indicate that the main goal for most large companies at this stage is to increase capitalization (or increase the value of assets for non-public companies). Performance indicators are now rather in the background. There is certainly a profit orientation but this target is not without contradictions: since the prosperity of the shadow economy Russian companies have learned not to show a high level of profit - not only from the pursuit of tax optimization but also from business security considerations. We believe that a certain inertia in this respect persists today.

Regarding the development of corporate governance itself as a strategic goal the situation is even more controversial. Objectively managers have no interest in such development and it occurs rather as a result of external pressure on management. The obvious interest of top managers is caused by the issue of increasing their income level which has significantly risen in recent years due to the deficit of highly qualified managerial staff noted above.

These statements are based on the results of a study according to which the motivation of management and personnel to implement the principles of corporate social responsibility / sustainable development in the organization's activities, including the connection of remuneration with the results in the field of corporate social responsibility / sustainable development, is an unpopular principle of the Corporate Governance Code - only 19% of the 100 largest by capitalization of

Russian companies whose shares are listed on the Moscow Exchange comply with it.

In addition, one cannot exclude the possibility of opportunistic management behavior favorable conditions for which are created due to the difficulty of the owner to exercise full control over the management activities. In this regard, a large role is given to the Boards of Directors which are largely called upon to regulate relations between owners and management. The obvious manifestations of opportunistic behavior are:

1) withholding information about the real market position of the company;
2) theft;
3) work with low return;
4) inefficient use of company resources;
5) conclusion of high-risk or illegal transactions;
6) unfair performance of assigned obligations;
7) damage to the business reputation of the company;
8) transfer of insider materials to competitors.

An analysis of the managers' income structure confirms international practice: there is a tendency to more closely link the income level of top managers with the results of the company - these may be significant bonuses or option programs. These efforts are aimed, among other things, at overcoming the previous practice of seeking interest on the side of the counterparty and realizing it in the form of "kickbacks". Among the 25 largest Russian companies, the leader in payments for professional managers is Nornickel which in 2018 spent almost 7 billion rubles on remuneration. In total, these 25 companies spent 54.5 billion rubles to pay bonuses to management (Table 2). The most paid were representatives of the oil and gas sector (they accounted for 17.3 billion rubles), banks (9.6 billion rubles) and metallurgical companies (9.4 billion rubles).

Table 2: Leaders in the payment of bonuses to professional managers

Companies	Bonus volume		The number of managers who received bonuses
	2018	2017	
Nornickel	6,8 billion rubles	6 billion rubles	23
Sberbank	4,4 billion rubles	3,9 billion rubles	18
Gazprom	4,3 billion rubles.	4,5 billion rubles	17
Rosneft	4 billion rubles	4 billion rubles	17
VTB	3,7 billion rubles	3,8 billion rubles	24

Regarding the management style it can be stated with great certainty that most of the Russian companies retain the legacy of the Soviet period - an authoritarian management style that can take different variations, for example paternalistic form or bureaucratic management. In both variations authoritarianism remains a key indicator of the managerial style of most Russian companies. And this may seem like a paradox: how authoritarianism and the previously mentioned team principle of business organization can be combined. The fact is that the team principle does not mean collegiality: as a rule, the head of the company is able and entitled to make individual decisions and the team is only his direct support. Collegial forms can work when discussing various issues until the top manager has determined his position and is not ready to make a single decision.

In this regard it is important to answer the question about the quality of management decisions and its dependence on the degree of effectiveness of the corporate governance system that has developed in the company. Most experts respond positively to this question. But the processes — managerial decision making and corporate governance — go largely parallel and the relationship between them is not always direct. At least, it is noted that effective company management is quite possible with poor corporate governance. But nevertheless, it is assumed that in the medium and even longer term this can play a tangible role.

Corporate governance performance can be judged from multiple perspectives. Well-managed companies achieve high results in the long term; it is easier for them to access capital. High management standards reduce investment risks - this is primarily due to the presence in these companies of highly paid managers with high qualifications. For an investor a well-functioning corporate governance system is an motive to provide capital at a lower cost. Companies with established corporate governance provide an increase in resources for shareholders, employees and the country as a whole, contribute to the economy and ultimately help the progress of society.

In conclusion, we note a number of factors that can directly affect the increase in the efficiency and strategic stability of the corporate management system:

1. The presence of clearly formulated strategic guidelines. Innovations in production, marketing, resource management and other areas of activity should be justified by the desire to get ahead of competitors and prevent the loss of market positions. At the same time, it is important to constantly ensure that the economic effect of innovations is higher than the cost of their implementation.
2. Minimization of management expenses. In a situation where management costs are higher than a positive result the question should arise about the restructuring of the entire management system or its individual links.
3. Improving the internal structure. A tangible effect in practice is provided, for example, by a transition from a functional-structural model of a company to a process-role or matrix one. This is not always possible but if it succeeds the number of hierarchical levels reduces, a horizontal (network) type of management develops, the gap between the leader and the executor narrows - as a result, the mobility and speed of the entire system increases.
4. Institutional aspects, the development of the regulatory framework. This factor relates primarily to the competence of the state. For the development of economic systems that would meet world standards it is necessary to create technological and economic institutions that take into account both world business experience and Russian traditions that shape the nature of entrepreneurship in Russia. An innovation policy is also necessary especially in the era of the digital transformation of society.

In the strategic plan strategically minded corporate executives will win who themselves will begin to solve a wide range of problems working for the future and strengthening their reputation, in contrast to those leaders who will be forced to do this under pressure from the state. They will begin to seriously appeal to broader interests, one can hope not only in order to redistribute property and control in strategic sectors.

Conclusion

Predicting the future of corporate construction in Russia it should be recognized that in the process of forming the Russian model of corporate governance it is inevitable to borrow a number of elements of foreign models that require adaptation to Russian realities. The modern look of the Russian model of corporate governance will permanently evolve and undergo a transformation due to a number of reasons including: a gradual decrease in ownership concentration; increasing requirements for company transparency; the inability of owners to manage the company in difficult turbulent environments which will inevitably lead to the delegation of an increasing number of functions to hired management. But the corridor of opportunities, it should be recognized, still remains limited - there is a so-called dependence on previous development coupled with strong structural and institutional inertia.

In general, in Russia as well as throughout the world the leadership model is gradually changing, the life cycle of top management is shortening. Top managers are faced with ever-increasing challenges, it is necessary to adjust existing and build new business models, manage to keep track of the market situation, and be more effective. Professional managers with a fresh look and a new approach, flexible and energetic are required. Boards of directors need to understand in which cycle the teams are. If managers have been taking their seats for the past 5-7 years, they are used to a certain type of

work and may not be able to quickly adapt to a flexible horizontal model and will not be able to respond to unexpected changes.

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Private Subsidiary Farming of The Region's Population: Problems and Development Prospects

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Abstract

World experience convincingly shows that the functioning of a market economy is impossible without a variety of forms of management, the simultaneous existence and interaction of which in social production on the basis of competition among them ensures an increase in production and an increase in the quality of products, contributes to the search and rational use of advanced forms and methods of organizing production. Among the variety of all forms of farming in agriculture, a special place is held by private subsidiary farming of the population. In statistical publications, the abbreviated name of this area is used - "households". These include private subsidiary farming of the population (farmsteads), collective gardens and vegetable gardens, summer cottages. The owners of private subsidiary and peasant farms are mainly rural residents, the owners and users of garden farming - mainly urban dwellers, residents of urban-type settlements. The functioning of the private sector is characteristic of agriculture from the very inception of agricultural production to modern days.In the context of the reform of agricultural relations, the collapse of collective farm and state farm production, the duration and complexity of the process of establishing new forms of management in the agricultural sector, the role of private subsidiary farming as the most flexible, fairly stable legal form in agricultural production is significantly increasing. At present, private subsidiary farming are one of the main sources of income for the population, food supply, and one of the areas of employment in conditions of unemployment. Revenues from the sale of surplus agricultural products make up a significant share of the budget of rural families, private farms contribute to the preservation of rural lifestyles, are often the only place of employment for rural unemployed.

The ongoing changes in the system of agrarian relations in Russia affect the small commodity sector, in particular the private subsidiary farming of citizens. The relevance of the research topic is due to the importance of private household plots in maintaining the country's food security and the well-being of the rural population and is determined by the need to improve the conditions for the functioning of private farming.

Keywords: Private Subsidiary Farming, Small Forms Of Managing, Rural Area.

Introduction

Private Household Farming Is One Of The Most Important Production Functions Of Households In Rural Areas.

The Concept Of Private Household Plots Is Given In The Federal Law "On Private Subsidiary Farming" Of July 7, 2003, Which Determines That "Private Plots Are Maintained By A Citizen Or Citizen And Members Of His Family Living With Him And (Or) Co-Operating With Him For Private Plots Meet Personal Needs On The Land Provided And (Or) Acquired For The Management Of Private Household Plots". The Same Law Confirms That The Production, Processing Of Agricultural Products In Private Household Plots And Their Sale Are Not Entrepreneurial Activities And Are Not Taxed. However, The Law Does Not Specify Some Important Points: The Nature Of Employment In Private Household Plots And Income Received From Its Management Is Not Defined; Despite The Presence In The Law Of The Term "Subsidiary" It Does Not Specify What Exactly The Need Is, The Size Of The "Surplus" Of Agricultural Products Is Not Established.

These Are the Basic Statutes That Characterize the Very Concept of Private Subsidiary Farming. It Differs from Peasant (Farm) Farming, Primarily in That It Is Not Always An Entrepreneurial Activity, And Is Not Always Of A Commercial Nature, I.E. Has An Auxiliary, Consumer Character And Is Carried Out Mainly In Order To Meet The Private Needs Of Its Members On The Land Provided.

Thus, The Characteristic Features of Private Subsidiary Farming of Citizens That Distinguish It From Other Types Of Activities Are:

- Firstly, The Activity of Production and Processing of Agricultural Products. In This Way, It Differs from Other Types Of Activity That Are Not Related To Agricultural Production;
- Secondly, Such Activity Is Not Always Entrepreneurial, Is Not of The Main, But Subsidiary Nature to Other Types of Activities of Citizens Conducting Such A Farming;
- Thirdly, Such Activity Is Mainly Not Commodity, But Consumer in Nature And Is Carried Out In Order To Meet The Personal Needs Of Citizens Conducting Private Subsidiary Farming;
- Fourthly, The Main Means of Production Is the Pre-Granted or Acquired Land.

At Present, Personal Subsidiary Plots Are One of The Main Sources of Income for The Population, Food Supply, And One Of The Areas Of Employment In Conditions Of Unemployment.

Revenues from The Sale of Surplus Agricultural Products Make Up A Significant Share of The Budget Of Rural Families, Private Farms Contribute To The Preservation Of Rural Lifestyles, Are Often The Only Place Of Employment For Rural Unemployed.
According to the 2006 All-Russian Agricultural Census, There Are 17.9 Million Private Farms In The Russian Federation: 15.8 Million Families In Rural Areas And 2.1 Million Families In Cities And Urban-Type Settlements. Private Farms Play the Role Of Stabilizing The Socio-Economic Balance In The Countryside.

The Functioning Of Small-Scale Production In The Countryside, As Well As The Study Of The Economic Problems Of The Development Of Private Farms, Were Described In The Work And Research Of Statesmen Of The Pre-Revolutionary Period S.Yu. Witte, P.A. Stolypin, Scientists N.P.

Makarov, A.V. Chayanov, A. N. Chelintsev. The Problems Of The Functioning Of Private Household Plots, The Prospects For Their Integration With Other Subjects Of The Agricultural Economy, The Possibilities For The Development Of A Cooperative Movement Are Reflected In The Contemporary Works Of Such Scientists As I.I. Bezaev, V.A. Dergunov, V.M.Zherebin, A.P. Zinchenko, E.G. Lysenko, E.S. Stroev, S.O.Rubakhin And Others.

The Foreign Predecessors Of Domestic Scientists Are Considered To Be The German Economists T. Goltz, F. Erebo, The Swiss Agrarian E Laura. Great Influence On The Views Of Agricultural Scientists Was Also Exerted By The Work Of German Economists I. Thünen, A. Weber On The Rational Distribution Of Productive Forces On A Regional Scale, And On The National Economy As A Whole.

Foreign Experience In The Development Of Farms Is Presented In The Works Of M. Buckett, F.G. Ashbrooke And Others

Materials and research methods.

The research involved teachers and staff of the Chuvash State Agricultural Academy. The scientific problem was studied on the basis of the Department of Economics, Management and Agro-Consulting using available information resources, including reference networks, electronic library networks, official websites of government agencies of the Russian Federation and Russian enterprises. The objects of the study were households of the population of Russia and the Chuvash Republic.

In the course of the work, the following research methods were used - general scientific methods of dialectics, analysis, synthesis, induction, deduction, analogy.

The results of the study

A significant contribution to the production of many types of agricultural products is made by small-scale enterprises, which include citizens conducting personal subsidiary plots, agricultural consumer cooperatives, individual entrepreneurs working in the field of agriculture, and peasant (farm) enterprises.

Let's consider the dynamics of the state of these farms according to the results of the All-Russian Agricultural Census of 2006 and 2016.

Table 1: The number of objects and the total land area per one census object by category of farms based on the results of the All-Russian Agricultural Centers 2006 and 2016.

No.	The name of the categories of objects of agricultural enterprises	The number of objects of agricultural enterprises, thousand units		The total land area on average per agricultural enterprise, ha	
		2006 г.	2016 г.	2006 г.	2016 г.
1	Agricultural organizations	59,2	36,4	6930,1	6018,1
2	Peasant (farmer) enterprises and individual entrepreneurs	285,1	174,6	103,0	240,9
3	Private subsidiary and other individual households of citizens	22800	18200	0,4	0,7
4	Nonprofit organizations of citizens	79,8	76,3	15,1	14,6

The data in the table show that the number of private farms decreased, according to the 2016 census, compared with the 2006 census, from 22.8 million units to 18.2 million units, however, while their total number is the largest among all categories of farms, and the land area per one LPH object increased from 0.4 ha to 0.7 ha.

Let us analyze the contribution of this category of farms to the total volume of agricultural production over the past fifteen years.

Table 2: The structure of agricultural production by farm categories in the Russian Federation, 2003-2017,%

Household Categories	2003	2005	2010	2014	2015	2016	2017
Farms of all categories, including	100	100	100	100	100	100	100
Agricultural organizations	42,6	44,6	44,5	49,5	51,5	52,5	55,1
Households	52,5	49,3	48,8	40,5	37,4	35,4	32,4
Peasant (farm) enterprises, individual entrepreneurs in the field of agribusiness	4,9	6,1	7,2	10,0	11,1	12,1	12,5

The data in the table indicate that the combined contribution of households (private household plots), peasant (farmer) households and private enterprises in the agricultural sector decreased from 2003 to 2017 from 57.4% to 44.9%. Over the past fifteen years, there has been a tendency towards a decrease in the volume of production in private farms and an increase in peasant (farmer) and private sector enterprises, which is explained by the transfer of households to this sector as part of participation in receiving grants to support beginning farmers in accordance with state programs.

The Chuvash Republic is the smallest and most densely populated region of the Volga Federal District, in which 40.2 percent of the republic's population lives in 1720 rural settlements. The territory of the Chuvash Republic is 18.3 thousand square km, of which 1,009.9 thousand ha (55.1 percent) are agricultural land.

The Chuvash Republic, as well as the Russian Federation as a whole, is characterized by an increase in the number of small forms of farming in the countryside, and both the small business sector, consisting of peasant (farmer) farms and agricultural consumer cooperatives, and private subsidiary farms are dynamically developing.

In the Chuvash Republic, there are over 235 thousand private subsidiary farms (according to the 2016 All-Russian Agricultural Census). Owners of private farms produce 63% of potatoes, 69.6% of vegetables, 61.8% of milk, 32.5% of eggs from the total volume of the main types of agricultural products produced in the Chuvash Republic.

Table 3: Agricultural Products by Category (at actual prices; million rubles)

	2015	2016	2017	2018
Farms of all categories				
Agricultural products	39347,2	39338,3	38736,9	37370,9
including: plant growing	20191,7	19369,6	17467,6	17183,4
animal husbandry	19155,5	19968,7	21269,3	20187,5
Agricultural organizations				
Agricultural products	15479,4	16912,1	16893,8	16560,1
including: plant growing	5719,9	6253,3	5869,3	5328,8
animal husbandry	9759,6	10658,9	11024,5	11231,3
Households				
Agricultural organizations	20383,2	18338,9	17768,0	16941,8
including: plant growing	11732,6	9933,5	8608,4	9126,3
animal husbandry	8650,5	8405,4	9159,6	7815,5
Peasant (farmer) households				
Agricultural organizations	3484,7	4087,3	4075,1	3869,0
including: plant growing	2739,2	3182,8	2989,9	2728,3
animal husbandry	745,5	904,5	1085,2	1140,7

Table 4: Structure of agricultural products by farm category (at actual prices; percent of total)

	2015	2016	2017	2018
Farms of all categories	100	100	100	100
including: Agricultural organizations	39,3	43,0	43,6	44,3
Households	51,8	46,6	45,9	45,3
Peasant (farmer) households	8,9	10,4	10,5	10,4

In 2018, private household plots of the population of the Chuvash Republic produced agricultural products worth 16560.1 million rubles. or 45.3% of the total output, including crop production at 9126.3 million. rub. or 53.1%, livestock production by 7815.5 million rubles. or 38.7% of the production of relevant products in the republic (table 3). [2]

Thus, we see that private subsidiary farming plays a key role in the socio-economic development of the region. In this regard, the issue of the formation of a special economic mechanism aimed at their full support and development remains relevant. For objective historical reasons, private household plots for the rural population are the main and often non-alternative type of economic activity and employment.
To date, many private subsidiary farms are large-scale, focused on the production and sale of products in order to make a profit. The entrepreneurship of rural residents to expand their farms is supported.

To this end, programs are being implemented at the federal and republican levels to support start-up entrepreneurs, which allow obtaining budget funds for the registration of an entrepreneurial form of activity: individual entrepreneurship or peasant farms.

The advantages of peasant farms or individual entrepreneurship over private farms are that they can legally work in the legal field:

- Obtaining state support in larger volumes than private subsidiary farming, that is, on a par with agricultural producers;
- obtaining a land plot for rent for agricultural production with an area of over 1 ha;
- attracting and creating additional jobs legally;
-increasing the size of the pension after going on a well-deserved rest;
- obtaining social support measures from the Social Insurance Fund:
-reimbursement of sick leave benefits and in connection with motherhood;
- payment for the treatment of workers at the expense of the Social Insurance Fund in case of accidents, etc.

In the Chuvash Republic, a number of forms of state support for small businesses are being implemented:

1) a grant is provided to support a novice farmer in the amount of up to 3,000 thousand rubles - for those planning to breed milk and meat cattle; up to 1,500 thousand rubles - for other types of activities;

2) grants are allocated in the form of a grant for the development of family livestock farms. To farmers who have expressed a desire to build a farm in the countryside, up to 60% of the cost of building livestock buildings and equipment are reimbursed from budgetary funds. The maximum grant size per family livestock farm cannot exceed:

- 10 million rubles, but not more than 60 percent of the costs — for raising cattle for meat and dairy industries;
- 5 million rubles, but not more than 60 percent of the costs - for other activities.

3) grant support for agricultural consumer cooperatives for the development of material and technical base. The maximum grant amount provided to one agricultural consumer cooperative is an amount not exceeding 70 million rubles and not more than 60 percent of the costs of developing the material and technical base of the agricultural consumer cooperative.

In just seven years (2012-2018), 285 novice farmers, 56 family livestock farms and 6 agricultural consumer cooperatives benefited from state support.

During the implementation of the grant support project for small-scale farming (beginner farmers and the development of family livestock farms), 763 jobs were created, revenue from these farms increased 11 times, the area cultivated by farmers - 6.5 times, cattle stock - 7 times.

The Ministry of Agriculture of the Chuvash Republic accepts applications from peasant farms and private subsidiary farms for the provision of grants from Agrostartap.

Grants are provided as part of the regional project “Creating a Farmer Support System and Developing Rural Cooperation”. The maximum size of the Agrostartap grant is determined in an amount not exceeding:

- 4 million rubles - for heads of peasant farms planning to use the funds of the Agrostartap grant to form an indivisible fund of the agricultural consumer cooperative, of which this peasant farm is a member (funds of the Agrostartap grant allocated to the indivisible fund of the agricultural consumer cooperative cannot be less than 25 percent and more than 50 percent of the total amount of funds);
- 3 million rubles - for other heads of peasant farms or citizens of the Russian Federation.

At the same time, the size of the Agrostartap grant cannot exceed 90 percent of the costs indicated in the plan of expenses of the business plan, and is determined by the tender committee taking into account the applicant’s own funds and the plan of expenses of the business plan.

The development of private subsidiary farming is one of the important directions of the socio-economic development of the republic. Its main goals are: increasing the level of employment, increasing incomes, replenishing the domestic market for goods and services, strengthening the role of the family in raising children through joint work, moving away from measures that encourage dependency, supporting initiatives, independence of citizens, and others.

Currently, members of private subsidiary plots, who are of working age and are mainly employed in private household plots, in our opinion, can choose one of the following options in order to ensure the accumulation of seniority, retirement, sick leave, maternity benefits, etc.

Saving employment. This option is most suitable for the rural population. If it is impossible to maintain full employment, since the reasons stimulating citizens to expand private household plots, at the same time determine the reduction in production in collective agricultural enterprises, it is advisable to transfer the employed to private household plots:

- to work on a part-time basis;
- to perform seasonal or temporary work;
- for civil law contracts (work contracts). When working under a contract, work experience is maintained. In addition, the employer must transfer all payments to extrabudgetary funds.

Organization of private agricultural enterprises by private owners (individuals) for servicing private households and hiring them as hired workers. Consumer cooperatives have the right to hire workers from among their members. Working hours in a cooperative are counted in the general and continuous work experience on the basis of entries in work books. The able-bodied members of private household plots not accepted into the consumer cooperative may conclude a contract with him.

Early registration of pensions for unemployed citizens - members of private household plots. At the suggestion of the employment service authorities, in the absence of employment opportunities for unemployed citizens who were laid off due to liquidation of the organization, reduction in the number of employees or staff and who have work experience regardless of interruptions in their employment, giving the right to full retirement pension (old age), including retirement on preferential terms, with their consent, the pension is issued ahead of schedule, but not earlier than two years before the retirement period established by the legislation of the Russian Federation.

Registration of able-bodied members of private household plots as unemployed. The time during which a citizen receives unemployment benefits in the manner prescribed by law does not interrupt the length of service and is counted into the total length of service. Unemployed persons are also subject to compulsory health insurance (payments are made by executive authorities). However, the duration of the payment of benefits in each period of unemployment may not exceed 12 months, in total terms - 18 calendar months, except as otherwise provided by law.

Registration as an individual entrepreneur. If the owner of private subsidiary farming has a side job (production of handicrafts, sewing clothes, knitting, etc.), he can buy a patent for these types of activities and become an individual entrepreneur. This will provide him with seniority and retirement. And in his free time from entrepreneurial activity, he can engage in private household plots.

Registration by the farmer. The expansion of private household plots can become an advisable change in its status and the registration of a peasant (farm) farm. Such a change in status solves the problems of seniority, retirement benefits and access to other social funds.

Currently, owners of personal subsidiary plots within the framework of the State program have an additional opportunity to increase the production of agricultural products in the courtyard due to soft loans. These measures certainly contribute to the development of private household plots and increase labor costs for agricultural production and increase its profitability. However, with the increasing public importance of the development of private household plots in the framework of a

priority project, labor in private household plots remains socially unprotected, income from it is not only non-indexed, but, on the contrary, depreciated due to increasing price disparity, the working time and income of private plots are not counted for calculating pensions, household members do not enjoy social protection for temporary disability, vacations, etc.

Conclusion

Thus, we see that private subsidiary farming plays a key role in the socio-economic development of the region. In this regard, the issue of the formation of a special economic mechanism aimed at their full support and development remains relevant. For objective historical reasons, private household plots for the rural population are the main and often non-alternative type of economic activity and employment. The task of improving the well-being of the rural population, creating a qualitatively new standard of living in rural areas is directly related to the development of private household plots.

In our opinion, it is necessary to expand state support for personal subsidiary plots of the population, because: firstly, private plots are the basis on which local staff are trained to organize peasant (farm) farming; secondly, personal subsidiary plots are an integral part of the infrastructure of the village, a carrier of rural culture and the identity of peoples; thirdly, personal subsidiary plots show better results of the efficient use of land resources in comparison with other forms of management, they adapt more quickly to market situations.

The studies on this topic allow us to draw the following conclusions and suggestions:

1. At different periods of its development, the economy of agriculture was characterized by the presence of different styles of life. Among them, over the centuries-long history of our country, a special role has been played by the small peasant form households with a private form of ownership, which, by their nature, purpose and function can be combined by a common name - private subsidiary plots.

2. The high viability and stability of private farms of the rural population, due to which they can function in any economic conditions, is due to the maximum approximation, in many cases, the coincidence of the spaces of the private subsidiary plots and the place of residence of peasants, which helps to minimize all types of costs, including transport and labor related to the delivery of labor to places of work and products to places of storage; private subsidiary plots have no dependence on the circulation of money capital, they require cash in order to complete the circulation of resources in a much smaller amount than large agricultural enterprises, and replenishment of these funds is carried out to a greater extent from family income derived from core activities in large-scale production, pensions or scholarships.

3. One of the main tasks of the socio-economic policy of the Russian state at the present stage is to overcome the degradation of the social infrastructure of the village, the revival of rural settlements, their comprehensive development, ensuring the proper quality of life of the people living in them.

4. The experience of organizing agricultural production indicates that private farms have always developed in conjunction with collective enterprises. Therefore, the search for the most effective forms of relations between private household plots and other subjects of agricultural production is an urgent task for modern science and social practice.

5. Currently, the rural farmstead has become the main source of income for the majority of the rural population and an increasingly important supplier of raw materials for the processing industry. Private subsidiary plots are an integral part of the agrarian economy of the republic, the social and economic importance of which has grown significantly in recent years.

6. The main reason restraining the growth of agricultural production of private household plots is the lack of a structure capable of organizing its marketing on acceptable terms. The solution to this problem could be the creation of a consumer cooperative with the tasks of providing various services, including sales.

One of the factors hindering the marketing of manufactured products is the remoteness of many rural locations from markets that are primarily located in large cities.

As before, the problem in the activities of private household plots is the acquisition of feed, and especially forage. Practically no wholesale deliveries of compound feeds, mineral fertilizers and other resources are made.

In private farmsteads, low-mechanized technologies based on manual labor are used, which makes rural labor unattractive for rural youth.

Private farms also experience in their development a number of difficulties of a legal, organizational, economic, financial and technological nature. All of the above requires the adoption of a system of organizational and economic measures to support private household plots of the rural population and stimulate the development of rural cooperation, the development and adoption of regional and district programs for the development of personal subsidiary plots in rural areas.

7. The bulk of the economically active rural population works on the farmstead - a private subsidiary farm, where labor, first of all, requires clarification of the content and legal status of the workplace, determination of the main and additional activities, and accordingly its impact on the formation of rural families' incomes.

8. The increased role of household plots of the population, their expansion require solving issues of cooperation of private plots. Further development of production in private farms is possible through various types of cooperation between them and integration with the public sector, which already has a material and technical base capable of serving small-scale agricultural production.

9. Cooperation can be carried out according to one of the following options:

- Creation of a legal entity (consumer cooperative), the founders of which are the heads of private farms (individuals);
- creation of a legal entity, the founders of which, along with individuals are collective farms, processing, trading and serving enterprises; joint use of machinery, land, livestock through the conclusion of contracts.

10. The development of private subsidiary plots is one of the important directions of the socio-economic development of the republic. Its main goals are: increasing the level of employment, increasing incomes, replenishing the domestic market for goods and services, strengthening the role of the family in raising children through joint work, moving away from measures that encourage dependency, supporting initiatives, independence of citizens, and others.

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Simulation of Promotional Efforts as An Instrument of Competition in The Market "Fight" of Russian Mobile Operators

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Abstract

Modern mobile commerce enterprises of any format and dimension, due to their flexibility and technological efficiency, are able to adapt to the changing environmental conditions and form new areas of activity in accordance with the challenges of the time. Mobile commerce is a continuation of e-commerce, the transfer of e-commerce into the most diverse mobile forms. Forms of the implementation of mobile commerce and its innovative mobile communication technologies allow you to transfer the information flow to the most advanced mobile gadgets of users, giving them complete freedom in their movements in space. The article discusses the objects of mobile commerce, provides a classification and analysis of market activities of subjects of mobile commerce. National peculiarities of entrepreneurship in the mobile commerce market of Russia are revealed. The quartet of the largest federal players in a completely mature mobile commerce market created a unique situation of the classical oligopoly in the face of imperfect competition, which put the domestic antitrust authority in a difficult position. Although the appearance of reliable competition requires a reduction in the financial success of each member of this strategic group, a kind of quadriga, in particular a decrease in marginal service revenue, a decrease in the growth rate of net profit, the reality of cartel conspiracy, especially in terms of price and tariff formation for a range of services mobile communications, of harmonization of non-price instruments, more and more becomes convex and tangible. And the extremely high indicators and characteristics of market concentration and tension for the oligopoly structure of mobile operators can become the source material of the case study for analysts of the territorial administrations of the FAS RF. While working on a report for the IBIMA Conference, the authors pay special attention to the construction and testing of a statistical model for analyzing the revenue from advertising activity of oligopolistic quartet participants in the mobile communications market.

Keywords: mobile commerce, mobile operator, digital economy, advertising wars, Internet environment, game theory, the net profit model, telecommunication services, Strategic Management Accounting, space-time continuum, market player, coalition strategy, utility theory, convergent offer

The world caught me, but did not catch.
Grigory Sckovoroda

Introduction

The main solution of the diverse and numerous economic problems that have arisen in the country recently seems to be the implementation of the promising program "Digital Economy of the Russian Federation"[1]. This program is aimed at creating conditions for the development of a knowledge society in Russia, improving the welfare and quality of life of our citizens, the availability and quality of goods and services produced in the digital economy and using modern digital technologies, the degree of awareness and digital literacy of users, improving accessibility and the quality of public services for citizens, as well as economic security both within the country and abroad.

The deadline for the implementation of such a large-scale project is indicated by the end of 2025. By this time, the Ministry of Communications and Mass Media of the Russian Federation intends to create a broadband Internet coverage of the most remote corners of the country. The government's plans included a significant reduction in the cost of Internet service providers. However, the famous intervened circumstances related mainly to the entry into force of the so-called "I. Yarovaya package", consisting of two federal laws, which are combined with the tasks of preventing terrorist activities [1, 2].

According to the regulations, from 01.07.2018, operators have become obliged to store conversations, text fragments, images, sounds, video recordings and other electronic messages of users. A resolution of the government of the Russian Federation, adopted in April of the same year, specifies that it is necessary to keep the content of negotiations and messages for 6 months, and messages transmitted via the Internet, for one month. The economic side of the "package" formed the need for purchasing new, naturally, import and, of course, expensive equipment, on which the intercepted information will be accumulated and stored [11]. Accordingly, only increased tariffs for the services of providers will allow to compensate the costs incurred for the strict execution of the specified sacred "package".

Of course, in the summer of 2018, Russian Internet providers together and everywhere raised their tariffs by about 8-10%. However, the horn press services of major companies try not to associate such a reactive pricing scheme with promulgated regulations and argue that their employers in these matters are guided solely by balancing the interests of customers and consumers and dictated by the characteristics of the competitive situation in communication services markets. In turn, independent market experts believe that by the end of 2020 the cost of these services should not increase on average by more than 10% from the corresponding regional base levels of 2018.

Official statistics show that the domestic mobile communications market of wireless technologies is showing steady growth due to the increased sales of tablets, music players, smart phones and other gadgets, which allows you to go online not only from computers and laptops. At the same time, as networks are deployed LTE standard (Long Term Evolution) as the initial version of the 4G standard (development started since 2008), 3G coverage expansion (mobile Internet communication standard has been used for more than 20 years) of significant areas of the country as new coverage areas appear directly from mobile operators2.

Without a doubt, the mobile Internet is a global information environment of a decentralized nature and turns out to be quite an effective means of providing business activities in the mode of application of advanced information technologies. Moreover, a modern and sensitive Russian business is gradually being digitized on the background and under the circumstances that foreign business has long acquired the status of, so to speak, "digitalized". Although both abroad and in the homeland, the main business process that is striving for digitalization, and other industrial production processes clearly need a new round of growth in their productive capabilities, which is especially important for Russia. Thus, at the International Labor Forum in St. Petersburg, A.L. Kudrin said on 02/28/2019 that in terms of labor productivity of $ 23 per hour on average in the national economy, we are noticeably behind even our neighbor and friendly Turkey3.

However, against the background of the unsatisfactory development of the infrastructure of basic communication devices, traditional skepticism and undisguised mistrust of Russian consumers of the older age groups to the newest information technologies, the state of the mobile communications market and mobile commerce can be considered as starting, h. e. with a low initial level of reference and a very narrow client segment. Therefore, the largest Russian operators brought down their impressive avalanches of advertising messages on the head of the domestic consumer through very powerful TV channel injectors.

Naturally, it is precisely on television channels as the largest media tool in reaching the audience that advertisers spend the most. And here, to the average user, constantly updated standards of available communication are not important; for him it is important that the connection is available. A slightly

more advanced and inquisitive user wants to actively download a variety of applications, quickly view the news feed in social networks and enjoy watching high-quality movies On-line.

Advertising messages from TV screens inform the consumer about the emergence of new types of services and about new content formats, as well as opportunities to get new entertainment and new quality of life. It is highly artistic and even, in a certain sense, talented advertising messages that explain to a potential buyer that, for example, thanks to the 5G standard, the Internet of Things, unmanned cars, smart houses, robotization of production and business processes, telemedicine (remote operations, including surgical) in real time, education (visual learning through VR-broadcast of the best practices of the educational process), advanced computer games and even interactive virtual reality will be transferred from the pages of technological media in the daily lives of Russians.

Russian telecom operators are not lagging behind the world trend and cooperate with the world's leading suppliers of network equipment – corporations Ericsson, Huawei, Nokia, which develop 5G devices. Most domestic analysts are convinced that the widespread introduction of 5G will begin after 2020. Today, the 5G level is more a concept than a technology, because there is no uniform standard yet. In order for the 5G connection to enter into wide consumer use, it is necessary to develop technical requirements, select frequencies and switch to fundamentally new equipment.

Potentially innovative resource elements of the existing communication systems can be assessed by the diversity of the latest basic production assets owned by the players of the mobile communication market, i.e. economic entities (EE), as well as in the quantity and quality of the information services they provide. At the same time, the quantity and quality of these services unambiguously depend on the quantity and quality of the communication facilities themselves, which are used by mobile operators when building their own information systems based on the elements developed by companies [11].

Here we note that an objective, and even more so, a quantitative assessment of the quality of communication services is extremely difficult, since every individual subscriber is clearly subjective about the relative level of quality of services provided under the influence of many explained and taken into account signs-factors, as well as covariance factors of a stochastic nature individually. However, the psychophysical state of the consumer of services and the peculiarities of his perception of external information in the advertising format become the decisive determinant of this impact [8].

To other specific features of the formation and development of the mobile communications industry is the following. It is here that industry innovations are characterized by genuine scientific and technical novelty, and the development and production of innovative products, works and / or services actually forms a new market for pioneer goods, inaccessible, and therefore free for some time from any industry competitors. However, high market competition for the first time declared economic good, which only in words and with great difficulty is recognized as innovation, however, and unfortunately, is the most important sign of the absence of noticeable innovations. Thus, in the author's understanding, radical, breakthrough innovations represent the true path to the commodity markets for the economic good [7].

Formulation of The Research Problem

Competition in commodity markets and advertising activity of market players in time go hand in hand. Traditionally, advertising has served as a marketing tool everywhere. To a certain extent, advertising allowed the FOrmation of customer Demand and STImulate Sales (for Soviet marketers and applied specialists, the FODSTIS system in the abbreviation of the 70s of the 20th century) products, works and services that the population needed, including our country, where, as you know, competition did not have. And classic marketing provided appropriate activities to promote the economic benefits of the end user in a well-studied and saturated market [12].

However, the movement of time is non-stop, and views on research subjects are fluid and changeable. And today: “The essence of marketing today is not at all in serving customers – it is necessary to outwit,

circumvent, and defeat your competitors. In short, marketing is a war in which a competitor is your opponent, and the buyer is a territory to be conquered" [4.5]. Consequently, in the newest marketing concept, the advertising tool turns into a weapon of war and begins an independent wingedly expressed militaristic terminology – "shooting at bastions", "Fire on headquarters!", Other jargon and turns of professional common vocabulary4.

In scientific use, advertising warfare now refers to a kind of verbal-visual rivalry of one or several brands in the advertising space in order to assert its superiority. And the meaning of the military-advertising confrontation of market players is to call the "attacking" brand and not at all a peaceful response an ambitious competitor [13]. Modern dynamics and trends in the development of global communications and PR technologies lead to the fact that EE is becoming increasingly difficult to successfully operate in its business areas without choosing a strategy that allows you to take an optimal and reliable position in the market space, while guaranteeing that all the benefits are rationally organized and calculated defense.

So, in innovative entrepreneurship, in modern business, a situation arises when the use of classic advertising communications becomes insufficient. An objective marketing need is being formed for the organization of an adversarial EE campaign. At the same time, the basis of the modern trade doctrines and concepts of promoting economic benefits is the struggle between the brands of these EEs. Of particular interest in this regard is the accumulated and interesting practice of advertising wars abroad [4.13]. But gradually, instructive and domestic experience is accumulating, where, in particular, the belligerent one is noticed, and for our case pattern, the person involved in the person of the operator Tele2 with its rather provocative content advertising billboards5.

The advertising war begins to act as an independent and self-sufficient strategy for practical application of general marketing tools, and it turns out to be aimed directly at supporting and promoting the brand in a competitive environment as on the real battlefield, without diverting to seemingly secondary considerations of economics and logistics. And such a verbal-visual duel of universally recognized brands in the advertising space has another combined goal – achieving unconditional and fixing long-term customer loyalty.

Such truly expensive, well-thought-out and planned information efforts are ultimately aimed at the final approval of real or retouching of imaginary competitive advantages. The local objectives of the advertising war are the desire to significantly break away from the nearest market rival, create their own specific and unique brand, and capture the largest segment of the target audience of consumers of economic benefits.

The difference between advertising and marketing wars lies in the fact that it concerns only aspects of advertising positioning, in its rigid variant, of an economic entity and does not concern pricing policies and pricing strategies. And, in particular, does not affect the tools of the procedure of price dumping. Today, the organizers of advertising wars are increasingly being used as a popular tool of psychological pressure on a competitor, down to psychedelic methods of influencing consumers on the economic good.

At the same time, it is extremely important for the market analyst and any official market controller (for example, Roskomnadzor – Federal Service for Supervision in the Sphere of Communications, Information Technologies and Mass Communications of the Russian Federation) to determine reliably whether this advertisement is misleading or not. It is especially important to investigate which claims are made in advertising about the properties of specific goods, works and services, which are about prices, tariffs, which are about the hedonic merits of the economic good [14], and which are about the terms of delivery or the benefits of a branded service.

Thus, in relation to the comparison of prices and tariffs, the legislation of most countries of the European Union and the Russian Federation (RF) prohibited the indication in the same advertising offer at the same time the price of the current (declared) and the price of the previous (old), as a rule, higher.

Was this practice of advertisers misleading the consumer, or was it really the case in such cases about sincerely informing those interested and wanting to know absolutely everything about the consumer? There is no answer to this question, since advertising can be really unfair, but not necessarily at the same time misleading the consumer. In connection with the adoption of new regulations in such cases, all kinds of inaccuracy, misleading the consumer can be the subject of a special trial and fall under strict law enforcement practice6.
In the 60s of the 20th century, the concept of bad faith was associated, by advocates of consumer rights, as a rule, with clients of advertising agencies (customers), and not with consumers or the public in general. Half a century later, the concept of unscrupulous advertising implies in most countries both market rivals (their guilt) and consumers or the public (the effect of their perception), regardless of how the advertising message is presented. At the same time, all actors of the market process, including the advertising industry itself, have long recognized that TV and the Internet are especially powerful sources and an effective medium of information (media) from all available.

Consequently, these sources of advertising messages must be subject to appropriate regulation and especially tight control over the content of the advertising offer as a message to an unidentified, not stratified and generally unidentified consumer of any economic benefit, including mobile services.
In recent years, the decline of the authority of most Russian television channels has led to a proportionate increase in the interests of the user of gadgets to the information capabilities of the Internet, which is still sluggishly regulated and ineptly controlled. However, against the background of the threats announced by the government structures of various tightening and in connection with the impending international sanctions against the blocking of the Russian Internet channels, the ideas of creating a sovereign, h. e. Autonomous RuNet7, where the control of Roskomnadzor, after the adoption of the relevant Federal Law on the protection of RuNet from external threats, will, of course, be absolute.

Setting the Research Tasks

Traditionally, the use of economic and mathematical methods was caused by the need for proper justification when making a rather limited timeframe of a management decision in an already functioning economic system or because of the need to obtain reliable forecast ideas about the effectiveness of projects, strategies and programs. The general scheme for implementing the strategy of sustainable development of a conditional EE in the external environment, taking into account the conditions of its operation, is shown in Figure 1.

The process of formation of the market status of a sectoral business structure is closely related to the analysis of the competitive environment in industry markets and actualizes the problems that determine the current functioning of the EE in the studied market, and to a much greater degree that information support the development of a development strategy for the market of services in its future parameters. Such well-developed strategies, as a rule, competitive in nature, are a set of marketing and production measures organized by the entrepreneurial structure itself on the principles of a flexible combination of the internal and external environments of the EE (see Fig. 1).

The performance of any entrepreneurial structure in the free and highly competitive mobile communications market in the context of globalization and the information network economy depends not so much on the available total production capacity of the structural business units, on the material, technical, technological and personnel characteristics, but on sustainable and equilibrium financial condition of units in the region. In the regions, rationality, the effectiveness of the chosen management system and ways of strategic development, economic justification and final management decisions play an exceptional role, especially in the Russian context.

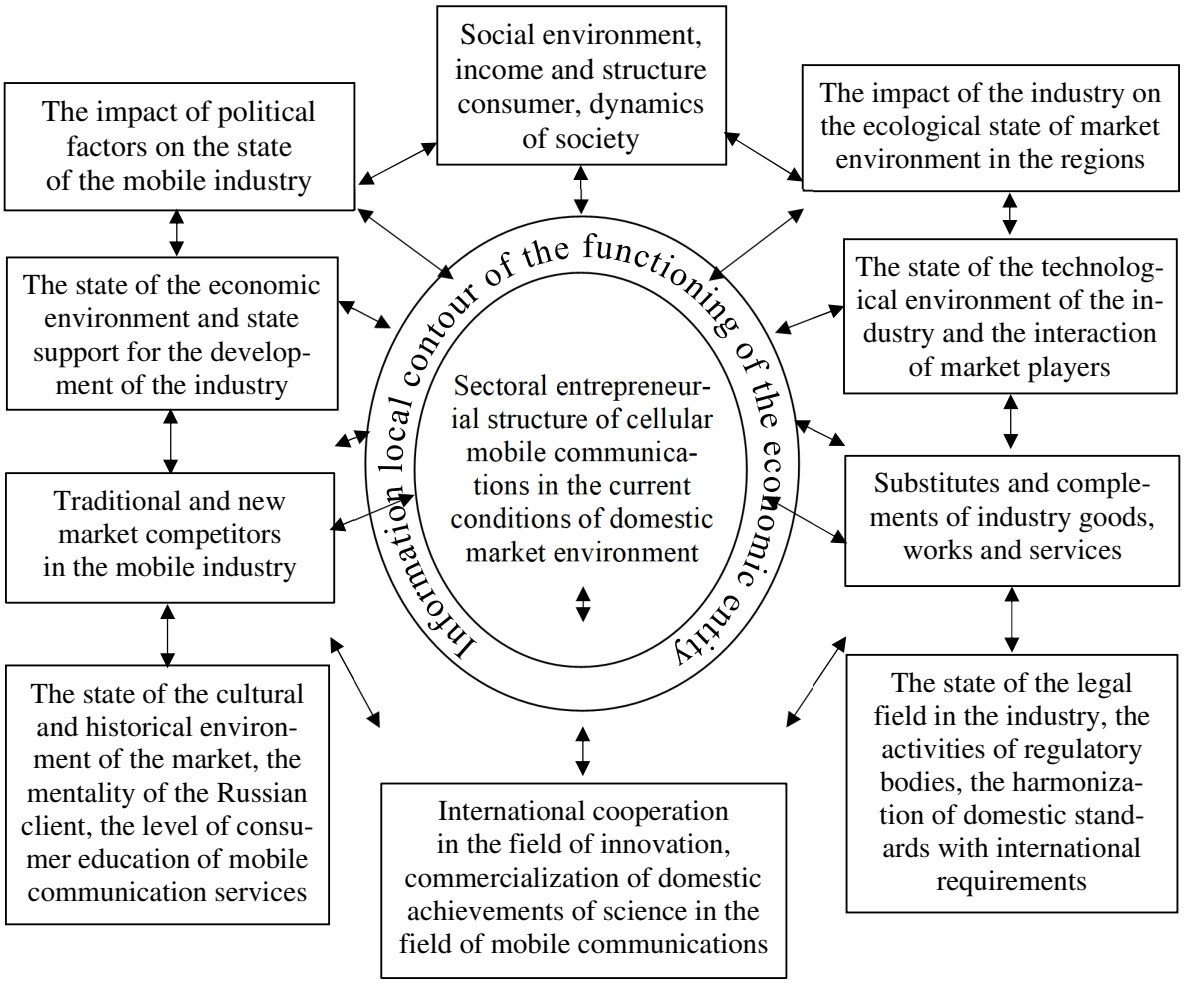

Fig. 1: The components of the environment of functioning of the economic entity, forming the mechanism of interaction of competition factors in the mobile communication market[8] (developed by the authors)

According to the dominant concept of J. Schumpeter [29], all strategies of entrepreneurial structures in commodity markets provide for solving problems of maximizing profitability levels, which turns out to be strategic goals not only in an unstable economic environment resembling the Russian situation. The prosperous financial position of the company ensures the reliability of securities on the stock market, the preservation of jobs, the retention of market share and even the strengthening of competitive positions in consumer price segments and in innovative niches.

In these cases, economic-mathematical models of different complexity and dimension are constructed, representing some analogs of behavior in the market space of the studied economic system with different variants of the estimated model parameters, as well as possible sets of specified counting variables. Successfully constructed models will serve as the basis for the adoption, with the help of a selected or

assigned performance criterion, of the so-called optimal or close to optimal, required by any hierarchical level (center) of managerial decision responsibility.

When solving many economic problems, the analyst has to deal with the problem of choosing such a management decision in the context of explicit / implicit uncertainty. Under the problem situation is understood as the uncertainty of the conditions for the fulfillment of one or another supply, sales and service, etc. operations and the uncertainty of the manifestation (actions) of individual elements of the socio-economic system, the functioning of any components or even independent mechanisms for the implementation of business processes that affect the efficiency and effectiveness of the implementation of the adopted or in assessing management decisions already taken.

For the correct formalization of tasks in such uncertain situations, many mathematical methods are used, of which a well-developed tool is, by the way, game theory, which allows one to quantify the uncertainty level of a local economic situation, to accept both the proper (within the legal field) and (according to the chosen criteria) managerial decision, which, as is commonly believed, provides for obtaining the necessary effects of any nature that form the basis of goal setting [6], but importantly, the effects of the equilibrium state of EE.

One of the popular tasks of this class is the task of a stable and equilibrium market sales, associated with the capabilities of the FODSTIS system for products, works and services through fairly powerful means of *PR* and commercial advertising. And although the organization of advertising business in the marketing schemes of entrepreneurs paid enough attention, and techniques for creating advertising messages to the potential consumer have achieved some perfection, the economic rationale for the budget of advertising efforts, their basic analytics of many EEs in some cases are inconclusive. The latter entails known financial losses in the implementation of projects for the market activity of these EEs in the fight for ratings.

We will not touch on the organizational side of the advertising business, the essence of its business processes in the market promotion of economic benefits to the final consumer, who, under the influence of the advertising message as one of the essential factors, formed the corresponding solvent consumer demand. This demand is the target consumer and presents mobile services during the purchase and sale transaction. But to substantiate the required size of costs in the composition of the cost of services of mobile operators for advertising efforts, you can refer to the analysis methods that go back to the game theory with a nonzero amount9.

Suppose that the existence of only two, but very large companies (as was originally in the domestic mobile communications industry) in the local (federation subject) or commodity market of the enlarged region (federal district), or even the All-Russian market, along with the neighboring markets (CIS countries) and further afield, the market segments sufficiently provide goods, jobs, services equivalent to an unusually advanced, fully knowledge-intensive and innovative product mix.

Naturally, both designated EEs are interested in a constant increase in the volume of their market sales. And although, according to market rules and in accordance with a customer-oriented approach to business understanding, these EEs are considered to be competitors fighting for their loyal customers, their interests in the market space are not are completely or markedly opposed, h. e. In their mobile network business, these companies are not in the ordinary sense antagonists.

Suppose that both EEs dominate in a certain commodity market by aggregate volume of their sales, which is quite typical for collaborating and affiliated companies, for example, in the sphere of trade (well-known and popular trade networks), e-commerce (even more well-known and even more popular thanks to advertising leading domestic mobile and mobile service operators operating in all segments of the telecommunications market and others) and so on. The dynamics of the shares of the main players in the mobile communications market is shown in Figure 2.

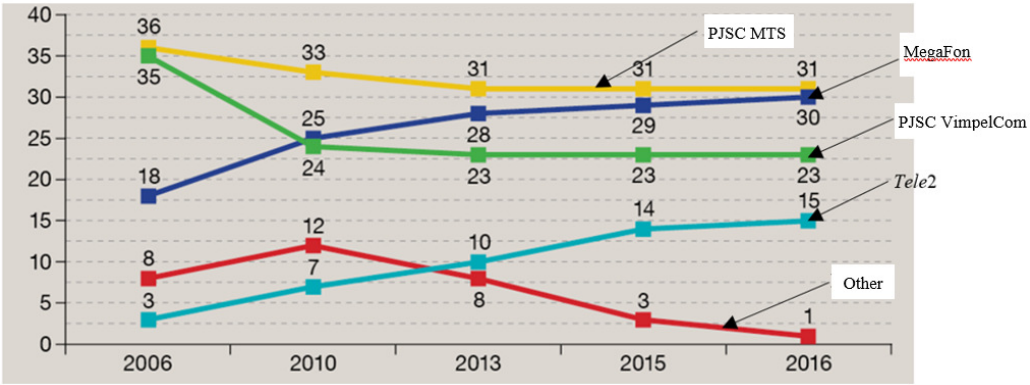

Fig. 2: Dynamics of indicators of the market share of the main Russian mobile operators by the number of subscribers for the period 2006-2016, %. Source of information: open data J'son & Partners Consulting (handling date: 11.03.2019).

A common example of such mobile operators is the "quadriga" or the "big four" of the Russian format of oligopoly companies (PJSC VimpelCom, PJSC MTS, MegaFon and *Tele*-2) that work so smoothly and synchronously that the attentive market observer has certain ideas and there are serious suspicions that the owner of these seemingly different companies is the only but very highly qualified manager-organizer with the appropriate support at the highest level and with very strong but not advertise, foreign bonds.

However, the author of this material, even at the level of his own value judgment, does not say anything like that. Nevertheless, it is extremely interesting and useful to explore such assumptions and facts in the area of market-political analytics or even to assist the units of the Federal Antimonopoly Service of the Russian Federation (*FAS RF*). The start of this initiative can put someone voluminous journalistic investigation of the mobile market in the spirit of: company "A" *VS* of company "B"?[10]

Let their total sales (*m – mutual*) coincide with the value of realized customer demand (*Demand*) in the *t-th* period – $D_m^{(t)}$. Suppose also that for each company the coefficient of effectiveness of advertising efforts is determined. This ratio is able to take into account what proportion of the commodity market belongs commensurately with the company, depending on its cost of advertising offers. Accordingly, the total sales volume for the period of related (according to the working hypothesis of a conspiracy nature) adopted for service and discussed above is made up of their *i-th* volumes $D_i^{(t)}$, $i = \overline{1,n}$.

Russian viewers, for example, are impressed by the costs of expensive television advertising by such giants as PJSC VimpelCom, PJSC MTS, MegaFon, *Tele*-2, etc. It is enough to recall such entertaining and popular advertising memes of one of the well-known companies related to the cost of traffic services in rub. per unit of time, as "Not a tariff, but Tariff", "Unlimited", "Zabugorishche" and similar auditory tenacious memes, turning into the Russian newspeak. Suffice it to recall the catchy and optimistic slogan of Beeline – "Live on the bright side!".

Brand awareness of a company is achieved, firstly, by using color gamut. So, the red color fills the advertising messages of the MTS with purple bookmarks, the lilac-green colors are assigned to the Megaphone, the traditional yellow-black accompany Beeline, the gray-blue shades of the commercials with scenario and American Hollywood film company trick tricks accompany *Tele*-2.

Secondly, the use of celebrities in commercials is also regulated and fixed in time. Recognizable showmen D. Nagiyev, D. Malikov, M. Boyarsky, M. Gorban - this is MTS. The singer I. Labutenko, the

bench mark Vlady from the "Cesta" group and the footballer A. Miranchuk, sometimes the coach S. Cherchesov is a Megaphone. A very capable and expressive A. Revva, the mythological Deadpool from "not ours" comics, etc. – this, of course, Beeline with his system of tracking advertising campaigns over time. And the second-tier actors, but outwardly representative K. Samoukov, O. Nazarov and others provide the entire gamut of aesthetic demands of the viewers of most *TV* channels from *Tele*-2.

Methods and Tools of Research

As a research technique, the author used a group of problems from game theory. For further calculations on the case under study, we introduce the following notation for two companies of mobile operators, although in the most general case there are four major market players:

$C_1^{(t)}$, $C_2^{(t)}$ – costs of advertising the first and second company in the *t-th* year;

a_1, a_2 – the effectiveness of the promotional efforts of the first and second companies are fairly stable in size in the medium term;

the ratios in the volume of sales of services are determined by the accounting balance equation $D_m^{(t)} = D_1^{(t)} + D_2^{(t)}$.

The difference in the values of the efficiency ratios of the studied companies is explained by the fact that services, such as mobile communications, etc., are not in demand among consumers. And it is obvious that in the prevailing market conditions, the volume of sales of the services of the first company will be equal in *t-th* year equal to

$$D_1^{(t)} = D_m^{(t)} \frac{a_1 C_1^{(t)}}{a_1 C_1^{(t)} + a_2 C_2^{(t)}}, \tag{1}$$

and of the second company to

$$D_2^{(t)} = D_m^{(t)} \frac{a_2 C_2^{(t)}}{a_1 C_1^{(t)} + a_2 C_2^{(t)}}. \tag{2}$$

To simplify the economic situation in the industry and similar activities of the homogeneous companies under study, we will assume an approximate equality of the costs of both companies, with the exception of the costs of forming their advertising budget. In this case, the balance sheet profit from the sale of services by the first company, taking into account the prevailing industry average standards for the formation of profit η_{Π}, will be equal in *t-th* year[11]

$$\Pi_1^{(t)} = \eta_{\Pi} D_1^{(t)} = D_m^{(t)} \frac{\eta_{\Pi} a_1 C_1^{(t)}}{a_1 C_1^{(t)} + a_2 C_2^{(t)}}. \tag{3}$$

Similarly, the gross profit from the sale of services of the second the enterprise turns out to be numerically symmetrical by its algebraic notation of the calculation formula

$$\Pi_2^{(t)} = \eta_{\Pi} D_2^{(t)} = D_m^{(t)} \frac{\eta_{\Pi} a_2 C_2^{(t)}}{a_1 C_1^{(t)} + a_2 C_2^{(t)}}. \tag{4}$$

Taking into account the cost of advertising efforts, the first company's *net inc*ome (but not the planned net profit) $\Pi_1^{(t)}{}'$ will be

$$\Pi_1^{(t)\prime} = \Pi_1^{(t)} - C_1^{(t)} = D_m^{(t)} \frac{\eta_{\Pi} a_1 C_1^{(t)}}{a_1 C_1^{(t)} + a_2 C_2^{(t)}} - C_1^{(t)}. \tag{5}$$

Similar financial performance for a second company is defined as

$$\Pi_2^{(t)}{}' = \Pi_2^{(t)} - C_2^{(t)} = D_m^{(t)} \frac{\eta_\Pi a_2 C_2^{(t)}}{a_1 C_1^{(t)} + a_2 C_2^{(t)}} - C_2^{(t)}. \quad (6)$$

Suppose, by resorting to the methods of commercial intelligence or industrial espionage, the first company was informed (that is, it turned out to be quite familiar) about the cost of advertising efforts from the second company. Although in reality, knowing the market contingency in the activities of these twin companies, one could not resort to any clever conspiracy.

However, in this case, financial analysts of the first company may look for such a value $C_1^{(t)}$ (the size of the advertising budget) at which the net profit $\Pi_1^{(t)\prime}$ will have the maximum value. For a specific search for extremal values, it is necessary to differentiate the right-hand side of expression (5) by variable $C_1^{(t)}$ and equate the resulting first partial derivative of the resulting dependence to zero

$$\frac{\partial \Pi_1{}'(C_1^{(t)}, C_2^{(t)})}{\partial C_1^{(t)}} \equiv 0; \quad (7)$$

The partial derivative of the first order in a variable $C_1^{(t)}$ forms the corresponding equation with respect to the variable $C_1^{(t)}$.

$$D_m^{(t)} \frac{\eta_\Pi a_1 a_2 C_2^{(t)}}{(a_1 C_1^{(t)} + a_2 C_2^{(t)})^2} - 1 = 0. \quad (8)$$

From where

$$D_m^{(t)} \eta_\Pi a_1 a_2 C_2^{(t)} = (a_1 C_1^{(t)} + a_2 C_2^{(t)})^2. \quad (9)$$

Similarly, the second company, in order to maximize its net profit, mirrors the amount of advertising efforts $C_2^{(t)}$, based on the already familiar ratio given in the formula from (7)

$$\frac{\partial \Pi_2{}'(C_1^{(t)}, C_2^{(t)})}{\partial C_2^{(t)}} \equiv 0. \quad (10)$$

Taking into account the completed and understandable procedure, as well as the derived expression (6), the following entry was obtained

$$D_m^{(t)} \frac{\eta_\Pi a_1 a_2 C_1^{(t)}}{(a_1 C_1^{(t)} + a_2 C_2^{(t)})^2} - 1 = 0, \quad (11)$$

either

$$D_m^{(t)} \eta_\Pi a_1 a_2 C_1^{(t)} = (a_1 C_1^{(t)} + a_2 C_2^{(t)})^2. \quad (12)$$

The right parts in expressions (9) and (12) are the same, therefore, their left parts are equal, h. e.

$$D_m^{(t)} \eta_\Pi a_1 a_2 C_2^{(t)} = D_m^{(t)} \eta_\Pi a_1 a_2 C_1^{(t)}. \quad (13)$$

Thus, the correlation of the cost of advertising efforts EEs

$$C_2^{(t)} = C_1^{(t)}. \quad (14)$$

From expressions (9) or (12) equally after simple transformations and taking into account the relation from expression (14) it follows

$$C_1^{(t)} = C_2^{(t)} = \frac{D_m^{(t)} \eta_{\Pi} a_1 a_2}{(a_1 + a_2)^2}. \quad (15)$$

Substituting the obtained values into the formula from the expression (5) for the cleared profits of the first company, we find

$$\Pi_1^{(t)\prime} = D_m^{(t)} \frac{\eta_{\Pi} a_1 C_1^{(t)}}{a_1 C_1^{(t)} + a_2 C_2^{(t)}} - C_1^{(t)} = \frac{D_m^{(t)} \eta_{\Pi} a_1 C_1^{(t)}}{C_1^{(t)}(a_1 + a_2)} - \frac{D_m^{(t)} \eta_{\Pi} a_1 a_2}{(a_1 + a_2)^2} =$$
$$= \frac{D_m^{(t)} \eta_{\Pi} a_1^2 + D_m^{(t)} \eta_{\Pi} a_1 a_2 - D_m^{(t)} \eta_{\Pi} a_1 a_2}{(a_1 + a_2)^2} = \frac{D_m^{(t)} \eta_{\Pi} a_1^2}{(a_1 + a_2)^2}. \quad (16)$$

Similarly, the purified profit (operating) of the second company from the formula of expression (6) is equal to

$$\Pi_2^{(t)\prime} = D_m^{(t)} \frac{\eta_{\Pi} a_2 C_2^{(t)}}{a_1 C_1^{(t)} + a_2 C_2^{(t)}} - C_2^{(t)} = \frac{D_m^{(t)} \eta_{\Pi} a_2 C_2^{(t)}}{C_2^{(t)}(a_1 + a_2)} - \frac{D_m^{(t)} \eta_{\Pi} a_1 a_2}{(a_1 + a_2)^2} =$$
$$= \frac{D_m^{(t)} \eta_{\Pi} a_1 a_2 + D_m^{(t)} \eta_{\Pi} a_2^2 - D_m^{(t)} \eta_{\Pi} a_1 a_2}{(a_1 + a_2)^2} = \frac{D_m^{(t)} \eta_{\Pi} a_2^2}{(a_1 + a_2)^2}. \quad (17)$$

Behavior strategies of market players { $C_1^{(t)}, C_2^{(t)}$ }, that lead to reliable, in terms of the quality of calculations, the values of the purified profit $\Pi_1^{(t)\prime}$ and $\Pi_2^{(t)\prime}$ are considered fairly stable and balanced in the sense that if the first company applies the market strategy discussed above, and the second company uses any other conditional market), then the indicator of the purified profits of the second company will necessarily decrease in proportion, and vice versa.

Mathematically, it is easy to show, using the method of incomplete induction, that for the oligopoly quartet under study ("quadrigue", "big four") in general, the net operating profit of each of the *i-th* mobile operators that operate on the corresponding product market in synchronized link mode in the corresponding *t-th* year, takes in the relevant volume range for *a very small* sample – $\langle n \rangle \in \{N\}$ – the following form

$$\Pi_i^{(t)\prime} = \frac{(\sum_{i=1}^{n} D_i^{(t)}) \times \left[(\prod_{i=1}^{n} a_i^2) - a_i^2 \right] \eta_{\Pi}}{\sum_{i=1}^{n} (a_i)^2}, \text{ при } 2 \le n \le 5. \quad (18)$$

The formula from the expression (18) can be considered quite workable and make the necessary calculations on it for the mobile communications industry, including an assessment of financial indicators and market development directions telecommunication services. The authors of the article will use the formulas from expressions (16) ÷ (18) for calculating financial analytics in the second part of the article.

Results

Analysis of market share, financial indicators of cellular operators and directions of development of the telecommunications services market in the Russia. According to the results of 2016-2018, the mobile communications market has stagnated, although, starting in 2017, companies began to take decisive steps towards changing their strategy towards digitizing their global market activities. Such a turn in the long-term strategies of mobile communication development has become forced for operators,

since in order for the business to survive as an industry, really competing companies need to think about individual strategic changes.

Digitalization of business in the activities of each market player occurs in different ways, and in this competitive struggle, each company is obliged to choose its strategies for interacting with the country's digitalization policy. So far, we note from ourselves, all the main players are in the same starting conditions, which confirms the working hypothesis of a unified strategy for the development of the sectoral mobile communications market.

And what is the strategy of market behavior will actually «winning», yet difficult to say. On the one hand, if the market telecom operators had previously been associated exclusively with voice services, now the range and the list of services they sell has expanded considerably. On the other hand, it is becoming more and more difficult for market players to earn money in this business: in a competitive struggle, the cost of services decreases, the subscriber base is already distributed between operators, subscribers use instant messengers that allow them to communicate generally free of charge.

Separate results of economic activities of the main participants of the cellular communication market for 2017 are shown in Table 1. The reduction in the market share of small mobile operators shows one of the trends of the past ten years (see the graph lines in Figure 1). Today, they collectively own only 1% of the market share, while in 2007-2010 all other EEs occupied 10-12% of the market. The current situation also requires separate professional comments with the identification of special features.

Table 1: Indicators of financial and economic activities of the "big four" for 2017 *

Number in order	Name of indicator	PJSC MTS	MegaFon	PJSC Vimpel Com	*Tele*-2
1	2	3	4	5	6
1	Revenue, billion rubles	442,9	321,80	327,5	123,0
2	Net profit, RUB billion	56,0	20,52	7,6	-5,5
3	The change in revenue compared to with the previous year, %	1,70	1,80	19,80	16,20
4	Change in net profit / loss compared with the previous year, %	15,60	-29,00	-63,20	64,60

**Calculated by the author according to the Annual Report of the studied companies.*

The fight for the first position in the ranking unfolds between MTS and MegaFon. Some analysts believe that a large proportion belongs to MegaFon. Others insist that this operator is inferior to MTS, which is also developing steadily. Whichever analyst is right, the gap between competitors is insignificant – about 1%. Strengthening the position of MTS and MegaFon had a negative impact on the Beeline brand, which since 2006 has lost 12% of the market, and at the beginning of 2019 the share of the latter dropped to 23%. *Tele*2, which entered the market in 2003, has been demonstrating good momentum for several years in a row. Despite a shorter history than its competitors, by 2019 its share reached 15%, and further growth to 20% would not surprise.

Literature Review

Theoretical refinements to the working hypothesis of the study. Strategic management accounting is a relatively new area of accounting and analysis, so the boundaries of this area are not yet strictly defined and are quite vague. There are so far no restrictive prohibitions and unified regulations indicating what and how should be developed. And the available scientific literature in this area is heterogeneous, incomparable and contradictory. The definitions of the categories and terminology of the conceptual academic apparatus are verbose and not concrete.

For example, the term strategy in this article is not accidental at all and is not a tribute to frivolous fashion for the application of various innovative technologies, in particular, the use of the concept of so-called strategizing [27] everywhere, always and without much reason. But, nevertheless, it should be distinguished in relation to the topic of the stated research of the concept of competitive strategy and the strategic mission of the organization (as the strategy development).

So, a competitive strategy describes how an economic entity (EE), in the form of a company, is going to compete in its industry, and how it will try to gain a competitive advantage. The strategic mission of EE can be presented in conjunction with the continuous so-called spatially-temporal continuum (from lat. continuum – continuous, solid) – from the first to the last stages of the life cycle of the actual market product in time, including the creation, implementation, active use and, finally, its withdrawal from the market space [3].

In the first part of the article, the basic multi-agent variants of the market environment in which each specific agent, i.e. EE is forced to take into account the actions of other agents and to establish for themselves how they will affect his own well-being. The presence of various competitive variants of the environment in which the goals of agents are conflicting, leads to the emergence of a family of special search problems in real opposition, often called mathematical games.

In the mathematical theory of games as with a zero sum with an appeal to the Maximin|Minimax method (the Minimax von Neumann principle, 1928), and with full information, which is one of the branches of applied economics, any multi-agent versions of the functional environment are considered games, provided that the influence of each agent on others is significant, regardless of whether the agents are cooperative or competitive structures. However, it is better to consider variants of a specific market environment with a sufficiently large number of agents as certain economies, and not as purely mathematical games [15.240].

Applied economic aspects of game theory are widely used in the analysis of serious business situations related to decision-making, for example, in cases of insolvency and bankruptcy of electric power plants, when organizing a variety of auctions, in particular, on the distribution of the spectrum of radio frequencies of mobile operators, in projects for the development of innovative industrial products and in setting prices for them, as well as in developing national defense strategies, etc.

Returning to the object of our study, the behavior of the four main companies in the industry of means and operators of mobile communications (MTS, MegaFon, Beeline and *Tele-2*) in several recent economic episodes, such as a refusal to work in Crimea after 2014; almost simultaneous, for the same period of time refusal to withdraw roaming, surprisingly synchronized and equivalently funded, massive advertising campaign, etc., prompted the author to express a certain working hypothesis. Do not these companies make up a certain coalition managed from a single peculiar think tank of global strategic initiatives?

But, let's say, Mobile TeleSystems PJSC (MTS), which is a leading telecommunications operator in Russia and the CIS countries, has already been operating in Crimea since the end of June 2019, i.e. The operator's management is thinking about the development tactics of their company. But Megafon, Beeline and *Tele-2*[12] have not yet directly connected to network traffic, although by law they are

obliged to turn around and work in new federal subjects from June. Possibly, such an order from the administrative authorities does not quite fit and is coordinated in the development strategies of the other three operators.

In proposing and substantiating his working hypothesis, and then in constructing an analytical model of cost-effectiveness of advertising campaigns for mobile operators (see the report of the author at the 2019 Conference [28]), the author adhered to generally accepted canonical definitions from the field of game theory and probability theory [16, 17].

The subject / object, to which possible actions and interests are attributed, is called *the player*. The set of players will be denoted by n, (in our case $n = 4$), while the exhaustive set is N, $n \in N$. The subset $K \subset n$, $K \neq \varnothing$, will be called the so-called *coalition*[13]. A coalition can consist of one player and all n. Each K-coalition has a certain set of actions X_K, which we will call *the set of strategies* of K-coalition, and the elements of this set $x^K \subset X_K$ – strategies of K-coalition.
The global interests of the emerging coalition $K \subset X_K \neq \varnothing$ are set in the form of a transitive preference on the set of all outcomes of the decisions made S. The market preferences that arose for a player are usually denoted by a special mathematical sign – ⊢. More details on the strategies of socio-economic behavior used in best practices can be found in [18, 19]. The emerging individual preferences of specific players, essentially competing needs, can be represented by individual utility functions f_i, $i = \overline{1,n}$ on the set $\{S\}$, which are commonly called *payoff functions*, or simply winnings of a particular player. But not all *multi-agent* variants of the market environment include cooperating industry players.

On the one hand, players with conflicting utility functions are in a state of competition with each other. This actually means that any player in a competitive environment must, firstly, recognize the presence of other active players, secondly, predict some of the other player's possible plans, thirdly, determine how another player's plans will affect his own plans, and fourthly, to establish the best way of their behavior, taking into account competently identified and measured external and internal influences. Therefore, in conditions of real market competition, as well as in conditions of bona fide cooperation, a transparent statistical modeling procedure is needed with a description of the true plans of another player.

On the other hand, in a truly civilized competitive environment, player actions cannot be included in the joint plan and affect its periodic adjustment. In this sense, if in a multi-agent market environment of a similar product there are other active players of similar weight categories with whom you have to cooperate, compete or coordinate their market actions, then each player prepares an independent, not always overlapping plan, but necessarily reflecting the vision of their own household activity in the foreseeable or forecast period [11].

For the presentation and formation of considerations taking into account preferences, it is advisable to use the achievements of *the utility theory*, which indicates that each prevailing economic state of the market environment has a certain degree of usefulness for the player and that the player prefers an updated state with a higher utility for himself. Preferences, being expressed in terms of countable characteristics of utility, can be combined with probabilities given in the general theory of rational decisions or in best practices for making informed management decisions [20, 21].

There is experience in successfully combining the tools of utility theory with probability theory and mathematical statistics [15.778] in order to create such a market agent that is able to make rational decisions, thereby maximizing the utility function, taking into account what the agent is convinced of and aims for. How can one not recall the correct and pertinent observation of Jean-Baptiste Say (1767-1832): "Utility tells objects value, which is a measure of utility" [22.124]. Such an agent can make decisions with a claim to indisputable outcomes in situations where, due to information uncertainty and the existence of conflicting goals, the so-called *the logical agent* remains unable to successfully solve anything at all.

For example, an important risk factor of economic and legal nature – the so-called legal risks (as opposed to market risks) – may become tax legislation in force in the service markets in which agents operate. It is known that new domestic regulations are notable for their unpredictability and lead to significant uncertainty, which complicates the formation / processes and/or policies / planning of both financial and tax nature.

This, in turn, prevents the obtaining of acceptable results on the validity and reliability of decision-making regarding business development. An object of certain concern may also be the unpredictable interpretation by tax authorities of such fresh normative acts, for example, in relation to transfer pricing, controlled foreign companies, subsidiaries with uncontrolled participation interests, tax residency, and more.

Discussion

Market players in the domestic mobile communications industry. VimpelCom, the first domestic mobile operator, where Alfa Group was a controlling auctioneer for a long time (its share reached 44% at the time), had an undeniable advantage in extremely promising non fixed-line telephony markets[14]. As a rule, there were no problems with attracting equity capital back then. And as the author of the article presents, the auctioneers of large-scale projects are a heterogeneous set of investors, each of which is unlikely to fully understand, and most importantly, in detail, the concept of project financing, which is now very popular in the regulation of economic processes.

There are always different groups of investors who evaluate the real prospects of the recipient company differently depending on the composition and the degree of influence of various auctioneers. If you project what has been said on any market organization, then the increase in the administrative and economic influence of one auctioneer or the existing greater degree of control of another auctioneer can both attract various kinds of investors to finance and implement the project, and scare them equally.

When it comes to the development prospects of the company, it should be understood what kind of investors the EE is going to attract, and what strategy is being laid in the development of this EE. It should be borne in mind that both well-known basic strategies are absolutely viable. As for the structure of blocks of shares and other securities, the generally accepted, fairly objective judgment is this: it is always easier for the management of EE to work when there are no large shareholders, and EE is 100% a public joint-stock company (PJSC) with a dispersed investor base.

In such conditions, much greater strategic freedom of action is provided for EE. In other words, the choice of certain steps is less limited by some competitive features of the market good or by direct barriers that are associated with the presence of heavyweight shareholders who have their own interests that conflict or at least do not coincide[15] with the interests of other participants.

There is a certain opinion that with the beginning of the active introduction of new generation networks, the mobile communications market will return to a situation of fierce competition for subscribers between leading operators. But it’s not worth talking about any toughening of the competition – only its focus is changing. Competition is not at the expense of each other in a quartet format, i.e. in the battle for new subscribers – the competition of the participants takes place parallel to each other for their loyal subscriber base. And, as noted above (in this report), the competition does not come at the expense of a sophisticated mechanism of pricing and tariffs, but towards a significant increase in the quality, creativity of services, and the innovativeness of the service offered, which generally and friendly underpins the final quality of economic benefits for consumers.

At the same time, the individual breakthroughs ahead of someone from the quartet agreed upon, according to the author's judgment, form a gap in time factor of only three to five months, which disappears rather quickly. All operators have built approximately the same (technologically and in

terms of equipment) networks, offer similar sets of services in the product lines. And compared with foreign prices, low prices for one minute of the service and suspiciously close to each other tariffs in terms of their level, firstly, complicate their further decline for purely economic reasons. Secondly, prices and tariffs cannot fall out of the restrictive framework of special conciliation protocols on pricing, which, according to the author, the quartet participants adhere to. Analysts from the Federal Antimonopoly Service of the Russian Federation usually call these protocols exactly the cartel price conspiracy.

Analysis of the financial activity of mobile operators

In the process of operating the base stations of mobile operators, it is necessary to monitor the effectiveness of the facilities and units located, evaluating all the gross, technical, economic, financial and commercial indicators of the organization's business activity. To control the level of traffic, income and activity of subscribers, it is also necessary to take into account the number of subscribers, in particular, have the information necessary to study the level of operator presence in a particular administrative-territorial zone and / or geographical location. The coverage area of cellular communications by all market agents of the territory of the Russian Federation is shown in Figure 3, and the main indicators of the companies from the Big Four are shown in Table 2.

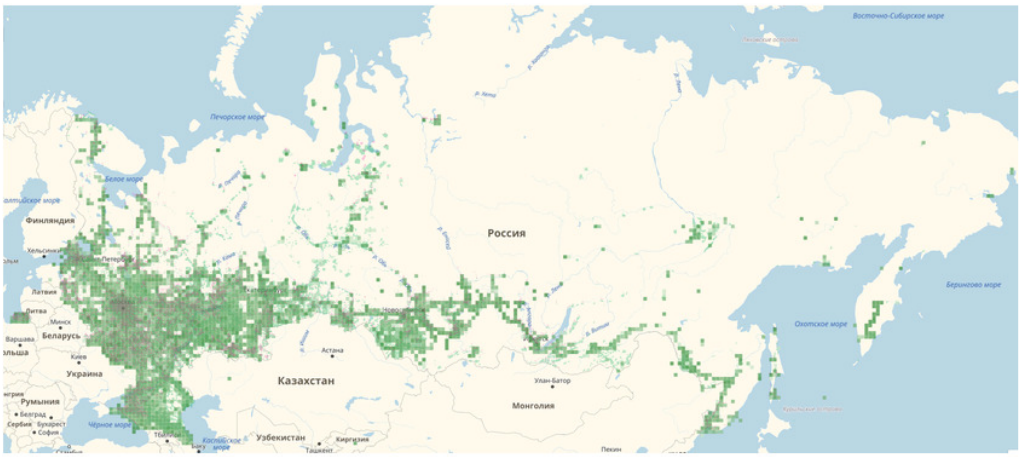

Fig. 3. 3G coverage area in the Russian Federation as of February 2019. All operators. Source of data [24].

According to analysts at *QBF*, a management investment company, the Russian telecommunications market has been static since the beginning of 2014[16]. The annual increase in the number of subscribers tends to zero, as the market for mobile services is oversaturated. For 2016, the positive dynamics of the IFRS net profit index $\Im_{\Pi_{N_{110}}}$ was recorded only for MTS[17]. As a rule, the national currency rate is an important factor taken into account when conducting a financial analysis, since a large share of the operating expenses of mobile operators is historically tied to the dollar exchange rate.

In addition, the weakening, in turn, of the Russian ruble reduces revenues from foreign roaming against the background of a noticeable drop in foreign tourist flow, as well as other categories of *VAS* revenue (*VAS – Value Added Services*)[18]. In combination with a decrease in real wages, disposable incomes of the population and a weakening of the Russian ruble by the moment in question, the mobile communications companies under review showed a record-breaking synchronized drop in margins (*ROS – Return On Sales*, in percent as the ratio of the difference between the wholesale price and cost of services to this very price).

In the conditions of a long and significant decrease in disposable income, domestic households showed a tendency not earlier characteristic for consumers to save on communication services. According to the Federal State Statistics Service, from 2013 to 2017, the share of relevant expenses decreased from 2.0% to 3.3%. At the same time, users switched to cheaper tariffs and refused additional *SIM*-cards. According to the results of 2018, as shown in the Table 2, MTS gross revenue fell nearly 6%, but net profit increased 34.62%[19]. The operator himself explains that the development of roaming in many respects influenced this situation[20]. According to analysts, about half of foreign roamers use the services of MTS, so the behavior of the "guest" network affects MTS more than other market operators.

In addition to the relatively good dynamics of other financial indicators, last year the operator recorded the most noticeable increase in customers, despite the fact that in the "quadriga" it has the largest consolidated subscriber base, exceeding 102 million subscribers. At the same time, Beeline PJSC, on the contrary, showed negative dynamics, having lost about 1 million customers over the analyzed period.

According to the results of 2018, PJSC *Tele-2* shows almost three-fold growth in gross revenue compared to the previous year, which is largely due to an increase in the monthly *ARPU* metric – *Average Revenue Per User* – average income from an active subscriber, which found its way reflection in the table 2, although such tariffs were provided in advance. Naturally, this company, together with Rostelecom, is developing

Table 2: Indicators of financial and economic activities of the "big four" according to the results of 2018*

Number in order	Name indicator	MTS	Mega-phone	VimpelCom-Communications (Beeline)	*Tele-2*
1	**2**	**3**	**4**	**5**	**6**
1	Gross revenue, RUB mln	480 293	335 541	349 741**	143 200
2	Change in gross revenue compared with the previous year, %	0,084	-0,101	2,437	16,378
3	Gross profit, million rubles	199 212	169 475	41 098	×
4	Change in gross profit, %	0,029	-0,104	-10,160	×
5	Operating profit, RUB mln	116 006	58 787	20 550	×
6	Change in operating profit, %	0,200	-0,024	116,407	×
7	EBIT, млн руб.	80 961	31 922	9 351	43 700
8	EBIT change, %	0,112	0,950	13,995	43,2
9	Net profit (loss) after tax Π_N, thousand rubles	9 574 000	20 603 000	2 116 415	2 342 000
10	Change in net profit (loss) after tax – $\Im_{\Pi_{N_{110}}}$, %	-0,829	3,527	-84,729	75,64
11	Costs for promotion, advertising, incl. media purchases, billion rubles	15,11	17,92	13,67	8,39***
12	Number of users (consolidated subscriber base), mln	102,3	75,4	58,16	42,26
13	The growth rate of the subscriber base compared to the previous year, %	-2,13	-0,22	-0,25	29,31
14	Operator Market Share, %	29,77	28,34	21,14	19,91

Notes:

** It is calculated by the author according to the Annual Report of the studied companies for the corresponding period (https://www.finanz.ru/balans/megafon, https://www.finanz.ru/balans/mobile_tele-systems_adrs, etc. by operators);*
*** Consolidated revenue according to the audit of PricewaterhouseCoopers Audit JSC in 2019;*
**** Together with the state holding Rostelecom;*
× – So far, according to the author, the reporting information for 2018 is not convincing.

several promising business areas at once. And if through the state holding network in 2018, 90% long-distance and 80% of international connections of users of *Tele-2*, then Rostelecom itself operates on the operator's networks as a virtual operator (*MVNO*). For example, in Moscow and St. Petersburg, *Tele-2* under the *Sky Link* trademark provides mobile services in IMT-VC-450 and LTE-450 standard [26]. An effective outcome of such cooperation was the inclusion of 1.19 million new subscribers by the beginning of 2019.

Formally, in an updated format, according to the author of the article, such a carrier duo of cellular communications is a strong and serious market competitor, capable of crowding out other members of the Quadriga in the coming years. The impressive dynamics of gross revenues, which almost completely turned into *EBITDA* and, together with the "dried up" characteristic of *CAPEX* [21], gave a forecasted "zero" in the operating cash flow, which makes it possible to objectively and professionally evaluate professional competencies financial and economic block of the company.

The restrictions on decryption of the financial statements of *Tele-2* do not allow for a more detailed analysis, however, it is obvious that the accumulated long-term debt decreased in the reporting year by about 22 billion rubles. It was redistributed along other lines of the balance sheet, which lowered the critical ratio of debt to *EBITDA* to an acceptable level. In other words, the financial condition of the operator was somewhat more stable than it was imagined two years earlier.

Since mid-2018, it can be cautiously noted that the domestic mobile communications market has become a full-fledged multi-agent market of four federal players in structure resembling an oligopoly (see the sector diagram in Figure 4), but in a spirit that claims to be a cartel with signs of cooperative behavior. Although the launch of *Tele-2* at the Moscow region, which is key for Russian operators, negatively affected the quality of market pricing schemes[22].

Over the past year, MegaFon PJSC lost about 1/3 of its retained earnings and became the leader in reducing this indicator, which is directly related to the increase in operator expenses due to stagnation of gross revenue. Nevertheless, some market analysts believe that such a low economic result was affected by the negative dynamics of the value of the operator's shares in the stock market. So, in order to support his quotes, he began to pay tangible, long-promised and long-awaited dividends. Directly, the representatives of the operator company justify their threatening drop in gross revenue by not completely convincing their dependence on the influx of migrants, which has significantly decreased, according to the Federal State Statistics Service, to the analyzed period (2018-2019).

Study limitations

Analysis of pricing policies, tariffs and methods competition of mobile operators. The standard strategy for the behavior of Russian operators in the cellular market in their competition over the past three years, practically until 2017, was a steady reduction in prices / tariffs and the offer of unlimited packages, as well as the offer of the so-called *converged services*. However, market specialists draw attention to the fact that schemes for a longer price reduction in the long term can also cause noticeable negative consequences in the form of a decrease in gross revenue, which was already observed in 2018. It seems that in the future, the most rational for the economic activities of operators will be the introduction of such a model of pricing and tariffs, when the unit of tariffing will be the unit amount of transmitted data, and not the time interval, say, the minute of voice communication, during which the signal will be served by the operator.

It turns out that convergent company offers, combining fixed (wired) and mobile services, are still a popular technique for maintaining revenue and retaining customers. In particular, it is possible to monetize this convergence due to additional paid accounting services in the *VAS* system. So, for example, Beeline collaborates with *Alfastrakhovanie*, offering subscribers, complete with the Internet, a service to protect their apartments from natural and other disasters. At the expense of lower prices, the MTS operator filled the retail network with data-generating devices, which are more cost-effective for the operator than push-button telephones.

And the participants of the quartet of operators adopted a tacit agreement on "reconciliation", deciding to abandon the dumping policy and switch to holding their subscribers. Market analysts immediately, but cautiously enough, characterized like an agreement the terms "price conspiracy", "price cartel" and other soft formulations. Attempts at non-market pricing are not uncommon everywhere. Thus, the Accounts Chamber of the Russian Federation in its operational report on the implementation of the federal budget for 2017 notes that mobile communication services are rising at an alarming rate, and the growth rate of prices and tariffs exceeds the corresponding average dynamics in other sectors of the national economy[23].

In particular, the supervisor indicates that among the types of services observed, communication rose in price in the first half of the year by 2.4%, which is significantly higher than the average cost of services, which amounted to 1.3%. A year earlier, the chain tariff index for communication services grew by 2.1%. Thus, the Accounts Chamber has included the communications sector in the group of the most dynamically growing sectors of the services sector, which includes medical services + 2.3%, pre-school education + 3.3%, passenger transport + 4.9% and some other types of consumer services. Moreover, the noted price gains exceed the corresponding level of inflationary expectations for the same period throughout the price range.

After a record drop in mobile revenue and margin contraction in 2016, market players began to almost simultaneously change their pricing strategy according to the marketing principle, known for its paradoxical nature, *more services, but at a higher price*, including providing them at archive rates. The first stage was the abolition of unlimited *data*-tariffs in early 2017, the second was the increase in prices for become limited *VAS*. The actions of the operators coincided with a local recovery of real wages and led to a noticeable acceleration in the growth rate of mobile revenue in the Russian Federation, as well as the expected improvement in the quality of margins. Nevertheless, these actions have interested specialists from the FAS bodies, and they may have a rather short effect as a result, in particular, due to the small number of conditionally independent players on the mobile communications market. In fact, the oligopoly model of market competition "quadriga" confidently steps towards monopolistic competition.

The authors of the article do not have reliable information about market shares and the main financial indicators of mobile operators for 2018, so the calculations for the proposed model will be limited to economic results until 2018. However, at the beginning of 2019, the mobile cellular market in Russia gained a stable configuration in terms of the number of subscribers and is now represented by four named quite equal players. They own more than 99% of the entire market (see the sector diagram in Figure 4), but none of the operators violates the antitrust laws. The largest market share was won by MTS. Despite the decrease in the number of subscribers by 2.13%, the operator was once again able to maintain a leading position. According to the results of the analyzed year, the share of MTS reached almost 30% of consumers, which amounted to 78.3 million subscribers.

The second position is occupied by MegaFon, which suffered less loss in the number of subscribers. Their number decreased by only 0.22%, however, this fact did not take MegaFon to the leading position, and the operator's share slightly exceeded 28.0%. The subscriber base of this provider was equal to 75.4 million people. Following MegaFon with an indicator of 21.14% comes VimpelCom (the Beeline market brand). This operator also suffered losses in the customer base due to a decrease in the number of subscribers by 0.25%, and it amounted to 58.16 million people. The last place in the quadriga so far belongs to the Tele-2 operator with a market share of about 20%.

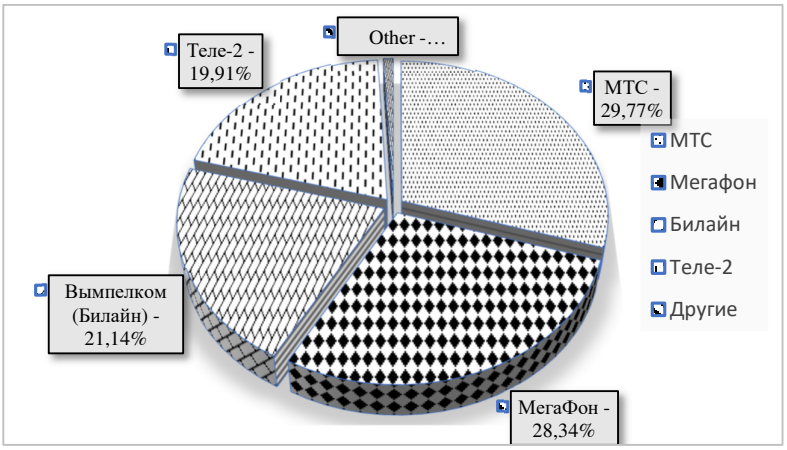

Fig. 4: Sector chart of the market shares of Russian mobile operators of the number of subscribers as of the end of 2018 in the territory of the Russian Federation as a whole. Data Source: J`'son & Partners Consulting

The tasks of the largest mobile operators analyzed are not limited to the provision of cellular services. Their current innovation is already aimed at optimizing the business processes of various industries and the formation of *a smart* digital infrastructure. Technical features of the functioning of mobile networks existing innovative, as well as future technological generations, and specific aspects of the marketing work of mobile operators are described in detail in [26].

Prospective directions for the development of the cellular communications market

Almost everyone uses mobile gadgets and their services today, and, in connection with this circumstance, the possibilities of expanding the client base due to traditional services, which are becoming less popular, are essentially minimal. The launch of high-speed 5G standards, most likely, will not significantly change the situation. The best solution for mobile operators may be to expand the boundaries of the industry, for example, by offering to a market consumer media services in various formats of television, online music and the development of mobile commerce.

And here the video, as the most popular content in the near future, is recognized as one of the drivers for the development of the telecommunications services market. Firstly, the volume of these video media increases the average revenue per ARPU user. Secondly, as a widely demanded service, its provision affects the loyalty of subscribers. In addition, there are mainstream IT sectors that can open up new financial opportunities for operators and increase industry competitiveness. These include well-known projects in the field of M2M (Machine-to-Machine – literally in Russification – machine-to-machine interaction), BigData-based solutions, cloud services, the Internet of things, etc. So, "smart" cars, "smart" houses and cities need network, as well as services through which such things will communicate. According to MegaFon managers, in 2017 the number of M2M devices increased 2.2 times, and by 2020 38 million such devices are expected to appear.

Despite some partial loss of subscribers, the studied mobile operators demonstrate an increase in gross revenue, while the main revenues come from the sale of mobile services. The increase in revenues from the sale of mobile services is determined by the action of the following factors: refusal of operators from price competition schemes; avoiding unlimited tariffs; income from additional services provided to corporate clients.
However, for the purposes of statistical comparability of indicators, it is advisable to compare companies in the mobile communications sector at the level of the Russian business segment, a key source of gross revenue. According to VEON24, in the last year of the retrospective period, the entire

relevant segment generated slightly less than 50% of operating income. However, Megafon this share is 98.6% of revenue, and MTS – 93.0%.

Conclusion

Advertising activity of market players. Considering the specifics of the business of the mobile operator companies, in particular, the fact that almost every fourth Russian is a client of each company from quadriga, an advertising message for them is one of the key determinants of the promotion (promotion) of services. At the same time, with the improvement of the market and technologies, the range of services has significantly expanded and acquired a package nature. The number of mobile services today is impressive, their structure is diverse, the differentiation of prices and tariffs is noticeable even for individual operators by market niches, segments and consumer sectors.

The above distinguishes the specific market of consumers of mobile services from others and, of course, increases the advertising activity of players, forcing them to choose the optimal set of media channels for themselves to communicate with the consumer. In the Russian advertising market, and the total advertising costs of the largest mobile communication operators are measured in many billions, the Quadriga participants for a long period of time invariably occupy a leading place in the tops of the most advertised categories of goods, works and services. These advertisers determine the behavior of the category as a whole.

The total expenses of mobile communication companies on advertising activity are unevenly distributed across various media and advertising media. There is still an increase in the share and volume of television advertising purchases and a commensurate decrease in purchases from other media, more radio and the press, and less outdoor advertising. A special object of research is advertising efforts on the Internet. The advertising activity of the remaining players, comprising 0.84% (see Fig. 4), which are mainly represented by regional mobile operators, is extremely small compared to the listed companies and in most cases is inconstant.

Due to the fact that there is actually high competition in the Russian market of mobile services in conditions of its proximity to saturation, it can be assumed that the costs of direct advertising are unlikely to be seriously reduced. Most likely, in this case we need to talk about the dependence of sales of services on advertising costs. Preliminary results of statistical analysis indicate that the relationships between these indicators in the studied operators are in a measurably narrow confidence interval. The only exceptions are market neophytes, who in the current situation need not only serious financial investments to overcome the market entry barrier, but also much more significant investments in connection with the public and marketing efforts.

Specific calculations based on the developed analytical model of the net profit of the quadriga of mobile operators [28], as well as a quantitative assessment of the level of competition in the telecommunications market using O. Herfinadal – A. Hirschman[25] species concentration $\Im_{c}^{(HH)}$ and tension $\Im_{ten}^{(HH)}$ indices, index of R. Linda $\Im_{d}^{(Lin)}$, index of A. Salai $\Im_{d}^{(A)}$, measurements of the market capacity of these services and critical mass the author will spend upon receipt of updated reliable statistics for 2019.

In continuation of this study the model calculations from expression (18) will be given. After that analytical calculations will follow with a more detailed discussion of how mobile cellular operators plan to hold their positions in the market, improve financial performance and attract new customers. However, the recruitment of new customers is hampered by the fact that Russian consumers find themselves in extremely difficult economic conditions, much more complex than the mobile communications industry itself.

Page links

[1] Order of the Government of the Russian Federation of 28.07.2017 No. 1632-p /http://static.government.ru/ media / files / 9gFM4FHj 4PsB79I5v7yLVuPgu4bvR7M0.pdf. (the date of circulation: 02/09/2019).
[2] Generations of cellular communication are replaced every 10 years with a significant increase in data transfer speed. The fifth generation of 5G mobile networks (fifth generation) promises to be particularly breakthrough, since the speed of transmissions is 40 times higher than existing wireless networks, and the speed record was 15 Gbit per second. Megaphone, MTS, Beeline and Tele2 are engaged in the 5G standard in Russia. Source of information: https://rb.ru/ longread/5g-in-russia/ (appeal date: January 15, 2019).
[3] https://forum-truda.expoforum.ru/delovaya-programma?date=28.02.19&eventId=5c63c5c5ec5e3e55205f0df1. (the date of circulation 01.03.2019).
[4] Not to be confused with the well-known slogans of Russian advertising on the brands of cellular operators: “People are talking”, MTS; “The future depends on you”, Megaphone; "Just cheaper", Tele2; "Prices are just o*uet", Euroset; "Live communication", Svyaznoy; "More opportunities to talk about the important", Rostelecom, etc.
[5] https://pikabu.ru/story/_2665200. (the date of circulation: 07.03.2019).
[6] The profile committee of the Council of the Federation on constitutional legislation and state construction recommended for approval by the Chamber a number of laws, including those aimed at combating the dissemination of false information. The first package of the two laws prescribes responsibility for the dissemination of inaccurate data, which created the threat of harm to the life or health of citizens, a massive violation of public order. According to the law on "fake news", the prosecutor's office may apply to *Roskomnadzor* if information found to be unreliable in the online media. 05/13/2019 The Federation Council approved the draft law on blocking "fake" news adopted by the State Duma of the *RF*.
[7] https://www.rbc.ru/technology_and_media/15/02/2019/5c666af39a79478787a38cd3. (the date of circulation: February 18, 2019).
[8] It provides for the full activity of all established functions of the market – regulating, stimulating, distributing, informational, intermediary, sanitizing [3].
[9] A game with a non-zero amount (*Nonzero sum games*) is a mathematical class of games in which not necessarily winning one player implies losing the other, as is observed in zero-sum games. In such a game, market agents have the ability to communicate to each other about their intentions, and in some cases even coordinate their market actions. In this case, the most sophisticated ways of exchanging information can be used – from fake commercial "threats" to primitive psychological bluff. It is mathematically proved that the game of n people with a nonzero amount can always be converted into a game of "n+1" people with a zero amount by adding a so-called. "Fake player". A finite non-zero-sum game is also called *a bi-matrix game* in the literature, which has obvious signs of searching for equilibrium states [10].
[10] *VS* – abbr. from lat. *Versus*, meaning – *against*.
[11] EBITDA (an abbreviation of Earnings before interest, taxes, depreciation and amortization) – an analytical indicator equal to the amount of profit before deducting expenses for interest payments, taxes and accrued depreciation, taking into account the impairment of assets of all kinds. The EBITDA indicator demonstrates the potential of an EE to make a real profit, which allows it to cover its expenses [9]. As a relative indicator of EBITDA to the total revenue of TR (Total Revenue), the share in% reflects the market efficiency of the analyzed object.
[12] Serious changes are expected in the independent status of the further existence of *Tele-2*, with which the state-owned company Rostelecom (today owns 45% of the operator’s shares) entered into a transaction (the parameters of which were not disclosed) on a consolidation basis of 100%, which will allow, according to President of the state holding M. Oseevsky, to achieve total gross revenue of half trillion rubles. Preliminary professional appraisers determined the market, fairly fair value of the operator at 240 billion rubles, which is equivalent to 5.5 annual *EBITDA*, and the purchase of the remaining stake in the upcoming Rostelecom transaction, which thereby returns to the Russian cellular

market after August 2014 communications are likely to be paid by quasi-treasury shares and other securities.

[13] The sign ∅ – means a set that does not contain a single element, that is, the so-called empty set is considered.

[14] PJSC VimpelCom was founded on 08/15/1992 by Russian radio engineer D. Zimin and American businessman E.O. Fabela II. Since September 1993, under the Beeline brand, it has been providing cellular services, becoming the first Russian mobile telephony company. Then it became the first company in the Russian Federation to place shares on the New York Stock Exchange back in November 1996.

[15] The author distinguishes between the terms auctioneer and shareholder. The first is a potential buyer / seller of securities, a person conducting an auction, a bidder – a public sale of assets [23]. The second is an already held holder of securities entitled to dividends.

[16] http://qbfam.ru/analytics/reviews/ (accessed: 07/21/2019).

[17] Net profit (net loss) - the final part of the organization's income, which remains after all deductions for taxes, salary costs, equipment, rent and other expenses.

[18] The *VAS* indicator, that is, additional types of services that bring companies revenues, is a technical and economic indicator common in the telecommunications industry that takes into account the volume of allowed and registered services provided not by the network core, but by the so-called supporting platforms.

[19] Gross revenue is the total amount of cash received by the company from the sale of products, services, works for a certain period of time; depends on: *APPM* (from the English – *Average Price Per Minute*) - the average cost per minute of a subscriber's conversation on a dedicated base station and *ARPU*. *TR* – *Total Revenue* – revenue received from subscribers and the provision of other mobile services.

[20] https://bcs-express.ru/novosti-i-analitika/mts-zaplatit-shtraf-850-mln-za-deiatel-nost-v-uzbekistane (Date of appeal: 11/26/1019).

[21] *CAPEX* (*capital expenditure*) – expenses of a capital organization for the purchase of fixed assets (fixed assets, non-current tangible assets) and the costs of their renovation.

[22] According to prof. V.P. Odinets, the main shareholder of Tele2 is a certain Swedish businessman who tested in Sweden in 2017 the strategy and tactics of conquering the mobile communications market [25].

[23] http://www.tadviser.ru/ (Date of appeal: 07.12.2019).

[24] *VEON* – financial reports, annual reports, presentations (LLC "*VEON*": accounting reports and financial analysis, IFRS, RAS) / https://smart-lab.ru/q/VIP/f/l/ (date of treatment: 08.07.2019).

[25] The index is named after economists Orris Herfinadal and Albert Hirschman. Into the official analytical circulation introduced in 1982 in the United States.

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Transition Towards A Circular Economy in Romania

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Abstract

The authors start from the objectives of the 2020-2030 National Strategy for Sustainable Development and try to identify the public policies by which the transition towards circular economy in Romania may be accelerated. It is taken into account the preservation of natural capital and the increase of the efficiency of using resources.In the paper there are highlighted the reflections of the authors with regard to resource productivity. We insist on responsible production-consumption models and the stage of implementing of integrated waste management systems in each county.Appealing to EUROSTAT data, a multifactorial model of assessing the circularity of an economy is proposed. In the end of the paper there are underlined the concerns of certain romanian companies for assimilating the CIRCULYTICS tool for measuring circularity.

Keywords: sustainable development, secondary resources, recycling rate, circular economy, waste management, multifactorial model, Circulytics.

Introduction

A hundred years ago, by means of his works in the sphere of public relations, Edward Bernays (nephew of Sigmund Freud), fires the flame of consumerism in the world. This comprised all the developed West, and after the fall of the communist regime it moved also in the Central and Eastern European countries. Based on the linear model produce-distribute-consume-throw away, the present economic development becomes unsustainable. There is need of a rethinking of the economic science and a redesign of public policies. Consumerism led to an increase in waste volume and diversity. On this background, waste management becomes a substantial issue of future economic development. Following 2015 when the European Union adopted programmes and goals for adequate management of raw materials, waste, by-products, and energy, also in Romania these issues received a special attention. These are to be found under various forms on the agenda of public authorities, business environment, and academic and research institutions. Numerous campaigns to inform the public and raise awareness took place in Romania's counties, by which stakeholders were explained the importance of the transition towards circular economy. All communication programmes were oriented towards explaining the new way of viewing fluxes from the standpoint of sustainability: the value of products, materials and resources is to be held in the economy as long as possible, and the producing of waste is to be reduced to a minimum.

Circular economy – the solution for the future

Romania's Government puts at the base of the 2020-2030 Strategy for sustainable development the Objective no. 12: responsible consumption and production, more principles that are to be found in the philosophy of the "circle that closes". There is in view the triad production-consumption-environment. A couple of principles are formulated by McKinsey Center for Business and Environment, among which there are:

- The preservation and strengthening of natural capital;
- Optimizing the yield of resource use;
- Making the economic system more efficient by eliminating negative externalities.

The process of transition towards a circular economy in Romania is closely tight to reconsidering the unsustainable consumption and production models, in view of identifying future development opportunities. To this end, implementing the 2030 Agenda for sustainable development, especially by the 12th Objective, brings in front the need of an integrated promotion of environmental, social and economic elements.

Debates in the last years regarding the importance and role of circular economy concluded with the approval at European level of an ambitious action plan regarding circular economy (2018). This plan is considered the engine of the transitions towards the "circle that closes". Within the mentioned strategy, research and academic institutes from Romania work at drafting a list of synergies of circular economy. This aims at the scope of agriculture and waters, municipal waste, biodiversity, human health, renewable energy, resource efficiency, preventing and reducing food waste, etc. All these suppose making analyses in terms of costs and benefits.

In the Report towards the Club of Rome entitled "Bankrupting nature" is analyzed the opportunity of decoupling economic growth from continuous use of resources. The efficiency of using resources is also approached in depth under the aspect of effect – effort.

Resource efficiency in Romania

Global environmental issues that Romania also confronts with are to a great extent the result of overexploiting natural resources, i.e.: fuels (fossil), ores, water, soil and biodiversity. It becomes more clear that the prevailing model of economic development in Romania, based on the intensive use of resources, on waste generation and pollution is no longer sustainable. Many resources, especially the important ones, are used on the short term or represent a loss for the economy, being disposed in waste deposits or becoming compost. Also in Romania solutions are looked after for maintaining as long as possible in the economy the value of products, materials and resources. In this way, waste production is effectively diminished.

The use of resources and waste management puts significant pressures in the phases of extraction, production, consumption and at the end of the lifecycle. Through the National Strategy of Sustainable Development also in Romania there are in view a couple of main objectives:

- Reducing the quantity of materials used in the economy;
- Using resources more efficiently;
- Significant diminishing of waste production;
- Transforming (through recycling) waste into secondary resources.

The Europe 2020 Strategy was taken in also by the Romanian Government, following by specific programmes the three priorities:

- Intelligent growth – based on knowledge and innovation;
- Sustainable growth – building a more ecologic economy that would use resources more efficiently;
- Inclusive growth – based on a high rate of employment that would assure social and territorial cohesion.

Circular economy is in close relation to these priorities. In this way, also Romania prepares for 2030 when it will have an authentic social market economy. These priorities have been transposed in Romania into specific national objectives and action lines. The productivity of resources is being measured by the value in euro of the products obtained by processing one kilogram of raw materials.

In 2018 Romania was placed in a low position, marking a regress compared to the European average. According to EUROSTAT, although the average of the European Union was of 132.0 (where 100 represents the productivity of resources in 2000), Romania was ranking last with a coefficient of 78.9. In 2019 Romania's import totalled 86.24 billion euro and exports 69.0 billion euro, indicating that Romania registered a deficit of 17.28 billion euro. Up to today Romania is a net exporter of raw materials, semi-fabricated and products with a relatively low degree of processing (low added value). It has to be signaled that in Romania's case the rythm of improving the return of resources is slower that in the E.U. countries. To this adds also the unsatisfactory dynamic of the labour cost, with a constant difference between Romania and the E.U. average of over 6 times.

Responsible models of consumption and production

Decoupling the negative effects that economic growth has on the environment needs a new sustainable model of production and consumption. Sustainable development proposes the solution of a more efficient production, of a sustainable management of waste and activities in line with the principles of environmental protection. In terms of consumption, recycling is compulsory, this asking for the transition towards a circular economy and making citizen conscious of the limits of the planet.

Within the new E.U. approach there is an increasing highlight on competitiveness through ensuring the stability of production and consumption, increasing the efficiency in using resources (material and energetic), reviving the processing industry that has high added value and the relative balancing with the sector of services that saw an important development in the last decades. In Romania, industry (including constructions) had a contribution of 38% to the GDP in 2018, greater than the E.U. average of 24%, fitting within an increasing dynamic in favour of services (a trend observed in the majority of the European countries).

Integrated waste management fits naturally in the vision of sustainable development and represents the putting in practice of the concept of circular economy based on recycling and preservation. In 2017 we recycled approximately 740.000 tons of waste. The results are not at all enough having in view that Romania's target for 2020 is 50% degree of selective collection and recycling out of the total household waste that is produced. Through the Environmental Operational Programme 2007-2013 projects have been promoted for integrated waste management systems (IWMS) at the level of each county of Romania. These were finalised at the end of 2019. The recycling rate of municipal waste is still very low in Romania, of only 14% (comprising 7% from recycling of materials and 7% from composting). This situation is shown in the Country Report regarding the assessment from 2019 of the application of the EU environmental regulations (EIR), drafted by the European Commission. In 2017 the production of municipal waste per capita was 272 kg, much under the EU average which is of approximately 487 kg. Romania set a recycling target of 55% of the municipal waste until 2025 and 60% until 2030. There is in view the selective recycling of dangerous household waste until 2022, of biological waste until 2023 and of textile fabrics until 2025. In the 2020-2030 decade Romania will pass to a new model of rational, responsible and efficient development of resources. Also, the implementing of sustainable practice of green acquisitions will be accelerated according to national priorities and European policies.

A multi-factorial model for the circularity of the economy

At the beginning of 2018, the European Commission published the values upon which it will survey in the future the circularity of the economies of the member countries. Already by the package adopted in 2015, EU promoted the idea of circular economy in which nothing is wasted, in which products last as long as possible and at the end of their lifecycle they are recycled. The magazine "Politico" made an analysis regarding the way EU member countries adapt to the policies regarding circular economy. At the end of the analysis certain surprising conclusions resulted. Thus, northern countries, such as Sweden, considered having "green economy" are not in the top of transition towards circular economy. In turn, Center European countries, such as Poland and the Czech Republic, are in top of the countries with the most circular economy. Such economies are structured on the following fluxes (Fig. 1):

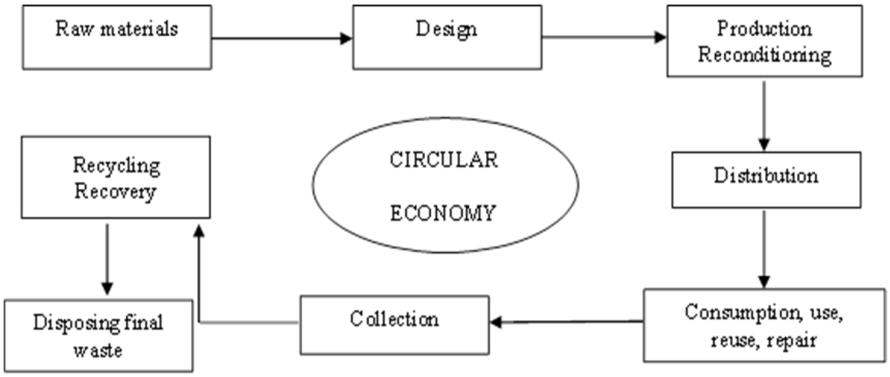

Fig. 1: Fluxes in circular economy

Source: own conclusion (2020)

One of the causes that is slowing transition towards circular economy is the tendency to produce a lot of waste. The values that the EC uses in order to determine the degree of circularity are mentioned in the following table:

Table 1: Values that the EC uses in order to determine the degree of circularity

No.	Explanation
1	Quantity of garbage and alimentary waste produced
2	Quantity of waste that is being recycled and how much of the recycled material is reused
3	The volume of traded recyclable materials
4	The number of registered patents related to circular economy
5	The number of jobs created in the sectors of circular economy, of which, mostly in repair and maintenance

Source: data gathered from magazine "Politico"

"Politico" magazine analysed 7 key values based on data from EUROSTAT and ranked each of the 28 member countries (before BREXIT). These key values are shown in Table. 2:

Table 2. 7 key values

No.	Explanation
1	Municipal waste (annual kg per citizen)
2	Alimentary waste (annual kg per citizen)
3	Municipal recycling rate
4	Rate of traded recyclable goods
5	Rate of reusing materials
6	Number of patents within circular economy (since 2000).
7	Investment in circular economy (million euro).

The ranking for circular economy differs also in relation to the Index of Performance for the Environment proposed in 2018. Through it is classified a larger range of environmental policies, from pollution to emissions from agriculture and to biodiversity. This is due also to the fact that practices that reduce the impact upon health and the environment do not necessarily contribute also to circularity. For example, burning waste to obtain energy, as happens in Austria, Germany or the northern countries reduces significantly waste deposits but does not contribute to the growth of the rates of recycling and reusing.

For dynamic empirical analysis, using EUROSTAT data, we may build matrixes of the dimensions 28 x 7 with elements $X_{ij}(t)$, where:

i = 1,2,…28 – the EU member countries;
j = 1,2,…7 – collected key values;
t = 1,2,…5 – time interval 2015 – 2019.

Based on these dynamic matrixes may be studied the evolution of economies circularity and their approach to the strategic targets of EU and of each member country.

A tool for Measuring Circular Economy

Recently, Ellen Mac Arthur Foundation launched the most comprising tool for assessing the circularity of an economy at global scale. Through this tool companies are being offered the possibility to assess their degree of circularity. With its aid material fluxes are measured, information in being given regarding circular operations within offer chains, opportunities for strategic innovation is highlighted. The tool called CIRCULYTICS uses data and parameters by which the transition of a country towards a high degree of circularity is highlighted, it allows economic agents to understand and monitor circular economy. By using CIRCULYTICS companies are able to design systems through which they dispose waste from production chains. At the same time, they develop strategies with a positive influence upon the environment, improve results and consolidate the brands on the market.

Although economy entered a decline due to the effects of the global pandemy, there are consultancy firms, but also companies that undergo clear analyses and collect data that is necessary for the intake of CIRCULYTICS. There are in view 7 key domains of the business evolution, recommended by Ellen Mac Arthur Foundation: strategy, people and skills, systems, processes and infrastructure, innovation, external involvement, input, output. The tool adopted at the beginning of the year has a great benefit: it measures the circularity of the economy in a comprehensive way as fields such as strategy, innovation, people and skills and networking are included in its values. This tool will allow Romanian companies to create circularity reports that can be forwarded to shareholders or to the public so as to maintain transparency and to keep the customers informed regarding data by which they are assured that the products acquired fit within a model based on circular economy.

Conclusions

In April 2019 Environment Implementation Review (EIR) published a report regarding Romania's application of the EU policy and regulations in the field of environment. Within the pack of measures adopted by the EC in January 2018 is stipulated also the design of a frame to monitor the progress towards a circular economy.

Circular (secondary) use of material resources in Romania is much under the EU-28 average and with a declining trend compared to previous years. With regard to the number of persons employed in the circular economy, Romania is close to the EU-28 average, with 1,54% of the total occupied persons. In an inquiry, ING International shows that 8 out of 10 Romanians wish to pass to a circular economy. Measuring the transition of a country towards a more circular economy is a complex task. In Romania's Sustainable Development Strategy is considered that the number of products with ecological label as well as the number of economic organizations (small and medium size enterprises) that are concerned about the environment offer an approximation of this transition. The two indicators show to what extent the private sector and other stakeholders at national level are involved in the transition to circular economy. At the end of 2018, Romania had 24 products and 19 licenses registered in the EU system of ecologic labelling. In turn, small and medium size enterprises from Romania continue to obtain results under the EU-28 average for the environment component. An efficient way to follow would be focusing the decisional factors upn the most interested enterprises

and the adoption of a certain "value chain" that could generate propelling effects at the level on the Romanian society.

Waste management continues to represent a major challenge for Romania. The national performance is still marked by a low rate of recycling municipal waste (14%). In the early warning report, the EC mentioned Romania among the states that risk failing in reaching its municipal waste recycling objective until 2020 and enter the infringement area. Also, on this background, using the special EU funds for improving waste management is still extremely low. With all this lack of accomplishments, numerous Romanian big enterprises started investing in the infrastructure for recycling and collecting used products, trying to profit from this business opportunity.

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Problems of Transition to Distance Learning of Legal Disciplines in the Context of the COVID-19 Pandemic

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Abstract

The new conditions in which the largest states of the world were put by the COVID-19 pandemic, which required the broad masses of the population to stay at home, became a serious test for the education system, which was forced to reorganize as quickly as possible, urgently switching to distance learning. The article describes the experience of teaching the disciplines of the criminal law cycle for the students of the law faculty of Southwest State University (Kursk, Russia) in the context of an emergency transition to distance learning in connection with the COVID-19 pandemic and the introduction of high alert mode in the region. The main possible approaches to the implementation of educational programs in the context of the impossibility of personal contact between the teacher and students, as well as taking into account the need to work at home and use the available communication channels, are considered. It is concluded that although the emergency transition to the remote interaction of the teacher and students was successfully organized as a whole, the implementation of the training of lawyers completely on a remote basis is still undesirable. At the same time, the introduction of distance technology elements and the constant use by students of the university's electronic educational environment, encouraging the use of modern multimedia and communication technologies, interactive forms of discussion of lectures and practical classes, mutual verification of completed tasks, it is advisable to integrate into the normal educational process in order to increase its effectiveness.

Keywords: COVID-19, self-isolation, distance learning, legal education, electronic educational environment, video lectures, knowledge control, interactive training, digital footprint.

Introduction

The pandemic of the new coronavirus infection COVID-19 has become a serious challenge to the entire world community, including the modern education system. In conditions when the need to curb the spread of infection required students and teachers to stay home, the ability to continue their education using distance technology is one of the most important factors that allow the education system to stay "afloat" in the most difficult economic and epidemiological situation.

The proliferation of distance learning technologies is no longer a new trend; it is one of the fastest growing sectors of the education industry (Means et al., 2010). More and more universities both in the Russian Federation and abroad offer to receive education through the Internet. As noted (Davis D. et al, 2018), mass educational distance learning platforms are functioning quite successfully, offering

courses from leading universities in the world, such as Coursera, edX, as well as their Russian counterparts (for example, Universarium).
Initially, these platforms acted more as an advertising platform for universities participating in programs, offering only free electronic certificates that do not have any official status. However, gradually they began to offer paid certification of certified educational certificates, occupying an intermediate niche in the educational market: past training courses in such systems gained a competitive advantage in the labor market, since in those areas of special activity where higher university education is required, certificate holders, even about taking a distance learning course, they are more trusted by employers than people who do not have any formal documents at all in special education. As noted by E.A. Seregina (2018), distance learning allows education despite temporary and spatial barriers, as well as reduce the cost of education by increasing its availability.

The first distance learning courses focused on teaching technical disciplines. So, one of the first massive online courses created by Stanford University was devoted to the problems of artificial intelligence. However, over time, more and more courses in the humanities began to appear, including the legal cycle. The wide distribution of such courses, their support by leading world (Yale University, Stanford University, University of London) and Russian (the Higher School of Economics is the pioneer here) universities allow us to talk about the possibility of distance learning, including lawyers.

At the same time, in the Russian context, the emergence of distance learning faculties in many law schools, and far from always leading ones, raised reasonable doubts about the quality of knowledge received by students. I.V. Goncharova et al. (2018) Indicate that despite the growing interest of Internet users in distance learning, only a small number of the best universities in the country provide this opportunity, and most universities that still use distance learning do it purely on a commercial basis. It can be noted that for many universities, attracting students to distance learning is only a way of attracting additional funds, in the absence of real investments in the creation of high-quality distance learning courses. Moreover, as noted by G. Aglyamzyanova and R. N. Abaydulin (2018), often a distance education course is a direct adaptation of a traditional full-time or extramural (with training in sessions) training course, which includes lectures, practical exercises, implementation of control and term papers, as well as final control in the form of tests and exams.

As a result of this, the problem of finding acceptable forms of distance learning for students in legal education is becoming particularly relevant. It seems that this should focus on the requirement set forth in the educational standards of the third generation for the widespread use in the educational process of active and interactive forms of conducting classes, such as business and role-playing games, analysis of specific situations, psychological and other trainings, meetings with representatives of commercial, state and public organizations, master classes by experts and specialists. T. Markova, I. Glazkova and E. Zaborova (2017) note that only the joint work of students, teachers and administrative staff of educational institutions can ensure an adequate quality of education. The common goal of all these groups is the use of modern information technologies that allow remote interactive interaction between students and teachers at a high level (as indicated by Panigrahi R., Srivastava PR, Sharma D. (2018), the greatest involvement of students can be achieved through multi-user computer simulations or help of virtual worlds similar to those used in network games, but simulating a real situation).

Despite the fact that most Russian universities have been interested in the technologies described above for a long time, and were engaged in the creation of an electronic educational environment (hereinafter - EEE), a complete transition to distance learning was not planned, and these resources were considered mainly as having an auxiliary role. However, the COVID-19 pandemic sharply violated plans for the gradual introduction of distance learning technologies. Already on March 14, 2020, the Ministry of Education and Science recommended the transition to distance learning (Order of the Ministry of Science and Higher Education of the Russian Federation dated March 14, 2020 No. 397), and from March 16, 2020, many universities began to urgently switch to distance technologies.

In conditions of such a quick and hasty introduction of new forms of training, it is extremely important to analyze and generalize the experience of teaching legal disciplines in new conditions without the possibility of organizing contact forms of training.

Methods

An analysis of the distance learning methods of students was carried out under conditions of necessity to organize a contactless interaction of a teacher with students in a short time using technical means of communication. As part of the emergency transition to distance learning for students in connection with the COVID-19 pandemic and the introduction of a high-readiness regime in the region since March 18, 2020, the following disciplines using distance technologies were taught at Southwest State University (Kursk, Russia): “Criminal law”,“ Criminology”, “Crimes related to malfeasance”. Classes were held with full-time students. In total, remote interaction was carried out with more than 150 students. The established class schedule was kept as much as possible; all classes were held in full with the interaction of the teacher and students in the online mode.

Results.

Conducting classes was carried out in three main forms: lecture classes, practical exercises and test control.

The lecture classes were supposed to be held on the basis of the available Powerpoint presentation slides, which were used as the base material for face-to-face lectures. The following options for organizing interaction with students were considered:

1. Online broadcast using teleconferencing (such as Zoom, Skype and the like).

2. Online broadcasting using streaming services without using teleconferencing, with the organization of direct communication with the teacher through text chat.

3. Placing a video of the lecture on video hosting (Youtube) with transmitting the link to students for viewing at a convenient time, organizing direct communication with the teacher through a text chat.

4. Sending students presentations without accompanying audio / video materials for self-study, with the organization of the possibility of direct communication with the teacher through text chat.

The latter option seems to be the least attractive, since it uses less communication tools compared to a traditional lecture. Only the visual channel for perceiving information (reading) is used, while it is considered necessary that the student visual and auditory perception of information is combined during the lecture, as well as lecture notes (which with this method of conducting it becomes unnecessary). At the same time, this method has the undoubted advantage that it does not need to use communication channels with high bandwidth, which may not be available to the teacher or students.

The organization of teleconferencing seems to be the most attractive option from the point of view of interactivity, but the practical implementation of this option faces significant difficulties. Firstly, almost all teleconferencing services require a paid subscription to organize full-fledged communication: there are restrictions on the duration of the conference (in Zoom no more than 40 minutes), the number of participants, etc. It is rather difficult to quickly provide teachers with a paid subscription; moreover, it ties them to a specific service. It is possible to organize video conferencing using the university’s own services (BigBlueButton software), but this requires the university’s information infrastructure to withstand the necessary load, and it is usually not ready for this. Secondly, teleconferencing requires a stable communication channel that provides a sufficiently high flow rate for both downloading and downloading. Quite a lot of students, especially in rural areas, use mobile or xDSL connections that do not provide the necessary stability, are limited in the amount of transmitted traffic, and are asymmetric, making it possible to watch online video, but not broadcast their own video stream. Thirdly, a teleconference with 60-80 participants requires several moderators to be allocated in order to organize well, since uncontrolled interaction with so many participants risks quickly becoming chaos. Fourth,

there are certain concerns related to the security of personal data of participants in such teleconferences, as well as the possibility of unauthorized connection to them (which almost inevitably leads to class failure). This applies specially to Zoom, the practice of using which in various educational institutions has shown its inadequate safety - there have been cases of unauthorized connections (including using illegally obtained student credentials) with the subsequent disruption of the lesson (for example, by demonstrating pornographic videos).

Finally, it is necessary to take into account the special conditions in which teachers and students were placed in connection with the introduction of restrictive anti-epidemiological measures. In conditions when parents are both at the same time in a typical home, both working remotely and involuntarily unemployed, a university student and his brother or sister who are remotely taking school classes, there is simply no talk of any teleconferencing. Therefore, this option has also been discarded.

When choosing between the online broadcast and the pre-recording of the lecture, the choice was made in favor of the pre-recording, since the increase in the interactivity of interaction during the online broadcast is insignificant. It should be borne in mind that broadcasting in any case is delayed by a few seconds, as a result of which the chat questions are inevitably late and appear when the teacher has already switched to another material. In addition, it is quite difficult to conduct a lecture and follow a text chat at the same time. Thus, it was considered that this option creates an excessive load on the teacher, without giving significant advantages.

Modern versions of PowerPoint (using the version available by Office 365 subscription) allow you to fully record a lecture with audio / video accompaniment without the need for any additional software using a standard microphone and webcam, including a built-in laptop. The important thing is that the recording unit is one slide of the presentation, which allows you to quickly overwrite the failed fragment. In addition, during the lecture, you can make handwritten notes on the slide or highlight individual fragments of the text, use multimedia tools (for example, animation or videos). The result is a video lecture in the format of slides with a video of the teacher's story superimposed on them (in the corner of the screen) explaining the material presented on the slides. Such a lecture can be exported using standard PowerPoint functions to an MPEG4 video file, which can easily be uploaded to video hosting.

Video materials recorded in this way were posted on Youtube, a link to them was posted on the university's EEE and sent to students on the day of the lesson. Feedback with students was carried out in two forms. Firstly, in order to verify that the students attended the lecture and learned its material, they had to submit a handwritten summary of it. His photograph was uploaded by students in the EEE. This makes it possible to record lecture attendance using a point-rating system. The student who uploaded the synopsis at the scheduled time (not earlier than 10 minutes before the end of the lecture lesson on schedule and no later than 30 minutes from its end) is considered to be present at the lecture. Of course, the lecturer and his assistants should carry out spot checks of abstracts.

As a means of organizing text communication, various instant messengers (Viber, WhatsApp, Telegram, Discord, Skype) and social networks (VK, Facebook) were considered. It was found that all of them in one way or another provide the possibility of organizing a group chat with a sufficient number of participants, with the ability to send text messages, links, multimedia elements and audio messages. All of them have a mobile version and a desktop version, as well as a web version. Thus, the choice of a specific tool is not determined by their technical capabilities (which are almost the same), but only by which of these tools are most familiar to teachers and students. In the specific circumstances, it was preferable to use the VKontakte social network, since the vast majority of students have already used it for communication.

For direct communication with students, general chats were organized, in which all students were added. During the lesson, these chats were monitored, answers were given to questions arising on the topic of lectures. It can be noted that students were much more active in taking the opportunity to ask the teacher a question than during the in-person lecture, and participated in mutual discussions regarding the material presented by the teacher.

Practical classes were conducted on the basis of existing author's methodological developments designed to organize work under the conditions of applying a point-rating system for assessing knowledge, taking into account the need to involve the maximum number of students in the lesson.

The possibility of conducting classes in a teleconference format was also considered. Although the number of conference participants in a practical lesson is less than the limit for free use of most services, the remaining drawbacks of this method of conducting the lessons described above with regard to lectures remain relevant for practical exercises. In view of this, despite the attractiveness of this format, which is closest to the traditional face-to-face training, it was decided to abandon it. At the same time, it should be considered the possibility of its use in relatively small groups of students (up to 10 people), provided that there are no problems with communication channels and there is an organizational possibility of interaction.

Quite widespread in practice is a non-interactive format for conducting practical classes in remote form, which involves students completing written tasks of the teacher with their subsequent direction to the teacher for verification. It can hardly be called providing full involvement of students in academic work. In addition, non-individual task execution becomes very likely under such conditions.

As a result, an interactive format using text and multimedia communication tools (video messages, voice messages) was chosen for conducting classes. As noted above, almost any messengers or social networks can be used for this, taking into account specific conditions, the social network VKontakte was chosen.

Chats were created for each group of students. The actual conduct of classes took place within the established schedule as follows. At the beginning of the lesson, each student was given an individual task by surname.

The following task options were used: an oral answer to a question, an oral or written solution to a case problem, an oral report (preparation is entrusted as a homework in the previous lesson), a checklist for definitions (in writing), a test (in writing), and a summary of a scientific article (in writing) followed by an oral report), writing a short essay (in writing).

The student fixes the oral task in the form of a voice message. The written task is performed on a piece of paper, fixed on a photo and also sent to chat. In addition, students were told about the ability to accompany the answer with illustrative and other multimedia material (for example, links to videos), which many students actively used.

The teacher supervised the work of students, listening and viewing completed tasks. In order to stimulate the independent work of students, additional questions were asked (in text form, the answer to them also in text form). Students were reminded of the need to familiarize themselves with the answers of classmates during the lesson (view and listen), and were asked to ask questions to the teacher and classmates. As the used technologies became familiar to students, the request to ask questions to classmates was replaced by a mandatory requirement for some students.

At the end of the lesson, the students' work in the lesson was evaluated by the teacher, the assessment was brought to the attention of students. A digital trace of the lesson was also recorded. At the end of the lesson, screenshots of correspondence with students, other available for saving, were uploaded to the EEE so that students (including those who were not present at the lesson) and other teachers could familiarize themselves with them. It should be noted technical difficulties with the preservation of audio messages and other multimedia materials. Some instant messengers (Telegram, WhatsApp) allow them to be downloaded as a file using regular means, so if there is a need to include such materials in a digital footprint, you need to consider them as the preferred means of organizing interaction. At the same time, these technical difficulties are not insurmountable: for example, on the VKontakte social network, you can use the Video DownloadHelper extension for the Firefox browser

(https://www.downloadhelper.net/) and standard browser developer mode tools to save video messages and audio recordings. allowing you to get a direct link to the audio file for a voice message.

Discussion

In general, the distance interaction with students, despite the suddenness of the transition, was able to be organized quite quickly and without serious difficulties (in particular, due to the fact that I had previously trained students using distance technologies). Such a system was generally perceived positively by students, one can note a more creative than some students' traditional approach to completing assignments using multimedia tools. There were no significant technical problems in the interaction of teachers or students with the EEE of the university - there were only a few complaints about the temporary inaccessibility of the environment, these students were able to successfully upload materials after a few minutes.

However, it should be noted that none of the traditional forms of working with students can be losslessly adapted to the distance learning format.

So, lectures in their traditional form involve live communication between the teacher and the audience. A qualified teacher does not just present material in his discipline, he adapts it to the needs and level of a specific audience, explaining it with illustrative examples, including those of current interest; he has the opportunity to illuminate in more detail any aspect of the topic, if he aroused keen interest among the audience, or was not clear to them, to answer questions that the audience has. It is good practice for the lecturer to include dialogue elements in the lecture.

However, even in the form closest to the traditional form of remote lectures (using telepresence systems), the teacher is deprived of direct contact with the audience and is not able to assess the perception of his speech by the audience. Often, even at a fairly high level, distance courses are limited to providing pre-recorded video or audio lectures, or even a lecture course in text format. This, of course, cannot be recognized as an adequate replacement for the traditional lecture. In addition, the limitations of the used technical means, telecommunication channels and human resources lead to the fact that the use of fully interactive forms of interaction becomes impossible or difficult to implement.

The situation is even worse with practical exercises, which involve a joint solution by a group of students of tasks designed to consolidate the knowledge gained, as well as the current control of their performance. In the distance course, students are forced to work individually, without close contact between themselves and the teacher. This does not allow you to get teamwork skills, business interaction. Even if students are involved in collective forms of work (for example, by mutual verification of tasks), their interaction is still limited, in such conditions it is quite difficult to organize a truly interactive interaction, involving a general discussion of discussion issues, brainstorming and other similar forms of work.

There is no opportunity to control the familiarization of students with the work of classmates in practical classes. The student can ignore tasks that are not personally relevant to him, not get acquainted with their results and their assessment by the teacher.

The most serious questions are also caused by the organization of students' knowledge control during distance learning. First of all, this is due to the complexity of controlling the independence of tasks. The only more or less reliable way to control the student's personal performance of this or that work is to ensure his full-time presence at the university, its branch or a specially created center, however, the main advantages of the distance learning form over the usual part-time form are lost. If the assignment is carried out in the absence of full-time control of the student, wide opportunities for academic deception open up to the task of hired "specialists."

In part, this drawback can be mitigated by issuing an individual assignment to each student, offering to answer additional questions, constructed in such a way that a ready-made answer to them would be difficult to find, as well as cross-checking students' work.

The complexity of preparing for classes has increased due to the fact that all materials must be pre-translated into a form suitable for sending to students, specific students performing tasks, etc.

The complexity of evaluating the results of students' activities and providing them with feedback in connection with the need to fully listen to an oral answer without the possibility of interrupting a student, checking written answers, and also interacting primarily in the form of text messages as the most accessible to them, has increased. It also takes a lot of time to save the results of the lesson for the full fixation of its "digital footprint" in the EEE.

Separately, the laboriousness of preparing lectures should be noted. Recording video accompaniment to a presentation requires a much greater concentration of attention than a traditional lecture, since it is highly desirable not to allow interruptions and speech malfunctions, which often require rewriting “takes” of the same slide several times. In addition, even if the lecture is fully prepared in video format, for full-fledged work with students, it is still required that the teacher during the lecture be available online and be ready to answer students' questions (which they could also ask during the full-time lectures). In fact, the labor costs for lecturing increase threefold: approximately 4 academic hours for preparing (updating, clarifying) the presentation and recording video material and 2 academic hours for online consultation during the lecture, instead of 2 hours for lecturing in the classic non-interactive format.

It should be noted that all these shortcomings are not critical and can be smoothed out with varying degrees of success provided that distance learning technologies are introduced into the teacher’s daily work, as well as the possibility of combining full-time and distance learning under normal conditions when anti-epidemiological measures do not force the teacher and students avoid personal contact.

Conclusion

Although the emergency organization of distance learning in the context of the coronavirus infection pandemic at Southwestern State University was successful, taking into account the circumstances, the full implementation of educational programs in this form on an ongoing basis is undesirable.

However, the identified shortcomings cannot be called critical, at least in the framework of the teaching of individual disciplines of the industry cycle. Moreover, the revealed advantages in the form of increasing student engagement and encouraging them to use modern multimedia and communication technologies indicate the prospect of learning using distance technologies, including the possibility of organizing active and interactive forms of training sessions with their use.

For example, it was found that students are more willing to ask questions and discuss the lecture material in group text chat than verbally directly during or after the lecture. Therefore, it makes sense, regardless of the format in which the lecture is delivered, in remote or in-person mode, to create such a chat for students by highlighting in-person lectures to assist in organizing its work of assistants - like other teachers (for example, conducting practical classes at students in this discipline), as well as volunteers from among students who are good at mastering the material.

An important advantage is also the fixation of the digital footprint, which allows students and the teacher to use the recorded learning results when implementing the subsequent educational process, referring to them if necessary. In addition, it increases the objectivity of the current assessment of student knowledge.

Although many traditional forms of training are not applicable in distance learning, there are many educational technologies, the full potential of which is revealed precisely with distance learning. For example, this is a crosscheck of tasks (especially of a creative nature) performed by students: while in traditional education, its use is complicated by the possible overstatement for personal reasons, then in an online course, in the absence of direct communication between students, the influence of this factor is significantly reduced.

The aforesaid allows us to talk about the need to generalize the experience of using distance learning forms after removing the restrictions associated with the distribution of COVID-19, in order to integrate their individual elements into the usual educational process.

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Fight Against Transnational Drug Trafficking in The Framework of Cooperation Between the Russian Federation and The European Union

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Abstract

This article focuses on the definition of transnational crime, as well as on the identification of the causes and conditions of transnational crimes. On the example of illegal sale of narcotic substances at the international level, the authors attempt to make a comprehensive analysis of the characteristics of transnational crime at the present stage of development of the international community.
Authors conclude that domestic methods of detection of transnational crimes are outdated and are not able to fully meet the needs of the investigation. Confronting transnational crime, which is complex in nature, requires interaction between the entire world community and individual regions. Cooperation between the European Union and Russia as the largest participants in international relations is particularly important. Despite the established regulatory framework for combating organized crime, in particular drug trafficking, there are problems that require immediate solutions. It should be noted that the need for work on which it is necessary to intensify in the near future: the development of a unified anti-drug policy, the harmonization of national legislation, the development and implementation of international operations to control narcotic and psychotropic drugs in legal circulation, further exchange of experience on drug demand reduction, prevention, treatment and rehabilitation of drug patients.

Keywords: Transnational Organized Crime, European Union, Interaction, European Police, Drug Trafficking.

Introduction

In the context of globalization, States interact with each other more actively every year. Humanity faces new challenges that require joint solutions from States. One of the global problems of the 21st century is the Commission of crimes at the interstate level. According to Valeev D.M. (2016), under transnational crime adopted to understand the social anti-legal phenomenon, which is a purposeful system of active operations of criminal groups organized on ethnic, kinship or professional signs, and operating on the territory of several States. The main international Treaty regulating the fight against transnational crime is the UN Convention against transnational organized crime of 15 November 2000. However, it is difficult to settle all relations in the field of combating various types of interstate crimes in one document, so States cooperate on these issues at the local level. A striking example of such cooperation is the cooperation of the Russian Federation and the European Union. Let us consider the features of the fight against transnational crimes on the example of identifying the illegal sale of drugs.

A serious problem of our time is the sale and distribution of drugs at the interstate level. According to data provided by the United Nations Office on drugs and crime, around 250 million people worldwide have experience in the use of drugs. At the same time 190 thousand people die of addiction, 8 thousand of whom are citizens of the Russian Federation. The scale of the problem of drug use is serious: according to the Ministry of health and law enforcement in 2017, the number of people suffering from drug addiction ranged from 640 thousand to 7.3 million people.The first figure reflects the data on those who applied for medical care, and the second expresses the number of detainees by law enforcement agencies during the use of drugs.

It is significant that both in Russia and in the world, the production of synthetic drugs is steadily growing. What are the reasons for this growth?

The first reason for the trend of growth in the production of synthetic drugs around the world is the simplicity of their production. In order to produce synthetic drugs, you do not need to have large reserves of natural resources, as well as attract a large number of people, spend money on expensive equipment, there is no dependence of the manufacturer on climatic conditions. That is why there is an increase in the consumption, storage and marketing of synthetic drugs. The second reason for the increase in the spread of synthetic drugs in society is the ease of their production, which can be established almost anywhere. The third reason for the manufacture of synthetic drugs is the low cost and high profitability of "business" in the market. The fourth reason is that the production of synthetic drugs does not require a specific precursor. Police Colonel Vyacheslav Dikarev (2019) believes that this circumstance makes it possible to obtain several types of synthetic drugs, including those not included in the list of prohibited, but having a similar negative impact. All of the above reasons are responsible for the increase in the number of people involved in the criminal sphere of drug distribution, and, accordingly, their use.

The victims of drug trafficking offences are drug users. According to the 2018 world drug report, young people remain the most vulnerable group to consumption and exposure. Studies show that there are two peak periods when a person is most likely to become addicted to drugs and psychoactive substances: early (12-14 years) and late (15-17 years) adolescence. The largest proportion of people who use psychoactive substances falls on the age of 18-25 years. The world report cites two opposite reasons that serve as the beginning of drug use. First, persons with sufficient means to pursue recreational purposes, wanting to make emotions brighter. Secondly, young people experiencing difficulties, on the contrary, want to relax and distance themselves from the extreme conditions in which they live. At the same time, there are two diametrically opposite consumption models, the so-called club and street consumption. Club drugs include ecstasy, methamphetamine, cocaine, ketamine, LSD - these types are used by young people with a high level of income. The peak of "club" consumption according to statistics occurs in 15-24 years. It should be noted that these drugs have a complex composition, so this fact should be taken into account when searching for sales channels in the framework of the seizure of drugs from young people. Street consumption is characterized by the low cost of narcotic or psychoactive substances, which usually include inhalants, which are paint solvents, gasoline, paint, corrective fluid and glue. It is evident that with this type of consumption, it is often impossible to identify the funds prohibited in circulation. States, taking into account international experience showing the causes and conditions of drug use, are developing a strategy to combat their spread.

Considering transnational crime as an example of the sale of drugs, we consider it important to establish the reasons and conditions for the involvement of young people in the distribution of drugs. It is no secret that there is a large turnover of money in the drug business, which, at first glance, is very easy to earn. According to the developers of the UN world drug report for 2018, the main reason for the involvement of young people in the cultivation, manufacture and production of drugs is social instability, poor economic situation in the country and, as a result, the inability to earn at all or receive extremely low wages. This group of people is "easy prey" for organized criminal groups, so they turn their attention to poor young people in order to obtain labor for the cultivation, manufacture, transportation and trafficking of drugs at the local level. In the system of transnational crime, this category of people acts as the" lowest link", performing the most rough work. Organized criminal

groups is beneficial to recruit children and young people in the criminal activity connected with illegal drug trafficking, because they are due to age are reckless, assisting organized group to give the youth any orders and the ability of the subordination of young people and children organized groups. In the investigation of illicit drug trafficking as a transnational crime of an international character, it is always necessary to pay attention to the most vulnerable category of citizens – young people, because it can help in uncovering a whole complex network of drugs in huge quantities.

Investigation of the committed interstate crimes in the sphere of drug trafficking and prevention of new criminal acts requires a detailed analysis of the concept of transnational organized criminal group. Note that the UN Convention against transnational crime of 2000 does not define a transnational organized group. The international instrument in the conceptual apparatus contains two terms: organized and structured criminal groups. The 2000 Convention identifies several characteristics of an organized criminal group: structure, membership of at least 3 persons, acting for a period of time to commit a serious crime within the meaning of the Convention, and the ultimate goal of obtaining direct or indirect financial or other benefits. Within the meaning of the 2000 Convention, a structured group is a group formed by a group that has no mandatory formal definition of the roles of group members or developed structure. The article of this Convention strictly regulates the responsibility for participation in an organized group, without paying attention to the fact of personal participation in criminal acts. N. I. Zelinskaya emphasizes that the definition of transnational organized groups laid two categories: 1) the group's operations beyond one state, the so-called "internationalization"; 2) the cohesion of the group members who are citizens of different States. E. B Serova (2013) gives a criminalistic definition of transnational organized group, understanding as such created for the purpose of committing criminal acts at least moderate system of interrelated elements, subject to common principles, traditions and United criminal purpose, the result of which is to obtain direct or indirect financial or other benefits.This system is branched and has a centralized hierarchical structure, headed by the organizer and has corrupt connections, since it cannot act with impunity without the preferences of some authorities, usually law enforcement. The distinctive features of transnational crimes include the following: they are national in nature of the criminal-legal prohibition and international in characterization of subjects or criminal activity. Transnational crimes thus fall under the jurisdiction of more than one state. In order to carry out full-fledged activities, the organized community, in addition to the sale of drugs, sometimes needs to commit other illegal acts: legalization of income, corruption crimes and so on. The difficulty of identifying such groups is that they receive support from the authorities, which discredits the work of law enforcement agencies, which "close" the way to expose a transnational organized group.

Results and Discussion

The scientific community has repeatedly attempted to develop a universal concept of transnational organized criminal group. The work of legal scholars was carried out on the basis of legal definitions enshrined in international instruments, the main of which is the UN Convention against transnational crime of 2000. However, there are legal gaps in its text. E. B. Serova (2013) rightly points out that article 2 contains the number requirement as "at least three persons", whereas article 5 of the above Convention refers to the presence of two or more persons in a transnational organized group. National legislation has tightened the conditions when deciding on the form of complicity, which is recognized as a transnational organized criminal group, it must consist of at least 2 people. It is important to distinguish a transnational criminal group from terrorist activities, the former becoming transnational by virtue of its interstate nature. The full list of characteristics of a transnational criminal group includes the receipt of direct or indirect, financial or other benefits, as well as the presence of prior collusion and a certain structure. In a transnational organized group, there is usually a foreign element. V. Nomokonov (2003) notes that this characteristic is decisive in terms of the characteristics of transnational criminal groups. It is worth noting that such criminal groups, as we mentioned above, are formed with selfish motivation. The activities of a transnational criminal group differ in that they are carried out in more than one state, and a significant part of the planning, preparation and control of the Commission of crimes takes place in another state. Thus, a transnational criminal group, with an extensive network, concentrates the main center in a country where, as a rule, the main criminal acts

are not committed. The 2000 UN Convention indicates other options for the activities of a transnational criminal group.

Thus, it can be committed in one state, but with the participation of an organized group that commits crimes in more than one state; crimes can be committed in one state, which entails significant harm to the public order of another state. Based on the analysis of the above, we propose our own version of the concept of transnational organized criminal group – a system of interrelated elements, including at least two persons, specially created for the purpose of obtaining direct or indirect financial or other benefits by committing a number of criminal acts of a cross-border nature, that is, on the territory of two or more States, as well as with the participation of persons with different nationalities.

Police Colonel Vyacheslav Dyukarev (2019) notes that the fight against transnational criminal groups that sell drugs is difficult and has certain problems, because there is a constant increase in the "professional skills" of participants in transnational organized criminal groups]. The relevance of operational and investigative measures carried out by law enforcement agencies is gradually decreasing. In particular, it is difficult in practice to carry out a controlled purchase or controlled delivery, as drug dealers understand how dangerous it is for them to interact directly with the client. Moreover, such measures are not enough, because the transnational criminal group is so difficult to weave into the social systems of countries that one detention of its lower levels will not give law enforcement officers the opportunity to find the organizer. This circumstance forces to look for new ways of obtaining evidence base, and only with their complex application it is possible to achieve the desired result. The complexity of the disclosure of transnational organized groups engaged in illicit trafficking in narcotic substances is that in the era of technology in the vast majority of cases for the interaction of parts of the criminal group used software, including information and telecommunication network "Internet".

An illustrative example of international drug trafficking via the website "Silk Road, the owner - administrator Ross Ulbrich, hiding under psuedonyms "dread Pirate Roberts". The site took orders for drugs for payment with bitcoins, which have recently become very popular in the world. At the time of arrest of the founder of the website according to research conducted in Traini College, the number of visits to the site daily reached 60 thousand, and the monthly turnover of profit in 2012 (a year before closing) was 1.2 million dollars. The service was arranged on the principle of the international trading platform eBay: the platform charged a Commission of 10 percent for all transactions, drugs were delivered by mail. Only by 2013 was it possible to arrest and then sentence the founder of the site to life imprisonment. Given the scale of silk road activities, it is difficult to measure the number of victims worldwide who have suffered from the use of narcotic drugs. This example shows that the fight against illicit trafficking in narcotic drugs is a world-class problem and constantly requires the search for new means and methods.

Before proceeding to a detailed analysis of the mechanisms of interaction between the European Union and Russia on the fight against illicit drug trafficking, we consider it necessary to pay attention to the situation on the sale and use of drugs in Europe in recent years.

Ivanova N. In. and Hismatova Z. G. (2017) give the following categories of groups of States according to the degree of rigidity of the legislation concerning drugs.

The first category is moderate control countries. These include Germany, France, Russia, Italy. These States are actively engaged in the fight against illicit trafficking in narcotic drugs, and criminal legislation provides for a penalty of imprisonment for crimes related to the illegal sale of narcotic and psychoactive substances. Punishment can be replaced by an alternative measure-referral to treatment for drug addiction by a court decision.

The second category – countries with a strict policy in the field of drug trafficking. Among them are the USA, Japan, China. For committing a crime in the specified areas there is a serious punishment, up to life imprisonment and the death penalty.

A special place in the classification is occupied by the Netherlands. According to the legislation of this state, drugs are divided into "light" and "heavy", with the latter being actively fought. Banned, for example, in Russia, drugs based on cannabis there legalized and responsibility for their cultivation, production, storage and marketing is not provided. In this regard, the Netherlands has become, without exaggeration, a real drug capital of the European Union. According to the Ministry of justice of the Netherlands for the year 2000, 5% used "light" drugs on a regular basis. Do not forget that in Russia these substances are prohibited, therefore, their supply is illegal and subject to the Criminal code of the Russian Federation.

The statement of the former Director of FSKN of the Russian Federation (it is transformed into Gosnarkokontrol of the Ministry of internal Affairs in 2016) Victor Ivanov that 90% of the drugs turned in Russia have foreign origin is indicative. Indeed, in Europe there is a problem with the increase in the production of narcotic drugs, as well as the emergence of fundamentally new drugs. This is evidenced by statistics. According to the European report on drugs: trends and changes in 2016, the evolution of the drug market was as follows: the markets of cannabis, amphetamines and heroin appeared in the 1970s of the 20th century, then in the 2000s the market was replenished with cocaine. Throughout the 21st century, the "range" of narcotic and psychoactive substances grew, in the process of globalization, the ways of smuggling drugs and their analogues became more complicated.

The European drug report 2016 indicates that drug markets generate huge revenues: according to the most conservative estimates in 2013, the volume of retail drug sales in the European Union amounted to 24, 3 billion euros. The volume of sales for certain types of drugs as follows: 38% - products of cannabis, 28% heroin 24% cocaine, 8% amphetamine, 2% - MDMA. Most seizures occur in Spain and the UK. According to the European report 2014, London has become the largest consumer of cocaine: 700 thousand people in the UK aged 12 to 59 years take it on a regular basis. Relatively high indications for seizures have Italy, Germany, Belgium. In France, the Netherlands, information on seizures is closed, and Turkey also records frequent cases of confiscation of narcotic drugs, as law enforcement agencies intercept drugs in transit to countries outside the European Union, in particular Russia, as well as countries of the Middle East. The report of the International narcotics control Board indicates that there are 4 smuggling routes through which heroin enters the European Union: the "Balkan route", the "southern route", the offshoot of the "Balkan route" and the "Northern route". The first two pass through the territory of Turkey, then crosses one of the countries: Romania, Bulgaria or Greece, then lead to Central, southern or Western Europe. Branch of the "Balkan route": drugs transit to Europe through Africa.

In General, the member States of the European Union have taken concerted action to combat transnational organized criminal groups engaged in the illicit sale of narcotic drugs. Each of the countries of the European Union undertakes to treat the smuggling of narcotic substances as a criminal offence, but the approach to the differentiation of punishment for their Commission in the countries of the European Union differs, based on the classification of the degree of rigidity of the legislation of States, given above.

In practice, there are cases of manifestations of transnational crime associated with illicit trafficking in narcotic substances in the system "European Union - Russian Federation".

Deputy Prosecutor General of the Russian Federation Alexander Zvyagintsev asked for the extradition of Russian citizen Vladimir Krasavchikov in order to bring to criminal responsibility for crimes that are associated with drug trafficking. As a result of the investigation, it was found that Vladimir Krasavchikov led an international (transnational) criminal group that exported cocaine from Ecuador to Russia in the period from 2003 to 2010. Until 2010, Krasavchikov was hiding from the investigation in Ecuador, but after the Prosecutor General's office of the Russian Federation sent a request for his extradition, which forced the offender to leave this state. Then Krasavchikov was detained in the Netherlands, where all the necessary materials for extradition were sent. The process of extradition of a Russian citizen was difficult: the interests of Krasavchikov were represented by a large group of Dutch lawyers, who strongly hindered the speedy extradition of the criminal. On July 13, 2012, the court of Amsterdam decided to extradite Krasavchikov, and on November 20 of the same year, the

Supreme court of the Netherlands approved it. Only in 2014 managed to extradite Krasavchikova in the Russian Federation, and the verdict of the Kirovsky district court of St.-Petersburg from 22.12.2017 in the case № 1-4/2017 (1-6/2016; 1-120/2015; 1-1024/2014;) he was sentenced to the penalty of deprivation of liberty for a period of 10 years with punishment serving in a corrective colony of a strict mode. The long process of transferring the organizer of a transnational criminal group to the territory of the Russian Federation shows the need for additional study of the processes of interaction between the European Union and Russia in the disclosure of such complex crimes in the field of illicit drug trafficking.

In 2017, the Russian interior Ministry managed to block a major channel of drug smuggling from Europe. Employees of the Department of transport in the Ural Federal district managed to stop the activities of the interregional group and to withdraw from illicit trafficking more than 100 kilograms of prohibited substances. Malefactors tried to create in the territory of the Ural and Volga Federal districts new channels of sale of drugs from Europe, at the same time employees of Chelyabinsk customs transferred information on a parcel with drugs which have to arrive from Europe. Parcels were sent from Germany, Belgium and Holland, and the recipients of batches of 1 to 10 kilograms of drugs were persons from Krasnodar, Ufa, Rostov-on-don, Moscow, Novosibirsk and Chelyabinsk. From the above information, it can be concluded how developed the transnational criminal group was. Only in Ufa, interior Ministry officials were able to find 240 caches in the city cemetery. In addition, an underground laboratory was discovered, where 50 kilograms of mephedrone were produced from precursors weighing 300 kilograms in one cycle. Drugs were passed through postal items in children's toys. A total of 8 contraband shipments of cocaine, hashish LSD, marijuana and other drugs from other countries in Russia were identified. As Urda M.N. (2018) informs, all operatively-search event was held with the cooperation of the MIA of Russia and of Interpol. As a result, 47 criminal cases were opened. The scale of criminal activity in this case is simply huge, which indicates the urgent need for cooperation between the European Union and Russia in combating transnational crime.

Member States of the European Union carry out activities aimed at the prevention of international drug trafficking, carried out by governments and law enforcement agencies. The implementation of the anti-drug strategy, as well as the action plans and policies of the European Union to combat organized crime, have helped in this endeavour.

Cooperation between Russia and the European Union in the fight against transnational crime is based on the International Treaty "on the plan of joint action of the European Union and Russia to combat organized crime" of 29 March 2000. This document sets out in detail the framework of cooperation between Russia and the European Union with the judiciary, law enforcement agencies, as well as with the bodies coordinating the framework of cooperation between the European Union and Russia. In section 2 "cooperation with law enforcement agencies" the document, defining the framework of such cooperation, the document instructs the participants of the action Plan to strengthen border control in order to suppress drug trafficking. According to Volevodz A.G. (2009), a common strategy of the European Union against Russia stipulates that the cooperation with Europol is in conformity with the Convention on Europol.

There is a set of measures that Express cooperation between Russia and the European Union in the fight against transnational crime: preparation of annual joint reports on the state of organized crime, exchange of technological and strategic information, training courses for law enforcement officers of the Russian Federation, exchange of experts, joint meetings, exchange of information on suspicious transactions. In our opinion, these measures should be implemented together, to use a comprehensive approach, but in this case, according to Sheveleva and Urda (2017) it is possible to achieve the desired result - if not complete eradication, a substantial reduction in the number of transnational organized criminal groups and crimes committed by them.

The action Plan for 2016-2020, prepared on the basis of the report "White paper on transnational crime", is interesting to study. The document identifies a range of actions, key areas that ultimately help to implement measures to combat transnational organized crime: strengthening international cooperation through the development of networks; the introduction of special investigative techniques,

witness protection and incentives for cooperation; administrative influence and cooperation with the private sector, as well as asset recovery. The document was adopted with the aim of structuring the mechanism for combating transnational organized crime, the task of developing a legal framework for combating transnational organized crime, and strengthening international police and judicial cooperation. According to the 2016 action Plan, the Committee of experts on the functioning of the European conventions on cooperation in criminal matters is the main body implementing the above goals and objectives. It has the following functions: to support the Committee's web page with a view to providing adequate information on the fight against transnational organized crime; to condemn the use of a safe and secure means for international legal cooperation; and to establish links between judicial networks. According to D.D. Shalagin (2018), taking into account the action Plan of 2000, as well as those transnational crimes (for example, trafficking of narcotic substances) the objectives and tasks set by the action Plan for 2016-2020 is an important aspect of combating transnational organized crime in light of the interaction between the European Union and Russia.

Cooperation between Russia and the European police (Europol) is important in the fight against international drug trafficking. A framework for the implementation of the cooperation is the cooperation Agreement between the Russian Federation and the European police office of 6 November 2003 the Purpose of the document is the expansion of cooperation in the fight against the most dangerous forms of transnational organized crime. The Agreement States that one of its subjects is the detection, disclosure and investigation of crimes that are associated with the illicit traffic in narcotic drugs, psychotropic substances and their precursors. In 2004, the Russian national contact point (RNCP) for interaction with Europol was established, it is a division of the national Central Bureau of Interpol at the Ministry of internal Affairs of the Russian Federation. RNCP interacts with Europol in the framework of its activities in the processing of requests of the latter, the direction of requests to Europol, the formation of reference materials, etc. Interaction of law enforcement agencies of Russia and Europol allows to exchange information more productively, thereby developing the most effective plans of investigation of transnational crimes and exposure of transnational organized groups.

Conclusion

Summing up the study, we note the following. The consequences of transnational crimes are harmful not to one state but to the whole of humanity, as they violate basic human rights: the right to life, the right to health, the right to work and others. Only by uniting will the international community be able to confront this serious threat. On the example of illegal sale of drugs, the authors showed the scale of the problem, identified the most effective mechanisms to combat this type of transnational crimes. It should be noted that domestic methods of detection of transnational crimes are outdated and are not able to fully meet the needs of the investigation. Confronting transnational crime, which is complex in nature, requires the interaction of both the entire world community and individual regions. Cooperation between the European Union and Russia as the largest participants in international relations is particularly important. Despite the established regulatory framework for combating organized crime, in particular drug trafficking, there are problems that require immediate solutions. It should be noted that the need for work on which it is necessary to intensify in the near future: the development of a unified anti-drug policy, the harmonization of national legislation, the development and implementation of international operations to control narcotic and psychotropic drugs in legal circulation, further exchange of experience on drug demand reduction, prevention, treatment and rehabilitation of drug patients. At the international conference "Russia-EU Partnership after enlargement: strategic planning and everyday implementation" Fedorov (2003) said that Russia shield protected Europe from the flow of drugs coming from the East. However, this can not continue permanently, because there are many examples of the elimination of drug smuggling channels from Europe, which caused significant harm to Russia. Only constructive cooperation between Europe and Russia will help to improve the situation regarding transnational organized crime in the field of illicit drug trafficking.

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Analysis of The Impact of Credit Growth and Its Asset Capacity to Non Performing Loan of Public Banking In Asean-5 Countries for Period of 2013 - 2018

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Abstract

This paper analyzes the relationship of credit growth to credit risk, namely the level of non-performing loans in 69 banks located in the ASEAN-5 countries (Indonesia, Malaysia, Thailand, Philippines, and Singapore). Bank credit risk is susceptible to financial constraints in which the relationship with the smooth running of the Bank in carrying out its core business. On the other hand, the growth of bank credit can affect the increase in NPLs, but at a certain point, credit growth can actually affect the decline in the level of NPLs. This indication of bad credit can arise if the related banks have constraints from the credit given and also the capacity of the assets owned by the Bank. This paper describes how the Bank's credit growth and the size of the firm can affect the risk related to the Bank's non-performing loan. In the context of this paper, the model used is the GMM estimator, which is suitable for research using lagged variables so that the influence of the previous period can be seen significantly. To take a more in-depth look at the effects of NPLs, using the selected variables can affect NPLs to be more specific influences. To illustrate the effect of this approach, research was conducted based on banks listed on ASEAN-5 countries. Analysis results prove that credit growth and firm size have a significant effect on non-performing loans. this is evidenced by the risk management development that occurred in ASEAN-5 countries.

Keywords: Non-Performing Loan; Credit Growth; Firm Size; Risk Management; GMM Estimator

Introduction

The 1997-1998 financial disaster, which has been hit the Asian economic system, has been affected the banking region. ASEAN-5 is a designation for 5 Southeast Asian countries, namely Indonesia, Thailand, Malaysia, the Philippines, and Singapore. Two countries, namely Indonesia and Thailand, were countries that had a significant impact during the Asian monetary crisis in 1997/1998 at that time. As for Malaysia and the Philippines, it is quite affected only by the decline in the value of their currencies. But not for Singapore, which only experienced a decline in investor confidence and demand from all investors in the Asian region. The 1997-1998 monetary crisis that once hit the country's economy in Southeast Asia, which has affected the banking sector, which began with the weakening of the exchange rate of the Thai state, which weakened the exchange rate of Bath (Yamazawa, 1998).

The crisis that began with the weakening of the nominal exchange rate in Southeast Asian countries against the United States dollar has caused a lot of bad credit and reduced public confidence in banking institutions, which in turn has weakened the banking intermediation function. At that time many people withdrew their funds (rush) in private banks and transferred them to banks that were considered safe (flight to safety), namely foreign banks and government banks or even abroad.

To prevent this, banks set high-interest rates for funds and then followed by adjustments to high lending rates. With these conditions, bank lending has stalled because the real sector is unable to absorb expensive funds. The impact of these conditions is the weakening of economic growth.

Banks always face the risk of Non-performing Loans (NPLs) because of their main function as intermediary financial institutions. Credit activities are said to be safe if the NPL ratio of the Bank concerned is less than 5%. Efforts to reduce the level of NPL ratios and eliminate the risk of bad credit

have certainly been made, as is the case with the credit application policy, the 5C principle, and others. But in reality the things that are policy and principle are still not perfect in its application. Not because of one of these policies, but there are factors that affect the level of NPL in the company.

Many previous studies have examined NPL, but with the aim to update and to strengthen the results of previous studies, this study was conducted, especially for the influence of the variable Credit Growth on NPL which is still very rarely examined. Besides that, in previous studies there were still inconsistencies in the results between the variables tested influence on NPL. This study seeks to fill these gaps so that more literature can be used as a reference for further research. The variables that will be used as control variables between Credit Growth and Bank Size to NPL in this study are Capitalization (CAR), Revenue Diversification, Debt to Asset Ratio, Return on Assets (ROA) and Operating Risk (SDROA).

The paper proceeds as follows. In section 2, a literature review related to this research is explored. Then, the methodology is presented in section 3. Data and result is studied in section 4. The final section 5 concludes the paper.

Literature Review

According to Kuncoro (2002), Asset Quality shows the quality of assets related to credit risk faced by banks due to lending and investment of bank funds in different portfolios. Every investment of bank funds in earning assets is assessed for quality by determining the level of collectibility, which is whether Current, Substandard, Doubtful, or Loss. Non-performing loans is one of the key indicators to assess the performance of bank functions. One of the functions of a bank is as an intermediary institution or a liaison between parties who have excess funds and those who need funds.

Credit growth illustrates the level of development of total loans extended to third parties in a given period. The higher the credit growth, the better the quality and quantity of credit. The higher the credit quality, the higher the chance for banks to channel the funds back to the public or debtors. With this in mind, the opportunity for banking is even greater in making profits (Vithessonthi, 2016)

According to Hammami and Lindahl (2014), credit growth defines as calculations of the natural logarithm of total bank credit with total bank assets. Total bank credit is the overall credit from loans provided by banks and all bonds issued by banks, less the allowance for impairment losses provided by banks in preventing bad loans.

This study will focus on looking at the effect of credit growth being an independent variable on bank credit risk, which in a previous study conducted by Vithessonthi (2016) found that there were different relationships between the two research periods. The variable is said to be significantly positive between credit growth and bank credit risk before the crisis in 2008, and the variable is said to have a significant negative relationship in the post-crisis 2008. as an indicator of non-systemic risk, which is the credit risk itself.

Kingu, Macha, and Gwahula (2018) said that Bank size has a positive effect on the non-performing loan dependent variable. This research was conducted at banks in Tanzania which incidentally have been effective in addressing credit risk and good loan portfolios. It was found that the greater the market share obtained by banks could reduce the level of non-performing loans while the research of Alexandri and Santoso (2015) said that it has a negative relationship to non-performing loans because of companies with a small market share, especially Rural Credit Banks (Bank Perkreditan Rakyat) that do not have a significant influence in influencing existing credit risk.

Research from Kingu et al. (2018) also says that the capital adequacy ratio is negative and statistically significant for the existence of non-performing loans. The results of his research show that the higher the capital ratio, the less non-performing loans, whereas Kumar and Kishore (2019) say that the relationship between the capital adequacy ratio is insignificant, due to policies in Indian banks.

Ferreira, Zanini, and Alves (2019) prove from his research that revenue diversification has a relationship with the non-systemic risk of banking. This is indicated by the diversified non-interest income, which has a positive and significant relationship to the Z-score, which in this diversification

activity reduces the risk of insolvency. This statement is in line with Sariartha and Husnan (2015), which states that revenue diversification can reduce non-systemic risk in banks in carrying out their business processes.

From previous research conducted by Vithessonthi (2016) shows that the deposit to asset ratio has a positive effect on non-performing loans. With high deposits as a percentage of total assets shows that the development of financial security. This shows that the deposit program is cost-efficient. Research conducted by Mwangi, Muturi, and Ombuki (2015) shows that the deposit to asset ratio has a significant contribution to financial security.

According to the research conducted by Ekinci and Poyraz (2019) on banks in Turkey, it shows that the increase in bank lending and the lack of management in carrying out monitoring and screening of borrowers results in a negative effect on return on assets. This is in line with the results of Probondani (2018), which shows that return on assets has a significant impact on the value of credit risk as measured by non-performing loans, which have an impact on reducing the profitability of government banks in Indonesia.

According to the research of Vithessonthi (2016), shows that banks in Japan have results related to operational risk from ROA having a positive correlation to non-performing loans. This calculation uses the standard deviation for the three sample years as the variability of return on assets.

Research Methodology

This research was conducted in public banking that includes ASEAN-5, namely Indonesia, Malaysia, Singapore, the Philippines, and Thailand, during the study period. The study was conducted through the websites of each company, the stock exchanges of each country, and by using the Eikon Thomson Reuters data stream. The time of the study was conducted from 2019 to 2020. The selection of the research period between 2013 - 2018 was due to the non-performing loan performance, which tended to decrease when it touched the year between the end of 2013 to the end of 2018. The purpose of this study is to determine the extent of internal factors in the banking sector that affect credit growth so that if the data are taken starting in 2014, it is likely that external factors that will predominantly influence the variable credit growth in ASEAN-5 countries.

Data is obtained by getting it from outside the company, which is called external data. Viewed from the time dimension, the data used is dynamic panel data; that is, the data obtained is a combination of time series data and cross-section data. Meanwhile, for the purposes of statistical analysis, the model testing will be used by the Bank's annual financial statement data. Bank data is the total data of government banks and private banks listed publicly.

The number of public banks covered is 83 (eighty-three) banks, consisting of 44 banks in Indonesia, 10 banks in Malaysia, 15 banks in the Philippines, 3 banks in Singapore, and 11 banks in Thailand. While there are banks included in the sample selection results that will be the subject of research are 34 (thirty-four) banks from Indonesia, 8 (eight) banks in Malaysia, 14 (fourteen) banks in the Philippines, 3 (three) Singaporeans banks and Thailand as many as 11 (eleven) banks. So that the actual amount can be used to become 69 (sixty-nine) banks. The number of observations used in the study was (6 x 69 = 414) 414 bank-years. Observations were taken from each bank's annual report for six years of observation. The sample size is used as a basis for testing the hypothesis

In this study, there are 7 (seven) variables that are grouped into three parts, namely the dependent variable, the independent variable, and the control variable. The dependent variable (Y) in this study is credit risk, as indicated by the non-performing loan (NPL) variable. Meanwhile, the independent variable is Credit Growth (BCG) (X1) and Size (X2). The control variables used are Capital Adequacy Ratio (X3), Revenue diversification (BRD) (X4), Deposit to asset ratio (DEPTA) (X5), Return on Assets (ROA) (X6), and Operational Risk (SDROA) (X7).

Table 1: Explanatory variables

No	Explanatory Variable	Equation	Definition
1	Non Performing Loan	$\frac{Non-Performing\ loan}{Total\ Credit}$	Y
2	*Credit Growth*	$\boldsymbol{Bank\ Credit\ Growth = ln\frac{Total\ Credit}{total\ asset}}$	X1
3	*Size*	$\boldsymbol{Size = \ln total\ assets}$	X2
4	*Capital Adequacy Ratio*	$\boldsymbol{CAR = \frac{Tier\ 1\ Capital + Tier\ 2\ Capital}{Risk-Weighted\ Assets}}$	X3
5	*Revenue Diversification*	$Revenue\ Diversification(HHI) = \left(\frac{INT}{NOR}\right)^2 + \left(\frac{NON}{NOR}\right)^2$	X4
6	*Deposit to asset ratio*	$Deposit\ to\ asset\ ratio = \frac{Total\ deposit}{Total\ Asset}$	X5
7	*Return on asset*	$Return\ on\ Asset = \frac{EBIT}{Total\ Asset}$	X6
8	*Operating risk of ROA*	$SHROA = {ROA_{i,t}}/{\sigma ROA_i}$	X7

The optimal Non-performing loan for banking I in period t is determined as NPL * it. Then Xit is symbolized as a collection of independent variables and control variables, which have been used as previous studies by Radivojević et al. (2019). The model used to sees a lagged variable to see its relationship within a one-year difference. The model is

$$NPL^*{}_{it} = \beta_0 NPL_{i,t-1} + \beta_i X_{i,t} + \varepsilon_{i,t} \quad (1)$$

by using lagged variables can cause errors in using too much lagged variable. In other words, the possibility of bias can occur in using panel data such as the use of OLS and FE methods. In addition, the model can also cause bias due to endogenous factors that arise due to the use of lagged variables. And to reduce these endogenous variables, the GMM method is used as a reference to minimize the endogenous factors that emerge. The modified model is shown below

$$NPL^*{}_{it} = \alpha + \beta_0 NPL_{i,t-1} + \beta_1 BCG_{i,t} + \beta_1 SIZE_{i,t} + \gamma_i X_{i,t} + \varepsilon_{i,t} \quad (2)$$

Where:

$NPL^*{}_{it}$: *Non-Performing Loan*

NPL_{it-1} : *Lagged one period of Non-performing loan*

BCG_{it} : *Credit Growth*

$SIZE_{it}$: *Firm Size*

X_{it} : *Control Variable*

ε_{it} : *Error terms*

Therefore in using the OLS method will get inconsistent results. By using two lagged variables will increase accuracy in calculating non-performing loan variables. Therefore, for independent variables and control variables, lagged variables are carried out in one period.

Arellano-Bond and Blundell-Bond estimators have one-step and two-step variants, but two-step is more efficient. Two-step standard errors tend to be biased downwards (Arellano & Bond, 1998). For that, there is a finite-sample correction for the two-step covariance matrix from Windmeijer (2005). This can make two-step robust estimates more efficient than one-step robust, especially for GMM systems.

After modeling the data and getting the estimated parameters, statistical testing to be performed are the parameters significance testing, the goodness of fit model testing, and the overdispersion model testing. After all of the testing are done, and the model is fit, best estimate of non-performing loan over in listed banking companies of ASEAN-5 Countries can be derived.

A regression model is said to have these characteristics if it has a minimum variance, if average, the estimated value will have the same value as the actual value, and the estimator used is not biased, and no estimator has a smaller variance. However, there are often regression problems that arise in regression models due to the use of several independent variables, such as serial correlation and other validity checks fo GMM methods.

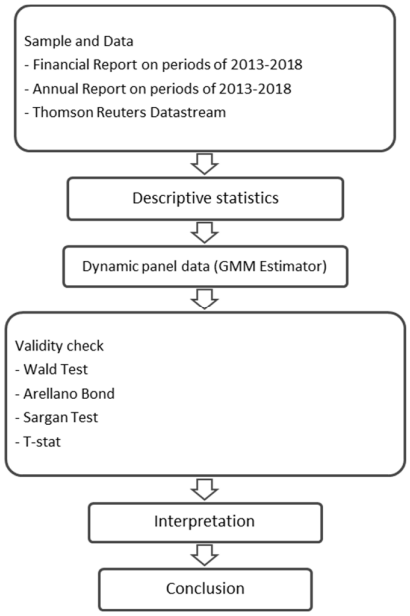

Fig. 1: Research Methods Flowchart

Results

From the statistical results, it can be seen how the average of the variables used and see the most significant and smallest values of the data taken and the average and standard deviation to see the normality of the data to be used. With a total of 414 observations, the samples taken were those listed from the public financial statements with complete information for six years.

Table 2: Descriptive Statistics

	NPL	BCG	SIZE	CAR	REV	DEPTA	ROA	SDROA
Mean	0.0274	0.1194	20.7843	0.1866	0.3066	0.7685	0.0104	0.0036
Median	0.0231	0.0965	21.0630	0.1699	0.3024	0.7825	0.0108	0.0018
Maximum	0.3455	1.9988	26.7251	0.8749	0.8608	0.8977	0.0390	0.0728
Minimum	0.0000	-0.4394	14.1535	0.0802	0.0213	0.4808	-0.1173	0.0001
Std. Dev.	0.0251	0.2041	3.5576	0.0700	0.1649	0.0730	0.0122	0.0075
Observations	414	414	414	414	414	414	414	414

If we look at the results of the correlation tables that have been tested, it can be seen that the correlation coefficient between the independent variables does not have an enormous enough value. The highest value is 0.6252, and it does not reach 0.7. By looking at the results of the table above, we can conclude that this model does not have multicollinearity. This is because the correlation coefficient between independent variables is still under the condition of multicollinearity, which is 0.8 (Gujarati & Porter, 2008)

Table 3: Serial Correlation Test Tables

Correlation	NPL	BCG	SIZE	CAR	REV	DEPTA	ROA	SDROA
NPL	1.0000							
BCG	-0.2648	1.0000						
SIZE	-0.0772	-0.2349	1.0000					
CAR	0.1009	0.2152	-0.3255	1.0000				
REV	-0.0325	-0.1450	0.6252	-0.2167	1.0000			
DEPTA	0.0254	0.0751	-0.2573	-0.1441	-0.3067	1.0000		
ROA	-0.3345	0.1429	0.1978	0.0033	0.0588	-0.2197	1.0000	
SDROA	0.3266	-0.1262	-0.2952	0.1132	-0.0613	0.0405	-0.6146	1.0000

This first analysis uses a panel data regression type where the selected variables have been tested in several previous studies, where the value of Non-performing loans influences the selected instrument variables (Vithensonthii, 2016). The dependent variable (Y) in this study is credit risk, as indicated by the non-performing loan (NPL) variable.

By seeing the goodness of fit using the Wald test, the regression model conducted and estimated using the first difference generalized method of moments is already significant. This can be seen from the following table.

Table 4: Wald Test

Wald Test:			
Equation: EQ01			
Test Statistic	Value	df	Probability
F-statistic	6.039807	(7, 332)	0.0000
Chi-square	42.27865	7	0.0000

It can be seen that this condition has a p-value for F-statistics of 0,000. With a significance level of 1%, then the null hypothesis, which states that the chosen instrument variables do not have a significant effect on the dependent variable simultaneously, can be rejected. So overall, it can be said that the instrument variable has its own influence on the dependent variable.

Table 5: Arellano-Bond Test

Arellano-Bond Serial Correlation Test				
Equation: EQ01				
Date: 05/09/20 Time: 14:09				
Sample: 2012 2018				
Included observations: 345				
Test order	m-Statistic	rho	SE(rho)	Prob.
AR(1)	-0.429767	-0.009178	0.021356	0.6674
AR(2)	-1.772427	-0.013717	0.007739	0.0763

From the Arellano-Bond test, it can be concluded that there is no second-order autocorrelation in the regression model used. This is evidenced by the p-value of the m-statistic AR (2) of 0.0763, by using a significance level of 5%.

By using NPL as a dependent variable and looking at the effect of its lag variable, the regression results obtained with the Generalized Method of Moments (GMM) method use data from the previous period (t-1) to the next period. The regression model used is the Two-Step System Generalized Method of Moment (GMM).

This method is carried out to overcome bias results due to endogeneity problems that often occur in the OLS method. GMM is the most suitable method to be used in this study because GMM is used to overcome endogeneity problems that arise. After all, there is a possibility that the relationship between the dependent variable and the independent variable not only reflects the influence of that two variables, but also affects the dependent variable on the control variable. Following is a table of regression results using the GMM dynamic data panel model.

Table 6: GMM Dynamic Panel Data Results

Dependent Variable: NPL				
Method: Panel Generalized Method of Moments				
Transformation: First Differences				
Date: 05/09/20 Time: 14:08				
Sample (adjusted): 2014 2018				
Periods included: 5				
Cross-sections included: 69				
Total panel (balanced) observations: 345				
White period instrument weighting matrix				
White period standard errors & covariance (no d.f. correction)				
Instrument specification: @DYN(NPL,-1) BCG SIZE CAR REV DEPTA ROA				
SDROA @LEV(@SYSPER)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
NPL(-1)	-0.049100	0.019630	-2.501200	0.0129
BCG	-0.010460	0.003533	-2.960549	0.0033
SIZE	0.007753	0.003850	2.013782	0.0448
CAR	-0.014115	0.019636	-0.718839	0.4727
REV	0.010944	0.007891	1.386858	0.1664

DEPTA	-0.033659	0.015756	-2.136298	0.0334
ROA	-0.383596	0.140282	-2.734467	0.0066
SDROA	0.472304	0.314167	1.503353	0.1337
@LEV(@ISPERIOD("2014"))	-0.001485	0.000971	-1.528237	0.1274
@LEV(@ISPERIOD("2015"))	-9.15E-05	0.000790	-0.115791	0.9079
@LEV(@ISPERIOD("2016"))	0.004333	0.001098	3.945346	0.0001
@LEV(@ISPERIOD("2017"))	0.000526	0.001166	0.450533	0.6526
@LEV(@ISPERIOD("2018"))	-3.89E-05	0.000830	-0.046804	0.9627
	Effects Specification			
Cross-section fixed (first differences)				
Period fixed (dummy variables)				
Mean dependent var	0.002428	S.D. dependent var		0.022794
S.E. of regression	0.021989	Sum squared resid		0.160527
J-statistic	23.18214	Instrument rank		32
Prob(J-statistic)	0.229414			

The results of the Sargan test value listed above was obtained the j-statistic value of 0.229414. With a significance of 10%, it can be assessed that the number can be greater, so that the null hypothesis of no overidentifying restrictions fails to be rejected

T-test was conducted to test the effect of independent variables on the dependent variable individually. The results of the test can be seen by comparing the value of α with a p-value. If the P-value is smaller than the Alpha value of 0.05, then H0 is rejected, and H1 is accepted, which means that there is an influence between the independent variable and the dependent variable. Conversely, if the p-value is greater than the Alpha value of 0.05, then H0 is accepted, and H1 is rejected where it indicates that there is no influence between the independent variable and the dependent variable.

Discussion

Table 7: GMM Dynamic Panel Data Summary (One-tailed)

Variable	Coefficient	t-Statistic	Prob. (one-tailed)
BCG	-0.0105***	-2.9605	0.0016
SIZE	0.0078**	2.0138	0.0224
CAR	-0.0141	-0.7188	0.2363
REV	0.0109*	1.3869	0.0832
DEPTA	-0.0337**	-2.1363	0.0167
ROA	-0.3836***	-2.7345	0.0033
SDROA	0.4723*	1.5034	0.0668
***Significancy at 1%			
**Significancy at 5%			
*Significancy at 10%			

Based on Table 7, it can be seen that the p-value of the independent variable is 0.0016, where when the p-value is smaller than the significance value of Alpha 0.01, then H0 is rejected, and H1 is accepted. So it can be concluded that the independent variable in this study, namely Credit Growth (BCG), has a

significant influence, there is a dependent variable, namely Non-Performing loans (NPL), which indicates that credit growth can be a predictor of non-performing loans. Then the p-value of the independent variable that is size shows a value of 0.0224 which means that there is a significant influence between SIZE and the NPL dependent variable which means SIZE can indeed be a predictor to see non-performing loans which is also in line with previous studies.

By looking at the control variables, there are four control variables that indicate the significance of the Non-Performing Loan dependent variable, namely revenue diversification (REV) with a probability value of 0.0832 with a significance of 10%; Deposit to asset ratio (DEPTA) with a probability value of 0.0167 with a significance of 5%; then Return on Assets (ROA) with a value of 0.0033 using a 1% significance; and Operating Risk (SDROA) with a value of 0.0668 using 1% significance. These four control variables have a significant influence on Non-performing Loans, so that the chosen variables are in accordance with previous research journals.

Other control variable regression results, namely the Capital Adequacy Ratio (CAR) showed a p-value of 0.2363 where this value is greater than Alpha 0.05 and indicates that no significant effect was found between the CAR and the NPL dependent variable so that in this study indicated that the CAR could not be used as a predictor for predicting an increase in bad credit in this study.

Conclusion

After running some data analysis, Credit growth has a significant and negative effect on non-performing loans in public banks that include ASEAN-5. This indicates that in banks in Southeast Asian countries, credit growth can be used as a predictor to predict an increase in non-performing loans in the state. This can happen because the customer's sentiment towards credit demand is very dependent on the economic conditions in the state. It can be pointed out that the increase in NPLs in ASEAN-5 is related to the decrease in credit demand from customers as well as from monetary conditions such as inflation and changes in interest rates in the country.

Size as an indicator of asset capacity owned by banks has a significant and positive influence on non-performing loans of public banks, including ASEAN-5. This indicates that banks in ASEAN-5 countries with the majority of banks with large assets instead indicate an unfavorable credit cycle. This inadequate credit cycle shows that there is inadequate risk management for banks that have large assets in lending.

The selected control variables that have been chosen indicate a significant effect on the changes in Non-Performing Loan, except the Capital Adequacy Ratio (CAR). It can be seen that the minimum capital supply that has been provided by the bank did not affect the increase in NPL.

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Limitation for Non - Traditional Trademark Protection in Indonesia: Certainty Over Progressivity?

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Abstract

Indonesia issued Law Number 20 / 2016 on Trademark and Geographical Indication. This new law also introduces several significant changes that refine current practices; one of the most important amendments is the broadening scope of the trademark category including three- dimensional form, sound marks, and hologram marks, known as Non - Traditional Trademark. This provides broader progressivity in the term scope of protection although the requirement of visually perceptible for trademark remains to stand as a limitation in the name of legal certainty. This paper used juridical normative method, aims to examine the new scope protection of trademark according to Indonesia's new trademark law and how it impacts to the implementation of trademark protection in Indonesia compared to some countries that also applied the protection of Non - Traditional Trademark. The result shows that the requirement "graphically visible requirement" in Indonesia New Trademark Law provides certainty in its implementation of legal protection although its limiting the scope of trademark protection comparing to other jurisdictions where many countries perceived Non - Traditional Trademark as a progressive effort to comply with global trade tendencies for in recent years the industries keep registering more and more trademarks in an unconventional area like a hologram, three - dimensional trademark, sounds, scents and even taste and this potentially result in the limitation of protection for Indonesia's product in the global market.

Keywords*:* Non - Traditional Trademark, Legal Protection, Indonesia Trademark Law

Introduction

Statement of the Problem

Trademark plays a pivotal role in the modern economic world as an inevitable part of product identity. The main function of a trademark is to provide distinctiveness among products and services. Traditionally trademark limited to word, color, symbol, or design or a combination thereof. Over the years, the concept of a trademark has expanded along with the massive growth of the global market and international trading. The producer faces the urgencies to individualize their product and sharpen the distinctiveness from the competitor's products to give the clearer information about the product and services (Mauritius Research Council, 2003) by individualizing the signs and characteristic as the element of distinctiveness to strengthen product impression, not limited to traditional forms like word, color, and symbol, but also in broader scope and senses, for example, the scents have been used as the product identity in the commercial market to sharpen the product impression in the eye of the consumer. (Hawes, 1989)

Globally, the producers use many measures and resources to gain a distinctive impression of a product that can vary in a very wide range starts from color, sound, position, olfactory, taste, moving image, 3 - dimensional designs, and shapes. These market phenomena tend to broaden the trademark in the scope of definition and sharpen it in the scope of the use and function. The definition of the non-traditional trademark can be extremely wide appearing as a challenging issue in the matter of legal protection and verification in trademark registration. Considering the uptight intersection between the definition and scope of the non-traditional trademark in Indonesian Law Number 20 / 2016 on Trademark and Geographical Indication and the very real and factual main function of a trademark, the two most important statements of the problems in this paper are:

1. Has the approach of nontraditional trademark legal protection according to Indonesian Law Number 20 /2016 on Trademark and Geographical Indication meets the needs of Indonesian products?
2. How to create synchronized legal protection of non-traditional trademark for Indonesia's product concerning international regulations, comparative studies, and national needs?

Objectives

This paper aims to:

1. Identify the approach of nontraditional trademark legal protection according to Indonesian Law Number 20 / 2016 on Trademark and Geographical Indication and its implementation in protecting Indonesian products
2. Analyze the formulation of the synchronized legal protection of nontraditional trademark concerning international regulations, comparative studies and national needs

Significance of the Study

This research expected to be the reference for interested parties and institutions related to the legal framework protection for the non-traditional trademarks according to Indonesia new trademark law and how to formulate legal protection of non-traditional trademark for Indonesia's product taking international regulations, comparative studies and national needs as consideration to formulate appropriate and synchronous protection of trademark in the global scope.

Trademark Protection in Indonesia according to Law of the Republic Indonesia Number 20 /2016 on Trademark and Geographical Indication

Law of the Republic Indonesia Number 20 /2016 on Trademark and Geographical Indication has entered into force on October 27th, 2016 and took effect on November 28th, 2016 with some major changes where Indonesia now protecting non-traditional trademarks in certain form, limited to three - dimensional trademarks, sound marks, and hologram. This limitation is a direct consequence of the definition and requirement in article 1 verse (1). The trademark protection in Indonesia uses the visual approach with the "graphically visible" requirements. This main requirement excluded non-visual (non-traditional) trademark like olfactory / scent mark from protection for they are lack visual perceptibility.

However, the new definition of a trademark based on Indonesia new trademark law provides broader and better protection of trademark as the effort to accommodate the current development of trade and information technology where creativity becomes an ultimate necessity (Ahmad M. Ramli, Ranti Fauza Mayana and Tisni Santika,2020), which brought consequences to the ease and vary creative process of creating effective product marketing strategy including product identity development through branding.

According to the present Indonesia legal context, the broader scope of trademark protection potentially brought significant implications in providing legal protection for various forms of trademarks. As further implication downstream, this potentially results in chain reactions from encouraging the producers to be more creative in branding creation and strengthening the identity of products although this new scope of protection limited to Hologram, 3 Dimensional Trademark, and Sound Mark.

Indonesia grants legal protection of trademark based on registration (first to file principle), this puts trademark registration as paramount importance. The requirements regarding the form of trademark registration based on Article 4 of Indonesia Trademark Law are: the application must contain color(s) if the Mark being applied for registration use color elements, if the Mark is in 3 (three) dimensional shape, its Mark representation is supplemented in the form of characteristics of the Mark, for sound mark the application supplemented with musical notes and sound recording this strengthen the requirement of visual perceptibility of trademark protection.

The Vary Wide Scope of Non - Traditional Trademark

The Standing Committee on the Law of Trademarks, Industrial Design and Geographical Indications established by The World Intellectual Property Organization (WIPO) classified nontraditional trademarks into two categories: Visual trademarks for example 3 (three) dimensional marks, hologram and color marks and non - visual trademarks such as sound marks, olfactory/scent marks, and taste marks. In the term of nontraditional trademark, to define the criteria means to limit the scope of protection. This wide scope frame trademark not only limited to any word, name, or symbol but also including device (and any combination of thereof) used/utilized by manufacturer/merchant as product identification to differentiate and distinguish their goods from those made / manufacturers by others. This approach tends to focus on the function and the use of trademarks as the means of identifying a product, providing the information for consumer about the origin of the product and as the symbol of the reputation of the producer, manufacturer or merchant (Sullivan, 2016), further trademark broadly viewed as a sign, or any element that also represents something other than itself. (Sandri and Rizo, 2003).

Considering the difficulties and challenges in determining the definition of non - traditional trademark, any trademark that does not fall with within the traditional scope of a trademark shall be considered as non-traditional trademark (Carapeto, 2016) and as the consequences, the registration criteria for nontraditional trademark appear to be difficult to satisfy, and further, each country to regulate the limitation considering the scope of protection for nontraditional trademark by defining what nontraditional trademark is or strictly define the limits of trademark types that can be registered, the broader the definition of a trademark the broader the scope of trademark protection.

International instruments mostly leave the scope protection of trademarks to national sovereignty. The first example is Paris Convention for the Protection of Industrial Property of March 20, 1883, as last amended on Sept 28, 1979, does not provide the limitation of protection in the absence of any specific definition of trademark and leaves the state parties to define trademark and incorporate any relevant regulations in their domestic law. The condition and requirement for the filling and registration of trademarks shall be determined in each country of the Union by its domestic legislation. TRIPs Agreement also allows the contracting parties to provide not only visually perceptible signs that are eligible for protection. The registrations of non-visual trademarks are not expressly excluded. Article 15 verse (1) TRIPs Agreements states the broader definition as any signs as long as they are capable to conduct the function of distinctiveness for products and services ranging from personal names, figurative elements, numbers, letters, and colors also any combination of these signs, TRIPs Agreement emphasized Trademark as the sign of product and also implement the principle of free to determine by allowing member states to grant trademark protection based on use. Further, members may (and may not) require a trademark to be visually perceptible.

As the consequences of those international regulations, the protection of nontraditional trademark in the European Union has been progressively conducted through *European Trademark Reform* with the latest Amendment of Trademark Regulation from Community *Trademark Regulation* (CTM) to

European Union Trademark (EUTM). EUTM entered into force on March 23rd, 2016, this new regulation defines trademark broadly as signs that capable of distinguishing the goods or services whether its particular words, personal names, letters, numbers, colors or designs, including the shape of goods or sounds to differentiate goods/ services of one venture from those of other ventures. These signs are registered to enable the competent authorities to determine the exact and precise subject of the protection afforded and enable the public to identify these signs and the relations to the manufacturer. (Kulbaba, 2016)

The graphical representation requirement has removed in trademark registration (Gruebler, Disdier-Mikus, Fields, and Hoy, 2016). The definition tends to be flexible to allow the new type of fillings that may be possible in the future due to technological advancement. The basis protection approach is the function of the sign registered as a trademark can be any signs capable of distinguishing the goods and services (Kumar, 2016). This wide scope doesn't mean that anything can be registered as trademarks. Article 7 verse (1) point (e) states the absolute grounds for refusal in case the signs exclusively consist of the natural shape/characteristic of the goods themselves, came from the necessity to obtain technical function, or in case the shape / characteristic result substantial value of goods. The scope of trademark protection in the European Union consists of a wordmark, figurative mark, figurative mark with letters, 3D mark, color per se mark, and sound mark.

This wide scope of definition and protection brought a direct consequence in the term of registration. It will be necessary to ensure that all trademark offices are equipped to manage different kinds of nontraditional registration fillings and to formulate certain mechanisms for verification of proof. The adding of the phrase *"or another characteristic"* is a step to counterbalance the removal of the graphical representation requirements which allow the expansion types of registrable trademarks, the grounds of refusal should be in the balance position. The wide scope of non-traditional trademark leads to the variation of trademark protection between one country and another.

A broader scope of trademark protection in the United States of America (USA) regulates by the *Lanham Act*. Beside word, name, and symbol, *Lanham Act* also includes devices along with any combination of thereof). *Lanham Act* also emphasizes the functional aspect of a trademark as the instrument adopted by merchants, producers, or manufacturers to identify, personalize, and distinguish their products from others'. This functionality and distinctiveness approach opens the possibility of non-traditional trademark protection. The scope of trademark protection in the USA consists of Color Trademark, Sound Mark, Olfactory Mark, Taste Mark, Moving Image Trademark, and Three Dimensional Design and Shape.

Color marks are marks that consist solely of one or more colors used on particular objects (Stockell and Hickey, 2009). To gain the color trademark protection, the applicant must prove that the color brings distinctiveness as applied to particular objects. United States Patent and Trademark Office (USPTO) will identify the determinant factors such as the duration, color promotion, and the level of product knowledge among consumers. There is a certain number of the color marks that have gained the trademark protection, for example, Tiffany & Co.'s robbin's egg color for boxes and shopping bags. Since 1845 the color has used extensively on promotional materials, including boxes and shopping bags. The Tiffany & Co Blue Color known as "*Light-medium Robin egg blue color"* is protected as a color trademark based on Registration Number 2,359,351 for boxes and Registration number 2,416,795 for shopping bags. (Max, 2012). Sound can be registered as a **sound mark** when the sound gives a certain link with the associated product and services. The applicant should clearly describe such sound marks by attached the musical notation as require by *layman's term*, for example, Metro – Goldwyn-Mayer (MGM)'s iconic lion's roar. (Daniel, 2012). The applicants also require providing audio record as supporting evidence.

Olfactory mark protection in the USA based on the consideration that sensory element especially scent is a determinant factor for product recognition. Sensory marks for example scent is also a determinant factor of products. The first registered olfactory trademark was a *Plumeria blossom* – scented registered in 1990 by California Company OSEWEZ. In the olfactory mark registration, the applicant should be able to prove that the scent or fragrance is not related to the functional or practical use of the product. For the olfactory mark, there is no graphical visibility requirement;

however, the applicants still require providing a detailed description of a certain scent. The physical specimen of the scent also uses as the supporting prove in trademark registration. To be registered as olfactory marks the applicants have to show that the scent or fragrance serves the function to identify and distinguish a brand or product. This means that the product whose purposes merely smell related like perfume or air fresheners cannot be granted with olfactory marks (Greene, 2015).

Taste marks protection can only be applied to goods and not services. The example of the taste mark is the application for the "Taste of Strawberries for pharmaceutical" applied by Ely Lily and was represented using a verbal description. Lanham act does not exclude taste marks from protection, but it's still very challenging to prove the use of the taste is a non-functional purpose of a product. **Moving Image Trademark** is given the protection when the applicant provides the specimen describes the movement of the image and its correlation with the product. Such specimens can be video recording, serial images, or a set of screen shots and have to describe the whole movement or repetition. (George, Hardy, Mangan, Poulter, 2013). Three Dimensional Designs and Shape in Lanham Act known as Trade Dress. The trade dress of a product is essentially the total image of a product and may include features such as size, shape, color or color combinations, and texture, graphic or even particular sales technique. (Pattishall, Beverly W and Hilliards, 2013).

Methodology

This research using juridical normative methods preceded by studying and examining the legal regulation and literature on theories and concepts related to the subject matter of this research. Regulations placed as the primary sources that apply to a particular situation, the research enriched by viewing the question as a matter of synchronizations among different normative systems.

Result of Analysis

The Approach of Non-Traditional Trademark Legal Protection According to Indonesian Law Number 20 /2016 on Trademark and Geographical Indication and its Implementation in Protecting Indonesian Products

Law Number 20 /2016 on Trademark and Geographical Indication defines Trademark as the signs in form of drawing, logo, name, words, alphabets, numbers, color composition in two-dimensional form and/or three-dimensional form, sound marks, hologram or the combination of two or more elements which are graphically visible to differentiate goods and/or services produced by the person or legal entity in the commercial activity of goods and services. Indonesian trademark law does not clearly define sound marks, three-dimensional marks, and hologram marks although this law does state the requirement of protection for those marks. For example, for the registration of sound marks, the applicant must submit a notation or sound recording as supporting prove. For three-dimensional marks, the applicant obliged to submit the trademark label in the form of three-dimensional characters that can be seen from the front, side, top, and bottom. Indonesian Trademark law does not state the requirement of hologram mark registration. This raises the assumption that the requirement to register a hologram mark is in has the same requirement as the traditional mark.

The compulsory requirement of a trademark to be graphically visible put the big challenge for registration of the non-visual mark, except sound mark that can be easily described with musical notation composition. The requirement visual graphic for trademark protection in Indonesian law, however, very logic requirement since it's a tough thing to translate the intangible aspect like sounds, scent and tastes into a graphically captured format. (Burrel and Handler, 2003).

The compulsory obligation to describe the signs registered as trademark precisely in a visible graphic form is the effort to seek legal certainty, transparency, and publicity principle in trademark registration. (Kitchin, 2011). Legal certainty is one of the most measurable purposes of the law, but this should not be the reason to step aside the objective main function of a trademark to operate as source identifiers by distinguishing the products from those of another. Further trademark has a vital

role in facilitating consumer's buying decisions and as the symbol of a reputation for a producer to gain more economic incentives for their products.

The formulation of legal protection for a non-traditional trademark in Indonesia should be set as urgency since the nontraditional trademark such as scent, taste, and texture came as strong and determinant sensory branding for global products. Practically the acknowledgment of sensory branding as a trademark is given to well known or famous trademark. The purpose is the most basic function of law itself: to protect the righteous owners from the bad faith of others. The expansion of the trademark scope raises the possibility of overlap, for example between the three-dimensional mark and industrial design. When certain design registered as a trademark the validity of protection extends from 10 years to unlimited, as long as the trademark still performs the actual use in trade. For this very reason, the scope of protection and limitation is set clearly and precisely in achieving the certainty concerning the scope of protection, the procedure, and requirement of registration also the implementation of trademark protection.

Synchronized Legal Protection of Nontraditional Trademark: Suggestions Concerning International Regulations, Comparative Studies, and National Needs

The main function of trademark law is to protect the consumers from confusion about the source of products sold under a trademark, trademark as an indicator of the source plays an important role in trade and business (Roth, 2005), with the growing creativity of product development, trademarks appear in new and innovative context (Froomkin, 2004). Businesses show increasing interest in pairing pleasant sensory marks such as scent and taste with their products as smell and taste is said to be one of the most potent types of human memory. Olfactory marks and taste marks are the two hardest kinds of marks to meet the graphical visibility requirement, besides the distinctiveness. Practically, there are few possibilities methods to describe non-visual trademark but so far these methods haven't proved to be effective and precisely describe non-visual trademarks for example through chemical formula/ingredients used by the applicant to represent the olfactory mark and write the ingredients/composition to represent taste marks, although this methods perceived to be insufficient as chemical formula and ingredients represent the substance rather than the actual smell or taste.

Verbal description considers being an option to provide the description of smell and taste although this method lacks of accuracy for there a great possibility that the description will be different between subjects. Specimen sample of the scent/taste can also be attached to support the registration although the stability of this specimen sample has certain issues of consistency. Lyons (1994) introduced Gas Chromatography (GC) or High –Performance Liquid Chromatography (HPLC) method that claimed to be able to provide good qualitative and quantitative information about complex mixtures and produce a graphic output indicating a plot of the amount of each compound against the time taken for its separation (Lyons, 1994)

Besides the hardship in providing graphical visibility form of non-visual mark, the claim of certain scent or certain taste would create a broad scope of a trademark with a strong tendency to unfair competition and monopoly. The limitation scope in trademark registration needs to be set to prevent the broad – generic trademark (as well as the broad patent is prohibited in patent law) and also can be based on the function of the trademark itself as the distinctive factor of the products. In order to be protected, a trademark (especially non-visual trademark) should be affiliated with the products. For example, the scent or taste marks affixed to the product that is not normally scented or tasted. The uniqueness of the scent, taste, and "unique" collaboration with the product has a greater chance to be considered as distinctiveness.

There are few successful registrations of such combination in the United Kingdom and the United States for example "the smell of fresh-cut grass for tennis balls (Vennootschap Onder Firma Senta Aromatic Marketing's Application, Case R 156 / 1998-2 ETMR 429), the scent of roses applied to tires (U.K. Reg No.2000234/filling date Oct 31, 1994) the strong smell of bitter beer applied to flights for darts (U.K. Reg No.2001416/filling date Oct 31, 1994) and the scent of strawberry, grape or cherry for motor fuel (U.S. Reg No. 2,596,156, strawberry; U.S. Reg No. 2,568,512, grape; U.S. Reg No.2,463,044).

The solution for the invisibility of sensory marks like sounds, smell, or taste can be through the visualization of such marks in the form of product application and perform the distinctiveness function because traditionally trademarks are attached to goods. The distinctiveness should be measured on how many the sensory marks produce the distinctiveness on such goods/product they are attached. (De Carvalho, 2011). In other words, the attachments of the sensory marks with the products create the visibility of such invisible sensory marks to meet the graphically visible requirement in trademark law.

Broadly, the doctrine of secondary meaning can be the solution and intersection between sensory marks (non-visual marks) and graphically visible requirement. The secondary meaning gained by certain products through the process of marketing to build the consumer's perception of such products and then apply for trademark protection based on actual use according to article 15 verse (2) of TRIPs Agreement where Member state may make registrability depend on use. However, actual use of trademarks shall not be a condition for filling of application of registration"

Tyser (2015) proposed the existence of secondary meaning can be proved by both direct evidence and indirect evidence. Direct evidence gained from a consumer survey and the scope of product market, whereas indirect evidence gained based on use, exclusivity, advertisement methods, and the evidence that such product is a trendsetter and massively copied by the competitors. Protection based on secondary meaning aims to protect the unregistered - but popular or been used in a relatively long time from the bad faith of unfair competitors and as the recognition of any existing prior rights in accordance with Article 16 of TRIPs Agreements. Further, Indonesia Trademark Law also allows the unregistered well-known trademark owner to fill lawsuit for trademark annulations in case other party registers a similar trademark.

Conclusion

The protection of non – traditional trademark according to Indonesian Trademark Law limited to sound mark, hologram, and three-dimensional trademarks. This scope of protection is the direct consequence of the definition of the trademark which is limited by the graphically visible requirements. This approach took as the effort to guarantee the legal certainty in trademark registration and scope of protection.

Along with the massive development of global trade, in order to formulate synchronized legal protection of nontraditional trademark, it's important for Indonesia to continuously pursue progressivity in protecting nontraditional trademark by adopting some progressive methods and measure taking international regulations, comparative studies and national needs in accordance with the global tendency where trademarks appear in a new and innovative context.

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Food Waste in Poland – Typology of Households

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Abstract

Food waste is a widespread issue posing a challenge to global food security and environmental governance. Causes of food waste on the level of wholesalers and retailers, food services, and households involve a wide range of issues including awareness, knowledge, attitudes, preferences, portion size, planning, socio-economic factors, labelling, packaging, handling, storage, stock management, logistics and expectations of a retail chain concerning product quality and shelf life. Among the key reasons for wasting food in households, first of all, non-consumption of the product in a timely manner is given, which results in its deterioration or expiration. In the article, the authors present the results of a study on consumer behavior regarding food waste in households in Poland (N=1070). The focus was on the analysis of the frequency of throwing out purchased food and on identifying the causes of throwing out food by consumers in Poland in relation to consumer segmentation variables (such as age, material status, education and the number of people in the household). The results of the study made it possible to carry out typologies of households that waste food in Poland. The frequency scale and reasons for throwing food out by Polish consumers clearly indicate that they have very low awareness of the problem of food waste. Food waste in Poland is a big ethical, economic and social problem. This study was supported by the National Science Centre (Narodowe Centrum Nauki), Poland [grant number 2017/27/B/HS4/00805].

Keywords: Food Waste; Food Labelling; Food Purchase; Shelf Life Labelling; Expiration; Food Waste Reducing; Consumption Behavior

Introduction

Food waste is a widespread issue posing a challenge to global food security and environmental governance. It is directly related to environmental, economic, ethical and social impacts (Jírovec and Calleja, 2015). It represents an inefficient use of resources such as land, water, labour, energy, emitted greenhouse gases, a decrease of the edible mass of food along the food supply chain, and also, loss of economic value of the food produced. According to the existing data, the food system is highly inefficient as a significant amount of food is quantitatively and qualitatively lost and wasted along the supply chain. Quantitative food loss refers to physical waste resulting in a decrease in the mass of food destined for human consumption. Qualitative food loss is related to the decrease in food value in terms of product usability and fitness for consumption as it may no longer have its intended sensory, physiochemical, nutritional characteristics or even safety. Non-compliance with quality standards have an impact on the economic value of food (FAO, 2019).

Food waste in Poland and the world

FAO estimates that one-third of edible parts of food produced for consumption is lost or wasted globally, which constitutes about 1.3 billion tons per year (FAO, 2011). The concepts of food loss and food waste have been worked out in many reports and papers. The definition of food waste was not universally agreed up, which lead to problems during data collection, analyses and interpretation (do

Carmo Stangherlin and de Barcellos, 2017; Thyberg and Tonjes, 2016). According to the most often used approach, the term 'food loss' refers to a decrease in edible food mass throughout the part of the supply chain (food suppliers in the chain, excluding retail, food service providers and consumers). Food losses occurring at the retail and consumption level are considered 'food waste'. This term refers to the cases when edible products are thrown away. This is a result of the decisions and actions of retailers, food services and consumers (Thyberg and Tonjes, 2016; FAO 2019). It was reported that the share of wasted food at the consumption stage rises with the increase in a society's wealth (European Commission 2010; Lipinski et al. 2013; Kowalska 2017). In low-income countries, mass of food decreases mainly at the production stage. In developing countries, the main reasons for throwing food away are low consumer awareness and a lack of knowledge about proper handling, transportation storage and preparation of foodstuffs, and a lack of technical facilities (Parfitt et al., 2010). In industrialized countries, over 40% of the food losses occur at retail and consumer levels, which is almost as high as the total net food production of sub-Saharan Africa (FAO, 2019).

According to the data collected in the EU under the FUSIONS project, annual food waste in member states was assessed at the level of 88 million tones, which equates to 173 kilograms of food waste per person and one-fifth of the EU food production. The sector contributing the most to food waste in Europe are households, and they are responsible for 53% of cases. The costs associated with food waste for member states were estimated at around 143 billion euros. Households cover two-thirds of this amount (Fusions, 2016). The highest amounts of wasted food were reported in the UK (14.4 million tons per year), then in Germany (10.4 million tons per year), Netherlands (9.5 million tons per year), France (9.1 million tons per year), Poland (9.0 million tons per year), Italy (8.8 million tons per year) and Spain (7.7 million tons per year) (European Commission, 2010). The share of the food lost in the production sector and households varies in particular state members, e.g. in Poland over 6.5 million tons come from the production sector, and over 2 million are attributable to households, whereas in Germany these amounts are 1.8 million tons and 7.7. million tons, respectively (European Commission, 2010).

Causes of food waste on the level of wholesalers and retailers, food services, and households involve a wide range of issues including awareness, knowledge, attitudes, preferences, portion size, planning, socio-economic factors, labelling, packaging, handling, storage, stock management, logistics and expectations of a retail chain concerning product quality and shelf life (European Commission 2010). At home, food can be wasted after purchasing, after preparation and after serving, therefore Wansink (2018) specified three distinct stages of food wasting in households: buying food which is never used, preparing food that is never served, serving food that is never consumed. There are several reasons for this. One of the most common reasons for food wastage reported in researches from many countries is lack of consumption at the right time, which results in its spoilage or expiration (Quested, Ingle and Parry, 2012; Aitsidou et al. 2019; Banki Żywności, 2019). Prior literature suggests that food-related routines related to decisions in the food provisioning process are the main contributors to food waste together with perceived behavioral control. The leftovers reuse routines were found to be the most important drivers of food waste but were closely followed by shopping routines. Planning routines contributed only indirectly as a result of shopping routines. These routines were closely associated with households' perceived skills (Stancu et. al. 2016). Aktas et al. (2018) who investigated the relationship between food waste and contextual factors proved that planning routines (e.g. making a shopping list) can help reduce the food surplus.

Another cause of food waste in households is improper storage or poor stock management. A frequent occurrence is the preparation of portions which are too big in relation to the actual need (Banki Żywności, 2019; Lipinski et al. 2013). Lanfranchi et al. (2016) reported that the main reasons for food waste in Italy are leaving food in the fridge, freezer or pantry for a too long (23%), buying too much in relation to the amount which was needed (13%), expiration (12%), cooking too much (10%) and food spoilage (10%). In the UK, 255 000 tonnes of food are discarded prematurely due to non-compliance with storage conditions information (Brook Lyndhurst, 2011). Household provisioning routines, time management, accounting for family preferences can also influence food waste (Evans, 2012). Consumer waste is often a result of confusion over labels and not understanding the difference between various types of shelf life labelling used around the world. This may result in throwing out

high-quality food due to unnoticed information, misunderstanding or sometimes – due to excessive safety concerns (Wilson et al. 2017; Brook Lyndhurst, 2011). Melbye et al. (2017) reported on the attitudes of Norwegian consumers toward wasting edible food. The researchers found that people with higher subjective knowledge of food (the consumer's beliefs about his or her knowledge) tend to show more negative attitudes toward wasting edible food. Also, respondents expressing a high level of environmental concern were inclined to be more negative toward wasteful behavior.

The study of van Geffen et al. (2020) conducted in Germany, Hungary, Netherlands, and Spain showed that the presence of competing goals, such as competition between health and food waste, competition between enjoyment and food waste, and between maintaining the budget and food waste, seems to have an impact on the intentions of consumers to reduce food waste. It was noted that low food prices do not motivate consumers to reduce food waste. On the other hand, consumers in Hungary reported that they would need more money to reduce food waste arguing that food waste was often caused by the low-quality food that spoils too fast.

The socio-economic and demographic characteristics of a household also influence the level of food waste it produces. In a study by Tucker and Farelly (2016) conducted in New Zealand, it was found that food waste increases with the number of people in a household and the number of younger people. Elder people are often less likely to throw out food (CBOS 2016; van Grasso, 2019; Melbye et al. 2017). The article by van Grasso et al. (2019) demonstrated that being unemployed or working part-time was associated with less food waste behavior in Denmark and Spain. In Denmark, being male was associated with more food waste behavior, and living in a household with four or more people was associated with less food waste behavior. The results of other authors' research show that food waste increases according to the number of individuals in a household, and in particular the number of younger people (Koivupuro et al., 2012; Tucker and Farrelly, 2016).

Goal 12.3 of the Sustainable Development Goals (SDG) which were set in 2015 by the United Nations General Assembly, calls for halving per capita global food waste at retail and consumer levels by 2030, and reduce food losses along production and supply chains (United Nations, 2015). Several interventions were undertaken and policies implemented both at the local and global levels (FAO, 2019; Kim et al. 2019; Schanes et al. 2018; Parfitt et al. 2010).

The methodology of the research

The main purpose of the study was to identify consumer behavior in Poland in terms of food waste. Specific research objectives included:

• recognition of the frequency of throwing out purchased food by consumers in Poland,
• identifying and analyzing the causes of food waste in households in Poland,
• identifying and analyzing the relationship between consumer behavior related to food waste and segmentation variables such as gender, household size, and consumer income. The results of the study also allowed us to determine the typology of households in Poland in the context of wasting purchased food. In addition, the conducted analyses of the collected research material constituted the basis for the development of the demographic and economic profile of the households in Poland with the largest and smallest predisposition to food waste.

The survey was conducted using the individual direct interview method throughout Poland in the period from April to May 2019. The research tool was an interview questionnaire prepared and verified in the pilot, containing questions about consumer behavior in terms of food waste, perception of health risk in food consumption after its shelf life, interpretation of information on food shelf life, and the birth certificate (gender, age, education, material status, household size, number of children in the household). As part of the analysis, descriptive statistics were used to determine the structure of the surveyed population: structure and intensity indicators (proportions, percentages). To measure the strength of the relationship between the features (on a nominal scale), the V - Cramer contingency coefficient was used (Akoglu, 2018; Croux and Dehon, 2010).

Sample

The research population was comprised of consumers who have declared the systematic purchase of food products. The selection of the research sample (N = 1145) was carried out by the quota method (selection criteria: sex, age, and place of residence), which met the demand for maintaining the relative representativeness of the research population. After verifying the completeness of the questionnaires, 1070 questionnaires were analyzed.

Results and Discussion

The key goal of the study was to identify consumer behavior related to food waste in households, and more precisely the frequency of throwing out purchased food in households in Poland. The surveyed consumers were asked to indicate how often they discard purchased food. The results of the study of the above-mentioned issue are presented in Table 1.

Table 1: Frequency of throwing out purchased food in the household (%)

How often do you throw out purchased food?		
Frequency	**Numbers of persons**	**Percentage**
everyday	14	1.3%
2-3 times a week	83	7.8%
once a week	172	16.1%
several times a month	337	31.5%
several times a year	341	31.8%
it doesn't happen to me	123	11.5%
total	1070	100.0%

Source: Own research

As the results in Table 1 indicate, the vast majority of consumers surveyed in Poland admit that to having thrown out purchased food (88.5% of indications) - only 11.5% of consumers declare that they do not happen to throw out purchased food. The above results are very worrying - any action related to the disposal of food is referred to as waste. Such behavior is unethical, uneconomical and socially unacceptable - especially when we consider the fact that, according to the report 'Global Hunger Index 2016' worldwide, 950 million people suffer from hunger (of which a significant part comes from Africa and Asia) (https: //www.ifpri.org/publication/2016-global-hunger-index-data). The largest percentage of consumers surveyed wastes food by throwing it away several times a year (31.8% of responses). Unfortunately, an equally high percentage of consumers throw out purchased food several times a month (31.5% of responses) - this is a relatively high frequency, very worrying in the context of the long-term social and economic effects of food waste. In turn, 16.1% of respondents declared they throw out purchased food even more often - once a week, and 7.8% of consumers throw out food 2-3 times a week. The smallest percentage of consumers in Poland indicate that they throw out food every day (1.3% of responses). The results of the study regarding the frequency of throwing out purchased food indicate that the phenomenon of food waste by consumers in Poland is quite common - more than half of the surveyed people throw out food more often than once a month. It can be assumed that consumers who discard food are not able to plan shopping rationally, buy too much food in relation to consumer needs, and also have low awareness of the importance of the food waste problem.

An important issue related to the wastage of food by consumers in Poland (manifested in the throwing out purchased food) is to identify the reasons for this behavior. The results of the survey on identifying the causes of food waste by Polish consumers are presented in Table 2.

Table 2: Reasons for throwing out food by consumers (%)

Reasons for throwing out food	Numbers of persons	Percentage
Food is out of date	663	62.0%
I am not sure if the food is suitable for consumption	300	28.1%
Shopping has been poorly planned	241	22.5%
I bought or prepared too much product	214	20.0%
Food is visually unattractive	209	19.5%
I bought a spoiled food	126	11.8%
I don't want to consume food	116	10.8%
I have no storage space	33	3.1%
I didn't know how to store food	26	2.4%
The product would expire soon	25	2.3%
I can't prepare food	18	1.7%

Source: Own research

Analyzing the data contained in Table 2, we can conclude that the only rational reason for consumers throwing out purchased food is the fact that the purchased food is spoiled. In such a situation, when the consumer notices that the product is spoiled taking into account the health risk associated with consumption, discarding the product seems to be the only obvious and reasonable solution. Therefore, the above reason for throwing out food (indicated by 11.8% of respondents) should not be treated as food waste. If we consider this a waste, the reason lies with the sales agents who improperly stored the product (allowing it to break down) or did not control the shelf life, allowing to sell the product, which has expired. The most common reason for consumers throwing out purchased food in Poland is the fact that the product is expired (62% of indications). Consumers, seeing that the shelf life of food has expired, throw it out in fear of health risks. In the case of perishable food, labelled with the term 'use by', such behavior is reasonable. But throwing out expired food which is microbiologically stable, and thus marked with 'best before' date, is not reasonable and contributes to food waste. Such food is still safe but it may not be at its best in terms of sensory quality. In the context of the above, it is worth paying attention to one more aspect related to the disposal of expired food - since food has expired, it may mean that consumers buy too much food in relation to their consumption needs. Brook Lyndhurst (2011) reported that approximately 50-80% of the decision to discard overdue eggs, ice-creams and desserts was dictated by the fact that the product was out of date. The same reason was given for 40-50% of the discards of convenient ready-to-eat foods, biscuits, sweets and snacks, dairy products, rice, pasta, noodles, meat, refreshing drinks, bakery products, and salads. The driver for this state can be excessive food purchasing. Also, promotions or bulk discounts may entice consumers to buy on impulse, which encourages waste (Wansink, 2018; Aschemann-Witzel et at. 2016; Wilson et al. 2017).

Another reason indicated by consumers for throwing out food is the fact that they are not sure if the product is suitable for consumption. As one can suppose, it is caused by the fact that the consumer is not able to correctly interpret the date marking or such information is missing (e.g. when the original

packaging or parts of it are removed). In view of the above, consumers, for fear of their health (and the health of other household members), throw out such food. It seems that social communication activities to increase consumer awareness of food durability labelling and educational activities to acquire food sensory assessment skills could contribute to reducing the percentage of food waste due to consumer uncertainty about its freshness.

Another reason indicated by consumers in Poland for throwing out purchased food includes errors in planning purchases and buying or preparing too much food - about a quarter of consumers indicated the above reasons. In order to avoid such behaviors and situations leading to food waste, consumers should be more aware of their consumption needs, should rationally plan purchases (e.g. by making a list of products needed) and should increase their awareness of the socio-economic effects of the problem of food waste in Poland and the world. About 10% of respondents declared that they throw out purchased food because they do not want to consume it. The above reason seems absurd and indicates a highly irresponsible consumer as a result of buying a product (perhaps under the influence of a sudden impulse or promotion). If the consumer does not intend to consume purchased food, he should (by following the economy of sharing) share with other people (family, neighbors), or hand over the product to those in need. Throwing out food in such a situation is extremely irresponsible behavior.

In turn, the least frequently indicated reasons for wasting food by throwing it out were: 'I have no storage space' - 3.1% of indications, 'I did not know how to store the product' - 2.4% of indications, 'the product would expire soon' - 2.3% of indications and 'I can't prepare food' - 1.7% of the responses. The above reasons were indicated by a small percentage of consumers surveyed in Poland, however, in analyzing them we can conclude that they also indicate irresponsible, irrational shopping behavior of consumers, carried out on impulse, without analysis of real consumption needs; in addition, they indicate low consumer awareness of the problem of food waste. An interesting issue is the analysis of the frequency of discarding food in relation to the reasons that consumers are guided by wasting food. The results of this study in are presented in Table 3.

Table 3: Reasons for throwing out food and frequency of throwing out (%)

Reasons for throwing out food	**Frequency of throwing out food**				
	everyday	2-3 times a week	once a week	several times a month	several times a year
Food is out of date	30.8%	28.2%	32.6%	34.7%	34.9%
I don't want to consume food	7.7%	8.8%	7.8%	5.1%	4.6%
I am not sure if the food is suitable for consumption	17.9%	17.2%	15.1%	15.6%	13.3%
Food is visually unattractive	12.8%	11.0%	9.1%	10.5%	11.8%
Shopping has been poorly planned	23.1%	14.5%	11.5%	13.7%	9.8%
I bought a spoiled food	5.1%	11.0%	13.3%	10.7%	9.8%
I bought or prepared too much product	0.0%	0.9%	1.6%	1.9%	1.8%
I have no storage space	0.0%	0.9%	1.8%	0.9%	0.6%
I can't prepare food	0.0%	2.2%	1.0%	0.9%	1.4%
I bought a spoiled food	2.6%	3.5%	5.0%	4.7%	10.2%
The product would expire soon	0.0%	1.3%	0.8%	1.1%	1.5%

Source: Own research

Analyzing the relationship between the frequency of throwing out purchased food and the reasons indicated by consumers, we can see that:

• Consumers who declare they throw out food every day mainly do so because of its expiry (30.8%), poorly planned purchases (23.1%) and lack of certainty as to whether food is suitable for consumption (17.9%);

• Consumers who very often throw out food (2-3 times a week) mainly point to their expiry (28.2%), uncertainty as to whether the food is suitable for consumption (17.2%) and poorly planned purchases (14.5%). In addition - food is thrown out for the absurd reason of being visually unattractive or involving too too much preparation as indicated the consumer (about 10%).

• 1/3 of consumers discarding food once a week do so because of their expiry date, as well as the uncertainty about its usefulness (17.2%); Consumers also indicate such reasons for throwing out as: preparing too much food, poorly planned shopping and visual unattractiveness of food (about 10%). Almost 8% of consumers discard food once a week because they simply do not want to consume it, even though they have bought it.

• Consumers who discard food the least often, i.e. several times a month and several times a year, also do so mainly because of its expiry (1/3 of respondents), lack of certainty whether food is useful for consumption and visual unattractiveness of food (12 - 13%), as well poorly planned purchases and poorly planned quantity of food prepared (about 10%).

To sum up the analysis of the frequency and reasons for throwing out purchased food by consumers in Poland, there are three main reasons for such behavior, namely:

• low consumer awareness of labelling food with shelf-life dates, or more precisely the possibilities of consuming the product after the shelf life has expired, as well as the inability to correctly interpret food labelling;

• irrational purchasing behavior, which results in buying excessive amounts of food or buying food that the consumer does not want to consume or cannot prepare;

• low consumer awareness of the problem of food waste, which results in its being thrown out when the food could be handed over to people in need.

It seems that in order to reduce food waste in Poland, it is necessary to educate consumers widely about the problem of food waste, as well as about the correct interpretation of information on packaging regarding food durability.

A highly interesting issue in the context of analyzing food waste in Poland is the identification of the relationship between food discarding and segmentation variables describing the consumer and his household and the reasons for discarding indicated by consumers. An important element of the analysis is also the issue of interdependence (strength of the relationship) between demographic, economic and social features that differentiate the examined population and the frequency of throwing out purchased food. Because these features have mainly qualitative and responses are represented on a nominal scale, the V-Cramer contingency coefficient was used to measure the strength of the relationship (Bergsma and Wicher, 2013; Liebetrau, 1983). It is not burdened with such restrictions as other contingency coefficients such as C-Pearson, Q-Kendall or T-Czuprow. The analysis of the strength of the compound included all the characteristics of the research unit included in the study did not generally show any strong relationship between the frequency of food ejection and individual features. Only for statistical correctness can it be emphasized that the highest strength of the frequency of food throwing occurred in the case of education (V-Cramer = 0.134), material status (V-Cramer = 0.091) and the age (V-Cramer= 0.089) and the number of persons in the household (V-Cramer = 0.076). V-cramer correlation coefficients were calculated using IBM SPSS Statistics version 25. Generally, the obtained coefficient values can be considered low and basically say that there is no relationship between the frequency of food thrown out by the surveyed consumers and their demographic, socio-economic characteristics. Despite the fact that the conducted contingency analysis using the V-Cramer factor did not show a clear correlation between the frequency of throwing out food by consumers and their demographic and economic features, it should be considered a fully justified cross-sectional analysis, which allowed to indicate the relationship and regularity between the profiled consumers and the phenomenon of food waste in households. The rest of the article will present the relationship between the frequency of discarding food and the indicated variables, which will allow for developing a demographic and economic profile of consumers in households that waste food to the greatest and least extent as a result of throwing it out.

When analyzing the frequency of throwing out purchased food by consumers in Poland (Table 4), it can be seen that the propensity to waste food varies in different age segments.

Table 4: Frequency of throwing out food and the age of consumers (%)

Frequency of throwing out food	Age segments					
	up to 19 years	20 - 29 years	30 – 39 years	40 – 49 years	50 – 59 years	60+ years
everyday	0.0%	1.6%	1.4%	0.0%	1.8%	1.6%
2-3 times a week	18.2%	8.9%	8.1%	8.7%	7.2%	6.3%
once a week	22.7%	2.0%	19.8%	18.8%	15.7%	11.0%
several times a month	31.8%	34.2%	36.5%	31.5%	31.9%	26.6%
several times a year	18.2%	26.3%	24.8%	31.5%	33.1%	38.6%
it doesn't happen to me	9.1%	8.9%	9.5%	9.4%	10.2%	15.9%

Source: Own research

The youngest consumers are dominated by consumers who throw out purchased food several times a month (31.8%) and those who throw it out once a week, 2-3 times a week and several times a year (about 20%). None of the youngest consumers surveyed in Poland discard purchased food every day, and about 10% of them do not throw out food at all. In turn, in the consumer segment of 20-29 years, the largest percentage discards purchased food several times a month (34.2%) and several times a year (26.3%). In the aforementioned analyzed age segment, a small percentage of respondents throw out food every day and once a week, and as in the group of youngest consumers, around 10% declare that they never throw out purchased food. In the next analyzed age segment (30-39 years), also a small percentage of consumers throw out food every day (1.4%), but the percentage of consumers throwing food once a week increases significantly (compared to the 20 – 29-year-old segment) and it amounts to almost 20%. The highest percentage - like among younger consumers - discards food several times a month (36.5%). In turn, the 40 - 49 age segment shows a tendency to throw food at a lower frequency than in younger age segments - none of the surveyed consumers declared that they throw out food every day, and the largest percentage of consumers throw out food several times a month and several times in the year (31.5%). In the oldest consumer segment, there is also a smaller tendency to throw out food - the frequency is decreasing. And so in the 50 – 59-year consumer segment, the largest percentage of respondents throw out food several times a year and several times a month (about 33%); in turn, among senior consumers (60+) almost 40% declare that they throw out food several times a year, and 16% declare that they do not throw out purchased food at all (which is the highest value among all the surveyed segments). Wansink (2018) explains this phenomenon by experienced hunger or food insecurity as a child. To sum up, it can be stated that as the age of the consumer increases, the frequency of throwing out purchased food decreases, so the older the consumer, the lower his tendency to consumption behavior leading to food waste. The most frequent discarding of food concerns the youngest consumer segment (72.7% discards food every day, several times a week, once a week and several times a month), the segment 30-39 years (67.3%) and the segment 40- 49 years and 50-59 years (59% and 57%). Thus, it can be concluded that consumers aged 60+ and aged 20-29 are the least wasteful with purchased food.

Another interesting area of analysis of the study results is the relationship between the tendency to throw out purchased food and the material status of the family (subjective assessment of the material level of the household).

Table 5: Frequency of throwing out food and the material status of the family (%)

Frequency of throwing out food	Material status of the family									
	definitely below the national average		slightly below the national average		the national average		slightly above the national average		definitely above the national average	
everyday	1.1%	42.3%	0.5%	47.5%	1.8%	62.7%	0.7%	59.3%	2.0%	59.0%
2-3 times a week	3.3%		5.6%		8.9%		8.2%		9.7%	
once a week	10.0%		12.2%		17.5%		18.3%		17.4%	
several times a month	27.9%		29.2%		34.5%		32.1%		29.9%	
several times a year	34.4%	57.7%	37.2%	52.5%	28.7%	37.3%	31.0%	40.7%	31.3%	41%
it doesn't happen to me	23.3%		15.3%		8.6%		9.7%		9.7%	

Source: Own research

Analyzing the frequency of food throwing out, i.e. de facto food wastage by consumers in Poland, depending on the subjectively assessed material status of the family, it can be seen that consumers from the poorest segments have the lowest tendency to throw out food. Almost a quarter of consumers assessing the material status of their family (household) well below the national level never throws out food, and a relatively high percentage throws out only a few times a year (34.4%). 42.3% of consumers in this segment are wasting food very frequently. In the segment of consumers assessing their material status at a level slightly below the national average, a relatively high percentage (compared to other segments) admits that they never throw out food (15.3%), and as much as 37.2% throw out only several times a year. Compared to the previous segment, the percentage of people who waste food frequently (47.5%) increases slightly. In the segments of consumers assessing the material status of their family at the level of the national average and above (slightly, definitely) the percentage of people throwing food with a high frequency (from 59.0% to 62.7%) clearly increases in relation to the less affluent segments, and thus the percentage of people who never throw out purchased food decreases(about 10.0%). Thus, in summary, it can be concluded that the propensity to waste food expressed by the high frequency of its disposal is low in the poorest consumers segment (material status below the national average), and definitely higher in the segment of consumers with good and very good material status (national average and above). The above is economically and socially justified - consumers from the poorest group in Poland are more prone to rational purchases, they do not buy beyond their needs, they try to optimally plan food expenditure and consumption of this food in their households.

Another area of analysis is the relationship between the frequency of discarding purchased food and consumer education. The results of this study are presented in Table 6.

Table 6: Frequency of throwing out food and consumer education (%)

Frequency of throwing out food	Consumer education							
	vocational education		secondary education		bachelor degree		master degree	
everyday	1.0%	45.2%	1.8%	52.1%	1.7%	62.9%	0.6%	65.5%
2-3 times a week	3.6%		9.1%		5.5%		11.1%	
once a week	12.7%		15.6%		14.3%		19.7%	

several times a month	27.9%		25.6%		41.4%		34.1%	
several times a year	35.0%	54.8%	34.4%	47.9%	29.1%	37.1%	28.8%	34.5%
it doesn't happen to me	19.8%		13.5%		8.0%		5.7%	

Source: Own research

Analyzing the frequency of throwing out purchased food in relation to the education of the surveyed consumers, we can conclude there is a clear relationship between the studied phenomenon and the analyzed variable. In the segment of consumers with the lowest level of education, the largest percentage of people (from all segments) declare that they do not throw out the purchased food at all (19.8%), while the lowest percentage of people declare that they throw out food with a high frequency (e.g., only 3.6% 2-3 times a week). Among people with secondary education, the percentage of consumers who do not discard food at all is 13.5%, and the percentage of people discarding with high-frequency increases by 5 percentage points compared to the previous segment (e.g., 9.1% 2-3 times a week). In the most educated consumers segment, the percentage of people who declare that they never throw out food (up to 5.7% in the segment of consumers with master's degree education) clearly decreases, and at the same time the percentage of people who throw out food with a high frequency (e.g., up to 11.1% discarding 2-3 times a week). Therefore, analyzing the data contained in Table 6, it can be clearly stated that the propensity of consumers to throw out purchased food (expressed in a higher frequency) increases with the level of education of the consumers in Poland. Van Geffen noticed that despite the fact that consumers report a widespread aversion to waste of food and are concerned with food waste, there is a gap between what consumers aim to do in order to reduce food waste and what they actually do (van Geffen et al. 2020). This conclusion is extremely worrying - it seemed that educated people are more aware of the economic and social threats associated with food waste, as well as the huge problem of malnutrition and hunger worldwide, which should be associated with restrictive attitudes and behaviors regarding food waste in households. However, it turns out that - according to the study - consumers with lower education levels are less likely to throw out purchased food products, and thus waste less food.

When analyzing the frequency of throwing out purchased food by consumers in Poland, it is also worth analyzing the relationship between the studied phenomenon and the size of the household (the number of people in the household). These results are presented in Table 7.

Table 7: Frequency of throwing away food and the number of people in the household (%)

Frequency of throwing out food	**Number of persons in the household**									
	1		2		3		4		5+	
everyday	0.7%	54.3%	2.1%	55%	0.9%	61.5%	0.9%	62%	2.7%	53.5%
2-3 times a week	11.4%		5.6%		6.8%		10.9%		7.1%	
once a week	13.6%		13.9%		18.8%		15.4%		19.6%	
several times a month	28.6%		33.4%		35.0%		34.8%		24.1%	
several times a year	33.6%	45.7%	32.9%	45%	26.5%	38.5%	30.3%	38%	34.8%	46.5%
it doesn't happen to me	12.1%		12.1%		12.0%		7.7%		11.7%	

Source: Own research

Analysis of the data contained in Table 7 indicates that there is no clear relationship between the size of households (number of persons in a household), and the frequency of wasting food as a result of throwing it out. It turns out that the highest percentage of people who declare that they do not throw out purchased food is about 12% and occurs in all separate households except for 4 persons - in these households this percentage is lower by 5 percentage points. In turn, analyzing people who declare that they throw out purchased food every day, it turns out that most of them belong to two-person households and the largest of 5 people or more. Consumers are the least likely to dispose of purchased food from the smallest (1 and 2 persons) and largest (5+) holdings - the percentage is around 45%.

In turn, the highest frequency of throwing out purchased food can be seen in households of 3 and 4 people - the percentage is 62%. Thus, to sum up, it can be stated that the highest frequency of throwing out purchased food, i.e. wasting it in Poland, concerns consumers being members of 3 and 4-person households.

Conclusions and Recommendations

The results of the study on the diagnosis and analysis of the frequency and causes of consumer disposal of purchased food provide interesting conclusions regarding the problem of food waste in households in Poland. The basic conclusion that comes to mind is awareness of the problem of food waste. The frequency scale and reasons for throwing food out by Polish consumers clearly indicate that they have very low awareness of the problem of food waste, and thus its social and economic effects. Another important conclusion that can be made based on the conducted study (in particular based on the analysis of the causes of throwing away food) concerns the awareness of consumers in Poland in the field of marking food with information regarding its durability. It turns out that consumers are not able to correctly interpret and assess whether the product is useful for consumption (28.1% of consumers discard food because of this). In addition, consumers are not educated on labelling systems - they do not distinguish between the terms 'use by' and 'best before', which results in waste products that can be consumed beyond their shelf-life. A disturbing conclusion drawn from the research pertains to the purchasing and consumption behaviors contributing to food waste. The analyzed reasons for throwing away food indicate that Polish consumers make ill-considered purchases, buy more food than they need, and buy products that they do not want to consume later. In addition, consumers prepare more food than they can consume, which also contributes to food waste. The frequency with which Polish people dispose of purchased products is also alarming - well, more than half of the respondent’s waste food very often (up to several times a month).

In addition to the conclusions presented, the key achievement of the study is the ability to identify and describe the demographic and economic profile of the consumer in Poland and the household that wastes food the most by throwing it away. Analyses of the relationship between the frequency of throwing away food and the segmentation variables (structure indicators) indicate that the youngest consumers - under 20 years old and consumers aged 30 to 59 - are the most wasteful of food (therefore the age range is quite wide). They are also people with a bachelor’s degree or a master's degree (the higher the education, the greater the frequency of throwing away food), and those with good and very good material status (national average and above). In terms of the number of people in the household, 2 and 3-person households are the most wasteful with food.

To sum up, the results of the conducted study are worrying, they point to the large scale of the problem of food waste in Polish households. In view of the above, it seems necessary to have a broad educational social campaign that would increase the level of public awareness both within the problem of food waste itself, as well as in the field of food labelling and making rational purchasing decisions.

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Management of The Customer Portfolio and The Competitive Strategy of a Packaging Industry Enterprise

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Abstract

As a result of market instability, the economy is experiencing a rapid rate of change, which is contributing to an increase in competition. Managing a company in such conditions must be a continuous process of analyzing the business environment and potential of the company from the perspective of customers and designing and implementing strategies to secure its sustainable competitive position and effectiveness of its operations. An important area in this process is an analysis and assessment of values and establishing an optimal structure of customers. The article presents an analysis of the portfolio of active clients of a packaging industry company existing on the market since 2006. The research has made it possible to divide the customers into groups according to their individual characteristics. The assessment of the customers of a packaging company is very important and complex due to the type of dependent demand that characterises this industry and its exceptional susceptibility to economic fluctuations. The results of the research allow us to understand better the complex dependencies between the customer and the company in situations when companies change their strategies aiming at reducing costs of packaging and facing changes introduced in legal regulations concerning this specific business area.

Keywords: Customer Portfolio, Packaging, Dependent Demand

Introduction

Customer portfolio management is one of the key issues faced by company managers on a daily basis. Having initially devoted a period of time on building up a portfolio of customers, at the following stages, companies strive to increase their efficiency and thus improve the performance of the entire company. It is of crucial importance that then the profitability of customers is analysed and decisions are taken to deal with unprofitable customers.

Portfolio analyses, known since the 1980s, are an invaluable aid in customer portfolio management. Among them, the research into the customer portfolio, like CLV or CPA, is particularly important (Rudawska, 2016; Čermák, 2015), and the concept of customer relationship management is increasingly growing in popularity. The information that comes from estimating the value of customer portfolio allows for a better planning of the company's marketing strategy, shows the benefits of building lasting relationships with the client and is a helpful tool in choosing the most effective way of reaching out to the client. (Żak, 2015). At the same time, when building customer relationships, the company needs to answer the following questions: Are all customers equally important to the company? Can the company afford to meet the needs and expectations of all its customers? How to choose those clients in which it is worth, or even needed to invest?

The literature on the subject offers numerous methods of customer portfolio analysis. As well as deciding on a given method, the conclusions and decisions based on the method itself are also extremely significant, as regards further handling of customers and shaping relations with them in practice. This is particularly important in the modern economy, which is characterised by intense competition, the phenomenon of global competition and, above all, individualised and increasingly sophisticated customer needs. In situations where managers become aware of arising problems, they not infrequently take inadequate actions, which may not necessarily have an adequate impact. The most common of these are cost reductions. (Skowronek-Mielczarek, 2016) This approach may have negative consequences for the future operations of the company. In this context, it would be advisable to consider other solutions, perhaps such that go a little further and require, for example, a

modification of the company's strategy and ways of achieving a competitive advantage. Thus, a customer portfolio analysis may prove to be a kind of research which, if properly conducted, may enable the company's management to thoroughly verify the adopted strategy of gaining a competitive advantage and make a decision to change such strategy.

In this regard, a certain research gap emerges in the literature on the subject and in research. While there are many theoretical studies on strategy and portfolio analysis, there is a certain lack of considerations that would provide implications for economic practice to be followed. There is also very little reflection on how to verify competitive strategies by means of a portfolio analysis in specific cases.

Literature Review

A fundamental goal for business is to develop means by which it can perform better than their competitors (Čiarnienė, Stankevičiūtė, 2015; Troshani & Rao, 2007) Competitiveness can be described as comparative social, economic, political, technological and other positions of companies, sectors and countries. It means entity's ability to sustain and strengthen its position in the market through improvement of key competences. (Čiarnienė, Stankevičiūtė, 2015) Competitive advantage is defined as something what separates the enterprise from others and keep it alive and growing. (Smith & Flangan, 2006)

Research on business competitiveness and strategies for achieving competitive advantage has a rich and long tradition in the management science literature. It features numerous concepts of a business's competitive advantage and shows that new concepts are constantly being developed, which is probably a result of the complexity of the nature of such advantage, diversity of its sources and different types of approach to its identification and sizing (Stankiewicz, 2002). Competitive advantage is achieved by applying an appropriate competitive strategy, which can be defined as "a set of coordinated ways of achieving the company's objectives, tailored to the company's situation and environment". (Pierścionek, 1992)

In the traditional approaches, the most common sources of competitive advantage include cost advantage, quality leadership, leadership and the marketing concept of competitiveness. More recent concepts of a company's competitiveness take into account challenges resulting from sudden changes in its environment. Their distinguishing features primarily include innovation, entrepreneurship, the network connections of companies in a given sector (Włodarczyk, 2013) and also human capital (Coleman, 2007).

Some researchers emphasize the importance of resources in creating business competitiveness. Barney (1991), for example, asserts that a firm develops sustainable competitive advantage by leveraging the resources that it posses. These resources are described as unique, rare, non-substitutable and difficult to imitate by rival firms, and included all assets and capabilities (Ismail et. Al, 2014)

One of the most popular concepts of competition is the concept developed by Michael E. Porter, who identified three strategies that can be adopted by an enterprise in order to build a competitive strategy. These are the strategies of differentiation, (qualitative leadership), cost-effectiveness and focus. (Porter, 1998) Philip Kotler has also made a major contribution to the study of competitive strategies, distinguishing between the following types of strategies: leader strategy, contender strategy, follower strategy, niche strategy and alliance strategy. However, there are also other concepts in the literature on the subject. One of them is a concept based on resources and core competencies developed by Gary Hamel and Coimbatore Krishnarao Prahalad. As it is often emphasized, in practice Porter's concepts of competitiveness and core competencies complement each other, because, when combined, they comprehensively characterize the internal aspects of businesses and their environment. (Beyer, 2012)

Another concept of competitive advantage is the relational approach, which is based on the assumption that this type of advantage is based on the relations of the company. The source of advantage in this approach is the specialization of the participants in a given network, as well as unique relationships allowing for better use of specific resources of collaborating partners. Another contemporary approach to competitive advantage is the knowledge-based concept, which has its roots in a concept based on resources and core competencies. Knowledge is regarded here as a strategic resource of the company, determining its development, survival and generating a lasting competitive advantage. (Beyer, 2012).

Against such numerous strategies for achieving competitive advantage, the concept of customer service deserves - from the point of view of the objectives of this study - a very special attention. Customer service started to be of interest as early as in the 1980s, when managers pointed out that in the face of growing competition, when many companies offer products and services of similar quality, a perfectly organised customer service can be a distinguishing feature, thanks to which it is possible to win customers and encourage them to continue cooperation. (Coyle et al. 1996) It is stressed, however, that customer service is not only an area of interest for marketing specialists, but also for experts in logistics. The level of customer service offered by a given company largely depends on a number of decisions taken by the logistics team in the field of transport, inventory, warehousing, forecasting the demand, and supply orders. Therefore, it can be said that if this system is managed efficiently and the service together with the product meets their expectations, customers are fully satisfied. (Godziszewska-Nowicka, 2014) The main objective of the logistics strategy is to provide customers with the level of service they expect at a cost that is as low as possible from the point of view of the entire logistics chain. As the literature emphasizes, it is not an easy task to find the level that will allow to maximize the turnover of the company and at the same time minimize the costs. (Godziszewska-Nowicka, 2014) An adequate level of logistic customer service in industrial, commercial or service companies entails certain costs resulting from achieving specific effects of the logistics system.

Research Hypotheses and Methodology

The aim of the study was to verify the most important element of customer service as a strategy of achieving a competitive advantage by means of a portfolio analysis. This is one of the varieties of customer service strategy singled out by D. Kempny, alongside the low service cost strategy, customer selection strategy, core logistics skills strategy and trade-offs strategy (i.e. "one step ahead of the competition"), i.e. a group of strategies for achieving competitive advantage through customer service logistics strategies. The strategy of the most important element of customer service is to provide deliveries in the shortest possible time, availability of the product from stock, reliability of deliveries, flexibility, accuracy, completeness, etc. (Kempny, 2001)

The subject of the survey was a commercial enterprise offering auxiliary packaging materials (packaging tapes, polyester tapes, stretch film and packaging accessories). It is a small company located in the southern part of the Silesian Voivodeship which has now been present on the market for 15 years. The company's clients are manufacturing companies representing various industries, located mainly in the Silesian Voivodeship. They are mostly manufacturing companies of various sizes - from large manufacturing plants to small family businesses. The suppliers of the company under study are large companies with high economic power which manufacture packaging aids, both in Poland and in various countries of the European Union (France, Croatia, Turkey, Germany, and Spain).

The company's strategy was established at the very beginning of its existence and is based - in accordance with the intention of its owners - on achieving a competitive advantage thanks to an exceptionally efficient logistics service. Two assumptions were made at the time. First of all, it is extremely difficult to achieve a competitive advantage in the packaging sector in terms of product quality or innovation, as there are many importers and manufacturers of packaging and packaging materials on the market who apply aggressive pricing policies. The second assumption stipulates that the demand for packaging materials and auxiliary packaging means is a dependent demand, which

means that its size depends on the production volume in the enterprise. It is also a company operating on a B2B market. B2B markets differ from B2C markets in the structure and demand, the nature of the bought unit, the types of decisions and the purchase decision process itself. In addition, the arising demand in B2B markets is mostly derived from the demand for consumer foods. (Rebentisch, 2016) The founders of the company in question originally intended that their offer should be addressed to those companies which do not implement regular material planning, do not include packaging materials in material planning or operate in the area of large fluctuations in demand, and hence are unable to forecast demand with a sufficient accuracy. The market analysis showed that there were many such businesses in the region. The advantage of the company in question was therefore to rely on a truly efficient logistics service, i.e. immediate processing and completion of urgent orders, even relatively small ones, with a diversified range of products. That was expected to be possible thanks to the maintenance of appropriate warehouse stocks, which were supposed to ensure high availability of products and short order completion time, which in turn was to be made possible thanks to the efficient handling of orders made, mainly ad hoc, over the phone.

During the years of its economic operation, the company had to analyse the value of its customers and their profitability. While it was possible to maximize the value of the company for its customers and secure a high repeat customer business rate, the company proved to be generating too low revenues.

The research used primarily the method of examining customer profitability, which - in order to triangulate the study - was extended by a qualitative method in the form of an in-depth interview with the management of the company. During the analysis and as a result of the research in the field of the literature on the subject, a hypothesis was put forward, according to which the strategy of the most important element of service may lead to a decrease in the customer portfolio profitability. Therefore, it requires constant monitoring and analyses of the actions taken in order to be profitable.

The study was based on an analysis using a customer profitability matrix developed by M. Christopher and H. Peck. These authors proposed a matrix of customer profitability, taking into account the costs generated by customers, which is shown in table 1.

Table 1: Customer profitability matrix

Net sales value of the customer	high	Protect zone	Cost Engineer zone
	low	Build zone	Danger zone
		low	high
		Service costs	

Source: M. Christopher, H. Peck (2003) Marketing Logistics, Butterworth-Heinemann; 2 ed.

The build zone comprises relatively cheap customers with low net sales value. In their case, the possibility of increasing the turnover without a proportionate increase in service costs is considered. Customers in the danger zone should be given special attention in terms of medium- and long-term opportunities to improve sales value or reduce the cost of service, as well as strategic reasons for their

maintenance. The cost engineer zone is used to calculate the chances of increasing profitability while reducing the service level and finding new ways of securing orders. Special opportunities are being sought with customers in the protect zone in order to develop relationships so that they do not use the services of new suppliers, as these customers represent a high value for the company (Christopher, Peck, 2003).

Results and Discussion

The analysis carried out on the basis of the customer profitability matrix allowed us to locate the company's customers in the four zones.

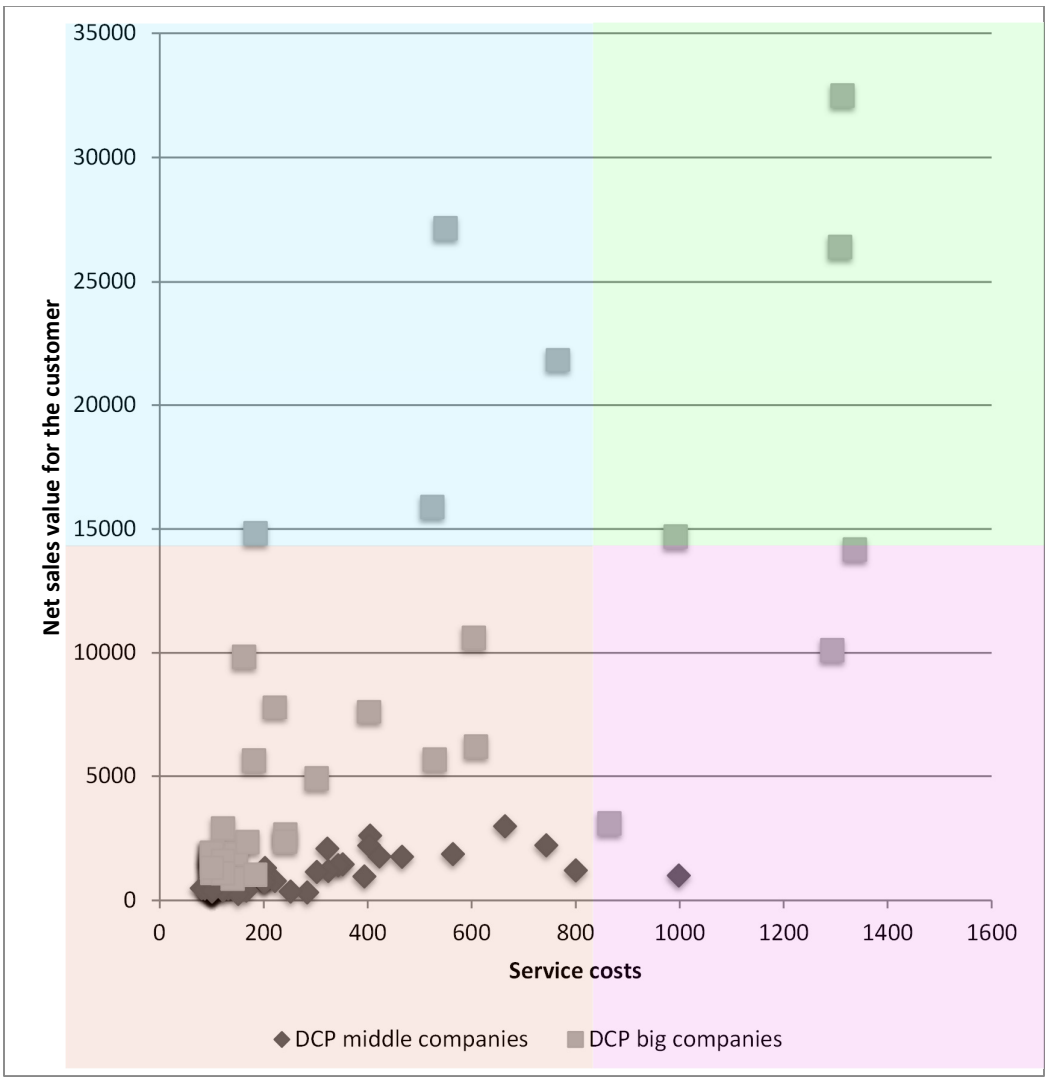

Fig. 1: Customer profitability matrix developed for the company under study

Source: author's own compilation

The approach developed by Christopher and Peck has revealed the following situation in the company's client portfolio.

There was only one large company in the protect zone, a zone where service costs are relatively low and net profit on sales is relatively high. According to an interview with the managers of the company in question, the business relationship between the two companies is long-standing and is based on a very good knowledge of the client's needs, advice and personalized orders. The companies are testing new products (specialized heavy-duty straps) together, and the employees of both companies are thinking about the best solutions. It is also important that the structure of the customer's company has allowed for the development of personal relationships: the management of the company has not changed for many years, which means that there are no barriers with regard to communication with the company and this cooperation takes place on a truly partner-like basis, with the unity of objectives of both companies.

The situation is slightly similar in the case of three companies: one of the cost engineer zone and two of the build zone. Here, too, these are large companies.

The company from the cost-engineer zone is a company which has recently recorded a large growth, and therefore its demand for raw materials, semi-finished products and thus for packaging and auxiliary packaging materials has increased. As a result, the values of individual orders from this company have increased, which can be completed in one delivery. This means that the company is approaching the protect zone, i.e. moving to the left in the graph. Due to the development of this client, there was a certain risk that it would decide to change its supplier and thus fall out of the client portfolio of the company under study. In practice, however, it turned out that the customer had become accustomed to a high level of logistical service combined with speed and flexibility of deliveries. The fact that the supplier company in question is small makes it possible for decisions to be made quickly and on an ongoing basis by its owners, in a flexible and customer-oriented manner. In this case, it is possible to speak of good results in applying the strategy of the most important element of service.

Two companies from the build zone which are close to the protect zone are long-standing customers of the supplier, and they also have recently developed rapidly expanding their customer base and increasing the value of orders. The cost of servicing them has not been very high, but the individual orders are increasing in terms of value and the companies are moving up in the graph. These companies operate according to certain patterns, in which the supplier must fit in. With the growth of these two companies, the qualifications of their employees, who are well aware of the supply needs of their companies, have improved. Here, too, the managers of the supplier company in question were concerned about whether these companies would wish to continue their cooperation, but here too, the customer's familiarity with certain standards of logistics service combined with the appropriate quality of goods played an important role.

In the cost engineer zone, theoretically, ways of handling services should be analysed in order to reduce their costs. Such a dilemma was faced by the managers of the studied company in relation to two companies from this zone. The recommended revision of the service methods in this situation could consist, for example, in less frequent deliveries higher in value. Unfortunately, in both cases it turns out to be impossible, due to the lack of standardised ways of collecting data in relation to demand in both these companies. Although they are large companies, they do not use electronic systems and place orders by telephone. The companies are not equipped with computer systems for processing demand data or planning materials needs. At the same time, they operate in a very unstable market, acting as an emergency service themselves. Also, they do not pay much attention to packaging, and do not store it. The relations of the examined supplier company with these two companies from the cost engineer zone are good, but it is impossible to discipline their managers to place orders on a more systematic and predictable basis. The chances of moving them to the protect zone (to the left in the graph) were assessed by the managers of the studied company as being low.

The build zone includes the largest group of companies, both large and small. This group comprises companies which have not recorded any growth for many years and thus, as customers, do not increase the volume or value of orders. They are often family businesses focused on their core competencies. Packaging and packaging materials are supplied on an ongoing basis, without

preparing specific demand plans as a result of which they place orders spontaneously, often modifying them after they have been already placed, order only the necessary quantities and do not store packaging. This is an extremely difficult group, as the managers of the investigated company do not see the possibility of changing the formula of cooperation with these particular companies. Of course, the examined company implements its strategy here and acts as an emergency service, but in the case of smaller companies this strategy does not generate sufficient sales value. It is significant that this value increases with the company size, as can be seen in the graph: larger companies are a little closer to the protect zone here.

Not many companies are in **the danger zone**, where high service costs are combined with low sales value (4 large and 2 small companies). Two of the large companies are nearing the cost engineer zone. The task of the managers of the studied company should be to move them to the protect zone, i.e. to the left and upwards in the graph, which may be achieved by reducing the cost of service and increasing the net sales value. In practice, the companies should be "disciplined" for this purpose, i.e. they should be compelled to order less frequently and with a higher value or they could be expected to develop into larger companies with a higher demand in the future. At the same time, however, there is a concern that by becoming larger players on the market and thus increasing their bargaining power, they might choose to resign from the services of their current supplier.

The remaining companies in the danger zone are two large and two small companies. In particular, the two small companies in this group, generating low sales value at relatively high costs at the same time, are particularly worrying from the point of view of the analysis. Similarly as in the case of the small companies from the build zone, the managers of the examined company do not see any possibility of working out a new formula of cooperation with these companies, which would allow them, e.g. to reduce their costs of service. This is also an area where the strategy of achieving a competitive advantage does not work.

Conclusions

The conducted analysis allows us to confirm the hypothesis set at the beginning of the research part, according to which the strategy of the most important element of the service may result in a decrease in the profitability of the customers' portfolio and therefore requires constant monitoring and analysis of the profitability of actions taken. The approach developed by Christopher and Peck reveals that the effectiveness of the strategy of achieving a competitive advantage through extremely efficient logistics service and acting as an " emergency service" has its limits. Net sales profit is correlated with company size, i.e., the bigger the company, the higher the profit and lower the service costs. However, it seems that companies could move in the graph to the protect zone if they were more disciplined in planning their materials needs and placed fewer orders of higher value. In this way, however, the company in question would not be implementing its competitive strategy, which its managers has chosen to follow.

Theoretically, as many companies as possible should be included in the protect zone. The only way in the current situation is to optimize routes, order volumes and routes, orders, customer discipline. First of all, however, this is not possible and as the reality shows small companies, in particular, do not systematically forecast demand and plan materials needs, and , what seems rather clear in this situation, do not use IT systems designed for these purposes. In many cases, these are family businesses, where there is also a lack of clearly defined competences of the staff responsible for purchasing. Orders are placed spontaneously and irregularly, and are often adjusted while being completed. As experience shows these companies understand "just-in-time" deliveries in this way. What is more, this also proves to be the case with large companies, as can be seen in the chart.

The company in question is dependent on the growth and corporate culture of its customers. It acts by taking on the currency risk and the risk related to fluctuations in raw material prices on the market. The packaging that the company sells contains oil-based materials whose prices fluctuate up to 10% on a quarterly basis, while product prices remain relatively stable. In conclusion, it should be stated that the strategy of the most important element of customer service described in the

literature does not prove to work. Understood as an "emergency service" does not bring the desired sales value while generating high costs. The management of the surveyed company is considering abandoning this strategy. The best solution is, of course, the economic growth of the customers' companies which would increase the value of their orders; however, the managers of the examined supplier company have absolutely no influence on that. A situation in which a specific employee responsible for purchases is appointed in the customers' companies is also extremely desirable; however, this is not always the case. In addition, it is necessary to consider individual analysis and forecasting of demand for a given customer on the basis of previous records, and encouraging the demand, e.g. by placing inquiries about orders and executing orders taking into account delivery routes. In some cases it may be recommended to move away from personal deliveries and own transport in favour of couriers and shipping.

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Entreprises Et Indicateurs Hors Prix De La Compétitivité A L'exportation

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Résumé

La compétitivité est l'aptitude pour un secteur ou l'ensemble des entreprises d'une économie à faire face à la concurrence effective ou potentielle à travers deux composantes complémentaires, à savoir la compétitivité-prix et la compétitivité hors-prix. Une multitude des instruments ont été utilisés dans la littérature pouvant évaluer la compétitivité. Cependant, cette évaluation a été dans la plupart des cas statique et se change selon le niveau d'analyse.

La compétitivité se trouve souvent réduite à la notion des prix, qui ne permet pas de dégager l'ensemble des caractéristiques des produits exportés. Ainsi, se baser seulement sur des avantages-prix, cache autant de justifications liées à l'échange extérieur. A titre d'illustration, les États-Unis et l'Allemagne qui occupent les premiers rangs au niveau des exportations mondiales, malgré les importants coûts salariaux qu'ils supportent. Leurs succès s'expliquent bien par l'utilisation des facteurs autres que le prix, le (hors-prix).

Le présent article propose de débattre l'alignement des facteurs de la compétitivité avec les exigences de la globalisation et l'importance de suivre l'évolution des facteurs de compétitivité pour chaque économie, encore plus pour une économie en voie de développement comme celle du Maroc.

Ce papier est décliné en trois grandes sections. La première présentera les déterminants de la compétitivité –prix, la deuxième est réservée à la définition de la compétitivité hors-prix dans les modèles théoriques, avant d'analyser. Dans une troisième section, l'analyse qualificative portera sur comment la compétitivité peut être améliorée à travers le développement de la capacité d'innovation, la qualité, la productivité de travail et l'adaptation à la demande internationale. La quatrième section portera sur une analyse quantitative portera sur un diagnostic de la compétitivité des exportations marocaines à travers l'évaluation de certains indicateurs clés de la compétitivité au Maroc.
Mots clés : compétitivité-prix, compétitivité hors prix, exportation, concurrence.

Introduction

L'environnement économique international a connu au cours des dernières décennies des mutations profondes, à la faveur de la dynamique des exportations et l'évolution de la perception de la compétitivité celle-ci est un concept vaste et à multiples facettes. Elle couvre des aspects aussi divers que la capacité à conquérir des parts de marché, maitriser le coût des exportations, saisir les mouvements du taux de change et garantir l'innovation, la qualité des infrastructures, le respect du droit ou bien encore la performance des services publics. La recherche de la compétitivité est devenue un souci majeur et permanent aussi bien de la part des pays développés qu'en développement.

De plus en plus, la compétitivité est liée à de nombreux facteurs comme la spécialisation géographique, la spécialisation sectorielle, les politiques de soutien des pouvoirs publics (subventions et autres aides aux exportateurs, accès au crédit et à l'assurance, etc.). Le taux de change joue aussi un rôle puisqu'il influence le prix des produits importés et exportés.

Dans cet article on essaie de déterminer les deux types de compétitivité et leurs caractéristiques d'évolution pour l'économie marocaine :

- La compétitivité-prix qui est la capacité à conquérir des parts de marché grâce à des prix plus faibles que ses concurrents ;
- La compétitivité hors-prix (ou compétitivité structurelle) qui est la capacité à conquérir des parts de marché en produisant avec une meilleure qualité et/ou un meilleur service que ses concurrents.

La compétitivité-prix se mesure par le rapport entre les prix des exportations des pays partenaires avec le prix des exportations du pays national. Dans un sens plus large, la compétitivité-prix est liée à l'évolution des coûts unitaires de production (coût du travail, prix de l'énergie, coût du capital, prix des consommations intermédiaires, etc.) nets de gains de productivité. Elle dépend donc aussi des comportements de marges des entreprises ou de l'évolution du taux de change.

La compétitivité hors-prix, de nature qualitative, est la partie de la demande non expliquée par le prix restent difficile à appréhender et il est peu aisé d'évaluer la dimension variété (cf. différenciation horizontale des produits) et la dimension qualité (cf. différenciation verticale des produits).

Par ailleurs, la Direction des études et de la prévision financière (DEPF) explique que pour le cas du Maroc, la part des exportations présentant un positionnement prix déficient est passée de 12,3% en 1998 à 20,8% en 2014. Ainsi, «le changement notable dans le modèle de croissance de l'économie, en faveur des branches industrielles émergentes à forte valeur ajoutée (automobile, électrique, électronique, produits chimiques…), a entraîné un renforcement de la contribution de produits à plus haute qualité. Ces Evolutions mettent l'accent sur l'importance de la détermination, de la mesure et de suivie des facteurs de la compétitivité propres pour chaque économie, éventuellement une économie en vois de développement comme celle du Maroc.

Les Déterminants De La Compétitivité-Prix

Le Taux De Change

Est considéré comme l'élément fondamental de l'économie des échanges, par conséquent sa gestion recouvre une place importante dans le commerce et la finance internationaux, cette caractéristique permet à la politique de change d'être un propos débattu au niveau national et international. Cet élément est déterminé par la confrontation de l'offre et de la demande relatives d'une monnaie à une autre. Il peut être défini comme suit : « le taux de change d'une zone monétaire, mesuré comme une somme pondérée des taux de change avec les différents partenaires commerciaux et concurrents ».

On distingue entre le taux de change effectif nominal (TCEN), mesuré en se basant sur les parités nominales et qui ne tient pas compte des différences de pouvoir d'achat entre les deux devises respectives, et le taux de change effectif réel (TCER), qui prend en considération les indices de prix et leurs évolutions. Le taux de change peut avoir un impact important sur la compétitivité-prix à l'exportation et sur le marché intérieur d'un pays, dans la mesure où une dévaluation ou une surévaluation peuvent influer directement la compétitivité externe du pays.

En effet, une surévaluation du taux de change effectif déprécie directement la compétitivité-prix, en renchérissant les exportations et en baissant le prix des importations. De même, une dépréciation du taux de change effectif (dévaluation en parités fixes) favorise la compétitivité-prix en diminuant le prix des exportations, ainsi en augmentant le prix des importations. Cette situation contribue à l'amélioration du solde commercial, en provoquant un déplacement de la demande étrangère et nationale vers les biens nationaux.

Pour comparer la compétitivité de deux pays dans un secteur donné, (Gallagher et al, 2006) propose de confronter leurs coûts de production, qui seront calculés en rapportant les salaires

nationaux et la productivité de la main d'œuvre. Le pays où les coûts de production sont les plus faibles bénéficie d'un avantage comparatif sur l'autre pays considéré. Toutefois, (Sharples, 1990) fait valoir que la compétitivité ne peut pas être évaluée sur la seule base des coûts de production et que les chercheurs devraient aussi prendre en compte les coûts de commercialisation, autrement dit, les coûts supplémentaires liés au fait d'apporter le produit à un acheteur étranger.

1-2 Les Couts De Production

La compétitivité-prix renvoie à la capacité de l'entreprise ou de l'industrie à gagner des parts de marché en raison d'un niveau de prix plus faible que celui des concurrents. C'est un concept de l'ordre du court terme, puisque toute variation de prix va pousser les concurrents à réagir immédiatement.

La compétitivité est déterminée par le coût de production tel que le coût des matières premières ou intrants, des frais financiers, des coûts de la main d'œuvre ainsi que de transport. Toutefois, Or, elle est considérée comme le levier d'action des pays développés pour améliorer leur compétitivité face aux pays en développement dont les coûts de la main d'œuvre sont très faibles.

A titre d'illustration, les automobiles japonaises ont mis du temps à percer en Europe, du fait d'une qualité jugée suspecte malgré leurs prix plus faibles que ceux des voitures européennes comparables; le fait que Toyota offre une garantie illimitée de trois ans a totalement modifié les conditions de la compétitivité de l'industrie automobile japonaise sur les marchés européenne. L'évolution de la compétitivité prix demeure insuffisante pour expliquer les performances d'un pays vis-à-vis du commerce extérieur.

Au niveau macroéconomique, la compétitivité d'une économie nationale désigne la capacité de son secteur productif à satisfaire la demande intérieure et étrangère. De fait, les parts de marché relatives à l'exportation sont souvent utilisées comme indicateur de la compétitivité commerciale d'un pays. Les coûts fixes sont des coûts qui ne varient pas lorsque les quantités produites augmentent ou diminuent. Ils regroupent les loyers des immeubles, les amortissements des machines, les intérêts à verser, et les dépenses administratives ... etc. Les coûts variables contiennent les dépenses qui évoluent de façon plus ou moins proportionnelle aux quantités produites, ils rallient les salaires des travailleurs, l'achat des matières premières, de l'énergie ... etc.

Par ailleurs, l'analyse de la position compétitive en fonction de l'avantage prix et avantage qualité, révèle que la part des exportations marocaines en concurrence prix à hauteur de plus de 70% en 2002 a cédé le pas à celle des ventes en concurrence qualitative.

La Compétitivité Hors-Prix Dans Les Modèles Théoriques

Pour justifier les points de différence des performances commerciales entre les pays, de nombreux modèles économétriques sont mis en place en vue d'expliquer ce phénomène, ainsi de prendre des décisions à propos des politiques structurelles. Pour certains économistes, l'avantage comparatif représente le déterminant clé de l'échange commercial. L'analyse de ce concept repose sur la comparaison entre les coûts dans un ensemble des pays, de telle sorte qu'il y ait une différence entre ces coûts comparés qui seront adoptées pour améliorer ses performances à l'export. Les modèles d'équations d'exportation à l'Armington sont la base de toute étude élaborée pour interpréter cette différence.

En fait, lorsqu'ils sont appliqués sur le cas de la France, l'étude a abouti au fait qu'ils expliquent bien l'évolution des exportations françaises avant les années 1990. Pourtant, (Bessone (A.-J.) et Heitz (B.) (2005) [1] ont conclu que les équations d'exportations traditionnelles ne peuvent pas expliquer les évolutions des parts de marché liées aux exportations françaises et allemandes. (Artus. p

et L. Fontagné, 2006)[2] confirment également ces résultats et ajoutent d'autres variables explicatives en vue de capter les facteurs d'offre et la qualité des produits. Or, (Junz, H. et Rhomberg, R.R. (1973)[3] ont déduit que les prix seuls ne peuvent refléter l'évolution des parts de marché à l'export des pays. En effet, les prix constituent l'élément important dans les transactions commerciales, et ils ne reflètent que partiellement la capacité d'un pays à imposer ses produits sur le marché mondial.

(Krugman, 1989 ; Grossman et Helpman, 1989), en tant que des pionniers des théories récentes, ont soutenu l'importance des facteurs d'offre dans l'évolution des exportations, notamment, leur forte influence sur la demande des biens et que les performances des exportations d'un pays ne dépendent pas seulement de l'élément prix mais aussi des phénomènes de qualité et de la différentiation de produit. (Murata et al, 2000) incluent une tendance non linéaire aux équations d'exportation afin d'appréhender l'effet des facteurs hors-prix de la compétitivité sur l'évolution des exportations des pays membres de l'OCDE. Ils estiment un Modèle à Correction d'Erreur MCE pour chaque pays de l'échantillon sur des données trimestrielles. Ils aboutissent à des résultats très hétérogènes selon les pays de l'échantillon. Par exemple, la tendance pour le cas de la France et l'Allemagne a un impact négatif sur les exportations, pourtant pour l'Espagne elle est positive, et pour d'autres pays comme l'Italie, elle n'est plus significative. Ensuite, (A. Rouabah, 2005) estime un modèle similaire pour le cas de Luxembourg, il a conclu la tendance a un impact significatif et positif sur les exportations de Luxembourg.

L'utilisation d'une tendance pour capter l'aspect hors-prix enrichit le modèle d'Armington et permet de mieux modéliser l'évolution des exportations mais sans discriminer les facteurs d'offre. La tendance tient en compte des variables d'offre très hétérogènes telles que la qualité des produits, la variété proposée, l'investissement direct, l'investissement immatériel ainsi que d'autres facteurs tels que l'entrée sur le marché des pays émergents. Les limites de cette approche se manifestent à l'utilisation des variables proxy pour visualiser l'effet hors-prix de la compétitivité sur les performances commerciales d'un pays donné, puisqu'il y'a un risque de divergence des résultats. Certains économistes considèrent l'innovation comme étant un facteur clé de la qualité et de la compétitivité et qui peut mieux éclaircir les différences de performances entre les pays.

(J. Fagerberg, (1988)[4] calcule un indice de la compétitivité technologique basé sur les dépenses de R&D et les brevets déposés, il stipule que si un pays possède un indice de la compétitivité technologique élevé, alors ses performances commerciales sont jugées appréciables. Toutefois, (Marnier, A ; Toujas-Bernate J (1994)[5] utilisent un proxy qui se base sur les dépenses relatives de R&D pour montrer qu'à long terme, l'augmentation des dépenses de R&D a un effet positif sur l'évolution des parts de marché.

Pamiès-Sumner (2005) [6] puis Blot et Cochard (2008) appliquent un modèle similaire en séries chronologiques et panel pour montrer les différences entre les exportations françaises et allemandes. Après, ils aboutissent à des résultats similaires, qui s'énoncent que les produits français sont moins innovants que les produits allemands, ce qui explique un décalage entre le deux pays.

A la suite, Hummels et Klenow(2002) utilisent également un indicateur des dépenses de R&D pour mesurer la variété des produits proposée par les pays. Amable et Verspagen (1995) pensent aux brevets déposés comme variable proxy de l'innovation.

Toutefois, la littérature empirique cite d'autres proxy de l'innovation, à savoir la part des secteurs de haute et moyenne technologique dans la production totale du pays (Barrellet Pomerantz 2007), le stock du capital fixe net dans le secteur manufacturier (Athanasogluet Bardaka 2008), ou

encore l'effort d'investissement (Erkel-Rousse 1992). Toutes ces mesures peuvent enrichir les équations d'Armington, mais elles ont un défaut de rétrécir la compétitivité hors-prix à l'innovation.

Plusieurs études empiriques ont été effectuées afin d'appréhender l'effet de la compétitivité hors-prix sur les exportations des pays de la zone euro par le biais de l'indicateur de compétitivité globale.

L'Institute for Management Development (IMO) donne une mesure appelée le World Competitiveness Yearbook (WCY), qui fait partie des indicateurs les plus connus de la compétitivité internationale, et elle est publiée chaque année depuis 1989, elle sert à analyser et classer les pays en fonction de leur capacité à créer et à maintenir un environnement qui permet aux entreprises d'être compétitives. Les nations doivent, en effet, fournir un environnement macroéconomique qui encourage la compétitivité qui se fait à travers les infrastructures, les institutions, et les politiques efficientes.

Quelques Déterminants De La Compétitivité Hors Prix

Les déterminants de la compétitivité hors-prix, notamment dans le contexte où la qualité et l'innovation deviennent des instruments centraux d'une concurrence efficiente à l'échelle internationale. La compétitivité hors-prix correspond à la capacité à conquérir des parts de marché indépendamment du niveau de prix grâce à la différenciation des produits, à la qualité réelle ou supposée du produit, à l'image de marque, aux délais de livraison, etc .... Cette compétitivité est de l'ordre du long terme puisqu'elle demande du temps pour se construire.

Dans le contexte actuel du commerce international, la nouvelle logique de la compétitivité est essentiellement basée sur l'exploitation des avantages hors-prix.

Ces avantages permettent à un pays de conquérir des parts de marché, de faire face au concurrence, ainsi d'améliorer l'attractivité des produits locaux en se basant sur des facteurs qualitatifs difficilement quantifiables. Ces facteurs autres que le prix, peuvent être l'apport de l'innovation, et donc de la R&D, d'amélioration de la qualité des produits, d'adoption des techniques de marketing avancé, d'une différenciation des produits ...etc

Parmi les avantages hors-prix déjà cités, la capacité d'innovation et de différentiation restent parmi les principaux éléments influant la compétitivité hors-prix.

Capacité D'innovation

L'innovation est un outil primordial de la compétitivité nationale, puisqu'elle permet de renforcer la position concurrentielle du pays à l'international. Elle permet également d'augmenter sa productivité, d'améliorer la qualité de ses produits et ses services ainsi de développer ses compétences clés. M. Porter souligne que l'innovation est le pivot de la compétitivité de n'importe quelle entité économique. Parce qu'elle conditionne sa capacité à maintenir des avantages concurrentiels durables sur les marchés.

L'innovation peut prendre deux formes, celle de produits qui renvoie à l'introduction des nouveaux produits sur des différents marchés ou bien des produits déjà présentés sur le marché intégrant un nouveau procédé, et celle de processus qui réfère au nouveau procédé de production ou une organisation novice dans l'entreprise. Or, ces deux formes ont une relation de causalité entre eux dans le sens où l'une provoque l'autre.

Qualité

La qualité est un appui important pour la compétitivité hors-prix, elle représente aussi, un pari pour les politiques qui, visent à réaliser une montée en gamme dans les secteurs à forte valeur ajoutée. La qualité d'une entité (bien ou service) se définit comme l'ensemble des caractéristiques qui lui confèrent l'aptitude à satisfaire des besoins exprimés et implicites des différents utilisateurs (AFNOR, cité par Collignon et Wissler, 1984). Elle représente la première condition d'accès au marché pour un produit, même à l'existence de ce dernier. Des économistes, toutefois soulignent que « faire de la qualité apparaît comme le prix à payer aujourd'hui pour être encore sur le marché de demain ». (Valceschini 1991).

Etant donnée une stratégie de différenciation de produits (pour certains secteurs) et dans un marché mondial en concurrence monopolistique, la qualité contribue énormément à l'amélioration de performances de pays en terme d'exportation, ainsi qu'au terme de gain de part de marché.

Productivité Du Travail

Peut être définie comme la valeur des biens produits ou la valeur ajoutée du secteur manufacturier par heure de travail. Il s'agit donc de la valeur ajoutée à la production réalisée par un travailleur. Une telle valeur dépend de plusieurs facteurs:

- Mise en place des équipements perfectionnés.
-La qualification et la formation adéquate de la main d'œuvre.
-L'amélioration des conditions de travail de la main d'œuvre et de la situation sanitaire de la population active.

La prise en compte de la productivité du travail est déterminante dans l'analyse de l'effet du coût de la main d'œuvre sur la compétitivité. L'effet de la productivité et du coût de la main d'œuvre sur la variation du coût de la main d'œuvre unitaire s'exprime sous la formulation suivante :

$$\Delta \text{ CMOU} = \Delta \text{ CMO} / \Delta \text{ PTV}$$

Ou :

Δ CMOU : variation du cout de la main d'œuvre unitaire
Δ CMO : variation du cout de la main d'œuvre globale
Δ PTV : variation de la productivité

Une augmentation des coûts de la main d'œuvre ne peut affecter l'état compétitif du pays par rapport à ses concurrents, que si la productivité relative du travail enregistre, simultanément, un accroissement notable. Alors, ceci réduit voire annule les effets pervers de la hausse des coûts salariaux sur la compétitivité. Par conséquent, la variation unitaire du coût de la main d'œuvre est un indicateur pertinent pour évaluer la compétitivité d'un pays par rapport à ses concurrents. Or, la productivité s'avère une source non négligeable de la dynamique industrielle, en favorisant l'innovation et le développement des avantages hors-coûts.

L'adaptation A La Demande Internationale

L'aptitude de répondre à la demande internationale représente un facteur déterminant de la compétitivité d'un pays.

Certes, la notion de la compétitivité exige aux pays qui veulent maintenir ou accroître leurs parts de marché, d'adapter leurs produits offerts à la demande mondiale. En effet, plusieurs travaux prouvent que les flux des exportations d'un pays dépendent en grande partie de

l'évolution du niveau de la demande extérieure qui lui est adressée, ainsi de sa capacité à s'orienter et à se positionner sur des marchés dynamiques à forte croissance.
L'ouverture mondiale ne demeure suffisante, pour stimuler la croissance du pays, qu'avec une spécialisation et diversification des échanges. Pourtant, celles-ci peuvent entraîner des risques sur la conjoncture mondiale.

La meilleure stratégie dépend de la capacité du pays à satisfaire un ensemble des conditions dont l'aptitude et la flexibilité pour suivre l'évolution de demande internationale et se prêter à la réorientation de la structure des exportations en anticipant l'évolution de la demande internationale.

D'après l'analyse effectuée ci-dessus et en se basant sur les différentes études théoriques, nous pouvons résumer les différents déterminants des exportations dans le schéma suivant :

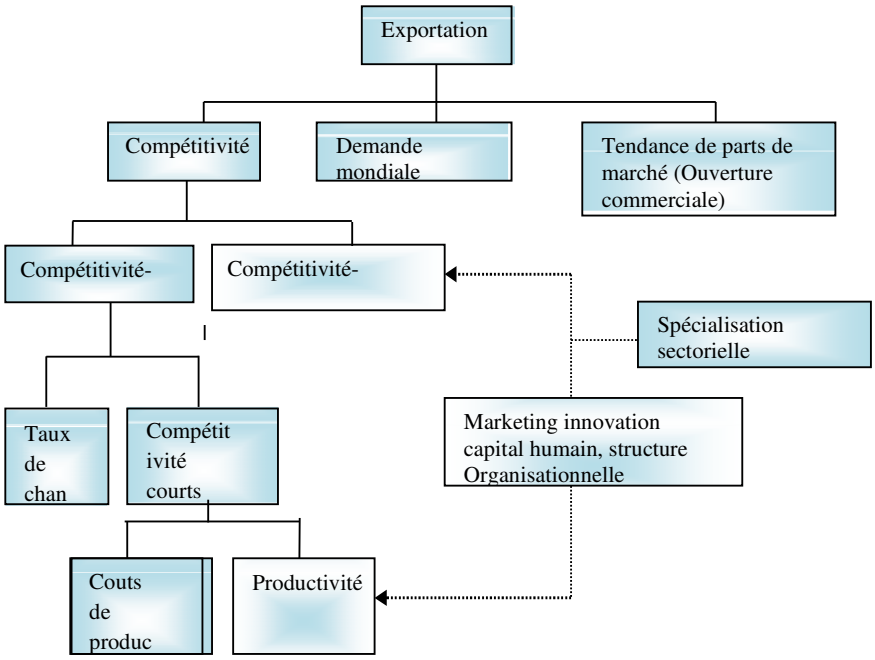

Figure1 : les déterminants associés aux performances des exportations

La mesure de la compétitivité hors prix (le cas du Maroc)

Rappel sur la Situation Des Exportations

Les exportations ont une tendance haussière durant la période 1980- 2014, mais à un rythme plus faible comparativement aux importations durant la même période. Ce qui implique une détérioration du déficit commercial d'une année à l'autre. Ce déficit s'est multiplié, allant de 7,15 Milliards de DH en 1980 jusqu'à 186,11 Milliards de DH en 2014. Il a néanmoins diminué en 2012 pour atteindre -202,3 Milliards de DH, ce qui résulte des effets de la crise économique et financière sur le Maroc et sur ses partenaires commerciaux.

Par extension, le tissu des exportations a été marqué, depuis le début de la décennie de 1980, par un manque de dynamisme, qui s'est expliqué essentiellement par la sensibilité élevée de l'offre exportable eu égard aux facteurs exogènes, notamment avec les fluctuations des prix de phosphates

et la succession des phases de repli de l'activité économique dans la zone euro. En effet, avec le recul de la demande adressée par cette zone à notre pays, la concentration de nos exportations sur le marché européen est devenue vulnérable aux effets de retournement du cycle conjoncturel dans la zone.

Quant aux importations, leur progression est maintenue à un taux de croissance moyen de 14,61%, 7,26%, 10,05%, et 7% durant les périodes 1981-1990, 1991-2000,2001-2010 et 2011-2014 respectivement. Cette progression est expliquée par la hausse des achats des biens d'équipement, des produits énergétiques et des intrants nécessaires. Pour relancer l'investissement, ainsi que le renchérissement des matières premières notamment le pétrole brut et les céréales, et également par les effets néfastes de la crise de 2008.

Les Indicateurs De Mesure Pratiqués

Suite à la mutation perpétuelle de l'économie mondiale, et pour suivre les tendances du développement de reste du monde, le Maroc se trouve face à la nécessité d'adopter une politique de la libéralisation des échanges commerciaux qui lui permet d'attirer des nouveaux débouchés extérieurs pour ses produits locaux.

En effet, la mise en œuvre de cette politique a provoqué l'intensification des investissements directs étrangers", ce qui a contribué à l'amélioration du degré d'ouverture de l'économie marocaine

Quant au taux de couverture qui traduit le pourcentage des exportations dans les importations, il est estimé à 51,8% en 2014. Ce taux a connu un fléchissement durant les dernières décennies passant de 66,43% en moyenne, durant la période 1995-2004 à 49,16% durant la période 2005-2014. Ceci est dû aux vulnérabilités structurelles de tissu industriel vis-à-vis des importations stratégiques, surtout celles des produits énergétiques depuis 2009, ainsi à la reprise depuis 2007 de celles des produits alimentaires. Ajoutons à cela, la flambée de cours des matières premières.

Les demi-produits

La part des demi-produits trace une tendance à la hausse, passant de 14% à 24,1% durant la période 1980- 2014. Cette évolution est tributaire de l'augmentation principalement, de la part des engrais naturels et chimiques et celle d'acide phosphorique, puisqu'ils prédominent les exportations des demi-produits.

Leurs parts dans celles-ci s'établissent conjointement à 62,24% en 2014 contre 70% en 1980. Or, dans les exportations totales leurs parts se situent respectivement à 8,2% en 1980 contre 6,4% en 2014, et à 1,6% en 1980, contre 8,6% en 2014.

Les produits finis d'équipement

Leurs parts dans les exportations globales s'accentuent durant la période 1980- 2014, soit un taux de croissance annuel moyen de 12,15%. Cela est dû essentiellement à l'augmentation des parts de produits finis industriels, dont la part allant de 0,3% en 1980 à 16,6% en 2014.

Evolution De La Part De Marché A L'exportation

Un des indicateurs' les plus importants pour évaluer le niveau de la compétitivité des exportations d'un pays sur un marché donné est l'évolution de sa part du marché. La hausse de cet indicateur implique une hausse des exportations du pays en question par rapport au reste du monde

Finalement, les produits manufacturiers, les biens d'équipement, et le textile qui clôturent la liste avec une part de marché à l'exportation qui est quasiment stable et qui n'excède pas 0,06%.

Quant à l'automobile, il débute à s'accroître à partir de 2008, et surtout avec le lancement de pacte d'Emergence industriel en 2012.

Durant la période 2000- 2014, les exportations des produits vestimentaires occupent le premier rang par rapport à d'autres produits. Leur part à l'exportation s'est inscrite dans une tendance baissière pour atteindre 0.67% en 2014, soit la part la plus faible observée sur l'horizon. Ce recul s'explique autant que par les crises de la consommation en Europe que par l'absence d'intégration industrielle.

Le second rang est occupé par les produits agricoles, dont la part de marché à l'exportation oscille aux alentours de 0,2% et 0,3% et qui demeure tributaire des aléas climatiques.

Adaptation des indicateurs de mesure pour la compétitivité hors prix

La Part De Marché Relatives

Elle est définie comme l'une des mesures fondamentales de la compétitivité hors-prix. Cet indicateur permet d'évaluer les performances d'un produit ou d'une industrie par rapport à ses concurrents sur le marché mondial.

L'indicateur de la part de marché en valeur permet de calculer la part des exportations d'un pays en un produit dans la demande mondiale. Comparativement à l'indicateur en volume, il présente l'avantage de tenir compte des éléments de la qualité et de la différenciation des produits soumis à la concurrence.

$$XMS_{ik} = (X_{ik} / X_{iw}) \times 100$$

Avec :

XMS ik : la part de du marché du pays dans l'industrie i au niveau mondial
X ik : la valeur des exportations du pays k pour l'industrie i
X iw : la valeur des exportations mondiales de l'industrie i

Il est à noter que si un pays présente une part de marché en valeur supérieure à celle en volume, cela indique que le prix d'exportation de ce pays est plus élevé que celui des concurrents

Indice de l'avantage comparatif révélé de Balassa

«Chacun des pays trouvant l'avantage à se spécialiser et à exporter les biens pour lesquels il dispose de plus fort avantage comparé, et à importer les autres biens de ses partenaires. Il s'avère difficile de mesurer directement ce concept, pour cette raison, de nombreuses études empiriques élaborées en référence à l'indicateur de l'avantage comparatif révélé, en tant qu'une mesure de spécialisation internationale

II existe plusieurs approches visant à mesurer cet indicateur. La plus pratique consiste à comparer la structure des exportations d'un pays *k* par rapport au reste du monde. La formule de calcul de cet indicateur se présente comme suit :

$$XRCA_{ik} = X_{ik} / \left[X_k \quad / \quad X_{iw} / X_w \right] \times 100$$

Avec:

$XRCA_{ik}$: représente l'avantage comparatif révélé, du pays *i* par rapport au reste du monde, pour un produit *k.*

X_{ik} : La valeur des exportations du pays k pour une industrie *i.*

X_k : La valeur des exportations mondiales d'une industrie i.

X_{iw} : La valeur des exportations de toutes les industries du pays *k.*

X_w: La valeur des exportations mondiales

Si le calcul de l'indicateur pour un pays *k,* dégage une valeur supérieure à 1 (l00), cela implique un avantage comparatif du pays *k* sur le commerce du produit i. De même, il indique que la part des exportations du pays *k* pour le produit. i par rapport à ses exportations totales est supérieure à la moyenne mondiale.

Productivité Apparente Du Travail

La productivité du travail ou production par actif occupé, qui, selon l'approche de la comptabilité de croissance, est la résultante à la fois du volume de capital mis à la disposition d'un actif (intensité capitalistique) et de la Productivité Globale des Facteurs (PGF). Cette dernière n'est autre que l'augmentation de l'efficacité globale du processus de production et d'une utilisation plus efficace de la combinaison capital-travail, permise par une réorganisation du travail ou bien par l'introduction de plus d'innovations.

Le coût de la main d'œuvre, a été considéré depuis longtemps comme la clé de la compétitivité des exportations marocaines. En fait, les salaires réels au Maroc, étaient faibles par rapport aux pays concurrents, ce qui lui a permis de se spécialiser dans les industries dites à forte intensité de la main d'œuvre, en particulièrement: le secteur agroalimentaire et le textile.

Cependant, cet avantage compétitif basé sur le coût salarial est devenu un désavantage en termes de la compétitivité dans la mesure où le niveau de SMIG actuel au Maroc, est classé parmi les salaires les plus élevé en Afrique, notamment dans les industries agroalimentaire et textile nécessitant le recours intense à la main d'œuvre.

La période (1999-2014) a été caractérisée par une augmentation de la productivité fortement corrélé à l'augmentation du stock d'emploi industriel.

En effet, les coûts salariaux ne constituent désormais le facteur déterminant de la compétitivité sur les marchés internationaux, pourtant, la différentiation des produits et l'amélioration de la productivité le sont. C'est pour cette raison que notre choix s'établit sur la variable de la productivité apparente du travail. Ajoutons à cela l'hypothèse qui stipule que le Maroc est doté en facteur travail.

La productivité apparente du travail se présente comme le rapport de la valeur ajoutée et les moyens mis en œuvre pouf l'obtenir. Elle peut être calculée soit par tête, soit par heure de travail effectué. Si nous procédons par l'approche par tête, la formule sera comme suit :

Productivité (t) = PIB non agricole (t) nombre de travailleurs dans le secteur industriel (t)

Hors, le surplus de productivité ne joue qu'un rôle marginal dans la croissance de la valeur ajoutée non agricole. Son taux de croissance n'a été que 0,5% en moyenne annuelle en 2000-2014 au lieu de 5,8% dans le secteur agricole.

Partant du constat que la compétitivité ne peut se réduire au coût du travail. Sans parler de la compétitivité hors-prix fondée sur la qualité et l'innovation. Celle basée sur le prix dépend aussi du coût du capital et des coûts de transactions liés aux complexités des cadres juridique et réglementaire. Par ailleurs, suite aux différentes réévaluations du SMIG au Maroc, cet avantage comparatif du bas salaire ne cesse de s'effriter au point que le travailleur marocain est devenu plus cher comparativement à d'autres pays tels que la Corée du Sud, Taïwan, la Malaisie ou encore la Turquie.

S'il est vrai que l'on peut obtenir des produits compétitifs grâce à des salaires bas, il est tout à fait possible de réduire le coût total avec des travailleurs plus productifs, qui permettront non seulement d'avoir une production plus élevée, mais aussi de faire des économies dans l'utilisation des autres facteurs de production, grâce justement à leur efficacité. Ainsi, dans l'hypothèse d'une convergence, c'est-à-dire d'un rapprochement, des salaires dans tous les pays, et c'est ce qui arrivera à terme, ce qui va faire la différence ce n'est pas le coût de travail mais c'est la productivité de travail.

Conclusion

En conclusion, compter uniquement sur les bas salaires pour attirer des investisseurs étrangers dans le but de relancer la croissance économique, revient à croire qu'il existe une course au bas salaire. Sauf que, si le bas salaire était le seul critère, comment expliquer alors que les pays développés, où le coût du travail est plus élevé, attirent plus d'IDE que les pays moins développés ? Si cette course existe, c'est uniquement pour des biens bas de gamme. Pour les autres biens, des critères supplémentaires pèsent dans la balance.

L'évaluation des principaux indicateurs de compétitivité du Maroc montre que, malgré les efforts des pouvoirs publics et en dépit de certaines réussites ponctuelles ou sectorielles, le pays n'arrive pas encore à atteindre le niveau adéquat pour affronter la concurrence mondiale et ce, en raison de la persistance de plusieurs handicaps structurels. Il s'agit en particulier de l'inertie de l'offre exportatrice nationale, sa concentration sur quelques produits et sur quelques marchés, la prédominance des produits à basse technologie et à forte intensité de ressources naturelles et de main-d'œuvre, la faible qualification et scolarisation des employés ainsi qu'une faible productivité comparativement à des pays concurrents particulièrement asiatiques. Le contexte mondial actuel, marqué par l'accélération du démantèlement des barrières à l'échange international et les co-localisations, offre, certes, des opportunités en matière d'extension du commerce extérieur. Cependant, malgré ces opportunités, les risques et les défis restent nombreux. Dans ce contexte, marqué, également, par une crise économique profonde qui affecte la zone euro, le renforcement de la compétitivité devient pour le Maroc un impératif pour relever le défi de la croissance et du bien-être, ce qui nécessite l'association des efforts de tous les acteurs socio-économiques pour développer une économie performante et compétitive.

Les pouvoirs publics ont joué un rôle important dans la promotion de la compétitivité et de l'attractivité de l'économie. Ils ont, en particulier, lancé un programme ambitieux de modernisation et de renforcement des infrastructures routière, autoroutière, ferroviaire et aéroportuaire. Ils ont même identifié, dans le cadre du ''Plan Emergence'', de nouveaux métiers mondiaux.

Ces efforts gagneraient, toutefois, à être complétés par la mise en place des conditions propices à l'amélioration des performances des exportations et la consolidation de l'attractivité. Remporter le pari de la compétitivité reste tributaire aussi du rôle de l'Etat et de l'Entreprise. Si l'Etat demeure sollicité pour assurer les conditions de la compétitivité de l'économie, il est important de souligner le rôle important que l'entreprise est appelée à jouer pour réussir le défi de la compétitivité. L'entreprise doit ainsi améliorer la qualité de ses produits, développer des techniques de management modernes, investir plus dans l'innovation et la Recherche & Développement. Elle doit aussi intégrer dans sa stratégie de développement la valorisation du capital humain comme facteur central de compétitivité et de promotion économique et social.

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Analysis of The Y Generation's Advertising Perception

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Abstract

The article focuses on the perception of advertising and its evaluation by the generation of the Millennials. The basic population for the purpose of the survey is the millennials of the East Slovakian region. 180 respondents were surveyed and it was possible to include 154 respondents' answers based on the criterion of completeness of completed questionnaires. Data collection was conducted through simple random sampling in January and February 2019. To verify the hypotheses, we used the StatSoft SPSS software. Due to the nature of the analysed variables we used Cronbach´s alpha and Mann Whitney U test. Based on the research findings, the respondents did not know or did not want to rate the internet advertising (banner, context, advertising on social networks, e-mail advertising). The generation of the Millennials evaluate internet advertising as more negative than the traditional advertising. This output suggests to some extent the so-called "advertising blindness". The result of the hypothesis verification is that there is a significant difference between the ranking of traditional and internet advertising in the generation of the Millennials. These results are very interesting if we confront them at the level of the global tendency of advertising perception by Y generation representatives.

Keywords: advertising, advertising perception, ad ranking, the Millennials.

Introduction

People are hit by an enormous amount of ads trying to get their attention from various media - television, print media, radio, and now even the Internet. With this number of promotional messages, businesses that do not use marketing communication are in the shadows of those who use it (Hagyari, Bačík and Fedorko 2016). Every company that builds its promotional activities only on the recommendations of its customers does not very often achieve what we call magnetism (Turner and Shah 2014; Lizbetinová et. al. 2019). However, if the company wants to achieve it, it should focus on developing the right strategy for marketing communication (Bačík, Mihal and Fedorko 2015). Marketing is an activity, a set of institutions and processes that have been created to communicate, deliver and exchange offers that are valuable not only to customers but also to other stakeholders and the general public (Lamb, Hair and McDaniel 2012; Mura and Kljucnikov 2018). In traditional marketing theory, we should be familiar with McCarthy's 4P model, which deals with product, price, placement and promotion (Dann and Dann 2011). Marketing communication is, according to Ferencová and Butoracová Šindleryová (2009) "any form of controlled communication used by organizations to inform, persuade or influence consumers, intermediaries and even certain groups of the public". In the traditional marketing theory, marketing communication tools include advertising, public relations, personal sales, sales promotion, direct marketing and etc. (Armstrong et al. 2009). E-marketing is a form of marketing where the application of IT tools and the Internet allows marketing tools and activities to focus on the defined relationships (Molenaar 2012). Molenaar further claims that e-marketing consists of three sub-areas: marketing, information technology and Internet. E-marketing helps to create customer demand by using the power of the Internet (Mudrík and Fedorko 2010). It gives businesses the opportunity to exchange attention for value (attention economy) (Frankovský and Birknerová 2014). E-marketing tools help building a long-term customer relationship. Moreover, the e-marketing environment is very well measurable (Stokes 2013; Mura, Marchevská and Dúbravská 2018). Dorčák (2012) states that traditional forms of e-marketing communication include: website, contextual advertising, banner advertising, search engine advertising; PPC advertising, e-catalogues, e-mail marketing and public relation (Štarchoň et. al.

2018). A website is a document containing hypertext, images, and other multimedia elements stored on a web server that is displayed to the user when entering a specific web address in the selected search engine (Fedorko and Kakalejčík 2015). For businesses, it is one of the proprietary media that allows it to communicate with its potential customer (Dorčák 2012). In an ideal world, any Internet user would immediately become a customer (Kovaľová, Frankovský, Birknerová and Zbihlejová 2019). As the real world differs greatly from the ideal, businesses need to think about the steps that the customer takes before and after the purchase to offer the customer enough information transforming them to customers as soon as possible. The funnel is the best choice for defining a purchasing cycle.

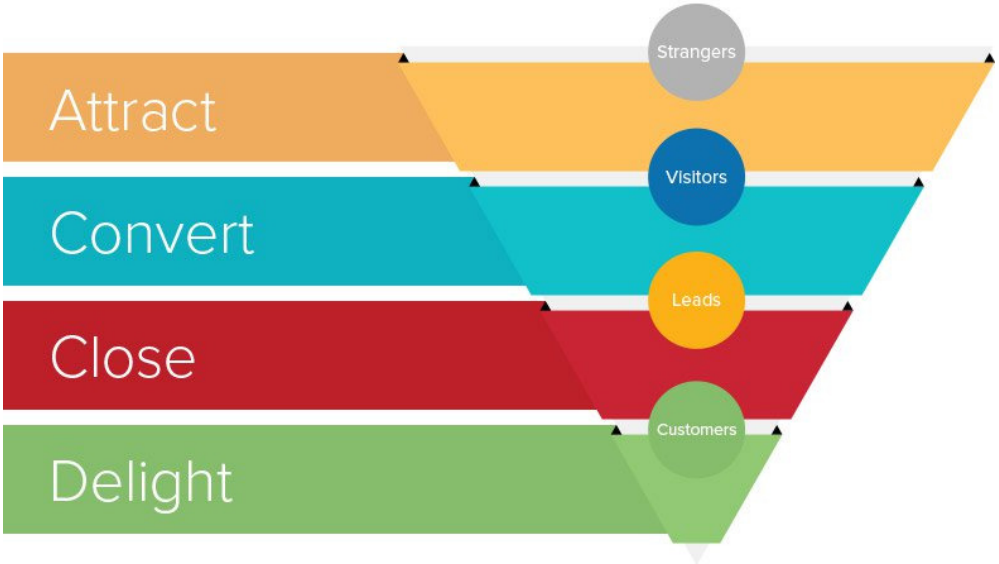

Fig. 1 : Purchasing funnel

The purchasing funnel is the purchasing process that the customer is conducting during the purchase cycle. It usually consists of several phases (Halligan Shah 2014). The definitions of the funnels vary with the author. However, for the purposes of this article, we will use Carter's (2013) purchasing funnel, which is shown in chart 1. The displayed funnel consists of 3 phases and 4 types of people involved in it. We can define these people as follows: stranger – represents an internet user who has not previously visited the business website (Halligan and Shah 2014); visitor – represents the internet user who previously visited the business website (Carter, 2013); lead - represents a visitor who has expressed a deeper interest in the website by providing their contact information in exchange for the content of the website (Scott, 2013; Štefko, Bačík and Fedorko 2014).

Methodology

The main objective of this article is to find out if there are differences in the ranking of traditional and online forms of advertising. Based on this objective, a research question is formulated as to whether: "Are there any differences in the evaluation of internet and traditional Y generation advertising?" Based on this research question, a research hypothesis is formulated:

H1: We assume that there are significant differences between the ranking of traditional and internet advertising in the generation of the Millennials.

The deeper relationships of the conducted research show a portion of inference statistics and part of the analytical processing. In this section, Cronbach's alpha and Mann Whitney U test were used.

For the purpose of this research, the research sample was defined as a new generation of customers represented by the Millennials. As for the definition of the age group of the Millennials, the article follows the methodology of Young (2017) from Ogilvy & Mather. The Millennials are referred to as "Y generation" from the age 18 to 34.

- C Centennials (1995-2012),
- Y Millennials (1977-1994),
- X Generation (1966-1976),
- S Generation (1955-1965).

The inputs to the analyses were obtained through the implementation of primary research, which was carried out using CAWI (Computer Assisted Web Interview). Data collection via an electronic questionnaire was conducted in January and February 2019. It was a quota selection based on the ROD variable, where were efforts to maintain the population ratio, i.e. 52% representing women and 48% representing men. It was an electronic inquiry, where the questionnaires were distributed on the Facebook pages to the groups of the University of Prešov and to other groups of people living in the Prešov and Košice regions. E-mails (from the private address database of the authors) were subsequently sent to identify the gender characteristics. The research was conducted in January and February 2019. Thus, based on the selection, the research has a limitation and therefore it can be generalised only to Eastern Slovakia. 180 answers were collected and in case of the question identifying their generation (how old are they) 26 respondents were eliminated, i.e. the number of selection proceeding to the investigation is 154.

Results

The examined issue points to the perception of advertising and its evaluation by the generation of the Millennials. The following chart shows the gender characteristics ratio.

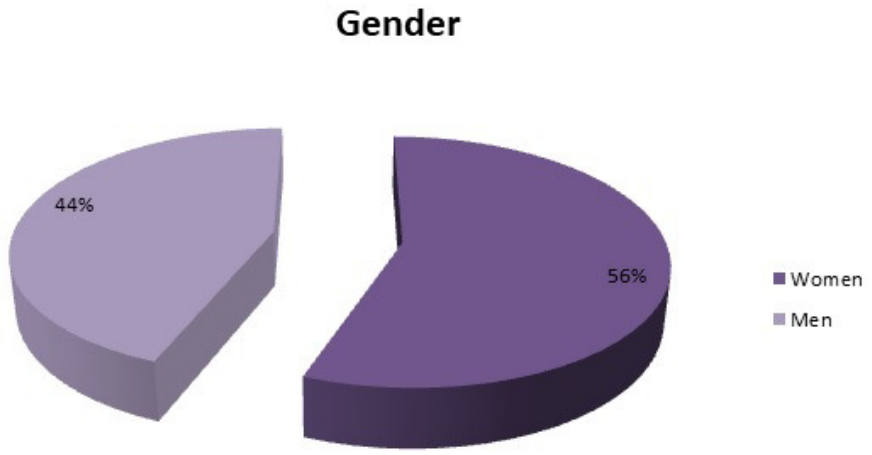

Fig. 2 : Gender characteristics – Advertising Rank

The previous chart points to the fact that the selection consists of 55.84% women (86 respondents) and 44.16% men (68 respondents), thus we can talk about the selection approximating the actual population of Eastern Slovakia. The questionnaire for the survey variables (the ranking of individual types of ads) also offered the possibility of not filling out the items. The following table shows the actual frequencies found.

Table 1 : Advertising Rank - Frequency

Advertising type	**TV Advertising**	**Banner advertising**	**Contextual Advertising**	**Advertising on Social Network**	**E-mail Advertising**
Valid	152	136	134	152	136
Not filled out	2	18	20	2	18
Advertising type	**Radio Advertising**	**Leaflet Advertising**	**Newspaper Advertising**	**Billboards**	**Posters**
Valid	152	150	154	154	154
Not filled out	2	4	0	0	0

It is noteworthy that the respondents did not know or did not want to rate the internet advertisement (banner, contextual, advertising on social networks, e-mail advertising).

Table 2: Descriptive Statistics - Advertising Rank

Advertising Type	**TV Advertising**	**Banner Advertising**	**Contextual Advertising**	**Advertising on Social Network**	**E-mail Advertising**
Negatively					
Rather negatively	62	36	36	34	58
Rather positively	44	42	46	44	58
Positively	32	46	36	54	8
	14	12	16	20	12
Median	2.00	2.00	2.00	2.00	2.00
Mean	1.99	2.25	2.24	2.39	1.81
Std. dev.	1.00	0.95	0.98	0.98	0.90
Advertising Type	**Radio Advertising**	**Leaflets**	**Newspaper Advertising**	**Billboards**	**Posters**
Negatively	26	12	8	16	10
Rather	52	32	16	30	26

negatively	56	70	88	66	74
Rather positively	18	36	42	42	44
Positively					
Median	2.00	3.00	3.00	3.00	3.00
Mean	2.43	2.87	3.06	2.87	2.99
Std. dev.	0.91	0.87	0.76	0.93	0.85

The previous table shows the outputs of descriptive statistics on the subject. Looking at the characteristics of the central tendency it is possible to note that the internet advertising of the generation of the Millennials is rated as more negative than the traditional one. This output suggests to some extent the so-called "advertising blindness". The following sections will be devoted to exact confirmation of the significance of the differences.

H1: We assume that there are significant differences between the ranking of traditional and internet advertising in the generation of the Millennials.

The assumption defined by the previous H1 hypothesis will be verified on average values of traditional and internet advertising. The possibility of average individual items is determined by an acceptable level of reliability. The following table illustrates this.

Table 3 : Cronbach's α - Reliability

Traditional advertising		**Internet advertising**	
α	N	α	N
0.788	6	0.830	4

The threshold for applying the selected item adjustment procedure (arithmetic mean) in terms of reliability is 0.7 (70%), thus the condition can be considered fulfilled. Data were adjusted by arithmetic mean. The following table shows the Mann-Whitney Wilcoxon U test output, and thus the significance of the difference in ranking between traditional and internet advertising.

Table 4: Test - Difference in Ad Rank

Ad rank	
Mann Whitney U	2 949.000
Wilcoxon W	5 577.000
Z	- 5.683
Asymp. Sig. (2-tailed)	0.00

H0: there is no significant difference between the variables.

H1: there is significant difference between the variables.

Based on the p value, which is equal to zero to three decimal places, it is advisable not to reject the alternative H1 hypothesis and to adopt an opinion on the significant difference in the ranking of traditional and internet advertising. The presented output also recommends adopting the basic H1 hypothesis, that there is a significant difference between the evaluation of traditional and internet advertising in the generation of the Millennials. The following chart shows the difference.

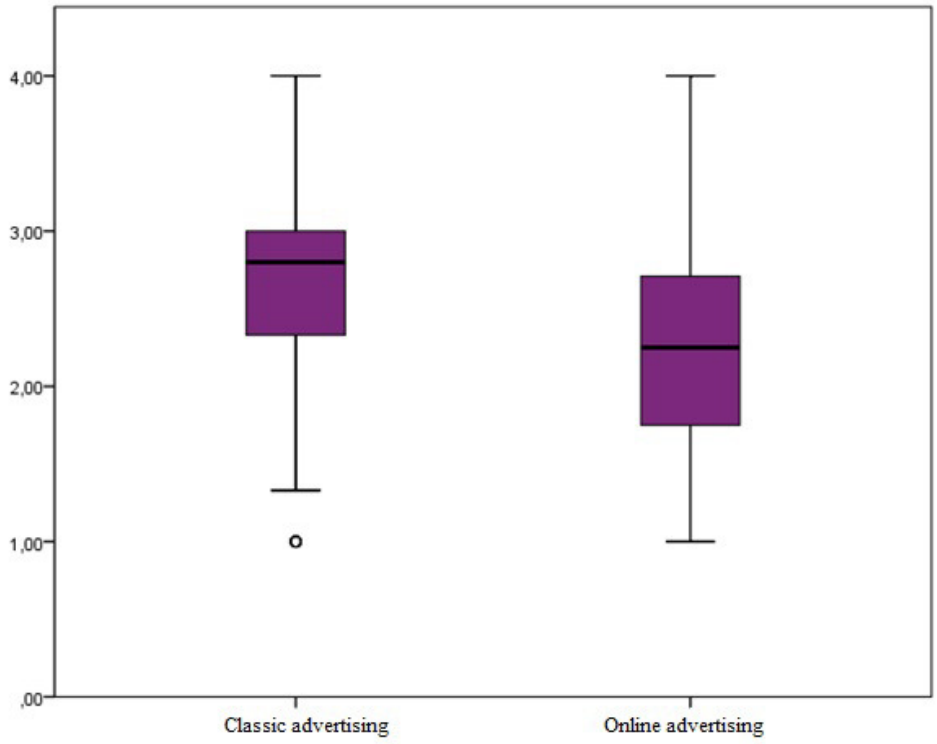

Fig. 3 : Rating of traditional and internet advertising

From the above it is clear that the Y generation (the Millennials) evaluate better the classical/traditional advertising. This fact can be a cause of advertising blindness, i.e. the given generation is ignoring the ads on the screen of their smartphones and they are somehow immune to it.

Conclusion

Until recently, businesses have implemented their marketing activities based on traditional marketing communication tools. However, since these tools often required a considerable budget, they were not available for every business. In addition, they only provided one-way communication. However, the arrival of the Internet as a network of networks and the emergence of social media has changed the situation. Using modern marketing communication tools, even small businesses with limited budgets have the ability to reach out to their target audience, often with minimal cost. In addition, they have the option of two-way communication.

Based on the above analysis, we can say that the Millennials do not know or do not want to evaluate the internet advertising. Representatives of the Y generation rated the internet advertising more

negatively than the traditional one. This output suggests to some extent the so-called "advertising blindness". Based on the hypothesis we have established, we note that there is a significant difference between the evaluation of traditional and internet advertising in the generation of the Millennials. The y generation (the Millennials) rated traditional advertising as better. This fact can be a cause of advertising blindness, i.e. the given generation is ignoring the ads on the screen of their smartphones and they are somehow immune to it.

Acknowledgment

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Women's Activity in Selected Political Structures in Poland In the Years 1989-2015

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Abstract

The subject of this article is the modern political activity of women in Poland after the year 1989. It concerns particularly issues of the participation of women in the sphere of the politics. A creature of the recognition of the phenomenon is the behavior not only in the relation with the sex in political structures, but also conditioning of both external and internal of internalized by the society and the participation of women in decision processes. The article is sacrificed to statistics devoted to the participation of women in political structures on chosen levels of the political life. The author analyses the statistical presence of women in individual decision bodies: the government, State-institutions and parties. A small percentage of women in decision-making bodies is a result of traditional rules according to which political structures in Poland function, but women themselves are also an obstacle to women's participation in decision-making structures. A decisive factor about the attempt of the analysis of the political participation of women in Poland after 1989 was the scarcity research and works devoted to these problems, especially in the area of analyses of the Polish political sphere. The participation of women in the Polish politics still has not had the complex elaboration, though more and more often some works, making an attempt analyses of the phenomenon from detailed scientific perspectives, appear. Undoubtedly, this issue requires deepened research.

Keywords: Gender, Political Participation, Social Psychology, Political Psychology, Women In Poland

Introduction

The main axis of the article is the participation of women in Poland in the decision-making process analyzed through their involvement in political structures over the last few decades. The following considerations concern the degree of women's political involvement in certain areas of the political sphere – in the legislative body (the parliament – in the decision-making body of the Parliament, Parliament committees), in the executive body (the government – a woman as the Prime Minister and as a Minister) after 1989.

The decision-making process is an integral part of human existence. An individual makes decisions almost from the beginning of its existence in each field of its functioning. Along with social development, the decision-making process was moved from the individual level to the group level, when people began to form communities (including political communities). Thomas Hobbes points out that along with the creation of the idea of the state, competences shifted from the private to the public sphere. As a result of the transfer of decision-making power, a significant social problem arose: decisions made by the community are largely unable to satisfy each member of a given community (regardless of how they make decisions within the community; whether in the form of an authoritarian decree of the ruler or through democratic voting). The degree of participation of an individual or group representing the interests of a particular environment in the political decision-making process implies their superior-subordinate relationship towards other individuals and groups. Subordinate position of one group and the superiority of another in the political sphere were explained by numerous researchers of the political activity aspect. Lester W. Milbrath and others emphasized the need to have certain means to undertake political activity. Milbrath also pointed to

the time that should be devoted to political activity as one of the main elements determining political commitment. Pierre Bourdieu believed that by having or lacking political capital we determine the degree of political participation: the smaller the political capital one has, the less influence on the sphere of political action they can have.

The fundamental aspect of participation in the political decision-making process is being a part of decision-making structures or having representatives in the system of power1. The right to elect is a tool that allows an individual to participate in decision-making processes. Today, in most political systems, after achieving the so-called electoral age and if the requirement of no criminal record is met, citizens have the right to be candidates in elections to representative bodies regardless of their gender. Contemporary electoral registration procedures do not differentiate candidates in terms of their gender. One of the most important components of electoral rights is the passive voting right.

There is a large gap between the participation of women and men in key political structures, including decision-making bodies. According to a report from a conference in Beijing devoted to the situation of women in the world, one of the main problems is enabling women's access to decision-making bodies at all levels of political life and making it possible for them to play leadership roles. The inability to participate equally in the decision-making process affects the disproportion in the representation of social structures, as well as the functioning of the democratic system. Equal participation of women in the decision-making process is a prerequisite for representing women's interests to an appropriate degree. At present, the interests of at least 50% of the population are not represented to such an extent and the lack of active participation of women results in the lack of a women's point of view in the decision-making process, not to mention the principles of social justice and equality. In Poland, the situation of women in the decision-making process and leadership roles is similar to that in the world, there is a large disparity between the genders in the participation in decision-making bodies at all levels of political life. After 1989 in Poland, the number of women in decision-making bodies at certain levels of government has been changing; a certain upward tendency in the percentage share in decision-making bodies can be noticed, but we cannot say that participation is equal. Women in Poland are largely underrepresented at all levels of government structures and in other bodies of executive power, with a smaller disparity at the level of legislative bodies.

The representation of each gender in authority bodies and in decision-making processes should not be lower than 40-50% - then you can talk about the representativeness of power, because – as researchers indicate – a share of 30-35% does not provide equality of gender [Norris, Lavenduski, 2004; M. Fuszara, 2010; and P. Oliver, G. Marwell, R. Teixeira. 1985]. The number of women in elected bodies, in public administration and in political parties (with particular emphasis in highest positions), is not proportional to the number of men in these institutions. This essentially translates into women's decision-making possibilities and the possibility to represent their interests on the political arena. There is a high probability that women in political and decision-making positions in governments and legislative bodies will contribute to the redefinition of political priorities and the implementation of completely new programs related to the marginalized interests of women. From the point of view of proper execution of democratic principles it is important to introduce the women's point of view to the mainstream politics (gender mainstreaming).

Woman – country leader

President

After 1989, four women ran for the office of the president: Hanna Gronkiewicz-Waltz (1995), Henryka Bochniarz (2005), Magdalena Ogórek (2015) and Anna Grodzka (2015). Hanna Gronkiewicz-Waltz was a candidate supported by Stronnictwo Ludowo Chrześcijańskie (People's Christian Party), Zjednoczenie Polskie (Polish Union), Partia Konserwatywna (Conservative Party), Koalicja Konserwatywna (Conservative Coalition), Zjednoczenie Chrześcijańsko-Narodowe (Christian-National Union), Niezależne Zrzeszenie Studentów (Independent Students' Association) and Stowarzyszenie Rodzin Katolickich (Association of Catholic Families). H. Gronkiewicz-Waltz

and an expert in her field received 2.76% of the population votes in the first round of elections, which was the seventh best result out of 13 candidates running for the office of the president. Henryka Bochniarz ran for the 2005 election as an independent candidate and expert in her field. The candidate's election was supported by the Democratic Party and the young Center. In the first round of elections, she received 1.26% of votes, which was the seventh result out of twelve candidates. Maria Szyszkowska initially declared her availability in the 2005 election as an independent candidate, but she failed to collect the necessary number of signatures necessary to submit her candidacy despite the support she received form Demokratyczna Unia Kobiet (Democratic Union of Women), Antyklerykalna Partia Postępu „Racja" (Anti-Clerical Progress Party 'Racja'), as well as small left-wing organizations and parties. Three women ran for the office of the president of the Republic of Poland in 2015, similar to the year 2005 as independent candidates, Magdalena Ogórek, supported by the Left Wing (SLD), Wanda Nowicka (NGO expert) supported by Unia Pracy (Labor Union Party) and Anna Grodzka supported by Zieloni (Green Party). Wanda Nowicka and Anna Grodzka did not collect enough signatures of support for their candidacy. Magdalena Ogórek managed to do that and received 2.38% of votes in the first round of elections.

Election campaigns of all the female candidates were incoherent and not very expressive. The political offer of female candidates (1995 and 2005) addressed to voters was not very characteristic and at the same time resulted in an image distrust. It was an image of women in important decision-making positions on one hand, and of housewives performing traditional female roles on the other. Both candidates relied on an image of an expert and referred to strong family traditions that they cultivate along with their simultaneous activity and professional career[2] Creating such an image of a female politician according to research carried out by Renata Siemieńska increases the chances of women's electoral success [R. Siemieńska 1997]. Hanna Gronkiewicz-Waltz received more votes from women than from men (3.9% of women compared to 2.2% of men) and from voters with higher education (4.7% of voters had higher education, 3.4% secondary education, 2.3 vocational education and 1.8% primary education [M. Mazur 2002]).

Political marketing specialists could not find a way to promote women[2], present their offer, their advantages and abilities, and change the quality of politics that choosing them would bring[3]. Among 55 candidates for the office between 1989 and 2010 there were three women, representing 5.45% of the total number of candidates. The reasons for underrepresentation of women on the list of candidates for the office of the President of the Republic of Poland should be considered from the perspective of numerous factors, emphasizing four elements:

- political calculations,
- lack of a woman with social support on the Polish political scene,
- lack of a woman with party support on the Polish political scene,
- low social support for women as president.

One of the factors having a decisive significance for putting up a female candidate is political calculation – you do not put up candidates who have little chance of being elected. Women in Poland competed as independent candidates and/or with the support of organizations and political parties of little importance on the Polish political scene. Another causative factor is the fact that since 1989 there has not been a charismatic woman who has public support in the area of Polish politics, which also negatively correlates with women's chances of being elected in the presidential election. The reasons for the low support of voters for women candidates for the office of the president be sought in the way they are presented by mass media during election campaigns, in the distribution of emphasis in the presented programs, as well as in political rivalries between individual political forces [R. Siemieńska 1997.]. Moreover, women in the Polish public sphere who are recognizable, are rarely popular in the society.

In the recent history of the Republic of Poland, any major party or one enjoying considerable social support, has not put up a female candidate for president. It seems that nowadays not only there is no political will to do it, but above all there are no women who meet the requirements necessary to

achieve a satisfactory result in elections. In the present shape of the political market in Poland, with the prevailing stereotype of a female politician and inconsistent creation of images of politically active women, it is impossible to put a woman in the highest position in the country. Nevertheless, if a woman politician was built an appropriate political image based on political experience, competence and successes in the professional field, this could become a significant impulse for the electors and introduce unexpected commotion on the potentially stable electoral market.

Parliamentary Decision-Making Structures

Apart from a few exceptions, underrepresentation of women in democratically elected parliaments is an undeniable fact [J.A Karp, S.A Banducci 2008]. This disproportion is the reason for women's interests not being properly represented in political decisions [A.M Holli, H. Wass. 2010]. Numerous scientific papers indicate that proportional electoral regulations contribute significantly to increasing the representation of women in political elites, among others, parliamentary elites [M. Duverger, 1956; E. Lakeman. 1976; F. G. Castels. 1981; P. Norris. 1985].

The presence of women in parliamentary structures in Poland is not surprising, although there is an unquestionable disproportion between the representation of women and men in legislative bodies [see Siemieńska 2000; Moser 2001; Kunovich 2003]. Since women in Poland obtained electoral rights [Walczewska 1995]4, their permanent presence in parliament can be seen.

One of the factors that increased the representation of the fair sex in the parliament were discussions about the introduction of the quota system to the electoral law. Initially, it was an unsuccessful attempt to apply affirmative actions in Poland. Despite this, on the wave of political discussion, three parties voluntarily used instruments to support women: Unia Demokratyczna (Democratic Union), Partia Pracy (Labor Party) and Sojusz Lewicy Demokratycznej (Democratic Left Alliance) introduced a quota system on their electoral lists. It is worth noting that in 2001 the most Polish women were introduced to the Sejm by Liga Polskich Rodzin (League of Polish Families), which did not use any tools to support women's participation in politics. Th phenomenon of this situation was brought by the support given to Liga Polskich Rodzin by the radio station Radio Maryja. This statistic was maintained until 2011, when slightly less than 24% of women were elected in the 7th term of the Sejm; this was the second time when attempts were made to increase women's political participation through instrumental activities. The downward trend reversed in 2015, when the number of women increased to 27% in the 8th term of the Sejm. As a result of actions taken, among others, by the Congress of Women in 2009, a draft parity bill was submitted to the Sejm and the quota law introduced before the parliamentary elections has been in force since 2011. Since 1997, Poland has been classified on the list of the Interparliamentary Union5 presenting the participation of women in world's parliaments. Poland currently occupies 55th (in reality 59th) place among 190 classified countries, although at the beginning of the term it was 42nd.

The Speaker Female and the Deputy Speaker

Since 1989 two women have been elected the Speaker of the Parliament Lower House (Ewa Kopacz, Małgorzata Kidawa-Błońska), the position of Deputy Speaker was held eight times. Statistically, the function of the Marshal of the Sejm was held by 7.14% of women, and the Deputy Speaker by 14.28%. During three terms of the Parliament Lower House, there was no woman in the position of Deputy Speaker (1st, 3rd and 4th term). The position of the Speaker is not only a prestigious office due to the fact that the one who holds it is the second most important person in the country, but it is also significant due to the wide range of powers assigned to this position. The symbolic participation of women in the decision-making body of the Parliament Lower House primarily affects the significant reduction of the influence of women politicians on shaping the legislative activity of the state and is the cause of underrepresentation of initiatives related to issues relevant to the pursuit of women's interests.

In the Parliament Upper House after 1989, the function of the Speaker was held once (Alicja Grześkowiak), and Deputy Speaker was held eight times. Statistically, 12.5% of women held the function of the Speaker of the the Parliament Upper House, and 25% held the Deputy Speaker position. During two terms, no woman held the Deputy Speaker position (4th and 6th term).

The prestige and competences of the persons holding the function of the Speaker of the Senate are much smaller than those holding the position of the Speaker of the Sejm of the Republic of Poland, but they still remain relevant in the legislative process. The lack of women in the presidium of the Senate implies a significant reduction in the influence of female politicians on shaping the legislative activity of the state and eliminating a woman's point of view on the organization of legislative processes in the Senate.

Prime Ministers and Deputy Prime Ministers

Women's participation in government structures relates to the problem of gender asymmetry in decision-making processes as an element of political commitment [R. Inglehart, P. Norris, 2003]. In the short history of Polish democracy, Poland was led by 17 governments and two politicians held the position of the Prime Minister twice. So far, three women have served as the Prime Minister, and the position of Deputy Prime Minister has been entrusted to women four times. The number of women in the ministerial position ranged from zero to six in particular offices. Two governments were fully masculine: the government of Jan Olszewski and the first government of Waldemar Pawlak; one government, apart from the position of the Prime Minister, consisted of men only, it was the government of Hanna Suchocka.

Since building a new political system started in Poland, 15 politicians have held the position of Prime Minister (two were the head of government twice). Among them there were three women (Hanna Suchocka, Ewa Kopacz and Beata Szydło) (see Chart 9) and two women served as Deputy Prime Minister (Izabela Jaruga-Nowacka and Zyta Gilowska – twice and Elżbieta Bieńkowska) . For 15 months in 1992-93 the position of Prime Minister was held by Hanna Suchocka. Ewa Kopacz also held this position for 15 months in 2014-2015. Beata Szydło held the office from December 2015 to December 2017. For 18 months in 2004-2005 Izabela Jaruga-Nowacka was the Deputy Prime Minister in the government of Marek Belka, while Zyta Gilowska was the Deputy Prime Minister in the government of Kazimierz Marcinkiewicz for 5 months of 2006 and for 14 months in the years 2006-2007 in the government of Jarosław Kaczyński. Elżbieta Bieńkowska was the Deputy Prime Minister in the second government of Donald Tusk for 9 months in the years 2013-2014 .

It is worth emphasizing that Hanna Suchocka became the Prime Minister by accident, according to the politicians from the party which put out her candidacy, as a result of a coalition trade, because from the candidates for the Prime Minister only she found relative acceptance of all the parties forming the government. However, she had no influence on the composition of the government, nor was she the author of the expose. Hanna Suchocka held the position of Prime Minister in the atmosphere of continuous conflicts of the coalition parties for 15 months. Ewa Kopacz was "anointed" for Prime Minister by Donald Tusk, who took office of the President of the European Council in December 2014. After the 2015 election, the winner party PiS (Law and Justice) designated Beata Szydło as Prime Minister. None of the women were the Prime Minister for more than two years.

Women in the position of the Minister

Since 1989 in Poland, women have held the position of a Minster 51 times, representing 11.72% of all ministerial positions during this time .

Most often, ministerial positions were held by independent women (23.53%), followed by those connected with PiS (20.59%) and PO (Civic Platform) (17.65%), and the least often those representing the PSL (Polish People's Party). The largest number of women were entrusted with the

function of a Minister by Donald Tusk during the second term of his government (7 women throughout the entire term – there were a maximum of 5 at the same time) and Jarosław Kaczyński (6 women throughout the entire term – there were a maximum of 5 at the same time), followed by Prime Ministers: Jerzy Buzek, Leszek Miller, Kazimierz Marcinkiewicz, Donald Tusk (1st term of his government), Ewa Kopacz and Beata Szydło appointing 5 women as members of the government. Three Prime Ministers did not entrust any women with a position of a Minister to: Jan Krzysztof Bielecki, Jan Olszewski and Hanna Suchocka. Women were entrusted with ministries related to areas stereotypically considered as fields of women's activity, these were ministries mainly dealing with social issues and areas perceived as women's spheres. Usually, Ministers' competencies were closely correlated with the roles played by women in private or professional spheres.

Most frequently women were appointed the head of the Ministry of Labor and Social Policy (5 times), followed by the Ministries of Regional Development and Finance (4 times), and once were appointed the head of the following Ministries: Health, State Treasury as well as Industry and Trade. Furthermore, women held the office of the Minister of Justice, Sport and Tourism, Culture and Art as well as Science and Higher Education (each ministry was entrusted to a female Minister twice). Women were the head of the Ministry of National Education and Spatial Planning and Construction three times, and received the function of a Minister without Portfolio four times. Women in Poland after 1989 have never held a function in the so-called hard ministries, stereotypically perceived as an area of male activity: at the Ministry of National Defense and the Ministry of Internal Affairs.

Expert Ministers include Halina Wasilewska-Trenkner, Zyta Gilowska (both independent) managing the Ministry of Finance, Teresa Kamińska (AWS) a Minister without Portfolio, Elżbieta Bieńkowska (independent) managing the Ministry of Regional Development, and Barbara Piwnik (independent) – Ministry of Justice. Women who run their Ministries as experts in their field were usually from outside the party having an image of a professional. Expert female Ministers transcend the stereotypical perception of women in politics. The political, social and media circles perceive them through the perspective of their skills and knowledge, not their gender. Some women in governments, despite their qualifications, were appointed to positions that did not guarantee the possibility of presenting and using their knowledge. The best example of a minister who received a Ministry because of the need to raise gender statistics is Joanna Mucha, who managed the Ministry of Sport and Tourism in the second government of Donald Tusk but did not have any qualifications to run the Ministry. She is known for wanting to be called a "Ministra" (previously unused female form of "Minister") and for lack of basic knowledge on subjects related to the Ministry she was managing. Mucha does not appear in the rankings of qualifications, but in those of beauty and fashion. This is worth mentioning, especially because Elżbieta Bieńkowska, who was a member of the same government, was perceived through the prism of professionalism and competence and was very often indicated as one of the best Ministers and a contender to take the position of Deputy Prime Minister. The appointment of Mucha may have been a good political move, due to low participation of women in Tusk's second government, but it caused political damage to both the person concerned and the potential subsequent female candidates for high decision-making positions. If Mucha had not been there, only 4 women would have been members of Tusk's government, which considering the political postulates of Platforma Obywatelska (Civic Platform) and above all, considering the promises of the Prime Minister, would have proven the failure of the government's pro-equality policy and the failure to fulfill the basic promises made by Tusk. Mucha's incompetence at her office was gross and also damaged her image as a competent and professional person. Joanna Mucha has long emphasized her activities to increase women's participation in political life and it seems that she would have definitely better managed the function of the Government Representative for equal treatment affairs rather than the office she managed.

The position of the Minister without Portfolio has been functioning in the Polish public sphere since 1989, Polish legal regulations give the Prime Minister the possibility to appoint the so-called Minister of Special Affairs, who does not manage any of the existing Ministries. A Minister without Portfolio is a special task Minister competences include working on issues that are important from the point of view of government interests, but which do not fall under the competence of any Ministry.

There were 31 Ministers without Portfolio during 17 government terms, out of which 6 women were appointed to this position (accounting for 15.38%): Małgorzata Niezabitowska, Teresa Kamińska – social reform coordinator, Izabela Jaruga-Nowacka – Minister for equal status for women and men and Danuta Hübner – Minister for European integration, secretary of the European Integration Committee, Elżbieta Witek and Beata Kempa.

The first Minister without Portfolio in 1989-91 – the spokesperson was Małgorzata Niezabitowska, a member of Tadeusz Mazowiecki's government. One of the most important Ministers without Portfolio was Teresa Kamińska, who was responsible for introducing four social reforms in 1997-99. Her significance in making political decisions was all the more important because she was one of the closest associates of the Prime Minister. Danuta Hübner was another woman in the position of a special task Minister. She formed the structures of the Polish administration, which was to prepare Poland for membership and accession negotiations in the European Union7. She was the first Polish Minister for European affairs in 2003-04 (as a Minister without Portfolio). She was the first Polish woman to become the EU Commissioner for Regional Policy (2004-09). In 2004, Izabela Jaruga-Nowacka became the next Minister without Portfolio. Her duties included, coordinating the work of the Council of Ministers in the field of social policy, monitoring the functioning of the Government Center for Strategic Studies and holding the office of the government's representative for equal status of women and men. The position entrusted to Jaruga Nowacka was supposed to be facade, due to the EU requirements regarding the government's responsibility for introducing equality postulates, but it became a flagship example of the pursuit of gender equality and determination in transforming the socio-political system. Her political activities contributed to the creation of a program of activity for the benefit of women, adoption of the law on the prevention of domestic violence, establishment of definitions of discrimination, mobbing and sexual harassment terminology as well as changes in the labor code to protect against discrimination and mobbing.

Most women in ministerial positions were independent (23%), followed by PiS (20%) and PO (17%). The relatively large number of independent female politicians (almost every fourth female Minister) holding the position of Minister indicates they were selected for the office through the prism of their competence and achievements in their fields. The fewest women among the Ministers represented the PSL affiliation – a tendency also reflecting the situation in the parliament, where PSL traditionally has the lowest number of representatives.

Conclusions

A small percentage of women in decision-making bodies is a result of traditional rules according to which political structures in Poland function, but women themselves are also an obstacle to women's participation in decision-making structures. There are many obstacles limiting political activity (discussed in more detail in previous parts of the work). In cyclically presented reports on gender equality, including equality in the decision-making process, the emphasis is put on the fact that in government bodies men and women often function differently, in accordance with the traditional division of roles. Men act as experts, and women perform a supporting function. There is also a significant obstacle related to informal decision making during men's meetings which women do not participate in, this applies to unofficial situations where binding arrangements and decisions are most often made. An analysis of the positions occupied by women indicates two key inclinations in the appointment of women to decision-making bodies. First of all, according to paternalistic patterns – areas requiring "typical female skills and predispositions" are put at the disposal of women. Second of all, the decisive element in the designation is the professionalism of the candidates (specialists in their area), which also affects the asexual perception of women in these positions. It is also worth mentioning two additional trends – the party line and the so-called filling in gender statistics.

The progress that took place in women's activity in decision-making structures in Poland after 1989 is noticeable, although there is still a relevant disproportion in the participation of women and men in decision-making bodies. This trend is forced by EU programs which assume equal political participation of women at all levels of the decision-making process. To balance gender representation in political structures, various institutional solutions are introduced in the European Union, i.e. quota

or parity systems, which is currently impossible to implement in Poland. Equal participation of women and men in decision-making processes is important not only from the point of view of implementing the principles of equality and social justice, but above all because it is a promise to take into account the point of view of women in all spheres of political life.

Footnotes

[1] In Poland, the issues of political decision-making were studied by, among others: Ziemowit Jacek Pietraś: (1990), (1997), (1998) and Jerzy Sielski (1983) and (1998); Andrzej Bodnar (1985) and (edited together with W. Szczepański) (1987).

[2] One of the four election campaign slogans of Hanna Gronkiewicz-Waltz referred to her activity and successes in the professional field "Hanna Gronkiewicz-Waltz. It was her who strengthened the zloty". Its perception in the society collided with another slogan "We will take care of Poland", which introduced a dissonance between a successful woman and a stereotypical woman-guardian. The reference to professional success in the electoral slogans of Henryka Bochniarz was not used, and the slogans constructed for the campaign were hardly suggestive and to a small extent related to the candidate or her achievements – "Presidential candidate" or "My presidential candidate" or "I choose concretes."

[3] The campaigns of both candidates tried to convince voters that the candidates were most of all women (mothers, wives), and the secondary focus was their professional success and political qualifications. During the election campaigns of both candidates, to a higher extent in the campaign of H. Gronkiewicz-Waltz, the proportions between the image of a Polish Mother and a successful woman were distorted, which led to the dysfunction of the election message. Moreover, professional competences and predispositions for political activity of both candidates were outweighed by the presented qualifications in the private sphere of both women. During the campaign Hanna Gronkiewicz-Waltz strongly publicly emphasized that she is religious, trying to win the support of the Catholic electorate. In her election campaign, Henryka Bochniarz emphasized the importance of acting to improve the situation of women in Poland.

[4] In 1995, for the first time in the short history of Polish democracy, while preparing election campaigns, the committees used the advice of specialists in the field of electoral marketing or image creation. The staff of Hanna Gronkiewicz-Waltz was one of the three pioneer teams that for the first time in the history of Polish election campaigns used paid election advertising.

[5] After Poland regained independence in 1918, women on an equal rights with men, were given the right to vote, both passive and active.

[6] The Interparliamentary Union is a supranational union of parliamentarians. It was established in 1889 in Paris. Its main goal is to promote peace and international cooperation. As part of its activity, statistics of individual sex participation in world parliaments have been kept since 1997.
[7] She organized the Committee for European Integration and she was the head of it in 1996-1997 and 2001-2004.

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The Relationship Between Consumer Innovativeness and Customer Engagement

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Abstract

The success of product innovations introduced to the market depends on many different factors, among which two seem particularly important. The first is the degree to which a given product innovation meets the expectations of its customers, and the second is the level of consumer innovativeness. Wanting to build and maintain a competitive advantage, companies around the world are increasingly engaging customers in value co-creation, which should lead to the introduction of products to the market that better meet the needs of customers. In the subject literature, a lot of research has been devoted to topics of both consumer innovativeness and customer engagement in value co-creation, but there are few studies that show the (possible) relationship between them. Therefore, the main goal of the article is to supplement knowledge in this area by empirical recognition of the relationship between consumer innovativeness and their level of engagement in co-creating the offer with enterprises. The research part of the article presents the process of segmentation of the inhabitants of the Poznań agglomeration due to their innovativeness and shows the relationship between innovativeness and the predispositions and behaviours of the respondents towards engaging in value co-creation with enterprises. The study was conducted by means of direct interviews using an interview questionnaire, on a sample of 795 inhabitants of the Poznań agglomeration, and its results confirm the hypothesis of the existence of a clear relationship between consumer innovativeness and engagement in value co-creation.

Keywords: consumer innovativeness, consumer behaviour, value co-creation, customer engagement (CE), motives, consumer segmentation

Introduction

As the market role of customers shifted from being only the recipients of firms' offers to now being a part of value creation process, the concept of consumer engagement has gained popularity in the academic research and is widely recognized by marketers. Today's customers communicate not only with firms but also with other consumers and are influencing each other's decision making process. Nowadays, value is created not only inside enterprises but co-created with external stakeholders, primarily with clients. It needs to be highlighted that they participate not only in the process of creating value but also in communicating and distributing it to the market. The level of customer (consumer) engagement affect firm performance – it directly and indirectly contributes to enterprises profits (for example through purchases and customer referrals) (Kumar and Pansari 2016).[1] "Engaged customers" are a great company asset – they are more loyal and profitable than average customers. One Gullup study found that in the banking industry "fully engaged" customers maintained balances that were 26% greater than less engaged ones (McEwen 2004). Another Gullup research indicated that "engaged consumers" bring 37% more annual revenue than "actively disengaged customer" (Adkins and Sorenson 2014). Nowadays customer engagement is one of the keys determinants of firms market success and is therefore getting more attention from academic researchers and practitioners. Customer

(consumer) engagement is very important in relation to both, the process of new product development and modification of existing ones in terms of adapting them to consumer requirements, increasing their chances of market success. Adapting products to the needs and expectations of customers obviously increases the chances of their acceptance by customers, but it is not the only important factor in this regard. Acceptance depends on a number of other determinants, including the characteristics of potential customers, and more precisely, on the degree of their innovativeness. The main goal of the article is to recognize the relationship between consumer innovativeness and customer engagement.

The concept of consumer innovativeness

Changes in market behaviour of consumers, emerging new trends, as well as the pace of technological development, force enterprises around the world to develop and market product innovation. They are currently one of the key factors to stand out from the competition, or more broadly – to gain and maintain a competitive advantage. Most new products introduced to the market do not gain consumer acceptance and must be removed from it. The level of acceptance depends not only on the characteristics of the innovation itself, but also, among others, on the degree of innovativeness of the consumers themselves. Despite the lack of unanimity in defining consumer innovativeness, its particular significance is emphasized. Hirschman (1980) stated that, "few concepts in the behavioural sciences have as much immediate relevance to consumer behaviour as innovativeness. The propensities of consumers to adopt novel products (…) can play an important role of theories of brand loyalty, decision making, preference, and communication".

For Rogers (1983) consumer innovativeness is "the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than the other members of a system". In this behavioural perspective on innovativeness (called "actualized innovativeness" or "innovative behaviour"), the time of product adoption is the main (only) criteria of innovativeness and people who adopt new products earlier are seen as more innovative than others. Innovative behaviour is also manifested by acquiring new information about new products (Hirschman 1980). On the basis of consumer innovativeness Rogers (1983) classified five adopter categories: (1) innovators, (2) early adopters, (3) early majority, (4) late majority and (5) laggards. In Midgley and Dowling (1978) view innovativeness in a construct at a high level of abstraction, that is by definition unobservable. They proposed a refined definition of innate innovativeness as "the degree to which an individual is receptive to new ideas and makes innovation decisions independently of the communicated experience of others". In this proposal innovativeness is based on the personality trait possessed (more or less) by every member of society. Steenkamp, Hofstede and Wedel (1999) also defines consumer innovativeness based on the personality trait "as the predisposition to buy new and different products and brands rather than remain with previous choices and consumer patterns". Hirschmann (1980) linked innovativeness to novelty seeking by stating that "the desire to seek out the new and different (…) is conceptually indistinguishable from willingness to adopt new products (i.e. inherent innovativeness)". Im, Bayus and Mason (2003) described innate consumer innovativeness as a generalized unobservable predisposition toward innovations applicable across product classes. On the other hand, the domain-specific innovativeness approach posits that innovators are not likely to adopt all new products (Truong 2013). Goldsmith and Hofacker (1991) stated that "domain or product category specific innovativeness reflects the tendency to learn about and adopt innovations (new products) within a specific domain of interest", so the adoption of innovations can vary across different product categories. Venkatraman and Price (1990) proposed that "innovativeness is comprised of cognitive innovativeness (the desire for new experiences with the objective of stimulating the mind) and sensory innovativeness (the desire for new experiences with the objective of stimulating the senses)". We acknowledge that on the one hand, consumer innovativeness is a personality trait, but the level of new product adoption is dependent on product category. It should be highlighted that consumer innate innovativeness is an important determinant of acceptance of innovations, but there are of course many more determinants in this matter. It means that in regard to some product categories consumers with high level of innate innovativeness can adopt innovations relatively later than consumers with lower level of innate innovativeness.

Systematic literature review on consumer innovativeness carried out by Bartels and Reinders (2010) and Kaushik and Rahman (2014) on one hand have shown ambiguous (positive or non-existing) relationships between innate innovativeness and new product adoption, but on the other hand, the reviews have shown a positive relationship between innate innovativeness and purchase and usage intention, so it seems to have a stronger effect on adoption intention than actual adoption. Innate innovativeness affects the product adoption with the help of some mediating variables, therefore indirectly (Kaushik and Rahman 2014). Several authors have also examined the positive relationship between innate innovativeness and domain-specific innovativeness. Most studies found that domain-specific innovativeness has a positive and significant relationship with new product adoption behaviours (Bartels and Reinders 2010). It should be emphasized that the scope of research on consumer innovativeness is extremely wide (Kaushik and Rahman 2014; Bartels and Reinders 2010). The variables used in the research carried out for the purposes of this article, which were used to determine the level of innovativeness, concerned such issues as – the rate of absorption of product innovations, propensity to take risks, searching for new products (novelty seeking), degree of interest in product innovations, opinion leadership, or broadly understood attitudes towards innovation and towards changes.

The Concept of Customer Engagement

The concept of customer engagement has been arousing the interest of the academic community and practitioners for several years. Despite numerous studies and presented concepts, there is no single, generally accepted definition of the concept in question (Table 1). The differences in views are visible both in terms of its nature and its scope. For some authors, this is a psychological state (Brodie et al. 2011), or a reflection of the bond between clients and the company (McEwen 2004), while others emphasize the behavioural aspects of consumer-enterprise relations (Van Doorn et al. 2010; Jakkola and Alexsander 2014). There is also no consensus as to whether customer engagement covers all behaviours towards the company (Kumar et al. 2010) or only those that go beyond the transaction (Van Doorn et al. 2010). Vivek, Beatty and Morgan (2012) state, that customer engagement can be manifested cognitively, affectively, behaviourally, or socially.

Table 1: Selected definitions of customer engagement (behaviour)

Authors	**Defintion**
McEwen (2004)	**Customer engagement** is a measure of the overall strength of a company's customer relationships; it reflects the degree to which customers have formed emotional as well as rational bonds to the brands they buy and own.
Patterson, Yu and de Ruyter (2006)	**Customer engagement** – the level of a customer's various "presence" in their relationship with a service organisation. The presences include physical presence, emotional presence and cognitive presence. Customer engagement is a higher-order construct, and it comprises of four components, namely, vigor, dedication, absorption, and interaction
Bowden (2009)	**Customer engagement** - psychological process that models the underlying mechanisms by which customer loyalty forms for new customers of a service brand as well as the mechanisms by which loyalty may be maintained for repeat purchase customers of a service brand.
Van Doorn et al. (2010)	**Customer engagement behaviours** go beyond transactions, and may be specifically defined as a customer's behavioural manifestations that have a brand or firm focus, beyond purchase, resulting from motivational drivers.
Brodie et at. (2011)	**Customer engagement (CE**) is a psychological state that occurs by virtue of interactive, co-creative customer experiences with a focal agent/object (e.g., a brand) in focal service relationships. It occurs under a specific set of context dependent conditions generating differing CE levels; and exists as a dynamic, iterative process within service relationships that cocreate value.
Hollebeek,(2011)	**Customer brand engagement** the level of an individual customer's motivational, brand-related and context-dependent state of mind characterised by specific levels of cognitive, emotional and behavioural activity in direct brand interactions.
Vivek, Beatty and Morgan (2012)	**Customer engagement (CE**) is the intensity of an individual's participation in and connection with an organization's offerings or organizational activities, which either the customer or the organization initiates.
Jaakkola and Alexander (2014)	**Customer engagement behaviours -** behaviours through which customers make voluntary resource contributions that have a brand or firm focus but go beyond what is fundamental to transactions, occur in interactions between the focal object and/or other actors, and result from motivational drivers.
Harmeling et al. (2017)	**Customer engagement** - a customer's voluntary resource contribution to a firm's marketing function, going beyond financial patronage
Pansari and Kumar (2017)	**Customer engagement -** the mechanics of a customer's value addition to the firm, either through direct or/and indirect contribution**.**

Source: McEwen (2004); Patterson, Yu and de Ruyter (2006); Bowden (2009); Van Doorn et al. (2010); Brodie et at. (2011); Hollebeek,(2011); Vivek, Beatty and Morgan (2012); Jaakkola and Alexander (2014)Harmeling et al. (2017); Pansari and Kumar (2017).

We recognize the different approaches in defining the term customer (consumer) engagement. We acknowledge that customer engagement behaviour is related to the purchase so it contributes to firms profitability directly, but also goes beyond transactions and generates value and positively contributes to the profits of the firm indirectly – through non-purchase reactions (Kumar and Reinartz 2016).

Customer engagement behaviours can be initiated by both clients (current and potential) and companies (Vivek, Beatty and Morgan 2012), both in the real world and in a virtual environment (Brodie et al. 2013) and they can be both positive and negative (Van Doorn et al. 2010).

Kumar et al. (2010) state that the value of customer engagement is comprised of four core dimensions – customer lifetime value (CLV), customer referral value (CRV), customer influencer value (CIV), and customer knowledge value (CKV). The last one is related to customer behaviour regarding feedback for ideas for innovations and improvements, and contributes to knowledge development.

According to Bijmolt et at. (2010), the three key behavioural manifestations of customer engagement are: word-of-mouth (WOM), co-creation and complaining behaviour. An example of behaviour related to co-creation, and hence customer engagement, is making suggestions to improve the consumption experience (Van Doorn et al. 2010). The desire to share opinions with companies is the subject of research, the results of which are presented in the article.

While many studies on consumer innovativeness and customer engagement can be found in the literature on the subject, relatively few (not many) studies were conducted to determine whether and to what extent there is a relationship between the level of consumer innovativeness and the degree of engagement in value co-creation.

Goldsmith's, Flynn's and Korzenny's (2015) research has found a positive relationship between brand engagement and consumer innovativeness. Sarmah's, Kamboj's and Rahman's (2017a) study carried out on a sample of luxury hotels guests revealed that consumer innovativeness is positively related to their willingness to co-creation. Another study conducted by those authors indicated that tourist's innovativeness positively influences their degree of co-creation with service providers (Sarmah, Kamboj and Rahman 2017b). Handrich and Heidenreich (2013) found that consumer technological innovativeness highly correlates with consumer's willingness to co-create. Based on those findings we also hypothesize that there is a relationship between consumer innovativeness and consumer engagement (or willingness to engage) in value co-creation.

Research Design

An empirical study on the assessment of the relationship between consumer innovativeness and their engagement in co-creating the offer with enterprises was conducted in the first half of 2019 using the direct interview technique (face to face interviews). The areas of empirical research included: respondents – residents of Poznań and the Poznań poviat, subject – assessment of innovativeness and customer engagement, spatial – the city of Poznań, cities and villages of the Poznań poviat, and temporary – the first half of 2019. The main purpose of empirical research was to identify the relationship between consumer innovation and customer engagement and the research hypothesis is that there is a relation between them. The research objectives include:

1. an analysis of the relationship between innovativeness and customer engagement in value co-creation on the example of the inhabitants of Poznań and the Poznań poviat,
2. identification of innovative predispositions of the inhabitants of Poznań and the Poznań poviat,
3. definition of segmentation criteria and isolation of segments of the inhabitants of Poznań and the Poznań poviat due to innovative predispositions,
4. assessment of the relative shares of the segments of the inhabitants of Poznań and the Poznań poviat due to innovative predispositions,
5. assessment of engagement in value co-creation in terms of segments of residents of Poznań and the Poznań poviat.

In the sample selection process, quota selection was used. In the quota selection of the sample, it is assumed that the study is representative if the structure of the sample coincides with the structure of the studied population. The comparison of the studied population and the research sample is presented in the table 2 below.

Table 2: Comparison of the studied population and the research sample

		RESEARCH POPULATION				RESEARCH SAMPLE			
		inhabitants		structure		respondents		structure	
	age	female	male	female	male	female	male	female	male
cities of the Poznań poviat	<19	1421	1470	**0.2%**	**0.2%**	2	1	**0.3%**	**0.1%**
	20-29	9853	9987	**1.2%**	**1.2%**	9	8	**1.1%**	**1.0%**
	30-39	11859	11588	**1.4%**	**1.4%**	11	13	**1.4%**	**1.6%**
	40-49	8882	8412	**1.1%**	**1.0%**	11	8	**1.4%**	**1.0%**
	50-59	9765	8921	**1.2%**	**1.1%**	11	9	**1.4%**	**1.1%**
	60+	20570	13533	**2.5%**	**1.7%**	18	14	**2.3%**	**1.8%**
villages of the Poznań poviat	<19	2366	2440	**0.3%**	**0.3%**	2	1	**0.3%**	**0.1%**
	20-29	15407	15415	**1.9%**	**1.9%**	15	16	**1.9%**	**2.0%**
	30-39	21242	20129	**2.6%**	**2.5%**	21	18	**2.6%**	**2.3%**
	40-49	13710	14039	**1.7%**	**1.7%**	13	12	**1.6%**	**1.5%**
	50-59	14042	13356	**1.7%**	**1.6%**	13	11	**1.6%**	**1.4%**
	60+	25341	18085	**3.1%**	**2.2%**	24	17	**3.0%**	**2.1%**
city of Poznań	<19	4591	4668	**0.6%**	**0.6%**	5	5	**0.6%**	**0.6%**
	20-29	46074	43641	**5.6%**	**5.3%**	51	43	**6.4%**	**5.4%**
	30-39	48511	47431	**5.9%**	**5.8%**	45	49	**5.7%**	**6.2%**
	40-49	31498	29921	**3.8%**	**3.7%**	34	27	**4.3%**	**3.4%**
	50-59	42226	35129	**5.2%**	**4.3%**	42	33	**5.3%**	**4.2%**
	60+	119797	73680	**14.6%**	**9.0%**	115	68	**14.5%**	**8.6%**
		447155	**371845**	**Sum**	**100.0%**	**442**	**353**	**Sum**	**100.0%**
		Sum	**819000**			**Sum**	**795**		

Source: Based on Statistics Poland and own study.

The size of the research sample was 795 observations (N = 795). In the process of selecting a sample for the study, quota selection was used, taking into account the criteria of sex, age, and the respondents' place of residence. In the process of empirical data analysis, the IBM SPSS Statistics tool was used, which allowed the analysis of the results of the statistical description, correlation analysis, exploratory factor analysis (EFA), and analysis of variance.

The research tool was built on the basis of variables used in international research, the scope of which covered, among others, attitude and pace of absorption of technological innovations (Filová, 2015), openness to technological innovations (Rosen, 2005), or generally understood in the broad sense of consumer innovativeness (Kuswati and Irmawati 2018; Goldsmith., 2011). The research tool constructed on the basis of the literature analysis, as well as the subjective premises of the authors, consisted in total of 23 variables (A01-A23), for which the Likert scale was used (Table 3).

Table 3: Variables in the area of innovativeness of respondents

Research question: Please specify whether the following statements are in line with your predispositions for product innovations.
A01. As soon as I hear that an innovative product has appeared on the market, I am looking for information about it and seek to try it.
A02. I start using innovative products only when most of my friends / family members already use them.
A03. I like taking risks when it comes to trying new things.
A04. When it comes to product innovations, I often need the support of others in learning how to use them.
A05. My friends and family often turn to me for opinions on product innovations and help in using them.
A06. I like to use only proven products.
A07. Among my friends / family, I am usually one of the first people to try / use innovative products.
A08. I prefer to wait until others (friends, family, etc.) try product innovation before I do.
A09. I like to be one of the first people to try an innovative product as soon as it appears on the market.
A10. I like to experiment with innovative products.
A11. I absorb technological innovations very quickly.
A12. I like to provide information on product innovations and teach my friends / family how to use them.
A13. Generally, I have barriers in using innovative products.
A14. I am interested in technological innovations.
A15. I like to use innovative products.
A16. I often check if there are new ways to do something / solve a problem.
A17. I think it's best to reach for the proven methods for doing something / solving a problem.
A18. I know more about innovative products than other people.
A19. I am distrustful of innovative products and new ways of doing something.
A20. I am usually one of the last people in my environment in terms of acceptance of innovative products.
A21. I try to get as much information as possible about new innovative products from many sources.
A22. I systematically encourage family and friends to use new innovative products.
A23. I regularly buy innovative products.

Source: Own study.

While measuring the engagement in value co-creation, the actual participation of respondents and their propensity to participate in this process were verified. The Likert scale (Table 4) was used to assess the answers to research questions (B1-B2).

Table 4: Variables specifying engagement in value co-creation

Research Questions:
B1. Do you give companies opinions / ratings about their offers? (participation)
B2. Would you like to participate in cocreating companies' offers? (propensity)

Source: Own study.

Results

The first step in the research process is to assess the relationship between innovativeness and engagement in value co-creation of the residents of Poznań and the Poznań poviat (Table 5). Spearman's rank coefficient was used in the analysis of correlation relationships.

Table 5: The results of the correlation between innovativeness and engagement in value co-creation of the residents of Poznań and the Poznań poviat

	customer engagement[(a)]	
Predisposition determinants towards product innovations	B1. participation	B2. propensity
A01. As soon as I hear that an innovative product has appeared on the market, I am looking for information about it and seek to try it.	0.335**	0.365**
A02. I start using innovative products only when most of my friends / family members already use them.	-0.129**	-0.144**
A03. I like taking risks when it comes to trying new things.	0.348**	0.373**
A04. When it comes to product innovations, I often need the support of others in learning how to use them.	-0.254**	-0.258**
A05. My friends and family often turn to me for opinions on product innovations and help in using them.	0.315**	0.371**
A06. I like to use only proven products.	-0.166**	-0.180**
A07. Among my friends / family, I am usually one of the first people to try / use innovative products.	0.345**	0.368**
A08. I prefer to wait until others (friends, family, etc.) try product innovation before I do.	-0.225**	-0.233**
A09. I like to be one of the first people to try an innovative product as soon as it appears on the market.	0.312**	0.335**
A10. I like to experiment with innovative products.	0.325**	0.352**
A11. I absorb technological innovations very quickly.	0.300**	0.324**

A12. I like to provide information on product innovations and teach my friends / family how to use them.	0.269**	0.305**
A13. Generally, I have barriers in using innovative products.	-0.272**	-0.231**
A14. I am interested in technological innovations.	0.271**	0.319**
A15. I like to use innovative products.	0.303**	0.363**
A16. I often check if there are new ways to do something / solve a problem.	0.284**	0.302**
A17. I think it's best to reach for the proven methods for doing something / solving a problem.	-0.182**	-0.197**
A18. I know more about innovative products than other people.	0.296**	0.325**
A19. I am distrustful of innovative products and new ways of doing something.	-0.239**	-0.255**
A20. I am usually one of the last people in my environment in terms of acceptance of innovative products.	-0.268**	-0.202**
A21. I try to get as much information as possible about new innovative products from many sources.	0.239**	0.269**
A22. I systematically encourage family and friends to use new innovative products.	0.289**	0.331**
A23. I regularly buy innovative products.	0.292**	0.317**
(a) – Spearman rank correlation coefficients (rs); **p≤0,01, *p≤0,05		

Source: Own research.

The obtained results (Table 5) allow for the identification of statistically significant correlations between the engagement in value co-creation (both actual participation and propensity to participate in this process) and all variables in the scope of innovativeness of the respondents.

The strongest, clear, positive correlation relationships include, first of all, relationships related to taking risks associated with new products ($rs_{(A03,B1)}$=0.348; $rs_{(A03,B2)}$=0.373), verification of new products earlier compared to the environment ($rs_{(A07,B1)}$= 0.345; $rs_{(A07,B2)}$=0.368), information search and immediate testing of new products ($rs_{(A01,B1)}$=0.335; $rs_{(A01,B2)}$=0.365), testing of new products ($rs_{(A10,B1)}$=0.325; $rs_{(A10,B2)}$=0.352) and passive opinions on new products in the environment ($rs_{(A05,B1)}$=0.315; $rs_{(A05,B2)}$=0.371).

In turn, the strongest, indistinct, negative relationships include, in particular, relations regarding the occurrence of barriers related to the use of new products ($rs_{(A13,B1)}$=-0.272; $rs_{(A13,B2)}$=-0.231), late acceptance of product innovations ($rs_{(A20,B1)}$=-0.268; $rs_{(A20,B2)}$=-0.202), expectations of support of the environment in using new products ($rs_{(A04,B1)}$=-0.254; $rs_{(A04,B2)}$=-0.258), distrust of new products ($rs_{(A19,B1)}$=-0.239; $rs_{(A19,B2)}$=-0.255) and verification of new products in the environment ($rs_{(A08,B1)}$=-0.225; $rs_{(A08,B2)}$=- 0.233).

The results of the research indicate that there are statistically significant relationships between the innovativeness of the inhabitants of the city of Poznań and the Poznań poviat and their engagement in value co-creation. Obtained values of correlation coefficients may indicate the occurrence of other potential dependencies determining the studied phenomena – they include scope of cooperation between enterprises and clients, time and frequency of relationships, risk related to participation,

analysis of costs and benefits of the entities involved, types of problems to be solved, etc. Nevertheless, the above results allow positive verification of the hypothesis according to which there is a relationship between consumer innovativeness and their engagement in value co-creation.

Then, using the exploratory factor analysis method, the identification of innovative predispositions of the inhabitants of Poznań and the Poznań poviat was identified (Table 6) – the number of distinguished components was based on the Kaiser criterion, according to which each of the new components explains more than a single variable.

Table 6: Results of exploratory factor analysis in the set of innovativeness factors of the inhabitants of Poznań and the Poznań poviat

component	measurable variables	factor loadings
component 1 - **pro-innovation predisposition**	A01. As soon as I hear that an innovative product has appeared on the market, I am looking for information about it and seek to try it.	0.779
	A03. I like taking risks when it comes to trying new things.	0.689
	A05. My friends and family often turn to me for opinions on product innovations and help in using them.	0.690
	A07. Among my friends / family, I am usually one of the first people to try / use innovative products.	0.686
	A09. I like to be one of the first people to try an innovative product as soon as it appears on the market.	0.749
	A10. I like to experiment with innovative products.	0.743
	A12. I like to provide information on product innovations and teach my friends / family how to use them.	0.686
	A14. I am interested in technological innovations.	0.694
	A15. I like to use innovative products.	0.687
	A16. I often check if there are new ways to do something / solve a problem.	0.644
	A18. I know more about innovative products than other people.	0.757
	A21. I try to get as much information as possible about new innovative products from many sources.	0.582
	A22. I systematically encourage family and friends to use new innovative products.	0.768
	A23. I regularly buy innovative products.	0.750
component 2 – **orthodox predisposition**	A13. Generally, I have barriers in using innovative products.	-0.752
	A19. I am distrustful of innovative products and new ways of doing something.	-0.652

	A20. I am usually one of the last people in my environment in terms of acceptance of innovative products.	-0.697
component 3 – **conservative predisposition**	A02. I start using innovative products only when most of my friends / family members already use them.	0.644
	A06. I like to use only proven products.	0.772
	A08. I prefer to wait until others (friends, family, etc.) try product innovation before I do.	0.654
	A17. I think it's best to reach for the proven methods for doing something / solving a problem.	0.501
KMO=0.862; p=0.000; rotation method: VARIMAX with Kaiser standardization explanation of total variance=61,327; min. factor load value 0.500		

Source: Own research.

The obtained results allowed for the identification of three innovative predispositions – 1.pro-innovative, 2.orthodox, and 3.conservative. Pro-innovative predisposition (component No. 1) is characterized by, among others, searching for and immediately testing new products, taking risks related to new products, giving opinions and encouraging others to new market solutions, priority in verifying these solutions, showing interest in technological innovations, their adoption and gathering knowledge related to them. Orthodox predisposition (component No. 2) is characterized by, among others, the occurrence of barriers related to the use of new products and distrust, and their late acceptance. In turn, conservative predisposition (component No. 3) manifests itself, among others, in the use of new products after prior verification by the environment and preferring proven products.

Due to similar ranges of components 2 – orthodox predisposition and component 3 – conservative predisposition, a decision was made to carry out the method of exploratory factor analysis with the limitation of the number of isolated components to two (Table 7).

Table 7: Results of exploratory factor analysis in the set of innovativeness factors of the inhabitants of Poznań and the Poznań poviat

component	measurable variables	factor loadings
component 1 - **pro-innovation predisposition**	A01. As soon as I hear that an innovative product has appeared on the market, I am looking for information about it and seek to try it.	0.767
	A03. I like taking risks when it comes to trying new things.	0.688
	A05. My friends and family often turn to me for opinions on product innovations and help in using them.	0.702
	A07. Among my friends / family, I am usually one of the first people to try / use innovative products.	0.693
	A09. I like to be one of the first people to try an innovative product as soon as it appears on the market.	0.728
	A10. I like to experiment with innovative products.	0.737
	A11. I absorb technological innovations very quickly.	0.666

	A12. I like to provide information on product innovations and teach my friends / family how to use them.	0.732
	A14. I am interested in technological innovations.	0.733
	A15. I like to use innovative products.	0.733
	A16. I often check if there are new ways to do something / solve a problem.	0.690
	A18. I know more about innovative products than other people.	0.760
	A21. I try to get as much information as possible about new innovative products from many sources.	0.628
	A22. I systematically encourage family and friends to use new innovative products.	0.771
	A23. I regularly buy innovative products.	0.742
component 2 - **orthodox and conservative predisposition**	A02. I start using innovative products only when most of my friends / family members already use them.	0.635
	A04. When it comes to product innovations, I often need the support of others in learning how to use them.	0.709
	A06. I like to use only proven products.	0.643
	A08. I prefer to wait until others (friends, family, etc.) try product innovation before I do.	0.690
	A13. Generally, I have barriers in using innovative products.	0.599
	A17. I think it's best to reach for the proven methods for doing something / solving a problem.	0.514
	A19. I am distrustful of innovative products and new ways of doing something.	0.601
	A20. I am usually one of the last people in my environment in terms of acceptance of innovative products.	0.621
KMO=0.966; p=0.000; rotation method: VARIMAX with Kaiser standardization explanation of total variance=54,757; min. factor load value 0.500		

Source: Own research.

Analysis of the results (Table 7) confirms the validity of limiting the number of components to two – all the variables that originally defined the components of the orthodox predisposition and conservative predisposition (cf. Table 6), make up the new component 2 – orthodox and conservative predisposition. In addition, limiting the number of components will allow simplification (reduction) of segmentation criteria of the inhabitants of Poznań and the Poznań poviat due to their innovative predispositions.

The next step of the research procedure was to define the criteria for segmentation of the respondents due to their predisposition to product innovations. Due to the range of the used measuring scale <1.5>, it was assumed that respondents representing a given predisposition (pro-innovative or orthodox-conservative) are qualified entities for which the value of a given component is greater than 3.00 ($Comp_{(n)}>3.00$). Otherwise, when the value of this component is less than or equal to 3.00 ($Comp_{(n)}\leq 3.00$), the respondents are not treated as representatives of the extracted predisposition. Based

on the results of the exploratory factor analysis (Table 6) and the assumptions made, the population of respondents was divided into four segments (S1-S4) (Table 8).

Table 8: Criteria for segmentation of the inhabitants of Poznań and the Poznań poviat according to innovative predispositions

components	component value	segments			
		S1	**S2**	**S3**	**S4**
P1 **– pro-innovative predisposition**	+ (Comp1 > 3.00) – (Comp1 ≤ 3.00)	+	+	–	–
P2 – **orthodox and conservative predisposition**	+ (Comp2 > 3.00) – (Comp2 ≤ 3.00)	+	–	+	–
	Sum N=100%	12.3%	30.9%	42.0%	14.8%

Legend:
S1 – **hybrid segment**–pro-innovative (+), orthodox and conservative (+) predisposition
S2 – **pro-innovation segment**–pro-innovation (+), orthodox and conservative (-) predisposition
S3 – **orthodox and conservative segment**–pro-innovative (-), orthodox and conservative (+) predisposition
S4 – **neutral segment**–pro-innovative (-), orthodox and conservative (-) predisposition

Source: Own research.

The results of the research procedure allowed the identification of four segments differing in values of the components separated after the use of the method of exploratory factor analysis. The most represented segment in the studied population is the orthodox and conservative segment ($P1 \leq 3.00 \cap P2 > 3.00$ – share of S3=42.0%). The characteristics of its representatives include, first of all, caution in the use of new products, distrust and late acceptance of new products, the use of new products after their verification by the environment, and the preference for proven products. The second segment in terms of representation is S2 the pro-innovation segment ($P1 > 3.00 \cap P2 \leq 3.00$ – share of S2=30.9%). The characteristics of its representatives include, first of all, the search for and as soon as possible to test new products, accepting the risk associated with new products, giving opinions and encouraging others to new market solutions, and priority in verifying these solutions. The representation of subsequent segments is definitely smaller – the neutral segment ($P1 \cap P2 \leq 3.00$ – both predispositions equal to or below the average – the share of S4=14.8%) and the hybrid segment ($P1 \cap P2 > 3.00$ – both predispositions above the average – the share of S1=12.3%).

The next step in the research process was to assess the engagement in value co-creation due to the innovative predispositions of the inhabitants of Poznań and the Poznań poviat. In the research process, analysis of variance was used – the one-way ANOVA method (Table 9).

Table 9: Assessment of engagement in value co-creation in terms of segments of residents of Poznań and the Poznań poviat

co-creating customer value	**total average**	**segment** **S1 | S2 | S3 | S4**	**ANOVA**
B1. participation (actual share)	2.52	$2.73^3 < 3.09^4 > 2.10^1 < 2.36^2$	46.619^{***}
B2. propensity – willingness to participate (willingness to co-create)	2.52	$2.87^2 \approx 3.04^2 > 2.12^1 \approx 2.31^1$	43.912^{***}

S1 – hybrid segment; S2 – pro-innovation segment; S3 – orthodox and conservative segment; S4 – opportunistic segment
Test post hoc – S-N-K Student-Newman-Keuls

Source: Own research.

The results obtained (Table 9) allow us to compare the engagement it co-create customer value due to the respondents' innovative predispositions. The actual share in co-creating customer value is the highest in the S2 segment – pro-innovative (M=3.09), then in S1 – hybrid (M=2.73), and then in S4 segments – opportunistic (M=2.36) and S3 – orthodox and conservative (M=2.10). On the other hand, the propensity to participate in value co-creation is highest in the S2 – pro-innovative (M=3.04) and S1 – hybrid (M=2.87) segments; propensity is lower in the other two segments – i.e. S4 – opportunistic (M=2.31) and S3 – orthodox and conservative (M=2.12).

Limitations and Future Research

The study was not national in nature, hence its results can only be referred to hybrids of the Poznań agglomeration. In the next stages of research, an interesting idea seems to be to examine the level of innovativeness, segmentation in this area, recognize both the willingness to engage in value co-creation, as well as activities in this field among the general population of Poland, as well as residents of other countries and comparing results internationally.

Analysis of the results of correlation relationships indicates the presence of clear relationships (rs>3.00) and indistinct relationships (rs≤3.00). It should be noted that both consumer innovativeness and customer engagement are complex and heterogeneous phenomena. This may indicate the existence of other dependencies, whose identification and empirical verification will allow the construction of more complex theoretical models, the verification of which will be used, among others, methods of confirmatory factor analysis, regression analysis, and structural equation modelling (SEM). In this context, the key problem is the definition of endogenous variables, which in the case of consumers will constitute broadly understood benefits, both tangible and intangible, while in the case of enterprises they will be elements related to both economic results as well as market position and the image of these organizations.

Conclusions

The presented results have confirmed the relationship between innovativeness and customer engagement. The results of exploratory factor analysis and the adopted segmentation criteria allowed the identification of segments of the inhabitants of Poznań and the Poznań poviat according to their innovative predispositions. In turn, the use of variance analysis allowed for a comparison of engagement in value co-creation between individual segments. This allows to indicate further directions of research and confirms the need to explore the identified compounds.

Endnotes

[1]We acknowledge that not every customer is a consumer and not every consumer is a customer. In most market transactions the customer paying for the product also consumes it. Being aware that there are some differences between these entities, due to the scope of the article and the context of their use, they will be treated as synonyms. Whenever the term 'customer' is used in an article, it means a customer who is also a consumer.

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Spatial Diversity of The Growth of Organic Farming in Poland

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Abstract

The article deals with the problem of spatial diversity of selected organic crops in Poland. The purpose of this study was to verify the hypothesis of convergence in the development of organic farming in Poland by voivodship. The research was based on cross-sectional data covering 16 voivodships of Poland and concerned the years from 2006 to 2018. The research was conducted on the theoretical and empirical level. In the theoretical part, the current research related to the issues discussed was presented. The empirical measurement was made using statistical analysis methods, i.e. sigma (σ) convergence analysis and the Czekanowski average difference method. The study assumed that we deal with various development paths resulting from the diversified allocation of resources, including in particular land resources and disproportions in long-term production structures. The conducted analyses revealed the unevenness of the organic farming development process in Poland by individual voivodships. In economic practice, this would mean using various instruments to support the development of agriculture and rural areas in a regional perspective.

Keywords: Convergence, Regional Economics, Agricultural Economics

Introduction

Organic farming is a farming method based on natural soil fertility and the effective use of agronomic techniques. Soil is the basis for organic farming. Therefore, all cultivation operations must be directed at maintaining and increasing soil fertility [Neuerburg 1994, p. 11] as well as preventing its erosion. The development of this way of farming in Poland is determined by both the natural conditions of the region and the Common Agricultural Policy of the EU, which aims to develop organic production and support it with financial aid [Kacprzak, Kołodziejczak 2011, p. 121]. Organic farming is part of the idea of sustainable agriculture aimed at equal treatment of the three social, economic and ecological spheres. According to Smith, Cohen, Reganold et al.[2020, pp. 2870-2878], these multi-functional benefits of organic farms for sustainable development result from the landscape context. Based on the research, they came to the conclusion that ecological areas were characterized by greater biodiversity and profits than conventional areas, despite lower yields. Research has shown that the benefits of biodiversity from organic farming vary depending on the landscape context compared to the benefits of yields and profitability. It has been found that ecological, but not economic, benefits resulting from the sustainability of organic farming are most evident in more intense agricultural landscapes, and therefore under the influence of intensive human activity, demonstrating a shaky capacity for self-regulation and requiring protection [Smith, Cohen, Reganold et al., 2020]. Bengtsson, Ahnstrom, Weibull [2005, pp. 261–269], Tuck, Winqvist, Mota, Ahnstrom, Turnbull, Bengtsson [2014, pp. 746–755] as well Katayama, Bouam, Koshida, Baba [2019, pp. 125-133] raised in their research the issue

of the impact of organic farming on biodiversity and the number of varieties. The research has shown that organic farming increases biodiversity in the agricultural landscape, supports greater organism wealth and abundance (by 30% on average) than conventional agriculture [Bengtsson, Ahnstrom and Weibull, 2005; Tuck et al., 2014; Katayama et al. 2019]. This study addresses the problem of uniformity in the development of organic farming in Poland in terms of time and space covering the division into voivodships. This problem is a contribution to further assessment of the conditions for the development of this activity. However, this requires an indication whether we are dealing with one or many models of its development and whether to support it is enough to use one universal policy or should we use different instruments? The achieved research results are both important for the theory of agricultural economics and application values.

Organic agriculture in the concept of sustainable development

Organic farming, unlike conventional farming, focuses largely on such production for which the use of most inorganic compounds for fertilization, pest control, diseases and weeds as well as the production of genetically modified varieties is forbidden for cultivation. On the other hand, this concept encourages crop rotation and catch crops to increase soil fertility, improve crop nutrition, and reduce production problems associated with pests, diseases and weeds [Connor 2008, p. 187]. Many definitions of organic farming have been created, which are used by various organizations, but they show the similarity of the research area and the analysed subject. The National Organic Standards Board treats organic farming as *an ecological production management system that promotes and strengthens biodiversity, biological cycles and soil biological activity. It is based on the minimal use of production means and management practices that restore, maintain and strengthen ecological harmony* [National Organic Standards Board 2000, p. 1]. The Codex Alimentarius Commission, in turn, defines organic farming as *a comprehensive production management system that promotes and improves the condition of the agro-ecosystem (...). It emphasizes the use of sound management practices instead of non-agricultural measures, given that regional conditions require locally adapted systems. This is achieved by using, where possible, cultural, biological and mechanical methods, rather than synthetic materials, to perform any specific function in this system* [Organically Produced Foods 2007]. Also, consumer preference studies confirm that organic food is associated with the natural process, care for the environment and animal welfare, and the non-use of pesticides and fertilizers. However, the price factor still plays an important role in shaping the demand for organic products [Shafie, Rennie 2012, pp. 360-367; Kułyk, Michałowska 2019, pp. 59-72]. Still, as noted by Jun and Xiang [2011, p. 1530], modern agriculture improves productivity while reducing the costs of excessive use of resources and energy, and generating damage to the environment.

Organic farming is part of the idea of sustainable development. Sustainable development should be understood here as a concept based on intergenerational equality - that is, the current generation cannot threaten the ability of future generations to meet their "material needs" and enjoy a healthy environment [Batie 1989, p. 1084]. It is an idea covering equivalent social, economic and environmental goals, referred to as the idea of eco-social justice. This can be considered a necessary condition and the goal of expanding democratic participation in ownership and control of resources [Gertler 2001, pp. 2-3]. Due to the fact that organic farming implements economic (providing income to farmers from the sale of agricultural products), environmental (rural development, animal welfare, landscape shaping) and social (provision of public goods, leisure places) goals, it is part of the concept of sustainable development. Economically, it can be observed that organic farming systems are achieving equal or even higher yields in developing countries compared to current conventional practices, which translates into a potentially important option for food safety and sustainable livelihoods of poor rural areas in times of climate change. Certified organic products meet the needs of farmers with higher incomes and therefore can serve as shaping climate friendly agricultural practices around the world [Scialabba, Müller-Lindenlauf 2010, pp. 158-169]. In addition, compared to conventional agriculture, organic products do not introduce so many harmful substances to the nutritional system.

There are several areas where the potential of organic farming is contained [Kilcher 2007, p. 32]:

1) improving soil fertility, biodiversity and the sustainability of agricultural production,
2) protection of natural resources,
3) improving agronomic and economic results,
4) providing access to attractive markets through certified products,
5) creating new partnerships along the entire value chain as well as strengthening farmers' confidence and autonomy.

The links with the concept of sustainable development are evident in the potential of organic farming. Moreover, it is favoured by the growing interest of consumers and a healthy lifestyle. It is also worth noting that the factor supporting organic farming is the EU subsidy system, which complements farmers' income. The aim of the research was to determine the direction of organic farming development in Poland, taking into consideration its spatial division into 16 voivodships.

The development of organic farming in Poland was three-stage. The first stage is the time before 1998, when organic farming did not benefit from any financial form of national support. The second stage is 1998-1999, when the state budget partly covered the costs of certification. At that time, subsidies for the costs of farm inspections were introduced in Poland [Luty 2014, p. 75], and after 1999, payments for the area of arable land were also introduced. The third stage is the period after Poland's accession to the European Union in 2004, when Polish farmers were included in the instruments of the CAP and the national agri-environmental program [Jończyk 2014, p. 131]. There are several key factors that have caused an increase in interest in organic production, which include a lower threat to the natural environment compared to intensive production, unused labour factor in agriculture [Siedlecka 2015, p. 240], concern for production potential, reduction in the level of agriculture intensification, limiting the use of fertilizers and plant protection products, respecting the natural environment, taking into consideration the specificity of local rural farms [Kułyk, Kowalewicz 2016, p. 151], growing interest in organic food and increasing demand for agricultural products of ecological origin, possibilities of exporting organic products [Komorowska 2015 , p. 119-120], an increase in consumer awareness of organic food and healthy nutrition, an increase in consumer purchasing power [Golik, Żmija 2017, p. 126] as well as an impact on public interest by caring for good animal breeding and rural development [Jończyk 2014, p. 130].

Material and Research Method

The empirical analyses of the convergence phenomenon carried out in the paper are based on cross-sectional and temporal data covering 16 voivodships of Poland in the years from 2006 to 2018. The aim of the study was to verify the hypothesis of convergence in the development of organic farming in Poland by voivodship. It was assumed that we are dealing with various development paths resulting from the diversified allocation of resources, including in particular land resources and disproportions in long-term production structures. In this article, sigma (σ) convergence analysis and the Czekanowski average difference method were used to achieve the assumed goal. Sigma convergence consists in the fact that the dispersion of the studied phenomenon tends to decrease over time, i.e. $\sigma_{t+T} < \sigma_t$ [Sala-and-Martin 1995, p. 3]. The idea of sigma convergence is associated with answering questions about long-term trends in the degree of diversity of the examined feature in a particular group of countries. During its measurement, the dispersion measure of the standard deviation of the natural logarithms of a given feature is used at some point *t* [Malaga 2004, p. 57]:

$$\sigma = \sqrt{\sum_{i=1}^{n}(lny_{it} - ln\bar{y}_t)^2}, \qquad (1)$$

where:
i- country index,
n- number of countries,
y_{iy}- level of convergence variable in the country *i* and at time *t*,
$\bar{y}$- average level of convergence in the examined group of countries.

If the standard deviations of the natural logarithms for the examined feature show a decreasing tendency, this indicates the occurrence of sigma convergence. This concept is derived from the neoclassical growth theory. Sigma convergence is defined as the effect of catching up over time [Dvorokova 2014, pp. 89-90]. In its original understanding, the sigma convergence analysis mainly concerned GDP per capita, but over time it was also used for research in agriculture [Czyżewski, Kułyk 2010, pp. 196-208; Kułyk, Augustowski 2017, pp. 44-53; or Somasekharana, Prasad and Nirmal Roy 2011, pp. 211-216]. The variable subjected to the convergence analysis (y) was the area of organic agricultural land converted into the number of certified organic farms in 16 voivodships in Poland. This variable is justified by changes in the size of arable land, the creation of new organic farms and permanent farms during the conversion period. The time range covered the years from 2006 to 2018 (Tab. 1).

Table 1: Sigma convergence results in Poland

Time	Sigma	Δ Sigma
2006	0,659	-
2007	0,609	**-0,076**
2008	0,459	**-0,247**
2009	0,562	0,225
2010	0,525	**-0,066**
2011	0,487	**-0,073**
2012	0,466	**-0,042**
2013	0,439	**-0,059**
2014	0,429	**-0,023**
2015	0,442	0,031
2016	0,432	**-0,024**
2017	0,440	0,019
2018	0,480	0,091

Source: own study based on BDL data (https://bdl.stat.gov.pl/BDL/dane/podgrup/temat), access: 05.04.2020.

The presented results show that the phenomenon of convergence did not occur in every period. Therefore, it is difficult to talk about equalizing the examined feature in all voivodships. Complementing the analysis was building a regression equation in the analysed time period (Tab. 2). The OLS estimation method was used, the observations 2006-2018 used (N = 13) and the dependent variable (Y) were the sigma parameters estimated each year.

Table 2: OLS model for the sigma parameter

Variables	Coefficient	Standard error.	t-Student	p-value	R^2
const	0,595300	0,0292701	20,34	<0,0001***	0,58
time	−0,0144158	0,00368769	−3,909	0,0024***	

Source: own calculations using the Gretl 2017d program.

A negative value of *time* parameter indicates the occurrence of sigma convergence. Both parameters are statistically significant at 99%, although the most important indicator of convergence is the value of the time variable parameter. The model fit factor for R^2 variables is 0,58.

Another used method was the Czekanowski average difference method. To perform this analysis, it is necessary to use the input data set, consisting of a series of objects of the same type (i.e. having the same variables), and then measure the distance between all possible pairs of objects. In practice, there are many methods for measuring distances in multidimensional space. The measurement is made using the formula [Soltysiak and Jaskulski 1999, p. 175]:

$$DD = \frac{1}{n}\sum_{j=1}^{n} |M_{1j} - M_{2j}|,$$

where DD indicates the average difference between two objects, resulting from elementary differences between their attributes, n number of variables (attributes) taken into account, M_{1j} attribute value for the first object; M_{2j} attribute value for the second object. The grouping procedure is to make the differences between units belonging to the same group as small as possible. Based on the scale of similarities, the Czekanowski diagram is built, which allows separating regions similar to each other in terms of the studied features [Mruk 2003, p. 204]. The larger the symbol at the intersection of the diagram's row and column, the more similar the regions are in terms of the studied features [Wójcik 2013, p. 359]. In the study, the area (in ha) of grain, potato, vegetable and fruit crops was analysed. The data came from the *report on the state of organic farming in Poland in 2017-2018* and concerned 2018. This category of crops was selected because, as Rembiałkowska [2007, p. 2761]. observes, plants grown in organic systems usually have significantly (on average 20%) lower yields than conventionally produced crops. This increases their price and creates a barrier for many consumers when buying organic food [Rembiałkowska 2007, p. 2761]. Due to the fact that all attributes were expressed in the same units, there was no need to standardize the features [Dzieciuchowicz 2007, p. 132]. In the first stage, the distance matrix was made using the Euclidean method (Tab. 3).

Table 3: Distance matrix among Polish voivodships

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	dolnoslaskie	0,000	16131,240	23976,990	7715,841	18815,050	18090,310	29863,380	16720,750	33258,620	3053,407	14448,690	19007,800	17443,760	5840,334	4262,897	9919,143
2	kujawsko-pomorskie	16131,240	0,000	24493,500	9054,646	8584,737	2697,800	31869,460	2708,885	28507,570	16474,880	2592,014	4017,802	5668,530	21079,570	14577,090	25336,870
3	lubelskie	23976,990	24493,500	0,000	20837,090	17820,930	23720,190	11346,800	26523,840	14942,510	22168,210	24222,250	27490,110	19709,810	24481,310	19932,860	25224,980
4	lubuskie	7715,841	9054,646	20837,090	0,000	11331,270	10642,840	27560,890	10004,850	28052,330	7981,668	7390,021	12163,610	10057,470	12716,340	5832,729	16668,410
5	lodzkie	18815,050	8584,737	17820,930	11331,270	0,000	6766,594	24479,640	10078,260	19951,590	18250,110	8716,451	10311,990	5073,497	23058,490	15816,680	26561,720
6	maopolskie	18090,310	2697,800	23720,190	10642,840	6766,594	0,000	30876,140	4081,964	26565,590	18190,030	4252,265	4074,630	4705,631	22954,020	16168,280	27109,250
7	mazowieckie	29863,380	31869,460	11346,800	27560,890	24479,640	30876,140	0,000	33309,340	13074,520	27937,280	30979,020	34189,050	27870,460	30190,490	26581,700	30291,310
8	opolskie	16720,750	2708,885	26523,840	10004,850	10078,260	4081,964	33309,340	0,000	29778,700	17355,660	2779,639	2299,754	8114,332	22008,560	15721,710	26306,090
9	podkarpackie	33258,620	28507,570	14942,510	28052,330	19951,590	26565,590	13074,520	29778,700	0,000	31701,620	28258,580	29774,220	24163,140	35473,150	29670,860	37091,570
10	podlaskie	3053,407	16474,880	22168,210	7981,668	18250,110	18190,030	27937,280	17355,660	31701,620	0,000	14892,680	19595,960	17089,150	5222,155	3786,281	9605,786
11	pomorskie	14448,690	2592,014	24222,250	7390,021	8716,451	4252,265	30979,020	2779,639	28258,580	14892,680	0,000	4807,300	6948,434	19666,110	13161,030	23899,230
12	slaskie	19007,800	4017,802	27490,110	12163,610	10311,990	4074,630	34189,050	2299,754	29774,220	19595,960	4807,300	0,000	8659,270	24284,940	17910,890	28570,290
13	wietokrzyskie	17443,760	5668,530	19709,810	10057,470	5073,497	4705,631	27870,460	8114,332	24163,140	17089,150	6948,434	8659,270	0,000	21577,050	14597,480	25396,490
14	warminsko-mazur	5840,334	21079,570	24481,310	12716,340	23058,490	22954,020	30190,490	22008,560	35473,150	5222,155	19666,110	24284,940	21577,050	0,000	7494,475	4994,286
15	wielkopolskie	4262,897	14577,090	19932,860	5832,729	15816,680	16168,280	26581,700	15721,710	29670,860	3786,281	13161,030	17910,890	14597,480	7494,475	0,000	11016,820
16	zachodniopomorskie	9919,143	25336,870	25224,980	16668,410	26561,720	27109,250	30291,310	26306,090	37091,570	9605,786	23899,230	28570,290	25396,490	4994,286	11016,820	0,000

Source: own calculations using the MaCzek program 3.3.44.

Based on the distance matrix, the Czekanowski diagram was constructed. For this purpose, two modules were used: Simple auto algorithm and Simple genetic algorithm (Fig. 1-2). The simple genetic algorithm requires two parameters before starting to run: Number of generations and Number of variants. These parameters have an impact on the quality and time consumption of calculations. Their growth increases the likelihood of a more optimal variant of diagram arrangement. However, it should be noticed that due to the randomness of this type of algorithms, there is no guarantee of better ordering

of diagrams than in the case of simple ordering. Therefore, both methods are used in this study. After starting the procedure, the program displays the progress of calculations, their duration and the value of the ordering function F (the smaller the value, the better the order).

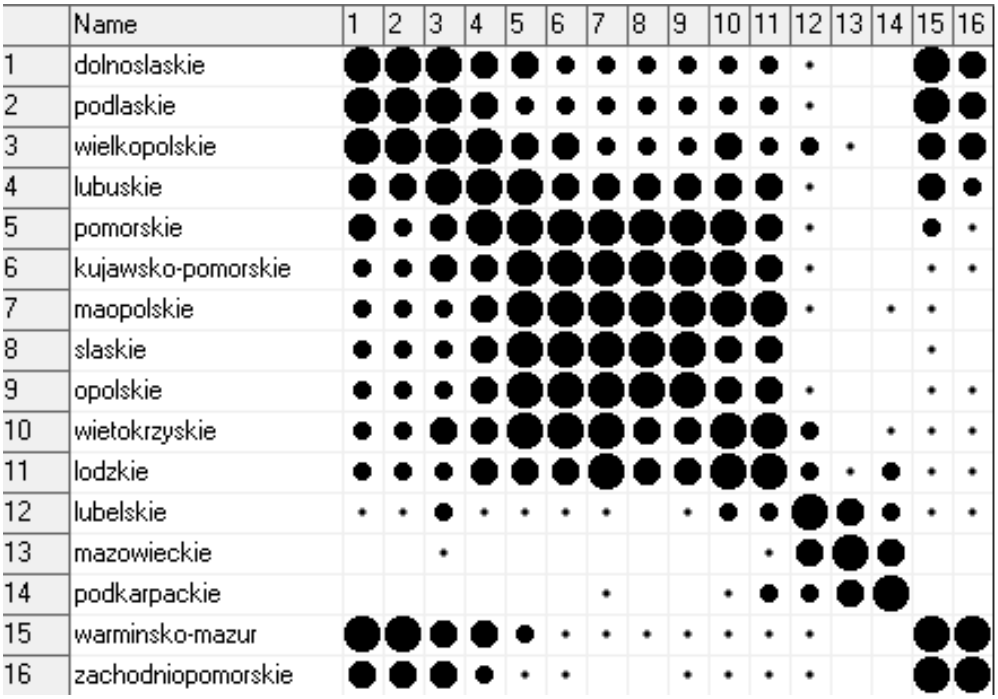

Figure 1: The Czekanowski diagram obtained with the use of Simple auto algorithm method
Source: own calculations using the MaCzek program 3.3.44.

Based on the ordering with the use of Simple auto algorithm, 4 groups of similar voivodships were identified. In the analysed case, the F value was 0,002, which indicates a high quality of ordering. The first group includes the following voivodships: Dolnośląskie, Podlaskie, Wielkopolskie and Lubuskie, the second group includes: Pomorskie, Kujawsko-Pomorskie, Małopolskie, Śląskie, Opolskie, Świętokrzyskie and Łódzkie, the third group consisted of the following voivodships: Lubelskie, Mazowieckie and Podkarpackie, while the fourth group are Warmińsko-Mazurskie and Podkarpackie provinces. This typology was then compared with the Simple genetic algorithm grouping method (Fig. 2). In this case, the maximum parameter values used were: Number of generations = 2000 and Number of variants = 50.

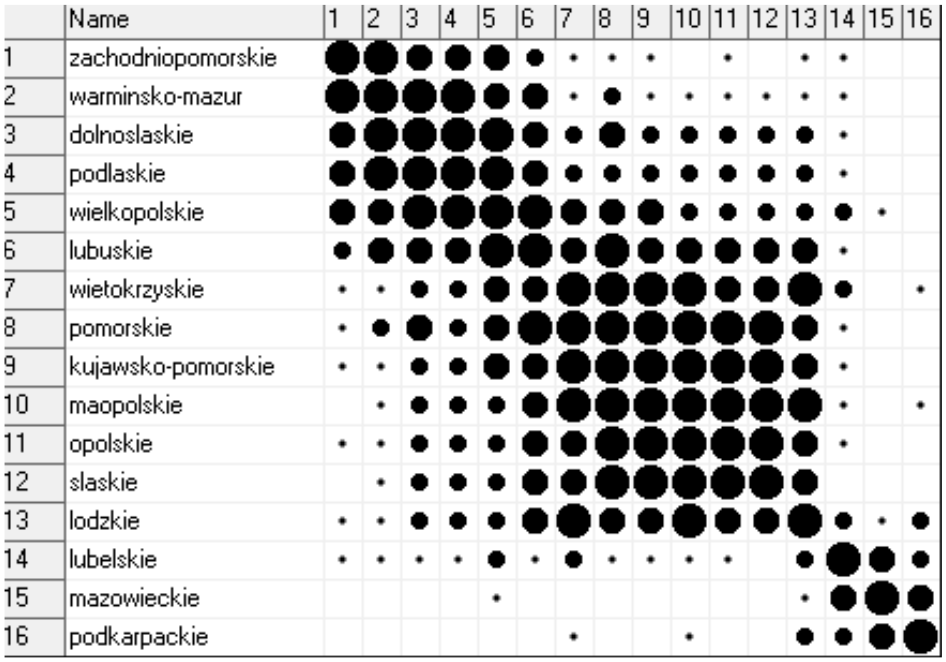

Figure 2: The Czekanowski diagram obtained with the use of Simple genetic algorithm method
Source: Own calculations using the MaCzek program 3.3.44.

Grouping with the use of Simple genetic algorithm revealed the occurrence of 3 similar groups of voivodships. The first group includes the following provinces: Zachodniopomorskie, Warmińsko-Mazurskie, Dolnośląskie, Podlaskie, Wielkopolskie and Lubuskie, the second group includes the following provinces: Świętokrzyskie, Pomorskie, Kujawsko-Pomorskie, Małopolskie, Opolskie, Śląskie and Łódzkie. The third group was represented by Lubelskie, Mazowieckie and Podkarpackie. The introduction of the Simple genetic algorithm method therefore reduced the analysed groups and moved Warmińsko-Mazurskie and Zachodniopomorskie voivodships from group 4 to group 1.

Conclusions

The convergence study allows assessing the development paths of a particular phenomenon and identifying possible gaps between the units under consideration. The aim of this study was to verify the hypothesis of convergence in the development of organic farms. The conducted analyses revealed the unevenness of the organic farming development process in Poland by individual voivodships. The results confirmed the occurrence of sigma convergence simultaneously, however, we did not deal with one convergence point, but with four different development models, characteristic for four groups of voivodships. The convergence process is long-term and if we take into consideration the diversity of labour productivity resulting from different positions of voivodships in relation to sustainable growth paths, we will obtain different growth models. The achieved results are in line with the adopted assumptions, and the differences are the result of disproportions in the size and structure of resources allocated in individual territorial units, including in particular land resources, production structures and environmental conditions. In this situation, it is possible to talk about conditional convergence, because the achieved disproportions are permanent and result from a number of structural (also historical – structure of the division of the land) differences. Conditional convergence means that the location of the point of long-term equilibrium of the size of capital and product per unit of effective work depends on many factors that to some extent may be shaped by economic policy. The identified different types of convergence of Polish regions are also independent of each other. This is help for the future in conducting economic policy and undertaking activities aimed at the development of agriculture and

rural areas on a regional basis. It also means that policies supporting changes in agriculture should be different due to the found disproportions and different development models.

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Informational Continuity of Operations in the Context of Safety and Security Research in Contemporary Organizations

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Abstract

The main aim of the article is to indicate the possibilities, scale and scope of application of alternative technologies such as Cloud Computing to shape informational continuity of operations and provide safety and security for modern public and private organizations. The study has used the CAPI method as well as statistical analysis of empirical data. The research was conducted for various entities representing public services, local government administration as well as entities running business activities. The subject of the study were problems related to the functioning of a given organization in circumstances of crisis and threats. One of the important areas of research was the problem to use the tools and services of the CC platform, which enables strengthening the level of information security and informational continuity of operations. The range of research and analysis and study work undertaken leads to the conclusion that the increasing use of cloud computing can foster security and informational continuity of operations.

Keywords: Informational Continuity, Cloud Computing (CC), Security, Risk.

Introduction

The criterion of systemic, including informational, continuity of operations, understood as the ability to function in a modern organization in circumstances of threats and crises becomes a key requirement of its safety and security. Achieving the appropriate value level of this attribute is a complex task, requiring multidimensional evaluation and coordination of the activities of many people with appropriate, individual executive and management competences. Based on literature studies and theoretical analyses and also empirical analyses and studies, it has been confirmed that it is possible to identify risk factors for the loss of informational continuity of operations (Zaskórski, 2011, pp. 67-105). This creates the premises for building a comprehensive system to counteract disruptions and the risk of loss of informational continuity of operations, by using alternative solutions that increase the level of reliability of informational services. On this basis, it can be concluded that proposals for model solutions should take into account the various systemic dimensions of informational continuity of operations, including safety, security and also mobility and alternative capacity of ICT infrastructure. Being aware of these attributes allows to build a comprehensive system that provides informational continuity of operations of a modern organization functioning not only in normal situations, but also in crisis situations.

The main aim of the editorial is to indicate the possibilities, scale and scope of application of Cloud Computing technology in shaping the informational continuity of an organization - in the context of ensuring safety and security of contemporary public and private organizations. Therefore, the research problem has been decomposed into the following research questions (sub-problems):

RQ1: *What actions are taken to shape infrastructure ensuring safety and security and information continuity of operations for various classes of organizations?*
RQ2: *What are the possibilities to apply Cloud Computing in shaping the safety and security of an organization and its informational continuity of operations in circumstances of crisis and threats?*
RQ3: *What is the scale and scope to apply Cloud Computing in public and private organizations to shape their safety and security and informational continuity of operations in circumstances of crisis and threats?*

The study has used the CAPI method as well as statistical analysis of empirical data. The article is structured in four essential parts relating to the following problems: (1) specification of the essence of the informational continuity of organization's operations - with particular emphasis on safety and security management elements and the use of Cloud Computing (CC) technology, (2) definition of research assumptions and limitations, (3) presentation of the results of empirical research in the scope of shaping the informational continuity of organization's operations with the use of Cloud Computing infrastructure, as well as (4) the re-summit of research results in the context of continuity of information and decision making processes in circumstances where Cloud Computing solutions are applied.

The essence of informational continuity of operations

Information continuity of operations is one of the attributes of informational safety and security (see: da Veiga et al., 2020, pp. 2-20). An organization's information resources may have an impact both on the way in which work processes are carried out and on management effectiveness, including its position on the market. The continuity of organization's operations means the ability to carry out basic tasks at a certain quality level. However, an organization's sense of safety and security is variable and depends on both external and internal threats. The sources of these threats can be both natural forces and human activity (Fans, Subriadi, 2019, p. 276 et seq.). Each organization is a system of activity that aims at achieving its objectives with a particular focus on the criterion of safety and security and the risk stemming from a variety of threats that may intensify in crisis situations. Continuity of operations in systemic terms can be determined by the level of safety and security of individual sub-systems and threats appearing in one sub-system affect others and can threaten the whole (Niemimaa et al., 2019, pp. 209-215). The potential source of a discontinuity of operations and crisis situation may quite often be the environment of a given system. Every modern organization as a system is open in a strong relationship with its external environment. Multilateral links between an organization and its environment can have a significant impact on the organization's safety and security and on the achievement of its goals in circumstances of risk, indeterminacy and uncertainty of activity (see: Kostera, 2008; Xing, Zeng, Zio, 2019).

The size of the organization and its importance in the economic and social system of a country or region may have a strong impact on the effective management of safety, security and the risk to lose continuity of operations. The research and analysis of the safety and security of each organization taking into account the possible consequences of the threats indicates the need to identify individual vulnerability to a given threat (based on: Fans, Subriadi, 2019). This problem can be analysed in many aspects, including the ease of unauthorized access to the organization's resources, including information resources (Järveläinen, 2013, pp. 583-590). In addition, one of the important determinants of the safety and security of modern organizations is the use of information and communication technologies both within the organization and in relations with the wider environment (Rose et al., 2012, pp. 445-456; Di Caprio, Santos-Arteaga, Tavana, 2014, pp. 108-124; Basole, Park, 2019, pp. 369 et seq.). Modern information technologies affect the level of information safety and security and affect the level of informational continuity of operations (Zaskórski, 2011, pp. 107-144). The loss of informational continuity of operations may also have consequences related to the loss or depreciation of the entire potential of a given organization and the loss of ability to effectively manage its own resources. However, modern IT technology platforms and their flexibility may be conducive to ensuring continuity of operations and reducing the level of vulnerability of an

organization to crises and threats, but unfortunately new threats arise here. Therefore, each organization should (ISO 9001:2015; ISO 31000:2018):

- successively identify risk management processes and ensure their monitoring,
- determine methods for effective risk management, taking into account the criteria for its unambiguous evaluation,
- ensure the availability of adequate resources and information necessary to execute these processes,
- monitor and measure the key values in the processes organization and implement the actions necessary to achieve the planned results and continuous improvement of these processes.

Information continuity of operations (Fig. 1) is one of the dimensions of the operations' continuity of contemporary entities (da Veiga et al., 2020). Continuity of operations can be seen in terms of personnel, logistics, finance and similar continuity (Gallagher, 2003). It is important to note that a violation of information continuity may generate effects in other areas of the operations' continuity. Moreover, the informational continuity of operations is conditioned by the safety and security of information resources, including the risk of violation of the confidentiality criterion, integrity or reliability of data (see: Di Caprio, Santos-Arteaga, Tavana, 2014). The realization of such a risk may cause losses proportional to the importance of resources used especially in so-called critical processes (Liderman, 2007).

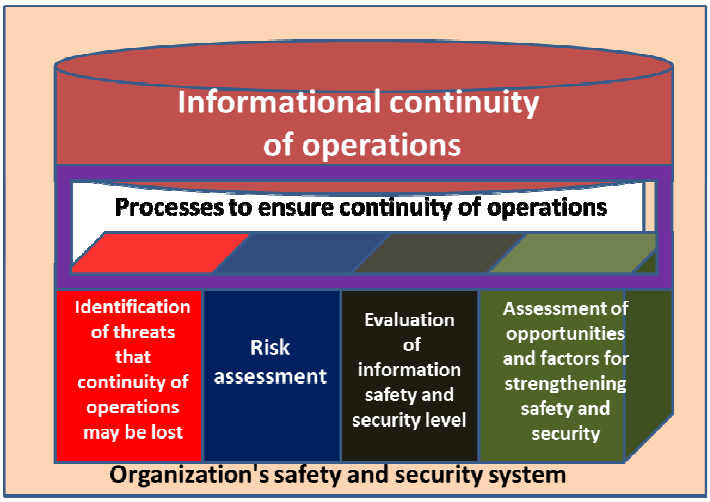

Fig. 1: Selected determinants of informational continuity of operations
Source: own elaboration based on (Miszalski, Zaskórski, 2014)

Every present-day organization should have an appropriate state of situational awareness (Endsley, 2015, pp. 101-111) of its operating conditions, and also of the needs of its stakeholders and of its capabilities (Artofmanliness, 2018). For this reason, when preparing to address the risks, the accepted standards and procedures for risk management should be followed, which should lead to the desired state (Management lexicon, 2004). The safety, security and crisis management system in any organization (including the state/country as a whole and any other entity) is therefore a system of coherent measures and coordinated undertakings, applied to ensure its smooth functioning (Białas, 2007, p. 182). Preparing an organization for crisis situations therefore requires linking many elements, including (Borodzicz, 2005; Crandall, Parnell, Spillan, 2014):

- procedures for monitoring and identifying threats and procedures for counteracting them (e.g. fire, hacking a computer system etc.),
- threat notification systems, as well as principles and forms of public relations and response methods appropriate to the nature of a given threat,

- evacuation and emergency solutions (back-up workstations, copies of data) and the principles of eliminating negative effects, taking into account the rules of cooperation with external entities according to established procedures.

The undertakings concerned with ensuring the security of the organization, including information security, should consist in recognizing, detecting and preventing situations that generate threats. Therefore, organizational and preventive procedures ensuring informational continuity of operations in crisis situations and the limitation of potential disruptions as well as the compensation of their negative effects are of great importance (Krzyżanowski, 1992). The safety and security policy is usually related to specific projects and requires the definition of the objectives, as well as the subject matter and area of impact of a given procedure and the conditions to use such a procedure. It is necessary to identify the persons responsible for carrying out the activities provided for by a given procedure. The organization's preparation to provide safety and security indicates the need to develop action plans and review it in several phases (see: Fans, Subriadi, 2019), including adequacy of actions in relation to needs and capabilities and identification of alternative solutions that would allow for continued emergency response (Gallagher, 2003, pp. 13-15).

In the information safety and security plans, a key role is played by the process of maintaining informational continuity of operations as the ability to effectively circulate useful information about incidents, threats and their consequences and the possibilities (forces and means) of actions to ensure overall continuity of operations, seen in different dimensions (based on: Järveläinen, 2013, p. 585 et seq.). This involves the effective and efficient exchange of information within the organization and its environment in all phases of crisis management, ensuring that the effects of information disruption are minimized and therefore the risk of loss of informational continuity of operations is minimized (based on: Rose et al., 2012, p. 447 et seq.). This may also mean providing situational awareness (including business awareness) for all links in crisis management.

An important assumption for effective management of a modern organization prepared for threats and crises is to develop and use the plans for information continuity of operations with the use of alternative information resources available not only in autonomous IT systems, but also with the use of services in cyberspace (based on: Basole, Park, 2019). Therefore, the use of the Cloud Computing (CC) information service platform (see: IDC MarketScape, 2019) may be an alternative solution that increases their reliability and thus reduces the risk of losing informational continuity of operations. This way of ensuring information safety and security with utilization of strong, professional mechanisms to protect data and services (based on: DaSilva et al., 2013, pp. 1161-1173; Vijayakumar, Arun, 2017, pp. S129-S136; Mishra, Umrao, Yadav, 2018, pp. 5980-6032) can foster:

- the integration of procedures of informational continuity of operations and the use of alternative procedures of informational continuity of operations, taking into account the various risks,
- preparing procedures for preventive, emergency and recovery activities, including the possibility of simulating the course of a crisis by using the CC platform,
- allowing access to resources, services and procedures without space and time constraints, and in particular in the event of failure (destruction) of the owned (autonomous) information resources,
- continuous and adequate analysis of risks for the updates of procedures.

The problem of developing and implementing organizational procedures for ensuring organizational security and responding to threats and crises is multi-faceted and difficult to fully formalize and unify. Therefore, research has been undertaken in relation to the evaluation and analysis of the condition and possibilities to provide informational continuity of operations of selected business entities and the government administration. These tests were carried out on a representative sample with many different assumptions and limitations.

Research Assumptions and Constraints

The essence and conditions of crisis management require the identification of information procedures for the informational continuity of organization’s operations in a specific task, organizational and,

above all, technological context (Miszalski, Zaskórski, 2014). This is primarily due to the particular importance of the attribute of continuity of operations for each entity in the face of the aware and unaware possible consequences of loss of continuity, both through the chaotic operation of individual services and the lack of coordination, and through the destruction and mutual obstruction of various activities, including the loss of control over the local and global situation.

In the article, the authors focus on the informational dimension and possibilities of counteracting the risk of lowering the level of informational continuity of operations. It is therefore assumed that the sign of ensuring informational continuity of operations is ultimately the pursuit to increase the level of information safety and security and preventing the risk of its reduction, and above all preventing the effects of such a phenomenon through the use of selected ICT platforms and tools in specific crisis situations.

The research was conducted for various entities representing public services, local government administration as well as entities running business activities. The subject of the study were problems related to the functioning of a given organization in circumstances of crisis and threats. One important area of research was the problem of using alternative tools such as the CC class services, which should enhance information safety and security and also informational continuity of operations. The population adopted in the research was evaluated according to various statistical parameters for selected attributes of operations' continuity.

The significance of differences in distributions between more than two variables of a ranked or quantitative nature was checked by a single-factor analysis of variance. The importance of differences between qualitative (nominal) variables was checked using the chi-quadrant independence test. Correlations between variables were checked using the Spearman's rank correlation coefficient. The analyses were based on the results of the questionnaire surveys by the questionnaire questions (Table 1).

The statistical analyses assumed the significance level of p=0.05. The analysis was carried out by using SPSS software. 77 representatives of organizations: public (27% of the total), non-governmental (22%) and commercial (51%) were surveyed. The public sector included organizations dealing with: health care (27%), science (23%), uniformed services (18%), local governments (14%) and central administration (9%). The NGO sector accounted for 34% of organizations. The private sector includes: services (33%), retail (17%), hotel and entertainment (15%), automotive (13%), telecommunications (10%), finance and insurance (6%), logistics (4%) and education (2%).

Table 1: The set of the questionnaire questions

No.	Question	The possible answers
1	Type of organization.	Public/NGO/Commercial
2	Sector.	Public: Uniformed governmental public services (e.g. the police), Health Care, Science, Central Governmental Administration, Local Government Administration, Others.
3		NGO
4		Commercial sector: Finance & Insurance, Retail, Logistics, Automotive, Telecommunications, Education, Services.
5	The quantity of staff employed.	Small: 0-50; Medium: 50-250; Big: 250+.
6	The age of the organization.	Startup: 0-2 years; The medium age: 2-5 years; The mature

No.	Question	The possible answers
		organization: over 5 years.
7	Geographical dispersion.	Small: 0-5 locations; Medium: 5-20 locations; Big: over 20 locations.
8	Security expenditure in relation to revenue.	Small: 0-0.4%; Medium: 0.4%-0,8%; Big: over 0.8%.
9	Expenditure priorities for the safety and security budget.	Prevention (1-5); Detection (1-5); Audit (1-5); Trainings (1-5); Safety and security policy management (1-5).
10	Is cloud computing used?	No; Private cloud; Public cloud; Hybrid cloud.
11	Security incidents detected within the last two years.	Please provide a number.
12	Is there a security or safety strategy?	Yes/No.
13	Is there an organizational level responsible for crisis management?	One-man position/Team/None.
14	Have key processes for the organization been identified?	Yes/No.
15	Have key resources for the organization been identified?	Yes/No.
16	Have the existing procedures allowed for the identification of materialized risk?	Yes/No.
17	Have the existing procedures allowed for the assessment of the materialized risk?	Yes/No.
18	Have the existing procedures allowed for continuity of operations for materialized risks?	Yes/No.
19	Priorities for keeping continuity of operations for materialized types of risks.	Information (1-3); Procedures & education (1-3); Infrastructure (1-3).
20	Sources of materialized types of risks.	Force majeure; Conscious destructive activity; Human errors and mistakes; Information system failure.
21	Does cloud computing affect business continuity?	Yes/No.
22	Is the organization testing its crisis management processes?	Yes/No.
23	Does the organization monitor the status of key processes and resources?	Yes/No.

Organizations employing up to 50 people accounted for 33% of the total number, while medium-sized organizations employing between 50 and 250 people accounted for 29% of the total number. The research group was supplemented by organizations employing over 250 people (39%). Most organizations have operated for more than 5 years (49%), medium in terms of age organizations accounted for 32% of the total, the least numerous were young organizations, which have existed for

two years at most (20%). In terms of geographical dispersion, small organizations with no more than 5 locations (39%) and large organizations with more than 20 locations (36%) dominated, the research group was supplemented by medium-sized organizations with 5 to 20 locations (25%).

It has been assumed in the conducted research that the entities that will be representative are enterprises and public administration entities. The population of entities subject to the research was 5751. In the research the formula for minimum sample size was adopted (see: Hoekstra, 2014, pp. 1157-1164):

$$Nmin=NP.(\alpha 2{\cdot}f(1-f))NP.\cdot e2+\alpha 2{\cdot}f(1-f)$$, where:

Nmin – minimum sample size,
NP. – the size of the population from which the sample is taken,
α – level of confidence in the results,
f – fraction size,
e – assumed maximum error, expressed as a fractional number.

Therefore, using the value of 5751 entities, 90% confidence level (10% uncertainty of the result was allowed), 0.5% fraction level (recommended default value), 10% error (assumed that there were up to 10% unintentionally misfilled questionnaires), the result of 67 entities was obtained as a minimum. A certain margin of safety was therefore adopted and a representative sample of 77 entities was determined.

Results of empirical research on informational continuity of the organization's operations, including cloud computing infrastructure (CC)

Nearly 45% of the respondents declared that the organization's expenditures on safety and security in relation to revenue are small, while the medium expenditures were declared by 18% of the respondents, about 37% declared that the expenditures are big and constitute over 0.8% of revenue (Table 2). Organizations with a small number of employees experienced relatively small expenses (75% of indications), the increase in expenses occurred with the size of the organization, large associations also experienced big expenses (63% of indications). The differences are statistically significant ($p<0.001$).

The vast majority of young organizations experienced small safety and security expenses (93% of them), organizations with internships from 2 to 5 years experienced small (48%) and medium (30%) expenses, while the majority of organizations operating above 5 years experienced relatively big expenses (60%). The differences between groups are statistically significant ($p<0.001$). Organizations having a big number of locations also experienced high safety and security expenses (75%), these expenses decreased with the number of locations, most organizations with small dispersion also experienced small expenses (69%). Analysis with the chi square independence test showed that the discussed differences are statistically significant ($p<0.001$).

The respondents also evaluated the spending priorities for the security budget, on a scale from 1 score to 5 scores, the scores were averaged and ranked from the highest to the lowest, i.e. from the highest priority to the lowest priority. The highest priority was given to expenditure related to the management of the safety and security policy (the mean score of 3.4, at least half of the people gave a score of 4) and expenditure related to training (the mean score=3.3; the median=4). Slightly lower priority was given to audit (the mean score=2.9; median=3), the least priority was expenditure related to prevention (the mean score=2.4; median=2) and detection (the mean score=2.3; median=2).

A one-factor analysis of the variance showed a statistically significant differences in assessments of safety and security policy management expenditures between different types of organizations (p=0,005). The highest mean scores was recorded for NGOs (4.1), slightly lower for public organizations (3.6), while the lowest for commercial institutions (2.9). No differences were found for the other priorities. In addition, statistically significant correlations between age (p=0.001),

geographical dispersion (p=0.020) and prioritization evaluation of audit expenditures were confirmed. Older organizations with a large number of locations valued this type of expenditures higher.

Most organizations used cloud computing: private one (34%), public one (9%) and hybrid one (25%). However, 33% of organizations did not use cloud computing services (Table 2).

The average number of security incidents within the last two years was 7.3, with a standard deviation of 15.6. At least half of the respondents stated that there were no more than 3 incidents in the organizations. The highest number of incidents was 123. It was found that statistically significant correlations between the number of detected safety or security incidents and the size of employment (p=0.032), age (p=0.004), dispersion of the organization (p<0.001), its safety and security expenditures (p<0.001). The higher the number of employees in the organization, the older and more dispersed the organization, the higher the safety and security expenditure and the higher the number of incidents detected.

Most of the respondents claimed that there was a safety and security strategy in their organizations (71%) (Table 2). Indeed, more often such a strategy was pursued by organizations with a larger number of employees (p<0.001), operating for a longer period of time (p<0.001) and having a large number of locations (p<0.001).

Most of the respondents stated that their organizations lacked a level of responsibility for crisis management (53%), in 32% of organizations a team was responsible for it (32%) and in 16% of cases a specific person was responsible (Table 2). Public and non-governmental organizations most often had no crisis level, 60% and 65% of cases respectively. The remaining public organizations had a crisis team, and most NGOs had one-man positions (29%). In the case of commercial organizations - 18% of them had a one-man position, 39% had a team, and nearly 44% did not have an organizational level responsible for crisis management. These differences are statistically significant (p=0.025).

Small and medium-sized organizations most often did not have organizational levels responsible for crisis management, large organizations most often had teams (69%) or one-person positions (21%). The differences are statistically significant (p<0.001). Also start-ups and middle-ranking organizations did not have such levels, 93% and 71% of cases respectively; organizations over 5 years old had most often teams responsible for crisis management (56%). The differences are statistically significant (p<0.001). Moreover, organizations with no more than 5 locations most often did not have a level responsible for crisis management (73%), the higher the number of locations, the more often organizations had a team or one-person positions responsible for crisis management (p=0.045).

Table 2: Summary results of the empirical research

Categories of responses	Percentage of respondents' indications
Problem: Safety and security expenditures in relation to income (relative to the size of the organization), n = 77	
Small; 0-0.4%	44.7%
Medium; 0.4-0.8%	18.4%
Big: over 0.8%.	36.8%
Problem: Use of cloud computing services (CC), n = 77	
Public cloud	9.1%
Hybrid cloud	24.7%
Private cloud	33.8%
No	32.5%

Categories of responses	Percentage of respondents' indications
Problem: Existence of security strategy, n = 77	
Yes	71.4%
No	28.6%
Problem: Existence of organizational level responsible for crisis management in the organization, n = 76	
One-man position	15.8%
Team	31.6%
No position or team	52.6%
Problem: Identification of key processes for the organization, n = 77	
Yes	75.3%
No	24.7%
Problem: Use of existing procedures for identification of materialized risk, n = 77	
Yes	58.4%
No	41.6%
Problem: Impact of existing procedures on the assessment of materialized risk, n = 77	
Yes	54.5%
No	45.5%
Problem: Impact of existing procedures on operations' continuity for materialized risk, n = 77	
Yes	66.2%
No	33.8%
Problem: Sources of materialized types of risks, n = 77	
Conscious destructive activity	31.1%
Human errors and mistakes;	28.4%
IT system failure	27.0%
Force majeure	10.8%
All above-mentioned causes	2.7%
Problem: Effect of cloud computing (CC) on continuity of operations, n = 77	
Yes	49.4%
No	50.6%
Problem: The testing of crisis management processes (systems) by the organization, n = 77	
Yes	57.1%
No	42.9%
Problem: The monitoring by an organization of states of key process and resource, n = 77	
Yes	61.0%
No	39.0%

In most cases (75%), key processes for the organization were identified (Table 2). More often such cases occurred in organizations employing a large number of people (p=0.035) and those operating for longer time period (p=0.018). However, the distribution of responses was not significantly affected by geographical dispersion (p=0.071). Key resources were identified among 70% of organizations (Table 2). This was most often the case among organizations with a large number of employees (p=0.007), operating for more than 5 years (p<0.001), with a large dispersion (p=0.001).

In more than half of the cases, the existing procedures allowed for the identification of materialized risk of loss of information security (58%). A slightly smaller percentage of respondents considered that the existing procedures allowed for the assessment of materialized risk (55%). More than 66% of the respondents considered that the existing procedures allowed for keeping the informational continuity of operations for a materialized risk (Table 2).

The empirical study also collected evaluations of priorities to keep continuity of operations for materialized types of risks on a scale from 1 score to 3 scores, the evaluations were averaged and ranked from the highest to the lowest, i.e. from the highest priority to the lowest priority. The most important priorities are information (the mean=2.2) and procedures and education (2.0). However, it was characteristic that the infrastructure was a little less prioritized (1.7). In the opinion of the respondents, the most frequent source of materialized risks were: conscious destructive actions (31%), human errors and mistakes (28%) and IT system failures (27%). Force majeure occurred less often (11%). At this point, it is also worth noting that almost half of the respondents (over 49%) believed that cloud computing had a fairly significant impact on the continuity of the organization (Table 2).

It is also worth noting that half of the respondents claimed that the organization is testing its crisis management processes (57%) (Table 2). They were most often tested by organizations employing between 50 and 250 people (64%), less frequently by institutions employing a smaller (36%) or larger (36%) number of people. The differences are statistically significant (p=0.031). More often such tests were also implemented by mature organizations (p=0.001) and with a large number of locations (p=0.003). Most of the respondents considered that their organizations monitored the status of key processes and resources (61%) (Table 2). Most often such monitoring was implemented by companies with a large number of employees (p=0.010), operating for longer period of time (p=0.008), and with a larger geographical dispersion (p=0.008).

Studies have shown significant gaps and inconsistencies in business continuity information systems and an insufficient level of perception of the problem, which may ultimately reinforce the legitimacy of the use of the CC services in ensuring informational continuity of operations in the crisis management systems of selected business entities.

Discussion: re-summit of research results in the context of continuity of information and decision making processes in circumstances of cloud computing application

The results presented confirm the relevance of the identified research problem. There is a need to increase the level of situation awareness that information safety and security of each organization is an important component of its effective operation and of the assurance of continuity of information and decision making processes and forecasting (including simulation) its condition (see: Zacharias et al., 2008, pp. 89-118). This can be facilitated by modern technologies and information platforms (Woźniak, Zaskórski, Pawlak, 2018). The virtualization of modern entities is connected with the process of “converting resources into data”, i.e. the process of collection, maintenance and manipulation of large volumes of data. Therefore, the use of cloud services not only increases flexibility in the face of a changing environment, but also increases the security and safety of the necessary services. Today's public and business entities, both public and business, should plan their activities in a context of threats and crises, where large amounts of data from heterogeneous sources can be processed. Therefore, in order to ensure high reliability of information processes it is worthwhile to refer to alternative services on the CC platform. This has also another aspect, namely reducing information exclusion of SMEs due to their weaker potential (see: Kostyńska, 2019). This is evident in studies where smaller organizations see lesser the loss of their value due to lack of access to certain services and cost barriers (see: Lei et al., 2018, pp. 3375-3388; Liu, Farouk, Zhen, 2019, pp. 3373-3380).

The demand for IT resources and services is constantly growing due to the continuous growth of collected and processed data (Lebens, 2013). Therefore, in order to increase the quality, and mainly

reliability, of information and decision making processes, the possibility of migration of implemented information processes to the cloud and organization of related resources in the cloud, is advised. The decision to operate through usage of the cloud is quite often made because of the short-term nature of a specific process and the low cost to enter the cloud environment (Chowdhury, 2018). However, the problem arises when considering the transfer of already existing resources and processes for various crisis situations and various options for scenarios of actions. In such situations, the quality of processes and resources may be determined by the time and amount of financial resources and the involvement of contractors and, above all, managers (based on: DaSilva et al., 2013, pp. 1162 et seq.).

The article therefore attempts to link the need for informational continuity of operations with the possibilities to use alternative solutions residing on the CC platform. Virtualization of information services does not have to be ultimately associated with the cost of purchasing your own servers and workstations, and resource consumption is automatically scaled to actual demand. The risk of physical destruction of resources and total loss of data can be monitored on an ongoing basis and the reliability of the system increases when potentially defective components are inspected and eliminated or replaced by other technical and technological components on an ongoing basis (see: Chowdhury, 2018). Cloud computing allows management to focus exclusively on the substantive aspects of their activities, especially in the crisis response phase. Effective monitoring and controlling the state of implementation of each process at any time and place - directly affects the quality and effectiveness of management (see: Basole, Park, 2019, pp. 370-379).

Empirical research has shown that without unrestricted access to automatically scalable resources it may not be possible to implement some key processes throughout the information and decision making process. To ensure informational business continuity, it may often be enough to invest a small amount of money to access the resources of the chosen platform (e.g. MS Azure with a Microsoft® PaaS model), with the possibility of secure use of resources without the risk of losing the continuity of processes.

Conclusions

In the processes of managing modern organizations in crisis situations, it is important for whom, when, where and what data and information services are necessary. The CC environment enables the integration of standard solutions with stand-alone solutions that support a given organization. This is particularly important for processes with strong time constraints. It becomes important to be able to report on-line by using an appropriate, up-to-date set of data, with availability on demand from any level of process execution. Moreover, for the quality of information and decision making processes, the selective availability of data from any device equipped with an Internet connection is quite often emphasized. Working on a common repository encompassing the information needs of a given process and of its territorially dispersed contractors provides an opportunity to use resources effectively. The efficiency and overall effectiveness of various working and management processes by using information services available in cyberspace can also be improved.

The undertaken scope of research and analysis as well as studies leads to the conclusion that the use of cloud computing may strengthen the level of safety and security and informational continuity of operations and have a positive impact on, among others (see: Chowdhury, 2018):

- the integration of processes implemented in many areas and places of operations conducted by the organization,
- flexibility and reliability of operations in a rapidly changing environment,
- dynamic change management and shortening the response time to changes in operational conditions,
- reduction of fixed/permanent and investment costs,
- increase in the scalability of resources, which can increase the efficiency of their allocation and usage.

- lowering the risk of losing continuity of operations of the entire organization, in which security and information continuity are the important attributes.

Therefore, the CC services can improve the effectiveness of information and decision making processes and their quality in modern process-oriented organizations, especially in crisis situations. The overall area of research will continue to explore other alternatives without excessive cost increases by assessing the suitability and effectiveness of the services available in Big-Data systems (ERP24, 2019; Zaskórski, Zaskórski, 2017) and in the IoT platform (Ogórek, Zaskórski, 2018). Information processes implemented in modern organizations therefore require information structuring in order to identify actual information needs determined by time and place and methods of access to resources. These determinants condition the quality of decision-making processes in the long-term perspective and in the operational dimension, with particular emphasis on contemporary possibilities (Satechnologies, 2018) to create an appropriate level of situational awareness.

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Landscape Performance in A Destination Motivation Choice

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Abstract

This research started from the interest of exploring the landscape as a tourist resource and understanding its role, performance, and importance in the current tourist context. This article aims to understand the role of the landscape as a tourist resource relating the characteristics of the landscape with the choice and motivation of the visitor and interpret the factors that influence the valorization of the landscape. In this sense, four research hypotheses were proposed for the northern region of Portugal: Tourists visiting the region of Porto and northern Portugal give importance to the characteristics of the rural landscape, to the aesthetics of the rural landscape, to the characteristics of the urban landscape, and to the aesthetics of the urban landscape; There are differences regarding the importance of the characteristics of the rural and urban landscape by sociodemographic variable; There is a relationship between the length of the average stay and the visit to the northern regions of Portugal; and finally, there is a relationship between the reason for the trip and the visit to the northern regions of Portugal: Porto Metropolitan Area; Trás-os-Montes; Minho, and Douro. These research results evidence that visitors from the region of Porto and Northern Portugal attach importance to the characteristics and aesthetics of the landscape

Keywords: Landscape, Tourism, Tourism Destination, Regions, Portugal

Introduction

The literature that addresses the function of the landscape as a tourist resource is limited. The relationship between landscape and tourism is vaguely explored. However, recent studies explore the connection between the landscape and its aesthetics and its influence on tourists, that is, the attractiveness factor of a landscape (De Aranzabal, Schmitz and Pineda, 2009; Carneiro, Lima & Silva, 2015; Breiby, 2015; Cébrian & Sánchez, 2016; Todorović, 2016; Serrano-Montes, Martínez-Ibarra, Arias-García, 2019; Lontai-Szilágyi, Bertalan-Balázs, Zsiros, Vasvári, Kumar, Nilanchal, Martonné Erdős, & Szabó, 2019; Lee, 2020). Terkenli (2004) argues that studies focusing on the relationship between tourism and the landscape emerged in the 1990s, also mentioning the distinction between three perspectives. The first perspective addresses the impact of tourism on the landscape, due to the growth and development of tourism activity. The second perspective covers the interest and awareness of the sustainability of the landscape by European and international bodies, which value the conservation of the landscape, the environment, and historical-heritage values. Finally, the third perspective presents a more complex approach by adopting structuralist perspectives that deepen the issue of tourism and landscape interactions and their impacts and changes that may arise: their consumption, conservation

and performance in everyday life and in the tourist context. The tourism destinations are places where it is possible to carry out and practice the tourist activity, through the available resources. Landscape tourism is the activity practiced in the tourist space, in this specific case, in the formerly called "tourist landscape". Beauty, aesthetics, and authenticity are some of the main attractive factors of a tourist destination. Tourist attractions, whether of a natural nature or human intervention, are essential components of a region tourism offer. The landscape scenario influences the attractiveness of a destination, since this is an element that inevitably is part of a tourism journey and experience. These points should be considered, regarding the management and planning of landscape sustainability as a tourist resource. The landscape establishes links between people and nature and should be recognized and valued on the basis of this vision, as the landscape is not simply a resource, but also plays the role of intermediary for the sustainable development of a region.

The Institute for Conservation of Nature and Forests (Instituto para a Conservação da Natureza e Florestas, ICNF, IP), in Portugal, explains through its online platform the concept of geosites: "The concept of geosite applies to the elements of geological heritage that constitute an occurrence of recognized scientific value, compared to the rest surrounding; it may, however, present more than one type of importance, namely didactic, cultural or aesthetic." Although "considered by the Legal Regime for Conservation of Nature and Biodiversity a natural value, such as the elements of biodiversity and landscapes, geosites have not enshrined at national level a specific classification regime". However, regarding its protection and conservation, its classification figure frames it as a "Monument of the National Network of Protected Areas". The rural environment and the rural landscape are understood as the most "genuine", because one of the most attractive factors is authenticity, often related to the surrounding culture and nature. The main motivation of visiting in rural areas is the search for tranquility, proximity to nature and the "authenticity" factor (Chambers, 2009). In another perspective, Cullen (1983) states that the urban landscape aims to combine the coherence and organization of urban space, through the management of the streets, spaces, and buildings planning, improving, and promoting the urban environment. Cullen (1983) adds that a very simplified street or avenue can become monotonous for visitors from a visual point of view, highlights the need to enhance some characteristics of the urban landscape: the optics, that is, the sequential perception of urban space (different views from different perspectives at the visual level); the place, in which different sensations are provoked in the individual according to the type of place where he is (closed places, open places); and the content, that is, the elements present in the urban landscape commonly associated with urban spaces (lights, buildings, skyscrapers, among others). Landscapes in the urban context contribute to the sustainability and biodiversity of the urban landscape with the inclusion of green spaces (urban parks, gardens) (Zárate, 2013). The urban landscape is in most cases the business card of a city, developed by city marketing whose goal is to appeal to aesthetic sense and emotions, and consequently contribute to the attractiveness of a destination.

We can say that the landscape is the element that is at the forefront of tourist demand, which reflects its attractiveness in this context (Cruz, 2002). According to Terkenli (2004), "as an image or representation of a place, the landscape represents the main and most durable means of contact between the tourist and the consumed place". Thus, we can consider the landscape a tourist resource, part of a tourist product and an identity element of the tourist destinations, the business card of a destination. The landscape is not only an element of attractiveness on the part of the visitor (and the population itself), but it is also an element that is shaped according to the needs that the tourist activity requires, that is, we can say that the perception of the landscape is modified and reinvented by the consumer himself. Kaplan & Kaplan, (1989) agree that nature develops a stimulating effect on people. Bourassa (1990) and Strumse (2001, 2002) point out other characteristics such as the landscape itself, the scenery, the harmony that end up influencing the state of mind and the well-being of the individuals who visit these places.

Breiby (2015) defined parameters regarding the aesthetic dimension of the landscape, which are harmony, scenery/view, purity, genuineness, and variety/contrast. Breiby (2015) still argues that there is a direct link between the aesthetics of a landscape and the satisfaction of the tourist, that consequently influence the desire to repeat the visit again, reinforcing that to better understand the experience of

tourists, research in this area should focus on the aesthetic dimensions of the anthropic and natural environment.

Destination Management Organization's (DMO) should seek to enhance the landscape as a tourist resource to achieve tourists' maximum satisfaction. Another concern of The DMO's is to manage and plan the available resources of a tourist landscape in order to achieve two purposes: to add tourist value to the place (taking into account its sustainability in the various dimensions) and use it as a resource that distinguishes itself as a competitive advantage over other destinations.

This paper is divided in three parts. The first part, the literary review, emphasizes the important influence of the landscape characteristics in the destination choice and visitor's motivation. The second part describes the research methodology, the methodology of data collection, presents and discusses the results of the research. The third and final part, the conclusion, discusses the innovative perspective introduced in the analysis of the landscape characteristics concerning the Northern region of Portugal.

Literature Review. Defining Landscape and Landscape Tourism

The cultural landscape plays a strong role in the identity and perception of a tourist destination, being considered a tourist product that holds value and meaning providing individual and collective emotions (Baudry and Paquot, 2003). The landscape is an indispensable tourist resource of a destination and that is naturally present regardless of its typology, the surrounding scenery is increasingly valued nowadays. As mentioned earlier, the literature that addresses the function of the landscape as a tourist resource is limited. The relationship between landscape and tourism is vaguely explored. However, there are studies that explore the connection between the landscape and its aesthetics and its influence on tourists, that is, the attractiveness factor of a landscape. Studies relating to tourism and the landscape are relatively recent. As already mentioned, the relationship between tourism and the landscape is a subject that began to be addressed at the end of the 20th century.

The cultural landscape plays a strong role in the identity and perception of a tourist destination, being considered a tourist product that holds value and meaning providing individual and collective emotions (Baudry and Paquot, 2003). The landscape is an indispensable tourist resource of a destination and that is naturally present regardless of its typology, the surrounding scenery is increasingly valued today.

The landscape can also be recognized as a tourist product, as it is a tourist resource that can exercise/provide services or functions commonly associated with a tourist product. According to Castro (2002), the use of the landscape to enjoy these activities "is possible due to the previous symbolic content of which it [landscape] is covered". That is, the changes made due to the tourist activity must pay attention to the historical-patrimonial context in which it is inserted and respect its requirements or conditions. However, this doesn't imply the total loss of the heritage and identity of a place, the tourist landscape can in some cases convey a greater sense of belonging (Tuan, 1979). The landscape as a tourist resource can be transformed into a tourist product through appropriate marketing techniques and allocation of infrastructure and services associated with tourism. The landscape can contribute to the sustainability of the environment where it is inserted to the extent that, if it reaches a certain level of popularity and attractiveness, it can condition excessive urbanization. In this way, we can reinforce the idea that the landscape acts as a tourism enhancer resource that, if properly planned, can contribute to the sustainability and conservation of the environment where it is inserted. The landscape contributes to the coherence and identity of the destination, especially if it presents property values. Concerning the promotion and development of landscapes, a new question arises regarding the artificiality of a landscape, which is created because of its significant exploitation and the growing popularity of the destination. Some actors take advantage of this phenomenon to promote a destination through landscape marketing, whose goal is to redefine landscapes as a tourist product to meet the expectations of visitors. "Tourist landscapes are, artificially, the translation into space of the consumers-tourists' spatial expectations of, whose tastes have already been properly worked by the media" (Cruz, 2002). Cruz (2002) adds that artificial landscapes are not products of the history or heritage of a place, but rather a tourism result. According to Pires (2001), "landscape and tourism are two closely related

realities. The landscape is a substantial element of the tourist phenomenon and therefore a resource of great value in the development and consolidation of the tourist offer".

The landscape and tourism are inseparable, especially when nature is assumed as a central qualification of the tourist product. Tourist experiences through the landscape, passive or active, gain a growing meaning in the tourist offer and are assumed as a central element of demand. However, to find a balance in the relationship between landscape and tourism, we cannot rule out the social context in which it is inserted and the local population. Tourist landscapes should be explored, planned, and developed with care and coherence, considering their values and the population where it is inserted. The landscapes convey historical and cultural significance; however, they also reflect the result of factors such as economic, social, and environmental policies.

To enrich the visitor's experience, the challenge is to enhance the landscape through their experiences, available information, and accessibility. One way to promote the landscape is the dissemination through interactive methods, in the emotional and imaginative dimensions, which allows awakening the sensations of amazement and admiration for the natural characteristics of the landscape (Gordon, 2012; Gordon, 2016; Pralong 2006; Dyer, 2007; Staiff 2014; Macadam, 2018). The landscapes have several distinct attributes, being then considered as a tourist resource of complex motivation (Jovičić, 1989), and at the same time manifest a complementary character to the tourist offer (Jovičić, 2008). These motivations are associated with the practice of cultural tourism, so the motivation that leads tourists to visit places of landscape beauty is a cultural need (Jovičić, 1989; 2008). Thanks to their attractiveness attributes, landscapes can respond to the needs of tourists (Todorović, 2016).

It is necessary a strong investment in the landscape as a potential tourist resource, thus allowing to belong to the range of the tourist offer of a destination. Thus, after its economic exploitation, its tourist value can be considered as a demand-motivating resource (Todorović, 2016). The motivation on the part of tourists can be influenced by the landscape of a destination or by the activities associated with it. The landscape plays an important role in the tourist offer also in terms of the tourist products available in this region, such as hospitality. Although the influence of the landscapes does not act properly through direct participation in tourist activities, indirectly adds value to a tourist destination. That is why we can consider the landscape as a tourist resource rather than a tourist product (Todorović, 2016). According to Pacheco & Oliveira (2011) "The landscape plays a fundamental role in the attractiveness of a tourist destination due to its intrinsic power of beauty, well-being, pleasure and satisfaction, has a high degree of representativeness at the time of the choice of the tourist/visitor as a spectator". That is, the landscape is a representative element of the destination and functions as a business card, eventually influencing and determining the visitor's choice.

Methodology

Following this investigation, the application of a questionnaire survey was adopted as a method. The purpose of the application of surveys is the collection of valid and reliable information through a set of questions asked to a representative group of respondents that can thus translate into the generalization of the universe of the population under study (Thayer-Hart et al., 2010). The planning and construction of the survey starts from the formulation of a problem that will answer the starting question of an investigation (Quivy & Campenhoudt, 1998) or through the implementation of objectives.

Part of the applied survey was based on an existing questionnaire conducted by the research of De Aranzabal, Schmitz and Pineda (2009) whose objective is to explore the relationship between visitor preferences and landscape characteristics with the support of an integrated spatial method for landscape analysis. Another study that served as the basis for the preparation of this questionnaire was that of Breiby (2015), "Exploring aesthetic dimensions in nature-based tourist experiences", whose results demonstrated that the aesthetic dimension influences the preferences of tourists in places of natural landscapes.

Table 1: Sample individual profile

Gender	Frequency	Percentage
Male	134	44,4%
Female	168	55,6%
Age	Frequency	Percentage
18-24	40	13,2%
25-34	82	27,2%
35-44	45	14,9%
45-54	57	18,9%
55-64	41	13,6%
+65	37	12,3%
Civil Status	Frequency	Percentage
Married/Civil Union	120	39,9%
Single	154	51,2%
Separate	17	5,6%
Widower	10	3,3%
Education level	Frequency	Percentage
Primary School	4	1,7%
High School	46	19,7%
College or university	109	46,6%
Postgraduate	75	32,1%
Country of Origin	Frequency	Percentage
Portugal	36	11,9%
Dominant European markets (Spain, France, UK, Netherlands, Belgium, Germany, Italy)	168	55,6%
Rest of Europe	18	6,0%
North America	23	7,6%
South America	28	9,3%
Africa	4	1,3%
Asia	14	4,6%
Oceania	11	3,6%
Income level	Frequency	Percentage
Up to 1500€	61	20,2%
1501-3000€	72	23,8%
3001-5000€	30	9,9%
+ 5001€	24	7,9%
Don't know/Don't answer	115	38,1%

Source: Compiled by the authors

In the study by De Aranzabal, Schmitz and Pineda (2009), the authors intend to relate the different types of landscape with the visitor's profile, so the idea that the demand and impact of the visit require specific measures in terms of destination management is reinforced. Several studies, already presented, are in line with the objectives of this research, and the general objective is to understand the role of the landscape as a tourist resource relating the characteristics of the landscape with the choice and motivation of the visitor and interpret the factors that influence the valorization of the landscape. In this sense, four research hypotheses were proposed for the Northern Region of Portugal:

- **H1:** Tourists visiting the Region of Porto and Northern Portugal give importance: To the characteristics of the rural landscape; To the aesthetics of the rural landscape; To the characteristics of the urban landscape; To the aesthetics of the urban landscape;
- **H 2:** There are differences regarding the importance of the characteristics of the rural and urban landscape by sociodemographic variable: Gender; Age; Civil Status; Qualifications; Country of origin; Income; And as to the degree of importance of: To the characteristics of

the rural landscape; To the aesthetics of the rural landscape; To the characteristics of the urban landscape; To the aesthetics of the urban landscape;

- **H3:** There is a relationship between the length of the average stay and the visit to the northern regions of Portugal: For the region of the Metropolitan Area of Porto; To the Trás-os-Montes region; To the Minho region; To the Douro region.
- **H4:** There is a relationship between the reason for the trip and the visit to the northern regions of Portugal: Metropolitan Area of Porto; Trás-os-Montes; Minho, and Douro.

The sampling method used was simple random sampling with the application of the survey to national and international visitors/tourists. The survey was applied at the *Porto Welcome Center* and the interactive store of Francisco Sá Carneiro airport. The questionnaires were applied between March and July 2019, obtaining a total of 302 valid questionnaires.

Throughout the analysis, a significance level of 5% will be assumed to make decisions about the validation of the investigation hypotheses. The sampling error was calculated based on the number of visitors/tourists in the Northern region, a total of 4,334,202, for the year 2018 (INE). It should also be noted that for the calculation of the final sample, was considered the non-violation of the assumptions for the application of a multivariate analysis. Thus, a final sampling error of 5.6% was assumed for a 95% degree of confidence.

Table 2: Sample technical data

Universe under study	Tourists from the North region
Geographic coverage	Northern Region of Portugal
Thematic coverage	Motivation; landscape
Sample Size	302 tourists/visitors
Sample Error	5,6%
Trust level	95%
Sample Type	Simple random sampling
Study	Quantitative
Data collection method	Non-documentary; Non-participant observation; Survey by Questionnaire
Data processing method	SPSS version 25
Data collection period	March to July 2019

Source: Compiled by the authors

To verify the reliability of the questionnaire, the internal consistency was analyzed using Cronbach's Alpha coefficient. Internal consistency is the specific reliability estimate for questionnaires. According to Pestana and Gageiro (2003) Cronbach's Alpha value varies between 0 and 1, and the internal consistency is better the closer it is to the value 1, i.e.: Values below 0.6 make the scale "Inadmissible"; Between 0.6 and 0.7 internal consistency "Weak"; Between 0.7 and 0.8 internal consistency "Reasonable"; Between 0.8 and 0.9 internal consistency "Good"; Greater than 0.9 internal consistency of "Very Good" scale; In this study, Cronbach's Alpha obtained to measure the latent variable, characteristics of the rural and urban landscape, was 0.950, which indicates a degree of internal consistency "Very Good" (Table 3).

Table 3: Cronbach's Alpha coefficient

	N	%	Cronbach's Alpha
Valid	277	91,7%	0,950
Excluded	25	8,3%	

Source: own elaboration based on SPSS outputs

Twenty-five questionnaires were excluded for partial non-response and thus the sample was 277 valid questionnaires. After the data collection was completed, the Statistical Package for Social Science

(SPSS 25.0) program was used to create the database. The processing of data focuses on the use of statistical techniques such as exploratory descriptive analysis and inferential analysis. In the first analysis and in order to present the data, we use the production of absolute and relative frequency tables, graphs and measures of location (mean) and dispersion (standard deviation), with the purpose of characterizing the sample under study and helping to identify the visitor's profile. With the inferential analysis, it is intended to validate the established research hypotheses. Parametric tests, in particular t-Student, will be applied to this end to examine whether there are differences between means for two independent samples. One-Way ANOVA, to compare means between three or more independent samples, in turn, if one of the assumptions for the application of this test is violated, uses the Kruskall-Wallis nonparametric test, and finally, Pearson's correlation coefficient to analyze the relationship between variables. To achieve the objectives of this investigation, the hypotheses were developed according to the structure of the questionnaire. All hypotheses were tested with a 95% confidence level.

Table 4: Research hypotheses and statistical tests used

Chance	Statistical tests
H1: Tourists visiting the Region of Porto and Northern Portugal give importance:	
1. To the characteristics of rural landscape	One sample Student's t-test
2. To the aesthetics of the rural landscape	One sample Student's t-test
3. To the characteristics of the urban landscape	One sample Student's t-test
4. To the aesthetics of the urban landscape	One sample Student's t-test
H2: There are differences regarding the importance of rural and urban landscape characteristics by sociodemographic variable:	
Gender	Mann-Whitney U
Age	Kruskal-Wallis H
Marital status	Kruskal-Wallis H
Qualifications	Kruskal-Wallis H
Country of origin	Kruskal-Wallis H
Income	Kruskal-Wallis H
As to the degree of importance of:	
To the characteristics of the countryside	
To the aesthetics of the rural landscape	
To the characteristics of the urban landscape	
To the aesthetics of the urban landscape	
H3: There is a relationship between the length of the average stay and the visit to the northern regions of Portugal	
Porto Metropolitan Area	
Trás-os-Montes region	Pearson coefficient
Minho region	
Douro region	
H4: There is a relationship between the reason for the trip and the visit to the northern regions of Portugal	
For regions:	
Porto Metropolitan Area	Pearson coefficient
Trás-os-Montes	
Minho	
Douro	

Source: Compiled by the authors

Results

H1: Tourists visiting the Region of Porto and Northern Portugal give importance: to the characteristics of the rural landscape, to the aesthetics of the rural landscape, to the characteristics of the urban landscape, to the aesthetics of the urban landscape.

Table 5: Empirical global average of degrees of importance

	Landscape features	Aesthetics of the rural landscape	Characteristics of the urban landscape	Aesthetics of the urban landscape
Average	3,4122	3,8390	3,2976	3,70776
Standard deviation	0,72971	0,73302	0,62431	0,78150

Source: own elaboration based on SPSS outputs

To calculate the degree of global importance it was necessary to calculate the empirical global average of importance for the characteristics of the rural landscape (mean 3.41 and standard deviation 0.73), the aesthetics of the rural landscape (mean 3.84 and standard deviation 0.73), the characteristics of the urban landscape (mean 3.29 and standard deviation 0.62) and the aesthetics of the urban landscape (mean 3.71 and standard deviation 0.78). which encompasses the 33 items measured on a 5-point Likert scale and assesses the degree of importance visitors place on the characteristics of the landscapes.

Table 6: Validation of hypothesis 1

Hypothesis	Test	Value	P-Value, New American	Conclusion
H1: Tourists visiting the Region of Porto and Northern Portugal give importance:				
To the characteristics of the countryside		9,041	0,000	Confirmed
To the aesthetics of the rural landscape	One Sample Student's T Test	19,049	0,000	Confirmed
To the characteristics of the urban landscape		7,933	0,000	Confirmed
To the aesthetics of the urban landscape		15,069	0,000	Confirmed

Source: own elaboration based on SPSS outputs

To respond to this research hypothesis, the T-Student test was used for a sample and the theoretical reference mean was 3 points. From this application, a test value of 276 (freedom degrees) and the test value (p-value) were lower than 0.001. Since the test value is lower than the level of significance assumed, the hypothesis of investigation is corroborated and it can be affirmed that there is statistical evidence to indicate that visitors from the Region of Porto and Northern Portugal attach importance to the characteristics and aesthetics of the landscape.

H2: There are differences regarding the importance of the characteristics of the rural and urban landscape by sociodemographic variable: Regarding the characteristics of the rural landscape; regarding the aesthetics of the rural landscape; regarding the characteristics of the urban landscape; regarding the aesthetics of the urban landscape. To respond to this research hypothesis, the Mann Whitney U test and the Kruskal-Wallis H test were applied for independent samples. Table 7 shows the results obtained for each sociodemographic variable.

Table 7: Hypothesis 2.1. Test value for statistical tests - Characteristics of the rural landscape

Variables	Test	p-value	Significance
Gender	Mann-Whitney U	0,728	NS
Age group	Kruskal-Wallis H	0,493	NS
Civil Status	Kruskal-Wallis H	0,285	NS
Qualifications	Kruskal-Wallis H	0,720	NS
Country of origin	Kruskal-Wallis H	0,233	NS
Income	Kruskal-Wallis H	0,524	NS

Source: own elaboration based on SPSS outputs

In all variables there are no statistically significant differences, since the test value is higher than 0.05 (p-value), that is, there are no differences by sociodemographic variable regarding the degree of importance given the characteristics of the rural landscape.

Table 8: Hypothesis 2.2 Test value for statistical tests of rural landscape aesthetics

Variables	Test	p-value	Significance
Gender	Mann-Whitney U	0,828	NS
Age group	Kruskal-Wallis H	0,484	NS
Civil Status	Kruskal-Wallis H	0,440	NS
Qualifications	Kruskal-Wallis H	0,423	NS
Country of Origin	Kruskal-Wallis H	0,714	NS
Income	Kruskal-Wallis H	0,448	NS

Source: own elaboration based on SPSS outputs

In all variables there are no statistically significant differences, since the test value is higher than 0.05 (p-value), that is, there are no differences by sociodemographic variable regarding the degree of importance given the elements of the aesthetics of the rural landscape.

Table 9: Hypothesis 2.3 Test value for statistical tests of urban landscape characteristics

Variables	Test	p-value	Significance
Gender	Mann-Whitney U	0,735	NS
Age group	Kruskal-Wallis H	0,988	NS
Marital status	Kruskal-Wallis H	0,450	NS
Qualifications	Kruskal-Wallis H	0,975	NS
Country of Origin	Kruskal-Wallis H	0,011	S
Income	Kruskal-Wallis H	0,102	NS

Source: own elaboration based on SPSS outputs

In all variables except for the country of origin there are no statistically significant differences, since the test value is greater than 0.05 (p-value), that is, there are no differences by sociodemographic variable regarding the degree of importance given the characteristics of the urban landscape.

Table 10: Hypothesis 2.4 Test value for statistical tests of urban landscape aesthetics

Variables	Test	p-value	Significance
Gender	Mann-Whitney U	0,710	NS
Age group	Kruskal-Wallis H	0,745	NS
Civil Status	Kruskal-Wallis H	0,104	NS
Qualifications	Kruskal-Wallis H	0,747	NS
Country of Origin	Kruskal-Wallis H	0,411	NS
Income	Kruskal-Wallis H	0,585	NS

Source: own elaboration based on SPSS outputs

It is verified that in all variables there are no statistically significant differences, since the test value is higher than 0.05 (p-value), that is, there are no differences by sociodemographic variable regarding the degree of importance given the elements of the aesthetics of the urban landscape.

H3: There is a relationship between the length of the stay and the visit to the northern regions of Portugal: For the Region of Porto Metropolitan Area; For the region of Trás-Os-Montes; For the Minho region; For the Douro region.
Pearson's Coefficient (Chi-Square) test was used to validate this research hypothesis.

Table 11: Hypothesis 3 - Test value for statistical tests by northern region of Portugal for chi-square test (Pearson coefficient)

Variables	Value	Df	p-value	Significance
Porto	5,942	4	0,204	Ns
Trás-os-Montes	8,134	4	0,087	Ns
Minho	12,663	4	0,013	S
Douro	7,794	4	0,099	Ns

S - Significant NS- Not significant Source: own elaboration based on SPSS outputs

As for the analysis of the results of statistical tests on the research hypothesis 3, we can conclude that:

- The inferential statistical analysis allows us to conclude that the relationship between the length of stay **is independent** of the visit to the " Porto Metropolitan Area" region (α=0.204; proof value<0.05; N=299);
- The inferential statistical analysis allows us to conclude that the relationship between the length of the stay **is independent** of the visit to the region "Trás-Os-Montes" (α=0.087; test value>0.05; N=299);
- The inferential statistical analysis allows us to conclude that the relationship between the length of the stay **is not independent** of the visit to the "Minho" region (α=0.013; test value<0.05; N=298);
- The inferential statistical analysis allows us to conclude that the relationship between the length of stay **is independent** of the visit to the "Douro" region (α=0.099; test value;0.05; N=299).

It's possible to conclude that for all regions of northern Portugal except for "Minho" there is no relationship regarding the length of stay.

H4: There is a relationship between the reason for the trip and the visit to the northern regions of Portugal. For the regions: Porto Metropolitan Area; Trás-Os-Montes; Minho; Douro.

Table 12: Hypothesis 4 - Test value for statistical tests for chi-square test (Pearson coefficient)

Variable "Porto Metropolitan Area"	Value	Df	p-value	Significance Value
Vacation/Leisure	0,182	1	0,669	NS
Touring Cultural	11,664	1	0,001	S
Shopping tourism	0,101	1	0,751	NS
Wine and gastronomy Tourism	0,416	1	0,519	NS
Business tourism	2,123	1	0,145	NS
Visit to family and friends	0,351	1	0,554	NS
Other(s)	0,029	1	0,864	NS

S - Significant NS- Not significant Source: own elaboration based on SPSS outputs

Based on the results of the statistical test we can observe that:

- The inferential statistical analysis allows us to conclude that the relationship between the visit to the region of "Porto Metropolitan Area" **is independent** of the reason "Vacation/leisure"(α=0.669; test value>0.05; N=240);
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the region of the "Porto Metropolitan Area" **is not independent** of the reason "Cultural Touring" (αα=0.001; test value<0.05; N=240);
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the region of the "Porto Metropolitan Area" **is independent** of the reason "Shopping tourism"(α=0.751; proof value>0.05; N=240);
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the region of the "Porto Metropolitan Area" **is independent** of the reason "Gastronomic tourism"(α=0.519; test value>0.05; N=240);

- The inferential statistical analysis allows us to conclude that the relationship between the visit to the region of the "Porto Metropolitan Area" **is independent** of the reason "Business tourism"(α=0.145; proof value<0.05; N=240);
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the region of the "Porto Metropolitan Area" **is independent** of the reason "Visit to family and friends" (αα=0.554; test value>0.05; N=240);
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the region of the "Porto Metropolitan Area" **is independent** of the reason "Other(s)" (αα=0.864; proof value>0.05; N=240).

Based on these conclusions, we can affirm that there is only a statistical relationship between the "Cultural Touring" reason and the visit to the Porto region. Which means that the main motivation of the visit to this region is "cultural touring".

Table 13: Hypothesis 4.2 - Test value for statistical tests for chi-square test (Pearson coefficient)

Variable "Trás-Os-Montes"	Value	Df	p-value	Significance Value
Vacation/Leisure	0,545	1	0,460	NS
Touring Cultural	0,000	1	0,991	NS
Shopping tourism	0,730	1	0,393	NS
Wine and gastronomy Tourism	3,940	1	0,047	S
Business tourism	0,730	1	0,393	NS
Visit to family and friends	0,063	1	0,801	NS
Other(s)	0,228	1	0,633	NS

S - Significant NS- Not significant Source: own elaboration based on SPSS outputs

Based on the results obtained for the variables related to the “Trás-Os-Montes region” we can verify that:

- The inferential statistical analysis allows us to conclude that the relationship between the visit to the region of "Trás-Os-Montes" **is independent** of the reason "Vacation/leisure" (α=0.460; test value>0.05; N=17);
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the region of "Trás-Os-Montes" **is independent** of the reason "Cultural Touring" (α=0.991; test value>0.05; N=17);
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the region of "Trás-Os-Montes" **is independent** of the reason "Shopping tourism" (α=0.393; proof value>0.05; N=17).
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the region of "Trás-Os-Montes" **is not independent** of the reason "Wine and gastronomy tourism" (αα=0.047; test value;0.05; N=17);
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the region of "Trás-Os-Montes" **is independent** of the reason "Business tourism" (α=0.393; test value>0.05; N=17);
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the region of "Trás-Os-Montes" **is independent** of the reason "Visit to family and friends" (α=0.801; test value>0.05; N=17);
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the region of "Trás-Os-Montes" **is independent** of the reason "Other(s)" (αα=0.633; proof value>0.05; N=17).

We can say, based on these results, that the only reason for travel that is correlated with the visit to the region of "Trás-Os-Montes" is the reason "Wine and gastronomy tourism".

Table 14: Hypothesis 4.3. Test value for statistical tests for chi-square test (Pearson coefficient)

Variable "Minho"	Value	Df	p-value	Significance Value
Vacation/Leisure	10,475	1	0,001	S
Touring Cultural	0,589	1	0,443	NS
Shopping tourism	0,944	1	0,331	NS
Wine and gastronomy tourism	0,001	1	0,973	NS
Business tourism	0,043	1	0,836	NS
Visit to family and friends	0,063	1	0,801	NS
Other(s)	5,030	1	0,025	S

S - Significant NS- Not significant Source: own elaboration based on SPSS outputs

Based on Pearson's coefficient test results, it's possible to draw the following conclusions:

- The inferential statistical analysis allows us to conclude that the relationship between the visit to the "Minho" region **is not independent** of the reason "Vacation/leisure"(α=0.001; test value<0.05; N=31).
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the "Minho" region **is independent** of the reason "Cultural Touring"(α=0.443; test value>0.05; N=31).
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the "Minho" region **is independent** of the reason "Shopping tourism"(α=0.331; proof value>0.05; N=31).
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the "Minho" region **is independent** of the reason "Wine and gastronomy tourism" (αα=0.973; test value>0.05; N=31).
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the "Minho" region **is independent** of the reason "Business tourism"(α=0.836; proof value>0.05; N=31).
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the "Minho" region **is independent** of the reason "Visit to family and friends" (αα=0.810; test value>0.05; N=31).
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the "Minho" region **is not independent** of the reason "Other(s)" (αα=0.025; proof value<0.05; N=31).

Based on these conclusions, the reasons "Vacation/leisure" and "Other(s)" are directly correlated with the visit to the Minho region.

Table 15: Hypothesis 4.4. Test value for statistical tests for chi-square test (Pearson coefficient)

Variable "Douro"	Value	Df	p-value	Significance Value
Vacation/Leisure	0,000	1	0,985	NS
Touring Cultural	12,765	1	0,000	S
Shopping tourism	1,667	1	0,197	NS
Wine and gastronomy tourism	4,362	1	0,037	S
Business tourism	2,656	1	0,103	NS
Visit to family and friends	4,157	1	0,041	S
Other(s)	2,145	1	0,143	NS

S - Significant NS- Not significant Source: own elaboration based on SPSS outputs

Based on Pearson's coefficient test results it's possible to verify that:

- The inferential statistical analysis allows us to conclude that the relationship between the visit to the "Douro" region **is independent** of the reason "Vacation/leisure" (α=0.985; test value>0.05; N=122).
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the "Douro" region **is not independent** of the reason "Cultural Touring" (α=0.985; test value<0.0001; N=122).
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the "Douro" region **is independent** of the reason "Shopping tourism" (α=0.197; proof value>0.05; N=122).
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the "Douro" region **is not independent** of the reason "Wine and gastronomy tourism" (α=0.985; test value>0.037; N=122).
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the "Douro" region **is independent** of the reason "Business tourism" (α=0.103; proof value>0.05; N=122).
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the "Douro" region **is not independent** of the reason "Visit to family and friends" (αα=0.041; proof value<0.05; N=122).
- The inferential statistical analysis allows us to conclude that the relationship between the visit to the "Douro" region **is independent** of the reason "Other(s)" (αα=0.143; proof value<0.05; N=122).

According to these conclusions, there is a relationship between the reasons "Cultural Touring", "Wine and gastronomy tourism" and "Visit to family and friends" and the visit to the Douro region, which shows that this is the region of Northern Portugal with greater significance in terms of the motivation of the traveler.

Conclusion

Based on recent literature that addresses the landscape role as a tourist resource, exploring the connection between the landscape and its aesthetics and its influence on tourists, that is, the attractiveness factor of a landscape (De Aranzabal, Schmitz and Pineda, 2009; Carneiro, Lima & Silva, 2015; Breiby, 2015; Cébrian & Sánchez, 2016; Todorović, 2016; Serrano-Montes, Martínez-Ibarra, Arias-García, 2019; Lontai-Szilágyi, Bertalan-Balázs, Zsiros, Vasvári, Kumar, Nilanchal, Martonné Erdős, & Szabó, 2019; Lee, 2020), this study proposed four research hypotheses for the northern region of Portugal: Tourists visiting the region of Porto and northern Portugal give importance to the characteristics of the rural landscape, to the aesthetics of the rural landscape, to the characteristics of the urban landscape, and to the aesthetics of the urban landscape; There are differences regarding the importance of the characteristics of the rural and urban landscape by sociodemographic variable; There is a relationship between the length of the average stay and the visit to the northern regions of Portugal; and finally, there is a relationship between the reason for the trip and the visit to the northern regions of Portugal: Porto Metropolitan Area; Trás-os-Montes; Minho, and Douro.

Some of the main results showed a statistical evidence to indicate that visitors from the Region of Porto and Northern Portugal attach importance to the characteristics and aesthetics of the landscape; the only reason for travel which is correlated with the visit to the region of "Trás-os-Montes" is the reason "Wine and gastronomy tourism"; a statistical relationship between the "Cultural Touring" reason and the visit to the Porto region; the reasons "Vacation/leisure" and "Other(s)" are directly correlated with the visit to the Minho region; there is a relationship between the reasons "Cultural Touring", "Wine and gastronomy tourism" and "Visit to family and friends" and the visit to the Douro region, which shows that this is the region of Northern Portugal with greater significance in terms of the motivation of the traveler.

Considering these results, Destination Management Organization's (DMO) should seek to enhance the landscape as a tourist resource to achieve tourists' maximum satisfaction, to manage and plan the available resources of a tourist landscape in order to achieve two purposes: to add tourist value to the

place (taking into account its sustainability in several dimensions) and use it as a resource that distinguishes itself as a competitive advantage over other destinations.

The measures to be taken to foster the growth of landscape tourism according to this research, must consider further analysis about the visitors motivations and categorize the landscape into different classifications (e.g. urban, wine, cultural), analyze the appreciation of the landscape by visitors to make an assessment of the landscape and viewpoints and identify those who are most valued, invest in infrastructure, access and equipment present in viewpoint locations (information panels, secure structures), define landscape routes to disseminate the landscape and viewpoints as a tourist resource and place signage and information panels as a guide in viewpoint locations.

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Energy Demand in The Hierarchy of Households' Socio-Economic Needs

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Abstract

Energy needs are all activities that consume rather heat or electricity and are necessary for the daily functioning of households. Energy is very important for modern lifestyles and social inclusion: it is essential for education, health, safety and well-being. Today, energy constitutes the basic necessity for all households. However, research on energy demand is a complex area that covers physical availability of energy sources, income and housing conditions, as well as individual and social factors in households. This is an important and complex issue that is part of the current EU energy policy, described, inter alia, in the latest package of solutions entitled "Clean energy for all Europeans", prepared by the European Commission in 2019. On the basis of theoretical findings regarding the issue of human needs and empirical research of households, there has been developed a research concept enabling the study of the place of energy demand in the hierarchy of household needs. It takes into account the conclusions from the analysis of energy demand in households taking into consideration consumption, sources and energy commodities used, as well as the results of public opinion surveys. The study, including statistical data analysis and public opinion reports, was conducted in regards to the Polish market. The proposed model presents the determinants of energy demand for households in the context of their place in the hierarchy of needs by A.H. Maslow.

Keywords: Energy, Energy Consumption, Households, Hierarchy of Needs, Energy Poverty

Introduction

Energy needs are all activities that use either heat or electricity, necessary to maintain a decent standard of living, i.e. heating the apartment and water, lighting, preparing meals and using basic home electronics and household appliances. Energy is very important for modern lifestyles and social inclusion: it is essential for education, health, safety and well-being. At the same time, energy policy and environmental policy of the state are often treated as decision areas requiring specialized technical knowledge, reserved for a narrow circle of experts. However, one should be aware of the fact that the effects of decisions in these areas have a direct impact on the state of health and sense of security of citizens (Gwiazda & Ruszkowski 2016). On average, energy expenditure accounts for 6% of the annual expenditure of 200 million households in the EU. The lowest-income households spent almost 9% of their total expenditure on energy in 2014. This represents a 50% increase over the past ten years, which is much more than in the case of average households (European Commission, 2019). Therefore, the energy transformation cannot be separated from socio-economic issues. This is reflected in the new Clean Energy for All Europeans package prepared by the European Commission in 2019.

Today, energy constitutes the basic necessity for all households. However, research on energy demand is a complex area that covers physical availability of energy sources, income and housing conditions, as well as individual and social factors in households. The aim of this article is to develop a research model indicating the scope of conditions for placing energy demand in the hierarchy of household needs. Research problems were formulated in the form of the following questions:

- How do households consume energy, taking into account the consumption purpose, technical means used and energy sources?
- What components should research on the place of energy demand in the hierarchy of household needs include?
- In what categories of needs should energy demand be classified?

For the purpose of the work, desk research was conducted in relation to households operating in Poland. Domestic and foreign statistical data and public opinion reports were used to this end.

The needs of consumers in A. Maslow's hierarchy of needs

The concept of need is inseparably linked to humankind. Defining *needs* is difficult due to the inherent complexity of the concept of 'need', so it is not surprising that numerous definitions have been proposed depending on the scientific discipline (including psychology, sociology, economics). According to J.F. Tobar Arbulu (1987), a challenging problem of needs research is how to define a need. *Needs* are theoretical constructs. The truth of those needs cannot, therefore, be proven in a direct physical way. The existence of a need can be concluded indirectly either from postulation or from the respective satisfiers that a person uses and strives for, or from symptoms of frustration caused by any kind of nonsatisfaction.

In economic literature, a need for the most part, is defined as some kind of state of an individual when he or she misses or feels a shortage. In positive form, an individual needs something and is interested in it. M. Pohorille (1985) defines need by claiming that shortage arouses an organism to action toward removing it. Similarly, L. Rudnicki (1996) believes that a need is a factor that activates the function to act towards an appropriate change of this state. The state of deficiency is felt as distress and inclines to take actions aimed at its "reduction", i.e. satisfying the need. Need is also defined by P.T. Beatty (1981) as a measurable discrepancy existing between a present state of affairs and a desired state of affairs, as asserted either by an "owner" of need or an "authority". In the former instance, need is described as a motivational need; in the latter instance, need is described as a prescriptive need. Therefore, the sources of needs are the human body (its biological and psychological structure) and human social environment. In most cases, a condition for meeting the need is its prior recognition. In the context of consumer behaviour, this occurs as a result of (Garbarski 1998):

- Lack of product or service (physical absence of the product in most cases prompts purchase);
- Obtaining information about a new product (may change existing habits);
- Emergence of new needs (caused e.g. by observing other people);
- Emergence of new financial opportunities (a change in material situation often changes the perception of previously consumed products and services);
- Changes in expectations for a product or service.

The complexity of needs is affected, among others, by the fact that satisfying them is of temporary nature, and that satisfying some needs often creates others. The number of needs is unlimited. Furthermore, they can be both complementary and substitutable, i.e. mutually replaceable. In the literature on the subject, attempts are made to group needs, however, it should be noted that due to their diverse nature, there is no way of classification that is universal and adequate for all individuals and their needs. The hierarchy of needs by A.H. Maslow (1943) is one of the best known ways of classifying needs. It is a motivational theory comprising a five-tier model of human needs, often depicted as a pyramid (Figure 1).

A. H. Maslow (1943) divided needs in accordance with the degree of necessity to satisfy them. Using this criterion, he established a list of innate needs, ranging from the lowest to the highest:

- physiological needs - e.g. hunger, thirst, sleep, providing protection against atmospheric influences;
- safety needs - regarding e.g. protection against injury, death or loss of own belongings, providing care during illness;
- belongingness and love needs - e.g. belonging to a family;
- esteem needs - regarding e.g. prestige, success, respect;
- self-actualization (self-realization) - e.g. the need to realize dreams, life plans, etc.

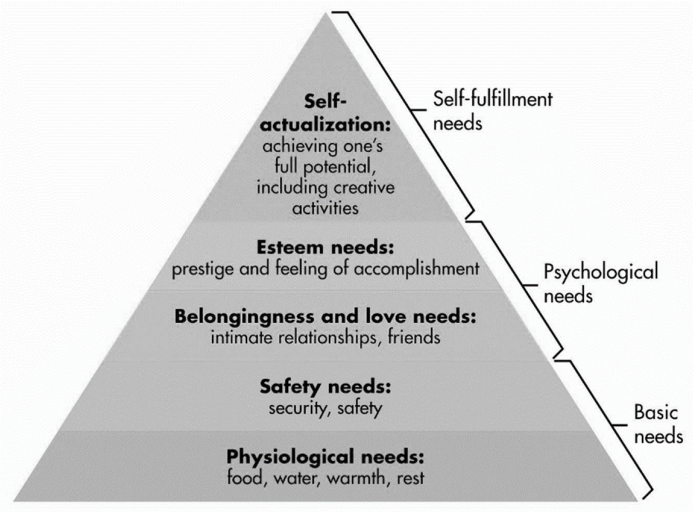

Fig.1: Maslow's hierarchy of needs

Source. (McLeod 2018)

A.H. Maslow (1943) initially stated that individuals must satisfy lower level deficit needs before progressing on to meet higher level growth needs. In his theory, he argued that human needs are unlimited, after a need is satisfied, another need will arise, needs have a certain hierarchical order, no need or drive can be considered independently, every need is related to satisfaction or dissatisfaction of other needs, and unsatisfied needs are a great source of motivation for humans (Maslow, 1943, 1954). For example, the most basic human need is physical survival, which will be the first factor to motivate their behaviour. After reaching this level, people are motivated by further categories of needs located at higher levels of the pyramid. Table 1 presents selected products that meet individual categories of consumer needs.

Table 1: Motivation focused on consumers' behaviour in context of Maslow's conception

Needs according to Maslow	The examples of consumers' behaviour – product categories
Self-actualization needs	Products enabling one's development , e.g. trips, education, hobbies, entries to museums and theaters
Esteem needs	Products „helping' gain the recognition of the other people by making the person look wealthy, e.g. designer's clothes, cars, furniture, credit cards, exclusive sport centers located outsider the town, high-proof spirits, cars etc.
Belongingness needs	Products making the buyer look like an outstanding person in the eyes of other people, e.g. luxury products, new products also clothes, beauty products, clubs and drinks
Safety needs	Buying the sufficient number of products which ensure „financial collateral', e.g. insurances, alarm systems, pension, investments and also products which ensure physical safety (in order to avoid damage), e.g. seat belts
Biological and physiological needs	Medicines, elementary and essential products such as food or beverages

Source. (Hanna 1980).

However, the evolution of A.H. Maslow's opinions over the years (1943, 1962, 1987) should be noted. As a consequence of further research, his concept of hierarchy of needs was improved. In his later works (Maslow 1987), he clarified that satisfaction of needs is not an "all-or-none" phenomenon,

admitting that his earlier statements may have given “the false impression that a need must be satisfied 100 percent before the next need emerges”. A. H. Maslow noted that the order of needs may vary depending on external conditions as well as individual differences. Furthermore, he stated that most behaviours have many motivations and pointed out that “any behaviour tends to be determined by several or all of the basic needs simultaneously rather than by only one of them" (1987). Due to the fact that A.H. Maslow’s hierarchy of needs is a frequent research tool (Tikkanen 2007), it will be used to explain the complexity of household energy needs.

Research Concept

Civilization development resulted in energy demand becoming one of the main human needs. Already in 2012, the OECD report (International Energy Agency 2012) clearly indicated that three classes of resources are considered critical in modern societies, i.e. energy, water and food. The order of their listing is not accidental and results from the hierarchy of importance for the functioning of societies:

- energy sufficiency allows the use of energy-consuming technologies for desalination, treatment and transport of water,
- energy and water abundance ensures the production of food in quantities that meet the needs.

Therefore, there occurs a mechanism of secondary goals as, in modern economy, access to energy makes it possible for individual and institutional buyers to meet the basic needs, like food production and satisfying hunger, as well as providing access to clean water. It is therefore a truism to say that energy is an essential good, which conditions the satisfaction of both lower and higher needs of buyers. This obvious statement does not explain the complexity of the problem. Therefore, a broader understanding of the determinants of energy demand in the hierarchy of social needs of households is required. Otherwise, simplifications affecting their operating conditions may be used. The indicated simplifications relate both to the relativization of social needs in the field of access to energy sources, and ways of satisfying needs based on access to energy.

The literature includes stands against the prioritization of energy needs in line with the initial version of A. Maslow's hierarchy of needs, which assumes the order of appearance and implementation of individual categories of needs. An example is the opinion of T. Michalak (2016)), who points out that in Poland, according to the Energy Law, energy security is "a state of the economy that can cover the current and long-term demand of consumers for fuels and energy in a technically and economically justified manner, while maintaining the environmental protection requirements" (Energy Law Act 1997). Thus, the statutory definition treats three aspects, that is technical, economic and ecological, which are critical for a positive assessment of the state of energy security, equally, assuming that they are fulfilled in a mutually harmonized way. The author, while analysing Polish energy policy, noted the use of argumentation to hierarchize the mutual relations of the above-mentioned aspects of energy security towards its users. In the proposed discourse, the technical aspect is presented as fundamental. This means that highest importance is attributed to the fact of energy provision, as its deficiencies are the most expensive. Next is the economic aspect, albeit treated as secondary. This means that in the accepted argument, any price is justified, as long as it allows access to electricity, since the lack thereof is the most expensive. Finally, the ecological aspect is treated as a higher need that should be implemented in the situation where the first two categories of needs are met, and in particular when the implementation of the ecological need does not threaten the technical and economic aspect (Kowalak 2016).

Therefore, when considering the place of energy demand in the hierarchy of socio-economic needs, attention should be paid to the complexity of this issue. Figure 2 proposes components for building the concept of energy demand conditions in the hierarchy of household needs.

In order to build a model of household energy demand conditions, an in-depth analysis of the selected market in terms of energy consumption by a given user segment is necessary. For the purposes of the article, desk research was conducted in relation to households operating in Poland. Domestic and foreign statistical data and public opinion report were used to achieve this objective.

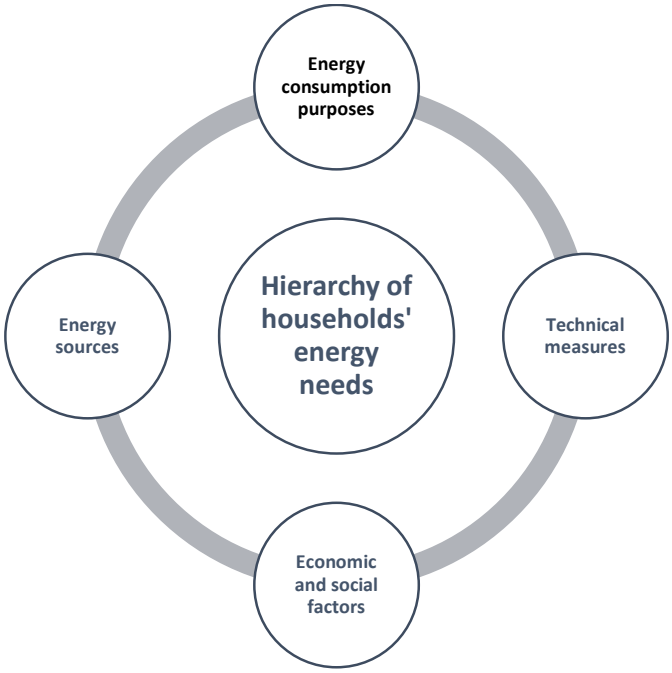

Fig. 2: Components of the research concept

Source. Own elaboration.

In order to present the research context, it should be clarified that the specificity of the Polish energy market lies in the very high share of coal in electricity production, which constituted as much as 78.4% in 2017. Primary energy consumption in Poland was 94.3 Mtoe in 2017. Renewable energy in gross final energy consumption amounted to 11.3% in 2016 (Atlas energii 2018). According to the data presented by EUROSTAT and the Statistics Office (2019), the population of Poland represented 7.4% of the total population of the EU-28 countries in 2018. Poland occupied the 6th place among the European Union countries; after Germany (16.2%), France (13.1%), Great Britain (12.9%), Italy (11.8%) and Spain (9.1%). There were 14.4 million households in Poland. The number of households in Poland represented 6.5% of total households in the EU-28. In terms of the number of households, Poland also came 6th among European Union countries. The average number of people per household in Poland was 2.6 and was higher than the EU average of 2.3.

Energy Demand of Polish Households

Reasons for energy demand in Polish households by energy sources and commodities used

According to research conducted by the Statistics Office (2019), Polish households use energy for the following reasons:

- Space heating,
- Water heating,
- Cooking,
- Lightning,
- Using household appliances and audio/video devices,
- Forced ventilation and air conditioning
- Use of private means of transport.

The characteristics of energy consumption by households are broken down below in accordance with the purpose of energy consumption, as well as the sources and energy commodities used.

Space Heating

Almost half of all households, i.e. 45.4%, applied heating equipment that used solid fuel, among which the most common were double-function central heating boilers used to generate thermal energy and heat water (Table 2). Electricity-powered heating appliances were used by 5.3% of households, while electric heating was more often treated as additional heating than primary one.

Table 2: Space heating by technologies

Devices	Households using a given device
Double-function boiler – solid fuels	19%
Single-function boiler – solid fuels	17%
Stoves in rooms – solid fuels	5%
Fireplace – solid fuels	2%
Double-function boiler – natural gas	10%
Single-function boiler –natural gas	3%
Non-portable and portable heaters, underfloor heating - electricity	3%
Other techniques	1%
District heat	40%

Source. (Statistics Poland, Energy consumption in households in 2018, Warsaw 2019)

There has been an increase in the number of solar devices and heat pumps used for the purpose of heating living spaces. The study identified that 0.13% of households were heated by solar energy. Households using heat pumps constituted 0.28%.

Analysis of energy sources used for space heating indicates that the leading role was played by solid fuel and district heating. Solid fuel is the basic commodity of heating energy for single-family houses, whereas district heating is used in multi-family buildings (blocks of flats). The two most important and most commonly used solid fuels are hard coal and firewood, while other fuels (other types of biomass, lignite, coke) were less frequently used. Hard coal and firewood were usually consumed simultaneously or interchangeably in the same boiler and furnace. Fewer households used only coal (15.3% of households) or wood (7.3%). Two typical strategies are:

- both fuels are burned interchangeably, depending on current availability conditions and prices,
- wood is burned in warmer periods, while coal, as fuel with higher calorific value, in colder periods.

District heating was used to heat spaces by 40.4% of households. Natural gas was placed third among energy commodities used for this purpose, as it was used by 14.0% of households, including 13.1% of households where it constituted the primary commodity. Another medium used in space heating was electricity, which was used by 5.1% of households (and being the primary commodity for 2.6% of households). The least number of households used liquid fuels to heat spaces. Only 0.45% of households used heating oil.

Water Heating

As in the case of space heating, methods of heating water for domestic purposes also varied. The share of individual methods is presented in Table 3, following the principle of class inseparability, i.e. the use of two or more different water heating devices by many households (this applies to 17.2% of households).

Table 3: Water heating by technologies

Devices	Households using a given device
District heating installation	32%
Boiler or water heater - electricity	24%
Bathroom heater – natural gas	17%
Double-function boiler – natural gas	10%
Double-function boiler or water heater – solid fuels	15%
Other techniques	1%
Lack of running hot water	1%

Source. (Statistics Poland, Energy consumption in households in 2018, Warsaw 2019)

The position "no hot running water" in practice means the possibility of heating water only in kitchen appliances, and most often on a solid fuel stove. Such living conditions concerned 1.0% of households, i.e. 144 thousand households, which constitutes over 400 thousand inhabitants of the country.

In order to heat water for living purposes, households most often used: district heating - 31.6% of households, natural gas - 26.0%, electricity - 23.9%, and solid fuel, the least often source - 23.8% of households.

Cooking

Cooking meals is the third most important, after heating spaces and water, process of energy consumption in Polish households (Table 4).

Table 4: Equipment of households with cooking appliance

Devices	Households using a given device
Electric-only cooker with oven	9.90 %
Electric-only cooker without oven	5.65 %
Separate electric oven	9.16 %
Combined gas-electric cooker	56.88 %
Gas-only cooker	29.41 %
Solid fuel fired cooking stove	3.49 %
Microwave oven	49.87 %

Source. (Statistics Poland, Energy consumption in households in 2018, Warsaw 2019)

The most popular type of stove in Poland is a gas-electric stove with gas burners and an electric oven. More than half (56.9%) of all households had such a stove, while 29.4% used a gas stove. Whereas, 20.2% of households were equipped with an electric stove. Half of the households, i.e. 49.9%, apart from the main stove, had a microwave used as an additional device for preparing meals.

LPG fired stoves were another device used to cook meals. Whereas, solid fuel stoves, often called "charcoal burner", were found in 3.5% of households, and in many cases they were not the only device used for cooking meals. They can also be used to heat spaces, as well as boil and heat water through a heat exchanger or a heating plate. This type of stove is built of ceramic or metal material and has a hating plate where pots are placed. Coal, wood and other types of biomass can be burned in this type of stove. In small apartments and small single-family houses, it can act as the only source of heat. In old housing stock, where liquid gas stoves were used, old solid fuel stoves were often treated as back-up appliances, e.g. when one is temporarily unable to buy gas.

In accordance with the analysis of energy sources used by households, the most common energy sources used for cooking meals included: electricity (75.5% of households), natural gas (51.9%) and LPG (33.8%).

Forced Ventilation and Air Conditioning Equipment

Due to the prevailing climatic conditions in Poland, air conditioning devices were not included in the category of popular household appliances. Only 2.8% of all households have this type of appliance, with their resources being presented in Table 5.

Table 5: Households equipped with mechanical ventilation and air conditioning equipment

Devices	Households using a given device
Central air-conditioning	1.42%
Air-conditioners installed in rooms	1.20%
Air-conditioners installed outside of the building	0.20%
Fan heaters	0.14%
Evaporative coolers	0.04%
Forced ventilators	9.68%
Recuperators	0.26%

Source. (Statistics Poland, Energy consumption in households in 2018, Warsaw 2019)

Lighting of Dwellings

Households used lighting mainly for indoor residential purposes. Over 1/3 of respondents also illuminated the exterior. The energy commodity in this case were the appropriate types of bulbs, as shown in Table 6. Most households used LED bulbs, whereas traditional bulbs came second, and halogen bulbs third.

Table 6: Equipment of households with bulbs

Types of bulbs	Households using specific type of bulbs
All bulbs inside dwelling	100.00 %
– Incandescent bulbs	56.55%
– Compact fluorescent lamps	29.60%
– Fluorescent tubes	15.03%
– Halogen bulbs	36.93%
– LED bulbs	70.14%
– Other bulbs	11.82%
Bulbs located outside the building	37.60%

Source. (Statistics Poland, Energy consumption in households in 2018, Warsaw 2019)

Household appliances and audio/video devices

Households use a wide spectrum of home appliances and electronics (Table 7). The categories of household appliances tested are: refrigeration equipment, washing machines, dishwashers and vacuum cleaners, and the categories of audio/video devices are: television sets, sound and image reproduction equipment and computers.

Table 7: Equipment of households with household appliances and audio/video devices

Devices	Households using a given device
Refrigerator (1-door)	16.06 %
Combined fridge-freezer (2-door)	82.27%
Freezer	11.68 %
Automatic washing machine without dryer	92.14%
Combined washer-dryer	2.08 %
Clothes dryer	0.92 %
Non-automatic washing machine	2.56 %
Dishwasher	31.82 %
TV set	93.92 %
– CRT	9.78 %
– flat screen (able to receive digital broadcasts)	69.49%
– other	20.73 %
Home cinema set	9.24 %
Radio or radio/tape-recorder with CD player	57.49%
Mobile computer (laptop)	56.82 %
Printer or multifunction device	21.66%
Desktop computer	18.87%

Source. (Statistics Poland, Energy consumption in households in 2018, Warsaw 2019)

Appliances commonly owned by households included: television sets (93.9% of households, where 64.2% of households had only one set, and 29.7% two or more), automatic washing machines (92.1% of households), combined fridge-freezers (82.3% of households) and radios or radio-cassette players (57.5%). 56.8% of households were in possession of portable computers (laptops). Nearly half of households, i.e. 45.6%, used one laptop, whereas the others used two or more. 18.9% of households used desktop computers, with 17.8% using one computer, while the remaining households used two or more.

Passenger cars in households

Table 8 presents households having passenger cars. In 2018, they were used by 66.2% of all households. Almost half of the households (46.9%) had only one car, 16.7% had two cars, and almost 2.7% of households made use of three cars. About 1/3 of households (33.8%) did not own or use a passenger car.

Table 8: Passenger cars in households

Cars	Households using cars
Passenger cars, of which:	66.19 %
– petrol powered without LPG-system	38.86 %
– petrol powered with LPG-system	10.44 %
– diesel oil powered	24.90 %
– hybrid cars	0.12 %
– electric cars	0.02 %

Source. (Statistics Poland, Energy consumption in households in 2018, Warsaw 2019)

On average, one household used 1.33 cars. About 2/3 of passenger cars (64.9%) used by households were cars with petrol engines (including 13.2% of vehicles adapted to burn LPG), 34.9% were cars with diesel engines (diesel oil) and 0.17% were modern hybrid or fully electric cars.

Assessment of energy sources used in the opinion of Polish households

To assess Polish households' opinions on the used energy sources, a research report "Poles on Energy Sources, Energy Policy and Environmental", conducted in 2016 by Centre for Public Opinion Research (CBOS 2016) on a representative national research sample, was employed. The study covered the overall functioning of the energy sector in Poland, understood as the generation, transmission and distribution of energy.

In the survey, respondents assessed public confidence in energy sources in terms of their safety and prospectiveness (Table 9). In both spheres, the highest confidence values, i.e. over 80%, were obtained by renewable energy sources (RES). Coal (both hard coal and lignite) holds the dominant position in conventional power engineering, but with significantly lower values: in the aspect of safety - about 50%, and in terms of prospectiveness - about 30%.

Table 9: Public assessment of energy sources in Poland

Scope of assessment	Energy sources				
	Coal	Petroleum	Natural gas	Nuclear fuel	RES
Safety	52%	47%	60%	24%	87%
Prospectiveness	29%	38%	55%	52%	82%

Source. (CBOS 2016)

In the above context, respondents were asked to indicate the strategy that Poland should adopt in the next few years (until 2030) in the field of power engineering development. It turns out that Poles strongly focus on renewable energy sources: as many as 89% of the respondents share the view (over half - strongly) that during this period *it is necessary to significantly increase electricity production from renewable energy sources (RES), which will raise clean environment standards in Poland and strengthen the impact of citizens and local communities on decisions regarding energy.*

For almost two-thirds of Poles, it is also important to know *which source (conventional or renewable) the electricity used in the apartment comes from.* Declarations of great importance in this matter are the more frequent, the better the assessment of one's own material living conditions. Slightly over half of the respondents (52%) say that they would be willing to pay more for energy if it came from renewable sources. Among these, the majority (34% of all respondents) are ready to accept an increase in the renewable energy fee by no more than 5%. In total, nearly one in five respondents would agree to pay at least 6% more for "green energy" than today. Readiness to pay higher fees for energy from renewable sources is most often declared by people for whom it is important to know the source of energy they use in everyday life. The vast majority (81%) of Poles are aware of their personal impact on the state of the environment.

Therefore, Polish households understand the relation between energy policy and the state of the environment. Nearly three-quarters of respondents believe that environmental hazards associated with global warming and carbon dioxide emissions into the atmosphere are a very important problem. Only 5% of Poles downplay this issue, considering it to be of little importance (Figure 3).

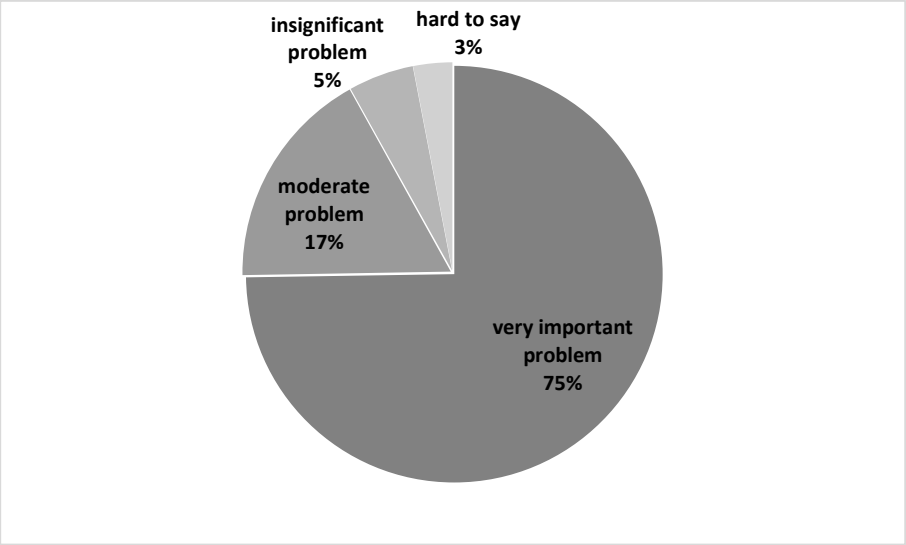

Fig. 3: Assessment of the importance of global warming problems, carbon dioxide emission into the atmosphere and the associated environmental risk
Source. (CBOS 2016)

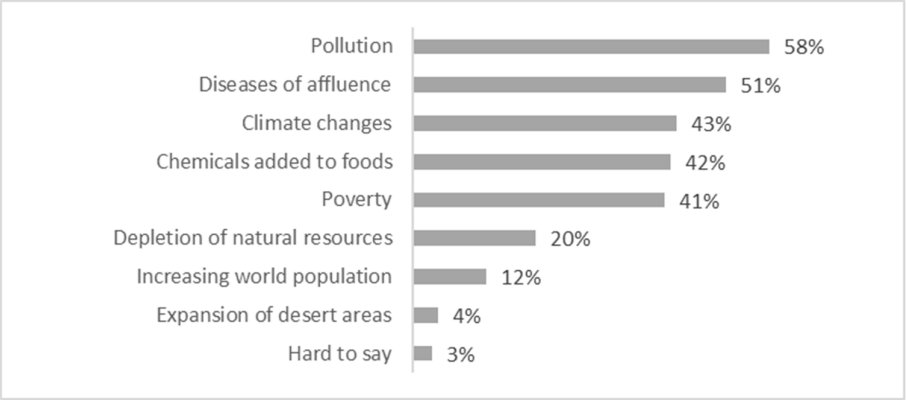

Fig. 4: Risk assessment from occurring phenomena (three answers possible)
Source. (CBOS 2016)

Furthermore, the problem of environmental pollution (58%) was most often indicated as the greatest threat among the phenomena and threats of civilization development. Slightly more than half of the respondents (51%) mentioned the threat of diseases of affluence (Figure 4).

The research results presented above are in line with the assessment of Poles regarding the use of energy sources and production methods in the context of carbon dioxide emissions. Generating energy is usually accompanied by carbon dioxide emissions that negatively affect the climate. In the opinion of the vast majority of Poles, the most harmful raw materials used for energy production are: hard coal, lignite and crude oil. In the opinion of the vast majority of respondents, the sources of energy that do not emit carbon dioxide at all are renewable sources. According to the respondents, solar, wind, hydro and geothermal energy that does not emit carbon dioxide is climate-friendly (Table 10).

Table 10: Public assessment of the impact of selected energy sources and energy production methods on climate (in%)

Energy sources - production methods	High carbon dioxide emission, harmful to the climate	Low carbon dioxide emission, neutral to the climate	Does not emit carbon dioxide, climate friendly	Hard to say
Hard coal	78	11	1	9
Lignite	68	15	1	16
Crude oil	54	21	3	22
Natural gas	20	44	12	24
Nuclear energy	15	16	42	27
Biofuels	6	38	34	23
Water energy	1	7	83	10
Wind energy	1	6	85	8
Solar energy	1	4	87	8
Geothermal energy	0	4	75	21

Source. (CBOS 2016)

The unequivocalness of self-assessment of Poles' knowledge on energy-related topics that is visible in the research results may be surprising. When asked directly how they assess their knowledge about the functioning of the power industry, understood as the generation, transmission and distribution of electricity in Poland, the respondents in the vast majority said that they knew little (62%) or nothing (24%) at all. Therefore, the presented opinions of Poles should be interpreted in the context of their sensitivity in terms of interest in their own health and the state of the environment at the local and global level. An analysis of the consistency of research results has allowed to assume that Poles have general awareness about energy, including preferences regarding the development of energy sources as well as opinions related to climate policy. The presented results of the sociological research are considered to be the first approach to the state of energy awareness of the Polish society of such broad and comprehensiveness, and indicate the complexity of the studied issues in the context of building a hierarchy of social needs regarding energy demand. Furthermore, they indicated a great interest of Polish households in energy issues in the broader context of caring for the climate and concern for the state of the environment.

The concept of examining the place of energy demand in the hierarchy of social needs of households

To describe the complexity of placing energy demand in the hierarchy of needs of households, the research model presented in Figure 5 was developed.

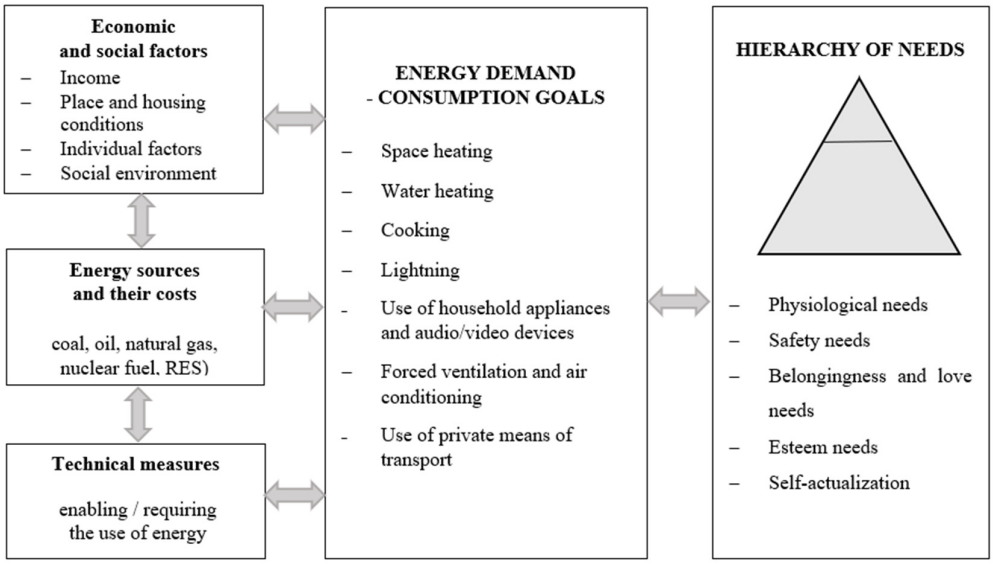

Fig. 5: The concept of examining the place of energy demand in the hierarchy of social needs of households

Source. Own elaboration.

The model was based on theoretical findings regarding human needs and empirical research on households. It takes into account the conclusions from the analysis of energy demand in households taking into consideration consumption, used energy sources and commodities, as well as the results of public opinion surveys. The proposed model schematically shows the conditions of household energy demand. The analysis makes it possible to place the energy needs of households in the hierarchy of needs divided into two main categories in accordance with the theory presented by A.H. Maslow:

- Deficiency needs,
- Being (growth) needs.

Energy demand in households based on deficiency needs

Energy needs are all household activities that use either heat or electricity for everyday operation. If a household has difficulties in satisfying its energy needs due to low income or housing characteristics, then energy poverty occurs.

According to this approach, a household is energy poor if it simultaneously meets two criteria: low income and high hypothetical energy expenditures, i.e. those that on average would allow it to meet standard energy needs. Hypothetical energy expenses are a derivative of the features of the inhabited building (apartment area, building age, heating method) and energy prices.

The scale of energy poverty in Poland is significant (Sałach & Lewandowski, 2018). In 2016, 4.6 million Polish residents, i.e. 12.2%, were affected by it (Figure 6). Half of them had a low income, which indicates that energy poverty should not be seen as an aspect of income poverty, but rather as a phenomenon affecting people with relatively low income and living in buildings that require relatively high energy expenditure. The energy poverty rate decreased by 2.2 percent points between 2012 and 2016, mainly due to the growing income of the population. However, this phenomenon invariably concerned mainly the inhabitants of single-family homes, especially in villages and in small towns. Energy-poor households more often than low-energy households used boilers or stoves for solid fuels as heat sources, and less often were located insulated buildings.

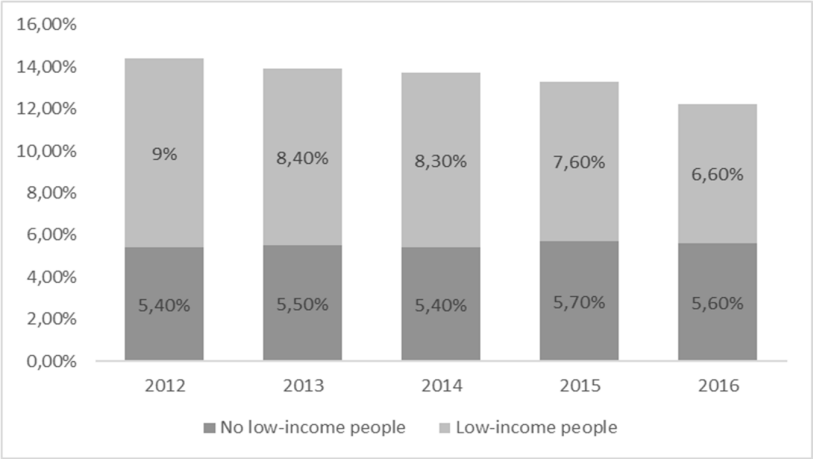

Fig. 6: Energy poverty in the years 2012-2016 in Poland

Source. (Sałach, Lewandowski 2018)

There is no common definition of energy poverty in the EU (Energy Atlas 2018). Only a third of countries officially recognize it, and just four of them - Cyprus, France, Ireland and the United Kingdom - have introduced a legal definition of this phenomenon. Still, it is estimated that 50-125 million EU citizens (10-25% of the population) are at risk of energy poverty, as shown in Figure 7.

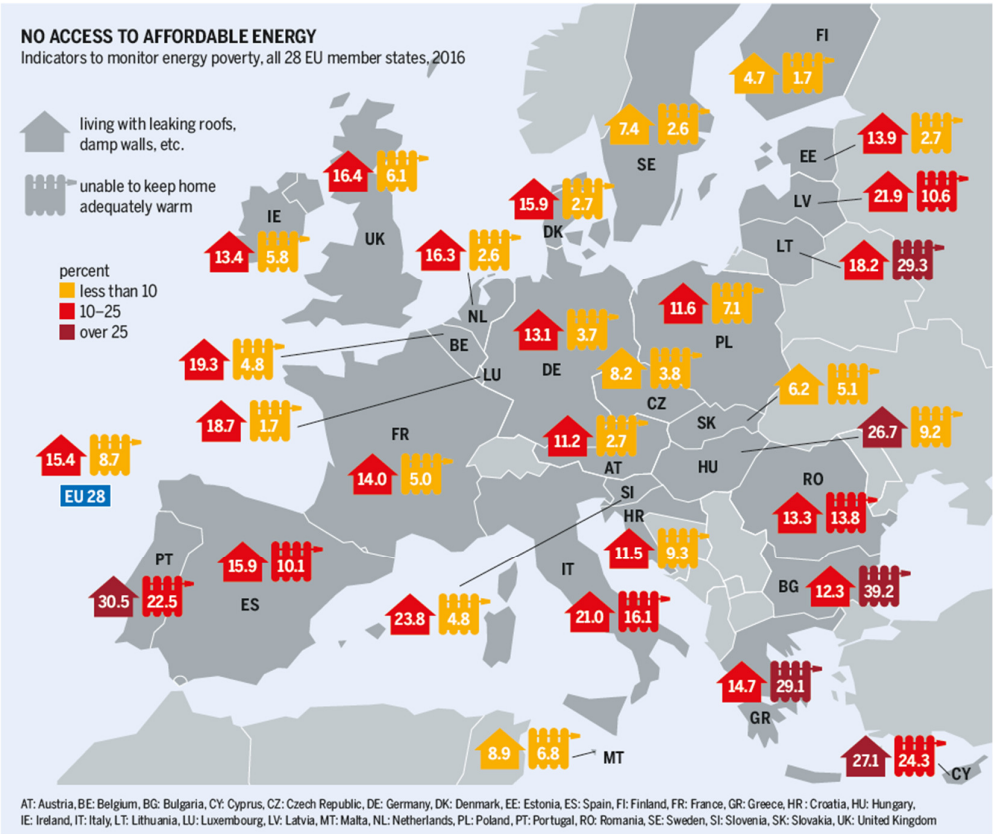

Fig. 7: Energy poverty in EU 28

Source. (Energy Atlas 2018)

Energy poverty has significant consequences for both individual households and society as a whole. It causes low quality of life and health problems. Furthermore, it has economic and environmental effects, such as illegal logging or air pollution from the combustion of unsuitable fuels.

Energy demand in households based on being (growth) needs

Energy demand as a higher order need is mainly visible in the survey of households' opinions on the used energy sources and their consequences. According to the presented research (CBOS 2016), households understand the relation between the type of energy used and the state of the environment, climate change and their health. Support for both renewable energy sources and individual energy production in Europe is constantly growing. However, there is no European database, and thus it is difficult to estimate the number of citizens involved in this process across the EU (Atlas Energy 2018). Analyzes for the most developed countries such as Denmark and Germany indicate a positive trend. Central and Eastern European countries lack adequate political conditions, while fossil fuels and nuclear energy are preferentially favoured by governments. However, these countries have great potential. For example, Polish society expects the state to carry out an energy transformation. It is increasingly recognizing the danger resulting from poor air quality, rising energy costs, and climate change. The preferred direction of energy development in Poland is not coal and fossil fuels, but renewable energy sources. Figure 8 presents the results of social research carried out by various research laboratories over the years 2014-2018. They prove constant high support for the implementation of renewable energy sources.

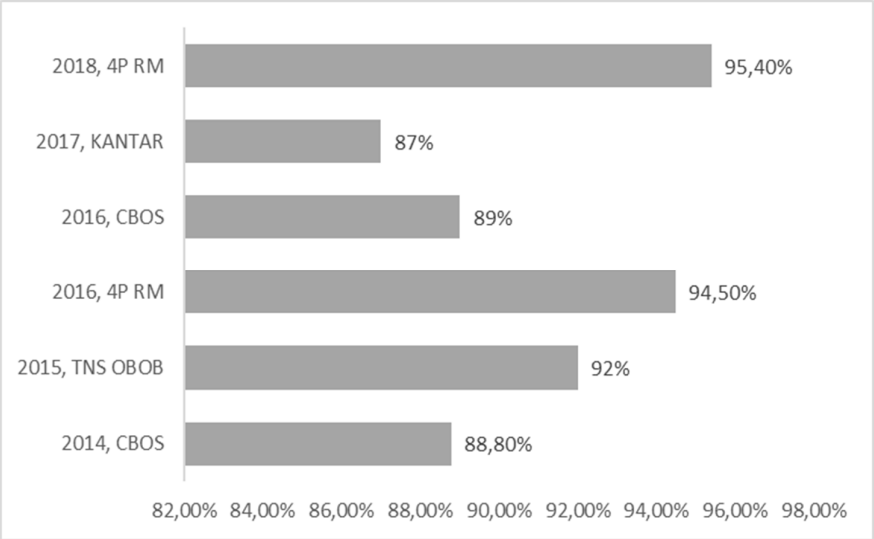

Fig. 8: Social support for renewable energy development in Poland in 2014-2018
Source. (Atlas Energii 2018)

The desire to use renewable energy sources is dictated not so much by securing basic energy needs, but results from ecological awareness and responsible civic attitude towards all people on Earth and future generations.

Summary

The presented concept of examining the place of energy demand in the hierarchy of needs of households takes into account all the conditions related to both the psychological nature of a person, their economic conditions and the availability of energy sources and their commodities. However, it does not indicate the location of specific energy consumption goals in the hierarchy of needs. In model terms, this is consistent with A.H. Maslow's final approach to individual and flexible appearance of needs. Nevertheless, the presented concept may form the basis for designing studies that will examine

the described issues in more depth. The study of placing energy demand in the hierarchy of household needs is an important and complex issue that is part of the current EU energy policy. Solutions included in "Clean energy for all Europeans" package sets the right balance between making decisions at EU, national, and local level. For the first time, the focus is put on European energy consumers. The new rules increase universal access to energy, by combating the causes of energy poverty and protecting vulnerable consumers. Under the new rules on energy efficiency, Member States must prioritize social housing households and take energy poverty into account in their long-term renovation strategies (European Commission 2019). Summing-up, energy is important for the competitiveness of Member State economies as it affects production costs of industries and services and the purchasing power of households.

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CSR In the Time of Covid-19 Pandemic: Some Thoughts on Future Research - Evidence from Poland

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Abstract

CSR stands for corporate social responsibility and is based on four dimensions - economic, legal, ethical and philanthropic. The growing popularity of CSR manifests itself both in real actions taken by enterprises and in published reports on these actions. However, during the COVID-19 pandemic, it is reasonable to ask the question - were these CSR activities based on the mission and goals of the company, or were they just a PR tool? The purpose of this article is to outline the problems associated with the implementation of CSR activities during the COVID-19 pandemic and to identify future research directions in this area.

Keywords: Corporate Social Responsibility, COVID-19 Pandemic, Crisis.

Introduction

CSR is a concept assuming that enterprises do not operate in isolation and its activities have an impact on the social, economic and natural environment. More and more companies are undertaking CSR activities and presenting them to stakeholders in the form of separate reports. As indicated in the further part of this paper, CSR can give many benefits to the company and its employees. A balanced way of running a business allows for further development of the economy, taking into account the needs of various social groups and natural environment. However, in times of crisis, and such time is now due to the COVID-19 pandemic, there is doubt as to how much CSR activities resulted from the mission of the companies, and how far they were only a PR tool.

Therefore, this article reviews the literature on CSR, including critical research on CSR. Based on the current situation in Poland and the reaction of companies to this crisis, future research areas have been outlined.

The concept of CSR

CSR is an abbreviation for corporate social responsibility. The general meaning of CSR described Carroll by selecting four dimensions of CSR – economic, legal, ethical and philanthropic responsibilities (Carroll 1991). Wagner-Tsukamoto described Carroll's dimensions briefly as follows (Wagner-Tsukamoto 2019, p.471-472):

"At the base of his framework, Carroll located economic responsibilities; the firm is meant "to be profitable". Can ethics be drawn upon to justify such a recommendation, and if so, which kind of ethics? Equally, can the idea of economics be restrained to the bottom dimension only? One level higher, Carroll discussed legal responsibilities, again normatively: The firm is expected "to obey laws". Again, critical questions include why should a firm obey laws? How could ethics be drawn upon to ground this argument? Would economic considerations come into play? One level higher Carroll placed ethical responsibilities, which reflect in his reading ethical expectations of society that go beyond the fulfilling of laws. The top dimension reflects philanthropic (voluntary, discretionary) responsibilities: The normative recommendation to the firm is "to be a good corporate citizen" through making donations, volunteering, engaging in charitable acts, etc. As it was for the bottom dimensions, the questions are why would a firm be expected to fulfil ethical and philanthropic responsibilities, and can economic argument play any role here?"

So, each of the dimensions can be described by a simple phrase:

- Economic: being profitable.
- Legal: obeying the law.
- Ethical: being ethical.
- Philanthropic: being good corporate citizen.

There are several approaches to CSR research, some of which are listed below.

Nowadays, CSR must be associated as an international tool, not only as a local initiative that does not go beyond the borders of the country or region in which the company operates. According to Amo-Mensah and Tench (2018, p.140) "As corporate social responsibility (CSR) becomes more relevant, the activities of transnational corporations, sometimes referred to as multinational corporations (MNCs), in host countries have received considerable attention in recent years. Due to global economic integration, liberalisation and technological advancements, a large number of transnational companies (TNCs) usually based in Europe and the USA have extended their activities across national borders".

A lot of research has been done on the relationship between CSR, management commitment and stakeholders activities. For instance, according to Jones, Bowd and Tench (2009, p.306) "It can be argued that there has been a paradigmatic shift from a business model and way of working in which shareholder interests and issues such as return on investment reign supreme, to one whereby different stakeholders compete to influence and shape the business agenda, so that shareholder interests are simply one of many". It can therefore be concluded that profit maximization is no longer the main goal of stakeholders. Of course, you can't do business without profit, but that profit is no longer the only criterion. This approach is consistent with the statement of Kilcullen and Ohles Kooistra (1999) that "corporate social responsibility have centered on the long-term advantages of socially responsible behavior, advantages such as greater customer and employee loyalty and a more supportive external environment".

According to Tetrault Sirsly (2009) "Most of the business classics reviewed have provided the underpinnings of what has become stakeholder management and corporate social responsibility. The overwhelming importance of top management's values, ethics and morals in setting the tone of organizational culture is the foundation upon which corporate social responsibility is also built". More about the relationship between corporate social responsibility and managements' activities in O'Dwyer (2003).

Recently, many "varieties" of CSR and new approaches have been described in the literature. According to Carroll and Brown (2018) there is a: political CSR, upstream/downstream CSR, CSR in emerging economies, corporate social activism, and corporate social *ir*responsibility. For instance, CSR comparison of the emerging economy with the developed economy presented Garstecki, Kowalczyk and Kwiecinska

(2019) and political perspective in CSR research presented Rehbein, Hond and Bakker 2018 or Lin, Sambasivan Ho and Law (2019). According to Amodu (2018) "an efficient corporate social responsibility (CSR) framework in many economies has been linked with human capital development, social and financial inclusion, environmental protection and better stakeholder management".

One of the latest topics in CSR-related papers is the relationship between corporate social responsibility and circular economy, which is gaining popularity due to limited sources and environmental problems (Scarpellini, Marin-Vinuesa, Aranda-Uson and Portillo-Tarragona 2020; Zhao 2018; Li, Meng, Leung, Zuo, Tang and Wang 2018) and improves business sustainability by reinserting waste into the supply chain in order to manufacture products on demand in different industries (Nascimento, Alencastro, Quelhas, Caiado, Garza-Reyes, Rocha-Lona and Tortorella 2019; Hvass and Pedersen 2019; Sandvik and Stubbs 2019). According to the recent studies circular economy has four main benefits: environmental, economic, social and operational (Sehnem, Vazquez-Brust, Pereira and Campos 2019). As we can see, the concept of CSR has evolved and has helped several industries find new ways of doing business in more sustainable way.

The purpose of this article was not a detailed analysis of the beginnings of the CSR concept, for this we refer to other papers, for instance (Gomez-Carrasco, Guillamon-Saorin and Garcia Osma 2016; Moura-Leite and Padgett 2011).

Benefits of CSR

There are many benefits of CSR in the literature. Some studies focus on benefits for employees, others focus on benefits for the company.

In connection with benefits for employees Bauman and Skitka (2012) presented four employee needs in the CSR area: 1) safety and security, 2) distinctiveness, 3) belonging and 4) meaningful existence. Bauman and Skitka perceive these needs as four different ways by which a given company could influence employees' relationships. Alhouti and D'Souza (2018) conducted extensive research on the benefits of corporate social responsibility. According to them "CSR influences spiritual, status, efficiency and aesthetic benefits equally and (…) study finds that in most cases spiritual benefit is more likely to lead to a stronger consumer outcome than other benefits" (p.283).

In terms of benefits for the company McDonald, Svensson and Galbreath (2010) discussed three potential benefits of CSR activities: reduced employee turnover, increased customer satisfaction and improved reputation. In the summary of their research we can read that "as a result, this study offers some level of confirmation for scholars who have theorized that CSR is a value creating activity important to firms beyond direct financial benefits, such as those measured by traditional accounting-based measures" (p.422).

Lenssen, Bevan, Fontrodona and Drews (2010) divided the benefits into two groups: monetary and non-monetary. Among the monetary benefits they include direct financial effects such as revenue increases, cost decreases and benefits that do not directly lead to cash inflow but can be measured in monetary terms like an increase in brand value. Non-monetary benefits include repurchase rates, improved access to capital or retaining investors.

Undoubtedly, CSR activities bring benefits for the company and its employees. However, in times of crisis, such as the current pandemic associated with the COVID-19, it is reasonable to ask the following question - will CSR activities before the crisis continue after it?

Selected problems concerning CSR in disruptive times

As indicated in the previous section, the implementation of the CSR strategy can bring benefits to the company. But there are also some doubts both on the idea of CSR and CSR reporting.

Roszkowska-Menkes (2017) identifies two major streams of CSR criticism. The representatives of the first group undermine that businesspeople may have social responsibilities (p.76). The most famous opponent of CSR was Milton Friedman (2007), who argued that "In a free-enterprise, private-property system, a corporate executive is an employee of the owners of the business. He has direct responsibility to his employers. That responsibility is to conduct the business in accordance with their desires, which generally will be to make as much money as possible while conforming to their basic rules of the society, both those embodied in law and those embodied in ethical custom" (pp. 173-174). In the light of this quotation, it can be stated that social responsibility is not the primary purpose of a business. The relation between CSR and financial performance was often examined in literature (e.g. Fauzi and Idris, 2009; Nelling and Webb, 2009; Maqbool and Zameer, 2018; Cho, Chung and Young, 2019; Awaysheh, Heron, Perry and Wilson, 2020), but the results are not consistent with each other. Roszkowska-Menkes (2017) states that "it is unclear whether companies "are doing well by doing good" or "are doing good, because they're doing well" and have sufficient resources to invest in CSR and improve reputation of top managers" (p. 78). The second problem concerns the use of CSR as a marketing and PR tool, some opponents also accuse CSR to be an empty promise.

The doubts also refer to CSR reporting as well. Based on analysis of CSR reports published by companies listed on the Warsaw Stock Exchange we have the following conclusions:

- Companies use different guidelines or do not use any of them at all,
- Reports differ in content, volume and structure, which makes it harder to compare one report to another,
- Reports are not subject to external verification or external auditor only check if a given indicator/information has been included in the report, auditors do not check whether the information provided is true.

These doubts came back with the time of COVID-19 pandemic. According to Kramer (2020) coronavirus is a test for CSR. He stated that "A great many large companies talk about their values, or about how much they care for their employees and other stakeholders. The coronavirus crisis is the time for them to make good on that commitment".

In this context, we conducted a preliminary analysis of the activities of companies in the time of the COVID-19 pandemic. In the light of the results, we have observed that:

- In the case of companies, which previously reported on CSR: CSR activities are undertaken by companies, which have strong position; among them are companies from sectors, which were highly affected by a pandemic of COVID-19 (e.g. LPP from Clothes & Cosmetics sector) and affected to a lesser extent by pandemic (e.g. Lotos Group and Orlen Group from Oil&Gas sector); while CCC Group (company from Clothes & Cosmetics sector) announced the reduction of costs related to the i. a. supporting sport activity;
- On the other hand, we can observe that companies' from IT engaged in a lot of CSR actions (e. g. Asseco Poland or Atende Software); it is worth to mention that it is rare if ever companies from the IT sector publish the CSR reports.

Conclusions and Future Research

In the context of the above considerations, it is reasonable to ask the following questions:

1) Is CSR only for companies with financial stability?
2) Do the "extensive" CSR reports result from the mission and goals of the company, or are they just a marketing tool? Perhaps a piece of brief information on the activities related to CSR would be sufficient?
3) Will the COVID-19 pandemic affect CSR and its reporting?

According to the authors, the following scenarios are possible:

- Scenario 1: the idea of CSR will survive, but companies that are socially responsible will focus less on reporting and more on actual activity.
- Scenario 2: The idea of CSR will lose its significance because in times of crisis companies will focus on survival and CSR activities will be too expensive.

The above issues will be the subject of our future research.

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Exploring the Role of Entrepreneurship and Innovation in the Privatization Process

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Abstract

Privatization is a global phenomenon encountered in both developed western countries as well as developing countries. Privatization is not a spontaneous phenomenon, which can be achieved by a simple decree or law. This is a complex process that requires time and especially an adequate strategy in which to analyze the situation of each public enterprise and to decide its future in relation to the objectives of the economic policy correlated with the requirements of the market and the economic-social realities of the country. In the case of former communist countries, privatization represented a decisive element of the economic-social reforms in order to create an economy based on market demands. This research analyses the role of entrepreneurs and innovation in the privatization process by performing an in-depth literature review based on the articles, books and reports that tackle the concepts proposed and presenting Romania as a valid case study to illustrate the struggles encountered by a nation in the privatization process of the national companies. The main contributions of this paper are the presentation of entrepreneurship concept in Romania in the first years after the fall of communism and the proposal of a diagram that incorporates suggested actions that constitutes the basis of a privatization strategy for any public enterprise.

Keywords: Entrepreneurship, Innovation, Privatization, Economic Success, Entrepreneurial Initiative.

Introduction

Understanding the entrepreneurial activity and institutional premises is paramount for those interested in the problems of civilization progress and economic prosperity (Herbener, 1992). In this sense, the first step is the analysis of entrepreneurial activity on a free market and its comparison with that of a socialist system. Only after this analysis a privatization program can be designed, one that can generate, in the social exchange and in production, the maximization of the quality and quantity of entrepreneurship.

In the vast majority of activities, people prefer greater efficiency in organizing production, followed by obtaining voluntary exchange goods. Entrepreneurial activity becomes part of the division of labor as some people demonstrate that they have greater ability to cope with the uncertainties inherent in the process of social production (Brunsson & Olsen, 2018).

The economic calculation of losses or profit is the process by which people decide what and how to produce in the complex structure of social production (Rahdari et al., 2016). In the absence of economic calculation, no social system could record the real preferences for consumer goods nor produce them rationally, appreciating the opportunity costs. Monetary prices set by the liberal exchange of private property rights reflect the social rarity of goods, highlighting the preferences of individuals to buy some goods by giving up the value of others, or refusing to buy, keeping the value of consumer goods that should be sold otherwise (Hefeker, 2018). Price provides the information needed to make entrepreneurial anticipations about the future scarcity of consumer goods. Under these conditions, entrepreneurs can coordinate current productive activities, in order to create those consumer goods with the highest social value.

Entrepreneurs turn their attention to obtaining the most desirable consumer goods, by assuming the function of coordinators of those who cooperate within the division of labor system. This is done by voluntary exchange, to the extent that each entrepreneur creates a business firm for contracting different owners of production factors within it and subsequently contracting abroad, with the firms of other entrepreneurs.

As long as the production and exchange process is governed by entrepreneurs, its purpose represents obtaining profit and ensuring the sustainability of the business. This is a basis for continuous testing in the selection of entrepreneurs capable of contributing to this goal. Those who do not systematically make a profit and cannot avoid losses will be eliminated by specialized entrepreneurs.

Research Question and Methodology

The current ongoing research established as main objective to explore the role of entrepreneur and innovation in the privatization process. In order to achieve this objective, the following set of secondary objectives are proposed:

- a thorough literature review on the concept of entrepreneur, innovation and the stages of a privatization process;
- presenting a real case study to describe the privatization process and the emergence of entrepreneurship initiatives after the fall of communism;
- proposing a set of actions as the basis of a privatization strategy for any public enterprise.

In the interest of investigating the mentioned aspects, the methodology of the current paper includes literature review on the publications regarding the concept of entrepreneurship, innovation and privatization process for states that are in the process of transition after the fall of communism. Also, the research includes a case study, respectively the way in which action was taken in Romania after the fall of communism, which should serve as an example for the privatization processes of state companies.

Literature Review

After the fall of communism, the most urgent challenge for the former communist countries was to draft a privatization process for state-owned companies (Papadopoulos, 2018). The privatization of socialist production centers should have been carried out on the basis of the division of private property into shares and their distribution to the workers in each center. The alternative modalities of privatization of these centers suffer from either economic or ethical vices, or both (Szarzec & Nowara, 2017). For example, organizing a national auction, in which the state sells all the properties it owns is an injustice, as the state is an illegitimate confiscator of property, it has no justifiable right to sell or use the property it has expatriated.

The fairness and economic success of such a privatization is essential with regard to the free exchange of these actions. The newly born stock exchange would expand rapidly as specialized entrepreneurs create new firms and begin, with the emergence of free capital markets in general, to properly direct savings to the production structure and to various processes, for the creation of capital goods, without government interventions injecting irrationality in this process (Del Bo et al., 2017). Through legislation, money should be handed over to the market so that monetary inflation can stop immediately, the official currency becoming convertible into gold allowing entrepreneurs to produce money freely, within the framework of private property rights. The return of money to the market is a necessity for a coherent economic calculation without which a rational social production cannot take place. By allowing the state to maintain control over money, even if only partially, it certainly distorts entrepreneurial activity, because the state uses this power to control spending and capital flows.

Privatization should not be instituted at the same time as the complete abolition of forms of government intervention, in a new configuration of the division of labor and voluntary exchanges.

This is a necessary condition for allowing the existence of private property rights and for opening up directions for the expression of entrepreneurial activity and social production. State intervention should be stopped in terms of the contractual conditions of private individuals by stopping price controls or compulsory occupational licenses, the government apparatus would still be reduced, releasing more and more bureaucrats to the private productive sector (Klapp, 2019).

Entrepreneurial activity does not play a direct role in the design of the privatization program, but it indirectly plays a crucial role in undermining the centralized planning system, illustrating the benefits of freedom. Entrepreneurship is first and foremost a regional event, the individual decisions of the entrepreneur and the success or failure of start-ups are influenced, among others, by the variables of the regions where their activities are located (Wang & Tan, 2019). This influence has a much greater impact than the national or continental context. However, the region cannot be compared with the city, metropolitan area or urban area as in many countries, most regions tend to be rural. Closely related to the urban climate are cultural wealth, economic diversity, international connections and infrastructure.

Perceptions about entrepreneurship can affect the supply and demand side of the field. Regarding the offer, for potential entrepreneurs, perceptions include the availability and ability to become a perceived entrepreneur (Crecente-Romero et al., 2016). The level of education and the availability of entrepreneurship training programs are possible determinants of perceived skills. The quality and quantity of perceived opportunities can be improved by conditions such as population growth, economic growth, culture and national entrepreneurial policy. The fact that agents are seeing more and more successful entrepreneurs in the direct environment, especially the local one, can strengthen their perception of their own capabilities, without developing the real capabilities. This effect can be enhanced when the economic climate is favorable.

Moreover, there are demographic differences between entrepreneurial capabilities for socioeconomic or historical cultural reasons. Policy programs can explicitly target groups that have low levels of perceived capabilities, but also those of current capabilities. Thus, several distinct regional and national conditions may affect the perceived capabilities directly and indirectly. At an early stage, entrepreneurial activity should be higher in the main cities of a country, and it is expected that the same can be applied to perceived opportunities for entrepreneurship. In other words, the perception of opportunity should be higher in large agglomerations.

However, previous research indicates that the cities of the world have an entrepreneurial advantage in the direction of growth of jobs and business activities related to the creative class (Audretsch & Belitski, 2017; Audretsch et al., 2019). The results also indicate that entrepreneurship in global cities is not necessarily remarkable, in terms of innovation and technology, when the regional context is appreciated. Non-urban areas can thus achieve competitiveness. A strong link with the latest developments in a global city would then be important.

Innovation is a complex organizational process, with a socio-economic role, and entrepreneurs are economic agents that put innovation in a corporate context (van de Wetering et al., 2017). In the contemporary global economy, businesses and companies do not compete in the quantity of products offered, not even for their quality. Geographically, unlimited access to the world's resources allows for large-scale production. In addition, the development of technology and science makes possible the efficient production of quality goods and services. As a result, market competition is won by innovative economic agents and innovative companies, whose products bring more novelty and significance to consumers (Yun et al., 2016). Entrepreneurs stimulate existing companies to improve their products and innovate, ensuring their profile and increasing the level of satisfaction, and thus the standard of living of consumers.

The generation of knowledge through innovation is better done in certain environments, specific to large cities or industrial clusters, characterized by diversity and high levels of qualification. Generating new ideas is about the flow of people and the information between the company and the

environment. Technological innovations are made to meet market conditions (Tidd & Bessant, 2018). Experts and consultants are an important source of information for managers, because they know the new products, processes and developments in their field. Newly hired staff are likely to know alternative ways to use the technologies used by competitors or suppliers.

Entrepreneurs can meet the high costs of production factors by introducing innovations and adopting innovative technologies that require low cost factors. They can also discover new sources of high quality factors, increase supply and reduce their prices. These can have an impact on the growth rate, increasing the causal importance of entrepreneurship.

Conventionally, entrepreneurs can negatively influence economic growth and development, if they do not benefit from favorable opportunities supported by cheap production factors or, they do not expand their activity with possibilities for this (Urbano et al., 2019). In such cases, one can anticipate when the rate of economic growth and development will be lower than economic opportunities. The quality of the factors of production is an important factor of productivity, which in turn influences the cost of a unit of production manufactured by entrepreneurs. The higher the quality of the production factors, the higher the productivity and the lower the cost of a production unit (Bergeaud et al., 2017). The productivity of technology, raw materials and labor is of particular importance to the entrepreneur. Capital-intensive technologies are more productive than those that need more work. Working with modern technologies and skilled labor will be much more productive than unskilled labor.

If the productivity of the factors of production is low and the opportunities are unfavorable, then any measures taken by entrepreneurs will attract more productive factors and in larger quantities, leading to increased growth and economic development in relation to opportunities making entrepreneurship important (Henrekson, 2020). Its structure and volume are the main determinants of the reward that the entrepreneur will receive in this situation. As a rule, the higher the market volume, the higher the potential reward. The actual market demand for manufacturing products may correspond to the products that the contractor is capable of producing. As for the supply of production factors here the number of competitors fighting for this market will be an important factor. In the case of a market with a given volume, the higher the number of entrepreneurs fighting for it, the more favorable the opportunities will be. Therefore, we can say that the market opportunities will be more favorable for a small market, since it has a smaller population with limited incomes and purchasing capacities. If the demand and competition from products other than those that the entrepreneur proposes in the market is higher, the reaction of entrepreneurs to this situation may be different.

First, entrepreneurs can try to increase the existing market volume for their products by reducing costs and improving quality by diversifying products according to market tastes, or they can manipulate consumer tastes.

Secondly, entrepreneurs can seek to find new markets in the segments of potential consumers in their country or in other countries. If entrepreneurs react differently, entrepreneurship is likely to have a positive causal influence on economic growth and development. Of course, entrepreneurs can take advantage of market opportunities. They can be satisfied with the quantity of products offered in the market and will not look for other larger markets; they can keep prices high for their products and produce goods for a limited number of consumers. In this situation, entrepreneurship will be an important cause but with a negative influence.

One of the most important factors influencing the emergence of entrepreneurship is the government system (Estrin et al., 2019). The state can protect the entrepreneurs, within a country, from the competition of other entrepreneurs, directly or indirectly, promotes the behavior of the entrepreneurs, corrects the difficulties under the opportune conditions that they face. At the same time, instead of promoting entrepreneurship, it can create barriers and, instead of avoiding difficulties in the economic system, it can increase them. There are several possibilities to influence the conditions

suitable for entrepreneurship, the following are the most important ones (Hanohov & Baldacchino, 2018; Porfírio et al., 2018):

- *capital* - the state can increase the supply of capital investments through several levers including direct subsidies for entrepreneurs;

- *labor* - the state can also increase or reduce the productivity of the labor force. Increasing labor supply can be achieved through industry and immigration in cases where labor is limited, by assisting entrepreneurs in training workers, or encouraging entrepreneurs to provide training programs to raise the level of skills of workers. On the contrary, the government can use the labor force available for its own purposes, to introduce restrictions on labor mobility, and force entrepreneurs to employ excessive labor through increasing its costs and reducing labor productivity;

- *the raw material* - the positive influence of the state on the opportune conditions can take place by encouraging the discovery of new deposits or the discovery of substitutable sources. The state can also facilitate the import of resources not found in the given country. Conversely, the state may not practice all of the above methods, but may maintain the high tariff system for important raw materials and increase the costs of entrepreneurs' products;

- *the market* - the state can also play the main role in determining and regulating the composition of the market. The tariff policy adopted by the state is very important. This can increase for domestic entrepreneurs by promoting the import of substitutable products. The state can expand the foreign market through the policy of export expansion. The structure and volume of the internal market may be influenced by the taxation policy. The state can be an important point of the market by presenting the offer on some products.

The state not only influences the economic but also the non-economic factors, which are quite important in the emergence of entrepreneurship. It can reduce the legality of entrepreneurship through supportive policy; can ensure a high level of security for entrepreneurs based on property and investment protection laws, or can allow chaos or confiscation; can manipulate the access of groups of individuals to mobility channels through legal restrictions and can play an important role in promoting the ideology of supporting entrepreneurship. The most important way in which the state can negatively influence the entrepreneur is to directly assume the entrepreneurial role. A distinction regarding entrepreneurial identity is that between public and private entrepreneurship. The causal importance of public entrepreneurship is a more important issue than the factors that contribute to its emergence. The emergence of public entrepreneurship is explained by the issuance of decrees and orders. Also, the analysis of the combination of economic and non-economic factors that contribute to the emergence of public entrepreneurship is very interesting, because it has a very small share in the countries analyzed, which has not been given much attention. The state can influence the role of entrepreneurs and the way they obtain the factors of production. State policy can also affect the range of products that entrepreneurs produce.

Case Study for the Privatization Process – Romania

The privatization process requires both skill, professional capacity and a series of legal guarantees to allow: the exclusion of the risks of fraud and corruption; protecting the population; avoiding the replacement of the state monopoly with a private, national or foreign monopoly; the use of privatization techniques to adapt to the specific situations of the country and of each enterprise, etc. The quantification of the effects of privatization, especially on the economic level, must include increasing productivity, reducing production costs, tariffs and prices, improving the quality of products and services, etc. If it cannot be demonstrated that the privatization of the enterprise has advantages over its maintenance in the public sector, it is preferable to postpone the privatization of that unit.

There are several limits on "de facto monopolies" or "natural monopolies", which may represent enterprises that through their activity actually have a monopoly over the entire internal market - water, gas, transport by rail, etc. In general, these companies remained in public ownership, but a system of control of the costs they incur and, implicitly, of the prices charged, was set up in such a way as to limit the possibility of taking advantage of their monopoly situation. A limitation of privatization is also imposed by the existence of non-profit activities, social assistance services, some units with a low profitability - for example, the activity of the post office for the transmission of correspondence to isolated places. In these cases, if the emphasis were on profitability through their privatization, the social purpose of the respective units would disappear.

Adopting the strategy for each public enterprise should have been based on a concrete analysis, as shown in the below figure:

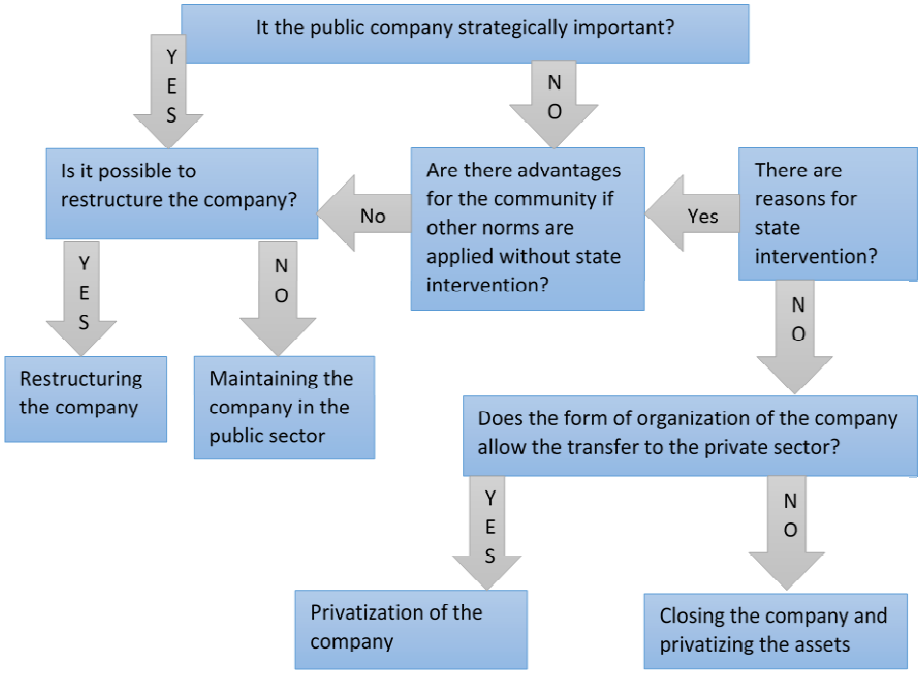

Figure 1: The strategy regarding the perspectives of a state company

Source: Created by author, based on literature review

Findings

Management Employee Buyouts (MEBO method) were the main method of privatization relevant for the first five years after the fall of communism in 1989 in Romania. Afterwards, as mass privatization began and case-by-case sales became increasingly used, MEBOs continued to be applied to an important number of companies. The situation consisted of two main aspects: there was a high number of employee-owned companies and there was a high percentage of employees who owned the majority of the shares of the companies. These companies were part of a vast category of industrial branches with varying sizes in terms of number of employees, from a few people up to 10,000 employees. Thus, the employers' patronage constitutes a relevant factor of the performance of

the Romanian companies, and the understanding of this aspect is important both from the theoretical point of view and from the point of view of the elaboration of the economic policies (Earle & Telegdy, 2002).

The first entrepreneurs to appear on the Romanian market were those who targeted primarily the factory buildings and the existing infrastructure within them. Unfortunately, many have shown interest in capitalizing on assets in companies and have not invested in their further development and long-term sustainability. The result was the bankruptcy of some companies considered empathetic during communism and many buildings in ruins. Following this fact, around 2008, an emblematic year for the very high prices of buildings and lands in Romania, the ruined buildings were sold for the capitalization of the lands on which later office buildings or malls appeared. The new constructions did not target the production sector, so this area no longer positively influenced the export sector.

Another part of the foreign investors sought to obtain financial incentives from the government offered for the purchase of former state-owned companies with large debts or in bankruptcy. These incentives were either to cancel part or all of the debt if investors undertook to hire a number of employees or to retain existing employees, or to grant them preferential contracts for certain public works, or to eliminate the obligation to make payments such as wage contributions to state for the company's employees for a certain period of time. Unfortunately, this policy also proved to be wrong, because most of the companies that were taken over in such conditions went bankrupt and were subsequently closed, the employees being laid off. It was found that investors used the incentives offered, and when they considered that the Romanian market is no longer attractive enough for them or the state stopped the tax exemption with the passage of the contract period, they moved production in other countries that have offered them superior advantages.

A third category of investors were those who subcontracted Romanian companies using the labor force for their Western factories. Basically, in Romania were processed in lohn system various components for cars, parts for agricultural equipment, clothing, etc. according to the contractor's specifications, with the materials provided by the contractor and under the brand of the foreign company (Gîrneaţă & Mascu, 2014). Unfortunately, the Romanian market was attractive in the short term, as long as the labor force was cheap. Foreign investments were minimal, mostly Romanian companies manufactured the orders received from abroad with the equipment already existing in companies, and the requested products did not represent innovations on the market, so the national research and development sector did not have to gain from this action.

The only medium-term benefit was the contribution of know-how with which foreign investors came, which generated the development of the local entrepreneurial spirit and further the initiation of new businesses. Because the models did not aim at innovation, few Romanian companies founded after the fall of communism or the state ones that were taken over by Romanian investors sought to create innovative products, with a very high added value, that are sustainable in the long run and that to lay the foundations of their own brand. Unfortunately, with Romania's accession to the EU in 2007, common measures were implemented at European level, such as guaranteeing a minimum wage. This aspect meant an increase in labor costs and a decrease in the attractiveness of Romanian workers for foreign investors who relocated to countries that offered lower hourly wage rates, such as Moldavia or Asian countries (Dima, 2018).

Conclusion

Entrepreneurship illustrates the benefits of freedom and undermines the centralized planning system of a former communist country. Entrepreneurs can be perceived as economic agents that put innovation in a corporate context. Market competition is gained by innovative economic agents and innovative companies that offer new and significant products to consumers. Entrepreneurs stimulate existing companies to improve their products and innovate, ensuring their profile and increasing the level of satisfaction, and thus the standard of living of consumers.

In the early 1990s, in Romania, with the fall of communism, the privatization process of state-owned companies was initiated. The main foreign entrepreneurs who came to invest in Romania mainly followed the benefits offered by a country in transition to capitalism. The small entrepreneurs in the years after the revolution were traders who seized the opportunity of a less regulated, little or no taxed market and began trade with Turkey or other neighboring countries. By taking advantage of state-owned enterprises or common resources, the entrepreneurship and innovation system has not even grown organically in Romania.

However, Romania is currently the country with the highest percentage in terms of entrepreneurial intentions in the European Union, 27% of Romanians say they want to start their own business. The percentage is more than double compared to the average registered in the European Union. The trends on the Romanian market largely coincide with those on the global market. Although there is uncertainty in the economic environment, entrepreneurial initiatives are open to innovation and global markets, using the advantages of technology.

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Natural Resources Management Policies Applicable in Romania

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Abstract

Contemplation of the world's disappearing supplies of minerals, forests, and other exhaustible assets has led to demands for regulation of their exploitation. The feeling that these products are now too cheap for the good of future generations, that they are being selfishly exploited at too rapid a rate, and that in consequence of their excessive cheapness they are being produced and consumed wastefully has given rise to the conservation movement. As such, natural resources are an important part of sustainability considerations of any country, thus being essential for a sustainable future, as well. Using these resources is fundamental to human well-being, because they are essential, practically, for all sectors of the economy, underpinning the environment people have built and provides them with the desired services. For these reasons, and for the sustainable management of natural resources, appropriate policies are needed to enable their economic and efficient use. Therefore, this paper identifies and presents European natural resource management policies (for crude oil, natural gas, coal and mineral ores) applicable in Romania.

Keywords: Crude Oil, Natural Gas, Coal, Non-Ferrous Ores, Environmental Protection

Introduction

The foundations for the sustainable management of mineral resources have been laid through a review of the concepts of sustainable development, their links with mineral resources, natural resources mineral national policies and management programs. The likelihood of improved choices among possible development options is increased when these decisions are based on knowledge and science. Scientific and technical experience can be applied to the monitoring of socio-economic and biophysical processes and, in this regard, to provide information and data for each stage of the political cycle, including for sustainability policies.

Economic, environmental and social issues need to be integrated into decision-making and the long-term effects on resources and capital must be taken into account, as well as the capacity to create future benefits. The decision itself must be comprehensive, participatory and also interdisciplinary.

Natural resources are an important part of any country's sustainability considerations. Discussions on the role of natural resources in sustainability tend to focus on the need to support ecosystems and maintain biodiversity. The fundamental purpose is to support the ecosystem.

Mineral resources are also essential for a sustainable future. The use of these resources is fundamental for human well-being, because they are essential, practically, for all sectors of the economy, they are at the basis of the environment built by people and provide the desired services [1]. However, these resources also have intrinsic characteristics that make them not only useful, but also

problematic. Sustainable development has emerged as a framework in which an appropriate combination of consumption and conservation can be sought.

It is counter-productive to talk about mineral resources as being sustainable as well as ecosystems, given that individual deposits have finite size and volume. However, there are several ways of approaching how minerals are related to sustainable development. One perspective focuses on the development of minerals as a source of creating the wellbeing of local communities and, by extension, as a tool for poverty eradication. This is an example of weak sustainability (Neagu *et al.,* 2018) because of natural capital's inevitable transformations resulting from the extraction and use of mineral resources [2]. The transition from the natural capital (mineral) to the human capital, and further, to human and social capital, can be described as the transition from the primary means at the final goods, i.e. the well-being [3].

Therefore, for the sustainable management of natural resources, adequate policies are needed to allow their economic and efficient use (Seymour, 1998). Thus, in the following paragraphs, various European natural resource management policies (for crude oil, natural gas, coal and mineral ores) applicable in Romania [4] will be identified and presented.

Management policies for hydrocarbon resources from Romania

Due to its geological and geographical peculiarities, Romania can be considered as a case study, with universal significance (Constantinescu and Anastasiu, 2019), because is one of the few small and medium countries in the world that has a diversity and complexity of geological resources similar to those of large countries such as the USA, Russia and China.

Romania is recognized in the specialty literature as the first country in the world with officially registered crude oil production (275 tonnes extracted in 1857) and the first refinery in the world, built by Marin and Teodor Mehedinteanu brothers, in 1857, in Rafov, near Ploiesti (The Science of Petroleum, 1938). If in 1900, 0.250 million tons were extracted (3rd place in the world after Russia and USA), then 1.1 million tons in 1920 (4th place in the world), in 1937 the maximum interwar production was 7.147 million tonnes, in order to reach a maximum production of 14.65 million tonnes in 1976 (20th place in the world); after this year, however, the decline in oil production began to become visible, a trend recorded even today. This decrease is the effect, mainly, of the natural decline of reserves, but also the reduced efforts of exploration and investment.

The oil extraction industry represents a strategic sector in the Romanian economy, as well as a pillar in the development of the other industrial sectors of the country.

Despite the decline, Romania remains the fourth largest oil producer in the EU (including the United Kingdom before Brexit) and the fifth largest oil producer in Europe (including Norway). Domestic production accounts for 5.5% of the EU production and 2.5% of the European production [5].

In turn, ***the gas extraction industry*** is a strategic sector both in itself and as a major contributor to the development of other sectors. Romania has a century of experience in natural gas production. In 2018, a quantity of 9.5 billion cubic meters (bcm) of natural gas [6] was extracted and an amount of 1.4 bcm was imported to cover the domestic consumption (SNGN Romgaz, 2017, 2018, 2019).

Apart from the economic role, domestic natural gas production also plays a geopolitical role, given that Romania has traditionally been much less dependent on imports than its neighbours. Given the economic slowdown in recent years, which has also attenuated domestic demand for natural gas, Romania has recorded several months in the last few years, when it has been able to fully cover the demand for gas from domestic production. Natural gas accounts for about one third of the domestic primary energy mix (Government of Romania, 2018).

Even though domestic natural gas production is declining, Romania is still the largest producer of natural gas in Central and Eastern Europe [9].

As such, in the next paragraphs, we shall present examples of policies that can be adopted in Romania in the field of hydrocarbon resources management.

✓ ***Policies to redevelop geological research activity in order to discover new reserves.***

There are major concerns both at European and global level in the redevelopment of the geological research activity in order to discover and develop new economically efficient reserves. Romania, in the conditions of the drastic decrease of this activity in the last 30 years, needs more and more the resumption and intensification of the geological research activity, by making 2D and 3D seismic profiles and making geological drilling, to attenuate the natural decline of the deposits in operation.

Harnessing the potential *of the existing oilfield portfolio* aims to maximize the recovery rates, in terms of economic performance, on one hand, and to rationalize this portfolio, on the other hand.

Thus, in order to discover new oil reserves, leading to the assurance of an annual reserve consumption coefficient of max. 4% and a reserve replacement ratio of 60-100%, are estimated total costs of about 300 million euros by 2021. Finally, in order to discover new natural gas reserves, are estimated total costs of about 500 million euros by 2025 (SNGN Romgaz, 2014).

✓ ***Policies to discover new oil and gas structures, both onshore and offshore.***

European countries with significant oil and gas reserves (Norway, the United Kingdom, the Netherlands, Denmark or Ukraine) are making great financial efforts to discover new deposits to replace the current reserve base, which is in a natural process of depletion (such as the case of the huge deposits in the North Sea, Ekofisk fields in Norway, and Groningen in the Netherlands). Romania, where the level of reserve replacement will not exceed 15-20% for oil and condensate, and respectively 15-30% for natural gas, must intensify, in turn, jointly efforts for discovering and geological survey with foreign companies of new gas structures, and to attract investments for pilot projects with foreign high profile companies for increasing the reserves in oil and gas fields (for research and rehabilitation purposes).

Therefore, three options may be identified in this respect: the discovery of new onshore oil and gas reserves, the development of extraction by hydraulic fracturing, and the exploitation of oil and gas proved reserves from the Black Sea Basin; among them, the exploitation of the Black Sea Basin reserves shows the greatest potential to reposition Romania in the regional energy hierarchy.

Hence, in order to increase the oil and gas safe reserves, in the short and medium term, Romania must assume as a priority investments in technologies that will lead to increasing the recovery degree from existing deposits; also, in the long term, investments must be driven in the development projects for the exploration of deep areas (under 3,000 m), of onshore deposits with complicated geology and of offshore deposits in the Black Sea Basin.

✓ ***Policies to increase (or at least stabilize) current levels of onshore oil and gas production.***

All European oil and gas producing-countries are interested in increasing domestic oil and gas production to meet the needs of domestic energy sector and other branches of their economies, and for the efficient and sustainable use of oil and gas internal resources, so these resources to be useful for the following generations. In Romania, where the hydrocarbon production decline is permanent and quite significant (a decline of 5% for oil and a decline of 1.5% for gas), the most feasible goal is to stabilize oil and gas production at levels as nearest to the current ones, including increasing the final recovery factor for oil and associated gas, or by drilling operations and commissioning of new wells.

Thus, in order to stabilize the oil production around 3.6-3.7 million tonnes annually, are estimated total costs of about 1 billion euros per year by 2021 (OMV Petrom, 2017).

Although natural gas is the most "green" fossil fuel, its production growth is closely linked to availability, competitiveness and the ability to compete in traditional sectors and expand into new

ones. Thus, in order to stabilize gas production around 9-9.5 billion cubic meters annually, are estimated total costs of about 500 million euros by 2025 (SNGN Romgaz, 2014) .

- ✓ ***Policies for the exploration, development and production of oil and gas offshore fields on the continental shelf of the Black Sea.***

The Romanian offshore area covers 22,000 square kilometres and reaches depths of over 1,000 m (ANRM, 2017, 2018, 2019). The entire area is divided into perimeters of different dimensions, some of them being granted by the holders for exploration, development and exploitation activities. The application of exploitation policies for the oil and gas proven reserves in the Black Sea Basin, such as those applied in the North Sea by countries such as Norway, the United Kingdom, the Netherlands, Denmark or Germany (the latter to a lesser extent), gives Romania the potential to become one of the most important natural gas producing areas in EU.

Moreover, these additional natural gas resources, becoming commercially viable, would help ensure Romania's sustainable energy supply, achieve long-term decarbonisation targets, as well as the development of the national infrastructure, or of other high value-added industries, such as chemistry and petro-chemistry.

Thus, the cumulative value of investments in offshore gas exploration, development and production was estimated at $ 22.2 billion [10]. Moreover, this economic growth will generate revenues to the state budget of about $ 26 billion, of which over $ 5.5 billion in royalties.

- ✓ ***Policies to develop the underground natural gas storage capacity.***

Development of natural gas storage capacities (similar to that of Germany or the Netherlands) for covering the peaks of consumption during the cold season, for increasing the security degree of gas supply of the consumers in crisis situations, as well as for increasing the energy security degree of the country is one of the important points of the energy strategy in Romania in the medium term (Government of Romania, 2018).

All these measures and actions aim to increase the safety coefficient in gas delivery, to values as close as those practiced by the countries of the European community, in order to avoid major disruptions in the national transport system and, respectively, in the gas supply of the consumers in crisis situations, at almost constant flows and prices throughout the year [11].

These actions also involve a significant volume of investments, with total estimated costs of about 500 million euros by 2021 (SNGN Romgaz, 2014).

- ✓ ***Policies for investing in infrastructure related to alternative transit and interconnection projects for the diversification of oil and gas sources.***

Romania's gas imports come entirely from the Russian Federation, which is an element of strategic vulnerability. From this perspective, it is extremely important to integrate the Romanian natural gas market into the European market. Security of gas supply is at the heart of any energy policy, as any disruption of gas supplies has important consequences for the economies of EU Member States.

In the context of geo-politics and geo-strategy of European energy routes, Romania benefits from the advantages of geographical location on important transport corridors and access to potential major natural gas resources recently discovered in the Black Sea, which leads to the need to efficiently exploit these opportunities.

As such, for the implementation of these policies, the total investment effort depending on the deadlines is estimated at 1.62 billion euros by 2026 (SNTGN Transgaz, 2018).

In the context of the materialization of the BRUA [12] project, starting with 2020, Romania will have the necessary conditions for profiling as a regional *natural gas hub*. It is essential to realize the interconnection projects and the modernization of the natural gas national transport system (SNTGN), in order to have an efficient internal market for natural gas. Regarding the price of natural gas from

Romania on the regional market, it will be established on a trading platform within the *regional hub* (probably CEGH [13] in Austria).

- ✓ ***Policies for ecological reconstruction in order to comply with European environmental norms.***

In the evolution of hydrocarbon extraction sector, Romania will follow the best practices for environmental protection, while respecting the national targets assumed as an EU Member State. Climate and environmental policies, focused on reducing greenhouse gas emissions (GHG) and changing social attitudes in favour of "clean energy", are another determining factor that shapes investment behaviour and consumption patterns in this sector.

Thus, for the purpose of ecological reconstruction in the extraction of crude oil in order to comply with the norms provided by the environmental legislation for this field of activity, total costs of about 500 million euros per year are estimated by 2021 (OMV Petrom, 2017). Finally, for the purpose of ecological reconstruction in the extraction of natural gas in order to comply with the norms provided by the environmental legislation for this field of activity, total costs of about 150 million euros per year are estimated until 2025.

- ✓ ***Policies for the development of a regional oil and gas hub, from the perspective of new discoveries included.***

The insularity of the Romanian gas market is no longer justified, as long as all EU Member States have obligations to implement and monitor in order to achieve the objectives set out in EU legislation (regulations and directives).

In the horizon of 2025-2035, with the prospect of discovering new indigenous sources of oil and gas, and new regional sources of imports, as well as an increased interconnection with adjacent markets, ***Romania can become a regional hub*** (like the Netherlands, whose positioning is known as a "roundabout" of North-western Europe, i.e. a hub for gas infrastructure that provides transportation, transit and storage for the North-western region of the European gases). This would stimulate industrial competitiveness through optimal energy prices, generate economic growth and job opportunities. Romania's interest and sustainable development must be promoted concurrently with the creation of an attractive business environment, in which the Government, regulatory agencies and legislators must be competent and steady partners of the investors.

Management policies for coal resources from Romania

The Romanian political regime prior to 1990 was characterized by the promotion of a self-sustaining economic development strategy in the provision of coal resources, through an explicitly mentioned policy of ensuring energy security, which led to the exploitation of technically and economically unfeasible deposits, regardless of costs and consequences on the environment, thus resulting in a sector of coal mining artificially developed, with numerically oversized workforce. Access to new technologies and know-how has been reduced in the sense that coal mining has become increasingly inefficient.

After mining worker strikes in the early 1990s, in the context of industrial decline and declining energy consumption, successive Governments artificially maintained coal production by providing *significant subsidies* in coal mining to maintain production and save jobs.

The role of coal as a fuel resource in the Romanian economy has been in a continuous decline over the last two decades. The significant restructuring and reforms that have taken place and will continue in the coal sector are aimed at improving the operational efficiency of the entities in the sector, promoting private investments, together with judiciously solving the social and ecological problems of the sector.

However, the future of coal in Europe, and therefore also in Romania, depends on the success of the EU 20/20/20 Program, as well as on its rivalry with natural gas, within the energy mix (Coria and Sterner, 2011).

The extraction of mineral resources is under the strong influence of the environment, technological changes and capital investments necessary both to maintain current production capacities, and to open new mines. Given Romania's coal and lignite reserves, long-term mining experience and tradition, energy consumption will be ensured through a mix of fuels in which coal will continue to represent 34-38% (Government of Romania, 2016, 2018).

As such, in the next paragraphs, we shall present examples of policies that can be adopted in Romania in the field of coal resources management.

- ✓ ***Policies to maintain subsidies in coal mining.***

The subsidy was applied in most countries (including Romania) in order to maintain the level of production (for example, in Ukraine: cross-subsidization of state-owned mines, which produce losses, by profitable mines), to reduce the economic and social pressure, with deadlines set by EU regulations. It involves considerable financial efforts, slowing down the processes of technical innovation and economic development.

We believe that the EU should not impose time and value limits on Member States in granting state aid to the coal industry. If the State falls within the framework of climate and energy policies in the period 2020–2030, in particular with regard to the reduction of greenhouse gas emissions, it must be allowed to support its mining industry.

Such an approach can lead to the continued exploitation of coal, even on a smaller scale, so that the energy security of each EU Member State can be achieved at any time.

The European Commission should authorize Member States to grant state aid in the area of coal mining (and not for closure programs), based on a strategy put forward by each state concerned to establish a clear and stable framework to enable industry to invest in modern and clean coal mining and combustion technologies.

- ✓ ***Policies to allow transfer of lignite-based energy production capacity to a security reserve*** (applied in Germany) ***to ensure supply-demand balance***.

We consider that, based on the strategy of national energy security and efficiency, it will be necessary to maintain a balanced energy mix that will ensure Romania the capacity to absorb some shocks in the supply and limit the dependence on external energy resources, in the perspective of 2035.

In the long run, maintaining the role of lignite as a primary energy carrier will be conditioned by the endowment of new capacities with CO_2 capture, transport and storage technologies.

Considering the pit-coal and lignite reserves Romania has, the long-term experience and tradition of mining, energy consumption will be ensured by a mix of fuels in which coal will represent 34-38%.

Due to the role of domestic coal resources in meeting the country's energy requirements, the policies to be applied in the mining sector will have to ensure the competitiveness and successful operation of economic units in the market economy.

- ✓ ***Policies to application of restructuring and governmental agreements*** (applicable in Germany) ***in order to achieve economic development and diversification in the mining areas.***

The zoning of coal reserves by economic criteria, the restructuring of the coal extraction activity, and its placement on a commercial basis determines the restriction, sometimes until the total cessation of the productive activity, to mines with costs that exceed the current average in the sector and without chances of rehabilitation. The result of such actions materializes in the redundancy of the labour force, with a direct consequence of the decrease of incomes of the population from mining regions, with restrictive consequences on local economy and the decrease of incomes for local budgets.

Although the restructuring programs and agreements with governmental actors agreed that they should be accompanied by measures necessary for job creation, they did not materialize, so that in the mining

areas a level of unemployment well above the national average was reached, respectively a standard of living located at the threshold of poverty or subsistence.

- ✓ ***Policies to favouring "energy transit" to renewable energy and to honouring commitments assumed by decarbonisation climate agreement in Paris and strict EU climate policy.***

Most countries with plans to phase out coal need to make additional efforts added to the least costly current measures to implement the mines closure programs. However, countries that rely heavily on coal need additional measures at regional and national levels to achieve the sharp decline in coal production needed over the next decades.

In the context of the sustainable use of coal resources, the achievement of profitability of mining units must be accompanied by a high degree of job security, modernity and innovative production processes, and a low level of negative impact on the environment.

The implementation of these policies is supported by the presence of an opportunity starting with the phase of exploitation of coal deposits, namely the possibility of implementing modern technologies for the capture of coal methane and the emissions of methane from the deposits in operation, and the degassing of coal.

In the future, EU legislation provides for the reduction of certificates available for CO_2 emissions and offers two new funds to support innovation and the transition to reducing carbon emissions, a step forward in regulating commitments under the Paris Agreement. The new law will speed up the withdrawal of emissions certificates on the "carbon market" from the EU Emissions Trading Scheme (ETS), which covers about 40% of EU greenhouse gas emissions.

- ✓ ***Policies to increase stakeholder involvement.***

Stakeholders, namely administrations, politicians, large companies, research institutions, civil society and citizens can be increasingly involved by establishing regional economic, social and restructuring Councils made up of representatives of the main stakeholders (as applied in Germany and Czech Republic).

The social partners were permanently connected to the realities and problems that mining sector faced or is facing, so that, depending on their nature, they were analysed by Government representatives and materialized in several protocols.

- ✓ ***Policies to attract local and foreign investment in exploration, extraction and processing worldwide by creating a favourable investment climate for mine privatization***.

The result of applying these policies (similar to Bulgaria, Ukraine, Serbia) is the realization of environmental commitment and standards, as well as the compliance of extraction and combustion operations with the provisions of the EU acquis.

- ✓ ***Policy for privatising and listing on the Stock Exchange*** (similar to Poland and Czech Republic) ***of the largest producers of coal in order to allow profitability of extraction activity.***

The Romanian government has such a coal mine under construction with a Chinese investor, but has not yet made significant progress on the project.

- ✓ ***Creating a clean coal technology centre, co-financed with EU funds*** (as in Poland)**.**

The aim is to improve the combustion and gasification of coal and create the conditions for reducing carbon emissions.

- ✓ ***Applying a unitary policy at national level to provide a perspective on strategic geological reserves,*** by creating the centralized institutional potential for the development of strategies on mineral resources.

Management Policies for Mineral Resources from Romania

Romania has a great diversity of non-ferrous ore deposits, but with a reduced content of useful substance, with specific mineralogical features and cantoned at a relatively high depth, which implies technological extraction and preparation difficulties.

Polymetallic ores deposits, in terms of quality, have reservoirs which are characterized by low content of useful substances (1.94% Zinc, 1.01% Lead), and from the economic point of view, lies at the lower point of their exploitability compared to those in other countries. Moreover, some deposits also have difficult exploitation conditions which, together with the low useful content, determine the inefficiency of the exploitation activity. Due to this, the exploitation of these resources has been stopped (Government of Romania, 2016).

Speaking of ***gold reserves,*** Romania has resources amounting to 760 million tons of ore, existing since the period when these deposits were exploited through a processing infrastructure based on cyanidation process (Government of Romania, 2016). Unfortunately, because of the economic difficulties in ore mining, the two autonomous companies that subordinated the mining units stopped the gold ores exploitation. The environmental catastrophe that took place at the tailings pond in Baia Mare, resulted in pollution with cyanide of river Tisa and showed the deficiencies of mining waste disposal system. This highlighted the danger of processing gold ores with cyanide.

As such, in the next paragraphs, we shall present examples of policies that can be adopted in Romania in the field of mineral resources management.

- ✓ ***Policies for revising the legislative framework in the field.***

For this purpose, it is necessary to establish a coherent legislation and an adequate information framework in accordance with the requirements of the European Union in the field of ore exploitation.

- ✓ ***Policies for reviewing the institutional framework in the field.***

For that it is necessary to establish a new framework institutional referring to: the creation of a National Authority (perhaps within the current National Agency for Mineral Resources - ANRM) ; setting up of the National Geological Service that, independently, to ensure updating, management and public use of the national geological data fund, to elaborate the geological atlas of Romania, etc.; the creation of the Geological Survey Department, which will have to recover and store the entire mining database lost after 1989.

- ✓ ***Policies to attract investments in the non-ferrous ore mining industry in Romania.***

The creation of a stable legislative system, adapted to the European legislation, will increase the interest of the investors for the Romanian mining industry. This interest is intended both in the concession of mining perimeters for the beginning of production operations, and in the endowment with modern mining technologies. Application of new and modern technologies will significantly influence the work safety improvement, while, due to the implementation of environmental solutions, emissions of harmful substances to the environment will decrease considerably.

The regulation of small-scale and artisanal mining operations, on the other hand, will encourage investments in the exploitation of non-ferrous ores, especially of gold and silver. Anyhow, there is a model applied in the interwar period, when the National Bank was implicated in precious metal extraction, by purchasing gold from gold-seekers to whom financial incentives were granted, and encouraging them to capitalize on the gold they extracted. We appreciate that this initiative, redesigned and supported by modern legislation, can develop.

- ✓ ***Policies to develop education and research in the field.***

Higher education in mining still exists. Therefore, in order to have well-trained staff, the cooperation between mining sector and universities needs to be improved. Emphasis will also be placed on the development of vocational education, improving cooperation with secondary and occupational education.

✓ ***Policies to reduce the impact of mining industry on the environment.***

Technological processes meant for the extraction of non-ferrous ores have a strong negative impact on the environment, both because of the extraction itself, and the substances used in production processes. It is well known that gold is extracted by cyanidation, a process that produced, not only once, devastating environmental accidents. Therefore, rigorous monitoring of all environmental factors must be carried out during mine closure operations.

In this respect, the entire legislation in the field, applied at EU level, has also been adopted by Romania. Such measures are capable of guaranteeing, at present and in the future, basic principles of ethics, responsibility and transparency, such as to provide the citizen with the necessary peace and security, to discourage illegal, immoral or dangerous practices in the extractive industry and to promote the safe, efficient and profitable exploitation of Romania's natural resources.

Conclusions

Romania is an exporter of electricity and petroleum products (Government of Romania, 2018), but at the same time imports approx. 69% of crude oil consumption, 10.6% of natural gas consumption, small amounts of coal (about 3%) and uranium ore. Given the exports of petroleum products, the degree of dependence on crude oil imports to cover domestic consumption is about 50%. In 2017, the import of primary energy resources represented 37.8% of the total primary energy resources.

In the medium term, Romania will continue to be the main producer in the region among the countries that already have a national production of this kind, with 46% of the region's production followed closely by Italy with 41%.

Indigenous EU production will continue to decline significantly over the next 20 years. This decrease could be easily mitigated by the development of oil and gas production fields in the Romanian offshore sector of the Black Sea and in Cyprus. The total production could fall by more than 60% by 2040 or even more, if finally the non-FDI developments are not put into operation.

In such a market environment, Romania has, through the opportunities offered and its geographical position, the possibility to become ***a regional balancing/trading hub*** that would significantly contribute both to ensuring/streamlining cross-border trade in natural gas, and energy security of Europe.

Moreover, EU policies for the use and promotion of the use to the greatest extent possible of alternative fuels will mitigate the impact of the dependence on imports of crude oil and petroleum products market in Romania. This process will be possible to the extent that the development of infrastructure related to the production and use of alternative fuels will be carried out in direct relation to their competitiveness in the fuel market.

Globally, ***coal*** has been and remains one of the main energy resources, a cheap, expanding base for economic and social development. Accounted on the vast and well-distributed resource base, coal will make a significant contribution to eradicating energy poverty.

At the same time, the environmental problems generated by the exploitation of coal resources can find their solution in the improvement of new clean technologies.

In Romania, ***the energy produced based on pit-coal or lignite***, with all the inconveniences presented, gives security to the national energy system; therefore, coal will continue to be a major energy pawn, with major importance in ensuring energy security, even if is desired that its share in the energy mix be diminished.

At the foundation of the national energy efficiency and security strategy, it will be necessary to maintain a balanced energy mix that will ensure Romania the absorption capacity of some shocks in supply, on

one hand, and limit the dependence on external energy resources, in the perspective of 2035 and beyond, on the other hand.

To cope with globalization and climate change, ***the EU's energy policy and integrated mining policy*** are vital strategic elements. Behaviour change, energy efficiency and renewable energy sources have led to the modernization of technologies and research and development (R&D) activities. It is known that technological equipment incorporates large quantities of metals, of which a significant proportion is represented by rare and precious metals, which can be find in small quantities in Europe.

The security of supply of European industries can be improved by substantial investments in the mining sector of the new Member States with geological potential, by using and improving already existing EU support mechanisms. Major mineral resources are available in the countries of Eastern Europe, where the geological structure has always allowed mining activities. However, in the new EU countries this sector has been underfunded by the State, so the current situation does not reflect the real potential of the non-energy mining industry. From this perspective, it is essential to invest also private capital in these enterprises, in order to provide the financial resources that have so far been provided mostly by the State.

At this point, ***the mining industry*** has greatly restricted its activity and is waiting for important decisions to be made. Many mines and quarries that had as their activity the extraction of non-ferrous metals, are in conservation but can be reopened using other technologies and complying with the legislation in force. Therefore, the decision-making bodies must align with the European policies in the field, to finalize the harmonization of the European legislation with the Romanian one.

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[4] Romania is a republic in Southeast Europe, bordering the Black Sea, Bulgaria, Ukraine, Serbia, and Moldova. With 19.41 million inhabitants (2019 Eurostat estimates), it is the sixth most populous member state of the European Union. Its capital and largest city, Bucharest, is the fifth largest city in the EU. It has been a member of NATO since 2004, and part of the European Union since 2007.

[5] Eurostat, Supply, transformation and consumption of oil - annual data.

[6] Of which, 5,333 bcm were extracted by SNGN Romgaz [7]. Along with OMV Petrom [8], SNGN Romgaz is one of the largest natural gas suppliers in Romania (Source: SNGN Romgaz, Annual Reports 2017, 2018, 2019).

[7] S.N.G.N. Romgaz S.A. (or simply Romgaz) is the largest natural gas producer in Romania and one of the largest in Eastern Europe. The company is responsible for producing around 40% of the total natural gas consumption in Romania. Its majority stockholder is the Government of Romania, which owns 70.01%. Fondul Proprietatea (Fund “the Property”) owns 14.99%, while the remaining 15% is owned by various shareholders.

[8] OMV Petrom S.A. is a Romanian integrated oil company, the largest corporation in Romania and the largest oil and gas producer in Southeast Europe. It is a subsidiary of OMV Austria. In late 2004,

Petrom was privatized by the Romanian state and sold to the Austrian oil company OMV. As of 2005, it was the largest privatization deal in Romania's history.

[9] Eurostat, Supply, transformation and consumption of gas - annual data.

[10] According to the Deloitte study: *The contribution of Black Sea hydrocarbon exploration and production projects to the development of the Romanian economy*, May 2018.

[11] At national level, the ratio between the volume of working gas and annual consumption was approx. 27% in 2016, located in the first half of the ranking of values practiced in Europe at 2015 level (United Kingdom 6.4%; Spain: 9.8%; Holland: 40.6%, Poland: 19.9%; Italy: 26.2%; Germany: 29.8%; France: 29.5%; Denmark: 33.6%; Hungary: 69.6%) (Source: SNGN ROMGAZ SA, Directors' Report 2016).

[12] BRUA is the acronym for Bulgaria-Romania-Hungary-Austria gas pipeline. The project falls within the Bulgaria-Romania-Hungary-Austria (BRUA) natural gas transmission corridor. The BRUA natural gas corridor is a 1,318 km pipeline project being developed to ensure the integration of European gas markets and increase the routes and sources of supply. Main objectives of the project include diversification of natural gas supply sources in European markets and transmission of natural gas volumes from the Caspian region to Central European markets.

[13] CEGH is the acronym for Central European Gas Hub (formerly Gas Hub Baumgarten), founded in 2005 as a subsidiary of OMV Gas & Power GmbH. Baumgarten hub is the Baumgarten interconnection point in Lower Austria (one of the largest gas hubs in Europe), which mainly receives gases imported from Russia, but also receives gas transported from Norway and other countries. These deliveries are redirected to consumers in Austria and Europe through a series of pipeline systems operating in various directions. The Baumgarten Hub consists of gas reception, metering and testing facilities, and a compression station (Source: https://www.gasconnect.at/en/network-information/at-a-glance/baumgarten-hub/).

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Various Forms of Basic Income as a Remedy in Times of Crisis

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Abstract

Basic income is a social policy tool that raises as many positive as negative emotions. It is a controversial instrument but still discussed. This idea is raised especially in times of danger, when the social, health, or economic crisis may deprive citizens of their livelihood and wellbeing. The following article provides the definition and assumptions for basic income. Various modifications of guaranteed income occurring in the literature are indicated. The ideas of negative income tax, fixed grant, and then universal basic pension were presented. Differences in particular models were indicated and their advantages and disadvantages were discussed.

Keywords: Guaranteed income, Crisis management, Unemployment

Introduction

Equalizing of social and economic inequalities is still a current and important topic in a scientific debate. The environment around us is constantly changing (Kulhanek and Sulich, 2018). The challenges that society must meet also are changing. Nowadays, two very important aspects give socio-economic inequalities a new context.

The first is an aspect that was hard to predict and whose consequences will be felt by every citizen - the first pandemic on such a large scale. It has exposed the failure of health care in crises in many countries, and its economic effects will be felt for a long time. It was during the pandemic, when many people were deprived of the opportunity to perform their work due to sanitary and epidemiological safety, in the public discussion various options for additional social transfers that would allow reducing significantly income inequalities of people and even all employees of enterprises from industries particularly affected by the crisis.

This situation has shown that the unpredictability of the environment can even leave the day-to-day well-paid and well-educated citizens without financial resources. Even if their existence was not threatened, their subjective quality of life significantly decreased, which is largely based on the material situation (Christoph, 2010).

The second aspect affecting the equalization of socio-economic inequalities are issues related to the environment and the use of natural resources. It is believed that satisfying basic human needs while respecting life support systems on earth, is the essence of sustainable development, which in turn is also an idea describing the relationship between nature and society (Kates et al., 2001)

The concept of sustainable development, of course, does not only concern the environmental aspect but also provides for civilization changes in the ecological, social, and economic aspects (Pawłowski, 2009; Sulich et al., 2020). In the era of an increasingly conscious society, the goal should be to equalize socio-economic inequalities while respecting the environment, natural resources, and technology that supports the ecology.

In the current reality, taking into account the progressing globalization, and at the same time with the emerging serious crises that all countries of the world have to face, the question is more and more often asked about what characteristics should be implemented by individual countries social policy, on what values should resist and what tools she should use. The thesis on the ideal features is made by the

authors of one article, indicating that new instruments of social policy should meet the following assumptions (Leff et al., 2019):

- they should be more cost-effective,
- they should be paid to individuals, not for example households or the head of the family,
- the administrative procedure should be simple and as cheap as possible,
- they should be transparent and secure,
- they should mobilize benefit applicants for risk-taking and planning
- they should not discourage anyone from working,
- they should maximize personal freedom and enable decisions that do not violate social norms.

Universality and equality with individuals, simplification of the procedure by limiting the procedure necessary to examine administrative decisions in each case, social security that maximizes personal freedom and motivation to take up work without the risk of losing benefits are advantages attributed to basic income.

The use of the term 'basic' in the name is intended to underline its safe nature. A basic income is one that citizen can regularly count on, it is a foundation that ensures a secure existence, but at the same time it should be emphasized that its size is not dependent on the size of basic existential needs - the benefit can be both smaller and larger than the minimum required amount to survive. (Parijs, 2000). However, it can be a particularly difficult benefit, crises would allow citizens to survive and then motivate them to take up further professional activities. During a pandemic, both employers and employees, regardless of the possibility of running their business, would also receive funding then.

Besides, there is a positive relationship between basic income and the environmental effect achieved. It is believed that basic income would give individuals a chance to experiment and live outside the productivism and growth-based paradigm, would allow the transfer of activity to a more autonomous ground, which would probably be less harmful to the environment, citizens could focus more attention on the ecological and emotional sphere, choose more free time, and thus less use of materials and natural resources (Howard et al., 2019). Other benefits of basic income are considered (Fitzpatrick, 1999):

- elimination of fear of an uncertain tomorrow - in the context of losing or quitting job
- increasing interest in one's own business and at the same time decreasing the role of paid employment
- simplification of the redistribution system,
- reduction of administrative costs
- recognition of social rights as human rights
- strengthening the employee's negotiating position (financial security possessed)

The article aims to analyze the features of the social policy instrument which is the basic income and to review the instruments that are a modification of the common definition of the basic income.

Basic Income - Different Variants

Universal Basic Income

The idea of unconditional income that citizens receive - also known as "territorial dividend" and "state bonus," "demogrant" and "citizen's wage," "universal benefit", or simply "basic income" - is the subject of public discussion not only from decades but also for hundreds of years (Parijs, 2004).

The definitions of guaranteed income include: "an income paid by a political community to all its members on an individual basis, without means test or work requirement" (Parijs, 2004).
In the definition of basic income, D. Raventós emphasizes his unconditional income - it is income that is paid to citizens or residents regardless of whether they want to take up paid work or not, whether they are rich or poor, and have any other sources of income. Benefits individuals, not groups, not families, but individuals (Raventós, 2009). This is a solution that can motivate to take up a job, because taking up a job by a beneficiary does not entail a loss of benefit. In times of crisis it allows to survive.

Narrower definitions require all benefits to be replaced by guaranteed income, and wider ones allow tax credits to be treated as a type of guaranteed income. However, the vast majority of definitions focus on the cash payment of basic income as a citizen's benefit.

The authors do not prejudge the amount that guaranteed income would amount to, although they emphasize that it should be sufficient for a modest life and at the same time participation in the cultural, economic, and political life of a given society (Dowding et al., 2003; Sulich, 2016). G. Standing, in turn, indicates that it should be a sum that will cover basic material needs, and at the same time will facilitate the pursuit of other life goals (Standing, 2015).

Scientists point out that if basic income cannot be implemented for political reasons, then other instruments that are its modification may be an alternative way to achieve the same goal (Jaquet et al., 2000; Suplicy, 2000).

Negative Income Tax - NIT

A negative income tax idea may be close to the idea of guaranteed income. This is the concept proposed by Milton Friedman. It consists of deducting from the tax liabilities of each household the amount of guaranteed income that its residents are entitled to. In the case of a positive difference, the household must pay tax. In the case of a negative difference, a household - negative tax is paid.

Friedman indicates that NIT should be below the subsistence minimum amount to activate and encourage citizens to work. This is the opposite assumption than for basic income. He also emphasizes that the amount of NIT should depend on the capabilities of the society concerned. It does not exclude tax progression for incomes that exceed the threshold (Friedman, 1962).

The advantage of such a solution may be greater efficiency in terms of costs compared to guaranteed income, as there is no need to pay guaranteed income to those citizens who earn high incomes and then take them away from them in collected taxes.

NIT also has several disadvantages - to operate efficiently, it would have to be supplemented with an advance payment system so that citizens can use it not only after settling the tax year, but on an ongoing basis, income is guaranteed by a solution supporting units, not households as a whole thus, it supports households with lower incomes, usually less well-off women, and does not transfer the part of their tax credit due to higher-earning households.

Also, UBI, unlike NIT, supports people who want to take up a job, does not deter them from administrative procedures and loss of benefits for a time that coincides with the time they are already working, but when they have not yet received their remuneration for work (Parijs, 2000).

D. Tondani, in turn, indicates that there are fundamentally economic and ethical differences between the basic income and the negative income tax that is its modification. NIT is financed by high and middle-income taxes for the benefit of the poor. In the case of guaranteed income, the wealth tax is redistributed to those on a middle and low income. He also believes that low-income labor supply is being more intensively reduced by NIT than by UBI (Tondani, 2009). During a crisis - also pandemic - it can be one of the tax solutions giving economic impulses and protecting citizens against losing their livelihood.

Stakeholder Society

Another alternative is the idea of a "fixed-height grant" or "participation". Bruce Ackerman and Anne Alstott are considered originators of this idea (Ackerman and Alstott, 1999). It is a proposal assuming a universal and cumulated (in four quarterly installments) payment for a person reaching the age of majority, which he can spend for any purpose.

A well-known proposal that implements this idea is to donate 80,000 dollars to persons 21 years of age. The funds can be used for any purpose - purchase of an apartment, opening an enterprise, or consumption. Funds for this program would come from a 2% wealth tax, which could then be replaced by an amount tax of the amount previously transferred. Such a payment is treated as a cumulative guaranteed income that is paid once in a lifetime in exchange for regular money transfers (Parijs, 2000).

However, this is not an unconditional income. To receive the benefit, a citizen must finish high school and not be punished. The foundation of this idea is the universalization of ownership. Its authors promote the assumption that "everyone should own property." Besides, they want to promote the activity of young people who can translate their energy and creativity into entrepreneurship (Sulich, 2017). In their opinion, this is state support that equalizes the chances of starting into adulthood (Guczalska, 2017). This solution can be a natural economic impulse in uncertain times when citizens' risk appetite is falling. On the other hand, the assumption of stimulating entrepreneurship among young people can be replaced by the conservative accumulation of funds or their allocation to consumption.

Wright points out that stakeholder grants can probably have a real impact on capitalist class structures because they allow a citizen to change the proportion - a larger number of citizens will "be their bosses". Also, it indicates that even though some people will allocate such a grant for consumption, and when opening more enterprises by young people is likely to increase the number of those that turn out to be unsuccessful, it will still affect the class structure, increase entrepreneurship among young people and it will be a chance for many citizens to take responsibility for their future (Wright, 2004).

The disadvantages of such a solution are indicated by C. Pateman - in her opinion, the transferred capital may be lost by the citizen and does not constitute material security. The originators, however, believe that the possibility of losing capital is something natural, every decision made by citizens, especially the one regarding capital, is and should be at risk (Sulich and Zema, 2017). Also, the author believes that core capital can support women in the labor market, but it is basic income, paid out regularly, that gives a chance to change culture-based stereotypes about the role of women and makes employment cease to be the only valued form of work (Dowding et al., 2003).

Universal Basic Pension

B. Ackerman and A. Alstott indicate that in compensating for inequalities it is necessary to introduce an unconditional pension, which would be collateral in a situation in which citizens would not use the opportunity - received capital (Ackerman and Alstott, 1999). Universal Basic Pension is a benefit that all citizens would be entitled to, regardless of whether they had paid pension contributions in their life.

Basic Pension is defined as: "the benefit is either a flat rate (the same amount is paid to every retiree) or it depends only on years of work, but not on past earnings, nor does additional income in retirement change the value of basic pensions " (OECD, 2009). It happens that this benefit is also called civic retirement. This means that, by definition, old-age pensions from citizenship, or possibly from the place

of residence. The entitlement to receive this benefit is obtained after exceeding a certain age and being a citizen or resident of a given country for a long time (Czepulis-Rutkowska, 2014).

The main advantages of the civic pensions system are (Sołtys and Jagodziński, 2011):

- a simple and uniform system for all citizens
- permits administrative savings - does not require the collection of personalized contributions
- implements family policy
- does not discriminate against women
- can motivate citizens to undertake investment activities

In some countries, solutions are being introduced that modify the civic pension. An example would be a concept that has been implemented in Great Britain. The pension paid out there is divided into two parts - Basic State Pension and Additional State Pension. Basic State Pension is paid to anyone who reaches the required retirement age and demonstrates adequate seniority, while Additional State Pension is paid in the amount depending on the income of the person and the number of social security contributions. Basic State Pension is paid regardless of the number of funds accumulated but remains a contributory and not universal benefit. If the contributions paid to social security are insufficient, the citizen is entitled to an incomplete or supplementary pension to his spouse (Johnson and Stears, 1996).

Another modification of the Basic Pension is the "Mama 4+" program introduced in Poland, which is a program addressed to people who gave birth and raised or raised at least four children and did not acquire the right to an old-age pension, or their pension is lower than the lowest old-age pension. This is a non-contributory benefit. Persons aged 60 and over for women and 65 years for men can apply. However, this is not unconditional income because it indicates the requirements that the recipient must meet ("Serwis Rzeczypospolitej Polskiej", 2020).

One thing is certain - most European countries are on the verge of serious demographic problems. Negative population growth and an aging society are the main motivation to look for new solutions for pension systems. To introduce a basic pension, European decision-makers must answer several questions - which social groups and on what terms entitlement to a basic pension could apply, what would be the level of the benefit, how and from what sources the benefit would be financed, including those regarding administration, organization and management issues the program and in the case of Europe - what should the role of the European Union be in introducing such a guaranteed service (Goedemé and Lancker, 2009). Universal Basic Pension is an instrument that secures seniors, and at the same time, allows them to participate in sustainable development - meeting the needs of retirees would not reduce the satisfaction of the needs of future generations. Moreover, it would enable reform of the pension system burdening the state budget.

Conclusion

The idea of guaranteed income is still valid, also due to the possibility of its modification. Everything indicates that the world, and especially its socio-economic order as we know it will be transformed in the near future.

Automation and robotization of work, increasing unemployment, the economic crisis caused by the stoppage of work of many enterprises due to pandemics, climate change, and increasing use of natural resources are just some of the challenges that modern economics has to deal with.

Money transfers that would retain their unconditional character could undoubtedly be an antidote to the uncertain future for most of society. The article presents the idea of unconditional income but also indicates various types of its modification.
Negative Income Tax appears to be the least controversial variant among those presented.

Unfortunately, the amount of differentiation of this benefit does not diminish administrative costs in making decisions, and can even overstate them.

The fixed grant awarded is an idea that could increase entrepreneurship among citizens and have a positive impact on the economy - including the one recovering from the economic crisis.

The last of the presented options is the citizens' pension being considered more and more often by various countries. It would not only be a security benefit for people who had not paid their contributions in their entire life but would also motivate to invest. Its construction, however, would have to be determined depending on the individual capabilities of countries, and in the case of Europe perhaps even the European Union.

All of the forms of guaranteed income presented above have one aspect in common - they are instruments in every option that secures the means necessary to support citizens and can have a positive impact on citizens' entrepreneurship. Thus, they support two aspects at risk in times of crisis - economic security and economic development.

The article does not indicate the sources of funding for any of the programs, but it is believed that the increased administrative efficiency in terms of cost and general social consent to increase taxes, which would be dictated by increasing economic and environmental awareness, may be reflected in reality.

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Marketing, Competitiveness and Promotion of Tourist Attractions

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Abstract

The purpose of this study is to identify, through a Systematic Literature Review (SLR), the marketing strategies used to promote tourist attractions and make them more competitive. Marketing strategies are important elements for the economic development of a tourist destination and to keep it competitive in the market. However, it is important for managers to be cautious when choosing strategies to promote their tourism offerings, as wrong strategies can compromise many factors, including economic ones. The methodology used in this research is the survey of articles using the keywords competitiveness, marketing and tourist attraction that guided the searches in databases of international relevance. In RSL, 649 articles were identified, which after three inclusion and exclusion processes reached the 07 articles that answered the guiding question of the research. The results show that the main marketing strategies used to promote tourist attractions are: organization and participation of regional and international fairs, participation in regional tourism events, conferences and festivals, use of social media, use of slogans in advertising material and websites. promotion, brochures with city slogans, sports and photo competitions, billboards, mass media (film and TV), promotional videos, photo CD provided to visitors, signage in historic centers and city slogans. However, the most used strategy, according to the studies, is digital media, especially social networks, where supply and demand can interact, creating a relationship and strengthening CRM (Customer Relationship Management). The results show that there are many marketing efforts used by managers, both in the public and private sector, to enhance tourist destinations and thereby increase visitor numbers. The use of the literature review methodology, through the RSL technique that makes an exhaustive review of empiric research published in relevant journals, allow a synthesis of the marketing strategies used in the promotion of tourist attractions. Although the study provides useful results it is not possible to generalize, since the number of articles that answered the guiding question was researched.

Keywords: Marketing Strategy; Commercial Competitiveness; Tourist Attraction; Systematic Literature Review

Introduction

The changes that occur in the competitive environment in the tourism sector are very fast (Martínez, Galván & Lafuente, 2014), even though the service is considered a perishable product because it is not stored. In fact, it has to be consumed at the same time as it is sold, making tourist destinations offer higher quality services with added value to their consumers. Therefore, it is important to understand how to adapt to these changes and to use them as a competitive advantage (Boes, Buhalis & Inversini, 2016; Acar, 2018).

The competitiveness of tourism destinations is the ability of a destination to add value through the integrated management of benefits and processes to the economic and social model, and thus preserve the position in the market in relation to the competitors (Crouch & Ritchie, 2000; Hassan, 2000). And in order to become more competitive and attract more tourists, destinations should not focus their efforts solely on public policies, cultural and natural resources, infrastructure and the qualification of the workforce, but also on marketing to prospect potential tourists and innovation that leads to the long-term economic performance of individual firms, cities, regions and nations (Booyens, 2016; Crouch & Ritchie, 2000).

Marketing is a management strategy that uses a variety of tools with the objective of stimulating the consumption needs of products and services on potential clients. In the tourism sector, marketing should act as a facilitator of regional development, promoting the tourism activities of a region (Martínez, Galván & Lafuente, 2014). According to Kotler (2010), tourism marketing is responsible not only for attracting more tourists to the destination, but mainly for developing quality goods and services to meet the needs and desires of these visitors. It goes beyond the promotion of attractions, it is the management of the brand as a whole, it is the definition of the identity of the tourist destination, and its strengthening through strategies that can develop a strong image of the destination (Beni, 2012; Vignati, 2012; Kotler, 2010).

Marketing strategies are important elements for the economic growth of the tourist destination and to keep it competitive in the market, since its development depends mainly on the flow of tourists. However, it is important that managers are cautious when choosing strategies to promote their tourist attractions, since indicators with negative results due to the wrong choice of strategy can bring damage to several factors, not just the economic ones.

The objective of this study is to identify, through a Systematic Review of Literature (RSL), the marketing strategies used to promote the tourist destination to make them more competitive.

Methodology

The present paper was elaborated from the methodology of the Systematic Review of Literature (SRL). A SRL is one of the methodologies used in bibliographic reviews, being a form of research that uses scientific literature studies on a specific topic, enabling the researcher to have a broad view of what is being studied in a given period, or country or year. It is a complete and "indispensable" research to discover studies already carried out on a certain area of knowledge (Saur-Amaral, Ferreira & Conde, 2013; Santos, Firme & Barros 2008; Sampaio & Mancini, 2007).

For this study, three keywords were chosen: Competitiveness, Tourist Attraction and Marketing (Competitiveness, Tourist Attraction and Marketing), which were submitted to the search process in the national and international scientific-scientific journals: Science Direct, Scielo, Social & Behavioral, MEDLINE / PubMed, LILACS, Bireme and ISI Current Contents. However, only two, Science Direct and Scielo, obtained positive results in the searches. During the search, an AND was used, with the purpose of giving more amplitude to the search and restricting the keywords.

For the better reliability of the searches and the results of this study, three exclusion processes were carried out: In the first, papers that did not contain any of the keywords in the title of the work, the chapters of books and bibliographic studies were excluded, and included for analysis that contained at least one of the keywords in the title. The second process was through the reading and analysis of the summaries of the articles, where the methodology and results were analyzed, excluding those that did not respond to the initial questioning; In the third one, the papers were analyzed in a more thorough way: only those that responded to the initial questioning were included.

The papers selected in the third triage were once again analyzed in more depth and the data extracted from variables to compose a table with the results of the study, namely:

- Title: The title in the original and translated language;

- Author / year: Identifies which authors are studying tourism marketing;
- Journal: Which scientific journal publish on tourism marketing;
- Methodology: Which methodology did these authors use to study tourism marketing;
- Location: Which sites have already been studied;
- Sample: Number of subjects searched;
- Subject: Who are these subjects;
- Keyword repetition: Displays the relevance of each keyword within each paper;
- Marketing strategies used: They present which marketing strategies are being used in tourism marketing;
- Conclusion: Where relevant parts of the completed study are scored.

In Figure 1 it is possible to observe all steps performed in RSL to answer the guiding question of the study.

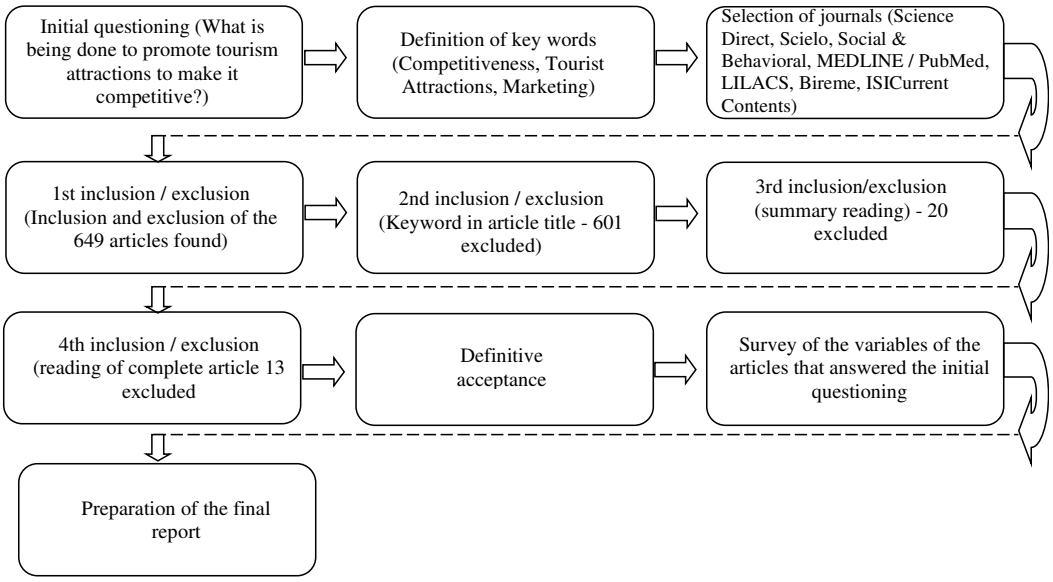

Fig. 1: Research design

Source: Prepared by the authors.

Results

The results are summarized in Tables 1 and 2, where Table 1 presents the related variables, plus the characterization of the papers and Table 2 the variables related to the results.

As can be seen in Table 1, 649 papers were identified with the RSL in the databases Science Direct (645) and Scielo (04), of which 601 were rejected in the first stage, leaving 48 papers for the analysis of the abstracts, that, after this analysis, 20 were rejected and 28 papers were for the reading stage of

the paper, of which 21 were rejected and only 7 were included as they answered the guiding question about what is being done in the promotion of the tourist attractions to make them competitive.

All rejected papers were unrelated to the keywords and / or did not answer the guiding question of the search. From the analysis of the collected material it was possible to verify that the studies related to marketing strategies in the promotion of the tourism are relatively recent, published in their majority of them in the years of 2015 and 2016.

In relation to the keywords, it can be observed that there are no papers that relate the keywords tourist attractive with competitiveness and marketing. Besides the word tourist attraction does not relate to the other keywords in the research, it is not mentioned once individually in the papers, while the word competitiveness was cited 15 times and the word marketing 360 times. This result shows the importance of studies that relate the word tourist attraction with the other two, in addition to showing that tourism marketing is a topic that has been discussed and widely discussed. Of the magazines, the Journal of Destination Marketing & Management was the one that most presented papers with the keywords were published. Of the seven papers that answered the guiding question of the research, only one was done by Brazilian researchers. Regarding the methodology addressed in the studies, the qualitative, through a case study with in-depth interviews is preferred by the researchers.

Table 1: Characteristics of Selected Articles in RSL

Item	Original Title	Author/Year	Journal	Methodology	Local	Sample	Subjects
11	Joint destination marketing in the South Central Coast region of Vietnam	Lan Thi Phuong Nguyen and Douglas Pearce (2015)	Journal of Destination Marketing & Management	Qualitative/ interview/website analysis	Central Coast of South Vietnam	8 provinces	Target marketing Organizations
22	Traditional cultural manifestation marketing and service quality- The case of Dubrovnik Summer Festival	Marija Dragicevic and Ana Tevsic (2015)	Procedia Economics and Finance	Quantitative/ interview	Dubrownik (Croatia)	200 interviewed	Festival participants
33	Innovación en la promoción turística en medios y redes sociales: Un Estudio Comparativo entre Destinos Turísticos	Guilherme Mendes Thomaz, Alexandre Augusto Biz and José Manoel G. Gândara (2013)	Estudios y Perspectivas en Turismo	Qualitative/ exploratory	Paraná (Brazil)	5 countries	California (USA) Valencian community (Spain), Emilia Romagna (Italy), French riviera (France) e Paraná (Brazil)
44	Dynamic destination image formation and change under the effect of various agents: The case of Lijiang, 'The Capital of Yanyu'	Honggang Xu and Tian Ye (2016)	Journal of Destination Marketing & Management	Qualitative/ observation and interviews	Lijiang (China)	41 interviewed	32 tourists/ 7 public workers / 2 bar staff
55	The image of the creative city: Some reflections on urban branding in Turin	Alberto Vanolo (2008)	Cities	Qualitative/case study	Turim/Italy	1 country	Promotional materials and political documents
66	Destination branding and reconstructing symbolic capital of urban heritage: A spatially informed observational analysis in medieval towns	Aleksandr Michelson and Katrin Paadam (2016)	Journal of Destination Marketing & Management	Qualitative/ multicases/ analysis of promotional material and official websites	Germany	7 cities	Bruges (Belgium), Lübeck (Germany), Stral-sund (Germany), Tallinn (Estonia), Toruń (Poland), Visby (Sweden) e Wismar (Germany)
77	La imagen del Camino de Santiago: Análisis de su representación promocional como producto turístico	María José Andrade Suárez and Iria Camaño Franco (2016)	Tourism & Management Studies	Quali/quantitative/ questionnaires	Santiago de Compostela	2.131 interviewed	Pilgrims

Source: Prepared by the authors.

Following the results (Table 2), it is possible to identify that the marketing strategy most used in promoting tourism attractions is digital marketing through social networks and official sites of tourist destinations. The other used strategies that also contribute to the promotion of tourist attractions are: organization and participation of regional and international fairs, participation in events, conferences and festivals of regional tourism, use of social media, use of slogans in publicity material and official websites, promotional posters with slogans of the city, holding of competitions of photos and sports, publicity panels, mass media (cinema and TV), promotional videos, photographic CD provided to the visitor, signage in the historical centers with UNESCO logo and city slogan.

Table 2: Characteristics of Selected Item Results in RSL

IItem	Repetition of keywords			Tourism Marketing Strategies			Conclusion
	Competitiveness	Tourism attractive	Marketing	Fairs and events	Media Digital	Other Strategies	
11	22	0	144	Participation of regional and international fairs / Organization of fairs / events and conferences / regional tourism festivals	Social Media	Printed Folders / Photo & Sports Competitions	The DMOs of the eight provinces studied carry out marketing activities individually and others together.
12	11	0	25		Internet in general	Advertising Panels / Mass Media Vehicles / Promotional Folder	Modern marketing practice requires the segmentation and direct evaluation of the segment market.
33	0	0	75		Social Media (Facebook / Twitter / Youtube / Flickr)		Well-planned and used social media and media together can increase the number of users, achieve greater visibility and create a great competitive advantage for the business or tourist destination.
44	11	0	37		Internet	Mass Media / Film / TV / Promotional Videos	The findings reveal that this anomalous image has been formed under the forces of the market with the combined effect of various agents and nowadays become well known.
55	2	0	25	Host sports events	The use of the slogan "increasingly beautiful" in advertising material on the official website	Advertising brokers, Promotional DVD of passion lives here, the photographic CD provided to foreigners to help them compile articles in the city.	Tourism seems to persist in the Fordist heritage that is still challenging to deal with, persisted in a deeply Fordist culture in promoting a cultural brand for the city.
66	5	0	41		Official website	Signage in historic centers with UNESCO logo and city slogan / Folders with slogan / In touristic promotional materials	The construction of symbolic capital over built heritage, with socioeconomic and cultural practices as significant contributors to the creation of unique selling propositions, can result in a successful destination brand.
77	4	0	13		Social Media	Advertising campaigns on TV / posters with slogan and promotional video "Now is when, Galicia is where" / "Galicia, thinking back to you" / can you keep a secret? / "People who want to recommend you Galicia"	The results show that in general, tourists visiting Santiago de Compostela are not driven because of the publicity but because of the experience they expect to find and that the projected image in advertising is precisely to provide information.

Source: Prepared by the authors.

According to the study carried out by Nguyen and Pearce (2015), the most developed destinations are the most active in terms of marketing, and the least developed have their most modest marketing actions. For the destinations that wish to receive ISO 9001 certification, the study did by Dragicevic and Tevsic (2015) shows that certification is directly related to the improvement of product quality and the creation of new marketing strategies; and that sponsorship and financial support are a tool to strengthen the image of fate and not an expense.

Public and private tourism organizations should interact with users on their social networks, allowing interactivity between supply and demand, and should also create innovative marketing strategies. For Thomaz, Biz and Gandara (2013), for marketing strategy in media and social networks to be efficient, they need to work in an integrated way with others and with the main site.

In the study carried out by Vanolo (2008), the use of video technology for mobile phones, and in the subway system driven by a computer, although not as innovative, is a very used strategy with an excellent return; Vanolo also pointed out that more economical heterogeneous actions such as supporting local artists in public spaces create a public consensus, in addition to zero risk.

Tourist destinations with historic centers offer tourist experience in various ways, according to the study of Michelson and Paadam (2016). These unique experiences intensify the reproduction of the symbolic value that can be used in the destination brand strengthening the heritage of local culture. The offerings of products anchored in this cultural inheritance integrated in the brand creates a differential, which guarantees its competitive position in the international market of cultural tourism.

Creating an identity of the destination is one of the first, and perhaps the main marketing strategy that fate management should worry about, because the image becomes a key issue in the analysis of the behavior of tourists before, during and after living the tourist experience, besides guiding the choices of the other strategies to be used in the marketing planning of the destination (Suárez & Franco, 2016).

The marketing strategies used to promote the tourist attractions found in the study are represented in Figure 2. The most used is digital media, especially social networks, where supply and demand can interact, creating a relationship and strengthening CRM (Customer Relationship Management).

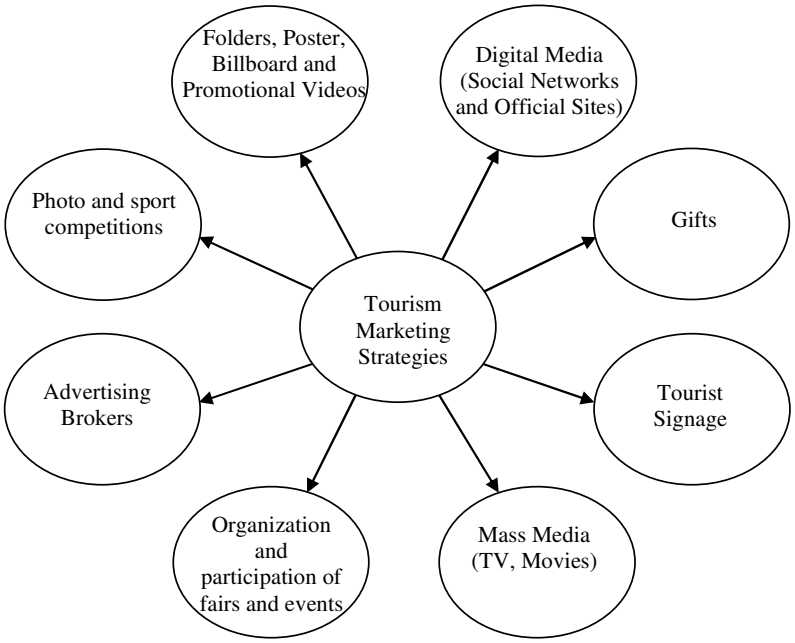

Figure 2: Marketing Strategies Used to Promote Tourist Attraction

Source: Prepared by the authors.

What may be contributing to managers investing in digital media as a marketing strategy is the use of the Internet in the world. According to research conducted by the Internet Word Stats (2017) are 3,366,261,156 users worldwide, about 51% of the world population, and 139,111,185 users in Brazil, 65% of the Brazilian population, and of these Brazilian Internet users, 80% access social networks, and besides the most accessed social networks in the country, Facebook is in first place with 70%. This data corroborates with the most used social media, according to the results of the study, they are Facebook, Official sites, Instagram, WhatsApp, Twitter and Blogs.

Besides the interaction of supply with demand, social media has a low cost. Some marketing strategies that could be used as well as outdoor advertising, radio and catalogs with tourist attractions did not appear in any of the papers studied, so the reasons for their exclusions.

The important thing before selecting the marketing strategies to be used in the promotion of the destination is to make a plan, identifying the profile of the tourists, and with this data in hand select the strategies according to the ratings, so the return will be greater.

Conclusions

The use of the methodology of bibliographic review, through the technical RSL allowed a synthesis of the marketing strategies used in the promotion of tourist attractions. The results show that there are many marketing efforts used by managers, both in the public and private sectors, to boost tourism destinations and consequently increase the number of visitors.

In addition to identifying the strategies being used, the study provided information that can strengthen the development of the local site with other strategies such as the use of CRM, the creation and use of slogans in advertising material, joint marketing actions with other destinations, as well as develop products anchored in the unique identities of integrated cities.

It was also possible to identify that there are many studies that mention tourism marketing with a focus on brand management, but few are exploring strategies used to promote the destination or its tourist attractions.

It is expected that new studies that relate marketing to competitiveness and tourist attractions will be made, since their results can be used to guide tourism managers and future researchers.

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Synergy in Shaping Shopping Experience in the Omnichannel Concept

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Abstract

This paper is devoted to the process of implementing omnichannel concept in companies. Omnichannel's main idea is to integrate all channels between customers and companies. Omnichannel state of the art has been just scratched, that is why, there are close to none guides, that can help companies to implement the omnichannel concept. Creating the sequence of integrating channels in implementation the omnichannel concept is a natural next step for authors' current research. It is an extension to recent authors' studies of factors in implementation the omnichannel concept. However, the sequences of integrating channels can lead to different results. Recommendations regarding the integration process and its sequence provides guidelines for senior management to take a decision, on how the implementation process should be performed correctly. The sequence of integrating channels shows not only the implementation process itself, but it corresponds with the level of omnichannel concept company can acquire. Having knowledge about these aspects can lead to better understanding on, how to coordinate company's divisions, which take part in customer service process, during implementation. This article mainly focuses on potential customers' knowledge. Data about shopping experience was acquired from survey and from in-depth interviews with potential customers. The primary objective, of this research, is to answer the question: „combination of which customers service channels can give synergy effect in customers' shopping experience?". Inference on the results from the survey and the synergy effect from combination of customers service channels let authors create recommendations for managers in terms of what pairs of channels can create synergy effect in customers' experience.

Keywords: omnichannel, multichannel, synergy, customer service channels, e-commerce

Introduction

The term omnichannel comes from Latin word "Omnis" which can be defined as "all, universal, whole, every". Based on Latin definition Omnichannel means "all channels together" (Juaneda-Ayensa *et al.*, 2016).
In omnichannel concept during the process of purchasing there are many touchpoints between customers and shops. Those touchpoints are placed across multiple channels. The idea behind omnichannel is to integrate those channels (Neslin and Shankar 2009).
Nowadays, customers are willing to use different channels as they want, not as they are forced to use (Bell *et al.*, 2014). Development of communication technologies gave more free will to customers in terms of choosing channels (Rangaswamy and van Bruggen, 2005).

The main idea behind integrating omnichannel concept is to unify the brand experience of customers during the process of purchasing (Hansen and Sia, 2015, Gupta *et al.*, 2004; Shah *et al.*, 2006). The

purchasing experience for customers is a critical knowledge for companies (Barwitz, N., & Maas, P. 2018, (Homburg, Jozić, and Kuehnl 2017) and it can affect companies' sales growth (Cao and Li 2015). The technological development led customers to freely use multiple channels to interact with retail companies Chheda et al., 2017, Leeflang et al., 2014. Companies are more and more aware that their value can benefit from interaction options in different channels (Baxendale et al., 2015, Kumar and Reinartz, 2016)

Omnichannel has developed from multichannel approach. Multichannel idea was to give as many as possible channels to customers, but there was close to none integration between those channels (Cummins *et al.*, 2016, Verhoef, 2012). However companies start to engage customers in multi and omnichannel strategies during purchase process for better customers' experience (Bianchi et al., 2016, Brynjolfsson et al., 2013, Homburg et al., 2017, Verhoef et al., 2007). Channels and touchpoints in multichannel and omnichannel may include:

- printed catalogues and leaflets delivered to mailbox or hand to hand on streets,
- phone contact by telemarketers,
- direct traditional mailing,
- e-mailing,
- retails stores,
- e-commerce,
- mobile and TV apps,
- TV adverts,
- tradeshows,
- social media.

The list of channels was created based on (Kushwaha and Shankar, 2013, Baxendale *et al.*, 2015; Broussard, 2016; Li and Kannan, 2014; Peltier *et al.*, 2003; Wind and Hays, 2016a, 2016b; Zahay *et al.*, 2004), authors' experience and Internet search on shops websites.

Each channel has its own attributes, that the customer takes into consideration. Each of the attributes has its own value for different customers (Balasubramanian et al., 2005, Lee and Ariely, 2006). The aspect of ranking up was described in Wojciechowski & Hadas 2020. Those attributes can be: price and quality of the product, risk, availability of channels, outside influence of channel choice and convenience (e.g., Ganesh et al., 2010, Gupta et al., 2004, Inman et al., 2004, Verhoef et al., 2007, Yu et al., 2011). Attributes mentioned before are similar to 7 Right rules of logistics, which refers to right product, customer, quantity, condition, place time and cost. The risk aspect in implementation the omnichannel concept was described in (Wieczerniak & Milczarek, 2019), (Wojciechowski & Hadas, 2018).
Authors decided to conduct research on, how does integrating channels influence the customers' experience. The reason for this was, that touchpoints, it's variety and numbers are not always taken into account in the decision-making process (Li and Kannan, 2014).

Methodology of research

The primary objective, of this research, is to answer the question: „combination of which customers service channels can give synergy effect in customers' shopping experience?". The methodology of this research consists of several steps, which are presented in (fig.1). Steps that are far to the left are milestones and determine each chapter.

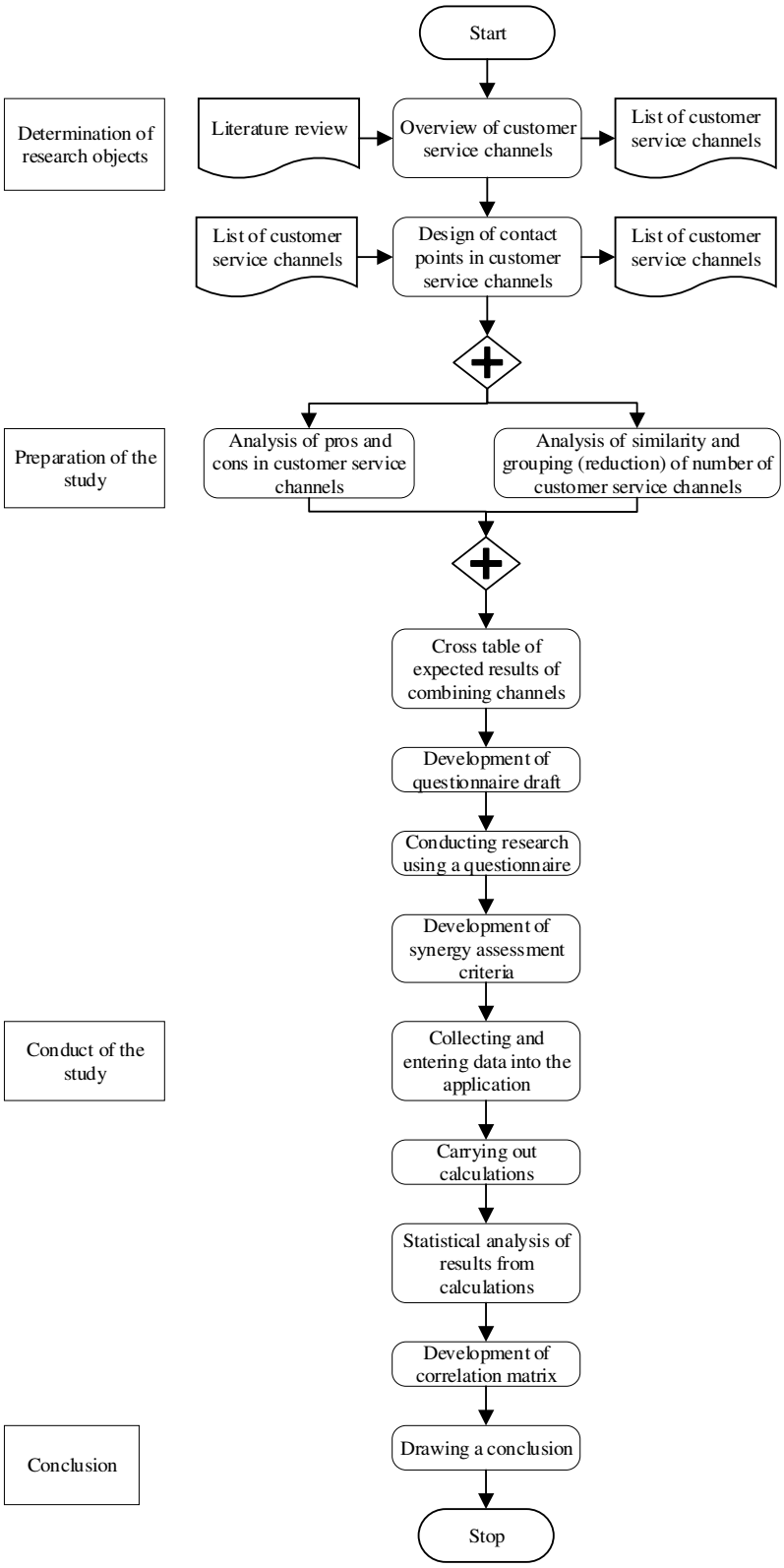

Fig. 1 : Algorithm of methodology of this research

The first step of this research methodology was the scope of literature in the aspect of customer service channels. The next step was to figure out touchpoints in every customer service channel. It was followed by grouping channels and creating recommendations in combing customers' service channels. All mentioned before tasks led to creating survey. After the survey was published, it took around 1 month to acquire enough data. Statistical calculations were made. The last step was the interpretation of data.

Preparation of the study

In this chapter there are presented grounds that led to designing the questionnaire and criteria to assess level of synergy. In table 1 there are presented all researched channels. There is also a list of pros and cons in each channel. This list was created based on authors' experience.

Table 1: Pros and cons in each channel

Parameters:	Printed catalogues and leaflets	Telephone contact	Newsagents	Stationary retail stores	Direct mail	Digital media, including e-commerce	Mobile platforms	Social media
Pros:	Delivers information of the offer to many potential customers, low cost	Delivers information of the offer to many targeted customers, low-medium cost, can place an order right away, standalone channel	Pickup point, low-medium cost	Delivers information of the offer to many targeted customers, can place an order right away, standalone channel, pickup point	Delivers information of the offer to many targeted customers, low-medium cost, can place an order right away, standalone channel	Delivers information of the offer to many targeted customers, low-medium cost, can place an order right away, fast response to customers' questions	Delivers information of the offer to many targeted customers, low-medium cost, can place an order right away, fast response to customers' questions	Low-medium cost, can place an order right away, fast response to customers' questions
Cons:	Needs customers to make contact to order, it's not standalone channel, most people get rid of leaflets right away, not even reading them	Customers can be disrupted when called and can hang up (called calling), customers need to deliver all information and place an order in one call	Needs customers to make contact to order, it's not standalone channel, customers need to visit newsagent personally	High cost, customers need to visit store personally and not all products may be available on hand	Needs customers to make contact to order	Needs any type of delivery to customers and customers to make contact to order	Needs any type of delivery to customers and customers to make contact to order	Needs any type of delivery to customers and customers to make contact to order

Definition of synergy in this article is as follows – significant growth of customers' experience, as a result of combining two channels. Combining channels is a step to acquire full omnichannel in a company. Combination of each pair of customers' service channels (Table 2.)

Table 2: Combination of each pair of customers' service channels

Current channels: / Combined channels:	Printed catalogues and leaflets	Telephone contact	Newsagents	Stationary retail stores	Direct mail	Digital media, including e-commerce	Mobile platforms	Social media
Printed catalogues and leaflets	X							
Telephone contact	Faster opportunity to place an order	X						
Newsagents	Additional pickup points	Presentation of the offer to customers and encouragement to see the offer	X					
Stationary retail stores	Presentation of the offer to customers and encouragement to see the offer, additional pickup points	Presentation of the offer to customers and encouragement to visit	Additional pickup points	X				
Direct mail	Distribution of catalogues and leaflets	Transfer of package / letter status	Additional pickup points	Additional pickup points	X			
Digital media, including e-commerce	Presentation of the offer to customers and encouragement to see the offer	Presentation of the offer to customers and encouragement to see the offer	Additional pickup points	Additional pickup points	Distribution of orders	X		
Mobile platforms	Presentation of the offer to customers and encouragement to see the offer	Presentation of the offer to customers and encouragement to see the offer	Additional pickup points	Additional pickup points	Distribution of orders	Additional places where you can make an offer	X	
Social media	Presentation of the offer to customers	Presentation of the offer to customers and encouragement to see the offer	Additional pickup points	Additional pickup points	Distribution of orders	Additional places where you can make an offer	Additional places where you can make an offer	X

Based on table 1 channels were grouped by similarities in pros and cons they represent. That is the reason why in questions 1 – 10 there are 5 different channels considered. Result of grouping are as follows:

- printed catalogues and leaflets – no grouping
- telephone contact – no grouping
- direct mail – no grouping
- newsagents and stationary retail stores – grouped together as stationary stores
- digital media, including e-commerce, mobile platforms, social media – grouped together as e-commerce platform

Respondents answered the following questions:

Question 1 - The first channel of customer service are printed catalogues and leaflets, they are to be combined to a telephone contact (orders placed by telephone). Will this have a positive effect on your experience in the purchasing process?

Question 2 - The first channel of customer service are printed catalogues and leaflets, they are to be combined with stationary stores (orders placed personally at the counter). Will this have a positive effect on your experience in the purchasing process?

Question 3 - The first channel of customer service are printed catalogues and leaflets, they are to be combined with direct mail (orders placed by sending the order form by traditional mail). Will this have a positive effect on your experience in the purchasing process?

Question 4 - The first channel of customer service are printed catalogues and leaflets, they are to be combined to the e-commerce platform (orders placed on the store's website). Will this have a positive effect on your experience in the purchasing process?

Question 5 - The first channel of customer service is telephone contact (telemarketing), it is to be combined to stationary stores (orders placed personally at the counter). Will this have a positive effect on your experience in the purchasing process?

Question 6 - The first channel of customer service is telephone contact (telemarketing), it is to be combined to direct mail (orders placed by sending the order form by traditional mail). Will this have a positive effect on your experience in the purchasing process?

Question 7 - The first channel of customer service is telephone contact (telemarketing), it is to be combined to the e-commerce platform (orders placed on the store's website). Will this have a positive effect on your experience in the purchasing process?

Question 8 - The first channel of customer service is stationary stores (showroom) they are to be combined to direct mail (orders placed by sending the order form by traditional mail). Will this have a positive effect on your experience in the purchasing process?

Question 9 - The first channel of customer service are stationary stores (orders placed personally at the counter), they are to be combined to the e-commerce platform (orders placed on the store's website). Will this have a positive effect on your experience in the purchasing process?

Question 10 - The first channel of customer service is direct mail (orders placed by sending the order form by traditional mail), they are to be combined to the e-commerce platform (orders placed on the store's website). Will this have a positive effect on your experience in the purchasing process?

Question 11 - Which shopping model do you prefer? First, looking at offers online, then buying in a stationary store (webrooming), or looking at offers in a stationary store, and making purchases online (showrooming)?

Each pair of channels was compared in question 1 – 10. 7-point Likert's scale was used to measure the level of synergy/dysergy presented in table 3. Synergy is defined to yield more than the sum of the individuals. Dysergy is defined as antonym to synergy, that is conflicting desires (Cooper 2017), which leads to yield less than the sum of the single elements. Elements in this article are customer service channels.

Table 3 : Scale of level of synergy/dysergy as a result of combining two channels

Answer: (Likert's scale)	Level of synergy:
Strongly agree	3 perfect synergy
Agree	2 significant synergy
Somewhat agree	1 weak to none synergy
Neither agree nor disagree	0 neutral combination
Somewhat disagree	-1 weak to none dysergy
Disagree	-2 significant dysergy

Answer: (Likert's scale)	Level of synergy:
Strongly disagree	-3 pointless combining

Conduct and results of the study – recommendations in combining customer service channels

The research was carried out on a sample of 105 respondents who make purchases and returns using various customer service channels. The research was directed to clients who are active users of information technologies in purchasing processes.

The obtained results provide a lot of important information on customer service combinations desired by customers (potential impact of the analysed solutions on the shopping experience).

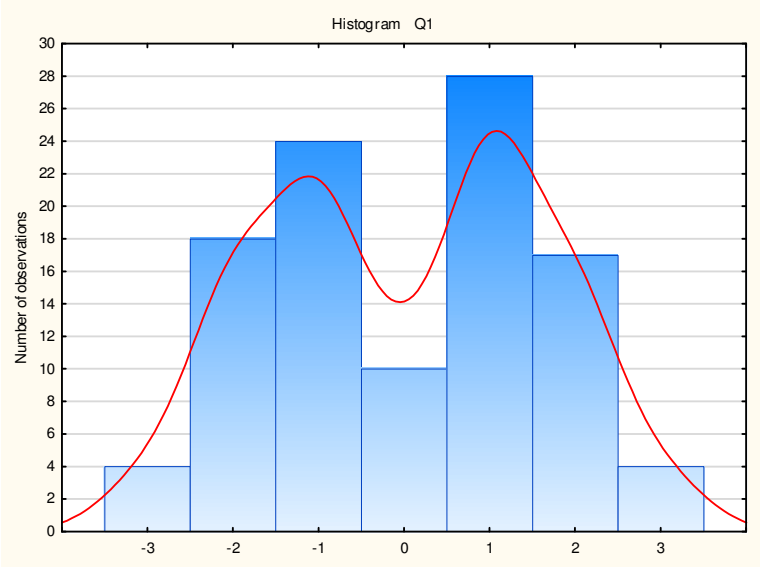

Fig.2 : Impact of channels combination: printed catalogues and leaflets with telephone contact on the shopping experience

Channel combination: printed catalogues and leaflets with telephone contact divides respondents into 2 groups (fig.2). The first group (slightly larger) indicates positive effect on experience in the purchasing process. The second group of respondents did not notice the positive impact. The distribution of answers allows us to conclude that the channel combination is justified, but its impact will be significant only for some clients.

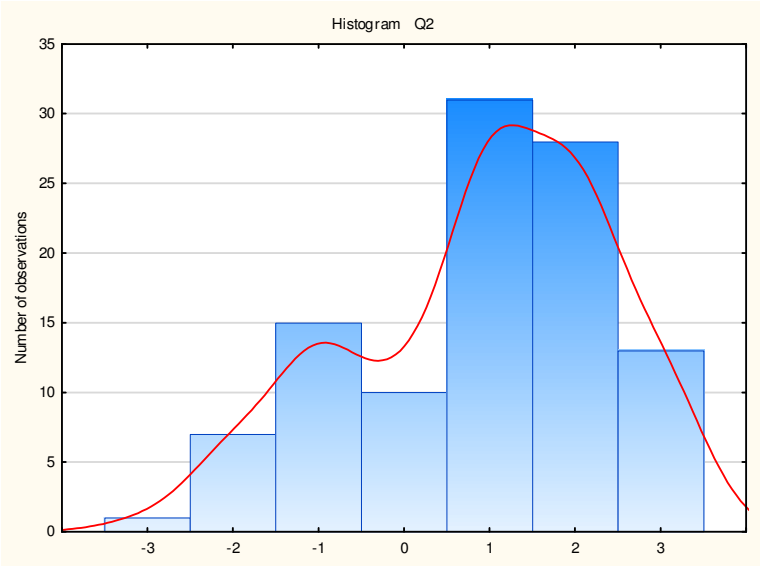

Fig.3 : Impact of channels combination: printed catalogues and leaflets with stationary stores on the shopping experience

The results for the combination of channels: printed catalogues and leaflets with stationary stores clearly show positive effect on experience in the purchasing process (fig.3) This traditional combination of customer service channels in the opinion of customers gives significant effects, so it should be recommended whenever it is compatible with a trading company strategy or vision statement.

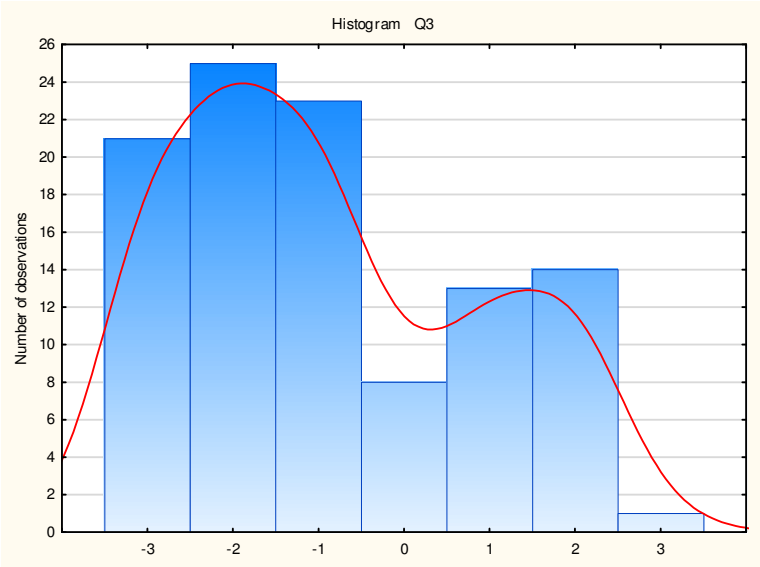

Fig.4 : Impact of channels combination: printed catalogues and leaflets with direct mail on the shopping experience

Channel combination: printed catalogues and leaflets with direct mail in the opinion of most customers does not have a positive impact on experience in the purchasing process (fig.4). The result can be interpreted in such a way that it is a traditional and old-fashioned solution and because of this it lacks features that are important for a client looking for high service standards in every possible aspect. The combination of these channels should probably not be regarded as unfounded or incorrect. Rather, it is the basic solution that should be extended, i.e. it should not function on its own.

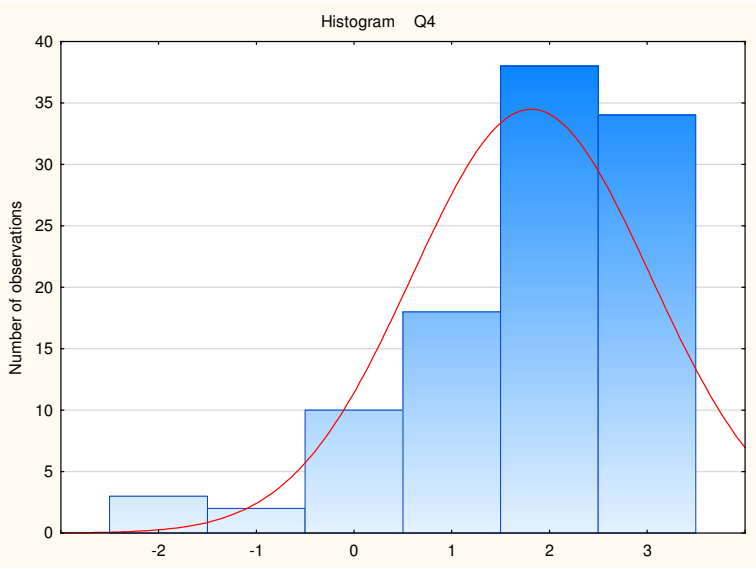

Fig.5: Impact of channels combination: printed catalogues and leaflets with the e-commerce platform on the shopping experience

The results for the channel combination: printed catalogues and leaflets with the e-commerce platform show unequivocally positive effect on experience in the purchasing process (fig.5). This is a very preferred combination of customer service channels, which should be clearly recommended to commercial enterprises.

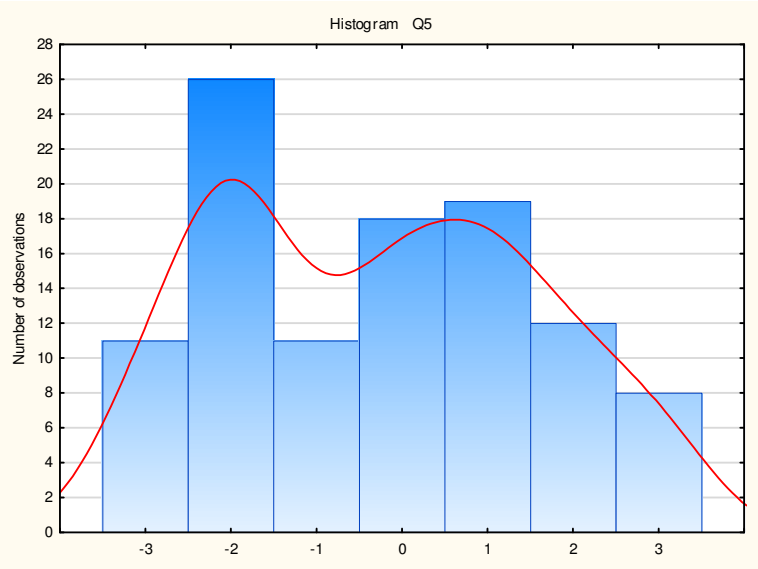

Fig.6 :Impact of channels combination: telephone contact (telemarketing) with stationary stores on the shopping experience

Customer feedback on channel combination: telephone contact (telemarketing) with stationary stores is ambiguous (fig.6). In the respondents' opinion, slightly negative opinions prevail. Generally, however, the results are distributed in a way that makes it difficult to formulate business recommendations. The possible combination of these channels requires in-depth research to determine their legitimacy for the target customer group.

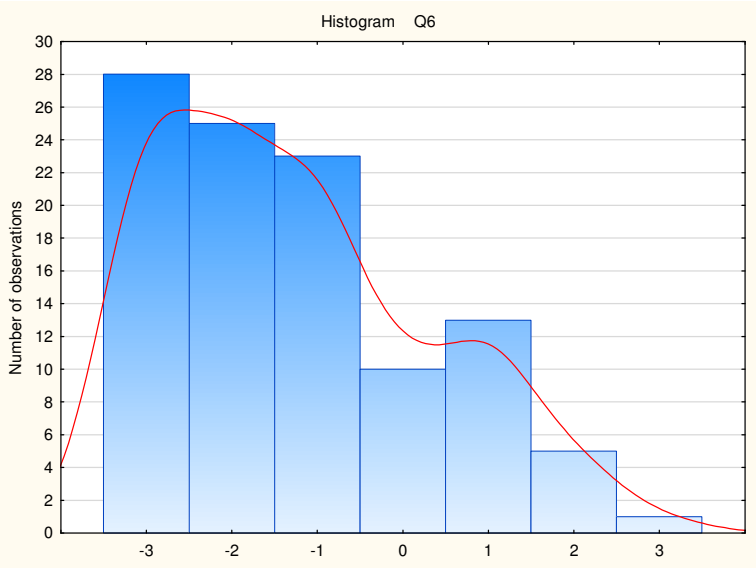

Fig.7 : Impact of channels combination: telephone contact (telemarketing) with direct mail on the shopping experience

Customer feedback on channel combination: telephone contact (telemarketing) with direct mail (orders placed by sending the order form by traditional mail) clearly indicates that this solution is unreasonable (fig.7). This is an undesirable combination of customer service channels. In the authors' opinion, this solution is also doubtful as to its legitimacy because the purpose of telemarketing is to conclude a transaction during a single contact and it does not require expansion with an additional channel.

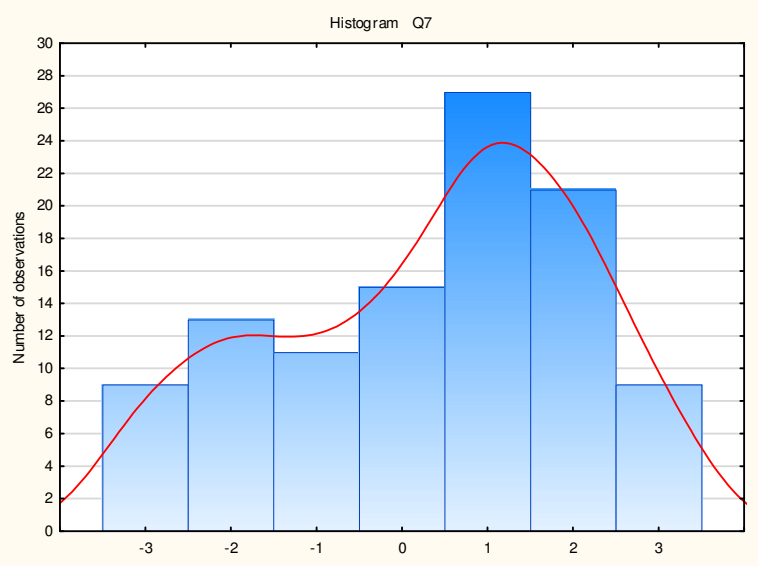

Fig.8 : Impact of channels combination: telephone contact (telemarketing) with the e-commerce platform on the shopping experience

Customer feedback on channel combinations: telephone contact (telemarketing) with the e-commerce platform (customer service on the store's website) allow us to conclude that this is a good solution (fig.8).

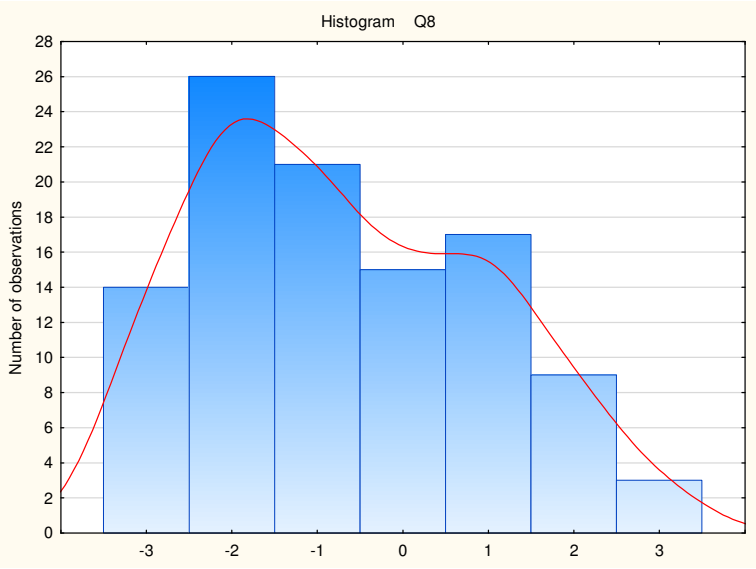

Fig.9: Impact of channels combination: stationary stores with direct mail on the shopping experience

Another considered solution is to combine channels: stationary stores (showroom) with direct mail (orders placed by sending the order form by traditional mail). The results obtained (fig.9) clearly indicate that for most customers this is a solution that will not ensure an increase in their satisfaction. For this reason, it cannot be recommended as valuable.

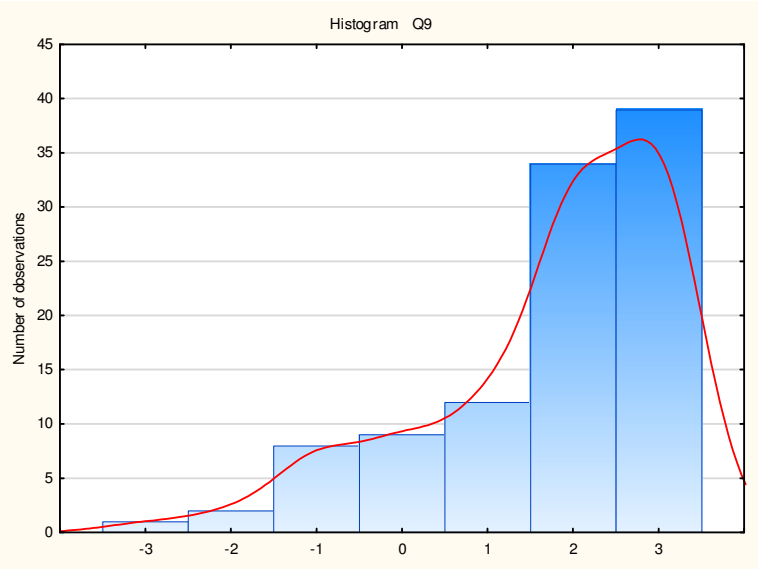

Fig.10 : Impact of channels combination: stationary stores with the e-commerce platform on the shopping experience

Channel combinations: stationary stores (orders placed personally at the counter) with the e-commerce platform (customer service on the store's website) is the most preferred solution in the opinion of customers. The results clearly indicate the legitimacy of implementing such a solution (fig.10), because it gives the greatest potential for creating a positive experience in the purchasing process. In this case, it can be assumed that synergy effect is achieved for combining customer service channels understood as significant growth of customers 'experience. By comparing the obtained result with the question

about the preferred shopping practice of showrooming and webrooming, you can get a wider picture. After years of change in customer preferences, consisting in the popularization of e-commerce, currently there is a lack of a clear advantage between preferred practice (showrooming or webrooming) (fig.11).

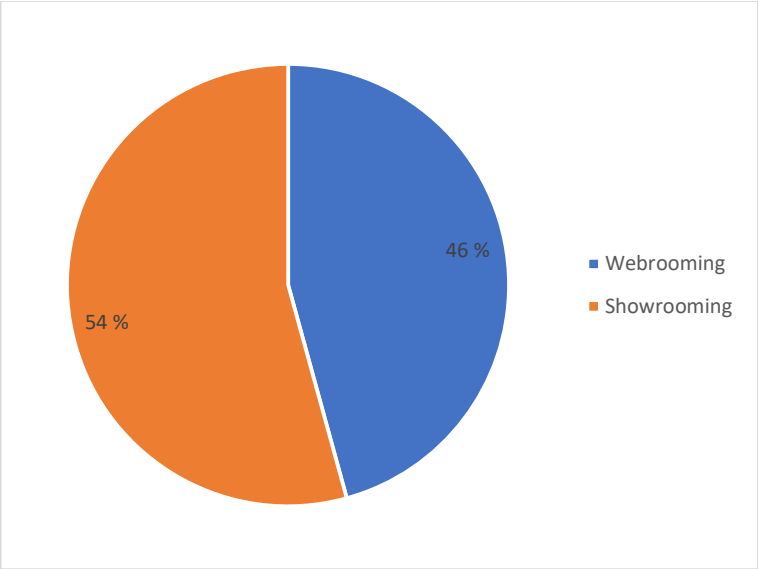

Fig.11: Preferred practice of showrooming and webrooming

Currently, customers are equally eager to use both practices, and thus the combination of channels: stationary stores with the e-commerce platform is fully justified for commercial entities. This will limit the migration of customers who visit a stationary store in one company and make purchases through the Internet in another company.

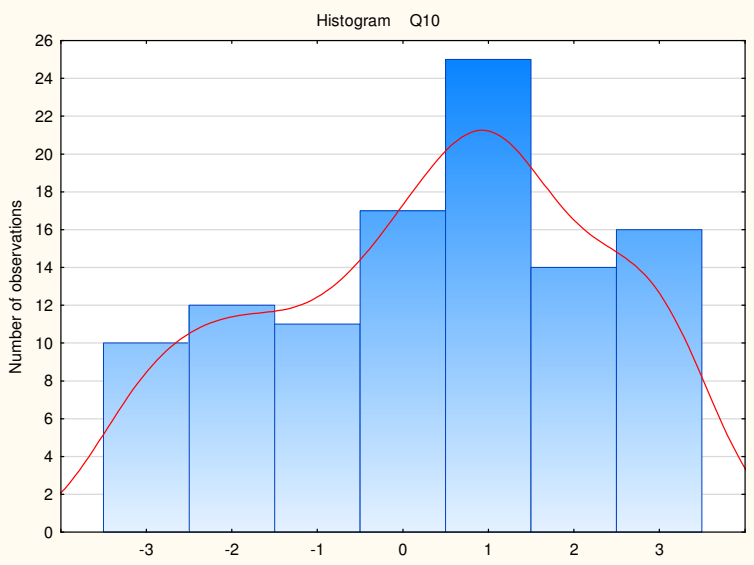

Fig. 12 : Impact of channels combination: direct mail with the e-commerce platform on the shopping experience

The last considered solution is to combine channels: direct mail (orders placed by sending the order form by traditional mail), they are to be combined to the e-commerce platform (customer service on

the store's website). The obtained results indicate the validity of this solution for a significant number of clients (fig.12).

Table 4: Descriptive statistics from survey

	Descriptive Statistics								
Nvalid = 105	**Mean**	**Median**	**Mode**	**Min**	**Max**	**Lower quartile**	**Upper quartile**	**Variation**	**Standard deviation**
Q1	0,02	0,00	1,00	-3,00	3,00	-1,00	1,00	2,54	1,59
Q2	0,90	1,00	1,00	-3,00	3,00	0,00	2,00	2,19	1,48
Q3	-0,88	-1,00	-2,00	-3,00	3,00	-2,00	1,00	2,97	1,72
Q4	1,79	2,00	2,00	-2,00	3,00	1,00	3,00	1,47	1,21
Q5	-0,28	0,00	-2,00	-3,00	3,00	-2,00	1,00	3,32	1,82
Q6	-1,25	-2,00	-3,00	-3,00	3,00	-3,00	0,00	2,44	1,56
Q7	0,30	1,00	1,00	-3,00	3,00	-1,00	2,00	3,14	1,77
Q8	-0,68	-1,00	-2,00	-3,00	3,00	-2,00	1,00	2,72	1,65
Q9	1,73	2,00	3,00	-3,00	3,00	1,00	3,00	2,01	1,42
Q10	0,34	1,00	1,00	-3,00	3,00	-1,00	2,00	3,48	1,86

Detailed results for the analysed combinations of customer service channels can be found in the table 4. The analysis of mean and median as well as distribution measures allows determining the strength of the impact of a given combination of customer service channels on shopping experience and differentiation of customer opinions. In most cases it is clearly mentioned, that customers prefer to have a choice as to what channels to use in shopping process.

Table 5 : Correlation matrix based on effects from combining customer service channels

	Q1	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Q9**	**Q10**
Q1	1,00	0,16	0,29	-0,04	0,05	0,25	0,10	0,09	-0,24	-0,10
Q2	0,16	1,00	0,26	0,27	0,51	0,20	0,32	0,17	0,17	0,28
Q3	0,29	0,26	1,00	-0,04	0,39	0,59	0,23	0,47	-0,25	0,15
Q4	-0,04	0,27	-0,04	1,00	0,14	-0,13	0,25	-0,16	0,31	0,21
Q5	0,05	0,51	0,39	0,14	1,00	0,53	0,63	0,30	0,05	0,47
Q6	0,25	0,20	0,59	-0,13	0,53	1,00	0,44	0,59	-0,19	0,25
Q7	0,10	0,32	0,23	0,25	0,63	0,44	1,00	0,22	0,07	0,49
Q8	0,09	0,17	0,47	-0,16	0,30	0,59	0,22	1,00	0,03	0,20
Q9	-0,24	0,17	-0,25	0,31	0,05	-0,19	0,07	0,03	1,00	0,32
Q10	-0,10	0,28	0,15	0,21	0,47	0,25	0,49	0,20	0,32	1,00

Correlation analysis for the answers given, in table 5, allows to identify the compliance of customer assessments regarding the impact of individual channel combinations on the shopping experience. In the context of searching for the synergy effect or lack thereof, the following relationships pay attention:

- compatibility between Q3 combination ratings (printed catalogues and leaflets with direct mail) Q6 (telephone contact (telemarketing) with direct mail) and Q8 (stationary stores with direct mail) by clients and their generally negative rating. Here, the common channel

is direct mail, which has been explicitly rejected as a valuable enrichment of the customer service channel.

- compatibility between Q4 (printed catalogues and leaflets with the e-commerce platform), Q7 (telephone contact (telemarketing) with the e-commerce platform), Q9 (stationary stores with the e-commerce platform) shows positive relation based on e-commerce.
- compatibility between Q5 (telephone contact (telemarketing) with stationary stores) and Q8 (stationary stores with direct mail) show a little negative rating based on stationary stores. This situation may suggest, that there is a trend of leaving traditional stores in favour of e-commerce and showrooms.

Conclusion

In current market conditions, conducting business activity requires having many service channels, tailored to the clients' expectations. Research results show that arbitrary combination does not necessarily mean increased customer value. Instead of the expected synergy effect in the purchasing experience, which is supposed to constitute a competitive advantage, it may even deteriorate current state of customers' experience. The authors of the article analysed the selected connections of customer service channels in pairs and created a conceptual model between those channels. The date for analysis was acquired from over 100 respondents, who make purchases and returns using various customer service channels. The limitation of this research study is the point of view – customers and analysing channels only in pair, not in groups. Then based on the results of the research, obtained the answer, how does the impact of these connections affect the shopping experience. Combining customer service channels can result in different results:

- achieving a significant synergy effect of shopping experience (in the opinion of a wide group of customers),
- a perceptible benefit only for a limited group of clients, while disapproving another group of clients,
- no noticeable results, because the connection is neutral in the opinion of customers, while disapproving another group of clients,
- negative reception among clients (connection pointlessness).

As a consequence of the obtained results, managers are provided with the information, which service channels should be integrated in order to rationally implement the omnichannel concepts. The process of implementing effective customer service requires IT support in the form of CRM systems. Knowledge of service channels desired by customers is also important for the development of their functionality. The authors' research on the opportunities and threats of implementing the omnichannel concept also prove that IT systems are a key source of information about retained shopping customers in existing channels. Nevertheless, at the stage of designing a comprehensive solution, which is a modern customer service system, it is necessary to decide which channels will be available.

The pairing of customer service channels has allowed the identification of common parts for connections that are positively determined by customers, and for ones that are negatively determined by customers. The next natural stage of research is to exclude negatively defined service channels and to examine relationships not only in pairs, as was the case in this article, but also round-robin, creating more complex solutions. Based on this article research conceptual contribution, a connection matrix can be created that can be used as a template to determine the required modules when implementing CRM or ERP II systems in enterprises.

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The Practice of Strategic Management of Polish Enterprises: Concern For CSR, Image or Greenwashing?

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Abstract

Research background: Modern companies are looking for a competitive advantage, not only in new technologies and innovative products offered to clients, but also in the introduction of modern tools to management. This type of activities includes the implementation of the concept of sustainable development, eco-development and CSR into management practice. Research shows that some companies with a strong market position try to shift organizational and financial burdens associated with the implementation of selected socially responsible practices to their subcontractors, while usurping at the same time the effects of their application. Also they often introduce solutions that the market forces to apply as CSR initiatives, although in practice they are PR activities only. Therefore, it is interesting to conduct research aimed at diagnosing the real intentions of introducing this kind of solutions into practice. Purpose of the article: The analysis of literature and company information on CSR practices and sustainable development, including eco-solutions, allows us to diagnose research areas that require deeper analysis and allow us to determine the purpose of the proposed article. It is to examine how individual pillars of CSR and sustainable development are used in creating and implementing the organization's strategy and shaping its image, and in what situations it should be assessed as a "greenwashing". Methods: Implementation of this objective will be served by the study of international literary sources, as well as case studies conducted on the basis of source materials of selected companies and institutions involved in reporting good practices.

Keywords CSR; environment, development; organizations culture

Introduction

Corporate Social Responsibility, in accordance with the assumptions of the Lisbon Strategy, is the most effective tool for building the European economy as most dynamic, competitive and capable of long-term sustainable development. Implementation of Corporate Social Responsibility in contemporary organizations is based on the undertaking of prospective initiatives covering business, society and the environment, giving the opportunity to accomplish sustainable development principles, in order to ensure the future generations a quality of life not lower than that of the current generations (Stappen, 2006; Ingaldi, 2015).

In Albinger and Freeman's view, CSR is the most appropriate configuration of social responsibility principles, processes of reaction to social problems, policies, programs and possible to follow-up results, referring to company social relations for each business organization (Albinger, Freeman, 2000, p. 243.). Therefore, companies striving for long-term market success and a strong market position generally implement CSR principles and promote initiatives in this area, in this way sending a message about their responsibility to the business partners, thereby increasing own attractiveness as business partners. However, there is no hard evidence that being a responsible company is a guarantee of good economic condition. There are no hard indicators to measure the economic effects of socially responsible activities. R.N. Farmer and W. Dickerson-Hogue (1973, p. 11) already recognized this problem in the 1970s, stating that there is no recognized method for measuring the effectiveness of socially responsible activities, other than by measuring the degree of implementation of adopted economic goals.

Perhaps because of this, it is not uncommon to hear, that under the guise of CSR activities, companies

use fraudulent practices or even commit misdemeanors and crimes which allow them to achieve a better market position, sometimes even without generating additional costs. That is why one should agree with the statement of Sachs, that societies indiscriminately recognized the implementation of the sustainable development and CSR as a salvation for the Earth, which is environmentally endangered (Sachs, 2010, pp. 1-5).

That is why various questions arise: First of all, is it an acquiescence for unfair practices and is it possible that the concealment of those is the true reason behind the appearances of irregularities in the implementation of CSR, and it likely being the cause for tendency of using cheap substitutes instead of real activities? Second, is it the desire to generate profit with the lowest possible cost that is the source of such behavior, or are there other factors responsible for such a state of affairs, like for example cultural conditions?

The consequence of asking these questions is a study aimed at assessing whether the largest Polish companies reach PR practices and greenwashing, implemented under the name of CSR, and what ramifications may arise due to determining such companies as socially responsible.

The selection of Polish companies that belong to the group of the largest market players is not accidental. It is the result of the authoress conscious decision, resulting from the fact that for many years she has been able to track changes taking place in these companies. She could also observe the changes that have been taking place in recent years in the policies and strategies of the largest state-owned companies, while not seeing the reflection of these changes in CSR reports. Therefore, these problems will become the subject of analysis later in the study.

Literature Review

In contemporary studies on corporate social responsibility, many researchers notice the existence of a relationship between the possibilities of introduction and implementing CSR, and the dominant culture within the organization (Fukuyama, 1997). This culture is also an element of social capital deciding about interpersonal cooperation skills, giving way to the possibility of real implementation of social responsibility (Trompenaars & Hampden-Turner, 2012).

Activities from the area of CSR serve to build credibility, contribute to strengthening the market position while shaping the social image in internal branding and external relations employer branding through competition based on non-material assets, specifically the brand and human resources (Wojtaszczyk, 2010, p. 20). As a result of this, CSR becomes a management strategy based on multidimensional relations, (Kazojć 2014, p. 36), and not just a attractive public relations tool used for the promotion of the company. In modern times, the concept of CSR has been precisely defined, and simultaneously methods, techniques and tools for its measurement have been developed. Said tools make it possible to build reports, which subsequently can be verified by independent institutions.

The most important means of reporting is an indicator called GRI - Global Reporting Initiative (Szejnwald-Brown et al., 2009, pp. 182-200; Toppinen et al., 2011, pp. 191-205; http://www.global reporting.org.pl/ing.org.pl). In 2007, GRI developed the Integrated Reporting Framework for economic, environmental and social aspects of business operations and disseminated the idea of creating integrated reports that combine the entire reporting of an organization. The GRI Integrated Reporting Framework defines the Standard Information that should be included in the report and performance indicators from the key areas (Global Reporting Initiative, 2013).

They also indicate 10 principles to ensure the quality of reports and comparability in the scale of individual companies within member countries and on a global scale. The rules were divided into two categories: rules for defining quality and rules for defining content. These standards also provide two levels of reporting: basic (core), meaning reporting of at least one indicator for each of the main areas, and extended (comprehensive), obliging to report all indicators (Koskela, 2014, pp. 294-308; Kudełko et. al., 2016, p. 83).

Supporting the implementation of CSR is also possible due to the AccountAbility AA1000 series standards (Pflugrath et al., 2010, pp. 239-254). Thanks to them, the company is equipped with methods allowing to manage engagement in relations and dialogue with stakeholders in order to build company value, stimulate its innovation, risk management as well as create corporate governance and apply modern management methods.

ISO 26,000:2010 standard (Guidance on social responsibility…) has a crucial meaning in the analyses and elaborations concerning good practices in Europe. It aims to assist organizations in:

- contributing to the implementation of sustainable development rules and extending the responsibility by society‘s health and welfare issues,
- taking into account the stakeholders expectations,
- checking the compliance of company’s actions to the binding laws and international standards of behavior;

Despite so many methods and tools recommended by international institutions for reporting good practices, or preparing non-financial reports (Directive 2014/95/EU…), even the largest companies still have a large room for maneuvers in reporting.

The criticism of activities that are traditionally considered as socially responsible began with a debate between two American lawyers: Dodd and Berly, for a long time before the formalization of the concept. "The discussion concerned whether the sole obligation of entrepreneurs is, or is not, to create profit for shareholders. (...) Dodd, in opposition to Berly, postulated in 1932, that the entrepreneur's goal should be not only to bring profit, but also to act in the social interest "(Kopeć, 2016, p. 130). Friedman (1962; 1970, pp. 32-33), a supporter of Berly's view from the turn of the 1960s and 1970s was one of the greatest CSR critics.

Tracking dishonest practices used by companies leads to the generation of reports, rankings and other elaborations describing socially irresponsible practices e.g. *Corporate Irresponsibility America Newest Report* elaborated by Mitchell (2002).

Term CSI was first used by Armstrong in 1977. In his opinion social irresponsibility consists in permanent disregarding and ignoring of regular research in this field which leads to negative results (Armstrong 1977, pp. 185-213). Kotchen and Moon (2011, p. 2) believe that CSI is a set of company behaviors that cause an extreme increase of costs and/or promote distribution of conflicts.

Other critics issued a concern as to whether it is the duty of companies to act for the benefit of society and if they have the appropriate prerogatives and skills (Kaman, 2015). Many authors also allege that behind the façade of CSR activities there is a number of pathologies and a pursuit for profit and power as described in Bakan, (2004; Chatterji and Listokin 2007, pp. 52-63).

Numerous socially irresponsible practices are widely described by supporters of the post-development concepts (Anyanwu & Nweake, 2014, pp. 105-109; Encarnation-Tadem, 2007, pp. 92-97; Sachs, 2010, pp. 1-5). These practices can even be called "black CSR" (Lulewicz-Sas, 2013, p. 9).

Highlighting and making certain activities of companies public makes it possible to have doubts as to whether they are indeed an element of CSR or are they simply PR campaigns, promoting the company. So what is PR, and what is CSR? Both efficiently serve for supporting strategic management, something essential for building the culture and identity of the organization. Actions taken in both fields also serve similar purposes: building the company's image and thus gaining a competitive advantage as a consequence.

According to Gohil and Gohil (2016, pp. 384-387) PR activities allow modulating the level of satisfaction of stakeholders and are a broad process of communication for the organization in order to build social responsibility and realize the interests of said stakeholders while maintaining mutual respect. While PR actions are for building its image. In other words, they "overtake" the introduction

of CSR and prepare the organization and its employees for its implementation (Tomic et. al., 2006, p. 26).

Increasingly used greenwashing is another dangerous activity for stakeholders and the environment. It is beneficial and serves for the intention of company act of spreading disinformation, in order to convince stakeholders - especially consumers - that the company acts responsibly and ethically towards society and the environment (Rowell, 2002, p. 19). This concept also includes selective disclosure of positive information along with the simultaneous concealment of negative data, in order to create a false image, excessively beneficial for the company (Bowen & Aragon-Correa, 2014, pp. 107-112). Common greenwashing practices include (Bowen, 2014, pp. 17-23):

- providing incorrect information about product features,
- suggesting pro-ecological or pro-social character of the subject based on tendentiously selected product features,
- not presenting evidence on CSR activities,
- using general and imprecise expressions in the product information,
- using facts that are not related to the real condition,
- use of false labels, signs and certificates concerning CSR,
- deliberately omitting unfavorable information about the product or its manufacturing process.

Along with how greenwashing methods and techniques become more and more sophisticated and take the form of "symbolic corporate ecologism" (Short & Toffel, 2010, pp. 369-396), they become more and more difficult to grasp and prove. Research conducted in North America and Europe indicates that for over 90% of products that were advertised as ecological, at least one of greenwashing practices was applied (Lane, 2012, pp. 582-587; TerraChoice, 2010, p. 11).

A brief literature review presented here and the issues raised by it prompted the authoress to make an attempt of investigating whether the largest companies in Poland seen as socially responsible implement genuine CSR strategies in building market position and image, or if they use unethical, immoral and illegal ways in order to minimize costs while achieving the greatest benefits.

Methods

The primary sources of information on the basis of which the research was conducted are: scientific publications on the issues, opinions of experts and reports published by the surveyed companies and independent national and international institutions dealing with researches on this issue. The presented analysis was also carried out based on data and information provided in the latest CSR reports by companies belonging to the WIG 20 group, as well as reports by journalists specializing in the so-called "Investigative journalism", who gather and verify information regarding various types of practices that are contrary to the principles of CSR and sustainable development.

For the purpose of research, concerning the presented article, mainly qualitative methods have been used, and the starting point for the aforementioned analysis was to look for an answer to the key, from the researcher's point of view, question: Are the largest Polish companies dominated by the approach to CSR as an area of activities determined by their strategy and national assumptions for sustainable development, or are they rather image-based activities?

The examined companies were divided into three categories, based on information on the basic business profile: industrial and commercial entities, service providers and third, insurance and financial companies. In the group of industrial and commercial companies listed on WIG 20 are nine companies: CCC, DINOPL (from 2019) JSW, KGHM, LOTOS, LPP, PGNiG, PKN Orlen, SANPLAST. Second, six companies conducting commercial and service activities: Eurocash (until 2018), CDProjekt, Cyfrowy Polsat, Orange Polska, ENERGA (until 2018), PLAY (from 2019) PGE and TAURON. Lastly, five insurance and financial entities: Alior, PKO BP, PKAO SA, mBank and PZU SA.

The study includes the analysis of reports developed after the entry into force of EU rules on the

obligation of non-financial reporting. For most companies, these are reports for 2018. At the time when study was conducted, only one company published the report for 2019, so it was assessed by the authoress.

Results

Most of the surveyed entities issued integrated reports, adapted to EU requirements and containing a very large amount of non-financial information in 2018 already. Table 1 shows how fast growing the number of companies developing such reports in Poland and worldwide are.

Table 1: Changes in the number of reports reported to GRI

Fiscal year	Number of reports (approximate values)			
	Sustainable development (CSR)		Integrated reports (GRI)	
	World (±)	Poland (±)	World (±)	Poland (±)
2004	2000	0	10	0
2005	2300	1	10	0
2006	2900	4	60	0
2007	3400	3	110	1
2008	4100	15	190	1
2009	4900	13	240	4
2010	5800	29	275	12
2011	5900	37	360	18
2012	6200	41	375	28
2013	6900	49	410	22
2014	12700	40	1450	20
2015	41600	55	27300	28
2016	50500	551	31000	31
2017	53400	631	32600	36
2018	55700	601	34500	51

Source: Own elaboration based on data: globalreporting.org

The type and level of reporting in the surveyed companies is presented in Table 2.

Table 2: The type of report and standards on the basis of which it was created

Type of activity	Type of report				Norms of report				Presence in RI
	sust. devel.	CSR	integ.	no data	GRI		ISO 26000	Diff.	
					G4	Stand.			
inds.	3	0	5	1	6	3	8	3	9
serv.	0	1	5	0	6	0	2	0	6
finan.	0	0	5	0	2	3	5	2	5

Source: own study based on company reports

Only one of those companies does not publish commonly available reports, nor does it place information about the rules and reporting standards on its website. A fee must be paid first to access its reports. The rest not only create CSR reports, but more and more often develop comprehensive integrated reports, consistent with the guidelines of not one, but several standards at the same time.

Most often it is the GRI standard, 14 companies reports are based on its older version, while 6 of them use the newest version. Nowadays it gets more often for 15 of those companies CSR strategy, and thus its reporting, to include ISO 26 000, some of the surveyed organizations also include UN guidelines included in the Global Compact (GC) and Agenda 2030 for sustainable development (http://ungc.org.pl/sdg/sustainable-development-goals).

Upon examination of the company reports, we see great care taken in their preparation and very

meticulous registration of all activities which allow us to state that the company meets the requirement of a standard, which is used as a basis.
However, it should be kept in mind that reporting and boasting about achievements and good practices in the area of CSR does not mean that at the same time companies do not conduct activities, that could be considered ethically questionable or even contrary to the CSR and sustainable development principles. The best examples for this are companies from the energy and mining industries. In their reports, they pride themselves in actions taken for the environment and social well-being, however in practice they invest more and more in acquiring and developing conventional energy sources, while the amount of "green" energy they produce is symbolic. In 2018 it was 21 210 GWh at the total production of 179 335GWh, or 12.45% of the total energy generated (https://www.are.waw.pl/).

In the cases of energy and mining companies there are visible elements of PR manipulations. Photographs presented in folders and reports are shown in a way that makes elements of the natural environment, like forests, green fields and blue water, appear in the background (https://raportzintegrowany 2018.gkpge.pl/en/; file:///C:/Users/KATATR~1/AppData/Local/Temp/ raport-csr-2019.pdf; et all.). Fuming chimneys are rarely seen however, there are no mine heaps, waste dumps or landscapes with visible mining damage. Even though in the immediate surroundings of those facilities, changes can be encountered at every step, indicating the degradative nature of their activities. Even when for years past they have been one of the largest polluters in Europe.

The charts included in the reports show a decreasing emission of gases harmful to human health and the natural environment, including SO_2, however there is no such data on changes in CO_2 emissions (European Green Deal…).

A different matter related to these issues is the excessive exploitation of hard coal deposits, extraction of which becomes more and more dangerous and increasingly expensive, while at the same time causing more and more mining damage. In 2016 the mining company spent almost 55 million PLN on its extraction, and in 2018 it was already over 92 million (no data for 2019) (https://www.jsw.pl /media/wydarzenia/artykul).

In authoress opinion this problem is shown in the reports, however it is presented in such a way, that the reader may get the impression that it is of no significance, and that it does not contribute to the deterioration of the conditions and quality of life of the inhabitants of city Jastrzębie and its surroundings.

There are also ambiguities and doubts in the assessment of the actual activity and purposes of CSR reports prepared by other groups of companies. Particular doubts concern the LPP report, which is the first document so comprehensively developed by this company (https://www.lppsa.com/en/ sustainable-development). The question arises whether the company was forced by EU regulations to develop a CSR strategy and undertake reporting, or perhaps its aim was to strengthen the image which was heavily damaged after the collapse of a building that was LPP's production facility that took the lives of about 1,100 people working there. However looking at the amount of space in the report devoted to efforts made for improving safety at work in Asian companies producing for LPP, the second option was probably dominant. Especially because in LPP report there was no mention, that activities aiming to improve occupational health and safety appeared only after this incident, additionally there is no information regarding the issue of compensation. It seems that between the years of 2013-2018, in business practices implemented in Asian countries, LPP switched from greenwashing activities to a carefully developed and implemented PR campaign (Rozwadowska, 2016; Guzik, Zapart, 2017). But is it already a social responsibility? It is probably still too early for such statement.

In addition to data analysis for individual groups and individual companies, we can also indicate that the information appearing in the reports of almost all enterprises raise doubts as to their assessment as socially responsible companies. These issues concern corporate governance, and more specifically diversity policy. Each of the surveyed companies states that they do adopt such policy and undertake extensive actions to combat all forms of discrimination, while at the same time it is enough to familiarize oneself with the composition of management and supervisory boards in order to gain certain

doubts. In each of these groups there are only, or almost only men, managerial positions are also more often occupied by representatives of the aforementioned sex (https://www.lppsa.com/en/about-us/management; https://www.gkpge.pl/Investor-Relations/PGE -Group/Management; https://kghm.com/en/about-us/leadership et all.).

Additionally most of these reports show data indicating that female employees working on the same positions as men receive lower salaries. One can speak about such information as suggesting the existence of the "glass ceiling" phenomenon in the higher structures, however there is no information indicating that the company notices this problem. On the other hand, the report emphasized information on equal participation of women and men in training sessions, identical assessment systems, etc.

For service and financial-insurance companies it is a distinguishing characteristic that they employ mainly young people, aged no more then 30-40 years, and as such, the number of employees in older age groups is significantly lower (https://raportroczny2018.pzu.pl/en/business/employee/human-capital-management; https://www.mbank.pl/en/annual-report/ 2017/; http://www.raportroczny2018.pkobp.pl/en/otoczenie-banku/nasi-pracownicy/; et all.). Opposite problem can be seen in industrial companies, especially JSW, where a significant percentage of the crew are people over 40, or even 50 years old, so here, in turn, a generational gap may occur, and as a result an inability to obtain an inflow of new employees in the future is possible (https://www.jsw.pl/raportroczny-2017/pl/CSR/ZatrudnienieIWynagrodzenie/ZatrudnienieIWynagrodzenie/). Of course, these phenomena cannot be identified with the negative phenomena that accompany improper implementation of CSR, although in the future they may pose threats to the functioning of the organization and foster unethical practices in the area of employment.

Summing up the assessment of content in presented reports about the CSR and sustainable development, according to the authoress, there is a visible interlacing of CSR and PR messages, but misleading or clearly false information weren't noticed. Typical CSI or greenwashing practices cannot be indicated. High ratings of the reports of the surveyed companies issued by independent auditors and expert institutions, with the Responsible Business Forum at the forefront, seem to confirm this claim.

Conclusions

The analysis of issues of interest to the researcher made in this study, based on integrated reports, as also reports on sustainable development, CSR and scientific and journalistic studies as well, made it possible to conclude, that in the surveyed companies and their reporting, socially responsible practices and their proper presentation prevail.

However, in many cases, there will also be attempts to bypass or downplay unfavorable information, and to take initiatives included in good practices in order to weaken public dissatisfaction from the negative impact of the organization on social development and the environment, instead of forming conditions for long-term progress for both company and communities that companies can influence.
It also seems that the analyzed reports are dominated by information on good practices, while there is no notice of greenwashing practices. However, it cannot be excluded that these practices are mixed with PR activities meant to build a positive image of these companies in society.

At the end of the discussion, one more afterthought arises, coming not from the analysis of company documents and reports contained in various types of publications, but from observation of social and health reality related to the development of the COVID-19 pandemic. According to the published reports, companies particularly focused on their activities related to the environment and ecology, seeing them as a source for shaping the image and their market position. It seems that in the near future this approach will change and much more attention will be devoted to human health and threats to it, which can also in a completely new way, now difficult to predict, affect the functioning and economic condition of companies.

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Evaluation of Threats to The Internal Safety and Internal Security of The State

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Abstract

The assessment of a state of an internal safety and security is based on reports of the decision-making centres responsible for ensuring the functioning of the State safety and security system and is estimated on the basis of studies carried out by public opinion research institutions. The problem of assessing a state of an internal safety and security of the State is embedded in the perception of the phenomenon being assessed. A failure to correctly identify threats to the internal safety and security environment is related to the ability to disclose them and prioritise the degree of individual threats. The purpose of this Article is to pay attention to the proper identification and response to actual threats to safety and security of the State and to related needs.

Keywords: Internal Safety, Internal Security, Threats, Public Safety, Public Security, National Safety, National Security, Constitutional Safety, Constitutional Security,

Introduction

In many cases, scientific studies on the internal safety and security of the State are geared to referencing definitions of safety and security or to creating new terms for the problem. Extensive scientific discourse raises subjective and objective issues of internal safety and security and their relations with other types of safety and security, e.g. international security. Without, of course, reduction of the importance of scientific theories in the field of safety and security sciences, many of the publications devoted to this issue remain in the current of theoretical discussion. Another challenge for the proper assessment of the State's internal safety and security is to succumb to a kind of fashion for particular phenomena, in the case of internal security in recent years these are the terrorism threats. An additional problematic issue in this area is that representatives with a poor range of theoretical knowledge, not to mention practical knowledge, are engaged in discourse. A separate problem of presenting the State's internal security threat is the studies prepared by the analysis and information departments of individual state administration entities responsible for public communication. In this editorial, using the qualitative research method, scientific studies on internal safety and security issues have been analysed. The result of the study indicates that the vast majority of the analyzed articles include the issue of terrorist attacks, including the construction of local and national systems aimed at counteracting such threats, as well as the issue of theoretical consideration of internal safety and security and its institutionalization. Among the analysed items were, among others, studies and compact items: Susan E. Clarke, Erica Chenoweth *„The Politics of Vulnerability: Constructing Local Performance Regimes for Homeland Security”,* Susan Page Hocevar *„Building Collaborative Capacity: An Innovative Strategy for Homeland Security Preparedness”,* Linda Kiltz *„ Perceptual Framing of Homeland Security”,* Charles R. Wise *„Organizing for Homeland Security*”, Robert R. Friedmann, William J. Cannon *„ Homeland Security and Community Policing: Competing or Complementing Public Safety Policies”,* Shawn Reese *„ Defining Homeland Security: Analysis and Congressional Considerations”,* Christopher Bellavita *„Changing Homeland Security: A Strategic Logic of Special Event Security”*, Katarzyna Grosicka, Leszek Grosicki, Przemysław Grosicki *„Organizacja i Kierowanie Instytucjami Bezpieczeństwa Wewnętrznego Państwa”,* Marian Kopczewski *„Bezpieczeństwo wewnętrzne państwa – wybrane elementy”, „Bezpieczeństwo wewnętrzne państwa. Wybrane zagadnienia”,* red. Stanisław Sulowski, Michał Brzeziński, oraz Zbigniew Ścibiorek, Bernard Wiśniewski, Rafał Kuc, Andrzej Dawidczyk „Bezpieczeństwo

Wewnętrzne. Podręcznik Akademicki". In addition to scientific studies, the analysis also included a document prepared by Eurostat called *"Crime statistics"*.

Threats to internal safety and security

The above mentioned studies (representatives of American centres) refer to the tragic event in 2001 related to the terrorist attack on public and strategic facilities in the United States of America and to the natural disaster state caused by Hurricane Katrina in 2005. Terrorist attacks continue to have a high probability to be carried out in Europe, the United States of America and other places which are linked to counter-terrorism activities against major terrorist organisations. Equally high risk is posed by events related to the occurrence of natural forces, which recently affected Australia - bushfires, (Karnaszewski, 2020), USA - forest fires (Gersz, 2017), Bahamas - Hurricane Dorian (Rogacin, 2019), Mozambique, Zimbabwe, Malawi - Cyclone Idai (Goldin, 2019), storm in the Tatra Mountains - Poland (Krzywda, Mateusiak, 2019), and also forest fires in Greece (Krzymińska, 2019). Both terrorist attacks and disaster response and recovery events are activities that fit into a crisis management scheme that falls within the area of a common safety and security. Crisis actions are also taken as a result of erroneous or intentional human activity. Examples of such events include the failure of the BP oil rig in 2010 in the Gulf of Mexico (Przybylski, 2017) or the crack of the sewer collector under the Vistula River in 2019 (Chełmiński, 2019).

As already mentioned above, the threat of terrorist attacks is still a current challenge for the state administration obliged to ensure safety and security, but in addition to this phenomenon (the central phenomenon, in the opinion of many researchers), many other activities undermining the internal safety and security of the State are spreading. Reacting to terrorist threats and disasters is part of the crisis response, qualified as undertakings for general safety and security. Internal safety and security, in addition to the indicated general safety and security, includes the areas of public and constitutional safety and security. At present, it seems that these two issues do not give rise to a comprehensive discourse on threats to the internal safety and security of the State. When building a responsible internal safety and security strategy, one should not succumb to stereotypes and imposed leading trends; on the contrary, reliable analyses should be carried out to show the actual threats that result in:

- ✓ the economic situation of the Country,
- ✓ unemployment,
- ✓ social sentiments and tensions,
- ✓ he hostile influence of other states and countries,
- ✓ frequent staff changes in the institutions responsible for safety and security,
- ✓ enacting legal acts that are unclear and contrary to the Constitution,
- ✓ failing to react to reported social problems,
- ✓ the lack of public support for initiatives by executive authorities,
- ✓ the distortion of democratic values expressed by the power triangle,
- ✓ malfunctioning system for disclosing and prosecuting perpetrators of criminal, drug-related crimes and organised crime, including cross-border crime.

These points do not constitute a closed catalogue of causes which may directly or indirectly affect the emergence of threats, but are only an indication of the need for constant monitoring of areas where behaviours directed against the health, life and property of citizens may occur, as well as against the economic interests of the State and the credibility of the legislative, judicial and executive powers. By analysing the information on the Europol website, it is possible to identify the main areas of criminal activity that affect the state of internal safety and security of the State, such as, among others:

- ✓ trafficking in people and trading in human slaves,
- ✓ illegal immigration,
- ✓ terrorism,
- ✓ trading and trafficking in narcotics,
- ✓ cyber-crime,
- ✓ sexual abuse of children,
- ✓ the counterfeiting of money and means of payment,

- ✓ economic crime,
- ✓ trading and trafficking in arms,
- ✓ crimes against the environment,
- ✓ organised crime - criminal/narcotics/economic crime
- ✓ corruption, bribery,
- ✓ illegal trade in works of the arts,
- ✓ xenophobia and racism (Europol, 2020).

Ensuring internal safety and security resulting from the need to respond to the threats identified in the above points is confirmed by Interpol's areas of interest. The official website of this institution highlights risks related to: corruption, counterfeiting of means of payment, crime against children, crimes against national heritage, cybercrime, drug trafficking, environmental crime, financial crime, trafficking in firearms, trafficking in people, trafficking in counterfeit goods, organised crime, terrorism, car theft and also crimes against the population and war crimes (Interpol, 2020). Another institution that illustrates the sources of threats to the State's internal safety and security is the Federal Bureau of Investigation (FBI), which lists terrorism, espionage, cybercrime, corruption, crimes against civil liberties and rights, organised crime, economic crime (white collar crime), violent crimes against health and life, and crimes related to the production and trafficking of weapons of mass destruction (FBI, 2020) in its catalogue of behaviours that have a negative impact on safety and security. The areas of threat to the internal safety and security of the State, as identified by the three major organisations involved in identifying and combating crime, seem to coincide. In addition to terrorism, there are crimes directed against both citizens and the economic interests of the state. Crimes (corruption, espionage) are also indicated, which affect the shaking of democratic foundations of nation states.

In an attempt to identify the sources of threats to the State safety and security as accurately as possible, the author referred to the analysis of the Eurostat report entitled “Crime statistics”, which provides a quantitative summary of criminal acts committed in European countries in the years 2008-2017. Between 2012 and 2017 according to information provided by the police the robberies committed in the EU fell by 30.3% to around 317,000 in 2017. A significant increase in this type of offences occurred in the years 2008-2012. In 2016–2017, on the other hand, the total number of robberies in the EU decreased by 22,000, only Ireland, Cyprus, Romania, Slovenia and Sweden recorded some increase (a total increase of 266 assaults). An analysis of assaults registered by the police in relation to the population (number of crimes per 100,000 inhabitants) shows that in 2017 the highest indexes were recorded in Belgium (167), France (150), Spain (144) and Portugal (115). The lowest results were diagnosed in Romania (16), Estonia and the Czech Republic (15), Cyprus (14), Slovenia (12), Slovakia and Hungary (9). In the United Kingdom this index was the highest in England and Wales (132). Of the EFTA countries, Switzerland had the highest index - 21 assaults. The report also indicates data on the homicide crime. In 2017, the police in the European Union recorded around 4,300 homicides (excluding data for the Netherlands), which is the 22% decrease compared to 2008. Statistics indicating the number of homicides per 100,000 inhabitants show that in 2017 the highest values were recorded in Latvia (5.6), Lithuania (4.0), Estonia (2.2) and Malta (2.0), and the lowest in the Czech Republic and Italy (0.6) and Luxembourg (0.3). In the EU, the number of assaults in 2017 recorded by the Police was around 589,000. The number of assaults recorded by the police varies considerably across the EU. Different rules, frequency of reporting and recording practices affect the quality of the comparison, e.g. in the same list, i.e. the categories of robbery and extortion (assaults), some countries have shown criminal acts related to intimidation, or have included completely different categories, e.g. homicides. Another category of criminal acts is theft of vehicles. In 2017, police units registered about 573,000 vehicle thefts in the European Union countries, which is 35% less than in 2008. Between 2008 and 2017 a downward trend in vehicle thefts was recorded in the European Union. However, Ireland, Greece, Spain, Latvia, Malta and Romania saw an increase in car thefts between 2016 and 2017. Belgium, France, Luxembourg and Hungary have not reported outcomes (Eurostat, 2020).

With reference to this study, it must be assumed that criminal offences continue to constitute a serious threat to internal security of the Country. The impact of external threats that directly affect the internal safety and security of the Country, which include, in particular, espionage and soft power measures, must be added to the above-presented information. Initiating by the external aggressor the tools of information combat in the form of disinformation or reflexive management leads to destabilization of the political system of the State. An important element of the information combat is the targeted transmission of information, by using the instrumentation chosen according to conditions (society, political elite). The lack of a proper reaction of the State to the undertakings undertaken by the aggressor may lead to destabilisation of the adopted model of the State functioning, both in the political, economic and social sphere.

Forecasting threats affecting safety and security of the State

The development of a model of actions aimed at combating crime and responding to events with a terrorist dimension, or actions being a result of natural disasters and technical failures, is a necessary measure to ensure the internal safety and security of the State. However, just as important as not more important are the actions preceding events that affect a state of safety and security of citizens and administrative structures of the State. To this end, it is necessary to refer to an issue somewhat overlooked in the common discourse on safety and security, which is forecasting. As Brunon Hołyst points out, forecasting is an integral part of crime prevention, but it is underestimated and unpracticed knowledge. The key objective of conducting forecasts is to obtain information on the dynamics and structure of phenomena (crimes). Three basic functions are assigned to forecasting: preparatory, activating and informative function. With regard to the time criterion, forecasting can take the form of short-term (up to 2 years), medium-term (up to 5 years) and long-term (over 10 years). Assuming that crime is an important phenomenon affecting threats to internal security, the organisation of the fight against criminal acts should be regarded as the integral part of controlling all fundamental social processes. For a proper model for fighting crime it is necessary to forecast social phenomena, including pathological ones. Criminological prognosis is understood as any statement made about the future characteristics of criminal phenomena, built on the basis of the conducted observation, description of the phenomena and laws that specify the relationship between successive phenomena (Holyst, 2017).

When using the instruments used for criminological forecasting, it is also necessary (when choosing the right methodology, e.g. in the form of expert opinions, reflections or analogies) to strive for comprehensive forecasting of threats relevant to the internal safety and security of the State. By maintaining the division of the State's internal safety and security into public, general and constitutional safety and security, it is possible to develop the research frameworks for each of these categories to accurately predict future events. For understandable reasons, future criminal behaviour will be examined differently from spying behaviours or behaviours targeting the decision-making structures of the State.

Conclusions

A key aspect for building a strategy to ensure the retention of the internal safety and security of the State is to identify threats in this area. Stereotypic understanding of threats narrows cognitive horizons that become incomplete and do not provide decision-makers with accurate information about threats. Currently, terrorist threats are presented as the most serious source of social unrest. Other criminal activities, such as the financing of terrorism, money laundering, immigrants, cross-border crime and organised crime, are therefore attributed to this phenomenon. Many European countries have not been affected by a direct terrorist attack, or have been affected only once, and yet it is this type of threat that is given priority. The author of this article understands the seriousness of the events resulting from the terrorist attack and appreciates the initiatives to build and strengthen the already existing anti-terrorist system, but would like to draw attention to the need to rebuild the perception of today's threats. The proposed approach does not reject the issue of terrorism, on the contrary, it focuses on the further approach to monitor (forecast) the risks associated with it. This system must apply equally to criminal and economic crime and to crimes that harm the vital interests of the State. Actions directed against the State Treasury or corruption-like actions are certainly not as expressive as terrorism, but they certainly have a equal if not bigger destructive impact on the

condition of society and state structures. Citizens of the States do not want to be victims of thefts, robberies, or do not want to see one of their loved ones become victims of trafficking in people and want to have freedom of development. However, these objectives will not be achieved if the threats of this type of crime are marginalised. An additional problem in responding properly to a security threat is that decision-making centres suspend, do not publish or do not produce reports containing the actual scale of the problem. None of the political elites in power will be in favour of the full and timely reporting of data that could affect, for example, the election or support for the government. Threats to the State's internal safety and security continue to change and take on new, hitherto unknown forms, such as pandemics, and therefore ongoing monitoring and forecasting of future events in an objective light seems to be a necessary measure to ensure the State's internal safety and security.

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Analyzing New Technologies in Motivation and Team Management: An Exploratory Contribution

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Abstract

The present study through the analysis of the telecommunications field in Portugal, aims to demystify the strategies that are being used, in a technological era, to achieve organizational goals regarding employee satisfaction and, by other side, employee turnover. Human Resources Management covering its origin, its dominant perspectives, the evolution of the concept and its dimensions and emphasis is given to the actions and activities of Internal Marketing suggested by the literature, as well as the tools used for an effective practical implementation of this, within the organizations and also how this area of studies is so related with HRM. In terms of methodology, the manuscript presents a qualitative approach using direct observation, a focus froup and structured and semi-structured interviews within Portuguese companies and focus group. Three semi-structured and 2 structured interviews were conducted in February 2019, individually, to the Human Resources Administration and focus group with employees. For the analysis of both the interviews and the focus group, it was used the technique of content analysis of Bardin. Job satisfaction is the answer for the decreasing of turnover, increasing of retention and the management of IM which, not only translates into higher sales and loyal consumers, but also means less costs with workers by boosted performance. As key persons in organizations who are responsible for a capable workforce, HR managers must have full and real-time information to measure, predict, and manage workforce change and development. The adoption of IT by HRM is important for growth as organizations face quick changing environments. More specifically, the systems of IT adopted by HRM contain HR Information System, HRM System, e-HRM, and so on.

Keywords: Electronic Human Resources Management, Internal Marketing, New Technologies, Retention, Turnover

Introduction

The business world itself demands constant adaptation to changes in our society, specially in the current global context characterized by a dynamic, competitive, innovative and volatile environment. For this reason, it is necessary for the concept of change to be sharp within organizations. Organizations should respond proactively to being able to keep up with the fast changes today's society is under. Organizations are becoming more aware of this reality, are looking for new ways to offer competitive advantages to their stakeholders (Guimaraes e Borges, 2009a). As such, consolidated capital and organizational structures are no longer enough elements for the success and maintenance of the business and, in order to cope with these growing environmental demands, it is urgent for organizations

to develop strategies. In this way we can point out that a business strategy can be defined as the direction or scope of a company in the long term, aiming to achieve some kind of competitive advantage, through the configuration of its resources and activities, in a changing environmental context, meeting the needs of the large stakeholders (Grant, 2010). The present study aims to verify, through the analysis of the telecommunications field, to demystify the strategies that are being used, in a technological era, to achieve organizational goals. Given the quick changes in technology in the past decades, technology proven to have a significative impact on Human Resources Management, and it is likely to move the field in some new directions in the future. The world has experienced cultural, societal and economic changes based on the increasing domination of digital technologies (Ferreira & Sousa, 2020), which have led to the current period called the digital age or digital era (Malheiro et al., 2019; Sousa et al. 2020). Digital technologies play an increasingly flagrant role in both the lives of employees and Human Resources Management, which seems to be affected in multiple ways (Prensky, 2001). This special issue focuses on the impact of these changes on Human Resources Management, in relation to changes to the workforce, to Human Resources Management in general and more specifically to the use of technology in delivering HRM activities. Along with the technological transformations and advancement of the Internet has emerged a concept that is called e-HRM (electronic Human Resources Management) which uses information technology in two ways: Firstly, technology is necessary to connect people who are usually segregated in different spaces and it allows interactions between them, in this way technology is serving as a medium with the aim of connection and integration; Secondly, technology supports all people involved completely, replacing them in the execution of HR activities.

Sales field is undeniably challenging for the Human Resources Management. Adjacent to the persistent hiring of people by these companies, it is a reality where the search for a job and the difficulty in getting it, has caused several people to look for alternatives, most of the times to choose a job they do not desired. In this field, companies have several places with immediate entry, however companies are willing to invest in the new employees but, by the opposite, employees do not believe in the organization, resulting in a huge challenge for the Human Resources Management and Internal Marketing. The retention of employees in this area is something that companies are struggling with, so it is necessary to plan and implement a successful and sustainable strategy in the short and long term. In fact, without a good and well-functioning internal relationship, external customer relationships will not develop successfully. It is necessary to manage employees - on all levels - internal relationship (Gummesson, 2011). Further on this study, it would be possible to establish the determinants of job turnover, the strategies developed for employee retention, and the Internal Marketing practices such as communication, empowerment and Job embeddedness which highly influences whether an employee intends to continue with the current job or not (Holtom et al., 2006). This study appears to be extremely important because, despite of the fact that more than thirty years of literature on the subject, in the current context, the application of Internal Marketing in companies remains scarce and little in complexity (Conceição, 2012; Van Maanen & Schein, 1977). However, the growing concern of organizations to engage their employees in business is notorious, even being understood as key elements for organizational success. Human beings are seen as the DNA of companies, they are unique resources and difficult to replicate, and may even constitute an aspect of competitive advantage (Grant, 2010). Given this view, it is currently verified that the employees are encouraged to participate in the direction of the companies, giving suggestions for the improvement of the work processes. Thus, the presented study is to analyse an average size company, whose main activity is the provision of services in the area of telecommunications, where everyone is asked to know the company and to "sell" their service. The manuscript structure is divided into Human Resources Management, Internal Marketing, Methodology, Context, Analysis/Discussions of the Results and General Reflections/Conclusion.

Human Resources Management

The term Human Resources (HRM) has developed over time among other terms and meanings such as: human capital, workers, personnel, staff, etc. In this ontext, Padoveze (2000) describes human capital as the set of skills, knowledge and individual experiences of an organization's employees to perform certain tasks. Therefore, Human Resources Management Capability (HRMC) is a very important business' capability. Skills and knowledge of human resources can be hard for competitors to imitate, these are unique and exclusive, not like machines and other assets that can be acquired in

the market by any competitor. In fact, this is one of the assumptions of the VRIN framework (valuable, rare, inimitable and non-replaceable) a set of resources capable to support achievement of sustainable competitive advantage (Barney, 1991) . Later on, the author adapted the VRIN framework into the VRINO framework with the 'O' (organisation) denoting if a firm is "organized to exploit the full competitive potential of its resources and capabilities" (Barney, 1991, p. 56). This new paradigm of competition, management acknowledged the importance of people and gradually take the conscience that the competitive advantage depends, in the most part, of the qualified people, the capacity of developing them inside the company and making them th key for competitive advantage. Like Ulrich (1998) observed, the main traditional competitive aspects can be sooner or latter copied – cost, technology, distribution, production, etc – however, it remains people, the key-factors. The literature reveals that, although it was not well received, the designation of Human Resource Management quickly established itself in contrast to traditional personnel management practices (Cunha et al., 2010). That is, the function of HR detached itself from its traditional connotation to fit strategically in the business strategy, which is recurrent to use nowadays different terms to define the HRM activity in an organization, such as: Human Resource Management, Personnel Management. The HR function are often confused as being synonymous with each other, without any distinction being made at the level of their content, however the following definition indicates the essence of what HRM really is: "HRM is a distinctive approach to employment management which seeks to achieve competitive advantage through the strategic deployment and a highly committed and capable workforce using an array of cultural, structural and personnel techniques" (Storey, 2007, p. 4).

As management area, the Human Resources function arises as a response to organizational needs. Being an activity, it is transversal to the whole organization, that is, everyone practices it, and requires professionals specialized in HRM as a specialized activity (Fernandes, 2012). Thus, HRM is a set of knowledge, and at the same time, an activity too, while knowledge is something heterogeneous that intents to achieve results, influencing people's behaviour and attitudes through a defined management system. In order to do this, it has a management system tailored to the needs of the organization that will influence employees' behaviours and attitudes (Neves & Gonçalves, 2009; Ribeiro & Gomes, 2016; Bloom & Van Reenen, 2011). Regardless Guest, Paauwe and Wright (2012) states that it is not possible to assert that a good HRM has an impact on organization performance. Therefore, one of the purposes of HRM is to recruit people who are capable, flexible and committed to the organization, and for this it is necessary to reward the performance and development of key competences. Today, HRM's role is far more comprehensive than simply looking after its employees. Thus, HRM has a strategic area for the organization, in that it does not limit its intervention only when problems arise, thus assuming management functions such as planning, monitoring and control. Given this, it is perceived that the effectiveness of HR functions has a significant impact not only on top managers but also on all workers in the organization (Chimoga, 2014). In the concept of HRM, people are no longer seen as a cost to be considered as an investment, that is, one of the most competitive assets. Thus, knowledge and skills must be expanded so that the organization produces value in individual, organizational and social terms (Neves & Gonçalves, 2009). Soft and Hard Models of HRM are the two of the most widely adopted models of HRM are the hard and soft versions. McGregor (1960), created and developed in the 1960s models about the Motivational theories X, Y and these are based on opposing views of human nature and managerial control strategies. The hard model – theory X - is based on notions of tight strategic control, saying that the average workforce is more efficient under strict supervision and authoritarian approach. In here managers believe their employees are less intelligent than the managers are, lazier than the managers are, or work only the necessary; While, for other side, there is the soft model is based on control through commitment and according to this model - Theory Y – work is as natural as play or rest, people are not inherently lazy, they have become that way as a result of experience. People will exercise self-direction and self-control in the service of the objectives to which they are committed. People have potential and under proper condition they learn to accept and seek responsibility (Barrick et al., 2015).

Therefore, it is possible to sustain that Human Resources Management is constantly evolving, thus posing a challenge for Human Resources managers in the way they plan their strategies for the management of their workers (Chimoga, 2014), in general. Thus, the organizational approaches of the last decades have emphasized that the effective management of the human resources of an organization

can be a fundamental determinant for the improvement of organizational performance and to achieve a sustainable competitive advantage (Caetano & Tavares, 2000; Lo et al., 2015). The world has experienced a cultural, societal and economical changes based on the increasing dominance of digital technologies. In sum, these changes have led to the current period called the "digital age" or "digital era". Digital technologies play an increasingly flagrant role in both the lives of employees and HRM, which seems to be affected in multiple ways. This special issue focuses on the impact of these changes on HRM, in relation to changes to the workforce, to HRM in general and more specifically to the use of technology in delivering HRM activities.

New technologies have created a new generation of employees and the organizational structure has changed. The changes are organized in a way that today the absence of organization on the www (World Wide Web), means the loss of huge capital resources. Nowadays the business faces many challenges such as globalization, the value chain for competitiveness and technological changes, specially, three focal areas labelled as digital employees, digital work and digital employee management. The concept of "digital employees", a first major area, has various terms such as "digital natives" Prensky (2001), "millennials" (Deal, Altman, & Rogelberg, 2010) or "net generation" (Tapscott & Barry, 2009), it is assumed that the early interaction with digital technologies has shaped a new generation of people with distinctively different attitudes, qualifications, behaviours, multitasking capabilities, expectations and learning by doing and preference of instant gratifications and frequent rewards (Prensky 2001).

Internal Marketing

The origins of Internal Marketing started in the seventies, when it was recognized the importance to attend the needs of the employees so that they could be able to offer quality services, in order to satisfy their clients. (Berry, Hensel, & Burke, 1976) argued that Internal Marketing could be applied to change organizational capacity and not only service delivery, at the same time that the internal communication to be promoted would allow understanding the difficulties in customer service, developing the potential of employees in the execution of a superior service (Vilas-Boas & Sousa, 2019). In this way, Internal Marketing was a solution for companies to offer an exception service. According to these authors, activities such as disseminating the decisions made, obtaining frequent feedback, training and rewarding employees who serve clients with excellence, fulfil the objective of Internal Marketing. Sharing the same view, (Sasser & Arbeit, 1976) argued that organizations should understand their employees as their first market. In this relational perspective, Internal Marketing meant that managers and the other members of the organization were essentially partners, treating the organization as their employees' clients and, therefore, they could perceive their clients more clearly in the service' delivery. In this sense, it is definitively important to mention the value of the Nordic School, which made a very important contribution in the study of Internal Marketing. The origins of this School go back to the early seventies, through the investigations of Christian Grönroos and Evert Gummesson (2000). It is a School of Marketing, where a way of thinking has developed through service marketing research in Scandinavia and Finland, thus gaining international knowledge. In the 1990s, was developed within a framework of a relational marketing thinking school (Grönroos, 2000). It should be noted that it was the Nordic School researchers who emphasized the nature of the relationship and the long-term in-service marketing, creating terms such as "buyer-seller interactions"; "Customer relationship lifecycle" (Gummesson, 2000); "Internal marketing" and "part-time marketers" (Gummesson, 2000). This author emphasizes the importance that these employees have in relation with the clients, since these influences the relations with the clients without belonging to the department of marketing or sales. Given the complexity of the concept, several definitions have been developed, and so far there is no consensual definition (Ahmed & Rafiq, 2003). In fact, this area still needs studies to consolidate its importance as an academic discipline and organizational management philosophy, which is why its practical application is not yet spread in all companies. The definitions found in the bibliography are varied and can be grouped into four dominant perspectives: 1) As a synonym of Human Resource Management; 2) As a use of marketing techniques in the internal market; 3) As a precondition for satisfied external customers; 4) As a way to achieve competitive advantages.

Some academics understand Internal Marketing as synonymous with Human Resource Management (Lewis & Varey, 2012). In this context, (Kotler & Armstrong, 2003) considered Internal Marketing to be "the task of hiring, training and motivating competent employees who want to serve customers well". This author emphasized the importance of Human Resources and reinforced this idea when he suggested that “employees are the company itself. Can build or destroy marketing plans" (Kotler & Armstrong, 2003). Another author who shares this view is (Varey & Lewis, 2000), who emphasizes that "Internal Marketing is the permanent training of service providers in order to improve the knowledge of their services and their capacities, making them aware of the opportunities and the marketing skills" (Varey & Lewis, 2000). The author justifies his opinion, arguing that there is a need to establish a close integration between different functional areas. It considers that the application of Internal Marketing can achieve this interdepartmental integration, which can align efforts around common goals. However, this approach is somewhat limited, as it does not reflect customer orientation, nor does it contemplate strategic marketing management. Furthermore, all successful management programs require commitment from top management and employees (Cascio, Mariadoss, & Mouri, 2010; Heskett, Jones, Loveman, Sasser, & Schlesinger, 2008; Kilburn, 2009; Kim, Tavitiyaman, & Kim, 2009; Robert & Cheung, 2010), and internal marketing is no exception. Kilburn (2009) argued that top management commitment is the most important factor that affects the effectiveness of internal marketing in the manufacturing environment.

In studying the implementation of internal marketing, service environment and supportive management affect the attitudes and behaviours of service employees (Sousa & Rocha, 2019). Shanock and Eisenberger (2006) showed that supervisors would influence employee perceptions and performance significantly due to their proximity to employees. Cascio et al. (2010), on the other hand, reported that frontline employees perceive top management commitment as having a greater effect on employee work behaviours than the influence of their direct supervisors. Cascio et al. (2010) also suggested that organizations should employ internal marketing to convince employees that top management is committed to enhancing employee satisfaction, empowerment, and service quality. In the social-exchange theory, Cropanzano and Mitchell (2005) reported that employees who recognize top management commitment to their staff, will give a positive return with better work attitude as expected.

Methodology and contextualization

The choice of a methodological research depends on the assumptions underlying the problem, and aims to achieve the objectives set for the study (Yin, 2005). In this way it is presented as a general objective, to verify the role of the New Technologies in the Human Resources Management, through the analysis of the telecommunications field, demystify the strategies that are being used, in a technological era, to achieve organizational goals. As specific objectives, the study intends to achieve the following: Present the advantages and disadvantages for organizations in the use of new technologies in HRM practices; Identify the influence of new technologies on HRM practices; Understand how new technologies strengthen the human resources management system; Realizing the consistency of HRM practices influences retention of employees; Understanding consistency in evaluations of human resource practices influences job satisfaction; Identify whether new technologies reduce turnover; Detect if the perception of relational justice influences the intentions of turnover; Understand the linkage of internal marketing theories simultaneously with HRM practices in the context of telecommunications.

Currently, in the Portuguese Telecommunication market exists several different operators. It makes sense to say that the market is diverse and reaches the needs of the different targets. There are two types of telecommunications operators operating in Portugal: mobile operators with their own network and virtual mobile operators. The difference between them is that Mobile operators with their own network have their own telecommunications network; and Virtual mobile operators use the network of one of the Mobile operators with their own network. The liberalization of fixed and mobile networks and the entry into the Portuguese market of new telecommunications operators increased competition, improved quality and reduced prices. The innovative spirit in national telecommunications was affirmed during the second half of the 1990s, through mobile phones, with the development of unique products (such as prepaid service), or the launch of new operators through various marketing initiatives times awarded internationally. According to Sampaio (2004), the mobile telecommunications market

in Portugal had an unusual history, since it began in the year of 1992 with the launch of two GSM technology operators: TMN (PT) and Telecel (now named Vodafone). For some years, through high investments in marketing, these two companies, in addition to competing with each other, stimulated market growth, striving to acquire new customers to always increase their consumption base, and in this way, the market grew day after day. In 1997, Portugal ranked 4th in the mobile penetration ranking and one year later, in 1998, Optimus entered the market, which already had 6 years of activity, with 15% of the population using its services. In 2014, two big events happen in the Portuguese telecommunication market. With the acquisition of Portugal Telecom by Grupo Altice and the new brand NOS launched by ZON Optimus, after combining the biggest fix broad band players and the major mobile telecommunication operator in Portuguese telecommunication market, NOS became the major player to provide integrated telecommunication services to customers. During the recent years, the telecommunications sector in Portugal has undergone deep changes, particularly with the emergence of new capabilities and innovative services by telecom operators, as the case of double-play, triple-play or quadruple-play bundles. These offers try to position themselves as distinctive and competitive, especially in the constant creation of new applications and features associated with each service. To summarise, Portuguese Telecommunications Companies use outsourcing in order to spread and wise their market across the country so, outsourcing companies can work for/with their brand (company). The next chapter will be focused on the data analysis of the data collection from an anonymous Telecommunication's Outsourcing Company.

Preliminary conclusions and future research

Given the results presented, it is possible to respond to the problem of this work, because it is perceived that companies are striving to modify their HR areas on most issues that indicate changes in a strategic role. In the literature review, it was reported the phases of management and the evolution attributed to HRM over time. Along with the phases of the management, it was observed that HR policies and operational area also progressing, which continue providing adaptations to the best strategic decisions in front of the organizational challenges. On the Internal Marketing side, it was explained how much IM is linked to HRM and what strategies have been used in his favour. In order to meet the general goal of this work, the information and results obtained from the research were used to identify and describe the fact that, commercial companies appear to have strategic initiatives for employee involvement, human capital as obtaining for competitive advantage and intellectual's management, indicating a concern from this companies to continuously improve their HRMP, given the prominence that this area has for the competitive advantage and position in the market for the companies. With all this, the main goal is to increase employee's retention. However, the researcher treated data that still applies until now. The researcher interviewed former colleagues knowing already the business, due to previous work experience, that sometimes may affect the transparency and clearness. It was interesting to listen the answers to the different subjects, and surprisingly match or disrupt the ideas pre-made. It is suggested that future research should seek to not only understand employee characteristics in relation to organisational change efforts in further detail, for example the extrinsic and intrinsic motivators, but also seek to place these in terms of organisational and geographic cultural context sector in other fields besides Telecommunications. The researcher emphasis the extreme importance of this study complemented with: Internet of Things and Human Resources Management; 4.0 Industry; 5.0 Industry.

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Usefulness of Domestic and Regional Data Bases in Agricultural and Environment Protection Management

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Abstract

Currently, farms face the challenges of contemporary agriculture, natural environment, and agribusiness. Conducting activities as part of the common sectoral policy which cater for diverse needs requires policy makers to develop advanced tools aimed at monitoring the implementation of scheduled results. In addition, farmers should apply effective management based on advanced decision-making tools and with the sectoral policy priorities factored in. The unfolding advancement of the digital economy creates an opportunity of using the so far unavailable data resources and cutting-edge data processing technologies to increase the analysis and assessment of the effectiveness of existing policies in the field of agriculture, environmental protection and mitigation of climate. The purpose of this article is to analyze and evaluate the usefulness of national and regional databases in agricultural and environmental management against the objectives and priorities of the CAP.

Keywords: Agriculture, Environment, Policies, Data Bases, Management

Introduction

What we are currently observing is the emergence of a new type of economy – digital economy, conditioned by the growing use of digital technologies. These processes are now becoming universal and global in nature. Societies, economy, and politics are now subject to digital transformation. The increasingly common processes of forming digital representations of each and every area of the real world and of deriving value from the information thus obtained (datafication) mean that governments are gaining access to more and more data on citizens as well as on political, economic, and social conditions and phenomena (Śledziewska, Włoch 2020). Such data make it possible for politicians to influence decisions made by entrepreneurs and to plan and implement their political priorities in terms of public policies such as environmental protection, mitigation of climate change, and the provision of healthy and safe food. The creation and use of data resources used by governments is a crucial driver behind the development of innovation and science. Owing to these phenomena, it has become possible to introduce new solutions associated with e.g. planning, measuring the effectiveness of, and monitoring laws and policies based on the so far unavailable data coming from numerous sources and on new technologies and advanced data processing methods.

Development goals specified in strategic documents are usually determined by identifying measurable and verifiable key factors analyzed in the economic, social, environmental, institutional and spatial domains.

Therefore, the purpose of this article is to analyze and evaluate the usefulness of national and regional databases in agricultural and environmental management against the objectives and priorities of the Common Agricultural Policy (CAP).

Evaluation of the effectiveness of the CAP in the light of environmental protection and socio-economic factors

Development, intensification, and industrialization of agriculture are key forces of biodiversity and ecosystem services loss (Diaz et al., 2019) as well as climate change (IPCC, 2019). Historically, some agricultural practices have supported biodiversity and multiple ecosystem services. Yet such practices have been increasingly abandoned or replaced by intensive farming systems which maximize yields through the unsustainable use of natural resources and at the expense of biodiversity and ecosystem services (Stoate et al., 2009). Such processes are determined by socioeconomic and technological factors but also supported by public policies. The European Union's (EU) Common Agricultural Policy shapes the EU's agricultural sector (Hodge, Hauck, and Bonn, 2015) and supports a variety of practices contributing to wide-scale biodiversity loss (Pe'er et al., 2014; Gregory et al., 2019; Pe'er et al., 2019; Van Swaay et al., 2019), climate change (Alliance Environment, 2019), soil erosion (Orgiazzi et al., 2016; Hamidov A et al., 2018; IPBES, 2018). CAP programs which could oppose these developments are not enough and/or underfunded (Alliance Environment, 2019; Pe'er et al., 2019). Furthermore, the current CAP is ineffective and inefficient in addressing the social and economic challenges (ECA, 38 2016; Pe'er et al., 2017a). The CAP has undergone several reforms, partly aiming to enhance its environmental and social performance. Some positive outcomes have been described (Batáry et al., 40 2015; Walker et al., 2018), yet effective measures are still required to reverse negative trends (e.g. Pe'er et al., 2017b) – indicating the need for a much more fundamental change to the CAP in order to deliver on prevailing environmental and socioeconomic challenges (Bojar, Sikora, Dzieża, 2017). The CAP post-2020, as proposed by the European Commission in June 2018 (EC, 2018), acknowledges the need to address environmental and sustainability challenges and introduces a new Green Architecture and a delivery model that offers Member States (MSs) higher flexibility as to how they implement the CAP. It seems that donators of CAP funds should pay closer attention to the role of effective use of knowledge centers, enabling synergic effects to be obtained from cooperation between multiple research centers in the EU and across the world through merging the findings from different projects (Bojar, 2018). It is also worth noting, however, that there are often contradictions between the ecologic and production goals of agriculture, and they often determine the inefficiency of funds allocated to supporting sustainable development. Moreover, it seems that cultural, mental, and economic differences between farms in different EU member states require a differentiated approach to the tools used to shape farmers' attitudes and decisions. It requires more decentralized policies distributing funds directly to agent-based models of farms that allow consideration of all the specific conditions of a given entity.

One such key solution within the new concept for CAP can be relevant models and software applications based on the newest achievements of IT, (cloud computing, machine learning, etc.), to set, verify, gather, process, and retrieve frittered away and heterogenic data arising from different domestic and regional data bases.

Criteria of Analysis of The Data Bases Useful for Environmental Protection Management of Rural Areas from A Perspective of The Concept of a Systemic Model of Contemporary Sustainable Agriculture

Currently, farms face the challenges of contemporary agriculture, natural environment, and agribusiness. Sustaining market agriculture alongside agribusiness and eco-services in a model of balanced growth requires integrating such objectives as requirements of food consumers (cheap food goods, enough quantity, quality, healthy, safety), profitability of market farming guaranteeing the welfare of farm families and societies from surrounding agriculture (efficiency of production factors usage), appropriate natural environment protection, and revitalization of rural areas. The concept of a model farm for inducing growth (fig. 1) shows crucial determinants of contemporary challenges in agriculture-integrated economic, social, and environmental goals guaranteeing sustainable development.

Fig. 1: Determinants of contemporary challenges of agriculture within model of inducing growth

Source: own study

In this context, the Common Agricultural Policy (CAP) seems to be an especially important tool for shaping the behavior and decision-making of farmers in the most sound way to better enable them to face the contemporary challenges of agriculture.

The theory of the evolutionary changes of a farm can also help to explain the mechanisms shaping this adjustment process running in agricultural enterprises (fig. 2).

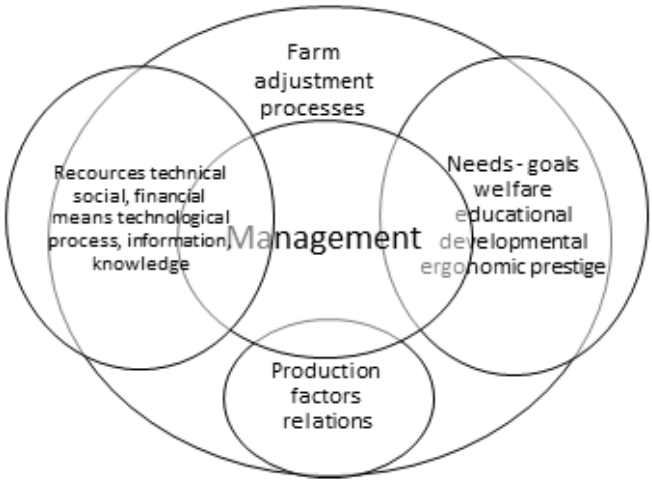

Fig. 2: Mechanisms shaping evolutionary changes in farms

Source: own study

Public data sources and datasets classification and characterization

The impact assessment of CAP policies is mainly reliant on the Farm Accountancy Data Network (FADN) and the Farm Structure Survey (FSS) databases. FADN is an annual farm survey that gathers detailed EU-wide accounting data from a sample of agricultural holdings. FSS provides harmonized data on the structure of agricultural holdings regarding land use and livestock, farm laborers, machinery and equipment as well as participation in rural development programs.

The basic unit of the FSS is the agricultural holding and a complete agricultural census is updated over long periods (with intermediate sample surveys). Despite the fact that information present in the FADN and FSS has allowed the impact analysis of previous CAP versions, in the digital era, it seems appropriate to use larger data sets, especially for the assessment of recent and more targeted policies.
At the national level, many public institutions collect and provide datasets that could complete the information provided by the FADN and FSS for policymakers and researchers. Selected public institutions and examples of data sources useful in this area are presented in Figure 3

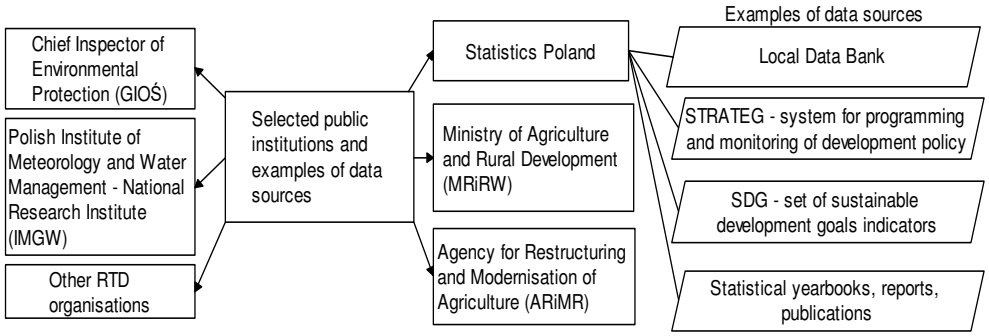

Fig. 3: Polish public institutions and examples of data sources

Source: own study

Table 1 presents the results of the classification of publicly available data sources in terms of socio-economic and environmental areas (table 1).

Table 1: Classification of domestic data sources in terms of socio-economic and environmental areas

Producer	Name of data source	Type of data source / category
Agency for Restructuring and Modernisation of Agriculture (ARiMR)	RDP 2014-20 (PL) Implementation reports	Database / Socioeconomic (Policy)
Statistics Poland	Agricultural and horticultural crops	Database / Socioeconomic
Statistics Poland	Local Data Bank	Database / Socioeconomic and environmental
Statistics Poland	Animal production, Farm animals	Database / Socioeconomic
Institute of Soil Science and Plant Cultivation - State Research Institute (IUNG-PIB)	ADMS - Agricultural Drought Monitoring System	Database / Environmental

Chief Inspector of Environmental Protection (GIOŚ)	National State of the Environment Reports	Report / Environmental
Chief Inspector of Environmental Protection (GIOŚ)	Regional State of the Environment Reports	Report / Environmental
Chief Inspector of Environmental Protection (GIOŚ)	National „mosaic" reports on the environment	Report / Environmental
Statistics Poland	Strateg	Database / Socioeconomic and environmental
Statistics Poland	SDG - set of sustainable development goals indicators	Database / Socioeconomic and environmental

Source: own study

Table 2 presents the content and classification of datasets available in the agriculture category in the Polish database – Strateg.

Table 2: Agriculture category datasets classification of the Strategy database

Strateg database (producer: Statistics Poland), agriculture category content:	**Type of datasets**
Agricultural land area in good agricultural condition	Environmental
Agricultural land area per 1 tractor (in ha)	Socioeconomic
Area of forest burned	Socioeconomic
Average area of agricultural land in agricultural holding	Socioeconomic
Consumption of mineral fertilizers in terms of pure ingredient per 1 ha of agricultural land	Environmental
Ecological areas in thous. ha	Socioeconomic
Exports of agricultural-foodstuff goods per capita	Socioeconomic
Forest cover	Environmental
Forest renewals and afforestation	Environmental
Gross agricultural output per 1 ha of agricultural land	Socioeconomic
Households in rural areas with access to connection with a download speed of at least 100 Mbps	Socioeconomic
Index of implementation of National Program of Forested Areas Increase	Environmental
Index of prices relations ("price gap") of sold agricultural products to goods and services purchased	Socioeconomic
Indices of agricultural output prices (previous year=100)	Socioeconomic
Indices of gross crop output (previous year = 100)	Socioeconomic
Number of agricultural holdings	Socioeconomic
Number of agricultural holdings engaged in activities other than farming directly related to the farm	Socioeconomic
Number of certified organic farms	Socioeconomic
Number of full-time employees in individual farming per 100 ha of agricultural land	Socioeconomic
Number of organic farms (Poland=100)	Socioeconomic
Organic agricultural area under conversion in organic holdings.	Socioeconomic
Percentage of agricultural products samples of inadequate marketable quality	Socioeconomic
Share of (active) registered non-profit organisations with headquarters in rural areas in the total number of those organisations	Socioeconomic

Strateg database (producer: Statistics Poland), agriculture category content:	**Type of datasets**
Share of agricultural holdings of an agricultural land area of 100 ha and more in total number of agricultural holdings	Socioeconomic
Share of expenditure on agriculture and hunting in the state budget	Socioeconomic
Share of farms with agricultural land area from 1 to 5 ha in the total number of farms	Socioeconomic
Share of individual agricultural holdings with the land area above 1 ha managed by a person up to 40 years of age in the total number of individual agricultural holdings	Socioeconomic
Share of processed products in export of agri-food industry products	Socioeconomic
The area of certified organic agricultural land and agricultural land under conversion in organic holdings	Socioeconomic
The area of certified organic agricultural land in organic farms	Environmental

Source: own study

Table 3 contains an exhaustive description of the selected national database on agriculture. The metadata on data collection, database updates and database content are presented in detail. This in-depth characterization of data sources can be used in the process of improving the tools for assessing the effectiveness of the existing agri-environment-climate policy to better adjust them to the various priorities of individual policy submeasures. This is particularly important in terms of the dynamic development of the digital economy and how it is used to, for instance, shape agricultural producers' attitudes and decisions that are conducive to the implementation of current social priorities.

Table 3: Detailed characterization of the selected domestic data sources (Agricultural and horticultural crops)

Name	**Agricultural and horticultural crops**
Type of dataset	Results of the sample surveys and final estimates of agricultural and horticultural crops and statistical reports coming from farms of legal persons and organizational entities without legal personality.
Content	87 datasets, It contains detailed results of estimated output of basic agricultural crops, i.e. cereals by species, including spring and winter crops, oilseeds, potatoes, sugar beets, edible pulses, fodder crops: permanent meadows and pastures, pulses and legumes with grasses, both for fodder and for seeds, root plants and maize for green fodder and production of horticultural
Structure details	The data is structured according to different parameters: 1) by region (Voivodeship), 2) by area of crops, yields and production, 3) by forms of ownership. Crops structure: 1) Main agricultural crops production 2) Fodder crops production 3) Horticultural crops output
Format	Tables in XLSX format and publication in PDF format
Data source access	Datasets are available free of charge for downloading in the Statistics Poland website – Agriculture, Forestry Section. This data can be downloaded in: https://stat.gov.pl/en/topics/agriculture-forestry/
Anonymous	Yes

Name	Agricultural and horticultural crops
Access to specific farms	No
Producer	Statistics Poland
Last actualization	The last one was published on 30.05.2019 (2018 annual edition), archive: 2017 and 2011.
Update frequency	Annually (archive: 2017 and 2011)
Periods covered	2018, 2017, 2011
Geographic scope	Poland, regions, voivodships
Geo-referenced dataset	NUTS 2 divisions - Voivodeships

Source: own study on the base of [https://bdl.stat.gov.pl/BDL/start]

Summary

As a sector of the economy, agriculture operates in a diverse economic and socio-cultural environment. The complicated nature of agricultural sector research is emphasized by many authors, and the level of agricultural development in a given area is shaped by not only vital climatic and soil circumstances but very often by complex economic, social and cultural interrelations. Under such conditions, conducting activities as part of the common sectoral policy which cater for diverse needs requires policy makers to develop advanced tools aimed at monitoring the implementation of scheduled results. In addition, farmers should apply effective management based on advanced decision-making tools and with the CAP priorities factored in. The unfolding advancement of the digital economy creates an opportunity of using the so far unavailable data resources and cutting-edge data processing technologies to increase the analysis and assessment of the effectiveness of existing policies in the field of agriculture, environmental protection and mitigation of climate change.

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Towards the Development of Contemporary Leadership Theory and Practice

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Abstract

In the article there are presented and discussed theoretical concepts and contemporary theories developed in social sciences – as a methodological basis for improving the acquisition and leadership competences development in the army. A methodological platform (leadership navigator) was developed to focus the processes of shaping and developing leadership competencies.

Keywords: Social Sciences, Leadership Theory, Leadership Practice

Introduction

The practice of organizing business activity, the practice of commanding in the Army, facing the contemporary conditions shaped by technological and technological progress, but first of all the progress of the universal recognition of civilization values and human rights (as members of contemporary organizations, as members of modern communities citizens) defines completely new competences for people who play leading roles and functions in organizations, communities and in the Army. Former traditional functions and roles of managers and commanders, as well as their traditional roles and functions of leaders underwent and are still undergoing dramatic transformations. A contemporary manager (a member of a large corporation management or a new, innovative start-up), each member of a public organization management (self-government administration of the contemporary region); each commander (at every level of command), apart from very complex professional competences, must have very highly evaluated, perceived, understood and appreciated by subordinates, co-workers, leadership competences. Competences need to be based on a very high level of moral values of modern leaders, a very high level of emotional intelligence and a very high level of moral credibility. Hence the common process of discovering and creating leaders by subordinates, co-workers, leaders who, having high professional competences, have special abilities to build trust in teams of co-workers and subordinates, and to positively influence their behavior. The phenomena of striving for the members of organizations, societies, task teams to lead the leaders in situations of implementation of complex ventures despite seemingly unlimited possibilities of obtaining information and knowledge provided by modern information and cognitive technologies can be considered as the phenomena of cognition. We are entangled in many networks of various influences, in many sources of a huge amount of information, which modern people are "bombarded" with, which are huge information resources, it is difficult for us to process due to the limited abilities of organs and human functions. Hence the search for and creation by modern members of organizations of such individuals who are willing to take responsibility for the behavior of other members of the organization (teams), for their actions and decisions. Hence, not only searching for, but conscious education and development of leadership competences in all areas of human activity, including the Army.

Not only large global corporations have been created and developed as ventures invented and developed by their leaders, but above all, basically all modern innovative enterprises, build their business models and development strategies on innovations created by employee teams, led by

leaders. In this respect, it is impossible not to emphasize the special role of creators and start-up enterprises in creating and implementing successful strategies for those innovative organizations for the progress and development of modern technologies. Civilization progress, which, unfortunately, is caused significantly by technological progress, changes the roles and functions of leaders in organizations and societies. Namely, the role and organizational function of leaders go down in the hierarchy, and the functions performed by leaders in organizations are mainly resulting from the duties of leaders – projects, ventures, task group leaders and innovation teams, that are organized as part of e.g. an innovation management system in enterprises. And, what needs to be emphasized, these new leadership roles in organizations are created by the interaction, mutual impact of members of organizations discovering and creating leaders – especially talented managers and commanders. These leaders have leadership competencies, mainly the high level of emotional intelligence and integration of the declared moral values advantages actually undertaken and attitudes presented. Another challenge facing the practice of leadership today is the need for commanders – leaders of high qualifications in the area of knowledge about the use of information and cognitive technologies, including technologies based on artificial intelligence (AI). The use of these technologies for integrated real-time command in the five-dimensional military operations theater space (land, air, space, maritime and cyberspace) requires not only modern commanders of very high professional competences, but also the ability to use security systems against various forms of cyberattacks, as well as ability to verify the information received in excess is not always true and not always conveyed in just and positive intentions.

Towards Creating A New Type of Leadership, Leading in The Army

Traditionally, leadership was defined as a particular type of people management by leaders with specific attributes of professionalism, a high level of emotional intelligence, whose role in the organization is mainly limited to directing and commanding in accordance with praxeological criteria (effectiveness, efficiency, planning, control). In contrast, commanding today, in the future, is understood as a type of task teams management, organizations and communities, the essence of which is a targeted impact on the attitudes, actions of members of these teams and organizations, as well as entire societies through managers, very high competences commanders, professionalism in leadership, commanding in the conditions that are imposed by the implemented modern information and cognitive technologies, as well as through endowed with special abilities and competencies, recognized by other members of teams and organizations in the processes of mutual interactions, which interactions are created in the course of undertaken and implemented activities. The targeted influence of the leader on co-workers, subordinates is based on the unique psycho-mental abilities of mutual interaction of people in cooperating networks during the implementation of team members tasks, organizations etc. (J. Stachowicz, M. Nowicka-Skowron, 2019; J. Ledzianowski, 2020).

The functions of conduction, hereinafter, were described in the form of the required conduction style model, which was called the Wise Leader model. Leadership wisdom is built by the highest level of utilization of knowledge, creativity, but in accordance with moral values and norms, as well as with the highest possible level of emotional intelligence of the leader. Smart Commander is an outstanding professional in fulfilling his command functions, but above all a manager, project-manager, a leader who uses his professional knowledge, uses and develops it in a credible and socially responsible manner. The commander's wisdom, formed on the basis of his credibility, is manifested in building an ever higher level of trust among subordinates – which, as has been said, provides a platform for undertaking and implementing complex, risky ventures in a creative way. In the literature other models are known to describe different types of conduction styles, methods, and required competencies to perform that function. The essence of J. Adair's model is exercising leadership functions in such a way as to harmonize the three main needs that are met during leadership processes (J. Adair 2000):

- G. Yukla's model, in which there are contrasted the styles of behavior and preferred values of a transforming leader as a leader referring to positive moral values to styles of performing the function of the leader, the so-called transformative who increase the involvement of

partners regardless of whether the effects of their behavior are beneficial to them by manipulating their behavior.

- The model of sensual leadership based on less organized innovation teams and on full agreement to experiment during innovation processes (K. Krzakiewicz 2008).

Models – patterns of ways, dominant attitudes and values of shaping competences in undertaking behaviors, functions and decisions making up the success of leadership in teams, subunits and organizations characterized by the limited concept, but above all they do not answer the question of how a modern leader should behave in order for his functioning to be assessed by the subordinates and superiors as socially responsible.

Theoretical grounds for building the modern commanders leadership competences

Assumptions for building a modern leadership theory:

a) At each level of command, a high, constantly improved and developed share of leadership competences in the overall, i.e. integrated, potential of the commander's competence fulfilling the role of management, motivation of selection and shaping task teams for the implementation of specific ventures, tasks, strategic planning (formulation of departments' mission and strategy, strategic ventures) is justified.

b) The process of integrating professional competences in the application and use of modern information and cognitive technologies, strategic competences, competences, skills in organizing tasks, undertakings and leadership competences occurs during undertaking and implementing specific tasks, undertakings for a specific level of command.

c) The driving force of the integration of these different types of competencies, and above all their shaping and development for the efficient and socially responsible implementation of these tasks are the leadership competences of modern commanders. Competences shaped according to pattern of the Wise Leader (J. Ledzianowski 2020, J. Stachowicz, M. Nowicka-Skowron 2019). The higher the potential of leadership competences of commanders during command, leadership during the processes of performing specific tasks, enterprises, the higher the level of effectiveness and innovation of implemented tasks.

d) The modern leader competences potential is determined, modeled and shaped on personality attributes, knowledge, but above all on the preferred moral values (credibility) that make up the Wise Leader model. Moral values and related moral norms, as taught by R. Ingarden, define various varieties of good such as: honesty, justice, truthfulness, faithfulness to vows and evil: injustice, unfaithfulness.

e) The key features of the leadership competence shaping pattern are: a high level of command credibility integrated with large professional competences, the dynamic nature of shaping these competences during the implementation of these tasks – projects, recognition of the important role and importance of the commander's influence (impact) – leader on the behavior of subordinates – team members carrying out tasks. At the core of the leadership competency potential of leaders there are their specific abilities that are not common, but possible for shaping and developing, and the ability to shape attitudes and behaviors of subordinates. The psychology sciences provide a lot of evidence to explain the phenomena of empathy and value transfer. At this point, one should recall the work of F. Crick and J. Watson (creators of the theory of so-called mirror neurons), as well as the work of Ch. Keysers 2017 (creator of the theory of shared circuits trying to explain the phenomenon of the interaction of living entities on each other, including the transfer of value). Through shared circuits surrounding people in the structure of influences and interactions transfer emotions, values to the area of the human brain. Emotions and values, as many say and

experience teaches, are "contagious." The invisible bonds of shared circuits entwine our minds together forming the organizational structure of the system beyond the individual. In this process, mirror neutrons are mechanisms that materialize functioning, thinking, and action in an integrated, global, constantly evolving social system. Human emotions and intuition are phenomena that probably will never allow artificial intelligence to take on human abilities.

f) Leadership competences are developed in a network of mutual relations – interactions – influences of subordinates and the leader. These mutual relations constitute the role of a leader in subdivisions by building mutual relations of interpersonal trust.

g) Built relationships of trust between the commander with a high potential of leadership competences and subordinates – the implementers of specific tasks and undertakings are the driving forces in shaping and developing the innovative potential of task teams and subunits; potential capable of undertaking and using subsequent tasks – projects at an ever higher level of innovation and an ever higher level of social responsibility. P. Sztompka formulated a very wise principle of shaping and developing trust in task teams in departments, organizations and communities. In his opinion, as those teams, organizations, and various activities undertaken and implemented by them, the potential of trust in those teams, organizations, communities increases in line with the phenomena that characterize self-accelerating growth spirals (P. Sztompka 2007). Interactions and mutual influences of the commander - leader and members of the task forces, subunits, divisions shape the self-potential of these teams and subunits. Self-potential, i.e. recreation and development of the organizational culture, including the culture of innovation. Explanation of those phenomena of self-potential can be found in the works of F.J. Varel (1992), J. Stachowicz (2017), J. Tischner (1998) and N. Luchamann (1995). The works of Alber-Laszlo Barabasi (2018) known for developing a theory explaining the phenomenon of individual success as a phenomenon shaped by positive thinking, praises of the environment, community, individual, man taking specific actions, also well explain the processes of mutual interaction of team members and the positive influence of a leader on attitudes and the behavior of team members and the community. I emphasize here the impact and influence of a leader with a high level of credibility. Practice, observation of phenomena occurring in communities and organizations gives many examples of impact "toxic" leaders – unreliable leaders taking various actions to manipulate members of organizations and teams for various not always positive actions on team members, communities. Shaping and developing higher and higher levels of interpersonal trust in a group of cooperating subordinates, employees, members of local communities, e.g. the local ones, builds and develops those teams, organizations and communities as communities more and more innovative, open and capable of cooperation for the common good.

h) High leadership competences at all levels of command is the potential of more and more innovative problem solving, which is shaped by command practice in the face of challenges and threats that contemporary commanders with increasingly higher competences in using modern information and cognitive technologies, including technologies based on AI, must deal with.

i) The higher the level of leadership competence measured by the level of "distance" from the MDL pattern (distance measured by the level of emotional intelligence, credibility, level of confidence potential, efficiency and innovation of task performance), the higher the authority of the commander. The authority of the commander moves with it to the other positions held in the service and it makes easier building of trust relationships during the undertaking and implementation of various tasks, and thus consolidates this authority.

Recommendations for modern leadership practicing (navigator of modern leadership)

Shaping and developing leadership competences are processes that take place during the implementation of tasks, command projects in the network of cooperating implementers of these tasks. During the implementation of tasks and leadership projects, there are cooperation processes whose causative potential depends on the nature of social relations – mainly interpersonal trust occurring in those teams. The driving forces of this process of increasing leadership competence in the commander towards ever higher perfection measured by the MDL pattern are:

- high level of leader credibility,
- high level of professional competence (in the area of knowledge and skills in the rational use and the use of information and cognitive technologies, including AI) as well as in the area of ability to use organizational techniques and methods (innovation management, risk management, project management).

The higher the level of moral credibility of the commander, the higher the level of his professional competences, the higher the level of integrating these competences for the purposes of efficient, effective and socially responsible task performance, undertakings, the higher the level of mutual trust in the group, branch, task implementers, the higher the potential of the implementation teams tasks, the higher the level of leadership competence of the commander.

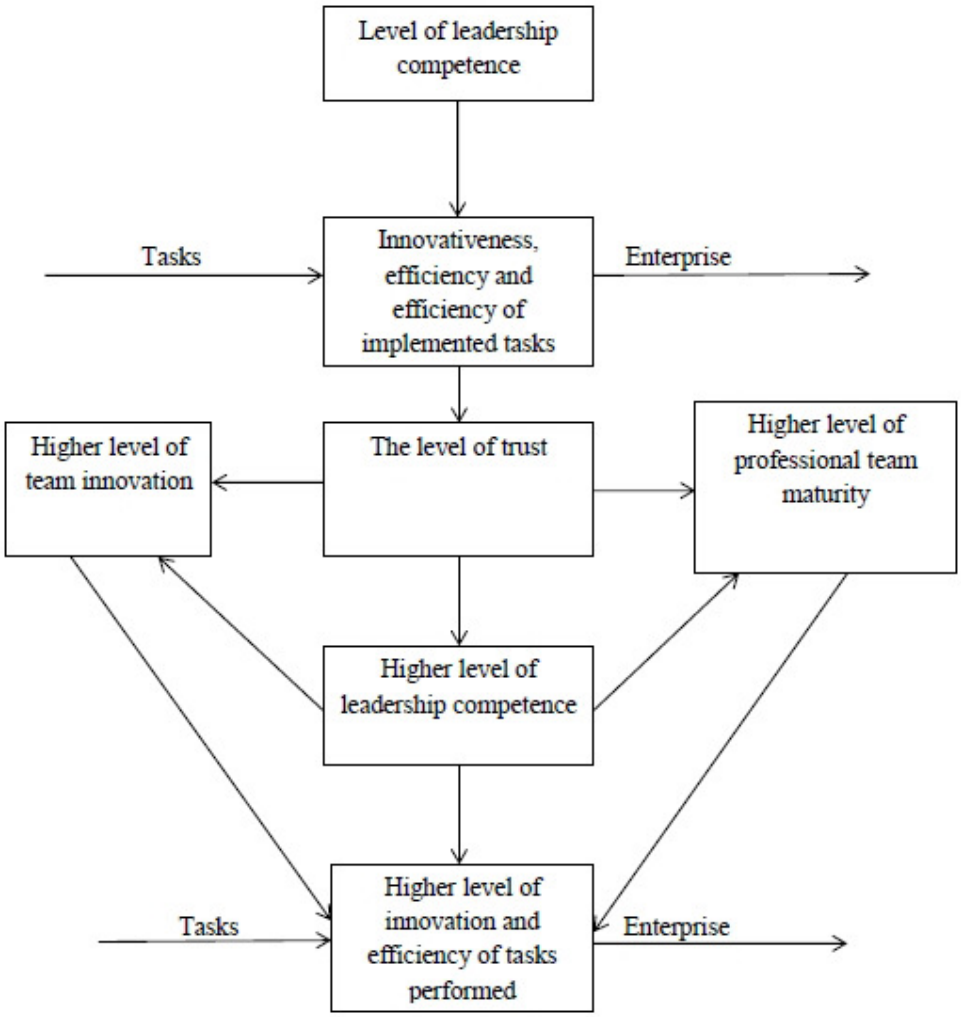

Fig .1: Shaping and development of leadership competences (leadership navigator)
Source: own elaboration

Assumptions of modern leadership theory

- Conscious, professional "discovery" of rare leadership skills, taking into account in particular the important role of axiological, emotional factors in shaping and developing leadership competences.
- Professional organization of the program for shaping and developing leadership competences in the programs of training and improving for managers, leaders and politicians.
- Including in the programs discovering and developing leadership competences the fact of mutual relations and the interaction of leaders, subordinates and colleagues.
- Recognition of the special importance of standards – authorities of people with a high level of emotional intelligence and credibility in the processes of shaping leadership skills.

- Professional consideration of the impact on the processes of leadership of modern information and cognitive technologies.

The basis of the modern leadership theory assumptions is the contemporary network theory of organization. The assumptions of that network theory of organization are:

1. Social reality is understood as a dynamic social being that happens as a network of activities of people – members of the organization – as the creators of this social being.

2. Every action, intention, idea of people affects all other actions, intentions, ideas in networks of mutual influences of influences.

3. Social reality has the features of a self-organizing system in which harmony is mainly provided by an axiological factor.

4. Changes in social reality are the effects of intentional creative processes of people, members of the organization, in particular those members of the organization who take the role and function of initiators and strategists of those changes – i.e. among others entrepreneurs, managers and leaders.

Works in that area have been undertaken for several years, among others by J. Stachowicz (2017), K. Perechuda (2007), N. Luchmann (1995) and others.

Conclusions

1. In the author's intention the constructed model of shaping and developing leadership competences should constitute a methodological platform for improving the processes of commanders training, for improving the processes of their development and competences.

2. Studies undertaken to formulate a model for shaping and developing the competences of a modern commander are a positive confirmation of the legitimacy of the work undertaken to create and develop contemporary organization theory (network theory of organization), and within it – modern leadership theory.

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Leadership Competences Shaping in The Contemporary Army

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Abstract

The paper presents the Wise Commander - Leader model (in Polish: Mądry Dowódca - Lider – MDL) justified by modern command conditions: i.e. the pattern of preferred command systems, conduction systems, necessary competences, as well as functions and behaviors of a modern commander. The model should be a pattern for shaping and developing leadership competences in the army. The pattern of this process was also developed as a model for shaping and developing leadership competences – as a practical recommendation to reach the pattern of Wise Commander - Leader (MDL). The paper also presents, discussing the experience and achievements of a military academy in this field, shaping and developing leadership competences for the needs of the contemporary army.

Keywords: leadership, command and leadership styles, moral value systems, emotional intelligence, trust

Introduction

The last dozen of years has been a period of radical transformation of the mission and vision of the contemporary army. More about the review of the literature on military leadership and research opportunities for scientists in the field of leadership can be found in the article: 'Military leadership: A context specific review' (L. Wong, P. Bliese, D. McGurk, 2003). This is not only ensuring security against contemporary, new threats, generated by dynamically developed new information and cognitive technologies, but, what is important, contemporary mission the army fulfills in the conditions of necessary, continuous cooperation and trust based on cooperation. The cooperation is based on collaboration of institutions and organizations with the local, as well as the regional community, etc. Challenges defining the special role of high competence and leadership skills commanders in contemporary armies are:

1. The dynamic development of complex military ventures in a qualitatively new reality, which is cyberspace, in which new information and cognitive technologies dominate.

2. The complexity of tasks undertaken at all levels of command requiring an innovative high level of command independence.

3. Independence, innovation of command characterized by a particularly high share of commanders' moral competences – their integrity.

A specific distinguishing feature of the leader's intentional actions for successfully fulfilled and morally and responsibly carried out tasks is: exerting a special impact – influence – a leader on subordinates – partners – on the performers of those tasks. This contemporary command of the army is, in fact, about new commanding competences and skills, but first of all it shapes the absolute

necessity to develop (at all levels of command) the necessary leadership competences. This necessity is very well understood in organizing and preparing commanders training processes in allied armies. In our Army this necessity is also well understood; programmed projects and training and other programs are undertaken and continued at all levels of command, training, and new programs for the preparation of command staff are developed and implemented – as indicated and clearly emphasized by the Chief of General Staff, General Rajmund Andrzejczak (R. Andrzejczak 2018).

The legitimacy and directions of changes and improvement of command in a contemporary army

Practicing command in contemporary conditions creates the need to establish and implement a new command model. The model – pattern consists of the preferred command style, including the dominant leadership style, the required professional skills, etc. A contemporary commander with his competences, command and leadership skills and a high potential to influence the attitudes and behavior of subordinates, i.e. the Wise Commander takes command of task teams in the conditions of the growing share of information and cognitive technologies (including AI technology). He is a professional in the application and use of those technologies; he is also a specialist with high skills in using organizational techniques and methods such as project management, risk management and innovation management. The contemporary commander manages teams composed of specialists in the use of those technologies, who by undertaking specific tasks have knowledge, skills, as well as a high level of their own creative ability to undertake these tasks at a high level of innovation. The level of innovation in the implementation of those complex tasks by subordinates is significantly dependent on the credibility of the commander. The credibility is based on the very high potential of moral and organizational values. Credibility means meeting expectations, fulfilling our obligations towards those whom we have trusted. It is an agreement and harmony between professed moral values systems and behavior. It is compliance with the declared motives of activities and their implementation. The necessary, high level of innovation of subordinates, the implementers of tasks that are undertaken at all levels of command, require a high potential for mutual trust (J. Stachowicz, M. Nowicka-Skowron 2019).

The requirements of efficient and socially responsible as well as moral command constitute the pattern of command styles and leadership styles preferred by a contemporary commander. That pattern was called the Model of the Wise Commander, Leader (MMDL). Traditionally, leadership was defined as a type of people management by leaders with specific attributes of professionalism, a high level of emotional intelligence, whose role in the organization is mainly limited to leadership and command in accordance with praxeological criteria (effectiveness, efficiency, planning, control). In contrast, leadership – contemporary preferred leadership according to the MDL model is a type of task teams, organizations and communities management, the essence of which is the targeted impact on the attitudes, actions of members of those teams and organizations, as well as entire societies through managers, commanders with very high professional competence in management; command in the conditions imposed by the implemented contemporary information and cognitive technologies. It is commanding by commanders endowed with special abilities and competences recognized by other team members, organizations in the processes of mutual interactions, which interactions are created during undertaken and implemented activities. The targeted influence of the leader on co-workers – subordinates is based on the unique psycho-mental abilities of mutual interaction of people in cooperating networks, during the implementation of tasks, team members, subunits.

The specifics of practicing contemporary command according to the model of the Wise Commander - Leader (MDL) in activities – military undertakings

a) The necessity and legitimacy of a high proportion of leadership competences at all levels of command. Indeed, at the lowest levels of command, the tasks undertaken by the subunit commanders are complex projects that require a lot of innovative involvement of subordinates. Hence, at each command level commanders should have a high potential for leadership competence.

b) Bonds of trust between commanders and subordinates that shape and develop during the implementation of subsequent tasks and ventures, they shape and develop subunits, divisions etc. as innovative teams and organizations.

c) Pragmatics of promotion requires that commanders who change their official positions are followed by their authority achieved by professionalism in command, and first of all by moral credibility, which determines the potential of the ability to influence subordinates and colleagues. The results of research in the sciences: psychology (positive psychology), sociology (field theory, as well as the theory of spiral confidence development in teams with a high level of interpersonal confidence potential P. Sztompka 2012), modern organization theories (positive organization theory), network theory organizations justify the thesis that: The Smart Commander MMDL interact and positively affects other partners, and the partners, subordinates, trusting commanders also build positive relationships of trust and cooperation with him. These processes are described by J. Stachowicz (2014), P. Sztompka (2012), K. Perechuda, A. Stachowicz-Stanusch (2011), M. Heller (2015), N. Luchmann (1995) r.), HR Maturana, F.J. Farela (1992).

d) High level of moral credibility of the modern commander (MDL) determines the resolution of conflicts between the freedom associated with the individuality of people, subordinates and the rigors arising from and institutional hierarchy in military communities and the associated rigors of the need to observe military discipline and command-based command.

e) High leadership competences practiced at all levels of command are the potential for innovative solutions to many problems shaped by command practice in cyberspace reality and, which is undoubtedly related to the need for high skills of modern commanders, the use of modern information and cognitive technologies – including AI-based technologies.

Model of shaping and developing leadership competences in the contemporary army

Analyzes and studies undertaken in the course of research, as well as observations and analyzes undertaken in the course of organized teaching processes and specialist leadership workshops, are a methodological platform for constructing a model of the process of leadership competence development in military organizations. The model is presented in Figure 1.

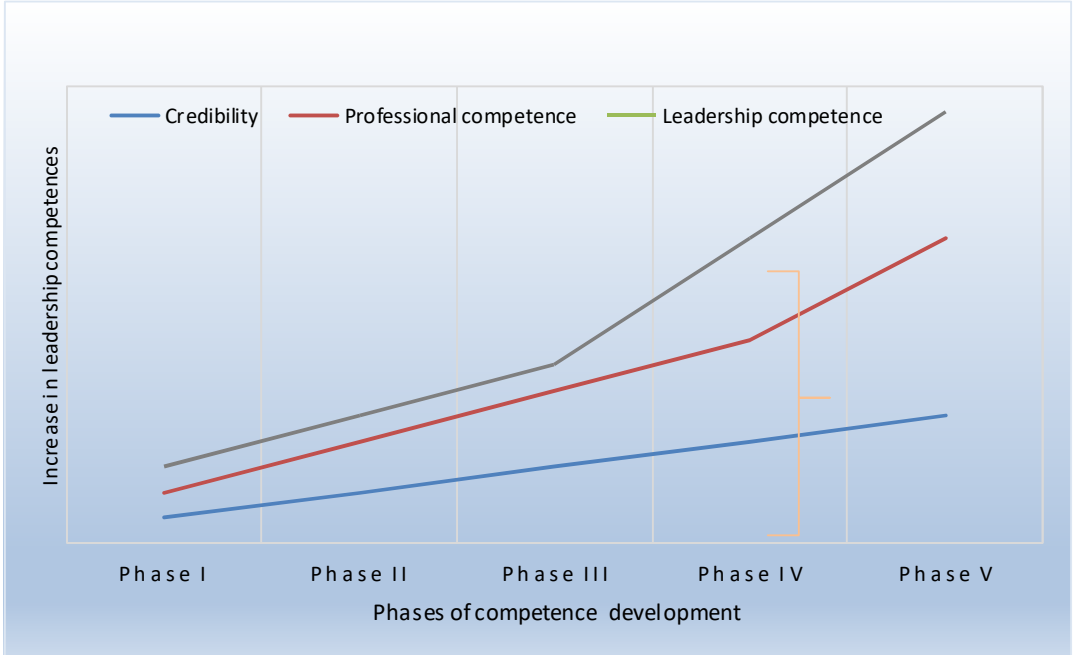

Fig. 1: Shaping and development of leadership competences

Source: own elaboration

During the process of developing command competence and the process of military promotion, commanders acquire knowledge and experience, reinforce and develop their "moral - ethical competence", they confirm and develop their emotional intelligence. The integration processes should be emphasized at an increasingly higher level during the development process of command and professional competences. The driving force of this integration is the moral credibility of the modern commander (MDL). The role and value of ethics in the process of shaping leadership competencies is extremely important. It is worth to look at this problem in more detail in the article: *"Ethical leadership: A review and future directions"* (M.E. Brown, L.K. Treviño, 2006). The process of leadership competence development is, of course, associated with the increasing level of commander responsibility, but also with increasingly complex and risky tasks that he receives to undertake and perform at subsequent levels of command. In the initial phase (phase 1) of this process, "discovering" leadership predispositions appears, revealed and developed already during the participation of future officers in the activities of pro-defense organizations and participation in uniform classes – this level of shaping command and leadership competences is described as: Candidate. Pro-defense organizations and teaching innovations in the form of so-called uniformed classes should be a potential source of recruitment for military service candidates, as well as candidates for schools and military academies. These functions are already well fulfilled by those organizations, but, like all activities, they require further improvement. Pro-defense organizations are concentrated in the Federation of Pro-Defense Organizations (in Polish: Federacje Organizacji Pro-obronnych), consisting of five shooting associations, the Academic Legion and the FIA, which has 250 members and its field departments in large cities. The FIA's task is also to train youth in uniformed classes. Last year (as of February 9, 2019) there were 576 schools in Poland implementing pedagogical innovations in the field of defense education. It was 57 thousand of students who received education in about 2,000 uniformed, military, penitentiary, police, Border Guard classes (M. Schwarzgruber, 2019). The next period (phase II) – the period of study in military schools and academies – is the phase of shaping, teaching professional command competences, but also raising awareness and developing leadership competences with the use of direct impact methods (professional knowledge and credibility) by commanders, lecturers to subordinates – cadets. For example, an officer graduating from the General Tadeusz Kosciuszko Military University of Land Forces has also a master's degree in management and quality sciences, or a master's degree in security sciences. This stage is described as: Potential - Contemporary Commander.

The next stages are the adaptation of graduates of Military Universities to take command duties and the stages of subsequent promotions, and as a consequence the development of leadership competences. It is not without significance for the fate and quality of officer life after the end of the military service. Contemporary enterprises and contemporary public organizations are even waiting for managers and leaders who have acquired many experiences of leadership in the army. We describe these stages as: Professional and Wise Commander - Leader. Cadets – future officers – after the period of adaptation, undertake further five-year university level education in their basic military specialties, but also in academic fields. This period is mainly studying for the acquisition of command competences, but also in the characteristic orientation of the study weave on military specialties and specialties of management and security, acquisition and development of leadership competences. The key potential for the development and constitution of contemporary commanders (at all stages of education, improving those competences both during studies and service) is the personal example and experience of reliable, with a high level of emotional intelligence, and a high level of moral credibility of officers - commanders, educators. As it has been many times emphasized, the key issue for the development and constitution of modern commanders is the personal example and experience of credible, with a high level of emotional intelligence and high credibility potential of officers - commanders, tutors and lecturers of the Military University of Land Forces. Indeed, the practice of command in contemporary conditions forces such shaping and development of leadership competences. They are realized through the influence of the commander on subordinates in the processes of carrying out increasingly complex tasks that require cooperation and creativity.

Professional commander can and must, today, be efficient, effective, but above all socially responsible. He should accept and rationally fulfill leadership functions. The impact of the Professional Commander on subordinates - participants and implementers is determined by the level of competence and responsibility at each level of command; the company level is probably the first and main level of testing and development of developed leadership predispositions, it launches a special process of building interpersonal trust. The trust is built between the commander - leader and executors of complex and creativity demanding tasks undertaken in conditions of particular risk. The processes of mutual interaction of the commander and his subordinates (while undertaking complex, innovative and risky tasks) shape and build teams of implementers as special communities in which the process of self-propelling spiral of confidence growth occurs (P. Sztompka, 2012). The commander - leader in led by him sub-units and departments wins - shapes - special groups of subordinates in which mutual trust and trust in a competent commander take place. These groups gain specific competences for creative and innovative problem solving during the implementation of complex and risky ventures. The network of these subordinate groups is further the structure and mechanism of constitution of all subunits commanded and led by the Leader Commander, in which the culture of trust and cooperation is built. These organizations are able to solve complex and innovative problems and undertake tasks, enterprises in a creative and socially responsible way – obviously under the leadership of the Commander - Leader.

The next stage in the development of leadership competencies is the phase in which the Leader Professional achieves an ever higher level of leadership competencies, called the achievement of the level of competence of the Wise Commander (MDL). Leadership wisdom builds the highest level of utilization of knowledge, creativity, but in accordance with and legitimately with moral values and norms, as well as with the highest possible level of emotional intelligence of the leader. The high level of emotional intelligence of the Wise Commander is shaped by social trust relationships in performer groups and communities in which the leader is leading. Intelligence is more than the ability to use knowledge for practical purposes, it is the ability to use all human skills: knowledge, emotions, moral values for practical purposes. Emotional intelligence is a high human skill in managing own emotions and the emotions of partners, that is, subordinates.

The next phase of the development of leadership competencies, which are achieved by outstanding personalities, are commanders of the authority of great strategists, leaders, great social, political and military undertakings. These Leaders - Personalities are role models for all of us in constituting and developing command and leadership competences. A lot has happened in the scientific field over the

past 20 years, especially regarding service leadership, but many critics still have this problem. It is worth referring to the article from 2019: *"Servant Leadership: A systematic review and call for future research"*, which thoroughly reviews the literature in this field and presents interesting research conclusions (N. Eva, M. Robin, S Sendjayac, D. van Dierendonck, R.C. Liden, 2019).

Conclusions

1. There is a widespread awareness that the education and development of modern commanders as outstanding Professional - Wise leaders is a condition for the armed forces to fulfill their mission. In the Polish Army, comprehensive actions have been taken to prepare a comprehensive tooling of the budget used, using the experience of the Allied army's program to shape the development of these leadership competences. The Gen. T. Kosciuszko Military University of Land Forces has a special role and place in that work; which results from its experience and the achieved effects in this area. Due to their function, pro-defense organizations as well as uniformed schools are also important for shaping and developing the competences of contemporary commanders. It is time to really develop their functions and use them also in the practical process of shaping and improving these leadership competences among commanders.

2. The developed Wise Commander – Leader and developing leadership competencies models can be successfully used as a methodological platform for the necessary, continuous improvement of processes for shaping and developing leadership competencies in the Army.

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The Radial Cycle of Resilience. Adaptation of The Concept in Economic Recession on Selected Examples

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Abstract

The direct inspiration to write the article were signs of the economic crisis that appeared along with the COVID-19 coronavirus pandemic. Many economic recessions in the modern world are predictable. The repeatability of threats and the real likelihood of subsequent ones justify the need for proper preparation of enterprises. Therefore, research was undertaken to develop a methodical basis for formulating a model of resilience, which can be used in the sector of small and medium-sized enterprises in Poland in economic recession. The research hypothesis was formulated as follows: The level of preparation of small and medium-sized enterprises in Poland for functioning in economic recession is insufficient and requires adjustment. The following research methods and techniques will be used to verify the hypothesis and achieve the purpose of the research: induction and deduction method, criticism of the studied problem in the aspect of previous scientific achievements by analysing the literature on the subject and the multiple case study method based on in-depth interview technique (IDI). The result of the research is a contribution to the development of resilience theory and the creation of a proprietary concept based on the radial cycle of resilience. The proposed reference model of the enterprise is based on three elements: resistance, flexibility, strategic revitalization. It gives the opportunity to apply in economic practice in economic recession.

Keywords: radial cycle of resilience, economic recession, enterprises, multiple case studies

Introduction

Economic recessions recur with varying frequency and their duration varies (usually several years). Their effects are severe for the economy and for enterprises. It is therefore important to be well prepared for any subsequent economic recessions. One solution is the adaptation of the resilience concept by enterprises. This concept has been described by many researchers using multidimensional and relative concepts. However, there is no universal concept that can be used in any sector of the economy and in any size enterprise (most concepts only include large enterprises).

Using quality analysis, a broad, universal and new approach to the concept of resilience was presented. Factors that enable the application of this concept in business practice are also indicated. The research hypothesis was formulated as follows: The level of preparation of small and medium-sized enterprises in Poland for functioning in conditions of economic recession is insufficient and needs to be corrected. The verification of the hypothesis has been subordinated to the goal, which is to develop a methodical basis for the formulation of a resilience model that can be used in the sector of small and medium enterprises in Poland in conditions of economic recession. The application of the proposed concept by enterprises does not necessarily mean an absolute return to previous conditions, but it may indicate the ability to respond to challenges resulting from negative effects and changes. The application of the resilience concept will also affect the rate of economic growth, macroeconomic stability and macroeconomic market efficiency. This is confirmed by researchers pointing out that the use of resilience by enterprises has an indirect impact on growth, private investment and employment (Tierney 2003).

Theoretical Basics

Many economics theorists and practitioners use the terms recession, depression and crisis interchangeably and synonymously. They refer to the decline in economic activity with economic, social and political consequences.

Recession is an ambiguous concept in the literature on the subject. According to J. Shiskin, re-assignment is a state in which the real gross domestic product decreases over the next two quarters in the economy [Shiskin 1974, p. 222]. This interpretation has been accepted in all European Union countries. In the United States, the National Bureau of Economic Research (NBER) has a special committee on determining the time of the American economy entering recession (Business Cycle Dating Committee). NBER defines economic recession as: "a significant decline in economic activity, scattered throughout the economy, lasting more than a few months, usually visible in a decline in real GDP, real income, employment, industrial production and wholesale and retail sales" [The National Bureau from Economic Research 2020].The terms recession and crisis are treated in the literature equally [M. Drozdowicz-Bieć 2012, p. 29]. In turn, depression is understood as a deep and prolonged recession. Both recession and depression are often preceded by rising oil prices, slumps in government debt and currency markets. This is related to the direct indebtedness of the economies and the inability to meet their obligations towards creditors. Earlier, "speculative bubbles" have risen on the currency, commodity and securities markets. Examples of recent years include: The Mexican Peso Crisis of 1994, the Financial Crisis in East Asia from 1994, the Russian Financial Crisis of 1998, the Argentine Economic Crisis of 1999 or the Financial Crisis 2007-2009 [Buckley 2011, p. 243 -246].

A. Mitroff and M.C. Alpaslan [Mitroff, Alpaslan 2003, p. 10] distinguished three types of crises due to their sources (Figure 1):

1. Natural accidents: earthquakes, floods, fires.
2. Normal accidents [Perrow 1999, pp. 464]:
   a) Economic crises: recession stock market crashes, hostile takeovers.
   b) Physical crises: industrial accidents, supply breakdowns, product failures.
   c) Personnel crises: strikes, exodus of key employees, workplace violence or vandalism.
3. Abnormal accidents:
   a) Criminal crises: product tampering, kidnappings or hostage situations, acts of terrorism.
   b) Information crises: theft of proprietary information, tampering with company records, cyberattacks.
   c) Reputation crises: rumour mongering or slander, logo tampering.

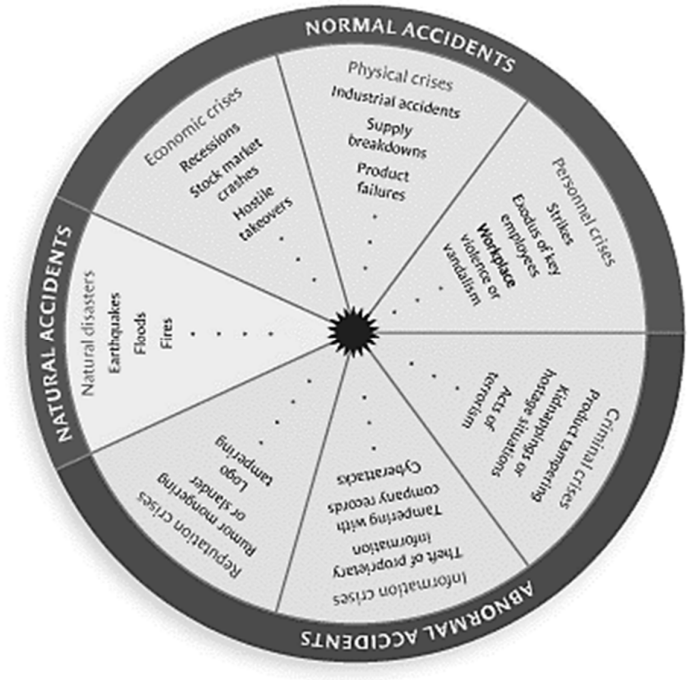

Fig. 1: The Wheel of Crises

Source: Mitroff. I.I., Alpaslan, M.C. (2003), "Preparing for Evil", Harvarde Business Review, April 2003, 10.

There are many indications that before the global economy, another economic crisis that started the 2019/2020 pandemic. Despite many questions and uncertainties, it seems that the effects of a pandemic will be much more economically severe than previous threats of this type. In times of extraordinary and recurring threats, it is necessary to prepare market players for subsequent recessions. Entities should be resilient (proactive) and not vulnerable to crisis (reactive).

Research Material and Methodology

Research to date has confirmed the great importance of preparing enterprises for economic recessions and their consequences. At the level of research on the application of the concept of resilience in enterprises, there are many theories, but often they have little practical utility and the possibilities of application limited to large enterprises. This gap, in part, is complemented by pilot studies, the results of which are presented in this article. The research hypothesis was formulated as follows: The level of preparation of small and medium enterprises in Poland to operate in economic recession is insufficient and needs to be corrected. The verification of the hypothesis has been subordinated to the goal of developing a methodical basis for formulating a resilience model that can be used in the sector of small and medium enterprises in Poland in economic recession. This goal will be achieved through:

1. A literature review of the concept of resilience and presentation of the author's concept.
2. Theoretical identification of factors shaping the resilience model of a small and medium enterprise (components of the resilience concept).
3. Empirical verification of factors shaping the resilience model of a small and medium enterprise (pilot studies).
4. Presentation of the possibility of applying the concept of resilience in small and medium-sized enterprises and the possibility of conducting wider research in this field.

Realization of research goals will be possible thanks to the following research methods and techniques:

a) the induction and deduction method, which will include checking the correctness and verification of all elements of scientific and research work that will be performed to verify the hypothesis.
b) criticism of the studied problem in the aspect of previous scientific achievements by analysing literature on the subject (and other online sources), in the field of economic recession theory and the concept of resilience;
c) analysis of secondary data obtained from publicly available sources such as European Centre for Disease Prevention and Control (ECDC) databases,
d) multiple case study method, which in addition to the general heuristic method, will be used to carry out primary research. The choice of method was determined by the research goal and the variety of real situations [Meredith 1998]. Additional arguments in favour of using this research method was the fact that the practical application of the concept of resilience is still unknown, and the phenomenon itself is not fully discovered [Yin 2003]. The in-depth interview technique (IDI) will be used. Interviews were carried out in eight polish service enterprises belonging to the SME sector. The literature presents various views on the number of cases that should be analysed in order for the conclusions of the study to be scientific. The dominant view suggests four to ten case studies [Glaser, Barney 2001]. The goal is not statistical replication but theoretical. This number also has practical reasons, i.e. due to financial and time constraints. Contact details came from its own database (the author conducts research focused on the service sector since 1999). The selection of samples was carried out using the expert method, based on the knowledge and experience of specialists in the field of the phenomenon under study. Only enterprises that undertake any actions aimed at preparing for the situation of economic recession were invited to the interviews. Interviews were conducted in the first quarter of 2020, based on a structured scenario consisting of three parts: a metric and record part containing information about the audited entity (company size, headquarters location, length of market existence), the main part containing information on implementation the concept of resilience in the enterprise and the summary part. Interviews have been supplemented with the process of examining enterprise documents and their content.

Extensive documentation has made it possible to characterize enterprises including parameters that cannot be identified in quantitative research. Among others, thanks to this research it was possible to examine the process of preparation for the economic recession and planned changes in this respect. The reference model of the enterprise applying the resilience concept and prepared for economic recession emerged from the research.

Research is the first step in the process of verifying the theory and its falsification (in the understanding of K. Popper's critical rationalism). The conclusions drawn on the basis of the case study method, consistent with the assumptions of the phenomenological paradigm, allow for the explanation of exceptional phenomena. These phenomena may be valuable in another environment and organization as an interpretation of phenomena, but they cannot be completely predictable in the future. G. Walsham lists four situations in which the generalization of conclusions adopting an interpretative perspective is justified: concept development, theory creation, drawing specific implications and contribution to knowledge in the form of a rich description of the phenomenon [Walsham 1995]. In this study, the multiple case study method will be used to describe, test and create a new theory that will find application in business practice [Eisenhardt, Graebner 2007].

The Concept of Resilience - New Approach

Resilience in direct translation means resistance, flexibility, strength, revitalization. There is one word missing in Polish that would convey the meaning of the English term "resilience". The term "resilience" was most likely used for the first time in 1973 [Holling, 1973] to refer to ecology. Ch. Perring also attempted to adapt the concept in economic sciences in 2006. Perrings referring to sustainable development. According to him, resilience is the ability of the system to deal with disorders without losing its functionality. It is the ability to withstand market or environmental shocks without losing the ability to effectively allocate resources (market and supporting institutions functionality) or to provide the necessary basic services (production system functionality) [Perrings 2006, pp. 417-427]. Enterprise resilience can also be defined as the company's ability to cope with and adapt to change (Gallopin 2006). Resilience is also the ability of an enterprise to assess the degree of threat, realize mutual

relations and interrelationships between business activities, information and technologies in an enterprise (Gomes, 2015). Regarding regional and local policy, P. Regibeau and K. Rockett define resilience as the ability of the economy, society, organization or individual to successfully return to the state from before the unexpected shock [Regibeau, Rockett, 2013, pp. 107-147]. On the other hand, World Bank experts assume that resilience is the ability of the economy or society to minimize losses in living standards in the event of extraordinary threats [Hallegatte, 2014, pp. 2-3]. The resilience concept is therefore present in interdisciplinary fields dealing with complex systems such as enterprises, infrastructure systems and ecosystems [Carpenter et al., 2001].

Taking into account the sources of the concept of resilience and previous economic interpretations, it is proposed (and this definition will be adopted in this article) to interpret resilience as resistance, flexibility and the ability to strategic revitalization in the conditions of extraordinary threats.

Resilience is not only one concept, but a broader conception of the functioning of enterprises. The most important component of resilience is resistance, which T. Bishop and F. Hydoski defined as "the company's ability to recover before the stress factor" [Bishop, Hydoski 2010, p. 23]. The organization's resistance can be assured by four interactions:

1. Risk assessment - identify, categorize and estimate risk factors and indicate which strategy should be used to reduce them.
2. Risk prevention - you need to implement appropriate prevention strategies that will aim to anticipate and counteract specific risks.
3. Detection of irregularities in accordance with previously accepted risk areas - etc. through periodic audit, constant monitoring.
4. Responding to irregularities - scenarios should be prepared in the event of irregularities in order to minimize their negative impact on the enterprise.

The second component of the resilience concept is flexibility. R. Krupski presented a broad interpretation of the proposals of various authors [Krupski 2008, pp. 15-17]. When looking for the result of different concepts, it can be assumed that flexibility is the ability to adaptify an organization to the conditions in the environment. The term adaptation was used deliberately as a synonym for adaptation, due to the widespread use of the term adaptation in the English-language literature [Gibson, Ivancevich, Donnelly 1998, p. 38]. Adaptation can be external - consisting of the organization's ability to influence the environment or internal - boiling down to adaptive changes in the organization. Flexibility is also often considered in the arrangement of organizational subsystems: financial, manufacturing, market and strategic management. [Krupski 2008, p. 22]. The information subsystem will be analysed within each of the four subsystems.

The third element contributing to the concept of resilience is the strategic revitalization of the enterprise. The revitalization process is identified with strategic change [Floyd, Lane, 2000, p. 155]. This change requires a new look at human resources management and company organization (renewing) [Nogalski, Marcinkiewicz, 2004, p. 49]. Efficient strategic revitalization of an enterprise should potentially bring it not only to improve efficiency, but also to improve its competitive position in the market, establish better relations with customers, changes in the organizational structure conducive to its flexibility of response, increase the range of deletions assigning rights, adapting activities (processes) to customer requirements, developing new skills and key competences, optimizing the value chain, etc. [Walas-Trębacz, 2008, p. 97]. Therefore, there are close relations between resistance, flexibility and strategic revitalization.

Results and Discussion

The research was conducted in connection with extraordinary events initiated in China at the turn of 2019 and 2020. According to the logic of theoretical analytical replication, enterprises differing in size, location of the seat and time of existence were selected for multiple case studies. Among the eight enterprises were three enterprises belonging to the group of micro-enterprises, three small and two medium enterprises (according to the criterion of the number of employees and net turnover from the

sale of goods, services and financial operations). Each of them was located in a different province (with a different level of development). Two of the analyzed enterprises exist less than 5 years (exactly 4 years), three from 5 to 10 years (two existed 8 years, one 9 years) and three over 10 years (two existed 20 years, one 24 years). Thus, all enterprises operated at least 4 years before the COVID-19 corovirus pandemic.

The study was carried out by the method of multiple case studies. Three components of the full resilience concept were taken into account: resistance, flexibility, and the ability to strategic revitalization. The research is supplemented by the fourth part, which is a summary and at the same time gives guidance as to the prospective expectations of enterprises.

As part of the resistance test, entrepreneurs were asked the following questions:

• Which of the company's subsystems is the most vulnerable?
• Please assess the significance of individual elements of enterprise resilience building.
• Please assess the individual components of the company's resilience against competition.
• How, how often is the risk assessment carried out?
• Is risk prevention carried out and how?
• whether and how is risk prevention carried out?
• What is the reaction to irregularities?

When testing flexibility, the following questions were asked:

• How do you assess the significance of the flexibility of individual subsystems compared to competition?
• Please assess the flexibility of individual enterprise subsystems.
• Please assess the external flexibility of the organization (ability to influence the environment) compared to the competition.
• Please assess the internal flexibility of the organization (ability to introduce adaptive changes in the organization) compared to the competition.

The study of the company's strategic revitalization capacity was based on the following questions:

• Please assess the significance of the individual effects of the company's strategic revitalization.
• Please evaluate the effects of the company's strategic revitalization
• In which of the areas is the strategic regeneration process more important?

The following questions were asked in the supplementary part:

• Is there a need for external support in a recession situation:
• Who should provide such support?
• Any actions are necessary to maintain the competitiveness of the government's side?
• When should such support occur?

In the field of enterprise resistance testing, managers were asked a question about the vulnerability of individual enterprise subsystems to the risk of economic recession. Six of them said that the financial subsystem was the most vulnerable, and two indicated a high vulnerability of the strategic management system. Answers to in-depth questions have shown that enterprises do not have sufficient financial security for the most part. There were statements: "I don't have money set aside for the time of recession" or "What should I put aside? There are salaries, leasing". Managers also have concerns about their own management skills in times of crisis. They are also concerned about the market and production subsystem. When assessing the significance of individual elements of resistance building (risk assessment, risk prevention, detection of irregularities, responding to irregularities), in the majority (7 people), they attach the main importance to the final stage - responding to irregularities. They even think that this element is definitely better organized than their competitors.

Depth questions about earlier stages of building resistance lead to the conclusion that managers assume that their enterprises cannot afford creating permanent risk management systems. There is a lack of risk assessment and no strategies to mitigate them. Similar is the case with preventive strategies - they do not exist or are poorly developed. Detection of irregularities is usually carried out through a periodic audit (6 enterprises), less often by constant monitoring (2 medium-sized enterprises). The reaction to the detection of irregularities is to prepare scenarios of proceedings in the event of similar irregularities in the future (6 companies). However, they do not include other types of threats. Two of the surveyed enterprises operate on an ad hoc basis, without preparing any scenarios for the future. Therefore, there is a lack of long-term policy in enterprises in this respect. Strategies, even if they exist in the form of a document, rarely contain instructions on how to deal with an economic recession (only 1 in 8 cases).

In the field of testing the flexibility of enterprises, managers were asked a question about the importance of flexibility of individual subsystems in the enterprise. Everyone considered the flexibility of the financial subsystem to be the most important. By this flexibility they mean, for example, shifts in tax payment dates, credit instalments and leasing instalments. Market flexibility and strategic management are equally important. Comparing themselves to the competition, managers (6 people) decided that the financial subsystem of their enterprise is less flexible than the competition subsystem. At the same time, most assess low their external flexibility and high internal flexibility. Seven managers believe that their enterprise has a high capacity to introduce adaptation changes. Their views are largely based on properly selected and loyal employees and well-established market position (in the studied group there are only two enterprises existing for less than 5 years). There are such statements: "I know the market well, I know how to survive on it", "I have a permanent team of employees, everyone knows what to do."

In the scope of testing the strategic revitalization capacity of enterprises, managers were asked a question about the significance of individual effects of the company's strategic revitalization. Six of them believe that the most important effect of revitalization will be the improvement of the company's efficiency. Managers also count on improving their competitive position. Next to this there are statements such as: "I would decide on strategic revitalization of the enterprise if I knew that it would improve my relationships with clients" or "for me revitalization is to increase flexibility of response". Managers also believe that strategic revitalization will create the opportunity to tailor activities (processes) to customer requirements and optimize the value chain. Additional effects may be: development of new skills and key competences, and increasing the scope of delegation of powers. Generally, most of them (5 people) recognized that the process of strategic revitalization is more important in human resource management than in the organization of the enterprise. In a depth interview, they add: "going through the crisis is easier thanks to the employees involved", "when the crisis came, I realized that I can only count on myself and my employees."

In the summary part, managers were asked a question regarding the assessment of the implementation of the resilience concept through three components: resistance, flexibility and strategic revitalization. Everyone decided that they implement it to some extent. Medium-sized enterprises on a scale of 1 to 5 rated the implementation of the concept at 4, the others on a scale of 1 to 3. Everyone is convinced that this concept should be implemented in a broader dimension (perhaps the answers arise from the time of the survey - rampant pandemic). There is a certain relationship here: the location of the headquarters in a richer provinces (GDP per capita) affects the willingness to take action to correct the adopted strategies in a shorter time (up to 1 year). It is interesting that despite the fact that there was no such question from the interviewer, the managers themselves add that they need help to get through the current crisis and prepare for the next one. They await government support in the form of, inter alia, low-interest loans and credits that can be redeemed, as well as shifting tax payments, credit instalments and leases over time.

Summing up, it can be stated that managers are aware of economic crises occurring at different frequencies and the need to prepare for them. They see their chances in building resistance, flexibility and strategic revitalization of the enterprise.

Theoretical research and multiple case studies allow to create a reference model of the enterprise applying the concept of resilience in economic recession (Figure 2).

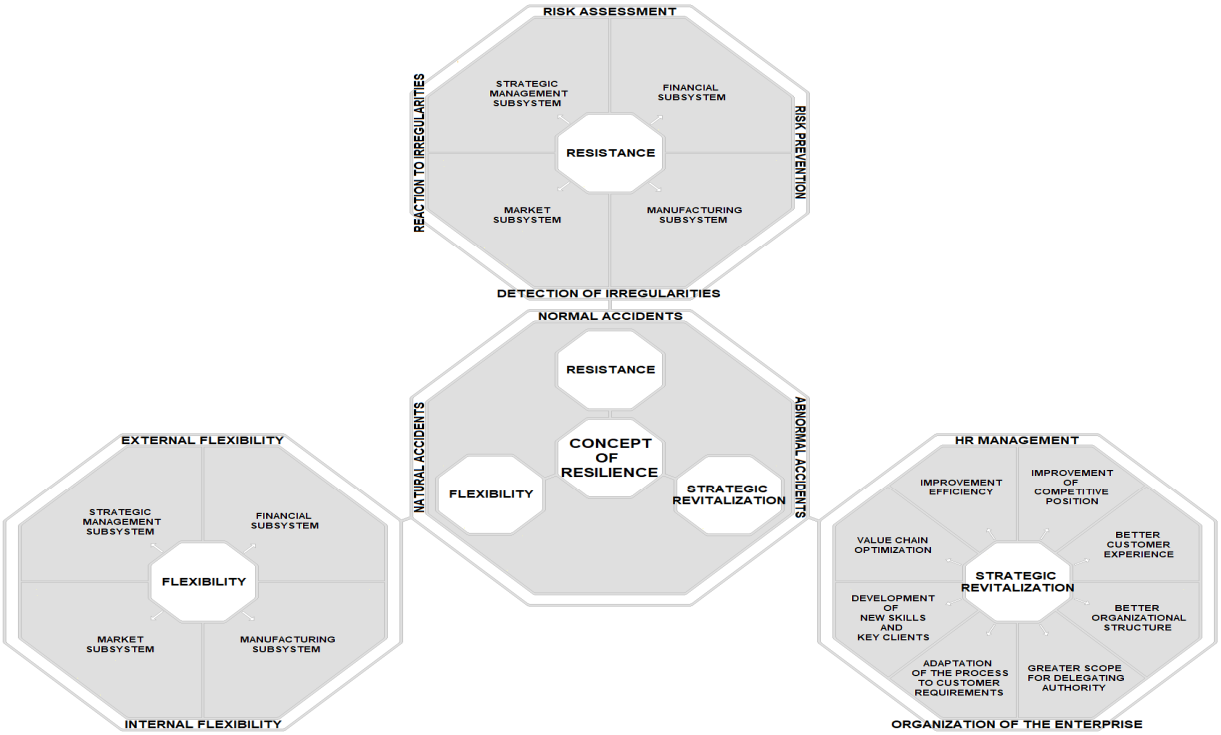

Fig. 2: Radial cycle of resilience

Source: own study.

The conducted research, which requires continuation, allowed to identify the initial boundary conditions necessary to meet the introduction of the resilience concept:

1. The model is introduced based on the radial cycle of resilience.
2. The introduction of the model is preceded by a thorough analysis of three areas of the enterprise: resistance, flexibility and strategic revitalization at all levels.
3. The model must be adapted to the enterprise life cycle. Failure to do so may result in the enterprise losing competitiveness.

Multiple case studies have shown that, in addition to the existence of boundary factors for the introduction of the proposed reference model, there are success factors, i.e. those elements that justify the success of the project. Belong to them:

- having a financial reserve during the economic recession,
- management skills in times of crisis,
- loyal employees and employees prepared for work in crisis conditions,
- good market position,
- organizational structure with the ability to quickly adapt to changes,
- openness of managers and employees to strategic revitalization.

Quick implementation of the proposed solutions may contribute to minimizing the economic effects of economic recessions. The expected effects of the ongoing pandemic, as well as subsequent economic crises indicate the need for proper preparation of enterprises and moving beyond traditional operating patterns.

Conclusion

A large part of the economic recession in the modern world is predictable. The repeatability of threats and the real likelihood of subsequent ones justify the need to build an enterprise model that would be able to function in changing economic conditions, including times of extraordinary threats. Many managers realize that it is impossible for a company to go through a crisis without prior preparation. Qualitative research has shown that a good solution is to use a concept based on the radial cycle of resilience. The proposed enterprise reference model is based on three elements: resistance, flexibility, strategic revitalization. In the literature on the subject, they are often analysed separately. This is not appropriate, among others, due to the large relationship between the enterprise's resilience and its competitiveness (Stephenson 2010, pp. 27-32). Building a thriving company should be a strategic initiative that changes the way the company operates and increases its competitiveness (Sheffi and Rice, 2005). These authors point out that the company's resilience can be achieved by reducing vulnerability and increasing flexibility, which indicates the company's ability to return to the "right path" in the event of disruption.

In relation to the recession, which began with the events in China 2019/2020, additional tips are given to entrepreneurs by Philipp Carlsson-Szlezak, Martin Reeves and Paul Swartz [Carlsson-Szlezak, Reeves, Swartz 2020]:

1. You should be very cautious about forecasts that may be currently characterized by high uncertainty. Many scenarios remain feasible and companies should examine them.
2. Turmoil in financial markets must not be allowed to affect judgments about business operations.
3. Focus on signals of consumer confidence, trust your instincts and learn how to use information about our company to calibrate such information. The impact will not be identical for everyone, and the conclusions will be specific to your industry.
4. The company should be prepared for both positive and negative scenarios.
5. In a pandemic, it's worth thinking about the period of the company's operations after it expires. The following questions should be answered: What micro- and macroeconomic effects will the current threat bring? What opportunities or challenges will arise?
6. It is worth considering the possibility of better preparation for the next crisis. It may be worth implementing new technologies or new processes faster, which would allow you to gain a competitive advantage in the event of another crisis.

As a result of scientific research, the hypothesis has been positively verified and the research goal has been achieved. As a result, a reference model of the enterprise was proposed, based on the radial cycle resilience: resistance, flexibility, strategic revitalization, possible to apply in economic recession.

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Blockchain - A Crypto-Intensive Technology - A Review

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Abstract

Researchers, critics and industry gurus are agreed that Blockchain is the next big thing. Blockchain is the technology that has shifted the entire paradigm of computer applications in the last decade. The key concept behind the development of Blockchain was to create a chain of data which is immutable, confidential, open-source and located on a de-centralized peer-to-peer (P2P) network. The ownership of Blockchain doesn't belong to a single person or a group but each node on the network therefore, it works without the involvement of any centralized authority. Blockchain was originally designed for cryptocurrency but this technology has been using in many other fields and application like Health, Finance, Banking and IOT etc. Big things come with big challenges so is the case with Blockchain and beside technical challenges, advancement in technology and hardware, Blockchain technology still claims flawless because of cryptographic primitives. This study contributes to review on different cryptographic techniques like ECDSA, SHA-256 and RIPEMD160 used in Blockchain technology and to exemplify its implementation, we choose Bitcoin.

Keywords: Blockchain, Bitcoin, Cryptography, ECDSA, SHA-256, RIPEMD160.

Introduction

Blockchain a is type of distributed de-centralized database which uses blocks to store data and each block is coupled with other blocks using strong cryptographic hash functions and then forms a chain of blocks, that's why it is called Blockchain. Information in these blocks is immutable therefore this technology stands high among other top technologies. Vertical industries are also revamping themselves by implementing Blockchain (Sarwar M. Imran, Nisar and Khan, 2019). Blockchain has some indispensable characteristics like data is distributed among all nodes over a de-centralized network, data in blocks is infeasible to delete or alter and all is transparent.

The World Economic Forum states that, "58 percent of all survey respondents said, they expect that by the year 2025, 10 percent of the global GDP will be stored using the Blockchain technology" ('World Economic Forum - Survey Report, September 2015 - The Global Agenda Council on the Future of Software and Society - Technology Tipping Points and Societal Impact', 2015). From the facts, it can surly be stated that Blockchain based applications would be high in demand and expecting huge investment inflow. Blockchain Vertical Opportunities Report released in 2018 states that "The business value of Blockchain is projected to reach US$ 2.0 trillion by 2030" (Tait *et al.*, 2018).

Blockchain, like any other technology, should be clearly differentiated as technology and its implementation. Blockchain is a technology and Bitcoin, Ethereum and such other cryptocurrency applications use Blockchain to work with. Blockchain is a sort of database which stores records or data and Bitcoin uses Blockchain as data storage. Blockchain technology is a combination of cryptography and an economic model which works on P2P de-centralized network (Lin and Liao, 2017) as illustrated in Figure 1.

Blockchain was allegedly developed by Satoshi Nakamoto for the cryptocurrency Bitcoin and the only purpose for developing such technology was to ensure a reliable and secure transaction mechanism between two users on a P2P de-centralized network. Nakamoto addresses the challenge of ownership of the digital currency and suggests a solution that is based on Public Ledger (Nakamoto, 2008) .

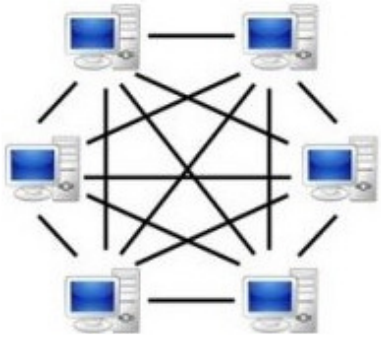

Fig. 1: P2P De-Centralized Network

ROADMAP: Our study purely focuses on the Blockchain as a Crypto-Intensive technology and, Bitcoin is the case to exemplify its implementation. However, cryptocurrency is out of scope of this study. The remaining of this paper is organized as follows: Characteristics and architecture of Blockchain are introduced in section 2. Section 3 discusses about the Cryptographic primitives of Blockchain. Literature review is presented in section 4 and the paper is concluded in the last section.

Characteristics and Architecture

A. Characteristics of Blockchain Technology

- *De-centralized*. Blockchain stores data on every single node on a P2P de-centralized network. Unlike conventional centralized and distributed data storage schemes, every node becomes the data owner so there is no need for any centralized authority to record, keep or maintain the data.

- *Persistency.* Stored data in the chain is persistent and traceable since the formation of a chain is designed in a way that any transaction or block can be validated. In case of Bitcoin, a complete trail is available for every single coin and there is only single ledger uses to record all transactions and this ledger is available on all nodes. This feature is also important to deal with double-spending problem.

- *Open-source.* Records in a public Blockchain is open to view by anyone and can be checked publically.

- *Consensus.* Every block that is to be added in the chain must be approved by all the participants involved in the transaction. As the consensus mechanism is predefined through an algorithm, it ensures a complete trustable environment between the participants and all rules must be followed for a block to become the part of the chain. A transaction becomes invalid if it violates any rules or violated by any participant.

- *Anonymity.* Parties involved in a transaction remain anonymous because there is only one thing needs to know before initiating any transaction and that is receiver's ID and any further details is not available in the chain.

- *Immutable.* The maximum time allowed for adding a block of transaction(s) into the chain is 10 minutes and it also requires 51 percent nodes to validate the block. Every precursor block becomes more and more immutable as new blocks are added into the chain and 51 percent nodes are required to endorse any alteration in any block or transaction and then further altering all successor blocks to update the chain. It nearly becomes impossible for

the miners and attackers to alter a group of blocks which have already become the part of chain.

B. Architecture of Blockchain Technology

Blockchain is a sequence of blocks which are tightly coupled using a cryptographic Hash function SHA (Secure Hash Algorithm). Every block contains the Hash value of the previous block. The chain starts from the block which is called genesis block which doesn't contain the hash value because it is the starting block in the chain. Block is the fundamental part of Blockchain and it has two parts; the block header and the block body as illustrates in Figure 2.

A typical header part of a block contains the following information:

(i) Block ID: Every block in the chain is assigned a unique ID to get recognized.
(ii) Timestamp: current time is stamped every-time a new block is created. This time is taken from UNIX times server in seconds as universal time since 1970 (Zheng *et al.*, 2017).
(iii) Hash – Current Block: Hash value of current block which is to be mined.
(iv) Hash – Previous Block: Hash value of previous block.
(v) Merkel Root: A merkel root is the hash value of all transactions' hashes in a block.
(vi) nBits: A difficulty level to determines how difficult it would be for a miner to mine the block.
(vii) Nonce: It is a 32 bit random number to be searched by the miners to produce a correct hash value. This number ensures that any computation that has already been done for a block during the mining process, never used again in any other block.
(viii) Other Information: Any other information as per the requirements of the application.

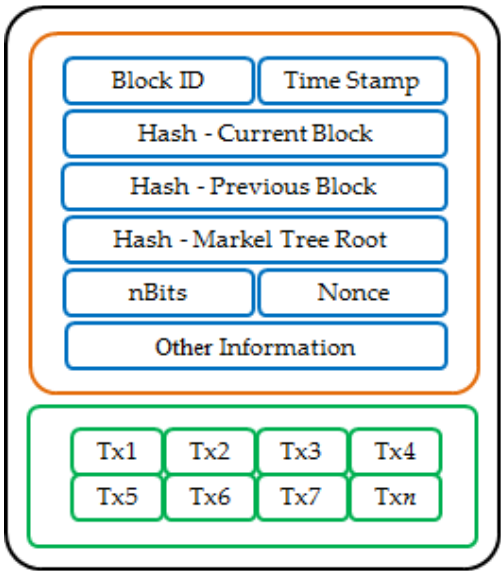

Fig. 2: Block Structure (Nakamoto, 2008)

The body part of the block contains data, record or transaction(s) and is digitally signed by the participants as illustrated in Figure 3.

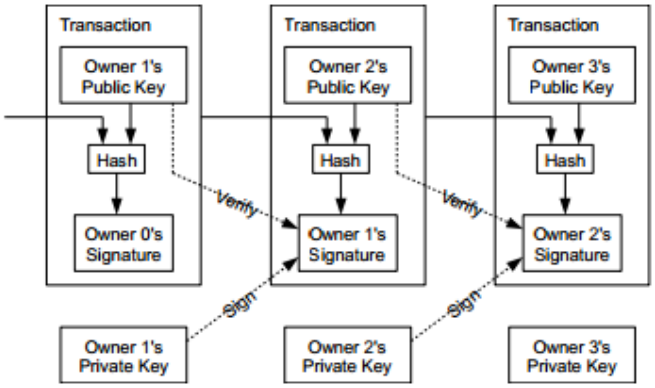

Fig. 3: Bitcoin Transaction (Nakamoto, 2008)

Cryptographic Primitives in Blockchain

Blockchain was introduced in 2008 and it was the first application that doesn't need any rusted third-party. Eliminate the third party from the system was a new and a revolutionary idea which was never attempted before. Strong cryptographic functions were used which changed the entire scenario and now we are available with a technology that can be trusted without any third-party. All have done with help of robust cryptographic primitives. Blockchain has some other features like de-cartelized, double spending resistance and scalability, now it has become a trusted underlying technology or framework for cryptocurrencies. There are two important cryptographic primitives use in Bitcoin (to practically understand, we will exemplify Bitcoin as a case study), hashing algorithms and digital signing algorithms as illustrates in Figure 4.

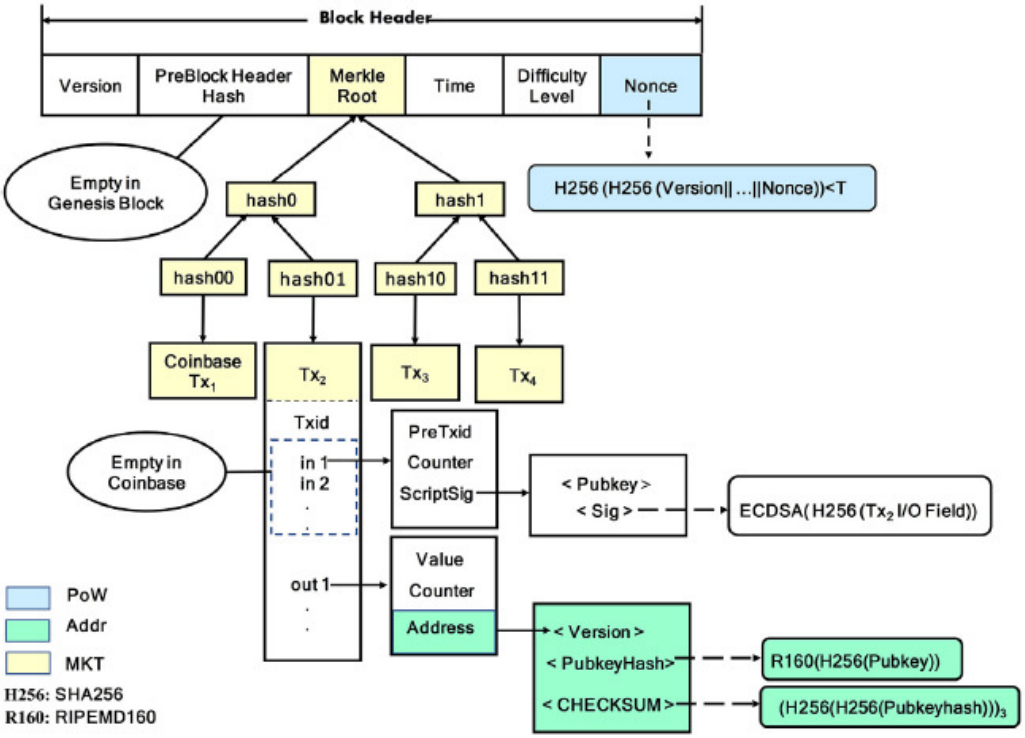

Fig. 4 : Hash Functions Implementation in Bitcoin (Wang *et al.*, 2019)

Since the innovation of Bitcoin, more or less all cryptocurrencies have adopted this technology and there is no single evidence available which suspects or challenges the security mechanism of Blockchain. For the purpose of hashing, SHA and RIPEMD-160 (RACE Integrity Primitives Evaluation Message Digest) are used and ECDSA (Elliptic Curve Digital Signature Algorithm) uses as Digital Signature Algorithm for signing a transaction digitally.

A. Hashing Algorithms

Bitcoin uses SHA-256 and RIPEMD-160 algorithms for hashing. These algorithms are used in combination and due to the reason they not only increase the security but also maintain the highest level of privacy in Bitcoin transactions. The purpose of using the combination is to ensure two main requirements namely one-wayness and collision-resistance (Wang *et al.*, 2019). The purpose of one-wayness is to ensure that the hash is not invertible or at-least infeasible and collision-resistance which means to avoid having the same output of two different inputs. For a hash value with 256 bits output length, the possibility of breaking one-wayness will take 2^{256} times a brute force attack and similarly to avoid having same output from two different inputs will take $2^{256/2}$ times birthday attack.

SHA is a popular cryptographic hashing algorithm which has different variants SHA-0, SHA-1, SHA-2 and SHA-3. It was designed by National Security Agency (NSA). Bitcoin uses SHA-2 family variant and in particular SHA-256 which has 256 bits output with a block size of 512 bits and complete in 64 rounds. This cryptographic hash function creates and output of fixed length from an indefinite length of input.

Here it is important to highlight that the output of SHA-256 cryptographic algorithm will always remain the same for a particular input and this algorithm also satisfies preimage-resistance, second-preimage-resistance and collision-resistance properties as well. This cryptography technique is altogether different from encryption and decryption algorithms. The second cryptographic function that uses in Bitcoin is RIPEMD160 which is a cryptographic hash function based upon the Merkle-Damgard construction. Bitcoin uses SHA-256 and RIPEMD160 in combination and collectively called HASH160 when it uses in Bitcoin. Moreover it is also used to hash the transactions in the block to create a merkle tree and this algorithm is also uses to hash the transaction that is singed by the sender using his / her private key (Giechaskiel, 2015).

B. Digital Signing Algorithms

A public key cryptography is a high-level frame work that uses in many different applications. Bitcoin uses ECDSA to digitally sign the transaction and to ensure the rightful owner of the funds. The ECDSA is consisted of the following three key elements:

Private Key: A private key is only known to the person who generates it and it is a positive integer value. A user having a valid private key can unlock the funds for further using or sending.

Public Key: Public Key is based on the private key and in Bitcoin it is uses as an address of the party. It acts like an ID of the holder and doesn't need to keep it secret. This key is publicly available and uses to authenticate if the information is been sent by the right person.

Signature: A signature is mathematically calculated value generated with the combination the transaction and the private key of the sender.

When a user creates a wallet and becomes the part of Bitcoin, a pair of public key and private key is generated. The public key derives from the private key and further uses in the verification process. A Public key is a user ID for identification and becomes the address of user's wallet and is publically visible on the network. The public-key cryptography is the underlying technology for wallets and transactions. Whereas, the private key is only knows to the user which is the only proof of ownership of a wallet. If private-key is lost, then everything associated with it lost forever.

There are two steps involve in the signing process: *signing* and *verification*. For example: Alice wants to send a message to Bob, by using her private key she would do:

Signature = Sign (Message, Private-Key)

Where *Sign* is a function to encrypt message using original *Message* and Alice's *Private Key*. Signature and original message then send to Bob for verification. Bob verifies the value received from Alice by using Alice's public key as:

Result (T / F) = Verify (Message, Signature, Public-Key)

Where *Verify* is a function which decrypts the received message using *Message*, *Signature* and Alice's *Public Key* and gives results in True or False. An important element of crypto-system security is based on ECDSA which derive its security from the computational infeasibility of the Elliptic Curve Discrete Logarithm Problem (ECDLP) which is hard to break. Authenticity and security in Bitcoin are ensured by ECSDA (Kikwai, 2017).

Literature Review

This review covers the articles published in recent years. We have tried different combinations through different conditions, to search appropriate material to support our study which included journals publication, conference proceedings and different online articles.

To support our study and to ensure comprehensive and systematic methodology for searching the material, we started from Google and Google Scholar. The search option was only limited to the titles. The keywords: Cryptography Primitives on Blockchain, Securities issues in Bitcoin, How safe Bitcoin is, and their combinations were used. We further explore IEEE and ACM digital libraries to find out related material. The articles' abstracts were carefully read to check their relevance for the review. Only articles closely addressing Blockchain, Bitcoin and Cryptographic primitives were selected.

Conclusion

We have systematically studied the cryptographic primitives used in Blockchain technology and particularly in Bitcoin. It is found that the combination of SHA-256, RIPEMD160 and ECDSA ensures that the security barriers of Bitcoin are still strong and reliable. There is no such evidence in past that any hacker broke the security and tried to enter into the system. Bitcoin data is safe and protected by the hash algorithms and is still strong enough to resist any known method by the hackers. We analyzed that there are possibilities that if 51percent of miners pool them to control the mining process. Further there are chances of Man-In-The-Middle attack and has been reported many times but again, this is the network security related issues. Overall, we are convinced that Blockchain and Bitcoin are quite safe as they have adopted the combination of best security algorithms which are unbreakable and irrevertible.

Future Study: Quantum Computing is a new theory which is expected faster and accurate manifold. We propose to revisit the security levels of Blockchain by keeping in view its processing speed as it could be a threat or an opportunity for the future of so-far so-safe Blockchain technology.

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E-Financial Reporting as A New Challenge for Accountants

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Abstract

The purpose of the article is to present e-financial reporting, analyse the opinions of accountants from the perspective of its application in accounting as well as identify and discuss the biggest challenges for companies resulting from its implementation. The article starts with a brief introduction addressing the development of information and communication technologies affecting every area of life, including accounting. E-financial reporting is one of the examples confirming an ongoing revolution in this area. Next the essence and scope of financial reporting as the final product of accounting are discussed. A new technological solution is also identified, i.e. e-reporting. The core part of the article presents the source of introducing e-statements, the method of their preparation and forwarding. Owing to the synthetic analysis of the conducted survey results, it was shown that this solution poses a new challenge for accountants which, however, they are capable of meeting, whereas the benefits of its implementation are measurable.

Keywords: Accountant, Financial Statement, E-Financial Reporting, Accounting

Introduction

The development of information and communication technologies introduced numerous changes in economic and social life and also the way of entities' functioning in the 21st century (Scapens, Ezzamel, Burns, Baldvinsdottir, 2003). It resulted in both business entities and stakeholders operating in a virtual space (Siegel, Sorensen, 1999) (cyberspace), in which communication is carried out between computers connected in a network. The application of modern technologies has become an indispensable component of entities' functioning on the market, which requires quick access and acquisition of information (Umble, Haft, Umble, 2003) and imposes costs related to the implementation of technology and the respective security.

The development of information technology exerts impact on almost every area of contemporary life worldwide. This phenomenon also refers to accounting and creates new challenges for business entities. On the one hand, it improves the functioning of many of them, and on the other – adds new responsibilities. The emergence of technological solutions, such as financial and accounting programmes, transaction systems, IT systems supporting management in companies and many others, have changed the way of accounting functioning.

Digitization of many aspects of public life is continuously progressing, which also results in the need for ongoing changes related to legislation in terms of adapting the standards followed by the functioning institutions and their legal structures to the advancing computerization.

Standard Audit File (SAF), e-statements or abandoning VAT declaration represent just a few examples of the ongoing revolution in the area of accounting.
One of the most difficult technological solutions takes the form of e-financial reporting, which imposes new obligations on entrepreneurs, accountants, auditors and a number of other entities.

Therefore, the purpose of this article is to discuss e-financial reporting and analyse the opinions presented by accountants from the perspective of its application in accounting based on the survey

results (Report, 2019) conducted by the Accountants Association in Poland and also to identify and discuss the biggest challenges for companies resulting from its implementation.

The applied research methods include the analysis of legal acts, the analysis of survey results, the subject literature overview and conclusions.

The essence and scope of financial reporting

Financial reporting represents one of the most important forms of communication between enterprises and other entities with their environment. It is often referred to as the language of business. The primary role of financial reporting is to provide both reliable and transparent presentation of the entity's financial standing and the generated financial result, as well as characterize the key areas of its functioning, mainly through the prism of monetary values. From the perspective of the reported information addressees, its reliability, credibility and timeliness are of fundamental importance. These problems are particularly important in terms of ensuring business transactions security and the efficiency of capital allocation processes performed on capital markets. The information exchange system, both between the business entities themselves and their institutional environment should be used to support the decision-making processes carried out by the stakeholders. Therefore, the information presented in financial statements should not only be characterised by high quality, resulting from the need to reflect the actual situation in a true and fair manner, but also reach the interested parties quickly enough to allow making rational and effective economic decisions.

In the conditions of an increasing complexity of business processes, efficient and effective reporting on the current situation requires using adequate solutions in the area of accounting organization and reporting.

The focus on providing due credibility and reliability of the reported information is particularly important, especially in the case of public companies and such financial institutions as banks, insurance companies, investment and pension funds or brokerage houses. Access to reliable and updated information, reflecting the economic situation is of key importance not only for the immediate stakeholders, but also for the stability of the entire financial system. Hence, these entities have to follow specific financial reporting obligations (Żukowska, Zuba-Ciszewska, Bolibok, 2016).

The information resulting from a financial statement is crucial not only for the entity which prepares it, but also, and perhaps primarily, by the external entities, such as, e.g.: investors, banks, insurance companies, leasing companies and the entity's contractors. The key decisions taken in every enterprise and in relation to each of them should be preceded by an in-depth analysis of the data disclosed in a financial statement.

Accounting, including reporting, is highly formalized, thus both national and international law are important in their functioning. The basic legal act referring to accounting and reporting in Poland is the Accounting Act (Act, 1994). This Act sets out the accounting principles, the procedure for auditing financial statements by statutory auditors and the principles for performing activities in the field of bookkeeping services.

Article 2 of the Act specifies which business entities are obliged to apply its provisions, and thus issue financial reporting (to a different extent). These provisions outline the diverse scope and form of the prepared statements. This diversity applies to many entities – enterprises (manufacturing and providing services, banks, insurers, other financial institutions, micro and small entities). The templates of financial statements are included in the annexes to the Accounting Act: Annex No. 1 – template of a financial statement for companies other than banks and insurers, Annex 2 – template of a financial statement for banks, Annex 3 – template of a financial statement for insurers and reinsurers, Annex No. 4 – template of a financial statement for micro-entities, Annex No. 5 – template of a financial statement for small entities and Annex No. 6 – template of a financial statement for NGOs.

The diversity of financial reporting also applies to the entities included in the sector of public finance, foreign entities, entities which do not perform business activities and other entities covered by the regulations of the Accounting Act, which has been specified in the implementing provisions to the Act.

The provisions of balance sheet law and the implementing legislation provide the sufficient legal basis, covering all issues referring to accounting (reporting) for the majority of business entities and other entities obliged to do so.

The scope of national and international accounting regulations in force is different in various countries. Many of them have adopted the International Accounting Standards (IAS) and/or the International Financial Reporting Standards (IFRS) as the national accounting standard. In Polish legislation the following hierarchy has been adopted: the Accounting Act applies as first, however, in the case of absence of the respective regulations provided by the Act, a given entity should follow the National Accounting Standards (NAS) first, and in the absence of an appropriate national standard should be guided by IAS and/or IFRS. Since 2005, the EU has introduced IFRS as outlining the applicable principles to be adopted while preparing financial statements for the listed companies. Thus, the EU directives and the international accounting and financial reporting standards (IAS and IFRS) have a significant impact on the Polish Accounting Act.

Financial statements should present a number of structured information. However, the ability to read and interpret them remains the condition of their usefulness. The IAS Conceptual Framework (Conceptual Framework, 2004) assumes that the addressees of financial statements have the indispensable economic knowledge, including accounting, the particular industry sector and the respective economic activities, and also are capable of reviewing and analysing the presented information in detail.

As the above discussion shows, financial reporting plays the key role in contemporary economic reality. However, the increasing complexity level of the carried out business operations and the need to provide the interested parties with the fastest possible access to high-quality, reliable information to be used in the decision-making process is becoming a growing challenge for all entities required to prepare financial statements.

E – financial reporting – a new stage of accounting digitization

In Poland, the digitization in accounting has reached a new level starting from 1st October 2018. Another amendment to the Accounting Act (Act, 1994) introduced the obligation of preparing electronic financial statements in the form of XML standard file (so-called e-statements) and signing them with an electronic signature, which are later forwarded electronically to one of the below repositories, appropriate for the given business entity type:

- National Court Register (NCR), which collects financial statements prepared by the entities entered in the Business Register and provides them to the interested parties, and also forwards them to the National Revenue Administration (NRA),
- National Revenue Administration (NRA), which collects financial statements from the Corporate Income Tax (CIT) payers, who are not listed in the Business Register held by the National Court Register and also natural persons, as well as provides them for the relevant Revenue Offices.

The introduced amendments are in accordance with Community law, in particular Directive 2013/34/EU (Directive 2013/34/EU) and Directive 2017/1132 (EU) (Directive 2017/1132). The provisions of the aforementioned Directives impose the requirement on Member States to provide the duly approved annual financial statements and activity reports along with the audit report, and ensure that the above documents can be submitted in an electronic version.

The submitted set of electronically signed documents consists of: the annual financial statement prepared in accordance with Art. 45(1f) of the Accounting Act, including balance sheet, profit and loss account, additional information, and for the entities whose financial statement is subject to an

annual audit by a certified auditor also a statement of changes in equity (fund), cash flow statement, report on business operations if required by the provisions of the Act, the auditor's report on the statutory audit of the financial statements, if it was carried out, as well as the resolutions on the statement approval and the distribution of profit or coverage of loss, which are prepared as hard copies and submitted to the repository in the form of a scan certified by the person responsible.
Therefore, currently it is possible to use two types of e-financial statements: a structured format – saved in XML standard and an unstructured one – saved in any format.

The Ministry of Finance published, on the Public Information Bulletin website, the logical structures of financial statements to be used in preparing statements since 01/09/2019 by:

- entities other than banks and insurance companies (Annex No. 1 to the Act),
- small entities (Annex No. 5 to the Act),
- micro entities (Annex No. 4 to the Act),
- NGOs (Annex No. 6 to the Act),
- alternative investment companies,
- banks (Annex No. 2 to the Act),
- brokerage houses,
- insurance and reinsurance undertakings (Annex no. 3 to the Act),
- cooperative savings and credit unions,
- small cooperative savings and credit unions,

as well as the consolidated statement structures of:

- entities other than banks and insurance companies,
- brokerage houses
- insurance and reinsurance undertakings.

A financial statement, in a structured form, is prepared using an online application which creates files in XML format, but the responsibility for the correct data transfer to this format, including its technical aspects, lies with the person preparing the statement. An unstructured file can be attached to the XML file that includes additional information and explanations. This file is saved in an encoded form and due to its subsequent presentation in the National Court Register, it is recommended to save it in PDF format.

Next the annual financial statement, both in a structured and unstructured form, is signed by the person entrusted with keeping the books of account and the head of the business entity, where, if the entity is managed by a collective board, the statement is signed by all members of the board. This signature is an electronic one: advanced, qualified or personal.

The method of submitting financial statements depends on the status (category of the business entity), however, the generally accepted principle is their submission to one place only. Table 1 presents the statement components which have to be forwarded and the repositories they are submitted to.

Table 1: Components of the financial statement and its forwarding method

No.	Status (category) of the entity keeping the accounts	Place of forwarding	Form		
			annual financial statement	activity report	other documents
1	Entities entered in the Business Register of the National Court Register preparing financial statements in accordance with the Accounting Act	repository of financial documents held by the National Court Register	prepared in XML format, signed by the person responsible for keeping the accounts and by the entity manager – electronic signature	prepared electronically in an unstructured form signed by the entity manager – electronic signature	a) certified auditor's report on the statutory audit (if performed) – prepared in an electronic version and submitted with a qualified electronic signature b) resolution on the approval of the financial statements by the approving authority – prepared and signed in paper form; a scan certified by a management board member with an e-signature is submitted to the National Court Register repository (in a partnership – by a partner or a general partner) c) resolution on the distribution of profit or loss coverage – prepared and signed in paper form; a scan certified by a management board member with an e-signature is submitted to the National Court Register repository
2	Entities entered in the Business Register of the National Court Register preparing financial statements in accordance with IAS	repository of financial documents held by the National Court Register	electronically signed in any form by the person responsible for keeping the accounts and by the entity manager (the entire management board)	as in point 1	as in point 1
3	Entities – corporate income tax (CIT) payers – not entered in the Business Register of the National Court Register (preparing financial	National Revenue Administration (NRA)	as in point 1	not applicable	as in point 1, but excluding point c (if these are companies not entered in the Business Register of the National Court Register, point c applies)

	statements in accordance with the Act)				
4	Civil law partnerships preparing financial statements in accordance with the Act and their business partners (taxpayers of both personal income tax (PIT) and legal corporate income tax (CIT)	they do not forward financial statements to NRA or NCR; if the financial statement was audited – it is forwarded for publication in the Court and Economic Monitor (C&EM)	prepared in any electronic form, signed electronically by the person responsible for keeping the accounts and by all the partners conducting the company affairs	not applicable	in the case of forwarding for publication in C&EM – as in point 1, but excluding point c
5	natural persons preparing a financial statement in accordance with the Act	NCR; if the financial statement was audited, it is also forwarded for publication in C&EM	as in point 1	not applicable	in the case of forwarding for publication in C&EM – as in point 1, but excluding point c and instead of the resolution on approval – the decision on approval; these documents are not forwarded to NCR

Source: author's compilation based on: (the Act of 29 September 1999, Bakalarz, 2019).

A financial statement, along with the required documents, has to be sent to either NCR or its bodies within the deadlines specified by the legislator. The entities entered in NCR, which do not prepare financial statements in accordance with IAS are obliged to send e-statements within 15 days from the approval date of the annual financial statements (in accordance with Article 69 of the Accounting Act), i.e. usually not later than by July 15 of the following year. In turn, the personal income tax (PIT) payers, who keep the accounts and are required to prepare financial statements, should submit e-statements to NCR by the end of April (in accordance with Article 45(5) of the Personal Income Tax Act). Preparing and submitting e-statements is subject to electronic time-stamping, which allows the respective authorities to monitor them more accurately.

The importance of the obligation to prepare financial statements in relation to the entities' financial standing and, thus, the implementation of the transparency principle means that their violation may result in criminal liability for the violations specified in the Accounting Act. Failure to prepare a financial statement, despite the existing obligations, or failure to prepare it in accordance with the provisions of the Act or presenting unreliable data in its content, as well as failure to submit a financial statement or an activity report in a relevant court register is subject to specific sanctions.

Pursuant to the provisions of Art. 77(2) of the Accounting Act, the first of the above mentioned violations is punishable with a fine or imprisonment for up to two years, or both. However, in accordance with Art. 79(4) of the Act, a person who, contrary to the regulations in force, refrains from submitting financial statements to the relevant registers is subject to a fine or the penalty of restricted liberty.

The responsibilities related to financial reporting rest with the manager of the business entity, who is a member of the management board. He/she bears full responsibility for keeping the deadlines and the mode of submitting financial statements as well as their proper construction. If an entity is

managed collectively, where no single person responsible in this matter has been indicated, all management board members are subject to criminal liability.

E - financial reporting in the opinion of accountants

Within the framework of the adopted purpose of the article, i.e. presenting e-financial reporting and analysing the opinions of accountants from the perspective of its application in accounting, the results of the survey, carried out by the Poznań Branch of the Accountants Association in Poland (Report, 2019), were verified . The conducted analysis is focused on identifying and presenting the biggest challenges for companies resulting from the implementation of e-financial reporting, as assessed by the accounting-related environments.

914 representatives of accounting professions, working both in the internal financial departments of companies (47%) and in accounting offices (49%), as well as other entities involved in the financial reporting process, participated in the survey requesting to provide answers about the entity level of preparation, being either the respondent's employer or a client. The vast majority (98%) took an active part in this process, however, for the majority of them it was a new challenge.

In terms of the respondents' positions at work, their vast majority occupied the decision-making functions. The largest group covered people employed at the chief accountant position or the accounting department manager. The second, most numerous group were the owners of service entities keeping the accounts. Among the representatives of internal accounting departments in the entities – most people worked in medium-sized and small companies. The survey also covered over 30 tax advisory offices and entities performing audits of financial statements.

At first, the respondents assessed, in general, the entity's preparation level for the process of preparing and submitting e-statements using the scale of 1-10. The responses provided to this question were assigned to five categories, where 17% of the respondents rated the preparation level as very poor, 24% as poor, 25% as moderate, 21% as good and 13% as very good. It shows that the answers were relatively evenly spread, which indicates the cross-sectional nature of the study constituting the basis for the report. The cross-sectional nature of the survey is also confirmed by the even division according to the authorization tools of financial statements, where 35% used a qualified electronic signature, 20% a trusted profile and 43% both of these forms.

In the vast majority of entities (65%), the accounting departments faced difficulties at every stage of the e-reporting process. Most problems (indicated by approx. 20% of the respondents) were encountered at the stage of signing and submitting e-statements to the National Court Register/National Revenue Administration. Approx. 9% admitted problems with preparing and providing e-statements to shareholders /owners. Only approx. 2% of the respondents came across problems with approving an electronic version of the statement.

A detailed analysis of the prepared report shows that the actual problems with e-reporting have their source outside accounting departments and do not result from the substantive preparation of the accounting personnel to the occurring changes. The biggest identified problems, associated with the discussed process, are presented in Table 2.

Table 2: Problems in the process of e-financial reporting

No.	Problem	Scale of the problem (%)
1	Insufficient time to prepare the organization of changes in the financial reporting process	39,5
2	Reducing the actual time for preparing financial statements	40,9
3	Absence of appropriate adjustments related to IT solutions – accounting program, Enterprise Resource Planning (ERP) system	35,7
4	Unclear provisions referring to e-financial statements	31,4
5	No trusted profile and/or qualified electronic signature of people signing the statements	35,2
6	No availability of e-NCR system, IT problems related to accessing e-NCR	35,1
7	Lack of knowledge/awareness among the individuals responsible for approving the statements	18,5
8	The need of programming knowledge and skills among the financial and accounting personnel	33,8
9	Absence of the professionally prepared explanations and instructions on completing the logical structures of e-statements	21,8
10	Absence of instructions about submitting e-statements to NCR/NRA (setting up a profile, submitting e-statements etc.)	15,4
11	Absence of appropriate IT support (external/internal)	20,3
12	Unavailability of persons approving the statements	18,5
13	Lack of knowledge/awareness among the management staff	19,8
14	Lack of knowledge/awareness among the financial and accounting personnel	10,7
15	Unclear notes in the logical structures of e-statements	17,7
16	Unavailability of the individuals responsible for signing the statements	9,3
17	Lack of knowledge/awareness among the individuals responsible for signing the statements	10,7
18	Errors in the logical structures of e-statements	12,0
19	Lack of knowledge/awareness among the certified auditors performing audits of e-statements	1,1
20	Unavailability of the certified auditors performing audits of e-statements at the time of signing them (along with the audit report)	0,4

Source: author's compilation based on (Report, 2019).

The comparison of answers provided by the responses and presented in the form of the above list, shows the actual, objective problems related to accountants' work or even, in general terms – the entire organization. The conducted analysis indicates that it was possible to prepare, in a proper way, for carrying out the process of both preparing and submitting e-financial statements. Every eighth respondent admitted that the organization being his/her employer or client was very well prepared for the e-financial reporting process. However, certain objective problems occurred, the source of which was outside the accounting departments or accounting offices, and predominantly took place during the stages of providing and submitting the statements. These difficulties were also associated with insufficient time needed to prepare financial statements and with IT solutions, both used in the company and provided on websites.

Interesting conclusions result from the analysis of the respondents' seniority in the accounting and finance departments, in the context of the identified obstacles. The fewest number of problems referred to the respondents presenting 11-15 years of professional experience, i.e. the ones who had already been dealing with digital technologies at an early stage of their careers. This group covered the largest percentage of employees and business owners, the best prepared for the e-financial reporting requirements.

Having analysed the research results, it can also be stated that the companies with the functioning internal accounting were better prepared for this task. It is especially true for large and medium-sized companies carrying out a broader scope of reporting obligations on a daily basis. The new solutions have often proved to pose a significant problem for micro and small organizations. In addition, the companies characterised by good infrastructure and IT support did not report major problems related to generating and sending e-statements.

Incorrect assessment of the companies' preparation, being the clients of accounting offices, could have been the result of the management boards' dismissive approach to the obligation of e-financial reporting, and thus – the absence of their active participation in the entire process. The companies commissioning the accounting services to external entities transferred the entire work to accounting offices and expected a comprehensive service with their own minimal participation. However, the external entities have limited possibilities of controlling the actual implementation stages of preparing e-financial reporting within the companies and exerting an effective pressure on management boards for greater involvement.

Conclusion

A financial statement is an important source of information about the entity's financial status. For a long time, the entire business trading reported the need for introducing electronic financial statements allowing an effective use of the data provided therein through, e.g., cross-sectional compilation of individual data. The respective legal provisions strengthened the implementation of EU legislation, as the submission of electronic financial statements in a specific format facilitated access to these statements, as well as using the data they provide by the interested entities from all EU and EEA Member States.

Changing the form of preparing and submitting financial statements resulted in new obligations related to transforming the traditional statement into XML format. Generating the appropriate e-financial statement structure also imposes covering additional expenses by companies related to the electronisation of financial statements. However, its implementation aims at improving the accounting processes and allowing more efficient use of the data provided in such statements. Obligatory reporting in an electronic form, along with the internal mechanisms of data correctness control will allow tax administration to obtain the information regarding the financial results of entities on an ongoing basis.

It is also a great opportunity for entrepreneurs because, on the one hand, they will have to organize their recording and reporting processes to obtain high quality data, and on the other – owing to the public records, they will have free access to verified and reliable information about the financial condition of their contractors.

In the author's opinion, the conducted analysis of the survey results allowed meeting the adopted goal of the article, i.e. identifying and discussing the biggest challenges faced by companies and related to the implementation of e-financial reporting. According to the author's assessment, accountants met the challenge of preparing the first e-financial statement and signing it with an electronic signature successfully. The difficulties appeared primarily outside the accounting departments, at the stage of signing the statement by the management board members and when submitting the statement to NCR/NRA.

The electronisation of financial statements is an example of the rapidly advancing digitization in relations between entrepreneurs and government institutions, which will definitely contribute to increased work efficiency in accounting departments and allow saving the time spent on preparing financial statements. This, in turn, will force entities to improve their work organization and regularity.

As a result of the digitization of financial statements and e-NRA service, employees, suppliers and competitors have access to financial data, whereas e-financial reporting has a chance of becoming a new tool for developing a positive company image, which the best entities, focusing on good cooperation and active communication between management and accounting will definitely be capable of using to their advantage.

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Analysis of Retail Markets: Evidence from Slovakia

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Abstract

The retail sector as a result of transformational changes has undergone significant changes that influenced mostly buying behavior of consumers. The development of large-scale retail chains brings many positives as well as negatives, which directly affect the population. The main objective of the article is to focus on the retail network of large enterprises with 20+ employees in the Slovak Republic, namely retail sales in the context of GDP per region in the SR according to NUTS III classification. The number of observations for variable ranges from 72 to 80. When verifying the development (i.e., changes), the number of variables is from 64 to 72. Measurement has taken place in two basic phases for the purposes of achieving the goal and the presented hypotheses a). and b). The retail network is constantly growing. At the end of 2016, according to the Statistical office of the Slovak Republic in Slovakia is more than 14,000 retail units with more than 20 employees. The structure, size, location and innovation of retail operations are one of the tools to attract customers under their roof.

Keywords: Economic Development; Retail-Trade in Slovakia; Revenues; Retail Formats; Regional GDP

JEL Classification: M29, O11, L81

Introduction

The perception of retail is becoming increasingly important in all countries of the world, including Slovakia. Also in Slovakia, retail is part of GDP creation. After years of stagnation, the business sector experienced a positive turnover in mid-2016, reflecting growth in retail sales. The trend continued in the first quarter of 2017. The source of this development is the positive results of the Slovak economy, which posted a 2.9% GDP growth in 2016. Retail sales in 2016 amounted to EUR 19.3 billion and increased by 2.2% compared to the last year. The most dynamic growth was recorded in retail sales specialized in food, beverages and tobacco. Specifically, growth was 17.1%; in fuel retailing (mainly due to rising prices) - growth of 5.8%, for goods for culture and sport - growth of 3.8% and in non-specialized retail stores - growth of 2.2% (Ťapuš, 2017).

Issues of the retail development and its influence on the region is currently considered as particularly topical taking into account the economic attenuation in the world. Because of transformation changes, the retail-trade industry underwent through significant changes influencing mainly the shopping behavior of consumers. The development of large-scale retail-trade networks brings many positive but also negative matters directly affecting the population. This very specialized theme fills in a gap

in the field of research that was specific for the integration processes related with the accession of the Slovak Republic to the European Union.

The contribution of the article lies in the assessment and evaluation of the retail network (enterprises with 20 and more employees) in Slovakia during the integration processes into the structures of the European Union, in relation to revenues linked to gross domestic product (GDP) for individual regions of Slovakia (NUTS III level).

Literature Review

Retail can be characterized as an area of constant change, where it is very important for traders to react flexibly and adapt to customer needs and wishes. Changes in the market make it easy for new competitors to enter retail. However, it also brings frequent failures to sales units that do not adapt quickly to these changes. Therefore, there is a natural flexibility in the retail industry towards all the changes that occur. At the same time, retailers need to consider all parts of the so-called retail mix when creating a sales strategy (Soukalová, 2004).

Retail Activity

One of the most striking features of the current retail trade in Slovakia is at its first hand its concentration and the changing retail network structure, where small shops and supermarkets have been replaced by large-scale business formats such as supermarkets, hypermarkets and discounts. However, the construction of these large-scale facilities also brought restrictions. Localization models, analyses and various other theories are trying to explain these notions (Križan et al., 2017; Spilková, 2012).

According to the authors Tonysheva & Kuzmina (2018) represents of the balanced development of local food markets in the conditions of existing socio-economic differences and intermunicipal and is condition for ensuring the physical and economic accessibility of food products for the population of the region.

Retail activity in Slovakia is defined and delimited by the legal norms found in the Trades Licensing Act and the Commercial Code.

Legal provisions from the point of view of companies are dealt with in more detail by Horzinková (2010); (Chapčáková & Hečková, 2010). The Trades Licensing Act is a basic public law that sets the rules for businesses. Retail is defined as the purchase of goods for sale to the final consumer (retail) or for the purpose of their sale to other traders (wholesale). The law also states that retail is part of free trade that requires compliance with the general terms of this law. Neither professional nor other competences of subjects are required (Zákon č. 455/1991 Zb). The Commercial Code regulates business and other business related matters. Entrepreneurship is understood to be a continuous activity undertaken by an entrepreneur in their own name and on their own responsibility for profit. Retailers - Entrepreneurs are registered in the Trade and Business Register (Zákon č. 513/1991 Zb.).
The final consumer is very important, or most important, in this case. This type of business is operated in stores, outside of them and in retail organizations (Kotler & Keller 2013).

Levy, Weitz & Grewal (2012) state, that retailing is a key element of the distribution chain, linking production to consumption. The distribution chain is described as a summary of companies that make and distribute products and services directly to consumers. They also define it as a summary of activities that add value to products and services.

Important element for industry is the development of technology and the internet which brought great changes to the way consumers shop. The traditional way of visiting a store is considered no longer

relevant, replaced with online shopping through social media, websites, and ecommerce (Afriza et al., 2019).

Retail Transformation

The retail transformation processes in the 1990s in Central and Eastern Europe have resulted in increased interest in consumption culture and in the area of retail capital linked to the "re-emergence" of retail geography in terms of moving away from traditional localization to economic and cultural geography (Ducatel & Blomley, 1990; Križan, 2009). The transition of retail from central market management to a market economy was a complex transformation process that included qualitative changes and had to respond to the situation and conditions of the emerging domestic and foreign markets. This process was not simple and was essentially closely related to the transformation of the entire economy (Trembošová & Dubcová, 2013).

After 1989, the stage of concentration was fully manifested by the arrival of a larger number of multinational retail chains in regional cities in the Slovak Republic. This stage also affected rural municipalities with comparable signs of an increase in the number of stores (Trembošová & Dubcová, 2016). Naturally, the greatest emphasis is placed on food shops in the regions. The level of retailing in individual rural and urban municipalities is highly differentiated. Significant differences in retail equipment between western and eastern territories have been created, reflecting the size of municipalities and their economic base (Križan, Barlík & Bilková 2017; Križan et al., 2016; Danielová, 2011).

According to Pícha et al. (2012), retail is an important sector of the national economy in terms of its contribution to individual macroeconomic indicators. Retail sales are a significant indicator that reflects household consumption developments. Household expenditure is an important component of gross domestic product (GDP), affecting the behavior of other economic operators and consequently the development of other indicators.

Internationalization in the Slovak retail sector has become intense after the transition to a market economy. Many international companies have established themselves in the internal markets of post-communist countries, and this trend continued in the second half of the 1990s and continues today. Changes occurred after the entry of large retail chains into the Slovak market, which became apparent after 1996 and even more after 2000. Major chains operating in individual regions of Slovakia are mostly: Tesco, Billa, Kaufland, Coop Jednota, Lidl and others. They significantly increased competition in the regions, resulting in the disappearance of several small stores. The process of internationalization does not affect consumer behavior as much as the process of globalization does (Lauko et al., 2008). Since globalization can be characterized as an evolutionary trend in the development of society, at least a brief excursion into retail development within retail formats in Slovakia is necessary to define the globalization in retail (Križan, 2009).

Table 1: Retail Formats

Formats	Retail strategies	Store
Supermarkets	Price ranges are mostly low due to discounts and bonus benefits. These are self-service shops with a wide range of grocery and non-grocery goods.	Billa, Terno.
Hypermarkets	Price-aggressive policy with a discounted orientation, the advantage is a full range of grocery, non-grocery items such as: clothing, furniture, hairdressers, restaurant, or refreshment facilities.	Tesco, Hypernova, Kaufland.
Specialist wholesalers	The prices are similar to those in specialized department stores, with the exception of the range that differs in goods, namely, sports equipment, electrical goods, and furniture stores. They concentrate mainly on one product type. They feature hall construction solutions with lower operating costs.	Ikea, Kika, Nay, Elektroworld.

Specialized and highly specialized stores	Price ranges are mostly higher than in other sales units, high demands on staff expertise. They can focus on grocery or non-grocery assortment of goods.	DM.drogéria, Tauris, Zdravá výživa
Mixed stores (neighborhood stores)	Price ranges are largely high due to low demand for goods; retail outlets are mainly located in rural areas. It is characterized by proximity to the customer.	Gas stations.
Grocery store	Price ranges are on average, stores are located near the population (customers), especially in housing estates.	Fresh, CBA,
Full-range department stores	Price ranges are mostly at medium and higher prices, a wide range of products with individual departments managed by a specialized manager.	Baumax, Hornbach. OBI
Discount stores	The main criterion is the low price, the range of fast-moving and fast-selling, self-service type, limited range of goods.	CBA, Lidl

Source: Spilková, 2012

The current status and spatial distribution of services (retail) is the result of the long-term development. In this context, social trends and their impacts, such as industrialization and urbanization, can be taken into account, resulting in the concentration of this sector in cities (Bilková & Križan, 2013).

The scope and structure of the grocery retail area has been significantly influenced by the expansion of international retail chains to Slovakia. The emergence of retail chains can be seen as a logical phenomenon that results from the global trend of the global economy, the trend of using the "economy of sale" effects. Part of the philosophy of a typical retail chain is also the same or very similar way of selling, designing stores, as well as other elements confirming central management. The characteristics of individual retail formats are also interestingly developed in several scientific studies (Križan, 2009; Kotulič & Marchevská, 2013; Viestová, 1995; Spilková, 2012; Benda-Prokeinová et al., 2017).

Pikora (2007) points out that the development of retail sales has, in addition to unemployment, a significant impact on investor behavior, share price developments and thus stock indices, as investors link their expectations to the overall development of the national economy with these indicators.

Methods and Methodology

The aim of the paper is to evaluate the revenues for own performances and goods in the retail trade in relation to the regional GDP in Slovakia during the integration processes into the structures of the European Union.

The narrowly specialized topic fills the gap in the given area of research for the monitored period (2000 - 2010), which was a specific integration process related to the accession of the Slovak Republic to the European Union and the European Monetary Union. The analysis is based on the data base for the regions of the Slovak Republic according to the NUTS III classification and thus it is the so-called panel data, where the spatial dimension consists of regions and time - years. In total, the number of observations for individual variables is from 72 to 80. In case the development (i.e., changes) is verified, the number of variables is from 64 to 72.

Measurements take place in two basic phases for the purpose of achieving the stated goal and the hypotheses presented a). and b).

Phase one (I)

It is implemented using regression statistics to determine the most appropriate model from the selected options. Regression analysis according to Rimarčík (2006) is the starting point for inferring the results and expressing other analyses of measurements. Individual regression analyzes are recorded in Microsoft Excel. It is based on the linear, power, exponential and logarithmic model. Selection is based on maximum index of determination R2, quantile of Student distribution and Fischer distribution with degrees of freedom.

Phase two (II)
After evaluating phase one, presented hypotheses are verified using panel regression models. Individual analyses of the examined regression are recorded in statistical software - Stata. The properties of time series are discussed and then the panel test is applied. In order to find out how the variables are being examined, the panel test: Harris - Tzavalis (1999) test is used. This test is designed based on these reasons:

- verifies the null hypothesis, there is at least one nonstationary time series in one panel (e.g. GDP for all regions); as opposed to the alternative hypothesis and all-time series are stationary;
- the test counts with one, common auto regression coefficient for all-time series, which makes it more suitable than other tests for such smaller panels;
- for small samples, the strength of the tests is relatively low. Therefore, if, despite this disadvantage (small sample), the null hypothesis is rejected, it would be considered as a strong signal that the time series are stationary. First, this level-variable test will be used, taking into account the possible presence of a deterministic trend.

The key feature of the time series of (macro)economic indicators that needs to be explored in terms of their modeling is the stationarity. The time series is generally considered to be stationary if its stochastic properties are invariant to time, i.e. its diameter, variance, and covariance do not depend on time. Time series testing for stationarity is necessary for regression analysis. This is a common problem in time series analysis. If the time series are neither stationary nor cointegrated (for more details, e.g. Hatrák, 2007) and enter regression analysis, then deceptive results can occur. In fact, the non-stationarity of time series leads to the problem of so-called apparent or spurious regression, the results of which can be considered worthless (Haluška, 2011).

The principle is that if both variables have a trend at a given time interval, a strong relation between variables can be found in the analysis, even though there may be no relation between them. This phenomenon is often accompanied by the fact that in the regression analysis a high coefficient of determination are obtained and at the same time the residues from the regression model are significantly auto correlated.

Many economics and econometrics researchers are mainly focused on research of time series in individual fields. Among the Slovak economists is Benčík (1999), whose research is focused on consumer prices and nominal wages in Slovakia in terms of time series research. Also including, Ostrihoň and Ivaničová (2015), their research partly focuses on the production homogeneity of regions of Slovakia, municipalities and household consumption (Haluška, 2011; Adamišin & Tej, 2012; Buleca et al., 2017).

If they are stationary, there is a tendency to trust the regression model. If they are not stationary, the confidence in the results obtained is largely questionable.

The results are shown in the following Table 2, which shows the verification of (non)stationarity of level variables.

Table 2: Verification of (non)stationarity of level variables

	N	Trend?	Harris - Tzavalis (1999)	
			Z statistics	p – value
GDP per capita adjusted by price index	72	Yes	-1.186	0.118
Revenue in retail trade adjusted for price index	80	Yes	-2.221	0.013

Source: (authors), statistical software - Stata

This analysis shows that the following variable is stationary (taking into account or not taking into account the deterministic trend):

- revenues (adjusted for price index and trend taking).

If only this variable enters the regression analysis, the results (if trends are present) will not be considered misleading. If at least one non-stationary variable enters the analysis, the "confidence" of the results will be decided by verifying that residual autocorrelation is present in the regression models.

The Harris-Tzsavalis (1999) panel test is also used for changing variables. They can be used to analyze the presence of a dynamic relationship between variables. At the same time, as a rule, these variables are stationary and this test will only verify this property. Changes are expressed from original variables using the following relation:

((variable in time t) – (variable in time t – 1)) / (variable in time t – 1).

If these development variables are concerned, the symbol Δ is used. In the case of changes, the null-hypothesis of non-stationarity of variables was rejected by the Harris-Tzavalis (1999) test in each case. Therefore, if variables expressing changes are used in the next analysis, the result can be statistically trusted, results are apparently not deceptive.

Table 3: Verification of (non) stationarity of variable changes

	N	Trend?	Harris - Tzavalis (1999)	
			Z statistics	p – value
GDP per capita adjusted by price index	64	No	-5.725	0.00
Revenue in retail trade adjusted for price index	72	No	-10.653	0.00

Source: (authors), statistical software - Stata

Panel regression is used to verify all hypotheses, while fixed effects are considered (regions are not selected randomly - therefore, it is necessary to prefer models with so-called fixed effects as models with random effects). The following assumptions are made for each of the models:

- residual Heteroscedasticity (Wald test);
- panel Dependence of Residues (Pesaran Test);
- residue auto-correlation (LM test);

Survey Results

The essence of the problem solved is the determination of the research goal of the paper. The research objective of the paper is to evaluate the revenues from own performances and goods in retail trade in relation to regional GDP based on verification of (non) stationarity of level (changes) variables and panel regression. Two research topics and two hypotheses have been set on the basis of the stated goal.
Topic a). Is there a statistical correlation between revenues from own performances and goods in retail and regional GDP per capita within the regions of Slovakia?

Topic b). Is there a statistical link between the development of revenues change from own performances and goods in retail trade and regional GDP change per capita within the regions of Slovakia?

Price indices are adjusted in the case of regional GDP as well as revenues from own performances and goods in retail. This transformation does not affect the results in this case because it is applied to both variables. The following two hypotheses are verified.

Hypothesis a). We assume that there is no statistically significant linear relationship between revenues from own performances and goods in retail (adjusted for price index) and regional gross domestic product (adjusted for price index).

Hypothesis b). We assume that there is no statistically significant linear relationship between the development of revenues change in retail (adjusted for price index) and the development of regional gross domestic product change per capita (adjusted for price index).

The results from these tests are presented in the tables and refer to the standard fixed effect panel model. If some assumptions are violated, then panel regressions are estimated by a method in which the breach of these assumptions is taken into account. The exact procedure depends on the specific results of testing these assumptions and the data on which these regressions are performed. Therefore, a specific procedure for each of the tests is presented.

Table 4: Results of regression statistics and its statistical testing for hypothesis a).

	Linear	Exponential	Power	Logarithmic
Reliability Value R	0.88493	0.760279	0.70253	0.78363
Corrected coefficient of determination	0.883286	0.756855	0.698219	0.780494
t calculated	23.20186	14.89988	12.76543	15.80816
F calculated	538.3262	222.0065	162.9562	249.898
t table value (quantile of Student's distribution)	2.647905	2.647905	2.648977	2.648977
F table value (critical value)	7.011399	7.011399	7.017078	7.017078
Number of comparisons	72	72	72	72

Source: (authors), statistical software - Stata

Tables 4 and 5 show the results of these measurements. Therefore, other correlation analyses are based on a linear model.

Table 5: Results of regression statistics and its statistical testing for hypothesis b).

	Linear	Quadratic
Reliability Value R	0.048883	0.057862
Corrected coefficient of determination	0.033542	0.026972
t calculated	1.785074	0.931491
F calculated	3.186488	1.873179
t table value (quantile of Student's distribution)	2.657479	2.658857
F table value (critical value)	7.062192	4.971015
Number of comparisons	64	64

Source: (authors), statistical software - Stata

Hypothesis a). is verified using panel regression models. The shape of the regression model in verifying the hypothesis a) is as follows:

$$gdpadj_{i,t} = \alpha_i + \beta_1 revenuesadj_{i,t} + \beta_2 year_t + u_{it}$$

The estimation of this model is based on the assumption that the variable [revenuesadj] (sales for own performances and goods in retail trade adjusted for the price index hicp) is considered stationary and variable [gdpadj] (GDP per capita adjusted by the price index hicp) for non-stationary. Therefore, similarly as explained in the previous text, the result of the residual autocorrelation test will also determine whether this hypothesis can be statistically solved at all.

The results suggest that auto-correlation is present in the residues. Therefore, this hypothesis cannot be solved meaningfully. For full disclosure, the panel regression results are shown in the table below.

Table 6: Results from hypothesis a) testing in panel regression

N	72		Groups	8
	Coefficient	**Std. Error**	**T- stat.**	**p-value**
Revenues in retail trade adjusted for HICP price index (revenuesadji,t)	1.79	0.29	6.19	0.00
Year (yeart)	345.99	56.26	6.15	0.00
Constant	-687057.60	112438.40	-6.11	0.00
R^2 modified (from the OLS assumption)	97.22%			
Wald test	0.000			
Pesaran test	0.407			
LM test	0.001			

Source: (authors), statistical software - Stata

Hypothesis b). with respect to the interrelationship of changes of both variables. Hypothesis b) was translated in panel regression:

$$\Delta gdpadj_{i,t} = \alpha_i + \beta_1 \Delta revenuesadj_{i,t} + u_{it}$$

Table 7: Results from hypothesis b) testing in panel regression

N	72		Groups	8
	Coefficient	**Std. Error**	**T- stat.**	**p-value**
Revenues in retail trade adjusted for HICP price index (Δrevenuesadji,t)	0.05	0.03	1.63	0.11
Constant	0.03	0.01	3.95	0.00
R^2 modified (from the OLS assumption)	-4.93%			
Wald test	0.526			
Pesaran test	0.620			
LM test	0.091			

Source: (authors), statistical software - Stata

Both variables are stationary, so the relationship that is (not) found in this regression is considered relevant to this analysis. All assumptions that are verified are considered to be met (p-values are all greater than 0.05). However, the relationship between sales variable and GDP (both adjusted for price indices) was not found (p-value is 0.11). For this reason, the hypothesis b) is not rejected; rather the following statement is presented.

There is no significant linear relation between the development of turnover change in retail trade (adjusted for price index) and the development of regional gross domestic product change per capita (adjusted for price index).

Discussion

The authors of Bento, P., Restuccia, D. (2020) documented in their study a comprehensive and comparable data set for the average size of enterprises in production within services. We welcome the positive impact on average business size and GDP per national and the remarkable similar income flexibility in manufacturing and services. It also compiles and documents data on correlated distortions in previous productions and industries, which have a negative impact on the distortion and GDP on the domestic market in both sectors. According to Carter, M. (2019), in terms of retailers of food and non-food products, net profit margins have decreased in recent years. The reason was a decrease in gross margins, which indicates a decrease in the number of company's price strength. The companies are trying to compensate for the decline in margins through such measures such as vertical supply chain integration and product mix modification. According to a recent study by Dujak, D. (2019), dealing with a distribution system that significantly affects not only the cost structure of

retailers and their suppliers, but also their cost structure. Results indicate high degree of retailers' satisfaction with centralized distribution mainly due to lower costs and increase in sell-out traffic. While suppliers also feel cost reduction, they are not satisfied with change of distribution system model mostly due to lost control over physical product flow. This study proposes a four-phase methodology - diagnostics, program design, assignment and design - that considers grouping suppliers by means of K and fuzzification according to several criteria. In addition, a case study analysis of 149 retail suppliers in Colombia grouped companies into high (8), medium (32) and low (109) risk groups, each of which was assigned tailor-made development programs. The results obtained support the use of the proposed methodology to improve supply chain performance for organizations with many suppliers in need of development programs Buriticá, NC, Matamoros, MY, et al., (2019). According to a recent study *"Sustainable Initiatives and Organizational Reshaping in Food Retailers"*, which examined how large food retailers adopt corporate social responsibility (CSR) programs for employees and their families. The findings point to the need to redefine organizational structures and implementation processes. Selected cases highlight the importance of closer coordination between organizational dimensions in the implementation of the CAP in the retail sector, with some cases showing delays in the implementation of organizational tools and employee involvement Risso, M., & Tavino, S. (2020).

Conclusion

Hypothesis (a) was based on regression models: Driscoll-Kraay (t-statistics, p-value), OLS (R2 modified), LM test, Wald test, Pesaran test. Significant links between own performances and goods and regional GDP were statistically insignificant from the results of the LM test, which confirmed the presence of auto-correlation in residues. Therefore, these results cannot be further interpreted. Hypothesis (a) cannot be verified.

Hypothesis (b) was expressed similarly to (hypothesis a), i.e. based on regression models: Driscoll-Kraay (t-statistics, p-value), OLS (R2 modified), LM test, Wald test, Pesaran test. However, the relationship between the development of revenues from own performances and goods and the development of regional GDP was not found (p-value is 0.11). Consequently, hypothesis (b) is not rejected. The hypothesis was confirmed.

The issue of retail development and its impact on the region is currently considered to be a topical issue in view of the ongoing economic downturn in the world. The development of sales in the Slovak retail sector depends largely on the structure and number of outlets, which according to statistical surveys are divided into department stores, shopping centers, hypermarkets, mixed stores, supermarkets, wide-range grocery and other specialized stores. The network of retail outlets with 20 or more employees is growing year by year in terms of reporting units. The number of hypermarkets and supermarkets is growing with the emergence of retail chains and the number of shopping centers, self-service stores and discount stores is declining. It is very likely that, in generalizing the relation between consumer buying behavior and commercial supply, the concentration in the retail services sector will increase, which will increase the competition for retailers, and the pursuit of meaningful innovation will be a matter of future direction and survival in the industry.

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Process Favorability for Different Types of Selection Methods

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Abstract

The goal of the study was to compare the fairness assessment levels for various traditional and ICT-based forms of personnel selection tools. Basing on data from an e-questionnaire conducted on a sample of 405 employees in Poland, a comparison was made of 6 different forms of interviews (including long-distance), 4 forms of reference checking (including social and professional media screening), 4 active work-related methods (including playing computers games and internships), and 4 tests/questionnaires. Potential candidates were found to assess the various forms of selection conducted using tools from a given group in different ways. ICT-based selection tools are generally given lower assessments as compared with their traditional analogues, with the exception of screening of professional media. Respondents who have been previously evaluated by a given selection tool perceive process favorability of this tool higher than those who have no experience with this selection tool.

Keywords: Personnel Selection, ICT-Based Selection Tools, Organizational Justice, Process Favorability.

Introduction

Research into employee selection at first focused on the predictive value of data provided by a selection tool for success at work (Truxillo & Bauer 2011; Ployhart, Schmitt & Tippins 2017). With time, researchers started focusing on other measures of success (e.g. litigation intentions, withdrawal from the selection process, turnover) in their assessments of the quality of the selection process. However up until the 1990s, the employer's perspective dominated, and minimal attention was devoted in studies to candidates' interests (Truxillo & Bauer 2011; Ployhart, Schmitt & Tippins 2017).

S.W. Gilliland's (1993) fairness-based model introduces a new approach in the research on applicants' reactions to selection methods, by applying constructs from Greenberg's (1990) organizational justice theory. This model connects applicants' and employees' reactions to selection procedures with their perceptions of procedural and distributive justice of selection methods. Steiner & Gilliland (1996) proposed a methodology, until now followed by almost all studies into how candidates perceive selection tools (Nikolaou et al 2019: 103). However, although numerous studies have been conducted within this framework, reviews of the literature emphasize that we do not know whether the form in which a tool is implemented has significance for its acceptance level (Truxillo & Bauer 2011; Nikolaou & Oostrom 2015; Truxillo et al 2018). Specifically, there is no data on whether online equivalents of traditional tools are similarly accepted (McCarthy et al 2017).

The goal of the study was to compare the acceptance level of the different forms in which 4 types of selection tools are used. Data was collected from 405 respondents in Poland through an e-questionnaire on a panel devoted to market research. Comparisons of assessments were made for various forms of the following: interviews (4 typical interview methods, stressful interview and long-

distance interview); methods based on others' opinion (2 types of traditional reference checking and 2 types of social media screening); active work-related methods (2 types of traditional work samples and 2 types of simulated work samples); and 4 types of tests/questionnaires. It was found that potential candidates assess the various forms of a tool from the same group differently. It was also confirmed that respondents who have been previously evaluated by a specific selection tool perceive process favorability of this tool higher than those who have no experience with this selection tool.

The article is organized in the following way: part 1 describes the traditional methodology of research into the acceptance of selection tools, to outline its assumptions and limitations. Part 2 introduces the premises of the study and the research hypotheses. Part 3 presents the research methodology, and part 4 describes the research results. section should follow keywords.

Assumptions of the standard methodology for studies on the assessment of fairness of selection tools

The dominating methodology in studies on the assessment of fairness of selection tools (Truxillo & Bauer 2011; Nikolaou & Oostrom 2015; Truxillo et al 2018) bases on Steiner and Gulliland's classic study (1996). In it, acceptance of a tool is analysed by distinguishing distributive justice (process favorability, i.e. the fairness of the result of the selection decision) and procedural justice (fairness of selection procedures). These constructs are measured with the use of a questionnaire, with 2 questions indicative of the former, and 7 questions indicative of the latter. Each group of questions is preceded by a short description of the tool to be assessed. Each of the questions is assessed on a 5- or 7-point Likert scale. This research procedure has been followed multiple times (Anderson, Salgado & Hülsheger 2010; Bilgic & Acarlar 2010; Ispas et al 2010; Anderson, Ahmed & Costa 2012; Liu, Potočnik & Anderson 2016), despite its arduousness for respondents (Bilgic & Acarlar 2010), and the questionability of its underlying assumptions.

The most fundamental of these controversial assumptions is that respondents comprehend the tool they assess in a similar way. This is obviously incorrect, however, as some respondents know the tool from their own experience, others from everyday exchanges with colleagues, and yet others – from a description they read with greater or lesser attention. This observation finds confirmation in Snyder & Shahani-Denning's research results (2012), which have shown that subjects who know a given selection tool from their own experience give it a higher fairness assessment.

A second group of assumptions concerns the determinants of the opinions shown in a questionnaire. Standard methodology assumes that the main criterion followed when responding to questions in a questionnaire is fairness assessment. This in turn assumes that emotional attitude is evened out with respect to (at least) the selection tools, and (more broadly) with respect to ways of communicating with the employer. However, studies have shown that fear of being assessed by a given tool, such as a test (Arvey et al 1990), affects not only the result, but also the respondent's emotional attitude towards the fact of being assessed, and in effect – his/her assessment of the fairness of such a test (Nikolaou & Oostrom 2015).

Despite the broad use of ICT-based selection tools, attention is drawn in the literature to the scarcity of studies both on how they are accepted (McCarthy et al 2017; Woods et al 2019), as on how the fairness assessment of various forms of the same personnel selection tool is differentiated (Truxillo & Bauer 2011; Nikolaou & Oostrom 2015; Truxillo et al 2018). We may, however, expect that candidates' responses will differ in the case of face-to-face interviews concerning qualifications, or their reactions to a stressful situation provoked during the interview.

Assumptions of the Research

Four basic types of selection tools were chosen for the study (interview, reference checking, work sample and questionnaire), and each of these had several forms (variants of the tool type). In effect,

the study analyzed: 6 types of interviews, 4 types of methods based on others' opinions, 4 work sample related tools (simulated and specific work samples), and 4 types of written tests and questionnaires (Tab. 1).

In this article we use the term "form of implementing a selection tool" as a general term to describe the differentiation between ways in which a specific type of tool is implemented, the effect of (a) a specific method of creating stimuli for the candidate, and (b) communication channel through which the stimulus is delivered to the candidate. The first group of differences includes, e.g.: method of constructing interview questions, simulated or real work samples and references gathered from various types of people. The second group includes face to face and ICT-based communication. Such a multidimensional approach seems useful for an explorative study.

The aim of this study was to verify whether the different forms of implementing selection tools from a given group (e.g. using different interview methods) affects assessments of their process favorability. We based on a common sense expectation that assessments of recruitment interviews will differ depending on whether the interview used stress-inducing techniques, or was "traditional" and concerned candidates' educational and professional experiences. In addition, we wanted to verify whether the perception of fairness of ICT-based selection tools is lower than that of similar traditional tools. The belief that technology-mediated communication decreases fairness assessment level for a given selection procedure is based on media richness theory, according to which the acceptance level of media of a lower density (in their role of communication tool), is lower (Daft & Lengel 1986). According to some (McCarthy et al 2017), this should also be relevant for selection tools. Partial confirmation for this belief may be found in earlier empirical studies concerning technology-mediated interviews (Blacksmith, Willford & Behrend 2016; Langer, Kőnig & Krause 2017), however our research focuses on a broader range of selection tools. An indirect argument that this may be expected for social media searching may be the unwillingness of candidates concerning this type of recruiter activity (Aguado et al 2016). On the other hand, however, we may expect that present-day candidates, living in internet times, are not only familiar with this kind of communication, but treat it as naturally as traditional methods.

A second goal of the study was to verify if experience with a given tool affects perception of its fairness. Research conducted on a sample of 169 employees in Mumbai (Snyder & Shahani-Denning 2012) showed that fairness scores were significantly higher if participants indicated that they have previously been evaluated by the same tool. The study showed this to be true for personality tests, personal contacts, assessment centers, biographical information blanks, written ability tests, honesty tests, online information and graphology, but not for interviews, resumes, personnel references and work-samples. In the latter case, the differences were insignificant, which was explained by the fact that almost all subjects had had experience with the given method (Snyder & Shahani-Denning 2012: 306).

Table 1: Types of investigated methods, their descriptions and their abbreviations

No	Description of method type	Abbreviation
	Group: Interviews	
1	Interview concerning your experience and qualifications	Interview (qualifications)
2	Interview during which you have to describe in detail how you acted in the past in specific situations	Interview (episodic)
3	Interview during which you have to describe how you would act in a given (hypothetical) situation	Interview (situational)
4	Interview concerning your strong and weak points	Interview (strengths and weaknesses)
5	Interview during which interviewers try to frighten and stress you	Interview (stressful)

6	Long-distance interview (e.g. via Skype)	Long-distance interview
	Group: Based on others' opinions	
7	Checking your credentials (references) by interviewing people who know you	Personal references (acquaintances)
8	Checking your credentials through interviews with your former bosses	Personal references (former bosses)
9	Being assessed on the basis of information that can be found on "non-professional" social media (such as Facebook)	Social media screening
10	Being assessed on the basis of information to be found on "professional" social media (such as LinkedIn)	Professional network screening
	Group: Active work-related	
11	Work samples (you show how you would perform in a given task)	Work sample
12	Assessment center (exercises conducted in a group over 1-2 days, observed by several assessors)	Assessment center
13	Being accepted for an internship, and then those who show they possess the appropriate competencies for the job are proposed a normal work contract	Internship
14	Being asked to play a computer game, on the basis of which it is assessed whether the player is suitable (has the required competencies) for the job	Computer game
	Group: Written tests and questionnaires	
15	Written tests checking your professional knowledge (e.g. exam concerning legal knowledge, procedures, standard solutions)	Written knowledge test
16	Questionnaire describing situations and a set of solutions for each, with a forced choice of the solution that best describes your behaviour in the given situation	Situational questionnaire
17	Cognitive skills test with tasks and logical puzzles to solve	Cognitive skills test
18	Personality tests	Personality test

Source: Own elaboration based on (Woźniak 2013) and (Steiner & Gilliland 1996)

We thought it worth repeating this study with the use of several ICT-based tools, rather than just one. On the one hand, previous experience favours an increase in perceived ease of use – it is one of the determinants of attitude toward using technology in the Technology Acceptance Model (TAM) (Davis, Bagozzi & Warshaw 1989). Hence, we may expect that previous experience with being assessed with the use of a given selection tool will favour more positive assessment of the tool, through its perceived ease of use. On the other hand, however, the negative valence of this experience may lower its score (through a decrease in its perceived usefulness).

If we define the research goals in this manner, i.e. that a variety of different forms of the use of a given selection tool need to be assessed, the sheer length of the measurement tool (questionnaire) forces us to limit the study to an analysis only of process favorability. In this case, the measuring questionnaire consists of 2 questions for each of the recruitment tools, with assessments made on a 7-point Likert scale (Steiner & Gilliland, 1996).

The following hypotheses were posed:

H.1. The different types of methods, grouped into four categories;

a) interviews (qualifications, episodic, situational, strengths and weaknesses, stressful, long-distance),

b) methods based on others' opinions (personal references from acquaintances, personal references from former bosses, social media screening, professional network screening),

c) active work-related methods (work samples, assessment center, internship, computer games),

d) written tests and questionnaires

will be assessed in different ways, and (e) ICT-based methods will be rated less favorably than their traditional counterparts.

H2. Individual experience with a selection method affects perceived process favorability of this tool..

Method

Participants

The study was carried out using an e-questionnaire on the ankietowo.pl portal in January 2018. The portal has access to a panel of gamification-renumerated respondents, and declares that its composition corresponds (layer-wise) to the demographic structure of Polish society Our sample was not random – the responses of people who are not currently professionally active were rejected. It consisted of 405 currently employed subjects, and was dominated by female subjects (60.0%). The average age of participants was 33,31 years (SD = 12.44). 43.7% of respondents had university degrees, the remainder had at most high-school degrees. 34.6 % respondents declared that their job seniority was below 4 years, 36.5% – 5-15 years, 28.9 – 15 years or over.

Measures

A total of 18 types of selection methods were investigated. They were described to respondents as presented in Table 1, which also lists the abbreviations used for each type of method.

The first question concerns experience with a given method: “Recall the last recruitment you took part in, which gained you a job. What methods were used to assess whether you were suitable (mark all that you think were used)?”. In this question, respondents were not asked for their experience with the use of social media screening or professional network screening. Instead, they were asked to answer with a yes/no to the statement: “I think they searched for information about me on the Internet”.

The next two questions concerned process favorability measured on a 7-point scale, from 1 (“strongly disagree”) to 7 (“strongly agree”):

1. “[This type of method] is effective for identifying people qualified for the job.”

2. “If I did not get the job after [the use of this type of method], I would consider that selection based on [this type of method] is fair.“

The process favorability index was calculated as the mean score on those two items.

In the questionnaire, these two questions measuring process favorability were preceded by a description of the tool, which detailed facts and behaviours as they would be perceived and experienced by candidates (i.e., the description was phenomenological).

Lastly, respondents were asked about their gender, year of birth, job seniority, level of education and type of work.

IBM SPSS Statistic software (v.25) was used to conduct all statistical analyses. Statistical significance was set for a 0.05 level.

Results

In order to examine if the form of selection tool in each group affects perceived process favorability scores, four repeated-measures analyses of variance (ANOVA) followed by pairwise comparisons with Bonferroni's adjustment were conducted. Table 2 presents the results of these analyses. These analyses showed the large significant effects of method type in the "Interviews" group, moderate effects in the "Active work-related" group and low effects in the remaining groups.

In two of the three groups in which perception of ICT-based tools was tested, the lowest rated tool was the ICT-based one; in the "Interviews" group it took second last place. Contrary to our hypothesis that ICT-based methods will be rated less favorably than their traditional counterparts, in the "Tools that are based on others' opinions" group, one of the 2 ICT-based tools (being assessed on the basis of information to be found on "professional" (LinkedIN-type) social media) was not assessed lower than its traditional counterpart (checking candidate's references through interviews with his/her former bosses). This partly falsifies hypothesis 1, and indicates that not only communication channel, but also other factors (here: form of implementation of the method) affect how a tool's fairness is assessed.

To recapitulate, hypotheses 1.a-d were fully supported, while hypothesis 1.e was only partially supported, as not all the ICT-based tools investigated are rated lower than their traditional counterparts

Table 2: Process favorability ratings – means and standard deviations in groups

	Mean	Std. Deviation	F	p	partial η2
Group: Interviews					
Interview (qualifications)	5.16	1.13	163.72	<0.001	0.29 (large)
Interview (situational)	4.59 [A]	1.14			
Interview (episodic)	4.56 [A, B]	1.18			
Interview (strengths and weaknesses	4.45 [B]	1.12			
Long-distance interview	3.81	1.27			
Interview (stressful)	3.53	1.38			
Group: Based on others' opinions					
Personal references (former bosses)	4.11 [A]	1.26	16.97	<0.001	0.04 (small)
Professional network screening	3.98 [A, B]	1.41			
Personal references (acquaintances)	3.94 [B]	1.33			
Social media screening	3.68	1.44			
Group: Active work-related					
Work sample	4.51 [A]	1.10	50.69	<0.001	0.11 (moderate)
Internship	4.49 [A]	1.27			
Assessment center	4.21	1.21			
Computer game	3,79	1.40			
Group: Written tests and questionnaires					
Written knowledge test	4.49 [A]	1.14	6.43	0.001	0.02 (small)
Situational questionnaire	4.52 [A]	1.06			

Personality test	4.36 [B]	1.13			
Cognitive skills test	4.36 [B]	1.14			

Notes: Methods in the groups are listed in descending order of process favorability.
Means with the same superscripts in the groups are not significantly different at p<0.05

To determine if significant differences existed between perceived process favorability reported by respondents who have or do not have experience with given tool, 16 independent t-tests were performed for each selection method type. Apart from three tools – social media screening, professional network screening, and situational questionnaire, for which the differences between mean evaluations are insignificant – experienced respondents assessed the favorability process higher than the inexperienced (Table 3). Hypothesis 2 was thus supported.

Discussion and Conclusions

The goal of the study was to verify whether the form in which a specific type of selection tool is implemented affects how its fairness is assessed by candidates. Specifically, we attempted to verify whether the implementation of ICT-based methods during selection decreases acceptance level. Data collected with the use of an e-questionnaire from 405 employees in Poland showed that potential candidates assess various forms of interview, reference and opinion checking, (simulated) work samples, and tests/questionnaires in different ways, and ICT-based methods are usually – with one important exception – given lower evaluations than the corresponding traditional methods. Familiarity with a given tool (experience with it during a previous selection) was also found to increase acceptance for the given tool (measured by an assessment of its distributive justice) – again, with certain exceptions.

Table 3: Differences between perceived process favorability based on subjects' experience with a given method

Types of selection methods	Not experienced		Experienced		t-test		
	N	Mean (SD)	N	Mean (SD)	t	p	Cohen's d
Group: Interviews							
Interview (qualifications)	143	4.73 (1.04)	262	5.40 (1.12)	-5.83	<0.001	0.61
Interview (situational)	307	4.49 (1.09)	98	4.92 (1.25)	-3.08	0.003	0.36
Interview (episodic)	334	4.46 (1.12)	71	5.04 (1.34)	-3.41	0.001	0.45
Interview (strengths and weaknesses	284	4.33 (1.09)	121	4.73 (1.13)	-3.32	0.001	0.36
Long-distance interview	374	3.74 (1.28)	31	4.58 (0.98)	-3.57	<0.001	0.67
Interview (stressful)	383	3.50 (1.39)	22	4.16 (0.98)	-2.19	0.029	0.48
Group: Based on others' opinions							
Personal references (former bosses)	377	4.07 (1.25)	28	4.66 (1.31)	-2.41	0.016	0.47
Professional networks screening	386	3.96 (1.39)	19	4.45 (1.81)	-1.48	0.141	
Personal references (acquaintances)	351	3.87 (1.34)	54	4.34 (1.18)	-2.43	0.016	0.35
Social media	386	3.69	19	3.40	0.88	0.380	

screening		(1.44)		(1.50)			
Group: Active work-related							
Work sample	360	4.46 (1.08)	45	4.83 (1.27)	-2.13	0.034	0.34
Internship	361	4.42 (1.26)	44	4.99 (1.24)	-2.81	0.005	0.45
Assessment center	388	4.16 (1.20)	17	5.27 (1.15)	-3.73	<0.001	0.93
Computer game	393	3.76 (1.40)	12	4.79 (1.36)	-2.52	0.012	0.74
Group: Written tests and questionnaires							
Written knowledge test	340	4.40 (1.15)	65	4.96 (0.95)	-3.69	<0.001	0.50
Situational questionnaire	373	4.49 (1.07)	32	4.81 (0.93)	-1.63	0.104	
Personality test	342	4.30 (1.16)	63	4.72 (0.92)	-2.76	0.006	0.38
Cognitive skills test	374	4.32 (1.15)	31	4.81 (1.00)	-2.29	0.022	0.43

Note: Standard deviations are given in parentheses

Apart from these general results, the study revealed some interesting details. Firstly, candidates assess professional media screening relatively well (i.e., not worse than checking references with former bosses), and differentiated it from social media screening, which is given a low rating. This result suggests that not only communication channel, but also the specific method of communicating within this channel are of significance for assessing the tool's fairness. This is consistent with the main assumption of the study, namely that the different forms in which tools from a given group are implemented will be evaluated in different ways, and supports the thesis that difference in implementation are not solely an issue of the density of the medium through which the activity takes place. This thesis, verified through an analysis of 5 types of interview, differing with respect to method of constructing questions, finds confirmation in the data in table 2. Similarly, evaluations of various forms of reference checking and active work-related selection methods were found to differ significantly.

Secondly, though having been assessed with the use of a given tool usually increases its acceptance, testing with both kinds of social media are an exception. The questionnaire used a single question to measure experience with being assessed through internet-based reference searches. Our data cannot therefore distinguish whether respondents who underwent social media screening during their last selection assess reference checking tools differently to respondents who had undergone professional network screening. The decision, made in the preparatory phase of the study, to have a single question was dictated by the assumption that questionnaire items should only include elements visible to the respondents – who were at the most able to guess that the recruiter had searched online for information about them. Hence verifying whether the experience of having references checked with the use of professional (LinkedIN type) social media screening favours later positive assessment of this tool, is an important future research direction, with significance for HR practice.

Two conclusions may be drawn from the fact that in selection practice, previous experience with a specific tool favours its later acceptance. If previous experience with a selection tool increases its acceptance, we may assume that this experience was a positive one. This means the work of previous recruiters (HR workers) is positively evaluated, and suggests that such positive experiences not only decrease fear (and so probably increase acceptance) of successive recruitments conducted with the use of the given tool – but also strengthen trust put in information provided by recruiters. This in turn increases the probability that giving candidates additional information before using the selection tool will decrease their fear of being evaluated by this tool. Earlier studies conducted in a laboratory

setting showed that fairness assessments may potentially be increased (e.g. McCarthy et al., 2017a), if before implementing the tool, candidates are informed about the reasons it is being used for. Applying these research conclusions to practice requires assuming that candidates will trust the information provided by recruiters at the beginning of the recruitment process. In effect this means that – with the significant exception of social media checking –acceptance of various forms of selection tools, including those based on ICT, will be increasing. This will happen both spontaneously (thanks to the positive experiences of being assessed by a given kind of tool), and in an accelerated way (when HR departments begin to include explaining why this selection tool is used as part of the procedure).

To summarize, our study suggests that with prospective candidates' current level of awareness, ICT-based selection tools should be used with the utmost care in Poland. Secondly, research into fairness should be broadened to include a greater variety of selection tools – both with respect to communication channels through which data about candidates is collected, as with respect to the method used to provoke behavior or collect data.

There are several limitations which need to be taken into account before drawing any categorical conclusions. Firstly, the study based its results on opinions declared by a specific group of respondents – relatively young people (average age of 33,3 years), currently not looking for work and not in the position of having to be subjected to selection by a given tool. The relatively low age of respondents suggests a relatively high level of internet literacy and hence an untypical attitude towards ICT-based tools – more positive, but also more aware of the risks associated with this medium. The fact that respondents are currently not undergoing selection is a limitation typical of most studies conducted in this field. In effect, the results are biased – but the direction of this bias cannot be a priori assessed.

Secondly, the study does not control whether all respondents similarly understand the recruiter's role in the given selection tool – specifically, how they imagine what the recruiter really does. Theory of organizational justice indicate that subjects' responses are not so much a reaction to the selection tool used, as to how they perceive and imagine the recruiter's behavior. From the HR perspective, it is not so much the fairness assessments, as their behavioural consequences (drawn attention to by organizational fairness theory) that are of significance. The perspective we adopted, with its phenomenological description of the recruiter's behaviour, constitutes just a first step towards limiting this phenomenon.

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Integrated Assessment Models for Air Quality Control at Local Level

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Abstract

Poor air quality is dangerous for health, the environment and many industrial activities; recently, it has been correlated to the pace of coronavirus outbreak in some areas. From an environmental regulatory perspective, it is a challenging problem, since regulators seem to be missing decision support systems to tackle the issue and come up with balanced policies. We advocate the use of integrated assessment modelling (IAM) as a tool of decision support system for regulators that are in charge of air quality control. Since pollutants in the atmosphere depend on multiple sources of emission and some of them have non-linear reactions when in contact with other substances, traditional models of response for air quality pollution do not perform well. IAMs allow for multi-objective optimization, also taking into account the costs and benefits of emission reduction in a Pareto-optimality framework of analysis. We use the RIAT+ software and methodology to show how IAMs is feasible and how it has been implemented at least in one case, providing useful insights to policy makers.

Keywords: Integrated Assessment Modelling – Air Quality Control – Decision Support System – Government Policy and Regulation

Introduction

Air quality is becoming an issue with serious consequences for human health and for economic systems worldwide. The Real-time Air Quality Index online provides an indication of how serious the situation is in some strongly industrialized areas around the globe (AQI 2020). As an example, in areas of high concentration of pollutants, initial correlations between air pollution and the diffusion of coronavirus have been observed, as particulate favors the spreading of airborne particles.

Current analytic models and holistic tools developed at academic level allow to harness data on the status of air and to identify measures that might be both effective and efficient for air quality control. Surprisingly, notwithstanding the wealth of such tools, regional governments very often fail to address the problem in practice, particularly in some countries and within more problematic areas. There seems to be a serious clash or a divergence between what the theory recommends and what the practice does, similar to those observed in other disciplines (Ungureanu and Bertolotti 2016).

In the United States, the Clear Air Act of 1963 was the first modern piece of legislation to require authorities to adopt plans for air quality control in so called non-attainment areas, where air quality standards are not met. The European Union followed the U.S. example and Directive 2008/50 now obliges Members states to implement air quality plans for regions or sub-regions where the quality of air deteriorates because of anthropic emissions. Notwithstanding the efforts at European level, the

situation does not improve in many areas and some Member States either failed to adopt plans or passed measures that eventually did not work. Our main research question relates to the motives decision makers fail to adopt in practice effective support decision systems. We believe the issue is both timely and useful to reconcile theory and practice and to make efforts of air quality control finally effective, as states are becoming more and more aware of the problem.

Theoretical background

In this paper, we advocate the use of integrated assessment models (IAMs) to introduce notions of efficiency in the adoption of policy measures to fight outdoor air pollution and enhance decision support systems (DSS) in the field of environmental control. Traditional and AI-powered models are instrumental to reduce discretionary powers and guide the decision-making process in regulating anthropic activities that have an impact on the environment and, more specifically, on air.

Contrary to the perception of policy makers, we aim to demonstrate that IAMs represent a solid scientific contribution to solve a widespread problem; science-driven approaches are hugely important for decision-makers and should become part of the environmental policies (Kørnøv and Thissen, 2000). Outdoor air pollution is caused by pollutants that float in the atmosphere and, more precisely, in its lower layer that is in contact with the planet surface (troposphere) (Sitaras and Siskos, 2008). Pollutants are caused by a number of natural and anthropic activities, that go from manufacturing to energy production, from mobility to heating households, to volcanic eruptions or fires. Emissions from human activities are more dangerous, as they increase the concentration of pollutants in urban areas and regions, where the population typically lives.

From a technical standpoint, the relationship between emissions and concentration is extremely complex and it is influenced by the meteorology and the chemistry at atmospheric level.

Meteorology will explain whether a pollutant, depending on the orography or the climate of a given area, remains more or less concentrated (for instance, because of mountains or hills that prevent transportation) or is dispersed (for instance, by the marine breeze of coastal areas). Chemistry of the atmosphere explains that some pollutants, when entering the troposphere, start combining with other substances and such reactions can be slow (as for SO_2) or more rapid (as for NO_x or VOC), thus determining different impacts on concentration and on the evolution of the air quality status.

With respect to the chemistry of atmosphere, pollutants are typically classified in primary and secondary. Primary pollutants are emitted in the air and preserve their condition, not being reactive and not combining with other substances. Secondary pollutants, instead, result from reactions among gas already present in the atmosphere, called “precursors”, and are the most dangerous and difficult to control, since concentration and impact on the air quality depends on several factors and conditions.
Secondary air pollutants include (EEA 2017):

- Carbon monoxide (CO), a compounded gas formed mainly by combustion of crude oil; its sources of emission are mostly related to transport, but also to industrial burning plants or household heating.
- Nitrogen Oxides (NOx), which includes NO and NO_2, are also related to combustion processes. Diesel engines and energy production and distribution systems are the main sources. Importantly, NOx are precursors of other secondary pollutants like ozone (O_3) and particulate matter (PM).
- Sulphur Oxide (SOx) is also mainly due to fuel combustion and the main sources are stationary power generation, industry, commercial, institutional and household (ISPRA 2015).
- Ozone (O_3) is a secondary pollutant, generated in the atmosphere by primary pollutants, that has transboundary effects and is activated through photochemical reaction. Consequently, its emergence is more significant when exposure to sunlight is higher (as during the day and in summer).

- Volatile Organic Compounds (VOCs) include a mix of different substances (like methane, benzene and hydrocarbons) that, according to their structure and nature, are organic and volatile enough to be considered vapor.
- "Black carbon is the sooty black material emitted from gas and diesel engines, coal-fired power plants, and other sources that burn fossil fuel", which is not otherwise classified (US EPA 2018).
- Particulate Matter (PM) is a class of substances very dangerous for human health. It is a combination of particles – solid and liquid – suspended in the air. It is composed both by primary PM and secondary elements. In practice, the chemical structure of PM is not identifiable ex ante, since it results from a variety of precursors, like sulphur dioxide (SO_2), nitrogen oxides (NOx), ammonia (NH_3), VOC, black carbon and primary PM. PM also has natural and/or human generated components. Among the natural constituents, there are sea salt, dust, volcanic ashes and pollen. Anthropic elements include, for instance, combustion and dust generated from road and tires wear, as well as fires from agriculture. Hence, sources of emission can be manifold. PM is further classified with respect to the diameter of the particles. If it is equal or less than 10 µm it is called PM10, and if it is equal or less than 2,5 µm it is called PM2,5.

Needless to say, the size of the particles is inversely proportional to the dangerousness of the particulate matter, since the smaller it is, the easier is the risk of absorption in the human body. PM is largely responsible for cardio-respiratory diseases and smaller particles can also penetrate cells and interact with DNA, causing alterations (WHO and OECD, 2015).

What is strikingly important to understand is that because of the many factors that interfere in the relationship between sources of emission and concentration of pollutants in the troposphere, as well as for the behavior of active pollutants and non-linear reactions, air quality control is not an easy problem to tackle. Therefore, it requires solid analytic models to direct any action aimed at improving the air quality status.

Methodology. the DPSIR paradigm for air quality control

In order to understand how analytical models can be developed to address the problem of pollutants to the purposes of air quality control, we refer to a conceptual framework of analysis originally developed by the European Environment Agency. Such framework is termed DPSIR, an acronym that stands for Determinants (Driving forces), Pressures, State, Impact, Responses, and it is an extension of the pressure-state-response (PSR) conceptual framework originally proposed by the OECD (OECD 2003). DSPIR is the first conceptual framework to come up with an integrated assessment model for air quality control, as it aims at providing a holistic approach to the problem, by describing the interactions between the environment and society (Guariso et al, 2016).

The DPSIR model becomes useful in modelling, since it allows a more accurate analysis of the relevant factors and their interactions, but it is also crucial in developing forecast models for ex ante and ex post regulatory assessment and in supporting decision-making processes in relation to actions that should be implemented. The following figure gives a graphical representation of DSPIR's elements, their reciprocal positions and interactions.

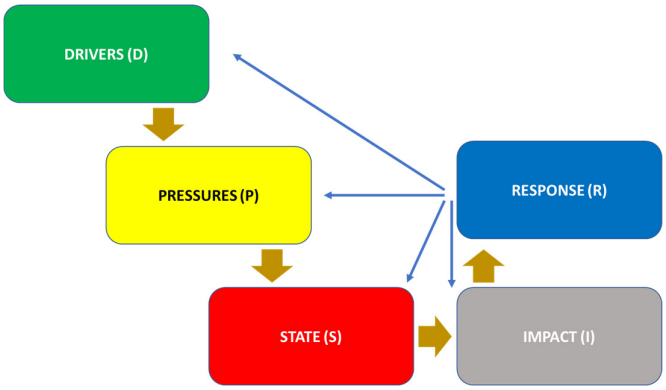

Fig. 1: DPSIR

The rationale behind DPSIR is the causal link among the elements. Individual and social needs, as well as the activities and the infrastructure aimed at their satisfaction (Determinants) exert pressures on the environment (Pressures). Such pressures cause changes in the condition of the environment and of natural resources (Status), whose effect is to produce consequences (Impacts) for human health, ecosystems, and the economy in general. Eventually, impacts require mitigation solutions, through responses, that can act – with various degree of effectiveness and various level of costs – on each of the previous elements.

To be sure, determinants refer both all socio-economic factors that satisfy individual and social needs (food, raw material, energy, or even culture, leisure and other human dimensions that entail individual choices) and infrastructure and activities aimed at producing goods and services. Hence, determinants include sources of emissions that have an impact on the quality of air. For clarity, we consider sources as belonging to four main categories: (1) industry and productive activities in general (2) agriculture and related activities (such as farming) (3) traffic and mobility in general and (4) heating and energy production.

Intuitively, only under extremely simplified models by influencing one of the sources there is a direct and positive consequence in terms of air quality, because anthropic activities cannot be shut down altogether and because of the behavior of pollutants deriving from the above-mentioned sources. More complex models of optimization are required and a vast body of research has been dealing with several proposals (for a review see Blond et al, 2017).

Pressures are represented by the set of human activities producing modifications on the environment, such as the release of pollutants in the air, or waste disposal or electromagnetic and acoustic pollution. Pressures cause changes in the state of the environment and, more specifically, on air. The development of models hinges on data on state, which can be monitored, measured and exposed to simulations that can predict its changes and evolutions. Authorities have developed air quality indexes and statistics reports based on data available within given geographic areas (US EPA 2018) and such data are typically available to download for uses also by the scientific community.

Impacts can be both negative and positive, and they depend on variations of the state of ecosystems, on health, on wealth and economy. Eventually, technical and regulatory responses are aimed at reducing or mitigating the consequences on the state, while trying not to cause side effects or impacts that can offset the advantages of regulation. Under this standpoint, IAMs become crucial to optimize the options available when facing a multi-level, multi-variable problem.

Integrated Assessment Modelling: RIAT+

The interactions of pollutants and the variety of sources of emissions and their nature trigger a reflection about the construction of a decision support system that integrates anthropic elements, economic considerations and natural phenomena in a holistic tool.

One such tool, that one of the authors of this paper contributed to develop is the RIAT+ (acronym of Regional Integrated Assessment Tool), that is able to handle non-linear phenomena (contrary to state-of-the-art solutions that follow a linear approach) and provides a multi-objective framework, that is supposed to overcome the traditional scenario analysis and the cost-benefit analysis. Improved versions of such systems are also available and improvements have been discussed and implemented in other research projects, also with a view to supporting policy makers in their attempt (Viaene et al, 2016).

To address the complexity posed by the economic and physical variables, the RIAT+ model resorts to neural networks and neuro-fuzzy models (Carnevale et al, 2009). The model relies on two objectives that must be optimized, that is the air quality (measured according to the standard AQI) and the costs of implementing actions that reduce emissions. The two dimensions of the model are relevant to the purposes of this paper, since the model itself allows for optimization by looking at both objectives from the perspective of efficacy and efficiency.

Importantly, RIAT+ proves a light model, that does not require significant computational power and extended runtimes, which makes it also suitable for timely applications when the decision-maker needs real-time tools to redress a situation where the air quality is worsening and multiple sources are responsible for concentration of primary and secondary pollutants.

Results on the application of RIAT+ to a real case

One of the tools based on the IAM approach is the RIAT+, a system developed by a consortium of European universities and research centers during the EU-funded OPERA project. After its development, RIAT+ was applied to assess the effectiveness of the local air quality plan of the Lombardy Region, in Italy (Carnevale et al, 2018; Turrini et al, 2018). By illustrating the results of the application, we aim to provide evidence of how IAM models can be used to assess and adopt measures that are not only effective, but also efficient, when considering the costs of their adoption.

Due to peculiar meteorologic conditions, Lombardy is one of the most problematic regions in Europe. Its intense industrial and agricultural activities also cause high level of atmospheric pollution and concentration of PM. Under the European regulation scheme, Member States and regions are required to adopt regional plans for air quality control where concrete measures are identified to limit the concentration of pollutants and to reduce the exposure of individuals to high levels of dangerous substances, particularly in urban areas.

The regional plan for air quality control (Regione Lombardia 2013) in Lombardy was approved in 2013 and then amended in 2018. It envisions a series of measures to reduce emissions and it is supposed to operate throughout 2020. Since 2018, it envisions a set of 66 measures for air quality control, that include:

- 26 measures related to road and off-road transportation (e.g., traffic ban in case of emergency or speed reduction on local roads).
- 27 measures for energy production and energy efficiency (e.g., introduction of maximum temperatures for household heating or limitation of daily operation for burning plants).
- 13 measures for agriculture and forestry (e.g., prohibition of fires to clean dry fields).

All measures can be classified in two main groups:

(1) End-of-pipe measures, that are instrumental to emission reduction of pollutants resulting from anthropic activities. They rely on technological systems of filtering that do not require a change in the productive process, even though they entail costs of adoption. End-of-pipe solutions are effective on emissions of traditional pollutants (NOx, SO2, PM10) but do not change the emissions of greenhouse gasses.
(2) Energy measures (including measure of energy efficiency) have an impact of emissions, as they alter the energy consumption. Such changes can correspond to a more efficient (and, as such, reduced) use of fuel or to a radical change of a human activity, such as the replacement of car transportation for individual uses with active mobility systems (e.g., biking). Energy measures do have also an effect of greenhouse gasses.

RIAT+ implements two different approaches of the decision-making modelling (Carnevale et al, 2012). On the one side, it assesses a scenario defined by a group of experts; on the other side, it allows to identify the emission-reducing measures that must be introduced or supported in order to decrease the level of concentration for secondary pollutants (particulate matter, NO2 and O3), while minimizing the costs of intervention. RIAT+ also allows for the evaluation of emissions of greenhouse gasses for any specific policy measure.

RIAT+ is boosted by a set of neural networks able to simulate the link between emissions of precursors and annual mean concentrations of pollutants and it is powered by a database that relates emissions with diffusion of specific technologies. The system performs a variety of activities: (i) calculates the costs of intervention, (ii) assesses the impact of given measures on the indicators introduced by local and national legislation for PM10, NO2 and ozone, (iii) generates maps of emissions and concentration (iv) measures the costs of the health system caused by exposure of the population to pollutants.

Importantly, as a decision support system, RIAT+ measures the distance between an actual policy measure with respect to the most efficient solution (that the system can identify, based on the combination of data available) or how effective is the policy on air quality control compared to the optimal value. Hence, RIAT+ can provide inputs on policies both in terms of cost-efficiency and of effectiveness.

The PRIA in Lombardy envisions a set of policy measures (classified both as end-of-pipe and energy-related). Their adoption produces a hypothetical future scenario. RIAT+ measures the impact of such measures ex ante by comparing the ideal scenario with a business-as-usual situation, where the current legislation as of 2020 is left untouched (CLE2020 scenario). Figure 1 below refers to the effectiveness of measures on PM10, NO2 and ozone indicators.

It can be easily seen that the effectiveness of the PRIA is more significant in the areas surrounding Milan (the capital city of the region) where urbanization and industry presence is stronger. The more intense reduction on the territory of mean annual concentration of PM10 equals 3.8 $\mu g/m^3$ (Figure 1)

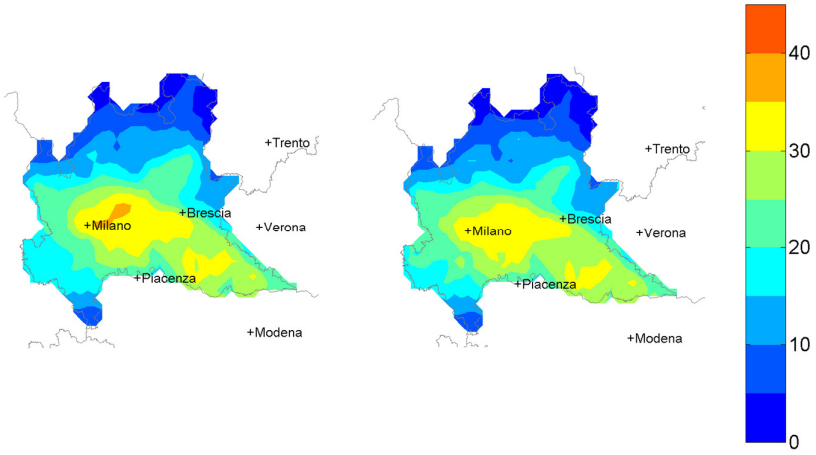

Fig. 2: Map of annual mean concentrations of PM10 [µg/m3] for the reference scenario CLE2020 (left) and the PRIA-implemented scenario (right)

Figure 2 represents the expected distribution for the ozone indicator SOMO35. Because of the more intense reduction of NOx with respect to emissions of VOC envisioned in the PRIA, what can be observed is an increase of ozone concentration in large portions of the region and only in limited areas a decrease. The more significant reduction and the most significant increase of SOMO35 are 1836 $\mu g/m^3 \cdot d$ and 1803 $\mu g/m^3 \cdot d$ respectively, whereas the mean reduction is of 258 $\mu g/m^3 \cdot d$, corresponding to 1.7% of the average value of the domain.

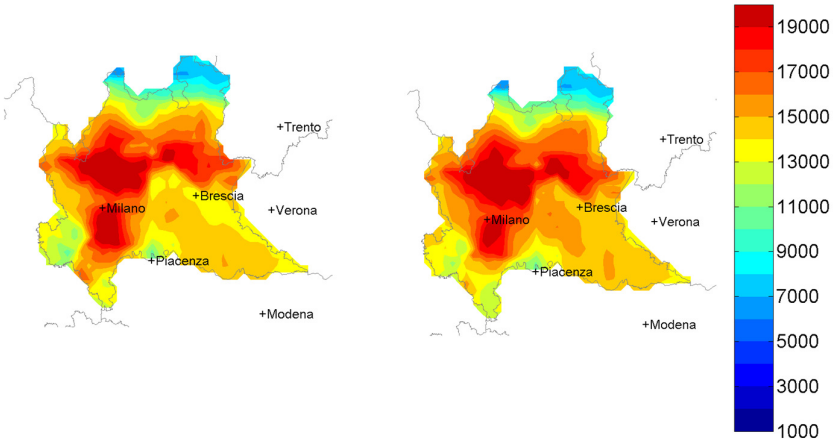

Fig. 3: Map of the ozone indicator SOMO35 [µg/m3·d] for the reference scenario CLE2020 (left) and for the PRIA-implemented scenario (right).

Expected reductions for NO2 are similar to those for PM10. Most significant changes are visible in the metropolitan area of Milan, where it can be reached a mean decrease on the regional domain of 3.01 $\mu g/m^3$ (Fig. **4**).

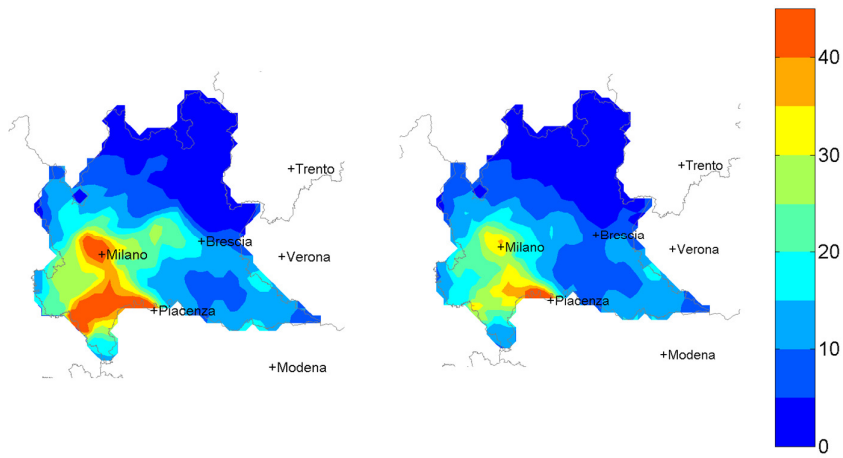

Fig. 4: Map of annual mean concentration of NO2 [µg/m3] for the reference scenario CLE2020 (left) and the PRIA-implemented scenario (right)

Previous examples refer to the measurement of effectiveness for policy measures envisioned in the PRIA. As decision support system, RIAT+ allows a cost/benefit analysis of the PRIA policy measures compared with the reference scenario CLE2020. Policy measures are grouped in four main areas: (1) private transportation, (2) public transportation and other modes of so-called soft mobility (e.g., biking), (3) production of thermal energy (heating) or (4) generation of electric power. The analysis includes:

- Direct costs related to the adoption of each policy measure of the PRIA
- Direct benefits related to energy saving and reduced consumption of fuel
- Health benefits related to the reduced exposure of individuals to PM10
- Avoided costs deriving from reduced emissions of greenhouse gasses

The following table 1 illustrates for each policy measure the whole set of costs and benefits (expressed in million euro per year).

Table 1: costs and benefits (M€/year) of policy measures of PRIA divided by type

	2020 (M€/year)			
	Direct costs	Direct benefits	Health benefits (PM10)	GHG reductions (€20/t_{CO2})
Private transportation	208	966	57	~0
Public transportation	846	1454	~0	21
Power production	2590	2058	~0	122
Thermal energy	3781	8688	37	160
Total PRIA	7425	13166	80	303

RIAT+ can be also used to assess the trade-off between the (incremental) cost of end-of-pipe measure and some air quality indicators (AQI). For instance, as far as PM10 is concerned, there is a problem at decision-making level whenever the regulator (as it is for the PRIA in Lombardy) aims at multiple objectives. The trade-off analysis then becomes crucial to address all the goals envisioned in the plan. Figure 4 shows how RIAT+ tackles this issue. The Pareto curve is made of all combinations (within the range of all possible solutions of reduction of PM10 yearly mean concentration and restraint of intervention costs) for policy measures and corresponding costs of adoption. As an example, the P solution in the graph, requires total costs of 275M€ per year. It corresponds to a situation in which the most significant decrease of PM10 in a given point of the domain is 6.14 µg/m3, while the overall mean reduction is about 1.85 µg/m3, which is 9.7% of the mean value of the domain for the reference

scenario. The graph shows (quite strikingly) how with a limited cost (it is only 5% of the total cost of adopting the best available technologies), the mean concentration of PM10 can be reduced to 99% of the maximum reduction achievable by fully applying all the best available technologies (of course, with huge investments).

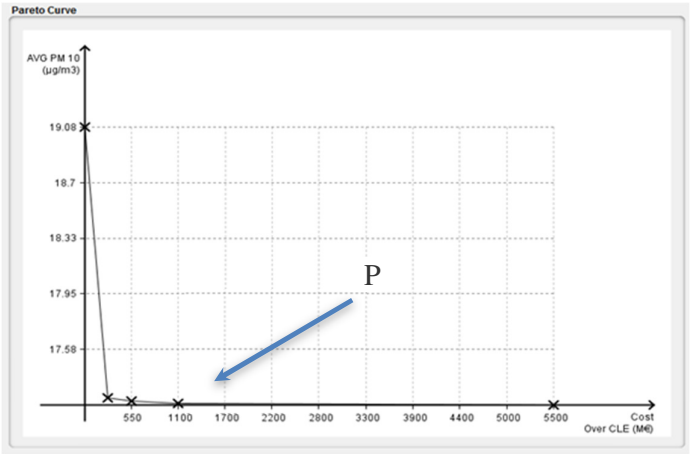

Fig. 5: Pareto Curve in the space of annual mean concentrations for PM10 and implementation costs for end-of-pipe measures.

A comparison among the reductions in emissions envisioned in the PRIA-implemented scenario and the solution P shows that the PRIA strategy is mostly focused on reduction of primary particulate (both PM10 and PM2.5 are reduced more than twice with respect to P), while the solution P is aimed mostly at other precursors (in particular NH3), whose emissions are reduced four times more than the PRIA strategy. Benefits for health are larger for the P solution because of the lower concentrations of PM10. The PRIA and the P solutions are not easily comparable for one reason, above all. For the solution P, the multi-objective problem only considers the application of end-of-pipe measures, while the PRIA includes also energy measures. Nonetheless, the multi-objective analysis is useful since it gives evidence of how important incremental actions for ammonia reduction are (being NH3 a precursor). This is just an indication for improvement of the PRIA, that comes from the use of the RIAT+ model as decision support system.

Discussions and Conclusions

Using evidence from the application of an integrated assessment tool developed from models of control systems applied to pollutants, we show how a data-driven assessment can be useful both in planning and in measuring effectiveness and costs of air quality control plans. Multi-objective decisions can be optimized and arbitrary solutions set aside when quality control is based on regulation of anthropic activities that relate to production, mobility, and leisure. Integrated assessment modelling can help develop different scenarios and dynamically adjust the solution, and chose according to current and local conditions of areas affected by concentration of primary and secondary pollutants.

Since regulatory solutions in some areas of the world prove ineffective, legislators should consider adopting more sophisticated approaches coming from the science of control systems and modelling. We do not contend to have found the ultimate model for air quality control and further research is needed to integrate multiple sources of data and improve the use of artificial intelligence techniques to further the analytical models. We believe continued research in the field might provide additional evidence that science can provide answers to the problem of managing air quality

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The Effects of Digital Transformation of The Economies of The Eurasian Economic Union

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Abstract

The article is devoted to the analysis of the effects of digital transformation of the countries of the Eurasian Economic Union. The classification of the main effects of integration of the economies of the countries of the Eurasian Economic Union (synergetic, macroeconomic, microeconomic, environmental, digital) is proposed. Based on a synthesis of the foreign experience and cooperation of the Eurasian Economic Commission with the World Bank, recommendations are given for the successful digital transformation of the economies of the EAEU countries. The characteristic of the effects of digital transformation of the economies of the EAEU countries is given and their influence on economic growth is determined. It is concluded that ensuring the accelerated development of innovative sectors of the economy, digitalization of the services sector, education, healthcare, public administration, information and economic security should be the main priorities in the implementation of the digital agenda for the transformation of the economies of the EAEU in the medium term.

Keywords: Eurasian Economic Union, digital transformation, integration, effects, risks, institutions

Introduction

In modern conditions, there is a transformation of the economies of Russia and the countries of the Eurasian continent, which is due to the transition from industrial-market to information-network economy. After the entry into force of the Treaty on the Eurasian Economic Union (The Treaty on the Eurasian Economic Union, 2014), a new stage of deepening Eurasian integration began, which is characterized by the formation of a digital economy in all countries participating in the Union. At present, the most important factor in economic growth, increasing competitiveness and the realization of the competitive advantages of the countries of the Eurasian Economic Union is the digitalization of all sectors and spheres of the economy and public administration. The legislative and regulatory basis for implementing the digital transformation strategy of the EAEU countries was the adoption of the "Guidelines for the implementation of the digital agenda of the Eurasian Economic Union until 2025", which were approved at a meeting of the EAEU Supreme Eurasian Economic Council in October 2017. The main directions of the EAEU digital agenda are: digital transformation sectors of the economy; cross-industry transformation; digital transformation of markets for goods, services, capital and labor; digital transformation of integration process management processes; development of digital infrastructure and ensuring the security of digital processes (The main directions for the implementation of the digital agenda of the EAEU until 2025, 2017).

Statement of the problem

The successful implementation of the digital agenda in the EAEU countries requires a comprehensive study of the conditions and mechanisms for creating a single digital space, digital platforms, network infrastructure, the introduction of incentive initiatives and the implementation of joint digital

transformation projects. The implementation of the tasks of the digital agenda, the creation of new digital sectors and industries, the formation of a single digital space of the EAEU will allow achieving a number of effects and an increase in the gross product of Eurasian countries.

Research Questions

- Development of a mechanism for implementing the concept of digital transformation of the economies of the EAEU.
- The impact of the digitalization of the EAEU economies on the emergence of innovative industries, new types of services, new jobs, increased productivity and the effectiveness of interaction between countries.
- Classification of the main effects of the integration of economies of the countries of the Eurasian Economic Union.
- Description of the main effects of the digital transformation of the economies of the EAEU countries.
- The impact of the digital transformation of the EAEU on economic growth.

The purpose of the study

In the all EAEU countries, national programs for digital transformation and development of the digital economy have been developed and adopted (Woodpeckers S.A., 2018). The main common elements are the creation of a single EAEU digital platform, the introduction of common digital standards, data exchange systems and electronic document management, as well as the development of digital EAEU infrastructure management systems. The creation of the EAEU digital space will allow achieving a number of effects from the implementation of the Eurasian digital agenda. Implementation of a joint digital agenda should lead to investment activity, achieving sustainable economic growth, employment growth and productivity growth in priority sectors of the economy. The implementation of the digital agenda also includes the use of new business processes, digital models of cooperation, the creation of digital assets and digital systems of government and information security.

Deepening integration is possible on the path to the formation and use of common digital networks, digital platforms and new digital technologies that allow us to break borders, create new jobs and develop new areas of economic activity and international cooperation.

Research Methods

Promotion of the EAEU digital agenda and development of a single digital market require taking into account positive foreign experience. The creation of the Common Economic Space of the EAEU should take into account, first of all, the experience of the European Union and other regional associations. In 2017, the EU adopted and implements the “Digital Agenda for Europe”, aimed at “achieving sustainable economic and social benefits through the creation of a single digital market based on high-speed Internet and compatible applications”. It is also important to generalize and analyze the experience of existing regional associations such as the Association of Southeast Asian Nations, the Gulf Cooperation Council, and others.

According to Western scholars, Eurasian integration has borrowed the experience of European integration within the EU, but there are differences in the approaches to the formation and functioning of these associations are significant. Thus, S. Roberts and A. Moshes believe that, unlike the countries of the European Union, the EAEU countries do not show much interest and willingness to delegate authority to the supranational level (Roberts S., Moshes A., 2016)

Western researcher D. Tarr emphasized that the Eurasian Economic Union includes a wide range of deep integration measures and support for lagging countries (Tarr D., 2016). The well-known Western European sociologist and one of the leaders of the sociological association of the European

Union, D. Lane, believes that the EAEU integration project fully fits into the logic of the ongoing process of regionalization of the world economy and international relations. In his opinion, the success of this project will depend on the rigidity of anti-Russian sanctions, as well as on how effectively the interaction of the EAEU with other regional unions BRICS, ASEAN, MERCOSUR and others (Lane D., 2016). The effects of the integration of the economies of the EAEU countries have various forms and are manifested in various fields. Among the effects of integration of the EAEU, the following effects should be highlighted:

- Synergetic effects of Eurasian integration that arise as a result of integrated integration in all EAEU countries;
- macroeconomic integration effects, consisting in the growth of GDP, the growth in the production of goods and services due to the expansion of sales and demand markets, savings in production, financial and administrative costs, the development of an economy based on new technologies and the expansion of cooperation ties;
- microeconomic effects of economic entities in the EAEU countries (enterprises), consisting in the growth of market share, expansion of sales, growth in revenue and profits of companies;
- integration effects of end consumers (population): increased prosperity (income) of the population of the EAEU countries due to lower food prices and increased employment, increased general educational and cultural level, increased security, improved environment, ensuring the comfort of life and business through the introduction of advanced international standards, institutional development;
- The environmental effects of Eurasian integration, including the effects of environmental activities, reducing carbon emissions, the use of energy and resource saving technologies, the joint implementation of environmental projects and the creation of environmentally friendly industries;
- digital effects of Eurasian integration, including macroeconomic, sectoral and microeconomic effects due to the transition to a digital economy in the EAEU countries, as well as special effects due to the convergence of national information and economic systems into a single EAEU geo-economic space (Dyatlov, SA, Lobanov, OS, Selischeva , TA, 2018)

Results of the study

For the successful implementation of the EAEU Digital Agenda until 2025, it is necessary to develop an organizational and economic mechanism that will ensure accelerated economic growth, create new jobs, improve public services and increase the competitiveness of the Union's economies. The following elements of this mechanism should be noted:

1. It is necessary to create the institutional and legal framework for the digital agenda, including ensuring the separation of roles, responsibilities and authorities between national and integration management organizations.
2. It is necessary to provide for the allocation of sufficient financial resources, taking into account the long-term and multilateral nature of the digital transformations of the EAEU.
3. To ensure the successful launch and maintenance of the dynamics of digital transformation, programs should be developed and launched to increase the level of digital skills and digital literacy of the general population.
4. For the successful development of reliable cross-border cross-industry digital platforms and digital solutions, distribution and broadband Internet access should be ensured.
5. It is necessary to create a single digital space, integrated digital platforms for coordination and interaction of national and integration management structures.
6. It is necessary to develop incentive measures to ensure the rapid development of innovative sectors of the economy, digitalization of the services, communications, education, healthcare and public administration of the EAEU.
7. Taking into account the digital and synergetic effects arising in the process of integration of the economies of the countries, it is necessary to develop and implement a system for operational and strategic management of the EAEU regional information and economic space (Dyatlov, S.A., Lobanov, O.S., Zhou, W.V., 2018).

8. It is necessary to ensure the preservation of information and economic security of the EAEU countries in the medium and long term.

The creation of such a mechanism must be carried out sequentially and in stages, taking into account available resources, priorities, complexity, the need to take into account the interests of all participants in the integration of national economic systems of the EAEU countries

According to World Bank estimates, the implementation of the joint digital agenda until 2025 will bring an additional increase in the EAEU's total GDP to 1% per year, and will also contribute to the creation of 8 million jobs and cost savings for businesses of $ 50 billion (Kostyleva T., 2018).

In 2016-2017 The Eurasian Economic Commission and the World Bank conducted a joint study to study international experience and develop recommendations on the maximum economic impact of the development of the digital space and the implementation of the digital agenda of the EAEU (Kheifets B.A., 2016). Digital technologies provide the EAEU countries with ample opportunity to transform their national economies. The emergence of new ways of interaction between people, communities and governments, access to information, doing business and interacting with public authorities contributes to increasing competitiveness in world markets. Due to the influence of digital technologies on all spheres of public life, the heads of the EAEU member states recognized the need to stimulate and manage technological transformation processes for the benefit of all members of society as new opportunities for regional cooperation and economic growth in the region (Vinokurov E., 2017).

A new quality of association arises on the basis of digital networks, common digital platforms and new digital solutions that reduce distances, remove boundaries, create new jobs and develop previously non-existent areas of business activity. In 2016, the Eurasian Economic Commission, together with World Bank experts, began work to study the current situation and develop recommendations for obtaining economic benefits from digital development. They studied the potential of creating a single digital space and implementing the EAEU Digital Agenda by 2025, aimed at creating a unified digital economy in the region and achieving related digital dividends.

The EAEU experts, together with the World Bank experts, developed a model for creating a single EAEU digital space, which should become an effective tool for identifying, approving, measuring, coordinating and monitoring actions aimed at achieving the goals of the EAEU Digital Agenda (The Treaty on the Eurasian Economic Union, 2014). The most important areas of joint digital initiatives within the framework of this model are: the creation of a common digital infrastructure; creation of integrated digital platforms; digitalization of leading industries and sectors of the economy; digitalization of national and regional markets. The main elements of the organizational and economic mechanism for implementing this model are: development of a general regulatory framework; creation of public-private partnerships for the implementation of priority digital initiatives and projects; development of partnerships between all participants in the created regional ecosystems; promoting the dissemination of best digital solutions and practices.

The successful transformation of the economies of the EAEU countries requires the implementation of innovative cross-cutting projects, the adoption of measures aimed at encouraging and stimulating the development of new industries and industry segments, the development of general rules for the use of information and communication technologies and the development of a favorable digital environment for the implementation of economic activities in the EAEU (Minasyan K., 2017). The most important task is to obtain synergistic effects and the accumulation of competitive digital assets using the advantages provided by Eurasian integration.

According to the European Commission, the creation of a single digital market in the EU can bring the EU economy an additional 400 billion euros per year, help create new jobs and increase productivity. Innovations such as cloud services and data analytics can add more than 2,000 billion euros to the EU's GDP by 2030 through increased industrial production. The implementation of the concept and programs of the EAEU member countries until 2025 involves the growth of the Gross

Product of the association due to the expansion of broadband Internet access, due to increased traffic bandwidth, due to the development and expansion of electronic commerce.

The most important area is the creation of cloud services and cloud computing in the EAEU member states for the research and educational community, as well as for state authorities in order to provide a new generation of cross-border services. Such cloud-based initiatives will provide Member States with the opportunity to consolidate existing data centers, increasing their resilience while reducing maintenance costs. Supporting the development of cloud technologies through the introduction of cloud services at Union level, the formation of a regional Eurasian network of data centers and regional operator companies, as well as the provision of Internet traffic caching services for European and Chinese providers will significantly accelerate economic development. According to World Bank estimates, the potential increase in the EAEU's GDP through this sector will be 0.95% by 2025. Savings resulting from the removal of legal barriers to the implementation of the EAEU Digital Agenda can potentially add 2.6% to GDP.

The development of the digital economy inevitably leads to a significant transformation of the labor market. This transformation is complex and takes place gradually, as more and more traditional sectors of the economy are engaged in the digital economy. This transformation affects job creation at several levels. Due to the introduction of ICT, process optimization, robotics, and overall efficiency gains, obsolete professions will disappear. However, according to experts, despite the release of a significant number of jobs under the influence of digitalization from the sphere of employment, the net effect of the creation of new jobs in new sectors of the digital economy will be positive.

For example, McKinsey estimates that one job in the ICT sector creates two to four jobs in other sectors of the national economy. PwC estimates that a 10% increase in digitalization reduces unemployment by 0.84%. Analysis of data on the French economy over the past 15 years showed that due to digitalization, an additional 1.2 million jobs were created and 500,000 jobs of outdated professions were eliminated. According to calculations, with an average penetration rate of fixed broadband in the EAEU at 30 percent, it can be expected that by 2025 about 3-4 million new jobs will be created, of which more than 1 million will be created in the digital economy. As a result of the implementation of the "Digital Agenda" of the EAEU member states, the achievement of target values of up to 3% of employment in the ICT sector for the EAEU member countries can provide an increase in employment by 2.4% by 2025 (Evaluation of the economic effects, 2018).

The growth of e-commerce platforms is creating a new group of micro-entrepreneurs who can access global markets and expand their business. Information, consulting, recruiting and job search services should be provided at the regional level together with an appropriate regulatory framework to ensure the free movement of citizens in the Union in search of work as new jobs are created throughout the EAEU. It is planned to create a new information system that accumulates data on employment and migration within the framework of the EAEU, which will allow providing cross-border services to employees and employers related to the employment and movement of workers between the EAEU countries. It is estimated that by 2025 up to 4 million new jobs can be created in the EAEU countries, including more than a million in the digital technology sector, and it is also planned to increase labor productivity by 1.73%. Optimization and robotization of production, as well as increased productivity, will certainly make some workers redundant, but the net effect of the development of a digital economy in the workplace will be positive (On approval of the Regulation, 2017).

The development of the services sector in 2018-2025, the removal of existing regulatory barriers in relations between the EAEU member states can increase the gross product of the Union by $ 42.3 billion. The possible effect of digitizing government procurement at the regional level is estimated at $ 1.6 billion. The provision of "open government" services can save $ 1.3 billion, the implementation of cross-border electronic services will save $ 0.5 billion.

Implementation of digitalization programs in the EAEU countries will provide additional dividends and effects in various fields and industries. According to available estimates, the greatest effect will be achieved in the manufacturing, fuel and energy, retail and services sectors. So, if the digitalization

level reaches 20% by 2025, an additional growth of EAEU GDP of 0.98% is expected in manufacturing, in retail trade - by 0.92%, in the service sector - by 2.2%. The share of digital services in the total export volume of the EAEU countries should grow from 28% in 2015 to 36% percent in 2025. Significant growth is expected in export-oriented digital services, which include outsourcing of information technology, outsourcing of business processes, cloud services, offshore programming and individual software tools and development.

It is important to note that the provision of electronic public services requires a sufficient amount of open data available to the public and business. The adoption of common digital standards for open data and ensuring synchronization and data quality are important for creating such a unified big data database in the EAEU. According to World Bank estimates, the potential impact of creating a regional open data warehouse could be a 1.34% increase in EAEU GDP by 2025. In general, according to World Bank estimates, an increase in the digitalization of the EAEU by 20% by 2025 could lead to an increase in the services market by 2.2% of the EAEU's GD (Knobel A., Lipin A. P., 2016).

The development of a system of electronic international transactions and electronic commerce, technologically compatible and compatible architectures, standards, data, processes, services, platforms, infrastructures and networks, which significantly expand the opportunities for cooperation between consumers and business structures in the EAEU member states, has great growth potential. Deeper Eurasian integration, subject to a 20% mutual reduction of non-tariff barriers between the EAEU countries, will lead to an increase in mutual trade by 12.4% or by $ 7.1 billion (Kofner Yu., 2020).

The Council of the Eurasian Economic Commission adopted a detailed plan for the implementation of the Guidelines for the development of a Single Window mechanism in the system of regulating foreign economic activity. This document serves as one of the project management tools for the development and implementation of the Single Window mechanism in the Member States of the Union (The Eurasian Economic Commission, 2020).

The increase in trade, the circulation of goods and services in the EAEU, as well as the more efficient use of the transit potential between Asia and Europe, requires the free movement of vehicles through digital interaction between the customs authorities of the EAEU member states. Since 2018, the customs services of the EAEU countries have begun work on the basis of the requirements of the new EAEU Customs Code, which introduces the mechanism of electronic tax returns and digital customs administration tools. Digitalization should significantly simplify the process of removing barriers in the internal markets of the Union. In the near future, the EAEU intends to form free trade zones and sign "Agreements on trade and economic cooperation" with Egypt, Israel, India, Iran, China, Singapore and Serbia (Sargsyan T., 2017).

The adoption and introduction of a single Customs Code of the EAEU countries leads to the transition to automated systems and electronic document management. Simplifying the procedures for making digital cross-border purchases can increase cross-border trade conducted by online businesses and increase consumer confidence in cross-border e-commerce in the EAEU. Digital solutions include finance, services, customs, procurement, taxation, logistics, and migration. Successful implementation of such solutions results in digital dividends. An example of such decisions is the basic registers of the public sector, which are official sources of basic information about citizens, the business sector, companies, licenses, land plots, etc. Basic registers are a key element in the development of new digital services in the EAEU.

A significant effect should be given to the development of Single Window systems and mechanisms in the system of foreign economic activity, electronic customs declaration in the EAEU countries. Measures aimed at simplifying cross-border procurement, including the elimination of customs and trade barriers, the introduction of electronic customs declarations and the transition to electronic trade document management should have a positive effect on increasing the EAEU GDP by 2025. Digital

trade and customs solutions include online processes related to export / import and expediting cross-border trade, including logistics, customs clearance, licensing and certification.

The implementation of the EAEU Digital Agenda will have a significant impact on the growth of cross-border electronic commerce, as online shoppers will be able to use duty-free online purchases in any member country based on common digital platforms, including identification and authentication platforms and digital cross-country.

The EAEU digital agenda includes the creation and implementation of a Trans-Eurasian logistic platform, which should become the basis for uniting all participants in trade and economic activity through integrated digital platforms and electronic data exchange. The creation of the EAEU digital logistics system should become a driving force for dynamic development in all sectors of the economy of the EAEU countries. The introduction of a digital cross-border logistics system should bring dividends and increase the efficiency of logistics companies in the EAEU economic space. According to the calculations of WEF experts, expanded digital cross-border logistics can increase the volume of international trade for the small and medium-sized business (Samokhin I.O., Abramova O.K., 2017).

To ensure the widespread use of new digital solutions, it will be necessary to solve the problems of widespread training of qualified personnel with professional digital abilities and skills, as well as the need to increase the overall digital literacy level of the population of the EAEU countries.

Based on the experience of the EU countries, it is necessary to create institutions of an interstate monitoring system, statistical collection and analysis of data on the digital transformation of the EAEU countries (country differentiation according to a number of indicators: the level of development of digitalization, networking, competitiveness, etc.). The cooperation of the EAEU countries and the EU in the collection, analysis and use of Big Data is of utmost importance. Big data includes a set of approaches, tools and methods for collecting, processing and analyzing large volumes of diverse structured and unstructured data. In the modern digital economy, Big data (network data) is becoming an important factor in economic growth, the main asset with market and social value, which lies in the possibility of using big data for innovation, development and creation of new ideas, technologies, products and services, as well as adoption flexible, operational and effective management decisions.

Conclusion

Summarizing and taking into account the positive foreign experience in creating integration structures for managing the digital transformation of the EAEU with a wide range of powers at the Union level is crucial for the success of digital transformation. It is important to determine the priorities of digital transformation and approve the list of basic digital services, the implementation of which will accelerate the processes of integration and digitalization in the EAEU. Given the scale and intersectoral nature of the digital agenda, it is important to create mechanisms for continuous monitoring of measures taken, monitoring and quantifying the progress and its results, as well as informing citizens about the ongoing changes in order to ensure the participation and commitment of all sectors of society (Sokov K., 2018).

It should be noted a number of risks arising in the process of digital transformation for the EAEU countries. Recently, the hypercompetitive pressure of global players-world leaders on the digital space of the EAEU countries has been intensifying. One of the risks is the significant dependence of the EAEU countries on the external market of digital technologies and digital services, in which the leading companies in the USA and China occupy leading positions. The digital inequality (digital lag) of the EAEU countries from the leading countries of the world is constantly increasing, which leads to an increase in threats to the digital sovereignty, information and economic security of the EAEU countries. Also a big risk is a brain drain, primarily of specialists in the field of digital, cloudy nano- and bio-neural technologies, from the EAEU countries to the developed countries of the world.

It should be noted that the widespread spread of the coronovirus pandemic in early 2020 became the main threat to the economies of the EAEU and other countries of the world. Therefore, one of the urgent tasks is to digitalize healthcare and create a flexible and effective e-Health system nationwide and the EAEU. Achieving the accelerated development of innovative sectors of the economy, digitalization of the services sector, education, healthcare and public administration, as well as ensuring digital independence, information and economic security should be the main priorities in the implementation of the digital agenda for the transformation of the economies of the EAEU in the medium term.

Taking into account the achievement of the main objectives of the digital agenda, the Eurasian Economic Commission has developed plans and identified the main trends in the implementation of the EAEU digital agenda in the main areas until 2025 (The digital agenda of the EAEU, 2019). Successful implementation of the strategy and programs of digital transformation and development of the digital economy of the EAEU member countries requires an integrated approach, coordination of efforts and coordinated actions of all national and integration departments, structures and regulatory institutions of the Eurasian Economic Union.

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The Mediating Role of National Culture in the Relationship between Total Quality Management and Performance at the Abu Dhabi Agriculture and Food Safety Authority

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Abstract

Total Quality Management or TQM is an integrative organizational-wide management philosophy that is aimed at continuously improving the quality of processes, products and services by focusing on, meeting or exceeding customer expectations in order to enhance customer satisfaction and organizational performance. Thus, this paper aims to investigate the mediation role of the national culture between the TQM dimensions and performance. Therefore, a survey questionnaire was distributed to senior employee and managers at the Abu Dhabi Agriculture and Food Safety Authority. The results show that there is significant positive relationship between the TQM practice dimensions and performance. Pawer distance, uncertainty avoidance and Individualism mediate the relationship between the TQM and performance. Although dose not mediate the relationship between customer focus and performance. This study will contribute in the existing literature in the area.

Keywords*:* TQM practices, National culture, performance, UAE

Introduction

In the modern business landscape, both quality and innovation have become essential concepts that guide optimal performances for business organizations (Zehir *et al.*, 2012). As a result, organizations (whether for-profit, not-for-profit or regulatory ones) pay particular attention to optimizing and maximizing organizational resources to attain successes by employing strategic leadership and management techniques (Ahmad *et al.*, 2013; Aziz & Morita, 2016). One of such strategic management approaches which have stood out amongst contemporary management approaches and has gained widespread attention from industry and academia is Total Quality Management (TQM) (Haffar *et al.*, 2019; Jimoh *et al.*, 2019; Panuwatwanich & Nguyen, 2017). According to Eniola *et al.* (2019), TQM is an integrative organizational-wide management philosophy that is aimed at continuously improving the quality of processes, products and services by focusing on, meeting or exceeding customer expectations in order to enhance customer satisfaction and organizational performance (Baird, Jia Hu, & Reeve, 2011; García-Bernal & Ramírez-Alesón, 2015; Sadikoglu & Olcay, 2014). Thus, organizations that implement TQM improve their business performance by differentiating their products and gaining a competitive advantage in the market (Herzallah, Gutiérrez-Gutiérrez, & Munoz Rosas, 2014; Pérez & Gutiérrez Gutiérrez, 2013). Consequently, leading to positive results with increasingly higher profits, market share and superior performance (Eniola *et al.*, 2019; Kim, Kumar, & Kumar, 2012).

Several recent studies have found that the implementation of total quality management in an organization has a tremendous and significant association with organizational performance (Al-Dhaafri, Al-Swidi, & Yusoff, 2016; Kanapathy *et al.*, 2017; Sinha & Dhall, 2018). However, in contrast, some other researchers have found no association or in some cases negative associations between TQM and a firm's performance (Duarte *et al.*, 2011; Yeung & Chan, 1998). The mixed and

inconclusive nature of the relationship between TQM and organizational performance has been implied to be because of the level of TQM implementation within organizations. Arguably, organization with a higher level of implementation of total quality management principles have been shown to have higher levels of performance whereas firms with lower levels of TQM implementation have resulted in no association or sometimes negative associations with organizational performance (Aquilani *et al.*, 2017; Eniola *et al.*, 2019; Nawelwa, Sichinsambwe, & Mwanza, 2015).

Given that the Abu Dhabi Food and Control Authority (ADFCA) is responsible for ensuring that the Emirates' food and agricultural produce, as well as those from imports and exports, meets the acceptable standards required for consumption by the local populace, they face the challenge of maintaining a consistent and high degree of quality throughout their operational processes, as well as issues of food security, sustainable agricultural produce and maintaining a higher level of customer satisfaction. This has led to the implementation of strategic leadership approaches across the ADFCA (Aziz & Morita, 2016; Jabnoun & Sedrani, 2005). One of such strategic leadership approaches is the integration of Total Quality Management across the operational processes of the ADFCA. Implementing Total Quality Management is a necessary undertaking that is sure to bring about many benefits to an organization. For instance, TQM implementation has been reported to bring about improved productivity, customer satisfaction, improved quality, employee participation, teamwork, improved working relationships, employees' satisfaction as well as communication (Ahmad *et al.*, 2013; Besterfield, 2004). Hence, since the ADFCA's major priority is centred on food safety and security, which are also dependent on quality performance, the degree to which TQM is implemented at the ADFCA becomes of paramount importance.

One of the main concerns of the government of Abu Dhabi spearheaded by the Abu Dhabi Food and Control Authority is to ensure food safety, food security and sustainable agricultural produce (i.e. including those from imports and exports) and ensure that these produce meet the required standard for consumption by the local populace (ADFCA, 2016). Hence, the ADFCA was charged with fulfilling this responsibility. In 2015, it was reported in ADFCA (2016), that the ADFCA scored 99% in the food safety performance evaluation carried out by the United Arab Emirates' (UAE) Ministry of Environment & Water in conjunction with the Food and Agricultural Organization (FAO) of the United Nations (UN) (ADFCA, 2016). The evaluation came as part of the Ministry's effort to develop and enhance the food safety situation of the country and was executed with a team of experts from the FAO (ADFCA, 2016).

Given that the ADFCA is a regulatory authority, its organizational culture may be rooted in the national culture since the authority essentially differs from for-profit organizations or traditional business enterprises. Hence it is imperative to examine how national culture mediates the relationship between TQM implementation and the performance of the ADFCA in terms of quality performance, employee performance and society results.

Literature Review

In general, the concept of organizational performance is based upon the idea that an organization is the voluntary association of productive assets, including human, physical, and capital resources, for the purpose of achieving a shared purpose (Mandlburger, Pfennigbauer, Schwarz, Flöry, & Nussbaumer, 2020). Those providing the assets will only commit them to the organization so long as they are satisfied with the value they receive in exchange, relative to alternative uses of the assets. As a consequence, the essence of performance is the creation of value. So long as the value created by the use of the contributed assets is equal to or greater than the value expected by those contributing the assets, the assets will continue to be made available to the organization and the organization will continue to exist (Ericsson, Hoffman, & Kozbelt, 2018). Therefore, value creation, as defined by the resource provider, is the essential overall performance criteria for any organization. How that value is created is the essence of most empirical research" in management.

Quality Performance

A numerical measurement of the performance of an organization, division, or process; Quality of "performance can be assessed through measurements of physical products, statistical sampling of the output of processes, or through surveys of purchasers of goods or services. In addition, performance of an employee on a given job or task is strategic edifice of a business as a result, elements that "give rise to enriched performance must be dissected in a more critical dimension by the establishments for success, advancement and growth (Abbas & Yaqoob, 2009). Performance and productivity of an employee is seen an issue of momentous vitality for employers, managers and the entirety of an organisations as well (Helmreich, & Schaefer, 2018).

Total Quality Management (TQM)

Total quality management (TQM) is the system of activities directed at achieving delighted customers, empowered employees, higher revenues, and reduced costs (Dudin, Frolova, Gryzunova, & Shuvalova, 2015). A "recently published study (Saleh, & Sweis, 2017) reviews the variety of definitions of TQM available in the literature and concludes that it is a management approach which prescribes guidelines for organizations to operate and achieve high performance. The literature suggests that organisational excellence is a key stage on the TQM journey. Furthermore, it is often applied to TQM enabling actions as an effectiveness measure (Fonseca, 2015).

Total Quality Management (TQM) has evolved in four stages: Quality Inspection, Quality Control, Quality Assurance and Total Quality Management. Quality management has "been part of human activities as long as one can recall. However, the first evident quality management to be applied in the practice occurred in 1910s in Ford Motor Company in its production of the "T" model car. Ford Company employed teams of inspectors to test or compare product in accordance with the project standards (Yang, 2017). Inspectors compared the product to the set project standards in all stages covering production delivery and process. The aim of conducting the inspection was to separate poor-quality products detected by inspectors from acceptable quality products and either scrapping, reworking or selling them off as lower quality at lower prices. The second stage of quality and TQM development came as a result of industrial advancements. This stage was controlled through written specification, supervised skills, and standardization and measurement

Leadership Management

Leadership is cited as the most dominant and acknowledged dimensions of TQM strategy. According to Bush, Bell, & Middlewood, (2019), the success of an organization is largely "determined by the ability of leaders to utilize both human and social capital to create a competitive advantage. In view of Serin (2004), the top management commitment and the organization's leadership contribute towards the successful implementation of the organizational program. Management leadership is largely based on teamwork spirit, effective communication, participative decision-making process, effective training of employees and employee empowerment. The literature on TQM recognizes the relationship between the firm performance and management leadership.

Customer Focus

The key objective of using TQM strategy is to meet customers' latent and current needs by offering quality "services and products. Wilson, Zeithaml, Bitner, & Gremler, (2016) suggest that there should be effective and continuous communication between the firm and its customers. Staub, (2019) further suggests that an organization should also establish strong relationships with customers, directly interact with the customers, continuously monitor their satisfactory levels; and always try to meet their future expectations and changing needs. Others (Kiseleva, Nekrasova, Mayorova, Rudenko, & Kankhva, 2016) believe that a firm may have a competitive edge over others in the same industry by providing innovative and high-quality services and products that meet customer needs. Other

researchers demonstrated that customer satisfaction and firm performance are positively related in that high customer satisfactory may translate to higher profits, Kiseleva et al., (2016); enhanced organizational performance and reduced operating cost. Becker, & Brettel, (2017) assert that total quality management is the customer-oriented strategy that emphasizes on customer loyalty and customer satisfaction as it the core of the firm's success, generating high competitiveness and profits. Elsewhere (Karttunen, Hallikas, & Stek, 2017) demonstrated that customer focus and" business performance is positively and significantly related.

Hofstede's Model of Culture

National culture has a great influence on the work values (Minkov, 2018). Hofstede`s dimensions of national "culture, determined for 53 countries and regions of the world, led by the number of quotes and by importance in the field of cross-cultural management (Beugelsdijk, Kostova, & Roth, 2017). The basis of the model is the research conducted among employees of IBM on a sample of 60,000 workers in the period 1967-1969. The inclusion of the results of other authors who have used an identical methodology produced a sample that includes 71 countries and three regions. The extension of the model with the original four-dimensional culture of the society got one extra dimension. Database eliminates the differences that arise as the impact of corporate policies and procedures because of the impact of various strategies (Saleem, & Larimo, 2017). Therefore, any variation between countries can be reliably attributed to national culture. Hofstede also found that employees and managers vary according to the following dimensions of national culture: (1) power distance, (2) uncertainty avoidance, (3) individualism vs collectivism, (4) masculinity vs femininity, (5) long-term vs short-term orientation" (in a later phase of the study) (Hofstede, 1980).

Power Distance

Power distance "represents the degree of inequality in the distribution of power within societies to be considered socially acceptable and is derived from the fact that power in institutions and organizations is not evenly distributed (Taras et al., 2017). Societies with high power distance accept large differences in power within the organization.

Uncertainty Avoidance

Uncertainty avoidance dimension measures "the extent to which the members of a culture feel "threatened by uncertain and unknown situations". Uncertainty avoidance indicates the extent to which a society feels threatened by ambiguous situations and the extent to which a society tries to avoid these situations by adopting strict codes of behaviour, a belief in the absolute truths, establishing formal rules, and not tolerating deviant ideas and actions. Individuals with high uncertainty avoidance are concerned with security in life, feel a greater need for consensus and written rules, less likely to take risks while individuals in low uncertainty avoidance societies are less concerned with security, rules and they are more risk tolerant (Laitinen, & Suvas, 2016).

Individualism

Dimensions of individualism refers to societies in which the ties between individuals and the poor of every individual is expected to look after themselves and their immediate families, while collectivism refers to societies in which people from birth include the strong cohesive groups that are" protected throughout their life in exchange for unquestioning loyalty. It is noted that the degree of individualism in a country complies with the wealth of the country (Block, & Walter, 2017), and also countries with a high degree of individualism are more inclined to the Protestant ethic, individual initiative and progress to the market shift. Countries with low level of individualism are less prone to the Protestant ethic, show less individual initiative, while the progression of age-related / age.
Hypothesis of the study

H1: Customer focus positively affects performance.
H2: Leadership management positively affects performance.

H3: Strategic planning positively affects performance.
H4: Dose National culture dimensions mediate the relationship between TQM practices and performance

Methodology

The questionnaire was adapted from the scales used in the following studies (Ahmad *et al.*, 2013; Anil, 2019; Aziz & Morita, 2016; Syduzzaman *et al.*, 2016). The adapted questionnaire consists of an introductory section along with four main parts, namely Part A, B, C and D. Part A of the questionnaire was the demographic section. In this section, respondents were asked to provide information regarding their gender, experience in years and highest qualification as of the time of collecting the data for the study. In Part B, respondents were required to rate their perceptions of the TQM values implemented in the quality management process of the Abu Dhabi Agriculture & Food Safety Authority on a 5-point Likert scale from Very Low (1), Low (2), Moderate (3), High (4) to Very High (5). A total of forty-one (41) items corresponding to three (3) TQM dimensions were contained in Part. Furthermore, in Part C, respondents were asked to describe their national culture on a 5-point Likert scale also used. A total of twenty (20) items corresponding to three (3) national culture constructs (i.e. power distance, uncertainty avoidance, and individualism) were contained in Part C. Finally, in Part D, respondents were asked to give a self-report of the performance of the Abu Dhabi Agriculture & Food Safety Authority using three performance indicators of quality performance, society results and employee performance.

Thus, 350 questionnaires were distributed and 313 was valid usable survey used in this study. The target respondents were senior employees and managers. Those groups were selected to rate the extent to which they perceived the total quality management in the organization; as they have good experience on the quality performance as well as the organizational performance. However, the part-time employees, contract base and the employee that currently is not working in with The Abu Dhabi Agriculture and Food Safety Authority have not been included in the study. Therefore, Statistical Package for Social Sciences and the partial least squares path modeling or partial least squares structural equation modeling (Smart-PLS) were used for the data analysis.

The reliability coefficients of the pilot study shows that the TQM has a α value of 0.781, with all the underlying dimensions ranging between 0.718 to 0.794 respectively. Similarly, national culture and its dimensions had α value greater than the acceptable threshold of 0.7. Furthermore, performance had 0.835, which is also greater than the threshold and acceptable α value of 0.70. With these results, all the constructs and their dimensions as used in this study as considered reliable and adequate to elicit the needed data for the study. Therefore, the Table 1 shows the results of the pilot test of the study.

Table 1: Pilot test result

S/No	Constructs	Cronbach's Alpha
1	**TQM**	0.781
	Strategic Planning	0.718
	Customer Focus	0.794
	Leadership Management	0.759
2	**National culture**	0.766
	Power distance	0.779
	Uncertainty avoidance	0.943
	Individualism	0.836
3	**Performance**	0.835

Key Findings

Data collected was analyzed to investigate the mediating role of the national culture (i.e. power distance, uncertainty avoidance and individualism) between the TQM dimensions (i.e. leadership management, customer focus and strategic planning) and performance. Thus, Partial Least Squares Structural Equation Modelling (PLS-SEM) software used as the tool for the analysis.

Convergent Validity and Reliability

Reliability is the extent to which an assessment tool produces stable and consistent results. While validity refers to the extent to which the construct measures what it is supposed to measure (Valle & Assaker, 2016).

Table 2: Constructs Reliability and Validity

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Customer Focus	0.818	0.849	0.532
Individualism	0.759	0.845	0.646
Leadership Management	0.861	0.906	0.709
Performance	0.963	0.967	0.748
Power Distance	0.779	0.872	0.694
Strategic Planning	0.826	0.872	0.578
Uncertainty Avoidance	0.865	0.908	0.713

Table 2 presents the factor loadings and Average Variance Extracted (AVE) of each of the constructs in the study. All measured constructed had AVE scores greater than the threshold value of 0.50 and factor loadings ranging from 0.759 to 0.908 consecutively, indicating that convergent validity had been established according to (Byrne, 2013). Therefore, the Figure 1, illustrate the measurement model of the study.

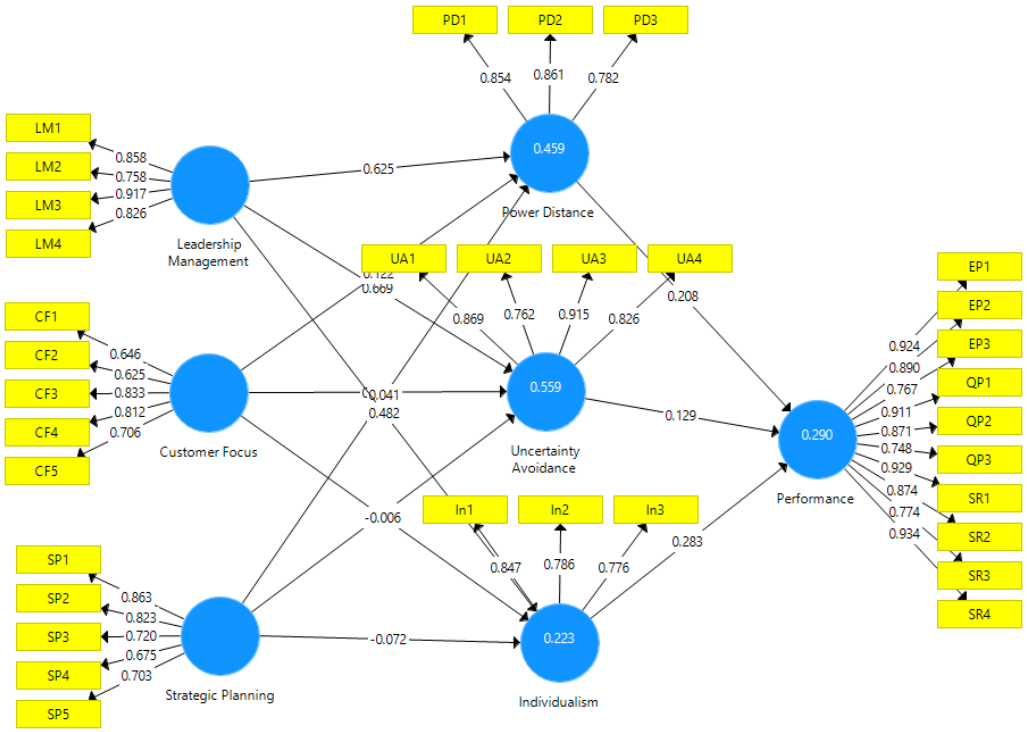

Figure 1: Measurement model of the study

Discriminant Validity

Discriminant validity is one of the key building blocks of model evaluation (Henseler et al., 2015). Henseler et al (2015) sated that discriminant validity analysis ensures that a construct measure is empirically unique and represents phenomena of interest that other measures in a structural equation model do not capture (Hair et al., 2010).

Table 3: Discriminant Validity based on Fornell-Lacker criterion

	Customer Focus	Individualism	Leadership Management	Performance	Power Distance	Strategic Planning	Uncertainty Avoidance
Customer Focus	0.730						
Individualism	0.118	0.804					
Leadership Management	0.271	0.467	0.842				
Performance	0.134	0.469	0.465	0.865			
Power Distance	0.294	0.549	0.666	0.471	0.833		
Strategic Planning	0.085	0.020	0.191	0.056	0.171	0.760	
Uncertainty Avoidance	0.357	0.556	0.726	0.461	0.839	0.203	0.845

Besides, the cross-loading criterion, advocated by Chin (1998), required that items are required to load higher on their own construct that their cross-loadings on other construct. This approach is considered liberal in determining discriminant validity (Hair *et al.,* 2014). The discriminant validity is presented in Table 3 and Table 4 present Heterotrait-Monotrait Ratio (HTMT) to support the achievement of the discriminant validity.

The result of discriminant validity using Fornell and Larcker criterion is presented in Table 2 in which the square root of AVE inserted diagonally in bolded italics. Other figures, both horizontally and vertically, indicated the correlation among the research constructs. The result indicated that all the lower-order components achieved the stated condition. The lower-order component with higher correlation than the square root of AVEs are only with their highest order components which is expected (Sarstedt *et al.,* 2019).

Table 4: Heterotrait-Monotrait Ratio (HTMT)

	Customer Focus	**Individualism**	**Leadership Management**	**Performance**	**Power Distance**	**Strategic Planning**	**Uncertainty Avoidance**
Customer Focus							
Individualism	0.612						
Leadership Management	0.643	0.491					
Performance	0.124	0.463	0.484				
Power Distance	0.319	0.646	0.806	0.518			
Strategic Planning	0.127	0.136	0.200	0.074	0.199		
Uncertainty Avoidance	0.318	0.599	0.835	0.484	1.017	0.512	

The study therefore achieved discriminant validity based on Fornel and Larcker criterion. Likewise, the analyses of this study pass the HTMT criterion as presented in Table 4; all the values in the HTMT table are below both 0.85 and 0.9. Furthermore, after all the possible discriminant validity tests, it has been found out that discriminant validity is not a problem in this study.

Coefficient of Determinant (R2)

The coefficient of determination R^2 is considered as a measure of model's predictive accuracy, and is calculated as the squared correlation between dependent construct and predicted values (Hair et al., 2013).

Table 5: Coefficient of Determination (R^2)

	Constructs	**R Square Adjusted**
Exogenous variables	Total Quality Management Practices	0.910
Mediators	National Culture	0.789
Exogenous variables	Organizational Performance	0.875

Table 5 presents the R^2 results, the first column shows the R^2 when total quality management, national culture and performance are included into the model as higher-order components construct. It shows an overall R^2 for the major endogenous construct of the research, TQM, to be 0.910. The R^2 for the higher-order components was unity. This is expectable because the lower-order components are explaining same variance of the variables in the higher-order components (Sarstedt *et al.,* 2019). Thus, the R^2 are greater than 0.75 indicated substantial R^2 (Hair *et al.,* 2014).

Effect Size (f2) Assessment

The effect size (f^2) is the estimation of R^2 in a case when a given independent variable is taken out from the research model. Hence, the effect size is a measure used to assess the relative impact of a predictor variable on an endogenous variable. It specifically assesses how strongly one exogenous variable contributes to explaining a certain endogenous variable in terms of its R^2 (Memon & Rahman, 2013).

Table 6: Effect size assessment

	Customer Focus	**Individualism**	**Leadership Management**	**Performance**	**Power Distance**	**Strategic Planning**	**Uncertainty Avoidance**
Customer Focus		0.000			0.025		0.061
Individualism				0.075			
Leadership Management		0.269			0.649		0.911
Performance							
Power Distance				0.017			
Strategic Planning		0.006			0.003		0.008
Uncertainty Avoidance				0.007			

The categories for its calculation was provided by Cohen, (1988) which are 0.02, 0.15 and 0.35 representing small, medium and large effects respectively. As shown in Table 6, customer focus (f^2 = 0.000) has small effect on individualism; while it has medium effect ($f^2$0.025) on powder distance and also on uncertainty avoidance ($f^2$0.061). In addition, individualism has medium effect medium effect on Individualism (f^2 = 0.269) and large effect on power distance ($f^2$0.649) and also large effect on uncertainty avoidance (f^2 = 0.911). Power distance has medium effect on performance and strategic planning has small effect on individualism, power distance and uncertainty avoidance as shows in Table 6.

Path Coefficient

According to Hair et al., (2014), the level of strength of a relationship is measured by the magnitude and significance of the estimates. Path coefficients that are close to +1 represent strong positive relationships while those that tend towards -1 represent strong negative relationships (Hair et al., 2014).

Table 7: Relationships between TQM Dimensions and Performance

Path	Std β	Std Error	*t* Statistic	*p-v*alue	Decision
Direct Effects					
Leadership Management -> Performance	0.122	0.124	3.307	0.001	Supported
Customer Focus -> Performance	0.171	0.173	4.570	0.000	Supported
Strategic Planning -> Performance	0.283	0.286	5.817	0.000	Supported

From Table 7 with t-values exceeding the t-critical value of 1.96 and p-values value less than 0.05. Thus, all three of the direct effect had a strong positive relationship between total quality management dimensions.

Mediating effect of national culture on the relationship between TQM practices dimensions and performance

The essence of conducting mediation analysis is to establish the extent of indirect effect of the mediating construct through the direct paths (Hair *et al.,* 2014).

Table 8: Mediating Effect of National Culture Dimensions

Path	Std β	Std Error	*t* Statistic	*p-v*alue	Decision
Strategic Planning -> Power Distance -> Performance	0.625	0.625	21.438	0.000	Supported
Customer Focus -> Power Distance -> Performance	0.283	0.286	5.817	0.000	Supported
Leadership Management -> Power Distance -> Performance	0.482	0.484	12.060	0.000	Supported
Customer Focus -> Uncertainty Avoidance -> Performance	0.669	0.668	24.015	0.000	Supported
Leadership Management -> Uncertainty Avoidance -> Performance	0.208	0.207	2.583	0.010	Supported
Strategic Planning -> Uncertainty Avoidance -> Performance	0.012	-0.069	1.493	0.004	Supported
Customer Focus -> Individualism -> Performance	-0.006	-0.002	0.159	0.874	Not supported
Leadership Management -> Individualism -> Performance	0.061	0.063	1.912	0.056	Supported
Strategic Planning -> Individualism -> Performance	0.129	0.129	1.563	0.000	Supported

The specific indirect effect of national culture dimensions between TQM practices and performance is presented in Table 8. The result shows that there is significant indirect effect of power distance, Uncertainty Avoidance and Individualism between the leadership management, customer focus and strategic planning. However, Uncertainty Avoidance dose not mediate the relationship between the Strategic Planning and Performance. This shows that the three national culture elements significantly mediate the relationship between TQM practices and performance at The Abu Dhabi Agriculture and Food Safety Authority.

Discussion and Conclusion

Findings from the analysis revealed that there is a significant positive relationship between national culture and organizational performance; thus, the hypotheses were supported. However, only one sub-hypothesis was not supported (see Table 4.28). This shows that national culture significantly effects Abu Dhabi Food Control Authority performance. This finding is consistent with some studies reported in the literature. For instance, Mardani, Bagheri, Kish, Soltan, & Kazemilari (2013) investigate the relationship between national culture and TQM implementation, Case study: Iranian multinational electrical manufacturing companies. Findings from the study revealed that some national culture dimensions and the dimensions of TQM implementation are correlated. Uncertainty avoidance affects two TQM elements "(Information and analysis and human resources focus)". Individualism has a significant negative impact on "Information and analysis", but has a significant positive impact on process management and business performance. Power distance is the most influential cultural element and impacts all seven TQM elements. Masculinity has no significant affect to TQM elements except business performance. Long-term orientation significantly affects three TQM elements (strategic planning, process management and business performance) in positive ways (Mardani, Bagheri, et al., 2013). Likewise, Aziz & Morita (2016) suggested that a relationship exists between national cultures, and that they influence TQM implementation and performance. While there was no significant cultural difference between the companies, the implementation and organizational performance differed significantly.

In addition, Chen, Dou, Rhee, Truong, & Veeraraghavan, (2015) examine whether cultural dimensions explain the variation in corporate cash holdings around the world as well as within the United States. They concluded that individualism and uncertainty avoidance influence the precautionary motive for holding cash. Besides, firms in individualistic states in the United States hold less cash than firms in collectivistic states. And lastly, their results show that individualism is positively related to the firm's capital expenditures, acquisitions, and repurchases while uncertainty avoidance is negatively related (Chen et al., 2015). Therefore, Mourouzidou-Damtsa, Milidonis, & Stathopoulos, (2019) investigate the relation between national cultural values and bank risk. They report a positive (negative) association between the cultural values of individualism and hierarchy (trust) and domestic bank risk-taking. Similarly, Emin Huseyin Cetenak, Ayse Cingoz (2017) studied on the effects of national culture on financial decision-making. Emin et al. (2017) examined Hofstede's cultural dimensions among 20 countries around the world to explain the variation of financial decisions based on cultural differences.

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Terrorism Trends in Tourism Research

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Abstract

Tourism is a vulnerable sector in many aspects, either by nature factors or by human factors such as wars, rebellions, or terrorism, being the image of tourist destinations a fundamental asset for territories trying to attract tourists and wealth.
Some recent studies concluded about the obvious negative impacts from terrorism to tourism, affecting costs regarding later protection and promotion, while others consider that terrorism may not impact tourism because of the iconic destination reputation.
This article aims to discuss recent trends in the literature review addressing perspectives of 2019 and 2020 studies, published in the context of tourism, terrorism, political instability, and behaviour of tourists towards the intention of travelling. The conclusions present suggestions for approach in future studies, minimizing the impact of large destructive occurrences on destinations.

Keywords: Tourism – Terrorism – Destination – Travel Intention

Introduction

Tourism is a vulnerable sector in many respects, either by nature factors or by human factors such as wars, rebellions, or terrorism. At the same time, terrorism has gained new forms and purposes, being a practice long used by groups as an instrument of domination. That is why, recently, the sector and tourist areas have become the target of terrorism. According to the World Tourism Organization, tourism refers to activities carried out by individuals during trips and stays in places other than where they live or their usual circulation for a period of less than 365 days for leisure, work or other reasons, such as shopping or religious pilgrimage, for example (OMT, 2017).

Corbet, O'Connell, Efthymiou, Guiomard, and Lucey (2019) define terrorism as 'the creation of fear either by an act of violence or by threatening the destination with an act of violence, that causes disruption to the tourism flows, infrastructure and overall operations'. When a terrorist incident in one country involves citizens, targets, institutions or governments of another country, terrorism takes on an international character. In this case, actions conducted in each country may impose costs on people or property in other countries (Sandler and Enders, 2004).

Tourism destinations' demand is particularly influenced by tourists' concerns about their safety, health,

and well-being (Blake and Sinclair, 2003). To Seabra, Reis and Abrantes (2020), safety is one of tourists' main concerns, so when tourists travel, they do not want to be exposed to situations that will threaten their integrity. It is a basic human need. However, although natural disasters have a significant impact on changes in tourist demand and can prevent tourist flows, terrorist attacks and political instability have a more relevant intimidating role for tourists (Sonmez, 1998; Sonmez, Apostolopoulos and Tarlow, 1999). Still in this reasoning, it's possible to observe how terrorist actions have economically affected the tourist destinations, and which impacts the actions have left in the countries that have suffered attacks is what the numerous media and researchers have been trying to understand (Baumert, 2016). Attacks on tourists also represent ideological objectives, connected to positions of different values, cultures and social classes. Tourism has been the target of these actions on a recurring basis, as it is an important source of income for many regions, being able to reduce social inequality. Terrorism, wars and political instability have immediate negative consequences in some destinations, while increasing demand in other destinations (Russel and Faulkner, 2004), which are perceived as safer and thus chosen as substitutes (Enders and Sandler, 1991; Enders, Sandler, and Parise, 1992; Gu and Martin, 1992; Adeloye, Carr, and Insch, 2019; Asongu and Acha-Anyi 2019; Karamelikli, Khan, and Karimi, 2019).

Since the late 1960s, terrorist attacks have become more severe, better organized, more specialized, more violent, and geographically more dispersed (Reisinger and Mavondo, 2005). In the 1980s and 1990s, researchers already predicted a substantial increase in terrorist attacks in future times (D'Amore and Anuza, 1986; Jenkins, 1988). Experts speculated that terrorists would continue to select vulnerable targets, attacks would be more indiscriminate, terrorism would become more institutionalized and geographically broader as a method of armed conflict. On the other hand, because of media coverage, the public would be confronted with more terrorism than had ever been seen (Atkinson, Sandler, and Tschirart, 1987). In the 21st century terrorism assumed other dimensions. After the September 11, 2001 attacks in the U.S., security measures became more restricted and extended worldwide. The U.S. has come to dictate the new world order, with changes in the global geopolitical framework. Currently terrorist organizations, whether ethnic, religious, or political, are scattered throughout the world and have members infiltrated in any country (Júnior, 2013). Over the years, tourism has not only grown exponentially, but also experienced a notorious diversification, proving to be one of the fastest growing sectors in the world and becoming a key factor in socio-economic development and progress. Terrorism has been considered an almost millennial practice and carried out in different ways in which, after the attacks of September 11 and November 2015, many researchers try to understand how tourism has become the target of terrorist actions (Oliveira and Freitas, 2018).

Currently, there is an intimate relationship between tourism and terrorism, as tourism represents a significant socio-economic activity and terrorist attacks cause a substantial decline in revenues in the affected areas, thus causing an imbalance in governments. However, it allows terrorists to gain a political advantage over public authorities, i.e. greater visibility (Korstanje and Clayton, 2012). According to Drakos and Kutan (2001), the main economic consequences of terrorism within tourism concern the effects of contagion and substitution. The substitution effect can affect tourism, in the way that tourists can replace that place with another safer tourist destination, or else replace tourism with other services or goods. In this way, the consequences of terrorism can affect in such a way a tourist destination or any place since tourists can also replace international tourist destinations with national ones. In addition to the substitution effects, a large decline in tourism in neighbouring countries can lead to a decrease in tourism activity throughout the region, which is associated with the effect of negative propagation or externality, the so-called contagion effect (Drakos and Kutan, 2001).

Analysed the Global Terrorism Database (GTD), through the study "Trends in Global Terrorism: Islamic State's Decline in Iraq and Expanding Global Impact; Fewer Mass Casualty Attacks in Western Europe; Number of Attacks in the United States Highest since 1980s" it is possible to conclude the total number of terrorist attacks worldwide decreased by 43% between 2014 and 2018, and the total number of deaths decreased by 48%. However, Western Europe has suffered a relatively continuous occurrence of terrorist attacks - approximately 20 per month on average. Most of these attacks were not lethal. In 2015, 2016 and 2017, there were several incidents in Western European countries in which attackers killed more than five people, including mass attacks by jihadist victims in Paris, Brussels, Nice, Berlin, Manchester, London, and Barcelona. Terrorists killed more than 400 people in

Western Europe during this period.

Table 1: Western European terrorism, by country, 2018

Country	Total attacks	Total deaths
United Kingdom	100	0
Greece	27	0
Germany	22	0
Italy	14	0
France	13	2
Amsterdam	6	1
Ireland	5	0
Sweden	5	0
Belgium	3	1
Spain	2	1
Austria	1	1
Denmark	1	0
Finland	1	0
Switzerland	1	0
Total	**202**	**6**

Source: GDT, Adapted

The number of terrorist attacks in Western Europe decreased by 31% between 2017 and 2018, and the number of deaths decreased by 70%. In the following table (Table 1), it is possible to verify that the total number of attacks carried out and the number of deaths made per country. It should be noted that the largest country that has excelled is effectively the United Kingdom with around 100 attacks (2018), followed by Greece with a total number of 27 and Germany with 22 attacks. Approximately half of all attacks in Western Europe in 2018 occurred in the UK, 85 of them in Northern Ireland. Most of the attacks involved explosives or incendiary weapons and caused no injuries. In two attacks, civilians were killed. It is then possible to verify the main targets of terrorists (Table 2) at the time of their acts of violence/attacks. As can be seen in the table below, and being the theme addressed to tourists and tourism in general, there were in 2017 about 18 terrorist acts to tourists and 13 in 2018. Although there has been a decrease in the number of attacks, it is still worrying today.

Table 2: Targets chosen by terrorist groups, 2017-2018

Targets	2018	2017
Private citizens and property	3147	3552
Police	1623	1604
Government	977	932
Business	604	803
Military	385	456
Religious Figures/Institutions	251	231
Educational Institutions	185	171
Terrorists	153	161
Transport	140	151
Utilities	140	159
Journalists and media	105	131
Government (Diplomats)	89	96
Political groups	83	149
NGO	47	56
Telecommunications	40	33
Airports and Terminals	21	12
Seaports	21	15
Food or water supply	14	11
Other	14	7

Tourists	13	18
Eliminated by early detection	1	1
Total	**8053**	**8749**

Source: GDT, Adapted

Today's tourists seem to be "learning to live with terror" and world tourism continues to grow despite terrorism (IPK International, 2016). However, the choice of destinations is increasingly dependent on perceptions of terror and security. Also, the 2016 World Travel Monitor data (IPK International, 2016), observed that the choices of tourists from the main issuing markets have been influenced by this feeling of insecurity reflecting the choice of destinations such as Spain, Portugal or even travel within their own countries of origin rather than destinations such as Turkey, Egypt or Tunisia.

Indeed, analysing the most recent 2019 world travel monitor data (IPK International, 2019), like the 2018 figures, 38% of international travellers currently say that political instability and terrorist threats will influence their travel planning in 2019. Tourists visiting Asia feel much more impacted by terror threats than travellers from other continents. Regarding the type of influence that terrorism has on travel behaviour, concludes that they tourists will choose only destinations that they consider "safe". The security picture of most destinations has improved slightly in the last 12 months - also for Turkey, Israel, and Egypt. According to Ritcher and Waugh (1986), tourists are a target, to the extent that for terrorists they represent values of freedom of choice, wealth, independence, and consumption.

This article is divided in three parts, introduction to the theme of terrorism and concern for security in tourist destinations, the literature review that addresses perspectives of recent 2019 and 2020 studies, published in the context of tourism, terrorism, political instability and behaviour of tourists towards the intention of travelling. The conclusions present suggestions for approach in future studies and contribution to minimize the impact of large destructive occurrences on destinations.

Literature Review. Terrorism and safety concern in tourism destinations

Existing literature considers that, nowadays, the image of tourist destinations is a fundamental asset for territories trying to attract tourists and wealth (Oliveira and Huertas, 2019), being tourism an important tool in national economic development strategies in many developed and developing countries (Karamelikli, Khan, and Karimi, 2019). Tourism has turned into an expanding industry in recent years, which confronts various multifaceted challenges and demands of the modern era, showing a significative resilience with continuous growth despite many serious shocks and concerns (Karamelikli, Khan, and Karimi, 2019), namely the increasing terrorism phenomena across the globe (Asongu, and Nwachukwu, 2019). Karamelikli, Khan, and Karimi, (2019) consider that despite the growing and strict security measures discussed and applied, several countries like Egypt, Kenya, Pakistan, and Turkey have faced terrorist attacks targeting travel and tourist destinations, but now becoming also prevalent in Western tourism destinations, like France, Belgium, Germany, and the United States, as states Bacon and Buzinde (2019), Corbet, O'Connell, Efthymiou, Guiomard, and Lucey (2019), and Harb and Bassil (2020), influencing, not only tourism destinations in general, but also mega-sporting events (Choi, Kim and Leopkey, 2019). Also, Asongu and Acha-Anyi (2019) studied the relevance of military expenditure in mitigating the number and destructive effects of terrorist attacks, considering that military expenditure does not reduce the incidence of terrorism.

Recent empirical studies concluded about unidirectional negative impacts from terrorism to tourism (Adeloye, Carr, and Insch, 2019; Asongu and Acha-Anyi 2019; Karamelikli, Khan, and Karimi, 2019), and discussed terrorism-related risk as a major factor that influences tourist risk perceptions and travel decisions (Adeloye, Carr, and Insch, 2019), once terrorism externalities translate into perceived risk that discourages tourist arrivals (Asongu and Acha-Anyi 2019), affecting tourist destinations (Kapuściński and Richards, 2016; Asongu and Acha-Anyi 2019, Corbet, O'Connell, Efthymiou, Guiomard, and Lucey, 2019). Although these studies offer significant insights into tourism and terrorism risk, little research has been done with regards to terrorism and domestic tourism (Adeloye, Carr, and Insch, 2019). Two plausible explanations for the negative correlation between the lack of safety and security and tourist arrivals are that insecurity decreases the tourist's perceived satisfaction while the costs of protection increase, affecting the costs the tourist incurs

(Fourie, Rosselló-Nadal and Santana-Gallego, 2020), having the affected destinations to contend with issues like heightened tourist fear, negative changes in destination image perceptions, and even modified travel plans due to perceived risk (Bacon and Buzinde, 2019). Bassil, Saleh and Anwar (2019), also consider that, in addition to lost revenue, terrorism imposes high cost on tourism, namely, regarding additional advertising expenses to remedy the image of the tourism destination, increased security-related expenses to prevent future attacks and reconstruction cost (Bassil et al, 2019).

In opposition, Harb and Bassil (2020) consider that terrorism may not impact tourism or may increase tourist inflows, because of the uniqueness of a destination and the iconic reputation of some cities, the personality type of tourists, and previous terrorism experiences may reduce sensitivity to this factor (Harb and Bassil, 2020). In the same perspective, also Lutz and Lutz (2020), state that terrorist events did not always have the predicted negative results in some Caribbean countries, being this conclusion justified by the success of government efforts to mitigate the negative publicity that comes with terrorism, stabilizing tourist levels with lower prices or special promotions.

Table 3: Recent Research in Security evaluation and terrorism impacts in tourism destinations

Author	Goal	Research project	Notes and results (Main findings)
Adeloye, D., Carr, N., and Insch, A. (2020).	To explore the challenges of interviewing people about terrorism in sensitive situations.	Study of fifty-two Nigerians who took part in semi-structured, personal interviews on domestic travel risks associated with terrorism.	This paper contributes to the literature by explaining the strategies that were employed and their implications for researcher and participant wellbeing.
Harb and Bassil (2020).	To investigate the impact of terrorism on bilateral tourism flows within the Organization for Economic Co-operation and Development countries, and examine the moderation effect of immigration in the destination country on the terrorism–tourism relationship.	Using estimated gravity models.	The results obtained show that after reaching a certain threshold, terrorism negatively impacts tourist arrivals. This relation seems to be moderated by the share of immigrants in the country of destination: when the share of immigrants in a country is relatively high, the positive impact of immigration on tourist arrivals would counterbalance the adverse impact of terrorism on tourist arrivals.
Fourie, J., Rosselló-Nadal, J., Santana-Gallego, M. (2020).	To investigate the effects of security threats, namely terrorism, crime, and corruption, on international tourist flows.	Estimation of a gravity model to evaluate differences in the instability measures between country pairs quantifying not only how security threats in the host country have a negative effect on inbound tourism but also how conditions in the origin country also determine tourism flows to a particular destination.	Results show that tourists prefer traveling to countries with similar levels of safety and security as exist in their origin country. Tourists from stable countries prefer traveling to countries with the same conditions, while tourists from unstable countries are more tolerant with insecurity at the destination country. Greater knowledge about the destination country reduces the negative effect of security threats on inbound tourism. There exists a U-shaped relationship between security threats and tourism.
Lutz, B., and Lutz, J. (2020).	To evaluate the effects of terrorism on tourist arrivals in Caribbean countries and territories.	Several analyses based on simple variate correlations, with terrorism and number of arrivals.	Results show that terrorist events didn't always have the predicted negative results. Government provided efforts to mitigate the negative publicity that comes with terrorism, successfully maintaining tourist levels in the first three decades of the analyses with lower prices or special promotions.
Seabra, Reis and Abrantes (2020).	To examine the impact that terrorist attacks within a representative group of European countries can have on the tourism demand of a South European country with no record of terrorism attacks.	To analyse the connections between terrorist attacks and tourists' arrivals, occurred between 2002 and the end of 2016, an Unrestricted Vector Autoregressive model was used for multivariate time series analysis.	The main results show that terrorist attacks have a strong impact on tourist arrivals and confirm the existence of terrorism spillover, namely the substitution and generalization effects phenomena.
Ulucak, R., Yücel, A., Ilkay, S. (2020).	To explore the demand-side factors that affect the number of international tourist arrivals to Turkey	To this end, an augmented gravity model has been employed to analyse the factors affecting the number of international tourists visiting Turkey from the top 25 originating countries from 1998 to 2017.	Empirical findings suggest that per capita income of both origin country and Turkey, relative exchange rate, and globalization positively affect the demand for tourism, while it is negatively affected by consumer price index, violence/terrorism, household debt level, and bilateral distance between Turkey and the origin country. Empirical results show that terror attacks are the most dominant factor for tourism demand in Turkey, causing significant decreases in the number of tourist arrivals.
Asongu, S., and Acha-Anyi, P. (2019).	To understand how military expenditure can modulate the effect of terrorism externalities on tourism.	The geographical and temporal scopes are 163 countries and the period 2010–2015. The empirical evidence is based on negative binomial regressions. Measuring Terrorism externalities in	Military expenditure significantly lessens the destructive impact of these terror-related incidents to induce positive net effects on tourism. This finding is robust to all measurements of terrorism. Homicides and violent demonstrations reduce tourists' arrivals whereas the rate of incarceration of convicted offenders has the

Author	Goal	Research project	Notes and results (Main findings)
		terms of terror-related incidents, injuries, fatalities, and damaged properties.	opposite effect. The analysis is extended to income levels and regions to provide more opportunities for policy implications.
Asongu, S., Nnanna, J., Biekpe, N., and Acha-Anyi, P. (2019).	The examination of the effect of terrorism and peace on tourist destination arrivals using a panel of 163 countries with data for the period 2010–2015.	The empirical evidence is based on Generalised Method of Moments and Negative Binomial (NB) regressions.	Political instability, violent demonstrations, and number of homicides negatively affect tourist arrivals, while the number of incarcerations positively influences the outcome variable. Second, the effects of military expenditure, "armed service personnel," and "security officers and polices" are not positively significant.
Asongu, S., and Nwachukwu, J. (2019).	To investigate the role of security officers, the police and armed service personnel in dampening the effect of terrorism externalities on tourist arrivals.	The temporal and geographic scopes are respectively 2010–2015 and 163 countries. Four terrorism measurements are used. They include the number of incidents, injuries, fatalities, and property damages.	Armed service personnel can effectively be used to modulate the damaging influence of all four terrorism externalities to achieve a positive net effect on tourist arrivals. Conversely, the corresponding moderating role of security officers and the police is not statistically significant. Moreover, violent demonstrations and homicides have a harmful effect on tourist arrivals while the number of incarcerations displays the opposite effect.
Adeloye, D., Carr, N., and Insch, A. (2019).	To discuss the implications of domestic tourism and terrorism research for theories and models developed for understanding tourism and risk, as well as its significance for the planning and development of domestic tourism.	It, therefore, discusses the implications of domestic tourism and terrorism research for theories and models developed for understanding tourism and risk, as well as its significance for the planning and development of domestic tourism.	The recognition of the importance, for tourism and risk research to understand perceptions of domestic tourists (as a separate market) in order to provide a base for understanding domestic tourists' risk perceptions and attitudes towards terrorism (or other forms of risk).
Bacon, L. and Buzinde, C. (2019).	To understand and document perceptions held by tourists so as to inform destination recovery efforts post terror attack.	This exploratory study employs focus groups to examine American millennials' perceptions of risk and their intentions to travel to terror-stricken destinations, specifically Nice, France. Perceived risks related to general international travel articulated by participants included, health, theft, and safety concerns.	Participants indicated that they were willing to travel to Nice, post terror attack, except for one group that would choose to travel elsewhere in France. Participants' rank ordering of the sources they would consult during the decision-making process for travel to a terror-stricken destination included: family, people with lived experience of the destination, and government. This paper contributes to risk perception literature, particularly scholarship on the nexus between terrorism and tourism.
Bassil, C., Saleh, A. and Anwar, S. (2019).	To examine the impact of domestic and transnational terrorism on tourism demand (as measured by visitor arrivals) to Lebanon, Turkey and Israel.	Using a seemingly unrelated regression (SUR) model. Using a dynamic framework considering the intensity of terrorism and the associated spill over effects.	The empirical results, based on monthly data from 1995 to 2007, reveal that terrorism in one country affects visitor arrivals not only to that country but also to other countries: tourists view Lebanese and Turkish tourism markets as substitutes. Terrorism in Israel, domestic or transnational, and intensities, affects visitor arrivals to Lebanon and Turkey. In overall terms, terrorism showed a much larger negative impact on visitor arrivals to Lebanon.
Choi, K., Kim, M. and Leopkey, B. (2019).	To examine the relationship between tourists' risk perceptions and their intention to travel to an Olympic host country with apparent risks of terrorism and political instability during and around the event period using the case of the 2018 PyeongChang Olympic Games.	Using a convenience sampling technique prior to the hosting of the event in question from college students in the southeast region of the U.S. via an online survey software.	Terrorism risk was found to have a negative impact on travel intention while political instability did not. The results suggest that potential terrorism risk is a vulnerable point for the host country, and host organisations' collaborative risk management strategies for minimising potential threats and generating a safe destination image are necessary to attract a higher number of visitors around and during the Olympics.

Author	Goal	Research project	Notes and results (Main findings)
Corbet, S., O'Connell, J., Efthymiou, M., Guiomard, C., Lucey, B. (2019).	To estimate the influence of terrorist attacks on European tourism through the short-term post hoc response of the airline industry and passengers.	Using a seasonally-adjusted ARMA-GARCH methodology on unique datasets that examine changes in tourism as measured by ASKs, seats filled and changes in both fares and revenues. Traffic flows are found to fall despite significant fare reductions; however, this response varies substantially based on the flight origin and ticket-type purchased.	Business travel slows substantially due to duty of care legislation for corporate transport. Evidence indicating substantial airline fare reductions, in most investigated cases this response was unable to mitigate substantial reductions in passenger demand and flows across varying ticket types.
Ghosh (2019).	This paper investigates in a time series framework over the period 1995 to 2016, the impact of uncertainty on tourism.	The paper explores the causal association of both political uncertainty and economic uncertainty between tourism and other macroeconomic variables for the countries of France, Greece, and the United States.	The unit root test and the ARDL cointegration are applied for unknown structural breaks. In the long run uncertainty adversely affects the tourism industry in all the countries under study.
Karamelikli, H., Khan, A., and Karimi, S. (2019).	To estimate the long-run and short-run impact of terrorist incidents on inbound and domestic tourist arrivals in Turkey: to explore the relationship between terrorism and tourism in Turkey using a non-linear economic modelling approach for monthly data for the period 2007–2016, and to determine whether terrorism has obstructed tourism in Turkey.	Using a non-linear autoregressive lag (NARDL) model for the period between 2007 and 2016.	The results reveal unidirectional nonlinear relationships from terrorism to tourism in both the long-run and short run. Inbound and domestic tourists show different respond towards an increase or decrease in terrorist incidents. The findings are expected to help tourism management, planning, and forecasting regarding greater economic benefits for the country.
Kim, Choi, Leopkey (2019).	To examine and compare the influence of tourists' risk perceptions on travel intentions across mega sporting event host destinations with different levels (i.e. apparent risks, less imminent risks, and unidentified risks) of such risks.	Data collected from 571 potential tourists via an online survey software and analysed using a structural equation modelling technique.	The results indicated that perceived terrorism risk significantly influenced the tourists' travel intentions. Tourists' terrorism risk perceptions toward South Korea (apparent risks) most significantly impacted their travel intentions, followed by general destinations outside of the United States (unidentified risks), while political instability was not significantly related to travel intentions. These findings offer practical implications for mega sporting event organizers.
Oliveira, A. and Huertas, A. (2019).	To investigate how the destination marketing organizations (DMOs) of Barcelona and Cambrils communicated information about the terrorist attacks they suffered and what they have done to recover their image.	The tweets posted on the Barcelona and Cambrils profiles were examined following a content analysis method focusing on three categories of communication: (1) the terrorist attacks, (2) the actions by the DMOs to manage them, and especially (3) the tourism-related decisions that were taken in order to recover the image of the destinations.	The results reveal that to a great extent the destinations focused their communication efforts on managing the attack and to a lesser extent on messages to promote tourism in the region to recover their image.

Source: Authors

Several conceptual models have been presented in recent research, considering risk perception, namely through terrorism risk and political instability (Choi, Kim, and Leopkey, 2019; Seabra, Reis and Abrantes, 2020).

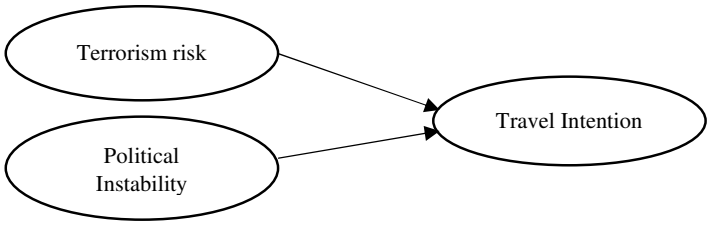

Figure 1: Structural equation modelling results measuring terrorism risk and political instability

Source: Seabra, Reis and Abrantes (2020)

Choi, Kim, and Leopkey, (2019) developed a study, in which, the main purpose was to examine the relationship between tourists' risk perceptions and their intentions to travel to an Olympic host country with apparent risks during and around the event period, presenting the following questions: does perceived terrorism and political instability risk influence tourists' intentions to visit an Olympic host country?; how do tourists' perceived anxiety and safety influence their intentions to travel to a host country when the country has apparent risks? (figure 2).

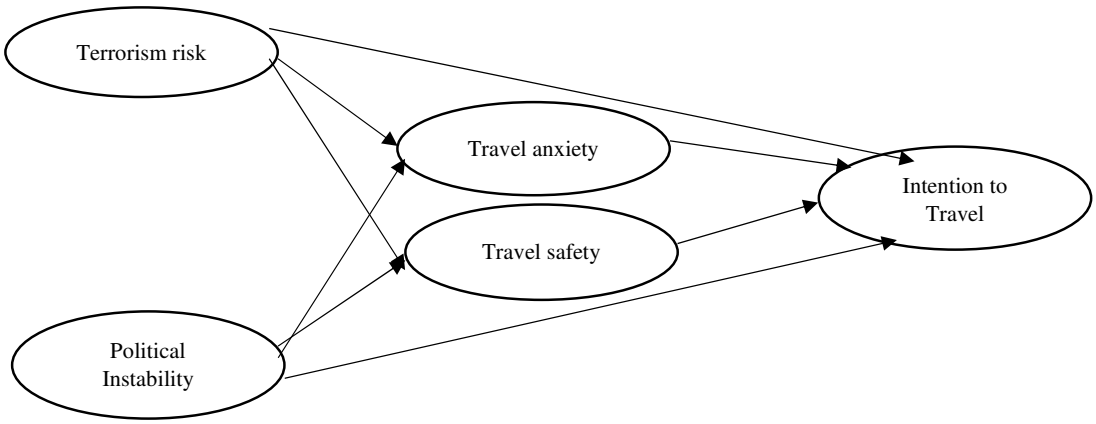

Figure 2: Structural equation modelling measuring terrorism risk, political instability, travel anxiety, and travel safety

Source: Choi, Kim, and Leopkey, (2019)

Curiously, Choi, Kim, and Leopkey, (2019) concluded that terrorism risk had a negative impact on travel intention while political instability did not.

Conclusion

Scientific research published in 2019 and 2020 about terrorism, political instability, and behaviour of tourists towards the intention of travelling, present several conclusions, namely, strategies proposals for citizens wellbeing; understand domestic tourists' risk perceptions and attitudes towards terrorism;

increasing of negative impacts of terrorism, regarding tourists arrivals; tourists prefer travelling to countries with similar levels of safety and security as exist in their origin country; successfully government efforts to mitigate the negative publicity that comes with terrorism, with lower prices or special promotions; terror attacks as the most dominant factor for tourism demand in Turkey; homicides and violent demonstrations reduce tourists' arrivals; political instability, violent demonstrations, and number of homicides negatively affect tourist arrivals, while the number of incarcerations positively influences the outcome variable; terrorism in one country affects visitor arrivals not only to that country but also to other neighbouring countries; terrorism risk has a negative impact on travel intention while political instability did not.

When tourists realize that a destination is unsafe, they replace it with others they consider safer (Seabra et al., 2020), being determinant to promote tourism investigation concerning the impact that terrorism may have on tourist arrivals in a regional perspective, considering also tourist behaviour (Seabra et al., 2020), and terrorism events effects on a safe country with no record of terrorism attacks (Seabra et al., 2020), as a result of a reject/replace destinations.

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Professional Development of Employees in the Social Competence Context

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Abstract

The fact that man is a social creature is corroborated by a substantial portion of human behaviour of interpersonal nature. Individuals cooperate with others, either working for others or at least taking their opinion into account. Even when there is no direct interaction with others, human behaviour manifests interpersonal nature because the presence of other people may not only be actual, direct, but also symbolic or imagined. Therefore, in a situation when we make (allegedly) independent choices, we also take social standards into account and take heed of reactions of persons close and important to us, i.e. they indirectly influence our behaviour, decisions and choices, imbuing them with social character (Hamer, 2009, p. 229). This paper focuses on a goal which includes determination whether a relation exists between social competence of employees and their professional development, as well as pinpoints the nature of the impact of the former on the latter along the weakening - reinforcing axis.In order to present the performed survey and analyses in a transparent manner, the paper is divided into three sections, where the following issues are discussed: social competence, professional development and presentation of results and conclusions from empirical studies carried out via a diagnostic survey method with the use of a questionnaire.

Keywords: Social Competences, Professional Development

Introduction

Observation of social life of individuals makes one reflect on what makes some people cope better and others worse in inter-human contacts. This factor (or factors) determining the ability of shaping inter-human contacts translates to the feeling of happiness in personal life, as well as may affect development and, in its consequence, professional success.

Social competence has been discussed in the humanities (in particular psychology) for quite a long time (1920s, Thorndike) (Tomorowicz, 2011, p. 93), yet it seems that greatest interest in these aspects took place in the first decade of the 21st century (literature studies indicate that this refers both to the academic milieu and psychologists - practitioners (e.g. Strelau J., Goleman D., Cupach W.R., Spitzberg B.H., Wojcieszke B., Matczak A., Jaworowska A., Borkowski J., Oleś M., Sęk H. et al.). Popularity of this issue may result from searches for accurate predicates of extensively understood well-being and success in life, as it is known that there is no simple translation of good school results to professional success. Reference books lack a clear and generally accepted mode of defining social competence (one of such attempts was commissioned by the European Parliament and the Council on 23 April 2008). It may be assumed that there are few concepts in psychology with respect to which there is such great diversity of the proposed definitions. Researchers tackling the issue of social competence ask the following questions: *is social competence a certain general social skill manifested in various types of situations or does it encompass a number of specific, often unrelated, skills?* (Argyle, 2002, p. 38)

In this paper, primary attention (i.e. the goal of the paper) is focused on issues of relation/ correlation between social competence and professional development.

The direction of professional development in an organisation is determined not so much by the employee, but mostly by a superior, a manager, i.e. a person who is responsible for proper staffing of a company.

Management of human resources, and in particular their development, is a purposeful configuration of measures intended to: enrich knowledge, develop skills, shape values, stances, motivation and skills; as well as the ones whose goal is to take care of the physical and mental condition of persons performing work. Finally, such activities lead to increased efficiency and boost the market value of a given enterprise.

Strategic management of human resources is nowadays considered the most important factor which makes the organisation capable of facing up to the dynamically changing conditions of the economic environment, as well as adjusting to changes in stances and employee expectations. This is related to decisions pertaining to employees, which map out, in a long-term perspective, activities in the personal realm, also the ones that are of vital significance for meeting the enterprise's goals.

Employee development, carried out on the basis of knowledge about social competence of the employees (its level and possibilities of improving it) which was planned on a strategic level, may form a strong tool of the organisation on its path to accomplishing a competitive advantage.

Social Competence: Definitions and Formation Factors

Man's social nature (according to R. Hogan) is reflected in two fundamental needs: the need of approval (acceptance) and the need of status (power). The need of approval expresses the desire of affiliation to a group, experiencing acceptance on the part of its members and living in harmony with them. On the other hand, the need of status reflects the dream about influence over one's life and surroundings, primarily by creating new possibilities for self-fulfilment and the so-called "distinguishing oneself" i.e. moving up the steps of social hierarchy, gaining respect, authority or at least fame. These two primary social needs are the strong motives of inter-personal behaviour (Tillmann, 1996).

The aforementioned division of man's social needs is a basis for defining social competence, also in a dual manner.

One of them, emphasising the necessity of approval and acceptance, portrays social competence as the *ability to generate social behaviour which enables and facilitates creation and maintenance of advantageous interpersonal relations.* From this point of view, social competence is simply a relational skill with the use of which we initiate, negotiate, maintain, change and end interpersonal relations. In line with the above, a socially competent person is an individual who can establish mutually satisfactory relations with other people, both intimate/ close, as well as professional (Tillmann, 1996, p. 55).

The second mode of defining social competence refers to the need of status and power. Social competence is defined as efficiency in pursuing own intentions in contacts with other people and is related to the *ability to exert influence*, e.g. one of the hallmarks of professional effectiveness is the success in taking up job, especially the fi rst one. (Arnett, 2001, pp. 133-143) This approach emphasises that the level of social competence of an individual is most acutely evinced by the results which the individual accomplishes by contacts with other people and reputation (respect, authority) which the individual enjoys in his/ her social environment. It is also worth noting that interpersonal efficiency is not only related to exerting influence on others, but also with understanding benefits which follow from, e.g., taking the advice of a more experienced person or entering into a proper "coalition" with others. The core of this approach of defining social competence is thus emphasis on the significance of efficient social adaptation, whereas interpersonal skills are often examined in the categories of political skills (Argyle, 2002, p. 43).

Social competence is related to personal and social well-being which requires:

- awareness of how to secure an optimum level of physical and mental health, also understood as the resources of a given person and his/ her family and direct social environment, as well as;

- knowledge of how a proper lifestyle may contribute to this (Borkowski, 2003, p. 76).

Understanding of principles and rules of conduct generally accepted in various societies and environments such as, e.g., a work place, is crucial for success in interpersonal contacts and social participation. Equally important is the awareness of basic concepts pertaining to persons, groups, professional organisations, gender equality and non-discrimination, society and culture. It is necessary to understand multicultural and socio-economic dimensions of European societies, as well as mutual national interactions, cultural identity and European identity (Borkowski, 2003, p. 76).

Even though it may be claimed that researchers differ in their mode of comprehending social competence, yet all of them consider it a feature that conditions the efficiency of the individual's functioning, because competent individuals obtain valuable, high results without extensive effort connected with the undertaken activity. (Boyatzis, 1982)

The issue of social competence is located at the threshold of several sciences such as sociology, psychology, ethics, management, political studies, anthropology, etc. and thus we can speak about a mass of variables conditioning a man's competence effectiveness. Taking into account the framework limitations of this paper and the direction of undertaken research, it is necessary to mention at least two factors differentiating the level of social competence, namely: personality and emotional intelligence.

Researchers representing psychology identified thousands of features and personality dimensions on account of which people differ from one another.

In the second half of the 20th century and more precisely at the beginning of the 1980s, activities promoting the concept of the "Great Five" were undertaken on a broad scale (Goldberg, 1981) (however, the beginnings of its history date back to the 1940s and 1950s – Fiske, Christal, Norman, Tupes), namely five basic personality traits which have special significance for the organisation, i.e. agreeableness, conscientiousness, neuroticism, extraversion and openness (Oleś, 2000, pp. 7-18).

The outline of the "Great Five" personality traits still focuses the attention of both science and management practice. Its potential value consists in the fact that it encompasses an integrated set of traits that seem to be reliable indicators allowing to foresee certain behaviour in specific situations. Relative to this issue, managers who can understand the outline well, will be able to detect and assess occurrence of such personality traits in their employees and discern causes and mechanisms of their specific behaviour. However, managers should avoid overestimating their ability to assess five basic personality traits in others, as even when applying most rigorous and reliable measures, the assessment may be imprecise to a certain degree. Another limitation of the outline of five personality features is the fact that it primarily relied on the results of studies carried out in the United States, and therefore the issue of transferring it to other cultures remains open. However, even in the United States behaviour of people in organisations is affected by various factors and traits (not only psychological), in relation to which interpretative narrowing down of the human behaviour exclusively to the "Great Five" traits may be a significant misuse (Borkowski, 2003, p. 95).

The second factor listed before as clearly determining social competence is emotional intelligence. As opposed to some other types of intelligence, emotional intelligence should be, in a certain manner, related to higher emotional or mental skills. Even though such criterion seems to be obvious, some of the definitions of emotional intelligence do not take it into account, for example one of the more popular definitions of emotional intelligence which says that it includes "self-control, zeal, perseverance and the ability of self-motivation" (Śmieja, Orzechowski, 2008, pp. 23-27). The above-quoted definition is

centred on motivational aspects (zeal and perseverance), and not on emotions, and thus corresponds to certain definitions of motivational intelligence.

For the purpose of this paper, an abbreviated version of the definition of emotional intelligence was adopted, determining it as the "capacity to perceive emotions, accessing them and such activation of emotions that they accompany thinking; capacity to understand emotions and having emotional knowledge which allows for control of emotions and is conducive to emotional and intellectual development" (Epstein, 1998, pp. 25-30). This definition combines the ideas that emotions may be conducive to better thinking and that by thinking about emotions, we make use of intelligence, i.e. it juxtaposes intelligence with emotions, making them inter-dependent.

Professional Development: Description of Significance of the Concept and Leading Theories

Man's professional development may be understood as the process which takes place in two dimensions. The first of them is a compilation of opportunities and threats set before him/ her by the organisation and the other is the resultant of his/ her potential and aspirations in this respect. Thus, factors aiding an employee's professional development, i.e. motivating him/ her to raise his/ her qualifications, will have both external and internal nature (Balcerek, 2004, pp. 31-38).

Nevertheless, it must always be remembered that work is a natural element of man's life, such as birth, ageing and death.

Work influences the possibility of man's development and if this is so, man's professional development occupies a special place in such development. This is a characteristic process exclusively with respect to people, unarguably confirming and enriching the essence of humanity. Until recently, a tendency to treat the issue of professional development as a specific form of pro-social development was perceptible (Gladding, 2001, pp. 21-25).

Nowadays, work is mainly focused on the teamwork of its course, and not on organizational functions. Therefore, the employee is expected to be flexible, resourceful, and also self-employed in various areas of work, taking into account the diversity of sectors and their regulations. (Hall, 1996, 8-16)

Due to the significance of the sphere of professional work in man's activity, studies and in-depth analyses of this area seem to be necessary. Such discussion most often refers to the role of the process of development in the element of work, and less frequently to the element of work in the process of a man's life (Balcerek, 2004, pp. 51-55).

When analysing dependencies and looking for relations between personal and professional development, it is worth referring to the systematics which was in this respect prepared by I. Korcz and which juxtaposes subsequent categories of development of man, an individual and professional activity. Man's development in this approach is understood as: "a multidimensional process, conditioned by various factors with subjective and objective nature"; whereas personal development as "(...) a process of systematic and lasting, throughout the entire period of man's life, transformations, taking place in various conditions of his activity and manifested in proper forms of man's conduct" (Korcz quoted in Plewka, 2016, p. 30).

In relation to the above, professional development forms a part of characteristics of conscious and intentional activities the essence of which is the process of socially desired and directed quantitative and qualitative transformations, conditioning purposeful, active, controlled and responsible participation of man in the profiling of oneself and, through this, one's own closer and further surroundings (Janiga, Pietrulewicz, 2004, p. 77).

Being guided by the logic of the above breakdown, it is necessary to adopt a view that the general development of man is related to the evolution of the entire *Homo sapiens* species, starting from primary forms. Such development on a macro scale on the axis of time designates the possibilities and the potential predispositions of a specific individual which, in turn, determine the mode of fulfilling a professional career. However, answers to questions: *which relations and ties occur between these areas?* are to be searched for in the concepts explaining such dependence by the dynamics of changes in the behaviour of an individual with respect to work (Adamiec, Kożusznik, 2000, p. 102).

In the era of rapid transformations in man's life which are the consequence of implementation of modern technologies, work places cannot merely train employees; first and foremost, they have to take care of ongoing improvement of the employees' qualifications.

Due to the special role in the professional development which is attributed to qualifications, it is worth mentioning several definitions of this term referring to man's physical and psychical features.

And thus, A. Polańska, analysing the concept of qualification relies on the encyclopaedic definition (*Mała encyklopedia prakseologii i organizacji*): "qualification is the overall familiarity with the performed work, proficiency in it, modes of intellectual work, as well as experiences collected by the employee during the work processes as a premise of social activity. By taking the physiological and psychological dexterity of the employee into account, qualifications determine his/ her skills and ability to work" (Polańska, 1999, p. 126).

Other approach to the concept is found in a publication of T. Oleksyn who does not use the term "qualifications" as "in many enterprises, it is associated with the so-called qualification scale, where only requirements with respect to education and job seniority are entered." Thus, the author decided that the word competence has a broader meaning than the term qualifications and uses this term. He defined it in the following manner: "competence is education, experience, skills, talents and predisposition and other psycho-physical features, as well as behaviour expected by the employer and important in professional work" (Oleksyn, 1997, p. 47). The first three are measurable and comparable; the subsequent ones cannot be measured or compared, but the author treats them all as equal.

Qualifications have a structure composed of multiple elements; they are a dynamic construct, subject to evolution on account of changes occurring in the economy and in man's life.

During analysis of individual qualifications, three different clusters are distinguished, composed of numerous ingredients: - man's psycho-physical features, his/ her talents, predisposition, character; - various types of general and life knowledge, professional and specialist knowledge; - various types of life and professional skills (Polańska, 1999, p. 128).

To accomplish and retain qualifications with a high market value, correct improvement of the elements from every cluster is necessary, along with their integration; it is not enough to work only on one cluster.

By analysing the labour market in Poland and in Western countries, A. Polańska distinguished three categories of market value of qualifications: - *rare*, also known as scarce, unique, potentially strategic (they are held by creative people who improve economic, technical and organisational processes); - *universal*, which are characterised by high efficiency in keeping organised teams, companies and work positions, whereas their main task consists in retaining competitive efficiency in the existing organisations; - *weak*, characterised by low efficiency, which is often on the level of labour costs. Progress of technology reduces the number of simple and easy work positions which, in turn, generates the risk of unemployment for a group of people with low qualifications (Polańska, 1999, p. 125).

A significant element of shaping professional development is the motive for embarking on it. Scientific interest in the issue started in the first half of the 20th century in the United States (Amstrong, 2000, p.

19). The created concepts may be grouped into three thematic blocks referring to: *theory of professional choice:* analysis of the course of pre-orientation and vocational orientation processes, along with indication of factors determining choices in this area (e.g. A. Roe - relations inside a family; J. Holland - role of personality and degree of identification with social stereotypes; M. Ginzberg - long-term process of the individual's adjustment to the changing reality); *theory of learning a profession:* from the stage of becoming acquainted with the areas of human economic and cultural activity, through stages of pre-vocational preparation, up to the period of vocational preparation, which are followed by subsequent stages which are the periods of professional development; - *theory of professional work*: analysis of the individual's entire life, with special attention to these manifestations which are related to work; necessity of synthesis of an individual's personal development with professional development, thus forming a platform combining the accomplishments of knowledge developed in individual areas of science (D. Super who determines professional development as a process of growing and learning, with all manifestations of professional behaviour subjected to it) (Griffin, 2007, p. 89).

The presented concepts discussing the motives of professional development seem to overlook the question about the dynamics and purposefulness of these activities (their function) in the analysis. This gap is filled by W. Łukaszewski who tackles the problem of location of personality development in the context of human activity and indicates the existence of three types of possibilities in the system of goals and means of human actions: - development as a goal of an action; - development as a means leading to another goal; - development as the so-called side product of an action (Gladding, 2001, pp. 21-25).

Choice made by managers and application of specific development practice is the outcome of coherence or a compromise accomplished between the employees' aspirations and goals of the organisation. The undertaken development activities must also take into account and be adjusted to the specific determinants of the environment. Modes and directions of handling employee development are thus the outcome of co-existence and flexible adjustment of factors located in the environment and characteristic for the organisation and the employees.

Social Competence Vs. Professional Development in the Light of Own Study

Methodological Study Bases

A production company was selected as the research area for supplying household products to the market (soap, detergents, toothpaste and toothbrushes, etc.). The company sells its products in 222 countries around the world, employing approximately 40,000 employees and achieving annual sales revenues exceeding USD 10 billion. The concern's factory employs 650/700 people in the Polish branch. The aim of the study was to analyze the impact of social competences on the employee's professional development.

The subject of the study were social competences of employees, and above all those that have an impact on the employee's professional development [see tables No. 1, 2 and 3; the set of key social competences used for the study was inspired by the division according to M. Argyle (Argyle, 1999, 133-141, 247)]

The research was carried out using the diagnostic survey method, the survey technique was a survey method, and the questionnaire was a tool that correctly filled in 150 employees of one of the Polish branches of the examined international concern. The survey was conducted in a distributed, anonymous, individual and direct way (during a break from work) and took the respondents about 15 minutes. The survey questionnaire contained 14 questions (and so-called metrics - independent variables: age, gender, education, seniority, position held).

An important element of the adopted methodology was the formulation of the following research problems:

- What social competences are the most educated among employees?
- What social competences are the least educated among employees?
- Is there a relationship between your level of social competence and your position in the company's hierarchy?

These questions set the direction and nature of the questionnaire contained in the questionnaire, and the answers provided to them constituted the basis for the final conclusions on the relationship between the impact of social competences on professional development.

Results and Analysis of Collected Study Material

A summary breakdown of the presented questions asked and answers given to them is presented in *Tables 1, 2* and *3*.

Data collected in *Tables 1* and *2* allow for answering which competence is developed the most and the least among the employees. On the other hand, *Table 3* allows for determining the correlation of social competence and professional development.

Table 1: Most/ least developed social competence among employees (part 1 out of 2)

Question	**How do you assess your skills:**				
	to motivate yourself to take action?	of verbal interpersonal communication ?	in the area of non-verbal communication ?	in the area of behaving in an assertive manner?	of coping with emotions?
answer to question:	N = 150				
Very high	36	51	54	36	54
Quite high	54	57	66	57	66
Average	24	27	24	33	24
Quite low	30	15	6	18	6
Very low	6	0	0	6	0

Source: author's own study based on the results of questionnaires.

The majority (approx. 60%) of respondents highly assess their own ability of self-motivation to work, communication, being assertive and controlling emotions.

Correlating the answers given by employees with independent variables (both from *Table 1* and from the others), it is difficult to see any significant trends or regularities in relation to: age, sex or education (therefore their presentation was omitted in this study). The only variable that differentiates the employee behavior undertaken in the study is the position taken, which will be presented in *Table 3*).

However, the data in *Table 1* indicate the fact that there are people (4%) in the organization who have problems with motivation and assertiveness, while none of the respondents rated their communication skills and control of emotions as "very low. "

Table 2: Most/ least developed social competence among employees (part 2 out of 2)

Question	How do you assess your skills:				
	of setting short-term goals and accomplishing them?	of long-term planning and accomplishing goals that were set?	of coping with failures?	of adapting to new situations?	of working in a team?
answer to question:	N = 150				
Very high	24	36	36	24	63
Quite high	39	54	57	39	72
Average	81	24	33	81	15
Quite low	6	30	18	6	0
Very low	0	6	6	0	0

Source: author's own study based on the results of questionnaires.

Not all of the company's employees are capable of setting goals and accomplishing them. As far as short-term goals are concerned, the majority of respondents concede that they cope with this skill on an average (54%) or high (42%) level. On the other hand, in case of accomplishing long-term goals, we are dealing with a greater polarisation of answers towards high (60%), as well as low (24%) assessment of own skills. Lower rank employees, i.e. those whose goals in professional life are set by the superiors, assessed their ability to set goals on the lowest level.

It is necessary to pay attention to the fact that exactly the same distribution of answers as in the case of the ability to accomplish short-term goals is applicable with respect to the declaration about adapting to new situations (average assessment 54% and high 42%). The relation between the answers to these two survey questions seems to be non-accidental and logical, as accomplishing short-term goals induces rapid changes, adequate to current needs and the necessity of adapting to new circumstances, and this was primarily assessed on the average level by the respondents.

On the other hand, the distribution of answers given with respect to accomplishing long-term goals seems to reflect the assessment of coping with failures. Here, one might posit a thesis that the efficiency of accomplishing long-term goals is assessed by the respondents in the categories of coping with failures, i.e.: "if I can cope with failures, then I efficiently accomplish long-term goals" and vice versa.

Among all questions asked, the respondents were the most optimistic about their own ability to work in a team (high 90%, average 10%). This may only testify to the high level of awareness of accomplishing goals by a corporation.

Table 3: Level of social competence and the position in the company's hierarchy

N = 150					N = 150				
Question		Do you have any ambitions about professional promotion?		Is professional development important for you?	Question	Were you promoted in the last 5 years?			Did you complete any additional professional training in the last year?
Answer to question:	Agree strongly	24	**44%**	21	Answer to question:	Agree	42	**28%**	33
	Agree slightly	42		48					
	Disagree slightly	36	56%	45		Disagree	108	72%	117
	Disagree strongly	48		36					

Source: author's own study based on the results of questionnaires.

46% of respondents believe professional development to be important and almost the same number (44%) has ambitions related to professional promotion. Thus, considering something important, the respondents are striving to accomplish it.

It also follows from the collected research material that every second employee with professional ambitions had extra training in the course of the last year, and almost two out of three persons aspiring for promotion received it in the course of the last 5 years of work.

Final Conclusions

The performed analyses of questionnaire material allow for answering the research questions that were set in the paper.

According to the respondents' answers, most developed social competence of employees is related to building emotional bonds with other people. In the discussed aspect, it is also noticeable that employees with lower social competence take more care of interpersonal relations, whereas persons with a higher level of social competence are more intent on self-fulfilment and accomplishing professional promotion.

The research has also shown that there is a dependence between the level of social competence and the position held in a company. Social competence definitely affects professional development of employees (analysis of this aspect was the goal of this paper) as the survey has shown that there is a dependence between the level of social competence and the mere desire for professional development. It goes without doubt that more developed social competence leads to higher professional development of an employee. The research has shown that among lower rank employees whose social competence is less developed, there is smaller interest in professional development. Their status and their position in the company fully suffice them and they do not need to strive for professional promotion and thus improve their living conditions, wage or social situation. On the other hand, employees with more developed competence manifest a tendency to compete for better positions; they are striving for

promotion and better life. This is caused, to a significant degree, by more developed social competence which makes such employees want to develop in the realm of professional life.

The competence responsible for interpersonal communication is most developed among the respondents. Along with subsequent levels of professional development, non-verbal communication plays an increasing role and thus it is improved more and more.

Mere building of emotional ties with other people offers a feeling of affiliation and acceptance on the part of the surrounding environment. This is very important in the case of team work. Better effects and higher efficiency of work are noticeable provided people have good relations and emotional ties. If there are some emotional ties among them, people are more willing to help one another, they strive to accomplishing a common goal (good base for synergy).

Summing up, it may be concluded that the conducted study allows for confirming that the influence of social competence on professional development of employees is high. This is significantly reflected in desires and the potential of employees' development. Hence, it is important to develop social competence since the very beginning, as it significantly affects our later life, both social and professional.

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Evaluation of Consumer Preferences of Czech Shoppers with at least Secondary Education

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Abstract

Cross-market changes in consumer preferences go hand in hand with the development of society, the advent of technology and globalization. Household consumption has long been on the rise and the term "consumer society" has become increasingly popular. As market supply and competition increase, consumers are faced with a sea of options which in turn both stimulate aggregate consumption and affect the factors considered by consumers when making a purchasing decision. It is no longer true that product price or availability is the primary criterion; today's consumers place increasing importance on quality, brand or whether the products they purchase meet environmental standards. The objective of this paper is to present the results of a survey of Czech consumers' behaviour in terms of their shopping preferences and factors influencing their consumer habits. Only respondents with at least secondary education were included in the survey.

Keywords: shop, preferences, consumer, market

Introduction

Consumer behaviour changes in response to the development of society and the advent of modern technology. This affects both the type of shops preferred by consumers and the factors that determine their choices. There is a trend towards increasing use of the Internet, while, for many people, price is no longer the primary factor influencing their purchasing decisions. In addition, people (especially the younger generation) have recently become more interested in food quality and organic healthy food, which is reflected in the growing interest in farmers' markets and health food stores. Researches demonstrate how general societal attitudes affect the value of green consumption and consumer's shopping behavior (Paço, Shiel and Alves, 2019). Consumer habits are also changing, as are the types of advertisement that affect consumers. In this regard, an important role was played by Facebook and others social networks, resp. effectiveness of advertising on social media (Anastasiei and Dospinescu, 2017).

The objective of this paper is to present the results of a survey of Czech consumers' behaviour in terms of their shopping preferences and factors influencing their consumer habits. The research includes only respondents with at least secondary education. The aim of the research is achieved by testing hypotheses focused on the analysis of the influence of gender, age and income on the choice of the type of businesses in which consumers shop and on the factors influencing the consumer behaviour of these citizens.

Literature Review

Given the present state of society – characterized by high consumption, the wasting of resources and climate change (Moravcikova, et al., 2017) – many consumers prefer specific goods, including green or fair-trade products, and are less inclined to consider standard factors such as price, quality, etc. Studies focusing on the analysis of students' decisions have directly proven that price does not affect their decision-making (Ting, Thaichon, Chuah and Tan, 2019). This is naturally reflected in the way producers respond to these changes. As the world develops, so does marketing. Nowadays, we often

hear about global marketing, where the basic element of innovative marketing strategies is their content, which is developing and changing at a fast rate due to the Internet and social media (Poradova 2020; Krizanova, Majerova, Kliestik and Majercak, 2013). With up to 55 % of consumers watching online videos on a regular basis, the significance of video marketing has been on the increase (Achen, Kaczorovski, Horsmann and Ketzler, 2018). Furthermore, businesses find online retailing particularly attractive since its effectiveness can be measured with relative ease (Abeywardana, Ginige, Herath, Somarathe and Thennakoon, 2018). This is also one of the reasons why online shopping is booming. Another characteristic of the present times is the increasing pressure on brand building. This is primarily reflected in the preferences and purchasing behaviour of consumers who base their purchases on the prestige of a particular brand (Moravcikova and Kliestikova, 2017; Kicova, Kral and Janoskova, 2018). As Anastasiei and Dospinescu (2018) points out, for company strategies it is crucial to be familiar with the character and personality traits of its customers, as these have a direct influence on their consumer behaviour. Possession of this kind of information enable companies to communicate with customers in the most appropriate way.

Methodology, Data Sources

All background information relating to the article was processed by the analysis and subsequent synthesis of secondary sources. The basic method applied in the research consisted of examining various documents, especially scientific papers and professional publications. Statistical data and some additional information were gleaned from sources currently available online. Information concerning current consumer preferences and shopping habits was obtained via a questionnaire survey.

Primary data were generated through quantitative research using the questionnaire data collection method. The selected sample of respondents was obtained through deliberate selection, only including respondents with at least secondary education. The research was carried out in the period from January to March, 2019. The target group was limited in particular to reflect the growing level of education among Czech people; therefore, it can be said to constitute a representative sample, as it is made up of the predominating population group (Ondrušová, 2020). The questionnaire survey involved a total of 324 respondents, representing an 82 % return rate after discarding empty or incomplete questionnaires. The gender composition of the respondent group was 174 men (54 %) and 150 women (46 %). The respondent group was divided into the following age-based categories: 0–20 years, 21–30, 31–40, 41–50, 51-60 and 61 and over. The largest was the 21-30 age group, including 146 respondents (45 %), while the 31-40 age group had 88 respondents (27 %). The 41-50 age group contained 58 respondents (18 %). To achieve the most accurate analysis, the age categories of respondents in the productive age were divided by 10 years intervals. The 0-20 year category is set more or less artificially, as persons aged 0-14 are not active shoppers yet and with regard to the requirement of at least secondary education, the research in this group therefore concerns practically respondents from 17 to 20 years of age. Likewise, the age group from the age of 61 is left so wide, as these are seniors, which can be assessed collectively due to the similarity of their shopping habits.

In addition, the respondents were monitored based on their region of residence. Majority of respondents came from the Central Bohemian Region (126 respondents, 39 %) and Prague (86 respondents, 27 %). The Pardubice, Liberec, South Bohemian and Vysočina Regions were represented by 14 respondents each, while the Hradec Králové and Ústí nad Labem Regions each had 12 respondents. Since the survey also examined the correlation between the consumers' level of income and their decision-making, the respondents were similarly classified based on their monthly income into the following categories: CZK 0–15,000; CZK 15-20,000; CZK 20-30,000; CZK 30-40,000; CZK 40-50,000; and over CZK 50,000. The largest was the CZK 20-30,000 group (134 respondents, 41 %), while the CZK 15-20,000 group was represented by 64 respondents (20 %) and the CZK 30-40,000 group by 60 respondents (19 %).

In terms of descriptive statistics, both absolute and relative frequency values were applied, and the obtained data were analysed using contingency tables and the $\chi 2$ test. The contingency tables list the frequency values from the questionnaire survey of individual character combinations. The differences (residuals) between observed frequencies and frequencies obtained based on the null hypothesis assumption were used to calculate the total standardized residual. If its value is less than the critical

distribution value $\chi 2$ at the significance level of 0.95 for the appropriate degree of freedom, the null hypothesis cannot be rejected at the 95 % significance level.

The following hypotheses were tested to meet the objective:

$H0_1$: The choice of shop is not influenced by gender.

$H0_2$: The choice of shop is not influenced by age.

$H0_3$: The choice of shop is not influenced by the level of income.

$H0_4$: The factors influencing purchasing decisions are not affected by gender.

$H0_5$: The factors influencing purchasing decisions are not affected by age.

$H0_6$: The factors influencing purchasing decisions are not affected by the level of income.

Results and Discussion

Contemporary society is often referred to as a consumer society. This notion is further reinforced by the number of newly emerging shops and businesses and the rising household expenditures for consumables (Širmer, 2019). Moreover, as the Association of Small and Medium-Sized Enterprises and Crafts CZ (2020) corroborates, we can expect continuing development in the retail sector and further growth in sales, which is associated with increasing household consumption.

$H0_1$: The choice of shop is not influenced by gender

In absolute terms, the majority of the respondents shop in supermarkets (154 respondents in total, 76 men and 78 women). In relative terms, the numbers translate to 37.3 % of men and 41.94 of women. Online shopping was the least prevalent. Small retail shops are used by 72 men (35.29 %) and 56 women (30.11 %).

Tab. I. Questionnaire survey results – The preferred types of shops – Classification based on gender

Gender	Small shops	Supermarkets	Internet	Total
Men	72	76	56	204
Women	56	78	52	186
Total	128	154	108	**390**

Source: Questionnaire survey, own research

$H0_1$: The calculated $\chi 2$ statistical value (1.35) is lower than the critical $\chi 2$ value of distribution for 2 degrees of freedom at a probability level of 0.95 (5.99). Therefore, the null hypothesis cannot be rejected. There is no correlation between the choice of shop and gender.

$H0_2$: The choice of shop is not influenced by age.

Small shops were most preferred by respondents in the 21-30 and 31-40 categories, as expressed in absolute terms. In relative terms (expressed as the proportion of respondents in the relevant age category favouring small shops), small shops are most preferred by individuals over 61 (50 %) and by individuals in the 41-50 category (47 %). With respect to the Internet, the majority of respondents engaged in online shopping were in the 21-30 category. This is also confirmed by the behaviour of the C Generation, i.e. people born between 1980 and 2000 who trust online media and spend a significant portion of their Internet time on social networks (Kusá and Piatrov, 2020). This group is not as interested in the content as it is in authenticity.

Tab. II. I. Questionnaire survey results – The preferred types of shops – Classification based on age

Age	Small shops	Supermarkets	Internet	Total
0-20	2	4	4	10
21-30	38	86	50	174
31-40	46	42	20	108
41-50	33	12	25	70
51-60	6	10	6	22
over 61	2	0	2	4
Total	127	154	107	**388**

Source: Questionnaire survey, own research

$H0_2$: The calculated $\chi 2$ statistical value (36.20) is higher than the critical $\chi 2$ value of distribution for 8 degrees of freedom at a probability level of 0.95. Therefore, the null hypothesis can be rejected. The degree of dependence as measured by Cramer's V is 0.22; there is a direct correlation between age and the choice of shop.

$H0_3$: The choice of shop is not influenced by the level of income.

Respondents in the lowest-income category, i.e. CZK 0–15,000/month, decidedly favour supermarkets (18 respondents, 52.94 %). People with the highest income shop in supermarkets the least. The high-income population clearly prefer small shops (44.4 % of respondents in the over CZK 40,000 category).

Tab. III. I. Questionnaire survey results – The preferred types of shop – Classification based on income

Income level in CZK	**Small shops**	**Supermarkets**	**Internet**	**Total**
0-15,000	8	18	8	34
15,001-20,000	30	38	18	86
20,001-30,000	56	58	44	158
30,001-40,000	18	24	18	60
40,001-50,000	4	2	6	12
over 50,000	8	4	6	18
Total	124	144	100	**368**

Source: Questionnaire survey, own research

$H0_3$: The calculated $\chi 2$ statistical value (11.57) is lower than the critical $\chi 2$ value of distribution for 8 degrees of freedom at a probability level of 0.95 (15.51). Therefore, the null hypothesis cannot be rejected. There is no correlation between the choice of shop and the level of income.

The following text focuses on analysing the factors influencing consumer decisions regarding purchases. The respondents could indicate the product price, discount level, quality, references and country of origin as determining factors. The absolute majority of respondents identified quality (45.04 % of all respondents) and price (26.44 % of respondents) as the principal reasons for choosing a particular product. In contrast, the discount level and country of origin play the least part in choosing a product. Recently, there has been an increasing emphasis on quality, while media campaigns in particular reinforce the trend towards food quality and composition, for example (Nadanyiova, 2015).

$H0_4$: The factors influencing purchasing decisions are not affected by gender.

Quality is a key factor for 63.79 % of men (111) and 71.33 % of women (107). A total of 65 men (37.36 % of all men) and 63 women (42 % of all women) indicated price as a key factor.

Tab. IV. I. Questionnaire survey results – What are the key factors influencing your purchasing decision? Classification based on gender

Gender	Price	Discount level	Quality	References	Country of origin	Total
Men	65	8	111	35	29	248
Women	63	6	107	33	27	236
Total	128	14	218	68	56	**484**

Source: Questionnaire survey, own research

$H0_4$: The calculated $\chi 2$ statistical value (0.22) is lower than the critical $\chi 2$ value of distribution for 2 degrees of freedom at a probability level of 0.95 (5.99). Therefore, the null hypothesis cannot be rejected. There is no correlation between the factors influencing the purchasing decision and gender.

$H0_5$: The factors influencing purchasing decisions are not affected by age.

Price was indicated as a key factor by respondents mostly in the 21-30 and 31-40 age categories. In relative terms, this translates into 42.86 % of respondents aged 0-20 and 31.75 % of respondents aged 31-40. In comparison, price is the least important factor in the over 61 and 51-60 categories. Quality is a significant factor which, in relative terms, is key for respondents in the 21-30 (52.47 %) and 41-50 (52.38 %) categories.

Tab. V. Questionnaire survey results – What are the key factors influencing your purchasing decision? Classification based on age.

Age	Price	Discount level	Quality	References	Country of origin	Total
0-20	6	0	0	6	2	14
21-30	58	8	108	22	18	214
31-40	40	2	46	24	14	126
41-50	16	4	44	10	10	84
51-60	6	0	14	4	10	34
over 61	0	0	4	0	0	4
Total	126	14	216	66	54	**476**

Source: Questionnaire survey, own research

$H0_5$: The calculated $\chi 2$ statistical value (49.54) is higher than the critical $\chi 2$ value of distribution for 10 degrees of freedom at a probability level of 0.95. Therefore, the null hypothesis can be rejected. The degree of dependence as measured by Cramer's V is 0.16; there is a direct correlation between age and the factors influencing consumer decisions regarding purchases.

$H0_6$: The factors influencing purchasing decisions are not affected by the level of income.

As has already been mentioned, price and quality are the most frequently quoted factors influencing the respondents' purchasing decisions. Price is most frequently indicated by respondents in the CZK 0-15,000 category (34.78 % of all respondents in this category). In absolute terms, the CZK 20-30,000 category had the most respondents (96) identifying quality as the key factor. In relative terms, quality was most frequently mentioned by respondents in the CZK 30-40,000 category (57 % of respondents).

Tab. VI. I. Questionnaire survey results – What are the key factors influencing your purchasing decision? Classification based on income.

Income	Price	Discount level	Quality	References	Country of origin	Total
0-15,000	16	2	14	6	8	46
15,001-20,000	32	2	40	14	10	98
20,001-30,000	52	4	96	28	22	202
30,001-40,000	14	4	40	8	4	70
40,001-50,000	4	0	6	6	6	22
over 50,000	6	2	10	4	4	26
Total	124	14	206	66	54	**464**

Source: Questionnaire survey, own research

$H0_6$: The calculated $\chi 2$ statistical value (28.63) is higher than the critical $\chi 2$ value of distribution for 10 degrees of freedom at a probability level of 0.95. Therefore, the null hypothesis can be rejected. The degree of dependence as measured by Cramer's V is 0.12; there is a direct correlation between the level of income and the factors influencing consumer decisions regarding purchases.

Conclusion

The conducted research focused on analysing the consumer behaviour of shoppers in the Czech Republic with at least secondary education. 91 % of the presented sample were secondary school leavers.

Tab. VII. Summary results of the questionnaire survey

Hypothesis	Degree of freedom	$\chi 2$	Critical value	Cramer's V	Result
H01	2	1.35	5.99	-	sustained
H02	8	36.2	15.51	0.22	rejected
H03	8	11.57	15.51	-	sustained
H04	2	0.22	5.99	-	sustained
H05	10	49.54	18.31	0.16	rejected
H06	10	28.63	18.31	0.12	rejected

Source: Questionnaire survey, own research

The completed research has established a direct correlation between the choice of shop and the age of respondents. Even though the majority of people do most of their shopping in supermarkets, the results have shown that small shops especially are used by people in higher-age groups and, by contrast, people in the 0-20 and 21-30 categories do more shopping online. Furthermore, the research has demonstrated a correlation between factors influencing purchasing decisions and age/income level. Price and quality are by far the most frequently mentioned factors influencing consumer behaviour. By contrast, the discount level was shown to be the least important. The outcomes of this study can be used, for example, for marketing directors of companies focused on a complex marketing activities and advertisement appropriately targeted at selected consumers.

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Big Data Analysis in Crisis Management - Improving the Development Process of Hydrological and Meteorological Hazard Alerts in The Polish Hydrological and Meteorological Service[1]

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Abstract

Natural hazards have significant results in material and human losses. Due to the increasing intensity of weather phenomena, the national hydrological and meteorological services, which play an important role in national crisis management structures, are obliged to provide rapid and precise warnings about extreme phenomena in the hydrosphere and atmosphere. Based on this information, other participants involved in the functioning of the national crisis management system plan and implement tasks having a direct effect on the level of health, life and property protection. To meet growing demands, national services must boldly reach for solutions related to Big Data analysis, artificial intelligence (AI) and machine learning (ML) more often. The article presents a general concept of an IT system aimed at comprehensive support for the process related to issuing and distributing warnings about hydrological and meteorological hazards at the Institute of Meteorology and Water Management - National Research Institute (*Polish* - IMGW-PIB), acting as the national hydrological and meteorological service in Poland.

Keywords: Big Data, crisis management, hydrological warnings, meteorological warnings.

Introduction

In the member states of the European Union, extreme forms of natural weather hazards caused losses of almost EUR 426 billion (according to the value from 2017), which constituted 83% of total monetary losses and contributed to the death of over 87,000 people in the years 1980–2017. Despite being a country in a temperate climate zone, Poland is exposed to phenomena in the hydrosphere and atmosphere, and recorded over EUR 15 billion in material losses and over 1,200 fatalities, respectively [European Environment Agency 2019], in the mentioned period.

One of the greatest responsibilities of the state is to ensure the safety and protection of citizens [Constitution of the Republic of Poland (Journal of Laws) 1997] through public administration bodies and institutions established for this purpose. The national hydrological and meteorological services have a growing share in the risk management process related to natural hazards [Rogers, Tsirkunov 2011]. They are responsible for analysis of prevailing weather conditions, prediction of phenomena and continuous provision of information to the public and government administration units responsible for safety in the country. If the phenomena meet the criteria of intensity, the national services are obliged to create alerts. The speed of creation and publication, as well as quality, have a significant effect on minimizing the effects caused by weather hazards. In Poland, the national

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hydrological and meteorological service is the Institute of Meteorology and Water Management - National Research Institute (IMGW-PIB) operating on the basis of Water Law [Water Law (Journal of Laws) 2017].

In the process of creating warnings about hydrological [WMO-No. 168 2015] and meteorological hazards [WMO-No. 49 2015], it is necessary to acquire, collect, process and analyse (qualitative and quantitative) data from ground measurement systems managed by IMGW-PIB and other national hydrological and meteorological services, marine systems, satellite images, as well as hydrological and meteorological forecasting models. This diverse set of sources contains formatted text, photos, videos. They are analysed by employees of Meteorological Forecast Offices and Hydrological Forecast Offices. Despite instructions, procedures and recommendations, the human factor makes it a subjective assessment. The same set of data assessed by different employees may result in different results. The aim of the conducted research work presented in this manuscript was to develop a general concept of an IT system that comprehensively supports the process of issuing warnings about hydrological and meteorological hazards based on data obtained using Big Data techniques, including artificial intelligence (AI) and machine learning (ML).

Creating warnings about hydrological and meteorological hazards

IMGW-PIB supervision over the issue of information on current hydrological and meteorological conditions to institutions and citizens is executed by the Ministry of Maritime Economy and Inland Navigation [RCB 2019]. The minimum catalogue of stakeholders of warnings about dangerous phenomena occurring in the atmosphere and the hydrosphere, meteorological and hydrological forecasts, meteorological and hydrological messages, bulletins and yearbooks is set out in relevant regulations. The stakeholders include the President of the Republic of Poland, parliament marshals, the prime minister and elected government ministers, heads of services and key state institutions, province marshals, voivodes, heads of public media [Regulation of the Minister of Maritime Economy and Inland Navigation (Journal of Laws) 2019].

Meteorological Forecasts Offices (*Polish* - BPM) and Hydrological Forecasts Offices (*Polish* - BPH) operating in IMGW-PIB develop and provide warnings about dangerous phenomena that occur in the atmosphere and the hydrosphere. The creation process is shown in the form of a diagram in Figure 1.

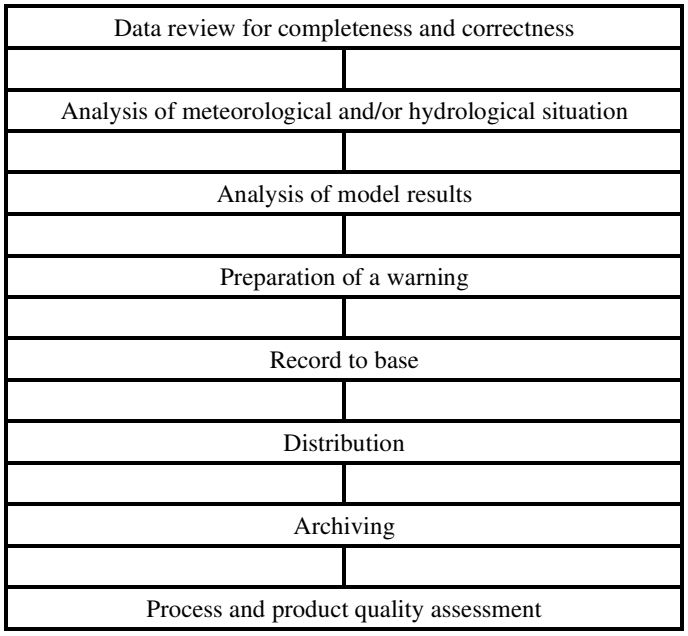

Fig. 1: Diagram of the process of creating meteorological and hydrological warnings at IMGW-PIB

Source: own study based on IMGW-PIB internal procedures and instructions

The process of creating and distributing alerts is a multi-step one. Before preparing products, BPM and BPH review the necessary hydrological and meteorological data and information for their completeness and correctness. The result of the work is a report on the review of completeness and correctness of data, saved in electronic form.

Data and information from various sources, which are presented in Table 1, are used to create warnings.

Table 1: Summary of input data necessary to create warnings of dangerous phenomena that occur in the atmosphere and the hydrosphere

Hydrological warning	Meteorological warning
1. Data from the measurement and observation network managed by IMGW-PIB 2. Data from the measurement and observation network of hydrological and meteorological stations managed by the national hydrological and meteorological services in neighbours of Poland 3. Results from numerical prognostic models operated at IMGW-PIB 4. Results from numerical forecasting models operated by other global centres with which IMGW-PIB has relevant agreements and arrangements 5. Results from numerical forecasting models available as part of WMO international exchange	1. Data from the measurement and observation network managed by IMGW-PIB 2. Data from the global measurement and observation network managed by national meteorological services 3. Results from numerical prognostic models operated at IMGW-PIB 4. Results from numerical forecasting models operated by other global centres with which IMGW-PIB has relevant agreements and arrangements 5. Results from numerical forecasting models available as part of WMO international exchange 6. Radar data from the POLRAD system managed by IMGW-PIB

6. Data from other measuring and information systems, internal and external, domestic and foreign, including: a. synoptic meteorological forecasts; b. warnings and meteorological messages	7. Data from radar systems managed by the European national meteorological services 8. Data from the PERUN lightning detection system managed by IMGW-PIB 9. Data from lighting detection systems managed by the European national meteorological services 10. Satellite data available from the systems receiving data from NOAA, Metop, Meteosat, Terra/Aqua satellites 11. Data from other measuring and information systems, internal and external, domestic and foreign, including: a. synoptic meteorological forecasts; b. warnings and meteorological messages

Source: own study based on IMGW-PIB internal procedures and instructions

Based on the data listed in table 1, using available tools (mainly dedicated, manufactured inside or for the needs of IMGW-PIB) and methods (based on WMO guidelines [WMO-No. 834 1999; WMO-No. 49 2015; WMO-No. 168 2015, WMO-No. 471 2018]), the following is carried out:

- analysis of the current hydrological situation and the forecast meteorological situation - for hydrological warnings. Created by authorized BPH employees;
- analysis of the current hydrological situation and the forecast meteorological situation - for meteorological warnings. Created by authorized BPH employees;

In the next stage, results from forecasting models are analysed. If the expected development of the hydrological situation indicates the occurrence of a dangerous hydrological phenomenon, the synoptic hydrologist on duty decides to issue a hydrological warning. If necessary, before making a decision, he can conduct an additional consultation with a meteorologist on duty. Warnings, depending on the intensity of a phenomenon, are graded from 0 (no threat) to 3 (very high threat).

Table 2: Degrees of hydrological warnings

Degree	Description
0	No warnings
-	*Hydrological drought threat.*
	Flows are in the zone below SNQ for the contractual period. The hydrological drought warning does not specify the degree of danger.
1	*Moderate threat*
	Water levels (observed or forecast) are in the zone below the warning states - $H_{WARNING}$, with a forecast dramatic increase in water levels
2	*High threat*
	Water levels (observed or forecast) are in the zone above the warning states - $H_{WARNING}$, but below alarm states - H_{ALARM}
3	*Very high threat*
	Water levels (observed or forecast) are in the zone above the alarm states - H_{ALARM}

Source: own study based on IMGW-PIB internal procedures and instructions

The situation is similar when creating a meteorological warning. If the analysis of the meteorological situation indicates the occurrence of a dangerous phenomenon, the synoptic meteorologist on duty decides to issue a meteorological warning. He does so after arrangements (video conference) with representatives of other local Meteorological Forecast Offices. Warnings, depending on the intensity of a phenomenon, are graded from 1 (no threat) to 3 (very high threat).

Table 3: Degrees of meteorological warnings

Degree	Description
No warnings	Weather hazards that have a significant effects on everyday life are not forecast.
1	Conditions conducive to the occurrence of dangerous meteorological phenomena that may cause material losses and threat to health and life are expected. Conducting business in conditions of exposure to these factors is difficult and dangerous. Expect difficulties resulting from activities in the area of threat, including delays caused by traffic jams, disruptions in the course of outdoor events or even cancellation. Caution, messages and weather conditions tracking are recommended.
2	Dangerous meteorological phenomena that may cause great material losses and threat to health and life are expected. Dangerous phenomena or the effects of their occurrence significantly limit economic activities. Expect disruptions in everyday functioning. High caution, messages and weather conditions tracking are recommended. Follow all instructions given by emergency services in an emergency situation. Adapt your plans to weather conditions.
3	It is predicted that serious meteorological phenomena will occur, causing great damage or damage at the level of disasters and life threatening situations. Dangerous meteorological phenomena or the effects of their occurrence will prevent business operations. Be prepared for significant disruptions in your daily functioning. Extreme caution, messages and weather conditions tracking are recommended. Follow all instructions given by emergency services in an emergency situation. Adapt your plans to weather conditions.

Source: own study based on IMGW-PIB internal procedures and instructions

Regardless of the type of warning, they are created according to a specific pattern containing the following sections:

1. Origin identifier (office name)
2. Type identifier (message title, phenomenon and degree of danger)
3. Content (area, validity, mileage, probability of occurrence, comments, duty officer, date and time of publication)
4. Text message (text message identifier, phenomenon and degree of danger, area, importance, course)
5. RSO message[2] (RSO message identifier, area, phenomenon, content)

Warnings are saved on local workstations and in databases (archived for the time resulting from the Office Instructions), published on websites, IMGW-PIB social media. Distribution to stakeholders takes place using dedicated software. The IT Center is responsible for its timeliness and efficiency.

Every quarter, the Hydrological and Meteorological Forecast Offices assess the implementation of the process of developing and issuing warnings. At the end of the year, an assessment of implementation of the warning development and issue process throughout the year is made.

[2] Regional Warning System (RSO) - free, universal service of the Ministry of the Interior Affairs and Administration that allows informing citizens about threats. It covers all of Poland.

System supporting the process of issuing warnings about hydrological and meteorological hazards

Big data

One of the first publications in which the term Big Data can be found appeared in 1997 and defined it as a maximally large data set for analysis, from which a maximum of useful information can be taken [Cox, Ellsworth 1997]. In 2001, the Big Data concept appeared based on the 3V model (Volume, Velocity, Variety) [Douglas 2001], wherein [Williams et al. 2014]:

- Volume - refers to a large amount of data that can be used to formulate new concepts;
- Velocity - indicates high speed of data incoming and processing;
- Variety - draws attention to data heterogeneity.

In subsequent years, this model was expanded with other elements characterizing:

- Veracity - the accuracy of raw data and its integrity (4V model) [Czajkowski 2014];
- Value - value, significance, usefulness for analysis from the user's point of view (5V model) [Tabakow et. al 2014].

The very concept of Big Data literally refers to the size of the data. Key features for Big Data have been identified in HACE theory [Tamhane, Sayyad 2014]:

- magnitude and diversity of data sources;
- autonomous, distributed, controlled data sources;
- complex and evolving connections.

Large sets are usually formed in areas related to the data obtained, for example, from extensive measuring systems, imaging systems. These fields include atmospheric sciences, geophysical sciences, and health and medicine [Cox, Ellsworth 1997].

In the process of creating warnings about phenomena in the atmosphere and the hydrosphere, large sets of various data appear from many sources (from within IMGW-PIB, from other national services and from WMO exchange). From the analysis of the input data set, necessary to create warnings about dangerous phenomena that occur in the atmosphere and the hydrosphere (Table 1), it can be seen that all types of data structures appear. Dominant data is data that can be stored, consulted and processed in the form of a fixed format (e.g. numerical value of the measured wind speed). This is the so-called structured data [Drosio, Stanek 2016]. Data, and to be more specific - partially structured sets [ITPedia 2017], is synoptic forecasts, warnings and meteorological and hydrological messages. This data is prepared according to a pattern, but in addition to the content that exhausts the definition of structural data, it contains a descriptive part in the form of a commentary presenting additional information, such as a more detailed description of a phenomenon, its expected development or a mention of the planned next release of information.

The last group is unstructured data, which is not present now but will soon appear in the form of cyclical images of the sky from which information about cloudiness and the type of clouds will be extracted.

Analysis cycle

Data from the IT system (with embedded, among others, Big Data analysis) that supports the process related to issuing warnings about hydrological and meteorological threats will be valuable if key stakeholder groups with clear roles, responsibilities and expectations are defined. At this stage of the discussion, the life cycle of an analysis can be used [Schmarzo 2013] (Fig. 2) with the following users:

1. Business user. In this process, business users are recipients of warnings about:

a. Defined by law [Regulation of the Minister of Maritime Economy and Inland Navigation (Journal of Laws) 2019].
b. Commercial.
c. Users using websites and social media (Facebook, Twitter).

Dominant recipients defined by law are state institutions and bodies involved in ensuring Poland's security, participating in the implementation of tasks included in the National Crisis Management Plan. The next group is commercial users who need data for business activities. These are companies from the road and construction industries, energy companies, etc. The last group is made up of individual users who look for weather information on institute websites and social media profiles. They do not need this data in business processes, but based on data they make decisions affecting many areas of the economy - they buy goods and services that depend on weather conditions. Apart from the external stakeholders mentioned above, internal stakeholders should not be forgotten. These are organizational units at IMGW-PIB that carry out processes for which warnings about hydrological and meteorological hazards are very important. An example of the service of maintaining key measuring systems and data acquisition.

Business users who use warnings about hydrological and meteorological hazards begin and end the life cycle of the analysis. The effectiveness of their decisions testifies to the quality of work of other stakeholders of the cycle - data warehouse administrator, data analyst and BI analyst.

2. The data warehouse administrator defines, develops and manages the data platform. Platform:
   a. It supports structured data (e.g. from the terrestrial measurement network), partially structured data (e.g. synoptic forecasts, meteorological and hydrological warnings and messages), unstructured data (e.g. sky imagery).
   b. It provides access to internal IMGW-PIB data (e.g. from the POLRAD meteorological radar system), and external sources operating outside the Institute's structures (e.g. from data receiving systems from NOAA, Metop, Meteosat, Terra/Aqua satellites).
   c. It supports the ability to download and analyse data streams in real time (e.g. from the PERUN lightning detection system).
   d. It allows adding new data sources smoothly (e.g. from new forecasting models).

   In addition, the stakeholder uses historical data warehouses (Central Historical Database) and operational data warehouses (Hydrology System, Telemetry System, Data Collection System from Synoptic Stations, and others).

3. A data analyst looks for valuable relationships and connections in various data sources. For this purpose, he explores structured and unstructured data, both internal and external. An example is the hydrological rainfall - outflow model, which connects the water level on a selected section of the river with precipitation on a specific surface.

4. The Business Intelligence (BI) analyst is responsible for:
   - the process of collecting, recognizing, interpreting and analysing data that directly translates into improving the decision-making process of the business user;
   - *key performance indicators*;
   - collecting and standardizing data from various areas and sources. Identification and presentation of data; on its basis, business users will monitor, verify and evaluate activities;
   - Development of reports and dashboards that are a tool for data visualization and analysis for business users;
   - Dynamic modification and update of business standards and reports;
   - Conduct of periodic checks on the operation of reports;
   - Implementation of new functionalities;

- User support, especially business support in the use of the system.

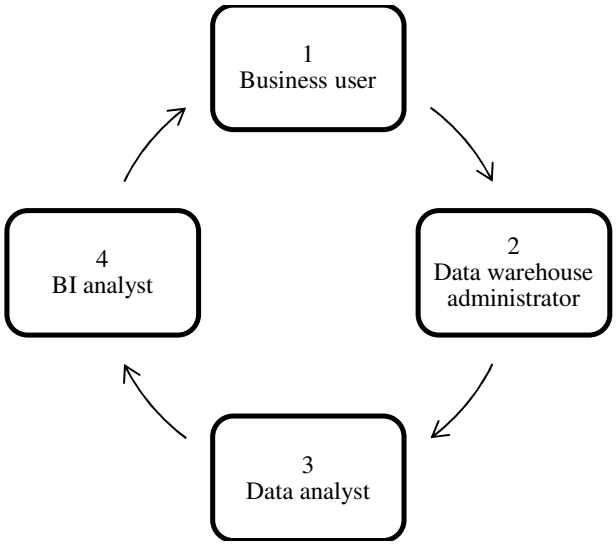

Fig. 2: Analysis life cycle at IMGW-PIB

Source: own study based on [Schmarzo 2013]

Business System Requirements

The IT system supporting the process related to issuing warnings about hydrological and meteorological hazards at IMGW-PIB in a comprehensive manner should meet the following requirements:

1. Be a source of structured data.

2. Integrate data from various sources (e.g. telemetry system, aerological measurements, terrestrial remote sensing, satellite remote sensing, actinometric, evaporometric, hydrological and other measurements).

3. Ensure secure access for users (recipients of warnings).
4. In terms of information, generate (in automatic mode) or support creation (in supervised mode):
    a. Hydrological and meteorological warnings according to the catalogue of threats.
    b. Hydrological and meteorological reports according to the catalogue, procedures and internal guidelines of IMGW-PIB.
    c. Additional information, e.g. anticipated development of situation, indications for preparation (readiness levels) for individual recipients (e.g. emergency service officer monitoring the flow of warnings and messages, local government units and crisis management centres, fire brigades, police, etc.).
    d. Dedicated products created by users themselves, configured by checking the appropriate boxes (checkbox), according to the catalogue of available data and parameters.

5. Generate warnings and messages for:
    a. Provinces
    b. Poviats

6. Enable distribution of warnings, messages, information according to the distribution list to stakeholders:
    a. Defined by regulations [Regulation of the Minister of Maritime Economy and Inland Navigation (Journal of Laws) 2019].
        i. Central authorities
        ii. Crisis management centres
        iii. Central services (fire brigade, police, etc.)
        iv. According to the situation - local government units at provincial levels and in poviats,
        v. According to situation (poviats) - services in the form of poviat fire brigades, police, etc.
    b. Commercial
    c. Users using websites and social media (Facebook, Twitter).

7. Depending on the type and dynamics of a phenomenon (in the atmosphere or/and the hydrosphere), select time intervals for verification of the development of a phenomenon and updating information for individual groups of recipients.

8. AI analysis of data changes and the need to update the data - automatic data verification and notification of the need to introduce significant changes in parameters. Over time, implementation of automatic data update and elimination of obvious errors according to particular criteria.

9. Enable data to be added and integrated with other systems (e.g. systems of other institutions) flexibly.

10. Allow boxes (checkboxes) appropriate for a given type of data, limit parameters for analysis, time of information transfer and recipient groups to be checked.

11. Allow for "individualization" of area warnings, creation of combined warnings.

12. Enable the system to be supplied with structured and unstructured data from heterogeneous sources of variable intensity, including video streams.

System Architecture Proposal

The IT solutions used in IMGW-PIB hardly support the process of creating warnings about meteorological and hydrological hazards. Their role is to provide and send data, as well as to archive and partially distribute products to stakeholders. The very process of assessing the completeness and correctness of data from various sources, as well as the creation of warnings, takes place with the full involvement of the hydrologist and the meteorologist. Some of the necessary tasks are not implemented, e.g. redundant data elimination. The system proposal presented below is aimed at meeting business requirements through a suitable set of tools that are used to:

- eliminate existing restrictions,
- minimize the human factor in the process (and ultimately eliminate it),
- enrich the process with elements that are not implemented (the above-mentioned elimination of redundant data),
- speed up the implementation of individual process steps (e.g. data assessment and issuing a warning taking into account the scope of individualised information required for a given recipient),
- enable dynamic system adjustment to the needs of the recipient.

The system has the following layers:

1. Data sources.

Data sources in the proposed system are, among others:

a. Data from the measurement and observation network managed by IMGW-PIB
b. Data from the measurement and observation network of hydrological and meteorological stations managed by the national hydrological and meteorological services.
c. Results from numerical prognostic models operated at IMGW-PIB
d. Results from numerical prognostic models used by other global centres.
e. Results from numerical forecasting models available as part of WMO international exchange
f. Radar data from the POLRAD system managed by IMGW-PIB
g. Data from radar systems managed by the European national meteorological services
h. Data from the PERUN lightning detection system managed by IMGW-PIB
i. Data from lighting detection systems managed by the European national meteorological services
j. Satellite data available from the systems receiving data from NOAA, Metop, Meteosat, Terra/Aqua satellites
k. Data from other measuring and information systems, internal and external, domestic and foreign, including:
    i. Synoptic meteorological forecasts;
    ii. Warnings and meteorological messages

2. Data Integration.
In this layer, data coming from various sources is processed into formats in which it can be analysed.
Data integration understood as a set of processes, technologies, control mechanisms, automated tasks and skills necessary to standardize and connect data from various sources takes place here.
Three components are proposed in the solution:
    a. ETL that is usually used to integrate structured data in Business Intelligence, which involves data extraction from source systems, transforming them and loading data into a data warehouse.
    b. The Big Data type is used to integrate unstructured data and load it into non-relational databases.
    c. An intermediate area used to store data obtained from the source layer to preserve it in its original format, but enabling the addition of data from other sets (e.g. results of previous analyses and scenarios) before passing it for transformation and analysis.

3. Data storage in which data is stored and made available based on technologies:
    a. Relational databases - for storing e.g. data from telemetry networks, historical measurement and observation data.
    b. File databases - for storing e.g. satellite images, sky photographs, warning texts and other unstructured data.
    c. In Memory Data Grids (IMDG) - for storing data in RAM which is more efficient than using disk. The use of a key or/and value storage gives the application developer more flexibility. The data model and application code are inextricably linked. More than a relational structure. It is easier to provide and maintain scalability and resistance. Software and/or hardware can be updated without interference. The technology works well for operations and collections that require high variability, fast data update and modification. However, close attention should be paid to data consistency, which may prove to be the weak point of IMDG.

4. Data analysis, which consists of:
    a. AI and ML component [Qadir et al. 2016] performing tasks related to:

- data verification - checks the correctness of data and eliminates errors based on, among others, detection of outliers, e.g. incorrect results in measurement series, mistakes when entering information into database;
- detecting patterns of coexistence of phenomena, e.g. the effect of precipitation in a given area on the level of river levels;
- generating hydrological and meteorological warnings using prediction mechanisms - classification (assigning a given level of warning based on boundary parameters, e.g. 2nd degree warning with strong winds that exceeds 72 km/h), regression (predicted value of the continuous variable due to the current development of raising or lowering the level of warning based on boundary parameters for each level, tendency - e.g. due to the forecast intensification of gusty winds, regression to the 3rd degree due to forecast gusty winds exceeding 90 km/h), recommendation (issuing recommendations - e.g. Cleaning the environment cleaning, fixing objects and staying indoors to minimize the risk of health and life loss and material losses).

b. Real-time analysis component responsible for handling data from satellite systems, meteorological radar systems, lightning detection systems.
c. Component of textual (descriptive) analysis of some hydrological and meteorological warnings. Based on the defined and calculated statistics for words and phrases appearing in warnings, the structure of the text is expressed in numerical categories. The statistics received are then analysed using data mining methods.
d. An alert distribution component that sends alerts to stakeholders in a specific format. Depending on the operating mode, automatically or after being authorized by a synoptician, a hydrologist or a meteorologist.

5. System management, which includes:
   a. Metadata management component.
   b. Data management component.
   c. Security component.
   d. Data resource management component.
   e. Relationship management component.
   f. Qualification management component.

6. Design and implementation tools.
   Currently, there are many tools available for designing and implementing this class of system on the market. They should be selected according to the assumed requirements but also competences of a team performing such a task. Ready-made, closed solutions can be used or everything can be started from scratch by writing the data migration program in the selected framework. Due to the repeatability of the processes, it is reasonable to consider using ready-made and tested solutions that are best known to teams building and maintaining the system.
   Therefore, it seems optimal to base on open, but existing and tested solutions, with an extension of own proprietary solutions and algorithms that allow implementing services and requirements that are unique for the system. However, the simplest possible solutions should be followed and too much complexity of the system architecture avoided.

7. User interface.
   The user interface should be as intuitive as possible, close to commonly encountered and known interfaces. Choose between GUI (graphical interface) and WUI (website interface) - depending on the system architecture option selected. Where possible, it should be automated, limited to check boxes using dictionaries and checkboxes. It should give wide possibilities of own configuration with integrity of architecture and connections within the system.

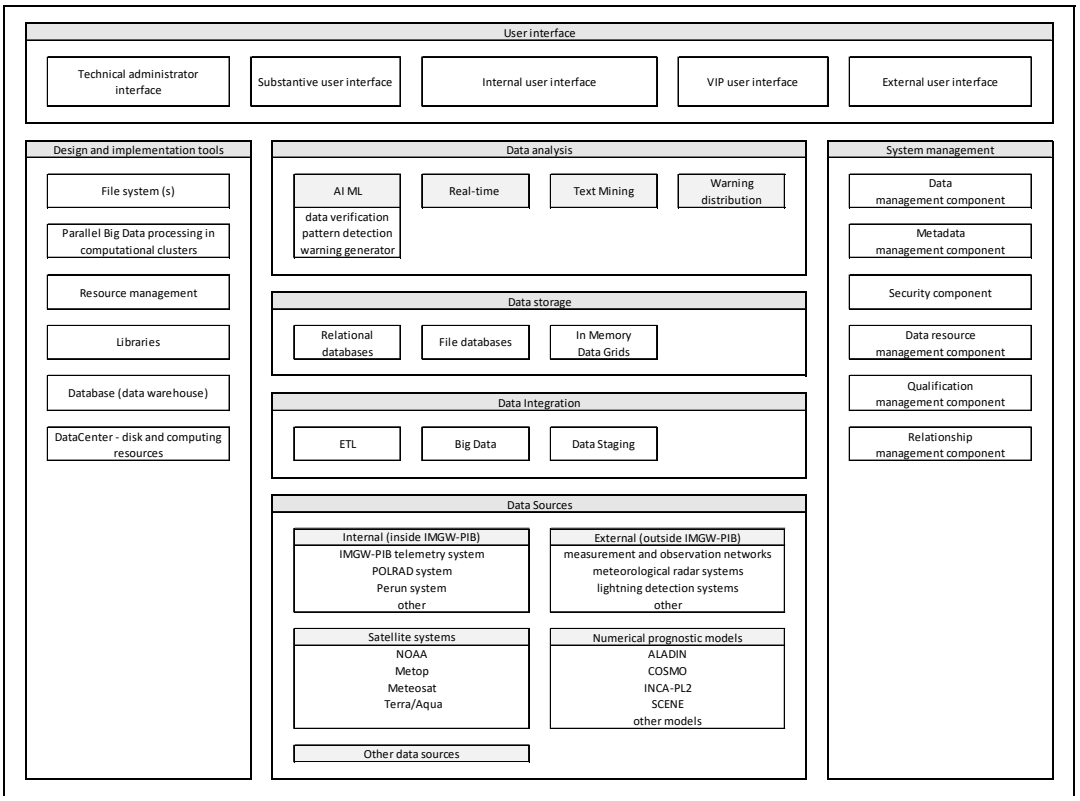

Fig. 3: The architecture of the IT system supporting the process of issuing warnings about hydrological and meteorological hazards

Source: own study

Summary

Due to the progressing climate changes and the resulting increasing dynamics of weather phenomena, national hydrological and meteorological services are becoming an increasingly important link in national crisis management systems. IMGW-PIB and twin services operating in other countries are expected to be more and more precise in monitoring and forecasting phenomena and issuing accurate and constantly updated warnings about dangerous weather phenomena. Based on this information, other participants of crisis management systems plan and implement their activities, which at the end of the process translate into the level of protection of health, life and property.

The purpose of the research work presented in the manuscript was to develop a general concept of an IT system that is to comprehensively support the process related to issuing and distributing warnings about hydrological and meteorological hazards by the national service on the example of the Institute of Meteorology and Water Management - National Research Institute.

In the context of crisis management, the capabilities of such a system and Big Data capabilities cannot be overestimated. The most important aspect for crisis management bodies and services is timely and quick provision of information. Information based on the most current data and its current comprehensive analysis. A quick analysis of scenarios that can occur with a given event configuration and selection of the most probable one. This is very important when making real decisions regarding preventive and rescue measures. Big Data gives a wide range of fast and accurate forecasts of events and their development, but also correction of predictions of developments. In active actions, this should bring real benefits from the possibility of ongoing correction of behaviour, and hence in more effective and precise action and better decisions. This will not only help to better protect and protect human health and property, but also to reduce the costs incurred.

The use of modern methods and IT tools will allow analysing incomparably more data from various sources, obtaining a more detailed and multi-variant perspective of the possible development of a forecast situation in the hydrosphere and the atmosphere. A multi-faceted overview of scenarios will be available in a short time. A wide range of input data and a large number of possible variables will be used for the compilation.

This will allow choosing the most suited, predicted course of events and quickly correcting it when additional variables or additional information are found, and verifying the course and development of phenomena, if any occur.

For IMGW-PIB, the implementation of the system in the company will definitely improve the process of creating and distributing information, messages, forecasts, as well as hydrological and meteorological warnings. The data reaching the recipient will be personalized and adapted to its needs without any additional effort. It will be faster to analyse the course of events in the past and forecast possible development, depending on the input data received and the circumstances of its occurrence. Correcting the course of events as well as updating forecasts and warnings will be faster and more effective.

A great advantage of such a system is an extensive analysis of data and current and historical information. In such a wide range it is not possible to be implemented by man. Quick correction and update of data, taking into account various variables to provide information that allows for a quick and effective protection of human life and property against the negative effects of a natural event is crucial.

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How Perceived Values Relates to User's Intention to Save Money In E-Wallet: Indonesian Case

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Abstract

Currently, the electronic wallet (e-wallet) payment method has been commonly used in Indonesia and slowly has been replacing cash as a payment method. *Fintech* companies, which mostly operate e-wallet services in Indonesia, are able to make short-term investments using their consumers' e-wallet balances. However, the money balances tend toward small amounts. This research aims to evaluate whether perceived values affect Indonesians' willingness to save more money in their e-wallet accounts. Perceived values here consist of perceived benefits and risks. We define perceived benefits as perceived monetary and convenience values. Meanwhile, we define perceived risk as encompassing economic, privacy, service, and psychological risk. We analyze the primary data from a total 103 respondents collected via online survey across Indonesia. We have conducted validity and reliability tests of the data collected before performing the main analysis using the regression method with SPSS Statistics 22. We found that perceived value affects users' willingness to save more money in their e-wallets. However, we found that convenience benefit has a significantly positive affect on users' saving intentions, while monetary benefit does not have the same effect. Meanwhile, service risk is only risk that is relevant to users' willingness to save money. These findings indicate that convenience and service are the most critical values for e-wallet users in Indonesia.

Keywords: E-wallet, perceived value, benefits, risks.

Introduction

E-wallet has been used as a common payment method today and is slowly replacing cash. Based on 2019 data, the volume and amount of electronic money transaction in Indonesia have been increasing almost exponentially for the last couple of years (Bank Indonesia, 2019). Also, the utilization of e-wallet in Indonesia is projected to replace cash payments and bank transfers in the upcoming years (Jayani, 2019). *Fintech* companies, which run most e-wallet services in Indonesia, are also growing; in 2019, there were 61 e-payment *fintech* companies in Indonesia (Wijaya, 2019).

The total transactions of electronic money in Indonesia reached 47.1 trillion rupiahs by 2018 within 2.9 billion transactions. As of 2019, around 500.000 merchants have accepted e-wallet payments, almost the same as the amount of EDCs spread across Indonesia (Wijaya, 2019). The growth of the e-wallet usage was supported by the high penetration of the Internet across the nation (64.8% of the population in 2018) and also the high percentage of smartphone/tablet users in Indonesia (50.08% of the population in 2017) (APJII, 2017; 2018).

Many studies have been conducted to determine which factors affect the development of mobile-based online payment, especially e-wallet, which has been growing rapidly in Indonesia. Similar to the case of mobile banking, even though people are aware of the advantages of the service, some are still unsettled and reluctant to use the offered service. Research in mobile-based payments has been conducted in different regions like China (Zhou, 2013), India (Singh, Sinha, & Liébana-Cabanillas, 2020), and Indonesia (Azizah, Handayani & Azzahro, 2018). Those studies found factors that affect one's intention and continued usage of e-wallet. Zhou (2003) found that flow and switching costs affect performance expectancy and switching barriers, which in turn affect continued usage. Singh et al. (2020) found that high stress negatively influences users' perceived satisfaction, and social influence affects users' adoption and recommendation to mobile wallet services. Azizah et al. (2018) found that users' trust and the system's flow affect satisfaction and thus the usage of e-wallet services.

However, the majority of the previous research focuses on the technological aspects, using the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT2) models to determine factors affecting behavioral intention, customer satisfaction, and continuance usage of mobile payment and e-wallet. Other research has enhanced the TAM and UTAUT2 models with several new aspects such as security, privacy, and trust to learn about the intention to adopt such technology and service (Merhi, Hone & Tarhini, 2019; Syakiela, Triono & Arif, 2019). However, we have yet to find a study focusing on the relation of value-based factors in e-wallet service. Given the limited value-oriented research related to e-wallet, this study tries to fill the existing gap and to look deeper into other motivational values beyond technological ones.

Furthermore, this study aims to analyze what values might affect the willingness to save money in e-wallet. In Indonesia, companies that operate e-wallet services utilize the saving balance for short-term investment. Thus, they compete to offer the best promotion to attract people to use their products as the fastest way to gain people's trust, which usually takes many years to build. This research offers insights into the perceived values that mater so companies can strategize better to ensure customers to save more in their e-wallet accounts. Perceived value is the balance of the benefits and sacrifices of using a service (Zeithaml, 1988).

Literature Review

E-wallet is a payment technology accessed through an application installed on a mobile device that allows customers to save money and make online transactions (Madan & Yadav, 2016). It is also described as a cashless and paperless payment instrument, such as cards, and it directs transfers and transactions through electronic channels (Singh, 1999). E-wallet payment in Indonesia is regulated by the central bank, Bank of Indonesia.

Perceived Value

Perceived value is defined as a judgment or a valuation by the customer of the comparison between the benefits (or utility) and the perceived sacrifices (or cost) to obtain a product or service (Zeithaml, 1988). Another perspective defines perceived value as a trade-off between quality and sacrifices (Monroe, 1990), but still holds the same meaning. First, perceived benefit falls into two categories, direct and indirect benefits (Lee, 2008). Direct benefits refer to tangible paybacks that customers can get immediately, such as lower interest rates, gifts, and cheaper transaction costs. Indirect benefits are harder to measure, like 24-hour service, news service, and investment. Second, perceived risk is defined as the expectation of losses associated with purchase and serves as an inhibitor to purchase (Peter & Ryan, 1976).

Many studies found a link between perceived value with intention to repurchase and to use mobile service, satisfaction, word of mouth, and willingness to buy (Hartline & Jones, 1996; Oh, 1999; Sweeney, Soutar & Johnson, 1999; Syakiela et al., 2019). However, we are unaware of any prior research on the effects of perceived value on willingness to save money in e-wallet. Some research in countries like China (Zhou, 2013), India (Singh et al., 2020), and Indonesia (Azizah et al., 2018) tend

to focus on the technology aspect of the product and use the TAM and UTAUT2 models in their analysis. Some have added several factors such as security, privacy, and trust in order to learn about the intention to adopt such technology and service (Merhi et al., 2019).

Of course, the concept of perceived value, or the variable building it, will vary with different types of products and services. One of previous studies developed a value-based adoption model (VAM) in adopting mobile commerce (Kim, Chan & Gupta, 2007). In the said research, the benefit was defined by usefulness and enjoyment, while the sacrifice was defined by technicality and perceived fee. Other research on e-commerce defined benefits from value as perceived quality and experience with the product or service, while the sacrifices are perceived risk and cost of the product or service (Chen & Dubinsky, 2003).

The dimensional view applied in this research comes from five dimensional conceptualizations of consumption values by Sheth, Newman, and Gross (1991). Those five dimensions are functional, social, emotional, conditional, and epistemic. The functional value represents the value obtained from finishing a task effectively, usually related to monetary and convenience value. Social value is defined as the benefit of social acceptance and the increase of one's self-image in his or her relationships. Emotional value is related to how a product and service can ignite feelings or affect the emotions of the user. Conditional value refers to the value gained from a specific situational context, such as location and social situation. Finally, the epistemic value is the capability of the product or service to arouse curiosity and satisfy the desire for new knowledge.

In a prior study linking perceived value in mobile service (Pura, 2005), the value dimensions are structured into two groups: context-related perceived value (conditional and epistemic) and content-related perceived value (emotional, social, convenience, and monetary). Later studies by Beatty, Shim, and Jones (2001) and Lee (2009) indicate that perceived benefit has a positive relation with intention to adopt and use online-based services. From the five dimensions mentioned before, only functional (separated to monetary and convenience), conditional, and epistemic are considered relevant. However, Sweeney and Soutar (1999) consider epistemic and conditional dimensions to be less significant than the others. Therefore, this research will focus on assumedly relevant content-related value, which refer to monetary and convenience value. We hypothesize that (a) monetary value positively affects users' willingness to save money and (b) convenience values also positively relate to one's willingness to save money.

Perceived Risks

Five key facets of perceived risk are financial, performance, social, and physical, and psychological risk (Jacoby & Kaplan, 1972). However, due to the nature of the research, we can omit physical risk. Financial (economy) risk is the potential monetary loss related to the initial purchase of the product and the following maintenance costs. Performance (functional) risk lies in the risk of a malfunctioning product. Social risk is the risk of losing status in a social group due to adopting or not adopting a product. Psychological risk is the negative effect from a customer's self-perception due to the decision or performance of a product or service provider.

In 1971, Roselius determined the notion of time risk, and it also has been adapted as a dimension of perceived risk. Time risk is the risk of losing time due to the need to learn how to use a product. Furthermore, the growth of Internet-based products and services has led to new dimensions of risk: security and privacy risk (Pikkarainen et al., 2004). Security risk is the risk of losing control of transactions and financial information. Meanwhile, privacy risk is the risk of losing control of personal information.

A study conducted by Yang et al. (2015) on the effect of perceived risk and trust on online payment in China develop dimensions of perceived risk that better suit the nature of online payment. Their model consists of eight dimensions that are divided into two group. The first is system dependent risk, which includes functional, security, time, and social risks. The second is transactional dependent risk, which includes economy, privacy, service, and psychological risks. Perceived risk on e-service

and online payment reduces customers' trust and lowers their intention to use the service (Featherman & Pavlou, 2003; Zhou, 2013). However, system-dependent risk tends to be uncontrolled by service providers and is closely related to the technology as well as the supporting infrastructure of the applications. This kind of risk will eventually diminish with the development of technology and the environment of service. Consequently, in this research, we will only use the dimension of transactional risk.

Based on previous studies, we hypothesize that (a) economic risk negatively affects users' willingness to save, (b) privacy risks negatively affect users' willingness to save, (c) service risk negatively affects users' willingness to save, and (d) psychological risk negatively affects users' willingness to save.

Taken together, we propose a hypothesis based on the model described as Figure 1 below.

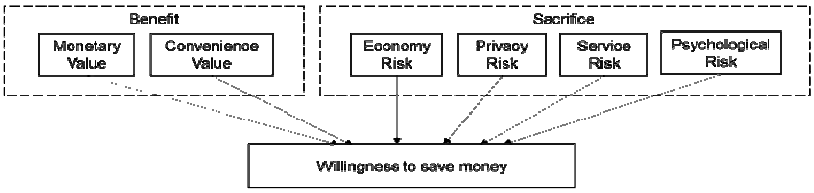

Figure 1: Research Model

Data and Research Methodology

Research Methods

This research uses a quantitative approach. Data for this study was collected via online survey as the research instrument. Due to the minimum qualification for the respondents, the sample was chosen using convenience and snowball techniques while keeping the demography of the sample to represent the population. Before the distribution, an internal test was conducted in which the questionnaire was scrutinized in order to eliminate any errors, typos, or ambiguities. The survey link was spread out conveniently through messenger application groups and social media.

Table 1: Descriptive Statistics of Respondent's Characteristics

Measure	Items	Subjects	
		Frequency	Percentage
Gender	Female	41	60,2%
	Male	62	39,8%
Age	< 21 years old	26	25,2%
	21-40 years old	60	58,3%
	40-60 years old	17	16,5%
Education	Primary to high school	30	29,1%
	Under graduate	64	62,1%
	Post graduate	9	8,7%
Occupation	Student	31	30,1%
	Civil worker	11	10,7%
	Private worker	53	51,5%
	Entrepreneur	2	1,9%
	Housewives	4	3,9%
	Unemployed	2	1,9%
Usage frequency	< 1 time a week	17	17%
	1-5 times a week	50	50%
	6-15 times a week	28	28%
	> 15 times a week	5	5%

The respondents in the sample are from different demographies: gender, age, education background, and job. The total sample consists of 103 respondents, in which 100 respondents are users of e-wallet, and thus are qualified for this research. The detailed characteristics of the respondents are shown in Table 1. The pre-condition for respondents is that they have to use one of ten major e-wallet services in Indonesia: GoPay, OVO, Dana, LinkAja, DOKU, Jenius, Paytren, i.saku, Sakuku, or dan Uangku.

Main Concept Measurement

The main concepts to be explored in this study are perceived benefit, perceived risk, and willingness to save money in the context of e-wallet service usage, as shown in Figure 1. The perceived benefit consists of two variables: monetary and convenience value, measured using 8 indicators adapted from Pura (2005) and Sheng, Parker, and Nakamoto (2014) and then customized to fit the context of e-wallet services in Indonesia. The perceived risk that was adapted from Yang et al. (2015) consists of 12 indicators that were also customized for the context of e-wallet services in Indonesia. Lastly, willingness to save money is measured using 6 constructs adapted from Lim et al. (2006) and customized to fit the context of this research. In areas in which the constructs have been developed or adjusted, we followed strict procedures: specify the domain of the construct, and the constructs were developed based on the conceptual definition. All items were measured on a five-point scale. The perceived risk variables use a Likert-type scale, and others are adjusted according to each construct.

Data Analysis Approach

This research used a two-step data analysis approach. First, we used factor analysis to check the reliability and validity of the construct. Factor analysis will help to determine whether independent variables are valid and reliable to measure the dependent variable and to test the validity and reliability of every construct that composed each variable. Following the results of previous tests, these variables were tested with regression analysis using the SPSS Statistics 22 application.

Data Analysis and Results

Reliability and Validity of Instruments

We conducted factor analysis for dependent and independent variables. All variables showed high KMO levels above 0.5, which are also significant under 0.01, except for one variable, which is monetary value (MF). Based on the factor analysis for MF, the indicators were split into two components. According to the indicators, both component consists of two type of values, fee and promotion. Thus, we split the variable into two different variables, fee value (MFV) and promotion value (MFP). After MF was split, all items for all variables showed convergent validity above 0.6, as in Appendix B.

All variables have Cronbach's alphas of more than 0.7, which shows good reliability. Validity of variables was measured using Pearson correlation test. The correlation result for all variables was higher than the *r* table 0.1946, based on the number of sample and α=0.05, as shown in Appendix A. Therefore, the results of the test indicate that the reliability and validity of variables were satisfactorily met.

Hypothesis Test

Table 2 shows the results of the multiple regression analysis. First, the multicollinearity test was examined using the collinearity statistics: variance inflation factor (VIF) and tolerance. The highly collinear variable, which means it has a VIF that exceeds 10, will pose a problem for regression analysis (Hair, et al., 1998). All of the variables show tolerance > 0.100 and VIF < 10.00, meaning the multicollinearity was verified.

The regression result shows an R^2 of 0.164 and an *f* value 3.036, which is higher than the *f* table value of 2.10. Furthermore, the hypothesis is evaluated based on the *t* value, which is 1.984 on the significance level of 0.05, and 1.660 on the significance level of 0.10. Hypothesis test results show that Hypothesis 1b is accepted on the significance level of 0.05, and Hypotheses 1b and 2c are accepted on the significance level of 0.10.

Table 2: Result of Hypothesis Testing

Hypothesis	Independent Variables	Dependent Variables	Tolerance	VIF	*t* value	Sig.
H1a	MVF	WM	0.876	1.141	0.774	0.441
	MVP	WM	0.722	1.385	-0.499	0.619
H1b	CV	WM	0.756	1.322	3.063	0.003
H2a	ER	WM	0.527	1.897	1.848	0.068
H2b	PR	WM	0.371	2.698	-0.672	0.503
H2c	SR	WM	0.459	2.179	-1.824	0.071
H2d	PSR	WM	0.408	2.451	0.142	0.888

Discussion

Based on the data analysis result, we found that, at significant level 0.05, perceived value as a whole has an effect on the dependent variable, which is the willingness to save more money. At the same significance level, convenience value proved to positively affect the dependent variable. In addition, at a lower significance level, besides convenience value, service risk also had a negative effect on the dependent variable, which aligns with our hypothesis. However, contrary to the hypothesis, monetary value, economy, privacy, and psychological risks were not proven to have an effect on willingness to save money.

To enrich the research analysis, we conducted regressions on each WM indicator as dependent variables. The results are shown in Table 3. Each WM indicator represents different conditions (what-ifs) that may be applied to e-wallet service (details in Appendix B). Based on the result, WM1, WM5, and WM6 are accepted at the significant level of 0.05, and WM4 is also accepted at the significance level of 0.10. WM1 is the willingness to save money if e-wallet offers an interest rate equal or more than bank savings; WM4 and WM5 are for whether e-wallet is provided by big private banks and international banks, respectively; and lastly, WM6 is for if the e-wallet offers more promotion and discount price.

Table 3: Regression Result for Each WM Indicators

Parameter	R^2	F-value	sig.
MV, CV, ER, PR, SR, PSR → WM1	0.131	2.328	0.039
MV, CV, ER, PR, SR, PSR → WM2	0.096	1.645	0.144
MV, CV, ER, PR, SR, PSR → WM3	0.090	1.541	0.173
MV, CV, ER, PR, SR, PSR → WM4	0.120	2.104	0.060
MV, CV, ER, PR, SR, PSR → WM5	0.205	3.987	0.001
MV, CV, ER, PR, SR, PSR → WM6	0.236	4.736	0.000

There are limitations in this study that may restrict the generalizability of the research result, which could be addressed in future studies. First, more than 50% of the respondents are 21-40 years old and are workers. They might be not as constrained by monetary and cost issues as students or unemployed people. They also might be more indifferent about privacy or service risks due to high exposure to technology development. Second, the research was geographically limited to one country, which is Indonesia. Future studies could be conducted at the cross-national level, since e-wallet has been adopted worldwide. Replication of the research in a different geographical context is also encouraged.

Implications

This research is done in response to the need for more value-oriented research in e-wallet services, beyond the technological perspective that has been used in many previous studies. The main

contribution of this research is the involvement of value-based variables in understanding e-wallet usage compared to previous studies that examines e-wallet adoption as more of an IT service. While models such as TAM could help to explore factors affecting the shift from traditional to technology-based service, this research has explored more factors that are determined by the value offered by the service. We believe that the findings will be useful in marketing, since almost all kinds of e-wallet services, especially in Indonesia, have about the same performance and sophistication level in terms of technology.

This study showed that perceived value, which consists of benefits and risks, affects customer's willingness as a whole to save more money using e-wallet. Having more money in one e-wallet will increase the usage of said e-wallet, since almost all e-wallets already provide transfer fund service. Amongst all variables in this study, we found that convenience value has consistently proven to positively affect saving intention. Consequently, e-wallet service providers may want to improve the accessibility of their service with more offline and online merchants, which can also enhance integration across platforms. It is important to note that, in Indonesia, two of the most often-used e-wallet services initially started as internal wallet services for the two biggest online transportation service platforms. As the services on the platform as well as the integration of the platform with offline and online merchants grew, so did the usage of these two e-wallet services.

At lower significance levels, service risk was also found negatively to affect savings intention. Improvement in customer service is the most important driver to enhance users' trust and willingness to use the product more. Service providers shall enhance the presence of the companies and also provide a faster response to inquiries and complaints. This aligns with the results of this study that the willingness to save money is positively affected by the profile of the company that provides the service, in which the respondents chose big, private, and international banks that are usually known for providing better service than state-owned banks in Indonesia.

We found that monetary value, economy, privacy, and psychological risk do not affect users' willingness to save money. We suspect that this finding is matched with the profile of most respondents, most of whom are under 40 years old and workers with steady incomes. The questionnaire also explores the various channels used to top up the e-wallet. The highest channel chosen was mobile banking. This shows that respondents must have been familiar with technologies and do not hesitate to use technology-based services. This is consistent with previous research findings (Kim et al., 2007; Singh et al., 2020) that the usefulness of the service affects adoption intention and continuous usage.

Conclusion

This study aimed to identify the factors of perceived value in the usage of e-wallet service from the perspective of service consumers, not technology users. This research found that perceived value, which consists of benefits and risks, has an effect on customers' willingness to save more money in their e-wallet. Convenience value has consistently proven to positively affect savings intention. Additionally, at a lower significance level, service risk was also found to negatively affect savings intention. If customers save more with e-wallet, it will increase the usage of the e-wallet. Hopefully, these findings will encourage further research and more in-depth analysis and also involve or develop more variables that could enrich this study.

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Appendix

Appendix A. Reliability and Validity Statistics

Variable/ Indicator	Cronbach's Alpha	Pearson Correlation
MVF	0.775	
MV1		0.897
MV2		0.911
MVP	0.833	
MV3		0.923
MV4		0.929
CV	0.740	
CV1		0.773
CV2		0.792
CV3		0.765
CV4		0.731
ER	0.832	
ER1		0.717
ER2		0.807
ER3		0.883
ER4		0.857

Variable/ Indicator	Cronbach's Alpha	Pearson Correlation
PR	0.924	
PR1		0.888
PR2		0.916
PR3		0.924
PR4		0.884
SR	0.933	
SR1		0.968
SR2		0.968
PR	0.933	
PSR1		0.968
PSR2		0.969
WM	0.907	
WM1		0.889
WM2		0.879
WM3		0.796
WM4		0.841
WM5		0.784
WM6		0.761

Appendix B. Factor Analysis Results

Code	Indicator Description	Factor Loading	Valid
MVF	***Monetary value (fee)***		
MV1	What do you think of the top-up service cost (affordable – expensive)? (reversed)	0.904	Valid
MV2	What do you think of the transfer fund cost (affordable – expensive)? (reversed)	0.904	Valid
MVP	***Monetary value (promo)***		
MV3	How is your satisfaction with the promotion from e-wallet?	0.928	Valid
MV4	How is your satisfaction with the discount price from using e-wallet for payment?	0.928	Valid
CV	***Convenience value***		
CV1	It is easy to use e-wallet for transactions in offline merchants.	0.841	Valid
CV2	It is easy to use e-wallet for transactions in e-commerce/online merchants.	0.824	Valid
CV3	It is easy to use e-wallet for transactions on mobile devices (smartphone/tablet).	0.789	Valid
CV4	It is easy to use e-wallet for transactions on desktop/PC.	0.617	Valid
ER	***Economy risk***		
ER1	You worry that the Internet and other costs will make the total expenditure higher when using e-wallet for transactions.	0.898	Valid
ER2	You worry that monetary loss can be caused by service failure/failed transaction.	0.875	Valid
ER3	You worry that it will be hard to request refunds to e-wallet service providers.	0.811	Valid
ER4	You worry that it will take a long time to request refunds to e-wallet service providers.	0.676	Valid
PR	***Privacy risk***		
PR1	You worry that your personal information can be used by e-wallet service providers without your consent for advertising, research, etc.	0.921	Valid
PR2	You worry that your information will be collected or sold by e-wallet service provider to third parties without your consent.	0.918	Valid
PR3	You worry that your information can be stolen through transactions using e-wallet, for example from phishing or other similar method.	0.890	Valid
PR4	You worry that hackers can steal your personal information from service providers' databases.	0.882	Valid
SR	***Service risk***		
SR1	You worry that, if you apply for an e-wallet account, it'll be difficult to communicate with the service provider when you need help.	0.968	Valid
SR2	You worry that, if you use e-wallet for transactions, it'll be difficult to communicate with the service provider when you need help.	0.968	Valid
PSR	***Psychological risk***		
PSR1	You feel anxious before the payment is confirmed.	0.968	Valid
PSR2	You feel anxious if the payment doesn't transfer in a timely manner.	0.968	Valid
WM	*Willingness to save money*		
WM1	You will save more money in e-wallet if the provider offers an interest rate higher than bank saving.	0.885	Valid
WM2	You will save more money in e-wallet if the provider offers an interest rate higher than bank deposit.	0.874	Valid
WM3	You will save more money in e-wallet if the service provider is a state-owned bank.	0.847	Valid
WM4	You will save more money in e-wallet if the service provider is a big private bank.	0.794	Valid
WM5	You will save more money in e-wallet if the service provider is an international bank.	0.792	Valid
WM6	You will save more money in e-wallet if the provider offers more promotion/discount prices for merchants.	0.767	Valid

Relationships with The Superior as An Element of An Organisation's Employer Branding Communication – The Example of Poland

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Abstract

Interpersonal relationships between employees are fundamental in contemporary organisations. The quality of those relationships, and in particular relationships with the superior, affects not only the wellbeing of individuals but also the functioning of the entire company. The advantages of good relationships in the workplace are hard to overestimate. They translate to a higher productivity, employee engagement, innovation stimulation and higher job satisfaction. Positive employee relationships, in particular relationships with the superior, build the market success of an organisation and at the same time are a value that may constitute an important element of the brand of a valued employer. Employer branding (EB) measures associated with the creation of a positive employer brand, addressed to both job candidates and existing employees, in order to be effective must take into account their respective expectations and needs. According to studies and reports, a positive atmosphere in the workplace, and in particular good relationships with the superior, constitute one of the highest values for contemporary employees. The purpose of this paper is to show the importance of relationships with the superior for the development of the EB proposition – based on the example of Polish TOP 500 enterprises. The study presents the results of a nationwide quantitative survey of companies from the TOP 500 list. The results of the conducted research indicate that the great importance that employees attach to positive relationships in the workplace is noticed by leading companies and taken into account in shaping their employer branding offer.

Keywords: employer branding, relationships with the superior

Introduction

The picture of the contemporary labour market shows that many organisations find it difficult to attract and keep valuable employees. This forces employers to pay more attention to the needs and expectations of both employees and job candidates. It turns out that currently, they expect not only to receive attractive wages and benefits, be able to develop and have stable employment but also work in a positive atmosphere (Earle 2003, pp. 244-257; Młokosiewicz 2015, pp.103-116.). Especially representatives of the youngest generations in the labour market want to feel that their work makes sense and they want to know what is going on in the organisation they work for and to be able to influence that. However, in the first place, they expect to work in a place where there exist good relationships between employees on the same level and, in particular, between the superior and the employees (Employer Brand Research 2019).

The purpose of this paper is to show the importance of relationships with the superior for the development of the EB proposition based on the example of Polish TOP 500 enterprises. The TOP 500 list, developed by the portal of the Polish *Rzeczpostpolita* newspaper, includes organisations that achieved the biggest market and financial success in a given year. The first part of the paper presents the importance of relationships with the superior for contemporary employees and how they can contribute to the development of the EB proposition. The analysis of this issue is based on the literature on the subject as well as studies and reports presenting employee expectations concerning relationships in the workplace. The empirical part of the paper presents the results of surveys conducted under a Polish quantitative research among TOP 500 enterprises.

The importance of relationships with the superior and their role in developing the EB proposition

Interpersonal relationships at work cover all the mutual relationships between the employees of various levels in a given organisation, including: behaviour, standards of conduct, the way of addressing others determined by the position in the organisation, joint performance of tasks and ensuring the welfare of the company and the people who work there (Jakimiuk 2016, p. 45). Relationships at the workplace help achieve specific goals and the parties to those relationships influence one another, realising their individual needs and expectations as well as common tasks and projects. They are implemented by means of the links between individuals or groups and specific ways of communicating knowledge, information, emotions, attitudes, values and convictions between two or more partners of interaction. Relationships at work may be personal and individualised and they are unique, not replaceable by other interactions, and involve interdependence and disclosing of personal information, thoughts or feelings. Their opposite are impersonal interactions that result from socialisation, politeness or acquired norms and standards of conduct towards people (Adler et al. 2011). In personal relationships, employees establish closer contacts, deepen their mutual bonds and are more engaged and willing to help one another. This type of relationships makes it possible to experience the support of others and build a friendly atmosphere at work (Raport Fun at work 2018).

Good atmosphere at work is created by a community built on the basis of shared values and employee relationships stimulated by mutual respect and trust. Such atmosphere is associated with organisational culture founded on values and relationships, among which the understanding of employee needs, appreciation of employees and openness in contacts are accentuated. The advantages of building positive relationships at work may be analysed in the individual, as well as team and organisational contexts. The main idea of positive relationships in an organisation is to help and support one another. Significantly, such help is provided even if it is not formally required in a given situation, because the important thing about such type of relationships is their reciprocity. Concerning the organisational profits of positive employee relationships, it is worth noting their impact on innovation, higher productivity – associated with effective communication and stimulating employee engagement (Glińska-Neweś et al. 2017, pp. 25-37). Meanwhile, individual advantages of maintaining good interpersonal relationships at work and a friendly atmosphere are important not only for increasing job satisfaction but also for developing a sense of self-esteem in employees. Positive relationships constitute a huge source of support, build a sense of security and satisfy the need for belonging and acceptance.

Employers who want to distinguish themselves in the labour market and build competitive advantage over other companies must create organisations founded on people and organisational culture that stimulates an emotional bond between the employee and the employer. Contemporary employees not only expect to be treated as partners and understood but they also want to feel that the employer cares about their opinion and considers them to be an important part of the company. Especially representatives of the youngest generations in the labour market expect their work to be meaningful and the company philosophy to be coherent with their own values and compatible with their lifestyle. Those young employees also find it attractive if a company supports local projects and its activities correspond to its declared values (Singh and Dangmei 2016). In order to meet the needs of mainly young employees, many companies introduce well-being services that are supposed to improve their health and condition. However, taking care of the health and wellbeing of young employees of the generations Y and Z must not disregard the aspects of their functioning at work that they consider to be crucial, namely the atmosphere at work associated with relationships with the superior and colleagues.

An important factor affecting the development of positive relationships at the workplace, and in particular relationships with the superior, is the appreciation of employees. Research reports clearly show that employees want to know that their efforts are noticed and their work is recognised by their superior (Employer Brand Research 2019). This creates an atmosphere that is conductive to cooperation and development, and stimulates creativity. Employees who feel appreciated are more

willing to identify with the employer, more engaged and loyal. Importantly, in the contemporary competitive labour market, where talented employees are highly valued, employee turnover is much lower in companies that have a culture of appreciation. The importance of employee appreciation is proven by the results of studies concerning the expectations especially of persons of the generations Y and Z (Raport Index Doceniania 2019). Considering the nature and needs of the youngest generations in the labour market, this issue is particularly important and even decisive for their perception of the working environment as friendly and relationships with the superior as satisfactory.

Positive employee relationships, including relationships between employees and their superiors, contribute to the market success of an enterprise, at the same time being an extremely precious organisational value. The special importance of this value means that eventually, it may constitute a crucial element of the development of the brand of the organisation as a valued employer. Contemporary enterprises that want to effectively compete with others should include employer branding (EB) measures associated with the creation of a positive employer brand in the important areas of organisational management (Backhaus and Tikoo 2004, pp. 501-517: Barrow and Mosley 2006). They relate to the fulfilment of such important needs of an enterprise as attracting and maintaining talented employees who would identify with the employer.

Employer branding covers organisational measures focusing on existing and potential employees and their goal is to build the image of an organisation as an attractive employer and to support its strategic business goals (Lievens et al. 2007, p. 548; Moroko 2008, p. 161; Kozłowski 2012, p. 13; Francis and Reddington 2012, p. 269). EB projects may be divided into external EB – focusing on persons potentially interested in working for a given organisation and internal EB – focusing on company employees (Backhaus and Tikoo 2004 pp. 502-503; Lievens and Slaughter 2016, pp.407-440). External EB targets future employees of an organisation and provides substantial information and opinions about the company to a potential candidate. Measures undertaken as part of external EB may be divided into activities associated with image creation and recruitment, respectively. Image-related measures are supposed to increase the awareness of the target group of the organisation and the potential advantages of working for that organisation. Meanwhile, recruitment-related measures arise from ongoing recruitment processes and their goal is to reach valuable candidates and to persuade them to apply for a specific job. On the other hand, the most important goal of internal EB is to increase employee productivity, which is achieved through various initiatives aimed at improving working conditions and highlighting the benefits of employment in a given organisation. The tools that support the implementation of internal EB include the following: wage and non-wage incentives, professional training and development, internal communication, employee satisfaction surveys and measures that stimulate their integration as well as CSR projects focusing on the employees and the organisational value system (Katoen and Macioschek 2007). Building the employer brand among employees helps increase employee job satisfaction, as a result of which employees become the ambassadors of the company and create its positive image among potential job candidates (Martin et al. 2005, p. 79; Lievens et al. 2007, p. 548). One of the effective contemporary methods of building the employer brand is whisper marketing. It means reaching a potential job candidate through immediate, spontaneous communication. Whisper marketing in blogs, fora or social networks, by triggering discussion about a given company, makes people recommend the company in a natural and genuine way (Mistewicz 2011; Kozłowski 2012, p. 131-132).

An important element of the EB proposition is the Employee Value Proposition (EVP), which is a description of the features and attractiveness of jobs offered by a given employer. An increasingly frequent element of the EVP are organisational measures that highlight personal treatment of the employee (Heger 2007, pp. 109-121; Browne 2012, pp. 29-36). This is due to the fact that contemporary employees not only expect to be treated as partners and understood but they also want to feel that the employer cares about their opinion and considers them to be an important part of the company.

Research shows that it is profitable for an employer to create a good brand. Implementation of EB programmes stimulates recruitment, because such programmes attract valuable candidates to an organisation, reduce employee turnover and have a positive impact on work motivation. As a result,

the company profits financially, especially as a result of reduced employee turnover thanks to employees being satisfied with their work and good communication between the employee and the employer (Barrow and Mosley 2006; Sokro 2012, pp. 164-173).

Methodology

The empirical part of the paper is based on the results of research that was a part of the Polish quantitative research of enterprises under the project: "Innovative trends in human resource management in large enterprises". The research population were the top 500 Polish companies (according to the *Rzeczpospolita* portal 2018 ranking). The research was conducted in 2019 at the Faculty of Management at the Częstochowa University of Technology in collaboration with the specialist outsourced company MRW Market Research World. Random sampling was used by the company conducting the research. Following the sampling, the representative sample was examined based on the following parameters: the size of the general population 500, the estimation error 6%, the level of trust 95%. If a certain company refused to participate in the research, another company was randomly selected.

The research used quantitative survey methods with mixed techniques: the Computer Assisted Web Interview (CAWI) and the Computer Assisted Telephone Interview (CATI). The research tool used in the research was a standardised questionnaire. It contained a set of closed-ended and semi-open-ended questions formulated both as questions and statements. The closed-ended questions were constructed taking into consideration their theoretical, logical and substantial correctness. The questions contained answers in the Likert scale, which enabled determining the relative intensity of various answers. The part of the survey concerning the employer branding (EB) used the five-level Likert scale. The questions relating to the EB were original and they were formulated by the members of the research team of the Chair of Psychology, Sociology and Communication in Management of the Faculty of Management of the Częstochowa University of Technology.

This paper uses the part of the research results concerning the EB proposition of the analysed enterprises, and in particular relationships with the superior as an element of an organisation's EB communication. The following research problem was formulates regarding this issue:

Are relationships with the superior an essential element of the EB proposition of the TOP 500 enterprises?

The following four research assumptions were made in association with this problem:

1. Whisper marketing concerning relationships with superiors in an organisation is very important for the development of the EB.

2. Healthy atmosphere at work constitutes an essential element of an organisation's emotional communication regarding the EB.

3. The organisation promotes a caring and partnership style of management.

4. Communication competencies are more important than professional competencies in performing managerial functions.

For the purpose of examining and describing the significance of differences in relation to the above-mentioned independent variables and the correlation existing between them and other variables STATISTICA software was used. Spearman's rank correlation coefficient was used to assess the strength of correlations between variables.

Results and Discussion

Questions concerning the organisations under review were answered by representatives of senior managerial personnel (HR departments) or employees delegated by the employer. They represented 179 companies, of which: 41.8% were manufacturing companies, 14.5% were manufacturing and service providing companies, 27.4% were service-providing companies, 8.4% were trading companies and 7.8% were manufacturing and trading companies. Most of the responding organizations generate annual revenue ranging from 51 to 200 million PLN (68.1%), the second most numerous group were organizations with revenue ranging from 5 to 50 million PLN (17.9%) annually, and the least numerous group were organizations with annual revenue exceeding 200 million PLN (14%). In terms of the number of employees, the most enterprises employed from 201 to 500 persons (73.18%), and the other 26.82% were companies with more than 500 employees.

The information obtained from employers from the TOP 500 group concerning their EB proposition led to a number of interesting conclusions on the issue of relationships with the superior. The main research problem was directly linked with the issue of whisper marketing associated with relationships with the superior. Representatives of most of the responding companies, asked for their opinion on the importance of whisper marketing concerning relationships with the superior for the development of the EB proposition, emphasised its crucial role (53.07% of responses). Of this, 34.07% respondents partly agreed with the statement that "whisper marketing concerning relationships with superiors in an organisation is very important for the development of the EB" and nearly every 5th representative of the responding enterprises (18.99%) strongly agreed with this statement. Only 18.99% of the respondents were of different opinion and 27.93% did not give an explicit answer on this issue (table 1).

Table 1: Respondents' opinions on the relationships with superior as an element of the EB proposition

Relationships with the superior as an element of the EB proposition	strongly agree	partly agree	neither agree nor disagree	partly disagree	strongly disagree
Whisper marketing concerning relationships with superiors in an organisation is very important for the development of the EB	34	61	50	27	7
	18,99%	34,08%	27,93%	15,08%	3,91%
Healthy atmosphere at work constitutes an essential element of an organisation's emotional communication regarding the EB	84	52	27	9	7
	46,93%	29,05%	15,08%	5,03%	3,91%
The organisation promotes a caring and partnership style of management	32	63	54	17	13
	17,88%	35,20%	30,17%	9,50%	7,26%
Communication competencies are more important than professional competencies in performing managerial functions	20	63	60	26	10
	11,17%	35,20%	33,52%	14,53%	5,59%

Source: own study based on research results

These results mean that leading Polish companies are aware of the importance of opinions on relationships with the superior expressed by satisfied employees through whisper marketing. This method of delivering information on employee relationships constitutes a reliable source of information for potential candidates. Thus, in order to attract valuable employees, who can choose from numerous job advertisements, the examined companies create their EB proposition on the basis of very reliable recommendations that often come directly from employees. Representatives of the surveyed organizations were also asked to assess the situation of their company on the market. These statements were correlated with the adopted EB indicators using the Spearman's rank correlation coefficient. Using the statistical analysis of the obtained data, it was shown that there is a statistically significant correlation between the EB offer of the surveyed enterprises relate to relations with superiors and the increase in enterprise resources ($p = 0.040056$) and the implementation of new technologies ($p = 0.003357$).

Relationships with the superior, being a key element of interpersonal relationships at work, have a very strong impact on the perception of the overall work atmosphere. Thus, representatives of the examined organisations were also asked to respond to the statement that healthy atmosphere at work constitutes an essential element of an organisation's emotional communication regarding the EB. The results clearly show that the respondents appreciate the importance of good atmosphere at work for EB measures – as many as 75.97% of them emphasised the significance of that factor. It should be noted that as many as 46.92% of the representatives of the responding of leading Polish enterprises strongly agreed that good atmosphere at work constituted an essential element of their EB communication. The low percentage (8.93%) of contrary responses suggests a uniform image of the examined enterprises and unanimity of their opinions concerning this aspect of developing the employer brand (table 1). Positive perception of the work atmosphere in an organisation is, according to studies and reports, one of the most important factors affecting the choice of the future place of work or the decision to stay with the current employer (Raport Fun at Work, 2018; Employer Brand Research 2019). According to the available data, companies from the TOP 500 group are aware of the trends in the labour market and, in their emotional EVP communication, they include an image of healthy work atmosphere, meaning good employee relationships. Friendly work atmosphere, being an important element of the emotional communication of a company, draws on the key expectations of employees, which is in line with the contemporary employee expectations. Statistical analysis of obtained data showed that there is a statistically significant correlation between the EB offer of the surveyed enterprises regarding a good work atmosphere and the increase in enterprise resources ($p = 0.005381$) as well as an increase in productivity ($p = 0.044524$) and the implementation of new technologies ($p = 0.007360$) and greater innovation of the company compared to competitors ($p = 0.034639$). Leading Polish companies owe their market success and further opportunities for successful development, related to innovation and new technologies, to the atmosphere of work that promotes the productivity and creativity of employees. In such an atmosphere of work, employed people are more willing to cooperate and share their knowledge, which affects organizational benefits.

The relationships between superiors and employees belong to the most important factors that affect both productivity and job satisfaction. Positive perception of those relationships by employees is influenced, among other things, by their expectations regarding the superiors and their style of management. According to reports presenting the expectations of the youngest generations in the labour market, they mainly opt for a superior-patron who is sympathetic and helps employees do their job or a superior-partner who discusses tasks with his employees and works together with them to complete those tasks. The least popular is the traditional style of management, in which the superior mainly gives orders and controls their performance. Considering these employee preferences, representatives of the examined companies from the TOP 500 group were asked to respond to the statement that their organisation promotes a caring-partnership style of management. The information suggests that the majority (53.07% of responses) of successful enterprises prefer relationships between superiors and employees based on partnership and supporting the employees. Of this, 35.19% of the respondents partly agreed that their organisation promoted a caring-partnership style of management, and 17.87% strongly agreed with this statement. Only 16.75% of the respondents were of different opinion and 30.16% did not give an explicit answer on this issue (table 1). Using

statistical analysis, it can be concluded that there is a statistically significant (p = 0.034369) correlation between promoting a caring and partnership style of management and increasing in company's resources.

The studies and reports available in the literature on the subject suggest that contemporary employees, and in particular representatives of the youngest generations in the labour market, pay special attention to issues associated with communication. In this context, the superior's communication skills are relevant to employee expectations and relationships with employees. A competent superior should thus not only be experienced and knowledgeable and share their knowledge with employees but, more importantly, they should have good communication skills. Accordingly, the survey could not omit the question of the competencies associated with the superior's communication with employees. In order to visualise this issue in the best Polish companies, the respondents were asked to comment on the statement that communication competencies are more important than professional competencies in performing managerial functions. Such response seemed to be quite provocative, however, the opinions of the representatives of the examined organisations prove the special role of communication skills in performing managerial functions. The largest percentage of the respondents (46.37%) agreed with this statement, while 33.52% chose the option: "I neither agree nor disagree". The lowest percentage of the organisations (20.11%) stated they did not agree with this statement (table 1). Professional knowledge and job-related skills, although valuable in leading the enterprise to success, proved to be less essential in performing the role of the superior than communication competencies. The carried out statistical analysis in relation to this issue allowed to make some important observations. It turns out that the importance assigned to the manager's communication competences is statistically significantly correlated with the increase in enterprise resources (p = 0.009802); an increment in product sales (p = 0.005981) as well as an increase in productivity (p = 0.002532) and the implementation of new technologies (p = 0.011450); an increase in the market value of the enterprise (p = 0.001356) and higher market shares compared to the competition (p = 0.045475). Although the strength of the correlations between the studied variables is rather weak, the existence of theme indicates the importance of managers' communication competences in shaping the market success of the enterprise.

An analysis of the results leads to the conclusion that Polish enterprises from the TOP 500 group, in order to successfully compete with other companies in the labour market, carefully build their EB proposition and regard relationships with the superior as an important element of EVP communication. It could be presumed that one of the reasons for such measures are the generational changes in the labour market and the related transformations of employee values and expectations, reflected not only in the wording of formal contracts, but also with respect to psychological contracts. Such contracts, containing both the obligations of an employee in an organisation and the things the employee expects in return, also provide for the issues of the development of the working environment and employee relationships (Rogozińska-Pawełczyk 2019, pp. 171-184). According to the reports of HR specialists, changes in contractual obligations concern, in the first place, more independence and the possibility to enrich one's professional experiences and develop one's competencies, but they also highlight the key importance of work atmosphere and positive employee relationships, especially relationships with the superior (HRM Institute https://www.hrminstitute.pl/raporty-eb). The preferences of young employees demonstrated in studies clearly show that, on the one hand, they want to experience the help and support of their superiors but, on the other hand, would like to have a partnership relationship with them. These preferences of young employees are noticed by leading enterprises, which use their knowledge of this issue in developing their EB proposition. However, it is not certain whether such positive employer image is only an element attracting job candidates or it is coherent with the entire EB and actually reflects the organisational reality. This is important, because employees who experience the coherence of measures undertaken by an organisation in both areas of the EB (internal and external) are more likely to be involved with the company for longer (Andreassen and Lanseng 2010, pp. 212-236; Wilska 2014, pp. 46-54).

Conclusion

Considering the conclusions of relevant studies and reports (Stach 2014, 33-59) and the results of research presented above, it should be noted that leading enterprises are aware of employee expectations concerning positive relationships at the workplace and take them into account when developing the employer branding proposition. Such attitudes of employees, especially the youngest generations of employees, whose representation among all employees is increasing, forced some changes in the labour market (Albrychiewicz-Słocińska and Robak 2017, pp. 147-161). HR specialists agree that those persons particularly value relationships with superiors. Young employees pay a lot of attention to their superiors' ability to appreciate employees and make them feel important for the implementation of organisational goals. In this context, appreciating employees for their good work must not be treated as a redundant measure or loss of time, because, apart from strengthening the employee-employer relationship, it also increases employee job satisfaction, engagement and loyalty to the company. Establishing good relationships with employees based on open communication by employers and frequent provision of feedback, and in particular appreciating the achievements of employees, are examples of good ways to ensure a friendly work atmosphere.

Currently, leading enterprises try to create the image of an attractive employer by building and implementing an effective employer branding strategy, both inside and outside the organisation. Building an employer brand that will not only attract the desired job candidates but also help keep talented employees for longer is becoming an essential challenge and at the same time – a necessity. Thus, creating the image of the employer of choice is increasingly often included in the range of practices supporting human resource management in organisations in the Polish market. The question is how the EB proposition in the labour market will change after the COVID-19 epidemic. It seems that the forecasted economic slowdown and increase in the unemployment rate will not eliminate the problems companies have with attracting and keeping valuable specialists. It should be expected the EB propositions will remain important and relationships with the superior will continue to play an important role among EVP preferences.

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The Investigation of Saving Habits of Generation Z's Young Adults

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Abstract

Generation Z presents people born after 1995 and is also called digital generation, generation of media and generation.com. Its members have specific attitudes and expectations as consumers, employees and citizens. They are the youngest consumers who participate on labour market. Also, they have specific savings habits and a level of financial literacy. To understand how members of Generation Z are saving, their attitudes towards saving and their own financial capacity, a research was conducted using a survey questionnaire on a suitable sample of 250 respondents, adult members of Generation Z born between 1995 and 2001. Examined variables relate to attitudes towards savings, their own financial capacity and tendency to save. It is concluded Generation Z has positive attitudes towards saving, believe they can make their own financial decision and have tendency to save. Most of Generation Z is saving and mostly by themselves, not in the bank. They are familiar with types of saving available on the market, but they do not use them on a larger scale. To raise the number of savings in banks and in general, and to increase awareness of saving between young adults of Generation Z it is necessary to enhance their knowledge about personal finances and saving strategies and to adjust saving offer according to their needs.

Keywords: Saving Behavior, Saving Habits, Generation Z, Young Adults

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Introduction

The generation is defined as groups of individuals with the same or similar traits (Berkup, 2014). So far, according to the period of time when they were born, five generations of people have been defined: Traditionalists, Baby Boomers, Generation X, Generation Y and, at the end, Generation Z, the centre of many modern research. They have specific attitudes and expectations as a consumers, employees and citizens (Gaidhani, Arora and Sharma, 2019). Presents people born after 1995 and is also called digital generation. They were born in the period of time when technological development was already in full swing and social networks are of great importance for communication and sharing information (Berkup, 2014). Accordingly, the best way to understand, communicate and make an impact on members of Generation Z are social networks (Center for Generational Kinetics, 2018).

Due to their efforts to understand and adapt to the rapidly changing environment, Generation Z represents the generation of the future. They have an educational plan and start their education at a younger age, hence they are exposed to a large amount of information ever since (Berkup, 2014). Moreover, they are aware of the importance of financial literacy and consider the implementation of financial education into the learning programmes crucial (Loveland, 2017). Furthermore, Generation

Z's members also have specific savings habits, a level of financial literacy and an attitude towards financial responsibility as well. To understand how members of Generation Z are saving, their attitudes towards saving and their own financial capacity, a research *Motives, Attitudes and Behavior of Generation Z in the Context of Savings* was conducted.

By the research conducted, attitudes towards saving, perceived financial capacity and tendency to save of Generation Z were investigated. Also, it was researched if they are familiar with the types of savings offered by financial institutions of the Republic of Croatia. Finally, it is analysed how the Generation Z are saving. Due to importance of saving for personal finances and standard of living for individual but also for the whole economy it is necessary to adopt savings habits at an earlier age. Accordingly, it is crucial to research how members of Generation Z are saving, the reasons of their saving and are they capable of saving and prone to saving. The oldest members of this generation are just finishing their education, entering the labour market and earning their own income. To improve the saving structure of a young people, increase their awareness of savings and introduce them savings products, it is necessary to explore their savings habits.

Members of Generation Z understand the importance of saving and they keep in mind the effect of purchase on the saving (TransUnion, 2017). While making financial decisions and, consequently, saving decisions, they mostly gather information through the conversation with their parents (UPCEA, 2019). Previous research has also concluded that members of Generation Z have specific savings goals and save for their further education, but also to secure financial stability in retirement (Center for Generational Kinetics, 2017).

However, most of the research were conducted in the United States and there are no enough relevant researches conducted about Generation Z in Europe and, consequently, in the Republic of Croatia as a member of the European Union. Also, the savings goals of Generation Z have not been sufficiently examined, but only a few of specific goals of saving have been identified. On the other hand, although previous research found that members of Generation Z are saving, their way of saving and familiarity with types of savings, as crucial factors of saving offer modelling, have not been adequately inquired into.

Therefore, the aim of the paper is to analyse the attitudes towards saving, tendency to saving and saving habits of Generation Z's young adults, on the market of the Republic of Croatia, as a member of the European Union. Also, the goal is to examine in details savings goals of Generation Z and whether its members understand importance of saving for retirement. Also, it is necessary to investigate how members of Generation Z save and whether they have knowledge of types of savings offered on the market of Republic of Croatia. By this insight the savings offer will be formed by financial institutions in the most efficient way consequently increasing the number of savings and raising awareness of saving in general.

Theoretical basis

Private savings is the main domestic source for founding of capital investments, the primary initiator of long term economic growth. It is also important for the financial stability of the household. The importance of saving is in ensuring a certain standard of living in the future, realization of the financial goals and creating of a fund for emergency and crisis (Barbić and Lučić, 2018). Due to importance of saving for the economy and personal finances, it necessary to examine Generation Z attitudes towards saving and whether they can understand importance of saving in the context of personal finances and, consequently, present and future consumption.

Generation Z's attitude and behavior is significantly affected by their financial literacy. They are aware of the necessity to avoid debt (Center for Generational Kinetics, 2017.) which has great impact on developing of positive attitudes in the context of savings. Furthermore, adopting of this mindset at an earlier age is also evident in earlier understanding of the importance of saving. When spending, members of Generation Z are considering the amount of money saved before they made purchase (TransUnion, 2017.).

Members of Generation Z, according to Chaston (2012), have optimistic views on their future financial situation (Vojvodic, 2018) and they are confident about their future financial stability (Nielsen, 2015).

They are also optimistic about their careers and believe that studying at universities and colleges is crucial for its development. Members of Generation Z start working at an earlier age, which enables them to acquire work habits earlier as well (Center for Generational Kinetics, 2017). Optimism and self-confidence in the context of making financial decisions and their own careers, as a result, leads to optimistic attitudes towards their own saving performance.

To explore the tendency for saving of Generation Z, it is extremely important to consider the influence of social factors on formation of their spending and savings decisions. The attitudes of parents and friends, as environmental factors, influence the financial decisions of Generation Z (Lincoln Financial Group, 2016). The parents present the most important social factor for Generation Z. Through conversation with parents, Generation Z gains insight into the possibilities and importance of saving, different ways of saving and eliminates any concerns about saving (UPCEA, 2019). Environmental factors such as friends or peers also influence on their saving decision through conversation, advice, but also through their own example (Lincoln Financial Group, 2016).

Members of Generation Z are characterized as experienced consumers and a rapidly maturing generation. Factors and conditions in the market, such as globalization, digitization, social networking, improving quality of life and government incentives, create motivation for Generation Z in the context of retirement savings (Reutova and Gorlovskaya, 2019). According to previous research, Generation Z members are already considering retirement and it motivates them for saving. They are aware of necessity of saving for retirement and need to be prepared in case state pension programs will not be in function. It is extremely important for Generation Z to start saving as early as possible, so they have sufficient time to raise funds until retirement (Center for Generational Kinetics, 2017). Considering, most of the research has been conducted on the United States market, it is important to investigate how Generation Z of the Republic of Croatia perceive the importance of saving for retirement.

According to previous research most of members of Generation Z are saving. Specifically, 83% of respondents were saving at the moment of research conducting and 52% of them were saving for specific goal. Furthermore, 35% did not have a specific goal of saving. For Generation Z saving presents the method of reaching goals that are determined (TransUnion, 2017) which is characterized as a positive saving habit. Although they strongly against borrowing, Generation Z still wants to own a house and a car, but also to provide their family financial stability. With high expectations, aspirations and distancing from borrowing, saving presents the way of achieving life goals (Synchrony Financial, 2018).

Members of Generation Z, are motivated for saving by a variety of life and financial goals. Therefore, to create the saving offer and to popularize the usage of savings among young adults of Generation Z, it is necessary to identify their savings goals, way of saving and to investigate what drives them towards saving.

Methodology and sample

Data used in a one-off descriptive research called *Motives, Attitudes, and Behavior of Generation Z in the context of saving* were collected between August and November 2019. The survey was conducted using a survey questionnaire on a suitable sample of 250 subjects represented by adult members of Generation Z born between 1995 and 2001. Of the total number of respondents, 69.2% were women and 30.8% were men. Also, more than half of the respondents, 52.4%, are resident in Zagreb, the capital of the Republic of Croatia. By age structure, most of the respondents were born in 2000, or 23.2% of them were 19 years old at the time of the survey. Considering the current employment status of respondents, 83.6% are students and 15.6% are employed. In other words, the current structure of employment following the age of the respondents who were currently from 18 to 24 years old. Also, the age structure following an educational structure according to which the highest percentage of respondents, 64%, have graduated the high school, 19.2% are undergraduates, 14.8% graduates and 2% have graduated the elementary school.

The variables examined in the survey relate to savings attitudes, attitudes toward their own financial capacity, and tendency to save (Table 1). The stated variables represent concise sets of statements that were measured by 7-point Likert-type scale, where number 1 represented disagreement with the

statement completely and number 7 agreed with the statement completely (1 - Strongly disagree, 7 - Strongly agree).

Table 1: Variables used in the study

Variables	MEAN	ST DEV
Generation Z attitudes towards saving		
Day-to-day action	**4,28**	**1,25**
Saving lifestyle	**4.55**	**0,96**
Generation Z attitudes towards their own financial capacity		
Subjective norms in the context of financial ability	**5,51**	**1,06**
Behavioural norms in the context of financial ability	**4,62**	**1,40**
Index of responsible financial behavior	**5.25**	**1,04**
Generation Z propensity to save		
Descriptive norms in the context of saving related to parents	**5,45**	**1,41**
Descriptive norms in the context of saving related to friends	**4,37**	**1,33**
Prescriptive norms in the context of saving related to parents	**5,65**	**1,27**
Prescriptive norms in the context of saving related to friends	**4,54**	**1,45**
Behavioural intentions in the context of saving	**5,45**	**1,54**
Self-efficacy in the context of saving	**5,62**	**1,30**
Controllability in the context of saving	**4,87**	**0,84**

Source: Author's own figure

Attitudes toward saving were examined using sets of statements relating to day-to-day activities in the context of saving and saving as a lifestyle (Dholakia et al., 2016). Also, a semantic differential, a scale consisting of a series of seven-step agreement scales on the far ends of which are adjectives of the opposite meaning (Marušić, 1992), was used. This way, the importance of saving and attitudes towards saving formed by the members of Generation Z has been examined (Ajzen, 2002).

Generation Z's perceptions about financial capacity were examined using attitudes (Barbić, Lučić & Chen, 2019; Ajzen, 2002, 2006). This set of statements is divided into statements regarding subjective and behavioural norms in the context of financial capacity and statements relating to the index of responsible financial behavior.

Generation Z's tendency to save has been studied by a set of statements relating to descriptive and prescriptive norms regarding the parents and friends of the respondents. Descriptive norms represent an individual's perception of the ordinary behavior of people in their environment in a given situation, while prescriptive norms refer to an individual's perception of behavior that people in their environment will approve or disapprove (Cialdini, Kallgren, & Reno, 1990). Statements for measuring tendency to save are also relate to the behavioural intentions, self-efficacy, and controllability of respondents in the context of saving (Ajzen, 2006).

By the conducted research the goals and the way of saving of Generation Z were also researched. It was examined whether the members have specific or unspecified savings goals and if they have specific goals, are they long-term or short-term. Also, it was examined whether the respondents regularly save, what percentage of monthly income they save and where they save.

Results

Generation Z members' savings attitudes were examined using two sets of statements. The first set refers to the day-to-day activities of respondents related to saving, while the second set refers to saving as a lifestyle (Dholakia et al., 2016) (Table 2).

Table 2: Generation Z attitudes towards saving

Generation Z attitudes towards saving	MEAN	MOD	ST DEV	ST ERR
Day-to-day action				
I keep a careful watch over my spending on a daily basis.	4,72	5	1,49	0,09
I do not spend money thoughtlessly, I would rather save it for a rainy day.	4,34	5	1,51	0,10
Putting money into personal savings is a habit for me.	4,21	5	1,89	0,12
I actively consider the steps I need to take to achieve my personal savings goals.	4,62	6	1,73	0,11
I like to discuss the topic of saving money with my family and friends.	3,50	4	1,84	0,12
Saving lifestyle				
I usually save money without having a specific goal in mind.	3,74	4	1,89	0,12
The goal of saving money is always at the back of my mind.	4,33	3	1,81	0,11
Saving money on a regular basis should be an important part of one's life.	5,37	6	1,43	0,09
Saving money is like a lifestyle, you have to keep at it.	4,76	5	1,55	0,10

Source: Author's own figure

Regarding statement related to day-to-day savings activities, 58.4% of respondents rate the statement they carefully control their spending on a daily basis with high degrees of agreement, while 56% of respondents chose high levels of agreement with the claim they actively consider the steps they must take to achieve saving goal. The statement saving on a daily basis should be an important part of everyone's life, 52.4% of respondents rated with a high degree of agreement, 6 or 7. Another important statement refers to saving as a way of life which is rated by 57.6% of respondents with a high degree of agreement, indicating that the majority of respondents agree with the stated statement (Table 2).

Furthermore, using semantic differential (Ajzen, 2002) for analysing attitudes considering two opposite adjectives, 69.6% of respondents strongly agree saving money is useful, 64.4% confirm saving is positive, and 68% strongly agree that saving money is good.

The set of claims relating to financial capacity (Barbić, Lučić, and Chen, 2019; Ajzen, 2006) is divided into statements regarding subjective and behavioural norms in the context of financial capacity, and statements regarding to the index of responsible financial behavior (Table 3)

Table 3: Generation Z attitudes towards their own financial capacity

Generation Z attitudes towards their own financial capacity	MEAN	MOD	ST DEV	ST ERR
Subjective norms in the context of financial ability				
I consider myself qualified to manage my financial situation and financial decision-making.	5,14	7	1,69	0,11
I think it is extremely important to create a financial plan for the future.	5,72	7	1,22	0,08
I think it is extremely important to adhere to personal financial budget.	5,68	7	1,21	0,08
Behavioural norms in the context of financial ability				
I feel free to make my own financial decisions.	5,47	7	1,51	0,10
My financial situation is entirely within my control.	4,36	5	1,97	0,12
I have the necessary resources and means to achieve financial success.	4,03	4	1,68	0,11
Index of responsible financial behavior				
I live in accordance with my financial possibilities.	5,44	7	1,38	0,09
I pay my monthly bills before on their due date.	5,66	7	1,47	0,09
I try to anticipate and plan future financial income and expenses.	5,24	5	1,47	0,09
In everyday purchases of consumer goods, I am informed to make rational decisions that are in line with my financial possibilities.	5,28	6	1,45	0,09
I try to be informed and educated in the field of successful management of personal finances.	4,31	5	1,71	0,11
When buying an item, the first think I think about is whether I can afford it.	5,60	7	1,52	0,10

Source: Author's own figure

Furthermore, 70% of respondents with high degrees of agreement, from 5 to 7, rated themselves as being qualified to manage their own financial situation and make their own financial decisions. Moreover, 76.8% of respondents rated with a high degree of agreement the statement they were free to make their own financial decisions. Also, it is observed how respondents care about their future finances (Table 3).

To investigate Generation Z attitudes towards saving, statements related to the descriptive and prescriptive norms in the context of saving regarding parents and friends of the respondents and statements related to behavioural intentions, self-efficacy, and controllability in the context of saving were used (Table 4).

Table 4: Generation Z tendency to save

Generation Z propensity to save	MEAN	MOD	ST DEV	ST ERR
Descriptive norms in the context of saving related to parents				
My parents are saving money	5,32	7	1,74	0,11
My parents talk about saving.	5,06	7	1,76	0,11
My parents think saving is a good idea.	5,96	7	1,32	0,08
Descriptive norms in the context of saving related to friends				
My friends are saving money	4,28	5	1,44	0,09
My friends talk about saving.	3,81	4	1,79	0,11
My friends think saving is a good idea.	5,02	5	1,50	0,10
Prescriptive norms in the context of saving related to parents				
My parents would support my intention of saving money.	6,37	7	1,05	0,07
My parents think I should start saving money.	5,37	7	1,64	0,10
My parents would like me to start saving money.	5,20	7	1,75	0,11
Prescriptive norms in the context of saving related to friends				
My friends would support my intention of saving money.	5,38	7	1,55	0,10
My friends think I should start saving money.	4,23	4	1,72	0,11
My friends would like me to start saving money.	4,00	4	1,79	0,11
Behavioural intentions in the context of saving				
I plan to start saving money in the next 3 months.	5,25	7	1,76	0,11
I will try to save some money in the next 3 months.	5,65	7	1,52	0,10
Self-efficacy in the context of saving				
I am confident that I will be able to save some money in the next 3 months.	5,60	7	1,60	0,10
I am confident that I will be able to overcome obstacles that may make it difficult for me to save.	5,34	7	1,47	0,09
I believe I have the ability to save money.	5,92	7	1,29	0,08
Controllability in the context of saving				
Whether or not I will be able to save money in the next year depends only on me.	5,80	7	1,39	0,09
I can decide by myself how to spend or save money.	6,06	7	1,15	0,07
Saving money is not under my control.	2,76	1	1,88	0,12

Source: Author's own figure

The parents of the respondents save and talk more about saving than their friends. Furthermore 35.2% of respondents confirmed they strongly agree with the statement their parents are saving, while a significantly smaller percentage of respondents strongly agree with the statement that their friends are saving. Moreover, twice as many respondents, 47.2%, strongly agree with the statement that their parents think saving is a good idea while, on the other hand, only 20.8% of respondents strongly agree with the statement that their friends think that saving is a good idea (Table 4).

There is a similar trend in prescriptive norms in the context of saving. Twice as many respondents, 66.8%, strongly agree with the statement that their parents would support them in the intention of saving. Due to the results stated, that respondents have or expect more support from their parents than from their friends in the context of saving (Table 4).

Attitudes related to behavioural intentions, self-efficacy, and controllability in the context of saving were also rated with high degrees of agreement. Therefore, 67.6% of respondents rate the statement they have a plan to start saving in the next 3 months with high degree of agreement. Also, 41.2% of respondents completely agree they will try to save some money in the next 3 months. Additionally, 42% of respondents are strongly convinced they will be able to save some money in the next 3 months. Likewise, 72% of respondents rate with a high degree of agreement the statement they would be able

to overcome obstacles that may occurred during saving and 85.2% chose a high degree of agreement for the statement they believed they had the ability to save money. Finally, 43.6% of respondents strongly believe their savings will depend only on themselves, while 48.4% strongly believe they can decide how to save or spend their money. Also, 59.2% rated the statement their own savings is not under their control with a high degree of disagreement. Therefore, the respondents consider the saving is completely under their control (Table 4).

Of the total number of respondents, 71.2% confirmed they are currently saving, while the remaining 28.8% confirmed they are not saving. For analysing the significance of differences between the attitudes of Generation Z members who are saving and those who are not, a t-test for large independent samples was conducted. In the analysis were included twelve dependent variables represent previously examined statements and one independent variable, whether the respondent was saving at the time of the survey or not.

Table 5: T-test results

Dependent variables	Independent variable	MEAN	STDEV	p value
Day-to-day action	Saves	4.65	1.07	0.0000000000007
	Do not save	3.35	1.19	
Saving lifestyle	Saves	4.74	0.92	0.0000001417985
	Do not save	4.06	0.87	
Subjective norms in the context of financial ability	Saves	5.71	0.96	0.0000253031181
	Do not save	5.03	1.15	
Behavioural norms in the context of financial ability	Saves	4.81	1.31	0.0015293442438
	Do not save	4.15	1.50	
Index of responsible financial behavior	Saves	5.48	0.88	0.0000025255817
	Do not save	4.70	1.19	
Descriptive norms in the context of saving related to parents	Saves	5.60	1.32	0.0105322286645
	Do not save	5.06	1.55	
Descriptive norms in the context of saving related to friends	Saves	4.53	1.30	0.0043166180877
	Do not save	3.99	1.35	
Prescriptive norms in the context of saving related to parents	Saves	5.70	1.19	0.3596868451981
	Do not save	5.52	1.46	
Prescriptive norms in the context of saving related to friends	Saves	4.56	1.46	0.7043688711076
	Do not save	4.48	1.43	
Behavioural intentions in the context of saving	Saves	5.80	1.34	0.0000002227832
	Do not save	4.59	1.65	
Self-efficacy in the context of saving	Saves	6.01	1.01	0.0000000000771
	Do not save	4.66	1.43	
Controllability in the context of saving	Saves	4.95	0.83	0.0176215868949
	Do not save	4.69	0.76	

Source: Author's own figure

To examine the significance of the differences, a theoretical significance level, α, of 5% was considered. According to t-test, there is a significant difference between the attitudes towards saving, financial capacity, behavioural intentions, self-efficacy and controllability in the context of saving. Also, there is a significant difference between attitudes towards descriptive norms related to parents and friends in the context of saving, while there is no significant difference between attitudes towards prescriptive norms related to parents and friends (Table 5).

According to the survey, most respondents are currently saving and 45%, save up to 20% of their monthly earnings, while 35.2% save between 20% and 40%. By researching saving goals, 63.5% of respondents confirmed they save so in the future they would have more money for their needs. In other words, they do not have a specific savings goal. Furthermore, 62.1% of respondents save money so they can buy something specific in the near future, for example, to go on a short trip, buy clothes, shoes

or a mobile phone, and 57.3% of respondents save money for contingencies. Finally, 53.6% of respondents save money so they can buy something specific in the distant future, such as car, apartment or house. Besides, 49% of them save for travel as long-term goal, 42.3% for education, while 35.6% save for house or car. Additionally, 19.1% saves for starting their own business and 9.8% for retirement.

On the other hand, 71.2% of those respondents who are not currently saving consider specific goals, such as purchase in the distant future as encouraging factor that could motivate for saving. Furthermore, 49.2% of the them stated purchase of an apartment or house as a long-term goal that would encourage them to save, while 46.8% stated a travel. Also, 45.2% cited purchase of a car, 37.6% education, 23.3% starting of their own businesses and 11.2% saving for retirement as a goal that will encourage them for saving.

Most of respondents confirmed they were saving on their own. In other words, Generation Z do not primarily save money in banks (Figure 1.).

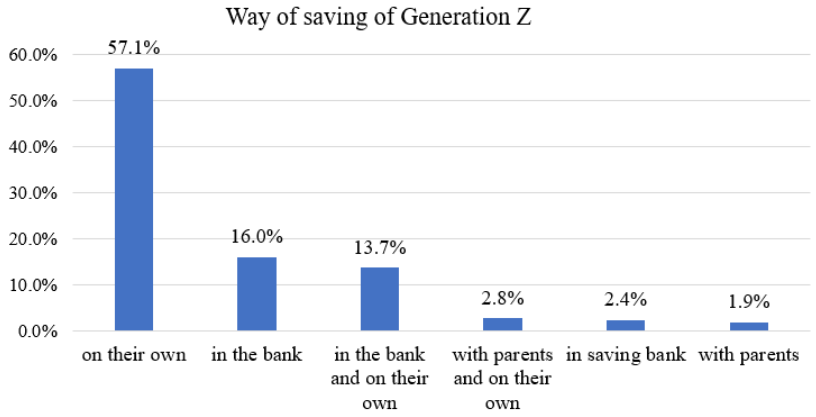

Source: Author's own figure

Figure 1: Way of saving of Generation Z

Most of Generation Z is familiar with the types of saving available by the Croatian National Bank. But even though they are familiar with them, they do not make extensive use of them. The largest number of respondents, 67.1%, heard about the types of savings they had when talking to their family, 65.3% through the media, 41.4% at school or college and 23.9% when talking with friends.

Discussion

By the conducted research, it is concluded how members of Generation Z have positive attitudes towards savings. They believe saving is useful, good, positive and gives them pleasure. In addition to careful control of their spending, members of Generation Z actively consider steps they must take to achieve their saving goals. Thus, Generation Z monitors the impact of consuming on saving (TransUnion, 2017). The members of Generation Z perceive saving as a lifestyle and they are aware of the importance of its implementation in the daily activities. Hence, Generation Z's attitudes indicate their willingness to save and consequently increase savings of young adults of Generation Z.

Observing the attitudes towards Generation's Z own capacity to make financial decisions and their understanding of the importance of financial security in the future, it can be concluded that Generation Z considers themselves capable of making their own financial decisions and qualified to manage their own financial situation. They care about their financial future and understand the importance of creating of a financial plan. Stated results follows previous findings about Generation Z members who are confident in their financial future (Nielsen, 2015). Therefore, confidence in their own financial capacity leads to a belief in their own savings performance. So, investment in Generation Z financial literacy is crucial for matching of perceived and real financial capacity.

In the context of the saving tendency of Generation Z, it is observed that parents have bigger influence on members of Generation Z than their friends. So, parents are saving more and talking about saving in a larger scale. Also, members of Generation Z have or expect more support in the context of saving from parents than friends. These results are following previous conclusion by which the most important environmental factor for Generation Z are parents or family. Also, it is confirmed that members of Generation Z mostly discuss about savings with their parents (Center for Generational Kinetics, 2017; UPCEA, 2019). So, to encourage Generation Z to save it is necessary to educate and inform their parents about benefits of saving for their children.

Members of Generation Z plan and believe they are capable and efficient and they will be able to save a certain amount of money. By conducted research it is confirmed that members of Generation Z believe they save a sufficient amount of money every month and are effective in the context of savings (Nielsen, 2015). Therefore, it is necessary to present them the full potential of savings, so they could achieve their goals and maximize their benefits through the saving.

Most of Generation Z is currently saving. According to conducted t-test it can be concluded there is a significant difference between attitudes towards savings, their own financial capacity, attitudes regarding descriptive norms related to parents and friends, behavioural intentions, self-efficacy, and controllability of saving of respondents who are saving and who are not. On the other hand, there is no significant difference between attitudes about prescriptive norms. So, it can be concluded there is no significant difference between attitudes towards behavior in context of saving that parents or friends will whether approve or not.

Generation Z is equally saving for specific and unspecified savings goals. For members of Generation Z saving represent the way of reaching the goals and reflect on their future (TransUnion, 2017). When saving for their long-term goals, they are saving for travels, education, buying an apartment, home or car, starting their own business and retirement. It is not following previous studies according to which Generation Z is aware of the importance of saving for retirement and dedicate to saving for retirement as early as possible. In order to raise the awareness of necessity of saving for retirement among the young people in the Republic of Croatia, it is crucial to educate them to start saving as soon as possible. Otherwise, they could face a sharp decline in their living standard in old age.

Most of the members of Generation Z who are saving do not make savings in banks, but on their own. However, they are known to the types of savings offered to them by banks largely and they are most likely to be heard about them during conversation with their parents and through the media. Therefore, to increase the number of savings of Generation Z in banks, it is necessary for banks to communicate with Generation Z members and their parents, who would pass on information about particular types of savings, savings methods and savings opportunities to their children. Furthermore, financial institutions to communicate with members of Generation Z and present their savings products to them, they must use the most common type of communication for Generation Z, social networks. This way, banks are able to provide information about the types of savings to members of Generation Z, while, on the other hand, members of Generation Z can provide banks feedback on their own perceptions of each type of savings.

Furthermore, in order to bring Generation Z members closer to savings products and savings types, it is necessary to adjust savings products to their specific needs. In other words, since Generation Z make extensive use of mobile applications for money management (Business Insider Intelligence, 2019), it is extremely important for banks to upgrade their mobile applications constantly to present their savings products to Generation Z and facilitate their usage.

By advertising in media and informing in affiliates, banks can present the types of savings they offer and their benefits to the parents of Generation Z. If parents understand and perceive the importance of the advertised types of savings, they will, through their own example and through the conversation, show and inform the children about importance and benefits of types of savings, but also about importance of saving in general. Because parents strongly influence their children's behavior in the context of making financial decision and saving, they can directly influence on their knowledge of types of savings and increase their savings in general.

Limitation and Conclusion

Previously research on saving habits of Generation Z were mainly conducted on the USA market. On the other hand, in the Republic of Croatia, the same topic has not been satisfactorily covered which represent the limitation of the research. Furthermore, Generation Z living in the USA is more aware of importance of saving for retirement than the one living in the Republic of Croatia. Therefore, it is highly important to strengthen education and raise awareness of saving for retirement to avoid possible disruption of living standards once members of Generation Z will retire.

Generation Z has specific saving habits and behavior in the context of saving. They have positive attitudes towards saving and believe it should be an integral part of life. They perceive themselves capable of making their own financial decisions and they are described as determined, confident and optimistic in the context of their financial future. Also, members of Generation Z believe they can decide if they will save or spend their money. Furthermore, they are prone to saving and most of them are saving.

Members of Generation Z save for both, specific and unspecified savings goals. Among specific goals those who are more common, are related to purchase in the near future. On the other hand, members who are not saving, as goals that would encourage them to save are pointing out those goals related to purchase in the distant future. Besides impact of parents, friends and media on their saving goals, the impact of education is necessary as well.

The oldest members of Generation Z are in their early twenties, have just finished their education and entering the labour market. They are starting to earn their own income. Considering, they need to be focused on the importance of saving and what they can achieve with it. Therefore, education needs to strengthen the awareness of the importance of saving for retirement and other saving goals related to financial stability in the future.

Generation Z is mostly saving on their own, not in the bank. They are familiar with types of saving available on the market and collect the information about saving by talking to their parents and through the media. Although they are familiar with the types of saving, they do not use them on a larger scale. Therefore, to maximize usage of different types of saving, the key is presentation of saving types and communication between banks and members of Generation Z and their parents, as well as educating of Generation Z about savings in general. Banks need to advertise saving products through social media and continuously work on developing mobile money management applications through which these products are available to Generation Z.

To raise awareness of saving among Generation Z and to increase the number of savings in banks and in general, it is necessary to invest in curriculum of educational institutions. Therefore, it is necessary to educate Generation Z about personal finances and to explore their saving goals in detail. Also, it is crucial to detect which factors encourage them to save in order to shape savings offer by their preferences and in that way achieve benefits for the individual and the economy as a whole.

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Modern Feed-Processing Equipment for Small Farming in The Agricultural Business

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Abstract

This paper discusses the state of feed production in Russia. The effective development of animal husbandry directly depends on the fodder base, featuring a balanced diet for animals according to the content of nutrients. Currently, large agricultural organizations have seen trends in the separation of feed production from animal husbandry, which prompted the development of international feed trade. However, the purchase of feed from the outside is not profitable for most of the small farming enterprises in Russia; organizing their own feed preparation from crop production is a more effective solution. As for the technical provision of fodder preparation, various technologies are currently used that are aimed at the maximum preservation of nutrients.

Keywords: Agribusiness, Animal Husbandry, Feed Choppers, Fodder Preparation.

Introduction

The article discusses the need for the introduction of modern technologies for the preparation and feeding of fodder to increase production of livestock products. A feasibility study of the effectiveness of the use of feed preparation machines of domestic brands was carried out. The possibility of entering the foreign market with feed preparation equipment was considered.

Materials and Methods

The main factors affecting feed preparation are considered. The qualitative characteristics of the main domestic brands of animal feed choppers are analyzed. The level of livestock production development was predicted for the year of 2025according to the trend line equation, which would require an increase in the production of feed preparation equipment.

Research Results and Discussion

Based on benchmarking and the assessment of various production lines by the total score, it was found that the most preferred option is the proposed feed preparation line (TL3), developed by scientists at the Nizhny Novgorod State University of Engineering and Economics, the payback period will not exceed 4.6 years. To expand the sales of equipment to small farms, it was proposed to use not only the domestic market, but also the foreign one.

For small farms, the most profitable option is to purchase a production line for the preparation of dry, loose, wet loose bulk fermented feeds with a capacity of up to 1 ton per hour which are more competitive than their analogues.

The effective functioning of the agricultural sector largely depends on the mechanism of the agricultural production management system, adapted to modern economic conditions. An analysis of the development strategy of the agricultural company shows that ensuring the implementation of the goals depends on the awareness of the leadership of the role of the technological strategy and its compliance with the level of progress.

At the same time, it should be noted that domestic management is characterized by a lack of a clear understanding of the economic part of the technological strategy and its place in the agricultural production management system. The strategic management of technological development is carried out, as a rule, intuitively and is not always linked to the competitive advantage of the enterprise and its dynamic development. Therefore, the strategic management of technological development in modern conditions is the most important factor affecting the final result of the activities of each agricultural enterprise. Only a focus on advanced technologies will ensure success in the markets, due to a significant improvement in the quality characteristics of the product, for which you can get a high price. Regardless of the specific direction of the regional or state economy, all managers must rely on innovation, as new technologies become the most important factor in the increaseof productivity and competitiveness. Without a scientifically sound and balanced state investment policy and system mechanisms guaranteeing investment and scientific and technical support for production, it is impossible to turn the agricultural sector of the economy into a dynamically developing and efficiently managed industry.

At the same time, the continuity of innovation activity related to the introduction of process innovations (modern technological lines, production technologies and automated systems) should be given special importance in agricultural activity, which allows to reduce production costs, labor costs, optimize the number and improve the quality of products.

In modern conditions, agriculture solves an important problem in animal husbandry providing the population with products of their own production. The increase in livestock production requires the introduction of the latest technologies that contribute to lower labor costs and funds for its production. An extremely costly element of the technological operation is the preparation and distribution of feed.

Historically, the basis of the agricultural sector is grain production. Grain stocks in international practice are considered, first of all, as strategic food reserves. The food security and global prestige as a whole depend on the level of development of the country's grain economy.

At the same time, grain is the most important part of the animal diet, which usually makes up 1/3 of the total diet. Science has repeatedly proved that the grinding of feed and grain helps to accelerate the digestion process and the absorption of nutrients.

Currently, considerable experience has been gained with the use of feed mixers in many domestic farms and significant results have been obtained: in dairy farms, average daily milk yields increase in the range of 19–26 kg with an improvement in product quality.

In the practice of balancing feeding diets, it is extremely difficult to achieve their full balance, this requires the use of mathematical dependencies for standardized components, as well as accounting for losses arising from deviations from the norms for individual components.

The economic feasibility of preparing feed in a farm is not in doubt, since this process is associated with low transport costs, the efficient use of its feed base, and the ability to quickly change the diet, one of the main components of which is grain.

In these conditions, in order to increase the efficiency of the livestock industry, it is extremely important to choose a technical device that performs operations on the preparation and feeding of fodder. For these purposes, domestic AKM-9, ISRK, KIS, KRFchoppers-mixers-distributors,KR-03 and KR-01 grinders (BIO RESOURCE of the Chelyabinsk Region) IK-07U and IKK "Kubanets" (ZAO Avtomash, Moscow), IKP-1.5root-cutting of packing and machine-building holding (Voronezh region), as well as mixers of Ukrainian (Ikor-5) and Belarusian manufacturers (Elikor 1-4 M) can beused.They, like domestic choppers, have low productivity and are intended to produce a porridge-like product. Most of them chop the tubers to a pulp state, while in screw choppers, a large amount of juice is released due to squeezing, which affects the quality and nutritional value of the feed.

Therefore, the design of disk grinders with plate knives that cut feed into slices are most promising today. A similar type of equipment was inventedby the scientists from the Nizhny Novgorod State University of Engineering and Economics: a technological line for preparing dry, loose, wet loose fermented feeds with a capacity of up to 1 t per hour. The technological line of preparation and distribution of feed includes a number of machines which givea certain productivity. Arrangement and installation of them in a certain sequence provides a continuous process of work and ensures constant cycle of operation.

In order to assess the prospects for the production and sale of feed choppers for households and farms of the Russian Federation, it is necessary to assess the composition of the livestock and the state of production of livestock products (Table 1).

Table 1: Dynamics of the number of cattle and pigs in Russia

Years	Large cattle, millionheads	Pigs, millionheads	Total livestock, millionheads
2010	19,8	17,3	25,8
2014	18,9	19,5	26,4
2015	18,6	21,4	27,2
2016	18,3	21,9	27,4
2017	18,3	23,1	28,2
2018	18,1	23,7	28,2
Growthrate	91,4	137	109

Analyzing table 1, it can be noted that in 2018, compared with 2014, there was a decrease in the number of cattle by 8.6% and an increase in the number of pigs by 37%. In general, the total number of livestock increased by 9% due to the intensive growth in the number of pigs. It should also be noted that due to the growth of animal productivity, production increases, which is undoubtedly associated with an improvement in the quality characteristics of the feed base (Table 2).

Table 2: Dynamics of agricultural production by categories of farms in Russia, billion rubles

Name	2010	2014	2015	2016	2017	2018	Growthrate,%
Farmsofallcategories							
Agriculturalproducts	2465,4	4031,1	4794,6	5112,3	5109,5	5119,8	207,7
including: livestock	1375,2	2044,4	2307,3	2402,0	2509,8	2550,8	185,5
Agriculturalorganizations							
Agriculturalproducts	1102,9	2083,0	2588,6	2818,4	2818,5	2819,6	255,6
including: livestock	644,6	1142,3	1324,7	1390,0	1482,2	1532,3	237,7
Households							
Agriculturalproducts	1185,7	1538,4	1654,9	1659,2	1655,4	1687,7	142, 3
including: livestock	678,9	807,6	873,5	890,3	891,2	877,0	129,2
Peasant (farm) enterprises[2]							
Agriculturalproducts	176,8	409,7	551,1	634,7	635,6	612,5	346,4
including: livestock	51,7	94,5	109,1	121,7	136,4	141,5	273,7

The data in table 2 indicate that livestock production in 2018 compared with 2010 increased in all categories of farms. In the households of the past two years, production has declined slightly, but compared to the level of 2010 it increased by almost 30%. In farms, steady dynamics of annual growth is observed, the total increase in gross output amounted to almost 90 billion rubles compared to the base year or by more than 2,7 times. High growth rates in the livestock industries indicate the possibility of increasing the demand for feed chopping equipment in Russia, both of high productivity and low productivity for small farms.

Having considered the dynamics of livestock development in farms for 2005 - 2018 and given the high coefficient of determination coefficient R2 = 0.9166, one can predict the planned level of development of livestock production for 2025 using the trend line equation y = 20.007x + 16.429

Table 3: Linear statistics of the dependence of the value of gross livestock production for 2005-2018

Name	Indicatorvalue	Name	Indicatorvalue
Coefficient C1	20,00714286	Coefficient C2	16,42857143
Standard error values for the coefficient	2,699571017	Standard error values for the coefficient	12,07284861
Coefficientofdetermination	0,91656423	Standarderrorfor*y*	14,28478711
F statistics	54,92633644	Degreeoffreedom	5
Regression sum of squares	11208,00143	Residualsumofsquares	1020,275714

Forecast for 2025 ry = 280.1 + 16.429 = 296.53 billion rubles.

However, given that the indicators of 2005, 2010, 2018 below the indicators of the trend line, it is necessary to determine the average deviation of these indicators from these indicators of the trend line.

$y(2005) = 20{,}007 + 16{,}429 = 36{,}436$, $\Delta y = 36{,}436 - 20{,}3 = 16{,}136$

$y(2010) = 40{,}014 + 16{,}429 = 56{,}443$ $\Delta y = 56{,}443 - 51{,}7 = 4{,}743$

$y(2010) = 140{,}049 + 16{,}429 = 156{,}478$ $\Delta y = 156{,}478 - 141{,}5 = 44{,}978$

$$\Delta y_{cp} = \frac{16{,}136 + 4{,}743 + 44{,}978}{3} = 21{,}95$$

$$x_{CP} = \frac{20{,}3 + 51{,}7 + 94{,}5 + 109{,}1 + 121{,}7 + 136{,}4 + 141{,}5}{7} = 96{,}46 \text{ billion rubles.}$$

$$K = 1 - \frac{21{,}95}{96{,}46} = 0{,}772$$

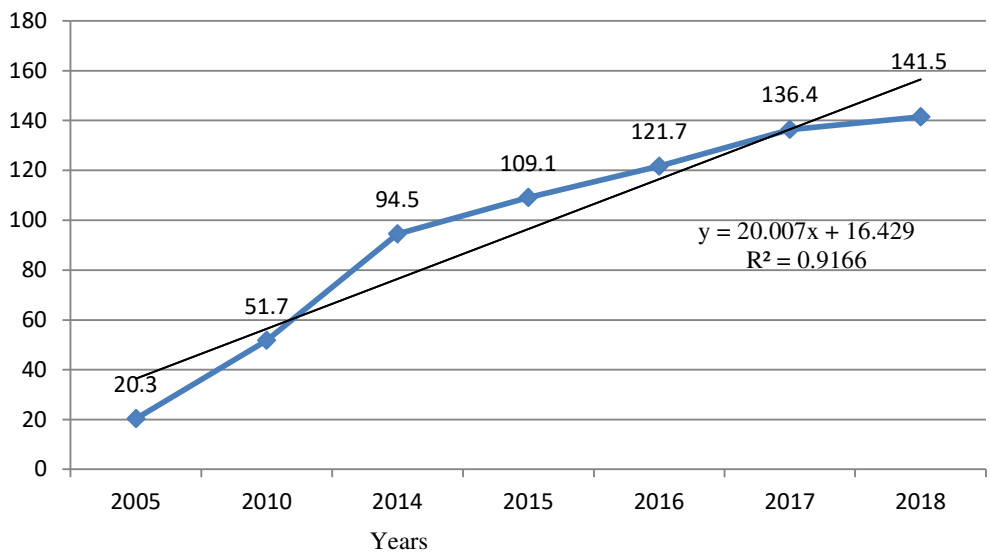

Figure 1: Dynamics of livestock production in Russian farms in 2005 – 2018

The forecast indicator taking into account deviations from the trend line for 2025 will be y = 296.53y = 296.53 · 0.772 = 228.92 billion rubles. Based on the presented dynamics of the cost of livestock production (Fig. 1), the growth rate in 2025 in comparison with 2018 will be 161.8%, which indicates the active development of livestock farming in Russia.

The dynamics of the share of farms in the general structure of farms of all categories for 2015-2017, presented in table 4, showed that the share of peasant farms in the total number of farms is insignificant, but increased by 1.6 percentage points. It also creates favorable opportunities for expanding chopper sales.

Table 4: Dynamics of the proportion of farms of all categories in total

Name	years			Deviation (+, -)
	2015	**2016**	**2017**	
Farmsofallcategories,%	100	100	100	
including:				
agriculturalorganizations,%	51,5	52,5	52,7	1,2

households,%	37,4	35,4	34,6	-2,8
peasant (farm) enterprises,%,	11,1	12,1	12,7	1,6

The federal scientific and technical program for the development of agriculture for 2017-2025 is aimed at ensuring the growth of agricultural production, including through the use of technologies for the production of high-quality feed, feed additives for animals, processing and storage of agricultural products, raw materials and food. At the same time, a decrease in the level of import dependence due to the introduction and use of technologies for the production of high-quality feed and feed additives for animals should be at least 25%.

In 2018, 1485,310 grinders for coarse and succulent feed were sold to domestic agricultural producers, which is 329,274 grinders more than in 2017 or an increase of almost 30%. This increase shows that the demand for this equipment is growing. This is due, first of all, to an increase in the production of agricultural products in animal husbandry, which directly depends on the feed preparation technology used, which ensures its quality.

The Russian market is represented by a variety of different types of feed choppers, models differ in power, size, are divided into portable and stationary, vertical and horizontal mixers, and also differ in the performance and the duration of the cycle.

Consider the technical and economic indicators of the main types of food choppers sold in Russia and compare with the indicators of the proposed equipment developed at the Nizhny Novgorod State University of Engineering and Economics.

Table 5 : Comparative analysis of the main domestic brands of animal feed choppers

Name of the chopper	**Manufacturer**	**Price, rub (estimated indicator)**	**Electricity consumption, sq / h (estimated indicator)**	**Netpower, W**	**Weightkg**	**Performance**		**Total score**
						Roots	**Corn**	
KP-03	OOO Technomash, Chelyabinsk	3200 (1)	0,9 (1)	900 (1)	11 (0,72)	900 (1)	300 (0,6)	5,32
Cyclone IZKB-2	OOO Cyclone,St. Petersburg	5690 (0,56)	2, 0 (0,45)	2000 (0,45)	22 (0,36)	400 (0,44)	400 (0,8)	3,06
Optimus 3 in 1	OOO FermerPlus, Miass	6080 (0,52)	1,2 (0,75)	1200 (0,75)	10 (0,9)	280 (0,31)	155 (0,31)	3,54
Niva IK-07U	ZAO Avtomash,Moscow	3200 (1)	0,9 (1)	1100 (0,82)	8 (1)	600 (0,66)	250 (0,5)	5,98
IZK-500 M "Kubanets"	ZAO Kuban Elektromash, Krasnodar region	16500 (0,01)	2,0 (0,45)	2000 (0,45)	50 (0,16)	300 (0,33)	500 (1)	2,4
DKU 03	ZAO Avtomash,Moscow	23000 (0,139)	1,6 (0,56)	1600 (0,56)	45 (0,17)	500 (0,55)	300 (0,6)	3,57

Based on table 2 of the assessment of the total score for each indicator in the context of feed choppers, the advantages of the feed chopper Niva IK 07U are obvious in comparison with analogues. This equipment is preferable to the others at a price of 3200 rubles, because of electricity

consumption. At the same time, with the lowest weight, its useful power amounts to 1100 watts, which is significantly lower than analogues. The total score is 5.98, which is higher than that of analogs by 0.66-3.58 points.

Using benchmarking, which is a way to study the activities of business entities, especially their competitors, in order to identify sources of competitive advantage, increase competitiveness and formulate effective business strategies, the competitive advantages of equipment developed at Nizhny Novgorod State University of Engineering and Economics were determined. It is benchmarking that allows you to develop new strategies for success, based on already gained experience.

We will consider various production lines for feed grinding, including using the Niva IK 07U feed chopper and the feed preparation line developed at the Nizhny Novgorod State University of Engineering and Economics. A comparative analysis of the proposed equipment is presented in table 2.

Table 6: Comparative analysis of the technical and economic efficiency of the feed preparation machines (in 2017 prices)

Indicators		**Carrying amount*B*, RUB (estimated indicator)**	**Weight*M*, kg (estimated)**	**Electricity consumption qE, kW · h / t (estimatedindicator)**	**Productivity$W_{ЭК}$, t / h (estimated indicator)**	**Installed power P, kW (estimated indicator)**	**Occupied area Snom., m^2 (estimated indicator)**	**Totalscore**
Values for the samples of the compared equipment	KK-2D unit loading system (TL1, TL2)	260000 (1)	2530 (1)	9,8 (1)	1,96 (0,85)	24,5 (1)	21 (1)	5,85
	advancedloadingsystem (TL3)	272000 (0,95)	2549 (0,99)	9,8 (1)	2,3 (1)	24,5 (1)	21,1(1)	5,94
	DKR - 0.3 (TL1, TL2)	46000 (0,76)	90 (0,83)	10 (0,5)	0,3 (1)	3 (0,5)	0,3 (0.73)	3,32
	DZ with rotor-fan (TL3)	35000 (1)	75 (1)	5(1)	0,3 (1)	1,5 (1)	0,22 (1)	6
	IKP-1,5 (TL1)	9500 (0,33)	21 (0,3)	3 (0,21)	0,5 (0,65)	1,5 (0,33)	0,22 (0,45)	2,27
	Niva IK-07U (TL2)	3200 (1)	8 (1)	0,9 (0,72)	0,6 (0,78)	1,1 (0,45)	0,1 (1)	5,6
	A new version of the root crop chopper (TL3)	12000 (0,26)	33 (0,24)	0,65 (1)	0,765 (1)	0,5 (1)	0,19 (0,52)	4,02

	SPP-1600 (TL1, TL2)	1200000 (0,54)	1170 (1)	1,57 (0,86)	7 (0,7)	11 (0,9)	3,92 (1)	5,0
	Mixer-fermenter (TL 3)	650000 (1)	1220 (0,95)	1,36 (1)	10 (1)	10 (1)	5,6 (0,7)	5,65

TL1 - traditionalfeedproductionline
TL2 - feed preparation line using the Niva IK 07U feed chopper
TL3 - proposed feed preparation line

Summing up the scores for each presented technological line, we determine the most preferred option.

Table 7: Definitions of the most preferred feed preparation line

	Name	Totalscore
TL1	Traditionalfeedpreparationline	16,44
TL2	Feed preparation line using the Niva IK 07U feed chopper	19,77
TL3	Feed preparation line proposed by Nizhny Novgorod State University of Engineering and Economics	21,61

Based on the presented assessment of the total score for the considered option technological lines of table 7, the most preferred is the proposed technological line for the preparation of feed (TL3).

The total annual cash savings from the fodder preparation line being introduced into production due to changes in product quality and a decrease in energy costs, according to the calculations of scientists from the Nizhny Novgorod State University of Engineering and Economics, will amount to 236 thousand rubles (in 2017 prices), and the payback period will not exceed 4.6 years.

Each enterprise is looking for solutions on how to convince customers to purchase its products, and thereby ensure a safe and stable market position. Satisfying customer expectations is determined by their attitude and preferences. Assessment of customer satisfaction allows you to determine what features should be included in the products and services offered by the company.

The production efficiency of the feed preparation line will directly depend on sales volumes. Therefore, in order to expand sales, it is proposed to organize access to foreign markets with this equipment. To begin, consider the volume of world trade in raw materials for the preparation of feed, as well as ready-made feed for animals. In 2017, according to the estimate of the International Independent Institute of Agrarian Policy, it amounted to about $ 68 billion (Fig. 2).

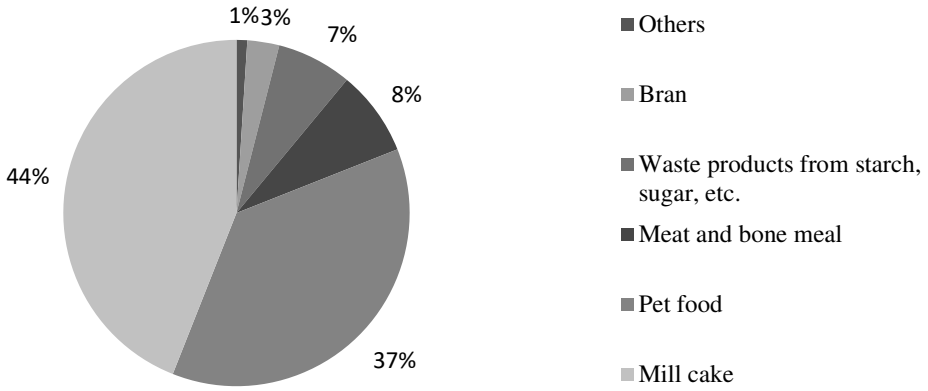

Figure 2: Structure of the world trade in feed and raw materials for their production in 2017

Analyzing the presented structure, it can be seen that the trade in animal feed occupies the second position and accounts for 37% of the total value of the world trade in feed and raw materials for their production.

Since 2014, there has been a decline in world trade. According to the International Independent Institute of Agrarian Policy, in 2017 the volume of the international feed market amounted to 68 billion dollars, which is 13 billion dollars less than in 2014. The main reason is the growth of national livestock production in many developing countries and, accordingly, an increase in feed demand due to own production. An example is China, for which the development of feed production is one of the national priorities.

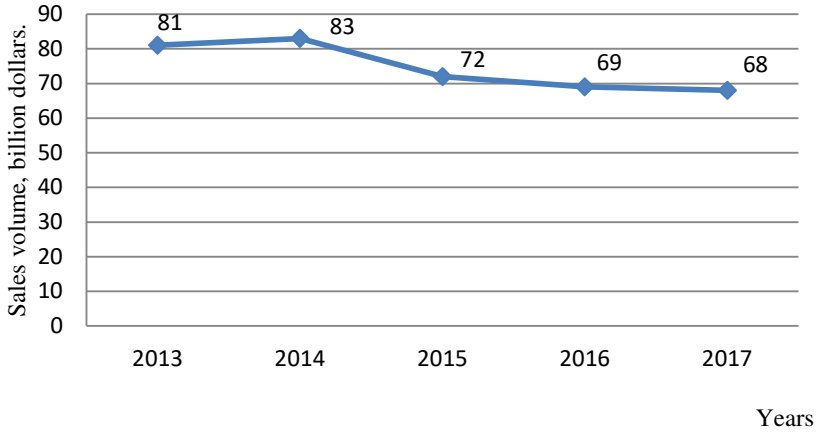

Figure 3: Dynamics of the international market of feed and raw materials for its preparation.

The decline in world trade is primarily due to a decrease in exports from countries - leading feed suppliers. Thus, Argentina reduced supplies by 9%, Brazil and the USA - by 3%. In 2017, Russia also reduced this indicator by 8% compared to 2016. At the same time, countries with a stable market and developed processing industry, on the contrary, are increasing exports. Holland increased by 10%, France - by 7%. The record was set by the United Kingdom, which increased exports by 17% in

2017.

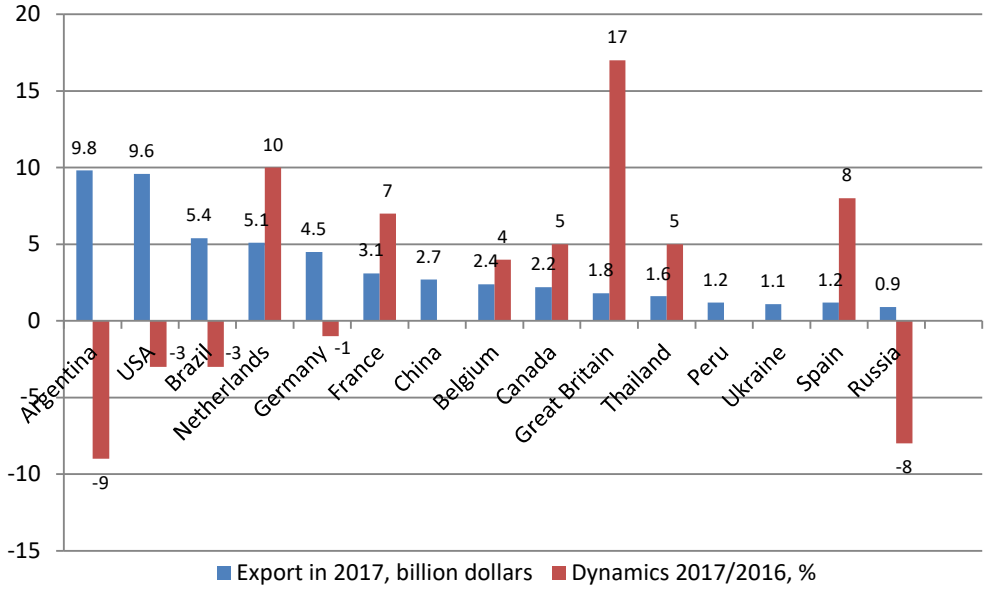

Figure 4 : Structure of export of feed and raw materials for their production by countries

Despite the decrease in feed and raw materials for their preparation in Argentina and the United States in 2017, they were the leading exporters of these products. In 2017, Russia was on the 15th place in the world in terms of export of feed and raw materials for their production.

Analyzing the import of feed and raw materials for their preparation in the context of countries, one can single out the highest dynamics in 2017 compared to 2016 for such countries as Thailand, Germany, Holland and Belgium.

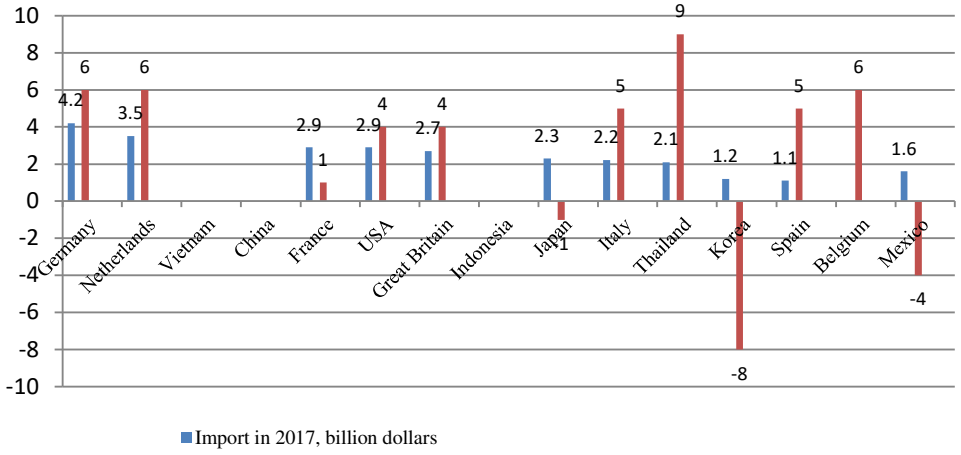

Figure 5: The volume and dynamics of imports of feed and raw materials for their production

Analyzing Figure 5, it can be noted that countries such as China, Vietnam, Indonesia do not import feed, and in Mexico and Korea there is a decrease in the import of feed and raw materials for their production - by 4% and 8%, respectively. In our opinion, the absence of imports in a number of countries indicates that in these countries animal feed is produced in sufficient quantities in domestic farms. The development of livestock production in these countries is mainly based on small-scale production, where livestock and milk production are not separated from the production of feed and raw materials for their preparation. Therefore, these farms need to supply modern technological lines

of feed choppers of small capacity at an affordable price, allowing to produce feed for various types of farm animals.

As such equipment, a technological line is proposed for the preparation of dry, loose, wet loose bulk fermented feeds with a capacity of up to 1 ton per hour, which was invented by scientists of the Engineering Institute of the Nizhny Novgorod State University of Engineering and Economics.

Conclusion

Thus, sales channels for these technological lines of feed shredders with a capacity of up to 1 ton per hour should be searched both in Russia and in the markets of China, Vietnam, Indonesia, and Korea, these markets will be more preferable compared to European countries. In order to increase the efficiency of the lines is necessary to organize systematic process control at all stages of production, from reception of raw materials to distribution of finished products, as the quality of prepared feeds depends on the smooth running of all manufacturing operations and components of mechanisms. Technological control should be inextricably linked with sanitary control as an important measure for the prevention of animal diseases. In conditions of high competition, it is necessary to constantly monitor the performance of equipment, improve the technology of feed preparation in order to reduce energy consumption, metal consumption and improve quality characteristics

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Modernization of the Organization of Technical Maintenance of the Machine-Tractor Park of Agricultural Organizations

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Abstract

A direct connection between the organization and the repairs of the machine and tractor park (MTP) and the effectiveness of its use requires an appropriate engineering system. The existing engineering services were simplified; the organization of maintenance in most cases was left to chance. However, the physical need of the machine and tractor park remained, since it is objectively inherent in equipment and machines. A systemic contradiction arose between the required maintenance organizations and its actual implementation. Its modernization is an urgent task. In order to increase the efficiency of the organization of technical maintenance of the MTP of agricultural organizations, the system and organizational relationships of repair and maintenance services are investigated. Improving the efficiency of the operation of the MTP can be achieved by modernizing the organization of its maintenance in accordance with the adopted regulatory acts and the proposed structure of the maintenance system.

Keywords: Agriculture, Agricultural Organization, Machine and Tractor Park, Operation, Maintenance, Repair.

Introduction

Numerous studies in the field of agricultural engineering confirm the direct relationship between the organization and repairs of the machine-tractor park (MTP) and the effectiveness of its use. In the previous period of the planned economy, the organization of repairs was regulated in detail by various recommendations, norms and standards, which were canceled during the market period, since privatized agricultural enterprises became private in accordance with the adopted laws on privatization [10], the interference with which is prohibited by law. The existing engineering services were simplified; the organization of maintenance was left to chance. However, the physical need of the MTP remained, since it is objectively inherent in equipment and machines. A systemic

contradiction arose between the required maintenance organizations and its actual implementation. The task of its modernization, provided for by the Decrees of the President of the Russian Federation and Government Decisions, has become urgent.

Materials and Methods

Abstract-logical and structural analysis is applied. In the research, we relied on the basic maintenance concepts, the fundamental works of academicians A.I. Selivanova, M.S. Runchova, V.M. Kryazhkova, A.E. Northern, V.I. Chernoivanov, professors Yu.K. Kirtbay, V.P. Vedenyapina, N.I. Agafonova and others.

Research Results and Discussion

The organization of technical services (maintenance) and repairs depends on the operating conditions and the availability of the park of serviced machines, on the direction of production activity and the size of the agricultural organization, on the natural and climatic conditions. The agricultural enterprises of livestock and grain areas differ significantly from each other in terms of marliness and structure of the MTP, therefore, they have different flows of failures and service requests, a different amount of work per 100 hectares of arable land, which requires a different material and technical base. In this case, the volume of repair and maintenance work differs in the structure of operations and equipment required.

The size factor of agricultural organizations is manifested in a different volume of repair and maintenance work. In large enterprises, the number of machine and tractor parks is higher; travel in the total mileage is greater.

Natural and climatic factors affect the need for repair and maintenance through the duration of use in the field, the duration of the frost period, since low temperatures accelerate the wear of equipment.

Currently, the directions of agricultural activity, the size of the agricultural organization and their share in the structure of agricultural production vary significantly across regions of the Russian Federation. For example, in the Krasnodar territory, substantial areas are occupied under sugar beets, and in the Belgorod Region, the share of forage crops is high. In the Rostov Region, field work begins in March, and in the central black earth zone a month later, therefore, the development of MTP is less, the north the enterprise is located. Different conditions determine the different requirements for the organization of maintenance of the MTP. The above facts became the basis for the study of agricultural enterprises of the Rostov region.

Research Results

Due to the factors of specialization, size and location, the organization of maintenance should be differentiated. We examined the organization of maintenance on the example of the Rostov Region, which is located on an area of 101.0 thousand km², of which 84.3% are agricultural land, 4.64 million hectares of sown area. In 2018, agricultural products of all categories were produced for 255.1 billion rubles, of which 184.3 of crop production and 70.9 billion of livestock were produced. Crop production prevails, exceeds the volume of livestock production by 2.6 times. Agricultural organizations produce 1.6 times more than households, twice as much as peasant farms. The structure of production in 2018 is as follows: grain - 7.07 (64.7%), sunflower seeds - 0, 84 (62.8%), meat - 0, 14 (53.3%) and milk - 0, 13 (11.5%) million tons. Large and medium-sized agricultural organizations, occupying 18.8% of the total number of agricultural producers in 1231 units, produce the majority of crop and livestock production. Based on the structure of the production, the number of MTPs in agricultural organizations is higher. The above factors of production determined the organization of maintenance in agricultural enterprises (AE) of the Rostov region as an object of the study.

We examined the material and technical base of agricultural enterprises and concluded the following: they have machines and equipment worth 50.1 billion rubles, and in the year preceding these studies, the renewal coefficient reached 11.5% with a liquidation coefficient of 2.6%, which indicates the finding in the operation of the MTP for depreciation periods requiring service to a greater extent than new ones. In total, agricultural organizations have 12.4 thousand tractors, 4.6 thousand combine harvesters, 2.2 thousand forage harvesters, agricultural machines and agricultural implements. The presence of a significant number of machines and equipment with a service life of more than 5 years, according to the experience of engineering services, causes an increase in the volume of maintenance and repair, for which it is necessary to have not only the material and technical base, but also an engineering structure that ensures the reliability of the operation of the MTP.

In accordance with GOST R 27.001-2009 [4], it should focus on the flow of service requests and be based on the following principles: the integrated nature of solving the problems of technical operation of the MTP, the distribution of responsibility between engineering and technical workers, the identification and prevention of failures by the application of preventative systems, change management, providing the necessary material and technical base in the form of fixed maintenance points and mobile maintenance units, distribution of responsibilities among engineering personnel technical and technical services, monitoring of maintenance and repair performance and documenting commissioning, technical operation (including maintenance and repair), storage and removal from it, decommissioning. Therefore, the organization of maintenance includes: engineering and technical personnel, material and technical base, information and software for diagnostics, accounting of maintenance and repairs, documentation of technical operation of the MTP (Fig. 1).

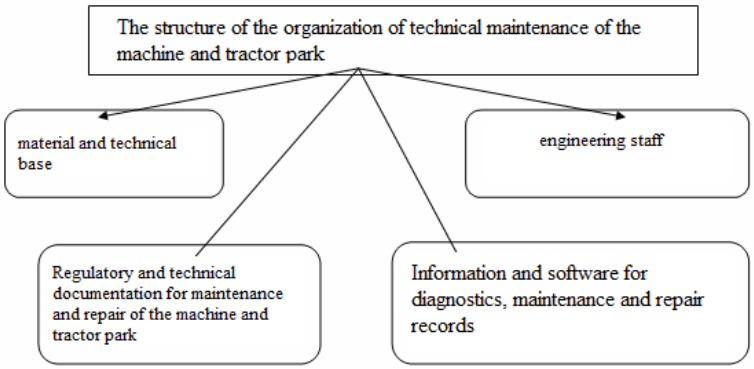

Fig. 1: Organization of maintenance and repair in agricultural enterprises in accordance with GOST R 27.001-2009

The functioning of the organization shown in the figure should provide the operating conditions for the operation of machine-tractor units (MTA) and combines, regulated by the operating instructions, thereby ensuring the general functioning conditions of the agro-industrial sectors [11]. The organization must comply with innovative scientific and technical support for crop production [12], ensure that state standards [1, 3] are provided; the claims of machine and equipment owners regarding the inadequate quality of sold or repaired equipment during the warranty period [8] should be considered.

It is known that the organization of maintenance should include not only the formation of the technical policy of the organization, but also the determination of the scope and composition of repair and maintenance work.

The volume and composition of these works is determined by the number and structure of the MTP of the agricultural organization in accordance with the standards.

We calculated the average size of the MTP, which falls on one enterprise. It compiled on tractors - 66, combine harvester - 22, forage machines 10 units. Given the prospect of increasing the number of MTPs, it is necessary to have a central workshop for 75 tractors, which will provide repairs not only to tractors, but also to combine harvesters and agricultural machines. For storing equipment during the non-working period, it is necessary to have a central machine yard and production machine yards in production units.

Conclusion

The effectiveness of the operation of the ICC of agricultural organizations significantly depends on its technical operation, which includes the organization of maintenance and repair. Improving the efficiency of operation of the ICC of agricultural organizations can be achieved by modernizing the organization of its technical maintenance in accordance with the adopted regulatory acts, which provide for the observance of the planned preventive maintenance system, managing the reliability of the ICC through maintenance and its provision, filing claims of the owners of ICCs regarding inadequate quality sold or repaired equipment during the warranty period.

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Sustainable Development of Rational Use of Agricultural Land with Allowance for State Support

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Abstract

Today the country's economy is inextricably linked with the environment. This situation is due to the negative impact of industry on the environment. As a result the population suffers. Reducing environmental pollution is possible only with the use of clean and environmentally friendly sources of energy. Increasingly renewable energy sources have been mentioned as the most economically advantageous but also the most expensive at the initial stage of implementation. In this regard not every organization can use them. The most difficult situation is in agricultural production: due to the seasonality of production, dependence on climatic conditions and disparity in prices this industry is not considered profitable and investment attractive. As a rule, agricultural organizations do not have free cash that could be spent on introducing renewable energy sources thereby bringing the production process closer to more effective results. In this case the main role is given to the state as the main regulator of market relations and the source of financing. It is government subsidies and grants that can support organizations in the transition to the use of renewable energy sources. This requires the development of public financing mechanisms for each industry separately with allowance for the influence of all possible factors.

Keywords: State Support, Agriculture, Efficiency, Agricultural Land, Agro-Industrial Complex, Rational Use of Agricultural Land.

Introduction

The main supplier of food resources in the country is agricultural production. In fact, it is the basis for addressing environmental food production problems. All production in agriculture is inextricably linked to natural processes. Work with natural soil processes occupies a special place in all production activities. Existing agricultural mechanisms are aimed at making a profit while the resource potential is not always rationally used. In the world the first priority is the greening of all production processes including agricultural ones. To do this ecosystems and the rational use of natural resources are being thoroughly studied. It is possible to minimize or even avoid harming the environment through the use of nutrients and water in the soil, the attraction of natural energies, the use of natural pest control in the production process. The goods produced in this way will be safe for humans and more attractive in the food market. The sale of environmentally friendly products will allow you to receive a stable income. Such agricultural production is called sustainable.

Agriculture plays a significant role in meeting the world population food needs. The successful and environmentally friendly development of the country's agro-industrial complex as a whole contributes

to the production of environmentally friendly and healthy products. In the minds of every agricultural commodity producer a production process scheme should be developed aimed at developing sustainable agricultural production. That is why it is important to evaluate all the production processes taking place in the organization. Today every agricultural enterprise actively uses chemicals in fertilizers and pesticides, animal medicines. A lot of fuel is spent on cultivating agricultural land, planting and maintaining crops, and later on for harvesting and delivering the grown products to the final consumer.

Each machine in the processing of fuel emits into the atmosphere about 700 grams of harmful substances per day [1]. Moreover, as a rule, several tractors work in the fields, and during the harvesting season combines and trucks are added to transport products from the fields to warehouses or drying plants. The latter, in turn, work almost continuously spending huge amounts of energy to bring products from the fields to the desired humidity. And this is only a branch of crop production. The livestock industry also spends large amounts of energy and causes significant harm to the environment: the use of equipment for the transport of feed and the export of organic fertilizers, pig farms that pollute nearby lands with ammonia, and the air with unpleasant odors and dust. All this together requires the adoption of significant measures aimed at greening the agriculture of Russia. The use of renewable energy sources in the agro-industrial complex around the world is called environmentally friendly energy agriculture [2].

Authors increasingly use the concept of sustainable agriculture in their works. The main purpose of such way of production is to maximize the use of the land's resource potential but at the same time ensure environmental safety and constant restoration of ecosystem fertility [3, 4, 5, 6]. The principles of sustainable agriculture are:

- competent use of renewable and recyclable resources;
- control over the continuous restoration of natural resources;
- the standard of living in rural areas (it should be increased in order to avoid migration of the population from village to city);
- profitability of the final result (with the competent use of renewable resources);
- rational use of land resources (land is the basis of all agriculture).

The totality of the principles discussed above will ultimately yield an annual increase in the profitability of agricultural production. However, the presence of clearly defined principles does not solve the problem of developing sustainable agricultural production. The main problem is the lack of funds for the purchase of equipment and machinery, as well as technologies for the development of sustainable agricultural production. The country's agro-industrial complex is not able to independently solve these problems. The main sources of funds may be investments but with investment unattractiveness of agricultural production as a whole this source of funds is considered unattainable. In this case the main support should come from the state in the form of subsidies and grants. Acting as a regulator of market relations the state at the legislative level can regulate the introduction of renewable and processed resources in agriculture, designating areas of responsibility for all participants in the production process, contributing to the development of infrastructure near agricultural enterprises.

Materials and Research Methods

The Researchers

Today many scientists have already paid attention to the development of outsourcing in their works: Tanwar Kavinder, Dagar Harender Malik Kapil [3], Helmers Glenn, Hoag Dana [4], Khan Shahrukh [5], Lloyd Pauline [6], Palsova Lucia [7], Gamulescu Oliviu-Mihnea, Rosca Sebastian, Leba Monica, Ionica Andreea [8], Kiseleva S.P. [9], Столярова, М. А. [10].

Information Research Base

The basis for the study is the work of both domestic and foreign authors. In their writings they reveal the results of theoretical and practical research in the field of state support for sustainable agriculture in Russia. These questions are raised in the materials of scientific conferences, articles in scientific journals, dissertations, monographs.

Method

Different approaches and methods are used in research, such as abstract and logical, monographic, comparison method.

Research results and discussion

Condition of agricultural land in Russia

The economic development of any agricultural region directly depends on its land and resource potential. Despite all the achievements of science and technology agricultural production involves a high risk. It is due to biological and climatic factors that have a negative impact on crop yields, reducing the economic performance of the organization. 10% of all arable land in the world is in Russia. According to the 2016 census 44% of farmland in Russia is not used but the area of arable land is increasing annually [11].

In order to control the use of agricultural land a Federal Fund for the Redistribution of Land has been created. According to Rule 80 of the Land Code of the Russian Federation this fund includes lands of federal and municipal property, ownerless plots and territories seized from private owners [12].

The work of this fund contributes to the coverage of all agricultural lands with their further involvement in agricultural circulation but does not guarantee that in the coming years all these lands will begin to work. There are many problems that slow down the process of putting these lands into agricultural circulation. Firstly, “waste” lands require additional costs to bring them to a suitable state. These lands are overgrown with forest or shrubs, depleted and polluted. Secondly, they are far from roads, settlements, which increases the cost of transporting equipment and labor. Thirdly, the quality of these lands may not meet the requirements for growing crops as a result of which costs arise to bring the soil balance to an acceptable level. And of course, a special place is given to legislation, which often contradicts itself and does not contribute to the development of land relations. This situation does not contribute to the active involvement of agricultural land in the turnover although the creation of a land redistribution fund is already a big step in this direction (Fig 1).

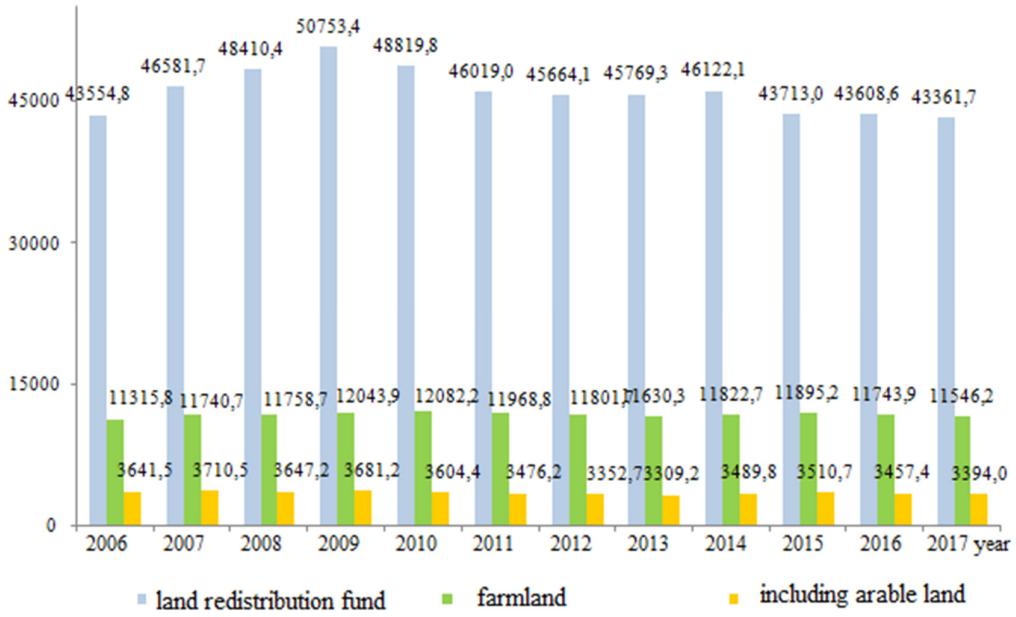

Fig.1: Change in land area of the redistribution fund, agricultural land in its composition, including arable land (thousand ha) [13]

In the process of its activities the fund carries out work on the transfer of forest land from agricultural organizations to the management of forestry enterprises, and also accepts land on a voluntary basis from agricultural organizations with unsatisfactory economic conditions.

Rational use of Agricultural Land

The next step should be monitoring the quality of agricultural land. Agricultural land should not only be involved in agricultural circulation but also used in it in such a way as not to lose its beneficial properties. To achieve this goal each agricultural producer must adhere to a single methodology for the rational use of farmland, which, unfortunately, has not yet been developed.

Europe is also concerned about the state of agricultural land. In recent years there has been a significant increase in soil degradation processes which will only increase annually if no action is taken. As a rule the degradation of agricultural land is caused by human influence, the content of organic substances in the soil is increasingly reduced and more often it is subject to pollution [7].

One of the solutions to the problem of rational use of agricultural land is the use of precision farming. The implementation of precision farming has become available due to the development of scientific and technological progress. Devices have been developed for assessing the state of soil, soil moisture, microclimate [8].

The use of precision farming is possible with the appropriate equipment and technologies, while in most agricultural organizations the equipment is not only worn out morally, but also physically so much that more funds and resources are spent on processing a unit of land than planned. And we even do not mention the damage done by these outdated machines to the environment.

Rational land use in agriculture depends not only, and not so much on internal factors as on external ones. Of course a lot depends on how competent a leader is at the head of the organization but even the most advanced leader is not able to influence conflicting legislation, the constantly growing interest on loans, prices for fuel, agricultural machinery, fertilizers, animal feed. All this together contributes to

the fact that all actions are aimed at surviving, and issues of improving the environmental status of the organization as a whole are fading into the background.

Many devices are currently available and used to collect data or provide information in the implementation of the precision farming project. These devices can evaluate soil condition , for example : Arent soil application

measure electrical conductivity (EC), e.g. radiometric sensors, and soil moisture give information about the weather and microclimate (thermometer, hygrometer etc.). Special meaning has attached to sensors developed in Quantitative physiological state from cultures (Senso nitrogen RS). These sensors contribute in the imaging using remote sensing [1]. Real-time and worldwide monitoring of agricultural vegetation includes processing a large volume of spatial data ranging from weather data in satellite image and enhancement Global plant growing. AGRIFISH analysts work primarily for estimating and interpreting spatial datasets, are also involved in the purchase, storage and redistribution of them. Together with foreign partners have developed large geographic databases and according to INSPIRE (http://inspire.jrc.it). paying attention to п

Legislative framework for rational land use

The Land Code of the Russian Federation is the main document regulating relations in the field of land resources of the country. According to the Land Code “Agricultural lands are recognized as lands located outside the boundaries of a settlement and provided for agricultural needs, as well as intended for these purposes.” The concept of rational use of agricultural lands is also reflected in the Land Code of the Russian Federation [14]. There is no exact concept of "rational use of land" as such in the legislation therefore there is no obligation for the right holders to rationally use land. But according to Rule 12 of the Land Code of the Russian Federation the rational use of land is considered as land protection: “The goals of land protection are the prevention and elimination of pollution, depletion, degradation, damage, destruction of lands and soils and other negative impacts on lands and soils, as well as ensuring the rational use of lands including for restoration of soil fertility on agricultural lands and land improvement”[14]. It turns out that the owners of land including agricultural land must take care of protecting their land from pollution, depletion, degradation, etc. The absence of clearly established requirements for the rational use of land entails many difficulties in holding to account for violation of land legislation, primarily agricultural land.

Over the past year the government has begun the development of several bills that will simplify the withdrawal of ownerless land and agricultural land not used for its intended purpose. The issue of introducing fertility rates and passports for each agricultural plot is being considered. It was proposed to strengthen state control over the state of agricultural lands and soil fertility [15].

The Ministry of Economic Development has also developed two bills that spell out the mechanism for withdrawing private land plots if their owners do not comply with fire safety standards during their operation. The bill does not spell specific violations for which you can withdraw the site. However, the authors of the document cited examples of violations in the synthesis report - “burning of crop residues, overgrowing of land with weeds, accumulation of household waste” [16].

In February 2020, a new bill enters into force, the purpose of which is to establish a uniform procedure for determining the types of permitted use of land plots, reducing the number of disputes which arise when determining the types of permitted use of land plots when they are provided and formed. It is expected that the bill will supplement the Land Code with a chapter that regulates on a systematic and integrated basis the issues of establishing and changing the types of permitted use of land. The bill provides:

- definition of the concept “permitted use of the land plot”, its types (main, auxiliary, conditionally permitted);
- the establishment of a ban for tenants and land users to change the types of permitted use of land;
- determination of the procedure for termination of rights to land plots;

- clarification of certain provisions of the Land Code and other federal laws regarding the formation and provision of land in state or municipal ownership [17].

The Ministry of Agriculture has developed a state program for the effective involvement of agricultural land in the circulation and development of the reclamation complex. The main goal of the program is the collection and systematization of data on agricultural land. It is assumed that during the implementation of the program land management schemes of 44 million hectares of agricultural land of municipalities will be approved. In addition, involvement in the turnover of at least 12 million hectares by 2030 with an increase in reclaimed land by at least 1.6 million hectares compared to the level of 2018. It is planned that the program will enter into force in March 2020 and will be implemented until 2030. Its value exceeds 1.41 trillion rubles, including 887.9 billion rubles from the federal budget [18].

The federal scientific and technical program aimed at the development of agriculture for 2017-2025 considers the development of the agro-industrial complex with regard to the use of seeds of new domestic varieties and breeding products (material), production technologies for high-quality feed, feed additives for animals and medicines for veterinary use , pesticides and agrochemicals of biological origin, processing and storage of agricultural products, raw materials and food, modern media TV diagnostics, methods of quality control of agricultural products, raw materials and food, and examination of genetic material. One of the objectives of this program is to increase the investment attractiveness of the agricultural sector [19].

Investment attractiveness of agricultural land

Due to the peculiarities of the production process and its dependence on climatic conditions, the agro-industrial complex is an unattractive object for investment. But given the fact that Russia strive for an innovative type of development, the current situation can be changed. The production process in agriculture is based on the use of land. The problem of its most effective and rational use in the new conditions is directly related to increasing their investment attractiveness for all forms of capital, which is ready to take part in innovative projects. Considering land resources from this point of view, it turns out that they act both as an object of investment and as an integral part of the mechanism for attracting capital to the innovation sphere. Upon entering the Russian land market, both domestic and foreign investors are faced with a number of problems hindering their active work:

- the level of protection of land property rights is low;
- the activities of state authorities, municipal bodies in terms of land management is ineffective;
- the level of land development in the country is relatively low, mainly due to poor transport infrastructure.

Involving the agro-industrial complex in innovative projects on sustainable agricultural development will attract more investors. The use of renewable energy sources in the agro-industrial complex, as well as throughout the world, will lead Russian agriculture to environmentally friendly energy agriculture. The effectiveness of agriculture is significantly affected by the investment attractiveness of agricultural land use, depending on a number of factors (Fig 2).

The influence of objective and subjective factors in different agricultural areas is not the same. Fertile soils look more investment attractive than soils with less fertility, since at the same cost the yield from 1 ha of fertile soils will be higher. However, on infertile soils, innovative technologies can be used in conjunction with competent management, which can level the chances or even increase the investment attractiveness of a less fertile land. A focus on the sustainable development of agricultural production contributes to the development of not only the agricultural organization itself but also the infrastructure around it. And support from the state will contribute to the development of the agricultural organization in the innovation field. In any case, to attract investment it is necessary to make efforts, work both on the object of investment itself (agricultural land), and on the entire agricultural production as a whole. Only a set of measures, together with support from the state, will achieve the desired results.

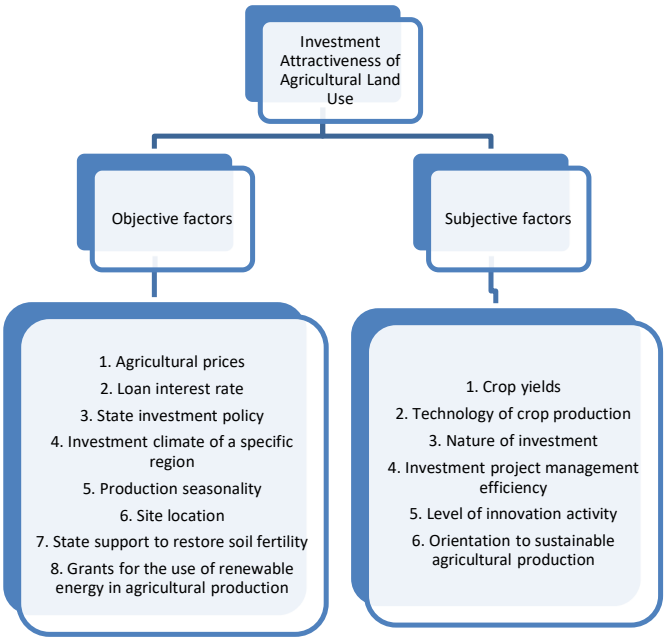

Source: Compiled by the author.

Fig. 2: Investment Attractiveness of Agricultural Land Use

State support for rational land use

The requirement for the protection of agricultural land is an integral part of the land legislation of the USA, Germany, Poland, Australia, Czech Republic, Portugal, Switzerland, Canada. In the United States, they are pursuing a policy of supporting agricultural producers and protecting soils and rational use of agricultural land, controlling the targeted use of land in agricultural zones and enforcing a farm protection law. The Swedish government has implemented a series of programs to improve the environmental efficiency of agricultural land use. In accordance with the approved programs, peasants are provided with certain financial compensation for not plowing land near rivers, ponds and forests, for the construction of dams, and conservation of swamps. All this contributes to an increase in the area of ecologically clean lands. Financial investments in the agricultural sector in developed countries are 1.5–2 times higher than the market value of products. In foreign countries there is a division of the land fund into three types: land of settlements, agricultural land, and environmental land [9].

In Vietnam, the mechanism of state administration of land in general and agriculture in particular includes:

- administrative mechanism - the direct impact of the state on an object related to agricultural land through the use of administrative methods and decisions of a mandatory nature, binding;
- economic mechanism - the indirect impact of the state through economic interests on an object using agricultural land, so that the latter independently chooses the most efficient method of production;
- a mechanism for training and disseminating knowledge - an impact on the views of land users in order to increase their self-awareness in the work on the regulation and use of agricultural land [9].

In Europe, there are programs that support rural development through:

- soft loans (lower interest rates, easier approval of loans and the adequacy of the size and purpose of funds),
- tax system (real rates and base, as well as the introduction of benefits),

- subsidies (food prices, insurance premiums, etc.).

In highly developed countries, the state affects four main areas:
- determines the appropriate price policy for agricultural products;
- determines the measures of subsidizing costs for specific types of costs;
- determines adequate models for financing agricultural production and stocks;
- subsidizes the export of agricultural products [20].

State support of various countries comes down to the mechanism of subsidizing specific objects. The very mechanisms of distribution of subsidies for each country are unique for several reasons. Agricultural land, acting as an object of subsidies, should be evaluated not so much in terms of area as in terms of their quality use. An indicator for determining the amount of subsidies from the federal budget should be a differentiated approach, focusing on land efficiency and taking into account its quality.

The efficiency of agricultural organizations depends on the quantity and quality of the resources at their disposal, but even the most equipped and efficient agricultural enterprises will not be able to function for a long time if they do not strive to constantly modernize their resources. A balance is needed for the development of agribusiness and ecology [21].

To assess the quality of a unit of land area, M. A. Stolyarova proposes to use the efficiency of a hectare according to the proposed author's formula, and further recalculation of the area of agricultural land in conventional cadastral hectares based on the total soil score will make it possible to equalize land of different quality for conducting objective and real assessment of the effectiveness of its use. When comparing the actual management indicators based on the physical area of land with the calculated data on the rate of hectare efficiency, one can determine how efficiently and rationally agricultural land is used [10].

The algorithm for subsidizing agricultural organizations for the rational use of agricultural land with regard to the rate of hectare efficiency can have the following form (Fig 3).

1. Federal budget
Budget appropriations for state support for the rational use of agricultural land
2. Ministry of Agriculture of Russia
Distribution and provision of subsidies from the federal budget to the budgets of the constituent entities of the Russian Federation
3. Management body of the agro-industrial complex of a constituent entity of the Russian Federation
Formation of a request (terms of reference) for a subsidy for the restoration of soil fertility with the application of the necessary documents in accordance with the list approved by the regulatory legal acts of the subject of the Russian Federation
4. Department of Agriculture of municipalities
Formation of a request (terms of reference) for a subsidy for soil fertility restoration with the application of the necessary documents in accordance with the list approved by regulatory acts of the constituent entity of the Russian Federation among agricultural producers of the municipality
5. Agricultural producer
-submission to the governing body of the agro-industrial complex of the constituent entity of the Russian Federation an application for a subsidy for the restoration of soil fertility with the necessary documents in accordance with the list of approved regulatory legal acts of the constituent entity of the Russian Federation
6. Department of Agriculture of municipalities
Collection and transmission of applications to the regional governing body of the agro-industrial complex
7. Department of Agriculture of municipalities
- consideration of documents (applications of agricultural producers).

At the stage of consideration of documents, an assessment is made of the quality of the land claiming a subsidy taking into account the rate of hectare efficiency. In fact, the amount of the subsidy claimed by the organization is multiplied by the ratio of the hectare efficiency to the average district indicator - decision to submit a subsidy or a reasoned refusal - transfer of subsidies - reporting to the Ministry of Agriculture of the Russian Federation

Source: Compiled by the author.

Fig. 3: Algorithm for subsidizing agricultural organizations for the rational use of agricultural land

Subsidizing of agricultural land should be based on the quality of use of a unit of land. Only in this case can a continuous process of reproduction of soil fertility be achieved. It is the reproduction of soil fertility that is the basis of green agriculture.

Conclusion

As a rule, land use in various countries is diverse and has its own specifics. Therefore, for the rational use of agricultural land, the experience of a single country cannot be applied. It is necessary to approach in a balanced way, competently combining state and market mechanisms for managing land resources, protecting highly productive agricultural zones and supporting low-productive ones, controlling soil pollution by harmful industrial waste and developing a system of fines for soil pollution by waste, developing economic incentives for improving soil quality. It is government support that plays a special role in the development of environmentally friendly agriculture.

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Identification of Laws of Reproduction in the Organizations Producing Grain of the Nizhny Novgorod Region of the Russian Federation Depending on their Size

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Abstract

In the conditions of the global changes caused by an increase in a role of information as a production factor, universal application of IT technologies, one of necessary conditions of effective functioning of any economic sphere is the knowledge of laws of its functioning. In this research laws of short-term dynamics of the cost expenses in the agricultural organizations of the Nizhny Novgorod Region of the Russian Federation engaged in production of one type of agricultural product - grain are investigated. Various indicators of the amount of economic resources at the disposal of the organization, their ratios and financial results of a production activity were considered as the influencing factors. During research it was established that different sets of the influencing variables work for different agricultural organizations (broken down into 4 groups according to their size – ultra-small, small, mid-sized, large as to their production volume). For each group the corresponding equations were formulated, the statistical analysis of the importance of coefficients was carried out, and conclusions were drawn on character and degree of regressor influence on dynamics of costs of production. During research previously expressed assumption that different patterns of the reproductive process are identified for different sized agricultural organizations and further directions for the research are defined.

Keywords: Reproduction, Economic Resource, Regression Equation, Agricultural Organization, Financial Results

Introduction

The scientific mainstream, like most of the world's phenomena, is cyclical. The first studies on ecoomics mostly described agricultural economics, or placed a very large emphasis on agricultural production processes, processes of agricultural products sale, exchange, etc. The development of the economy as a system had logically led to an increase in the number of relevant studies and a change in their focus. Thus, at the beginning of the XXI century in the world economy researchers started to focus on other important issues. However, as recent review studies show, for example, (Fitz-koch et all, 2017), this trend has changed in recent years. Currently, there are a number of works that highlight issues within the competence of agricultural economics. (Czyzewski, Matuszczak, 2016) discusses a new theory of rent, (Chamberlain, Anseeuw, 2019) considers the theory of cooperation, (Dias et all, 2019; Lans, Seuneke, Klerkx, 2017; Shane, Venkataraman, 2000) reinterprete the concept of agricultural entrepreneurship and examine the environmental impact of agricultural production, (Britz et all, 2012) studies the landscape and general issues of land use efficiency, (Daugstad, Rønningen, Skar, 2006) consider the conservation of biodiversity and the preservation of cultural research through land use, (Meador, Skerratt, 2017) studies the theory of the rural development.

All this is superimposed on the widespread use of network-centric systems in agriculture, the emergence of big data in this industry, the need to adapt them to improve the efficiency of agricultural systems (Bessler et all).

Under these conditions, a revision of theories of the content and essence of economic resources is inevitable. At present, it can be noted that these attempts are actively undertaken by Russian and foreign researchers, in particular, the theory of reproduction of agricultural lands (Stevens, 2018; Aparin, 2018), the theory of reproduction of fixed capital (Zolotareva et all, 2018), and the theory of labor resources are being modified (Maltseva , 2017).

Rethinking the essence of production factors and the structure of social relations due to the virtualization of society and the economy leads to attempts to rethink the classical theory of reproduction by K. Marx (Burkett, 2004; Christophers, 2014).

At the same time, it is worth noting the fragmentary nature of these attempts. According to the authors, today there is a need to rethink individual elements and expand the provisions of reproduction theories as applied to agriculture, which, in terms of access to big data and as part of rethinking the essence of economic resources, will lead to identification of the corresponding patterns of changes in the number of resources in agricultural systems of various levels, which will significantly increase economic system performance (Shamin et all, 2019)

Materials and Methods

The classical interpretation of the reproduction process involves the study of economic processes at only one level - in kind or in value (as in works, for example (Adadimova, 2017; Ivanova, 2017)). However, as noted in (Pronyaeva, 2016), the modern interpretation of the reproduction process involves the study of reproduction at two levels - value and natural. At the cost level, reproduction processes are expressed in the change in production costs, which are based on the value of the fixed, working capital involved in the agricultural production process.

Currently, according to the authors, the consideration of the cost level of the reproduction process is relevant for two reasons:

- according to generally accepted approaches, the assessment of the state of the economy as a whole and the identification of signs of crisis in the economic system of any level occurs precisely on the basis of the analysis of cost indicators;

- there are objective difficulties in quantifying the properties of economic resources at the natural level (for example, currently there are no generally accepted methods for assessing the parameters of human capital and information as economic resources).

Historically, most research on the reproductive process was related to macroeconomics. However, the emergence of a large amount of information on the activities of individual organizations and other subjects of microeconomics allows us to focus on the processes of reproduction in microeconomics, at the level of individual agricultural organizations in order to identify relevant patterns.

The current specifics of agricultural production, which consists in increasing the number of types of agricultural products produced by an individual economic entity, leads to a complication of the structure of reproduction processes. Proceeding from this, the authors decided to distinguish a separate category of agricultural producers - those organizations that are engaged in the production of only one type of agricultural product. A preliminary analysis showed that in the study pool among the producers of mono agricultural products, grain producing organizations dominate (more than 90%). Thus, based on the foregoing, the following purpose of the study can be formulated: to identify the patterns of cost reproduction in agricultural organizations of the Nizhny Novgorod region of the Russian Federation that produce only grain.

During the study, the authors put forward several assumptions:

1. For different-sized organizations, there are different patterns of reproduction (for example, this assumption was proved by a number of foreign scientists (Gabre-Madhin, Haggblade, 2004; Ahmed, 2004; Mignouna, 2011) for the process of introducing innovations in agricultural production;
2. The direction of the reproduction process is influenced by the number of economic resources, their correlation, financial results of the organization and the effectiveness of its activities;

When selecting agricultural organizations and information for research, the authors were guided by the following theses:

- The cycle of the reproduction process was taken equal to 1 year. Thus, the reproduction processes in agricultural organizations of the Nizhny Novgorod region in 2016-2017 were analyzed.
- The key indicator (dependent variable), reflecting the dynamics of reproduction processes, was the indicator of the growth rate of production costs of an agricultural organization;
- The following indicators were taken as influencing factors (independent variables):

1. The number of manufactured products, centner
2. Amount of land, ha
3. Number of employees
4. Power of fixed assets, hp
5. Per 1 agricultural worker, ha
6. Amount of land cultivated by 1 hp, ha
7. Power of the machine-tractor fleet (MTP) per 1 worker, hp
8. Profit, thousand rubles
9. Profitability,%
10. Profit per unit of output, rubles / centner

- The indicator reflecting the size of the agricultural organization was the amount of grain produced in centners.

The sources of information were the data of the annual reporting of agricultural organizations of the Nizhny Novgorod region for 2016-2017.

The information base for the research was formed according to the data of organizations which met the following criteria:

- for 2 years, the agricultural organization was engaged in the production of grain only;
- none of the indicators considered above is equal to 0 or undefined;

Based on these criteria, 51 agricultural organizations were selected.

In dynamics over the past six years, the area of arable land decreased by 0.02% and in 2017 amounted to 2035.7 thousand ha. As compared to 1990, the area of arable land decreased by 9.53%, or by 214.4 thousand ha.

In general, we can state the general stability of the land fund used by agricultural organizations of the region in their activities During this period, the number of workers employed in agricultural production decreased and in 2017 amounted to 65.2 thousand people, which is 35 thousand people less than in 2010, and 40.8 thousand people. less than the 1990 level.

An analysis of the dynamics of the cattle amount indicates that the trend of a decrease in the number of livestock in agricultural organizations of the Nizhny Novgorod region continues. From 2009 to 2017 total cattle amount decreased by 20%.

The decrease in cattle amount significantly reduces the production potential of the region. However, means of labor are also very important in the production process. One of the means of labor in agriculture is the basic production assets, which include machine and tractor fleet, which at the end of 2017 in agricultural organizations of the Nizhny Novgorod Region consisted of 4443 tractors, 1161 combine harvesters, 431 forage harvesters, 152 potato harvesters with a total capacity of 1857, 6 thousand hp. For 2008 - 2017 the number of tractors decreased by almost half (for the period 2013 - 2017 by a quarter), combine harvesters - by 44% (the peak of decline fell on the period 2008 - 2013), forage harvesters - by a third, potato harvesters - by a quarter. This led to a reduction in the total capacity of mobile equipment by 33% (Shamin, 2015; Shamin, Vasil'ev, 2016; Shamin. Shamin, 2015).

Next, we turn directly to the characteristics of agricultural organizations of the Nizhny Novgorod region engaged in grain production in comparison with the total population (table 1).

Table 1: General characteristic of the organizations producing grain of the Nizhny Novgorod Region

Indicator	2016	2017	Deviation
Total of the agricultural organizations, units	499	452	-47
Total of the agricultural organizations which are engaged in production of grain, units	383	358	-25
Total of the produced grain in all agricultural organizations, one million c	9.413	11.027	1.614
General balanced financial result of all organizations, billion rubles	1.491	2.889	1.398
The general balanced financial result of all organizations from production of grain, million rubles	595.9	12.1	-583.8
The general balanced financial result of the organizations which are engaged in production of grain, billion rubles	1.671	1.775	0.104
Average profitability of the agricultural organizations of the Nizhny Novgorod Region, %	14.5	23.3	8.8
Average profitability of the agricultural organizations of the Nizhny Novgorod Region making grain, %	-2.9	10.0	12.9
Total of the produced grain the agricultural organizations which are engaged only in production of grain, in one million c	1.452	1.915	0.463
The general balanced financial result of the organizations which are engaged in production only of grain, billion rubles	110.38	-26.45	-136.83
Average profitability of the agricultural organizations of the Nizhny Novgorod Region making only grain, %	-6.26	-6.49	-0.23

Thus, for the period 2016-2017 we have recorded:

- a general decrease in the number of agricultural organizations did not lead to a decrease in grain production;
- the general increase in the profitability and efficiency of agricultural production in the region over the period under review has formed two various trends. On the one hand, organizations that grow not

only grain, but also engage in other sectors of agriculture, showed an increase in the overall balanced financial result, profitability, and production volumes. On the other hand, organizations engaged in the production of grain alone showed a significant increase in production volumes (31%, a total increase in the total volume of produced grain - 17%), but showed a decrease in profitability and a negative overall balanced financial result.

The dynamics of the amount of resources for selected agricultural organizations of the studied region is shown in table 2.

Table 2: Quantity of resources in the agricultural organizations of the Nizhny Novgorod Region which are engaged in production only of grain

Indicator	2016	2017	Deviation
Costs of production, billion rubles	1.21	1.47	0.26
Area of agricultural grounds, one thousand hectares	94.94	113.52	18.58
Number of workers	695	926	231
Power of fixed assets, one thousand h.p.	142.8	179.1	36.3
General fund of compensation, million rubles	130.9	192.3	61.4
Fixed capital, billion rubles	2.21	3.19	0.98

A significant increase in the number of resources was recorded in agricultural organizations engaged in the production of only grain for the study period: production costs increased by 21%, sown area - by 19.5%, number of employees - by 33%, fixed assets - by 25 %, wage fund - by 47%, the cost of fixed capital - by 44%. This indicates positive dynamics of the development of these agricultural organizations.

At the same time, it is obvious that not all the considered organizations showed exclusively positive trends. The structure of the totalpopulation of the studied organizations according to the dynamics of the amount of resources is presented in Figure 1.

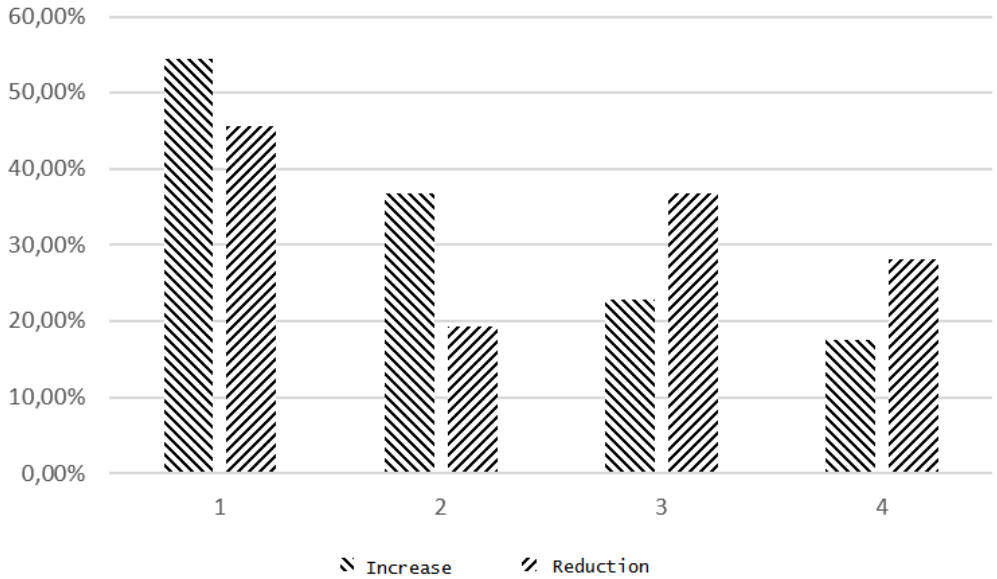

Fig. 1: Structure of the organizations making grain of the Nizhny Novgorod Region on dynamics of volumes of resources for the considered period

(symbols: 1 - Costs of production, billion rubles; 2 - Area of agricultural grounds, one thousand hectares; 3 - The number of workers in the organization, people; 4 - Power of fixed assets, one thousand h.p.)

The share of organizations that increased production costs and agricultural land area exceeds the same indicator for organizations that reduced production costs and agricultural land area; however, the opposite is observed in terms of the number of employees in the organization and the capacity of fixed assets, which, against the background of a general increase in their values, indicates a significant increase in the differentiation of the organizations under study in terms of the volume of these resources.

Results

At the first stage of the study of the laws of reproduction, a table of correlations between reproduction indicators at the cost and natural levels was compiled (table 3). All calculations were performed using the STATISTICA 10 program.

Table 3: Correlations of indicators of reproduction of resources of the agricultural organizations at the cost and natural levels

Indicators	Reproduction of costs	Reproduction of the land	Reproduction of workers	Reproduction of power
Reproduction of costs	1.000	0.774	0.342	0.447
Reproduction of the land	0.774	1.000	0.195	0.283
Reproduction of workers	0.342	0.195	1.000	0.081
Reproduction of power of equipment	0.447	0.283	0.081	1.000

The most correlated among themselves are indicators of land reproduction and production costs, which is logical, since it is land that is the basis of agricultural production. No significant relationships were found between the remaining indicators.

Thus, we can conclude that a separate study of the laws of cost reproduction is logical, since it is highly independent of reproduction at a natural level.

Table 4: Correlations of reproduction of resources of the agricultural organizations with quantity, structure of their resources, and also with financial results of activity of the organization

Indicator	Correlation level with reproduction of expenses
Quantity of the made production, c	0.006
Volume of the land, hectare	-0.050
Number of workers, people	-0.046
Power of fixed assets, h.p.	-0.074
The hectare	-0.006
1 h.p. of the earth, hectare	-0.083
The power of MTP falling on 1 worker, h.p.	0.028
Profit, thousand rubles	-0.022
Profitability, %	0.139
Profit on unit of the made production, rub/c	-0.034

An analysis of the correlations of reproduction costs with the selected indicators reflecting the size of the agricultural organization, the amount of resources in it, their ratio, financial performance, showed

the absence of strong correlations. Consequently, a deeper study of correlations depending on the size of the organization is needed.

As the main indicator characterizing the size of the organization, the authors decided to use the volume of grain produced. This is because the adopted dependent variable (the growth rate of production costs) is cost-based, and the order of its magnitude is determined precisely by the volume of output, regardless of the type of production (extensive or intensive). In addition, since reproduction is a controlled process, including making managerial decisions, the difference in thinking between the heads of large and small agricultural organizations may appear in the dependencies studied, and the volume of manufactured products is traditionally considered the criterion for determining the size of an organization in the community of agricultural company leaders.

Subsequently, the following classification was used to draw conclusions:

- organizations with a production volume of up to 10,000 c are considered ultra small in this study;
- organizations with a production volume of 10,000 to 20,000 c are considered small in this study;
- organizations with a production volume of 20,000 to 40,000 c are considered medium-sized in this study;
- organizations with a production volume of 40,000 to 60,000 are considered large in this study.

Accordingly, this allowed us to formulate the following conclusions:

- a significant correlation of the volume of land at the disposal of the agricultural organization and the reproduction of costs is observed in ultra-small organizations producing about 5,000 centners (-0.41);
- a significant correlation of the number of workers at the disposal of the agricultural organization and the reproduction of costs is observed in ultra-small organizations producing about 1000 centners of grain (-0.5);
- a significant correlation of the capacity of the machine and tractor fleet at the disposal of the agricultural organization and cost reproduction is observed in ultra-small organizations producing about 1000 centners of grain (-0.63);
- a significant correlation of the amount of agricultural land per 1 worker and cost reproduction is observed in ultra-small organizations (-0.45);
- significant correlation of the cultivated amount of land by 1 hp and cost reproduction is observed in large organizations (-0.37);
- a significant correlation of machine and tractor fleet capacity per 1 employee and cost reproduction is observed in ultra-small organizations (-0.67);
- a significant correlation of the organization's profit indicator and cost reproduction is observed in small organizations (-0.41);
- a significant correlation of the profitability of organizations and cost reproduction is observed in ultra-small organizations (0.45) and medium-sized organizations (-0.44);
- a significant correlation of the organization's profit indicator per unit of output and cost reproduction is observed in medium-sized organizations (-0.5);

Next, 6 regression equations were formulated for different groups of agricultural organizations in terms of output. In models (1) - (6), the following conventions are used:

y - Cost reproduction rate
v_1 - The amount of land, ha
v_2 - Number of employees, people
v_3- Power of fixed assets, hp
v_4 - Per 1 agricultural worker, ha
v_5 - The amount of land cultivated by 1 hp, ha
v_6 - The power of the machine-tractor fleet per 1 worker, hp
v_7 - Profit, thousand rubles
v_8- Profitability,%
v_9 - Profit per unit of output, rubles / c

For ultra-small organizations, three regression equations were formulated.

It is revealed that organizations with a production of up to 1,500 centners have the patterns of reproduction described by the formula

$$y = a_1 + a_2 v_3 + a_3 {v_3}^2 + a_4 {v_4}^2 + a_5 v_3 v_6 + a_6 v_4 v_6 \quad (1)$$

The values of the coefficients of the model and their statistical characteristics are presented in table 5.

Table 5: Values of coefficients of model (1) and characteristic of their importance

Coefficient	a_1	a_2	a_3	a_4	a_5	a_6
Value of coefficient	1.14E+00	-2.03E-04	1.00E-06	2.00E-06	-3.00E-06	7.00E-06
Standard error of coefficient	5.80E-02	9.30E-05	0.00E+00	1.00E-06	1.00E-06	2.00E-06
t-value	1.96E+01	-2.17E+00	3.43E+00	2.56E+00	-3.77E+00	3.22E+00
Lower 95% value of coefficient	1.01E+00	-4.18E-04	0.00E+00	0.00E+00	-5.00E-06	2.00E-06
Top 95% value of coefficient	1.27E+00	1.30E-05	1.00E-06	3.00E-06	-1.00E-06	1.20E-05
p-value	0.00E+00	6.18E-02	9.00E-03	3.38E-02	5.45E-03	1.22E-02

Equation (1) is statistically significant, the determination coefficient was 83.535%. An analysis of the significance of the coefficients of equation (1) showed that at a 5% significance level, all model coefficients are significant, except for the coefficient a2.

Organizations with a production volume of 1,500 to 4,000 centners are subject to the laws of reproduction described by the formula

$$y = a_1 v_2^3 + a_2 v_2^2 + a_3 v_2 + a_4 v_8^3 + a_5 v_8^2 + a_6 v_8 + a_7 v_2 v_8 + a_8 {v_2}^2 v_8 + a_9 v_2 {v_8}^2 + a_{10} {v_2}^2 {v_8}^2 + a_{11} \quad (2)$$

The values of the coefficients of the model and their statistical characteristics are presented in table 6.

Table 6: Values of coefficients of model (2) and characteristic of their importance

Coefficient	a_1	a_2	a_3	a_4	a_5	a_6	a_7	a_8	a_9	a_{10}	a_{11}
Value of coefficient	-0.26	1.85	-1.94	-454.99	-5166.38	993.03	-537.54	67.39	2942.92	-388.29	-2.67
Standard error of coefficient	0.11	0.71	0.66	199.73	2183.81	413.08	225.74	28.47	1251.21	165.60	1.82
t-value	-2.48	2.60	-2.96	-2.28	-2.37	2.40	-2.38	2.37	2.35	-2.34	-1.47
Lower 95% value of coefficient	-0.60	-0.42	-4.03	-1090.62	-12116.24	-321.56	-1255.96	-23.23	-1038.98	-915.29	-8.47
Top 95% value of coefficient	0.08	4.12	0.14	180.64	1783.47	2307.63	180.88	158.01	6924.83	138.71	3.13
p-value	0.09	0.08	0.06	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.24

Equation (2) is statistically significant, the coefficient of determination was 84.386%. Analysis of the significance of the coefficients of equation (2) showed that at a 5% level of significance all the coefficients of the model are not significant, which indicates the need to include other variables.

Organizations with a production volume of 4,000 to 10,000 centners are subject to the laws of reproduction described by the formula

$$y = a_1 + a_2 v_1 + a_3 v_1^2 + \frac{a_4}{v_8} + \frac{a_5}{v_8^2} \quad (3)$$

The values of the coefficients of the model and their statistical characteristics are presented in table 7.

Table 7: Values of coefficients of model (3) and characteristic of their importance

Coefficient	**a_1**	**a_2**	**a_3**	**a_4**	**a_5**
Value of coefficient	2.027640	-0.004361	0.000003	0.065813	-0.000967
Standard error of coefficient	0.708850	0.002202	0.000002	0.035432	0.000574
t-value	2.860465	-1.980529	2.025699	1.857421	-1.684891
Lower 95% value of coefficient	0.424110	-0.009342	0.000000	-0.014341	-0.002264
Top 95% value of coefficient	3.631169	0.000620	0.000007	0.145967	0.000331
p-value	0.018766	0.078992	0.073443	0.096208	0.126293

Equation (3) is statistically significant, the determination coefficient was 52.517%. An analysis of the significance of the coefficients of equation (3) showed that at a 5% significance level, only the free term of the equation is significant, which indicates the need to include other variables in the model
For small agricultural organizations, the pattern of reproduction is described by the formula

$$y = a_1 + a_2 v_7 v_2 + a_3 v_7^2 \quad (4)$$

The values of the coefficients of the model and their statistical characteristics are presented in table 8.

Table 8: Values of coefficients of model (4) and characteristic of their importance

Coefficient	**a_1**	**a_2**	**a_3**
Value of coefficient	1.58669902	-0.00002324	-0.00000004
Standard error of coefficient	0.22014160	0.00000834	0.00000002
t-value	7.20762927	-2.78746817	-2.34210580
Lower 95% value of coefficient	1.10705168	-0.00004140	-0.00000008
Top 95% value of coefficient	2.06634635	-0.00000507	0.00000000
p-value	0.00001075	0.01642145	0.03724294

Equation (4) is statistically significant, the determination coefficient was 48.475%. An analysis of the significance of the coefficients of equation (4) showed that at a 5% significance level, all model coefficients are significant.

For medium-sized agricultural organizations, the pattern of reproduction is estimated by the formula

$$y = a_1 + a_2 v_8^2 + a_3 v_9^2 \quad (5)$$

The values of the coefficients of the model and their statistical characteristics are presented in table 9

Table 9: Values of coefficients of model (5) and characteristic of their importance

Coefficient	**a_1**	**a_2**	**a_3**
Value of coefficient	1.15080	6.67970	-26.08045
Standard error of coefficient	0.13399	2.08436	10.89888
t-value	8.58849	3.20467	-2.39295
Lower 95% value of coefficient	0.85885	2.13826	-49.82706

Top 95% value of coefficient	1.44275	11.22113	-2.33384
p-value	0.00000	0.00757	0.03395

Equaion (5) is statistically significant, the determination coefficient was 59.182%. An analysis of the significance of the coefficients of equation (5) showed that at a 5% significance level, all model coefficients are significant.

For large agricultural organizations, the pattern of reproduction is estimated by the formula

$$y = \frac{a_1}{\frac{1}{v_3{}^2} + \frac{a_2}{v_8^2 + a_3} + a_4} + a_5 \quad (6)$$

Table 10: Values of coefficients of model (6) and characteristic of their importance

Coefficient	**a_1**	**a_2**	**a_3**	**a_4**	**a_5**
Value of coefficient	0.02964	-31.49654	3801.37596	8567.80226	-0.44277
Standard error of coefficient	0.00020	0.11387	0.16285	3.70059	0.00019
t-value	150.36875	-276.59178	23343.02197	2315.25325	-2309.25895
Lower 95% value of coefficient	0.02920	-31.75026	3801.01311	8559.55684	-0.44320
Top 95% value of coefficient	0.03008	-31.24281	3801.73881	8576.04769	-0.44234
p-value	0.00000	0.00000	0.00000	0.00000	0.00000

Equation (6) is statistically significant, the determination coefficient was 50.215%. An analysis of the significance of the coefficients of equation (6) showed that at a 5% significance level, all model coefficients are significant.

Thus, using models (1) - (6), the previously mentioned assumption that different patterns of reproduction operate for different sized agricultural organizations has been proved. The presence of significant coefficients allows us to identify their economic meaning and draw appropriate conclusions.

Discussion

A study of the significance of the regression equations coefficients (1) - (6) led to the following conclusions:

- For ultra-small organizations with a production volume of up to 1,500 centners, there is a positive quadratic relationship between the indicator of cost reproduction and the capacity of fixed assets in the organization. So, with an increase in fixed assets capacity by 100 hp the growth rate of costs increases by $0{,}02v_3$ % - i.e., at a capacity of 500 hp, additional 100 hp increase the reproduction rate by 10%, and at a capacity of 4000 hp - by 80%;
- For ultra-small organizations with a production volume of up to 1,500 centners, there is a positive quadratic relationship between the indicator of cost reproduction and the indicator per agricultural worker. So, with an increase of this indicator by 50 hectares / per person the growth rate of production costs increases by an amount equal to $0{,}005v_4$ % - i.e., with the value of this indicator of 50 ha / person a twofold increase in this indicator will lead to an increase in the indicator of cost reproduction by 0.25%, with a value of 500 g / person - by 2.5%;
- However, high values of the fixed assets power indicator lead to a negative impact on the results of the reproduction process - there is a negative relationship between the product of the variables v_3 and v_6, which in fact are private from dividing the square of the fixed assets capacity by the number of employees - that is, with a small number of employees, positive effect of the amount of fixed assets is reduced to 0;

- At the same time, it is worth noting that, in the general case, for ulta-small agricultural enterprises in terms of production, a general increase in the level of manufacturability of production and labor (estimated by indicators of the ratio of fixed assets, amount of land and workers) leads to an increase in the cost reproduction rate;
- For small agricultural organizations, there is an inverse quadratic dependence of the indicator of reproduction of production costs and profits. On average, at zero profit margins, the rate of growth of production costs with a 95% probability ranges from 1.1 to 2.07, and with increasing profits it will decrease by an amount positively related to the number of employees - the larger the number of employees, the sharper reproduction rate will decline with increasing profit;
- In medium-sized agricultural organizations, the indicator of cost reproduction depends on the financial results of the organization. So, with a zero value of profit, the reproduction rate with a 95% probability will range from 0.86 to 1.44, an increase in the profitability of the organization leads to an increase in the growth rate of cost reproduction; however, with small volumes of production, this relationship is reversed;
- An analysis of dependence (6) for large organizations allows us to say that when the capacity of fixed assets decreases, the denominator of the fraction (6) increases, and, therefore, the rate of cost reproduction decreases. With small values of the modulus of profitability (tending to zero), the value of the indicator of reproduction of production costs also decreases.

Conclusion

The study proved the previously expressed assumption that different patterns of the reproductive process are identified for different sized agricultural organizations. Among the further directions of the analysis of the reproductive process in agricultural organizations, one can single out the analysis of the laws of natural reproduction, the analysis of reproduction in agricultural organizations involved in the production of heterogeneous agricultural products, as well as the analysis of the impact of the characteristics of human capital on company management, which may affect management decisions (Dias, Rodrigues, Ferreira, 2019; Mignouna et all, 2011; Jorge, Douglas, Huang, 1994; Fernandez-Cornejo et all 2017; Keelan et all, 2009).

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Methodological Approach to Assessing the Effectiveness of Cluster Interaction in the Field of Rural Services

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Abstract

The article substantiates the need to develop a methodology for assessing the effectiveness of cluster interaction using housing and communal services as an example. The relevance of the study is obvious, since the creation of clusters in this area will improve the quality of services in rural areas, and assessing the effectiveness of the cluster's activity will develop a mechanism for its optimal management. Based on the analysis of domestic and foreign experience, it is concluded that it is advisable to evaluate the synergistic effects arising from the functioning of the cluster. The use of the Harrington desirability function and the method of pairwise comparisons of alternatives for calculating the cluster state index is proposed. Conclusions are made about the appropriateness of applying the cluster functioning efficiency index in assessing cluster interactions.

Keywords: Housing and Communal Services, Cluster, Performance Evaluation, Rural Area, Synergistic Effect, Desirability Function.

Introduction

Creating conditions for a comfortable and safe living of a person is the basis of the policy of the social state. The standard of living of the population is directly proportional to the quality of the provided housing and communal services. Thus, the sphere of housing and communal services is the foundation of the socio-economic life of society. Despite constant reforms in the industry, significant improvements in this sector of the economy do not occur. The low investment attractiveness due to state regulation of tariffs does not contribute to the introduction of innovations, the development of competition and a change in the approach to managing enterprises in the field of housing and communal services (Skripnik O., 2017; Mottaeva A., 2019).

Cluster formation in this area can significantly improve the situation in the housing and communal services market and attract private investors. Of particular interest is not only the mechanism of formation and development of the cluster in the field of housing and communal services, but also the assessment of the effectiveness of its functioning.

Currently, due to the lack of a single generally accepted approach to assessing the economic efficiency of enterprises in various sectors, including the field of housing and communal services, it is difficult to predict the need for a cluster. As practice shows, a comprehensive assessment of cluster programs is carried out extremely rarely, due to the cost of this event. In addition, the lack of consistency in the opinions of experts leads to incorrect assessment results (Oborina E.D., 2016).

The purpose of this study is to develop a system of indicators and a description of the methodology for assessing the functioning of the cluster in the field of housing and communal services in rural areas of the Russian Federation.

Materials and Methods

Analyzing domestic and foreign experience in implementing cluster policies in various sectors of the economy, we can conclude that one of the most successful methods for assessing the effectiveness of a cluster is to evaluate the so-called synergistic effect (Skoch A.V., 2008; Zhdanov S.A., etc., 2018). The synergistic effect in this context is understood as the total arithmetic sum of the value of the assets of the united organizations included the cluster, which exceeds the sum of the costs of the individual assets of these enterprises.

The concept of “synergetics” was first introduced by the founder of the theory of synergetics, Nobel laureate Herman Haken in 1969 (HakenG., 1980). The main types of synergistic effects arising from the functioning of the cluster include managerial, financial, innovative, infrastructural and operational. At the same time, many scientists, when assessing cluster effects, are guided both by the performance indicators of organizations included into the cluster and by the development indicators of the region as a whole (Buyanova M.E., Dmitrieva L. V., 2012; Leonova L. B., 2015; Zhdanov S.A., etc., 2018).

However, the sphere of housing and communal services, primarily, the socially significant sphere and improving the quality of these services will have a significant impact on the development of rural areas (Provalenova N.V., 2018, 2019; Egorov E.E. etc., 2019). We’ll draw attention to the fact that the provision of, for example, housing services involves the direct participation of consumers in their provision. Features of the services must be considered when forming performance indicators features of cluster functioning (Sri Herliana, 2015; Niusha Esmaeilpoorarabietal, 2017; Agapitova E. etal; Derbasova E. etal, 2019).

The work of many researchers noted the importance of including the results of interviewing experts as an integral part of the information security and reliability of the assessment results (Lyubushin N.P. Brigach G. E., 2014; Bezborodova T.I. 2014) In our opinion, to increase objectivity analysis of the cluster, it is important to take into account the views of all experts interested in the cluster, both external and internal.

Results

Evaluation of the effectiveness of the functioning of the cluster is necessary. It is a difficult task due to the multicomponent and heterogeneous performance indicators of cluster entities. The assessment process should be conducted systematically, sequentially and continuously, including all stages of the implementation of cluster projects from creation to control. At the same time, it is not enough to rely solely on economic data; one must take into account both the social and innovative components.

Discussion

The authors identified three groups of indicators of the cluster functioning efficiency in the field of housing and communal services in rural areas, among which are indicators of economic, social and innovative efficiency (Table 1).

Table 1: performance indicators cluster in the sphere of housing and communal services

№ п/п	Name of the indicator	Symbol of the indicator	Value of the indicator
	Economic performance indicators		
1.	The profitability of organizations included in the cluster	$П_1$	x_1
2.	Return on investment	$П_2$	x_2
3.	Capital productivity	$П_3$	x_3
	Social performance indicators		
4.	The average monthly accrued nominal wages of employees of organizations included in the cluster	$П_4$	x_4
5.	The number of newly created jobs	$П_5$	x_5
6.	The level of provision of the population with services	$П_6$	x_6
7.	The proportion of dilapidated and emergency housing stock in the total area of the entire housing stock	$П_7$	x_7
8.	The proportion of communal infrastructure facilities (heat, water and sewer networks) that are in a worn state	$П_7$	x_8
9.	The number of accidents at the facilities of municipal infrastructure in the field of water, heat supply and sanitation in the production, transportation and distribution of public resources	$П_9$	x_9
	Innovation Performance Indicators		
10.	The number of innovative, research and development projects implemented in the field of housing and communal services, including environmental protection	$П_{10}$	x_{10}
11.	The savings received by organizations included in the cluster from the measures taken to save energy	$П_{11}$	x_{11}
12.	The proportion of residential premises equipped with meters for the consumption of communal resources in the total area of the entire housing stock	$П_{12}$	x_{12}

The choice of these indicators is justified, which is confirmed by correlation analysis. So, based on 52 observations, a correlation matrix of economic efficiency indicators was obtained, which confirms the absence of their linear dependence and multicollinearity. Similarly, indicators of social and innovative effectiveness were tested.

$$\begin{pmatrix} 1 & - & - \\ 0{,}34 & 1 & - \\ 0{,}24 & 0{,}17 & 1 \end{pmatrix},$$

The proposed performance indicators do not have normative values, which leads to uncertainty and creates the risk of making non-optimal managerial decisions when evaluating the effectiveness of the functioning of the cluster. The theory of fuzzy sets makes it possible to operate with similar concepts that differ in heterogeneity. The use in the tasks of constructing an integrated performance assessment based on an analysis of the totality of the considered indicators is justified (Lyubushin N. P. Brigach G. E., 2014; Puryaev A.S., 2018).

From the point of view of the theory of fuzzy sets, the process of evaluating the effectiveness of cluster interactions is to establish the rules of correspondence between the elements of the set of input indicators and the elements of the set of output parameters. As a solution to this multicriteria problem, it is proposed to use the procedure for finding a certain generalizing indicator that can coordinate different-sized, heterogeneous indicators, bringing them together. The most successful way of calculating this indicator is the Harrington desirability function (Harrington E.C.Jr., 1965), which consists in converting the values of private indicators into a dimensionless scale of preference with psychophysical characteristics (Table 2).

Table 2: Harrington Desirability Scale

Desirability	The value of the desirability function
Very well	1,00 – 0,80
Good	0,80 – 0,63
Satisfactorily	0,63 – 0,37
Poorly	0,37 – 0,20
Very bad	0,20 – 0,00

The desirability function obtained as a result of empirical observations has the necessary properties, such as continuity, monotony, and smoothness (Heike Trautmann, Claus Weihs, 2006; Başak Akteke-Öztürk, Gerhard-Wilhelm Weber, Gülser Köksal, 2019). Values of the function range from zero to one. Moreover, “0” corresponds to the extreme degree of undesirability, and “1” corresponds to the absolute preference of the attribute. It is worth noting that the “sensitivity” of the function is significantly higher in the middle part of the graph (scale) and significantly decreases when approaching the boundaries. The value of the function $d_i = 0{,}37$ is the extreme acceptable value (Fig. 1).

Fig. 1: Harrington's Desirability Function Graph

Let us turn to the description of the main points of the methodology for assessing the cluster functioning efficiency. Initially, it is important to analyze the indicators and set the boundaries of acceptable values for all private indicators of the assessment. The restrictions imposed on the parameters are of two types: unilateral (y_{min} или y_{max}) and bilateral (y_{min} и y_{max}). In our case, all of the indicators listed above belong to the first group. For now, the Harrington function has the form:

$$d = e^{-e^{-y'}},$$

where y' is the coded (dimensionless) value of the indicator obtained from the equation y' = a + b · x. Coefficients a and b are obtained if we set the equation for two standard values of the indicator of a dimensionless scale in accordance with the values of their natural indicators x_i. The lower value is selected according to the initial value of the parameter, the upper - the final one, unless otherwise provided by the standard or legal regulation, while it is preferable to consider values that belong to the range (0.2; 0.8) with the greatest "sensitivity", for example:

$$\begin{cases} -0{,}5 = a + b \cdot x_{i(min)} \\ 1{,}5 = a + b \cdot x_{i(max.)} \end{cases},$$

where $x_{i(min.)}$ is the smallest (or worst) value of the indicator x_i, $x_{i(max.)}$is the largest (or best) value of the indicator x_i,

Based on the results obtained, intragroup generalized indicators of the desirability function are calculated, which are geometric mean partial indicators for groups characterizing economic, social, and innovative effectiveness:

$$D_j = \sqrt[\Sigma_{i=1}^{n} k_i]{\prod_{i=1}^{n} d_i^{k_i}},$$

where $d_i$are the values of particular preferences; k_i- is the weight coefficient of the indicator; *n* is the number of indicators; *i* - indicator number; *j* is the number of the indicator group.

Next, the intergroup generalized indicator of the desirability function is calculated - the cluster state index at time moment *m*, the values of which satisfy the desirability scale presented in Table 2:

$$I_m = \sqrt[\Sigma_{j=1}^{l} K_j]{\prod_{j=1}^{l} D_j^{K_j}},$$

where D_j- intragroup particular values of the desirability function; $K_j$is the weight coefficient of the indicator group; *l* is the number of indicator groups; *j* is the number of the indicator group.

The weight of the importance of the coefficients can be calculated in any convenient way, but the use of expert assessment methods (in particular, pairwise comparisons) will reduce subjectivity in the field of propositions and make an independent decision in view of checking the consistency of expert opinions. The indisputable advantage of the method of pairwise comparisons is a clear mathematical argumentation of the calculations and the relative prostate of the calculations. In accordance with the above method, a group of experts is created, which includes representatives of municipal authorities, heads and specialists of enterprises providing housing and communal services, representatives of small business and the population.

The obtained index of the cluster state $I_m$does not characterize its functional purpose in full, but only allows us to draw conclusions about work at a certain point in time *m*. In this connection, we introduce the cluster operation efficiency index E_m, which is determined not only by its state I_m, but also by the increment $Q_m = I_m - I_{m-1}$:

$$E_m = \alpha I_m + (1 - \alpha) Q_m, \;\; \alpha \in (0; 0{,}9)$$

The coefficient α takes on a value depending on the period of operation, i.e., α*=0,n*, where *n* is the number of years the cluster has been operating, and the maximum value of the coefficient is 0.9. Thus, during the formation of the cluster, and this period can be considered up to three years, α takes a value of no more than 0.3, i.e., the cluster operates taking into account the state of the service sector before its formation, the so-called “inheritance” ". In the heyday (from three to nine years), both condition and growth are significant. After nine years of cluster operation, the state of the cluster is more important. In addition, with a state above average, growth opportunities become limited.
Before creating a cluster and evaluating the effectiveness of its functioning, it is advisable to analyze the state of the sphere in terms of indicators of the socio-economic and innovative activities of enterprises.

Consider the calculation method on the example of organizations of housing and communal services of the municipal regions of the Nizhny Novgorod region, on the territory of which there are all the prerequisites for creating a cluster in the service sector (Table 3).

Table 3: performance Indicator Values

№ п.п.	Indicators	Units rev.	The values of indicators for the periods preceding the formation of the cluster					
			m-6	*m*-5	*m*-4	*m*-3	*m*-2	*m*-1
Economic performance indicators								
1.	The profitability of organizations in the cluster	%	0,8	1,2	2,8	4,1	5,2	4,8
2.	Return on investment	%	13,8	20,1	32,3	64,1	27,8	30,7
3.	Return on assets		0,3	0,3	0,3	0,4	0,4	0,5
Social performance indicators								
4.	Average monthly accrued nominal wages of employees of organizations included in the cluster	rub.	27638,8	30558,7	32700,9	35073,2	39761,6	42498,6
5.	Number of newly created jobs	units	2590	2317	2017	3127	2449	983
6.	The level of provision of the population with services	%	64,9	65,8	67,5	68,3	68,8	69,2
7.	The proportion of dilapidated and emergency housing stock in the total area of the entire housing stock	%	1,8	1,9	1,2	1,2	1,1	1,1
8.	Depreciation of communal infrastructure facilities (heat, water and sewer networks) that are in a worn state	%	58,7	59	63,1	67,22	67,02	67
9.	The number of accidents at the facilities of communal infrastructure in the field of water, heat supply and sanitation in the production, transportation and distribution of communal resources	units	2256	1540	1121	815	723	576
Innovation Performance Indicators								
10.	The number of innovative, research and development projects implemented in the field of housing and communal services, including environmental protection	units	1	1	1	2	2	2
11.	Savings received by organizations included in the cluster from measures taken to save	thousands rub.	-	419874	741842	978595	820640	846770
12.	The proportion of residential premises equipped with meters for the consumption of communal resources in the total area of the entire housing stock	%	29,5	28,3	23	24,3	26,5	27,9

We will calculate the encoded values of y 'for each indicator, having previously compiled a system of two linear equations, the matrix representations of which are of the form:

- for indicator Π_1: $\left(\begin{array}{cc|c} 1 & 0{,}8 & -0{,}5 \\ 1 & 5{,}2 & 1{,}5 \end{array}\right)$;
- for indicator Π_2: $\left(\begin{array}{cc|c} 1 & 13{,}8 & -0{,}5 \\ 1 & 64{,}1 & 1{,}5 \end{array}\right)$;
- for indicator Π_3: $\left(\begin{array}{cc|c} 1 & 0{,}3 & -0{,}5 \\ 1 & 0{,}5 & 1{,}5 \end{array}\right)$;
- for indicator Π_4: $\left(\begin{array}{cc|c} 1 & 37891{,}53 & -0{,}5 \\ 1 & 42498{,}6 & 1{,}5 \end{array}\right)$;
- for indicator Π_5: $\left(\begin{array}{cc|c} 1 & 2590 & -0{,}5 \\ 1 & 3127 & 1{,}5 \end{array}\right)$;
- for indicator Π_6: $\left(\begin{array}{cc|c} 1 & 64{,}9 & -0{,}5 \\ 1 & 69{,}2 & 1{,}5 \end{array}\right)$;
- for indicator Π_7: $\left(\begin{array}{cc|c} 1 & 1{,}9 & -0{,}5 \\ 1 & 1{,}1 & 1{,}5 \end{array}\right)$;
- for indicator Π_8: $\left(\begin{array}{cc|c} 1 & 67{,}22 & -0{,}5 \\ 1 & 58{,}7 & 1{,}5 \end{array}\right)$;
- for indicator Π_9: $\left(\begin{array}{cc|c} 1 & 2256 & -0{,}5 \\ 1 & 576 & 1{,}5 \end{array}\right)$;
- for indicator Π_{10}: $\left(\begin{array}{cc|c} 1 & 1 & -0{,}5 \\ 1 & 2 & 1{,}5 \end{array}\right)$;
- for indicator Π_{11}: $\left(\begin{array}{cc|c} 1 & 419874 & -0{,}5 \\ 1 & 978595 & 1{,}5 \end{array}\right)$;
- for indicator Π_{12}: $\left(\begin{array}{cc|c} 1 & 23 & -0{,}5 \\ 1 & 29{,}5 & 1{,}5 \end{array}\right)$.

As a result of their solution, we obtain the coefficients of the equations of the optimization parameters:

- for indicator Π_1: $y'_1 = -0{,}863 + 0{,}455x_1$
- for indicator Π_2: $y'_2 = -1{,}049 + 0{,}039x_2$
- for indicator Π_3: $y'_3 = -3{,}5 + 10x_3$
- for indicator Π_4: $y'_4 = -16{,}949 + 0{,}00043x_4$
- for indicator Π_5: $y'_5 = -1{,}417 + 0{,}00093x_5$;
- for indicator Π_6: $y'_6 = -30{,}686 + 0{,}465x_6$
- for indicator Π_7: $y'_7 = 4{,}25 - 2{,}5x_7$
- for indicator Π_8: $y'_8 = 15{,}279 - 0{,}235x_8$
- for indicator Π_9: $y'_9 = 2{,}186 - 0{,}0012x_9$;
- for indicator Π_{10}: $y'_{10} = -1 + 0{,}5x_{10}$;
- for indicator Π_{11}: $y'_{11} = -2{,}003 + 3{,}58 \cdot 10^{-6}x_{11}$;
- for indicator Π_{12}: $y'_{12} = -7{,}577 + 0{,}308x_{12}$

As noted above, indicators that assess the state of the housing and communal services sector have various meanings, which should be taken into account before performing calculations to find the values of the functions of particular desirability. We carry out the differentiation of the weighting coefficients through the application of the algorithm of pairwise comparisons of indicators, which allows us to reveal the relative degree of their importance, with a further check on the consistency of opinions.

The expert group was asked to fill out the matrix of pairwise comparisons (Table 4-6) and determine the level of advantage of one indicator over others on a scale of relative importance. The authors calculated the normalized vector (priority vector) by dividing the geometric mean of each row by the sum of geometric mean.

Table 4: matrix of pairwise comparisons of economic performance indicators

	П₁	**П₂**	**П₃**	**Specific indicator weight**
П₁	1	1	2	0,40
П₂	1	1	2	0,40
П₃	0,5	0,5	1	0,20
			Consistency Ratio	0<0,1 (acceptable)

Table 5: matrix of pairwise comparisons of social performance indicators

	П₄	**П₅**	**П₆**	**П₇**	**П₈**	**П₉**	**Specific indicator weight**
П₃	1	1	0,(3)	0,5	0,5	1	0,10
П₄	1	1	0,(3)	0,5	0,5	1	0,10
П₅	3	3	1	2	2	3	0,32
П₇	2	2	0,5	1	1	2	0,19
П₈	2	2	0,5	1	1	2	0,19
П₉	1	1	0,(3)	0,5	0,5	1	0,10
						Consistency Ratio	0,0029<0,1 (acceptable)

Table 6: matrix of pairwise comparisons of innovation performance indicators

	П₁₀	**П₁₁**	**П₁₂**	**Specific indicator weight**
П₁₀	1	0,51	1	0,25
П₁₁	2	1	2	0,50
П₁₂	1	0,5	1	0,25
			Consistency Ratio	0<0,1 (acceptable)

Initially, any matrix of judgments in general terms is not consistent, due to experts making subjective decisions and the existing risk of computational errors. Therefore, it is important to assess the degree of consistency of the results.

A matrix is considered consistent if the consistency ratio $OC = \frac{ИС}{СИ}$ is less than or equal to an acceptable value of 0.1. In our case, all judgment matrices are consistent.

Similarly, we calculate the weighting coefficients for the matrix of pairwise comparisons of groups of indicators of economic, social and innovative effectiveness (Table 7).

Table 7: matrix of pairwise comparisons of groups of indicators of economic, social and innovative effectiveness

	Economic performance indicators	Social performance indicators	Innovation performance indicators	Specific indicator weight
Economic performance indicators	1	0,5	2	0,30
Social performance indicators	2	1	3	0,54
Innovation performance indicators	0,5	0,(3)	1	0,16
			Consistency Ratio	0,0079<0,1 (acceptable)

When analyzing the effectiveness of the functioning of the cluster, it is sufficient to assess the state of the sphere of housing and communal services (activities of housing and communal services enterprises) only for the period (year) preceding the creation of the cluster. The calculation data for the indicators of the (m-1) period are presented in table 8.

Table 8: the results of the calculation of the desirability function

№	Indicators	k_i	y'_i	d_i	K_j	D_j
Economic performance indicators						
1.	The profitability of organizations in the cluster	0,40	1,32	0,76	0,30	0,61
2.	Return on investment	0,40	0,17	0,43		
3.	Return on assets	0,20	1,5	0,8		
Social performance indicators						
4.	Average monthly accrued nominal wages of employees of organizations included in the cluster	0,10	1,5	0,8	0,54	0,53
5.	Number of newly created jobs	0,10	-0,5	0,19		
6.	The level of provision of the population with services	0,32	1,5	0,8		
7.	The proportion of dilapidated and emergency housing stock in the total area of the entire housing stock	0,19	1,5	0,8		
8.	Depreciation of communal infrastructure facilities (heat, water and sewer networks) that are in a worn state	0,19	-0,44	0,21		
9.	The number of accidents at the facilities of communal infrastructure in the field of water, heat supply and sanitation in the production, transportation and distribution of communal resources	0,10	1,5	0,8		
Innovation performance indicators						
10.	The number of innovative, research and development (projects) implemented in the field of housing and communal services, including environmental	0,25	0,37	0,368	0,16	0,59

	protection					
11.	Savings received by organizations included in the cluster from measures taken to save	0,50	1,028	0,7		
12.	The proportion of residential premises equipped with meters for the consumption of communal resources in the total area of the entire housing stock	0,25	1,008	0,69		
A generalized indicator of the function of desirability						0,56

The obtained generalized indicator of the desirability function indicates a satisfactory state of the services sector in rural areas of the Nizhny Novgorod region in the pre-cluster period, which indicates the presence of potential for growth, a significant increase in the performance indicators of the enterprises of housing and communal services provided they participate in the implementation of cluster programs.

Let us turn to a graphical representation of the state in which organizations that provide housing and communal services in the (*m*-1) period are located (Fig. 2).

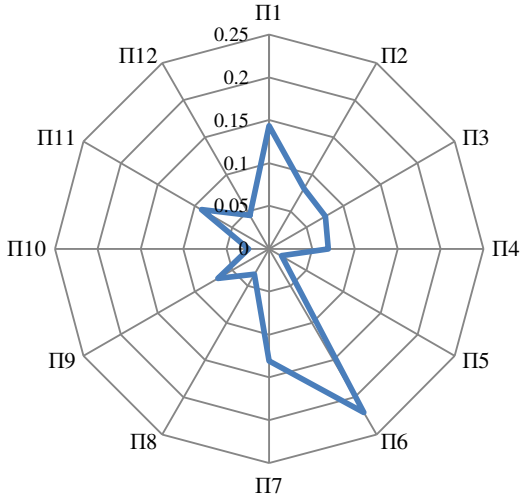

Fig. 2: Condition diagram of enterprises in the field of housing and communal services

The vertices of the polygon correspond to the normalized exponents of the values of the desirability function. Note that this diagram not only shows the state in which the system is located, but also shows what you need to pay attention to and what you should strive for.

Conclusion

Thus, the work considers a methodological approach to assessing the effectiveness of the functioning of the cluster in the field of housing and communal services, based on the use of the desirability function.

The presented technique allows you to:

– take into account the specifics of housing and communal services when choosing indicators for assessing the effectiveness of the functioning of the cluster;

– eliminate uncertainty in the heterogeneity and multicomponentness of indicators by translating them into a coded dimensionless scale using the desirability function;

– take into account the significance of the indicators under consideration using weighting coefficients calculated on the basis of expert assessments of pairwise comparisons of indicators;

– check the judgments for consistency and to eliminate possible subjectivism when making decisions;

– carry out the process of evaluations in a planned, consistent and continuous manner, taking into account all stages of the functioning of the cluster;

– greatly simplify the assessment procedure, due to simple mathematical calculations.

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The Economic Rationale for the Effectiveness of Using Agricultural Practices in Nursery Breeding, When Laying and Caring for Hop Plantations

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Abstract

The analysis of the economic efficiency of various agricultural practices (application of herbicides in the nursery when growing hop seedlings by green cuttings, planting of new plantings with various types of planting materials and using setting up as crop supports in the first year) in the conditions of the Chuvash Republic. Various doses of herbicides were used when growing planting material at certain times in order to exclude the phytotoxic effect on young shoots of green hop cuttings. According to the results of the study, the high efficiency of the use of herbicides in plantings was established, which eliminated manual weeding and significantly reduced labor costs per 1 hectar. The survival rate of stem cuttings and annual seedlings depended on the timing of planting, the type of planting material and weather conditions. On the hop of 1 year of laying with traditional technology, production costs are 620 people / hour, and when using crops as supports, they are reduced to 36 people / hour. With a yield of more than 2 kg / ha due to increased costs for mechanized and manual work; cleaning; for the purchase of twine, wire and protective equipment, growing hops becomes unprofitable. The differences in costs, with a certain productivity, are caused by additional expenses for harvesting. As productivity increases, profits increase to 61.5 thousand rubles.

The use of crops as a supporting material is a profitable technological technique, since the costs of mechanized and equestrian work are reduced to 3.3 thousand rubles, and for the purchase of materials and protective equipment up to 10 thousand rubles.

Keywords: Agricultural practices, traditional technology, herbicides, green cuttings method, supporting crops, planting stock, efficiency.

Introduction

Improving existing techniques and developing new most effective methods of cultivation is relevant in hop cultivation. Zakharov A.I., Makushev A.E., Zakharov D.A., Tolstov M.L. (2017) note that special attention is paid to technological factors of resource saving: the use of industrial technologies for growing high-quality planting material, creating optimal conditions for plant growth and development, the use of highly efficient types of trellis and plantings, cultivating intensive cultivars, mastering industrial production technologies, etc. in the production of hop raw materials. The efficiency of production of marketable hops is possible while reducing the cost and production costs per unit of output.

Milosta G.M., Lapa V.V. (2010) indicate that the use of herbicides allows you to maintain the degree of weediness and yield at the level of the option with the use of manual weeding, but significantly reduces labor costs. Some scientists believe that herbicides have a phytotoxic effect on hops. However, according to the conclusions of V.V. Kozina (1985) herbicides stomp, dual and bazagran are not phytotoxic for hops and effectively suppress weeds.

Under production conditions, a reduction in the period of low commercial fruiting and obtaining a good crop of hop cones in the second year is possible only when using annual seedlings with high plant survival after planting as planting material.

In hop breeding, the issues of using soil herbicides in nursery breeding when planting plantings with various types of hop planting material is of great importance mainly because the cultivation of planting material, the state of hoppers, and the technology of care during the growing season in the first and subsequent years largely depend on this. Alexandrov N.A. (1991, 1989). notes that hops are planted only with one-year-old seedlings grown in open and protected ground nurseries. Also, E.P. Libatsky (1984) believes that it is better to plant hops by annual seedlings, although planting by cuttings is also used.

The most progressive and reliable method, as well as ensuring high survival rate, is considered to be the method of laying hops with annual seedlings grown from stem and green cuttings in the autumn period in the second decade of October. In recent years, in the preparation of planting material, a method of growing seedlings from green cuttings has been successfully applied. According to V.P. Prokopyev (2008) athis method has a significant advantage for the quickest propagation of new, promising hop varieties.

Spring laying hops with stem cuttings, especially in a dry year, is a risky operation. Often, under such conditions, the survival rate of stem cuttings is reduced to 50%. In the future, such hoppers are difficult to bring in density to a full state, and as a rule, from year to year they remain low-yielding. However, under favorable weather conditions, the laying of hops with stem cuttings should not be discarded. Nikonova Z.A., Korotkova Z.P. (2017) note that the new collection nursery was laid with freshly cut stem cuttings from manual trimming of samples of the old collection. So, in the research of Korotkova A.V. (2008, 2019) it is proved that with the correct implementation of agricultural measures that ensure the survival of plants and create conditions for the growth and development of the root system, such hoppers are able to provide up to 2-6 kg / ha of hops in the first year of fruiting.

Hop is a liana-like climbing plant, so a special trellis is needed to cultivate it. According to the methodological recommendation “Perspective Resource-Saving Production Technology” each bush must be provided with supports for normal growth and development of plants.

Materials and Methods

The studies were carried out in the nursery of seedlings breeding when growing by the method of green cuttings, when laying new plantings with various types of planting material, and on the hop of 1 year of laying using crops as a supporting material. Various elements of the technology of

cultivation of common hop are summarized with a combination of agronomic assessment of techniques. The studies used methods of direct counting, visual assessments and field observations of plants. The identification of the economic efficiency of agro-activities carried out on hoppers was carried out at the cost of labor and funds provided by technological maps.

Research Results and Discussion

The control of weeds is of great importance in the cultivation of hop seedlings in the breeding nursery using the green cuttings method. Timely weeding eliminates inhibition, contributes to better growth and development of green cuttings. Currently, agronomic measures against weeds in breeding nurseries of the farms of the Chuvash Republic engaged in the cultivation of planting material are carried out exclusively by hand and labor costs in this case reach 185 people / days per 1 ha. Therefore, the use of herbicides in the nursery is relevant and is of some interest. Various doses of soil herbicides were applied at certain times in order to exclude the phytotoxic effect on young shoots of green hop cuttings. According to the results of the study, the high efficiency of herbicides on hop plantings was established (Table 1). After the opening of the film shelters in the control variant - without the use of herbicides, the number of weeds was 14 pcs / m². As the dose was increased and when used earlier, the weediness decreased by 64.3%. And when applying gaitan, a week before planting green cuttings, the weediness of plantings was up to 2-3 pcs./m². By the digging of seedlings on plots without treatment with herbicides, the number of weeds increased to 25 pcs / m². When spraying rows with a corsair on seedlings, the complete destruction of vegetative weeds occurred. Gaitan has proven effective in controlling cereal and dicotyledonous weeds.

As a result of visual observations in variants with a late period of application of herbicides, a phytotoxic effect was observed on young shoots of green hop cuttings. Some of them completely died, yellowing of the leaves took place, and further oppression of plants continued during the growing season.

Table 1: Effect of timing and doses of herbicide application on the weediness of hop plantings in the breeding nursery, 2019

Option	Thetiming		Weedweight		Totalweediness	
	After opening the films, pcs / m²	Before digging seedlings, pcs / m²	After opening the films, kg	Beforediggingseedlings, kg	Minors, pcs.	Perennial, pcs.
Control - noprocessing	14	25	0,5	3,15	22	3
EarlySpringGaitan - 1.7	11	10	0,4	3,05	10	1
Early spring application of gaitan -2.5	9	12	0,4	2,9	12	-

Early spring application of gaitan -3.5	8	7	0,3	2,9	7	-
Early spring introduction of gaitan - 1.7 + corsair - 1.5	9	-	0,4	-	-	-
Early spring introduction of gaitan - 2.5 + corsair - 2.0	5	-	0,2	-	-	-
Early spring introduction of gaitan - 3.5 + corsair - 3.0	5	-	0,2	-	-	-
Introductionbefore planting gaitan - 1.7	3	-	0,15	-	-	-
Introductionbefore planting gaitan - 2.5	2	-	0,1	-	-	-
Introductionbefore planting gaitan - 3.5	-	-	-	-	-	-
Introduction before planting gaitan - 1.7 + corsair - 1.5	3	-	0,15	-	-	-
Introduction before planting gaitan - 2.5 + corsair - 2.0	2	-	0,15	-	-	-
Introduction before planting gaitan - 3.5 + corsair - 3.0	-	-	-	-	-	-

Only individual farms are engaged in the cultivation of planting material in the Chuvash Republic. The volume of produced planting material at the enterprises of the republic is on average 20 thousand pieces, which will occupy the planted area up to 1117 m². Consequently, labor costs for manual weeding will amount to 21 people / days. When using soil herbicides, manual weeding is eliminated, labor costs per 1 ha are significantly reduced.

According to the results of studies, it was found that the survival rate of stem cuttings and annual seedlings depended on the planting time, type of planting material, and weather conditions. On 1-year-old hop plantations of layingwith stem cuttings, the yield was low compared to planting with annual seedlings. In the conditions of the dry summer of 2018, a significant part of the stems reached only the middle, and very few to the top of the trellis, the cones were small. In 2019, on the hoppers of the first year of laying with stem cuttings did not form cones, and with annual seedlings the yield was only 1.0-1.5 c / ha. Therefore, growing hops with traditional technology, including the cost of buying twine, pesticides and caring for plants, becomes unprofitable.

For the growth and development of hops, each bush must be provided with supporting material. So, when planting is left unsupported during inter-row cultivation, tramming of creeping shoots occurs and work on hilling bushes as a result of landfill is difficult.

According to the results of the 2019 study, it was found that in the variant with supporting crops, by the end of the growing season, the stems grew to 2.45 m, with twine - 2.66 m, and the seedling mass was 10.0 g., 26.3 g. respectively. The number of main roots formed up to 2-3 pcs.,and the length - 2.45-2.66 m and 3-5 buds of renewal. Cones did not have time to form.

On the hop of 1 year of laying with traditional technology, production costs are 620 people / hour, and when using crops as supports, they are reduced to 36 people / hour. With a yield of more than 2 kg / ha due to increased costs for mechanized and manual work; cleaning; for the purchase of twine, wire and protective equipment, growing hops becomes unprofitable. The differences in costs, with a certain productivity, are caused by additional expenses for harvesting. As productivity increases, profits increase to 61.5 thousand rubles.

The use of crops as a supporting material is a profitable technological technique, since the costs of mechanized and equestrian work are reduced to 3.3 thousand rubles, and for the purchase of materials and protective equipment up to 10 thousand rubles (Table 2).

According to many years of research in the conditions of the Chuvash Republic, under adverse weather conditions, on the hoppers of 1 year of laying, the average yield is 0.5-2 kg / ha.

Consequently, in such conditions and with a lack of labor, that is currently characteristic of agriculture, hop-growing enterprises on the hoppers of 1 year of laying with planting by stem cuttings, it is recommended to use supporting crops as hop supports.

Table 2: Economic efficiency of using agricultural material as a supporting material on hoppers of 1 year laying with stem cuttings

Option	**Mechanized and equestrian work, (thousand rubles)**	**Mechanized harvesting, drying and pressing of hops, (thousand rubles)**	**Cost of materials and means, (thousandrubles)**	**laborcosts, (people / hour)**	**Cost of production, (thousand rubles)**	**Profit, (thousandroubles.)**
Productivity 2 kg / ha						
When hanging hops with polypropylene twine	42,0	10,4	20,0	492/128	70,0	-2,4
Productivity 3 kg / ha						
When hanging hops with polypropylene twine	42,0	14,5	30,0	492/172	105,0	+18,5
Productivity 4 kg / ha						
When hanging hops with polypropylene twine	42,0	18,0	40,0	492/216	140,0	+40,0
Productivity 5 kg / ha						
When hanging hops with polypropylene twine	42,0	21,5	50,0	492/260	175,0	+61,5
When using agricultural crops as a supporting material	3,3	-	10,0	36/0	0	-13,3

Conclusion

The high efficiency of the use of herbicides on plantings was established, which eliminated manual weeding and significantly reduced labor costs per 1 ha. The survival rate of stem cuttings and annual seedlings depended on the timing of planting, the type of planting material and weather conditions.

On the hop of 1 year of laying with traditional technology, production costs are 620 people / hour, and when using crops as supports, they are reduced to 36 people / hour. With a yield of more than 2 kg / ha due to increased costs for mechanized and manual work; cleaning; for the purchase of twine, wire and protective equipment, growing hops becomes unprofitable. The differences in costs, with a certain productivity, are caused by additional expenses for harvesting. As productivity increases, profits increase to 61.5 thousand rubles.

The use of crops as a supporting material is a profitable technological technique, since the costs of mechanized and equestrian work are reduced to 3.3 thousand rubles, and for the purchase of materials and protective equipment up to 10 thousand rubles.

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The Influence of The Innovative Development Sustainability Class of Agricultural Enterprises on The Stimulation of Innovative Processes in The Regional Agribusiness

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Abstract

The article explores the specifics of innovation processes in the regional agro-industrial complex, considers approaches to a comprehensive assessment of the level of development of a regional innovation system, offers recommendations for stimulating innovation processes in the agricultural sector of the Republic of Mari El based on the level of sustainability of innovative development of agricultural enterprises.

Keywords: Innovation Process, Regional Innovation System, Innovative Development, Sustainability of Innovation Development

Introduction

The agro-industrial complex (AIC) is one of the significant elements of the Russian economy. In the agro-industrial sector, socially important products are produced, the significant industrial and economic potential of the country is concentrated. As a macroeconomic system, the complexity and heterogeneity of the structure of the agricultural processing industry and the specifics of its development processes depend on the characteristics of agricultural production and the agricultural economic structure. This actualizes the need for clarification and justification of conceptual and methodological approaches to the study of innovative processes carried out in the agricultural system.

The strategic goal of implementing innovative activities in the agricultural sector is to introduce models of the knowledge economy in the agricultural sector, create innovative cultural ideologies at the federal and regional levels, and create innovative agricultural production integrated into the global economic system. In this process, the development of regional innovation systems plays an important role. In the framework of this study, regional innovation systems in agricultural complexes are defined as organizations and institutions designed to implement the innovation process in the agricultural sector of a particular region. These systems are designed to provide:

- ✓ the potential for creating and diffusing innovations in the agricultural sector;
- ✓ technical and technological renewal of agricultural production due to the active development of advanced scientific and technical developments;
- ✓ formation of a competitive agribusiness.

When developing a regional innovation policy, it is necessary to focus primarily on the innovative potential of key enterprises in the territory. In this regard, the problem of forming a system of indicators for assessing the level of innovative development of the regional economic system, especially for enterprises of the industry, arises. Understanding the innovative nature of local production potential can lay the foundation for ensuring coherence in regional organizational and economic development, as well as determine the development and integration based on innovation.

According to a study conducted by the Institute for Statistical Studies and Economics of Knowledge (ISSEK) of the Higher School of Economics, large and medium-sized agricultural organizations of the Russian Federation are characterized by a low level of innovative activity. The share of agricultural enterprises introducing technological innovations in 2018 amounted to only 3.4%. In comparison, in industrial production this indicator is 9.2%. The maximum value of the level of innovative activity in agriculture was recorded in the field of animal husbandry (3.9%) and crop production (3.7%).

Agriculture and industrial sectors play an important role in the formation of the central link of the territory's economy, which attracts support services and other related industries. Therefore, the creation of conditions for innovation and development of the agricultural sector of the region is one of the most important factors affecting the competitiveness of the country's socio-economic system, the standard of living of the population and the quality of its life, which undoubtedly determines the relevance of the research topic.

The object of the research is the innovative processes of the regional agro-industrial complex in the context of the transformation processes taking place in the Russian and world economies.

The subject of the research is the problems of the influence of innovative processes on the development of macro- and microeconomic systems and the efficiency of their reproduction.

The influence of the innovation process on the efficiency of the development and regeneration of macro- and microeconomic systems has become a research topic for many scientists.

The purpose of the study is to develop proposals for stimulating innovative processes in the regional agro-industrial complex based on assessing the level of sustainability of innovative development of leading enterprises in the industry.

Research results and Discussion

A characteristic feature of modern macroeconomics is the dynamic development of innovative processes, the deepening of the social division of labor and the development of vertically integrated forms. In this regard, large intersectoral complexes are actively formed and developed. An important place among them is taken by the agro-industrial complex as a subsystem of market macroeconomics.

The complexity and heterogeneity of the agri-food complex as an economic system, the specifics of its development processes, determined both by the specifics of agrarian production and the agrarian structure of the economy, require substantiation of conceptual and methodological approaches to the formation of the innovative development system of the agro-industrial complex of the Russian Federation (Table 1).

Table 1: the Conceptual framework for the development of the industry innovation system of the agro-industrial complex of the Russian Federation

Term	Strategic priorities	Results
Medium term	-the creation of a regulatory framework for the regulation of industry-specific innovation processes in the agricultural sector; - building a system for the development of the technological and scientific research basis of the economy; - import of technologies and development of infrastructure of innovation transfer; - formation of the basic segments of the domestic market for innovative products	- continuous, accelerating growth in the need for skilled workers; - orientation of the business in the agricultural sector to high-tech production; - optimization of zoning of both agricultural production and the entire infrastructure of the agro-industrial complex, including primarily related to the development and implementation of innovations
Long-term perspective	- formation of an internal innovative industry market; - development and creation in the village of the middle class, focused on high professional culture as a living standard; - modernization of the agro-industrial sector of the country's economy; - strengthening the position of the industry in terms of reducing the imbalance in development between industries and agriculture	- steady growth of the information segment of agro-economy as the basis of the progress of the economic system; - investments in human capital, knowledge as an effective form of social accumulation; - transformation of knowledge into an economic and production resource; - development of new models of reproduction to accelerate the processes of society development

The combination of economic and biological processes determines the specifics of expanded reproduction. Therefore, when managing innovations in the agro-industrial complex, it is necessary to take into account not only the requirements of financial laws, but also the natural influence of the laws of nature: indispensability, equivalence and a combination of life factors.

For the agricultural sector, there are many factors that can stimulate the development of innovative processes. Among them, it seems appropriate to single out the following:

- availability of natural resources,
- significant scientific and educational potential,
- capacious domestic food market,
- ability to produce environmentally friendly natural foods.

The factors restraining the innovative development of the agro-industrial complex include:

- decrease in domestic demand for food,
- reduction of state support for the agricultural sector and state funding of scientific and technical programs,
- high interest rates on loans, lack of innovative infrastructure;
- insufficient level of training for agricultural organizations in the field of innovation management.

The Republic of Mari El (RME) is part of the Volga Federal District and is part of the Volga-Vyatka Economic Region. According to the main indicators of socio-economic development, the RME until 2016 steadily occupied the last places in the ranking of the regions of the Volga Federal District.

Nevertheless, it should be noted that the growth rate of agricultural production in 2015-2018 the Republic of Mari El demonstrates the highest rates, taking second or third places among the Volga regions, and is among the ten most active in this sphere entities of the Russian Federation. Most of the agricultural products (more than 60%) are produced by enterprises of the Republic.

In general, in the Volga Federal District for 2018, the following results were obtained for agricultural production (Table 2).

Table 2: agricultural products in the Volga Federal District in 2018, million rubles

Territory	Agriculture	Including:		Reporting year in% to the previous year (in comparable prices)		
		plant growing	animal husbandry	agricultural organizations	households	peasant (farmer) economy, entrepreneurs
Russian Federation	**5119756**	**2568966**	**2550790**	**99,4**	**97,6**	**101,3**
Volga Federal District	**1138372,5**	**530496,0**	**607876,5**	**98,7**	**96,3**	**100,9**
Republic of Bashkortostan	152220,3	61606,2	90614,1	99,1	99,6	98,8
Mari El Republic	**41386,4**	**9597,1**	**31789,3**	**109,6**	**127,1**	**104,8**
Republic of Mordovia	59758,9	22147,9	37610,9	101,3	96,3	104,5
Republic of Tatarstan	216002,9	101699,3	114303,6	97,1	92,3	101,8
Udmurt Republic	64491,1	22571,3	41919,9	101,1	99,9	101,8
Chuvash Republic	37370,9	17183,4	20187,5	101,7	100,9	102,3
PermRegion	42920,6	13899,3	29021,3	105,6	115,9	100,9
Kirov Region	39869,2	13866,0	26003,2	104,0	108,8	101,6
Nizhny Novgorod Region	66901,5	28853,0	38048,5	99,6	100,3	99,0
Orenburg Region	99576,4	47664,9	51911,5	89,5	84,0	95,4
Penza Region	74247,8	34855,1	39392,7	100,6	96,1	104,8
Samara Region	85420,8	55105,0	30315,7	100,9	102,3	98,6
Saratov Region	124728,5	81575,6	43152,8	96,6	93,9	102,0
Ulyanovsk Region	33477,4	19872,0	13605,4	96,9	94,1	101,8

For the first time in recent years, the Republic of Mari El has taken first place in the Volga Federal District and fourth in Russia in terms of agricultural production. The production index in farms of all

categories amounted to 110.3%, including in agricultural organizations - 109.6%. In January-October 2018, 240.2 thousand tons of cattle and poultry meat were produced, which is 5% higher than the same period last year. The average milk yield per cow in agricultural organizations increased by 201 kg and amounted to 6000 kg.

Nevertheless, the issue of intensification of agricultural production is very relevant for the Republic, since these processes are active only in individual farms of the Soviet and Zvenigovsky districts, where advanced technologies and resource-saving technologies are used.

At the end of 2018, 100 agricultural enterprises, 2060 peasant (farm) enterprises and individual entrepreneurs, 241 food and processing enterprises, 35 agricultural consumer cooperatives operated in the territory of the Mari El Republic. According to the rating of agricultural enterprises in 2018, the national indicator for the average milk yield per cow amounted to 6883 kg. Table 3 presents the rating of agricultural enterprises of the Republic of Mari El by the average milk yield per cow according to the results of 2017 and 2018. For several years now, ZAO Semenovsky has beenthe leader in the industry with an average milk yield of 7866 kg per cow.

Table 3: rating of agricultural enterprises of the Republic of Mari El by average milk yield per cow for 2017-2018

Name of the farm	Municipal area	Average milk yield per cow, kg		
		2017	2018	Change, +/-
1. ZAO p/z "Semenovsky"	**Medvedevsky**	**7597**	**8135**	**+ 538**
2. SKHPK-SHA (k-z) "Pervoe maya"	Novotoryalsky	7414	7784	+ 370
3. ZAO"Mariyskoye"	Medvedevsky	7330	7342	+ 12
4. SKHPK "Pobeda"	Paranginsky	6489	7249	+ 760
5. SPK SKHA "Peredovik"	Morkinsky	7113	7178	+ 65
6. OOO"Mari-Kuptinskoye"	Mari-Tureksky	6718	6828	+ 110
7. OOO"Emekovo"	Volzhsky	6744	6754	+ 10
8. OOO"Khlebnikovskoe"	Mari-Tureksky	6430	6543	+ 113
9. OOO A/f "Akpars"	Mari-Tureksky	6425	6428	+ 3
10.SPK pl/ k-z im. Mosolova	Gornomariysky	5355	6201	+ 846
11. SPK k-z "Rodina"	Orshansky	6273	6137	- 136
12. OOO"Tumyumuchash"	Kuzhenersky	6033	6094	+ 61

The current economic situation in the Mari El Republic determines the choice of the agro-industrial sector as a growth driver. To assess the level of innovative development of the Republic, an approach based on the use of system indicators is applicable.

System indicators reflect the state of the region's innovative potential, the level and orientation of the process of innovative development. System indicators are divided into four groups according to the key characteristics of the innovation process:

Group I: indicators of educational and scientific activity;

Group II: indicators of innovative activity of enterprises and organizations;
Group III: indicators of the effectiveness of innovation in the region;
Group IV: indicators of the state and development of innovative infrastructure.

The structure of system indicators to determine the level of innovative development of the Mari El Republic is summarized in table. 5.

Table 5: indicators for assessing the level of innovative development of the Republic of Mari El

Group	Indicators (according to 2018)
Group I - indicators of educational and scientific activity	1. The share of people employed in the region's economy with higher professional education in the total number of employed population: *2017 - 26.3%; 2018 - 29.3%* 2. The number of researchers by field of science: *researchers - 102 people; Doctors of Sciences - 5 people; Candidates of Sciences - 50 people*. 3. The number of personnel engaged in research and development: *187 people.*
Group II - innovative activity of enterprises and organizations of the region	1. The proportion of organizations implementing technological, organizational and marketing innovations, in the total number of organizations in the region: *4.6%* 2. The volume of innovative goods, works, services, in the total volume: *14.2%* 3. Costs of technological innovation: *1123.9 million rubles*.
Group III - the effectiveness of innovation in the region	1. The proportion of organizations implementing technological, organizational, marketing innovations, in the total number of organizations examined: *8.3%* 2. Internal costs of research and development: *199 million rubles*. 3. The volume of shipped innovative goods, work, services (excluding VAT, excise taxes and other similar payments): *14926.4 million rubles*.
Group VI - availability of developed innovation infrastructure	1. The presence of a cluster development center in the region: *none* 2. Existing infrastructure: ANO *"Business Incubator of the Mari El Republic", Volgatekh Science and Technology Park, Technology and Innovation Support Centers*

Based on the results of assessing the level of innovative development of the regional innovation system of the Mari El Republic, profiles of the region's innovative development are constructed (Fig. 2) and conclusions are drawn (Table 6) and the type of innovative development of the region is determined.

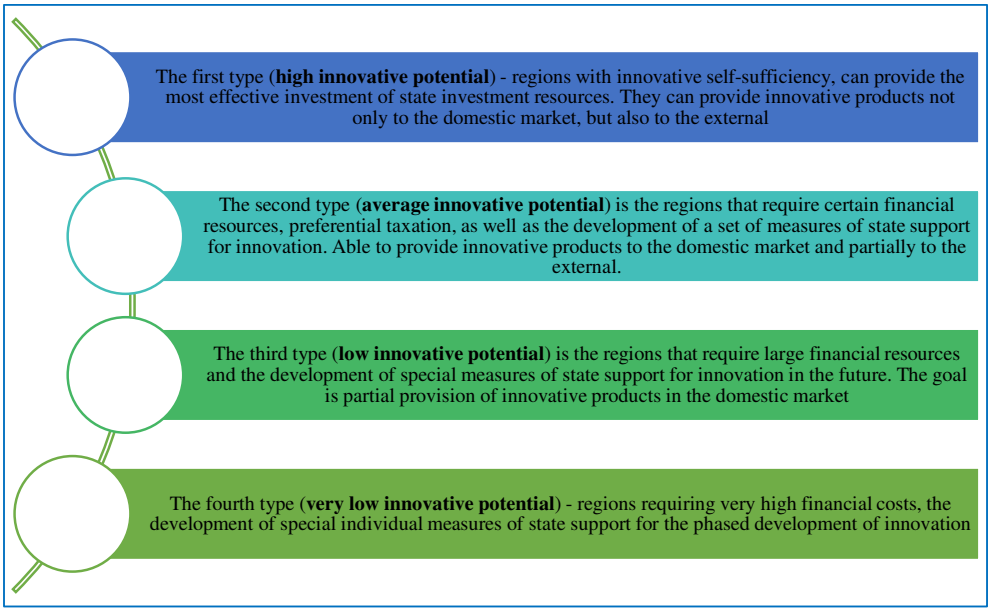

Fig. 1: Classification of regions by type of innovative development

According to the type of innovative development, the regions are divided into four types (Fig. 1):

- the first type - regions with a high level of innovative potential;
- the second type - regions with an average level of innovative potential;
- the third type - regions with a low level of innovative potential;
- the fourth type - regions with a low level of innovative potential.

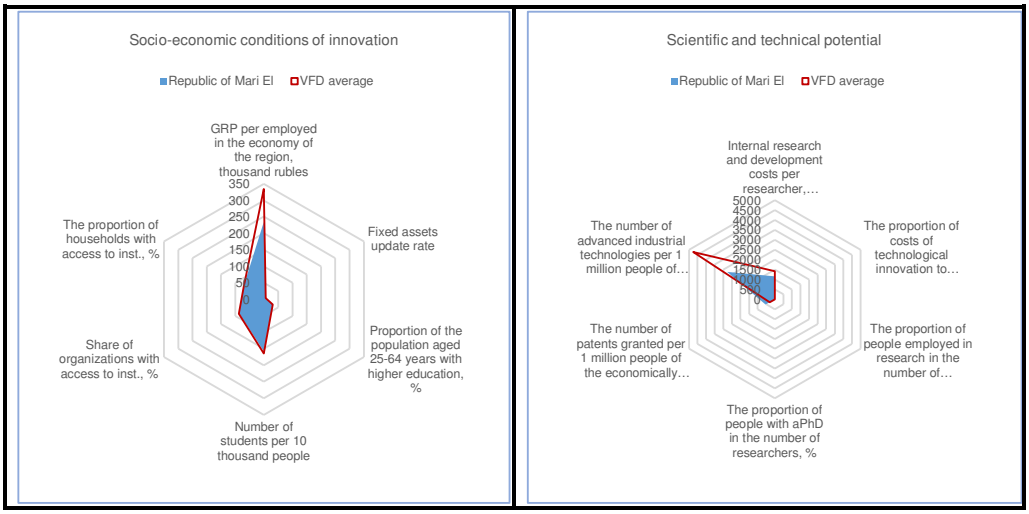

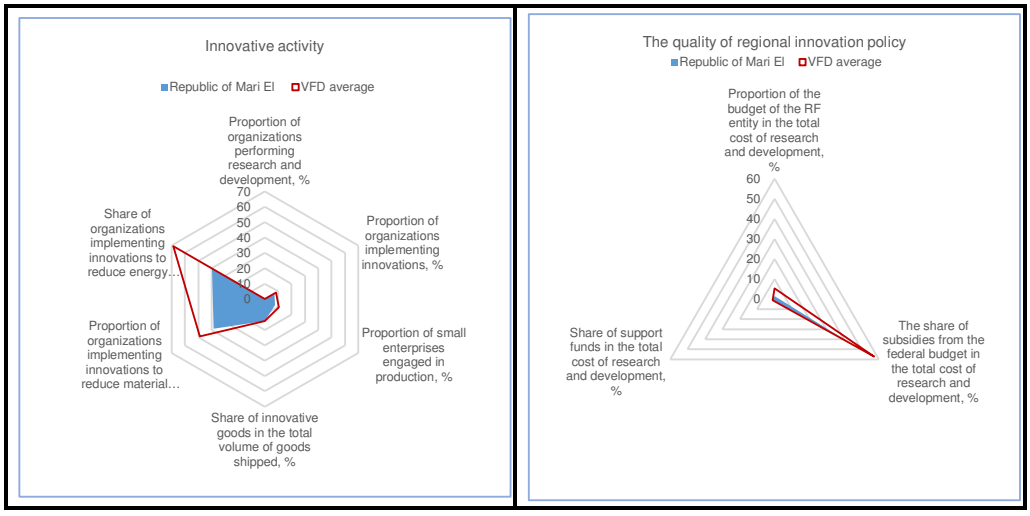

Fig. 2: Profiles of innovative development of the Republic of Mari El for 2018

The type of innovative development of the region must be taken into account when developing a strategy for innovative development and the selection of specific instruments to stimulate innovative processes in a particular region.

Table 6: results of the SWOT analysis of the regional innovation system

STRENGTHS	WEAKNESSES
1. Attractive economic and geographical location. 2. A sufficiently high level of development of small and medium enterprises. 3. Political stability in the region. 4. The presence of mechanisms of state support for investors, developed regional legislation in the field of investment. 5. The proximity of potentially large consumer markets in neighboring regions.	1. Low innovation activity of business entities. 2. Insufficient attraction of funds from support funds in the innovative activities of economic entities in the region. 3. Reduction of subsidies from the federal budget in the total cost of research and development. 4. The trend of the outflow of qualified personnel and youth from the region.

According to the results of the analysis, we can conclude that the innovation system of the Mari El Republic belongs to the third type - regions with a low level of innovative potential. For the effective development of innovative processes in regions of this type, a significant amount of attracting financial resources and the development of special measures of state support for innovative activities are required. The aim of the regions of this group is to partially provide innovative products to the domestic market.

Therefore, when developing a regional innovation policy for the Mari El Republic, first of all, it is necessary to raise issues of innovative development of key enterprises in the region, which primarily include agricultural enterprises.

Sustainability of innovative development is a comprehensive assessment of seven interrelated components describing the types of market, industry and technology, investment, organization and management, society, innovation and individual sustainability of consumers. The level of innovative development of the production potential of enterprises allows us to determine the total innovative

potential of the industry and highlight the main locomotives of innovative development of the regional economic system. Knowledge of the innovative characteristics of the production potential of the region's enterprises will create the basis for ensuring the coherence of the organizational and economic development of the region, determine the directions of development and integration on an innovative basis.

Assessing the level of innovative development of the production potential of industry enterprises in the region is a characteristic of the material conditions necessary for updating products and improving their quality and can be used as a basis for predicting the volume of industrial production in the region.

The proposed methodology for assessing the level of innovative development of the enterprise's production potential is based on a systematic approach that allows us to consider the studied object from the point of view of assessing the state and development of its internal structure and the influence of the external environment on the current and future situation in the structure of the regional economic system.

The methodology for analyzing the level of innovative development of an enterprise includes the following steps:
1. Formation of criteria and indicators characterizing the state and innovative nature of the development of the production potential of the enterprise and its economic subsystems

The sustainability characteristic of the innovative development of an enterprise includes an assessment of seven interrelated components:
- market stability;
- sustainability of the production and technological level;
- investment stability;
- organizational and managerial stability;
- innovative sustainability;
- social sustainability;
- consumersustainability.

The criteria for evaluating the values of indicators for each group are industry average standards and / or industry average indicators, estimated using the expert assessment method (from 0 to 3 points).

2. Calculation of the integral indicator and determination of the sustainability class of innovative development of the enterprise's production potential

According to the integrated enterprise, one of the four sustainability classes of innovative development of its production potential can be assigned (Table 7):

• enterprises with high sustainability of innovative development;
• enterprises with normal sustainability of innovative development;
• enterprises with the maximum permissible sustainability of innovative development;
• enterprises with crisis sustainability of innovative development.

Table 7: sustainability classes of innovative development of the enterprise

Sustainability class	Indicator value	Description	Recommended Innovation Development Strategy
High Stability	$У_{integr} \geq 60$	Efficiency of implementation of innovative product development programs, stability and social satisfaction of the workforce, high level of innovative culture, efficient organization of labor and production	Leadership strategy in mastering new products and technologies
Normal Stability	$45 \leq У_{integr} < 60$	High investment activity, stable market position, stable staff, acceptable level of innovative culture, market potential sufficient to implement development programs	Both a follower strategy and a leader strategy in the development of new or improving technologies and products can be implemented
Maximum permissible stability	$30 \leq У_{integr} < 60$	The market situation is unstable, the efficiency of the production process and the organization of labor are low, the level of innovative culture is insufficient, the innovative infrastructure is underdeveloped	Follower strategy for improving products and technologies
Crisis stability	$У_{integr} < 30$	There is no innovative direction of development, production processes are characterized by low efficiency, social security of personnel is not ensured, demand for products is unstable or low	No resources for innovation

Depending on the stability class, strategic mechanisms and programs for innovative development of the enterprise are determined or adjusted.

Testing of the methodology for assessing the level of sustainability of innovative development was carried out on the example of one of the leading agricultural enterprises of the Republic of Mari El ZAO stud farm “Semenovsky”.

The object of the study - Closed Joint-Stock Company (ZAO) stud farm "Semenovsky" - operates in the territory of the Medvedevsky district of the Republic of Mari El. The company is a diversified economy. In terms of agricultural land, the company ranks first in the Republic occupying 19,770 hectares (as of 01.01.2019). The main activity of ZAO Semenovsky Stud Farm is the production of agricultural products: in animal husbandry - the production of milk, cattle, breeding livestock; in horse breeding - production of koumiss, breeding of young animals and pedigree horses (Lithuanian and Russian heavy breeds); in crop production - fodder storage for livestock needs.

The main indicators for calculating the level of sustainability of innovative development of ZAO “Semenovsky” according to the results of 2018 are presented in table. 8.

Table 8: indicators of sustainability of innovative development of ZAO "Semenovsky"

Analysis criterion	Indicator	Value	Expert grade
1.Production and economic sustainability			
1.1.Market sustainability			
Patent Portfolio	Coefficient of change in patent portfolio	1,1	2
Market share	Coefficient of change in market share	1,4	2
Non-operating income	Non-operating income growth rate	1,1	2
Company value	The coefficient of change in the value of the company	1,45	3
1.2.Sustainability			
Productive capacity	Workability of fixed assets	0,97	2
Product update	Product update rate	1,6	3
Production efficiency	Production profitability	29%	3
1.3.Investment sustainability			
Investment activity	Coefficient of investment activity	1,9	3
Investments in fixed capital	Fixed capital investment ratio	1,18	3
Innovation costs	R&D investment ratio	0,55	2
2.Organizational and managerial sustainability			
Efficiency of labor organization	Net profit per 1 managerialemployee	440,83thous.rub.	3
Management	Equity ratio	0,88	2
Marketing	The coefficient of bringing the product to the consumer	1,4	3
3. Social sustainability			
Workforce social satisfaction	Staffstability ratio	1,6	3
Staff stability	Personnel retirement rate	0,1	3
The degree of material satisfaction of employees	The ratio of the average salary in the enterprise to the average salary in the industry	1,6	3
4. Innovative culture			
Staff motivation system	Non-financial and financial motivation system	available	3
Employees perception of company values	The degree to which employees perceive company values as their own	high	2
Communicative system	Level of development of the enterprise communication system	high	3
5. Consumer sustainability			

Analysis criterion	Indicator	Value	Expert grade
Consumer deficit	The presence / absence of a shortage of consumers of products	absent	3
Sales volumes	Return on sales	38%	3
Price level	Customer acceptance of price levels	average	3

To calculate the value of the integral indicator of the sustainability of innovative development of the ZAO "Semenovsky" we will use the method of grading, which allows us to formalize the indicators proposed for the study (Table 9).

Table 9: assessment of the level of sustainability of innovative development of ZAO "Semenovsky"

Indicator	The maximum value of the indicator for enterprises in the industry	The actual value of the indicator for the enterprise	The number of expert points for each indicator	The ratio of the actual indicator to the maximum	The number of points for the actual indicator (product of expert assessment and the ratio of the actual indicator)
Coefficient of change in patent portfolio	1,4	1,1	2	0,79	1,58
Coefficient of change in market share	1,5	1,4	2	0,93	1,86
Non-operating income growth rate	1,2	1,1	2	0,92	1,84
Coefficient of change in the value of the company	1,6	1,45	3	0,91	2,73
Workability of fixed assets	0,97	0,97	2	1	2
Product update rate	1,8	1,6	3	0,89	2,67
Production profitability	29%	29%	3	1	3
Coefficient of investment activity	1,9	1,9	3	1	3
Fixed capital investment ratio	1,3	1,18	3	0,91	2,73
R&D investment ratio	0,55	0,55	2	1	2
Net profit per 1 managerialemployee	440,83 т.р.	440,83 т.р.	3	1	3
Equity ratio	0,88	0,88	2	1	2
The coefficient of bringing the product to the consumer	1,6	1,4	3	0,88	2,64
Staff stability ratio	1,6	1,6	3	1	3
Personnel retirement rate	0,1	0,1	3	1	3
Ratio of the average salary in the enterprise to the average salary in the industry	1,8	1,6	3	0,89	2,67
Non-financial and financial motivation system	Yes	Yes	3	1	3
Degree to which employees perceive company values as their own	high	high	2	1	2

Indicator	The maximum value of the indicator for enterprises in the industry	The actual value of the indicator for the enterprise	The number of expert points for each indicator	The ratio of the actual indicator to the maximum	The number of points for the actual indicator (product of expert assessment and the ratio of the actual indicator)
Level of development of the enterprise communication system	high	high	3	1	3
Presence / absence of shortage of consumers of products	is absent	is absent	3	1	3
Return on sales	38%	38%	3	1	3
Customer acceptance of price levels	average	average	3	1	3
Integral indicator					**56,72**

The ratio "indicator value - number of points" is established by experts and has a non-linear relationship. The expert commission included representatives of the Federal State Budgetary Educational Institution of Higher Education "Volga State University of Technology"and the Ministry of Industry, Economic Development and Trade of the RME.

As a result of the assessment, it was revealed that ZAO Semenovsky belongs to the class of normal sustainability of innovative development, since the value of the integrated index $Y_{interg} = 56.72$. In this case, the enterprise can be both a follower and a leader in the development of new or improving technologies. It is advisable forZAO "Semenovsky" to focus on the active improvement of existing production technologies, the development of the product portfolio (table. 10):

Table 10: strategic guidelines for innovative development of ZAO "Semenovsky"

Sustainability class	Recommended Innovation Development Strategy
High stability	It is recommended to adhere to a leadership strategy in the development of new products and technologies.
Normal stability	**Enterprises can be both followers and leaders in the development of new products and technologies.**
Maximum stability	The enterprise can only be a follower in the development of improving technologies and products.
Crisis stability	The enterprise is not ready to conduct independent innovation

Conclusion

To optimize the results of the innovation development strategy of the Mari El Republic, we recommend that you focus on developing a set of measures aimed at increasing the production and technological potential of the leading enterprises in the region by updating their capital base. In addition, in order to increase the level of innovation sustainability, local companies should pay special attention to improving the efficiency of organizing financing of innovation and services through the development of their own sources.

In order to develop a comprehensive innovation structure of the local economic system, the Mari El Republic is recommended to focus its efforts on developing a system to stimulate innovative activity

of enterprises in the region. Incentive programs should include support for all stages of the innovation cycle: development and generation of ideas, commercialization, promotion and use of innovation. The tools for the formation and development of the innovation policy of the region will improve the quality of the innovation environment and solve problems that hinder the accelerated development of the territory.

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The Business Model of a Plastic Waste Recycling Project in the Context of the Strategic Integration of Innovation and Technology Entrepreneurship

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Abstract

Currently, the priority of the national economy is the course towards its accelerated innovative development. In this regard, there is an increased interest on the part of business entities not only in the problem of generating innovative business ideas, but also in their commercialization. Therefore, the issues of formation and development of technological entrepreneurship are becoming key at the present stage of economic development.

As part of the study, the essence and content of the process of technological entrepreneurship, its investment and design aspect, are examined. The study reflects the logic of building a business model based on an innovative business idea. The presented conceptual business model of the project reflects the aspects of project management, the value proposition to the market, the main risks of the project, the stages of the project development are identified and the conditions for its viability are formulated. As a business case for the design decisions, a financial model is presented that proves the economic efficiency of the project and its investment attractiveness. The constructed business model will help the entrepreneur understand the logic of creating profit and evaluate the technical, market and economical feasibility of the project.

Keywords: Innovation, Technological Entrepreneurship, Strategic Integration, Innovative Development, Project Management, Business Model.

Introduction

Most modern companies associate their strategic development with innovation. The term “innovation” was widely used thanks to Joseph Schumpeter, who noted that “innovation is a new scientific and organizational combination of production factors motivated by an entrepreneurial spirit”. The implementation of business ideas in the form of innovative commercially successful products is facilitated by the establishment and development of technological entrepreneurship.

As part of technological entrepreneurship, innovative solutions are being developed for complex engineering problems associated with the invention of new equipment and technologies, design and engineering, market research and the development of new materials, products and services. Technological entrepreneurship can take various forms, for example, in the form of licensing, start-ups, commercial R&D, but it is invariably accompanied by the creation of a business model that turns a business idea into an innovative investment project or an innovative product.

Materials and Research Methods

The object of research is the process of technological entrepreneurship in the conditions of innovative development of the national economy and its most important investment and design aspects related to the construction of a business model.

The subject of the research is the processes of innovative transformations taking place at enterprises and in the national economy as a whole, causal relationships and consequences of this process, as well as objective and subjective factors contributing to its development.

The theoretical basis of the study was the scientific and methodological works of foreign and Russian researchers, which reveal the essence of innovation and innovation, conceptual approaches to the development of strategic integration of innovation and technological entrepreneurship.

The fundamental principles that reveal the essence of innovation were formulated by the Austrian scientist J. Schumpeter in his work on the theory of economic development, where he highlighted the typical changes characteristic of innovation.

Among modern foreign researchers covering the problems of innovative development in recent decades, it should be noted the works of S. Blanck, E. Ries, M. Johnson, K. Christensen, H. Kagermann, A. Osterwalder, I. Pigne, in which they analyze the scientific methodological approaches to testing innovative ideas and building business models that contribute to their implementation.

A significant contribution to the development of methodological support for innovative management and technological entrepreneurship was made by Russian scientists. Barykin, V.O. Ikryannikov proposed a functional-dynamic model of technological startup management and methodological approaches to business modeling in the management of innovative projects. M.V. Kovaleva, L.V. Silakova, V.V. Shirokovara developed a classification of technological startups by functional areas of activity and proposed managerial approaches to their creation and development. N.N. Ilysheva, S.I. Krylov developed a balanced scorecard for the strategic management of innovation. B.E. Tokarev has developed a startup model with a feedback loop, characteristic of innovative products.

The methodological basis of the study was the historical and logical, formal and substantive approaches, methods of analysis and economic modeling.

Research Results and Discussion

Technological entrepreneurship is the process of creating a new business, focused on the implementation of innovative high-tech ideas, the implementation of which will create a sustainable competitive advantage in the market for the company.

Technological entrepreneurship is an innovative process characterized by the iteration of the stages shown in Figure 1.

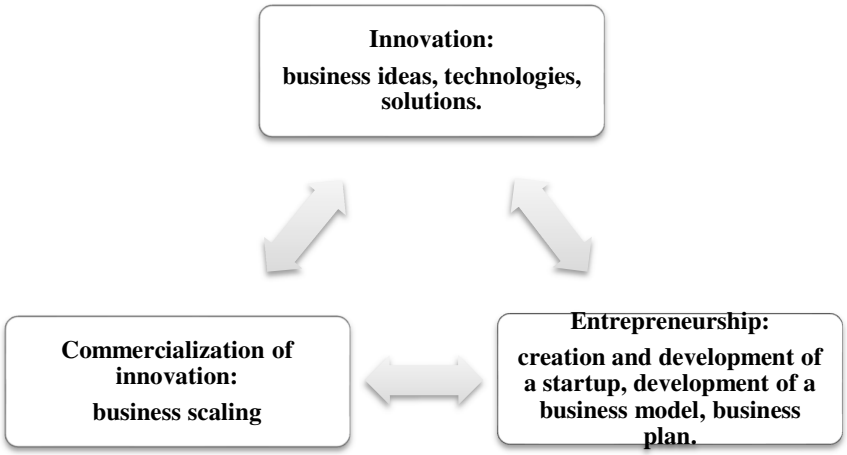

Fig. 1: Technology Entrepreneurship Process

To achieve the goals of innovative development, an economic entity must turn an innovative business idea into a commercially viable and competitive product. However, often the traditional approach to organizing a business is untenable in relation to innovation. The main reason for this lies in the high degree of uncertainty of the situation - the issue of acceptance of an innovative product by the market remains not fully clarified. Thus, the process of creating and scaling up a business should be cyclical and iterative. When developing a product, a constant connection with the market and a consumer reaction to the presented version of the product are needed, which can be finalized until a competitive sample is received. The basis of such an activity may be the strategic integration of innovation and technological entrepreneurship, focused on the formation of a successful business model.

Technological entrepreneurship and innovation are becoming major factors in the development of modern companies. Conducted research opens up new promising areas for the development of technological entrepreneurship and helps to increase the innovative activity of Russian business entities. In turn, technological entrepreneurship contributes to the flexibility and adaptability of business systems, and innovation creates a solid foundation for effective development and increased competitiveness.

As part of the study, a project was developed for the production of recycled plastic products. Currently, the issue of recycling plastic waste is very acute, since plastic is widely used as containers and packaging of various products. The situation is aggravated by the fact that the plastic practically does not decompose and the accumulation of plastic waste poses a serious environmental threat. Thus, the disposal, recycling and reuse of plastic waste are the most important environmental tasks and a promising direction for the development of technological entrepreneurship.

The essence of the design business idea lies in the use of polymer-sand technology, which allows the production of products of any shape and size from composite materials. Polymer sand composite is an innovative material consisting of a mixture of sand, polymers and safe oxide paint, which has a high degree of environmental friendliness. Building materials and various architectural forms for improvement of house territories, recreation areas, summer residences and other objects can act as a product brought to the market. Products made from this material look like wood traditionally used in construction and beautification, which contributes to the adoption of innovation by a target group of consumers.

Competitive advantages of products from polymer-sand composite materials are as follows:

- safety and environmental friendliness of the polymer included in the raw mix;
- resistance to atmospheric influences (frosts, temperature changes, high humidity);
- low flammability;
- strength and high wear resistance, which increases the life of the product;
- low cost.

The conceptual business model of the project reflects the following elements: value proposition, key resources, key processes, profit formula.

The value proposition is as follows:

- the consumer receives environmentally friendly, safe and durable products with a fairly low cost;

- the company gets a way to solve the problem of the accumulation of plastic waste and preserve the environment, the development of technological entrepreneurship and increase production efficiency.

Creating an innovative project and planning the stages of its development should be based on the professionalism of the project team. This will reduce the risks associated with starting a new business. Thus, an important condition for success is the competent project management at all stages of its creation and implementation.

The task of effective management of an innovative project is complicated by the variety of areas of activity that are affected during the work. The variety of functions implemented by the project team requires careful selection of specialists and makes the work of the project manager unique.

The team of the innovation project was made up of specialists with complementary roles and competencies that are implemented at all stages of the project (Table 1).

Table 1: innovation project team

The project team	**Functionality Implemented**
Leader - Project Leader	A key figure in project activities, forms goals, provides strategic and ongoing leadership, coordinates the actions of team members
R&D Specialist	Conducts research, develops engineering solutions, provides technical support for the project, embodies ideas in specific products
Analyst	Carries out the economic feasibility of the project, calculates the financial consequences of decisions made, assesses the risks of the project
Marketer - communicator	Conducts market research, forms a marketing strategy for an innovative product, interacts with contact audiences
Consultant - Lawyer	Develops IP-strategy of the project, provides legal support

Team members perform the following functions: project management, research and technical support, financial and economic justification of the project, marketing and legal support of the project.

Market research of composite building materials showed that Japan is the world leader in the use of recycled materials in production, where in some areas the share of recycled plastic products reaches 95%.

In Russia, this indicator barely approaches 3%, which indicates that the market has great growth potential. In 2018, the market growth amounted to about 12% and according to forecasts, the growth rate in the near future will increase to 16%.

Building materials and products for the improvement of local areas is a basic consumption product, the potential consumers of which are government agencies (B2G segment), construction companies (B2B segment), as well as individuals (B2C segment).

Market research of the Mari El Republic showed that the products have high sales potential in the B2G segment. Among the priority national projects is the project "Formation of a comfortable urban environment", the purpose of which is "to create conditions for systematic improvement of the quality and comfort of the urban environment throughout the Russian Federation by implementing annually a set of priority improvement measures in the constituent entities of the Russian Federation." During implementation of the national project, federal guidelines were developed that establish the beautification rules for municipalities in the Russian Federation. The range of priority improvement measures includes basic and alternative measures, including:

- improvement of territories adjacent to residential buildings, including courtyards;

- improvement of urban environment facilities;

- encouragement of improvement projects initiated by citizens;

- creation of co-financing instruments for public improvement projects;

- improvement of popular trade areas.

The budget of the priority national project "Formation of a comfortable urban environment" for 2020 provides for financing in the amount of 12,500 million rubles, including 5,000 million rubles at the expense of the federal budget and 7,500 million rubles at the expense of the consolidated budgets of the constituent entities of the Russian Federation. An analysis of public procurement showed that over the 11 months of 2019, 167 tenders were held in the Republic of Mari El for landscaping and landscaping, requiring small architectural forms.

A study of the B2B segment showed that the volume of housing construction in 2018 in the Republic of Mari El amounted to 136,000 sq.m. Upon commissioning of construction projects, improvement of the courtyard and adjacent territory is necessary. Outdoor furniture and other small architectural forms made of polymer-sand composite are elements of the arrangement of territories. According to the recommendations for the improvement of courtyards, outdoor furniture should be assembled from processed and durable materials with high strength. In addition, in order to increase safety and improve space, it is necessary to provide a sufficient number of recreation places in the yards, equip leisure areas with benches and ballot boxes, and equip children's and sports grounds. These requirements contribute to the formation of demand for products. According to the Portal of the Housing and Utilities of the Republic of Mari El, in 2019 5941 apartment buildings and 42 housing and communal services organizations were registered.

The product sales potential was determined on the basis of a marketing analysis of 50 cities of Russia with a population from several hundred to several million people, conducted by UmnayaSREDA. Assessment of the sales potential of products in the Republic of Mari El is presented in table 2.

Table 2: assessment of the marketing potential of products from polymer-sand composite for landscaping

Parameters	Indicators
The population of Yoshkar-Ola on 01.01.2019	282800 people.
The population of the Republic of Mari El on 01.01.2019	680380 people.
Number of apartment buildings (courtyards)	5941 yard
Number of parks, squares, gardens	25
Number of pedestrian areas in need of improvement	42
Number of city cemeteries	5
Points of consumption of products (total territory need for products)	
When landscaping courtyards (benches)	5941*10=59410
At improvement of park territories (benches)	25*50=1250
At improvement of cemeteries (benches)	5*120=600
Monthly sales potential	
When landscaping courtyards (benches)	59410/7/12=708
At improvement of park territories (benches)	1250/7/12=15
At improvement of cemeteries (benches)	600/7/12=7
The total sales potential of manufactured products, based on all the listed points of consumption per month	
Number of benches	708+15+7=730
Number of rubbish bins	730/2=365

Thus, there is great market potential. More than 90% of the market for recycled plastic products is free.

The product has a high degree of market novelty. The price of the product ensures its availability to the target group of consumers and competitiveness.

It is necessary to organize active product promotion by generating demand both from end consumers and from the professional community. When promoting products from innovative materials on the market, the idea of saving natural resources and environmental protection should be used.

Prediction of sales was made taking into account the following conditions (table. 3).

Table 3: the Structure and conditions of sales

Sales conditions	Share in sales%	Price by type of product, rub.				
		Bench (product 1)	rubbish bins (product 2)	Park sofa (product 3)	Flower pots (product 4)	Road border (product 5)
Retail	20	16000	8000	20000	800	350
Small wholesale	30	12000	6000	16000	600	300
Large wholesale and dealers	50	8000	5000	12000	500	250

At the first stage, one production line is launched, which allows to produce 100 benches and 50 rubbish bins every month. At the second stage, 6 months after the start of production, the second line will be purchased and launched, which will increase production volumes by 2 times. With the expansion of the line, 3 new positions will be introduced into the production program: a park sofa, a flowerpot, a road curb with monthly output volumes of 10, 300 and 500 pieces, respectively. The forecast of sales volumes for three years in the context of individual types of products is presented in table 4.

Table 4: sales forecast

Indicators	1st year	2nd year	3rd year	Total
Product 1 - bench				
Total quantity, pcs.	1200	1200	1200	3600
Total revenue, rubles	12960000	12960000	12960000	38880000
Product 2 - rubbish bins				
Total quantity, pcs.	600	600	600	1800
Total revenue, rubles	3540000	3540000	3540000	10620000
Product 3 - park sofa				
Total quantity, pcs.	30	120	120	270
Total revenue, rubles	444000	1776000	1776000	3996000
Product 4 - flower pots				
Total quantity, pcs.	900	3600	3600	8100
Total revenue, rubles	531000	2124000	2124000	4779000
Product 5 – road border				
Total quantity, pcs.	1500	6000	6000	13500
Total revenue, rubles	427500	1710000	1710000	3847500
Total revenue, rubles	17902500	22110000	22110000	62122500

Organized production must meet the following conditions (table 5).

Table 5: production specifications

Production Room Parameters	Required
Area, sq.m	not less than 100
Ceiling height, m	not less than 3
Power supply in the workshop	220 V and 380 V with power from 50 kW
Possibility to equip the workshop with ventilation	there is
Floor covering	Concrete

The set of basic technological equipment includes an extruder for preparing the raw material mixture, a hydraulic press, a molding table for the press, molds, a sawing machine, a drilling machine, a rack for assembling products, and a set of tools.

The calculation of the depreciation amount is made taking into account the useful life of the equipment and the depreciation rate (table. 6).

Table 6: calculation of depreciation

Name	Amount	Cost, rub.	Useful life, months	Monthly depreciation rate,%	Amount to be debited per month
A set of basic technological equipment	1	4200000	60	1,67	70140
Set of equipment for launching the 2nd line	1	2500000	60	1,67	41750
Total					111890

For the manufacture of the polymer-sand mixture, crushed recycled materials of the following types of plastic are used:

- HDPE (high-density polyethylene of low pressure, from which disposable tableware, bottles for cosmetics, packaging bags, bags, toys, cans, etc.) are made;

- LDPE (low-density polyethylene of high pressure, from which buckets, plastic bags, compact discs, linoleum are made).

The staffing required by the project is presented in table 7.

Table 7: the staffing of the enterprise

Position	Number of staff	Salary (permanent part), rub.	Labor remuneration fund per month, rub.
At the initial stage			
1. Head	1	70000	70000
2. Sales Manager	1	30000	30000
3. Team Leader	1	15000	15000
4. Worker	2	12000	24000
Total permanent part of payroll per month			139000
After the launch of the second line and the transition to a round-the-clock two-shift schedule for 12 hours			
1. Head	1	70000	70000
2. Sales Manager	1	30000	30000
3. Team Leader	2	15000	30000
4. Worker	4	12000	48000
Total permanent part of payroll per month			178000

Organization of remuneration will be constructed as follows (table. 8)

Table 8: organization of remuneration

Position	Remuneration per month
1. Head	70,000 rub. + 6% of value added (revenue - material costs)
2. Sales Manager	30000 rub. + 2% of value added (revenue - material costs)
3. Team Leader	Salary of 15,000 rubles. + 2% of value added (revenue - material costs)

4. Worker	Salary 12,000 rubles. + 1% of value added (revenue - material costs)

The risk map of the innovation project clearly represents the main risks identified during the risk management procedures and risk management strategies (Fig. 2).

	Low probability	**Medium probability**	**High probability**
High losses	Production risks: Problems of organization of production and work Risk sharing strategy	Technological risks: There is no way to go into mass production, a high level of marriage Risk reduction strategy	
Average losses	Management and social risks: Problems with the project staff Risk reduction strategy	Market Risks: The emergence of direct competitors Price increase due to rising costs End-product acceptance Risk preservation strategy	Market Risks: Problems finding suppliers of raw materials (plastic waste) Risk sharing strategy
Low losses		Environmental risks Change of law Risk avoidance strategy	

Fig. 2: Map of project risks

The most significant are production and technological risks, for the management of which a risk sharing strategy through insurance and a reduction strategy, that is, risk reduction, are recommended.

The total investment need is 7,500,000 rubles (Table 9).

Table 9: investment costs

Investments	**Amount, rub.**	**Source of funds**
1. Purchase of a set of processing equipment	4200000	Credit
2. Training, technology, technical documentation, development of a business plan, website, procurement of CRM	400000	Own funds
3. Replenishment of working capital (raw materials for 3 months)	300000	Grant funds
4. System of forced ventilation of the workshop	100000	Own funds
5. Purchase of a set of equipment for launching the second line	2300000 200000	Subsidy, equity
Total investment requirement:	7500000	

The structure of project financing sources is presented in table 10.

Table 10: sources of project financing

№	Source Name	Amount, rub	Share in the overall structure,%
1.	Equity	700000	9,3
2.	Borrowed funds (credit)	4200000	56,0
3.	Other support (grant)	300000	4,0
4.	Subsidy in the form of a return on investment in production	2300000	30,7
	TOTAL sources of investment:	7500000	100

Six months after the start of production, it is planned to receive subsidies in the form of a return on investment in production in the amount of up to 50% of 4,600,000 rubles, that is, from initial investments in fixed assets and preparation of premises. The funds received are planned to be invested in the expansion of the production line. After the installation of the additional line, it is planned to receive subsidies in the form of a return on investment in production in the amount of 50% of 2,500,000 rubles, which will amount to 1,250,000 rubles. The planned date of receipt of funds for 2020 is the middle of 2021 (1.5 years after the start). Funds may be used for early repayment of a loan.

In order to optimize the taxation of financial and economic activities of the newly organized enterprise during 2020-2022. the company will operate in a simplified tax system. The tax burden for this period will be as follows: deductions to social funds - 30.2% of the salary fund, income tax - 15% of the difference (income - expenses).

The financial model of the project is presented in tables 11 - 13.

Table 11: cash flow from operating activities

Period	**0**	**1st year**	**2nd year**	**3rd year**	**Total**
Cash flow from operating activities					
Revenue		17902500	22110000	22110000	62122500
Production costs - total		12213067,48	14710631,4	14453072	40446474
Variable part of the RFP		1658580	2476320	2476320	6611220
Variables (raw materials, components)		5370750	6633000	6633000	18636750
Permanent - total		5183737,48	5601311,4	5343752	15198504
including					
Labor costs		1785000	2136000	2136000	6057000
Contributions to social funds		539070	645072	645072	1829214
Depreciation		966930	1342680	1342680	3652290
Rent and utility bills		360000	360000	360000	1080000
Communication services		36000	36000	36000	108000

Marketing expenses		480000	480000	480000	1440000
Administrative expenses		144000	144000	144000	432000
Payout% on the loan		672737,48	257559,4		
Unexpected expenses		200000	200000	200000	600000
Profit before tax		5689432,52	7399368,6	7656928	21676026
Income tax		853414,878	1109905,29	1148539,2	3111859,4
Net profit		4836017,642	6289463,31	6508388,8	17633870
Operating Flow Balance		5802947,642	7632143,31	7851068,8	21286160

Table 12: cash flow from investing activities

Period	**0**	**1st year**	**2nd year**	**3rd year**	**Total**
Cash flow from investing activities					
Equipment for polymer processing and production of mortar	-4200000				
Training, technology, technical documentation, business plan, website, CRM	-400000				
Equipment for launching the second line		-2500000			
Working capital replenishment	-300000				
Workshop forced ventilation system	-100000				
Balance of flow from investment activities	-5000000	-2500000			

Table 13: cash flow from financing activities

Period	0	1st year	2nd year	3rd year	Total
Cash flow from financing activities					
Receipt of own funds	500000				
Grant proceeds	300000				
Getting a short-term loan	4200000				
Receiving a subsidy in the form of a return on investment in production		2300000	1250000		
Loan repayment payments		-1892410,96	-257559,4		
Net cash flow	5000000	607589,04	992440,6		

Based on the financial modeling of cash flows and the assessment of financial and economic indicators, it was established that the project is investment attractive. Project performance indicators are presented in table 14.

Table 14: project performance indicators

Period	0	1st year	2nd year	3rd year	Total
Total flow balance	0	3910536,682	8624583,91	7851068,8	21286160
Cumulative Flow Balance	0	3910536,682	12535120,59	20386189,39	20386189
Net cash flow from operating and investing activities	-5000000	3302947,642	7632143,31	7851068,8	21286160
Cumulative net cash flow	-5000000	-1697052,358	5935090,952	13786159,75	13786160
Discount coefficient at E = 15%	1				
Discounted flow on operating and investment activities	-5000000	-2126435,551	5800428,916	3956938,675	7630932
NPV	-5000000	-2126435,551	3673993,364	7630932,039	7630932
ID	3,7				
Return on investment,%	375,7				
Return on sales,%		31,78	33,46	34,63	34,89

The project meets the criteria of effectiveness. So in any time interval there is a positive balance of total cash flow cumulatively, where the investor makes expenses or receives income. Net discounted income takes a positive value, the profitability index is 3.7. For the entire billing period, the project generates a net present value of 7630932 rubles. The estimated payback period of the project is 15 months.

In the development of the project, several stages can be distinguished:

- preparatory stage;

- the stage of analysis of the conformity of the product to the expectations of the target market and its refinement;

- reaching the design capacity, expected by the end of the second year of implementation;

- scaling and market capture;

- sale of a business share to a strategic investor.

This business model is viable subject to a number of conditions:

1) products made on the basis of polymer-sand composite should be accepted by the mass consumer;

2) the entrepreneur should be able to organize mass production;

3) over time, it is necessary to develop product options for various consumer segments.

The second stage of assessing the investment attractiveness of the project showed that it is technically feasible. Currently, a technology for processing plastic waste and manufacturing polymer-sand composite material has been developed. At the initial stage, you can organize small-scale production and carry out test sales.

Market feasibility is confirmed by the sufficient capacity of the market and target segments, the willingness of the consumer to accept innovation; the low price of products from recycled plastic waste, which ensures its availability for consumers, as well as a sustainable and scalable business model.

Economic feasibility is confirmed by the high values of indicators of economic efficiency of the project.

Thus, the presented business model is quite formalized and allows you to understand the logic of creating profit. In addition, it contains a value proposition to target consumer groups, which makes it viable and commercially feasible.

Conclusion

The development of technological entrepreneurship is of great importance from the point of view of the strategic development of the Russian economy. As a process of creating a new business, technological entrepreneurship should be accompanied by the construction of a business model, which is based on the investment and project aspect and related characteristics: team interaction and functional addition of specialists participating in the project team, focus on creating the customer value of an innovative product due to new knowledge, characteristics of key resources, key processes, profit formula. Strategic integration of innovation and technological entrepreneurship creates the basis for the development of business modeling and contributes to the successful commercialization of innovations, which ultimately leads to increased competitiveness of enterprise structures and the national economy as a whole.

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Management of the Quality of Education in Municipal Educational Institutions of Russia

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Abstract

The article discusses the organizational and methodological foundations of intra-school education quality management in the system of municipal educational institutions of Russia. The Federal Law of the Russian Federation "On Education" defines the need for the functioning of the system of assessment activity in an educational organization (VSOKO). However, a national regulation on the formation of such a model and its inclusion in the activities of an educational organization in Russia has not yet been formed. The analysis of the practice of introducing the model of internal assessment of the quality of education in general education organizations of the Vologda Oblast, the study of the level of satisfaction with the quality of the educational process of all subjects of the educational process allowed us to develop a system of requirements for the formation of a model of intra-school education quality management, which allows for the development of effective management decisions.

Keywords: Education Quality Management System, Intra-School Management System, Municipal Level, Education Quality Assessment.

Introduction

The changes taking place in Russian education in general and in school education in particular are aimed at improving its quality. Any innovation, whether it is the introduction of the Federal State

Educational Standards, the professional standard of a teacher, changes in the state final certification procedure, or any other, results in a certain transformation of the properties of the educational process, the educational system of one or another level: adaptability, manageability, openness, coherence, etc. At the same time, the quality of education remains the leading one of the priorities, which found its expression in the national doctrine of Russian education, in the law "On Education in the Russian Federation" (Article 2, paragraph 29 of the Federal Law-273).

At present, education quality management systems are being built at all levels of government in Russia in order to ensure the fulfillment of a social order, guarantee students and their parents a certain level of quality, reduce the likelihood of unintended results, and ensure managed development.

State programs for regional development become a guarantor and, at the same time, a driver for achieving national goals. Of particular importance is the formulation of the problem in the face of uneven socio-economic development of the Russian regions and the growing pace of digitalization and innovative development of the global economy. In modern Russia, the formation of a knowledge economy is directly related to the implementation of the “Strategy for the Development of the Information Society in the Russian Federation for 2017-2030," which sets as a strategic guide the development of human potential by creating conditions for creating a knowledge space and providing access to it, and improving knowledge dissemination mechanisms, their application in practice in the interests of individuals, society and the state.

The ambitious goals of national projects and programs in a strategic perspective should be confirmed by the successful practice of implementing regional programs. The study of a number of regional programs for the development of educational systems made it possible to establish that in the education management system at all levels a unity of understanding of the strategic orientation of its development path towards achieving high quality standards has been achieved. In accordance with the state program "Development of Education of the Vologda Oblast for 2021-2025" the development of the regional education system is "... increasing the availability of quality education that meets the requirements of innovative development of the regional economy, the modern needs of society and every citizen.” The state program of the Republic of Mari El “Development of Education” for 2013 - 2025 stated as the main goal “... ensuring high quality and accessibility of education in accordance with changing demands of the population and promising tasks of the development of innovative activity in the Republic of Mari El”. The state program of the Chuvash Republic "Education Development" is focused on "... ensuring the availability of quality education, focused on the formation of a competitive personality that meets the requirements of innovative development of the economy, has the skills to design its own professional career and achieve modern standards of quality of life based on universal values and an active citizenship".

A whole range of functions is implemented in the quality management loops: from forecasting, modeling, goal setting, coordination to control, assessment, analysis, and accounting. Each of the functions is built into the management cycle, ensures the adoption of a certain managerial decision to improve quality (warning, corrective).

Effective management of the quality of education is possible only through the use of objective assessment procedures. The correctness of the assessment is determined by the quality of the measuring materials, the reliability of the data collected, the validity of the interpretation and use of the information received. But the directions of improving the procedures for assessing educational achievements of students reflect only part of the tasks that need to be solved for the effective functioning of the system of internal assessment of the quality of education. The quality management system should contain blocks that reflect the effectiveness of the educational organization, namely: strategic and operational planning of processes, intra-organizational assessment, decision-making on the adjustment based on the identified quality problems of the provision of educational services.

Of particular importance is the problem of effective management of the quality of education at the level of organizations providing training in the educational programs of primary, basic and secondary

education, that is, the school system. Between 2005 and 2018, the number of such educational organizations in Russia decreased by almost 35% (from 63174 organizations to 41349 organizations), while the number of students enrolled in primary, basic and secondary general education programs, despite the temporary decline in the second half the first decade of the 21st century, from 2005 to 2018 increased by 3% (from 15630.9 thousand people to 16137.3 thousand people) and has a tendency to further increase, since in the country's preschool educational institutions the number of children is much larger than the number of high school graduates and students of universities and professional educational institutions (7.5 million vs. 6.7 million). Russia overcame the period of the "demographic pit", but emerged from it with a significantly weakened school system.

Materials and Research Methods

The purpose of the study is to develop a system of requirements for the formation of a model of intra-school education quality management, which allows for the development of effective management decisions based on a reasonable assessment of the quality of education in municipal educational institutions of the Russian Federation.

The object of the study is the system of state management of the quality of education, the subject is the system of intra-school quality management of education in the municipal comprehensive school of Russia. The Vologda Oblast was chosen as the experimental testing ground for the region, where a tactical document was developed at the regional level to provide a solution to the identified problem - "Methodological recommendations for the formation of a model of the internal system for assessing the quality of education in educational institutions of the Vologda Oblast" (hereinafter referred to as the VSOKO model). The study was tested on the activity data of the Vologda municipal secondary school "Gymnasium No. 2", which implements educational programs at all three levels (primary general education; basic general education; secondary general education) that are most typical for such an institution in the educational system of school education in Russian Federation.

Problems of the quality of education in the managerial aspect are investigated in the works of Bermus A.G. (2003), Bolotov V.A. (2018), Arkhipova T.V. (2017), Sagdieva M.S. (2017), and others. The specifics of the concept of "quality of education" at the level of an educational institution is revealed in the works of Zagvyazinsky V.I. (2010), Kulemin N.A. (2005), Panasyuk B.P. (2000), Shcherbo I.N. (2005). Foreign experience in researching the problem of measuring the quality of educational services and developing competent management decisions on its basis is well diversified and deserves the undoubted attention of Russian scientists. Of particular note is the framework for education quality indicators proposed by UNESCO. However, the issues of turning off the model for assessing the quality of education in the system of intra-school management, developing managerial decisions in the context of the innovative development of educational systems and the formation of a knowledge economy in Russia remain insufficiently studied and therefore acutely relevant.

The methodological basis of the study was a complex of general scientific and special methods of cognition. In the course of the study, such general scientific methods were used as analysis, synthesis, generalization, historical, graphic method; special methods of cognition: formal-logical method and specific sociological.

Research Results and Discussion

The Federal Law "On Education" defines the need for the functioning of the system of evaluation activity in an educational organization (VSOKO). However, a national regulation on the formation of such a model and its inclusion in the activities of an educational organization in the Russian Federation has not yet been formed. It is understood that the educational organization is able to independently develop a similar model. Currently, in most regions of the Russian Federation, it was decided to develop this model at the regional level, however, the development of regulations and provisions on the use of the model did not become a sufficient basis for its effective inclusion in the process.

According to the methodological recommendations on the formation of a model of internal assessment of the quality of education in general education organizations of the Vologda Oblast, developed by specialists of the Vologda Institute for Educational Development, the VSOKO model should include:

1. Regulatory and documentary unit. This block includes local regulatory legal acts, the main task of which is to regulate the application of the internal system for assessing the quality of education, its individual assessment procedures, establishing the functionality and powers of officials, public administration bodies of a general educational organization, and other subjects of educational quality assessment;
2. Organization block. This unit is formed by the structures of linear-functional and program-targeted management of the educational institution and the educational process when implementing the functions of assessing the quality of education or procedures, which include an element of assessing the quality of education (self-examination, internal administrative control, examination, monitoring);
3. The process unit. This unit is responsible for describing the procedures by which the quality of education in an educational institution will be assessed, both in general and in its individual aspects;
4. Instrumentation unit. This block is a combination of the whole set of evaluation and measuring tools, control and measuring materials, evaluation technologies, techniques, technical resources, software and hardware used to carry out procedures for assessing the quality of education;
5. Information and presentation block. This unit has the task of systematizing information according to the results of internal and external evaluation procedures.

Local regulatory legal acts may include provisions, rules, instructions, requirements, and regulations. The composition of local acts is determined by the Charter of an educational organization, depends on the requirements of Russian legislation in the field of education, and follows from the conditions for the application of Federal state educational standards in practice. The volume of local regulatory acts that a general educational organization develops and applies directly depends on the number of students implemented in its educational programs, the level of development of the document management system, the level of qualification of administration representatives, and other factors. A study of a set of documents developed by a number of Russian municipal educational institutions showed that the most common local regulatory legal acts are:

- Regulation on the internal system for assessing the quality of education;
- Regulation on the system of internal monitoring of the quality of education;
- Regulation on intra-school control;
- Regulation on criteria-based assessment;
- Regulation on the assessment system, forms and procedure for conducting current, intermediate and final certification at the level of primary, basic general education;
- Regulation on extracurricular activities;
- Regulation on the forms and frequency of current control and intermediate certification of students;
- Regulation on design and educational research activities of students;
- Regulation on the provision of information on the student's current performance, maintaining an electronic diary and an electronic performance journal.

It is important to emphasize that for the effective functioning of the internal system for assessing the quality of education in a general educational organization, together with local regulatory legal acts, a number of documents should be developed and systematically applied that are aimed at implementing the managerial functions of planning, control, evaluation, analysis, and accounting. These documents establish the functionality and responsibilities of officials. The organizational unit is provided for by the Charter and staffing of the educational organization. The powers, responsibilities and duties of officials (director, deputy directors, class teacher, psychologist, etc.) are established in job descriptions.

The procedures included in the process unit are usually called internal procedures, since they are initiated, performed in accordance with the internal plans of the school. Such procedures may include

examination of various materials, pedagogical council, student and graduate portfolio, administrative control in various areas, career guidance testing and other materials.

The information collected based on the results of internal and external evaluation procedures should be convenient and technological for use by various consumers and stakeholders. It can be self-examination reports, various certificates, etc. For ease of use in managing the quality of education, it is important to structure all received data in a timely and periodic manner, to protect against unauthorized removal, distortion, loss.

The development and improvement of the internal system for assessing the quality of education existing in an educational organization today needs to be built on ensuring a combination of an approach that implements the principles of a qualitative assessment and an approach that traditionally represents technologies for the quantitative assessment of the parameters of educational services. However, a significant problem in the formation and application of such a model is also its adequate compliance with the interests of students and their legal representatives (parents, guardians), since assessment procedures should not create restrictions on the effective course of the educational process, since according to the modern logic of effective educational management, control is a function management should not prevail over other functions, reducing their effectiveness and importance. Ultimately, educational organizations, which include municipal educational institutions, are agents of the educational services market, who have as their primary task the high-quality rendering of these services in accordance with the needs of customers and spokesmen of their interests. Thus, the study of the level of satisfaction with the quality of the educational process in the current academic year of all subjects of the educational process should be an important tool for improving the model of intraschool education quality management. Obviously, in this regard, the study of the results of studying the level of satisfaction of subjects of the educational process in municipal educational institutions of Russia that have a fairly long experience in introducing the VSOKO model in the management of the educational process, which was undertaken during the study on the basis of an experimental training ground - the municipal educational institution, is gaining relevance. Gymnasium No. 2 "of Vologda. This educational institution, on the one hand, in terms of its organizational structure, the number of teachers and students is a typical Russian municipal educational institution, on the other hand, has successful experience in introducing innovative educational process management technologies. According to the results of the academic year 2009-2010, the gymnasium was included in the national register "Leading educational institutions of Russia" (certificate No. 10167 of January 13, 2011). In 2011, the gymnasium won the competition of educational institutions of the Vologda Oblast implementing innovative educational programs and received a grant in the amount of 1 million rubles. In 2017, this gymnasium was included in the list of 500 best schools in Russia.

In the course of the study, satisfaction with the quality of the educational process will be understood as the emotional and evaluative attitude of the individual and the team towards the work performed, the services provided, and the conditions for its flow, the receipt of these services (depending on the subject of the educational process), since, as a rule, it is important for a person not only the product of the activity, but also how satisfied or dissatisfied with this product is, is it satisfied or not satisfied with the process of the activity, the relations between its participants. It is important to understand that the level of satisfaction is subjective in nature and is associated with people's perception of their personal educational status, depending on cultural characteristics, value systems and social standards existing in society. The socio-psychological characteristics of the parent community of the gymnasium indicate a high level of claims and expectations regarding the quality of education provided by the institution, as well as the social adaptability of school graduates. The level of satisfaction of teachers with working conditions and the level of the socio-psychological climate serves as a kind of indicator of team cohesion, its potential to make collective decisions and cope with difficulties, and its willingness to bear responsibility for the common cause. Of course, all parties interested in quality education are clearly aware that recognizing the school successfully working if you can achieve high levels of training and education of students, and at the same time students and teachers show a positive attitude towards school life, they feel comfortable and confident enough for productive work.

During the study in 2019, a continuous survey was conducted of students, their parents, teachers of the Vologda Grammar School No. 2 municipal educational institution in order to study the level of satisfaction of all subjects of educational activity with the quality of educational services provided. In total, more than 500 people took part in the questionnaire, of which 42% were students' parents, 47% were students, and 5% were teachers of the gymnasium, which corresponds to the structural units of the abundance of these categories of participants in the educational process of the gymnasium. The questionnaire was developed during the study on the basis of the study and analysis of existing methodological approaches to assessing satisfaction with the quality of education and the implementation of activities as a teacher. Figure 1 presents the main results of the survey.

As can be seen from the results, a high level of satisfaction with the educational process of the gymnasium was shown by 65% of students, 83% of parents, 70% of teachers of the gymnasium, positively assessing the educational activities of the institution. In general, a high level of satisfaction amounted to 74% of the total number of all respondents. A score of 26% of students, 16% of parents, and 26% of teachers indicate an average level of satisfaction. The overall average satisfaction rate among survey participants was 22%. 4% of respondents are unsatisfied with the quality of education, working and studying conditions, and relations within the school team. Of these, a rather high percentage of students with a low level of satisfaction, which made up 9% of the total number of school students surveyed, deserve attention, which is quite different from the assessments of other groups of subjects of the educational process. It can be assumed that the internal processes of development of an educational institution have constraining factors in development in terms of quality, which reduces the overall assessment of the favorableness of schooling.

The questionnaire questions reflected 4 priority positions characterizing the quality of the educational process:
- satisfaction with the institution as a whole;
- satisfaction with the organizational side of the educational process;
- satisfaction with the active, substantive side of the educational process;
- satisfaction with the socio-psychological climate of the educational process.

For each block, a satisfaction index was calculated with a maximum value of 5 points. A comparative analysis of the results allowed us to identify trends in the decrease and increase in the satisfaction index for various aspects of the institution's activity relative to the average indicators for the gymnasium. So, among the parents of students assessment of the main criteria of the educational process distributed fairly evenly. Students of some classes clearly showed a decrease in satisfaction by various criteria. It is important to pay attention to the results in grades 6, 8, 10, where students note insufficient communication in children's groups and interaction with teachers. The most favorable results of satisfaction were in grades 4.

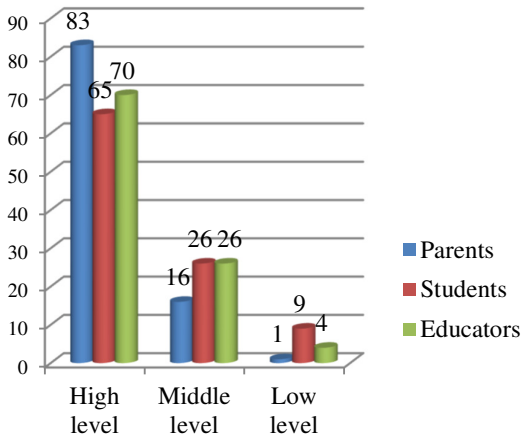

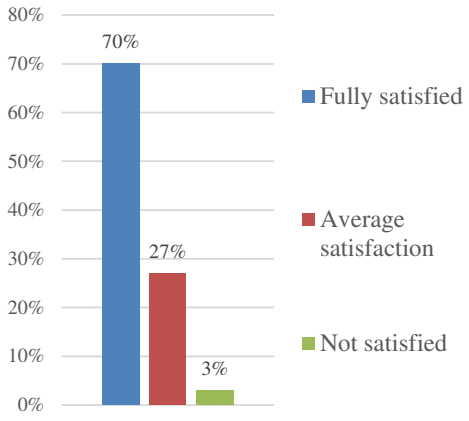

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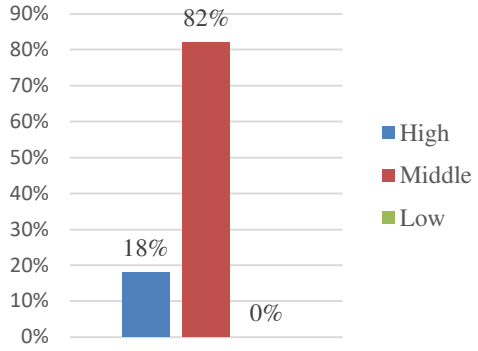

The results of the study of the creative potential of teachers of the gymnasium,%

Level of satisfaction of teachers of the gymnasium with the profession of teacher,%

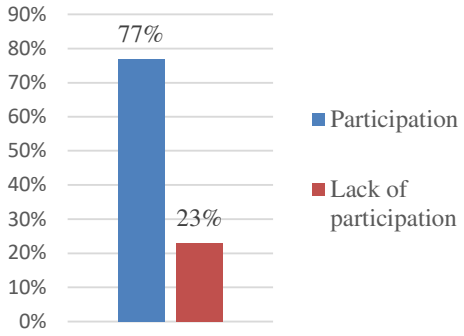

The level of involvement of teachers in professional competitions and innovative projects,%

Figure 1: Results of a study examining the level of satisfaction of all subjects of educational activity with the quality of educational services and self-examination of the municipal educational institution "Gymnasium No. 2" in Vologda (Vologda Oblast, Russia)

The survey procedure provided for proposals to improve the work of the municipal educational institution. The analysis of the questionnaires made it possible to single out a number of acute issues requiring the attention of the leadership of the gymnasium and the teaching staff. Students and their parents made suggestions on a number of parameters of the organization of the educational process, which, in their opinion, can improve its quality. Among the noted positions, quite a lot of attention is paid to the problems of infrastructure quality (repair of premises, improvement of the school yard, a variety of sports facilities, compliance with sanitary standards in public places) and the comfort of living in the gymnasium (quality of food, level of service in the canteens). Along with this, proposals were put forward to improve the psychological climate of school life, return to the traditional five-point grading system, reduce the workload, put forward the problem of staff shortages of professional teachers, and increase their qualifications, including the level of communicative culture.

During the study, an analysis of indicators for self-examination used for the public report of the Russian municipal educational institution was made. This analytical report contains information and analysis of the work of the educational institution in the main areas of functioning and is intended for the public presentation of the results of the work to the founder, parents, and the public. The purpose of this analytical report is to describe the real situation at the moment, to attract recipients to its discussion and assessment, to express opinions, suggestions and recommendations for the development of the school. The effect of such a dialogue can be an update of the school development program, an increase in the resource support of the school, a change in its material and technical security, an expansion of the student population, and increased competitiveness.

The results of the self-examination of the activities of the gymnasium made it possible to establish that the vast majority of teachers have a fairly high level of satisfaction with the profession of a teacher (70% of all teachers of an educational institution), their position in the team and the gymnasium as a whole. This factor indicates a favorable atmosphere conducive to the professional development of teachers themselves, and, as a result, improving the quality of education in a general educational institution. At the same time, one cannot fail to note the fact that almost a third of the teaching staff of the gymnasium are either not completely satisfied with the chosen profession, or partially satisfied. At the same time, the number of teachers with a high level of creative potential in one of the most successful municipal educational institutions in Russia is only 18% (Figure 1). Another indicator that indirectly affects the quality of the educational process is the indicator of the participation of teachers in professional competitions, development of innovative projects and the

dissemination of pedagogical experience. The analysis of self-examination data indicates that the teachers of the gymnasium, which has a lot of professional regalia, do not use all the opportunities for generalizing and disseminating pedagogical experience. Measures are needed to stimulate educators in activities related to the dissemination of personal pedagogical experience. An oral survey of teachers made it possible to identify the following limiting factors for improving the quality of the educational process: the low motivation of individual gymnasium students to learn, the difficulty in implementing techniques and methods of individualization and differentiation of education; difficulties in intersubject integration; inability to build individual educational training routes for students and their tutoring, lack of preparedness for the implementation of the provisions of the system-activity approach in training; a large number of reporting documentation.

Thus, a study conducted on the basis of an experimental training ground showed that a high level of satisfaction with the quality of the educational process provided by the gymnasium prevails in the municipal educational institution (74% of the total number of respondents). The proportion of survey participants, which is characterized by an average level of satisfaction, was 22%. 4% of respondents are not satisfied with the quality of education. The greatest satisfaction of parents is associated with the socio-psychological climate of the institution, with its atmosphere of constructive interpersonal relationships that have developed in the educational environment. At the same time, students are dominated by a high level of satisfaction with the gymnasium as a whole, its authority in the city and the region, and involvement in the traditions of the gymnasium. The results of monitoring the level of satisfaction made it possible to identify cool teams that require a set of pedagogical measures of support and control, support for educational activities. The smallest values in terms of satisfaction with the quality of the educational process were determined in the position of the organizational side of the educational process for each category of respondents. The evaluation of this criterion includes the comfort of the premises in the school, the sufficiency of teaching aids for mastering subjects, and taking into account all the basic needs of students.

The data obtained during the study allow us to determine the main components of the model of the intraschool education quality management system and the system of requirements for them. So, we will consider the following components of the VSOKO model, which have received confirmation of their significance, as the main ones: 1) the conceptual block, which primarily includes the policy and goals of the general educational institutions in the field of quality, as well as goals, objectives and principles of internal assessment of the quality of education; 2) the legal framework as a basis for quality management, which will comprise, as previously indicated above, legal acts of the federal, regional and municipal levels, as well as local acts of a general educational organization; 3) the organizational unit, that is, the organizational structure of quality management.

The fundamental element of the organizational structure of the quality management of education of a municipal educational institution in Russia (Fig. 2), in our opinion, should be the scientific and methodological council of the school, which on a mandatory basis includes the head of the organization, the leaders of methodical associations. The leaders of methodological associations are usually the most experienced and qualified teachers, selected by the team and approved by order of the director. This composition is standard. In the context of the development of education, the scientific and methodological council may also include managers or representatives of individual projects, in accordance with the development program of the educational institution. Strategically significant from the point of view of designing the future development of the municipal educational institution is the inclusion in the above composition representatives of science, educational development institutions, the Center for Continuing Professional Development of Teachers and the Center for Assessing Professional Skills and Qualifications of Teachers. This management body develops diagnostic programs, monitors quality, provides regulatory and methodological support to participants in educational relations; analysis of the results and formulation of proposals to improve the quality of education.

Head of educational organization			
Level 1 Strategic Management			
Social order	School board	Teaching board	
Level 2 Tactical Management			
Parents Committee	Scientific and Methodological Council	Expert Groups	Information Service
Level 3 Operational Management			
Board of Administration: Deputy Director	Board of students: self-government committees	Psychological service	

Figure 2: Organizational structure of education quality management of a municipal educational institution in Russia

Based on the complexity of the content of the concept of "quality of education", a municipal educational institution needs to create expert groups to evaluate it in three areas: quality of conditions, quality of content and process, quality of results. These groups can be created both due to the staffing table, and on a public basis; can work constantly or on demand. Competent members of the expert group should have experience in this particular area of quality assessment. When choosing experts, their personal interest in the decisions made should be excluded. Subject to the above conditions, objective decisions will be obtained, and the judgments of experts, in turn, will be appropriately accepted. The competencies of the Council of the school include: coordination of local acts on the assessment of the quality of education, participation in examination procedures and assessment of the quality of education in the selected areas, the adoption of a public report by the head of the educational organization based on the results of self-examination. The school council is a public, representative and elected body of school self-government. This governing body includes: representatives from the teaching staff of the school, from the parental community and high school students. Members of the School Council perform their duties on a voluntary basis. The information service is composed by the head of the press center, the site administrator and other involved persons, for example, technical specialists.

The organizational structure of education quality management, created on the basis of a specific municipal educational institution, is able to effectively implement the VSOKO model in practice that meets the requirements of consumers of educational services and Russian legislation in the field of education. The elements of the VSOKO model are designed to become elements of an effective management system of the municipal educational institution (Figure 3). Measures to implement the goals and objectives of the VSOKO should be included in the n-graph in which the respectively determined periodicity evaluation of certain parameters and responsible person. This schedule of the educational institution after an analysis of existing problems should be subjected to annual adjustment.

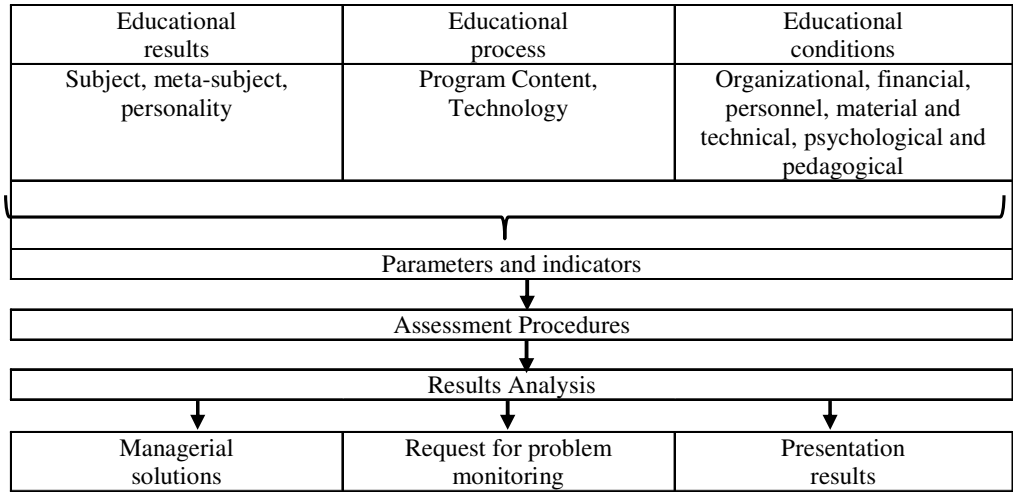

Figure 3: Elements of the VSOKO model in the management system of a municipal educational institution in Russia

The system of intra-school assessment of the quality of education in a general educational institution has a number of features: focus on assessing the individual progress of the student and teacher; the priority of self-assessment over external assessment, the inclusion in the system of education quality assessment of indicators consistent with the requirements of the Federal State Educational Standard and aimed at the emergence of new educational results. The main technologies for education quality management are problem-oriented analysis, marketing research of requests and satisfaction with the results obtained by consumers of educational services and participants in the educational process. No less important are the long-term goal-setting and decomposition of strategic goals for quality goals in the areas of educational activity; self-assessment of organizational management effectiveness.

Conclusion

The results of the study indicate the presence of a number of positive changes in the management of the quality of education in the municipal educational institutions of Russia: 1) the importance of creating an intra-school system for managing the quality of education is noted; 2) in certain regions, methodological recommendations have been developed that define the main components of the VSOKO; 3) self-examination is conducted on a mandatory basis in educational institutions, the results of which are open and published on the official websites of municipal educational institutions of Russia.

At the same time, there are a number of significant problems and limitations that do not allow ensuring the development of effective management decisions based on a reasonable assessment of the quality of education in municipal educational institutions. The organizational structure of the quality management of education, created on the basis of a particular municipal educational institution, is the guarantor of the effective implementation of the VSOKO model in the practice of the educational institution:

- the model should be adequate to the conditions and needs of a particular educational institution, since there is no single developed universal model of the VSOKO that could be applied in any educational institution;
- it is necessary to form a unified approach to the timing, levels, procedures of the VSOKO, which would ensure their continuity in the organization;
- the model should not ensure that the VSOKO is reduced only to monitoring the quality of education, since this is not the goal of introducing the model, it should be integrated into the process of effective management decision-making in the educational institution;

- reduced efforts to implement the model and accelerate processes are possible only in the context of digitalization of operations to collect and analyze the results of assessing the quality of education and ensuring timely access to the data of all bodies and employees interested in making management decisions.

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Peculiarities of labor market regulation in Russia

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Abstract

Timothy Besley and Robin Burgess (2004), based on the study of labor market in the Indian states, expressed an assumption that legislative regulation of labor market has a negative impact on economic development. The economic situation in Russia is a good confirmation of this assumption. Labor legislation of the Russian Federation imposes significant restrictions on the employer regarding the reduction of workers at enterprises and institutions. This allows to keep the unemployment rate in the country at a low level. However, this leads to significant negative consequences. Companies are cutting salaries, attracting hired professionals and moving salaries to the shadow sector of economy. This paper considers peculiarities of modern labor market in Russia in relation to the labor market, considered by Timothy Besley and Robin Burgess and in relation to the labor market in Western Europe. They showed that there is at least one significant difference - in Russian economy 45% of enterprises are enterprises with state participation. In addition, in Russia a significant part of population is employed in public sector. Thus, the state is able to limit the reduction of workers in a number of industries in order to maintain a low level of official unemployment. In particular, this confirms the "political" hypothesis on the issue of motives for regulating labor market. In Russia as in Western Europe there is an unfavorable demographic situation associated with an aging population. As in Europe, although to a lesser extent, there is a

problem of labor migration. However, these factors manifest themselves to a lesser extent in Russia which does not allow to use them as arguments for or against the assumption. under discussion.

Keywords: Labor Market Regulation, Unemployment, Hidden Unemployment, State Participation in The Economy

Introduction

Lack of flexibility in the labor market negatively affects output volume. This thesis is based on a number of works by various researchers and, first of all, on an empirical study by Timothy Besley and Robin Burgess (Besley T and Burgess R (2004)). Based on statistics from the Indian states for the period of 1958-1992, they showed that in states where workers are protected by law output and employment (as well as other indicators) are worse than in states where there is no such protection. This thesis has been repeatedly adopted as the basis for political decisions in India and a number of other countries and at present is considered generally accepted. We note, however, in the recent paper by Servaas Storm Storm S (2019), there is serious criticism of this position. His work shows that this result cannot be reproduced and is statistically unreasonable, which casts doubt on the methodology of Besley and Burgess. In the works of W. Siebert (Siebert 2003) the conclusion is not stated clear: "However, in terms of efficiency such regulation ... becomes a double-edged sword: some (working people) benefit from it at the expense of others (unemployed). Such a result cannot be called too effective. "

Thus, discussions about this thesis continue to this day.

In the previous work by Semenova A et al (2019), the author examined the thesis of Besley and Burgess in relation to Russian labor market. Russia has restrictions on labor market. It is shown that this leads to negative consequences. First of all, it is high hidden unemployment. In addition, this leads to moving salaries and wages to the shadow economy and to an increase in significant differences in salaries of top management and ordinary workers. The mechanisms of this phenomenon and the causes of it are considered.

According to the studies (2001), the reason for this state of affairs is laid down in the Labor Code - an employer has very high obligations to the employee (he must notify him of dismissal at least two months in advance, pay severance pay in the amount of three salaries, etc.). Therefore, an employer is forced to look for another way. One of the possibilities is wage reduction. This is due to the fact that in Russia a very significant part of wages are non-fixed payments. This leads to an increase in hidden unemployment. In countries with developed market economies the situation is the opposite - a fixed part of payments accounts for a large part of wages which makes it impossible to reduce wages. We note the following point: the reduction in wages will primarily concern highly paid specialists, since it is simply impossible to reduce wages of low-paid employees.

Thus, the Russian economy is a good confirmation of the thesis of Besley and Burgess. However, the question of similarity and difference of Russian labor market regulation in comparison with other countries remained unresolved. This study examines the main differences between Russian labor market and Asian and European labor markets.

Research Methods

Research sources for the study were the works by domestic and foreign scientists and economists on unemployment, the Federal State Statistics Service`s data, surveys` data and publications in scientific periodicals. The initial data for the analysis are taken from the reports of the Institute of Growth Economics named after Stolypin P.A. (2018) and Rosstat (the Federal State Statistics Service) for 2018-2019 (2019). The analysis of Russian labor market is based on the studies of Analytical Center under the Government of the Russian Federation (2001) as well as on the works by Siebert W.S. (2003).

Research Results and Discussion

There are two main aspects of regulation: establishment of acceptable working conditions and regulation of payments to employees.

The assessment of labor market regulation level is based on two indices - one of them concerns laws on protection of employment restricting the right to dismiss workers and the second concerns laws on protection of trade union rights. Russia is characterized by a high index of employment protection and a low index of protection of trade union rights. In this regard, Russia is closer to Greece and Portugal than to the United States and Great Britain. (Sources: OECD 2004, table 2.A2.4 (for the employment protection index); Botero et al, 2004 (for the union protection index)).

There are three main hypotheses about the causes of labor market regulation. According to one hypothesis regulation should compensate for the shortcomings of market regulation. According to another hypothesis labor market regulation is an expression of interests of some participants in the labor market. We also note the Botero hypothesis (Botero et al. 2004). According to Botero and his colleagues "regulatory methods in different countries are partly determined by their legal systems, and therefore, if a society regulates one particular area of activity, it will most likely regulate others as well" (Botero et al. 2004). Because of centuries of absolutism the powers of public administration are traditionally strong in Russia (as well as in continental Europe. Hayek (1960)). In this regard, Russia well confirms Botero`s hypothesis.

Currently economists are inclined to accept the view that labor market regulation is driven by political motives. An average voter stands for it (labor market regulation) viewing it as an instrument of income redistribution. Moreover, as shown in the work of St. Paul (Saint-Paul 1996), an average voter is a person who is employed.

Apparently, in Russia labor market regulation is also caused by political motives but the alignment of forces is somewhat different here.

According to experts, Russia has a very high level of state participation in the economy. According to the FAS Russia (Federal Antimonopoly Service, https://fas.gov.ru/documents/596439), the growth of the state's share in GDP from 2005 to 2014 rose from 35% to 70%. The IFF (International Finance Fund) in the 2019 report gives an estimate of 33% in 2016. According to experts of the RANEPA - 46% in 2016. Apparently a rating of 45% can be accepted as the most reliable. In particular, 28 companies of the 100 largest companies represented in the Expert RA ranking for 2017 are state-owned companies (the share of state participation is at least 25%), 5.5% of all people employed in Russian economy in 2017 work in them.

In addition, about half of the country's population (51.8%) (2019) is supported by the state: pensioners and people with disabilities (42.73 million people), officially unemployed (3.9 million people), officials and state employees (35, 22 million people), inactive population (30.15 million people). We will separately consider such group as officials and state employees. According to the study (2018), the sectors with the lowest level of value added generation per one workplace in 2017 were public administration (0.29 million rubles), education (0.37 million rubles), utilities and social services (0.39 million rubles) and healthcare (0.47 million rubles). As shown in our work by Semenova A et al (2019), based on the analysis of generation of value added per job during the crisis of 2014-2015, the decrease in output did not lead to an increase in unemployment. Instead, enterprises reduced wages of their employees. The same holds true for the above mentioned industries. Thus, here the hidden unemployment is even higher than in production.

The above mentioned facts allow us to put forward the following hypothesis. The objective functions of state-owned enterprises differs from commercial ones. If profit and economic efficiency are important for business then government policy is important for state-owned enterprises. The latter may be profit or efficiency, but it is not necessary. At the moment social peace is important to the government. Therefore, it is beneficial for the government to retain a lot of extra workers. Therefore,

high latent unemployment remains. This fully applies to officials and state employees. In enterprises with state participation this is, of course, not so clearly expressed but an influence of the state is still quite noticeable.

This confirms the point of view that labor market regulation is driven by political motives. The Russian labor market regulation system is the result of an informal agreement between workers, employers and the state that took shape in the 90s of the last century. For each of the interested parties this state of affairs is beneficial in its own way. This state of affairs is especially beneficial to the state since the state, as we saw above, is ready to put up with significant economic losses.

As for Botero's hypothesis, in our opinion, although the traditions of administrative management take place in Russia and the Russian system of labor market regulation, in a sense, they are a legacy of the Soviet past, this factor cannot be taken as determining.

Russia has similar problems in the labor market with Western Europe. This is a demographic situation and labor migration. As in Western Europe Russian labor market has faced the problem of an aging population. By raising the retirement age the government managed to hold back the labor force and skilled specialists in the economy for some time. Among the recent legislative initiativesm restrictions on the dismissal of workers of pre-retirement age can be noted here. The possibility of solving this problem through labor migration is also being considered.

To a lesser extent than in Western Europe but, nevertheless a migration problem is quite noticeable for the Russian labor market. Highly qualified specialists leave Russia and migration from the former Soviet republics results in low-skilled specialists. It also applies measures of state regulation of labor market. They mainly consist in the following: the host countries use the selective method in the regulating labor migration, the essence of which is that the state approves the entry of those categories of workers for which there is a demand in a given country, restricting the entry of all the rest. On this issue, there are also different opinions - the regulation procedure may become an incentive to increase the number of illegal migrants in the future and, in addition, undermines the foundations of existing legislative system. In particular, in real politics these views are held in countries such as Germany, Canada, Australia, Japan, Denmark and Norway. As for Russia, in our opinion, it is too early to draw any conclusions.

Conclusions

So, based on this study we draw the following conclusions. The main differences between the labor market examined by Timothy Besley and Robin Burgess and Russian labor market are the following: a) a high percentage of state participation in the economy, b) demographic problems, c) the influx of migrants. The last two factors also occur in Western Europe.

In our opinion, the fact that almost half of Russian enterprises are partially controlled by the state makes the mechanism of labor market regulation in Russia a unique phenomenon. This complicates the functioning of market laws and, thus, hinders Russian economy development. The Russian version of labor market regulation confirms the thesis that legislative regulation of labor market has a negative impact on economic development.

The assessment shows that in order to achieve the level of labor productivity in 2014, about 25 million of the 70 million workers must be freed. This is a difficult problem, what to do with this mass of unemployed. In this article we do not consider this issue.

The Russian system of labor market regulation is a balance of interests between workers, employers and the state. Each of the interested parties is happy with this state of affairs. However, it must be clearly recognized that this system has a negative impact on the economy as a whole. In society, however, there seems to be no clear understanding of this. Nevertheless, to improve the economy, it is necessary to change labor legislation in the direction of the laws of countries such as the United States, Germany and the United Kingdom.Список литературы/ References

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The Impact of Corporate Social Responsibility on Rural Development

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Abstract

Currently, corporate social responsibility is developing both within the organization and in relations with society. Despite the development of state support for the agro-industrial complex, the socio-economic, technical, cultural, domestic, demographic and other problems of the village have recently intensified. The future of rural territories depends on in what way and how quickly these problems are resolved. In our opinion, their comprehensive solution is significantly determined by the activities of modern socially responsible organizations of the agro-industrial complex, since it is they who are interested in their own development and increasing profitability under conditions of stability.
Social and labor relations in the countryside are characterized by a low degree of satisfaction of demand for labor resources with its supply, which is confirmed by the constant outflow of the rural population to regional centers. The geopolitical and socio-economic situation forces our country to develop these areas as soon as possible. Despite this, the prestige of labor in agriculture does not actually increase. The citizens of our country have a negative opinion about life and work in the countryside. The labor market in rural areas, as a rule, is not represented by the abundance of employers, rural labor is associated with the seasonal nature of many types of agricultural work, therefore work in agriculture is characterized by a lower level of material incentives. In this regard, the social development of the village, due to agribusiness, needs state support with a perfect selection system for recipients. This article discusses corporate social responsibility as a factor in the development of rural areas. A system of state support for corporate social responsibility of agricultural enterprises is proposed.

Keywords: Corporate Responsibility, Social Responsibility, Agribusiness.

Materials and Methods

Social and labor relations in rural areas are characterized by a low degree of satisfaction of demand for labor resources with its supply, which is confirmed by the constant outflow of the rural population

to regional centers. Labor in the countryside is associated with the seasonal nature of many types of agricultural work. Work in agriculture is characterized by a lower level of material incentives (Table 1).
However, judging by the data in Table 1, there are positive changes in the ratio of the average salary in agriculture to the average for the economy, which over the past 7 years has increased from 56% to 69%. These facts confirm the need to develop corporate social responsibility in the agricultural sector for the well-being of rural areas.

According to E.M. Korotkov, corporate social responsibility is the realization of the interests of the enterprise by creating conditions for the social development of its staff and the active participation of the company in the development of society.

Corporate social responsibility in the agricultural sector provides for:

- responsible behavior with business partners;
- social responsibility to consumers of products, goods and services and to suppliers;
- social development of the economy - improving the business with the participation of employees of the enterprise;
- labor protection and health of the company personnel;
- responsible personnel policy, advanced training and professional retraining of personnel;
- reduction of the hazardous environmental impact;
- active work on interaction with public authorities and non-profit organizations to address social issues.

Table 1: The average monthly nominal accrued wages of employees of organizations of the Chuvash Republic for 2012-2018, rubles.

Indicators	Years						
	2012	2013	2014	2015	2016	2017	2018
Wholeeconomy	14896,3	17187,4	19387,5	20854,4	21369,4	22907,6	24529,8
Agriculture	8352,1	9595,1	10853,6	12800,1	14773,3	15974,2	16908,4
The ratio of the average salary in agriculture to the average for the economy,%	56,07	55,83	55,98	61,38	69,13	69,73	68,93

The social responsibility of agribusiness, in contrast to responsibility before the law, implies the presence of a voluntary desire by the management of the economy to finance the solution of social issues. We are talking about those activities, the conduct of which is not obligated by law or regulatory authorities. The social responsibility of the management of agricultural enterprises consists in constant interaction with authorities, which as a result increases the efficiency of enterprise management. And the result of such mutually beneficial cooperation is a steadily developing society in the countryside, where wealth is increasing.

Given the experience of social responsibility of foreign corporations, the management of domestic companies begins to perceive corporate social responsibility as the norm, without which stable development is impossible.

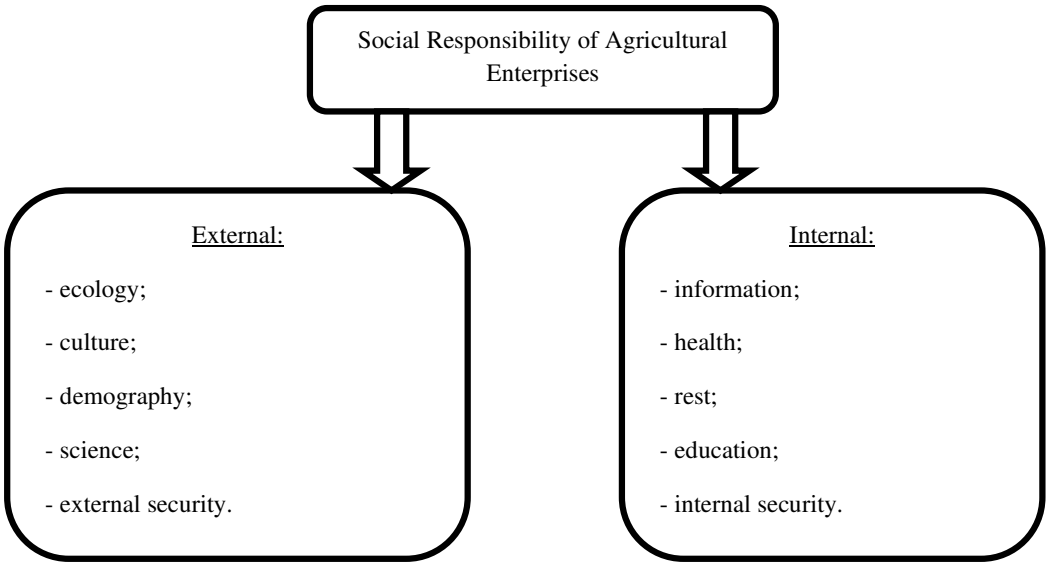

Fig. 1: Objects of social responsibility of agricultural enterprises

Figure 1 shows the main objects of corporate social responsibility of agricultural enterprises. These objects of development of society need, first of all, the economic support of agribusiness.

Social investments, depending on the objects and structure of the social responsibility of agricultural enterprises, can be directed both to the external and to the internal environment. Therefore, social investments can be both external and internal.

Depending on the direction of social responsibility and the costs associated with it, we can distinguish between external and internal social responsibility.

Let us consider in more detail the internal social responsibility of agribusiness, which is realized through investments directed inside the organization. In this case, social investments involve the allocation of financial, material, technical, technological and other resources to the implementation of social programs of the enterprise, and as a result of which in the future the company will receive some economic effect.

The manifestation of the internal social responsibility of owners and management should be felt by the employees of the agricultural enterprise. This implies the manifestation of not only mandatory liability prescribed by the legislation of the Russian Federation, but also additional responsibility, which is voluntary. Moreover, the latter may manifest itself to a greater extent.

Based on the foregoing, the following can be attributed to the directions of internal social responsibility of agricultural producers:

1. Social protection of company personnel;
2. Disclosure of the human potential of the company;
3. Making management decisions taking into account the interests of employees of the agricultural enterprise;
4. Socially responsible change in the structure of the enterprise.

The first area - the social protection of company personnel - involves the implementation of the following measures:
- the absence of discrimination on the basis of gender, age, national, racial and other grounds;

- ensuring the health and safety of workers in the workplace and assistance in difficult life situations. It is noteworthy that before the theory of corporate social responsibility appeared, only labor safety was implied. However, with the development of this theory, the scope of manifestations of measures to ensure the protection of the life and health of staff has expanded significantly. Studies of the development of human capital, taking into account the use of corporate social responsibility, have revealed an important trend: the negative consequences of excessive workload on employees, which leads to a deterioration in their health and performance, can be mitigated by company resources that are aimed at stimulating the organization's personnel;
- maintaining wages at a decent level and annual inflation indexing.

The second direction - the disclosure of the human potential of the company - should include training programs and professional retraining of personnel, which leads to increased competitiveness of employees in the labor market and to reduced dependence on one employer, and also saves the state budget funds aimed at promoting the employment of the population in case of dismissal of an employee. The disclosure of human potential is carried out in order to identify and stimulate talented highly qualified personnel. This area of internal social responsibility includes the use of modern mechanisms of employee motivation through remuneration and communication schemes.

The third area is the adoption of management decisions taking into account the interests of employees of the agricultural enterprise. It involves the adoption of key management decisions in accordance with the interests of company employees. This modern company development approach provides the involvement of employees in the company development process. Thus, due to corporate social responsibility, the effectiveness of personnel management is increased.

The fourth area - a socially responsible change in the structure of the enterprise - provides for the restructuring of the company in socially responsible ways.

Research Results and Discussion

For several years now, in Russia, with an eye on foreign experience, a socially responsible business has been developing. Domestic entrepreneurs have appreciated the benefits of doing business in a civilized way. It is worth saying that such changes are least noticeable in agriculture, and most noticeable in raw materials, energy, metallurgy, mechanical engineering, and the banking sector. This is confirmed by the rating data of the 100 most socially responsible enterprises of Russia, among which there are no agricultural enterprises.

Some people think that demanding changes in social management structures from agricultural enterprises is pointless, as they already have many unresolved problems. One can argue with this, since the development of the agro-industrial complex and rural territories today remains one of the most important areas of state support, especially in the framework of import substitution of food products.

The geopolitical situation and globalization processes increase the relevance of Russia's food security issues. But in fact, despite these changes, the image of labor in the agricultural sector has not increased in recent years. Russian people have a negative view of rural life and work in agricultural organizations.

Scientists of the Altai State Agrarian University Yu.A.Bugay, M.L. Akishina, A.A. Fannenstil believe that the main problem in the development of rural territories lies in a narrow-sector agricultural approach, and the fact that there are obstacles to the development of other types of production other than agricultural, despite their agricultural potential [1, p. 144]. Their publication, "The Impact of Corporate Social Responsibility of the Rural Business on the Employment of the Rural Population and the Development of Rural Areas," proves in detail that the social responsibility of agricultural enterprises is much higher than that of representatives of urban business. We agree with their opinion, according to which the rural population, unlike the urban population, significantly depends on one employer, who is the "locomotive" of life in the countryside.

For any enterprise, social costs in the short term will bring additional financial burden and subsequently a certain loss of competitiveness. Consequently:

1. Socially responsible business can be mastered, first of all, by the most profitable and financially sustainable agricultural enterprises with a sufficient margin of safety and significant competitive advantages.
2. The state and civil society should stimulate the spread of socially responsible behavior in the agricultural sector.
In this situation, with a competent approach, the implementation of the mechanism of social responsibility of agribusinessis able to solvemany problems of rural areas.This mechanism is designed to solve those problems that directly or indirectly concern both agricultural producers and rural residents. The practice of stimulating socially responsible business behavior is presented in table 2.

Table 2: Stimulation of socially responsible behavior

BytheState	**ByCivilSociety**
o Tax incentives; o Co-financing of socially significant projects; o Public–privatepartnership.	o Purchase of goods and use of services of socially responsible companies; o Investing funds in shares of socially responsible companies; o Work with a socially responsible employer.

The data in table 2 clearly show how the mechanism of socially responsible behavior contributes to the sustainable development of public life, takes into account the expectations of employees and those specialists whom the company expects to attract for work, as well as society, which directly or indirectly affects the enterprise.

In order for the concept of corporate social responsibility to be effectively implemented in agricultural enterprises, in our opinion, it is necessary:

1. To develop a system of indicators for assessing the social activity of agricultural enterprises, taking into account the areas of remuneration, staff development, health, safety, implementation of social programs and infrastructure of agricultural enterprises.
2. To conduct a prospective assessment of economic efficiency from the introduction of socially responsible practices.
3. To practically implement the proposed activities in agricultural enterprises of the Chuvash Republic.
4. To ensure the awareness of stakeholders about the implemented activities through the media and student information and advisory teams.
In order for these measures to be successfully implemented, the positive experience of voluntary social responsibility of the enterprises of the agro-industrial complex of Chuvashia is needed, aimed at improving the social and demographic indicators of the team, skill level, reducing the rate of staff turnover, improving the wage system, living and cultural conditions.

One of the most socially responsible companies in the Chuvash Republic is the Vurnarsky Mixed Products Plant (VZSP), a branch of the August Firm, JSC - the largest in Russia and the most specialized enterprise for the production of chemical plant protection products. This enterprise is the main production site of the August company, the largest domestic company for the production of chemical plant protection products. August is a socially responsible business. Today 750 people work at the Vurnarsky Mixed Products Plant, among which there are many highly qualified specialists with higher chemical and technical education. The August company regularly finances the training of employees at all levels, as well as the social support of plant employees and retirees. It is also important to note that the company allocates funds for the improvement of the village of

Vurnaryalong with local authorities. In recent years, the plant has built (or reconstructed) the following social facilities: a swimming pool (built in 2018, the construction cost of 240 million rubles), a fitness club, a sports complex, including a modern stadium, rope park, basketball and hockey courts, an amphitheater, leisure park and playground. Despite the prevailing stereotypes about the harmfulness of work at chemical industry enterprises, as well as the reduction in the population in the Vurnarsky district, the plant has no problems in selecting personnel due to many years of stability, sustainable development, attractive working conditions, prospects for professional growth, and social protection of employees. In addition, the company is one of the largest taxpayers of the republic.

In the agro-industrial complex of Chuvashia, the experience of JSC OldeevskayaAgrofirmis noteworthy - a producer of fresh environmentally friendly vegetables and milk, which pays special attention to labor protection. In order to improve working conditions, labor protection measures are carried out in the agricultural company. Occupational safety training and instruction is carried out constantly. When hiring, an introductory briefing on labor protection and an initial briefing on labor protection at the workplace are carried out as well as periodic medical examination of workers. All persons of the enterprise is provided with work clothes and other personal protective equipment in full in accordance with the standards. The agricultural company provides sanitary facilities: dressing rooms, showers, places for eating. According to the schedule, workstations are certified according to working conditions. Managers, specialists and authorized workers of the firm companies are being trained. The costs of conducting social policy for 2017-2018 are published on the website of the company. (table 3)

Table 3: Indicators of social costs of JSCOldeevskayaAgrofirmfor 2017-2018, thousand rubles

Indicators	2017	2018
1. Financial aid	548	449
2. Health resort and children's health camp vouchers	643	755
3. Corporateeventexpenses	624	730
4. Sponsorship	159	500
5. Vegetablesfortheholidays	206	250
6. Socially significant object maintenance	217	250
Total	2397	2934

As the data in table 3 shows, the agricultural company voluntarily allocated almost 3 million rubles for social needs in 2018, which is 22.4% more than in 2017.

For the successful implementation of the practice of voluntary social responsibility in agricultural organizations of the Chuvash Republic, a set of state support measures is required. According to the Ministry of Agriculture of the Chuvash Republic in 2019 2.2 billion rubles are provided for agricultural support, i.e. 11% more than in 2018. The list of government support measures is shown in table 4.

Table 4 : Measures of state support for agriculture of the Chuvash Republic

Name	Description
Singlesubsidy	1. Elite seed subsidies 2. Subsidies for laying and caring for perennial fruit and berry shrubs 3.Support oflivestockbreeding 4. Agriculturalinsurance

Unrelatedsupport	1. In the field of crop production 2. In the field of development of the production of seed potatoes and vegetable seeds
Dairycattleproductivityincrease	The amount of subsidy per 1 kg of milk sold depends on the productivity of cows
Softloans	Getting a loan at a preferential rate of up to 5% per annum in authorized banks
Smallbusinessforms	1.Support for novice farmers 2. Development of family livestock farms 3. Grants for the development of the material and technical base of agricultural consumer cooperatives
Capitalexpenditures	Subsidies for reimbursement of a portion of direct costs for the creation and modernization of agricultural facilities
Landreclamation	1. Landreclamation 2. Culturalequipment 3. Agroforestryreclamation
Hop production support	1.Subsidies for sold hops 2.Construction of hop trellis 3.Increased soilfertility 4. Technicalmodernization

According to table 4 among the existing measures there is no support for the social responsibility of agricultural enterprises. In our opinion, the existing support measures are insufficient, so they need to be supplemented with the following points:

1. Grants to agricultural enterprises for the implementation of internal social responsibility programs (to staff) on a competitive basis;
2. The provision of tax benefits to agricultural producers for the implementation of programs of external social responsibility (to the whole society).

As for the first point, you can use the experience of the club "Agro-100", which is engaged in the publication of the 100 best agricultural enterprises of the Chuvash Republic according to the results of work every year. When determining the winners, a set of indicators is assessed (revenue, sown area, salary, and others) - in accordance with the methodology for determining the members of the Agro-100 club, approved by a resolution of a joint meeting of the Government Commission of the Chuvash Republic on agricultural issues and the board of the Ministry of Agriculture of the Chuvash Republic February 13, 2008. This allows you to objectively approach the rating.

The enterprises - members of the Agro-100 club, invest in the technical renewal and modernization of the enterprise, increase the production of agricultural products, bear the social burden - the employment of workers is ensured.

To compile a rating of socially responsible agricultural producers for the subsequent allocation of grants for the implementation of social programs, it is necessary to use the criteria specified in table 5. We believe that in this way a general idea of the implementation of internal social responsibility in agribusiness can be formed. Agricultural producers will be able to direct the grant funds to the following social goals:

1. Remuneration;
2. Additional social guarantees for employees;
3. Further training and professional retraining of personnel;
4. Improving working conditions;
5. Medical care for employees;
6. Health resort service;
7. Sport and recreational activities.

Table 5: A system of indicators for assessing the social activity of agricultural enterprises

Labor Remuneration	Implementation of Social Programs	Staff Development	Healthand Safety
- the increase in the share of costs for the payment of wages in the total costs of the enterprise; - the ratio of the growth rate of the average wage to the growth rate of the company's revenue.	- the growth rate of social benefits per employee; -the growth rate of additional social benefits per employee; - the growth rate of social costs for own employees; - the ratio of the costs of environmental protection to the profit of the enterprise	- the proportion of employees who have undergone advanced training or professional retraining in the payroll number of employees; - the rate of increase in the costs of continuing education or professional retraining per employee.	- the growth rate of costs to improve working conditions per employee - an increase in the cost of medical care for staff per employee; - the rate of growth of expenses for the health and resort provision of staff; - The growth rate of expenses for sport and recreational activities.

The second paragraph of the proposed support measures provides for tax benefits to socially responsible agricultural producers implementing a policy of external corporate responsibility. These farms could finance the construction of social facilities such as kindergartens, first-aid posts, schools, roads, sports facilities, playgrounds, etc. and receive tax deductions commensurate with the funds spent for these purposes.

Conclusion

The implementation of the proposed measures will enhance the role of corporate social responsibility in the development of rural areas. On the one hand, this will make it possible to more rapidly increase the growth rate of agricultural production, and on the other hand, it will contribute to the return (in the form of tax revenues) of costs associated with state support for the development of social responsibility of agribusiness entities. Indeed, it is farmers and agricultural organizations that are more interested in social stability in the countryside, since the outflow of the rural population into cities has only increased in recent years. In such circumstances, the shortage of labor resources and especially qualified young professionals will increase. Thus, the effectiveness of stimulating socially responsible behavior of agricultural enterprises is expressed not only in the form of solving social problems in rural areas, but also in its social stability. The social responsibility of agricultural enterprises is much higher than that of representatives of urban business, since the rural population, unlike the urban population, depends significantly on one employer, who sets the pace of life in the countryside.

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Innovation Potential and Development of Socio-economic System of the Region

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Abstract

The region is an important and largely determining part of the overall national socio-economic system, which has a complex internal structure, its elements form the interacting subsystems of business, government and society with direct and feedback connections.
When classifying subsystems, we highlighted a logical-structural diagram of the innovative potential formation of the region's socio-economic system, which allowed not only to analyze and evaluate the level of development, but also to identify priority directions for its increase, including the development of investment activity. The paper considers the issues of accumulation, analysis and development of innovative potential of the socio-economic system of the region. Rating estimates of the innovative potential of the regions of the Volga Federal District are given, their ranking and comparative assessment are carried out. Promising directions of development are identified, strategic directions of the state innovation policy are determined.

Keywords: Region's Economy, Innovations, Innovative Potential, Socio-Economic System Of The Region

Introduction

The dynamics of the development of relations of socio-economic systems at various levels becomes more informative and predictable if it is based not only on the study of traditional conditions and relationships, but also on the study of their innovative potential, patterns and characteristics of its

accumulation, implementation and development. Knowing the prerequisites, trends and the nature of the dynamics of the development of the innovative potential of regional socio-economic systems, provided they are adequately interpreted, gives ample opportunities for effective impact on spatial economic reality. Moreover, this approach in economic science can be regarded as the theoretical and methodological basis for the modernization of the regional economy (Haixiang G., 2017). One of the most relevant and difficult tasks of the research plan in this regard remains a qualitative assessment and forecasting of the innovatization of regional socio-economic processes, in which the specificity of the dynamic development and interaction of regional innovation systems is manifested.

The innovation of the socio-economic system of the region in the work refers to the opportunities and abilities of its business entities for creative activities aimed at obtaining a new form of income or some other kind of effect (Fernández-i-Marín X, 2015).

To date, economic science has developed certain methods and approaches to assessing patterns and trends in the accumulation, implementation, and development of the innovative potential of socio-economic processes in regional economies. However, none of them can be considered universal or sufficiently reliable, since it does not always ensure the coherence of estimates. The interconnectedness of research aimed at building a single forecast of the development of innovative potential of regional socio-economic systems will allow us to agree on existing methods for assessing and predicting the dynamics of the development of innovative economic processes that most fully characterize the state and prospects of development of the innovative potential of regional socio-economic systems.

The need to form an optimal integrated assessment and prognostic complex, combining in the best way various methods and approaches, in order to identify patterns of accumulation, implementation and development of innovative potential of regional socio-economic systems confirms the relevance of this study, its theoretical and practical relevance.

Materials and Methods

The study of the role of innovation, information and knowledge in socio-economic systems was based on the works of D. Bell, P. Drucker, M. Castells, M. Polanyi, J. Sapir, L. Thurow, F. von Hayek and others. Justification of the provisions of the systems theory and system concepts was implemented using the works of L. von Bertalanffy, R. Ackoff, L. Zadeh, R. Kalman, G. Klir, E. Laszlo, M. Mesarovich, A. Rappoport, D. Sornette, J. Takahara, A. Uemova, Yu. Urmantsev, B. Fleischmann, A. Hall, W. Ashby and others.

The problems of innovation-oriented development were considered on the basis of the works of P. Begidzhanov, N. Gazizullin, O. Gordeev, Yu. Zhiltsova, S. Makarov, V. Proskurin, I. Tukkel, E. Fakhrutdinov, R. Shakirov and others.

Certain aspects of modern scientific ideas about the structure and features of the functioning of regional socio-economic systems and the dynamics of the accumulation, implementation and development of their innovative potential are reflected in the economic, socio-humanitarian and natural-scientific literature, in particular in the works of N. Alekseeva, T. Bogatova, V. Gorfinkel, A. Granberg, L. Kornilova, Yu. Lapygin, N. Marenkov, B. Milner, A. Prilepsky, A. Sadriev, S. Timofeeva, S. Shigilcheva, etc.

The work used data from the Federal State Statistics Service; data of economic entities, ministries and departments; legislative and regulatory legal acts of the Russian Federation. When processing them, methods of system analysis were used; statistical data processing; financial and econometric analysis; general scientific methods of deduction, induction, analysis and synthesis, dialectical techniques and analogies.

Research Results and Discussion

Due to the fact that the socio-economic system of the region is a complex structure and consists of many different industry, functional, organizational, managerial and other subsystems, it is advisable to highlight their innovative potentials that can have different or identical transformation forces. Their implementation and development can be coordinated, therefore, more effective, or inconsistent, which means less effective, or even unprofitable (Medvedeva T.A., 2014).

Using the logical-structural scheme for assessing the existing and interacting in the regions of the Volga Federal District (VFD) innovative potentials of socio-economic subsystems (Fig. 1), differences in the level, direction of implementation and development of their innovative potentials, in particular production, reproduction and industrial structures potentials that positively and negatively affect the implementation of innovative economic policies of business, government and society, were identified.

Thus, the modern innovative industrial policy, which is a set of measures of state and legal regulation of the activities of economic entities, is determined by the fact that the existing structure of the economy of most regions tends to extensive reproduction, which leads to inefficient use of their production potential (Shigilcheva, 2018).

An analysis of the economic indicators of the Volga Federal District revealed that in 2018 the district produced 22.8% of Russia's industrial output. The highest growth rates in 2011–2018 occurred in the following regions of the Volga Federal District: Penza and Saratov regions, the Republic of Mordovia, The Mari El Republic, Republic of Bashkortostan and Republic of Tatarstan. A decrease in production potential was recorded in the Nizhny Novgorod and Orenburg regions.

Despite the decline in production, we can note that the economic potential of the Chuvash Republic currently has a sufficient impact on the socio-economic development of the Volga Federal District.

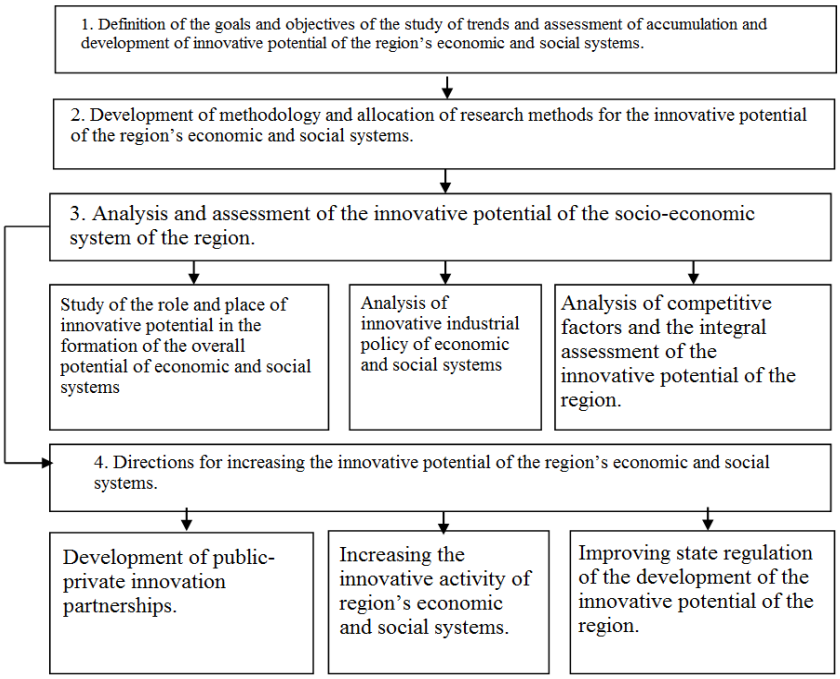

Fig. 1: Algorithm for evaluating the logical and structural diagram of the formation of innovative potential of the region's socio-economic system

Due to the limited resources of the regions, the most rational policy option to promote their economic growth is an unbalanced growth strategy aimed at supporting real and potentially competitive industries and enterprises; encouraging industries and enterprises supplying the market with fundamentally new and modernized goods (services) with improved consumer and operational characteristics, allowing them to expand their positions in existing product markets and conquer new ones. However, as experts indicate in their work, within the framework of this strategy, the revival of the entire industry is an extremely difficult task (Alekseeva, 2019).

Therefore, the strategy of unbalanced growth in the industry should be transformed into a policy of selective support for those industries and enterprises that are most promising for further progress of the region and could strengthen its innovative potential.

For the successful implementation of innovative industrial policy, we suggest using adequate tools for innovative industrial policy, shown in Fig. 2.

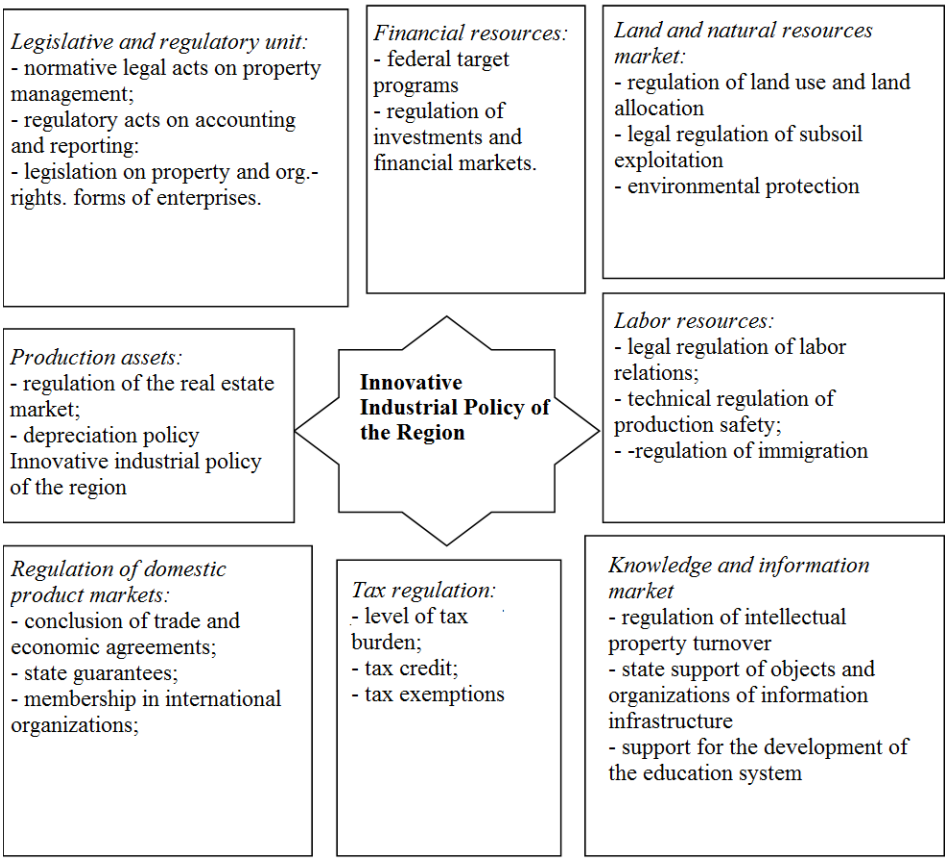

Fig. 2: Toolkit of innovative industrial policy of the region

We also note that in order to optimize the management of structural adjustment in the region, it is very important to achieve technological equilibrium of the sectors of the regional economy and to ensure the reprofiling of a number of industries on a differentiated basis (Rodríguez-Pose A., 2013). Enterprises subject to reprofiling can conditionally be divided into three groups:

a) producing unprofitable, uncompetitive products and bankrupt;
b) enterprises of conversion industries and enterprises focused on the creation of import-substituting industries;

c) enterprises with reserve capacities due to an objective decline in production (Miles D., 2017).
The innovative potential of the region's economic and social systems can be analyzed on the basis of our rating, the results of which are shown in table 1 (the calculation was made according to the official data of the Federal State Statistics Service) using the “distance method”, which allows, firstly, to establish the level of development of innovative potential in the region, secondly, to determine the dynamics of its change, and thirdly, to compare its innovative potential with potentials of other regions.

Table 1: Rating of the regions of the Volga Federal District in terms of the development of innovative potential for 2011-2018.

Region of the Volga Federal District	Years								
	2011	2012	2013	2014	2015	2016	2017	2018	
								Fact.	Diff.from 2000
1	2	3	4	5	6	7	8	9	10
Republic of Bashkortostan	1,866	1,817	1,903	1,752	1,798	1,723	1,750	1,622	- 0,244
Mari El Republic	2,378	2,400	2,410	2,370	2,363	2,379	2,408	2,200	- 0,178
Republic of Mordovia	2,333	2,221	2,139	2,123	2,223	2,257	2,262	1,973	- 0,360
Republic of Tatarstan	1,334	1,307	1,333	1,508	1,366	1,437	1,444	1,075	- 0,259
Udmurt Republic	1,818	1,862	1,774	2,028	2,150	2,120	2,109	1,888	0,070
Chuvash Republic	2,246	2,140	2,229	2,208	2,163	2,156	2,144	2,099	- 0,147
Perm Region	1,513	1,583	1,757	1,761	1,535	1,696	1,805	1,593	0,078
Kirov Region	2,286	2,338	2,208	2,338	2,311	2,338	2,309	2,218	- 0,068
Nizhny Novgorod Region	1,649	1,713	1,575	1,526	1,612	1,603	1,539	1,460	- 0,189
Orenburg Region	1,838	1,943	2,076	2,012	2,043	2,105	2,031	1,628	- 0,212
Penza Region	2,213	2,170	2,069	2,189	2,167	2,149	2,141	2,028	- 0,185
Samara Region	0,869	1,044	0,968	1,020	0,950	1,227	1,199	1,125	0,256
Saratov Region	2,085	2,114	2,042	2,079	2,114	2,100	1,959	1,890	- 0,195
Ulyanovsk Region	2,171	2,199	2,220	2,276	2,260	2,310	2,165	2,002	- 0,169

For each indicator, a “reference region" was formed, which has the greatest or optimal value of the indicator being studied. Then, based on the source data, standardized indicators were calculated using the formula (James H. (2017):

$$x_{ij} = \frac{a_{ij}}{opt_j a_{ij}} \qquad (1)$$

where x_{ij} are standardized indicators of the state of the j region;
a_{ij} is the value of the i indicator of the j region;
$opt_j\, a_{ij}$ - maximum (optimal) value of the i indicator
For each region, the rating value was determined by the formula (Newcomer K. E., 2015):

$$p_j = \sqrt{\sum_{i=1}^{n} (1 - x_{ij})^2} \qquad (2)$$

Regions were ranked in ascending order of rating, with the highest rating assigned to regions with a minimum rating value. The rating score and rating value of the regions are presented in table 2.

A compiled matrix of ranking the regions according to the level of development of innovative potential (high - up to 1,199, above average - from 1,2 to 1,499, average - from 1,5 to 1,799, below average - from 1,8 to 1,999, low - 2,0 and more) and the dynamics of its change (increasing, decreasing) shows that the Republic of Tatarstan and the Samara Region had the highest innovative potential in 2018. The indicated regions were characterized by large volumes of industrial production, construction, a low share of unprofitable organizations and a high standard of living of the population. It should also be noted that the Samara region is a leader in the Volga Federal District in terms of innovation and business activity, the volume of attracted foreign investment and the degree of development of small business. Therefore, it is the most promising in terms of strengthening the innovative potential of the region. At the same time, in the Samara region there is a tendency to decrease the level of innovative potential in 2018 compared to 2017.

Table 2: Grouping of the Volga Federal District Regions by the level of innovative potential and the dynamics of its change in 2011-2018

The level of development of innovative potential	Dynamics	
	Increase	**Decrease**
High	I. Republic of Tatarstan	II. Samara Region
Above average	III. Nizhny Novgorod Region	IV. -
Average	V. Orenburg Region, Republic of Bashkortostan	VI. Perm region
Below average	VII. Saratov region. Republic of Mordovia	VIII. Udmurt Republic
Low	IX. Penza Region, Kirov Region, Ulyanovsk Region, Chuvash Republic, Mari El Republic	X. -

The Chuvash Republic belongs to the group of regions with a low level of innovative potential. The competitiveness of this region is ensured by the presence of a developed construction complex, a low share of unprofitable organizations and a high share of innovative organizations. All this allows us to conclude that the use of an innovative approach to the development of the economy is especially relevant for the Republic, since it will contribute to changing the socio-economic situation in the region and increasing its competitiveness.

The strategic direction of the state innovation policy should be the formation and protection of the domestic market of scientific and technical products. Other scientists and economists of the region come to similar conclusions in their studies (I. Golyshev, 2016).

Specific measures of the strategy for the prospective development of innovative potentials of socio-economic systems and subsystems of the region should include the following set:

- formation of a catalog of innovative programs;
- introduction of competition between research institutes and universities of the Republic for the best indicators in the field of science and innovation;
- Republican competitions for the best innovative product, innovation process, the most progressive organizational and economic management;
- development and purchase of advanced technologies in the field of agriculture;
- reorientation of the state's structural policy to support the so-called "new" sectors of the economy (innovative and informational);
- conducting an audit, monitoring and audit of Republican programs for socio-economic development with a view to their compliance with the innovative development goals of the Republic;
- application of the indicative planning system for indicators of innovative development (for example, the share of innovative products in the total volume shipped, the share of research and development costs) at the micro- (enterprise), meso- (industries and complexes) and macro- (republic) levels;
- development of methods, tools and technologies of strategic planning and management at the Republican level.

Implementation of long-term goals related to the development of innovative potentials of socio-economic systems and subsystems and the achievement of competitiveness of regional economies should be accompanied by goals that have a socio-economic orientation in a strategic plan (OECD, 2017).

Chuvash Republic should set the following goals:

- achieving stable positions in relevant segments of the global market. These segments include mechanical engineering, electrical and instrument-making industry, chemical and light industry, electric power industry, construction industry;
- accelerated renewal of fixed assets (to date, depreciation of fixed assets in the main sectors of the economy of the Republic has reached 50%, which negatively affects the pace and quality of innovative growth);
- improving the environmental situation in the Republic and protecting information resources.

Medium- and short-term socio-economic goals are designed to ensure in the Chuvash Republic:
- alignment of the conditions for the implementation of innovative activities in the districts, between enterprises of various industries, forms of incorporation and legal forms;
- creating an attractive investment climate; optimization of resource consumption, primarily electricity and capital resources.

To achieve the above-mentioned goals in Chuvashia, it is advisable to carry out the following main tasks:

- intensive development of a public-private partnership system;
- formation of a strategy for future development, i.e. strategic goals will prevail over tactical ones to ensure long-term innovative growth and increase of the innovative potential of the Republic;
- implementation of targeted financing of innovative projects on a competitive basis;
- implementation of personnel policy in the field of innovation and high technology, contributing to the formation of innovatively receptive personnel;
- formation of innovative infrastructure as the material and technical basis of a continuous innovation process;
- accelerated development of innovative entrepreneurship, the most susceptible to market requirements;
- optimization of financing and stimulation of the innovation process in terms of regional competence;
- development of interregional cooperation and international exchange of high technologies and products;
- information support of innovative development.

Conclusion

The current state of innovative potentials of socio-economic systems and subsystems of the Volga Federal District regions is unbalanced, which negatively affects the effectiveness of its implementation.

When studying the innovative potentials of socio-economic systems and subsystems of the Volga Federal District regions, based on a comparative analysis of the characteristics of the analyzed region with the corresponding characteristics of competing regions, the Chuvash Republic and other regions of the Volga Federal District were selected as competing regions, due to their territorial proximity.

An assessment of the innovative potentials of socio-economic systems and subsystems of the regions of the Volga Federal District and their grouping based on the calculation of specialization coefficients and the construction of a rating of innovative activity showed that the Chuvash Republic belongs to the group of regions with a low level of innovative potential. The competitiveness of the Republic in relation to other regions with a low level of innovative potential is determined by the presence of a

developed construction complex, a low share of unprofitable organizations and a high share of innovative organizations. Thus, the use of a cluster approach to the development of the economy and its innovative potential, which will contribute to changing the socio-economic situation in the region and increasing its competitiveness, is especially relevant for the Republic.

The analysis shows that most regions of the Volga Federal District, including of Tatarstan and the Chuvash Republic, specialize in the chemical, construction industry and mechanical engineering. A high level of concentration of these industries, on the one hand, contributes to the development of competition, and on the other hand, creates conditions for production and cooperation innovative interaction between enterprises. All this allows us to conclude that these industries are the most promising in terms of increasing their innovative potential.

One of the relevant ways to increase the innovative potential of the region is public-private partnership. Creation and functioning of research and production bases and technology-innovative zones can prove to be effective. However, such a synergy between the state and innovative business requires special tools for each specific area of implementation and individual developments.

Goals and objectives of state regulation for the development of the innovative potential of the socio-economic system of the region are proposed, including auto-stabilization mechanisms and innovative approaches to modernizing the region's economy.

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Integrated Accounting and Control System: Flexible Object-Based Approach

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Abstract

The article considers the concept of a system and a system approach. The possibility of applying a systematic approach to accounting and control at the level of an economic entity is assessed. The definition of an integrated accounting and control system is given, its elements and approaches to their integration are considered.

Keywords: system, system approach, information integration, accounting, control, integrated accounting and control system.

Introduction

The concept of a system and the system approach formed on its basis is one of the key and universal scientific approaches. And if initially this concept and scientific approach was used exclusively in technical sciences (primarily in cybernetics), then in the future they acquire a universal character. Not surprisingly, this approach has also been widely applied in economics. Currently, the representation of the organization in the form of a system consisting of many interconnected elements is traditional and familiar. In accounting disciplines, however, this approach is ambiguous. There are scientists who advocate the presentation of accounting, analysis and control in the form of a single management information system. And scientists (most of them) consider accounting, analysis and control as separate, almost independent systems. Both approaches have the right to exist, however, isolation is convenient in the framework of scientific research, highlighting certain topical issues in the framework of separate scientific disciplines and directions. In practice, integration is determined by a number of significant socio-economic and technological factors.

The simplest factor lying on the surface is the technological one. The standards for creating and processing economic information over the past fifteen to twenty years have changed dramatically. Information that was originally created and processed manually or with the help of computer programs of limited functionality (accounting, marketing, analytical, and so on) is currently processed using management programs of complex automation (the so-called ERP systems). Within

the framework of such a software product, all management processes are interconnected, and it is practically impossible to consider them strictly separately, in the form of a closed information cycle. However, such a combination in practice is not limited to the program level and requires normative and methodological adaptation.

No less significant is the economic factor. The trend of recent years, in connection with a certain economic and political instability of the world community, is to reduce costs, primarily for the implementation of the managerial function. Part of this trend is the optimization of costs associated with accounting, analysis and control, without significant loss of their effectiveness. Integration theoretically can significantly reduce costs in the long run, but it is also a complex problem requiring economic justification.

Not so obvious, but nonetheless significant, is the social factor. Its influence is manifested in setting up new goals for the organization by the society and the state. If earlier its main goal was simply to make a profit, now it requires the organization to participate in the implementation of more global goals - such as ensuring food security, applying an innovative approach to carrying out activities and implementing management functions, attracting investments, solving social and environmental problems of the society and etc. The participation of any medium and especially large organization in the implementation of these global goals is strictly necessary and only in this way can it achieve sustainable and effective development in the long term. Effective integration of accounting and control can significantly improve the quality and variety of created accounting information, which will affect the efficiency and effectiveness of management decisions, which is important in the current socio-economic situation.

In such conditions, the integration of accounting and control into an integrated system based on a single software package seems to be the most effective solution. This will significantly increase both the quality of accounting information and the control functions carried out, and will significantly increase the efficiency of organizations.

Main Section

Materials and Methods

The direct object of research is the accounting system of both Russian and foreign organizations.

The main research methods are analysis and modeling.

First, let's analyze the main approaches of scientists to the key concepts of research. The basic concept is "system".

Despite the fact that the concept of “system” is developing as a scientific concept for quite a long time, it remains largely debatable and not completely formed. Each author working with this concept, to one degree or another, brings his point of view. Table 1 gives the definitions of the concept of "system" in the interpretation of some authors.

Table 1: Approaches to the Concept of the "System" of Various Scientists

№	Definition	Source
1.	System: a set of interconnected elements, each of which is connected directly or indirectly with each other, and any two subsets of this set cannot be independent.	Ackoff R., Emery F. (1974) On purposeful systems, Sov. Radio, Moscow
2.	The system is a holistic complex of interconnected elements that are in functional relationships and relationships with each other for a certain time.	Volkov Yu.G., Dobrenkov V.I., Nechipurenkr V.N., Popov A.V. (2000) Sociology, Gardariki, Moscow
3.	A system is a group of purposefully interacting elements.	Gaides M.A. (2005) General theory of systems (systems and systems analysis), GLOBUS-PRESS, Moscow
4.	A system is a collection of parts or components that are interconnected organizationally.	Gig J., van. (1981) Applied General Theory of Systems, Mir, Moscow
5.	A system is an object, phenomenon or process consisting of a qualitatively defined set of elements that are in mutual relationships and relations, form a single whole and are able to change their interaction with the external conditions of their existence structure.	Osipov G.V., Moskvichev L.N. (1996) Sociology. Fundamentals of the general theory, Aspect Press, Moscow
6.	A system is usually understood as a combination of interconnected elements, united by a unity of purpose and functional integrity. Moreover, the property of the system itself does not reduce to the sum of the properties of the constituent elements. Any system is formed as a result of the interaction of its constituent elements, and this interaction gives the system new properties that were absent from separately taken elements.	Prangishvili I.V. (2000) A systematic approach and system-wide patterns. Series "Management Systems and Problems", SINTEG, Moscow
7.	A system is a collection of interacting elements.	Bertalanffy L. von. (1968) General Systems theory. George Braziller, New York
8.	A system is an arbitrary thing when some of its relations satisfy a certain property (attributive definition). A system is an arbitrary thing, any properties of which satisfy a certain relation (relational definition). Both definitions fix a certain order of representing things in the form of a system.	TsofnasA.Yu. (1999) Theory of systems and the theory of knowledge, AstroPrint, Odessa
9.	A system is a separate part, a fragment of the world, of the universe, which has a special quality (emergence), relative self-sufficiency (thermodynamic isolation).	Atkins P. (1987) Order and disorder in nature, Moscow

The list of definitions carried out in the table allows us to conclude that they all differ in their content, but, in our opinion, the following points are common to them:

1. The definition of the system as a set of interconnected elements;

2. Mandatory presence of connections and interactions between elements;
3. Integrity.

Taking into account the general features, shortcomings and positive aspects of the above concepts of the concept of "system", we will try to formulate our own vision in relation to the topic of our study. A system is an integral set of interconnected elements united by a single goal to achieve a given useful result and interacting for its implementation. Our definition, in our opinion, does not contradict the system concepts discussed above, revealing a slightly different aspect of the concept of “system”, and therefore has some heuristic.

Based on the above concepts and the concept of the system we have given, we can conclude that the properties of the system are determined by:

- properties of its elements;
- properties of the structure of the system.

The generally accepted properties of the systems are shown in Figure 1.

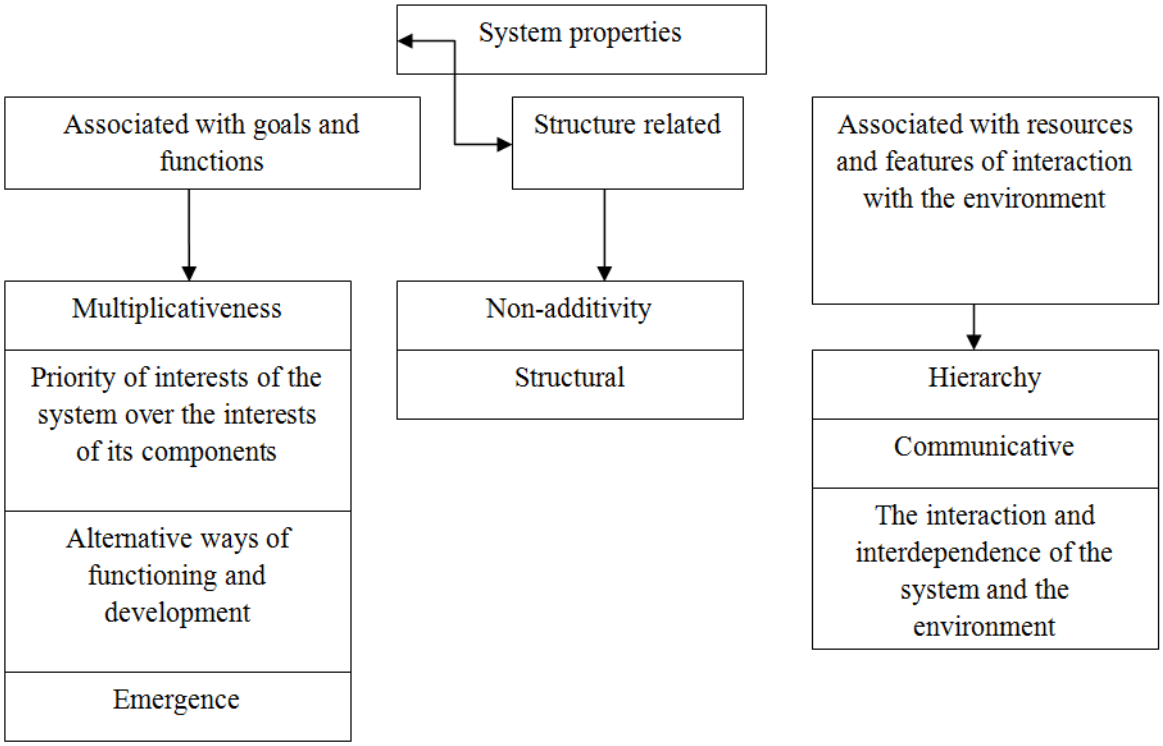

Fig. 1: System Properties

In many ways, it is the concept of the system and its properties that are the basis of the system approach. It allows you to consider each object as a system consisting of a certain number of interconnected elements that have certain properties.

Using a systematic approach in accounting is currently quite common. In our opinion, the integration of accounting and control, in our opinion, is based on the following premises:

- the complication of the conditions of the organization and, as a result, the constant emergence of new information requests of users, the development of new types of accounting, analysis, control, as well as models of their interaction;

- development of information technologies and models of the information society and education, as a result of which new models and approaches in the field of automation of the organization, the development of electronic document management and data transfer;
- orientation of many organizations on the strategy of cost reduction, optimization of the organizational structure of the organization and the model for the implementation of its management and business processes.

Despite the fact that the integration of accounting and control into a single system is a fairly relevant and promising scientific direction, at the moment there is no optimal concept for such integration.

The question of creating an integrated accounting and control system can be divided into two problems: integration of accounting systems and integration of accounting and control.

The issue of integrating accounting systems in the past has become particularly relevant. At present, a lot of concepts have been developed for integrating accounting types into a single system. Consider the main ones.

According to Ya.V.Sokolova and V.F. Palia (1981) “an integrated system of economic accounting is a dialectical unity of various types of accounting in their essence”. Integration in their understanding should occur with the help of automated accounting systems and cover operational-technical, accounting and statistical accounting.

V.I. Tkach and M.V. Shumeiko (2012), within the framework of the engineering theory of accounting, suggests integrating accounting information through the use of a single information field and a structured chart of accounts.

I. A. Varpaeva (2014), within the framework of the integrated process-oriented accounting system model, offers to integrate financial management accounting based on the process-oriented approach and the application of information technologies.

A. A. Solonenko (2011), within the framework of the concept of an accounting system, proposes to integrate accounting information based on the allocation of common goals, objects, terminology and methodology.

According to I.V. Kalnitsky (2014) integration of components of the accounting and analytical system should be carried out depending on the management structure of the business entity and be organizational in nature.

Thus, we can distinguish programmatic, methodological, organizational, adaptive and mixed approaches to the integration of accounting systems (see Fig. 2).

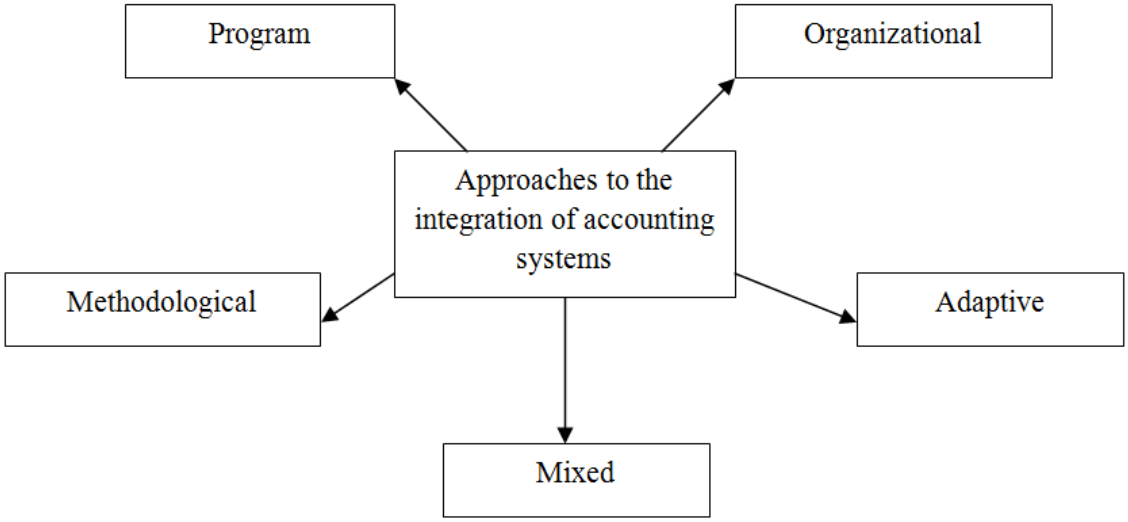

Fig. 2: Approaches to the integration of accounting systems

The program approach involves the use of a single software product or a set of interconnected software products for the integration of accounting systems.

The methodological approach for the integration of accounting systems uses a single methodological base (a single chart of accounts, a single accounting policy, a single reporting system, and so on).
The organizational approach is based on the application of a process-oriented approach and the construction of an integrated accounting system in strict dependence on the management structure of the organization.

With an adaptive approach, the structure of the integrated accounting system is flexible and directly depends on changes in the external and internal environment of the organization.

In a mixed approach, several integration methods are used simultaneously when integrating accounting systems.

The second problem in the framework of creating an integrated accounting and control system is the integration of accounting and control systems.

On the one hand, in accordance with paragraph 1.2 of the Conceptual Framework for Presenting Financial Statements, the purpose of general financial reporting is to provide financial information about the reporting organization, which is useful to existing and potential investors, lenders and other lenders when they decide to provide this organization of resources. That is, we can conclude that accounting information is the basis for making management decisions, including for the implementation of the control function of management.

On the other hand, the control function is one of the main accounting functions. This postulate has a long history of scientific justification.

Among foreign scientists who identified the control function in accounting, one can name F. Best, F. Villa, J. Rhys, J. Rossi, B. Needles, R. Anthony. The founder of the doctrine of the control function of accounting is Leon Say.

Among Russian scientists we can name N.A. Blatova, Y.M. Halperin, L.I. Gomberg, M.I. Kuter, N.P. Kondrakov and others.

There are also a number of modern theories and paradigms that justify control as part of accounting.

Y.V.Sokolov (2004) highlighted the legal theory of accounting, according to which the subject of accounting is the control of the rights and obligations of persons involved in business processes.

S. Zeff, G. Miller, and M. Munitz (2014) substantiated the economic paradigm, according to which the goal of accounting is to control and evaluate economic indicators, ensuring conditions for achieving maximum production efficiency.

Based on the foregoing, we can conclude that the relationship of accounting and control is based on the following provisions:

- accounting forms the information base for monitoring;
- forms and methods of control directly depend on the organization and methods of accounting;
- an effective and rationally organized accounting system affects the effectiveness of control;
- control allows you to identify ways to improve and rationalize accounting.

The issue of integration of accounting and control is complicated primarily from a methodological point of view. It is currently impossible to combine them into a single process, as these are two different, albeit interdependent processes that are influenced by various factors. However, it is quite possible to bring together and increase the efficiency of such processes. Within the framework of an integrated accounting and control system, we assume close coordination and increased correlation between the accounting and control functions, leading to an increase in the efficiency of these processes.
Thus, the creation of an integrated accounting and control system is possible on the basis of various approaches, the most popular and simple of which is integration within the framework of a software product. All these approaches solve their problems, but are not universal.

However, in our opinion, the full integration of all types of accounting and control into a single process is impossible due to their different specifics, goals and methods. Individual objects of accounting and control need full integration, some partial, and individual objects can only be integrated at the program level. In this regard, we propose to use a flexible object-by-object approach when creating an integrated accounting and control system.

The concept of accounting and control objects is complex and debatable. The question is, what objects can be selected for integration? Let us consider this problem in detail.

In the field of accounting, the simplest is supposed to be based on generally accepted objects described in regulatory legal acts. For example, the document “Conceptual basis of financial reporting” in paragraph 4.1.defines five components of the reporting and, accordingly, accounting objects: asset, liability, equity, income and expenses. Despite the fact that this document is not a standard, the presented set of objects as a whole is generally accepted in the framework of financial accounting. However, tax and management accounting imply a slightly different detail of these objects, with each individual state (regarding tax accounting) and each author (regarding management accounting) offer their own approach.

The situation is similar in the framework of internal control - each author identifies his categories of objects. However, it is generally accepted, depending on the objectives of control, an orientation on two factors: features of activities and managerial decision-making in the organization, as well as features of the existing system of forming economic information.

In our opinion, within the framework of an integrated accounting and control system, the objects of internal control should depend on the accounting processes carried out within the framework of the system.

Based on the above, we will present a list of objects of an integrated accounting and control system:

1. Assets.
2. Obligations
3. Sources of financing
4. Income and expenses
5. Planning
6. Risk Management
7. Assessment of the quality of accounting information and the effectiveness of the accounting system

The above list of objects is of a general nature and can be clarified when applied in each specific organization, taking into account its industry and individual characteristics. We believe that the allocation of certain types of accounting objects (assets, liabilities, etc.) should be based on an assessment of their materiality for the organization. Moreover, the assessment, in our opinion, should be based on a combination of a quantitative and qualitative approach. Planning, risk management and assessment of the quality of accounting information, in our opinion, have already become standard for most organizations and require inclusion in the list.

Thus, we have considered the basic concepts of the study and can proceed to consider its results.

Results

The integration model of the presented facilities requires an integrated and flexible approach. We believe that their integration should be carried out at the following levels: method, reporting and software product (see Fig. 3).

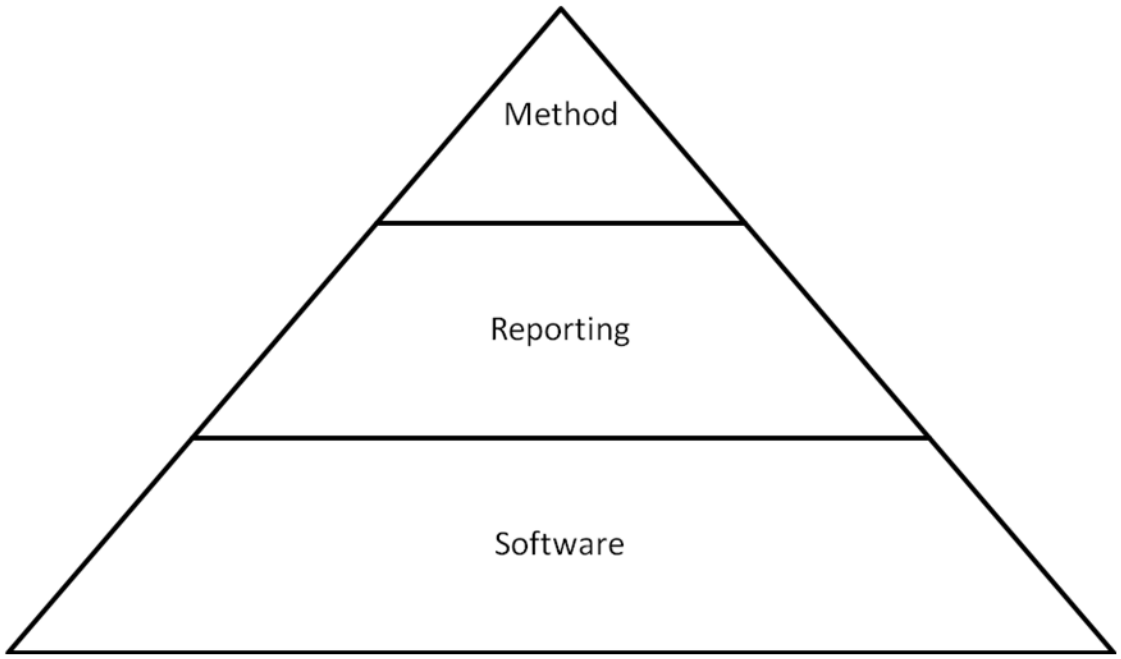

Fig. 3: Levels of integration of accounting systems

At the method level, integration involves the use of a single base of methods for financial, tax and management accounting; single accounting policy; a single database of primary documents and

accounting registers, as well as a single chart of accounts with a multi-level system of analytical accounts to detail the most relevant information for users (about income, expenses, liabilities, etc.). Moreover, it is supposed to use both unified methods and documents for all elements of the system, and their partial combination - depending on the possibility and effectiveness of such a combination.

At the reporting level, it is planned to develop a unified system of interconnected reporting forms.

At the level of the software product, the formation of a single information space of the organization is supposed.

In our understanding, a single information space is a set of methods for collecting, storing, processing and protecting electronic information used by an organization. It should consist of the following elements:

- a single automated software package for all activities of the organization (in our opinion, the most effective solution in this case is to use a software product specially developed for the organization that takes into account its industry and individual characteristics);
- a single repository of the organization's management information in electronic form: primary documentation, accounting registers, internal and external reporting forms, analysis results and managerial decisions made with limited access for employees depending on their position (it is possible to implement both using local and server internal organization information network);
- a single information security policy (both a complex of antivirus programs and various instructions for employees to reduce information risk);
- A unified system of electronic document management organization.

An important point, in our opinion, is the installation of a requirements system, which must be met by an integrated accounting and control system. We propose highlighting the following requirements for an integrated accounting and control system (Fig. 4).

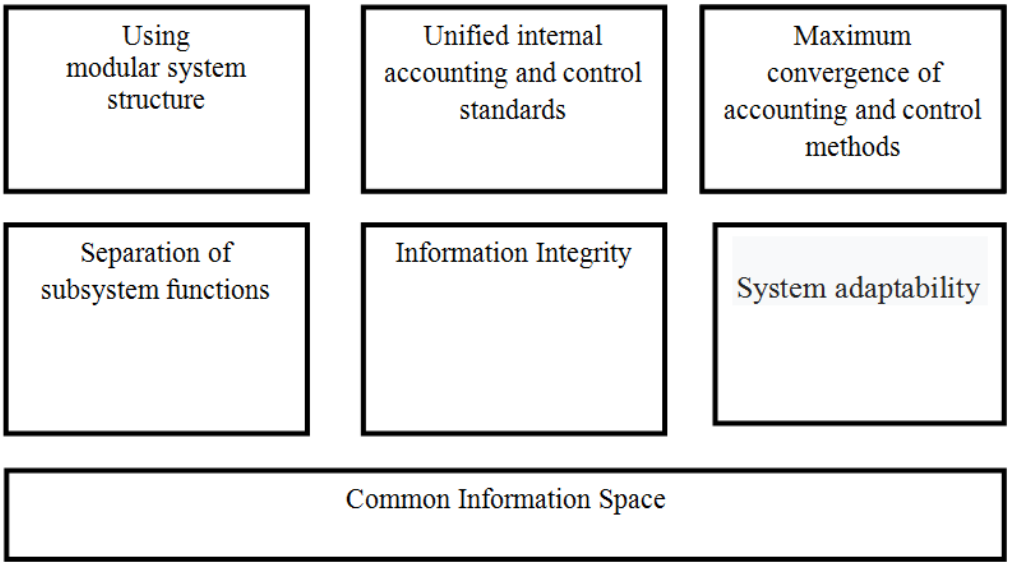

Fig. 4: The principles of an integrated accounting and control system

A single information space, as already noted, is the basis of an integrated accounting and control system. Without a specialized program for the comprehensive automation of the management process, combined with the use of electronic document management technology, an electronic repository of information essential for management decisions and an information security policy developed, integration is not technically possible.

The development of a single set of internal accounting and control standards will allow their integration, both at the method level and at the reporting level. In our opinion, it is necessary to highlight the following standards:

- a single policy of accounting and control;
- provision on a single information space and its components;
- provision on electronic document management;
- provision on an integrated accounting and control system and its constituent modules;
- the provision on a single system of interconnected reporting forms in the organization;
- provision on planning in the organization;
- provision on the target indicators of the organization, their planning and evaluation;
- provision on the assessment and management of the risks of the organization;
- provision on the assessment of the quality of accounting information and the effectiveness of an integrated accounting and control system;
- provision on consulting.

Integrality of the input information will significantly reduce the complexity of accounting and control by reducing the number of routine operations for entering data into the system: data will be entered only once in one software product and used by the entire system as a whole for various needs repeatedly.

The modular structure of the integrated accounting and control system will allow timely and effective adjustment of it, depending on changes in the needs of external and internal users of the organization. In relation to the topic of our study, by a module of an integrated accounting and control system we mean its element, which has a certain structure and allows, due to its change, to quickly change the quality of the module and the system as a whole.

In our opinion, the module of the system under consideration should have the following structure (Fig. 5):

The objectives of the module
Standards – Methods for Realizing Goals
Software product - a way to implement standards

Fig. 5: Module structure of an integrated accounting and control system

In the integrated accounting and control system, it seems to us appropriate to distinguish the following modules (Fig. 6):

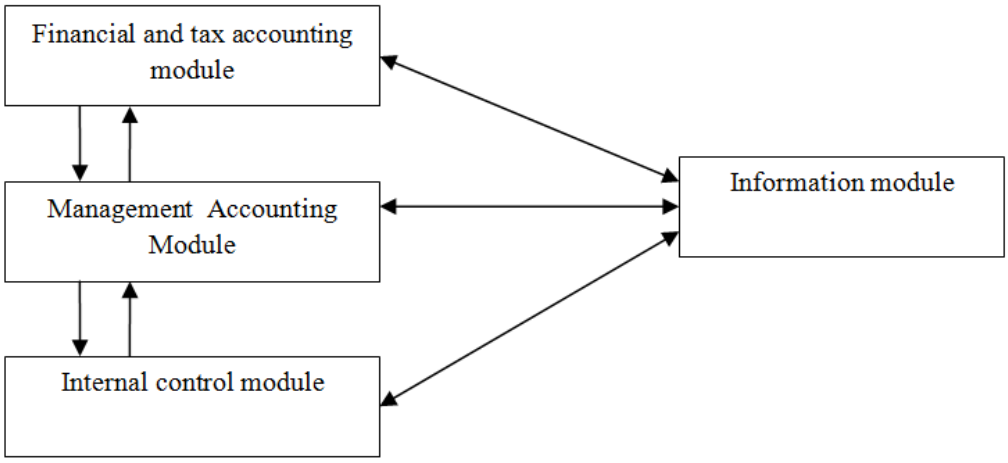

Fig. 6: Structure of an integrated accounting and control system and an algorithm for the interaction of its elements

Let's characterize these modules.

The module of financial and tax accounting. Its main function is to collect, process and provide relevant information. The subsystems of financial and tax accounting included in this module, in our opinion, should perform the following functions:

- entry into the system and processing of primary documents;
- compilation of registers regarding financial and tax accounting;
- preparation and submission to users of accounting (financial) and tax reporting;
- preparation of accounting standards (with the participation in this process of the management accounting module, as well as the internal control module);
- full satisfaction of the needs of external users

Management and strategic accounting module. It, in our opinion, should perform the following functions:

- organization of management accounting in the organization;
- compilation of registers regarding management accounting;
- preparation of internal reporting (in close interconnection with the financial and tax accounting module);
- planning of current effective indicators (production volume, revenue, profit) based on the break-even point indicator;
- assistance in making tactical management decisions based on evaluating the effectiveness of each possible option;
- development of a long-term development strategy for the organization;
- assessment of factors of the external and internal environment;
- development of a system of indicators for evaluating strategic management decisions;
- risk assessment (both in the organization as a whole and within the framework of the accounting and control system) and the development of measures to reduce it;
- full satisfaction of the information needs of internal users.

Internal control module. It, in our opinion, should perform the following functions:

- the formation of a single accounting and control policy within the organization (with the participation of accounting modules in this process);
- development of standard internal accounting documents and corporate recommendations in the field of accounting and control (with the participation of accounting modules in this process);

- advising employees of accounting modules on accounting and control issues in order to develop common methodological approaches;
- monitoring and coordination of ongoing control procedures;
- assessment of the effectiveness of the integrated accounting and control system;
- assessment of the quality of accounting information;
- ensuring the safety of property and conducting audits and inventories on a regular basis (with the involvement of representatives of accounting modules);
- ensuring compliance with legal requirements;
- conducting an operational audit, compliance audit and audit of accounting (financial) statements;
- making recommendations on the results of the audit and monitoring their implementation.

The information module, in our opinion, should perform the following functions:

- implementation, maintenance and ensuring the smooth operation of a single software package for automation of the organization;
- creation, configuration and maintenance of a single data warehouse;
- introduction of a full cycle of electronic document management;
- ensuring information security;
- assessment of information risk and development of measures to minimize it;
- advising representatives of accounting and internal control modules on issues of effective work within the framework of a single information space and information security.

Based on the foregoing, the accounting and internal control process within the framework of the integrated accounting and control system will look as follows (see Fig. 7)

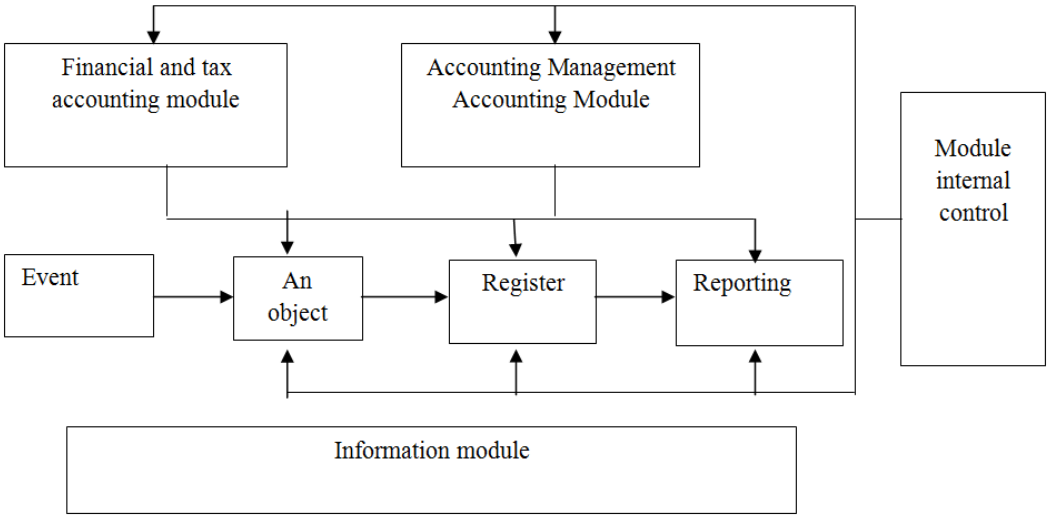

Fig. 7: Accounting and internal control process as part of an integrated accounting and control system

As can be seen in the above figure, the process of accounting and control within the framework of an integrated system of accounting and control remains unchanged. However, the methodology for accounting facilities, the contents of registers and reporting forms are changing significantly. The control technique also changes significantly due to a change in the approach to the definition of its objects.

Discussion

The presented research results are not absolutely universal. However, the proposed integration model allows to significantly optimize the information and control systems of the organization, which ultimately improves the quality of management decisions.

Conclusion

The proposed model of flexible objective integration allows to organize the operation of the systemin the most rational way, the modular principle provides a sufficient degree of flexibility, a strict delineation of the functions of the modules and implementation within a single information space will achieve maximum system efficiency. At the same time, it is quite universal and can be adapted based on the characteristics of the activity and the process of making managerial decisions of a particular organization. Further research suggests adapting the proposed model for organizations of various industries and territories of operation.

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Directions for Increasing the Effectiveness of the Organization of Independent Work of Russian Students in the Field of "Accounting, Analysis and Audit"

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Abstract

In the context of the formation and further development of market relations in Russia, the informatization and digitalization of the society, fundamental changes are taking place in all spheres of life, making it necessary to introduce fundamental changes in the educational process. The article is devoted to the search for directions of improving the independent work of students, as the main way of forming knowledge, the present and future development of the individual. This question is especially complex, specific and interesting for the authors of this article who are engaged in the preparation of bachelors and masters in the field of "Accounting, analysis and audit".

Keywords: independent work of students (IWS), the educational process, types of IWS, types of IWS control, effective organization of IWS, principles of IWS organization.

Introduction

The modernization of Russian vocational education, its integration into the international educational space required a certain adjustment of approaches to its organization. Now much more attention should be paid to the independent work of students (IWS) - the basis of the formation of their knowledge, skills, and subsequent continuous self-education - the basis of personality development.

The development of informatization and the subsequent digitalization of the society necessitates continuing education. In modern society, you cannot learn once for life, this will lead to a crisis of competence. The only way to overcome this crisis is self-education - as a form of constant independent work on self-development and self-improvement, aimed at acquiring new knowledge. The student must master this ability to master the skills of independent work within the walls of the university, so that in the future to become self-fulfilled as a person and as a professional.

Research Results and Discussion

The educational process in universities is increasingly acquiring the character of independent educational work of students, organized and managed by teachers on the basis of the latest teaching methods and tools. In this regard, along with improving teaching methods, introducing new pedagogical and information technologies into the educational process, the most important tasks of universities are the rational organization, planning and monitoring of students' independent work, its further activation.

According to Abdykarimov B.A., Andasova B.Z. (2004) independent work of students is an integral part and the most important form of the educational process at the university, one of the main reserves for improving the quality of education and training of future specialists. The purpose of the IWS is the formation of the knowledge, skills and abilities of students aimed at independent creative solution of technical and scientific problems that arise in the practical activities of a future employee. Since independent work is both the goal and the means of obtaining education, the relevance of the search for methods and ways to effectively manage this process is undeniable. Fig. 1 clearly presents all possible types of independent work of students in the discipline "Financial accounting".

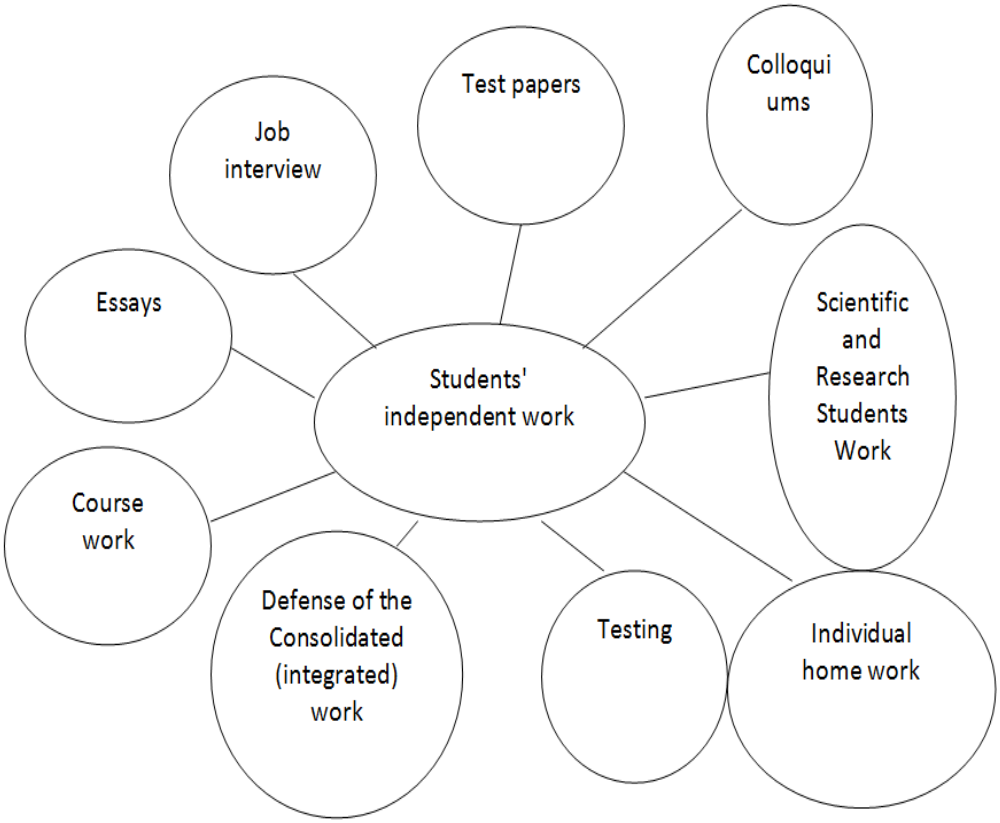

Figure 1: Types of independent work of students in the discipline "Financial accounting"

The role of independent work in the formation of bachelors and masters is extremely large, because it is in its process that the most important qualities, knowledge and skills, the ability to study new questions creatively, the criticality of the mind, and the ability to navigate the flow of information are brought up and developed. It is especially great and necessary in the study of the discipline "Financial Accounting" in the preparation of bachelors and masters in the profile "Accounting, Analysis and Audit".

In the context of the development of market relations in Russia, constant changes are taking place in the economy, legislation, and taxation. A lot of orders, orders of the RF Ministry of Finance, the Federal Tax Service, the Central Bank of the Russian Federation and other bodies, the constant introduction of amendments and additions to them, often their inconsistency and contradiction complicate and dement the work of accountants. They should spend a significant part of their time studying regulatory documents in order to keep abreast of all changes in accounting, to keep records correctly and, ultimately, to avoid various sanctions from the tax and other authorities.

In such difficult conditions, it is extremely difficult to prepare bachelors and masters in Economics, the profile of Accounting, Analysis and Audit, teach financial accounting, the procedures and rules of which, in contrast to management accounting, are determined by regulatory documents. The standard period for mastering the basic educational program of undergraduate studies in the field of Economics, the profile of Accounting, Analysis and Audit is 4 years, and its complexity in full-time education is 250 credits. By the time of graduation and the beginning of work, the knowledge given to students at the institute may become outdated. Sometimes this obsolescence occurs much earlier. Hence the constant obsolescence of educational and methodological literature - not a single textbook on accounting keeps pace with the constant changes in the legislation and new regulatory documents on accounting.

Therefore, now you can’t just teach students accounting, but you must first of all teach them to “learn creatively”, take any information critically, do not take textbooks as dogma, you need to educate and develop students' ability to navigate in the normative, reference and scientific flow information, the need for reading special periodicals. Only such training and education can form students' knowledge and skills inherent in a professional accountant.

Love, devotion, attachment to one’s profession, especially to the profession of an accountant, will not come immediately. They will appear only when knowledge and experience have accumulated, when you understand and master your business, when you are recognized as a specialist in this field, people will turn for advice, consultations, and you will be invited to work. Is it possible to achieve all this without working on yourself, without constant independent training? It is impossible,especially for the future accountant.

So how to organize students' independent work when studying accounting disciplines in difficult modern conditions?

First of all, it should be carefully and thoughtfully planned at the stage of development of work programs. When planning independent work it is necessary: to determine the full amount of information on the discipline, submitted for independent study; determine the optimal amount of information to be monitored; determine the frequency and timing of ongoing monitoring of independent work. In the work program of the discipline, it is necessary to clearly distinguish on each topic the questions submitted for independent study and the forms of control of students' independent work. It is also important that sufficient and latest regulatory, literary, reference sources are recommended.

In conditions of shortage of study time, undergraduate students will either have to separate topics of the discipline or separate questions from the students for independent study, but it is also necessary to establish proper control over the level of mastering the material. Here you can apply foreign experience, well represented in the movie "Legally Blonde". Its essence is that the lecturer gives students a lecture plan and a list of literary sources for self-study in advance. In the future, the lesson only discusses these issues, commenting on the answers (messages) of students. It is possible to conduct a lesson in combination: to devote only part of it to discussion of issues, and devote the rest of the time to practical work on the topic. All this will allow students to be not passive, but interested listeners and conduct lectures interactively.

Practical classes in Financial Accounting have always organically included elements of students' independent work. They were traditionally built according to the collection of tasks, covering all

areas of accounting work of the conditional organization and including the registration of facts of economic life with primary documents, maintaining accounting registers, preparation of accounting (financial) statements and tax returns. The whole complex of these works cannot be performed only in practical training, students must do part of the work at home on their own. And in the practical exercises themselves, a significant part of the work is performed by students independently under the guidance of a teacher. However, in modern conditions it is necessary to increase the proportion of students' independent work both in the practical classes themselves and outside the classroom. The teacher should skillfully organize and direct such work, clearly define the tasks for students, while it is desirable to individualize them and determine forms of control and encouragement.

The independent work of students is also based on the educational, four production practicesand undergraduate practice of students of the profile “Accounting, analysis and audit” (applied undergraduate). According to their results, students should write and protect reports on their own. At the same time, it is very important to teach and demand from students a critical assessment of the organization and accounting in practice objects, as well as the development of practical recommendations for eliminating identified deficiencies in accounting, proposals for evaluating the effectiveness of accounting policies, building or improving them.

An important role in teaching students to independently work on the study of “Financial Accounting” was played by the course “Fundamentals of Scientific Research”, which was studied in the third semester of undergraduate studies. Within its framework, students were taught the skills of self-education, the rational organization of independent scientific, educational, informational work. However, unfortunately, this discipline is no longer included in curricula.

One of the main places in the organization of independent work of students should be occupied by their research work. Students should be attracted to it throughout the training. For this, scientific student circles are created in the departments. Arousing students' interest in accounting problems, developing a research and creative spirit in them is the task not only of the head of the corresponding scientific student group, but also of each teacher - the scientific supervisor of student reports to student scientific conferences. The solution to this problem is also largely facilitated by the observance of the constancy in fixing one and the same teacher - the supervisor of studies and within the framework of the student’s scientific circle, both in the course work on the discipline and in the writing of the final qualifying work.

Among the interactive teaching methods combined with the independent work of students, one can distinguish scientific and practical research. So, at the Cheboksary Cooperative Institute (branch) of the Russian University of Cooperation V. Khristolyubovain 2008 made a similar reasearch, in which 5 teachers, 1 graduate student and 12 students were involved. The study was conducted on the materials of the Morgaushsky district consumer society of the Chuvash Republic, and was devoted to the organization of work of accounting. As a result of this study, an assessment of the accounting policy used in this organization was given, recommendations were developed for its improvement and organization of work of accountants, implementation of management accounting, etc. The results of the study were discussed at a round table with the participation of chief accountants of all cooperative organizations of the Chuvash Republic, to which all members of the scientific student group "Accounting in the market" led by the author were also invited. The results of the study were also published in the preprint of V. Khristolyubov and others (2009) “Organization of the work of the accounting department of the consumer society”: Cheboksary Cooperative Institute, Cheboksary.

Educational and methodological support is of great importance in the correct and rational organization of independent work of students is. All students, of all forms of training should be provided with basic textbooks and teaching aids, task books, guidelines for their solution. Moreover, all of them should be different for students of different courses, forms of training and are designed for “their own” volumes of time. The main direction at the same time is the creation of electronic libraries, which is already implemented in many universities. But for now it’s too early to talk about the sufficient supply of teaching and methodological materials for undergraduate and graduate

programs, which greatly facilitate the process of independent study of educational material for students.

The individual abilities of students are different. With these in mind, it is necessary to build independent work of students. Individual students who are better, well-trained and well-versed in accounting issues and, moreover, working in their specialty (which is often found not only among correspondent students, but also in the last courses of full-time education), should increase and complicate the volume of information for independent study, give independent practical tasks of individually defined complexity. The individual inclinations and abilities of students to study accounting disciplines for a teacher can be identified by testing or interviewing, as well as in the preparation of essays, scientific and practical reports, etc.

An important role in organizing the independent work of students is played by control. It should be systematic, both from the leading teacher and from the department. Monitoring the independent work of students in the discipline of "Financial Accounting" is advisable to carry out in various forms (Fig. 2).

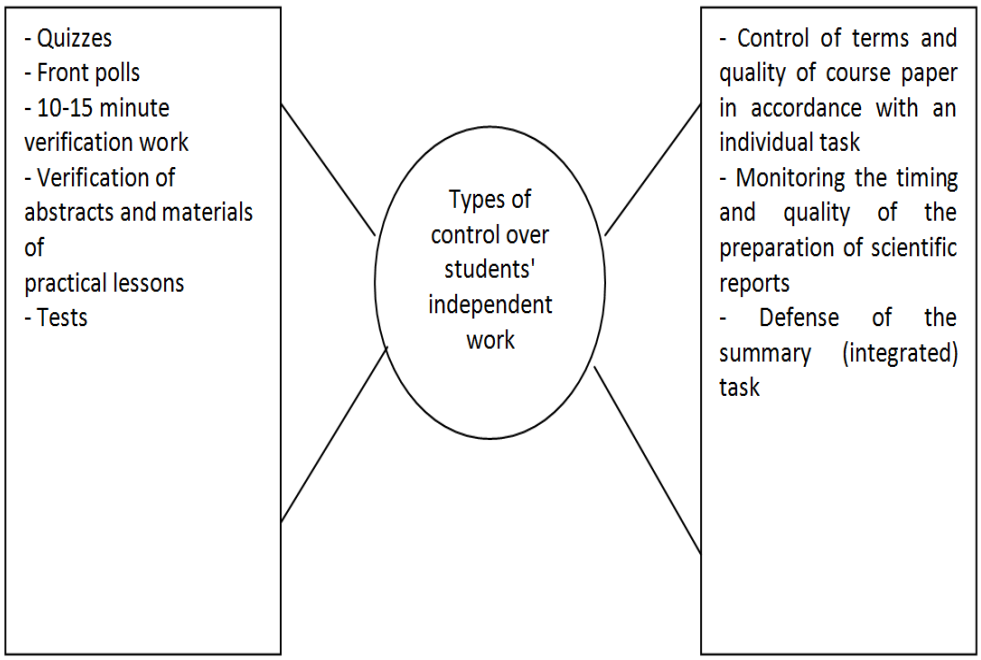

Figure 2: Types of control of independent work of students in the discipline "Financial accounting"

The task of each teacher and the university as a whole is to ensure the effectiveness of independent work of students. This requires careful planning, systematic implementation, the use of its various forms and types, clear instruction of students on the order of implementation and presentation of the completed task, sufficient teaching and methodological support, the gradual complication of tasks, creative orientation, individual approach, control over deadlines, quality implementation, publicity and job promotion.

We single out the factors that determine the effectiveness of the organization of independent work of students in accounting profiles (Table 1):

Table 1: Factors of the effectiveness of the organization of the independent work of studentsof accounting profiles

№	Name of factor
1	The presence of carefully designed and approved educational and methodological complexes of all educational disciplines of undergraduate and graduate programs
2	The high level of the teaching staff not only in terms of scientific degree, but also pedagogical preparedness, experience, creativity, willingness to work “in a new way”
3	Adequate provision of the university library with educational and methodological literature, including electronic publications, as well as various guidelines for the organization of different types of independent work of students
4	Provision of classrooms, libraries with computer and telecommunication equipment. Use of innovative technologies by teachers and students
5	Availability of electronic tests not only in all disciplines, but also in all topics
6	The availability of equipped classrooms corresponding to the profile of student training (“Educational accounting”, “Analytical laboratory”, etc.)
7	The creation of branches of departments in organizations and enterprises on a contractual basis
8	Conclusion of community agreements and internships for students with organizations
9	Implementation of graduation qualification works by orders of organizations
10	Careful planning of independent work of students in the development of work programs with the definition of its types, forms, content, volumes, deadlines and control on each topic of the discipline and clear instruction of students on these issues
11	Possible individualization of tasks for each student or their small groups, based on the level of preparedness of students, self-awareness, responsibility, activity, etc.
12	Dosing of volumes of independent work of students, based on the total workload of students
13	The account of social conditions (life, work, rest)
14	Differentiated assessment and publicity of the results of the independent work of students, its promotion in various ways (additional points, etc.)

According to Kashina E.A. (1997), the informatization of education required the transformation of pedagogical processes through the introduction of new technologies in the educational process. Moreover, in the work of Nikulina T.V., Starichenko E.B. (2018) that despite the fact that the stage of informatization of Russian educational institutions has ended - they are equipped with computer technology; teachers have been trained and retrained on the use of information technology in the educational process, a lot of effort is still required to develop methodological and didactic materials, educational websites, educational software for various purposes, etc.

In the conditions of informatization and digitalization of education, the role of students' independent work increases significantly. The independent creative activity of a student in studies, on the one hand, acts as a quality of the process of cognition, on the other hand, as a quality of the personality itself. In this regard, further improvement of the educational process at the university should go along the path of increasing the volumes and complicating independent work while strengthening and improving the guiding and organizing functions of classroom lecture and practical classes.

A creative approach to the independent work of students requires its high-quality, systematic organization, skillful management. Independent work is both the goal and the means of education. Therefore, the search for ways and methods to effectively manage this process is relevant. In accounting disciplines, it can be carried out in the following areas (table. 2):

Table 2: Directions of the search for ways and methods of effective management of the independent work of students

№	Description of directions
1	The study and analysis of the budget of time and the complexity of students' independent work, the determination of actual time costs and its complexity in the discipline
2	Rationing of independent work, that is, the definition of the normative budget of students' time for independent work in general, for its individual types, for individual topics of the discipline; planning of independent work.
3	Organizational and methodological provision of students with textbooks, manuals, task books, guidelines, links to their sources. Appropriate organization of work of study rooms, laboratories, study accounting cabinet
4	Clear and effective control over students' independent work
5	Analysis of current performance and results of students' independent work control
6	Development and implementation of measures to further improve the educational process in general and independent work, in particular

We agree with the opinion of Pidkasisty P.I. (1980) that for the effective organization of independent work of students, a teacher of a higher school needs to know and observe the principles of its organization: the principle of systematicity and consistency; principle of activity; the principle of an individual approach; accessibility principle; principle of presentation; the principle of science-based calculation of time and dosage of homework. However, in our opinion, it is advisable to supplement this list of accounting disciplines (and not only) with such principles as the principle of regularity, the principle of control, the principle of organizational and methodological support, the principle of the connection of theory with practice, the principle of a gradual increase in the difficulties of tasks.

We will try to determine the features of the practical implementation of these principles in relation to the management of students' independent work in accounting disciplines and present them in table 3.

Table 3: Features of the practical implementation of the principles of organization of independent work of students in accounting disciplines

№	Content Features
1	Independent work should be focused. This is achieved by its clear wording.
2	Independent work should first be carried out under the guidance of a teacher, and then completely independently
3	The volume of work, the complexity of the tasks should be intense, but doable and grow from beginning to end of the study of discipline
4	Tasks for independent work should require the student to have knowledge of the discipline, study of legislative, regulatory, methodological, periodical literature
5	It is imperative to take an individual approach to students when organizing their independent work, as their abilities are different and each requires different tasks in complexity and different time to complete them
6	Orient students to complete assignments for independent work in individual cases on practical materials from specific economic entities (for course, graduate qualification, research work, a report to the conference). To teach students the skills of collecting such material and its processing

7	Tasks for independent work should not be routine, they should be interesting, new to students, but doable
8	Independent work of students should be systematic. It should be included in classroom and extracurricular activities.
9	Monitoring and evaluation of the results of independent work of students should be systematic

Conclusion

The independent work of students is not just a way of acquiring knowledge, but the fundamental principle of higher education, an integral part of the educational process regulated by the Federal State Educational Standard and the curriculum, in which as much time is spent on independent work as on classroom lessons. Therefore, the rational organization of students' independent work is the most important reserve for improving the quality of education and one of the priority and most effective directions for its development.

In the context of developing digitalization of education, the task of the university and teachers is to strive to master new technologies, opportunities to gain access to vast information resources and, on this basis, guide and individualize the educational process through rationalizing the organization of students' independent work.

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Digitalization of agriculture in Russia: government policy and practice

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Abstract

In recent years, Russian agriculture has received a new impetus for development through the implementation of the import substitution policy and the improvement of state support. At the same time, unresolved problems remain in the industry, and the degree of development of digital technologies is quite low. The need for digitalization in agriculture is determined by a large number of factors affecting the efficiency and productivity of processes including high labor intensity of production processes, staff shortages, high risks caused by climatic conditions, relatively low level of industrial engineering, increase in environmental pressure on ecosystems and others. These aspects determine the purpose of the study - to identify problems and factors hindering the transition of rural Russian economy to a digital model and the formation of a digital business. As a result it was found that the digital transformation of the industry depends, firstly, on the basic conditions, the formation of which is associated with the implementation of the economic, scientific and technical policy of the state; secondly, on the degree of activity and willingness of business and the population to use digital technologies to solve their problems. The limitations of business digitalization are: lack of own funds, insufficient maturity of business processes, lack of specialists in the field of IT technologies and insufficient development of digital competencies, low involvement of management and staff in the transformation, immature digital culture. The solution to these problems depends on both state policy and a change in the management paradigm at the corporate level.

Keywords: Digital Transformation, Digital Agriculture, State Policy.

Introduction

In modern conditions digitalization as a technological trend covers not only high-tech sectors of the economy but also penetrates deeper into other areas and sectors of the economy, digitizing the value chain, changing business models, forms and standards of interaction between transaction participants.

The influence of digital technologies on politics, economy, society is so great that in scientific circles this phenomenon is considered as a digital revolution. In the technological aspect its results depend on the degree of readiness and penetration into the practical economy of the so-called end-to-end technologies: big data and their analysis, autonomous robots, modeling, horizontal and vertical integration systems, additive technologies, the Internet of things, cloud solutions, cybersecurity, augmented and virtual reality. The main advantage of digital technology is the reduction in operating and transaction costs.

At the same time according to studies of international experts the digital transformation contains threats of deepening the differentiation and polarization of countries and sectors of the economy due to existing digital gaps. Among all sectors of the economy agriculture is the least advanced in using digital technologies and competencies. The results of the expert assessment of Rosatom State Corporation (2018) indicate that this situation is typical not only for Russia but also for developed countries - the USA, Europe (despite a higher level of readiness of countries for digitalization) as well as for developing countries.

In the context of globalization the need for digitalization of agriculture in Russia is determined by the following internal and external factors:

- ensuring food security of the country: population growth creates pressure on the demand for agricultural products while the production capabilities of producers are limited by the potential of ecosystems and applied technologies; in addition, the realization of the potential of import substitution also requires more radical transformations in agriculture with a focus on increasing production volumes, labor productivity, reducing costs, etc.;

- increased competition in the domestic and international food markets; in these conditions digital technologies can help increase the competitiveness of producers through lower costs and losses resulting in lower prices, higher product quality, the development of new competencies in the field of digital marketing, etc.;

- intensification of interindustry competition for alternative options for the use of agricultural raw materials, for example, for the production of biofuels;

- strengthening the process of urbanization and reducing the size of the rural population, the high complexity of operations and low attractiveness of the industry for young professionals which necessitates the introduction of labor-saving technologies and also stimulates the automation and robotization of production processes;

- aggravation of environmental problems among other things due to the growth of agricultural waste, food waste, etc.; waste management and recycling of raw materials can become additional sources of revenue growth and cost reduction;

- deterioration of land and need for comprehensive measures in the field of protection of natural and land resources;

- differentiation of countries and players in the global value chain, crowding out small players (farmers, small agribusiness enterprises); development of digital technologies and platforms creates a new environment for more effective interaction and cooperation of business of various sizes, opens up new niches and opportunities for using the economic and social potential of small business forms;

- creating conditions for the production of environmentally friendly products as the basis for ensuring and protecting human health and sanitary well-being; in recent years, the number of adherents of healthy eating has grown significantly, the demands of the population on food quality and safety have been increasing, digital technologies allow restructuring business processes in such a way as to take into account all consumer requirements for final products, etc.

Thus, the digitalization of agriculture is a sort of tool for achieving the goals and objectives of the Sustainable Development Concept. Digital technologies as inclusion contribute to achieving a balance of interests between all members of society, spheres of human life, improving the quality of life, solving the problem of intergenerational distribution of resources and ensuring environmental protection, etc.

Materials and Methods

The study was based on materials from an expert assessment of the state and development of the digital economy, agriculture and business, presented in the reports of the Food and Agriculture Organization of the United Nations, Rosatom State Corporation, legislative, regulatory and legal acts of the Russian Federation, reports and analytical information materials from the Ministry of Agriculture of the Russian Federation, data of the Federal State Statistics Service, etc.

Theoretical and methodological aspects of digitalization of agriculture are reflected in the scientific research of foreign and Russian scientists: N.M. Trendov, S. Varas, V. Zeng (2019), T.N. Astakhova (2019), I.A. Ganieva (2019), B.A. Voronin (2019), M.O. Kolbanev, N.I. Kuznetsov, V.N. Milovanov (2019), S.B. Ognivtsev (2019), A.V. Plotnikov (2019), S.A. Chernikova (2019), G.A. Shcherbina (2019) and others.

To achieve the objectives of the study general scientific methods were used: abstract-logical, monographic, analytical. The evidence for the conclusions of the study is provided by the use of systemic and statistical analysis.

Research Results and Discussion

Currently in the scientific literature there is no generally accepted concept of "digitalization". So many authors reduce digitalization to the "quintessence of automation and informatization". S.B. Ognivtsev (2019) notes that digital transformation is a representation of real objects and processes in digital images representing these objects in models and further interactions.

Applied to agriculture I.A. Ganieva (2019) defines digital transformation as “the transformation of economic activity in the industry through the introduction of digital tools - technologies and platform solutions designed to generate, process, deeply analyze and transmit analysis results in the form of numerical information about objects and subjects of the agricultural economy for the subsequent adoption of informed management decisions, providing a technological breakthrough in the agro-industrial complex ”. B.A. Voronin (2019) and others use the concept of "intellectual agriculture." This is agriculture based on the use of automated decision-making systems, integrated automation and production robotics, as well as ecosystem design and modeling technologies.

Thus, common to all definitions is the digitization of real objects, the use of digital technologies to solve production and managerial problems, and the interaction of stakeholders through the Internet.

According to FAO experts the conditions of two levels are necessary for the formation of a digital economy:

1) basic: a high level of development of the digital sector (communications, IT sector) and accessibility of infrastructure (mobile subscriptions, network coverage, Internet and electricity), the educational level of IT specialists, institutional support of the digitalization process (government policy, programs, support tools) ;

2) “activators” are factors of stimulation and promotion of digital technologies: the use of the Internet, mobile phones and social networks, digital skills of the population, entrepreneurial and innovative culture (talent development, incubators, programs).

In 2019, Rosatom State Corporation presented the results of the assessment of the National Index for the Development of the Digital Economy of the Russian Federation. International comparisons show

that in this rating Russia ranks 23rd with a total score of 0.458, which is below the average - 0.521. The profile of Russia is presented in Figure 1.

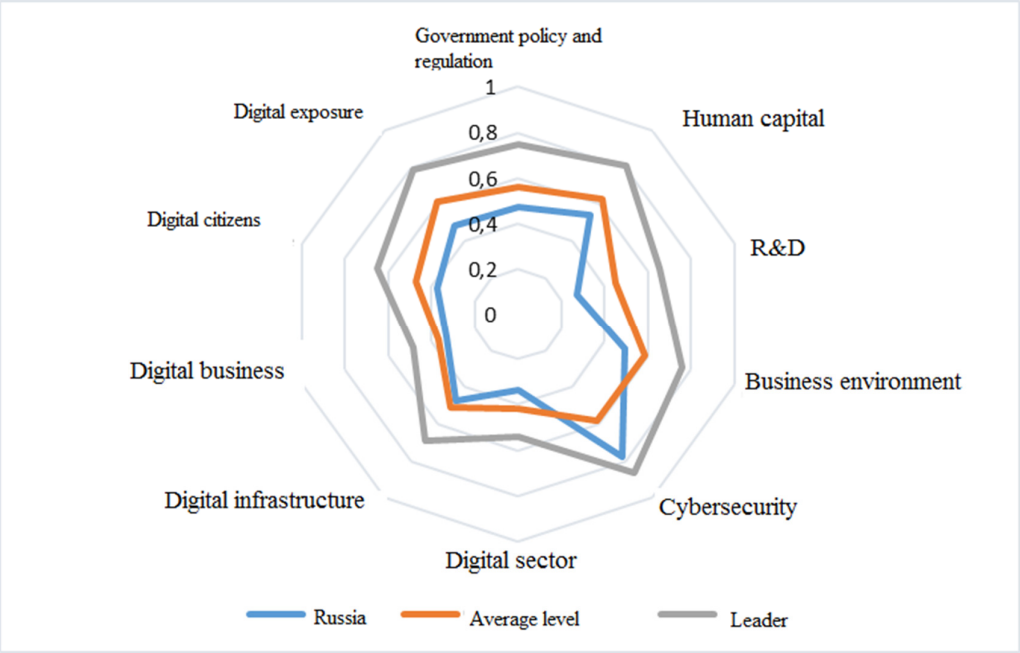

Fig. 1: International comparison of Russia on the digital economy development index

From the data in the figure we can conclude that Russia lags behind European countries in most of the basic conditions of the digital ecosystem, the exception is "cybersecurity", the parameter of which is above average, and "digital infrastructure", in which the value is quite close to average. As a result, low rates of application (demand) of digital technologies by the population and business as well as relatively low rates of digital impact. The problematic aspects include R&D / innovation (these are financing and commercialization issues) and the development of the digital sector.

As for the digital business, according to the results of a global study of the Digital Transformation Index (2018), conducted by DellTechnologies together with Intel, only 7% of the Russian companies surveyed are "leaders", 19% are "implementers", 36% are "evaluators", 37% are "led", 1% are "lagging behind". Thus, only 26% of company executives at the current stage see the potential of digital technologies and the possibility of their practical application for business purposes.

As noted by S. B. Ognivtsev (2019), for the digitalization not to become just another fashion trend it is necessary to aim the digital transformation, first of all, on the implementation of new economic models and fundamentally new control systems that would allow achieving the necessary efficiency and profitability.

In this context, in our opinion, the definition of the digital transformation of A. Prokhorov (2016) is relevant and most accurate. "Digital transformation is the process of the organization's transition to new ways of thinking and working through the use of social, mobile and other digital technologies. It includes changes in thinking, leadership style, a system of encouraging innovation and the adoption of new business models to improve the work of the organization's employees, its customers, suppliers and partners".

The digitalization level of agriculture and agribusiness is much lower than other sectors. Although information and analytical, other digital platforms exist at the state and business levels, business

management information systems for crop production and livestock production, satellite communications and navigation solutions (including for the purposes of safety and control of vehicles, fuel and lubricants costs)), enterprise management systems (ERP), accounting systems, electronic document management systems, personnel, asset and business process management systems, business analytics solutions, CRM systems, these technologies are fragmented and do not yet have a holistic solution. As a result, producers incur high transaction costs which negatively affects the level of financial accessibility of food for the population, the efficiency and profitability of agricultural producers themselves, their competitiveness in comparison with foreign companies. Some performance indicators of agricultural organizations in Russia are presented in Table 1.

Table 1: Performance indicators of agricultural organizations of the Russian Federation for 2013-2018

Indicators	Years						Change, (+,-)
	2013	2014	2015	2016	2017	2018	
Agricultural production index in comparable prices,%	105.1	104.1	102.1	104.8	102.9	99.8	-5.3
Index of physical volume of investments in fixed assets aimed at reconstruction and modernization,%	77.7	96.0	90.9	118.9	…	95.0	17.3
The share of investments aimed at reconstruction and modernization in the total volume of investments in fixed assets,%	8.7	8.4	8.6	8.9	10.3	9.2	0.5
The number of high-performance jobs, thousand units	333.8	368.2	318.2	335.1	365.8	431.9	98.1
Labor productivity index,%	106.2	103.3	103.6	103.0	105.9	99.9	-6.3
Labor capital ratio,%	103.6	103.3	103.7	104.0	106.7	107.1	3.5
Capital productivity index,%	102.8	100.0	101.1	101.6	97.3	93.2	-9.6
Energy ratio of labor: energy capacity per employee, hp	72	75	74	77	75	80	8
Energy ratio of agricultural organizations: energy capacities per 100 ha of sown area, hp	201	201	197	200	198	200	-1
Profitability index of agricultural organizations, taking into account state subsidies,%	7.3	16.1	20.3	16.4	12.0	12.5	5.2

An analysis of the data in Table 1 indicates that production volumes in the industry are unstable and in general there is a decrease in the indicator for the period under review. Among the reasons can be noted a decrease in labor productivity and capital productivity. Low rates of investment in fixed assets lead to a technical lag in agriculture. The share of investments in fixed assets aimed at reconstruction and modernization remains at about the same level of 9%. An increase in the number of high-performance jobs has been observed only in the last three years.

Innovative activity of agricultural organizations remains rather low for the industry. Share of organizations engaged in technological, organizational, marketing innovations for 2016-2018 is approximately: in crop production - 10% (the highest activity is observed for organizations growing seedlings, up to 20%), in livestock production - about 5%, in mixed agriculture the indicator increased from 2.7% in 2016 to 16.3% in 2018. The share of innovative products in 2018 was approximately 6%

in crop production, 2.1% in livestock and 1.4% in mixed agricultural organizations. The number of new crop technologies acquired by organizations has decreased from 635 units in 2017 up to 242 units in 2018, in livestock - from 526 units up to 188 units. The main reason is the rising cost of foreign technology. As a result, the livestock industry provides 93.5% of production by means of domestic reproduction animals.

As for the indicators of digitalization of agriculture, no statistics are currently being maintained, which is also a problem that needs to be addressed. According to the passport of the Digital Agriculture departmental project (2019), the share of investments for the purchase and implementation of digital products and technologies at the end of 2018 is 0.5% of the total investment of agricultural organizations; in agricultural organizations there are no specialists with digital competencies.

Thus, the growth in production volumes, crop yields and livestock productivity in the industry is ensured mainly by extensive factors, and the profitability index of agricultural organizations, even taking into account state support, remains low.

The current situation has determined the agenda for the digital transformation of agriculture - the creation of a digital ecosystem of the industry, combining knowledge bases, information resources, interactive communities, a network of business platforms, personnel capable of working with new technologies that provide solutions to systemic problems of the industry. To achieve this goal in 2018 the Federal Scientific and Technical Program for the Development of Agriculture for 2017-2025 was developed, and in 2019 the Ministry of Agriculture of the Russian Federation began to implement the Digital Agriculture departmental project, which includes five areas (Table 2).

Table 2: Directions for digitalization of agriculture in Russia

Digitalization direction	Opportunities	The benefits of agricultural producers
"Effective hectare" - the creation of the Unified Federal Information System on Agricultural Land	An intelligent system of automated collection, analysis, updating of information on the state of soil and land resources of the territory, developing recommendations on the optimal (landscape-adaptive) sowing of agricultural crops, cutting fields, planting crop rotation, agricultural cultivation technologies, assessing land plots (including cadastral value), control and monitoring of the functioning and effectiveness of land use systems and adaptive landscape agriculture, their impact on environment and rural areas	Profitability increase up to 50%
Creation of the Central Information and Analytical System of the Ministry of Agriculture of Russia	A single analytical base for monitoring the state of the agricultural sector and foreign markets, supporting management decisions by the Ministry of Agriculture of Russia and informing users	Government services and state support on the principle of "one window", saving time
Agroexport “from field to port”	A system for modeling export flows followed by linking forecast yields with the rolling stock of Russian Railways to break down bottlenecks	Entering foreign markets, reducing logistics costs
“Agro-solutions for agribusiness”: creating a single electronic trading platform, developing and scaling “smart farming”, “smart field”, “smart herd”, “smart greenhouse”, “smart processing”, “smart	Automation of all business processes (from interaction with consumers to waste disposal) based on digitalization: the creation of autonomous robotic agricultural facilities operating in an automated mode with minimal human participation.	In livestock business: - increase in milk production to 13 thousand liters per year; - decrease in the incidence of animals with mastitis by 70%; - improving the quality of dairy products by more than 40%; - product profitability of more than 40%;

warehouse", "smart agricultural office" solutions, individual business processes		In crop production: - reduction of crop losses up to 20%, increase in labor productivity by 30%; - increase in organic production up to 50%; - decrease in import dependence in the production of vegetables by more than 70%.
"Land of knowledge" - electronic educational environment	Agricultural specialists training	Advanced training of specialists in mastering digital skills, increasing labor productivity

According to the project developers through the Information system of digital services of the agricultural sector agricultural producers will also get access to a single electronic trading platform which will simplify their access to domestic and foreign markets.

Among the already launched projects it is worth mentioning Mercury Federal State Information System in veterinary medicine, which allows you to automatically compile veterinary accompanying documents, automatically take into account incoming and outgoing products at the enterprise, track the movement of consignments in the Russian Federation taking into account its fragmentation, forms a single centralized database of relevant information for subsequent reporting and analysis (obligatory for all who are involved in livestock).

The existing digital platforms include Seed Production FSIS which was created to build up-to-date databases in the field of seed production of agricultural plants and to inform agricultural producers and citizens about selection achievements, the availability and quality of seeds of agricultural plants produced in the Russian Federation as well as imported. A similar information resource is desirable for livestock breeding.

The digitalization of the economy and agriculture covers a range of important technological, as well as political, economic and social issues the solution of which is impossible at the level of an individual state. In this regard, the Government of the Russian Federation initiated joint projects with the EAEU member countries. The strategic areas for the implementation of the projects identified are: electronic customs, electronic commerce, electronic logistics, digitalization of industries, data economy, digital finance, IT standards, platform for digital integration of the EAEU countries. Achieving joint goals in digitalization involves: developing a single regulatory framework and harmonizing laws and regulations in this area, creating a single digital space and expanding the application of IT technologies, developing and implementing joint projects aimed at digital transformation of spheres, industries, markets and economies of the EAEU member countries as a whole.

Currently work is underway to create a unified information environment - a system of electronic veterinary certification, and subsequently it is planned to extend it to fish farming and fishing for marking eggs. The Ministry of Agriculture of Russia amended the law On Veterinary Medicine in the clause on labeling and registration of animals, according to which all animals born and imported into the territory of the Russian Federation from the list specified by law should be marked and registered so that each animal will receive a digital identification number. According to the legal act of the Russian Federal Service for Veterinary and Phytosanitary Surveillance electronic identification in 2018 became mandatory for all pedigree farms and since 2019 for all commodity farms including private household plots.

The digital transformation of agriculture aimed at creating a digital ecosystem of the industry should cover not only the processes of digitalization of public administration but, first of all, the formation of a modern digital business and the infrastructure necessary for its effective functioning, including financial and insurance sectors, logistics infrastructure, and educational and consulting services.

According to the International Independent Institute of Agricultural Policy (MNIAP) for 2012-2018 investment attractiveness of the industry remains quite high. Global investments in innovative start-ups in agriculture increased 7 times from $ 2.6 billion to $ 16.9 billion. The average transaction size ranges from $ 4.1 million in biotechnology to $ 1.5 million in online delivery restaurants. Priority areas for global investment are shown in Figure 2.

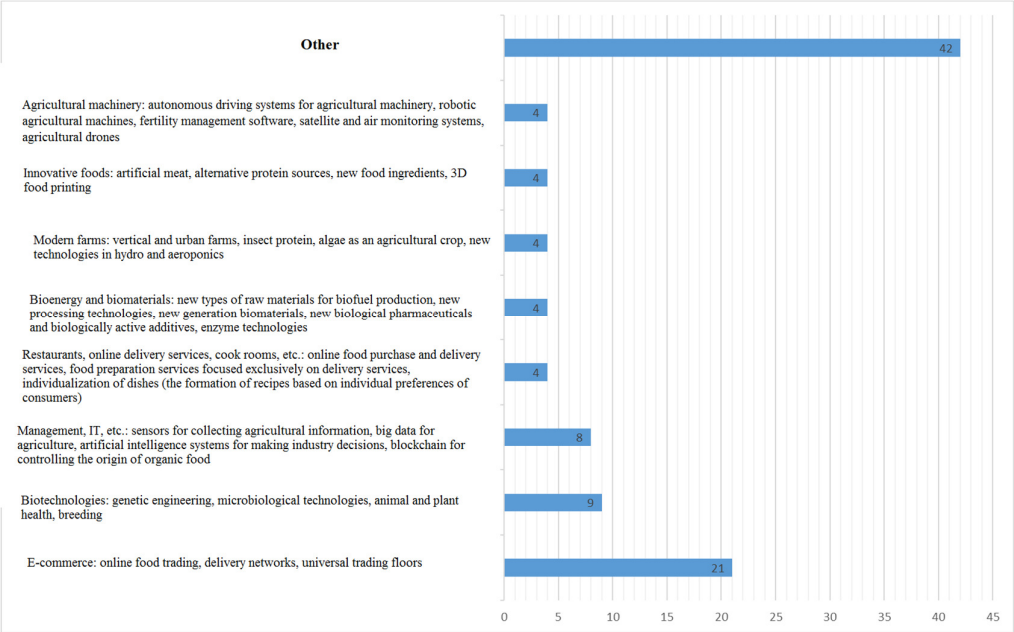

Fig. 2: Priority areas of global investment in digital agriculture for 2018,%

At present in Russia there is an uneven use of digital technologies among agricultural producers. Only large agricultural holdings can afford intensive investment in among other things digital technologies. As T.A. Shcherbina (2019) notes in his work the most attractive segment for investors is the production of fruits and vegetables. Of significant interest are investment projects in the processing of agricultural products (26% of projects), livestock (25%), poultry and crop production (16% each), greenhouses (15%), fish farming (12%). Feed production and veterinary medicine projects (3% each) are unattractive. At the same time there is a low involvement of farmers in the investment process. Domestic farms which lack significant financial resources and competencies in digital technologies use them primarily for interacting with consumers - advertising, taking orders via the Internet and delivering products.

It should be noted that the positive experience of implementing digital technologies in Russia is gaining momentum. In the regional section agricultural enterprises in Moscow, Lipetsk, Belgorod, Rostov, Sverdlovsk regions, Krasnodar Territory and some other regions are active. Among the technologies that have been tested it is possible to distinguish the following: design and creation of “smart farms”, geoinformation systems of fields, use of unmanned aerial vehicles and smart equipment, innovative accounting systems, etc.

However, in general, the level of agribusiness readiness for digital transformation remains low. Internal problems include: lack of equity and high cost of loans, as a result, low level of financing for innovations and digital technologies, insufficient maturity of business processes, lack of IT specialists and insufficient development of information competencies among other specialists, lack of vision and development strategies in the context of digitalization, low involvement of management and staff in changes, immature digital culture.

Accelerating digitalization is highly dependent on the availability of drivers. According to M.P. Galimova (2019) these include: human potential, technology and innovation, infrastructure, access to global trade and investment, sustainable resource support, domestic demand.

Private tools include

1) at the state level:

- expansion of interstate interaction and implementation of joint projects in the sphere of economy digitalization and assessment of the potential of digital technologies;

- formation of a regulatory framework governing the relations of entities in the digital economy;

- improving the information security of participants and the creation of mechanisms to suppress illegal behavior in the information and communication environment;

- increasing funding for the development of end-to-end technologies and promoting Russian information technologies on the world market;

- development of public-private partnerships in construction and expansion of digital infrastructure and stimulating the formation of a market for infrastructure services; increasing the availability of the Internet and mobile communications in rural areas;

- increasing the state order for IT specialists and encouraging the reform of the education system towards training specialists for the digital economy;

- development of a system to support and encourage the transition of business to digital technologies - subsidies, grants, preferential taxation, training programs for specialists;

2) at the industry level:

- creation of a single digital platform for agricultural management including regional and municipal level; development of standards for the interaction of participants in information exchange; development of systems for collecting, storing and analyzing data on agricultural facilities, as well as for statistical monitoring of the results of economic activities of agribusiness entities;

- formation of a basic set of business processes and methodology for the organization and management of digital agriculture;

- stimulating the creation of innovative farms as platforms for technology development and training; systematization and popularization of best practices;

- Development of a specialist education system for digital agriculture and agro-consulting on digitalization issues;

3) at the agribusiness level:

- development of a strategy for digital transformation of a business, assessment of the potential and possibilities of digitalization of business processes;

- study of best practices, design and development of domestic model of integrated digital enterprise;

- assessment of the marketing environment and external capabilities of digital interaction with stakeholders through cooperation;
- search for sources of financing for digitalization, including the possibility of state support;

- assessment and planning of human resources development taking into account the digitalization of agribusiness;

- creation of supporting systems: change management, innovation, solutions to non-standard problems, staff motivation and incentives, interaction with stakeholders, etc.

Conclusion

Assessing the prospects for the development of the digital agricultural economy in Russia it can be noted that Digital Economy of the Russian Federation state program, On the Strategy for the Development of the Information Society in the Russian Federation for 2017-2030 Decree of the President of the Russian Federation , the national plan for the development of competition in the commodity markets, as well as Digital Agriculture Departmental project of the Ministry of Agriculture of Russia form the prerequisites for the digital transformation of agriculture and determine the direction of its institutional infrastructure, financial and economic, resource support.

However, this process is at the initial stage when the goals and objectives of the digitalization of the industry are clear, and the mechanisms and tools for achieving them are so far blurred. Accelerating the process depends on the degree of readiness of end-to-end technologies and understanding of their commercial use. The winnings will be given to those countries, industries and business entities that are more open to cooperation and innovation.

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Assessment of The State of The Mortgage Market in Russia And Its Prospects of Future Development

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Abstract

The development of mortgage activates various sectors of the country's economy, such as the construction industry, the real estate market, entrepreneurship, and creates the conditions for investing in the economy. In addition to the economic role, mortgage also performs important social functions, which are manifested in the possibility of improving housing conditions for certain segments of the population; in this regard, the issues of analysis and assessment of mortgage lending in the Russian Federation do not lose their relevance. The problem of mortgage lending is connected with a housing problem that 60% of Russian families have to confront. The problem is dissatisfaction with housing conditions, especially by young families with children. The growth of income and the increasing needs of the population in housing create favorable conditions for the effective solution of one of the most acute social problems in Russia - housing, as well as for increasing the volume of housing construction and raising funds in the housing sector due to the development of mortgage lending (Averin A.N., 2019). These provisions determined the following tasks of scientific research:
- to characterize the current state and trends in the functioning of the mortgage lending market in Russia, identifying factors that negatively affect the effectiveness of its development;
- to identify priority problems, the solution of which must be foreseen when forming the appropriate strategy for the development of the mortgage market in Russia;
- to offer the main directions for improving mortgage lending in modern economic conditions.

Keywords: Mortgage, Mortgage Lending, Mortgage Market, Analysis of The Mortgage Market**.**

Introduction

The study involved teachers of the Chuvash State Agricultural Academy and the Cheboksary branch of the Russian Presidential Academy of National Economy and Public Administration. The scientific problem was studied using data from the Bank of Russia, Sberbank of Russia PJSC as the largest bank in the banking system of the Russian Federation, and other banks that are leading at the federal and regional levels.

The role of mortgage lending in the total volume of lending market to individuals is increasing. The growth of the mortgage portfolio of the Russian banking sector reached 6.41 trillion rubles (the growth rate for 2018 was 124, %), which is explained by the growing demand for mortgages as the main way to improve housing conditions. In 2018, 1.47 million loans worth 3.01 trillion rubles were granted. (+35.4% in quantitative and +49% in monetary terms compared to 2017). The average mortgage loan amounted to 2.05 million rubles, an increase by 19.2% for 2016-2018. (Nasrulaeva Z.F., 2018).

The record growth in mortgage lending in recent years is largely due to a significant reduction in housing loan rates. The average rate on loans granted in 2018 amounted to 9.56% (-1.08 percentage points compared to 2017), including loans for apartments in new construction - 9.3% (-.11 percentage points), and for the purchase of finished housing in the secondary market - 9.67% (-1.09 percentage points). At the end of 2018, mortgage rates increased due to the growth of the key interest rate, and at the present stage they are at the level of 10-11%.

The main feature of the Russian mortgage market is the high degree of competition among market participants and among their offers to the consumer. Smaller players in the Russian mortgage market have to compete with state-owned commercial banks, whose share in the country exceeds 85%. Competition among banks leads to attractive conditions for customers, including existing ones. Mortgage refinancing procedure is being developed. A big number of mortgage programs in leading banks with favorable interest rates and refinancing programs, provision of state subsidies (mortgages with state support for families with children, military mortgages, etc.), loyal attitude and minimum requirements (no down payment or down payment starting from 10%) allow this type of lending to become more popular and increase housing affordability.

The problem of the development of mortgage relations is covered in the economic literature in different directions and from different positions. Some authors pay more attention to the theoretical side of the issue, others - consider practice in the field of mortgage lending, and others - focus on legal issues. The work of foreign economists is devoted to the analysis of certain theoretical aspects of mortgage lending: N. Almeida (2006), B. Amable (2000), B. Bernanke (1996), M. Campello (2006), J. Cook (1996), M. Gertler (1996), S. Gilchrist (1996), S. Liu (2006), P. Strike (1999) and others.
In domestic literature, the most complete analysis of the factors that impede the formation of mortgage-credit relations in modern Russia was carried out by A.N. Averin (2019), Z.F. Nasrulaeva (2018), N.K. Norets (2019), Ya.S. Pavlova (2018), S.V. Shchurina (2019), N.Kh. Shakirova (2018) and others.

However, in economic science there is a lack of comprehensive research. Little attention is paid to the connection of a mortgage loan with the real sector of the economy. Most studies are devoted to fragmented coverage of certain aspects of foreign experience in the field of mortgage lending.
Hence the need arises for the analysis of mortgage lending as one of the sources of investments that provide solutions to important social problems.

Materials and Research Methods

The theoretical and methodological basis of the study is provided by the results of fundamental and applied research of domestic and foreign scientists, materials of scientific conferences, regulatory and legal acts of the federal and regional levels.

The empirical base of the study is informational materials from foreign and domestic practice of the formation and development of the mortgage market, reference and statistical data of the Federal State

Statistics Service of the Russian Federation and territorial statistical bodies, legislative and regulatory acts of the Russian Federation, periodicals, and data from the global Internet.

In the process of research, methods of dialectics, a systematic approach, logical, structural, factorial, functional, comparative, economic analysis, statistical forecasting methods, as well as expert assessment and modeling methods are used.

Research Results and Discussion

Housing lending is beginning to occupy an increasing place in the volume of lending to individuals. According to the results of 2018, the share of mortgage lending in the total portfolio of loans to the population remained at the level of the end of 2017 and amounted to 44% (Fig. 1).

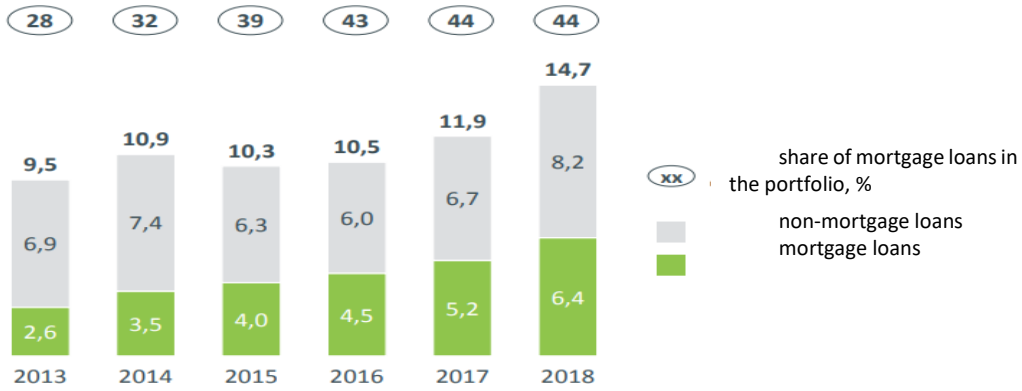

Fig. 1 : Dynamics and structure of the portfolio of loans to individuals in Russia, in trillion rubles.

As of 01.01.2019, the volume of the mortgage portfolio of banks reached 6.41 trillion rubles. (+ 23% compared to 01.01.2018). The mortgage market is growing, primarily due to new borrowers. The average mortgage loan amounted to 2.05 million rubles, an increase of 10.2% compared to 2017 and 19.2% compared to 2016.

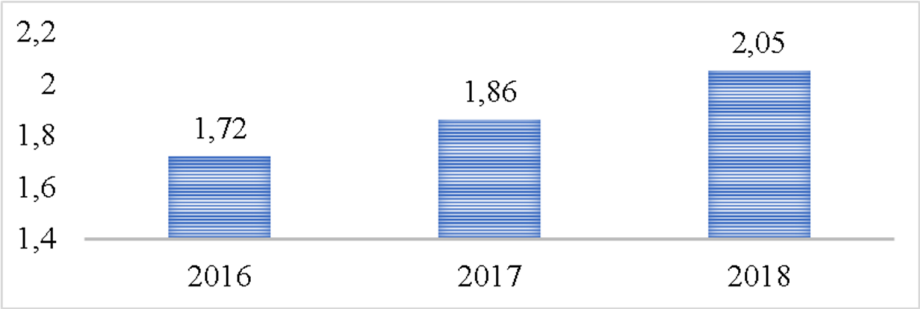

Fig. 2: Dynamics of the average size of a mortgage loan in 2016-2018, in million rubles.

The growth of the mortgage portfolio of the banking sector reached 6.41 trillion rubles in 2018, the growth rate was 124%, which is explained by the growing demand for mortgages as the main way to improve housing conditions (Table 1).

Table 1: Dynamics of debt growth under housing loans to GDP in Russia,%

Date	GDP, billion rubles	Housing loans debt, million rubles	Share of housing loan debt to GDP,%
01.01.19	103 627	6 410 409	6,2
01.01.18	92 082	5 187 462	5,6
01.01.17	85 881	4 493 155	5,2
01.01.16	80 413	3 920 442	4,9
01.01.15	77 893	3 528 379	4,5
01.01.14	66 194	2 648 859	4,0
01.01.13	62 147	1 997 204	3,19
01.01.12	55 967	1 478 982	2,71
01.01.11	46 309	1 129 373	2,5

The share of housing loan debt to GDP in Russia is growing annually and in 2018 amounted to 6.2%. In general, this indicator is quite low compared to foreign countries: the USA - 73%, Hong Kong - 47%, Singapore - 54%, Mexico - 10%, India - 10%, China - 19.4%.

In the mortgage portfolio of banks 1.37 trillion rubles are housing loans granted upon the security of co-investment agreements for the acquisition of housing in the primary market (+ 22% compared to 01.01.2018).

The Russian mortgage market in 2018 experienced a real boom. In 2018, 1.47 million loans worth 3.01 trillion rubles were granted. (+ 35.4% in quantitative and +49% in monetary terms compared to 2017).

During 2016-2018 there was a decrease in the share of the primary market in the volume of loans issued, their share in 2018 amounted to 25% (Pavlova Y.S., 2018).

Analysis of the state of mortgage lending showed that the economic downturn of 2009 and 2014-2015 had an impact on the mortgage lending system. Many construction companies went bankrupt, citizens stopped trusting them, exchange-value of rouble dropped, inflation grew - all these factors affected the incomes of the population and the decrease in the volume of mortgage loans and contributed to the growth of overdue debts, especially in foreign currency mortgages.

Foreign currency mortgages granting is not widely-spread. In 2018, 12 mortgage loans in foreign currency worth 413 million rubles were granted, the average loan period amounted to 1.6 years. Since 01.01.2018 the volume of foreign currency debt decreased by 20% from 64.6 to 52 billion rubles (less than 1% of all mortgage debts) (Shchurina S.V., 2019).

According to the data provided in table 2 we can conclude that the volume of mortgage lending is growing during periods of economic stability and falling during periods of economic downturn.

Table 2: Quarterly Issued Housing Loans from 2008 to 2018, million rubles [7]

Year	I quarter	II quarter	III quarter	IV quarter	Total for the year	Annual growth rate,%
2018	582 049	727 400	761 424	942 242	3 013 115	148,9
2017	321 314	451 664	512 779	736 185	2 022 942	137,3
2016	323 664	341 213	362 506	445 958	1 473 341	128,9

2015	218 130	242 544	301 161	385 504	1 147 339	66,3
2014	334 817	434 836	452 217	540 661	1 762 523	130,2
2013	226 989	315 513	363 430	447 665	1 353 624	131,6
2012	180 950	248 434	269 185	330 378	1 028 947	143,5
2011	105 272	168 169	194 561	248 942	716 944	188,6
2010	48 947	84 415	100 716	145 981	380 061	by 2,5 times
2009	24 546	30 856	36 111	60 773	152 501	22,9
2008	150 759	188 424	198 280	118 345	655 808	117,8

In 2018, 368.3 thousand loans worth 0.87 trillion rubles were provided for the purchase of housing in the primary market. (+ 18% in quantitative and + 32% in monetary terms by 2017). This is 25% in quantitative and 29% in value terms of all mortgage loans issued in 2018.

The record growth in mortgage lending in recent years is largely due to a significant reduction in housing loan rates. Banks have been reducing rates steadily following a decrease in the key interest rate by the Bank of Russia.

The average rate on loans issued in 2018 amounted to 9.56% (-1.08 percentage points by 2017), including on loans for apartments in new construction - 9.3% (-1.11 percentage points), and for the purchase of finished housing in the secondary market - 9.67% (-1.09 percentage points) (Fig. 3)

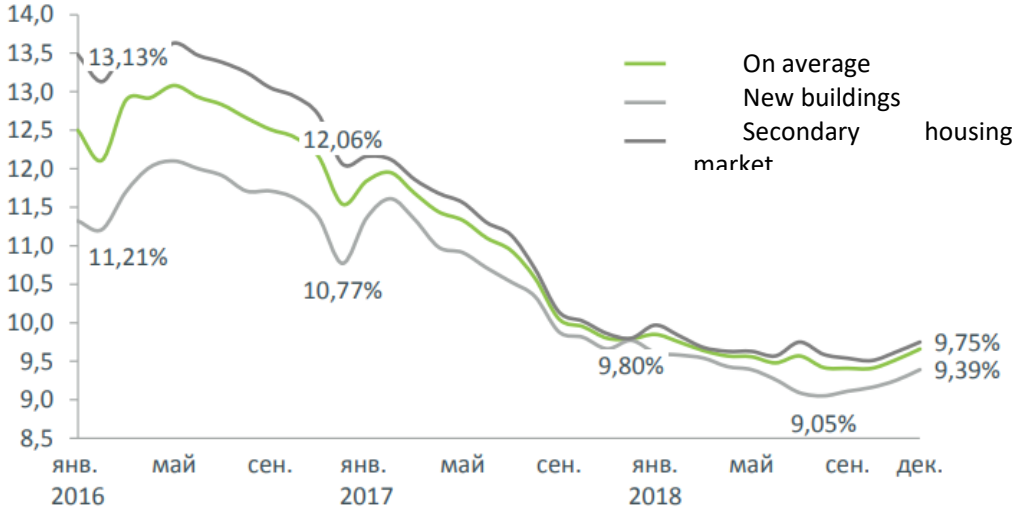

Fig. 3: Weighted Average Mortgage Rates in Russia in 2016-2018, % per annum

In the first half of 2018, mortgage rates decreased steadily and reached 9.05% for new buildings (August 2018) and 9.51% for finished housing (October 2018). In the second half of 2018, mortgage rates shifted to growth following an increase in funding costs for the banking sector. Thus, the yield of 5-year federal loan bonds increased from 6.6% in early April 2018 to 8.25-8.5% in January 2019. The rate on loans issued in December amounted to 9.66%, increasing by 0.25 percentage points. compared to the minimum values. At the same time, the level of issuance rates in December 2018 is lower than last year's values (9.79 in December 2017). In December 2018, rates on loans for new buildings rose to 9.39% (+0.23 percentage points compared to October 2018), and for secondary housing - up to 9.75% (+0.24 percentage points by October 2018) (Schurina S.V., 2019).

The increase in rates is the result of a review by the main mortgage lenders of mortgage conditions since October 2018 due to an increase in the cost of funding. Taking into account the validity period of previously received approvals (on average - 3 months) and the time for obtaining a loan, these changes will still be reflected in the statistics on loans granted in January - March 2019.

In 2019, in the absence of new stresses in the economy, the mortgage market expects continued growth. The dynamics of mortgage rates will be determined by the length of the period of increased volatility in the financial markets. With the favorable situation in the market in the second half of 2019, rates can be reduced to 10% or lower. In the statistics of the Bank of Russia on mortgage issuance until the end of the first half of 2019, rates may continue to rise to about 10.5% - this is the result of processing loans approved in the first quarter.

Under the influence of the current rate hike, demand for mortgage products will be limited. So, for an average loan of 2 million rubles, raising rates from 9.5% to 10.5-11% means an increase in payment by 1.3 - 2 thousand rubles per month. This is only 2-3% of the income of an average family with 2 workers.

In general, the average mortgage rate in Russia is much higher than in the USA - 3.5%, China - 4-5%, Mexico - 9.5%, Hong Kong - 5.25%, Singapore -2.2%., which restrains the growth of mortgage lending in Russia. (Nasrulaeva Z.F., 2018).

The share of refinancing in loans granted in 2018 amounted to about 11.5% (about 350 billion rubles). About 170 thousand borrowers took advantage of the opportunity to refinance their loans.

The decrease in interest rates in 2017 by 3 pp to 10% and lower formed the demand for mortgage refinancing, which began to develop actively in the third quarter of 2017. Thus, the benefits of lowering rates are not only new, but also existing mortgage borrowers. Since the beginning of 2018, the share of refinancing has decreased by 2 times - from 16% in January to 8.1% in December 2018 (Fig. 4). A decrease in the share of refinancing is the first result of raising rates.

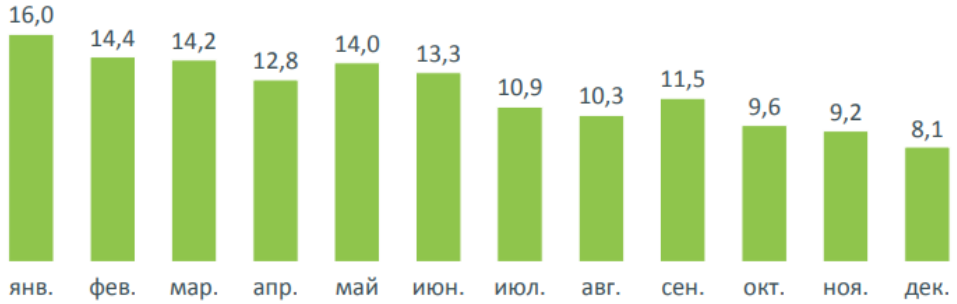

Fig. 4 : Dynamics of the share of mortgage refinancing in Russia in 2018, %

Mortgage refinancing will be facilitated by a dynamic reduction in interest rates and the growing popularity of refinancing among those borrowers who previously took loans at an average interest rate of 12% or higher.

With mortgage lending, credit organizations face the problem of overdue loans, which negatively affects the financial result of the credit institution. The share of loans with arrears over 90 days decreased to a historic low of 1.78%. Throughout 2014-2018 this indicator did not go beyond the recommended value in the economic literature - 3-5%. There are no prerequisites for the formation of a “bubble” in Russia (Norets N.K., 2019).

The Bank of Russia closely monitors the situation with the accumulation of risks in the field of mortgage lending in order to prevent the formation of a “bubble”. Since January 2018, risk-to-weight ratios for high-risk mortgage loans with a low down payment have been increased (for loans with a down payment of less than 10% - from 150 to 300%, with a down payment of less than 20% - from

100 to 150%). From 01.01.2019, the risk-weight ratios for mortgage loans with an initial payment of 10% to 20% (from 150 to 200%) were further increased. After the loan balance is reduced to less than 80% of the property value, a standard risk-weight ratio of 100% is applied to such loans.

Competition of banks leads to increasingly attractive conditions for customers, including existing customers. According to the ranking of the Rusipoteka Analytical Center, the top ten mortgage market leaders are headed by Sberbank PJSC (Table 3).

Table 3: Top 10 in the Russian mortgage lending market in 2017-2018. [7]

Results of 2018		Results of 2017	
Bank	**Volume, million rubles**	**Bank**	**Volume, million rubles**
1. Sberbank	1 560 204	1. Sberbank	1 082 413
2. VTB	672 292	2. VTB24	376 736
3. Gazprombank	149 408	3. Gazprombank	79 821
4. Russian Agricultural Bank	128 004	4. Russian Agricultural Bank	73 323
5. Delta Credit	74 643	5. Raiffeisen Bank	59 000
6. Raiffeisen Bank	63 441	6. Delta Credit	58 565
7. Absolut Bank	48 096	7. VTB Bank of Moscow	57 077
8. FC Otkritie	33 743	8. Absolut Bank	27 251
9. Alfa Bank	33 049	9. Uralsib	27 085
10. Uralsib	30 531	10. St. Petersburg	24 946

In 2018, the 15 largest mortgage lenders issued mortgage loans in the amount of 2.98 trillion rubles. According to DOM.RF and Frank RG, this is 50% more than in the same period in 2017. The market share of the largest creditor of Sberbank in 2018 amounted to 51.8% (- 1.7 percentage points for the year); VTB's share is 22.4% (+3.8 percentage points). The shares of Gazprombank (GPB) and Russian Agricultural Bank increased by 1.1 and 0.7 percentage points respectively, amounting to 5% and 4.3%. DOM.RF, taking into account the results of the work of the subsidiary Bank DOM.RF in 2018, took 5th place in the ranking in terms of the volume of granted mortgage loans, rising by 2 positions over the year. Foreign banks in the ranking – Delta Credit and Raiffeisen Bank - occupy 6th and 7th places, respectively (Averin A.N., 2019).

In the process of research, a number of problems were identified that hinder the development of mortgage lending in Russia:

- unstable economic situation complicates mortgage lending, which implies stable development for a long term;
- cost of mortgages is too high: the average mortgage rate in Russia is much higher than in the USA - 3.5%, China - 4-5%, Mexico - 9.5%, Hong Kong - 5.25%, Singapore -2,2%., which restrains the growth of mortgage lending in Russia;
- a decrease in the share of refinancing is the first result of raising rates;
- low level of solvency of the population. The ability of the population to use the borrowed funds of the bank directly depends on their financial situation, primarily on the level of income. For example, for residents of the Chuvash Republic, the recommended family income should be 64.8 thousand rubles per month in 2019, with an average salary in the region of 26.3 thousand rubles. It can be assumed that a mortgage is available to those who do not have an acute need for housing;
- increase in prices in the primary housing market, which will increase as a result of the transition from a shared to the project system for financing housing construction, will affect the increase in the credit burden on interest for developers and will affect the increase in the cost per square meter for the final buyer;

- high inflation rate is hindering factor in the dynamic development of mortgage lending in Russia, which does not allow the CBR to lower the key interest rate. In recent years, the inflation rate in the Russian Federation has decreased and amounted to 4.3% in 2018, but compared with the economies of other countries, it is still high - the United States -1.91%, the United Kingdom -2.1%, the Eurozone -1.57 %;
- low level of financial literacy of the population has a greater effect on the decision-making strategy in households than the size of the income of citizens, traditionally regarded as a key determinant of the financial behavior of the population;
- supply shortages in the housing market; existing secondary market cannot provide the basis for the development of mortgages.

The main factors in reducing mortgage rates are the systematic lowering of key rate by the Central Bank of the RF and low inflation rates, the programs of the Government of the Russian Federation to provide subsidies for the mortgage market, as well as the increase in the supply of economy class housing developers (Table 4).

Table 4: Factors for Reducing Mortgage Rates in the Russian Federation

Cause	Factor content
The policy of the Central Bank of the Russian Federation	Since 2016, the regulator has been systematically lowering the key rate for banks, which for the period from September 17 to December 16, 2018 was 7.5%. At the present stage – it amounts to 7.75%. The Central Bank of the Russian Federation plans to reduce the key interest rate for the future. If inflation rises, it will assess the feasibility of further raising of the key rate. The Central Bank of the Russian Federation predicts annual inflation in the range of 5.0–5.5% according to the results of 2019 with a return to 4%.
RF Government Policy	Decrease in the level of inflation indicators in recent years; subsidy program for the mortgage market, which will allow in the future to keep mortgage rates at an acceptable level.
Building companies Policy	Growth in the supply of economy class apartments

A consequence of lower mortgage rates may be an increase in the number of transactions in the primary and secondary real estate market. In order to combat the high cost of mortgages, the Central Bank of the Russian Federation set a goal to reduce mortgage rates in 2019 by 9%, and then by 8%. The market method of achieving the set target for the rate implies the resumption of the CBR rate reduction rate. However, the resumption of monetary easing will be possible no earlier than the second half of 2019, when inflation will stabilize after acceleration and will begin to decline again. And even in this case, the key rate is unlikely to drop from the current 7.75% below 7%. Consequently, a decrease in mortgage rates can occur up to a maximum of 9%. However, lowering mortgage rates will be able to stimulate the mortgage market, which, in turn, will spur demand for primary housing.

An increase in demand for mortgages depends not only on lower interest rates, but also on the solvency of borrowers. The macroeconomic indicators in the country are of great importance. If the cash incomes of the population are subject to stagnation, a decrease in mortgage interest rates will not lead to the desired result. Low-wage borrowers will not be able to pay mortgages (Nasrulaeva Z.F., 2018).

Thus, low solvency of the population is the main problem of the slow development of mortgages in the Russian Federation. Banks (credit institutions) grant loans, taking into account the income of citizens. It is this indicator (solvency) that is fundamental when granting a loan and, accordingly, the entire banking and credit system of the country. Banks issue loans if the monthly payment is not more than 40% of the borrower's family income. However, there are cases when borrowers, trying to get a loan, indicate higher incomes that are actually invalid. Thus, they make it difficult for themselves to pay interest on the loan. Given the real incomes of citizens, we can conclude that mortgage lending is not available to everyone (Shakirova N.Kh., 2018).

To increase the level of savings in incomes of the population, it is necessary to systematically carry out a number of important measures: implement a system of state measures to increase real cash incomes of the population, reduce inequality in incomes, continue the policy of lowering inflation, and monitor the savings process.

In addition to inflation, banks have the following difficulties:
- firstly, depositors seek to reduce monetary risk and therefore do not keep their funds on deposits;
- secondly, the income of future bank customers is growing much slower than the rate of inflation;
- thirdly, due to the small number of depositors, the level of mortgage lending services is decreasing.

Thus, the mortgage is developing as an offer for certain categories of citizens who own a high level of income.
The solution in this situation is the adoption of urgent measures to combat inflation, as well as raising the level of the economy as a whole.

Unstable economic situation. Mortgage -is a long-term loan. To offer a project of a strategic nature, i.e. for a long time, credit organizations require a certain guarantee of balance in the economy. Individuals and legal entities holding a loan also want to be sure that they can repay the loan over a long period. The country's economy directly depends on the economy in other countries, as well as the prices of resources in them. Currently, state and population incomes are fluctuating, as are under constant pressure from global sanctions and unstable prices for black gold. And therefore, our country has no guarantees of economic stability. Consequently, banks cannot issue loans to potentially insolvent populations. The way to solve this problem is to ensure the stability of the economic and political situation in the country.

The source of the high cost of mortgages, or, in other words, high interest rates is the high cost of attracting resources - the inflation rate should not exceed the interest on deposits, so that it would be profitable for depositors to keep their money in bank accounts. Following the interest rate on the deposit, the rate on housing loans will increase. Only a significant reduction in inflation in Russia will help to fully solve this problem.

At the same time, there is a shortage of offers on the mortgage market. The existing secondary market cannot provide the basis for the development of mortgages. Buying and selling in this market is often fraught with legal conflicts regarding ownership of housing. This is also due to the fact that the system of state registration of real estate transactions was developed much later than the Law of July 4, 1991 No. 1541-1 “On the privatization of the housing stock in the Russian Federation”.

With a high degree of probability it can be assumed that an increase in the solvent demand of the population due to mortgage lending without a corresponding development of the construction market will lead to a significant increase in prices caused by an acute shortage of offers in the primary housing market. The main obstacle to investment in housing is the high financial risks, which are more associated with risky financing schemes through shared housing construction.

The transition from a shared to a project system for financing housing construction will affect the increase in the credit burden on interest for developers and will affect the growth in the cost per square meter for the final buyer. In the Russian construction industry, there is a high cost of facilities under construction, which limits construction companies in the use of equity due to its insufficiency, since it is formed from net profit. Project finance can help small construction companies exit the market.

Russia has a long way to go in the struggle for stability in the economy and constancy in the mortgage market. Prospects for the availability of mortgages in the Russian Federation can be estimated based on the opinions of heads of departments and banks that have a direct impact on this process (Table 5)

Table 5: Predicted Positions of Mortgage Accessibility by the Government and Business in the Russian Federation

Source	Forecast
Bank of Russia	It is supposed to achieve mortgage rate indicators in the range from 9 to 10% with the key rate of the Central Bank of the Russian Federation at 6.5-7% and with annual inflation of 4% by 2020 (E. Nabiullina)
Government of the Russian Federation	The country has created all conditions for achieving a mortgage rate indicator of 6–7% (D. Medvedev)
Ministry of Economic Development of Russia	Mortgage rates will be 8–9% in 2019–2020. (M. Oreshkin)
Ministry of Construction of the Russian Federation	Proposals are being prepared to change the mortgage subsidy program in order to try to implement the ambitious plans that the President of the Russian Federation has set.
Sberbank	While maintaining the trend for lowering inflation, it is possible to achieve mortgage rate indicators in the value of 6–7% by 2020; as of November 2018, the mortgage rate of Sberbank is 8.99% (G. Gref)
Promsvyazbank	A mortgage rate of 8% will be reached by 2020 (D. Monastyrshin, chief analyst at Promsvyazbank)

Some experts predict a decrease in mortgage rates, which can reach record low values, while others, on the contrary, predict the formation of "financial bubbles" similar to those that had appeared in American mortgage market by 2008. The provision of cheap mortgage loans by American banks and the lack of proper solvency control of borrowers had become the causes of the global financial crisis.

In his annual Address to the Federal Assembly on February 20, 2019, the President, speaking about the support of mortgage lending, noted that it is necessary to consistently reduce mortgage rates to 9%, then to 8% and improve the effectiveness of preferential mortgage lending programs. For families with 2 or more children there is a preferential mortgage program at a rate of 6%. However, only 4.5 thousand families took advantage of the privilege. The rate is subsidized for only the first 3 or 5 years of the loan. It is proposed to establish a concession for the entire duration of the mortgage loan. This will require 7.6 billion rubles in 2019, 21.7 billion in 2020, and 30.6 billion in 2021. The program can reach 600 thousand families. 450 thousand rubles are given from the federal budget to the family with 2 or more children to pay for the mortgage loan. This will require an additional 26.2 billion in 2019, 28.6 billion in 2020, and 30.1 billion in 2021. It is necessary to provide the family with the opportunity not only to buy new housing, but to build their own home on their own land. Individual housing is not covered by the mortgage. Construction companies that transfer social facilities to the state and municipalities must be exempted from income tax and VAT.

Conclusion

Solving the problems of mortgage lending is a complex task that affects macroeconomics, social and political spheres, banking and construction sectors, and much more. It takes a long time to settle these elements and take mortgage lending to a new level.

The Government of the Russian Federation, with the help of various state mechanisms and social programs, is trying to make mortgage lending affordable for all the population. The Bank of Russia policy to combat inflation and the systematic reduction of the key rate has created favorable conditions for setting acceptable bank rates for mortgage loans, which has allowed over the past few years to significantly increase demand for mortgages. Russian commercial banks have lowered mortgage rates and offer refinancing of previously received mortgage loans, which testifies to the confidence of the banking sector in the state, the confidence of banks in maintaining stability in the economy at the macro level.

In the future, the main actions in stimulating the mortgage market by the state may be:
- ensure the stability of the economic and political situation in the country;
- implementation of measures to reduce the risks associated with long-term lending in order to increase the profitability and attractiveness of this type of lending for banks;
- reducing the administrative burden on developers, improving the regulatory framework and the procedure for regulating activities in the field of housing construction;
- taking additional measures to encourage the participation of banks in mortgage lending, for example, attracting banks to manage the funds of free grants provided to citizens for the construction and purchase of housing;
- providing support to families with low incomes when buying a home by providing them with subsidies to pay the down payment when using a mortgage loan;
- the introduction of the standard for responsible lending which is a standard that will be recommended to banks so that they familiarize customers with the procedure for paying a loan, and especially with those conditions when a security object could be withdrawn if the mortgage is not paid. The document describes options for pre-trial settlement of mortgage arrears, as well as options for helping if a person is in a difficult financial situation (T. Bogatova, 2016).

In our opinion, the main problem with mortgage lending for a young family in need of their own housing is no money for down payment, absence of a credit history, and lack of awareness of financial decisions. Therefore, in the study, we propose to open mortgage deposits in banks, which assume monthly payments, as with mortgage lending, only family funds will be received on a deposit account at an interest for a long period of time. 2-4 years savings, depending on the level of family income, will make it possible to form a down payment of 20-30%. A person will not be able to take away the savings before the expiration of the period indicated in the contract. At the end of the term, the citizen receives not only the deposited amount and interest, but also the opportunity to conclude a mortgage agreement at a preferential interest rate.

This practice will allow not only banks to evaluate the creditworthiness of a young family, but also for young people to realize their ability to pay a mortgage loan. If this load turns out to be exorbitant, the young family will always be able to refuse mortgage lending and will remain with their savings.

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Problematics of Organizational (Corporate) Culture theories In the Russian Management Model

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Abstract

The relevance of scientific research of the organizational culture of Russian enterprises is due to the changes that have occurred in the political, social and economic spheres. Changing the form of ownership and the status of enterprises stimulates the search for optimal ways to carry out business processes and the introduction of progressive forms of management.

In modern science, both domestic and foreign, there is no single concept of organizational (corporate) culture. There are several areas of research: some scientists consider corporate and organizational culture to be synonyms. Others formally believe that corporate culture is the culture of large corporations, and organizational culture is that of small organizations. There is a scientific opinion according to which corporate culture refers to specially created, externally formed values of an organization that contribute to its competitiveness, and the organizational culture develops by itself as a result of direct production and social interaction.

Keywords*:* organizational culture concepts, organizational culture assessment methods, organizational culture interpretation elements

Introduction

Researchers did not immediately come to understand the importance of organizational (corporate) culture but at a certain stage in the socio-economic development of society and management as a scientific discipline. The emergence, in particular, of new organization management methods is associated with certain market conditions.

In the modern theory of management there are three stages of progress towards the formation of a theory of organizational (corporate) culture, which are expressed in the following concepts: A. Fayol

"personnel management" and its basic principle of corporate spirit, E. Mayo and his human factor as a new type ofpersonnel labor assessment, A. Maslow "HR - human resource" and its human resource as the main object of management in the conditions of scientific production.

For most ordinary people organizational (corporate) culture as a business process was formed in the 1970s during the period of the so-called "Asian miracle" and the emergence of the Japanese management model where value orientations of entrepreneurial activity were called the main economic engine.

In the Russian Federation since the beginning of the 1990s there was a transition from a planned system of economic development to a market model of economic development. The American management model was chosen as an example of the development of entrepreneurial culture, which did not fully take into account all the features of Russian society and the realities of that time. In the 2000s during the formation of large business the concept of a valuable employee appeared as a carrier of the capital of a company requiring a more attentive attitude from the owner of the business. This situation in management entailed a number of problems that required the creation of working conditions that satisfied qualified personnel. Thus, the question arose of creating and maintaining a certain corporate (organizational) culture, methods for assessing it and choosing an interpretation for organizational and legal activities.

Materials and Methods

Teachers and staff of the Chuvash State Agricultural Academy have taken part in the study. The scientific problem was studied at the Chair of Economics, Management and Agricultural Consulting using available information resources including electronic library networks, information and reference systems, official Internet sites of government agencies of the Russian Federation and Russian enterprises. The objects of research were Russian business entities and business processes occurring in the management system. In the course of the work general scientific methods of dialectics, analysis, synthesis, induction, deduction, comparison, and analogy were used.

Research Results and Discussion

In order to deal with the problems of the theory of organizational (corporate) culture in the Russian model of management it is necessary to analyze three important components of the theory of organizational (corporate) culture:

- elements of organizational (corporate) culture and their interaction in the organization;
- the most acceptable interpretation of the phenomenon of organizational (corporate) culture taking into account the peculiarities of organizational and legal forms in the Russian Federation;
- themethodology most suitable for assessing organizational (corporate) culture.

Most domestic authors studying this issue agree that organizational (corporate) culture can be called a subjective element of organizational activity, which consists of a wide variety of complex assumptions unprovenly accepted and shared by members of a group or organization. To simplify the assessment procedures most authors propose to group elements of culture according to similar characteristics. At present it is customary to distinguish three such signs of classification - patterns, values and symbolism.

Many firms have special documents intended for staff which describe in detail their value orientations, called corporate codes. Using the general that is inherent in many definitions we can characterize organizational culture as follows:

Organizational (corporate) culture is a set of the most important assumptions accepted by members of the organization and expressed in the values declared by the organization giving people guidance on their behavior and actions.

These value orientations are transmitted to individuals through the symbolic means of the spiritual and material internal organizational environment. In Figure 1 you can clearly see many elements of organizational culture which are inscribed in the structure of all business processes in the organization.

The second no less important point is a different interpretation of the term organizational (corporate) culture. To date in various literary sources the concepts of "organizational culture" and "corporate culture" are identified and contrasted. How correctly and appropriately do these concepts compare and prioritize?

According to V.A. Spivak priority should be given to corporate culture as the basis for identifying personnel with a particular enterprise. By corporate culture the author understands the combination of material and spiritual values inherent in an individual organization, demonstrating its distinguishing features as an understanding of itself and others manifested in the behavior, interaction and evaluation of oneself and the outside world.

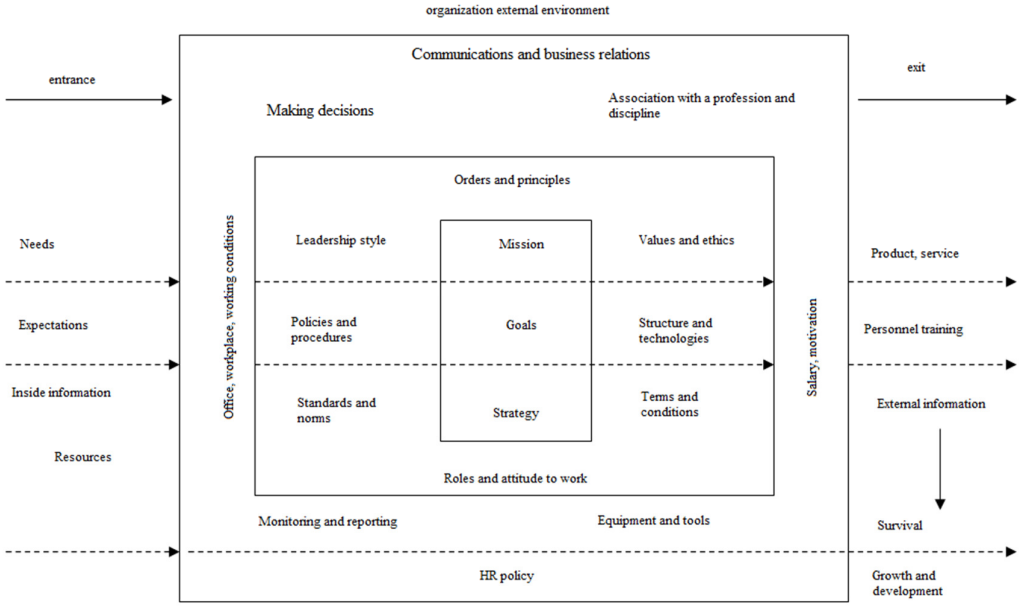

Fig. 1: Structure of interaction of elements of organizational (corporate) culture in an organization by S.S.Zhogova

His opinion is shared by V.V. Tomilov arguing that the culture of a corporation should be seen as an expression of core values in the organizational structure, management system, personnel policy exerting its influence on them.

According to E. Shane organizational culture as external adaptation and the unification of employees within the organization is of paramount importance.

According to A.A. Averyanovait's advisable to talk about corporate culture since it describes a system of values that is understood and taken lead from by employees of the organization. According to the author corporate culture consists of a set of rules adopted by employees of the organization expressed in the values required by a particular company which coordinate the norms of human behavior.

A.A. Maximenko and T.O. Solomandina believe that the difference between the terms organizational and corporate culture lies in the size of the enterprise. In their opinion the concept of organizational

culture is more appropriate for enterprises belonging to the category of small and medium-sized, while for large enterprises corporate culture is more suitable.

Some authors prefer to contrast the terms corporate and organizational. So A.E. Kapitonov and E.A. Kapitonov believe that organizational culture should include the qualitative characteristics of the assessment. The authors include the order of management and the degree of development of economic resources. According to them corporate culture includes rules within the company that is traditions and norms. The authors also substantiate the idea that organizational and corporate cultures have different tasks.

Another author N.N. Morgunova believes that corporate and organizational cultures are autonomous phenomena that have common components. Therefore there is no difference in these definitions.

In order to try to answer the question of the acceptability of the use of terminology organizational culture and corporate culture in the Russian management model it is advisable to compare the concepts included by the authors on the basis of the factors indicated by them.

Let us compare the concepts of "organization" and "corporation." In the Anglo-Saxon tradition “a corporation is a collection of people who have united to achieve common goals, carry out joint activities and form an independent subject of law - a legal entity”. "Organization" is a certain group of people whose activities are deliberately coordinated to achieve common goals. The Tax Code of the Russian Federation equates organizations with legal entities. A formal comparison shows that the concepts of "corporation" and "organization" are identical, they simply have different etymological roots. It should also be noted that enterprise is also an independent, organizationally separate business entity with the rights of a legal entity which produces and sells goods, and performs work and provides services. It can be created in any legal form from an individual enterprise to a joint-stock company or state corporation.

But it is necessary to clarify that enterprises are both commercial, where the main goal is to make a profit, and non-profit, where the goals are somewhat different.

Therefore, it is advisable to compare the concepts of "organization" and "enterprise".

1. An enterprise is a subject of market relations and is exclusively engaged in the production of goods and services. An organization, in addition to production, can engage in activities not related to it (politics, culture, sports, science);
2. An organization may be an informal group functioning according to its own rules and formed on the basis of friendly relations. An enterprise cannot be informal. All its activities are based on a legal basis;
3. The head of an organization may occupy his position on the basis of a legal act. In an informal organization a leader is determined by the will of its members; there may not be any documentary basis for this;
4. The effectiveness of the management of non-production organizations is determined by their bodies. Performance indicators for managing an informal organization, as a rule, do not exist. The effectiveness of enterprise management is determined by the parameters established by regulatory enactments.

Thus, we can conclude that organization, in the broadest sense, is a community of people united by mutual goals; this is a specific concept which can include both enterprises and corporations, therefore, in essence the concepts of “organizational” and “corporate” are synonymous, and denote the culture of a particular group of people.

With the increasing role of culture for organizations the need for its assessment increases. Therefore, the third, no less significant point for managers, is the choice of the most balanced methodology for assessing organizational (corporate) culture.

By“methodology for assessing organizational (corporate) culture”we shall mean a system of sequential actions aimed at researching the organizational culture to obtain information about the state of the company and identify its advantages and disadvantages.

In the process of studying and analyzing literary sources the currently existing methods for assessing organizational (corporate) culture were identified, which we combined according to the evaluation criteria into two groups - qualitative and quantitative.

Qualitative methods for assessing organizational (corporate) culture involve descriptive studies based on an analysis of the collected primary data about the company (survey, questionnaire, etc.) and private information (the opinion of employees about the company, its resources and development opportunities; level of motivation; suggestions to improve the work, internal conflicts, informal relationships) without quantitative expression (Table 1).

Table 1: Qualitative methods for assessing organizational culture

Methodology	Analyzedparameters
Typology of T.E. Dil and A.A. Kennedy	Employeeattitudetowards risk
Typology of R. Ackoff, Typology of M. Burke, Typology of C. Handy, Typology of W. Ouchi, Typology of G. Islam and M. Zipur, Methodology of E. Shane, Typology of R. Blake and J. S. Mouton	The relationship between the organization and employees
Typology of F. Klukholm and F.L. Stroberg, Methodology of C. J. (KawakitaGiro), Typology of M. Mark and K. Pearson, Typology of F.R. Manfred Ke de Vree and D. Miller, Typology of S. Medoc and D. Parkin, Methodology of F. Harris and R. Moran, Typology of Larry Constantine	Employeefeatures

Despite the fact that qualitative methods for assessing organizational (corporate) culture allow us to obtain a visual result of the study and identify the characteristics of culture at the same time they practically do not reveal the features of the organizational (corporate) culture of an individual organization (Table 2).

Quantitative methods for assessing organizational (corporate) culture involve conducting various surveys to obtain a numerical assessment of the state of the organization. These methods are used to obtain statistics about the organization under study.

Table 2: Quantitative Methods for Assessing Organizational Culture

Methodology /authors	Analyzedparameters
D. Denison model (DOCS), Methodology of G. Hofstede, Methodology of K. Cameron and R. Quinn (OCAI), Methodology of Van de Post and Koning, Methodology of N.V. Levkina	Taking into account the features of the internal and external environment of the company
O’Reilly, Chatman and Condwell Methodology (OCP), R. Cooke and J. Lafferty Methodology (OCI), C. Glaser and S.	The study of the internal environment of the company

Zamanou Methodology (OCS), Methodology of T.O. Solomandina, Method of I.D. Ladanova, Methodology of O.E. Steklova, Method of L.S. Savchenko	

When assessing organizational (corporate) culture, the greatest popularity in our country was gained by the methodology of K. Kemeron and R. Quinn (OCAI), which is explained by the ease of use and the universality of its application. In addition this technique was one of the first to be proposed by Russian specialists. Like most quantitative methods, the OCAI methodology involves questioning, mathematical calculation on a 100-point scale, interpretation of the results by typology, and construction of a framework design. The survey participant is offered six sets of questions, the results of which are used to build the entire diagnosis. This is a very subjective technique, where the error in the answers of the questionnaire is high and can vary depending on the circumstances. The second most popular use is the D. Denison Qualitative Assessment Methodology (DOCS). In comparison with the model of C. Kemeron and R. Quinn (OCAI), D. Denison's methodology (DOCS) includes a questionnaire of 60 statements rated on a five-point scale. The main disadvantage of this model is the complexity of the conduct, the advantage is a more accurate result compared to the OCAI methodology. The value of these methods lies in the fact that they both allow the management of the organization to catch the employees' mood for adherence to the existing organizational (corporate) culture or the desire to change it, being a valuable signal for the manager to take further actions.

Conclusion

Until recently the concepts of “corporate culture” and “organizational culture” were not clearly distinguished in Russian literary sources raising a lot of questions. To date no consensus has been formed on the correct use of these terms. The most common approach is that corporate and organizational cultures are identical concepts since the philosophy and ideology of the organization, value orientations, norms are accepted and shared by all members of the team. In addition, from the legal interpretation there are no significant differences in these terms. Therefore, both terms in most literary sources are commonly used together especially in educational literature. But no final decision on this issue has been made, which forms the process of transformation of the cultural space based on the following concepts:

The first concept is based on the fact that corporate and organizational cultures are independent phenomena. Organizational culture is a holistic view of the goals and values inherent in the organization, specific principles of behavior and ways of responding. Corporate culture is a set of assumptions accepted by all members of a particular organization, which defines the general framework of behavior accepted by most of the organization. The main difference between organizational culture and corporate culture is that the former is regarded as a theoretical model, and the latter for each particular organization is a set of types of organizational cultures.

The second concept is formed around an organization belonging to the category of small and large. It is worth noting that the separation by the size of the organization and type of business is not objective since a large enterprise may also have an informal internal structure, and relations in a small company may be official.

The third concept is based on the definition of a local industry organization and a multidisciplinary international corporation revealing the term "entrepreneurial culture", which refers to the culture of small enterprises. According to this theory corporate culture is part of organizational culture where the concept of "organizational culture" is broader than the concept of "corporate culture". So from the perspective of management the term “organizational culture” is more applicable.

The fourth concept considers the concept of corporate culture at the level of values and norms of a particular enterprise, suggesting that corporate culture as a concept covers norms and values at a wider level based on the social significance and responsibility of employees. From this point of view

an organizational culture can be formed as a result of long practical activities or the activities of a particular leader or by the formation of an organizational culture by specialists from outside. At the same time it can be developed to the corporate level, when the interests and actions of employees are maximally focused on the goals of the organization as a whole.

Building a certain organizational (corporate) culture for many managers is an integral part of the enterprise development strategy. Differences in goals, established patterns of behavior of employees of the enterprise can lead to conflicts, and therefore interfere with business. Therefore, the value-based way of management becomes the basis for the formation of organizational (corporate) culture. Thinking through the goals and values of the business creates a solid motivational environment for employees, forms a union of like-minded people. Also a strong organizational (corporate) culture motivates an employee to put much more effort into achieving the goals of the organization, to do it more actively and purposefully. In this aspect organizational (corporate) culture is an effective means of planning and implementing productive business ideas. It is important for an organization to consider this view of the essence of corporate culture especially at the stage of its formation.

In the formation of culture the head of the enterprise plays a paramount role. Strategically thinking leaders of successful enterprises use organizational culture as a strategic tool that makes it possible to direct employees to common goals and values, attract initiatives, maintain company loyalty, and optimize the communication environment.

The study of all aspects of organizational (corporate) culture creates scientific theories as a consequence of all previous research activities. All theories contain elements of empirical data accumulated in the initial stages of rational knowledge. Empiricism, hypotheses and laws in every scientific theory are its essential elements, which change during the development of the theory.

Theories of organizational (corporate) culture are currently under active development, both theoretical and empirical. The indisputable relevance and variety of existing concepts dictate the need to search for universal scientifically confirmed postulates, laws and principles of construction, methods of maintaining and developing the culture of an organisation.

It should be noted that in recent years the study of organizational culture generates intense interest. This is determined by the existence of a number of features of modern economic development, such as:

- transition to a new knowledge-based economy;
- change in the way of organization management (increasing the importance of human capital management);
- occurrence of significant changes in the process of interaction of organizations with the external environment;
- tendency to integrate the goods and services provided (the growing "complexity" of consumption and, accordingly, the promotion of products and services requiring effective interaction of organizations of various sizes representing different geographical areas, industries, patterns of ownership);
- aggravation of the problem of social responsibility and business ethics;
- demand for additional competitive potential of organization;
- need to expand the ability to predict the situation at the global, national, industry and organizational levels in the short and long run.

To summarize, we propose to interpret the organizational (corporate) culture as the social and spiritual life of a team consisting of beliefs, values and attitudes in which all employees of the enterprise participate. Corporate culture contributes to the achievement of tasks and the implementation of planned actions in the future.

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Financial Support for Innovation and Investment Processes in The Fuel and Energy Complex of Russia

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Abstract

The article is relevant as the fuel and energy complex (FEC) ensures work and activities of Russia as a whole and the consolidation of its regions, formation of a significant part of budget revenues and foundations of innovative economic development. The purpose of the study is to identify priority areas for the development of the fuel and energy sectors based on a comprehensive analysis of the development of their innovation and investment activities. Research methods include dynamic, coefficient and comparative analysis, which allowed us to identify trends in the development of the Russian energy sector in 2008-2017. It is noted that the need for large-scale modernization of the fuel and energy complex, which will require significant investments and support from state authorities. A comprehensive study of the State Programs of Russia was conducted - "Energy Efficiency and Energy Development", "Development of the Nuclear Energy Industrial Complex", and Corporate Innovation Development Programs (PIR).
The results of the study identify priorities for innovative development in the electricity, oil, gas and coal industries of the fuel and energy complex. The conclusions formulated will allow for a more effective innovation policy in the fuel and energy sector.

Keywords: fuel and energy complex, innovation and investment processes, fuel and energy complex development programs

Introduction

The fuel and energy complex (FEC) is a combination of companies working in oil and gas production, oil refining, system for transporting and distributing gas, oil and its products, various types of power plants, and transmission and distribution network for heat and electric energy. Russia occupies a leading position in the world in terms of development of the fuel and energy complex and it is one of the most stably working sectors of the country's economy. The importance of the fuel and energy complex in the Russian economy is obvious as it fulfills the following functions: ensuring domestic demand for fuel and energy resources; formation of the needs of the budget system of the country. The development strategy of the fuel and energy complex should provide for the fiscal needs of the budget system, with a gradual redistribution of the tax burden and a decrease of the fuel and energy complex indicators in the structure of the country's economy. All this indicates that the fuel

and energy complex occupies a special place in the system of social production, is an important factor in ensuring the country's security and a guarantee of further economic progress.

Research Results and Discussion

In 2017, the share of fuel and energy complex in Russia's GDP was 22.6%, in export - 58.9%, in federal budget revenues - 39.6%, [2. 8]. Therefore, Russian practice is of interest to other countries that seek to accelerate the innovative development of the fuel and energy complex and increase its importance in the national economy.

The source of development of the fuel and energy complex is innovation, and the source of sustainable development is constant innovation process. Consequently, the sustainable development of the fuel and energy complex in the near future will be based on the formation and implementation of innovative policies aimed at developing effective solutions to meet the needs of society in energy in the conditions of exhaustion of the most common types of fuel in domestic practice.

Effective organization of the innovation process does not provide for the existence of a single mechanism for its financial support and depends on the type of economic activity, production specialization, development programs, innovation goals, the amount of necessary costs, the timing of receipt of financial resources, and interest rates on borrowed sources of financing. These factors together affect the choice of sources of fundraising and the formation of the resource base for financial support of innovative processes in the fuel and energy complex.

Modern studies prove the relationship of long-term economic growth with the level of development of technological innovations and their implementation. By supporting the innovative activities of energy companies, the state thereby has the opportunity to influence a significant part of the national economy. In the fuel and energy complex, the state owns a significant share of the complex, in accordance with which there is a high degree of participation in the activities of this complex. Through the adoption of long-term development programs, the state realizes its economic and social targets.

Thus, the State Program of the Russian Federation “Energy Efficiency and Energy Development”, developed to be implemented until 2020, is aimed at achieving the goals of the state: providing the country with highly reliable energy resources; increasing the efficiency of their use; reduction of environmental impact during their production and transportation.

The importance of the State Program “Development of the Nuclear Energy Industrial Complex” should be noted. The program was developed to be implemented until 2020 and aimed at the innovative development of the nuclear industry.

The adoption of programs testifies to the state’s interest in research and development, technological modernization using modern achievements of world practice. To identify promising areas of scientific research and technology development, the forecast of scientific and technological development of the Russian energy sector for the period up to 2035 was developed and approved in 2016 by the Ministry of Energy of Russia [5, 6]**.** To ensure the processes of scientific and technological development of the fuel and energy sectors, substantial investment is required. In general, the volume of investments in the fuel and energy sector of the Russian Federation in 2015 amounted to about 3.1 trillion. rubles, in 2016 - 3.7 trillion. rub. (equivalent to 25% of total investment in the economy), in 2017 - 3.5 trillion rubles. As shown in Figure 1, investments in the Russian energy sector in 2008-2016, according to the Federal State Statistics Service, have continuously increased at current prices, but investment growth has begun to decline since 2013 [2, 8].

At the present stage, the main increase in investment is observed in the oil and gas production sector and in the provision of services in this area. For 2008-2016 the volume of investments in oil and gas production grew by almost 2.4 times (taking into account nominal prices) and reached 2.4 trillion

rubles. in 2016, mainly due to the implementation of projects in the north and east of the country, as well as in the offshore areas. In 2015—2016 the volume of investments in the oil and gas industry decreased significantly due to lower oil prices, which caused a drop in total investment in the fuel and energy sector. According to the International Energy Agency, in 2016, the volume of investments in the fuel and energy complex amounted to about $80 billion, and the country ranked fourth in the world after China and the USA and India [3, 9].

According to the Ministry of Energy of Russia, in 2018 the level of depreciation of the equipment of power plants amounted to 36%, and that of the major equipment and power lines as a whole - 25%, which indicates "satisfactory" and "good" technical conditions respectively. However, the growth rate of capital investment in the electric power industry since 2011 has been lower than investment in the country's economy as a whole.

The reasons for underinvestment in the Russian fuel and energy complex is the use of own funds of business entities as the main source of investment. The industry is not sufficiently attracting large resources from the capital market. The instability of the regulatory framework and the imperfection of the institutional environment and market infrastructure also hinder raising funds for the energy sector. The presence of a large number of administrative barriers, direct state price and tariff regulation in the electric power and gas industries negatively affects the investment climate in the industry.

Currently, the fuel and energy complex faces structural changes in production, including the transition to the development of reserves of unconventional oil and oil, which lies at great depths in dense rocks, which will accordingly lead to an increase in production costs.

In 2011, the Innovation Development Strategy of the Russian Federation was adopted, on the basis of which the Corporate Innovation Development Programs (IDP) were developed. These are strategic planning programs that are developed for a period of 5-7 years. They contain a description of the set of measures necessary to introduce and bring to the market new innovative technologies, products and services, as well as measures to modernize existing capacities and technological development of oil and gas companies. Each IDP company is guided by its business development strategy taking into account the main trends in the market environment, as well as national priorities for the country's technological development in the state strategic planning system. Currently, IDP is implemented by more than 60 companies that provide about 20% of Russian GDP, including PJSC Gazprom and PJSC Rosneft [4, 5].

The country has a "road map", a set of tools to support the innovative development of energy companies has been formed. One of such tools is the selection and implementation of effective projects of national importance. In 2015-2017 20 national projects on the introduction of innovative technologies and modern materials in the fuel and energy complex were approved. The use of domestic technologies with the use of Russian materials, components and equipment will stimulate the development in the country of not only the fuel and energy complex, but also heavy oil engineering [1, 13].

In 2016, the "Energy Net" road map and the "Intelligent Energy System of Russia" concept were approved, which envisages the modernization of the entire electric power industry of Russia in the next 15–20 years in order to achieve leading positions of Russian companies in the high-tech world energy markets. The development of technologies and intelligent services will ensure the transformation of business models of organizations that will change the structure of the electric power industry and increase its reliability and safety.

The Ministry of Energy of Russia, having approved the "road map" for introducing innovative technologies, has created a mechanism to stimulate innovative activity and introduce modern technologies in the fuel and energy complex. The largest Russian energy companies are gradually introducing digital and "intelligent" technologies, including those made in Russia which corresponds to the advanced world trends [12, 13].

In the oil and gas sector, the most promising areas of innovative development include technologies for increasing oil recovery, developing hard-to-recover oil reserves, including in the offshore zone, as well as technologies for producing liquefied natural gas and its transportation. According to expert estimates, the technologies of "smart wells" and "digital fields" can reduce the cost of operating fields by about 20% [6, 7].

In the coal industry, the biggest priority is the development of high-performance tunneling complexes and the use of modern means of remote control and monitoring of downhole processes, the use of effective methods and technical means to reduce methane and dust emissions.

Currently, work is underway in the electric power industry to increase the reliability of the functioning of national energy systems, which will be facilitated by the development of technologies for actively adaptive electric networks, the technological concepts of Smart Grid and Energy Net, the introduction of automated protection and control systems for electrical substations ("digital substations"), and a new electrical and electronic equipment, the use of new structural materials, including composite materials, etc. [10, 11]

In atomic energy, the state-owned Rosatom corporation has created an advanced digital Multi-D project management system that allows you to effectively manage all stages of the nuclear power plant life cycle.

Such a large-scale modernization of the fuel and energy complex will require substantial investments and support from the state. The main sources of investment in innovation can be enterprises, large corporations, small innovative companies, investment funds, innovation development funds, etc.

Prospective financing of the fuel and energy sector involves an increase in the share of external sources (budget allocations to investment programs that have national priorities, bank loans, foreign investments), which are used to a much lesser extent. In 2016, own funds accounted for 67% of the production of fuel and energy minerals, and 50% of the total funding in the production and distribution of electricity.

It is expected that as a result of the implementation of innovative investment measures, by 2020 the energy intensity of GDP will be reduced by 9.41% compared to 2007, the oil refining depth will increase to 85% and the annual oil and condensate production will stabilize at 548 million tons.

Conclusion

Thus, the sustainable development of the fuel and energy complex is a process of constant search and implementation of solutions to achieve a new equilibrium between the changed environmental conditions and the capabilities of economic entities to realize their national economic mission in the new conditions. Sustainable development is based on the unity of the following components: effective investment policy; optimal composition and interaction of the participants in the complex to coordinate interests and areas of action; constant innovation process.

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Development of A Concept to Improve the Quality of Life of The Region's Population Based on A Study of The Factors of Human Capital Development in The Conditions of Innovative Systems

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Abstract

The article identifies the problems of a comprehensive assessment of the results of managing innovative systems from the perspective of a systematic approach for the participants of the systems, describes the methodological approach to assessing the effectiveness of innovative systems from the perspective of the theory of human capital development, substantiates the possibility of achieving the goal - improving the quality of life of the population by increasing the quality of human capital. It is proposed in the article to use the resulting indicator - the quality of life of the population to assess the effectiveness of the innovation policy of the territories, an algorithm of the influence of innovation on the target indicators of the main components of the economic development of the territory with an expanded description of its stages is presented, factorial two- and three-dimensional models of the influence of the main components of the economic development of the territory on the quality of life of the population are developed, recommendations are given on the development of the innovative policy of territorial innovative systems.

Keywords*:* Innovation System, Human Capital, Quality Of Life Of The Population, Management Positioning Map.

Introduction

The modern model of socio-economic development, developed by the governments of the countries, is largely due to changes in the economic role of innovations, directions and mechanisms for the implementation of innovative processes laid down in official legislative documents and regulations for the sustainable growth of economies. Russia is objectively integrated into the global economy and the global scientific and technological space [Barro, R.J., 1996], [The Global Competitiveness

Report, 2018], [Fleurbaey, M., 2019]. But the level of this integration is not high enough yet. For the period 2010-2019, Russia, according to the Global Innovation Index, succeeded and rose from a place in the middle of the rating to a place in the first third of the rating of the countries observed. However, in 2010 Russia took 9th place in the ranking of the world economies of developed countries according to the UN data, by 2018 Russia's position fell to 11th, which indirectly confirms the long-term stagnation of the Russian national innovation system (NIS). Russia's GDP growth rate in 2018 amounted to 2.3%, with a global value of 3.0%. A peculiarity of managing the innovation sphere in Russia is predominant and insufficiently effective financing from the federal budget. Under the conditions of objective budgetary constraints, two interrelated tasks should be solved - actively attracting business funds to the field of science and innovation and increasing the profitability of relevant types of activities and sectors of the economy. All of the above does not provide impulses to the development of the Russian national innovation system (NIS) on the part of business. It should be noted that the Russian NIS is distinguished by the presence of gaps between science, education and business, a weak level of network cooperation as the basis for innovative growth in leading countries. The level of innovative activity of organizations oriented to international markets and directly determining the global competitiveness of the Russian economy is only 0.2 -0.3% from 2016 to 2018. According to the strategy of innovative development of the Russian Federation for the period until 2020, it was planned to increase this indicator to 2%. This task was set based on the high quality of human capital available in Russia, which is estimated to be higher than the general level of innovation activity (The Global Innovation Index) - 46th place, and in terms of the Global Qualified Professionals Index (The Hays Global Skills Index) - 27th place). All this testifies to the underutilization of the country's intellectual potential.

The aggregate indicator of the level of human development in the country according to the United Nations Development Program (UNDP) is the human development index, which is interpreted as a synonym for the concepts of "quality of life" or "standard of living". Between 2016 and 2019 Russia maintains a stable position in the international rating of human development at the level of 49-50 places among 188 countries. This situation indicates a stagnant state of the implementation of the state policy of socio-economic development of the country [Gokhberg, L, 2017] [Data on international ratings, 2020].

In recent years, a large number of regulatory documents have been developed in the Russian Federation aimed at achieving new qualitative and quantitative indicators of sustainable economic development. For example, the goal was set - to enter the top five leading economies in the world. Despite the fact that institutional conditions were created to achieve ambitious goals, this did not significantly change the competitiveness of the country's economy at the international level.

In this regard, the relevance of the research topic lies in the scientific and practical importance of the formation and development of technologies for managing innovative systems of various levels within the framework of the concept of competitiveness of territories, allowing for the long term to create conditions for sustainable economic growth, ensuring an increase in the quality of life of the population in all its aspects [Meissner, D., 2019]. In the world and domestic practice, with the abundance of available points of view regarding the problems of developing innovative systems, there is still no consensus on the categorical apparatus that would show all participants of these systems the importance of innovation as a necessary condition for improving the quality of life of the population.

In our opinion, ensuring the existing needs of participants in innovative systems interested in obtaining reliable information resources on the results of the effectiveness of applied technologies for managing innovative systems cannot be achieved for several reasons. They are associated with the lack of complete, reliable, timely, accessible statistical information in the context of objects of research; the lack of a methodology and a comprehensive assessment of the results of managing innovative systems from the perspective of a systematic approach; the lack of an approach to taking into account the influence of the level of innovative development of systems of various levels on the achievement of one of the national goals of the country - improving the quality of life of the population while maintaining macroeconomic stability.

Materials and Research Methods

The purpose of the study is the development of a methodological approach to assessing the effectiveness of innovative systems from the perspective of the theory of human capital development.

The object of research is the innovation system of the Russian Federation, which implements the state innovation policy.

The subject of the study is the factors of human capital development in the context of innovative systems of various levels within the framework of the concept of improving the quality of life of the region's population.

The methodology of work is based on foreign scientific works (G. Becker, I. Ansoff, P. Drucker, S. Kuznets, R. Nelson, D. North, R. Solow, C. Freeman, J. Schumpeter, S. Young and other authors) and domestic scientists (V.V. Ivanova, V.L. Makarov, G.G. Malinetsky, T.E. Kuznetsova, L.E. Mindeli, L. Gokhberg and other authors) dedicated to the formation and development of human capital, development of innovative systems and assessment of the effectiveness of their management to ensure innovative development and increase competitiveness of socio-economic systems.

The methodological basis of the study was a complex of general scientific and special methods of cognition. In the course of the study, such general scientific methods were used as: analysis, synthesis, generalization, historical, graphic method; special methods of cognition: formal-logical method and specific sociological.

Research Results and Discussion

An analysis of the definitions of "innovation system" proposed in scientific papers as applied to the research topic allows us to state that the innovation system can be considered as a set of subjects and objects of innovative activity that interact in the process of creating and selling innovative products and carry out their activities within the framework of the innovation policy pursued by the state. Given the current state innovation policy, it is assumed that all territories should be considered as innovation systems. The innovation system is characterized by a certain structure, its degree of orderliness and connections in accordance with the concept of open innovation. According to this concept, the innovation system is represented vertically as a three-level system (national, district, subject), and horizontally it is defined as an innovative platform that unites participants taking into account their mutual interests, within which innovation is synthesized using a dynamic and adaptive mechanism that generates, consuming and transforming innovation into innovative products.

In addition, the innovation system is influenced by environmental factors, which include market, infrastructure, cultural, knowledge and institutional conditions [Sveiby, K.E., 1997]. In these conditions of development of innovative systems, there is an objective need to study the specifics of innovative processes in the framework of the formation of the information society to justify their impact on the final result according to key indicators characterizing the achievement of the goals of the system. To assess the effectiveness of the innovation system, a level of competitiveness is used, which shows the degree of effectiveness of the creation, transfer and maintenance of customer value [Suvorova, A.P., 2017].

When exploring approaches to the formation of state innovation policy in the framework of the sustainable development model, it is necessary to proceed from the priority of the national goal - ensuring the quality of life of the population, which is determined by three aspects: the well-being of the population, the accumulation of human capital, and the level of human development. The well-being of the population is characterized by the achievement of a certain level of provision of the population with tangible and intangible goods. It is customary to distinguish three qualitative levels of well-being of the population: the first - sustainable satisfaction of the primary human needs, ensuring a normal level of life; the second is the achievement of material wealth, in which there is a saturation of primary needs; the third is the optimal, individually-oriented type of satisfying human

needs [Santalova, M.S., 2016]. The accumulation of human capital in terms of its ability to reproduce social capital, which can be characterized by the state of public health, educational, professional and cultural parameters [Rudenko, S.A., 2019]. The concept of "human development" as an indicator of the quality of life of the population is assessed in cross-country comparisons and is characterized by the possibility of fulfilment of a person through demographic, medical, environmental, and intellectual conditions of their existence and personal fullfillment, as well as the possibility of integrating individuals into society [Alimova, E.F., 2010].

The concept that combines the effectiveness of the innovation system with its results is the theory of intellectual capital. Despite a significant amount of research on intellectual capital, this theory is still considered to be undeveloped due to the lack of a unified understanding of the essence of this capital and approaches to its assessment. Researchers define different categories of human and intellectual capital [Novgorodov, P.A., 2017]. Most researchers interpret the category of intellectual capital as potential, which implies the possibility of obtaining a useful result through the use of this capital. Another fairly common approach to the essence of the category of intellectual capital is its understanding as a resource, and only a small part of researchers consider such capital as a result.

Moreover, all scientists engaged in research on the concept, essence and structure of intellectual capital are unanimous in their opinion that human capital is a structural element of intellectual capital.

In our opinion, the formation of intellectual capital as a result is preceded by the formation of resources, as well as capacity building and use (Figure 1). The resources should include human and labor resources as the physical presence of the population in a certain territory. The potential includes: firstly, the part of the population involved in the production of goods and services is economically active population; secondly, human capital, as a person's potential ability to generate income, which is ensured by an increase in the level of education, qualifications, employee health, and the formation of innovative skills and competencies. The result is intellectual capital, considered as qualifications, competencies, technologies, intellectual property, corporate culture and communication channels that can create added value and provide competitive advantages, high quality of human life. In the categories considered, a hierarchical vertical is clearly traced, the categories are interdependent, with each previous category being the basis for the next category. Each subsequent level of capital formation is formed by the increment of certain components, allowing you to go to the next stage of formation of intellectual capital [Sasani, Ali, 2012].

The basis of the hierarchy of constructing categories are human resources, as a set of qualities and characteristics of a person, which is the source of his ability to work of a certain kind. The scheme presented in Figure 1, in our opinion, combines all the categories we have examined into a single process of reproduction of this capital, which is reflected by the upward arrow from human resources to the top of the pyramid - intellectual capital. The reverse arrow in Figure 1 directly illustrates the process of reproduction of intellectual capital from resources.

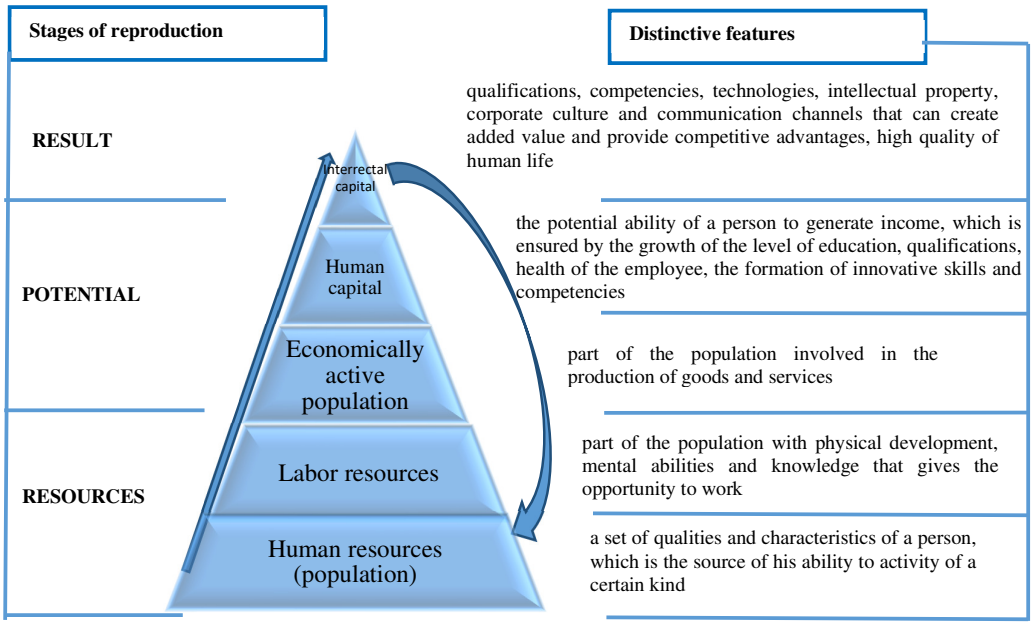

Fig 1: The relationship of the categories that form the intellectual and human capital

For the intensive growth of the country's intellectual capital in order to ensure a high quality of life for the population, at each stage of the reproduction process, managerial innovative solutions are necessary within the framework of an innovation system of different levels [Suvorova, A.P., 2019]. Thus, since 2007, in accordance with Federal Law of December 29, 2006 No 256-FZ "On Additional Measures of State Support for Families with Children" [Federal Law, 2006], in order to create conditions providing families with children with decent life standards, they are building up human resources through increased fertility. At the stage of the formation of labor resources in Russia, for example, a migration policy is implemented that focuses on attracting highly qualified specialists and educational migrants [President of the Russian Federation, 2012]. The pension reform of 2019-2028, providing for a gradual increase in the retirement age, also contributes to an increase in the mass of labor resources [Federal Law, 2018]. All of the above measures of state policy allow us to form the resource base of intellectual capital.

The next stage of reproduction is related to capacity building based on the formed labor resources. The increase in the economically active population is facilitated by the implementation of state policy in the field of employment. However, it is human capital that is the fundamental potential of Russia's innovative growth through the formation of intellectual capital. The mechanisms that ensure the growth of competitiveness of the domestic national innovation system were laid down by the state in the Strategy for Innovative Development of the Russian Federation in 2012 [Government of the Russian Federation, 2011]. The state played a leading role in ensuring the implementation of innovation policy, creating an innovative field, using the development of the institutional environment and a system of tools and regulators, including support for the interaction of science and business, innovative infrastructure of universities, the creation of technological platforms, the development of innovative development programs for companies with state participation and others. Achieving the goal of the quality of life of the population is ensured by many factors (table 1), the main of which is improving the quality of human capital, which, in turn, is achieved through the sustainable development of institutions of the innovation system at various levels.

In order to implement the social functions of innovation and increase the degree of public involvement in the innovation process, improving the quality of human capital contributes to the formation of a creative class that, through the development of innovative thinking and culture through entrepreneurial initiatives, leads to the construction of a knowledge economy and a transition to the resulting level - intellectual capital. In Russia, it is possible to single out areas of the economy where

significant increments of intellectual capital have occurred: nuclear energy, space, and weapon technologies. The direct development of innovative systems in the given institutional conditions occurs through an increase in intellectual capital (Figure 2).

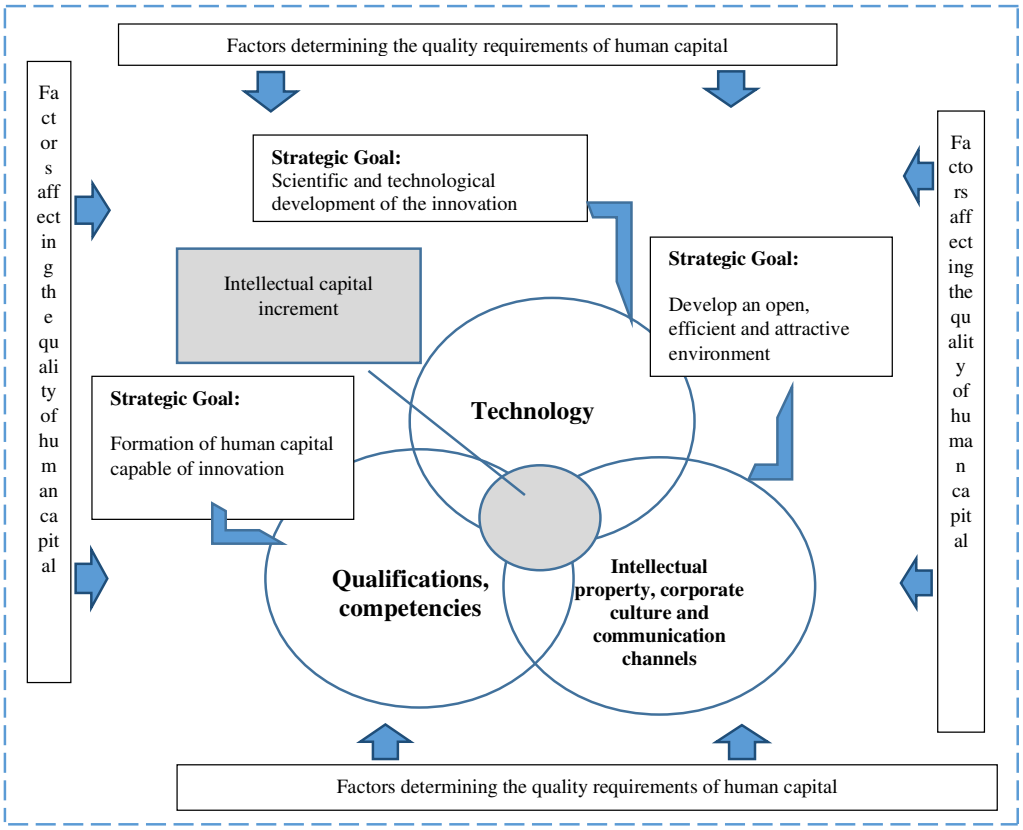

Fig. 2: Intellectual Capital Development Model

In order to identify the opportunities (potential) that allow ensuring the quality of human capital to meet the needs of the reproduction of innovative systems of different levels, it is necessary to determine the factors of the institutional environment for the development of innovative systems that determine the requirements for the quality of human capital and also affect the quality of human capital (table 1).

Table 1: Factors of the institutional environment for the development of innovative systems

Innovation system levels	Factors determining the requirements for the quality of human capital	Factors affecting the quality of human capital
National	Strategic national goals and development goals Current level of innovation development Level of technological development Legal regulation	Income and expense policy Health care system Education system Priorities for scientific and technological development Labor market Population policy Migration policy Pension system

		Living conditions Inequality and poverty Family, motherhood and childhood Criminality Level Ecology Partnership for sustainable development
District	District Development Strategy	Inequality and poverty Partnership for sustainable development
Subjective	Subject Development Strategy Level of technological development Features of institutional development	Income and expense policy Education system Priorities for scientific and technological development Population policy Entrepreneurship support Ecology Infrastructure development Partnership for sustainable development

Assessment of factors affecting the quality of human capital should be carried out: firstly, in order to study the impact of innovation on the possibility of ensuring an increase in the quality of life of the population of the territories; secondly, to determine the existing differences in the level of innovation within the framework of the concept of competitiveness of territories; thirdly, to justify the impact of innovation on the achievement of target indicators of the main components of the economic development of the territory.

Studying the impact of innovation on ensuring an increase in the quality of life of the population at each of the three levels is difficult due to objective reasons due to the lack of statistical information by factors. In accordance with the sustainable development goals of the countries, the Federal State Statistics Service (Rosstat) in the Russian Federation developed a project of the list of national indicators of sustainable development goals [Rosstat, 2020], [Sustainable Development Agenda, 2020]. Data collection on the levels of aggregation of official statistical information should be carried out according to national and subject innovation systems. In fact, the published collection "Sustainable Development Goals in the Russian Federation" [Rosstat, 2019] reflects information on indicators of achieving the sustainable development goals in the Russian Federation both for internal use (for the national innovation system) and international comparisons between countries. Data presented in the collection allow us to assess the current state of the dynamics of sustainable development of the country. It is not possible to compare the results of achieving the sustainable development goals with other CIS countries, BRICS and some OECD countries, since the point data for individual indicators are presented from 2015 to 2019.

In Russia, a number of national and federal projects (programs) have been developed and are being implemented in accordance with Decree of the President of the Russian Federation dated May 7, 2018 No. 204 "On National Goals and Strategic Tasks of the Development of the Russian Federation for the Period until 2024" [President of the Russian Federation, 2018]. Rosstat drew up a collection of methods for calculating indicators of national projects (programs), calculated as part of the implementation of this decree [Rosstat, 2018]. The study of this document allowed us to ascertain that the proposed indicators are calculated by industry ministries and Rosstat at the federal level as a whole for the Russian Federation on an annual basis. Thus, the problems of the methodology of statistical support for the adoption of managerial innovative decisions, which should form the invariance of all participants in the perception of innovative systems of different levels of the current state of innovative development and the quality of life of the population do not allow successfully implement public policy in this area.

The existing theory and practice of assessing the socio-economic development of territories of any level allows us to judge that in most cases the emphasis is on either the economic or social

component of economic development, thereby limiting the coverage of existing problems in these areas of development.

In our opinion, to justify the impact of innovation on the achievement of target indicators of the main components of the economic development of the territory, it can be represented by the following stages:

- assessment of the level of innovative development of territories;
- assessment of the quality of life of the population of the territory;
- assessment of the level of economic development of the territory;
- building a two-dimensional model “Quality of Life - Innovation”;
- building a three-dimensional model “Quality of life - Level of economic development - Innovation”;
- development of directions of strategic management decisions based on the analysis of the obtained model results.

In international practice, different approaches are used to assess the level of innovative development of territories. In practice, the index method is most often used, which allows you to calculate innovative indices by forming a system of indicators for the development of innovative processes and their regulation within the framework of regional innovation systems. In the practice of assessing the level of innovative development of the United States, the Portfolio innovation index (PII) technique is used [Statsamerica, 2009]. Based on the Portfolio innovation index, more than 3,000 areas within the United States are analyzed and five groups of territories are identified. With the aim of informing the innovation policy at the regional level, the European Commission applies the regional innovation development rating development model Regional Innovation Scoreboard (RIS) [Hollanders, H., 2019]. The structure of the Regional Innovation Scoreboard and Portfolio innovation indexes is such that they combine both innovation resources and their results.

In the domestic practice of assessing the level of innovative development of the territory, a methodological approach is applied, developed by the Association of Innovative Regions of Russia together with the Ministry of Economic Development of the Russian Federation in 2012 [AIRR, 2012]. The AIRR model includes a system of indicators grouped in 4 blocks: research and development, innovation, socio-economic conditions of innovation and innovation activity in the region. According to the authors of the approach, the rating reliably reflects changes in the innovative development of the economy of the constituent entities of the Russian Federation, since it is scientifically substantiated and built primarily on the basis of official statistics and is used as a tool for managing the regional innovation system. The results of assessing the level of innovative development of the territory allow the regional authorities to obtain the necessary information for making strategic decisions regarding the further development and improvement of innovative systems and the dynamics of changes in all directions reflected by indicators. One of the important components of the Association’s work is the exchange of regional experience in creating a favorable economic, social, legal, educational and creative environment for the development of innovations. In addition, the work of the Association contributes to the effective innovative development of its members, built on the recognition of various models of scientific and technological growth of the regions. Despite the practice-oriented nature of the AIRR methodology for assessing the level of innovative development of territories, the results of regional assessments are weakly related to the achievement of one of the national goals countries - improving the quality of life of the population.

To assess the quality of life of the population of the territory, data from the Russia Today International Information Agency, the largest Russian information provider for an international audience, are used. The agency draws up ratings of the constituent entities of the Russian Federation on various aspects of the country's socio-economic development and is one of the authoritative experts in this field [Agency "Russia Today", 2020].

Assessment of the level of economic development of the territory is carried out by the Federal State Statistics Service on a regular basis and can be used by researchers to assess different parties.

To assess the effectiveness of managing a regional innovation system aimed at achieving the national goal of improving the quality of life, by building an innovative institutional environment, a strategic toolkit — a management map — in the form of the matrix model "Quality of Life - Innovation" can be used. Such a model can be represented in the form of a coordinate system in which the X-axis shows the indicators of the rating of innovative development of regions, and the Y-axis shows the indicators of the quality of life of the population of the constituent entities of the Russian Federation, the factor sign is the innovativeness of the subject, and the resultant sign is the quality of life of the population.

As an information base for building the map, we used the ratings of innovative development of the AIRR regions for 2016-2018 and the ratings of the regions of the Russian Federation in terms of quality of life for 2016-2018 of MIA Russia Today. The object of the research is the innovative systems of the Central Federal District and the Siberian Federal District, since they are two types of development of the economic systems of the Russian Federation, namely, industrial and raw materials.

Management cards "Quality of Life - Innovation", based on data for 2016-2018, are presented in Figures 3, 4.

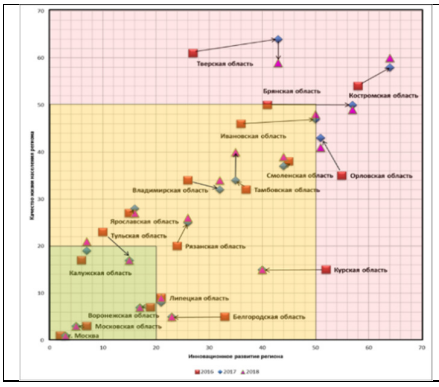

Fig 3. Map "Quality of life - Innovation" for the regions of the Central Federal District, 2016-2018

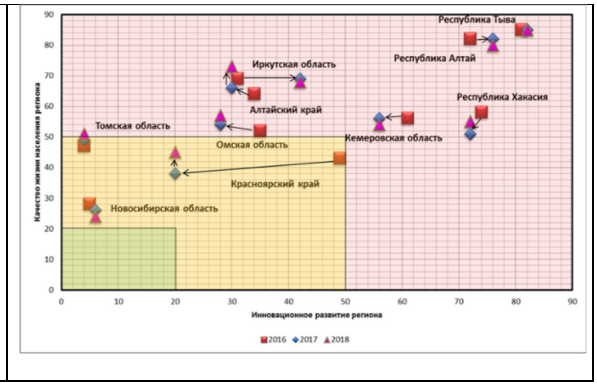

Fig 4. Map "Quality of life - Innovation" for the regions of the Siberian Federal District, 2016-2018.

The management card is designed on the basis of a systematic approach, which allows us to argue that any single problem - improving the quality of life - should be tied in conjunction with solutions to another problem - the level of innovative development of the region - focused on achieving the best socio-economic results, namely increasing the competitiveness of the region.

The position of the region on the management map allows us to assess the effectiveness of the innovation policy pursued by the regional authorities in dynamics and the competitiveness of the region in its impact on the quality of life of its population. The positioning of the region is determined by the minimum values on each coordinate axis, since the management map is based on rating estimates. Three authors zones of regional positioning: leading regions are "green", middle regions are "yellow" and weak regions are "red", which allows was visually assess the degree of success of the innovative development of the territory.

The approach used makes it possible to conclude that the innovation policy pursued by regional authorities has a significant impact on the level of innovative development of the territory with the ability to achieve the goal - to ensure a high quality of life for the population. Thus, the top 4 in terms of innovative development, through which a high standard of living of the population of the Central Federal District is ensured, is Moscow, Moscow Region, Voronezh Region and Kaluga Region. The green zone regions remain stable during the period under review. The arrows on the management map show the direction of the change in the position of the region from 2016-2018. For example, the

Tula region from the “yellow” zone in 2016 moved to the “green” in 2017-2018. However, improving the quality of life was provided not by increasing the innovative activity of the region, but by other factors. Note that for a full analysis of the effectiveness of the state innovation policy of the region, it is necessary to use additional factor attributes to analyze the socio-economic situation of the territory and study the assessment of their impact on the quality of life of the population. In the Central Federal District, the quality of life of the population in most regions for the period under review decreased, which indicates the insufficient attention of the authorities of this level to the issue of innovative development of the district.

An analysis of the positioning of the regions of the Siberian Federal District on the management map made it possible to conclude that none of the regions fell into the green zone, despite the presence of two large scientific and technical centers in the Tomsk and Novosibirsk regions and large reserves of natural raw materials. Note that in this district, the position of almost entities remains stable, maintaining positions in the "red" zone. The exception is the Krasnoyarsk Territory, which has improved its position in the ranking of innovative development of regions by 12 positions, but remained within the "yellow" zone. Presented on the two-dimensional matrix model “Quality of Life - Innovation”, the relationships and the mutual influence of the levels of innovation of the region and the quality of life of its population can be used by regional authorities to develop alternative options for strategic development.

In our opinion, the most complete idea of the possibility of strategic innovative development is provided by the construction of the three-dimensional model “Quality of Life - Level of Economic Development - Innovation”. The three-dimensional model includes the indicator "Gross Regional Product (GRP) per capita", which allows you to evaluate the economic component of socio-economic systems. In this model, the factor signs are “innovative development of the region” and “GRP per capita of the region”, and the resulting “quality of life of the region’s population”. By analogy with the two-dimensional model, three zones of regional positioning are distinguished: “green” - leaders, “yellow” - medium, “red” - weak.

The three-dimensional models “Quality of Life - Level of Economic Development - Innovation”, constructed for the Central Federal District and the Siberian Federal District for 2017, are presented in Figures 5 and 6.

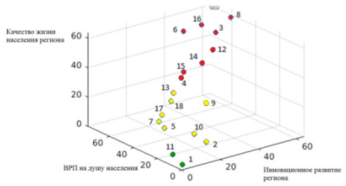

1- Moscow, 2 - Belgorod region, 3 - Bryansk region, 4 - Vladimir region, 5 - Voronezh region, 6 - Ivanovo region, 7 - Kaluga region, 8 - Kostroma region, 9 - Kursk region, 10 - Lipetsk region 11 - Moscow region, 12 - Oryol region, 13 - Ryazan region, 14 - Smolensk region, 15 - Tambov region, 16 - Tver region, 17 - Tula region, 18 - Yaroslavl region

Fig. 5. Three-dimensional model “Quality of life - Level of economic development - Innovation” for the regions of the Central Federal District, 2017

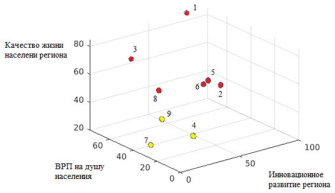

1-Republic of Tuva, 2-Republic of Khakassia,
3-Altai Territory, 4-Krasnoyarsk Territory, 5-Irkutsk Oblast, 6-Kemerovo Oblast, 7-Novosibirsk Oblast, 8-Omsk Oblast, 9-Tomsk Oblast

Fig. 6. Three-dimensional model “Quality of life - Level of economic development - Innovation” for the regions of the Siberian Federal District, 2017

With the introduction of another factor in the model for the Central Federal District, only Moscow and the Moscow Region, Voronezh Region and Kaluga Region moved to the “yellow zone” as the leading regions. Thus, only Moscow and the Moscow Region provide high quality of life for the population of these territories with production volumes. If in the two-dimensional model only four

regions were represented in the “red” zone, then in the three-dimensional model their number increased to eight. The same trend continues for the regions of the Siberian Federal District.

So, a three-dimensional model using an indicator of the economic component of socio-economic systems allows a more objective assessment of the influence of model factors on the quality of life of the region’s population. This model, built over several years, allows us to analyze the dynamics of changes in the positioning of the region and, based on its results, allows us to develop alternative options for strategic management decisions by regional authorities. Of course, the factors of the model should be considered as opportunities for software solutions in the development of the territory and improving the quality of life of the population.

Communication and mutual influence of the level of economic development, the level of innovativeness of the region and the quality of life of its population, presented on two- and three-dimensional models, can be used in the development of managerial decisions within the framework of the development strategy of the region as a whole. Depending on the choice of management methods and models, managerial relations in the implementation of innovative activities and interaction mechanisms of participants in the innovation system, the regional leadership may generate solutions to the problems identified. For example, it is recommended to use information and institutional management methods to influence the awareness of participants in the innovation system; for choosing the direction of strategic changes in the region’s policy, it is necessary to determine the position of the region Compared with other regions - competitors and study the experience of the leading regions and closest competitors on the basis of benchmarking techniques.

Conclusion

The presented study reveals a relevant topic for the Russian Federation in the study of factors of development of human capital in the context of innovative systems to improve the quality of life of the population. The relevance of the topic is explained by the fact that the dynamics of the economic and innovative development of the country does not allow achieving the national goals declared by the state and the expected results of development strategies. One of the reasons for Russia's lagging behind the leading countries of the world is revealed - the underutilization of the country's intellectual potential.

The study of approaches to the formation of state innovation policy in the framework of the sustainable development model showed the inadequacy of a systematic study and full analysis of the process of reproduction of intellectual capital in order to increase it. In the work, a model for the development of intellectual capital in the conditions of innovative systems of different levels was proposed.

The factors of the institutional environment for the development of innovative systems have been identified that determine the requirements for the quality of human capital, as well as affect the quality of human capital in order to identify opportunities for moving to another level - intellectual capital.

It is proved that the assessment of factors affecting the quality of human capital cannot be fully realized due to the problem of the methodology of statistical support for making innovative management decisions. The classification of regions by positioning of regions in the innovation field is formed. The algorithm presented in this paper for assessing the impact of innovation on achieving the target indicators of the main components of the economic development of the territory will allow regional authorities to use the results in the development of managerial decisions in implementing the regional development strategy.

This problem is seen as a promising area of scientific and applied research.

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Methodological Support For Inventory Accounting And Internal Control In Construction Organizations

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Abstract

Accounting and internal control in organizations in the construction industry is one of the problem areas of modern control and accounting. The tasks of accounting in organizations in the field of construction include: the formation of complete and reliable information about an organization's activities, its property status, the provision of necessary information to internal and external users and the prevention of negative business results. Meanwhile, the possibility of high-quality and effective accounting and internal control of stocks depends on the presence or absence of methodological support in a construction organization.

This study develops the theory of methodological support of accounting and internal control of stocks in construction organizations. It interconnects the process of accounting and internal control of reserves in construction organizations, discloses the tasks and procedures of internal control, the measures of methodological, regulatory internal control of reserves, regulatory documents.

Keywords: Stock Accounting, Internal Control, Stocks, Accounting Methods, Accounting Records.

Introduction

The issues of accounting and control of activities have always been relevant not only at the level of managerial interaction but also at the legislative level, the process of organization and internal control of activities of construction organizations are very important and are considered in various aspects from the point of view of historical experience, practical activities in modern conditions and those trends that modern market dictates to us. The desire of a construction organization for stability, for reducing the possible risk draws special attention to the reliability of internal control and accounting systems all over the world. This issue is considered both in foreign studies and in the domestic system and has been developed in the works of many scientists and practitioners.

Materials and Methods

The object of the study is the practice of accounting and internal control of stocks in construction organizations of the region.

The subject of the study is the theory and methodology of accounting and internal control of stocks in construction organizations.

The results of studies that reveal the specifics of managing inventory are presented in the works of domestic scientists: Yu.A. Babaev, A.S. Bakaev, K. Drury, I.B. Laninai, S.A. Nikolaeva, Ya.V. Sokolov, O.V. Solovieva, and other authors.

Foreign authors such as A. Apcherch, E. Atkinson, J. Brimson, R. Garrison, C. Drury, D. Ryan, J. Foster made a significant contribution to the development of scientific methodological support for managerial accounting and internal control.

A significant contribution to the development and establishment of domestic audit, the study of the theory and methodology of its implementation, development and improvement of internal standards was made by Russian scientists and practitioners: Brovkina N. D., Burtsev V.V., Korotkova A.V., Marenkov N. L., Melnik M.V., Ovsiychuk M.F., Petrov V., Podolsky V.I., Pugachev V.V., Sheremet A.D.

More substantive issues of organization and conduct of internal control and internal audit are considered in the works of Andreev V. D., Bogomolov A. M., Burtsev V. V., Vasiliev N. E., Gordienko A. V., Labyntsev N. T. , Makalskaya A.K., Melnik M.V., Reutov V. Yu., SoninA.M., Sotnikova L.V., Shchadilov S.N., ShcherbakovV.V., Podolsky V.I., Sotnikova L.V., Savina N.V., Sokolov P.A., Kisilevich T.I., Khachemizova E.N. A large contribution to the theoretical and practical research and development in relation to the construction industry in terms of internal control and internal audit and accounting was made by: Avrova I.A., Adamov N.A., Artyomenko I.O., Baranovskaya, N.I., Danilov M.V., Zelenskaya T.M., Kasyanova, G.Yu., Kucherenko S.A., Ovsiychuk. M.F. Podolsky V.I., Sotnikova L.V.

At the same time, legal regulation of internal control in construction is not adequately covered in the scientific literature.

The methodological basis of the study is the principles and rules of accounting and internal audit of reserves, the works of domestic and foreign scientists on the theory and methodology of accounting and internal audit of reserves, the legislation of the Russian Federation and regulatory legal acts of accounting and internal audit of reserves.

Research Results and Discussion

In order to create an effective system of internal control, it is necessary to organize a system of accounting for reserves in accordance with applicable law and taking into account the specifics of economic activity. Assessment of the accounting system and internal control of construction organizations in the region showed the following problems:

- inventories of productive reserves and stocks are carried out formally, not always actual accounting data are recorded in the inventory sheets ;
- data on the movement of inventories are not reflected in a timely manner, which does not contribute to the high-quality planning of the purchase of productive reserves and sometimes leads to a halt in production;
- materially responsible persons do not always keep records of stocks in warehouses, material reports are compiled on the basis of accounting data, which can lead to fraudulent actions by both materially responsible persons and by accounting employees and managers;
- the workflow schedule is not observed while inventories are moving.

Without eliminating the above mentioned problems, it is impossible to establish effective systems of accounting for reserves and internal control in construction organizations. In this case, special attention should be paid to the methodological support of accounting and internal control of reserves.

The composition of the methodological support for accounting of inventories of construction organizations should include such basic units as: synthetic and analytical accounting, documenting and control of stock movements.

The main document governing the accounting of inventories in construction organizations is the accounting policy of an organization.

When forming the methodological section on inventory accounting in the accounting policy of a construction organization, special attention should be paid to the accounting methodology and the application of the chart of accounts.

The chart of accounts and Instructions for its application (approved by Order of the Ministry of Finance of the Russian Federation No. 94n of October 31, 2000) and PBU 5/01 "Accounting for material and production costs" established that the actual costs of acquiring material resources can be not only the amounts paid directly to the supplier, but also all other expenses that are directly related to the acquisition of material resources (information and consulting services, customs duties and fees, intermediary services, insurance, costs of maintenance of an organization`s supply unit, material interest for the use of borrowed funds charged before acceptance for accounting, the cost of bringing the inventories to a suitable for use state, etc. [3].

The indicated additional expenses for the acquisition of material resources can either be preliminarily collected on account 16 "Deviations in the value of material assets" or directly debited to account 10 "Materials" on direct grounds. One of these methods for all materials or for certain groups of material resources should be fixed in the accounting policies of the organization.

In addition, account 16 “Deviations in the value of material assets” can be used even in accounting for materials on account 10 “Materials” at actual cost to reflect difference in amount when paying for materials, the cost of which is expressed in conventional monetary units. In this case, account 16 takes into account only the total differences that arose prior to the adoption of material resources for accounting. This feature can also be taken into account when adopting accounting policies for accounting purposes.

To summarize information about the availability and movement of raw materials, other materials, fuel, spare parts, containers and the like belonging to the enterprise, account 10 “Materials” is intended.

Depending on the accounting organization adopted at the enterprise, the receipt of materials can be reflected either at planned (accounting) prices using accounts 15 “Procurement and procurement of materials”, 16 “Deviation in the cost of materials” or without their use, at actual costs of acquisition without value added tax and other recoverable taxes.

When choosing a method of accounting for tangible assets being on the way, you need to pay attention to the transfer of ownership of acquired tangible assets. The supply contract may provide for a different procedure for transferring ownership of material values. Depending on the procedure established by the contract, tangible assets belonging to the organization but not received by an enterprise may be taken for accounting for separate sub-accounts of account 10 “Material valuables in transit” in the valuation provided by the contract. At the moment of actual arrival of material assets to the warehouse, there is a “transfer” according to subaccounts and a cost adjustment in accordance with the actual data of settlement documents of material resources suppliers.

The accounting policy, as a rule, indicates that the procedure and terms of creation of primary accounting documents and their transfer for reflection in accounting are determined by the schedule (chart) of document circulation approved in the established manner. At the same time, it is advisable to separate the schedule (chart) of the workflow into a separate document and approve it as an application to the accounting policy of an organization for accounting purposes.

The actual workflow graph reflects the workflow system that has been developed in a construction organization.

The schedule includes a list of works on the creation, verification and processing of each of the primary documents, journals, books of records, consolidated documents, accounting registers and financial statements of a parent organization, separate structural units and an organization as a whole; departments (employees) responsible for this, indicating their relationship and timeliness of work.

Using a workflow schedule in enterprise management allows to reduce labor costs for processing documents at an enterprise due to:

- increasing the responsibility of performers for meeting deadlines for the preparation and processing of documents;
- identification and exclusion from the document flow of unused (redundant) documents (especially with regard to consolidated documents and accounting registers).

On the clarity of the scheduling of workflow to a large extent depends the timeliness of obtaining information for the needs of management of a construction organization.

The workflow schedule is the most important organizational regulation, ensuring the creation of a harmonious accounting organization system at an enterprise, a means of improving the quality of accounting service and, in general, financial and economic activities of a construction organization and a means of servicing the workplace.

As a means of servicing the workplace, the workflow schedule ensures the rhythm of the work of accounting workers at each workplace and the service as a whole, the performance of work within the established working day duration.

As a means of improving the quality of work of an accounting service and, in general, financial and economic activities of a construction organization it ensures the timely compilation and submission of accounting and statistical reports to established addresses, timely receipt of accounting information for the operational management of an organization.

The regulatory documents governing the organization of accounting workflow can be divided into the following groups:

- governing the general principles of accounting workflow organization;
- regulatory features of the workflow of primary accounting documentation regarding the application and filling out industry-standardized forms;
- regulatory features of the workflow of primary accounting documentation regarding the use and filling out unified forms (without industry);

The technology for processing accounting information to a great extent depends on the form of accounting independently selected by a construction organization. The selected form of accounting is fixed in the accounting policies of an organization for accounting purposes and is used continuously. A change in the form of accounting is formalized by making appropriate changes to the accounting policies of an organization.

Thus, the methodological support of inventory accounting in a construction organization is achieved by developing an accounting policy for the financial year and mandatory annexes to it (working chart of accounts, workflow schedule, provision for inventory of assets and liabilities, provision for internal control of a construction organization).

Construction organizations independently develop a procedure for organizing internal control in accordance with the requirements of current legislation and based on the features of functioning and requirements of managing an organization and sale of goods (works, services). When creating an internal audit service in an organization, its work is carried out in accordance with the regulation on this service, approved by the head of a construction organization.

In order to effectively organize internal control of reserves, it is necessary to ensure:

- accountability of some workers to others;
- internal checks and reconciliations of interrelated data on financial and economic activities of an organization, including the movement of stocks;
- regular inventory of stocks;
- continuous monitoring of the state of primary, analytical and synthetic inventory accounting;
- restriction of access to assets and records;
- monitoring of computer information systems and applications;
- regular operational analysis of stock movements.

The accountability of some workers to others is regulated by job descriptions based on professional standards, the structure of the construction organization and the regulation on internal control.

Internal audits and reconciliations of interrelated data on financial and economic activities of an organization, including movement of stocks, are regulated by the internal stock control program. We recommend the following program of internal control of stocks in construction organizations:

- correctness of registration of information on inventory and productive reserves and reflection of these results in the inventory accounting;
- validity of prices for purchased raw materials;
- accuracy of determining and writing off of the costs of used reserves;
- carrying out measures to calculate the limit standard for the volume of consumption of inventories per 1 ruble of the volume of sales of products (works, services), as well as a factor analysis of actual deviations from it;
- correctness of the synthetic and analytical accounting of inventories;
- conformity of the methods used by the Company for valuation of certain groups of material assets upon their disposal with the methods provided for by the accounting policy;
- correct procedure for writing off deviations of actual expenses for the acquisition of material assets from their accounting price (when using accounts 15 and 16);
- correctness of the write-off of the trade margin related to the goods sold.

Regular inventory of the stock contributes to the safety of the stocks of a construction organization. Inventory of stocks is carried out in accordance with the regulation on inventory of assets and liabilities and the inventory plan approved by the head of a construction organization.

Continuous monitoring of the state of primary, analytical and synthetic inventory accounting is achieved by conducting internal control procedures, which should be reflected in the analytical procedures. This is primarily a comparison of the data of primary documents with the data of accounting registers and indicators of financial statements.

When participating in the inventory of reserves of an internal controller, the following actions should be performed:

- request analytical accounting data for the MPZ in the context of the MOT, locations (units) with an indication of their types and cost;
- establish whether there are written instructions for conducting an inventory of stocks. If so, a copy of these instructions should be attached to the questionnaire;
- make sure that the requirements are reflected in the instructions for organizing an inventory of stocks, the order and control over its implementation comply with regulatory documents and the features of a construction organization;
- identify the responsible persons for the inventory;
- check the staff of permanent and working inventory commissions, a document on the commission composition (order, resolution, order);
- make sure that the materially responsible person is not included in the inventory

commission;

- familiarize yourself with the procedure adopted at an enterprise for assigning stockpile stock numbers;
- make sure that all materially responsible persons have concluded agreements on material liability;
- get a copy of the inventory for the internal control service;
- make sure that all members of the commission are present during the inventory;
- make sure that the inventory commission received, before the start of an audit, the latest at the time of the inventory receipt and expenditure documents or reports on the movement of material assets and whether receipts are collected from financially responsible persons, that all expenditure and receipt documents collected by the beginning of the property inventory are transferred to accounting;
- check the visas of the chairman of the inventory commission on all receipts and expenditures attached to the registers (reports), indicating "before the inventory on" ... "(date)", which should serve as a basis for accounting to determine the balance of property at the beginning of inventory data;
- check whether stocks (inventories, finished goods, goods, other stocks) entered the inventory documents for each item with an indication of the type, group, quantity and other necessary data (article, grade, etc.);
- get acquainted with the methods of calculation and types of devices during inventory of stocks (calculation, measurement, weighing, technical calculations) and their documentary reflection;
- make sure that the head of a construction organization has created conditions that ensure a complete and accurate verification of availability of property on time (provide manpower for re-weighing and moving goods, technically sound weighing facilities, measuring and control instruments and measuring containers);
- check whether measures are being taken to ensure that no inventory movement will take place at the time of the inventory;
- identify whether actions were taken by the commission to identify stocks unsuitable for production purposes;
- check the acceptance of documents, received during the inventory, by materially responsible persons in the presence of members of the inventory commission of stocks;
- check the presence of collation statements in the event of a discrepancy between the actual availability and accounting data;
- check that the amounts of surpluses and shortages of inventory in the collation statements are indicated in accordance with their assessment in accounting;
- in addition, when monitoring the inventory, it is necessary, on the basis of the sample formed during the test, to carry out control procedures for the selected inventories using the “from accounting to availability” method;
- at the same time form a sample for implementation of control procedures by the method of "from availability to accounting" and carry out these procedures;
- check the conformity of the name of the inventory values and objects, their number indicated in the inventory according to the nomenclature and in the units of measurement accepted in the accounting.

Based on the results of the inventory, the internal controller is obliged to express his opinion on the reliability and effectiveness of the measures taken during the inventory of stocks, paying particular attention to the availability of instructions for conducting an inventory of stocks, the correctness of instructions and correct presentation of inventory results.

In addition, the internal controller notes all identified inconsistencies, sets out his opinion on the inventory as an element of the internal control system in terms of its reliability.

As the main document regulating the internal control of compliance with restrictions on access to assets and records, computer information systems and applications we recommend a confidentiality provision with access regulation taking into account the job descriptions of each employee of a construction organization.

The internal controller may conduct regular operational analysis of stock movements based on material and production reports of materially responsible persons, accounting registers, taking into account traditional methods of stock movements.

Thus, all the described means of methodological support of accounting and internal control of stocks in construction organizations allow business entities to organize and maintain high-quality accounting of stocks and conduct effective internal control.

Conclusion

In recent years business activity in construction organization management and related activities has increased. In modern conditions, interest of owners and management of an organization in the effective and reliable functioning of internal control as a guarantee of timely analysis and improvement of activities of an organization is growing, since the improvement of an organization's management system is inextricably linked with the development of accounting, including inventory, which makes it possible to monitor and analyze the achievement of the goals set, to receive timely, reliable and objective information which is necessary in preparation and justification of management decisions at different levels.

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Personal Branding Via Social Media: Benefits and Risks in The Eyes of Polish Medical Doctors

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Abstract

In medical circles, personal branding is important both from the point of view of doctors and patients – and here social media, with its accessibility and scope, can be a useful tool. The paper aims to provide an answer to the following research questions: Do medical doctors have a sense of being a brand, do they consider social media to be an appropriate tool for professional personal branding, and what benefits and risks do they perceive in social media in this regard? The presented diagnostic survey was carried out among 81 Polish medical doctors. The results show that a significant number of doctors who participated in the survey uses social media and considers it to be a good personal branding platform. Still, not many of them has accounts related to their profession. One of the reasons is that over half of the respondents do not see themselves as a brand, which results in a lack of conscious branding policy. Other reasons include risks associated with the use of social media, among which the respondents most often pointed to: loss of privacy, receiving judgemental posts about their private life, receiving requests for medical advice, and ethical dilemmas concerning doctor advertising.

Keywords: Social Media, Personal Branding, Medical Doctors

Introduction

People associate the concept of a brand mainly with big companies, manufacturers, and corporations. Prominent brands, such as Apple or Nike, embed themselves in people's awareness thanks to consistent communication, advertising campaigns, visual identity, and long-standing traditions. D. Aaker (1996) says that a brand can be both a product and a service, as well as an organisation, a person, or a symbol. J. Joseph (2013) goes a step further in holding a bold view that each person has a personal brand, shaped from the moment of their birth and being named by their parents. A personal brand is not based solely on one's profession or professional title. It allows to show why, for whom, and how one performs their job (Dalla-Camina, 2016). It is the way one is perceived by others, a created image which entails certain expectations (Peter, Gomez, 2019).

In medical circles, personal branding is important both from the point of view of doctors and patients. The strong image of a doctor affects his social capital, allowing him to be easily recognised by the patients, and strengthening his position in the professional environment, thus raising his confidence and increasing job satisfaction (Chu et al., 2018).

Social media, with its accessibility and scope, can be a useful personal-branding tool. It allows to shape one's image, reputation, and recognisability in the professional environment (Petrucă, 2016). Doctors can use it both to share their knowledge, experience, and discoveries, and to manage their professional profiles, which are a kind of business card, presenting the realities of their daily work and their interests. This increases chances for building a network of professional contacts and for finding new work possibilities. It also allows to keep in touch and interact with patients (Panahi et al., 2016), which may

be of key importance for doctors who want to build their personal brand due to the strict correlation between patient satisfaction and a specialist's image (Luca et al., 2015). This is why it is crucial to be aware of one's online presence and of its significance, and to thus be able to control one's own image and ensure consistency between online information and offline activities (Petrucă, 2016).

An analysis of literature shows that the issue of doctors building their personal brand on social media is new and rarely discussed. This paper aims to partly bridge this gap by providing an answer to the following research questions: Do medical doctors have a sense of being a brand, do they consider social media to be an appropriate tool for professional personal branding, and what benefits and risks do they perceive in social media in this regard? The presented diagnostic survey was carried out among 81 Polish medical doctors.

The paper opens with an introduction devoted to the presence of medical doctors on social media in the context of building their image and personal brand. Next, it describes the benefits of their activity on social media and the associated risks and challenges. The paper then presents the adopted research methodology and the results of the survey. It closes with a summary and conclusions.

Medical Doctors in Social Media

As social media becomes increasingly popular, the number of doctors using it also grows. This is why today personal branding and managing one's professional image via social media are especially important (Kalia et al., 2017). Patient platforms are constantly being developed which allow to find basic information about a particular doctor, such as the address of their office or telephone number. Some of them provide an option to submit an opinion about a given specialist. Doctors may not be aware of their presence on popular platform, where the quality of their worked is evaluated by patients. It is therefore very important to take control over one's image on social media and to consciously shape it (Kalia et al., 2017).

When deciding to be active on social media, it is important to carefully choose appropriate platforms and means of communication and interaction. The right choice positively affects brand recognisability and maximises the effects of the effort put in the branding process (Levy, 2013). Instead of creating many accounts on different platforms, it is much more effective to focus on specific platforms used daily by one's target group. When building an engaged community, regular and factual communication is of key importance (Kalia et al., 2017). When choosing a platform, it is worth paying attention to their purpose, type of published materials, popularity, users, as well as manner of communication and interaction (Table 1).

Table 1: most frequently used social media platforms and their main uses in personal branding

Name	Description
Facebook	• the largest and most used platform among adults • many configuration and interaction possibilities helpful in building a brand and an image • dedicated to those who want to build close relationships and engaged communities
Twitter	• real-time interactions • dynamically changing trending topics • source of up-to-date news and reports • dedicated to those who want to share the most recent news and get immediate feedback
LinkedIn	• created to facilitate establishing professional and business contacts • allows to build networks of professional contacts and exchange industry-specific information • provides a way to contact other companies • dedicated to those who want to build a professional brand
Instagram/Pinterest	• based mainly on images and photos, privacy concerns may limit their use among medical professionals • can be treated as complementary to the existing profiles on other platforms and used in order to reach a wider group of people
YouTube	• second largest search engine in the world, online video-sharing platform • used for uploading both amateur and professional videos • content of uploaded videos may be varied, from brand presentation to educational issues which emphasise brand quality and improve an expert's image

Source: Own elaboration based on: (Kalia et al., 2017).

Benefits of medical doctors' presence on social media

Social media profiles of medical doctors may be classified as personal or professional depending on the content they share. Personal profiles predominate, but more and more doctors choose the latter form of personal branding as well (Chretien et al., 2011). Their presence on social media benefits both themselves, and their patients.

The presence of doctors on social media provides patients with access to reliable information and improves their knowledge of issues concerning health and disease prevention. Moreover, it facilitates communication, and thus improves patient-doctor relationships, builds trust, and combats stereotypes (Kane, Sands, 1998). On the other hand, building a network of professional contacts allows doctors to promote their academic papers and practice, and to share their experience with their colleagues. They can talk about the difficulties of their daily work and discuss interesting medical cases with people who understand their point of view. Engaging in discussions about professional and ethical issues, current problems of the healthcare industry, career building, or healthcare management may inspire or guide less experiences colleagues or students (Chretien, Kind, 2013). And being able to get in touch with specialists from all over the world in real time allows to consult complicated cases regardless of physical distance (MacMillan, 2013).

According to sources, ca. 60% of doctors have a positive attitude towards relationships between medical professionals and patients established via social media. This concerns mainly doctors' engaging in educational initiatives, informing about drug administration instructions, as well as promoting a healthy lifestyle and a change of bad habits (Househ, 2013). Doctors' educational activities can take many forms on numerous different social media platforms, such as blogs, videos, or online forums. It has been observed that such activity is helpful in fight against obesity, motivates people to lead a more active lifestyle, and produces results in fight against cigarette smoking and risky sexual behaviour (Househ, 2013). According to research, communication with patients via social media contributes to better results of treatment and quality of care. The best results are achieved with treatment

of chronic diseases. Thanks to the established relationship, patients more strictly follow their doctors' instructions and are more satisfied with medical service they get (Farnan et al., 2013).

Risks and concerns associated with social media activity of doctors

The presence of medical doctors on social media has its benefits, but it is not free from risks. One risk results from the quality of published information, which may be unchecked, incomplete, unformal, or apply to individual cases only (Pirraglia, Kravitz, 2013). This is in contradiction to evidence-based medicine. Moreover, the authors are often unknown or unreliable. The interactive character of social media and freedom to publish any content exacerbates the problem (Moorhead et al., 2013).

Social media is a useful tool in building one's image, but its unskilful use may negatively affect one's personal brand. Information shared on social media profiles about one's values, ideas, or priorities shape other users' first impression. Moreover, the perception of a person is affected by photos they upload, websites they like, content they share and comment on, their posts, and even their online friends (Bernhardt et al., 2014). This is why it is recommended to make use of privacy settings which allow to decide what type of content is visible to people from one's contact list and to all users visiting one's profile. What is more, in order to maintain a professional image it is necessary to regularly search one's own name in an online search engine and check the available data – a so-called image audit (Ventola, 2014).

Another problematic issue is invasion of patients' privacy, i.a. by publishing comments, posts, videos, photos, or other materials concerning them. Thus, if one wants to discuss a medical case, name and other information about patients, specific dates and locations should be changed or left out, one should also not describe rare cases without the patient's consent (Ventola, 2014).

The presence of doctors on social media can also contribute to blurring the lines in the professional doctor-patient relationship. This occurs mainly due to communication in private messages, or requests to be added to the list of 'friends'. Doctors, too, by finding and making an inappropriate use of information about patients, such as their material situation, social status, or contacts, can violate these boundaries (Farnan et al., 2013).

The social media activity of doctors doubtless comes with its challenges and risks which, however, fade in comparison with its benefits. The very awareness of the existing dangers can make us avoid them or reduce them. Thus, it is important to consciously and carefully use social media as a tool for building one's brand, maintain relationships with patients, and develop one's image as a specialist in a given field.

Methodology and Sample

A voluntary, anonymous survey was carried out in July 2019 in Poland among doctors and dentists. The questionnaire was prepared as an interactive Google survey form. It was delivered electronically, directly to the respondents, through health care units and curtesy of the fanpage of "Okręgowa Izba Lekarska w Gdańsku – Młodzi Lekarze" on Facebook. The questionnaire was comprised of 24 questions, 5 of which were open-ended, and 19 closed-ended. Demographic data was also collected in a part of the questionnaire comprised of 6 questions.

81 respondents took part in the survey, among them doctors and dentists. 69.1% of the respondents were female, 30.9% were male, all between the ages of 25 and 52, among them over 80% aged 25–29 (44.4%) and 30–34 (39.5%). The most respondents (69.1%) lived in cities with over 250,000 inhabitants, and the fewest respondents (4.9%) lived in small cities with under 50,000 inhabitants and in villages. The sample was not tested for education due to the equivalence of a medical degree and an MA degree. However, it was tested for the level of professional development based on work experience and current function. The most respondents (59.3%) were doctors during specialty training, and the fewest respondents (6.2%) has no specialty. The average work experience was 5.3 years, with the most

respondents (64.2%) having worked for 1–5 years, and the fewest (25.9%) for 6–10 years. Average job satisfaction indicator on a scale from 1 (very poor) to 7 (very high) was 5.2.

Results

The sample was tested for social media activity. 98.8% of the respondents confirmed having a social media account, which shows the great popularity of such platforms.

The respondents were asked for their opinion about the chances of building a professional image among potential patients and other representatives of the medical profession with the use of social media. 77.8% of the respondents answered positively, 12.3% answered negatively, and 9.9% chose the answer "hard to say". These results show that there is high awareness of the potential of social media as a tool for building a professional image. Even so, very few respondents decided to have a strictly professional social media profile. Only 1.2% have a professional profile on Facebook, Instagram, or Twitter, or write a professional blog. For professional purposes, the most respondents (15%) use LinkedIn. Some respondents share both professional and private content on their profiles (Facebook 11.3%, Instagram 6.2%) or have two separate accounts, one professional and one private (Instagram 3.8%, Facebook 2.5%). However, most of them use their social media profiles for private purposes. The most popular platforms among the respondents were Facebook (83.3% private profiles), Instagram (48.8%), and YouTube (41.2%). Table 2 presents detailed figures.

Table 2: Social media profiles of medical professionals, by type

	Profile type				
Name of platform	**Private**	**Professional**	**Two separate profiles: private and professional**	**One profile with private and professional content**	**No profile**
Facebook	83.8%	1.2%	2.5%	11.3%	1.2%
Instagram	48.8%	1.2%	3.8%	6.2%	40%
LinkedIn	5%	15%	0%	0%	80%
Twitter	8.8%	1.2%	0%	1.2%	88.8%
Google plus	17.5%	0%	0%	0%	82.5%
YouTube	41.2%	0%	0%	0%	58.8%
Snapchat	15%	0%	0%	0%	85%
Blog, e.g. on WordPress	6.3%	1.2%	0%	1.2%	91.3%

Source: Own elaboration.

A certain reluctance to manage professional profiles on social media may result from a lack of sense of being a brand or from some difficulties in interpreting this concept and associating it with oneself. Asked whether they consider themselves a brand, doctors rarely gave definite answers. The results are therefore ambiguous, with many answers chosen by a similar number of respondents, with a slight predominance of positive answers (Figure 1).

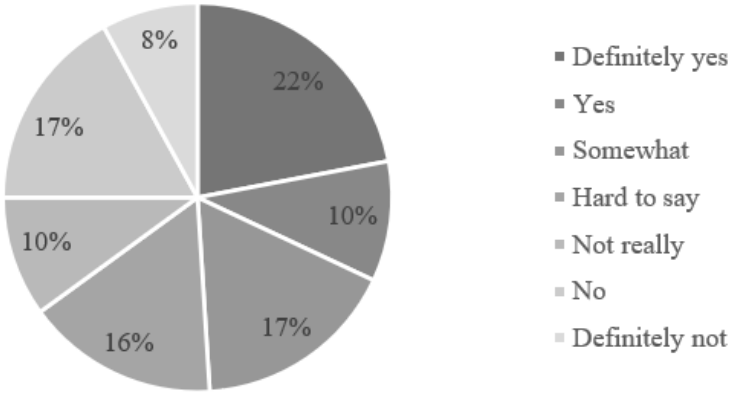

Figure 1: Do medical professionals consider themselves a brand?

Source: Own elaboration

Moreover, this reluctance may result from a sense of danger and the awareness of potential consequences. The respondents were most often concerned about loss of privacy (61.7%), receiving judgemental posts about their private life (53.1%), receiving requests for medical advice (48.1%), and ethical dilemmas concerning doctor advertising. Figure 2 presents the most prevalent of those concerns.

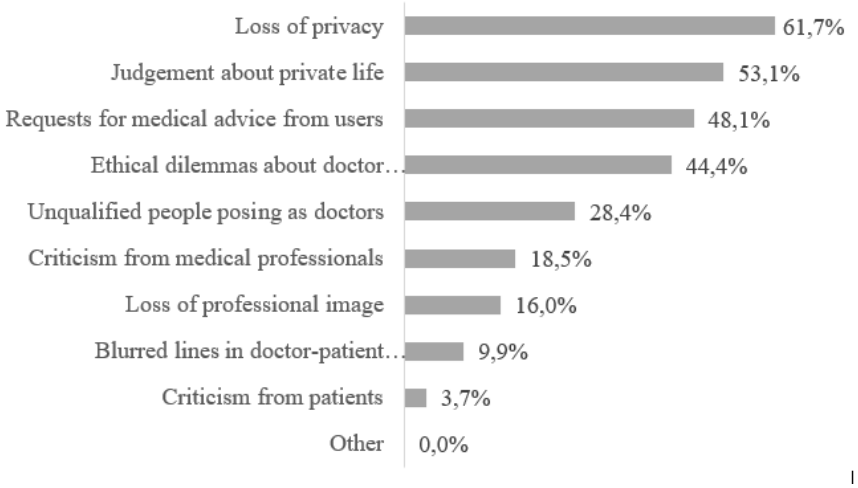

Figure 2: Risks associated with social media activity of medical professionals

Source: Own elaboration.

Conclusions

A significant number of respondents use social media and consider it to be an appropriate means of building their image. Even so, not many of them have professional accounts. This may stem from a lack of sense of being a brand, which results in a lack of conscious branding policy, also on social media. Other reasons include certain risks, among which the respondents most often pointed to: loss of

privacy, receiving judgemental posts about their private life, receiving requests for medical advice, and ethical dilemmas concerning doctor advertising.

It is worth noting that ethical problems may emerge as a result of a lack of clear position of the medical profession and of guidelines about the use of social media by Polish doctors. Such recommendations have been made by, i.a., the American Medical Association (AMA), and cover issues concerning ethics, patient privacy, doctor-patient confidentiality, and informed consent. They also emphasise the need to control information published online and approve making a distinction between private and professional content.

In order to build and maintain a professional image, it is also important to perform regular image audits and use privacy settings offered by most popular social media platforms. The results of the survey also indicate the existence of a certain knowledge gap concerning the concept of a brand among the respondents, which may result in a lack of understanding of this concept and of a conviction about the advantages of engaging in professional communication and building one's own image.

In order to better illustrate the knowledge and awareness of medical professionals, broader studies should be conducted. This is especially important considering reports that in the future, lack of social media activity will negatively affect one's image, and therefore personal brand. This is connected with lack of control over one's image and loss of digital identity, which may result in loss of public trust (O'Hara et al., 2013).

A positive conclusion from the survey is that the respondents are aware of the potential of social media in the context of building an image, both among patients and medical professionals. It is now important to educate them about online security and privacy protection, and for medical associations to update the guidelines concerning ethics and professionalism. With the dynamic development of telemedicine and online consultations, this seems indispensable in order to ensure that medical professionals have freedom of action and can use social media to build their brand in the most professional manner possible.

Due to the methods of sampling, the obtained results cannot be generalised. However, they do provide a picture of how medical professionals perceive social media and can serve as an inspiration for further research in this area.

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Heterodox Perspective on Sustainable Development in Economic Order – the Case of Poland

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Abstract

Since 1990 Polish economy generally followed neoliberal path of growth. There was a chance that the new Constitution of 1997 would introduce and propagate broad and inclusive sustainable development paradigm. Unfortunately, this opportunity was missed in the 2000s. Some corrections of orthodoxy were made after the global financial crisis. The switch into the sustainable development path was only partial. The list of indicators in the economic pillar (or order) of sustainable development is still relatively narrow and not adequately popularised. Despite obvious weaknesses, the dominance of GDP and GDP per capita is practically intact.

Keywords: GDP, neoliberalism, sustainable development, Poland

Introduction

The aim of the article is to answer the question whether the experience of the recent global financial crisis and the overall experience of transformation translated into the adjustment of the socio-economic policy in Poland in accordance with the sustainable development (SD) paradigm. The paper also tries to assess whether the SD paradigm as defined by Polish Statistical Office (GUS) complies with heterodox lessons from the global financial crisis and earlier numerous crises in developing countries and emerging markets since 1980s. In particular, the set of SD indicators will be analysed on the basis of two publications by Polish Statistical Office: (GUS 2011) and (GUS 2015). Unfortunately, up till now Polish Statistical Office did not publish a continuation of the aforementioned studies of 2011 and 2015. To fill this gap time series of selected SD indicators of Poland were updated and contrasted with the figures describing other CEE countries. The discontinuation of GUS publications on this particular subject most probably springs from the fact that earlier model of SD – Millennium Development Goals agreed at the United Nations General Assembly in 2000 was scheduled for the period ending in 2015. On September 25, 2015 new SD strategy covering next 15 years: "Transforming our world: the 2030 Agenda for Sustainable Development" was adopted by 194 countries of the UN General Assembly. In consequence, GUS reports on the subject are replaced by the so-called voluntary review of the implementation of the 2030 Agenda at the national level. The 2018 National Report is the first document in this series.

The path of development in Poland – neoliberalism versus sustainable development

As the partially democratic Parliamentary elections in June 1989 marked the symbolic fall of communism in Poland, one can assume that Constitution of the Republic of Poland of 2nd April, 1997 manifested definitive break from the past legal system.

Paradoxically, the new constitution was implemented when the coalition of two-post communist parties (Alliance of Democratic Left – SLD and Polish Peasant Party - PSL) had the majority in the Parliament. At the same time, the President of the Republic of Poland who signed the constitution was Aleksander Kwaśniewski former senior member of the communist party which later transformed into Alliance of Democratic Left. This political constellation of the left wing party and peasant party enabled introduction of certain corrective elements to newly institutionalised neoliberal orthodoxy and the so-called Washington Consensus initiated by the Balcerowicz shock therapy (by some

economists also referred to as Balcerowicz-Sachs Program). One of critics of the shock therapy was Grzegorz W. Kołodko who was the Deputy Prime Minister and Minister of Finance since April 1994 till February 1997 in the governments formed by aforementioned two parties. Kołodko often dubs the Balcerowicz Plan a "shock without therapy".

In this context, it is hardly surprising that the Constitution of the Republic of Poland of 1997 attempted to rein back newly introduced turbo-capitalism as described by Szahaj (2017), Kowalik (2009) or Kieżun (2013). It would be a continuation of Kołodko's 'Strategy for Poland' which broke away from neoliberal dogma. Hence, transformation at that time was characterised by bustling and multidimensional activity of the state (Bałtowski 2019: 193). The introduction of the broad concept of sustainable development to the Constitution (in place of narrow and simplistic laissez-faire capitalism) could be understood as the confirmation of the new course in the socio-economic development.

The article 5 of the Constitution directly refers to sustainable development (SD) and states: 'The Republic of Poland shall (...) ensure the freedoms and rights of persons and citizens, the security of the citizens, safeguard the national heritage and shall ensure the protection of the natural environment pursuant to the principles of sustainable development.'

The article 74 also refers to sustainable development concept. This time rather indirectly: 'Public authorities shall pursue policies ensuring the ecological security of current and future generations. Protection of the environment shall be the duty of public authorities. Everyone shall have the right to be informed of the quality of the environment and its protection. Public authorities shall support the activities of citizens to protect and improve the quality of the environment.'

On the basis of these two articles, it may seem that the concept of sustainable development is narrowly defined by the Polish Constitution, i.e. the other pillars (orders) within SD concept are not adequately addressed. This remark might especially apply to the social order.

However, many other articles of the Constitution refer to social issues and social justice without mentioning the concept of sustainable development. In this context, it is worth quoting article 20: 'A social market economy, based on the freedom of economic activity, private ownership, and solidarity, dialogue and cooperation between social partners, shall be the basis of the economic system of the Republic of Poland.'

A number of other important rights are guaranteed by the Constitution of the Republic of Poland. Most of them are social rights which could constitute the social pillar of SD. For example, according to:

- *Article 24* – Work shall be protected by the Republic of Poland. The State shall exercise supervision over the conditions of work.
- *Article 59.1* – The freedom of association in trade unions, socio-occupational organizations of farmers, and in employers' organizations shall be ensured.
- *Article 65.5* – Public authorities shall pursue policies aiming at full, productive employment by implementing programmes to combat unemployment, including the organization of and support for occupational advice and training, as well as public works and economic intervention
- *Article 66.2* – An employee shall have the right to statutorily specified days free from work as well as annual paid holidays; the maximum permissible hours of work shall be specified by statute.
- *Article 67.2* – A citizen who is involuntarily without work and has no other means of support, shall have the right to social security, the scope of which shall be specified by statute.
- *Article 69* – Public authorities shall provide, in accordance with statute, aid to disabled persons to ensure their subsistence, adaptation to work and social communication.
- *Article 71.1* – The State, in its social and economic policy, shall take into account the good of the family. Families, finding themselves in difficult material and social circumstances -

particularly those with many children or a single parent - shall have the right to special assistance from public authorities.

- *Article 75* – Public authorities shall pursue policies conducive to satisfying the housing needs of citizens, in particular combating homelessness, promoting the development of low-income housing and supporting activities aimed at acquisition of a home by each citizen.

These noble rules and guarantees, however, were often breached in the course of rapid transformation and lack of concern by policymakers who focused either on speeding up GDP growth or fast disinflation (with rapid EMU membership as one of the aims). The improvements in other spheres (including social sphere) were supposed to be a consequence or a by-product of achieving the aforementioned two prime goals. Certainly, the policy which focuses on lowering inflation may exert negative effects on the social sphere, especially in the short-term. The pursuit of high GDP dynamics, in turn, does not pose such serious risks. Nonetheless, heterodox works on inequality prove that the marine metaphor according to which 'a tide lifts all boats', does not apply to current version of capitalism seriously affected by the process of monopolization and financialisation.

Therefore, the dignity of work was often forgotten in the Polish caricatured version of liberalism (rubbish liberalism) or turbo-capitalism (Szahaj 2017). T. Kowalik (2010), bitterly states that social justice is 'a fashionable subject, but not in Poland'. He also provides examples of senior and influential figures (for example, the President of the Constitutional Tribunal at that time) for whom 'social justice is only intuition'(Safjan 1999). The list of senior figures who are indifferent to the issue of division of national income is broad and includes L. Balcerowicz and his acolytes, liberal Henryka Bochniarz and conservative Ryszard Legutko. The last two persons expressed deep dissatisfaction when Amartya K. Sen won the Nobel Prize in economics in 1998 (Kowalik 2010). It is worth evoking another former President of Constitutional Tribunal, Andrzej Zoll. His stoic attitude towards the dramatic situation of the people working on short term contracts without any social protection is rather surprising. The professor of constitutional law maintains that: 'Prosperity originates out of work, savings and also exploitation. Being a realist, it is difficult not to see it. Injustice is unavoidable, especially during the period of such changes as in Poland'(Zoll 2017: 180-181). It is worth mentioning that according to article 208 of the Constitution 'The Commissioner for Citizens' Rights shall safeguard the freedoms and rights of persons and citizens specified in the Constitution and other normative acts.' Indeed, his views are startling given that he held the position of the Commissioner for Citizens' Rights between June 2000 and February 2006, i.e. at the time when the situation in the labour market in Poland was one of the most acute in Europe.

In this connection it is interesting to note that according to Józef Tischner – an influential Polish priest, first chaplain of 'Solidarity' and renowned philosopher, Leszek Balcerowicz was one of the three figures who formed the "ethic of solidarity" (the other two were Lech Wałęsa and Tadeusz Mazowiecki). Tischner (2018: 263) claimed that Balcerowicz 'bounded utopia of solidarity with Anglo-Saxon political economy'. The question remains to what extent his rather positive stance on economic transformation in Poland springs from the fact that he passed away in June 2000, i.e. shortly before dramatic increase of the registered unemployment rate to 20% in December 2002. Yet already in 1999 the unemployment rate was high and hovered above 11%. As Tischner was influenced by the book by D. Méda (1995) one cannot be sure that his views on the nature of unemployment would change. He might well continue to perceive hikes in joblessness as something unavoidable and therefore natural: 'Does political power has a power over dynamically developing technology? Is it not technology to 'blame' that smaller and smaller amount of human labour is necessary to produce increasingly bigger amount of wealth?'(Tischner 2018: 273). This way of thinking may evoke naturalism, historical determinism and neomalthusian approaches. At least in the short term, these predictions about the end of work by D. Méda and her followers proved premature as over 2 million usually young and educated Poles emigrated to more economically and technologically advanced West European countries in the 2000s. Less than 15 years later, history repeated itself when Polish employers started desperately seeking labour from East European countries.

In 1998 the composition of the parliament changed with Electoral Action Solidarity (AWS) and Freedom Union (UW) forming government with Leszek Balcerowicz from UW returning to the position of Deputy Prime Minister and Minister of Finance. The 'Strategy for Poland' was replaced by an ambitious plan to implement several major and expensive reforms (which included social security reform, i.e. its partial privatization) and subsequent cooling down policy. For a number of experts the economy was overcooled (i.e. the GDP growth was unnecessarily reduced to very low levels (Kołodko 2009; Woźniak 2017). The idea to build 'social market economy' according to sustainable development paradigm was put aside and the socio-economic policy returned to its neoliberal path with continuing financialization, less progressive tax system and mediocre condition and security of the labour force. Provenience of the ruling majority did not make much difference.

After nineteen years of turbulent, predominantly neoliberal transformation Poland (along with other post-communist CEE countries) was eventually hit by the global financial crisis that symbolically started with the collapse of the Lehman Brothers on September 15 2008. The viability of orthodoxy was questioned by scholars from various economic and philosophical schools: Belka (2015), Mączyńska (2019), Petru (2015), Szahaj (2017), Wilkin (2019), Woźniak (2019) and Żyżyński (2019). The sentiment of the general public also changed and culminated in reshuffling in the political scene. This major turnaround in 2015 was only partly the consequence of the increased positive sentiment towards conservative values. Even more so it sprang from the promise to strengthen neglected social sphere for example by the Family 500 Plus programme (monthly transfer of 500 PLN for each child up to the age of 18). Paradoxically (at least for Western public), this wholly left-wing socio-economic programme was introduced by a coalition of three conservative and right-wing parties. 'Several negative phenomena in economics were caused by neoliberal doctrine and the domination of neoclassical school which is characterised by market fundamentalism, i.e. the notion that market perfectly finds solution to everything, including ethics' (Mączyńska 2019).
Therefore, it is hardly surprising that such mistakes strongly affected social and political sphere in a number of developed countries, such as Greece, Italy, the USA and the UK – the Brexit. The question remains whether the global financial crisis will prompt necessary changes in the long term development strategy. The obvious recipe is to return to the sustainable development paradigm.

Selected sustainable development indicators in the economic order

SD is commonly referred to as meeting the needs of the present generation without compromising the ability of future generations to meet their own needs. The concept of sustainable development (SD) goes along with heterodox economics which prefers holistic, pluralistic and interdisciplinary approach. The concept takes into account time which is often neglected or trivialised by orthodoxy. It presupposes, unlike M. Thatcher, the existence of the society and even takes care of future generations. According to Wichaisri and Sopadang (2018) the concept of SD rests on three main pillars: economic growth, social inclusion and environmental protection. This model could be broadened. As noted by Fiedor et al (2002: 231) SD is a collection of four orders: environmental order, socio-demographic order, economic order and spatial order. This definition could be further extended by including institutional or institutional-political order.

Closer examination of economic pillar of SD seems particularly relevant in the case of the global financial crisis and the subsequent Great Recession (the most serious economic crisis since the Great Depression in the 1930s). It especially applies to heterodox perspective with its numerous studies on casino-capitalism, financialisation and monolopy-capitalism which greatly developed in the recent decades.

Economic order in Poland as discussed by two studies by Polish Statistical Office (GUS 2011) and (GUS 2015) comprises following five sub-orders (or sub-categories): Economic development, Employment, Innovativeness, Transportation, Model of production. From macroeconomic perspective the first two of these sub-orders, namely Economic development and Employment, require more detailed analysis. Innovativeness also requires, at least brief, analysis in the context of the aforementioned need to transform Polish economy towards high value added production.

Table 1: Selected* sustainable development indicators in Poland in sub-domain economic development within the economic domain (order or pillar)

	ECONOMIC DOMAIN	
	2011	**2015**
Economic development	Growth of Gross Domestic Product per capita	Growth of Gross Domestic Product per capita
	Investment outlays on fixed assets (Percentage of GDP)	Investment rate
	Dispersion of regional GDP per capita (NTS 3)	Regional dispersion of GDP per capita (PPP) at NTS 3 level
	Public debt (Percentage of GDP)	The debt of central and local government institutions (Percentage of GDP)
		Surplus/Deficit of central and local government institutions (Percentage of GDP)
		GDP per capita (PPP)
		Gross domestic savings rate (Percentage of GDP)

** The table does not include three indicators for the year 2011 and 2015: Water reception in the economy, water use of the economy and transport intensity in the relation to GDP.*
Source: Based on: GUS (2011) and GUS (2015).

The set of indicators in economic domain in 2015 was extended in comparison with 2011. At the same time, however, table 1 confirms the dominance of GDP (GDP per capita and GDP growth) as the leading macroeconomic indicator in the economic development sub-domain of the economic domain (pillar, order). Hence, two leading publications on SD in Poland (which were published during or shortly after the global financial crisis) to great extent mimic the hierarchy of goals powerfully advocated by the mainstream. Other sub-domains such as employment, innovation, transport and methods of production play rather minor role in the popular debate.

Heterodox approach, as it was already stated, is more holistic and interdisciplinary. Exhaustive analysis of the economic domain would require much more developed work (beyond the scope of this publication) and also cooperation with a host of experts in different domains. Hence, the analysis of economic domain will exclude several sub-domains such as "Employment", "Innovation", "Transport" and "Methods of production" which are described by 19 indicators. These sub-domains (with the exception of "Employment") do not belong to typical macroeconomic or microeconomic topics or problems. They are having their specific sectoral character. Undoubtedly, next studies should be more socially oriented and focus on the analysis of sub-domain "Employment" (described by 4 indicators) and selected elements of social domain which in the study by Polish Statistical Office (GUS 2015) is described by 31 indicators. For obvious reasons, the analysis of sub-order "Economic development" within the economic order should be of great interest for scholars. It applies both to mainstream economists and those with more alternative views (various heterodox schools).

The set of indicators describing the sub-order (sub-pillar) 'Economic development' fully confirms the dominance of GDP. According to GUS (2015: 139) 'GDP per capita is a very important indicator of the level of economic development and its long term growth constitutes the main goal of the state economic policy." Therefore, the growth of GDP per capita has a prime importance for policymakers.

Poland's performance measured by this indicator is impressive even in comparison with other Central and East European countries. Indeed, the country relatively quickly recovered from the transformational recession at the beginning of the 1990s and in subsequent decades recorded uninterrupted GDP growth. Poland growth performance seemed immune to numerous international

turbulent events that took place since the collapse of the iron curtain in 1989 such as the crises in the so-called Asian tigers in 1997, Brazil, Russia, Argentina, the bursting of the dot com bubble in 2000. The country also avoided the recession (often referred to as Great Recession) that followed the global financial crisis which symbolically started in September 2008 with the collapse of the Lehman Brothers. The same applies to long-term growth dynamics. According to GUS (2015: 140) 'average annual growth of GDP per capita amounted to 3.9% in Poland and 0.6% in the European Union (EU) in 2004-2014.' From this perspective, the stability of the economic growth in Poland is impressive. Little wonder that M. Piatkowski (2019) refers to Poland as "Europe's growth champion".

On the other hand, numerous studies confirm that GDP has its deficiencies even in comparison with Gross National Product (GNP) which used to be a standard measure of economic performance until 1990 when it was replaced by GDP (Stiglitz 2013: 231). Thanks to this change capital importing countries could boast fast economic growth (understood as GDP dynamics). At the same time, the leaders of developed countries (usually the exporters of capital) may portrait themselves as the promoters of more balanced economic development in the global scale. Poor countries catch up with more developed ones in terms of GDP per capita what automatically translates into rapid poverty alleviation in less-developed countries.

This rhetoric, however, blurs the real picture of country's socio-economic situation. GDP does not take into account net incomes which gain prominence in the era of globalization and financialisation (i.e. excessive growth of the financial sector at the expense of the real sphere).

As the calculation of net incomes could pose certain challenges to national statistical offices numerous mainstream economists or economic commentators make use of this fact and focus solely on GDP. Some experts do it deliberately others simply mimic the herd leaders. The change of prime economic indicator or indicators requires changes of the perspective in the influential mass media and government (with its numerous agencies such as national statistical office).

According to official figures the real gap between Poland and a number of West European countries is narrowing very rapidly. For example, according to recent Eurostat data (as of February 2020) Poland overtook Portugal in terms of GDP per capita. However, actual distance between Poland and a number of capital exporting advanced countries (such as the Netherlands, Germany, Japan) is not dwindling that fast.

It needs to be stressed that since the early 2000s the discrepancy between GDP and GNP (also referred to as Gross National Income – GNI) is widening in Poland.

GNI is the sum of GDP and foreign income (balance). While, "foreign income (balance) is the difference between the value of gross primary income (accounts receivable due from foreign entities to domestic entities) and the accounts payable of domestic entities to foreign entities or the sum balance of wages and salaries, income from direct and portfolio investments as well as other income and interest" (GUS 2019: 683).

In 2002 the discrepancy between GDP and GNI in Poland stayed below 0.5% GDP. Eight years later (i.e. in 2010) the foreign income balance amounted to -3.5% of GDP, while in 2017 the foreign income deficit exceeded 4 % of GDP. In absolute terms this figure amounted to 80.7 billion PLN. In other words, annual net outflow of income from Poland reached over 4% of GDP.

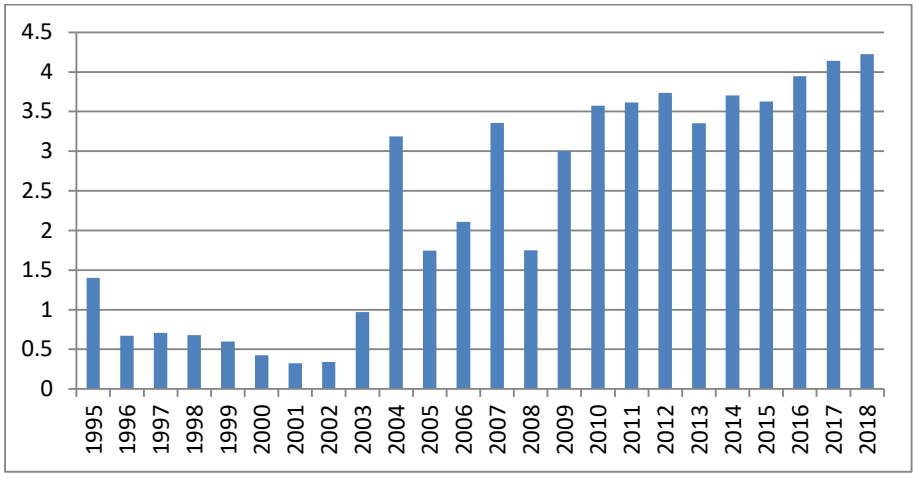

Fig. 1: GDP (current prices) minus GNI (current prices)

(i.e. -foreign income balance) (% of GDP) in Poland

Source: Own calculations based on GUS

GDP has a number of other disadvantages. This caveat also applies to GDP per capita. For example, it does not measure the actual distribution of income in the society. It needs to be stressed, that any serious economic analysis cannot be limited to a narrow set of indicators (not to mention single measure such as GDP). GDP is not and was never intended to be a measure of the quality of life (Coyle 2018: 80).

More recent report on sustainable development (SD) indicators of Poland (GUS 2015) introduced another indicator, namely „Gross Domestic Product per capita (in PPP)". Of course, it broadens the understanding of country's economic situation. However, it also proves that SD indicators in Poland were dominated by GDP. Historical comparisons of GDP per capita dynamics (calculated in PPP) show the success of transformation in Poland. The selection of the base year for calculations significantly influences the standing of Poland in comparison with other high-growth countries. Orthodox analyses have a tendency to shorten the time horizon. For example, they do not take into account that GDP per capita dynamics in Poland in the 1980s was one of the lowest among Central and East European communist countries. The distance between Poland and a number of capitalist countries also widened in the 1980s. Therefore, Poland had a lot to catch-up in the following decades. The country's good economic performance could be explained by the convergence (or catch-up theory) which states that the poorer or developing countries tend to have a faster income per capita growth than wealthy and developed countries.

Mainstream scholars also tend to select a base year that does not include all years of transformational recession (1990-1991 in the case of Poland). For example, when the base year is 1991 as in the case of the study by Balcerowicz (2016: 379) the economic growth in Poland was only slightly lower than in South Korea and was faster than in Chile and Malaysia. The gap widens significantly when the base year is set at 1989. Between 1989 and 2017 GDP per capita (measured in PPP) amounted to 141.2% in Poland, 235.5% in South Korea and 153% in Chile. It needs to be stressed, however, that during the same period the performance of many post-communist countries was far from spectacular. For example, the indicator increased by 81,1% in Romania, 50,1% in Hungary and only 39,1% in Bulgaria.

Proper assessment of long term growth performance requires taking into account the purchasing power of GDP. Purchasing Power Parity satisfies this requirement. PPP is the exchange rate at which GDP in all countries (measured in national currencies) is converted to the common currency such as Purchasing Power Standard (PPS). One needs to realise that calculations of this measure for

communist countries is rather difficult. This especially applies to countries which suffered from high inflation or hyperinflation (such as Poland). In consequence, the income collapsed even more than GDP. It needs to be stressed that cross-country comparisons could be affected by major exchange rate movements. For example, Poland significantly devalued its currency (zloty) in January 1990 (when the Balcerowicz Plan was introduced), but later till May 1991 the exchange rate against USD was fixed what led to real revaluation of zloty. Despite all these caveats, Poland's long term growth record (measured by GDP per capita in PPP) should be treated with due respect.

The indicator GDP per capita (PPP) is not particularly precise especially in countries with substantial population inflows and outflows. Poland became one of such countries especially after its fast transition to the market economy in the early 1990s. The economic performance after initial transformational recession in 1990-1991 was generally positive. New capitalist system offered many opportunities to young and educated people especially in big cities. Hence, emigration was rather subdued in the 1990s. Tertiary educational boom that started in mid-1990s prompted major transfer of young people from towns and villages to strong university and business centres such as Warsaw and several other big cities, such as Kraków (Cracow), Wrocław, Poznań and Gdańsk. It was an example of internal migration.

Economic condition dramatically changed at the turn of the century when the already mentioned cooling-down policy was introduced by the central bank. The situation in the labour market was further aggravated by the unfavourable demographic development, i.e. massive inflow of graduates from baby boom generation into the labour market. It is hardly surprising that emigration to West European countries was spectacular in the early 2000s. This trend even gained momentum after Poland's accession to the EU in May 2004).

Table 2: Estimated emigration from Poland for temporary stay* in the years 2004-2018 (thous.) (the number of persons staying abroad at the end of a year)

	2004	**2005**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
TOTAL	1000	1450	2000	2060	2130	2196	2320	2397	2515	2540	2455
including: the EU	750	1170	1607	1670	1720	1789	1901	1983	2096	2121	2031

** for years 2004-2005: over 2 months; for years 2010-2018: over 3 months,* *Source: GUS*

This spectacular development, however, is not particularly well documented in official demographic data (see figure 2). Several estimates point that actual emigration from Poland exceeded 2 million persons. This, in turn, could blur the GDP per capita (PPP) statistics. The proper GDP per capita figures were, in fact, higher than according to GUS or Eurostat. The actual gap between productivity and wage growth is even greater, i.e. the stake of labour force in GDP was diminishing.

The situation reversed in 2015-2019 with the massive inflow of labour from the East European countries (predominantly from Ukraine) to Poland. This phenomenon was mainly caused by the conflict in the East Ukraine which started in April 2014. The other factors include: the discrepancy in wages/salaries between the two countries, proximity (the countries are neighbours) and relatively similar languages.

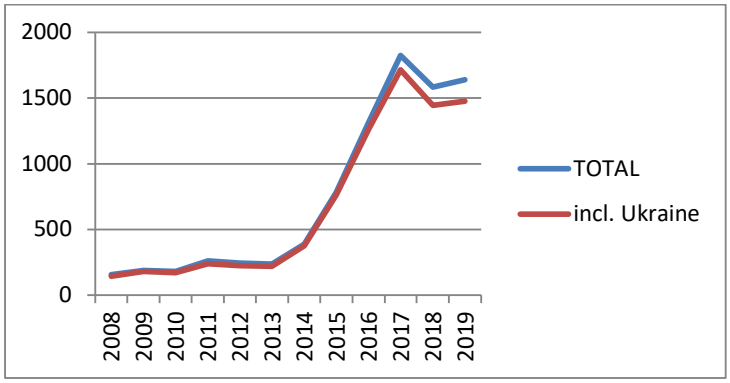

Fig. 2: The number of work declarations registered by local employment agencies for eligible East European countries^ (including Ukraine) (thous.) in 2008-2019

Note: ^ Since 2014: BY, RU, UA, MD, GE, AM; In 2010-2013: BY, RU, UA, MD, GE; In 2009: BY, RU, UA, MD; In 2009: BY, RU, UA, MD.

Again, official population statistics does not take into account this massive inflow of people. Eurostat figures (see below) show even a population decline from 38.063 million in 2013 to 37.973 million in 2019. The underestimation of immigration (even though it is in most cases temporary) leads to the overestimation of GDP per capita in Poland in recent 4-5 years. It is even more the case with GDP per total employment indicator as immigrants are predominantly at the working age.

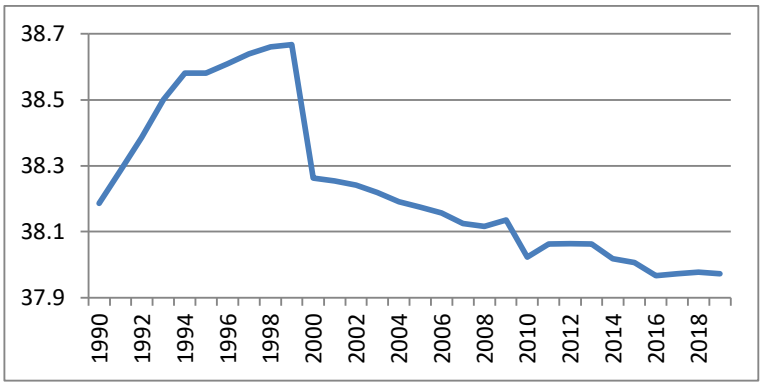

Fig. 3: Population in Poland (Millions)

Source: Eurostat.

The same problem is most probably present in other CEC countries (for example the Czech Republic) which also experienced influx of Ukrainian labour force.

It needs to be stressed that adequate assessment of immigration to Poland is not an easy task. The number of work declarations granted to aforementioned East European countries exceeds the number of persons applying for work (i.e. during one year two temporary permits could be granted to one person). On the other hand, Polish labour law offers several other forms of employment permits.

As noted by S. Izdebski Ukrainians could work in Poland on the basis of visa-free movement (for maximum 90 days) or visas in order to exercise work (for 6-12 months). After this period they have to return to Ukraine. Up to now (i.e. March-April 2020) the workplace emptied by these workers was granted to other workers with new permits and visas (Puls Biznesu 2020). Hence, temporary migrant workers were subject to constant rotation.

At the same time, there is a growing number of people possessing valid permits for long-term stay in Poland. The total figure increased by about 50 thousand annually in 2016-2019. On January 1 2020 as many as 423 thousand foreigners had such long-term valid permits. To put it into perspective on January 1 2019 and 2018 it amounted to 372 thousand and 325 thousand, respectively. Half of these people were Ukrainians. As of January 1 2020 the list of foreigners (i.e. 423 thousand) comprised (among others) the citizens of: Ukraine – 214.7 thous., Belarus – 25.6 thous., Germany – 21.3 thous., Russia – 12.5 thous., Wietnam – 12.1 thous., India – 9.9 thous., Italy – 8.5 thous., China – 8.5 thous., Great Britain – 6.3 thous., Spain – 5.9 thous., Georgia – 5.5 thous. and Moldova – 2.4 thousand (UDSC 2020). Almost 83% of all the foreigners possessing this document were at the age of 20-59. Thus, the majority were at the working age. The figures above do not take into account people whose temporary stay in Poland is based on visa or visa-free movement.

It is interesting to note that estimates by Ukrainian experts are higher than figures provided by Polish specialists. For example, according to Ukrainian Analytic Centre 1.2 million Ukrainians officially worked in Poland in 2016 (Solodko, Fitisova 2017). The same researchers also estimated that by the end of 2017 the number of Ukrainian workers would exceed 2 million people.

In the light of the above data, there is no doubt that the fifth recommendation of the so-called Warsaw Consensus (Piątkowski 2014; 2019), namely to open up to immigration, was very eagerly exercised by Polish authorities in the 2010s.

Crude comparisons of GDP per capita between countries do not take into account the amount of effort with which the GDP was produced. The OECD data clearly show that in developing countries this effort disproportionately rests on the labour force. Indeed, the discrepancies between the average hours actually worked (per capita paid employment) between countries are huge. In 2014 the figure in Mexico exceeded that in Poland by 15.9%. In contrast, in most West European countries it was much lower than in Poland, for example, by 12.8% in the UK, 16.3% in Sweden, 23.4% in France and 28.7% in Germany.

It is yet another proof that standard orthodox economic indicators such as GDP or GDP per capita do not adequately measure the level of sustainable development (not to mention quality of life). The gap between rich and poorer countries are simply more pronounced.

Finally, one should not overlook the fact that GDP is also used to measure spatial economic dispersion between regions in the economic order of SD. This fact, in turn, confirms GDP's hegemonic position. Interestingly, regional dispersion of GDP per capita (PPP) at NTS 3 level in former post-communist countries in most cases considerably exceeded the levels measured in affluent West European countries. The figure equals zero when the values of regional GDP per capita are the same in all regions. To illustrate the point, in 2011 the dispersion index amounted to: 45.5 in Bulgaria, 35 in Croatia, 42.1 in Estonia, 36.9 in Latvia, 40 in Romania, 35.2 in Slovakia, 44 in Hungary and 34.9 in Poland, while in Italy, Spain and France it amounted to only 25.2, 19.5 and 26.9, respectively (GUS 2015). The economic growth in most Central and East European countries was highly concentrated in several main regions or cities (especially the capital). This posed threat to territorial cohesion of Poland and many other CEE countries. This indicates that spatial order within the sustainable development is not adequately addressed. One of solutions is the ongoing development of longitudinal transportation projects aimed at intensification of trade and tourism between these countries.

Summary

The study by Polish Statistical Office significantly overestimates the information capacity of GDP by claiming that: „gross domestic product is a fundamental measure of economic development which in a concise form describes the fullest picture of national economy and the changes of economic structure" (GUS 2015: 139).

One has to agree with T. Sedláček and D. Orrell (2012: 60) who assert that GDP "pretends to be mathematics, but in reality it is not all about mathematics." To put it bluntly, this exaggerated

concentration on GDP masks deficiencies in many other spheres. Socio-economic development is a much broader concept than economic growth which is reduced to GDP dynamics. The sustainable development paradigm is also much broader than the concept of economic growth. Naturally, the criticism of GDP does not mean the outright discarding of this measure. It also should not lead to its replacement by any other "all encompassing" measure such as Gross National Happiness index as in the case of Bhutan for almost forty years. In many respects Bhutan differs from many other countries (also developing countries). It is a rather small kingdom with uncomplicated economy (Balasubramanian, Cashin 2019). Generally, the proper answer to neoliberal reductionism should be the broadening of socio-economic analysis.

Undoubtedly, the concept of sustainable development constitutes essential alternative to the dominant paradigm in economics. At the same time, it is much closer to heterodoxy which is a big advantage in the context of recent global financial crisis and subsequent Great Recession. However, the conducted analysis indicates gaps in the description of economic order of sustainable development paradigm. The list of indicators should be further extended and popularised in order to adequately evaluate monopolization, financialisation and the distribution of income.

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Verbal And Quantitative Algorithms For Assessing The University Management Quality

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Abstract

The important structural element of national higher education is the university. The level of specialists training in it is largely determined by the university management quality. This determines the importance of assessing of the university management quality. In practice, descriptive (verbal) assessments of the management quality (unsatisfactory, satisfactory, etc.) are often used. Therefore, the problem of validity of verbal assessment is important. The aim of this paper is to develop algorithms for quantitative assessment of the university management. The used database is information on the work of Russian universities. The research methodology is modeling and comparative analysis of empirical data on the activities of Russian universities. Conclusion: to improve the accuracy of the verbal assessment of the university management quality it is necessary to use quantitative estimates. The proposed model combines the construction of quantitative and verbal assessments of the management quality, which allows a more accurate verbal assessment of the quality of university management.

Keywords: Quantitative assessment of the university management quality, Verbal assessment of the university management quality, Algorithm s for assessing the university management quality

Introduction

The leadership of any university pursues the achievement of specific, predetermined strategic goals of its development and the solution of tasks that meet the achievement of these goals. These may be, for example, goals related to the development of university at all its levels — the entire university, faculty, specific educational program, or research project. At the same time, the management quality can be considered high only if these strategic goals and tasks are achieved and solved in a predetermined time frame and with the use of specified resources.

The problems of assessing the university management quality in scientific and practical literature are discussed quite actively (see, for example, Salmi (2009), Liman (2006), Rozovsky (2014), Achamer (2015), Vilgats & Heidmets (2011), Udam & Heidmets (2013), Biju & Nair (2017), Sima, Udam, Mattisenu and Lauri (2017)). However, most of the research is devoted to construction of descriptive

(verbal) assessments of the quality of university management. A specific feature of the research presented below is that it is devoted to the problems of building interrelated quantitative and verbal assessments of the quality of university management, and is a development of the authors' previous scientific works (Khalin, Chernova (2018), Belov, Chernova, Khalin, Kuznetsova (2018), Khalin V.G., Chernova G.V. (2019)).

The logic of the presented study, which determines the structure of the article, is as follows.

In the practice of university management, descriptive (verbal) assessments of the management quality are often used. As a rule, they require justification for the selection of their specific values. The reliability and accuracy of descriptive (verbal) quality assessments can be improved if the actual values of university activity indicators are used in determining their values.

That is why the article proposes the construction and use of quantitative assessments of the university management quality, on the one hand, calculated from the actual values of university activity indicators, and, on the other hand, linked to the values of verbal estimates of management quality.

The transition from a quantitative assessment of management quality to verbal is implemented on the algorithms developed and presented in the article. Through the proposed scaling procedure, algorithms, firstly, establish a mutual correspondence between the interval values of the quantitative assessment of the management quality and the specific values of the verbal evaluation. Secondly, they allow us to determine the specific meaning of the verbal assessment of the management quality based on the actual value of the quantitative assessment calculated on the real data basis.

The presented approach increases the reliability of the obtained verbal estimates, as they are ultimately determined by the actual quantitative values of university activity indicators.

The specific content of the algorithms for constructing quantitative and oral assessments which determine the quality of management depends on the level of the management problem.

Before an university management system for a certain period of time, different tasks can be posed, for example, achieving a certain value of a specific indicator of an university's activity, solving a certain management problem, or realizing some goal of university development.

Assessment of the university management quality for each of the management tasks has its own characteristics, the contents of which are taken into account in the proposed algorithms.

Realization of a specific goal of university development may include the solution of a number of specific management tasks, and the solution of any specific management task may suggest that some indicators of the university's activity should reach certain values.

This means a possible interconnection of the named management problems and, as a result, involves the complex simultaneous use of different algorithms, that confirms their interconnection.

So, when the management quality evaluating on the Realization of a specific goal of university development is, the algorithm of the management quality evaluating on solving a particular problem and the algorithm of the management quality evaluating on achieving by particular indicator of the university's activity of specific meaning can be used several times.

The contribution of this research is. First, the basis for constructing interconnected algorithms for quantifying the university management quality is the relationship of individual university activity indicators with the goals and objectives of university management. Secondly, the article proposes the options of establishing the correspondence of quantitative assessments with verbal. Thirdly, the article reveals the content of the proposed interconnected algorithms used to assess the university management quality on separate indicators, on solving specific tasks and on achieving certain strategic goals. Conclusion: the use of verbal assessments of the university management quality requires more

justification. Application of the proposed original quantitative approach allows to increase the reliability of the verbal evaluations, since the quantitative evaluations and verbal evaluations built on them are based on actual values of university performance indicators.

General Provisions

Need for Verbal and Quantitative Assessment of The Management Quality

The assessment of the university management quality can be verbal (poor, satisfactory and good) and quantitative, reflecting the degree (level) of achievement of the indicator value, solving the problem, achieving the goal.

The use of verbal assessment of the university management quality UMQ implies the possibility of applying of the different criteria for the selection of its specific value:

- expert opinion, determining the value of the verbal assessment of the University Management quality, formed on the basis of the experience of the experts themselves and analysis of the actual situation;
- values of the qualitative characteristics of various aspects of the university. So, if the university has the latest computer technology, then the quality of the University Management quality for solving such a task as providing technical equipment of the university can be assessed as good;
- quantitative assessment of the University Management quality, linked to different values of the verbal assessment of the quality of management. Its advantage is that it is based on the actual values of the performance indicators of the university, and therefore both estimates, quantitative and corresponding to verbal ones, are more accurate and objective.

The choice of the criterion for constructing a verbal evaluation remains for decision makers (DM). However, in view of the advantages of sharing quantitative and verbal assessments, we will dwell on this issue in more detail.

Options for the simultaneous use of verbal and quantitative assessments of the university management quality

Simultaneously, quantitative and verbal assessments can be used in assessing the quality of university management.

- on a separate indicator of its activities, for example, on an indicator of the average salary of university professors. It must be more than the average monthly wage calculated for the region, at least 2 times;
- on solving a specific management problem, for example, the task of creating a favorable system of academic contracts at the university requiring management of a number of indicators of its activities;
- to achieve the strategic goal set for a certain period, which involves solving a number of specific tasks. Such a strategic goal, for example, may be the creation of a favorable management system at a university aimed at attracting, retaining and developing any talents. Achieving this goal involves, inter alia, the solution of such tasks as the formation of a favorable system of hiring, work and academic contracts for professors; creation of favorable conditions for the admission of the most talented applicants, etc.

The above options for constructing estimates are related. Evaluation of the management quality to achieve the strategic goal involves the repeated construction of assessments of the management quality to solve all the problems (tasks) associated with the implementation of this goal. Assessment of the management quality on solving each of these tasks includes an assessment of the management quality to achieve a certain values of all indicators related to the corresponding task solution. This intercon-

nection of building assessments of the university management quality determines the interconnectedness of the algorithms used to solve them.

In general, a certain relationship should be established between verbal and quantitative assessments — the specific values of the quantitative assessment of the University Management quality must be matched to certain values of its verbal evaluation. It should be noted that the establishment of such compliance has its own characteristics, due to the variant of the task of assessing of the University Management quality: the management quality is evaluated on the achieving a certain value of its activity indicator; the management quality is evaluated on solving a specific management task or on achieving a certain strategic goal, which involves solving a number of management tasks.

Management Tasks and algorithms for assessing the quality of university management

Management Task 1 — Evaluation of the quality of university management to ensure a certain value of a specific indicator of its activities

It is carried out on the basis of the implementation of the simplest algorithm 1, applied to a specific indicator of the university's activities and including 2 stages.

Stage 1. *Construction scales of interval values of the studied indicator.* To solve the task of the university managing with respect to a separate indicator of its activity, it suffices to limit the construction of two interrelated scales that establish the relationship between the interval values of the indicator measured by natural (natural) units and verbal quality assessment. In tab. 1 presents an example 1 of building such scales for the indicator A.1 "Guaranteed amount of monetary reward for the month of the professor's work". In the table 1, compiled by the authors, an example 1 of constructing such scales for indicator A.1 "Guaranteed amount of cash compensation for the month of the professor's work" is presented.

Table 1: an example of interrelated scales in assessing the quality of management of indicator A.1 "Guaranteed amount of monetary remuneration for the month of the professor's work"

The scale of the values of the verbal quality assessment on the management of the indicator A.1 "Guaranteed amount of monetary remuneration for the month of the professor's work"	Quality of management is "bad"	Quality management is "Satisfactory"	Quality management is "good"
The scale of interval values of the indicator A.1 "Guaranteed amount of monetary reward for the month of work of the professor", measured by natural units	Less than twice of the average monthly salary in the region*	Not less than twice of the average monthly salary in the region, but less than four times the monthly average salary in the region*	More than four times of the average monthly salary in the region

**When establishing a scale of interval values of indicator A.1, linked to specific values of a verbal assessment of the management quality, here and in the future the authors took into account the requirements of the Decree of the President of Russia (Decree (2012)) and the real statistics of this indicator for the largest universities in St. Petersburg (Monitoring (2018).*

However, it should be noted that if these results are used to assess the quality of management of a university on solving a specific management problem to achieve a certain strategic goal, there is a problem of comparability, homogeneity of indicators measured by different natural (natural) units (rubles, hours, etc.) The comparability of such indicators can be provided by the transition from the values of the indicator, measured in natural units, to its values, measured in points (for example, on a 10-point system).

With further use of the analyzed indicator for the above cases, the scales construction involves the construction of not two, but three interrelated scales of interval values for each of the studied parameters.

Note that the conversion of the values of indicators measured in physical (natural) units to its point values, as well as the interrelated scales construction of interval values of indicators measured in natural and point units, require additional presentation and discussion. This is difficult to do because of the limited size of the article, and therefore is taken out of its limits.

In table 2 shows an example of building such scales for the indicator A.1 "Guaranteed amount of monetary remuneration for a month of a professor's work" for the case when it (this indicator) is used, for example, to solve such a problem of university management as creating favorable conditions of hiring, work and academic contracts university professors.

Table 2: example of interrelated scales construction when assessing the quality of management of indicator A.1 "Guaranteed amount of monetary remuneration for the month of the professor's work"

The scale of the values of the verbal quality assessment on the management of the indicator A.1 "Guaranteed amount of monetary remuneration for the month of the professor's work"	Quality of management is "bad"	Quality management is "Satisfactory"	Quality management is "good"
The scale of interval values of the indicator A.1 "Guaranteed amount of monetary reward for the month of work of the professor", measured by points*	From 0 to 5 [0; 5]	From more than 5 to 8 [5; 8]	From more than 8 to 10. (8; 10]
The scale of interval values of the indicator A.1 "Guaranteed amount of monetary reward for the month of work of the professor", measured by natural units	Less than twice of the average monthly salary in the region	Not less than twice of the average monthly salary in the region, but less than four times the monthly average salary in the region	More than four times of the average monthly salary in the region

** The boundaries of the scoring interval values of indicator A.1 here and in the future were established on the basis of expert opinion.*

Stage 2. *Evaluation of the university management quality based on the actual value of the studied indicator.* The actual value of an indicator measured in natural units is compared with its interval values, represented by natural units of measurement.

The hit of the actual value of the indicator in a certain interval of its values, measured in physical units, stage 1 determines

- the value of the corresponding verbal assessment of the management quality for this indicator, if it is a question of assessing the management quality only for this indicator,
- its assessment in points and the corresponding value of a verbal assessment, if it is a question of building more complex quality assessments.

Table 3 shows an example of the actual quality assessing of management at St. Petersburg State University by the indicator A.1 "Guaranteed amount of monetary remuneration for the month of the professor's work".

Table 3: an example of an assessment of the actual quality of management by indicator A.1 "Guaranteed amount of monetary remuneration for the month of the professor's work" (2017)

The scale of the values of the verbal quality assessment on the management of the indicator A.1 "Guaranteed amount of monetary remuneration for the month of the professor's work"	Quality of management is "bad"	Quality management is "Satisfactory"	Quality management is "good"
The scale of interval values of the indicator A.1 "Guaranteed amount of monetary reward for the month of work of the professor", measured by points	From 0 to 5 [0; 5]	From more than 5 to 8 [5; 8]	From more than 8 to 10. [8; 10]
The scale of interval values of the indicator A.1 "Guaranteed amount of monetary reward for the month of work of the professor", measured by natural units	Less than twice the average monthly salary in the region	More than twice the average monthly salary in the region, but not more than four times the average monthly salary in the region	More than four times the average monthly salary in the region
The actual value of the indicator A.1 "Guaranteed amount of monetary reward for the month of work of the professor", measured by natural units	53,094.96 r rubles [1]		

Based on the results of the application of the algorithm, the quality of university management to ensure the guaranteed size of the professor's monetary remuneration for a month of work is assessed as unsatisfactory.

Management Task 2 — Assessing the university management quality on solving a specific university management task

The quality of the solution of any problem is determined by the actual values of a number of indicators. Therefore, its assessment can be carried out on the basis of the implementation of algorithm 2, including the application of algorithm 1 inside it with respect to each of the indicators related to this task.

Stage 1. *The task formulation of the university managing, the quality of management on which will be evaluated.* It may be:

- attracting and retaining the best and most talented undergraduate and graduate students at the university,
- creation of favorable conditions for hiring, working and academic contracts of university professors etc.

For example, such a task will consider the creation at the university, for example, at the Faculty of Economics of St. Petersburg State University (SPbSU), favorable conditions for the hiring, work and academic contracts of professors. This task can be considered as one of those that must be solved in order to achieve such a strategic goal as the formation at the university of a constellation of talents — professors, researchers and students.

Stage 2. *Formation of a balanced scorecard used to assess the quality of university management on solving a specific management problem*. The development and adoption of any university management decision involves the use of certain information — those criteria and indicators that should describe the functioning of the university.

But it should include only the number of indicators that is necessary to describe the activities of the university and is sufficient for the management evaluation. The logic of the information formation used to assess the management quality for any object, including for a university, led to the introduction into scientific circulation of such a thing as "balanced scorecard".

In the general case, a balanced scorecard (SSP) is a system of indicators necessary for a complete and comprehensive description of the university management process, and sufficient for the assessment based on them to be reliable.

The originally balanced scorecard (BSC) was proposed by Robert S. Kaplan and David P. Norton as a system for measuring the performance of a financial company (Kaplan and Norton (1996).). Currently, the term "balanced scorecard (SSP)" is used both in a broad and narrow sense (see, for example, Balansed Scorecard (2018), Khalin, Chernova (2018b)).

Its use in a broad sense implies consideration of the BSC within the framework of the whole concept of development of a certain company, which unites the mission, strategic goals of development, the corresponding management system tasks, methods and ways to achieve them.

At the same time, only those of them that are necessary and sufficient to build an assessment of the company's development described by a certain concept are included in the BSC.

Leading foreign universities already have positive examples of actual use of BSC in a broad sense. Thus, management at the University of California[2] was aimed at achieving the goals and objectives arising from the concept of its development (Balansed Scorecard 2018).

The validity of the application for management and evaluation of its quality at the University of California of the balanced scorecard that meets the entire concept of its development (BSC in a broad sense) is confirmed by the leading positions of its member universities in authoritative world rankings. For example, in 2018, (UCLA (2018)), in the Top 100 of the Shanghai World University Rankings (ARWU), the University of California is represented by six out of 10 universities: University of California, Berkeley — 4th place; University of California, Los Angeles — 11th place; University of California, San Diego — 15th place; University of California, San Francisco — 21 place; University of California, Santa Barbara — 46th place; University of California, Davis — 96 place (UCLA 2018).

In the Russian higher education, the concept of BSC in a broad sense is not yet used, at least in relation to the strategic management and development of universities.

That is why this article offers options for applying this concept in the narrow sense — when the BSC does not cover the whole concept of the university’s strategic development, but is formed to assess the management quality to achieve a certain indicator value, to solve a specific task and to achieve a specific goal of university development.

For an example of stage 1 of this algorithm, i.e. to solve the task of creating favorable conditions of hiring, work and academic contracts for university teachers, indicators can be used

A.1 "Guaranteed remuneration for the month of the professor’s work",
A.2 "Guaranteed duration of the academic contract with a professor",
A.3 "The value of the classroom professor's load",
A.4 "The level of social support of professors ("social package")".

Stage 3. *Ranking of the BSC indicators used to assess the quality of university management in solving the named university management task.* The priority of indicators of BSC can be expressed by the values of weights. The indicators presented at stage 2 can be ranked as follows: the weighting coefficient 0.4 corresponds to indicator E.1; weighting coefficient 0.3 – to indicator E.2; weighting coefficient 0.2 – to indicator E.3; a weighting coefficient 0.1 – to indicator E.4.

Stage 4. Construction scale of interval *values of indicators expressed by natural units, interval point (score) values of these indicators and verbal assessment of the university management quality.* This stage assumes, for each of the indicators used to describe the task of the university managing (in our example for indicators A.1, A.2, A.3 and A.4), the use of stage 1 of algorithm 1 (example 2). Its result will be a collection of tables (by the number of indicators used), similar to Table 2 (Stage 1 of Algorithm 2, Example 2).

Stage 5. *Determination of the indicators' actual scoring (point) values used to assess the quality of university management in solving the specific managerial problem under consideration.* For each of the balanced indicators used to describe the task of managing the university, according to the actual value of the indicator, based on the results of the scaling of stage 5 of this algorithm, tables similar to table 3 are built (Step 1 of Algorithm 2, example 2).

They are determined by the actual point (score) value of the corresponding indicator. Since all indicators are expressed in points, they become comparable and comparable.

The result of this stage can be a table of final actual point values of indicators used to assess the management quality on solving a specific management problem.
In the presented example, they are given in table 4.

Table 4: actual values of indicators used to calculate the assessment of the university management quality on solving the task of creating favorable conditions for hiring, work and academic contracts for professors at the Faculty of Economics of St. Petersburg State University (2017)

Indicators	Actual values in natural units	Actual values of indicators in point units (A_i^B)	The actual verbal quality assessment of the management on the relevant indicator
A.1 "Guaranteed remuneration for the month of the professor's work"[3]	53,094.96 rubles	2	bad
A.2 "Guaranteed duration of the academic contract with a professor"	2 years	2	bad
A.3 "The value of the classroom professor's load"	8 aud. hours per week per lesson year	6	satisfactory
A.4 "The level of social support of professors ("social package") ".	5	5	satisfactory

Stage 6. *Calculation of a quantitative assessment of the university management quality on the solving a specific management problem.* This assessment can be used not only independently, but also to assess the university management quality in order to achieve a certain strategic goal of the university development, which implies, among other things, a solution to this task.

По этой причине назовем ее как субиндекс качества управления вузом (Index of University Management Quality — IUMQ) по решению рассматриваемой задачи, в то время как оценку качества управления вузом по достижению стратегической цели, предполагающей решение этой задачи, назовем как интегральный индекс качества Integral Index of University Management Quality (IIUMQ).

For this reason, we call this assessment as a subindex of university management quality (Index of University Management Quality — IUMQ), while the assessment of university management quality

on achieving the strategic goal, which involves solving this problem, we call as Integral Index of University Management Quality (IIUMQ).

The subindex IUMQ is calculated taking into account, firstly, the chosen method of convolution of all indicators used to solve the problem, and, secondly, taking into account the results of ranking of these indicators (stage 3 of the algorithm). For example, with a linear convolution of the indicators selected at stage 2 of the algorithm, but taking into account their ranking (stage 3 of the algorithm), the subindex will be calculated by the formula:

IUMQ = 2/5*A.1P + 3/10*A.2P +1/5*A.3P + 1/10*A.4P =

= 2/5*2 + 3/10*2 +1/5*6 + 1/10*5 = 3.1

where A.1P, A.2P, A.3P, A.4P — point actual values of indicators A.1, A.2, A.3, A.4.

Stage 7. Construction scale of verbal and quantitative assessments of the university management quality on solving a specific management problem. It involves the construction of two interrelated scales which establish the correspondence between the values intervals of the subindex in points and the verbal assessment of the university management quality on solving a specific management problem (Table 5).

Table 5: an example of interrelated quality management scales for a higher education institution for solving a specific management problem

Scale of values of the verbal assessment of the university management quality on solving a specific management problem	Quality of management is "bad"	Quality management is "Satisfactory"	Quality management is "good"
The scale of the point interval values subindex[4]	From 0 to 5 [0; 5]	From more than 5 to 8 [5; 8]	From more than 8 to 10 [8; 10]

Stage 8. *Verbal assessment of the university management quality on solving a specific management problem.* First of all, the scoring interval of the subindex is determined, into which the real value of the subindex falls (tab. 6). It (the actual value of the subindex) is calculated on the basis of the actual values of the indicators of university activities. The found scoring interval indicates the corresponding value of the verbal assessment of the quality of university management in solving the set task. Tab. 6 contains an example of establishing correspondence between a point and a verbal assessment of the quality of university management when the point grade, for example, is 6.

Table 6: an example of the value determining of a verbal assessment on the university management quality on solving a specific management problem

Scale of values of the verbal assessment of the university management quality on solving a specific management problem	Quality of management is "bad"	Quality management is "Satisfactory"	Quality management is "good"
The scale of the point interval values subindex субиндекса	From 0 to 5 [0; 5]	From more than 5 to 8 [5; 8]	From more than 8 to 10. [8; 10]
The actual value of the subindex		6	

The result of applying the algorithm is as follows. A quantitative assessment of the management quality for solving the specific problem of creating favorable conditions for the recruitment, work and academic contracts of university professors, found on the basis of specific values of its performance indicators, is 6 points. It meets the satisfactory quality of university management in solving this specific problem.

Management Task 3 — Assessing the university management quality on achievement of a specific strategic goal

Stage 1. *The formulation of the strategic goal of the university management system.* The quality of university management to achieve a certain strategic goal is determined by the solution of a number of specific tasks. Therefore, its assessment can be carried out on the basis of the implementation of Algorithm 3, including the application of Algorithm 2 in relation to each of the tasks being solved, and the application of Algorithm 1 in relation to each of the indicators characterizing all the tasks.

The strategic goals of university development can be very different. For example, it may be such a goal as attracting and retaining the best professors and teachers at the university. Such a goal, for example, is provided by the Salmi model (Salmi J. (2009)) for the formation of world-class universities.

Stage 2. *Formulation of university management tasks that need to be solved to achieve the goal.* Achieving a specific goal involves solving a number of university management tasks, including, for example, such as creating favorable conditions on hiringt, work, and academic contracts for university professors at a university (stage 1 of Algorithm 2).

Stage 3. *Ranking of tasks solved by the university to achieve the strategic goal of the university development.* The priority of these tasks can be expressed by the values of weights assigned to the tasks, taking into account, for example, the opinions of experts.

Stage 4. *Formation of a Balansed Scorecard,* used to assess the quality of university management for solving each of the tasks related to the achievement of the strategic goal of the university development. It should be noted that the process of forming the BSC can be carried out separately for each of the tasks to be solved, and can occur on the basis of target selection of indicators for each of the tasks from the general initial base of indicators characterizing all the activities of the university.

Stage 5. *Calculation of subindex* — assessments of the university management quality on solving each of the tasks that affect the achievement of the strategic goal of the university development. It is carried out for each of the tasks and involves the use of algorithm 1, taking into account the number of indicators used to solve each of these tasks.

Stage 6. *Calculation of the Integral Index of University Management Quality (IIUMQ)* — of the quantitative assessment of the university management quality on achieving the strategic goal of the university development. Suggests

- using the values of subindex found in step 5 for each of the tasks being solved,
- selection of the subindex convolution method (for example, the linear method),
- accounting of the ranking tasks.

It is implemented like step 6 of algorithm 2.

Stage 7. *Construction scaling of the verbal and quantitative assessments of the university management quality on achieving the strategic goal.* It involves the construction of two interrelated scales that establish the correspondence between the values intervals of the integral index in points and the verbal assessment of the university management quality on achieving the goal (similar to stage 7 of Algorithm 2).

Stage 8. *Verbal assessment of the university management quality on achieving the strategic goal.* It is conducted similarly to the content of stage 8 of Algorithm 2.

The result of the algorithm application will be a quantitative assessment of the university management quality to achieve a specific strategic goal. Found on the basis of specific indicators of the university's activities, it is the justification of the value of the generated verbal assessment of the university management quality to achieve this strategic goal.

Conclusion

The descriptive (verbal) assessments of the university management quality used in practice (the quality of management is poor, satisfactory, etc.) require serious justification for choosing their specific values.

To increase the justification of the choice of certain values of the verbal assessment of the management quality, the article proposes a model for determining the specific values of verbal estimates.

It is based on the construction of quantitative assessments of the university management quality, which (quantitative assessments) are based on actual values of university performance indicators.

The article proposes interconnected algorithms for the joint construction of quantitative and verbal assessments that are used to assess the quality of university management on a separate indicator of its activity (algorithm 1), on solving a specific problem of its management system (algorithm 2) and for achieving a specific strategic goal of university development (algorithm 3).

Algorithm 1 is used in Algorithm 2 as many times as many indicators describe the solution to a particular problem. Algorithm 2 is used in algorithm 3 as many times as many tasks must be solved to achieve the goal of university development.

The model proposed by the authors to determine the specific values of the verbal assessment of the university management quality at different levels, additionally involves solving the following issues disclosed in this article: the use of different systems of balanced indicators of the university activity, due to the difference in the content of different tasks of university management; the construction of scales of interval values of indicators, sub-indices and integral index associated with a verbal assessment of the management quality; the conversion of the indicators values expressed in natural units of measure into their scoring (point) values; determination of scoring (point) and descriptive (verbal) assessments of the university management quality when solving of management problems at different levels.

The proposed interconnected algorithms for determining the values of descriptive (verbal) assessments of the university management quality are based on quantitative estimates calculated on the basis of actual values of university activity indicators.

This ensures the validity and accuracy of the values verbal assessment of the university management quality on solving problems of the university management at different levels.

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[1] This level of monetary remuneration in 2017 amounted to only 97.7% of the average accrued wages in St. Petersburg for 2017 (the average accrued in St. Petersburg in 2017 was equal to 54,353 rubles), which is significantly below 200%, as provided for Decree of the President of Russia dated May 7, 2012 No. 597).

[2] The University of California is a unified university system that unites 10 public universities in California, including: University of California, Berkeley, University of California, Los Angeles, University of California, San Diego, etc.

[3] The values of the indicator E.1 at St. Petersburg State University depend essentially on a specific faculty. Indicators E.2, E.3, and E.4 data on are not present on the website of the university. The values of these indicators were chosen by the authors according to full-time professors information at the department of information systems in economics for the 1st semester of 2018-2019 academic year.

[4] The values of the scoring interval values of the subindex in the table are given for example.

Corporate Social Responsibility as an Element of SME Management in Poland

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Abstract

The aim of the article is to present the concept of corporate social responsibility as one of the aspects of management in the sector of small and medium-sized enterprises operating in Poland. In the first part of the study, the nature of corporate social responsibility was presented and its role in business management was indicated. Subsequently, the state of knowledge on social responsibility in small and medium-sized enterprises and practices undertaken in this respect in key areas of CSR were analysed. On this basis, an attempt was made to assess the degree of SME involvement in the implementation of corporate social responsibility activities.

Keywords: corporate social responsibility (CSR), good practices, management, small and medium-sized enterprises.

Introduction

Corporate social responsibility (CSR) has been drawing constant attention already for several decades, becoming an integral part of the world of business and science. The belief that concentrating solely on economic effects is insufficient for the operation and development is becoming more and more common among entrepreneurs. Therefore, enterprises become increasingly actively involved in activities for the broadly understood social interests and ecology.

The complexity and multidimensionality of the CSR concept implies the emergence of its numerous definitions. The first of these was created as early as in the 1950s. of the 20th century and defines corporate social responsibility as a commitment of the entrepreneur to conduct policy, make decisions and conduct activities that will be consistent with the goals and values of the society (Bowen, 1953). Currently, one of the more frequently cited definitions presents CSR as a concept according to which enterprises voluntarily consider social and environmental problems both in their activities and in their interactions with stakeholders (Green Paper, 2001; Zafar and Farooq, 2014). Therefore, the above-mentioned definitions indicate that the concept of CSR covers the economic, social and environmental aspect (Castejón and López, 2016; Banasiak, 2014). The first of them is associated with the development of the enterprise based on ethical management, use of honest business practices and offering socially desirable, safe and good quality products of its operation. The social aspect refers to issues related to job creation, development of the staff, raising the standard of living of employees, ensuring health protection and safety at work, undertaking initiatives for the local community, avoiding discrimination and respecting human rights. In turn, the environmental aspect is related to the impact that enterprises exert on the environment through their activities and the measures taken to protect it.

To summarise, it should be noted that CSR defines a new framework for enterprise management that includes operation compliant with corporate ethics, respect for legal norms and human rights, as well as respect for the needs of stakeholders (Castejón and López, 2016; Banasiak, 2014). Hence the recommendation included in the international ISO 26000 standard dedicated to social responsibility, according to which CSR should be an inseparable part of the enterprise basic strategy (ISO 26000).

The implementation of the CSR concept is usually associated with large enterprises, because it is recognised that in the past it was mainly addressed to corporations. The reason may also be the ease

of access to data in large enterprises and the possibility of allocating significant financial resources to this purpose (Rojek-Nowosielska, 2008; Leoński, 2015). However, more and more often the benefits of applying the principles of social responsibility start to be noticed by enterprises belonging to the small and medium-sized enterprises (SME) sector (Ma, 2012). These mainly include: competitive advantage, greater commitment of the staff, better customer understanding and satisfaction, better reputation (Turyakira, Venter and Smith, 2014; Castejón and López, 2016; Ratajczak and Stawicka, 2008). Therefore, these entities should be interested in undertaking activities in this area. The implementation of CSR principles in small and medium-sized enterprises is also of great importance for the development of modern societies. These entities, due to the dominant advantage in terms of both size and employment, as well as their contribution to the creation of GDP, have a huge impact on the development of socio-economic conditions in the country (Zafar and Farooq, 2014; Lachiewicz and Matejun, 2012).

The aim of the article is a presentation of the concept of corporate social responsibility as one of the aspects of management in the sector of small and medium-sized enterprises operating in Poland and an attempt to assess the implementation of activities in the area of CSR. The state of knowledge on social responsibility in small and medium-sized enterprises and activities undertaken in this respect in key areas of CSR were analysed.

Materials and Methods

For the purpose of the present paper, the desk research technique, which consists in analysing already available data and information, was applied. Research activities included the analysis of data on the involvement of SMEs in activities for social responsibility and barriers inhibiting these initiatives. The data for this analysis was taken from the report entitled *CSR w MSP. Pod Lupą*, and they relate to 500 surveyed entities operating in Poland included in the sector of small and medium-sized enterprises. The study covered 200 micro-, 200 small and 100 medium-sized enterprises in the following industries: services (120), trade (110), production (100), construction (60), transport (50), hotels and gastronomy (40) as well as agriculture and processing (20).

Subsequently, research activities included analysis of data on the implementation of the so-called good practices in the area of responsible business undertaken by SMEs in Poland. The research was conducted on the basis of data contained in the reports "Responsible Business in Poland. Good practices" developed by the Responsible Business Forum association. They contain examples which, according to the authors of the report, best present the involvement of enterprises in implementing the principles of responsible business in Poland. Good practices are presented in key CSR areas which include: organizational order, human rights, work practices, environment, fair operating practices, consumer issues as well as social involvement and local community development. Examples of good practices contained in the publication come from notifications made by enterprises and concern the years 2012-2018. As part of the analysis, a comparison of changes in the number of activities (good practices) undertaken by SMEs in all CSR areas in individual years of the study period with respect to other enterprises included in the reports was made.

In the present study, statistical data from the annual report of the Statistics Poland (GUS) – "Działalność przedsiębiorstw niefinansowych w 2018" were also used. This publication presents information on the structure and economic results of non-financial enterprises conducting business activity in Poland in 2018. The data for the report were obtained from the following statistical forms: SP – Annual enterprise survey and SP-3 – Report on the business activity of enterprises.

Results and Discussion

The SME sector in Poland constitutes the largest group of business entities.[1] Their share in the structure of enterprises in 2018 was as much as 99.8%. Among them, the overwhelming majority

[1] This concerns non-financial enterprises, which are juridical persons, entities without legal personality and natural persons conducting business activity classified according to PKD 2007

were micro-enterprises, which were 2 million and constitute 96.7% of the total number. On the other hand, the percentage of small and medium-sized enterprises amounted to 2.4% (less than 53 thousand entities) and 0.7% (over 15 thousand entities), respectively. Large enterprises had the smallest percentage in the total number of business entities – only 0.2%, which corresponds to over 3.5 thousand enterprises. In addition to the dominant number of SMEs, they also have a significant impact on the generation of Polish GDP, constituting almost 50% of its value. Also in this case, micro-enterprises constitute the group with the largest share in creating its value, which is approximately 30%. In addition, approximately 68% of all people employed in enterprises were employed in the SME sector, while 40.8% of them were employed in micro-enterprises (Działalność..., 2019, pp. 19 and 21). The quoted data clearly indicate that the small and medium-sized enterprises sector is extremely important for the functioning of the entire socio-economic system. Therefore, it is reasonable to analyse the involvement of these entities in the implementation of CSR initiatives.

The first area of the analysis undertaken in this study will concern the issue of knowledge of the concept and the nature of corporate social responsibility among enterprises and the degree of implementation of initiatives they have declared in this respect (Table 1).

Table 1: Knowledge and implementation of CSR activities in SMEs

By place of business									
Details	**Village**			**Cities up to 500 thousand inhabitants**			**Cities of over 500 thousand inhabitants**		
	Y*	N*	Dk/Ds*	Y	N	Dk/Ds	Y	N	Dk/Ds
Knowledge of the CSR concept in [%]	17	76	7	24	72	4	27	69	5
Implementation of CSR activities in SMEs [%]	75	13	12	57	34	10	73	19	9

By the achieved turnover												
Details	below 1 million PLN			1-5 million PLN			5-20 million PLN			over 20 million PLN		
	Y	N	Dk/ Ds	Y	N	Dk/ Ds	Y	N	Dk/ Ds	Y	N	Dk/ Ds
Knowledge of the CSR concept [%]	15	79	6	20	73	7	34	62	4	32	68	-
Implementation of CSR activities [%]	44	42	14	67	23	10	84	10	6	75	21	4

Source: On the basis of: Report 2019 CSR w MŚP. Pod Lupą, p. 27.
** Y- yes, N- no, DK/DS – I do not know, Difficult to say.*

The data presented in Table 1 show that irrespective of the size of the locality in which the surveyed entities operate, as well as the turnover achieved by them, a very large percentage among them declare that they do not know the concept of corporate social responsibility. This percentage is slightly lower in enterprises operating in large cities and generating higher turnover, however it remains at a high level of 60-70%. In case of enterprises operating in villages or achieving lower turnover, this percentage reaches almost 80%. Therefore, the level of indications regarding the second examined aspect, which is the implementation of activities related to social responsibility is surprising. This is because It turns out that after learning about the definition and idea of CSR, respondents declare that such initiatives are implemented in the surveyed entities. The percentage of enterprises declaring such activities is at a high level, usually over 70%. In the case of the locality

(Polish Classification of Activities) in the following sections: B-J, L-N, P-S, excluding cultural institutions having legal personality, institutions of higher education, independent public health care institutions, activities of membership organizations.

size criterion, the highest level is demonstrated by those entities which operate in villages. Such results suggest that in case of SMEs, social responsibility initiatives are undertaken intuitively, unplannedly and most likely are a response to the immediate needs of the local society, which confirms the above-quoted remarks regarding the dependence of these enterprises and the local environment. Certainly, even such spontaneous activities should be considered in the most positive terms. Nevertheless, consciously undertaken initiatives have a chance to be more effective, because they can be properly planned, and it is possible to choose the best tools or be able to prevent potential difficulties in their implementation.

In turn, Table 2 presents various forms of CSR initiatives undertaken in three areas of activity significant for SMEs, namely: in relations with employees, business partners and the social environment.

Table 2: Activities undertaken in the field of CSR in SMEs

Undertaken activities*		Percentage of enterprises undertaking activities
Area of relations with employees	Providing conditions for professional development, training opportunities	58
	Activities aimed at facilitating the reconciliation of professional and family roles	57
	Adaptation of the work environment, machines and technical devices to the needs of employees and minimising the negative impact of workplace factors on employees' health	55
	Activities aimed at reducing occupational stress	47
	Activities promoting an active lifestyle	32
	Introducing solutions to facilitate the functioning of disadvantaged groups in the workplace	28
	Supporting pro-diversity activities	27
	Corporate volunteering	22
	Activities to promote a healthy diet	19
	No activity is is undertaken in this area	6
	Other activities	1
	I do not know, difficult to say	2
Area of relations with business partners	Transparent regulations for the sale of products/services	63
	Monitoring customer satisfaction with the quality of service	56
	Transparent information about the enterprise activities (e.g. on the level of salaries in the enterprise, profit margins)	41
	Introducing solutions enabling and/or facilitating cooperation with representatives of disadvantaged groups	33
	Determining and verifying ethical and legal requirements posed to business partners	21
	I do not conduct activities in this area	11
	Organising aid/volunteer events addressed to customers (e.g. food collection among people making purchase)	10
	I do not know, difficult to say	5
Area of relations with the social environment	Actions for the local natural environment (e.g. participation in the Clean Up the World action, planting trees around the enterprise)	39
	I do not conduct activities in this area	35
	Financial support for local non-profit organizations (NGOs)	32
	Material support for local non-profit organizations (NGOs)	23

	Activities aimed at animating/activating the local community (e.g. organising neighbourhood and socialising events	9
	Other activities	1
	I do not know, difficult to say	4

Source: On the basis of: Report 2019 CSR w MŚP. Pod Lupą, pp. 30-31.
**more than one activity could be indicated.*

Based on the analysis of the data contained in Table 2, it should be stated that significant activity of the surveyed entities occurs in the area of relations with employees and business partners. Lack of activity in these areas was very low – 6% and 11%, respectively.

In case of relations with employees, in two cases the percentage of enterprises undertaking CSR initiatives reached the level of almost 60% in very important issues: on the one hand ensuring appropriate conditions for professional development, and on the other hand – maintaining work-life balance . A significant percentage of enterprises also introduces health protection activities both in the context of preparing an appropriate workplace (55%) and caring for the psychological and physical condition of employees (reducing occupational stress – 47%, promoting an active lifestyle – 32% and healthy diet – 19%).

In turn, the area of relations with business partners was dominated by initiatives related to the application of transparent sale regulations (63%), monitoring customer satisfaction (56%) and informing about the enterprise activities (41%), which undoubtedly has a positive impact on its perception by this group of stakeholders.

The responses in the area of environmental protection are slightly different. Despite the fact that SMEs are indicated to be close to the local environment, as many as 35% of respondents declared that they did not undertake any activity in this respect. Only 39% of the surveyed enterprises undertake activities for the benefit of the local natural environment, while they are more involved in material or financial support of local non-profit organizations.

When analysing the activities of SMEs in the area of corporate social responsibility, one cannot ignore the issue of limitations hindering or preventing their undertaking (Table 3).

Table 3: Barriers to undertaking CSR activities in SMEs

Details*	What discourages my enterprise from activity (%)	What discourages other enterprises from activity (%)
Lack of knowledge how to implement such activities	71	70
Lack of funds for implementing CSR activities	69	70
Lack of time	50	47
Lack of interest in CSR activities among employees	45	46
Logistic difficulties	43	37
Lack of conviction of the management that CSR activities will translate positively, measurably into the operation of the enterprise	37	46
Fear of being misunderstood by the environment/ customers/business partners	30	31
I do not know, difficult to say	4	6
Other factors	2	1
Answer refused	1	0

Source: On the basis of: Report 2019 CSR w MŚP – Pod Lupą, pp. 36-37.
**more than one indication could be made.*

According to respondents, the biggest barriers limiting undertaking activity in the area of social responsibility is the lack of knowledge concerning the method and possibility of the implementation of these activities, and the lack of funds to finance them. The reason for the formation of the first of these limitations may be the lack of knowledge on the concept and idea of CSR, as shown in the previous comparison. This ignorance, according to the author, may also have an impact on the emergence of limitation related to the lack of interest among employees in CSR activities, as well as the lack of conviction of the management about the benefits of implementing the principles of social responsibility for the operation of the enterprise.

Another source of data for the analysis undertaken in this study are the reports entitled *"Responsible business in Poland. Good practices"*. This is one of the most comprehensive reports presenting the activities undertaken as part of corporate social responsibility by entities operating in Poland. In Table 4, the data on the number of implemented CSR activities (so-called good practices) in small and medium-sized enterprises in comparison to other entities undertaking such activities, were summarised.

Table 4: Practices performed as part of CSR in SMEs in comparison to other entities

Details		2012	2013	2014	2015	2016	2017	2018	Total
Number of performed practices	Practices performed in SMEs	28	66	43	48	51	62	94	392
	practices performed in all entities	262	403	420	454	461	639	826	3465
	Percentage of practices performed in SMEs (%)	10.7	16.4	10.2	10.6	11.1	9.7	11.4	11.3

Source: own work based on Raport: Odpowiedzialny biznes w Polsce. Dobre praktyki for the years 2012-2018.

Based on the data presented in Table 4, it results that the total number of practices performed in the study period (by all entities included in the report) was 3,465, out of which only 392 were in the SME sector, which represents only slightly more than 11% of their total number. In case of the total number of practices, their annual increase throughout the entire study period is clear. Unfortunately, this trend does not occur in case of SMEs. A significant increase in their activities took place in 2013 compared to the previous one (by 38 practices) and in 2018 compared to 2017 (by 32 practices). The year 2013 was also the most significant in terms of the percentage of activities undertaken by SMEs in their total number (16.4%). In the remaining years, this percentage was approximately 10-11%. Certainly, such results cannot be considered as fully satisfactory. Nevertheless, taking into account the previous remarks regarding the insignificant awareness of the very idea of CSR among entities of the SME sector, it should be considered positive that despite all, the trend in the number of undertaken activities is growing. In the last year of the study period, 94 practices were reported, which constitutes over three times more activities compared to 2012.

A more detailed analysis of good practices undertaken in the group of small and medium-sized enterprises will concern particular key areas of CSR. Such a summary is presented in Table 5.

Table 5: Practices performed in key CSR areas by SMEs in Poland in 2012-2018

Year / Areas of CSR	2012	2013	2014	2015	2016	2017	2018	Total
Organizational order	1	3	4	1	2	5	9	25
Human rights	-	1	1	4	2	2	1	11
Work practices	4	9	5	4	3	8	17	50
Environment	6	9	6	5	8	7	14	55
Fair operating practices	2	5	7	5	6	4	4	33
Consumer issues	1	1	-	-	4	7	2	15
Social involvement and local community development.	14	38	20	29	26	29	47	203
Total number of practices for SMEs	28	66	43	48	51	62	94	392

Source: own work based on Raport: Odpowiedzialny biznes w Polsce. Dobre praktyki for the years 2012-2018.

Analysis of the data contained in Table 5 in terms of the frequency of application of practices in individual CSR areas clearly indicates that the largest number of them was implemented in the area of social involvement and local community development. Over the study period, as many as 203 activities in this area were undertaken, which represents almost 52% of all performed activities. The majority of initiatives undertaken in this area occurs in each year of the study period, and their number in the last year is more than three times greater than at the beginning (it should be noted that this increase does not occur successively from year to year). This phenomenon should be interpreted as a definitely positive one, especially because this area is an integral part of sustainable development. In addition, such numerous initiatives in this area seem to confirm the postulate about the significant relationships between entities of the SME sector and the local community. The reason why numerous activities are being undertaken in this area may also be the fact that they are usually of an individual nature and do not involve significant financial outlays, which, as mentioned earlier, is one of the major limitations in undertaking CSR initiatives.

A relatively large number of activities was also performed in the area of environmental practices (55) and work practices (50), which represent 14% and 12.8%, respectively of all undertaken initiatives. In the first of these areas, the number of introduced practices has more than doubled over the last year, which indicates that small and medium-sized enterprises are becoming increasingly involved in pro-environmental activities. In case of work practices, the year 2018 was also the one, in which the most initiatives were undertaken. This means that for SMEs employee-related matters are becoming one of the priority issues implemented as part of social responsibility, which would coincide with the previously quoted declarations of the surveyed entities.

Next, in terms of the number of undertaken activities, is the area of fair operating practices (8.4% of the total number of activities undertaken during the study period). Unfortunately, in this case within the last two years there has been a decrease in the number of introduced practices, especially compared to 2014 and 2016. Practices in this area mainly concern relations with suppliers, market education or dialogue with stakeholders. Therefore, enterprises should be very interested in their implementation for correct relations with broadly understood stakeholders, which undoubtedly affects the positive perception of enterprises by these stakeholders.

The area related to organizational order is very important from the point of view of implementing CSR activities. Because of the fact that it is a system that allows making and implementing decisions in an enterprise, it is a very important factor enabling integration of social responsibility with the operations strategy of the entity. Therefore, it is considered to have a significant impact on other areas implemented within CSR. As it results from the data presented in the table, 25 practices were

performed in this area in the entire analysed period, which constitutes over 6% of all undertaken activities. Most of them were performed in the last two years of the study period. This is not a significant number, however, because of the complexity and difficulty of the involved issues, it can be considered satisfactory. All the more so because a similar percentage of practices in this area was recorded in the same period in all entities included in the reports used for the analysis (Kuraś, 2019).

However, the smallest number of activities was performed in the area of human rights and consumer issues. In the area of human rights, only 1-2 practices were performed in individual years. In the second case, in 2014-2015 no activities were conducted in that area. According to the author, such a phenomenon may be the result of ignorance of more detailed issues falling within the scope of those areas.

Unfortunately, based on the analysis of all activities in all areas of CSR, it is difficult to notice a successive increase in their number. Performed practices seem rather immediate measures, there is no regularity in their implementation. The situation looks best in the area of social involvement and development of the local community, where, in addition to the largest number of undertaken activities, their successive growth and regularity can be observed. The fact that in the area of organizational order in the last two years of the study period there was a significant growth dynamics of performed activities is optimistic. This is all the more important as this area is crucial for the conscious management of activities in the area of social responsibility.

Conclusion

The considerations made in the article allow to draw the following conclusions:

1. In the SME sector, a very low level of knowledge of the concept and idea of corporate social responsibility is observed, while in enterprises operating in towns/cities it is slightly higher than in those operating in villages.

2. After learning about the definition and assumptions of CSR, a high percentage of surveyed enterprises declares the implementation of activities in this respect, but it is higher in case of enterprises operating in villages than those operating in towns/cities.

3. Because of the lack of knowledge about the concept of CSR, activities in this area are undertaken intuitively and accidentally, without a clear strategy in this respect.

4. The biggest barriers limiting undertaking activity in the area of social responsibility is the lack of knowledge concerning the method and possibility of the implementation of these activities, and the lack of funds to finance them.

5. Practices implemented as part of CSR by entities of the SME sector constitute a small percentage of activities undertaken by all enterprises, which is at the level of 10-11%.

6. Among the entities of the SME sector there is a slow increase in the number of so-called good practices in the field of social responsibility. Admittedly, the number of practices in individual areas does not increase successively from year to year and is irregular, however, it proves the increasing involvement of SMEs in the implementation of social responsibility initiatives.

7. The largest number of activities was undertaken in the area of “Social involvement and local community development”. The dominance of practices in this area occurred in each year of the examined period. According to the author, the intensity of activities in this area is the result of, on the one hand, strong relationships between these entities and the local community, on the other, the fact that activities undertaken in this area usually do not require high financial outlays.

8. Numerous practices were also undertaken in the areas of: "Environment" and "Work practices". According to the declarations of enterprises in the area of relations with employees, the activities concerned ensuring adequate development conditions and maintaining work-life balance.

Although a high percentage of enterprises from the SME sector declares that they undertake activities in the sphere of CSR, the analysis of the number of practices implemented by these entities in the study period indicates that they are not very numerous. According to the author, this is because of the fact that the practices included in the reports "Responsible business in Poland. Good practices" are reported by enterprises themselves, and because the majority of them implement the practices unconsciously, they are simply not included in the mentioned reports. However, it should be considered positive that the number of implemented practices is slowly increasing in most areas, which can be considered a slow increase in the involvement of SME sector enterprises in CSR activities.

It is very important to raise the level of knowledge about corporate social responsibility among SMEs, because it will allow for activities in this area in a non-accidental and orderly manner. It will increase the efficiency and number of undertaken activities and will enable appropriate tools to be prepared and optimal methods for their implementation to be used. Therefore, it will allow for better management of activities in the area of social responsibility in this group of enterprises.

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Factors Influencing Employment in An AI Era

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Abstract

Artificial intelligence (AI) is currently outsourcing the skills of the human resources to an extent to which it can transform them from an asset to an outsider of the labor market. Nowadays, more than ever, the human needs are increasingly met by using technology and artificial intelligence, polarizing the labor force in terms of its ability to adapt to change and progress. The paper aims to capture the perception of students from the final years of three master programs from Politehnica University of Bucharest about the impact of technology and artificial intelligence on jobs in order to demonstrate that higher education supports a proactive attitude in front of changes generates by AI on jobs. The methodology includes a quantitative analysis having a survey as a method of data collection based on a self-administered questionnaire comprising 12 factual and opinion questions from which 7 are closed-ended, 3 mixed and 2 open-ended. The survey is based on quota sampling, the sample size selected having 98 units, respectively all the students enrolled in second year of the three master's programs mentioned. Despite the fact that absolutely all participants are graduates of higher education, ISCED level 6, only a few (less than 1%) considered education as an important factor in adapting to the changes imposed by AI on their work.

Keywords: Employment, Human Resource, Labor Force, Technology, Artificial Intelligence (AI).

Introduction

The current stage of economic development is accompanied by the massive introduction of information and communication technologies in all spheres of human activity. Today the world is facing a new fourth industrial revolution, which is marked by the development of the digital economy based on the most advanced innovative technologies (Bataev et al, 2019)

Living and working in an environment marked by the impact of technology and Artificial Intelligence create the premises of such developments that can polarize the labor force in terms of adapting to change and progress. As a consequence of this situation, the artificial intelligence can play many roles varying from a device to a substitute for human work and having the most diverse influences on future developments of the human resources.

The jobs profile and the skills they involve often changes at a rate that goes beyond the possibilities of reaction of the labor force, adding both advantages and pressure to its working style. For an accountant, for example, studies have shown that it is necessary to have IT skills (Bigioi, 2017). The coexistence of generations on the labor market in general and within a company in particular makes the impact of technical progress very divers, facilitating the transformation of the labor force into human capital for the generation Y and generating fears, challenges and pressure for an important part of the generation X.

Working together in a friendly environment for one part of the human resources and challenging for the other part, can generate a wide range of phenomena at the labor force level, from satisfaction to burnout.

Besides, according to Lie and Mihăiță (2015), the main issue, among others, for burnout at a general level, taking into consideration employees from different fields, are long working hours and

workload. The use of artificial intelligence supports the efficiency of the work but, depending on the attitudes and the skills of the human resources, can lead to work overload.

People from all generations increasingly recognize that rapid technological change, while holding out the promise of valuable opportunities, also creates unforeseen impacts that can dramatically disrupt their careers and lead to massive changes in the composition of the workforce and the level of employment. Trends like these make workers anxious as many worries about their future livelihoods (Montealegre and Cascio, 2019). Excessive trust in new technologies can lead to large-scale or new forms of accidents. Global business networks will cause destruction of workers' biorhythms, some cancers, overwork, and task complexity. The social disconnection because of an independent work will be a risk for worker's mental health (Min et al, 2019). Attitude towards technical progress in general and artificial intelligence in particular, may in itself form a basis for a proactive or reactive behavior and can influence the adaptation to new technologies.

In this respect, we consider important to present the perception of human resources, who are at the end of a formal cycle of professional training, on the impact of artificial intelligence on human work. In this way we want to highlight the reactive or proactive behavior of the human resource towards AI but also the extent to which this is seen as a mean of progress or a source of fear for highly qualified labor resources.

The study certainly has its limits given by the small sample based only on qualified human resources and leaves the possibility of expanding it to other environments or areas. Education is an important factor in sustaining the adaptability of human resource in front of all sorts of challenges, especially in front of this generate by AI. The author considers the results of the study to be of importance for adapting the way in which it is build the attitude of the UPB graduates in front of the impact of AI on labor market.

Literature Review

Industries are changing and the number of robots delivered to the businesses across the world has risen from 100000 per year to 300000 in 2016. Adoption of industrial robots will lead on one hand to labor productivity growth, creation of new types of jobs, rising wages and making some of the jobs more pleasant to do. On the other hand, robots will make some jobs less and less important and some jobs will be expendable altogether (Chinoracky, and Corejova, 2019).

The rise of AI calls for a new human-machine symbiosis, which presents a shifting division of work between machines and humans. (...) In line with the vision of machine-humans symbiosis it is more meaningful to view AI as a tool of augmentation (extending human capabilities) rather than automation (replacing them) (Jarrahi, 2018). The digital revolution has provided significant productivity improvements for the back-office operations of firms and allowed consumers to buy goods and services online without having to physically go to a store or office. In the process it has eliminated a large number of repetitive mental tasks performed by people and shifted employment patterns (Makridakis, 2017).

In an era of rapid technological change there is widespread anxiety concerning the potential impacts of digital technologies across a vast range of industries. Policy responses to this changing employment landscape have tended to champion the necessity for growing ‘digital skills’ (Richardsona and Bissell, 2019). The trajectory towards increasing applications using AI has the potential to change many aspects of human lives and impacting society as a whole. The way forward is not clear and the potential roadmap is undefined. There are numerous benefits that could accrue from AI but there are also significant risks that swathes of society may be disenfranchised form the implementation of the technology. Decisions made within the next few years on the forward path for AI are likely to have an impact on all our lives and the lives of future generations (Dwivedi et al, (2019).

Methodology

The paper is based on a survey as a quantitative method of data collection and research using a self-administered questionnaire comprising 12 factual and opinion questions, 7, closed-ended, 3 mixed and 2 open-ended. The survey was attended by the students from the second year of three master programs from the Politehnica University of Bucharest: Quality of industrial products and services, Human Resources Engineering in industrial organizations and Economic Engineering in industrial activities. These programs are part of the nine master programs organized within Faculty of Entrepreneurship, Business Engineering and Management (FAIMA) from Politehnica University of Bucharest.

The sample size selected has 98 units, respectively all the students enrolled in second year of the three master's programs mentioned above. The stratification of the reference population was carried out on homogeneous layers, choosing only students of second year, the final year of long-term studies. Out of 98 students only 66 answered the questionnaire.

The hypothesis our study departs from is that the higher-educated labor resource, employed mainly in services, does not perceive AI as a threat to the workplace but as an opportunity for progress. The study is limited by the small sample, which, even if it is relevant for the profile of students enrolled in the Master's courses of FAIMA, does not provide valid results for the entire population with higher education.

The perception of students from Politehnica University of Bucharest upon the impact of artificial intelligence on jobs.

According to Verma and Sharma (2019), as world is approaching towards fourth industrial revolution one can't deny that automation is increasing at a very faster rate thereby creating an impact on labor markets in various countries. Some researchers have pointed out the positive impacts while others are of negative view point.

The purpose of this paper is to present the perception of students from the final years of three master programs from the Politehnica University of Bucharest on the impact of artificial intelligence on their jobs, both in terms of its content and its security. The study involved 66 students belonging predominantly to generation Y, 51 of them being between 24 and 39 years old.

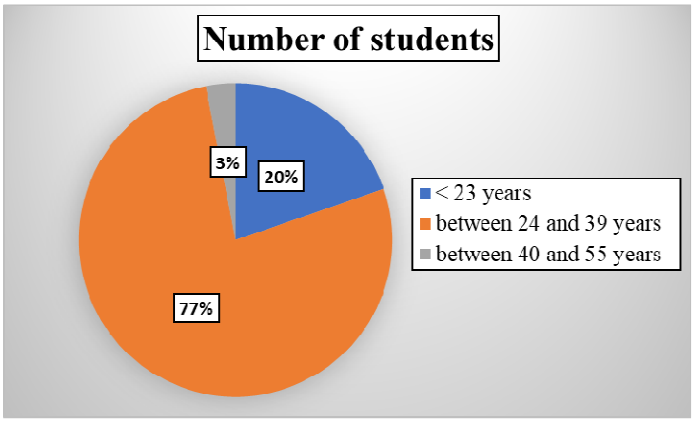

Fig. 1: Number of participating students, depending on age

Out of a total of 66 students, 61 are employed and 45 have indefinite employment contracts. Jobs are mostly in the field of services and involve higher education training. Most of them works in areas such as logistics, accounting, banks, human resources, IT, sales.

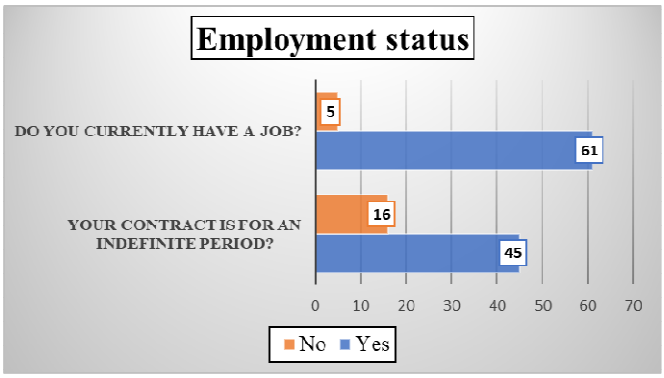

Fig. 2: Employment status of the participants

In the analysis of students' perception of the impact of artificial intelligence on the labor market we considered to be of importance to highlight the type of activities that predominate in the participants' workplace. In this regard, students who have a job could choose between two major types of activities, namely, routine activities that involve physical and/or intellectual effort and creativity-based activities which may involve one, two or three types of skills: social skills communication skills and intuitive skills.

Among the CEE countries, a decline in routine cognitive jobs (…) occurred only in Hungary and Slovenia; while in Romania, Latvia, Lithuania, and Poland the average intensity of routine cognitive tasks increased sharply. These patterns are not a cause for concern, as they have largely been driven by sectoral shifts that are typical of economies in the process of converging with the most developed economies (Keister and Lewandowski, 2016). Most labor economists studying automation agree that the jobs most at risk consist of performing tasks that are routine. If the routine tasks are cognitive, they are easier to automate because programming raw data is simpler than programming movement (Holden, 2017). The question concerned two-time horizons, present and future and the answers are highlighted in figure 3.

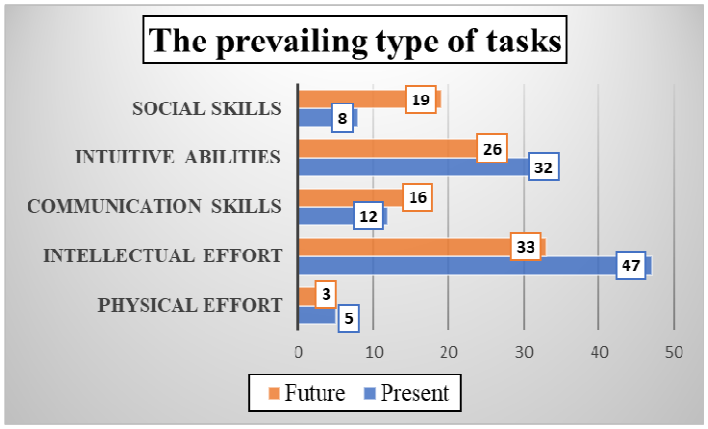

Figure 3: The prevailing type of skills

As can be seen from the figure above, about 30% of the students want to give up the routine activities that involve intellectual effort, opting, especially in the future, for activities that involve social and communication skills.

These choices also support the logic of their answers to the following question: to what extent they fear the impact of technology on their jobs and their employment opportunities. On a scale from 1 to

10 where 1 means that there is no fear of AI and 10 means technophobia, more than half of the respondents were in the range 1-4.

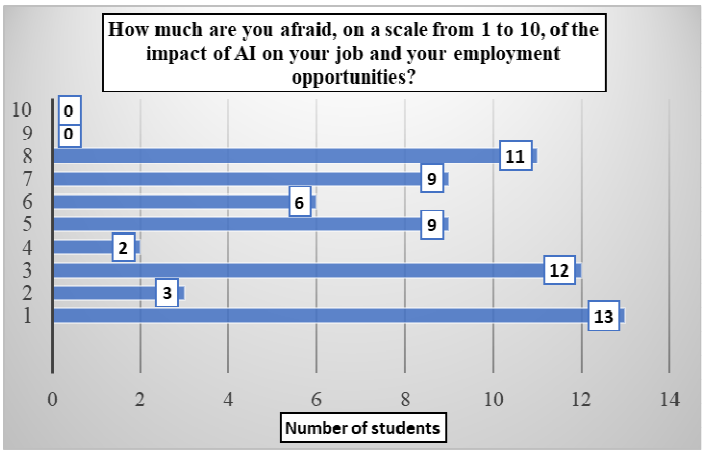

Figure 4: Fear of human resources towards technology / AI

Moreover, 78% of the respondents use or have used in proportion of over 50% the AI at work, an important percentage of them, about 33%, using AI in proportion of over 80%. This shows that they have the opportunity to know directly how and if their professional activity are affected or not.

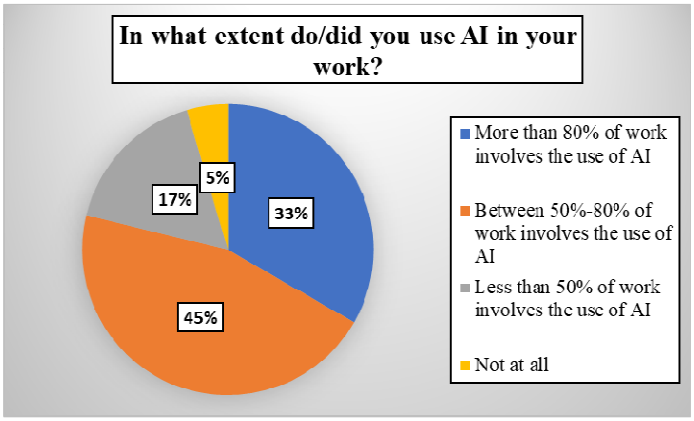

Figure 5: Use of AI in the workplace/current profession

Despite the massive use of artificial intelligence in the workplace respondents are not afraid of their replacement by AI. More than 50% consider that their work can be replaced in a proportion of 20% - 50%, 31% of the respondents considering that less than 20% or even none of the work they are currently doing can be replaced by Artificial Intelligence. The main argument the majority uses is supported by their answers to one of the open questions, respectively: what do you consider to be your main asset compared to the AI in the work you do (name only one element)? The strengths mentioned by them are very much found in the sphere of emotional communication or intuitive skills that are required by activities that, according to the research in the field, are not in danger of complete automation. Some of these strengths are: creativity (mentioned by 20% of respondents) passion, intuition, empathy, communication, the existence of feelings, dexterity etc.

In fact, about the same mentions were made when asked to answer the question: what do you think is the main weapon for mitigating the negative effects of the impact of AI on jobs? It was surprising that the education or training were not mentioned as a main weapons in counteracting the negative effects the AI has on jobs. According to Leustean et al (2016), studies have a very strong effect on what concerns personal values and beliefs and a strong effect on the economic level. Despite of the

fact that all respondents has higher education studies, only few of them consider education as a tool of harmonize the human resource-AI relation.

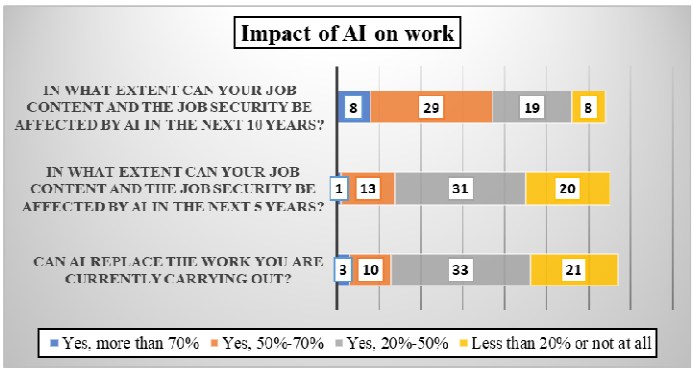

Figure 6: Impact of AI on work

As you can see from the figure above, very interesting are their answers to questions related to the impact of AI on their work over a time horizon of 5 and 10 years respectively. If for the time horizon of 5 years their perception is approximately the same as for the present time, when we refer to 10 years the situation changes. Those who believe that AI will affect the content of work and job security in a proportion of over 50% will increase from 21% for the next 5 years to 57% for the next 10 years. Also, those who believe that the impact on work in the next 10 years will be more than 70% increase from 1.5% in the next 5 years to 12.5% in the next 10 years.

Despite the large number of those who believe that AI will have a significant impact on work about 80% of respondents believe that AI means progress, 18% mean competition and less than 2% see AI as a threat.

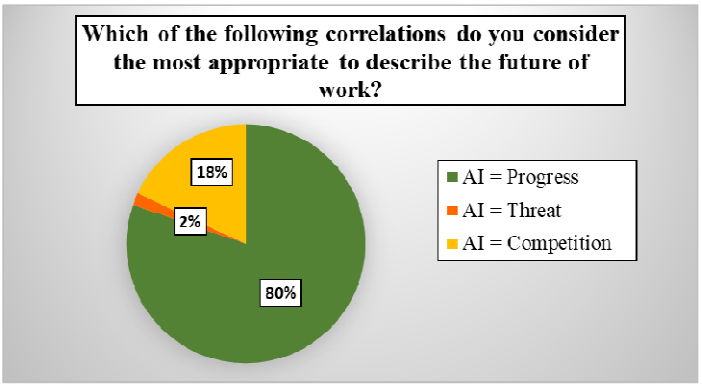

Fig. 7: Impact of AI on future of work

Results

Out of a total of 98 students enrolled in three master's programs from Politehnica University of Bucharest, 66 responded to the self-administered questionnaire the research is based on. The participants in the survey are persons predominantly of generation Y (77%), with a level of education ISCED 6. 92% of them have jobs, of which 73% have work contracts for an indefinite period.

For about a third of the respondents more than 80% of their work involve artificial intelligence, only 5% considering that this is not necessary in their jobs. Also, 80% of respondents consider artificial intelligence as a factor of progress, while only 2% perceive it as a threat. Despite the fact that absolutely all participants in the survey are graduates of higher education, ISCED level 6, only a few

(less than 1%) considered education as an important factor in adapting to the changes imposed by AI on their work.

Conclusion

If five years ago we consider that, in economic terms, the people quality could make the difference between two competing companies (Ionescu, 2014), nowadays the impact of AI forces us to change the angle from which we look at economic and social efficiency.

There is evidence that digital technology and automation have already significantly affected work over and above the role of trade liberalization. This evidence shows that the use of digital technology in work is linked with increasing polarization of work between jobs mainly performed by workers with low levels of formal education ('low-educated') and jobs performed by high-educated workers (Frontier Economics, 2018). Artificial intelligence has already made a real revolution in many spheres of the economy. It is widely known that AI beat man in chess, go and many other games. Last year, the robot reached the final stage of the literary contest in Japan (population 130 million people). AI is already making films, writing music, painting and much more (Pavlov et al, 2019).

In these circumstances it is important to analyze the perception of human resources on the impact of digital technology and AI on the content of work and on the job security in order to meet the real training needs of students and to build proactive attitudes in the university environment. It is also necessary to increase the level of awareness about the role of education in rising the adaptability of the human resources since in Romania these calls for sources characterized by an inflation of the fragmented information, often incomplete and of poor quality extracted from the internet, social media, mass media, friends and other sources (Leustean et al, 2016).

The study revealed that the sampled persons approach the AI as a factor of progress and not as an anxiety-generating factor. The authors consider that the result of the study is the consequence both of higher education of the survey participants and of the fact that the majority belongs to generation Y, a generation by excellence formed together with AI. A proactive attitude towards the changes produced by AI in the labor market can only be built by increasing awareness of the role of education in this regard. Even if for the most participants in the study the AI means progress, the small share of those who are aware of the role of education in this relationship shows that their attitude is a positive one, of acceptance and trust, but not a proactive one, of pre-empting future developments that could affect their mode of living and working. The limitations of the study can be solved through future researches by expanding the types of labor resources included in the sample.

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Analysis of the EU Security Architecture Confronting Terrorism and Bioterrorism in the COVID 19 Era

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Abstract

Although the civilized world finds it difficult to accept, the terrorism phenomenon has become a reality with global implications, which is hard to prevent and manage. Many historical events were characterized by the use, or threat to use, of toxic substances and pathogens, presenting evidence which clearly demonstrates that certain individuals and terrorist groups have recently conducted research on biological agents or toxins, or tried to obtain these substances. Biological agents (such as bacteria, viruses and fungi) are easier to manipulate and transport than nuclear or conventional weapons and harder to detect as the symptoms of exposure can last from several hours to several days before occurring. A terrorist possessing chemical or radiological weapons could kill hundreds or even thousands of people. With a biological arsenal, he could kill hundreds of thousands of people.
In recent years, the European Union public debates and press agencies started raising questions on the implications of migration crisis, political extremism, terrorism and other forms of hybrid threats on the global supply chains. These debates demand from the European authorities countermeasures to prevent the tragedies and the loss of human life. The police, the military, border services and other security agencies of European Union countries seek to strengthen cooperation in order to address the present challenges and to deter immediate risks. At the same time, the terrorist phenomenon affects not only the internal order of a state, but also its relations with other states and, in order to be prepared, we must have a clearer understanding of the challenges facing the European Union and its security architecture.

Keywords*:* Security, Bioterrorism, Intelligence, European Union.

Introduction

The technological advances and rapid societal transformations characteristic of the 21st Century also meant that globalization has come to encompass most geographical areas and alter most human cultures. As such, for most state-players one of the main priorities became finding new solutions for ensuring national security within the new international framework. Moreover, another consequence was that states were practically compelled to join regional or international organizations, as this was the best option to meet the common objective of defending both global and national security.

Etymologically, the concept of security comes from the latin securitas, which means *"without care, serenity, peace of mind."* Traditionally, security has been associated with a state's military factor.

However, the concept underwent changes with a series of "paradigm" shifts since the end of the previous century. In terms of security, we encounter a shift from conventional threats - state actors, to asymmetric threats - non-state actors or state-sponsored irregular or hybrid aggressions.

Asymmetric threats differentiate from the classical approach, as the battlefield is transferred within the civil society. What does that mean for the individual?

In short, the emergence of a whole new set of threats to personal security, through the possible employment of biologic, chemical, cyber weapons created to alter normal life or to fuel a series of informational aggressions designed to erode the link between the citizen and his country by stimulating various feelings of mistrust in public authorities.

Thus, nowadays security has several components: political, economic, social, cultural, ecological and the individual component.

All these elements must be carefully considered when paying attention to security dimension.

EU in Counter-Terrorism Age

Terrorism is one of the most debated and controversial issues of the last decades, the most visible and most worrying manifestation of the hybrid threats to the security environment, an unconventional combat tactic threatening global peace.

International terrorism is the main threat to the states of the world, human society and democracy, both for the international structure and social cohesion frame, and for the national security of the states.
Thus, terrorism has two purposes, the first is to make life unbearable for the average citizen, and the second to create a destructive climate.

Under these conditions, terrorism can be considered one of the most serious threats to the European security, the European values and last but not least to the rights and freedoms of the citizens.

The United States Department of Defense defines terrorism in terms of identifiable elements as the calculated use of unlawful violence or threat of unlawful violence, to inculcate fear and to coerce, or to intimidate governments or societies in the pursuit of goals that are generally political, religious, or ideological (Department of Defence, 2010).

Following the terrorist attacks on the US (9/11) and some EU countries (Madrid, London, Paris, Brussels), it has become clear that the fight against international terrorism will not be short and that it will mobilize huge resources and capabilities especially after COVID-19 crisis, which may represent a previous frame of reference for future acts of bioterrorism.

The risk of terrorist attacks produced by means of biological agents is a major concern, keeping the attention of law enforcement services, governments and health authorities worldwide.

Bioterrorism means the deliberate release of biological agent or toxins in order to harm humans, animals or plants or to cause death, with the aim of intimidating a government or civilian population or compelling them to meet certain political or social objectives.

Threat of Bioterrorism in the E.U

Current terrorist techniques include suicide attacks, bomb use, narcoterrorism, bioterrorism, cyber-terrorism and even nuclear terrorism. Some terrorism analysts list latent terrorism among the modern terrorist techniques.

This new concept aims at replacing the actual use of terrorist means with terrorist threats at using them in order to achieve the goals targeted and aimed.

The same category of risk and serious threat to international peace, security and to fundamental human rights includes the proliferation of mass destruction weapons.

Associating it with terrorism, meaning the use of chemical, biological, radiological and nuclear weapons in terrorist actions (CBRN terrorism), it aggravates the threat facing humanity.

At any time there, exist the possibility that some terrorist groups will use weapons of mass destruction, not only as asymmetric responses, but also as extreme ways of implementing or imposing fundamentalist religious precepts, as a reaction to globalization, as a way of “punishing” populations, ethnicities, etc.

Thus, the proliferation of weapons of mass destruction represents probably the biggest threat to EU security.

Also, new developments in biological sciences may lead to an increased output of biological weapons in the coming years, chemical and radiological attacks are a very serious issue for Europe.

Biological agents (such as bacteria, viruses and fungi) are more easily manipulated and transported than nuclear or conventional weapons.

Moreover, they are difficult to detect, and symptoms of exposure can last from several hours to several days before the disease manifesting.

For many law enforcement agencies, the recent terrorist pattern shows an increased interest in using weapons of mass destruction and biological weapons.

It is relatively easy to purchase these type of agents, biological weapons representing an effective way to produce a generalized sense of fear among people.

Terrorist groups may use unconventional means such as biological weapons or materials which have the potential to infect thousands of people, contaminate soil, buildings and means of transport, destroy agriculture and infect animal populations and, ultimately, to affect food and feed at any stage of the food chain.

From a statistical point of view, the probability of a "bioterrorist" attack is very low, but with devastating consequences.

According to SARS-CoV-2 characteristics, this virus can be rated as lethal pathogen agent (or a natural outbreak of a disease) which was deliberate introduced in the EU or imported from a third country, and simultaneously affected severely, several member states like Italy, Spain, France and not only.

Also, the spread across EU borders had a considerable economic and social impact, especially as health services were overwhelmed with the number of patients requiring, laboratory tests, treatment and specialized medical equipment.

The use of biological agents and toxins as weapons is mainly characterized by the awareness of the effects and the advantage using the agent or toxin over potential enemies, human or animal.

The epidemiological evolution of SARS-CoV-2 is similar to a "mass" disease targeting the general population, raising questions on the probability of similar viruses being potentially spread on purpose in the future.

The characteristics of these types of agents (specific for weapons of mass destruction) are:

- Simple production technique, available to any nation with a pharmaceutical industry;
- Industrial production methods are to be found in making yoghurt, beer, even antibiotics or vaccines;
- Most equipment used in their production is "dual use" and is sold on the open market;
- The existence of previous pathogen crops, kept in certain specific facilities/warehouses;
- The ease of reaching the target, using even the weather;
- Increased efficiency: small quantities, with maximum effect;
- Large scale of contamination.

Biological agents are micro-organisms, including genetically modified micro-organisms, cell cultures and human endoparasites, which are likely to cause infection, allergy or poisoning.

The biological weapon, called *the nuclear bomb of the poor* or *the dirty bomb*, is an invisible weapon. It can be transported without being detected, even across borders, either in "culture" – to obtain the desired amount – either in quantities sufficient to commit a disaster.

Microorganisms can be released without noise and without causing immediate effects. The disease cannot be defined until the symptoms of the infection and the causative agent are known. If this one may easily spread from one person to another, such as smallpox, the number of victims can easily reach tens of thousands of cases.

According to their intentions, the terrorists will choose a biological agent, according to several characteristics:

- Easy acquisition/production;
- Easy use as a weapon;
- Easy transmission;
- Resistance to environmental factors;
- Terrorists' intention to kill or to cause a temporary disability;
- The countagiousness of the agent;
- The potential risk to the terrorists themselves.

The acquisition of biological agents is possible as a result of: a government's support; the diversion of substances during their transport; from natural sources; theft from universities, microbiology laboratories, veterinary laboratories and industrial companies.

From a technical point of view, producing various substances for terrorist purposes are not difficult to achieve.

A second-year or a third-year student in medicine or microbiology should have enough laboratory experience to be able to produce a biological agent, without exposing himself/herself to too many dangers.

As mentioned in the doctrine, bioterrorism agents could be utilized in various ways:

- Aerosols – spread either through conditioners or by an airplane or helicopter, or by a bomb scattering. Anthrax, tularemia, Q fever, typhus, smallpox and plague are likely to be spread by the respiratory route. Also, sarin gas and botulinum toxin could be spread in the same way.
- Water and food - it contains toxins, particularly ricin toxin and botulinum toxin, which mixed in large containers for beverage supplies could produce catastrophic consequences. It also the case of a large number of food bacteria: Escherichia coli and all food poisoning agents.
- Dermal route may be the source of infection for anthrax, tularaemia and smallpox.

Specialized publications reference over twenty cases of terrorist threats or attacks put into practice by the use of biological agents: cases of threats, apparently without consequences, whose authors said they could use such agents, but without providing evidence that they have indeed purchased them; cases when serious steps have been taken to purchase biological agents; cases in which certain quantities of agents were found on terrorists or persons suspected of having committed terrorist attacks.

They indicate a high number of threats (even actual attacks) on food contamination, but in most cases the reason was only financial and not political, and the authors were not considered terrorists.
Using ricin substance in several assassinations or assassination attempts is a worrying example of biological terrorism, as these attacks were attributed to intelligence services in some countries.

Bioterrorism risk raises many questions to law enforcement authorities, especially for those responsible to ensure security after the COVID 19 crisis will pass.

Terrorists have the ability to choose performers that are easy to manipulate in order to be sent to some certain locations to pose a threat to one person or to thousands of people.

This form of terror may have effects involving several jurisdictions or countries and it requires international cooperation at the level of sharing information and investigation.

The coronavirus crisis has highlighted the need to identify ways to strengthen the response capacity of E.U. bodies in charge of emergency situations when deal with such threats.

The threat that a terrorist group may acquire chemical, biological, radiological or nuclear materials (CBRN) requires governments and international organizations to adopt regulations and programs with significant impact, in order to protect populations against risks associated with this type of threats.

According to the general opinion during COVID-19 crisis, future risks of bioterrorism are so high which requires coordinated action in preventing, detecting and counter it as a top priority.

Most experts share the opinion that in order to "succeed" in producing such materials and use them as a weapon, terrorists have to overcome considerable difficulties. Therefore, the probability that such attacks occurring is small, but it is clear that no public authority can afford to ignore this threat after coronavirus crisis.

In order to avoid another crisis, ensuring security in the face of such threats must be a top priority on the list of E.U. leaders, given their negative consequences generated over the human, social, economic, financial and other segments of daily life.

There is also a general consensus among experts on the need to carefully consider the likelihood of a small-scale attack.

As the SARS-CoV-2 pathogen has already shown, the psychological, medical and economic effects generated by this virus had a significant impact on the population, and the use of a similar agent for terrorist purposes can be disastrous.

European Union Security Response

With regard to the terrorist threat, The European Union has developed a legal framework and a number of specialized bodies with the purpose to prevent and counter terrorism.

So considerable progress has been made on cooperation and exchange of intelligence between EU member states, but the terrorist attacks in Paris (7 January and 13 November 2015) indicated that the measures taken, were insufficient or even ineffective.

In addition to the issue of terrorism, the EU recently confronted and still faces a number of other crises, starting with the economic crisis of 2008, the crisis in Ukraine 2014 (including the annexation of Crimea by the Russian Federation), the crisis in Greece, the crisis of the refugees, Brexit and newly 2020 the CoVID-19 pandemic crisis.

All aspects stated above, indicates a number of important questions that need to be asked about the role and capacity of the EU to overcome these situations.
Moreover in the light of the economic and health crisis generated by SARS-CoV-2, there are voices questioning the EU's slow response and the lack of consensus among its members for a common approach.

Naturally, close cooperation between law enforcement agencies and institutions from the member states with competence tackling this type of problem is more than necessary.

With this aim, the EU encourages states to cooperate through its security institutions in order to ensure a coherent and cohesive response to future crises.

Security Institutions

Europol (The European Law Enforcement Agency), based in The Hague, is an important player in strengthening Europe's security for the benefit of its citizens. Europol manifests its authority in the fight against terrorism and organized crime by owning and managing databases and by initiating formats for cooperation between security agencies in the Member States.

On the issue of terrorism, Europol supports member states through analytical products such as reports, threat assessments and missing links for ongoing operations, exchanges of information and access to Europol databases, data exchange systems and through expertise of the Europol mobile office, which provides on-site assistance. Moreover, following the January 2015 attacks in Paris, with the support of the European Security Strategy, was created the ***European Counterterrorism Center***, a security priority designed to improve the Europol's counter-terrorism capabilities.

Thus, Europol has developed its expertise on terrorism issues and should be taken a step further bringing together its counter-terrorism capabilities, pooling resources and making the most of it.

Cooperation in Intelligence

Further in this presentation it should be emphasized that an important element of recruitment and radicalization in Europe is the terrorist and extremist activity on social media, and it was announced that a Europol-led intelligence police team across Europe is trying to detect and destroy this presence. A Special Function on EU Counter-Terrorism Policy is held by the **Counter-Terrorism Coordinator** (CTC). The CTC regularly reports to the European Council on, how existing counter-terrorism instruments, are being operating and implemented at EU level .

It closely monitors how EU Counter-Terrorism Strategy is implemented and presents specific policy recommendations based on security threats and special reports drawn up by INTCEN and Europol.

As well, another important player in EU security policy is the High Representative for Foreign Affairs and Security Policy (HRVP).

HRVP has several functions at the level of the EU institutions, but its main task is to coordinate and implement the EU's foreign and security policy.

In carrying out its work, HRVP is supported by the European External Action Service (EEAS), de facto the EU diplomatic service.

From a European security perspective, the EEAS coordinates the work of the EU Intelligence Analysis Center (INTCEN) and the EU Military Staff –(EUMS).

The EU Intelligence Analysis Center (INTCEN) is the only point of contact for civilian intelligence services in Member States across the EU institutions.

The Center has no operational capacity to collect information, however is based on the "products" received from the agencies from the Member States.

Within the The European Union Military Staff (EUMS) there is an Intelligence Directorate (IntDir), consisting of approximately forty officials from the member states' intelligence services, which also have the role to ensure the intelligence channel.

The role of IntDir is to provide early warning assessments and situation warnings, in order support the planning of the military operations. Thus, intelligence analysis became the response foundation for the crisis situations.

Moreover, in order to avoid discrepancies between civilian and military analytical products, but also to have an EU-wide cooperation mechanism, in 2007 was created the *Single Intelligence Analysis Capacity (SIAC).*

SIAC is a virtual format coordinated by the executives of INTCEN and EUMS IntDir, in order to synchronize the held known intelligence. So, within SIAC, both civilian and military contributions are used to produce all-source intelligence assessments.

For comprehensive documentation SIAC uses complex and diversified sources of information which include:

- The EU Satellite Center (SatCen), the national diplomatic missions and the EU in third countries;
- The EU civilian and military missions under the Common Security and Defense Policy (CSDP);
- As well as NATO and the OSCE as external partners of the EU.

Thus, in order to counter act the terrorist threats, multilateral cooperation between the competent authorities of the Member States is a absolutely necessary and mandatory solution.

Also, there are discussions on the extension of Europol's mandate which will be a significant progres in the law enforcement field.

Additionally, in the last years, the activity carried out by the Counter Terrorist Group (CTG),(a product of the Berne Club, which includes the twenty seven EU Member States, Switzerland and Norway), has brought a substantial contribution to the fight against terrorism.

The CTG has been described as a "parallel" intelligence-sharing network, where the intelligence agencies of the various member states participate on equal footing.

The Heads of the Member States intelligence services are the governing board of the CTG, and their meetings take place twice a year and generates thematic debates. Heads of Units meet four times a year, or more if needed to implement programs. Moreover, the UK does not plan to leave the CTG after Brexit, according to the head of MI5, who cited the importance of intelligence-sharing in the current climate.

It is necessary to mention that the establishmentof the SITCEN Anti-Terrorism Cell in fact meant its transfer from the CTG.

Thus, INTCEN, in collaboration with the CTG, draws up half-yearly assessments of the terrorist threat to Europe, a benchmark for analytical intelligence production at European level.

Conclusions

Among the root causes of most security crises, the deteriorating economic situation of one or more countries should be highlighted. This situation leads to increased poverty, unemployment, inflation, social insecurity, increasing virulence of criminal phenomena (organized crime, immigration, violent extremism), but also to insufficient structuring of institutions tasked with countering serious criminal phenomena.
Terrorism is a borderless threat and needs to be tackled at both national and international levels. Thus, EU states, through individual efforts, must constantly contribute to ensuring national and European security especially during unforeseen emergency situations such as the crisis caused by SARS-CoV-2.

Moreover, the EU has become a relevant player in the field of preventing and countering terrorism, and this status also entails the duty of the Member States to initiate a series of measures that will have the effect to improve security.

However, the nature of the measures taken, can became afuture matter of debate regarding citizens' freedom, especially in the context of the COVID 19 crisis.

The free movement of EU citizens is one of the most important achievements of the EU, but also indicates a possible vulnerability in the system.

The question to be asked is whether freedom is a security vulnerability? or if the relationship between them can be proportional?

It is clear that freedom would not be worthwhile if we were in an insecure environment without a sense of security, especially after the coronavirus crisis.

Consequently, the questions that need to be asked are whether freedom is a security vulnerability ? and also whether the relationship between freedom and security can be proportional ?

It is clear that freedom would not be worthwhile if we were in an insecure environment without a sense of security, especially after the coronavirus crisis.

The presence of a sense of security in the absence of freedoms is practically impossible. So we have to refer to these two concepts as two necessary conditions for prosperity. Rather, it can be said that security is a means to obtain freedom.

A more effective way to prevent potential crises in the future would be to initiate debates on giving up some freedoms in order to gain more security. This aspect has been strengthened by the social deterrence measures imposed by the authorities to prevent the spread of the pandemic caused by the pathogen SARS-CoV-2.

There must be a balance between security and freedom, and in the current context generated by the new hybrid threats, this balance must be based on security. People must to understand also that the process of strengthening security does not harm the freedom.

As well, it is imperative to mention that the limitation of certain rights for the sake of security should not be overestimated.

Giving up some freedom means that the state comes closer to the citizen, knows him better and understand his needs. It should not be seen as a violation of privacy.

Therefore the percentage of those who would give up some of their freedom to gain more security seems to be on the rise as a result of the COVID 19 pandemic crisis, that has spread terror and fear among the European community and beyond.

In a deeply interconnected world, no country can fight alone against global crises. Terrorist acts are more and more destructive every day and the bioterrorism threat creates unprecedented dangers. Thus, bioterrorism represents a fundamental challenge for the international community. That is why, at both community and national level, European states need to take flexible measures against this phenomenon.

Preventing, protection, tracking and responding are thus the four axes of the global approach to international terrorism which must be applied without delay in the case of the use of biological agents for destructive purposes, as a fundamental challenge for international security. The EU needs to insist on the prevention and repression of bioterrorist acts, as well as on the protection of its infrastructure and citizens.

Moreover, the EU has a duty to act with full power against the causes, means and capabilities of bioterrorism.

At the same time, increased attention should be given to the EU legal framework, in order to facilitate international cooperation and to ensure rapid response in case of bioterrorism, particularly by updating documents such as: Strategy to fight terrorism, Stepping up the fight against terrorism, Terrorist offenses, The Hague Program, European security strategy.

Also, a high-level political dialogue on the fight against terrorism must take place with each EU Council presidency and the strategy against terrorism should be complemented by an action plan that will contain concrete measures to be taken to prevent, protect, react and track biological pathogen agents.

Additionally given that prevention of bioterrorism is a top priority for NATO, the European Union should act in close cooperation with the North Atlantic Alliance in the fight against bioterrorism.

On one hand, the internal and external security challenges facing the EU and its member states, manifest itself as a complex, dynamic and open system. Their effects, favorable and unfavorable, are cumulative and with consequences of great diversity.

On the other hand, EU member states are each affected in a different way by the consequences of these effects, either in a positive or a negative sense. Therefore, their efforts will have different intensities, natures and directions.

In order to counteract the undesirable consequences generated by the new security challenges of the 21st Century, the European Union must to act coherently and focused both in terms of amplifying the positive effects and at the same time reducing and / or limiting the negative effects emanated from the system of security risks, dangers and threats against Member States.

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The HRM Indicators Used in CSR Reporting in Various Sectors in Poland

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Abstract

The purpose of this paper is to explore which HRM indicators are used in CSR reporting in different sectors in Poland. The analysis relies on study of CSR reports of companies, which represent various sectors. The main goal of research in this article is answer the question: Are indicators which characterize HRM depended on the sector of entities' activity? The method used, analyse of chosen CSR reports, will based on reports which are clear for the author. It could cause that some valuable information from other reports will be omitted. Findings should show, which indicators of HRM are used to characterized the special conditions of human resource management depending on the sector of activity. The article assumes that the employment aspects presented in the reports can be identified as human resource management (HRM) reporting. There is abundant literature referring to a connection between HRM and CSR, but empirical research on groups of indicators characteristic for HRM in various sectors is hard to find. The development of this topic has generated the need to use a yardstick that indicates which indicators are sector-specific. Therefore, an indicator of reporting accuracy was constructed for the research and this is the main value of this paper.

Keywords: Corporate Social Responsibility (CSR), Human Resource Management (HRM), reporting.

Introduction

Corporate Social Responsibility (CSR) is a trend, that is being implemented by more and more companies (Lindgreen, at al., 2009). Human activity, both individual households and large corporations, affect the broadly understood environment. This environment should be understood as the market environment, the natural environment and society.

A lot of companies on the market are being aware of the effects of their activities, thus they take actions in order to limit or eliminate the negative effects of their activities and strengthen the positive ones. It is underlined, that in the long-term perspective, the care for social and environmental aspects should be just as important as striving for profits (Høgevold, 2014; Cramer *at al.*, 2006).

Both social pressure and the importance of CSR are reflected in reports published by companies. A lot of them publish CSR reports in a voluntary manner, but on some of them, operating in Poland, the reporting obligations were imposed through the legal regulations. In Poland, the obligation in CSR reporting has been introduced since 2017 by the provisions of the Accounting Act and concerns large companies. Thus, companies with major economic importance must formally describe their CSR activities. The CSR reports are not only a source of knowledge about the operations of a given company, but they can also be a means of promoting its image (Porter and Kramer, 2006). CSR is connected with ethics in business and the sustainable development. This ideas permeate each other.

The historical background of CSR in Poland is not long. It's because of fact, that to 1990 the Polish economy was dominated by centrally controlled system. This is the cause, that Polish research and publications on that area are not rich until 2000. For instance: the Polish base of scientific publications, named BAZEKON, includes only 2 publications with CSR subject, 6 about ethics in business and 4

about sustainable development of entity. In the following years more and more Polish scientists became interested in these issues. Hence the scientific achievements also increased significantly.

CSR reports pay attention on non-financial aspects of entities' activity, which are usually divided on areas: social, employment, environmental issues, respect for human rights and anticorruption. In this article consideration will be focused on employment aspects, which can be identified as the reporting about human resource management (HRM). The main goal of research in this article is answer the question: Are indicators which characterize HRM depended on the sector of entities' activity?

To answer that question, the research on non-financial information, connected with employment area, reported by enterprises assigned to two types of enterprises: production and nonproduction will undertaken. The reporting accuracy indicator proposed by the author of the article will also be used.

The coherence of HRM and CSR idea

From 1990s, worldwide companies began to issue their social reports. Two main reasons that contribute to this trend can be identified easily. The first one is the increasing pressure from various stakeholders, and the other one is that some companies have realized that reporting their social contribution is a useful way to benefit themselves (Gao, 2011).

A growing number of companies publish an annual social report, also referred to as a public-interest report (Malone and Roberts, 1996), values report, integrated report (Wallage, 2000), ethics report (Adams, 2002), integrity report (Kaptein and Wempe, 2002), sustainability report or triple-bottom-line (TBL) report (Elkington, 2001), to show their concern on social responsibilities.

Some authors underline, that organizational culture and corporate social responsibility share some common ground (Jaakson at al., 2012). Authors' question in the empirical literature is looking more closely at the lack of alignment between the practice of corporate responsibility and the reporting of corporate responsibility activities (Kujala *at al.*, 2013).

Corporate social responsibility can be as well referred to as business ethics because the strategy of the corporate social responsibility and the Code of Ethics or Conduct determines the attitude of the enterprise to its shareholders and stakeholders (Strautmanis, 2008).

CSR and sustainability has become an essential part of the international and global business activities of companies. It is the way of communication.

CSR reporting can be used to communicate with the environment of the entity, especially during the difficult situation. For example: "The period prior to and after the 2008 financial crisis represents a chain of events that led to the changes in beliefs regarding innovative financial products and banks' role in assuring the acceptable return on customers' investments as well as their role in rejecting loans to customers lacking loan-servicing capabilities. These concerns were further amplified by negative media attention. As legitimacy gaps can be overcome by communication, CSR disclosures (as one form of communication) could be used to repair banks' legitimacy both in the eyes of the Banks' CSR disclosures public as well as in the eyes of specific stakeholders. However, the impact of legitimacy repairing activities on disclosures depends on the strategy chosen" (Laidroo and Oobik, 2014). CSR has been considered by companies to be a useful tool to manage stakeholders or public relations, to enforce organizational or operational legitimacy and to build good reputation (Gao, 2011).

During the results of research by Skudiene and Auruskeviciene (2012) it is important to take into consideration today's economic situation. The research findings indicate that CSR is a very important tool that create benefits to organizations and go in accord with Hopkins (2007) observations that CSR leads to positive long-term affects and is a competitive strategic approach to managing a company.

The review of researches made by Gao (2011) proves that a growing body of evidence suggests that CSR is differently comprehended under different cultures and in different countries.

Human capital should be considered against the background of an intellectual capital in the context of a knowledge-based economy (Strautmanis, 2008; Lu et al., 2015; Obedgiu, 2017). The management of capital in the face of a new kind of an employee - the employee of the knowledge - needs the methods

which will conduct to greater emotional and intellectual involvement of employees in the enterprise (Soliman and Spooner, 2000). The management should also encourage employees to expand their knowledge constantly, as well as to expand their qualifications and competences (Chen and Huang, 2009).

Human capital should become a priority objective of investment in the enterprise. That is why, nowadays, human resources may be treated as intellectual capital resources, regardless the type of work performed by the employee or the position occupied (Szczygielska, 2009).

In practice, human resource is responsible for employee experience during the entire employment lifecycle. It is first charged with attracting the right employees through employer branding. It then must select the right employees through the recruitment process. Human resource manager brings on board new hires and oversees their training and development during their tenure with the organization. Human resource assesses talent through use of performance appraisals and then rewards them accordingly (Obedgiu, 2017).

Polish Law Background of CSR

Employees' issues are reflected in reports prepared by enterprises. In Poland reporting obligations are regularized by the Accounting Act according which financial, descriptive and non-financial data is expanded in proportion to the size of the entity. The Accounting Act in Poland introduced the obligation to draw up and publish a statement on non-financial information by the largest entities in terms of the number of employment and financial results, as well as by public trust institutions such as banks or insurance companies. Statements about non-financial information may be identified with CSR (Corporate Social Responsibility) reports and in this article, such naming will be used for simplicity. But, it should be underlined that in practice, reports which present aspects of social responsibility can take on different names - enterprises define themselves as social reports, CSR reports, sustainable development reports, and in the case of reports including financial information and non-financial information - integrated reports.

The way and the field of social activity reporting are supported by standards, norms, guidelines and recommendations. There are: international standard ISO 26000 Guidance on Social Responsibility, international norm Social Accountability 8000 (SA 8000), International Standard for Corporate AccountAbility 1000 (AA 1000), Global Reporting Initiative Guidelines GRI G4, Non-Financial Information Standard (SIN) for non-financial reporting in Poland (Bagieńska 2018). The key point mentioned in guidelines of The Accounting Act regarding the reporting of non-financial data is the ability for entities to use their own standards or indicators.

There is National Accounting Standard (Standard No 9) also, which is helpful to prepare the Report on the operations of the entity. It's not act of law, but the guide rather. It includes instructions how to prepare the report on non-financial information.

It should be mentioned that the employees' issues are regulated in the Labour Code in Poland and they are the base to establish relationships between the employer and the employee. These guidelines specify that: "the employer is obliged to respect the dignity and other personal rights of the employee. Employees have equal rights for the same fulfillment of the same obligations; this applies in particular to equal treatment of men and women in employment. Any discrimination in employment, direct or indirect, in particular on grounds of sex, age, disability, race, religion, nationality, political beliefs, trade union membership, ethnicity, religion, sexual orientation, as well as due to fixed-term employment or unspecified or in full or part time - is not allowed. (Labour Code, Art. 111, Art. 112, Art. 113). These guidelines are nothing more than diversity policy, which employers should use when hiring employees. It's nothing new in Polish law, but entities have not reported that aspects on the large scale.

Extended reporting obligations are imposed on larger entities, then the annual financial report is accompanied by a report on the entity's operations, if the obligation to prepare it results from the act or separate regulations. Report on the operations of the entity is mandatory for entities with a more complex legal and organizational structure and of greater economic importance.

The report on the entity's activity should include material information on the assets and financial condition of the entity, including an assessment of the effects obtained, an indication of risk factors and a description of the threats.

The unit's statement of activities should also include - if it is relevant for the assessment of the development, results and situation of the entity - at least:

- key financial performance indicators related to the entity's operations;
- key non-financial performance indicators related to the entity's operations as well as information on employee issues and the natural environment.

The aspects mentioned in the second point, related to employee and environmental issues, refer to reporting in the field of CSR.

The entities, considered the largest in the conditions of Polish economic realities, additionally include in the activity report - as a separate part of the statement on non-financial information.

When making a statement about non-financial information, an entity shall provide non-financial information to the extent necessary to evaluate the entity's development, results and standing and the impact of its operations on issues related to policies in relation to social, employment, environmental issues, respect for human rights and anti-corruption.

It is important from the point of view of the entities that the entity may use any rules, including its own rules, national, EU or international standards, standards or guidelines when drawing up a statement on non-financial information. In the statement, the unit contains information about the principles, standards, standards or guidelines applied.

The presented legal regulations in force in Poland show that the obligation to report CSR issues applies only to large entities, which does not mean that smaller entities cannot prepare such reports. In turn, although the obligation to draw up a statement on non-financial information is introduced in Poland with reference to financial statements prepared from the 2017 financial year, such reports have already been prepared and published by many entities. They took the form of separate CSR reports or were part of integrated reports.

Polish Experience in CSR

In the past non-financial reporting was a good practice of enterprises only. To increase consistency and comparability of non-financial information shown in the territory of the European Union, some of the big units should prepare a statement on non-financial information containing information on environmental, social and labor issues, respect for human rights, counteracting corruption and bribery (Directive No. 2014/95/EU). This regulation concerns approximately 6,000 large entities functioning within the EU area, including more than 300 Polish entities based on the estimations of the Minister of Finances (Krawczyk, 2019).

The CSR idea in business life is not long in Poland. The first steps taken in this direction by entrepreneurs took place in the late nineties of the twentieth century, although CSR, or even the promotion of business ethics were not common. A report conducted by the Business Ethics Center, citated in REPORT Responsible Business in Poland (2004), shows that 2/3 of the surveyed companies admit that they do not conduct any training on business ethics, and in nearly 80% of companies they recognize customary standards and no documents written to regulate these issues as ethical standards. The activity in ethics and CSR were rather intuitional.

The above trend was also highlighted in studies conducted by ICAN Institute, Crido Taxand and Employers RP. According this, 92% responders from Polish entities expect taking by managers activity connected with raising ethical culture in organization.

The employee area is important aspect in surveys in 2009 – 80% of surveyed say, that responsible company should “treat and care for employees well” – it shows, that social expectations are going in this direction.

In September 2011, CSRinfo, a communication and education platform, published CSR Reporting in Poland 2010, from which it followed that 29 companies had published CSR reports in 2010 (twice as many as in 2009). A further analysis demonstrated that apart from better transparency and reliability of data, there were many shortcomings, such as the tendency to exaggerate success and overlook challenges or problems, incomplete information, irregular reporting and poor advertising of reports. In summary, social reporting is developing in Poland but has a long way to go (Ćwik, 2009).

The subject connected with HRM is the management of age – in 2011 it was the one of the most important aspect, especially the employment of people over 50 years of age (Schimanek, 2011). This problem was continued in 2014, parallel with the management of the youngest workers, which are called the Generation Y (Millennials) (Leśnowolska, 2014).

The group of yang employees is very important take in point of view their interested in CSR activiti of corporation. The researches called "Millennial CSR Study" shows that people of 18-34 age, looking for work take into consideration social responsibility of potential employer – this is declarated by 82% respondents and 60% of them say, that they are ready to work for responsible employer for lowest salary (Gruszecka-Tieśluk, 2015).

The next important area, which should be take into account by CSR activity is the diversity. The formal form of this was implement in Poland in 2012 as the Diversity Charter. The Diversity Charter is a written commitment which is signed by organizations that oblige themselves to the introduction of equal treatment policy and diversity management, as well as active prevention of discrimination and mobbing in the workplace.

Diversity constitutes a fundamental value of the modern society. Nowadays 263 companies implemented the Diversity Charter in Poland and they become the signatory of Diversity Charter (data on 28 August 2019).

The very valuable researches were conducted in 2015 by Fundacja CentrumCSR.PL "Corporate Social Responsibility in Polish realities". During the research 227 the biggest firm representing 16 branches were monitored for 12 indicators. The conclusion of researches is, that information published in CSR reports is not specific, doesn't include clear declarations for future and doesn't include verifiable data (Gruszecka-Tieśluk, 2015). It's not positive image of CSR in Polish entities.

The research conducted by FOB in cooperation with PBS Institute and with Deloitte shows on the other hand, that 80% respondents realize the influence of CSR on Polish business activity. The most important conclusion is, that implementation of CSR actions effects not only the better reputation, but first of all impacts on ethics and involvement of employees.

Researches

As observed by Gao (2011): Various interests of employees are addressed by listed companies. The frequently addressed interests include "people oriented/centered (93.8 percent)", "salary and welfare (91.4 percent)", "education and training (86.4 percent)", "abiding by labour laws (85.2 percent)", "workplace safety and workers' health (81.5 percent)" and "employment policy (81.5 percent)".

The article will focus on reporting in these areas as key aspects of HRM. The main question is: Are indicators which characterize HRM depended on the sector of entities' activity?

In order to achieve the aim of the article, the research on non-financial information reported by enterprises assigned to two types of enterprises: production and nonproduction was undertaken.

The division into these two categories of enterprises was aimed at identifying groups of indicators in the scope of reporting HRM, characteristic for a given group of activities.

The survey covered 17 non-production entities and 17 production entities. They were selected from the list of companies submitted to the competition of social reports in 2018 and 2019. In fact, the audit was carried out on the basis of reports for 2017 or 2018, i.e. in the period in which large entities were covered by the non-financial reporting obligation. In the period under examination, a total of 73 reports were submitted to the competition, hence the research sample of 34 companies gives 47% of the total.

The similar statistics are achieved in the database CSRinfo. The types and number of entities in research groups are presented in the table 1.

Table 1: The types and number of entities in research groups

Nonproduction entities		Production entities	
Sector	**Quantity**	**Sector**	**Quantity**
Finances	11	Heavy industry	4
Trade	2	Chemical industry	3
Media	2	Construction industry	6
IT	1	Energetics	4
Hotel industry	1		
Total	**17**	**Total**	**17**

Source: own studies.

The division of the surveyed entities into two groups is justified by the different nature of the work performed by employees.

In production companies, employees are exposed to a higher degree of risk of physical injury, they are exposed to contact with dangerous substances or risky situations, such as breakdowns of machines, equipment at which they work, exposure to noise or changing weather conditions.

In non-production entities, workers come into contact with a different type of hazard, than in production companies. The direct threat to life or health is usually small, while greater emphasis is placed on the development of competence or the ability to cooperate with customers. An important aspect in the analysis of these issues is also the perception of certain types of professions as more "male" or "female".

The diversity of these groups of entities has contributed to the examination of whether their specificity is reflected in the applied non-financial HRM indicators.

The list of indicators has been conducted in the following groups:

- employment indicators,
- training (excluding health and safety training),
- benefits,
- health and safety indicators,
- salary indicators,
- periodic evaluation of employees,
- to survey employees' opinions.

The results of the obtained researches are presented in the table 2.

Table 2: Number of indicators used in individual enterprise groups

Indicator		Nonproduction entities	Production entities
Employment indicators	Age	11	12
	Sex	17	15
	Fixed-term contract or indefinite contract	14	13
	Full-time or part-time work	12	7
	Number of training hours	10	6

Training indicators	Average number of training hours per employee	12	11
Health and safety indicators	Frequency of accidents	7	10
	Number of accidents	13	16
	Severity of accidents	10	12
	Absence from work due to accident	10	11
Salary indicators	Women's to men's pay ratio	6	4
	Reference of wages to the minimum wage or average wage	4	2
Benefits		17	17
Periodic evaluation of employees		12	4
To survey employees' opinions		3	1

Source: own studies based on non-financial reports of 34 Polish entities.

Preliminary analysis of the data presented in the table 2, allows to observe general reporting trends, depending on the nature of the company's activity. We can see also, that some areas are characterized by several indicators and company choose that one, which are the most valuable for them.

In the case of nonproduction companies, a greater emphasis is placed on employee training, which is reflected in broader reporting on the subject. In production companies, on the other hand, the most important issue is occupational safety, which has been confirmed in the reporting. The analysis may be more detailed and deepened by examining the accuracy of reporting in particular areas. For this purpose, the reporting accuracy indicator proposed by the author of the article can be used.

This indicator measures the ratio of the number of indicators shown in the reports in the surveyed group of entities to the maximum number of indicators that could be used, assuming that each company will use all indicators selected in the survey.

The indicators of reporting accuracy in particular HRM areas are presented in table 3.

Table 3: Reporting accuracy indicator in nonproduction and production entities

Reporting accuracy indicator	Nonproduction entities	Production entities
Employment indicators	0,794	0,691
Training indicators	0,647	0,500
Health and safety indicators	0,588	0,720
Salary indicators	0,294	0,176

Source: own studies

The reporting accuracy indicators presented in the table 3, confirm certain reporting trends:

- a greater emphasis is placed on employee training in nonproduction entities,
- the most important issue is occupational safety in production companies.

These trends indicate that, depending on the nature of the company's business, other aspects are highlighted in non-financial HRM reports.

We can observe also, that aspect of wages is not the most exposed in the non-financial information reports, especially the women's to men's pay ratio.

In all the reports analysed, employers provide employees with additional non-wage benefits. The employee survey is not revealed in the reports to a small extent.

The analysis of the data in Table 2 gives grounds to claim, that the periodic evaluation of employees is an important element of HRM in non-productive entities – most of them perform employee evaluations.

It should be stressed that the proposed reporting accuracy indicator is not intended to assess the reliability of the report, but only to help identify which areas are particularly important for a given group of entities. It is also important to relate the reported indicators to data specific to the sector in which the company operates - only such a reference shows full information.

The reporting accuracy indicator can also be used to determine the accuracy of reporting in a given area in the context of an individual enterprise. It is then worth comparing the indicator to the average in a given sector or other selected indicator.

The review of non-financial reports of 34 companies shows that every of them report the diversity. This aspect is characterized by participation of women in management bodies as well as in the employment structure. Other indicators showing the application of diversity policy, such as the employment of disabled people or foreigners, are marginal.

Conclusions

This paper contains main findings from literature studies and research:

- the subject of CSR is very large and it can be characterized in many sections and in different shots,
- CSR has not long history in Polish practice and researches,
- aspects of employment reported by entities can be equated with HRM,
- the review of non-financial reports of 34 Polish companies shows that a greater emphasis is placed on employee training in nonproduction entities and the most important issue is occupational safety in production companies,
- diversity policy in Polish reports is not is not widely exposed,
- reporting accuracy indicator, proposed by author, can be useful to research how important is the reported area for the entities in sector or for the individual company.

It's difficult to avoid some limitations and it's not possible to accommodate every details of the subject. First of all, the research was based on review of 34 companies reports. The rationale is that these were the reports submitted for the competition, thus they were prepared carefully and information could be obtained from them more easily. In fact, the choice of companies to research was subjective but on the other hand they represented almost 50% entities which submitted reports to the competition in the examined period. Many threads require further and more detailed work, which will certainly be reflected in future researches.

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Sustainable Estate Management of Green Neighborhood Index: Greenship GBCI in Subsidized Hosing

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Abstract

Indonesia is the third most populous country in the world, which will certainly have needs for housing. According to data from the Ministry of Public Works And Public Housing of Indonesia, it is known that the number of subsidized houses built in Indonesia in 2019 is a 74.6 percent. So, subsidized housing construction should be given greater attention in ensuring sustainable development. On the other hand, subsidized housing is a house that must be affordable by middle-low income people. So that environmental, social, economic aspects must be implement in harmony and affordable. This study aims to assess the sustainability management application in subsidized housing. The method uses the green neighborhood index in Indonesia, called Green Neighborhood GBCI. The location of this research is in Perumnas Parung Panjang. The data in the form of satellite photos, design master plan and the data from estate management system. The results of the green neighborhood index, then analyzed descriptively for the sustainability management discuss. Assessment in the Parung Panjang Perumnas gets 43 points according the GBCI Green Neighborhood Index. From the aspect of sustainability management, some input can be obtained for energy, water, material and culture aspects. If the input is carried out, the GBCI Green Neighborhood Index points will be 85 points so that sustainable development will be created in subsidized housing.

Keywords: Green Neighborhood, Sustainability, Management, Subsidized Housing, Indonesia

Introduction

United Nation said that in 2018 the total world population will be in urban areas reaching 55% and projected to continue to increase to 68% in 2050. Indonesia has a large population of 265 million in 2018 (BPS, 2019). The large population certainly has a high need also in terms of meeting the needs of the house, as a primary human need for life. The results of the construction of the Ministry of Public Works and Public Housing during 2019 were 1,257,852 housing units, with 938,405 units (74.6%) being subsidized houses, while 312,691 units (25.4%) were non-subsidized houses (PUPR, 2020). From these data it can be seen that the construction of subsidized houses is greater than non-subsidized houses, so attention to the quality of sustainability in subsidized housing is important to be studied.

Jakarta, as the capital city of Indonesia serves as business center and the center of government. Because of that, on the weekdays the numbers of workers as commuters reach up to 12 million people. Jakarta is to bear the process of rapid urbanization of the surrounding area, such as Tangerang, Bekasi, Bogor and Depok (Rahadi et al., 2015). Perumnas Parung Panjang as the case study of this research is located in Bogor, one of the urbanization regions that effect Jakarta. High population numbers and limited supply significantly increase housing prices (Rahadi et al., 2015). On the other hand, the government lacks control with firm policies, as a result housing prices grew out of control (Aswin Rahadi et al., 2016). Especially if it is related to sustainability, then there is still a view that the concept of sustainable housing means that prices are not affordable. Whereas price affordability is part of subsidized housing. One of the solutions to achieve sustainability in subsidized housing is estate management that applies a sustainable concept (Khamidi et al., 2010).

In a residential area, it is necessary to design a plan that must accommodate the concept of sustainable development. On the other hand, the residential area must also guarantee an estate management system that is sustainable and affordable (Khamidi et al., 2010). The maintenance of the environment after the planning and development period needs to be managed with sustainable estate management so that in the end it will create a comfortable, safe and livable housing environment for a better future and the quality of the best inhabitants.

Method

This study will use the Green Neighborhood GBCI (Green Building Council Indonesia) from Indonesia to conduct an assessment of the housing performance of Parung Panjang Perumnas in applying the concept of sustainable development. Then a descriptive analysis will be carried out using previous research to obtain input on post-development activities within the framework of the estate management system so that sustainable management will be achieved. This research will be conducted in the residential area of Parung Panjang Perumnas, Bogor Regency, West Java Province, Indonesia. Perumnas Parung Panjang area has an area of around 200 hectares, with the number of houses that have been built as many as 10,474 units. The location of the Parung Panjang Perumnas area can be seen in Figure 1.

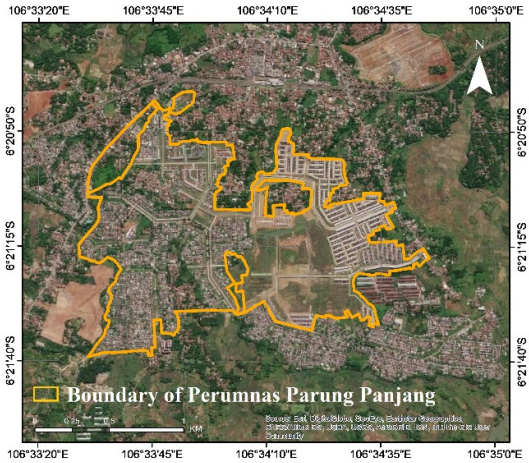

Fig. 1: The location research in Perumnas Parung Panjang, Indonesia

The data used are observations of satellite photos, master plan planning data and data from the estate management system that has been implemented in the Parung Panjang Perumnas. Details of the data sources can be seen in Table 1. It is hoped that with this research step, the Parung Panjang Perumnas will be able to implement sustainable management and obtain a better assessment going forward.

Table 1: Data and source of the data

Data	Source
Satellite photos	Arc Map 4.0 base map, 2020
Master plan Data of Perumnas Parung Panjang	Perumnas (National Housing and Urban Development Company)
Estate Management Data of Perumnas Parung Panjang	Perumnas (National Housing and Urban Development Company)

This research will use the GBCI sustainability index assessment of residential areas (Green Building Council Indonesia, 2015). Then the level of conceptualization of sustainable concepts will be obtained in the case study. From these results, intervention steps can be identified to improve the application of

sustainable concepts in case studies. Intervention steps are obtained using the literature review and benchmark method from housing areas in other countries or regions.

Result and Discussion

An evaluation of the application of the concept of sustainable development has been carried out at the Perumnas Parung Panjang, Indonesia and has resulted in as many points as 43 points (Bronze Level). Details of the assessment results using the Green Neighborhood Index, GBCI can be seen in Table 2 below.

Table 2: Assessment point Green Neighborhood Index, GBCI result

Parameters	Maximum Point	Assessment Point
Land Ecological Enhancement	19	8
Movement and Connectivity	26	12
Water Management and Conservation	18	2
Solid Waste and Material	14	6
Community Wellbeing Strategy	16	8
Building and Energy	18	3
Innovation and Future Development	11	4
Total poin	122	43

Assessment result and improvement in estate management

The results of the assessment get Bronze levels in accordance with the provisions of the points level set by the GBCI (Green Building Council Indonesia, 2015). One of the steps to improve the application of the concept of sustainable development in housing that has been built, it needs to be improved by implementing several interventions in the area's estate management (Jones & Cooper, 2007), (Olanrewaju et al., 2015). Some steps that could be implemented in the Parung Panjang Perumnas depend on the parameters could be seen in Table 3.

Table 3: The Estate Management intervention to Perumnas Parung Panjang

Parameters	Improvement Point
Land Ecological Enhancement	Planting native trees Planting trees on green space Urban farming
Movement and Connectivity	Disability friendly Activate pedestrian Bicycle paths & parking lots Avoid on street parking
Water Management and Conservation	Alternative water sources Reduce runoff water Planting trees in a body of water Wastewater treatment facilities
Solid Waste and Material	Trash sorting socialization Waste treatment facilities B3 waste treatment facilities
Community Wellbeing Strategy	Satisfaction survey of area quality Promotion of sustainable lifestyles Sustainable living socialization program Local cultural preservation activities Local cultural education activities

	Simulation of disaster events
Building and Energy	Sound pollution reduction program
Innovation and Future Development	Involving regional greenship experts Create SOP for managing the area Sustainability innovation

Sustainable Housing Maintenance Management Model (SHMMM/ SHM3)

Some of the parameters that can be upgraded are then used as input to create the SHMMM. The process to build a conceptual of the SHMMM begins with the Planning stage, at this stage the vision of the subsidized housing area and the procurement strategy are carried out. Then the vision of the subsidized housing area and the parameters intervention was used as the basis in making Objective Estate Management, followed by being made the basis in making Estate Management Regulations and Standards. The Second Stage, Organization, at this stage the Estate Management Procedure was made, to be able to regulate the process of maintaining subsidized housing areas. Then followed by the Report Making and Report Submission process. The third stage, namely Directing, at this stage the development of Communication Patterns, work culture, and Division of Responsibility is carried out within a Sustainable Estate Management framework. The fourth stage is Implementation, at this stage the execution of all plans that have been made from the previous stages will be carried out. The fifth stage is Controlling, at this stage monitoring activities and re-checking of all activities that implement sustainable estate management will be carried out (Olanrewaju et al., 2015). Implementing estate management can influence the use of energy, water and materials in the area so that ultimately it will reduce the amount of emissions to the environment (Mustapha et al., 2017) which can be seen in Table 4.

The application of several things to the estate management of Parung Panjang Perumnas will affect the energy, water, material and culture aspects. The details can be seen in Table 4. By implementing the solution step then re-assessment by using the Green Neighborhood Index, GBCI, the value of applying the sustainable concept in the residential area becomes 85 points or Gold Level (Green Building Council Indonesia, 2015).

Table 4: The distribution of interventions in estate management based on the aspects affected (Mustapha et al., 2017)

Energy	Water	Material	Culture
Sound pollution reduction program,	Alternative water sources, Reduce runoff water, Planting trees in a body of water, Wastewater treatment facilities	Reuse development materials waste, trash sorting socialization, Waste treatment facilities, B3 waste treatment facilities	Planting native trees, Planting trees on green space, Urban farming, Disability friendly, Activate pedestrian, Bicycle paths & parking lots, Avoid on street parking, Satisfaction survey of area quality, Promotion of sustainable lifestyles, Sustainable living socialization program, Local cultural preservation activities, Local cultural education activities, Simulation of disaster events
Involving regional greenship experts, Create SOP for managing the area, and Sustainability innovation			

Benchmark improvement the sustainable estate management in affordable housing

Several concepts of improvement in the implementation of estate management can also be implemented in technical applications in residential areas. In the field of energy management: In Russia the construction of affordable housing has paid attention to energy efficiency that leads to a reduction in the cost. There are five management strategies C1 - C5. The C1 - C3 management strategies are for the middle low segment of Russian buyers, because there is not too much extra cost: C1 builds an installation of an automated heat supply unit, C2 provides an additional insulation of the building, and C3 builds an installation of wind and solar power plants. As for C4 and C5 management strategies are for the more affluent segment of Russian buyers: C4 build an installation of apartment ventilation systems with heat recovery, C5 provide an additional insulation of the building envelope with polystyrene (walls, roof), installation of an automated heat supply unit in the apartment block, using low-grade ground thermal energy in heat pump systems, installation of a solar system and installation of a wind and solar power plant (Baronin & Kulakov, 2015). In the field of water management: The housing complex in Cracow, Poland, soak ways, rain gardens, permeable surfaces and infiltration boxes are proposed. Some of this is done with the aim of limiting surface runoff, so that it can be reused and making savings on costs in accommodating surface runoff nationally. With the calculation of payback period (PP) and return on investment (ROI), it is obtained a potential savings of around 9% (rate of return) and investment return time is around 12 years (Godyn et al., 2020). In the field of material management software Building Information Model (BIM) can be used. The application of BIM software has several advantages, namely the precise amount of material needed, so that the waste of material can be reduced which in the end will reduce construction costs (Wei et al., 2017). In the field of culture improvement, a housing area needs to implement a Sustainable Green Management System (SGMS). SGMS is an integrated management system from several sustainability elements in the ISO standard. SGMS is useful for applying sustainable principles to existing facilities in an area with cost and time efficiency, so that productivity increases (Mustapha et al., 2017), (Gazea & Serbanoiu, 2018).

Conclusion

The application of sustainable concepts in housing that has been built can be done by intervening in the estate management. Sustainable estate management implementation will have a good impact on the environment, social and economic area. Estate management interventions in the housing area of Parung Panjang Perumnas, Indonesia were able to increase the concept of application points in accordance with the Green Neighborhood Index, GBCI in force in the country that gets 43 points (Bronze levels) that want to be upgraded to 85 (Gold levels).

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Waste Management Challenges in Office Building: Case Study at Logistics Company

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Abstract

Increased population growth causes environmental problems, such as what happened in the capital city in Indonesia. If there is no systematic effort made, the environmental impact will occur to be significant. One of the ecological problems in the Capital City is the waste problem. The growth of waste every year continues to increase due to various human needs. Potential environmental pollution due to waste occurs accross multiple business sectors, both small and large scale. The office building is one of the contributors to the waste sector. The purpose of this study is to determine what factors are obstacles to waste management in an office building that can improve environmental performance. This research uses a qualitative approach, and the method used is a mixture of qualitative and quantitative through observation, interviews, and literature study. This research was conducted at a logistics company. Based on the results of the study showed that employee knowledge plays an essential role in the success of the waste Separating program in the Company. Limited knowledge makes it difficult for employees to distinguish and separate waste. It means that it is needed a way to increase understanding by socializing, providing clear information on the waste and easy access so that it can increase employee interest in Separating waste.

Keywords: Office Waste; Solid Waste; Sustainable; Segregation; Waste Management.

Introduction

Increased population growth causes environmental problems, such as what happened in the capital city in Indonesia. The issues faced by the capital city of Jakarta are getting heavier because day by day, the population is increasing, and the carrying capacity is also getting smaller (Sutiyoso, 2007). No systematic effort made, the environmental impact would occur to be significant. In principle, every human activity will affect on the environment. Moreover, there is no balance of environmental wisdom (Utomo, Sutriyono and Rizal, 2012). Wisdom on the environment needs to be done because the environment is a unit in which there is an abiotic environment (non-living things), and biotic (living things) (Chauhan, 2008). Therefore, humans must maintain and preserve the environment because environmental problems in the form of impacts on the environment will also affect human life itself.

One of the environmental problems in the Capital City is the waste problem. The growth of waste every year continues to increase due to various human needs (Mangarengi, Zubair and Abdurrahman, 2020), good clothing, food, shelter, and other needs are increasing (Utomo, Sutriyono and Rizal, 2012). Another thing is also due to population density, economic status, culture, even the size of a region that also affects the amount of waste (Kumar *et al.*, 2017). Various types of waste often accumulate everywhere, such as in households, markets, or other places. The amount of waste is due to various problems, according to Sutiyoso, (2007) waste is often not transported, so it piles up everywhere like on a roadside (Wulandhary *et al.*, 2019), most people still have the habit of littering,

making it very easy to find waste on the streets. This is also in line with research in India that the biggest challenges to the waste problem are the transportation of waste that is not maximally transported, handling, and disposal of waste (Kumar *et al.*, 2017). The bad impact of the large amount of waste is environmental pollution. Efforts to minimize waste from the source are needed because without realizing it in the future, problems will arise, such as public health (Tariq *et al.*, 2017) and environmental pollution. Environmental pollution is the addition of substances or materials into the environment which have detrimental effects (Utomo, Sutriyono and Rizal, 2012). Environmental pollution that occurs is like water pollution (Wulandhary *et al.*, 2019), and then air pollution that produces greenhouse gases (Balogun-Adeleye, Longe and Aiyesimoju, 2019).

Potential environmental pollution due to waste occurs in various business sectors, both small and large scale. The office building is one of the sectors contributing waste, according to the Indonesian National Standard (SNI) number 19-3983-1995 concerning the specification of waste generation for small cities and medium cities in Indonesia is 0.025-0.1 kg per employee/day (Nasional Standardization Body, 1995). The potential for waste is an average potential, which means that per employee or employee may be more than that generated per day. The lattest research conducted by Edjabou *et al.* (2015) found that waste generated by employees amounted to 0.08 ± 0.018 kg/employee/day. Office activities such as administrative activities that certainly use paper will produce potential paper waste, then food waste produced by employees, both organic and inorganic waste. Based on its composition, the generation of waste in offices is according to Wardiha *et al.* (2013) are food waste 26.43%, paper waste 18.55%, residue 16.83%, and organic waste 10.93%. With the considerable office waste potential, the company has conducted an environmental program related to waste management. This is because to improve environmental performance by placing two different types of waste bin facilities so as to make it easier for employees to separate waste according to type. Even though the company's program has been running, it does not mean that this program runs optimally in waste management because based on observations, it is often found that waste is mixed, so the purpose of this study is to find out what factors are obstacles to waste management in office buildings so as to improve environmental performance.

Methods

This research uses a qualitative approach, and the method used is a mixture of qualitative and quantitative through observation, interviews, and literature study. This research was conducted at a logistics company. The research was conducted at the company because the company was already ISO 14001-certified, so it must have run a clause that must be met so that environmental performance can continue to improve. This research involved cleaning staff that used to collect waste at the end of their work and involved the company's employees. The research activity began with observations made at all the waste facilities owned by the company and then continued with interviews. Interviews were conducted with selected informants, namely to Office cleaners and employees, for a period of 20-35 minutes to obtain the quality of answers desired by researchers comprehensively. Before conducting interviews with respondents, the researcher ensured that the respondent's profile was kept confidential, and the researcher gave a gift of souvenirs as a thank you for participating in this research.

Some of the questions carried out there are open questions so that they can be developed during interviews, and respondents can be free to answer without any sense of pressure. The research question can be seen below:

- What kind of waste is produced at this company during working day?
- What do you think about the waste Separating program that the company runs?
- What is missing from the waste Separating program so that it has not run optimally?

During the interview with the respondents, the researcher recorded every answer given by the respondent, and the researcher used a voice recorder so that the answers obtained from the respondents were not biased.

Result and Discussion

Waste management carried out by the company is to reduce waste from its source by placing separate waste bin facilities by type. Forms of handling carried out every day by way of waste collected every day at the end of operational office hours. The Office cleaners consist of people assigned to take out waste every day. Waste that is collected into plastic bags is always found waste that has been mixed even though the organization or company has provided two different types of waste, namely wet waste and dry waste. This program is part of the rules that have been issued by Nasional Standardization Body (2002), gathering, separating and processing at the source, then collection, transfer or separating and processing, transportation, and final disposal. The operational engineering scheme can be seen in Figure 1. below:

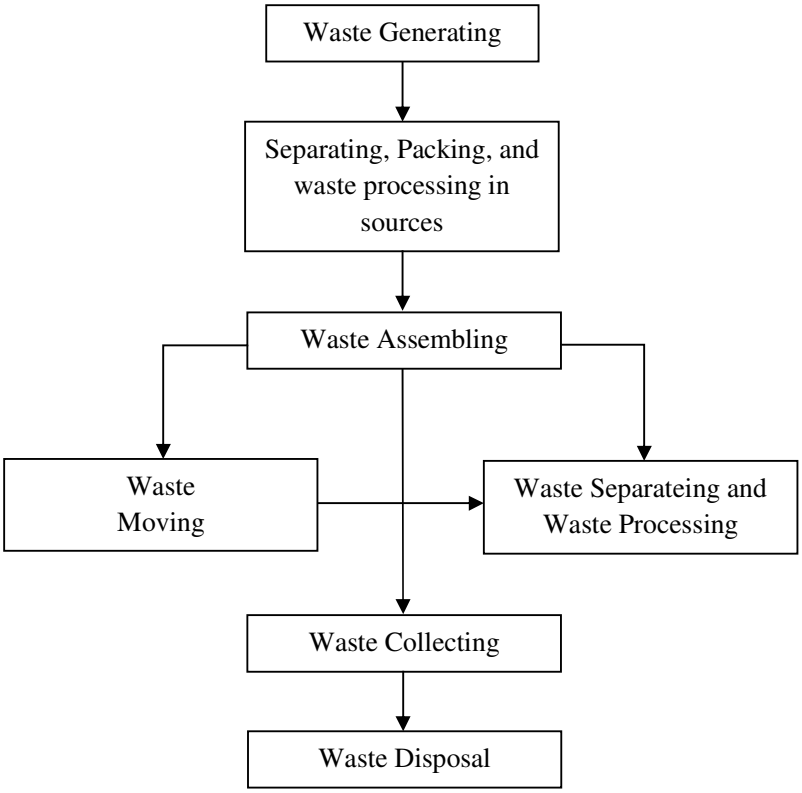

Figure 1: Operational techniques for waste management (Nasional Standardization Body, 2002)

Potential waste collected daily will be collected by the cleaners and will be dumped into a Temporary Waste Station (TPS) provided by the building management. According to research Shochib (2011), waste in offices, especially in the workspace, tends to be more inorganic waste such as paper, plastic, rubber, metal, glass, Styrofoam, and tissue, which is 90.69%, while organic waste is only 9.31%. This was confirmed by the Office cleaners. Based on the information from informant 1 explains that:

> *"According to the Office cleaners, there are very varied, especially in each location of waste placement. Waste bin facilities are placed in the area where food is more organic or wet bins compared to inorganic bins or dry bins. Meanwhile, there are more inorganic waste bins around the workspace. Waste can also always be found mixed with waste like waste in the workspace, and sometimes employees only see the waste can nearby, so it is likely that waste bin facilities is always mixed."*

This statement shows that there is inconsistency even though the organization or company has provided separate waste bin facilities. Lack of knowledge is one-factor, causing employees not to separate their waste. Based on the information from informant 2, the employee shows that:

> *"Waste is not placed in an appropriate place because they do not know what is meant by wet and dry waste. It may be added clearer information in the form of additional images making it easier for employees to dispose of waste. Placement of the point of the waste can also need to be considered so that no need to place each point placed two different waste bin facilities. Some employees still think that there is an Office cleaners who will separate it in the end, and it is not part of their job to separate waste.*

Employee participation needs to be done actively in running the company's program for waste management because it really determines the success of the implementation of a program. The level of employee concern is the key to a program that can run well. Employee concern for the environment lacks due to several things, one of which is the lack of environmental knowledge and the impact that will occur. Research founded by Handayani and Moersidik (2017) confirm that employees care about the environment is lacking because many employees have a perception that the waste management program is not part of their job because there are already Office cleaners who handle it. This is also confirmed research by Yulianto (2016) that many of them think to hand over the waste handling by the Office cleaners because they have already paid so that they do not need to participate in waste Separating.

Environmental knowledge is needed for employees to increase their awareness so that employees are more concerned about the environment. Increased knowledge can be from any activity, such as training. The positive impact of training activities will certainly increase knowledge, and if someone lacks knowledge about the environment, especially related to waste, it will be a challenge for an organization to controll the environment, especially the waste-handling program. (Kumar *et al.*, 2017). Therefore, to improve the environmental performance of an organization, it is necessary to educate employees (Susmono, 2017) so employees can behave friendly to the environment by helping in waste management (Nasional Standardization Body, 2002).

Education for employees can be in various ways, according to Xiao *et al.* (2017) by completing the waste bin facilities in the form of clear information, namely waste instructions according to the type. Clear information in the form of pictures or logos makes it easy for someone to participate in Separating waste (Xiao *et al.*, 2017). It is also confirmed by Sin-Yee and Sheau-Ting (2016) which states that the lack of clear information to separate waste becomes a barrier for someone to separate waste because clear instructions or information becomes vital. Even for someone who does not have limited knowledge related to separating waste, but the existence of clear information on the waste bin facilities can help someone to separate the waste (Sin-Yee and Sheau-Ting, 2016). Moreover, this information is given regularly and continuously will increase employees to participate in Separating waste (Edjabou *et al.*, 2015).

General advertisements such as posters that are easy to read and understand can also increase a person's knowledge so that they can participate in caring for the environment even though with this method, a person will not quickly change behavior (Xiao *et al.*, 2017). The conventional method that can be applied is through direct socialization because socialization is one of the two-way communication methods so that one cannot interact to ask something more in detail so that someone gets knowledge. Effective socialization is when there are questions and answers in it so that two-way communication occurs. The more people are socialized, the more their awareness increases, especially the awareness of the environment. According to research conducted Yulianto (2016), the more people who have not received good socialization, the lower the level of awareness and concern for waste segregation.

Effective waste management, one of which is to provide adequate waste bin facilities so that employees can easily dispose of waste in accordance with his office. Inadequate waste bin facilities will be a challenge for an organization in handling waste (Kumar *et al.*, 2017). Research conducted by Wulandhary *et al.* (2019) revealed that by providing adequate waste bin facilities, a person's

behavior can change and can optimize the program. The comfort factor and easy access to waste bin facilities are also an important part of increasing employee awareness to dispose of and then separate waste bin facilities can according to its type. These factors, according to Xiao *et al.* (2017), became one of the effective factors to increase participation in waste management. The easier accessibility to the waste bin facilities, the higher the likelihood of someone to practice waste separation behavior (Sin-Yee and Sheau-Ting, 2016). For example, the placement of inorganic waste bin facilities near locations that produce a lot of paper waste, this will increase one's ease of Separating waste (Armijo de Vega, Ojeda Benítez and Ramírez Barreto, 2008). Then the short distance also determines whether someone will participate in Separating waste or not. The results of the research conducted by Struk (2017) shows that someone's willingness to separate waste if the distance from the disposed of waste is not too far away.

Conclusion

Based on the results of the study showed that employee knowledge plays an important role in the success of the waste segregation program in the Company. Limited knowledge makes it difficult for employees to distinguish and separate waste. That means that it takes a way to increase knowledge with socialization, provide clear information on the waste and easy access so that it can increase employee interest in separating waste.

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The Impact of Ethnocentrism on Consumer's Buying Decision Process in Polish Sweets Market

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Abstract

In times of globalization the phenomenon of ethnocentrism is gaining interest among consumers who turn towards products produced and delivered by local producers. This phenomenon is particularly relevant to the food market. The main purpose of the paper is a to systemize major issues referring to the subject as well as to identify and analyze consumers' behaviors in the light of consumer ethnocentrism and to determine its impact on buying decision process. The paper presents partial results of the survey on ethnocentric attitudes of selected consumers with regard to Polish sweets market in a local perspective.

Keywords: Consumer Ethnocentrism, Buying Decision Making, Sweets Market

Introduction

The paper constitutes a brief theoretical and empirical study relating to selected aspects of consumer ethnocentrism. The paper was divided into two main parts: theoretical and empirical. The theoretical part completed the theoretical goal which was the critical review of the literature on consumer ethnocentrism phenomenon. The second part of the paper is of empirical nature. In this part the authors performed empirical goal which is the identification and analysis of consumers' behaviours. For this goal the survey method was used.

The main consumer's type of decision occurring the most often is purchase decision. Consumer is perceived as a target object of any enterprise's activity. That is why companies try at all costs encourage them for buying particular products. However, businesses do not have the only impact of consumer's purchase decision.

Consumer while making any buying decision pays particular attention to aspects such as price, quality, packaging, brand, advertisement, promotion or even atmosphere in a store. However, some psychological aspects like consumer ethnocentrism play significant role too.

Above mentioned notion refers to attitude concerning the purchase of only domestic products which is caused by duty to buy national goods and thus assisting local economy. Ethnocentrically oriented consumers treat their own group as the center of the world and classify others with the reference to it, usually they are seen as worse ones.

The basis for this research is the assumption that consumer ethnocentrism influences the purchase decision process in Polish sweet market.

The approach applied in the paper is of descriptive-empirical nature. The research methods involved in this paper are: induction, deduction, literature studies as well as survey and data analysis. The method of critical and comparative analysis was used in relation to the views presented in the literature.

The paper ends with a brief presentation of research findings which are of the preliminary nature and will be developed in further research.

Defining Ethnocentrism

Ethnocentrism notion was introduced and defined by G.W. Sumner as a belief that 'one's own group is the center of everything' in reference to which others are scaled and rated. (Sumner, 1906). Ethnocentrism creates the viewpoint that one's own group is better and more important that others groups in terms of language, behavior, customs and religion (Kowalczyk, 2016). The word ethnocentrism is composed of two expressions: 'ethnic' that stands for cultural heritage, and 'centrism' that stands for being in the center. The whole name refers to assessment of other groups while taking into consideration own cultural viewpoint (Barger, 2019).

Ethnocentrism is also understood as "*tendency for judging members of other groups and communities and also people of different lifestyles, on the basis of standards of own group or culture, where foreign groups are usually perceived as inferior to one's own group"* (Matsumoto & Juang, 2016).

Ethnocentric attitudes among persons composing a given society are being developed by all cultural systems. This means that they perceive their system of values, convictions and norms as better than others. Ethnocentrism thus may lead to intolerance, which causes conflicts and tensions (Hammond & Axelrod, 2006).

From the ethnocentrism's point of view, one's own group constitutes the center of the world, and others are assessed and classified with reference to it. Norms, value systems and behaviors characteristic for personal group are recognized as good, correct and appropriate. However, external groups' features that differ from one's own group are seen as bad, wrong and inappropriate. (Perreault & Bourhis, 1999). The phenomenon of ethnocentrism is widespread and deeply rooted in inter - environment relations. It is not only restricted to individual nations but also occurs within a much smaller social groups. It is also manifested in forms such as: nationalism, racial discrimination or religious prejudices (Watson & Wright, 2000).

Ethnocentrism is a natural consequence of socialization that took place in childhood. Its main purpose is to inculcate in child fundamental values, norms and roles appropriate for a particular society or community. In the early stages of socialization, ethnocentrism is treated as a positive phenomenon because it causes subordination to basic social norms binding all group members. It brings about also recognition of the system of values shared by all community members. As a result, an individual engages in behaviors that society benefits from and thus not only focuses on satisfying personal needs. However, while interacting with foreign cultures, ethnocentrism turns out to be dysfunctional: it leads to perceiving one's own group by its members as superior to others. As a result, a particular social group considers its system of values as universal and the only appropriate one. What is more, values shared by foreign groups (external) are being negated (Sharma, Shimp, & Shin, 1994).

Ethnocentrism favors the exaggeration of differences between groups and contributes to the lack of cooperation with members of other groups. This results also in disregard of authorities coming from foreign groups. However, from the other point of view, it contributes to a sense of community within own social group and the acceptance of authorities deriving from that group. In extreme cases, ethnocentrism manifests itself in the form of social distance, hostility toward certain nations, the lack of confidence toward 'foreigners' and blaming them for the failures and problems appearing within own group (Figiel, 2004).

Ethnocentric attitudes exist in many areas of human activity. These include among others: culture, politics, religion and economy. In each of these social areas ethnocentric behavior may be viewed as a feature of the way of thinking and acting with regard to individuals, social groups and even the whole society. Above mentioned behaviors may appear occasionally, temporarily or permanently (Fernández-Ferrín, et.al., 2017). Ethnocentrism in interpersonal relations, especially its aggressive form, is a

negative phenomenon and even sometimes a dangerous one. It can lead to fanaticism by causing serious problems and disputes.

Ethnocentrism helps group members to unite by sharing the same culture and also causes subordination to basic norms and rules present within a group (Fernández-Ferrín, Bande-Vilela, Klein & del Río-Araújo, 2015). That is why an individual is more interested in group's benefits rather than own ones. However, interacting with other foreign groups can lead to conflicts through exalting over them. It may be visible by prejudice, contempt and even violence (Josiassen, Assaf & Karpen, 2011),

Consumer ethnocentrism and buying decision process

Purchasing products usually engages putting special attention to standard factors, which include among others: quality, price, method of payment, delivery date, the possibility of discount, guarantee or possibility of return. However, contemporary marketing research concentrated on the analysis of consumer behavior, make use of the achievements of psychology. It examines the impact of factors that characterize emotional features of the buyer with regard to his/ her confidence in the company or product, reputation, as well as to general opinion about brand or country of origin (Watson & Wright, 2000).

Consumers, while buying any product, are generally driven by emotions and their choices are not always rational. Purchase decision of a specific brand is particularly difficult in the case of a large number of competing products. Consumers make the choice on the basis of own experience, knowledge or information received from a producer, family members or friends (Rudnicki, 2012). Consumer pays also special attention to promotional activities that shape his/ her view of reality, attitudes and references (Huddleston, Good & Stoel, 2001).

Each product can be identified according to certain characteristics, both physical and emotional ones. Origin of the product is treated as one of them. Consumer, due to information placed on the product or packaging, but also to specific symbolic labeling (bar code, national symbols of quality, name and address of the manufacturer, place of production, brand, language of product description) may assume where does the product come from (Rudnicki, 2012).

Nowadays, when the deepening internationalization of world trade is visible, the country of product origin is becoming crucial (Figiel, 2004). On its basis a consumer may assess a given country's product from the point of view of own preferences and stereotypes concerning that particular country. One glossary explains that country of origin depicts the impact of consumers' perception of a particular country on the assessment of products (or brands) originating in that country(Kowalczyk, 2016).

The phenomenon of consumer ethnocentrism is a specific variation of the effect of country of origin that consists in preferring the purchase of domestic products. The concept of consumer ethnocentrism was defined by Sharma, Shimp and Shin. According to these authors, consumer ethnocentrism may be defined as: "*a belief held by consumers on the appropriateness and indeed morality of purchasing domestic-made products. Consumer ethnocentrism implies the normative belief that purchasing domestic products is more beneficial than purchasing foreign goods"* (Sharma, Shimp & Shin, 1994).

Ethnocentric countries perceive other nations while taking into account two dimensions. On the one hand there is a concept of 'in-group' that strictly refers to home country. The second type, an 'out-group' touches overseas countries. Such division assumes that the first group is better than second one (Han, 1988).

From the ethnocentric consumers' point of view, the purchase of foreign origin products is improper because it weakens the domestic economy while causing an increase in unemployment. Due to that fact, products manufactured abroad are commonly rejected. Ethnocentrically focused customers, while buying products, are driven not only by economic or emotional reasons, but also by moral ones. However, non-ethnocentric purchasers do not notice such characteristics as the country of origin and while choosing the most adequate products they focus on other features of that commodity. In majority

of occurrences, buying decisions are more rational from the financial benefits viewpoint (Watson & Wright, 2000).

Consumer ethnocentrism has several attributes. First of all, it stems directly from the concern about own country and from the anxiety of losing control over the economy due to increased import. Secondly, it encourages to refrain from buying foreign origin products. Consumers with a significant level of ethnocentrism perceive the acquisition of foreign products not only in the economic context. It also creates problems with their morality. That moral engagement means that consumers in extreme cases purchase domestic products even though their quality is significantly than imported goods (Dyrda, 2010). Thirdly, it can be assumed that the level of consumer ethnocentrism is the sum of tendencies of particular individuals that compose a part of a given social group. Consumer ethnocentrism constitutes a form of economic patriotism in the consumption sphere and while being a social phenomenon it is the result of conscious and purposeful decisions (Han, 1988). Consumers' tendency to favor the purchase of domestic products, even when an entity is aware of product's inferiority to other commodities, results in several positive economic effects from the native country's point of view.

Summarizing, the consumer ethnocentrism's consequence is overestimation of domestic products, depreciation of the import significance and a sense of moral obligation for purchasing domestic products.

Economic activity is strictly based on the sale of products and services offered by any kind of an enterprise. (Rudnicki, 2012). It is known, therefore, that the target object is presented in the person of consumer that can be portrayed as an individual person who acquires and consumes goods or services for own use or ownership rather than for resale or use in manufacturing.

In order to obtain the largest possible number of customers, entrepreneurs need to be acquainted with specific consumers' behaviors their choices are directed by. It is crucial for developing the strategy that enables them to have an impact on consumer and his/ her behavior (Balabanis & Siamagka, 2017).
Nowadays, many definitions concerning consumer behavior may be enumerated. For instance, some authors introduce it as a field of research of cognitive processes and decision- making concerning the purchase and consumption of products and services (Falkowski & Tyszka, 2001). On the other hand it is defined as a set of consumer's actions and perceptions that contribute to preparation of decision on product selection, performance of a given choice and consuming. Moreover consumer behavior consists of three types of reactions: communicating, the purchase and consumption (Rudnicki, 2012).

Throughout the whole life, each person makes uncountable number of decisions. These include significant decisions that cause meaningful changes in human life and long - term consequences. There are also decisions of lower importance which do not cause any changes in human life and relate to everyday matters, such as selection of food, cosmetic brand or way of spending free afternoon.

Majority of decisions are taken immediately, in the heat of the moment and without any particular mental effort. However, some decisions constitute the result of long term analyses of all pros and cons as well as benefits and possible unpleasant consequences. Generally speaking, it is believed that the more important decision for a human is, the longer the period of reflection and extensive mental effort put in taking it is (Falkowski & Tyszka, 2001).

Decision in general may be defined as a conclusion reached after consideration of possible options. It is always associated with the necessity to make a choice. Making decisions relies on choosing a specific action from the set of possible actions.

The purchaser of particular goods is usually identified with the person that takes decision to acquire them. However, it is not always the same person. It is often very difficult to determine the decision - maker because decision making process may involve more than one person (Dyrda, 2010).

Selected Survey Results

The above-mentioned conditions are also typical for Polish consumers who are guided by similar behavioural patterns (Smyczek & Glowik, 2011). The Polish sweets market seems to be the relevant example as Polish sweet products are commonly perceived as of excellent quality. For the purposes of this work a survey was conducted which was an objective of the research. Its topic was to analyse the purchase behaviours of consumers. The following research questions were formulated:

1. Does a country of product's origin have an impact on the purchase decision?
2. Are consumers ethnocentrically oriented in terms of the purchase of sweets?

The survey was conducted on September - October 2019. The respondents were answering on the internet. There were 60 respondents involved with 57% of women and 43% men within the age range of 18 – 65 years who originated from Silesian region in southern Poland. They were chosen at random. The sample is justified by the region's population density and demographical structure which is reflected in it.

The first question related to the product's label. The results are presented in Figure 1. Results are based on a conducted survey.

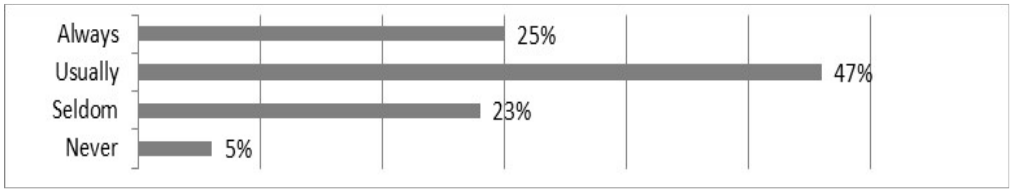

Fig. 1: Particular attention to product's label

In the above mentioned question respondents had to decide whether a product's label has a piece of importance for them. Results show that major group usually scrutinizes labels (47%) while 25% of them always do it. Respondents who seldom look at labels constitute 23% of the surveyed group. Only 5% of questioned people never pay attention to product's label.

Generally speaking, it can be assumed that 72% of respondents check labels to a greater or lesser extent. In this question respondents were to determine whether the product's country of origin was important to them.

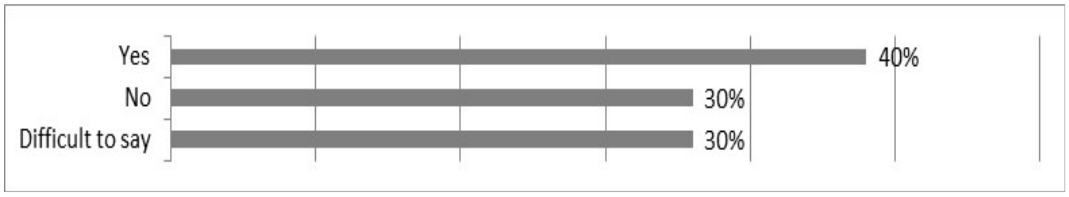

Fig. 2: Importance of product's country of origin

The question of country origin was presented in Figure 2. Results are based on a conducted survey. According to 40% of respondents, the country or origin has a piece of importance in the moment of purchase. Two groups of 30% surveyed answered that it is not important and defined it as difficult to say as well.

In following question respondents were to indicate whether they agree or disagree with the following statement: 'If there is a possibility to choose I prefer the purchase of foreign products instead of domestic ones'. Received answers were as follows and are presented in Figure 3.

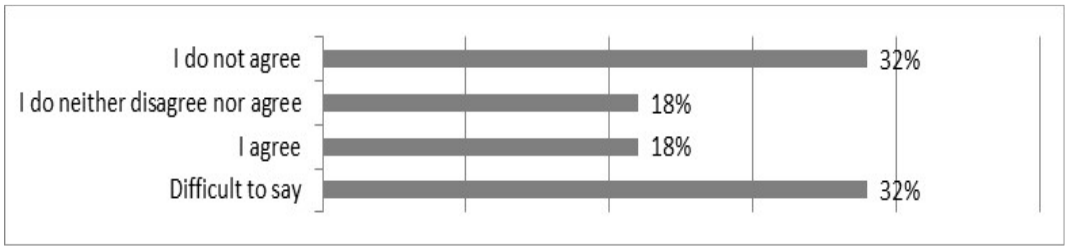

Fig. 3: Consumers' preferences in terms of country of origin

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The above question concerns preferences referring to the country of origin. 32% of respondents respond to not agree with mentioned sentence. The same percentage of surveyed perceived this enquiry as difficult to say. Remaining both groups of 18% of respondents neither disagree nor agree or agree with stated phrase. In the following question respondents were to indicate their preferences in terms of product's country of origin in terms of food.

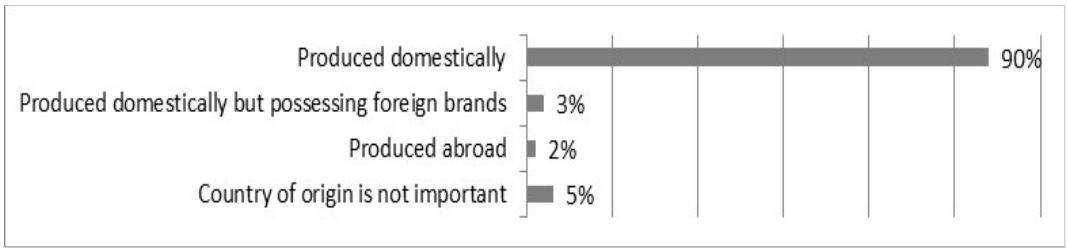

Fig. 4: Consumer's preference of country of origin in terms of food.

While speaking about food products respondents absolutely prefer goods produced domestically (90%) which is illustrated in Figure number 4. Only 3% of surveyed favors products produced domestically but possessing foreign brands whereas 2% picks those produced abroad. For 5% on respondents country of origin is not important.

According to the greatest group of respondents, detergents and cosmetics produced abroad are most frequently chosen by 38%. 20% of surveyed picks produced domestically goods whereas 18% favors produced domestically but with foreign brands ones. The country of origin is not important for 23%. The next question concerns the perception of sweets produced in Poland which is presented in Figure number 5.

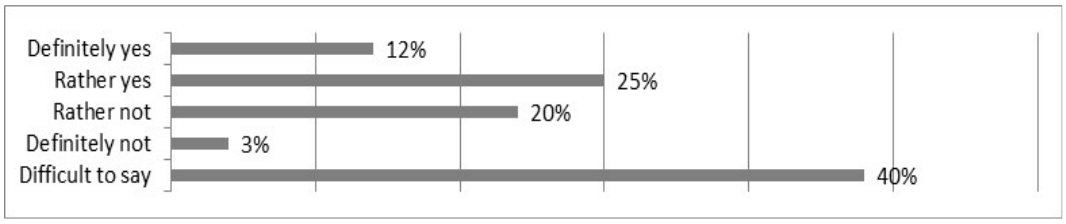

Fig. 5: Superiority of sweets produced in Poland over foreign ones

In above enquiry respondents were asked to present their point of view in terms of sweets produced in Poland. 25% of surveyed perceive them as rather better than foreign ones and 12% view them as definitely better ones. Poland's sweets are recognized as rather not better than foreign ones by 20% of respondents and as definitely not better by 3%. 40% of surveyed conclude that it is difficult to say.

It can be assumed that 37% of respondents in total treat sweets produced in Poland as better than those from abroad. In the next question respondents were declaring their preferences on the origin of sweets producers.

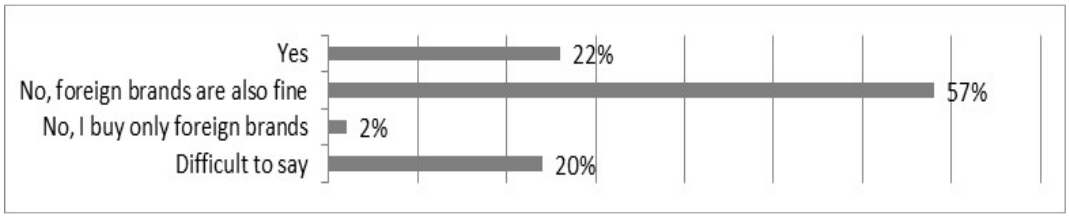

Fig. 6: The purchase of sweets coming from Polish producers only

The majority of respondents seems to be tolerant and buys both Polish and foreign brands sweets (57%). 22% of surveyed desire to buy sweets coming from Polish producers only whereas 2% purchases only foreign brands. 20% perceives this question as difficult to answer.

Results from this question, illustrated in Figure number 6, show that almost one-fourth of respondents are directed only for specific countries of origin: 22% of surveyed desire to purchase only Polish products whereas 2% looks for foreign brands only.

It can be also seen that over one-fifth of asked people (22%) may be perceived as ethnocentric consumers who value only national products and desire to assist only domestic economy. The following question relates to the better exposure of Polish brands of sweets in a store and is presented in Figure number 7.

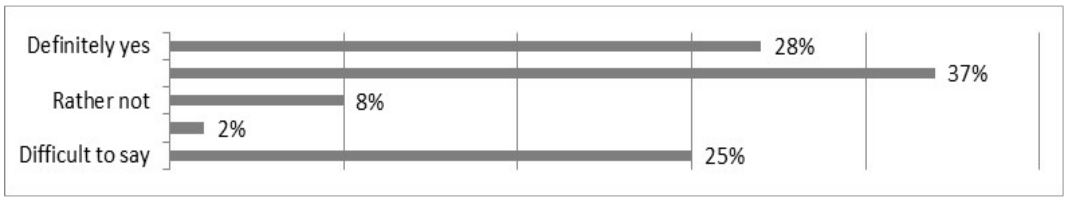

Fig. 7: Indication of Polish brands in a store

In the last question respondents were asked to express their opinion on the improvement of Polish brands' visibility in a store. The major group answered that Polish sweets rather should be better indicated (37%). Additionally, 28% of surveyed claims that they should be definitely demonstrated in more visible way. According to 8% of respondents there should not rather be any improvement in that case whereas 2% definitely do not support this idea. One-fourth of surveyed perceives this question as difficult to say (25%).

Generally speaking, 65% of respondents manifest the urge for improved visibility of Polish brands in a store.

Conclusions

Summarizing the above findings the following observations based on the survey were made attempting to offer the answer to the research question on a consumers' ethnocentrism influence on the purchase decision process in Polish sweets market.

- 37% of respondents perceive Polish brands of sweets as superior to foreign ones whereas 40% of them perceive that question as difficult to answer. It assumes that over one-third of surveyed can be described as ethnocentrically oriented. A significant number of persons indicate uncertainty of purchased products quality what- as it can be visible after conducted research- was caused mainly by lack of knowledge concerning the recognition of Polish brands.
- Over one-fifth of respondents (precisely 22%) express the urge for the purchase of only Polish brands of sweets. The conviction regarding the purchase of domestic products in terms of duty for assisting national economy is visible here.

- 40% of respondents described country of product's origin as important factor of purchase decision whereas 30% of surveyed do not pay particular attention for that aspect. 30% view question no 5 as difficult to answer.
- 37% of respondents perceive Polish sweets as superior to foreign ones. However, 22% of surveyed expresses the urge for the purchase of only domestic brands. It assumes that over one-fifth of society wants to buy sweets only domestically what can be treated as a symptom of consumer ethnocentrism. This phenomenon in some way encourages to the purchase of local products.

More detailed research in this area is required, however preliminary simplified results confirm the assumption that ethnocentrism is of key importance in consumer choices in Poland and the sweets market is a good example of this phenomenon.

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Corporate Social Responsibility Practice of Mobile Network Operators in the DACH Countries

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Abstract

Corporate social responsibility (CSR) and sustainability efforts are of increasing importance to consumers when making purchasing decisions. The telecommunications industry is one of the most heavily regulated industries in the DACH countries (Germany, Austria, Switzerland and Liechtenstein), with only a few participating companies generating the highest revenues. This example will be used to examine the dynamics of CSR practice in an oligopolistic market. Despite its increasing importance, there are hardly any studies on the CSR practices of mobile network operators (MNO) in the DACH countries. Therefore, their CSR strategies and activities shall be analysed for similarities, differences and trends. First, a literature review was conducted to identify research on the topic, and all MNO in the DACH countries were identified. Subsequently, the reporting of the individual companies' CSR activities since 2017 was analysed. MNO in the DACH countries take their social responsibility seriously and practise diverse and comprehensive CSR strategies. Health and mobile radiation exposure is an essential element in all CSR strategies. Furthermore, the topics of sustainability, energy efficiency, climate and environmental protection, infrastructure development, diversity, occupational safety and health, data protection and security, protection of children and minors and digital literacy and inclusion are essential elements of CSR in MNO. The mobile communication industry in the DACH countries shows exemplarily the dynamics of how CSR practice in an oligopolistic market works.

Keywords: MNO, CSR, Strategic Management, Mobile Communication

Introduction

The social responsibility and sustainability efforts of mobile network operators (MNO) are becoming increasingly important for consumers when making purchasing decisions (Lee et al., 2015). Corporate social responsibility (CSR) communication, especially sustainability reporting, is an essential tool for highlighting and disseminating initiatives and steps to support sustainable development. The Global Reporting Initiative's (GRI) sustainability reporting framework is in the process of becoming the world's most widely used standard for CSR reporting in large corporations (Blasco & King, 2017) In the DACH countries (Germany, Austria, Switzerland and Liechtenstein), the telecommunications industry is one of the most heavily regulated industries. Only a few companies operating on the market achieve the highest revenues – the MNO can, therefore, be seen as an oligopoly in the DACH countries. Although more and more MNO are reporting separately on CSR initiatives and the achievement of their social and environmental goals, the information is often not detailed enough to be of value (Bhandarkar & Alvarez-Rivero, 2007). Standardised and consistent reporting is essential if CSR activities in MNO are to be monitored and managed (Bowrey & Clements, 2019). Accordingly, the market considered in this paper presents the mobile communication industry – specifically the MNO market – in the umbrella countries on the basis of their sustainability reporting. Despite the increasing importance of CSR in the practice of MNO, hardly any research exists in this area. There is an especially small amount of literature available on the question of how mobile services can be made more sustainable, fair and transparent.

Therefore, this study aims to analyse the application and implementation of CSR strategies of MNO providers in the DACH countries and to qualitatively analyse them for similarities, differences and trends. Furthermore, this example will be used to examine findings on strategic corporate management and dynamics of CSR in an oligopolistic market. The obtained results are intended to provide meaningful insight into business practices and extend the existing literature. First, the study carried out a literature review. It then identified all MNO in the DACH countries and analysed their sustainability and their reporting of CSR activities since 2017.

Literature Review

In the DACH countries, the mobile communications market is characterised by different players and different sub-markets. These can be divided into MNO and mobile virtual network operators (MVNOs). MNO are companies that operate and manage the infrastructure (e.g. cable connections, switching stations, the core network and network management systems) to provide mobile services, and thus they act as the market's network operators. MNO, therefore, have access to all network capacities, which they license to MVNOs in addition to their core business through a cooperation strategy, thus making their mobile network services available to other companies (Luber & Donner, 2019). Accordingly, MVNOs do not have their own networks, and they act as resellers by cost-effectively marketing mobile services under their product and brand names. An MVNO is thus characterised by a strategy of cost leadership (Nollau, 2017). In the DACH market under review, the MNO players are divided as follows. The German mobile communications market is made up of three MNO providers: Telekom Deutschland GmbH, Vodafone GmbH and Telefónica Germany GmbH & Co. OHG (Bundesnetzagentur, 2020). The Austrian mobile communications market also consists of three MNO providers: T-Mobile Austria GmbH, Telekom Austria AG and Drei Austria GmbH (ICT Kommunikation, 2020). The Swiss mobile communications market subsumes the companies Swisscom AG, Sunrise Communications AG and Salt Mobile SA under the term MNO (BAKOM, 2020). The mobile communications market in Liechtenstein comprises a total of three MNO, each with its own infrastructure: Telecom Liechtenstein AG, Swisscom (Schweiz) AG and Salt (Liechtenstein) AG (Amt für Kommunikation, 2020).

There is currently little knowledge on the subject of CSR in mobile communications companies. Although more and more mobile communications companies are reporting on their CSR initiatives and the achievement of their social and ecological goals, the information is often not detailed enough to be meaningful (Bhandarkar & Alvarez-Rivero, 2007). There is little literature available, especially on how to make services in the mobile communications industry more sustainable, fair and transparent (Wang et al., 2016). With reference to this, numerous research deficits are explicitly seen in the areas of 'climate protection', 'fairness and transparency' and 'data protection' (WEtell, 2019).

In the modern global economy, behaving appropriately socially responsibly is now seen as a social necessity (Marsden & Andriof, 1998). Accordingly, customers are increasingly demanding that mobile communications companies also assume social responsibilities (Lee et al., 2015). Standardised and consistent reporting is essential if CSR activities are to be monitored and managed (Bowrey & Clements, 2019). The question for MNO is no longer whether CSR activities should be carried out, but rather how they should be carried out (Smith, 2003). In line with this, CSR has also gained importance in management research (Schneider, 2015). Accordingly, CSR must not only be understood as a business management process but must also be professionally integrated into the area of strategic corporate management (Maignan & Ferrell, 2004). Indeed, international standards and a wide range of instruments (e.g. certification, corporate mission statements and sustainability reporting) or comprehensive management systems are available for modelling CSR in mobile communications companies (European Commission, 2004). In return, sustainability and social concerns can be significantly promoted through their inclusion in CSR frameworks and standards as companies must take these concerns into account in their CSR reporting (Miethlich, 2019). However, so far, there is little knowledge about the implementation of specific CSR activities (Peloza & Shang, 2011; Wang et al., 2016). Therefore, the acquisition of profound knowledge of how CSR activities affect mobile communications customers – in terms of their overall impression of the company and its benefits –

remains of great importance for strategic corporate management (Chen et al., 2018; Peloza & Shang, 2011).

Increased competition in oligopolistic markets – such as the mobile communications market – leads to increased adaptation and activity of CSR (Hawn & Kang, 2018) and can lead to a sustainable competitive advantage (Lambertini & Tampieri, 2015). In oligopolies, strategic market considerations seem to be the primary reason for a company's implementing of CSR (Lambertini & Tampieri, 2015; Wirl, 2014). Companies operating in an oligopolistic market play a pioneering role here, which other companies adopt. This 'rat race', therefore, explains the rapid adaptation and the great growth of CSR in oligopolistic markets (Wirl, 2014). On the positive side, the presence of companies with CSR can be seen as effective self-regulation of an oligopolistic market (Lambertini & Tampieri, 2015). For example, one of the few existing studies on CSR in the mobile communications market, which uses the South Korean mobile communications market as an example, showed that CSR is a key factor for competitive success. A positive correlation was found between CSR and customer satisfaction and the decision to choose a provider (Lee et al., 2015).

This anchoring of CSR is particularly elementary in the area of strategic management with regard to the achievement of sustainable competitive advantages in the mobile sector. Only through this can mobile communications companies achieve and maintain a competitive position in the market (Bea & Haas, 2016). However, CSR activities can only give mobile communications companies a real competitive advantage if they succeed in generating or expanding actual customer benefits (Papulova & Papulova, 2006). Sustainability reporting, therefore, plays an important role in mobile communications companies' generation of competitive advantages from their CSR activities. Only through customer awareness of their commitments can advantages for the company be created (Peloza & Shang, 2011). The method for achieving and securing a lasting competitive advantage is referred to in the specialist literature under the term 'competitive strategies' (Kerth et al., 2015). Porter (2008) discusses competitive strategies, and Baumgartner and Ebner (2010) discuss the classification of CSR strategies, dividing them into conservative, visionary, introverted and extroverted strategies. According to Porter (2008), the basic strategic options for gaining a competitive advantage are differentiated into two types: the strategy of cost leadership and the strategy of differentiation. Porter posits that a competitive advantage can only be achieved if entrepreneurial action is taken by focusing on one of the two main strategic directions: either the most favourable cost structure (strategy of cost leadership) or differentiation (strategy of differentiation). For this reason, these strategy options are also known as generic competitive strategies (Porter, 2008). Within these generic strategies, there is a third option concerning the cultivation of the market area: the strategy of concentration on focal points. In this case, the concentration takes place in a sub-market – e.g. an industry or a target group – that has a certain structure of needs (Bea & Haas, 2016). The validity of the respective generic competitive strategies is industrywide, whereas, in the strategic approach of concentration on focal points, it is only specific to the respective segment (Porter, 2008). Accordingly, the market to be addressed is defined by focusing on a niche of the respective industry (Kerth et al., 2015).

The prerequisite for gaining a sustainable competitive advantage in the mobile communications sector is profound knowledge and a clear understanding of customers' needs. Only if customer needs are met profitably, effectively, consistently and better than by competitors can a real competitive advantage be created (Papulova & Papulova, 2006). In this respect, CSR activities are very suitable as a means of developing differentiation strategy methods in the mobile communications market (Chen et al., 2018). Within this strategic sub-area, decisions on services are considered a market-related problem. The respective components of the differentiation strategy represent intangible (and tangible) problem solutions in line with customer needs (Brockhoff, 1999). Satisfying customer needs through a service programme geared to those needs can ensure that strategic marketing and corporate goals are achieved (Meffert et al., 2015). These aspects thus make a sustainable contribution to the corporate success and viability of mobile communications companies in the DACH market.

Methods

First, all MNO in the DACH countries were identified. Then, the CSR, sustainability and annual reports from 2017 to 2019 were examined with regard to CSR activities. The identified MNO were asked by email to provide any missing information, such as the year for which the first CSR or sustainability report was published. Furthermore, the GRI database (GRI, 2020) was used for complementary information. The scientific publication databases Web of Science and Scopus were also searched for research on the topic using the following query: *('CSR' OR 'social responsibil*') AND ('MNO' OR 'mobile network operator' OR 'telecom*' OR 'MNO') AND ('German*' OR 'Austria*' OR 'Switzerland' OR 'Swiss' OR 'DACH' OR 'Liechtenstein')*. Three publications were found in the Web of Science database and 10 were found in the Scopus database, of which only two articles at least partially dealt with the CSR practice of MNO or telecommunications providers in the DACH countries.

Results

The literature research carried had only revealed an investigation into the CSR of a Swiss MNO and a further article on an Austrian MNO. No additional literature on the subject exists. Sachs et al. (2006) examined the organisational and strategic implementation of CSR at Orange SA, a Swiss MNO and predecessor of Salt Mobile SA, and pointed out variants for interaction with stakeholders. Szőcs et al. (2014) investigated the Austrian mobile communication market and demonstrated a positive correlation between CSR and corporate reputation. There are no studies on the CSR practices of MNO or the telecommunications industry in general in the DACH countries. On this basis, the CSR and sustainability reporting and annual reports of the companies identified were examined concerning their CSR activities. The identified MNO in the DACH countries are listed in Table 1, and the form of CSR reporting is described.

Table 1: Overview of sustainability/CSR reporting by MNO.

Country	MNO	Sustainability/CSR reporting
Germany (D)	Telekom Deutschland GmbH	1996: first reports on sustainability activities in various publications* From 2003, combined personnel and sustainability reports* From 2004, also reports according to GRI standard* From 2008, separate CSR report* Annual reporting to date
	Telefónica Germany GmbH & Co. OHG (O2, E-Plus)	2006: first CSR report? From 2009, GRI Standard Separate CSR reports Annual reporting to date
	Vodafone GmbH	2001: first CSR report* Separate CSR report From 2009, GRI Standard Parent company maintains international CSR reports Annual reporting to date
Austria (A)	Telekom Austria AG (A1)	2005: first CSR report? CSR report integrated into the annual report From 2005, GRI Standard Annual reporting to date
	T-Mobile Austria GmbH (Magenta)	2010: first CSR report? Separate CSR report From 2011, GRI Standard

		Annual reporting to date
	Drei Austria GmbH (3)	No dedicated CSR reporting; the superordinate, international holding company maintains CSR reports Annual reporting to date
Switzerland (CH)	Swisscom AG (formerly Schweizer Telecom)	1997: first CSR report* Separate CSR report From 2009, GRI Standard* Annual reporting to date
	Sunrise Communications AG	2015: first CSR report* Separate CSR report Annual reporting to date
	Salt Mobile SA (formerly Orange SA)	No CSR reporting* Only keywords on the website, no specific reports or further information about them (Orange SA had CSR reports already from 2001, according to GRI)
Liechtenstein (FI)	Telecom Liechtenstein AG (FL1)	No dedicated CSR reporting References to individual CSR activities integrated into the annual report
	Salt (Liechtenstein) AG (7acht)	No dedicated CSR reporting
	Swisscom (Schweiz) AG	No dedicated CSR reporting

*Sources: Company websites, *provided by the company by email.*

Most MNO in the DACH countries carry out regular annual CSR or sustainability reporting. The first reports date back to 1996 in Germany and 1997 in Switzerland, and CSR was, therefore, a strategic issue in both countries at a very early stage, much more rapid than in other sectors. The CSR reports are mostly published separately and are based on the GRI standard. There are also a few mobile communication companies that have recently stopped publishing CSR reports, but have previously done so for more than a decade. This applies, for example, to the Swiss MNO Salt Mobile SA. It is noticeable that no MNO in Liechtenstein carries out dedicated CSR reporting.

The CSR and sustainability reporting, as well as the annual reports of the identified MNO, were examined for their CSR activities. The only criterion was that the activities had to go beyond the legal minimum. The activities found were assigned generalised terms, which are listed in Table 2 for each company.

Table 2: Overview of MNO' CSR activities in the DACH countries.

Country	MNO	CSR activities (cumulative)
D	Telekom Deutschland GmbH	Digital literacy, Digital inclusion, Health and mobile radiation exposure (EMF), Occupational safety and health, Infrastructure development (network quality and reliability, service for all), Climate and environmental protection, Cultural and sports sponsoring, Sustainability (products, services, operations and supply chain), Cyber security, Consumer protection and security, Protection of children and minors, Diversity, Equal opportunities
	Telefónica Germany GmbH & Co. OHG	Data protection and security, Digital inclusion, Health and mobile radiation exposure (EMF), Occupational safety and health, Good employer, Protection of children and minors, Sustainability (products, services, operations and supply chain), Climate and environmental protection
	Vodafone GmbH	Supply chain integrity and safety (working conditions and sustainability), Health and mobile radiation exposure (EMF), Digital literacy, Diversity, Social inclusion, Energy efficiency, Sustainability (products, services, operations and supply chain), Data protection and security
A	Telekom Austria AG	Digital literacy, Digital inclusion, Products with social added value, Sustainability (products, services, operations and supply chain), Climate and environmental protection, Energy efficiency, Infrastructure development (network quality and reliability, service for all), Data protection and security, Health and mobile radiation exposure (EMF), Diversity, Occupational safety and health, Good employer
	T-Mobile Austria GmbH	Diversity, Protection of children and minors, Data protection and security, Digital inclusion, Accessibility/being barrier-free (in shops, website, services etc.), Infrastructure development (network quality and reliability, service for all), Sustainability (products, services, operations and supply chain), Climate and environmental protection, Energy efficiency, Good employer, Health and mobile radiation exposure (EMF), Occupational safety and health, Equal opportunities
CH	Swisscom AG	Digital literacy, Data protection and security, Protection of children and minors, Sustainability (products, services, operations and supply chain), Accessibility/being barrier-free (in shops, website, services etc.), Good employer, Supply chain integrity and safety (working conditions and sustainability), Climate and environmental protection, Energy efficiency, Health and mobile radiation exposure (EMF), Energy efficiency, Occupational safety and health, Diversity, Equal opportunities
	Sunrise Communications AG	Energy efficiency, Climate and environmental protection, Sustainability (products, services, operations and supply chain), Diversity, Cyber security, Data protection and security, Infrastructure development (network quality and reliability, service for all), Good employer, Occupational safety and health, Health and mobile radiation exposure (EMF), Digital literacy, Corporate volunteering, Support of domestic social initiatives

	Salt Mobile SA	Health and mobile radiation exposure (EMF), support of recycling initiatives, support of public health projects
FL	Telecom Liechtenstein AG	Sustainable management and development, Health and mobile radiation exposure (EMF), Good employer

Source: Sustainability and annual reports from 2017.

The CSR activities of companies are generally very comprehensive and diverse. Health and mobile radiation exposure was named by all MNO as an important CSR activity, with information included in reports on radiation as well as on the limits and their radiation levels, which are all below the legal limits. Sustainability is also a central issue for almost all MNO (i.e. achieving sustainability in their products, services and supply chain). For most companies, this also includes the topic of energy efficiency, in the sense of reducing energy consumption and purchasing from sustainable sources. Climate and environmental protection is, therefore, an aspect of CSR for almost all companies. At the same time, the expansion of infrastructure to achieve the broadest, most reliable and best possible coverage is also a topic in the context of CSR. Social CSR activities refer in particular to occupational safety and health and diversity in the workforce, as well as the fact that MNO themselves want to be good employers. Furthermore, digital literacy, data protection and security, protection of children and minors, digital inclusion and accessibility/being barrier-free (in shops, websites, services etc.) are further aspects of CSR.

Conclusion

CSR has become increasingly important in management research in general and is fundamental in the mobile sector's achievement of sustainable competitive advantages. Mobile communications companies in particular succeed in achieving and maintaining a competitive position in their saturated markets through product differentiation. However, CSR activities can only give companies a real competitive advantage if they succeed in generating or expanding actual customer benefits. Despite the increasing importance, there are hardly any studies on the CSR practice of MNO in the DACH countries. Therefore, this study has analysed their CSR strategies and activities and examined them for similarities, differences and trends.

MNO in the DACH countries take their social responsibility seriously and practise diverse and comprehensive CSR strategies. MNO started sustainability and CSR reporting at an early stage: Deutsche Telekom reported publicly on its CSR activities as early as 1996, and Schweizer Telecom began one year later, in 1997. Health and mobile radiation exposure is an essential element in all CSR strategies. Moreover, the topics of sustainability, energy efficiency, climate and environmental protection, infrastructure development, diversity, occupational safety and health, data protection and security, protection of children and minors, digital literacy and digital inclusion are important elements of CSR in MNO.

The analysis also showed that some MNO, such as Salt Mobile SA, no longer maintain or publish CSR reporting. This aspect serves as an indicator that CSR in the DACH countries is not always influential on the purchase decisions of customers. This circumstance may also be because the MNO sector has been making CSR efforts and reporting on it from early on – for decades. For this reason, CSR is taken for granted by customers and is less effective as a means of product differentiation. This can also be seen as an indication of the characteristics of an oligopolistic market: at first, companies adapt each other's product differentiation strategies quickly and comprehensively, but after the strategy has been exhausted, they slowly abandon it, one by one. It also appears that in the case of MNO, the transformation of the international CSR strategy to the regional level is not working sufficiently.

In summary, it can be said that CSR activities in the DACH countries are comprehensive and diverse. In Germany, this aspect is strongly pronounced in all MNO. In both Switzerland and Austria, on the other hand, there is one MNO that hardly conducts any CSR activities (or simply does not report on

them). In Liechtenstein, CSR, or at least CSR or sustainability reporting, still seems to be of no significance for MNO.

The mobile communications industry in the DACH countries is an example of how the dynamics of CSR practice work in an oligopolistic market. The study has comprehensively shown the current situation of CSR practice of MNO in the DACH countries. A further area in need of research is the analysis of the strategic contribution of CSR to business success in the mobile communications market (as an oligopolistic market).

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The Effect of Big Data on Improving Moroccan University Students' Performance

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Abstract

This work is articulated in the context of our research which is big data and mental health, we will talk about big data, its chronology, its characteristics and its relationship with business intelligence, then we will present the relationship between big data and mental health and finally a literature review on nomophobia one of the mental health disorders. We are also interested in this work, to introduce machine learning, its different algorithms, its applications as well as its relationship with big data, and finally part of this chapter is devoted to the use of supervised learning methods for classification of the state of nomophobia in students. The main objective of our project is to study the psychology of university students and to know their nomophobia state which has consequences on the physical and psychological health of the individual. In general, the recommendations we will work on involve activating the program and rendering it in the form of an information system that will always be accompanied by its owner. The system will be converted into an application which will be downloaded to a smartphone. It will also be equipped with information and tests which will be accessible offline without the presence of the Internet.

Keywords: Machine learning; Big Data; Business intelligence; Psychology; Consciousness; Intelligent system.

Introduction

Nowadays, scientific research in the field of psychology and its relationships with technology are becoming more dynamic. This fact has led researchers to offer products that help booming humanity by combining a range of fields such as medicine, psychology, sociology, education and technology. There are still many constraints on the mental health sector such as new technologies: smartphones which are the source of several diseases such as nomophobia. The challenge for mental health specialists is to ensure quality care for their patients while minimizing costs. When data access and information analysis functions are available at all levels of a mental health business, it has multiple benefits: can monitor effective treatments and optimize results so that effective decisions can be made. In addition, precise information helps companies in this sector to identify the most efficient service and workflow practices. In this work, we tried to facilitate the task of descriptive analysis of our data by the use of the technologies and the most known tools in this field. The quantitative explosion of digital data has forced researchers to find new ways to see and analyze the world. It is about discovering new orders of magnitude concerning the capture, research, sharing, storage, analysis and presentation of data. Thus, was born the « ***Big Data*** ». It is a concept for storing an unspeakable number of information on a digital basis. According to the archives of the digital library of the Association for Computing Machinery (or ACM) in scientific articles concerning the technological challenges to be met in order to visualize « large data sets», this designation appeared in October 1997. Literally, these terms mean big data. They denote a very large set of data that no conventional database or information management tool can really work. Indeed, we procreate about 2.5 trillion bytes of data every day. Its information from everywhere: messages we send to ourselves,

videos we publish, climate information, GPS signals, transactional recordings of online purchases and much more. This data is called Big Data or massive volumes of data. The web giants, at the forefront of which Yahoo (but also Facebook and Google), were the very first to deploy this type of technology. However, no precise or universal definition can be given to Big Data. Being a complex polymorphic object, its definition varies according to the communities which are interested in it as a user or service provider. A transdisciplinary approach makes it possible to apprehend the behavior of the various actors: the designers and suppliers of tools (computer scientists)[1], the categories of users (managers, business managers, political decision-makers, researchers), health actors and users. Big data does not derive from the rules of all technologies; it is also a dual technical system. Indeed, it brings benefits but can also generate disadvantages**.** Thus, it is used by speculators on the financial markets, independently with, at the end, the creation of hypothetical bubbles.

The arrival of Big Data is now presented by many articles as a new industrial revolution similar to the discovery of steam (early 19th century) of electricity (late 19th century) [2] [3] and computers (late 20th century)**.**Others, a little more measured, qualify this phenomenon as being the last stage of the third industrial revolution, which is in fact that of "information". In any case, Big Data is seen as a source of profound upheaval in society. Big Data issues and challenges are far from new. If we look at the chronology of the events that created Big Data as we know it today, we can see that this genesis goes back quite a long time and that idea had to convince and that the solutions mature in order to get there (see table 1).

Table 1 : Chronology of BIG DATA

Date	Events
1997	First appearance of the term Big Data (NASA) to designate the challenge of working with large volumes of unstructured data
1998	First NoSQL database (and use of the term) by Carlo Strozzi
2000	Neo4j (NoSQL database oriented graphs)
2001	First definition of Big Data (Volume / Variety / Velocity) by Gartner
2005	Birth of Hadoop
2005	Birth of CouchDB (NoSQL document-oriented database)
2006	Google BigTable publication
2007	HBase birth (document-oriented database)
2007	MongoDB database (document-orienteddatabase)
2008	Birth of Cassandra (partitioned NoSQL database)
2008	Creation of Cloudera company
2009	Birth of Spark (data analysis)
2010	Creation of DataStax (Cassandra)
2011	Creation of the company Hortonworks
2014	Spark breaks the record "Terabyte releases Benchmark"

Here is a list of the sources and nature of the most common data in Big Data:
Sources

- Business data,
- History of use of your services by users,
- Customer files (Customer Relationship Management (CRM))
- Data provided by partners
- Social media
- Call centers ...

Nature

- Transactions (e-commerce)
- Geolocation
- Social media
- Emails/documents
- Internet of Things (sensors, ...)
- Pictures
- Audio

Big Data and Mental Health

Mental health (including addiction) is the fifth contributing factor to the global burden of the disease, with an economic cost estimated at 2.5 trillion US dollars in 2010, which is expected to double by 2030. Developing information systems to support and strengthen mental health at the population level health surveillance is an essential element of the World Health Organization's Global Action Plan 2013-2020.

The widespread use of social media, combined with the rapid development of IT infrastructures for efficient processing of "Big Data" and above all, the maturation of natural language processing (NLL) and machine learning (ML) technologies offers interesting opportunities for improving health at the population and individual levels.

The use of “big data” social media for health applications - health applications in particular for the public - is a rapidly growing field of research, variously called infoveillance, digital epidemiology, and digital disease detection. Mental health has been a subject of research for NLP researchers since the beginning of the discipline, as evidenced by the interactive psychotherapist program ELIZA Rogerian by *Weizenbaum* (1966) and the "paranoid" conversation agent by Colby, PARRY (1972). As you would expect, the domain has evolved a lot since the development of these first chatbots [4]. Recent work uses sophisticated NLP and ML methods to, for example:

- Predict the risk of suicide of active duty military personnel using data from the electronic medical record.
- *Choudhury et al.* describes the creation of a dataset on Twitter using participatory sources from Twitter users with depression scores indicative of CES-D (*Center for Epidemiological Studies-Depression*). This data set was then used to form an ML statistical algorithm capable of identifying tweets indicative of depression, and then applied to geocoded Twitter data derived from 50 American states, the results being closely correlated with depression data from the United States Centers for Disease Control.
- Automatic personality assessment via social media language: Researchers used data from users of my Personality, a Facebook application designed to measure personality variables (including "Big 5" variables). The researchers used a sample of 71,556 participants who had both completed the online personality questionnaire and granted access to status updates on Facebook.

Recent technological advances have considerable potential for understanding and improving mental health, both at the individual and population levels. However, risks in particular for privacy remain for example nomophobia.

Nomophobia, The Evil of Generation Z

Nomophobia, by definition, is a phobia linked to the anxiety of not having your mobile phone at hand. Nomophobia for no mobile phone phobia is a new kind of disorder linked to our new digital consumption. Being permanently connected to your smartphone via our applications and our social

networks has become a real reflex. To the point where you can sometimes feel completely lost if you don't have your phone with you all the time.

- ***Technology, Towards Nomophobia***

Nomophobia has the negative consequence of increasing anxiety, even anxiety attacks that can result in chest tightness; lumpy sensations in the throat and stomach, nausea and vomiting, abdominal pain. Behavioral symptoms may also develop. The most frequent is the avoidance of situations where the nomophobia person could be deprived of his mobile [5]. An individual suffering from such dependence thus risks reducing his range of possibilities. For example, he will refuse to go to places where he could find himself cut off from the network.This addiction to the mobile phone is sometimes, especially in young people, correlated with personality disorders, or disorders such as obsessive-compulsive disorder or social interaction anxiety.

- ***The causes of nomophobia***

Nomophobia has been booming since the appearance of smartphones, making it possible to be permanently connected to the world through the Internet and social networks. For nomophobes, the anxiety of being deprived of their smartphone rather symbolizes the fear of being isolated, cut off from the world. Boredom can also be a possible cause of addiction to cell phones and nomophobia (the subject is playing more and more on his cell phone to pass the time) [7].

- ***The consequences of nomophobia***

This phenomenon has many consequences, both socially and on the health of smartphone users. On **the social level**, we observe social isolation. The user cuts himself off from the outside world, leaving his loved ones behind his phone, even in public places. In the bus, the train, at home, in front of the television, in the bedroom and even in the toilet, the smartphone has invaded all spaces. We also observe a trivialization of the language through coded writing. The user will write a large number of text messages in which the words will be shortened, abbreviated and phonetically written. These coded messages popularized by the younger generation are sometimes incomprehensible for an older generation.

In terms of health, especially in children and adolescents, there are difficulty concentrating, insomnia or poor quality sleep due to electromagnetic waves emitted by the telephone, brain tumors, neck pain , dysfunction in the hand and wrist in the most addicted.

- ***The impact of nomophobia on human psychology***

Nomophobia causes psychological disorders resulting in an excessive, uncontrollable or even obsessive need to use a telephone to the point of spending so much time and energy, that the object and its use end up negatively interfering with the daily, professional or emotional life of the subject who may develop anxiety, sometimes phobic and / or depression which will also indirectly affect those around him. Many users have become slaves to their smartphones, to the point where they can be panic attack, their breathing may become short, nausea, tremors or an accelerated heart rate.

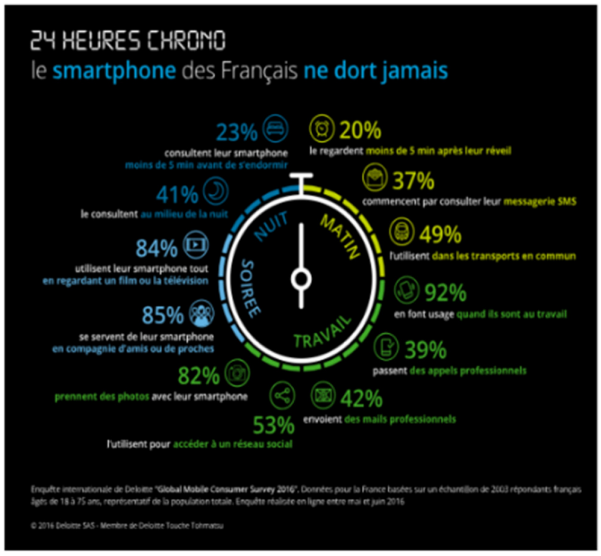

Figure 1: The French and the Smartphone in 2016

Result

The analysis of key indicators collected from officials of the Ministry of Health will be carried out according to different axes of analysis. These were developed according to the needs of managers and also according to the availability of data.

Following the needs analysis that we conducted, it was necessary to plan the creation of the following dimensions:

- Age.
- Level of study
- Gender
- Response

This phase places us in the seventh step of the "Dashboard system" work conduct methodology. We took a bottom-up approach to building our data warehouse. « *This approach called "Bottom-Up" consists in going from the bottom up, in other words, starting by designing the datamarts and grouping them thereafter until obtaining the datawarehouse* ». In our case, it is the construction of the two datamarts of consultations and treatments.

Choice Of Multidimensional Model

We presented in the second chapter the different diagrams of a DWH: star and snowflake. In our case we opted for the star model, which is the classic model. It is considered to be the simplest model and one that offers great ease of navigation.

We chose this model for several reasons to cite:

- Queries are faster on a star schema.
- The adaptability of this model to 1-n cardinalities between the fact table and the dimension tables, which is the case for the relationships between the facts and the dimensions that we have noted.
- ETL is simpler with a star diagram.

- The space occupied by the dimension tables is negligible compared to that of the fact table; indeed the majority of the dimension tables that we have collected are not large.
- Performance: Limited number of joins, management of sparse data [8].

Although the star model has some drawbacks such as redundancy in dimensions, especially in dimensions that have a hierarchy, but it is the most suitable model for our case.

The design of a remote psychotherapy application« E-psychotherapy»

We have previously seen the importance of machine learning algorithms for classifying the state of nomophobia for students. In the same spirit, we thought of implementing a design of a mobile psychotherapy application that allows each user to pass psychological tests:

- ***Personality test:*** from a set of questions see **appendix 5**, the test allows to assign a score for each user and from this score we can know the personality of the user, for this fact we can base on a code programmed in C language see **appendix 4.**
- ***Nomophobia test***: this test allows to know the state of the user towards nomophobia, in other words it allows to classify the user in 3 classes : « *nomophobic, risk of being nomophobic, is not nomophobic* »

In addition, the application allows the user to chat with an online psychologist, this allows users who refuse to visit a psychologist to be in contact with one and share their problems.
The fact table "consultation_fact" contains information about students, such as age, gender, level of study, and their responses regarding psychology. Data used as analysis axes is entered as foreign keys referring to dimension tables which contain the data integrity of each dimension. The figure 2 represents the multidimensional model of this datamart. On the other hand, we built the multidimensional model of Datamart "nomophobia" using a fact table connected to dimension tables. (see Figure 3)

The fact table called "*nomophobia fact*" contains data which come from different different source tables; they make it possible to calculate the indicators relating to nomophobia.
The fact table "*fact nomophobia*" contains the primary keys of all the dimension tables with which it is linked.

Use cases represent the services that the system to be developed must provide according to the needs of each actor. In this section we present the use cases of our application. The figure 4 illustrates the structure of the major departments needed with supervisors and subjects. Besides, the figure 5 represents the class diagram of the system. The class diagram describes the classes that the system uses.

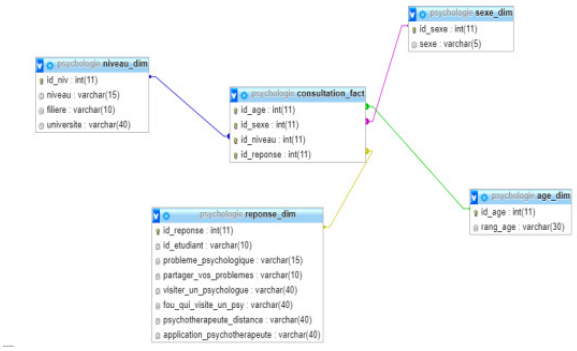

Figure 2 : Datamart E-psychotherapy

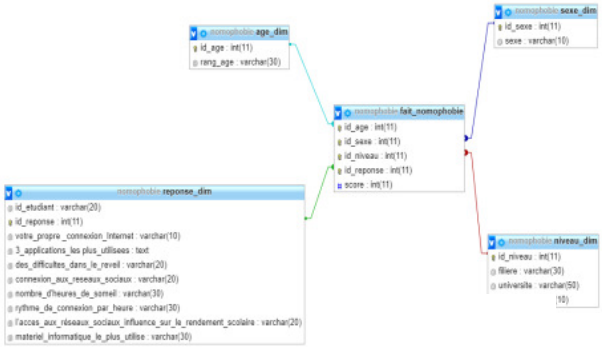

Figure 3 : Datamart Nomophobie

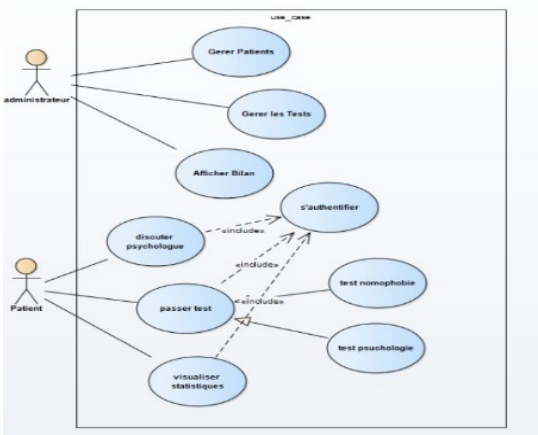

Figure 4: Identification of use cases

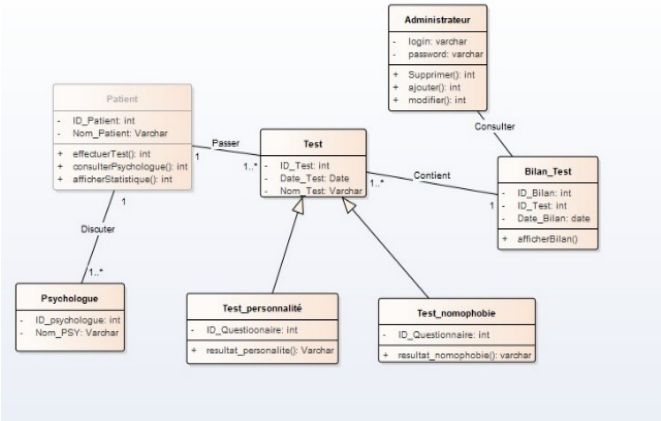

Figure 5: Class diagram

Discussion

Psychologists agree that this addiction to Smartphones is most often the result of a deficiency. Social networks for example meet three human needs: attachment, group membership and recognition. If one of these needs is not met, creating a virtual and ideal "me" can be a way to compensate. The fashion of the selfie testifies to this narcissism assumed by the users. They need to exist permanently. Another psychological impact, users no longer accept being frustrated. With smartphones they have everything right now. Older users have lived without smartphones and are therefore less affected by this phenomenon. But young adults, those born with a smartphone in their hands, do not experience this feeling of frustration. Or little. The problem is that successive developments have not helped users to mitigate the impact of smartphones on their daily lives. Manufacturers are making ever more efficient devices and operators are offering ever cheaper plans with ever greater data volumes. And we don't even talk about connected objects. So yes, psychologically, a lot of users have become completely addicted. So much so that they favor virtual relationships over real relationships. Their virtual "me" has taken over their real "me". All observers note that human relations have deteriorated since the emergence of the smartphone.

In this part, we tried to make a general design of our application in which we presented some models (mockups) using an online software called **CREATELY** which is a tool for creating diagrams online. (see figure 6)

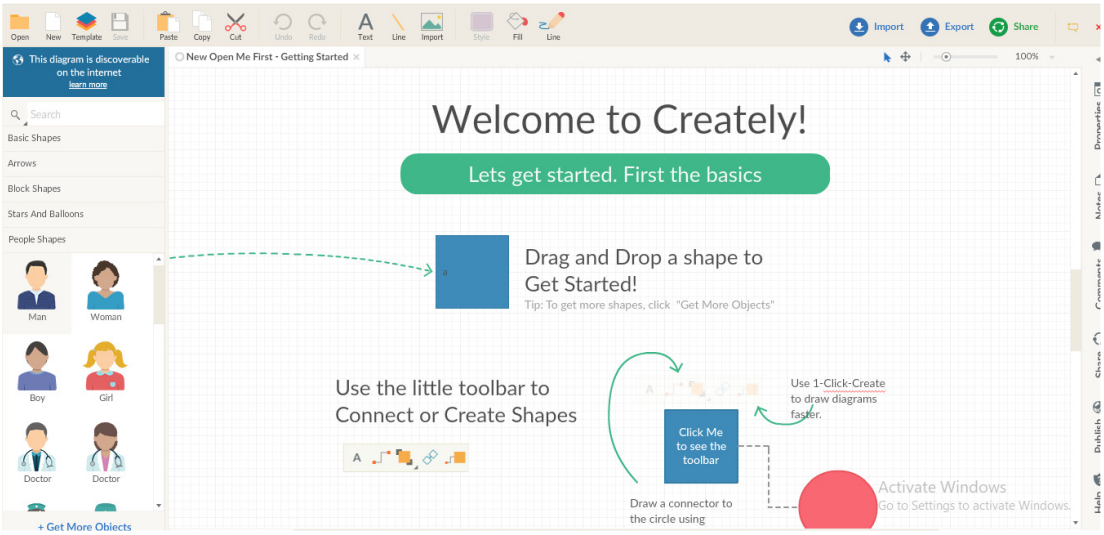

Figure 6: Creately interface

At the first level, the application allows the user to display the start page. This is the door to the main window. This interface contains the logo of the application as well as a "connection" button which allows the user to connect to the application (see figure 7). In the interface illustrated in figure 8, the user enters his login and password to connect to the application, and if it is a new user "new user" redirects him to the registration interface. Then, the redirection to the next page which contains the different tests.

This is the interface that allows the addition of a new user. In this window he enters his login, password, profession and age. Once done correctly, the "Validate" button allows you to go to the home window. (see figure 9)

In this home window, the user has three options to choose from:

- **Consultation**: to consult a psychologist
- **Test**: to do tests like personality test and nomophobia test.
- **Statistique**: to view statistics for users of this application.

This interface allows the user to choose the test that suits him among the proposed tests

- Personality test: this test allows the user to know his personality type.
- Nomophobia test: this test gives the user his nomophobia state.

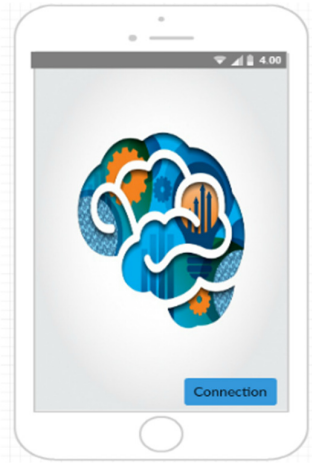

Figure 7: Boot interface

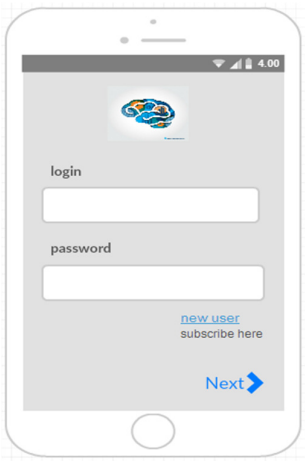

Figure 8: Connection interface

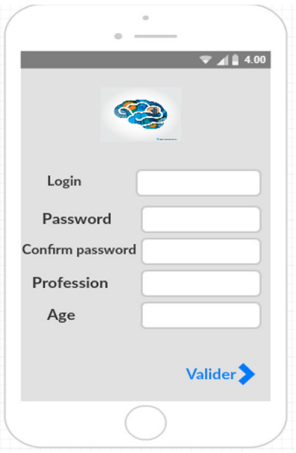

Figure 9: Registration interface

Figure 10: Home interface

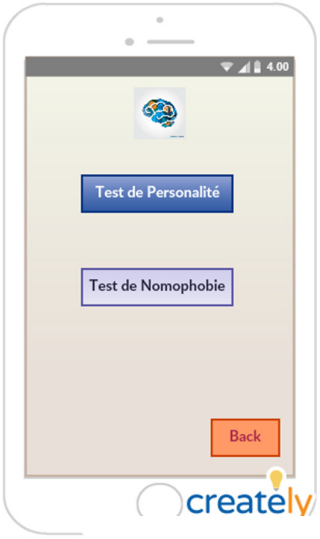

Figure 11: Test interface

Conclusion

Big data is accumulating in a multitude of fields and offers new research possibilities. The role of these resources in mental health surveys remains relatively unexplored. Big Data is positioned as a powerful tool to increase understanding of human behavior. Its ability to aggregate and correlate large volumes of data from various sources allows a quick overview of a patient's behavior, which was previously complicated and time consuming.

Internet has intrigued new modalities of psychotherapy treatment. Electronic psychotherapy uses the power and convenience of the Internet to enable simultaneous (synchronous) and deferred (asynchronous) psychological therapy between individuals and professionals. The term electronic psychotherapy is defined as a professional mental health care service via Internet technology, such as email, online chat technology, multimedia interaction, or any combination thereof. This work, allowed us to define the functionalities of our application, which led us to start the design phase (technical and graphic) to ensure a good implementation of a functional system meeting the cited needs.

The design phase was important in order to be able to visualize the functioning of our application in an abstract way, and from which we can move on to the implementation phase.

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The Impact of an Innovative Blockchain Model on Big Data Security and Management

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Abstract

The notoriety of Blockchain innovation and the wide extent of its application brings about a great deal of progressing research in various pragmatic and scientific fields. Albeit still new and in the exploratory stage, Blockchain is viewed as a progressive arrangement, reacting to present-day innovative concerns, for instance, decentralization, trust, identity, data possession, and data-driven decisions. Simultaneously, the world is confronting an extension in the amount and a decent variety of computerized information created by clients and gadgets. During the dynamic quest for the most ideal approach to save, arrange, and process Big Data, Blockchain technology makes a significant contribution. Its suggested answers for decentralizing, credible, transparent, and data security management, have significantly affected the quality of analysis reports regarding this data. This paper considers and suggests a Blockchain-based arrangement related to the exemplary Big Data process that can reinforce and enhance the performance of this area.

Keywords:Blockchain, Consensus, Big Data, Smart Contract

Introduction

The emergence of the Blockchain was in 1991 by a team of researchers (Haber and Stornetta, n.d.) who needed to make a PC device to timestamp computerized files so that they can never be backdated or edited. Nonetheless, this technology immediately faded into obscurity in 1992 with the emergence of the "Merkle tree" protocol, which had the option of collecting a few documents in one block. Furthermore, in 2008, the innovation returned in another, increasingly strong edition designed by an unidentified individual introducing himself under the pseudonym "Satoshi Nakamoto", the maker of Bitcoin, the original application founded on the Blockchain(Nakamoto, n.d.).There is no centralized or ranked framework when we discuss the Blockchain. The fundamental qualities of this innovation depend on decentralization, transparency, and security. This innovation incorporates three fundamental components: a chain founded on the timestamp of the blocks, the circulated stockpiling instrument in regard to a shared network, and a consensus system relying on the shared nodes.Blockchain technology provides three categories that adjust to the requirements of clients. There are public Blockchain, the semi-private Blockchain, and the private Blockchain(Nofer et al., 2017). As long as public Blockchain is available to everybody; any individual, element, or body can take part and assume the job of validator or verifier (digger); this is the situation of the "Bitcoin" Blockchain. In contrast, there is the semi-private Blockchain or a Blockchain with authorization, in this engineering, the nodes which control the network must acknowledge other new partakers as indicated by specific rules. Overall, this sort of Blockchain is available in the banking and insurance sectors. The Ripple is a case of a Blockchain with an authorization that connects global banks and which plans to substitute the SWIFT framework. The third category of this technology is the private Blockchain, the usage of whichconcerns closed entities. For instance, a university administration, which would prepare every one of its faculties to make an inward Blockchain for its own needs.Compared to the emerging Blockchain technology, enterprise information systems have made great strides in recent decades, aimed at providing business decision-makers with the data they need. The technology behind these

systems, including data warehouses, common database systems, and Big Data, has matured and established a good position in the market.However, in the era of the explosion of Big Data, new challenges have emerged, namely: the risks of data circulation, the trust of data sources, and the ineffectiveness of data management and analysis have gradually attracted the attention of researchers.Furthermore, to address these challenges to strengthen data security, high availability, and credibility, numerous studies have been conducted. In the case of secure data distribution and management of solutions, research proposes the use of a decentralized blockchain-based solution for Big Data supporting key functions and discussing its implications for the management and sustainability of Digital archives (García-Barriocanal et al., 2017). Other researchers propose a system that can manage client data in a secure and distributed way using cryptographic primitives as well as a keyword search service(Jiang et al., 2020). Another proposal, stresses the importance of trust in the field of Big data and presents a secure data sharing system, based on Blockchain (Yue et al., 2017). In collaboration with a German bank, a group of researchers is following scientific research methods in design to design, implementing, and evaluating Blockchain prototypes used to manage the workflow between organizations. The results are encouraging and demonstrate the potential of Blockchain as an inter-organizational workflow management infrastructure (Fridgen et al., N. D.).In the next section, we will examine the qualities of the Blockchain which can modify the present version of the collection and manage monstrous quantities of data. After that, we will examine the significant difficulties of the Big Data sector and the way its combination with Blockchain technology can be a superior answer to tackle these difficulties that despite everything influence the quality of Big Data analysis outcome. Lastly, we will introduce a Big Data model dependent on Blockchain architecture.

Litterature Review

➢ *Characteristics of Blockchain*

Blockchain is a circulated "peer-to-peer" system, every node in the network has the chance of recording and saving operations (Chen et al., 2017). In theory, the data is shared by default and circulated between the nodes with no middle person or outsider mediation. In this decentralized structure, the nodes are active to participate in tasks and operations. In contrast to the centralized structure of traditional mechanisms, decentralization is a peculiar attribute of the Blockchain which increases its performance (Gao et al., 2018). Furthermore, the Blockchain data is in general transparent as anybody can view and question the data hereunder, just by utilizing the block explorer. All members have similar approvals and permits, so information and operations are open and solid (Nofer et al., 2017), but the exchange of data between the nodes does not dictate common trust between the partakers (Gao et al., 2018). This innovation depends on the standards of shared system conventions utilizing decentralized structures or a halfway focus structure which shapes a relationship of trust between network nodes and appropriated framework structures. Assurance is a significant factor that distresses trading partakers. However, partakers don't have to deal with common trust connections in the Blockchain framework since it utilizes hash capacities and the consensus protocol to take care of this issue.One of the major objectives of Blockchain-based systems is to guarantee the irreversibility of transactions. It is impossible to cancel the block containing the transaction (the data) because this requires significant computational power, making it highly improbable that the hypothesis of a longer chain development may not contain this block. Thus, once the chain is long enough, it makes it technically impossible to go back.Transactions can be considered, de facto, as irreversible; they cannot be modified or deleted, and all the histories are accessible and searchable.This guarantees the traceability of data (Wang et al., 2018).

➢ *Security of Blockchain*

- ***Cryptography***

Blockchain transactions are valid and reliable due to complex calculations and cryptographic evidence between the parties involved.Each block in the Blockchain is composed of its data, its nonce (an arbitrary number), the hash of the previous block and its hash calculated with the SHA256 algorithm,

then a large proof of work algorithm is executed to find the smallest value starting with 000 for the block to be signed. So, if we change anything in a block, this block and the following blocks lose their signatures, and given the complexity and the computing power, this is not possible(Gao et al., 2018).

- ***Integrity Control***

A digital signature, thus, ensures the integrity and authenticity of the data (the data comes from reliable sources). Integrity control is ensured by calculating a hash of a given by a hash function. A safe hash function (SHA-256 for example), always generates two distinct fingerprints for two distinct data (this is not the case for MD5). Furthermore, the authenticity of a signed data follows from the fact that only the owner of the private key can carry out the signature. Since the public key is accessible to everyone, a means is needed to attest to the link between it and its owner(Shrier et al., 2016). The digital or electronic certificate answers this problem and is issued by a certification authority. Digital time-stamping consists of affixing to any type of digital document (text, image, video, sound, etc.), a time and a date that are legally authentic in the form of an electronic seal. The electronic signature is the set consisting of the digital signature and the digital time stamp. A block recently added to the blockchain includes the electronic signatures of the previous blocks. For example, in the figure below, Block 2 contains theelectronic signature of Block 1. Therefore, to falsify Block 2, you must first falsify Block 1 (see Figure 1).

To falsify a digitally signed block, it would be necessary, firstly, to generate the same footprint for two separate blocks, which is impossible to achieve. Also, we should keep in mindthat the hash functions provide data integrity control.Additionally, the private key with which the signature is made should be available. Moreover, to calculate a private key of 128 bits length, it is necessary to carry out 2128 possible tests (with a powerful computer executing 10.51 x 1015 instructions per second, which will take approximately 1018 years). As a result, Blockchain security increases as more blocks are added to it. Logically, the more blocks you add to the Blockchain, the more fingerprints and keys will have to be calculated to falsify the blocks (Shrier et al., 2016). Consequently, the security of the Blockchain increases as more blocks are added to it.

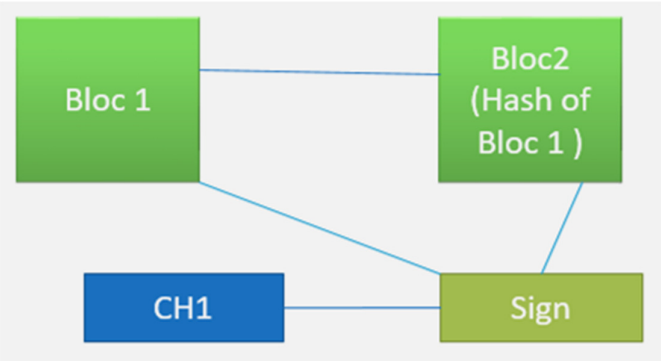

Fig. 1.Digital Signature of a Block

- ***Peer-to-Peer Network***

Peer-to-peer networks offer better security than traditional server-client networks. Distributing the Blockchain across many entities (nodes) is providedwith immunity to Denial of Service (DoS) attacks that strike many systems. Therefore, the distributed peer-to-peer network, in combination with the consensus protocol, gives Blockchains a high degree of resistance to malicious attempts.

- ***Smart Contract***

A Smart Contract or a smart contract is simply a script that runs automatically, and which has offered a very powerful code execution capacity to integrate business logic on the Blockchain; since the founders of Ethereum kept Nick Szabo's idea of a smart contract more than 20 years ago in mind.

These scripts are executed by all the nodes of the Blockchain, and the result is validated via the consensus protocol before being accepted(Clack et al., 2017). The execution of this code and its result are validated and verified by the entire network, which is not possible on a computer program hosted on a single server or even in the Cloud. The latter, consequently, ensures the resistance of smart contracts against any malicious attempt at falsification or mishandling. The smart contract has many advantages.It particularly facilitates the transaction for the transfer of assets other than value or cryptocurrency.It also provides an application framework for the application domain, for example, considering a request home mortgage loan. Additionally, it could integrate all the business logic and the intelligence of the rules and regulations, to allow the automatic calculation and the start of the operations, with high transparency.These operations are registered in the Blockchain, and the user can directly access the system without any intermediary or a trusted third party. An intelligent protocol integrated into the contract has been proposed to validate trust in a PKI (Public Key Infrastructure) ecosystem, which will be transparent and automatic. Furthermore, some research has described the ability to assess the effectiveness, scalability, and feasibility of smart contracts. More specifically, BDD (behavior-based development) and TDD (test-driven development) are two useful alternatives for validating and estimating the accuracy of intelligent contracts programmed with the Solidity language; which is an object-oriented language, and which has been influenced by C ++, Python and JavaScript, designed specifically to target the Ethereum Virtual Machine (EVM). It is a static-type language, which supports inheritance, libraries, and user-defined complex types.

The Blockchain' Impact On The Big Data

Security and Management

Information is the lethal weapon of the 21st century. Whoever has the information has the power. Big Data aims to be able to take advantage of new data produced within the framework of the five rules often described by 5V: Volume, Speed, Variety, Veracity, and Value (see Figure 2).

The impact of Blockchain is evident on several levels:

In the Big Data sector, three problems are frequently encountered in the use of generated data: Data reliability, data security, and data management.

- ***Veracity***

The veracity of the data represents one of the major challenges of the exploitation of the data whose analysis accuracy is affected. With this Big Data (see Figure 3), quality and accuracy are less verifiable, and the lack of quality and accuracy often results from large volumes and less efficient analysis reports. However, the combination of Blockchain and Big Data could be a better solution to face this challenge which always damages the quality of Big Data analysis results. Blockchain is a distributed data system, secure and inviolable, which is based on consensus algorithms. It will also be a repository of data verified and written by the members of this federated ecosystem while maintaining its consistency and integrity.

The ecosystem records all events as the identity holder goes through different stages and provides each authorized entity with a verifiable history. Thus, the register can be enriched and verified without limit, as well as the Blockchain keeps track of each recorded action, which will eliminate the first exhausting but essential phase in the traditional Big Data infrastructure: Data cleaning.

- ***Security***

The integration of Blockchain into the Big Data management structure solves the problem of security via mathematically verifiable cryptographic signatures. Additionally, thanks to the use of the Merkle tree, the Blockchain is immutable, so once the data is added to the Blockchain, it cannot be changed. This immutability property makes Blockchain derive data very reliably. Also, the transparency feature in the Blockchain aligns with the trendy trend of Open Data, on two aspects: Legal openness which

means that access to data is legal, just like the exploitation and sharing. Then, there is Technical openness which means that there must be no technical barrier to the use of data. In general, Open Data is only non-personal data (Zyskind et al., 2015). Simply put, these data do not include any information on individuals, for obvious reasons of respect for privacy. Moreover, the integration of the Blockchain guarantees this rule, since it is based on anonymity and since each node in this system is represented by an address.

- ***Management***

Blockchain's ability to securely, transparently, and immutable store public data eliminates the possibility of falsification or manipulation by bad actors while promoting the protection and continuous availability of data since the concept of Blockchain does not represent the Single Point Of Failure (SPOF) problem (Lee, 2017).

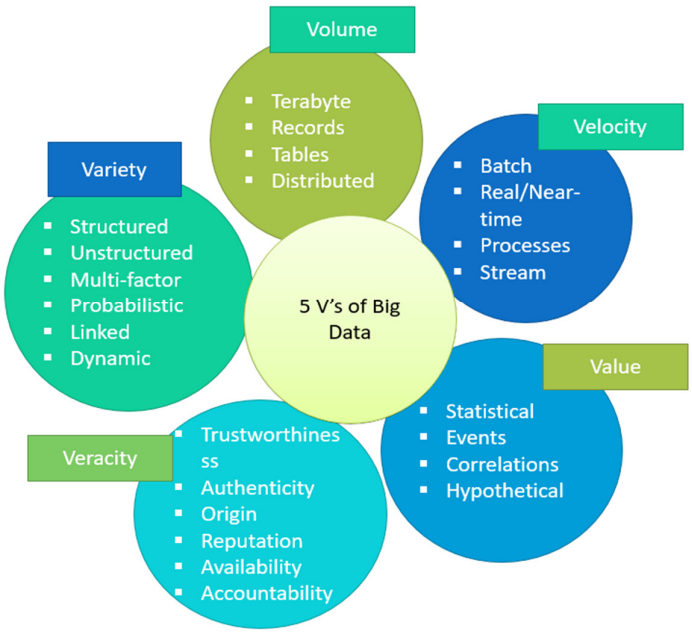

Fig. 2.The 5V's of Big Data

Fig. 3.Classic Architecture of Big Data

Big Data Model of Security Sharing Based on Blockchain

There is a model of Big Data based on Blockchain and smart contracts that were proposed by a group of researchers(Yue et al., 2017), which aim to improve the security performance of Big Data. As shown in Fig. 4, the system designs three major parts, namely, data producers, Blockchain network, and data users.

- The data producers are divided into school, government, and business. With the school collecting student's data, the government collecting the citizen's data, and the enterprise collecting the user's data. These three parties will collect the massive data through the smart contract to store in the Blockchain, for the use of data sharing.
- The smart contract code runs on the contract layer of Blockchain, which provides the authority to control the system. Each data producer corresponds to deploy a smart contract on the Blockchain and storing the data through it.
- The data consumers are also divided into individuals who need data assets or organizations that research Big Data. They can initiate a data transaction request, which requests the data producer to provide data usage rights and obtain an authorized data set from the Blockchain through a smart contract. A smart contract is designed to accept only two types of requests: one is to store data requests, and the other is the query data request.
-

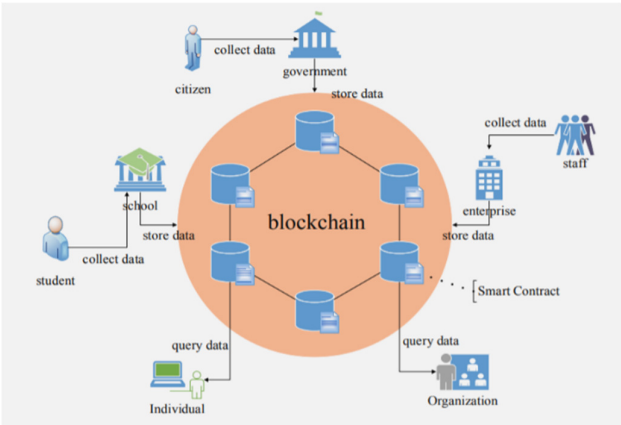

Fig. 4.Model of Big Data Based on Blockchain and Smart Contracts (Yue et al., 2017)

This model ensures three major aims:

Secured Data Storage:Parties with data sources use the blockchain as a data storage system and place the data in a specific way to link it to the blocks. The timestamp server, encryption algorithm, and working evidence can guarantee security, confidentiality, and credibility of the data. Moreover, the data source is stored in the blockchain, which is a distributed data registry shared by each node. Transaction information and authentication information in the block is transparent. So,if hackers alter block data, the network consensus model (Proof of work) will ensure that other nodes reject the wrong nodes. This model withstands all attacks against traditional data storage models. Thus, data information is encrypted and stored by the private key and can be accessed and authorized by the data owner. Miners use specific hash algorithms and MPT operations to encapsulate transaction data and codes received in a certain amount of time in data blocks with timestamps. The irreversibility of time and the unidirectionality of the hash value ensure the authority of the data.

Safe Sharing:Gathering the owners of the main data sources to create a blockchain network, then each blockchain acts as a network node that maintains the content of the nodes. Accordingly, Blockchain information is synchronized between nodes and ensures data sharing is secure.The data sharing blockchain network is designed using a data flow protocol driven by smart contracts, which is used to call the data storage and authorization management interface. Furthermore, the structure of the traffic protocol is as follows: When a data producer joins the Big Data blockchain network, they automatically launch a contract creation transaction. The address of this contract corresponds to the address of the data producer.The latter can store the data in the Blockchain by calling the storage interface. Next, the data requester submits a data authorization request to the contract holder via the contract address and the "ABI call query interface". The data owner authorizes the data via the "AddAuthorize (address user)" function. As a result, the data circulation protocol built through smart contracts ensures secure data sharing.

Authority Management:The data owner authorizes the data to the data requester. Automated execution of the smart contract ensures the entire process to be open and transparent.

Blockchain Consensus Algorithms

Consensus algorithms play a crucial role in maintaining the security and efficiency of the Blockchain. Using a good algorithm can lead to a significant increase in the performance of the Blockchain application(Mingxiao et al., 2017).

PoW (Proof of work)

PoW is the consensus algorithm used in bitcoin. Its central idea is to allocate accounting rights and rewards through hash power competition between nodes. Based on the information in the previous block, the different nodes calculate the specific solution of a mathematical problem. It is difficult to solve a mathematical problem, though. The first node that solves this math problem can create the next block and get some Bitcoin reward. Satoshi Nakamoto used HashCash to design this math problem in bitcoin (Nakamoto, n.d.).

The specific calculation steps are as follows:

- Getting the difficulty: after the production of all the 2016 blocks, the bitcoin exploration algorithm will dynamically adjust the difficulty value according to the hash rate of the whole network.
- Collecting transactions: collecting all pending transactions on the network after the production of the last block. Then calculating the Merkle root of these transactions and filling in the block version number, the 256-bit hash value of the previous block, the current target hash value, the Nonce random number, and other information.

- Calculation: Browse the Nonce from 0 to 232 and calculate the SHA256 double hash value in step 2. If the hash value is less than or equal to the target value, the block can be broadcasted. Then, complete the accounting of the node after checking the other nodes.
- Restart: if the node cannot determine the hash value at a certain time, it repeats step two. If another node finishes the calculation, it restarts from the first step.

The PoW takes the workload as a backup. The newly created block is linked to the blocks in front of it. The length of the chain is proportional to the workload. All nodes trust the longest chain. If someone wants to tamper with the Blockchain, they have to control more than 50% of the world's hashing power to ensure that they can become the first to generate the last block and master the longest chain. The gains from falsification can be far greater than the cost. Thus, PoW can effectively guarantee the security of the Blockchain (Cachin and Vukolić, 2017).

PoS (Proof-of-stake)

PoS was mentioned in the first Bitcoin project, but it was not used due to robustness and other reasons. The first application of PoS is PPCoin. In PoS, the digital currency has the concept of the coinage. Therefore,the age of a coin is its value multiplied by the period after its creation. The more parts a node has, the more rights it can get on the network. Consequently, coin holders will also receive a certain reward based on the age of the coin.

In the design of PPCoin, mining is also necessary to obtain accounting rights. The formula is proofhash<target room age *>(Mingxiao et al., 2017). The proofhash is a hash value made up of the weight factor, the unspent output value, and the fuzzy sum of the current time. However, PoS limits the hashing power of each node.

While the difficulty of mining is inversely proportional to the age of the coin, PoS encourages coin holders to increase detention time. Nowadays, with the concept of the age of the coin, the Blockchain is no longer entirely based on proof of work. This effectively solves the problem of wasting resources in PoW. Thereby, the security of the Blockchain using PoS improves with the increase of value in the Blockchain. Thenattackers must accumulate a large number of coins and hold them long enough to attack the Blockchain.

This also greatly increases the difficulty of attacks. Including PPCoin, there are also many other coins using PoS such as Nxt and BlackCion. But they take into account the rights of the nodes and use a random algorithm to allocate the accounting rights.

DPoS (Delegated proof of stake)

In the initial bitcoin design phase, Satoshi Nakamoto hoped that all participants could use the CPU to extract it. Thus, the power of hachage can correspond to the nodes and each node has the possibility of participating in the decision-making of the Blockchain. With the development of technology and the appreciation of bitcoin, machines specially designed for mining are invented. Also, the hash power is grouped in the participants who have a large number of extraction machines. Ordinary miners rarely have the opportunity to create a block. BitShares is an example of DPoS(Gao et al., 2018).

In the Blockchain with DPoS, each node can select the witnesses according to its stake. Across the network, the first N witnesses who take part in the campaign and obtain the most votes have the right to count. The number N of witnesses is defined in such a way that at least 50% of the voting stakeholders believe that decentralization is sufficient. Furthermore, elected witnesses create new blocks one by one as shown and get rewards; whereas,cookies must guarantee adequate online time.If a witness is unable to create their assigned block, the activity of this block will be moved to the next block and the stakeholders will vote for a new witness to replace it. The Blockchain using DPoS is more efficient and more energy-efficient than PoW and PoS (Mingxiao et al., 2017).

PBFT(Practical Byzantine Fault Tolerance)

In distributed systems, Byzantine fault tolerance can be a good method for resolving transmission errors. However, the first Byzantine system requires exponential operations. Until 1999, the PBFT (Practical Byzantine Fault Tolerance) system was proposed, and the complexity of the algorithm was reduced to a polynomial level, which significantly improved efficiency (Baliga, 2017). The PBFT consists of five states:

- Request: the client sends a request to the master server node. After that, the master node gives the request a time stamp.
- Prior preparation: the master server node records the request message and gives it an order number. Then, the master node broadcasts a pre-preparation message to the other following server nodes. The other server nodes initially determine whether to or not accept the request.
- Prepare: if a server node chooses to accept the request, it broadcasts a preparation message to all the other server nodes and receives the preparation messages from other nodes. The transfer of RAFT states after collecting 2f + 1 messages, if a majority of nodes choose to accept the request, then it will enter the validation state.
- Validation: each node in the validation state sends a validation message to all the other nodes of the server. At the same time, if a server node receives 2f + 1 validation messages, it might believe that most nodes reach a consensus to accept the request. Then the node executes the instructions in the request message.
- Respond: the server nodes respond to the client. If the client does not receive a response due to the network delay, the request is returned to the server nodes. If the request has been executed, the server nodes only have to send the response message several times.

Raft

After the problem of the Byzantine generals was raised, Lamport proposed the Paxos algorithm to resolve the problem of consistency under certain conditions in 1990(Baliga, 2017). Nevertheless, since the content of the article was difficult to understand, it was not accepted. Lamport republished the article in 1998, and Paxos was briefly reintroduced in 2001. Paxos then occupied the dominant position in the field of the coherence algorithm; from which many other algorithms are derived.However, the Paxos algorithm is too theoretical thatpeople have a lot of trouble understanding it and implementing engineering.

In 2013, Ongaro from Stanford and others published the article and proposed the Raft algorithm (Xiao et al., 2020). Raft achieves the same effect as Paxos and is more practical in the implementation and understanding of engineering. The Raft cluster typically contains five server nodes. Up to two nodes are allowed to plant at the same time. The server node has three states: leader, follower, and candidate. There is only one leader in a mandate, and the leader is responsible for handling all client requests.

Result And Discussion

The model above is partially approaching our proposal.Based on the fact of the combination between Blockchain and Big Data, its efficiency will be considerably increased following the adoption of the points below:The model proposed above is based on the consensus mechanism Proof of work (POW). The effectiveness of the consensus mechanism is generally assessed according to three main criteria; termination (activity): all operational nodes participating in the consensus must eventually produce value. Confidentiality/consistency (security): all operational nodes must agree in real-time on one of the values proposed by one of the nodes, this value must be valid according to the rules defined by the mechanism. Fault tolerance: even if one or more nodes fail, the mechanism must be able to operate. Unfortunately, in asynchronous systems such as distributed node networks, no deterministic consensus algorithm can guarantee these three properties at the same time (FLP is impossible) (Fischer, Lynch, and Patterson 1985). Fault tolerance is indeed absolutely crucial in a network of distributed nodes, and

the consensus mechanism must choose between security and termination based on the requirements of the application that designed the distributed platform. However, functional and non-functional considerations must be taken before ensuring the appropriateness of an appropriate consensus mechanism, i.e.: Performance objectives (especially the number of transactions per second), power consumption, scalability, size of nodes, and the expected relationship between different participants: users and verification nodes.This important point has not been taken into account in previous research. Our proposal will take into account the requirements of the designed system, such as transaction throughput, energy consumption, as well as the scalability of the network; given the massive data to be processed.

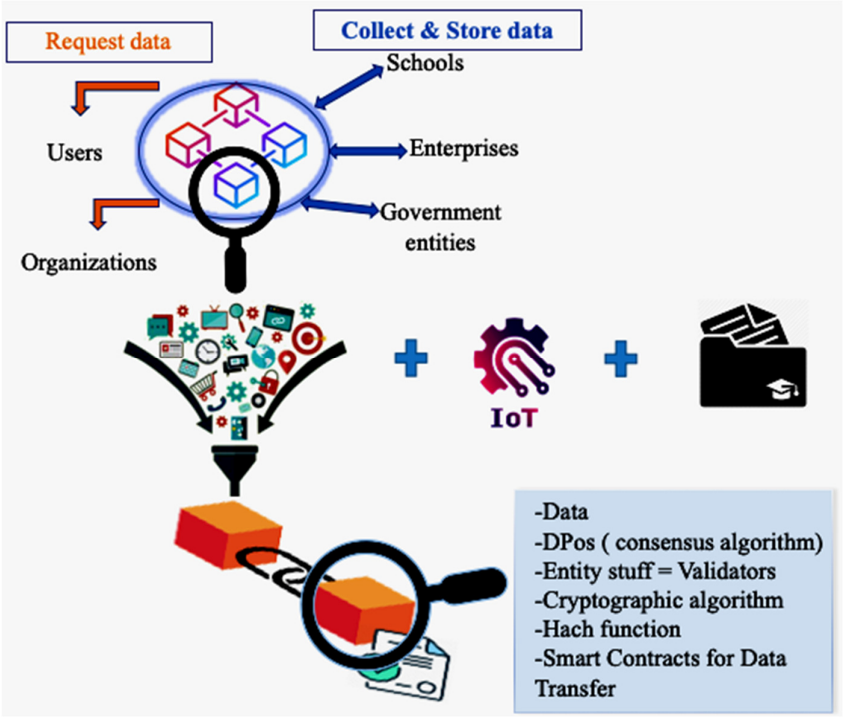

Fig. 5.A Big Data-sharing Model Based on The Blockchain Using DPoS Algorithm and Smart Contracts

A synthetic comparison of consensus mechanisms showed that the delegated proof of stake (DPoS) (explained in a previous section) is more efficient at the level of security, scalability, decentralization, and more efficient at the level of energy consumption (Xiao et al., 2020). On the other hand, our proposal is based on Blockchain in the flow of data between the different entities that own the data sets (Smart Contracts). It is also based on the process of collecting information (Blockchain private consortium) whose interest is seen through the volume of data generated by the Internet of things as an example (see figure 5). Moreover, it explodes about the volumes generated by other data sources while representing several problems namely: the heterogeneity of IoT systems and security flaws such as exploiting the weaknesses of a device that could allow access and modify highly sensitive data such as personal or health information. The aggregation of the Blockchain and this important source of data solves firstly the problem of heterogeneity since IoT data will be converted, processed, extracted, compressed, and finally stored in the Blockchain. Secondly, it guarantees the security of the data. The integration of smart contracts can help to secure an agreement between nodes, automate the data transfer, payment between data-driven and minimize or even eliminate the risk of unpaid payments and mainly reduce intermediate costs in the preparation and monitoring of a contract.

Conclusion

This article quickly sums up how Blockchain innovation and its characteristics in collaboration with Big Data work emphasize the pertinence of these advancements and how they are firmly identified with one another. We gave Big Data stage dependent on the blockchain: an idea that can emphatically impact Big Data to locate an increasingly secure information arrangement in a circulated manner on a P2P network and to guarantee the security, the management, and veracity of the information to guarantee its worth. A few difficulties remain, for instance, consensus models, computation expenses, and time. Moreover, Blockchain applications are arrangements that require significant changes or the total substitution of existing frameworks. This makes the progress troublesome and moderate. The Blockchain is still in its beginning times of improvement, and these obstructions will eventually be survived, opening the path for some fascinating prospects. In the future project, we will attempt to suggest an entire platform Big Data-based Blockchain by taking into account a custom consensus algorithm that will address our issues while diminishing the expense of computation, time of treatment, and the expense of substitution of existing systems.

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Online Training for Adults: From the Andragogical Model to the Modeling of Adaptive Hypermedia Contents

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Abstract

This article presents, from a bibliographical study, an andragogical model allowing setting up a learning situation for adults in a state of literacy. Because we see that the majority of people stop their studies at an early age. For this reason, literacy can only be truly effective if it fits into larger visions and makes it more sustainable. The reason why our model is based on modern andragogical approaches using information and communication technologies (ICT), online training logistics, is that these later become tools of citizenship and take on a lot of importance.

Keywords Andragogical, Modeling, Online Training Logistics

Introduction

This article is based on the results of an integration needs analysis information and communication technologies (ICT) to fight against illiteracy in Morocco, The project is part of the partnership agreement between the Agency National Anti-Illiteracy Network (ANALN) and Abdelmalek Essaadi University of Tetwan (UAE) which aims at the contribution of the UAE to the development of the project RAMAA II (Research Action Tailored Learning for Recipients of literacy programs) initiated by UIL (the UNESCO Institute for Learning throughout life).

This research also aims at the contribution of the UAE to the development of the project of the integration of ICT into the training and learning in literacy and post-literacy initiated by the DVV, while using didactic materials with andragogical approaches according to the needs of the beneficiaries. Because Morocco counts improve its Human Development Index (HDI) ranking, this using didactic materials with andragogical approaches according to beneficiaries' needs.

The National Agency for the Fight Against Illiteracy (ANALN), created in 2014, wants accelerate the pace of enrollment in the program to combat illiteracy to reach 1.2 million registered annually by 2024. This is done by developing a guide with television program to strengthen teaching, particularly in active population. According to UNESCO, an estimated 759 million young people and 15 years and older) in the world today are illiterate, and about 153 million in Africa, two-thirds of whom are still unable to read or write. These figures remind us that we must make further efforts why every year since 2002, UNESCO publishes a world report education for all (EFA) monitoring; so the 2006 report looked at literacy emphasizing that this is an international issue.

From here RAMMA sees day because it is part of the perspective, initiated by UNESCO for lifelong learning

(ULL) at the request of the countries; The first generation was conducted from 2011 to 2014 in five countries in French-speaking Africa: Burkina-Faso, Mali, Morocco, Niger, and Senegal during this first phase (RAMAA I), which was based on the objective of measuring the level of knowledge and

skills in reading and writing mathematical reasoning of young people and adults aged 15 and over .since 2016, seven other countries have joined the project, representing a total of twelve countries, all committed to the implementation of the second phase RAMAA II (RAMAA II) to achieve target 4.6 of Sustainable Development Goal 4 (SDG4) on education, which demands that "by 2030 all young people and one considerable proportion of adults know how to read, write and count ", as well as a support program for interuniversity training, the aim is to bring together postgraduate students (Masters, PhDs) with research projects in the field to promote exchanges scientists and intellectuals, and to open fields for applied scientific research.

In Morocco the number of postgraduate students with research projects in the literacy field is 9 PhD students and 30 masters (according to the survey conducted by ULL.

With the help of DVV International, which has been running a national office in Rabat since 2008, it has been able to create a network of educators working in the field of illiteracy, using technology to ensure learning throughout life.

In the context of development within the Moroccan university and among the axes of the development of research at the digital level aimed at literacy and post-literacy, Morocco has already developed a project "Alpha Nour" dedicated to training in distance in the field of the fight against illiteracy.

For what to choose such as subject of thesis? There is a need for interactive digital resources for adults in literacy, but there are several questions among them: How? Which model? What purpose? Which public?

The goal of this paper is to propose digital model resources by relying on a mortgage-deductive approach while taking into consideration the andragogical circumstances (phases of conceptualization).

The Theoretical Framework

A. Adaptive Hypermedia

Adaptive hypermedia systems are hypermedia systems that reflect some characteristics of the user in a user model and use this model by adapting different aspects of the system to the user [1].

The goal of these hypermedia systems is to adapt the presentation of the knowledge and help the learner to move in relevance. As a result, in a hypermedia we must be able to modify both the content of the pages and the links between different pages [1].

The architecture of adaptive hypermedia relies mainly on two models: the domain model and the learner model. They are characterized by the relationship between the domain model and the media used to present the concept to the learner.

Adaptive hypermedia represents a significant step towards classic hypermedia. Indeed, the different techniques used allow learners to be guided in their learning, and to better teachers structure their knowledge. Likewise, distinguishing between knowledge of tools that allow presenting it clarifies the work of the teacher. The latter can then better structure his work, thinking first of all about the organization of knowledge, and then how to expose them. However, some problems persist because the adaptation of the content has often been put aside. First of all, you have to adapt the content to guide the learner in his progress.

The role of hypermedia in the process Teaching/Learning:

According to the definition given to the hypermedia above, we can deduce that hypermedia plays an important and effective role in teaching learning. hypermedia remains a flexible and flexible tool in which we can integrate links, images, sounds ... the principle of hypermedia is based on the

navigation between the objects the latter allows us an interactivity. Digital information the opposite of written information can be hidden to the screen only at the request of the user.

The importance of online training logistics

Online andragogical learning requires adequate logistics and materials for excellent online training. we must understand the logistics used to train online individuals reaching a certain age and responsible maturity. In order to properly follow the training and especially the workshops or online and instant exercises, the training logistics must be constantly monitored, whether for IT equipment or the online Internet network. There is therefore a logistics cloud that includes three important logistics components, namely the infrastructure, the platform and the application.

CSCL (Computer-supported collaborative learning) systems born from the emergence of Web 2.0, takes shape in the training of adults who want to continue their studies. Distance learning logistics will bring together information and communication technologies for education (ICT), which are digital tools and products that can be used in the context of education and teaching for adults.

An online learning platform (Learning Management System) becomes necessary. This involves setting up a website that hosts didactic content and facilitates the implementation of andragogical strategies. As an essential logistical tool for trainers is the interactive whiteboard (IWB) which is a device combining the advantages of a touch screen and video projection. A white touch screen is connected to a computer via a cable (usually USB). The computer is capable of transmitting various information to the whiteboard, including the new position of the mouse cursor. A video projector is responsible for displaying the computer screen on the whiteboard. Thus the trainer can easily move around and better transmit knowledge and knowledge to people who follow the training at a distance.

Basic models for design

The Learner Model

Knowing that our goal is not to innovate in the field, but to seek a model to achieve the goals set because until now a good representation of the learner model remains essential.

The model we decided to use, described by Nicaud [2] and Balacheff [3], consisting of two sub-models: an epistemic model and a behavioral model.

The Epistemic Model

The epistemic model is the component that allows the system to know this that the learner is supposed to know or not to know, it also makes it possible to reason on the knowledge of other agents.

A. So far, teaching systems use three types of weighting [4]. It can be binary (know or not know the concept), discrete, by defining categories of learner (e.g. novice, average or expert) or continuous (the values belong to an interval). It's this last technique that we decided to use because we think it is the more able to represent the knowledge of the learner. Moreover, she is the only which allows to take into consideration the time, parameter that we also have decided to use.

Indeed, in order to improve our epistemic model we introduce time as variable of a function of forgetfulness, because anyone who does not regularly review a particular knowledge, risk forgetting partially or completely.

And we also introduce the motivational variable because adults are not children; the rate of their motives is different; every adult is sensitive to external motivations (promotions, best jobs, etc ...)

The Behavioral Model

Our adaptive system is very close to the learner, which means that it has to take into account its preferences, objectives and capabilities natural.

The preferences of the learner will have an impact on the organization of the situations problems.

The learner's goals will also influence the behavior of the learner. The system will have to be more or less flexible, flexible to adopt a point view of the organization of knowledge.

The abilities of the learner will be taken into account in detailed ways.

Learning Styles

We cannot teach adults like teaching children; traditionally children are seen as a blank page in which children teachers can pour knowledge.

Why trainers cannot control adults by the same way. Because children have little experience in the real world unlike adults who have a lot of accumulated experience and who can enrich their education; our life experiences can be considered as a reservoir of information.

In recent years researchers in the field of adults education and their learning processes find that the experience contributes to the intellectual faculties and therefore to learning.

Understand and use Learning Styles

Researchers propose different definitions of learning styles and they classify each one in their own way. For example, Reuchlin [5] defines the cognitive style as “the organization and the general operating procedures of the by which each subject acquires and elaborates information about his environment”. Individuals are more effective when they learn in a personal way.

Usually, there are different and many views on styles learning depend on types of learners (three types of learners). Well that most people can learn using one of these styles; most people prefer one [6].

Visual learners: Visual learners are those who generally think in photos. They often prefer to see things written in a document, a text, on a slide or a PowerPoint slide. These maps, graphics, diagrams and other highly effective visual learning tools.

- Auditory learners: Hearing learners are those who learn generally better by listening. They usually like to learn through lectures, discussions, and read aloud. they remember best in hearing or saying things out loud.
- Kinesthetic Learners:Kinesthetics, also called tactile, are learners who learn best by touching, feeling and experimenting what they are trying to learn. they remember best by writing or physically manipulate the information [6].

An overview of the literature quickly highlights the plurality and diversity of learning style templates. These different models are grouped in three typologies [7]:

- Grasha and Reichmann [8]: models of learning style that interested in preferences for teaching conditions and learning.
- Kagan, Rosman, Day, Alpert and Phillips [9]; Myers [10]; Witkin and al. [11]: learning style models that deal with the personality of the learner. Honey and Mumford's model: learning style models that rely on practices and experiments to assimilate and concretize theoretical concepts. Experiential learning is organized in four phases: concrete experience, thoughtful observation, conceptualization abstract and active experimentation.
- Gregorc [12]; Honey and Mumford [13]; Kolb [14]: style models who are interested in how the learner deals with information, in terms of privileged means.

David Kolb's research contributes to our field the latter studied learning and noticed that anyone who finds in learning situation goes through a four-phase cycle.

1. Concrete experience of an action / idea.

2. Observation in a thoughtful and attentive way.
3. Abstract and theoretical conceptualization.
4. Implementation of the idea / action based on the initial experience.

Kolb gave a name to the different types of learners, depending on the phase of the learning cycle.

The divergent:	Learn through specific experiences is better in situations who solicit ideas. The divergent is interested in people and emotions. It makes sense of observation; is adept at perceiving an object or a problem under different angles. Enjoys innovative activities, he has a fertile imagination and interests varied. He is interested in people and values feelings. But he does not check his theories and he lacks depth.
The assimilator:	The assimilators like create theoretical models and are less interested than others in people and practical applications of knowledge. It logically reorganizes information, juggle with ideas and theories. This type appreciates the theoretical courses and they are able to take a lot of information and put it in a specific order and logic.
The convergent:	Take the time to observe and reflect, compare experiences with knowledge. The convergent type like to be practical than emotional. Plus, they prefer to deal with things rather than people. They prefer to solve problems so the solution is unique. And they learn by memorization rather than reasoning.
The accommodator:	Learn by error they like to take risks. The accommodator adapts easily to new experiences and tends to find solutions. He learns by manipulation, performing the tasks. They likes to be involved in the planning and carrying out activities; They tends to trust the reflections of the 10 others rather than his own analysis he is sensitive to the reactions and opinions of others, and He enjoys small group exercises.

Andragogy

B.a. Who is the adult?

In the agreed definitions, the adult is defined as the person who has ceased to go to school, and who has reached the age equal to maturity (from 16 to 21) depending on the country.

In normative definitions, we find that the adult is the person who is reasonable, responsible and autonomous. These notions make it difficult for adults to express his needs for help then the learning process at this. The category of society must first and foremost help him to express his needs. The adult means to be responsible, then the learning process must also empower the adult throughout the course.

B.c. Definition of andragogy:

The term Andragogy appears for the first time by Alexander Kapp in Germany in 1833.the term "andragogy" is an existing concept from ancient times it is formed from two Greek words andros which means "man", and agogos who wants say "the guide". So, by andragogy science and practice of education adults. (Larousse), or the set of techniques likely to lead to knowledge, educate, train apprentices, workers. (Wikipedia).

Then Thorndike [15] will be one of the first to investigate in the field of adult education by broadening the knowledge of the adult learner.

For his part, Lindeman [16] also mentions that adult education must be seen as a new approach to learning that can be also essential for an illiterate worker. Lindeman states that the education of adults should be considered from a situation perspective.

In 1980 UNESCO adopted the concept of andragogy to designate continuing education adults.

The term andragogy then evolved into a theory of adult education with Eugen Rosenstock-Huessy, who writes andragogy as a true means by which adults maintain a relationship of intelligence with the modern world.

For Roger Mucchielli you have to take into account certain characteristics of the adult in his learning. Understand that for adults, the real thing is their life with their current and future professional responsibilities. No way for him to return the adult to the school system: memorizing or being judged will rather need training that starts with the analysis of his situation to meet its immediate objectives by putting people into situations referring to his own experiences.

Finally, the term will be popularized by the American humanist Malcolm Knowles [17] who was looking for a coherent and comprehensive theory of learning the latter will draw a clear opinion that the which the adult finds must be comfortable. in 1984 Knowles will define andragogy like the art and science of helping adults learn and it will suggest 4 principles of base of andragogy:

- The learner's self concept (autonomy, self-diagnosis, self-evaluation)
- The adult learns from his experience and his mistakes.
- Learning is related to developmental tasks (motivation is extrinsic).

The immediate application of learning because adults are more interested in learning things that have an immediate impact in their personal or professional life.

From here Knowles will define Andragogy as “the art and science of helping adults to learn” [17].

To learn effectively Knowles [18] has created a learning model in adults based on:

- The need to know: Adults need to know why they have to learn, so you have to make them feel that need to be able to to join a formation.
- The concept of self in the learner: Adults are aware of their own decisions and their lives. They need to be seen and treated as individuals able to self-manage.
- The role of the learner's experience: the adult accumulates a reservoir of experience Adults come to training with experiences they are not a blank sheet.
- The will to learn: adults have a desire to learn if people knowledge and new skills allow them to better cope with new real situations.
- The orientation of learning: With maturity adults orient their learning around life or a problem they are investing energy for learn if they feel it will help them cope with this situation.
- Motivation: adults are sensitive to external motivations (better jobs, promotions, etc ...) but most of all, they are sensitive to pressure interior (desire, self-esteem, etc ...).

B.d Andragogical models that integrate the characteristics of adults:

The Muchielli Rogers model:

For Muchielli [19] adults, aware of their potentialities and possibilities realization that can offer them the learning; their motivation is one function of their characteristics and the social or educational situation in which they evolve. Generally for the adules the real is their life with their responsibilities current and future professionals. Then adult education cannot be done by the school system or the university system, since in adults:

- There is resistance to return to school, not only because adult risk of recovering attitudes or blockages, but because this system is a threat of evaluation.

- Adults feel that academic-academic knowledge is not do not serve much in everyday life.

Bernice Mccarthy's model:

Based on the characteristics of the learner adult Bernice Mccarthy [20] finds that adult education must take into account some requirements:

- It is necessary to start from lived situations, problems or difficulties to emphasize the need for knowledge.
- It is necessary to adapt to the learning styles of adults.
- It is necessary to ensure understanding of the themes after each stage of teaching.

The model of Knowles:

The andragogical approach presented by Knowles [17 and 18] is marked by the contemporary humanist, according to this philosophy the human being is basically a trustworthy organization, able to assess the situation that he observes, to understand himself, to make the choice and to act accordingly.

The model of self-training:

The self-training model focuses on the subject, the person and his / her life experience, more than on the environment. So that the person can be autonomous in learning, it must master metacognitive strategies, that is, to say strategies that refer to knowledge about his activity cognitive and on the control of the task in which she is engaged.

Autonomy in learning also means that the person is mature emotionally that she is confident in her ability to learn. This assumes that the educational environment is reassuring.

B. From the andragogical model to the content model

Illiteracy is not an isolated phenomenon, it is both a particular problem, and a symptom of an economic, political, social and cultural situation. This plague has a direct impact on our life and on our society by causing a strong isolation and low self-esteem among the category of people involved.

C.a. Being an illiterate what is it?

Being an illiterate means:

- Do not have the ability to write and express thoughts in an organized manner.
- Not having the power to communicate with family, friends, neighbors, his banker and even with the teachers of his children.14
- Not be able to do basic calculations - such as addition, subtraction, multiplication and division.
- Not being able to solve a simple situation in real life such as paying bills.
- Can not understand the signs and symbols he faces every day in his life.
    - Bus: know the bus routes in his city or buy his ticket?
    - Health: understand simple notices.
    - Vote: Know where to register to vote in an election ...

What can be deduced?

Adults usually know their needs, their motivations, their interests, their capabilities and goals. So why not integrate them into a approach that will allow them to express their thoughts, to solve their problems, to process new information and to better understand the world that surround them?

C.b. Modeled problem solving problem

Every day in our real life the adult learner is confronted with situations problems (learning situations) that he has to solve, at home, at school, in the street, at the supermarket, at work ... In the sphere of cognitive psychology, the problem situation concept developed at the end of seventies within the educational movements of New Education. Cognitive psychology studies the mental strategies of individuals in the interpretation of a given situation and the resolution of problems encountered. Starting from the premise that "learning is understanding", she states that knowledge is acquired through a problem-solving process implement a dynamics of questioning. Faced with an obstacle, the individual summon his knowledge and abilities to break the deadlock.

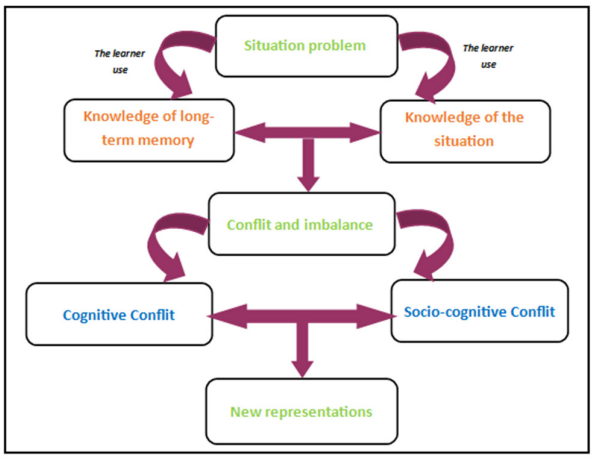

Fig. 1. Solving problem model

Through the exercise of its potentialities, but also by the exchange with others on the complexity of the situation, he is building new skills. The reason why our model was based on the notion of problem situation is that the adult learner combines several concepts to solve a problem in real life (fig.1).

- Mental representation: Mental representation is very much related to acquired knowledge, if the concept is an object already facing the screen, the concept construction uses knowledge stored in memory (term-term / long-term memory) and / or elements from environment to analyze the situation and make sense of the situation encountered.
- Cognitive conflict: In a situation where the representations of an individual are perceived as incompatible because it is a confrontation between what he believes he knows about the situation (his representation) and what he sees reality). This observation forces the individual to deconstruct the initial representation in order to build a new one while integrating new knowledge.
- Socio-cognitive conflict: develops when an individual becomes contradiction or incompatibility between ideas, representations actions ... here the individuals makes a cure to another person because usually the last does not learn alone but he learns in interaction with other individuals.
- The situation-problem: We can say that each learning situation will be resolved by following a difficult process because in the first place a situation problem is a situation to build with care. Its objective remains to establish a imbalance, a conflict, a discrepancy between what the learner thinks he / she knows about problem posed (his initial representations) and what he finds in reality. This which will provoke a question which will lead to give several hypotheses.

C.c. How to build a problem situation?

"We just learn to learn" does not learn, on the contrary it must get as close as possible to problems, obstacles and real situations to ensure a good level of learning. We must formulate the situation-problem so as to take into account every little detail.

A problem situation must:

- To convey functional knowledge.
- To convey a functional know-how.
- Be built with an interactive didactic approach.
- Take into account the learning styles of adults.
- Be framed by objectives and skills.

C.d. Model to set up a learning situation at adults.

The heart of our model is the situation problem in order to solve it we confront two variables (fig.2):

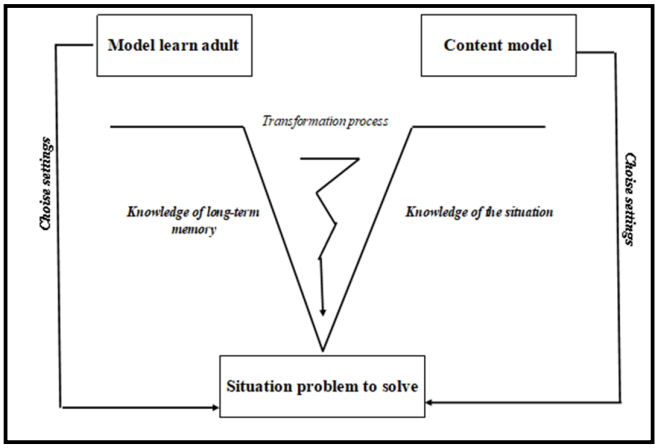

Fig. 2. Model for setting up a learning situation in adults

Fig. 3. The learner model: it is necessary to place the learner in good receiving conditions by giving meaning to the proposed learning activity. According to [21], a model of the learner is born from the desire to adapt the interaction tutor / learner according to each learner. This author defines model learning as a "set of learner-specific information. This information is most often about the knowledge and know-how that the system attributes to the learner in view of his behavior, for [22] the learner model is central to an adaptive learning system since it reflects the understanding of the learner (and possibly others aspects such as goals, learning preferences, motivations, etc.).

Fig. 4. The content model: the content put in place must be around the situation to solve, the adult learner will not learn anything but on the contrary he will learn new information that will have a direct relationship with the situation problem. Some other variables impact our model such as:

Fig. 5. The choice of the problem: Every adult learner with particulate problems then the problem must be motivating.

Fig. 6. The interactions: The back and forth between the data of the memory and the data of the problem situation will impact according to the age of the learner.

Fig. 7. Storage in the memory: It is necessary to structure the knowledge in the memory so that the learner does not give up the training.

Conclusion

Several researches have focused on adaptive hypermedia most are destined for formal training, based on pedagogical principles, but very can who are interested in the educational field.

Really one can understand that without literacy, one cannot be neither a independent person or an independent person. Literacy represents for anyone illiterate - the freedom to go, to move forward and to achieve those goals in life without being afraid [23]

According to my studies I found that andragogy was used in several domains but very little research that has focused on illiterate adults because this category of people remains very complex which makes it very difficult to generate a fixed model, but apparently one must think of a flexible model that takes into consideration of the target audience. So when it comes to learners in situation for post-literacy literacy, which andragogies should be followed to what digital resources? What about adult literacy?

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Development of Tax Monitoring in The Russian Federation and Assessment of The Effectiveness of The Internal Control System of a Business Organization

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Abstract

This article discusses a new form of interaction between the taxpayer and tax authorities tax monitoring. It is noted that tax monitoring is used for the largest taxpayers as a pilot project. The features of this form are: on-line monitoring, voluntary nature and the availability of selection criteria for the implementation of the procedure and regulation of interaction between the taxpayer and the tax authority. In total, in 2017, 14 taxpayers used tax monitoring, while the transition to the procedure uses the qualitative and quantitative criteria considered in the article. The main positive aspect of applying tax monitoring is the cancellation of field and office tax audits with respect to the taxpayer. Moreover, like any new project, tax monitoring has 4 main problems when implementing, the main of which is not the complete abolition of tax audits, which reduces the attractiveness for taxpayers. Moreover, as measures to improve the process, it is proposed: the development of common standards and formats for information interaction, as well as formalization of approaches to checking the effectiveness of the Taxpayer Internal Control System for taxes and further development of a risk-based approach to tax audits. The article notes that the central element is the internal control system of the business unit, and an expert assessment of the internal control system is proposed in the work.

Keywords: Tax Control, Tax Monitoring, Internal Control System, Efficiency.

Introduction

The tax monitoring procedure has been introduced in the Russian Federation since 01.01.2015. The Federal Tax Service of Russia continues to implement a mechanism for enhanced interaction between taxpayers and tax authorities. Federal Tax Service of Russia clearly formulated objective of the introduction of the tax monitoring institute - formation of optimal P model institution prior tax

clarification on the basis of this analysis, increasing the transparency of enforcement of the Russian Federation tax legislation, a significant improvement in investor perceptions of the business climate. According to the Federal Tax Service of Russia, about 2,000 taxpayers fall under the law. In 2016, out of the submitted applications for participation in tax monitoring, seven participants were approved, then in 2017 the number of applications increased significantly, and the decision to conduct tax monitoring was made with respect to 14 new participants.In 2017, participants in tax monitoring will be organizations operating in the field of:oil production and production of petroleum products (members of the group of PJSC Rosneft, LLC Zapolyarnneft);

•natural gas production (members of the Novatek group);
•production and trade (LLC Russol, LLC Unilever Rus);
•production and transmission of electric energy and thermal energy (PJSC InterRAO);
•the provision of communication, broadcasting and television services (PJSC Megafon, PJSC MTS);
•financial activities (JSC National Clearing Center Bank, LLC HSBC Bank (RR). In a research study by Boboshko Diana Y.. (2020)

According to the tax authorities, the institute of tax monitoring will solve the following problems: increase the predictability of tax payments; timely identify gaps and conflicts in the legislation on taxes and fees; reduce the costs of tax audits, legal costs in connection with the reduction of tax disputes, as well as provide an increase in the level of legal culture of taxpayers; reduce the number of field tax audits, as well as the taxpayer will comply fully with tax laws. The subject of tax monitoring is formulated for two categories of taxpayers:

1. For all categories of taxpayers, tax agents, payers of fees and insurance premiums, except for members of a consolidated group of taxpayers -the correct calculation (withholding), completeness and timeliness of payment (transfer) of taxes, fees, insurance contributions, the obligation to pay (transfer) which in accordance with Tax Code of the Russian Federation assigned to the taxpayer (payer of the fee, payer of insurance premiums, tax agent) - organization;
2. For participants in a consolidated group of taxpayers - the correct determination of the income received and the expenses incurred for the purposes of calculating and paying corporate income tax.

When conducting tax control, it is necessary to comply with a number of principles, the most important is the observance of the legal procedure, since tax legislation contains a clear mechanism for the implementation of tax control, requirements for the execution of procedural documents drawn up during the events. Failure to comply with procedural requirements is the basis for the cancellation of decisions of the tax authority. In a research study by Eliseeva E.N. (2017) The main principles of tax monitoring in Russia include:

• voluntary participation in tax monitoring is a right, and not a taxpayer obligation, as provided for in a desk and field tax audit. Tax monitoring is the first form of tax control, which is declarative and voluntary in nature (article 105.27 of the Tax Code of the Russian Federation .;
• limited participation - not all taxpayers can participate in the procedure, only those that meet quantitative and qualitative requirements;
• expansion of information exchange between taxpayers and tax authorities;
• exemption from other forms of tax control;
• the possibility of obtaining clarifications from the tax authorities on tax-complicated transactions in the organization.

The first question that arises when mentioning tax monitoring is which organizations can use it. The Tax Code of the Russian Federation provides for quantitative criteria that enable the transition to the use of tax monitoring:

1.The amount of taxes (VAT on internal operations, excise taxes on internal operations, corporate income tax, mineral extraction tax) for the calendar year preceding the year in which the application for tax monitoring is submitted is at least 300 million rubles .;
2.The total amount of income received according to the annual accounting (financial) statements of the organization for the calendar year preceding the year in which the tax monitoring application is submitted is at least 3 billion rubles .;
3.The total value of assets according to the accounting (financial) statements of the organization as of December 31 of the calendar year preceding the year in which the tax monitoring application is submitted is at least 3 billion rubles.

Thus, quantitative criteria are very relevant for tax monitoring and allow you to constantly monitor the largest payers of taxes, fees and contributions to the budget. At the same time, the principle of increasing the effectiveness of tax control is implemented. Currently, the goal of tax authorities is to reduce the cost of tax control measures and improve its quality and effectiveness. At the same time, it can be assumed that the Pareto principle is implemented here, the essence of which is 20% of the effort gives 80 % of the result, and the remaining 80 % of the effort is only 20 % of the result.

The quality indicators include the mismatch:

• regulations for information interaction in the established form and requirements for regulations for information interaction;
• internal control systems to the established requirements for the organization of the internal control system.

The period for which tax monitoring is carried out is a calendar year (article 105.26, clause 4 of the Tax Code of the Russian Federation), and the period is January 1 of the year of the specified period and ends on October 1 of the year following the specified period. For example, the taxpayer filed an application for tax monitoring in 2016 and the tax authorities made a positive decision, therefore this procedure will be valid from 01.01.2017 to 01.10.2018.

The main advantage of using tax monitoring by a taxpayer is the cancellation of field and desk tax audits against him. However, there are exceptions to any rule.

The second advantage of using tax monitoring by an organization can be attributed to the fact that when conducting tax monitoring, the tax authority is not entitled to send a motivated opinion to the organization on issues related to monitoring compliance of prices applied by the organization in controlled transactions to market prices.

In addition, we can highlight a number of positive aspects of applying tax monitoring for a taxpayer:

1. Tax risk reduction;
2. Decrease in interpretation uncertainty of tax legislation;
3. The opportunity to get a free consultation with a tax specialist.
However, tax relations are not only taxpayers, but also tax authorities. The positive aspects of applying the tax monitoring procedure for tax authorities include:
1. Permanent tax control of the largest taxpayers, who are the main payers of taxes to the budget of the Russian Federation;
2. Enhancing the transparency of law enforcement of the legislation of the Russian Federation on taxes and fees;
3. Significant improvement in investor perception of the business climate;
4. Simplification of the tax audit process;
5. Reducing the risk of taxpayers using illegal tax evasion schemes;

6. Ensuring the timeliness and completeness of reflection of tax obligations of taxpayers;
7. Reduced costs of tax audits, legal costs in connection with the reduction of tax disputes.

Tax monitoring is a new stage in the relationship between the taxpayer and tax authorities, many points have not yet been finalized and the mechanisms have not been debugged, but it is undeniable that the introduction of the tax monitoring procedure will positively affect the volume of tax revenues to the budget.in book by Hanlon, M. (2014)
The main problems of applying tax monitoring include:

1.The inability to apply monitoring by medium and small enterprises. At the same time, the mechanical transfer of the mechanism of tax monitoring of large enterprises to medium and small enterprises is impossible, adaptation is necessary for new conditions;
2. Not used to control compliance with market prices;
3. Incomplete cancellation of tax audits;
4. Security risks are not regulated when examining the taxpayer information base. In a research study by Kostygova L.A., Sidorova E.Yu (2019)
Thus, in the future until 2020, the authors propose the following:
1. Development of common standards and formats for information interaction. In the tax monitoring mode, the taxpayer can choose between two possible formats of information interaction - to provide the tax authority with direct access to its information system or to submit information in electronic form. Both options provide for the possibility of organizing various methods of transferring information to the tax authority and using a variety of electronic formats (xls, doc, pdf, jpg, etc.) and their combinations. In international practice, the standardized structure and format for transferring data to tax authorities is widely used - the so-called standard tax audit file (StandardAuditFileforTax, or SAFT-file). The structure and content of the information in the SAFT file allows the tax authority to obtain the information necessary for effective tax audits, complete analytical procedures and minimize additional document requests. The specified standard has already been adopted as mandatory for use in a number of OECD countries (for example, in Portugal, France). In addition, it is supposed to be used for organizing the international exchange of information between tax authorities of OECD countries. Given the latest trends in the development of international tax information exchange, it is impossible to exclude the use of a similar standard for building information interaction in the framework of tax monitoring in Russia. In a research study by OECD (2008)/

2. Development and formalization of approaches to checking the effectiveness of the taxpayer internal control system for taxes. Using the results of the internal control system, so as the development and development of practical experience in applying the principles of evaluating the internal control system during tax audits, unified methodology and approaches to assessing the effectiveness of these systems will be developed based on the results of pilot projects and international standards (COSO, etc.), already operating in a number of countries.

The use of statistical methods in tax audits. The regulation of information interaction on tax monitoring provides the opportunity for the organization to independently determine the volume, principles for selecting information and documents for the tax authority, provided that information about its internal control system is disclosed. In development of this principle in the international practice of tax administration, methods of statistical analysis of taxpayer data have become widespread. Such methods allow tax authorities to significantly reduce the amount of requested and verified information, limiting verification procedures by spot testing areas of high risk. Statistical methods, as a rule, are used in automated tax control systems that allow for the efficient processing and testing of significant amounts of tax information. In a research study by OECD. (2010)

3. Further development of a risk-based approach to tax audits. The practice of applying tax monitoring should give impetus to the study by tax authorities of key business processes of taxpayers in the main

sectors of the economy at a qualitatively new level and, as a result, lead to a significant reduction in the number of questions examined as part of the audit and the further development of a risk-based approach to planning and implementation tax audits. As a result, we can expect a general decrease in the number of tax disputes and litigation, labor and other expenses of tax authorities and taxpayers on tax administration, the establishment of a constant and constructive dialogue between them, and mutual trust.
One of the methodologically unsolved problems is the question of evaluating the effectiveness of the internal control system. As a hypothesis of the study, it was proposed that the RF Tax Code provides for quantitative and qualitative criteria that allow the transition to the use of tax monitoring. Quantitative criteria are very relevant for tax monitoring and allow you to constantly monitor the largest payers of taxes, fees and contributions to the budget. At the same time, the principle of increasing the effectiveness of tax control is implemented. Currently, the goal of tax authorities is to reduce the cost of tax control measures and improve its quality and effectiveness. At the same time, it can be assumed that the Pareto principle is implemented here, the essence of which is 20% of the effort gives 80% of the result, and the remaining 80% of the effort is only 20% of the result.

The quality indicators include the mismatch:

• regulations for information interaction in the established form and requirements for regulations for information interaction;
• internal control systems to the established requirements for the organization of the internal control system.
In order to solve this problem, the article will use the expert method in developing an assessment of the organization's internal control system that applies tax monitoring.
In the framework of the study of foreign experience in building an internal control system, the following can be noted. The Belgian Tax Administration Division of Large Enterprises (hereinafter referred to as the Division) announced the launch of a two-year pilot project on joint tax compliance. The program aims to transform the traditional approach of subsequent tax investigations into a system of effective, real and constructive dialogue on corporate tax matters. The joint compliance program will cover corporate income taxes, VAT, taxes equivalent to income taxes, and other taxes administered by the Division. However, the collection and collection of taxes will be excluded. It is assumed that the program will spell out certain elements of the corporate internal control system.

The pilot program will be open to very large enterprises. Participation is voluntary. The following thresholds are expected to apply:

- revenue of 750 million euros or more;
- overall balance of 1.5 billion . Euro or more;
- staff more than 1000;
- subject to corporate income tax in Belgium.
It is still unclear whether the sum of the threshold values or the passage of only one of the criteria gives access to the joint compliance program (when other conditions are met). The mandatory principle of " All - in " or " All - out " will apply to Belgian organizations and group affiliates based on association rules.
To gain access to the joint compliance program, taxpayers must also:
• have been timely filed tax returns in the past;
• have been to pay all taxes;
• Create a robust tax control system ("TCF") . Moreover, here we have in mind an analogue of the Russian system of internal control and:

• may not have been involved in tax evasion;
• may not have violated tax laws and have not shown serious setbacks over the past 3 years. In a research study by Sidorova E.Yu (2019)

Participation in the Joint Compliance Program does not mean that taxpayers will receive a more favorable tax regime. All rights and obligations based on national and international law remain fully applicable. Although the goal of the Program is to reduce the number of disputes through a constructive dialogue in real time, businesses and the Division may agree to disagree with the Program. In this context, in-depth tax audits are still possible.

At the same time, joint ventures participating in the Program can expect to receive a lower risk profile with a corresponding impact on the degree of audit. From a procedural point of view, it is not yet clear how an active and widespread exchange of information between enterprises affects or interacts with international (automatic) mechanisms for the exchange of information.

One of the main advantages offered for the Program is the most prompt feedback on tax positions (statuses). It is currently unclear whether the Program's dialogue will provide the same level of legal certainty regarding tax positions as formal preliminary decisions (resolutions) or preliminary pricing agreements.

This pilot project will start at the end of 2018. Successful preliminary discussions with taxpayers will lead to a more formal acceptance process if both the enterprise and the Department consider that the Program will bear fruit. The most important part of the admission process will be related to the review of the Tax Control System (a Russian analogue of the internal control system) , as well as to the basic concepts of the Program. It is assumed that the duration of the admission process will vary from 6 months to 1 year. . In a research study by Muradov I (2019)

The approval procedure for the use of tax monitoring is regulated by two main documents:

1. The Tax Code of the Russian Federation, part one;
2. Letter No. ED-4-15 / 12378 of the Federal Tax Service of Russia dated June 28, 2017 "On the direction of the procedure for assessing the completeness of information specified by an organization in a tax monitoring application and documents (information)" (hereinafter - the Letter).

At the same time, the Letter regulates the methodology for checking qualitative and quantitative indicators. In this case, two approaches are used during verification: formalized and high-quality, but this does not allow an objective assessment of the submitted documents; it is proposed to use a quantitative approach to verify individual points.

Thus, initially a formal approach was taken to verify information about the organization, then the Federal Tax Service of Russia will examine additional information about appealing the tax authority in pre-trial procedure. Let us dwell on this in more detail, as a second appendix on assessing the completeness of the information specified by the organization in the application for tax monitoring, and the documents (information) submitted in accordance with paragraph 2 of Article 105.27 of the Tax Code of the Russian Federation are examined with reference to appeal against decisions of the tax authority in pre-trial the procedure , in particular, analyzes the types of inspections, the period being checked, taxes as an object of verification, the amount of additional charges and the stage of consideration. The reasons for the appearance of this application is understandable:
•evaluate taxpayer compliance
•assess the degree of readiness of the taxpayer to recognize the arguments of the tax authority and agree with its decision. This conclusion can be drawn from the fact that the table contains the column "Consideration (stage) of consideration", in this column there can be 3 formulations: I agree with the decision, it is aimed at pre-trial settlement, the case is in court;
•evaluate the effectiveness of the implementation of tax monitoring, as it is necessary to correlate the amount of costs of the audits and tax monitoring. In a research study by Vinogradova E.V et al (2019)

However, these goals cannot be fully realized with the help of this application, since it is necessary to understand the entire volume of inspections carried out by the Federal Tax Service of Russia with respect to the taxpayer, it is possible that there are inspections that did not reveal offenses.

At the same time, an analysis of foreign practice confirms the fact that for a number of countries taxpayer compliance is one of the main criteria for allowing the use of tax monitoring, for example, Germany, where only law-abiding taxpayers can use tax monitoring.

Further, in the continuation of the above information, the tax authorities examine the information on the consideration of tax disputes in the courts , however, the presence of this application is very controversial, since the information contained in it is fully correlated with Appendix 2 and the column on the results of consideration is present in two applications.

The formal approach is implemented in Appendix 4, “Assessing the Legality of Handling a Tax Monitoring Application , ” where quantitative criteria for tax monitoring are checked and the check is symmetrical, namely, the taxpayer’s information is checked with the tax authority.

At the same time, qualitative indicators are tested , using two approaches and formal quality. In this audit, it is necessary to implement an additional methodological approach to assessing the internal control system, however, this does not allow an objective assessment of the submitted documents; it is proposed to use a quantitative approach to verify individual points. So in Appendix 7 for prices of the Regulation on the internal control system and documents governing the internal control system formally verifies the presence or absence of indicators in accordance with Order of the Federal Tax Service of Russia dated 16.06.2017 No. MMV-7-15 / 509 @ "On Approving the Requirements for the Organization of an Internal Control System", then a reference is made to the document and description, in this case there is the problem of a fair assessment of the quality of the system. We propose to apply an expert approach to the assessment of the internal control system (table 1). It should also be noted that Appendix 7 gives a classification of the levels of organization of the internal control system and gives a qualitative description of each level, which, together with the quantitative method, will allow tax authorities and taxpayers to more accurately determine the quality of the internal control system used.

Table 1 - the System of expert assessments of the internal control system of the organization that applies tax monitoring

Indicator	The importance of the indicator, Ki	Expert Score , Oi	Consolidated Index Jn
1.Control environment	0.08		
Compliance with professional, ethical and behavioral standards	0.05		
The participation of the head of the organization	0.01		
Organizational structure, distribution (differentiation) of powers and responsibilities	0.01		
Competencies and staff development	0.01		

2. Risk Management	0.55		
Identification by the organization of risks associated with the distortion of the accounting (financial), tax and other statements of the organization for tax monitoring purposes	0.2		
An organization's assessment of the risks associated with the distortion of the accounting (financial), tax and other statements of an organization for tax monitoring purposes	0.2		
Documentation of risks by the organization associated with the distortion of the accounting (financial), tax and other statements of the organization for tax monitoring	0.15		
3. Control procedures	0.13		
Description of organization control procedures	0.05		
Documentation of organization control procedures	0.05		
Evaluation of the effectiveness of control procedures of the organization	0.01		
Organization automated control procedures	0.01		
The ratio of automated and manual control procedures of the organization	0.01		
4. Information systems	0.09		
Internal and external audit of organization information systems	0.01		
Availability of protection against unauthorized access to source data	0.05		
Organization information systems for the organization of accounting and tax accounting	0.01		

Organization information systems used to control the correctness of the calculation (withholding) of taxes, fees, insurance premiums and to prepare the accounting (financial), tax and other statements of the organization	0.01		
Real-time controls	0.01		
5. Monitoring and evaluation of the effectiveness of the internal control system	0.15		
Monitoring and evaluation by the organization of the organization's internal control system	0.1		
Measures to improve the organization's internal control system	0.02		
Internal and external audit	0,03		

The calculation of the composite competitiveness index for each group of factors will be performed according to the formula:

Jn = Oi * Ki ,
where: Jn is the composite competitiveness index of the group of factors of each block;
Oi is the value of expert assessments of the indicators of each group of competitive factors within the block;
Ki - the importance of the indicator of a specific competitiveness factor in the overall structure of the block.

There are four levels in total:

initial (1) level - 0 - 20 points;
certain (2) level - 21 - 40 points;
controlled (3) level - 41 - 60 points;
managed (4) level - 61 - 80 points;
improving (5) level - 81 - 100 points.
These percentages are the benchmark for pricing and experts, Oi Moreover, as the characteristics of each level, it is necessary to use the descriptions given in Appendix 7 of the Requirements for the organization of the internal control system
The " Control environment " section in the weight equivalent is 0.08, the statistics are based on the insignificance of this section in the overall assessment system of the internal control system, and these sections are more formal than semantic.

The " Risk Management " section in the weight equivalent is 0.45, the statistics are based on the significance of this section in the overall assessment system of the internal control system and these sections are semantic.

The “ Control Procedures ” section in the weight equivalent is 0.22, the statistical data are based on the partial significance of this section in the overall assessment system of the internal control system and these sections are semantic, while the most difficult question is about the effectiveness of control procedures of the organization .

The “ Information Systems ” section in the weight equivalent is 0.09, statistics are based on the fact that this section is of a technical nature and is developed before submitting an application for tax monitoring and is worked out before the start of tax monitoring.

The section “Monitoring and evaluating the effectiveness of the internal control system ” in the weight equivalent is 0.15, statistics are based on the fact that this section can be debugged as standard business processes that will have minimal errors.

Thus, the use of the methodology given in table 1 gives a clear quantitative assessment of the organization’s internal control system and allows two tax-monitoring entities to diagnose it by levels. The mechanism of applying the internal control system will allow using the risk-based approach to obtain the most favored nation treatment for bona fide taxpayers. A company may, due to the system, be less often subject to audits, which should be first subject to the activities of those taxpayers for whom cases of violation of tax laws were previously identified: this can be as a failure to pay tax payments, evading interest and fines, using various types of withdrawal schemes from taxation. In this regard, the system provides high-quality interaction until the fact of verification.

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Detecting The Cross-Points In Laser Generated Lattice Using Hessian Eigenvalues And Mathematical Morphology

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Abstract

Many of the industrial activities are connected with threats caused both to the employees and the infrastructure. It is especially true in the case of deep mining industry, where the seismic threats are counted among the most dangerous ones. Risk management in such a case requires the knowledge of the current conditions, which can be obtained by the use of computerized monitoring systems. In the article, a detailed part of such a system is presented. The monitoring of rock mass tension is performed by analyzing the deformations of conical borehole made in the draft sidewall. The article presents the method for discovering a set of points formed by the crossing of the laser-generated lattice on the conical borehole surface. The methods of noise reduction methods are presented. The discrimination of the lattice lines by use of the Hessian matrix as well as the detection of its crossings are described. The developed algorithm was tested on the images gathered in the laboratory stand simulating industrial conditions with satisfactory results.

Keywords: Information systems issues, knowledge discovery, image analysis, image processing

Introduction

Information technology is playing a crucial role in many aspects of nowadays industry. The information systems are used widely in different branches of industry, influencing not only the productivity but also the organizational culture and safety. The last is especially true in case of inherently tough industrial activities such as raw materials excavations. Though many aspects of safety factors can be mentioned here, it is out of doubt, that the seismic ones, especially in deep mines are of most importance. The most effective way to improve safety in the case of these threats is prevention associated with continuous monitoring of the state of stress prevailing in the rock mass. The information gathered during the monitoring process can be used in the estimation of the rock mass condition and assess the potential of severe consequences. One of the most important parameters is the tension appearing in the rock mass. However, its determination is not easy and requires constant monitoring. One of the methods bases on the determination of shape changes of the geometry of the borehole drilled in the sidewall. The borehole is usually about 8m long, but its most important part is the conical shape at the end. The deformations of the cone in time are caused by the influence of rock mass and depict the stress in it. It is important that the determination of the shape of the cone is performed in the way which does not influence the tension field. Therefore, the optical methods were considered as they allow assessment of the shape without the necessity to touch the measured surface in any way.

The determination of the shape using optical methods can be performed using structured light, stereoscopy, or laser distance scanning. When the structured light is used, the known geometric pattern is projected onto the surface (Geng, 2011; Wang, Zhou and Shuang, 2020). The analysis of the deformations of the projected shape gives the information about the surface shape. The knowledge about it is discovered by calculating the difference between the placement of known elements of the pattern on the surface and their placement on the plane. The usage of stereoscopy takes advantage of observing the scene, the investigated surface, by two (or more cameras). The corresponding points are identified in the images gathered by the cameras. The displacement of the points reveals the knowledge about the analyzed shape (Koch, 1995). The last-mentioned method uses a laser beam for the direct measurement of the distance between the laser source and the surface. The distance is measured in a

set of selected points (the surface is scanned) and the measurements inform of the shape of the analyzed surface.

In the article, the method using both structural light and stereoscopy is considered. The source of light, the laser projector, display a rectangular grid on the surface of the cone. The first step and the crucial difficulty in the shape assessment process is the detection of the grid lines and precise detection of the key points formed by lines crossing.

Image processing and analysis were widely used in the many branches of industry (Yu and MacGregor, 2004; Honkanen, Eloranta and Saarenrinne, 2010). It is also true for the mining industry. The image analysis was used for the raw materials enrichment process (Kistner, Jemwa and Aldrich, 2013; Fu and Aldrich, 2019), assessment of mineral resource quality (Yaghoobi *et al.*, 2019; Iwaszenko and Smoliński, 2020), or the monitoring of people's behavior (Fang *et al.*, 2020). One of the applications is a determination of the bulk rock materials granulometry. In the article, a method for enhancement of the gathered image quality is presented as well as the method for displayed rectangular grid lines cross-sections. The presented methods use Hessian matrix eigenvalues analysis for the linear structure discrimination (Sato *et al.*, 1998). The method uses the 'vesselness' parameter (Frangi *et al.*, 1998) as a discriminative quality. Once the grid lines are extracted from the image, the morphology operations are utilized for grid cross-sections determination. The method was implemented and used in the equipment for the rock stress monitoring developed in Central Mining Institute (Kabiesz *et al.*, no date).

Materials and Methods

Image Acquisition

The images for the experiment were collected using RGB cameras mounted on the cylindrical metal-plastic chasse. The chasse has diameter 76mm and the length 160mm and can be inserted into the drilled borehole when necessary. The lattice pattern was generated by a laser projector placed along the chasse axis. The two cameras were placed on both sides of the laser projector. The scheme of the cameras and the laser projector montage is presented in Fig. **1** and the frontal view of the equipment is shown in Fig. **2**.

All images were gathered at the laboratory stand consisting of the rock block (233mm x 180mm x 350mm) with centrally drilled cone borehole on the biggest side. The cameras and the projector focus was set at 120mm, which resulted from the laboratory stand geometry. There were 12 series of pictures taken. Each series consisted of 5 images. The images had a resolution of 2592x1944 and were registered with 24-bit RGB color depth (8 bit for each channel). The laser projector (red) was the only source of light during the experiment. The example image taken during the experiment is depicted in Fig. **3**. All images, due to hardware limitations, were saved as jpg files.

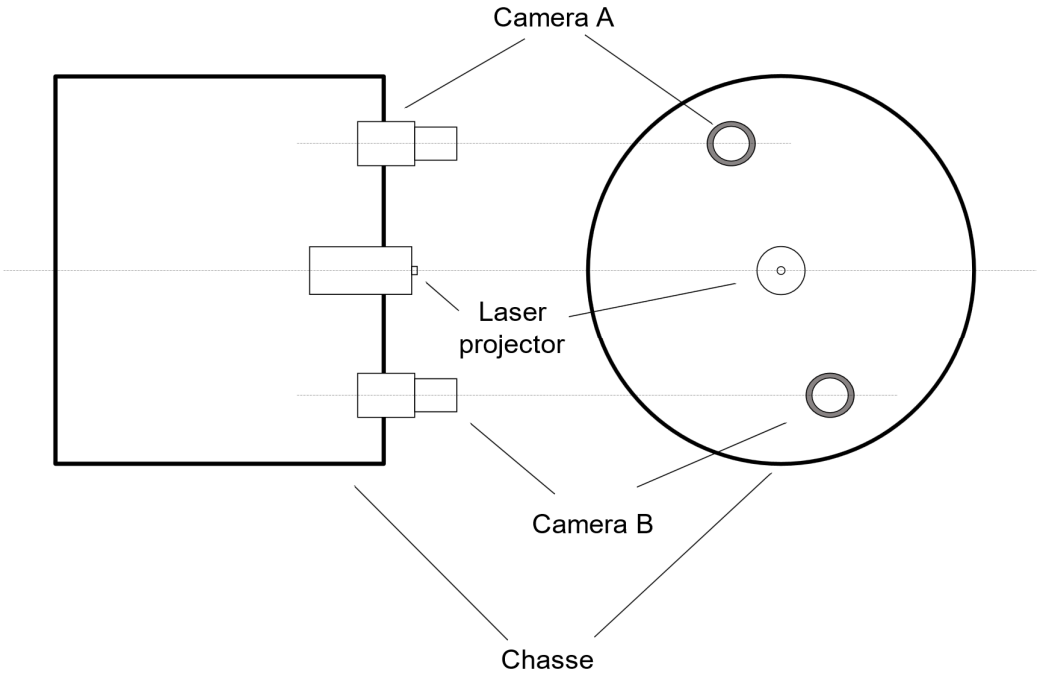

Fig. 1:The schema of the image acquiring equipment

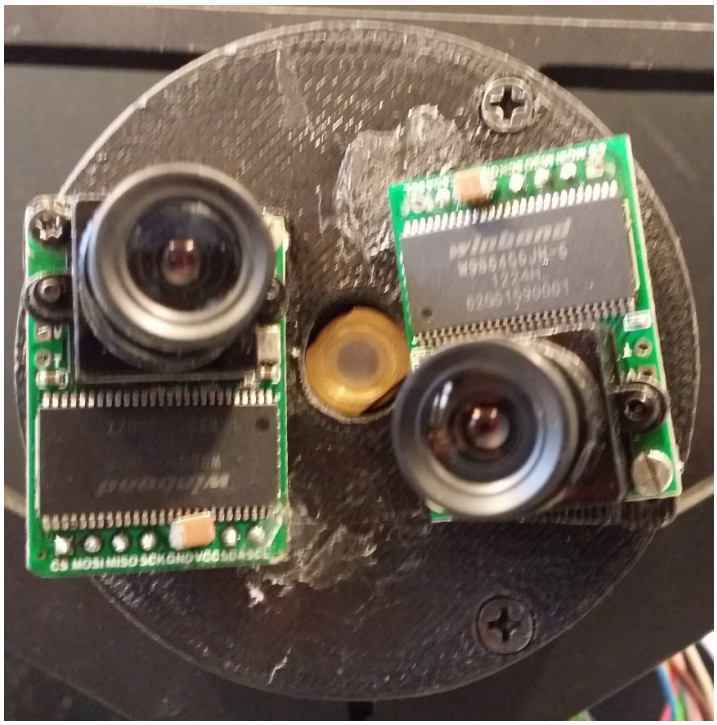

Fig. 2:Frontal view of imaging equipment

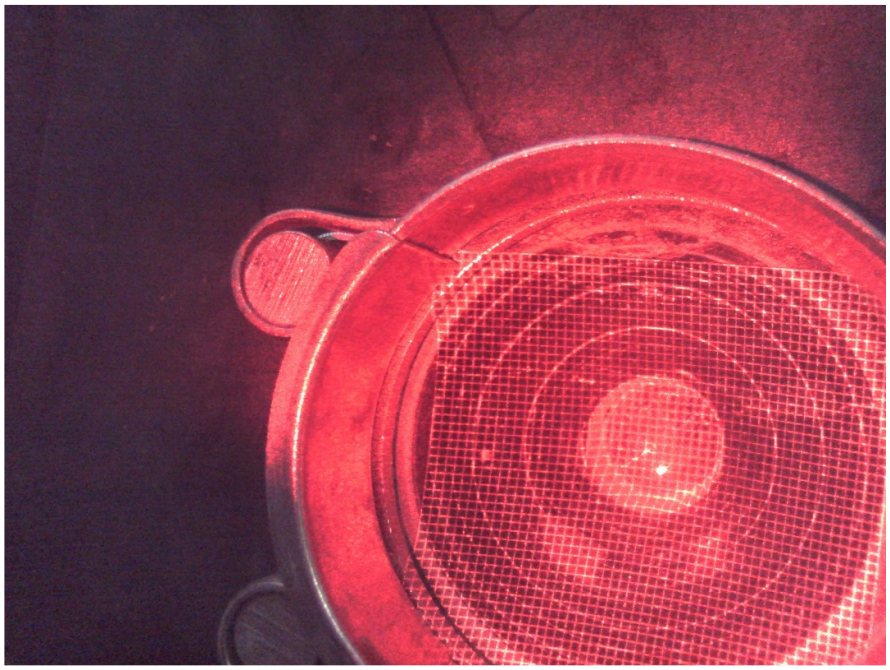

Fig. 3:The example of input image

Image Preprocessing

The 'raw' images registered during the experiment suffer from a few drawbacks:

- the images are distorted by the camera optics,
- the framing is not perfect,
- the noise, reflections, and 'false' curves make the image hard to analyze.

Therefore, the images have to be preprocessed before any other analysis steps are taken. The two first drawbacks can be corrected relatively easily. The distortion can be eliminated using camera intrinsic matrix and distortion coefficients (Zhang, 1999). Because the scene observed by the cameras is steady and there are no significant movements in the field of observation, the cropping parameters can be determined once in the beginning (even manually) and applied consecutively to all registered images. The last problem, however, needs more attention.

The first step in images preprocessing wast to switch from the three-channel, color RGB image into the one-channel grey level. The transformation was motivated by the fact, that the illumination used is monochromatic and the only important information contained in the image has geometric nature – the placement of grid lines and lines cross-sections. The images were converted to HSV color space, and only the V (value) channel was used for further processing. The preliminary noise elimination on the images consisted of two phases. It was assumed, upon inspection of the noisy region of images, that its nature is probabilistic and caused by poor light conditions during image acquisitions (which is the inherent feature of the conditions inside the borehole). It implies, that the noise levels in each pixel will vary in the images taken within the series. Fortunately, there are no changes to the laser projected grid at the same time. Therefore, summing up the images taken during the same series will result in significantly higher amplification of the region containing the lattice lines, and a relatively low increase of values of pixels in dark areas. In other words, the same pixels on the lattice on different images have similar values, but the pixels in the noisy parts of the images, have different values on each image. All images taken during one series were added, and the result was normalized to a standard 8-bit color range. As a second phase for noise reduction, a 5x5 median filter was used.

Gridlines Discrimination

The grid lines discrimination method uses the 'vesselness' feature, proposed in (Frangi *et al.*, 1998) and previously used for discrimination of linear structures (e.g. vessels) on computer tomography (CT) images. The method was successfully utilized in the linear structures discriminations on images (Fabijańska, 2017; Sebastian Iwaszenko and Karolina Nurzynska, 2019). The method utilizes the comparison of eigenvalues of the Hessian matrix. The Hessian matrix is composed of second-order partial derivatives of the function. Treating the image as the function of two variables, the Hessian can be written as follows:

$$H = \begin{bmatrix} I_{xx} & I_{xy} \\ I_{yx} & I_{yy} \end{bmatrix} \tag{1}$$

where $I_{ij} = \frac{\partial I(i,j)}{\partial i \partial j}$, and I is the image. The eigenvalues and eigenvectors of the matrix hold the information about the intensity and directions of function values changes. In the case of the considered image, the values are simply the image gray level. The discrimination of the linear structures on the image requires finding all the pixels for which the first eigenvalue, λ_1 is much greater than the second one. Moreover, in the case of discriminating the bright lines, the λ_1 should be close to zero while λ_2 should be negative. Such a combination reflects the situation when there is almost no change in color in direction of the first eigenvector and there is a huge drop in the color value in the direction of the second eigenvector. The (Frangi *et al.*, 1998) propose calculation of the feature which value depicts the chance, that the given point is placed at the linear structure:

$$v_\sigma = \begin{cases} 0 \; for \; \lambda_2 > 0 \\ e^{-\frac{\mathcal{R}_B^2}{2\beta^2}} \left(1 - e^{-\frac{S^2}{2c^2}}\right) \end{cases} \tag{2}$$

where S is a Frobenius norm of H matrix, $S = \sqrt{\lambda_1^2 + \lambda_2^2}$. The β and c are the parameters. The $\mathcal{R}_B$ parameter measures the "blobness" of the pixel's vicinity and is calculated as follows:

$$\mathcal{R}_B = \frac{\lambda_1}{\lambda_2} \tag{3}$$

As the linear structures observed in the image can manifest at a different scale, the v_σ is calculated for the image blurred by Gaussian filter with standard deviation σ. The complete algorithm for enhancing and discriminating linear structures uses a series of different, increasing values of σ_i. The image is blurred using the values, and for each pixel a v_σ is calculated. The result consists of the highest detected v_σ values between all scales used. The β value was equal to 0.5 and c was equal to half of the maximum Frobenius norm at a given scale.

Morphological Transformations For Grid Cross Points Identification

The linear structures discriminating algorithm allow discovering the laser grid among disturbances and noises present in the image. The determination of the crossings of the lattice lines was performed using morphological operations.

The proposed solution uses the erosion operator with two cross-shaped structuring elements, one being the negative of the other. Before the application of erosion was performed, the histogram of the input image was equalized. This operation improved overall quality and positively influenced the results. Then two images were obtained, one after erosion by the cross-shaped element, and one by the erosion using the negative of it. The last image was subtracted from the first one, and the result was binarized using threshold operation. Such operation can be interpreted as a kind of hit-or-miss morphological operation (Dougherty and Zhao, 1992). After performing the operations, the resulting image should

contain mostly the pixels placed in the regions of line structures crossing. The proposed operation is straightforward and can be effectively performed.

Results and Discussion

The images used for testing the proposed methodology were gathered using the laboratory stand. There was a total of 10 pictures taken in each of the 12 series. The images were taken by two cameras, yielding 5 pictures per camera per series. The typical raw image is presented in Fig. **3**. The conversion to HSV color space as well as morphological operations and image arithmetics were done using the OpenCV library. The improvement in image quality due to proposed preprocessing can be noticed in Fig. **4**. The obtained result shows noticeable noise reduction. However, the image is still problematic in a direct investigation, therefore further steps had to be taken. The calculation of the multiscale vesselness parameter requires defining the range of the σ parameter used for images blurring. The range depends mainly on the size (thickness) of the linear structures, which are supposed to be detected on the image. For laser lattice images, the set of experiments was performed varying the starting σ value from 0.2 to 5 and the ending value from 2 to 30. The parameter was changed with steps 0.1, 0.2, and 0.5. It was observed that the lattice is well discriminated against on the pictures with σ varying from 0.5 to 5 with step 0.2. The wider intervals did not change the observed discrimination of the lattice significantly, though the highest values resulted in very long calculations times. The typical result of used linear structures discriminations is presented in Fig. **5**.

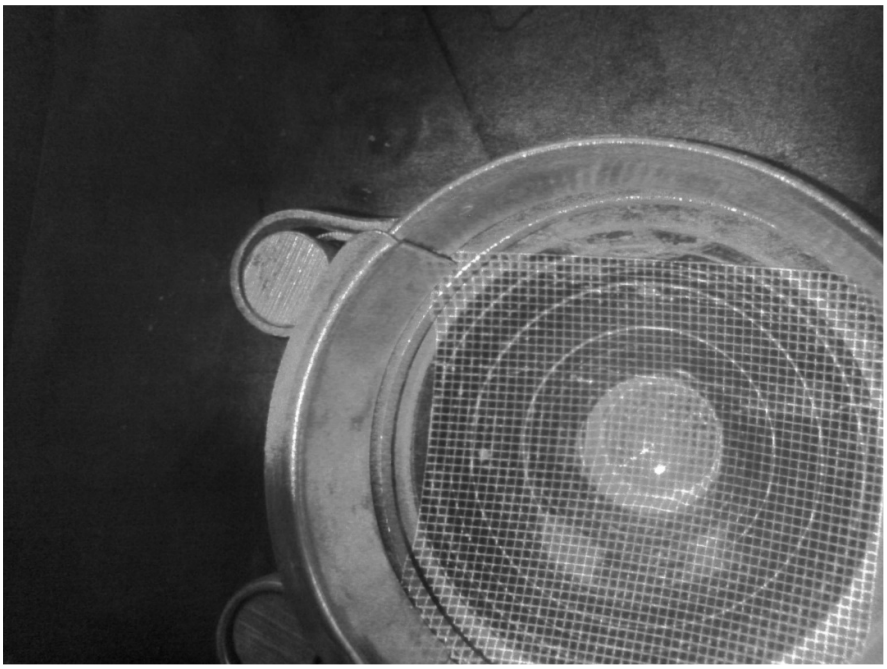

Fig. 4: The image after applied preprocessing - the significant noise reduction can be observed.

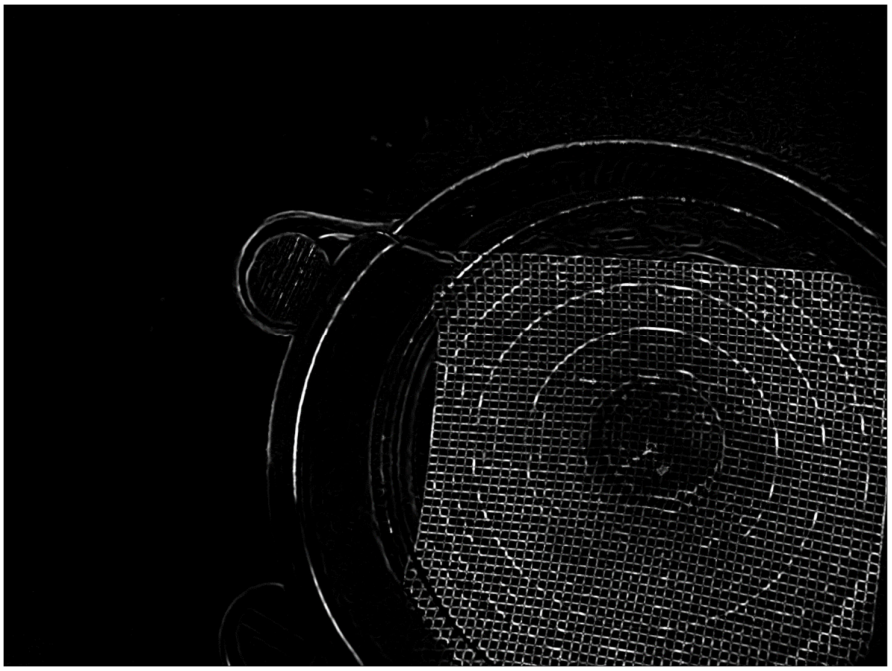

Fig. 5:The image after linear structures discrimination and normalization. The lines of projected laser grid ara clearly visible.

The application of morphological transformations resulted in the images similar to the one presented in Fig. **6**. The detected cross points can easily be spotted. Their segmentation, however, lacks precision. There is rather a cluster of pixels present, where one can expect a single point. The reason for that is connected with the spatial dimension of the lattice itself. The thickness of the lines is as high as 8 pixels. This is the cause, that the crossing contains a group of pixels instead of the one. These clusters can be refined to the single-pixel by calculation of its centroid. There is also another problem, which can be observed in the image. As the conical hole is drilled, the few circular scratches on its surface are made. The scratches are clearly visible when lit by the laser light as the parts of circles, disturbing the view of the lattice. They were not eliminated nor by the preprocessing nor by the linear structures discriminations. They are still visible on the final picture, but at this time, that rather cause the pixel clusters on the lines crossing are bigger than in the other places. Though it is still possible to reasonably detect the crossing, it is not as precise as in the other places. Fortunately, the problems occur only in very limited numbers of crossing and therefore can be neglected in most applications. The presented method proved its robustness when applied to every test image and can be used as the method of knowledge discovery from image information.

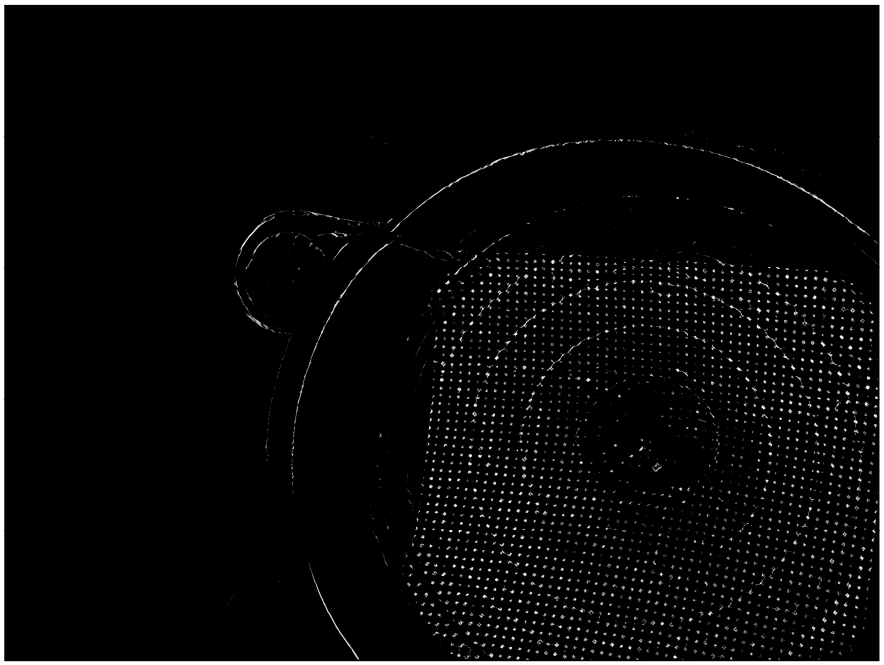

Fig. 6: The image after morphological transformation and thresholding. Lines cross points are visible as 'dots' (pixels' clusters)

Conclusions

The method for discovering the knowledge of the set of characteristic points upon the image information was presented. The characteristic points are formed at the crossing of lines of the laser-generated grid. The knowledge of point's locations is crucial in determining the shape of monitoring borehole used for the determination of the stress field in the rock mass. The presented method is able to reduce the noise level at input images, discover the linear structures, and identify the crossing of the grid lines. Though the method proved its usefulness, there still is a place for improvements, e.g. its effectiveness (calculation times can be long) and the ability to eliminate false signals from the scratches on the borehole surface. The improvements will be elaborated during further method development.

Acknowledgments

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Socially Responsible Investments and Investment Policy Evidence from Listed Companies in Poland

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Abstract

The subject of the considerations is the investment policy, the concept of socially responsible investments and their disclosure in the reports of listed companies in Poland. The research problem of the paper boils down to examining the investment policy of listed companies in Poland in the field of socially responsible investing. The purpose of the paper is to evaluate the investments made by companies listed on the Warsaw Stock Exchange and to assess disclosure of information about SRI in the company reports. The research methods used are financial analysis method, content analysis method, descriptive statistics using the IBM SPSS 24 program and the MS Excell spreadsheet.
The examined period covers the years 2011-2018. The results of the research prove that listed companies in Poland have a significant percentage of investments in their assets, and the results obtained from investing activities largely contribute to the financial success of the company. In addition, the surveyed companies show good quality information about SRI (89.5% in 2018). The analysis over the period 2011-2018 shows that the disclosure quality about SRI is steadily increasing. The results of the research increase knowledge in the field of making and reporting information on socially responsible investments.

Introduction

Investments mean economic expenditures for increasing or restoring assets that will bring positive effects in the future. Investments understood in this way include expenditures on creating new production capacities by constructing new facilities or expanding existing ones, as well as investing free cash in a way that will generate increased income in the future. Currently, when making decisions about investing free financial resources, investors take into account not only economic factors (rate of return on invested capital and risk), but also social, environmental, ecological and ethical ones. In such a situation, Socially Responsible Investing (SRI) becomes an alternative to traditional forms of investing, understood as the result of the investment strategy adopted by the company, which equally strives to maximize profit as to achieving specific social goals and taking into account the needs develop sustainably.

The research problem of the paper boils down to examining the investment policy of listed companies in Poland in the field of socially responsible investing.

The purpose of the paper is to evaluate the investments made by companies listed on the Warsaw Stock Exchange and to assess disclosure of information about SRI in the company reports.

The paper is organised as follows. The introduction builds up the motivation for the paper and states its purpose. The second chapter provides an overview of the investment literature, especially SRI. The third one shows dataset and research methodology. Next chapter reports and discuss the main results of an empirical research. The final chapter summarises the main findings.

Literature Review

The term “investments” is particularly important in a market economy, where investing is a fundamental factor for economic growth and development. J. Hirschleifer (1965, p. 509) defined investments as current renunciation of future benefits. The present is relatively well known, while the

future is always a secret. This means that the investment is a renunciation of certainty for the expected benefit.

There have been many attempts in the literature to define the concept of investment (e.g. Baumol, Blinder, 1991; Beherens, Hawranek, 1993; Dydycz, Wrzosek 2000; Dziworska 1993, 1996; Francis 2000; K. Jajuga, T. Jajuga, 2006; Leszczyński, Skowronek-Mielczarek 2004; Relly, Norton, 2006; Walica, 2004; R.J. Wonnacott, P. Wonncott, 1990; etc.) . However, in most cases they are based on the definition of J. Hirschleifer.

Investments are most often understood either as monetary expenditure that is to bring income to the investor (financial aspect) or as a process in which cash is transformed into other goods (material aspect) (Różański, 2006, p. 13). Initially, the scope of the investment was narrowed to material goods, so a material approach was widely recognized. The development of technology and technology caused that investments in intangible assets are made and the development of capital markets caused an increase in capital investments.

There are two basic trends in defining the concept of investment:

- the monetary (financial) trend, treating the investment as cash flows, while a direct connection with obtaining the effect in a material form is not necessary,
- material (economic) trend, where the investment is perceived as a movement of goods, it is therefore necessary to obtain a material effect.

Currently, when defining the concept of investment, the emphasis is on their financial side. The adoption of the monetary (financial) option results from the immanent, natural relationship between finance and investment.

The author understands investments as a current commitment of financial resources to acquire specific assets, both material and immaterial, thanks to which the investor expects to achieve benefits. Investing is a process of engaging financial resources in order to obtain benefits, assuming that these benefits from the investment will be greater than the funds involved.

Recently, we can observe an increase in financial investments in accordance with the concept of sustainable development. This is indicated by the growing number of assets on the global financial market managed in accordance with this concept (Janik, 2014, p. 8). This means seeking a balance between the economic, ecological and social aspects of the enterprise. Economic policy cannot be detached from social policy or environmental policy. Achieving this goal in practice requires that economic development supported social progress and respected the need to protect the environment, social policy strengthened economic results and environmental policy was economically effective (Gasparski, 2003, p. 54). The investments that take into account both economic, social and environmental factors are referred to as socially responsible investments (SRI).

The field of SRI has been characterised by debate (Bruyn, 1987; Hylton, 1992) or lack of consensus about definitions (Cooper, Schlegelmilch, 1993; Frankel, 1984). Even the terminology is not settled. Thus broadly similar or related terms which appear in the literature include social (Bruyn, 1987; McGill, 1984), divergent (Schotland, 1980), creative (Powers, 1971), green (Simpson, 1991), targeted, development and strategic (Wokutch et al., 1984) investing or investment. However, the two most common terms are socially responsible investment and ethical investment (Sparkes, Cowton, 2004, p.46).

Socially Responsible Investing is a kind of philosophy and at the same time a practice of making strategic investment decisions, in which traditional financial criteria, i.e. the rate of return and risk, are extended and supplemented with non-financial factors, including social and environmental aspects, and those related to corporate governance (Urban 2011, p . 496). According to R. Sparkes (2002, p. 22), SRI is an investment philosophy combining both financial and non-financial criteria.
The review of the literature on socially responsible investing (Klasen, Röder, 2009; Marcinek, 2016; Pasewark, Riley, 2010) demonstrated that, when making decisions to invest their own funds in

accordance with the SRI concept, the investors focus primarily on four areas: economic (business), social (sociological), environmental (ecological) and ethical (moral). Research on socially responsible investing can be divided into two main groups. The first group includes literature studies on the SRI concept itself, and the second group concerns research on effectiveness of investments taking the ESG factors into account.

The development of market for socially responsible investments has led to research verifying their effectiveness. However, the researchers' opinions on this issue are divided.

Skeptics of the SRI concept believe that limiting the investment portfolio to socially responsible investments must lead to a decrease in its efficiency by reducing the achieved profit or increasing the risk incurred (Jedynak, 2011, Geczy, Stambaugh, Levin, 2003). Supporters of the SRI concept quote the results of indexes of socially responsible companies and the funds that declare to pursue SRI in the long term (Statman, 2005; Schroder, 2007; Jedynak, 2012; Kubińska, 2014). Positive results of research on the effectiveness of SRIs are also cited by the 2016 report by Deloitte, on the impact and scale of including ESG factors in the process of making investment decisions.

The development of the SRI concept and its positive impact on the results of business operations justify the need for research on disclosing information about SRI in company reports.

Data and Methodology

The research problem of the paper boils down to examining the investment policy of listed companies in Poland in the field of socially responsible investing.

The source of data for research are the financial statements of companies listed on the Warsaw Stock Exchange, operating as part of the RESPECT Index project framework[1].

In order to select the research sample, the following assumptions were made:

1) the survey covered companies of the RESPECT Index at 27 December 2018
2) the examined period covers the years 2011-2018,
3) due to the nature of the operation and various accounting and financial reporting rules, banks, insurance companies and entities operating on the basis of securities trading regulations as well as regulations on investment funds and investment fund management were excluded from the research sample,
4) the companies that did not publish financial statements for all the years covered by the research were excluded.

Out of 31 listed companies, 12 companies were excluded due to:

- 9 companies - specifics of their operations and different accounting and financial reporting principles,
- 3 companies - lack of financial statements for all years covered by our survey.

The sample consists of companies that operate in the industry:

- construction industry, energy industry and fuel industry –3 companies in every industry,
- raw materials – 2 companies,
- other industries (chemical industry, electrical machinery industry, hotels and restaurants, media, retail, telecommunication, timber industry and wholesale – 1 company in each industry.

Of the 19 companies accepted for the research, we included 8 companies listed in the WIG20 index (contains 20 largest companies), 8 companies that were part of the mWIG40 index (includes 40

[1] RESPECT Index is the first index of responsible companies in Central and Eastern Europe introduced on the GPW Warsaw Stock Exchange in 2009. The main goal of the project is to promote the highest standards of responsible management.

medium-sized companies), and further 3 of the mWIG80 index (comprises 80 small companies). Taking companies of various sizes into the study makes the research sample more representative.

Considering the 8-year period, 152 reports published by companies were subject to observation.

The research methods used are financial and content analysis, descriptive statistics using the IBM SPSS 24 program and the MS Excell spreadsheet.

H: The value of investments on the Polish capital market improves over time, but this is not reflected in socially responsible investments.

Results and Discussion

Value of Investments

The research problem boils down to examining the value of investments disclosed in the financial statements of the surveyed companies.

A preliminary analysis of the individual financial statements of the analyzed companies allowed to conclude that in the period of 2011-2018 all of the surveyed companies invested their free funds. This proves how important an asset group the investments are for the companies. The descriptive statistics are presented in Tab. 1.

Tab. 1 : Descriptive statistics – Total investments

Statistical measures	2011	2012	2013	2014	2015	2016	2017	2018
mean	4 254 481	4 530 106	5 441 915	5 314 844	5 695 980	5 673 548	5 523 919	5 651 437
median	384 302	767 419	662 025	636 998	660 536	686 083	517 999	499 506
max	22 903 348	22 657 054	23 166 290	25 611 801	29 049 000	29 515 000	30 040 000	32 868 000
min	38 633	40 649	40 275	40 627	39 967	64 005	68 969	66 497

Source: Author's calculation

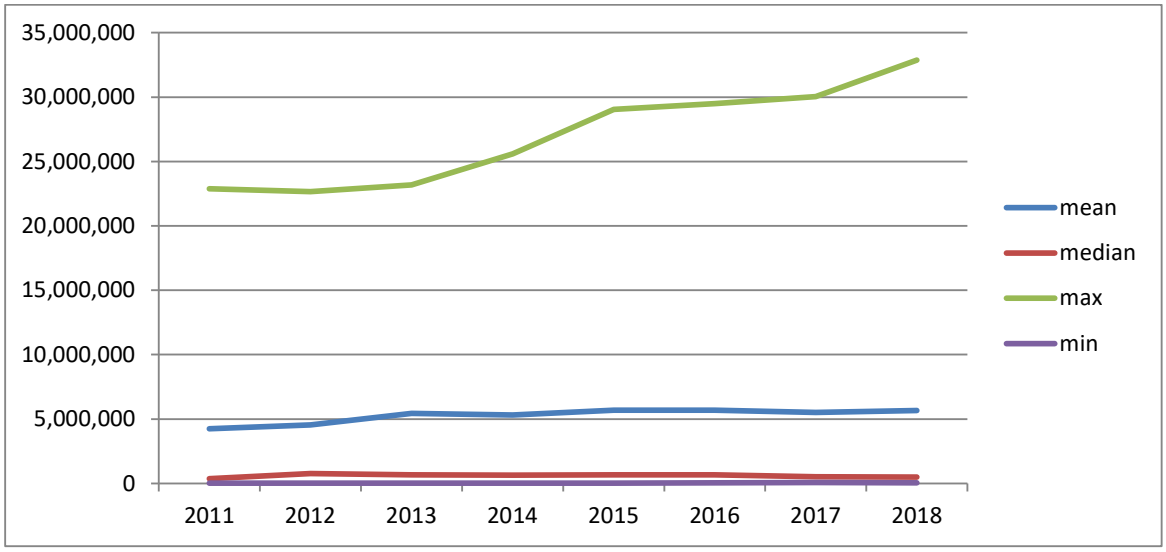

Fig. 1 : Disclosure Index of Total investments over period 2011-2018

The average value of total investments measured by its mean (blue colour) is PLN 4.25 million in 2011 and it rises steadily up to PLN 5.65 million in 2018. The improvement can be identified in 2013. If the median (red colour) is taken into account, it produces a higher level than the average value. At the beginning of the examined period only one company had investments over PLN 20 million. It was company which operate in energy industry. At the end of the period, 2 companies (both companies in the energy industry) had investments worth over PLN 20 million. The largest value of investments is over PLN 32 million.

The next step in the study is the analysis of relative values - investment share in total assets.

Tab. 2: Descriptive statistics – Investment share in total assets (%)

Statistical measures	2011	2012	2013	2014	2015	2016	2017	2018
mean	29,5	30,9	34,9	33,0	33,6	34,5	33,7	32,5
median	20,8	29,3	37,4	28,6	29,4	27,0	30,2	27,8
max	93,3	93,4	89,0	91,6	88,5	93,8	93,9	90,7
min	2,6	2,4	2,2	2,0	1,8	2,0	2,1	1,9

Source: Author's calculation

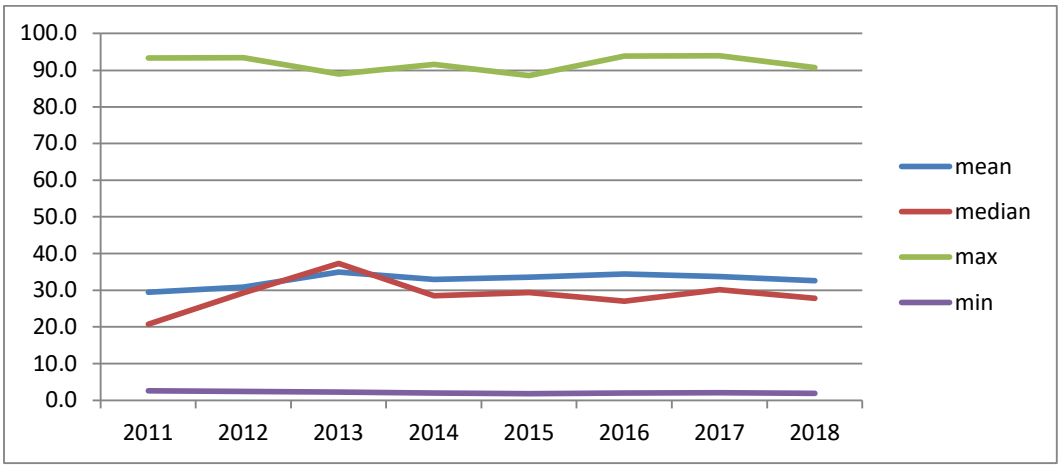

Fig. 2: Disclosure Index of Investment share in total assets over period 2011-2018

The average investment share in total assets measured by its mean (blue colour) is 29.5% in 2011 and it rises steadily up to 32.5% in 2018. If the median (red colour) is taken into account, we can see that it is below average. However, there was a clear increase in 2013.

The largest share of investments in total assets fluctuates around 90%, taking the lowest result in 2015 (88.5%), and the highest - in 2017 (93.9%). This result belongs to a company from the energy industry. This proves that the company is heavily invested and the business activity has been reduced to investment activity.

The lowest result can be recorded in a company from the raw materials industry (from 1.8% in 2015 to 2.6% in 2011). The analysis of the balance sheet and additional notes shows that due to the kind of business, the majority of assets are components of property, plant and equipment (fixed assets). We can also note that the number of companies whose investments accounted for more than half of their assets is growing over the period considered. This confirms the thesis about the significant role of investments in business operations of enterprises.

Socially Responsible Investments

The research problem boils down to examining the quality of information about SRI in reports prepared by companies.

This section analyzes the quality of SRI disclosures. The first step in the qualitative analysis of disclosures concerning socially responsible investments was to determine, which elements of the annual report will be assessed. Three important sources of information provided to stakeholders were selected:

- financial statement,
- letter to stakeholders,
- management commentary.

In the subsequent step, research questions were formulated:

1) is there information on **corporate social responsibility** in the reports?
2) is there information on **corporate governance** in the reports?
3) is there information on **sustainability** in the reports?
4) does the company inform about its **social responsibility activity**?
5) does the company avoid investing in **dirty businesses**[2]?
6) does the term "**socially responsible investment**" appear in the reports?
7) does the term "**ethical investments**" appear in the reports?
8) does the term "**impact investments**" appear in the reports?
9) does the term "**green/ecological investments**" appear in the reports?
10) is there information about **investments for environmental protection**?
11) was the information concerning **investments for the benefit of local community** included?
12) is there information about the expenditure incurred to **improve the working conditions of employees**?

The next step of research is content analysis of the reports of the surveyed companies. There is calculated an information quality index on socially responsible investments (further QI) for each year-firm observation. The disclosed information relating to research questions has been quantified using a binary system, where:

- 1 denoted affirmative answer to the question posed,
- 0 denoted negative reply, i.e. no information.

The binary system adopted for coding means that the maximum test result (QI) is 12 points. Depending on the number of points achieved, 5 categories of information quality index on socially responsible investments were determined:

- First Category (I) - 0 points denotes no information,
- Second Category (II) - a score of 1- 3 points denotes low quality of information,
- Third Category (III) - a score of 4 - 7 points means average quality of information,
- Fourth Category (IV) - with a score of 8- 10 points means good quality of information,
- Fifth Category (V) - with a score of 11 - 12 points denotes very good quality of information.

Table 3 presents the results of the content analysis of the reports of the surveyed companies relating to socially responsible investments during the examined period.

[2] Dirty business is investment in companies related to the arms, alcohol, tobacco industries, etc.

Tab. 3: The number of companies in each category of SRI disclosure quality

Category	Interpretation	2011	2012	2013	2014	2015	2016	2017	2018
I	No information	0	0	0	0	0	0	0	0
II	Poor information quality	1	0	0	0	0	0	0	0
III	Average quality of information	9	7	7	6	4	3	2	2
IV	Good quality of information	9	12	12	13	15	16	17	17
V	Very good information quality	0	0	0	0	0	0	0	0
	Total	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**

Source: Author's own elaboration.

Analysis of the quality of disclosed information on socially responsible investments show that 17 of the surveyed companies (89.5%) disclosed in 2018 information of good quality, while 10.5% of the surveyed companies presented average quality. This is a clear improvement, when compared to 2011, when only 9 companies (47.4%) presented good quality of information, 47.4% average and 5.2% poor quality of information. During the examined period, none of the companies presented very good information quality. The category "No information" is also empty.

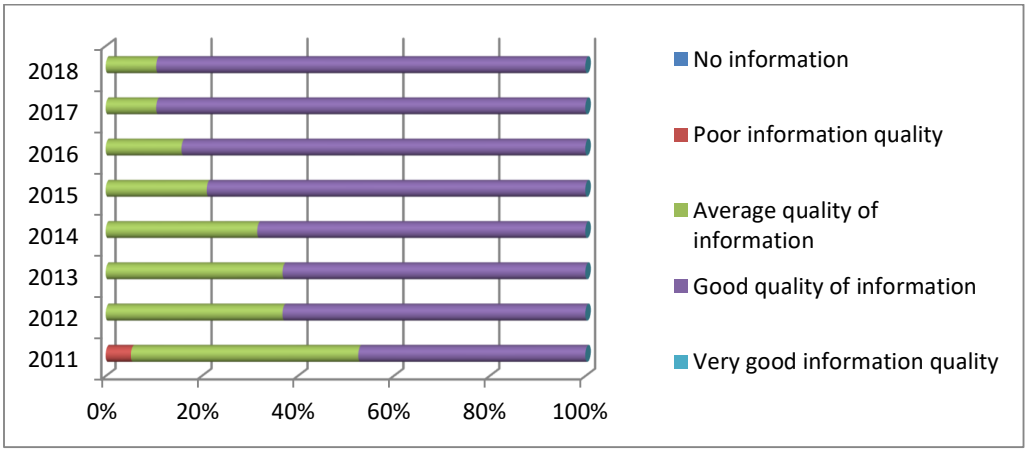

Fig. 3 : SRI disclosure quality over period 2011-2018

During the whole period investigated (i.e. each year) 5 companies (26.3%) reached good quality of information about SRI. However, none of these companies used the term socially responsible investments. There are expressions “corporate social responsibility”, “corporate governance”, “sustainability”, “expenditure on environmental protection”, “projects for the local community”, “improvement of working conditions of employees”.

The lowest disclosure quality measured by QI is evidenced for the Polish companies in 2011. Figure 4 compares the structure of the quality category of disclosed SRI information at the beginning and end of the examined period. Only 9 companies presented good quality information about SRI in 2011, while there were 17 companies in 2018.

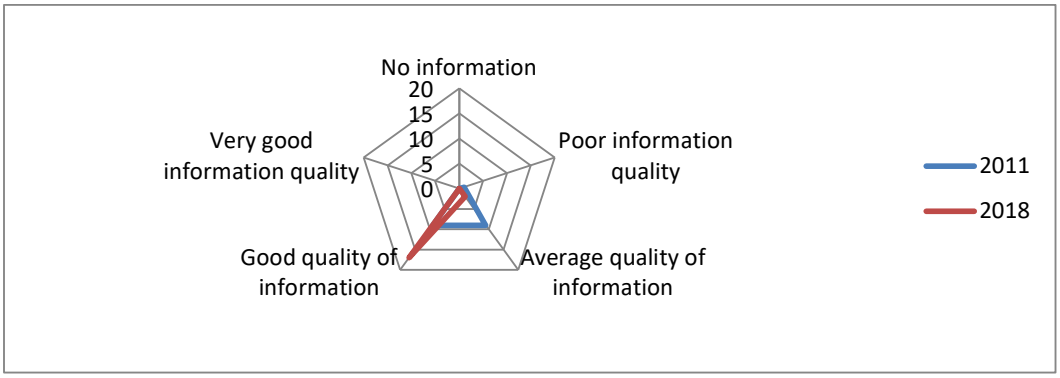

Fig. 4 : Comparison of QI in 2011 and 2018

Table 4 and Figure 5 present the disclosure quality and its evolution during the examined period.

Tab. 4: Descriptive statistics of QI over period 2011-2018

Statistical measures	2011	2012	2013	2014	2015	2016	2017	2018
mean	7.16	7.84	7.89	7.89	8.32	8.74	9.05	9.16
median	7	8	8	8	8	10	10	10
dominant	10	10	10	10	10	10	10	10

Source: Authors' calculation

The average value of QI measured by its mean (blue colour) is 7.16 in 2010 and it rises steadily up to 9.16 in 2018. The improvement can be identified approximately in the middle of the period investigated. If the median (red colour) is taken into account, it produces a comparable compliance level, however with more stable movements. The line reveals a tendency of "average firms" to disclose the required information persistently in the same format, i.e. to use the same template of the notes as in the previous year.

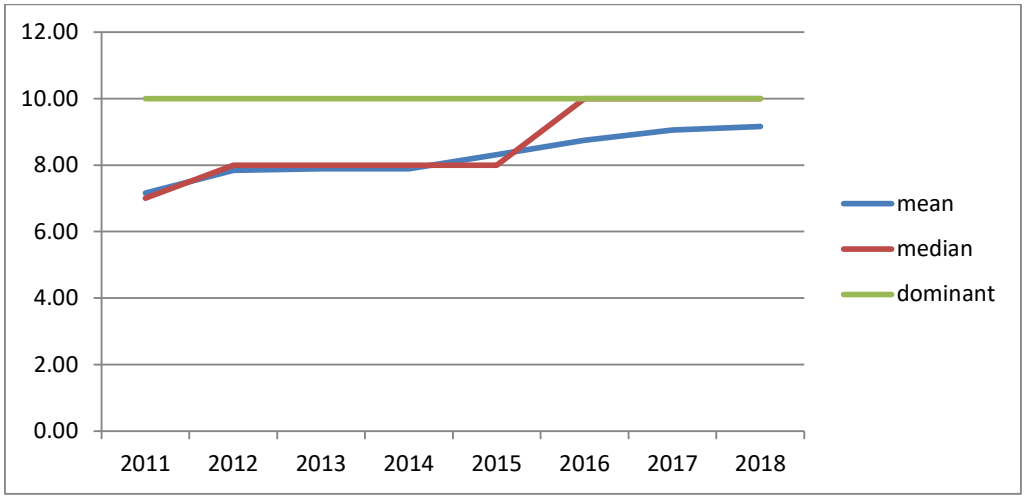

Fig. 5: Quality Index over period 2011-2018 (years' means, medians and dominants)

Among the surveyed companies, there were cases in which the value of the quality index for disclosed information on socially responsible investments:

- did not change during the examined period - in case of 7 companies,
- increased - in case of 11 companies.

In one company, the value of the index both increased and decreased during the period considered. The quality index has not decreased in any company.

The largest progress was noticed in case of the timber industry company, where the 2011 value of the quality index was 4, while in 2018 already 10. In addition, it should be noted that none of the surveyed companies received 0 points, which indicates that all companies disclose information on expenditure in areas such as: environment, society, ethics, employees. However, the level of detail provided information varies. The qualitative analysis of content of the reports of the surveyed companies allows us to conclude that information on socially responsible investments is presented in various forms and in different places and with different detail. This variety of presentations makes it difficult to compare the quality of information.

Conclusion

Investing as a process of engaging financial resources in order to obtain benefits, assuming that these benefits from the investment will be greater than the funds involved. The author understands investments as a current commitment of financial resources to acquire specific assets, both material and immaterial, thanks to which the investor expects to achieve benefits.

The results of the research prove that listed companies in Poland have a significant percentage of investments in their assets, and the results obtained from investing activities largely contribute to the financial success of the company. The average value of total investments is PLN 4.25 million in 2011 and it rises steadily up to PLN 5.65 million in 2018.

The average investment share in total assets is 29.5% in 2011 and it rises steadily up to 32.5% in 2018. The largest share of investments in total assets fluctuates around 90%, taking the lowest result in 2015 (88.5%), and the highest - in 2017 (93.9%). This result belongs to a company from the energy industry. This proves that the company is heavily invested and the business activity has been reduced to investment activity. On the other hand the lowest result can be recorded in a company from the raw materials industry (from 1.8% in 2015 to 2.6% in 2011). We can also note that the number of companies whose investments accounted for more than half of their assets is growing over the period considered. This confirms the thesis about the significant role of investments in business operations of enterprises.

Recently, we can observe an increase in financial investments in accordance with the concept of sustainable development. The investments that take into account both economic, social and environmental factors are referred to as socially responsible investments (SRI).

Literature review and the analysis of data contained in reports prepared by the European Sustainable Investment Forum (Eurosif) confirm the growing interest in the concept of socially responsible investing in Poland.

The results of the research prove that listed companies show information of good quality about SRI (89.5% in 2018). The rest of the sample (10.5% of the surveyed companies) presented average quality. We can notice a clear improvement because at the beginning of examined period only 9 companies (47.4%) presented good quality of information. During the examined period, none of the companies presented very good information quality. The category "No information" is also empty. The analysis over the period 2011-2018 shows that the disclosure quality is steadily increasing which corresponds with recent studies on the importance of the SRI.

The conducted research broadens the cognitive achievements of current research on the scope of disclosures of socially responsible investments in companies reports. They also have practical significance for the companies themselves, as well as for users of reports, and especially investors.

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Role of Geographic Information System, Tunnelling Technology and Space Technology in Natural Disaster Management in UAE

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Abstract

Managing environmental disaster requires the use of technology into how technology is used to minimize the casualties and loss incurred when disaster strikes. This research is on the Role of GIS, Tunnelling Technology and Space Technology in Natural Disaster Management in UAE. Natural Disaster management plays a very vital role in UAE as many disasters occurred which have a devastating effect on human life. Therefore, quantitative methodology was employed in this research work and SPSS was used as the tools for data analysis. Questionnaire was used as a means of data collection in this paper. The relevant data were collected from the National Emergency Crisis and Disasters Management Authority (NCEMA). The findings show that Aggregately, disaster management construct have a mean value of 3.824 indicating agreement with all the statements posed to the respondents. The result shows that GIS and Space Technology have the highest mean values indicating respondents' higher rating for them in tackling natural disasters in United Arab Emirates (UAE).

Keywords: Natural Disaster, Technology, Tunnel, GIS and Space Technology.

Introduction

Although the United Nations designated the 1990's as the International Decade for Natural Disaster Reduction (IDNDR), there was a global failure to reduce natural disaster impacts during that time. Eventually contributing to this trend are environmental degradation, rapid urbanization and social marginalization (Parsons et al., 2015), particularly in developing countries. The increasing number of disasters suggests that vulnerability to natural hazards is also rising and so equates to changing the geography of risk. By way of expansion, more people are living in low-lying coastal zones, seismically hazardous areas and concentrated urban environments (Dunaway et al., 2017). Vulnerable populations will be at increased risk, for example, as the geography and magnitude of hydrometeorological hazards that are historically associated with some of the greatest disasters change with global climate (Erdelj et al., 2017).

They are defining the geography of risk of major concern in general and in particular in developing countries, where disasters jeopardize important social development goals such as addressing poverty, ensuring adequate food, water, and sanitation, and protecting the environment, (Oloruntoba et al., 2018). Because natural disasters have the greatest overall impact in developing countries (Oloruntoba et al., 2018). Although natural disasters cannot entirely be prevented, disaster losses (including

human, environmental and infrastructure/personal property) can be minimized with effective disaster management process of mitigation, preparation, response and recovery (Haworth et al., 2015).

Simply put, natural disasters are unpredictable acts of nature, characterized by extremes in physical processes (Carley et al., 2016). Examples of natural hazards include earthquakes, tsunamis, hurricanes, typhoons, droughts, wildfires, tropical storms and floods. The fundamental determinants of natural hazards are location, timing, magnitude and frequency. Landslides, for example, have a local impact, whereas major floods can affect a large region. Earthquakes occur with little warning and last only a few seconds to minutes, while drought may build up over months over large regions and last even longer. Thus, a distinction can be made between 'rapid-onset' natural hazards such as floods and earthquakes, or slower 'creeping crises' hazards like drought or disease (Akgün et al., 2015). However, Coppock (1995) points out that those slowly developing hazards have more in common with natural resource management, at least from a mitigation perspective.

McEntire (2001) describes natural disasters as the disruptive and deadly and destructive outcome of triggering agents when they interact with and are exacerbated by, various forms of vulnerability. Simply put, when a hazard intersects the zone of human use there is the risk of disaster. The number of people affected by disasters resulting from natural hazard events of rapid onset is increasing (Erdelj et al., 2016). In particular, hydrometeorological related natural disasters (e.g., floods, landslides/avalanches, forest/ scrub fires, windstorms and waves/surges) have more than doubled since 1996 and caused over 90per cent of deaths from natural disasters during the 1990s.

However, the United Arab Emirates (UAE) and its archipelago that extends over the Arabian Gulf cover 83,600 sq km. The Emirati coastline extends for approximately 700km. The country shares land borders with Qatar to the west, Saudi Arabia to the south and west, and Oman to the east and south. Four-fifths of the UAEs land mass is desert. The littoral zone of the UAE is characterised by active coastal sabkhas, a phonetic translation of the Arabic word for a salt flat. In 1980 the total population was 1 million. It increased to 8.4 million, only 30 years later. By 2050 the UN expects this figure to reach 15.5 million. The overwhelming majority of the population lives in urban areas in coastal zones, which is also prone to several natural and manmade hazards.

The UAE is prone to various natural hazards, including those atmospheric, geological and anthropogenic in origin. There are also meteorological and tectonic hazards to consider. As development continues in the nation, the country and its people become even more vulnerable to the effects of those hazards (Al Ghasyah et al. 2010). As one might expect, rainfall is few and far between.

Increasing frequency and intensity of disasters have resulted in severe disruptions to communities and built environment facilities around the world. There is an evident increase in human and property losses from disaster events over the past few decades. In the period between 2000-2011, 2.7 billion people have been affected by disasters, 1.1 million of which were fatalities and the financial cost of disaster impact was estimated at $1.3 trillion (Wex et al., 2014). Evidence suggests that disaster risks are rising at a rate faster than affected communities can build resilience (Al Khaili and Pathirage, 2014). Fast-growing cities and urban areas of the world increase disaster vulnerability due to economic growth and fast population expansion. Cities, where more than 50% of the global population resides and where much of the economic assets can be found (Haworth et al., 2015), are very much the epicentre for destruction and loss brought about by natural and man-made disasters. Therefore, this research paper intends to identify the most devastating disasters that frequently occurred in UAE.

Methodology

The study employed a quantitative approach to achieve the research objective. The use of quantitative methods provides a concrete manifestation of the findings in an actual setting. In the same light, the use of this type of research allows the researcher to measure the parameters held in the objective of this research paper (Lewis, 2015). Using survey research strategy and a convenience sampling

technique, a total of 400 questionnaires were distributed to the target respondents which were employees of the National Emergency Crisis and Disasters Management Authority (NCEMA). A total of 329 questionnaires were used for the analysis. The sample size was calculated to guarantee a sufficient number of respondents. Thus, the following formula was used to estimate the population sample size (The Survey System, 2007):

$$(n) = \frac{t^2 * p * (1-p)}{m^2}$$

where:

n = Required sample size (minimum size)
t = Confidence level at 95% (standard value of 1.96)
p = Estimated fractional population
m = Margin of error at 5% (standard value of 0.05)

The number of respondents was calculated based on the collected data from the 329 respondents. Similarly, the questionnaire constituted of two sections A and B. Section A sought information about the respondents' socio-demographic data while section B contained questions with respect to the research constructs (Natural Disasters in UAE). The question format in the section B was designed in a Likert-scale format in a scale of 1 to 5. The data analysis was conducted using SPSS software.

Analysis and Result

The result of the analysis conducted on the collected data is presented in this section. The analysis is conducted in accordance with the research aim and objectives. The major aim of the research is to identify the major natural disasters occurred in the UAE. In order to achieve the stated research objective, several analyses were conducted. Prior to the main analysis, the data was coded, screened and cleaned by assessing outliers, normality, multicollinearity, and reliability. The research used descriptive analysis to achieve objective. The analyses were conducted with the aid of Statistical Package for Social Sciences (SPSS) software. The following subsections provide detailed information on the various analyses conducted and the results obtained. Before the analysis, the questionnaire administration outcome is first presented.

Questionnaire Administration

This research utilised survey research design using questionnaire as a means of data collection. As stated in in the methodology, the study adopts a sample size of 350 respondents. However, to ensure adequate response, 400 questionnaires were distributed to the operations staff of National Emergency Crisis and Disasters Management Authority (NCEMA) in UAE. The detail of the questionnaire administration is presented in table 1 below.

Table 1: Questionnaire administration

Questionnaires	Frequency	Percentage
Distributed	400	100%
Returned	366	91.5%
Responded	350	87.5%
Useable/Valid	329	82.2%

The result of questionnaire distribution is presented in table 1 above. The result shows that 400 questionnaires representing 100 percent were distributed out of which 366 representing 91.5 percent were retrieved with 350 representing 87.5 were fully responded to. After data cleaning and screening

for outlier, normality and collinearity, 329 responses were considered useable and valid for subsequent data analysis.

Data Cleaning and Management

The nature of survey data is such that it does not always absolutely meet the requirement of most multivariate analyses. Accordingly, the data after it's collected and coded into software, need to be screened and cleaned prior to detailed analysis. This is in accordance with the recommendation of Pallant (2011) that prior any significant analysis of data, it is of significant importance to screen and clean the data set so as to avoid errors that could distort the quality of the analysis which could jeopardise the result. The most common threats to data quality are the missing values, wrong posting, outliers, non-normal data, and multicollinearity. After, data cleaning, the instrument's reliability using internal consistency is established. These data cleaning and management procedures are discussed in the following subsections.

Missing Values and Wrong Postings

Perfection is not an attribute of survey research design, as such, it's almost impossible to have a perfectly responded data. Issues of missing or non-response are mostly bound to occur such that some questions are left unanswered by the respondents in the questionnaire resulting into missing values during analysis of the data. This could have adverse effect on the result of data analysis. Accordingly, due diligence is required to identify the missing entries and treat them accordingly (Pallant, 2011). The major point of concern is how to minimize occurrence of missing entries in the first instance. This is normally achieved at the initial stage of questionnaire preparation to ensure that the questions are understandable, simple and unambiguous. To achieve this, the drafted questionnaires were moderated by expert and reviewed to ensure understanding by the respondents. Similarly, the missing data were checked at the point of collection and immediately returned to the respondents by the research assistants to fill them. By so doing, the missing data were greatly minimized. Those missing data that appear after the initial processes were made; the cases with severe occurrences were removed from further analysis. In this case, 16 cases were found to contain substantial missing values and were therefore removed from the data set leaving 350 fully responded questionnaires. A critical issue was whether the samples available will remain sufficient for subsequent analysis. With total 350 samples achieved after omitting the severe cases missing values, it is considered sufficient for multivariate analysis (Hair Jr et al., 2016).

Wrong postings, on the other hand, have severe effect on research result. It either inflates the result or deflates it with serious consequences on the normality of the data. Before the detail analysis of the data, wrong postings were checked by means of frequency distribution table. The wrong postings were all treated by referring to the original filled questionnaires and corrected accordingly.

Outliers

Outliers are serious issues in multivariate data analysis. Outlier is like an outcast, an observation with extreme value on one variable or a combination of extreme values on two or more variables that adversely affect statistical analysis (Tabachnick & Fidell, 2007). The major aim of outlier evaluation is to identify the cases with extremely high or low value from the rest of the data and treat them by deleting the extreme cases so as to improve the quality of the data for subsequent statistical analysis.

There are two forms of outliers the univariate and the multivariate outliers. The univariate outliers are outliers on individual variables which this research assessed by means of 'explore' option in SPSS. The outliers were identified by means of Q-Q plot, histogram and detrended Q-Q plot. The multivariate outliers on the other hand were were assessed based on the recommendation of Tabachnick and Fidell (2007) that Mahalanobis value is compared with the Chi-square table such that any Mahalanobis distance value above the computed value is considered as multivariate outlier. Accordingly, a Mahalanobis distance was save from regression equation with all the research constructs as the independent variables and compared by the tabulated Chi-square. Mahalanobis

distance at 0.01 significance level were considered extreme multivariate outliers and were subsequently deleted from the data set for subsequent analysis. Accordingly, 21 cases were extremely affected by both univariate and multivariate outliers and were deselected for further statistical analysis. Subsequently, 329 usable cases that are not affected by extreme outliers and missing data were retain for further analysis. The summary regressions table containing Mahalanobis Distance information is presented in table 2 below.

Table 2: Residuals Statistics including Mahalanobis Distance

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	141.6626	222.9533	175.500	11.47151	350
Std. Predicted Value	-2.950	4.137	.000	1.000	350
Standard Error of Predicted Value	5.587	30.784	12.238	5.106	350
Adjusted Predicted Value	145.5145	232.3196	175.451	11.79464	350
Residual	-185.3074	176.47865	.00000	100.52813	350
Std. Residual	-1.830	1.743	.000	.993	350
Stud. Residual	-1.850	1.783	.000	1.001	350
Deleted Residual	-189.3513	184.64038	.04878	102.22965	350
Stud. Deleted Residual	-1.857	1.788	.000	1.002	350
Mahal. Distance	**.065**	**31.261**	**4.986**	**5.399**	**350**
Cook's Distance	.000	.037	.003	.005	350
Centered Leverage Value	.000	.090	.014	.015	350

As presented in table 2, The Mahalanobis distance for the 350 cases has a minimum value of 0.065 and a maximum value of 31.261 with mean value of 4.986 and standard deviation of 5.399. However these values cannot show the significance of the distance. Accordingly, the value is compared with chi-square tabulated value as presented in figure 1 below.

	OganisationalPerformance	MAH_1	P_MahH
1	3	48.55477	.0000005
2	3	46.55624	.0000011
3	2	46.06388	.0000014
4	3	44.34075	.0000029
5	3	44.04924	.0000032
6	3	40.37903	.0000145
7	3	40.40349	.0000144
8	1	40.06928	.0000165
9	3	40.09900	.0000163
10	3	39.70226	.0000191
11	5	39.06152	.0000248
12	2	38.87705	.0000267
13	1	37.84866	.0000403
14	1	37.72802	.0000423
15	4	37.78252	.0000414
16	5	37.14867	.0000533
17	3	36.17975	.0000784
18	3	36.02644	.0000833
19	4	35.88399	.0000881
20	2	34.80667	.0001347
21	2	34.52856	.0001502
22	3	33.23275	.0002489
23	3	33.14077	.0002579

Figure 1: Saved Mahalanobis Distance Variable

The saved Mahalanobis distance variable and its corresponding tabulated Chi-square p-values are presented in Figure 1 above.

Data Normality

Most multivariate analyses require data to be normally distributed. The term normality is derived from the concept of normal distribution that describes the shape of population as being in that of a bell curve, a shape like symmetrical mountain. A data that does not comply with such a distribution makes statistical distribution analysis much more difficult (Hair *et al*., 2016). Data normality is checked using statistical or graphical techniques. These involve normality probability plots (Normal Q-Q plot), histogram and skewness and kurtosis. While skewness shows the symmetries of the data distribution, kurtosis revealed the peakedness of a variable's distribution as either too peaked (with short, thick tails) or too flat (with long, thin tails).

This research checked the normality of the data distribution using skewness and kurtosis. Based on the recommendation of George & Mallery (2010), skewness and kurtosis values of -2 to +2 are considered a symmetry distribution which are suitable for parametric tests and presume a normal distribution. In this regard, the values of skewness and kurtosis for the entire constructs in this research were presented in table 3 below.

Table 3: Data Normality

	Skewness		**Kurtosis**	
	Statistic	**Std. Error**	**Statistic**	**Std. Error**
ST	-1.043	.130	.516	.260
TT	-.774	.130	-.322	.260
GIS	-.683	.130	-.692	.260
TR	-.765	.130	-.478	.260
DM	-.681	.130	-.568	.260

The result of mormality test of the constructs used in multivariate analysis using skewness and kurtosis is presented in table 3 above. The result shows that all the variables are within the recommended range of -2 and +2.

Collinearity Test

In multivariate analysis, independent variables are required to be distinct and measure different concept from what other variables are measuring in order to have accurate and robus result (Hair et al., 2016). When this assumption is violated, multicollinearity problem distorts the result. Multicollinearity happens when independent variables are highly correlated such that one variable is predicting the same thing as the other. Correlation value is considered very high when the value is above 0.9. Hair *et al*. (2016) suggest that when an exogenous variable can be explained perfectly by other exogenous variables in a regression model then multicollinearity problem is inherent among the variables.

Multicollinearity in independent variables is determined by assessing the tolerance level and Variance Inflation Factor (Hair et al., 2016). Hair et al. (2016) recommended a rule of thumb for assessing collinearity issues. Multicollinearity exist when the tolerance level is less than 0.1 or when the VIF is greater than 10. Hence, a tolerance level above 0.1 and VIF of less than 10 signify absence of multicollinearity. This criterion is used to assess the collinearity of the research constructs as presented in table 4 below.

Table 4: Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
	ST	.417	2.401
	TT	.325	3.079
	GIS	.293	3.410
	TR	.297	3.362

Table 4 above shows the tolerance level and VIF of the research constructs. The tolerance levels range from 0.297 to 0.417 all above the recommended 0.1 minimum. Similarly, the VIFs range from 2.401 to 3.410 all below the recommended minimun of 10. Therefore, the research constructs are all within the recommended thresholds and therefore they pass the collinearity test requirement and are suitable for multivariate analysis.

Reliability Test

Constructs that have multiple items are required to be internally consistent to have reliability. This implies that the items under the construct should be highly related. Reliability is the degree to which research measurement are free from random error and the extent to which a scale used produces consistent results if repeated measurements were made on the variable concern (Pallant, 2011). The most common measure of reliability is the Cronbach's alpha. Cronbach's alpha measures the reliability of the measurement scale. For internal consistency to be achieved, Cronbach's alpha is required to be above 0.7 (Pallant, 2011).

Accordingly, the reliability of the research constructs was evaluated using Cronbach's alpha as presented in table 5 below.

Table 5: Reliability test

	Reliability	
	Items	Cronbach's α
ST	5	.923
TT	4	.927
GIS	4	.951
TR	5	.950
DM	4	.941

The internal consistency of the research constructs' items measured using Cronbach's alpha is presented in table 5 above. The result indicated that all the constructs have cronbach's alpha value above the recommended 0.7 minimum. The construct with the least Cronbach's alpha is Space Technology (ST) construct which has an alpha value of 0.923 far above 0.7. GIS construct on the other hand has the highest Cronbach's alpha with a value of 0.951. The Tunelling Technology (TT), Training (TR), and Disaster Management (DM) have Cronbach's alpha values of 0.927, 0.950, and 0.941 respectively. Hence all the research constructs are internally consistent and reliable.

Respondents' Demographics

The profile of the respondents is presented in table 6 below. It contains information on the gender of the respondents, their age, marital status, and the highest educational qualification attained by the respondents.

Table 6: Respondents' Profile

S/N	Respondents' Details	Response	Frequency	Percent
1	Gender	Male	274	83.3
		Female	55	16.7
		18-29 years old	48	14.6
		30-39 years old	140	42.6
2	Age	40-49 years old	103	31.3
		50 years old and above	38	11.6
		Single	73	22.2
3	Marital Status	Married	244	74.2
		Divorced	12	3.6
		Secondary Certificate	10	3.0
4	Educational Level	Diploma	36	10.9
		Degree	231	70.2
		Masters	35	10.6
		PH.D	17	5.2

Table 6 is used to present the respondents' information regarding their gender, age, marital status and educational level they attained. The result shows that the respondents are predominantly male as indicated by 83.3 percent response while felames account for the remaining 16.7 percent response. Similarly, Majority of the respondents are within the age bracket of 30-39 years as indicated by 42.6 percent response followed by those within the age bracket of 40-49 years as indicated by 31.3 percent response rate. The younger respondents of between 18 and 29 years account for 14.6 percent while the elderly above 50 years account for the remaining 11.6 percent. Majority of the respondents have degree qualification as indicated by 70.2 percent followed by those with Diploma and Masters as indicated by 10.9 percent and 10.6 percent response respectively. 5.2 percent of the respondents have PhD qualification and the remaining 3 percent of the respondents have secondary school certificate.

Response Evaluation Criteria

The first research question and objective of this research are descriptive and therefore required descriptive analyses to determine the level. As such, an evaluation criterion is adapted from other studies in order to evaluate the various constructs of the research. A 5-point likert scale was used throughout the research with different constructs having similar or different scale descriptors. However the difference in descriptors, the construct have uniform mean ranking scale. Accordingly, the ranks were numbered between level one (1) which was lowest level to level five (5), which was highest level. This research adapted the mean score decision interval based on the works of Kasim *et al.* (2013), from which the following interval decisions were deduced. This is shown in table 7 below.

Table 7: Response evaluation criteria

S			Mean Interval
1	Less Likely	Strongly Disagree	1.00-1.80
2	Rarely	Disagree	1.81-2.60
3	Less often	Neutral	2.61-3.40

4	Often	Agree	3.41-4.20
5	Very often	Strongly Agree	4.21-5.00

Table 7 contains the evaluation criteria used to evaluate the responses to the questionnaire questions. The first research objective seeks to identify the major natural disasters that occurred in the UAE. Thus, a response of less likely, rarely, less often, often and very often shows the level or frequency at which natural disasters occur in UAE. Accordingly, the research constructs are evaluated descriptively using tables and mean ranking as presented in subsections below.

Natural Disasters that Occur in the UAE

This section presents the level at which natural disasters occur in the UAE; it shows the frequency or level at which the following natural disasters - flood, earthquake, landslides, storm, and tsunami happen at UAE. The result of the analysis is presented in table 8 below.

Table 8: Major Natural Disasters in UAE

Natural Disasters	Mean	Rank	Remark
Flood	3.71	2nd	Often
Earthquake	2.10	4th	Rarely
Landslides	2.70	3rd	Less often
Storm	4.78	1st	Very often
Tsunami	1.05	5th	Less likely

Table 8 shows the occurrence of major natural disasters in the UAE. The result shows that the most common major natural disaster that occurs in UAE is storm. The result shows that storm very often occur as indicated by mean value of 4.78. The second most common natural disaster that often occurs in UAE is flooding. This is indicated by mean value of 3.71 thereby ranking second among the major natural disasters in UAE. Landslides disasters occur less often in UAE as indicated by mean value of 2.7 and ranked third among the major natural disasters in UAE. Another natural disaster that rarely occurs in UAE is earthquake as indicated by mean value of 2.10 and ranked fourth among the five major natural disasters in UAE. Tsunami is less likely to occur in UAE as indicated by mean value of 1.05 and ranked the least of the natural disasters occurrence in the UAE. This may be because the earthquakes that normally trigger tsunamis rarely occur in the UAE.

Natural Disaster Management in UAE

As shown in the preceding section, there are natural disasters that occur in UAE which require comprehensive natural disaster management in order to eliminate or minimise their impact. These natural disasters management include space technology, tunnelling technology, Geographical Information Systems (GIS) and training which cumulatively impact disaster management. Result of the impacts of these interventions in tackling natural disasters in UAE is presented in the following subsections.

Space Technology

The use of space technology in disaster management in UAE is presented in table 9 below.

Table 9: Space Technology

	Mean
Space technology helps in capturing data of natural disaster	3.84
It provides opportunity to get more information about the occurrence of the disaster	3.74
It gives more accurate data than other technologies when it come from the space	3.85
Available space gadgets help in tackling disaster	3.76
It provides information of the big data about natural disaster	3.84
Space Technology (Aggregate)	**3.8073**

The use of space technology in natural disaster management in UAE is presented in table 9 above. The result shows that the respondents agree that space technology helps in capturing data of natural disaster; It provides opportunity to get more information about the occurrence of the disaster; It gives more accurate data than other technologies when it come from the space; Available space gadgets help in tackling disaster; and It provides information of the big data about natural disaster as indicated by mean values of 3.84, 3.74, 3.85, 3.76, and 3.84 respectively. Aggregately, space technology has high application in tackling natural disasters in UAE as indicated by 3.807 mean value response.

Tunnelling Technology

This section presents information on the use of tunnelling technology in addressing natural disaster in UAE as presented in table 10 below.

Table 10: Tunnelling Technology

	Mean
Tunnels help in tacking flood disaster	3.85
Tunnels provide routes for motorist to evade disaster	3.80
Available tunnels in UAE will help tremendously in disaster management	3.85
Tunnel management is paramount to disaster management	3.92
Tunnelling Technology (Aggregate)	**3.85**

Table 10 is used to show the influence of tunnelling technology in talking natural disaster in UAE. The result shows that respondents agree that tunnelling technology helps in natural disaster management in UAE. This is indicated by agreed response to Tunnels help in tacking flood disaster; Tunnels provide routes for motorist to evade disaster; Available tunnels in UAE will help tremendously in disaster management; and Tunnel management is paramount to disaster management as indicated by mean values of 3.85, 3.80, 3.85 and 3.92 respectively. Aggregately, tunnelling technology has high application in tackling natural disasters in UAE as indicated by 3.856 mean value response.

Geographic Information System (GIS)

This section presents the result of descriptive analysis conducted on the use of GIS as a means of disaster management in UAE. The result of this analysis is presented in table 11 below.

Table 11: Geographic Information System (GIS)

	Mean
Performing tasks efficiently for disaster management	3.55
Provide information about natural disaster	3.75

Overcoming obstacles when disaster strikes	3.76
Solving problems related to geographical disaster	3.86
GIS (Aggregate)	**3.73**

The use of Geographic Information System (GIS) in natural disaster management in UAE is presented in table 11 above. The result shows that the respondents agree that Geographic Information System (GIS) is used in performing tasks efficiently for disaster management; Provide information about natural disaster; Overcoming obstacles when disaster strikes; and Solving problems related to geographical disaster as indicated by mean values of 3.55, 3.75, 3.76, and 3.86 respectively. Aggregately, Geographic Information System (GIS) has high application in tackling natural disasters in UAE as indicated by 3.731 mean value response.

Disaster Management

This section provides information on overall disaster management in UAE through the use of space technology, tunnelling technology, Geographic Information System (GIS) and training. The result of the descriptive analysis is presented in table 12 below.

Table 12: Disaster Management

	Mean
Space technology help in disaster management	3.88
Tunnelling technology help in disaster management	3.75
GIS help in disaster management	3.88
Training help in disaster management	3.79
Disaster Management (Aggregate)	**3.82**

The operations staff of National Emergency Crisis and Disasters Management Authority (NCEMA) in UAE agreed that Space technology help in disaster management; Tunnelling technology help in disaster management; GIS help in disaster management; and also Training help in disaster management as indicated by mean values of 3.88, 3.75, 3.88, and 3.79. Aggregately, disaster management construct have a mean value of 3.824 indicating agreement with all the statements posed to the respondents. The result shows that GIS and Space Technology have the highest mean values indicating respondents' higher rating for them in tackling natural disasters in United Arab Emirates (UAE).

Conclusion

This research examined the Role of Geographic Information System (GIS), Tunnelling Technology and Space Technology in Natural Disaster Management in UAE. Managing environmental disaster requires the use of technology into how technology is used to minimize the casualties and loss incurred when disaster strikes. Thus, natural disaster management plays a very vital role in UAE as many disasters occurred which have a devastating effect on human life. Therefore, to achieved the research objective a quantitative methodology was employed in this research work and Statistical Package for Social Sciences (SPSS) was used as the tools for data analysis. Questionnaire was used as a means of data collection in this paper. The relevant data were collected from the National Emergency Crisis and Disasters Management Authority (NCEMA). The results show that Aggregately, disaster management construct have a mean value of 3.824 indicating agreement with all the statements posed to the respondents. The result shows that GIS and Space Technology have the highest mean values indicating respondents' higher rating for them in tackling natural disasters in United Arab Emirates (UAE).

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The Impact of Internationalization on Commercial Firms' Liquidity

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Abstract

The paper shows that exporters often suffer from liquidity shortages and suggests that to promote exports, the governments should take steps to provide exporters access to additional operational financing and information, which would reduce exporting risks. The paper also shows that corporate liquidity is impacted by the unstable economic situation in the country and excessive public debt, which forces companies to create additional liquidity buffers. In particular, the paper analyses the relationship between the internationalization of a company and its liquidity (and all significant determinants of corporate liquidity). The hypotheses which are positively verified in this paper are that there exists a positive relationship between the fact of internationalization and a quick liquidity ratio (H0) and that there exists a linear relationship between the level of internationalization and a quick liquidity ratio (H1). The paper shows that for four analyzed countries (Bosnia and Herzegovina, Greece, France, and the United Kingdom) there existed a positive relationship between the fact of exporting and the level of liquidity and also that there existed a relationship between the share of export sales in total sales and the liquidity. In other words, the paper results show that the more exports a company has, the higher is the liquidity it maintains in its assets.

Keywords: Corporate Finance, Internationalization, Corporate Liquidity

Introduction

The internationalization of a company can be perceived as the process of increasing foreign sales and learning how to make these sales profitable. The theory of international trade offers many explanations for why international trade is beneficial for both; the exporters and importers, but in terms of a microeconomic approach it can be brought down to the simple fact that sooner or later the domestic market becomes saturated with the company's products and then to increase the market share the business has to go abroad. Entering foreign markets also provides other benefits: the company learns how to become more competitive (Neubelt 1990, p. 48), it learns how to operate in a different legal, economic and cultural environment; finally, it also learns how to benefit from the cultural diversity of its employees and clients. Exporting usually also makes the sales revenues more stable (Neubelt 1990, Bennet 2007) over time (through diversification), allows for better utilization of the company's resources (Bennett 1990) through the economies of scope, improves competitiveness (Neubelt 1990), improves the employees' morale (Janssen 1992) and generally, makes the company grow faster regarding sales and assets growth (Richardson, Rindal 1996). The paper concentrates on presumably one of the negative side-effects of exporting, which is the necessity to maintain higher liquidity to secure the company against increased operating risk and additional expenses. Higher liquidity demand in exporting is so significant and important that only the companies that are not liquidity constrained can begin exporting and later increase their foreign sales. Internationalization of companies that try exporting and are incapable of accessing additional funding (overcoming liquidity constraints) is often unsuccessful. The paper attempts to prove this theory. In particular, the research hypotheses of the paper are that exporters maintain higher liquidity measured with a quick ratio and that there is a linear dependency between the percentage of export sales and the quick ratio (all liquidity ratios are highly correlated, so we chose only one ratio which is considered the most fragile measure of static liquidity).

Literature Review

From the financial liquidity point of view, there seem to be many reasons why the exporting companies report a higher demand for liquidity. First of all, an entrance to a foreign market requires costly

preparation (there are different entrance modes, but generally, all require a part or all of the following costs): advertising, finding cooperatives, hiring local consultants and lawyers, checking the credibility of the clients, paying for market research, learning local law and customs (Bugamelli, Infante 2003), fulfilling all local requirements and obtain all necessary certificates and licenses, overcoming non-tariff barriers (Gamba and Triantis 2011). Evidence that this affects liquidity can be found in Manova (2008) or Wilkinson and Nguyen (2003).

Secondly, when the company enters the foreign market it has to make significant initial outlays (Świerżewski 2006) to adjust its production to international requirements, to increase its production to meet the demand, to make adjustments to conform to foreign expectations (usually export production has higher quality), hire people with experience with exporting and foreign negotiations, overcome many problems that arise when the first transaction is completed. Evidence that these problems increase liquidity requirements of exporting firms can be found in Aw, Chung, and Roberts (2000), Clerides, Lack and Tybout (1998), Bernard and Wagner (2001), or Mundakkad and Sasiharan (2016).

When the company already entered the market, it is often necessary to offer foreign customers attractive credit terms; it has to deal with international disputes with non-paying customers and delayed payments (usually under foreign jurisdiction). Discussion of how this affects exporters can be found in Gamba and Triantis (2012) or Kaczmarek (2001).

Fourthly, the exporter operates on a higher operating risk than non-exporters: deliveries may remain in a harbor longer than it was expected, there might be adverse movements in foreign exchange rates, there might be unexpected problems with complying to foreign legal requirements (for example, unexpected necessity to put stickers on products which provide necessary information about the product in a foreign language (Forlani 2010)) and many other types of risk (2001) (evidence of so-called liquidity buffers in exporting companies which secure the company against unexpected payments resulting from enumerated risk factors can be found in works of Almeida, Campbell, and Weisbach (2004), Han and Qiu (2007), Bolton, Chen and Wang (2011), Gamba and Triantis (2011)).

Finally, usually, only the companies in the best financial situation begin exporting (it is the so-called self-selection theory (Manole and Spatareanu, 2009, Rehman 2017)). Evidence can be found in Bellone et al., (2010), Bernard, Jensen, and Schott (2003), Clerides, Lach, and Tybout (1998), Delgado, Farinão and Ruano (2002), Eaton, Kortum, and Kramarz (2004) or Baldwin and Gu (2012).

Theoretically, increased demand for liquid resources can be satisfied with various financial services such: factoring, forfeiting, export insurance, letter of credit, IOUs, and various financial instruments, but the availability of these instruments for certain firms may be limited. A bank or financial institution to avoid financial losses check the financial situation of an exporter before they offer their services: they take into account the risk of the exporter's target country, the profitability of the exporter, the size of the exporting company and quality of its cash-flow statement, cyclicality of negative results, size of a company, availability of assets which may secure the transaction. The general rule is that the higher is the transaction or export risk, the smaller are the chances for the support from financial institutions (Sisson 1997, pp. 663-691). In other words, the more the exporter requires support, the lesser are the chances of receiving it, and as a result, they remain in the local, national market (Hoshi, Kashyap and Loveman 1992, Chaney 2016). Good export projects should always find providers of the capital, but low information efficiency of financial markets can cause that it will not happen (Shaver 2006, Muuls 2008, Faceuglia 2012, Bermann and Hericourt 2010, Manova 2006, Manole and Spartaneau 2009, Minetti and Zhu, 2011, Rajan and Zingales 1998). Empirical evidence of this phenomenon can be found in works by Manova (2008), Rajan and Zingales (1998), Manole and Spatareanu (2009), Minetti, and Zhu (2011), Rajan and Zingales (1998)).

Research Problem

The research problem analyzed in the paper is whether there exists a statistically significant dependency between the export sales and the financial liquidity of a company. The dependency may take two different forms. The first form is a statistically significant difference between the liquidity of exporters

and non-exporters, which may suggest that additional liquidity is necessary to enter the foreign markets and gather adequate knowledge about these new markets. The second form is the linear dependency between the level of internationalization (measured with the percentage of export sales in total sales) and the financial liquidity, which suggests a constant dependence between the scale of foreign operations, which increases operating risk and the necessary liquidity reserves of a firm. These observations led to the formulation of 2 research hypotheses. The H0 hypothesis states that there exists a positive and statistically significant relationship between the fact of being an exporter and a quick liquidity ratio. The H1 hypothesis states that there exists a linear and statistically significant relationship between the level of internationalization and a quick liquidity ratio (H1). We chose the quick ratio because it efficiently measures the financial liquidity of businesses.

Research Method

To verify the research hypotheses, we used data downloaded from the Amadeus database. Financial data had to include information about export sales, and this reduced the number of countries to Bosnia and Herzegovina, France, Greece, and the United Kingdom. We wanted to prove that exporting increases liquidity and that there exists a linear dependency between the liquidity and the percentage of export sales in total sales revenues. In the model, we included other liquidity determinants that were proven by other research, which included: debt ratios and assets growth ratios taken from the paper by Bruinshofd and Kool (2012). From the article by Lins, Servaes, and Tufano (2010), we chose: operating risk measures (standard deviation of cash-flows), profitability ratios, property type of a company (whether it is a private or state-owned). From Levine, Loayza, and Beck (1999), we took macroeconomic ratios: national debt ratios, the relation of private loans to GDP, GDP growth rate, and interest rate in the economy. From Kim, Mauer, and Sherman (1998), we took the standard deviation of operating cash flows divided by total assets, cash conversion cycle, the variance of the cash conversion cycle. From Opler et al. (1999), we took: the percentage growth of assets, operating and financial leverages, insolvency risk of a company. From Faulkender and Wang (2006), we chose: interest divided by debt. From Manova (2008), we took the Herfindahl index and multifactorial productivity calculated as described by Kukuła et al. (1996, p. 170).

The initial sample included 672 thousand companies, but due to the gaps in data, the useful sample which could be used in model estimation was much smaller: this is why for every model estimated, we provided the number of companies that were used for estimation. Table 1 shows the definitions of financial ratios, which we considered as potential determinants of the quick liquidity ratio.

Table 1: Potential determinants of a company's financial liquidity

symbol	formula	direction	group
liq	(current assets - inventories)/current liabilities	x	liquidity
eksport_operrevenue	export sales revenues/total sales revenues	+	export
exporter	variable exporter = 1 if a company's export sales >10% of total sales revenues	+	
size	natural logarithm of employment size	-	Size
operrevenue	logarithm from the operating revenue	-	
growth	operating cash flow/total assets	+	
dev_ebitda	the standard deviation of EBITDA / total assets	+	Uncertainty
fix_as_change	the annual growth rate of fixed assets	-	Investments
tempos	the annual growth rate of sales revenues	-	

symbol	formula	direction	group
difference_returns	EBITDA/ fixed assets - the risk-free rate of return	-	
cash_conv_cycle	collection period + stocks cycle - credit period	+	Transactional liquidity demand
credit_period	short-term liabilities * 360/sales	-	
collection_period	short-term receibables * 360 /sales	+	
stocks_cycle	inventories * 360/sales	+	
debt_as	debt/total assets	-	
dol	Annual % change of EBIT/annual % of sales	-	
dfl	Annual % change of EBT/annual % change of EBT	-	
int	Interest/debt	-	
de	debt/equity	-	
dtl	sales/net financial profit	-	
ebitda_s	EBITDA / total sales	+	
ebitda_is	(EBITDA - fixed assets increases) / sales revenues	+	
cf_s	average cash flows for 3 years/assets	+	
non_operating	(dividend+fixed assets change+loans/20 + interest) / net operating cash flows	+	
liab_st_lt	short-term liabilities/long-term liabilities	+	
EMScore	EMScore=6.56*working_capital/totassets+3.26*change_sharehfunds/totalassets+6.72*ebit/totalassets+1.05*sharehfunds/(totalassets-sharehfunds)+3.25	+	
Zscore	Zscore=0.717*(currassets-currliab)/totalassets+0.847*(sharehfunds[t]-sharehfunds[t-1])/totalassets+3.107*ebit/totalassets+0.42*sharehfunds/(totalassets-sharehfunds) + 0.998*sales/total assets	+	
CBBF	CBBF=-1.255*interest/EBITDA+2.003*sharehfunds/totalassets-0.824*(plbeforetax+depreciation)/totalassets+5.221*plbeforetax/operatingrevenue-0.689*creditperiod-1.164*((operatingrevenue[t]-employeescosts[t]-materialcosts[t])/(operatingrevenue[t-1]-employeescosts[t-1]-materialcosts[t-1])-1)+0.706*collectionperiod+1.408*(fixedassets[t]-fixedassets[t-1])/(operatingrevenue[t]-employeescostst[t]-materialcosts[t])-85.544	+	
Taffler	Taffler=0.53*p/l beforetax/currliab+0.13*currassets/(totalassets-sharehfunds)+0.18*currliab/totalassets+0.16*ebit/totalassets	+	
kredyty_pkb	private loans / gdp * 100	-	Macroeconomic
pubdebt_gdp	gross national debt / gdp	-	
countryprodsold	the growth rate of industrial production sold	+	
gdprealgrowthrate	GDP real growth rate	+	
int_rates	country risk-free rate	-	

symbol	formula	direction	group
corp	corp = 1 if fixed assets increased by more than 100% or current ratio grew by more than 100%	+	Corporate changes
rosf	net financial profit / core (share) capital	+	Profitability
roe	net pl (profit of loss) / equity	+	
ebit_operrevenue	ebit/operating revenue	+	
roce	(EBT+interest)/(equity+debt)	+	
prod_e	sales revenues / number of employees	x	Productivity
prod_a	sales revenues / fixed assets	x	
TFP	TFP=A(t)/A(t-1) where A(t) - empirical turnover/theoretical turnover estimated with a panel model based on Cobb-Douglas function	x	
private	0 if a company is privately owned, 1 if a company is state-owned	X	ownership
HHI	Herfindahl index – the share of sales in total industry sales	+	industry
industry	dummy variables to distinguish different industries	x	
year	from 2005 to 2015	x	time

The selection of the model and estimation method used to verify the relationship was based on the following observations:

- the exogenous variable strongly depends on its historical (delayed in time) values; undeniably the model must include the process of partial adjustment of the endogenous variable over time,
- it is possible that features of objects that remain unchanged in time, for instance: location (region) or demographics are correlated with explanatory variables, and they are going to be included in fixed effects,
- existing methods of building static models with fixed effects which correct for the correlation between the delayed dependent variable and the error expression have their estimators only asymptotically fulfilling desired properties (that is, when the number of observations in time goes to infinity),
- individual effects represent omitted variables, which means that it is very likely that these properties of objects (enterprises) are correlated with other exogenous variables (Judson and Owen, 1996),
- the selected sample of enterprises is difficult to be called representative – it consists of all available records in the Amadeus database for which information about the export share in total sales revenues was found (Judson and Owen, 1996),
- the expected relationship is linear,
- there may be some autocorrelation and heteroscedasticity inside objects, but not between them - idiosyncratic errors are not correlated between objects,
- the variables used in the model have been adjusted for stationarity - they were built to be stationary (their construction makes them stationary).

The choice of the Blundell-Bond model and not the Arellano-Bond model resulted from the following premises:

- the Blundell-Bond model better deals with the variables which are not perfectly stationary (Bond, 2002),
- Arellano-Bond estimators are not correct for strongly autocorrelated variables (Blundell and Bond 1998),
- better properties for a small sample,
- in the case of weak instrumental variables, the Arellano-Bond model even for large samples may lead to biased estimators (the so-called large finite sample bias), when the variables do not change strongly in time (delayed variables are weak instrumental variables for increments, especially when there are few observations).

It should be noted, however, that in certain conditions, the Blundell-Bond model produces biased estimators if there are significant differences in the variances of individual effects or when there are substantial differences in the idiosyncratic error and autocorrelation (Hayakawa 2005).

The model was estimated by adding successive variables according to their correlation with the explained variable. The explanatory variables were removed from the model if the correlation level between them was higher than 0.3 - that is why sometimes more than one econometric model was created. If the sign of the variable in the model was incompatible with the expected direction, it was also eliminated from the model.

It is also worth mentioning that the data was subjected to pre-selection, which consisted of removing the highest and the lowest percentage of observations for variables (more than 2 standard deviations from the mean) - the aim was to remove outliers that could strongly affect the model coefficients (for example, a receivable cycle of 30 000 days). Due to the number of variables used and the limited volume of this study, we did not provide detailed descriptive statistics for individual variables.

The method of two-stage estimation with resistant residues was used. Hence we did not run the Pearson test but only Arellano-Bond.

The overall form of the model was as it is shown in Equation 1:

$$LIQ_{\mathrm{it}} = \sum_{k=1}^{K} \gamma_i LIQ_{\mathrm{it-k}} + \beta^T \mathrm{x}_{\mathrm{it}} + \alpha_{\mathrm{i}} + \varepsilon_{\mathrm{it}}$$
(1)

where $x_{it}$are explanatory variables, α_{i} – group effects, $\varepsilon_{\mathrm{it}} \sim IID(0, \sigma_{\varepsilon}^2)$ – residual errors, i- object number, t – time, k – time-delays, LIQ – quick liquidity ratio, endogenous variable.

Among exogenous variables (which were discussed above), there was either the discrete variable that identified which company (object) was an exporter or the variable which represented the export sales share in total sales revenues. The purpose of the model was to identify the significant determinants of the quick liquidity ratio and to check whether the additional variable identifying exporters or the export share in total sales were statistically significant in such a model.

Results

The results of the model estimation for four countries are presented in Table 2 and Table 3. Table 2 shows parameters of the model in which we wanted to find the relationship between the quick liquidity ratio and the discrete variable which determines whether a company has more than 10% of its sales as export sales (variable exporter) (less than 10% of export sales could result from random, unplanned transactions with foreign companies operating in the domestic market).

As can be seen from Table 2, models do not use identical determinants, which can be explained with different internal systems and economies. However, the financial statements which we used were adapted to the global standard (by the administrators of the Amadeus database), which made them comparable between various countries. Another reason why models for different countries employ different variables is the estimation method. To estimate the models, we tested variables from different groups (names of the groups are presented in Table 1 in the last column) and only one variable from every group, with highest statistical significance, was employed in the model (to avoid collinearity, variables within groups were highly correlated with each other). We only kept variables from a given group in the model if they were statistically significant and added explanatory power to the model. This approach is similar to a forward selection technique only under the condition that from every group, one can take only one representative.

Estimated models confirm a statistically significant relationship between exports and liquidity, and a significant impact of such factors as: historical liquidity ratios of a given enterprise, bankruptcy risk

(measured with different bankruptcy prediction models), financial leverage of a company (relation between debt and assets), total factor productivity, the company's growth rate (measured with a change of fixed assets), corporate transformations (mergers and take-overs and other organizational changes), profitability and macroeconomic situation.

The results presented in Table 2, therefore, seem to confirm that exporters have liquidity ratios significantly higher than those of non-exporters, after removing the impact on the liquidity of bankruptcy risk and other variables used in the model estimation. Therefore, we found no evidence to reject the H0 hypothesis.

If one looks at the factors other than the fact of being an exporter, which turned out to be statistically significant in the model, the first significant group of variables were the bankruptcy prediction models scores (the idea came from Opler et al. (1999)). They turned out to be statistically significant (any of these models) only for two countries: France and the United Kingdom. In the case of Greece and Bosnia and Herzegovina, we did not manage to find an international bankruptcy prediction model, which would be statistically significant. This could be due to the economic crisis in Greece and the unstable economic situation (as in the emerging market) in Bosnia and Herzegovina.

The next statistically significant group was the indebtedness ratios. The most significant ratio for Bosnia and Herzegovina was debt divided by total assets; for France, it was the degree of financial leverage, for Greece and the U.K. the most significant variable was long term debt divided by total assets. Generally, we expected the dependency between indebtedness and liquidity to be statistically significant based on Bruinshofd and Kool (2012) and Opler et al. (1999). If one tries to understand why different ratios were the most significant determinants in analyzed countries then one of the possible explanations is that in the case of Bosnia and Herzegovina the interest rates were relatively high for both: long term and short term debt and this made the total value of debt (through interest payments) to impact the liquidity of companies. The significance of financial leverage in France could result from the impact of financial leverage on the financial risk of companies, which hold liquidity buffers to cope with the potential negative consequences of that risk. For the UK and Greece, the relevance of only long-term debt could result from its higher cost compared to short-term debt.

The third group significant to liquidity ratios was the total factor productivity (based on Manova (2008)), but it was statistically significant only for two countries: Bosnia and Herzegovina and France. The lack of significance of these ratios for Greece and the UK could be due to the limited number of methods that we used to estimate this factor. Another possible explanation for Greece could be a difficult situation of companies in the economic crisis. For the UK as the most developed country of the analyzed group, the reason could be that this sector is highly automatized, and this impacted the relationship between liquidity and productivity. Generally, the more productive is a company, the less liquid resources it should requite to maintain because it spends every dollar more effectively.

The fourth group of significant determinants was the growth rate of companies (based on Bruinshofd and Kool (2012)). The most significant variable from this group was the growth of fixed assets, which was significant for companies in France and the UK. The faster is the growth of a company, the more liquidity is needed to pay for increased operating costs. The growth rate was not significant for Bosnia and Herzegovina nor Greece, which could be explained with disturbances in their economies and unstable economic dependencies.

The fifth group which appeared as significant in the models were corporate restructurings (based on Bruinshofd and Kool (2012)). This factor was only significant for companies from Bosnia and Herzegovina. We believe that the lack of significance for other countries was due to the imperfect method of detecting such transactions (we estimated this variable indirectly through rapid changes of total assets or liquidity ratios).

The sixth group of significant determinants was profitability ratios (based on Lins, Servaes, and Tufano (2010)), but they were only significant for Bosnia and Herzegovina, and it was the operating

profitability which turned out to be important. We believe that this could be caused by profit smoothing and tax evasion of companies which disturbs the picture of their true profitability.

The final group of determinants was the macroeconomic variables (based on Levine, Loayza, and Beck (1999)), which were often uncorrelated with each other, which was the reason why there appeared more than one variable from this group. It was difficult, though, to divide them into two separate groups because they all belong to the same set of a general, macroeconomic character. For companies from Bosnia and Herzegovina, we found no statistical significance of macroeconomic variables – probably due to the emerging type of the market in this country. For companies in France, we found the significance of the annual growth of production sold in a country and sales, whereas for companies in Greece, it was a GDP growth rate. For companies in the UK, we found the significance of interest rates and national debt. Both the GDP growth and production sold growth measure the rate of national growth, which probably allows companies to make profits, which eventually are converted into cash and liquid resources. As for the UK, we believe that his highly developed economy with its large GDP has a low rate of growth (due to the amounts needed to significantly increase its GDP in percentage terms), but the interest rates play an essential role in the control of the economy including the companies sector. The national debt can limit governmental support for companies, which in turn must take more care of their liquidity. The last significant variable was time, which could be interpreted as a general improvement of cash after the subprime crisis.

Table 2: Parameters of models describing the relationship between exporting quick liquidity ratio, unit data for Bosnia and Herzegovina (BA), France (FR), Greece (GR) and United Kingdom (UK), data for the years 2005-2015, unconsolidated reports

country	**BA**	**FR**	**GR**	**UK**
no of observations	9 800	104 479	13 229	15 254
no of groups	2 930	31 641	3 037	3 999
no of instruments	34	29	34	35
Wald chi2(4)	734,35	1 528,20	1286.23	2 697,33
Prob>chi2	0,00	0,00	0,00	0,00
abond 2 z	0,32	0,39	-0.82	0,23
abond 2 p	0,75	0,70	0,41	0,82
L1.LIQ	**L1.liq**	**L1.liq**	**L1.liq**	**L1.liq**
Estim	0,16	0,41	0,33	0,06
Z	4,17	16,07	7.38	3,22
P	0,00	0,00	0,00	0,00
L2.LIQ		**L2.liq**	**L2.liq**	
estim		0,11	0,05	
z		5,72	4,05	
p		0,00	0,00	
EXPORT	**exporter**	**exporter**	**exporter**	**exporter**
estim	0,61	0,61	0.25	0,22
z	2,34	1,86	1.85	2,10
p	0,02	0,06	0,06	0,04
bankruptcy prediction		**CBBF**		**Taffler**
estim		0,01		2,50
z		3,35		40,27
p		0,00		0,00
DEBT	**debt_as**	**dfl**	**long_debt_as**	**long_debt_as**
estim	-3,55	0,00	-0,58	-4,75
z	-4,38	-8,72	-15,34	-11,29
p	0,00	0,00	0,00	0,00

country	**BA**	**FR**	**GR**	**UK**
TFP	**TFP**	**TFP**		
estim	-0,11	-0,32		
z	-1,80	-2,52		
p	0,07	0,01		
FIX_AS_CHANGE		**fix_as_change**		**fix_as_change**
estim		-2,50		-1,38
z		-8,30		-2,69
p		0,00		0,01
CORP	**corp**			
estim	8,21			
z	25,70			
p	0,00			
profitability	**ebit_operrevenue**			
estim	**0,07**			
z	1,42			
p	0,16			
MACRO1		**countryprodsold**	**gdprealgrowthrate**	**pubdebt_gdp**
estim		0,01	0,001	0,01
z		5,25	4,51	2,13
p		0,00	0	0,03
MACRO2		**tempos**		**int_rates**
estim		-0,22		-0,27
z		-1,92		-4,13
p		0,05		0,00
YEAR	**year**	**year**	**year**	
estim	0,07	0,20	0,27	
z	1,60	20,07	11,07	
p	0,11	0,00	0,00	
CONS	**cons**	**cons**	**cons**	**Cons**
estim	-140,37	-397,73	0.28	12,48
z	-1,55	-19,98	-7.76	28,80
p	0,12	0,00	0,00	0,00

Table 3 shows the results of the model estimation, where we wanted to prove the relationship between the quick liquidity ratio and export share in total sales. As can be seen in Table 3, the obtained results confirmed a relationship between the share of export in sales and the liquidity level of the business. The higher the share of exports in the company's turnover, the higher the level of liquidity ratio the entity maintained. Other factors that proved to be important included: bankruptcy risk (measured with various bankruptcy prediction models), level of debt, total factor productivity, growth rate (measured with a growth rate of fixed assets), corporate restructurings (mergers, take-overs, other organizational changes), profitability and macroeconomic situation in a country.

The results presented in Table 3 show that the impact of exports on liquidity ratios does not end when the business commences exporting - it is continued throughout foreign sales, which confirms the impact of not only the sunk export costs but also the operating costs described in this paper. Based on present evidence, we fail to reject the hypothesis H1.

Models presented in Table 3 show that except for Bosnia and Herzegovina, an important group of liquidity determinants was the level of bankruptcy risk measured with various bankruptcy prediction models. Due to a smaller research sample (our models only worked on the full panel, so depending on the variables selected for the model, we had a different size of a research sample), the models turned out to be significant also in Greece.
The relation of total debt to total assets was statistically significant for Bosnia and Herzegovina and the UK, and no indebtedness ratio was an important determinant of liquidity in France and Greece. This suggests that this dependency was not very strong for a sample of French companies (different selection of variables in the model made indebtedness insignificant for France for this model). As with the previous models, total factor productivity was a significant determinant of liquidity only in Bosnia and Herzegovina and France. The same situation takes place with assets growth ratios, which similarly to the previous models, were only significant in France and the UK.

Corporate restructurings were significant in Bosnia and Herzegovina and France, but as we said previously, this could be due to an imperfect way of detecting these activities.

The next significant determinant was profitability, but only in Bosnia and Herzegovina. As we explained earlier, this could be due to profit manipulation or conflicting relationships between liquidity and profitability. On the one hand, strong companies have high and profitability and liquidity, and weak units have both of these indicators low. On the other hand, increasing liquidity must negatively affect profitability and vice versa, because either cash is retained in the company or reinvested (which improves profitability).

The last important variables was the public debt, which in Greece and the UK seemed to make companies rely more on their resources than on any government support and time, which could be interpreted as the improvement of corporate liquidity after the global crisis.

Table 3: Parameters of models describing the relationship between export share in sales revenues and quick liquidity ratio, unit data for Bosnia and Herzegovina (BA), France (FR), Greece (GR) and United Kingdom (UK), data for the years 2005-2015, unconsolidated reports

country	**BA**	**FR**	**GR**	**UK**
no of observations	9 800	106 483	4 755	16 304
no of groups	2 930	31 642	1 094	4 337
no of instruments	34	26	31	35
Wald chi2(4)	733,44	5 827,39	261,56	3 059,27
Prob>chi2	0,00	0,00	0,00	0,00
abond 2 z	0,35	0,61	-0,73	0,52
abond 2 p	0,72	0,54	0,46	0,68
L1.LIQ	**L1.liq**	**L1.liq**	**L1.liq**	**L1.liq**
estym	0,16	0,33	0,03	0,05
z	4,15	13,93	1,68	2,78
p	0,00	0,00	0,09	0,01
L2.LIQ		**L2.liq**		
estym		0,09		
z		5,13		
p		0,00		
EKSPORT	**eksport_operrevenue**	**eksport_operrevenue**	**eksport_operrevenue**	**eksport_operrevenue**
estym	1,14	0,60	156,10	0,21
z	1,88	2,02	14,26	2,33
p	0,06	0,04	0,00	0,02

country	BA	FR	GR	UK
bankruptcy prediction		**CBBF**	**Zscore**	**Taffler**
estym		0,00	1,94	2,50
z		2,71	5,87	43,42
p		0,01	0,00	0,00
DEBT	**debt_as**			**debt_as**
estym	-3,58			-5,58
z	-4,40			-18,75
p	0,00			0,00
TFP	**TFP**	**TFP**		
estym	-0,11	-0,24		
z	-1,85	-2,64		
p	0,07	0,01		
GROWTH		**fix_as_change**		**fix_as_change**
estym		-1,89		-1,37
z		-7,06		-3,22
p		0,00		0,00
CORP	**corp**	**corp**		
estym	8,21	4,34		
z	25,76	66,76		
p	0,00	0,00		
profitability	**ebit_operrevenue**			
estym	0,07			
z	1,42			
p	0,16			
MACRO1			**pubdebt_gdp**	**pubdebt_gdp**
estym			0,10	0,01
z			6,45	1,81
p			0,00	0,07
YEAR	**year**	**year**		
estym	0,08	0,13		
z	1,83	13,71		
p	0,07	0,00		
CONS	**cons**	**cons**	**cons**	**cons**
estym	-160,00	-262,04	13,33	12,42
z	-1,78	-13,63	7,63	31,67
p	0,08	0,00	0,00	0,00

Conclusions and Recommendations

As the model estimation results suggest, selling products abroad by a company requires a measurable financial effort from the company. Export sales force a company to perform adjustments to its production process, pay the entrance costs, deal with the higher level of risk, and continuously learn the foreign markets' business rules. Significantly higher liquidity ratios in exporting companies can have many explanations, but as we tried to prove in this paper, it cannot be brought down only to sunk costs and self-selection of exporting companies. Higher operating risk and costly learning process continue with the increased participation of foreign sales in total sales of a company. As a result, exporters require support from the government to be able to acquire additional liquidity from the market to be able to pay for additional expenses.

Estimated models showed certain differences between analyzed countries. The youngest and least stable economically country was Bosnia and Herzegovina, and in the case of this country, the liquidity of companies was negatively impacted by their overall debt, which included a short-term debt. In no other country, short-term debt was so much visible to affect their liquidity. This suggests an underdeveloped financial market and problems with obtaining financing. We also did not find any bankruptcy prediction model which would fit the model for Bosnia and Herzegovina – probably due to unstable and young economy. The same problem we observed with macroeconomic variables – no macroeconomic variable turned out to be significant on a company's level in Bosnia and Herzegovina.

As for Greece, one could see that the country is going through a difficult period, and the liquidity of most companies was low, independently of their needs. This is why we could not find the dependency between investments and liquidity – probably Greek companies in the analyzed period had minimal investments due to the troubles in the economy. Greek government-debt crisis made this country to receive bailout loans in 2010, 2012, 2015 from the International Monetary Fund, Eurogroup and the European Central Bank. This situation can explain why the GDP growth rate and public debt turned out to be significant determinants of Greek companies' liquidity - macroeconomic situation changes in this country had a direct impact on consumption and, consequently, on the situation of companies.

Models estimated for France show that it is a developed and predictable economy where the sector of companies has excellent access to financial markets and funding. A surprising discovery for French companies was a relatively weak dependency between indebtedness and liquidity, which can be either due to a large data sample used in the study or the fact that contrary to other countries, corporate debt increased significantly during the analyzed period. French companies have built significant cash reserves and taken on new debt, whereas, in other analyzed countries, companies lessened their debt burden after the global crisis. Corporate debt rose to almost 175% of the country's GDP, which means 40 percentage point growth.

Looking at the models estimated for companies in the United Kingdom, one can see the stability of their situation and dependency of corporate liquidity on public debt. The public debt in the UK was one of the highest in the European Union rose from 40% in 2006 to 80% in 2015. This can be explained with the economic costs of joining the European Union (the United Kingdom was a net payer to the EU budget) and budgetary deficits during the global crisis. At the same time, it seems that British companies created liquidity buffers, probably for investments in Europe.

Independently on the differences found between the countries, in this study we intended to show that seems to be a need for financial preparation when a company is planning to enter foreign markets regarding maintaining proper liquidity. Companies should be aware of the level of difficulties that may arise. The governments should support exporting companies regarding their operational financing needs due to the high risk of foreign sales. Transactions with international clients may turn to be very profitable, but there is a risk that losses from bad debts and lengthy legal disputes may equally well force the company to announce insolvency. There might be periods when exporting companies may dramatically require liquidity injections to make them continue their operations.

There are many possible forms of supporting liquidity constrained exporters. The government may subsidize the postal services to make the shipment process easy and cost less. Another possibility is bank guarantees, cheap insurance, specialized agencies which hire experienced in foreign trade practitioners, exchange of export experience between companies, and dependable intelligence about international customers and their reliability. Since, to some extent, the liquidity reserves are necessary to tackle additional risk, the government may provide access to all essential information about the countries, their politics, and clients to reduce this uncertainty. This study also shows that a critical form of support for companies that can be "given" by the governments is economic stability in a country, reasonable public debt, and predictability of the economic relations in a country in the future.
(It is worth mentioning here that the variables used in this study were tested for causality whether they affect the liquidity of the enterprise or the relationship has the opposite direction. It turned out that they affect the liquidity of enterprises.)

The issue which form of government support could potentially have the most significant positive impact on the liquidity constraints of exporters and how effective are methods currently used by governments is going to be the future work of the authors. We also intend in the future to learn more about what financial and non-financial measures should be taken by national governments in various countries to promote the exports and support exporters.

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Removing Barriers for Successful Technology Transfer Offices through the Development of a Holistic Tool

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Abstract

Successful technology transfer is often linked to the performance of technology transfer offices (TTOs) within universities and research institutions in general. Although a number of tools have been proposed to improve the performance of TTOs, scarce literature concentrates on an overall approach that takes into account the whole set of dimensions impacting on performance. Drawing from literature on strategy and business development of SMEs, we reviewed the extant contributions where such critical success factors have been identified and assumed TTOs could be considered as small firms struggling to become competitive. Based on evidence from literature, we eventually propose a holistic tool to measure and improve the performance of TTOs.

Keywords: technology transfer, capacity building, technology transfer offices

Introduction

Knowledge transfer, and its more commercially focused component technology transfer, have become integral to the strategy of public research organisations (PROs) over the last 30 years.

In the U.S., the Bayh-Doyle Act of 1980 enabled PROs and individual inventors to own intellectual property (IP) generated by the use of government funds, opening up the possibility of commercial exploitation. Later, in the UK, the Lambert Review (Lambert, 2003) highlighted the importance of university-industry collaborations and helped introduce the so-called 'Third Mission' to drive economic growth (Laredo, 2007). Third mission is an additional mission of universities, beyond teaching and research, that encompasses knowledge and technology transfer activities and it is generally concerned with turning research results into factors of economic growth (Zomer & Benneworth (2011).

Particularly in last decade, within the Horizon 2020 framework, the European Commission has worked hard to promote the Third Mission across Member States to foster economic growth highlighting the fundamental role of Technology Transfer offices in such processes. Indeed, the Innovation Union Commitment 21 stated that "mechanisms are needed to further strengthen knowledge transfer offices in public research organisations, in particular through transnational collaboration". In the same vein, the European Commission adopted a Recommendation on the management of intellectual property in knowledge transfer activities and a Code of Practice for universities and other public research organizations (COM (2008) 1329), that is currently under revision with the perspective of a second, and tighter, recommendation.

Despite these intentions, the performance of European PROs in Technology Transfer appears largely variable and irregular. For instance, across Europe, the 10% of PROs secure 80% of all licensing deals

and the top 2% of PROs across 6 countries capture 40% of licensing revenues (Piccaluga et al, 2011). Whilst all countries in Europe have a high degree of variability in Technology Transfer performance, the problem is particularly acute in Southern and Eastern Europe and it also influences in a negative way the ability of PROs based in those regions to attract funding for Technology Transfer (Darcy et al., 2009, Swamidass and Vulasa, 2009).

In response to these issues, the European Commission launched a capacity building initiative to transfer best practices from high performing PROs to those underperforming, especially in Southern and Eastern Europe. This programme, lately renamed PROGRESS-TT, was delivered by a consortium of Technology Transfer experts from across Europe in response to a call for the Capacity Building Technology Transfer action (H2020-CBTT-2014).

This study is rooted within the PROGRESS-TT programme. The overall aim of this study is to develop a set of Critical Success Factors for successful Technology Transfer activities within PROs. Such factors form the basis of a diagnostic tool able to help single TTOs and their PROs identifying areas where changes could be made to improve their performance.

Metrics and Key Performance Indicators for Technology Transfer

Current scholarly and managerial debates suggest that there are a number of barriers to successfully transferring best practice between PROs. In view of any capacity building initiative, a first step is to define metrics able to capture how well a PRO is performing at present, and why it is not performing better. To this regard, well-known technology transfer metrics such as number of spin outs, licensing revenue, and revenue from contract research can be used to define how well a PRO is performing. Relating these metrics to organisational characteristics like size and research intensity can be instrumental in defining how efficient PROs are being. Also benchmarking these metrics against other institutions provides a picture of relative performance. However, none of these indicators identifies why the organisation is performing at that level, nor which factors need to improve to increase performance. Therefore, scholars and practitioners are left with a still underdeveloped understanding of how a measure to build capacity in a PRO by means of transferring best practices from higher performing PROs, would actually affect their performance.

This paper proposes a way to identify a PRO's performance potential and the factors that influence it, so that a diagnosis can be performed to identify areas where changes could be made to improve performance, irrespective of the initial rating of a PRO, compared to others. Whilst extensive work has been carried out over the past 30 years to identify factors that influence Technology Transfer performance (Oliveira & Castro Teixira, 2010), there is no single model bringing all of these factors together in a truly holistic tool of performance measurement for TTOs. Although it can be difficult to single out all the influencing factors (at individual, organizational, and policy level) of Technology Transfer performance, aiming at an overarching approach can provide a useful tool for improvement (see also York and Ahn, 2012).

Consequently, we have combined University's technology transfer literature with insights coming from technology and innovation management, to identify potential diagnostic tools that may be able to provide a framework for PRO diagnostics and suggest Key Performance Factors (KPFs) relevant to Technology Transfer, as described below.

There are many similarities between the domains of Technology Transfer performance in PROs and commercial business growth, since many university Technology Transfer Offices (TTOs) operate as independent businesses and to some extent are very close to small and medium enterprises. Barriers to growth in private enterprise have been studied extensively and a number of diagnostic tools exist. This paper argues that they could be suitable for the needs of capacity building actions to improve TTO's performance.

One of the most comprehensive of such tools is CCODETM, originally developed by the UK company Pera Consulting. CCODETM is a simple but robust model of analysis that has been applied across

startups, fast-growing businesses, and the public sector to measure several features of growth (e.g., such as exports). CCODETM states that all organisations pass through a series of stages in their development. To move to the next stage, it is important to have five elements in place:

- Capability of the management to drive growth
- Capacity (staff, equipment, facilities, etc.) to deliver at the increased level of performance
- An Opportunity to exploit intellectual property and technology to generate the growth
- Desire to achieve this higher level of growth
- An Environment (political, physical, logistical, etc.) supportive of that growth

If any of these elements is missing, sustainable growth will not be possible (just like a cog missing in a machine). This means that business support is of little value if it only addresses one barrier to growth when multiple barriers exist. CCODETM is aimed at providing a holistic approach to elements that relate to performance.

Within these five elements, there are unique sets of factors depending on the application (e.g., measuring innovation and export implies looking at different factors). However, across all application areas, these five elements remain consistent. Table 1 reports the factors for business growth.

Table 1: business growth CCODE^{TM} model

- **Capability**
  - Systems
  - Skills
  - Strategy
  - Leadership
- **Capacity**
  - Staff
    - Delivery staff numbers
    - Marketing and Sales capacity
    - Staff Skills
  - Existing Facilities
  - Operational Processes
  - Finance
  - Partnerships
- **Opportunity**
  - New National Markets
  - New Overseas Markets
  - Innovative Offerings
  - Innovative Processes
- **Desire**
  - Personal Ambition
  - Understanding of Growth
  - Necessity for Growth
  - Risk and Reward
- **Environment**
  - Government support
  - Legislation
  - Competition
  - Access to services
  - Availability of finance
  - Availability of skills

- Customer base
- Networks
- Infrastructure

In this paper, we hypothesize that a modified version of this tool would be effective as the basis of a diagnostic tool for TTOs. However, we also recognize that some of the factors for Technology Transfer may be different from those for business growth. For example, the existence of powerful research institutions and research facilities (and, as a consequence, quality and quantity of intellectual property) for a successful practice is much greater in the case of Technology Transfer compared to conventional business.

Using the CCODETM approach, the goal of this research is to develop a set of Critical Success Factors for successful Technology Transfer activities within PROs, which may be used to form the basis of a diagnostic tool to identify barriers to success. To do so, we conducted a literature review to identify: (i) which parts of the existing business growth CCODETM have been shown to be Critical Success Factors within the Technology Transfer environment; (ii) Critical Success Factors for successful Technology Transfer that are not currently covered by CCODETM. (iii) aspects within CCODETM that have not been sufficiently explored in the Technology Transfer scholarly literature, but may still be Critical Success Factors for PROs.

As a result, the paper contributes to the current debate on TTOs performance by developing a version of CCODETM specific to Technology Transfer, which can in turn be used to develop diagnostic tools and other services to assist PROs in increasing their Technology Transfer performance.

Literature review on critical success factors and adaptations to CCODE™

To ascertain the relevance of CCODETM to technology transfer, it is necessary to cross reference each factor within the five CCODETM elements with the findings of previous research on the barriers/Critical Success Factors for successful Technology Transfer. This was achieved by reviewing a number of papers and reports from surveys specifically addressing the topic of technology transfer barriers. Wherever possible, papers providing evidence of performance impact have been favoured. Eventually, 33 papers and reports were selected.

It was found that Capability, Capacity and Environment factors are broadly comparable between business and Technology Transfer: all but three of the 18 sub-factors examined received at least one reference in the literature. It was decided that three references would be a minimum threshold for applicability, giving an initial set of 10 factors directly relevant to Technology Transfer. Of these, the most widely cited factors were the following.

Staff skills – almost half the papers examined made reference to staff skills as a critical factor. Some aspects are related to experience. The European Knowledge Transfer Report 2013, Final Report (European Commission, 2013) notes that half of all TTOs surveyed were started after 2000, meaning that there has been little time to build expertise. This is exacerbated in places like Turkey, where several new public and private universities were founded after 2006. The blend of skills as well as the level of experience is also important (Conti et al, 2007), but it appears PROs do not always possess or recruit the required expertise (Phan and Siegel, 2006).

Delivery Staff Numbers – seven papers considered this important. For instance, the Kienbaum survey in 2006 (cited in von Ledebur, 2008) found that TTOs with more than five employees were more successful than smaller offices. The Lambert Review (Lambert, 2003) also identified a minimum efficient size for TTOs. Also the 'Dream TTO' described in the 2009 expert group on knowledge transfer final report (European Commission, 2009) proposes a figure 21 staff for a PRO of 10,000 students.

Strategy – This aspect was cited by seven papers as well. The issue was significant within the European Knowledge Transfer Report (European Commission, 2013), which found that PROs that set up policies

on IP, licensing and start-ups were more successful. The report also noted that strategy development was a leading issue in all the stakeholder workshops. Graham (2013) comments the importance of an effective institutional strategy and Lockett and colleagues (2003) found that "results indicate that the more successful universities [at spinning out companies] have clearer strategies towards the spinning out of companies".

Identifying Critical Success Factors not currently found in CCODE™

The review revealed that some areas of the business growth CCODE™ did not translate well into the TTO environment. In particular, the areas related to Opportunity to transfer technology and Desire to engage in technology Transfer needed to be reconsidered to enable them to function effectively within the model. Importantly, it is important to remind that TTOs are not active on any product market, but on upstream markets, otherwise defined technology markets (Arora, Fosfuri and Gambardella, 2001), where fundamental inputs for production (not final goods or services) are exchanged.

Opportunity

Within the business growth CCODE™, opportunity is defined through two key factors: 1) new markets (often export related); 2) differentiated offerings (innovation).

This structure works very well for established industries, where there is a need to constantly find new revenue streams in the face of fierce competition. However, Technology Transfer is still (at least in Europe) a relatively immature industry, with the majority of TTOs not performing in a consistent way within existing markets and with core offerings (contract R&D, licensing and spin-outs) for many countries to be considered as significant areas of improvement.

Having said this, customers (on markets for technology) are still obviously a crucial element of TT success. However, the literature does not seem to indicate that the identification of new customers, especially related to export, is the significant issue. Rather, absorptive capacity of existing markets is a crucial factor. This refers to the ability of customers to integrate the intellectual property into their business and effectively exploit it. Cohen and Levinthal (1990) in particular identify the absorptive capacity of SMEs as being a limiting factor. The 2009 Expert Group on knowledge transfer final report (European Commission, 2009) recommends a policy focus on increasing industry's absorptive capacity. Part of this capacity issue relates to time and money, as identified by industrial respondents in Gilsing et al (2011).

A closely linked factor is that of the culture clash between academia and industry. This is cited extensively in the literature. For example Harman (2010), Siegel et al (2003) and Salter et al (2009), and recent studies, evidenced how the same clash happens not only in hard sciences, but also in executive education (Ungureanu and Bertolotti, 2016; 2018). A lack of understanding of each other's cultures, procedures, needs and aspirations leads to delays, lack of trust and ultimately failed interactions. The literature thus seems to indicate that interacting effectively with identified customers is a more significant barrier than identifying new markets.

This evidence allows us to propose two new categories within Opportunity:

1. Customer base – absorptive capacity
2. Relationships (networks and understanding)

Also the offering side (the flipside of the customer transaction) needs to be reconsidered radically. Within industry, customers tend to buy a product or service that is clearly defined, and repeatable. In the case of Technology Transfer, the offer is usually based on intellectual property, or services to develop intellectual property (something happening at the level of technology markets). As such, all offerings are unique, and hence always innovative. Thus, the question is not 'do you have innovative offerings?' but 'are you able to access sufficient commercially attractive IP?'

The literature reveals four key areas within intellectual property that define the likely success or failure of Technology Transfer activity. First is the quality of the intellectual property (although the definition of quality referred to intellectual property rights is still a hotly debated topic). The European Investment Bank, citing Chukumba and Jensen (2005), states that "Universities producing higher-quality research, as measured by the quality of their doctoral programmes, generate more licenses and higher licensing income." Kumar and Uruthirapathy (2007) and Martyniuk et al (2003) also reference the ability of a given technology to address significant market needs. It is interesting to note however that Lambert (2003), amongst others, identifies that universities often over-value their IP, creating a difficult negotiation platform.

Of course, whenever quality is discussed, quantity cannot be neglected. However, it is not the quantity of IP held by an institution at any point in time. IP is a time-limited resource, meaning that a better measure is an organisation's ability to produce IP and achieving critical mass that can attract potential "buyers" and reduce their transaction costs (knowledge generation capacity). Lambert (2003) identifies an R&D expenditure of £20m p.a. to achieve critical mass. This is supported by the Handbook of research on techno-entrepreneurship (2007), which cites studies by Vohora, Wright, and Lockett (2004) and Powers and McDougall (2005) showing that spin-off activities are closely correlated with R&D expenditure.

An institution may produce excellent IP in large quantities, but there is no opportunity unless it is knowledge that the market wishes to acquire. For example, over 90% of all licensing deals occur within biotechnology and ICT (European Commission, 2013). Therefore, a critical success factor is the market relevance of intellectual property.

Intellectual property is an intangible asset, often stored in the heads of individuals. As such, it is prone to leakage and loss. Research reveals that IP security is thus an important success factor - if it cannot be protected, it cannot be exploited (Arrow, 1962; Sherwood, 2002).

These findings enable us to create a further four factors within Opportunity to replace the innovation factors within the business CCODE™ model:

1. IP quality
2. knowledge generation capacity
3. IP market relevance
4. IP security

All six of these new factors were validated, by making sure that each of the new factors receives at least three references in the literature, justifying their inclusion within a Technology Transfer CCODE™.

Desire

Within the business growth CCODE™ model, desire to grow is focused very much on the individual business leader, or its immediate senior management team. In the case of the Technology Transfer environment, this equates to the senior management of the TTO. However, the success of a TTO does not rest solely in the hands of that management team. Two other stakeholders play a significant role in the success of the supply-side activities.

The first of these is the IP creator. IP creators must be motivated to see their creations commercialised, otherwise they can become significant barriers for the TTO, rather than critical factors of success.
Both the TTO and IP creators are ultimately controlled by the PRO's management. Unless the university or research centre sees Technology Transfer as a key success indicator, they will not be motivated to support Technology Transfer activities, affecting, in turn, the desire of IP creators and of TT management.

As such, it is possible to replace the four factors of desire for business managers with a single aggregated factor for each of the three critical stakeholders:

1. Top management desire
2. IP creator desire
3. TTO desire

As for the other factors, also these new ones were validated with at least three references in the literature, justifying their inclusion within a Technology Transfer CCODE™.

Other Factors

In addition to the elements within Opportunity and Desire discussed above, the literature revealed a number Critical Success Factors not covered by CCODE™.

1. **Tools and methodologies** – Standardised tools and methodologies support the TTO staff to deliver high quality and repeatable services to their PRO. Mike Wright (2014) highlighted many of the issues related to insufficient standard tools and processes. These included mismatched support models for spin-outs and insufficient attention to building management boards. Kumar and Uruthirapathy (2007) highlight the value of decision checklists and commercialisation assessments in increasing TTO efficiency. Electronic resources and analytics tools are also acquiring importance (Sullivan and Mayer, 2011). Tools and methodologies are sufficiently differentiated from processes to warrant inclusion as an additional factor, albeit with only two references in the literature. As efficiency and shared best practice are emerging requirements for TTOs, this factor is likely to become more important as time goes on.
2. **Political/societal Environment** – PROs do not exist in a vacuum, and their TTO performance is influenced by political and societal aspects of their environment, as well as by their frequent involvement in complex organizations, such as hybrid partnerships, wherein performance is also influenced by vicious circles of decision-making processes (e.g. Ungureanu et al. 2018; Ungureanu et al., 2019; Ungureanu et al., 2020). The ECON Centre for Economic Analysis (2000) highlights political factors such as "instability, interventions in domestic markets (e.g. subsidy distortions), corruption and lack of civil society"; and linked economic factors such as "inflation, poor macroeconomic conditions and disturbed and/or non-transparent markets". Graham (2013) highlights the influence that the local quality of life has on Technology Transfer performance, as customers are predominantly local, as are staff. Chapple et al (2005) also find connections between regional economic performance and Technology Transfer efficiency, although they do not prove causation, nor the extent to which environment influences Technology Transfer (as opposed to Technology Transfer influencing the environment). Although there are few references in the literature examined, the above discussion supports the inclusion of political and societal influences as an additional factor.
3. **Proximity to market** – Among others, Villani et al. (2017), Lambert (2003) and Friedman and Silberman (2003) indicate that the physical proximity between industry and PROs is related to Technology Transfer success. Cummings and Teng (2003) cite numerous studies supporting this assertion, although their own studies find no such correlation. Despite the fact that only few papers from the last decade examine this issue, the available research indicates that proximity does have an effect on Technology Transfer performance and this is seen as important enough to be included as an additional factor within Environment.

Identifying potential new Critical Success Factors using CCODE™

Within the initial literature search, three factors of the original CCODE model were identified as having no references within the technology transfer literature and two factors were identified with only one reference. These were, respectively: Environment (Competition), Environment (Access to services),

Environment (Availability of skills), Capacity (Existing Facilities) and Capability (Leadership of the TTO)

A further literature search on Scopus database was conducted focusing specifically on these factors, and the following information identified:

Competition

Competition is one of the most important elements of business success. Very few markets exist in which there is no competition for customers. It therefore seems logical that there must be competition between research institutions for customers for their intellectual property. Importantly, competition has to be interpreted differently when referred to technology markets and intellectual property transactions, since IP makes the protected resource somehow unique and, to some extent, protected by competition. None of the papers examined in the initial literature review cited competition as a factor in the success of TTOs. Within the further search, just one significant reference to competition between TTOs was identified. Rossi (2014: 23) notes that "universities in regions with greater GVA per capita are more likely to be inefficient" and hypothesises that "this may reflect the more intense competition between universities for knowledge transfer engagements such as research and consultancy contracts and CPDs, as universities tend to concentrate in historically more prosperous regions."

Due to the importance of competition in conventional business markets, the authors argue that further research into the effect of competition between TTOs is essential. This is especially important for growing economies, where the university base is expanding rapidly. In the case of businesses, understanding of competition leads to innovation to enable market differentiation; such understanding within the technology transfer landscape may thus also lead to innovation and advancement within the sector.

Access to services

Access to services refers to the provision of supporting services within the technology transfer environment. These may include patent agents, intellectual property offices, export agencies and other organisations devoted to supporting the commercialisation of IP (including business angels and other funding institutions, such a proof-of-concept funds; Munari and Toschi 2019). The authors were unable to find any direct evidence proving that access to services has a direct impact on Technology Transfer success. This may warrant further research, as access to such support services is important within industry, suggesting there may also be a relevance to Technology Transfer success, especially transnationally.

Availability of skills

The skills of TTO staff were identified as a critical factor in the original literature search, with almost half of the reviewed papers citing their importance. However, none of the papers went on to examine the barriers to the acquisition of these skills by the TTO. For example, within business, there is a strong link between the education system and industry requirements, and a lack of graduates within particular subject areas can severely affect the success of an industry sector. It can therefore be hypothesised that a similar issue could exist with Technology Transfer skills. However, the authors were not able to identify if the problem is a lack of suitably qualified individuals, a lack of desire of those individuals to work in TTOs, or poor hiring practices by the PROs. Anecdotal evidence suggests that a blend of factors is the likely cause of skills deficiencies. However, we were unable to find any research examining this in detail. The authors suggest further research into this issue is important to inform both institutional and national policy regarding Technology Transfer skills development.

Existing Facilities

Kumar and Uruthirapathy (2007) mention facilities as a critical success factor for technology transfer from government laboratories. However, it is not clear if they are referring to research facilities or to the facilities of the TTO. The former represents a factor in generating the quality and quantity of IP necessary, and is dealt with under 'Opportunity'. Here we will discuss about the second factor: TTO facilities. In reality, TTOs have very few facilities requirements, as the majority of activities rely on the skills of individuals. Often facilities are just composed by office space equipped with computers. Whilst the provision of these is obviously important, based on the literature review conducted so far it cannot be identified as a critical success factor, as even basic facilities are adequate to allow skilled TTO staff to undertake their roles. As such, the authors propose to remove facilities from the Technology Transfer CCODETM model.

Leadership (of the TTO)

Within business, the leadership skills of senior management are a vital part of business success. Many growth programmes, such as the UK's Business Growth Service, include dedicated leadership and management activities in recognition of this fact. However, within the initial literature review and the subsequent extended review, just Kumar and Uruthirapathy (2007) mention leadership as a critical success factor. As with competition, it would be surprising if the leadership abilities of TTO management did not have some bearing on Technology Transfer success for an institution. As such, the authors suggest further research is needed into this topic.

Towards a TT-specific CCODE™ model

This paper has examined the suitability of a business support model, CCODE™, as a model for the critical success factors for Technology Transfer from PROs. A literature review of Technology Transfer success factors and barriers has revealed a broad alignment of the model with the Technology Transfer landscape. However, some factors, especially those in Opportunity and Desire, have needed to be adapted to suit the particular nature of PROs, especially the multiple stakeholders within the PRO itself. The review also highlighted a number of potentially influencing factors that had not been explored in detail by the literature. Based on the above-mentioned work, we propose a new a Technology Transfer-specific version of CCODE™, as shown below (*new factors shown in italics*):

- **Capability**
  - Systems
  - Skills
  - Strategy
  - Leadership
- **Capacity**
  - Staff
    - Delivery staff numbers
    - Marketing and Sales capacity
    - Staff Skills
  - Operational Processes
  - Finance
  - Partnerships
  - *Tools and Methodologies*
- **Opportunity**
  - *Customer Base – Scale*
  - *Customer base – Absorptive Capacity*
  - *Relationships (networks and understanding)*
  - *IP Quality*

    - *Knowledge generation capacity*
    - *IP Security*
    - *IP Market Relevance*
- **Desire**
    - *PRO Management Desire*
    - *IP Creator Desire*
    - *TTO Desire*
- **Environment**
    - Government support
    - Legislation
    - Competition
    - Access to services
    - Availability of finance
    - Availability of skills
    - *Proximity to market*

Limitations and Future Research Directions

Whilst the business growth CCODE™ model provides an interesting and valuable perspective on Critical Success Factors, and the literature review covered extensive studies, there is still the possibility that some Critical Success Factors have been missed. However, this TT CCODE™ model provides a foundational tool that can be refined as further data and insights becomes available.

The inclusion of factors was based on the number of references in the papers and surveys that were reviewed. To further refine this model, a meta-analysis of quantitative studies would be desirable, in order to develop some form of ranking and weighting of the factors. Such development would depend on the availability of a high number of quantitative studies focused on the extent to which factors influence outcomes.

As shown above, there are four areas of the business growth CCODE™ that have not been examined in detail by Technology Transfer research and that provide suitable direction for further studies. These are:

1. Environment: Competition – the effect of competition between PROs on the success of Technology Transfer
2. Environment: Access to services – the extent to which the availability of support services, such as export agencies and patent offices, affects Technology Transfer performance
3. Environment: Availability of skills – the extent to which the skills needed for Technology Transfer are available within the labour market
4. Capability: Leadership (of the TTO) – the effect that the leadership skills of the TTO management have on Technology Transfer performance.

Investigation of these topics is an area of potential interest for management studies especially in relation to the availability of skills. Skills emerged as the most referenced factor in the success of Technology Transfer, so it is vital that the relationships between PROs, the labour market and education are fully investigated to ensure that the required skills are available.

Our research was conducted to provide a foundation for a diagnostic tool to be developed within the EU-funded PROGRESS-TT project. The next stage will be to identify the question sets necessary to profile a PRO against the TT CCODE™, as well as the relative weightings and thresholds to help identify areas requiring intervention. PROGRESS-TT and its legacy could be a platform to assess the validity of the TT CCODE™ and its associated diagnostic tools.

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A Discussion on the Use of Review Aggregators as a Measure of Quality of Video Games

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Abstract

Assessing the quality of video games raises many difficulties, as there is no single, accepted framework for this task. This article discusses the use of a review aggregator, particularly Metacritic's "Metascore", as a tool for measuring the quality of video games, based on literature study, statistical analysis of existing data and example case studies. While numerous sources highlight the importance of the metric, there is only limited proof of its actual impact on the market, and there is some controversy around using it as a base of business decisions. The alternative User score shows moderate correlation (r=0.565) with the Metascore and its distribution is slightly closer to normal, as the "amateur" reviewers tend to use a wider part of the grading scale, however it is easy to manipulate in a number of ways.

Keywords: Video Games, Quality, Review Aggregators, Metacritic, Metascore

Introduction

There is a popular belief that "anyone can make video games", as their development does not consume any material resources and both hardware and software tools are common and affordable. That statement is only partially true. It is possible for anyone with enough self-determination to develop a game that works; to compete in a saturated market, however, modern video games are often expensive projects that require countless work hours to finish, with budgets surpassing $100 million (Hodges 2019). Such costly investments are tied to a high risk, therefore it would seem sensible to ensure the developed product will be of highest quality. The quality assessment of video games raises several problems.

The video game industry is considered a "creative industry" (Howkins 2001; United Nations 2004; BOP Consulting 2010), and as such, it generates income by creation and exploitation of intellectual property. Video games (as well as other software) once designed, are not subject to change during replication - unlike more tangible, physical goods. This makes the use of statistical quality control methods, including Shewart's control charts or Six Sigma debatable (Binder 1997; Raczynski and Curtis 2008). Other "classical" quality tools may also prove problematic. Ip and Jacobs (2006) tried to adapt a QFD (Quality Function Deployment) method for game development; they developed a list of 45 VOC (Voice of Customer) factors, determining the customers' quality expectations. Given the niche character of their focal game genre (rally racing games), that is an overwhelming number, while the level of detail of particular items constrains the transferability of the framework to other genres; the "benchmarking" nature of the method may also limit creativity and uniqueness of games in development. To illustrate the complexity of video game quality phenomenon from the user's perspective, a preliminary research was conducted on a small sample of students (n=53, of which only 42 admitted playing video games), who were asked to define the quality of video games and point out factors contributing to their quality (Sobocinski 2019). The simple survey resulted in 93 differently phrased factors (later reduced by the author to 41 by subjectively grouping the synonymous ones), while a bigger sample would most probably bring even more. The factors covered a wide array of characteristics, technical, functional, artistic, social, emotional, and even market-related elements. While most video games are subject to at least some degree of quality assurance

(QA), the process (as described by Ruuska 2015), consists mostly of functional, linguistic and platform compliance tests, but does not include the evaluation of creative elements of video games such as their story, art style or soundtrack. Similarly to other fields, where the concepts and models of service quality (see e.g. Parasuraman et al. 1985) are displaced by concept of "experience quality" (see Otto and Richie 1996), also in relation to video games there are several different specialized frameworks for the consumers' experience own-assessment through questionnaires. Ryan et al. (2006) provide Player Experience of Need Satisfaction (PENS), elaborated from self-determination theory (SDT). Poels et al. (2007) provided a through-out documentation of preparing their Game Experience Questionnaire. Nacke (2009) includes user experience analysis as a part of a broader model of game usability. The myriad of suggested factors affecting the quality of player experience motivate a need for an objective, third party assessment tool.

Video Game Reviews

A possible tool for assessing the quality of a video game may take the form of a review. Video game reviewers usually evaluate many different aspects of those products, basing their judgment on their vast experience with both similar and different types of games, previous entries in the series, market situation, socio-cultural context, and sometimes even in-depth technical knowledge (a breakdown of common review can be found in Zagal et al. 2009). Reviews were already discussed as a powerful marketing tool, both in case of "professional" reviews (Ribbens and Steegen 2012), as well as online consumer reviews (Fruth and Neacșu 2014). An experimental study (see Wilde 2010) ran by EEDAR shown a positive impact of reviews on game perception, likelihood of recommendation, and preference of receiving a copy of the game instead of $10 cash). The role of reviews on the design process was also discussed. Bond and Beale (2009) analyzed reviews to find key design factors determining if the game is "good" or "bad", similarly Swain (2008) discussed the choice of game features based on games with highest and lowest review scores aggregated by the Metacritic website (metacritic.com). Ribbens and Steegen (2012) postulated that review scores are correlated with game sales, both variables used in their research was mostly limited to the Flemish Region.

Reviews have their shortcomings, however. Ribbens and Steegen (2012) stressed the lack of professionalism among video game journalists, as they often vary in experience, base their judgment on varied criteria and use different jargon. The subjective, not standardized character of reviews can be problematic, as even researchers have different views on the topic of video game criticism. Bogost (2006) discussed if video games should be analyzed from a new, monothematic academic field (which he refers to as an "functionalist" approach), or through "comparative criticism", in relation to other forms of human production. Konzack (2002) suggests a framework for computer game criticism, building upon existing methods from other fields, but also considering the "uniqueness" of video games as a medium; the proposed method includes the analysis of 7 "layers" of video games, from the hardware and program code, through the functionality and gameplay, to the game's meaning, referentiality and socio-culture. The presented approach highlights the complexity of video games, however a complete analysis of a single game would require broad knowledge, including electronics, programming, culture and social sciences, as well as at least some experience with ludology and game design. The author himself, while providing an example analysis of Soul Calibur, admitted that he was not an electronics expert to say much about the hardware, and did not have access to the game's code (nor skills to understand it, if he had; p. 91-92). Despite acknowledging many layers of the game, the method did not provide much information regarding assessment of the audio-visual side, which is very often discussed by both consumers and professional reviewers.

The Power of Review Aggregators

A logical solution dealing with differences in the reviewers' subjective point of view, would require a way of gathering several individual opinions and developing a common agreement. Review aggregators seem to provide this solution. A review aggregator can be generally defined as a "platform that regroups opinions and makes them available, allowing both objective and subjective information on a product to be easily accessible to potential consumers" (Piolatto 2015, p. 2). There

are many "aggregator elements" in different websites, i.e. most e-shops and shopping platforms provide a possibility for customers to rate and/or review offered products; for several dedicated services that functionality is one of their biggest assets. Although concerning different media (video games, movies, TV shows, music), Metacritic (metacritic.com) is probably the most popular review aggregator website in the video games industry specifically. The service, launched in January 2001 (see *About Us*), gathers various professional reviews, transforms their scores to a single scale (0-100) and calculates a weighted average called the Metascore. Additionally, the service allows users to provide their own scores (scaled 0-10) with an optional review, and calculates an average User score (also 0-10, but with one decimal place).

Some academics rely on Metacritic in their studies, referring the source as "objective" (Koeffel et al. 2010), and an "indication of game quality" (Baldwin et al. 2013). There is also a strong belief that the Metascore has a significant effect on the market. According to different reports based by EEDAR (Electronic Entertainment Design and Research) data, there is some correlation between the average review scores and sales (North 2012), however it decreased overtime (Walker 2014). A study of 88 Xbox 360 and 80 PS3 titles from 2012 showed that review aggregators scores are weakly (c.a. 0.3) correlated with actual sales (see Khan 2020, and the provided dataset). A slightly larger sample of X360 and PS3 titles (196 total) but without time constraints (X360 was released in 2005, PS3 in the following year) returned a correlation of 0.55 (Greenwood-Ericksen et al. 2013). It is important to note, that the volume of sales used in most research is based on VGChartz (vgchartz.com); the website does not use actual sales numbers (which are, in fact, very rarely disclosed through official channels), but estimates based on reports from a sample of stores and statistical models (Walton 2007). On the other hand, study shows that in the case of the movie industry, basically none of the analyzed review aggregator scores - Rotten Tomatoes' (see Rotten Tomatoes) Tomatometer and Audience scores, IMDb (see IMDb) and Metacritic - showed any meaningful correlation with the box office revenue (Wolf 2016).

It seems that the Metascore can affect the market in other ways. Market analysts suggest it can influence the game publisher's share prices (Baker 2011). It can influence the seller's range of products, as Microsoft delisted from their digital shop those Xbox Live Arcade titles (limited in size, often independently published by small studios), which had a Metascore lower than 65 (Remo 2008). There are proofs of using Metascore as a part of hiring policy; one example showed a requirement of previous experience in developing a title with a Metascore of at least 85 (Greenwood-Ericksen et al. 2013). Drachen et al. (2011) also found a slight correlation between the Metascore and volume of piracy (number of BitTorrent peers) of a given game (r=0.29, although using log transformation).

Possible Drawbacks

One particular effect of the Metacritic in the video game industry causes some controversy: the practice of basing developer's remuneration on the Metascore. While the phenomenon is seemingly not recent (signs of it were highlighted in Totilo 2008), it brought much attention in 2012, after Chris Avellone (creative director of Obsidian Entertainment) shared that his studio did not get a bonus for developing *Fallout: New Vegas* from its publisher, Bethesda Softworks, since the contract required the game to achieve a Metascore of at least 85 (see e.g. Gilbert 2012, Orland 2012, Greenwood-Ericksen et al. 2013, Schreier 2013) Unofficial sources hint that said bonus was worth 1 million USD (Schreier 2013), and could be the reason for Obsidian's lay-offs and cancellation of future projects (Gilbert 2012).

One of the reasons for the controversy over this case is that in fact, said title missed the target score by only 1 point, scoring 84 for PC and Xbox 360, and slightly less (82) for the PlayStation 3 (PS3) shortly after release. Another dire fact is related to the history of the franchise. First two *Fallout* games were developed by Black Isle Studios, a subsidiary of Interplay; the studio was closed in 2004 and Interplay sold the *Fallout* IP rights to Bethesda Softworks. The latter developed the third installment, changing a lot of the game's basic concepts. Obsidian Entertainment was founded by former Black Isle Studios employees, who were responsible for the first two games, and as Bethesda

(busy with its own projects) issued them the development of *New Vegas*, they somewhat "reclaimed" the franchise (see *Obsidian Entertainment*), although only for a moment. Bethesda Softworks decided to develop future *Fallout* games on their own. To be clear, there are no reasons to suspect that this decision was based on *New Vegas*' Metascore, as there are no official sources that confirm it was. The next *Fallout* installment, however, did not gather much better Metascores, and another one (the online-only *Fallout 76*) collected very mixed reviews. User scores of both titles released after *New Vegas* show a significant drop (see Fig. 1), which raises concern over trusting the Metascore as a base for business decisions.

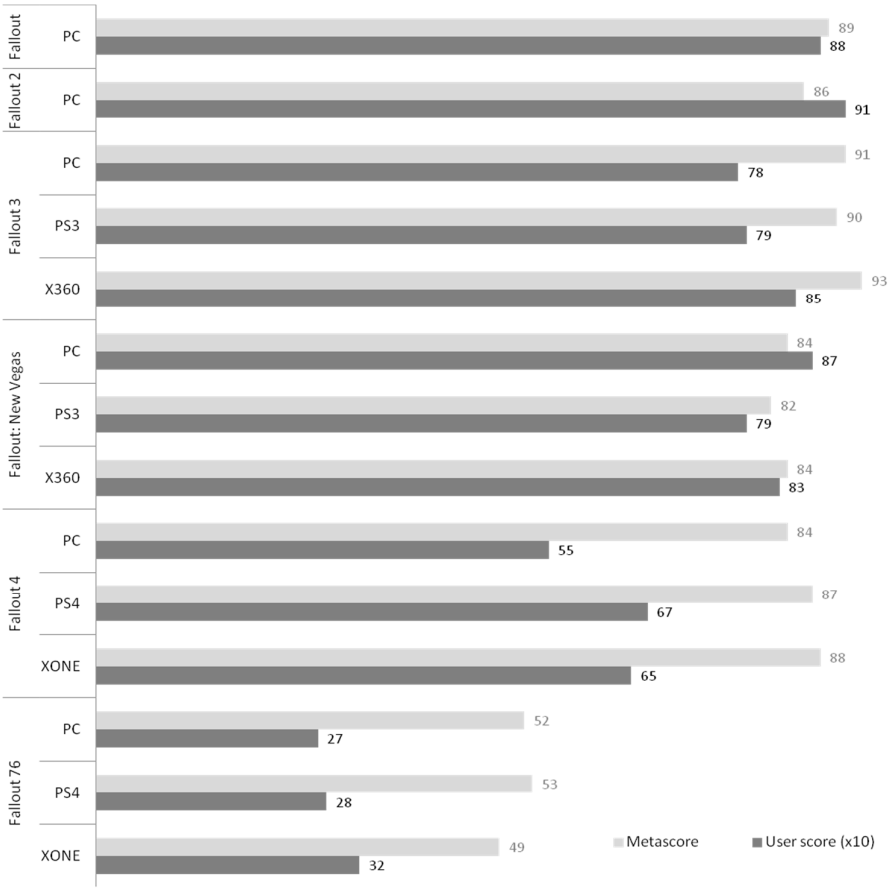

Fig. 1: Major installments in the Fallout series and their corresponding Metascores and User scores (multiplied by 10 for comparison; Source: own elaboration based on Metacritic.com, last accessed 04.24.2020)

The sole process of calculating Metascore is somewhat controversial (see Greenwood-Ericksen et al. 2013). Particular critics or publications use different scales (0-5, 0-10, four or five stars with possibilities of halves, A-F letter grades) which are converted to a 0-100 scale. Only a few of the conversion tables are illustrated (see *How We Create The Metascore Magic*). Later, the weight of particular reviews is based on the "credibility" of a given critic and publication source, as perceived by Metacritic staff; the weights are not publically disclosed. That motivates the question: is the more "liberal" User score a better indicator of the game's quality, both for academic analysis, and for business decision?

Metascore vs. User Score

The Metacritic's User score tends to gather a lot less attention than the Metascore. Still, there is some research analyzing the two metrics. Johnson and others' (2014) study showed both metrics do not seem to fully reflect the game consumers' experiences, as the group found little to no correlation between the Metascore and the factors of aforementioned GEQ questionnaire, and weak correlation with the factors of PENS questionnaire. In the second case, the correlations were even weaker and less significant for the Metacritic's User Score. Park and Byun (2016) compared the two variables, however their results are not fully consistent (the final sample size is not specified, other than being smaller than 2069). Santos et al. (2019) presented a through-out analysis of both "professional" (journalist) and "amateur" (user) reviews from Metacritic. The authors pointed out several important findings, including (among others): (i) differences in style of professional and amateur reviews (detached vs. emotional), (ii) more "extreme" (either low or high) ratings from amateurs, sometimes highlighting disagreement with professionals, (iii) "nostalgia" effect, as amateur reviews tend to become more positive over time since the game's release (iv) early reactions may predict the long-term game performance. Despite its complexity, the research focuses only on text reviews, and omits the user ratings that were not backed with explanation.

To fill that gap, it was decided to provide a statistical comparison of both scores. The data for analysis was taken from a publically available dataset provided by Andrea Cadeddu (2019) via Kaggle.com. The dataset includes (i.a.) Metascores and User scores from Metacritic.com for every game (and major add-ons) dated from 1995 to 2018, covered by the website, and gathered in November 2019. It's important to note, that while the website was established in 2001, some earlier titles were added to the catalogue "retroactively", but their number is limited. Every "port" of a single title (a release on a different "platform", or "game system") is counted as a separate release, since it has a separate page on Metacritic, with different scores. Not every title received enough professional reviews and/or user scores to calculate the overall score, in which cases Metacritic gives a "TBD" (to be disclosed) label instead of scores. Those cases were removed from the dataset for further analysis, to enable some simple statistical methods. The number of reviews (positive/neutral/negative) provided in the dataset for some reason proved incorrect through random checking, thus had to be omitted from analysis. Only one error in the dataset was found concerning the Metascore (one title had a numerical score listed instead of TBD on the actual site) and was removed, and no other errors were found throughout the analysis. After cleaning the data, the dataset consisted of n=17822 cases. The descriptive statistics of the focal variables are listed in Table 1.

Table 1: Descriptive statistics of analyzed dataset, n=17822 (Source: own elaboration based on dataset from Cadeddu 2019)

	Metascore	User score (x10)
Avg.	69,864	69,462
Mode	80	76
Min.	8	1
Max.	99	94
Range	91	93
Q_1	63	63
Mean	72	73
Q_3	79	79
SD	13,239	14,057
Var.	175,262	197,602
Skewness	-0,881	-1,240
Kurtosis	0,893	1,742

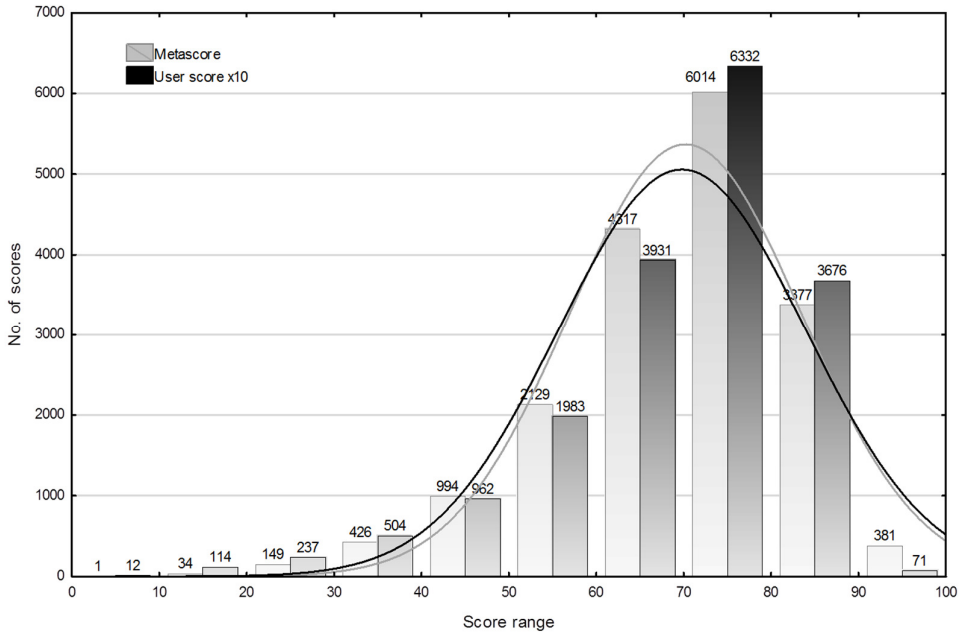

Fig. 2: Two-variable histogram representing the distribution of Metascores and User scores (multiplied by 10), n=17822; source: own elaboration based on Cadeddu (2019)

At first glance, both the Metascore and User score statistics seem similar, with near identical average, mean, lower and higher quartiles. The first hints of difference appear with skewness and kurtosis, representing non-normal distribution of both values (which is typical to review aggregators in the movie industry, as mentioned by Wolf 2016), with a bigger "peak" and left "tail" of User scores. The difference is clearer with a histogram of both variables, illustrated in Fig. 2. The Gaussian curve (black) of the User score distribution is slightly more flattened, which can possibly reflect users' tendency to give more polarized scores (either bad or good, with less middle grades), although

effectively, the average user scores end up using a wider scale than average of scores from professional reviews.

The calculation of the Pearson's correlation coefficient (Pearson's r) of the two variables returned the result of r=0.565. Not surprisingly, given the size of the sample, the result was significant (p<0,0001). While many academics would eagerly use such result as enough to confirm a hypothesis (as there is a significant correlation), the "strength" of this correlation in most works is considered "moderate" (see e.g. Taylor 1990). To better illustrate the differences between the Metascores and the User scores, a scatter graph was developed (see Fig. 3), with darker dots representing the more clustered areas (i.e. many games share the same combination of Metascore and user score).

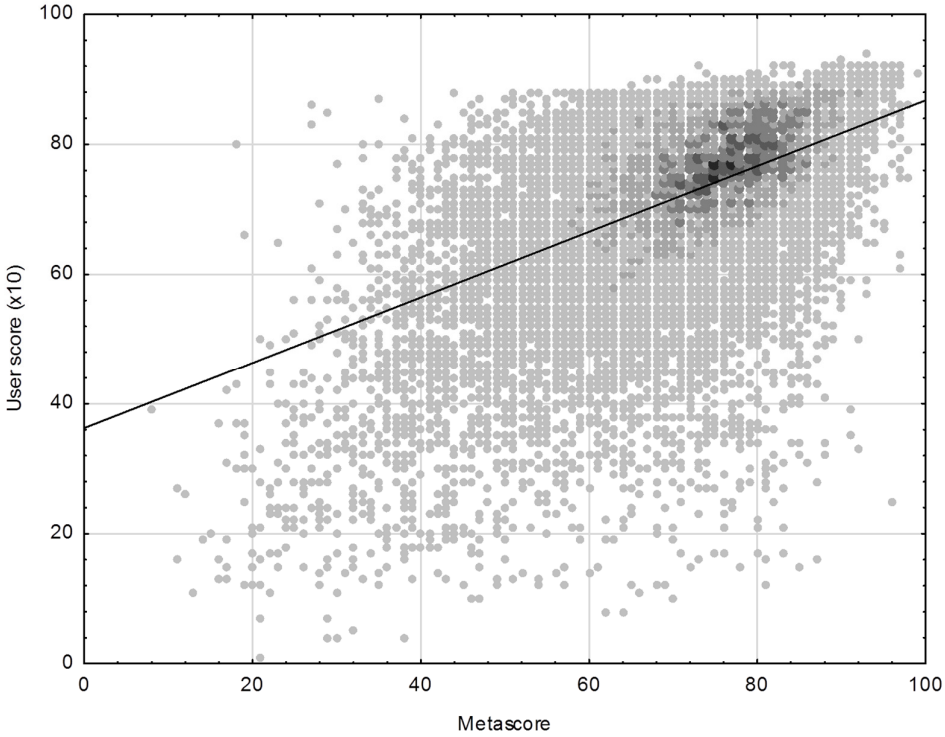

Fig. 3: Scatter graph of video games' Metascores and corresponding User scores (n=17822); high density areas highlighted with darker colors (Source: own elaboration based on Cadeddu 2019)

To better understand the disagreements between the Metascores and User scores, a further analysis was conducted. The major differences between those variables were calculated as absolute values and color-filtered in an calculation sheet, to highlight the biggest gaps; then the professional and amateur reviews of a game with a considerably big gap were compared on the game's Metacritic page, with some additional study on the game background in the gaming news websites. Unfortunately, this approach had to be abandoned before all significant gaps were checked, due to time constraints, and poor outcome. In a great amount of cases, even though a title has a User score based on several numerical user ratings, it has very few – if any – "written" user reviews, and it was often impossible to determine the reason for the difference in scores. Often the written reviews contradicted the overall user score, as either the reviews were positive while the overall score was low, or the other way around. One obvious finding that emerges, is that users are way more likely to simply give a numerical rating, than to motivate their grade, and analysis of users quality perception should considerate both the overall numerical score as well as written reviews, as taking into account only one of them can give false overall impression. Most of other findings only confirm those of Santos et al. (2019). There is an evident polarity in the user scores, and a lot of users usually explain their

different grades by simply disagreeing with the Metascore (in the type of "This game is underestimated, it deserves a higher score - 10" or "A total disappointment, can't see why it has such high scores - 0"). Some gaps can be explained by a clearly visible "nostalgia" factor, especially with the titles released for the Sony Playstation 2 and Sega Dreamcast. "Trolling" seems to be one phenomenon that Santos' team had omitted. It can be observed as many games with the lowest Metascore values – that are often clearly badly designed, unoriginal and/or filled with technical "bugs" - have a surprisingly high user scores, and written user reviews often describe those titles as a "best game ever", most probably in a sarcastic manner. Another "new" finding is the effect of consumer boycotts on the user scores, called "review bombs" – organized actions of lowering the overall score by giving minimal ratings by numerous users.

One major "bomb" found concerned Electronic Arts' *Star Wars Battlefront II* (2017), with the Metascore ranging from 65 (PC) to 68 (PS4), but with a user score of 1.3-1.4 (on a 0-10 scale). The main reason for both the "bombing" and relatively low professional scores is the introduction of a "loot box" mechanic in a fully priced game, which sparked the record breaking Reddit thread (Leskin 2019), drop in EA share prices (Kain 2017) and new anti-gambling policies (Webb 2018). Although the microtransactions were halted at the games' release, and later reworked to only provide cosmetic changes instead of "paid" advantage, the Metacritic scores failed to rise to this day. Another example is *Company of Heroes 2*, which "bombing" has more historic and political foundations. The game's storyline focuses on WWII's Eastern Front, and shows the ruthlessness and brutality of war. It raises controversy, as it is believed to put the Soviet Army in a "bad light" (not to cite directly) by Metacritic users from Russia and other post-soviet regions, responsible for the "review bombing".

Recently, there are also examples of "positive" or "reverse review bombs". One instance is *Assassin's Creed: Unity*, which received rather mixed reviews from critics and users alike, due to numerous bugs upon the game's release in 2014. The game, featuring a realistic virtual recreation of Notre Dame, was offered for free after the real-world chapel's fire in 2019. This decision resulted in a significant positive shift in Steam user's review scores (Orland 2019). Another, yet different case concerns *AI: The Somnium Files*. Its "review bombing" changed the Metacritic's User score from 8.2 to 1.9 in a single day, forcing the game's developers to ask fans for high grades, to help rise the score. Shortly after, one individual claimed responsibility for the bombing, motivating this act as a proof of Metacritic's faulty User score system. In effect, Metacritic staff decided to delete the negative ratings, which in result raised the overall user score to 9.0 - 0.8 point higher than before the "bombing" (Denzer 2020).

It is also important to mention that not only the more or less organized crowd can influence the user score, but also companies, as there are proofs of "abusive" raising of the score by developers of a given game, without disclosing their affiliation (Greenwood-Ericksen et al. 2013). It is not confirmed, but not impossible, that at least some of the past "review bombs" were actually administered by a competitive company. That being said, the user score metric, while being more "liberal" or "democratic" (as anyone can post a rating, and the overall score does not use weighted average) is relatively easy to manipulate.

Summary

Among the review aggregators used for video games, Metacritic's Metascore, based on "professional" review scores from game journalists, seems to be the most popular. Although there are signs of its significant impact on design and business decisions, there are flaws both in the methodology of calculating the metric (e.g. different scales of source data, unknown weights for calculating the average), as well as the distribution of professional review scores (using only a limited part of the grading scale). The alternative User score metric, based on "unprofessional" scores, is only partially correlated with the Metascore (r=0.565), showing a lot of discrepancies between the "professional" and "amateur" quality perception. The user score, while more "liberal" and inclusive, also has its shortcomings; the users tend to give more polarized, emotional ratings, with small (if any) explanation, and the overall score is vulnerable to manipulation by organized actions ("review

bombs") or as a form of a joke ("trolling"). While both metrics have a potential as a marketing tool, caution should be advised when using them as metrics of video game quality, as well as a base for business decisions. A methodology for assessing the quality of video games has yet to be developed, which leaves a field for future research.

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Revisiting Tourist Decision Making Styles: The Role of Life Satisfaction (Finding from Middle-Income Tourist in Bali, Indonesia)

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Abstract

This research aims to discover whether a traveler's level of life satisfaction could affect destination decision making. Additionally, the present study also wants to discover the effect of social media on the traveler's decision. This study involves two hundred tourists who participated in an online survey. Hypotheses testing has successfully revealed some findings. First, the level of life satisfaction is significantly creating brand consciousness, developing awareness of price over value, and adding confusion by over-choice. Second, the tourist's level of life satisfaction has no significant effect on high-quality consciousness and habitual orientation. Furthermore, the largest critical score was found between life satisfaction and brand consciousness. It indicates that visitors who were satisfied with their lives tend to choose well-known travel destinations.

Keywords: Life Satisfaction, Decision-Making Style, Tourism Destination

Introduction

Decision-making styles or ways of decision making in management have been studied for four decades (Cox & Rich, 1964; Kim, Ferrin, & Rao, 2008; Malhotra, 1982; Olshavsky & Granbois, 1979). The main focus in this field is carried out to understand deeply how the flow of a product purchase decision is made by individuals (Häubl & Trifts, 2000; Hoyer, 1984; Shiv & Fedorikhin, 1999). Further, studies on decision making elaborate about the antecedents and consequence models that significantly influence consumer decision making (Sirakaya & Woodside, 2005). The study from Tsiros and Mittal (2000) introduced a model of "regret" as a decision-making process. Furthermore, Han, Lerner, and Keltner (2007) also introduced "feelings" as an extension of the appraisal tendency framework (ATF) model. Consistent with these studies, some researchers have confirmed that studies on decision making will come on the strength or weakness of repurchase intention (Chalip, Green, & Hill, 2003; Kim, Ferrin, & Rao, 2008; Macdonald & Sharp, 2000). However, they don't focus on the style of selecting tourist sites.

One of the early contributions that received much attention was the findings of Sprotles and Kendall (1986) regarding the methodology of the analysis of decision-making styles. In the following decade, research on consumer-related decision making also developed in the tourism sector (Fakeye & Crompton, 1991; Smallman & Moore, 2010; Tsaur & Tzeng, 1996). The study of tourist decision making styles on tourist destination selection is complex. Correia and Crouch (2004) and de Freitas (2003) argue that the decision-making process for taking holidays is strongly influenced by natural environmental conditions such as the intensity of the sun, climate, and beach quality. In contrast, Alegre and Juaneda (2006) have elaborated on tourist's economic behavior related to the decision on the choice

of tourist sites. However, various studies above still have not found any formulation about the style of tourist decision.

Tourists themselves as a unit of analysis have also been reviewed by several researchers with a psychological approach (Decrop & Snelders, 2005; Dellaert, Ettema & Lindh, 1998). They found that psychological aspects such as "rational" and "hedonic" are closely related to the decision-making process in traveling to a location. Decision making related to tourist destinations was also analyzed from the perspective of cultural attractiveness (Correia, Kozak, & Ferradeira, 2011; Handaru, Nindito, Mukhtar & Mardiyati, 2019). Other studies also explained that decisions about the choice of the tourist sites are influenced by the quantity and quality of initial information search conducted by visitors (Dodd, 1998; Fodness & Murray, 1997, 1999). However, various studies also did not specifically discuss the decision-making styles that are associated with the background of life satisfaction of visitors.

Previous studies have been conducted to discover the concept of decision-making styles. Some antecedents and consequences of the decision-making styles have been examined with a quantitative and qualitative method to get a better result. However, there is a lack of discussion about decision-making styles relating to the role of life satisfaction of middle-income tourists. Contribution of middle-income tourists for local tourism is huge, but unfortunately, the correlation of their life satisfaction and how they choose a specific destination is rarely elaborated. Further study is important to get a deeper understanding of the decision-making style which influences by the conditions of tourist's life satisfaction. This goal is the main motivation for this research as well as to contribute to the field of strategic management and tourism management. To achieve this goal, this research is organized based on the following stages: first, mapping and literature review is conducted; second, the selection of quantitative methods to test causal effects between variables; and third, a discussion of the results of hypothesis testing. The research concludes with a discussion and in-depth interpretation of the results of the hypothesis test and explanation of conclusions as well as further research suggestions

Literature Review

Life Satisfaction and Its Effect on High-Quality Consciousness

Life satisfaction could be interpreted as the level of satisfaction on financial condition, career, or family welfare. Life satisfaction is one of the strong antecedents of high-quality consciousness related to holiday destination choice (Decrop & Snelders, 2005). The level of life satisfaction which is perceived by some people essentially be subjective, but still associated with the style of the consumer when deciding the purchase of products or services (Correia, 2002; Hsu Tsai & Wu, 2009). The level of life satisfaction that influences the style of decision-making to travel is reflected in many aspects. Generally, monetary satisfaction was derived from the monthly income. Consumers who have higher incomes tend to choose high-quality travel destinations. The high-quality destination normally is expensive, and it may only be afforded by those who have high monetary income. In this study, life satisfaction reflected by economic conditions, good career, and family welfare. Based on the explanation above, the first hypothesis is:

H1: Travelers who have high life satisfaction are preferred to choose a high-quality travel destination.

The Relationship between Life Satisfaction and Brand Consciousness

Visitors who understand the situation and conditions of a tourist location, usually have an established educational and occupational background (Jenkins, 1999; Milano, Baggio & Piattelli, 2011). People who are dissatisfied with their lives tend not to be interested in finding information related to travel packages. In other words, people who are satisfied with their lives will be more motivated to ensure the safety of the travel itinerary (Kassean & Gassita, 2013). Brand awareness is the level of tourist's knowledge about a specific tourism destination. Previously studies explained that the Brand Consciousness is obtained by searching for information through the Internet such as social media or website (Leung, Law, Van Hoof & Buhalis, 2013). The intensity to use online media and tourism

websites provides a strong awareness of a specific destination and its supporting infrastructure (Kruger & Saayman, 2010; Miguéns, Baggio & Costa, 2008). By accessing online media, tourists have the information to be used as the basis of decision-making. Based on the description above the second hypothesis could be stated as follow:

H2: Travelers who have high life satisfaction are preferred to choose famous travel destinations.

Life Satisfaction and Its Impact on Price and Value for Money

Consumers bought a tour package to get a memorable experience (Hays, Page & Buhalis, 2013). Hays et al. (2013) explained that the value of money is a very important proposition in tourism marketing. The value for money aspect is important because tourists are divided into several segments. For tourists who are sensitive to price, the cost of travel is vital for making a decision. Price sensitivity is a part of life satisfaction associated with status and economics. Other researchers also mentioned that value for money proposition is fundamental in destination decision making (Hudson & Thal, 2013). For that reason, the extent of life satisfaction can make visitors more sensitive to cost travel and tourism package because they want to make sure all things are hassle-free. Consequently,

H3: Travelers who have high life satisfaction are more selective related to value for money of particular destination

Life Satisfaction and Its Effect on Confusion by Over Choice

At the time when the extent of life satisfaction is high, the buying power of tourists toward a tourism package will be increasing. This condition widens the alternatives to holiday destinations. Unfortunately, this will also create confusion to choose the best holiday options. On the contrary, when life satisfaction is low (for instance caused by poor economic condition), "confusion by over choice" rarely occurs (Patterson, 2007; Petrick, Li & Park, 2007). Therefore, it can be concluded that confusion by over choice is often happening in visitors who have a high level of life satisfaction (Garg, 2015; Jenkins, 1999; Wong & Yeh, 2009). Based on the description above, the fourth hypothesis is:

H4: Travelers who have high life satisfaction are often confused to choose a specific holiday destination

Life Satisfaction as Antecedent of Habitual and Brand Loyal Orientation

Visitors who have accomplishments in terms of education, career, and finance tend to visit a high-quality tourist destination. (McKercher 2002: Nicoletta & Servidio, 2012). Visitors who have good educational background also tend to choose a secure and hassle-free destination. A set of pleasant memories fosters a tendency to revisit the same destination. Therefore, it can be concluded that visitors with a high level of life satisfaction will choose a high-quality destination and willing to revisit the location in the future (Hung and Petrick, 2012; Kassean & Gassita, 2013). For that reason, the fifth hypothesis is:

H5: Travelers who have high life satisfaction are often visited the same holiday destination

The relationship between all variables and hypotheses in this study arrange in figure 1.

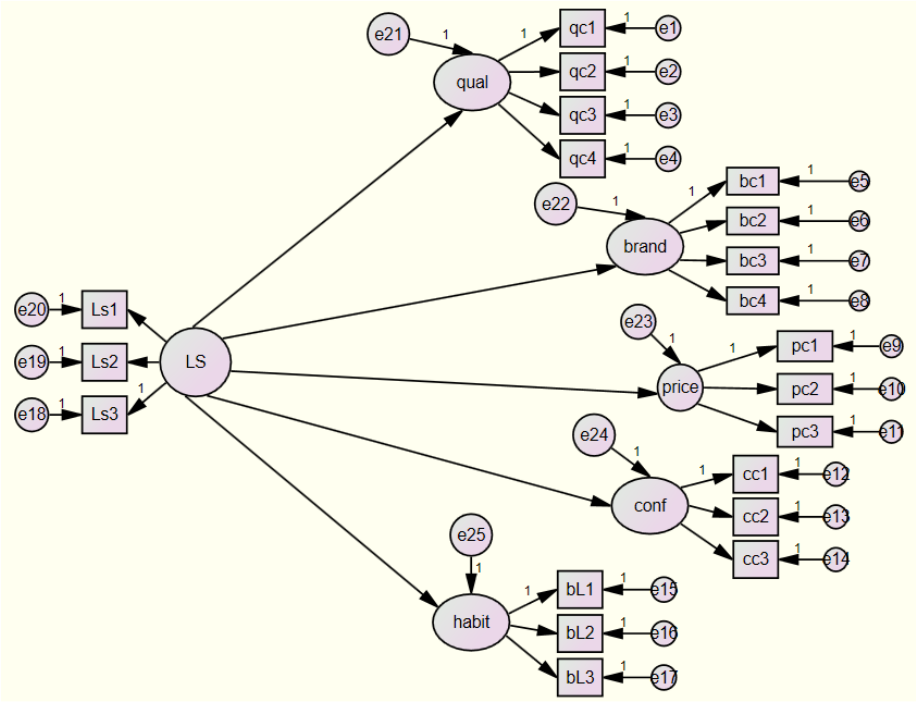

Fig. 1: Conceptual Framework

Method

This study used structural equation model/SEM analysis to test all hypotheses. Covariance based SEM was applied and supported by two hundred online respondents. Some criteria were applied in the online survey process. First, respondents must have a social media account. Second, they must be active in social media for at least two years. The online survey instrument is adopted from Decrop and Snelders (2005), Tsiros and Mittal (2000), Alegre and Juaneda (2006), Correia, and Crouch (2004), also Nicoletta and Servidio (2012) with total 23 questions. Score 1 to 5 of the measurement scale has been used in the online survey. Options are ranging from 1 "not me at all" to 5 "so much like me". The level of life satisfaction measured by option 1 "very dissatisfied with my life" to 5 "very satisfied with my life right now" answer. Tourist destination to examined is Bali, which is very popular in global tourism and meets the requirement of holiday destination for middle-income tourists. The goodness of the research model was evaluated by some criteria which are included in the goodness of fit (GoF) model measurement (Hair, Black, Babin & Anderson 2014).

Results and Discussion

Sample Profile and Most Popular Social Networks

The online survey reveals some information. Participants are 135 males (67.5%) and 65 females (32.5%). There are 92 males (68.12%) who work in government institutions. The rest of the male participants are having a family business or work in a private company. The majority of female participants are working in various private companies (61.5%) and the rest of them are unemployed or being housewives. The extent of life satisfaction which reflects on the financial condition reveals some important facts. There are 172 participants (86%) who have a monthly income of more than 450 USD, which is relatively high for average workers in Indonesia. The intensity to use social media is also high.

All participants are having a personal social media account. Furthermore, there are 168 people (84%) who have more than one social media account. Additionally, there are 122 people (72.6%) who have more than two social media account. The most popular social network is shown below:

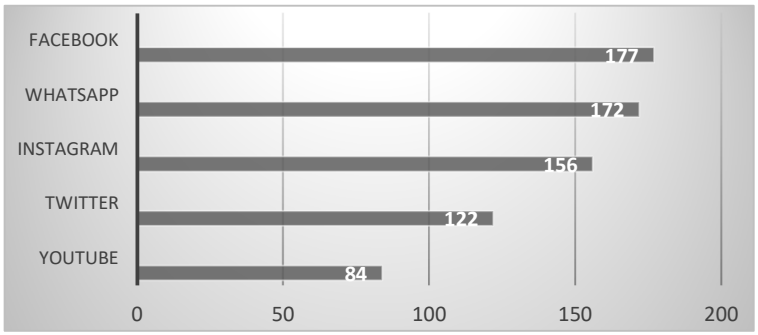

Fig .1: Social Networks User (Own Personal Account)

Goodness of Fit Result

The evaluation of the structural research model discovers a satisfying result as presented in table 1.

Table 1: P-Value of Default Model

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	31	72,158	60	,135	1,203
Saturated model	91	,000	0		
Independence model	13	358,590	78	,000	4,597

The score of the default model (p-value) is 0.135, indicating a good fitness level of the research model. Another evaluation of the goodness of fit (GoF) shows good consistency. In table 2, the GFI score is 0.949 and the AGFI score is 0.922, indicating the research model can represent the phenomenon. The parsimony test result is also satisfying. In table 3, the PNFI and PCFI scores are 0.614 and 0.736, indicating the research model is relatively simple yet effective.

Table 2: AGFI and GFI Weights Result

Model	RMR	GFI	AGFI	PGFI
Default model	,011	,949	,922	,625
Saturated model	,000	1,000		
Independence model	,039	,733	,688	,628

Table 3: Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	,769	,614	,736
Saturated model	,000	,000	,000
Independence model	1,000	,000	,000

Several reflective indicators are removed because the loading score is low. Therefore, the final model has been modified according to the modification indices (MI) score. The final model of this research is in figure 2 below.

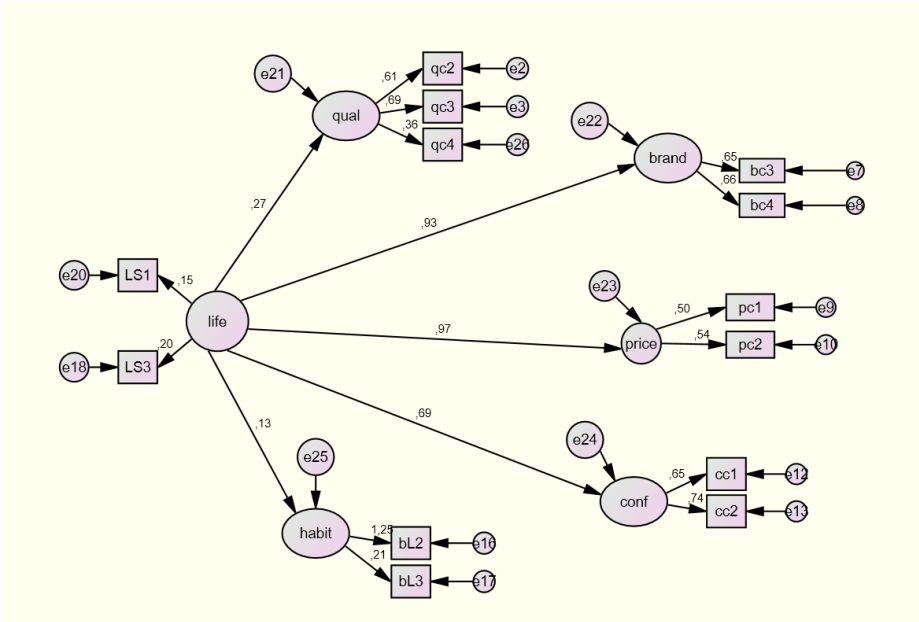

Figure 2: Final Model

Response from respondents in the online survey shows good consistency related to empirical fact. The result of life satisfaction level measurement is high, indicating our participants are mostly satisfied with their lives. Next, from the measurement of "perfectionist or high-quality consciousness style", the highest loading score occurs from the statement "I often go to a high-quality holiday destination". This indicates that people with a high level of life satisfaction are prone to choose a high-quality holiday destination. Rajesh (2013) argued that a high-quality holiday destination can provide pleasant attractions, comfortable accommodation, easy access, superb amenities, and activities. The level of life satisfaction is also creating "a holiday destination which often appears in social media is a good choice" opinion. This opinion is logical since our survey participants are highly active in social media. In terms of "price and value for money" style, most of the participants answered "I often visit cheaper holiday destinations". This finding shows that the extent of life satisfaction can make people more aware of benefits and cost calculations. Moreover, a high loading score also occurs in the statement "the more I search for information, the harder I choose a holiday destination". This result consistent with the prior issue that social media usage can bring much confusion to select a specific holiday destination.

Hypotheses Testing Result

Hypotheses testing has discovered some important findings as presented in table 4.

Table 4: Regression Weights Result

			Estimate	S.E.	C.R.	P	Label
qual	<---	life	1,227	,733	1,675	,094	
brand	<---	life	4,413	1,929	2,287	,022	
price	<---	life	3,505	1,561	2,245	,025	
conf	<---	life	3,220	1,446	2,226	,026	
habit	<---	life	,172	,543	,317	,752	

			Estimate	S.E.	C.R.	P	Label
qc2	<---	qual	1,000				
qc3	<---	qual	1,017	,297	3,429	***	
bc3	<---	brand	1,000				
bc4	<---	brand	,938	,156	6,011	***	
pc1	<---	price	1,000				
pc2	<---	price	1,040	,221	4,710	***	
cc1	<---	conf	1,000				
cc2	<---	conf	1,126	,211	5,332	***	
bL2	<---	habit	5,849	17,780	,329	,742	
bL3	<---	habit	1,000				
LS3	<---	life	1,000				
LS1	<---	life	,475	,323	1,469	,142	
qc4	<---	qual	,493	,144	3,419	***	

First, the participant's level of life satisfaction does not automatically make them choose a high-quality destination (p=0.094). This opens a new discussion because Decrop and Snelders (2005), also Rajesh (2013) have a different argument. In this case, the survey participants are more likely to choose the "viral" holiday destination, as they get the information from social media. This information confirms the prior study of Leung et al. (2013), also Macdonald and Sharp (2000) who mentioned that social media provides many "viral" holiday destinations. Second, destination awareness correlates to the level of life satisfaction (p=0.022). This supported by a wide network of participants who actively socialize in various online media. Information regarding holiday destination now is very easy to access. Participant's level of education and health economics condition support this finding.

Third, the participant's level of life satisfaction can create a strong awareness of cost and benefits before they choose the best holiday destination (p=0.025). This finding is similar to some previous studies of Alegre and Juaneda (2006), also Correia and Crouch (2004). They mentioned the same information that the evaluation of cost and benefit is often found in a high education environment. Fourth, confusion to choose a specific holiday destination caused by a high level of education and good economics condition (p=0.026). Some scholars like Sharifpour, Walters, Ritchie, and Winter (2014) have explained the same fact. This finding also confirms Rewtrakunphaiboon and Oppewal (2003) also Milano et al. (2011) who claimed that education and economics open more opportunities and thus create much confusion. Fifth, destination loyalty does not correlate to the level of life satisfaction (p=0.752). Some participants are fond to try different holiday destinations. This evidence confronts Sönmez and Graefe (1998), Wong and Yeh (2009) also Poria, Butler, and Airey (2004). In this case, the age factor might be the reason why they choose to travel to various locations rather than to one location repeatedly.

Conclusion

This study aims to discover the impact of tourist's life satisfaction on their style in choosing vacation destinations. To achieve that, an online questionnaire has been distributed to 200 travelers who active in social media. Some findings show that the level of life satisfaction has a strong impact on the decision to choose a "viral" holiday destination. The level of life satisfaction makes travelers more aware of cost and benefit calculation. Confusion to choose specific holiday destinations also found amongst participants who have a high level of life satisfaction. The recommendation for further research is using cultural and religious aspects to determine destination decision-making process.

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State Regulation of Industrial Policy in Financial, Economic and Business Development in The Countries of the European Union

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Abstract

The new EU industrial policy is aimed at implementing key priorities: maintaining global competitiveness of European industry and equal playing conditions, both domestically and globally, ensuring Europe's climate neutrality by 2050 and shaping the digital future of Europe. These vectors define a comprehensive set of principles for state regulation of industry and the specifics of future actions in the field of common European industrial policy. This publication attempts to identify the key drivers of industrial development and industrial policy in Europe and to outline the transformation vectors of European industrial and economic development. Based on the analysis of official data and analytical reports, space-time and sectoral features of industrial production in EU countries are determined, factors that influence industrial development are identified, major trends in industrial development are considered, socio-economic effects of industrial policy for EU countries are identified.

Keywords: Industrial Policy, Public Administration, Economic And Regional Development, Production, European Union

Relevance of Research

In the European Union, attention to industrial policy is increasing. Increasing attention to industrial policy is driven mainly by economic trends. Developed industrialized countries are gradually losing their competitive position to developing countries that have substantially increased their industrial capacity in recent years, including through active industrial policies.

Despite the decline in the share of the European Union in world GDP at purchasing power parity over the past decade, its combined contribution to the global economy remains significant (according to the IMF, 15.8% in 2019). As of January 1, 2019, more than 513.5 million people lived in the EU. The EU is characterized by a significant difference in development levels between the two groups of states, which can be described as “EU-15” (“old” EU members with a higher level of development) and “EU-13" (13 states that entered into the union after 2004 of the year).

The dynamics of the EU-15 and EU-28 GDP are similar, since most of the gross output of the EU as a whole is the GDP of the fifteen “old” members of the union (almost 90%). After 2000, the growth rate of the EU-13 countries became higher than that of the "old" member countries of the association, which led to a convergence of the level of development of countries. According to IMF estimates, in 2016-2019, the growth rate of the gross output of the "new" members of the European Union averaged 3.9% annually, and the "old" – 1.9%. It is important to note that the high growth rates of the EU-13 countries were provided by a strong increase in domestic demand and consumption. During 2016-2018, the gross output of the EU increased on average by 2.3% annually. According to IMF estimates, in 2019, the growth rate of the EU economy fell to 1.5%. Such dynamics of gross output is due to the negative conjuncture of the world economy, a slowdown in world trade growth, tariff conflicts between individual countries and the uncertainty associated with geopolitical risks, in particular the UK's exit from the EU, and the implementation of the obligations of a trade deal between the United States and China.

Analysis of Previous Studies

Studies of particular aspects of industrial development and industrial policy in the European Union and in some of its countries are sufficiently thoroughly discussed in the scientific community. In the concept by Stiglitz (2016), industrial policy in the most general sense is a government policy aimed at changing the structure of the economy, increasing production potential and ensuring competitiveness in world markets. The transition from vertical to horizontal industrial policies with their distinguishing characteristics is shown in a study by Singh (2016).

The features of new industrial policy in EU countries at the sectoral and regional levels are explored in the work by Landesman (2015). Vectors of activation of industrial development and directions of an exit from economic crisis are investigated in works by Ambroziak (2017). Some issues of stimulating the innovative component of EU industrial development are presented by Pianta (2015).

Starikov (2017) examines the economic content of industrial policy and its structural elements, examines the tools and mechanisms for its implementation, explores the global experience of industrial policy formulation and implementation, and principles for evaluating its effectiveness.

A study of the impact of sectoral impact on industrial development of the EU-Ukraine Free Trade Agreement is reviewed by Bazhenova (2018). Tsyplitskaya and Yannenkova (2018) analyze the socio-economic, political and institutional prerequisites for shaping the European Union's industrial policy and the specific features of its implementation.

Dhéret and Morosi (2014) analyze the de-industrialization process that is currently taking place in Europe and the role that government plays in the evolution of European industrial policy.

The study by Alexa and Alam (2019) focuses on a review of the current status, as well as the implications and challenges of the Industry 4.0 concept among European industries, in the direction of innovative development and changes at all levels of business models and value chains of industrial products.

In the work of the authors Danilova, Pravdina, Dzenzeliuk and Kochegarova (2019) suggest the rationality of the existing structure of the regional economy and the actual development priorities of the industry based on the positioning of territories in coordinates "integral index of efficiency" – "integral index of localization" and identify outsider regions and leading regions, assess the impact of basic industry localization in the region on industry performance.

Purpose and tasks. This publication embodies an attempt to summarize industrial production trends and outline the existing mechanisms for state regulation of industrial policy in EU countries. To achieve this research goal, based on the analysis of official data and analytical reports, identify the sectoral and regional characteristics of industrial production in EU countries, determine the factors influencing industrial production, consider the main trends, determine the socio-economic consequences of modern industrial policy mechanisms for European countries, outline regulation of industrial production in EU countries.

Information base and research methods. Information base for the analysis of state regulation of industrial policy in EU countries is official data of the European Union, European Commission, World Economic Forum, World Trade Organization, European Central Bank, open Eurostat data, analytical reviews, reports and reports, scientific articles, sociological research data, specialized and socio-political press, the results of the authors' own research. The study used methods of analysis and synthesis (to identify the structural features of industrial production), systematization (to group industrial policy principles), comparative-time method (to identify the dynamics and trends of industrial production in EU countries), comparative-spatial method (to identify regional features of industrial production in EU countries), generalizations and others.

Outline of the material. In 2017-2018, the EU economy continued to grow, but in the second half of 2018, growth rates slowed down somewhat due to several factors, including increased trade tensions, global uncertainty, the UK's exit from the EU and so on. The EU's real GDP growth rate is expected to increase to 1.6% in 2020, up from 2.0% in 2018 and about 1.4% in 2019. In recent years, significant progress has been made towards reducing unemployment and poverty, correcting macroeconomic imbalances and improving the financial position of EU member states.

Figure 1 shows the dynamics of the cost of products sold in the EU-28 from 2008 to 2018. After the economic crisis in 2008, the cost of production in the EU fell sharply in 2009 with a sharp drop of 18%. However, between 2009 and 2011 there was a turn when the cost of products sold increased by 15% and remained stable over the next three years. The results of 2018 show the consolidation of production growth after a full recovery and exceeding the level of 2008. This upward trend in industrial production in the EU was continued in 2018 and was mainly related to the production of cars, trailers and semi-trailers, other transport equipment and machinery, as well as equipment.

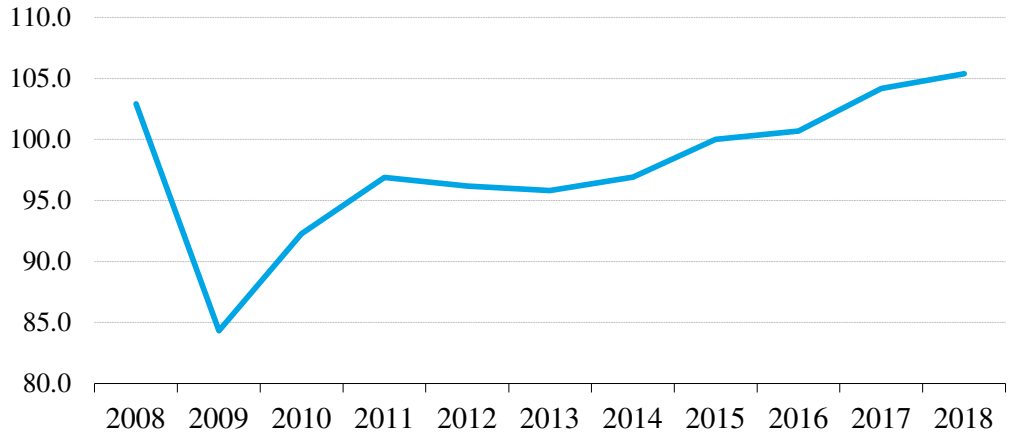

Note: EU-28: Except Cyprus, Luxembourg, Malta
Analysis based on constant price ref. 2015

Fig. 1: Evolution of EU-28's value of sold industrial production, 2008 - 2018 (2015=100)
Source: Eurostat (online data code: DS-066341)

According to Eurostat, during 2016-2019, the growth rate of production of cars, trailers and other transport equipment maintained a high amplitude of fluctuations, reaching a maximum in April 2016, when the growth rate was 10.6% in annual terms. Since the second half of 2018, production of this category of goods has significantly decreased. In 2019, the negative dynamics continued: in April 2019, the decline rate reached its maximum over the four-year period (–8.2%) in annual terms, and at the end of December 2019, production decreased by 7.7% in annual terms. In the following countries, the decline in production of this category of goods was more than the indicator for the EU as a whole: Greece (-29.2%), Denmark (-20.3%), Germany (-13.5%), Hungary (-10.5%), Czech Republic (-10.4%) and France (-9.1%).

The share of external trade in EU goods and services relative to GDP was about 35% in 2018. The EU's share of total world trade in goods and services has fallen to 16.7% in 2017-2018 (a downward trend has been observed over the last two decades). At the same time, the EU remains an important trading partner for over 80 economies. Despite the fact that the volume of trade in goods with third countries continued to grow, in 2018 the external trade balance of the EU was negative, primarily due to the significant shortage of fuel and lubricants. The United States, China and Switzerland remained the main export destinations for EU goods.

Analyzing the cost of products sold in the EU-28 by individual EU member states in 2018 (fig 2), three quarters of the cost of products sold in the EU-28 (77%) was received by six EU member states. Germany recorded the highest cost of products sold, equivalent to almost 28% of the total EU-28, followed by Italy (16%), France (12%), the United Kingdom (9%), Spain (8%) and Poland (5 %). The remaining 22 EU member states contributed smaller shares (up to 3%).

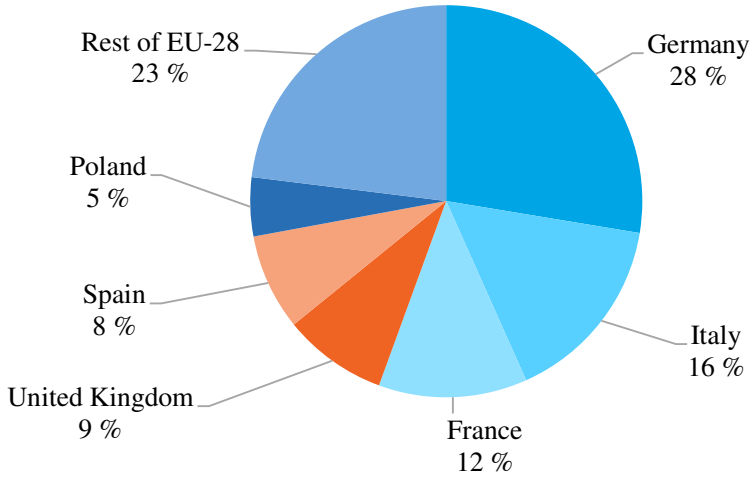

Note: EU-28 except Cyprus, Luxembourg, Malta
Due to confidential reasons the EU-28 total is rounded and do not sum up the countries' total

Fig. 2: EU-28 value of sold industrial production, by country, 2018 (% of total value of sold production)
Source: Eurostat (online data code: DS-066341)

Industrial goods continued to dominate the EU's export structure (mainly transport equipment and chemicals), but their share gradually declined from 81.9% in 2016 to 80.4% in 2018.

Considering the production sectors in more detail, Slovakia stood out for the production of cars, trailers and semi-trailers, as well as other transport equipment, which accounted for 50% of the total cost of products sold in the country in 2018.

More than 42% of the value of products sold in Greece was derived from the production of food, beverages and tobacco. The Netherlands was close to this share with 33%, followed by Croatia, Spain, Bulgaria, Belgium and Lithuania with shares from 26% to 29%. In contrast, the Czech Republic and Slovakia are the least specialized countries in food production, with the lowest share in sales - 9% and 6%, respectively.

The share of production activities in the cost of products sold in the EU-28 in 2018 is shown in Fig 3. The cost of products sold in the EU-28 is concentrated in fourteen groups of activities; six of these groups account for nearly three quarters of the total for both accounting years. The sectors of food, beverage and tobacco production, the production of basic metals and finished metal products, and the production of automobiles and other transport equipment together accounted for 47% of the cost of products sold in 2018. Production activity in the EU-28 the cost of products sold remained stable from 2008 to 2018.

The production of pharmaceutical products and pharmaceuticals in 2018 increased by 49% compared to the cost of products sold in 2008, and, on the other hand, the production of computer, electronic and optical products decreased by 6%.

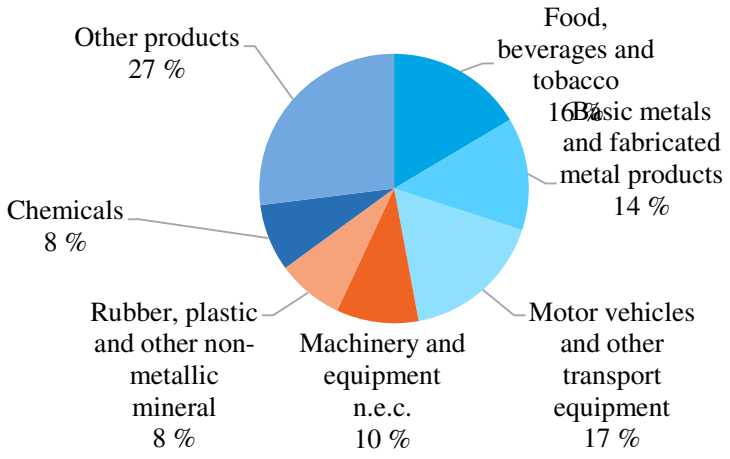

Fig. 3: Value of sold production by group of manufacturing activity, EU-28, 2018 (% share of total sold production)

Source: Eurostat (online data code: DS-066341)

Fig 4 shows the dynamics of the cost of products sold for the five largest manufacturing enterprises in the EU-28 for the period from 2008 to 2018. Between 2008 and 2018, the production of cars, trailers and semi-trailers was the most unstable. activity among the five leading manufacturing assets. From the point of view of the reported value of the products sold, this activity has increased the most compared to 2008 (from 31% or 180 billion euros). Food production increased in 2018 by 102 billion euros (16%) compared with 2008, while the largest growth was 110 billion euros in 2017.

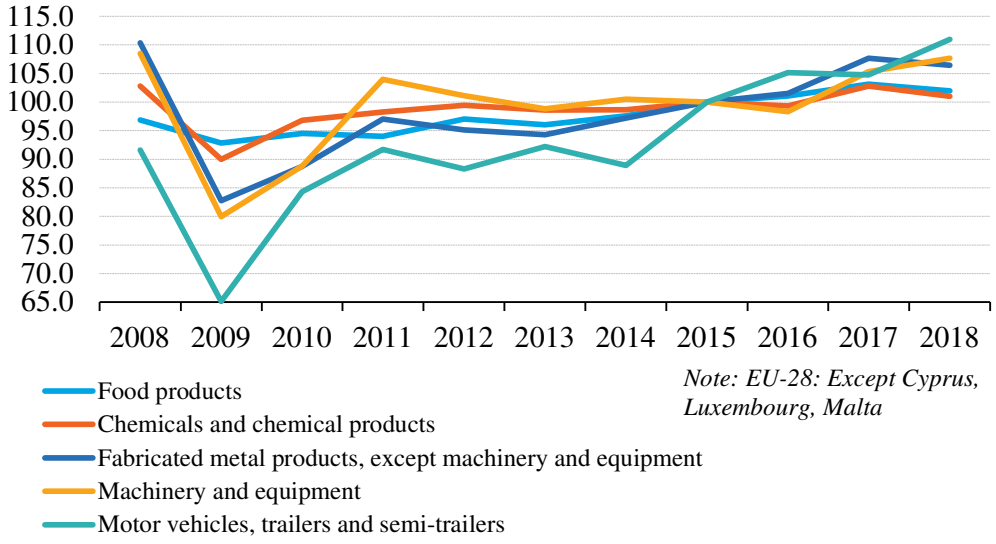

Fig. 4: Evolution of the value of sold production for top 5 manufacturing activities, EU-28, 2008–2018 (2015=100)

Source: Eurostat (online data code: DS-066341)

Analyzing constant prices, in 2018 the production of machinery and equipment decreased by 1%, the production of chemicals and chemical products decreased by 2%, and the production of finished

metal products, except machinery and equipment, by 4% compared to 2008. Food production increased by 5%, and the production of cars, trailers and semi-trailers - by 21% over the same period.

The total value of the sold products produced by the production of cars, trailers and semi-trailers in 2018 amounted to 755 billion euros; this value is 14% of the total cost of products sold EU-28. In 2018, the cost of products sold for this manufacturing sector reached its peak, it grew by 31% compared to 2008 and by 7% compared to last year. In 2018, this amounted to approximately 467 billion euros, which is almost two-thirds of the cost of products sold, accounted for automobile production (61%). The production of other parts and accessories, bodies (bodies), electrical and electronic equipment for motor vehicles, trailers and semi-trailers accounted for the rest of the products sold in this type of activity, which is 39% (fig 5).

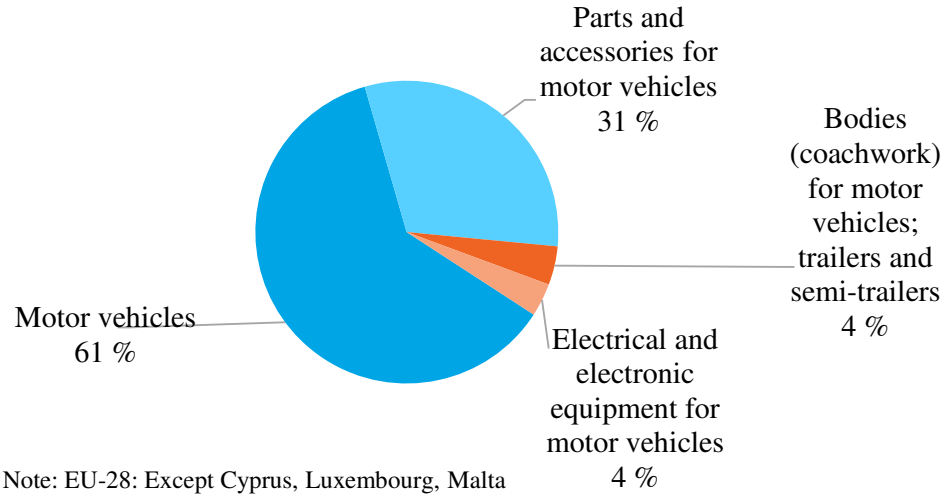

Note: EU-28: Except Cyprus, Luxembourg, Malta

Fig. 5: Sold production of motor vehicles, trailers and semi-trailers in EU-28, 2018 *Source:* Eurostat

The slowdown in economic growth in 2019 was not typical for all countries of the union. Acceleration of GDP growth was noted in Ireland, which showed the highest value among the countries of the European Union (+ 4.3%), Greece (+ 2.0%), as well as in most countries of the EU-13 group: for example, in Hungary (+4, 6%), Latvia (+ 2.8%), Lithuania (+ 3.4%) and Poland (+ 4.0%).

According to Eurostat, during 2016-2017, industrial production in the EU grew steadily: in 2016, the growth rate was 1.8%, in 2017 - 3.1%. Starting in 2018, the growth rate of industrial production began to slow down. In 2018, the value dropped to 1.2%, in 2019, industrial output decreased by 1.0%. In 2019, the largest contribution to the reduction in industrial production was made by such countries as Germany (-4.7%), Luxembourg (-3.0%), Romania (-3.2%), Portugal (-2.4%). However, a decrease in the growth rate of industrial production was not characteristic of all countries. For example, in Denmark this indicator increased by 2.7%, in Lithuania - by 3.5%, Hungary - by 5.4%, Poland - by 4.4% of Slovenia - by 3.0% (table 1).

Table 1: Dynamics of industrial production of the EU countries, 2016-2019

	Index 2015 = 100		Growth rate,%, to предыдущему году	
	2016	**2017**	**2018**	**2019**
EU-28	101.8	105,0	1.2	-1,0
EU-15				
Austria	102.7	108,2	4,2	-
Belgium	104,5	107,5	1,1	-
Denmark	103.8	106,2	2,3	2.7
Finland	104.1	107,6	3,4	1.9
France	100.6	102,9	0,3	0.2
Germany	100.9	104,3	1.0	-4,7
Greece	102,6	106,9	1.8	-0,7
Ireland	101.8	99.5	-0.1	0.7
Italy	101,9	105.6	0.6	-1.3
Luxembourg	100,2	103,9	-1.3	-3.0
Netherlands	101,3	102,7	0.6	-1,1
Portugal	102,4	106,1	0,1	-2.4
Spain	101,7	105,0	0,4	0.5
Sweden	101,3	106,2	2.7	1.4
United Kingdom	101,7	104,2	0,3	-0,9
EU-13				
Bulgaria	102,7	106,6	1.0	0.8
Croatia	105,0	107,0	-0.9	0.5
Cyprus	109,1	117,9	6.9	-
Czech Republic	103,2	110,2	3,1	-0.4
Estonia	103,0	107,4	4,1	-1.9
Hungary	100,7	106,1	3.8	5.4
Latvia	104,7	113,8	2.0	0.8
Lithuania	102,7	109,7	5.1	3.5
Malta	92,8	100,9	1,3	1.6
Poland	102.8	109,9	5,7	4,4
Romania	104,2	113,2	4.3	-3.2
Slovakia	104,6	108,1	4.3	0.4
Slovenia	107,1	116,0	5.0	3.0

Source: Eurostat

Some experts consider current EU industrial policy to be similar to a mercantilist economic policy. Particularly doubtful is the possibility of involving private companies in a continuous continuous process of production and research. The European Commission expects that enterprises will be able

to "give their future in the hands of technological policy". The result of such an EU industrial policy may be the elimination of free competition between enterprises and the transformation of the European model of division of labor.

EU industrial policy today is based mainly on a horizontal approach, but industry support is also present. Sectoral assistance in the EU is strictly regulated as being detrimental to competition and subject to clear conditions and restrictions (fig. 6).

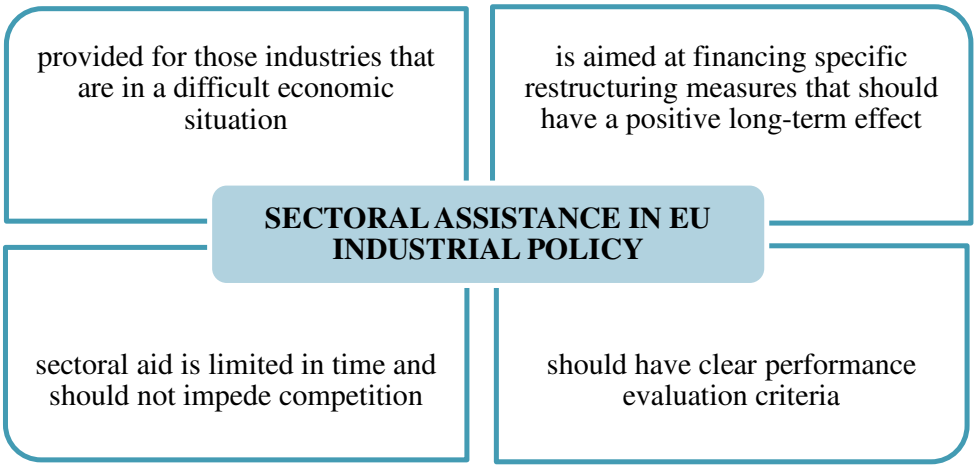

Fig 6. Current sectoral assistance in EU industrial policy
(summarized by the authors)

The application of an economic approach to EU industrial policy is necessary to ensure a level playing field for the entities of the common market. This means that state aid decision-making is based on economic analysis and a comparison of the positive effect of the aid with its negative effects on competition and trade (fig. 7).

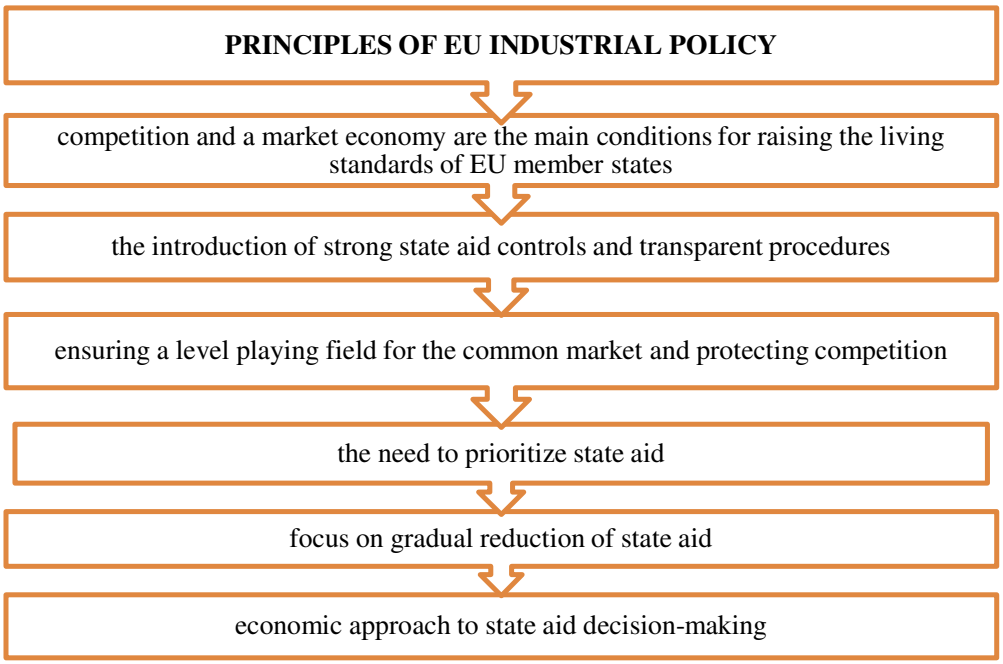

Fig. 7: Principles of EU industrial policy
(summarized by the authors)

It should be noted that any state aid in the EU is interpreted as distorting market mechanisms and restricting competition. State aid which favors individual enterprises or goods and impairs trade between countries is incompatible with the common market.

The conditions and types of assistance that are eligible in the EU are clearly defined, including:

- aid for the development of regions where the standard of living is particularly low or where there is significant unemployment;
- assistance in the implementation of important projects of common European importance;
- assistance in the recovery of Member States in times of severe economic downturn;
- assistance for regional development and economic activities that will not have a negative impact on trade.

The need to identify priority areas for industrial policy and state aid (Fig. 8) is explained by the fact that public resources are limited and the lost benefits from the possible implementation of alternative options can be significant.

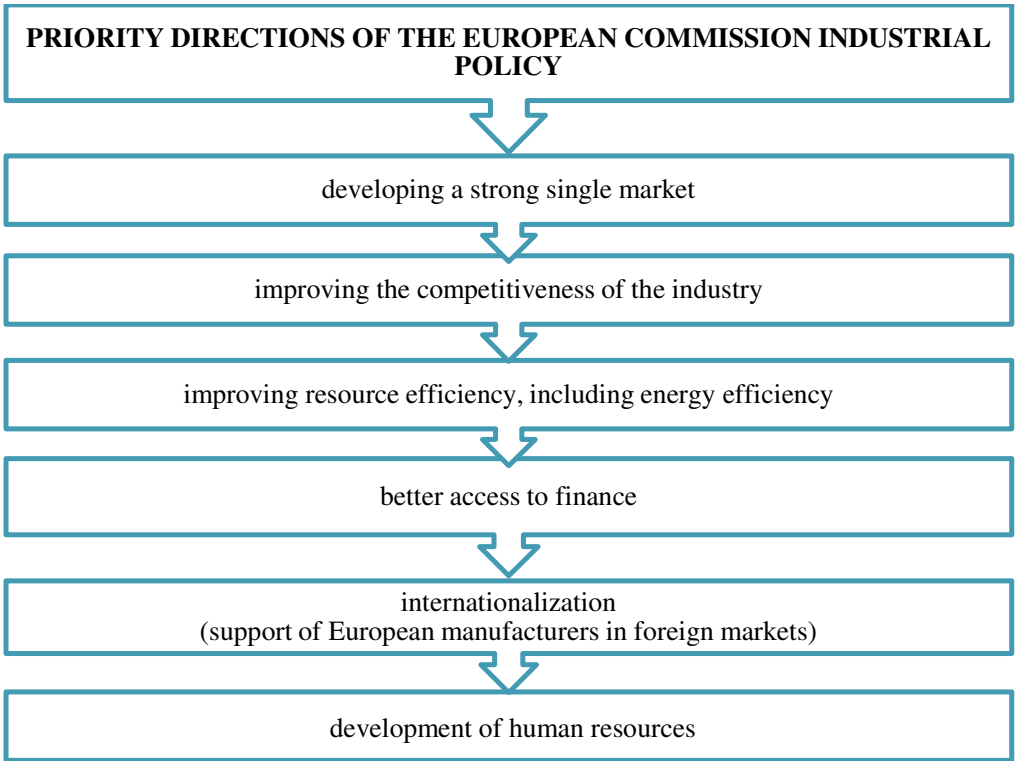

Fig. 8: European Commission's industrial policy priorities
(summarized by the authors)

The European Commission has unveiled in 2020 a new strategy to help European industry lead the dual transition to climate neutrality and digital leadership. The strategy is aimed at enhancing Europe's competitiveness and strategic autonomy during a period of shifting geopolitical plates and increasing global competition. By mid-2020, the European Commission will approve a «White Book» that will combat the devastating effect on the single market from foreign subsidies and determine the parameters of external participation in European public procurement programs. Work should be completed by establishing a legal instrument for foreign subsidies as early as 2021. At the same time, the EU will continue to support global rules on industrial subsidies within the WTO and the principle of reciprocity with third countries in public procurement policy.
To meet the objectives of the industrial strategy, a so-called EU Industrial Forum should be set up by September 2020, which will be a technology platform open to industry, including small and medium-sized enterprises and social partners.

Two more initiatives in the renewed industrial policy package will address the development strategies of small and medium-sized enterprises and the creation of favorable conditions for their activity in the internal and external markets of the European Union, as well as the prospects of developing a single EU market for the benefit of both producers and consumers.

Some countries, such as Germany, are negative about the EC's argument that the European Union must create absolute independence in the most important sectors of industry and shape Europe's self-sufficient economic system. It is considered impossible to have the know-how in all important sectors of the industry, to implement import restriction policies to reduce the competitive pressure of external competitors, while ensuring full openness in the domestic market. The results of the industrial economy and the new theory of international trade put at the heart of the question of the contradiction between industrial and competitive policies in the field of merger and acquisition control in the European Union. European business associations can also become part of industry strategies and programs and claim grants for productivity development.

Conclusions

The slowdown in the global economy can slow down the economic growth of the "new" members of the union, slowing down the convergence of economic development of the EU countries. This is confirmed by IMF estimates: according to the forecast, in 2020 the growth rate of the gross output of the EU-15 will increase to 1.5%, and the EU-13 will decrease to 3.2%. At the same time, the EU-28 GDP growth rate is expected to increase to 1.6%. However, in 2020, coronavirus (2019-nCoV), which affected all European countries, could become an additional uncertainty factor for the economy of the European Union.

In the European Union, there is a rigid system for monitoring and controlling the implementation of State aid programs to the industrial sector. The process of convergence of industrial policies can take a long time, because with the changing global markets, the transformation of the EU structure and the ever-increasing global challenges, conflicts of interest will arise between nations, regions and, especially in the future, between large industrial groups. This includes the fight for markets, which will stimulate industrial integration under the microeconomic scenario, but will hinder the convergence of industrial policies that is happening from above. In the next stages of the convergence of EU industrial policies, there will be a constant imbalance of interests between selfish industry groups, including non-European ones, and supranational institutions, seeking to minimize the effects of profit-oriented company policies. Industrial policy will be accompanied by a number of lobbying bills and increasing opposition from supranational authorities and business representatives.

The new approach to European industrial policy should include a number of measures to support all players in European industry, including large and small companies, innovative start-ups, research centers, service providers, suppliers and social partners. Specifically, it is an intellectual property action plan aimed at supporting technological sovereignty, promoting a level playing field globally, more effectively combating intellectual property theft and adapting the legal framework to green and digital transitions.

Another important area of industrial policy is to clarify the rules of competition both domestically and globally, including measures to prevent unfair competition. The EU's strategic autonomy should be aimed at reducing the dependence on critical raw materials, developing strategic digital infrastructure and relevant key technologies. Also, comprehensive measures should be envisaged for the modernization and decarbonisation of energy-intensive industries, support for sustainable and intellectual mobility, and energy efficiency.

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Information Science for Competition & Data Analysis Via HADOOP: The Case of Smart Transport

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Abstract

Organized data investigation has been a colossal achievement formerly, nevertheless, the examination of huge scope unstructured information as a troublesome zone. YOUTUBE has trillions of clients, and consistently these clients watch YOUTUBE for a countless number of hours and create trillions of views [1]. Another statistical figure indicates that consistently and over the entire world more than 1.2 million recordings on YOUTUBE are downloaded. Moreover, to study and comprehend the activity that happens on such a monstrous scope, a relative database is no more adequate; you need a circulated and equivalent system similar to HADOOP. The primary goal of this paper is to concentrate on how data is created on YOUTUBE and how it might be utilized by various companies to target more clients and improve their purchases. Our project utilizes the YOUTUBE data API. When the API key has been produced, python content will be employed to utilize this API to recover video information as indicated by the search standards. In this paper, we use SQL type inquiries which will be executed in HIVE to remove the critical output which can be used for the examination. Our objective via this research is to treat the key words in relation to intelligent transport, especially in some Moroccan cities.

Keywords: Youtube API, Big Data, Hadoop, intelligent transport, SQL

Introduction

Every day we generate more than 2.5 trillion bytes of data [2], this amount of data to give birth to a new concept called Big Data, this data is mainly generated in real time from social media websites which exponentially increases on a daily basis. Youtube is one of the most popular and attractive social media platforms in the world, it is a source that provides a huge amount of data via comments, the likes, the number of subscribers, etc.Analyzing these points is an interesting data source to gain insights into users to help businesses target and make informed decisions.Indeed, most companies launch their product on YouTube and anxiously await the opinions of their subscribers. Big production houses launch movie trailers and people give their first reactions and comments on the trailers. It also creates a buzz and excitement about the product. Therefore, the data points listed above become very critical for companies so that they can analyze and understand the feelings of customers about their products / services.

Hadoop is an open source software framework for storing data and launching applications on clusters of standard machines. Its various components are used by many companies for their Big Data projects. This solution offers massive storage space for all types of data, immense processing power and the possibility of taking on a virtually unlimited number of tasks. Based on Java, this framework is part of the Apache project, sponsored by Apache Software Fondation [3]. Hadoop consists of two main components [4]:

- **HDFS**(**Hadoop Distributed File System**): is the foundation of Hadoop since it is responsible for storage, whose management is made easier by the framework it integrates.
- **MapReduce**: HDFS efficiently stores large data, reads and writes it with robustness and speed. But he does nothing. MapReduce is a framework for writing applications processing large volumes of data and paralleling processing on HDFS.

This paper starts by presenting the Hadoop distributions in section 2. Section 3 describes the application model. After that, section 4 is added to illustrate and clarify the result and discussion of the current research study. Finally, a conclusion with future contribution is involved in section 5.

Hadoop distributions

While Hadoop offers the possibility of collecting data on HDFS (Hadoop Distributed File System), many applications available on the market (such as **MapReduce, Pig** and **Hive**) can be used to analyze the data. The following table (see table 1) presents the functionalities and the comparison of the main Hadoop Data Analysis technologies available on the market [5].

Table 1: Comparison between Pig, Hive and MapReduce

Featured	MapReduce	Pig	Hive
Language	Algorithm of Map and Reduce Fonctions (can be implemented in C, python, java)	PigLatin (scripting languge)	SQL like
Schemas /Types	No	Yes (implicit)	Yes (explicit)
Partitions	No	No	Yes
Server	No	No	Optional thrift
Lines of code	More lines of code	Fewer (Around 10 lines of PIG = 200 lines of Java)	Fewer than MapReduce and Pig due to SOL Like nature
Development Time	More development effort	Rapid development	Rapid development
Abstraction	Lower level of abstraction (Rigid Procedural Structure)	Higher level of abstraction (Scripts)	Higher level of abstraction (SQL like)
Joins	Hard to achieve join functionality	Joins can be easily written	Easy for joins
Structured vs Semi-Structured Vs Unstructured data	Can handle all these kind of data types	Works on all these kind of data types	Deal mostly with structured and semi-structured data
Complex business logic	More control for writing complex business logic	Less control for writing complex business logic	Less control for writing complex business logic
Performance	Fully tuned MapReduce program would be faster than Pig/Hive	Slower than fully tuned MapReduce program but faster than badly written MapReduce code	Slower than fully tuned MapReduce program but faster than bad written MapReduce code

For our study we chose to work with Hive, this choice is based on the following criteria:

- A familiar programming model for people who know SQL.
- Avoid difficult coding in MapReduce programming.
- Development time is fast.
- Less line of code due to SQL nature.
- Easy for joins.

On the market, there are a variety of solutions, each with its particularities; we can cite three distributors in the Hadoop ecosystem:

- **Cloudera**: it is the leader, which gives it legitimacy with a number of customers greater than that of its competitors. Having the creator of the Hadoop framework in these ranks is a great advantage [6].
- **MapR**: this distribution offers a solution a little distant from Apache Hadoop because it integrates its own vision of MapReduce and HDFS. She comes right after Cloudera [7].
- **Hortonworks**: this distribution is the only fully Hadoop platform. Its strategy is to base itself on stable versions of Hadoop rather than on the latest versions [8].

Cloudera distribution is the solution chosen for carrying out our tests, it has been used for several reasons. First of all the fact that Cloudera offers an open source version which uses the main components of Hadoop. Then, the distribution of Cloudera is the most mature on the market with already the fourth version named CDH5. But above all, the Cloudera distribution is the most used in business. Indeed, according to the white paper « *Where is the adoption of Big Data?* » Published by *Talend* in 2013, 12% of people replied that they considered for the future or were already using the Cloudera distribution compared to 4% for the distribution of MapR and 3% for the distribution of Hortonworks. The rest of the answers concerning other solutions [9]. Another reason to choose Cloudera is that it uses less memory space (4 GO). Cloudera exists in three versions: Free Edition, Standard and Enterprise, we decided to work with the Free Edition version.

Application Model

Figure 1 shows the general model of the application, we retrieved the YouTube data from the channels using the YouTube API. We then used Google Developers Console to generate a unique access key required to retrieve data from public YouTube channels. Once the API key is generated, a python script is designed to use the YouTube API to extract video information based on a search criteria. The output of the file generated from the script is then loaded into the HIVE database. Next, we execute queries on HIVE to extract meaningful output that can be used by management for analysis.

The study uses the YouTube Data API which allows applications/websites to integrate functions used by the YouTube application to extract and display information.The above data can be used in many ways. To retrieve information from YouTube using their data API, our app must be authenticated. Once the application is authorized, we can recover data that can be used to analyze and represent.

To communicate with the YouTube API, an application program interface key is required. Google Developer allows you to create a unique key to connect to YouTube [10].

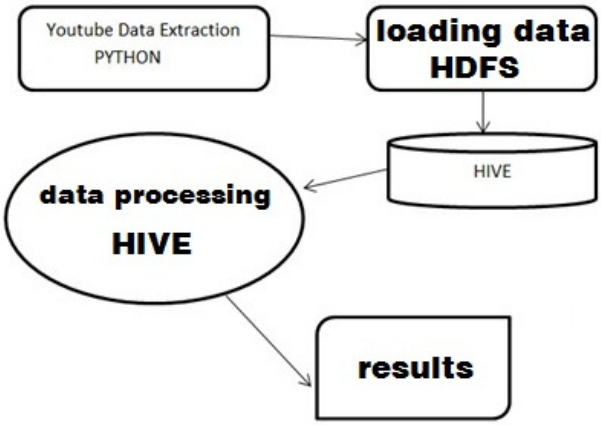

Figure 1: model of the project

Result and Discussion

The script we used is developed in python, it is based on a set of libraries among others: **Pandas** which provides high performance data structures and data analysis tools, **unide code** which takes Unicode data and tries to represent it in ASCII characters, CSV for Reading and writing in files, **Argparse** module facilitates the writing of user-friendly command line interfaces, **Apiclient** to Easily access YouTube APIs from Python.

Subsequently the script obtains the user credentials from "Key" and uses the credentials to establish the connection to the service. Then, based on the search criteria list item. The following modules were used in a **youtube_search** function to retrieve video information:

- **Snippet**: the object contains basic details about the video, such as its title, description and category.
- **ContentDetails**: the subject matter contains information about the content of the video, including the duration of the video and an indication of whether subtitles are available for the video.
- **Localizations**: object contains translations of video metadata.
- **Statistics**: the object contains statistics on the video as an example: The number of times the video was viewed, the number of users who indicated that they liked the video or not.
- **Status**: The object contains information about the download, processing and privacy statuses of the video [11].

After generating the file, it was loaded into HDFS.

In the phase of loading and analyzing data on HIVE, we will present some requests for data processing (see figure 2), which we retrieve from the script and whose search criteria were "Animals" and we will interpret the result in the form of diagrams for a more simplified visualization.

	A	B	C	D	E	F	G	H	I	J
1	title	videoId	viewCount	titleCH	likeCount	dislikeCount	mmentCou	categoryId2	duration	publishedAt
2	Martin Garrix - Animals (Official Video)	gCYcHz2k5x0	1167425967	Spinnin' Reco	6192915	236304	241591	Music	PT3M12S	2013-06-17T14:30:09.000Z
3	Maroon 5 - Animals	qpgTC9MDx1o	526580008	Maroon5VEVC	2706719	156310	127290	Music	PT4M41S	2014-09-29T16:00:13.000Z
4	FORGET CATS! Funny KIDS vs ZOO ANIMALS are WAY FUNNIER! - TRY NOT	RKU6x1n9Hak	80480977	Tiger Producti	176097	53370	10059	Pets & Animals	PT10M21S	2017-11-03T11:58:35.000Z
5	Colors for Children to Learn w/ Animals Spiderman and Play Doh Toys 3D	Zta20LSVp7w	35834	Candy Candy	121	61	1	Education	PT0S	2018-06-08T00:31:26.000Z
6	Amazing Jaguar Hunting Crocodile While Sleeping | Big Battle Animals Re	X8MqDH9uqhg	9203061	Leopard - Che	30650	4449	2431	Pets & Animals	PT2M32S	2017-12-11T07:33:03.000Z
7	Top 10 MOST POWERFUL ANIMALS in the World including Tiger, Rhino, Po	2iCJ-ci7N1c	3994234	Animal Chann	7504	2177	451	Pets & Animals	PT7M27S	2018-04-17T14:41:06.000Z
8	1% CHANCE that these animals WON'T MAKE YOU LAUGH! - Funny ANIMA	qc_VLyxUqbk	1586838	Tiger Producti	8202	1027	874	Pets & Animals	PT10M18S	2018-05-13T12:30:01.000Z
9	Real life Of Goat Animals Hit Group - Style Meeting Group	7Fg1cTCOOEc	240061	Animals Daily	273	101	19	Pets & Animals	PT5M22S	2018-05-26T14:14:05.000Z
10	Learn Colors Animals Swimming Race Outdoor Playground For Kids | Lear	1UZFZjYEmx0	1376046	My Superherc	3447	1895	83	Education	PT30M52S	2018-06-01T10:30:00.000Z
11	LIVE: Most Amazing Moments Of Wild Animal Fights - Wild Discovery Ani	Zxfwj24-YcA	4599492	Wild Animals	10822	3219	24	Pets & Animals	PT0S	2018-05-12T09:02:45.000Z
12	Ozzy Man's The Lives of Animals - Volume 1	cRGkuFUclD8	9591053	Ozzy Man Rev	23132	1979	673	Entertainment	PT1M44S	2015-10-18T12:08:09.000Z
13	The Best Of Eagle Attacks 2018 - Most Amazing Moments Of Wild Animal I	RB4RCOe-ZEw	9505287	Wild Animals	19115	5309	1322	Pets & Animals	PT10M2S	2018-04-14T11:10:45.000Z
14	Amazing!! Animal Saves Another Animal | Animal Heroes 2016 HD	Nubc09jTW-M	41051587	ANIMALBIOLC	230108	22248	15673	Pets & Animals	PT8M52S	2016-04-28T00:03:14.000Z
15	Animals never fail to make us laugh - Super funny animal compilation	QpNXHJGfGYo	32948875	Tiger Producti	67443	10773	4758	Pets & Animals	PT11M55S	2016-05-06T13:19:02.000Z
16	Learn Domestic Animals Sounds For Children | Best Way To Learn Animal	7K0uS9LpKgU	78808244	ChildrenNurs	106970	70282	2471	Education	PT10M33S	2016-02-06T11:00:00.000Z
17	Animals Train Video For Kids | Animals Cartoons For Children | Learn Col	94NuFTMBBOY	5120259	Animals Rhyn	11030	6413	229	Education	PT12M34S	2018-05-03T04:30:02.000Z
18	Animals Can Be Jerks! (June 2018) | FailArmy	ZMel6h2jywk	822750	FailArmy	13481	694	549	Comedy	PT6M23S	2018-06-05T16:00:03.000Z
19	10 Unbelievable Animals That Saved Other Animals	NTcw012d2ag	24479077	Crazy Univers	187705	9092	13118	Entertainment	PT4M24S	2017-09-21T17:19:48.000Z
20	Amazing Cheetah Compilation - The Fastest Animal in the World!	QROzsTBgtvQ	16257708	Animal Chann	32131	7581	1332	Pets & Animals	PT5M48S	2017-12-17T17:15:15.000Z
21	Learn Wild Animals Go To School On Wooden Train Toys For Kids Pretend	Cf6R-8YxYPo	569862	My Superherc	1421	810	53	Education	PT30M14S	2018-05-31T02:30:01.000Z
22	Top 200 Highlights of Animals - VERY FUNNY ANIMALS	xO8Cz-9qKTI	65364964	Teen Titans G	318661	42227	16743	Pets & Animals	PT21M16S	2017-10-07T13:21:55.000Z
23	Live: National Geographic Animals, Animal Documentary BBC 2018, Hyena	dOyiEKJIPF8	5489368	Lion Animal	8806	3825	30	Pets & Animals	PT0S	2018-05-30T01:30:40.000Z
24	The Animals - The House of the Rising Sun Mafia III Trailer 3 Casino !!!	0sB3Fjw3Uvc	249072673	José Antonio	1211472	43521	43731	Music	PT4M19S	2010-09-03T17:28:45.000Z
25	24 Awesome Animals Only Found In The US	TghlWfr7pQI	752	Epic Wildlife	105	3	23	Pets & Animals	PT13M	2018-06-09T00:00:01.000Z

Figure 2: DataSet retrieved via the application

- **Calculation of the ten best channels that have the most likes**

The output describes that for a specific video channel, how many likes we received. The results shows that the chain "***Spinnin records***" which has the most number of likes (see figure 3). And therefore, if a company concerned by the search criterion publishes its video on YouTube, it will be aware of the competing chains on the market, so that it will choose the procedure to follow to deal with it.

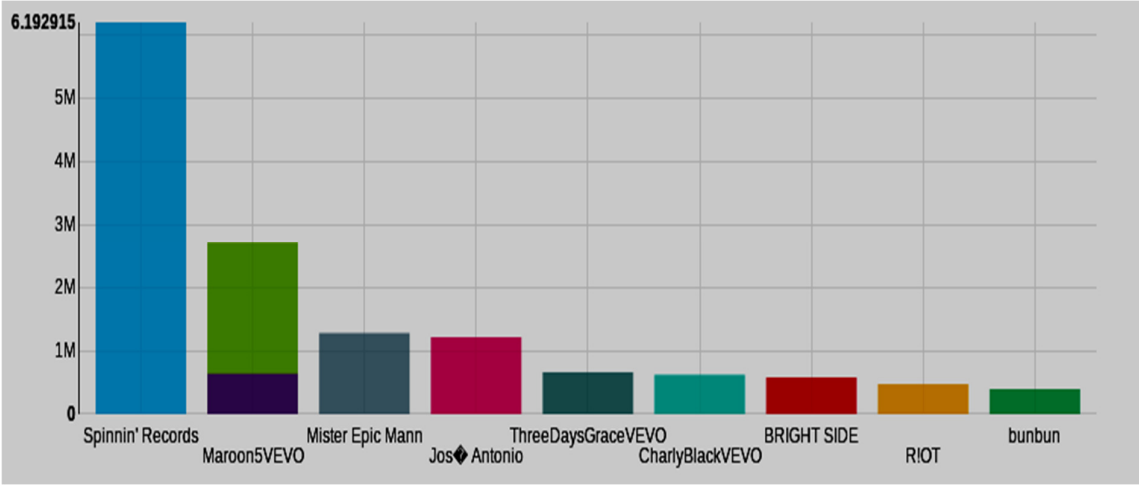

Figure 3: Bar chart

- **Calculate the five best categories of videos with maximum comments**

According to data collected in the dataset, the output results show « Entertainment » and «Comedy» are some of the largest categories (see figure 4). On the other hand, the number of comments generated was most marked for the videos marked under the category «Comedy». This result shows whether there is an interest affinity model for a certain category and for which category a meaningful discussion can be triggered. For example, if a business falls under the « Entertainment »section, it would be better to launch its new.

Nowadays, a field of research is the subject of particular attention: the analysis of feelings. In a very general way, it is about the process which makes it possible to determine the emotional tone which is hidden behind a series of words. This analysis is used to better understand the perception, opinions and emotions expressed in an online mention [12]. This type of analysis therefore opens the way to automatic surveys on the participative web and social networks as well as to buzz detection; the idea behind this is to take advantage of this area for the analysis of YouTube comments, after processing the data on Hive and after knowing the best videos in relation to the search criteria.

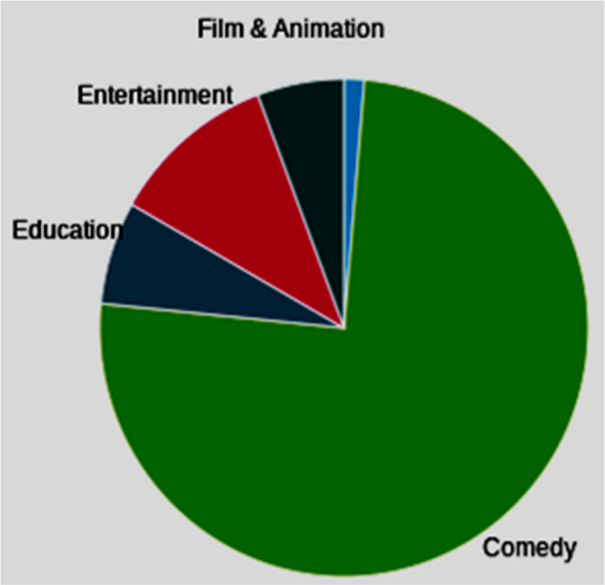

Figure 4: Pie chart

Conclusion

The task of Big Data analysis is not only important but also a necessity and a requirement. In fact, many rail transport organizations that have implemented Big Data achieve a significant competitive advantage over other organizations without Big Data efforts. The project aims to analyze the big data of the transport organizations in order to improve the satisfaction of these customers and offer better comfort service for travelers.YouTube data analytics project output shows key information that can be extrapolated to other use cases. One of the output results describes that for a specific video ID, how many likes were received. According to YouTube Analytics, the number of likes or thumbs up in a video has a direct impact on the ranking of the YouTube video [13]. So if a company of transport posts their video on YouTube, the number of YouTube likes you can determine whether the company or its competitors appear more prominently in YouTube search results. Indeed, Data has become in a very short time a new wealth coveted by all. Comments are one of these riches, this is why analyzing YouTube comments is an important research subject to exploit because it will provide a very useful data source for businesses in their advertising and decision-making.A possible extension of this research work could be the YouTube Comments Analysis, so that the company can target users directly. Using sentiment analysis, we can determine whether the general attitude of people is positive, negative or neutral towards a specific subject or video.Another possible extension is to improve the extraction script, in order to be able to lean the search on the comments. The script this time will extract all the comments related to the search criteria, subsequently analyze these comments, namely the positive ones and the negative ones, and directly target users who have a positive attitude towards the product. A point to add on Youtube and which will improve the analysis, is to add the emoticons in the button “I like” so that the feelings of the user will be better expressed, the thing which will filter the search well and will lead towards more precise results.

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Santander Group and Its Environmental and Social Responsibility in the Banking Sector

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Abstract

The paper concerns aspects of Corporate Social Responsibility (CSR) in the banking sector. The special attention was focused on Santander Group as a benchmark for financial institutions and its environmental and social responsibility. According to the financial statement, Santander is one the biggest financial institution in the Europe and in World as well. The bank is evaluated by different of ESG indexes: Dow Jones Sustainability Index (DJSI), Vigeo Eiris (DJSJ), FTSE4Good Index Series, Bank Ecologisation Index (BEI) and Respect Index (RI) as well. The paper consists of five parts: introduction, Santander Group on the international financial market, green and social orientation of Santander, Santander in evaluation of ESG indexes and analysts and conclusions. Research and publication have been financed by National Science Centre, Poland, project number 2016/23/D/HS4/02841, "Green banking versus economic efficiency of Polish banking sector in the context of implementation of the Directive UE 2014/95/UE".

Keywords: Bank, Environmental Responsibility, CSR, Sustainability, Santander Group

Introduction

The main aim of the paper is to present Santander Group as a benchmark in the aspect of environmental and social responsibility in banking sector. Santander is evaluated by the variety of indexes concerning ESG aspects. There were analyzed the ESG indexes in the world connected with the specific aspects of banking e.g. DJSJ, FTSE4Good Index Series, Bank Ecologisation Index (BEI) and Respect Index (RI). The indexes concern a range of dimensions: environment, social, human rights, management of human resources, relation with clients, suppliers and other partners. Special attention was focused on environmental and social responsibility in banks. Research described in the paper concerns project financed by National Science Centre, Poland, project number 2016/23/D/HS4/02841, "Green banking versus economic efficiency of Polish banking sector in the context of implementation of the Directive UE 2014/95/UE".

CSR entered the popular lexicon in the 1950's with R'Bowen's book: *Social Responsibilities of the Businessman*. Then, the concept was underlined in the 1960's, with R. Carson's critique of the chemical industry in *Silent Spring* (Visser, 2015). It supported to birth the environmental movement. It was one the reasons for the develop of environmental directions in banking sector.

The main mission of the green bank is to connect business and ecology for the benefit of costumers (Paluszak, Wiśniewska-Paluszak, 2016). The approach to green banking varies from bank to bank in different countries. The term green banking concerns banking practices that foster firstly environmentally responsible investments and as well environmental friendly internal processes in banks (Paluszak, Wiśniewska-Paluszak, 2016). Environmental responsibility can be defined as respect for natural resources at all three levels of the bank's activity (supporting activities, internal management and products addressing pro-environmental projects, these levels will be discussed in more detail later in this article) (Zabawa, Kozyra, 2020). Ecologization can mean a process consisting of taking action to protect natural resources, therefore it is a manifestation of the environmental responsibility of banks. Green and sustainable finance and corporate social responsibility have become central issues in

measuring organizations' success, competitive advantage and influence on the marketplace (Popescu, Popescu, 2019).
The structure of the paper is organized as follows. The paper consists of five parts: introduction, Santander Group on the international financial market, green and social orientation of Santander, Santander in evaluation of ESG indexes and analysis and the last part: conclusions.

Santander Group on the international financial markets

Santander Group is one of the biggest financial institution in the Europe and in World as well. At the end of December 2019, Santander was the second largest bank in the Eurozone by market capitalization and it was also the 25th biggest bank in the world among financial entities - EUR 61,986 million (Financial Report, Santander 2019). The number of shares amounted 16,618,114,582. The share's weighting amounted 7.1% in the DJ Stoxx Banks and 1.5% in the DJ Stoxx 50. In the domestic market, its weight in the Ibex 35 as at end-December amounted 12.5%. In 2019 a total of 19,334 million shares were traded for an effective value 77,789 million euro. It was the largest figure among the shares that comprise the EuroStoxx. Liquidity ratio in 2019 was at the level of 118%. Additionally, it is worthy to notice that the daily trading volume was 76 million shares with an effective value of 305 million euro. The selected items from the balance sheet and the profit and loss account are presented in the table 1 and in the table 2.

Table 1. Balance sheet (EUR million)

	Dec-2017	Change in % (y/y)	Dec-2018	Change in % (y/y)	Dec-2019
Total assets	1,444,305	1,04	1,459,271	4,35	1,522,695
Loans and advances to costumers	848,915	4,01	882,921	6,72	942,218
Customer deposits	777,730	0,36	780,496	5,62	824,365
Total funds*	985,702	-0,52	980,562	7,16	1,050,765
Total equity	106,832	0,50	107,361	3,07	110,659

**Total funds include customer deposits, mutual funds, pension funds and managed portfolios*
Source: based on: Financial Report, Santander, 2019 and own calculations

Table 2. Profit and loss account (EUR million)

	Dec-2017	Change in % (y/y)	Dec-2018	Change in % (y/y)	Dec-2019
Net interest income	34,296	0,13	34,341	2,74	35,283
Total income	48,355	0,14	48,424	1,66	49,229
Net operating income	25,362	1,12	25,645	1,19	25,949
Profit before tax	12,091	17,45	14,201	-11,68	12,543
Total equity	6,619	17,99	7,810	-16,58	6,515

Source: based on: Financial Report, Santander, 2019 and own calculations

Gross loans and advances to customers in Santander went up to 942,218 million in December 2019, 7% growth year-on-year. The Group uses in 2019 gross loans and advances to customers excluding reverse repos for the purpose of analysing traditional commercial banking loans. Compared to December 2018, gross loans and advances to customers excluding reverse repos and the exchange rate impact increased by 4%, with the following trends in the regions (Financial Report, Santander, 2019):

- the growth in South America was at the level 9%, with Brazil and Chile growing 8% and Argentina 40%, the latter driven by peso balances and the impact of the currency's depreciation on dollar balances,
- in North America, the increase was by 10%, with the US up - 12%, with growth in SC USA and SBNA and Mexico 5%,

- in Europe, moderate growth for gross loans and advances to customers was 2%. Increases in Santander Consumer Finance (+7%), with all countries growing, Poland (+5%) and the UK (+4%), where the increase in mortgages and other retail loans was partially offset by lower exposure to commercial real estate. There were declines in Spain (-6%), due to lower wholesale balances and with institutions, and in Portugal.

Customer deposits went up to 824,365 million euro. It was 6% growth compared to December 2018. customer funds, excluding the exchange rate impact, increased at the level of 6%, as follows (Financial Report, Santander, 2019):

- customer funds rose in all countries except Mexico, which remained stable. Additionally, it is worthy to underline: Argentina (+24%), Brazil (+12%), Chile (+12%) and the US (+11%). There were more moderate increases in Portugal and Santander Consumer Finance (+8% each), Poland (+6%) and Spain (+3%),
- the strategy of the bank focused on increasing loyalty was reflected in demand deposits (+6%), which increased in all in regions except Mexico. Time deposits remained virtually unchanged overall. Mutual funds rose 15%, with increases in all core markets.

Medium-and long-term covered bonds placed in the market of 8,941 million euro and senior debt amounting to 20,057 million euro. This value includes the 1 billion euro green bond issued initiating the Bank's global sustainable debt issuance plan. Green bonds confirm environmental responsibility of the bank. In 2019, there were 19,191 million euro of securitisations placed in the market. Additionally, the contractual maturity of 1.2 billion euro of securitisations was extended, with the total amount EUR 20,391 million. In the period under the consideration, issuances to meet the TLAC (Total Loss-Absorbing Capacity) requirement amounted 3,850 million euro, in order to strengthen the Santander Group situation: senior non-preferred - 2,778 million euro, preferred - 1,072 million euro.

Green and Social Orientation of Santander

The bank got our start in Spain, but it has been serving customers in the Northeast since 2013[1]. Santander has got over 575 branches and more than 2,000 ATMs across the Northeast. For more than twenty years, the bank has worked with universities, research centers and colleges to empower STEM (Science, Technology, Engineering, Mathematics) students around the world. The bank has taken a lot of activates concerning Corporate Social Responsibility. People working there believe, that supporting higher education is the best way to contribute to the economic & social development of the communities they serve. They can have a positive impact on the communities where they work and live. They have given back to their communities every day through the financial education website and program, their charitable contributions program and by partnering with higher education institutions.

The Santander Bank, N.A. Charitable Contributions Program is an example of non-profit organization which the main aim was providing support to market area that focus on civic, community and public affairs, health and human services, education and other organizations. Santander Bank has developed an Inclusive Communities plan which sets a goal of 11 billion in loans, investments and charitable contributions during last five years. The plan outlines Santander's commitment to communities across its eight-state northeastern U.S. footprint for years: 2017 - 2021. During this time Santander will increase its Community Reinvestment Act activity by 50 percent and us well triple its investment in charitable grants and projects and triples its charitable giving, compared to 2012 to 2016[2].

Additionally, it is worthy to notice, that the bank has continued fostering financial inclusion and empowerment. Over the year, the bank financially supported more than 1,600,000 people by its microfinance programs and granted loans for 277 million euro. Santander has continued to invest in

[1] Based on: https://www.santanderbank.com/us/about/about-us (accessed on: 25.04.2020).

[2] Based on: https://www.santanderbank.com/us/documents/22507/1008086/FINAL+-+Inclusive+Communities+Plan_Summary_Final+10_30_17/be3d246d-25f0-4345-916e-8a17f7455ae8 (accessed on: 25.04.2020).

the communities. It helped more than 1,200,000 people by community investment programs and supporting higher education with more than 66,000 scholarships granted and projects.
Santander is recognized as an environmentally responsible bank in Europe and as well in the World. It means that it is actively looking for ways to reduce its carbon emissions and use technology to benefit customers in the world. The bank is engaged on the high level in eco-management inside the company, it means: using paper, electricity, water, gas and others. Santander supports financing investments concerning environmental protections, especially projects connected with Renewable Energy Sources (RES). During last years, the Santander Group has taken many activities regarding sustainability and it has been active fighting climate change. The bank supported the customers in their transition towards a low carbon economy. Santander has mobilized 18 billion euro in green financing, and it issued the first green bond, 1 billion euro, under a global strategy of sustainable issuances for the coming years. The funds from this bond will be used to finance solar energy and wind power projects.

Santander joined the twenty fifth edition of the UN Climate Change Conference (COP25) in Madrid. Santander organized various events and activities aimed at enriching the debate and increasing environmental awareness, and participated in the Eje Castellana Verde agenda. During the Conference, the bank announced its commitment to being carbon neutral in 2020.

Previously in the year at the climate summit in New York, Banco Santander participated as one of the founding members of the Principles for Responsible Banking. It committed to strategically aligning its business to the UN's Sustainable Development Goals. Additionally, Santander joined the Group Commitment to Climate Action, along with 30 other banks. It is needed to underline the fact, that Santander is the first financial entity in Spain to obtain the Zero Waste certification from AENOR (The Spanish Association for Standardization and Certification)[3].

Santander in Evaluation of ESG Indexes and Analysis

Santander sustainability performances are periodically evaluated by many indexes and ESG analysis (Santander, Annual Report 2019). These evaluations and their results are used internally to measure its performance and identify improvement opportunities. In 2019 its results stand out in the Dow Jones Sustainability Index (DJSI), and us well Vigeo Eiris. The Dow Jones Sustainability Indices (DJSI) were launched in 1999[4]. DJSI are a group of indexes which evaluate the sustainability performance of companies trading publicly. They are operated under a strategic partnership between S&P Dow Jones Indices and RobecoSAM (Sustainable Asset Management) of the S&P Dow Jones Indices.

It needs to be highlighted that Santander was recognized as the most sustainable bank in the world by the Dow Jones Sustainability Index. This index is an international benchmark which assesses environmental, economic and social impact of over 175 banks globally. The bank achieved a total score of 86 points out of 100. In this way Santander achieved the maximum score in a number of areas, including: environmental reporting tax strategy, privacy protection, corporate citizenship and philanthropy, and us well financial inclusion. As a result, the bank has received the Gold Class distinction.

Vigeo Eiris included Santander's ESG rating profile in November 2019. The new ESG overall score achieved shows a notable improvement. It had moved from a position of 22nd in the banking sector in December 2016 to 5th in 2019. Vigeo Eiris noted upward trends in four areas of performance: Environment, Human Rights, Community Involvements, and us well Corporate Governance.

Additionally, Santander is included in the FTSE4Good Index Series. This bank is also evaluated by other ESG analysts such as Sustainalytics, ISS-ESG (Institutional Shareholder Services) and MSCI. ISS-ESG was founded in 1985 with the goal of promoting aims of sustainable growth and corporate governance. Its fundamental mission is as follows: "Empowering investors and companies to

[3] More information on: https://www.en.aenor.com/conocenos/ (accessed on: 25.04.2020).
[4] Based on: https://www.robecosam.com/csa/indices/?r (accessed on: 27.04.2020).

effectively manage governance, environmental and social opportunities and risks to realize long-term value"[5]. The evaluations of Santander are presented in the table 3.

Table 3. Santander in the ESG evaluations[1]

Rating/Scoring	2018	Vs. last year	2019	Vs. Sector average
DJSJ	86	=	86	First position within the banking sector. Gold class
ISS-ESG	C	=	C	> (decile rank of 2 out of 280 companies in the industry)
MSCI	A		BBB	-
Vigeo Eiris	57	<	63	> (rank 5 of 31 companies in the sector)
Sustainalytics	30.8	<	32.7	> (52nd percentile in the industry group)

[1] latest ISS-ESG rating (on a scale of A+ to D-) available at January 2020, compared to December 2018. The ISS-ESG decile rank of 1 indicates the highest relative ESG performance, and 10 the lowest. Latest MSCI ESG rating available (on a scale of AAA to CCC) at June 2019, compared to October 2018. Latest Sustainalytics scores (on a scale of 0 to 100) available at December 2019, compared to November 2018. Since September 2018 Sustainalytics has applied a new methodology for its ratings, where the score indicates a company's exposure to and management of ESG risks. Latest Vigeo Eiris overall scoring (on a scale of 100 to 0) available at November 2019, compared to December 2018
Source: Santander, Annual Report 2019

In Poland, Santander operates as Santander Bank Polska SA (earlier: Bank Zachodni WBK SA). Based on researcher (Zabawa, Kozyra 2020), (Zabawa 2019) this bank was recognized as the most environmental oriented bank in Poland. Santander Bank Polska SA received the highest value of BEI index (Bank Ecologisation Index): 0.626. It was the first research concerning measurement of environmental responsibility in the whole banking sector in one country. The envoronemtal orientation of banks was analyzed in banks in three levels of criteria (Zabawa, Kozyra 2020), (Dziawgo 2010):

- Level I—Supporting activities,
- Level II—Internal management,
- Level III—Products addressing ecological risk and those designed to protect natural environment.

Santander Bank Polska SA has been included also in Respect Index (RI) (Zabawa, 2018). The Respect Index project (with the first edition in 2009) aims at identification of companies managed in a responsible and sustainable manner. Additionally, it puts strong emphasis on investment attractiveness of companies that are characterized by reporting quality, level of investor relations or information governance[6].

Conclusions

Currently, aspects concerning Corporate Social Responsibility play an important role in functioning of companies, as well including financial institutions. Most financial institutions, including banks, at least at the level of declarations, treat "being compliant" as part of their policy on corporate social responsibility (CSR) (Losiewicz-Dniestrzanska, Nosowski 2017). Modern banks are aware that this context of their activities is evaluated by many kinds of stakeholders: clients, suppliers, employees, communities and others. For that reason, helpful can be special indexes: Dow Jones Sustainability Index (DJSI), Vigeo Eiris, Bank Ecologisation Index (BEI), Respect Index (RI). It's turned out that

[5] More information: https://www.issgovernance.com (available on 14.04.2020).
[6] More information on: http://respectindex.pl/project_description (available on 14.04.2020).

some of financial institutions are on the top in the engagement of social and environmental responsibility. As an example, it can be pointed Santander Group. This financial institution, in all countries, is recognized as an environmental and social oriented bank. It is confirmed by ESG indexes.

Acknowledgments

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13. https://www.en.aenor.com/conocenos/ (available on 25.04.2020).
14. https://www.robecosam.com/csa/indices/?r (available on 27.04.2020).
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Theories of Financial Innovation

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Abstract

Recent changes, especially caused by the COVID-19 pandemic, deeply affected financial markets all over the world. For years, the development of international financial markets has depended on the implemented financial innovations. Those innovations have created new financial instruments, minimized risk and supported liquidity. It can be assumed, that in the nearest future the fluctuations will require some new proposals, supporting the financial markets in staying in motion
The study presents theories of financial innovation along with a classification framework. In the article, the author hypothesized that many existing theories of creating financial innovations make it impossible to determine precisely which temporary factors can eventually become the cause of creating new innovations. However, alternative scenarios that do not assume innovations in the long run may provide constraints or even declines in financial markets - because they are well known at present.

Keywords: Financial Instruments, Theories of Innovation, Innovations

Introduction

In previous analysis and research works there are many factors that are presented as common catalyst to financial innovations. At least three are prominent: the worldwide trend toward deregulation of markets, high inflation in the United States in a few decades in last century and the progress in computer and telecommunication industry (Obay, 2000). Thus scientists begun to verify, what are the causes and processes of innovations. Finally the issue of innovation in the capital markets has been finally encapsulated in a number of scientific theories that seek to elucidate the circumstances of its origination.

Theories on Financial Innovation – Classification Framework

The lack of single theory implies that the issue of financial innovations is complex. The difficulties to determine that concept in a clear-cut way result also from the varied development of areas of the international capital market (e.g. the United States and Western Europe, see: Franzen, 1998). The so-far arisen notions may be grouped as follows: demand-oriented group, supply-oriented group, mixed (demand and supply-oriented) group, a group based on the capital market theory as well as institutional economy theory (Hastenpflug, 1991). The grouping criterion is hinged on the structure of elements that impact development of an innovation. Each of those theories attempts to find a specific condition that directly affects the development of a new financial instrument. Individual theories, along with their authors and recognition clues, are presented in Table 1.

Table 1: Theories on financial innovation.

Theory type	Representative	Conditions substantiating development of innovation
1. Demand-oriented	S. I. Greenbaum, C. F. Haywood	Income and substitution effects in capital market
2. Supply-oriented	W. L. Silber	Competitiveness
	E. J. Kane, W. L. Silber and M. Ben-Horim	Legal restrictions
	C. R. Dunham,	Interest rates and risk
3. Based on capital market theory	J. C. Van Horne	Increase in effectiveness and aiming at market completeness / cohesion
4. Based on institutional economy	G. Dufey, I.H. Giddy	Institution malfunctioning

Source: own study based on W. Hastenpflug, Das Securitizationsphänomen, Wiesbaden 1991, p. 45.

The demand and Supply Oriented Theory

In the demand-oriented theory, the income and substitution effects in the capital market are construed as a function that interconnects demand for financial instruments with growing income or movements in interest rates, taking account of the available (alternative) products (see: J. G. Gurley, E. S. Shaw, 1956). Advancing those hypotheses, S. I. Greenbaum and C. F. Haywood pointed to a significant correlation between an increasing value of assets subject to investment in the capital markets and costs of their diversification (S. I. Greenbaum, C. F. Haywood, 1971). In relation with the theory by H. M. Markowitz, where a greater portfolio diversification results in risk diminishing, the investors endeavour to generate the highest possible rate of return at the given risk level. At the same time, the costs related to the portfolio management, including portfolio diversification costs, originate. Those costs are on increase if the value of the portfolio is growing. According to the theory, the demand for a financial innovation arises when the costs of the portfolio management begin to exceed the gains on those assets. The disappearing benefits trigger a search for alternative solutions in the capital market in order to downsize those costs or increase the income. The latter element is manifested in the substitution effect that regards interest as remuneration for the use of the capital.

Every financial service may be perceived as an n-element vector, which may be described with the use of specified attributes such as time, risk, liquidity etc. Potentially, there exists an unlimited number of different combinations of those attributes, which translate into an unlimited number of financial services. Under this theory, an innovation shall be a product that combines those elements in an innovative way and develops an instrument unknown before. At the same time, it provides for a response to demand occurring on the part of the capital market participants.
Development of an innovation may be schematised in the following way:

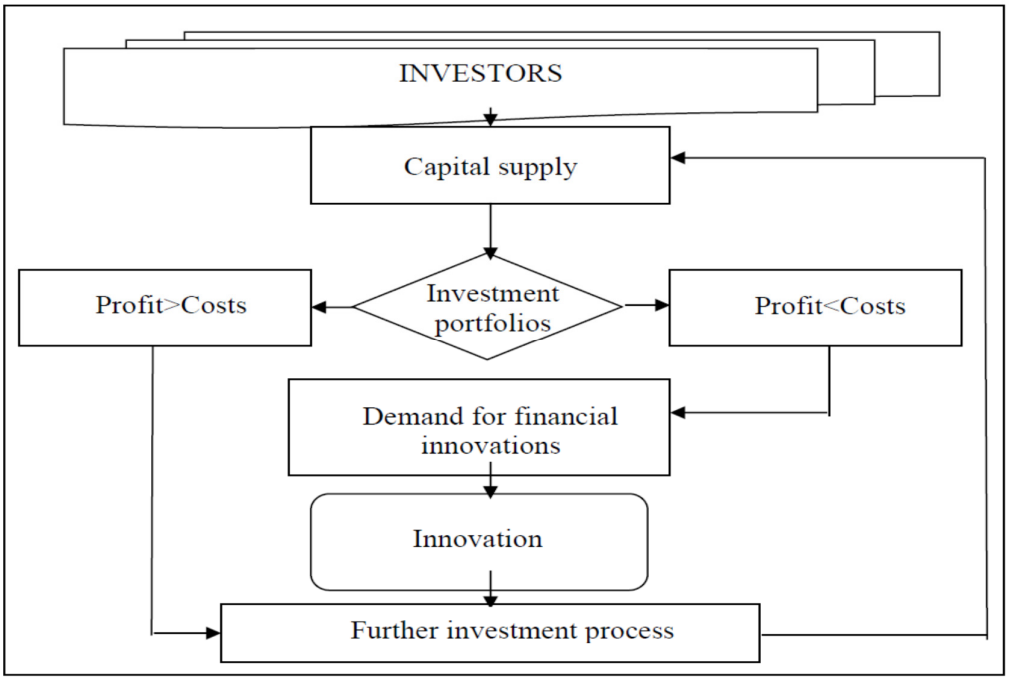

Fig. 1: Conditions of innovation development according to the demand-oriented theory.
Source: own study based on S. I. Greenbaum, C. F. Haywood, Secular Change in the Financial Services Industry, Journal of Money, Credit, and Banking, Vol. 3, 1971, No. 2.

As opposed to the demand-oriented theory, supply-oriented concepts may be split into a few trends, each of which highlights a different aspect of an innovation development. A model by E. J. Kane, named also as *regulatory dialectic*, recognizes innovations as a reply to a legal regulation that limits the freedom of action. The theory is based on an assumption of cyclical changes and adjustment of two opposing trends: political interventionism in the economy, which is manifested in establishing legal regulations, and pursuance of business processes to evade those regulations. The struggle between those drives may be compared with an interaction of visible and invisible forces, where the first one is represented by the actual transactions in the market, and the second mirrors the introduced regulations (E. J. Kane, 1981). The temporarily reached equilibrium is thrown off balance due to an action of one of the parties and the whole process starts anew. Such a speculative presentation of the entire change process, to which the theory owes the name "dialectic", has been confirmed in the course of actual financial market operation. An example may include statutory restrictions, introduced as early as in the 30s of the last century in the United States, with respect to determination of the maximum interest rates for deposits. The growing inflation in 60s resulted in opening new possibilities of depositing, which enabled evasion of the then existing regulations (E. Glogowski, M. Münch, 1996). However, recent survey shows, that financial crisis may also be caused by implementing financial innovations (D. Awrey, 2013).

Sequential approach to the innovation process by E. J. Kane is based on a premise of *innovation and regulatory lags* that arise from the calculation of the costs of innovation. Introduction of a given regulation makes an innovation arise only if the probable profit from the innovation is greater than the cost of such an introduction. The lag may be a consequence of "accumulation" of factors, which will determine profitability of its introduction. If influence of the regulation is immaterial for the increase in the costs of the market operation, then an innovation does not arise immediately. It may originate in the future if the costs of its introduction become reduced. This may be affected with external changes such as the higher inflation rate in the already presented example of deposits, or technological changes. Then, while the profit remains constant, the costs of implementation may be downsized to such an extent that development of an innovation will turn profitable. If, however, a regulation impacts profitability of the market transaction in a vital way, it may encounter a relatively prompt response in

the form of a new financial service aimed at evasion of those unfavourable regulations. The same may be applied in the other way round, where the significance of the innovation is reviewed from the legislator's perspective. Figure 2 presents the innovation process described above.

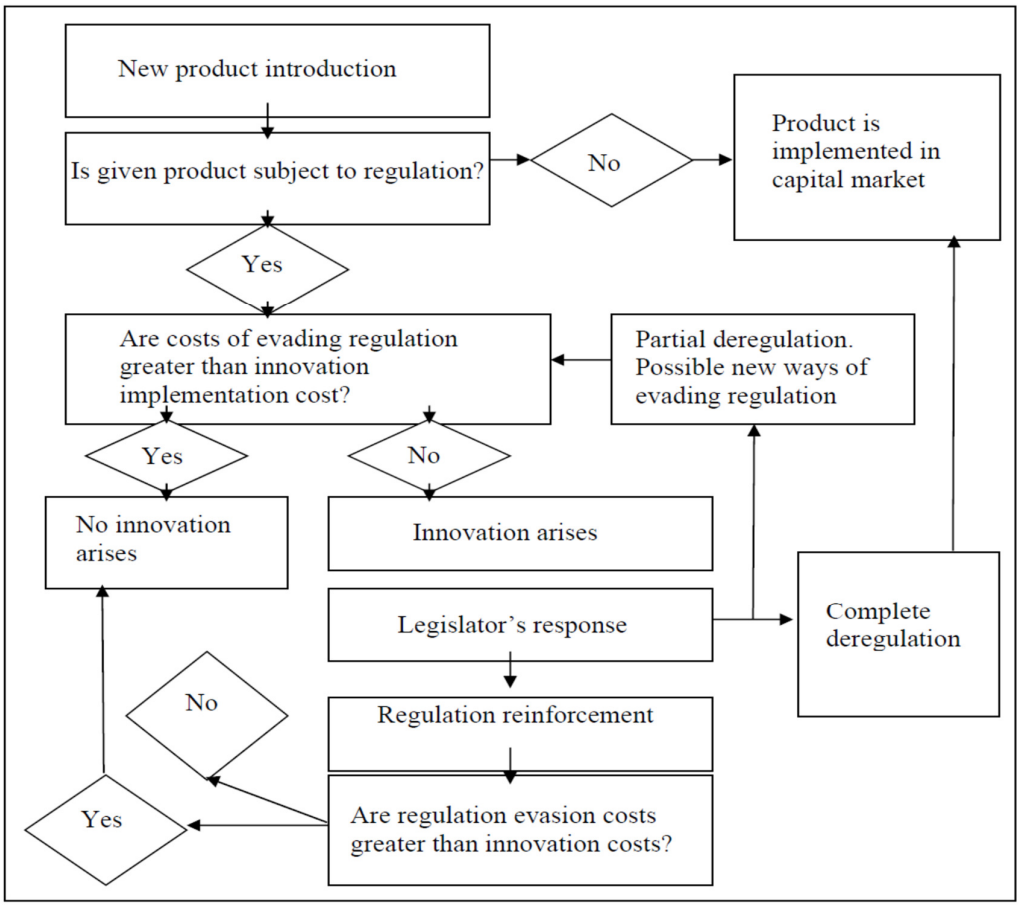

Fig. 2: Development of innovation according to the regulatory dialectic theory by E. J. Kane.

Source: study based on P. Bofinger, Geldpolitische Regulierungen und Finanzinnovationen, Aussenwirtschaft, Vol. 2/3, 1987.

In his theory, W. L. Silber deepens the understanding of the restrictions that trigger innovations. In addition to the legal regulations, as external factors, he also takes into account internal restrictions occurring in a given market (e.g. demand for given products), or the ones imposed by the entities themselves (e.g. mutual deposit securities). The source of an innovation development is sought in two aspects (W. L. Silber, 1975). The first one involves dropping profits from operations of financial institutions in given markets. As a consequence of external changes, such as decreasing demand for credit, banks are forced to introduce new products or search for new market segments at the expense of the developing security market that provides for immediate financing. The second one involves the costs related to the existing and implemented regulations. Those alterative costs derive from fulfilment of certain conditions, both external (legal regulations), and internal, which require additional expenditures to be incurred in order to track the changes, modifications and adjust accordingly. An innovation arises when the profit from given services is on decrease or the costs of operation under certain regulations are too extensive. The chart below schematises development of an innovation.

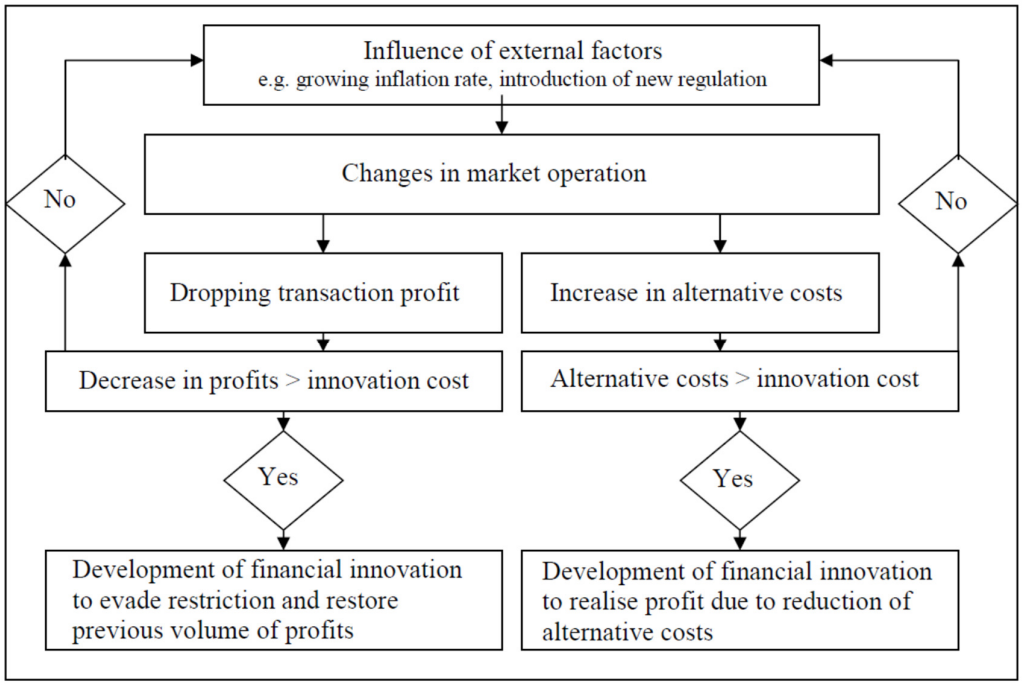

Fig. 3: Development of innovation according to the theory by W. L. Silber.

Source: study based on W. Hastenpflug, Das Securitizationsphänomen, Wiesbaden 1991, p. 63.

The last theory in the supply-based group belongs to of C. R. Dunham, who assumes that every financial intermediary operates within the frame determined by the correlation of risk and interest rates, in which they are compelled to offer their services all the time. This means assumption of both active as well as passive role towards the market in such a way so as to enable demand to balance in those areas. An innovation arises in a situation where the existing demand and supply structure is subject to transformation in the financial service market as a result of changes in the structure of risk and interest rates (C. R. Dunham, 1980). Factors of two kinds may trigger development of those changes. The first group involves transformations of the very structure of risk and interest rates. Co-existence of the capital markets and the commodity and service markets leads to establishing certain equilibrium in which demand for tangible investment financing equals the financial service supply. Changes on either part (e.g. increase in investment expenditures) strike the whole system off balance and a process of adjustment is set off. During such a period, financial entities strive to re-adjust to new market conditions, which may bring about development of an innovation. The second group of conditions involves diversity in risk approaching assumed by the participants in the transaction. Similarly to the previous case, the changes result in a need to adjust to new conditions and, therefore, bring about development of an innovation.

The theory may find it difficult to determine the factors that substantiate the changes within the operating structure of the market. It is hard to define them, and in particular the weight of their influence, in a clear-cut way.

Effectiveness of The Capital Market and Institutional Economy as A Reason for Creating Innovation

The theory by J. C. Van Horne is founded on two bases: reaching for operating effectiveness of capital markets and making them total, more complete (J. C. Van Horne, 1985). The notion of operating effectiveness assumes that the costs of capital flow between the entities should be as low as possible. An innovation provides, therefore, for reduction in paid commissions, interest etc., and enables more

efficient and immediate allocation of the existing funds. Totality does not imply here any struggle for total (weighty) market effectiveness in the meaning of asset valuation models (J. Czekaj, M. Woś, J. Żarnowski, 2001), but it rather involves the occurrence of such financial instruments as are in correspondence with that given point in time and that specific economic situation. It is, hence, possible to conclude a transaction with the use of securities or their combination, to provide for inclusion of any future event. An innovation is an instrument that is introduced to cover the existing gap, as there has been no possibility so far to conclude a transaction in view of a given period or with respect to a given event. An example of such an innovation may be creation of a product that will secure the transaction in the forex market for a period longer than it is possible with the existing instruments.

According to that theory, a financial innovation would not occur in a market of complete effectiveness, where all information was reflected in the price of the assets. As markets are not effective in the above sense, there are incentives that may trigger development of innovations. C. Van Horne listed variability of economic ratios (inflation, interest rate), impact of legal regulations as well as technical and social progress among such incentives.

Functioning of social structures defined as institutions substantiates development of an innovation, according to the theory by G. Dufey and I. H. Giddy. Within the frame of the institutional economy, in order to function properly the society requires to minimize the so-called transaction costs that constitute a material aspect of the agreements made (O. E. Williamson, 1998). If no relevant protection of competition and property rights (incl. intellectual property rights) exists, the incentives to trigger an innovation are on decrease (G. Dufey and I. H. Giddy, 1981). A paradox in this theory may be the fact that the actual capital market development since the 80s of the last century has denied the necessity to protect patents for the introduced innovations, and their imitations became the drivers of the global financial market development.

The authors of this theory split the financial innovations into two types. The first one is called *aggressive innovation*, which is a result of a search made by the companies that specialise in generation of products of this kind. Potential buyers will be more willing to acquire new instruments from known and reckoned companies, as that involves less risk. On the other hand, such solutions are more expensive than the imitations to come in the future, as their price includes an additional cost related to both research on the innovation as well as a possible risk to fall in disrepute in case a faulty solution is introduced. We may even speak about a peculiar monopoly on introducing innovations, which is hold by reckoned financial institutions. The second group comprises the so-called *defensive innovations* that address the changes in regulatory laws, or asset interest rates and risk. Notion of this kind refers explicitly to earlier theories by E. J. Kane and W. L. Silber (legal regulations) as well as by C. R. Dunham (interest rates and risk).

Summary

Considering the theories of innovation, presented above, it must be reiterated that financial innovations are unique solution, which must be analyzed in many dimensions. Literature abounds with macroeconomic perspective, which justify innovation process, where microeconomic base has been rather limited.

The theories presented in the article emphasize that innovations arise in those branches of the economy where no clear-cut rules of operation of public and private institutions exist. Parallelly, an essential reason for developing an innovation is an attempt to downsize the statutory costs of transaction, as attributed to assertion of the ownership title.

As a good example from recent reality, the COVID-19 crisis can be mentioned. This epidemic has been caused by supply shock as well on the commodity, as financial market. The oil derivatives market is a perfect example, with negative prices for the May-2020 contract. The W. L. Silber may be adopted to such changes. It refers closely to the influence of an external factor on the process of creating financial innovation. Thus in the future, changes in the financial markets shall be perceived in the light of this concept.

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Developing A Multicriterial Framework for Selecting A Critical Infrastructure Protection Strategy Based on Financial Instruments

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Abstract

The purpose of this paper is to develop a decision-making framework intended to for selecting the optimal strategy for the protection of an infrastructure considered critical. As infrastructure management is a problem of complexity management, the preferred approach was employing a Multi-Criteria Decision Analysis, specifically the Analytic Hierarchy Process technique. Based on the main interactions and processes involved in infrastructure management, a set of 6 criteria was proposed to establish the decision space. A panel of 5 experts provided pairwise comparisons as inputs for the AHP application from which priorities and weighs were derived. To validate the framework, consistency tests were performed as well as a consensus indicator was calculated to determine whether mathematically consolidating the opinions is representative for the individual inputs. The results obtained provide sufficient confidence for validating the model as a trustworthy starting point in a decision process.

Keywords: AHP, Critical Infrastructure Protection, Strategic Decision-Making, Governance Tools

Introduction

The advent of innovative financial technologies such as distributed ledgers, blockchain platforms and smart contracts, as well as efficiency improvements in financial markets facilitate new approaches for building strategies for protecting critical infrastructures. Beyond currency and payment solutions, some of the newer technologies specifically address interactions between citizens, corporations and the public sector within the arising concept of a smart city, as the Internet-of-Things changes the way data is exchanged and stakeholders are connected. While the promise of increased energy efficiency, improved flow of traffic, better decision-making processes and other infrastructure optimizations is appealing from a practical point of view, more scientific research is needed to accurately asses actual use cases. The technologies themselves are in the early stages of development, with various technical and economic challenges affecting their adoption. Studies that investigate core infrastructures such as voting mechanisms (Karlof, Sastru and Wagner 2005; McCorry, Shahandashti and Hao, 2017) and smart city energy applications (Swapna 2011; Mahmood, Chaudhry, Naqvi, Kumari, Li and Sangaiah 2018; Castellanos, Coll-Mayor and Notholt 2017l; Leonhard 2016; Zhang, Pota, Chu and Gadh 2018; Pieroni, Scarpato, Di Nuzio, Fallucchi and Raso 2018) show potential for more efficient processes facilitated by cryptographic instruments, but not without potential weaknesses and new challenges. Additionally, smart contract platforms and blockchain technologies with capabilities for applications in infrastructure projects are facing intense competition, both from within the blockchain ecosystem and from other substitutable conventional solutions. Given the limited availability of developers and experts in these new fields of technology as well as the slow rate of innovation propagation within public institutions, even the more advanced projects are in their infancy. With ample evidence of technological advantages provided by the new generation of instruments based on distributed ledgers, more research is required to properly facilitate a transition to real use cases.

Before considering the technical factors of such endeavors, the problem of choice arises as selecting the optimal instruments and subsequent strategy is not straight forward. As the fundamental problem is one of complexity management, the deciding factor, be it government or a business organization, requires a multicriterial framework to analyze and organize the decision process. The purpose of this

paper is to develop such a framework in aid of decision makers seeking to identify a suitable protection strategy for their specific infrastructure application. The chosen Multi-Criteria Decision Analysis (MCDA) method is the Analytic Hierarchy Process (AHP), proposed by Thomas L. Saaty (1980, 2012) and perfected over time through business and academic use. This is a reliable technique for accurately determining the weighs of decision criteria.

The main purpose of the envisioned framework is to formulate a set of criteria that comprises the essence of critical infrastructure interactions pertaining to a protection strategy, and determine the priority and relative importance of each with regard to potential solutions. To achieve this task, we have enrolled 5 experts to express their opinion on the presented criteria, from which we derived a consolidate result that will constitute the foundation for the decision framework. To validate the result, we verified that both the individual resulting decision matrixes and the consolidated one are consistent. Additionally, we studied whether the consolidation data is representative for the individual expert opinions by calculating a consensus indicator. Without a sufficiently high consensus indicator, more research would be needed for finding a valid decision framework. The obtained results provide sufficient confidence for validating the model as a trustworthy starting point in a decision process. Expectations based on the criteria formulation before conducting the AHP analysis included bias towards specific areas of interest deriving from the background of individual experts, as well as a more even distribution of preference. However, the results showed little evidence of bias in the experts' judgements and a clearer than expected clustering of preferences. Regarding the final weights of the criteria, the relative low importance of the cyber security aspect is surprising considering the nature of the instruments and the background of experts. A reasonable explanation would be that as these technologies mature, then security becomes an intrinsic feature, resulting in less strain on the decision process.

Formulating the criteria in a MCDA is an important undertaking, but thankfully extensive classification of critical infrastructures provides enough detail to anticipate the decision space and it allows us to bypass the decision-making paradox. Choosing the most reliable method of making a decision is, in itself, a decision-making problem for which we don't have an a priori answer (Triantaphyllou and Mann, 1989). Velasquez and Hester (2013) provide an extensive review of the most used MCDA methodologies, underlining advantages and disadvantages as reflected by literature and various use cases. Based on their conclusion, as well as other studies (Triantaphyllou and Mann, 1989; De Felice, Petrillo, 2010), we have established that AHP is a reliable and appropriate solution for this particular use case, as it has been used in problems regarding system performance improvement strategies, resource management, business strategies, government policy planning including in the infrastructure sector. It has advantages regarding scalability, flexibility, low input data intensity as well as adaptability to various decision-making scenarios. Disadvantages of this method regarding ranking reversal due to changes in criteria or strong inter-dependencies between them can be mitigated through separate independent analysis and are not a critical factor in determining the validity of the final model.

The essence of any AHP analysis is structuring the decision problem as a hierarchy with a top-down unidirectional relationship between the levels. An advantage is the ability to concurrently include varied criteria, both qualitative and quantitative, in a homogenous analysis system. Also, the origin of this method is the general theory of measurement allowing for concurrent deductive and inductive judgements without using syllogisms (Saaty and Vargas, 2012). The diagram presented below showcases the architecture of an AHP hierarchy, with the top layer – the decision objective being parent to the middle layer – the criteria, each of which is connected to the alternatives.

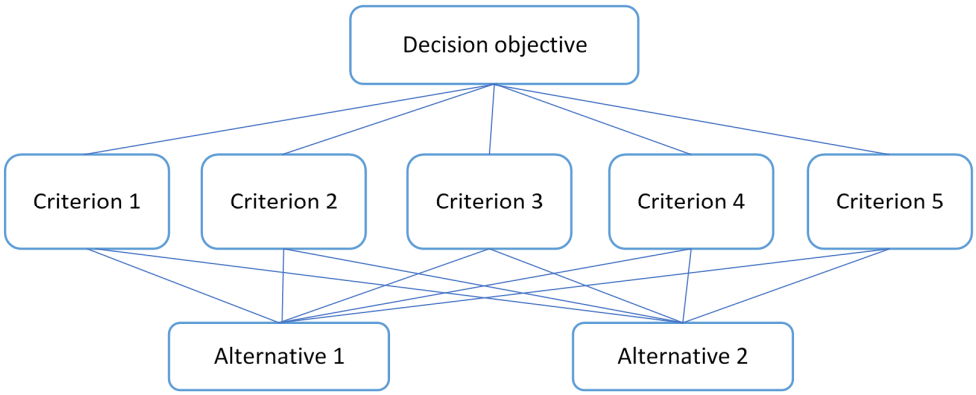

Source: Adaptation from Thomas L. Saaty and Luis G. Vargas, 2012, pg. 3

Figure 1: A three-layer AHP hierarchy

This format of expressing the decision problem allows a better overview of the complexities and interactions within the decision space and offers more information regarding the order of magnitude between various elements that are compared in pairs. To achieve efficiency in the decision-making process, the criteria should balance sufficient detail of the underlying problem with sensitivity to changes in the environment or in system elements.

Methodology

From a methodological stand point, the first stage of the paper was defining the hierarchy. The decision objective is the selection of a strategy for critical infrastructure protection, in essence, a form of dealing with complexity. The criteria are derived from the main characteristics of the underling infrastructure systems and define the decision space. The criteria and their importance are presented separately in the third part of this paper, but are the main components of the numeric application and determined the format of the questionnaire sent to the experts. The third layer of the hierarchy is left open ended.

The second stage was expert selection and organizing individual sessions to obtain the pairwise comparisons. To this effect, a custom electronic questionnaire was designed and shared, together with a document explaining the criteria and evaluation procedure. The participant selection process was centered on maximizing the relevance of the final results by providing an extensive perspective through diversification of backgrounds and expertise, as well as mitigating potential biases that arise from the experience and education of each expert. Considering the contents of the questionnaire, the expert elicitation process is a simplified version of the technique proposed by Ayyub M. Bial (2001). Among the 5 main types of experts classified by Ayyub: proponents, evaluators, resource experts, observers and peer reviewers, our participants are evaluators, as they asses the credibility of presented comparison hypothesis, offer input based on experience and education and establish qualitative relationships among the concepts that comprise de object of analysis. Each expert input has the same weight in the final result. While the experts requested to remain anonymous in this study, their expertise and background is presented below.

Table 1: Individual background profiles of study participants

Expert	Background
Expert 1	Sector of origin: ITC Position: Senior programmer Expertise: Various software applications, automation, hardware programming Blockchain experience: Yes, personal investments
Expert 2	Sector of origin: ITC Position: CEO of a company with over 200 employees

	Expertise: High complexity hardware and software projects, including applications for critical infrastructure Blockchain experience: No
Expert 3	Sector of origin: Academic, Government Position: Former high-ranking government official, currently university teacher Expertise: Risk management, Security research, Communication, Foreign Affairs Blockchain experience: Limited
Expert 4	Sector of origin: Academic, Scientific Research, Engineering Position: Associate Professor at various American and European Universities, member of research organizations Expertise: Infrastructure systems modelling, risk analysis, emerging technologies, critical infrastructures Blockchain experience: Yes, through research
Expert 5	Sector of origin: Military, Government Position: High ranking official in office, secretary of state level, Former expert in various EU institutions, former adviser in the Romanian Ministry of Defense Expertise: International relations research, public administration policies, political sciences, Strategic consultancy Blockchain experience: Undisclosed

The pairwise comparisons were conducted using the Saaty value scale, described below. Judgements on the Saaty scale are characterized by reciprocity. If activity a compared to b has a value from 1 to 9, then the inverse statement is a reasonable assumption. This is expressed by constructing a decision matrix A = (a_{ij}), where a_{ij} signifies the dominance of criterion i over criterion j, the reverse being respected through a_{ij}= 1/ a_{ji}.

Table 2: The fundamental Saaty value scale

Intensity of importance	**Definition**	**Explanation**
1	Equal importance	Two activities contribute equally to the objective
2 **3**	Weak Moderate importance	Experience and judgment slightly favor one activity over another
4 **5**	Moderate plus Strong importance	Experience and judgment strongly favor one activity over another
6 **7**	Strong plus Very strong or demonstrated importance	An activity is favored very strongly over another; its dominance demonstrated in practice
8 **9**	Very, very strong Extreme importance	The evidence favoring one activity over another is of the highest possible order of affirmation

Source: Adapted from Thomas L. Saaty, Luis G. Vargas, Models, Methods, Concepts & Applications of the Analytic Hierarchy Process, pg. 6

The third stage of consisted in doing the numerical analysis with a specialized application for AHP in order to derive the priorities and weighs for each criterion. We used an implementation proposed by Klaus D. Goepel (2013) that allows consolidating sufficient inputs and provides transparent calculations for verification. Identifying the weight of a criterion is a problem of linear transformation, more precisely solving the eigenvalue problem for a matrix of ratio comparisons. The solution arises from the assumption that priorities with respect to each criterion are known, so that the initial comparison values can be recovered by deriving the vector of priorities. An easy approximation is obtained through the normalization of the geometric means of the rows (Row Geometric Means Method, or RGMM). A more accurate solution is obtained by using an algorithm for raising the matrix to a sufficiently large power to determine the eigenvector (EVM method). The AHP implementation

proposed by Goepel uses the power iteration algorithm to solve the eigenvalue problem (Larson, 2013). Additionally, see Andrilli & Hecker (2016). We use both approaches to aid consistency calculations.

To determine the consistency of the data, that is the transitive property of judgements, the largest principal eigenvalue of the matrix, λ_{max}, must be calculated. The closer the value is to the number of criteria, the less overall deviation for the judgments. For numerically determining the consistency across all judgments an index can be defined using the following relation:

$$C.I. = \frac{\lambda_{max} - n}{n - 1}$$

Saaty furthers this with the Consistency Ratio (C.R.) obtained by comparing the index with an average consistency index derived from a sample of randomly generated reciprocal matrixes using the Saaty scale. In our particular case, the Random Index used as comparison is valued at 1,25, corresponding to matrix of rank 6. The application we employ uses a formula for C.R. perfected by Alonson / Lamata (2006):

$$C.R = \frac{\lambda_{max} - n}{2.7699n - 4.3513 - n}$$

For additional consistency validation, the Geometric Consistency Index (G.C.I.) is calculated (Williams and Crawford, 1985; Aguaron and Moreno-Jimenez; 2003), but by estimating the vector through RGMM. This does not detect individual errors, but offers an additional heuristic indicator to test whether the comparison matrixes are acceptable or not. The formula following formula is used:

$$ICG = \frac{2\sum_{i<j} \ln a_{ij} - ln\, {}^{p_i}/_{p_j}}{(n-1)(n-2)}$$

Saaty suggest a threshold value for CR of 0.1, however other implementations have determined that this value is unrealistic, especially for applications with more than 5 criteria. To this effect, we have used 0.15 as a value of testing the consistency with the CR. CGI is a direct analogue to the consistency ratio, Aguaron and Moreno-Jimenez (2003) suggest an estimate maximum value of 0,555 for a matrix with more than 4 criteria to pass the consistency test.

Apart from these two main consistency descriptors, we also analyze the overall dissonance of the matrix. The dissonance indicator ψ (Psi) reflects ordinal inconsistencies in the comparisons, and its calculation is done following the methodology propose by Sajid Siraj (2011), with the following set of relations:

The function is defined: $step(x) = \begin{cases} 1, if\ x > 0 \\ 0, if\ x \leq 0 \end{cases}$

The following matrix is compiled $\psi_{ij} = \frac{1}{n-2}\sum_k step(-\log(a_{ij})\log(a_{ik}a_{kj}) > 1$

Overall dissonance is determined by the following relation.

$$\Psi = \frac{2}{n(n-1)}\sum_{i=1}^{n-1}\sum_{j=i+1}^{n}\psi_{ij}$$

All 5 individual matrixes have been verified for consistency with both methods, while dissonance was interpreted in conjecture with the variation of the priorities. As the objective of the paper is unaffected by the need for absolute ordinal consistency, no particular thresholds have been appointed.

The final stage of the methodology consisted in determining whether the obtained consolidated priorities and weights are representative for the opinions of the experts. One of the main uses of AHP applications, as an objective mathematical method, is for informed group decisions. That all opinions are incorporated in the result does not guarantee acceptance by the participants. To validate the decision-making framework, a consensus indicator must be determined to increase the likelihood that opinions are accurately reflected in the final decision model. The approach is a departure from the classic dispersion analysis proposed by Saaty and Vargas, with a framework proposed by Lou Jost (2006) inspired by biological diversity. The assessment is made through a diversity index determined as a measure of homogeneity of priorities appointed to each criterion. The concept of diversity can be partitioned into two distinct components determined as Shannon entropy, (1949): specifically, alpha,

the average entropy for all individual participants of the group and beta, as the difference between aggregated group priorities entropy and alpha entropy. A small variation of the distribution of priorities between the experts will relay a high consensus indicator.

The criteria and their importance

A defining step for any AHP analysis is criteria formulation, as they define the decision space and influence the final decision. An effective tool for the decision maker offers the possibility to understand the problem, the purpose of the decision and to correctly evaluate the alternatives. For a proper comparison and ranking, it is necessary that the wording of the criteria covers how the decision will impact the stakeholders and all implementation interactions. A correct assessment involves a wide range of interactions, processes and implications, which determines the need to include both tangible, measurable and intangible criteria. The main factors considered for establishing the criteria in this study are the development, operation and maintenance of infrastructure, under the following premises:

a. The criteria are not expressed in absolute terms (admitted / rejected). The format allows comparisons between various decision-making options.

b. The criteria must correspond to specific objectives subordinated to the general decision objective.

c. The decisional problem implies the formation of some correlations between the analyzed alternatives and the formulated criteria. In our situation, the relationships are formed according to a "top-down" process, i.e. from criteria to alternatives, so that the decision-making apparatus has the possibility to identify the relevant alternatives.

d. The criteria and the resulting hierarchy must be sufficiently extensive to include all major issues that may affect the implementation of the solution, from the decision-maker's perspective, and detailed enough to allow for timely changes.

e. Further examination on costs, patrimonial impact and the resource management dynamics is required as a secondary problem for each choice.

f. It is reasonable to assume that successful implementation of the final decision is contingent on the competence of the involved parties.

Considering the above premises, the following criteria have been considered in the configuration of the AHP application:

1. Financial aspects of the project

The comparative evaluation of the solutions and strategies from this perspective will determine whether the projects are financeable and sustainable after the implementation duration. For a comprehensive analysis, the following information can be considered: initial set-up costs, operating and maintenance, budget availability, revenue generation, net present value, if the operation of the underlying infrastructure is supported from a public budget or is financially autonomous.

Evaluation involves drafting and implementation of a methodology by which a suite of indicators can be consolidated in a general index or score allowing for pairwise comparisons of alternatives.

2. The human component

This criterion is related to the availability of adequate personnel with relevant technical and managerial competence. It also considers the organizational or expertise gap between the current state and the ideal one. The following issues are relevant:

- The need for substantial changes in the infrastructure management structure from the perspective of stake holders;
- The complexity of the necessary organization hierarchy;
- The need for programmers able to write code, to translate functionalities and policies into computer programs or smart contracts, with the ability to identify computer risks and potential consequences;
- The need (or absence thereof) for an active network management structure.

3. Public appeal and utility

This refers to specifications of the final solution that determine general public opinion in regards to actual usage. Among the evaluated aspects we mention the following:

- transparency - network transactions and stored information are traceable and independently auditable;
- anonymity and management of personal data;
- whether it has the effect of streamlining the use of public resources, simplifying administration or increasing accountability in the public sector;
- If it allows the optimization of the use of resources in the private sector (at personal level, at the level of a household or in a business);

4. Operational opportunity

This criterion refers to how the system is used after implementation. The degree and intensity of use of a system can be adversely affected by multiple factors, ranging from errors in tracing the fundamental architecture to mistakes in the implementation of the system itself. The evaluation will take into account:

- The risk that the established system will register low usage;
- The speed of transactions and the performance dependence on the underlying infrastructure usage level;
- The level of automation and autonomous execution and consensus conditions;
- System scalability and technological constraints;
- The existence of direct and predictable transaction costs;
- The risk of indirect transaction costs, including scalability issues;
- Overall system reliability
- How uncertainty factors can be identified; The ambiguity component includes both non-cognitive sources (statistical uncertainty, limited information, excessive simplification of working hypotheses) and cognitive sources (definition of working parameters in an infrastructure or protection system, qualitative aspects, human factors, etc.)

5. The consequence of failure

This criterion is concerned with assessing how the protection mechanism may deviate from the initial objectives. In particular, the focus is on adverse effects on the supporting infrastructure in the event of protection failure. These may include costs of deviating from the proposed objectives. Also, the integration of the strategy with the contemporary legal system implies the analysis of the legal implications in situations of failure through aspects such as:

- Whether or not there is a risk of ambiguity in the legal interpretation of the effects of a transaction;
- The extent to which the terms and conditions of use, as well as the general intentions of the strategy, are translated into code to avoid misinterpretation and the possibility of resolving a legal dispute.

6. Cyber security and resilience

This assessment will be done both in terms of risk and intrinsic characteristics of the used tools. At least the following aspects can be considered:

- the decentralized nature of transactions, the transfer and storage of information, the immutable nature of the distributed database;
- reversibility of transactions - whether or not it is possible and under what conditions;
- In the case of computer programs or smart contracts, problems related to the transposition in the code of the desired functionalities, respectively vulnerabilities regarding the manipulation and malicious execution of the code;
- The level of complexity of the contract and the existence of appropriate complexity management tools.
- The sensitivity of the system to the operating capacity of the IT infrastructure of the infrastructure manager / operator;
- Vulnerability and resilience to various types of cyber-attacks;

- The general level of maturity of the technology involved;

The Analytic Hierarchy Process Analysis

The inputs were used to construct decision matrixes, and priorities were computed for each expert with both methods, Row Geometric Mean Method and Eigen Vector Method via power iterations. Initial values for priorities p_i have been obtained by normalizing the geometric means of r_i values of n rank matrix A=a_{ij}, with the formula: $r_i = (\prod_{i=1}^{n} a_{ij})^{1/n}$

The *exp* function was used with the following relation (the value of *e* raised to the power of a number): $r_i = \exp[\frac{1}{n}\sum_{j=1}^{n} \ln(a_{ij})]$. Normalization was done using $p_i = {r_i}/{\sum_{i=1}^{n} r_i}$. Normalized values are error adjusted with the formulas proposed by Tomashevskii (2004):

$$w_{adjusted} = w_i * \cosh\left(\sqrt{\frac{1}{n-1}\sum_{k=1}^{n} ln^2\left(a_{ik}\frac{w_k}{w_i}\right)}\right)$$

Power iterations method was used to determine the eigen value considered for the final results.

Before consolidating the individual matrixes and computing the final weights of the criteria, each expert input was tested for consistency. Additionally, absolute errors were determined for each individual priority, so not to overlap with the error range. In the case of priorities determine via EVM, the following calculation was used to determine errors:

$$\Delta w_i = \sqrt{\frac{1}{n-1}\sum_{k=1}^{n}\left(\frac{n}{\lambda_{max}} a_{ik}w_k - w_i\right)^2}\ , \qquad where\ i = 1, \dots, n$$

To pass the error check test, the absolute error should be lower than the percentile value of the criteria weigh. Additionally, the mean relative error across all criteria was determined using $\boldsymbol{MRE} = \sqrt{\frac{1}{n}\sum_{i=1}^{n}\left(\frac{\Delta w_i}{w_i}\right)^2}$.

This average is used to assess the overall error range for the matrix, although there is no particular threshold that needs to be met. Tables 3 to 7 synthetize the comparison matrixes for the five participants to the study, along with the primary consistency indicators. Supporting calculations are included in Annex 1.

Table 3: Decision matrix synthesis for Expert 1

Crit	*1 - Fin*	*2 - Hum*	*3 - Util*	*4 - Oport*	*5 - Fail*	*6 – SCyb*	*EVM*	*Absolute Errors*	*RGMM*
1 - Fin	1	5	4	1	6	5	35.4%	19.0%	34.9%
2 - Hum	1/5	1	1/5	1/3	3	2	8.0%	4.1%	8.0%
3 - Util	1/4	5	1	1/3	5	7	20.1%	11.0%	20.6%
4 - Oport	1	3	3	1	3	4	26.8%	14.7%	26.5%
5 - Fail	1/6	1/3	1/5	1/3	1	3	5.8%	3.0%	5.9%
6 – SCyb	1/5	1/2	1/7	1/4	1/3	1	4.0%	1.8%	4.0%
	λmax=6,706	C.R.=11,3%	GCI=0,41	Ψ = 11,7%	MRE 52,1%				

For expert 1, a clustering phenomenon can be observed, with over 82,3% of the decision being attributed to 3 of the criteria. Feedback from this participant also mentioned the possibility that

preference for the criterion regarding consequence of failure to change depending on the specificity of the underlying infrastructure. The assumption made to provide this consideration was that for a particular infrastructure, failure mechanics are similar regardless of chosen strategy, hence a lower overall preference.

Table 4: Decision matrix synthesis for Expert 2

Crit	*1 - Fin*	*2 - Hum*	*3 - Util*	*4 - Oport*	*5 - Fail*	*6 – SCyb*	*EVM*	*Absolute Errors*	*RGMM*
1 - Fin	1	1	1/2	1/2	1/3	1/3	10.0%	10.9%	8.9%
2 - Hum	1	1	3	3	4	4	35.9%	20.2%	38.8%
3 - Util	2	1/3	1	1	1/2	1/2	10.3%	3.8%	9.7%
4 - Oport	2	1/3	1	1	1/2	1/2	10.3%	3.8%	9.7%
5 - Fail	3	1/4	2	2	1	1	16.8%	6.1%	16.5%
6 – SCyb	3	1/4	2	2	1	1	16.8%	6.1%	16.5%
	λmax=6,749	C.R.=12%		GCI=0,42		Ψ = 20%		MRE 58,4%	

Expert 2 provided with results that are visibly less convergent with those of the other participants, making a clear hierarchy more difficult. Having the highest number of employees under direct supervision can be a reasonable explanation for the bias towards Human component. Additionally, there is an anomaly regarding criteria 1 with a high absolute error, but because preference distribution is relatively homogenous for all criteria apart from C2, and because the matrix passes the consistency test, it is not enough to warrant a re-examination of the pairwise comparisons.

Table 5: Decision matrix synthesis for Expert 3

Crit	*1 - Fin*	*2 - Hum*	*3 - Util*	*4 - Oport*	*5 - Fail*	*6 – SCyb*	*EVM*	*Absolute Errors*	*RGMM*
1 - Fin	1	3	4	2	2	3	30.3%	3.4%	30.1%
2 - Hum	1/3	1	3	1	1/4	1/3	10.8%	7.4%	11.3%
3 - Util	1/4	1/3	1	1/3	1/3	2	8.2%	6.5%	8.0%
4 - Oport	1/2	1	3	1	2	3	20.8%	9.1%	20.9%
5 - Fail	1/2	4	3	1/2	1	1	17.9%	10.6%	17.5%
6 – SCyb	1/3	3	1/2	1/3	1	1	12.1%	8.9%	12.2%
	λmax=6,902	C.R.=14,4%		GCI=0,51		Ψ = 20%		MRE 60,3%	

The third participant to the study generated a clear hierarchy of preferences, despite coming closer to the consistency thresholds. Additional feedback included the recommendation for further steps to develop instruments for numerically quantifying infrastructure failure and associated risk.

The comparison matrix for the fourth expert relays a clear preference toward the financial criterion, and is the only one that includes judgements higher than 6. One of the arguments provided in the session pertains to past experiences with infrastructure projects adversely affected by sub-par financial performance. Additional feedback is given regarding extending the decision model with a separate methodology for this criterion, achievable by introducing a distinct layer in the decision hierarchy. Considering that for 4 of the 5 participants C1 was ranked highest is a strong incentive to pursue this line of research, achievable by enrolling a separate panel of financial experts and developing a performance index.

Table 6: Decision matrix synthesis for Expert 4

Crit	*1 - Fin*	*2 - Hum*	*3 - Util*	*4 - Oport*	*5 - Fail*	*6 – SCyb*	*EVM*	*Absolute Errors*	*RGMM*
1 - Fin	1	5	4	5	8	7	47.3%	31.9%	46.7%
2 - Hum	1/5	1	4	5	5	6	24.7%	14.5%	25.3%
3 - Util	1/4	1/4	1	1/2	4	3	8.9%	4.4%	8.8%
4 - Oport	1/5	1/5	2	1	4	5	11.4%	4.7%	11.6%
5 - Fail	1/8	1/5	1/4	1/4	1	4	4.8%	3.0%	4.7%
6 – SCyb	1/7	1/6	1/3	1/5	1/4	1	3.0%	1.7%	3.0%
	λmax=6,817	C.R.=13%		GCI=0,46		Ψ = 10%		MRE 56,8%	

The fifth session resulted in consistent matrix data as well as feedback regarding formulation of the criteria, specifically the need to further detail potential impact in organization architecture, especially in government. Also, as a complementary tool to the AHP analysis, the expert suggested a study regarding uncertainty, how it can be better understood and how strategies can cope with it by design.

Table 7: Decision matrix synthesis for Expert 5

Crit	*1 - Fin*	*2 - Hum*	*3 - Util*	*4 - Oport*	*5 - Fail*	*6 – SCyb*	*EVM*	*Absolute Errors*	*RGMM*
1 - Fin	1	5	3	1	5	6	34.4%	16.0%	35.0%
2 - Hum	1/5	1	4	1/6	1/2	1/3	6.8%	4.5%	6.6%
3 - Util	1/3	1/4	1	1/5	1/3	1/4	4.5%	3.1%	4.6%
4 - Oport	1	6	5	1	5	3	32.2%	11.5%	31.9%
5 - Fail	1/5	2	3	1/5	1	3	12.1%	7.6%	11.8%
6 – SCyb	1/6	3	4	1/3	1/3	1	10.1%	5.7%	10.1%
	λmax=6,835	C.R.=13,3%		GCI=0,47		Ψ = 20%		MRE 57,5%	

With all 5 matrixes passing the consistency tests, the data can be consolidated in a single decision matrix called C=c_{ij}. Consolidation is achieved by determining the weighted geometric mean of the values in the individual matrixes with the following formula:

$$c_{ij} = \exp \frac{\sum_{k=1}^{n} w_k \ln a_{ij(k)}}{\sum_{k=1}^{n} w_k)}$$

Consolidating the data leads to a clear distribution of preferences with lower absolute errors than found in the input data. Additionally, consistency indicators are improved significantly, apart from dissonance that remained unchanged. Mathematically, the consistency checks indicate that the pairwise comparisons were correctly done and transitivity of judgments is maintained across the matrix. This, however, is not sufficient to determine that the final results are acceptable as a decision-making framework.

Table 8: Consolidated decision matrix

Crit	*1 - Fin*	*2 - Hum*	*3 - Util*	*4 - Oport*	*5 - Fail*	*6 – SCyb*	*EVM*	*Absolute Errors*
1 - Fin	1.00	3.27	2.49	1.38	2.76	2.91	31.9%	9.3%
2 - Hum	0.31	1.00	1.96	0.96	1.50	1.40	15.7%	4.4%
3 - Util	0.40	0.51	1.00	0.41	1.02	1.39	10.4%	1.9%
4 - Oport	0.72	1.04	2.46	1.00	2.27	2.46	21.8%	3.5%
5 - Fail	0.36	0.67	0.98	0.44	1.00	2.05	11.6%	2.9%
6 – SCyb	0.34	0.72	0.72	0.41	0.49	1.00	8.6%	2.1%
	λmax=6,141	C.R.=2,3%		GCI=0,08		Ψ = 15%		MRE 23,8%

To assess the representative quality of these values, a consensus indicator must be calculated in order to measure statistical deviation of the mean compared to individual opinions. The software documentation establishes indicative thresholds for interpretation, <50% very low consensus, 50-65% low consensus, 65-75% moderate consensus, 75-85% - high consensus, and very high for over 85%. To characterize diversity, the diversity index S, based on alpha and beta Shannon entropy is calculated:

$$S = \left[M - \exp(H_{\alpha min}) \ / \ \exp\left(H_{\gamma max}\right)\right] / \left[1 - \exp(H_{\alpha min}) \ / \ \exp\left(H_{\gamma max}\right)\right]$$

Where $M = 1 \,/\, \exp\left(H_{\beta}\right)$ și $H_{\alpha\beta\gamma}$ is Shanon α, β, γ entropy of the priorities of all K participants, respectively:

Shannon alfa entropy: $H_{\alpha} = \frac{1}{K}\sum_{j=1}^{k}\sum_{i=1}^{N} -p_{ij} ln\, p_{ij}$

Shannon gamma entropy: $H_{\gamma} = \sum_{j=1}^{k} -(\frac{1}{n}\sum_{i=1}^{n} p_{ij}) ln\, (\frac{1}{n}\sum_{i=1}^{n} p_{ij})$

Shannon beta entropy: $H_{\beta} = H_{\gamma} - H_{\alpha}$

$H_{\alpha min}$ is determined via adjusting the values by the c_{max} scores according to the scale used: $H_{\alpha min} = -\frac{c_{max}}{N+c_{max}-1} \ln\left(\frac{c_{max}}{N+c_{max}-1}\right) - (N-1)\frac{1}{N+c_{max}-1} \ln\left(\frac{1}{N+c_{max}-1}\right)$

$$H_{\gamma max} = \ln(n)$$

To improve reliability of the study, two sets of data have been processed, in order to test the impact of the priorities of expert 2, whose opinion was further apart. After the calculations. the following values were obtained:

- 72.4 % consensus level for AHP 5 data;
- 83.5% consensus level for AHP 4 data.

Despite a somewhat drop of the consensus indicator on inclusion of all 5 experts, there is no rank reversal and priorities remain unchanged across the decision matrix. The graph below shows in bar form the weigh variation for each criterion. Solid bars reflect a drop in overall weigh, while empty bars an increase in weight. Vertical bars show min-max variations across all input data.

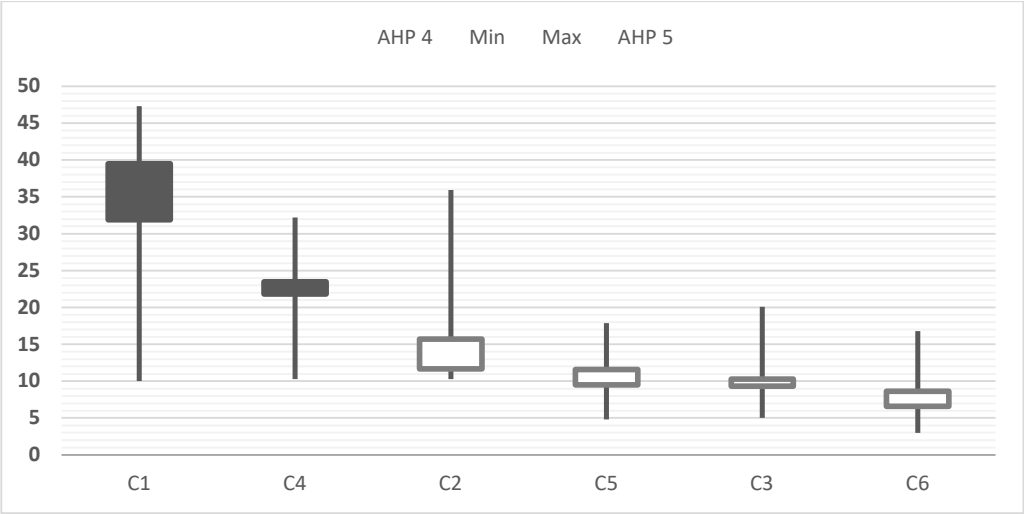

Figure 2: Weigh variation across the AHP analysis

Considering these results, one can deem with sufficient confidence that the final weight and priorities is representative of expert opinions and allow for a validation of the decision-making framework.

Conclusions

The availability of technology and innovative instruments with applications in critical infrastructure protection does not alleviate the initial decision problem. Considering the multitude of underlying infrastructure interactions and complexity of the systems, a multi-criteria decision-making approach can provide more insight selecting a better strategy. Using the Analytic Hierarchy Process method, a framework can be developed to aid decision makers in this respect.

For this study, a panel of 5 independent experts has been assembled to provided inputs for an AHP application. The selection of the experts was done to provide a wide expertise coverage as well as to mitigate potential biases. The six criteria have been phrased to best define the decision space and to allow pairwise comparisons of strategy candidates. Their importance is reflected in trying to convey a large spectrum of interactions, processes and implications in the underlying infrastructures, including both measurable and unmeasurable aspects.

The decision-making framework consisted in expressing the relative importance of the asserted criteria. The weight and priority of each was determined through pairwise comparisons, and tested for consistency. The final stage was determining whether the final result is indicative of individual opinions, and the consensus indicator suggests that the constructed decision model is sufficiently accurate to be used in a real-world decision-making scenario. Using such a tool could improve the probability of a decision maker to identify the optimal choice regarding a strategy design to increase de protection and resiliency of an infrastructure.

Table 9: Synthesis of AHP results

NR.	CRITERION	NOTATION	WEIGHT	RANK	EXPERT RANKS				
1.	Financial aspects of the project	1 – Fin	31.9%	1	1	6	1	1	1
2.	The Human component	2 – Hum	15.7%	3	4	1	5	2	5
3.	Public appeal and utility	3 – Util	10.4%	5	3	4	6	4	6
4.	Operational opportunity	4 – Oport	21.8%	2	2	4	2	3	2
5.	Consequence of failure	5 – Fail	11.6%	4	5	2	3	5	3
6.	Cyber security and resilience	6 – SCyb	8.6%	6	6	2	4	6	4

From a scientifical point of view, this study provides a tool for inferring the most important determinants in the success of an infrastructure protection solution. Additionally, it has practical and research implications, both for decision makers that seek a framework for developing complex strategies and for developers that seek to create and perfect instruments capable of meet high standards of real-world applications. By using an established multi-criteria decision analysis technique, the collected data was used to construct a decision framework suitable from an infrastructure complexity management stand point.

The results of the study provide a sufficiently clear ranking between criteria, with favorable consistency tests results as well as adequate representation power for individual judgements. The financial aspects of the underlying infrastructure strategy are clearly of the highest importance in any decisional selection process. The relative importance of cyber security and resilience was significantly lower than initially expected, indicating perhaps that such projects are feasible only in the context of robust informational infrastructure with instruments that have intrinsic security characteristics. Hence, there is lower operational burden in the project implementation, given pre-existing cyber security features. Another relevant finding is a degree of dependence between the human component and the financial aspects, with the final weight of latter including aspects that are specific to human resource problem. Thus, we can safely assume that the human component is of critical importance to the final result, but part of the problem is financial in nature.

This study also opened up addition research opportunities that could refine the framework and provide further insight into the subject matter. The most obvious is obtaining additional validation concerning the detail and coverage of the criteria. Also, applying real-world scenarios can provide the opportunity to conduct a sensitivity analysis. Finally expanding the decision hierarchy with a sub-level dedicated to the financial criterion, which is, incidentally, the one with the highest priority.

Annex 1. Supporting calculations

Expert 1 Supporting calculations

Comparison matrix

Crit	*1 - Fin*	*2 - Hum*	*3 - Util*	*4 - Oport*	*5 - Fail*	*6 – SCyb*	*Normalized eigenvector*	*Absolute errors*
1 - Fin	1.00	5.00	4.00	1.00	6.00	5.00	35.4%	19.0%
2 - Hum	0.20	1.00	0.20	0.33	3.00	2.00	8.0%	4.1%
3 - Util	0.25	5.00	1.00	0.33	5.00	7.00	20.1%	11.0%
4 - Oport	1.00	3.00	3.00	1.00	3.00	4.00	26.8%	14.7%
5 - Fail	0.17	0.33	0.20	0.33	1.00	3.00	5.8%	3.0%
6 – SCyb	0.20	0.50	0.14	0.25	0.33	1.00	4.0%	1.8%

Geometric mean error calculation

							Absolute error
Crit	1	2	3	4	5	6	$\sqrt{\frac{\Sigma}{n-1}}$
1 - Fin	0	0.015	0.588	0.082	~0	0.335	0.451748577
2 - Hum	0.015	0	0.55	0.011	0.592	~0	0.483359273
3 - Util	0.588	0.55	0	0.585	0.17	0.142	0.638111949
4 - Oport	0.082	0.011	0.585	0	0.186	0.267	0.475445147
5 - Fail	~0	0.592	0.17	0.186	0	0.528	0.54355371
6 – SCyb	0.335	~0	0.142	0.267	0.528	0	0.504289885

Geometric mean method priorities

	Ln(A)						$e^{\Sigma/n}$	*Weights*	*Error adjusted weights*	*Normalized weights*
Crit	1	2	3	4	5	6				
1 - Fin	0	1.60944	1.38629	0	1.79	1.60944	2.9	35.8%	39.6%	34.9%
2 - Hum	-2	0	-1.6094	-1	1.1	0.69315	0.66	8.1%	9.1%	8.0%
3 - Util	-1	1.60944	0	-1	1.61	1.94591	1.56	19.3%	23.3%	20.6%
4 - Oport	0	1.09861	1.09861	0	1.1	1.38629	2.18	26.9%	30.0%	26.5%
5 - Fail	-2	-1.0986	-1.6094	-1	0	1.09861	0.47	5.8%	6.7%	5.9%
6 – SCyb	-2	-0.6931	-1.9459	-1	-1.1	0	0.33	4%	5%	4.0%
						Sum	8.1	100%	113.3%	100%

Power iterations method with a rank 10 matrix

1	1.00	5.00	4.00	1.00	6.00	5.00	-	-	-	-
2	0.20	1.00	0.20	0.33	3.00	2.00	-	-	-	-
3	0.25	5.00	1.00	0.33	5.00	7.00	-	-	-	-
4	1.00	3.00	3.00	1.00	3.00	4.00	-	-	-	-
5	0.17	0.33	0.20	0.33	1.00	3.00	-	-	-	-
6	0.20	0.50	0.14	0.25	0.33	1.00	-	-	-	-
7	-	-	-	-	-	-	1.00	-	-	-
8	-	-	-	-	-	-	-	1.00	-	-
9	-	-	-	-	-	-	-	-	1.00	-
10	-	-	-	-	-	-	-	-	-	1.00
Sum	2.8167	14.833	8.5429	3.25	18.333	22	0	0	0	0

Iterations								
0	1	2	3	4	5	6	7	8
2.20	18.73	6.39	6.59	6.73	6.72	6.70	6.70	6.71
0.67	3.98	1.40	1.49	1.52	1.51	1.51	1.51	1.51
1.86	10.49	3.52	3.74	3.83	3.81	3.80	3.81	3.81
1.50	13.78	4.87	5.00	5.10	5.09	5.08	5.08	5.08
0.50	2.69	1.03	1.10	1.12	1.11	1.11	1.11	1.11
0.24	1.83	0.72	0.74	0.75	0.75	0.75	0.75	0.75
0.10	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00
0.10	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00
0.10	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00
0.10	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Scaling – Ration between value and column maximum								
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.31	0.21	0.22	0.23	0.23	0.23	0.23	0.23	0.23
0.84	0.56	0.55	0.57	0.57	0.57	0.57	0.57	0.57
0.68	0.74	0.76	0.76	0.76	0.76	0.76	0.76	0.76

0.23	0.14	0.16	0.17	0.17	0.17	0.17	0.17	0.17
0.11	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.11
0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Normalization								
0.2982	0.3609	0.3560	0.3528	0.3534	0.3537	0.3537	0.3536	0.3536
0.0913	0.0767	0.0778	0.0799	0.0799	0.0797	0.0797	0.0797	0.0797
0.2519	0.2021	0.1961	0.2003	0.2011	0.2008	0.2007	0.2007	0.2007
0.2033	0.2654	0.2716	0.2680	0.2675	0.2679	0.2679	0.2679	0.2679
0.0682	0.0519	0.0575	0.0590	0.0586	0.0584	0.0585	0.0585	0.0585
0.0329	0.0352	0.0399	0.0399	0.0395	0.0395	0.0396	0.0396	0.0396
0.0136	0.0019	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0136	0.0019	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0136	0.0019	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0136	0.0019	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Eigen value:*	6.46981	6.6452	6.71913	6.71057	6.70478	6.70549	6.70602	6.70597

** Sum of the initial scoring normalized sums*

Geometric Consistency Index calculation

Crit	*1*	*2*	*3*	*4*	*5*	*6*	*Total*
1 - Fin		0.0142	0.6724	0.0771	~0	0.3377	1.1015
2 - Hum			0.47	0.013	0.6225	~0	1.1055
3 - Util				0.6562	0.1413	0.1035	0.901
4 - Oport					0.1793	0.2772	0.4566
5 - Fail						0.5011	0.5011
6 – SCyb							
							Total:4.0656

Absolute error calculation – power iterations method

Crit	*1 - Fin*	*2 - Hum*	*3 - Util*	*4 - Oport*	*5 - Fail*	*6 – SCyb*	*Standard deviation*	*Deviation weight*
1 - Fin	31.6%	35.7%	71.8%	24.0%	31.4%	17.7%	19.0%	53.7%
2 - Hum	6.3%	7.1%	3.6%	8.0%	15.7%	7.1%	4.1%	51.1%
3 - Util	7.9%	35.7%	18.0%	8.0%	26.2%	24.8%	11.0%	54.6%
4 - Oport	31.6%	21.4%	53.9%	24.0%	15.7%	14.2%	14.7%	54.8%
5 - Fail	5.3%	2.4%	3.6%	8.0%	5.2%	10.6%	3.0%	51.4%
6 – SCyb	6.3%	3.6%	2.6%	6.0%	1.7%	3.5%	1.8%	46.5%

Dissonance matrix - ψij

Crit	*1*	*2*	*3*	*4*	*5*	*6*
1		0	1/4	0	0	0
2			0	0	1/4	0
3				3/4	0	0
4					0	0
5						1/2
6						

Expert 2 Supporting calculations

Comparison matrix

Crit	*1 - Fin*	*2 - Hum*	*3 - Util*	*4 - Oport*	*5 - Fail*	*6 – SCyb*	*Normalized eigenvector*	*Absolute errors*
1 - Fin	1.00	1.00	0.50	0.50	0.33	0.33	10.0%	10.9%
2 - Hum	1.00	1.00	3.00	3.00	4.00	4.00	35.9%	20.2%
3 - Util	2.00	0.33	1.00	1.00	0.50	0.50	10.3%	3.8%
4 - Oport	2.00	0.33	1.00	1.00	0.50	0.50	10.3%	3.8%
5 - Fail	3.00	0.25	2.00	2.00	1.00	1.00	16.8%	6.1%
6 – SCyb	3.00	0.25	2.00	2.00	1.00	1.00	16.8%	6.1%

Geometric mean error calculation

							Absolute error
Crit	1	2	3	4	5	6	$\sqrt{\frac{\Sigma}{n-1}}$
1 - Fin	0	2.032	0.156	0.156	0.101	0.101	0.714
2 - Hum	2.032	0	~0	~0	0.549	0.549	0.791
3 - Util	0.156	~0	0	0	0.045	0.045	0.222
4 - Oport	0.156	~0	0	0	0.045	0.045	0.222
5 - Fail	0.101	0.549	0.045	0.045	0	0	0.385
6 – SCyb	0.101	0.549	0.045	0.045	0	0	0.385

Geometric mean method priorities

	Ln(A)						$e^{\Sigma/n}$	*Weights*	*Error adjusted weights*	*Normalized weights*
Crit	1	2	3	4	5	6				
1 - Fin	0	-0.6931	-1	-1.1	-1.0986	0	0.55	8.18%	10%	8.9%
2 - Hum	0	1.09861	1.1	1.39	1.38629	0	2.29	34.04%	45%	38.8%
3 - Util	-1.0986	0	0	-0.69	-0.6931	-1.0986	0.74	11.03%	11%	9.7%
4 - Oport	-1.0986	0	0	-0.69	-0.6931	-1.0986	0.74	11.03%	11%	9.7%

5 - Fail	-1.3863	0.69315	0.7	0	0	-1.3863	1.2	17.86%	19%	16.5%
6 – SCyb	-1.3863	0.69315	0.7	0	0	-1.3863	1.2	17.86%	19%	16.5%
						Sum	6.73	100%	116.6%	100%

Power iterations method with a rank 10 matrix

	1	2	3	4	5	6	7	8	9	10
1	1.00	1.00	0.50	0.50	0.33	0.33	-	-	-	-
2	1.00	1.00	3.00	3.00	4.00	4.00	-	-	-	-
3	2.00	0.33	1.00	1.00	0.50	0.50	-	-	-	-
4	2.00	0.33	1.00	1.00	0.50	0.50	-	-	-	-
5	3.00	0.25	2.00	2.00	1.00	1.00	-	-	-	-
6	3.00	0.25	2.00	2.00	1.00	1.00	-	-	-	-
7	-	-	-	-	-	-	1.00	-	-	-
8	-	-	-	-	-	-	-	1.00	-	-
9	-	-	-	-	-	-	-	-	1.00	-
10	-	-	-	-	-	-	-	-	-	1.00
Sum	12	3.1667	9.5	9.5	7.3333	7.3333	0	0	0	0

Iterations								
0	1	2	3	4	5	6	7	8
0.37	3.12	1.80	1.88	1.89	1.88	1.88	1.88	1.88
1.60	12.57	6.29	6.68	6.81	6.75	6.74	6.75	6.75
0.53	3.26	1.78	1.93	1.95	1.93	1.93	1.93	1.93
0.53	3.26	1.78	1.93	1.95	1.93	1.93	1.93	1.93
0.93	5.48	2.90	3.16	3.20	3.17	3.16	3.17	3.17
0.93	5.48	2.90	3.16	3.20	3.17	3.16	3.17	3.17
0.10	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00
0.10	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00
0.10	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00
0.10	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Scaling – Ration between value and column maximum								
0.23	0.25	0.29	0.28	0.28	0.28	0.28	0.28	0.28
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.33	0.26	0.28	0.29	0.29	0.29	0.29	0.29	0.29
0.33	0.26	0.28	0.29	0.29	0.29	0.29	0.29	0.29
0.58	0.44	0.46	0.47	0.47	0.47	0.47	0.47	0.47
0.58	0.44	0.46	0.47	0.47	0.47	0.47	0.47	0.47
0.06	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.06	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.06	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.06	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Normalization								
0.0694	0.0929	0.1027	0.1001	0.0993	0.0997	0.0998	0.0997	0.0997

0.3028	0.3744	0.3597	0.3561	0.3585	0.3588	0.3585	0.3585	0.3586
0.1009	0.0971	0.1020	0.1031	0.1026	0.1025	0.1026	0.1026	0.1026
0.1009	0.0971	0.1020	0.1031	0.1026	0.1025	0.1026	0.1026	0.1026
0.1751	0.1634	0.1659	0.1687	0.1684	0.1682	0.1683	0.1683	0.1683
0.1751	0.1634	0.1659	0.1687	0.1684	0.1682	0.1683	0.1683	0.1683
0.0189	0.0030	0.0005	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
0.0189	0.0030	0.0005	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
0.0189	0.0030	0.0005	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
0.0189	0.0030	0.0005	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
Eigen value:*	6.53997	6.74267	6.76142	6.74732	6.74786	6.74956	6.74940	6.74923

** Sum of the initial scoring normalized sums*

Geometric Consistency Index calculation

Crit	*1*	*2*	*3*	*4*	*5*	*6*	*Total*
1 - Fin		1.6376	0.4419	0.4419	0.3311	0.3311	3.1837
2 - Hum			0.0233	0.0233	0.3966	0.3966	0.8399
3 - Util				0	0.0393	0.0393	0.0787
4 - Oport					0.0393	0.0393	0.0787
5 - Fail						0	0
6 – SCyb							
							Total:4.1809

Absolute error calculation – power iterations method

Crit	*1 - Fin*	*2 - Hum*	*3 - Util*	*4 - Oport*	*5 - Fail*	*6 – SCyb*	*Standard deviation*	*Deviation weight*
1 - Fin	8.9%	31.9%	4.6%	4.6%	5.0%	5.0%	10.9%	108.9%
2 - Hum	8.9%	31.9%	27.4%	27.4%	59.8%	59.8%	20.2%	56.3%
3 - Util	17.7%	10.6%	9.1%	9.1%	7.5%	7.5%	3.8%	37.5%
4 - Oport	17.7%	10.6%	9.1%	9.1%	7.5%	7.5%	3.8%	37.5%
5 - Fail	26.6%	8.0%	18.2%	18.2%	15.0%	15.0%	6.1%	36.1%
6 – SCyb	26.6%	8.0%	18.2%	18.2%	15.0%	15.0%	6.1%	36.1%

Dissonance matrix - ψij

Crit	*1*	*2*	*3*	*4*	*5*	*6*
1		0	1/4	1/4	1/4	1/4
2			1/4	1/4	1/4	1/4
3				0	1/4	1/4
4					1/4	1/4
5						0
6						

Expert 3 Supporting calculations

Comparison matrix

Crit	*1 - Fin*	*2 - Hum*	*3 - Util*	*4 - Oport*	*5 - Fail*	*6 – SCyb*	*Normalized eigenvector*	*Absolute errors*
1 - Fin	1.00	3.00	4.00	2.00	2.00	3.00	30.3%	3.4%
2 - Hum	0.33	1.00	3.00	1.00	0.25	0.33	10.8%	7.4%
3 - Util	0.25	0.33	1.00	0.33	0.33	2.00	8.2%	6.5%
4 - Oport	0.50	1.00	3.00	1.00	2.00	3.00	20.8%	9.1%
5 - Fail	0.50	4.00	3.00	0.50	1.00	1.00	17.9%	10.6%
6 – SCyb	0.33	3.00	0.50	0.33	1.00	1.00	12.1%	8.9%

Geometric mean error calculation

							Absolute error
Crit	1	2	3	4	5	6	$\sqrt{\frac{\Sigma}{n-1}}$
1 - Fin	0	0.021	0.011	0.053	0.002	~0	0.133
2 - Hum	0.021	0	0.719	0.609	0.623	0.966	0.767
3 - Util	0.011	0.719	0	0.005	0.063	1.122	0.62
4 - Oport	0.053	0.609	0.005	0	0.26	0.188	0.472
5 - Fail	0.002	0.623	0.063	0.26	0	0.232	0.486
6 – SCyb	~0	0.966	1.122	0.188	0.232	0	0.708

Geometric mean method priorities

	Ln(A)						$e^{\Sigma/n}$	*Weights*	*Error adjusted weights*	*Normalized weights*
Crit	1	2	3	4	5	6				
1 - Fin	1.09861	1.38629	0.7	0.69	1.09861	1.09861	2.29	33.4%	34%	30.1%
2 - Hum	0	1.09861	0	-1.39	-1.0986	0	0.66	9.6%	13%	11.3%
3 - Util	-1.0986	0	-1	-1.1	0.69315	-1.0986	0.51	7.5%	9%	8.0%
4 - Oport	0	1.09861	0	0.69	1.09861	0	1.44	21.1%	23%	20.9%
5 - Fail	1.38629	1.09861	-1	0	0	1.38629	1.2	17.5%	20%	17.5%
6 – SCyb	1.09861	-0.6931	-1	0	0	1.09861	0.74	10.8%	14%	12.2%
						Sum	6.85	100%	112.1%	100%

Power iterations method with a rank 10 matrix

	1	2	3	4	5	6	7	8	9	10	
1	1.00	3.00	4.00	2.00	2.00	3.00	-	-	-	-	
2	0.33	1.00	3.00	1.00	0.25	0.33	-	-	-	-	
3	0.25	0.33	1.00	0.33	0.33	2.00	-	-	-	-	
4	0.50	1.00	3.00	1.00	2.00	3.00	-	-	-	-	
5	0.50	4.00	3.00	0.50	1.00	1.00	-	-	-	-	
6	0.33	3.00	0.50	0.33	1.00	1.00	-	-	-	-	
7	-	-	-	-	-	-	1.00	-	-	-	
8	-	-	-	-	-	-	-	1.00	-	-	
9	-	-	-	-	-	-	-	-	1.00	-	
10	-	-	-	-	-	-	-	-	-	1.00	
Sum	2.9167	12.333	14.5	5.1667	6.5833	10.333	0	0	0	0	

Iterations								
0	1	2	3	4	5	6	7	8
1.50	10.93	6.93	6.90	6.90	6.90	6.90	6.90	6.90
0.59	3.87	2.46	2.47	2.47	2.47	2.47	2.47	2.47
0.43	2.91	1.88	1.86	1.86	1.86	1.86	1.86	1.86
1.05	7.52	4.76	4.73	4.73	4.73	4.73	4.73	4.73
1.00	6.53	4.07	4.07	4.07	4.07	4.07	4.07	4.07
0.62	4.45	2.77	2.75	2.76	2.76	2.76	2.76	2.76
0.10	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00
0.10	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00
0.10	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00
0.10	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Scaling – Ration between value and column maximum								
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.39	0.35	0.36	0.36	0.36	0.36	0.36	0.36	0.36
0.28	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
0.70	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
0.67	0.60	0.59	0.59	0.59	0.59	0.59	0.59	0.59
0.41	0.41	0.40	0.40	0.40	0.40	0.40	0.40	0.40
0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Normalization								
0.2687	0.2984	0.3025	0.3028	0.3028	0.3028	0.3028	0.3028	0.3028
0.1060	0.1058	0.1075	0.1084	0.1083	0.1082	0.1082	0.1082	0.1082
0.0761	0.0796	0.0821	0.0818	0.0817	0.0818	0.0818	0.0818	0.0818
0.1881	0.2053	0.2080	0.2076	0.2075	0.2076	0.2076	0.2076	0.2076
0.1791	0.1784	0.1777	0.1785	0.1787	0.1786	0.1786	0.1786	0.1786
0.1104	0.1216	0.1208	0.1207	0.1211	0.1210	0.1210	0.1210	0.1210

0.0179	0.0027	0.0004	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
0.0179	0.0027	0.0004	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
0.0179	0.0027	0.0004	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
0.0179	0.0027	0.0004	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
Eigen value:*	6.82084	6.88979	6.90106	6.90223	6.90229	6.90235	6.90237	6.9023

** Sum of the initial scoring normalized sums*

Geometric Consistency Index calculation

Crit	*1*	*2*	*3*	*4*	*5*	*6*	*Total*
1 - Fin		0.0049	0.0059	0.0996	0.0274	0.033	0.1707
2 - Hum			0.6694	0.4242	0.7835	0.9739	2.851
3 - Util				0.0278	0.1005	1.178	1.3064
4 - Oport					0.2948	0.3125	0.6074
5 - Fail						0.1516	0.1516
6 – SCyb							
							Total: 5.087

Absolute error calculation – power iterations method

Crit	*1 - Fin*	*2 - Hum*	*3 - Util*	*4 - Oport*	*5 - Fail*	*6 – SCyb*	*Standard deviation*	*Deviation weight*
1 - Fin	26.3%	28.2%	28.4%	36.1%	31.1%	31.6%	3.4%	11.4%
2 - Hum	8.8%	9.4%	21.3%	18.0%	3.9%	3.5%	7.4%	67.9%
3 - Util	6.6%	3.1%	7.1%	6.0%	5.2%	21.0%	6.5%	78.9%
4 - Oport	13.2%	9.4%	21.3%	18.0%	31.1%	31.6%	9.1%	44.0%
5 - Fail	13.2%	37.6%	21.3%	9.0%	15.5%	10.5%	10.6%	59.4%
6 – SCyb	8.8%	28.2%	3.6%	6.0%	15.5%	10.5%	8.9%	73.5%

Dissonance matrix - ψij

Crit	*1*	*2*	*3*	*4*	*5*	*6*
1		0	0	0	1/4	0
2			1/2	0	1/4	1/4
3				0	1/4	3/4
4					1/4	1/4
5						0
6						

Expert 4 Supporting calculations

Comparison matrix

Crit	*1 - Fin*	*2 - Hum*	*3 - Util*	*4 - Oport*	*5 - Fail*	*6 – SCyb*	*Normalized eigenvector*	*Absolute errors*
1 - Fin	1.00	5.00	4.00	5.00	8.00	7.00	47.3%	31.9%
2 - Hum	0.20	1.00	4.00	5.00	5.00	6.00	24.7%	14.5%
3 - Util	0.25	0.25	1.00	0.50	4.00	3.00	8.9%	4.4%
4 - Oport	0.20	0.20	2.00	1.00	4.00	5.00	11.4%	4.7%
5 - Fail	0.13	0.20	0.25	0.25	1.00	4.00	4.8%	3.0%
6 – SCyb	0.14	0.17	0.33	0.20	0.25	1.00	3.0%	1.7%

Geometric mean error calculation

							Absolute error
Crit	1	2	3	4	5	6	$\sqrt{\frac{\Sigma}{n-1}}$
1 - Fin	0	0.939	0.046	0.062	0.042	0.637	0.588
2 - Hum	0.939	0	0.181	0.792	0.001	0.097	0.634
3 - Util	0.046	0.181	0	0.204	0.495	0.002	0.431
4 - Oport	0.062	0.792	0.204	0	0.214	0.051	0.514
5 - Fail	0.042	0.001	0.495	0.214	0	0.859	0.568
6 – SCyb	0.637	0.097	0.002	0.051	0.859	0	0.574

Geometric mean method priorities

	Ln(A)						$e^{\Sigma/n}$	*Weights*	*Error adjusted weights*	*Normalized weights*
Crit	1	2	3	4	5	6				
1 - Fin	1.60944	1.38629	1.6	2.08	1.94591	1.60944	4.21	46%	55%	46.7%
2 - Hum	0	1.38629	1.6	1.61	1.79176	0	2.22	24%	30%	25.3%
3 - Util	-1.3863	0	-1	1.39	1.09861	-1.3863	0.85	9%	10%	8.8%
4 - Oport	-1.6094	0.69315	0	1.39	1.60944	-1.6094	1.08	12%	14%	11.6%
5 - Fail	-1.6094	-1.3863	-1	0	1.38629	-1.6094	0.43	5%	6%	4.7%
6 – SCyb	-1.7918	-1.0986	-2	-1.39	0	-1.7918	0.27	3%	3%	3.0%
						Sum	9.07	100%	117.1%	100%

Power iterations method with a rank 10 matrix

	1	2	3	4	5	6	7	8		9	10
1	1.00	5.00	4.00	5.00	8.00	7.00	-	-	-	-	-
2	0.20	1.00	4.00	5.00	5.00	6.00	-	-	-	-	-
3	0.25	0.25	1.00	0.50	4.00	3.00	-	-	-	-	-
4	0.20	0.20	2.00	1.00	4.00	5.00	-	-	-	-	-
5	0.13	0.20	0.25	0.25	1.00	4.00	-	-	-	-	-
6	0.14	0.17	0.33	0.20	0.25	1.00	-	-	-	-	-
7	-	-	-	-	-	-	1.00	-	-	-	-
8	-	-	-	-	-	-	-	1.00	-	-	-
9	-	-	-	-	-	-	-	-		1.00	-
10	-	-	-	-	-	-	-	-	-	-	1.00
Sum	1.9179	6.8167	11.583	11.95	22.25	26	0	0		0	0

Iterations								
0	1	2	3	4	5	6	7	8
3.00	29.53	7.01	6.64	6.78	6.83	6.82	6.82	6.82
2.12	16.69	3.61	3.43	3.54	3.57	3.56	3.56	3.56
0.90	5.76	1.26	1.24	1.28	1.29	1.28	1.28	1.28
1.24	7.44	1.61	1.58	1.64	1.65	1.64	1.64	1.64
0.58	2.75	0.67	0.67	0.69	0.69	0.69	0.69	0.69
0.21	1.68	0.43	0.42	0.43	0.43	0.43	0.43	0.43
0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scaling – Ration between value and column maximum								
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.71	0.57	0.52	0.52	0.52	0.52	0.52	0.52	0.52
0.30	0.20	0.18	0.19	0.19	0.19	0.19	0.19	0.19
0.41	0.25	0.23	0.24	0.24	0.24	0.24	0.24	0.24
0.19	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.10
0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Normalization								
0.3550	0.4595	0.4798	0.4747	0.4721	0.4725	0.4728	0.4728	0.4728
0.2508	0.2597	0.2473	0.2452	0.2468	0.2471	0.2470	0.2470	0.2470
0.1065	0.0896	0.0860	0.0887	0.0892	0.0890	0.0889	0.0889	0.0889
0.1467	0.1158	0.1104	0.1131	0.1141	0.1138	0.1137	0.1138	0.1138
0.0689	0.0429	0.0459	0.0481	0.0480	0.0478	0.0478	0.0478	0.0478
0.0248	0.0262	0.0296	0.0300	0.0298	0.0297	0.0297	0.0298	0.0297
0.0118	0.0016	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0118	0.0016	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

0.0118	0.0016	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0118	0.0016	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Eigen value:*	6.70918	6.71365	6.81229	6.82675	6.81832	6.81633	6.81704	6.81728

Geometric Consistency Index calculation

Crit	*1*	*2*	*3*	*4*	*5*	*6*	*Total*
1 - Fin		0.9218	0.0809	0.0342	0.0449	0.6723	1.7541
2 - Hum			0.1331	0.6961	0.0011	0.1055	0.9358
3 - Util				0.1997	0.5865	~0	0.7861
4 - Oport					0.2699	0.0718	0.3417
5 - Fail						0.8312	0.8312
6 – SCyb							
							Total: 4.6489

Absolute error calculation – power iterations method

Crit	*1 - Fin*	*2 - Hum*	*3 - Util*	*4 - Oport*	*5 - Fail*	*6 – SCyb*	*Standard deviation*	*Deviation weight*
1 - Fin	41.6%	108.7%	31.3%	50.1%	33.7%	18.3%	31.9%	67.5%
2 - Hum	8.3%	21.7%	31.3%	50.1%	21.0%	15.7%	14.5%	58.9%
3 - Util	10.4%	5.4%	7.8%	5.0%	16.8%	7.9%	4.4%	48.9%
4 - Oport	8.3%	4.3%	15.7%	10.0%	16.8%	13.1%	4.7%	41.5%
5 - Fail	5.2%	4.3%	2.0%	2.5%	4.2%	10.5%	3.0%	63.6%
6 – SCyb	5.9%	3.6%	2.6%	2.0%	1.1%	2.6%	1.7%	56.5%

Dissonance matrix – ψij

Crit	*1*	*2*	*3*	*4*	*5*	*6*
1		0	0	0	0	0
2			1/4	0	0	0
3				1/2	1/4	0
4					0	0
5						1/2
6						

Expert 5 Supporting calculations

Comparison matrix

Crit	*1 - Fin*	*2 - Hum*	*3 - Util*	*4 - Oport*	*5 - Fail*	*6 – SCyb*	*Normalized eigenvector*	*Absolute errors*
1 - Fin	1.00	5.00	3.00	1.00	5.00	6.00	34.4%	16.0%
2 - Hum	0.20	1.00	4.00	0.17	0.50	0.33	6.8%	4.5%
3 - Util	0.33	0.25	1.00	0.20	0.33	0.25	4.5%	3.1%
4 - Oport	1.00	6.00	5.00	1.00	5.00	3.00	32.2%	11.5%
5 - Fail	0.20	2.00	3.00	0.20	1.00	3.00	12.1%	7.6%
6 – SCyb	0.17	3.00	4.00	0.33	0.33	1.00	10.1%	5.7%

Geometric mean error calculation

							Absolute error
Crit	1	2	3	4	5	6	$\sqrt{\frac{\Sigma}{n-1}}$
1 - Fin	0	0.002	1.033	~0	0.288	0.273	0.565
2 - Hum	0.002	0	0.854	0.019	0.013	0.511	0.529
3 - Util	1.033	0.854	0	0.255	0.003	0.292	0.698
4 - Oport	~0	0.019	0.255	0	0.288	0.029	0.344
5 - Fail	0.288	0.013	0.003	0.288	0	0.815	0.53
6 – SCyb	0.273	0.511	0.292	0.029	0.815	0	0.62

Geometric mean method priorities

	Ln(A)						$e^{\Sigma/n}$	*Weights*	*Error adjusted weights*	*Normalized weights*
Crit	1	2	3	4	5	6				
1 - Fin	0	1.60944	1.09861	0	1.61	1.79176	2.77	34%	40%	35.0%
2 - Hum	-2	0	1.38629	-2	-0.69	-1.0986	0.53	7%	7%	6.6%
3 - Util	-1	-1.3863	0	-2	-1.1	-1.3863	0.33	4%	5%	4.6%
4 - Oport	0	1.79176	1.60944	0	1.61	1.09861	2.77	34%	36%	31.9%
5 - Fail	-2	0.69315	1.09861	-2	0	1.09861	0.95	12%	13%	11.8%
6 – SCyb	-2	1.09861	1.38629	-1	-1.1	0	0.78	10%	11%	10.1%
						Sum	8.13	100%	113.2%	100%

Power iterations method with a rank 10 matrix

	1	2	3	4	5	6	7	8	9	10
1	1.00	5.00	3.00	1.00	5.00	6.00	-	-	-	-
2	0.20	1.00	4.00	0.17	0.50	0.33	-	-	-	-
3	0.33	0.25	1.00	0.20	0.33	0.25	-	-	-	-
4	1.00	6.00	5.00	1.00	5.00	3.00	-	-	-	-
5	0.20	2.00	3.00	0.20	1.00	3.00	-	-	-	-
6	0.17	3.00	4.00	0.33	0.33	1.00	-	-	-	-
7	-	-	-	-	-	-	1.00	-	-	-
8	-	-	-	-	-	-	-	1.00	-	-
9	-	-	-	-	-	-	-	-	1.00	-
10	-	-	-	-	-	-	-	-	-	1.00
Sum	2.9	17.25	20	2.9	12.167	13.583	0	0	0	0

Iterations								
0	1	2	3	4	5	6	7	8
2.10	18.01	6.57	6.68	6.86	6.85	6.83	6.83	6.84
0.62	3.10	1.25	1.34	1.36	1.35	1.35	1.35	1.35
0.24	2.05	0.86	0.88	0.89	0.89	0.89	0.89	0.89
2.10	16.45	6.13	6.29	6.44	6.43	6.41	6.41	6.41
0.94	6.38	2.26	2.35	2.42	2.41	2.40	2.40	2.41
0.88	5.05	1.84	1.97	2.02	2.01	2.00	2.00	2.00
0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Scaling – Ration between value and column maximum								
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.30	0.17	0.19	0.20	0.20	0.20	0.20	0.20	0.20
0.11	0.11	0.13	0.13	0.13	0.13	0.13	0.13	0.13
1.00	0.91	0.93	0.94	0.94	0.94	0.94	0.94	0.94
0.45	0.35	0.34	0.35	0.35	0.35	0.35	0.35	0.35
0.42	0.28	0.28	0.29	0.29	0.29	0.29	0.29	0.29
0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Normalization								
0.2885	0.3501	0.3470	0.3425	0.3431	0.3436	0.3435	0.3435	0.3435
0.0852	0.0603	0.0660	0.0685	0.0680	0.0677	0.0678	0.0678	0.0678
0.0325	0.0398	0.0455	0.0453	0.0447	0.0447	0.0448	0.0448	0.0448
0.2885	0.3198	0.3236	0.3226	0.3221	0.3223	0.3224	0.3223	0.3223
0.1291	0.1240	0.1196	0.1202	0.1210	0.1209	0.1209	0.1209	0.1209
0.1213	0.0982	0.0972	0.1008	0.1011	0.1007	0.1007	0.1007	0.1007
0.0137	0.0019	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0137	0.0019	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

0.0137	0.0019	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0137	0.0019	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Eigen value:*	6.62121	6.76753	6.84758	6.84138	6.83354	6.83412	6.83497	6.83493

Geometric Consistency Index calculation

Crit	*1*	*2*	*3*	*4*	*5*	*6*	*Total*
1 - Fin		0.0002	0.88068	0.004	0.3192	0.3189	1.523
2 - Hum			0.94449	0.0542	0.0132	0.4943	1.5062
3 - Util				0.1325	0.0112	0.3321	0.4758
4 - Oport					0.3951	0.0042	0.3993
5 - Fail						0.8391	0.8391
6 – SCyb							
							Total: 4.7437

Absolute error calculation – power iterations method

Crit	*1 - Fin*	*2 - Hum*	*3 - Util*	*4 - Oport*	*5 - Fail*	*6 – SCyb*	*Standard deviation*	*Deviation weight*
1 - Fin	30.2%	29.8%	11.8%	28.3%	53.1%	53.0%	16.0%	46.6%
2 - Hum	6.0%	6.0%	15.7%	4.7%	5.3%	2.9%	4.5%	66.8%
3 - Util	10.1%	1.5%	3.9%	5.7%	3.5%	2.2%	3.1%	69.0%
4 - Oport	30.2%	35.7%	19.7%	28.3%	53.1%	26.5%	11.5%	35.5%
5 - Fail	6.0%	11.9%	11.8%	5.7%	10.6%	26.5%	7.6%	62.9%
6 – SCyb	5.0%	17.9%	15.7%	9.4%	3.5%	8.8%	5.7%	56.6%

Dissonance matrix – ψij

Crit	*1*	*2*	*3*	*4*	*5*	*6*
1		1/4	0	0	0	1/4
2			1/2	0	1/4	1/2
3				0	1/4	1/4
4					0	0
5						3/4
6						

Consolidated matrix supporting calculations

Comparison matrix

Crit	*1 - Fin*	*2 - Hum*	*3 - Util*	*4 - Oport*	*5 - Fail*	*6 – SCyb*	*Normalized eigenvector*	*Absolute errors*
1 - Fin	1.00	3.27	2.49	1.38	2.76	2.91	31.9%	9.3%
2 - Hum	0.31	1.00	1.96	0.96	1.50	1.40	15.7%	4.4%
3 - Util	0.40	0.51	1.00	0.41	1.02	1.39	10.4%	1.9%

4 - Oport	0.72	1.04	2.46	1.00	2.27	2.46	21.8%	3.5%
5 - Fail	0.36	0.67	0.98	0.44	1.00	2.05	11.6%	2.9%
6 – SCyb	0.34	0.72	0.72	0.41	0.49	1.00	8.6%	2.1%

Power iterations method with a rank 10 matrix

	1	2	3	4	5	6	7	8	9	10
1	1.00	3.27	2.49	1.38	2.76	2.91	-	-	-	-
2	0.31	1.00	1.96	0.96	1.50	1.40	-	-	-	-
3	0.40	0.51	1.00	0.41	1.02	1.39	-	-	-	-
4	0.72	1.04	2.46	1.00	2.27	2.46	-	-	-	-
5	0.36	0.67	0.98	0.44	1.00	2.05	-	-	-	-
6	0.34	0.72	0.72	0.41	0.49	1.00	-	-	-	-
7	-	-	-	-	-	-	1.00	-	-	-
8	-	-	-	-	-	-	-	1.00	-	-
9	-	-	-	-	-	-	-	-	1.00	-
10	-	-	-	-	-	-	-	-	-	1.00
Sum (col)	3.1374	7.2035	9.6062	4.598	9.0333	11.212	0	0	0	0

Iterations								
0	1	2	3	4	5	6	7	8
1.38	8.85	6.13	6.14	6.14	6.14	6.14	6.14	6.14
0.71	4.36	3.00	3.01	3.01	3.01	3.01	3.01	3.01
0.47	2.87	1.99	2.00	2.00	2.00	2.00	2.00	2.00
0.99	6.05	4.19	4.20	4.20	4.20	4.20	4.20	4.20
0.55	3.18	2.22	2.22	2.22	2.22	2.22	2.22	2.22
0.37	2.36	1.65	1.65	1.65	1.65	1.65	1.65	1.65
0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Scaling – Ration between value and column maximum								
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.52	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
0.34	0.32	0.33	0.33	0.33	0.33	0.33	0.33	0.33
0.72	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
0.40	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36
0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Normalization								
0.2832	0.3153	0.3189	0.3193	0.3194	0.3194	0.3194	0.3194	0.3194
0.1460	0.1552	0.1562	0.1565	0.1566	0.1566	0.1566	0.1566	0.1566

0.0970	0.1022	0.1037	0.1040	0.1040	0.1040	0.1040	0.1040	0.1040
0.2039	0.2155	0.2178	0.2184	0.2185	0.2185	0.2185	0.2185	0.2185
0.1127	0.1133	0.1153	0.1156	0.1156	0.1156	0.1156	0.1156	0.1156
0.0752	0.0842	0.0857	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859
0.0205	0.0036	0.0006	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
0.0205	0.0036	0.0006	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
0.0205	0.0036	0.0006	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
0.0205	0.0036	0.0006	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
Eigen value:*	6.04768	6.12615	6.13897	6.14088	6.14118	6.14124	6.14125	6.14125

** Sum of the initial scoring normalized sums*

Geometric Consistency Index calculation

Crit	*1*	*2*	*3*	*4*	*5*	*6*	*Total*
1 - Fin		0.2232	0.04374	0.0034	~0	0.0595	0.3298
2 - Hum			0.06918	0.088	0.01	0.0706	0.2377
3 - Util				0.0249	0.0161	0.0197	0.0607
4 - Oport					0.0333	0.0011	0.0345
5 - Fail						0.176	0.176
6 – SCyb							
							Total general: 0.8386

Absolute error calculation – power iterations method

Crit	*1 - Fin*	*2 - Hum*	*3 - Util*	*4 - Oport*	*5 - Fail*	*6 – SCyb*	*Standard deviation*	*Deviation weight*
1 - Fin	31.2%	50.1%	25.3%	29.4%	31.2%	24.5%	9.3%	29.2%
2 - Hum	9.5%	15.3%	19.9%	20.6%	16.9%	11.7%	4.4%	28.1%
3 - Util	12.5%	7.8%	10.2%	8.7%	11.5%	11.7%	1.9%	17.8%
4 - Oport	22.6%	15.9%	25.0%	21.3%	25.6%	20.6%	3.5%	16.1%
5 - Fail	11.3%	10.2%	10.0%	9.4%	11.3%	17.2%	2.9%	24.7%
6 – SCyb	10.7%	10.9%	7.3%	8.7%	5.5%	8.4%	2.1%	24.0%

Consensus indicator supporting calculations

RGMM priorities and consensus – 5 expert AHP

Expert \ Criterion	C1	C2	C3	C4	C5	C6	
E1	35.8%	8.1%	19.3%	26.9%	5.8%	4.0%	
E2	8.2%	34.0%	11.0%	11.0%	17.9%	17.9%	
E3	33.4%	9.6%	7.5%	21.1%	17.5%	10.8%	
E4	46.5%	24.5%	9.4%	11.9%	4.7%	3.0%	
E5	34.1%	6.5%	4.1%	34.1%	11.7%	9.6%	
Average priority - Pm	0.316	0.166	0.103	0.21	0.115	0.091	
Pm*ln(Pm)	0.364	0.298	0.234	0.328	0.249	0.217	$H\gamma$

	$H\gamma = e^{\sum Pm*ln(Pm)}$						5.418
Shannon Entropy -Pm x*ln(Pmx)							∑ent
1	0.368	0.204	0.317	0.353	0.166	0.129	1.53687
2	0.205	0.367	0.243	0.243	0.308	0.308	1.67326
3	0.366	0.226	0.194	0.328	0.305	0.241	1.66037
4	0.356	0.345	0.222	0.254	0.144	0.105	1.42548
5	0.367	0.178	0.131	0.367	0.25	0.225	1.51814
	$H\alpha = e^{\sum Ent/_k}$						4.772
	$exp\ H\beta = \gamma/\alpha$						1.135
	M = 1/1.135						0.881057
	$\exp(H_{\gamma max})$						6
	$\exp(H_{\alpha min})$						3.41
$S = [M - \exp(H_{\alpha min})\ /\ \exp(H_{\gamma max})]/[1 - \exp(H_{\alpha min})\ /\ \exp(H_{\gamma max})]$							0.7241

RGMM priorities and consensus – 4 expert AHP

Expert \ Criterion	C1	C2	C3	C4	C5	C6	
E1	35.8%	8.1%	19.3%	26.9%	5.8%	4.0%	
E2	34.1%	6.5%	4.1%	34.1%	11.7%	9.6%	
E3	33.4%	9.6%	7.5%	21.1%	17.5%	10.8%	
E4	46.5%	24.5%	9.4%	11.9%	4.7%	3.0%	
Average priority - Pm	0.375	0.122	0.101	0.235	0.099	0.069	
Pm*ln(Pm)	0.368	0.257	0.231	0.34	0.229	0.184	$H\gamma$
	$H\gamma = e^{\sum Pm*ln(Pm)}$						4.9977
Shannon Entropy -Pm x*ln(Pmx)							∑ent
1	0.368	0.204	0.317	0.353	0.166	0.129	1.53687
2	0.367	0.178	0.131	0.367	0.25	0.225	1.51814
3	0.366	0.226	0.194	0.328	0.305	0.241	1.66037
4	0.356	0.345	0.222	0.254	0.144	0.105	1.42548
	$H\alpha = e^{\sum Ent/_k}$						4.6423
	$exp\ H\beta = \gamma/\alpha$						1.0766
	M = 1/1.0766						0.92885
	$\exp(H_{\gamma max})$						6
	$\exp(H_{\alpha min})$						3.41
$S = [M - \exp(H_{\alpha min})\ /\ \exp(H_{\gamma max})]/[1 - \exp(H_{\alpha min})\ /\ \exp(H_{\gamma max})]$							0.8353

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Revival of The Romanian Rural Areas by Agricultural Cooperatives

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Abstract

The depopulation, corroborated with population ageing has made the Romanian rural areas vulnerable both from economic and social point of view. This vulnerability is acutely manifested within the agricultural sector due to shortage of personnel, limited financial resources and the effects of climate changes being more and more present. A possible solution for the revival of the rural area is represented by the establishment of agricultural cooperatives with the role of protecting and developing the production and the agro-food chain. Romania is at the beginning of a new road in the development of cooperation between farmers. Due to the increase in the acknowledgement degree of European and global cooperatives, many initiatives for the creation of new cooperatives have been performed in the last years. In this context it is important to understand the activity of modern agricultural cooperatives, the factors influencing it and their impact on agro-food producers, in order to identify and promote adequate policies ad legislative measures which would lead to a sustainable development of the rural area.

Keywords: Agriculture, Cooperatives, Romania

Introduction

The rural area has become more and more depopulated and aged demographically in the last years, which has systematically compromised the development tendencies (Lutz et al., 2008). The impact of these factors are intensely manifested in the economic, social and political system, being necessary a series of significant measures (Kholer et al., 2017; Șerban, 2012).

In the context of ensuring better living conditions, the international bodies have established a series of objectives named Sustainable Development Goals (SDGs) with direct impact on the reduction of poverty, starvation and inadequate exploitation of resources at global level (Townsend et al.,2018).

Food and Agriculture Organization (FAO) considers the sustainability of agriculture and food chain as one of the most important paths for the revival of the rural areas (FAO, 2018). For the

development of a sustainable agriculture, the role of cooperatives is essential (Aref, 2011; Stanciu et al, 2018).

At the same time, Wanyama (2014) highlights the importance of cooperatives in the process of reaching SDGs objectives, as they have been already activating in all sustainable development areas, as we have presented in Figure no. 1.

Supporting the association of farmers in order to consolidate the agro-food sector has represented a measure highly debated in Romania in the last years (Wolz et al, 2019).

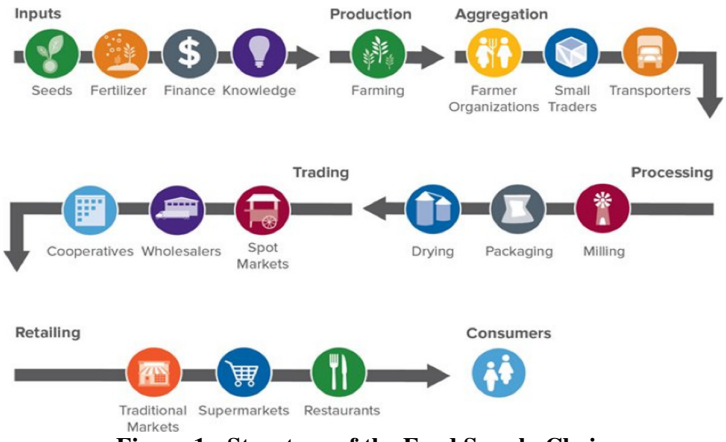

Figure 1: Structure of the Food Supply Chain

Source: Chicago Council on Global Affairs

As can be seen in Figure 1, cooperatives are tools with which to better negotiate transaction prices. But their role is not limited to this, as they have major implications for the other components of the food chain.

The cooperation idea appeared in the second half of the 19th century in Romania, based on "apportionment of property and emancipation of peasantry" (Petrescu, 2013).

Although the cooperatives have made their mark since 1889 as founding member of the International Cooperative Alliance and have had a beneficial effect on the economic evolution of agriculture, they have reached the limit of the evolutional potential before the 1989 Revolution without having too many things in common with the Western cooperation principles (Cruceru, 2010; Petrescu, 2013).

After 1989, the agricultural production cooperatives had directly or indirectly self-bankrupt (by lack of usage and maintenance), destroying the local or regional investments, including those from agricultural infrastructure (cereal silos, irrigation systems etc.) (Schmitt, 1993; Florea et al, 2018).

One of the fundamental deficiencies of Romanian agriculture and of cooperatives was the inexistence of an adequate strategic program for the management and development of economy in general and especially for agriculture (Aceleanu et al., 2015; Schmitt, 1993; Lapusanu, 2010).

The export of raw materials and import of value added products after 1989 have contributed to the impoverishment of the rural areas and to decreasing the desire to activate in agricultural sector (Wolz et al, 2019). As no stable association alternative and no series of well defined principles had existed for almost 15 years, up to the implementation of the Cooperation Law in 2004, no significant progresses within Romanian agriculture have been registered (Lapusanu, 2010).

The main objective of the present study is to identify the steps taken, the appropriate measures and recommendations in order to improve the business of agricultural cooperatives and successful entrepreneurial development in associative forms.

The sustainable development of the Romanian rural area is closely related to the efficiency of the activity of agricultural cooperatives and agricultural companies in Romania. It is therefore necessary to establish a strategy to guarantee the socio-economic environment and long term viability of rural areas.

Methodology

The researches for the performance of the present article are based on fundamental and applicative aspects, starting from the specialty literature identified with the help of international databases: Scopus, Science Direct, Google Academic, ResearchGate.

The research was performed using key words such as: poverty, depopulation, agricultural cooperatives, Romania, social development, association and food chain.

After the description of the phenomenon, the following step was data collection from the websites of the Ministry of Agriculture and Rural Development (MARD), Ministry of Public Finance (MPF), National Trade Register Office (NTRO), the National Institute of Statistics (NIS) and Eurostat.

The legislative framework regulating the activity of agricultural cooperatives and the modifications performed in order to increase the agricultural cooperative's activities has been consulted.

Background Information and Data

Otiman (2012) ascribes the economic and social problems manifested at Romanian agricultural level and rural area on the expense of the agricultural company's structure. Accordingly, it is considered necessary the alienation from the concept of subsistence agriculture and rethinking the agricultural policy in order to some avoid undesired effects (Ciutacu et al., 2015).

The Romanian farmer faces also a series of difficulties in the trading of the production, the farm gate price being much smaller than the sales price to the final consumer. In other words, the added value does not return to the farmer. This assertion is supported by Eurostat reports (2019) according to which the evolution of the agricultural income is much smaller as compared to that of other sectors of the economy (Figure no. 2).

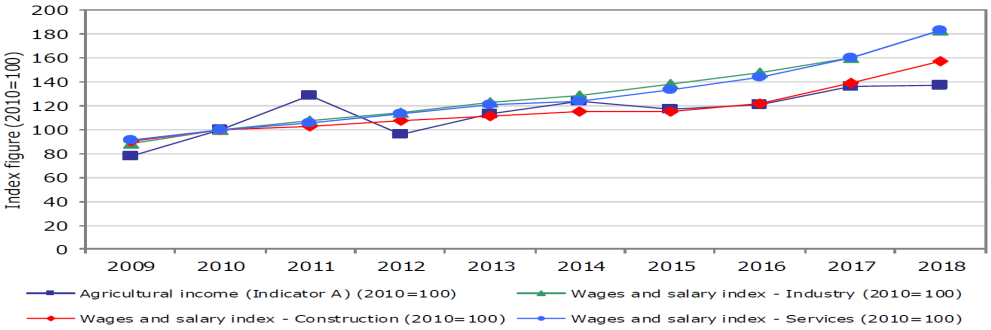

Figure 2: Evolution of agricultural income as compared to other economic sectors from Romania

Source: Eurostat

According to figure no. 2 we observe that the incomes realized in the agricultural sector in the period 2017-2018 remain constant compared to the evolution manifested within the other sectors.

The development of some short food chains can significantly contribute to increasing the value added in agriculture (Stanciu, 2015).

At the same time, the negative effects of the climate changes with direct impact on the productivity level of the agricultural sector bring into discussion the necessity of efficient management of agricultural lands. (Prăvălie et. al, 2020)

Romania faces phenomena like intensification and extension of drought and desertification due to natural and artificial causes (no irrigation). (Mateoc-Sîrb et. al, 2014).

In these conditions, MARD supports the association as a modality to protect small and medium farmers against the generated risks, as well as a method of social and economic development (MARD, 2015).

A series of authors consider the agricultural cooperatives as an instrument conferring the farmers the power to face the market challenges (Hendrikse and Bijman, 2002; Bijman et. al., 2012).

The agricultural cooperatives in Romania have been staggered throughout history, due to the implications of agricultural production cooperatives for people during communism, but also after 1989, due to the lack of legislation that should stimulate their development, without having any benefit against any type of private legal person (Lapusanu, 2010).

The bases of Romanian agricultural cooperatives were laid in 2004, through Law no. 566/2004 (Wolz et al, 2019). The law stipulates a series of benefits that have been effectively applied starting with 2019.
According to the data published on the website of the National Trade Register Office (NTRO), the period 2018-2019 represents a re-launch of agricultural cooperatives in Romania, as we presented in Figure no.3.

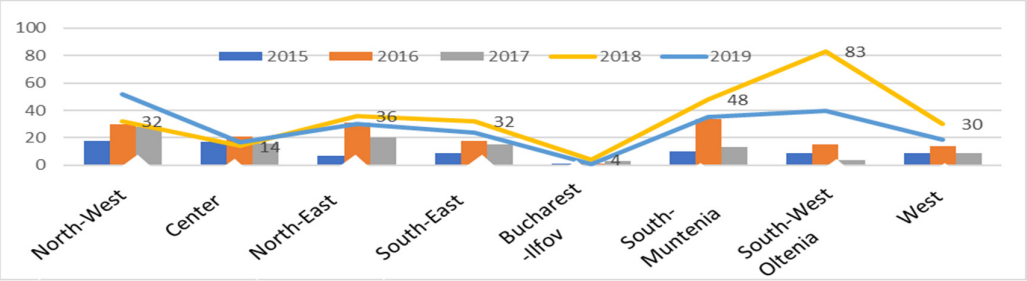

Figure 3: The number of established agricultural cooperatives per regions, according to NUTS II classification

Source: NTRO

There is an evolution in the sense of increasing the number of agricultural cooperatives, especially in South-West Oltenia where in 2018, 83 such entities were established.

Another major problem faced by agricultural cooperatives in 2018 was the accounting misunderstanding of the taxation of cooperatives. According to the provisions of Government Emergency Ordinance no. 79/2017, agricultural cooperatives with a turnover of up to one million Euros should have been taxed only on the profit made by the cooperative and not on the value of the income that was previously taxed.

The harmonization of the differences between the Tax Code, Law 566/2004 and the other legislative aspects has been carried out starting with 2017. By the beginning of 2019, the understanding of the way of taxing cooperatives as well as the granting of fiscal facilities was achieved.

The promotion of cooperatives by professional organizations and authorities, as well as the introduction of selection criteria that favor cooperatives when accessing European non-reimbursable funds, has led to the development of associative forms. At the same time a number of national

projects, such as Agricoop have had a positive influence in increasing the number of agricultural cooperatives. The program for consultancy services for agricultural producers proposed to establish and develop associative forms in the agricultural sector, with the ultimate goal of establishing 350 cooperatives (Agricoop, 2019).

Results and Discussions

Although the bases have been laid for the adhesion of agricultural producers to an agricultural cooperative in order to ensure the profitability of an agricultural exploitation no matter its dimension, there are still necessary some measures and time in order to create the space for the development of the modern cooperation system from Romania.

The Law no. 21 of 13th January 2019 has brought a series of improvements in the commercial activity of agricultural cooperatives which stimulates the association based on correct, transparent, stimulating principles, the efficiency of the cooperation activities and their trade in order to add value to the primary products of the members and supplies finished food products which will be sold directly to the consumer by cooperatives or by retailers.

Conceptually speaking, the Romanian cooperatives are still at the beginning of their operation, even though we compare them with the European ones which have been operating with the same principles for decades. In Romania, in the last 14 years, everything has started from scratch, being made small steps, but the cooperatives must be rebuild based on solid principles, granting special attention both to reconstruction and to recruitment of some capable persons and of course, staff. Law 566/2004 represents the initial moment from which the process of reconsolidation of agricultural cooperatives in Romania began. The first step is now made by encouraging the establishment of cooperatives as many as possible, which would lead to a period of rationalization, merger between them and the unavoidable extinction of those not operating due to various reasons. According to the legislation and the measures taken, this period of development and consolidation of the cooperative sector can be a reasonable one of up to 5 years or it can be extended.

Progresses had been registered in 2018 to this sense and the measures, sub-measures, projects and programs must be followed up in order to stimulate the association in efficient and correct agricultural cooperatives, which:

- Contribute to the optimization of the predominant production costs of the small and medium-sized farmers;
- Increase the accommodation degree of agricultural product offer in what concerns the quantity, quality and assortment at consumer's request;
- Lead to performance of joint investments which add value to the primary production, balancing the income from the food chain by generating economic value added for their members and more so, with a relevant economic activity, they resist on the market and develop;
- Distribute correctly the results of the cooperative according to the economic activity of each member;
- Approach the market volatility risks as compared to the individual sales activities of each producer;
- Contribute to the re-launching and socio-economic stabilization of rural areas by encouraging the development of agrarian structures integrated in the market flows and efficient from economic point of view;
- Offer services and information specialized to their members, which would be too expensive individually;

From legislation point of view, more conditions, criteria, measures of orientation and control have to be introduced in order to guide the cooperatives to the balance element, to ensure the patrimony of the cooperatives and the introduction of pecuniary measures for those which do not comply with the agriculture law.

Both the leaders of the agricultural cooperatives / branches / professional organizations and the State's institutions, by their representatives, should encourage and promote steady and transparent agricultural cooperatives with economic and social results, with history and which distribute equally the cooperative result according to the economic activity of each member.

The agricultural producers must understand that the national and EU legislation in agriculture area is in continuous change and it is essential to report certain irregularities they might face with, to join the cooperatives, industrial unions, specific professional organizations, to be involved actively in order to be able to cope with the competition, to ensure profit and have a social-economic impact on the sustainable development of the rural area.

Increasing the number of agricultural cooperatives is a good thing if efforts are made to make them work and develop according to the principles of cooperatives. It is also important to note how many of these cooperatives generate profit. Figure no. 4 presented the percentage distribution per year of agricultural cooperatives that recorded profit, loss or no activity.

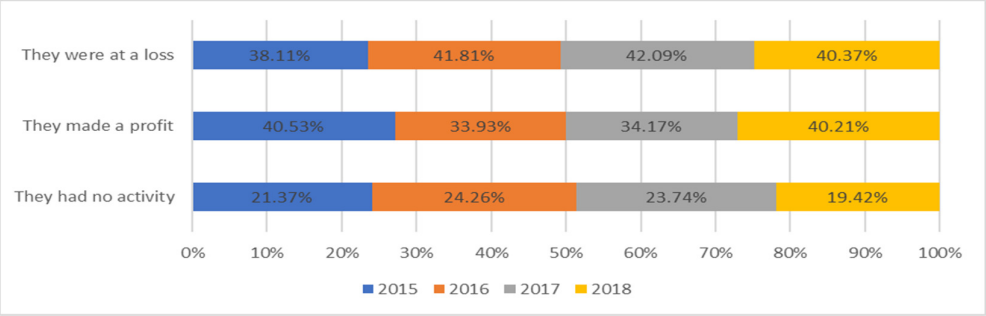

Figure 4: The structure of cooperatives according to the financial results in the period 2015-2018

Source: Issued by the author, based on NTRO and MPF data

There is a decreasing trend of cooperatives without activity from 21.37% in 2015 to 19.42% in 2018. There is also a percentage increase in 2018 of cooperatives that registered profit compared to 2016 and 2017. The analysis showed that 51% of the cooperatives that registered a profit were established in the period 2016-2018.

Functionality is another issue as can be seen from the analysis on the data published on MPF website on the status of agricultural cooperatives at the end of 2018, corroborated with the information supplied by NTRO and presented in Figure no. 5.

Within the figure no. 5 were represented only those cooperatives that reported / submitted the financial statements in 2018. Reporting them to the total number of cooperatives, it is observed that only 47.88% of them submitted the financial statements to the Financial Administration.

Functional cooperatives are those having a turnover higher than 250 de euro, out of which the contribution of members is excluded. The pseudo-cooperatives are defined by Gertler (2011) as those entities being characterized by a minimum involvement of the members and with reduced socio-economic impact on the rural community.

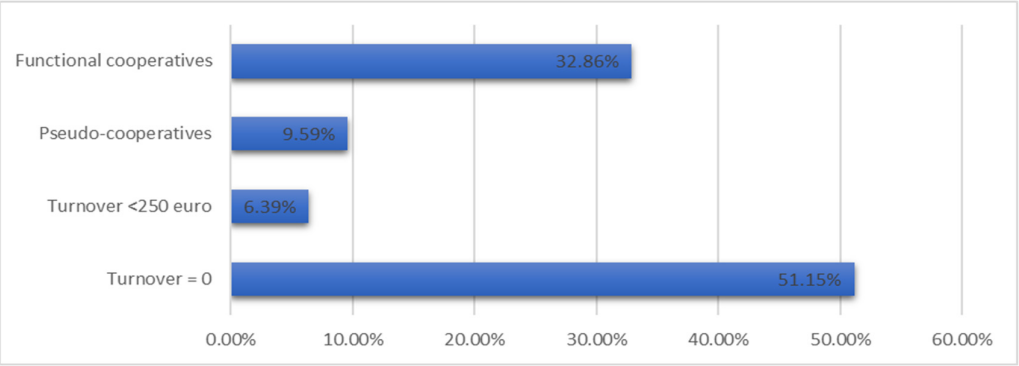

Figure 5: Status of agricultural cooperative according to the financial statements of 2018
Source: Issued by the author, based on NTRO and MPF data

If we extend the analysis in Figure 5 and set a threshold of complex functionality represented by cooperatives that have a turnover of more than 25,000 euros, we will see that only 9.2% of the 654 cooperatives that submitted financial statements meet this criterion.

This threshold was estimated on the basis of the areas exploited and the average number of members corroborated with the obligation to market 50% of the production.

Conclusions

One of the factors of the certain progress in the sustainable development of agriculture and rural area is the construction and development of efficient and correct agricultural cooperatives, actors absolutely essential in the creation of predictable and everlasting value-added chains in the Romanian agriculture.

In the cooperative sector in Romania there is an evolution of the number of newly established agricultural cooperatives. But we consider that for their consolidation and operation at optimal parameters it is necessary an average period of 2-3 years from the establishment.

Fiscal facilities, financing programs and the adaptation of the legislative framework are the dynamic factors that encourage farmers to form cooperatives.

At the same time, a declining share of agricultural cooperatives between 5 and 10 years old has been observed. This is due to the difficulties in maintaining the homogeneity of the group and is a major problem in the development of cooperatives because these long-standing cooperatives should be the beneficiaries of large-scale projects starting from the experience they are supposed to have gained.

A good direction for the development of agricultural cooperatives in Romania is represented, in the opinion of the authors, by encouraging the establishment of agricultural cooperatives and supporting the functional ones. At the same time, special attention must be paid to non-functioning agricultural cooperatives, by making a selection of those that can be recovered and those that are not set up in accordance with the principles of cooperation.

Acknowledgment

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The Framework of Knowledge Transfer Model in Industry 4.0 Context

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Abstract

Rationale of the research was the observation on the dynamics of knowledge generated on Industry 4.0. Analysis of the number of scientific papers on the subject proved that it is exponentially growing. The research question that emerged after that analysis was: Is the knowledge generated by academics used to support companies willing to benefit from Industry 4.0 solution? The question was roughly answered after analysis of reports on Industry 4.0 implementation barriers. Lack of knowledge was recognized there as one of the main reasons for delaying decisions on implementation of Industry 4.0 tools and methods. That inspired authors to developing model of knowledge gap filling. Hence, the ambition of the paper is developing the model of knowledge gap filling. The methodology implemented encompasses causal diagrams and system dynamics.

Keywords*:* Industry 4.0, Knowledge Transfer, Causal Loops, System Dynamics

Introduction

Industry 4.0 is the topic interesting from both, academic and business perspective. Researchers model and analyse solutions that are then implemented by companies. The result expected are increased knowledge resources and improved competitive advantage.

Rationale of the research was the observation on the dynamics of knowledge generated on Industry 4.0. Analysis of the number of scientific papers on the subject proved that it is exponentially growing. The research question that emerged after that analysis was: Is the knowledge generated by academics used to support companies willing to benefit from Industry 4.0 solution?

The question was roughly answered after analysis of reports on Industry 4.0 implementation barriers. Lack of knowledge was recognized there as one of the main reasons for delaying decisions on implementation of Industry 4.0 tools and methods.

That inspired authors to developing model of knowledge gap filling. Hence, the ambition of the paper is developing the model of knowledge gap filling. The methodology implemented encompasses causal diagrams and system dynamics.

The paper is structured as follows: First section briefly introduces the dynamics of knowledge on Industry 4.0 generation and outlines barriers to Industry 4.0 implementation. The second presents knowledge dissemination models. The third section presents model of knowledge gap filling from qualitative perspective. The fourth gives quantitative model of the phenomena. The last section summarizes the paper, concludes the research and introduces further research opportunities. Authors expect to identify the manageable variables that can improve efficiency of knowledge gap filling process to formulate recommendations for academia on knowledge dissemination and for companies on cooperation with academia to not only to acquire knowledge but also to inspire and support research in their efforts of new knowledge generation.

Industry 4.0 Knowledge Development Dynamics

Industry 4.0 concept was designed to stimulate German industry and economy and soon it became universally, globally recognized approach discussed and implemented worldwide. Over the last nine (the concept was introduced in 2011) Industry 4.0 was defined from many perspectives and with various precision. Selected examples of the definitions are presented in the Table 1.

Table 1: Definitions of Industry 4.0 concept

Source/author	Definition
High-Tech Strategy 2020 plan	A paradigm shift from centralized to decentralized smart manufacturing and production. Smart production becomes the norm in a world where intelligent ICT-based machines, systems and networks are capable of independently exchanging and responding to information to manage industrial production processes.”
McKinsey and Company	The next phase in the digitization of the manufacturing sector, driven by four disruptions: the astonishing rise in data volumes, computational power and connectivity, especially new low-power wide-area networks; the emergence of analytics and business-intelligence capabilities; new forms of human-machine interaction such as touch interfaces and augmented-reality systems; and improvements in transferring digital instructions to the physical world, such as advanced robotics and 3-D printing
Industrie 4.0 Platform	The intelligent networking of machines and processes for industry with the help of information and communication technology
The Industrial Internet Consortium	The integration of complex physical machinery and devices with networked sensors and software, used to predict, control and plan for better business and societal outcomes
Boston Consulting Group (BCG)	A new digital industrial technology that is powered by nine foundational technology advances: big data and analytics, simulation, autonomous robots, horizontal and vertical system integration, the industrial internet of things, cybersecurity, the cloud, additive manufacturing, augmented reality
A. Merkel, OECD Conference (2014)	The comprehensive transformation of the whole sphere of industrial production through the merging of digital technology and the internet with conventional industry. In short, everything in and around a manufacturing operation (suppliers, the plant, distributors, even the product itself) is digitally connected, providing a highly integrated value chain
M. Brettel, N. Friederichsen. M. Keller, M. Rosenberg (2014)	A digitalization of product and processes through increased intelligence. It focuses on the establishment of intelligent products and production processes

R. Schmidt, M. Möhring, R. Härting, C. Reichstein, P. Neumaier, J. Jozinović (2015)	The embedding of smart products into digital and physical processes"
C. Toro, I. Barandiaran, J. Posada (2015)	An integration of complex machinery and devices, with sensor and software networks, used to predict, control and improve plan business and results in society
M. Hermann, T. Pentek, B. Otto (2016)	A holistic system of information technologies, people, machines and tools where CPS monitor physical processes, create a virtual copy of the physical world and make decentralized decisions
A. Sanders, Ch. Elangeswaran, J. Wulfsberg (2016)	An industrial revolution applying the principles of cyber-physical systems (CPS), Internet and future-oriented technologies and smart systems with enhanced human-machine interaction paradigms
J. Qin, Y. Liu, R. Grosvenor (2016)	A concept of manufacturing which consist of exchanged information and controlled machines and production units acting autonomously and intelligently in interoperable
R.Y. Zhong, X. Xu, E. Klotz, S.T. Newman (2017)	A holistic system combines embedded production system technologies with intelligent production processes to pave the way for a new technological age that will fundamentally transform industry value chains, production value chains, and business models
C. Santos, A. Mehrsai, A.C. Barros, M. Araújo, E. Ares (2017)	A comprehensive concept as well as a new trend in manufacturing (and relevant sectors) based on the integration of a set of technologies that enable ecosystems of intelligent, autonomous as well as decentralized factories and integrated product-services
A. Wortmann, B. Combemale, O.A. Barais (2017)	A vision of manufacturing in which smart, interconnected production systems optimize the complete value-added chain to reduce cost and time-to-market. It is the smart factory of the future, whose successful deployment requires solving challenges from many domain
J. Lu (2017)	An integrated, adapted, optimized, service-oriented and interoperable manufacturing process which is correlate with algorithms, big data, and high technologies

Source: Janik, A., Ryszko, A. (2018). Mapping the field of Industry 4.0 based on bibliometric analysis. Conference: 32nd International Business Information Management Association Conference (IBIMA) – Vision 2020: Sustainable Economic Development and Application of Innovation Management from Regional Expansion to Global Growth, At Seville, Spain

The definitions focus on digitization, intelligence and optimization, stressing various methods and tools to achieve these goals. With the development of technology, new solutions are considered, contributing to knowledge on Industry 4.0 development. The Industry 4.0 knowledge development dynamics as interesting phenomena, which was analysed with two parameters. Authors assume that there are two parameters that should be considered, namely the number of publications per year, and the number of citations. The first parameter was to show the size of the knowledge, while the second its impact on academic society.

Since the term "Industry 4.0" originated in 2011 from a German government project in the high-tech strategy, and it was first publicly introduced in the same year at the Hannover Fair scientific publications from 2011–2020 were searched with the term "Industry 4.0" in their title, abstract or keywords. The initial search for the defined basic concept of "Industry 4.0" included 4988 references in Web of Science Core Collection (Figure 1).

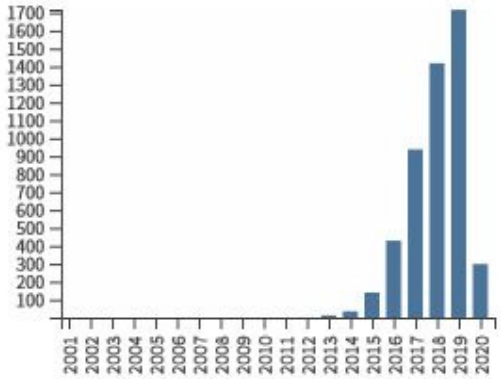

Figure 1 : Number of publications on Industry 4.0 topic (title, abstract, keywords: WoS core collection, March 2020)

The number of publications on Industry 4.0 is growing. The dynamics of the growth is presented in the Table 2. It displays the number of papers published and indexed each year, starting from 2011, and the increase in number of publications compared to the previous year and their share in the total number of publications so far.

The growth of the number of publications was the most dynamic in 2013-1016 period, after 2016 slight decrease in the growth rate is observable.

Table 2 : Dynamics of growth of publications on Industry 4.0 number over years (WoS core collection, March 2020)

Year:	Number of publications/years	Increase rate per year [%]	Share in total number of publications [%]
2011	0	-	0
2012	1	-	0
2013	12	1200	0
2014	35	292	1
2015	140	400	3
2016	429	306	9
2017	938	219	19
2018	1418	151	28
2019	1716	121	34
2020	299	17	6
Total:	4988	-	100

The publications are shared and the knowledge is disseminated which is proven by the citation count analysis, presented in the Table 3. The knowledge on Industry 4.0 spreads among academics, thanks to which it can be developed, improved and recognized by numerous environments, disciplines and industries.

Table 3 : Citation count for Industry 4.0 (WoS core collection, March 2020)

Results found	4988
Sum of the Times Cited	22054
Average Citations per Item	4,42
h-index	59

The average citations number per item is 4,42, which means that the publication spread in the academic world and contribute to generating new knowledge. The most often cited publication was referred to 528 times. The dynamics of growth of the number of citations (presented in the Figure 2) supports the thesis on growing interest in Industry 4.0 issues and proves the dissemination of knowledge between academics. The dynamics of growth is close to exponential, resulting in exponential growth of knowledge on Industry 4.0, its assumptions, methods and applications.

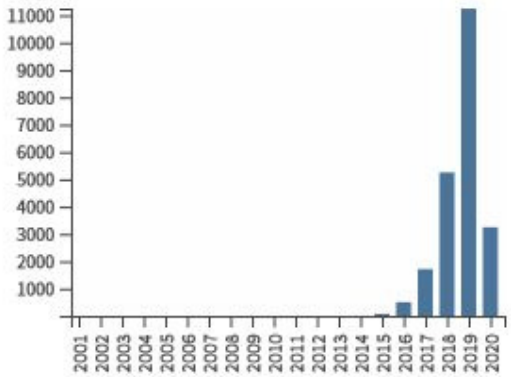

Figure 2: Number of citation of Industry 4.0 (WoS core collection, March 2020)

The knowledge is generated by academics at the high rate, which is the consequence of their scientific curiosity but also of the demand for knowledge that comes from industry willing to improve its performance with latest solutions. Nevertheless, the research show that Industry 4.0 solutions are not commonly implemented. The set of barriers for Industry 4.0 implementations is recognized and commonly accepted but the importance of the barriers differ on account of the country and region as it is economically driven. The list of the barriers is presented in the table (Table 4); the set presented encompasses the barriers to innovation implementation (general approach) and to Industry 4.0 implementation specifically. Authors believe that merging the sets is justified as solutions within Industry 4.0 are of a different character. Nevertheless, they are innovative in terms of both technology and organization.

Table 4: Barriers to Industry 4.0 implementation recognized by literature

CATEGORY	BARRIER	REFERENCE examples
Economic/financial	Lack of monetary resources	Kelley (2009),
	High investments required	Martinez and Briz (2000) and Frenkel (2003)
	Innovation cost difficult to control	Hadjimanolis (1999) and Martinez and Briz (2000)
Cultural	Lack of support from customer/supplier	Hewitt-Dundas (2006) and Mohen and Roller (2005)
	Unsupportive government	Hadjimanolis (1999) and Freel (2000)

	Paucity of external finance	Minetti (2010)
	Excessive risk	Hewitt-Dundas (2006) and Galia and Legros (2004)
	Preferred autonomy	Lynn et al. (1996)
	Unsupportive organizational structure	Baldwin and Lin (2002) and Martinez and Briz (2000)
	Restrictive mindset	Wolfe et al. (2006)
	Restrictive local culture	Riffai et al. (2012)
	Focus on day-to-day operations	Orzes et al. (2020)
	Awareness about the potential of robots	Orzes et al. (2020)
	Lack of support from the IT department	Orzes et al. (2020)
Technical	Technological immaturity	Chiesa and Frattini (2011)
	State of machine park	Orzes et al. (2020)
Competencies	Lack of discovery competencies	O'Connor and DeMartino (2006)
	Lack of incubation competencies	O'Connor and DeMartino (2006)
	Lack of acceleration and commercialization competencies	O'Connor and DeMartino (2006) and Story et al. (2009)
	Lack of qualified employees	Mohen and Roller (2005) and Galia and Legros (2004)
	Lack of information about technologies	Galia and Legros (2004) and Frenkel (2003)
	Inappropriate infrastructure	Iyer et al. (2006)
	Lack of knowledge of Industry 4.0 technologies and technical providers	Orzes et al. (2020)
	Factory layout constraints	Orzes et al. (2020)
Implementation process	Required time for implementation	Orzes et al. (2020)
	Changes required for implementing Industry 4.0	Orzes et al. (2020)
	Difficulties in demand forecasting	Orzes et al. (2020)
	Product characteristics	Orzes et al. (2020)

Source: own work based on Orzes G., Poklemba R., Towner W.T. (2020) Implementing Industry 4.0 in SMEs: A Focus Group Study on Organizational Requirements. In: Matt D., Modrák V., Zsifkovits H. (eds) Industry 4.0 for SMEs. Palgrave Macmillan, Cham

The categories identified in the table refer to resources: financial, human and technical, and to the culture and implementation process. The strength of the impact of the barriers is, as mentioned individual, based on situation in both micro-perspective (of a single company) and macro-perspective (of the economy in the region or country). The analysis of the barriers presented inspired authors to the

research on knowledge and competencies gap. Having noticed the dynamic increase in knowledge on Industry 4.0 represented by growing number of research and publications on the subject and identifying lack of competencies and knowledge as one of the barriers to Industry 4.0 implementation authors came with following research questions:

1. What is the mechanism of knowledge on Industry 4.0 dissemination and absorption?
2. What are the causes of the perceived knowledge gap?
3. How can the knowledge gap identified be minimized?

To answer the questions authors decided to implement causal diagrams for qualitative, descriptive model of knowledge dissemination and absorption development, and mathematical modelling and simulation for defining recommendation concerning knowledge gap minimization. The results of the research conducted are discussed in the subsequent sections of the paper.

Knowledge Dissemination – Theoretical Background

Much of the literature on economic growth in the last couple of decades has focused on the role of knowledge creation and diffusion. The theory of "endogenous growth" (see for example Romer, 1986 and 1990, and Lucas, 1988) is based on the idea of knowledge spillovers emanating from R&D.

Literature related with knowledge management covers among others such topics as knowledge transfer, knowledge acquisition, knowledge dissemination, knowledge sharing, knowledge technologies.

Evolutionary theory provides an appropriate analytical framework for better understanding of the processes of knowledge creation and dissemination. (See e. g. Metcalfe 1994, 1995; Cantner and Pyka, 2001; Smits et al., 2010) The main components of the necessary theoretical framework are incorporated in the theory of innovation systems (Carlsson & Stankiewicz, 1991).

Knowledge is the main transaction unit flowing through the structures of innovation networks. The knowledge-based view of the firm (Nonaka, 1991; Penrose, 1959) discusses that accessing external knowledge is required to improve the efficiency of innovations. Empirical studies suggest that the participation of organizations in innovation networks will not only speed the innovation process, but also bring them closer to obtaining new knowledge (Borgatti et al., 2013; Sternberg, 2000). Tacit and explicit knowledge represents the basic unit of transaction in innovation networks. Hence, the structure and dynamics of the network depend in great extent on the knowledge brought from each actor to the network and the representativeness of that knowledge to achieve innovation. The motivations of organizations to participate in collaborative innovation actions are related to the acquisition, assimilation and transformation of knowledge to accelerate innovation or to gain better competencies to improve their internal innovation process. (Batz A. et al, 2018)

Knowledge development refers to the accumulation of new knowledge for innovation, adaptation and achievement objectives of the organization. The organization accumulates knowledge from outside by renting (hiring a consultant and using his expertise for acquiring new acquaintance) or by buying (purchasing a society for the knowledge it holds) or from inside, through the dissemination of it from a particular source component and the development of existing sources.(Costache A. et al, 2017)
Whereas diffusion is the natural spread of ideas, dissemination is the conscious effort to spread new knowledge, policies, and practices to target audiences or the public at large. Despite numerous reviews and guidelines, a gap still exists in how knowledge is implemented and utilized (Green L.W. et al, 2014).

Dissemination is best described as the delivering and receiving of a message, the engagement of an individual in a process, or the transfer of a process or product. It is also helpful to think about dissemination in three broadly different ways, viz., dissemination for awareness, for understanding, and for action. Indeed, effective dissemination of a knowledge product will most likely require that it satisfy all three in turn: utilization is the goal (Ordoñez M. and Serrat O., 2009).

The sources of knowledge and the vehicles of dissemination of knowledge differ among high-tech clusters. Universities are anchors in the early phase of discovery-driven innovation. New knowledge creation tends to take place in large firms rather than universities. These firms tend to be connected to other large firms (suppliers of sub-systems and components), often via international networks through which knowledge is both created and shared via market-mediated processes. The role of universities is to supply skilled labor (Carlsson B., 2012).

Recently, scholars pay much attention on building knowledge dissemination model to investigate knowledge dissemination. Knowledge dissemination is a complex process that organizational global knowledge behavior is formed by the local knowledge interaction among individuals (Meng X.F. et al, 2004)

A wide range of approaches to knowledge dissemination is available. It is important that organisations choose an approach that is appropriate for the knowledge being disseminated and for the organisation's structure, culture and business goals (Kingston J., 2012).

Knowledge dissemination is crucial for progress in a discipline. It allows ideas, perspectives, and findings to collide—often spawning new advances that would not otherwise exist. It also allows ideas, perspectives, and findings to coalesce—as part of the fulfilling discipline's mission of making sense out of phenomena of interest. Researchers perceive Universities as one of the fundamental actors to guarantee the dissemination of knowledge and the development of competences related to the Industry 4.0 (Rios et all., 2017, Hadaś et al., 2020)

We can found numerous models, techniques describing how knowledge can spread and be disseminated. A number of qualitative and quantitative models have been developed to describe various aspects of knowledge dissemination in knowledge-based organizations, with or without intervention (see for instance, Kelliher et al. (2010), Chen et al. (2014), Su et al. (2018), Li et al. (2017), and Liu et al. (2017)).

Jiafu et al (Jiafu et al, 2018) developed an improved CA (cellular automation) model with heterogeneity to study the process and rule of knowledge dissemination in knowledge-based organizations. Their work investigated the process and mechanism of knowledge dissemination from the perspective of micro knowledge exchange among individuals, which can help decision-makers to forecast and monitor the trend of knowledge dissemination.

The European Institute of Innovation and Technology (EIT) will require effective structures for disseminating knowledge throughout the knowledge triangle of higher education, research and innovation. Knowledge dissemination schemes will need to be tailored to each context of application and to each class of intended recipients.

Entering the automatized era the dispersion of knowledge will increase and also an intensification of price competition has to be expected (Wilson and Doz, 2011). Thus, concepts like agile innovation or agile innovation process are emerging to respond to these new challenges (Similä et al., 2008; Wilson and Doz, 2011).

Model Assumptions

To answer the question on mechanism of knowledge on Industry 4.0 dissemination and absorption authors decided to develop the model based on causal diagram structure.

The first step of model development process was identification of the variables in the system and the relations between them. The objects and variables considered, together with brief description of their behaviour is presented in the Table 5

Table 5: Variables of direct knowledge gap filling model and their description

Variable	CHARACTERISTICS	TASKS of OBJECTS
Knowledge and competencies of companies	The scope of knowledge and competencies referred to covers Industry 4.0 issues, the **companies** considered are industrial companies, implementing innovation, striving to increase their competitiveness, adjusting to market requirements	Searching for innovation, implementing innovations, developing solutions (innovations)
Knowledge of academia	The scope of knowledge and competencies referred to covers Industry 4.0 issues, the **academia** is represented by Universities (Higher Education Institutions) and research centres generating knowledge	Conducting research on advanced solutions, innovation causes and barriers, developing innovations, innovation implementation methodology

The table focuses on the variables that when confronted represent the knowledge gap: the difference between knowledge available (represented by academia) and the knowledge acquired (represented by companies) is the gap. If companies were equipped with the knowledge available, lack of competencies would not be the barrier to Industry 4.0 solutions implementation. To minimize the gap, academia needs to disseminate knowledge and companies need to absorb it, so the process of knowledge transfer is required. The process of knowledge transfer requires defining some relations between objects. The relations identified are based on cooperation between academia and companies that takes form support provided by academia to companies when developing innovations with scientific expertise. There are programs (by local authorities, governments, UE etc.) financing such, cooperation and it can also take the form of joint industrial projects founded by companies themselves.

The dynamics of the relationship between the variables presented prompted the authors to present a model illustrating the knowledge transfer in the form of a cause-and-effect diagram. Visualizing relationships and, to some extent, their dynamics makes it easier to interpret the current situation and the consequences of changes in the system. Cause-effect diagrams consist of nodes representing variables and connections representing connections and relationships (Sterman J. D. 2000). Associations can be identified as unidirectional, which means that the observed changes have the same direction (S: same direction), or omnidirectional, which means that the observed changes have different directions (O: opposite direction). Because the observed changes are cyclical, the cause-and-effect diagram takes the form of a loop. Loops, in turn, can be reinforcing (R: reinforcing) or balancing (B: balancing), their orientation results from the feedback mechanism on which the relationship is based (Lopez-Caamal et al 2014). Unidirectional changes are a consequence of positive feedback between variables. In this arrangement, small changes are amplified by interrelated system components. Omnidirectional changes in balancing systems are a consequence of negative feedback between variables. Consequently, changes in one element of the system are balanced by changes in the opposite direction in the element associated with it. Using the above, embedded in the theory of systems, the author's approach illustrated the relationships between variables: level of knowledge represented by academia and level of knowledge represented by companies using a dynamic model in the form of a cause-and-effect loop (Fig. 3)

The lack of knowledge on Industry 4.0 perceived by companies as the barrier for Industry4.0 solutions implementation is being eliminated by cooperation with academia. The knowledge gap is filled in directly as presented in the figure 3.

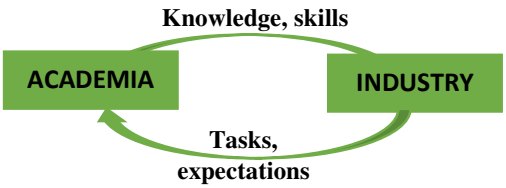

Fig. 3: Direct knowledge gap filling, own source

The direct knowledge gap filling is driven by requirements of companies needing knowledge and innovation. It includes industrial projects and expertise provided by universities and its nature is determined by clear and comprehensive identification of needs. In this case, companies willing to implement or develop innovative solutions cooperate with academia on market basis, feeding it with data necessary to develop a solution. Product of such cooperation is customized to specific needs and requirements of companies. If the gap between expectations and products is recognized, it is immediately filled in. Knowledge flow is initiated by specified need; hence, it is pulled from both academia and industry. The relations presented are limited in time by project duration and the level of knowledge required is determined by project scope. The model presented refers to one aspect of relations between academia and industry – based on joint cooperation on developing and implementing innovative projects (Industry 4.0 scope).

Nevertheless, the relations between academia and industry can take other forms as well. One of them is via the students and alumni, equipped with knowledge by universities and employed by industry. Such relation is indirect. Consequently, more variables and objects need to be considered. Their presentation is included in the table 6

Table 6: Variables of indirect knowledge gap filling model and their description

Variable	CHARACTERISTICS	TASKS of OBJECTS
Knowledge and competencies of companies	The scope of knowledge and competencies referred to covers Industry 4.0 issues, the **companies** considered are industrial companies, implementing innovation, striving to increase their competitiveness, adjusting to market requirements	Searching for employees equipped with knowledge
Knowledge of academia	The scope of knowledge and competencies referred to covers Industry 4.0 issues, the **academia** is represented by Universities (Higher Education Institutions)	Providing educational offer for students, teaching
Knowledge of students/alumni	The scope of knowledge and competencies referred to covers Industry 4.0 issues	Acquiring knowledge from **academia** and using it in **companies**

The alumni are the intermediary with accumulated knowledge they were provided with and they are supposed to use in their work. The nature of the phenomena is more complex. Students during their courses are taught and trained, knowledge flow is pushed by academia. The expectations of industry and tasks to be performed are communicated to alumni/employees and this is the moment when the gap is recognized. According to research by Polish Ministry of Entrepreneurship and Siemens (Smart Industry, 2019) over 50% of engineers, working in industry think that educational offer is not well

adjusted to requirements of innovative industry (see Fig. 4.). They lack knowledge and understand that the knowledge they need was not provided to them during educational processes.

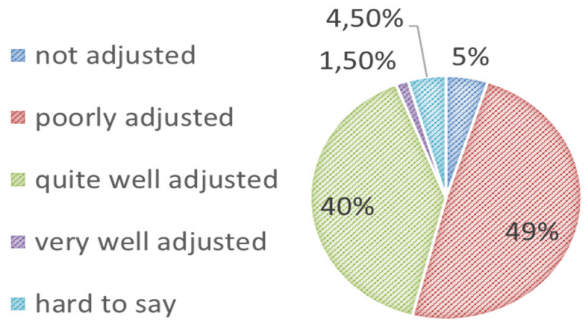

Fig. 4 : Managers' perception of adjustment of educational offer to requirements of innovative industry, Smart Industry Report, 2019

The indirect knowledge gap filling is through the University alumni, equipped with knowledge and working for industry. The indirect knowledge dissemination and absorption mechanism is presented in Figure 5. The model is based on the assumption that academia and other knowledge providers equip student with knowledge over the entire education process. Students absorb knowledge, and after their education process is finished, as alumni they start work. They are employed by companies, as they need human resources equipped with knowledge. Hence, through the alumni knowledge content provided by academia is confronted with task and expectations of industry, as presented in Figure 5.

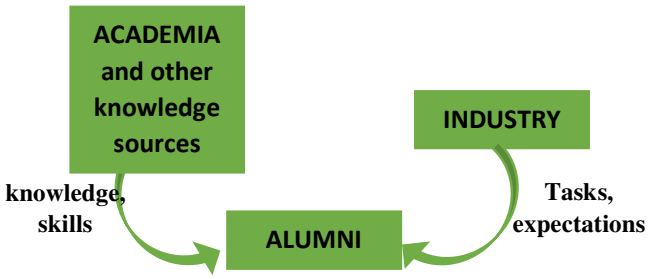

Fig. 6: Indirect knowledge gap filling, own source

Size of the gap perceived by/within alumni is determined by the following factors: the range of courses offered by Higher Education Institutions and quality of teaching process (characteristics of academia), commitment (characteristics of students) and innovativeness of processes (characteristics of companies). The relations presented is long-term, as educational process takes time and over time is adjusted to available knowledge in the field and to the recognized requirements of industry.

The models developed show two mechanisms of knowledge on Industry 4.0 dissemination and absorption. The first is based on direct relations between academia and industry and knowledge flow focused on fulfilling predefined demand communicated by industry. The second is based on indirect relations and knowledge transfer through the alumni, who absorb knowledge from HEIs and disseminate in their work environment. The dynamics of knowledge gap filling is discussed in the next section.

Dynamics of Knowledge Gap Filling – Models and Simulation

The models presented in the previous section were based on the observed phenomena of knowledge gap perceived by industry (see Figure 4.0). The knowledge gap existence was proved by literature analysis (see Table 4). The research problems defined by authors are:

1. Identification of the causes of the knowledge gaps observed,
2. Identification of knowledge gap filling mechanism

The authors decomposed research problems basing on the following scenarios:

1. Knowledge gap filling is direct process, knowledge flows directly from academia to industry
2. Knowledge gap filling is indirect process, knowledge flows indirectly from academia to industry.

Considering the first scenario:

Knowledge is transferred from academia to industry to fill in the knowledge gap that arises from the need to develop or implement innovative solutions. The need to implement selected solutions within Industry 4.0 scope differs on account of a market, industry, company size. Authors identified the need based on research on polish companies (Siemens 2019). According to research results over 11% of SMEs plans to implement Industry 4.0 within the next three years (4,3% of micro companies, 10,0% of small and 16,0% of medium companies examined). The percentage of large companies considering Industry 4.0 implementation is close to 20,0%. The SMEs willing to implement Industry 4.0 more often operate in light industry (14,1% compared to 8,7% in heavy industry). These companies represent the need for knowledge on Industry 4.0. The process of knowledge gap filling is based on goal-seeking dynamics. The goal is predetermined knowledge level. It is based on comparison between knowledge required (academia's knowledge) and knowledge available (company's knowledge). The gap recognized is filled in by knowledge transfer during: customized trainings, consulting, industrial projects (corrective actions). The concept is presented in figure 7.

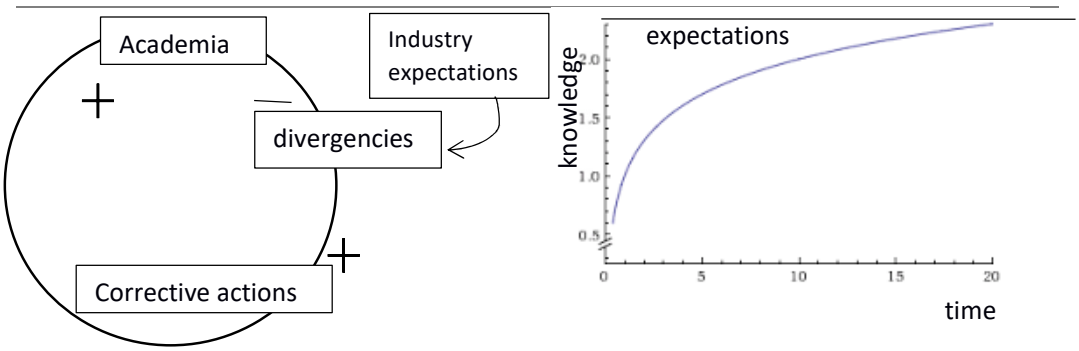

Fig. 7: Dynamics of gap filling: goal-seeking dynamic, own source

The loop dynamics shows that when considering the expectations and taking corrective actions, the knowledge gap can be easily filled in a given time period. The period differs because of corrective actions taken (training duration, consulting period or industrial project time range). The dynamics of the system is described by time-dependent Academia's (HEI: Higher Education Institution's) knowledge flow equation:

$$HEIs(t) = HEIs(0) - c_A \int_0^t (HEIs(t) - InExp)\, dt \qquad (1)$$

where:

$HEIs(t)$- *HEIs active offer* at the time (t),
$InExp$- *industry expectations,* expressing the knowledge gap bottom level,
c_A- *corrective actions*, determining the speed of knowledge transfer (here equal 1).

Equation (1) can be solved as a continuous time differential problem using numerical approximation procedures.

The resulting knowledge level in the enterprise is described with the following evolution formula:

$$K_n(t) = K_n(0) + c_A \int_0^t (HEIs(t) - InExp)\, dt \qquad (2)$$

The dynamics of the system is determined by corrective actions taken. The intensity of cooperation between Academia and Industry, disregarding the form could affect the time of knowldge gap filling. Hence, the recommendation to initiate joint projects and stimulate cooperation between the stakeholders.

The basic diagram of the simulation is presented in figure 9. It shows dynamics of gap-filling, increase of the knowledge $K_n(t) - K_n(0)$, over 120 months in case of continuous exchange of knowledge between enterprises, assuming that the initial knowledge of the company is about 10% of *HEIs* offer. Serie 1 describes a reference transfer with parameter$c_A = 1$.

As cooperation may take different form and be realized with various intensity, the coefficient of cooperation was introduced, to reflect the innovativeness of company, and consequently its need for expertise, the level of innovation coefficient was introduced. Considering flexibility of Academia emerging from knowledge it has and is able to generate, adjusting offer coefficient was introduced. The coefficients bring the model closer to actual causal relations within the system, as presented in Formula 3:

$$HEIs(t) = HEIs(0) - c_A \int_0^t c_C\, (HEIs(t) - l_I/a_L\, InExp)dt \qquad (3)$$

where:

c_C- *coefficient of cooperation*, expressing intensification of cooperation relative to the reference level,
l_I- *level of innovation*, estimates by fractional factor (≤1),
a_L- *adjusting offer,* estimates by fractional factor (≤1).

Level of innovation and *adjusting offer* ratio express mutual readiness to absorb knowledge provided (reference level of both coefficients is 1).

Figure 9 serie 2 represents the results for parameters $c_C = 2$and $l_I = 0.5$, which corresponds to the situation with intensified cooperation, while the lack of full conditions for absorbing innovation (lower level of adaptation). The transfer of knowledge is faster but it cannot be fully implemented.

Nevertheless, taking into account the operation mode of education system the process of knowledge gap closing or minimizing is disturbed by delays: in identification of divergences, as they are recognized after the students graduate, hence the feedback opportunities are limited. Moreover, there are some delays connected with designing and then implementing corrective actions. Thus, the Fig. 8 more likely reflects the gap filling dynamics.

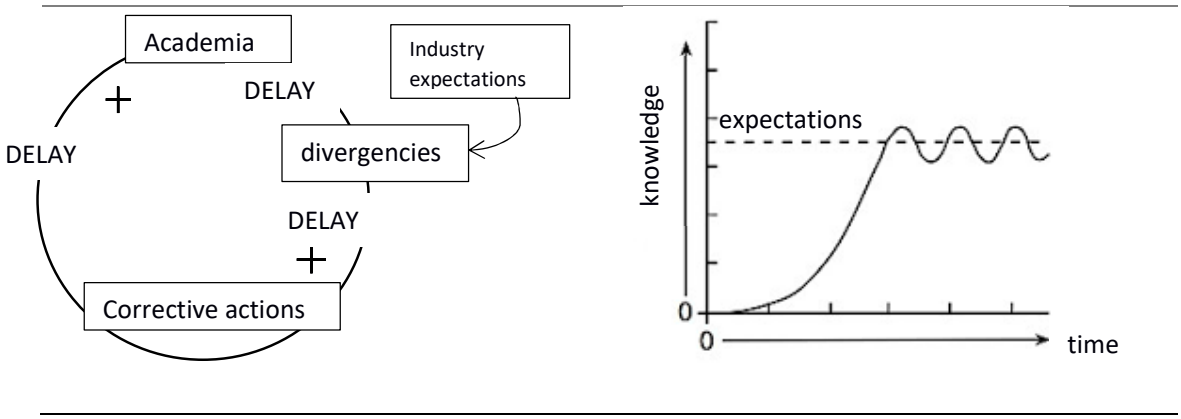

Fig. 8: Dynamics of gap filling: oscillatory dynamics, own source

The delays make the knowledge gap filling more difficult, and time- and cost-consuming. To deal with them, identification of knowledge needs and corrective actions design and implementation need to be the processes carried on not only regular bases but also concurrent to providing education

$$t_K(t)HEIs(t) = HEIs(0) - c_A \int_0^t c_C\,(t_K(t)HEIs(t) - l_I/a_L\,InExp)dt \quad (4)$$

where the oscillation term $t_K(t)$with a period of 12 months was added.

Exp. (4) represents an extended form of the system's dynamics equation (1). The number of model parameters is significant and allows to model much more complex situations.

In the case of alumni activity a periodic factor overlaps with the basic knowledge absorption stream. On Fig. ZZZ serie 3 and 4 we observe fluctuation of gap-filling. It is connected with periodicity of the flow of alumni to industry, which however does not translate into well-established and absorbed knowledge transfer. The difference between series 3 and 4 results from the assumed smaller intensivity of HEIs-Industry cooperation $c_c$from 1 to 0.3

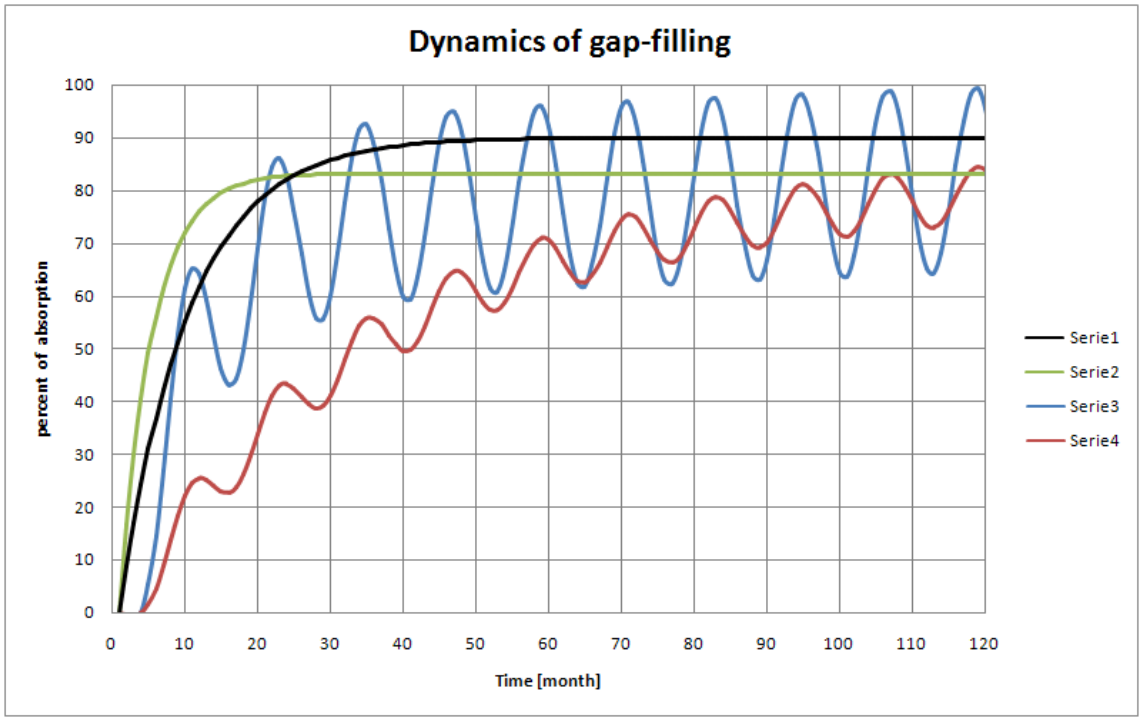

Fig. 9: Simulation of the knowledge gap filling, own source

The next step to consider in the model presented, is the relative importance of university-industry direct cooperation and through university graduates, which can express the size of the company and radiness to practic there by new graduates. An important necessary factor in subsequent research is also time delay in implementing innovations since the adoption of the concept of action, and in finding employment by alumni.

Conclusions

Contemporary economy generates numerous challenges for companies. Customers' requirements are changing immanently and these changes on one-hand follow technological changes, on the other induce them. The range and scope of changes in technology and management results in developing many methods and tools of different character but grouped under a flag of Industry 4.0. To implemented these innovative solutions companies seek for support. The most important aspects of the support respond to the need for financial resources and knowledge. Financial support can be obtained thanks to government programmes or EU projects and programmes and is not the subject of the paper. Knowledge support is provided by Academia and two models of knowledge gap filling were introduced in the paper. The first one assumes direct cooperation between academia and industry while the second is based on indirect relation via the alumni, equipped with knowledge by academia and using it in their work environment.

The models developed were presented from qualitative (descriptive) and quantitative perspective. The models are based on system behaviour archetypes recognized in the literature of the subject. Nevertheless, before they are used for further research, they will be validated by experts panel to identify potential deviations for archetypic behaviour. The expected outcomes from further research are practical, as authors strive for developing recommendations for companies and academia on forms and scope for cooperation, believing it could result in synergistic effect and make Industry 4.0 the solution vigorously spreading among companies.

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Artificial Intelligence in The Banking Sector – Experience from Poland

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Abstract

The purpose of the article is to identify and summarize the strategic factors of artificial intelligence having a particular impact on the development of the Polish banking sector. The SWOT analysis preceded by the conversations in panel discussions with specialists in the banking sector and study of fundamental static phenomena was used as the research method. The results of the conducted research indicate that institutions in the banking sector using AI tools represent an aggressive strategy. These institutions are development-oriented. 2020 brings a new conversational banking trend based on artificial intelligence. The publication is also enriched with an illustrated division of the possibilities of using AI in the Polish banking sector.

Keywords: Artificial Intelligence, Robotics, Financial Intermediation

Introduction

In the current era of robotization, artificial intelligence plays a significant role. Nowadays, this technology supports Polish economic activity and significantly affects the functioning of the entire society. Artificial Intelligence algorithms have improved many Polish industries, including a vital finance sector. The banking sector fully utilizes the potential of AI in its operations. Today's banks in Poland are not the same institutions as a decade ago. Today's banking customers are called mobile clients. According to data collected by PRNews.pl (2020) „in Poland at the end of 2019, the bank already served 13.9 million customers using smartphones. Such a large group of mobile banking users are people who operate the bank using applications, lite services and RWD (Responsive Web Design). The vast majority, because nearly 11 million use mobile apps."

The purpose of the article is to identify and summarize the strategic factors of artificial intelligence having a particular impact on the development of the banking sector. The secondary goal is to present a case study of artificial intelligence in the Polish banking sector. The implementation of the goals formulated requires verification of the following hypothesis:

• The most considerable changes taking place in the Polish banking sector in 2020 can be observed thanks to AI-based implementations.

The hypothesis formulated in this way was verified utilizing the SWOT matrix analysis comparing the most important factors affecting the current form of technology in the Polish banking sector. The review was preceded by the conversations in panel discussions with specialists in the banking sector and analysis of static vital phenomena. The article also includes a case study of artificial intelligence in Polish banking, which allows analyzing and evaluating the development of the current state of the discussed technology.

Artificial Intelligence in the light of theoretical considerations

According to the European Commission (2019) "Artificial intelligence refers to systems that display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals. AI-based systems can be purely software-based, acting in the virtual world (e.g. voice assistants, image analysis software, search engines, speech and face recognition systems) or AI can be embedded in hardware devices (e.g. advanced robots, autonomous cars, drones or Internet of Things applications)."

In the report of the Polish Ministry of Digitization (2018) regarding the assumptions about the AI strategy in Poland, one can read that artificial intelligence is not a trend. Already 50 years ago, the first idea of its use emerged, but it was not until the 1990s that its first practical applications appeared, also in Poland. Initially, this did not translate into an economic breakthrough because then there was not enough data and computing power.

AI is understood as Artificial Intelligence interpreted in general perception by the Dictionary Cambridge as an IT department that focuses on creating developed machines/computers capable of performing activities intended for the human mind, and more specifically human intelligence, i.e. the ability to reason language or solve learning problems (2020). It is the definition introduced by McCarthy in 1956, who accurately described it as "the science and engineering of creating intelligent machines, especially intelligent computer programs" (2007). Since then, many new definitions of artificial intelligence have emerged. Nowadays, the division of artificial intelligence can be seen as narrow/weak and general/strong. In the article by Forbes the first one is to use AI for simple tasks or to solve simple types of problems. It is most often used in the form of voice assistants (e.g. Alex Amazon, Siri, Apple, Google Assistant or Microsoft Cortana). Thanks to that help, its users can manage their calendar, buy tickets or book various attractions. However, the general concept of AI is systems that can think independently, quickly and efficiently perform tasks on the same level as a human would do. General intelligence is characterized by generalized human cognitive skills that surpass people in almost any cognitive task (2019).

Depending on the participation of the human element in the AI paradigm, artificial intelligence may be interpreted differently. In the report by PwC (2017) by analyzing the term through the prism of specific systems, taking into account the human being, AI can be defined as Assisted Intelligence, namely a system that helps people in making decisions or their actions. In other words, they are wired systems that do not learn from their interactions. When the human factor is omitted, AI becomes the 2 basic version of Automation, i.e. automation that includes the elimination of manual and cognitive tasks that are routine for humans. However, when looking at artificial intelligence from the perspective of adaptive systems, the term AI becomes of Augmented Intelligence, i.e. systems that support human decisions by continually learning based on their interaction with humans and the environment. In the report of European Commission many (2019) AI applications, especially in the Polish financial sector, are Augmented Intelligence solutions, focusing on a limited number of intelligent tasks performed to support people in the decision-making process. In a research study by Pwc (2017) "if the human factor is subtracted in this case, AI will be called Autonomous Intelligence, meaning systems that can adapt to different situations and operate autonomously without human participation".

When mentioning AI concerning the banking sector, four basic areas of Artificial Intelligence implementation in a financial institution cannot be omitted: data management, technological infrastructure, organization and management, and analytical methodology.

The four areas mentioned are related to each other to form a coherent whole. In the publication by the European Commission (2019) the data management area allows the financial institution to control data used for the enterprise's purposes. To manage data efficiently, you should have information about where the data is located, where it comes from, and who has access to it. The area of technological infrastructure according to the American National Institute of Standards and Technology (2018) is divided into three components: infrastructure - responsible for network resources, data platform -

responsible for data management, processing - responsible for data processing according to their volume. Another important area is organization and management, whose task is to establish management procedures and measures and to develop skills and knowledge. The last area is the analytical methodology, developed to the implementation and adopt the process of building advanced analytical solutions.

AI analysis by the SWOT matrix method

SWOT Matrix Methodology

SWOT analysis is currently one of the most popular methods of strategic management. Its origins date back to the 1950s, and its procedure and scheme derive from a somewhat more complicated tool, which is K. Lewin's field strength analysis, which assumes that every behaviour is a resultant of two types of forces: driving and braking. In the research study by Nowicki (2015) rightly states that "SWOT analysis, being a simplified tool, retains, however, extremely high practical utility, being a 3 solid, flexible and relatively easy to use strategic analysis tool". In a book by Gornaczewski and Puciato (2010) this analysis can be used to create a development strategy (the so-called overall strategy) and a functional strategy (the so-called fractional strategy), which relates to a specific function to be performed by the state, local government units or an enterprise. Opposite to the generally accepted theory, Gierszewska and Romanowska (2002) argue that SWOT analysis is not a strategic analysis method, but is „a unique algorithm of the strategic analysis process, a system proposal and a broad assessment of external and internal factors that determine the current state of the enterprise and its development potential.”

Korczak (2010) emphasizes in his publication that "the SWOT technique is very widely used, especially in the initial stages of strategic planning". Determining the strengths and weaknesses of the methods of examining the role of Artificial Intelligence in the banking sector is a diagnostic part of the analysis, while determining potential opportunities and threats is its prognostic part.

Analysis of financial institutions in the banking sector using AI technology

The source of data used was information obtained from conversations during discussion panels as the conference between the meeting leaders and experts in the area of new technology in the financial sector. The data comes from presentations prepared directly by the advisers of Polish financial institutions and many reports, both Polish and English, thanks to which the internationalist overtones of the conducted research are given. This article carried out a SWOT matrix study to identify and summarize the strategic factors of artificial intelligence, having a particular impact on the development of the Polish banking sector. An internal analysis was carried out, detailing the strengths and weaknesses of Artificial Intelligence, and an internal analysis that allowed to determine the opportunities and threats arising from the role of AI in the Polish banking sector. The assessment of individual factors was divided into stages. Initially, all the strengths and weaknesses of banking sector institutions that use AI as well as opportunities and threats appearing in its environment are listed. Then, each group of factors was assigned weights, which after summary gave 1. Weights were given depending on the impact on the entire economy. Then, factors were assessed using a 9-point scale depending on their impact on the banking sector under study. The products of weights and scores for individual factors and weighted averages for individual groups were calculated (Kadłubek and Ingaldi, 2016).

Table 1: SWOT analysis of financial institutions in the banking sector using AI technology

STRENGTHS	WEAKNESSES
1. Saving bank labour costs 2. The institution's strong position in the financial market 3. High efficiency of the financial institution's operations 4. Elimination of bank employees' mistakes 5. High employee satisfaction 6. Fast and secure integration with other operating systems 7. Redirecting employees' processing capacity for more important tasks	1. Constant updating of processes to obtain the highest efficiency 2. Constant supervision of safety standards 3. Implementing new people in projects 4. Constant supervision over the process of impressing AI 5. Loss of important employees 6. Insufficient return on investment 7. The requirement of professional AI implementation due to her first contact with the client
OPPORTUNITIES	**THREATS**
1. Possibilities for further cost reduction 2. Reaching customer segments previously unavailable to the bank 3. Acquiring new valuable employees in line with the bank's business profile 4. Reducing the scale of fraud in the banking sector 5. Maximizing the security of banking customers by implementing the latest biometrics tools 6. Quick detection of so-called "Bad customers" 7. Bank fraud prevention	1. The emergence of more advanced technology 2. Privatization of new technology (AI) 3. Possible resistance from recipients in the implementation of new technologies (public reluctance) 4. The reality is faster than the law - the legislation is not keeping pace with the introduced changes 5. Misunderstanding by external recipients 6. Competitors can easily duplicate the AI model 7. New cyberattacks in the banking sector

Source: own processing

Tables 2-5 present a summary of individual groups of factors that affect the strategic position of the banking sector under study using AI technology.

Table 2: Classification of strengths of the surveyed banking sector institutions using AI technology

Lp	Element	Weight	Rating	Product
S1	Saving labour costs of the financial institution	0,15	6	0,9
S2	The institution's strong position in the financial market	0,2	9	1,8
S3	High efficiency of the financial institution's operations	0,2	8	1,6

S4	Elimination of employee errors	0,1	8	0,8
S5	High employee satisfaction	0,1	5	0,5
S6	Fast and secure integration with other operating systems	0,15	6	0,9
S7	Redirecting employees' processing capacity for more important tasks	0,1	5	0,5
		weighted average		**7**

Source: own processing

Table 3: Classification of weaknesses of the surveyed banking sector institutions using AI technology

Lp	Element	Weight	Rating	Product
W1	Constant updating of processes to obtain the highest efficiency	0,1	5	0,5
W2	Constant supervision of safety standards	0,25	8	2
W3	Implementing new people in projects	0,05	5	0,25
W4	Constant supervision over the process of impressing AI	0,1	5	0,5
W5	Loss of important employees	0,2	7	1,4
W6	Insufficient return on investment	0,15	6	0,9
W7	The requirement of professional AI implementation due to her first contact with the client	0,15	7	1,05
		weighted average		**6,6**

Source: own processing

Table 4: Classification of opportunities of the surveyed banking sector institutions using AI technology

Lp	Element	Weight	Rating	Product
O1	Possibilities for further cost reduction	0,05	6	0,3
O2	Reaching customer segments previously unavailable to the bank	0,2	8	1,6
O3	Acquiring new valuable employees in line with the bank's business profile	0,1	7	0,7
O4	Reducing the scale of fraud in the banking sector	0,15	9	1,35
O5	Maximizing the security of banking customers by implementing the latest biometrics tools	0,2	9	1,8
O6	Quick detection of so-called "Bad customers"	0,15	8	1,2
O7	Bank fraud prevention	0,15	9	1,35

			weighted average	**8,3**

Source: own processing

Table 5: Classification of threats of the surveyed banking sector institutions using AI technology

Lp	Element	Weight	Rating	Product
T1	The emergence of more advanced technology	0,1	7	0,7
T2	Privatization of new technology (AI)	0,1	4	0,4
T3	Possible resistance from recipients in the implementation of new technologies (public reluctance)	0,1	7	0,7
T4	The reality is faster than the law - the legislation is not keeping pace with the introduced changes	0,15	8	1,2
T5	Misunderstanding by external recipients	0,15	6	0,9
T6	Competitors can easily duplicate the AI model	0,15	8	1,2
T7	New cyberattacks in the banking sector	0,25	9	2,25
			weighted average	**7,35**

Source: own processing

Based on tables 2-5, a point has been determined that refers to the strategic position of the Polish banking sector, which will indicate the directions of its future strategic plans (Fig. 2). This point was determined according to the formulas as follows:

Y = | strengths | - | weaknesses | = 7.00 - 6.60 = 0.40

X = | opportunities | - | threats | = 8.30 - 7.35 = 0.95

Fig. 2: The strategic position of the surveyed banking sector institutions using AI technology

Source: own processing

Based on the analysis carried out, it appears that institutions in the banking sector using AI technology are in the most favourable position. Opportunities prevail, and their strengths prevail within them. Aggressive strategy (maxi-maxi) is based on the maximum use of opportunities and strengths to develop dynamically. For the examined institutions, the solution to success is diversified development.

Analyzing individual areas can be seen that the area of opportunities at the disposal of the surveyed institutions had an extraordinary impact on the results obtained. In particular, the highest ratio is assigned to areas related to the security of both customers and bank security, namely: maximizing the security of banking customers by implementing the latest biometrics tools (9), minimizing the scale of fraud in the banking sector (9) and preventing bank fraud (9).

It should also be noted that the aggressive strategy received is not placed very high. This is due to equally strong positions in the areas of weaknesses and threats, namely the possibility of new cyberattacks in the banking sector (9), situations in which legislation cannot keep up with the changes introduced by AI in the banking sector (8), and the ease of duplication AI tools by competitors (8) and constant supervision over maintaining security standards in a given institution (8).

Case study AI in the Polish Banking Sector

The banking sector is one of the more active sectors in the Polish economy using AI in its operations, although, according to experts from Bluemedia (2020): „the real change that will soon take place in Polish banking is still waiting around the corner. The implementation of the PSD2 directive will accelerate this process." Artificial intelligence ranging from detecting credit fraud, increased risk to customer experience allows you to increase the efficiency and precision of human effort making the bank more profitable.

In the research study by SAS (2020) AI in Polish banking is implemented primarily to combat fraud and financial crime, credit and regulatory risk management, improve customer service quality and generate sufficient capital. Institutions using AI tools quickly identify fraudulent transactions in real-time, protect revenues and reduce bank costs, detect good and bad clients in real-time by providing information about changes and inconsistencies in their clients' behaviour patterns.

Figure 3 illustrates the possibilities of artificial intelligence divided into three principal categories, namely: the criterion of security, consulting and communication.

Fig. 3: Case study AI divided into categories

Source: own processing

The first of these is responsible for both customer and bank security. Anti-money laundering is a great solution - AI can monitor transactions related to money laundering and terrorist financing. Elimination of fraud by detecting and preventing fraud in real-time is another critical area. Risk management is one of the bank's primary tasks while using AI it becomes more effective through proactive management using a comprehensive risk management environment.

Another criterion applies to both investment, credit and insurance consulting by offering support to advisers using specialized computer programs based on machine learning

The last area is communication, which is mostly focused on first contact with the bank's client. Nowadays, many banking institutions offer widely used bots, among others to recruit, modern VR (Virtual Reality) leaflets are created, and useful landing pages are created.

Conclusion

Changes taking place in the banking sector in 2020 can be seen thanks to AI-based implementations. A thorough SWOT analysis was carried out, which made it possible to identify and summarize the strategic factors of artificial intelligence, having a particular impact on the development of the Polish banking sector. This analysis indicated that banking institutions in Poland using AI tools in their activities adopt an aggressive strategy. The chances of artificial intelligence tools have surpassed other areas in the Cartesian system. It is worth paying attention to the most important possibilities of using AI tools, which are mentioned by world experts, above all, the security of banking customers through the implementation of the latest biometrics tools. It should not be forgotten that AI in Poland is just gathering momentum. A new trend that is developing in banking this year is the automation of customer service and the so-called conversational banking, which uses bots presented in Fig. 3.

The presented proposal is a narrow area of research carried out by the author. It should be added that the analysis and illustrated areas of using AI tools by the bank are valuable information, but they do not fully cover the issues raised. The research methods used are characterized by high subjectivity, but they can be a starting point for further strategic analyzes.

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Development of Smart Contracts in The Process of Automation of Blockchain Projects

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Abstract

In the last few years there has been a dynamic development of smart contracts and the process of project automation based on blockchain technology. The purpose of the article is to present the global market for smart contracts and blockchain technology from 2016 to 2025 and the role of smart contracts in the process of automation of blockchain projects. The analysis was based on a report published by Market Research Future (2020) and Global Market Insights (2017) as well as the study of English-language article items. The article presents the benefits of using smart contracts and blockchain technology. These include increased customer satisfaction, increase in overall level of security, reduction of internal costs of the company, as well as increased awareness of end-users using automation processes of their services.

Keywords: Smart Contract, Blockchain Technology, Blockchain Project

Introduction

According to many opinions and interviews of financial industry experts, smart contracts show large potential, especially in emerging financial markets. A smart contract is a software used to carry out transactions in a given blockchain. In the article by Blockchain, smart contracts, and DAO (2016) transactions are carried out by a distributed network node, which greatly facilitates its use, by eliminating a third party, such as an intermediary or a court. Smart contracts play a significant role in the process of automation of blockchain projects. The creators of blockchain projects encounter obstacles in obtaining funds for their development in the environment, taking into account future potential recipients. Financing is often carried out using "ICO", which is the release of a specific crypto token on a public blockchain and its sale to anyone interested. The process of automating the blockchain project brings measurable benefits due to the use of the consensus phenomenon. This mechanism commits transactions and adds new blocks to the chain that are executed by blockchain network node software. Traditional solutions do not provide such a spectacular solution, because a third party is necessary. The article Blockchain - technological aspects and examples of applications (2020) states that the combination of these mechanisms is an agreed, automatic consensus of network nodes.

The concept of Blockchain Technology

Website - Business Insider (2020) informs that "blockchain technology is used to store and send information about transactions concluded on the internet. These transactions are arranged in consecutive data blocks. Each block contains information about a specific number of transactions. After filling it with transaction information, another data block is created, followed by the next and next block. This creates a kind of chain (hence the name: blockchain is a block chain). A new block appears on average every 10 minutes. It may contain information about various transactions, e.g. commercial transactions, ownership status, shares, shares, electricity generation, and the purchase or sale of

currencies, including cryptocurrencies, i.e. electronic currencies. The essence of blockchain is to maintain a joint and collective accounting ledger of transactions, in digital form, scattered throughout the network in the same copies. Blockchain is a collection of all transactions carried out at the moment in the blockchain. This technology is based on peer-to-peer networks without central computers, transaction management, and verification systems. Any computer on the network can participate in transaction transmission and authentication. In the case of blockchain, these will be blocks within the transaction book. The book is open to everyone, but fully secured by complicated cryptographic tools against unauthorized access. Thanks to this entry, transactions are public, available to everyone, but visible only as part of access rights for a given user. Their entire history, from the beginning of blockchain existence to today, can be reviewed and verified. Currently, blockchain can be used to handle various transactions, but work is underway to use the blockchain as an accounting book in banking, a document authentication system, a digital signature in state administration, and a notary record. All these transactions can take place outside the system that has been functioning for centuries - without the participation of public trust institutions, directly between the parties to the transaction. You can store any type of transaction in data blocks in the blockchain network. One of the applications are the cryptocurrencies mentioned (e.g. bitcoin - BTC)".

The concept of smart contracts and possible forms of application

Smart contracts are computer protocols that check and enforce contract performance. Contracts are usually created by programmers, using special programming tools and languages: Solidity, C ++, Python, or Java. They are converted into computer code. This code defines the conditions, obligations of the parties as well as the effects and penalties that bind both parties to the transaction. This information can be found in the article - Smart contracts for the uninitiated (2019). The main purpose of smart contracts is to meet common contractual conditions, i.e. payment, confidentiality, pledge and enforcement obligations. These protocols, after cryptocurrencies, are the most common use of blockchain technology, which is called the distributed database. The use of smart contracts in combination with blockchain technology will, therefore, result in many advantages and disadvantages arising from the properties of both modern solutions.

Szpringer (2019) mentioned that the most important advantages include, above all, autonomy and no need to trust the parties to the contract. This is due to certain operating conditions, namely - automatic programming of previous functions without the participation of third parties. Data and assets are sent automatically or retained altogether. Then, stability and security are exchanged. The code that has been developed will work as long as the blockchain running on it. Blockchain technology achieves a high level of security through cryptography. One of the cryptographic functions is responsible for this - the hashing function. It creates the hash value based on the user input. In the article – What makes a blockchain Secure? (2020) - the benefits mentioned are listed. The advantages also include the speed and efficiency of transactions and the elimination of intermediaries, which reduces the costs of both obligated parties. Smart contracts are also characterized by precision and transparency - they have detailed programming parameters. Using smart contracts allows verify and control the correctness of transaction.

On the other hand, smart contracts are characterized by immutability, which may indicate the weakness of this protocol in the event of potential errors in the code. A smart contract once launched in the blockchain is difficult to change - one mistake can cost even millions of dollars. The legal issue also raises a lot of controversy. Smart contracts are a relatively new technology, that's why there are no precedents regarding the legal treatment options. Disadvantages include the lack of proper control, which is a liquid issue in traditional systems. For example, one of the parties to the transaction decides to delay the transaction due to improper performance of the obligations of the other party. This is only possible in the traditional form. Costs are also contentious, which on the one hand, are significantly reduced by the liquidation of a third party, but storing data in a blockchain still causes high costs - this is due to complicated calculations performed by network nodes. Transactions based on a smart contract require, above all, possession of a cryptocurrency. It allows the user to conclude a contract and then send it to the blockchain. It will be automatically confirmed by the contractor concerned.

In the article - Blockchain - technological aspects and examples of applications (2020) – is written that smart contracts can have many practical applications - from the most prosaic - to applications with a global reach. The simplest example is the process of buying an apartment. Traditional purchase still requires the involvement of several third parties - especially intermediaries: agents, banks, notaries, lawyers. The prospect of using smart contracts when buying real estate, compared to the current system, looks very favorable for those interested in their apartment. It is projected, that in the future, real estate will be saved on a blockchain along with an electronic title. That title will indicate any real estate charges. The interested person after paying the advance will have an insight into the entire history of the selected property. An analogous use of smart contracts will be for mortgage or car loans. The processing of applications will be improved, and hence the user will be able to receive funds for the intended purpose faster. Smart contracts will also be used as a digital ID. Personal data will be saved on the blockchain and the data owner will be able to decide to what extent to share it. Besides, smart contracts can be used in all kinds of elections - they could minimize counterfeiting and the process of voting and counting votes. Currently, this process is used by Estonia and West Virginia. What's more, the management area can make great use of smart contracts in the context of obtaining approvals, signatures, elimination of contradictions, or simply in a better workflow. The insurance area (automatic settlement of damages, payment of claims, calculation of premiums, reporting events), health care (secure data transmission, prescription management, test results, order fulfillment), or logistics, where tracking product rights, can also be used favorably. The location and fulfillment of contractors' obligations will be significantly improved.

Case study of Selected International Companies

There are currently 884 development companies around the world that offer the implementation of blockchain smart contracts into users internal systems. Smart contract programming allows companies to easily trade cash, real estate, shares or anything of significant value while away from the broker administration. The blockchain of smart contracts can oppose rules and penalties, just like a regular contract.

In the article - Top Smart Contract Development Companies (2020) - the register of companies actively using blockchain smart contracts and offering technological services to their users has been published on the website goodfirms.co. Companies with branches based in Poland have been analyzed. There are currently twenty-four such enterprises in Poland. These include Eleks, Softengi, Espeo Software, Ulam Labs, Nopio, Try Codnet, Software Brothers, Profile Software, 10Clouds, Codahead, Concise Software, Itransition, Vazco, Anchor Blockchain Consulting, KLGSolutions, Look4App, Idego Group, 180 Creative, Crodu, Sparkbit, Rumble Fish Development, Codete GmbH, Pragmatic Coders, CreateIT.

As a reference point, according to article - Top 50 Blockchain App Development Companies (2020) - among the above-mentioned enterprises, the three most important enterprises that are pioneers of technological services in blockchain smart contracts were assessed.

The first enterprise was "Eleks", which facilitates the digital transformation of enterprises, providing specialized engineering and consulting services. More than 1,400 enterprise specialists are located in Supply Centers throughout Eastern Europe and sales offices in Europe, the United States and Japan. The company provides its users with a full range of programming services. These include dedicated teams, product development, research and development, and technology consulting. Finance and auditing companies are offered:

- the most advanced distributed accounting technology that eliminates the need to hire expensive lawyers, brokers, bankers and the others,
- reducing accounting costs, while ensuring the security of financial transactions, because third party intervention is kept to a minimum,
- optimization, efficiency and acceleration of growth,
- topping up financial operations, eliminating downtime and the long hours often encountered in cash transactions.

In the article - Blockchain's Smart Contracts for Business: Ready or Not? (2020) there is also an information about implementation of blockchain. Transactions take place within a few minutes - around the clock. "Eleks" optimizes data security, regardless of the environment in which smart contracts operate.

The next analyzed enterprise was "Softengi". The article - Car Fines Distributed Database Based on the Blockchain Technologies (2020) informs that this company develops software. It is recognized as one of the 100 best global IT outsourcing service providers. The company offers a service in which all parties can access smart contracts through a decentralized system. Any attempt to amend the contract may be rejected and all stakeholders will be automatically notified of such an attempt. The network connects the company with its users in a common system, which allows users to speed up transfer processes, increase transaction accuracy and offer the most competitive prices for its services. The advantage of using blockchain technology is also distributed data storage and an authentic reading of information. In practice, this service works as follows. Initially, in the first stage, the database is filled with basic information based on existing registers. It is also very important to create authorization rules for employees of regulatory institutions at the beginning. This is the stage of entering the primary data. Then enter into the system is recomended. The company ensures a high level of security at this stage. The user can use various methods of user authentication: password, face recognition, etc. To identify the user's access rights, a verification mechanism based on blockchain technology is used. In this way, violations and unauthorized access to the system are prevented. The next stage is the stage of data recording. All information entered by the user is automatically saved in the system using blockchain technology. Data regarding the new license number, car number change, new fine imposed, or fine paid will be securely stored in the system. Then the information is filtered. By using different filters, the user can filter records and receive specific information he needs. The last stage is information editing. The user can easily read, edit, or delete any information. At the same time, all data entered into the system is securely stored in the archive, and all changes are recorded.

The third company under analysis was "Espeo Software". On the official website of this company there is an article - Blockchain innovations (2020). According to this, the company is a consulting company with a team of engaged consultants and blockchain programmers with a strong international position. Using blockchain smart contracts they provide the following benefits: greater data transparency, increased security, reduced costs, increased performance, better traceability. Besides, comprehensive services are offered to any enterprise interested in using smart blockchain contracts in their internal systems. Such services include blockchain consulting for entrepreneurs, which will enable them to build an optimal business plan in a larger blockchain ecosystem. The company also offers a technical feasibility study. The "Espeo Software" team will analyze each enterprise and its functional and non-functional requirements. Then follows mapping to the appropriate framework and diagrams, by mapping the Tokenomics model. This is planning all mechanisms and projects so that the token ecosystem works perfectly in the cryptographic economy. What's more, the recipient can benefit from smart contract development, because blockchain development is the most important basic skill. The company will carry out the development of blockchain in the context of smart contract security by adapting the technology individually to the recipient. The user can also buy the landing page design - efficient and attractive design "UI/UX design" and full development of the project landing pages and code review. Testers analyze the existing smart contract code and related components and will prepare a full report on security vulnerabilities and problems.

In a Guide to Smart Contracts and Their Implementation (2020) the possibilities of using smart contracts in combination with blockchain technology are very diverse. Much depends on the resources and skills of the company that will provide services to the user and on the individual needs of the consumer. Examples of smart contract blockchain projects are e.g. in the health industry "Dentacoin", especially in article - Blockchain solution for the global dental industry (2020). Dentacoin aims to bring patients and dentists together in communities to improve dental care and make it available worldwide. Another example is presented in article - Implementation of smart contract technology on the peer-to-peer market (2020). The aim is the use of supply chains in the logistics industry. "Name Bazaar" implements smart contract technology on the peer-to-peer market, where users can exchange cryptographic resources for blockchain in the form of domain.

The global market for smart contracts and blockchain technology in 2016-2025

There are a number of scientific predictions about the future and evolution of smart contracts around the world. However, when analyzing the chart of smart contracts market in 2016-2023, it can be seen a steady increase in this trend from 2016 to 2020 with a forecast of further growth until 2023. Figure 1 shows the evolution of smart contracts.

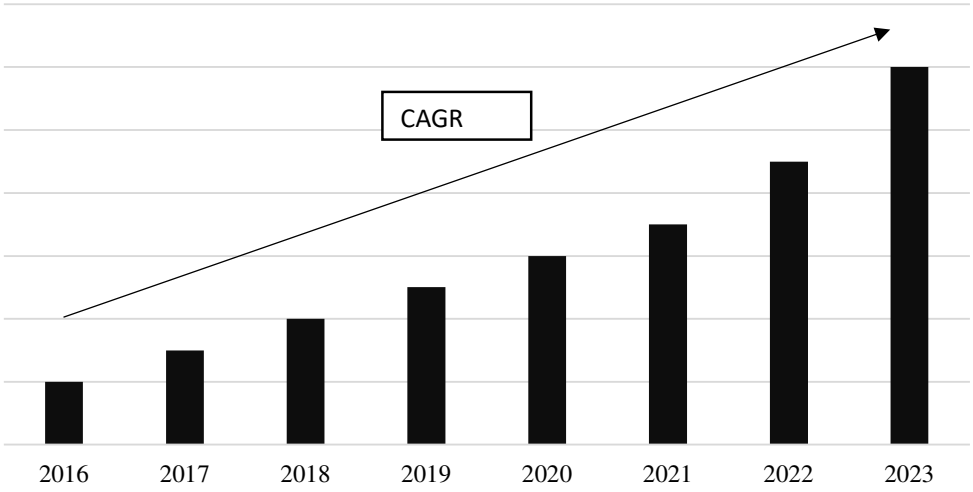

Fig.1: Global market for smart contracts in millions of USD in 2016-2023

Source: Own processing based on an online report: https://www.marketresearchfuture.com, as of 27.03.2020

According to a report published by Market Research Future (MRFR) „…the global smart contracts market should reach a valuation of USD 300 million by 2023. The market is forecast to reach 32% CAGR in 2017-2023. The factor that maintains the growth of the smart contract is its tendency to define the rules and provisions of the contract, but also to automatically enforce any of the obligations. The development of smart contracts is expected to grow steadily over the anticipated period, while serving end-users such as banking, government, insurance, real estate, and the supply chain. In the case of government smart contracts, these contracts may prove to be the next advanced step towards improving the voting procedure and other legal formalities and tenders organized by the government. They may include any contract concluded between a government and private or public enterprises…".

Based on the report - smart contracts market 2019-2023: emerging technologies, business trends, size, share, global segments and profit growth in the industry (2020), the smart contract market is segmented by the available tools: blockchain platform, available technology, end-users, and regions. The blockchain platform includes: Bitcoin, Sidechains, NXT and Ethereum. The most advanced tool for coding and processing smart contracts is Ethereum, followed by Bitcoin and NXT. Using available technology, segmentation is based, among others: on Ethereum, Rootstock (RSK), Namecoin, Ripple. The market, which has many end-users, is divided into: banking, government administration, management board, supply chain, automotive market, real estate, insurance, and healthcare. In contrast, the regions covered by the above report are Asia-Pacific, Europe, North America, and the rest of the world. Of these regions, the European smart contract market is recognized as a leader. North America is on the second place. This is mainly due to the rapid digitization of European and American industries. Many European entrepreneurs integrate digital solutions to increase their competitiveness. Market players in many regions are actively focusing on product innovations and implementing strategies that allow them to strengthen their market position. Many companies also invest in mergers and

acquisitions. The number of partnerships and cooperation on the European smart contract market has also increased.

Another essential report - Market Research Reports (2020) is presented Blockchain Technology Market size by providers - Infrastructure Provider, Application Provider, Operators, Application - Smart Contract, Payment & Wallet, Digital Identity, Exchange, Compliance & Risk Management, End-user - BFSI, Government, Healthcare, IT Service, Media & Entertainment, Transportation & Logistics. It is an industry analysis report, regional outlook, growth potential, competitive market share & forecast for the years 2019 – 2025. According to the report - Global Market Insights (2017) „…Blockchain Technology Market size surpassed USD 488 million in 2018 and is predicted to grow at more than 69% CAGR between 2019 and 2025. The digital identity application is estimated to grow at 78% CAGR over the forecast timeline. Blockchain-based identity platforms have various applications in unregulated countries or countries with weak identification systems. Various governments have implemented blockchain technology-based identification platforms at the national level to facilitate secure & transparent transactions across private & public sectors. For instance, in June 2018, Estonia used a blockchain at the national level with its e-citizenship program. The country created its identity system, ID-Kaarts to reduce bureaucracy and digitalize all public transactions through secure digital identities...". Figure 2 shows europe blockchain market size by providers.

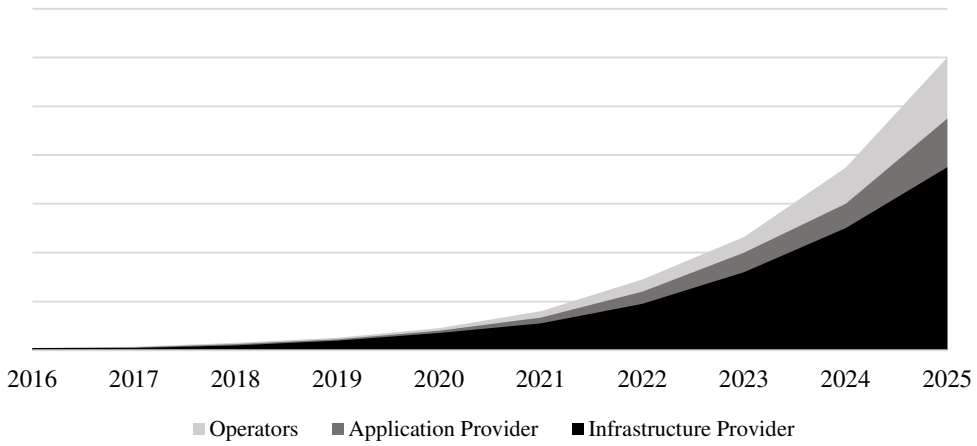

Fig. 2: Europe blockchain market size by providers in millions of USD in 2016-2025

Source: Own processing based on an online report: https://www.gminsights.com/industry-analysis/blockchain-technology-market, as of 27.04.2020

When analyzing the Blockchain market report Global Market Insights (2017) „…The infrastructure provider market in Europe had a dominant share in 2018 and is expected to maintain its position until 2025, as organizations develop their private blockchain networks. Major infrastructure providers develop the basic software components that are necessary for network deployment. They can be further segmented based on protocol companies and network companies. The main goal of the companies involved in the development of protocols is to develop a basic protocol layer on which distributed ledger networks can be built. Network development companies build custom distributed book networks for clients…".

Conclusions

Over the next few years, the development of smart contracts and blockchain technology will certainly grow in the aspect of the process of automating blockchain projects. The perspective of the global trend of smart contracts, especially over the next three years, looks very positive. This aspect is confirmed above all by the analyzed Market Research Future and Global Market Insights reports. In this study, the global smart contract market was analyzed in 2016-2023. There is a growing trend that will reach a valuation of USD 300 million by 2023. Just like the smart contract market, the blockchain technology market will grow over the next five years and is predicted to grow at more than 69% CAGR between 2019 and 2025. Therefore, both presented markets will face large-scale growth and development in the future. The factor that will maintain the growth of the smart contract is its tendency to define contract rules and regulations, but also to automatically enforce obligations. Service providers will be a factor that will continue to increase Blockchain technology. What's more, the global smart contract market offers many positive applications resulting from the simultaneous use of smart contracts and blockchain technology. The examples of enterprises presented in this article, which offer consultancy in the implementation of smart contracts, offer their users the following benefits: increased level of customer satisfaction, increase in overall level of security, reduction of internal costs of the enterprise, as well as greater awareness of users using automation processes of blockchain projects. However, the most important factor that will determine the general level of user satisfaction with the use of smart contracts will remain the fact of eliminating the third party of contract. Thanks to which transactions will be marked by a significant increase in confidentiality and a high level of their security. Although the development of smart contracts and blockchain technology around the world is extremely dynamic. In Poland it is still at the initial stage of evolution. However, according to the article - Europe can become a leader in the field of crypto assets. What should she do not to miss this opportunity? (2019), this does not exclude the opportunity to become a leader in the development of innovation in this area in the future.

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The Fields of Supervisory Boards Activities in Different Kinds of Subsidiaries: The Case of Polish Business Groups

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Abstract

The business group is a specific type of an economic entity, because subsidiaries must achieve goals, which are a consequence of their role in the group and their supervisory board (board of directors), in addition to obligations under the law, may engage to the management of subsidiary in many different ways. There are three generic types of subsidiaries: operational, cooperative and conglomerate. The results of the research conducted by the author show that depending on the type of the subsidiary, the supervisory board differently affects the management process in the subsidiary. In the case of operational subsidiary in the largest number of cases the supervisory board was identified as an industry-oriented type, in the case of cooperative type it was the active board type and in the case of the conglomerate type – finance-oriented type.

Keywords: business group, board of directors, supervisory board, subsidiary

Introduction

Proper supervision over enterprises, where ownership and management are separated, is an issue considered on many levels for years (see e.g. Jensen & Meckling, 1976; Claessens *et. al.*, 2000; Young *et al.*, 2008; Heyden *et. al.*, 2014). The question of effectiveness of such supervision is usually raised after reports about the bankruptcy of another corporation, as a result of which the owners had to accept loss of the capital invested. Thus, despite broad literature on conducting effective ownership supervision, there is still a need for theoretical and empirical analysis of this phenomenon. Despite relatively good knowledge of this subject, an efficient theoretical model of ownership supervision has not been developed yet (Starbuck, 2014; Paine & Srinivasan, 2019). Simultaneously, modern economy demonstrates a desire to "consolidate" organizations and combine them into broader economic organisms. As a result of merger and acquisition processes, entities operating in corporate group structures replace entities which are independent in terms of organisation and making decisions. And conversely – large companies "fall apart", e.g. by means of asset outsourcing a single organization is replaced by a number of legally independent entities connected by "capital ties". Supervision over such an entity is likely to be different from the supervision over an independent company. This is primarily due to the fact that the purpose of a subsidiary's operation is often directly dependent on the role it has been assigned by the parent entity. It may be implementation of a "part" of the parent entity's or the whole group's goal. Thus, supervision over performance of a subsidiary is crucial in the context of effective functioning of the whole business group (Khanna & Rivkin, 2001; Colli & Caplan, 2016; Aluchna, 2017; Sakawa & Watanabel, 2018). A supervisory board is the main tool for the exercise of supervision, but also for affecting its current activities (Przybyłowski *et. al.*, 2011). The aim of this paper is to analyse theoretical aspects of the supervisory board operation in a subsidiary, as well as to present the results of research on the role and activities of a supervisory board in various types of subsidiaries.

The structure of the paper is as follows. The first part discusses the nature and perception of a business group as a research object. The second part discusses the concepts of supervisory board functioning models. The third part presents a subsidiary typology, proposed by the author, research hypothesis and the results of empirical research. The study was conducted with the use of a questionnaire on a sample of 107 subsidiaries. The data was being collected in two periods of time: from 2014 till 2015 and from 2016 till 2019. The respondents were members of supervisory boards of these entities. The sample size does not allow for drawing conclusions with the use of descriptive

statistics tools. These results, however, may be a basis for discussion, a contribution to further research as well as may let us formulate practical recommendations for actions of a supervisory board in subsidiaries of a business group.

Theoretical Background

Business group as an object of study

A business group is an unusual object in the management science. Legally speaking, such an organization consists of a number of separate companies, but in economic terms it is acknowledged an economic "unity". Therefore, on the one hand it is a multi-entity enterprise, as it consists of business units of different legal and economic status, on the other hand, these units form a single economic entity, common objectives and principles of operation of which are imposed and enforced by a "managing medium" (Allan, 1978, Granovetter 1995, Khanna & Yafeh, 2007).

A business group can therefore be perceived in two ways. It can be treated as a single economic entity but one can also recognize performance of its parts. In theoretical terms, the group consists of two types of entities: the parent company and its subsidiaries. The parent company is a "commander" of the group. Through appropriate coordination of various elements it seeks to achieve its objectives. Subsidiaries are obliged, by various types of relations, to carry out the tasks arising from these objectives. Obviously, research on business groups has been carried out, but usually its proposals concern functioning of the group as a whole from various perspectives including management, business history, sociology, role in the modern economy (Khanna & Palepu, 2000; Colpan *et. al.*, 2010; Iacobucci & Rosa, 2010). Research on business groups considers governance to be a relevant topic, and a greater part of management research emphasizes an instrumental perspective of business groups rather than an operational one (Colli & Colpan, 2016; Lin *et. al.*, 2019).

Nevertheless, a methodological question arises: can management science treat a subsidiary of a business group equally to a financially independent company? If not then, should business groups be analysed only as a whole or can one study its subsidiaries as separate entities, which in many ways differ from independent companies? The latter seems to be a more appropriate option. A subsidiary's incomplete autonomy in decision making the necessity to adapt its strategy to the group's objectives, restricted or completely "closed" path to external market, an imposed role in the value creation chain, limited technological and product-market innovation, these are just some aspects of strategic and operational management, which seem to differentiate subsidiaries from independent companies.

According to the data of the Central Statistical Office of Poland (GUS), entities which belong to a particular business group employ over 50% of all employed in enterprises, and their total revenues are twice as big as total revenues of financially independent businesses (GUS, 2018). Simultaneously over 80% of entities which belong to business groups are "single-storey" subsidiaries i.e. companies which simultaneously are not dominant towards any other entity of the group (GUS, 2018). These statistics show that subsidiaries of business groups should be "under constant observation" of researchers, especially that in some developed economies, their number begins to outweigh independent enterprises (excluding self-employment) (Heugens & Zyglidopoulos, 2008).

The issue of business group subsidiaries operation has not been particularly explored in management science, nevertheless this topic has been covered, but mostly by perception of subsidiaries through the prism of analysis of companies created and managed by foreign business groups. This field of research is quite common and resulted in a number of publications. Moreover, this matter, though not new (White & Poynter, 1984; Putti & Chong, 1985; Birkinshaw & Hood, 1998; Legewie, 2002; Harzing & Noorderhaven, 2006), seems to be gaining in importance in the face of ever increasing globalization of the world economy and far-reaching internationalization of business organizations (Doherty & Teague, 2011; Lin *et al.*, 2013; Pisoni *et. al.*, 2013; Schleimer & Pedersen, 2014; Miao *et. al.*, 2016; Belenzon *et. al.*, 2019). However, it is unjustified to limit the study on performance of subsidiaries only to such companies whose parent entity is based in another country. Given the

prevalence of this type of organizations and their role in modern economy one should gradually fill this gap, both conceptually and empirically.

The role of supervisory boards

Business group subsidiaries can be an object of research conducted from several different perspectives, for instance, economic efficiency, organizational culture, strategic management, people management, etc. It seems, however, that one of the first positions "on the list" should be held by the analysis of business groups from the perspective of ownership supervision held over subsidiaries, as in spite of extensive literature in this area, there still is a need for theoretical and empirical analysis of this phenomenon. An economic operator in turbulent environment demonstrates the need for an effectively functioning system of supervision. Supervisory boards (often also called board of directors) are an essential element of such a system in the modern enterprise. The interest they raise is steadily growing. At the same time there is a relatively strong conviction about the need for fundamental changes in their functioning. Issue of understanding the role of a supervisory board in the process of enterprise management is gaining in importance. It should be noted that it does not seem sufficient for the board to perform only functions resulting from generally applicable legislation. A supervisory board should also operate in areas that do not fall within its "legal" duties. For instance, many strategic management specialists and researchers for years share the concept that board members should work closely with managers at the strategic decision-making process (e.g. Forbes & Milliken, 1999). They usually have broad experience and an ability to assess a situation correctly which increases the effectiveness of the control functions performed by the boards agrees with the view that the sphere of strategic management should be a special area of a supervisory board's interest (Haynes & Hillman, 2010; Tuggle *et al.*, 2010).

Understanding of the role of the supervisory board as a solely "supervisory" and controlling body refers to the agency theory, in which the board cares primarily about the implementation of the owners' interests (Bathala & Rao, 1995; Hendry, 2005). Its main task is then to monitor implementation of ownership objectives by those who manage the company. The so-called steward theory represents a completely different point of view, the keynote of which is not only to control the activities of managers but mainly to support them with knowledge and experience. The board by fulfilling their obligations in terms of initiating, approving and controlling the activities of management, should focus on the aspects of long-term survival and development of the company (Huse & Rindova, 2001). Also, management practices seem to head in the direction of increasing the supervisory board's role in the management process (Shen, 2003; Boyd *et. al.*, 2011).

The typology of supervisory boards

One of supervisory board typologies is based on the criterion of activities undertaken by them. According to this theory, supervisory board members communicate with each other, as well as with the management, shareholders and business partners at the process of preparation, decision-making and control. Orientation adopted by the board in this process is crucial. This orientation can be of two types. Where the priority is the board's position in the capital market and/or financial results, we can talk about the **financial orientation** of the board. An **industry-oriented** board focuses primarily on technological innovation, research and development, product quality improvement, market opportunities or forecasts of the development of industries in which the company operates as well as the company's manner of operation in the market. The second criterion of distinguishing supervisory board types, according to this concept, is the degree of their involvement in activities specific to one and the other orientation. A low level of involvement indicates that functions of the board are limited, basically only to approving decisions of managers and *ex-post* control of their effects. A high degree of involvement demonstrates not only control but also initiation of certain actions. The board is actively involved in preparing decisions and the control process is based on the *ex ante* control of plans and *ex post* control of results. A combination of these two criteria allows to distinguish four types of supervisory boards (Działo, 2001; Jonnergård *et. al.*, 2004; Jonnergård & Kärreman, 2004), as shown in Figure 1.

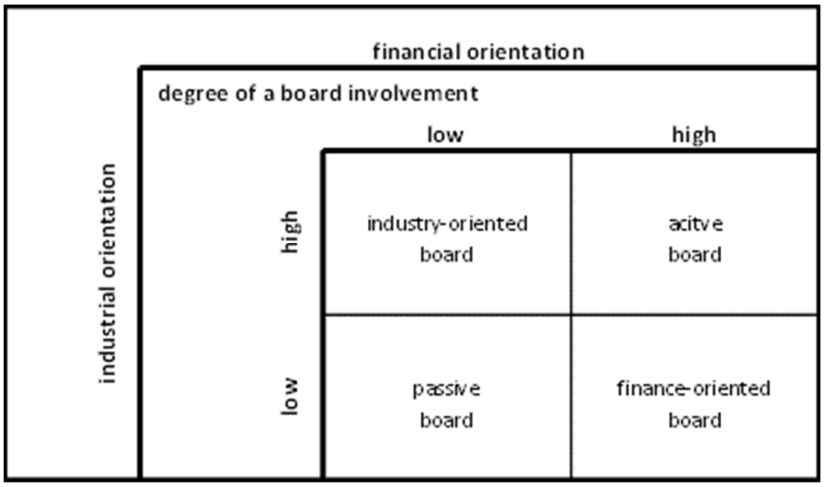

Fig. 1: Types of supervisory boards distinguished by the type of orientation and the degree of involvement

Source: (Działo, 2001)

An active board is focused on both financial and industrial areas of the enterprise and while making decisions it takes the consequences of both these aspects into account. **An industry-oriented board** is mainly focused on industrial aspects of the company and thus on the situation on market for products and services. It pays less attention to financial issues. Similarly, a **finance-oriented board** focuses its attention on the issue of the company's (joint stock company's) position in the capital market. **A passive board** leaves active involvement almost exclusively in the hands of management. These two concepts form the basis for formulation of hypotheses concerning the types of operation of the supervisory boards of subsidiaries.

The typology of subsidiaries

Subsidiaries of a business group do not form a homogeneous group. Their most characteristic feature as economic entities is obviously being a part of a business group. However, there are many criteria that can be used to differentiate these entities. Some of these differentiate a whole class of companies. Such criteria may include for instance company size, geographical area of operation or industry. There is also, however, a number of criteria which differentiate subsidiaries within a business group. These criteria include: a level of location in the group's structure, the objective of functioning within the group, the method of "incorporation" of the entity into the group and the time of existence in the group, ownership structure of the company, "distribution" of decision-making powers in the supervisory bodies, the method of exercising supervisory functions by authorized bodies, etc. Therefore, various combinations arise, which increase the number of all possible types of subsidiaries to the extent that it seems impossible to carry out research, especially of a quantitative nature, which could cover all possible types thereof. Another issue is the (questionable) point of distinguishing research object classes based on so many criteria as well as the fact that due to the research focus, not all criteria seem to be relevant. Therefore, the author decided to focus on one differentiation criterion, namely on the subsidiary's "purpose of existence".

A typology of business groups according to this criterion was formed by Trocki (2004). It has been based on a modified classic typology of forms of economic interdependence by Thompson (1967). According to this concept, we can differentiate between the following types of business groups (Trocki, 2004):

1) operational – subsidiaries conduct activities supporting the primary operations of the parent company, which runs key business operations,

2) management – subsidiaries conduct operations focused on maximizing the synergistic effect between them, through functioning as successive stages of the value chain or assist each other in carrying out separate operations,
3) financial – subsidiaries conduct diversified operations, whereas the parent company focuses solely on managing its interests/shares.

On the basis of this typology the author divided subsidiaries into:

1) operating entities – activities focused almost exclusively on supporting the activities of the parent company,
2) cooperative entities – activities focused on collaboration with other entities within the group to maximize the synergistic effect, occurring in a particular subgroup,
3) conglomerate entities – the value for the group's operations is contributed in the form of a suitable financial result generated by them,
4) Hybrid entities – engaged in an activity that meets the demands of two or three different types.

The measure, which was adopted for the purpose of identification of a type of subsidiary is a subjective measure of involvement in activity which meets the demands of a given type. An objective measure could be for example the amount of revenue derived from activities of a particular type, however, first of all, the turnover size does not always reflect the company's level of commitment. Secondly, in the case of a capital group these values may not correspond to the actual involvement due to the application of transfer pricing for intra-group transactions (Amershi & Cheng, 1990; Pffeifer & Wagner, 2006).

Research questions and hypothesis

The objects of study were subsidiaries with a "single storey" structure, in which the subsidiary simultaneously was not a parent company to any other entity of the group. The second criterion for qualifying a subsidiary to the research group was that the parent company owned at least 95% of the shares of the subsidiary. This condition was aimed at exclusion of forcing upon the subsidiary "tunnelling-like" activities (Baek *et. al.*, 2006; Siegel & Choudhury, 2012), namely conscious acts to the detriment of the members or minority shareholders. At the same time, subsidiaries had already been operating for at least six years and, at the time of the study, were not designed to disintegrate (sale or liquidation). The study sample included only such subsidiaries whose nature, according to the purpose of functioning in the group, was unequivocal – operational, conglomerate and financial entities. The research hypothesis was not verified for hybrid entities. The number of possible "combinations" and thus the number of units that would have to be examined is so large that attempts to collect a minimally representative sample proved impossible.

The results of a survey conducted by the author were to answer, among others, the following question: is there a correlation between the subsidiary type and the role and type of actions undertaken by the supervisory board? The research aimed to provide information about what type of boards (active, finance-oriented, industry oriented, passive) are present in subsidiaries. The main goal was to find a relationship between a subsidiary type and the type of supervisory board, on the basis of the criterion of its actions, as well as to try to answer the question of why such a model prevails in subsidiaries of a given type.

On the basis of the analysis of literature and the author's research according to the case study methodology, a hypothesis has been formulated. It consisted of three parts verification of which was to answer the question posed.

Hypothesis 1a: The dominant (the largest number of cases) mode of action of a supervisory board in operational subsidiaries is based on the industry-oriented supervisory board type.

An operational subsidiary is designed to support the activity of the parent entity, thus the main interest of the supervisory board should lie in the matters of technological innovation, research and development, product quality improvement, forecasts for the development of industries in which the entity operates, and the like. The monitoring function performed by the board of such an orientation

can be performed by tracking changes concerning for example the quality of the subsidiary's products or changes in the technological process.

Hypothesis 1b: The dominant mode of action of a supervisory board in cooperative subsidiaries is based on the active board type.

The purpose of a cooperative subsidiary operation is to maximize the synergistic effect in the subgroup, thus the board needs to focus on both financial and industrial aspects of the company's operations, it must also demonstrate a high degree of involvement in the implementation of its functions. The synergistic effect is dependent on the harmonious cooperation of all stakeholders, which is possible with strict control of the subsidiary operation.

Hypothesis 1c: The dominant mode of action of a supervisory board in conglomerated subsidiaries is based on the finance-oriented supervisory board type.

Conglomerate subsidiaries operate "independently" of other entities in the group, thus the dominant model of functioning of the supervisory board in these entities should be finance-oriented, implementing the control function by monitoring the position of the company and tracking financial indicators, e.g. indicators of profitability or liquidity. Operational issues in such companies remain at the discretion of the board.

Research Methodology and Results

A questionnaire was the research tool of the study, whereas chairpersons of supervisory boards in subsidiaries were its respondents. Each of the possible board focus models (industry and finance) were assigned six areas in which a supervisory board may demonstrate commitment by counselling or initiating decisions.

In the case of an industry-oriented board the issues covered production and service efficiency, product quality improvement, organizational and personal potential, technological innovations, technical and production potential, as well as anticipated technical changes in the industry. In the case of a finance-oriented board the assigned areas included the subsidiary's value, financial results and profitability, financial situation, debt levels, market position and anticipated changes in the market.

The degree of activity of a supervisory board was assessed on the basis of frequency of involvement against a five-degree scale ranging from 0 points (very low involvement) to 4 points (very high involvement) in every of six assigned areas. Therefore, the total score ranges from 0 to 24 points. Depending on the number of points, assignment of the studied board to one of the four types followed. The assignment method has been demonstrated in Figure 2.

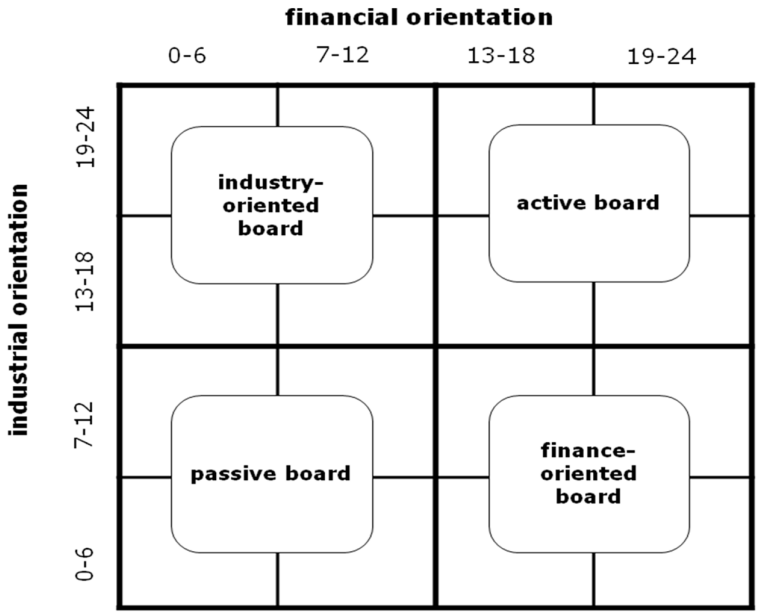

Fig. 2: The method of assigning supervisory boards to particular types
Source: author's own.

Assumptions about verification of the research hypothesis, especially the "point boundaries" between individual types, are subjective and may give rise to doubts. The collected research sample, however, did not allow for a more detailed breakdown of the typology of Jonnergård, Kärreman and Svensson (2004) to, for example, a strongly industry-oriented board or to some hybrid orientation boards. In the study participated respondents from 30 operational subsidiaries, 39 from cooperative subsidiaries and 38 from conglomerate subsidiaries. Every subsidiary of the sample represents a different business group. The study was based only on interviews with use of a questionnaire. Because of the requirement of confidentiality, there can be only shown the structure of the industry of these subsidiaries (see table 1.). There was not significant correlation between the type of industry and the type of the board.

Table 1: The structure of the sample

operational subsidiaries (n=30)			
services	trade	standard production	high-tech production
11	7	8	4
cooperative subsidiaries (n=39)			
services	trade	standard production	high-tech production
12	7	13	7
conglomerate subsidiaries (n=38)			
services	trade	standard production	high-tech production
14	10	8	6

Source: author's own.

Having made the above assumptions about the study result assessment, the following results were obtained:

1) In the case of operational subsidiaries, in 18 cases (60.0%) the supervisory board was identified as an industry-oriented type, in 3 cases (10.0%) as an active board, in 5 cases (16.7%) as a

finance-oriented type and in 4 cases (13.3%) as a passive board. It can therefore be concluded that these results support the hypothesis 1a.

2) In the case of cooperative subsidiaries, in 11 cases (28,2%) the supervisory board was identified as industry oriented, in 17 cases (43.6%) as an active board, in 5 cases (12.8%) as a finance-oriented type and in 6 cases (15.4%) as a passive board. It can therefore be concluded that these results support the hypothesis 1b, although the results are not as clear as in the case of the hypothesis 1a.
3) In the case of conglomerate subsidiaries, in 5 cases (13.2%) the supervisory board was identified as industry oriented, in 13 cases (34.2%) as an active board, in 16 cases (42.1%) as a finance-oriented type and in 4 cases (10.5%) as a passive board. It can therefore be concluded that these results support the hypothesis 1c.

The results above demonstrate that the subsidiary type appears to have a large impact on the model of cooperation with the management adopted by the supervisory board. If these results were confirmed on a larger sample, one could on such basis formulate certain recommendations for the boards of parent companies and members of the supervisory boards of subsidiaries. Assuming of course, that the choice of the board's model of action is in most cases based on reasonable grounds, stemming for instance from knowledge and experience as well as that the model is a result of evolution of the board performance leading to the best, optimal model.

Final Conclusions

Business group functioning has still not been thoroughly identified, which in the context of their high economic importance, poses significant challenges. The subject of business group efficient management, despite the long-lasting discussion, is still very important and valid. The issue of ownership supervision over subsidiary operation, signalled on theoretical grounds may indicate possible directions for further empirical research. The presented results of the empirical research can be a contribution to further considerations of "tools" for influencing a subsidiary's behaviour by the parent company. Further research could try to answer the question to what extent the orientation of activities adopted by the supervisory board is effective in a given subsidiary. Another issue may be the question of the operation of supervisory boards in subsidiaries whose activities are a "mix" of different types. Such studies may provide answers to fundamental questions concerning management of these specific business objects which may contribute to the comprehension of various aspects of business group functioning and provide a basis for creation of effective tools for managing their components.

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The Critical Link Between Knowledge Management and Succession Management at Higher Education Institutions

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Abstract

The purpose of this paper is to provide the growing range of literature review and offers a comprehensive review for new researchers with a specific focus on the relationship between knowledge management and succession planning at a higher education institutions.This study will get a better idea of how higher education institutions deal with the danger of face the risk of knowledge loss due to long absence at workplace. Most of the literature on succession planning was focused on healthcare and limited literature for the education sector.The study has categorized the literature representing knowledge management introduction, challenges facing by higher education for knowledge retaining, succession management and linking relationship of knowledge management and succession planning. Today, higher education institutes are playing a big role to create university leaders.The changing role of the higher education system is all part of the globalization process. This study sets the global context which can help for new leadership processes in the higher education system. There are some challenges faced by knowledge management in terms of retaining leadership within the organization, which includes culture, knowledge retaining, technology and directive leadership. The relationship between knowledge management and succession planning can improve the decision making capabilities of academic leaders.

Keywords*:* Higher Education, Knowledge Management, Succession Management

Introduction

Higher education institutions are responsible to prepare and retain employees within their institutionswhen leaders are expected to retire. The biggest mistake of organizations is replacing staff not retaining them.The specific problem is the lack of effective succession planning practices that support the transfer of technical older employees to younger experts before they leave the institution. Zain et al., (2010) mentioned organizational knowledge as information that is relevant, actionable, and based on experience, context, interpretation, and reflection in the organization. Besides, transferring specific knowledge, skills, and culture from retiring organizational leaders to successors is one of the more challenging tasks of leadership (Joshi et al., 2010).

It has been observed that most of the public organizations only focus on the efforts of succession planning for senior management positions. Most of the cases organizations neglect the middle management and even do not have staff available will take over to the top posts. Therefore, more organizations are at risk. Although in some cases, it is not feasible to plan succession for every unexpected event, it is important to have a roadmap to prepare future leaders when a key position is vacant. Succession planning is difficult in some situations when the lower management staff departs

from an organization because it could lead to a lack of awareness of expertise required for specific positions.

Literature Review

The literature review is classified into two main intentions. The first intention is to explore the relevant literature review on the importance of knowledge management and succession management in association with higher education. The second intention is to identify the theoretical and practical connection between knowledge management and succession management. The field of Knowledge management has certainly advanced and developed in significant new ways in recent decades. This study takes existing research on knowledge management and succession planning succession which is currently limited to abstract concepts and models for deeper understanding in academic world.

Knowledge Management Introduction

The existence of knowledge is not new. However, Knowledge management has been highlighted around fifteen years ago. Knowledge management has gained popularity in both the business and education sectors (Wiig, 1993; Bhatt, 2001; Metaxiotis et al., 2002,2005). Higher education institutes play also a major economic role in the business and education sectors. The highest mandate for higher education is to prepare a workforce to enter learning situations of all types of organizations.

Universities prepare graduates to enter learning culture of institutions. Brewer & Brewer (2010) stated that "Preparing students to succeed in a knowledge-based economy requires an integrated educational environment that encourages creativity and a commitment to lifelong learning. Educational institutions are challenged to prepare students to compete in a knowledge society made more complicated by globalization" (p.6)

There are two main approaches to knowledge management. One is human or people approach, and another approach is information technology. The study of (Chong, 2005) is a key driver to knowledge management. The human or people approach is crucial to any organization for the Knowledge management process. It is the truth that the knowledge management process cannot be successful without people. The information technology approach plays an important role in filtering knowledge. without information technology and computer, knowledge cannot be stored (kotoroy & hsu,2001; Abs).

In sum, the human approach is more common since knowledge existed long ago before information technology. Besides, information technology is only a human creation that can act as a catalyst to speed up the activities of knowledge management processes (Chong, 2006a).

Generations of Knowledge Management

Several authors has focused to the improvements of the knowledgege management genrations. Historically ,it can be divided into main three categories by the study of Metaxiotis et al(2005).The First generation of knowledge management was from 1990 to 1995. During this period several initiatives were taken for the identification of knowledge management which includes determine the potential benefits of knowledge management for businesses, designing projects for specific knowledge management projects (Senge, 1990; Nonaka, 1994, Quinn, 1992; Wiig, 1993). Some other authors including study of Ignizio(1991) has taken initiative to work on artificial intelligence influenced research on knowledge management, mainly in the direction of knowledge representation and storing.

The second generation of Knowlegde management was started in 1996 with creation of coorporate jobs with specific skills and knowlegde officers . During this period knowledge management research focused on Knowledge definitional issues business philosophies, system framework, operations and practices. The second genertion of knowledgege management was more focused on advance technologies which includes systematic organization change (practices, system, tools). This generation has also emphasized on emerging with new solutions and outcomes.

The third generation of knowledge management is from 1997 to 2000. The study of Paraponaris(2003)mentioned that during this period knowledge management emerged from an individual knowledge focus in the 1970s and 1980s to a group knowledge focus in the 1990s and 2000s. The third generation was more focused on relationship between knowledge and action.

Challenges Faced by Higher Education System for Knowledge Management

Higher education institutes all over the world are facing some challenges but this study will determine some of the crucial challenges facing by higher education institutes such as Culture, organization knowledge retention, technology, and directive leadership.

Culture: The first challenge is the adaption of changing knowledge at higher education institutions is organizational culture, hiring practices and employees' work habits. The study of Tseng & Fan (2011) culture consists of common beliefs, ideas, basic values, mutual norms, and practices. Most of the time knowledge is stored in individuals or organizations. The implementation of a succession planning process in higher education institutions is exceedingly difficult due to cultural shift and recruitment practices (Kelly,2011, Grossman,2014).

Organizational culture has been identified as a fundamental determinant of the success or failure of Knowledge management, and extensive research has been conducted to identify cultures that promote knowledge sharing (Al-Adaileh and Al-Atawi, 2011). The study of Ragab and Arisha (2013) stated that "organizational structure has also been studied as being as important as a culture with Success" (p.8)

Organization knowledge retention: The best way to retain knowledge at higher education learning institutions is the review of knowledge regularly. It is suggested that all knowledge documents must be updated during the validity period. Higher education institutes are facing internal knowledge loss due to departs or retiring (Rajasegaran et.al, 2005; Wiig, 1997). The study of Busine & watt (2005) mentioned about organizational knowledge that "the functions, processes, systems, products, services, or technologies of an organization and industry that a leader must understand; knowledge 'holes' need to be identified and filled"(p.7).

Knowledge retention was defined by Martins & Meyer ,2012), as "maintaining, not losing, the knowledge that exists in the minds of people (tacit, not easily documented) and knowing (experiential action manifesting in behavior) that is vital to the organization´s overall functioning" (p. 80).

Directive Leadership: The higher education institutes are playing an important role to cultivate talents, develop new technologies and enrich human knowledge. To fulfill these needs, the leaders in higher education institutes are expected to be directive and participative. According to McCauley et al(1998) leadership development is stated as expanding the collective capacity of organizational members to engage effectively in leadership roles and processes.

Leadership roles come with or without authority whereas in the leadership process group pf people work together. All organizations including higher education institutes are facing challenges in leadership development. The study of (Rothwell,2002) mentioned some leadership difficulties such as shortage of resources for employee's development, a rapidly aging workforce which causes a shortage of experienced talent for top positions. Another study relevant to this article by Kilian et al (2005) mentioned some more challenges including lack of a mentor, stereotyping, career advancement, that women and people of color often face in the corporate world.

Technology: In today's dynamic world, technology is an increasingly important factor for a successful business to provide accurate information. The top management of higher education institutes needs to use the latest technology, not only the ability to use technology but with an orientation that creates new technologies**.** The invention of technology between 1700 AD and 1881 was called applied knowledge (Allee,1997). The study of Hsu (2001) focused that without information technology, knowledge cannot be stored, filtered and process.

The technology facility can help to narrow the gap between knowledge management processes and knowledge management performance outcomes in the higher education sector. Information technology advancement has been recognized to esteem the search for suitable information to solve our daily and academic problems, but are limited by ability in critical information technology policies, infrastructures, usage, personnel, deficit in funding and basic information technology services (Ifinedo & Ololube, 2007).

Succession Management

In today's highly competitive global business environment, succession planning is considered a powerful tool to retain leadership within an organization. Succession planning requires more than just a plan. Some institutions prepare a succession plan for a loss or a change of employment for an unexpected event. For example, the military has some sort of succession plan for leaders who can take over quickly during unexpected events. The study of (Grossman,2014) mentioned that previous studies have done to evaluate the lack of succession planning in higher education institutes (William & Mackey,2008; Richards& Neefe,2009; luna,2010; Green,2011).

Some successful institutions are recognizing the importance of succession planning and they are willing to devote their time and resources to retain the best talent and prepare leaders by providing pieces of training. On the other hand, some organizations such as universities, public agencies, and nonprofit organizations face financial issues to retain their best talent within. For example, hiring of a vice chancellor for university or hiring a CEO for a big company requires a lot of time and considerable budget. Ultimately, these organizations prefer to hire an external consultant or outsourcing provider. There is a little discussion for academic leaders for succession planning as compared to the health sector which is more focusing on the importance of mentoring sessions (Phillips,2019).

Succession Planning definitions

Some authors mentioned succession planning as a systematic activity to help top management to identify, select from the pool of candidates. On other hand, succession planning is referred to as a strategic activity to ensure the vacant positions without any favoritisms. Several authors have studied about succession planning and defined as under.

According to Rothwell(2010), the definition of succession planning is "a deliberate and systematic effort by an organization to ensure leadership continuity in key positions, retain and develop intellectual and knowledge capital for the future, and encourage individual advancement"(p. 28).

The study of (Mackey,2008) has given succession planning as a tool to assist with professional development on the individual employee and promoted cross-trained employees from within the organization.

Sambrook (2005) stated that "succession planning is an attempt to plan for the right number and quality of managers and key skilled employees to cover promotions, retirements, deaths, serious illness and any new position which may be created in the future organization plans"(p.580). This definition provides an example that succession planning is a long-term approach.

The relevant study of Getza & Peterson (2005) also defined succession is encouraged to internal successors involve themselves within. succession planning is viewed as an important way to address retirement and its consequences (McQuade et al., 2007).

Best time to prepare succession planning

The rule of thumb for starting to prepare for the next successor is no less than five years. Some organizations realize the importance of succession planning too late. The ideal time to start succession planning is when the business is starting to take off. According to (Butler et al.,2002) "Succession

planning is a complex task that requires constant attention and ongoing resources. Successful organizations devote considerable time and resources to mapping out skills and competencies so that they can hire and train appropriately and achieve a distinct competitive edge" (pg.202).

Succession planning process

Typically, succession planning involves in major four steps from design to implementation phase.

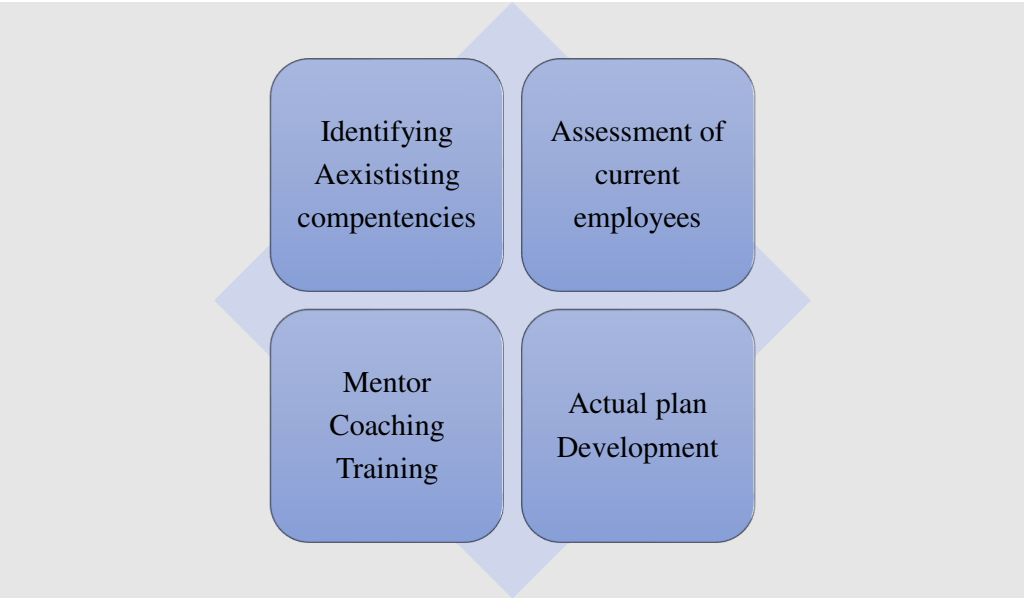

Figure 2.2.3 Succession Planning Process

The first step is to identify the existing competencies related to both leader's needs and organization needs. The second process evaluates or assesses the current employees to determine their matching skills and expertise with the organization. The third process involves many factors such as mentoring, coaching, training and hiring approaches (internal or external) according to organizational needs. The last process involves developing the actual plan. Some organizations such as small institutions only focus on succession plan charts, but big organizations focus on applications such as human resources management systems.

Create a successor Profile

Creating a successor profile is very important when organizations start thinking to identify successors and create critical positions. This process includes having the right people and financial structure, documenting their experience, skills, behavior and technical knowledge which can be needed to be successful in a specific role. More than anything else, succession planning requires the full structure of the organization from top to bottom. The key role of successor in higher education institutes has been accepted for many decades. Less experienced candidates may be unappealing for the executive post. succession planning model which always focuses on developing a within candidate competency skill profile.

The selection criteria to find out the selected successor is to keep the track record of leaders with their relevant job experience, their professional skills, leadership style, and new leadership competencies. As a result, competency profiles can be determined for the selected successor. Succession planning identifies talented successors as potential leaders and granting them systematic leadership development programs (Broome, 2013, Wilkes et al., 2015, Philllips,2019)

The Aging leaders at higher education institutes workforce

Most of higher education institutes are facing the aging workforce within the organization. This institutional loss is long term skilled and experienced employees. Higher education institutions are beginning to realize the high impact of retiring workforce which can decrease workforce size withing the organization. These workers include the mature workforce those who are reaching their minimum retirement age and who are retiring from all levels. In this case, the role of senior management is highly important to identify the managerial functions on each level. The study of (Robbins et al, 2003) identified the main functions of senior leaders as planning, organization, directing and controlling. These managerial functions are the social and technical skills of a successful manager.

The study of (Jacob,2016) in Malaysia found that the number of old age has been increased from 7% to 15% within 28 years. It is expected that by 2030 the number of aging populations will be double. The first things come in everyone's mind about the aging stereotype. The older employees are discriminated in many terms such as employment promotions and their skill recognition. The study by Posthuma, Wagstaff, and Campion (2012) defined age stereotype as judgments about an individual employee based on their age rather than on their actual knowledge, skills or abilities.

Internal Vs External Practices and Preference

Internal recruitment might be beneficial to educational institutions as in some cases internal candidates are very loyal to the institution with clear organizational goals and familiar with the current leadership. However, some institutes are not in favor of hiring an internal candidate due to budget constraints. The external preferences require identifying qualified candidates with technical skills and experience for top leadership positions.

External Vs internal leadership hiring in higher education is always highly debated. The study of(Grossman,2014,p.44) stated that "various higher education institutions do not grasp the business model for promoting strong internal candidates as hiring data suggested that there is a distinct preference for external candidates (collins,2009)".

Moreover, the study of Barden (2008) also identified difficulty in an internal successor in the academic sector. Succession planning is a purposed and efficient action developed by academic institutions to recognize cultivate and assess internal employees to prepare internal employees for critical leadership positions (Rothwell, 2010a).

The Link Between Knowledge Management and Succession Planning

This study exhibits the close connection between succession planning and knowledge management. Both topics are linked to playing an important role in having adequate actions in place to handle the challenge for long term absentees of employees. The study of Lahaie (2005) estimated that 42% of organizational knowledge exists exclusively with employees, which has serious implications for institutions of higher learning.

There is an urgent need for a study on succession planning and knowledge management strategies for higher education institutes. The study of (Grossman,2014) mentioned that "as expected, shortages of academic leadership have received increased attention, limited literature is available to address the importance of succession planning and its relationship to the organizational knowledge-based theory"(p.30)
The succession planning process is considered a high-level plan for knowledge management. Transferring organizational knowledge from leadership to successors is a challenging task during the leadership change. Organizational knowledge transfer studies make clear the potential loss of information when knowledge transfer is not planned at an organization, providing validation to the value of leadership succession planning (Grossman,2014).

The study of Sambrook (2005) has suggested the three types of knowledge requires for successors. The first type of knowledge is K1 which requires Technical Knowledge and a threshold competence. This knowledge can be passed on and learned. The second Knowledge is K2 which is about a firm or an organization and how it works. This knowledge can be relatively easily made explicit and transferred to a potential successor. The last type of knowledge is K3 which covers specific tacit knowledge that relates to decision making and risk-taking. This is more difficult to make explicit and the transfer of it. This depends on the leader's willingness and capacity to share this knowledge as a successor.

The study of Grossmna (2014) mentioned that previous studies have done to evaluate the lack of succession planning in higher education institutes (William & Mackey, 2008; Richards& Neefe,2009; luna,2010; Green,2011). Successful Organizational sustainability is depending or knowledge transfer. Because when an experienced workforce departs from the organization, it is a potential loss of institutional knowledge (Rothwell,2011). Organizational knowledge has been learned from experience with work and people. (Rothwell,2011).

The study of Grossman (2014,p.18) mentioned that "the lack of effective succession planning for higher education institutions may limit organizational knowledge transfer as well as organizational effectiveness at a time of projected leadership shortages (Jacobson, 2010; Peters, 2011; Taylor & Machado, 2008)". In addition to this succession planning is the best technique for knowledge management withing organizations to protect institutional knowledge for organizational effectiveness (Cabrera-Suarez,2005).

The sharing of knowledge at the workplace is the only method of organization collaborations and employees can pass the acquired knowledge. Although knowledge is known as an influential factor in the succession process. The study of Durst et, al (2015) mentioned that "Loss of knowledge may represent the most critical aspect related to succession planning (p.8). In addition to this study "lost knowledge means the decreased capacity for effective action or decision making in a specific organizational context" (DELONG, 2004, p. 21). The study of Tonet & Paz (2006) mentioned that the loss of knowledge causes knowledge sharing.

According to Durst et, al (2015, p.8) the study of Sambrook (2005) mentions" different types of knowledge that need to be considered from a successor's point of view. These are the technical knowledge (easily codified); knowledge about the firm (made explicit relatively easily), and the specific tacit knowledge related to leadership, decision-making and risk-taking (most difficult to make explicit)".

In conclusion, this study reviewed the situation of limited literature review about knowledge management and succession planning in public learning institutions. In addition, this study clearly exhibits the close relationships between knowledge management and succession planning. Furthermore, limited academic research can integrate knowledge at risk.

Methodology

This paper is based on extensive traditional literature review search of published articles that primarily address the concept of knowledge management, succession management and the importance of the link between knowledge management and succession management. The criteria for inclusion are peer-reviewed journals from the world scientific Scopus, science direct and emerald insight published from the last decade to present. The exclusion criteria are non-academic researchers and other languages. Three main key words knowledge management and succession management and higher education were used in the database for search. This study has reviewed more than 70 references, of which 26 are cited in this study. Most of the articles were published in the highest-ranked journals in the relevant field. The results of the literature review indicate that higher education institutes are aware of the importance of knowledge management, succession management. Although, few studies exist, and it gives strong evidence in the education sector.

Discussion

The concept of knowledge management is complex. Public higher institutes have significant opportunities to apply knowledge management to achieve organizational goals. Using knowledge management techniques at higher education institutes is fundamental as in the business sector. lack of knowledge management and succession planning at higher learning institutions along with the aging workforce is a problem. Succession planning is not vital in higher education if knowledge transfer strategies are in place. (Grossman,2014).

In today's global business environment, there is a need for Succession planning due to retired workforce and a lack of interest in younger employees. The study of (Dezure et al., 2014; Mintz-Binder, 2013; Vogelsang,2014) mentioned that organizations facing the problem of lack of interest by the younger generation for the leadership positions. Susanne& Stefan(2012) emphasized that " universities and other educational institutions the findings reveal that there is a need to stronger incorporate the handling of knowledge loss into their curriculum, to help future managers and business owners to better tackle this issue in an increasing knowledge has driven business environment respectively in firms with an aging workforce"(p.9). Higher education institutions always expect adaptable knowledge employees who can lead and produce new knowledge.

Top management in higher education cannot be ignored the practice of succession planning. The study of Phillips (2019) has focused that "Succession planning is a systematic approach to ensuring leadership continuity within an organization by encouraging individual employee growth and development, through purposeful identification, development, and mentoring of future leaders. The benefits of succession planning include job satisfaction, leadership stability, retention, and ensuring inherent knowledge of the organization is not lost" (P.8).

The brief review clearly explains the close relationship between knowledge management and succession planning which can tackle the threat of long-term absence of employees from the institution.

Conclusion

This study concludes that Succession planning should not be limited to focus on employee's identification and selection of successors, but also focus on the transfer of technical and critical knowledge within the higher education institutes. The departs of technical knowledge can be resulted in financial and non-financial losses. Therefore, Higher education institutions must focus on developing a knowledge workforce that can be excel in a today's challenging environment. This study finds that higher education institutes are familiar with the crisis of knowledge attrition. However, some factors such as culture, advanced technology, lack of directive leadership influence the implementation of knowledge management. The results of this article are expected to serve as a reference guide for higher education institutions involved in knowledge management projects. In addition ,a strong connection between knowledge management and succession planning was another finding of this study.

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The Size of The Organization as A Moderator of Relation Between Organization's Resilience and Organizational Performance

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Abstract

The paper is devoted to the analysis of the potential influence of organization's resilience on organizational performance. In particular the analysis concentrates on organization's resilience. It is assumed that organization's resilience is one of factors potentially influencing organizational performance, and that relation is influenced by the size of the organization. It must be stressed that, although the size of the organization is measured here directly, it is treated as a proxy (a category followed by a set of specific, organizational characteristics). Empirical research was conducted to verify formulated hypotheses based on results obtained from 268 organizations from Poland.

Keywords: organization's size, organization's resilience, organizational performance, management

Introduction

Organizations every day face internal and external factors that can induce crisis. Some of them successfully deal with those events and prosper even better than before, benefiting from the opportunities that arise that way, while others suffer severe damages or even bankrupt. Understanding how and why organizations avoid or survive crises and outline the drivers of crisis avoidance, handling and recovery has been for long a subject of interest of researchers and practicioners (companys' owners, executives, managers). To explain it the concept of organizational resilience emerged, incorporating insights from crisis management and contingency theories, natural accidents theory (NAT) or high reliability organizations (HRO) concept (Perrow 1984; Pearson & Mitroff, 1993; Pearson & Clair 1998; Sutcliffe 2011; Vogus et al. 2014). There is no a widely accepted definition of organization's resilience, however most of researchers agree that it refes to the organizaton's ability to function despite the presence of challenging, unfavourable conditions or ability to recover from untoward events (Sutcliffe & Vogus, 2003; Manyena 2006; Vogus & Sutcliffe, 2008; Lengnick-Hall et al. 2011; Lee et al. 2013; Zabłocka-Kluczka 2014; Linnenluecke 2017). In literature there is also a lot of different research streams regarding organization's resilience. They focus on the ways how resilience arise, drivers of resilience and their implications for organisations' functioning. Due to the fact, that "many factors influence organizational resilience simultaneously, and in different and often competing ways" (Andersson et al. 2019, p. 36), that concept is still characterized by the lack of clarity. Moreover, it is often underline that organizational resilience is contextual – it is atrributed to a number of organizational (often latent) characteristics that "can be activated, combined and recombined in new situations as challenges arise" (Koronis & Ponis 2018, p. 34). All them contribute to organizational resilience, but often none of them is sufficient on its own to explain it (Andersson et al. 2019). In scientific research that confusing complexity is often reduced by focusing on selected factors contributing to resilience. At the beginning of XXI century the accent in research was shifted from the activities and actions purposefully undertaken in the hope of ensuring resilience (e.g. business continuity management) to the attributes (features) of the organization as a resilience drivers (i.e. leadership, strategic or cultural factors, or organizational structures). However, among the latter group there are still relatively few works devoted to the size of the organization as a resilience driver. Hence, from the research gap indicated above is arising the need to verify if the size of the organization can indeed be treated as a "protective umbrella" and to deepen the knowledge on mechanisms shaping organization's resilience in order to contribute for both theory and practice. In that context the main aim of the paper is to verify if the size of the organization influences organization's resilience, and

going further, if it is a moderator of the relation between organization's resilience and organizational performance.

Literature Review and hypotheses Development

Organization's resilience and the problems with measuring it

As it was already pointed, neither it is easy to define the concept of organization's resilience, nor to measure it. A widely accepted definitions, as well as widely adopted instrument to measure organization's resilience has not yet emerged.

Organization's resilience can be understood as a *capacity* (for successful adaptation or positive functioning despite unfavourable conditions (Hamel & Välikangas (2002)) or a *property* of the organization (that enables its survival and sustainable development (Zabłocka-Kluczka 2014)), an *outcome* (positive end, "positive state that every organizations aim to achieve" (Kantur & Iseri-Say, 2015), a state of organization "conditioned by entirety of management processes designed to restore the integrity of the internal environment" (Zabłocka-Kluczka 2014, p. 319) or as an *process* ("linking a set of adaptive capacities to a positive trajectory of functioning and adaptation after a disturbance" (Norris et al., 2008), or "the maintenance of positive adjustment under challenging circumstances such that the organization emerges from those conditions strengthened and more resourceful" (Vogus & Sutcliffe, 2007, p. 3418)).

Moreover, organization's resilience can be understood both as the organization's ability to absorb or cope with disturbance or other challenging event (capacity to preserve position), but also as the developed capacity to recognize and adapt to unexpected changes (Sutcliffe & Vogus, 2003; Manyena 2006; Vogus & Sutcliffe, 2008; Lengnick-Hall et al. 2011; Lee et al. 2013; Linnenluecke 2017; Koronis & Ponis 2018). In that context two forms of understanding of organizational resilience have been distinguished: *reactive (passive)* resilience (being a form of absorptive capacity that refers to survival in the face of threat) and *active* resilience, that refers to the ability to transform the organization in response to environmental shifts or even to grow with challenge (Giezen et al. 2015; Sawalha 2015). According to it organization's resilience can be "static, when founded on preparedness and preventive measures to minimize threats probability and to reduce any impact that may occur, and dynamic, when founded on the ability of managing disruptions and unexpected events to shorten unfavourable aftermaths and maximize the organization's speed of recovery to the original or to a new more desirable state" (Annarelli & Nonino 2016).

From this combined approaches different drivers of organizational resilience are derived. They vary widely across studies, however most of researchers agree that to the most important one belong: situation awareness, preparedness, responsiveness, resourcefulness, redundancy, robustness, rapidity, adaptability, agility, integrity, learning processes or organizational culture (Norris et al., 2008; Scholl & Patin, 2012; Bruneau et al. 2003; Wicker et al. 2013; Kantur & Iseri-Say, 2015; Koronis & Ponis, 2018). They are also often the basis for building organization's resilience assessment tools. This variety of possibilities points the difficulties that scholars have experienced trying to measure, evaluate and compare organizational resilience. In practice it is difficult to meet research conducted according to the same scheme and with use of the same research instrument. And although the 4R model (referring to resourcefulness, redundancy, robustness, rapidity) repeats most often (Bruneau et al. 2003; Wicker et al. 2013), items and measuring scales are usually constructed by researchers individually.

Organization's Resilience, Size of The Organization and Organizational Performance – Hypotheses Development

It is obvious that the size of the organization cannot be neither main nor the only factor determining organizational resilience (as organizations' should be resilient regardless of its size), however it can influence resilience alongside other organizational characteristics. The size of organization could be treated as a proxy – a category followed by a set of specific, organizational characteristics.

"Empirical studies have documented a systematic connection between organizational size and age" (Larsen & Lomi 2002, p. 281), as well as other organizational characteristics. According to size usually grows routinization, formalization, and institutionalization. As the organization becomes larger (grows older and gains experience), the initial variability in production activities, quality and administrative behaviour decreases due to routinization and learning (Larsen & Lomi 2002, p. 279). Grows also structural inertia (defined by (Larsen & Lomi 2002) as the tendency of organizations to resist change), which higher level slows downs the creation of new capabilities. According to size grows also inherent complexity of organization which inhibits processing and hinder the transfer of information.

Structural characteristics are not the only features that distinguish small and large organizations. Small companies have their own specifics. These are usually organizations with a homogeneous, non-diversified profile, operating in market niches that are not profitable or not capacious enough for large companies. They have limited access to the capital market, which also means limited financing investment options. Due to the lack of capital links, on the one way their decisions' freedom is higher, however range of cooperation possibilities – lower. Smaller organizations usually have not broad access to network of industry connections. Lower size of organization is also usually positive correlated with lower market share and negative connotations attached to risk-taking which in turn discourage innovation. Small and large firms possess fundamentally different resources and capabilities. Small organizations have limited resources in the form of time, money and human capital (Van Gils 2005), however "small businesses possess certain resources that allow them to overcome some barriers which create greater difficulties for their larger counterparts, as well as allow small businesses to exploit certain industry opportunities more readily than larger ones" (Dean et al. 1998). Also the way they run the business, the way they are organized and managed, and the markets they serve are significantly different than in case of large enterprises. With the help of all these qualitative criteria, it is difficult to distinguish between small and medium-sized enterprises. They are most often presented together as one category (SME) and characterized in opposition to large enterprises. In general, it is widely recognized that are substantial differences of SMEs in comparison to large organizations.

According to Ates and Bitici (2011) SMEs are characterized by a number of patterns of behaviours which may hinder their ability to become more resilient. They tend to think and plan in the short term, focus on day-to-day problems, apply rather firefighting management style than strategic management, "accept their environment as given and install the mechanisms to react to its forces rather than leveraging internal capabilities for proactive change, which is an essential driver for resilience" Ates and Bitici (2011, p. 5602). It seems also that due to restricted resources (personal or financial) smaller organization are in disadvantage to implement an organizational resilience management systems or business continuity management solutions, because planning and preparing for crisis is potentially costly. However, there are also suggestions that lower organization's size does not necessarily go hand in hand with lower organizational resilience. Leflar & Siegel (2013) notice that lower complexity of small organization eliminates organizational silos, promotes faster decision making and greater flexibility and adaptability. SMEs are generally good at taking decisions quickly, especially in the face of challenges, and that speed in action can be regarded as an important resilience driver of SMEs. However, from four categories of capabilities that an organization's requires for resilience (resourcefulness, redundancy, robustness, rapidity), "SMEs fall short in all but rapidity" (Wishart 2018, p. 15). Considering all the above, the following research hypothesis can be formulated:

H1: There is a positive relation between Size of the organization and the Organization's Resilience.

Organizational performance is a key factor enabling the survival and achievement of success in the modern business and in that context it is a category desired by both large and small organizations. Although it is probably one of the most common construct (and output factor) used in research in the management field, it is surprisingly rarely precisely defined. According to Richard et al. (2009), organizational performance can be defined broadly or very narrow, as a part of wider and more general one - organizational effectiveness. In the narrow sense it is equated with financial performance (by usage of such measures like profitability, sales growths or stock returns), in the broader one – related to strategic and operational performance (and measured by using such measures like productivity, market share, product quality, innovativeness, competitiveness etc.) (Judge 1994). According to that

first category, taking into account only absolute measures, supremacy of larger organizations seem indisputable. This thesis has been confirmed among others by Judge (1994), who proved that larger organizations have an inherent financial advantage over smaller organizations. This positive effect of size on organizational effectiveness results from economies of scale (Amah et al. 2013). Also according to such performance measures like market share, productivity or innovativeness (conditioned by access to resources) dependence between organizational size and organizational performance seem to be similar, which means that size can be treated as an organizational performance driver. Although there are also measures that seem to be independent from organization's size (like product quality) and despite the fact that the Judge's (1994) research showed that the organization's size is negative related with social performance, considering all the above dependencies and accepting the predominant management outlook based on the belief that the size of a firm affects corporate efficiency, the following research hypothesis was formulated:

H2: There is a positive relation between Size of the company and the Organizational Performance.

It is often underlined that resilience is the capacity to rebound from adversity strengthened and more resourceful (Sutcliffe and Vogus 2003). To be resilient thus means to emerge stronger from the adversity the organization's was caught in and to achieve positive potential outcomes (like increased competitiveness or innovativeness, more adjusted internal processes or higher profitability). Moreover, as the drivers of organization's resilience are in many cases the same as those that are needed to gain a competitive advantage (Mitroff et al. 1989), one can suppose links between organization's resilience and business as usual profitability. Links between organisational resilience and profitability suggest i.e. Sundström and Hollnagel (2006). According to them "to be resilient, an organisation must be able to deal with unexpected and disruptive events as well as to understand the longer term impact of such events. (…) this translates into the ability to identify and successfully manage risk at all levels in the organization while sustaining a profitable business" Sundström and Hollnagel (2006, p. 1). The relationship between organizational resilience and organizational performance in the financial aspect had been proven by Carden et al. (2018). This relation can be also double-sided. Not only organizational resilience can influence organizational performance (i.e. profitability), also higher profitability can strengthen organization's ability to prepare and respond effectively to emerging threats. That observation seems to be valid also in relation to other categories taken into account when measuring organizational performance. Therefore, following hypothesis may be formulated:

H3: There is a positive relation between the Organization's Resilience and the Organizational Performance.

And finally, based on the arguments presented above, it may be stated that the size of the organization has the potential to moderate the influence of organization's resilience on organizational performance. That is mainly because of the differences between small and big organizations arising from organizational characteristics and practices of management. Bigger organizations enjoy the scales effect and the effects of networking, establish an unique, complex and supportive external relationship, engage more strongly in innovation processes and respond in more systemic way to crises and change in general. The effects of these practices affect both organizational resilience and performance. It can be thus assumed that in a larger organizations even a small increase in the level of organizational resilience can result in a greater increase in organizational performance than in the case of small organizations. So it can be another benefit of economies of scale. Considering all the above, in the context of planned research scheme, the following research hypothesis was formulated:

H2M: In bigger organizations, the influence of the Organization's Resilience on the Organizational Performance is stronger than in smaller organizations. Size of the company thus is a moderator for the relation between the Organization's Resilience and the Organizational Performance.

All developed hypotheses, showing the relation between Size of the organization, Organization's resilience and Organizational performance, are presented on Fig. 1.

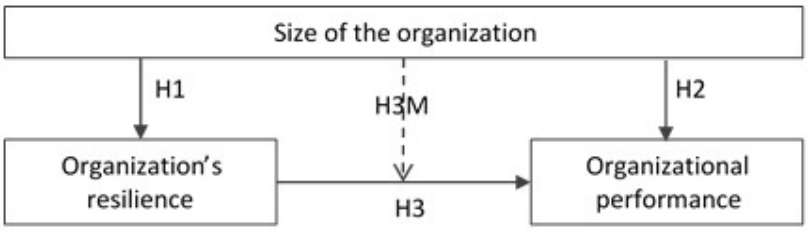

Fig. 1: Size of the organization as a moderator of the relation between Organization's resilience and Organizational performance. Source: own research.

Research Methodology Description

Data Gathering Process and Characteristics of The Research Sample

The survey was conducted in order to verify the proposed hypotheses and identify the relations between organization's resilience and organizational performance. The research was conducted in December 2019 using online survey service: SurveyMonkey among organizations located in Poland, which was the only condition limiting the sample (organizations were surveyed regardless of size, industry or type of business etc.). Only one survey was carried out anonymously in one organization, and it was completed by employees who have a broad view of the entire organization. 268 valid responses were collected. According to the size of population of organizations operating in Poland the sample cannot be considered as representative, however, it is sufficiently diversified to be a basis for overall conclusions concerning the given topic. Characteristics presented in Table 1 clearly show that the sample is covering organizations of all sizes and all types. The sample is dominated by typically manufacturing organizations (approx. 49%), approx. 27% of the surveyed organizations conduct service activities, the remaining 24% - are trade organizations. Approx. 60% of respondents are local enterprises, the remaining 40% are economically independent organizations that are part of large international corporations and holdings, or cooperate with them and operate internationally.

Table 1: Research sample characteristics

Size of the organization	Manufacturing organizations	Trade organizations	Service organizations	Total
Micro (below 10 employees)	12	11	9	32
Small (10-49 employees)	37	15	11	63
Medium (50-249 employees)	42	26	24	92
Large (above 249 employees)	37	11	28	76
Total	128	63	72	263

Source: own work.

Variables Measurement

In order to examine the proposed hypotheses, key variables were defined: *Organization's size*, *Organization's resilience* and *Organizational performance*.

Organization's size was measured by number of employees and operationalized as a four-group categorical variable with micro (employing less than 10 people), small (employing from 1 to 49 people), medium (employing from 50 to 249 people) and large (employing over 249 people) organizations in particular groups. This distinction was adopted after the EU recommendation (2003/361/EC, Official Journal EU L 124 from May 25th, 2003).

Variable *Organization's resilience* was build basing on four properties assigned to system's resilience: robustness, redundancy, resourcefulness and rapidity (Bruneau et al. 2003; Wicker et al. 2013). Within this four properties 4 measures (respectively one item according to one property) of the organization's resilience were indicated. They were rated on the 5-points' Likert scale (from strongly disagree to strongly agree, with middle point I do not have an opinion).

Organizational performance was measured based on Balances Scorecard concept (Kaplan & Norton, 1996). That framework allows to draw together multiple measures aimed at financial performance, internal business processes, customer perspectives, and innovation and learning. Within these 4 perspectives, 10 measures of the organizational performance were indicated. They were rated on the 5-points' Likert scale (from well below expectations to well above expectations with the middle point: as expected).

The Research Results Description

Descriptive statistics and reliability analysis of scales

As a first step in a research process, the reliability of scales of each variable was verified. The results of the analysis of the reliability of the measurement scales are presented in tab. 2. It is worth underlining that Cronbach's α was high for every variable, which indicates a high internal reliability of the scales and measurements.

Table 2: Defined variables along with the results of the reliability analysis of scales

No.	Variable	No. of scales	Alfa-Cronbach
1	Organization's resilience	4	0.809
2	Organizational performance	10	0.873

Source: own work.

Relations between Organization's size, Organization's resilience and Organizational performance

As the next step of the research, before verifying the main research hypotheses, it was investigated whether there were any statistically significant differences in the assessment of organizational performance and organization's resilience between organizations of various size. Table 3 presents the means assessments in groups of organizations of different size and they seem to be different, what could be a basis for the statement that in bigger organizations, organizational performance and organization's resilience was evaluated higher than in smaller organization, however it was important to check, if this differences are statistically significant.

Table 3: Differences in the assessment of organizational performance and organization's resilience between organizations of various size – means in groups

	Organizational performance			**Organization's resilience**		
Size of the organization	N	mean in group	standard deviation	N	mean in group	standard deviation
micro	30	3.02	0.786	30	2.89	0.955
small	62	3.26	0.716	62	3.00	0.871
medium	90	3.39	0.523	89	3.28	0.729
large	72	3.73	0.706	76	3.70	0.822
	254	3.41	0.695	257	3.29	0.869

Source: own work.

In order to check it ANOVA analysis was conducted preceded by verification of assumptions regarding statistical data characteristics. Results of variance homogeneity test for means in both cases confirmed

that the differences between the variances in the compared groups were not statistically significant, so it can be assumed that the variances are equal or at least similar to each other (F-Levene'a (3,250) = 2,41; p=0,068 for organizational performance and F-Levene'a (3,250) = 0,71; p=0,547 for organization's resilience). It allowed to carry out the ANOVA analysis, which results showed that there were statistically significant differences between the means in the compared groups of organizations of various sizes, both in case of evaluation of the organizational performance (F(3,250)=10,065; p<0,001) and organization's resilience (F(3,250)=11,399; p<0,001) as well. Due to the fact that the test results do not precisely indicate which of the compared medium groups differ from each other, *post-hoc* analysis was performed. Scheffe test showed that in both cases there was a statistically significant difference in means for organizations of different size only between SMEs and large organizations (see Table 4), which is in line in the overall thesis that there are substantial differences of SMEs in comparison to large organizations.

Table 4: Test Scheffe for difference of means of analyzed variables

Scheffe Test		**Organizational performance**			**Organization's resilience**		
Size of the organization	Size of the organization	difference in means	standard error	level of significance	difference in means	standard error	level of significance
micro	small	-0.23968	0.14683	0.448	-0.10833	0.18243	0.950
	medium	-0.36556	0.13918	0.078	-0.38642	0.17317	0.176
	large	-0.70500*	0.14346	0.000	-0.81228*	0.17687	0.000
small	micro	0.23968	0.14683	0.448	0.10833	0.18243	0.950
	medium	-0.12588	0.10896	0.721	-0.27809	0.13569	0.243
	large	-0.46532*	0.11438	0.001	-0.70395*	0.14038	0.000
medium	micro	0.36556	0.13918	0.078	0.38642	0.17317	0.176
	small	0.12588	0.10896	0.721	0.27809	0.13569	0.243
	large	-0.33944*	0.10439	0.016	-0.42586*	0.12811	0.013
large	micro	0.70500*	0.14346	0.000	0.81228*	0.17687	0.000
	small	0.46532*	0.11438	0.001	0.70395*	0.14038	0.000
	medium	0.33944*	0.10439	0.016	0.42586*	0.12811	0.013
**. the difference of means is significant at the level of 0.05*							

Source: own work.

The next step of the analysis was the correlation analysis between *Organization's size*, *Organization's resilience* and *Organizational performance* in order to verify hypotheses H1, H2 and H3 (see Table 5). The results showed that the size of organization is statistically significantly correlated with:

- *Organization's resilience* (r(257)=0,334**, p<0,001), which is the basis for positive verification of the hypothesis H1, and
- *Organizational performance* (r(254)=0,320**, p<0,001), which is the basis for positive verification of the hypothesis H2.

In both cases correlation is positive, although moderate. The obtained results showed also that there is positive, strong and statistically significant correlation between *Organization's resilience* and *Organizational performance*. It allows for the acceptance of H3 hypothesis.

Table 5: Correlation analysis between analyzed variables

		Organization's resilience	**Organizational Performance**
Size of the organization	r	0.334**	0.320**
	Sig.	<0.001	<0.001
	N	257	254
Organization's resilience	r	1	0.541**
	Sig.		<0.001
	N	259	247
***. Correlation is significant at a level of 0.01 (two-sided)*			

Source: own work.

Summarizing, the obtained results clearly show that there is a statistically significant and positive correlation between all analyzed variables, however definitely the highest in case of the relation between organization's resilience and organizational performance.

Organization's size as a moderator for the relations between Organization's resilience and Organizational performance

The relation between organization's resilience and organizational performance was analyzed in the context of the size of the organization to verify whether this variable is a statistically significant moderator of the relation, which existence is verified above. Regression analysis with moderator was used to determine that, using the pattern proposed by Tworek & Zabłocka-Kluczka (2018). According to that, as a first step, new variable – moderator – was introduced. The moderator variable was built as a product of two standardized independent variables (*Size of the organization* and *Organization's resilience* as a second independent variable). As a second step, 3 regression models were built (the analysis was performed using Process macro for IBM SPSS Statistics):

- first model was built as a base model for comparison and only independent variables (*Size of the organization* as a second independent variable) were added as predictors,
- second model was built to verify whether the moderating influence is occurring in sample, using independent variables (*Size of the organization* still as a second independent variable) together with the moderator as predictors
- to confirm that, the third regression model was built (using only one independent variable (without *Size of the organization* as a second independent variable) and the moderator as predictors).

The results of the analysis are presented in Table 6.

Table 6: Regression models' statistics

Model description	R^2	*Delta* R^2	*Moderator coeff.*	*Standard error*	*t Stat*	*P Value*
The size of the organization, Organization's resilience, Moderator *dependent v.:* Organizational performance	0.330	0.015	0.098	0.042	2.314	0.022

Source: own work.

The obtained model clearly shows that the size of the organization is a moderator of analyzed relations. The delta R2 and obtained model are statistically significant ($F (1, 243) = 5,356$, $p < 0,05$). Therefore, obtained results are the basis for positive verification of hypotheses H3M confirming that *Size of the company is a moderator for the relation between the Organization's Resilience and the Organizational Performance.*

Discussion

Although, according to Mitroff et al. (1989) insights, the size of organization will not protect it from hitting and the effects of the crisis, conducted research showed that in the context of organization's resilience, the size can matter. Larger organizations achieve higher resilience scores and moreover, it appears that the size of organization strengthens the relation between organization's resilience and organizational performance. However, it must be underline that this difference in resilience level is not so much because of the size of the organization itself, but because of the proxy effect it creates (that results from the internal inertia, possessed resources, management practices, network of relations or the support instruments that follow the size).

Unlike SMEs, large organizations have a much larger network of connections, often international and definitely greater access to external resources (capital, politicians or contractors). Also, by design, a

larger organization has a larger amount of internal resources that, if needed, can be allocated to other areas of its operations, which can paradoxically can provide more organizational flexibility. In smaller organizations the possibility of such substitution is usually limited by access to resources (often there is nothing they can allocate). Moreover, other instruments of external support available to small and large enterprises, result from the importance of organizations of various sizes for the economy. While the collapse of a micro or small enterprise can be treated in the context of a natural economic system regulator (capital is transformed and transferred to those who can use it better), the collapse of a large organization is usually associated with serious consequences for the economy of the region or even the country. Weighing tax revenues that can be lost, as well as the extent of social problems that can be caused by the failure of a large organization (e.g. unemployment, and following it decline in the purchasing power of citizens, recession in the region or poverty), it is often in the interest of the state to support big companies in trouble. All this makes it easier for larger organizations to remain resilient, to function despite the presence of challenging, unfavourable conditions or to recover from untoward events.

The research whose results are presented in this paper, were conducted before the COVID-19 pandemic, that hit the world at the beginning of 2020 and drastically changed the way and the context of all around the world organizations' functioning. In that specific situation organizations were suddenly facing the unprecedented challenge of surviving in a situation of almost complete market paralysis, disruption of global supply chains, interruptions to production, unavailability of physical and human resources. And although the problems they face were common for organization of various size (lack of earning opportunities, change in market structure, new demand trends), the vulnerability to the caused that way crisis seems specific not only to industry, but also to size. Due to their lower availability of resources (e.g. limited cash reserves or number of employees)), SMEs seem to be more vulnerable thus less resilient. The dramatically changing number of SME bankruptcies in March and April 2020, actually in all countries where the pandemic has developed, despite the scope of support given to SMEs by governments of various countries, seems to confirm this thesis. That case clearly shows that size can be indeed treated as "an protective umbrella".

Conclusions

The ability of organization to continue to operate despite the impact of adverse factors determines its survival and future performance. Practitioners and researchers have long been looking for factors building and strengthening organization's resilience, however a widely accepted organization's resilience theory still does not exist. This paper is not in main stream of research, as it neither explores the new way of understanding and defining the essence of organization's resilience, nor develops an universal tool that can be used to measure resilience, however it explains how and why the size of organization influences the organization's resilience and strengthens the relation between organization's resilience and organizational performance, and in that way also contributes to that theory.

Performed empirical study is burdened with certain limitations. The obtained sample of 263 organizations is by far not a representative sample and verified only in one business context, so in future it is worth to consider the verification of formulated hypotheses in organizations operating in other countries. Moreover, only one factor influencing organization's resilience is taking into consideration. However, although the obtained results seem to be a solid first step in the analysis of the role of organizational attributes (features) arising from the size of the organization in shaping the organization's resilience, they clearly need further research and in-depth analysis. It is also worth to explore simultaneously more than only one organizational factor influencing resilience. That would allow to assess the strength of influence and significance of each of them, providing the same interesting hints for organizational resilience management.

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Business Incubator and Digital Startup Company: Review and Case of Indonesia

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Abstract

The rise of digital start-up companies plays a vital role in various industries and affect the economy globally. Most of these companies initiate their businesses out of intriguing ideas and necessitate a business incubator to foster and nurture the initial ideas' development. The role of business incubators in developing digital start-ups becomes essential as well as the proses of executing this role. This study endeavors to elaborate on the role of business incubators in developing digital start-up companies using a systematic literature review and expands the understanding using the case of Indonesia. To have better information and enrich the literature review, we utilize in-depth interviews with three business incubators and four digital start-up companies. Business incubators have a significant role in the development of digital start-up companies through daily operations as a business mentor as well as ecosystem development.

Keywords: Business Incubator, Digital Startup, Roles, Literature Review, Qualitative Methods

Introduction

The emergence of new digital start-up companies become more important to some countries since they are very innovative, creative, and provide new opportunities to help push the economy forward. By the year 2014, many governments give easiness to create a company to start a small business; such as the United States in just six days, Saudi Arabia five days, Singapore three days, and even New Zealand in only one day ("10 Fun and Surprising Small Business Facts,"). Moreover, the United States Census Bureau reported that the start-up companies created over 2 million jobs in 2015 in the United States (Bureau, 2017). Indonesia has also adapted to this change; it took forty-seven days previously to only ten days with the 12th economic stimulus policy package starting in the second quarter of 2016 (Post, 2016).

Nevertheless, besides the economy, digital start-up companies have breached many things by changing the map of competition in various industries; for instance, Facebook, Uber, WhatsApp, Twitter, with novel ideas creating users feel more comfortable in their life. In Indonesia, we are also observing almost the same phenomenon; there are Gojek, Traveloka, Tokopedia, Bukalapak, and OVO, which have become Unicorn digital start-up companies, i.e., start-up companies with a valuation of more than $ 1 Billion (Post, 2019). That achievement was obtained in a relatively short time, under ten years since the establishment of these companies. In terms of impact, with many users, each of these start-ups "disrupts" conventional businesses. A similar question is remains; how Gojek disturbs the transportation business, how Tokopedia and Bukalapak disturb the conventional market and mall businesses, how Traveloka disturbs the travel business, and how Ovo disturbs wallet and payment mechanism. These so-called revolutions have become pro and contra for many parties, ranging from businesspeople, users, to regulators.

Furthermore, there is an interesting issue that can be explored, when these digital start-up companies start ideas and seek for potential users, they are faced with the choice to develop their company self-taught or learning from a business incubator. By learning from the business incubator, of course, it is expected to increase their knowledge until the digital start-up companies are finally ready to plunge into their operating industries. From the business incubator side, are they ready to provide the right experience or guiding program for the digital start-up business makers? It might be that the guiding program has played an essential role in developing the digital start-up company's plans to develop ideas and continuous improvements to "hit" other industries.

Based on the described phenomenon, how is the relationship between business incubators and digital start-up companies may promote beneficial conditions? In other words, what are the roles of business incubators? This study identifies the roles of business incubators in fostering digital start-ups. We argue that the roles have a significant impact on the start-ups so that they can take advantage of the guidance program provided by the business incubators. We explore previous studies using a systematic literature review (SLR) to provide an analytical overview of the current knowledge and examine the research theme under study (de Araújo, Alencar, & de Miranda Mota, 2017). Based on the SLR, we further qualitatively elaborate on the findings using Indonesian cases.

Literature Review

With the start of the era of the digital start-up company that disrupts everything, the existence of business incubators cannot be underestimated. The business incubators facilitate the initial phase of the development of digital start-up companies, with various services they can provide to the digital start-up companies that they fostered. According to Alon and Godinho (2016), business incubators are institutions whose design is to help new firms, which are regularly small and creative, to build their opportunity of endurance and their future development. This definition also means business incubators are a shared office that seeks to provide firms with a strategic, value-adding intervention system of monitoring and business assistance.

In different journal articles, there is a kind of expectations on the positive effects of business incubators on start-up growth, some of these positive effects include: to initiate and boost innovation in a region and accelerate the development and growth of innovative firms through the provision of high value-added services; provides innovative start-ups with a sheltered environment; provides access to financial resources and entrepreneurial start-up support in the form of training, coaching, or mentoring, as well as access to internal and external networks. Nevertheless, in the prior study, convincing evidence was not found that would justify the spending of public money on business incubator support in the short run, despite some indication that incubated innovative start-ups may experience faster revenue growth during their third or fourth year. Moreover, incubators often try to "pick winners" and provide them with a sheltered environment (Lukeš, Longo, & Zouhar, 2019).

Business Incubators Roles

The role of business incubators in facilitating innovation in general, and social innovation in particular, has been highlighted via a focus on open collaboration, network formation, learning and knowledge transfer, entrepreneurship, and leadership in ways that are context-dependent in terms of their capacity to create impact. Several of the businesses that have grown subsequently address in much more explicit manner agendas of sustainable development and priorities that could well locate them within the scope of the 'quintuple helix' model (Nicolopoulou, Karatas¸-Özkan, vas, & Nouman, 2015). Cultural and creative work appears to be particularly susceptible to precarious conditions, which have given rise to various responses from the antiprecarity movement. Since the business incubators become the third place, they help freelance designers become more embedded in business networks (in terms of collaborations or customers), both local and foreign, compared with working in isolation, as lone eagles. The third-place appears to counterbalance the pervasive im-materialization of labor successfully. This phenomenon is also reflected in the relatively higher level of job satisfaction reported by those working in third places (Avdikos & Kalogeresis, 2017). The incubator sponsors play a role in the choice of the incubation model. Different types of sponsors, due to differences in their missions and resources, systematically opt for different models, resulting in sponsorship specialization (Mrkajic, 2017). Business incubator as an experience accelerator, the incubator houses a wide range of firms under one roof, turns the business incubator into an area that integrates and accelerates relations between businesses (Redondo-Carretero & Camarero-Izquierdo, 2017).

Business Incubators Impact

Business incubators have both internal and external impacts. The internal impact is felt directly by the start-up fostered by the business incubator, as described above. In contrast, the external impact is the influence given by the business incubator for the surrounding environment, starting from a particular area to increase the economy of a country. For instance, emerging-market countries may benefit from business incubators to encourage the entry and growth of multiple forms of business actors. They tend to operate in parallel rather than in sequence in different stages of development. However, there is some tendency toward government sponsors in lower market development stages and private sponsors in higher market development stages (Dutt et al., 2016). The efficiency of business incubators may be enhanced by understanding the sustainable ecosystem concept and the relevance of the three dimensions of social capital theory (relational, cognitive, structural), which may enhance the development and

implementation of the strategy of business incubators (Theodoraki, Messeghem, & Rice, 2017). As an organization, the business incubators mechanism's governance needs to be explored for the relationships between management, client firms, and other key stakeholders.

In summary, business incubators are successful as a policy for economic and technological growth (Mian, Lamine, & Fayolle, 2016). The role of the business incubators is unexpectedly active in fostering entrepreneurship in a full process scale specified in the idea of an "entrepreneurial university." Such intermediaries act as a facilitator (and a very official broker) between local government, professional associations, university, and industry–which they found to be highly relevant as an enabler for university-industry collaborations (Brem & Radziwon, 2017). The role of the business incubator can also be seen from the valuation of start-up valuations, where incubation efforts and personnel may siphon limited resources away from exploitative programs, the presence of an incubation capability does not seem to be reflected directly in firm market valuation. Instead, the value of incubation investments appears to be leveraged through exploratory discovery investments. In other words, it appears that to translate exploratory, advanced research into profitable products and associated market valuation, firms need an incubation capability (Markovitch, O'Connor, & Harper, 2017).

From information based on the prior research, the existence of a business incubator can be seen from its effectiveness in influencing various parties, both internal and external, on a small scale in the surrounding environment to a large scale in a particular country. The results of previous studies indicate the potential of business incubators in developing a digital start-up company. Through the guidance program from the business incubators, as well as services as the third place for start-ups beside home and work-place, business incubators offer an accessibility/ networking to related parties such as sponsors, business partners, access to customers, suppliers. All these reasons make business incubators as one of the channels that quite powerful to support the business of a new firm to expand ideas and solutions to their users.

The primary characteristics a business incubator must have is to help start-ups generate ideas, do incubation, and make scaling of the business. Having new ideas that do not meet the market test, having market-tested ideas that cannot be scaled, or scaling ideas that are not market validated are all recipes for failure. Success needs all three. The fundamental proposition is that for new ideas to become a new business, they require leaders to master all three disciplines. Each of the three stages—ideate, incubate, and scale—is distinct and necessary, but only when all three are in place is it likely that new ideas will result in new businesses that enable incumbents to lead disruptive innovation in their markets (O'Reilly & Binns, 2019). It is necessary to deepen the guidance program by the expectations of digital start-up companies to provide support for these results. Whether what has been done by business incubators is right to help digital start-up companies to create an integrated ecosystem to provide a positive impact on improving the economy. Therefore, we attempt to elaborate on this matter and find the answer to the following question: What are the roles of a business incubator to digital start-ups?

Research Method

We utilize a two-stage research design. First, we employ a systematic literature review (SLR) to elicit current information related to the roles of the business incubator; second, we conduct in-depth interviews to expand and strengthen upon the understanding obtained from the SLR (Venkatesh, Brown, & Bala, 2013).

Systematic Literature Review Process

The systematic literature review is conducted via three academic databases, namely EBSCOHost, Science Direct, and SCOPUS using the keywords: "business incubators" AND "(start-up or start-up or start up or start-ups or start-ups),". The search is limited to academic articles (journals and conference proceedings) published since 2016. Articles from journals are limited to Q1, Q2, and Q3 classification based on Scientific Journal Ranking (SJR). The pooled articles are reviewed, first, by title and abstracts; second, by skimming the content and evaluating the relevance (the influence of business incubator to digital start-ups). The initial pool is 160 papers; the final pool after the filtering process is 21 articles.

In-depth Interviews

In-depth interviews are further utilized to expand and strengthen the result of the literature review. The interviews conducted to business incubators and their fostered digital start-up companies. They already finished the incubation program and should have a better understanding of the program as well as implement it in the real business world.

Topics related to the interviews are significant roles from SLR results. In total, there are three business incubators and four digital start-up companies. We analyze the interviews using qualitative data analysis by phase filters and create specific codes to groups, and organize the data needed. These codes are generated using the ATLAS.ti 8 application, by two phases: first, organization and preparation for analysis, and second, coding and analysis (Bandara, Furtmueller, Miskon, Gorbacheva, & Beekhuyzen, 2015).

We interviewed managers from three different business incubators because they run the incubator daily operation and directly communicate and collaborate with the digital start-up. From the digital start-up company side, we interviewed founder or co-founder, because they are the one who follows the entire incubation process starting from idea creation until entering the market. For each interview, we took 75 minutes discussion on average and focus on the roles of the business incubator as the business mentor and ecosystem development based on the prior findings.

Result and Discussion

From the resulted articles by systematic literature review, we noticed that not all these articles indeed inform about the influence of the business incubators on the digital start-up company. Twenty-one articles fit with the research objectives. In the following section, we identified the most significant roles of the business incubator from the selected publications:

- Business incubator as a business mentor.
  For digital start-ups companies, the role of a business mentor to help them grow, learning the business, and following step by step to increase performance and deal with the business itself. Process structure: Define as part of the start-up development process, whether it is strategic, administrative, and human capital, which is structured. Moreover, the structure is carried out by the business incubator to run the incubation process for its fostered start-ups. Related information for business incubator as a business mentor in-process structure was stated in 12 articles (Bezerra, Borges, & Andreassi, 2017; Bocken, Boons, & Baldassarre, 2019; Cohen, Fehder, Hochberg, & Murray, 2019; Fukugawa, 2017, 2018; Markovitch et al., 2017; Messeghem, Bakkali, Sammut, & Swalhi, 2018; O'Reilly & Binns, 2019; Patthirasinsiri & Wiboonrat, 2017; Sousa, Carmo, Gonçalves, Cruz, & Martins, 2019; Tripathi, Oivo, Liukkunen, & Markkula, 2019; Vanderstraeten, van Witteloostuijn, Matthyssens, & Andreassi, 2016).
- Ecosystem development
  The critical element of the start-up ecosystem requires businesspeople, technology, market, finance, human capital, supporting factors, education, and demography (Tripathi et al., 2019). Sustainability: Define as the scheme to provide sustainability on business incubator influence for the digital ecosystem. Related information for ecosystem development in sustainability was stated in 4 articles (Baglieri, Baldi, & Tucci, 2018; Fan, Urs, & Hamlin, 2019; Theodoraki et al., 2017; Zhou, Wang, Lan, & Yang, 2017).
  Support system: Define as a system established by the business incubator to support ecosystem development. Related information for ecosystem development in support system was stated in 4 articles (Brem & Radziwon, 2017; Dalmarco, Hulsink, & Blois, 2018; Parasol, 2018; Tripathi et al., 2019).

There are two articles which were pulled out since it was not strongly related to the process structure, sustainability, and support system.

The interview results are used to deepen the business incubator is best practice in Indonesia to make a better understanding of their role to develop digital start-up companies. The results are:

a. Business incubator as a business mentor-process structure

Table 1: Business Mentor-Process Structure Interview Results

Literature Review	Interview Results
Strategic Development	
• Ideas development thru interaction with local partners. • Incubation capability within a firm: the presence of incubation • Gaining understanding through start-up development stage: formation, validation, growth.	• Mentor, whether global or resident, play a significant role in validating ideas. • Requirement on three persons based on character: Hustler, Hacker, Hipster. • Coordination inner and outer the business incubator's incubatee could happen. • Learning on customer validation, product validation, business model validation, market validation. • Mentors play a role in guiding, not giving a solution.

Literature Review	Interview Results
• Start-ups stages are business plan, structuring idea, prototyping, analysis on market and product, evaluation.	• The start-ups should be full time to allocate their resources, especially the founder and co-founder of the incubation program. Focus on doing business instead of learning how to do business. • Adaptive to the situation, the possibility of changing curriculum when needed. • There is no standard curriculum among business incubators. It depends on their plan and area of fostering the digital start-up companies. • The business incubator's primary goal is to make the fostered digital start-ups known their business and how to run it well. Any other issues such as legal issues on how to register a company or how to make partnerships are bonuses to the digital start-ups to get information from the business incubators or their partners.
<u>Administration Development</u>	
• Experience of the founder affect their minimum viable product (MVP) development • Adapting from Balanced Scorecard to identify KPI of the business incubator: Local Development Performance, Incubatee Satisfaction, Incubation Process, and Learning.	• Product development based on customer focus, periodically test the product to fulfill customer's needs • A daily progress report is a must • Determine Key Performance Indicator (KPI) with minimum requirement and achievable. • The way to make KPI is based on the plan on doing something and target to be achieved at a particular time. This result means each start-ups have a different KPI. • Recording system developed by each start-ups, it is applied to make compliance management and learning the journey of making the progress
<u>Human Capital Development</u>	
• Founders should be aware of such tradeoffs and align their goals and objective with those of the accelerator. • The role of experienced and inexperienced founder and team members to the	• Business incubators give way to start-up to meet their network; it depends on the start-up whether they want to use or not. • Develop the product & learning the business model will generate the capability of human capital.

Literature Review	Interview Results
minimum viable product affection.	• Challenge for the start-ups team member, collaborating with other start-ups, and with the incubatee alumni. • There is no specific agenda to develop human capital, but it merges with business events such as seminars, workshops, or talks.

Ecosystem development-sustainability

Table 2. Ecosystem Development-Sustainability Interview Results.

Literature Review	Interview Results
Value Chain	
• The framework of innovation incubation value chain, divided into upstream resources investment, research and development midstream, and economics transformation downstream. • Evaluating innovation incubation ability, not only at the scope of incubators but also widen its understanding to regional incubating carriers.	• The investor is before and after the incubation process. Early investors to support business incubators to give grants to the digital start-ups company, while the latest investor will become the shareholder of the start-ups. • Each business incubator has its scenario to bring the fostered digital start-ups develop into a good company, using their resources in partnership. • Business incubators make partnerships to make way for their fostered digital start-ups to meet their market. • Business incubators also try to involve the government to help them give way to their fostered digital start-ups companies.
Ecosystem Concept	
• The development of a digital ecosystem is by following the rules: coordination and collaboration, increase climate trust, social capital, and interaction to increase performance & sustainability	• Business incubators use collaboration with ABCGM (academic, business, community, government, and media) to build the digital ecosystem for start-ups. • Business incubators make events such as seminar, workshop, training, talks, or specific event (demo day and/or business matching opportunities) • Business incubators build environment to synergize among fostered digital start-ups to back-up each other's business. • Start-ups are willing to give their share to business incubators to have some percentage if they get the benefit of it.

Literature Review	Interview Results
	• In the latest situation, the ecosystem is not created entirely. There is room to develop the ecosystem.
Technology Transfer	
• Technology transfer to spread innovation, giving access to the market, and orchestrating the SME.	• Business incubators act as the co-innovation and co-creation of digital start-ups companies. • There is some learning to digital start-ups companies to upgrade their skill, get from the business incubator. Mostly is about how to use the technology that suits their business plan. • Business incubators use their network to help them give transfer of technology to the digital start-ups companies.

b. Ecosystem development-support system

Table 3. Ecosystem Development-Support System Interview Results.

Literature Review	Interview Results
Digital Innovation Network	
• Bridging companies closer to the university, fostering technology transfer, entrepreneurship, academic research. • The creation of high-tech start-ups upgrading the industrial sector • Key element of start-ups ecosystem: entrepreneurs, technology, market, supporting factors, finance, human capital, education, demography.	• The strong point is that resources from each member of the ecosystem were linked. • Business incubators make events to link the digital start-ups companies to the investors. • Channeling which provided by business incubators are extensive, not to mention government, market, investor, prospecting distribution channel, et cetera. • Business incubators define a schedule to evaluate the effectiveness of a business incubator program to match the start-ups needs.
Intermediaries	
• Such intermediaries act as a facilitator (and a very official broker) between local government, professional associations, university, and industry–which they found to be highly relevant as an enabler for university-industry collaborations.	• One of business incubator declares their reason to exist is as the intermediator between digital start-ups companies to the market, investor, and other networks. • Digital start-ups company felt their business incubator is very helpful when they want to enter the market.

Literature Review	Interview Results
	• Digital start-ups company realizes that the most important is how they use the networking channel from a business incubator.
Tools & Equipment Provider	
• Human capital and supporting factors play a role by providing required business and technical skills to the process, and this is evident in the difference between experienced and novice team members in start-ups.	• The standard tools & equipment provided by the business incubator to help digital start-ups companies are co-working space. • Sometimes business incubators also provide technology-based equipment, such as connection to a server. • In advanced situations, business incubators have also made business catalog from their fostered digital start-ups companies. • The co-working space is useful for the newly established start-ups.

Business incubators run with collaborating, create a digital ecosystem, and use it for many purposes. The start-ups companies themselves know this condition, and they use it very well. The one who not understand the ecosystem established will not get the opportunity to grow and make differences.

Conclusion

We employ a systematic literature review followed by expanding and strengthening the understanding with in-depth interviews with related respondents from three business incubators and four digital start-up companies. The results show that business incubators have significant roles in developing digital start-up companies by being the business mentor and ecosystem development. From the business mentor, the business incubator's process structure was helping the digital start-up company reach its plan. No standard curriculum provides by the business incubators, but it much related to the typical stages of developing digital start-up companies; they are formation, validation, and growth. These typical stages bring opportunity to a digital start-up company to be developed with their needs.

From the ecosystem development, the business incubator's roles in making the ecosystem sustain and their support system are also shown by the result of interviews. Business incubators foster digital start-up companies and collaborate with ABCGM (academic, business, community, government, and media). For now, the role of a business incubator is significant since they provide the ecosystem by themselves, forming for their purposes. This result also is the reason that their program in the typical stages is suitable for the digital start-up company plan. Otherwise, the digital start-up company will leave the business incubator, finding another way to make them successful.

Due to the limitation of this research, therefore, the next study should consider other resources views (e.g., associations, industries, and government) to be unit analysis. With much information gathered, it will strengthen and widen the output of research. Finally, we hope that this research could provide more structured insights and knowledge about the roles of business incubators to the digital start-up companies, or even to economic growth and the creation of digital ecosystems.

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Valuation of Cryptocurrencies in Selected EU Countries

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Abstract

The main aim of this paper is to analyse and compare valuation bases used for cryptocurrencies pricing in three selected European countries, i.e. the Czech Republic, the Slovak Republic, and the Federal Republic of Germany. Among others, fair and true disclosure of cryptocurrencies in financial statements, is influenced by valuation techniques used. That is why our paper analyses and compares attitudes to this problem within examined sample of selected European countries. This paper loosely follows our previous paper dedicated to disclosure of cryptocurrencies in financial statements as interpretation and disclosure of cryptocurrencies influence naturally valuation bases used for accounting measurement. We take into consideration also IAS/IFRS view in outline. Firstly, interpretation of cryptocurrencies in selected countries is discussed briefly. Further, valuation bases and basic valuation rules used for cryptocurrencies pricing are analysed and compared.
Obtained findings suggest that equally as a view on cryptocurrency interpretation and disclosure in financial statements differs among traced EU countries, also valuation bases used for cryptocurrencies measurement differ. The Czech Republic that treats cryptocurrency as inventory uses cost of acquisition for its initial evaluation in accounting. Cost of acquisition encompass also related expenses such as exchange fees. Similar attitude holds the Federal Republic of Germany that interprets cryptocurrency as either the long-term intangible asset or other receivables. It evaluates cryptocurrencies by cost of acquisition defined similarly as in the Czech Republic. Different stand takes the Slovak Republic that integrates cryptocurrencies into the short-term financial assets and evaluates them by fair value. This stand differs also from interpretation of IAS/IFRS that include cryptocurrencies either in inventories or in the long-term intangible assets and recommend to evaluate them initially by cost of acquisition.

Keywords: Cryptocurrency, Bitcoin, Valuation, Valuation Basis of Cryptocurrencies, IAS/IFRS

Introduction

Cryptocurrencies that belong to a broader category of cryptoassets still represent a relatively new phenomenon and so their accounting treatment differs not only among EU countries. Bitcoin, probably the first cryptocurrency, was firstly used approx. in 2008 in order to accelerate peer-to-peer transactions worldwide with utilization of blockchain technology. From accounting point of view, some countries recognize cryptocurrencies as cash or financial assets, some integrate them into the long-term intangible assets or the current assets. Evidently, financial reporting of cryptocurrencies is not unanimous and so their reporting in financial statements may signify relatively important differences among countries and used regulations.

Also understanding of a cryptocurrency may differ in literature. For example, it may be defined as means of exchange, similar as US dollar, but digital and using cryptographic tools to control production of currency units and to confirm transfers of money (PricewaterhouseCoopers, 2017). Martinák (2015, p. 47) states that digital currencies are a new kind of currency, electronically created and deposited which also represents their main specific in comparison with classic national or international money that naturally exist in a form of cash. Also Lánský (2018, s. 1) for example considers cryptocurrency as a type of digital currencies that use cryptographic means to confirm transactions. Martinák (2015, s. 55) summarizes characteristics of cryptocurrencies as follows: full decentralization of currency, an absence of agent, worldwide territory, low transaction fees, and anonymity. Cryptocurrencies are regulated by no central authority, transactions take place directly without any agent across the whole world and anonymously. Moreover, virtual transactions are subject to low transaction fees in

comparison with classic economic transactions. Lánský (2018, s. 19) supplements characteristics of cryptocurrencies as follows: specific production of new cryptocurrency units, provability of ownership, elimination of duplicity, no possibility of changes. Production of new units is regulated only by system, ownerships can be proved only cryptographically, duplicate transactions are excluded and once realized transaction cannot be changed or cancelled.

At present, more than 2 000 types of cryptocurrencies operate on market. The most important cryptocurrency as for market capitalization is Bitcoin (about 65 % of the total market capitalization at present). The second and the third position occupy probably Ethereum (about 8 %) and Ripple (about 4 %) while the total market capitalization according to CoinMarketCap (2019) represents approx. 180 billion US dollars at present. The total market capitalization values show significant fluctuation when the highest vales fluctuated about 830 billion US dollar at the turn of 2017 and 2018. Among biggest cryptocurrency exchanges can be put Bitstamp, Binance, Bitfinex or Coinbase currently. There must exist sufficient offer and demand on a cryptocurrency exchange to realize a transaction. It means a substantial difference in comparison with a common exchange office that holds the post of seller or buyer. The less active and smaller cryptocurrency exchange, the less liquid; which is also one of disadvantages of cryptocurrencies that can be characterized by lower liquidity generally. Further drawback represents a question of safety. Cryptocurrency exchange crashes are not extraordinary events and verifying client's identity happens by personal data provided.

Financial reporting and valuation of cryptocurrencies differ depending on particular jurisdictions. It usually comes from interpretation of cryptocurrency established by local financial or other central authority and from characteristics of cryptocurrency. As it was indicated above, presenting of cryptocurrencies in financial statements and their evaluation vary significantly among countries and these differences may be material depending on a ratio of cryptocurrencies on the total assets. That is way we decided to analyse and compare attitudes to disclosure and valuation of cryptocurrencies in selected EU countries.

Methodology and Data

This paper deals with cryptocurrencies from accounting point of view. Its main aim is to analyse valuation techniques used for cryptocurrencies measurement in the Czech Republic and to compare them with techniques used in the Slovak Republic and the Federal Republic of Germany. Comparison will be briefly discussed also with respect to IAS/IFRS interpretation. As valuation techniques we understand valuation bases used for cryptocurrencies initial recognition in financial statements, methods used for valuation at removal of cryptocurrency, their conversion, and rules for revaluation. At this paper we loosely follow our previous paper dedicated to comparison of cryptocurrency interpretation in above introduced countries as the interpretation and disclosure of cryptocurrency influence also valuation techniques used.

As a research sample we used three neighbouring EU countries, i.e. the Czech Republic, the Slovak Republic and the Federal Republic of Germany because they arise from similar accounting traditions, especially the Czech Republic and the Slovak Republic. In future we would like to enlarge our research sample by others, mainly European countries. It would be also desirable to enlarge a scale of compared elements.

For purposes of the paper we used literary search, description of cryptocurrency and review of its development as basic scientific methods. Further we used analysis of the basic valuation techniques in the Czech Republic, the Slovak Republic and the Federal Republic of Germany, and comparison of jurisdictional attitudes with IAS/IFRS. In the last part of the paper we used synthesis of main findings and discussion.

As main data sources we used monographies, scientific papers, expert comments, and accounting regulations issued by the Czech, Slovak, and German authorities.

Main findings and Discussion

Valuation of cryptocurrencies proceeds from their interpretation and recognition in financial statements which was described in our former paper dedicated to financial reporting of cryptocurrencies. For purposes of this paper we come from its main findings.

Though in the Czech accounting regulations cryptocurrency is not explicitly defined at present, it is possible to utilize communication of the Ministry of Finance of the Czech Republic (2018) that interprets virtual currency as an intangible asset and recommends to report it as a "supply of its kind". This treatment of course influences valuation of cryptocurrencies for accounting purposes that should apply the same rules as for inventories measurement.

According to the Czech procedures, virtual currency should be measured at costs of acquiring, i.e. either cost of purchase or cost of production if it was acquired by mining. (Ministry of Finance, 2018). The Ministry of Finance of the Czech Republic refers to relating paragraph 25 of the Czech Act on Accounting (1991). In practice it means that costs on initial recognition of cryptocurrency should encompass besides the initial price also related costs (closely see table 1). If a cryptocurrency was acquired by mining it should be measured either by real cost, or by cost coming from production calculation. So cost of production will encompass energies or expenses relating to hardware used for mining.

If cryptocurrencies are treated as inventories than in the case of their removal from assets (within exchange or sale) FIFO method or weighted average method can be used for evaluation of their decrease, which is also recommended by the Ministry of Finance of the Czech Republic (2018). Within one analytical inventory account however utilization of the only one cost method is allowed. Weighted average must be recalculated once in month at minimum.

Tab. 1: Cryptocurrencies recognition and valuation – international comparison

Recognition and valuation of cryptocurrencies		**The Czech Republic**	**The Slovak Republic**	**The Federal Republic of Germany**
Recognition of cryptocurrency	Trade and exchange activity	Inventories – goods	Short-term financial assets	Long-term intangible assets or Current assets – other receivables (possession no longer than one year)
	Cryptocurrency mining	Inventories – own products, work in process	Sub-ledger accounts until exchange or sale	
Valuation base	Cryptocurrency acquired by purchase	Cost of purchase (related expenses as exchange fees included)	Fair value (applied as market value achieved on public market)	Cost of purchase (related expenses as exchange fees included)
	Cryptocurrency acquired by mining	Cost of production: real or calculated (related expenses as energies included)	Fair value from the moment of utilization (exchange or sale)	Cost of production (related expenses as energies or hardware acquisition)
Valuation method at removal		FIFO or weighted average (recalculated monthly)	FIFO or weighted average	-
Conversion method		Average of exchange rates from several	Aggregation of exchange rates	Time value of delivered goods or

	bigger stock exchanges		services must not exceed time value of received bitcoins
Exchange differences	Debatable, probably do not comply with legal regulations	Disclosed as financial expense or revenue	-
Revaluation of cryptocurrencies	When closing the books cryptocurrency provisions recommended	Revaluation of cryptocurrency when closing the books not required	Lower of cost or market value (bitcoin in long-term assets) Lower of exchange or market price (bitcoin in currents assets)

Source: author's own processing based on jurisdictional regulations

A problem may occur in the case of cryptocurrency exchange to the Czech currency. Act on Accounting in § 4 demands to keep the books in the Czech currency so assets and liabilities recorded in foreign currency should be exchanged on the Czech Crowns (CZK) using exchange rates announced by the Czech National Bank on regular basis (§ 24 Act on Accounting). However, no exchange rates are announced for cryptocurrencies at present. In that case some authors (Kocourková Trnková, 2017) or Jelínek (2018) suggest to calculate exchange rates average of a cryptocurrency to foreign currency followed by the Czech National Bank (for example US dollar or EUR). Average of exchange rates should come from two or three bigger stock exchanges and consequently it should be recalculated to the Czech currency according to exchange rate of the Czech National Bank. Kocourková Trnková (2017) in this context recommends to specify a way of cryptocurrency conversion to CZK in internal regulations. Transparency of cryptocurrencies evidence would be strengthened by their monitoring on sub-ledger accounts.

Further question that is solved in the context of cryptocurrencies conversion is an existence of exchange differences. Some authors think that exchange differences should not be recognized because cryptocurrency does not comply with provision of § 4 Act on Accounting that regulates this area. As for stocktaking of cryptocurrencies, the Ministry of Finance of the Czech Republic (2018) prescribes the same duties as in the case of other assets and liabilities. Stocktaking must be carried out once a year at minimum at the date of financial statements preparation. Value of cryptocurrencies must be proved by relating documentation, for example by a virtual wallet statement. The same source (2018) recommends entering of cryptocurrency provisions with respect to prudence concept if needed. Taking account of cryptocurrencies rate volatility and temporary character of fluctuation, provisions can play significant role in fair and true valuation a presentation.

The Slovak accounting regulations (Amendment to the Act on Accounting and its implementing regulations) regard cryptocurrencies as short-term financial assets. For purposes of valuation and disclosure it is necessary to distinguish whether cryptocurrency was acquired against payment (for fiat currency or other virtual currency) or it was acquired by mining (Bagiová, 2018, s. 6). If cryptocurrency is acquired by mining it is initially registered on a sub-ledger account till the moment of its utilization (exchange, sale). Than it is measured at fair value in EUR. In other cases, (purchase, exchange) virtual currency is considered as short-term financial asset immediately at the moment of the acquisition (credit to virtual wallet for example). Also in this situation according to § 25 Act on Accounting cryptocurrency is measured at fair value.

Outflow of cryptocurrencies (for example because of their sale) can be measured by FIFO or weighted average method, similarly as in the Czech Republic. When closing the books, it is not required to revaluate cryptocurrencies held by fair value, resp. market value (§ 27 Act on Accounting). Exchange differences incurred when converting virtual currency to EUR are recognized as either financial expense or financial revenue. Fair value of virtual currency is defined in § 27 Act on Accounting as

market value achieved on public market at the day of transaction realization in a way selected by unit for given kind of cryptocurrency. Trávnik (2018) recommends to create internal directives and specify a way of fair value determination. The author (2018) finds aggregation of exchange rates as the most secure way of fair value determination. In fact, this is a similar method as that used in the Czech Republic in the case of revaluation.

In Germany cryptocurrencies are disclosed either as the long-term intangible assets or other receivables (when they are held till one year) and evaluated at their costs (Mazars, 2019). It is in accordance with HGB (§ 255). Valuation at acquisition cost is used when cryptocurrency is obtained as payment means when selling goods or rendering services, exchanging virtual currency to fiat currency, and converting one cryptocurrency to other. Cost of acquisition in German procedures is defined similarly as in the Czech ones. It consists of purchase price and relating expenses consumed in relation to acquisition, for example cryptocurrency exchange fees.

Mazars (2019) underline that payments in virtual currency for sale of goods or services should be treated as barter trade – delivery of asset (cryptocurrency) for a certain counter-value which is in accordance with the view of BAFIN (2013). The acquisition cost of bitcoin obtained by means of exchange, measured according to time value of delivered goods or services, must not exceed time value of bitcoin received.

In the case of mining a new unit of cryptocurrency should be measured in cost of production (§ 255 HGB). Generally, to the cost of production consumption of material and services used to produce, enlarge, or significantly improve assets should be encompassed. To cryptocurrency mining expanses mainly consumption of energies or expenses connected with hardware utilization could be covered (Kirchbaum, 2017).

To compare stands of three selected EU countries with approach of IAS/IFRS we can utilize an agenda decision concerning holdings of cryptocurrencies published at meeting of Interpretation Committee in June 2019 (IFRS, 2019). As for nature of a cryptocurrency, the Committee stated holding of cryptocurrency meets the definition of intangible asset according to IAS 38. The Committee further remarks when cryptocurrency is held for sale in the ordinary course of business IAS 2 Inventories should be applied to them. If IAS 2 is not applicable an entity should apply IAS 38 Intangible Assets to holding cryptocurrencies. It follows that used valuation base depends on cryptocurrency disclosure. If it is treated as inventory, the initial disclosure should be measured at cost of acquisition or net realisable value (with the exception of brokers). If cryptocurrency is regarded as intangible asset, it should be measured initially at cost of acquisition and consequently revaluated by selected valuation model.

As our analysis suggests The Czech and the German attitude to cryptocurrencies evaluation is similar and partly also closer to IAS/IFRS interpretation. Though cryptocurrencies are disclosed in different items of financial statements (inventories, long-term intangible assets or even receivables), they are initially disclosed at cost of acquisition. The Slovak procedures comes from disclosure of cryptocurrencies as the short-term financial assets and so require to evaluate cryptocurrency at fair value.

Conclusion

This paper is focused on comparison of valuation techniques used for cryptocurrencies disclosure in financial statements. As a research sample the Czech Republic, the Slovak Republic and the Federal Republic of Germany were chosen.

Our analysis suggests that disclosure of cryptocurrencies in financial statements differs among the research sample countries. Therefore, also used valuation bases differ. The Czech Republic and the Germany evaluate cryptocurrency initially at cost of acquisition while the Slovak Republic uses fair value. The Czech and the German access seem also closer to IAS/IFRS interpretation. On the other

hand, it seems, the Slovak attitude reflects real characteristics and functioning of cryptocurrency in practice.

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Wine Business Models in The Slovakian Tokaj Region

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Abstract

The authors tackle a problem of the experience marketing applied in wine business models successfully. From the theoretical point of view, it has been used the meaning field concepted as the original authors' view toward satisfactory experience at a winery. Because due to the experience marketing we should consider a wine business model as organizational capability ready to resolve emerging customer related issues in a friendly, creative and humanistic way. The shadow customer perspective was applied as a leading method of detection of tangible (infrastructure) and intangible (relationship and atmosphere) elements of wine tourism service experienced in three analyzed wineries from the Slovakian Tokaj region. Particular attention was put upon: professional and friendly wine visits, wine tours, wine tasting; qualified wine education and conversations; family-style and boutique hospitality, service flexibility in resolving emerging customer related issues.

Keywords: Wine Business Models, Experience Marketing, Wine Tourism Experience, Tokaj Region

Introduction

The main aspect of identifying a business models is to get a picture of consumer perception over company products, services and organizational process. This perceivable interaction between consumer and company is known as a consumer experience (Gentile, Spiller & Noci, 2007). For the sector of wine services delivering an authentic wine experience is one of the main winery's business characteristics since its success depends not only on wine production prosperity but also on wine tourism services (Hołodnik, 2017), e.g. wine visits, wine tasting, vineyard tour, wine education etc. Thanks to the latter a wine experience has become an interesting object of the experience marketing. According to this approach, each consumer experience is a composition of short-live, unrepetitive and ephemeral impressions, emotions and sensory feelings imbued in a moment of being in an interaction (Holbrook, 2006). So, a co-creation of consumer field of experiences in the wine service delivery was named by the authors a meaning field. Therefore, the main focus of this paper is to present the differences between meaning fields of the winery business models identified in the Tokay Region (on the Slovakian side).

Wine Business Models – Theoretical Background and Problem Formulation

Classically, consumer experience is a predominant unit of value creation process (Homburg, Jozić & Kuehnl, 2017). Its main managerial function is to link the tangible with intangible elements of consumer perception, which in wine tourism are expressed by wine production and wine tourism respectively (Figure 1).

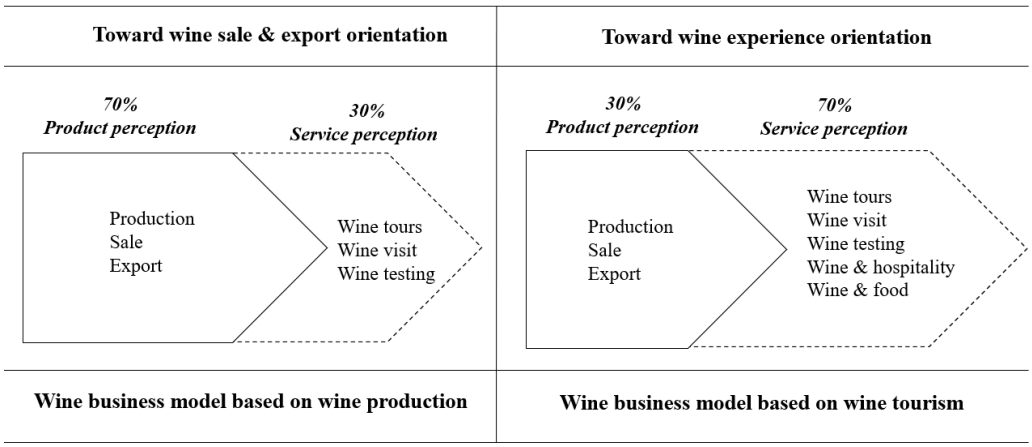

Fig. 1: Orientations of the wine business models

Source: authors' own elaboration

The model from the left side of the Figure 1 says that the relationship of wine tourism and wine industry is predominated by the latter. The business model ontology is constructed on the demand principle based on wine profiling that targets the most profitable wine drinkers' markets (Becker 2013). This ontology favors wine sale & export rather than delivering a wine experience in-home. Wine drinkers' expectations and requests are more significant than wine tourists, thus, the central interest of a winery is to develop value creation process related with wine production, and in the same time, having reduced interest in improving wine tourism facilities and services, which then play a supporting role of wine promotion.

On the contrary, there are wineries, for which wine tourism is a supreme aspect of business architecture (Hall, Sharples, Cambourne & Macionis, 2002). This position in the wine business model (Fig 1 – the right side) means that wine service design dominates over wine production in a consumer's experience perception (Stickdorn, & Zehrer, 2009).

Nevertheless, a decisive element to indicate which logic is applied to the wine business model is a consumer experience process (service or product delivery). This is because while having been immersed in a winery experience field the emerging interactions with its staff and environment can be crystalized (Figure 2).

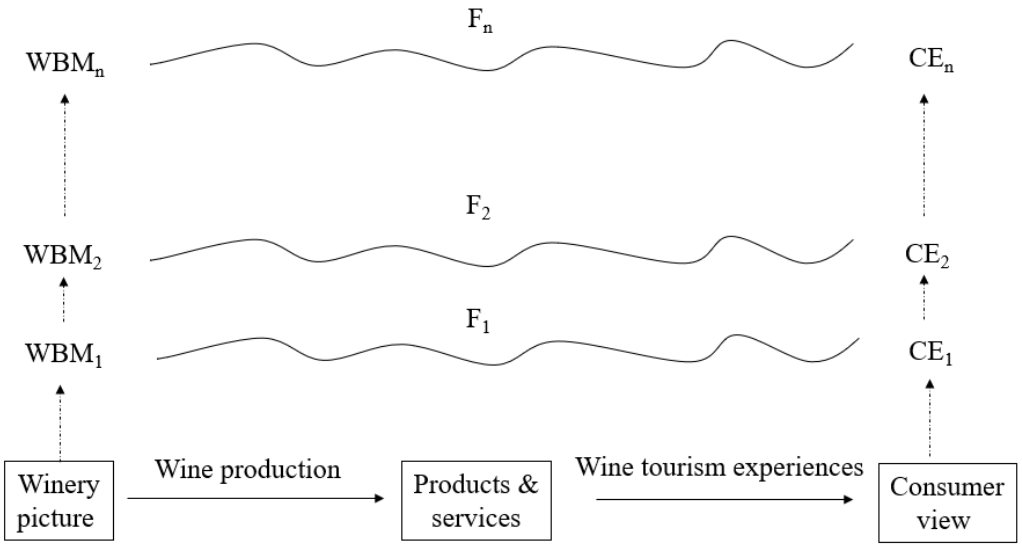

Fig. 2: Winery business models reflected in a concrete consumer's eye view

Legend:
WBM_{1-n} – winery business model
CE_{1-n} – consumer experiences at a winery
F_{1-n} – flows (of interactions with a winery's staff and environment)

Source: authors' own elaboration

In practice, especially in the field of impression marketing (referred as the experience or engagement marketing in the literature), consumers perceive through ideas, imaginations, expectations, feelings and projections of future or past experiences. But these, mostly psychological artifacts (impressions), have a very floating nature (appearing as inimitable, unrepeatable and changeable values), and flow as long as a consumer experience lasts.

For that reasons the following conclusion can be drawn out: the business model is an abstractive creation of intermediate and/or direct value flows between a winery and a consumer. Because the consumer imaginations as well as product and service delivery experiences are the drivers of value creation process (Figure 2).

To sum up, catching a dynamic picture of the business model is about finding and diagnosing its floating reflections in the consumer's perception through the content-based products and services experiencing. So, the key premise of this research is to depict a consumer's perception of the wineries' business models in Tokaj located on the Slovakian side of the region. In other words, the aim is to draw a comparison between the company's delivery of the product or service and the consumer's perceptions of offered experience.

Slovakian Tokaj Region – Research Aims and Method

As has been established above, business models can be constructed from the consumer's point of view and determined by specific parameters and characteristics that were crucial to the consumer's impression making process and value system. The authors propose to define and will further on call this process 'meaning field'. It is the main unity oriented toward analyzing the capabilities of the Slovakian Tokaj business model as an authentic terroir product (Spielmann & Charters, 2013) applied in the local wineries' identity. Therefore, the research was conducted by the mysterious-expert tourists that stayed for several days (around a week) in the region in order to eliminate the short-term perspective and limited knowledge of overnight stayers or one-time tasters.

It should be mentioned, however, that ordinary customers may not keep a wine business model in mind when engaging in their consumer experiences (Santos, Fernandez, M. C. & Fernandez, A.G., 2006). It would be unreliable to rely on such a consumer's individual impressions. Therefore, a professional researcher should be involved to conduct analysis of the cognitive aspects of the consumer's perception within the scope of the product or service experience.

So, each tourist's winery interaction in Tokaj that possesses some value, either positive or negatively, affecting the expected experience is included to the meaning field. That is quite a complex approach, because regards wine tourism management generally (Getz, 2000), as well as a particular aspect of wine experience co-creation (Ben-Nun & Cohen, 2008), e.g. wine attractions, wine festivals, wine testing, wine and gastronomy, tourist motivations, wine production etc. In this research, we propose to look upon wine business in a wider sense, so in a context of the whole tourist experience field (thus called the meaning field), so that the remarkable tourist experiences become fundamental for the construction of the business models of wineries. Therefore, a set of different experiences gained from each visit at Tokaj's wine producers, have created specific meaning fields.

But before presentation of the meaning fields of business models of research wineries, firstly it is worthy mentioning about Tokaj and its wine profile in general, which is shared across all wineries in the region (common meaning field).

The first research aim was to identify the Tokaj's common meaning field that refers to the macro scale of its recognition as a wine region. For foreign tourists, who are unfamiliar with the European wine map, it is difficult to conceive Tokaj as two-portioned regions between Slovakia and Hungary, rather they might think of it as the entirely Hungarian. And from this historical perspective they are right in doing so, because throughout most of European history, Tokaj belonged to the Hungary and subsequently to the Austro-Hungarian Empire. But after First World War it was shared by two countries Czechoslovakia and Hungary (today over 6.000 ha of vineyards belong to Hungary in comparison to only 900 ha on the Slovakian side). So, the worldwide fame of Tokaj has been gained by the Hungarian Tokaj. Therefore, it is very difficult for Slovakian wine producers to create their own identity of the business models based on the "Slovak Tokaj" image. This is why their business models had to be re-created by wine producer through recalling the local history, it's values, symbols, and traditions, which all together might reconstruct a different identity than Hungarian side does.

The Slovak Tokaj wine region is identified by a range of very unique features:

- possibility to grow grapes for naturally sweet wine,
- grapes are left on the bushes to become overripe and in favorable years become also *cibébs* (grapes covered with the specific mold called *Botrytis cinerea*, which give Tokaj wines their inimitable taste and aroma),
- specific climate for growing *cibébs* (mist in the morning and sun within day),
- at least two year ageing in the famous tuff cellars (where the specific mold easily spread around, covering walls, bottles, holy figures etc., tuff cellars are considered to have the best conditions for wine keeping: all year long stable temperature, old wines laid in quiet and locked quarters let them mature in peace).

From a wine tourism point of view worthy of note are the following attractions[1]:

- historic tuff cellars: dated from around XIII centuries (offered mostly in Velká Tŕňa and Malá Tŕňa),
- variety of -the- picturesque bike routes: called *cyklotourism* or *cyklotrasy*- signing system of info-maps in the cities, tourism information system on website: tokajregion.sk and trade mark: 'Tokaj is the only one' are all the results of the Swiss- Slovakian project initiated by local department of tourism in cooperation with University of Lucerne),
- variety of scenic walking trails: beautiful walking paths around wineries, observation tower in Malá Tŕňa, wine museum in Trebišov, statue of Saint Urban in Čerhov),

[1] https://tokajregion.sk/en/explore-tokaj/

- access to historic and cultural sites: Greek-Catholic and Roman-Catholic churches located in all wine cities, Julius Andrassy mausoleum in Trebišov).

As for the second research aim was to detect the individual meaning fields of Tokaj wineries, so the investigation of mysterious customer was conducted in the most significant wineries located in Slovak Tokaj region, these are:

- J. & J. Ostrožovič winery (Velká Tŕňa),
- Macik Winery (Malá Tŕňa),
- Tokaj Company (Malá Tŕňa).

Result presentation. Warm-eyed meaning field – case study of 'J. & J. Ostrožovič Winery'

The meaning field of the tourists has been divided into tangible and intangible elements of value creation process. The first one represents facility potential of the analyzed winery that attracted tourists and are dedicated to carrying out professional and friendly wine service. On the other hand, the intangible values outlined the key interactions between researched winery and tourists. The Ostrožovič Winery was the first identified business model, which from the tourists' experiences point of view can be called 'warm' - warm-eyed meaning field (Figure 3).

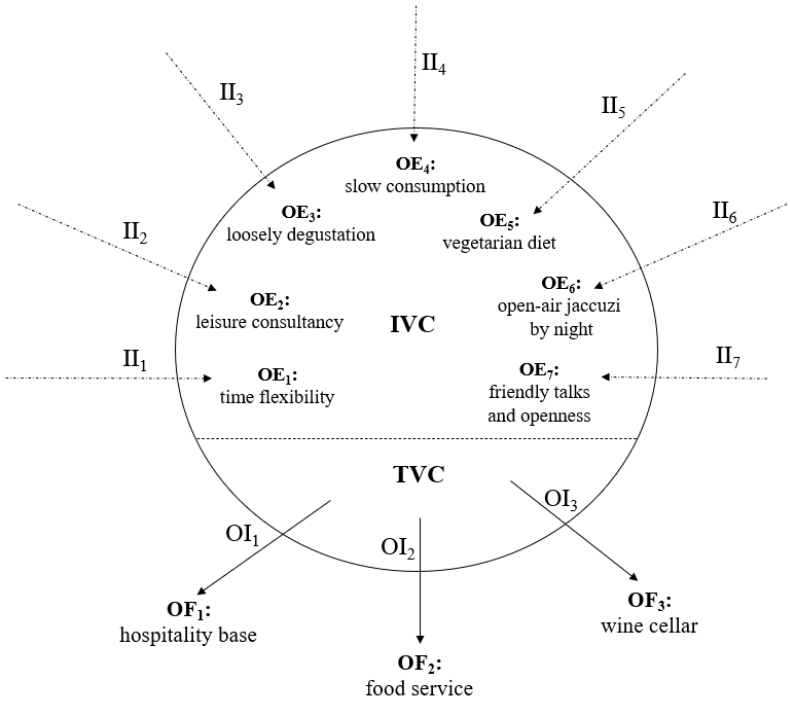

Fig. 3: Tourists field of experiences in the 'J. & J. Ostrožovič Winery'

Legend:
IVC- intangible-based value creation (for the visitors)
MVC- tangible-based value creation (for the visitors)
OF_{1-3} – offered facilities (related with infrastructure potential)
OE_{1-7} – offered experiences (related with service delivery)
II_{1-7} – inner interactions (inside the meaning field)
OI_{1-3} – outer interactions (outside the meaning field)

Source: authors' own elaboration

That is mainly because their stay there was characterized by the following experiences (Fig 3):

- inward orientation (restful and relaxing stay),
- comfortable atmosphere (high individualization, freedom in choices),
- tranquility during daily work hours,
- slow life in service (slow consumption, recreation etc.),
- spontaneous events arrangement,
- possibility of a long stay in winery house (more than 7 days),
- every day is "open" (loosely and adaptable in planned activities),
- experience co-sharing between owner, staff and tourists,
- long wine celebrations,
- self-service kitchen availability (e.g. tea, coffee, wine or small snacks between breakfast and dinners),
- positive and 'healthy' attitude of owners toward competitors (lack of a hostile attitudes towards nearby located wine companies),
- customer service problem resolving (making extraordinary wishes possible).

In the warm-eyed business model of Ostrožovič Winery the tourists felt very comfortable mainly because of the service delivery style was: very open, flexible, loosely arranged, heartful, kind and much personalized. The lady who prepared the daily breakfast was immensely kind and creative in tending to the needs of the tourists' less conventional dietary requirements (both were vegetarians). The traditional Slovak and local cuisine are based on meat; therefore, it was extremely difficult and unusual for her to offer a different meal creation.

Another reason why this meaning field is referred to as 'warm' is because of the hospitality base and the style of wine sale. All business processes are undertaken with the high level of respect toward the tourists' individual lifestyles and daily rhythms. Nothing is imposed on the daily structure of a client's activities or taken for granted. This approach makes for a comfortable and relaxing experience.

The staff emanated a very positive attitudes (willing to help, inquisitive about details and requirements), providing tourists with their own space and exuded happiness that also strengthened the whole atmosphere of a familiar and 'homely' stay (understanding of tourists' problems, nice and informal conversations).

Cold-Eye Meaning Field – Case Study Of 'Macik Winery'

The 'cold' meaning field diagnosed within the Macik' business model (Figure 4) is mostly a result of the commercial & selling orientation. It was very noticeable by the individual tourists and probably would not be by some groups or business client. The food service is only available for the groups, meaning that if you want to participate in degustation and afterward stay for -a- dinner, it is quite complicated unless you are an important client.

Wine shop design is very modern in comparison with the invitatory 'Tuscany' style in Ostrožovič, so it can be described as stylish, minimalistic and with predominantly 'whitish' features. The quality of service was perceived by tourists as medium. Mostly because of the inexperienced and quite rotatable staff (e.g. it was the third month for the young lady who was working there and she was in charge of the degustation), but also because of their staff's perceived lack of being integrated with the company (e.g. the young lady did not come from the village, neither did the girls from service and they appeared to make the owner nervous when the time of closing winery was coming up). Besides the owners and members of the winemaking family, nobody was able to take care of the business image and customer relationship management.

The call to confirm the booking before the visit was very formal and put the tourists in 'either-or' situations (visit winery on very strict rules, otherwise it is impossible). So, the tourists had to change plans and adopt to the service rules, without any possibility to achieve 'win-win' results. Therefore, no time and schedule flexibility were permissible, although the visit was during the 'out-of-season' period for the winery.

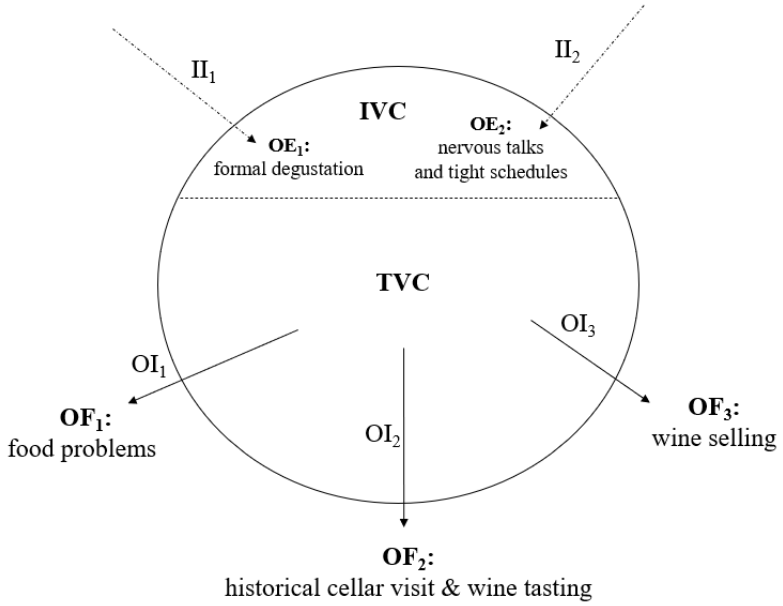

Fig. 4: Tourists field of experiences in the 'Macik Winery'

Legend:
IVC- intangible-based value creation (for the visitors)
MVC- tangible-based value creation (for the visitors)
OF_{1-3} – offered facilities (related with infrastructure potential)
OE_{1-7} – offered experiences (related with service delivery)
II_{1-7} – inner interactions (inside the meaning field)
OI_{1-3} – outer interactions (outside the meaning field)

Source: Authors' own elaboration

Regarding the winery's features with the tangible values one must definitely include the medieval wine cellar, compatibility of styles between wine house and rooms, as well as the creative offers possible to arrange up on the consumer's request (e.g. paragliding, river trip, bicycles, baths in barrels, agritourism works).

The short and rapid interview with the owner and manager (she was in a rush because of the approaching closing hours) was carried out in a formal business style with no attempt to build an informal relationship with the tourists. It confirmed that wine and service selling is the key competence of the winery, supported by the food and tourism offers.

Local-Eyed Meaning Field – Case Study Of 'Tokay & Co.'

Tokay Company is the most locally rooted producer in the Slovakian Tokay region, inheriting after the former state company the greatest wine cellars and distribution network (Figure 5).

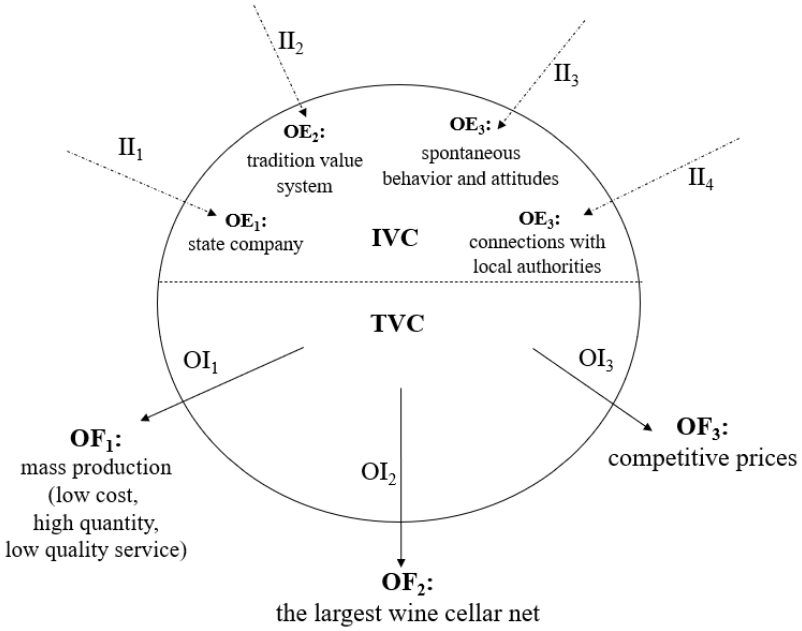

Fig. 5: Tourists field of experiences in the 'Tokay & Co.'

Legend:
IVC- intangible-based value creation (for the visitors)
MVC- tangible-based value creation (for the visitors)
OF_{1-3} – offered facilities (related with infrastructure potential)
OE_{1-7} – offered experiences (related with service delivery)
II_{1-7} – inner interactions (inside the meaning field)
OI_{1-3} – outer interactions (outside the meaning field)

Source: Authors' own elaboration

Tokaj & Co. is the only wine producer that after commercialization kept a networking structure of ownership. There are five, unknown stakeholders and among them one possesses the greatest share. What was identifiable for tourists was that they were neither personally nor through family connected with the Slovak Tokay region. Wine production is for them the most important business field, which is profit oriented (focusing on a relatively good price to quantity ratio), thus, from a tourist's point of view it is dominated by the tangible-based experience.

Most of the intangible experiences were created spontaneously, which was sometimes a bit awkward for tourists who were not informed of the clear principles of service organization, especially of cellar visiting, wine ordering and limited ways of payments. There was also observed a significant number of rifts in HR investments and staff education, which made tourists disoriented in the service processes (e.g. cellar visit was combined with the degustation due to the major assistance and phone calls, otherwise it would be difficult to catch anybody from the winery, the service lady was apparently interrupted from her other home activities in order to open the wine cellar and wine-house etc.).

From all three researched producers, Tokaj & Co. cellars are rated as no 1. Dating back to the medieval times, with a large and extensive network of tunnels and the most historical cultural heritage they should be consider as having the greatest competitive advantage. Nevertheless, the quality of wine is generally lower than that of Macik or Ostrožovič Wineries. The wine bottles design is without certain idea and profiling direction, which is characteristic of a typical selling strategy aimed at anonymous customer (a quick shopper).

During the interview with the managers it was said that there are plans for a new factory investment near to the historical wine cellars. This confirms that there is a lesser interest in extending wine services facilities (wine tourism) and more importance on wine production. Currently the wine shop is located inside a somebody's private house that most probably is related to one of the owners' families.

Tokaj & Co. is supported by the local authorities and has favorable connections with local restaurants and hotels. In all nearby restaurants (e.g. Aqua Maria, Kolonia and more) only this company's wines were offered in the wine card to accompany your meal, while two other producers were hardly met. So, this can be considered as favoritism and unfair competition.

Conclusions and Discussion (Confrontation of The Wine Business Models in Tokay)

The differences in business model design of wine producers in the Slovak Tokaj region offers a diverse range of individual styles, experiences and types of wine tourism options. For long-term stay (a week or longer) the most suitable infrastructure as well as service possibilities were exhibited by two wineries: Ostrožovič and Macik (Table 1).

The competitive advantages shared by Ostrožovič and Macik only vary in the details of the consumer experience and target market profile. For those, who prefer more tranquility, freedom, space, flexibility and have more stringent dietary or health requirements, Ostrožovič seem to be ideal. But the ones who are interested in wine field working or search for a more active form of wine tourism, Macik winery has more to offer.

The business model of Tokaj & Co. turned out to not have the basic services on offer that tourists seeking for a longer staying or time spending. However, it is definitely the winner of the Tokaj region in terms of wine cellar heritage and worthy of booking a wine visit.

This research has shed considerable light on the tourists' experiences of a weekly observation and participation in the Slovak Tokaj wine route. The results are based on meaning field research techniques that are ready to explore after a one-visit testing and do not need to be verified through a repetitive data collection.

Table 1: Tokay' business models – experience confrontation

Time spending offer	J. & J. Ostrožovič	Macik	Tokaj & Co.
1. Bed & Breakfast	✔	✔	
2. Restaurant	✔	✔	
3. Wine cellar	✔	✔	✔
4. Wine tasting: **a. groups** **b. individuals**	✔	✔	✔
5. Wine & dine	✔		
6. Wine school	✔	✔	
7. Wine recreation		✔	
8. Health	✔		
Total:	*7/8*	*7/8*	*2/8*

Source: authors' own elaboration

Summary

Consumer experiences understood as problem resolving skills of a company are the main constituents of the modern winery's business model according to the experience and engagement marketing approach. To find them out one has to be immersed in a value co-creation process (meaning field), by which tangible and intangible organizational capabilities can be authentically experienced. The analysis that assessing the service facilities and experiences of three wineries in the Slovak Tokaj region have exhibited their different business model's orientation within the scope of tourist's profiles, wine service delivery & wine sale strategy. The key competence of the Ostrožovič Winery's meaning field manifested as the relaxing stay Tokaj's combined with wine exploration, while the Macik Winery's one is directed on sporting activities for tourists and food design for professionals. In both of them wine facilities and production scale were on the comparable level but the service design was varied. The last visited winery with the largest production and lowest quality wine service was the Tokaj & Co. that can be also distinguished for the most historical tuff cellars, where tourists can feel like in an undergrounded labyrinth.

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Sustainability In Tourism And Hospitality: Trends And Challenges

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Abstract

Tourism and hospitality are increasingly recognized as one of the main impulses of economy, both in the European context and worldwide. The concept of sustainability has been widely debated socially and in the context of scientific research for the past two decades. When applied to the hospitality sector, investigation towards this topic is more recent and raises several issues that can be seen as challenges but also as sources of competitive advantage. In this article we seek to explore the concept of sustainability in the context of hospitality, making a theoretical review of the main lines of research and launching clues to those that may be the future lines of investigation in this context. The digital world has come to challenge companies, approaching everyone everywhere. Challenges that extend to all levels, not only economic, but also at a relational level, since the relationships themselves, and the way in which people relate and behave, have also undergone modifications.Two examples (best practices) of sustainability in communication will be presented, in specific contexts of hospitality and tourism (in Portugal). This research presents contributions to sustainability, tourism, hospitality and communication. At the end, guidelines for the future will be presented.

Keywords: Tourism, Hospitality, Sustainability, Communication, Trends

Introduction

Sustainability is a topic that is currently being discussed and constantly adapting, since it is related not only to an ecologically correct posture and strategy, but also economically viable and socially equitable. On the other hand, it is also a very complex concept, as it serves a set of interdependent variables, from the most diverse fields and disciplines, such as cultural, business, geographic sustainability, among others, which leads to the emergence of different interpretations about this. According to Hawken (2007) sustainability "is about stabilizing the currently disruptive relationship between earth's two most complex systems - human culture and the living world. The interrelation between these two systems marks every person's existence and is responsible for the rise and fall of every civilization" (Hawken, 2007, p.172). One of the theories on which the concept of sustainability rests relates to those who are its pillars of action, on which the concept rests. As previously mentioned, sustainability bases its action

on three aspects: economic, social and environmental, which are the so-called pillars of sustainability as it seeks economic prosperity, environmental quality and social integrity.

Therefore, the importance given by the media to the theme of ecology, sustainability has led to a growing concern among the population. This concern leads to greater environmental awareness, which ends up influencing the purchase, that is, they verify whether a product is ecological and sustainable. Consequently, companies need to act immediately to respond to this demand, which can use this factor as being differentiating and competitive. In this sense, Peneda de Oliveira and Sousa (2019) refers that communication professionals increasingly feel the challenge of integrating messages focused on corporate responsibility in their communication strategies, in a serious and creative way. New forms of communication have been modified and developed, in a world where information is made available in record time, it is important to know how to communicate and how to do it in a transparent perspective (Malheiro et al., 2019). Thus, the following sections will present a theoretical framework on the theme of sustainability and its relationship with current trends in online communication. Two (Portuguese) examples that illustrate the concern with sustainability (particularly in combating the new coronavirus in tourism and hospitality) will be presented and discussed.

Theoretical Background: sustainability and communication trends

Sustainability does not only comprise environmental issues, an idea that is in some way rooted, being much more comprehensive. This seeks that economic development occurs in coherence with environmental preservation and that allows the eradication of world poverty, based on a set of measures that respect nature and society. The tourism industry has the capacity to generate the movement of millions of people and, consequently, contribute to the entry of thousands of foreign currency in tourist destinations, which enable its development. However, uncontrolled growth in tourism can also cause serious damage, such as environmental and cultural degradation, the destruction of fragile ecosystems, the appearance of pollution, the generation of conflicts between tourists and the local population, overcrowding in receiving communities, among others (Hopkins, 2005). And it is due to these harms caused, and also for global well-being, that tourism must adopt sustainable measures, which will act as conservation tools and allow, for example, the preservation of important natural areas and wildlife, as well as as well as archaeological and historical sites; more efficient management of resources; improving the well-being of the community, through local investments and concern for its long-term sustainability, among others (Verbeke, 2000).

As previously mentioned, the concept of sustainability is based on three pillars: economic, environmental and social sustainability, which are considered fundamental for its development. In this way, three pillars were also defined for sustainable tourism, in order to demonstrate exactly to the tourist agents and other stakeholders what is intended with its practice. Regarding the economic pillar, tourism being an important activity that energizes the local economy, its main objective is to ensure the sustainability of operations in the long term and not its immediate profitability. In addition, it must contribute to the creation of new jobs, to the increase of income entry, both at national and local level, and above all to the equitable distribution of wealth, for example, by investing in less tourist destinations, favored, under development or not yet developed (Hopkins, 2005). The environmental pillar seeks preservation and respect for natural resources, since tourism affects and depends equally on them for the success of its activity. Thus, tourism needs to encourage the protection and conservation of these same resources and make tourists aware of the value they have, demonstrating that they are unique and that it is necessary to ensure their integrity for future generations (Moniz, 2009). Finally, the social pillar is dedicated to the conservation of the communities' cultural and historical heritage. It is essential for tourism to maintain the authenticity of these values and local customs, as it is also here that the attractiveness of various tourist destinations resides.

For instance, ecotourism is going to continue to expand and grow in importance as it is an essential strategy for the global plan of sustainable development. It has its base on the fundamental principles of sustainable tourism, integrating itself in the own development of this type of tourism as it is a

sustainable development tool that offers long-term social, environmental and economic benefits and given the proper priority in the economic development of the country (Hawkins and Lamoureux, 2001).

Thus, the latter must, for example, foster respect for local religion or culture, invest in the development of trade in local symbols, appeal to tourists for their responsible behavior, among others (Hopkins, 2005). In conclusion, it can be said that tourism is considered as one of the main agents responsible for major transformations that occur on a global scale, such as, for example, the emergence of new forms of displacement and new technologies, the transmission of cultural values, among others. But today the new challenge is the congruent integration of these three pillars, in order to be able to assist economic development, improve the quality of life of tourists and local communities and protect the environment and cultural heritage, all simultaneously. To carry out a sustainable tourism policy, stakeholders play an important role, since they both influence and are influenced by the activity of other tourist organizations, and their interrelationship is essential for the inclusion of sustainability in tourism. One of the sectors of tourism where this issue has been gaining relevance is hospitality. Legal motivations, market pressure, the sophistication of an increasingly infamous consumer and oriented towards sustainability issues have led companies in the sector to develop an increasing number of sustainability policies. In turn, marketing has proved to be an important tool for organizations in the struggle for this goal, which seek to associate the concept of sustainability with the brand it represents. Thus, sustainable marketing emerges, which uses traditional marketing methods in an attempt to assess the behavior of its potential customers, and to design a sustainable product that is suitable for them (Sloan, Legrand & Chen, 2009). It is in this sense that the following literature review seeks to systematize the conceptualization of sustainability in this context. In the end, the lines of action and challenges that the sector faces in this field will be identified and that may constitute a threat to its survival or an opportunity for the acquisition of competitive advantages.

Towards a comprehension of sustainability in tourism and hospitality

Tourism is increasingly recognized as one of the main impulses of economy, both in the European context and worldwide (Ferreira & Sousa, 2020). As a consequence of this expansion comes economic growth, increases in employment levels, social progress and the protection of natural resources when used with moderation (Pinto da Silva et al., 2019). Therefore, it is imperative in sustainable development to promote the satisfaction of the basic needs of the host community, favouring access to all opportunities that promote the well-being of society and facilitate its aspirations to a better life, without compromising coming generations (UN, 1987). So, sustainability should have a long-term perspective, avoiding the overexploitation of natural resources. At this point, we seek to address the way in which literature has focused on the theme of sustainability in the hotel industry, making reference to the measures that can be adopted by tourism agents to have a more sustainable enterprise. In addition, the competitive advantages arising from sustainable practices will be addressed, as well as some initiatives already put into practice to establish sustainability in this area. In hospitality industry where competition is increasing every day, it is necessary to create brand-new services or offer renowned services via diversified ways, to step forward from competitors. In this regard, it is important for companies to ensure that every innovative service should be sustainable (Ozturkoglu, Fari, & Saygili, 2019). In a recent investigation, Nair e Choudhary (2018), point out a set of social dimensions on which the concept of sustainability in hotels rests. The focal area of this research is 'social sustainability' and it comprises several aspects such as: social equity, liveability, health equity, community development, social capital, human rights, labour rights, place making, social responsibility, social justice, cultural competence, community resilience, and human adaptation as referred to the hospitality industry (James et al., 2015).

The hotel industry is considered as one of the main industries that has a negative influence on the environment, since it produces about 1 kg of waste, per night and per person, and around 180 kg of carbon (CO2), for each square meter quarter and a year. It also has a high water consumption, which averages 320 liters, per night and per person, among others (Sloan et. Al., 2009). In this way, the hotel industry has a great responsibility in adopting sustainable policies, which not only respect the environment but also promote the economy and social equity. On the other hand, it also has a greater financial capacity, than local commerce, for example, which allows it to invest in more sustainable

equipment and solutions. The strategies mentioned here are just a few examples of policies carried out by the hotel units, and there is room for the development of many others. It is up to the management of each hotel to identify the points where it is possible to improve its sustainability policy.

Sustainability policies in hospitality	Examples of good practice	Authors
Energy efficiency	Energy efficiency, type of construction, roof, lighting, air conditioning, electrical equipment	Sloan et. al. (2009); Werner (2006)
Waste management	Reduce the amount of packaging, choose environmentally friendly materials, promote good waste treatment, Choose reusable equipment over disposable equipment, use of recyclable batteries, donate food surplus	Sloan et. al. (2009); Werner (2006)
Water management	Efficiently designed distribution system that is preserved without failures or water leaks, choice of washing machines with less water consumption per cycle, use of rainwater, reuse of water, placement of flow control valves, or with aerators water, which introduce air into the water flow and reduce water consumption,	Sloan et. al. (2009); Werner (2006), Green (2010)
Hotels Eco design	Preservation of the surrounding natural and built environment, in order to integrate into the environment and not damage the predominant architectural feature, requalify degraded areas, encourage heritage conservation and even serve as a driving force for the local economy, using the sun as a natural source of light and heat, choice of materials that absorb, store and release heat have a high thermal mass and function as temperature regulators	Werner (2006), Ozturkoglu, Y., Fari, F. & Saygili, E. (2019).
Food and beverage management	Choice of local, safe, organic, seasonal foods, choice of organic wine	Oosterveer & Sonnenfeld (2012), Ozturkoglu, Y., Fari, F. & Saygili, E. (2019).
Efficient kitchen	Choosing the layout, the equipment you use and the actions of your employees.	Sloan et. al. (2009); Werner (2006)
Tourists' Awareness	Sensibilização dos turistas, promoção de comportamentos responsáveis	Belz e Peattie (2012); Sloan, Legrand & Chen, 2009; (Verbeke, 2000), Modica, L.A., Farmaki, A., Gursoy, D. & Zenga, M. (2020).

Energy Efficiency

This policy starts to be designed from the initial planning phase of the hotel project, since there are several aspects that can only be implemented in the construction phase. However, there are still several actions that can contribute to improving energy efficiency in the course of day-to-day activities, such as, for example, the purchase of high energy efficiency equipment or the appropriate choice of air conditioning parameters. Thus, the combination of these two factors, associated with a choice of mostly renewable energy sources, will maximize the overall sustainability of the building in the long term.

Waste Management

As mentioned above, the hotel industry is an industry that produces a large amount of waste, and as such it is essential to have a good management of it. Any industry concerned with the management of its waste must implement the policies known as the rules of the 3 R's, that is, reduce, reuse and recycle (Sloan et. Al., 2009). The reduce rule expresses the need to choose resources that minimize its impact on the environment and use only the minimum amount necessary for the hotel's operation, eliminating any expense that is not necessary. The reuse rule means that, whenever something is liable to be reused, once or several times, before being disposed of as garbage, it must be reused. The third rule, recycling, which is currently much debated, implies a differentiation between the different types of waste, so that it can be reused or correctly disposed of (Sloan et. Al., 2009). Good waste management, in addition to a better image, can also bring an additional economic advantage to the hotel, either through the savings obtained by eliminating waste, as well as gains obtained through the sale of used oils.

Water Management

The management of water consumption in hotels is a sensitive topic since restrictions on consumption could result in dissatisfied customers, but on the other hand water is a limited asset and as such should not be wasted. Although more than half of the water consumed in a hotel comes from the rooms, there is also a large amount that is used in the rest of the hotel's activities, such as the kitchen, laundry and common areas. Webster (Sloan et. Al., 2009) warns of the fact that any measure of water saving should not negatively affect neither the comfort of guests, nor the cleanliness and hygiene of the hotel. However, there are several measures that can be implemented and that contribute to reducing the consumption of this resource, without however neglecting the well-being of guests or the hygiene and general cleanliness of the hotel. There are measures that are more conventional and easy to implement, but also more innovative and complex concepts, among which measures can be highlighted (Green, 2010):

Guests can use the same towel and sheets for more than one day, if they are in good condition for use, in order to reduce the consumption of water used for washing. Thus, it is up to the hotel to raise awareness of this fact, and the vast majority choose to put a pamphlet in the room to explain this situation, and to ask the customer to place towels and sheets on the floor when they want them to be changed. However, in more luxurious hotels, this measure may not be well accepted. In addition to these measures, it is necessary to raise awareness and train all hotel employees, in order to also guarantee water savings in the normal day-to-day activities of the hotel. Thus, since water is an indispensable resource for man's survival and is disappearing due to its misuse, it is crucial to quickly adopt measures and attitudes that reduce its consumption. Thus, since the hotel industry is a sector that has a high consumption of water, it is of utmost importance that it also practices actions that allow the sustainability of water, having at its disposal a series of equipment and ways to achieve this. .

Hotels Eco Design

During the construction phase of a hotel and throughout its life cycle, there are several factors with a negative effect on the environment, such as the consumption of water, energy and fossil fuels, as well as emissions to the environment. However, due to technological advances and greater environmental awareness, it is possible to significantly reduce CO2 emissions and the environmental impact of building a hotel, through sustainable design or eco design. During the projection period of the hotel, it must take into account the preservation of the surrounding natural and built environment, in order to integrate into the environment and not harm the predominant architectural feature. In addition, depending on the construction site, the hotel will be able to requalify degraded areas, encourage heritage conservation and even serve as a driver for the local economy.

materials from local and environmentally responsible suppliers. To conclude, it can be said that the hotel sector has every interest in resorting to sustainable construction because it contributes to a better image of the hotel and, at the same time, it is economically advantageous. Therefore, despite requiring a larger initial investment, the option for this type of construction is largely offset by the higher

profitability in the medium and long term, in addition to increasing the life cycle of the building itself and reducing the investment risk.

Food and Beverage Management

More and more people are aware that the use and production of sustainable food and beverages also contribute significantly to global sustainability, with the hotel industry being an important driver due to the numerous meals it serves over a year. In this way, the author Walker (2012), defines sustainable food and drinks as the use of local products, since this way companies are able to reduce transport costs and contribute to the local economy. They must also pay attention to the entire production process, in order to guarantee their energy efficiency and a low CO2 emission. However, Sloan et. al. (2009) complements his definition with the fact that sustainable food production must necessarily respect natural resources, that is, it cannot consume these resources in an exacerbated way and that jeopardizes its regeneration time. The author even classifies sustainable foods and drinks as those that: are healthy and nutritious for consumers; provide a hygienic and safe environment for their producers and retailers; respect the limits of environmental resources and the safety and health of animals; and support for the local economy and culture, through the use of products and raw materials from the community where they operate.

Efficient Kitchen

In a hotel, the kitchen is considered to be one of the areas that expends the most energy, this is due to the fact that, for the most part, there is an energy inefficiency in the process of preparing food or in the storage equipment. However, this consumption can be reduced to a third, through the installation of efficient energy equipment and the correct training of employees, for example (Sloan et. Al., 2009). In this way, we can say that there are three main ways to ensure energy efficiency in a kitchen: through its layout, the equipment it uses and the actions of its employees.

Tourists' Awareness

There are several hotels that go further than achieving their energy efficiency to be considered sustainable, they also seek to attract the attention of tourists to the central need to adopt sustainable practices and attitudes. In this way, several initiatives started to emerge organized by hotels that seek exactly this awareness among tourists (UNEP & UNWTO, 2005). One of these initiatives consists of organizing guided tours around the hotel's surrounding space, in order to involve guests in the local community and the environment and to demonstrate the importance of preserving its cultural and natural traits (Lockyer, 2007). On the other hand, the organization of social events that support certain causes or charities, is a very sensitizing and wide-ranging action, since through the media they can easily spread the message and capture the attention of consumers, as for example, donate funds resulting from a particular event. But there are still small actions that can be developed by a hotel in the course of its activity that contribute to sensitize tourists, for example, through the placement of pamphlets in the rooms or in the various spaces of the hotel, that inform them about the sustainable activities that the hotel develops and the benefits they produce, in order to demonstrate its contribution to a better world and to encourage tourists to do the same (Lockyer, 2007). Thus, it can be seen that the sustainable initiatives carried out by the hotels are beginning to appear, although in small numbers, and that they have come to understand the need for their realization, as they are a sector that has direct contact with tourists and is easily manage to influence them.

According to Jackson (2006), consumers are the crucial element to achieve sustainable consumption, which the author defines as the use of products and services that satisfy the basic needs of society and provide him with a better quality of life, but at the same time, that minimize the use of natural resources, toxic materials, waste production and pollutants. That is, if consumers adopt sustainable habits, these attitudes will influence companies to create equally sustainable products and even acquire a similar attitude (Sloan et. Al., 2009).

On the other hand, practicing sustainable consumption also implies that each member of society carries out activities that contribute to this, namely the reduction of energy, water and waste consumption; the recycling; the use of public transport to replace private ones; consumption of local food; support for environmental protection projects; among others (Sloan et. al., 2009). However, there are a number of motivations that lead consumers to practice sustainable consumption that can be divided into four dimensions: personal well-being, ecology, ethics and lifestyle. To conclude, it is important to note that all consumers should seek to reflect on their consumption habits, in order not only to purchase sustainable products and services, but also to bring sustainability into their homes (Belz & Peattie, 2012).

Sustainability as a Competitive Advantage

Unfortunately, today, there are still many managers who only consider the initial investment of a venture, without checking other options that can become much more profitable in the long run, which is what happens with sustainability. A large part of the previously mentioned sustainable policies have a high acquisition value or require greater sensitivity on the part of managers, but in the long run, they are able to produce more benefits and even become a competitive advantage. Thus, according to Matias and Sardinha (2008), the adoption of sustainable measures generates mainly two advantages: cost reduction and differentiation in relation to the competition. Cost reduction is achieved through lower water consumption, more efficient management of energy and waste, among others, that is, through the reduction of waste and consumption. Differentiation occurs because, once the company offers a product or service considered "environmentally friendly" or contributes to the improvement of society's quality of life, it will stand out from the rest. In addition, this differentiation will contribute to a better reputation and, consequently, to a greater adhesion and loyalty of tourists, who are increasingly aware of the role of companies as social agents (Matias & Sardinha, 2008).

The fact that a new market segment has emerged, concerned with environmental and social issues, enhances new opportunities for the development of products and services, and, for this, companies must take full advantage of technological advances, which increasingly offers sustainable solutions. On the other hand, companies must also respect government regulations regarding environmental obligations, not only in order to subsequently avoid the cost of penalties, but in order to demonstrate their contribution to a modern and sustainable society. In short, it can be said that the competitive advantages arising from the practice of a sustainable activity result from the application of a set of measures, which require constant updating and adaptation to the new needs that arise.

Communicating with sustainability: best practices

"Haverá Tempo" - Turismo do Centro de Portugal

Turismo de Centro de Portugal launched, in March 2020, the "Haverá Tempo" campaign, called on the Portuguese to stay at home to contain the spread of Covid-19 and guaranteed that the region will be prepared to receive visitors after the pandemic. With this campaign, and according to the president of the Regional Tourism Entity of the Center of Portugal, he joined the enormous effort of the country in raising awareness and creating hope (figure 1).

Figure 1: "There will be time" campaign

Source: Turismo do Centro de Portugal (2020)

The campaign had as main platforms a video and images on social networks, accompanied by the hashtag #haveratempo, among others. The reaction, on the part of the public and followers, was quite positive, namely with regard to comments, reactions and shares through the social network Facebook. Analyzing the campaign promoted by Turismo do Centro de Portugal, it appears that the text of the promotional video states that "These are times like the ones we live in that force us to stop and then start again. Times that take away our freedom, but that also make us believe. Believe that we can, that we will win. There will be time to give wings to our dreams again, to embrace those we love, to smile without shadows". The video opens with the image of a person wearing a protective mask and follows some of the biggest tourist attractions in the region. "There will be time to start over, to travel, to run, to fly. Feel and vibrate again, with the wind, the sun, the rain. There will be time to sail and to be together again. Until then, we'll stay home. And as a whole, one, we will win". It should also be noted that under its Contingency Plan to deal with the outbreak, Turismo do Centro created a "sample" of 1,030 tourist spots, hotels, restaurants and attractions that it closely monitors. The objective was to follow the evolution of the pandemic, assess its impact on the sector almost at a minute and help find solutions.

"Estabelecimento Clean & Safe"

Turismo de Portugal will recognize companies in the Tourism sector that comply with the recommendations of the Directorate-General for Health to avoid contamination of spaces with SARS-CoV-2 (new coronavirus). Tourist Enterprises, Tourist Animation Companies and Travel and Tourism Agencies wishing to obtain the "Clean & Safe Establishment" seal must comply with the set of provisions contained in the «Declaration of Commitment» that will be available on the digital platforms of Turismo de Portugal concerning the registration of tourist companies: National Register of Tourist Enterprises (RNET), National Register of Tourist Entertainment (RNAT) or National Register of Travel and Tourism Agencies (RNAVT).

Figure 2: "Estabelecimento Clean & Safe"

Source: Turismo de Portugal (2020)

Only after companies have submitted the Declaration of Commitment on the aforementioned platforms, do they have the possibility to use the seal in question, either in their physical facilities, or in the channels and platforms for disclosure and sale. This measure, articulated with the Confederation of Tourism of Portugal (CTP) and with contributions from other associations in the sector, seeks to sensitize enterprises to the minimum procedures to be adopted and encourage the recovery of the tourism sector at national and international level, reinforcing confidence of everyone in the destination

Portugal and its tourist resources. The search for sustainability is thus operationalized through this Portuguese measure.

Final Considerations and Future Research

There is also a focus is also on the rising importance of a cared for destination image, vital for the success of every hotel unit in the different types of tourism, special relevance given to sustainable tourism.As previously mentioned, the tourism industry has the capacity to generate the movement of millions of people and, consequently, contribute to the entry of thousands of currencies in tourist destinations, which enable their development. However, uncontrolled growth in tourism can also cause serious damage, such as environmental and cultural degradation, the destruction of fragile ecosystems, the appearance of pollution, the generation of conflicts between tourists and the local population, overcrowding in receiving communities, among others (Hopkins, 2005). And it is due to these harms caused, and also for global well-being, that tourism must adopt sustainable measures, which will act as conservation tools and allow, for example, the preservation of important natural areas and wildlife, as well as as well as archaeological and historical sites; more efficient management of resources; improving the well-being of the community, through local investments and concern for its long-term sustainability; among others (Verbeke, 2000). But to carry out sustainable tourism, stakeholders play an important role, as they both influence and are influenced by the activity of other tourist organizations, and their interrelationship is essential for the inclusion of sustainability in tourism.

The current situation of tourism on a world scale brings the issue of sustainability to an even greater extent. At first sight, one might think that this has become the last concern of accommodation units that are struggling these days for survival. This study highlights the role of digital communication in changing consumer behavior in specific tourist and territorial marketing contexts. In this sense, the communication strategy used by Turismo do Centro de Portugal and by the Azores Tourism Association, reveals quite satisfactory results. The institutional communication strategy is strongly focused on social networks, in an attempt to capture the public's attention (domestic and foreign) and to convey the idea that “everything will be fine” in a “post-pandemic” scenario and that we will all have time to travel and to get to know the Portuguese tourist destination. In the present study, some real examples associated with the reaction to the new coronavirus were illustrated. The results show that online communication facilitated the interaction between the citizen / tourist and the brands, an aspect that is assumed to be very important in a context where the key is to inform, advise and prevent. The strengthening of the population's ties with tourism entities, a consequence of the messages used in the online context and the digital communication that was present on social networks. Consumers, tourists, visitors and the different generations (who also use social media more) like and appreciate the institution's type of communicational approach. This audience seems to be better able to understand the meanings of messages from publications and to understand that there is preventive work. The main focus of this initiative is to remember the importance of social detachment and “knowing how to wait” so that (in the future) everyone can again travel and spend their holidays in the tourist destination Portugal. Future studies should move towards corroborating the conclusions evidenced here, and it is recommended to use the quantitative methodology (ie questionnaire with consumers) in order to establish causal relationships between consumer behavior variables (and their relationship with the consumer). socially responsible marketing in tourism contexts). In an interdisciplinary perspective, the present study presents contributions to the area of marketing (digital communication) and tourism (with reaction to the covid-19 pandemic).

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Lexicographic and Transfer Orders in A Set of Allocations

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Abstract

Before the allocation of a predetermined number of indivisible and indistinguishable goods among agents with given claims, some boundary conditions are defined which such allocation should satisfy. If there are many such allocations, some additional constraints are necessary. The most frequent approach to solve this dilemma is choosing a specific method or algorithm of allocation, however another unsolvable dilemma emerges as to why a particular method should be chosen out of many other possible ones. This paper deals with a concept of performing the allocation by means of a compromise reached by agents participating in allocation based on the assumption that no agent or no coalition of agents can be favored. The compromise can be developed through subsequent reductions of the set of feasible allocations by maximal allocations under given relation of order, which favor at least one coalition. The identification of such allocation requires reviewing all possible permutations of agents and determining the relations of order that depend on the succession of allocation participants.
The paper analyzes two kinds of the relations of order, their properties and also how determining a given type of relation influences the reduction of the set of feasible allocations. The first type of relation are lexicographic orders which compare, in a given succession, the values of coordinates of vectors corresponding to allocations. The second type of relation are transfer orders where possibilities of relocating goods under given succession from a selected group of agents to remaining agents are considered. This relation has interesting properties, nevertheless, as shown in the paper, the methods to find its maximal elements require a great number of arithmetic operations and are inefficient given a great number of agents participating in allocation.

Keywords: Fair Allocation, Preference, Reduction of The Set

Introduction

The fair or optimal allocation of indivisible and indistinguishable goods or objects to a set of agents is a frequent and difficult problem. It emerges in many real world applications from different areas such as division of a bankruptcy estate, allocation of task to workers, choice of optimal strategy in a coalition game, and selecting electoral statute for legislative body.

In this paper models of fair apportionment of a given number of indivisible goods are considered based on the following assumption. A set of indivisible and indistinguishable goods are to be distributed among a set of agents, each of whom has got some entitlements, called also claims, which can be expressed numerically, and no monetary transfer is possible between agents. In other words, these allocations can be presented as vectors of natural numbers adding up to a given value, while the number of coordinates of vectors equals the number of agents. Moreover, it is assumed that the allocation process is centralized, that is:. it is either decided by a neutral arbitrator (or by computation), or through negotiations among agents always leading to a compromise.

One of key issues in this type of problems is how to correctly define the notion of fairness or optimality, and how to evaluate the degree of preserving it by a given allocation. Most of current papers focus on a specific and concrete criterion and a method to obtain the ensuing allocation. The strength of this approach is that is usually produces a clear unique solution, but its definite weakness is the arbitrary assumption of a concrete principle out of many possible criteria.

Literature Review

In order to avoid the arbitrariness one can proceed as follows. The first way is through the definition of a collective utility function (CUF) that aggregates individual agents' utilities. If this function is properly defined the arbitrator simply seeks the allocation maximizing the CUF. The second option is to define by means of a logical, naturally interpreted criterion, what is considered as fair or optimal. The examples of such criteria include: max-min fair share (MFS), proportional fair share (PFS), envy-freeness (EF), competitive equilibrium from equal incomes (CEEI) (Bouveret and Lemaître, 2016; Caragiannis et al., 2019; Conitzer et al., 2019; Golovin, 2005; Lipton et al., 2004; Segal-Halevi and Suksompong, 2019).

The allocation methods based on max-min fairness or envy-freeness are typically applied when preferences of agents are known and they are not necessarily equal: each player individually evaluates each good, and not necessarily in the same manner as other players. If the goods are indistinguishable and therefore the evaluations of goods are irrelevant these methods can also be applied. The similar dilemmas emerge when dealing with the area of bargaining games (Bateni et al., 2010; Goel and Krishnaswamy, 2018), cooperative matching games (Ito et al., 20160 and sequential forward selection (Padmaja and Vishnuvardhan, 2017). From many possible allocations one has to select the one that yields the most beneficial value of an objective function. If the objective function is known, then solving the problem comes down to concrete methods and it suffices to perform necessary computations. But it is not always clear how to define the objective function or the vector of pay-offs.

Barbera and Jackson (2006) and Koriyama et al. (2012) analyze the problem of selecting the electoral statute to political bodies such as the US Electoral College, the European Union Council of Ministers or the European Parliament, representing different regions, applying the collective utility function as the sum of utility functions of individual regions. Koriyama et al. (2012) assume in a simple and economically rational way that the coordinates of individual countries are positive functions with decreasing marginal values. Therefore they conclude that the optimal collective utility function is increasing and concave, hence the allocation of mandates should satisfy the principle of degressive proportionality. Correctness of such assumption can be confirmed by the analysis of the historical data regarding the composition of the European Parliament, which was elected according to this rule (Cegiełka, 2010). Nevertheless this assumption does not provide any rational argument as to which particular degressively proportional allocation should be selected. There may be many allocations satisfying the condition of degressive proportionality just like there are many increasing and concave functions. For example, there are millions of possible allocations of a given number of seats in the European Parliament among the member states of the European Union, which strictly satisfy the principle of degressive proportionality and all constraints implied by the Lisbon Treaty (Łyko and Rudek, 2013), and there are tens of proposed methods of allocation (Hamman, 2017; Dniestrzański, 2019).

Many authors introduce some additional criteria thereby allowing the unique selection of allocation or at least significant reduction of the set of solutions. These assumptions usually are contradictory. An example of such assumption is that the voters' preferences are independent random variables. This leads to the Penrose's square-root law stating that the optimal weights of individual entities participating in the allocation are proportional to the square root of their claims (Kurz, Maaser and Napel, 2017). It is worth emphasizing here that empirical research and common sense undermine the reliability of the assumption that decisions of agents participating in the allocation are independent (Gelman, Katz and Bafumi, 2004).

Another frequently applied assumption is trying to achieve proportionality of allocation in compliance with the rule that the closer an allocation is to the proportional allocation, the better are the interests of respective electoral groups represented. The conditions defining the manner of performing the allocation such as e.g. that each agent has to be allocated not more and not less than the predetermined numbers of goods -cause the feasible allocation to differ from proportional ones. Hence one has to select from the set of feasible allocations such allocation that is as close to proportionality as possible. Based on this principle, the Cambridge Compromise (Grimmett, 2012; Grimmett et al., 2017) and other

methods (Dniestrzański and Łyko, 2015; Cegiełka et al., 2018) were put forward as procedures to find the allocation.

This paper

The properties of another concept of fairness of allocation which is applied when the preference relation is not uniquely defined are discussed in this paper. One may then consider all the possible preferences in order to indicate the allocation which does not favor any agent or a coalition of agents. In organizations that associate agents with incompatible goals the compromise solutions are appreciated, based on cooperation and mutual concessions. Let us assume that all allocations satisfying given criteria can be determined. A set of such allocations will be called a set of feasible allocations. As mentioned before, in situations of this type it is not possible to uniquely define a collective utility function, so as a result, the set of feasible allocations can be very large. Nevertheless each relation of utility generates a preference, and for each preference one can indicate its maximal elements. They are valuable solely for a selected group of agents, i.e. they do not satisfy the criteria required to reach the compromise. One defines a relation of order in the set of feasible allocations and then one considers all possible permutations of agents participating in the allocation. Each permutation is associated with a preference relation, and each of them has got maximal elements. Thus in order to reduce the set of feasible allocations one has to exclude from it those which are maximal elements of one preference relation (Cegiełka et al., 2017). If such reduction does not give satisfying results, one can repeat the whole process to reach the desired goal.

Certainly, the effect determining of such subset of compromise allocations depends on the selected type of the order relation. This paper analyzes the properties of two types of order relations. The first type of relation are lexicographic relations Two given allocations are with each other in a lexicographic relation (i.e. one is "not worse" than the other) when the vectors of these allocations, preserving a proper succession, are not smaller lexicographically. Another type of relations are transfer relations where possibilities of relocating goods from a selected group of agents to remaining agents are considered under given succession (Cegiełka et al., 2017). This type of relation is a natural basis upon which the indices of the inequality satisfying the Pigou-Dalton transfer principle can be constructed (Maciuk, 2019). The effect of reducing the set of feasible allocations depends on the type of order relation defined. In Section 2 these relations are defined, while Section 3 presents their basic properties and shows how the set of maximal elements can be determined using these properties. The set of maximal elements for transfer orders is larger than for lexicographic relations, therefore the reductions in this case are more radical. Nevertheless determining such a set is more difficult and requires more arithmetic operations than determining the set of maximal elements in the case of lexicographic orders. In particular, finding maximal elements for lexicographic relations can be the first step of a procedure determining the maximal elements for transfer relations. The last section briefly compares the properties of these types of relations.

Problem Statement

The allocation s of indistinguishable and indivisible goods among n players can be equated to a n-dimensional vector whose elements are natural numbers, including zero and adding up to s. The term 'feasible allocation' indicates that this allocation fulfils additional conditions resulting from the issue under study, considering among other things the claims of shareholders (e.g. the condition that an agent with greater claims cannot be allocated less goods than an agent with smaller claims, and each of them is not allocated more than a predetermined number of goods). Let $\mathbb{D}_s$ denote the set of feasible allocations, $N = \{1,2,\dots,n\}$ – the set of indexes of agents, and $\Pi(N)$ – the set of permutations of the set N. A given feasible allocation is said to be not less in the relation of lexicographic order with respect to a given succession of agents than another allocation, if the vector of the first allocation is lexicographically not less than the vector of the other allocation with respect to a given succession.

Definition 1 (lexicographic order with respect to permutation π).

$d', d \in \mathbb{D}_s, \pi \in \Pi(N)$,
$d' \gtrsim_{\pi}^{lex} d \;\; \Leftrightarrow \exists t \; s.t. 1 \leq t \leq n \; \forall i \; s.t. 1 \leq i \leq t \; d'_{\pi(i)} = d_{\pi(i)}$ and $d'_{\pi(t)} \geq d_{\pi(t)}$.

The second type of studied relations includes the relations resulting from the possibility of transferring the goods between agents. A given allocation is not less than another allocation in this relation, if it is possible to transfer at least one single good from one to the other without violating the fixed succession.

Definition 2 (transfer order with respect to permutation π).
$d', d \in \mathbb{D}_s, \pi \in \Pi(N), \; d' \succcurlyeq_{\pi}^{tr} d \;\; \Leftrightarrow \;\; \forall k \in N \; \sum_{i=1}^{k} (d'_{\pi(i)} - d_{\pi(i)}) \geq 0.$

Both lexicographic relation and transfer relation are reflexive, transitive and weakly antisymmetric, i.e. they are order relations (Cegiełka et al., 2017). Lexicographic relation is a relation of linear order – each pair of relations has the property that either the first relation is in relation with the second relation or the second one with the first one. Transfer relation is different. For example, in lexicographic relation, under any succession of agents, it is always possible to compare the allocations (4,4,4) and (3,3,6): it holds either $(4,4,4) \gtrsim_{\pi}^{lex} (3,3,6)$, when there is index 1 or 2 in the first place of permutation, or $(3,3,6) \gtrsim_{\pi}^{lex} (4,4,4)$ when there is index 3 in the first place of permutation. They are also with each other in a transfer relation with respect to the succession $(1,2,3)$, but not with respect to the succession (2,3,1). In the case of permutation (1,2,3) one can interpret this in such a way that agent 1 transfers one good to agent 2, and agent 2 transfers two goods to agent 3: $1 \xrightarrow{1} 2 \xrightarrow{2} 3$. With permutation (2,3,1) this interpretation implies that agent 2 transfers a positive number of goods to agent 3, while agent 3 transfers a negative number of goods to agent 1: $2 \xrightarrow{1} 3 \xrightarrow{-2} 1$.

A maximal allocation is such an allocation that under a given succession, there is no better allocation, i.e. the allocation which is a maximal element of the order relation determined by a given succession of agents. It is the allocation that gives them the maximal number of goods, under given succession, beginning with the first one, then the second one, and so on.

Definition 3 (set of maximal elements for relation of linear and transfer order).
$\max \mathbb{D}_{s,lex} = \{d \in \mathbb{D}_s : \exists \pi \in \Pi(N) \forall d' \in \mathbb{D}_s d' \gtrsim_{\pi}^{lex} d \Leftrightarrow d' = d\}$;
$\max \mathbb{D}_{s,tr} = \{d \in \mathbb{D}_s : \exists \pi \in \Pi(N) \forall d' \in \mathbb{D}_s d' \succcurlyeq_{\pi}^{tr} d \Leftrightarrow d' = d\}$.

In a maximal allocation for transfer order each succeeding agent cannot transfer any good to the preceding agent without violating the allocation conditions. In particular, this means that the number of maximal allocations for transfer orders is not smaller than the number of maximal allocations for linear orders. Each lexicographic relation determined by a given succession of allocation entities, being a linear relation, has got exactly one maximal and one minimal element (i.e. the greatest and the smallest element of relation). On the other hand, in the case of transfer relation there may be more maximal or minimal elements.

Research Methodology

The trouble with the procedure determining maximal allocations for these relations is its computational complexity. Each permutation of the set of indexes can correspond to another relation, i.e. the number of relations may be equal to the number of permutation of an n-element set of indexes, i.e. $n!$, thus if one has to consider each of them, the procedure for large values of n will be inefficient. Therefore one has to apply any available steps to reduce the number of operations necessary to be performed. When the conditions determining potential divisions are fixed in such a way that there are some players who always are allocated the same number of goods or there is more than one player who always is allocated the same numbers of goods, then such players can be considered as insignificant for the subsequent analysis. For example, the rows of Table 1 present the set of all allocations of 75 goods among 8 agents with respective claims $P = [290, 230, 95, 92, 90, 30, 20, 10]$, satisfying the following conditions: agents with smallest and greatest claims are allocated fixed numbers of goods –3 and 20, respectively, and agents with smaller claims cannot be allocated more goods than those with greater claims, whereas

the succession of quotients of claims to numbers of goods has to be monotonic (so-called condition of degressive proportionality). In this case agents 1 and 8 are allocated the same numbers of goods, and agents 4 and 5 the same number as agent 3. Therefore, instead of considering the permutations of all eight agents, it suffices to consider the permutations of agents 2, 3, 6 and 7. It is worth noting that the reduction is significant – instead of considering 8! permutations which define the relations, it suffices to consider 4! cases, the number that is 1680 times smaller. In order to distinguish from initial indexes, these agents will be denoted in the remainder by letters A, B, C and D.

In a lexicographic relation determined by permutation $\pi = \big(\pi(1), \pi(2), \dots, \pi(n)\big)$ the maximal (minimal) allocation is characterized in such a way that an agent indexed by $\pi(1)$ is allocated the maximal (minimal) available number of goods. Hence, in the case of determining maximal (minimal) lexicographic orders, another available simplification is to reduce the set of allocations to the subset of allocations with a given coordinate that is of the greatest (smallest) possible value. In the case under study seeking the greatest element for all relations beginning with the index A can be reduced to allocations 9 and 10 (the smallest element – to allocations 1, 2 and 3).

Table 1: An example of the set of feasible allocations

#	1	2	3	4	5	6	7	8	+	–
	x	A	B	x	x	C	D	x		
1	20	16	8	8	8	6	**6**	3	D	ABC, BAC
2	20	16	8	8	8	**7**	5	3	C	ABD, BAD
3	20	16	**9**	**9**	**9**	5	4	3	BC, BDC	AC, AD
4	20	17	8	8	8	6	5	3		
5	20	17	**9**	**9**	**9**	4	4	3	BDA	
6	20	18	8	8	8	5	5	3		BCA
7	20	18	8	8	8	6	4	3		BDA
8	20	18	**9**	**9**	**9**	4	3	3		DA, DBA
9	20	**19**	8	8	8	5	4	3	AC, AD	BCD, BDC
10	20	**19**	**9**	**9**	**9**	3	3	3	AB, BA	C, DBC, DC

Table 2: Examples of graphs of transfer relations for the set of allocations from Table 1

ABCD	ACDB	ACBD
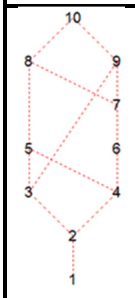	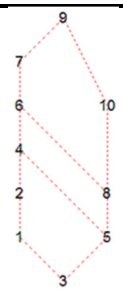	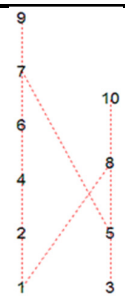
BCAD	BACD	CBAD

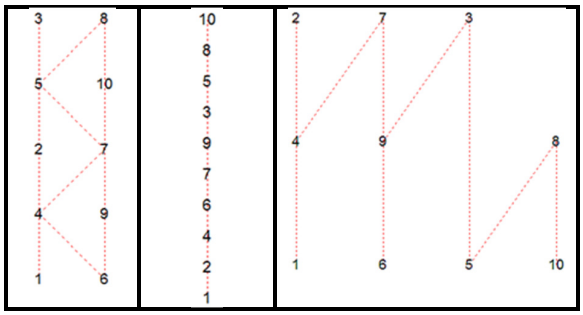

The remaining cases are similar. For relations beginning with the index B the set is reduced to allocations 3, 5, 8 and 10; for relations beginning with the index C – to allocation 2, and to allocation 1 for relations beginning with D. In the case of relations beginning with the index C or D one can stop seeking the greatest elements because there is no need to reduce the one-element sets. The greatest element of any lexicographic relation beginning with the index C is allocation 2 and for relation beginning with the index D – allocation 1. In the case of relations beginning with A one gets the one-element sets after introducing the second index: allocation 10 is the greatest element for relations determined by permutations beginning with AB. This is equivalent to the case when the agent indexed by A selects the most valuable allocation, while the agent B selects the most valuable allocation from allocations where A gets the largest part. In that case agents indexed by C and D have no choice, as the choice by the first two agents determined the unambiguity of allocation.

Determining a single allocation can be considered equivalent to labeling it. Allocation 1 has got a one-character label D, allocation 2 – label C, allocation 3 has got two different labels BC and BDC, and so on (see next-to-last column of Table 1). Therefore, determining the set of maximal elements for lexicographic relations is equivalent to identifying allocations that can be labeled. A similar procedure is applied to determine the set of minimal elements for lexicographic relations (see last column of Table 1).

A similar procedure to determine the set of maximal allocations for transfer relations is not possible because those relations may have more than one such element (see examples of graphs of transfer relations presented in Table 2). However, for that purpose one can employ the set of maximal elements of relations of lexicographic orders, because this set is a subset of the set of maximal elements of transfer orders.

Proposition. $\max \mathbb{D}_{s,lex} \subseteq \max \mathbb{D}_{s,tr}$.

Proof. It suffices to show that, given the succession $\pi \in \Pi(N)$, if the vector $d \in \mathbb{D}_s$ is the maximal element in lexicographic relation, then there does not exist a vector $d' \in \mathbb{D}_s$ that is greater than d in transfer order. Let us assume by contradiction that there exists such a vector, i.e. as $d'_{\pi(1)} \geq d_{\pi(1)}$, $d'_{\pi(1)} + d'_{\pi(2)} \geq d_{\pi(1)} + d_{\pi(2)}$, $d'_{\pi(1)} + d'_{\pi(2)} + \cdots \geq d_{\pi(1)} + d_{\pi(2)} + \cdots$ hold, but because it is the maximal element of lexicographic relation, it satisfies the inequalities $d'_{\pi(1)} \leq d_{\pi(1)}$, $d'_{\pi(1)} + d'_{\pi(2)} \leq d_{\pi(1)} + d_{\pi(2)}$, $d'_{\pi(1)} + d'_{\pi(2)} + \cdots \leq d_{\pi(1)} + d_{\pi(2)} + \cdots$. Hence $d'_{\pi(1)} = d_{\pi(1)}$, $d'_{\pi(2)} = d_{\pi(2)}$, …, or $d' = d$, thus resulting in a contradiction.

The proof of Theorem 2 also implies that each allocation "labeled" for lexicographic relation is the maximal element of transfer relation for the permutation corresponding to this label. For example, in the case under study allocation 9 has got label AC and is the maximal element of all relations defined by permutations beginning with AC. In the case of permutation ACDB it is the only maximal element, but for ACBD, besides allocation 9, also allocation 10 is the maximal element. This example also aptly illustrates the fact that one must not leave out any permutations -unlike in the case of lexicographic orders.

As a result, the first step in a procedure to determine the set $\max \mathbb{D}_{s,tr}$ can be division of the set $\mathbb{D}_s$ into $\max \mathbb{D}_{s,lex}$ and remaining allocations, whereas for the set $\max \mathbb{D}_{s,lex}$ labels of its allocations are determined and saved. Let $C \coloneqq \max \mathbb{D}_{s,lex}$, E – the set of labels of the set $\max \mathbb{D}_{s,lex}$, and $X = \mathbb{D}_s \setminus \max \mathbb{D}_{s,lex}$. Subsequently, all transfer relations $\succcurlyeq_{\pi}^{tr}$, at each step permutations of the set of indexes N, $\pi \in \Pi(N)$ and corresponding transfer relations $\succcurlyeq_{\pi}^{tr}$ are considered. For each of them $s \in \max \mathbb{D}_{s,lex}$, whose label belongs to π, is determined. Then the elements from the set $\mathbb{D}_s$ are compared with s to find those which are not in relation with it. If the set of such allocations is not empty, then they are compared with each other by relation $\succcurlyeq_{\pi}^{tr}$ and its maximal elements are determined. These elements are added to set C and deleted from set X. For example, in the set of allocations discussed above lexicographically maximal element of relation determined by permutation ABCD is allocation 9. Allocations 8 and 10 are not in transfer relation with it, while $10 \succcurlyeq_{\mathrm{ABCD}}^{tr} 8$ (see Table 2), therefore only allocation 10 is added to C.

Discussion

Methods resulting from preference relation such as relation of lexicographic order and relation of transfer order can be applied to conduct negotiations aimed at determining the allocation in conditions that are transparent and equal to all participants. These methods require the examination of all possible permutations of significant agents, thus increased computational complexity of procedures based on them. In the case of lexicographic relations, the procedure can be considerably streamlined for typical distributions of the set of allocations, yet in the case of transfer relations a procedure with this property is not yet available. If the set includes less than a dozen agents, the complexity is not a major problem, but in the case of larger sets transfer relations are not efficient. An open challenge for the forthcoming research is to find more efficient numerical methods that offer solutions possibly close to optimum.

Acknowledgment

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Educational Crafting (Edcraft): A Gamified Classroom for Recycling Intention

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Abstract

Gamification is a method for engaging learning in a fun way in different types of educational settings. Numerous recycling intention researches were conducted on the application of the Theory of Planned Behavior (TPB), a theory that explains why certain intentions or behaviours are formed. Self Determination Theory (SDT), a theory that explains the motivation of acting on a task through external and internal factors. This current study aimed to examine the recycling intention of participants before and after their gamified classroom experiences through educational crafting. This learning experience is called Edcraft Gamified Learning (EGL). A pre-survey and a post-survey were conducted with 14 participants who completed their EGL activities. The pre and post-survey analysis through Wilcoxon-signed rank was conducted. It is a non-parametric statistical test used to compare two similar pre and post samples of EGL. Results showed that the participants have no changes on their intention to recycle. With this data, an actual study will be conducted in the next stage of the research with more samples to participate in EGL. The current pilot study has surfaced with some suggestions to improve EGL on a larger scale.

Keywords: Gamification, recycling, educational crafting, Theory of Planned Behaviour, Self Determination Theory

Introduction

Gamification has been around for long before the appearance of video games; it applies gameful design into non-game settings to engage people in various types of activities. In the educational domain, teachers often employ games in the classroom [7], and in recent days, teachers have been applying game elements into their classrooms respectively to engage students.

The environmental problems have been a crucial issue which negatively impacted the natural ecosystem. This issue surfaced mainly due to irresponsible and selfish human activities who did not pay much attention to safeguard and protect their environment [8]. The purpose of this pilot study is to examine recycling intention among participants after experiencing the Edcraft Gamified learning class sessions.

Related Studies

Gamification and learning

In a recent study conducted by [1] showed that gamification is an effective way to quantify participants' academic performance, this leads to learning experience and engagement. Also, gamification in learning is a broad area to research on and it is yet conclusive [2], especially on the implementation of motivation in a game design learning environment. Besides, game-based design or serious game has been a famous implementation among the educators nowadays [5]. This had led to the motivation of this research in gamify

learning, to enable learners to think and visualise learning as a game and to reflect the knowledge that they learnt from the class, intervention or activity and to understand more about participants' expected outcome.

In gamification, badges and leaderboards are often implemented into non-game context [10] and the most prominent examples are Duolingo for language learning, Codeacademy and CodeCombat for computer programming learning. Using games in education has shown its success in the educational environment [13]. The freedom to retry has allowed the students to experiment without fear of failing and this has improved their engagement on learning [14].

Self Determination Theory (SDT)

Self-Determination Theory [9] is used as a theoretical support to enable a better understanding of the gamification mechanics in the context of motivating learning among participants. Besides, it is a type of motivation that drives behavior and performance [9]. The interpretation of motivation is an important factor to study the relationship between gamification and learning outcomes.

An educational research by Barna (2017) mentioned that "gamification research often focuses specifically on participants' performance like grades also in IT courses" [28], or on behavioural outcomes like tasks on schedule.

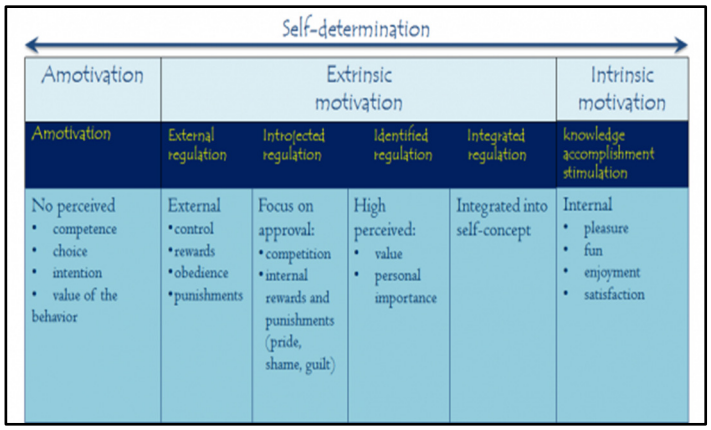

Figure 1: The spectrum of "self-determination and motivation within self-determination theory". Adapted from [16] and [17]. Image source: "https://academy.sportlyzer.com/wiki/motivation/self-determination-theory-intrinsic-and-extrinsic-motivation/"

Intrinsic Motivation

In the SDT model, enjoyment, challenge, pleasure and interest are the intrinsic motivation factors that can engage performance or behaviour.

Ryan and Deci (2000) define the intrinsic motivation as "an activity that characterizes its inner satisfactions rather than other outcomes externally". It does not cause by other external stimulations, pressure or rewards to get intrinsically motivated, get challenged and feel of engagement.

Intrinsic motivation facilitates "the behavioral regulation representing engagement in an activity for the sheer pleasure and satisfaction" [19]. Moreover, the behavior from intrinsic motivation is closely related to the "enjoyment, engagement in a task, or the capacity of the task to provide opportunities for cognitive and social development" based on Deci and Ryan's study.[21].

It is perceived that some individuals were not engaging themselves into a particular activity because they did not enjoy the activity. Boosting up the inner motivation or intrinsic motivation could eliminate the said attitude. With the complementary of any external rewards, players feel more enjoyable and excited in the said task and will keep them engaged to perform the activity.

Extrinsic Motivation

Extrinsic motivation is more apparent in the reward and achievement context. Extrinsic motivation can be in the form of grades, a promotion and social reciprocity. This type of motivation is not necessarily rewarding in a physical way.

In real-life practice, the applications of gamification are not an intention or extreme video games; intrinsically motivating game-like experiences is most widely accepted explanation for the behavioral impact from gamification elements, for example, leaderboard, badges and points [17, 18] that will be included in the current study.

By providing a suitable push factor by an extrinsic motivation, it is perceived that reasonable performance and goal can be achieved within a period.

Autonomous and Controlled Motivation

Few studies from [22] have confirmed that SDT constructs and predicts the future intention. The current work builds upon previous research by (Turel, 2016)"incorporating a measure of Autonomous Motivation (AM) and Controlled Motivation (CM) intended to clarify the exact revelators of behavioral intention".

AM is a self-determined behavior. It works as an intrinsic oriented goal and is defined as a behavior that engages with intrinsic goals or outcomes and discoveries of self-behaviour from an individual. [24]

With AM intact, a sense of choice can be felt by the individuals, as well as self-recognition, interest, and satisfaction. Therefore, behavior of a task is more likely to persist. They are personally motivated by the need to feel self-driven without the external factors and autonomous reasons or actions. [24, 25]

CM also engages an individual's behaviors for externally influenced reasons such as extrinsically motivated elements such as rewards, in form of money, consumable credits, points or perceived approval from others or to avoid any external penalisation and guiltiness [25].

Usually, the engagement of individuals in the behavior for "controlled reasons often has a sense of restriction and pressure when engaging such behavior" and are only motivated when engaging with the external factor [24, 25].

If the external reinforcing agent is removed, action will not be attached with the task. Individuals who are motivated through control-motivated are less self-regulated.

Amotivation

[15] explains that amotivation is a form of motivation that does not involve personal feelings. Amotivation, is the lack of interest, enthusiasm, emotion, or concern towards an action and is more closely related to goal-directed behaviour [20]. In a study from [16], they found that amotivation predicted students' physical activity intention, that it shows the strong relationship of Amotivation and intention.

At the ends of the opposite side of motivation is amotivation, a state where engagement of an activity does not regulate from intention; intrinsic motivation, an opposite behavioral regulation displaying of engagement in an activity with the ignorance of pleasure and satisfaction[19].

The Theory of Planned Behavior (TPB)

The TPB by Ajzen [11] stated that "each behavior is positively influenced by behavioural intention that will be predicted by attitudes (i.e., preferences beliefs), subjective norms (i.e., perceptions that others would approve), and perceived behavioural control **(PBC)** (i.e., difficulty to perform a particular behaviour)".

Research Conception Framework and Edcraft Gamified Learning (EGL) Gamification Design

This study's main objective is to study the intention of recycling, and it is referred to "an individual's self-commitment to engage in recycling behaviors" [29]. Throughout the study from (Park, 2014), "recycling intention has seen by drawing variables and models from social psychology". Theory of Planned Behavior (TPB) proposed by Ajzen as the main theory used to study the intention of recycling, numerous researches from TPB has also shown the improvement of the recycling of E-waste. This proves the effectiveness of TPB in recycling and learning.

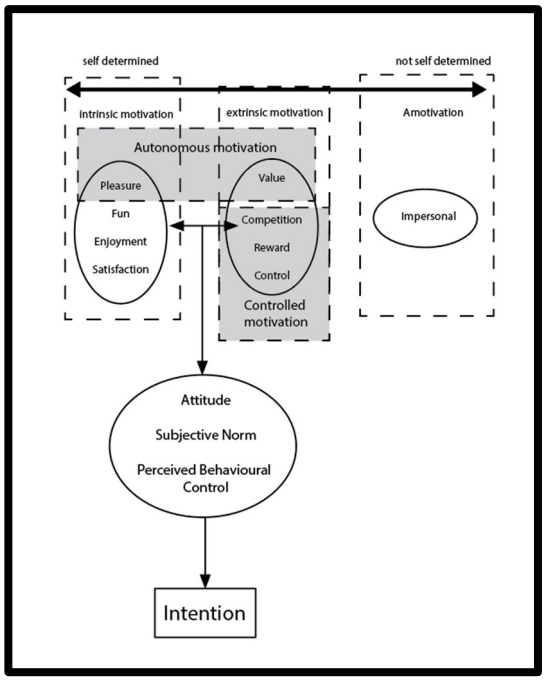

Figure 2: Research conceptual framework

The main idea of the research model (Figure 2) is to achieve intention by the end of the EGL activity. This research framework adopts SDT and TPB into the EGL gamification design for recycling learning activity, where SDT is to study the motivation on the gamification design. SDT is an important theory to investigate in numerous gamification research and it is based on the spectrum of self-determination, categorised from autonomous motivation to controlled motivation and to amotivation as explained in Section II – Related studies. The keywords of the SDT spectrum are selected to match with this study such as pleasure, fun, enjoyment and satisfaction for intrinsic motivation and value, competition, reward and control for extrinsic

motivation.

Whereas TPB is widely used for recycling related behavioural theory to test on the attitude, social norm and perceived behaviour control that affect intention of recycling.

This research aimed to test how game elements which are related to self-determination theory can improve the recycling intention.

Study Design and Flow of EGL Pilot Study

EGL activities were conducted in two piloted sessions. First, it was piloted to young participants and the second session was piloted to elder participants, in a "level 1 & level 2" gamified class setting. Before starting the game, the participants were required to answer a pre-survey, then followed by watching a video about the objective of EGL with footage of the current waste problems.

Next, the participants watched a tutorial video that guided them to craft a "level 1 craft" out of unused plastic. The participants were given 2 hours to make their own craft according to the tutorial video. During the session, they were also guided by mentors. Once the first level was done, participants were ranked by judges and proceeded to the level 2. In this level, they replicated the process of crafting by creating a more difficult and challenging craft. After "level 2" craft creation, the participants were asked to fill in a post-survey questionnaire. The participants were then ranked by the appointed judges, and the winners will earn a beautiful badge as a reward. As for the data collection, the pre and post survey consist of five-point Likert scales from left to right, strongly "agree, agree, neutral, disagree and strongly disagree" given to the participants in paper form during the EGL activity, the pre-survey questionnaire will be given right before the activity started, it is the state when they have little to no impression on the activity and post-survey is right after the activity and completed the EGL experience.

Figure 3: Badges for the winners as a reward.

Descriptions of The Study, Data Analysis and Findings

Participants

There were 14 participants involved in the two piloted EGL sessions. First EGL has 6 college students between 19 to 29 years old and the second session are 8 elderly persons aged between 50 to 60 years old. The questionnaire surveys consist of 4 major aspects, namely the recycling awareness, SDT, gamification,

TPB on "attitude, subjective norm, perceived behavioural control and intention" to recycle. Overall, all 14 participants attempted the survey items, and the dependent variable to be examined is on their intention to recycle.

Data collection

Pre-survey is a prior survey before EGL, it is comparable to the Post-survey data to compare with the difference of result, specifically on before and after for the intention to recycle. In the first EGL, a competition was held where level 1 and level 2 craft was made for the participants to follow.

Post Survey is a survey given after the participants completed EGL intervention.

Figure 2: The first pilot study session with 6 participants between age 19- 29.

Figure 3: The second pilot study session with 8 participants between age 50- 65

To determine the differences between pre-survey and post-survey, Wilcoxon signed rank test was used as a hypothesis testing tool, allowing the test to acquire an assumption from the test object population. Wilcoxon signed rank test compares the two independent groups' mean to find out whether there is statistical evidence that the related population means are significantly different. Wilcoxon signed rank test is a non-parametric test.

Analysis and Findings

A paired t-test and Wilcoxon signed rank test are normally used when a survey was conducted twice (pre and post survey each) to the same group of the participants. The paired t-test can show whether the mean (average) of Dependent Variable (versus the grouping variable) has changed between the first and second time the participants took the survey.

Since the current study involved a small piloted sample size, therefore it is not advisable to run the normality test for a small sample size; the parametric test such as paired t-test is inappropriate in this context. Instead, we decided to use the equivalent non-parametric test, namely the Wilcoxon signed-rank test to compare two sets of scores from the 14 samples.

Table 1: EGL pre and post survey on "intention to recycle" based on "Wilcoxon signed-rank test".

Ranks				
		N	Mean Rank	Sum of Ranks
intention_post - intention_pre	Negative Ranks	2[a]	6.50	13.00
	Positive Ranks	7[b]	4.57	32.00
	Ties	5[c]		
	Total	14		
a. intention_post < intention_pre				
b. intention_post > intention_pre				
c. intention_post = intention_pre				

According to the data, after EGL class, there were 2 participants with lesser intention in recycling recorded through the data, while 7 participants have recorded a positive intention to recycle, and 5 participants have recorded no changes in their intention to recycle upon completing EFL.

Table 2: EGL Wilcoxon test statistics

Test Statistics[a]	
	intention_post - intention_pre
Z	-1.130[b]
Asymp. Sig. (2-tailed)	.258
a. Wilcoxon Signed Ranks Test	
b. Based on negative ranks.	

Table 2 shows the "Asymp. Sig (2-tailed)" value, which the "p value" > .05 for the null hypothesis test of "equivalence of means for pre and post survey on 'Intention to recycling' " ; the hypothesis alternative is, "There are differences for both pre and post survey on the intention for recycling". The result can be interpreted as non-significant for the Wilcoxon signed-rank test, which means that the hypothesis null cannot be rejected, and hence there is no difference of "Intention to recycle" after completing their EGL classes with two levels of crafting game.

Discussions and Conclusion

This is a pilot study of the EGL and it will be further expanded with more samples for actual study with more consideration (or precaution) surfaced through this pilot study. Among the precaution measures are: coaching the participants whenever they are in trouble to avoid drop out; the difficulty of the craft activity should be

suitable for novice and not to give much pressure to the participants; also the period of the activity should be conducted during the participants' leisure time to avoid drop out or lack concentration and interest in the activity.

Results of intention (to recycle) for pre and post survey in EGL activity shows no difference based on the analysis, mainly due to the precaution measures weren't well established for this pilot test activity. From these statistic result and potential precaution measures, it is believed to be able to give a positive result on the actual study.

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Foreign and Domestic Investors Feedback Trading Behavior in Indonesia Stock Exchange

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Abstract

Foreign and domestic investors have shown different trading strategies in stock markets. For stock markets with foreign investor activity, however, previous studies indicate that they are exposed to risks related to volatility dan liquidity, especially during financial crisis. The purpose of this study is to analyze the characteristics of foreign and domestic investors regarding industry indexes. Using foreign and domestic investors 2013-2018 daily trading (buy and sell) data, we calculate daily Net Investment Flow (NIF) for each group of investors for each industry. We use vector autoregression (VAR) to estimate feedback trading behavior based on the relationship of daily industry index return and daily investor NIF. VAR estimation indicates that both foreign and domestic investors apply different feedback trading strategies for each industry index return. Foreign investors tend to react with positive feedback trading with shorter lags, while domestic investors tend to use negative feedback trading with longer lags. There is also an indication that domestic investors' trading affects industry index movement, but we could not observe the same effect from foreign investors. The findings of this research offer new evidence regarding foreign and domestic investor behavior regarding industry indexes.

Keywords: feedback trading, financial behavior, stock market, stock return.

Introduction

For the last few years, there's been a constant increase of trading activity in Indonesia Stock Exchange (IDX). This increase is not undesirable; IDX has continuously conducting a campaign to encourage local investors to trade in stock market actively. Since 1988, however, IDX has allowed foreign investors to trade and make transactions in stock market. In 2018, IDX reported that foreign investors are accounted for 52% of total investors in the stock market (CNN Indonesia, 2019). Interestingly, foreign investors net transaction has decreased quite significantly since 2013 despite market composite index continuous improvement over the years. Using IDX daily trading transaction data in 2010-2019 (Fig 1), we can see that in the last four years, there has been a decline in foreign investor percentage transaction volume compared to domestic investors'. Although occupying more than half of market participant numbers, foreign investors seem to trade less over the years compared to domestic investors.

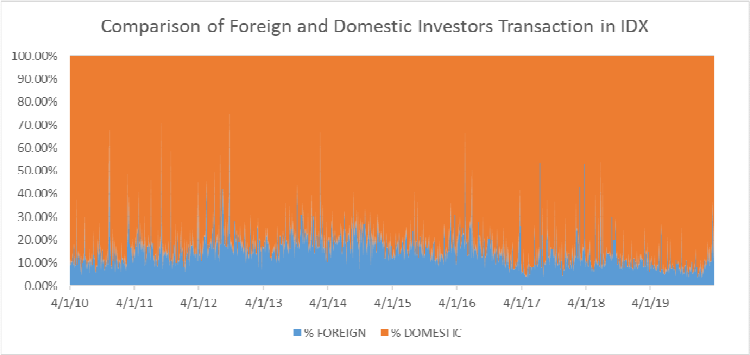

Fig 1. Comparison of foreign and domestic investor daily transaction in IDX 2010-2019

In 2019 The Indonesia Central Securities Depository (KSEI) mentioned that foreign investors ownership of Indonesian stock is 51,46% of the total market (CNN Indonesia, 2019), which leads IDX stock market to be exposed to higher liquidity risk, especially during financial crisis (Arshad et al., 2019; Naufa et al., 2019). Previous studies in this similar topic have shown that foreign investors' activity is related to market volatility, information publicity, and return (Vo, 2017; Martharini, 2018; Omay and Iren, 2019). Moreover, it is proven that foreign investors in IDX have superior knowledge based on their historical experience, which leads domestic investors' tendency to pseudo-herd in mimicking their trading strategy (Setyawan and Ramli, 2016).

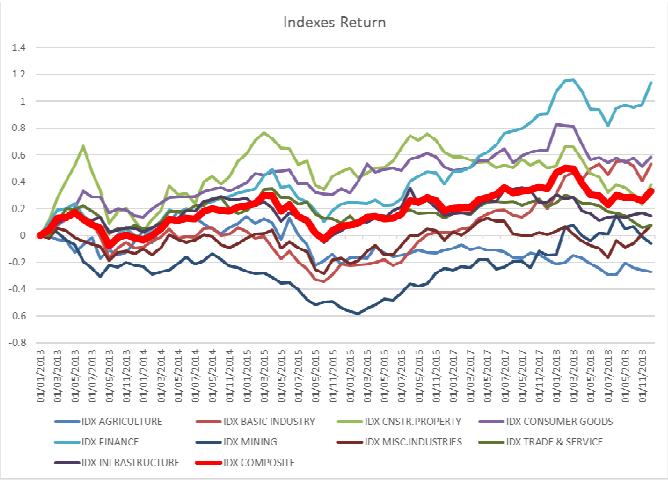

Fig 2. IDX Indexes return comparison 2013-2018

This research tries to expand the understanding of foreign and domestic investors' trading activity relationships with different industry indexes in the market. A study by Hong et al. (2007) showed that investors could use industry indexes to predict market index for a short period. This research is supported by Lee et al. (2013), who concluded that there is a correlation of industry index, primarily financial and service industry to market index in Asian countries. Observation of IDX trading data in 2010-2019 (Fig 2) shows that there's been a difference in performance for different industry indexes in IDX compared to the market-wide index. This study tries to comprehend analysis of the previous research in IDX, which indicates that foreign and domestic investors deploy different feedback trading behavior (Martharini, 2018) by using industry indexes instead of IDX composite index.

Using foreign and domestic investors trading data during the 2013-2018 period, we found that foreign and domestic investors show different feedback trading strategies in response to industry indexes return. Our VAR estimation data shows that foreign and domestic investors react differently to each industry indexes movement. In general, domestic investors tend to use negative feedback trading strategy while foreign investors use positive feedback trading strategy. Based on the lags, foreign investors also react in a shorter period compared to domestic investors.

Literature Review

Studies comparing foreign investors and domestic investors' performances are still inconclusive. Some studies indicate that foreign investors perform better (Johnson et al., 2009; Oh et al., 2008), while some showed the opposite (Agarwal, 2009; Choe et al., 2005). However, using data from 32 countries, Ferreira et al. (2017) concluded that domestic institutional investors perform as well as foreign institutional investors on average. A specific study in Indonesia Stock Exchange (Agarwal et al., 2009; Dvořák, 2006) suggested that domestic investors gained higher return than domestic investors in IDX (previously JSX), not because of a difference of information, but foreign investors aggressiveness in trading that affected their overall performance.

In the era of global investment, emerging economies become an interesting destination for investors from developed economies to diversify their portfolio, earning higher returns with lower risks (Vo, 2017). However, these investors can significantly affect market liquidity as it trades in large amount and create a trend of price movement (Peranginangin et al., 2016; Onishchenko and Ülkü, 2019). In Indonesia, domestic investors consider foreign investors to be better informed and have better trading strategies (Setyawan and Ramli, 2016). With the information on trading activities in IDX are accessible for market participants, foreign investors trading may affect domestic investors. Hence, studies regarding foreign investors in emerging economies are necessary.

Feedback trading is one of the many behaviors that can be observed between foreign and domestic investors trading characteristics. It is a form of noise trading where investors make investment or trading decision based on market noise (Koutmos, 2014). Investors responses to these noises can be classified as positive or negative feedback trading. Positive feedback trading (momentum trading) happens when net investment flow is positively related to increasing return. In contrast, negative feedback trading occurs when an increase of return affect net investment flow negatively (Phansatan et al., 2012). A study in IDX (Martharini, 2018) also indicates that foreign investors and domestic investors in Indonesia display contrast behavior regarding feedback trading. Foreign investors tend to use positive feedback trading strategy, especially for short term trading, while domestic investors tend to use negative feedback trading strategy. However, a rather new study using trading data from Korea, Taiwan, Thailand, and Finland indicates that some foreign investors are shifting from return chasing investment patterns and positive feedback trading in regards to market return (Onishchenko and Ülkü, 2019). Evidence from IDX also indicates that feedback trading in IDX investors led to herding behavior (Setyawan and Ramli, 2016).

As mentioned previously, some industries in IDX stock market give better performance than the other and even better than the overall market index. Previous studies have shown that industry return could predict market return as far as two months period and industry indexes are related to the market index, although some industry index has a better impact than the others, depends on the country (Lee et al., 2013; Hong et al., 2007). Investors' limited capability to process all complex information in the market causes lag of information diffusion from asset market to stock market. This finding might indicate that there is a difference in investors' trading activities in each industry sector and whether industry indexes movement can affect investors' behavior. A study in Asian stock markets shows that there's a tendency of different herding behavior within industry indexes, some more than the other, depends on the market. For some Asian markets, investors herd more within the industry than within domestic markets (Zheng et al., 2017). Therefore, it suggests that investors behave differently in regards to industry indexes.

Evidence shows that investors behavior and market performances may vary between industries, and there is an indication that foreign and domestic investors may behave differently in each industry market. Since both foreign and domestic investors in IDX has shown tendencies of different reactions to market return with positive or negative feedback trading, the evidence also suggests different market indexes may affect investors' tendency of feedback trading. This study tries to extend previous studies regarding foreign and domestic investors feedback trading behavior by analyzing foreign and domestic investors' trading activities in regards to industry indexes movement. For this research, we propose the following hypotheses:

Hypothesis 1: Industry indexes affect foreign investors trading behavior in IDX.

Hypothesis 2: Industry indexes affect domestic investors trading behavior in IDX.

Data and Methodology

For this study, we use daily volume trading data acquired directly from The Indonesia Capital Market Institute (TICMI), a subsidiary of IDX. The data consists of Foreign Investors (FI) and Domestic Investors (DI) daily buy and sell data for each company during 2013-2017. We have categorized these data based on nine industry indexes in IDX, as shown in Table 1. We also use daily closng price of industry indexes during the same period, which were acquired from Thomson Reuters Datastream.

Table 1: List of industry indexes and codes

Industry Index	Code	Number of Companies
Agriculture	AGRI	19
Basic industry	BASIC-IND	71
Consumer goods industry	CONSUMER	48
Finance	FINANCE	91
Infrastructure, utilities, and transportation	INFRASTRUC	63
Mining	MINING	47
Miscellaneous industry	MISC-IND	44
Property, real estate and building construction	PROPERTY	68
Trade, services, and investment	TRADE	136
Total		587

To analyze feedback trading behavior, we use bivariate Vector Autoregression (VAR) to model the relationship between net investment flow (NIF) of foreign and domestic investors trading and industry indexes returns. VAR model has been widely used for similar studies (Vo, 2017) and especially relevant in analyzing the relationship between foreign investor with stock returns in emerging market (Ülkü, 2015). On top of that, since both the trading transaction and market return can affect both ways, VAR is used to accommodate the lack definition of dependent and independent variable between the market return and trading activity.

$$NIF_{i,t} = \frac{NVBuy_{i,t} - NVSell_{i,t}}{NVBuy_{i,t} + NVSell_{i,t}} \quad \text{(Eq. 1)}$$

$$NIF^{g}_{i,t} = \alpha_1 + \sum_{j=1}^{k} \beta_1 Return_{i,t-j} + \sum_{j=1}^{k} \beta_2 NIF^{g}_{i,t-j} + \varepsilon_0 \quad \text{(Eq. 2)}$$

$$Return_{i,t} = \alpha_2 + \sum_{j=1}^{k} \beta_3 NIF^{g}_{i,t-j} + \sum_{j=1}^{k} \beta_4 Return_{t-j} + \varepsilon_0 \quad \text{(Eq. 3)}$$

We calculate NIF of each investor groups using Eq. 1, where *i* indicates the investor groups (domestic or foreign) and *NVBuy* and *NVSell* are net volume of buy and sell respectively on day *t*. This formula is a modification from Phansatan et al. (2012) which used value as an indicator of net investment. We opted to use volume, as Vo (2017) has indicated that volume is closely related to information acquisition and investors' return. We use Eq. 2 and Eq. 3 for VAR model

Table 2: Optimum lag selection and criterions

Model	Industry	Optimum Lag	LR	FPE	AIC	SC	HQ
Return - Domestic NIF	AGRI	8	16.120*	1.98e-06*	-7.455*	-7.312	-7.401*
	BASIC-IND	8	15.631*	5.05e-06*	-6.521*	-6.377	-6.467
	CONSUMER	8	11.768*	2.72e-06*	-7.139*	-6.995	-7.084
	FINANCE	8	13.205*	3.09e-06*	-7.012*	-6.869	-6.958
	INFRASTRUC	7	8.203	3.48e-06*	-6.892*	-6.766	-6.845
	MINING	5	11.475	1.22e-06*	-7.938*	-7.845	-7.903
	MISC-IND	6	8.711	4.89e-06*	-6.552*	-6.442	-6.511
	PROPERTY	8	16.312*	1.88e-06*	-7.507*	-7.363	-7.453
	TRADE	8	13.550*	2.32e-06*	-7.296*	-7.152	-7.242
Return - Foreign NIF	AGRI	3	8.511	1.38e-05*	-5.513*	-5.454	-5.49
	BASIC-IND	3	13.355*	1.94e-05*	-5.174*	-5.114	-5.151
	CONSUMER	6	14.334*	6.72e-06*	-6.234*	-6.124	-6.193
	FINANCE	7	9.193	7.58e-06*	-6.114*	-5.988	-6.067
	INFRASTRUC	6	14.813*	5.54e-06*	-6.428*	-6.318	-6.386
	MINING	7	12.641*	1.31e-05*	-5.568*	-5.441	-5.52
	MISC-IND	3	25.179*	1.73e-05*	-5.291*	-5.232	-5.269*
	PROPERTY	3	11.819	1.22e-05*	-5.638*	-5.579	-5.616
	TRADE	4	16.393*	8.25e-06*	-6.029*	-5.953	-6.001
* indicates lag order selected by criterion							
LR: sequential modified LR test statistic (each test at 5% level)							
FPE: Final prediction error							
AIC: Akaike information criterion							
SC: Schwarz information criterion							
HQ: Hannan-Quinn information criterion							

estimation of investors NIF and industry indexes return, where *g* indicates investors group (domestic or foreign), *i* indicates the industry index, and *t* indicates the day of trading observed. Optimum lags k for each VAR is estimated using a few different methods as explained in Table 2. We chose the most selected lag by five criteria used in EViews 10.

Results and Discussion

Table 3 presents the descriptive statistics from investors NIF and return of each industry indexes. Some industry indexes return was negative during the period, which indicates a decrease in performance in these industries. Foreign NIF is negative for most industry indexes, showing that foreign investors tend to sell instead of buy during 2013-2017. On the contrary, we can see domestic NIF is positive for all industry indexes, indicating an increase in domestic investment flow.

Table 3: Descriptive statistics of daily return and NIF for industry indexes

Industry Index	Variables	Mean	Median	Maximum	Minimum	Std. Dev.
AGRI	Return	-0.0001	- 0.0005	0.0777	- 0.0679	0.0128
	Domestic NIF	0.2583	0.0377	0.9610	- 0.6777	0.3386
	Foreign NIF	-0.0562	- 0.0530	0.9878	- 0.9983	0.2966
BASIC-IND	Return	0.0003	0.0002	0.0683	- 0.0768	0.0144
	Domestic NIF	0.2404	0.0529	0.9845	- 0.9490	0.3413
	Foreign NIF	0.0002	0.0108	0.9786	- 0.9866	0.3184
CONSUMER	Return	0.0006	0.0003	0.0567	- 0.0541	0.0127
	Domestic NIF	0.2401	0.0765	0.9699	- 0.4908	0.3082
	Foreign NIF	-0.0142	-0.0180	0.8404	- 0.8947	0.2289
FINANCE	Return	0.0007	0.0009	0.0736	- 0.0634	0.0124
	Domestic NIF	0.1316	0.0467	0.8910	- 0.7323	0.2093
	Foreign NIF	-0.0163	-0.0047	0.9757	- 0.9352	0.2374
INFRASTRUC	Return	0.0003	0.0005	0.0458	- 0.0439	0.0112
	Domestic NIF	0.2471	0.0649	0.9849	- 0.8265	0.3505
	Foreign NIF	-0.0278	-0.0223	0.9178	- 0.9726	0.2329
MINING	Return	- 0.0000	-0.0006	0.0709	- 0.0570	0.0126
	Domestic NIF	0.0325	0.0184	0.8691	- 0.7159	0.0905
	Foreign NIF	-0.0437	-0.0424	0.9842	- 0.9681	0.3016
MISC-IND	Return	0.0002	-0.0001	0.0917	- 0.0724	0.0175
	Domestic NIF	0.2478	0.0399	0.9798	- 0.3433	0.3395
	Foreign NIF	-0.0112	-0.0076	0.9640	- 0.9766	0.2666
PROPERTY	Return	0.0004	-0.0003	0.0918	- 0.0702	0.0136
	Domestic NIF	0.1719	0.0384	0.8641	- 0.3290	0.2212
	Foreign NIF	-0.0272	-0.0216	0.8748	- 0.9922	0.2700
TRADE	Return	0.0002	0.0007	0.0425	- 0.0527	0.0094
	Domestic NIF	0.2327	0.0422	0.9034	- 0.6856	0.3047
	Foreign NIF	-0.0398	-0.0134	0.9287	- 0.9743	0.3117

To accommodate space, we present the VAR estimation result for return industry indexes and investors NIF in four separate tables, two tables for each investor group. As we can see in Table 4 and Table 5, VAR estimation result indicates industry index return affects domestic investors trading in various lags. For lag (-8), we see that positive return in FINANCE affect NIF positively,

Table 4: VAR Estimation with coefficient and [t-statistics] for Daily AGRI, BASIC-IND, CONSUMER, FINANCE, INFRASTRUC Index Return and Daily Domestic NIF

LAG	AGRI		BASIC-IND		CONSUMER		FINANCE		INFRASTRUC	
	NIF	Ret	NIF	Ret	NIF	Ret	NIF	Ret	NIF	Ret
Ret(-1)	-0.198	0.109	-0.117	0.069	-0.333	-0.025	-0.522	0.111	-0.320	0.010
	[-0.7]	[3.7]	[-0.3]	[2.4]	[-1.1]	[-0.8]	[-1.5]	[3.7]	[-0.7]	[0.3]
Ret(-2)	0.058	-0.045	0.154	-0.017	-0.230	-0.025	0.445	-0.066	0.402	-0.082
	[0.2]	[-1.5]	[0.4]	[-0.5]	[-0.7]	[-0.8]	[1.3]	[-2.2]	[0.9]	[-2.8]
Ret(-3)	0.072	-0.019	-0.119	-0.068	-0.233	-0.128	**0.729**	**-0.049**	0.240	-0.108
	[0.2]	[-0.6]	[-0.3]	[-2.3]	[-0.7]	[-4.4]	**[2.1]**	**[-1.6]**	[0.5]	[-3.7]

Ret(-4)	**-0.634**	**0.002**	0.282	-0.008	0.285	-0.034	-0.033	-0.040	-0.785	-0.082
	[-2.5]	**[0.0]**	[0.9]	[-0.2]	[0.9]	[-1.1]	[-0.0]	[-1.3]	[-1.8]	[-2.8]
Ret(-5)	0.258	0.033	0.397	-0.000	0.306	0.000	0.593	-0.011	0.045	-0.008
	[1.0]	[1.1]	[1.2]	[-0.0]	[1.0]	[0.0]	[1.7]	[-0.4]	[0.1]	[-0.3]
Ret(-6)	-0.328	0.006	0.177	-0.032	0.058	-0.032	0.115	-0.047	0.110	-0.041
	[-1.3]	[0.2]	[0.5]	[-1.1]	[0.1]	[-1.1]	[0.3]	[-1.5]	[0.2]	[-1.4]
Ret(-7)	-0.357	0.003	-0.022	0.041	-0.067	0.006	-0.568	0.043	**1.153**	**0.021**
	[-1.4]	[0.1]	[-0.0]	[1.4]	[-0.2]	[0.2]	[-1.6]	[1.4]	**[2.6]**	**[0.7]**
Ret(-8)	**0.617**	**-0.027**	0.003	0.021	0.109	-0.033	**0.685**	**0.011**		
	[2.4]	**[-0.9]**	[0.0]	[0.7]	[0.3]	[-1.1]	**[2.0]**	**[0.3]**		
NIF(-1)	0.383	0.003	0.356	0.000	0.311	0.002	0.356	-0.000	0.311	0.000
	[13.]	[1.0]	[12.]	[0.1]	[10.]	[0.7]	[12.]	[-0.3]	[10.]	[0.4]
NIF(-2)	0.181	-0.004	0.148	-0.000	0.137	-0.003	0.121	0.001	0.070	0.002
	[5.9]	[-1.3]	[4.8]	[-0.3]	[4.5]	[-1.1]	[3.9]	[0.6]	[2.3]	[1.3]
NIF(-3)	0.096	0.000	0.135	-0.002	0.098	-0.001	0.166	-0.003	0.030	-0.000
	[3.0]	[0.2]	[4.4]	[-0.9]	[3.2]	[-0.5]	[5.3]	[-1.4]	[1.0]	[-0.1]
NIF(-4)	0.088	0.000	0.039	0.002	0.135	0.003	0.056	0.000	0.118	0.000
	[2.8]	[0.0]	[1.2]	[0.9]	[4.4]	[1.2]	[1.8]	[0.0]	[4.1]	[0.2]
NIF(-5)	0.059	0.005	0.060	-0.001	0.053	0.001	0.015	0.000	0.337	-0.001
	[1.9]	[1.6]	[1.9]	[-0.6]	[1.7]	[0.4]	[0.4]	[0.2]	[11.]	[-0.6]
NIF(-6)	-0.018	-0.000	0.060	-0.001	0.088	-0.003	0.073	-0.002	0.077	-0.001
	[-0.6]	[-0.1]	[1.9]	[-0.5]	[2.8]	[-1.2]	[2.3]	[-1.0]	[2.5]	[-0.8]
NIF(-7)	0.103	-0.005	0.063	-0.000	0.049	0.001	0.010	0.002	0.013	-0.000
	[3.3]	[-1.4]	[2.0]	[-0.3]	[1.6]	[0.4]	[0.3]	[0.9]	[0.4]	[-0.3]
NIF(-8)	0.086	0.001	0.097	0.004	0.090	0.001	0.088	0.001		
	[3.0]	[0.3]	[3.3]	[1.8]	[3.1]	[0.4]	[3.0]	[0.4]		

Table 5: VAR Estimation with coefficient and [t-statistics] for Daily MINING, MISC-IND, PROPERTY, and TRADE Index Return and Daily Domestic NIF

LAG	MINING		MISC-IND		PROPERTY		TRADE	
	NIF	Ret	NIF	Ret	NIF	Ret	NIF	Ret
Ret(-1)	0.022	0.104	0.216	-0.019	**-0.684**	**0.108**	-0.085	0.064
	[0.1]	[3.6]	[0.9]	[-0.6]	**[-3.1]**	**[3.7]**	[-0.1]	[2.2]
Ret(-2)	-0.202	-0.025	0.078	-0.073	-0.329	-0.004	-0.624	-0.034
	[-0.9]	[-0.9]	[0.3]	[-2.4]	[-1.5]	[-0.1]	[-1.2]	[-1.1]
Ret(-3)	-0.081	0.010	0.098	-0.098	0.053	-0.026	-0.672	-0.041
	[-0.3]	[0.3]	[0.4]	[-3.3]	[0.2]	[-0.9]	[-1.3]	[-1.4]
Ret(-4)	0.295	0.034	-0.100	-0.033	0.234	0.022	-0.094	-0.071

	[1.4]	[1.1]	[-0.4]	[-1.1]	[1.0]	[0.7]	[-0.1]	[-2.4]
Ret(-5)	0.043	-0.060	0.311	-0.033	-0.163	0.043	-0.741	-0.028
	[0.2]	[-2.1]	[1.3]	[-1.1]	[-0.7]	[1.4]	[-1.4]	[-0.9]
Ret(-6)			**0.570**	**-0.029**	0.069	-0.081	0.267	-0.046
			[2.6]	**[-1.0]**	[0.3]	[-2.8]	[0.5]	[-1.5]
Ret(-7)					-0.200	0.066	-0.179	0.067
					[-0.9]	[2.2]	[-0.3]	[2.3]
Ret(-8)					0.228	-0.001	**-1.091**	**-0.044**
					[1.0]	[-0.0]	**[-2.2]**	**[-1.5]**
NIF(-1)	0.180	0.004	0.503	0.000	0.302	-0.001	0.272	0.001
	[6.2]	[1.0]	[16.]	[0.1]	[10.]	[-0.4]	[9.4]	[1.0]
NIF(-2)	0.065	-0.003	0.132	-0.001	0.149	0.001	0.160	-0.000
	[2.2]	[-0.9]	[3.9]	[-0.2]	[4.9]	[0.3]	[5.4]	[-0.1]
NIF(-3)	0.048	-0.005	0.103	-0.005	0.106	0.000	0.035	4.00E
	[1.6]	[-1.3]	[3.0]	[-1.2]	[3.5]	[0.2]	[1.1]	[0.0]
NIF(-4)	**0.013**	**-0.010**	0.072	0.006	**0.082**	**0.010**	0.150	-0.001
	[0.4]	**[-2.6]**	[2.1]	[1.5]	**[2.6]**	**[2.6]**	[5.0]	[-0.7]
NIF(-5)	**0.041**	**0.009**	0.111	-0.002	0.058	-0.003	0.134	-0.001
	[1.4]	**[2.3]**	[3.3]	[-0.5]	[1.9]	[-0.8]	[4.5]	[-0.8]
NIF(-6)			0.043	0.001	0.132	-0.007	-0.010	-0.001
			[1.4]	[0.3]	[4.3]	[-1.9]	[-0.3]	[-1.0]
NIF(-7)					0.022	0.000	0.147	0.001
					[0.7]	[0.0]	[4.9]	[0.7]
NIF(-8)					0.112	0.001	0.061	0.002
					[3.8]	[0.4]	[2.1]	[1.3]

Table 6: VAR Estimation with coefficient and [t-statistics] for Daily AGRI, BASIC-IND, CONSUMER, FINANCE, INFRASTRUC Index Return and Daily Foreign NIF

LAG	AGRI		BASIC-IND		CONSUMER		FINANCE		INFRASTRUC	
	NIF	Ret	NIF	Ret	NIF	Ret	NIF	Ret	NIF	Ret
Ret(-1)	0.1322	0.111	**1.625**	**0.070**	0.937	-0.035	**1.875**	**0.110**	**1.298**	**0.002**
	[0.20]	[3.87]	**[2.63]**	**[2.42]**	[1.91]	[-1.1]	**[3.45]**	**[3.73]**	**[2.21]**	**[0.09]**
Ret(-2)	0.665	-0.046	0.045	-0.020	0.932	-0.027	0.366	-0.067	0.185	-0.092
	[1.00]	[-1.6]	[0.07]	[-0.6]	[1.89]	[-0.9]	[0.67]	[-2.2]	[0.31]	[-3.0]
Ret(-3)	-0.669	-0.020	0.640	-0.068	0.142	-0.125	**-0.354**	**-0.043**	0.140	-0.122
	[-1.0]	[-0.7]	[1.03]	[-2.3]	[0.28]	[-4.2]	**[-0.6]**	**[-1.4]**	[0.23]	[-4.0]
Ret(-4)					-0.081	-0.025	0.829	-0.035	0.268	-0.083

					[-0.1]	[-0.8]	[1.51]	[-1.1]	[0.45]	[-2.7]
Ret(-5)					-0.571	0.007	**-1.108**	**-0.004**	0.253	-0.023
					[-1.1]	[0.24]	**[-2.0]**	**[-0.1]**	[0.43]	[-0.7]
Ret(-6)					0.257	-0.033	-0.722	-0.052	-0.184	-0.056
					[0.52]	[-1.1]	[-1.3]	[-1.7]	[-0.3]	[-1.8]
Ret(-7)							0.860	0.033		
							[1.57]	[1.12]		
NIF(-1)	0.1362	-0.001	0.213	-0.000	0.269	0.001	0.164	0.0000	0.248	0.001
	[4.73]	[-1.3]	[7.38]	[-0.1]	[9.08]	[1.02]	[5.56]	[0.04]	[8.28]	[0.84]
NIF(-2)	0.0815	-0.001	0.064	0.000	0.131	0.000	0.077	0.0000	0.111	9.71E
	[2.81]	[1.09]	[2.16]	[0.58]	[4.28]	[0.07]	[2.60]	[0.04]	[3.62]	[0.06]
NIF(-3)	0.0791	-0.000	0.066	0.000	0.013	-0.000	0.065	0.000	0.014	0.001
	[2.75]	[-0.0]	[2.30]	[0.58]	[0.43]	[-0.0]	[2.20]	[0.10]	[0.46]	[0.89]
NIF(-4)					0.029	-0.002	0.060	-0.001	0.023	-0.001
					[0.96]	[-1.2]	[2.01]	[-0.7]	[0.73]	[-1.1]
NIF(-5)					0.041	-0.000	0.059	-0.001	0.038	0.002
					[1.36]	[-0.2]	[1.98]	[-0.7]	[1.25]	[1.57]
NIF(-6)					0.097	0.002	0.019	0.003	0.099	0.001
					[3.30]	[1.29]	[0.65]	[1.85]	[3.30]	[0.76]
NIF(-7)							0.059	0.001		
							[2.03]	[0.95]		

while negative return gives the opposite effect for NIF in AGRI and TRADE. For lag (-7) positive return index in INFRASTRUC affects domestic NIF positively, and a day later in lag (-6) negative return leads to positive domestic NIF. Moving to lag (-4), positive return in AGRI leads to negative NIF, a contrast to previous observation in lag (-8). Similar to this, domestic NIF in FINANCE is still growing despite negative index return FINANCE in lag (-3). Finally, the positive return in lag (-1) industry PROPERTY affects domestic NIF negatively. Generally, there is no apparent feedback trading behavior for industry BASIC-IND, CONSUMER, and MINING.

Table 7: VAR Estimation with coefficient and [t-statistics] for Daily MINING, MISC-IND, PROPERTY, and TRADE Index Return and Daily Foreign NIF

LAG	MINING		MISC-IND		PROPERTY		TRADE	
	NIF	Ret	NIF	Ret	NIF	Ret	NIF	Ret
Ret(-1)	0.337	0.106	**1.252**	**-0.014**	2.586	0.099	0.766	0.066
	[0.50]	[3.68]	**[2.92]**	**[-0.4]**	[4.66]	[3.42]	[0.82]	[2.31]
Ret(-2)	0.284	-0.024	0.213	-0.062	**1.750**	**-0.015**	**2.577**	**-0.031**
	[0.42]	[-0.8]	[0.50]	[-2.0]	**[3.12]**	**[-0.5]**	**[2.78]**	**[-1.0]**
Ret(-3)	-0.813	0.006	0.343	-0.078	0.121	-0.029	0.238	-0.042
	[-1.2]	[0.22]	[0.81]	[-2.6]	[0.21]	[-1.0]	[0.25]	[-1.4]
Ret(-4)	**-1.570**	**0.035**					0.912	-0.077

	[-2.3]	**[1.23]**					[0.98]	[-2.6]
Ret(-5)	-0.352	-0.054						
	[-0.5]	[-1.8]						
Ret(-6)	0.626	-0.002						
	[0.92]	[-0.0]						
Ret(-7)	0.045	0.076						
	[0.06]	[2.67]						
NIF(-1)	0.193	-0.000	0.257	-0.000	0.128	0.001	0.170	-0.000
	[6.69]	[-0.7]	[8.60]	[-0.2]	[4.44]	[1.27]	[5.91]	[-1.0]
NIF(-2)	0.040	0.000	0.100	-0.000	0.109	0.001	0.094	0.000
	[1.36]	[0.49]	[3.25]	[-0.3]	[3.80]	[0.88]	[3.22]	[0.97]
NIF(-3)	0.080	0.001	0.093	-0.000	0.084	-0.001	0.016	-0.000
	[2.70]	[1.33]	[3.15]	[-0.2]	[2.98]	[-0.9]	[0.56]	[-0.4]
NIF(-4)	**0.066**	**0.001**					0.082	0.000
	[2.25]	**[1.54]**					[2.86]	[0.63]
NIF(-5)	**0.036**	**-0.002**						
	[1.23]	**[-1.5]**						
NIF(-6)	0.050	0.001						
	[1.69]	[1.20]						
NIF(-7)	-0.037	-0.002						
	[-1.2]	[-1.8]						

These results show that domestic investors in IDX showed different feedback trading behavior regarding index return for each industry index in the form of negative feedback trading.

On the other hand, as we can see in Table 6 and Table 7, index return affects foreign NIF in shorter lags. Negative return of FINANCE index on lag (-5) affects foreign NIF negatively while positive return on lag (-1) leads to positive foreign NIF. Positive return of MINING index on lag (-4) affects foreign NIF negatively, and we can observe negative return of PROPERTY and TRADE indexes that affects foreign NIF on lag (-2) positively. For lag (-1) we can see positive return of indexes BASIC-IND, FINANCE, INFRASTRUC, and PROPERTY leads to positive foreign NIF as well. In contrast, negative return of MISC-IND index leads to positive foreign NIF. The estimation shows no apparent feedback trading in AGRI and CONSUMER industry. The result indicates that foreign investors in IDX showed different feedback trading behavior regarding index return for each industry index in the form of positive feedback trading.

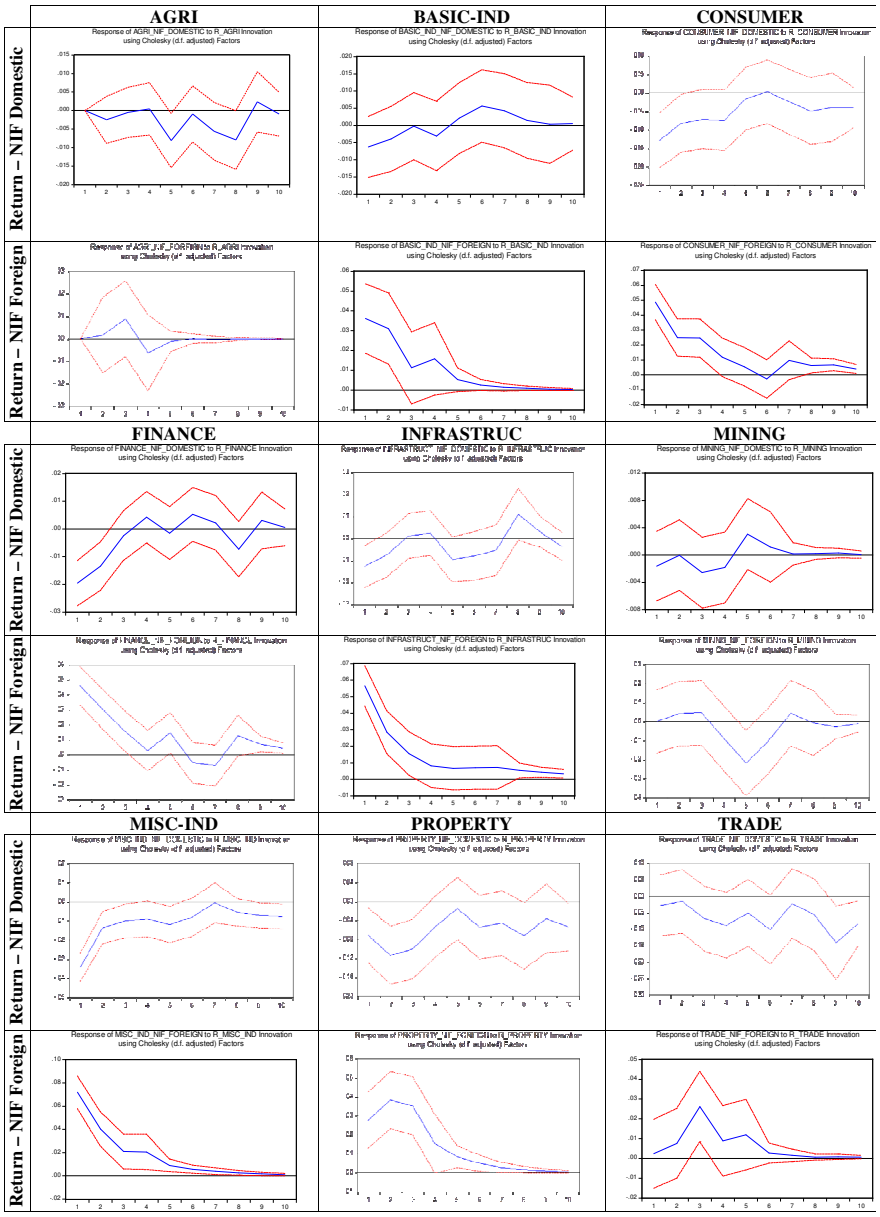

Fig. 3 : Impulse Response of Domestic and Foreign NIF to Indexes Return

We can also observe that domestic NIF affects index return for industry MINING and PROPERTY on lag (-4) and lag (-5). We cannot observe the same finding for foreign NIF on industry index return. Interestingly, return of CONSUMER index doesn't affect both foreign and domestic investors trading. Using impulse response function from Fig. 3, we can see that generally, a shock to industry index return will cause a rather high impact on foreign NIF and gradually decrease around day 6 where it tends to stay constant, unaffected. Domestic NIF, however, is more volatile against the shock of industry index return, although most of them are affected negatively. We can see that all domestic NIF will be affected adversely at first before gradually reaching the zero line (unaffected). For some industries (BASIC-IND, FINANCE, INFRASTRUC, MINING), we can see the shock of index return leads to positive domestic NIF around day 5-7. This result indicates that although showing a similar

pattern, domestic investors show a different reaction to each industry indexes.

Conclusion

Based on IDX daily foreign and domestic investors trading data during 2013-2018, we found that lagged returns affect both foreign and domestic investors' trading behavior differently. Domestic investors tend to show negative feedback trading behavior with longer lags, while foreign investors tend to respond to the industry index with positive feedback trading in shorter lags. We also observed that neither foreign or domestic investors trading were affected by the consumer goods industry index. Another interesting finding was domestic investors' trading affects industry indexes returns, while we cannot observe the same effect from foreign investors.

Related to the purpose of this study, we found that during 2013-2018 there is an indication of feedback trading behavior within the industry level in IDX. Both foreign and domestic investors showed various feedback trading strategy regarding lagged industry return; therefore, we can conclude that industry indexes in IDX affect both foreign and domestic investors' trading behavior.

These findings support previous studies regarding feedback trading in IDX (Martharini, 2018; Setyawan and Ramli, 2016) and bring new evidence regarding investors' behavior within IDX industry indexes. Although the previous study has shown that industry indexes lead to different herding behavior, this study focuses on trading behavior using net investment flow and index return to model the relationship. The findings of this research give implications for international stock market investors and portfolio investment about how investors trade within the industry level and how foreign and domestic investors' trading activity affects one another.

The findings of this research provide an analysis of a general perspective of foreign and domestic trading activities. Future research regarding this topic should analyze trading behavior or pattern on specific events, such as Ramadhan or financial crisis, that significantly affect the stock market. We also suggest that more in-depth analysis regarding movement of the stocks, whether stocks sold by foreign investors transferred to domestic investors or stay within the group, and vice versa.

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Features and Basic Principles of The Internal Audit of Pharmacy Organizations

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Abstract

In modern conditions of management and strict state regulation of pharmaceutical activity, the problem of using the internal audit system in the organizations of the pharmaceutical market is acute. In addition to the system of state control, independent control — external and internal audit — became widespread. In these conditions, taking into account the peculiarities of pharmacy organizations, it became necessary to develop organizational principles and methodological approaches to the implementation of internal audit of pharmacy organizations.
This study develops the theory of internal audit in pharmacy organizations. It allows on the basis of a documentary study of the regulatory aspect in the field of internal audit of pharmacy activities to substantiate organizational and methodological approaches to optimizing the conduct of internal audit. The article sets forth the basic principles of internal audit taking into account classification features that can improve the management of a pharmacy organization. The basic principles of the internal audit of pharmacy organizations can be divided into professional and ethical. In the course of the study, we added the following principles of the internal audit of a pharmacy organization to the list of ethical principles and professional principles of auditors, which can serve as an example in the development of local documents for internal audit in any organization: appropriateness, principle of practical benefit, consistency, logical harmony - to ensure clarity of wording, integrity and clarity of presentation, orientation on the interests of owners (the auditor should understand that he protects the interests of owners from internal economic violations).

Keywords: Internal Audit, Pharmacy Organization, Principles Of Internal Audit.

Introduction

The activities of pharmacy organizations are very specific and strictly regulated by regulatory documents. These organizations carry out retail trade in medicines, storage, transportation, manufacture and dispensing of medicines for medical use in accordance with the requirements of current legislation. In this regard, all sorts of risks arise.

Studies have shown that in practice a formal internal audit is carried out in the organization, while the applied methods of internal audit in the organization do not cover the entire process of pharmacy organizations. During the internal audit, its principles are not fully applied, which leads to inefficiency in the application of audit procedures.

Materials and Methods

The object of the study is the pharmacy organization of various forms of ownership and legal status, carrying out pharmaceutical activities.

The subject of the study is the stable, stably repeating premises, cause-effect relationships and the consequences of a single process of industrial specialization of the regions and the territorial division of labor with the accompanying process of industrialization in the aspect of their connection with the efficiency of social production.

The theoretical basis of the research is scientific developments and works of foreign authors such as A. Apcherch, E. Atkinson, J. Brimson, R. Garrison, K. Drury, D. Ryan, J. Foster , as well as Russian scientists P.S. Bezrukikh, N.A. Breslavtseva, S.A. Boronenkova, V.B. Ivashkevich, O.B. Vakhrusheva, M.A. Vakhrushina, O.N. Volkova, T.V. Zyryanova, T.P. Karpova, V.E. Kerimov, A.N. Kondrakov, E.I. Kostyukova, M.I. Kuter, , E.ALisovich., Ya.V. Sokolov, V.I. Tkach, Z.V. Udalova. Scientists such as M.A.Azarskaya, V.D. Andreev, S.M. Bychkova, Yu.A.Danilevsky, M.V. Melnik, O.A. Mironova, S.V. Pankova, V.I. Podolsky, N.A. Remizov, B.N. Sokolov, N.N. Khakhonova. contributed to the study of the development of the methodology and methods of internal control.

Research into the problem of internal audit in pharmacy organizations was carried out by scientists: Yakushev V.I., Grishin A., Kovalenko S., Lebedinets V.

The need for research is caused by the need for the administrative apparatus of pharmacy organizations to create an internal audit system.

The methodological basis of the study was the principles of a systematic and regional approach to the study of pharmaceutical regulatory mechanisms, including pharmacy organizations, the fundamental works of domestic and foreign experts in the field of auditing, legislative and regulatory acts of the Russian Federation, statistical and departmental documents of the RF Ministry of Finance, the RF Ministry of Health and Social Development, and International Standards audit activity.

Research Results and Discussion

When organizing an internal audit of pharmacy organizations, attention should be paid to the features of their activities.

Compared with other organizations, a pharmacy organization has its own peculiarity - it performs two functions simultaneously:

- social (providing the population with goods of a pharmaceutical assortment);
- economic (profit as an economic entity).

Therefore, the presence of an internal audit in a pharmacy organization is rather a necessary measure than just the desire of management, since pharmacy activity is, first of all, a socially oriented activity.

Features of pharmacy organizations, depending on the type, conditions, specifics of activity, include the following functions fully or partially in accordance with the main tasks:

- production, control and dispensing of medicines to the population according to prescriptions of medical workers who have the right to prescribe them;
- sale to the population of finished medicines permitted for over-the-counter sale, as well as hygiene items, patient care, dressings, medical instruments, veterinary products and items, children's, medical and diet food, cosmetics (parapharmaceutical products), medical equipment and etc.;
- sale of medicines and medical devices to medical, preventive and other institutions;
- procurement of medicinal plant material in the form of its purchase from the population;
- the provision of necessary first emergency medical care (first aid kit corresponds to the car first-aid kit);
- advising customers on the choice of medicines and other pharmacy products, disseminating sanitary and hygienic knowledge and popular information about medicines to the public;

- informing medical workers about the medicines available in the pharmacy, the receipt of new medicines and their administration;
- a systematic study of the demand of the population of the served region for medicines in order to determine the need for medicines.

Having studied the features of the activities of pharmacy organizations, we highlighted the features of internal audit in pharmacy organizations: the specificity of activities, since this industry has special social significance, accordingly, the internal control system is legally regulated, which must be checked by an internal audit system; the organization of activities directly affects the formation of accounting (financial) statements, the accuracy of which is verified by the internal audit service.

Based on the foregoing, the following tasks should be included in the internal control system of pharmacy organizations:

- verification of compliance with the storage conditions of drugs during transportation and delivery;
- checking the formation of the price of medicines in accordance with state regulation;
- organization of loading and unloading operations upon acceptance of the goods, taking into account its protection from the effects of environmental conditions;
- verification of shipping documents, including quality documents;
- conformity assessment of accepted goods shipping documentation on the assortment, quantity and quality, compliance with special conditions;
- verification of certificates of conformity for medicines and declarations for dietary supplements;
- checking the correctness of electronic document management;
- verification of acts of reconciliations of suppliers with the data of the accounting service;
- implementation of pharmacovigilance (monitoring the effectiveness and safety of drugs in circulation in the Russian Federation);
- andothers.

When checking, the internal auditor should be guided by the principles of managing pharmacy organizations and international audit standards (ISAs), the requirements of owners for internal audit, which are established by the internal documents of the pharmacy organization.

Therefore, the auditor of the internal audit service should build its work based on ethical principles.

The Code of Professional Ethics of Auditors defines: “The auditor must comply with the following basic principles of ethics: honesty, objectivity, professional competence and due care, confidentiality, and professional conduct.” Code - a set of rules of conduct that explains how the auditor should act in various situations. Therefore, observing ethical principles, the auditor should: [4]

- act openly and honestly in all professional and business relationships;
- avoid relationships that may distort or affect his professional judgment;
- maintain knowledge and skills at a level that ensures the provision of clients or the audit organization in which he works with qualified professional services based on the latest practice and legislation;
- act in good faith in accordance with applicable professional standards in the provision of professional services;
- be aware of technical, professional and industry achievements;
- act in accordance with the requirements of the assignment (contract), carefully and in a timely manner;
- take reasonable measures to ensure that persons working under his supervision in a professional capacity, have appropriate training and proper leadership;
- inform customers, audit organizations or other users of professional services of the limitations inherent in these services;

- ensure the confidentiality of information obtained as a result of a professional or business relationship, and not disclose this information to third parties who do not have appropriate and specific powers, except when the auditor has a legal or professional right or an obligation to disclose such information;
- not use confidential information obtained as a result of professional or business relations to obtain any advantages by him or third parties;
- maintain confidentiality outside the professional environment, bearing in mind the danger of unintentional disclosure of information to persons with whom he is in close business relations or close relationship;
- maintain confidentiality of information disclosed to him by a potential client or audit organization;
- maintain confidentiality of information within the audit organization;
- take reasonable measures to ensure that persons working under his supervision in a professional capacity, and persons from whom he receives advice or assistance, have due respect for his obligation to maintain confidentiality of information;
- maintain confidentiality after the end of the relationship between the auditor and the client or audit organization;
- comply with the requirements of applicable regulatory legal acts and avoid actions that may discredit the audit profession;
- notgive scornful comments about the work of other auditors or to make unreasonable comparisons of their work with the work of other auditors. [4].

The independence of the audit evaluation means the expression of the opinion of the auditor without attention to the influence of biased factors in the audit process. The auditor should prepare conclusions only on documented facts of economic activity, regardless of the opinion of the head, whether it be written or oral. The auditor should understand that during the examination errors may be identified that will affect the conclusions, therefore, sufficient audit evidence should be obtained, which should come first in the audit. Oral statements cannot serve as audit evidence. This is only possible subject to professional principles.

In accordance with International Auditing Standard 200 “The main objectives of an independent auditor and conducting an audit in accordance with international audit standards” (entered into force on the territory of the Russian Federation by Order of the Ministry of Finance of Russia dated 24.10.2016 N 192n), the auditor should observe the following principles:

1. Professional skepticism.

Professional skepticism is necessary for a critical assessment of audit evidence. It includes the need to cast doubt on conflicting audit evidence and the reliability of documents and responses to inquiries and other information received from management and those charged with governance.

2. Professional judgment.

A distinctive feature of professional judgment is that it is developed by an auditor, whose professional training and qualifications in themselves are already helpful in developing the skills and abilities necessary for the formation of reasonable judgments.

3. The sufficiency and appropriateness of audit evidence.

Audit evidence is required to justify the audit opinion. It is cumulative in nature and is mainly obtained as a result of applying audit procedures during the audit. However, they may also include information obtained from other sources, such as previous assignments or in-house quality control procedures for the purpose of considering proposals from new customers and continuing relations with existing customers.

The sufficiency and appropriateness of audit evidence are interrelated. Sufficiency is a measure of the amount of audit evidence. The amount of audit evidence needed depends on the auditor's assessment of the risks of misstatement, as well as the quality of such audit evidence.

Proper character is a measure of the quality of audit evidence; that is, its relevance and reliability to confirm the conclusions on which the audit opinion is based.

We have added the following principles to the list of ethical principles and professional principles of auditors for the internal audit of a pharmacy organization, which can serve as an example in the development of local documents for internal audit in any organization:

expediency;
principle of practical benefit;
consistency;
logical harmony - ensuring clarity of wording, integrity and clarity of presentation.
orientation on the interests of the owners (the auditor must understand that he protects the interests of the owners from internal violations);
making rational decisions according to the audit;
friendliness and loyalty towards employees; the responsibility of the auditor for the consequences of his recommendations and conclusions on the results of audits;
promoting the growth of the effectiveness of pharmaceutical activities.
improving the audit methodology (the auditor should strive to improve the audit system and develop his own professionalism, that is, to constantly learn);
compliance with local regulatory documents (internal audit should primarily be based on internal audit documents);
forecasting (the auditor in the course of inspections, based on experience and professional judgment, should assume and prevent the occurrence of errors on the ground);

knowledge of pharmacy activities (in order for the auditor to be able to provide quality judgments, he needs to know the structure, organization, regulation and other aspects of pharmacy activities);

systematization of information (since the internal audit is ongoing, it should systematize the receipt of evidence in order to rationally allocate resources and allow for an operational audit).

Based on the foregoing, we can distinguish the main principles of internal audit, which are presented in table 1.

Table 1: The main principles of the internal audit of the financial statements of pharmacy organizations

Ethical	**Professional**	
	Regulated by International Standards	**Regulated by Internal Documents**
independence;	Reasonable confidence	Proprietary orientation
honesty;	Professional skepticism	Improvement of audit procedures
objectivity;	materiality	Compliance with local regulations
Professional competence and integrity;	Custom scan	forecasting
confidentiality;	Division of responsibility	Knowledge of pharmacy
Professional behavior	uniformity	Systematization of information

Based on the foregoing, it follows that the internal auditor must adhere to all types of principles in his work, including ethical, regulated by the Code of Professional Ethics, professional, regulated by international audit standards, as well as specific ones that meet the characteristics of the organization. This is especially urgent in small businesses, because, as a rule, in such organizations, employees communicate closely and have friendly relations, in which case the internal auditor especially has to adhere to the principles of objectivity, independence, honesty, professional behavior, professional skepticism, differentiation of responsibility and orientation on the interests of owners. In accordance with the requirements of the Federal Law "On Auditing", the International Auditing Standards, the

preparation of working documents is a prerequisite for audit organizations, as well as for internal audit.

The cases recommended by us allow documentary coverage of all stages of the internal audit of the pharmacy organization and confirm the implementation of analytical procedures. Table 2 presents the structure of audit cases.

Table 2: The structure of cases of internal audit

Case Number and Name	Name of Working Documents
Case No. 1 “Working documents at the stage of organizing the work of internal auditors”	The order of the head of the organization to conduct an internal audit of the unit or facility
	Creation of a working group
	Independence of the internal auditor
Case No. 2 “Working documents at the planning stage of the internal audit”	Key elements of understanding division activities
	General plan of internal audit
	Control testing checklist
	Materiality in internal audit
	Internal audit strategy
	Reporting section checklist
	Risk assessment
	Elements of the internal control system of the unit
Case No. 3 “Collection of audit evidence by internal auditors”	Analytical кeview
	Business continuity
	Sample description
	Estimated values
	Claims, lawsuits and other obligations
	Inventory presence
	Related parties and transactions
	Events after the reporting date to the date of the audit report
	Comparative information and introductory balances
Case No. 4 “Working documents at the stage of completion of the internal audit”	Final memorandum
	Reporting verification checklist
	Distortion list
	Customer presentation letter
	Other information

Thus, making a conclusion from all of the above, it can be said that the internal auditor must adhere to all types of principles in his work, including ethical ones regulated by the Code of Professional Ethics of auditors, professional ones regulated by ISAs, as well as specific ones that meet the characteristics of a pharmacy organization.

Conclusion

The organization of internal audit in pharmacy organizations depends on their types and takes into account the characteristics of activities, key tasks at a certain stage of business development. The

effectiveness of the internal audit in pharmacy organizations depends on strict observance of the audit principles and the formation of the case system: “Working documents at the stage of organizing the work of internal auditors”, “Working documents at the planning stage of the internal audit”, “Collection of audit evidence by internal auditors”,“ Working documents at the stage of completion of the internal audit. ”

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Development of A Concept to Improve the Quality of Life of The Region's Population Based on A Study of The Factors of Human Capital Development in The Conditions of Innovative Systems

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Abstract

The article identifies the problems of a comprehensive assessment of the results of managing innovative systems from the perspective of a systematic approach for the participants of the systems, describes the methodological approach to assessing the effectiveness of innovative systems from the perspective of the theory of human capital development, substantiates the possibility of achieving the goal - improving the quality of life of the population by increasing the quality of human capital. It is proposed in the article to use the resulting indicator - the quality of life of the population to assess the effectiveness of the innovation policy of the territories, an algorithm of the influence of innovation on the target indicators of the main components of the economic development of the territory with an expanded description of its stages is presented, factorial two- and three-dimensional models of the influence of the main components of the economic development of the territory on the quality of life of the population are developed, recommendations are given on the development of the innovative policy of territorial innovative systems.

Keywords*:* Innovation System, Human Capital, Quality Of Life Of The Population, Management Positioning Map.

Introduction

The modern model of socio-economic development, developed by the governments of the countries, is largely due to changes in the economic role of innovations, directions and mechanisms for the implementation of innovative processes laid down in official legislative documents and regulations for the sustainable growth of economies. Russia is objectively integrated into the global economy and the global scientific and technological space [Barro, R.J., 1996], [The Global Competitiveness

Report, 2018], [Fleurbaey, M., 2019]. But the level of this integration is not high enough yet. For the period 2010-2019, Russia, according to the Global Innovation Index, succeeded and rose from a place in the middle of the rating to a place in the first third of the rating of the countries observed. However, in 2010 Russia took 9th place in the ranking of the world economies of developed countries according to the UN data, by 2018 Russia's position fell to 11th, which indirectly confirms the long-term stagnation of the Russian national innovation system (NIS). Russia's GDP growth rate in 2018 amounted to 2.3%, with a global value of 3.0%. A peculiarity of managing the innovation sphere in Russia is predominant and insufficiently effective financing from the federal budget. Under the conditions of objective budgetary constraints, two interrelated tasks should be solved - actively attracting business funds to the field of science and innovation and increasing the profitability of relevant types of activities and sectors of the economy. All of the above does not provide impulses to the development of the Russian national innovation system (NIS) on the part of business. It should be noted that the Russian NIS is distinguished by the presence of gaps between science, education and business, a weak level of network cooperation as the basis for innovative growth in leading countries. The level of innovative activity of organizations oriented to international markets and directly determining the global competitiveness of the Russian economy is only 0.2 -0.3% from 2016 to 2018. According to the strategy of innovative development of the Russian Federation for the period until 2020, it was planned to increase this indicator to 2%. This task was set based on the high quality of human capital available in Russia, which is estimated to be higher than the general level of innovation activity (The Global Innovation Index) - 46th place, and in terms of the Global Qualified Professionals Index (The Hays Global Skills Index) - 27th place). All this testifies to the underutilization of the country's intellectual potential.

The aggregate indicator of the level of human development in the country according to the United Nations Development Program (UNDP) is the human development index, which is interpreted as a synonym for the concepts of "quality of life" or "standard of living". Between 2016 and 2019 Russia maintains a stable position in the international rating of human development at the level of 49-50 places among 188 countries. This situation indicates a stagnant state of the implementation of the state policy of socio-economic development of the country [Gokhberg, L, 2017] [Data on international ratings, 2020].

In recent years, a large number of regulatory documents have been developed in the Russian Federation aimed at achieving new qualitative and quantitative indicators of sustainable economic development. For example, the goal was set - to enter the top five leading economies in the world. Despite the fact that institutional conditions were created to achieve ambitious goals, this did not significantly change the competitiveness of the country's economy at the international level.

In this regard, the relevance of the research topic lies in the scientific and practical importance of the formation and development of technologies for managing innovative systems of various levels within the framework of the concept of competitiveness of territories, allowing for the long term to create conditions for sustainable economic growth, ensuring an increase in the quality of life of the population in all its aspects [Meissner, D., 2019]. In the world and domestic practice, with the abundance of available points of view regarding the problems of developing innovative systems, there is still no consensus on the categorical apparatus that would show all participants of these systems the importance of innovation as a necessary condition for improving the quality of life of the population.

In our opinion, ensuring the existing needs of participants in innovative systems interested in obtaining reliable information resources on the results of the effectiveness of applied technologies for managing innovative systems cannot be achieved for several reasons. They are associated with the lack of complete, reliable, timely, accessible statistical information in the context of objects of research; the lack of a methodology and a comprehensive assessment of the results of managing innovative systems from the perspective of a systematic approach; the lack of an approach to taking into account the influence of the level of innovative development of systems of various levels on the achievement of one of the national goals of the country - improving the quality of life of the population while maintaining macroeconomic stability.

Materials and Research Methods

The purpose of the study is the development of a methodological approach to assessing the effectiveness of innovative systems from the perspective of the theory of human capital development.

The object of research is the innovation system of the Russian Federation, which implements the state innovation policy.

The subject of the study is the factors of human capital development in the context of innovative systems of various levels within the framework of the concept of improving the quality of life of the region's population.

The methodology of work is based on foreign scientific works (G. Becker, I. Ansoff, P. Drucker, S. Kuznets, R. Nelson, D. North, R. Solow, C. Freeman, J. Schumpeter, S. Young and other authors) and domestic scientists (V.V. Ivanova, V.L. Makarov, G.G. Malinetsky, T.E. Kuznetsova, L.E. Mindeli, L. Gokhberg and other authors) dedicated to the formation and development of human capital, development of innovative systems and assessment of the effectiveness of their management to ensure innovative development and increase competitiveness of socio-economic systems.

The methodological basis of the study was a complex of general scientific and special methods of cognition. In the course of the study, such general scientific methods were used as: analysis, synthesis, generalization, historical, graphic method; special methods of cognition: formal-logical method and specific sociological.

Research Results and Discussion

An analysis of the definitions of "innovation system" proposed in scientific papers as applied to the research topic allows us to state that the innovation system can be considered as a set of subjects and objects of innovative activity that interact in the process of creating and selling innovative products and carry out their activities within the framework of the innovation policy pursued by the state. Given the current state innovation policy, it is assumed that all territories should be considered as innovation systems. The innovation system is characterized by a certain structure, its degree of orderliness and connections in accordance with the concept of open innovation. According to this concept, the innovation system is represented vertically as a three-level system (national, district, subject), and horizontally it is defined as an innovative platform that unites participants taking into account their mutual interests, within which innovation is synthesized using a dynamic and adaptive mechanism that generates, consuming and transforming innovation into innovative products.

In addition, the innovation system is influenced by environmental factors, which include market, infrastructure, cultural, knowledge and institutional conditions [Sveiby, K.E., 1997]. In these conditions of development of innovative systems, there is an objective need to study the specifics of innovative processes in the framework of the formation of the information society to justify their impact on the final result according to key indicators characterizing the achievement of the goals of the system. To assess the effectiveness of the innovation system, a level of competitiveness is used, which shows the degree of effectiveness of the creation, transfer and maintenance of customer value [Suvorova, A.P., 2017].

When exploring approaches to the formation of state innovation policy in the framework of the sustainable development model, it is necessary to proceed from the priority of the national goal - ensuring the quality of life of the population, which is determined by three aspects: the well-being of the population, the accumulation of human capital, and the level of human development. The well-being of the population is characterized by the achievement of a certain level of provision of the population with tangible and intangible goods. It is customary to distinguish three qualitative levels of well-being of the population: the first - sustainable satisfaction of the primary human needs, ensuring a normal level of life; the second is the achievement of material wealth, in which there is a saturation of primary needs; the third is the optimal, individually-oriented type of satisfying human

needs [Santalova, M.S., 2016]. The accumulation of human capital in terms of its ability to reproduce social capital, which can be characterized by the state of public health, educational, professional and cultural parameters [Rudenko, S.A., 2019]. The concept of "human development" as an indicator of the quality of life of the population is assessed in cross-country comparisons and is characterized by the possibility of fulfilment of a person through demographic, medical, environmental, and intellectual conditions of their existence and personal fullfillment, as well as the possibility of integrating individuals into society [Alimova, E.F., 2010].

The concept that combines the effectiveness of the innovation system with its results is the theory of intellectual capital. Despite a significant amount of research on intellectual capital, this theory is still considered to be undeveloped due to the lack of a unified understanding of the essence of this capital and approaches to its assessment. Researchers define different categories of human and intellectual capital [Novgorodov, P.A., 2017]. Most researchers interpret the category of intellectual capital as potential, which implies the possibility of obtaining a useful result through the use of this capital. Another fairly common approach to the essence of the category of intellectual capital is its understanding as a resource, and only a small part of researchers consider such capital as a result.

Moreover, all scientists engaged in research on the concept, essence and structure of intellectual capital are unanimous in their opinion that human capital is a structural element of intellectual capital.

In our opinion, the formation of intellectual capital as a result is preceded by the formation of resources, as well as capacity building and use (Figure 1). The resources should include human and labor resources as the physical presence of the population in a certain territory. The potential includes: firstly, the part of the population involved in the production of goods and services is economically active population; secondly, human capital, as a person's potential ability to generate income, which is ensured by an increase in the level of education, qualifications, employee health, and the formation of innovative skills and competencies. The result is intellectual capital, considered as qualifications, competencies, technologies, intellectual property, corporate culture and communication channels that can create added value and provide competitive advantages, high quality of human life. In the categories considered, a hierarchical vertical is clearly traced, the categories are interdependent, with each previous category being the basis for the next category. Each subsequent level of capital formation is formed by the increment of certain components, allowing you to go to the next stage of formation of intellectual capital [Sasani, Ali, 2012].

The basis of the hierarchy of constructing categories are human resources, as a set of qualities and characteristics of a person, which is the source of his ability to work of a certain kind. The scheme presented in Figure 1, in our opinion, combines all the categories we have examined into a single process of reproduction of this capital, which is reflected by the upward arrow from human resources to the top of the pyramid - intellectual capital. The reverse arrow in Figure 1 directly illustrates the process of reproduction of intellectual capital from resources.

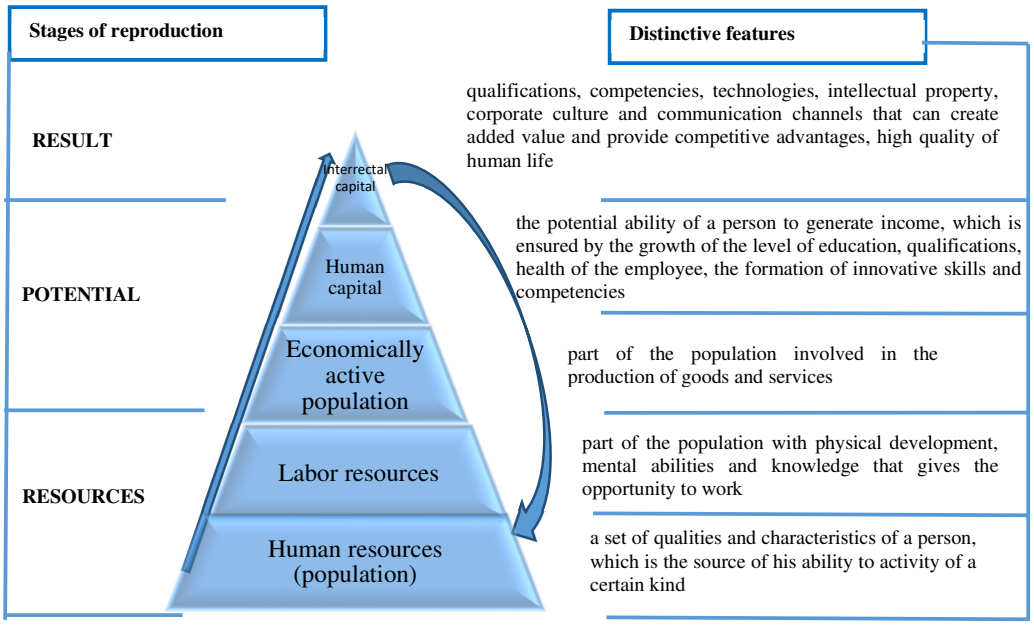

Fig. 1: The relationship of the categories that form the intellectual and human capital

For the intensive growth of the country's intellectual capital in order to ensure a high quality of life for the population, at each stage of the reproduction process, managerial innovative solutions are necessary within the framework of an innovation system of different levels [Suvorova, A.P., 2019]. Thus, since 2007, in accordance with Federal Law of December 29, 2006 No 256-FZ "On Additional Measures of State Support for Families with Children" [Federal Law, 2006], in order to create conditions providing families with children with decent life standards, they are building up human resources through increased fertility. At the stage of the formation of labor resources in Russia, for example, a migration policy is implemented that focuses on attracting highly qualified specialists and educational migrants [President of the Russian Federation, 2012]. The pension reform of 2019-2028, providing for a gradual increase in the retirement age, also contributes to an increase in the mass of labor resources [Federal Law, 2018]. All of the above measures of state policy allow us to form the resource base of intellectual capital.

The next stage of reproduction is related to capacity building based on the formed labor resources. The increase in the economically active population is facilitated by the implementation of state policy in the field of employment. However, it is human capital that is the fundamental potential of Russia's innovative growth through the formation of intellectual capital. The mechanisms that ensure the growth of competitiveness of the domestic national innovation system were laid down by the state in the Strategy for Innovative Development of the Russian Federation in 2012 [Government of the Russian Federation, 2011]. The state played a leading role in ensuring the implementation of innovation policy, creating an innovative field, using the development of the institutional environment and a system of tools and regulators, including support for the interaction of science and business, innovative infrastructure of universities, the creation of technological platforms, the development of innovative development programs for companies with state participation and others. Achieving the goal of the quality of life of the population is ensured by many factors (table 1), the main of which is improving the quality of human capital, which, in turn, is achieved through the sustainable development of institutions of the innovation system at various levels.

In order to implement the social functions of innovation and increase the degree of public involvement in the innovation process, improving the quality of human capital contributes to the formation of a creative class that, through the development of innovative thinking and culture through entrepreneurial initiatives, leads to the construction of a knowledge economy and a transition to the resulting level - intellectual capital. In Russia, it is possible to single out areas of the economy where

significant increments of intellectual capital have occurred: nuclear energy, space, and weapon technologies. The direct development of innovative systems in the given institutional conditions occurs through an increase in intellectual capital (Figure 2).

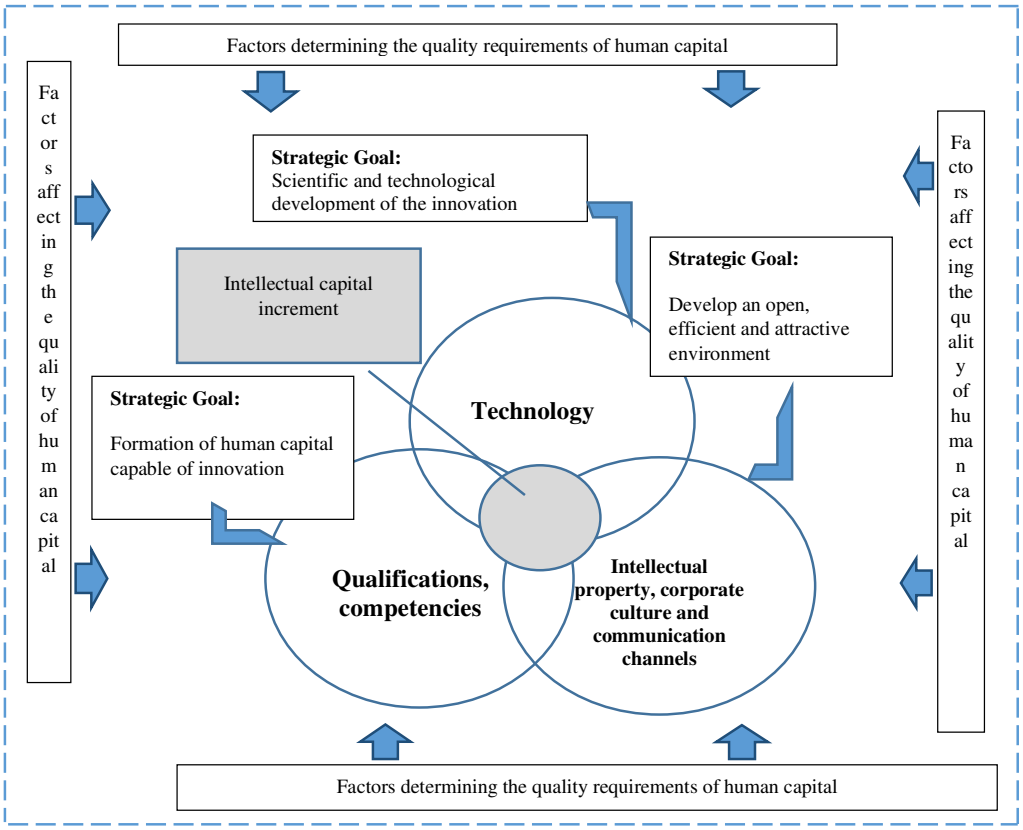

Fig. 2: Intellectual Capital Development Model

In order to identify the opportunities (potential) that allow ensuring the quality of human capital to meet the needs of the reproduction of innovative systems of different levels, it is necessary to determine the factors of the institutional environment for the development of innovative systems that determine the requirements for the quality of human capital and also affect the quality of human capital (table 1).

Table 1: Factors of the institutional environment for the development of innovative systems

Innovation system levels	Factors determining the requirements for the quality of human capital	Factors affecting the quality of human capital
National	Strategic national goals and development goals Current level of innovation development Level of technological development Legal regulation	Income and expense policy Health care system Education system Priorities for scientific and technological development Labor market Population policy Migration policy Pension system

		Living conditions Inequality and poverty Family, motherhood and childhood Criminality Level Ecology Partnership for sustainable development
District	District Development Strategy	Inequality and poverty Partnership for sustainable development
Subjective	Subject Development Strategy Level of technological development Features of institutional development	Income and expense policy Education system Priorities for scientific and technological development Population policy Entrepreneurship support Ecology Infrastructure development Partnership for sustainable development

Assessment of factors affecting the quality of human capital should be carried out: firstly, in order to study the impact of innovation on the possibility of ensuring an increase in the quality of life of the population of the territories; secondly, to determine the existing differences in the level of innovation within the framework of the concept of competitiveness of territories; thirdly, to justify the impact of innovation on the achievement of target indicators of the main components of the economic development of the territory.

Studying the impact of innovation on ensuring an increase in the quality of life of the population at each of the three levels is difficult due to objective reasons due to the lack of statistical information by factors. In accordance with the sustainable development goals of the countries, the Federal State Statistics Service (Rosstat) in the Russian Federation developed a project of the list of national indicators of sustainable development goals [Rosstat, 2020], [Sustainable Development Agenda, 2020]. Data collection on the levels of aggregation of official statistical information should be carried out according to national and subject innovation systems. In fact, the published collection "Sustainable Development Goals in the Russian Federation" [Rosstat, 2019] reflects information on indicators of achieving the sustainable development goals in the Russian Federation both for internal use (for the national innovation system) and international comparisons between countries. Data presented in the collection allow us to assess the current state of the dynamics of sustainable development of the country. It is not possible to compare the results of achieving the sustainable development goals with other CIS countries, BRICS and some OECD countries, since the point data for individual indicators are presented from 2015 to 2019.

In Russia, a number of national and federal projects (programs) have been developed and are being implemented in accordance with Decree of the President of the Russian Federation dated May 7, 2018 No. 204 "On National Goals and Strategic Tasks of the Development of the Russian Federation for the Period until 2024" [President of the Russian Federation, 2018]. Rosstat drew up a collection of methods for calculating indicators of national projects (programs), calculated as part of the implementation of this decree [Rosstat, 2018]. The study of this document allowed us to ascertain that the proposed indicators are calculated by industry ministries and Rosstat at the federal level as a whole for the Russian Federation on an annual basis. Thus, the problems of the methodology of statistical support for the adoption of managerial innovative decisions, which should form the invariance of all participants in the perception of innovative systems of different levels of the current state of innovative development and the quality of life of the population do not allow successfully implement public policy in this area.

The existing theory and practice of assessing the socio-economic development of territories of any level allows us to judge that in most cases the emphasis is on either the economic or social

component of economic development, thereby limiting the coverage of existing problems in these areas of development.

In our opinion, to justify the impact of innovation on the achievement of target indicators of the main components of the economic development of the territory, it can be represented by the following stages:

- assessment of the level of innovative development of territories;
- assessment of the quality of life of the population of the territory;
- assessment of the level of economic development of the territory;
- building a two-dimensional model “Quality of Life - Innovation”;
- building a three-dimensional model “Quality of life - Level of economic development - Innovation”;
- development of directions of strategic management decisions based on the analysis of the obtained model results.

In international practice, different approaches are used to assess the level of innovative development of territories. In practice, the index method is most often used, which allows you to calculate innovative indices by forming a system of indicators for the development of innovative processes and their regulation within the framework of regional innovation systems. In the practice of assessing the level of innovative development of the United States, the Portfolio innovation index (PII) technique is used [Statsamerica, 2009]. Based on the Portfolio innovation index, more than 3,000 areas within the United States are analyzed and five groups of territories are identified. With the aim of informing the innovation policy at the regional level, the European Commission applies the regional innovation development rating development model Regional Innovation Scoreboard (RIS) [Hollanders, H., 2019]. The structure of the Regional Innovation Scoreboard and Portfolio innovation indexes is such that they combine both innovation resources and their results.

In the domestic practice of assessing the level of innovative development of the territory, a methodological approach is applied, developed by the Association of Innovative Regions of Russia together with the Ministry of Economic Development of the Russian Federation in 2012 [AIRR, 2012]. The AIRR model includes a system of indicators grouped in 4 blocks: research and development, innovation, socio-economic conditions of innovation and innovation activity in the region. According to the authors of the approach, the rating reliably reflects changes in the innovative development of the economy of the constituent entities of the Russian Federation, since it is scientifically substantiated and built primarily on the basis of official statistics and is used as a tool for managing the regional innovation system. The results of assessing the level of innovative development of the territory allow the regional authorities to obtain the necessary information for making strategic decisions regarding the further development and improvement of innovative systems and the dynamics of changes in all directions reflected by indicators. One of the important components of the Association’s work is the exchange of regional experience in creating a favorable economic, social, legal, educational and creative environment for the development of innovations. In addition, the work of the Association contributes to the effective innovative development of its members, built on the recognition of various models of scientific and technological growth of the regions. Despite the practice-oriented nature of the AIRR methodology for assessing the level of innovative development of territories, the results of regional assessments are weakly related to the achievement of one of the national goals countries - improving the quality of life of the population.

To assess the quality of life of the population of the territory, data from the Russia Today International Information Agency, the largest Russian information provider for an international audience, are used. The agency draws up ratings of the constituent entities of the Russian Federation on various aspects of the country's socio-economic development and is one of the authoritative experts in this field [Agency "Russia Today", 2020].

Assessment of the level of economic development of the territory is carried out by the Federal State Statistics Service on a regular basis and can be used by researchers to assess different parties.

To assess the effectiveness of managing a regional innovation system aimed at achieving the national goal of improving the quality of life, by building an innovative institutional environment, a strategic toolkit — a management map — in the form of the matrix model "Quality of Life - Innovation" can be used. Such a model can be represented in the form of a coordinate system in which the X-axis shows the indicators of the rating of innovative development of regions, and the Y-axis shows the indicators of the quality of life of the population of the constituent entities of the Russian Federation, the factor sign is the innovativeness of the subject, and the resultant sign is the quality of life of the population.

As an information base for building the map, we used the ratings of innovative development of the AIRR regions for 2016-2018 and the ratings of the regions of the Russian Federation in terms of quality of life for 2016-2018 of MIA Russia Today. The object of the research is the innovative systems of the Central Federal District and the Siberian Federal District, since they are two types of development of the economic systems of the Russian Federation, namely, industrial and raw materials.

Management cards "Quality of Life - Innovation", based on data for 2016-2018, are presented in Figures 3, 4.

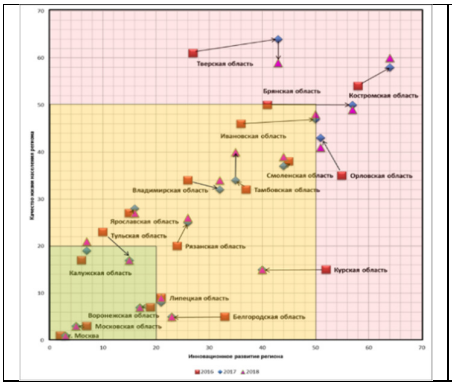

Fig 3. Map "Quality of life - Innovation" for the regions of the Central Federal District, 2016-2018

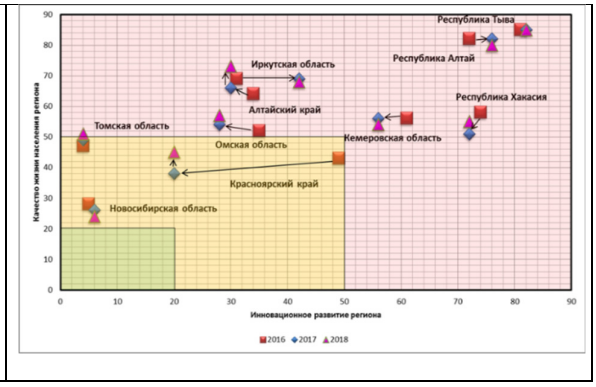

Fig 4. Map "Quality of life - Innovation" for the regions of the Siberian Federal District, 2016-2018.

The management card is designed on the basis of a systematic approach, which allows us to argue that any single problem - improving the quality of life - should be tied in conjunction with solutions to another problem - the level of innovative development of the region - focused on achieving the best socio-economic results, namely increasing the competitiveness of the region.

The position of the region on the management map allows us to assess the effectiveness of the innovation policy pursued by the regional authorities in dynamics and the competitiveness of the region in its impact on the quality of life of its population. The positioning of the region is determined by the minimum values on each coordinate axis, since the management map is based on rating estimates. Three authors zones of regional positioning: leading regions are "green", middle regions are "yellow" and weak regions are "red", which allows was visually assess the degree of success of the innovative development of the territory.

The approach used makes it possible to conclude that the innovation policy pursued by regional authorities has a significant impact on the level of innovative development of the territory with the ability to achieve the goal - to ensure a high quality of life for the population. Thus, the top 4 in terms of innovative development, through which a high standard of living of the population of the Central Federal District is ensured, is Moscow, Moscow Region, Voronezh Region and Kaluga Region. The green zone regions remain stable during the period under review. The arrows on the management map show the direction of the change in the position of the region from 2016-2018. For example, the

Tula region from the “yellow” zone in 2016 moved to the “green” in 2017-2018. However, improving the quality of life was provided not by increasing the innovative activity of the region, but by other factors. Note that for a full analysis of the effectiveness of the state innovation policy of the region, it is necessary to use additional factor attributes to analyze the socio-economic situation of the territory and study the assessment of their impact on the quality of life of the population. In the Central Federal District, the quality of life of the population in most regions for the period under review decreased, which indicates the insufficient attention of the authorities of this level to the issue of innovative development of the district.

An analysis of the positioning of the regions of the Siberian Federal District on the management map made it possible to conclude that none of the regions fell into the green zone, despite the presence of two large scientific and technical centers in the Tomsk and Novosibirsk regions and large reserves of natural raw materials. Note that in this district, the position of almost entities remains stable, maintaining positions in the "red" zone. The exception is the Krasnoyarsk Territory, which has improved its position in the ranking of innovative development of regions by 12 positions, but remained within the "yellow" zone. Presented on the two-dimensional matrix model “Quality of Life - Innovation”, the relationships and the mutual influence of the levels of innovation of the region and the quality of life of its population can be used by regional authorities to develop alternative options for strategic development.

In our opinion, the most complete idea of the possibility of strategic innovative development is provided by the construction of the three-dimensional model “Quality of Life - Level of Economic Development - Innovation”. The three-dimensional model includes the indicator "Gross Regional Product (GRP) per capita", which allows you to evaluate the economic component of socio-economic systems. In this model, the factor signs are “innovative development of the region” and “GRP per capita of the region”, and the resulting “quality of life of the region’s population”. By analogy with the two-dimensional model, three zones of regional positioning are distinguished: “green” - leaders, “yellow” - medium, “red” - weak.

The three-dimensional models “Quality of Life - Level of Economic Development - Innovation”, constructed for the Central Federal District and the Siberian Federal District for 2017, are presented in Figures 5 and 6.

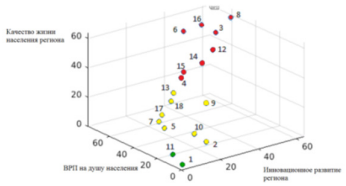

1- Moscow, 2 - Belgorod region, 3 - Bryansk region, 4 - Vladimir region, 5 - Voronezh region, 6 - Ivanovo region, 7 - Kaluga region, 8 - Kostroma region, 9 - Kursk region, 10 - Lipetsk region 11 - Moscow region, 12 - Oryol region, 13 - Ryazan region, 14 - Smolensk region, 15 - Tambov region, 16 - Tver region, 17 - Tula region, 18 - Yaroslavl region

Fig. 5. Three-dimensional model “Quality of life - Level of economic development - Innovation” for the regions of the Central Federal District, 2017

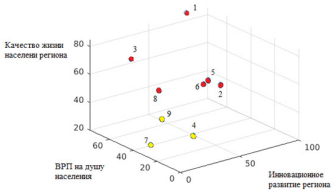

1-Republic of Tuva, 2-Republic of Khakassia,
3-Altai Territory, 4-Krasnoyarsk Territory, 5-Irkutsk Oblast, 6-Kemerovo Oblast, 7-Novosibirsk Oblast, 8-Omsk Oblast, 9-Tomsk Oblast

Fig. 6. Three-dimensional model “Quality of life - Level of economic development - Innovation” for the regions of the Siberian Federal District, 2017

With the introduction of another factor in the model for the Central Federal District, only Moscow and the Moscow Region, Voronezh Region and Kaluga Region moved to the “yellow zone” as the leading regions. Thus, only Moscow and the Moscow Region provide high quality of life for the population of these territories with production volumes. If in the two-dimensional model only four

regions were represented in the “red” zone, then in the three-dimensional model their number increased to eight. The same trend continues for the regions of the Siberian Federal District.

So, a three-dimensional model using an indicator of the economic component of socio-economic systems allows a more objective assessment of the influence of model factors on the quality of life of the region’s population. This model, built over several years, allows us to analyze the dynamics of changes in the positioning of the region and, based on its results, allows us to develop alternative options for strategic management decisions by regional authorities. Of course, the factors of the model should be considered as opportunities for software solutions in the development of the territory and improving the quality of life of the population.

Communication and mutual influence of the level of economic development, the level of innovativeness of the region and the quality of life of its population, presented on two- and three-dimensional models, can be used in the development of managerial decisions within the framework of the development strategy of the region as a whole. Depending on the choice of management methods and models, managerial relations in the implementation of innovative activities and interaction mechanisms of participants in the innovation system, the regional leadership may generate solutions to the problems identified. For example, it is recommended to use information and institutional management methods to influence the awareness of participants in the innovation system; for choosing the direction of strategic changes in the region’s policy, it is necessary to determine the position of the region Compared with other regions - competitors and study the experience of the leading regions and closest competitors on the basis of benchmarking techniques.

Conclusion

The presented study reveals a relevant topic for the Russian Federation in the study of factors of development of human capital in the context of innovative systems to improve the quality of life of the population. The relevance of the topic is explained by the fact that the dynamics of the economic and innovative development of the country does not allow achieving the national goals declared by the state and the expected results of development strategies. One of the reasons for Russia's lagging behind the leading countries of the world is revealed - the underutilization of the country's intellectual potential.

The study of approaches to the formation of state innovation policy in the framework of the sustainable development model showed the inadequacy of a systematic study and full analysis of the process of reproduction of intellectual capital in order to increase it. In the work, a model for the development of intellectual capital in the conditions of innovative systems of different levels was proposed.

The factors of the institutional environment for the development of innovative systems have been identified that determine the requirements for the quality of human capital, as well as affect the quality of human capital in order to identify opportunities for moving to another level - intellectual capital.

It is proved that the assessment of factors affecting the quality of human capital cannot be fully realized due to the problem of the methodology of statistical support for making innovative management decisions. The classification of regions by positioning of regions in the innovation field is formed. The algorithm presented in this paper for assessing the impact of innovation on achieving the target indicators of the main components of the economic development of the territory will allow regional authorities to use the results in the development of managerial decisions in implementing the regional development strategy.

This problem is seen as a promising area of scientific and applied research.

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Modelling Technical Knowledge using the Bayesian Network and the GMDH Method

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Abstract

Knowledge is the competitive advantage of companies. Its source are the experts who are embedded in the work environment and have technical knowledge - built mainly on the basis of procedures, documentation and professional experience. The turnover of experts causes a loss of company know-how. Therefore, it is important to formalise technical knowledge in order to use it further, in such as the training of new staff, in supporting decision-making and in the drawing of conclusions from it. To this end, mathematical algorithms are used to organise, classify, infer and optimise it.
On the basis of an analysis of the literature and a case study, an approach has been modelled which allows expert knowledge to be preserved and the level of knowledge to be predicted and also, the most important areas to be indicated which build it by means of functions. The model consists of the following elements: (1.1) a closed list of choices, which describe the area of the knowledge, (1.2) a questionnaire template, for acquiring the knowledge, (1.3) formalised and acquired expert knowledge which is stored in the knowledge base, (2.1) the Bayesian Network learned, (2.2) the level of knowledge in the enterprise, resulting from the clustering of acquired technical knowledge which is (3.1) the input data for the GMDH (Group Method of Data Handling) and (3.2) the model for forecasting technical knowledge. Finally, this model is implemented in a real case study conducted by the Research and Development department of a manufacturing company.

Keywords: Technical Knowledge; Technical Knowledge Modelling; The Bayesian Network; The GMDH Method

Introduction

Due to the growing phenomenon of the frequent turnover of employees, in companies, it is necessary to retain knowledge in the company and then to forecast its level, in order to determine which source might be missing, within the company, for the implementation of further projects or orders. Therefore, companies need to acquire the knowledge of their workers. Expert and technical knowledge is understood as the knowledge that specialists have, in their company which constitutes the competitive advantage of that company (Patalas-Maliszewska, Śliwa and Kłos 2019). It is formalized, using forms which can be stored and retrieved later, for use by new employees; however, expert knowledge that is closely related to tacit knowledge, is very difficult to acquire and describe formally.

Currently, the following methods and tools are used (Śliwa, Patalas-Maliszewska, 2015; Patalas-Maliszewska, Śliwa, 2017): filling in knowledge acquisition forms (Fazlagić, 2014); making audio-video recording showing actions taken by an experienced worker (Patalas-Maliszewska, Dudek,

2016); talking to experts, engaging experts from external companies, reporting workers' observations; brainstorming, thus comparing knowledge with that already held by workers; registering logs generated in the course of the creative work of an expert and showing the process by visualisations, holograms and the cyber-world etc.

Next, in order for acquired, expert knowledge to be of use to an enterprise, it needs to be formalised, correctly classified and finally forecasted. It is then necessary to design a solution which will enable any expert knowledge, so extracted, to be put into practice. An example of the algorithms used, in order to model knowledge, are the genetic algorithm (Prakash, Chan and Deshmukh, 2011), GMDH (Group Method of Data Handling) (Farlow, 1984; Witkowski, 2002), artificial neutral networks (Patan, Korbicz and Mrugalski, 2002) and data mining techniques (Zhang and Wu, 2010). Accordingly- and with a somewhat limited assumption of trust- comes the selecting of corresponding methods, depending on the conditions of their implementation (Kriegel, Schubert and Zimek, 2017). In our approach, those algorithms used to model knowledge were selected; these are the Bayesian Network and the GMDH Method. According to Van Hulse and Khoshgoftaar (2009) modelling with a simple, statistical algorithm appears to be more effective and reliable than do complex methods. This is confirmed, even in the case of a resistance to the impact of noise or imbalanced data. The Bayesian Network is widely used in statistical, decision-based analysis, where new knowledge is taken into account when making decisions. An example of such usage is in economic analysis (Salles et al, 2019) and reliability tests in the automotive industry (Hadorn, Pohl and Bammer, 2010; Torres-Jiménez et al, 2015). The GMDH algorithm is a solution with which the models organise themselves by creating polynomials and select those with the best prediction criteria. The issue of estimating the value of knowledge, using the Bayesian Network and the most important elements of expert knowledge, using the GMDH Method, within an enterprise, refers to research conducted on the process of the exploration and transformation of data and information, especially in the context of using the classification algorithm and artificial neural networks or the genetic algorithm, in order to predict decision variants, that is, to evaluate the effectiveness of cleaner production (Li et al, 2017b), to understand the causes of the failure of electronic products (Kang et al, 2017) or to understand discrepancies in the desired design (Baykasoglu, Özbakir and Kulluk, 2011).

The present authors have attempted to develop an approach to modelling the level of technical knowledge on the basis of an R&D department, in a production enterprise, in order to determine the most important elements of the technical knowledge within that department. It also endeavours to define the type of this knowledge, which is missing in the company, in order to process further projects or orders The model consists of the following elements: (1.1) a closed list of choices, which describe the knowledge area, (1.2) a questionnaire template for acquiring the knowledge, (1.3) formalised and acquired expert knowledge which is stored in the knowledge base, (2.1) the Bayesian Network learned, (2. 2) the level of knowledge in the enterprise, resulting from the clustering of acquired expert knowledge, which is (3.1) the input data for the GMDH Method and (3.2) the model for forecasting expert knowledge. Finally, this model is implemented in a real case study from the Research and Development department of a manufacturing company.

Review of the Literature

The modelling and forecasting of knowledge can be treated as an approach that not only allows knowledge to be analysed but also to be inference-based on accumulated knowledge, along with a simulation of future phenomena.

Forecasting the level of knowledge in a company means decreased risk, faster access to the necessary information and a base for optimal decisions. This translates into the minimisation of the expenditure taken up in solving problems. It is important to make decisions in an enterprise using the knowledge assessment algorithm, which could (Śliwa, 2018):

- support the management's decision-making processes by assessing the knowledge level expected.
- take into account knowledge resulting from constant assumptions and dynamic expert knowledge.

- be a reliable way of reasoning, based on statistics, for example.
- be a coupling of decision (mathematical) rules with a unique knowledge base.
- allow exceptions, conditions and rules, etc., for managed knowledge, to be declared.
- support the decision-maker with a clear and graphic representation of the availability of the knowledge resources in a company.

The level of technical knowledge results from a combination of the incidence of a codified knowledge base, developed standards and a competent team. The higher the incidence of constituent elements then the higher, also, is the level of estimated knowledge. This assessment may indicate areas of a high degree of employee competence. It can also be the basis for tracking the direction of the growth of knowledge in an enterprise, compared to the previous level, or to the assessment of the knowledge resources, present in a work team dedicated to a task. An interpretation of the level of knowledge may support the management in the form of ready-made conclusions, rules of conduct or the guidelines previously defined by experts. At the same time, "*acquiring knowledge*" is understood as the obtainment of an answer to a question posed in conditions of uncertainty in a complex environment.

Classification algorithms, as well as those operating as independent learning systems, are helpful in understanding and inference, on the basis of collected and formalised technical knowledge by recognising the pattern in images or audio-visual materials (Hall, Phan and Whitson, 2016). Its purpose is to use mathematical models, based on the forecasting data analysed (Kuhn and Johnson, 2013; Janardhanan et al, 2019) which supports decision-making processes. Modelled knowledge, created as the final product of the inference algorithm, is perceived as a new enterprise resource.

Knowledge mapping is also useful to represent the knowledge. It is based on the definition of a set of batch information, its properties and mutual relations (Pan, Wang and Liu, 2007). Knowledge maps, which are the easiest, can represent two-dimensional knowledge matrices which are chosen depending on the location of the map (Wachowiak, 2009). The technique is often used for the quick diagnosis of knowledge in organisations, for example when indicating sources of knowledge while conducting work in the enterprise department; it is also used for tracking processes.

Semantic nets represent the logical structure of knowledge. Semantic terms are selected in relevant clusters and describe the properties and features of the object tested (Kurtz et al, 2014). Semantics and the ontological approach are also used in the analysis of audio materials, in such as construction risk knowledge management in BIM (Ding et al, 2016) or as a document search system that describes the indicated documentation by ontological multi-level network.

Classification and the Regression Tree (one dependent, variable, qualitative and one or more, explanatory variables / independent variables), are developed by split nodes, where the nodes are in one class. Tree branching can be limited by node distribution rules or the optimal size of the tree can be controlled through a complexity parameter. Regression trees are used to perform tests, whose target quantitative value describes the degree of achievement of the variable explained, as opposed to the class label, which treats the problem as binary (Li et al, 2017a). Classification trees are used for assessing events with distribution probability, such as to indicate the cause of errors, to recognise patterns in Earth Science (Zaremotlagh and Hezarkhani, 2017) and also to indicate regressive ones for assessing reliability and estimating levels of a searched variable (Fenton and Neil, 2014).

Algorithm which allow the assessment of knowledge is e.g. Bayesian Network. It is used for classifying objects by the statistical probability of their distribution, presenting the process of dependencies, as well as when making decisions in uncertain conditions with data and expert knowledge (Fenton and Neil, 2012; 2014). Examples of use are in diagnosing learning diseases in such as robots, which are able to adapt to a changing environment in diverse knowledge (Wu and Bell, 2003).

Understanding knowledge includes intelligent algorithms that have the ability to estimate static systems, automatic control systems and optimisation systems when creating new solutions, such as

the replication process and independent creation, based on analysed data and then updating and adapting complex mathematical models. Mentioned here is the GMDH Algorithm.

Genetic algorithms (GAs) are used to study knowledge and optimise intelligence (Prakash, Chan and Deshmukh, 2011; Kuah, Wong and Wong, 2012). Further iterations in the development of the algorithm include evaluation, selection and reproduction to find the best-matched function obtained from the choices available (Chakraborty et al, 2017). In estimating knowledge, GA allows the optimal combination of attributes, affecting a function, to be examined, i.e. the level of knowledge.

Population chromosomes - a chromosome being a single polynomial - are exchanged in one iteration. The GMDH algorithm presents the relation of a dependent variable, Y, to some independent variables X1, X2,...,Xm and is used to construct a higher order, regression type model. The basic GMDH model is a quadratic polynomial of two variables, usually consisting of many layers (Prakash, Chan and Deshmukh, 2011). Examples of the use of GMDH, when forecasting knowledge, are applying it in order to select the features, as outlined by the customer (Xiao et al, 2017). Moreover, a hybrid GMDH was employed to establish a model in order to estimate the heat capacities of Ionic liquids (Rostami et al, 2019). The result of the algorithm's operation is a polynomial which is the model of the object.

Based on a review of the literature, a model to predict technical knowledge was formulated (Fig. 1). It was assumed that the technical knowledge, present in the enterprise - that is, where the sources are expert, from R&D, Technology, Production, Quality departments and others - is built by two kinds of knowledge, namely:

- tacit, understood as education, training, work experience, gained from years of work and the number of patents and completed projects etc.
- explicit, present in formalised sources, such as, technical documentation, reports, knowledge base, the Internet, books, journals.

Interviews with experts, in the area of technical knowledge examined, allowed definition of a closed list of elements describing their *know-how* from R&D (STEP 1.1). Cyclically, this increases during the implementation of new activities in the enterprise, such as, conducting a new project, laboratory work, results and new research. The use of a dedicated questionnaire (STEP 1.2) will allow it to be acquired and formalised (STEP 1.3) and then allow the Bayesian Networks to be learnt (STEP 2.1). A network, thus modelled, on the designed rules, shows the relationships between the elements of technical knowledge. As a result of classification, the level of knowledge is estimated (STEP 2.2). Implementing data, gained from the Bayesian Network into the GMDH Method (STEP 3.1) allows the function of the level of knowledge to be described (STEP 3.2). On this basis, the most important components that affect its level will be indicated, which in fact is new technical knowledge in the enterprise studied (STEP 1.3).

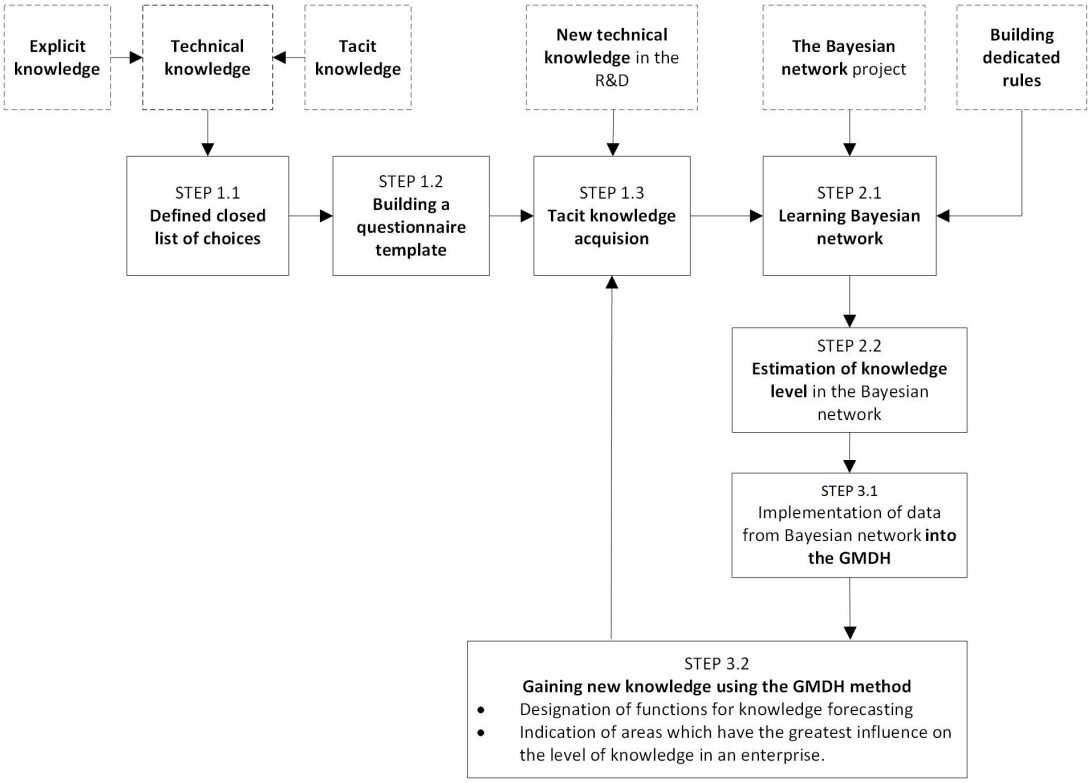

Fig 1. A prediction model for knowledge levels

The proposed model (see Fig. 1) was implemented in the R&D department. The manufacturing company in question, produces small elements of car pneumatics for several key clients; it has a series of repetitive tasks for which fixed elements of expert knowledge are used when developing a project.

Materials and Methods

As discussed in the introduction, the main objective of this paper is to develop a prediction model for the knowledge level in a manufacturing enterprise. This study was conducted with the participation of employees of R&D, a medium-sized, Polish automotive industry production company, making pneumatic components for braking systems. In order to be able to define this approach the following elements are developed.

STEP 1.1, STEP 1.2, STEP 1.3: Formalised and acquired expert knowledge which is stored in the knowledge base.

To collect the expert knowledge in the company, it was proposed that '*knowledge acquisition'* forms be completed. Before that, a closed list of choices was defined (STEP 1.1), according to the following areas: (1) domain: structure, technology, material, functionality, research, (2) sub-domain: e.g. in structure domain: construction, geometry, thread, (3) keywords: e.g. prototype, 3D model, pattern, 3D printing, (4) completed activities: client feedback, additional studies, external consultation, internal consultation, (5) documents used: technical documentation, literature, website, customer feedback, report, (6) documents created: technical documentation, procedure, audio-video recordings, report, model, patent, (7) connected departments: technology, maintenance, purchasing, sales, production.

For this, a dedicated knowledge questionnaire was created (STEP 1.2) and used, whereby using the direct interview method, experts selected responses from a closed list. This included questions about completed R&D projects related to the product's "valve" (STEP 1.3). The experts, who answered, were selected, according to the criteria of their general experience and for their years of work in the company analysed.

STEP 2.1, STEP 2.2: The level of knowledge in the enterprise, resulting from the clustering of acquired expert knowledge using the Bayesian Network.

The Bayesian Network (equation 1) is the so-called conditional probability - *'a posteriori'* of event A (belonging to specified class A) on condition of the occurrence of event B (possessing the properties specified as B) (Król, 2014; Constantinou, Fenton and Neil, 2016; Śliwa, and Patalas-Maliszewska, 2017).

$$P(A_i \setminus B) = \frac{\left(P\left(B \setminus Ai\right) P\left(Ai\right)\right)}{\left(P\left(B\right)\right)} \tag{1}$$

The analysis of events with the use of Bayes in the network construction, is based on determining the probabilities in nodes, which have ascending vertices, otherwise referred to as parents. It is assumed that the occurrence of an event is directly related to its state, also known as an alternative. The conditional probability table (CPT) is characterised by the sum of knowledge A states, for the state bi which belongs to the knowledge alternative vector B and their sum is 1 (*equation 2*). These states are mutually exclusive.

$$\sum_{i=1}^{n} P(A = a_i \mid B = b_i) = 1; \forall b_j \in sp(B) \tag{2}$$

where:

A, B - random variables (*nodes*),
B - a vector of knowledge states (*alternatives*),
a_i, b_i - states of variables *(nodes*),
sp(B) - states set,
i, n ϵ N.

The model of expert knowledge externalisation is based on the assumption that new knowledge is acquired through the Bayes Network (i.e. classification). This means that in order to obtain benefits for the enterprise, the codification of expert knowledge - by means of a form and slogans describing it, is necessary. This, on the other hand, functions in the algorithm as an a posteriori probability. Therefore, the basis is to determine the probability in the input nodes, in the CPT table, as q.v. equation 3:

$$P(X = T) = \frac{x}{t \times u}, P(X = F) = 1 - P(X = T) \tag{3}$$

where:

x - number of occurrences of element X in the database,
t - number of entries in the knowledge base (*completed forms*),
u - the number of potential X-type speeches,
T - State 1 (True),
F - State 0 (False).

In the Bayes Network, designed, dedicated rules were used to determine the probability in selected nodes. Learning the network is enabled by the implementation of the knowledge base, which is the result of formalised technical knowledge. By using the Bayesian Network, it is possible to obtain the

value of the level of expertise in the company. It allows one to determine whether or not a company has sufficient expertise to conduct new projects/orders, in a given area.

STEP 3.1, STEP 3.2: Gaining new knowledge using the GMDH Method

Employing this method, allows the most important type of expert knowledge in the company, to be defined, in order to process further projects or orders. Determining the structure of the object, using the GMDH algorithm, involves iterative repetition of a specific sequence of operations, leading to an evolutionary result structure (Prakash, Chan and Deshmukh, 2011; El-Alfy and Abdel-Aal, 2011; Xiao et al, 2017). This process is completed when the optimum level of complexity is achieved. In order to determine the population of polynomials (equation 5) for an object with m inputs x_1, x_2, ..., x_m, m ϵ N and one output y, a matrix is created in the form (equation 4):

$$X = \begin{bmatrix} x_{11}, x_{12}, \ldots, x_{1m} \\ x_{21}, x_{22}, \ldots, x_{2m} \\ \ldots \\ x_{t1}, x_{t2}, \ldots, x_{tm} \\ \ldots \\ x_{n1}, x_{n2}, \ldots, x_{nm} \end{bmatrix} \tag{4}$$

in which columns 1...m represent independent variables x_1, x_2, ..., x_m, m ∈ N; y represents the vector of output values: $y = [y_1, y_2, \ldots, y_t, \ldots, y_n]^T$, n ϵ N.

It is assumed that the columns of the X matrix are linearly independent. The input data is divided into training (1,2, ..., t) and testing (t + 1, ..., n) data. The training data will be used to construct the object model, while the test data will be used to evaluate partial models. In the first step, for each pair of independent variables $<x_p,x_q>$, p = 1, 2,..., m–1, q = p+1,..., m, m ϵN, an approximation polynomial of general form, namely Iwachnienko, is formed (equation 5):

$$y^* = A_{pq} + B_{pq}x_p + C_{pq}x_q + D_{pq}x_p^2 + E_{pq}x_q^2 + F_{pq}x_p x_q \tag{5}$$

Polynomial coefficients (equation 5) are determined for t training observations using the LS method, i.e. from the condition (equation 6):

$$S_R = \sum_{i=1}^{t} (y_i - y_i^*)^2 = \min \tag{6}$$

where:

$$y_i^* = A_{pq} + B_{pq}x_{ip} + C_{pq}x_{iq} + D_{pq}x^2{}_{ip} + E_{pq}x^2{}_{iq} + F_{pq}x_{ip}x_{iq} \tag{7}$$

In total, m (m – 1) polynomials are created. Every polynomial yi* (equation 7) is evaluated for all observations in the X matrix. The values calculated are placed in separate columns of the auxiliary Z matrix.

In the second step, for each column j = 1,2, .., m (m – 1), m ϵ N of the Z matrix, the regularity criterion is determined from the formula (equation 8):

$$r^2{}_j = \frac{\sum_{i=t+1}^{n} (y_i - zi_j)^2}{\sum_{i=t+1}^{n} y^2{}_i} \tag{8}$$

where:

i – the i-th observation of the X matrix.

j = 1,2,..,m(m−1) is the j-th column of the Z matrix

The coefficient obtained is an assessment of the quality of a given polynomial. The input values of the matrix (see equation 4) were probability values obtained from the Bayesian Network (STEP 3.1). In STEP 3.2, the best polynomials are selected with the lowest value of the coefficient. This process is repeated until the r_{min} value decreases. After the process is completed, the best of the previous generation polynomials is selected. The result of the algorithm is a polynomial being the object model.

Thanks to the use of the GMDH Method, it is possible to define the most critical expert knowledge for the implementation of new projects/orders and to build a prediction model for the knowledge level of a manufacturing company. The application of the algorithm enables the acquisition of new knowledge in the company.

A prediction model for the knowledge level of a manufacturing company

To measure expert knowledge in the enterprise, a dedicated decision model was built, *viz.,* the Bayesian Network (STEP 1.2, Fig. 1). The level of technical knowledge, referred to as a “K” node is, according to the definition, the specialist knowledge held in the minds of employees (Szwarc, Bach-Dąbrowska and Bocewicz, 2018). For this purpose, a network of dependencies was created on the basis of choices there defined: the area of "key words" (elements Ci), gathered in “sub-domain” (SBij), and those in larger thematic “domain” (Bi). Bi nodes, together with the area Gi ("Documents created during the implementation of the project") and Fi ("Sets of used documents") together with subordinate elements Fi ("Documents used to solve the task") constitute the input for node O ("Ready-made templates"). At the same time, area N ("Competent team") was defined, which is built by Di nodes "Connected departments”, to which knowledge in the IT system was made available, Ei nodes ("Activities carried out” while solving the design task) and Ii - "Worker who answered” which is the R&D department employee solving the design task.

In STEP 1.3, a questionnaire was used to formalise the technical knowledge of the R&D employees. The questionnaires then had to be completed and the data thus obtained entered into the knowledge base. Each response was identical to the node assigned to it in the Bayesian Network. The Bayesian Network was taught (STEP 2.1) based on 5 questionnaires. This was the basis for conducting research experiments, i.e. Test 0 and its variances:

- Test 00_v1 – implementation of 10 questionnaires: 5 obtained from the company and 5 the same, with the modification, with nodes E1, E2, E3 always being chosen in the Ei group.
- Test 00_v3 – implementation of 10 questionnaires: 5 obtained from the company and 5 the same, with the modification, with node I2, always being chosen in the Ii group.

On the basis of the answers obtained, the probability of the occurrence of particular choices, for the nodes belonging to the group, was determined: Bi, Bij, Ci, Di, Ei, Gi, Ii, Fi. The values in CPT table for nodes from the group Fi, O, N and K were determined, based on their own rules. They were built on the basis of dependencies and weights, which were defined in co-operation with the R&D department of the company in question. Methods for determining the conditional probability of the nodes for State 1, are presented below.

The rule for nodes Fi (equation 9):

$$P_{(F_i=1(true))} = \sum_{1}^{3}(S_{Fi'} \times P_{Fi=1(true)}) \quad .(9)$$

where:

$S_{Fi'}$ – the alternative state in Fi node (1 True/0 False), for Fi node i {1, …, 3: n ϵ N},
$P_{(Fi=1(true))}$ - the probability of the occurrence of Fi node in the base.
The rule for node N (equation 10):

$$P_{(N=1(true))} = (0.25\sum_{1}^{5} S_{Ei'} \times P_{(Ei=1(true))}) + (0.15\sum_{1}^{5} S_{Di'} \times P_{(Di=1(true))}) + (0.6\sum_{1}^{3} S_{Ii'} \times P_{(Ii=1(true))}) \quad (10)$$

where:

$S_{Ei'}$ - the alternative state in Ei node (1 True/0 False), for Ei node i {1, …, 5: n ϵ N},
$S_{Di'}$ - the alternative state in Di node (1 True/0 False), for Di node i {1, …, 5: n ϵ N},
$S_{Ii'}$ - the alternative state in Ii node (1 True/0 False), for Ii node i {1, …, 3: n ϵ N},
$P_{(Ei=1(true))}$ - the probability of the occurrence of Ei node in the base,
$P_{(Di=1(true))}$ - the probability of the occurrence of Di node in the base,
$P_{(Ii=1(true))}$ - the probability of the occurrence of Ii node in the base.

For example, a method for determining the conditional probability of the O node for State 1 (True) is presented by equation 11 (Śliwa, 2018):

$$P_{(0=1(true))} = (0.65 \times \sum_{1}^{9} \frac{S_{Gi'} \times w_{Gi}}{\sum_{1}^{9} w_{Gi}}) + (0.35 \times \sum_{1}^{3} \frac{S_{F_i'} \times w_{F_i}}{\sum_{1}^{3} w_{F_i}}) \quad (11)$$

where:

$S_{Gi'}$ – state of alternative in Gi node (1 True/0 False); for Gi node i {1, …, 9: n ϵ N},
$S_{F_i'}$ – state of alternative in F_i node (1 True/0 False), for F_i node i {1, …, 3: n ϵ N},
W_{Gi} – the materiality level of the resulting document is determined, based on the application of the AHP method (Analytic Hierarchy Process),
w_{F_i} – the weight assigned to the type of document used (w_{F_i} takes the scale: 1 minor -2 medium -3 major).

Each test required the network to be developed for the "valve" product to be learnt manually. This means: (1) determining the probabilities of each choice on an external spreadsheet and (2) the manual implementation of the results, as calculated, into CPT tables for each node in the Bayesian Network as built into the GeNIE programme. Table 1 presents part of the CPT table for the O node. Calculations for all nodes required the application of individual rules.

Table 1: part of the CPT table for O node, built onto a spreadsheet

Node	**State of node (alternative)**							
G1	1	1	1	1	1	1	1	1
G2	0	0	0	0	0	0	0	0
G3	0	0	0	0	0	0	0	0
G4	0	0	0	0	0	0	0	0
G5	0	0	0	0	0	0	0	0
G6	0	0	0	0	0	0	0	0
G7	0	0	0	0	0	0	0	0
G8	0	0	0	0	0	0	0	0

G9	0	0	0	0	0	0	0	0
F_1	0	0	0	0	1	1	1	1
F_2	0	0	1	1	0	0	1	1
F_3	0	1	0	1	0	1	0	1
P(O=0)	0,8005	0,7421	0,6838	0,6255	0,6255	0,5671	0,5088	0,4505
P(O=1)	0,1996	0,2579	0,3162	0,3746	0,3746	0,4329	0,4912	0,5496

The parameters of the experiments are included in Table 2. The results of the research of the experiments are the measurement of the probability in the target node with its level of knowledge, K, here, in the R&D department. This was done by declaring the occurrence of selected knowledge parameters representing network nodes. For tests 00_v1 and 00_v3, similar combinations of observed knowledge were tested for comparison. The selection of individual nodes with a declaration of their status (State 1 = True and State 0= False) is possible only when the knowledge represented by the node appeared at least once in the questionnaires assigned to a given test.

Table 2: conditions of the experiment and the levels of expert knowledge estimated by the Bayesian Network

Research	**The level of expert knowledge before the test P(K)**	**Observed nodes P("X")**	**The level of expert knowledge when tested with the Bayesian Network (K)**
Test 00_v3 (q. 1-5 + q. 1-5, where node I2 was always chosen)	0.27	D1, D4, E1, E2, I1	0.34
		D1, D4, E1, E2, I1, O	0.85
		E1, E2, E3	0.29
		N	0.51
		C61, C30, B48, B5, E2, F2, D4, G2, G7, I1	0.45
		D1, E2	0.27
		I1	0.32
		I2	0.32
		I1, I2	0.38
Test 00 _v1 (q. 1-5 + q. 1-5 where node E2 was always chosen)	0.38	D1, D4, E1, E2, I1	0.39
		D1, D4, E1, E2, I1, O	0.90
		E1, E2, E3	0.39
		N	0.51
		C61, C30, B48, B5, E2, F2, D4, G2, G7, I1	0.50
		D1, E2	0.39
		I1	0.38
		I2*	0.38
		I1, I2*	0.38
Test 0 (q. 1-5)	0.38	D1, D4, E1, E2, I1	0.39
		D1, D4, E1, E2, I1, O	0.90
		E1, E2, E3	0.39

		N	0.51
		C61, C30, B48, B5, E2, F2, D4, G2, G7, I1	0.50
		D1, E2	0.38
		I1	0.38
		I2*	0.38
		I1, I2*	0.38

** Empty node; never chosen in the questionnaires*

The knowledge described by the following parameters was observed: Connected departments (D1 – Technology dep., D4 – Sales dep.), Activities carried out (E1 - Customer feedback, E2 - Additional research) with the worker who answered, being I1. View of the Bayesian Network designed, is shown in Fig. 2. The results of the experiments conducted are summarised in Fig. 3. Further studies did not take into account the level of knowledge obtained from Test 0, because this data constituted the basis for the considered Tests 00_v1 and 00_v3.

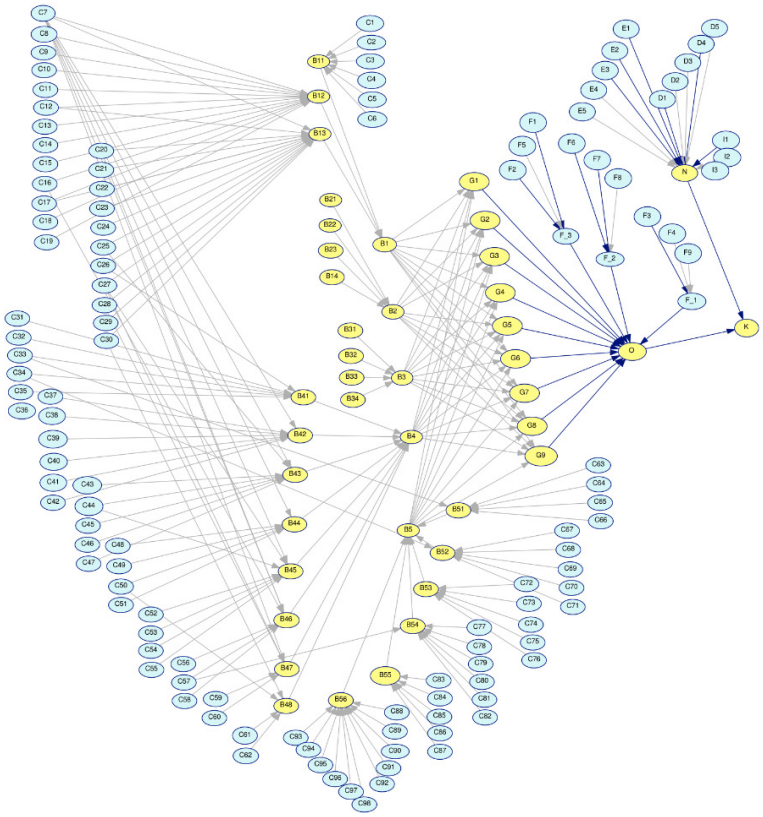

Fig. 2: A graphical model of the Bayesian Network, made in GeNIE

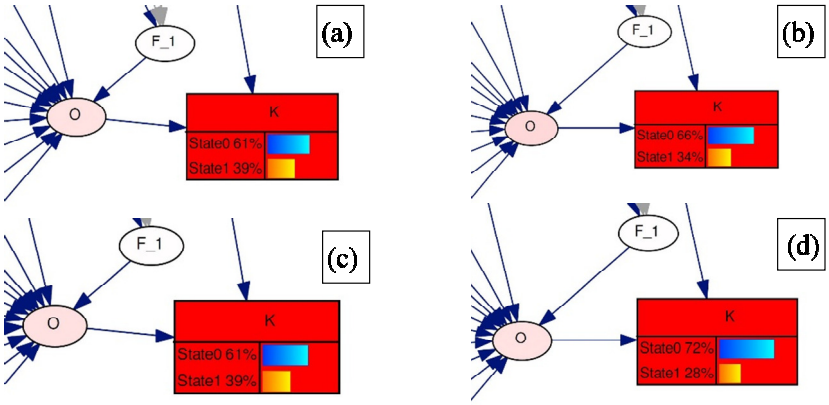

Fig. 3: The level of expert knowledge when tested with the Bayesian Network (K): (a) chosen nodes (State 1): D1 D4 E1 E2 I1 at Test 00_v1, there P(K)=0.39; (b) chosen nodes (State 1): D1 D4 E1 E2 I1 at Test 00_v3, there P(K)=0,34; (c) chosen nodes (State 1): D1 E2 at Test 00_v1, there P(K)=0.39; (d) chosen nodes (State 1): D1 E2 at Test 00_v3, there P(K)=0.28, made in GeNIE

In order to present the 10, most important parameters that affect the change of state in the K node, i.e. P(K=State1), a sensitivity analysis was undertaken (Fig. 4). In GeNIE software, the algorithm proposed by Kjaerulff and van der Gaag (2000) was implemented. The analysis supports validation of the probability parameters of the Bayesian Network [HELP Genie]. Each parameter presented below, is described by the exact relation of states that conditionally affect its value. The green bar shows a positive change, i.e. an increase in the level of knowledge (State 1) and the red bar – a negative change. The analysis was carried out assuming the observation of a 10% change for the knowledge level node. The location of those areas that affect the increase in the level of knowledge, in the company, can serve as a guide for the management, by showing which areas, in particular, need to be developed.

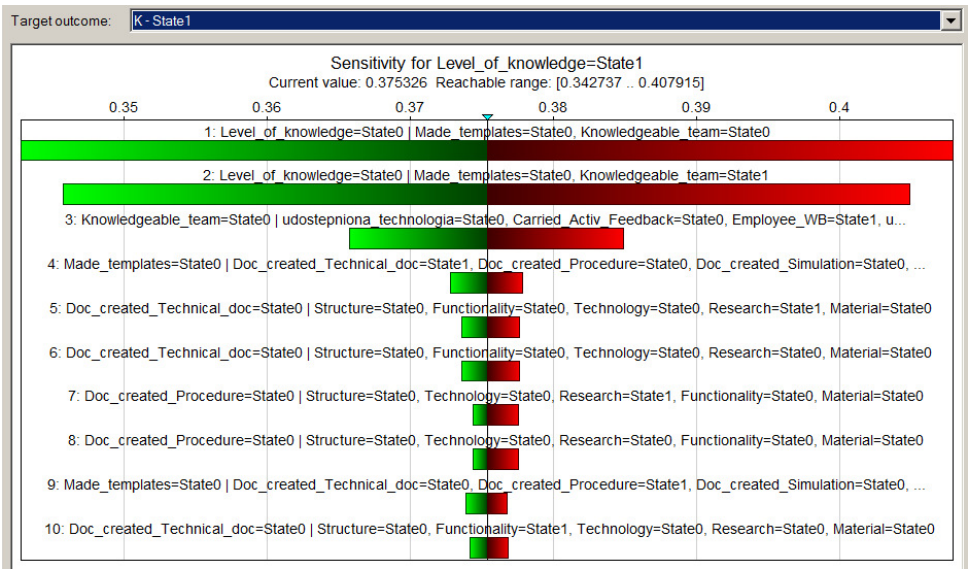

Fig. 4: Sensitivity analysis (Tornado analysis) for the K node "Level of knowledge", made in GeNIE

The level of knowledge of a completed project is the result of the combined presence of a codified knowledge base, a competent team and ready-made templates. The higher the occurrence of component elements and the higher the level of knowledge estimated, the better reflected is the increase in knowledge within the enterprise. However, it has been noticed (see Table 1) that the level of knowledge does not change, despite further development of the knowledge base. Further research in the company studied will allow us to determine the maximum value for the level of knowledge. Using the GMDH Method and based on the research results (see Table 2), the type of knowledge in the company is determined (equation 12, 13), which is crucial to the successful completion of further projects and orders (Patalas-Maliszewska, Śliwa and Kłos, 2019).

$$K^{T}_{00_v3} = [0.34; 0.85; 0.29; 0.51; 0.45; 0.27; 0.32; 0.32; 0.38] \quad (12)$$

$$K^{T}_{00_v1} = [0.39; 0.90; 0.39; 0.51; 0.50; 0.39; 0.38; 0.38; 0.38] \quad (13)$$

Each K_i is associated with indicators that describe the frequency of the response data from the knowledge questionnaire, stored in the individual nodes of the Bayesian Network. A KCO (Knowledge Classification Output) map is provided to present the relationship between formalised knowledge and the outcome of the estimated level of knowledge (see Table 2); equation 14 was based and built on the responses given in the knowledge questionnaires.

$$KCO = \begin{bmatrix} D11 & D41 & E11 & \ldots 1 & I11 & I21 \\ D12 & D42 & E12 & \ldots 2 & I12 & I22 \\ \ldots & \ldots & \ldots & \ldots & & \\ D1n & D4n & E1n & \ldots n & I1m & I2m \end{bmatrix} \quad (14)$$

where:

n, m ϵ N and D1,… ,I_m – elements of the nodes within the Bayesian Network, that is, the formalised knowledge, based on the knowledge questionnaires (Patalas-Maliszewska, Śliwa and Kłos, 2019).

The model proposed by the present authors makes it possible to estimate the most important elements of expert knowledge, in order to complete further projects and orders successfully. The Bayesian Network data regarding the product "valve", in all the variations of the GMDH algorithms, was investigated where designated, using the Consulting IT computer system (Patalas-Maliszewska, 2013) (Fig. 5).

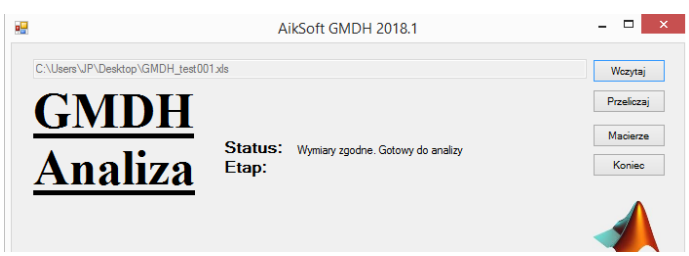

Fig. 5: Variations of the Group Method of Data Handling (GMDH) algorithm, for expert knowledge in a manufacturing company

As a result, the best possible polynomials were obtained, with the algorithm evolution process being completed on the second iteration (equation 15, 16):

a) model KT_{00_v3}:

$$KT_{00_v3} = -0.01 - 4.88 \times B48 + 5.88 \times C30 - 0.47 \times B48^2 - 0.81 \times C30^2 + 1.29 \times B48 \times C30 \quad (15)$$

where:

K - the level of knowledge, forecast in the enterprise
B48,C30 - the most important elements of expert knowledge, namely: B48 – functionality of the product “valve”: “thread sealing”, C30 – structure of the product “valve”: “glue”.

b) model KT_{00_v1}:

$$KT_{00_v1} = 0.28 + 0.21 \times F8 + 0.06 \times G2 + 0.38 \times F8^2 - 0.09 \times G2^2 + 0.42 \times F8 \times G2 \quad (16)$$

where:

K - the level of knowledge, forecast in the enterprise,
F8, G2 - the most important elements of expert knowledge, namely: F8 – the documents used: "reports”, G2 – the established documentation: “procedures”.

As a result of the research, it was found that critical expert knowledge for the implementation of a new project for the product “valve” is knowledge regarding:

- According to model KT00_v3: functionality of the product “valve”: “thread sealing” and its structure “glue”. Therefore, the decision should be made to expand the knowledge questionnaire for this part, so that, in the case of those employees who have such expert knowledge and who leave, or who are otherwise absent from work, do not, thereby, cause the company to lose this knowledge.
- According to model KT00_v1: the documents used: "reports” and the established documentation: “procedures”.
  Therefore, the decision should be made to initiate activities aimed at providing more detailed documentation regarding completed projects / orders in order to not lose expert knowledge from the company.

The resulting models allow new elements of specialised knowledge about the company, to be acquired that should be stored in the company. The use of these models is aimed at formulating recommendations for company managers in the context of developing tools to acquire detailed specialist knowledge, defined in this way.

Discussion

Due to the proposed prediction model for the level of expert knowledge, it is possible to receive expert knowledge using a knowledge questionnaire and then, using the established rules in the form of the frequency of responses, formulate a knowledge base, in order to build the Bayesian Network. The application of the Bayesian Network, a given state in the node, was assigned through an analysis of features, that is, through the probabilities of the elements of knowledge which build up this node. The Bayesian Network allowed, a priori, the classification to the states or alternatives assigned to this node, according to the size of the knowledge element selected. As a result of the operation of the Bayesian Network, a formalised knowledge base is obtained, based on which, and using the GMDH method, new knowledge about the most important elements influencing the success of the new project or order can be obtained.

The limitation in the proposed approach, is the need to define the rules for acquired specialist knowledge in order to formalise it. In addition, knowledge should only be obtained from specialists who actually do the job. Obtaining incorrect answers in knowledge questionnaires may lead to key elements of knowledge being wrongly obtained.

The use of the proposed model allows decision making to be supported when selecting the most important elements of knowledge that should be acquired and stored in a company. The use of the prediction model of the level of expert knowledge is helpful in:

- selecting an expert, from among the employees, to share the most important knowledge with the other employees.
- selecting the area of expert knowledge, in order to improve the competences of employees, in relation to the most important knowledge needed in a company.
- defining a key expert worker based on the value of the model.

The proposed model is currently implemented in a medium-sized, Polish manufacturing company. Currently, implementation has been partly completed with regard to the definition of the most important area of pre-requisite knowledge. Our model will be extended by the algorithm for automatic data acquisition from expert workers, as part of further research.

Conclusions

This work introduces the methodology for managing technical knowledge. For this purpose, a model for forecasting the level of knowledge was presented, along with a definition of the function. The solution presented is dedicated to activities carried out in the R&D department of a production company in the SME sector. Each time, the solution requires adaptation to the specifics of the enterprise, i.e. the formulation of elements describing the selected area of knowledge. Determining the level of knowledge enables prediction using the Bayesian Network. By contrast, the GMDH algorithm affords better understanding of classified knowledge and indicates areas that are key to the further increase of the company's know-how. Both tools support management in decision-making; when used together they create a synergy effect.

The novelty of our approach is the ability to estimate the level of technical knowledge and its most important elements in a company, in the absence of any involvement of experts, therein. Employees are only required to complete a general knowledge questionnaire and then, thanks to the use of our model, it is possible to determine what kind of knowledge area requires more detailed answers to be collected from the relevant employees who carry out the work, specific to the knowledge area identified.

In further work, is planned to expand the model with a dynamic knowledge questionnaire. Completing forms by workers will allow for continually update and expanding the knowledge base, which is very important for correct work of presented solution.

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XR Technologies in Support of Knowledge Management in Production Companies – The Concept of Using AR in the SMED Area

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Abstract

The assumptions of the Fourth Industrial Revolution have the digitisation of enterprises, as their objective. One of the factors that drive it is the use of XR technologies: augmented reality (AG), virtual reality (VR) and mixed reality (MR). Building a dedicated virtual environment supports knowledge management in terms of its formalisation and transfer. AR technologies in manufacturing companies are used in research and development departments and also in production and maintenance departments. This publication describes the concept of using augmented reality as support for quick changeovers, in line with SMED (Single Minute Exchange of Die) assumptions. The motivation was the desire to increase competitiveness in an existing automotive industry enterprise by using modern, IT applications to support business processes, while gaining technical knowledge and saving it in digital form. The solution developed is based on the definition of a closed set of keywords, which are also related to the graphic representation – the 3D model. The defined set contains the names of the machines, the instrumentation, the tools and the actions necessary to carry out the changeover. As a result of gaining expert knowledge, the dedicated iSMEDs system enables intelligent instructions to be built, based on a template assigned to a group of products. The implementation of such a solution may impact upon the ever faster and safer implementation of changeovers, the elimination of human error and a reduction in internal training time.

Keywords: Augmented Reality, SMED, Production Enterprise, Technical Knowledge

Introduction

In research conducted by Lindemann et al. (2010), Pillay and Barnard (2019), it was emphasised that the development of enterprises depends on expert and technical knowledge. Industry 4.0 assumptions determine the increase in demand for specialist engineers. On the one hand, they should have key competences, on the other, they should be able to use modern information technologies, as AgrotecPolska (2012) mentioned. There are still too few such experts; they have high requirements in relation to employment conditions and their 'turn-over' rate is quite frequent. Hence the need to preserve their knowledge, facilitate remote work and get new employees into their duties more quickly without causing machine downtime and the use of unnecessary resources.

According to report of World Economic Forum (2019), technological megatrends in the sphere of production include connectivity, intelligence and flexible automation. According to the Australian Government Department of Industry (2019), four key factors driving the development of enterprise digitisation can be identified:

- the increasing amounts of data, computing power and their connectivity,
- the analytical capabilities of Business Intelligence (BI) applications,

- new forms of human-machine interaction, such as touch interfaces, augmented reality and virtual reality systems,
- improvements in the transmission of digital instructions to the physical world, e.g. through robot work, 3D printing.

With regard to this, one important role is to promote the use of extended reality (XR) to preserve knowledge in an enterprise. XR is another dimension of human experience of the physical and virtual environment, from observation to immersion, as described Chuah (2018). A network of enterprises has been located in the world, which are model units using solutions in line with the demands of Industry 4.0. They are called lighthouses. As proved in the report of the World Economic Forum (2019), some of them explicitly list reality modelling – and there: augmented reality, mixed reality and virtual reality - as being among the five, most important technological solutions they use:

- The Bayer Pharmaceuticals Division in Garbagnate, Italy, admits that due to the use of mixed reality, changeover time has decreased by 30%.
- Johnson & Johnson DePuy Synthes in Cork, Ireland, state that training in virtual reality caused a fivefold increase in the retention of information by employees regarding work safety in a given environment,
- Phoenix Contact in Bad Pyrmont and Blomberg, Germany, states that the use of mixed reality in maintenance facilitates more effective time management and reduces errors,
- Schneider Electric in Le Vaudreuil, France declares that mixed reality causes a 20% decrease in the time required for diagnostics, maintenance and repairs.

Modelling reality as a support for knowledge management in an enterprise

Based on taxonomy, presented by Milgram and Kishino (1994), the real world stands out, while the other is completely virtual (VR), that is, a world in which the environment and actions between virtual objects are completely modelled, without access to external stimuli (Metry, 2018) [14]. The following are defined between these worlds: augmented reality (AR), which allows one to display objects modelled in the real environment, and which are “connected” to it by markers (i.e. specific shape, GPS data); and extension of virtual reality - augmented virtuality (AV) - by adding information, objects, obtained from the environment, expand the effect perceived in the modelled environment - i.e. implementation of the weather effects, mentioned by HITLabNZ (2018). Metry (2018) describes the intermediate element as mixed reality (MR), where virtual objects interact with the real environment, that is, there is manipulation of objects in both environments and the solids seen by man are spatial. Based on the definitions presented, the range of knowledge about the environment, generated by the model, was also distinguished (Fig. 1).

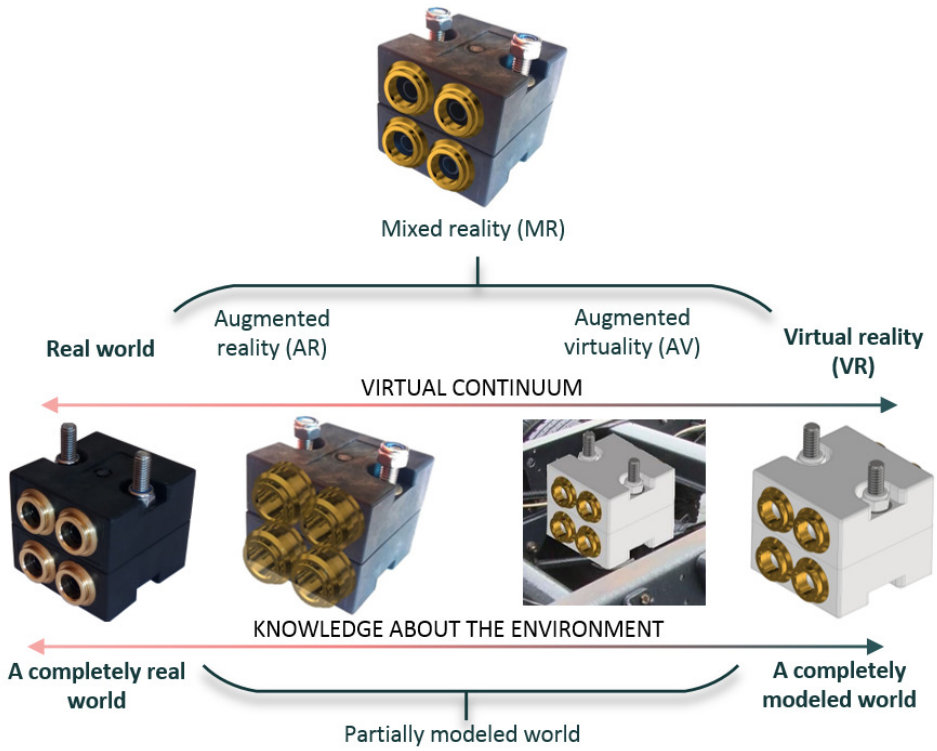

Fig. 1: Representation of a virtual continuum and knowledge of the environment; own study based on research by Milgram and Kishino (1994)

Modelling completely virtual reality means using more time and work resources. According to Milgram and Kishino (1994), the more knowledge remains in the real world - and thus in the consciousness of the people - the more it is dispersed and the less it is systematised [16]. Its opposite is an environment described by functions depicting relations between objects. This is also how the knowledge management support process, in a modern enterprise, can be understood - according to Baran, Ryszko, Szafraniec (2014) and Pedlowski (2012): as formalising technical knowledge - non-system principles that allow one to succeed in solving the engineering problems encountered, usually existing in the mind. However, obtaining tacit knowledge is difficult because it is based mainly on observation or independent action. In an enterprise, it means preparing recordings of actions taken and preserving photos of the surroundings (VR, AR, MR) with comments or voiced notes. In further use, procedures or actions should be described in words, using (in the case of visualisation) geometric models, or, in the case of intelligent decision support systems by using logical relationships or mathematical models (Śliwa, 2018).

Amadi-Echendu (2007), among others, mentioned that an expert is a basic source of technical knowledge [2]. In an enterprise, the engineers generate models and graphic visualisations built in CAD and CAM applications; these define the parameters and the rules for the working and production environments. This is the foundation of using AR and MR techniques. The recipient of knowledge, in this form, focusses on the reference of visualisation in relation to the real environment, which does not need to be modelled and which gives certain boundary conditions (Fig. 2).

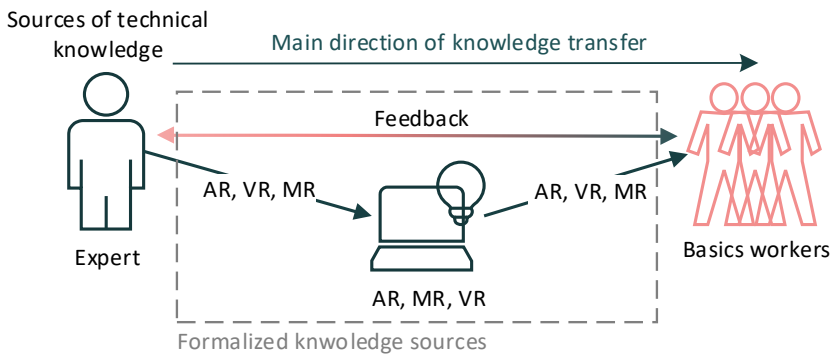

Fig. 2: XR technologies as a medium supporting the formalisation and transfer of knowledge in an enterprise; own study

The direction of the transfer of knowledge is from the expert to those employees subjected to immersion, which means, with reference to Rose, Nam and Chen (2018), the possibility of experiencing extensive, vivid stimuli, surrounding and matching such as user movement.

However, this concept is usually associated with the user's immersion in the VR environment. In a company, as Śliwa and Patalas (2016) mentioned, a source of formalised knowledge (explicit knowledge) documents, instructions, procedures are indicated. The specialist defines in them:

- a sequence of actions,
- programmes for machines,
- audio-visual tips, hints and comments,
- key indicators (KPIs), parameters, alerts,
- quick access paths to related and archived sources of knowledge,
- conditions for complying with the assessment of a process, product, etc.

It is also possible to exchange knowledge between employees as a result of a conversation, the sharing of comments about the real and virtual environment. These methods are mainly used when implementing a remote service, using AR or MR technology. As is well known, feedback communication promotes faster problem solving and learning.

The dynamics of the actions, taken in an enterprise, require the use of techniques for the rapid and repeatable transfer of knowledge, mainly in the case of training and the imparting of instructions.

XR Applications in the Production Department

With reference to Bridgwater (2018) and Michalos et al. (2018), in a production company, VR is most often dedicated to research and development activities, as an unreal training environment model, support for R&D design processes, numerous prototype visualisations, and also for workplace analysis and design. A technology that has a number of practical applications and is cheaper in relation to VR is AR. As presented by Rusek and Pniewski (2017), the most common advantage of implementing such a system is higher employee productivity, a reduction of the potential number of errors, a reduction of the time needed for training, as well as optimal employee utilisation, In this case, the user focusses on the reference visualisation relative to the existing environment; this allows him to more effectively fulfil his duties and minimise unnecessary movements in accordance with Lean methodology. The disadvantages refer directly to the limitations of technology; it is possible to reduce comfortable working when using additional equipment - goggles, reliability, battery life, communication range. The problem is also the limited viewing angle of the modelled image, which forces a physical distance from the real object. For example, the leader of equipment to MR technology, Microsoft Corp., in HoloLens goggles, provides 52 degrees diagonally – as was

described by Robertson (2019) in tech-article. The uses of AR glasses in the area of production, including technology and maintenance are:

- assembly of components using the instructions (Lang et al, 2019),
- operating machines with a preview of work instructions,
- determining communication paths, safety zones, in relation to machines and devices,
- monitoring; controlling working time and employee efficiency (Dataconsult, 2019),
- access to security procedures and as a problem solving platform,
- verification of quality parameters,
- mapping of areas of the most common faults assigned to a machine,
- remote co-operation with the service,
- programming machines and devices, e.g. trajectories of robot movements,
- verification of technical documentation, instructions related to the machine and device,
- retooling machines based on virtual instructions, diagrams,
- verification of the parameters of spare parts (e.g. date of last replacement) and their availability in stock,
- planning repairs and verifying the path of the installation with simultaneous collision detection.

In addition, in a modern factory, the virtual environment can provide broadly understood support for decision making by the management, by reading documentation from ERP systems, verifying the BOM structure of products, production plans. It can support the performance of audits in the production hall and the response during the review of messages, parameters, alerts, statistics or performance indicators (KPI).

Modelling reality as a support for SMED

As presented in chapter 1, production enterprises using modern information technologies, most often cite measurable benefits resulting from the automation of work related to maintenance. This suggests, that smooth machine changeovers, can result in big savings. Usually, these operations are carried out by experienced machine operators who have knowledge about the machinery and devices and who have many years of experience regarding quality requirements. They are able to choose the right manufacturing equipment and tools. During a large diversification of products, instructional support is necessary. Incompetence, when re-tooling can cause:

- a malfunctioning item which means the need to adjust the machine's settings which is both a waste of time and material,
- the possibility of damage to tools,
- possibility of damage to the machine: loss of axles, damage to bearings, damage to tool magazine sockets.

One of the Lean Tool, Single Minute Exchange of Die (SMED) techniques are commonly used to reduce changeover times, i.e. to eliminate waste and unnecessary operations (Monteiro et al, 2019). The SMED methodology begins with an analysis of the changeover process, distinguishing between internal operations which may cause interference on the production line and external operations, which can be carried out, outside the machine and which have no bearing on the flow of production. Based on Sousa et al (2018), it is continued by three main stages:

1st stage: separation of internal and external operations, including the preparation of a checklist necessary for the rig;
2nd stage: transformation of internal operations into external operations, through the use of indirect clamping devices and the standardisation of their functions;
3rd stage: streamlining the setting up of changeovers with particular emphasis on internal operations.

The implementation of SMED also means continuous improvement and monitoring of the process. Numerous studies, such as the example given by Moreira and Pais (2011), indicate that the implementation of this technique brings measurable benefits, such as savings of 2% of the sales value in a metal industry company. Another case is confirmed by an 83% decrease in the time necessary to carry out re-tooling operations in the furniture industry.

The concept of the practical use of AR in the SMED

The concept of a dedicated IT system, using AR technology, or the Intelligent SMED system (iSMEDs) so-called, can help in the efficient implementation of activities identical to SMED when monitoring the changeover process. The basic assumption is to support the current work of machine operators by displaying them in AR / MR technology virtual instructions, based on short commands, supported by virtual 3D graphics. This would shorten machine retooling time. In addition, this system would serve lower-level management staff while maintaining specialised knowledge, monitoring the efficiency of changeovers and implementing internal training.

The system's functions would overlap with the assumptions postulated in SMED methodology, i.e. preliminary operations from stage 0 (*definition of activities*), stage 1 (*definition of checklists*) along with monitoring the time of quick changeovers. Such a solution would allow the automatic re-tooling of instruction machines using universal templates. It is assumed that iSMEDs use both (Fig. 3): knowledge from *external sources* as: specialised database (CAD bib), producers' bib, Internet and *internal sources* of knowledge as: ERP systems, technical documentation, own CAD 2D/3D models of products, self-developed machines, infrastructure (places). The basis is therefore the definition of actions taken during retooling (1), necessary equipment for retooling (2), preparation of programmes for CNC machines (3), the statistics monitoring the changeover (4), definition of a closed list of machines, equipment, tools, materials available in the enterprise, associated with 3D models (5), and workers' feedback for instructions (6). Keeping statistical records would also enable the measurement of the performance of individual employees and the time taken to complete tasks while learning with the selected instruction.

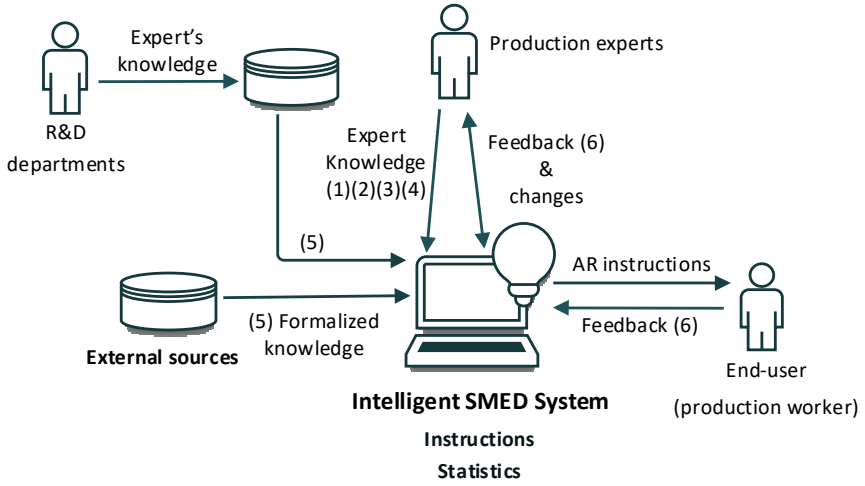

Fig. 3: Function diagram of the Intelligent SMED system; own study

When building instructions in iSMEDs, specialists would use markings for internal and external operations that would be initiated through a colour distinction in the interface. Operations of a given type would be grouped together and the time taken to carry out a particular action would be measured according to the change (execution) of command in the intelligent instruction. In addition, the employee would be shown a communication path which he should follow after downloading the

individual tooling. Improvement in the changeover means revision and development of instructions through the use of new solutions and acquired experience. Therefore, it is important to involve all employees, including the operator, who would be able to add comments to individual steps of the instruction. This would be the basis for a justified modernisation of the changeover by an authorised unit, i.e. a technologist.

Applying the iSMEDs concept requires the implementation of individual steps:

Step 1a. Development of a list of components, grouped together, according to their shared characteristics, where retooling is carried out in a similar way, that is, where their production takes place on similar machines. CNC programme overview. Preparation of a list of objects used in a company for changeover and their storage locations. This information is taken from the information system present in a company.
Place$_i$
Component's group$_i$ = {component$_i$, with the set of features (material$_i$: basic type of bar, forging, other materials); manufactured on the machine$_i$; using device$_i$; tool$_i$; .....}.

Step 1b. Integration of iSMEDs with a representation of places (3D or 2D picture) and a database of 3D models of products and objects used in the enterprise for retooling: a database of tools, devices and machines.
3D models database = {2D/3D place$_i$; 3D component$_i$; 3D machines$_i$; 3D device$_i$; 3D tool$_i$; 3D material$_i$}.

Step 2. Recording, e.g. using a camera built into the AR glasses, for retooling individual product groups (step 1a) by an experienced employee. The operations should be accompanied by voiced comments taking into account, especially, the equipment and tools required for assembly and use.

Step 3. Observation of the changeover process. Setting up a set of command sequences for standard changeover steps (formalisation of technical knowledge) dedicated to specific product groups (step 1a).
Sequences should be universal enough to be able to insert the names of necessary elements and places associated with the 3D object model, into the assigned set of activities. Association of identification tags for objects (if required) and places.

Step 4. Development of the tooling control system.
• Method 1: using the technology installed in AR / MR glasses, which allows one to scan the necessary tools prepared for the change of station and unchecking them on the virtual list.
• Method 2: using a defined list of control questions with confirmation.
The tooling used is in the defined database of 3D models (step 1b).

Step 5. Proposal and implementation the rules, which allow simple statistics to be kept for specific instructions:

- monitoring the average changeover time using the developed instructions,
- monitoring the efficiency of changeovers carried out by a given production employee (work efficiency assessment),
- statistics on the training of production workers (e.g. the number of completed re-tooling operations).

Step 6. Linking the activity sequence template (step 3) - there marking the operation as internal and external (step 2) - with statistics (step 5) to individual groups of details (step 1a).
Step 7. Install the instructions based on the template (step 6) for individual products (step 1a). Associate the names of objects and places with the graphic representation (step 1b).

Step 8. Implement the virtual instructions from the SMED in AR / MR technology, for employees.

An important improvement would be the implementation of voice control in iSMEDs in order to accept individual operations carried out with interactive instruction cards, especially for step 4.

Case study

The company under consideration is a producer of the pneumatic components used in the braking and suspension systems of commercial vehicles. The company manufactures diversified products from its permanent assortment and adds new projects from time to time. The problem is the lack of modern IT solutions supporting management of the knowledge of the production and technology employees. In addition, the company has high staff turnover. Description of the company's specifics is presented below:

- Enterprise size: SME.
- Industry: automotive. Production of connectors, blocks, pneumatic valves found in the braking system of trucks over 3.5t. Production and assembly take place in the enterprise.
- Production volume: serial and high volume depending on the product type.
- Machine park: 15 CNC machines with bar feeders; average changeover frequency *per* week: 2-4x per machine.
- Production mainly includes: semi-finished products constituting the basis for the finished product, mainly small, turned brass elements.

Currently, selected specialists (*2 employees with 15 and 8 years of experience working with CNC*) are involved in retooling in the machine park. Changes made by other operators take much longer and require consultation with experienced staff.

The case study presents a definition of the lists of necessary objects and the sequence of activities associated with re-tooling the machine for selected groups of products - straight connector bodies.

Step 1a
Component group: bodies of straight connectors turned from a round bar

Characteristics:
Tip type I: plug socket ØXX,
Tip type II: undercut thread, MX or GX,
Versions of tip I: Ø6, Ø8, Ø10, 12
Versions II: M12, M16, G1.8", G1.4"

Components:
The list of products meeting the given criteria was generated from the ERP system (Table 1).

Table 1: components building the group: bodies of straight connectors turned from a round bar (combinations of terminals I and II); own study

Body	Index	Body	Index	Body	Index	Body	Index
Ø6/M12	0M0612	Ø8/M12	0M0812	Ø10/M12	0M1012	Ø12/M12	0M1212
Ø6/M16	0M0616	Ø8/M16	0M0816	Ø10/M16	0M1016	Ø12/M16	0M1216
Ø6/G1.8"	0G0618	Ø8/G1.8"	0G0818	Ø10/G1.8"	0G1018	Ø12/G1.8"	0G1218
Ø6/G1.4"	0G0614	Ø8/G1.4"	0G0814	Ø10/G1.4"	0G1014	Ø12/G1.4"	0G1214

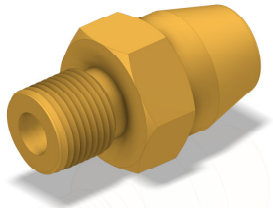

Fig. 4: Illustrative model of component groups: bodies of straight connectors turned from a round bar; own study

Machines: STAR1, STAR2, STAR3; each of these has a bar magazine - feeder.
The machine is selected based on the production plan available in the ERP system.

Instrumentation:
a) expansion sleeves and contracting collet for fixing the rod into the machine tool holder, with diameters appropriate for the diameter of the processed bars: Ø16, Ø18, Ø20, Ø22,
b) three-jaw chucks, in the diameter range appropriate for the rods being machined, chuck I - range 10-20, chuck II - range 20-30,

Material:
Cleaning materials, Compressed air gun,
Input material: Mo58 brass, round bar with diameters: Ø16, Ø18, Ø20, Ø22
Information from the ERP program, from the technology card.

Programmes (called component index numbers): 0M0612, 0M0616, 0G0618, 0G0614, 0M0812, 0M0816, 0G0818, 0G0814, 0M1012, 0M1016, 0G1018, 0G1014, 0M1212, 0M1216, 0G1218, 0G1214.
Information from the ERP program, from the technology card.

Machining Tools:
Turning tools: QS-SVJBR 12 3C, QS-SVJBR 16 3C, QS-SDJCR082XHP-M
Parting-of turning tool: DGTL 12B-1.4D30, DGTL 10B-1.4D20, DGTR 16B-1.4D30, DGTL 16B-2D32
Threading turning tool: SER 0808 H11, SEL 1010 H11, SER 1010 H11, SEL 1212 F16
Special turning tool: 266RG-16VM01A001EE 7015, 266RG-16VM01A002EE 7015, MATL 3-MM01F-040-A 1105, MATL 3-MM01F-050-A 1105
Standard drills: WØ4,2, WØ6,2, WØ8,2, WØ10,2
Multi-cut drill: WG06, WG08, WG10, WG12
Face mills: FØ8, FØ10, FØ12
Boring straight, internal turning tool: WTG6, WTG8, WTG10, WTG12
Information from the ERP program, from the technology card.

Support tools:
M4 Allen key, M6 Allen key, Transport trolley

Places:
Storage location for instrumentation: Machine room, zone A - collet rack
Storage location for machining tools: machine hall, common area - tool cabinet (for CNC tools)
Storage location for support tools: machine room - mobile tool cabinet
Storage location for material: material warehouse

Step 1b
Downloading 3D models representing the elements from step 1a from internal and external databases and documentation (Fig. 5 and Fig. 6.).

A) B)

Fig. 5: A) STAR20 CNC machine and B) mobile tool cabinet; own study

Fig. 6: External threading toolholder; own study

Step 2
Retaining the sequence of operations of the STAR1 machine changeover for the production of 0M0812 component.
Employee identification: Jan Kowalski
Total changeover time: 15 min 30 sec.
Image Recording

Step 3
Observation of recording, ordering activities.

An example of the changeover of the STAR1 machine for the 0M0812 component.
<u>1. (External) Preparation of tools, instruments and materials:</u>
- Get the turning tool: ... QS-SVJBR 12 3C ... from ... the tool cabinet ...
- Get the parting-of turning tool: ... DGTL 12B-1.4D30 ... from ... the tool cabinet ...
- Get the threading turning tool: ... SER 0808 H11 ... from ... the tool cabinet ...
- Get the special turning tool: ... 266RG-16VM01A001EE 7015 ... from ... the tool cabinet ...
- Get the standard drill: ... WØ6,2 ... from ... the tool cabinet ...
- Get the multi-cut drill: ... WG08 ... from ... the tool cabinet ....
- Get the face mill: ... FØ10 ... from ... the tool cabinet ....
- Get the boring tool: ... WTG8 ... from ...the tool cabinet ....

<u>1.1. (External) Approval of prepared equipment at the machine ... STAR1 ...</u>

... list (See step 4) ...

<u>2. (Internal) Preparation of the feeder:</u>
- Removing rods remaining from the previous process. Putting them onto ... a transport trolley ...
- Loading the correct rods into the feeder: ... Ø18 Mo58 ...
  Disassembly of the contracting collet from the feeder remaining after the previous process.
  Use the tool: ... M4 Allen key ...
- Blow out the slot with compressed air.
  Use a compressed air gun.
- Collet contracting collet ... Ø18 ...for the component ... 0M0812 ...
  Use the tool: ... M4 Allen key ...

- Removing rods from the feeder remaining after the previous process.
  Put the rods back onto the transport trolley ....
- loading ... 9 ... rods ... Ø18 Mo58 ...
  Load ... 9 ... rods into the magazine-feeder.

3. Preparation of the main spindle:
- Removing the contracting collet from the previous process.
  Use the tool: ... M4 Allen key ...
- blowing out the socket with compressed air.
  Use a compressed air gun.
- Installation of contracting collet... Ø18 ... for the component ... 0M0812…
  Use the tool: ... M4 Allen key ....

4. (Internal) Preparation of the counter-spindle for gripping components:
- Removing the contracting collet from the previous process.
  Use the tool: ... M4 Allen key ....
- blowing out the socket with compressed air.
  Use a compressed air gun.
- Installation of contracting collet ... Ø18 … for the component ...0M0812…

Use the tool: ...M4 Allen key...

5. (Internal) CNC programme selection: programme number ...0M0812...

6. (Internal) Machining tools assembly

Retrieved from the ERP programme, from a CNC machining technology card number: KTCNC-0M0812.

- Installation of tools in the subsequent main spindle storage socket, according to Table 2.

Table 2: list of tools dedicated to the main spindle storage socket; own study

Main spindle storage	
SOCKET	**TOOL**
WG100	QS-SVJBR 12 3C
WG200	DGTL 12B-1.4D30
WG300	SER 0808 H11
WG400	266RG-16VM01A001EE 7015

Use the tool: M6 Allen key.

- Tool assembly in successive counter-spindle magazine socket, according to Table 3.

Table 3: list of tools dedicated to the counter spindle magazine socket; own study

counter spindle magazine	
SOCKET	TOOL
PW100	WØ6,2
PW200	G08
PW300	FØ10
PW400	WTG8

Use the tool: M6 Allen key.

7. Initial turning of the component (at minimum feed speeds).

Set the feed on the potentiometer to approximately. …10 mm / min... Activate program No. ... 0M0812 ....

Step 4

List of objects necessary for retooling the machine ... STAR1 ... for production of component... 0M0812 ... (Table 4).

Table 4: checklist for objects necessary for retooling; own study

Checklist no	Machine	Name of list	Date:
08	STAR1	Retooling for component: 0M0812	10.03.2020
List of machining tools:			
√	QS-SVJBR 12 3C	√	WØ6,2
√	DGTL 12B-1.4D30	√	G08
√	SER 0808 H11	√	FØ10
√	266RG-16VM01A001EE 7015	√	WTG8
List of support tools:			
√	M4 Allen key	√	M6 Allen key
List of instruments:			
√	contracting collet Ø18 – 1 piece		
√	contracting collet Ø18 – 2 piece		
√	contracting collet Ø18 – 3 piece		
List of materials:			
√	Cleaning materials		
√	Compressed air gun		
√	Material: rods Ø18 Mo58		

Step 5

Development of statistics measurements:

- Measurement of changeover time from step 3 (retooling point 2) to the initial turning of the component.
- Total measurement of implementation time for external changeovers.
- Total measurement of the time for internal changeovers.
- The retooling counter carried out within the same group of details: straight connector bodies by employee 1.

The other steps - viz., 6, 7 and 8 - link the template to each component in a group named: bodies of straight joints turned from a round bar, then, build a ready-made, retooling instruction for the 0M0812 component (see Step 3) and implement it in the company, within the iSMED system.

Discussion and summary

The original concept of the IT system supports operation in the SMED area by the possibility of building and using intelligent machine setup instructions in augmented reality technology. The virtual instructions created in iSMEDs include:

- displaying the command and graphic equivalent of the activity visualisation (3D models),
- distinguishing between internal and external operations,
- checking prepared equipment,
- possibility of adding a comment to a particular instruction card,
- preservation of statistics on work with instructions,
- ability to record work with instructions, to make templates and analyse employees' mistakes.

The idea of the iSMEDs system is based on the definition of universal steps; however, developed machine retooling templates for individual products are the company's *know-how*.

The proposed concept requires refining the system's architecture and integration methodology with knowledge sources - the ERP system, 3D object databases. In addition, according to the research work of Patalas-Maliszewska (2012), integration with current resource management systems, of the presented solution, will also allow achievement of the company's strategic goals in the context of a *learning and growth* perspective.

It is recommended to specify a quick verification method for necessary equipment at the workplace. This is possible by scanning and comparing with the reference model, using a code or tag assigned to a part, or confirming by voice. It is also necessary to indicate the degree of interaction required, which will suggest which technology would be a better solution: AR or MR, as well as conducting performance and cost-effectiveness tests of the system, in the enterprise in question.

The expected benefits of applying the system are: fast execution of setups with instructions; faster implementation of machine operators; support in the implementation of operator training; the opportunity to improve and evaluate employees based on monitoring time and the possible creation of standard template instructions for rapid implementation, based on acquired technical knowledge. The advantage of using AR / MR in an enterprise is the presence of the user at the coal face; awareness of the real environment and the possibility of interaction; also freeing employees' hands and reducing the need to prepare and archive paper documents, which are replaced by a digital image.

Further work relates to the increased automation of analysis and to the preservation of knowledge in the initial white stage SMED. It is recommended to develop building and analysing audio instructions through ontology definitions and the assessment of acquired knowledge; this refers to the research presented by Patalas-Maliszewska, Krebs and Dudek (2017). Also useful could be video analysis - through the ability to automatically link objects, registered in the image, with objects used by the employee. Another important aspect is the development of XR functionalities related to control by defined movements of the eyeballs or blinking, which technology was presented by Fogliatto and Fagundes (2003). This kind of solution, viz., the registering of eye movements, give the possibility of precisely measuring the distance between the objects under observation and any quick glance at the related documentation.

XR technologies support many business processes, from development, through to production-technological and organisational activities. Virtual object models and rules of conduct embedded in the reality of a company can be classified as formalised knowledge and collected in internal databases. The solution is a medium for transferring technical knowledge in a repetitive and structured manner. The use of XR in production companies impacts on the elimination of human error, on better control and on increasing the efficiency of processes and product quality. The case studies described in the literature of companies that have successfully implemented AR solutions - especially for retooling machines - are proof of the huge potential and the need to popularise it in the SME sector.

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Ice Wine Production in The Conditions of Climate Change in The Czech Republic

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Abstract

In the 1990s, ice wine was added to the popular products of wine makers in the Czech Republic, who receive awards at international wine competitions. Although the Czech Republic is not one of the world's wine powers in terms of viticulture, wines from Bohemia and Moravia are considered to be of high quality and are currently successful at many of the world's wine competitions. Ice wine is considered by experts to be a real delicacy, characterized by a very sweet taste, full body, high extract, most often with fruit and honey tones or with tones of caramel, and a relatively low alcohol content. Ice wine is not intended for everyday drinking. It is drunk alone as an aperitif or consumed together with sweet desserts. The oldest known mention of the production of ice wine comes from the pen of the Roman philosopher Pliny the Elder, who lived in the first century AD. He noted that some wine makers were waiting until the grapes froze to make wine. Grapes for ice wine are most often harvested early in the morning, when there is the greatest frost. It is necessary for these grapes to be in the vineyard for at least two days at a temperature of not more than -7 degrees Celsius before being harvested. The aim of this article is to express the current state of ice wine production in the Czech Republic and the main problems related to its production, especially in the conditions of ongoing climate change.

Keywords: ice wine, wine growing and viticulture, wine production, climate change

Introduction

The wine industry is undoubtedly an economic sector in which the Czech Republic can compare with the major economies. The beginnings of wine growing in Moravia reach back to the 2nd century. Vineyards were planted by Roman soldiers on the south-west slopes of the Pálava hills. At the time of the Great Moravian Empire (833-906), wine was part of the way of life of the ancient Slavs. In the Middle Ages, a great many vineyards were established by monasteries. In the 13th century, the wine trade brought large profits to the nobility in certain areas.

Viniculture in Bohemia is connected with the Middle Ages. According to legend, wine came to Bohemia as a gift for Prince Bořivoj and his wife, Ludmila, on the occasion of the birth of their son, Spytihněv. The gift came from no-one else but Svatopluk, the Prince of Great Moravia. The couple took such a liking to the wine that they had the first vineyards planted in Mělnicko. Charles IV was a great supporter of wine-making and had grapevine seedlings brought from France. Burgundy varieties became traditional, in our country called Rulandské (pinot) (Kraus et al., 2010).

Nowadays, wine from Czech Republic is a synonym of quality. Wines of many Czech wineries win awards at competitions in France and other wine superpowers. However, the story of wine-making is not only successes and the tasting of wine from new harvests. To give an example, the Thirty Year's War caused the destruction of half of the vineyards on Czech territory.

The issues of vine-growing and wine-making in the Czech Republic are dealt with in the articles of the following authors: Tomšík et al. (2016), Kraus (2010) and Gosch (2005). The economic significance, position and performance of vine-growing and viticulture within the economy are also dealt with in the works of agricultural economists and journalists such as Horáková (2008), Kütner (2016), Poliačik (2016, 2019, 2020), Pánková (2019) and others.

The aim of this article is to express the current state of ice wine production in the Czech Republic and the main problems related to its production, especially in the conditions of ongoing climate change.

Material and Methods

Methodology

The main method used in writing this paper was to describe the production of ice wine and the problems currently related to it in the Czech Republic. Time series analysis was used to express the development of the grape harvest in the Czech Republic.

Vine-growing for the production of wine constitutes one of the major areas of agriculture of the Czech Republic, and in recent years it has been qualitatively improved. Of the total wine production in the Czech Republic, two thirds are white wine and one third is red wine. These ratios correspond to the ratio of vineyards planted with white and blue varieties. The total area of vineyards in the Czech Republic is over 18,700 ha. The share of the Moravian wine-growing region in the total area of vineyards in the Czech Republic is 96.4%, whereas the share of the Bohemian wine-growing region is a mere 3.6% (Kostovčík et al., 2020).

The vine-growing area of Moravia includes approved territories for vine-growing in the area of the historical country of Moravia. It is formed by four vine-growing sub-areas, Mikulov, Velké Popovice, Slovácko and Znojmo, and it includes 312 vine-growing municipalities. Chládková (2006) states that this vine-growing area is due to its prerequisites predetermined to produce white wines of a good quality. Moravian area can also be used for red wines producing. A typical taste of Moravian wines combines earthy genuineness with savoury fruitful characteristics. Because of the new technologies of wine production, the features of Moravian wines are changing. These technologies supply them particularly with refinement (Chládková, 2006).

Vine-growing regions include the approved areas for growing vine in the historical land of Bohemia. It consists of two vine-growing regions, Mělník region and Litoměřice region, and includes 66 vine-growing villages. The vineyards are located around the rivers of the Elbe, Vltava and Berounka on the southern protected slopes. As reported by Kraus (2010), the vine here gives fairly good yields; however, the quality of wines varies. Despite this fact, many excellent wines, which gain their quality from lying in historically interesting and perfect for aging wine cellars, are successfully grown (Kraus et al., 2010).

This classification of areas was established in May 2004 in connection with the new arrangement of vine-growing regions, which was brought by the Act no. 321/2004 Coll. on viticulture and wine-making and its implementing decree no. 324/2004 Coll.

Harvesting grapes in the Czech Republic

In 2019, domestic wine makers had problems with pests during the grape harvest, which contributed to a year-on-year decline in yield of 20 to 30 %. Wine makers therefore assume that they will harvest from 73,000 to 83,000 tons of grapes, which is the smallest amount in the last three to four years.

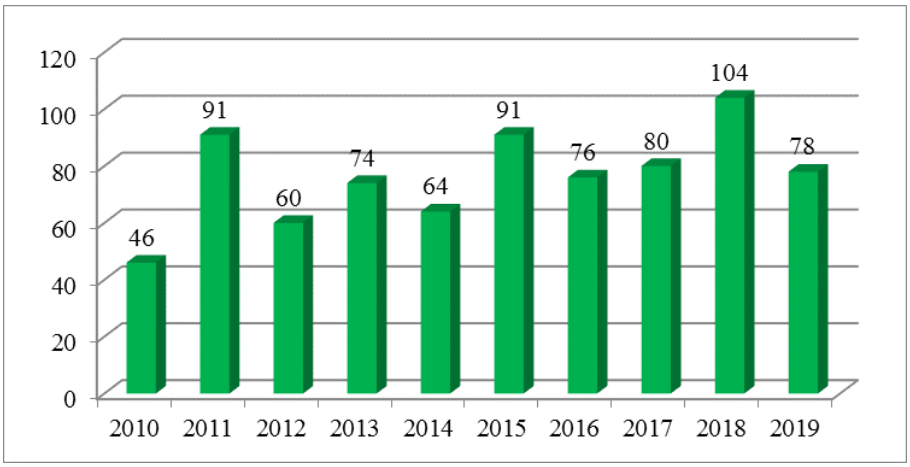

Fig. 1: Harvesting grapes in the Czech Republic (in thous. tons) (Ministry of Agriculture CR, 2020)

Starling raids in 2019 were more destructive than in the previous year (Château Valtice, 2020). The cost of the damage can reach millions of Czech crowns. Wine makers in the Czech Republic most often protect the harvest using gas cannons, which drive starlings away with noise. However, blasting cannot be used in all vineyards and it is expensive, as are the nets protecting the most valuable vineyards abroad. In 2019, wine makers in the Czech Republic also struggled with the overpopulation of voles. The voles attacked the roots of the vines and some of the ripe grapes, causing damage of up to hundreds of thousands of crowns in some places. Voles are naturally killed by small carnivores or birds of prey (Vinařská unie ČR, 2019).

The decline in the harvest is also due to the high comparison base from 2018, when 104,000 tons of grapes were harvested. The vineyards needed to rest after such an extraordinary performance. Nevertheless, wine makers in the Czech Republic are not going to raise prices. According to them, nothing significant is happening; they still have a supply of wine from the extremely successful harvest of 2018. They are also satisfied with the quality of the 2019 vintage. The Ministry of Agriculture, which makes an optimistic estimate of the harvest at around 90,000 tons of grapes, therefore is not considering compensation for wine makers (Pánková, 2019).

Results

Ice wine is considered by experts to be a real delicacy, characterized by a very sweet taste, full body, high extract, most often with fruit and honey tones or with tones of caramel, and a relatively low alcohol content. Ice wine is not intended for everyday drinking. It is drunk alone as an aperitif or consumed together with sweet desserts.

History of Ice Wine Production

The oldest known mention of the production of ice wine comes from the pen of the Roman philosopher Pliny the Elder, who lived in the first century AD. He noted that some wine makers were waiting until the grapes froze to make wine. Another, more accurate description of ice wine appears only at the end of the 18th century, in the German region of Franconia. At that time, early and hard frosts came suddenly, and unfortunate wine makers tried to press the affected grapes before giving them to cattle for food. Gradually, the production of wine from frozen grapes developed into an interesting and relatively complex procedure.

However, a greater expansion of the production of ice wine did not occur until the 20th century; of course, in those wine regions where early frosts can be expected. The cradle of this wine is therefore in Central Europe, especially in Germany and Austria. Currently, however, the largest producers are Switzerland, Slovenia, Croatia, Hungary, Moldova and Slovakia. Wine makers from the Czech Republic have been producing this delicacy since the 1990s. Canada joined the large European producers in 1983 (Poliačik, 2019).

Harvesting Ice Wine

According to the law, grapes for ice wine can only be harvested at a maximum frost temperature of -7 °C (-8 °C in Canada), while harvesting at -10 °C is considered ideal. Waiting for such weather conditions brings many pitfalls. As the vast majority of grapes from the vineyards have already been harvested, and at the same time other options for sustenance are narrowing, hungry birds and various game are very happy to find these islands of abundance (Poliačik, 2019).

However, the real wild card is the weather. When it is rainy and warm, it creates an ideal environment for various diseases. For example, if wine makers wait until the end of December for the harvest, which is not unusual, the chance of disease is very high.

As soon as the daily temperatures start to go below 0 °C, preparations for the harvest begin. Wineries have people in the vineyards who measure the temperature, mainly in the morning. Grapes for ice wine are most often harvested early in the morning, when there is the greatest frost. Wine makers will determine how long to wait for this day; some will hold on until January. When the perfect time comes, the team at the ready sets off.

The deadline for wine makers from Château Valtice is Christmas. At this time, thawing occurs regularly, so they begin to harvest in any case. The grapes are then used to make wine with the "selection of raisins" attribute (Château Valtice, 2020).

After harvesting, the grapes must be processed very quickly, as they must not thaw at all during pressing. Thus, the grape juice does not melt throughout the production process. During fine pressing, water remains in the form of ice inside the press, while a thick and very sweet, concentrated must flows out. The Czech Wine Act requires that this must have a sugar content of at least 27 °NM, which is usually not a problem. The price of producing high quality must is a very low pressing yield - around 20 percent. The must ferments very slowly, and a high sugar residue always remains in the wine. The wine does not ferment to more than 8-9 % of alcohol, but it has a higher acid content and a very high extract (usually more than 50 g/l) (Poliačik, 2019).

The production of ice wines requires late varieties that are resistant to rotting or falling grapes. The most commonly used varieties are Ryzlink rýnský, Ryzlink vlašský, Chardonnay, Sauvignon and Veltlínské zelené.

Ice Wine Price Research

In order to express the value of ice wine production, a survey was carried out of the prices of these special wines on a given segment of the wine market in the Czech Republic. The subject of the research was the prices for which the ice wines are offered to consumers through e-shops, i.e. the prices including the tax burden. As Table 1 shows, the prices of individual varieties of ice wines are differentiated not only according to type, but also according to the winery.

Table 1: Prices of ice wines from selected wineries

Variety	Winery	Price (CZK)	Volume (l)	Price for 1 dcl (CZK)
Ryzlink vlašský	Vinařství Mikrosvín Mikulov	799.00	0.375	213.07
Veltlínské zelené	Vinařství Mikrosvín Mikulov	679.00	0.375	181.07
Ryzlink vlašský	Vinařství Mikrosvín Mikulov	665.00	0.375	177.33
Sauvignon	Vinařství Krist	539.00	0.375	143.73
Ryzlink rýnský	Vinařství Krist	539.00	0.375	143.73
Rulandské modré	Vinařství Krist	539.00	0.375	143.73
Pálava	Vinařství Krist	539.00	0.375	143.73
Pálava	Vinařství Vajbar	449.00	0.2	224.50
Veltlínské zelené	Vinařství Vajbar	399.00	0.2	199.50
Veltlinské zelené	Rodinné vinařství Špalek	404.00	0.2	202.00
Rulandské bílé	Réva Rakvice	412.00	0.2	206.00
André	Réva Rakvice	412.00	0.2	206.00
Ryzlink rýnský	Réva Rakvice	412.00	0.2	206.00
Cabernet Moravia	Vinařství Proqin	469.00	0.2	234.50
Cabernet Sauvignon	Vinné Sklepy Maršovice	419.00	0.2	209.50
Rulandské šedé	Šebesta	469.00	0.2	234.50
Chardonnay	Vinné Sklepy Maršovice	419.00	0.2	209.50
Frankovka	Maňák	379.00	0.2	189.50
Cabernet Sauvignon	Vinné sklepy Lechovice	399.00	0.2	199.50
Frankovka klaret	B/V vinařství Ratíškovice	429.00	0.2	214.50
Frankovka	Maděřič	439.00	0.375	117.07
Merlot barrique	Maňák	439.00	0.2	219.50

Ice wines are offered in packages of either 0.375 liters or 0.2 liters; therefore, a conversion to 1 dcl is necessary for price comparability. For example, the popular Ryzlink rýnský variety from the Réva Rakvice winery is sold at 206 CZK for 1 dcl, while from Krist Winery this variety is sold at only 143.73 CZK for 1 dcl, i.e. about a quarter cheaper. Of the samples of ice wines selected by us, the highest price, 234.50 CZK for 1 dcl, was stated for the Rulandské šedé variety from the Šebesta winery. On the other hand, Frankovka from the Maděřič winery was sold for the lowest price, 117.07 CZK for 1 dcl. The price is not affected by whether the varieties are white or red, but especially by

the quality of the wine of the given vintage. The average price of the examined sample of ice wines in the Czech Republic was 191.75 CZK for 1 dcl, which is approximately the same price at which the consumer can buy identical varieties of late harvest wine in retail chains in packages of 0.75 l. Due to the high price, ice wine is not intended for normal consumption, and consumers therefore tend to buy it for special occasions. It is drunk mainly alone as an aperitif, or consumed together with sweet desserts.

Discussion

Wine makers from the Czech Republic have several years of experience in foreign competitions, so they know which wines to send to have a chance of success. Along with their victories, their self-confidence increases, and more and more wine makers from the Czech Republic apply to wine competitions abroad. However, these are not the most important reasons for their increasing success, because:

- The main reason why wine makers from the Czech Republic win medals in important competitions is that their wines are of better quality than many wines from the wine powers and renowned world wineries.

- At the same time, participation in prestigious competitions is becoming easier and easier for wine makers. In the Czech Republic, the Wine Fund and the National Wine Center especially are responsible for this. The portfolio of international competitions which wine makers can enter with the support of the fund is constantly expanding. The support is not only financial, however, but also organizational, with the National Wine Center currently in charge (Vinařský fond ČR, 2020).

The international wine competitions in which Moravian and Czech wine makers participate are carefully selected. Above all, attention is paid to seriousness and prestige. Most of the selected international competitions take place under the auspices of the OIV (Organisation Internationale de la Vigne et du Vin). If this international organization associates its name with a competition, it very strictly oversees the fairness and high quality of the competition. Thus, such events rank among the most prestigious competitions in the world (Poliačik, 2020).

Even though the production of ice wine in the Czech Republic has been permitted officially only since 1995, domestic wine makers are very successful with their ice wines. For example, Ryzlink rýnský 2013 from Vinné sklepy Lechovice won the gold medal at the prestigious Sélections Mondiales des Vins competition in Quebec, Canada in 2016. The winery celebrated the same success with Ryzlink rýnský at the Terravino Mediterranean International Wine and Spiritý Compétition in Israel in 2019. At the Vinagora world competition in 2015 in Hungary, Tramín červený 2010 from Znovín Znojmo won the gold medal and the title of National Winner. Neuburské 2001 from the Château Valtice winery became a champion at the world competition in Panama in 2003, where it was declared the best wine of the century (Poliačik, 2019).

Conclusion

Although the Czech Republic is not one of the world's wine powers in terms of viticulture, wines from Bohemia and Moravia are considered to be of high quality and are currently successful at many of the world's wine competitions. The oldest known mention of the production of ice wine comes from the pen of the Roman philosopher Pliny the Elder, who lived in the first century AD. He noted that some wine makers were waiting until the grapes froze to make wine.

However, a greater expansion of the production of ice wine did not occur until the 20th century; of course, in those wine regions where early frosts can be expected. The cradle of this wine is therefore in Central Europe, especially in Germany and Austria. Currently, however, the largest producers are Switzerland, Slovenia, Croatia, Hungary, Moldova and Slovakia. Wine makers from the Czech

Republic have been producing this delicacy since the 1990s. Canada joined the large European producers in 1983.

According to the law, grapes for ice wine can only be harvested at a maximum frost temperature of -7 °C (-8 °C in Canada), while harvesting at -10 °C is considered ideal. Waiting for such weather conditions brings many pitfalls. As the vast majority of grapes from the vineyards have already been harvested, and at the same time other options for sustenance are narrowing, hungry birds and various game are very happy to find these islands of abundance.

The production of ice wines requires late varieties that are resistant to rotting or falling grapes. The most commonly used varieties are Ryzlink rýnský, Ryzlink vlašský, Chardonnay, Sauvignon and Veltlínské zelené.

Even though the production of ice wine in the Czech Republic has been permitted officially only since 1995, domestic wine makers are very successful with their ice wines. For example, Ryzlink rýnský 2013 from Vinné sklepy Lechovice won the gold medal at the prestigious Sélections Mondiales des Vins competition in Quebec, Canada in 2016.

The lack of water, not only in rivers but also in the soil, is also reflected in the anticipated future harvest of grapes in the Czech Republic. According to the Czech Hydrometeorological Institute (2020), the drought in the Czech Republic is currently worse than it was in mid-April 2019 and 2018. If it does not rain in the near future, it will have a negative impact on agriculture. Not only agricultural crops in the fields, but also vines are at risk.

Acknowledgment

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New landscape of the Industry 4.0 trends in the ICT sector after the COVID 19 epidemic[1]

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Abstract

Technological progress has contributed over the centuries to the development of so-called industrial revolutions. One of such revolutions is the Fourth Industrial Revolution (Industry 4.0), in which we are now living. It is the development of ICT that has contributed to its definition as a concept within which technologies and the physical world not only coexist but intertwine. Given that currently, the coronavirus epidemic has shaken the global economy and practically all sectors have fallen. Therefore, the question naturally arises how Industry 4.0 trends in the ICT sector are shaping in the face of the crisis. The purpose of the article is to try to answer this question. The first part of the article defines the ICT sector, then presents its evolution and discusses the concept of Industry 4.0. The next part characterizes the main trends in the Industry 4.0 area in the ICT sector. These trends became the basis for empirical research conducted in the Polish ICT sector, the results of which are further presented. The last part of the article presents the summary and conclusions.

Introduction

The development of technological technology is one of the most important phenomena for the growth of a modern economy. In the era of the fourth industrial revolution (Industry 4.0), the ICT sector plays a key role. Enterprises and public investments invest in the implementation of new technological systems. These investments are not limited to individual processes, but fully integrated environmental technologies. Trends identified in the Industry 4.0 concept, such as: Internet of Things (IoT), intelligent factories, intelligent installations, artificial intelligence (AI) systems and analysis of large data sets translated into real enterprise strategies, and solutions in this field are not widely used only in enterprises, but also by individual users. In the most developed national implemented programs providing support in the adaptation of solutions used in enterprises, e.g. various clusters and Industry 4.0 programs focused on the development of digitization of selected transport branches, e.g. e-health, e-education and e-offices. The picture of technological development was current at the beginning of 2020. Currently, however, the coronavirus epidemic has shaken the global economy and practically declines have been recorded in all sectors all sectors. Therefore, the question naturally arises how industry 4.0 trends in the ICT sector are shaping in the face of the crisis. The purpose of the article is to try to answer this question.

The chosen goal is part of the economic analysis conducted by various institutions in the face of crisis phenomena [IDC 2020; KIGEiT 2020]. However, it should be emphasized that the available studies perform the functions of reports and do not constitute scientific papers.

The first part of the article defines the ICT sector, then presents its evolution and discusses the concept of Industry 4.0. The next part characterizes the main trends in the Industry 4.0 area in the ICT sector.

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These trends became the basis for empirical research conducted in the Polish ICT sector, the results of which are further presented. The last part of the article presents the summary and conclusions.

The ICT Sector

The ICT sector is defined in many ways [OECD 2011; Central Statistics Office 2010; PARP 2017; Zuppo 2012]. The large number of definitions of the ICT sector, and thus the diversity in the area of reporting data on it, is related to the relatively short time that has elapsed since it was recognized as an autonomous economic discipline by institutions involved in the classification of economic activities.

ICT as an autonomous sector in Europe began to be talked about only in the early 1990s in the context of separating economic activities related to advanced technologies. It was not until 1998 that OECD member states agreed on a common definition of the ICT sector [OECD 2002]. The basis for defining the ICT sector is product isolation specified in the International Standard Industrial Classification of All Economic Activities [United Nations Statistical Commission, 2002].

The condition for classifying an enterprise as ICT production is the production of products that must be designed to perform the functions of information and communication, including transmission and display, or must use an electronic system to detect, measure and / or record physical phenomena or control a physical process. However, the condition for qualifying service activities as being within the ICT sector is the provision of services for electronic information processing and communication [United Nations Statistical Commission, 2002]. According to this separation, ISIC defines the ICT sector as a set of enterprises conducting production and service activities, which consists in intercepting, sending and displaying data and information by electronic means [OECD 2011].

In the simplest way, the ICT sector is understood as a combination of the IT sector (Information Technologies) and the telecommunications sector. In practical terms, the use of the term ICT is somewhat discretionary. And as it depends on the specific company, e.g. telecommunications operators, all activities not related to telecommunications activities, e.g. equipment resale or integration activities, are classified as ICT activities. It should be emphasized that the issue of including a specific entity in the ICT sector is interpreted differently even by the sector participants themselves. However, over the past nine years, entity awareness has increased in this regard. According to my own research conducted from March to December 2011 on a group of 40 ICT enterprises and 104 respondents - 80% of surveyed employees of telecommunications operators (42 out of 53 persons) claimed that their companies are not ICT enterprises and 50% of surveyed employees of ICT equipment producers claimed that they do not carry out activities related to ICT (8 out of 16 people)2 [Jasińska, Szapiro, 2014]. Currently, based on a survey conducted in 2020, by interviews with representatives of 20 ICT enterprises, it can be seen that all respondents asked confirmed that their enterprises are representatives of the ICT sector (about half of the respondents participated in both the 2011 survey and the 2020 survey). It should be emphasized that these studies vary in scale, so the results can only speak of a certain trend in the perception of belonging to the ICT sector. The study will be described in more detail in the next part of the article.

[2] *Data provided on the basis of a survey consisting of a telephone interview with 30 experts from ICT enterprises and a survey of a group of 90 experts from enterprises in the ICT sector (in total, the study was conducted on 104 different people - 16 of whom took part in both the survey and the interview). The purpose of the interview and survey was not to create the definition of the ICT sector. The application presented by the author is an additional application in relation to the chosen research goal. During the first contact with a group of respondents, it turned out that some of them (48%, i.e. 50 out of 104 people) did not want to participate in the survey, claiming that they were not participants in the ICT sector.*

The evolution of the ICT sector and Industry 4.0 contept

Over the past 50 years, the following breakthrough ICT technology periods have been observed [Lombard 2009; Schwab 2017] :

- The Third industrial revolution (Industry 3.0) erupted in the 1970s and was connected with automation processes, thanks to the use of new computer technologies. Within the third industrial revolution, the following periods can be mentioned:
  - The first stage, covering the years from 1975 to 1995 (the period from the development of the second Moore and Ethernet law to the success of mobile telephony in the USA), in which the so-called three big blasts occurred, namely: the introduction of digital telephony, Internet take-up, and the beginning of mobile communication..
  - The second stage, covering the years 1995–2004 (the period from the Netscape debut on the stock exchange to the Google debut on thereupon) is called transitional or otherwise referred to as the "second fetal life of the network". During this period, Internet browsers developed, and the network became the basis for providing services and content, as well as many surprising uses.
  - The third stage, covering the years following 2004; the so-called second life of the web (Web 2.0). During this process, new phenomena occurred: e.g. the emergence of a new type of user being a network node, which not only downloads content, but also publishes it. Other phenomena from this period are the emergence of free services, conditioned by the spread of new business models of advertisers. Combining value chains, where companies search for new ways of functioning is another significant phenomenon (e.g. equipment suppliers take over the role of service providers, and service providers are struggling to grant new frequencies, which is associated with acquiring the key value for the enterprise - the final recipient).
- The Fourth Digital Revolution (Industry 4.0), which has been observed since 2014, concerns building interdisciplinary systems by integrating physical and digital layers [Lasi et. al 2014; Rifkin 2011; Czyżewski et. al, 2017]. Klaus Schwab and World Economic Forum characterized this term by a range of new technologies that are fusing the physical, digital and biological worlds, impacting all disciplines, economies and industries [Schwab, 2017]. In the Industry 4.0 solutions are: smart factories, cyber-physical systems, self-organization, new systems in distribution and procurement, new systems in the development of products and services, adaptation to human needs, and corporate social responsibility. Industry 4.0 focuses on the end-to-end digitalization and creation of complex digital ecosystems with value chain partners. In contrast - Industry 3.0 was focused on the automation of single machines and processes [PwC 2016]. In Industry 3.0 opportunities are limited by parameters of technology and IT infrastructure. The fourth industrial revolution is connected with completely new solutions in which technology becomes a part of complicated systems, societies, or even human bodies. The most important trends in Industry 4.0 are presented in Table 1.

Table 1: The most important trends in Industry 4.0

Trend	Description
Big Data and Analytics	The collection and comprehensive evaluation of data from many different sources production equipment and systems as well as enterprise and customer-management systems will become standard to support real-time decision making The collection and comprehensive evaluation of data from many different sources production equipment and systems as well as enterprise and customer-management systems will become standard to support real-time decision making

	The collection and comprehensive evaluation of data from many different sources production equipment and systems as well as enterprise and customer-management systems will become standard to support real-time decision making The trend is growing due to the increase in the amount of data in the company's services and their general availability. These data should be analyzed and made based on their decisions at runtime. The application of artificial intelligence and machine learning algorithms is the subject of many projects in the ICT sector [Rüßmann 2015]
Autonomous Robots	utonomous robots can complete given task precisely and intelligently within the given time limit and also focus on safety, flexibility, versatility and collaboratively The trend associated with the replacement of human work by robots in connection with progressive automation. Autonomous, robotic systems not only do the work for a man, but also make decisions for him. Thanks to this, given task can be implemented precisely and intelligently within the given time limit and also focus on safety, flexibility, versatility and collaboratively. Examples of applications are autonomous vehicles and drones [Rüßmann 2015]
Simulation	Simulations will be used more extensively in plant operations to leverage real-time data to mirror the physical world in a virtual model, which can include machines, products, and humans, thereby driving down machine setup times and increasing quality The trend associated with the development of virtual reality and its wide industrial and military applications. Simulations are used in data processing operations when used to calculate the physical world in a virtual model. Virtual reality currently allows reversing of real conditions, in which it is possible to conduct e.g. training in various fields. [Schuh et al. 2014]
Horizontal and Vertical System Integration	The trend is developing in connection with the progressive integration of ICT systems to create a coherent environment is one of the main assumptions of Industry 4.0. The Industry 4.0 paradigm concerns: the level of integration in the entire value creation network, vertical integration and networks of production systems and comprehensive engineering throughout the product life cycle [Stock, Seliger, 2016; Schuh et al. 2014]
Internet of Things	Is one of the fastest growing trends. It applies to equipping devices and commonly used items with communication modules to transfer their functionality to the network. IoT solutions include: Internet of Everything (IoE) which consists of Internet of Service (IoS), Internet of Manufacturing Services (IoMs), Internet of People (IoP), an embedded system and Integration of Information and Communication technology (IICT) [Neugebauer et al. 2016]
Cyber security and Cyber Physical Systems (CPS)	Decentralization and autonomous behavior of the production process are main characteristics of CPS. The evolution of CPS mainly depend on the adoption and reconfiguration of product structures Supply Networks considered as Collaborative Cyber physical systems which are used in Manufacturing systems as well as different cyber physical systems like city traffic control and control systems he trend is developing due to the need to secure ICT systems that are becoming more open and accessible to a large number of users. It is particularly important to secure Collaborative Cyber Physical systems that connect the real world with the technical one. These systems are widely used in the production and control of road traffic [Ivanov et al. 2016]

	With the increased connectivity and use of standard communications protocols that come with Industry 4.0, the need to protect critical industrial systems and manufacturing lines from cyber security threats increases dramatically. As a result, secure, reliable communications as well as sophisticated identity and access management of machines and users are essential
The Cloud	Cloud-based IT-platform serves as a technical backbone for the connection and communication of manifold elements of the Application Centre Industry 4.0 The trend is developing due to the need to secure ICT systems that are becoming more open and accessible to a large number of users. It is particularly important to secure Collaborative Cyber physical systems that connect the real world with the technical one. These systems are widely used in the production and control of road traffic [Ivanov et al. 2016]
Additive Manufacturing	With Industry 4.0, additive-manufacturing methods will be widely used to produce small batches of customized products that offer construction advantages, such as complex, lightweight designs. High-performance, decentralized additive manufacturing systems will reduce transport distances and stock on hand A growing trend in connection with the smart-factory concert. Additive-manufacturing methods are used to produce small batches of customized products that offer construction advantages, such as complex, lightweight designs. [Rüßmann 2015; Landherr et al. 2016]
Augmented Reality	Augmented-reality-based systems support a variety of services, such as selecting parts in a warehouse and sending repair instructions over mobile devices. Industry can use of augmented reality to provide workers with real-time information to improve decision making and work procedures. Workers may receive repair instructions on how to replace a particular part as they are looking at the actual system needing repair Trend related to the development of cyber-physical systems. Augmented-reality-based systems can support a variety of services or production systems, by displaying various information about objects without the need for special search. Workers in factories may receive repair instructions on how to replace a particular part as they are looking at the actual system needing repair [Rüßmann 2015]

Source: Own study based on [Rüßmann et al., 2015; Landherr et al. 2016; Neugebauer et al. 2016; Ivanov et al. 2016; Stock, Seliger 2016; Schuh et al. 2014; Vaidya 2018]

The trends presented in the Table1 show the complexity of the Industry 4.0 concept. A lot of tehnological phenomena are included into Industry 4.0. World Economic Forum predicts that will occur until 2025 and have a significant impact on the development of the economy are indicated. These include: 80% of people with a digital presence on the Internet, 5% of products made in 3D, 10% of cars in the US being unmanned cars, 90% of people having access to unlimited data storage, 10% of people wearing clothes connected to the Internet, 1 trillion sensors connected to the network, 30% of corporate audits carried out using artificial intelligence, 90% of the population using a smartphone, and 90% of the population with Internet access [WEF 2015]. The quoted data show the scope of challenges posed by ICT projects, and represent huge prospects for the development of the sector.

These activities, however, require significant capital, and even under stable conditions are subject to great risk. The question then arises whether these perspectives will not be significantly disturbed in connection with the crisis associated with the COVID-19 epidemic.

It should be emphasized that the emerging crisis is not the first situation of this type that can be observed during the last twenty years. The first of such events, strongly related to the ICT sector itself, was the crack in 2000 of "Internet bubble", which caused an avalanche of bankruptcies of ICT enterprises (e.g. the American operator Worldcom). This led to an overall decline in stock exchange rates and collapse in non-ICT industries as well. It is estimated that this crisis has led to the elimination of around one million jobs worldwide and decapitalization of the US stock market by around $ 2 trillion. After only a few years, the ICT sector - mainly due to telecommunications - has overcome the collapse. Another crisis that began in the US in mid-2007 due to the risky use of sub-prime mortgage loans on the financial market, hitting the entire global economy also had an impact on the ICT sector being analyzed [Lombard 2009]. The decade was even named by Angela Merkel as the "lost decade", which in her opinion meant that it takes 5 to 10 years to restore economic growth before 2008 [http://www.ekonomia24.pl/artykul/…, date downloads: 21.11.11]. Nowdays, Compared to 2019, Thomas Meyer, IDC's CEO in Europe, emphasizes that the stagnation in the ICT sector during the 2007-2008 crisis was significantly greater [IDC 2020].

Industry 4.0 trends in ICT Sector– Research Results

Trends indicated in the Table 1 were verified in empirical studies that was conducted from April 10-17, 2020 and involved in-depth interviews with 52 managers representing 20 companies from the Polish ICT sector. Share of respondents in the knowledge broken down by type of enterprise is presented in Figure 1-2.

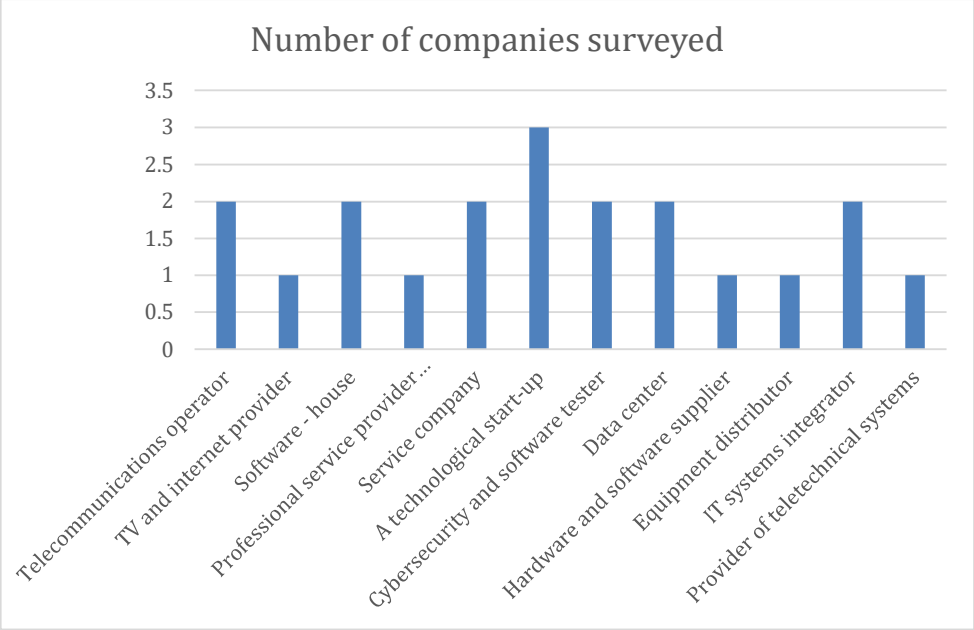

Figure 1: Share of companies surveyed broken down by type of enterprise

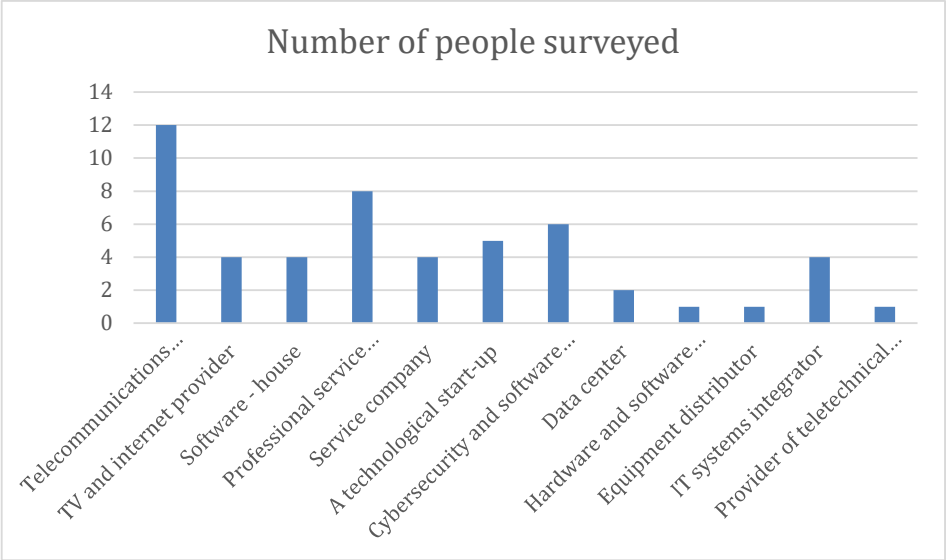

Figure 2: Share of respondents in the knowledge broken down by type of enterprise
Source: own study

Respondents were asked if the chosen trend described in Table 1 was significant for their company before the coronavirus epidemic. Then they were asked whether the area of the given three was related to the implementation of projects, sale of products or provision of services. Respondents were later asked to explain scope of changes taking place within Industry 4.0 trends after the coronavirus epidemic.

Results are presented in Table 2

Table 2: Results of the research

Trend	Description
Big Data and Analytics	The collection and comprehensive evaluation of data from many different sources production equipment and systems as well as enterprise and customer-management systems will become standard to support real-time decision making The collection and comprehensive evaluation of data from many different sources production equipment and systems as well as enterprise and customer-management systems will become standard to support real-time decision making The collection and comprehensive evaluation of data from many different sources production equipment and systems as well as enterprise and customer-management systems will become standard to support real-time decision making 19% of respondents indicated that in their enterprises the trend played a significant role in the pre-epidemic strategy. The respondents, however, expect decreases in orders. Currently, about half of the big data projects implemented by companies have been frozen. At the same time, over half of the respondents expect resumption of projects in the near future. They relate in particular to financial risk analysis. The projects, whose

	implementation was sustained, concerned modules supporting decision making and robot control in the scope of production support. Respondents also indicated that big data analyzes are used to model the course of an epidemic (one of the surveyed companies made infrastructure available to a scientific unit for this purpose).
Autonomous Robots	utonomous robots can complete given task precisely and intelligently within the given time limit and also focus on safety, flexibility, versatility and collaboratively The trend was very significant for the majority of respondents - 67%. Most enterprises also implemented projects in this field (57%) or provided services based on the work of robots (12%), 2% of the respondents provided services for providing autonomous robots for hours. In the long run, respondents even expect an increase in interest in the services they offer, because they enable the replacement of human work with a device, which allows for savings in the client's company (25%). However, most of the respondents expect a change in the scope of ongoing projects (54%). These changes relate to deferring part of the expenses for the future and focusing primarily on providing basic functionality. As an important perspective, the respondents indicated - the supply of robots to provide assistance services in hospitals at patients (transfer of patients, distribution of medicines and medical measurements).
Simulation	Simulations will be used more extensively in plant operations to leverage real-time data to mirror the physical world in a virtual model, which can include machines, products, and humans, thereby driving down machine setup times and increasing quality The trend was recognized by 32% as important, but it did not have a great impact on the current activities of the respondents. Only two companies from the surveyed offer services or products related to simulations (training simulators based on VR). The projects implemented by the companies were high-budget. Company representatives expect significant drop in orders in this type of simulators. However, one of the development companies was developing indirect cost simulation software at the client's company. Despite the epidemic, the project is still being continued.
Horizontal and Vertical System Integration	The trend was not considered particularly significant by the majority of respondents (62%). It should be emphasized that the understanding of what horizontal and vertical integration is was different. The necessity of multi-level integration of services provides and products of implemented projects was taken for granted. Taking into account the scope of conducted activities - 32% of respondents had in their strategy implementation of projects typically associated with the integration of devices and applications. None of the respondents had ever heard of the term "Horizontal and Vertical System Integration". Over half of the respondents assume significant changes in the area of integration strategy and expect significant decreases in orders in this respect. In response to what, integrators and operators are trying to develop their own cloud-based products, instead of implementing individual implementations.
Internet of Things	The trend was identified by 90% of respondents as very significant. 82% of respondents said that their strategy includes the development of IoT-related products or services, as well as implementing projects in this area. 71% of respondents confirmed that they would continue the IoT strategy also after the outbreak, but would partially change its scope. The number of implemented projects dropped significantly. The respondents estimate the decrease even at the level of 70% of the value of project portfolios, which mainly applies to smart city, POS TV and smart-building implementations. Telemedicine systems and systems for monitoring the movement of

	machines and people have gained enormous importance. 8% of respondents see a development perspective in this respect.
Cyber security and Cyber Physical Systems (CPS)	Decentralization and autonomous behavior of the production process are main characteristics of CPS. The evolution of CPS mainly depend on the adoption and reconfiguration of product structures Supply Networks considered as Collaborative Cyber physical systems which are used in Manufacturing systems as well as different cyber physical systems like city traffic control and control systems Over half of the respondents indicated that this is an important trend for their company (51%). 41% of the respondents had in their strategy directly included the development of the cyber-security area (e.g. creation of the Security Operation Center). 35% of respondents expected significant decreases in cyber security. At the same time, the importance of audit and RODO consulting services has increased. In the case of the CPS-related trend, the respondents pointed to its limited significance, only to specialist suppliers, e.g. in the production sector. Only a representative of one of the surveyed companies confirmed the implementation of the CPS project. This project was frozen in connection with the coronovirus epidemic. With the increased connectivity and use of standard communications protocols that come with Industry 4.0, the need to protect critical industrial systems and manufacturing lines from cyber security threats increases dramatically. As a result, secure, reliable communications as well as sophisticated identity and access management of machines and users are essential
The Cloud	Cloud-based IT-platform serves as a technical backbone for the connection and communication of manifold elements of the Application Centre Industry 4.0 90% of respondents considered the trend significant and had in their offer services, products or implemented projects in this area. Cloud was a very important element of business strategy. 81% of respondents said that the trend would develop undisturbed even after the epidemic in the context of the provision of SaaS services, although 70% expect a decrease in orders from the private cloud area.
Additive Manufacturing	With Industry 4.0, additive-manufacturing methods will be widely used to produce small batches of customized products that offer construction advantages, such as complex, lightweight designs. High-performance, decentralized additive manufacturing systems will reduce transport distances and stock on hand None of the surveyed companies had a trend in strategy or implemented this type of project. The trend was considered by the respondents as insignificant
Augmented Reality	Augmented-reality-based systems support a variety of services, such as selecting parts in a warehouse and sending repair instructions over mobile devices. Industry can use of augmented reality to provide workers with real- time information to improve decision making and work procedures. Workers may receive repair instructions on how to replace a particular part as they are looking at the actual system needing repair The trend was considered important but translated only into the strategy of two of the surveyed enterprises. None of the companies has implemented a

	project in this field yet. One of the enterprises saw prospects for the development of this type of systems in exhibition applications. However, this trend was abandoned due to the epidemic. Subjects were skeptical about its further development, putting it off into the distant future.

The data presented in Table 2 indicate that a large part of trends is subject to continuation, however their scope changes. However, significant pessimism has been identified in predicting the future of the sector. A surprising conclusion was the respondents' declarative rejection of continuing the Industry 4.0 development strategy in general, which, however, did not correspond to their actual activities, as is indicated by the launch of numerous projects. This discrepancy may be related to a strong focus on ongoing activities and rejection, even at the mental level, of commitment to development issues. At the same time, based on the statements of the respondents, it can be concluded that after a temporary shock related to the advent of new conditions, a new distribution of forces on the market and a new type of segmentation are forecasted. After this period, which is estimated to last for 1-2 years, there will be a further perspective of growth with the emergence of new trends. Probably it is the ability to adapt to these future trends, and not the crisis itself, that will be decisive in relation to maintaining the competitive advantage of existing leaders.

Summary

The development of information and communication technologies is one of the most important elements related to the Fourth Industrial Revolution. Trends identified within this concept stimulated the development of virtually all branches of the economy and influenced the development of various social phenomena. Due to the coronovirus epidemic, this picture was disturbed both in terms of the impact characteristics of trends and the continuation of the development of technologies themselves. In response to this problem, the article attempts to characterize the changes occurring within industry 4.0 trends in connection with the economic crisis caused by the COVID-19 epidemic. The goal of the article has been achieved. Changes occurring in the area of Industry 4.0 trends have been characterized by presenting the results of in-depth interviews with 52 managers representing 20 companies from the Polish ICT sector. Research has shown that virtually all companies will continue their pre-epidemic activities in the Industry 4.0 area. However, the scope of activities carried out will be different and minimized in some areas.

It should be emphasized that a significant limitation of the conducted research was a very large focus of the respondents on solving current problems, which hindered the discussion on the further development of companies. In addition, the Polish ICT sector is local and the impact of some Industry 4.0 trends is noted with some delay. Although the conducted research does not meet the conditions of representativeness, the presented conclusions seem to be of a directional nature.

Further research into the impact of the economic crisis caused by the coronovirus epidemic seems to be of interest from a scientific and practical economic point of view.

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The Asymmetric Influence of COVID-19 on Financial Market: Evidence From NARDL Model

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Abstract

The health crisis has led to a financial crisis and the various stock markets are also suffering from the virus. The consequences for the economy and individual investments are real. Therefore, our article tends to explain the relationship between the spread of the Coronavirus and the financial market behavior. To this end, we use the Non-linear Autoregressive Distributed Lag (NARDL) model. Our results, then, show that the financial market is negatively impacted by the spread of Coronavirus. Also, we note that the impact of positive and negative variations in new cases and deaths caused by COVID-19 have an impact on the values of market indexes.

Keywords : Covid-19, NARDL, Stock markets

Introduction

Stock returns always tend to spread to major events. Several studies explain these effects on financial markets, sports events (Buhagiar et al., 2018), news (Li, 2018), environment and events (Guo et al., 2020), and political matters (Bash & Alsaifi, 2019; Shanaev & Ghimire, 2019). The appearance of the new coronavirus has caused a pandemic of respiratory disease (COVID-19) for which vaccines, targeted therapies, and treatment are not available (Wang et al. (2020)).

The epidemic has caused great concern for public health worldwide. At the same time, the economic consequences are increasingly worrying, as families need to remain at home to slow the spread of the infection. In several articles, it is well indicated that the coronavirus epidemic could affect sectors such as travel, tourism, entertainment, hotels, and airlines. The fact that the spread of this epidemic has been rapid with an unforeseen rate, forced the world to undergo the lockdown and stop activities in several sectors. At the beginning of March 2020, COVID-19 had infected more than fifty times more people than the epidemic of SARS, and the situation is expected to worsen (Abadi et al., 2020). The impact of this economic "downturn" can cause damage in supply chains, household demand, and corporate financial stability.

As a result, governments and central banks have dramatically scaled up operations, and many economists are predicting a deep Coronavirus-induced recession (Schwartz, 2020). Thereby, policymakers, businesses, and market players are trying to revise growth expectations in the short,

medium, and long term. Due to the uncertainty surrounding the global COVID-19 pandemic, stock markets around the world have experienced sharp declines. According to a World Economic Forum article, two of the largest single-day declines in the history of Dow Jones Industrial Average and S&P 500 took place in March 2020, during the COVID-19 epidemic.

Previous studies suggest links between risks to human health and price equity. Unlike other different global financial markets, the literature has revealed that Chinese financial markets remain strong and stable regardless of the current COVID-19 pandemic. Xin Huan (2020, p. 1) reported this different and significant opinion on the world financial market, insisting that "the Chinese financial market remains generally stable compared to foreign markets despite the spread of the new Coronavirus (COVID-19)." However, in the United States, the market experienced turbulence, enough to push the main benchmarks to close in the red. On February 25, the S&P 500 Index fell 3%, the Dow Jones 3.2%, and the Nasdaq Composite closed down 2.8%.

The value of government bonds increased when central banks lowered benchmark interest rates and unveiled large bond-buying programs (Smialek and Irwin, 2020). Although the US Federal Reserve has also committed to buying corporate bonds, the S&P corporate bond index declined in value due to the increased credit risk among investors. Many products have also declined in value, particularly petroleum and natural gas. Gold, on the other hand, has increased in value and the US dollar strengthened against several foreign currencies.

Investors' fear is quite evident as the CBOE Volatility Index (VIX) rose 11.3% to close at 27.85, clearly indicating panic. In Morocco, the main index of the Casablanca Stock Exchange MASI lost 21.6% of its value between February 28 (last trading session before the appearance on Monday, March 2 of the first case of Coronavirus in Morocco) and March 20. Moreover, the literature on investing in an epidemic can be roughly divided into two parts. Indeed, the value of a company results from all the expected future cash flows discounted in the present to take into account time and uncertainty.

In the financial markets, a wide range of individuals meet, sophisticated and naive, obstinate and without convictions, to play a game with high stakes: the game of prices.

Thanks to a mixture of fundamental value factors and a simple dynamic of supply and demand, asset prices are emerging. The stock market is an incentive survey on expected future results. It is precisely in complex and rapidly changing situations that the Stock Exchange provides particularly useful information. However, we lack answers to some of the most basic questions about how pandemics affect the financial markets. Reinhart (2020) argues that there is "no historical episode that can provide insight into the likely economic consequences of the global Coronavirus crisis".

This study, therefore, provides one of the first large-scale empirical analyzes of the impact of the pandemic on the financial markets. This article aims to show how Coronaviruses have an impact on market indexes. We consider different periods (depending on the start of the epidemic in each country). We examine three categories of data, namely new case announcements and mortality rates, as well as several indexes from deferent country's (USA, Italy, Spain, France, China, and Morocco). For this purpose, we use the Non-linear Autoregressive Distributed Lag (NARDL) model, which allows us to explain the impact of the announcements of new cases and the number of death cases on the closing values of the flowing indexes (MASI, CAC40, IBEX35, S&P 500 FSTE CHINA A50 and FTES BIM).

Data And Descriptive Statistics

In this section, we describe the datasets used in this article. We obtain data on daily cases of COVID-19 from status reports on Coronavirus disease (COVID-2019), which have been being published daily since December 31, 2019, based on information provided to WHO (World Health Organization). The data relates to stock market indices were extracted from website investing.com and Yahoo finance. Nevertheless, the durations taken from each country are different because the starting periods of the epidemic are different. The data is structured on 6 panels: from 29/01/2020 until 15/05/2020 for the CAC40 index (FRANCE), from 21/01/2020 until 15/05/2020 for the SP500 index (USA), from 31/12/2019 until 15/05/2020 for the FTSE CHINA A50 index (CHINA), from 24/02/2020 until 15/05/2020 for the FTES_MIB index (ITALY), from 03/10/2020 until 15/05/2020 for the MASI index (MOROCCO), and from 02/11/2020 until 15/05/2020 for the IBEX35 index (SPAIN).

Table 1: Descriptive statistics of the data

	Mean	Median	Maximum	Minimum	Std Dev	Skewness	Kurtosis	Observations
Panel A:								
DEATHS FRANCE	244,0513	97,5	1438	0	326,0331	1,840175	6,795571	78
CASES FRANCE	1304,782	608,5	7578	0	1618,533	1,476112	4,949425	78
CAC40	4884,534	4515,38	6111,24	3754,84	743,0096	0,551047	1,754809	78
Panel B:								
CASES USA	11727,81	2377	37289	0	12877,63	0,384722	1,422943	84
DEATHS USA	747,9643	19,5	4928	0	1015,694	1,353547	4,869693	84
SP500	2927,344	2872,34	3386,15	2237,4	313,6151	-0,09135	2,036694	84
Panel C:								
CASES CHINA	647,596	67	15141	0	1770,787	5,930108	46,80956	99
DEATHS CHINA	36,92929	4	1290	0	134,0034	8,438943	78,9055	99
FTSE CHINA A50	13488,67	13523,63	14606,62	11959,72	642,9135	-0,1509	2,293515	99
Panel D:								
CASES ITALY	2555,367	2485	6153	53	1681,227	0,238379	1,944577	60
DEATHS ITALY	364,3667	358	839	0	245,2917	0,1064	1,901351	60
FTES MIB	37121,6	35922,15	48778,97	31012,48	4483,315	1,384886	4,002558	60
Panel E:								
CASES MOROCCO	95,87755	99	259	1	67,35838	0,230868	2,162023	49
MASI	9518,284	9395,76	11395,21	8987,89	524,1807	2,049196	7,473153	49
DEATHS MOROCCO	2,653061	2	11	0	2,854463	1,343165	4,20208	49
Panel F:								
CASES SPAIN	2319,203	1153	8954	0	2560,617	1,026522	2,954051	69
DEATHS SPAIN	280,942	182	864	0	296,3427	0,647989	1,993911	69
IBEX35	7499,046	6844,3	10083,6	6107,2	1253,014	1,051618	2,495057	69

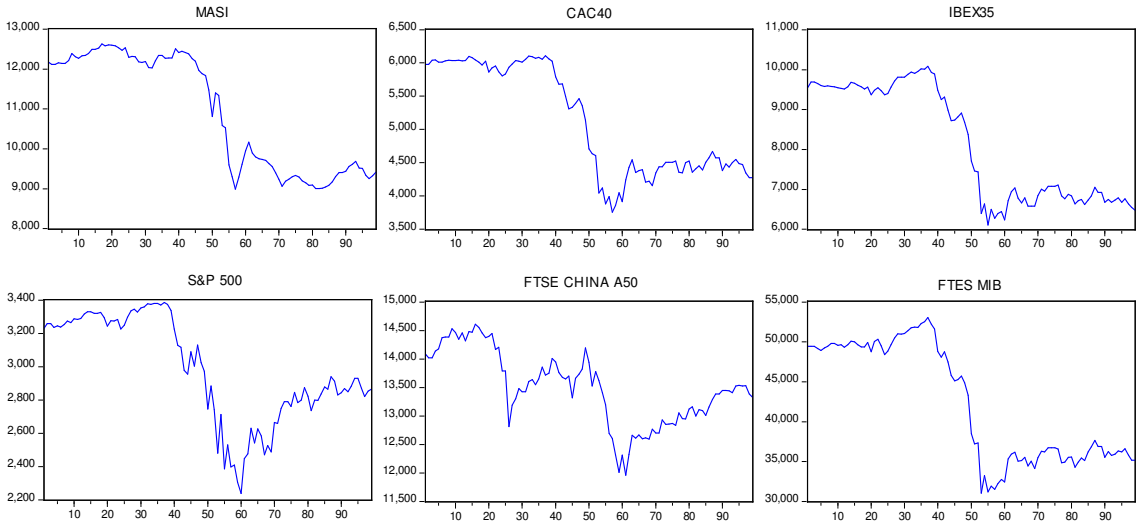

Figure 1: Evolution of the closing values of the MASI, CAC40, IBEX35, S&P 500 FSTE CHINA A50 and FTES BIM indices

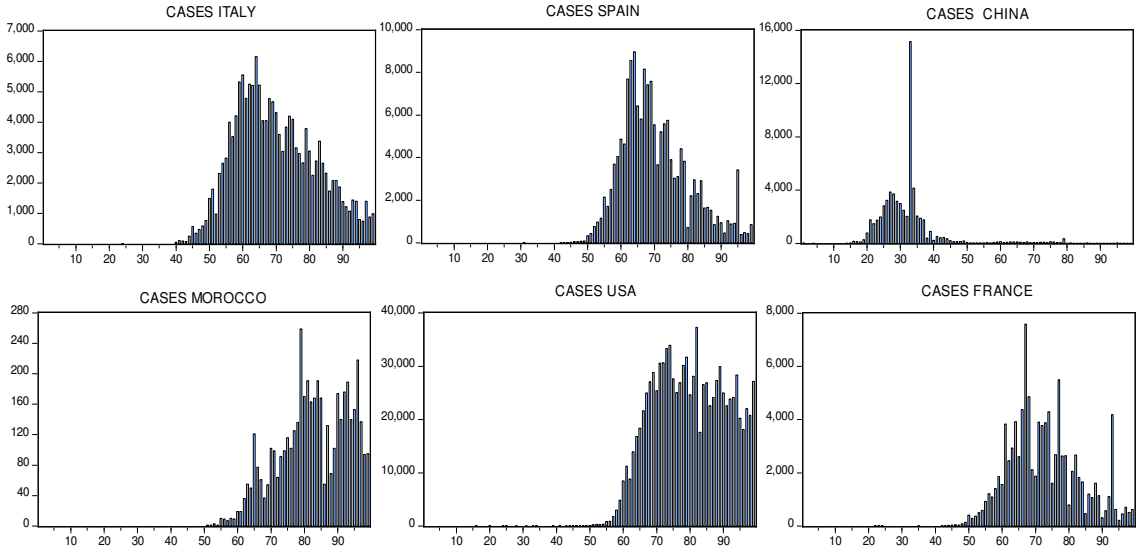

Figure 2: Announcements of new COVID 19 cases

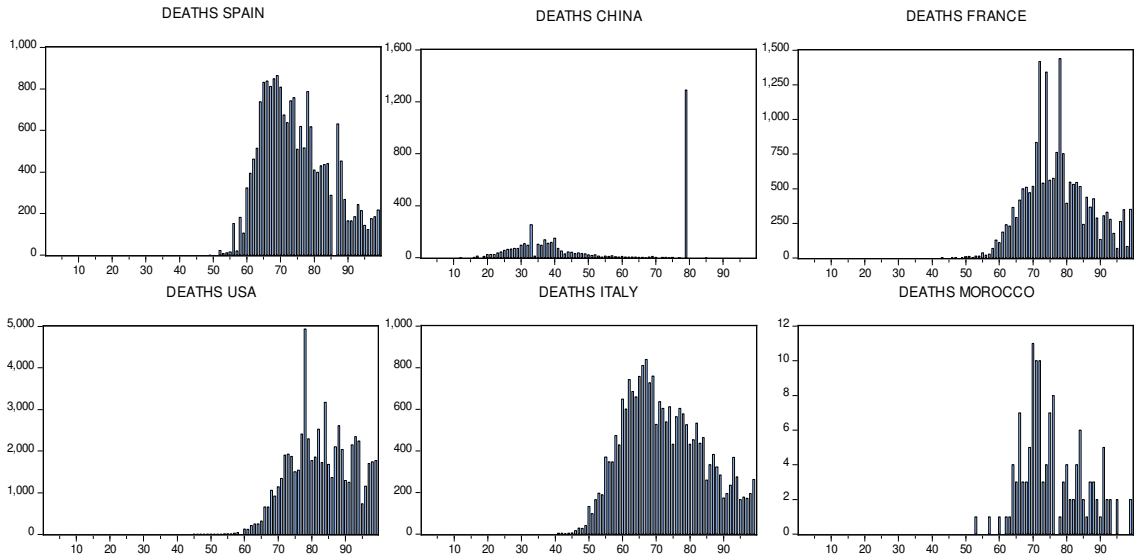

Figure 3: Announcements of deaths caused by COVID 19

We discover that the figures linked to the spread of the Coronavirus outside of China generate higher volatility in the financial markets, compared to those reported for China. Additionally, financial volatility increases with the number of countries affected.

Methodology

Given the objectives of this study, a linear model has two drawbacks. First, it cannot be used to test asymmetric uncertainty effects. Second, our data may contain other inherent non-linearities.

Bloom (2009) argues that at the micro-level, most companies operate near their hiring and investment thresholds and that a small positive VIX shock can affect hiring and investment, while a small negative shock may have no impact.

Moreover, asymmetric models can work better with equity data than symmetric models. Among autoregressive models, asymmetric non-linear methods can provide a better adjustment to the volatility of returns (Curto and Pinto, 2012; Dakhlaoui and Aloui, 2016).

Given these caveats, a linear model can impose unrealistic limitations and possibly lead to biased inferences (Katrakilidis & Trachanas, 2012). Recently, non-linear VAR models have been widely used to model the change of regime between the two phases of the economic cycle. In a second approach, quantile regression (QR), was applied to model the impact of uncertainty at different levels (quantiles) of a result variable reflecting the health of the economy. This article claims that the NARDL model is well suited for modeling the asymmetric impact of uncertainty. The NARDL model has three main advantages (Lahiani, Hammoudeh, and Gupta, 2016) which are directly relevant to our study.

First, it distinguishes between short and long-term asymmetries. This allows us to look for specific characteristics (for example, an overshoot) in the immediate reaction of index prices to uncertainty shocks.

At the same time, we can characterize the long-term equilibrium relationship between uncertainty and index performance. Secondly and in a related way, the methodology makes it possible to test the responses of the dependent variables regarding positive and negative changes in each of the explanatory variables (Lahiani et al., 2016).

This permits us to construct and represent the line of asymmetry. Consequently, the NARDL method is flexible to the dynamics of cointegration between variables. It can support multiple data sets of different integration orders and can be used to test linear and non-linear cointegration.

Recently, the NARDL model has been widely used to model the price asymmetry of basic products (Atil, Lahiani, and Nguyen, 2014; Bildirici & Turkmen, 2015; Kumar, 2017), energy policy (Hammoudeh, Lahiahi, Nguyen, and Sousa, 2015; Ndoricimpa, 2017), and other areas (Apergis & Cooray, 2015; Katrakilidis & Trachanas, 2012).

While it has already been used to model the price of stocks (Kisswani and Elian, 2017; Raza, Shahzad, Tiwari, and Shahbaz, 2016) and the impact of uncertainty (Gupta, Lahiani, Lee and Lee, 2018), to our knowledge, ours is one of the first NARDL asymmetry models studying the relationship between the index uncertainty and COVID-19.

Our study will test the following hypotheses

Hypothesis 1 (The damping effect of uncertainty): positive (negative) shocks cause a decrease (an increase) in the values of the indices.

Hypothesis 2 (Repressed growth potential): negative uncertainty shocks lead to greater long-term adjustments in index prices than positive shocks.

Hypothesis 3 (overshoot): negative uncertainty shocks lead to a short-term overshoot of index price adjustments.

NARDL Basic Methodology

We consider long-term asymmetric regressions of the form

$$X_t = \beta^+ UV_t^+ + \beta^- UV_t^- + u_t \qquad (1)$$

Where β^+ and β^- are the associated long-term asymmetric parameters, u_t is an i.i.d. with zero mean and finite variance, and UV_t is a decomposition of the following form:

$$UV_t = UV_0 + UV_t^+ + UV_t^-$$

With UV_0 equal to the initial uncertainty value UV_t^++ and UV_t^- representing the partial sums of the positive and negative changes in the uncertainty of the dependent variables (MASI, CAC40, IBEX35, S&P 500 FSTE CHINA A50, and FTES BIM) given by

$$UV_t^+ = \sum_{j=1}^{t} \Delta\, UV_j^+ = \sum_{j=1}^{t} max\,(0, \Delta UV_j)$$

$$UV_t^- = \sum_{j=1}^{t} \Delta\, UV_j^- = \sum_{j=1}^{t} mix\,(0, \Delta UV_j)$$

NARDL model (p, q) derived from the equation. (1) can be rewritten as follows:

$$X_t = \sum_{j=1}^{p} \varphi_j\, X_{t-j} + \sum_{j=0}^{q} (\theta_j^+ UV_{t-j}^+ + \theta_j^- UV_{t-j}^-) + \epsilon_t \qquad (2)$$

Where φ_j is the autoregressive parameter, θ_j^+ and θ_j^- are the delays asymmetrically distributed and ϵ_t is a homoscedastic process *i.i.d* with mean zero. The asymmetric error correction equation can be specified as

$$\Delta X_t = \rho \Delta X_{t-1} + \theta^+ UV_{t-1}^+ + \theta^- UV_{t-1}^- + \textstyle\sum_{j=1}^{p-1} \gamma_j\, \Delta X_{t-j} + \sum_{j=0}^{q-1} \left(\delta_j^+ UV_{t-j}^+ + \delta_j^- UV_{t-j}^-\right) + \epsilon_t \qquad (3)$$

Where

$$\rho = \sum_{j=1}^{p} \varphi_{j=1} - 1 \; et \; \gamma_j = -\sum_{i=j+1}^{p} \varphi_j \; , pour \; j = 1, \dots, p-1,$$

With δ^+ and δ^- short-term positive and negative adjustments to the changes in the explanatory variable $\llbracket UV_t$. We emphasize that the equations. (1), (2), and (3) are connected by:

$$\beta^+ = -\frac{\theta^+}{\rho} \; and \; \beta^- = -\frac{\theta^-}{\rho}$$

We implement Eq. (3) NARDL model (Shin, Yu, and Greenwood-Nimmo, 2014) in four steps. First, the error correction model is estimated via standard OLS. Second, the Banerjee, Dolado, and Mestre (1998) t-test and the Pesaran, then Shin and Smith (2001) F-test, which each apply a boundary test approach to search for long-term asymmetric relationships between the magnitudes of the variables, are used to test the null hypothesis (no cointegration) against the alternative hypothesis (cointegration). More precisely,

$$H_0: \theta^+ = \theta^- \; against \; \rho \neq \theta^+ \neq \theta^- \neq 0$$

Third, the Wald test is used to detect long and / short term asymmetries. The null hypothesis (long-term symmetry) is tested against the alternative hypothesis (long-term asymmetry). Similarly, the null hypothesis (short-term symmetry) is tested against the alternative hypothesis (short-term asymmetry).

In mathematical terms, we test:

$$H_0: \beta^+ = \beta^- \; against \; H_1: \beta^+ \neq \beta^-$$

$$H_0 = \sum_{j=0}^{q-1} \delta_j^+ = \sum_{j=0}^{q-1} \delta_j^- \; against \; H_1 = \sum_{j=0}^{q-1} \delta_j^+ \neq \sum_{j=0}^{q-1} \delta_j^-$$

Finally, the asymmetric cumulative dynamic multiplier effects of the unit change in UV_t^+ and UV_t^- on X_t , are calculated as:

$$m_h^+ = \sum_{j=0}^{h} \frac{\partial X_{t+j}}{\partial UV_t^+} \; , m_h^- = \sum_{j=0}^{h} \frac{\partial X_{t+j}}{\partial UV_t^-} \; , \quad h = 0, 1, 2, \dots \tag{4}$$

Where

$$m_h^+ \to \beta^+ \; et \; m_h^- \to \beta^- \; in \; the \; case \; h \to \infty$$

Long-term symmetry is implied by equality between long-term multipliers

$$L_{UV^+} = \frac{\theta^+}{-\rho} \; et \; L_{UV^-} = \frac{\theta^-}{-\rho}$$

Hypothesis Tests

The methodology gives us the tools necessary to test hypotheses 1 to 3. Since the long-term multipliers satisfy the hypotheses, they represent the adjustments in the price of long-term equilibrium indices following positive (negative) uncertainty shocks.

Hypothesis 1 indicates that positive shocks lead to lower prices, while negative shocks lead to higher prices. This happens if and only if both L_{UV^+} and L_{UV^-} are negative and significant.

Hypothesis 2 indicates that the impacts of negative shocks outweigh those of positive shocks. This can only happen when the Wald test indicates significant long-term asymmetry. (Otherwise, the difference in magnitude observed between the long-term adjustments the positive and negative uncertainty shocks may be due to chance.)

If Wald's test is significant, then we can classify long-term asymmetry as negative, which means that stock prices have a stronger reaction to decreases in uncertainty ($L_{UV^+} | L_{UV^-}$) or positive. Accordingly, this implies that they respond more strongly to the decrease in uncertainty.

Hypothesis 3 indicates that during the reversals, the prices of the indices show a short-term overshoot. This can only happen if the Wald test indicates significant short-term asymmetry.

When the Wald test is positive, we use the dynamic multipliers m_h^+ and m_h^- to reconstruct the line of asymmetry and determine if its short-term behavior displays the basic characteristics of the overrun.

Result and Discussions

The bounds test procedure requires that no I (2) variable can be involved. We, therefore, perform unit root tests on time series. The results of the unit root tests: ADF (Augmented Dickey-Fuller), and PP (Phillips-Perron) are at level. Additionally, the first difference of the logarithms of the stock market indices values and the announcements of new contagions and deaths are presented in table 2. Moreover, the unit root tests indicate that the different series are I (0) or I (1) and no series is, therefore, I (2). Thus, we can proceed with the bounds test and estimate by applying general procedures to reach the final specific model.

Table 2: Variables stationarity tests

	ADF				PP				Ordre de (I)
	Level		1st Diff,		Level		1st Diff,		
	t-Statistic	Prob*	t-Statistic	Prob*	t-Statistic	Prob*	t-Statistic	Prob*	
Panel A :									
LCASES_FRANCE	-1,0223	0,7384	-2,3036	0,1749	-3,1431	0,0287	-8,0711	0,0000	I(0)
LDEATHS FRANCE	-2,7625	0,0713	-7,6314	0,0000	-2,7429	0,0739	-11,2626	0,0000	I(1)
LCAC40	-1,2739	0,6379	-8,9021	0,0000	-1,3566	0,5991	-8,9818	0,0000	I(1)
Panel B :									
LCASES_USA	-3,0019	0,0406	--	--	-4,2440	0,0013	--	--	I(0)
LDEATHS_USA	-2,6220	0,0959	-8,0551	0,0000	-2,9428	0,0473	--	--	I(0)
LSP500	-1,3377	0,6085	-13,7380	0,0001	-1,5580	0,4994	-13,0053	0,0001	I(1)
Panel C :									
LCASES CHINA	-0,6013	0,8638	-9,7465	0,0000	-1,8362	0,3608	-14,1149	0,0001	I(1)
LDEATHS CHINA	-0,4726	0,8877	-7,9437	0,0000	-1,6625	0,4444	-13,8215	0,0000	I(1)
LFTSE CHINA A50	-1,6902	0,4330	-11,2980	0,0000	-1,7271	0,4145	-11,1619	0,0000	I(1)
Panel D :									
LCASES ITALY	-1,6704	0,4402	-3,0779	0,0344	-3,9109	0,0035	--	--	I(0)
LDEATHS ITALY	-2,0805	0,2531	-3,1227	0,0311	-3,1654	0,0273	--	--	I(0)
LFTES MIB	-3,1561	0,0281	--	--	-2,5580	0,1075	-8,7788	0,0000	I(1)
Panel E :									
LCASES MOROCCO	-2,9299	0,0493	-10,7420	0,0000	-3,6031	0,0093	--	--	I(0)

LDEATHS MOROCCO	-1,8370	0,3583	-3,4871	0,0130	-3,6150	0,0117	--	--	I(0)
LMASI	-4,0594	0,0026	--	--	-3,9282	0,0038	--	--	I(0)
Panel F :									
LCASES SPAIN	-4,5829	0,0004	-2,3784	0,1519	-5,2147	0,0001	--	--	I(0)
LDEATHS SPAIN	-3,1405	0,0332	-10,5716	0,0000	-2,5078	0,1204	-10,8041	0,0000	I(1)
LIBEX35	-1,6700	0,4418	-4,4192	0,0007	-1,7551	0,3994	-8,8220	0,0000	I(1)

Cointegration Test

The results of the cointegration test are presented in Table 3. Based on these results (F-Bounds Test), the four variables, namely the logarithms of the closing values of stock market indices, the announcements of new cases, as well as the number of cases of death, have long-term relationships. The F-Bounds Test shows significant relationships at the 1% level for CAC40, S&P 500, and LMASI. For LFTES MIB and LIBEX35, the F-Bounds test shows significant relationships at the 10% level. While the F-Bounds of the LFTSE CHINA A50 indices are not significant. This rejects the hypothesis of the existence of a long-term relationship between the variables in the series.

Table 3: Cointegration testing

F-Bounds Test				
Index	**F-statistic Value**	**Signif**	**I (0)**	**I (1)**
CAC40	8.009223	1%	3.29	4.37
S&P 500	8.771573	1%	3.29	4.37
LFTSE CHINA A50	1.634226	10%	2.2	3.09
LFTES MIB	2.351527	10%	2.2	3.09
LMASI	5.178341	1%	3.29	4.37
LIBEX35	3.414096	10%	2.2	3.09

Before studying the long-term and short-term links between the indices and the different repressors, we first judge the adequacy of the dynamic specification. This is done based on various diagnostic statistics including, LM statistics and the test ARCH of heteroscedasticity. The results of these tests are presented at the bottom of Table 4.

Table 4: LM statistics and the test ARCH of heteroscedasticity

	Breusch-Godfrey Serial Correlation LM Test		**Heteroskedasticity Test: ARCH**	
	F-statistic	**Prob**	**F-statistic**	**Prob**
LCAC40	2,05089	0,1442	0,771267	0,3841
LSP500	3,06087	0,0612	0,326409	0,5705

LFTSE CHINA 50	0,35327	0,7036	0,105853	0,7458
LFTESMIB	0,080659	0,9227	0,271883	0,6042
LMASI	0,573062	0,5743	0,583015	0,4506
LIBEX35	0,934147	0,4053	0,028986	0,8657

Our model surpasses all diagnostic tests suggesting the absence of autocorrelation and heteroskedasticity at a level of significance of 1% for all stock market indices.

Long- and short-run asymmetries

Table 5 summarizes the results of the Wald test for long and short-term asymmetry, respectively. The results (Table 5) suggest the existence of long-term symmetry for the LFTSE CHINA A50 index.

For the negative and positive shocks of the CAC40 and S & P500 indices, the null hypothesis according to which the variables in the series are symmetrical is rejected, which means that in the short and long term, the positive and negative partial sum of the squares is significantly different from each other and supports asymmetric behavior. For the FTES MIB, MASI, and IBEX35 indices, the null hypothesis is accepted in the long term but rejected in the short term.

Table 5: Long- and short-run asymmetries

Indice	Wald statistic	F-statistic	Proba	χ^2 Statistic	Proba
CAC40	W_{LR}	*3.499323*	*0.0073*	20.99594	*0.0018*
	W_{SR}	*9.940628*	*0.0001*	29.82188	*0.0000*
S&P500	W_{LR}	*11.19858*	*0.0000*	33.59573	*0.0000*
	W_{SR}	*18.16498*	*0.0001*	18.16498	*0.0000*
LFTSE CHINA A50	W_{LR}	*0.509674*	*0.6768*	1.529023	*0.6756*
	W_{SR}	--	--	--	--
LFTES MIB	W_{LR}	*0.502006*	*0.6827*	1.506017	*0.6809*
	W_{SR}	*7.737621*	*0.0077*	7.737621	*0.0054*
MASI	W_{LR}	*1.884030*	*0.1581*	5.652090	*0.1298*
	W_{SR}	*5.271441*	*0.0059*	15.81432	*0.0012*
LIBEX35	W_{LR}	*1.984396*	*0.1343*	5.953189	*0.1139*
	W_{SR}	*9.157866*	*0.0046*	9.157866	*0.0025*

Table 6 represents the coefficients of asymmetry at cost and long term for the dung beetle indices CAC40, S & P500, FTSE CHINA A50 FTES MIB, MASI, and IBEX35.

Table 6: Long-run and short-run asymmetry coefficients

	Coefficient	Coefficient	Prob		Coefficient	Coefficient	Prob
CAC40	Long-run			LFTES MIB	Long-run		
	Constant	*4.946306*	*0.0000*		Constant	*2.492568*	*0.0094*
	LCAC40(-1)	*-0.559196*	*0.0000*		LFTESMIB (-1)	*-0.231098*	*0.0089*
	LCASFR_POS (-1)	*-0.069733*	*0.0000*		LDEATHSITALY_POS	*-0.022838*	*0.2207*
	LCASFR_NEG (-1)	*-0.059577*	*0.0000*		LDEATHSITALY_NEG	*-0.015454*	*0.5071*
	LDEATFR_POS (-1)	*0.048776*	*0.0000*		LCASESITALY_POS (-1)	*0.010692*	*0.6825*
	LDEATFR_NEG (-1)	*0.048325*	*0.0002*		LCASESITALY_NEG (-1)	*0.002919*	*0.9131*
	Short-run				Short-run		
	D (LCASFR_NEG)	*-0.023387*	*0.0453*		D (LFTESMIB (-2))	*0.300476*	*0.0149*
	D (LCASFR_POS (-1))	*0.046086*	*0.0036*		D(LCASESITALY_POS)	*-0.059434*	*0.0492*
	D (LCASFR_POS (-3))	*0.038139*	*0.0084*	MASI	Long-run		
	D (LCASFR_POS (-2))	*0.037493*	*0.0098*		Constant	*2.006480*	*0.0028*
	D (LCAC40(-3))	*0.233541*	*0.0459*		LMASI (-1)	*-0.219827*	*0.0025*
	D (LCAC40(-2))	*0.202158*	*0.0718*		LCASESMOROCCO_POS (-1)	*-0.002540*	*0.6331*
	D (LDEATFR_NEG)	*0.009216*	*0.4978*		LCASESMOROCCO_NEG (-1)	*-0.003700*	*0.4262*
S&P 500	Long-run				LDEATHSMOROCCO_POS (-1)	*-0.001632*	*0.6662*
	Constant	*5.073196*	*0.0000*		LDEATHSMOROCCO_NEG	*-0.002659*	*0.5336*
	LSP500(-1)	*-0.649738*	*0.0000*		Short-run		
	LDEATHSUSA_POS (-1)	*0.021874*	*0.0466*		D (LMASI (-1))	*0.337374*	*0.0292*
	LDEATHSUSA_NEG (-1)	*0.069930*	*0.0000*		D (LCASESMOROCCO_POS (-3))	*0.017612*	*0.0024*
	LCASESUSA_POS (-1)	*-0.022707*	*0.0408*		D (LCASESMOROCCO_NEG)	*-0.012689*	*0.0245*
	LCASESUSA_NEG (-1)	*-0.130233*	*0.0000*		D (LDEATHSMOROCCO_POS)	*0.007764*	*0.0323*
	Short-run				D (LCASESMOROCCO_POS (-2))	*0.009042*	*0.0773*
	D(LCASESUSA_POS)	*-0.104753*	*0.0004*	LIBEX35	Long-run		
	D(LDEATHSUSA_POS)	*0.029622*	*0.0388*		Constant	*3.841054*	*0.0008*
LFTSE CHINA A50	Long-run				LIBEX35(-1)	*-0.437749*	*0.0008*
					LCASESSPAIN_POS (-1)	*-0.007756*	*0.4933*
	Constant	*0.887668*	*0.1103*		LCASESSPAIN_NEG	*0.003072*	*0.6936*
	LFTSE50(-1)	*-0.095161*	*0.1009*		LDEATHSSPAIN_POS	*0.009571*	*0.2197*
	LCASESCHINA_POS	*0.001392*	*0.4853*		LDEATHSSPAIN_NEG (-1)	*-0.009817*	*0.3696*

	LCASESCHINA_NEG	*0.000870*	*0.5937*		Short-run		
	LDEATHSCHINA_POS	*0.002150*	*0.4281*		D (LDEATHSSPAIN_NEG (-3))	*0.023140*	*0.0251*
	LDEATHSCHINA_NEG	*0.001914*	*0.3741*		D(LCASESSPAIN_POS)	*-0.024061*	*0.0381*

Combining our results with time series estimation, we detected evidence of asymmetric effects of increases and decreases in indices caused by new case announcements as well as numbers of deaths caused by COVID-19 in all countries; these match the indices dung beetles of our study, except China (LFTSE CHINA A50 index) which seem to differ in its reaction to new cases and deaths caused by COVID-19.

NARDL Estimates

Table 7 presents the results of the NARDL model estimates. Based on these results, we note that the estimated coefficients related to new case announcements and cases of death caused by COVID-19 are representative. Based on the AIC information criteria and Wald symmetry tests, we have selected the NARDL offset specification for each index. Therefore, the results of the long-term dynamics are presented in Table 6. They, accordingly, show that the long-term coefficients of positive and negative variations of new case announcements and death cases are negative. Consequently, the increase in COVID-19 cases has a direct negative impact on the financial market.

Table 7: NARDL estimates

	Variable	Coef	t-Statistic	Prob *		Variable	Coef	t-Statistic	Prob*
CAC40	LCAC40(-1)	0,3885	3,0183	0,0046	LFTES MIB	LFTESMIB (-1)	0,6786	5,0617	0,0000
	LCAC40(-2)	0,2429	1,6914	0,0994		LFTESMIB (-2)	0,3234	2,1794	0,0348
	LCAC40(-3)	0,0432	0,2966	0,7685		LFTESMIB (-3)	-0,2478	-1,8888	0,0657
	LCAC40(-4)	-0,2316	-1,9760	0,0559		LDEATHSITALY_POS	-0,0469	-1,9810	0,0540
	LCASFR_POS	0,0068	0,4589	0,6490		LDEATHSITALY_NEG	-0,0264	-0,8419	0,4045
	LCASFR_POS (-1)	-0,0295	-1,7641	0,0862		LCASESITALY_POS	-0,0882	-2,7153	0,0095
	LCASFR_POS (-2)	-0,0088	-0,5577	0,5805		LCASESITALY_POS (-1)	0,0613	1,8790	0,0670
	LCASFR_POS (-3)	0,0006	0,0351	0,9722		LCASESITALY_POS (-2)	0,0508	1,7309	0,0906
	LCASFR_POS (-4)	-0,0402	-2,7328	0,0097		LCASESITALY_NEG	0,0165	0,4177	0,6782
	LCASFR_NEG	-0,0257	-2,0271	0,0501		LCASESITALY_NEG (-1)	0,0279	0,6315	0,5311
	LCASFR_NEG (-1)	-0,0338	-2,5899	0,0138		LCASESITALY_NEG (-2)	-0,0919	-2,1016	0,0415
	LDEATFR_POS	0,0035	0,2419	0,8103		LCASESITALY_NEG (-3)	0,0509	1,3915	0,1712
	LDEATFR_POS (-1)	0,0475	3,9612	0,0003		Constant	2,7222	2,6556	0,0111
	LDEATFR_NEG	0,0070	0,4774	0,6360	MASI	LMASI (-1)	0,9967	5,4821	0,0000
	LDEATFR_NEG (-1)	0,0421	2,5053	0,0169		LMASI (-2)	-0,0011	-0,0051	0,9960
	Constant	4,9227	5,7993	0,0000		LMASI (-3)	-0,2998	-2,0711	0,0522
S&P	LSP500(-1)	-0,0056	-0,0409	0,9676		LCASESMOROCCO_POS	-0,0120	-1,7716	0,0925
	LSP500(-2)	0,3626	2,4492	0,0198		LCASESMOROCCO_POS (-1)	0,0007	0,0906	0,9288

	LSP500(-3)	0,0012	0,0092	0,9927
	LSP500(-4)	-0,2849	-2,1910	0,0356
	LDEATHSUSA_POS	-0,0054	-0,3124	0,7567
	LDEATHSUSA_POS (-1)	0,0110	0,6265	0,5353
	LDEATHSUSA_POS (-2)	0,0046	0,2775	0,7831
	LDEATHSUSA_POS (-3)	-0,0154	-0,9224	0,3630
	LDEATHSUSA_POS (-4)	0,0472	2,9372	0,0060
	LDEATHSUSA_NEG	-0,0102	-0,4697	0,6417
	LDEATHSUSA_NEG (-1)	0,0904	4,0182	0,0003
	LCASESUSA_POS	-0,1121	-3,1159	0,0038
	LCASESUSA_POS (-1)	-0,0266	-0,6294	0,5334
	LCASESUSA_POS (-2)	0,0796	2,8270	0,0079
	LCASESUSA_NEG	-0,0533	-1,3206	0,1957
	LCASESUSA_NEG (-1)	-0,0967	-2,2882	0,0287
	Constant	7,5325	5,6268	0,0000
LFTSE CHINA A50	LFTSE50(-1)	0,7686	6,8831	0,0000
	LFTSE50(-2)	0,2850	1,9887	0,0504
	LFTSE50(-3)	0,0301	0,2104	0,8339
	LFTSE50(-4)	-0,2193	-1,8969	0,0617
	LCASESCHINA_POS	0,0012	0,5934	0,5547
	LCASESCHINA_NEG	0,0005	0,2933	0,7701
	LDEATHSCHINA_POS	0,0021	0,7971	0,4279
	LDEATHSCHINA_NEG	0,0025	1,1653	0,2476
	Constant	1,2763	2,0037	0,0488

	LCASESMOROCCO_POS (-2)	0,0041	0,4945	0,6266
	LCASESMOROCCO_POS (-3)	0,0029	0,4170	0,6813
	LCASESMOROCCO_POS (-4)	-0,0170	-3,2892	0,0039
	LCASESMOROCCO_NEG	-0,0103	-1,7097	0,1036
	LCASESMOROCCO_NEG (-1)	-0,0019	-0,2290	0,8213
	LCASESMOROCCO_NEG (-2)	0,0025	0,3067	0,7624
	LCASESMOROCCO_NEG (-3)	0,0049	0,6082	0,5502
	LCASESMOROCCO_NEG (-4)	-0,0171	-2,6084	0,0173
	LDEATHSMOROCCO_POS	0,0111	3,0621	0,0064
	LDEATHSMOROCCO_POS (-1)	-0,0082	-2,1379	0,0457
	LDEATHSMOROCCO_NEG	0,0003	0,0581	0,9543
	Constant	2,8596	4,1861	0,0005
LIBEX35	LIBEX35(-1)	0,7826	4,9090	0,0000
	LIBEX35(-2)	-0,3293	-1,8644	0,0724
	LCASESSPAIN_POS	-0,0309	-2,6059	0,0143
	LCASESSPAIN_POS (-1)	0,0225	1,4638	0,1540
	LCASESSPAIN_POS (-2)	-0,0263	-1,8533	0,0740
	LCASESSPAIN_POS (-3)	0,0168	1,4167	0,1672
	LCASESSPAIN_NEG	-0,0047	-0,4602	0,6488
	LDEATHSSPAIN_POS	0,0082	0,7261	0,4736
	LDEATHSSPAIN_NEG	0,0184	0,9069	0,3719
	LDEATHSSPAIN_NEG (-1)	-0,0196	-1,1842	0,2460
	LDEATHSSPAIN_NEG (-2)	-0,0015	-0,1065	0,9159
	LDEATHSSPAIN_NEG (-3)	0,0218	1,6587	0,1079
	LDEATHSSPAIN_NEG (-4)	-0,0296	-2,7234	0,0108
	Constant	4,9035	3,7888	0,0007

The results of the NARDL model estimation for the different indices indicate that new cases and death cases affect negatively the evolution of the index values. For the CAC40, the coefficients of positive and negative variations of the LCASFR and LDEATFR variables are negatively significant which confirms the negative impact of the shocks caused by COVID-19. The same results are confirmed for the S & P500, LFTES MIB, MASI, and LIBEX35 indices. Only the LFTSE CHINA A50 index is of non-significant results. This may be because China has well-controlled the situation of COVID-19, and it has well-kept the economy in general in a more stable state than other countries. We should also be aware that the countries most affected by COVID-19 have stronger shocks than the others who have had good control over the situation from the start of the epidemic.

Nonlinear Dynamics

Figure 4 presents the dynamic effects of positive and negative variations of COVID-19 on the various stock market indices. Based on FIG. 4, an asymmetric response of the stock market indices values to the positive and negative variations of the new cases of COVID-19 are confirmed. The CAC40, S & P500, and LIBEX35 results show an asymmetric and statistically significant response of the shock and negative index values for new cases and deaths caused by COVID-19. For the LFTES MIB indices, the dynamics are asymmetrical only for new cases of COVID-19. However, for MASI, the dynamics are asymmetrical only for cases of death, while for the LFTSE CHINA A50 index, the dynamics are more symmetrical. Thereby, coefficients are not significant in the results of modeling estimates.

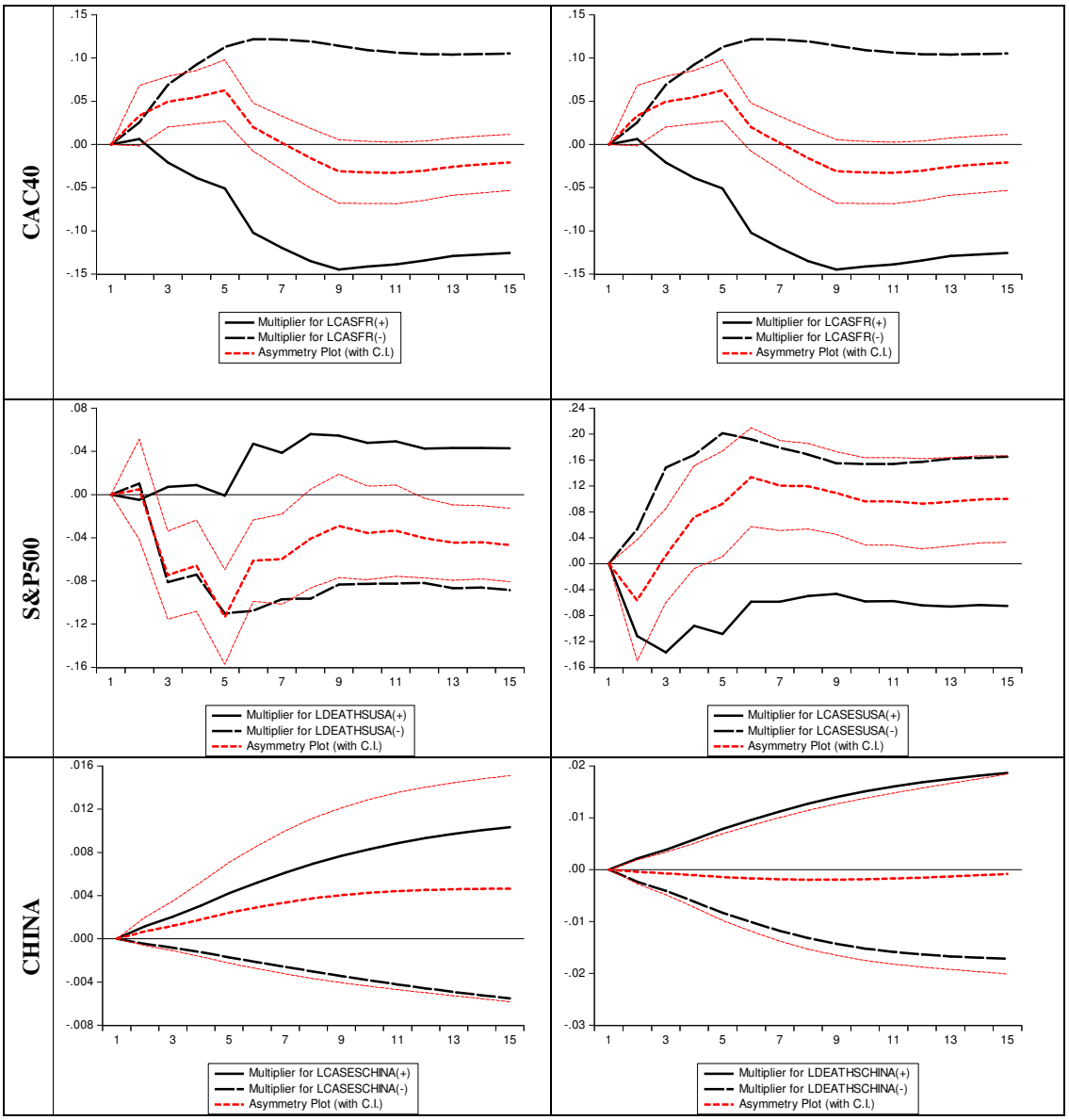

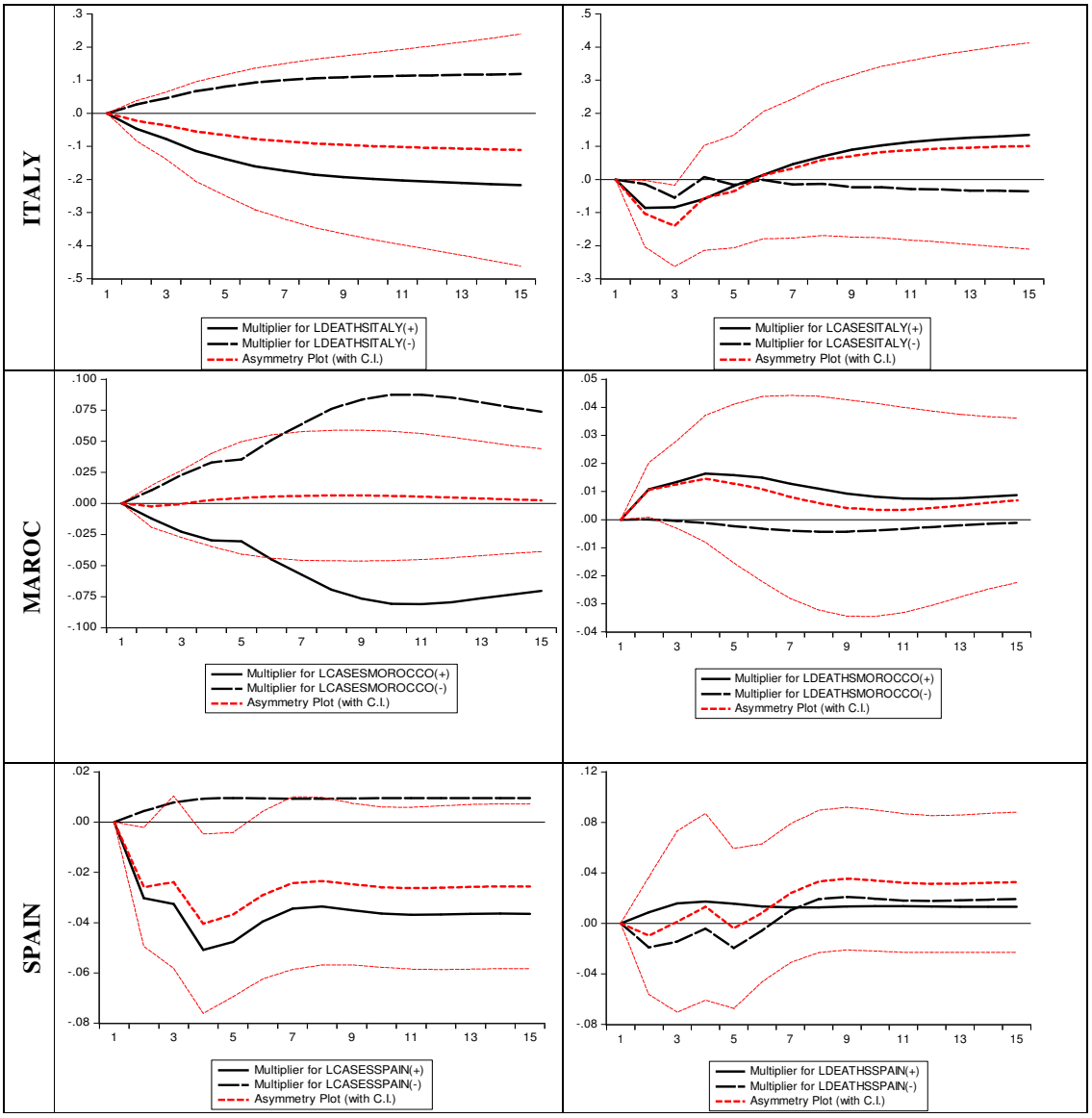

Figures 4: Non-linear dynamics of the explanatory variables of the models

The empirical results debated above have important insinuations for investors as well as analysts and policymakers. First, we note that the impact of positive and negative variations in new cases and deaths caused by COVID-19 affects the values of the indices. Second, we prove that the stock market values are very sensitive to positive, and negative shocks that occur by COVID-19. Overall, our results confirm that in the case of an epidemic, the financial market has negative reactions linked to the evolution of the epidemic, which confirms the first hypothesis. The second and third hypotheses are also confirmed since the wall test has shown significant asymmetric impact for the short and long time runs. The last hypothesis substantially helps investors adapt their investment strategies to these changes and lends itself to a more effective decision-making policy, as it helps them to mitigate the negative impact of unforeseen events.

Conclusion

This article examines the dynamics between stock market indexes on the one hand and new cases and deaths caused by COVID-19 on the other hand, using the closing values of a set of stock market indexes. One of the contributions of our analysis to the existing literature on the relationship between the price of indices and COVID-19 consists of using the nonlinear cointegration approach called (NARDL). This approach makes it possible to examine the possible asymmetry in the short and long term. The study used data relating to the CAC40, S & P500, LFTSE CHINA A50, LFTES MIB, MASI, and LIBEX35 indices. The second contribution of this study is to examine the dependence of the values of the stock market indices on fluctuations due to epidemic situations.

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Corporate Social Responsibility in Creating the Competitive Advantage of a Micro-Enterprise Based on The Example of The Better Land Online Environmentally-Friendly Drugstore

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Abstract

Corporate social responsibility in creating competitive advantage is currently the topic of many studies and analyses. The purpose of the paper is to provide an answer to the following research question posed by the author: Can a micro-enterprise strengthen its position in the market and achieve a market advantage by functioning according to the CSR concept? If so, how were particular fields of the enterprise's functioning designed? In order to obtain an answer to the posed research question, the author presented a method in which the Better Land online environmentally-friendly drugstore, by functioning based on corporate social responsibility principles, strengthened its market position and then achieved competitive advantage.

Keywords: Corporate Social Responsibility, Competitive Advantage, A Micro-Enterprise

Introduction

One of the objectives of enterprise management is the achievement of competitive advantage in the market. An enterprise can achieve it when it proposes its customers products or services that meet their expectations in a better way than the competition's offer. When will an enterprise be able to offer the most expected products and services to its customers? When it precisely gets to know its customers, including who they are, what are their values, what they expect from the enterprise and its products. The knowledge about customer needs and expected methods of meeting them allows for translating them into real profit. The key to success for contemporary enterprises is focusing on the customer and his or her expectations, and on building and maintaining lasting, long-term relations with him or her. Relations will constitute the basic determinant for survival, development and building competitive advantage in enterprises that will effectively respond to customer needs and expectations. Currently, it is the customers, by becoming prosumers, who increasingly pressure enterprises for them to also take into account long-term negative effects of their activity when focusing on their functioning. Corporate social responsibility (CSR), which engages enterprises in social activity, means meeting customer needs with simultaneous consideration of the expectations of other enterprise stakeholders: employees, suppliers or local communities. Furthermore, CSR allows an enterprise to achieve many benefits, which include, among others, building lasting relations with social and business partners, improving the company's credibility among its stakeholders, building a positive company image, increasing customer loyalty and consequently achieving competitive advantage.

Literature Review

The subject literature does not clearly define the CSR term. The most often referred definitions are definitions proposed by the International Organisation for Standardisation. According to the ISO 26000 standard, CSR is the "responsibility of an organisation for the impacts of its decisions and activities on society and the environment, through transparent and ethical behaviour that:

— contributes to sustainable development, including health and the welfare of society;
— takes into account the expectations of stakeholders;

— is in compliance with applicable law and consistent with international norms of behaviour; and
— is integrated throughout the organisation and practised in its relationships." The 6 core subjects listed by ISO 26000 include: human rights, labour practices, the environment, fair operating practices, consumer issues, community involvement and development (ISO 2010). The European Commission defines CSR as "the responsibility of enterprises for their environmental impact" (European Commission 2011). The deliberations in this paper are mainly based on research specifying that CSR is a product differentiation strategy (Navarro 1988, Bagnoli and Watts 2003, Siegel and Vitaliano 2007). This strategy, based on distinguishing oneself from the competition with features important for recipients, such as quality or uniqueness, can be focused on the product, sales system or customer service system (Pierścionek 2007). The differentiation can concern, for example, the product or brand model, product features, post-sale service, sales network, company philosophy, etc. The product's or service's distinctness does not necessarily have to be ascertained in a tangible manner, it can also be developed solely in the awareness of the recipients. The desired effect can also be achieved through effective marketing used for the given product or service. The implementation of this strategy improve customer loyalty, thereby providing enterprises with a greater bargaining power. A greater enterprise bargaining power results from its ability to sell at higher prices or to a greater degree products with CSR features (see, for example, Creyer and Ross 1997, Augeretal, 2003, Pelsmacker, et al. 2005, Elfenbein and McManus 2010, Elfenbein et al. 2012, Ailawadi et al. 2014, Hilger et al. 2019, Albuquerque, Koskinen and Zhang 2019). A product differentiation strategy may allow companies to establish lasting relations also with representatives of the Z generation, just entering the labour market, for whom values such as corporate social responsibility, ecology or environmental protection are very important (Korombel, Ławińska 2019a; Korombel, Ławińska 2019b; Ławińska, Korombel, 2019a; Ławińska, Korombel, 2019b). By using the product differentiation strategy, enterprises have a positive impact on the environment by providing diversified highest quality products.

Research Objectives and Methodology

The purpose of the publication is to obtain answers to the following research questions: Can a micro-enterprise strengthen its position in the market and achieve a market advantage by functioning according to the CSR concept? If so, how were particular fields of the enterprise's functioning designed? In order to obtain the answers to the posed questions, the author studied a Polish enterprise with registered seat in Leszno, the owners of which are Małgorzata Jackowska Poloch and Paweł Poloch. The marriage runs an environmentally-friendly drugstore in the form of an online shop, the offer of which includes reliable environmentally-friendly products or products that enable living in an ecological, healthy and economical manner. It is also a place for ecological inspiration, motivation for personal development and making changes in the local community. The information provided on the website of the Better Land online environmentally-friendly drugstore [Web-1], the company's Facebook page [Web-2] and other websites specifying the Better Land company was subject to analysis. The study was conducted in the first quarter of 2020.

Findings

Better Land History

Better Land is the biggest environmentally-friendly drugstore in Poland, offering environmentally-friendly products or products that enable living in an ecological, healthy and economical manner. It was established by Małgorzata Jackowska Poloch and Paweł Poloch in 2009 due to their passion for ecology, environmentally-friendly style of life and for creating innovative undertakings that change the reality for the better. Małgorzata was the originator of the business. Being an active participants of a forum devoted, among others, to environmentally-friendly cleaning agents, she noticed a huge interest of female forum members in reusable sanitary napkins which were then not available in Poland in the quantity that would meet the demand of Polish women. The women were sewing the product at home and sold it online, however the demand substantially exceeded the supply. This observation contributed to the establishment of the company and online shop, which was run solely by the owners at the beginning. The marriage started the manufacturing and sales of state-of-the-art reusable sanitary napkins under the Soft Moon brand in 2010. The first Soft Moon reusable sanitary napkins were sewn by women sewing and selling their products online. Then, the sewing of the reusable sanitary napkins

was commissioned to the Polish company called NAYA. The Better Land - the biggest in Poland professional shop with reusable sanitary napkins - was also established in 2010. Better Land encouraged KokoSi and Pupeko to sew reusable sanitary napkins (Web-1). In time, the drugstore's product offer was expanded with food stuffs, environmentally-friendly washing liquids, feminine hygiene products, cosmetics for children and menstrual cups. The owner, Małgorzata Jackowska-Poloch, was the first cup advisor in the world, providing advice to selecting menstrual cups (Web-1). In 2018, Better Land won the competition for the best environmentally-friendly online drugstore, which was organised among the Uroda i Zdrowie [Beauty and Health] magazine readers (Web-3). In the same year, Better Land also received an award in the popularity contest of Ulica Ekologiczna [Ecological Street] for the Lady Cup menstrual cup (Web-4). Over the years, Better Land and the products offered by it were repeatedly awarded in the Puchary Zero Waste [Zero Waste Cup] popularity contests (Web-5). Currently, the Better Land online shop's offer, including several thousand products (including, among others, cleaning agents, hygiene products, food stuffs, kitchen accessories, child clothing, books, office accessories), is one of the most developed offers of environmentally-friendly drugstores in Poland.

Better Land's Functioning Principles

Better Land is a part of business managed by Małgorzata i Paweł Poloch. Aside from the Better Land environmentally-friendly drugstore, they also run a wholesale business with environmentally-friendly products and are working on establishing a foundation (fig. 1).

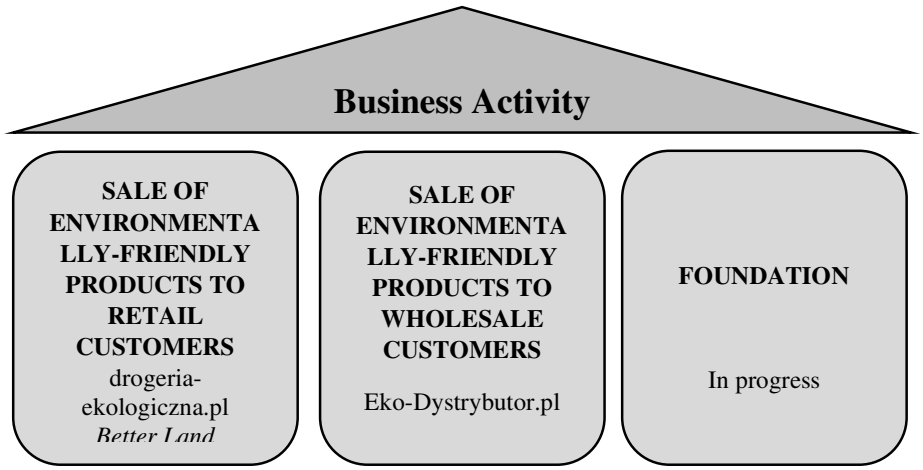

Fig. 1: Three pillars of the activity conducted by Małgorzata i Paweł Poloch

Source: own elaboration

Better Land Philosophy

The Better Land owners have clearly defined views on their values and objectives, as well as the methods of achieving them. The main priority is the will to change reality for the better, not only by applying and propagating an environmentally-friendly life style, but also by executing and creating innovative undertakings. The company's philosophy, focused on changing the world for the better, was presented by the owners in several points (figure 2).

WITH BETTER LAND WE CHANGE THE WORLD FOR THE BETTER!

Stop Consumption	When running a shop, it is difficult to remain authentic, but everyone that knows us also knows that we do not persuade customers to make purchases by force. We tell them how to make the product on their own, how to buy something that will make buying more of something else unnecessary!
Stop Corporations!	We know for a fact that NETWORKS and CORPORATIONS WILL NOT SAVE THIS WORLD, and that the world would be better without them. Corporations and networks will be painted green in the front and will be eyeing people like us, but from the back door they will be introducing plastics, crank up the economic situation and use cheap labour, thereby destroying culture and loyalty. Network will say: we have products for Vegans, but they also have 1,000 others that featured the use and harming of animals during the manufacturing process.
We support bottom-up initiatives!	Systematically! You don't have to be a freak and you cannot get discouraged. Therefore, we support! It was a dream come true that we were able to support HelloWielo. Of course, it was also publicity for us ☺
We bet on relations!	We know that it is necessary to bet on relations with children and everyone who surrounds us. Talk, talk and talk some more. Otherwise, the voice will be given to people with bad intentions towards the Earth or that are indifferent towards it. Check out our bookshop section occasionally. As you know, we are educators and ecologists: we offer communication and values, the following of which make respect for the Earth and people become NATURAL.
We bet on honesty!	We know that you have to speak your mind, call things the way they are, but also admit mistakes and imperfection. It would be difficult to develop and change otherwise.

Fig. 2: Better Land Philosophy

Source: elaboration based on (Web-1)

The most important values of Better Land are presented in figure 3.

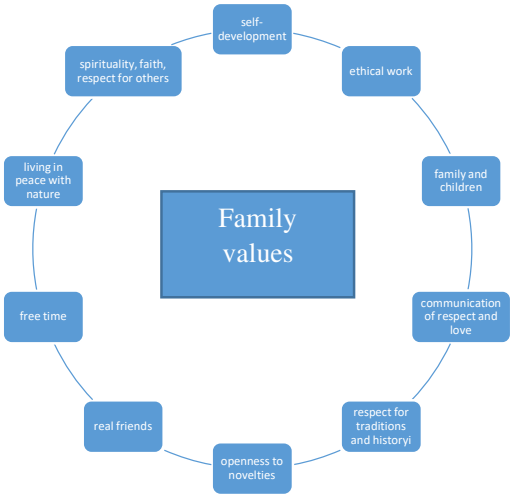

Fig. 3: Better Land Values

Source: elaboration based on (Web-1)

Objective and strategy

The elements of Better Land's strategy include not only increasing sales volumes, but also supporting good brands, education and changes aimed at minimising environmental impact. The objective is to be the leading centre of environmentally-friendly drugstore goods. On the other hand, the objective of the Soft Moon brand created by Better Land is to market the highest quality reusable sanitary napkins, hygienic pads, nursing pads and other accessories for women. The brand's mission is to support women self-esteem. Each product makes us remember about the greatest features of women - wisdom, sensibility, beauty. The brand's vision is: "we believe that we will support women with our products during days important to them: childbirth, lactation, period and when they need it. Because each one of us is a goddess. Each one of us is exceptional" (Web-1).

Recruitment Process

At the beginning of 2020, the company was employing 30 persons: 15 persons hired on an employment agreement and 15 persons hired on a contract of mandate. Contracts of mandate mainly apply to students, mother wanting to earn extra money and subcontractors. The owner conducts a long and multi-layered job interview, expecting the future employees to have a passion for ecology and follow values related to ecology. It is a necessary condition during recruitment for the company's key positions. The leave system forces employees to plan their two-week leaves until the end of April of each year. Such an early leave declaration allows for determining the substitutes' timesheet well in advance. Each employee receives a 30% discount for purchases and each hired woman receives a gift in the form of a menstrual cup or a set of environmentally-friendly sanitary napkins.

Selection of products for the shop's offer

The shop owners and employees are very committed to environmentally-friendly and Zero Waste activities. They test all the products they want to include in the shop's offer themselves. Only the products that pass their verification, i.e. are effective and of high quality, can be included in the drugstore's range of products. Better Land promotes brands that have real achievements in terms of environmental protection or in supporting people in need. The consistence of the approach and the fact that not all, not even the most popular brands can become part of Better Land's offer, is confirmed by the company owner: "*We seek honest manufacturers who not only can demonstrate the quality of their products, but also speak openly about the manufacturing, invite us to their laboratories, tell us about their work (…) - We don't want to market products from other continents if a similar product can be found in Europe. We rather choose small Polish workshops, the product quality of which is really high*

(…) – The message is important for us. If a manufacturer declares something and then keeps his word, he gains our trust. The case is similar for distributors. Activities in the scope of CSR, environmental protection and supporting good initiatives are important to us. Thus, our co-operation with the German Hydrophil, which not only has high-quality hygienic products, such as bamboo toothbrushes, but is also transferring a portion of its profits to a foundation dealing in providing access to water to Southern countries. (…) – I think we will always seek even more environmentally-friendly, ethical and healthy solutions. We are ecologists. The well-being of our customers is as important for us as the well-being of our planet. We believe that we can change much by our action. Join us!" (Web-3). In the given interview, Paweł Poloch emphasises: *"I check how long is the manufacturer in the market or where he is from. It is also important for us whether the given manufacturer really follows the values he declares. We don't co-operate with companies that are environmentally-friendly, because they want to make a profit on it. It is really clear – from business relation to the method of preparing a pallet, packaging, everything really. I know from experience that those who only declare being environmentally-friendly close their activity sooner or later."* (Web-6). Customers can also choose the "Zero Waste and high capacity" category in the shop's offer. This category means the ability to purchase chemical raw materials in large quantities sold in recycled and reusable packaging.

Sales Process

Better Land never used the dropshipping system. The sales process assumes that each product offered on the website is available in the Better Land's warehouse. The products are shipped immediately after the payment is credited or when the customer sends a payment confirmation. This allows us to substantially shorten the product delivery time - the purchased goods most often reach the customer the day after shipment. Each order is monitored and insured. It is necessary to note that since the beginning, Better Land has virtually never bought or used new packaging for its shipments. As much as 95% of the shipments are packaged in recycled packaging. The packaging is collected once a week from local wholesalers and stores, such as pharmacies, stationery shops and grocery shops. On the other hand, parcel paddings are made by Better Land or the company uses or the company uses the paddings sent to the company in parcels along with the ordered goods (the company uses films, foams and paper). Such a system not only enables minimising shipment costs, but also contributes to environmental protection. In 2019, Better Land estimated that the zero waste approached applied to its packaging process allowed for saving and refraining from purchasing 60,000 cardboards – so many cardboards would have to be bought in a traditional packaging process. In some cases, it is necessary to use adhesive tape and stretch film for product packaging. The company makes every effort to minimise the use of these materials and declares their complete elimination in the near future. Nearly 90% of all shipments is transported to logistics centres by bikes. The use of parcel pick-up stations and personal collection in the post office are also promoted (Web-1).

Conducting educational activity and providing financial support

Better Land is actively taking part in activities aimed at protecting the environment and local entrepreneurship. The company's flagship campaigns include, among others, the following:

1. *Appreciate local shops and regional products* – the company owners argue that there is huge strength and good in local diversity. They make an appeal and encourage to support small shops and thereby the local business, which should become competitive against commercial networks that fill the world with wastes. They link it with care for the environment and culture as well as decent employment. The quantity of wastes generated daily by a single commercial store is incomparably higher than the wastes generated by a single small shop, even if both shops had the same turnover. The Zero Waste principle will take action faster in the case of a small shop.
2. *Buy in Polish shops - support the Polish economy!* – in this campaign, the owners make an appeal to appreciate the Polish products and services as well as to promote them in social media.
3. *If you can, choose sunscreens that guarantee not being harmful to living organisms in water reservoirs* – the owners point to the huge problem related to the pollution of seas and oceans

with sunscreens and oils of swimmers, posing a direct hazard to the organisms living in them. They make an appeal to choose sunscreens certified to be neutral to seas and oceans.

4. *We say stop to the removal of particulate filters in passenger cars.* The particulate filter is a damper component, the removal of which causes substantial environmental pollution, lung diseases and cancer. The component is removed by vehicle owners for savings. The actions taken by the company lead to over a dozen press articles and TV programs. These included: Onet.pl, Nowoczesny Warsztat.

The drugstore's owner, Paweł Poloch is also actively engaged in the development of a democratic school in Poland. Until 2013, he was the co-creator of the first social democratic school in Poland called Trampolina [Trampoline] and took part in the establishment of the Democratic Education Foundation, the activity of which contributed to the formation of further democratic schools around Poland. In the opinion of the foundation members, a young man or woman knows quite well what he or she needs. Therefore, he or she should be able to decide for him or herself. Paweł Poloch emphasises that "*This will allow to prepare the child for the challenges of the contemporary world. Moreover, the child is learning responsibility thanks to the ability of making decisions on his or her own.*" (Web-7). Currently, Paweł Poloch is supporting the activity of the members of the democratic schools' initiative groups, propagating the functioning of democratic schools and supports close parenthood. Better Land's support for many organisations is a very important element of its functioning. The aid takes various forms, not only financial by transferring a portion of the profits, but also support in projects and undertakings. A portion of the profits is transferred, among others, to the Giving Birth Humanly Foundation, Bullerbyn Foundation for the organisation of the EUDEC event - the biggest and most important educational event in Poland, or for the organisation of the nationwide Close Parenthood Conference. The list of companies receiving support from Better Land is very long.

Building Relations

Communications with the customer are very important for Better Land owners. The Better Land owner's telephone number is available on the shop's website all the time. Paweł Poloch states that *"I still didn't remove my telephone number from the website. And, of course, it has its down sides, because my telephone is ringing all the time and I can't ignore it. Maybe on the other side there's a desperate mother, the child of whom has a very dry skin and all of the medicine used thus far were ineffective? Maybe the caller has a psoriasis problem and is helpless against it? We try to help such people."* Close contact with the customers does not only mean helping them in choosing the products, but also on listening to their comments and suggestions. Małgorzata Jackowska-Poloch admits that "*We get to know a lot of the products sold today from our customers. We listen to them and try to respond to their needs. People are knowledge repositories for us"* (Biokurier.pl 2019). The important role of the customers in the company's functioning is also visible in Paweł Poloch's statement during the interview. The Better Land owner responded as follows to the question of what should be the focus of a person that wants to open an environmentally-friendly drugstore: *"Contrary to popular opinion, the green industry is not the easiest. I am observing enthiusiastic establishments of environmentally-friendly shops that are closed after some time. Knowledge about the sold goods and actual interest in the green industry are surely important. Competencies related to customer services, sales, marketing, knowledge of the law related to sales, etc., are also important. However, the ability to recognise and adapt the products to customer needs is key. We provide aid in this scope to both our wholesale and retail customers. It is therefore worth having a good business partner. I think that we are such a partner for our recipients. If they ask, we always provide them with honest feedback. Companies that are open to criticism grow very well, they improve their offer and approach. It is also important to be resilient and happy of what you are doing, and I wish this to all of my partners. We have to remember that the green industry has really great customers. I love to listen. They have extraordinary knowledge and are eager to provide various ecological trivia. They also have problems that we try to solve together."* (Web-6)

The Better Land owners, in response to the question of customers on *What to do to be even more environmentally-friendly?*, formulated special recommendations for them (figure 4).

Packaging segregation!
It is very important to adequately segregate used materials. Waste sorting is very important as well.

Relay segregated packaging for further recycling!
For example, you can search your neighbourhood for a shop that deals with sending goods in packages. If it is conducting a responsible business, it will surely take you packaging and use it again. Do you have many paddings or cardboards? You can always send them to us! We will use them in our shipments.

Buy products in bulk packaging!
Rarely buy the products you use constantly. In other words, buy as much as you can at once. This way, you save time, money, consumables and generate less CO_2.

Buy consciously thoughtfully!
It is worth taking the vendor's advice on the product you want to buy, if it meets your expectations. Call us!

Order the shipment to a parcel pick-up station or personally at the post office. Such a parcel is cheaper and more economically-friendly if the customer picks it up by bike or foot.

Fig. 4: Recommendations formulated by Better Land owners *What can we do to be more environmentally-friendly?*

Source: own elaboration based on (Web-1)

Respect for other people is very important for Better Land owners when building relations with customers. This was confirmed with a situation that occurred during the shop's functioning *"A woman called once with complaints and she yelled at our pregnant employee who was concerned with the entire situation. Paweł did not trivialise this. He called the customer and told her that her behaviour was unacceptable and he does not wish her to talk to his employees that way"* (Biokurier 2019).

Better Land owners also try to keep close relations with their suppliers. This allows them to notice when something is not right and the co-operation must be stopped. This results from the fact that the company takes responsibility for what it sells and wants to deliver high quality products. Each co-operating company is under observation – it receives support from Better Land when necessary or the co-operation is stopped when it is not based on Better Land owners' values. Shop owners effectively pressure manufacturers and suppliers to make zero waste changes. It were the comments of Better Land owners that made the Italian Anthyllis brand, among others, to decide to market children products in glass packaging (Biokurier 2019).

Summary

The Better Land enterprise achieved success – from the time of its establishment in 2010, it consequently strengthened its market position to achieve competitive advantage. Currently, it is the largest environmentally-friendly drugstore in Poland and employs 30 persons (at the beginning, only the owners were managing the drugstore). The Better Land brand is recognised and respected among customers and by many websites or organisations, which is confirmed by numerous awards and

distinctions. A number of factors contributed to this. The owners, even before the company's establishment, had a very clearly defined need to change the world for the better, which they aptly expressed in the *Better Land* name. The shop owners' passion for an environmentally-friendly life style and for developing initiatives that change the world for the better are reflected in their business. The Better Land environmentally-friendly drugstore is not only an online shop with environmentally-friendly products, but also a place of education with ecological inspirations and incentives for self-development, taking care for the natural environment and local community.

Table 1: CSR in the Better Land business fields

Element of company functioning	Description
Philosophy	Clearly specified, covering socially responsible activities
Values	Clearly specified, covering socially responsible activities
Objective and strategy	Transparent, strongly correlated with corporate social responsibility
Recruitment process	Executed personally by the owner. Persons are employed based on similar values and their passion for ecology and environmental protection.
Relations	They are a very important element of the company's functioning. Relations based on trust, they are built with all of the company's stakeholders.
Process of selecting products for the offer	Very restrictive, scrupulous selection of products for the shop's offer. The drugstore's offer can only include high quality products manufactured by socially responsible entities.
Sales process	Consumer-friendly prices, very quick processing of orders and scrupulous selection of products checked in terms of quality and expiry date prior to shipment. Each transaction is monitored and reaction to a complaint is instantaneous. Complaints are most often recognised for the customer's advantage. The limitation of the negative environmental impact is executed through zero waste for shipment packaging which is most often acquired from the local community.
Social objectives	Large engagement in the development of the local community through substantive and financial support of environmental protection initiatives. The educational activity is executed on a broad scale, through propagation and co-creation of democratic schools and financial support of the foundation, among others. Propagation of the environmentally-friendly concept, healthy and economical life style.
Environmental protection	It is a priority, which is included in the philosophy, vision, strategy and selection of products in the shop's offer, in choosing business partners, educational activity and activity supporting local initiatives.
Profit division	Most profits achieved on commercial activity is allocated for developing other initiatives focused on innovations, social problems and improving reality.

Source: own elaboration

The concept of corporate social responsibility, with which the company owners identify, constituted the foundation for formulating the company's objectives and strategy. This in turn allowed for translating the CSR principles on the methods of achieving the objectives specified in the strategy and on particular processes (table 1). The functioning according to the CSR concept greatly contributed to strengthening the Better Land company's position in the market and achieving competitive advantage. Virtually all of the enterprise's fields of activity were designed to enable implementing the CSR principles. The CSR allowed Better Land to diversify its products, the sales process and building relations with stakeholders. The CSR allowed Better Land to differentiate its services from those of its competitors – customers choosing Better Land can be certain that the company, in every area of its operation, operates on the market in a socially responsible manner.

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Industrial Environmental Management Strategy in Shipyards

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Abstract

This research aims to study the application of industrial environmental management in shipyards. first, by identifying parameters that affect the implementation of industrial environmental management obtained based on literature studies. Second, analyzing the situation in the sample shipyard by using predetermined parameters, namely the production process, company management and environmental management. Third, formulate a strategy for implementing industrial environmental management in shipyards. Based on the analysis conducted, it was identified that the shipyards that were sampled by researchers had deficiencies in several aspects viz. energy saving activities, use of water resources, waste management, and lack of several aspects of existing environmental standards. The overall rating of the PROPER criteria raised is still in the red category. These deficiencies are then analyzed by researchers to formulate strategies to meet the parameters of the application of industrial environmental management.

Keywords: Management, strategy, knowledge, industry, Shipyard

Introduction

The environment is a place occupied by living things together with living and non-living objects in it (Haryanto MP, 2018). From this understanding, it can be concluded that the environment consists of two components, namely components (biotic) and components (abiotic) and within these two components there is a reciprocal relationship that can influence and the dependence of one another. This means that living things will affect the environment, and likewise with changes in the environment it will affect the lives of living things.

Industry is the activity of the economic branch of a company or business entity of the like where a person works. Large industries are companies that have 100 or more workers. A small industry is a company that has 5-19 workers. Home Industry is a household handicraft business that has 1-4 workers. The current industry is a company that has workers between 20-99 people (BPS, 2012). An advanced industry is an industry that develops by implementing a system of sustainable development (sustainable development) which is a strategy in ensuring the sustainability of the lives of future generations by paying attention to aspects of the sustainability of resources and care for the environment (Chen, et al., 2015).

The aim of sustainable development is to achieve ecological, economic, political, social and cultural success and prosperity with the principle of participatory equity with all forms of diversity in an integrated manner with a long-term perspective by optimizing existing resources in a sustainable manner (Harris, 2000). The parameters contained in sustainable development support the development of Indonesia that wants to achieve the MDGs (Millennium Development Goals). By contemplating a

sustainable development system the environmental management strategy in the shipyard industry can be applied by analyzing the initial conditions of the shipyard.

Over the years environmental degradation has increased in all areas including in the maritime industry, characterized by climate change, increased airspace, and disturbance to ecosystems due to decreased biodiversity of flora and fauna, including social problems caused (Wihaji, Achmad, & Nadiroh, 2018). In the maritime industry, the shipyard industry is one of the main supporting factors that become a reference to developments in the maritime world. Then there will be more shipyard industry in Indonesia over time. The shipyard industry not only handles the field of ship building, but also is engaged in ship repair, maintenance and modification.

Shipbuilding is an industry in which the process of transformation of inputs in the form of materials (fiber glass, wood, steel, rubber, etc.) becomes a whole that can be in the form of ships, or offshore buildings and other floating structures. Shipyard industry is an industry that is classified as Product Oriented or Job Shops production (Storch, 1995). Product oriented or job shop production suati can often also be referred to as an industry that works based on quantity or volume orders. The type of shipyard that does the construction of new ships is always in accordance with orders from the owner While the orientation of new buildings and repairs is a multi-function shipyard that is able to make new shipbuilding as well as maintenance / repair and modification of ships (Ahyati, A. 1996).

The shipyard industry can build various ships for government agencies in Indonesia, individuals and others including shipbuilding orders from abroad. Its products can be produced among other things: tankers, passenger ships, cargo ships, etc. Because it causes the shipyard industry to be an industry that uses quite large natural resources. On the other hand, the limitations of the availability of natural resources and the limitations of the carrying capacity of the environment in receiving industrial waste and emissions, so to develop an industry that is guided by the sustainability of economic, social value and protection of environmental quality must be done immediately.

Picture 1: Shipyard PT.X

(Source: Researcher, 2019)

Based on RI Law No.32 of 2009 concerning Environmental Protection and Management article 1 paragraph 3 that sustainable development is a conscious and planned effort that integrates environmental, social, and economic aspects into development strategies to ensure environmental integrity and safety, ability, welfare, and quality of life of present and future generations, living in harmony with the natural surroundings, with fellow humans (Marthinu & Nadiroh, 2018). Because of this the application of environmental management in the shipyard industry must be applied because the shipyard industry plays an important role, especially in terms of repairs and construction of stinky ships (Abdul & Heri, 2016). Industrial confusion management is management which in the production process prioritizes the effectiveness and efficiency of sustainable use of resources so as to harmonize the development of the shipyard industry.

Methods

The research method used in this study is a qualitative method with a focus on aspects of the production process, company management, environmental management. the production process is an aspect which explains therein everything related to the process of production, including supporting materials and raw materials, the use of energy and water, technological processes, products, work environment and human resources. The aspect of company management is an aspect in which all business fields that have been carried out by the company management in leading to the concept of sustainable industry include management systems, rewards and efficient production. The aspect of environmental management is an aspect in which all fields of business that have been carried out by the company in the framework of environmental and waste management include the fulfillment of quality in the environment of the shipyard industry.

The analysis of the initial conditions of the shipyard industry is carried out by researchers based on the implementation of environmental management of the shipyard industry. Shipyard which is used as material for the implementation of environmental management of the shipyard industry is one of the shipyards in Indonesia that has been serving projects from the government and the private sector, hereinafter referred to as shipyard X. Shipyard X is included in the most basic shipyards located in Indonesia with land that is in Indonesia. quite extensive, quite a lot of employees and included in the pilot private shipyards in Indonesia.

Result and Discussion

In the aspect of the production process it is known that there is no effort made by shipyard X in the use of raw materials / auxiliary materials from waste but the raw materials used do not use raw materials that are prohibited in their use. Shipyard X strives in optimizing and minimizing the use of raw and auxiliary materials which have been carried out strictly for the use of raw materials. Verification from the planning stage to its use must be undertaken before making an order or taking raw materials at warehousing. In the energy aspect, shipyard X has no incentive to use new renewable energy (EBT). But in the shipyard there are efforts in carrying out energy efficiency by means of an appeal to divisions that use high energy.

The use of energy for industry has been restricted. In Shipyard X, the majority of energy use uses electricity, so the limit is the maximum energy usage per year. In the use of water, shipyard X has no effort in implementing programs related to the maintenance of the existence, nature and function of water resources. In addition, there is no implementation of the water quality management program and there is no audit of water use by the shipyard which causes the use of water in the shipyard to become uncontrolled.

Likewise with the human resources who work on shipyard X have never gotten an increase in capacity for HR related to clean production, environmental management, K3, energy conservation, 3R, total quality management, six sigma, and so forth. The application of K3L to shipyard X is in accordance with Kepmenaker No. 51 of 1999 which has been carried out despite the disadvantages such as the level of humidity in the workroom and lighting. In Galangan X, there is no specific policy from top management regarding the application of production efficiency. So that the production process at this shipyard is running as is.

The development program in shipyard X regarding the implementation of CSR has been routinely implemented and managed every year. Galangan X divides the CSR program into two parts, namely the partnership program and Community Development. For the Environmental Development program, Galangan X has increased competencies with scholarships, training, becoming sponsors of sports such as football, opening places for students or students, field work practices, medical improvement for mosques. As for the partnership program, Galangan X does this by providing or providing capital to SMEs, equipment assistance for SMEs and also monitored its progress every 2/3 months to support the shipping of Galangan X will fully support.

The parameters regarding the quality standards of liquid waste, gas and dust are already owned by Galangan X, although not given in full, especially regarding the parameters of liquid waste. Evaluations regarding the fulfillment of environmental quality standards are also carried out every six months. Integrated business in Shipyard X related to segregation, reduction (minimization), handling (handling), utilization, treatment of waste and emissions in the shipyard environment is still lacking or nonexistent. Likewise with proper activities which are a mandatory agenda of the Ministry of Environment and is a policy of the government to improve the performance of the company's environmental management which has been followed by Shipyard X.

Equipment at Shipyard X that requires electrical energy does not get technology updates. This has an impact on electricity consumption being higher than the same equipment with newer technology. Shipyard X does not have a special program on saving water use. This causes no control on its use. In addition, there is also no audit regarding water use. There is no training to increase human resource capacity related to the results of clean production, environmental management, energy conversion, K3, 3R, total quality management, six sigma, and so forth. For the application of HSE, there are also many obstacles, namely lack of supervision. So some workers do not comply with K3L well. Lack of policy from top management towards efforts to implement shipyard industry management. This can be seen from planning to production activities as usual or not in accordance with applicable regulations.

Table 1: Investment value of implementing an environmental management strategy

Aspect	Strategy	Investment Value (Rupiah)	Savings (/Month)
Energy	Solar Panel	2.065.500.000,-	114.276.000,-
Air	Saving Machine	375.000.000,-	11.210.000,-
Industrial Environment	Green roof	1.000.000.000,-	
Heavy Equipment	Usage Time		
	Planting	87.500.000,-	
Total Investment		3.528.000.000,-	125.486.000,- /Month

For the application of an environmental management strategy to be more economical, the return on investment should not exceed 15 years. 15 years is the ideal time because the company will benefit from the investment already spent. One way to make the investment return time faster then what needs to be done is to impose a portion on the production results, namely the ship. Loading of this ship can be different from other shipyards. It really depends on the capacity of the shipyard. The increase in ship prices is due to some strategies that have no impact on savings. The strategy does not have an impact on the savings obtained because the strategy focuses on environmental management such as the use of green roofs, planting and making biopori holes. The increase in ship prices is expected not to reduce the shipyard's competitiveness because it directly has an added value in environmental management. Besides this value does not really affect the overall price of the ship whose value is much higher.

Conclusion

This research shows that the management of the shipyard industry environment needs to be implemented. Starting with regulations from the government that must be met with sanctions that will be accepted if not implemented. The importance of lighting the industrial environmental management in shipyards is because several shipyard companies in Indonesia have implemented strict regulations but still do not get maximum results like shipyard A which always gets a red PROPER every year. Knowledge about industrial environmental management in shipyards needs to be deepened as one way to change behavior in shipyard activities. Thus, shipyard industry activities related to environmental security will be a ladder to a sustainable shipyard industry.

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Fourth Industrial Revolution from The Perspective of Generation Z Representatives - Evaluation of Selected Aspects

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Abstract

The paper comprises a theoretical and an empirical part. The theoretical part includes an attempt at analysing the main premises of the fourth industrial revolution based on studies of Polish and foreign literature. Next, characteristics of Generation Z are presented. Generation Z has already marked its presence on the labour market and will become its driving force in the years to come.
The primary goal of the empirical part is to identify the remarks, forecasts and expectations guiding the employees that belong to Generation Z with respect to certain aspects of professional work in the era of the fourth industrial revolution.

Keywords: Fourth Industrial Revolution, Generation Z, Labour Market.

Introduction

Technological progress is an inseparable element of a society's development and exerts impact on the sphere of socio-economic life. If transformations in technology permeate a number of areas of life and exert a positive mark on production (starting from technology and ending with new products and commodities) or on consumption (within a broad meaning, understood as overall behavioural aspects), then we can talk about a revolution. Along with introduction of the term industrial revolution to literature for the first time in 1884, after discernment of the first one of 1760, four revolutions have been listed to date (Olender-Skorek 2017, p. 38). Nowadays, we are dealing with the fourth industrial revolution, which has changed basically every aspect of life. Three prior ones were primarily limited to industry (Bulak 2020, p. 78). There is no unanimous answer as to the degree to which the society will be able to make use of the opportunities brought by the fourth industrial revolution. A positive approach to changes and readiness to implement them is of key importance. The purpose of the paper is to analyse the fourth industrial revolution and to present expectations of representatives of Generation Z with respect to changes that are related to 4.0 economy in the realm of professional work.

Concept and Essence of Fourth Industrial Revolution

In relation to the growing proliferation rate of ICT, the approaching phenomenon of the fourth industrial revolution is talked of more and more frequently. It constitutes a compilation of three independent elements: the real world of production machines, the virtual world and the information technology. The phenomenon is becoming increasingly clear and the already happening industrial transformations initiated by new technologies are called the era of Industry 4.0 (Industry 4.0 or, less frequently, Digitisation 4.0), (Olender-Skorek 2017, p. 41). The characteristic feature of the new revolution is quality and speed of information flow, which often causes numerous problems related to the analysis of a huge quantity of information. The factor distinguishing man in such difficult situation is the ability to design machines which are going to help with this process and which support or even substitute man. This is the core of this revolution. Entities that are involved in production more and more frequently decide to introduce higher automation in their companies as machines are capable of processing greater volumes of data than people. This calls for an increase in the demand for qualifications and digital competence along with specialisations when ensuring high flexibility and production efficiency in a rapidly changing technological environment.

J. Gracel and M. Makowiec singled out four technological trends that drive the Fourth Industrial Revolution and significantly contribute to the changes on the labour market. The first refers to an enormous increase in the quantity of data, computing capacity and connectivity. The second trend is related to the emergence of analytical tools from the Business Intelligence segment that offer the possibility of processing data and drawing conclusions on their basis that facilitate decision making in business, without the necessity of relying on intuition. The third trend encompasses new forms of interaction between man and machine (tactile interface, augmented reality or virtual reality). The fourth trend is a facilitated process of transferring digital instructions to the physical world (advanced robotics and 3D printing), (Gracel, Makowiec 2017, pp. 105 – 125).

This context features a question about the employment prospects at the time of the fourth industrial revolution. Nowadays, forecasts related to the appearance of Industry 4.0 are diverging. Some mention reduction of work positions or FTEs, which means that a specific number of positions will be liquidated, whereas other predict an increase in employment.

Sceptics voice fears with a vision of factories dominated by robots installed on a mass scale. Work automation is slowly pushing professions the performance of which relies, to a significant degree, on routine and repetitive activities, out of the market. Smart software is an element supporting the manufacturing process of a new product (W. Schmitz 2015, p.6). This situation carries an increased risk of unemployment caused by maladjustment of qualifications to the requirements of created work positions and induces the necessity of adapting to the changing conditions in the environment (Bulak 2020, p. 83).

According to positive forecasts, machines will not replace man in specialist situations. They will not be capable of meeting the demands in the sphere of creation or construction of new inventions. A positive impact of 4.0 industrial revolution is pointed out with respect to the formation of such work environment where man plays the key role. There is talk about maintaining or even increasing employment. J. Bendkowski, relying on studies of numerous companies with respect to opportunities and threats brought by the fourth industrial revolution, notes the positive impact of this concept. Boston Consulting Group forecasts an increase in employment by 6% in the perspective of the next 10 years. Growth in employment is related to a high demand for qualified employees (Bendkowski 2017, p. 25). It follows from the analyses of Roland Berger that in spite of reduction in employment caused by the advent of the fourth industrial revolution, one should expect a positive net effect for employment. It is anticipated that as a result of implementation of approx. 50% of 4.0 industry solutions in the Western European countries, 8.2 million work places will be lost by 2035, which may be neutralised by creation of almost 10 million new ones (Götz, Gracel 2017, p. 224).

Enterprises are becoming increasingly aware of the fact that their competitive advantage is significantly determined by proper selection of highly qualified personnel. Activities aimed at raising qualifications of the employed personnel become necessary, and this will definitely result in an increase in outlays on trainings that the employers will be forced to make.

However, serious limitations in the implementation of changes related to the fourth industrial revolution concern no possibility of ensuring proper training of employees and difficulties with sourcing persons that have adequate knowledge for companies. Along with the arrival of digital transformation, employers are going to face a number of challenges, for example in the area of setting up new positions and searching for talents for 4.0 economy (7). The progress that is made in the area of technology, related to the creation of virtual reality or in the area of artificial intelligence, is not without impact on a change in the competence model of employees. Today, one cannot doubt that competence models may be assigned to a specific group of positions or specialisation. Major issues include the necessity of developing competence as part of another area than the one to which the performed work refers. One may notice permeation of numerous professions and the fact that competence of one professional profile turns out to be necessary in another one. When examining the issue of work skills, it must be stressed that both hard competence (technical and cyber-technical), as well as soft one (creativity, ability to reason logically and analyse data) become essential (1). According to McKinsey, transformation towards industry 4.0 induces the necessity of development of

specialisations resulting from performance of advanced technological processes and should cause an increase in professional activity, which may be stimulated by establishment of new platforms conducive to the formation of competence, as well as the possibility of remote performance of work (Mc Kinsey 2016). 4.0 economy will impose the requirement of adjusting to changing conditions, readiness to expand knowledge and acquire new professional experiences on the employees. It follows from the above that a linear professional path will cease to exist. A future employee will be characterised by a capacity for multitasking. Using the experiences and knowledge from various disciplines as a result of a change in the profession, he/ she will be capable of performing various projects (4).

Generation Z: Characteristic Traits

Employees who belong to Generation Z have been marking their presence on the labour market for a while. It is assumed that Generation Z are persons born after 1994, i.e. in years influenced by a rapid technological progress (Gajda 2017, p. 161). Since early years, they had the possibility of using computers with Internet access. Thus modern technologies are their natural environment. The world without the Internet is abstract for them. For Zets, the cyber-space has its reference to the real space which results in the fact that they do not feel hesitant about posting information about themselves on-line (Pandit 2015, pp. 17-18). Representatives of Generation Z experience difficulties with functioning outside of the Internet, which is manifested by the loss of contacts with people surrounding them and lack of ability to focus attention, as well as neglect of everything outside of the Internet (Stillman, Stillman 2017). On account of being constantly on-line, they narrate their lives on social networking media, they communicate via messengers and willingly read e-books. Based on the observations of representatives of this generation, it may be concluded that they are capable of performing several tasks simultaneously. Holding a conversation whilst simultaneously composing an e-mail is not problematic for them. They are characterised by the ability to divide attention. Furthermore, they are considered a generation that cannot focus on one task for an extended period of time and in relation to this, it is quite difficult to attract their attention sufficiently strongly to prevent them from doing something else (Gocłowska 2019). Due to this, the concept of multi-tasking is frequently applied to this generation. It is to be noted that multi-tasking that consists in moving from one task to another one is sometimes incorrectly understood as the ability to divide attention (Suchorabski 2017). Some researchers warn against work in a multi-tasking mode, claiming that it offers only a semblance of efficient work. The opponents of multi-tasking indicate that even if somebody is a productive person, it is impossible to focus attention on several things at once for an extended period of time and due to this, the quality of performance of each of them drops. Facing a number of tasks and wishing to perform them at the same time, it is impossible to carry them out accurately. Reality often shows that employers set increasing demands for subordinates. As a result of a rapid development of technology, people do not keep up with the changes that are taking place (Grzegrzółka 2018). In spite of it, they are trying to reach for various solutions in order to adjust to the current market conditions. Thence the idea of applying multi-tasking as a tool used for more efficient boost of the employee's potential.

More optimistic authors claim that the use of multi-tasking at work may turn out to be valuable. It will allow the young generation for efficient functioning in the reality that surrounds it, where quick and efficient flow of information is necessary and tasks required by the employer have to be performed reliably and precisely. According to the proponents of multi-tasking, for Generation Z to face the requirements set for it, it needs the ability to select among difficult tasks, tasks requiring concentration and minor partial tasks with a smaller degree of difficulty which do not require greater attention from them.

In compliance with an expert opinion, representatives of Generation Z would like to fulfil their dreams about a stellar professional career immediately, without any effort. They often find it difficult to cope with the vision of a long-term pursuance of individual professional career step by step (Dolot 2018, p. 290). They cannot be bound to a company for an extended period of time if their expectations have not been fulfilled and if they were not guaranteed the space for independence and realisation of own ideas. They are willing to commence work not only in Poland, but also abroad, as

knowledge of foreign languages facilitates their mobility. What the older generation sees as a threat is an object of fascination for Generation Z and a field for experiments. They do not attach great importance to stability at work, they are searching for variety and flee from routine (Hysa 2016, p. 390).

Study Methodology

The study was carried out between June 2018 and March 2019 among persons working in Poland in the Silesian Province. The goal of the study was to identify the observations, forecasts and expectations guiding the employees that belong to Generation Z with respect to certain aspects of professional work in the era of the fourth industrial revolution.

For study purposes, an on-line survey form (CAWI) available through a browser and completed independently by study participants, was used. Every participant received an e-mail invitation with a link to the survey and individual one-time access to the survey. A questionnaire was used in the study which consisted of closed-ended or semi-open ended questions (multiple-choice answers) and socio-demographic details. 820 invitations were sent to survey participants; the survey was anonymous and voluntary; 734 correctly completed surveys were sent back.

$\chi 2$ independence test was performed for the study sample. Based on the test, it was assessed whether the character of responses to the questions asked depended on age, education and industry in which the respondents were currently working. The zero hypothesis (H0) indicates absence of important dependences among presented variables, whereas the alternative hypothesis (H1) indicates presence of existing dependences. The test was carried out for a level of significance of α=0.05.

The results of analyses are presented in tables below.

Table 1: Description of Survey Sample

Age	18-20	21-23	24-26
Education			
Vocational	4%	3%	2%
Secondary	8%	6%	3%
Bachelor's degree	0%	8%	15%
Master's degree	0%	0%	50%
Industry			
IT	1%	6%	18%
Production	4%	3%	9%
Logistics	1%	4%	15%
Commerce	6%	5%	28%

Source: author's own study.

Results of Survey

The fourth industrial revolution related to a dynamic development of technology in combination with other socio-economic and demographic changes will leave its mark on the labour market in the course of the nearest decades. The tables below present remarks, opinions and forecasts of Generation Z employees with respect to changes that are related to economy 4.0 in the realm of professional work.

Table 2: Opinions of Generation Z with respect to prospects of employment in the era of economy 4.0

	Liquidation of jobs	Keeping employment on the same level	Increase in employment of highly qualified labour force
Age			
18-20	48%	37%	58%
21-23	60%	37%	62%
24-26	20%	6%	53%
χ^2	93.90	120.69	3.82
Hypothesis	H1	H1	H0
Industry			
IT	11%	31%	88%
Production	57%	5%	21%
Logistics	23%	29%	93%
Commerce	35%	1%	28%
χ^2	78.82	108.68	302.14
Hypothesis	H1	H1	H1
Education			
Vocational	62%	32%	28%
Secondary	42%	12%	20%
Bachelor's degree	27%	19%	66%
Master's degree	21%	11%	67%
χ^2	56.72	22.57	111.00
Hypothesis	H1	H1	H1

Source: author's own study.

The received study results will be presented on the basis of occurrence of statistically significant dependencies between the forecasts and expectations of young respondents in the area of the fourth industrial revolution and variables pertaining to age, education and industry in which they work. One of the factors differentiating the received results is the respondents' age. Persons representing Generation Z aged 21-23 clearly articulate their opinions (60% of indications) forecasting that in the course of the next decade, due to automation and digitisation of production processes, jobs may be liquidated, whereas employees who do not occupy specialist positions will be the most affected. IW Köln studies confirm the findings above and lead to a conclusion that in the case of Germany, one-tenth of enterprises expects that development of 4.0 industry will in reality contribute to a reduction in the number of jobs. The fourth industrial revolution encourages changes in the area of business management and sets the requirement of expanding own competence and acquiring a competence mix for the employees (soft and hard). Based on the survey above, it is impossible to determine precise consequences in the context of professional work (2).

An identical level of indications is observed among persons aged 18-20 (37%) and persons aged 21-23 with respect to employment staying on the same level. According to their remarks, the factor conditioning retention and further guarantee of work places on the hitherto level is investing in skills of employees which will allow for avoiding disruptions on the market in a long-term perspective. Similar findings follow from studies carried out by E. Voss and H. Riede. In the on-line survey for ETUC devoted to the effects brought by 4.0 economy, the most important possibilities indicated by the highest percentage of respondents (45%) included, in the first place, establishment of new work places (engineers/ IT specialists, scientists, network specialists, etc.). It is worth drawing attention to the fact that such possibility was pinpointed most frequently by study participants in Southern Europe (51%) and less frequently in Central and Eastern Europe (38%). The ETUC survey revealed significant differences among countries with respect to perception of possibilities on the national level: 56% of respondents in France and 50% of respondents in Spain indicated the potential of digitisation related to the creation of jobs as one of the most important opportunities, whereas in Denmark this opinion was shared by only 22% of respondents (Voss 2014, pp. 15 – 16).

It was noted that a variable significantly correlating with responses in this part of the survey is the industry where the respondents work. Positive impact of the fourth industrial revolution on the labour market is indicated by young people from the logistic industry (93% of indications) and IT (88% of indications), who expect an increase in employment of highly qualified labour force. They believe that extensive employment prospects are opening up for graduates of electrical engineering, automatics, robotics and electronics; furthermore, such employment is going to be stable and more and more attractive financially. According to the opinions of 57% of representatives of the young generation from the production industry, the level of employment will diminish. They explain this conviction by the fact that robotisation and automation of manufacturing processes is going to translate to a growth in productivity and simultaneously will contribute to emergence of situations where enterprises will have smaller demand for employees. IT industry employees (31% of indications) perceive a possibility of keeping the employment on an unchanged level, provided the requirement of qualification raise is fulfilled. There are substantial differences in views in the context of the discussed aspect between employees from the IT industry (31% of indications) and commercial industry (1% of indications) on the level of 30 percentage points. The optimism of IT industry employees in the context of changes on the labour market in the era of economy 4.0 should not be surprising, as it follows from the fact that they are practising the profession of IT technicians. According to young respondents from the IT industry, the greatest field of knowledge used as part of the fourth industrial revolution is information science, given that the majority of solutions relies on it.

Taking the next criterion from the list into account, namely education, it must be claimed that respondents with vocational education (62% of indications) as opposed to persons with master's degree (21% of indications) perceive a possibility of reduced employment in a 4.0 enterprise. Anxiety about the future at work results from a conviction that simple work will be performed by robots, whereas modern manufacturing systems will require the employees to acquire new skills. Respondents note disappearance of certain simple tasks performed manually and emergence of new jobs that require competence that has been rarely encountered to-date. A low percentage of people with secondary education (12% of indications) and tertiary education (11% of indications) as compared to the group of respondents with vocational education (32% of indications) believe that employment will be kept on the same level. The results above testify to low awareness of employees with vocational education about challenges that are brought by the technological progress. Opinions of well-educated respondents do not instil optimism as they assess their skills as insufficient. According to the assessment of respondents with master's degree (67% of indications) and respondents with bachelor's degree (66% of indications), only employees with an interdisciplinary approach to technology will find their place in a 4.0 enterprise, e.g. employees who have knowledge and practical skills from various areas of engineering and technical sciences.

Table 3: Opinions of Generation Z with respect to the role of man in a 4.0 enterprise

	Cooperation between man and machine	Machines (robots) will fully replace humans	Qualified employees will assume control over all operations in an enterprise
Age			
18-20	91%	46%	65%
21-23	59%	37%	40%
24-26	76%	11%	14%
χ^2	31.00	87.31	124.37
Hypothesis	H1	H1	H1
Industry			
IT	94%	12%	31%
Production	85%	39%	38%
Logistics	70%	26%	34%
Commerce	61%	14%	11%
χ^2	70.26	44.48	49.67
Hypothesis	H1	H1	H1
Education			
Vocational	62%	28%	30%
Secondary	69%	36%	32%
Bachelor's degree	68%	25%	30%
Master's degree	82%	11%	19%
χ^2	22.91	43.59	13.88
Hypothesis	H1	H1	H1

Source: author's own study.

The received results showed that employees aged 18-20 (46% of indications) took a positive stance towards a hypothesis claiming that in the future, the majority of routine and repetitive tasks will be performed with the use of artificial intelligence without the participation of people. They believe that robots will start to push people out of such industries as: production, transport, agriculture, trade and mining. On the other hand, it is noticeable that as many as 65% of respondents aged 18-20 are optimistic with respect to the forecast that even though machines are quicker and more efficient than man, they will not be able to dominate man and push him out of the labour market. In line with their expectations, robots will not find employment in places where creativity and establishment of contacts with people is necessary. A high percentage of respondents from the 18-20 age group (91% of indications) and among persons aged 24-26 (76% of indications) express a conviction that man creates robots to have support in rapid analysis of huge amount of information and in solving other complex problems. Representatives of IT industry (94% of indications), production (85% of indications), logistics (70% of indications) agree that robots (machines) have the task of supporting people in their work and will not cause a reduction in FTEs. The received results indicate a convergence of views with respect to the discussed issue among people with secondary education (69%), bachelor's degree (68%) and vocational education (62%). They believe that in spite of the

announcements of rapid growth in the number of robots in the future, they will not exist without people. An analogous situation takes place in the case of answers given by respondents with vocational education (30% of indications) and respondents with bachelor's degree (30% of indications) about the relations between man and machine (robot). These relations rely on employee personnel with high qualifications who are responsible for decisions and control of all activities in an enterprise, whereas machines handle exclusively precise performance of activities.

Review and analysis of studies in domestic and English-language literature induces a conclusion that one of the effects of technological revolution will be a higher level of cooperation between man and machine. So far, it has been feared that machines will fully replace man in a smart factory (8). Meanwhile, new opportunities are mentioned that man faces in the era of economy 4.0. Growing demands in the era of economy 4.0 contribute to the creation of new areas of application of robots intended for direct cooperation with man, assisting man in physical, precise or even hazardous work. Direct cooperation of man and robot carries a number of benefits. Man's intelligence and potential are a great supplement for the machine's precision and speed (9).

Conclusions

The approaching fourth industrial revolution related to a dynamic development of modern technologies brings changes in the area of work. Trends related to economy 4.0 (artificial intelligence, automation, robotics, advanced data analyses) redefine the employee market. For a number of years, diverse opinions have been heard about the impact of the "industry 4.0" concept on the employment policy. Some forecast growth in employment in the next 20 years as a result of expansion of artificial intelligence, whereas others foresee a deficit of qualified employees, which entails difficulties with staffing certain work positions.

As part of the adopted goal, an attempt was made at discerning the opinions of representatives of Generation Z with respect to the employment prospects in the era of technological transformation. The completed studies have shown that representatives of Generation Z are self-confident young people who can boldly present their views and expectations in the context of changes taking place in the area of work under the impact of economy 4.0. The advantage of the procured empirical results is specification of the aspects of professional work related to the functioning in industry 4.0 that the youngest generation of employees is aware of.

The survey carried out among employees that belong to Generation Z leads to the following conclusions:

- 60% of persons aged 21-23 anticipate that in the course of the next decade, jobs will be liquidated on account of automation and digitisation of production processes, whereas employees without high professional qualifications will be most affected by loss of work;
- 37% of persons aged 18-20 and 37% of persons aged 21-23 expect retention of employment on an unchanged level;
- 93% of persons from logistics industry and 88% of persons from IT industry expect a growth in employment of highly skilled labour force, as broad employment prospects are opening up before them (stable and financially attractive);
- 57% of persons from production industry expect that as a result of robotisation and automation of manufacturing processes the level of employment will be downsized;
- 31% of IT industry employees perceive a possibility of keeping employment on an unchanged level if the requirement of raising qualifications has been fulfilled;
- 62% of respondents with vocational education forecast the possibility of reduction in employment in a 4.0 enterprise as a result of performance of simple tasks by robots;
- 12% of respondents with secondary education and 11% with tertiary education foresee retention of employment on the same level;
- 46% of persons aged 18-20 expect that a major part of routine and repetitive work will be performed with the use of robots without the participation of man;

- 65% of respondents aged 18-20 are optimistic with respect to the forecast that machines will not be capable of dominating and pushing man out of the labour market (where creativity and ability to enter into relations with other people is concerned);
- 94% of employees from the IT industry, 85% from the production industry and 70% from the logistic industry believe that robots will not contribute to a reduction in FTEs, as their task is to support people at work;
- 60% of respondents with secondary education, 68% with bachelor's degree and 62% with vocational education claim that without the presence of man at a work place, robots do not have a reason to exist;
- 30% of people with bachelor's degree and 30% with vocational education believe that relations between man and robots at a work place should rely on cooperation (responsibility for decisions and controls over activities is taken by man, whereas a machine is responsible for precise performance of operations).

The above conclusions justify that in adapting to new trends, enterprises should make efforts to reorganize employment and efficiently use the opportunities created by digital transformation for business, to include employees in decision-making processes. Such action should bring a positive effect in the form of elimination of routine associated with the performance of work, but above all an increase in self-efficacy among employees (10).

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Differentiation of The Socio-Economic Situation of The Siberian Federal District Regions

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Abstract

The article is devoted to analysis of the Russian economy socio-economic conditions. Considerable attention is paid to assessing the economic indicators group: physical volume index of gross regional product, per capita gross regional product, state debt, energy intensity of gross regional product, retail trade turnover; and the social indicators group: the unemployment rate of the population aged 15-72 years; the number of fatal industrial accidents victims; level of participation in the workforce; the share of employees of organizations with accrued wages is lower than the cost of living of the able-bodied population. As a result, a multidimensional grouping of the Siberian Federal District regions by the socio-economic status level is presented. The interregional inequality in the studied district is revealed, the circle of problems and economic development courses is defined.

Keywords: Socio-Economic Situation, Gross Regional Product, Cluster Analysis, Siberian Federal District, Regions, Integrated Assessment.

JEL Classification Codes: E7.

Introduction

The Siberian Federal District importance is very great for the whole country due to its geopolitical position. в силу которого The region is not only an integrating link between the Far Eastern economic region and the European part of the country, but also a "bridge" between foreign Europe and the Asia-Pacific region. Therefore, the study of the Siberian Federal District socio-economic situation is a very urgent task. In terms of resources, Siberia and the Far East are the richest territories to which the increased attention of Russian and foreign investors is riveted (Malyshevskaya T.E., 2018). The Siberian Federal District role is becoming very significant for Russia and the world. In this regard, tracking trends in the socio-economic sphere, identifying the main risks and threats to the Siberian

Federal District economy, identifying measures to reduce their negative impact are very relevant from both a scientific and a practical point of view.

This study is devoted the socio-economic indicators dynamics assessment that reflect the state and development characteristics of the Siberian Federal District and its subjects. The purpose of the research is the Siberian Federal District regions ranking in the aggregate of socio-economic indicators.

Materials and Methods

The methodological tools formation of the research is determined in the context of the two principles implementation. The first principle is a theoretical study of the phenomenon essence. The basis of this principle are the theoretical differentiation of the object and the essential perception of the object. The second principle reveals the analytical features of the investigated phenomenon. The implementation of this principle is based on the application of statistical and econometric analysis methods that allow us to study the multiple elements of a holistic system based on the multifactor model construction; grouping data by a related attribute; conducting an integral indicators assessment.

The information and empirical base of the study includes legislative and regulatory documents of federal and regional significance, data of the Federal State Statistics Service for the Siberian Federal District (SFD). The results of the study are also based on data obtained in the process of the scientific work carried out by the authors and conclusions made (Rosstat, 2020; RIA-Analytics 2020).

The Results

A spatio-temporal study of the socio-economic situation of the territory should begin with an economic group of indicators, such as the index of physical volume of gross regional product, gross regional product per capita, state debt of the Siberian Federal District, energy intensity of gross regional product, and retail trade turnover. The volume of GRP in the Siberian Federal District for the entire period under review decreased by 3.9%, and compared with the previous year, increased by 0.04%. Considering the dynamics of the physical volume GRP of the Siberian Federal District in the regional context, we note that the volume of GRP in the Siberian Federal District increased in 2018 compared to 2007 only in the Tyva Republic – by 0.45%. The GRP volume decreased most significantly in the Altai Republic – by 6.54%, in the Novosibirsk Region - by 4.71% and in the Omsk Region – by 4.22%. Compared to 2017, the largest increase in GRP can be observed in the Irkutsk region – by 2.03% (Fig. 1).

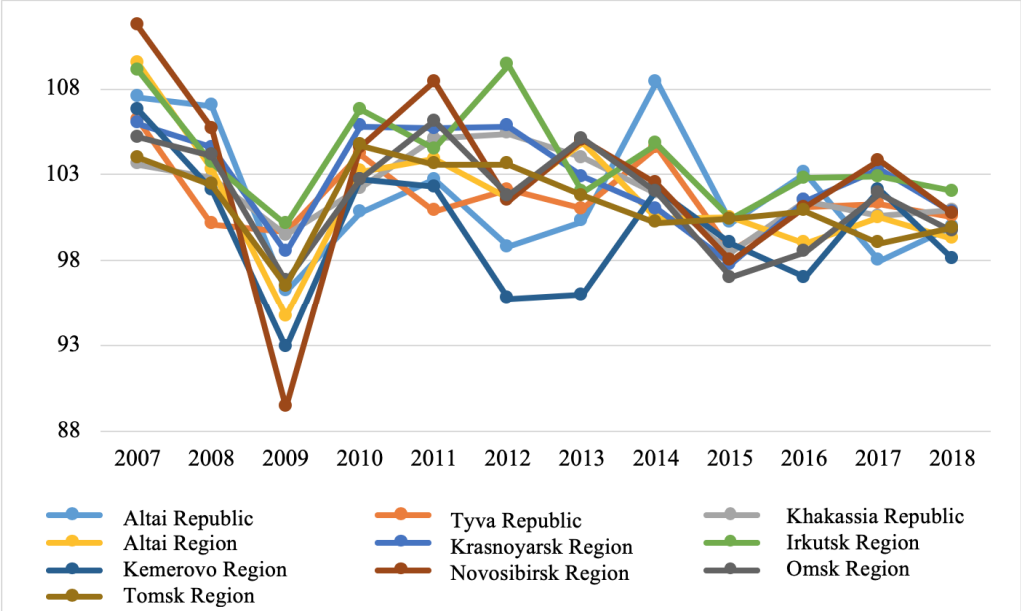

Fig. 1: Dynamics of the physical volume index GRP by the Siberian Federal District regions in 2007-2018, %

The cumulative T-criterion for a number of dynamics of the index of physical volume of GRP in the Siberian Federal District for 2007 - 2018 amounted to 3.04, which indicates the absence of a trend. With a probability of 82.6% in 2019, 97.00% in 2020, it can be argued that the index of physical volume GRP in the Siberian Federal District will decrease (Fig. 2).

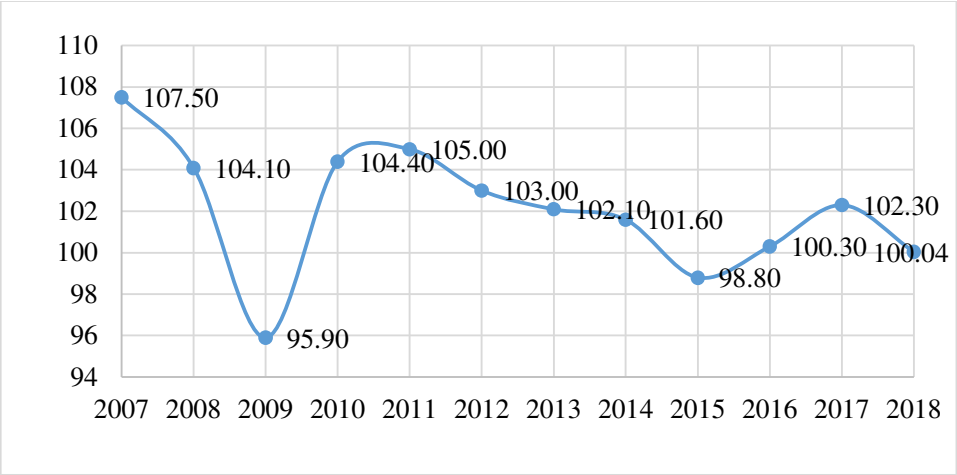

Fig. 2: Dynamics of the physical volume index GRP in the Siberian Federal District in 2007-2018, %

GRP per capita in the Siberian Federal District for 2007-2018 decreased by $ 1,123.1 (18.55%) and amounted to $ 7,177.9. The maximum GRP per capita was observed in 2013 – $ 9,003.3, the minimum – in 2009 – $ 5,535.0.

In 2018, leaders in per capita GRP are such regions as the Krasnoyarsk Territory – $ 10,867.4, the Irkutsk Region – $ 8,162.3 and the Tomsk Region – $ 8,087.9. The most lagging regions for this

indicator are the Republic of Tyva – $ 3,028.5, the Altai Republic – $ 3,674.9 and the Altai Territory – $ 3,773.2. Most in 2018, compared with 2007, GRP per capita increased in the Republic of Khakassia – by $ 1,799.5 (38.3%), in the Irkutsk region – by $ 1,759.7 (by 27.5%) and the Novosibirsk Region – by $ 1,602.1 (by 29.6%) (Fig. 3).

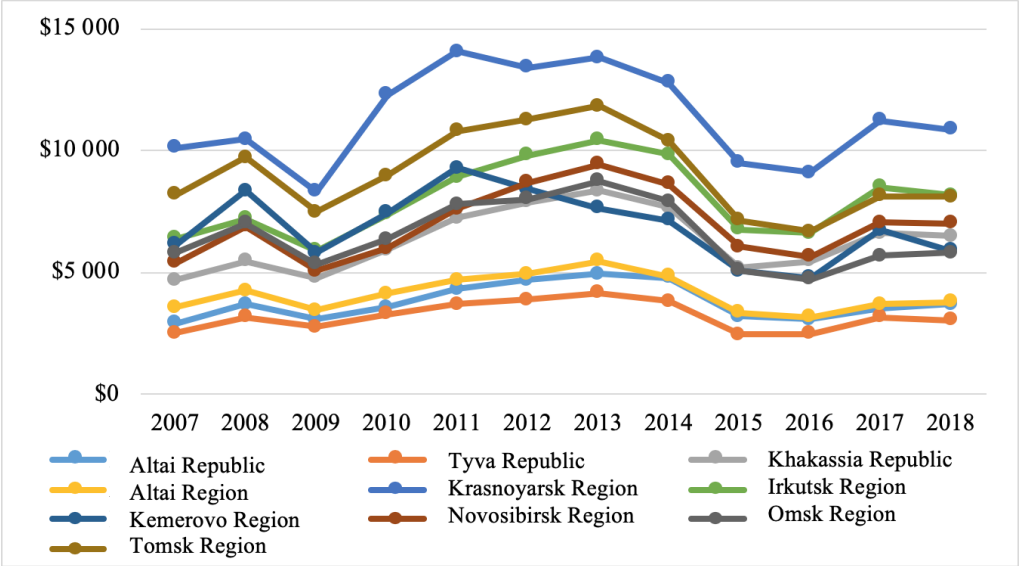

Fig. 3: The dynamics of GRP per capita in the context of the Siberian Federal District regions in 2007-2018, USD

The cumulative T-criterion for a number of GRP dynamics per capita in the Siberian Federal District for 2007-2018 amounted to 2.09, indicating the absence of a trend. With a probability of 49.0% in 2019 and 24.0% in 2020, it can be argued that GRP per capita will increase (Fig. 4).

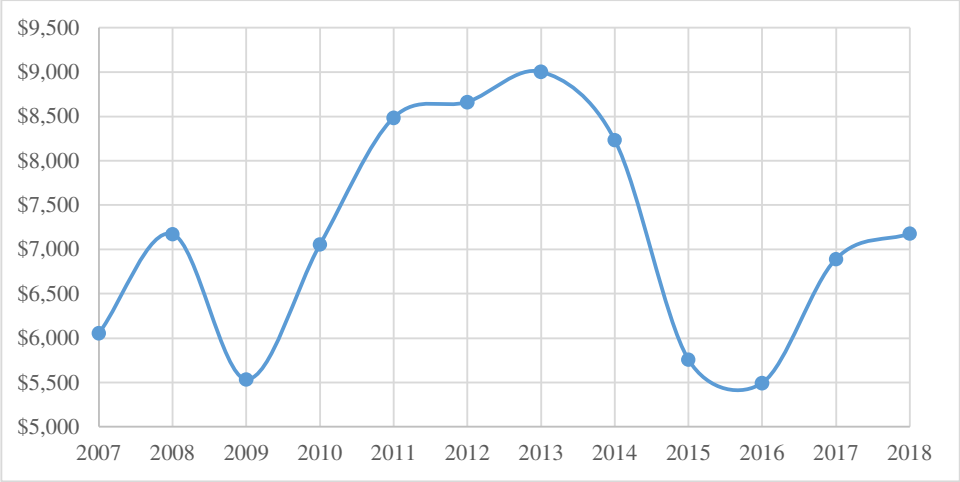

Figure 4: Dynamics of GRP per capita in the SFD for 2007-2018, thousand us dollars

The public debt volume for the period from 2007 to 2018 increased by 2.69 billion US dollars (2.38 times) and amounted to 4.65 billion US dollars, which is less than the same indicator in 2017 by 1.61

billion US dollars (by 25.70%). The maximum amount of government debt was recorded in 2013 – 8.43 billion US dollars.

In 2018, the leader in terms of state debt in the Siberian Federal District is the Krasnoyarsk Territory – 1 651 058.1 billion US dollars. This indicator in the Krasnoyarsk Territory increased in 2018 compared to 2007 by 1 586 837.3 billion US dollars. The smallest amount of government debt in such regions as the Altai Republic is 23 989.1 billion US dollars, Altai Krai is 30 734 billion US dollars and the Tyva Republic is 31 525.0 billion US dollars (Fig. 5).

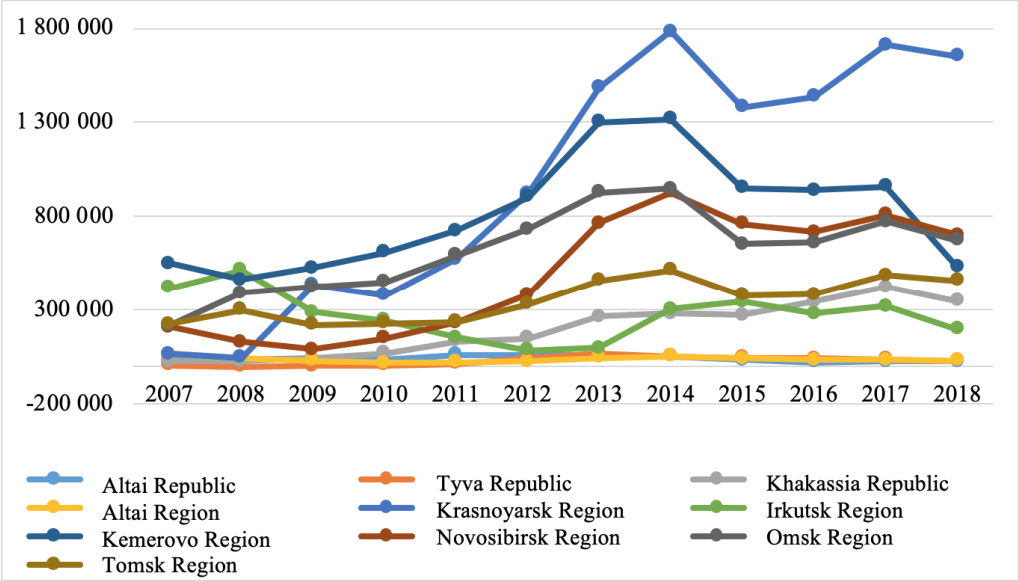

Fig. 5: Dynamics of the public debt volume by Siberian Federal District regions in 2007-2018, billion US dollars

The cumulative T-criterion for a number of dynamics of public debt in the Siberian Federal District for 2007-2018 amounted to 8.97, indicating a trend. The forecast value of the indicator in 2019 amounted to 7.15 billion US dollars, in 2020 – 7.52 billion US dollars (Fig. 6).

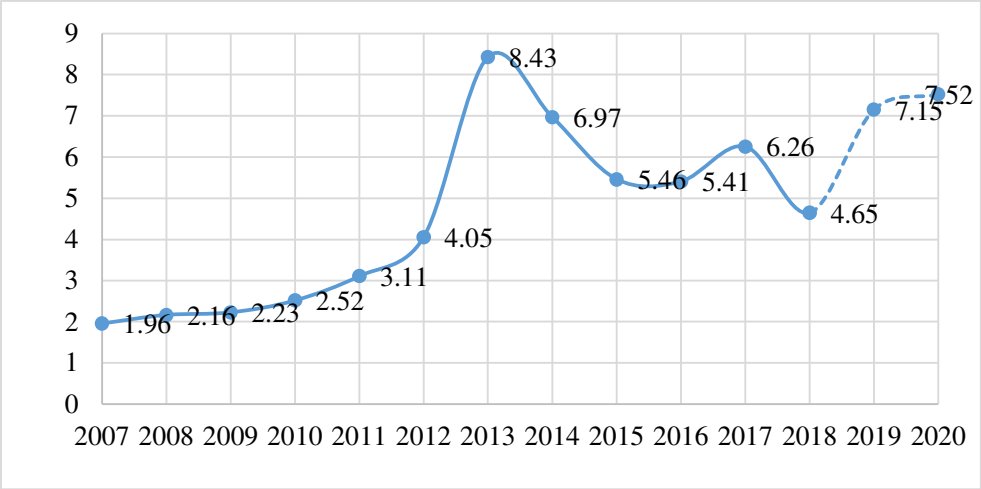

Fig. 6: The public debt volume dynamics in the Siberian Federal District for 2007 - 2018, billion US dollars

The GRP energy intensity in the Siberian Federal District for the period under review decreased by 273.22 kg of standard fuel/ 10 thousand rubles (62.77%) and in 2018 amounted to 162.08 kg of standard fuel/ 10 thousand rubles.

In 2018, the largest value of GRP energy intensity in the Siberian Federal District can be observed in the Kemerovo Region – 348.56 kg of standard fuel/10 thousand rubles, the Republic of Khakassia – 269.50 kg of standard fuel/ 10 thousand rubles and the Tyva Republic – 267.71 kg of standard fuel/ 10 thousand rubles. The lowest value of GRP energy intensity in the Siberian Federal District can be observed in the Novosibirsk Region – 72.31 kg of standard fuel/ 10 thousand rubles. and Tomsk Oblast – 95.22 kg of standard fuel / per 10 thousand rubles. To the greatest extent, energy intensity decreased in 2018 compared to 2017 in the Republic of Khakassia – by 66.66 kg of standard fuel/ 10 thousand rubles. and the Irkutsk region – by 59, 66 kg of standard fuel/ 10 thousand rubles. (Fig. 7).

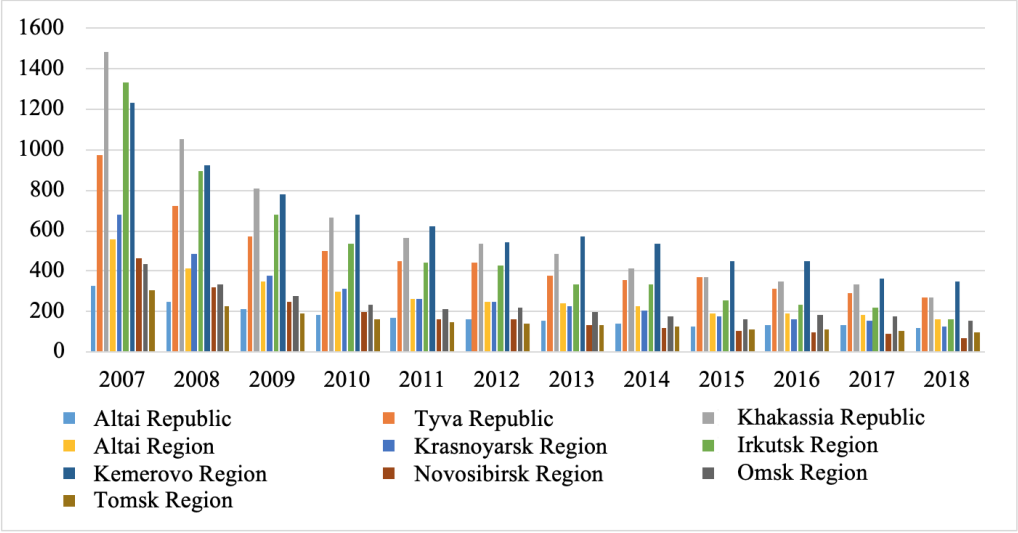

Fig. 7: GRP energy intensity dynamics by Siberian Federal District regions in 2007-2018, kg of standard fuel/ 10 thousand rubles.

The cumulative T-criterion for a number of GRP energy intensity dynamics in the Siberian Federal District for 2007-2018 amounted to 14.49, which indicates the presence of a trend. The predicted value obtained by the method of analytical alignment with a linear function in 2019 amounted to 137.24 kg of standard fuel/ 10 thousand rubles, in 2020 – 112.40 kg of standard fuel/ 10 thousand rubles. (Fig. 8).

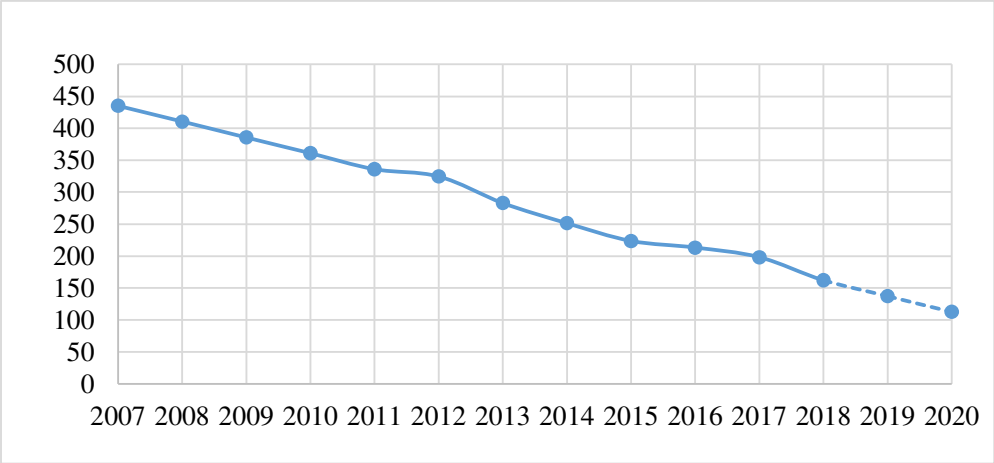

Fig. 8: GRP energy intensity dynamics in the Siberian Federal District for 2007-2018, kg of standard fuel/ 10 thousand rubles

Retail turnover for 2007-2018 decreased by 6.41 billion US dollars (12.84%) and amounted to 43.52 billion US dollars. It is worth noting that the highest value of the indicator was observed in 2013 – 80.07 billion US dollars, the minimum – in 2015 (41.85 billion US dollars). The largest retail turnover in 2018 was in the Krasnoyarsk Territory – $ 8.5 billion and the Novosibirsk Region – $ 8.0 billion, and the smallest in the Republic of Altai and the Tyva Republic – $ 0.4 billion. USA in both regions. To the greatest extent, retail trade turnover decreased in 2018 compared to 2007 in the Kemerovo region – by $ 2.8 billion (31.6%) (Fig. 9).

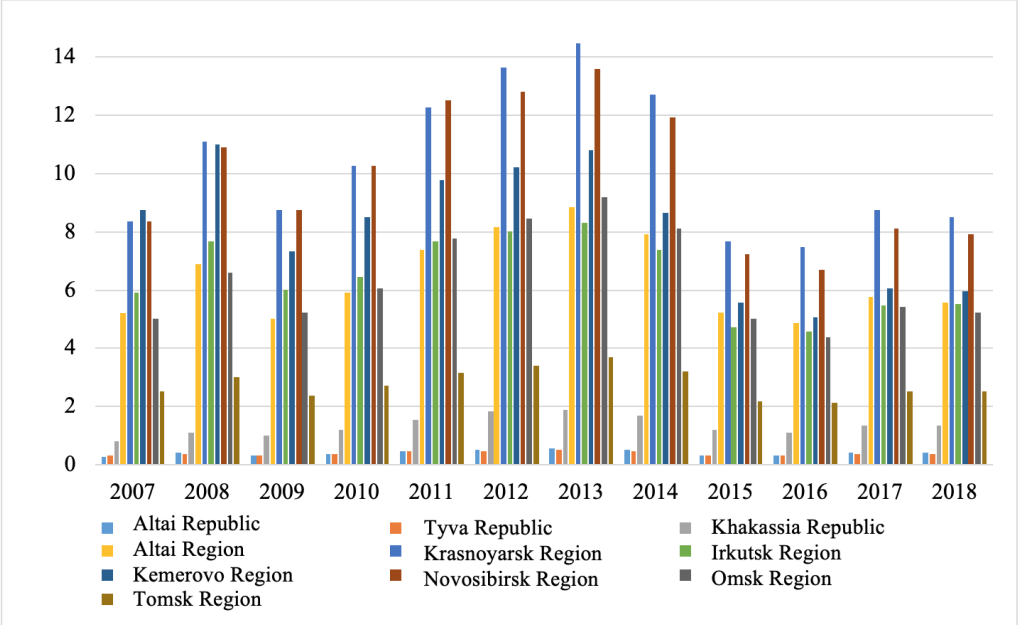

Fig. 9: Retail trade turnover dynamics by Siberian Federal District regions in 2007-2018, billion US dollars

The cumulative T-criterion for a number of retail trade turnover dynamics in the Siberian Federal District for 2007-2018 amounted to 3.79, indicating the absence of a trend. With a probability of 56.5% in 2019, 81.1% in 2020, it can be argued that retail sales will decrease (Fig. 10).

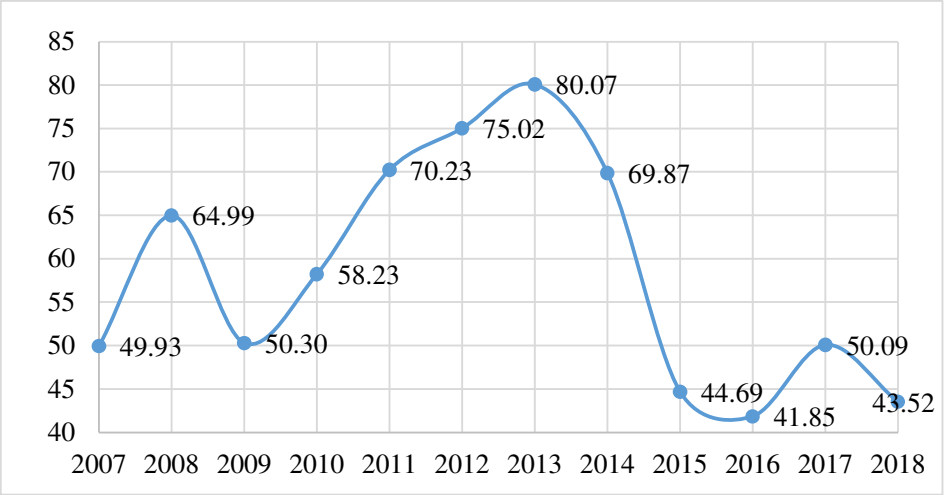

Fig. 10: Retail trade turnover dynamics in the Siberian Federal District for 2007-2018, billion US dollars

In the social indicators group for the Siberian Federal District, the unemployment rate of the population aged 15-72 years, the number of people injured in fatal accidents at work, the level of participation in the labor force, the number of people with cash incomes below the subsistence level, the share of organizations employees with accrued income are analyzed wages below the subsistence level of the able-bodied population.

The population unemployment rate aged 15-72 years for the entire period under review in the Siberian Federal District decreased by 0.80 percentage points (by 10.96%) and in 2018 amounted to 6.5%. The maximum unemployment rate was recorded in 2009 – 10.2%.

From 2007 to 2018 the unemployment rate ages of 15 - 72 years decreased in almost all Siberian Federal District regions, with the exception of the Altai Republic, where the increase was 25.8%. The greatest decrease in unemployment is observed in the Krasnoyarsk Territory (by 35.53%) and in the Khakassia Republic (by 21.21%). In 2018, a high unemployment rate aged 15-72 years was recorded in the Tyva Republic (11.20%) and Altai Republic (14.80%) (Fig. 11).

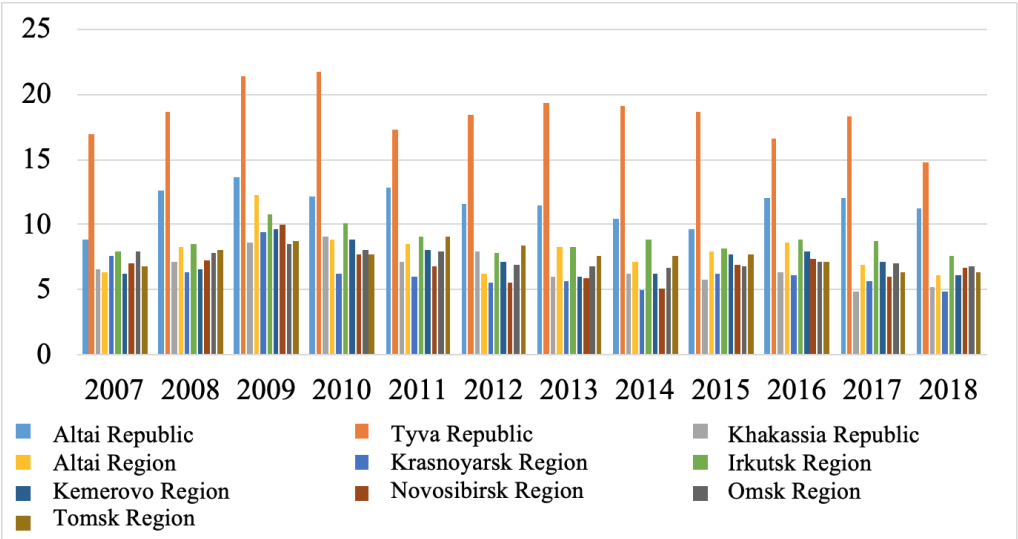

Fig. 11: Unemployment rate Dynamics by Siberian Federal District regions in 2007-2018, %

The cumulative T-criterion was 5.10, which is less than the critical value 5.49, therefore, there is no tendency in the series of the unemployment rate dynamics the Siberian Federal District. With a probability of 69.9% in 2019 and 90.9% in 2020, we can say that the unemployment rate will decrease (Fig. 12).

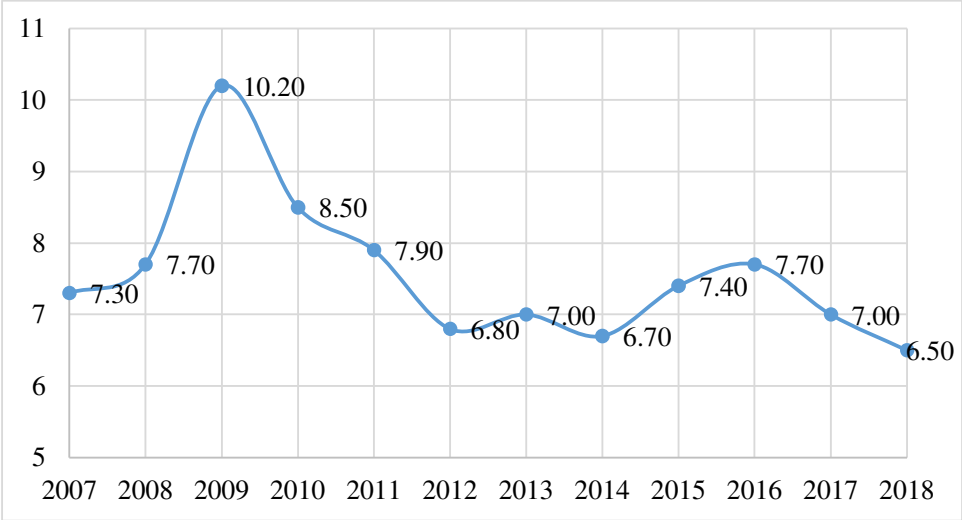

Fig. 12: The unemployment rate dynamics aged 15-72 years in the Siberian Federal District in 2007-2018, %

The number of injured in accidents decreased to 470 people (71.58%) and represented in 2018 186 people. In the regional context, the decrease in the number of fatal industrial victims accidents in 2007-2018 occurred in the Altai Territory (by 73.77%) and the Kemerovo Region (by 82.67) (Fig. 13).

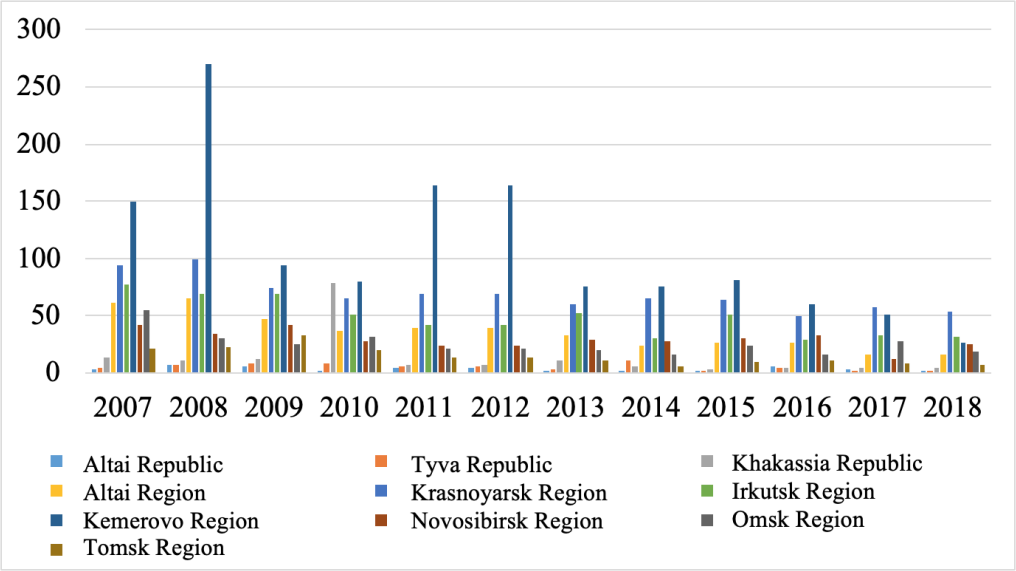

Fig. 13: The number of the fatal accidents at work victims number dynamics in the Siberian Federal District regions in 2007-2018, people

The cumulative T-criterion was 12.47, which is more than the critical one, equal to 5.49, therefore, there is a tendency in the number of the fatal accidents at work victims number dynamics in the Siberian Federal District. The predicted value of the indicator obtained by the method of analytical equalization based on a linear function in 2019 amounted to 129.46 people, in 2020 – 95.21 people. (Fig. 14).

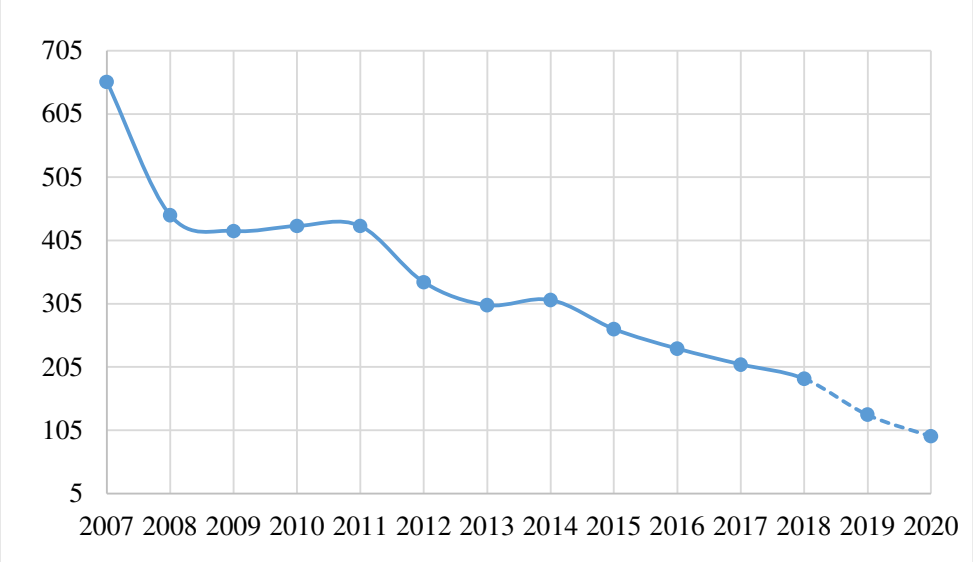

Fig. 14: The number of the fatal accidents at work victims number dynamics in the Siberian Federal District in 2007-2018, people

The participation in the workforce level of the Siberian Federal District population for 2007-2018 decreased by 0.30 percentage points (by 0.30%) and amounted to 66.90%. The maximum participation in the workforce level was observed in 2016 – 68.2%. An increase in labor force participation for the entire period under review is observed in the Omsk Region – by 5.8%, the Novosibirsk Region – by 3.81%, the Tyva Republic – by 2.84% and Khakassia Republic – by 0.47%. In all other the Siberian Federal District regions this indicator tends to decrease. Negative demographic trends are primarily due to the lack of comfortable conditions for economic activity and population living in Siberia (Fig. 15).

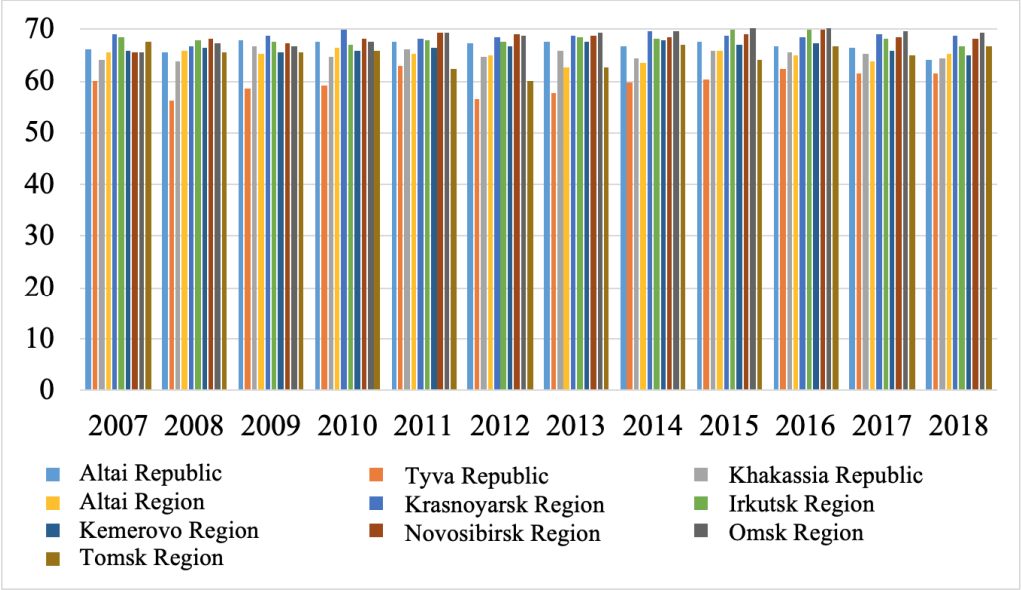

Fig. 15: Dynamics of the participation in the workforce level of the population by the Siberian Federal District regions in 2007-2018, %

The cumulative T-criterion for a number of dynamics of the participation in the workforce level of the Siberian Federal District population for the period from 2007 to 2018 amounted to 6.39, which confirms the presence of a trend. The predicted value obtained by the method of analytical alignment with a linear function amounted to 67.70% in 2019 and 67.78% in 2020 (Fig. 16).

Fig. 16: Dynamics of the participation in the workforce level of the population by the Siberian Federal District in 2007-2018, %

The population share with cash incomes below the subsistence level for the entire period under review decreased by 3.17 percentage points (by 14.36%) and amounted to 18.88% in 2018. The population share with cash incomes below the subsistence level in 2018 compared with 2007 increased in Kemerovo – by 54.17%, Irkutsk – by 5.29% and Tomsk oblasts – by 35.04%, the Republic of Tyva – by 11.19% and in the Krasnoyarsk Territory – by 15.83%. It should be noted that in all other subjects of the Siberian Federal District there is a decrease in the indicator in question (Fig. 17).

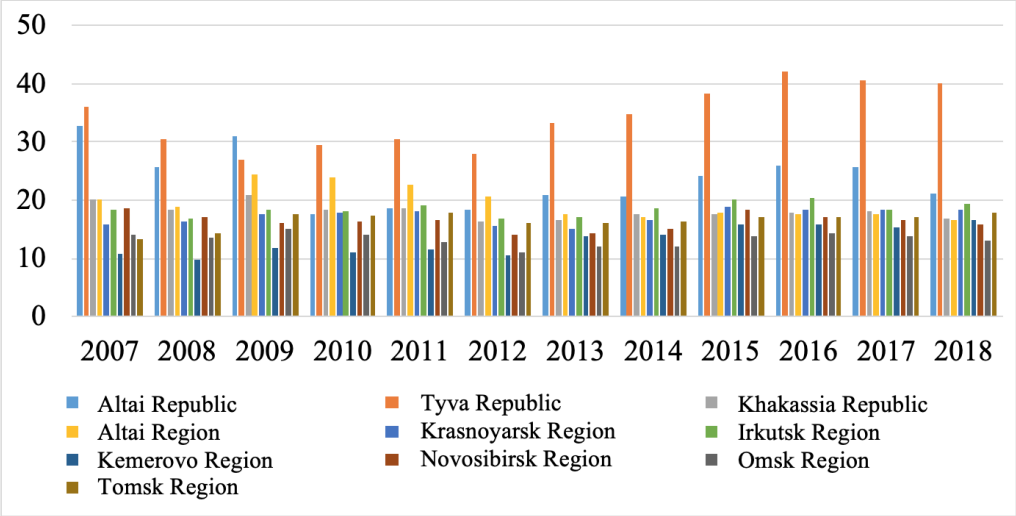

Fig. 17: Dynamics of the population share with cash incomes below the subsistence level in Siberian Federal District regions in 2007-2018, %

The cumulative T-criterion for a number of dynamics of the population share with cash incomes is below the subsistence level in the Siberian Federal District for 2007-2018 amounted to 2.48, indicating the absence of a trend. With a probability of 69.9% in 2019, 90.9% in 2020, it can be argued that the share of the population with cash income below the subsistence level in the Siberian Federal District will decrease (Fig. 18).

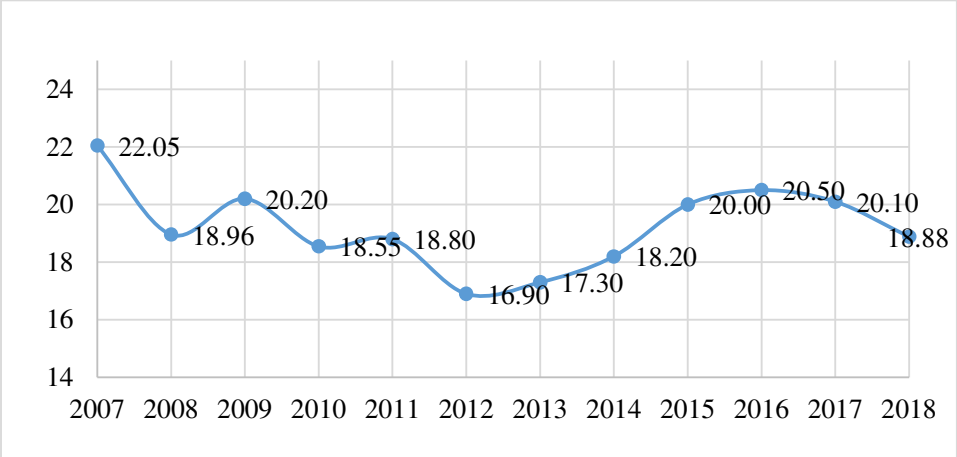

Fig. 18: The dynamics of the population share with cash incomes below the subsistence level in the Siberian Federal District for 2007-2018, %

The organizations employees share with accrued wages is lower than the subsistence minimum of the able-bodied population decreased by 8.88 percentage points (by 52.83%) and amounted to 7.92% for the period from 2007 to 2018. From 2007 to 2018 there was a reduction in the organization employees share with accrued wages below the minimum subsistence level of the able-bodied population in all subjects of the Siberian Federal District. It is necessary to highlight the Khakassia Republic and Altai Republic, where the decrease was 92.23% and 75.38%, respectively (Fig. 19).

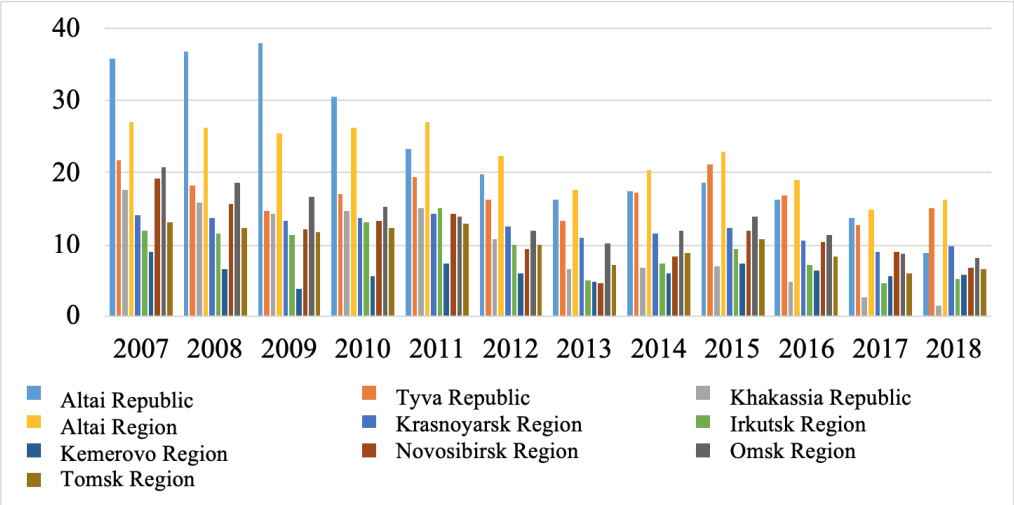

Fig. 19: The dynamics of the organization employees share with accrued wages below the subsistence level of the able-bodied population in the Siberian Federal District regions for 2007-2018, %

The cumulative T-criterion for a number of dynamics the organizations employees share with accrued wages is lower than the cost of living of the able-bodied population, the minimum in the Siberian Federal District in 2007-2018 dens to 11.29, which confirms the presence of a trend. The predicted value obtained by the method of analytical equalization based on a linear function filled to 7.20% in 2019 and 6.67% in 2020 (Fig. 20).

Fig. 20: Dynamics of the organization employees share with accrued wages below the subsistence level of the able-bodied population in the Siberian Federal District for 2007-2018, %

To predictive model of changes in the socio-economic situation of the Siberian Federal District, we took the amount of government debt (billion US dollars) as an effective indicator (y). This is due to the fact that currently the most important is the implementation of a balanced credit and financial policy aimed at phasing out the dependence of the country or the federal district on external credit borrowing and strengthening international positions. The following indicators were assigned to factor signs: X_1 – the investments share in fixed assets of GRP (%); X_2 – the share of investments in machinery, equipment, vehicles in the total investment in fixed assets (%); X_3 – the index of production by

economic activity "Mining" type (%); X_4 – Industrial Production Index (%); X_5 – Producer Price Index by Economic Activity "Industrial Product Manufacturing" (%); X_6 – the unemployment rate of the population aged 15-72 years (%); X_7 – the number of fatal industrial accidents victims (people); X_8 – level of participation in the workforce (%); X_9 – the share of population with cash incomes below the subsistence level (%); X_{10} – the share of organization employees with accrued wages below the subsistence level of the working population (%); X_{11} – GRP physical volume index (%); X_{12} – GRP per capita (thousand US $); X_{13} – Retail Turnover (Billion US $); X_{14} – Energy intensity of GDP (kg of standard fuel/ 10 thousand rubles); X_{15} – the share of domestic spending on research and development in GRP (%); X_{16} – The share of high-tech and knowledge-intensive industries in GRP (%); X_{17} – costs of technological innovation organizations (million US $); X_{18} – developed advanced manufacturing technologies (units); X_{19} – information on the use of intellectual property (units).

An analysis of the correlation matrix showed that the most significant factors are X_{13} and X_{17}. Thus, a regression model was obtained that describes the change in public debt in the Siberian Federal District, taking into account, two factors of influence – Retail Turnover (X_{13}) and the costs of technological innovation of organizations (X_{17}):

$$y = 2{,}677 - 0{,}035\ X_{13} + 0{,}002\ X_{17}.$$

The regression model is significant according to the F-Fisher criterion, since the calculated value was 24.71 with a critical value of 4.26. Consequently, the change in the Retail Turnover in the Siberian Federal District has the opposite effect on the effective attribute, that is, with the increase in revenue from the sale of goods to the population, the volume of public debt decreases. The amount of expenses on technological innovation of organizations directly affects the size of the state debt of the Siberian Federal District, i.e. increased costs may affect debt growth (Fig. 21).

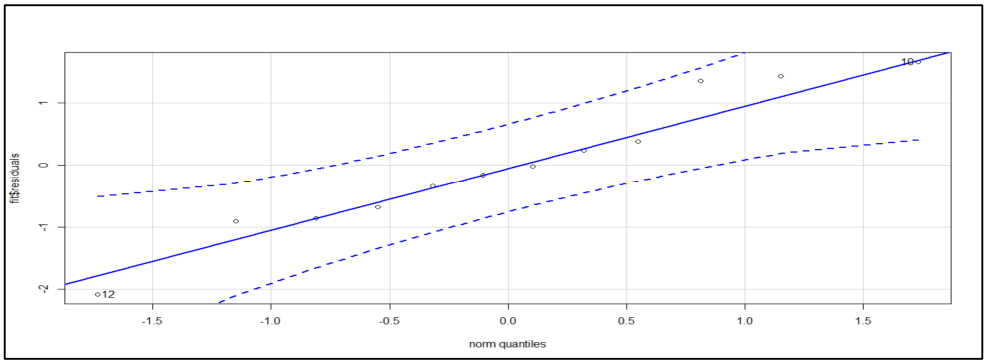

Fig. 21: Graphical interpretation of the regression model of the Siberian Federal District socio-economic status

To analyze the socio-economic situation and establish the ranking of regions in the Siberian Federal District, a multidimensional ranking method was used. For each indicator, ranks were calculated, according to the summary value of which ranking was carried out.

Then, all regions were divided into groups according to the following principle:

- total rank above 120 - 1 group (regions with the highest socio-economic level);
- total rank from 100 to 119 - group 2 (regions with an average socio-economic level);
- total rank below 99 - 3 group (regions with a low socio-economic level).

So, in 2007, there are 5 leading of the Siberian Federal District regions in terms of socio-economic status. The Novosibirsk region can be distinguished by a significant margin from other regions, and a high socioeconomic level can also be noted in the Krasnoyarsk Territory, Tomsk Region, Kemerovo Region, and Irkutsk Region. The average level for the values of indicators can be observed in the Omsk

region and Altai Territory. The lagging regions in 2007 were the Altai Republic, the Khakassia Republic, and the Tyva Republic. In 2018, 4 leaders – Krasnoyarsk Territory, Irkutsk Region, Tomsk Region and Novosibirsk Region. Unlike 2007, the Novosibirsk Region is no longer the undisputed leader and is in the last position in the group of regions with the highest socio-economic level. The regions with an medium indicator level include the Khakassia Republic, the Omsk Region, as well as the Kemerovo Region, which in 2007 was in the group of regions with a high socio-economic level. The most lagging regions in 2018 include the Altai Territory, the Tyva Republic and Altai Republic (Fig. 22).

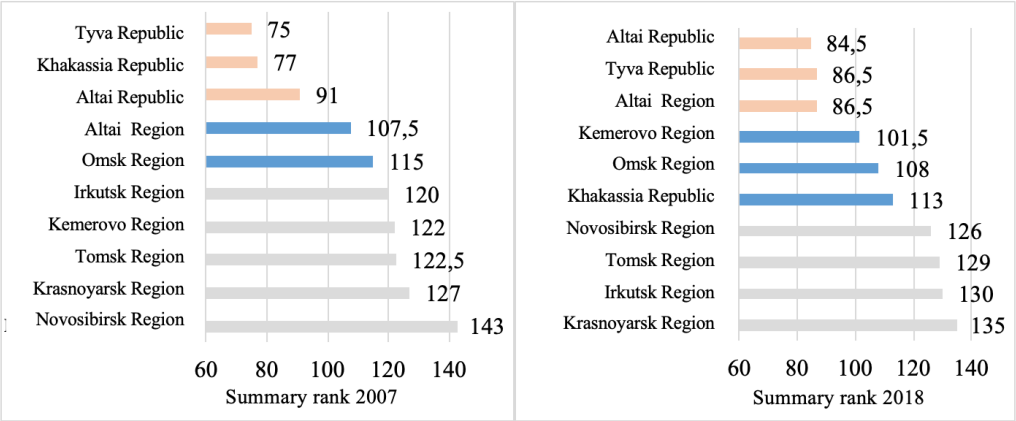

Fig. 22: Multidimensional grouping of the Siberian Federal District regions in accordance with the socio-economic level in 2007-2018.

We will also conduct a cluster analysis of the regions of the Siberian Federal District by socio-economic level in 2007 and 2018 and compare it with the results obtained by the multidimensional grouping method (Table 1).

Table 1: Grouping of the Siberian Federal District regions by the distant neighbor method in 2007 and 2018

Clusters	2007	2018
1 cluster	Krasnoyarsk Territory, Tomsk Region, Republic of Khakassia, Irkutsk Region and Kemerovo Region	Krasnoyarsk Territory, Irkutsk Region, Novosibirsk Region, Tomsk Region
2 cluster	Novosibirsk Region, Altai Territory, Omsk Regio	Khakassia Republic, Altai Territory, Omsk Region
3 cluster	Altai Republic, Tyva Republic	Altai Republic, Tyva Republic

The cluster analysis results by the distant neighbor method in the Siberian Federal District regions in 2007 and in 2018 confirm the situation with the presence of three main clusters, which have almost the same composition of the regions ranking position in terms of socio-economic level in a particular cluster.

The Conclusion

It can be noted that during the study period there is an increase in inter-regional inequality in the studied district. The economic level of more developed regions is growing faster than in other Siberian Federal District regions. One of the main factors that determine the prospects for socio-economic development of the Siberian Federal District is the huge resource potential of this region, including mineral deposits. An important factor in the economic development of the Siberian Federal District is its high production, scientific, technical, and scientific and educational potential. However, the Siberian Federal District

economy in modern conditions is uncompetitive in many types of products. Factors that hamper the economic development are: a qualitative deterioration in the raw material base, high transport costs due to the remoteness from the densely populated and more developed European Russia and the industrially developed Europe countries and the Asia-Pacific region, low population density in Siberia itself and insufficient level of development of transport infrastructure, increased consumption of fuel and energy resources for production and social needs due to harsh climatic conditions i, the lack of effective measures to attract investment at the regional level. To create a favorable economic environment, it is necessary to implement a number of measures for the development of the economy, competently implementing strategies in the priority areas of the Siberian Federal District development.

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Business Model Innovation and Internationalization Strategies: The Case of Flixbus

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Abstract

The impact of globalization has led to a significant rise of born global companies. In order to achieve competitive advantage on the global market these organizations aim to develop unique business models which are hard to replicate for their competitors. Some of these organizations pursued the strategy of establishing a strong local presence to ensure success of their future internationalization. FlixBus can be seen as one of these organizations. This start-up company's revolutionary business model has initiated a disruption of the bus industry in the global market, completely changing the landscape for traditional bus transport service providers. The aim of this exploratory study is to analyse the FlixBus case through the perspective of business model innovation as a tool for internalization. The aim of this exploratory study is to analyse the FlixBus case through the perspective of business model innovation as a tool for internalization.

Keywords: Business Model Innovation, Internationalization, Disruption, Franchise

Introduction

Global importance of the bus industry can be observed in terms of providing cost effective transportation services to general population and enabling the mobility of people in and between countries. Cost effectiveness of buses as a means of transport is especially important in less developed countries. The industry itself is highly regulated in many countries. Bus operators often need to compete and gain approval from local authorities in order to operate different lines. Less profitable lines often mean that the service providers will operate at breakeven point. The entrance of FlixBus to the market, however, completely changed the landscape and perspective of the whole industry.

German company FlixBus is part of the FlixMobility GmbH group. Through this case study, we will analyse the business model, structure and selected internationalization strategies of FlixBus. From 2013 to 2015 they covered 71% of the German market and in 2018, they covered 90% of the German market (The Economist, 2018). They currently offer over 400,000 daily connections with 2,500 travel destinations and 2,000 buses available. They employ over 1000 people in 27 countries and have over 300 partners and 7000 professional drivers in their partner network.

The data has been collected from the Flixbus official press releases, Bundesanzeiger (official government financial service), and Crunchbase (database for innovative global companies). Financial reports were analysed for FlixMobility group in 2015 and 2016. Our research method follows grounded theory approach and comparative case study (Eisenhardt, 1989). Ravenswood (2011) implies how theory building from case studies suits new areas of research with little extant literature because it does not rely on previous literature. Moreover, we conducted non-structural interview with FlixBus Global Communications Manager for better understanding the subject of this case study.

FlixBus Case Study

The peculiarity of the FlixBus business model is based on the fact that the company does not own a single bus nor employ any professional drivers. The FlixBus business model integrates local partners providing passenger transport in the markets in which they operate. FlixBus has currently over 1000 employees in its affiliates and management. They have over 300 partners (carriers) and over 7000 professional drivers in their network. With their activities, they provide over 10,000 jobs. They also record over 400,000 daily routes to over 2,500 destinations in 30 countries. From 2013 to 2019 they achieved over 100 million passengers in their network (FlixBus, 2020).

A quality partnership is one in which experience and learning can be measured. These two components can be potential sources of competitive advantage for businesses. Thus, in addition to learning through their own experience, organizations can learn from the experiences of other organizations (Kedia and Lahižri, 2007). FlixBus business model seems to have both of these components. FlixBus's partners own a bus fleet worth around 600 million € and employ over 7,000 professional drivers (FlixBus, 2020). The source of their competitive advantage are low operating costs. This enables them to offer low prices while maintaining a high quality of service.

In designing their innovative business model, FlixBus analysed the traditional bus industry where they planned to pursue their disruptive activity. At that time, very few tech companies operated in medium and long-distance travel market, while competition was already present in the short distance market with companies such as Uber or Lyft. FlixBus used the franchise strategy enter the market. Based on the franchise agreement, they planned and organized transport routes. The company was also responsible for marketing and sales activities, pricing (price algorithm by managing over 100 million tickets on a daily basis), supply and demand analytics and customer support. They created a platform model to influence the development of their customer network. Through interactive access today, users are able to purchase tickets online and leave feedback. FlixBus system tracks over 2500 buses in real time.

In the franchise model, FlixBus clearly emphasizes the rules of conduct for professional drivers and the maintenance of a partner bus fleet. They retain approximately 25 - 30% of the price of tickets sold for their services. On the other hand, local partners are responsible for providing end-to-end customer service - passenger transportation and covering operating costs. Partners are usually local small and medium-sized enterprises with registered passenger transport activity. In franchise, financial risks, as well as other costs, are significantly reduced with brand development. The franchisee will assume significantly less costs and risks of setting up an international franchise, which will also create a good incentive for the franchisee to build a profitable business as quickly as possible, or to continue expanding into new markets. The franchisee thus becomes a participant in the global market and a representative of the global enterprise, at a much lower cost than if he had developed a product or a brand himself (Hill, 2013).

FlixBus shows characteristics of a start-up corporation (Davila and Epstein, 2014). On one side, they combine the start-up's ability to develop an innovative idea and disrupt the traditional industry, while having a strong and established organization in terms of scalability of a business model and execution of operational plans. Spremić (2017) explains how digital transformation of a business takes place when a company makes radical changes in its most important business activities such as strategy in the short term, structure, business processes, business model and organizational culture. In the business transformation, the new business model may represent a competitive advantage in the market. The business model innovation (BMI) design facilitates business scalability and, through strategic sustainability, seeks to avoid business risk (França et al., 2017). FlixBus owes its rapid growth and internationalization process to business model scalability and successful internationalization strategies. Scalability involves developing a business model that can be customized in any local market, regardless of customer size or segment. FlixBus' scalable business model has enabled them to become a leader in the mobility market with successful financial and operational indicators together with the development and growth of a business partner network. FlixBus's long-term goal is to dominate the bus market

globally and to implement environmental reform that would significantly contribute to less pollution in the markets in which they operate.

BMI is considered to be an effective and efficient form of innovation. Primary function of BMI is to perform two important functions: create value and collect value. Good ideas or technologies have been proven to be inferior to a good business model (Chesbrough, 2007). Based on the example of FlixBus, we can conclude that there is no revolutionary idea in the way passengers are transported, but rather that innovation relates solely to the business model. We can justify the assumption that FlixBus business model is well designed and represents a competitive advantage for the company. Intense competition in the global marketplace has been influenced by changing market conditions. Such conditions force companies to adapt their business models and operating activities more often and more thoroughly, as innovations based solely on new products and targeted at local markets are no longer enough to maintain a competitive position in the market. Competitors can copy products relatively easily, and local markets have never been more accessible than they are today (Taran et al., 2015).

It is much more difficult for competitors in the same industry to emulate or replicate an entire system of activities than just one new product or a process. It should be emphasized that competitive threats often go beyond the boundaries of the industry in which the enterprise operates (Amit and Zott, 2012). If we were to compare the business of FlixBus with that of other companies in the industry, at first glance, we would not notice significant differences. However, a detailed analysis would determine that the difference comes precisely from the BMI, which is difficult to replicate. By investigating the bus industry separately through the FlixBus phenomenon, we can conclude that the company has gained a competitive advantage with its BMI, which has been very difficult to replicate for other companies. After the disruption of the local market, the organization has expanded through the internationalization process and has achieved significant success globally.

Internationalisation Strategies

Companies that base their operations on new technological platforms, often face challenges in their development process, as they rapidly enter the process of internationalization with the innovation of products or services (Onetti et al., 2012). Internationalization is dependent on the business model, which determines how to enter the international market. It also determines the level of operational activities on international markets. Internationalization combines innovative, proactive and risky behaviour in order to create added value to organizations on international markets. By pursuing growth opportunities and increasing the volume of business operations, companies face uncertainties and risks that require adapting internal routines and external processes to new environments. This strategy requires capital intensive action (Schwens et al., 2018).

Also, emerging economies mature, and advanced technology becomes more and more important for global competitiveness. In these conditions, firms have the ability to innovate and affect future growth with the internationalization process (Holmes Jr et al., 2018). The growth of the international market and the growing importance of emerging economies offer new opportunities for development, which more and more companies are choosing to take advantage of. The decision to internationalize may be due to a previous event or process, such as a rapid increase in competition in the domestic market, product maturity, access to resources, establishing relationships with international customers, flexibility, re-configuring the value chain or improving usiness image (Dominguez, 2018). Innovation and internationalization are processes that can be interconnected. Internationalization and innovation in the business model are influenced by the local market and the relationships between competitors on this market. New ventures in the high-tech industry should exploit the interrelationships between innovation and internationalization and are likely to design their strategy and business models accordingly (Onetti et al., 2012).

The literature describes internationalization as a slow and incremental process in which an enterprise gradually acquires knowledge in order to compete in international markets. Knowledge is a valuable resource because it enables companies to execute an internationalization strategy with greater

efficiency. It can be flexibly combined with other assets abroad. Knowledge-intensive firms may be better able to adapt to new environments compared to firms that rely more on capital (Schwens et al., 2018). However, they also face the risk of technological obsolescence at the moment when knowledge-based resources are dispersed, or competitors replicate innovative products. The ownership rights of these companies are difficult to determine and enforce in international settings, therefore, companies that are abler to protect their knowledge will be more successful.

FlixBus was founded as a start-up company in Munich, offering local bus transportation to customers. With the deregulation of the German bus industry market in 2013, they introduced three bus routes. Until then, Deutsche Bahn AG, more specifically the German Railways, had a monopoly on the market. In 2015, they merged with MeinFernbus, their competitor with similar business model, mostly focused on the platform economy. Main motive for the merger and acquisition strategy is the knowledge sharing with the aim of improving the business model of the company. These strategies and processes have been simplified with the development of digital technology (Vendrell-Herrero et al., 2018). A merger is a process where at least two companies combine to form a new legal entity. This merger brought FlixBus closer to internalization.

FlixMobility and MeinFernbus were two largest start-up companies in the bus industry in Germany just before the merger. Both companies began their journey by competing in the local market, MeinFernbus in Berlin and FlixBus in Munich. The objective they wanted to achieve through the merger was to create a pan-European transportation network. MeinFernbus was founded in 2011 and by the time of the merger, the firm had 40 routes, 135 destinations and over 10 million passengers carried. FlixBus had 90 routes, 148 destinations and approximately four million passengers (General Atlantic, 2015). With its well-designed business model, they won the award for the best start-up in 2014 by the Bayerischer Gründerpreis, the prestigious Bavarian business award.

FlixBus and MeinFernbus had 170 local partner bus carriers at the time before their appearance in foreign markets. The liberalization of the German market helped them at that moment to create an organization generated 10,000 jobs in the upcoming period of three years. The main investor who supported the merger of the then two competitors in the German bus industry was General Atlantic (FlixBus, 2015). They were also financially supported by Holtzbrinck Ventures and UnternehmerTUM. General Atlantic is one of the leading investment groups providing capital and strategic support to fast-growing companies. They have approximately 35 billion euros investment value in their portfolio. If we analyse their portfolio, we can see a lot of companies in various fields creating the disruption in the industries. They certainly played a major role in developing the internationalization strategy for the FlixBus. Main objective of internationalization for FlixBus was to establish wholly owned subsidiaries in strategic locations in order to achieve the strategy of creating a pan-European network in the bus industry. Through wholly owned subsidiaries they gained full control of their operations in foreign markets and did not have to disclose their technology to other companies, which also reduced the risk of creating competition among potential partners.

In 2015, the process of internationalization of FlixBus began. In Table 1 we can observe the speed and impact of the internationalization process. The biggest growth of FlixBus occurred in January 2016 when a wholly owned subsidiary of FlixBus CEE was established to cover Central and Eastern Europe (Flixbus, 2016).

Table 1: Speed of internationalization process in the EU countries in one year

Month and Year	Whole Owned Subsidiary	Bus Routes
May 2015	France	Yes
August 205	Italy	Yes
November 2015	Netherlands	Yes

December 2015	No	Austria, Switzerland, Belgium, Luxembourg, Sweden, Denmark
January 2016	Croatia, Slovenia, Poland, Czech Republic, Hungary, Slovakia, Romania	Yes
March 2016	No	Great Britain, Spain

Source: Author; FlixBus (2020)

Companies that wish to have a direct operational presence in the international market and to have complete control over their operations usually establish a wholly owned subsidiary. Subsidiaries can either be established or bought. In the second case, most of the companies will buy their existing partners or resellers. When a business is purchasing its local supplier to gain direct control of delivery, a process of vertical integration occurs. It requires the highest commitment due to all the risks involved – financial, economic and political. (Carpenter and Dunung, 2012). Moreover, from the point of view of capital investment, setting up a wholly owned subsidiary is generally the most expensive way of entering international markets. Businesses opting for this strategy must bear full capital costs and risks of setting up international operations. The level of risk is lower if the company acquires an already established organization in the local market (Hill, 2013).

In 2015, FlixBus agreed on a strategic co-operation with the Austrian Blaguss Group, a company owning a luxury bus fleet with many years of experience in the bus industry. In 2016, FlixBus has taken over Megabus Europe, owned by the Stagecoach Group. Megabus was founded in 2006 and has been one of the pioneers of change in the bus industry. As a low-budget company, they have started offering long-distance, online transportation services for as low as a dollar. Over a ten-year period in the business, they sold over 22 million tickets in over 120 cities across North America. The reasons for the acquisition were the environmental awareness and standards of Megabus and the high level of service on their platform. Today, FlixBus' vision and business are focused on creating green technology that is environmentally friendly. Also, this merger began the idea of electric buses. In 2018 FlixBus launched a new project of electric buses on long-distance journeys on the German, the French and the US market. After the acquisition, Megabus continued to operate, but under the management of FlixBus. The analysis showed that after acquisition, Megabus was capable to increase ticket sales by almost six times, while the cost of their services decreased. In the same year, FlixBus took over Postbus, which was a subsidiary of the Deutsche Post DHL Group (Deutsche Post DHL Group, 2016). Deutsche Post Mobility Group also launched Postbus after deregulation of the German bus industry. However, despite the high quality of service, they were unable to respond to the competitive presence of Flixbus, which dominated the market overwhelmingly because of its BMI that was hard to replicate.

In 2017 FlixBus started to operate in Portugal and Poland, in 2018 in the USA and in 2019 in Turkey. Their first cross-border conenection occurred in 2020 from France to Morocco. Future internationalisation strategy focus is targeting the markets in South America and Asia.

FlixBus' new corporate vision emphasizes smart and green, i.e., environmental mobility for every individual who has the opportunity to experience the world through their travels. In other words, FlixBus aims to offer every citizen their business travels at affordable prices, and through that experience take care of the environmental standards of its buses. In 2019, FlixBus took over Eurolines SA, a travel agency founded in 1971. Their network is considered to be the most extensive in Europe with over 500,000 possible routes between cities. In addition to booking tickets and organizing group travel, they also offer accommodation in hotels and apartments. According to the last available consolidated report from 2016 for the FlixMobility GmbH group, a positive impact of the internationalization processes on the business result can be seen. In one year, company revenues rose from 25.5 million € to 131 million € in the EU countries.

Chart 1: Consolidated financial reports of FlixMobility GmbH group (in 000 €)

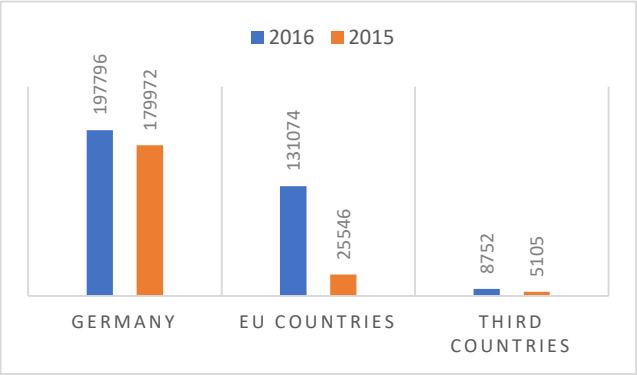

Source: Author; Bundesanzeiger (2020)

The impact of BMI on the choice of a company internationalization strategy has not been sufficiently explored in the academic literature. This exploratory paper based on a case study of an individual company may provide guidelines for future research. Flixbus's innovative business model enabled the organization to capture a somewhat overlooked market niche of mid and long-distance transport. So far, there has not been much competition on global market for the organization, and main competitors are predominantly large companies which still base their services on economies of scale instead of new business models. However, we have not fully demonstrated the impact of BMI on the choice of strategy for the internationalization process. Our analysis provided an overview of business model as well as current and past strategic choices related to FlixBus internationalization. We still lack insights into possible future trends related to the changes in FlixBus business model.

Conclusion

Early internationalization of a company helps develop an international identity and, consequently, the enterprise is likely to repeat the steps that led to internationalization in other markets if it already has a brand that is recognizable to customers. FlixBus can be seen as an example of this. On the other hand, companies entering the internationalization process at a later stage must change their pre-existing routines that have been established during the period of activity in the local market. Businesses with outdated business models are becoming inert, and if they do not embrace the wave of digital transformation in their industries, they can easily die out.

Essentially, the business model will specify the most important business activities of the company. The ultimate goal of each model is to create the value that customers or clients receive. Another important goal is to collect value, that is, to monetize the business model. By analysing the FlixBus platform, we concluded that it is based on technology and customer experience at the highest level. The organization uses the advantage of operating partnerships, which provided them with a greater possibility to develop a scalable platform. Scalability involves developing a business model that can be customized in any local market, regardless of customer size or segment.

The scalability of FlixBus' business model has enabled them to become leaders in the mobility market with successful financial and operational indicators and the development and growth of a business partner network. FlixBus's long-term goal is to dominate the bus market globally and implement environmental reform that would significantly contribute to less pollution in the markets in which they operate. To sum up, FlixBus has successfully integrated its BMI into the platform model and the concept of sharing economy. In doing so, they made a radical innovation in the traditional industry on the global market. Successful internationalization strategies enabled rapid business growth and current business

success. However, it would be interesting to see what the future will bring and in which way will the FlixBus business model evolve or will it be exceeded by a more competitive business model.

This paper sheds light on the understudied issue of using business model innovation as a tool for internalization. Contrary to organizations that are born global or incumbent multinational corporations, our case study shows how business model innovation can be used as another way of expanding on global markets. The findings of our research can be generalized and the method used is transferable for similar studies in the future.

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Financial Situation of The Banking Sector in Ukraine In 2013-2018 From the Point of View of Changes in Selected Financial Indicators of Key Ukrainian Banks

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Abstract

The article is devoted to the broadly understood issue of the effectiveness of banks. The study focuses on financial changes that took place in the banking sector of Ukraine in the period 2013-2018. The article presents the results of the analysis of changes in financial ratios used in the study of the financial effectiveness of banks. Therefore, the analyses included such values as the average of selected indicators, minimum, maximum, as well as references to the values of indicators in selected countries of Central and Eastern Europe and the European Union. The authors also thoroughly interpreted the changes in the value of indicators from the point of view of the effectiveness of individual analysed objects. The analyses presented in this article constitute the first stage of research on the financial effectiveness of banks in Ukraine. The research hypothesis adopted in the conducted research: The difficult political and economic situation in Ukraine was not without an impact on the condition of the banking sector. The article uses a critical analysis of the literature on the subject and indicator analysis as the research method. There was also conducted a comparative analysis of changes in the size of selected financial performance indicators over the years 2013-2018.

Keywords: financial security of banks, benchmark analysis of banks, financial efficiency, financial ratios of banks

Introduction

The growing economic and financial relations between the EU and Ukraine mean that aspects such as the country's economic development, institutional development issues, as well as stability and development opportunities for the financial system are becoming increasingly important from the point of view of Ukraine's potential future accession to the EU. Relations between the EU and Ukraine under the European Neighbourhood Policy and the Eastern Partnership are constantly developing. The Association Agreement between the European Union and Ukraine, covering a deepened and comprehensive free trade zone, entered into force on September 1, 2017. Considering the financial resources flowing from the EU to Ukraine, all of the above results in an increased interest in what is happening in the Ukrainian banking sector.

The former finance minister and president of the Hungarian stock exchange Lajos Bokros (2001) pointed out in one of his statements that the financial sector is a kind of symbol of general development phenomena in the economy. It should, therefore, be noted that the stabilisation of the financial system, the efficiency of its assessment by the efficiency of financial markets, and thus primarily the banking sector, plays a key role in assessing the changes taking place in the Ukrainian economy. All this undoubtedly helps EU authorities to determine not only the scale of Ukraine's

adaptation to the requirements of the modern global banking system, but it also helps in creating new directions of change.

It must be remembered that in today's economies, it is the financial system that assesses decisions made by enterprises and consumers. As Wojtyna (1997) point out the legal legitimacy of financial system, the scope of the employed institutional solutions, and social awareness of his role are all important criteria for changes taking place in the transforming socio-economic and political systems of this part of Europe.

In the context of the above considerations, therefore, it seems justified to have a more detailed interest in the financial situation and efficiency of banks operating in the Ukrainian banking sector. The aim of the article is to analyze and evaluate the financial effectiveness of 15 leading banks in Ukraine, measured by ROA and ROE ratios in 2013-2018 shown against the background of the political and economic situation in Ukraine. The research hypothesis adopted in the conducted research: The difficult political and economic situation in Ukraine was not without an impact on the condition of the banking sector.

The article uses a critical analysis of the literature on the subject and indicator analysis. There was also conducted a comparative analysis of changes in the size of selected financial performance indicators over the years 2013-2018. The necessary empirical data were collected using BankFokus database, data from the International Monetary Fund (IMF), the World Bank (WB) and the European Central Bank (EBC) and the financial statements of banks.

The political and economic situation during the period 2013-2018

In 2013-2018 Ukraine struggled with many serious problems. The political and economic situation during this period was extremely difficult. The main external factor influencing the situation of Ukraine was the conflict with Russia. This conflict in all its aspects, i.e. from the military confrontation in Donbass, through the issue of Crimea's membership to those related to gas, had an impact on the country's economic situation. There was a political crisis at the beginning of 2014. The occupation of Crimea and some areas of Donetsk and Luhansk oblasts resulted in a deep crisis in the economy.

Ukraine has experienced serious political, security and economic challenges. As the most significant events affecting these areas of state functioning, after the establishment of Maidan, which led to the overthrow of the previous president in November 2013, World Bank Group (2017) identified:

1) events in Crimea and Sevastopol in March 2014 which led to the adoption by the UN General Assembly of resolution 68/262 confirming Ukraine's territorial integrity;
2) the outbreak of conflict in the Donetsk and Lugansk regions of eastern Ukraine;
3) the presidential, parliamentary and local elections in 2014-2015.

As the paper developed by: the National Bank of Ukraine (NBU), the National Securities and Stock Market Commission (NSSMC), the National Commission for Regulation of Financial Services Markets (NCFS), the Deposit Guarantee Fund (DGF) and the Ministry of Finance of Ukraine (2020) highlighted, in 2014-2016 "Ukraine faced a triple crisis as the combined impact of a banking crisis and a currency crisis exacerbated a crisis in the real sector of the economy". 2014 and 2015 are the years in which several waves of significant depreciation of the hryvnia occurred in Ukraine.

Stephan Barisitz, Mathias Lahnsteiner (2017) points out that the effects of the armed conflict in the eastern part of Ukraine, which hit the economy through direct and indirect channels, such as the loss of export capacity of industry or the effect of confidence, had the greatest impact on the economy in 2014 and 2015. In 2016, economic activity began to recover, but the political and geopolitical environment remained unstable.

Among the internal problems faced by Ukraine, moral hazard, the high level of corruption and crimes, including financial crime, should be mentioned. From the point of view of their impact on the banking sector, a group of crimes directly related to the area of bank operations emerges as particularly important. Kurilo, Klochko, Timchenko, Gulyk (2017) emphasize that crimes in banking sphere are the very serious problem in Ukraine. The authors show that there are many types of crimes that include:

1) illegal actions with documents for transfer, payment cards and other means of access to bank accounts, electronic money, equipment for their production - article 200 of the Criminal Code of Ukraine;
2) legalization (laundering) of income from crime - article 209 of the Criminal Code of Ukraine;
3) making the bank insolvent - article 2181 of the Criminal Code of Ukraine;
4) causing to become bankrupt - article 219 of the Criminal Code of Ukraine;
5) violation in maintaining a database on depositors or reporting procedures - article 2201 of the Criminal Code of Ukraine;
6) financial documents and financial organization reports falsification, non-disclosure of the financial institution's insolvency or grounds for revocation (cancellation) of a financial institution's license - article 2202 of the Criminal Code of Ukraine;
7) fraud with financial resources - article 222 of the Criminal Code of Ukraine;
8) illegal collection or using sensitive information - article 231 of the Criminal Code of Ukraine;
9) commercial or banking secrets disclosure - article 232 of the Criminal Code of Ukraine.

The problem of financial crimes was presented in detail by the Chairman of the Council of the Independent Association of Ukrainian Bank - Roman Shpek - at the corporate security conference. As Shpek (2017) shows, the most common types of financial crimes consist: crimes in the credit process, financial resources fraud, falsification of related documents with these types of fraud, illegal actions with mortgaged property as well as intentional non-enforcement or obstruction of execution of court decisions.

In order to improve the situation of banks as well as to protect the rights of consumers in connection with high level of crime, appropriate actions and mechanisms were taken, such as the Comprehensive Program of Ukraine Financial Sector Development Until 2020 approved on 18 June 2015 by the Board of the National Bank of Ukraine. As Afanasyeva, O., & Kammel, A. J. (2017) indicate, according to the assumptions of this program, all Ukrainian obligations under the EU-Ukraine Association Agreement had to be resolved, ensuring the creation of a well-functioning financial sector in line with EU standards. NBU (2019) indicated that the most important areas of activities undertaken under the program were: ensuring financial stability, building institutional capacity of regulators as well as consumer and investor rights protection. The provisions of the Program indicate that the condition for the reforms to be effective is the implementation of the following comprehensive changes regarding:

- regulators of the financial sector, i.e. enhancing the institutional capacity of the regulatory authorities and the Deposit Guarantee Fund, and establishing conditions for effective supervision and remedies that promote sustainability of the financial sector as well as improve the credit and investment prospects of the country;
- financial sector participants (of different forms of ownership), i.e. removal of "dead weight" and problem institutions from the market, improving the financial soundness and solvency of the participants, restoring and increasing trust to the market players, fostering development, transparency and competition in all segments, which will ensure equal opportunities for all participants in the financial sector.

Fig. 1. shows the number of fraud with financial resources (article 222) and illegal actions with documents for transfer, payment cards and other means of access to bank accounts, electronic money, equipment for their production (article 200).

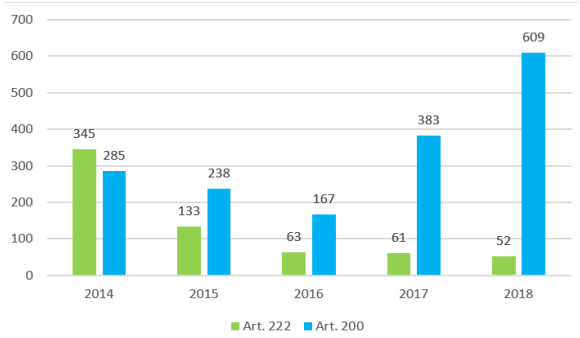

Fig. 1: Number of registered criminal offenses under Art. 222 and Art. 200 of the CC of Ukraine

Source: own elaboration based on Pohoretskyi, Serhieieva and Toporetska (2019); Klochko, Kurylo, Kvasha, Zahynei, Logvinenko (2020).

While figures show that fraudulent activities related to financial resources have indeed decreased, the number of illegal activities using documents for transfers, payment cards and other means of accessing bank accounts, electronic money and equipment for their production decreased only between 2014 and 2016 and then increased sharply between 2017 and 2018.

The signing of the Association Agreement between the European Union and its Member States, of the one part, and Ukraine, of the other part (OJ L 161, 29.5.2014, p. 3–2137) was extremely important from the point of view of building the basis for positive changes in Ukraine. This agreement entered into force on 1 September 2017. According to the content of the contract, the principles which constitute essential elements of the Association Agreement between the parties include respect for democratic principles, the rule of law, good governance, human rights and fundamental freedoms. It was concluded that the fight against various forms of trans-national organised crime and terrorism as well as the promotion of sustainable development are also important for building EU relations with Ukraine.

One of the important aspects that were a manifestation of the efforts aimed at improving the situation in Ukraine was also the Deep and Comprehensive Free Trade Agreement (DCFTA). This agreement is part of the EU-Ukraine Association Agreement and was entered into force on 1 January 2016. According to the observations of the European Parliament (2017/2283(INI)), the DCFTA provides a solid basis for economic development and modernisation of Ukraine.

Table 1 and Fig. 2 present the main indicators characterizing the economic situation in Ukraine in 2013-2018.

Table 1: Gross domestic product, capital investment and inflation in Ukraine in 2013-2018

	2013	2014	2015	2016	2017	2018
GDP (mln USD)	179,572	130,571	90,489	93,313	112,125	130,857
Capital investment (mln UAH)	249873,4	219419,9	273116,4	359216,1	448461,5	578726,4
Inflation	-0,24%	12,07%	48,70%	13,91%	14,44%	10,95%

Source: IMF data, State Statistics Service of Ukraine data, Kirchner, R. and Kravchuk, V. (2019).

Table 1 shows the value of GDP, capital investment and inflation, while Fig. 2 expands these values by the employment rate.

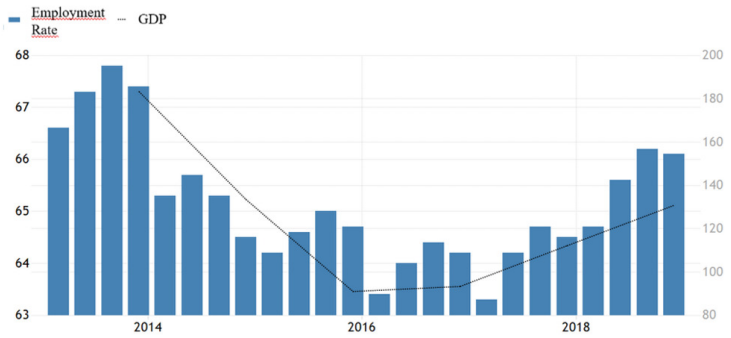

Fig. 2: The employment rate in comparison with GDP in Ukraine 2013-2018
Source: tradingeconomics.com.

The values of the employment rate are presented in comparison with GDP. As the data presented show, after the crisis and the difficulties encountered by Ukraine in earlier years, the economic situation in Ukraine began to stabilize from 2016.

Ratio analysis in research on the effectiveness of banks

Nowadays, the most popular method of analysing a bank's financial situation is the ratio analysis. The basis of such analysis are the financial amounts disclosed by banks in key financial statements such as balance sheet, profit and loss account, and cash flow. The results of a skilfully conducted indicator analysis can provide interested parties with numerous relevant pieces of information regarding the standing of the bank. Such skilfully used information may enable banks to take appropriate corrective action in advance, so that the negative consequences of "market and economy corruption by the bank" can be reduced and, in exceptional cases, ruled out.

Literature studies indicate several groups of indicators significant from the point of view of the bank's financial situation, among which Zabawa (2011) and Kochaniak (2010) lists the group of profitability indicators, margin indicators, financial result burden, and employment efficiency. According to another literature source Iwanicz-Drozdowska (1999), the following indicators are marked as financial indicators enabling a proper assessment of the bank's financial standing: efficiency, liquidity, solvency, stock market, and asset quality.

Market analysts dealing with analyses of the banking sector point to certain accepted market standards, in which the basis for assessing financial performance of banks are mainly the following indicators mentioned by Iwanicz-Drozdowska (2005): profitability, margin, financial result burden, as well as employment efficiency. For that reason, these groups of indicators are the main focus of the analysis of the financial standing of key banks in Ukraine.

The analysis of the values of individual ratios can be performed from the point of view of the group of the surveyed banks (which provides an opportunity to assess selected banks against the background of the group, e.g. Lithuanian banks, Polish banks) or time. Since the presented results are only part of the research on the financial efficiency of key banks in Ukraine, the presented article focuses on the analysis of the indicators obtained over time, taking into account the period 2013-2018. This approach allowed comparison and assessment of changes in the effectiveness of individual banks over time.

Considering the availability of unit data in the BanksFocus database, the following indicators, mentioned by Kochaniak (2010), were used in the study: ROA and ROE. In the conducted analysis,

according to the indications of Kochaniak (2010) the scientist researching the topic, the relation between selected indicators, i.e. the rate of return on equity and the rate of return on assets, was presented as follows:

- ROE > ROA – effective use of equity,
- ROE = ROA – the same return on equity and assets,
- ROE < ROA – the costs of liabilities are higher than the income obtained from investing them.

Both the value of ROE and ROA do not have any unambiguous benchmark, but should be as high as possible and compared to the values obtained by banks of a similar nature, as indicated in the scientific study of Kałużny (2012). For this reason, in the conducted analyses, the values of indicators recorded in the analysed period in the European Union, Poland, Lithuania, Latvia, Estonia, and the Czech Republic were used as comparisons.

The values of individual ratios for the analysed banks in the adopted period of 2013-2018, along with the determined minimum, maximum and average values may be used not only to appropriately rank the obtained results, but also to predict the behaviour of banks in the near future.

Analysis of changes in selected indicators of financial efficiency of Ukrainian banks

The analysis conducted during the research covered seven different financial values significant from the point of view of the financial effectiveness of the bank's operations. In this article, due to volume restrictions, there is presented the analysis of ROA and ROE indicators.

The analysed group of items consisted of the 15 largest banks of Ukraine and is presented in Table 2.

Table 2: List of banks included in the analysis

No.	The name of the bank	No.	The name of the bank
1	PrivatBank	9	Ukrsibbank
2	Oshchadbank	10	Prominvestbank
3	Ukreksimbank	11	OTP Bank
4	Ukrhazbank	12	Ukrsotsbank
5	Raiffeisen Bank Aval	13	Credit Agricole
6	Alfa-Bank Ukraine	14	Citibank (Ukraine)
7	Sberbank	15	Procreditbank
8	First Ukrainian International Bank		

Source: own elaboration.

Total assets of a selected group of banks accounted for over 50% of the banking sector's assets in Ukraine in the period 2013-2015. In 2017-2018, the share of the surveyed banks in the sector's assets increased to over 85%. For this reason, it was decided that this group, as the key players on the banking market of Ukraine, will be the basis for research. The first of the analysed indicators was ROA.

Return on Assets (ROA)

ROA is a parameter included in the group of profitability ratios that do not generally have limit standards. Their amount is compared in time and in space, most often against other banks, preferably from a given sector. This value can also be compared with the adopted

forecasts (e.g. assumptions of the bank's economic and financial recovery plan). The higher the value of these indicators, the better. The threshold value for profitability indicators is zero, because a negative indicator indicates a loss being generated by the bank, which in turn is an adverse phenomenon indicating a lack of financial efficiency of the bank's operations. Zaleska (2007) point out that the negative value of this indicator indicates not only the balance sheet loss but also the incompetent management of the bank or criminal activities. Both situations can contribute to the bankruptcy of banks. Therefore, the analysis of ROA is extremely important in research on the financial efficiency of banking sectors.

In the case of the analysed group of Ukrainian banks, there could be observed ROA values below zero in the analysed period. The minimum value of this indicator in the analysed period ranged from - 61.5% (recorded in 2016 by PrivatBank) to - 6.48% (recorded in 2013 by Prominvestbank). The highest value of ROA was achieved for Citibank (Ukraine) in 2014 and it amounted to 13.08%. It should be noted that Citibank was characterised by one of the highest ROA values throughout the entire analysis period. In addition, the analysis of the value of this indicator showed that, taking into account the average ROA value for each bank in the entire analysed period 2013-2018, the best banks are, in the following order: Citibank (Ukraine), Credit Agricole, Raiffeisen Bank Aval, Procreditbank, First Ukrainian International Bank, Ukrsibbank. For these banks, the average of the six analysed years was above zero.

The average value of the indicator in the analysed timeframe ranged from - 6.53% in 2015 to 1.2% in 2013. The average values of this variable for the entire time series are presented in Tab. 3.

Table 3: Average, minimum and maximum ROA values

ROA	2013	2014	2015	2016	2017	2018
min	-6,48%	-13,32%	-4,867%	-61,50%	-14,97%	-11,33%
max	8,04%	13,08%	10,14%	7,39%	5,64%	6,08%
average	1,20%	-2,76%	-6,53%	-6,19%	0,04%	1,14%

Source: Own calculations based on data from the BankFocus database and from the financial statements of banks

Unfavourable ROAs that could be observed in the key Ukrainian banks in the analysed period were caused, on the one hand, by the outbreak of the armed conflict in Donbass and the associated adverse changes in the financial system, especially in the banking sector. On the other hand, the reasons for the decline in the efficiency of some banks were ownership transformations as well as economic and political changes taking place in Ukraine.

Comparing the results of the largest Ukrainian banks with the results achieved in the same period by the banking sector of this country (see Table 4), it can be seen that the majority of banks with ROA below the sector were in 2014. The years 2015 and 2018 also recorded poor results in this respect and while the 2018 result can be read as positive because the ROA value above the sector meant a result above zero for this indicator, in 2015, unfortunately, the result for the above sector cannot be read as positive. This situation concerned Raiffeisen Bank Aval, which had an above-sector ROA; however, it was still negative (-2.81%), which was interpreted as negative in the analysis of the bank's financial effectiveness, indicating the bank's financial problems.

Table 4: Value of ROA in the period 2014-2018 for the banking sector of Ukraine

ROA	2013	2014	2015	2016	2017	2018
Ukraine sector	0.48%	0.26%	-4.24%	-12.42%	-1.76%	1.60%
banks with ROA above the sector	10.00	4.00	7.00	12.00	12.00	9.00

Source: own study based on data from the International Monetary Fund.

When comparing the results of the banking sector of Ukraine in the years 2013-2018 in terms of the ROA ratio with the results achieved in the same period by the sectors of selected countries of Central and Eastern Europe (Table 4), it can be seen that in the years 2013, 2014 and 2018 ROA was more favourable for the Ukrainian sector than for the entire EU. It can be noted here that the poor results of 2015-2017 are the aftermath of the war which broke out in 2014.

Analysing the value of ROA in the Ukrainian sector and the value of this indicator in selected countries of Central and Eastern Europe, it can be noted that apart from 2018, the other years are the period in which the ROA of the Ukrainian banking sector was below the value of this indicator in countries such as Poland, Latvia, Lithuania, Estonia, and the Czech Republic, as shown in Table 5.

Table 5: Value of the ROA (%) in the period 2014-2018 in selected banking sectors

	2013	2014	2015	2016	2017	2018
UE	0.1	0.2	0.3	0.3	0.4	0.43
Poland	1.12	1.03	0.86	0.82	0.78	0.76
Estonia	1.77	1.58	1.08	1.55	1.36	1.42
The Czech Republic	1.08	1.18	1.17	1.15	1.09	1.1
Lithuania	1.02	0.88	0.92	0.98	0.88	1.24
Latvia	0.91	0.98	1.2	1.51	0.88	1.22

Source: Own calculations based on data from the BankFocus database and from bank financial statements, IMF data, ECB, World Bank.

The analysis shows that the bank which maintained the highest and most favourable ROA value throughout the entire period under review was Citibank (Ukraine). Credit Agricole had the second largest ROA in the period under review, with the only weakness being 2014, in which ROA was 0.43%, whereas ROA for the sectors of banks from Poland, Latvia, Lithuania, Estonia, and the Czech Republic was around 1%.

Return on Equity (ROE)

ROE is another indicator included in the group of profitability ratios. It allows for assessing the ability of the equity involved to generate profit. Similarly to ROA, it has no indicated boundary or development standards, although Zaleska (2017) mentioned that it is accepted on the market that the value of this indicator for the bank is 10% or more. In the analysis of the ROE indicator, it is important to remember that a properly shaped value of this indicator should be at least equal to the inflation rate, so that there is no recapitalisation in the bank. It is also worth mentioning that the following relationship is maintained in a properly functioning bank:

- ROE > ROA – effective use of equity,
- ROE = ROA – the same return on equity and assets,
- ROE < ROA – the costs of liabilities are higher than the income obtained from investing them.

Analysing the ROE for individual banks included in the analysis, it can be seen that only three of them, i.e. Credit Agricole, Citibank (Ukraine) and Procreditbank, maintained the ROE > ROA ratio throughout the entire analysed period. Ukrhazbank and First Ukrainian International Bank did not maintain a proper relationship between ROE and ROA in only one of the analysed years - respectively in 2014 and in 2015. The following regularities can be observed for the remaining ten analysed banks:

- five of them had ROE < ROA in two of the six analysed years,
- three banks did not maintain the ROE > ROA relationship for three years,
- two banks retained ROE > ROA in only one year.

Therefore, taking into account this aspect of the ROA and ROE ratios, it can be said that only three of the 15 analysed banks deserved to be called financially effective. These banks not only maintained the aforementioned desired relationship between the analysed indicators, but they were also the only ones to have favourable (positive) ROE and ROA values throughout the entire analysed period.

Table 6: Average, minimum, maximum ROE values for the analysed group of banks, and inflation in Ukraine in the period 2013-2018

ROE	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Ukraine sector	1,72%	-31,95%	-65,51%	-122,17%	-15,34%	14,61%
min	-47,83%	-178,36%	-279,07%	-123,64	-124,53%	-161,59%
max	51,60%	76,65%	451,93%	68,48%	55,65%	61,29%
average	7,96%	-34,42%	-5,84%	-83,71%	-2,53%	2,84%
inflation	-0,24%	12,07%	48,70%	13,91%	14,44%	10,95%

Source: Own calculations based on data from the BankFocus database and from bank financial statements, IMF data, ECB, World Bank.

Analysing the minimum values for the ROE in the examined group (see Table 6) of banks, it can be seen that this value ranged from -279.07% in 2015 to -47.83% in 2013. The maximum ROE in the examined group of banks was recorded in 2015. It amounted to 451.93%. Both the minimum and maximum ROE values in the examined group of banks indicate that the most difficult year for all banks was 2014, when as many as nine out of 15 banks had ROE below zero. Equally unfavourable were the years 2015 and 2016 when seven banks out of 15 reported ROE below zero. The analysis shows that the years 2017 and 2018 are characterised by an improvement in the economic and financial situation of banks in the studied group. Only three of the examined banks in the last two analysed years showed ROE below zero and they were: Sberbank, Prominvestbank, Ukrsotsbank in 2018, as well as Sberbank, Prominvestbank and Privat-Bank in 2017.

Regarding the relationship that indicates that ROE should be at least equal to the inflation rate, it should be indicated in the examined group of banks that:

- in 2013 the condition was not met only by Prominvestbank,
- in 2014, only two banks: Citibank (Ukraine) and Procreditbank met the condition,
- in 2015, three banks met the condition: Ukreksimbank, Prominvestbank, Citibank (Ukraine),
- in 2016, five banks met the condition: Raiffeisen Bank Aval, OTP Bank, Credit Agricole, Citibank (Ukraine), Procreditbank,
- in 2017, banks such as PrivatBank, Oshchadbank, Ukreksimbank, Ukrhazbank, Sberbank, Prominvestbank, Ukrsotsbank did not meet the condition,
- in 2018, banks such as Ukreksimbank, Oshchadbank, Prominvestbank, Ukrsotsbank, and Sberbank did not meet the inflation condition.

Analysing the relation of ROE to inflation based on Table 5, it can be seen that the entire banking sector had a problem with maintaining this relationship in the period from 2014 to 2017. Only in 2013 and 2018 it can be observed that the ROE of the Ukrainian banking sector is above the inflation recorded in this period.

This situation indicates the weakness of the banking sector of Ukraine in the analysed period. The comparison of the results of the banking sector about Ukraine with the results of the EU and selected countries of Central and Eastern Europe is presented in Table 7.

Table 7: List of ROE values (in %) in the period 2013-2014 for selected countries of Central and Eastern Europe and Ukraine

ROE	2013	2014	2015	2016	2017	2018
UE	2.1	3.8	4.6	4	5.9	6.16
Ukraine	1.72	-31.95	-65.51	-122.17	-15.34	14.61
Poland	9.97	9.35	7.74	7.49	6.88	6.90
Estonia	10.74	9.69	6.79	11.1	9.2	10.36
The Czech Republic	11.36	11.44	11.28	11.86	13.02	13.97
Lithuania	8.56	7.73	7.48	11.89	9.12	11.69
Latvia	8.75	10.24	10.75	14.34	7.61	14.33

Source: Own calculations based on data from the BankFocus database and from bank financial statements, IMF data, ECB, World Bank.

As presented in Table 6, ROE for the banking sector of Ukraine strongly differed from the ROE values recorded for the EU and other analysed countries in the same period. The most favourable situation was in 2018, which may be a signal that the bank of Ukraine is slowly overcoming the difficulties and problems arising during the armed conflict which began in 2014. In 2018, the banking sector of Ukraine recorded ROE at a level above the EU average and above the average ROE for countries such as Poland, Lithuania, Latvia, Estonia, and the Czech Republic.

Conclusion

Research conducted in the article proves that the financial effectiveness for both the 15 leading banks in Ukraine and the whole Ukrainian banking sector, measured by ROA and ROE, in the period 2013-18 was not satisfactory and is characterized by changeability. Considering the development of ROA and ROE indicators, two subperiods can be distinguished:

1) the years 2013-2016, in which the deterioration of the situation of banks was observed;
2) the years 2017-2018 characterized by a significant improvement in the condition of banks.

The analysis carried out in this paper clearly shows that the years 2017-2018 are characterized by an improvement in the economic and financial situation of banks. Taking into account two analyzed indicators, the situation of the 15 leading banks and the banking sector of Ukraine is in 2018 by far more favorable then in the previous years. 2018 is the year in which the banking sector of Ukraine recorded ROA and ROE above the EU average. That means that Ukrainian banks were more financially effective than most banks in the EU banking sector.

The analysis of the financial effectiveness of banks in Ukraine through the prism of selected indicators used to assess the condition of banks, i.e. ROA and ROE, provide support for the hypothesis presented in the introduction of this article: The difficult political and economic situation in Ukraine was not without an impact on the condition of the banking sector.

As indicated in this paper, in 2013-2018 Ukraine struggled with many internal problems and the political crisis which acted as a catalyst for economic depression. However, as in the case of assessing the financial efficiency of banks, when analysing the political and economic situation in Ukraine, it can be seen that since 2016 the situation has started to stabilise, creating grounds for improvement in future years.

One of the positive aspects of the changes recorded in the last two years of the examined period is the decrease in the number of financial resources frauds (Art. 222 of the CC of Ukraine). The analysis of the total number of financial resources frauds, according to reports of General Prosecutor's Office of Ukraine, indicates that the number of registered cases is constantly decreasing - from 345 in 2014 to 61 in 2017 and 58 in 2018.

As Pohoretskyi, Serhieieva and Toporetska (2019) emphasize, the main the main reasons that contributed to the largest losses of domestic banks, and as a consequence to the decrease in the number of banks in Ukraine were: the fraudulent receipts and non-repayment of loans involve. The number of banks in Ukraine in 2013-2018 was presented in Fig. 3.

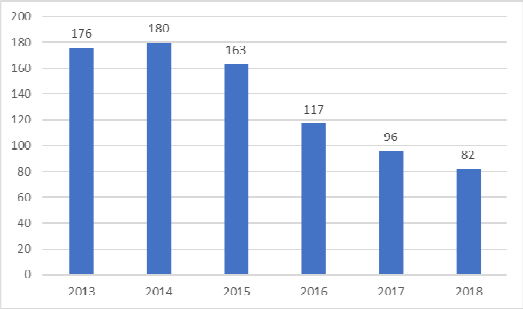

Fig. 3: Number of banks in Ukraine during the examined period
Source: National Bank of Ukraine.

As shown by the analysis of the data presented in the figure, the number of banks in the period under analysis has been steadily decreasing, with the greatest year-on-year changes recorded in 2016 and 2017. The number of banks that disappeared from the market during the 6 examined years is nearly 100 entities (94 banks).

One of the significant changes that took place in the period under review was also the change of ownership in banks. One of the most important events was the nationalisation of Privatbank, the largest bank in the Ukrainian banking sector, in December 2016. It was the biggest nationalisation in the history of Ukraine. As indicated by Repko and Soltysiak (2018), investigations showed that 97% of loans given by this bank, formerly owned by the Ukrainian oligarch Ihor Kolomoisky, were issued to former shareholders and to related-parties. Fig. 4 presents the increase in the share of state-owned banks expressed as a percentage of total assets.

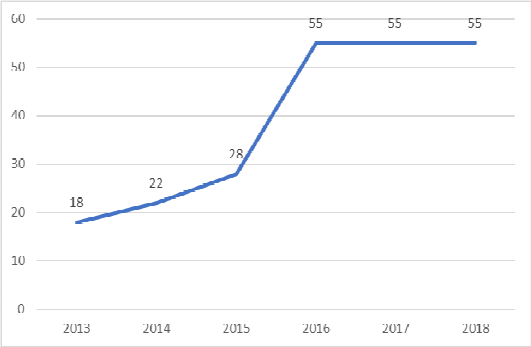

Fig. 4 : The share of state-owned banks as a percentage of total assets.
Source: own elaboration based on Kirchner, R. and Kravchuk, V. (2019).

Despite the improvement in the situation of the banking sector in Ukraine in 2017 and 2018, many issues still need to be strengthened in the context of measures to improve the stability of this sector, including crime. As Klochko, Kurylo, Kvasha, Zahynei and Logvinenko (2020) point out, effective interaction of all actors in combating crime in the banking business - from law enforcement agencies to bank clients - is important for ensuring stability of the Ukrainian banking system. According to the authors, the most importance law enforcement agencies include: National Police, Prosecutor General's Office of Ukraine, Security Service of Ukraine as well as National Anti-Corruption Bureau of Ukraine and State Bureau of Investigation. Other recommendations, important from the point of view of combating crime in the banking sector, indicated in this paper, are as follows:

- it is necessary to organize regional public councils and ensure cooperation between bank clients and local banking institutions (as part of the work of the National Bank of Ukraine's Public Council);
- it is assumed that the development of effective mechanisms for protecting rights and legitimate interests of depositors and creditors, as well as combating criminalization in the banking sector will be the main functions of these regional public councils;
- the relevant innovations require amendments to the Regulation on the NBU Public Council.

An important document, specifying actions to improve the situation of Ukraine, enabling the development of the financial sector in accordance with the expectations of the EU-Ukraine Association Agreement and Ukraine's other international commitments is Strategy of Ukrainian Financial Sector Development Until 2025 (2020), prepared by: The National Bank of Ukraine (NBU), the National Securities and Stock Market Commission (NSSMC), the National Commission for Regulation of Financial Services Markets (NCFS), the Deposit Guarantee Fund (DGF), and the Ministry of Finance of Ukraine. Actions strengthening the financial sector, specified in this document, refer to both the banking market and the nonbank financial institutions sector, as well as to capital markets. The five main development priorities of the financial sector indicated in the Strategy are:

- strengthening financial stability
- promoting macroeconomic development and economic growth
- developing financial markets
- expanding financial inclusion
- introducing innovations in the financial sector.

As the Ministry of Finance of Ukraine (2020) finds, the implementation of the Strategy will contribute to the creation of a transparent, competitive, stable and high-tech financial sector technologically, and thus will allow to the sustainable and inclusive development of the Ukrainian economy and to improve the well-being of households (through the efficient accumulation and redistribution of financial resources in the economy).

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Assessment of The Cost-Effectiveness of Banks in Ukraine in 2013-2018

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Abstract

This article focuses on the cost to income ratio as a critical measure describing the cost-effectiveness of banks. The article is a continuation of the research presented in the study "Financial situation of the banking sector in Ukraine in 2013-2018". The aim of this article is to present the results of analyzes on the cost efficiency of selected 15 leading banks in Ukraine in 2013-2018. This article focuses on the cost to income ratio (C/I). The research hypothesis is: cost effectiveness of leading banks in Ukraine, measured by the C/I ratio is negatively related to bank profitability in the period 2013-2018. The research presented in the article confirms the hypothesis. The cost to income ratio is negatively correlated with both ROE and ROA indicators. The only exception is 2015, when the C/I and ROE correlation was positive. The reason for this can be seen in the political and economic situation shortly after the outbreak of the conflict in Donbas.

Keywords: Financial Security of Banks, Benchmark Analysis of Banks, Financial Effectiveness, Cost-Effectiveness of Banks

Introduction

Political, economic and social changes taking place in the Ukrainian economy in 2013-2018 had an impact on the changes in the banking sector of Ukraine. At the end of 2014, it was noticeable that the economic crisis caused by political instability and the conflict with Russia had a significant impact on the situation of local banks. Data from the National Bank of Ukraine (NBU) from the end of 2014 indicate that 21 out of 184 commercial banks were subject to the liquidation procedure (NBU, 2013; NBU 2014; NBU 2015). In December 2014, another 16 banks were declared insolvent. The wave of bankruptcies observed in the banking sector of Ukraine in 2014-2016 was caused by the risky credit activity of banks, a significant number of unprofitable banks, as well as an inadequate policy of the National Bank of Ukraine. These unfavorable aspects of the operation of Ukrainian banks were reflected in the financial situation of some banks and, as a consequence, in a decrease of profitability and efficiency of Ukrainian banks against the background of European banks. In response to the bankruptcies of the NBU, to improve the financial condition of the sector and individual banks, it increased the minimum level of share capital from UAH 120 million to UAH 400 million in 2018. These changes can be considered as positive actions of the NBU to increase stability in the banking sector and bring the banking sector of Ukraine closer to European standards.

The massive wave of bankruptcies recorded in Ukraine in 2014-2016 made it necessary to conduct research on the financial efficiency of key Ukrainian banks. Our study focused on the analysis of changes in selected financial indicators in selected 15 largest banks of Ukraine. The period adopted in the study is 2013-2018.

The aim of this article is to present the cost-effectiveness of selected leading banks in Ukraine and the relationship between the cost income ratio (C/I) and ROE (return of equity) and ROA (return of assets) indicators. The article presents part of the results of research conducted by the authors as part of a project related to the issue of effectiveness of the banking sector in Ukraine. The analyzes conducted by the authors during the research covered 7 different financial values that are the most important from the point of view of this issue. This article focuses on one cost to income ratio describing the cost effectiveness of banks. It is a continuation of the research published in the article entitled "Financial situation of the banking sector in Ukraine in 2013-2018 from the point of view of changes in selected financial indicators of key Ukrainian banks" (Bywalec, Dudynets and Swacha-Lech, 2020). The article uses a critical analysis of the literature on the subject, analysis of financial indicator and Spearman rank correlation coefficient between C/I and ROE as well as C/I and ROA. There was also conducted a comparative analysis of changes in the size of C/I indicator over the years 2013-2018. The necessary empirical data were collected using BankFokus database, data from the International Monetary Fund (IMF), the World Bank (WB) and the European Central Bank (EBC) and the financial statements of banks.

The research hypothesis formulated in this article is: cost effectiveness of leading banks in Ukraine, measured by the C/I ratio, is negatively related to bank profitability in the period 2013-2018. This hypothesis is backed-up by the political and economic situation of Ukraine with the results of the effectiveness of banks.

Ukrainian Banking Sector

The banking system of Ukraine has a two level. The system is headed by the NBU and the second level consists of commercial banks, which number at the end of 2018 was 82 (according to NBU). Changes in the number of commercial banks in 2013-2018 in Ukraine are presented in Fig. 1.

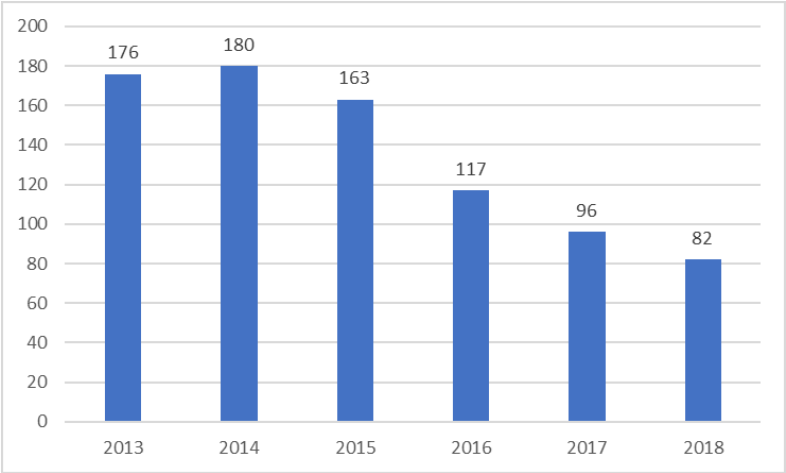

Fig. 1: The number of commercial banks in Ukraine in 2013-2018

Source: own study based on NBU, Annual Reports 2013-2018.

We could observe a downward trend in the number of commercial banks in Ukraine in the analysed years. Particular attention should be paid to the period 2014-2016, when 67 banks were liquidated, as a result of which the Ukrainian banking system lost UAH 435 billion in assets. This corresponds to approximately 22% of Ukraine's GDP (*Bankruptcies of banks in Ukraine are ruining citizens, they are hitting the economy*, Obserwator finansowy.pl). As Kirchner and Kravchuk (2019) show the years 2013-2016 was characterized by the increase in the share of state-owned banks expressed as a percentage of total assets (from 18 in 2013 to 55 in 2018).

Negative consequences of bankruptcies in the banking system of Ukraine were felt very strongly by natural persons who lost their savings. As a consequence, a large part of UAH entered the market, winding a wave of devaluation of the national currency of Ukraine.

The bankruptcies of a large number of banks as well as the low level of deposit guarantees up to 200,000 UAH (about EUR 7,000) caused a decrease in public confidence in the Ukrainian banking sector.

As Barisitz and Lahnsteiner (2017) highlight the Ukrainian banking sector faced a deep crisis - shrinking lending a deposit-taking, sharply risking proportion of bad loans and recapitalisation needs. One of the most important aspects of banking sector analysis which show an impact of the crisis on banking sector is the size of total assets. The value of total assets, total loans as well as deposits in the Ukrainian banking sector in the years 2013-2018 is presented in Table 1.

Table 1: The value of total assets, total loans and deposits in the Ukrainian banking sector in the years 2013-2018

	2013	2014	2015	2016	2017	2018
Total assets (EUR m)	115700	68462	46537	43189	40240	42874
Total loans (EUR m)	72384	45423	26605	18953	16752	18559
Deposit from households (EUR m)	40021	21980	14973	15058	14316	16033
Total loans as % of total deposits	113.7	121.6	93.1	63.5	60.4	61.2

Source: Kirchner, R., Kravchuk, V. (2019). Banking Sector Monitoring Ukraine, Institute for Economic Research and Policy Consulting and German Advisory Group, Policy Briefing Series [PB/05/2019].

The impact of financial crisis in Ukraine is also noticeable in the analysis of sector efficiency expressed in ROA and ROE ratios. As shown in the table 2 the years 2013-2016 are characterized by the deterioration of the financial situation of banks. Negative ROE and ROA in 2014-2017 are due to bank losses during this period. Among the main reasons for this was the formation of huge reserves to cover possible losses on active operations, as it was stated above. As a result, banks did not have internal sources of bank equity management.

Table 2: Value of the ROA and ROE in the period 2014-2018 in Ukrainian banking sectors and EU (%)

		2013	2014	2015	2016	2017	2018
ROA	**Ukraine**	10.00	4.00	7.00	12.00	12.00	9.00
	EU	0.1	0.2	0.3	0.3	0.4	0.43
ROE	**Ukraine**	1.72	-31.95	-65.51	-122.17	-15.34	14.61
	EU	2.1	3.8	4.6	4	5.9	6.16

Source: data from the International Monetary Fund.

The research presented in this article focuses on the 15 largest in terms of assets. These banks are presented in Table 3.

Table 3: List of banks taken over for analysis

No.	The name of the bank	No.	The name of the bank
1	PrivatBank	9	Ukrsibbank
2	Oshchadbank	10	Prominvestbank
3	Ukreksimbank	11	OTP Bank
4	Ukrhazbank	12	Ukrsotsbank
5	Raiffeisen Bank Aval	13	Credit Agricole
6	Alfa-Bank Ukraine	14	Citibank (Ukraine)
7	Sberbank	15	Procreditbank
8	First Ukrainian International Bank		

Sources: own study

In the period 2013-2015, the total assets of the analyzed banks constituted over 50% of the banking sector assets in Ukraine. In 2017-2018, the share of surveyed banks in the sector's assets increased to over 85%.

Due to the large share in total assets, the banks indicated in Table 2 have the greatest impact on the financial efficiency of the entire sector. These banks can be treated as patterns of behaviour on the Ukrainian market. Therefore, cost-effectiveness analyses and a correlation study between bank profitability and the C/I ratio were carried out for these banks.

Cost to income in assessing the effectiveness of banks

The effectiveness of banks is an extremely important issue in the context of assessing the activities of banking sector entities. The importance of this issue is reflected in the extensive literature on the problem of effectiveness. Articles that are part of the discussion on this subject concern both definition problems related to the term of effectiveness, as well as its types, measures or determinants of effectiveness (Casu and Molyneux (2003), Mester (1996), Huljak, Martin and Moccero (2019), Tripe (1998), Maudos, Pastor, Pérez and Quesada (1999), Bulajić, Jeremić, Knežević and Žarkić-Joksimović (2013), Chen (1998), Elahi and Poswal (2017)).

Both in the domestic and world literature the cost to income ratio is indicated as one of the significant indicators used to assess the bank's activity (e.g. in UK and Germany - Elahi and Poswal (2017), Australia - Tripe (1998), New Zealand - Hess, K. and Francis, G. (2004), Tripe (1996), Ghana - Antwi (2019), Naples - Pradhan and Parajuli (2017), Nigeria - Odunayo, Olarewaju, Oladejo and Migiro (2017), Kenya - Muriithi and Muigai (2017), Ukraine - Дудкин, Королев (2019).

As shown in the introduction, the problem of bank effectiveness is widely described in contemporary world literature. Jaworski (2006) indicates that effectiveness comes down to achieving the intended goals, ensuring the achievement of measurable economic benefits, greater than expenditure incurred. In terms of the literature generated for Poland, the problem of effectiveness is raised, among others, by: Capiga (2002; 2003; 2009), Siudek (2008), Kozak (2010), Kubiszewska (2015), Siudek and Drabarczyk (2015), Balina (2016), Kopiński and Porębski (2016), Kata (2017), Lepczyński and Gostomski (2018). This work concerns both issues related to theory (definitions, types of effectiveness) and practice (research for economic and financial effectiveness of selected banks). The following issues can be identified among the examined issues:

- measuring and assessing the effectiveness of commercial banks,
- measuring and assessing the effectiveness of cooperative banks
- economic growth and development versus financial effectiveness of banks,
- factors affecting the profitability and effectiveness of banks,
- dependence of the bank's performance on the gender of its president
- economic and financial effectiveness of banks in the conditions of low interest rates.

In the articles on the efficiency of the banking sector in Ukraine, the researchers refer to various aspects of the efficiency of the sector. They therefore examine intermediation-type efficiency of individual banks, bank lending efficiency as well as cost and profits efficiency. Zelenyuk and Zelenyuk (2014) estimate the intermediation-type efficiency of individual banks and analyze how bank specific factors explain the differences in the estimated levels of inefficiency across banks. They found strong support for the conclusions from the agency theory and proved that banks that were 100% foreign owned were significantly more efficient than locally owned and partially foreign owned banks, on average and ceteris paribus and, in particular, regardless whether they were headquartered in the capital city or in a region, in the East or in the West of the country.

Mohammad, Kots, Lyashenko (2016) analyzed in detail the forms of distribution by particular efficiency value levels of bank-lending in the real sector of Ukraine's economy. The crucial results of the study are as follows:

- there is the tendency to decline in average values of bank-lending efficiency in the real sector of Ukraine's economy, which is observed against the background of considerable values of inefficient component quota in error full dispersion of the observed model of the corresponding stochastic efficiency boundary;
- the efficiency of processes of transformation of attracted resources into lending resources with relation to banks functioning in Ukraine is determined in many respects by the adequacy of the real banks resources usage.

Mertens, A. and Urga, G. (2001) conducted the research related to cost effectiveness and profit efficiently of the banks in Ukraine in 1998. The authors proved that small banks operate more efficiently in cost terms, but they are less efficient in profit terms. They indicated that there is a significant difference in economies of scale between small and large banks. Large banks showed significant diseconomies of scale, while small ones - significant scale economies.

Capiga (2003) distinguished three types of banks effectiveness: organizational, financial and cost (Fig. 2).

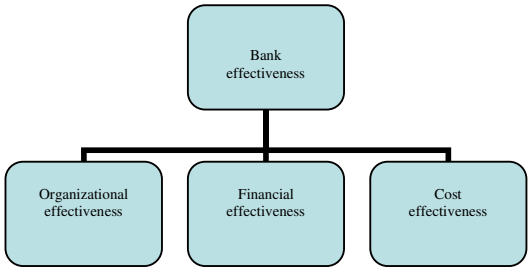

Fig. 2: Types of banks effectiveness

Source: own elaboration based on Capiga (2003).

Organizational effectiveness is related to the organization's goals and resources. It refers to the conditions existing inside and outside the organization, and also includes the time at which this concept is evaluated. Financial effectiveness is in turn related to the financial position of the bank, the financial results obtained. In order to determine it, we use information from financial statements. Cost

effectiveness, in turn, refers to the assessment of whether a given production volume was achieved with an appropriate volume and structure of inputs.

As Miklaszewska (2010) indicates, many methods are used to measure the effectiveness of banks - from financial indicators to econometric models. Among the methods of estimating effectiveness, two groups can be distinguished - parametric and non-parametric. Parametric methods include Stochastic Frontier Approach and Thick Frontier Approach. An example of non-parametric methods may be Data Envelopment Analysis (DEA). DEA is a popular method used by many researchers (among others: Staub, e Souza and Tabak (2010), Xiaogang, Skully and Brown (2005), Wu, Yang and Liang (2006), Wang, Lu, and Liu (2014), Chen (1998)).

The cost to income ratio, which is the crucial focus of this article, is used in the index analysis to assess the bank's cost-effectiveness. Analysis of the value of this indicator allows determining whether the bank is or is not cost-effective. A decrease in the value of this indicator means an improvement in the bank's financial efficiency, which is explained by the fact that the same amount of profit is obtained when the bank incurs lower operating costs.

As Tripe (1998) points out, despite the fact that the C/I ratio refers to both costs and revenues, its interpretation and information value focuses mainly on costs. Lowering costs, with a fixed level of income, should lead to an increased profit, and thus to an increase in return on equity and share prices, which are a measure of investors' greatest interest in bank shares. When interpreting this indicator, it should be remembered, however, that its value affected not only by costs, but also by variations in incomes. They can be caused by internal and external factors - inefficient operations of banks, lowering margins or an economic slowdown.

In a situation of low interest rates causing a decrease in interest income streams, skilful cost management at the bank is becoming increasingly important. As emphasized by Lipski (2015), banks with a persistently high cost-to-income ratio in the long term will not be able to cope with the aggressive battle for the client.

Elahi and Poswal (2017) studied factors influencing cost effectiveness for the banks in UK and Germany. The explanatory variables include the following six values: profitability, credit risk, net interest margin, income diversification, financial leverage as well as bank size. To indicate profitability they use ROA ratio. Results of conducted research show that cost effectiveness is positively influenced by ROA for both economies, so higher the returns on total assets, higher will be the bank effectiveness. The authors emphasize that clients usually prefer those banks that have higher profitability. The best potential creditworthy borrowers will therefore be more willing to use the services of this group of banks. Similarly, people wanting to invest their funds will be more willing to choose banks with higher profitability, which will translate into significant share of deposits.

In the next parts of the article, the authors will first analyze the cost to income ratio for leading banks in Ukraine in 2013-2018, and then the relationship between the cost to income ratio and the profitability, measured by ROE and ROA.

Cost to income ratio analysis for leading banks in Ukraine in 2013-2018

In 2014, there was a significant increase in the C/I ratio for some banks. During this period, the costs of Ukrainian banks increased by 57.2%. Banks suffered significant losses from the temporary occupation of the Autonomous Republic of Crimea and the situation in eastern Ukraine. The second reason was the increase in the amount of deductions to reserves for possible losses from active operations. In general, in the banking system, deductions to the bank reserves increased 3.7 times compared to the ones in 2013, and the total expense share increased from 16.7% to 39.3%.

Those banks which pursued risky unbalanced policies or gave loans to finance large-scale projects appeared to be the most sensitive to shocks.

The banking sector of Ukraine was also negatively affected by the devaluation of the hryvnia exchange rate in 2014-2015. This led to the non-repayment of foreign currency loans to banks from a significant number of domestic debtors and the growth of problem assets. The share of problem loans of banks for the period 2013-2017 increased from 7.7% to 54.5%.

Considering the evolution of C/I indicator in the examined group of 15 Ukrainian banks, Citibank (Ukraine) should be mentioned as the undoubted leader. In all the analysed years, this bank recorded a C/I ratio below 50% (see Table 4). It should be noted that Citibank is a specific narrow-profile bank that does not work with individuals, so its indicators are much better than those of other universal banks operating in all market segments.

Table 4: C/I ratio value for the banking sector of Ukraine and for the best banks in the analysed group in the period 2013-2018 (%)

	2013	2014	2015	2016	2017	2018
Citibank (Ukraine)	23.82	17.04	26.41	9.52	18.55	14.00
Procreditbank	83.71	72.46	28.06	57.78	46.84	38.96
Raiffeisen Bank Aval	88.63	95.87	124.62	46.99	36.75	42.22
Credit Agricole	69.25	88.96	79.85	66.19	53.38	49.85
Ukrsibbank	98.08	122.96	99.23	119.95	63.59	50.50
OTP Bank	94.87	167.74	685.21	71.28	60.66	46.88
Ukraine sector	65.62	60.57	55.37	49.18	60.82	58

Source: Own calculations based on data from the BankFocus database and from bank financial statements.

Procreditbank was in second place in terms of the C/I ratio. In the case of this bank, in 2015, 2017 and 2018 a significant decrease in costs could be seen, which had a positive impact on the indicator. The level of the C/I ratio of OTP Bank in 2015 at 685.21% is mainly due to the growth of the bank's expenses to increase reserves to cover the risks of the foreign currency loan portfolio in the conditions of exchange rate instability. In the third quarter of 2015, the bank formed additional reserves for foreign currency mortgages, as well as for loans in Donetsk and Luhansk regions. Raiffeisen Bank Aval showed a C/I level below 505 in 2016-2018. The other three banks indicated in Table 2 recorded a C/I ratio below 50% only in the last year, 2018. The high level of the C/I ratio is observed for Raiffeisen Bank Aval and Ukrsibbank. These banks are characterized by the most conservative policy of formation of reserves, which they highlight in their financial statements.

The high levels of the C/I ratio for the other nine analysed banks reflected the behaviour of the Ukrainian market, which translated into a high level of C/I for the banking sector of Ukraine. As can be seen in Table 2, the banking sector of Ukraine only in 2016 recorded a value of cost-to-income below 50%.

When analysing the results achieved by the banking sector of Ukraine in relation to the C/I ratio in the EU (as presented in Table 5), it is easy to notice that the results of the Ukrainian sector were below the EU average. Such a level indicates that the banking sector of Ukraine, taking into account cost-effectiveness, did better than most countries included in the European Union.

Table 5: C/I ratio in selected countries of Central and Eastern Europe and Ukraine (%)

	2013	2014	2015	2016	2017	2018
EU	65.28	63.38	63.46	65.88	64.03	65.73
Poland	52.67	52.15	62.27	56.96	56.30	55.87
Estonia	50.16	48.26	46.86	47.99	52.01	55.32

The Czech Republic	28.49	35.64	30.55	46.09	46.60	38.45
Lithuania	54.27	45.06	43.05	37.32	51.08	38.81
Latvia	53.59	52.62	53.07	50.64	65.18	75.05
Ukraine	65.62	60.57	55.37	49.18	60.82	58

Source: Own study based on data from World Bank.

Analysing the level of the C/I ratio in the countries indicated in Table 3, it can be seen that in 2013 the situation of Ukraine from the point of view of this indicator was the worst among the countries concerned. It was similar in 2014. However, 2015 brought a slight improvement and, as can be seen in the table, only Poland (62.27%) had a worse situation than Ukraine in terms of C/I. In 2016, Poland and Latvia had C/I higher than Ukraine. In 2017 and 2018 only Latvia had a C/I ratio even worse than the Ukrainian sector, and it was 65.18% and 75.05% respectively. Therefore, as presented, the situation in terms of cost-effectiveness of selected banks of Ukraine and the entire sector in 2013-2018 varied. However, a favourable trend of changes could be observed, which resulted in the value of the C/I ratio in 2018 at 58%, close to the value indicated as preferred for the sector (50%).

Analysis of the relationship between the C/I ratio and ROE and ROA profitability

During the research the Pearson's linear correlation coefficient and Spearman's rank correlation coefficients between C/I and ROA and ROE were calculated, which indicates the strength and direction of the relationship between variables. Because of construction of these financial indices, we expected the negative value of the correlation coefficient, indicated that the increase in the C/I value was accompanied by a decrease in the tested value (ROE or ROA). When analyzing the correlation coefficients, it should be remembered that it takes values in the range from -1 to 1. A correlation value at level 1 is interpreted as an ideal positive correlation, while -1 as a perfectly negative correlation. A score of 0 means no linear correlation. Bojańczyk (2013) in his study proposes an interpretation of the value of the correlation coefficient (see Fig 3.). There is a strong relationship when the correlation coefficient exceeds 0.7 (or -0.7).

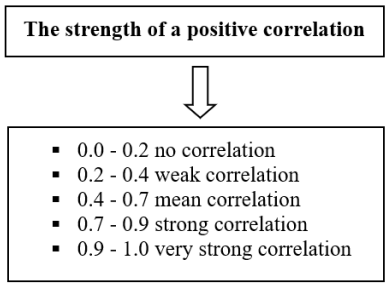

Fig. 3: The interpretation of the value of the correlation coefficient

Source: own elaboration based on Bojańczyk (2013).

Scatterplots showed us outliers in some years, so we decided to use rank correlation. In our research conducted for the 15 largest banks of Ukraine in the period 2013-2018, it was noted that the all values of the Spearman's coefficient, measuring the rank correlation between C/I and bank profitability ratios, are negative (see Table 6). Because usually the maximum of correlation between C/I and ROA or ROE was observed for indices from the same year, Table 4 shows rank correlation between variables from the same year.

Table 6: Spearman's correlation coefficient for C/I and ROE and ROA profitability ratios in the period 2013-2018

Year	2013	2014	2015	2016	2017	2018
Indices	C/I	C/I	C/I	C/I	C/I	C/I
ROE	-0.9143	-0.88214	-0.49643	-0.97143	-0.94643	-0.85357
ROA	-0.425	-0.93929	-0.82857	-0.97857	-0.95714	-0.91786

Sources: own calculations.

As you can see in Tab 4. in the examined period the group of examined banks showed usually a strong and very strong negative correlation between the C/I ratio and return on equity (ROE). The only exception was 2015, when the correlation was moderate negative. The reason for this can be seen in a consequence of economic disturbances resulting from the political conflict in Donbas, which translated into temporary disturbances in the banking sector of Ukraine.

Looking at the correlation between C/I and ROA, it can be seen that throughout the entire period considered it was negative. In 2013 it was very weak. The years 2014, 2016, 2017 and 2018 are a very strong negative correlation.

Analysis of correlation shows that cost-effectiveness assessment of banks based on the C/I index could be empirically seen as inverted problem of the bank profitability, measured by means of ROA and ROE.

Conclusion

The years 2013–2018 were a period in which Ukraine experienced many difficulties - both politically and economically. Armed conflict (the occupation of Crimea and some areas of Donetsk and Luhansk oblasts) and other political problem acted as a catalyst for economic crisis. Ukraine struggled with many internal problems, such as: high level of financial crimes, corruption or several waves of significant depreciation of the hryvnia at this time. Importance of the problems which Ukraine faced is perfectly defined by the sentence formulated in the study of the National Bank of Ukraine (NBU), the National Securities and Stock Market Commission (NSSMC), the National Commission for Regulation of Financial Services Markets (NCFS), the Deposit Guarantee Fund (DGF) and the Ministry of Finance of Ukraine (2020), which indicate that in 2014-2016 the state is “faced a triple crisis as the combined impact of a banking crisis and a currency crisis exacerbated a crisis in the real sector of the economy”.

Research conducted in the in the first part of the article proves that the cost effectiveness for the 15 leading banks in Ukraine in 2013-2018, shown on the whole Ukrainian banking sector, banking sectors of selected countries and the EU average, was characterized by volatility throughout the entire period examined. The best indicator value for both the 15 banks examined and for the entire Ukrainian sector was recorded in 2018.

The analyzes conducted in the second part of this article show a negative relationship between the cost to income ratio and ROE and ROA profitability ratios. This means that with the market trend to reduce the costs of banks’ activity, the profitability of banks will increase. This statement seems appropriate given the assumption of a normally functioning economy and the absence of political shocks. The research show that political conflicts translate into the relationship between C/I and ROE. It can be observed that in 2015, a year after the outbreak of the armed conflict in Donbass, the relationship between C/I and ROE changed to a positive one. Thus, with the increase in costs, an increase in the profitability of banks' capital could be observed.

An in-depth analysis of the cost to income ratio would require an extension of the research undertaken in this article to include a detailed study of the factors that affected the fluctuations of the

indicator over the period under analysis. It is therefore necessary to look in detail at the individual cost items each year and explain what factors influenced their fluctuations in value (e.g. costs related to salary). Analysis of these issues would allow full interpretation of the results obtained in this article.

It also seems interesting to propose to examine the relationship between the C/I ratio and ROE and ROA in other countries, which could lead to find out the reasons why the correlation between these indicators is positive. An interesting aspect of the research will also be the examination of the correlation between ratios cost to income and Tier 1.

The authors plan to expand research on the effectiveness of Ukrainian banks by further indicators (e.g. net interest margin) and further analysis. We also plan to undertake research on the efficiency of the banking sectors of selected European countries. This will allow interesting comparisons to be made between the countries studied and to identify certain patterns.

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Gauging Social Media Users Satisfaction – Based on The Case of Facebook

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Abstract

Customer satisfaction is a fundamental and key confirmation of quality of any product offered on the market. A satisfied customer is very often the guarantee of company strong market position and its competitive advantage. Therefore, it is understandable that more and more companies treat the customer satisfaction as the most important attribute describing the quality of the merchandises or services. It also concerns information systems such as social software / social networks that are offered on the market. Customer satisfaction studies concerning utilization of these products allows to know the factors that motivate people to use this type of websites. Equally important is obtaining information about which parts of this type of software operate unsatisfactorily for users. Thus this kind of knowledge is crucial in the processes of modifying and improving of community portals such as Facebook etc. The analysis of the Internet market clearly show that the average internet user increasingly willing to use different kinds of social networks. Therefore, it can be concluded that the satisfaction level of social media usage is shaped at a high level. However, there is a lack of studies on the topic of estimating the satisfaction of end-users of this type of software. The article presents the concept of estimating users satisfaction with social software, which is based on the achievements of marketing research and software quality studies. The basis of this concept is the model of user satisfaction in the context of social media that has been created by the author. The model is based on selected set of the most important end-user quality attributes describing the social networks. Such approach will not only determine the level of overall users satisfaction, but will also provide specific information for software improvement. The proposed model has been verified in the quantitative empirical research on the example of Facebook social network. The study have been carried out using survey method on the a group of active users i.e. university students.

Keywords: User Satisfaction, Social Media, Social Media Users' Satisfaction Model;

Introduction

Customer satisfaction is a fundamental and key measure of quality for products offered on the market. This also holds true in relation to such products as social media and software applications employed in the provision of such services. Studies of customer satisfaction of end users of social media platforms seem of particular importance in the context of future modifications and improvements, as they help recognize the most important factors that motivate users to invest their time and effort in this type of service. Another important benefit offered by that kind of analyses in this respect is the better understanding of reasons behind the enormous popularity of social media.

Professional ICT literature provides ample and frequent analyses of the social media phenomenon. Ever since the onset of such versatile platforms allowing for close integration and organization of activities of various virtual communities, the social media phenomenon has been studied at length and perceived as one of the most dominant trends in the development of modern communication systems. Researchers approach the subject from a multitude of perspectives, with the view of improving the reach and popularity of social media, providing added functionalities and areas of application, and facilitating their use for image-building and marketing purposes. Many studies are also devoted to the

task of analysing directions and perspectives of future development in this particular market segment. Analyses of internet and mobile markets clearly show that the average modern user of digital communication services is more inclined to reach for this type of service on a daily basis, which may be suggestive of the relatively high level of customer satisfaction from functionalities offered by social media applications. At the same time, literature studies suggest a clearly manifested disregard for a scientific approach to the evaluation of customer satisfaction among users of this particular type of applications. Even more baffling is the fact that social media falls behind other types of applications and software packages, which are typically subject to close examination in this respect – this observation holds true both with regard to standardized products and to dedicated systems employed in modern organizations.

In the light of the above, this paper represents an attempt at formulating a model of customer satisfaction to be used in the context of social media users. The model adopts some of the most useful properties of the available studies on customer satisfaction from software products, but it is construed and adjusted to fully correspond with the nature and specificity of social media. The conceptual structure of the model is built on a set of the most significant end attributes of quality expected by users from this type of application. For verification purposes, the model shall be employed as basis for quantitative empirical studies. This will have the added effect of improving the understanding of the growing appeal of social media and recognizing some of the most important factors motivating the users to reach for this type of service.

Customer Satisfaction as A Key Criterion in The Evaluation of Software Quality

Before we commence with our analysis of the notion of customer satisfaction from software-type products, it may be useful to approach it from a more general viewpoint, i.e. in terms of satisfaction displayed by consumers of any type of product offered on the market. It may be assumed that measurement and analysis of customer satisfaction is one of the key elements of the customer-oriented approach observed in modern companies.

A product of any type, even when presently perceived to be of utmost quality, may rapidly lose its appeal in the eyes of consumers, since the structure of needs and preferences of consumer base is nowadays quite volatile. In the light of such determinants as the rich offering of innovative products, frequent quality-of-life improvements, highly competitive markets and the new challenges of the information society, companies were forced to thoroughly restructure their traditional approach to customers and place them at the centre of any decision and activity.

Good evidence of the crucial role of customers in quality improvement processes can be found in many modern and fundamental theories of management, such as Total Quality Management, Kaizen, Lean Management and Business Process Reengineering (Pawłowska, Strychalska-Rudzewicz 2005). For example, customer orientation represents the core assumption and the principal objective of the TQM concept and is defined in terms of providing utmost customer satisfaction based on informed evaluation of customer needs, analysis of customer requirements, and measurement of customer satisfaction from products on offer (Kan 2002).

Strong customer orientation as basis for quality improvements of products offered on the market is also evidenced in the construct of the international ISO 9001 standard typically adopted by companies of every segment as a fundament of their quality management systems. The general principles section of the ISO 9001:2000 standard places the main emphasis on the postulate of strong customer orientation and the use of specific practices and techniques that target the customer base (Wawak 2007). This principle is mainly associated with the need for a rational evaluation of customer expectations at the level of product design, i.e. well ahead of the time when the finished product reaches the intended market. However, customer orientation is also expressed in the recommendations for continuous measurement of customer satisfaction from product use as basis for all decisions made with regard to the company offer of products.

According to Kotler (1994), satisfaction can be defined as "a person's feelings of pleasure or disappointment resulting from comparing a product's perceived performance (or outcome) in relation to his or her expectations" (Kotler 1994). A different approach to the definition of customer satisfaction can be found in Farris et al. (2010), where the notion is perceived as a measure of the degree to which the company offer of products or services fits or surpasses the expectations of the average consumer. Moreover, the authors perceive the category of customer satisfaction as "the number of customers, or percentage of total customers, whose reported experience with a firm, its products, or its services (ratings) exceeds specified satisfaction goals" (Farris et al. 2010). In contrast to the above, Kan addresses customer satisfaction from a purchased product as the conclusive verification of the assumption that the product on offer fulfils the expectations of the client base and is (as such) fit to use (Kan 2002). It seems that the most comprehensive definition is that by Marciniak, where satisfaction (or lack thereof) is described as an emotional state experienced by a customer in relation to the product purchase and subsequent use, resulting from confrontation between the customer's initial expectations towards the product and his/her practical experience from its use (Marciniak 2005).

It is worth noting that customer satisfaction (or user satisfaction) is one of the key attributes of quality for any product. Consequently, it may be useful to approach the studies and evaluations of customer satisfaction from the viewpoint of the constant quality improvement postulate. Implementation of quality management systems is nowadays a standard practice in many countries. However, this type of activities does not necessarily result in any tangible improvements that can be measured in terms of growing customer base, increased sales or improvement of the company competitive advantage on the market. Moreover, there is plenty of evidence for companies failing to maintain their position on the market despite their advanced implementations of quality management systems. As it turns out, both the sale and the profitability of business initiatives are – to a large extent – determined by unspecified and often sector- or product-specific psychological preferences. In view of the above, for a better understanding of the correlations between company results and their chosen approach to product quality improvement, it may be advisable to employ a comprehensive evaluation of customer satisfaction (Nieżurawski et al. 2010).

In analogy to the above, customer satisfaction from the use of software-type products, as the main objective of this paper, should be viewed in much the same context as satisfaction resulting from consumption of any other type of product. From the user's perspective, a piece of software represents a product utilized for the satisfaction of specific needs. Therefore, it may be assumed that the processes related to the purchase and subsequent use of a software application or IT system generate certain responses (be it positive or negative) on the part of their users.

According to SQuaRE document (Systems and software Quality Requirements and Evaluation) containing international standards for the development of software quality, the user satisfaction of any software product is defined as (Systems&software ... 2017):

- the extent to which user needs are met when a product or system is used in a specific context of use,
- the user's response regarding his/her interaction with the system including attitudes towards the use of the product or system.

Estimation of the level of satisfaction from the utility provided by a software product requires, most of all, specification of a detailed set of attributes describing the qualitative dimension of the studied product. Based on such a set, correct queries may be defined to study the perceived satisfaction from each of the defining elements as well as the level of significance attached to each such element. The sum of responses will serve as a knowledge base to support all future decisions designed to improve the utility, user interface, functions or any other constituent element of the product quality.

The conceptual basis for the study of customer satisfaction among the users of social media services on offer by Facebook

The postulated concept for the evaluation of user satisfaction from social media service functionality involves determination of the CSI (Customer Satisfaction Index) (Kozielski 2006), one of the key measures used in the evaluation of end user satisfaction in relation to various types of software. The CSI index allows for the estimation of levels of satisfaction from each of the identified attributes of quality (i.e. those confirmed by the users as the most significant) (Mazurek-Łopacińska 2005). As such, the index takes the form of the weighted average of levels of satisfaction reported for each of the constituent attributes.

The most important base for CSI estimation is the proper recognition of attributes deemed by users as the most significant. The initial phase involves construction of a list of attributes that best describe the utility of the software from the viewpoint of the end user. The list should then be verified at a later stage, for example in the course of in-depth direct interviews with users.

There are many approaches and classifications available for the task at hand, such as the IBM model CUPRIMDSO, the FURPS approach used by Hewlett-Packard (Nafees 2011), or the SUMI method (Mansor et al. 2012). Based on critical studies of professional literature related to software quality evaluation, the author decided to employ the McCall model and the current ISO/IEC 2510 standard as basis for the determination of initial candidates to the list of key attributes of the studied social media software.

The McCall model (McCall 1977, Deepshikha 2010) is a recognized model of quality describing attributes of software quality, both from the viewpoint of the provider and the end user. This model lists three types of product quality features that are important for:

- programmers who are responsible for maintaining and maintaining the system,
- programmers who are working on transforming the system,
- users who use the system operationally (Kobyliński 2007).

Due to the fact that the subject of the study is estimating user satisfaction, only the attributes from the third group of the McCall model were taken into account. They can be taken into account when determining the most important features of social software for users.

The set of attributes of quality defined in the ISO/IEC 25010 standard is derived from the standard's SQuaRE supplement (Systems and software Quality Requirements and Evaluation), containing detailed principles for the evaluation of IT systems' quality. Among other things, the document contains a postulate for a Quality in use model employing five fundamental characteristics describing the results of user interactions with a system under examination (Systems&software ... 2017). They were also taken into account when determining the most important features of social software for users. The selections of attributes employed in both the McCall model and the SQuaRE model contain detailed attributes which are then subject to user evaluations. It must also be noted that, despite the obvious differences in the approach to the task of quality evaluation, both models share a number of common properties. In the light of the above, it was possible to construe a model to describe satisfaction from the use of social media client software. Fig. 1 presents this author's postulate for such a model. The model is composed of eleven attributes, with four of them (namely: design/aesthetic, efficiency, productivity, and utility) further divided into detailed attributes. For this reason, the study involves evaluation of a total of 15 client software attributes that may impact the level of user satisfaction – this total was evidenced both in the design of surveys and in the context of analytical evaluations.

The preliminary set of thus defined key indicators of software quality may then be presented for user evaluation to produce a final set of properties perceived by users as the most significant. This task may be completed using various methods, such as online surveys and survey auditing. However, it seems that qualitative methods provide the best possible results, with the added benefit of identifying reasons behind users' evaluations and improved insight into specific behaviours displayed by users in

association with social media services. For this reason, it may be useful at this stage to introduce focus group interviews and brainstorm discussions in small groups.

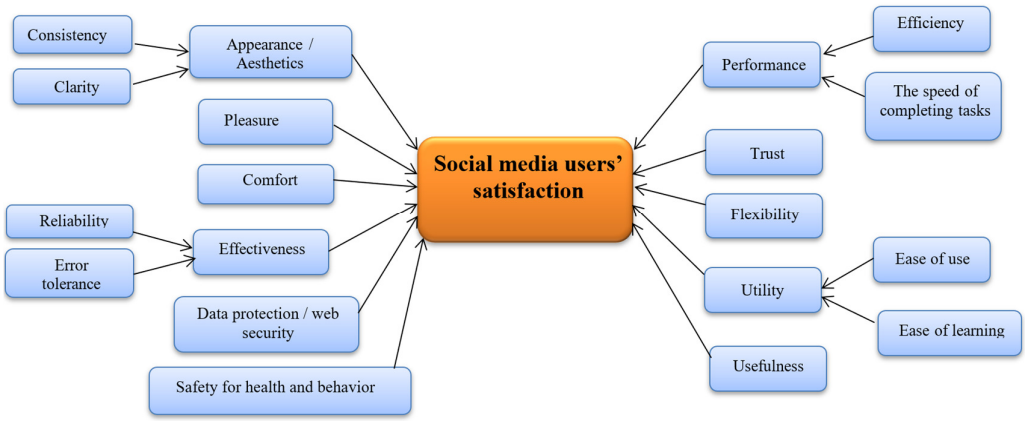

Fig. 1 : Social media users' satisfaction model

Source: Own study

Based on the obtained results, it is possible to determine the set of the most important attributes of social software that were the basis for the construction of the questionnaire. The key part of the survey are questions allowing to estimate the level of user satisfaction with individual software features. The questions referred to subsequent attributes that should be assessed on a five-point satisfaction scale (Kan 2002), ie:

1	2	3	4	5
very dissatisfied	dissatisfied	neutral	satisfied	very satisfied

In addition, each of the features should be assessed in respect of its importance for the user using a five-level importance scale, i.e.

1	2	3	4	5
completely unimportant	not important	quite important	important	very important

Quantitative data collected during surveys will be the basis for calculating the customer satisfaction index for social media users. The calculation of the CSI indicator is based on the formula:

$$\boldsymbol{CSI} = \sum_{i=1}^{N} \boldsymbol{w_{iw}} \times \boldsymbol{s_i} \quad , \; where \quad w_{iw} = \frac{w_i}{\sum_{i=1}^{N} w_i}$$

CSI – customer satisfaction index for social media users
i - social software attribute
N - number of evaluated attributes
w_{iw} - relative weight of the i-th attribute
s_i - assessment of satisfaction with the i-th attribute of the software
w_i – weight of the i-th attribute

The resulting value of the CSI index represents the users' general level of satisfaction from the most significant attributes of the system. In our context, it may be advisable to contrast the resulting value against the partial weighted values for each attribute under examination. This will help identify the weak points of the examined system, i.e. functions and properties in need of improvement. In addition, analyses of the results should be performed in various cross-sections, i.e. individually for specific groups of customers or within specific sets of attributes.

Estimation of the level of satisfaction displayed by users of the Facebook social media service – results of empirical studies

This author's postulated concept for the evaluation of user satisfaction from social media client software on the basis of a model described in the previous section has been verified though empirical evidence i.e. quantitative surveys.

At the beginning, a detailed plan and schedule of surveys was defined, as well as the size of the research sample necessary to obtain reliable results. The survey study was performed as planned, between May and June 2019, among students of both full-time and part-time studies at Wroclaw University of Economics.

The size of the required (minimal) study sample to reach reliable results was calculate on the basis of the following formula:

$$N_{\min} = \frac{N_p(\alpha^2 * f(1-f))}{N_p * e^2 + \alpha^2 * f(1-f)}$$

where:

N_{min} – minimum study sample size
N_p – the size of the population from which the sample is taken
$\propto$ – confidence level for results
f – fraction size
e – established maximum measurement error

The general population from which the study sample came was all students of Polish universities in 2019. According to data from the Central Statistical Office, their number was 1230.3 thousand in 2018 people (Central Statistical Office, 2019). It was assumed that the confidence level $\propto$ was set at 95% ($\propto$ = 95% means the 95% probability that the measurement result is real), the fraction size (the fraction size was set at the standard level) was at a universal level i.e. 0.5 and the maximum measurement error could equal 5%. On this basis, it was calculated that the required number of respondents in the study was 384 respondents. This requirement was met because the final number of correctly completed questionnaires was 413.

The main research objective was to determine the level of satisfaction displayed by users in relation to functionalities offered by social media services, particularly Facebook. The author was intent on not only evaluating the level of satisfaction reported by students, but also to determine factors that may influence their satisfaction.

Therefore, the objectives of the survey were:

- obtaining Facebook users' opinions on its perception and main areas of application.
- learning the opinions and ratings of active Facebook users regarding specific features and functions of the portal,
- estimating the level of user satisfaction with certain attributes of social software.

Accurate estimation of the satisfaction level was ensured through informed evaluation of the students' reported opinions on specific attributes of the studied client software (based on the model of social media user satisfaction described earlier in this paper). The sets of responses allowed for effective segmentation of respondents by such demographic and behavioural traits as: gender, frequency of social media use, form of access, fluency, experience history, use intensity, and the number of contacts.

Thus identified, the responder segments served as basis for detailed analyses of satisfaction. This part of the study helped identify practical correlations between user satisfaction level and user characteristics. The results provided valuable insight for the final determination of factors that may impact the level of social media service satisfaction displayed by active Facebook users.

Before we commence with detailed analyses of the results obtained in the course of the survey, it may be useful to provide general information on the structure and population of the respondent sample. The study was conducted on a sample of 413 female and male representatives of the student community at Wroclaw University of Economics and Business, from various departments and on various stages of their education. The survey was attended by 254 female students (61.5% of the total number of respondents) and 159 male students (38.5%).

A decided majority of the respondents (as much as 83%) described themselves as frequent users (with at least several visits each day); 11% reported one visit per day, with further 4% reporting several visits per week. Only 2% of the respondents reported their visits to be even less frequent than that. As for the use history (experience), nearly 70% of the respondents had their profiles active for 5 years or more, and nearly 25% of them – for 3 years.

Knowledge of Facebook functionality was declared by respondents to be at more than a satisfactory level. When asked about their knowledge of Facebook functions and operating specifics, nearly half of the students assessed it at a 'high' level, with 23% subscribing to the 'extensive' or 'very high' category. More than ¼ of the students (27%) described their knowledge of Facebook as 'satisfactory'. Analysing the results from the angle of users' declared intensity of social media use over the last 12 months, it may be observed that the responding students generally increase the intensity (number and time) of visits over time or at least maintain a similar level of activity – these two opinions were jointly subscribed to by more than 83% of the respondents. At the same time, it must be noted that more than 15% of the students reported a decrease in use intensity.

Questions regarding the assessment of satisfaction with individual Facebook attributes (features) played a key role in achieving the research objectives. These features result from the analysis of the McCall model and the SQuaRE document and are included in the developed social media users' satisfaction model (see: Fig. 1).

Thus, construed, individual attributes of Facebook were presented for student evaluation both in the context of their relative significance and the level of satisfaction attached to them by the respondents. The wealth of responses allowed for the estimation of CSI indexes both for the entire respondent population and for specific segments thereof based on such user characteristics as gender, frequency of use, fluency, experience, use intensity dynamics, and the number of friends on Facebook.

Calculation of the CSI index was done using the procedure described in sec. 3 of this paper. Tab. 1 presents detailed results of the index describing levels of satisfaction expressed by all 413 respondents participating in the study.

Table 1 : Satisfaction index values for the entire research sample (N = 413)

	Satisfaction attribute	Weighted rating	CSI
1	Usefulness	3.82	76.32%
2	Pleasure	3.50	70.06%
3	Comfort	3.79	75.86%
4	Reliability	3.19	63.86%
5	Error tolerance	3.54	70.82%
6	Efficiency	3.77	75.35%
7	The speed of completing tasks	3.85	76.98%
8	Safety for health and behavior	2.80	56.06%
9	Data protection / web security	2.13	42.60%
10	Trust	2.84	56.83%
11	Flexibility	3.62	72.34%
12	Ease of use	3.98	79.52%
13	Ease of learning	3.38	67.55%
14	Consistency	3.02	60.36%
15	Clarity	3.15	63.08%
	Average	**3.36**	**67.17%**

Source: Own study based on surveys

In accordance with the adopted CSI formula, a product of the relevant satisfaction level and the weighted values for 15 attributes was calculated for each student. The resulting values were then aggregated separately for each attribute to yield the corresponding weighted values for each such attribute. Since every attribute was evaluated on a 5-point scale (with 1 representing the lowest, and 5 – the highest score), the resulting indexes of satisfaction from the use of Facebook service were calculated as percentage values for all respondents – these are presented in column 3 of Tab. 1. Calculation of the CSI index for all respondents was done based on the averaged values of partial SCI indexes for those Facebook attributes deemed of significance upon the level of user satisfaction. The examination revealed the index to be at the level of 3.36 in the 5-degree scale, thus amounting to 67.17%. This is not a spectacular result by any means, but it can be seen as attesting to the moderate level of satisfaction displayed by the respondents from the use of the service.

In view of the above, it may be useful to separate those Facebook attributes which are received with satisfaction from the ones that receive the lowest scores. The resulting ranking of weighted evaluations for each of the analysed attributes of the portal is presented in Fig. 2.

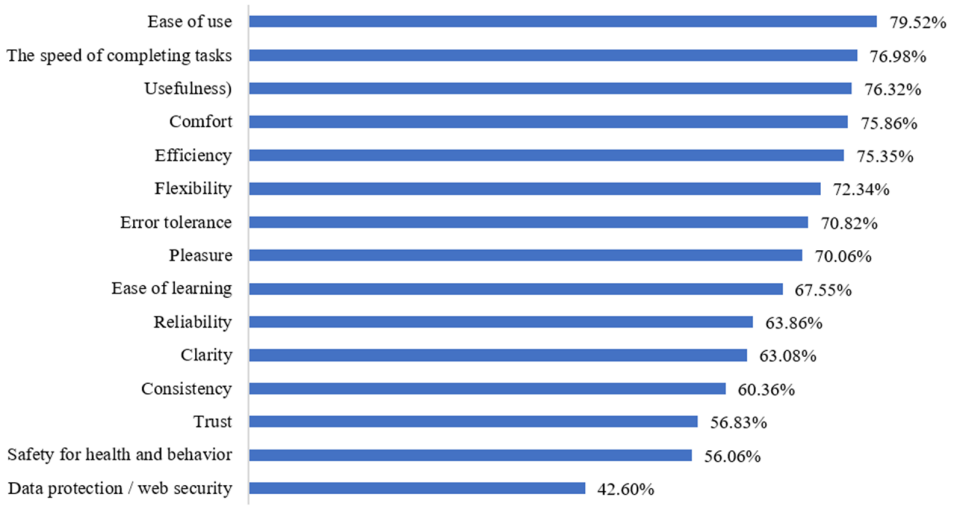

Fig. 2: CSI values for individual Facebook features in the opinion of all surveyed students
Source: Own study based on surveys

It may also be useful to confront the above ranking against information provided in response to a query of the most significant and the least important features of the studied service. The revealed significance of individual attributes is presented in Fig. 3. This approach allows for a reliable identification of Facebook's strengths and areas in need of improvement.

Results presented on both figures suggest that respondents attach great significance to such social media attributes as: speed in the realization of tasks, operational effectiveness, and ease of use. For Facebook, user satisfaction from these attributes was revealed to be fairly high. In particular, respondents were most satisfied from the ease of use, as attested by the corresponding CSI value of nearly 80%. High scores of 75%-77% were also registered in relation to such attributes as speed of operation, suitability for the tasks expected of the service, comfort of use, and operational effectiveness.

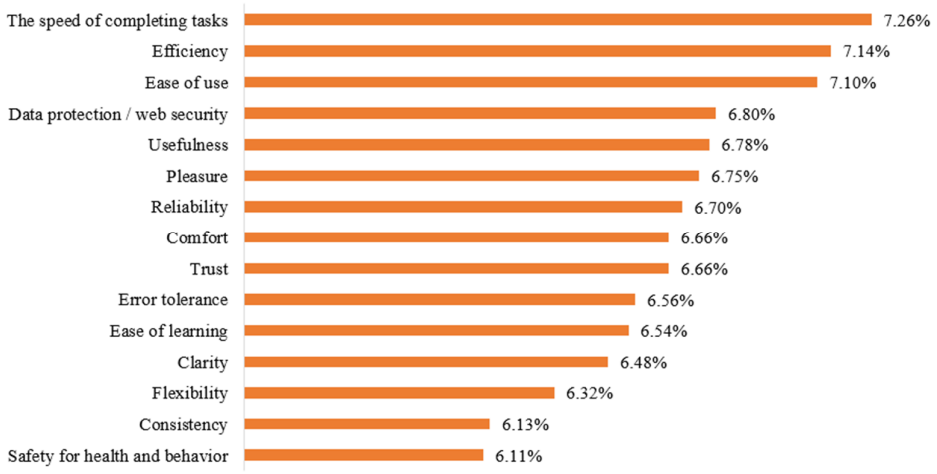

Fig. 3: The significance of individual features of Facebook in the opinion of all respondents
Source: Own study based on surveys

The fourth item in the respondents' ranking of attributes was related to protection of personal data – this clearly suggests that the participants placed great significance in securing their personal information from unauthorized use. The study revealed this aspect of Facebook to be one of the service's weakest points. As suggested by the results presented in Fig. 2, this particular attribute of the service received, on average, the lowest scores in terms of user satisfaction (with CSI at the level of 42.6%). This result signifies the urgent need for improvement. A decided majority of respondents (more than 70%) voiced their concern that the service could be seen as potentially detrimental to their online security and identity protection. At the same time, it must be noted that the opposite view was subscribed to by a marginal group (less than 7% of the respondents), as shown in Fig. 4.

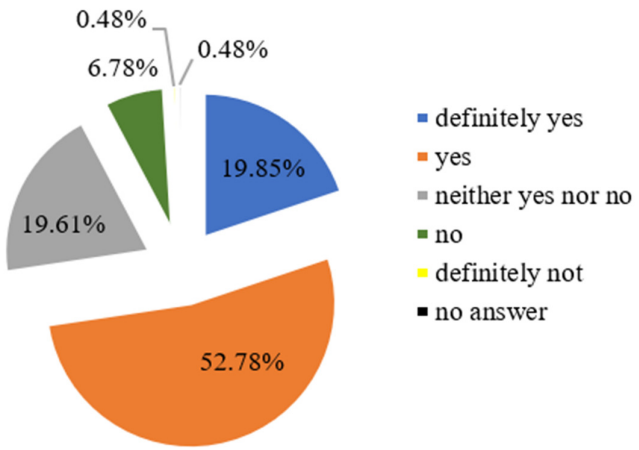

Fig. 4 : Distribution of answers to the question: "Do you think that the use of Facebook may have an adverse effect on your online security / privacy?"

Source: Own study based on surveys

In addition, the respondents were asked to voice main reasons behind their security and identity concerns. The study revealed that the main concern for the users was the potential 'leak' of personal details and private information placed with Facebook to the outside. This response was subscribed to by nearly ¾th of all respondents. Negative perception was also registered with relation to the use of personal information details by Facebook and the sale of such information to third parties for purposes associated with marketing and product advertisement. More than 40% of the respondents expressed their negative view on Facebook's tracking of user behavioural patterns and responses collected over the course of their visits. Other concerns voiced by respondents included the following: sale of personal details to intelligence services, insecurity of private files shared via Messenger, publication of profile content without the expressed user approval, the threat of unauthorized access to private profiles, and stalking via Facebook.

As suggested by the above findings, a decided majority of Facebook users express their concern for the inadequate level of security offered at present. This observation finds further confirmation in the fact that positive evaluations in this regard were alarmingly scarce. The results show that nearly 30% of the respondent students reported to be fairly distrustful of the service, with 5% more expressing their complete distrust. Ca. 45% of the respondents were impartial in this respect, and positive scores were only expressed by a fifth of the respondent base. The above conclusions are corroborated by the fact that the attribute of trust towards the service was ranked 13th (third lowest position), despite the confirmed high placement of the trust attribute in terms of significance attached by the users to the service under study. As shown in Fig. 3, trust was ranked eighth on the list of the most significant attributes expected of a social media service.

Coming back to the results presented in Figs. 2 and 3, it should be noted that the list of concerns voiced by the students is not limited to trust and personal protection issues, as many users were genuinely concerned for the impact of social media services on their health and behaviour. While it is true that this particular aspect was ranked well below that of the service security (see: Fig. 3), this does not change the fact that the item received the second lowest ranking in terms of reported user satisfaction. Results show that the most important problem in this respect is the concern for the disrupting effect of Facebook upon other tasks and assignments. Nearly as many students also expressed their belief that the service offered by Facebook might have an addictive effect on users.

In relation to health issues, nearly a fourth of the respondents reported problems with concentration generated by the use of Facebook service, while 11% subscribed to having headaches related to Facebook visits. Other responses in this section included such negative effects as: deterioration of

personal relations with relatives, reduction of more active forms of diversion and interest, deterioration of social ties, anxiety, overstrain and exhaustion, time wastage, and vision problems.

Conclusions

The article emphasizes, that the condition for a correct estimation of the level of user satisfaction of social software is primarily the definition of a set of detailed attributes describing its quality. A set of such attributes was proposed by the author based on the analysis of software quality models, with particular emphasis on features relevant to end users. The presented research method is based on the use of the CSI customer satisfaction index, determination of which was possible due to the users' assessment of their satisfaction with the detailed features of the social networking site.

The proposed method of user satisfaction measurement has been tested on a university research group. The majority of respondents were long-term Facebook users. They can be defined as advanced or intermediate users when it comes to their knowledge of website functions. Taking into account the frequency of using the website, it was at a high level. Respondents declared that they visit the website regularly. However, in the case of about 15% of respondents, dissatisfaction with the website was visible and was reflected in the decrease in the number of their visits.

The answers given by the respondents were the basis for calculating the overall CSI satisfaction index from Facebook use, which was described by 15 previously distinguished features of the website. These features more or less affect the perceived satisfaction of users. The overall value of the index was 67.17%, which is quite a good result, however, it cannot be considered exceptionally high. It should be noted that 9 out of 15 satisfaction attributes that were rated by respondents, scored higher than the overall CSI index, while the remaining 6 scored lower. The final result was also influenced by the significance level of individual attributes for the surveyed users.

In particular, it refers to the data protection / web security attribute, which was considered the fourth most important attribute for the respondents, yet obtained the worst result within the CSI partial index. Users were particularly afraid of the "leakage" of their personal data to the Internet, the use of private data and photos by the portal, and their sale for marketing purposes. This shows that in this area Facebook in particular can look for a way to improve user satisfaction by providing a much higher level of personal data protection and online security.

The attribute related to the health/behavior problems was also given a very low rating. It obtained the second worst result among the CSI partial indicators. This means that respondents were aware of the fact that regular use of the site, not only affects their work efficiency and concentration negatively but can even causes an addiction. However, from the point of view of overall satisfaction from using the website, it was not of a key importance because the respondents considered that the significance of the listed problems is very small.

It should also be noted that Facebook's other weaknesses were its consistency in interface design and overall transparency. The low values of CSI indicators for these features indicate that the website's visual side did not satisfy the respondents.

On the other hand, it can be seen that the main advantages of Facebook are its functional features, such as ease of use, speed of task completion and the general suitability of the website for users' purposes and needs. These attributes achieved the best CSI partial results and were highly significant to respondents.

To sum up, the research based on the proposed social media users' satisfaction model allowed for a transparent illustration of Facebook's strengths and weaknesses, from the point of view of satisfaction felt by its users. This type of research should therefore be carried out by various social networking sites because they allow for the identification of existing problems and can be the basis for corrective actions. On the other hand, it is possible to determine future directions of website development based on

information about which areas and functionalities of the website meet the needs of users to the greatest extent and most strongly affect their satisfaction of use.

An important issue in conducting satisfaction surveys using the CSI indicator is also the need to carry them out in different periods of time, e.g. in the following months or before and after the work optimization within a given social networking site. Only then it is possible to determine the actual effects of the implemented modifications for end users and to plan further actions of this type.

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Evolution of the Romanian Trade with Agro-Food Products between 2010 and 2019

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Abstract

This paper aimed to analyse the evolution of the Romanian trade with agro-food products in the last decade. Romania was a net importing country for almost all this period, with few exceptions in 2013 and 2014 when the trade balance with agro-food products was positive. The Romanian trade with agro-food products had an upward trend between 2010 and 2019, but the deficit increased up to 1,394,099 thousand US $ in 2019. During the 2010-2019 period, Romania recorded surpluses only for 6 out of the 24 groups of marketed agricultural products: cereals; oil seeds and fruits; tobacco; live animals; animals or vegetable fats and oils; and vegetable plaiting materials. The deficit was significant mainly for the meat group, for which Romania made significant imports. The paper is based on specific trade indicators, and used data provided by International Trade Centre.

Keywords: Agro-Food Products, Romania, Trade

Introduction

Recent statistic on the evolution of EU 28 Agro-Food Trade (European Commission, 2019) underlined the EU's position as the largest global exporter and second largest importer of agro-food products, while the impact of UK Brexit seems not have a major impact on EU trade with the rest of the world, which continued to grow (European Commission, 2020). While the contribution of agriculture in Romania's GDP is significant (Popescu, 2013) and grew in the last decade (INSSE, 2020), Romania didn't succeed - with few years of exception, as Beciu (2017) and Arghiroiu (2015) mentioned- in its effort to became a net exporter of agro-food products.

In the last decade only few categories of Romanian agro-food products proved to be competitive in the international trade with these products that are imported mainly from the EU countries.

The largest distribution chains which control the market and which is based abroad, seems not to help Romanian producers in gaining a stronger position on the market. Even if the Romanian has significant agricultural surfaces, the Romanian agro-foods products can hardly gain sectors on market. A new marketing method misleads buyers who want to buy products made in their own country. Many agro-foods products are imported from abroad but they are packed in Romania, often in regions that are well known for their Romanian traditional products. The importing companies which are settled in one or other famous production areas for a particular product use their name clearly specified on the package, but make it difficult to read the origin of the product. The imports are encouraged by the lower prices of the most of agro-food imported products, but often the quality of similar products is not enough considered in their choice on their buying. While imported exotic fruits and some vegetables justify their selling on the market other agro-food products which are produced in enough quantities to cover the internal products can hardly explain their selling on the Romanian market, especially in conditions of abundance of similar Romanian products. One of the

vulnerable Romanian sectors is the livestock sector. Difficult adaptation of this sector to the EU legislation, its low production efficiency, the limited financial support by the state and the sanitary crises as African swine fever and bird flu led to the situation in which Romania became a net importer of meat products.

Results and Discussions

From the analyse of the 2010-2019 period (Fig.1.) we can notice that Romania had a positive balance in the trade with agro-food balance in 2013 and 2014 only. The Romanian trade with agro-food products had an upward trend between 2010 and 2019, but the deficit increased up to 1,394,099 thousand US $ in 2019. While the imports of agro-food products increased from 5,032,082 to 9,589,605 thousand US $ from 2010 to 2019, the exports increased from 4,051,120 to 8,195,506 thousand US $ in the same period of time.

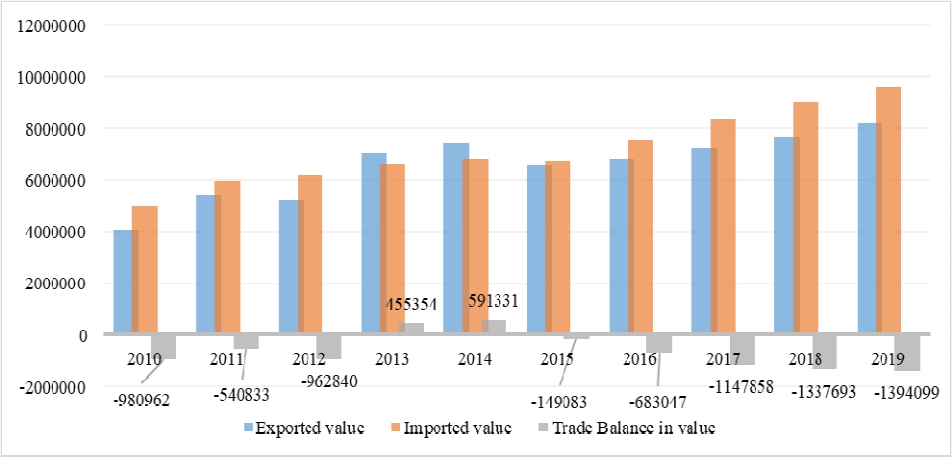

Fig. 1: Trade evolution with agro-food products in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre

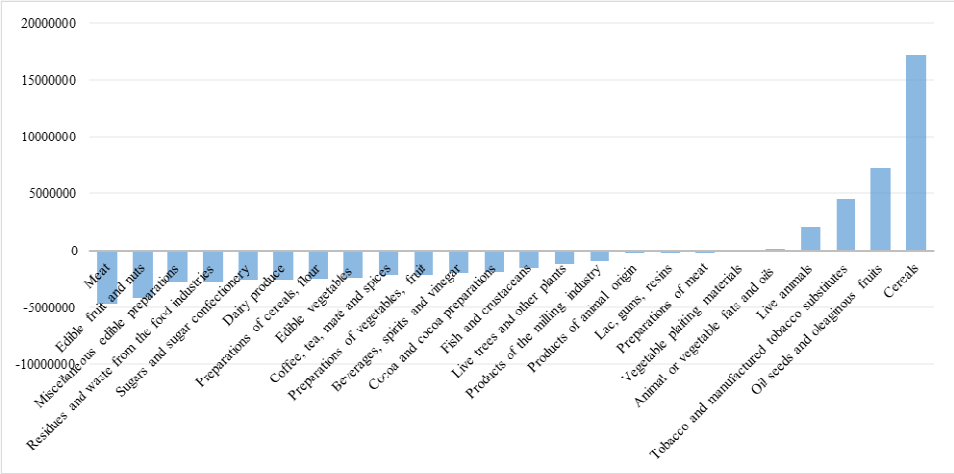

Fig. 2: Main sold of the agro-food groups cumulated in the period of 2010-2019 (US Dollar thousand) Source: Own calculations based on International Trade Centre data

From the analyse of the cumulated sold for each agro-food groups in the period of 2010-2019 the results indicated (Fig.2) that during the 2010-2019 period Romania recorded surpluses only for 6 out of the 24 groups of marketed agricultural products: cereals; oil seeds and fruits; tobacco; live animals; animals or vegetable fats and oils; and vegetable plaiting materials, the deficit being significant mainly for the meat group, for which Romania made significant imports.

In the figure 3 is showed the dynamics of the live animal group for the 2010-2019 period. Being one of the surplus groups, it can be noticed that for the entire period analysed, export values exceed those of imports, creating a surplus balance, with the maximum coverage of the imports by the exports in 2011 of 262 % and a minim of 168% in 2013. In 2019 Romania exported a value of 497,395 thousand $ for the category of live animals, while the imports reached a level of 209,397 thousand $.

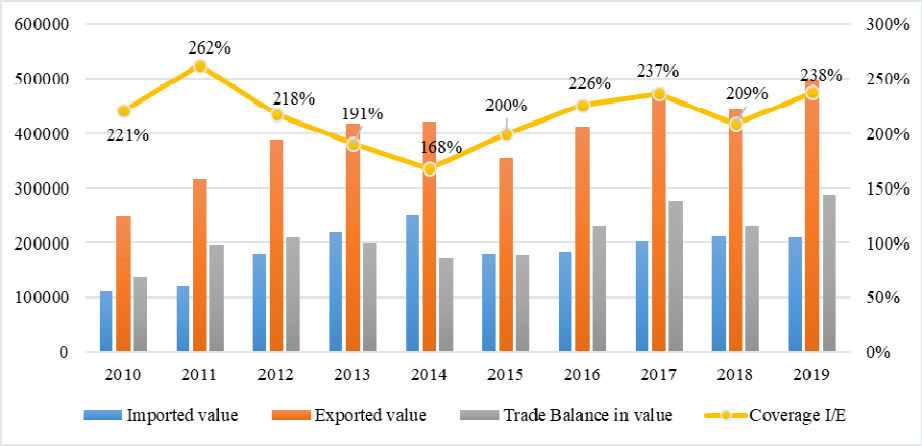

Fig. 3: Trade evolution and coverage of imports by exports for live animals in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

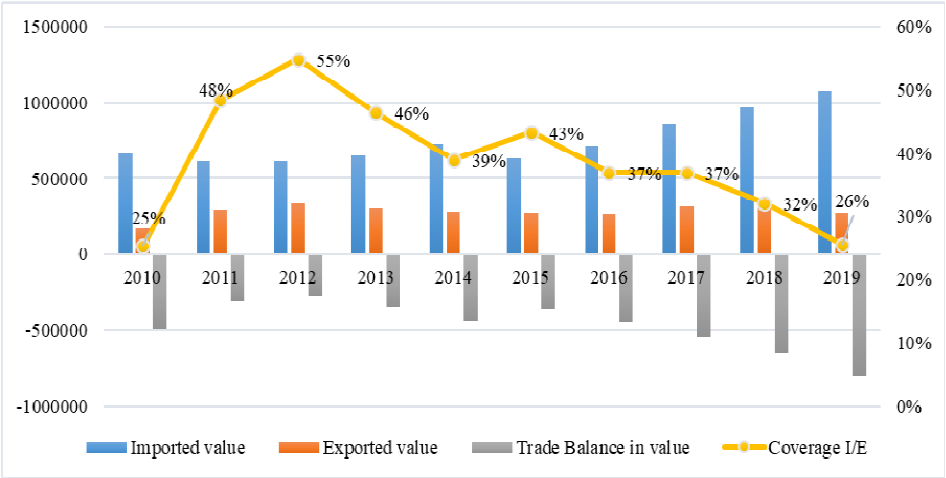

Fig. 4 : Trade evolution and coverage of imports by exports for meat and edible meat offal in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

Romanian trade with agro-food products is in deficit mainly for the meat group of agro-food products. The figure 4 presents the evolution for the meat and edible meat offal group and indicate that in 2019 the coverage of the imports by the exports was only by 26 % in 2019, almost similar with

the beginning of the period, and the highest level was reached in 2011, by 55 %. The decrease of coverage level of imports by exports from 2018 and 2019 is associated with the impact of African Swine Fever which decimated the numbers of pigs in Romania.

Concerning the agro-food product group, fish, it can be seen that Romania is also deficient and the value of the balance followed the negative trend from year to year, reaching in 2018 a balance of -208,848 thousand $, corresponding with a coverage level of fish imports by exports of 12 %. (Figure 5).

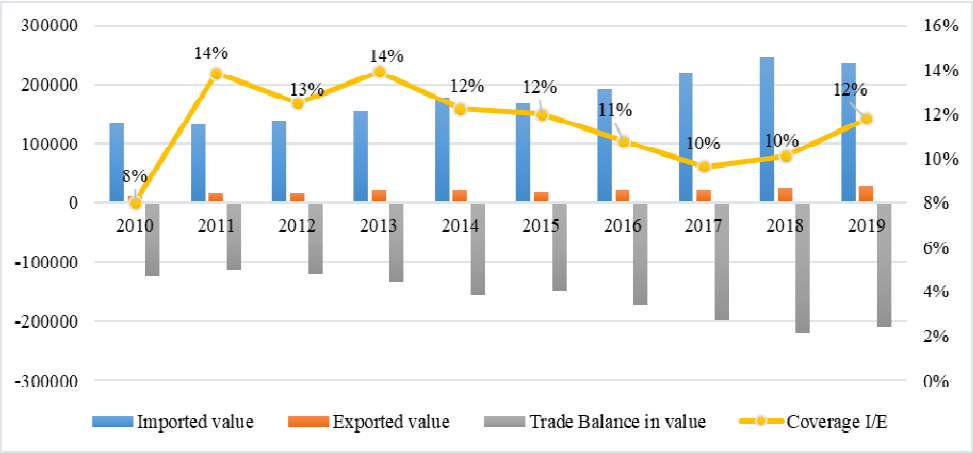

Fig. 5 : Trade evolution and coverage of imports by exports for fish and crustaceans, molluscs and other aquatic invertebrates in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

The evolution of the dairy trade is represented in figure 6, where it can be seen that the deficit increased compared to 2010, reaching maximum values in 2019, of 421,882 thousand $, corresponding to a coverage level of imports by exports of 36 %. The internal milk production doesn`t cover the internal milk consumption in Romania, due to very low yields recorded per cow, compared to the other EU state members. (Popescu and co., 2019)

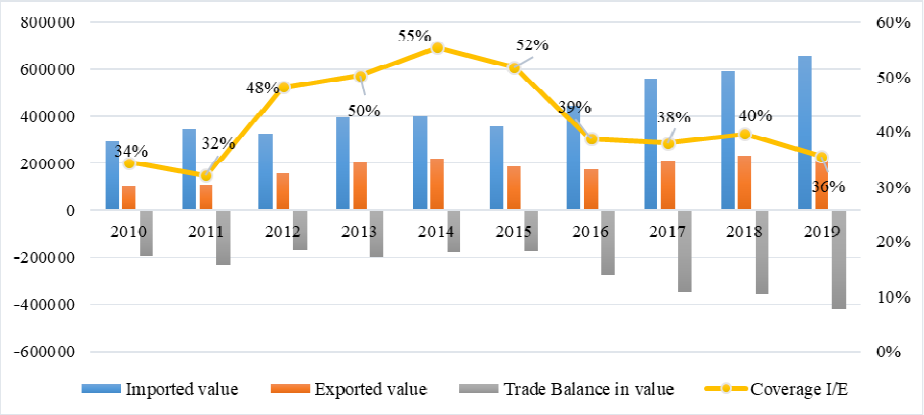

Fig. 6 : Trade evolution and coverage of imports by exports dairy produce; birds' eggs; natural honey; edible products of animal origin in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

The evolution of the other products of animal origin indicated a decrease of coverage of imports by exports from 80 % in 2013 to 47 % in 2019. In 2019 the trade balance recorded the highest deficit from the last decade, of 42,250 thousand $ for this category of products (Fig.7)

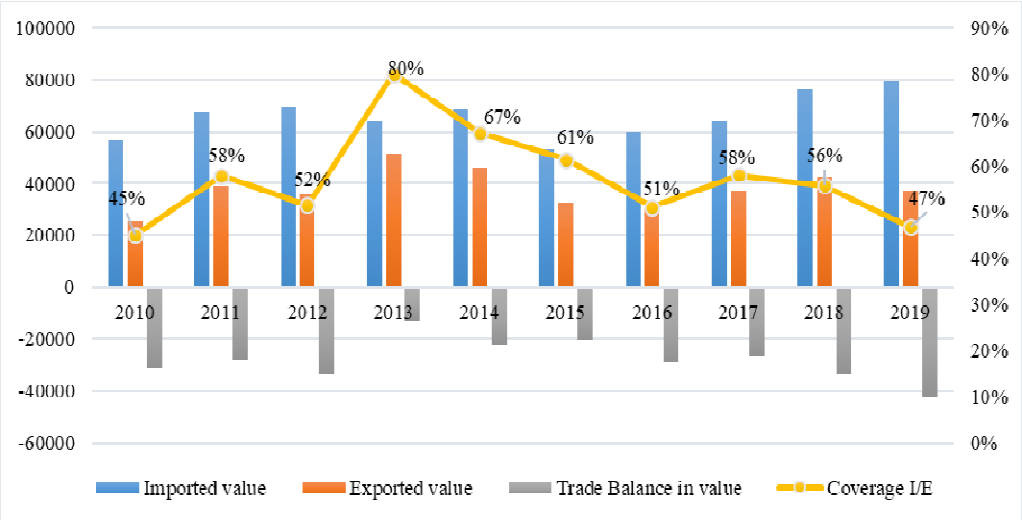

Fig. 7 : Trade evolution and coverage of imports by exports for products of animal origin, not elsewhere specified or included in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

Few products from the category: live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage are exported by Romania, so the coverage level of imports by exports fluctuated between 2 % in 2018 and 2019 and 5 % in 2012 and 2013 (Fig.8). In 2019 the trade balance for these products recorded a deficit of 169,370 thousand $.

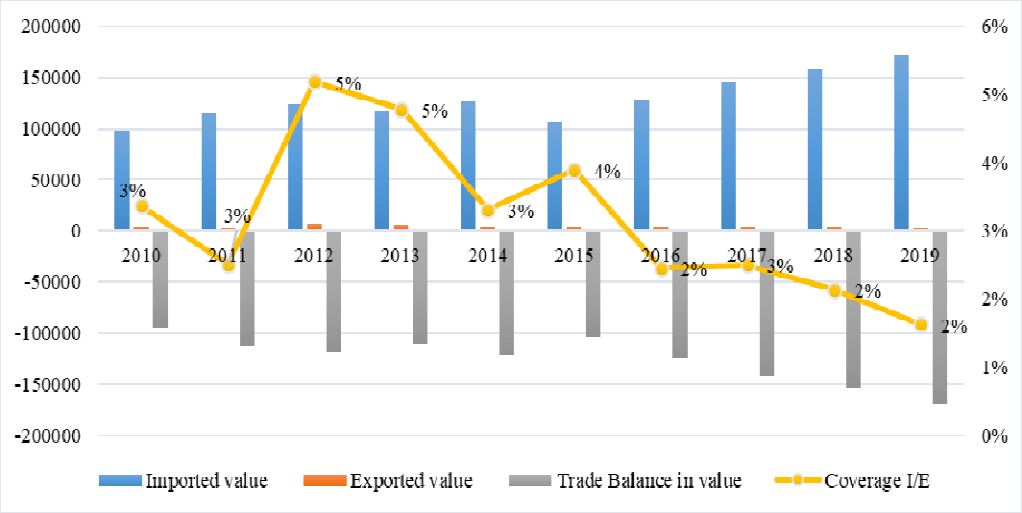

Fig. 8: Trade evolution and coverage of imports by exports for live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

The coverage level of imports by exports for the edible vegetables and certain roots and tubers in the period of 2010 – 2019 decreased from 43 % in 2010 to 19 % in 2019 (Fig.9), when the trade balance for these products recorded the highest deficit, of 478,409 thousand $.

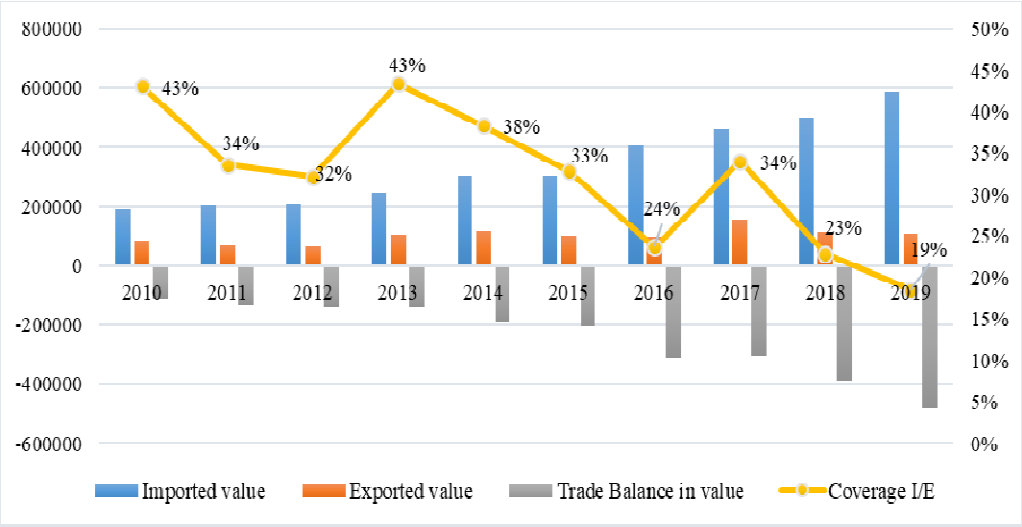

Fig. 9 : Trade evolution and coverage of imports by exports for edible vegetables and certain roots and tubers in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

The coverage level of imports by exports for the edible fruit and nuts; peel of citrus fruit or melons in the period of 2010 – 2019 decreased from 37 % in 2011 to 9 % in 2019 (Fig.10), when the trade balance for these products recorded a deficit of 674,620 thousand $, but in 2018 the deficit was higher, of 676,921 thousand $.

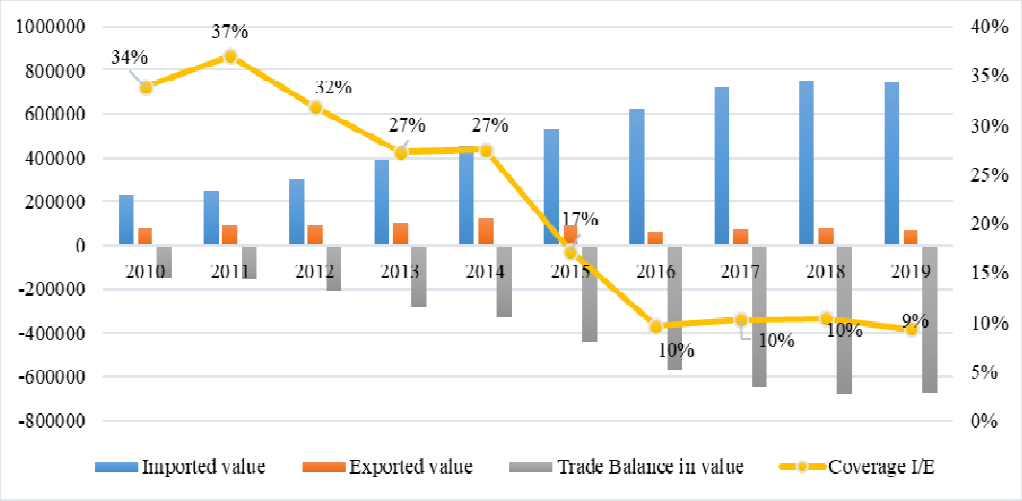

Fig. 10 : Trade evolution and coverage of imports by exports for edible fruit and nuts; peel of citrus fruit or melons in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

The level of Romanian exports for the category: coffee, tea, mate and spices is low, so the coverage level of imports by exports fluctuated between 8 % in 2010 and 2011, and 11 % in 2017 and 2019 (Fig.11). In 2019 the trade balance for these products recorded a deficit of 256,112 thousand $.

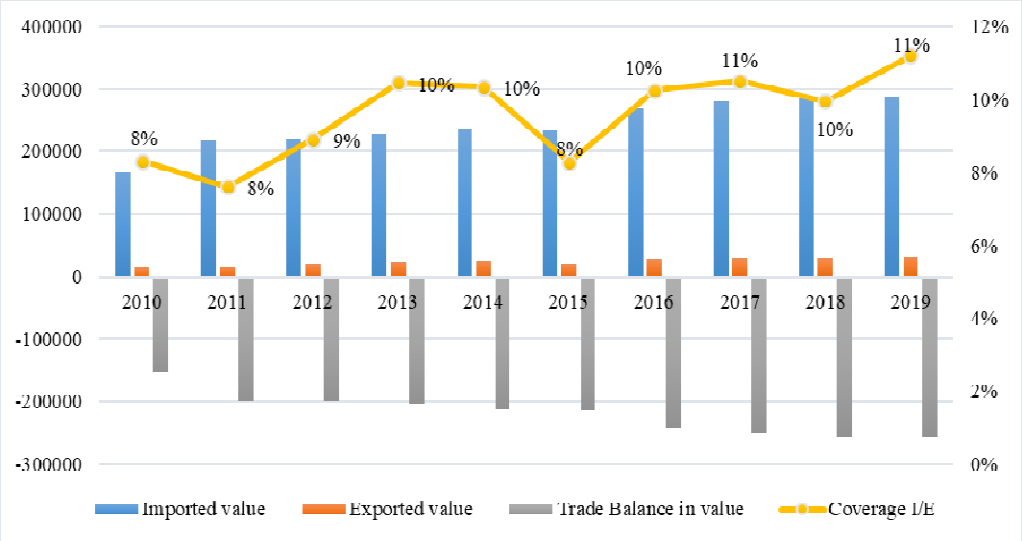

Fig. 11 : Trade evolution and coverage of imports by exports for coffee, tea, mate and spices in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

Cereals are the main group for which Romania has managed to achieve a surplus trade balance. (Fig.12). In the last decade the level of coverage of imports by exports increased from 326 % in 2011 up to 670 % in 2018. In 2019 Romania was the main exporter of cereals from EU (mainly maize and wheat), having as destination countries from EU as Spain and Italy but also countries from outside EU as Turkey, Egypt, Lybia or Morroco. In 2019 the trade balance recorded the highest surplus from the last decade, of 2,493,958 thousand $ for this category of products.

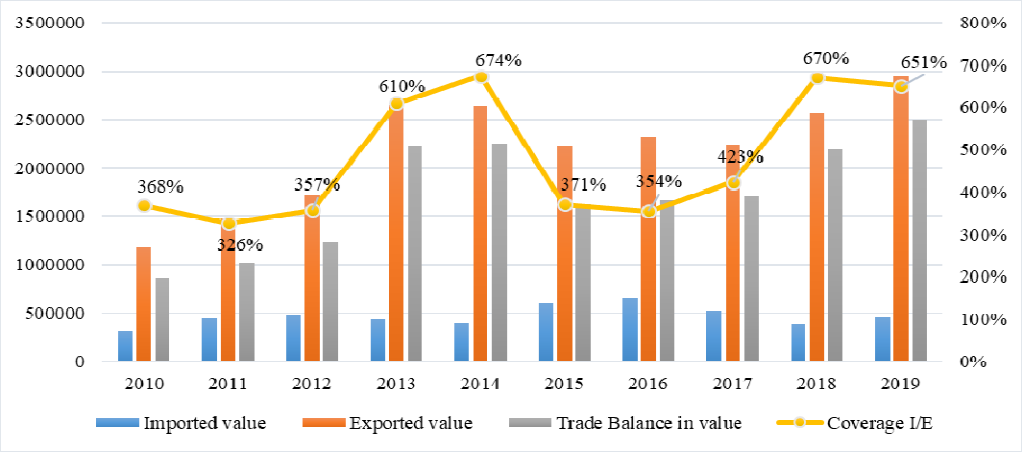

Fig. 12 : Trade evolution and coverage of imports by exports for cereals in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

The level of Romanian exports for the category: milling industry; malt; starches; inulin; wheat gluten is low, so the coverage level of imports by exports fluctuated between 26 % in 2016 and 13 % in

2014 and 2018 (Fig.13). In 2019 the trade balance for these products recorded a deficit of 110,244 thousand $.

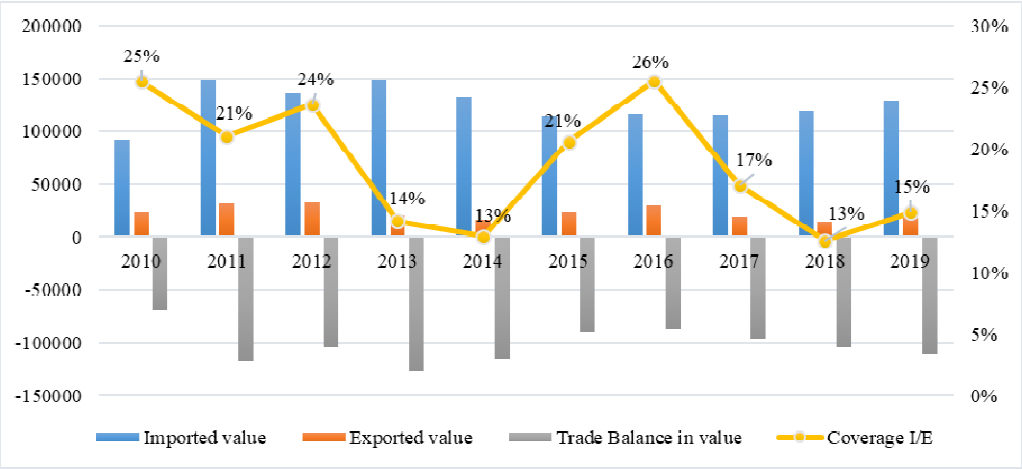

Fig. 13 : Trade evolution and coverage of imports by exports for products of the milling industry; malt; starches; inulin; wheat gluten in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

The group of seeds and fruits of oilseeds is the second group for which Romania registered a trade surplus, as can be seen in the figure 14. The increase in demand for oilseeds is based on their processing into vegetable oils, stimulated by the world population growth, but also for feed purpose or for transformation into biofuels. In the last decade the level of coverage of imports by exports increased from 182 % in 2012 up to 362 % in 2016. In the 2019, the coverage level was about 273 %, corresponding with a surplus of 781,343 thousand $, but the highest surplus was recorded in 2018, of 922,597 thousand $.

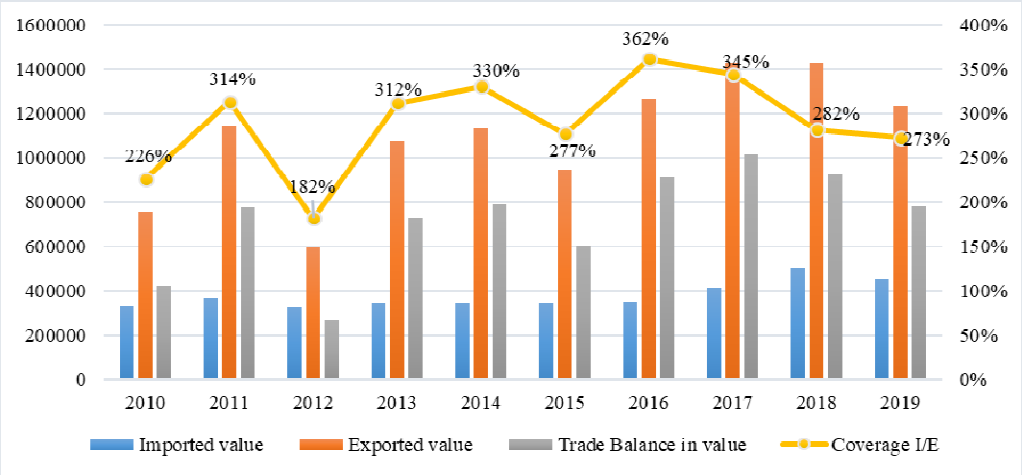

Fig. 14 : Trade evolution and coverage of imports by exports for oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

As regarding the lac; gums, resins and other vegetable saps and extracts group of products, it can be seen that Romania is also deficient and the value of the balance followed the negative trend from year

to year, reaching in 2019 a balance of -30,560 thousand $, corresponding with a coverage level of imports by exports of 5 %. (Figure 15).

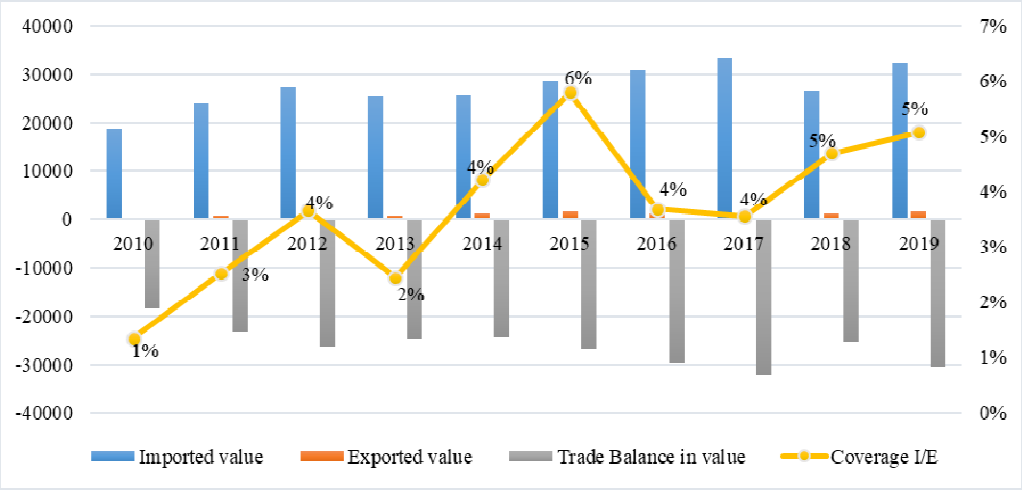

Fig. 15 : Trade evolution and coverage of imports by exports for lac; gums, resins and other vegetable saps and extracts in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

For the group of vegetable plaiting materials; vegetable products not elsewhere specified or included in the analysed period (Fig 16.), Romania was either in the position of net exporter or net importer. In 2019 the coverage of the imports by the exports for this group of products was 74 %, but in 2014 the coverage level was around 158 %.

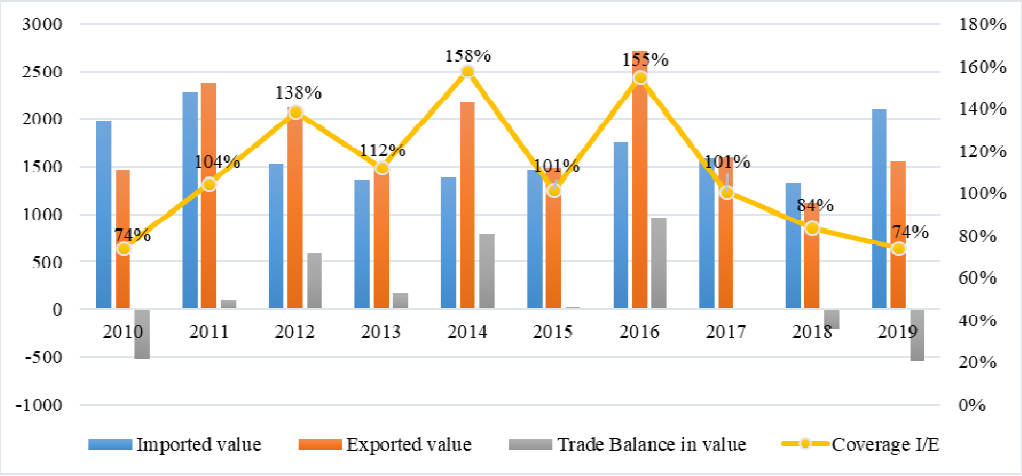

Fig. 16 : Trade evolution and coverage of imports by exports for vegetable plaiting materials; vegetable products not elsewhere specified or included in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

If at the beginning of analysed period, the coverage level of imports by exports for animal or vegetable fats and oils and their cleavage products and prepared edible fats was low (76 % in 2010 and 77 % in 2012), in 2018 this level increased up to 130 % and 129 % in 2019, the surplus recording in the last year of period around 57,603 thousand $.

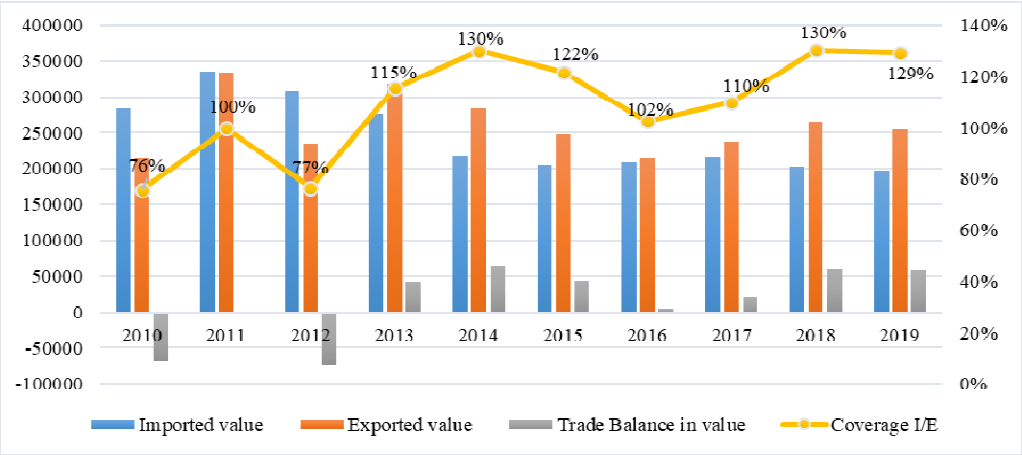

Fig. 17 : Trade evolution and coverage of imports by exports for animal or vegetable fats and oils and their cleavage products; prepared edible fats in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

The data of Romanian trade with preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates in the period of 2010 – 2019 (Fig. 18) indicated that only in 2013 the imports were covered by exports. In 2019 only 73 % of the imports were covered by exports and the deficit was about 76,047 thousand $.

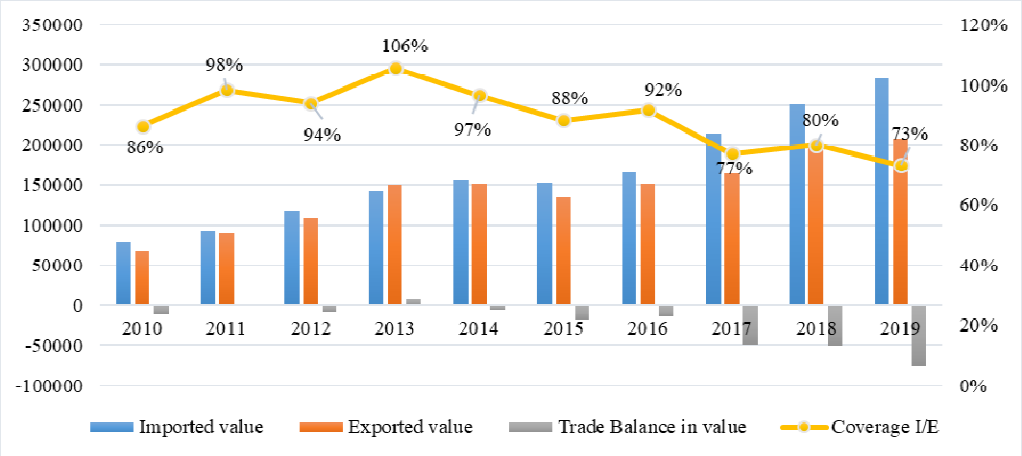

Fig. 18 : Trade evolution and coverage of imports by exports for preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

The coverage level of the exports by imports for the group: sugars and sugar confectionery in Romania between 2010 and 2019 was very low and it varied between 13 % in 2019 and 38 % in 2010 and 2014 (Fig.19). Only three enterprises are still producing sugar on the local market and only 22,4 thousand hectares were still cultivated with sugar beet in 2019.

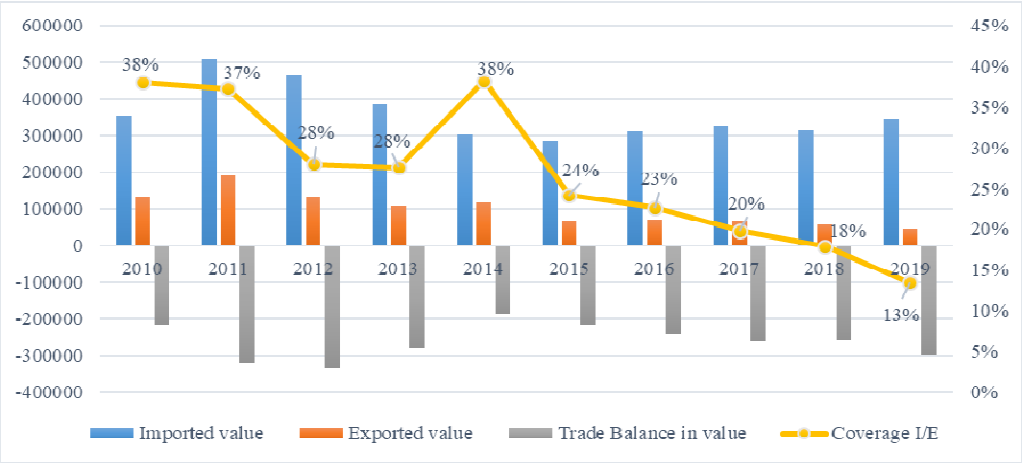

Fig. 19: Trade evolution and coverage of imports by exports for sugars and sugar confectionery in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

The export of Romania in terms of cocoa and cocoa preparation indicates (Fig.20) that Romania import raw material related with this group of products and resell on the international market.

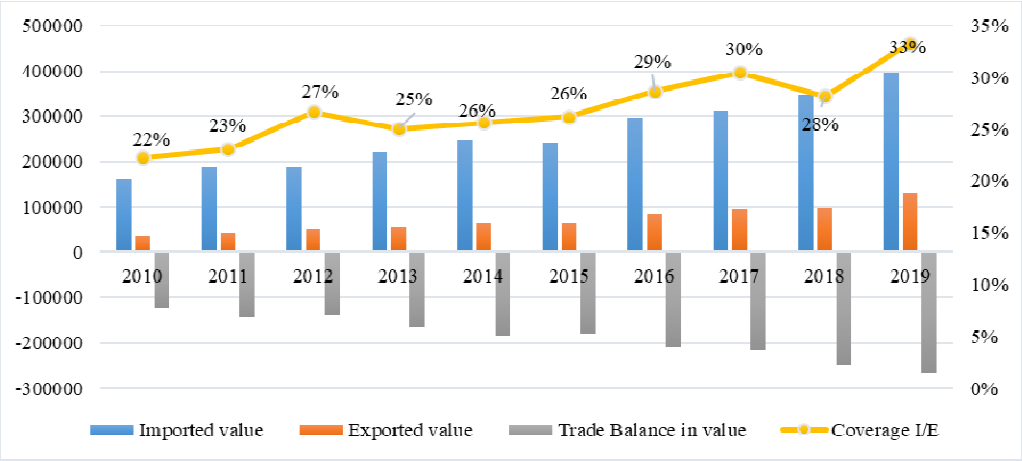

Fig. 20: Trade evolution and coverage of imports by exports for cocoa and cocoa preparations in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

As regarding the preparations of cereals, flour, starch or milk; pastry cooks' group of products, it can be seen that Romania is also deficient and the coverage level of imports by exports oscillated between 30 % in 2010 and 40 % in 2019 (Figure 21). In 2019 Romania had a deficit of 376,468 thousand $ for this group of products.

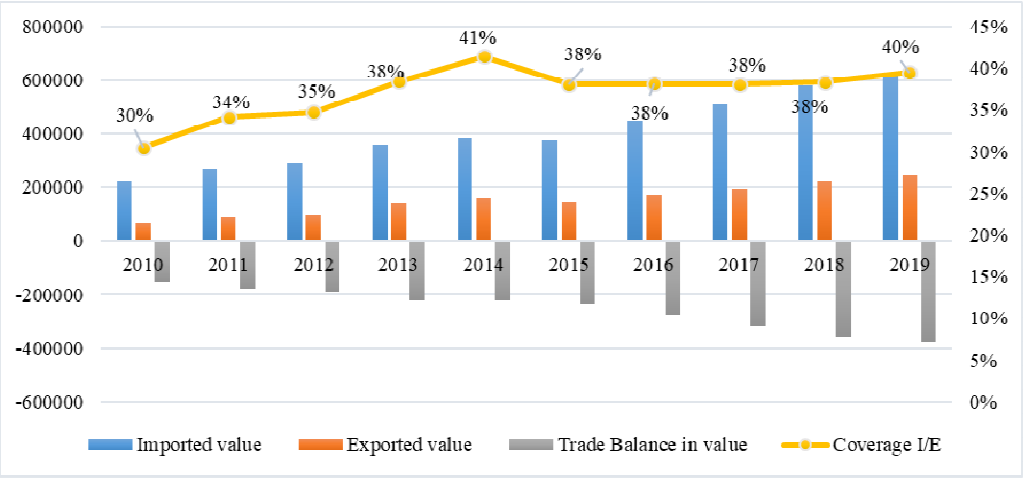

Fig. 21: Trade evolution and coverage of imports by exports for preparations of cereals, flour, starch or milk; pastry cooks' products in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

The coverage level of the imports by exports for the group: preparations of vegetables, fruit, nuts or other parts of plants in Romania between 2010 and 2019 was also very low and it varied between 18 % in 2019 and 28 % in 2012. (Fig.22). In 2019 Romania had a deficit of 350,236 thousand $ for this group of products.

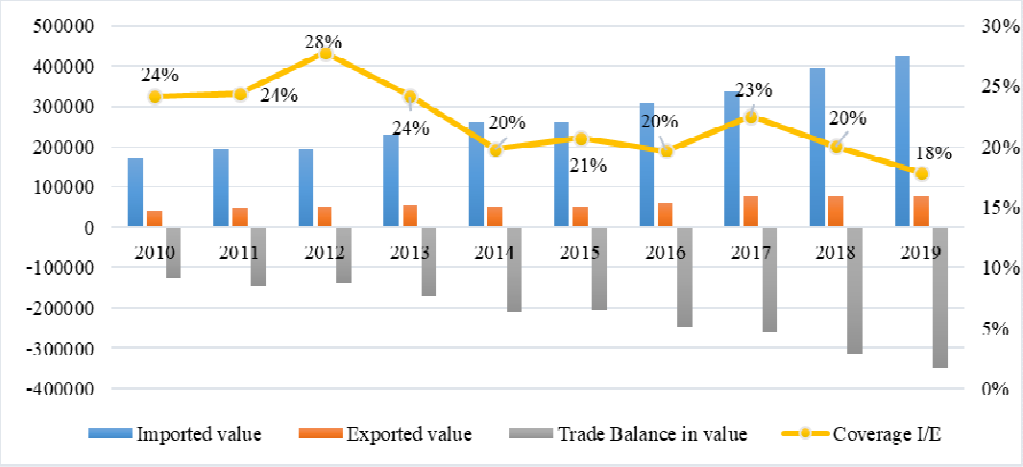

Fig. 22: Trade evolution and coverage of imports by exports for preparations of vegetables, fruit, nuts or other parts of plants in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

The coverage level of the imports by exports for the group: miscellaneous edible preparations in Romania between 2010 and 2019 varied between 29 % in 2010 and 41 % in 2016. (Fig.23). In 2019 Romania had a deficit of 412,155 thousand $ for this group of products.

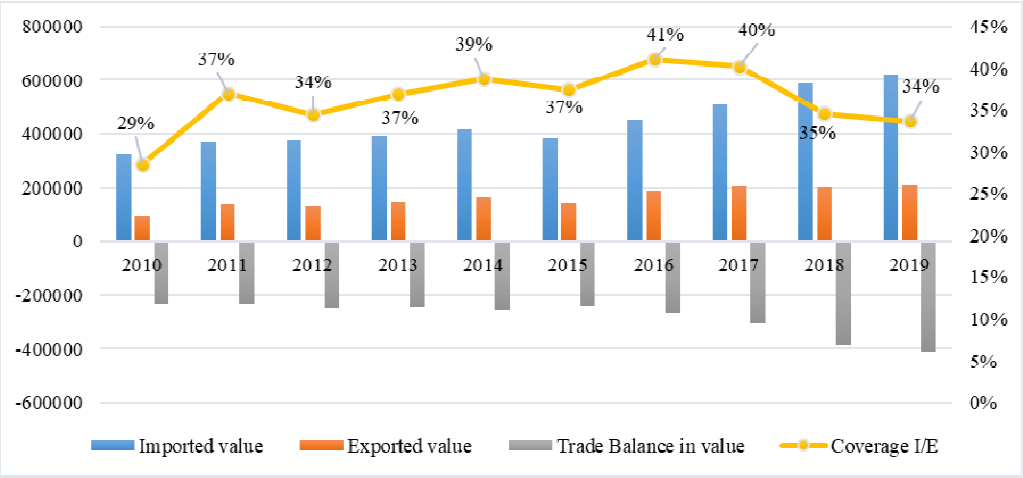

Fig. 23: Trade evolution and coverage of imports by exports for miscellaneous edible preparations in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

Even if Romania is an important producer for beverages, spirits and vinegar, in the period of 2010 – 2019 the coverage of imports by exports for these products decreased from 60 % in 2010 to 33% in 2019. (Fig. 24) In 2019 the balance deficit for these products was 374,819 thousand $.

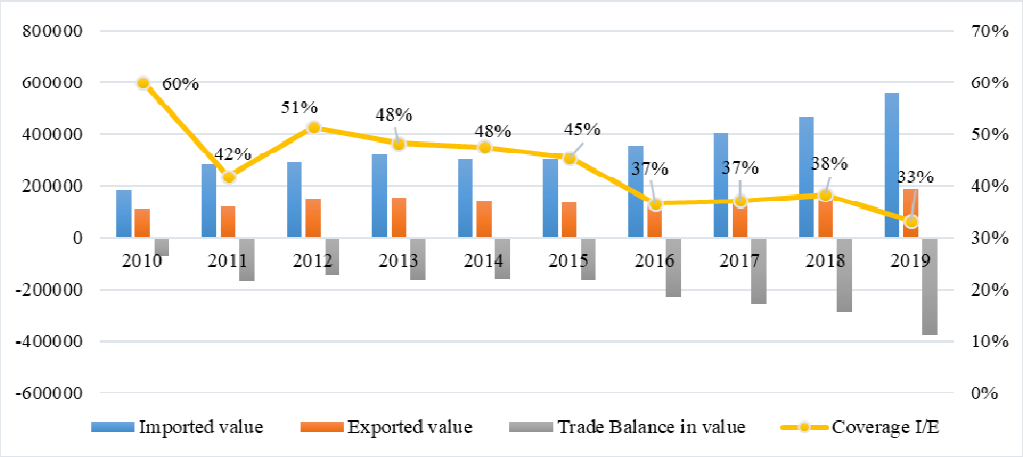

Fig. 24: Trade evolution and coverage of imports by exports for beverages, spirits and vinegar in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

The coverage level of the imports by exports for the group: residues and waste from the food industries; prepared animal fodder in Romania between 2010 and 2019 was also low and it varied between 27 % in 2010 and 45 % in 2019. (Fig.25). In 2019 Romania had a deficit of 336,014 thousand $ for this group of products.

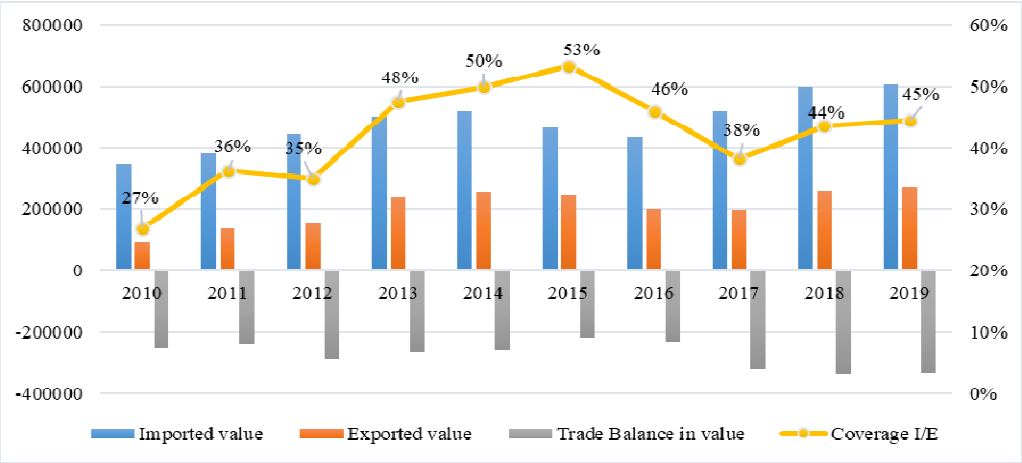

Fig. 25: Trade evolution and coverage of imports by exports for residues and waste from the food industries; prepared animal fodder in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

The present of one of the top leaders, the British American Tobacco in Ploiesti - Romania is the explication of the positive Romanian trade balance for the tobacco products, which export tobacco in almost 50 world countries.

In 2019 the coverage of imports by exports for tobacco and manufactured tobacco went up to 260 %, based on an export of 1,080,477 thousand $.

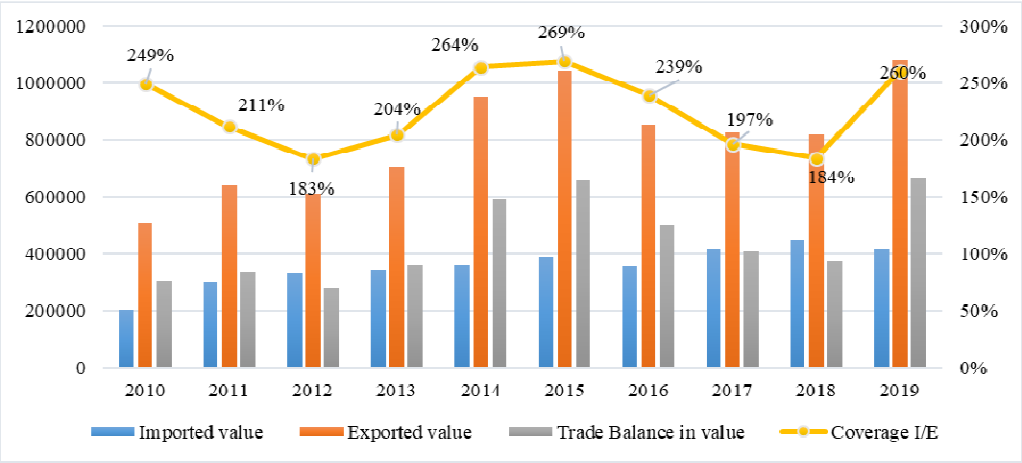

Fig. 26: Trade evolution and coverage of imports by exports for tobacco and manufactured tobacco substitutes in the period of 2010 – 2019 (US Dollar thousand) Source: International Trade Centre and own calculations

Conclusions

Based on the analysis it was found that in terms of food products, Romania recorded trade deficit in the last decade with few exception (2013 and 2014). In 2019, besides the "Cereals" and "Oilseeds" group, the surplus existed only for the groups "Tobacco", "Live animals", "Animals or vegetable fats and oils" and "Vegetable plaiting materials". The meat and edible meat offal group is the mainly

deficient group of trade. In 2018 and 2019 Romania was affected by African Swine Fever which caused the increase of meat imports.

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Building A Company's Relations with Its Employees – Components of The Personnel Policy of Polish Business Leaders

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Abstract

The study presents the results of research conducted among Polish business leaders. The market situation of relevant companies was characterised against the background of competition, allowing the identification of conditions that form the framework of activities undertaken in terms of the establishment and maintenance of relations in the internal community. The main research problem was an answer to the question, do companies undertake the indicated activities to reinforce the employees' bond with the company, and do they support the establishment of informal relations between employees. The self-assessment of the companies' position on the market, their financial and asset situations and their development and innovation level allows the conclusion that it seems substantiated that one should find themselves in the group of Polish business leaders. The analysed enterprises seem to be in stable positions, suggesting that in terms of the employee-organization relationship, such enterprises are more keen to financially and organisationally engage themselves in work aimed at the reinforcement of the internal work community. It was expected that the studied enterprises exercise engagement in activities related to employee integration. However, in half of the relevant enterprises, no such activities were conducted. Among the others, the activities most commonly undertaken was to support joint activities of employees and their families, organisation of employee sports teams and encouragement to do volunteer work jointly. In terms of the issue whether relations between employees at the work place should be exclusively professional, and only then informal – formal relations dominated in the majority of enterprises.

Keywords: Company's Relations with Employees, Internal Marketing, Social Exchange, Psychological Contract

Introduction

From the point of view of managing an organisation, the most demanding and at the same time the fundamental component of its operation is the social reality. People, acting within a specific cultural framework, within the scope of their social capital, shall by way of their behaviour generate results, the beneficiary of which will be the entity that employs them. The management of a social system is the more difficult that conditions influencing the participants in an organisation are frequently indirect, and standards of behaviour created by work colleagues function as an example to be followed, which can be both positive as well as negative. Human resources operating within a specific social environment tend do create a specific quality of work. Hence, all processes taking place within a company depend on the people. An example is the problem of implementation of the Lean Management concept, the efficiency of which is sensitive to social and cultural conditions, including education levels, life style, the awareness of rights and obligations, intensity of religious beliefs, social norms, the work ethic (Baskiewicz 2019, pp. 13731-13739). In terms of personnel policy, taken into account must be the fact that relations are an integral component of employees' daily lives at the workplace. The functionality of the practical application of knowledge about relations stems from their influence on the achieved results and the fulfilment of individual and collective needs. The complexity of the phenomenon and the research conditions of the societal reality that relations are may be explored among others through the human resources management theory (Golnau, Kalinowski, Litwin 2002), the perspective of an organisation's social capital (Kukowska 2013, pp. 145-149; Kukowska, Skolik 2013, pp. 140-144; Kukowska, Skolik 2013, pp. 20-34) and relational capital (Boyatzis, Rochford 2020; Żukowska, Kołodziejczyk, Mechło 2018 pp. 9-21).

From the point of view of management of a company and its labour resources, employee relations are of significance primarily within the context of their influence on employee efficiency and on the level of their identification with the company, which thanks to loyal, cooperating employees saves on costs stemming from personnel fluctuations. The issue remains open, whether the employee is, in practice, a resource or an engaged entity that may satisfy their basic needs of relations at the work place? The present study shows the results of analyses of the issue of activities in this regard by companies that became Polish business leaders. On the basis of a self-assessment of the enterprise's situation on the market as compared to the competition, the studied companies were described, permitting the identification of conditions, on the basis of which the relations between employees and organizations emerge. An attempt was made at identification of such activities undertaken within the scope of establishment of such relations.

Literature Review

It is complicated to comprehend what employee relations are, the topic covers in fact very diverse issues. They include legal aspects, meaning, acts of law governing employment (contracts concerning remuneration, practices and employment conditions), collective negotiations and disputes, equalisation of chances for the excluded, diversity management, work-life balance, practices ensuring employee satisfaction and security, employee participation in management-related decisions, communications, cooperation and control policies. Employee relations thus concern dynamic employee-organization relations within the context of satisfaction of the needs of the individual employees and managers. The objective of establishment of such relations is to improve employee morale and motivation, all of which should contribute to improvements in their performance, working in turn towards the company's success (Sequeira, Dhriti 2015, p. 2,17). The relationship between the enterprise and the employees constitutes the most sensitive area of organisational functioning, as the complexity of conditions always leaves a broad margin of spontaneity and unexpectedness. The issues of interpersonal relations from the point of view of their social and psychological effect on an organisation began to shift into focus between 1920 and 1930. Following World War II, organisational behaviour that was a response to outdated practices assumed by interpersonal relations began to gain traction (Kalwani, Mahesh 2020, p. 41). The fundamental theory concerning relations is the theory of social exchange as explained in the dynamic between employee and organisation, through anthropomorphisation of the organisation thanks to its representatives (agents), with the expectation of an answer concerning standards, values and rules that guide it (Shanock and Eisenberger, 2006, pp. 689-695). The employee adapts their engagement and behaviour in order to balance out the mutual exchange process. As the theory of social exchange assumes the effect of the ethic of reciprocity, the exchange of valuable resources maintains and strengthens relations (Tholén, Pousette, Törner 2013, pp. 62-69). However, if the effort made remains unnoticed by superiors, it becomes very probable for the ethic of reciprocity to be ignored (Blader and Tyler 2000, quoted in: Coyle-Shapiro, Shore 2007 pp. 166-179). Using the psychological conditions at the workplace as a basis, the concept of emotion management and the bond theory were developed, exposing the issues of dynamics of bonds as responsible for proactive behaviour, ethical decision making, effective negotiation behaviour and creative problem-solving (Kalwani, Mahesh 2020, p. 49; Zeidner et al. 2004, pp. 371-399). The causes of cognitive, emotional and physical engagement have a psychological basis, and one's psychological condition is a direct response to the condition of relations between employees and superiors. Collegial relations and the feeling of belonging, appreciation by co-workers and superiors are responsible for the feeling of security and the psychological meaning of work (Ariani 2015, pp. 34-35). All interactions and communications between managers and employees form the basis of cognition of mutual needs, allowing better adaptation and mutual functioning in line with expectations (Seth 2014, pp. 80-82). Hence, the management of such relations primarily entails the establishment of the best possible environment, in which employees would be able to develop their potential to the benefit of the company. In this sense, it is worthwhile for the organisation to establish an atmosphere of support and trust among employees, as they are the first line in the exchange of valuable information and resources, support, empathy or mentoring, creating social capital (Prusak, Cohen 2001, pp. 86-93). Before employees turn to their superiors, preceived as the formal side of the exchange, they will turn to their collegial

relations (Ariani 2015, p. 38). Employees and employers should be aware of their interdependency and note the advantages of cooperation for the purpose of achievement of common goals (Caldwell, Anderson 2018, pp. 2-3). The prevalence of this relationship on a subtle background refers back to the unwritten psychological contract between parties, perceived subjectively and reinforced in individual experiences of every individual (more broadly: Rousseau 1995; Caldwell, Hayes 2007, pp. 261-278.). Assumptions concerning the character of the relation between the employer and the employee within the psychological contract are a set of mutual agreements that give rise to a range of expectations that may have moral power (Sequeira, Dhriti 2015, p. 4). The conditions of this contract are susceptible to values represented by the organisational culture. The core of activities of an organisation is to model the values of the organisational culture in order to give credibility to the intention to support employees and perform duties with respect to them, for the purpose of establishment of relations based on trust. Uncertainty and the lack of satisfaction of the need of a bond may result in elevated stress levels, professional burn-out or employee fluctuation (Kalwani, Mahesh 2020 p. 49). In order to avoid unwanted effects, organisations undertake activities related to as internal marketing, which entails placing an employee in the position of an internal customer, and communicating with them through positive information about the organisation (Tsai, Tang 2008, pp. 1117-1118). The improvement of efficiency of influence on the levels of trust, ethic and cooperation between employee and organisation is served by the following rules: 1) high-trust relations, these depend on cooperation and engagement; 2) permanent communication, the character of which will provide certainty about the organisation's engagement in mutual understanding and provide information supporting efficiency and individual success; 3) always take into account the objective, mission and values of the organisation; 4) recognition of needs and fulfilment of the obligations (promises) made, including clear description of duties and control of their execution; 5) modelling of behaviour under guidance by the conviction that leaders and Human Resources Professionals are the models, whose behaviour communicates the values they preach and the devotion to the objectives and the mission of the organisation (Caldwell, Anderson 2018, pp. 15-17). Responsible management is the case when the company executes activities outside of its duties, paying attention to employee development, supporting cooperation and encouraging employees in civic terms (Bagieńska 2018, p. 24). The positive influence of Corporate Social Responsibility on employee behaviour shines through in engaging them in duties that project outside of their professional work (Shen, Benson 2016, pp. 1723–1746). When employees commence cooperation on the civic level, their individual results exhibit strong alignment with the results of the entire organisation (Kalwani, Mahesh 2020, pp. 51). In order to retain this positive relation, it is proper to assume the 4H model with respect to one's employees: help, hope, harmony and happiness in the creation of the working environment. The response that employees demand most from managers should be the 4C model: communication, commitment, contribution and competency (Saleh Dewydar 2015 p. 138). Among the numerous practices and activities that are characteristic for social responsibility, recalled are support for a healthy life style and healthy nutrition, offering cultural and sports activities and assurance of a work-life balance (Mandl 2009, p. 82). Hence, care for the social working environment also includes activities in the area of programming and organisation, which shall balance the professional area with the employees' personal lives. The significant factors embedded in the relations of the working environment that give rise to work-life balance include: treating employees as subjects, establishment of open relations, making it easier for them to communicate professional and personal needs, implementation of a managerial style that takes into account the establishment of bonds in the form of support in difficult life situations, identification of conditions of employee satisfaction, with particular attention to work-life balance needs (Słocińska A., Robak E. 2014, p. 176). Among the most up-to-date concepts of management concerning relations in the working environment, relational capital is most commonly indicated (semantically near to social capital). In the general sense, it is construed as the value of external and internal social bonds of an organisation that directly or indirectly contribute to the achievement of the enterprise's goals (Barão, Rodrigues da Silva 2012, pp. 220-243). Hence, it applies to all relations of the enterprise with its business environment, covering people, institutions, other businesses (Welbourne, Pardo-del-Val 2009, pp. 483-497). Relational capital is construed as a unique asset of an organisation, determined by internal relations. Hence, the capacity to establish it is a consequence of the condition of the relations within the working environment (Bombiak 2016, pp. 97-107). The High Performance Work Systems model seems to be a response to needs concerning solutions in terms of employee-organisation relations.

This concept entails the improvement of efficiency through transformation of the employee-organisation relationship into a partnerlike arrangement within the framework of joint achievement of the organisation's objectives. The basic practices of High Performance Work Systems entail the establishment of autonomous teams, assurance of the feeling of employment security and provision of specialised knowledge and training (Gojny-Zbierowska 2016, p.116).

On the other side of the approaches, theories, concepts, models and practices applied, describing the issues of relations in the social work environment, studies confirm that the most valued property of the working process is the possibility of cooperation with nice people (Nowicka 1999, pp 51-73). Practices in the area of support for relations between employees improve employee efficiency and hence the general performance of the organisation as a whole (Sequeira, Dhriti 2015, pp. 1-17). A higher level of employee engagement translates into higher financial results of the enterprise (Bagieńska 2014, p. 50). A study by S. Lachowski, M. Florek-Łuszczki, J. Zagórski and B. Lachowska showed that in Poland and west European countries, good interpersonal relations with co-workers and superiors influence one's general work satisfaction. Only good pay is valued higher (Lachowski et al. 2018, pp. 300–306). On the other hand, the main cause of resigning from work were bad relations with superiors (Szałach 2013, pp. 177-183). Interpersonal relations have a key influence not only on the general level of satisfaction with work, but also on health. As a result, flawed relations at the work place, symbolised by interpersonal conflict, impact the mental health of employees, shining through in more frequent cases of depressions (Lachowski et al. 2018, pp. 300-301).

Methodology

The objective of the study, a part of the results of which is presented in the present paper, was the identification of social and psychological factors supporting the development of personnel, the identification of intangible assets within an organisation and the processes of management of social capital and trust within organisations. The base for the study was the database of Poland's 500 largest companies according to a ranking by the website Rzeczpospolita, an influential daily with one of the biggest readerships in Poland. The study was conducted in the year 2019 among 179 of the largest companies operating in Poland, using the Computer Assisted Telephone Interview (CATI) and Computer Assisted Web Interview (CAWI). The fusion of these two quantitative methods increased the response rate. First, the study was conducted with entrepreneurs using the CATI. Respondents who refused to take part in the study, who would interrupt the survey or indicate a different time of provision of responses to the survey questions were provided with the option of filling in or completing the survey using a dedicated website. The gradual activity improved the comfort of respondents in terms of provision of responses, and improved the return rate of surveys and the quality of the receive research material. The sample was selected at random, with the draw repeated in case of a decline to participate. As a result of the draw, the study was conducted on a representative basis according to the following parameters: general population size – 500, estimation error – 6%, reliability: 95%. Enterprises taking part in the survey dealt mainly in production (42%) and services (27.4%). Other types of activities in the studied group were represented as follows: production and service business – 14.5%; retail – 8.4%, production and retail 0 7.8%. For the purpose of categorisation according to annual revenue, three scales were assumed (in million PLN): 5-50 – 17.2%; 51-200 – 68.2%; above 200 – 14%. In the majority of cases, the enterprises employed between 201 and 500 people (73%), with 27% of entities employing over 500 people, respectively.

Assuming that large enterprises undertake, as part of their personnel policy, diverse activities towards improving the relationship between the employee and the enterprise, the following research questions were assumed: 1) what kinds of activities do enterprises undertake in order to strengthen the bond between the employees and the company; 2) do they support the development of informal relations between the employees?

Research Results and Discussion

As assessed by the enterprises themselves, the situation was described by way of comparison with the competition, according to the following indicators: bigger profits, larger market share, faster development, greater innovation capacity, more successes and lower costs as compared to the competition (Table 1). In this area, for almost all indicators, the answer indicated most frequently was the one that could be described as evasive: "neither agree nor disagree". On average, this response was consequently selected by a quarter of respondents. The exception was to describe the enterprise as more innovative as compared to the competition, with the response pointed to most frequently was "I rather agree" - 24%. At the same time, the assessment of the own market situation against the backdrop of competition was selected the least frequently. An exception was the indicator of the company profits being higher than the competition, in which the response chosen least frequently was complete agreement with this statement – 14.5%.

Table 1: Market position of enterprises in comparison with the competitors

Indicators	Answers		
	I completely disagree/ I rather disagree	Neither agree nor disagree	I rather agree/ I completely disagree
bigger profits	34 / 35	48	36 / 26
larger market share	36 / 31	41	38 / 33
faster development	21 / 42	47	36 / 33
greater innovation capacity	27 / 42	38	43 / 29
more successes	33 / 38	45	41 / 22
lower costs	25 / 33	55	35 / 31

Source: Own study (N=179)

However, with the analysis data purged of enterprises responding "neither agree nor disagree" for the individual indicators, and assuming the entire scale of responses to be "I rather agree" and "I completely agree" or "I rather disagree" and "I completely disagree", the majority of respondents, though not over 54%, assessed their own enterprise better as compared to the competition for most indicators. This applied to the following indicators: higher market share – 51.5%, faster development – 52.3%, greater innovation capacity – 51.1% and lower costs as compared to the competition – 53.3%. The indicators of own profit (52.7%) and successes (53%) were assessed as minor compared to the competition.

The enterprises' own financial and asset situation as compared to the preceding year was also characterised, as follows: positive financial result, increase in company revenue, increase in own capital value, increase in company assets, increase in company market value or the indicator that in recent years the enterprise has been experiencing better net profit and productivity improvements (Table 2). Only in terms of assessment of own capital increases and enterprise asset value increases the highest number of responses was "neither yes nor no" (23.5% and 42.1%, respectively). It can be assumed that this response indicates that the enterprise situation did not change against the preceding year as compared on the basis of the assessed indicators. For the remaining indicators, taking into account the negative responses ("rather no" and "no") and the responses confirming growth ("rather yes" and "yes"), a positive image was obtained of the condition of the analysed enterprises.

Table 2: Property and capital condition of enterprises as compared to the previous year

Indicators	Answers		
	No/ Rather no	Neither yes nor no	Rather yes/ Yes
positive financial result	37 / 25	26	29 / 62
increase in revenue	32 / 33	27	38 / 49
increase in own capital value	32 / 34	42	34 / 37
increase in the value of assets	33 / 34	43	39 / 30
increase in company market value	32 / 34	37	37 / 39
(in recent years) better net profit	35 / 33	35	44 / 32
(in recent years) productivity improvements	25 / 34	39	45 / 36

Source: Own study (N=179)

Again, excluding from the pool of 179 those responses that would neither confirm nor deny the statement in line with the individual indicators, and on the basis of opposite responses on the scales, the following data was obtained: positive financial result in the preceding year was achieved by 59.5% of enterprises, revenue increased in 57.3% of cases, own capital value increase – 51.9%, asset growth – 50.7%, and enterprise market value growth – 53.5%. In recent years, however, increasing net profit is seen by 52.8% of enterprises, and productivity increases by 57.9% of enterprises.

In terms of characteristics of the development and innovation level, respondents would assess their position against the backdrop of the preceding indicators slightly less favourably (Table 3). Among the 179 enterprises, in the recent two years, new products were introduced by 44.7%, new investments were made by 45.8%, 51.4% implemented new technologies, product sales grew for 45.8%, resources increased in 39.7% of cases, and 39.7% was the rise in employee innovation capacity, 40.3% intensified market activity, enterprises competitiveness on the local market increased in 39% of cases, and new sales markets were acquired in 45.3% of cases. At the same time, in case of expansions of the customer portfolio and development of R&D activity, the response indicated most frequently was denial ("no" – 39.7% and 41.3%, respectively).

Table 3: Enterprises development and innovation level

Indicators	**Answers**		
	No/ Rather no	**Neither yes nor no**	**Rather yes/ Yes**
new products	28 / 40	31	35 / 45
new investments	40 / 31	26	38 / 44
new technologies	34 / 24	29	38 / 54
product sales increased	39 / 34	24	45 / 37
resources increased	34 / 36	38	35 / 36
customer portfolio growth	45 / 26	38	37 / 33
rise in employee innovation capacity	40 / 25	43	39 / 32
intensified market activity	33 / 28	46	44 / 28
increase of competitiveness on the local market	40 / 27	43	41 / 28
new sales markets	37 / 20	41	46 / 35
development of R&D activity	42 / 32	41	36 / 28

Source: Own study (N=179)

As assessed in the categories of market situation of the enterprise, financial and asset situation and research and development, the analysed enterprises have stable situations.

According to the assumed objective of the present publication, assessments were performed of the social sphere of selected components of the relation between the company and its employees (Table 4). The stable situation of the analysed enterprises suggests the assumption that in terms of relations with individuals, they do not limit their personal policy to employee development through qualification improvements and clearly determined career paths. As human resources management also covers activities aimed at the development of the social work environment and its surroundings, it was expected to see engagement by the analysed enterprises in activities integrating employees. However, in 50.3% of cases, the response was "we do not conduct such activities". In the group undertaking integration activities, the response indicated most frequently was support for common activities of employees and their families – 30.2%. A further form of activity was to organise employee sports teams – 25.7% and encouragement to joint volunteer work for the benefit of other employees, who are experiencing difficulties in life – 17.9%, as well as for the benefit of persons or institutions from outside of the company, who would need support – 17.3%. In 11.2% of cases, support was also provided for employee hobbyist groups. Beside the indicated examples of enterprise activity to build employee social capital, indicated were also such activities that could be caused by spontaneous activity of individual teams: "meetings in a relaxed atmosphere after work", "river canoeing", "supporting employees in terms of their life needs". Other responses concerned activities requiring the engagement of the management: "company events", "integration and training meetings and trips", "holiday meetings of the entire personnel", "joint outings (e. g. lunch, coffee with the boss)", "anniversaries (cake and financial award)". The quoted responses applied to 6.2% of the analysed enterprises. (Table 4).

Table 4: Enterprises' activities in terms of integrating employees

Activities aimed at the development of the social work environment and its surroundings	
Support for common activities of employees and their families	54 - 30.2%
Organising employee sports teams	46 - 25.7%
Supporting hobby groups among employees	20 - 11.2%
Encouragement to joint volunteer work for the benefit of other employees, who are experiencing difficulties in life	32 - 17.9%
Encouragement to joint volunteer work for the benefit of persons or institutions from outside of the company, who would need support	31 - 17.3%
Other types of activities	11 - 6.2%
we do not conduct such activities	90 - 50.3%

Source: Own study (N=179)

A further indicator was the enterprises' attitude towards inter-employee relations at the work place – describing the attitude towards the issue, whether they should be primarily professional, and only later collegial. The response given most frequently (53.6%) was: "Partly agree, partly disagree." However, 34.6% of respondents would agree with this statement, as opposed to 11.7%, who disagreed with it.

The lack of engagement of half of the analysed enterprises in activity that could strengthen relations in the social work environment suggests the conclusion that in the Polish reality, among leaders as well, many enterprises use traditional (imitative and repetitive) practices based on the development of competitive advantages through reduction of labour costs, and not through the utilisation of the unique potential that emerges through social relations. Searching for the causes of this state of affairs, one could indicate better readiness to invest in undertaking that are easier translated into financial capital. Furthermore, with the centrally-controlled economy in the portfolio, Polish entrepreneurs may have less experience in using policies of partnership and responsibility sharing.

Limitations and Future Research

The presented data constitutes a fraction of selected activities influencing the internal social environment that could be undertaken by enterprises. The acquired results only permitted a raw

sketch of the relationships between employees and organisations within the analysed enterprises in terms of satisfaction of selected social needs and preferred forms of organisation of cooperation in informal structures.

The acquired results must be amended and further studied in the future. It would be necessary to focus on a higher number of indicators that would comprehensively diagnose the quality of relations in the internal social environment. Subsequent research should entail an employee survey. A limitation of the presented results analysis is the lack of indication of the power of influence of the specific properties of the enterprises, e. g. the innovation capacity, on the employee-organisation relationship. In addition, one should also attempt to identify activities of enterprises that negatively influence the relationship between the employee and the organisation. It would also be interesting to research issues related to the quantitative assessment of enterprise value (economic capacity) of strong relations with employees.

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Sustainability: Carpooling as a Component of Smart Mobility

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Abstract

Purpose: The purpose of the article is to identify the perception of carpooling as a component of smart mobility in the opinion of city dwellers and the suburban area.
Methodology: The article is of an exploratory nature and is based on the results of in-depth interviews among residents of the suburban area and the city. The sample selection was intentional.
Findings: It was found that respondents are little familiar with the concept of smart mobility. They are distrustful of the concept of carpooling and sceptical about the safety of such a journey even if the identity of the driver or passenger is fully verified. Respondents also fear social mismatches, which can be a nuisance when traveling. The advantages of carpooling include savings, reduced congestion, the opportunity to meet interesting people, and a positive impact on the environment. The incentive to use carpooling may be ensuring travel safety, creating dedicated carpooling applications for employees of the organization, financial incentives and marketing activities.
Research limitations: The study was exploratory. Research should be conducted on a larger scale, including other smart mobility solutions.
Practical implications: If local authorities take measures to promote carpooling and at the same time ensure travel safety, then a reduction in the number of cars on the roads during peak hours and economic and environmental benefits can be expected.
Originality/value: The article presents qualitative research on carpooling in Poland, which enriches the literature. In addition, the results indicate the need for research in this direction, because the concept of sharing driving can bring measurable benefits.

Keyword: Carpooling, Sustainability, Smart Mobility.

Introduction

Sustainable development is defined as the development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs (United Nations General Assembly, 1987). Current solutions are based on combination of intelligent solutions supporting environmental protection, public education and developing the economy. On the other hand, sustainable transport and sustainable urban development are recognized as drivers of the country's economic growth. Forecasts show that the intensity of freight transport in urban areas will increase by 40% by 2030 and by over 80% by 2050 compared to 2005. At the same time, it is expected that passenger transport will also increase by about 34% by 2030 and by over 50% by 2050 compared to 2005 (Kiba-Janiak, 2016). This prognosis is also based on analyses of population movement, which indicate that the number of urban residents by 2050 may reach to over 80% of the world population. The increase in flows in urban areas affects congestion, air pollution and reduces the quality of life in cities (Rześny-Cieplińska, 2018). Therefore the issue of sustainable transport is becoming one of the key problems facing contemporary planners and researchers (Neoh et al., 2017).

Cities are the place where opportunities and dangers for stable development are concentrated. The city can be defined as "smart" when social capital, traditional and modern (ICT) communication infrastructure encourage sustainable economic development and high quality of life. Smart Mobility is often highlighted as a key system without which the Smart City could not be sustainable. Intelligent mobility solutions can have a positive impact on the functioning of the city and its inhabitants. The use

of public transport infrastructures is indeed certainly one of the best solutions to face the challenge of vehicular traffic congestion. However, conventional public transport denotes a service that follows fixed routes and schedules; it may not be available in certain areas, and usually, the distance to the stop locations may be huge in sparse areas. That is why public transport has lost its popularity in recent years, thus increasing the amount of passenger transport on the road. One of the tools to limit the negative effects that arise as a result of traffic is shared journeys. They are an opportunity to reduce road congestion, reduce exhaust emissions, save costs, and increase road safety. Joint journeys can be treated as an element of intelligent mobility, which has been widely popularized in recent years. In this context, carpooling has been a widely-accepted concept to implement Intelligent Transport Systems (ITS) in smart cities and to reduce the gas emissions caused by the use of the personal car (Mallus et al., 2017). Carpooling has been around for many years, but thanks to ICT it can gain a new level of popularity. The demand for public transport services is currently not high enough, which generates additional unjustified costs when providing these services. So carpooling can become an alternative in the absence of public transport. Furthermore, Çetin (2017) assumes that the development of sharing services will not have a negative impact on public transport.

The purpose of the article is to identify the perception of carpooling as a component of smart mobility in the opinion of city dwellers and the suburban area. The article is of an exploratory nature. Realization of the goal of the article will give the opportunity to create a tool to explore a larger population, and therefore an attempt will be made to create conditions for the development of these concepts under smart mobility. The research problem consists in examining the perception of shared journeys by residents and identifying the main factors encouraging them to travel together. Specifically, the study addresses the following research questions:

RQ1. How is smart mobility treated by society?
RQ2. How are carpooling perceived?
RQ3. What should be the incentives for carpooling?

The paper has the following structure: Part 2 defines the concept of smart mobility; Part 3 presents research on carpooling; Part 4 contains the research methodology; Part 5 includes results; Part 6 contains discussion; the article ends with conclusions.

Smart Mobility Concept

The concept of smart mobility is one of the components of smart city, which has been developed especially in the European Union since 2007. Smart city refers to city management aimed at improving the quality of life in urban areas. It is a comprehensive city strategy combining communication technology infrastructure and knowledge while using natural resources while respecting environmental considerations. Smart City includes different aspects of city management: building, energy, environment, government, living, education and mobility (Gil-Garcia et al., 2015). It seems that in the future smart concepts should be extended to the national level, i.e. smart country, where resource management will be based on a balanced approach to all ongoing processes. However, at present one cannot look so far, because intelligent solutions are not easy to implement and are not always accepted by the society.

The development and implementation of the concept “Smart Mobility” in all the major urban areas inside the European Union have to follow the European strategy Europe 2020. The strategy that was presented to all the member states of the E.U. and adopted in 2010 in the European Parliament, presents all the major activities that will be conducted developed in the union in the next 10 years. The main idea of this concept that the E.U. wants to implement is to integrate all the urban areas into the same pattern in all the things that are related to mobility / transport. Jeekel (2016) argues that the smart mobility could be considered the clever and active small brother of sustainable mobility. Benevolo et al. (2016) suggested that smart mobility could be seen as a set of coordinated actions addressed at improving the efficiency, the effectiveness and the environmental sustainability of cities.

Value in mobility is derived from traveller spend, whether this means spend on travel tickets, vehicle ownership, or services and apps (Wockatz and Schartau, 2015). Fundamentally, the commoditisation of individual journeys and the journey time of users is what makes smart mobility pay for itself, and represents a continuation of the long standing trend towards the neo-liberalisation of the transport system (Gössling and Cohen, 2014).

Pape and Lauwers (2015) note the other forms of mobility planning [Fig. 1]. It is conventional mobility, with essentially a focus on speed, convenience and affordability, and with a "predict and provide"-attitude. The next step it is a sustainable mobility, with a broad and multimodal system. And the last "city as a place"-approach where mobility should fit in the creation of attractive, liveable and efficient communities.

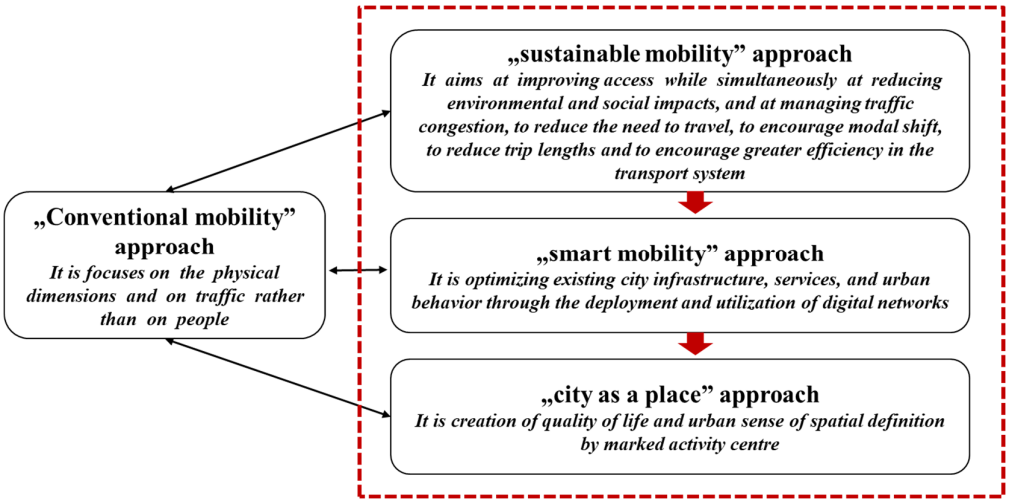

Fig. 1: Connection between different mobility approaches

Followers of the concept of smart mobility can meet their travel needs in a more ecological, socially desirable and more economical way. Ride can be done by public transport (e.g. buses, trams, subway, taxis), alternative means of transport (e.g. bicycle, scooter, rollers), shared types of transport (e.g. carpooling, ride sharing, car sharing). There is a transition in the role of the citizen in the transport system. This is both as a source and recipient of information through mobile communication and through bringing their resources to the shared mobility platforms (Dochert et al., 2018).

Šurdonja et al. (2020) in their empirical research found that responders in Croatia have more limitations in accepting new technological solutions for mobility in the future. Therefore, a wide campaign should be carried out among the public promoting intelligent solutions, outlining the benefits that can be achieved. In opinion of Balint (2017) by improving all of these kinds of smart transportation we can observe that the economy of the many large cities in the U.S.A. and in Japan has improve drastically, the quality of life also has improved and most importantly the environmental issues has been resolved up to a certain level by reducing the pollution level and the smog inside the largest cities in the world. With new technologies, it will become easier to share cars, to utilise their full capacity with ride sharing and on demand rides, meaning that cars can become part of the full spectrum of mobility options, with far less cars needed. In addition, researchers (Porru et al. 2020) suggest that intelligent mobility solutions can be implemented not only in cities but also in rural areas.

Carpooling

Sharing economy is a concept involving the sharing something yourself instead of buying goods or services. In terms of car transport, car-sharing and ride-sharing supported by advanced information and

communication technologies have begun to be accepted. It should be emphasized that carpooling should not resemble or consider itself synonymous with car sharing (Ciasullo et al., 2018). Carpooling implies the sharing of a car among private individuals, whereas car sharing is a membership-based service available to all qualified drivers in a community. A ride-sharing system is commonly seen as a system to bring together travellers with similar itineraries and time schedules. Car-sharing, ride-sharing and carpooling are effective to reduce total number of cars in our society comparing to owning cars for individual person (Aiko et al., 2017). In joint journeys, passenger safety is a very important aspect, which can be ensured by allowing public access to the ride, driver identification and passenger insurance (Chaudhry et al., 2018).

Participants would share rides to save time and money and, secondarily, to reduce environmental impacts. According to Kawaguchi et al. (2019) due to sharing concepts, CO_2 emissions will decrease significantly already in 2035.

Carpooling is a concept derived from ride-sharing and involves the use of shared cars by people with similar travel needs who decide to carry out common journeys between certain origins and destinations (Jamal et al. 2016). If we can take advantage of the free space in each car, this will lead us to its best use with an optimal equation for achieving: fewer cars in the streets with more number of passengers. For the first time carpooling can be used in practice during World War I, when the US government had to conserve resources, especially fuel. Joint journeys saved costs and provided mobility. Carpooling in 70's was very popular and then fell out of favour until the beginning of the new millennium. Travel comfort when using carpooling may be slightly lower than when using your own means of transport. Nevertheless, the benefits of using this solution in the form of reducing the number of cars on the road, reducing pollution and noise are a definite priority. Change in some socio-economic characteristics such as the increase in fuel price, in parking costs, or in the implementation of a new traffic policy, may prove to be an incentive to carpool. The latest technological advances, the widespread use of the Internet and the frequent use of mobile devices have given new impetus to carpooling, which has led to levels that in some countries exceed 10 percent of the total number of motor vehicle journeys (Chan and Shaheen, 2012). Carpooling can contribute to people abandoning the need to own a car and adopt carpooling to meet their mobility requirements, because almost the same benefits are offered in terms of freedom of movement and flexibility in both time and space. According to the research of Filck and Żak (2017), the main problem in carpooling is the coherence of the interests of passengers and drivers. To establish a shared ride, it is necessary that the driver and the passengers agree on a meeting point, travel conditions, travel costs. The carpooling service model implies significant trust concerns, especially derived from the fact that users must share their vehicle with strangers. According to research by Salamantis et al. (2019) a sense of security for traveling together can be provided by a reputation rating system. The reputation of each user should be depends on both the ratings of other users submitted to the system at the end of each ride, and their travel preferences.

Carpooling can be operated in two main ways: Daily Car Pooling Problem (DCPP, where users must agree on how to carpool on a daily basis) or Long-term Car Pooling Problem (LCPP, where users form groups and organize shared rides that persist during a certain period of time. (Bruck et al., 2017). In another classification there are three types of carpooling (Sghaier et al. 2010):

- Regular carpooling, which takes place regularly at known times and hours. These journeys mainly concern daily short drives, such as business trips,
- Occasional carpooling, which is the most common form of traveling together. Travels are unusual and usually relate to long distances (over 50 km) between cities,
- Factual carpooling, which applies to trips organized for special events such as concerts, celebrations. In this case, carpooling is proposed for logistics reasons, in order to counter parking problems, traffic congestion and difficulties concerning accessibility to the event covering places due to the important car's flow.

Nowadays, most of the carpooling services implement a "static" approach: when using such a service, the carpoolers have to post ridesharing requests and offers several hours before their desired departure time, and the shared ride has to be arranged before the trip starts (Mallus et al., 2017). A widely known example of carpooling in Europe is the BlaBlaCar system, enabling travellers to find a means of

transport at an affordable price. Also in many countries were created the similar platforms such as Amovens, ZimRide, RideSearch, eRideShare, Carpoolworld, pilot project in Germany Car2gether, Italian Jungo, Autostrade carpooling, Polish JedziemyRazem etc. Carpooling is also promoted at universities in Canada, the United States, Australia and even Greece (Liaskopoulou et al., 2017). Joint travels of students and university employees have a positive impact on travel costs and traffic flow at peak times. A mobile application enabling dynamic carpooling solutions was developed by scientists (Chorfi et al. 2015) in Saudi Arabia. This application is a real-time application, which connects people living in the same city and working at the same company or university and having the same travel needs. What is important - the application has the option to mark the travel option "only for women", which is useful for Arabic countries. Dynamic carpooling that instantly makes travel accessible through the use of ICT can gain popularity.

Methodology and Data Collect

The purpose of the article is to identify the perception of carpooling as a component of smart mobility in the opinion of city dwellers and the suburban area. The in-depth questionnaire interviews were conducted to achieve the research goal. The questionnaire consisted of open questions, which made it possible to find out in detail the opinions and feelings of respondents in relation to the issues examined. The selection of the sample was deliberate due to the nature of the study. The study involved 30 people compared for both sexes; aged 18 to 65; secondary and higher education; owning a car and not owning a car. They were inhabitants of the city and suburban area, commuting every day to work in the directions suburban area-city, city-suburban area, city-city. In qualitative research, the sample size of 30 respondents is justified. Guest et al. (2006) found that 12 interviews of a homogenous group is all that is needed to reach saturation. The explorations were conducted in March 2020. On average, the interview lasted about 30 minutes.

All interviews began with a question about understanding the concept of smart mobility. After answering this question, respondents were explained what about concept really is. Then, they were asked about their attitude towards shared journeys as a passenger and as a driver. Respondents were asked to indicate the advantages and disadvantages of carpooling after explaining exactly what this term means. The last question concerned the factors encouraging the use of carpooling. A flexible approach to interview resulted an additional information.

Rezults

The concept of smart mobility in public opinion

The concept of smart mobility is poorly known to respondents. This is the result of the lack of popularization of this term among the public. There is also a lack of promotion of smart mobility solutions on a large scale. The first associations of the population are associated with digital technologies and smartphones. In 2/3 of cases the answer appeared that smart mobility is intelligent route planning, choosing the optimal option and combining means of transport. However, such elements as joint travel, intelligent movement, low-combustion cars and those having the function of autopilot are not associated by society as smart mobility.

Perception of shared journeys

The respondents' opinions were divided. 2/3 of respondents said that shared journeys can be tedious, uncomfortable and dangerous. Other people perceive joint travel as an alternative to using public transport and their own means of transport. Men have a mainly negative attitude towards shared journeys, as this may change their plans.

Advantages of carpooling

Among the advantages of carpooling, the financial aspect has always appeared. Respondents believe that they could save money by traveling together. Drivers can use the saved money for current car repairs or insurance. Joint journeys also cover fuel costs. On the other hand, passengers in most cases have cheaper and more convenient access than public transport. Another effect of sharing is reducing the number of cars on the road at peak times. This results in shorter stoppages in traffic jams, and therefore faster travel and greater fuel savings. Thus, according to respondents, carpooling can have a positive impact on CO_2 emissions. Environmental benefits are becoming more and more desirable. Among the advantages of carpooling was the opportunity to meet interesting people, establish long-lasting interpersonal relationships and perform trip more enjoyable.

Disadvantages of carpooling

Travel safety plays a significant role when choosing a type of transport. Respondents say that carpooling is currently unsafe. When using carpooling in Poland, there are no internet platforms that accurately verify the identity of people offering a shared trip. This affects the sense of fear among users, especially women: "*Fear of who you meet and with whom you will stay for some time in one car often causes a tendency to choose another mode of transport"*. The solution is to create a travel network for commutes or studies, and authenticate users for random travels.

Social mismatches are the second factor that contributes to the reluctance to use and provide carpooling. The fear of a traveller who does not match the driver's lifestyle, behaviour and the oppressive atmosphere of travel discourages them from traveling together.

The disadvantage of carpooling is reduced travel comfort. The respondents' experience shows that: "*the driver offered a comfortable ride with two people in the back seats of an off-road car, where the driver does not smoke in the car - in fact the trip took place with three people in the back and two dogs, while constantly smoking cigarettes. This resulted in a very low comfort of travel"*. In carpooling, should be planning trip in advance, discuss the trip details with (time, pickup location, destination, baggage, breaks, etc.), which means less flexibility.

Limited access to information on journeys is also a barrier to widespread carpooling. The young generation commonly uses the Internet and has access to the network. The problem is the limited use of mobile applications by older people. Also in Poland currently there are no dynamic carpooling solutions, which necessitates planning a trip a few hours earlier. Therefore, dynamic carpooling models should be developed that will increase the number of trips using this alternative mode of transport in real time.

Factors encouraging to carpooling

Among the factors that may contribute to increasing interest in carpooling based on the respondents' answers, the following categories have been distinguished: safety, popularization, access to information on journeys.

Protection. There should be full verification of persons providing and using carpooling. All personal data should be properly secured and managed by carpooling platforms.

Popularization. Currently, joint rides are not promoted in Poland. There is no advertisement of carpooling platforms, enterprises do not create applications and portals dedicated to their employees. A chance to increase the interest in carpooling is to present the benefits of this solution and to direct advertising to specific groups of recipients. According to respondents' opinions: "*Mainly young people will use carpooling services, because older people are wary*". Such advertising should design and implement such security measures, to carpooling has become a common phenomenon. According to the answerer, figures should be provided to increase public awareness, because specific numbers are

more accepted than the advantages described in the form of text. Another factor aimed at encouraging drivers to travel together, aptly to the respondents' opinions, is establishing cooperation between carpooling platforms and e.g. petrol stations. An incentive for carpoolers as e.g. fuel rebates could have a positive effect in the form of increased joint travel offers. Also, a solution functioning in some countries has been identified, such as the ability to travel by bus lane when there are at least four people in the car. It is a matter of agreement with local authorities.

Access to trip information. In the opinion of respondents, the initiative of local authorities and enterprises to create carpooling platforms dedicated to employees of carpooling platforms will positively affect the image of these institutions. "Internal carpooling is desirable for greater safety, because you know at least the view of a particular traveller and there are no such fears as those of a stranger". In summary, a good solution would be to create a real-time carpooling application.

Discussion

The conducted research indicates that the respondents are not fully aware of the advantages and benefits of smart mobility and carpooling. The research results are largely consistent with the research carried out by Shaheen et al. (2016) which identified six main casual carpooling success factors: a time savings incentive for drivers; monetary savings for passengers; pickup locations near freeways, residences, parking, or public transit stops; a common drop off location; reliable public transit for the return trip; and a high-occupancy vehicle requirement of three or more occupants. By Witkowska et al. studies (2014) a positive attitude toward the use of carpooling emerged, whereby costs saving, protection of environment, and stress-free driving were revealed to be the key drivers of usage behaviour. The last element - stress-free driving - was not mentioned in this study, because respondents often feared social mismatches, which would have the opposite effect.

Similar results are also found in Ciasullo et al. (2018), where thanks to big data it was establish that the advantages of carpooling include economic efficiency, environmental efficiency, comfort, movement, socialization, reliability and curiosity. While, the disadvantages also included similar factors - lack of efficiency, lack of flexibility, lack of privacy, danger, lack of trust.

In the opinion of Olszewski et al. (2018) society can be stimulated to cooperate in carpooling through gamification. Nevertheless, according to the respondents' opinions, appropriate security measures should be introduced, dedicated carpooling platforms should be created, incentives for drivers in the form of e.g. fuel discounts, and a wide advertising campaign should be conducted.

Summary

Sustainable transport at the forefront with smart mobility is gaining an increasingly important role due to the increase in CO_2 pollution, nuisance traffic congestion in the city, noise and decreasing the quality of life of urban residents through the accumulation of these factors. Carpooling as a concept based on shared journeys, while sharing travel costs, can become one of the elements reducing the negative effects of urbanization and the automotive industry. Based on the research, it was established that respondents, both the older and younger generation, perceive smart mobility as using a smartphone to move and plan the optimal route. This means that measures should be taken to inform the public about the principles of this concept and the possibilities of its use. It was explained that carpooling is a known concept for all respondents, but opinions on this topic are divided. Some people consider carpooling as an alternative means of travel, which benefits both the driver and the passenger. On the other hand, the majority of respondents consider sharing travel as a burdensome phenomenon.

Among the main advantages of carpooling there are cost savings, reduced congestion, the opportunity to meet interesting people, caring for the environment. The disadvantages include the lack of trust in both the driver and passenger, the danger, the need to adapt to another person, the operation of the vehicle and the possibility of social mismatches. It has been identified that carpooling can gain popularity by presenting its advantages (savings, establishing interpersonal relations) to a wide

audience, creating safe travel conditions, internal organizational platforms for carpooling and the possibility of using bus lanes in the presence of four people in the vehicle. Nowadays, however, people are neither motivated nor encouraged by their local governments or employers to make use of such solutions as a carpooling. If local authorities take measures to promote carpooling and, at the same time, travel safety is assured, then a reduction in the number of cars on the road during peak hours and economic and environmental benefits can be expected.

Future research should be a quantitative research conducted on a larger scale, including other smart mobility solutions.

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Healthy Ageing Supported by Smart Home Technologies

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Abstract

Population ageing is a global social phenomenon that requires a better and faster implementation of advances in smart home technologies to create age-appropriated services and environments. Smart homes, which incorporate sensors, actuators and environmental and portable medical devices as well as modern communication technologies, can enable continuous and remote monitoring of the health and well-being of the elderly. Health monitoring is in line with current trends in the medical and social systems. The case study included in this paper presents a system for monitoring and assessing the health of the elderly in an intelligent environment. The major concern, in this sense, is to ensure optimal access to smart home technology for the elderly, aiming at the impact on quality of life, health and social involvement.

Keywords: Smart homes, Smart technology, Sensors, Elderly, Internet of Things.

Introduction

In most developing countries, the healthcare sector faces major economic challenges, particularly due to the growing number of people dependent on healthcare services, as well as the quality of care needed by the elderly. Older adults need more care and attention, as a minor illness or even small accidents can cause irreparable damage (Azimi et al, 2017).

Current studies also reveal that many older adults prefer to live in their own homes, but they need caregivers or medical experts to care for and monitor or help them. It is therefore essential to develop new tools and technologies to help older people age in their homes (Rashidi and Mihailidis, 2013).

Society is in a continuous transformation in terms of increasing the digitalization of the daily lives of the elderly. Numerous reports and analyzes conducted worldwide have shown that older people are willing to use a wide range of technologies to be safe at home, both for their personal health and well-being, and to maintain social ties (Syed et al, 2019).

As the number of elderly people increases, it is necessary to develop affordable, easy-to-use and discreet healthcare solutions for such people. It is necessary to monitor a person's daily life and work environment with the help of ICT, smart home technologies and stand-alone assistive devices (Blackman et al, 2016), (Muñoz et al, 2011). Smart homes can be adapted to remotely monitor the health of older adults by introducing smart and wearable sensors to track seniors' daily activities and help those in need of caregivers and experts.

Major advances in wireless technology, processing power and computing bring innovation in the healthcare sector, leading to the development of connected medical devices. These devices are capable of capturing, generating, analyzing and transmitting data. These devices, together with the data itself, create IoMT (Internet of Medical Things) - a connected infrastructure of software applications, medical devices, medical services and computing systems (Deloitte, 2018). IoMT-related devices can provide real-time monitoring to save lives in case of medical emergencies, such as asthma attacks, heart attacks, diabetes, falls etc. (Patel, 2019).

Overview of Smart Homes

Balta-Ozkan et al (2013) states that "*smart home is a residence equipped with a high-tech network, linking sensors and domestic devices, appliances, and features that can be remotely monitored, accessed or controlled, and provide services that respond to the needs of its inhabitants*".

To meet the growing need for health care services for the elderly, it is essential to develop affordable, discreet and easy-to-use healthcare solutions. Thus, smart technologies (for example: smart homes) are being used in the living environments of the elderly. These technical innovations have a varied potential for autonomy, communication, health and social contact.

Another function of smart homes is to improve the physical condition of the elderly. Smart homes have allowed the elderly who need medical care, but did not want to turn to the services of health care units for frequent health checks, and continue living independently.

One of the functions of the smart home is the real-time monitoring of the daily lives of the elderly, which has significant consequences for health problems. In addition to predicting the health conditions of the elderly and detecting abnormal events, this approach is useful for establishing medical emergencies that require the intervention of medical professionals. Therefore, continuous monitoring can improve safety and quality of life (Majumder et al, 2017).

Smart homes, which incorporate environmental medical sensors, wearable sensors and modern communication technologies, can enable continuous and remote monitoring of the health and well-being of the elderly at a low cost. These sensors and devices are designed to observe the environment, monitor the health of the inhabitant and provide proactive services in order to improve the experiences of the elderly.

The smart home system consists of three main technology sections:

- Sensors level - physical components (sensors, actuators).
- Communication level - wired / wireless network that connects the physical components and the control system.
- Applications and services level - control system.

Using the information collected from the physical components, the control system performs a simple automation of tasks, an analysis or prediction of the location of the resident and his behavior or recognition of the health of the person living in that house. Smart homes can provide greater comfort by automating care, instead of disrupting the normal lives of the elderly (see figure 1).

Smart Home Technologies

Smart housing technologies used for the elderly are "information-based technologies that passively collect and share information about residents with the residents, their family members and primary care providers." Smart home technology can also be defined as "using basic and assistive devices to build an environment in which many components in the home are automated and in which devices can communicate with each other." The smart devices in the house collect physiological data about location and movement, which can then be used to detect in time the problems that require the intervention of health care providers, residents and their families (Coardos and Marinescu, 2020), (Cocco, 2011).

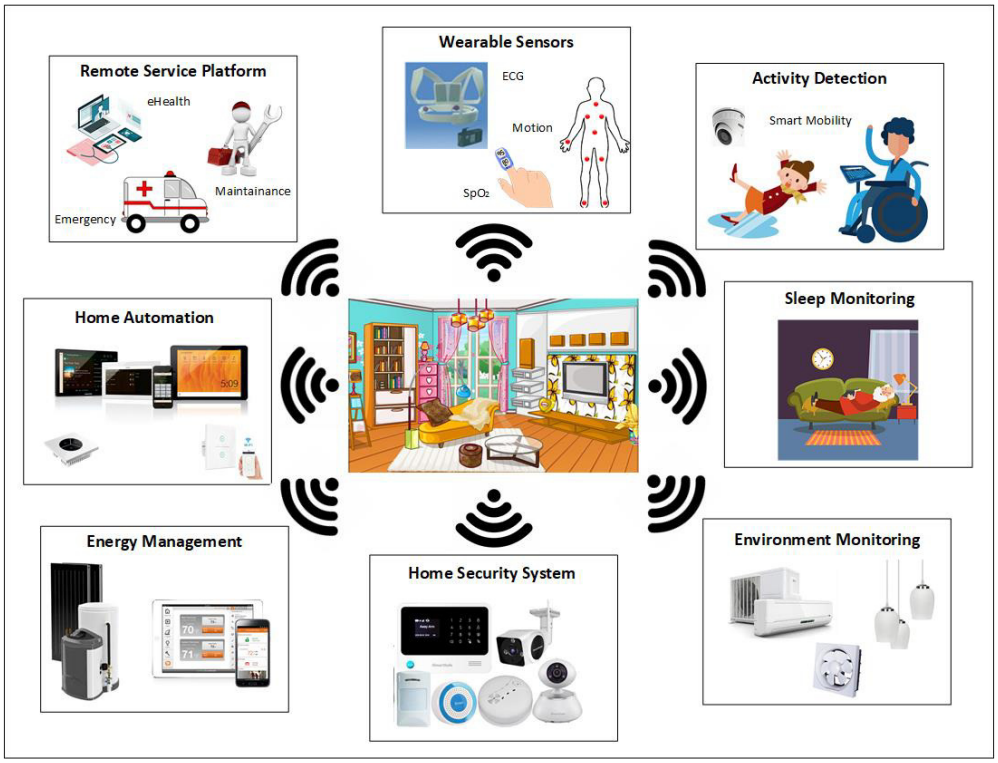

Fig. 1: Smart homes integrated with automated systems for elderly healthcare (adapted from Majumder et al. (2017))

Smart home technologies (environmental sensors / portable sensors, healthcare management platforms, mobile devices, etc.) are used in many medical applications, such as remote health monitoring, health programs, chronic diseases associated with aging, and care for the elderly (Alexandru and Ianculescu, 2018).

Smart home technologies create the necessary framework for collaboration between the medical staff involved in the care of the elderly, as well as the patient and his family. Thus, it is possible to offer elderly-centered or even proactive care.

Elderly with complex needs have a reduced ability to perform daily activities due to physical, mental and psychosocial challenges that require continuous and complex care (Liu et al, 2016), (Hickam et al, 2013). Thus, new Smart technologies offer the possibility for older adults with chronic conditions and complex needs to stay at home and maintain an acceptable quality of life (Frisardi and Imbimbo, 2011), (Archer et al, 2014), providing a cost-effective approach to improving the quality of life and helping older adults to live safely in their own homes (Liu, 2012).

Smart home technologies have to provide (Liu et al, 2019):

(1) *Confidentiality*: reduced exposure of patients' privacy.
(2) *Security*: reduced errors and increased monitoring sensitivity.
(3) *Risk prediction*: due to the use of Big data to analyze and predict the risk of adverse events.
(4) *Personalized service*: addressing different types of chronic conditions so that older people can obtain monitoring indicators appropriate to their disease. This can provide a more personalized service for different seniors, promote their health and improve user satisfaction.

"Smart home" can allow older people to live independently at home for longer and reduce their dependence on formal or informal caregivers or allow caregivers to take better care of older adults. A

smart home can provide a variety of services ranging from simple task automation (e.g. room temperature control), analyzing or predicting a resident's location, recognizing the health of an occupant living in their own home, with the subsequent transmission of data for remote monitoring.
In fact, "Smart" is the allocation of software, hardware, cloud and detection technologies so that it can capture and communicate data with sensors in the physical world in real time, which can be used for advanced analysis and smart decision making (Papa et al, 2020), (Chang, 2017a, 2017b), (Nam and Pardo, 2011). The Internet of Things (IoT) creates a network of connected, uniquely addressable smart devices that communicate in real time via standard IP-based communication protocols. Connected “things” can range from something as small as smart LED lighting and smart locks, to something as innovative as smart healthcare monitoring and smart logistics management (Chang, 2017c). Data collected from smart devices can be sent to the cloud for permanent storage or real-time viewing, but also sent directly to a computer or smartphone.

Smart home technology, which can also be called 'home automation', means the use of home devices that connect through a network, most often a local LAN or internet (Wikipedia, 2020a). It uses devices such as sensors and other devices connected to the IoT that can be monitored, controlled or accessed remotely and provides services that meet the perceived needs of users (Hendricks, 2014).

Sensors and devices are integrated into objects and home infrastructure and are connected using network technologies. Each sensor is responsible for one or more tasks at the same time (Mshali et al, 2018).

There are three main classes of interconnected networks, which are often used in this field: environmental sensor networks, portable sensor networks, and multimedia devices:

- *Environmental sensors* are responsible for capturing and retrieving contextual data on the elderly and their environment. The sensors can be placed in a living environment or attached to various objects in the house to detect the activities of the elderly person. Such objects could be a sofa, table, bed, chair or floor that contain pressure sensors. The level of performance in the daily activities of the elderly can be measured by observing them in their living environment, as well as their personal interactions with household objects in a particular location.

  Environmental sensors can provide rich contextual information to detect daily activities and observe human behavior in the smart home. Environmental sensors are used for additional dimensions, such as light, temperature, humidity. They are located in different places to monitor environmental conditions and to identify daily activities. Power sensors are used to measure and manage power consumption and to detect the use of electrical devices using On/Off events. The use of electrical appliances such as microwaves, water kettles, toasters, room heaters and televisions can also be used to detect activity and to further refine behavioral information (Suryadevara et al, 2013).

- *Portable sensors* are used in the smart home to provide a continuous flow of information about real-time health conditions. They are often incorporated into accessories such as clothes, belts, watches or glasses. These sensors often use accelerometers to detect outpatient activities, or devices measuring vital signs, such as heart rate sensors to monitor the subject's health. Accelerometers and gyroscopes are the most common inertia sensors used to monitor body movements and positions, such as standing, sitting, and walking.

  Global Positioning Systems (GPS) can also be used as portable sensors to monitor location-based activities in an open or mobile environment. In the smart home, several biosensors are used to monitor the vital signs of the elderly, such as electrocardiography (ECG) sensors used to monitor cardiac activity, electroencephalography (EEG) sensors used to monitor brain activity, sensors of electromyography (EMG) used to monitor muscle activity and electrooculography sensors (EOG) used to monitor eye movements. Pulse oximeters are

used to measure blood oxygen levels (i.e. oxygen saturation), while photoplethysmography (EPG) sensors are used to monitor blood flow.

- *Multimedia devices*. The widespread use of household appliances, enriched by a set of sensors, helps to create an interactive healthcare environment. Integrated appliances can be electrical or electronic devices that perform several functions at home. Devices such as cameras, microphones, telephones, speakers and televisions create a platform for data exchange. These devices increase the subject's interactions with health applications and represent either new sources for collecting contextual information or means to provide guidance and counseling (Lemlouma and Chalouf, 2013).

Figure 2 shows an overview of the sensor networks in the smart home.

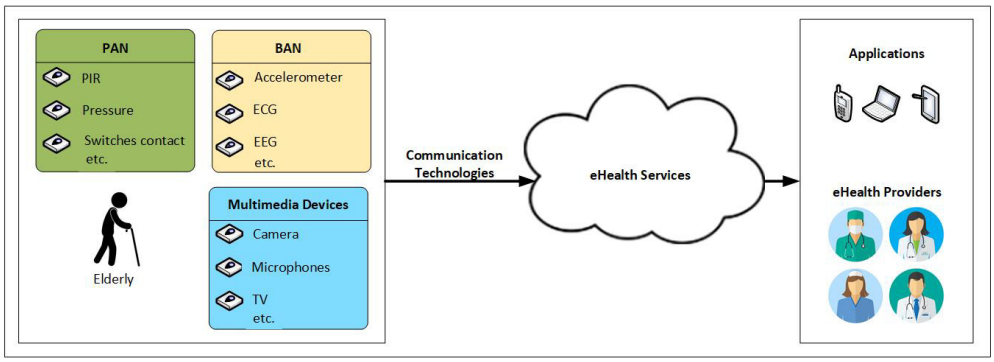

Fig. 2: An overview of the sensor networks used in the smart home (adapted from Mshali et al. (2018))

As the number of IoT devices increases, the communication networks that support them need to adapt. Communication infrastructures must be designed to allow the traffic they carry. Voice, video and data each have specific features and requirements for successful network transmission.

Depending on the distance range it covers, it is estimated to use several types of networks (figure 3). The most popular communication networks are: Nano Network, Internet of Bio-Nano-Things (IoBNT), BAN Network (Body Area Network), PAN Network (Personal Area Network), LAN Network (Local Area Network), CAN Network (Campus Area Network), MAN Network (Metropolitan Area Network), RAN Network (Radio Access Network), WAN Network (Wide Area Network).

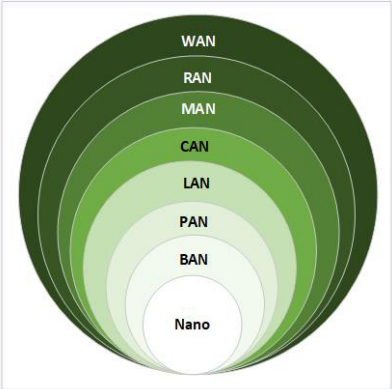

Fig. 3: Types of IoT Networks (adapted from Wikipedia (2020b))

The most popular communication technologies are: WiFi, Bluetooth, ZigBee, Cellular, 6LowPan, Z-Wave, RFID, NFC, LoRaWan, SigFox. Depending on the application, data requirements, security requirements, power and battery life, IoT systems will dictate the choice of a technology or a combination of technologies. The most important communication technologies for IoT can be classified into (figure 4):

(1) LPWAN - large area but low power network,
(2) Short Range Network - short range network.

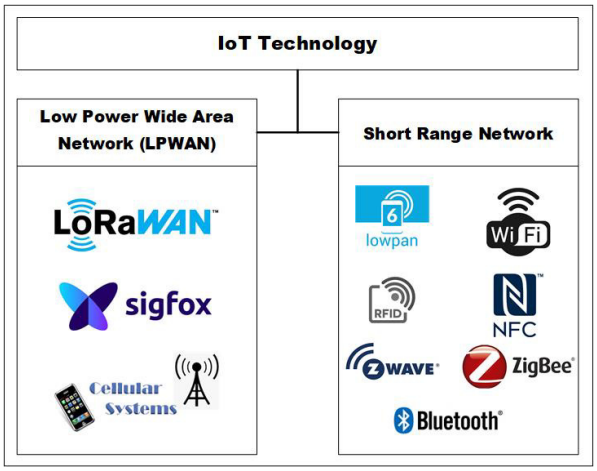

Fig. 4: IoT technologies

Providing a service is the most complex part of the smart home. The two main actors directly involved in smart home applications are the monitored subjects (e.g. patients, the elderly and people with disabilities) and the healthcare provider (e.g. doctors, nurses and volunteers in network coverage). End-user applications depend on the interaction between these two categories of actors.

The functionalities provided are influenced by the monitored subject and the services available. The processing system plays a major role in such context-aware applications, where the data collected must be relevant in order to be properly managed and interpreted. The necessary actions are taken to provide appropriate and personalized services depending on the situation. Context-aware features are personalization, provision of the necessary content and information; suggestion, in order to offer recommendations regarding the subject's behavior; configuration, automatical configuration of devices and user interface to optimize and adapt the interface based on the context of the subject.

In the processing system, several reasoning approaches and machine learning algorithms are used to understand the context of the subject and determine the services required.

The application implements a user interface, provides alerts and controls the sensors. The user interface is usually used to display information about the health of the subject, vital signs, changes in behavior, etc. Alert mechanisms are used in emergencies and are responsible for defining alert messages and selecting the network and service provider. Moreover, the context-aware application influences the sensor system based on the user's context. The aim is to provide an efficient monitoring system that optimizes system resources, controlling, for example, the durations, frequencies and quantities of data.

The impact of Smart Home Technologies in elderly lives

The progress of smart home technologies radically changes the society in which we live, the economy and the quality of life of the elderly, bringing benefits in the short and long term (Carnemolla, 2018).

Devices must share readings securely so that all warning signs can be retrieved and any daily information can be proactively sent to patients.

Regarding the impact of smart home technologies in the lives of the elderly, the medical branch has the highest utilization rate of smart home technologies among the elderly by monitoring health problems and age-specific dysfunctions using smart devices. Online health monitoring reduces periods of hospitalization and, subsequently, healthcare costs, facilitating an independent life with efficient management.

Another major impact of smart home technologies is the safety and comfort of the home – the two being central pillars in the lives of the elderly. The positive impact of these smart home technologies appears from the strong interest of older people in these technologies, as well as the willingness to know more and be trained to make better use of sensors and multimedia devices.

The smart home can have a major impact on the behavior and emotional state of the elderly, thus influencing the health, well-being and independence of the elderly. Smart home technologies work together to produce results that will give seniors independence, safety and well-being.

The main benefit of the impact of smart home technologies is that it can delay the institutionalization of the elderly.

Case Study

The project - " *Non-invasive Monitoring System and Health Assessment of the Elderly in a Smart Environment*" (RO-SmartAgeing) - aims to demonstrate the potential of smart technologies (such as IoT, cloud computing, Big Data) for the positive transformation of the way health care services are provided to the elderly and health care staff / provider.

This project aims to develop and validate a system for monitoring and assessing the health of the elderly that integrates physiological and non-invasive portable motion sensors for collecting medical parameters - an intelligent environment with discrete environmental sensors to monitor daily activities and the person's lifestyle and a cloud platform for data storage and aggregation, including the presentation of results generated by advanced data analysis.

This system creates a minimally invasive environment for the elderly, helps increase life expectancy, implements and integrates smart technologies to improve the quality of life of the elderly, monitors physiological and environmental parameters facilitating more efficient health management based on collected data helping to develop innovative personalized assistance services.

Among the most important features planned to be developed within the project are:

- non-invasive health monitoring in order to define a real profile of the elderly that presents the current state of some health parameters (physiological and cognitive);
- monitoring current activities and lifestyle;
- defining a model for tracking locomotor decline and preventing falls;
- personalized environmental adaptation allowing a controlled use of environmental devices or alarm triggers in the event of the occurrence of an abnormal health parameter or an unforeseen and dangerous event;
- supporting the doctor's remote assessment of the elderly current health status and early diagnoses;

- responsibility and involvement of the elderly in the optimal management of their own health;
- identifying the most representative ways of caring for the elderly.

The RO-SmartAgeing system will follow some essential aspects of monitoring an elderly person:

- *Medical records*: The system offers the possibility to store the records of the elderly in an electronic database providing access to them in a simple and fast way, with updated data in real time. Thus, doctors and caregivers can record information about daily activities, food, medicine, health, medical treatments, photos and other observations.

- *Remote monitoring*: With the help of IoT devices, the RO-SmartAgeing system ensures real-time remote monitoring of vital parameters of the elderly, which will be collected by sensors; they are selected based on user decisions and can be measured without intrusive sensors or human intervention. Data can be viewed in real time by doctors, caregivers, the elderly and the elderly's family.

- *Medical history*: From the moment the elderly person starts to be monitored in the intelligent environment and through the RO-SmartAgeing system, an initial clinical history will be created, with data such as surgical history, prescriptions, allergies, social data, etc.

- *Alert notifications*: When the IoT system detects a possible emergency related to the elderly person's health, it will generate an alert for the current doctor, caregiver or family member.

The main portable devices and the main actors that will be involved in the RO-SmartAgeing remote health monitoring system are shown in Figure 5.

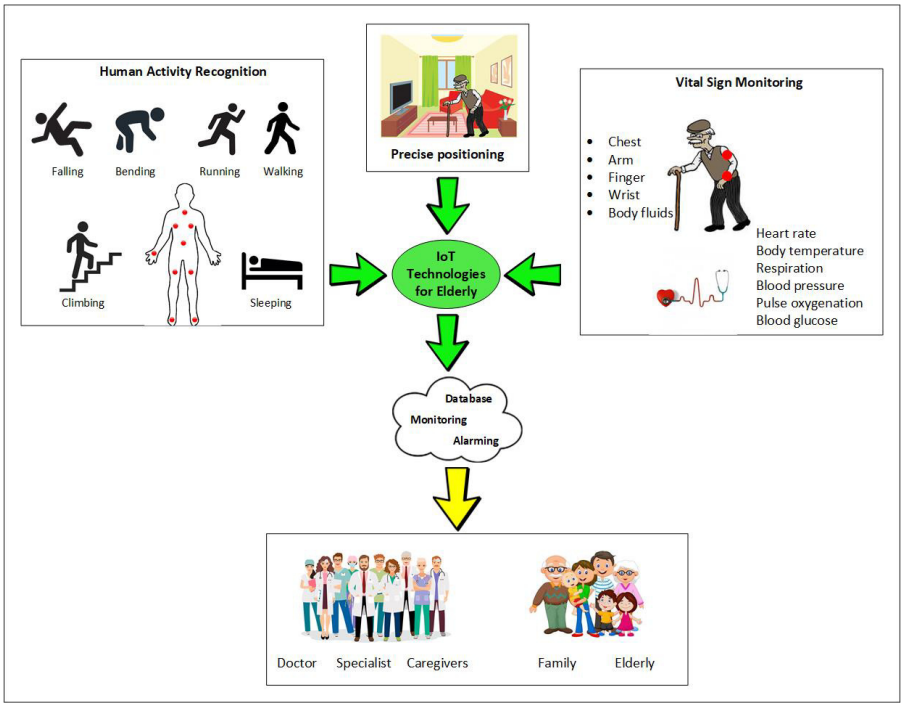

Fig. 5: Proposed system with portable devices for the elderly for RO-SmartAgeing

The RO-SmartAgeing system fits in a category of systems that has the potential to facilitate not only the fact that an elderly can live independently for longer, but also to make health care services more

efficient by reducing the pressure on general health system, as a result of repeated and long-term institutionalizations.

Conclusions

"Smart home technology" is one of the emerging technologies that is developing at a competitive level in the technological world, improving security, comfort and health at home. It seems to show potential to help older people live longer, safely and independently in their homes. The interest of the elderly in these smart technologies is mainly related to: caring for devices to ensure the safety of the home, devices dedicated to health and communication.

The project "Non-invasive Monitoring System and Health Assessment of the Elderly in a Smart Environment (RO-SmartAgeing)" estimates that:

- it will be increased quality of life of the elderly and their family members by providing intelligent non-invasive services remotely such as: monitoring, diagnostics, support for daily activities, alerting accident;
- new scientific knowledge in the field of non-invasive intelligent services for the elderly, analysis and modeling of health and quality of life related to health, to assess acceptance and usefulness of smart home technology solutions in healthcare.

The RO-SmartAgeing system fits in a category of systems that has the potential to facilitate not only the fact that an elderly person can live independently for longer, but also to make health care services more efficient with smart home technology.

Acknowledgment

The authors gratefully acknowledge the contribution of Ministry of Research and Innovation for funding the project RO-SmartAgeing - "*Non-invasive Monitoring System and Health Assessment of the Elderly in a Smart Environment*" for the period 2019-2022.

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K-Means Clustering of Stores in Retail Industry Using Predictive Analysis Library on SAP HANA XS Advanced

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Abstract

The retail industry is quite rotary, where there are many changes in a short period of time. In large international retailers there is a need to be able to differentiate the existing stores, in order to perceive their relevance to the business. For that purpose, data mining algorithms for clustering, such as k-Means, can be useful, combining two very important variables to observe the activity of retail stores: revenue and number of transactions. Using this method, it is possible to obtain a good differentiation between stores as to their activity so that managers can act accordingly. The study included the clustering of more than one thousand stores of a large food retail chain and revealed some at a very high level of activity and others at a much lower level. The clustering process using the k-Means algorithm was fully implemented in SAP HANA XS Advanced utilizing the Predictive Analysis Library (PAL). In a first phase, the clustering process involved the combination of the Elbow Method and Silhouette Coefficient to choose the optimal number of clusters. In a second phase, the capabilities of the Predictive Analysis Library for the k-Means algorithm were used to automatically choose the best number of clusters, based on the value of the Silhouette Coefficient. In the end, in both phases, two clusters were formed: one cluster housing the less active stores and the other encompassing the more active stores in terms of revenue and number of transactions. It was possible, then, to distinguish the stores under analysis, grouping them in a correct way, according to their relevance for the business.

Keywords: k-Means, Clustering, SAP HANA XSA PAL, Retail

Introduction

The retail industry is a business area where millions of transactions are processed by different operators, in several stores and under an immense variety of products. However, this sector is more complex than just selling goods to consumers. The retail industry can also encompass the design, manufacture and transportation of goods throughout the supply chain, as well as the use of different technologies to monitor and control the entire process (Beck and Peacock, 2009). Theoretically, the retailing concept would be simple: get the products at the right time, in the right conditions and with the best price for the consumer. Nevertheless, given the scale of this business, this process is much more complex and it is relevant to make certain types of analysis to the existing data.

Large retailers have different stores in several countries, so it is necessary to know which stores are more and less important to the business, those that contribute more and less to total revenue, and also those that perform a higher volume of transactions, annually. This is where Clustering algorithms can help differentiate each one by establishing different groups, based on some business variables.

The data of this study regarding transactions processed by the POS is hosted in SAP HANA, which can be accessed through the SAPA HANA XS Advanced Platform (integral part of the SAP HANA solution). SAP HANA has the Predictive Analysis Library (PAL), which enables, easily and without recourse to data extractions or connections to the database, via external applications, to execute some Data Mining algorithms directly over the data. Thus, and for this specific problem, it is possible to

recover the data and apply the k-Means Clustering algorithm, via SQL, directly in SAP HANA XS Advanced, obtaining, in the end, the expected result of clustering all the existing stores.

Related Concepts

Before starting to expose the methodology adopted and the results obtained, it is important to present a brief literature review of some concepts inherent to this study.

Clustering

Clustering is an Unsupervised Learning Data Mining technique capable of finding some structure in an unlabeled data collection and is usually applied in Machine Learning. This technique can be defined as the process of grouping a set of data objects into different subsets (clusters), so that the data objects present in the same cluster have a high similarity to each other, but are quite dissimilar to other data objects belonging to other clusters (Kononenko and Kukar, 2007; Hastie, Tibshirani and Friedman, 2009; Trivedi, Pardos and Heffernan, 2011; Han, Kamber and Pei, 2012; Singh and Bansal, 2015; Hossain, 2017; Kansal *et al.*, 2018; Syakur *et al.*, 2018). Albeit Clustering, as a Data Mining technique, can be used in a preprocessing task, it can also be used, in isolation, to find value in the data, observing the characteristics in each cluster and making deeper analysis in each one of them, as is the case of this study (Han, Kamber and Pei, 2012).

Clustering being a challenge in data mining research, it has some requirements that ideally should be satisfied: scalability; ability to handle different types of features; discovery of clusters with arbitrary shape; requirements for domain knowledge to determine input parameters; ability to deal with noisy data; capability of clustering high-dimensionality data; and interpretability and usability (Kononenko and Kukar, 2007; Han, Kamber and Pei, 2012). On the other hand, Clustering methods still have some problems. For example, dealing with large amounts of data can lead to problems with processing time; the efficiency of the algorithm can depend on the measure of similarity used; and sometimes the results can be interpreted in different ways (Kononenko and Kukar, 2007). Additionally, Clustering methods may differ at the partitioning level, the measures of similarity used, and also depend on whether Subspace Clustering is performed (Han, Kamber and Pei, 2012).

There are many clustering algorithms that can be used to solve various business problems. Generally, these algorithms can be classified into the following categories (Han, Kamber and Pei, 2012):

- Partitioning Methods: these algorithms divide a data set with n objects, partitioning it into k groups, where each group represents a cluster, each group having at least one object, being $k \leq n$. Partitioning Methods are based on distance and can use mean to represent the centers of clusters, being very efficient for small and medium data sets.
- Hierarchical Methods: given a set of data objects, a hierarchical method decomposes them hierarchically. In these methods, incorrect mergers or splits cannot be corrected.
- Density-based Methods: the general idea of these algorithms is to continue to increase a given cluster as much as the density in the neighborhood exceeds some threshold. Density-based Methods can handle arbitrary shapes and can filter outliers.
- Grid-based Methods: these methods quantify the object space in a finite number of cells, forming a grid structure. These methods have a fast processing time, since they typically depend on the grid size and not on the number of data objects.

This study focuses only on the use of a Partitioning Method (k-Means), more specifically centroid-based, and therefore more emphasis will be placed on this category.

Data Normalization

In most situations the data cannot be compared since it is not on the same scale. This is why it is necessary to ensure that a technique is used to make it suitable for comparison. To do this, Data Normalization should be a first step, as it guarantees that the data can actually be compared by

changing its scale of values to a specific range and minimizing biased values (Jayalakshmi and Santhakumaran, 2011; Han, Kamber and Pei, 2012; Patro and Sahu, 2015; Eesa and Arabo, 2017). Thus, the Data Normalization aims to give equal weight to all features, being very useful and used in Clustering (Jayalakshmi and Santhakumaran, 2011; Han, Kamber and Pei, 2012). There are several ways to perform Data Normalization, however, there are two that can be highlighted (the only ones that are supported by PAL in SAP HANA): **Quotient Transformation – Sum** (Object Normalization) and **Min-Max Normalization** (Column Normalization).

Quotient Transformation – Sum will normalize the sum of the modified values to 1 and the modified mean will be equal to $\frac{1}{n}$. Therefore, the mean will be constant across the attributes, but the variances will differ. Assuming that a data set has n features and $O\ (o_1, o_2, \dots, o_n)$ is an object in that data set, Quotient Transformation – Sum normalizes O into a new object $O'\left(\frac{o_1}{S}, \frac{o_2}{S}, \dots, \frac{o_n}{S}\right)$, where $S = |o_1| + |o_2| + \cdots + |o_n|$ (Milligan and Cooper, 1988; Walesiak, 2014):

$$o'_i = \frac{o_i}{\sum_{i=1}^{n} |o_i|} \tag{1}$$

Min-Max Normalization performs a linear transformation in the original data, modifying the value scaling between 0 and 1 and preserving the existing relations previously. However, Min-Max Normalization may be affected by the presence of outliers on the variable. Under the assumption that min_F and max_F are the minimum and maximum values for a feature F, respectively, Min-Max Normalization maps a value v_i of F to v'_i in a range between 0 and 1 (Milligan and Cooper, 1988; Jayalakshmi and Santhakumaran, 2011; Han, Kamber and Pei, 2012; Patro and Sahu, 2015; Eesa and Arabo, 2017):

$$v'_i = \frac{v_i - min_F}{max_F - min_F} \tag{2}$$

k-Means: A Centroid-Based Clustering Technique

The k-Means algorithm is very useful to make analysis to data coming from the POS, since its characteristics allow it (Yoseph and Heikkila, 2019), being currently the most used, popular and simplest Unsupervised Learning algorithm, when the objective is to find structures from the data (Chaturvedi *et al.*, 1997; Wedel and Kakamura, 2000 cited in Boone and Roehm, 2002; Singh and Bansal, 2015; Hossain, 2017; Kansal *et al.*, 2018; Syakur *et al.*, 2018; Yoseph and Heikkila, 2019), having an optimal behavior in terms of computing time (Baian, Firli and Tri cited in Syakur *et al.*, 2018) and helping in the Decision Making Process (Kansal *et al.*, 2018).

Assuming a data set (D), containing n objects in the Euclidean Space, this algorithm will partition the objects present in D into several k clusters ($C_1, \dots, C_k$). Mathematically, $C_i \subset D$ and $C_i \cap C_j = \emptyset$, for $i \geq 1, k \geq j$. In other words, each cluster must contain at least one object and each object can only be associated to one cluster. To evaluate the quality of the results, an objective function can be used, aiming at a high intra-cluster similarity and a low inter-cluster similarity. Each cluster C_i is represented by a centroid (the center point of the cluster), which can be defined by the mean of the objects present in the cluster. The centroids should be as distanced from each other as possible. This distance can be measured through the Euclidean Distance: the length of a line segment between two points x and y in a n-dimensional space. In this particular case, it can be considered an object $o \in C_i$ and c_i (centroid of the cluster C_i) (Prasad and Malik, 2011; Han, Kamber and Pei, 2012; Kodinariya and Makwana, 2013; Singh and Bansal, 2015; Hossain, 2017; Kansal *et al.*, 2018). Furthermore, the quality of a cluster C_i can be measured by the Sum of Squared Error between all objects present in C_i and the centroid c_i, being defined by (Han, Kamber and Pei, 2012):

$$SSE = \sum_{i=1}^{k} \sum_{o \in C_i} d(o, c_i)^2, \tag{3}$$

where SSE is the Sum of Squared Error for all objects in the data set; o is the spatial representation of the object; and c_i is the centroid of cluster C_i. In other words, for each object in each cluster, the distance from that object to the centroid of its cluster is squared and the distances are summed (Han, Kamber and Pei, 2012). The goal is always to minimize this objective function.

The k-Means algorithm is relatively easy to understand as it does not involve a very complex cluster formation process. As already mentioned, the algorithm basically defines the centroid of a cluster as the average value of the points in the cluster (Prasad and Malik, 2011; Han, Kamber and Pei, 2012; Kodinariya and Makwana, 2013; Amorim and Hennig, 2015; Singh and Bansal, 2015; Hossain, 2017; Kansal *et al.*, 2018):

1. Firstly, it randomly selects k objects from a data set D, each of which initially represents the center of the cluster.
2. Each of the remaining objects is associated to a cluster that is more similar to it, based on the Euclidean Distance between the object and the center of the cluster.
3. From iteration to iteration, the algorithm improves the SSE, being computed, for each cluster, a new center, using the objects associated to the cluster, in the previous iteration.
4. Afterwards, all objects are reassigned using the new center.
5. The iterations continue until the clusters obtained are the same as those obtained in the first iteration.

The need to specify the number of clusters (k) can be seen as a disadvantage if there is no prior knowledge of the business to know what the desired value for k is. Thus, the problem lies in finding the optimal value for k. It will be possible to perform different values for k and check the results obtained for each one of them (Han, Kamber and Pei, 2012). There are some measures that can be considered to choose the best for k, from the simplest, such as By the Rule of Thumb or Elbow Method, to the most efficient, such as Silhouette Coefficient or Cross Validation (Han, Kamber and Pei, 2012; Kodinariya and Makwana, 2013; Kansal *et al.*, 2018). The one that is natively supported by PAL in SAP HANA is the **Silhouette Coefficient**. Silhouette Coefficient measures the similarity of an object, relative to the cluster where it is inserted, comparing the cohesion (distance to all objects in the same cluster) and the separation (dissimilarity between clusters) (Han, Kamber and Pei, 2012; Zhou and Gao, 2014; Amorim and Hennig, 2015).

For a data set D with n objects, and assuming D is split into k clusters ($C_1, \dots, C_k$), for each object $o \in D, o \in C_i$ ($1 \leq i \leq k$), the mean distance between o and all other objects present in the same cluster is calculated as $a(o)$ (Han, Kamber and Pei, 2012; Zhou and Gao, 2014; Amorim and Hennig, 2015):

$$a(o) = \frac{1}{|C_i| - 1} \sum_{o' \in C_i, o \neq o'} d(o, o'), \tag{4}$$

where $d(o, o')$ is the distance between the objects o and o' in the cluster C_i. $a(o)$ can be interpreted as measure of how well o is associated to its cluster – compactness (the lower the value, the better) (Han, Kamber and Pei, 2012; Zhou and Gao, 2014; Amorim and Hennig, 2015). Similarly, the minimum mean distance between o and all clusters to which it does not belong can be defined by $b(o)$ (Han, Kamber and Pei, 2012; Zhou and Gao, 2014; Amorim and Hennig, 2015):

$$b(o) = \min_{C_j : 1 \leq j \leq k, j \neq i} \left\{ \frac{\sum_{o' \in C_j} d(o, o')}{|C_j|} \right\} \tag{5}$$

The cluster with the lowest value of $b(o)$ is the neighboring cluster of o. The larger $b(o)$ is, the more separated o is from other clusters. Thus, the Silhouette Coefficient can be defined as (Han, Kamber and Pei, 2012; Zhou and Gao, 2014; Amorim and Hennig, 2015):

$$s(o) = \frac{b(o) - a(o)}{\max\{a(o), b(o)\}} \quad (6)$$

The preferred case is when $s(o)$ approaches 1 (i.e., $a(o) < b(o)$), because the cluster containing the object o is compact and far from the other clusters. On the other hand, the worst situation is when $s(o)$ is negative (i.e., $b(o) < a(o)$), which means that o is closer to objects belonging to other clusters than those belonging to its cluster (Han, Kamber and Pei, 2012; Zhou and Gao, 2014; Amorim and Hennig, 2015).

To evaluate the quality of Clustering, the mean value of the Silhouette Coefficient of all objects in a cluster can be used. Additionally, the Elbow Method can also be used, together with Silhouette Coefficient, replacing SSE, to derive the best value for k (Han, Kamber and Pei, 2012). In Elbow Method there is a value for k where the cost falls sharply and after that it reaches a level where from then on the cost falls very slowly and this should be the optimum value for k. Nevertheless, this "elbow" cannot always be identified directly, since sometimes there is no "elbow" or there are several "elbows" (Han, Kamber and Pei, 2012; Kodinariya and Makwana, 2013; Kansal *et al.*, 2018).

Predictive Analysis Library (PAL)

SAP HANA provides a set of techniques capable of moving application logic to the database through the Application Function Library (AFL) where Predictive Analysis Library (PAL) is included. The Predictive Analysis Library (PAL) defines functions that can be called using SQLScript procedures to execute analytical algorithms. SQLScript is an extension of SQL in SAP HANA, which allows developers to define complex application logics through database procedures (SAP, 2015).

PAL includes predictive analysis algorithms in nine Data Mining categories (SAP, 2015):

- Clustering.
- Classification.
- Regression.
- Association.
- Time Series.
- Preprocessing.
- Statistics.
- Social Network Analysis.
- Miscellaneous.

Methodology

As already mentioned, the objective of this study is to cluster the stores of a large Food Retail Chain. The data is hosted in SAP HANA and the entire research process was done there, making it possible to increase performance through computing in the database itself, rather than at an application level.

The data refers to one year of transactions in all stores. In total, the data encompasses more than 1000 stores with different behaviors. In this case, a sales volume based approach was used, using the **revenue** and **total number of transactions**, over one year, to cluster the stores. The term "transaction" refers to each receipt line and not the receipt. The structure of the data used can be seen in the table below:

Table 1: Data Structure

Column Name	Data Type	Description
RETAILSTOREID	String	Unique Store Identifier
REVENUE	Double	Annual Revenue (€)
NUMTRANSACTIONS	Integer	Annual Number of Transactions Processed

This study was divided in two stages: the first stage was dedicated to combining the Elbow Method with Silhouette Coefficient to find the best value for k; the second stage was dedicated to using the capacity of SAP HANA to find the best value for k, automatically, without having to use the methods used in the first stage. In the end, it was possible to compare whether the two approaches produce the same results, although SAP HANA was used in both. Since there is no prior business knowledge of the ideal number of clusters, the objective is to discover it.

The figure below illustrates the workflow performed in the first stage in a simplified way:

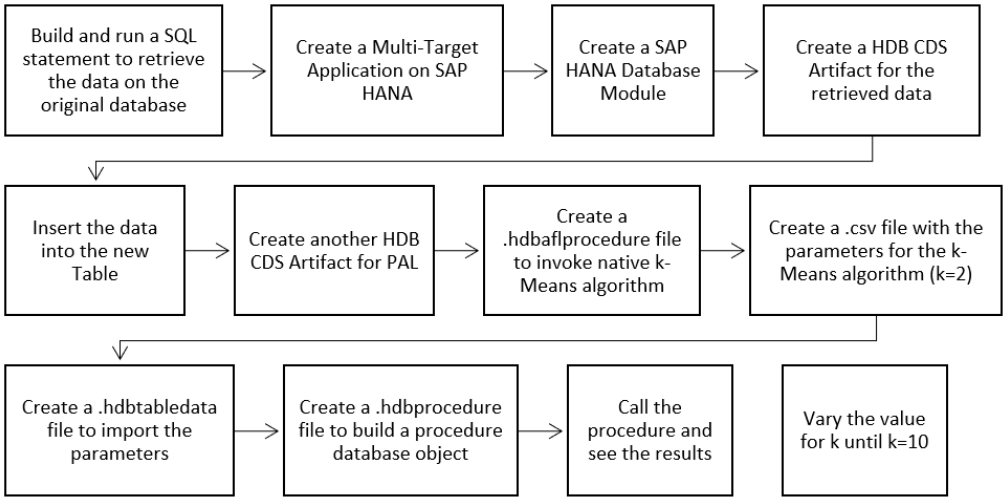

Figure 1: First Stage Workflow

First, the data had to be retrieved by executing an SQL statement, since the data does not match this structure in any table of the original database in SAP HANA. After that, there are all the conditions to start the creation of the project:

1. In the development part of SAP HANA XS Advanced, a Multi-Target Application (MTA) was created in the Cloud Foundry environment.
2. Then, a SAP HANA Database Module was created, indicating the Module Name, the namespace, the Schema Name and the SAP HANA Database Version.
3. Afterwards, a HDB CDS Artifact (tables.hdbcds file) was created, to build the entity that will save the SQL statement result. The SAP HANA Core Data Services (CDS) transforms a SAP HANA CDS resource into a database object defined in the CDS file (e.g. tables, views, types).
4. After the file with the table structure was created, the result of the SQL statement was inserted into that table.
5. After that, another HDB CDS Artifact (PAL_AFL.hdbcds file) was created to build the types, entities and views that will send data to the algorithm and save the results received from that algorithm.
6. Then, the PAL k-Means.hdbaflprocedure file was added to build the procedure that will invoke the native k-Means method of SAP HANA, passing it the information of which tables are input and output. In other words, it turns an AFL language procedure resource into a corresponding database procedure object.
7. After that file was added, a .csv file containing the parameters to be sent to the k-Means algorithm was also added. In this file, one of the parameters is the k (number of clusters), taking the value 2 initially.
8. The PAL Params.hdbtabledata file was created which maps the parameters inserted into the .csv file to the k-Means algorithm.

9. Later, the k-means-clustering.hdbprocedure file was added to the project, to transform a procedure resource into a procedure database object.
10. Finally, the built procedure was called, repeating the process up to $k = 10$ to see the results for each value of k.

After the entire workflow was completed, Silhouette Coefficient values were recorded for each value of k. Input (to send data to the algorithm) and output (to save the data returned by the algorithm) tables were used to run the algorithm, which can be seen below:

Table 2: Input and Output Tables for k-Means algorithm

Table Name	Purpose	Type
Input Data	Sends the data to the algorithm	Input
Parameters	Sends the desired parameters to the algorithm	Input
Results	For each data object, saves the cluster to which it belongs, the distance to the centroid of that cluster and the Silhouette Coefficient	Output
Center Points	For each cluster, saves the information about its centroids (average values of each feature)	Output
Center Statistics	For each cluster, saves the information about its centroids (average value of Silhouette Coefficient)	Output
Statistics	Saves the Silhouette Coefficient for the optimum value of k. In addition, it stores information about the F-Test and Analysis of Variance (ANOVA) for each value of k.	Output
Cluster Model	Saves a JSON statement with the algorithm settings	Output

The Parameter Table is probably one of the most important tables, since it will be the one that will send the parameters to the algorithm, including the value for k. The following are the parameters used for the first stage:

Table 3: Parameters for the First Stage

Parameter Name	Used Value	Meaning
GROUP_NUMBER	2	2 clusters
DISTANCE_LEVEL	2	Euclidean Distance
MAX_ITERATION	100	Maximum of 100 iterations
NORMALIZATION	2	Min-Max Normalization
THREAD_NUMBER	2	2 threads
EXIT_THRESHOLD	0,000000001	Threshold for exiting the iterations

Although k was set to $k = 2$, it was modified from iteration to iteration until $k = 10$. In the end, all values of Silhouette Coefficient were compared for each value of k and the Elbow Method combined with each of these values was used to choose the value of k.

Regarding the second stage, the changes that were imposed were at the workflow level, since the value of k was no longer changed and a range for k was imposed, i.e., instead of changing the value of k in each iteration, only one iteration with k between 2 and 10 was performed and the algorithm automatically identified the best value for k. Consequently, the parameters sent to the algorithm were also modified to meet this need. The figure below illustrates the workflow performed in the second stage in a simplified way:

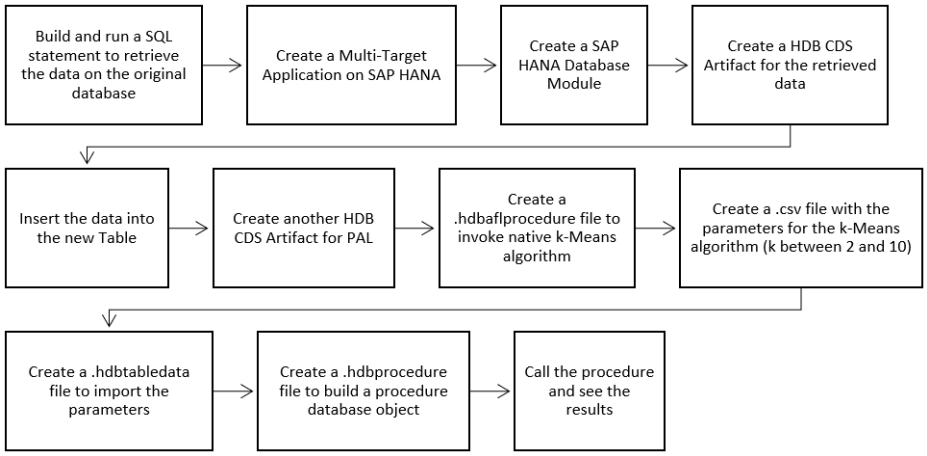

Figure 2: Second Stage Workflow

As can be confirmed in the image above, the workflow is quite similar to that of the first stage, but does not include iterations for the value of k, as the optimal value is automatically calculated. The following table shows the parameters used in the second stage:

Table 4: Parameters for the Second Stage

Parameter Name	Used Value	Meaning
GROUP_NUMBER_MIN	2	Minimum of 2 clusters
GROUP_NUMBER_MAX	10	Maximum of 10 clusters
DISTANCE_LEVEL	2	Euclidean Distance
MAX_ITERATION	100	Maximum of 100 iterations
NORMALIZATION	2	Min-Max Normalization
THREAD_NUMBER	2	2 threads
EXIT_THRESHOLD	0,000000001	Threshold for exiting the iterations

The results obtained will be presented and discussed in the following section.

Results and Discussion

First Stage: Using Silhouette Coefficient & Elbow Method

As already mentioned, in the first stage the value for k was varied between 2 and 10 and Silhouette Coefficient values were recorded for each one. In the image below, a graph is illustrated that permits to perceive the evolution of Silhouette Coefficient from $k = 10$ to $k = 2$:

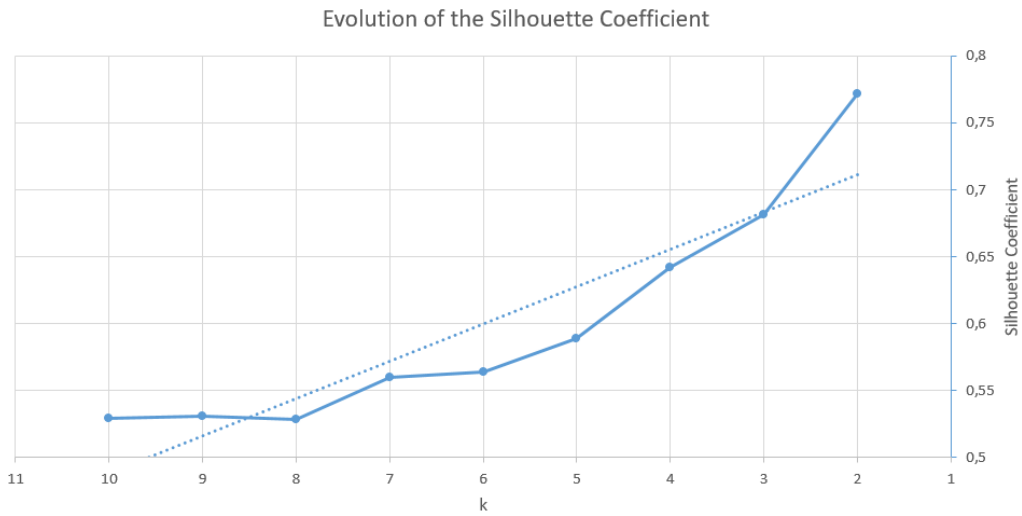

Figure 3: Evolution of the Silhouette Coefficient

Silhouette Coefficient was used instead of SSE, but the Elbow Method can still be used to choose the best value for k. The closer the Silhouette Coefficient is to 1, the better, and by analyzing the graph of the figure above, it can be concluded that the optimal value for k is $\boldsymbol{k = 2}$, since there is a sharp increase from $k = 3$ to $k = 2$ (the "elbow") (Ženko, Dzeroski and Struyf, 2006; Keith, 2018; Syakur *et al.*, 2018). Between $k = 10$ and $k = 8$ the Silhouette Coefficient remains relatively constant. It is from $k = 8$ that the value starts to have a more noticeable increase, until it reaches $k = 2$ with the highest recorded value.

Additionally, in the table below, the values of Silhouette Coefficient can also be consulted, for each value of k:

Table 5: Silhouette Coefficient values for each value of *k*

k	Silhouette Coefficient
10	0,52958552
9	0,53065832
8	0,52846195
7	0,56028868
6	0,56406801
5	0,58857234
4	0,64194644
3	0,68137486
2	0,77137570

The remaining results are present in the following subsection, since the optimal value for k was automatically calculated in the second stage and it can also be verified if the optimal value for k was the same in both stages. The goal is to present the results when the value of k is optimal and not to present all the results for each value of k.

Second Stage: Detecting Automatically the Better Silhouette Coefficient

As mentioned, in the second stage, a value for k was given between 2 and 10 and, automatically, the algorithm in SAP HANA calculated the optimal value, without having to resort to more manual

analysis. As expected, the optimal value for k in the first and second stages were the same. Therefore, it is relevant to present and discuss the results obtained for $k = 2$.

Starting with all the output tables, below are the structures for each one:

Table 6: Results Output Table Structure

Column Name	Meaning
RETAILSTOREID	Unique Store Identifier
CLUSTERNUMBER	Cluster Identifier where each data object is inserted
DISTANCE	Euclidean Distance between the centroid of the cluster and the data object.
SILHOUETTE	Silhouette Coefficient of each data object

Table 7: Center Points Output Table Structure

Column Name	Meaning
CLUSTERNUMBER	Cluster Identifier where each data object is inserted
REVENUE	Revenue value for the centroid (mean value of all data objects in the cluster)
NUMTRANSACTIONS	Number of Transactions value for the centroid (mean value of all data objects in the cluster)

Table 8: Center Statistics Output Table Structure

Column Name	Meaning
CLUSTERNUMBER	Cluster Identifier where each data object is inserted
SILHOUETTE	Silhouette Coefficient value for the centroid (mean value of all data objects in the cluster)

Table 9: Statistics Output Table Structure

Column Name	Meaning
NAME	Name of the statistical measure
VALUE	Value for the statistical measure

Table 10: Model Output Table Structure

Column Name	Meaning
MODEL	Model Identifier
JSON	JSON statement for the output model

Additionally, two views were built: STORES_CLUSTERED and CLUSTERS. The first crosses the information from the original data with the Results Output Table, thus being possible to complement the information from the Results Output Table with the Revenue and the Number of Transactions; the second view uses the first view, crossing this information with the Center Points Output Table, saving the additional information of how many stores were associated to each of the clusters. The respective structures are indicated below:

Table 11: STORES_CLUSTERED View Structure

Column Name	Meaning
RETAILSTOREID	Unique Store Identifier
REVENUE	Annual Revenue (€)
NUMTRANSACTIONS	Annual Number of Transactions Processed
CLUSTERNUMBER	Cluster Identifier where each data object is inserted

Table 12: CLUSTERS View Structure

Column Name	Meaning
CLUSTERNUMBER	Cluster Identifier where each data object is inserted
REVENUE	Revenue value for the centroid (mean value of all data objects in the cluster)
NUMTRANSACTIONS	Number of Transactions value for the centroid (mean value of all data objects in the cluster)
STORES	Number of stores in each cluster

After the algorithm was run, $k = 2$ was obtained, meaning that the algorithm built two clusters from the original data: **Cluster 0** and **Cluster 1**. Cluster 0 contains 1227 stores and Cluster 1 contains 205. For each cluster it is important to analyze the values of its centroids. The table below summarizes the values of the centroids in each cluster:

Table 13: Centroids Values

CLUSTER	REVENUE	NUMTRANSACTIONS	SILHOUETTE
0	0,07023500345024111	0,13588420543697133	0,8057390972346350
1	0,34512470874756773	0,45125316220345957	0,5656981654737712

By examining the table above with the values for each centroid, it can be concluded that Cluster 0 contains the less active stores, i.e., those with the lowest revenue and number of transactions processed, since the centroid values for this cluster (average value of all objects in the cluster) are much lower than for Cluster 1. Therefore, it can be concluded that Cluster 0 contains the less active stores and Cluster 1 the more active stores. In fact, the cluster of the less active stores is considerably larger than the cluster of the more active stores.

On the other hand, the centroid value for the Silhouette Coefficient in Cluster 0 is relatively higher than in Cluster 1. In Cluster 0, the centroid value for Silhouette Coefficient is very close to 1, which means that the Cluster is quite compact and distant from Cluster 1. Nevertheless, Cluster 1 not only has a lower value than Cluster 0, but it is also quite distant from 1, and it can be concluded that objects in this Cluster can probably be closer to objects in Cluster 0 than to objects in the same Cluster.

By analyzing the results directly in SAP HANA XS Advanced it is possible to obtain the location of the centroids of each of the clusters:

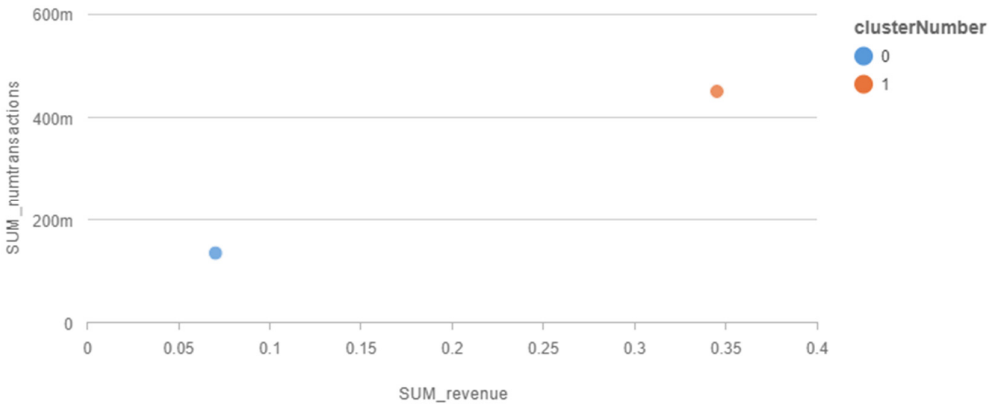

Figure 4: Scatter Plot for the Centroids Position

For the execution of the algorithm, the data was normalized using Min-Max Normalization. Nonetheless, after the algorithm is called up, it is not possible to view the normalized data, and only the original data in each cluster is available for viewing. Although the data is not available after Normalization, it is still possible to check the disposition of each store in a scatter plot:

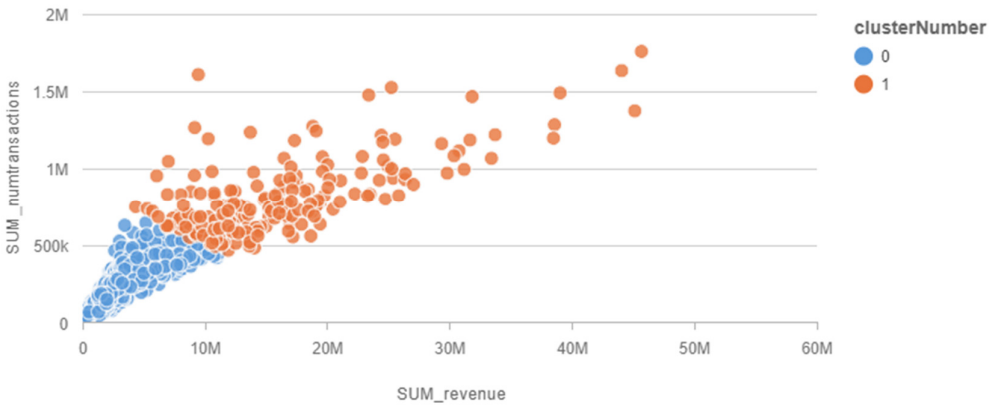

Figure 5: Scatter Plot for the Stores disposition

Analyzing the graph of the figure above, it is possible to verify a high point density for Cluster 0, confirming the theory that this Cluster is more compact and where the points are closer to each other (thus, the value of Silhouette Coefficient for its centroid is corroborated), unlike Cluster 1 that shows higher dispersion. This may mean that there are some outliers in the data, as k-Means is sensitive to outliers. As the goal was also to include outliers in the Clustering process, k-Means was used as the method for Clustering, being then possible to detect the most unusual stores. Thus, in the scatter plot it is possible to detect the stores that have a high activity and can be considered positive outliers.

Although there is a Silhouette Coefficient value for each centroid, the most important value is the value of this coefficient for the optimum value of k. As already mentioned, for $k = 2$, $\boldsymbol{s(o)} = \mathbf{0.7713756956906573}$.

Conclusions

All work was particularly focused on using the k-Means algorithm to cluster stores in the retail sector, conducting an in-depth technical analysis of existing SAP HANA methods to measure Clustering quality. SAP HANA is equipped with several algorithms that permit the execution of application logic in the database, considerably increasing computational efficiency. The k-Means algorithm was just one example of what PAL in SAP HANA has to offer to the developer community.

The k-Means algorithm proved to be quite efficient in running it on SAP HANA, taking less than 1 second to process the data and return the desired results. A very interesting advantage of SAP HANA, in relation to this algorithm, is its ability to automatically choose the best value for k, considering Silhouette Coefficient, thus reducing unnecessary human analysis. Although the Elbow Method, together with Silhouette Coefficient has been effective in this study, it may happen that in other situations there are different "elbows" and it is difficult to apply the same approach. Therefore, SAP HANA also comes to solve this problem, giving the possibility of obtaining the optimal result, without any interference from the user (except for the manipulation of the parameters to be sent to the algorithm). Another added value is the possibility to analyze the results obtained, directly in SAP HANA XS Advanced, through graphs that help to better understand the location of the centroids, for example.

On the other hand, this library provided in SAP HANA is not yet well known by the developer community and there is not much documentation on it, which makes it slightly difficult to use and develop in HANA. Still, it is a very powerful library, with a great deal of resources, which allows the developer to take advantage of the HANA environment, without having to use third-party applications and thus increasing computational efficiency.

With the results obtained in this study, it is now possible to identify the most and less relevant stores for the business, see which ones have more and less revenue and which ones have more and fewer transactions made annually. Actually, the group of less active stores is considerably larger than the group of more active stores. This is due to the amount of revenue generated and the number of transactions processed, given that not all stores have the same working capacity. Knowing how stores contribute to the business will drive manager's attention and allow for better decision making. For the less active stores, it will be necessary to consider whether they are really justified to remain in business, since they may only be reducing the final profit. The combination of the number of transactions and the revenue, during one year, is essential for the perception of business development in the retail market, since these two variables cannot be considered separately, as they could lead to misleading results.

In conclusion, PAL from SAP HANA has proven to be extremely useful and capable of solving real business problems, providing a different from the usual, yet efficient development paradigm.

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The COVID19 Pandemic and Sustainability: Consequences for The Fashion Industry

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Abstract

This article aims to understand how the epidemic crisis will affect the clothing industry's functioning and whether these changes will have a positive or negative impact on sustainable development. The analysis shows that most of the environmental consequences are related to the reduction of non-renewable resources and the reduction of environmental devastation. At the same time, social factors mainly concern job losses and the consequences in terms of poverty and hunger risk for many regions in developing countries. What seems interesting is that the changes in the functioning of the fashion industry have had an unambiguously positive impact on environmental factors, but definitely negative on social factors. The article uses research methods such as literature review, desk study (reports) and inference.

Keywords: sustainability, sustainable supply chain, fashion industry, COVID19 pandemic

Introduction

In recent years there has been a growing interest among governments, legislators, and managers in the idea of sustainable development. Businesses - especially those large companies with global brands and media visibility daily, with a strong economic, social, and environmental impact - have been in the center of public attention and under increasing social pressure. It applies, among others, to companies in the textile and apparel industry, which has been regarded as an anti-hero in sustainable development principles.

The industry is characterized by global, fragmented supply chains, steadily increasing outsourcing to developing countries, and the high environmental impact of production. The social pressure to increase corporate social responsibility forces many companies in this industry, to accelerate their search for ways to integrate sustainability into their supply chains. It seems all the more urgent as the further development of the fashion industry along its trajectory points to the possibility of catastrophic consequences in all dimensions.

The outbreak of the coronavirus pandemic severely hampered the industry's development and put into question the current business model. The economic effects of the crisis are becoming more and more visible and acute. A new report by Altagamma, BCG, and Bernstein predicts that the industry may lose up to 40 billion Euros this year through Covid-19, and its value will fall to 309 billion Euros, which is the lowest value in five years (Biondi, 2020). The main reason is not only delivery problems, but also hundreds of stores that are still closed or working short hours. Apart from these clearly adverse economic effects, however, the pandemic has many other social and environmental consequences. This article aims to understand how the epidemic crisis will affect the functioning of the clothing industry and whether these changes will have a positive or negative impact on sustainable development. In particular, the article tries to answer three research questions:

RQ 1. How has the pandemic affected the fashion industry?

RQ2: Do the identified changes in the industry supply chain impact the environmental or social aspects?

RQ3. Will these changes have a positive or negative impact on social and environmental aspects of sustainable development?

The article uses research methods such as literature review, desk study (reports, interviews) and inference.

Sustainable Development

The concept of sustainable development emerged in the 1980s and was disseminated with the Report of the UN World Commission on Environment and Development (OECD). It states that "sustainability means being able to satisfy current needs without compromising the possibility for future generations to satisfy their own needs." A decade later, the Elkinton concept of "Tripple Bottom Line" (TBL) has gained full recognition (Elkinton, 1998, 2004, in Caniato, 2012, p. 660). It proposes that enterprises' business performance should be assessed in parallel from three perspectives: economic, environmental, and social. It means that development can be both economic and social and environmental, and should also take into account the long-term perspective. It soon became apparent, however, that sustainability cannot be limited to the company alone, but must be extended to the entire supply chain and all key stakeholders. Sustainable Supply Chain Management (SSCM) can be understood as the strategic, transparent integration and achievement of an organization's social, environmental and economic objectives in systematic coordination of key inter-organizational business processes, in order to improve the long-term economic performance of individual companies and their supply chains (Carter & Rogers, 2008, p.368). Companies that strive to achieve at least a minimum level of sustainability must, therefore, extend all three elements of the TBL to each link in the supply chain (Koksal et al. 2017, p.1).

Sustainable Development in The Fashion Industry

The textile and clothing industry is a vital sector in the global economy. Globally, the $1.3 trillion worth clothing industry employs more than 300 million people throughout the value chain; cotton production alone accounts for nearly 7% of total employment in some low-income countries (Apparel & Footwear, 2016). Over the past 15 years, clothing production has roughly doubled, driven by the expansion of the middle class worldwide and an increase in sales per capita. It is mainly due to the 'fast fashion' phenomenon, which means the rapid introduction of new styles, increased number of collections offered annually, and often lower prices (A new textiles economy, 2017, p.18).

At the same time, it must be acknowledged that this is one of the most 'unsustainable' industries that exist, as the current system of production, distribution, and use of clothing operates in an almost linear fashion. It involves extracting large quantities of non-renewable resources to produce garments that are often only used for a short period, after which the materials are primarily lost in landfills or burned. It is estimated that more than half of the fast fashion clothing produced is disposed of in less than a year (A new textiles economy, 2017, p. 19). This linear system causes enormous consumption of resources, pollution and degradation of the natural environment, bringing about significant adverse social effects on the local, regional, and global scale. The textile industry relies mainly on non-renewable resources such as oil for the production of synthetic fibers, fertilizers for cotton growing, and chemicals for the production, dyeing, and finishing of fibers and textiles. Textile production (including cotton) also consumes about 93 billion cubic meters of water per year, contributing to problems in some water-poor regions (Ibid., p.20). The industry's massive carbon footprint goes beyond the use of raw materials - it also includes greenhouse gas (GHG) emissions from textile production, which amounted to 1.2 billion tonnes CO2 equivalent in 2015 (21 more than all international flights and shipping combined).

The textile and clothing industry not only sins against the environment but also causes many negative social consequences throughout the supply chain. Many workers in textile and clothing factories work under dangerous conditions in processes using hazardous substances and chemicals. The pressure to reduce labor costs results in the relocation of production to developing countries (Bangladesh, Vietnam), where decent wages, appropriate working conditions and working time and safety standards are rarely ensured (there is even talk of modern slavery). The effects of negative social impacts also affect local communities, which may suffer from bad environmental practices, such as pollution of local rivers by untreated production wastewater (Ibid., p.21).

Due to irresponsible practices throughout the supply chain, the fashion industry has, for many years, been subject to scrutiny and criticism by various types of sustainable development NGOs. The Pulse Score 2019 report shows that companies in this industry are still not implementing sustainable solutions quickly enough to offset the negative environmental and social impacts (Lehmann et al., 2019, p. 4).

The consequences of the COVID-19 pandemic for the fashion industry and their impact on sustainable development

The outbreak of the pandemic brought about dramatic economic effects for the fashion industry in particular. A report by Business of Fashion (BoF) and consultants McKinsey predicts that if stores are closed for two months, 80% of listed fashion companies in Europe and North America will be in a difficult financial situation (Amed et al., 2020a). The average market value of fashion and luxury companies fell by nearly 40% in the first three months of 2020 - a more sharp decline than the entire stock market. Global fashion sales are projected to fall by 30% in 2020 and the luxury goods market by up to 40%.

The following part of the article will analyze the most important consequences of the coronavirus pandemic crisis for the fashion industry and their impact on sustainable development practices, but only those concerning environmental and social aspects. This impact may be direct or indirect, positive, or negative.

Sourcing of Raw Materials and Materials

The COVID-19 pandemic has caused a sharp collapse in retailing and many disruptions in the fashion industry's supply chain. The first direct effect of the retail collapse due to the implementation of social distancing and border closure provisions was an almost immediate reduction in production and cancellation of orders. From an environmental point of view, this has the same benefits as a significant reduction in textile production means less environmental devastation. However, given the social consequences, this picture is no longer favorable. The latest statistics, collected by the ITMF - International Federation of Textile Manufacturers, show that in the first quarter of this year, brands and retail chains canceled 31% of orders from their textile suppliers worldwide, and a global turnover of the textile and clothing sector could fall by 28% in 2020 (Amed et al., 2020a). The International Labour Organisation (ILO) has described the pandemic as "the worst global crisis since World War II." It estimates that its impact could lead to 195 million workers being made redundant already in the second quarter of this year (in Bangladesh, India, and Cambodia).

Moreover, a direct consequence of the significant reduction in textile production is the very worrying phenomenon of withholding payments for ordered materials. It again leaves crowds of people without any material support, as this activity occurs in most countries where there are no social security systems based on insurance. However, many fashion companies are aware that such behavior dramatically undermines mutual trust and will be a severe barrier to restoring good relations in the future.

Likely, the increase in social and environmental vulnerability caused by the pandemic will result in higher pressure to use recycled materials for production. It creates an opportunity to drastically reduce the use of non-renewable resources and the negative environmental impact of the industry. At the same time, it provides an opportunity for innovative use of renewable raw materials for the production of plastic-based fibers, or the use of regenerative agriculture for the production of cotton and other cellulose-based fibers (A new textiles economy, 2017, p. 91). The use of recycling is also an excellent opportunity to reduce waste. Less than 1% of textiles produced for clothing are recycled, not to mention the high costs of storage and incineration (Ibid., p.112). Both phenomena, however, do not seem to have a significant social impact, except for the chance to develop knowledge and a certain number of jobs in companies working on such innovations.

Production

Just as in the case of the reduction in the production of materials and raw materials, the direct and immediate effect of the outbreak of the pandemic was a drastic reduction in the volume of production. From the perspective of sustainable development, we can again speak of the positive impact of this situation on the natural environment (reduction in the consumption of natural resources and raw materials and reduction of production waste) and the negative impact on social issues (loss of jobs and livelihoods of hundreds of thousands of employees).

Another critical effect of COVID-19 is the strengthening of partnerships with suppliers. The effects of the pandemic are expected to accelerate the building of close partnerships between retailers and their suppliers in all segments of the clothing market, from mass to luxury products. Companies need to invest in building closer relationships with their suppliers throughout the value chain to gain greater insight and impact and to become more agile and resilient to such crises (Roberts-Islam, 2020). Establishing close relationships with suppliers does not have any impact on environmental sustainability issues. However, it certainly has positive social consequences; above all, the improvement of supplier companies' position vis-à-vis their influential customers, more excellent stability, employment security for employees, or job guarantees.

Such strategic partnerships with suppliers (e.g., in the form of alliances) will also be necessary due to the gradual implementation of the digital transformation, consisting, among others, in wider use of digitization and modern 4.0 technologies. Tools such as virtual fashion shows, digital showrooms or live streaming trade, until recently used by only a few leaders in the industry, are now entering a wider circulation and become a must-have for companies wishing to stay on the market (Amed et al., 2020a, p. 32). The implementation of modern 4.0 technologies, such as the latest 3D design tools or the Internet of Things (IoT), is also observed at an accelerated pace. These technologies allow - even in the event of similar disruptions in the future - precise and up-to-date information on the various stages of production and distribution. They can, therefore, be used to track the entire supply chain and obtain immediate product information. A positive social consequence of this is that the transparency of the company's activities - both in terms of the quantity and method of manufacture of clothing and its carbon footprint - has increased significantly. Once the pandemic is over, transparency has a chance to become a strategy for rebuilding weakened trust in brands and retailers (Fashion Transparency Index p.47).

One of the most frequently mentioned consequences of the current pandemic is also nearshoring (or reshoring) (Amed et al., 2020a, p.33), i.e., the transfer of production to neighboring countries, due to lower transport costs, easy logistics and cultural/linguistic proximity. Closing the borders with all the focus revealed all the disadvantages and risks of outsourcing and increased the demand for "on-site" products. As a consequence, new jobs will have a positive social impact, due to the creation of production centers in, e.g., Central and Eastern Europe or Central America. A negative impact will be the reduction or loss of many jobs in developing countries.

Distribution

The coronavirus pandemic has also demolished the industry's current calendar with two main seasons (summer and winter) and a continuous race in the number of collections being launched. The critical event for the industry, which is decisive for the purchase of models for the next season, the so-called fashion week, held in several cities, has long been criticized for the incomprehensible and absurd waste of resources (expensive shows, trips, events for thousands of people in many cities, etc.) (Amed et al., 2020b). However, the shows and fairs themselves are already being successfully replaced by virtual events. On the environmental impact side, there is a "plus" due to reduced waste of resources associated with the organization of fashion weeks, fairs, and exhibitions (including reduced CO2 emissions associated with reduced business travel). In contrast, on the social impact side, there is a "minus" due to the loss of some existing jobs (bankruptcies of companies servicing this type of event, reduced demand for temporary workers). The sharp drop in sales resulting from the closure of shops and requirements of social distancing also resulted in a significant reduction in the transport of goods, which has some impact on the reduction of CO2 emissions.

An exciting direction of transforming the industry, which may gain momentum as a result of the pandemic, is the development of the 'clothing as a service' business model (A new textiles economy, 2017, p. 76). Such alternative business models are based on the resale or rental of clothing (rental subscription, short-term rental, sale of highly durable clothes, resale) and the provision of related cleaning, maintenance, repair services, etc. It is considered that the popularity of such business models may increase after the pandemic due to high levels of stock surpluses throughout the value chain. The increase in popularity of the "clothing as a service" business model would have a positive impact on the environment, reducing the need for new products and thus saving non-renewable resources. Secondly, it allows extending the life of clothes (time of their use) significantly, which is only 15 years worldwide has shortened on average by 36% (Ibid., p. 77), mainly due to the so-called fast fashion. Thus, the "clothing as a service" model becomes a kind of counterbalance to the cheap purchase of large quantities of clothes.

Retailing

The forced closure of stationery stores and the transfer of trade to the chain was the most visible and striking consequence of the coronavirus pandemic. The most affected were companies operating exclusively off-line, i.e., those where sales are conducted through stationery stores, but all players dramatically felt the effects. Experts from the industry claim that off-line trade will probably not return to the dynamics it had before the crisis for many years. It seems that the times of fast fashion (buy a lot and buy cheaply) are gone forever. From sustainable development, this is excellent news - the pandemic has become an impulse that rapidly changes the philosophy and functioning of the whole industry, making it more socially responsible. The closure of hundreds of thousands of stationery stores means, above all, saving resources: electricity, water, fuel, etc. In social terms, however, this means lost jobs and livelihoods for millions of people.

The consequence of closing the shops was the transfer of sales (like many other areas of life - communication, entertainment, etc.) to the Internet. The digitalization of sales is becoming a must-have for the entire fashion industry. It will perhaps consistently reverse the proportions between off-line and online sales, although until now, it was online sales that supported and added to fixed-line sales (Amed et al., 2020a).

Companies that have quickly improved their digital capabilities by introducing innovative ways of advising customers, presenting, and advertising goods (e.g. using social media, telephone applications, engaging influencers, etc.) are likely to do well and have a chance to maintain sales. The pandemic has accelerated well-established shopping habits; In Europe, 13 percent of consumers started visiting e-shops for the first time (April 2020), and in Italy, alone e-commerce transactions have increased by 81 percent since the end of February (Sneader and Singhal, 2020, p.3). Moving trade to the network will have positive environmental effects (related to saving resources) and, again,

several negative social consequences. These will be mainly bankruptcies of companies that do not have sufficient resources or competences to digitize their services, followed by the loss of many jobs and rising unemployment. The only positive social impact will be an increase in the digital skills of the part of the society that has so far been digitally excluded.

Consumer Practices

One of the most frequently mentioned effects of the pandemic is the observed increase in consumers' environmental awareness. Karl-Hendrik Magnus, one of McKinsey's partners and a clothing industry expert, believes that "consumers have seen how vulnerable the whole world is, and the whole crisis has raised awareness of social and environmental sustainability, even among those who have not been in the subject before" (Roberts-Islam, 2020). For this reason, he believes that a return to pre-crisis consumer behavior is unlikely. Before the crisis, there was a gradual change in preferences for goods marked as sustainable, and it can be assumed that the pandemic has significantly accelerated these changes. McKinsey's survey of 6,000 consumers in the UK, Germany, France, and Spain shows that an additional 16% will look for sustainable credentials once the stores are reopened. 20% of consumers intend to reduce their overall spending by the end of the year, and 45% will look positively on companies that communicate with care and purpose rather than prices and products. Younger consumers, in particular, are seriously concerned about social and environmental issues. These groups increasingly support their beliefs about shopping habits, favoring brands aligned with their values (Baum et al., 2020, p. 45).

Experts also claim that the pandemic crisis has drawn people's attention to other aspects of the clothing industry, such as social sustainability. These changes in awareness are followed by two crucial consumer practices, which are of great importance for the development of the fashion industry. The first is a higher demand for sustainable clothing, and the second is conscious self-restraint and more thoughtful shopping. The growing interest in eco-friendly clothing is probably the most critical impulse to revolutionize the fashion industry. It means many positive consequences on the environmental side: more significant use of recycled materials, organic farming (e.g., organic cotton), and less environmental devastation. It also has several positive consequences on the social side - the creation of new jobs associated with a higher demand for clothes lending and resale services, and the likely greater involvement of clothing companies in socially responsible activities, such as supporting local communities.

Self-limitation in clothing purchases seems to be the second essential consumer practice that can have a significant impact on the fashion industry. First, consumers are withdrawing from discretionary expenditure, which includes clothing. Secondly, many of them declare that they restrict future fashion purchases precisely because of social responsibility (anti-consumerism) (Amed et al., 2020a). After all, giving up the purchase of a product is the most sustainable thing any consumer can do, because buying a few additional products produced sustainably is still a waste of resources. The consequences of this practice on the part of the environment should be assessed unequivocally positively. One can mention the slowing down of the brutal fast fashion (which is associated with the reduction of resource consumption, environmental pollution, and waste reduction), as well as the reduction of resource consumption (including non-renewable ones) as a result of smaller production.

A summary of the impact of the pandemic on the fashion industry and its consequences (positive and negative) for sustainable development is presented in Table 1, but this is not an exhaustive list.

Table 1: Impact of the pandemic on the fashion industry and its consequences (P - positive and N - negative) for sustainable development

Supply chain	Industry implications of the COVID-19 pandemic	Impact on environmental aspects	Impact on social aspects
Sourcing of raw materials	**Restriction of textile production - cancellation of orders**	P – reducing environmental devastation	N – loss of jobs and livelihoods of millions of employees, increase in poverty
	Non-payment to producers for ordered and manufactured materials	no influence	N – job losses N – loss of confidence and difficulties in rebuilding future cooperation
	Increasing the use of recycled materials	P - reducing the use of non-renewable resources and reducing environmental devastation	P – new jobs in recycling companies P – innovations in fiber recovery and processing technology N – loss of some existing jobs
	Accelerating innovation in textile production	P – development of regenerative agriculture P – innovative use of waste for fiber production P – the use of renewable raw materials for the production of plastic-based fibers	P – development of new knowledge, innovations
	Reducing production volume	P – reducing the use of resources and raw-materials P – limiting the amount of production waste	N - loss of jobs and livelihoods of millions of employees, increase in poverty
	Strengthening partnerships with suppliers (e.g. strategic alliances)	No influence	P – greater stability, employment security, job guarantees
	Innovations increasing production efficiency -	P - reducing the use of resources and raw-materials	P – greater transparency (e.g., blockchain)

Production	**implementing technology 4.0 (4D, IoT)**	P – reducing resource waste P – reducing the amount of production waste (e.g., felling)	P – international virtual teams P – new jobs in technology companies that support fashion N – loss of some existing jobs
	Reshoring or nearshoring	P – smaller adverse effects of production on the environment	P – new jobs in Europe and America N – loss of some jobs in the Far East
Distribution	**Change of the fashion calendar - limitation of seasonality**	P – reducing resource waste P – reduction of business travel - lower CO2 emissions	N – loss of some jobs N – the bankruptcy of companies servicing fashion shows, fairs etc. P – new jobs in IT firms
	Restriction of transport of goods	P – lower CO2 emissions	N – loss of some jobs
	Accelerating the development of the "clothing as a service" model	P - reducing the use of non-renewable resources P - reducing environmental devastation	P – new jobs in companies based on new business models
	Virtual markets, fashion shows	P – lower CO2 emissions P – reducing the use of the resources P – less pollution	N – loss of some jobs P – new jobs in IT companies serving the industry
	Closure of stationery stores (decrease in sales)	P – reducing the use of non-renewable resources P – less pollution	N – loss of some jobs (sellers) N – lowering employees' salaries N – the bankruptcy of stationery retailers
	Transfer of sales to the network	P – reducing resource waste	N – the bankruptcy of stationery retailers

Retailing			N – exclusion of some customers (without internet access) P – acquisition of digital skills by new consumer groups
Consumer practices	**Increase in demand for sustainable clothing**	P – more extensive use of recycled materials for production P – wider use of organic and innovative materials P – reducing the use of non-renewable resources	P – new jobs (new business models) P – more socially responsible initiatives
	Consciously restricting purchases	P – slowing down "fast fashion" (reducing resource consumption, environmental pollution, reducing waste)	N – limiting production, which means job losses, increased poverty, etc.

Source: own work

The outbreak of the pandemic caused significant changes in the entire textile and clothing supply chain. All the consequences identified will have a greater or lesser impact on the sustainability of its businesses. These consequences concern both environmental and social aspects. They are positive, i.e., they are factors facilitating the implementation of sustainable development principles, or negative, i.e., they are barriers hindering adaptation to these principles. Attention is drawn to the relative balance of environmental and social factors and the fact that these factors are often repeated. It means that most of the environmental consequences can be reduced to a reduction in the use of non-renewable resources, less waste of resources, and environmental devastation. In contrast, most of the social factors are related to job losses, increasing the risk of poverty and hunger for many regions in developing countries. Characteristically, changes in the fashion industry's functioning have resulted in a positive impact on environmental factors, but definitely negative on social factors.

Summary

The outbreak of the coronavirus pandemic suddenly stopped the textile and clothing industry's development and questioned the business model. In the opinion of many experts, this is an excellent opportunity to rethink the industry's rules, which is considered to be exceptionally socially irresponsible and criticized for a massive waste of resources. The article analyses the issues of how the epidemic crisis affects the change in the functioning of the clothing industry and whether these changes will have a positive or negative impact on sustainable development. The last subchapter presents the consequences of the crisis, which concern both environmental and social aspects. Simultaneously, some of them are positive, i.e., they constitute factors facilitating the implementation of sustainable development principles, and some are negative, i.e., they constitute barriers impeding the adaptation to these principles of sustainable development. There is a relative balance of environmental and social factors.

Moreover, most of the environmental consequences are related to the reduction of the use of non-renewable resources and the devastation of the environment. At the same time, social factors mainly concern job losses and the consequences in terms of poverty and hunger risk for many regions in developing countries. What seems interesting is that the changes in the functioning of the fashion industry have had an unambiguously positive impact on environmental factors, but definitely negative on social factors. It leads to the conclusion that it is necessary to rethink very thoroughly how to rebuild the industry in order to counterbalance the negative social consequences and, at the same time, take advantage of the opportunities that arise to strengthen the positive environmental effects.

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Economic Dimension of Artificial Intelligence in Future Medicine

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Abstract

Living to the age of 120 is not enough, people want a quality and satisfied life, not a vegetative state. Artificial Intelligence in medicine provides a potential for a healthy life. It brings about new approaches to monitoring a patient's state, robotic surgery, decreases difficulty of operations and improves considerably diagnostic possibilities. Artificial Intelligence is an important vehicle for solving ethical problems in treatment and the entire health system. This saves up time for a physician to talk to the patient and mutual trust is re-established, which is the essential of medical ethics. This article focuses on a search for attributes of technical aspects in medical science. Its objective is to identify elements of holistic medicine that can be employed for transfer of information in a human body. The research presents an important conclusion, which is linked with the fact that current technical aspects of medical sciences are narrowly specialized and the key in such segment specializations is not the ethical medical aspect of the problem, but the technical one. It can be presumed that Artificial Intelligence will enhance holistic and personalized medicine. Personalized medicine analyses a person as a unique individuality. Holistic medicine considers a person as one complete set, a holistic system of interlinked organs, links and relations, it does not separate the technical aspect from the ethical aspect. Artificial Intelligence can become an immensely important platform providing data to be implemented by holistic medicine that is seen as the key treatment of the future.

Keywords: Artificial Intelligence, robotic surgery, personalized medicine, holistic medicine, neuroplastic mapping

Introduction

Artificial Intelligence helps to cope with new technologies and new approaches to diagnostics on the technical level. It will not replace physicians since only humans are able of independent thinking, at least so far. It enhances new approaches to the ethical dimension of the physician – patient relationship and it can decrease direct as well as indirect costs. This approach is tied more with the multibranch view as it contains, beside the medical view, also ethical and economic aspects. It is not a partial view, but a comprehensive perspective is required.

Artificial Intelligence is something that people cannot imagine quite precisely what it is. While most people have heard of it, only few have actually encountered it. Artificial Intelligence is nothing but an algorithm, a set of procedures and tools, another version of smart software (Ranschaer, 2019) that can process great amount of data in an extremely short time. Artificial Intelligence in relation to medicine has several lines such as the technical level, ethical level and method of information transfer in a human body etc. All of these levels need to be first researched before any conclusions can be made in line with the aim of this article (Pernica, 2017).

Theoretical basis

Technical line of Artificial Intelligence in medicine

The technical part has three basic lines. First, it is a set of algorithms that map certain body functions such as heart rate monitoring, monitoring of neural systems, monitoring of biochemical function processes and others. It is further modelled, connected in various ways with possibilities of alternative scenarios and results in a form of body functioning. The second line concerns robotic surgery when Artificial Intelligence enables to reduce radically blood consumption, the size of intervention in the body, decrease post-operation complications, increase efficiency of surgeries and often even eliminate them and apply a less invasive procedure instead. A robot is mostly controlled by a human, but its memory enneagrams (Mitchell, 2019) contain all known interventions, procedures and detailed operations that have been implemented at medical facilities in the past 6-8 years. The third line of use of Artificial Intelligence is its employment in diagnostics. Artificial Intelligence, thanks to its speed of data processing, (Mařík, 2019) is able to consider thousands of pieces of input information about the state of the human body and find in them the most probable type of disease. From the perspective of diagnostics, this has occurred in the past 3 years.

Ethical-spiritual line of Artificial Intelligence

Information protection. Artificial Intelligence can protect GDPR and all other standards, data security and protection systems better than humans do. The ability to work with such information. It will create information background that will strengthen a physician's role. Artificial Intelligence should guarantee amazing speed or processing voluminous quantities of information. The human brain chooses the main article strategy and then proceeds accordingly, whereas Artificial Intelligence has a reservoir of solutions and we can choose from these outputs. (Fieschi, 2013) Artificial Intelligence is best at processing this amount of information, searches it to find key information and links relating to its processing (Wilks, 2019). It is an ethical dimension of a physician. But a physician remains the key.

Artificial Intelligence processes a patient's diagnostics, but it cannot tell what disease it is, what are the prospects of healing and consequences. Telling patients whether they are terminally ill or whether they will suffer lifelong consequences depends only on a physician's empathy and approach. The Hippocratic Oath includes an ethical dimension. What does this dimension actually mean? The crucial dimension of ethical in medicine is to do no harm to patients. There are still many diseases that do not need to be treated, the effort should only be to mitigate it. But it is often omitted that patients should be done no harm. How can this be achieved in the modern overmechanized times we are living in when everyone is extremely busy and do not have time for anything? By giving patients the time. The second crucial moment in medical ethics is the patient – physician relationship. What relationship can actually establish when a patient answers a physician 3-4 questions? This could be the solution to the problem: giving medical staff in the health care sector where everything is limited and physicians are rather clerks who spend 3 minutes out of the 4 they have typing on their computer.

To give physicians time for their patients, we first need to take off them the burden of having to do various analyses. (Strachotová, 2012) The situation with biochemical procedures, neural systems, internal procedures. All of this can be done by modern medicine, processing data with the help of Artificial Intelligence. Thanks to AI, we can have results in a very short time and they include all crucial functions: it is a great facilitation for physicians and give them more time to address the patient. At present, medical science is advanced to a degree comparable to engineers calculating fortified constructions using a slide rule. In fact, engineers do not even use calculators, they even skipped calculations on computers, but the

are now assisted by the computer in the design of constructions. By contrast, a physician still writes request forms for different types of examinations and then waits long for the results. Furthermore, they try to find any connections between input results and they typically go for the first or the second solution that comes to their mind as the most frequent one. Patients spend their days like messengers, doing errands with their request forms, they carry around printed outputs or data carriers, suffer mentally and fear what their diagnosis may eventually be. This results in a patient being more mentally disturbed than it would be necessary. Physicians have hard time to find another 15 minutes to fix a date with their patients. In a fortnight? In a month? And the process will be no different as results from one examination will be bad, the second ones will get lost as the patient carries them around and third examination will have to be redone. By contrast, Artificial Intelligence can process all of this in several seconds, find similar symptomatic solutions in its database and suggest the physician to take a look from the perspective of holistic medicine. Although it may sound as a cliché, it is essential even for banal illnesses these days.

Holistic Medicine

Holistic medicine could benefit from Artificial Intelligence. Nowadays, the ethical and technical aspect of medicine lies in the fact that medical science, similarly to other scientific and technical branches, is narrowly specialized. Medical specializations are very narrow. With such segment specialization, it is the technical aspect of the problem that has become crucial, while the ethical-medical aspect was sidelined. Holistic approach has completely vanished. As a result, processes of different interventions keep improving together with the technique and display of the processes, but the ethical dimension of the physician – patient relationship is neglected and the holistic perspective is completely omitted. It is complicated to operate and resuscitate a patient after a brain stroke. Even when a patient is technically "safe and sound", they lost the ability to speak, walk and they will always be restricted to help from others. However, this is usually unimportant from the medical point of view.

Speaking of holistic medicine, it is necessary to consider two lines: firstly, a human is considered as a set of complex problems that cannot be separated. In technical and ethical terms, we need to see a person as a unity, we cannot deal with technical and ethical aspects separately. Artificial intelligence will help, will give us a holistic picture, but the ethical part is up to physicians. Half of success of any treatment lies in the trust between the physician and the patient. Artificial intelligence can provide physicians with information and with technical preconditions of treatment. It may suggest alternative methods of dealing with a given condition (Agah, 2013). It can process further data from other specialists in the place of a specialized physician and advise of risks linked with the selected solution that might not have been foreseen and check for any contraindications of the chosen treatment. Artificial intelligence is aware of no ethics, it has no empathy, it cannot communicate any conclusions or opt for a treatment, this role remains up to physicians. The communication between the physician and patient is crucial and Artificial Intelligence cannot substitute it. Artificial Intelligence provides information and implementation background and enhances the need for the ethical relationship between the physician and the patient. At present, 90% of Artificial Intelligence deals only with technical aspects, i.e. it is employed in robotic surgery, new materials, new diagnostic techniques, now methods of screening, but it does not address the supportive care in relation to patients.

Thanks to concentration of the maximum amount of information, Artificial Intelligence can suggest several methods (Topol, 2019) of treating a condition. It can calculate all possible scenarios (Klečka, 2014), find symptoms and history of previously implemented approaches. It knows their consequences and results. It can usually analyse them better than people. But should the main criterion for the decision to be taken be the cost-effectiveness or possibilities of technical solution? Or should the ethical dimension be the key? Ethical dimension means minimizing a patient's suffering, reducing their stay in a hospital and the treatment time. When patients cannot be cured, it is impossible to do harm to them.

Artificial Intelligence is used for treatment of common conditions (gall bladder, appendix) as well as new ones. They can be classified in subgroups (oncological diseases, degenerative nerve diseases, rare diseases). An example of a new disease is progeria – rapid aging. It is linked with an ethical as well as economic problem. Medical science usually does not carry out specific research of such diseases as it is extremely expensive and inefficient with respect to the number of treated patients. Who would invest billions in the development of a treatment for a small number of patients? Artificial Intelligence can help deal with this in the future. Artificial Intelligence will make diagnostic aspects of such diseases faster, cheaper and more effective. Causes of two new types of diseases are starting to occur. Diseases that have been unknown before and are linked with the climate change on the planet. The second cause is chemization of food, the environment and everything around us. In the Czech Republic, there are approximately 8 diseases that have fewer than 100 patients. These patients are only kept in a state of vegetative survival, which absolutely abstracts away from the ethical way of life.

Transfer of Information in The Human Body, Neuroplastic Mapping

Despite immense progress, we still know very little about the human body. When physicians following principles of Chinese medicine insert correctly an acupuncture needle and the kidneys start working better as if by miracle, is it a result of their perfect knowledge? How a signal was transmitted when there is neither connection through nervous system nor biochemical? (Beneš, 2016). There seems to be a strange kind of energy which we know very little about that was transmitted from the puncture mark to the kidneys. The Chinese physician does not now anything more either as they learn about different marks on the body from their predecessors. And since this "treatment" has been used for several thousands of years, patients often confide more in this alternative, because it really relieves them from common diseases. However, nobody explains to such patients that the treatment just followed the principle "Because of your faith you will be healed" (Dolista, 2017) that is often the case in treatment with homeopathic preparations. Chinese physicians know the technical method of such treatments, but they do not know the reason why they work.

Information is the basic unit of a body. Information is transmitted within the body as well as beyond. There is an effort to map such information flows, read them and process them. Information is transmitted through the nervous system that has several dimensions: electric, neuronic, stimulating, vibrating, harmonizing. And then there is the last dimension: immaterial. But in fact, it is not immaterial. It is only a system that is not known yet. It cannot be tracked identified, measured, monitored or controlled. From the ethical perspective, this system tells us that we still know very little about the functioning of the human body. That means that from the technical perspective there is an urgent need for the development of sensorics, scanning, interconnectedness of functions. Complementing the holistic picture, which we can get thanks to Artificial Intelligence by processing big data and big analytics. A human picture is a combination of material and immaterial processes. Which ones are immaterial? Thoughts and consciousness. Nobody has ever seen them, although there is an effort to map them via electric signals. Still it cannot be said that there is nothing like consciousness in our brain because we all subconsciously feel that something like that exists. Neuroplastic mapping forms the hardware of our consciousness. But what is actually consciousness? What kind of energy is it, what kind of transfer? We need to search for the answers to the questions. Do we know the human body? We do not. Can Artificial Intelligence help us map interconnectedness in the human body? (Ryneš, 2019) Yes, it is, thanks to the ability to process huge volumes of information. Artificial Intelligence can change the structure of time that a physician spends on a patient (analogically to marketing, change from 4Ps to 4Cs) (Kisslingerová. 2011). Artificial Intelligence saves time that physicians can dedicate to patients and enhance the ethical dimension of the physician – patient relationship, establishing trust and increasing the probability of successful treatment and thus increasing the prestige of medical occupation.

Presuming that the human body is a unity of material and immaterial systems, Artificial Intelligence can help identify, map and connect everything and save time that physicians can dedicate to their patients. In return, patients will have more trust in them and will naturally tell them more input data needed for the diagnostics of a given condition. At the same time, this approach will improve one more thing: while diagnostic methods in relatively young patients can be often remedied in time, in patients older than 60 or 70, a mistake can have fatal lifelong consequences. This is also the ethical dimension.

Economic Dimension of Artificial Intelligence

Humanity is facing global problems, which are probably associated with negative human activity and which undoubtedly cause damage to health due to the polluted environment (Rozenský et al. 2019). Health care costs keep growing. While it is to the joy of pharmaceutical companies, physicians often work extremely long hours and their job requirements are huge: their mistakes can damage patients' health fatally. It should be avoided that physicians prescribe statistically defined medicine that has no effect on solving a patient's problems whatsoever. This is non-ethical on the part of the physician, it yields no results, it is only a waste of resources. The economy is concerned directly (i.e. physicians' salaries, costs of medicine, operating costs of medical facilities) as well as indirectly when patients, instead of generating GDP, use up resources, often unnecessarily and with no use. (Monte, 2019) If holistic medicine is applied with the help of Artificial Intelligence, the total treatment time will reduce by up to 40%, treatment costs will decrease and patients will recover soon in all respects. Artificial Intelligence can make operations more considerate shortening in consequence the time of hospitalization, in some cases it might no longer be needed at all. Artificial Intelligence can also help with a personalized medical procedure as it will check all medicine used by a patient together with their contraindications. Personalized medicine, tailor made to a given patient, can also be useful in future. Estimates of decreasing the medicine consumption are about 50 – 60% of current values. This economic dimension will subsequently have positive impact on the ethical dimension as these measures will substantially improve patients' quality of life.

Discussion and Conclusion

Artificial Intelligence in medicine can process patient's symptoms faster than it would take a physician to sit down at the computer. Artificial Intelligence can save time and physicians can spend this time on establishing trust with the patient. The time needed for dealing with patients' problems will be reduced. This will create time for a discussion with patients and it will subsequently re-establish trust, which is essential of medical ethics and a basic predisposition of successful treatment.

Artificial Intelligence is an immensely important auxiliary tool for dealing with ethical problems in treatment and the entire health system. AI will enhance holistic and personalized medicine. Personalized medicine analyses a person as a unique individuality with no such other in the world. It will not be replacement of the physician as such, since only humans (out of all the fauna and flora on the planet) can think independently. In the first place, Artificial Intelligence lacks empathy. Holistic medicine considers a person as one complete set, a holistic system of interlinked organs, links and relations, it does not separate technical aspect from the ethical. Artificial Intelligence can become an immensely important platform providing data to be implemented by holistic medicine seen as the key treatment of the future.

Artificial Intelligence helps to cope with new technologies and new approaches to diagnostics on the technical level, new approaches to the ethical physician – patient relationship and it can decrease direct as well as indirect costs. This approach is tied with the multi-subject view as it contains, beside the medical view, also technical, ethical and economic aspects. It is not a partial view, but a comprehensive perspective is necessary.

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Comparing German And Czech Bakery Products Markets

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Abstract

Bread, just as other bakery products in general, has always been an important part of a modern human's food selection. However, the bread market has been through radical changes over the past centuries. Such changes are even more rapid and dynamic in our modern times. If companies want to succeed on the market, they need to understand the changes. Therefore, in order to understand the changes on this highly competitive market it is necessary to understand the trends in bakery operation economy, competitive environment, technological procedures, but most importantly: understand the consumer. This research was partially prompted by the fact that food production keeps growing, but the trends in bakery products do not correspond with such a growth. Its authors compare markets of two neighbouring countries, Germany and the Czech Republic. The objective was to describe changes and trends on both markets, identify similarities and/or differences in historic development, but primarily in the present. The authors focused, above all, on analysis of the causes of the changes. This paper presents a wide range of statistical data and a comparison of the two markets.

Keywords: Bakery, Czech Market, German Market, Trends

Introduction

Bread has always been important part on the menu of modern man. During centuries however, bread market has undergone dramatic changes. In our modern era, these changes are very fast and dynamic and bread market increased into billion business sectors in many countries. Despite these dynamic changes, we don't expect bread market to suddenly retreat, but if man wants to be successful on the market, he must understand these fast changes. To understand changes on this competitive market, man must understand trends in the economy, competitors, technological processes, but the most important thing without which he has no chance to survive is to understand consumer. First unconfirmed evidence of bread history we can find about 30000 years ago. According to Lohman (2012) other more proven dates to around 23000 years ago to the Upper Palaeolithic period. Form, type and quality was much more different as we know it nowadays. In nowadays Czech Republic territory, the oldest bread oven was found in village Bylany near Olomouc and its origin dates from around 4 800 to 4 600 BC (Hnutí, 2016).

In Germany evolved diversity of products, depending on region and different grain cultivation. The main two factors are pedological and climatic conditions and others could be different cultural development of each state (Deutsches Brotnstitut, 2011). In 13th century in Germany newly created cities established their independence and in accordance with customs and style a pronounced location-specific character (Brotexpert, 2017). Therefore, it could happen that bread forms changed from city to city and from landscape to landscape or had local idiosyncrasies. This boost of bakeries increased competition of an increasingly competitive

market which forced them more into inventions to stay efficient in order to secure sales. This initially led to local, later also to regional specialties (such as the Nuremberg gingerbread).

In nowadays Czech Republic regions, the growth of medieval towns and associated division of labour gradually pushed household productions. First bakeries were usually established in monasteries and under rich lords. In the 13th and 14th centuries, there were quite a lot of bakers. The bakers (same as in the rest of the world) were becoming wealthier and wealthier. Historical sources show, that in 1387 there were 159 bakers for Prague and of course most important from all baking products was bread (Hnutí, 2016). He played an irreplaceable role in the coronation of the Czech kings, when he was given priority over gold. In the first Czechoslovak republic - in 1930 – evidence show 13341 registered bakeries in which around 43000 people worked. In the 1950s, small businesses (in 1947 approx. 10000 bakeries with 45000 employees) were closed in the process of nationalization in connection with a change of the political regime after communist putsch in 1948 (Strachotová et al., 2018). After 1989, the privatization or restitution of all production capacities was gradually carried out, the renaissance of the craft bakeries and new technological trends. With the development of the market, the range of assortment is rising, manufacturers are grouped into production and sales groups to better withstand the pressures of concentrated business networks like supermarkets (Hnutí, 2016). German market was practically free if we count former Federal republic of Germany and these consequences in differences between these two markets we can see till nowadays.

Methodology

To describe the basic regularities we use descriptive statistics, it simply describes what is happening inside our sample or of what it consists of. It reduces big data into summaries, which serves us to simplify them and allows us to make observations and important comparisons inside unit. For forecasting of future trends are often used time series. Their main principle is to analyse data and predict how they will act in the future. As Litschmannova (2010) says, in prediction is sometimes very important elimination of random phenomenon on monitored indicator and to make time series smoother. For this are often used rolling means or medians.

Analysis of trend in time series is very important. As Hindls (2007) suggests, very popular method for trend estimation is least square method, which can be used if parameters are linear and we can estimate by this method linear and parabolic trend functions. For our estimation is this method sufficient. Now we will take a closer look on linear trend to indicate the procedure, which can be similarly applied with usage of literature on parabolic trend functions or common practise is usage of statistical software like SPSS or powerful Excel. At beginning of estimation, it is necessary to express trend, in our case now it is represented by general linear formula 1:

$$T_t{}' = \beta_0 + \beta_1 t \tag{1}$$

β_0 with β_1 symbolises unknown parameters and in accordance to linear regression we will come to system of two equations with two unknowns:

$$b_0 = \bar{y} - b_1 \bar{\bar{t}} \tag{2}$$

$$b_1 = \frac{\overline{yt} - \bar{y} * \bar{t}}{\overline{t^2} - \bar{t}^2} \tag{3}$$

Solving this we will acquire linear trend, but it is more appropriate to provide interval. For linear trend is interval prediction, where P>n defined as:

$$T_P - t_{1-\frac{\alpha}{2}}[n-2] * s * h_P < T_P < T_P + t_{1-\frac{\alpha}{2}}[n-2] * s * h_P \tag{4}$$

$t_{1-\frac{\alpha}{2}}$ is quantile of Student t distribution with n-2 degrees of freedom. Parameters s and h_P are defined as:

$$s = \sqrt{\frac{\sum_{t=1}^{n} y_t^2 - \sum_{t=1}^{n} T_t^2}{n-2}} \quad (5)$$

$$h_p = \sqrt{1 + \frac{1}{n} + \frac{(P-\bar{t})^2}{\sum t^2 - n * \bar{t}^2}} \quad (6)$$

Decision on which method to choose should be based on appropriate analysis of economic phenomenon, e.g. it is important to consider, if trend is growing, if function has inflex point, if method is designed for specific purposes (logistic trend was hugely used in estimations of biologic populations) or analysis of graph can be used, but this approach should be done very carefully, as is this method considered as subjective (Hindls, 2007). For realisation of this work were except of "harder" methods (e.g. statistical) used other relevant methods like descriptive, which is based on organised and description of processes, deductive method was used. We were trying to create conclusion from various information and general findings (for example from macroeconomic perspective in baking industry) or inductive method to form generalised answer.

Analysis of Czech Bread Market

Bakery market in Czech Republic is despite his communist history very competitive and most of the bakeries are funded through domestic capital (Dyntar, Strachotová, 2017). Foreign investments slowly decline or could be considered stable if we don't count companies returning from tax havens. Market is quite fragmented and doesn't have strong leader. According to Bisnode (2017) as leaders, we can mark company Penam and United bakeries. Strong leader in frozen semi-products is company La Lorraine. Other reason, why market doesn't have strong leader could be that profitability is lower as it is in other western countries. In recent years demand of customers for fresh products increased trend of semi-finished frozen products.

Transnational supermarket chains ruthlessly force bakers to concessions. Offer in bakery assortment is very rich and growth is noticed as well in regional specialties and bio products. Dřízal (2013) say, big problem on the market is very low prices on the market of EU. In 2015, according to (Hnutí, 2015) were margins of supermarkets 7x higher than margin of bakeries, see small margins of bakers (see fig. 1).

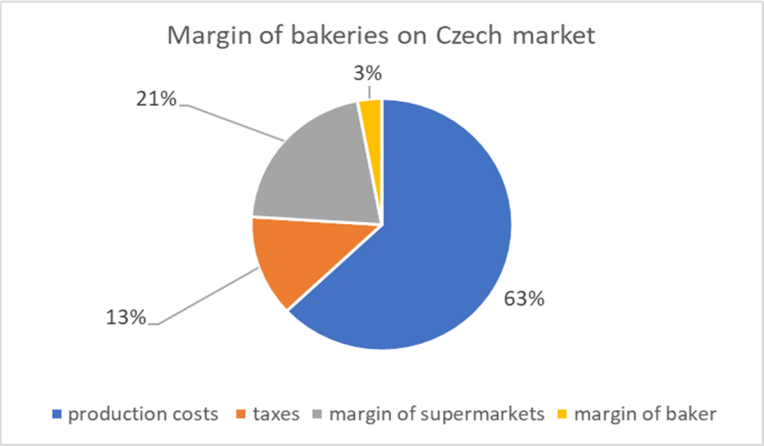

Fig. 1: Margin of bakeries on Czech market (Source: Self-plotted graph, data from Hnutí, 2015)

When we compare basic offer, which doesn't include regional specialities, we can say, that Czech market offers comparable offer of bread products to German for significantly lower price and price relations for baking products are therefore quite deformed. One of the reasons can be still very low purchasing power of Czech people. In the end of November 2017 was purchasing power of average German 2,65 times higher (22 239 euro to 8394 euro) than average Czech (Lichtner, 2017).

History indicates that volume of consumed baking products is slowly decreasing. According to the data of the Czech Statistical Office, in the year 1950 nearly 90 kilograms of bread per year were consumed per inhabitant in the year. By 2014 this volume fell by more than half (to 40 kg). On the other hand, previously, 27 kilograms of wheat bread products was consumed per capita, in 2014 it was more than 50 kilograms (Fryšarová, 2017) (see fig. 2). This group also includes pastries, such as baguettes, croissants, toast bread, but the croissant dominates it.

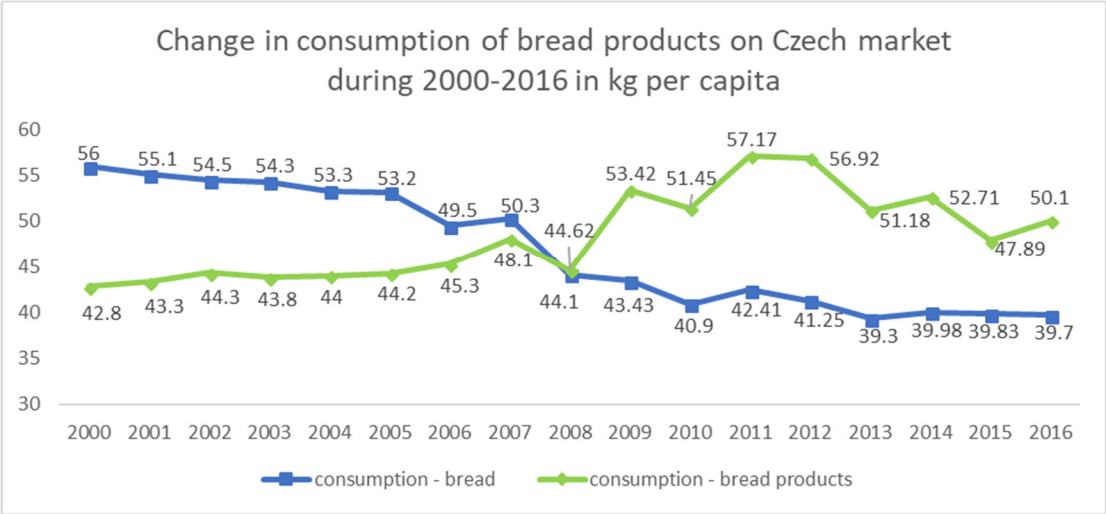

Fig. 2: Consumption development of baking products on Czech market (Self-plotted graph, data from Kozelský, Novák, 2018)

Current prices on the Czech market are relatively stabilised, strong turbulence in prices were around year 2008, bakeries then experienced shocks. As we see fig. 3, prices for baking products are approximately 1,9 times higher than price of bread. Exchange rate 1 EUR = 25,75 CZK. On one hand this can be advantage if bakeries use this price difference (Kutnohorská, Strachotová, 2019), but they must find the way how to persuade consumers to avoid supermarkets.

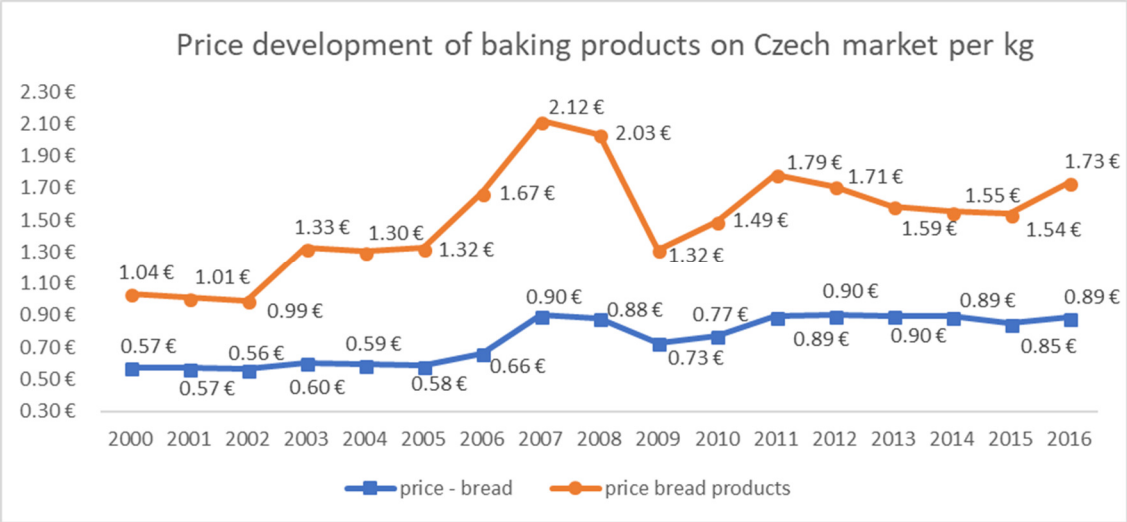

Fig. 3: Price development of baking products on Czech market (Self-plotted graph, data from Kozelský, Novák, 2018)

According to NMS market research from 2012, Czech consumers prefer preferences displayed in fig. 4 (HN, 2012). Research also mentioned that most of Czech consumers are buying in a bakery or shop with large assortment offer and significant amount of people don't mind buying semi-finished frozen products, even more, they appreciate freshness of baked frozen products in shops or bakeries.

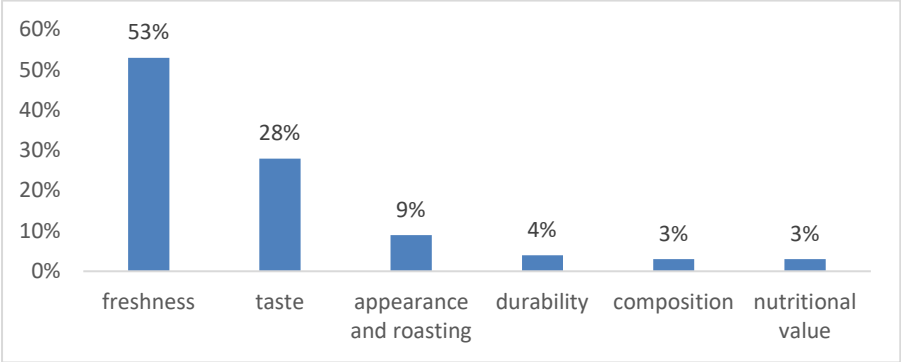

Fig. 4: Czech preferences when choosing bread according to NMS 2012 (Self-plotted graph, data from Dřízal, 2017)

Another research from 2012 conducted by GFK brings very surprising findings. Only 27% percent of spending on baking products bought by Czech people is bread, the rest consists of bread rolls or sweet bakery products (see fig. 5).

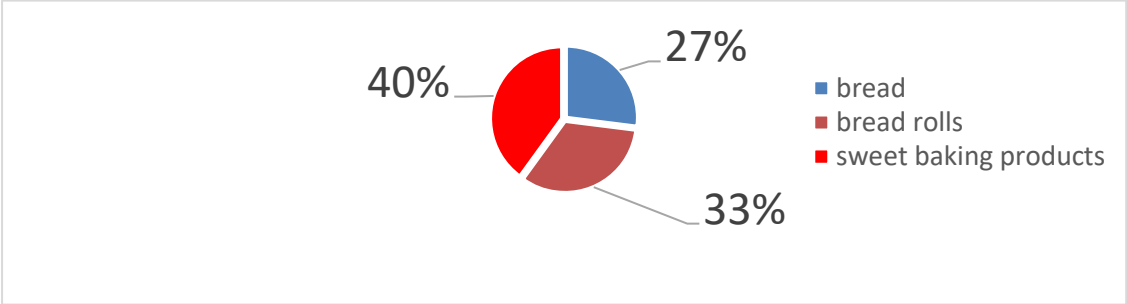

Fig. 5: Spending on baking products by Czech consumers, GFK 2012 (Self-plotted graph, data from Šebková, Bodorová, 2012)

More than half of Czech buying baking products daily (see ig. 6) and most people spend their money in supermarkets (see fig. 7).

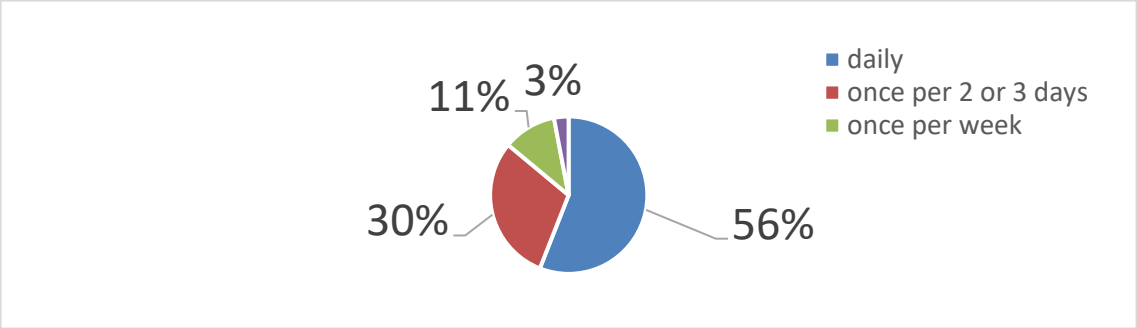

Fig. 6: Frequency of Czech buying baking products, GFK 2012. (Self-plotted graph, data from Šebková, Bodorová, 2012)

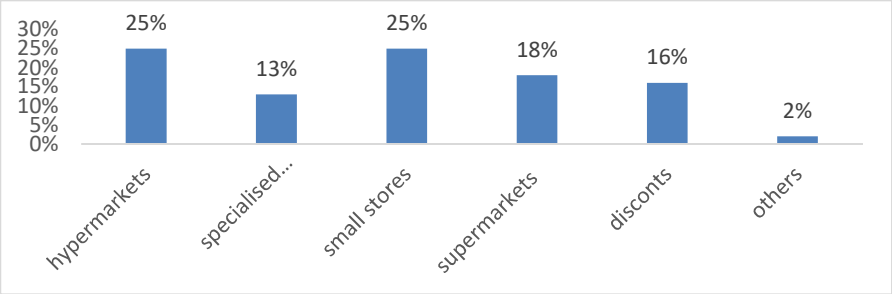

Fig. 7: Where Czech prefer to buy baking products, GFK 2012. (Self-plotted graph, data from Šebková and Bodorová, 2012)

Other interested finding was that almost two thirds of Czech population see bread as importance for menu. More than 85% of them buy fresh unpacked products. Around 14,3% of households declare that they bake bread at least once per month (Šebková and Bodorová, 2012). On the market, we can currently count around 700 hundred bakeries, recent years supermarket chains confirmed their position in baking their own produced baking goods or baking semi-finished frozen products. Bakeries are trying in this hard situation to change their competitive strategies, so they are trying to be closer to customer with quality fresh goods.

Approximately 24,5% of expenditures are on bread, rest is other pastries and sweet baking products. This verifies trend of continual decrease in consumption of bread products and newer study indicates as well increase of shopping inside small and specialised food stores, compared to 38% in 2012 it was around 44% in 2016 (Dřízal, 2017). Important finding unveiled KPMG market research. Conducted survey in 2016 proved that price is not the most important factor influencing consumer buying behaviours. Important factors we can see in fig. 8.

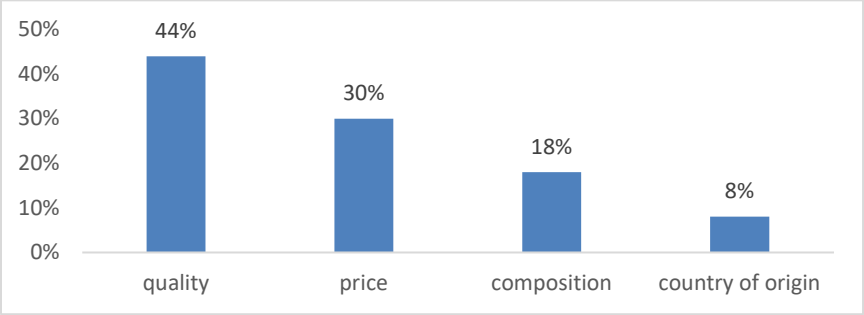

Fig. 8: KPMG Czech preferences when choosing bread in 2016 (Self-plotted graph, data from from Dřízal, 2017)

Revenues of baking companies on czech bread market are finally becoming stabilised and returns to pre-crisis period. Following fig. 9 shows us, how turbulent was market between years 2008-2016. Exchange rate for 1 EUR = 25,75 CZK.

Number of bakers has decreasing trend. For example, in 2008 sector employed approximately 34,5 thousand bakers, while in 2016 it was only around 30. One of the reasons could be highly demanded strenuousness from bakers, while average salaries are deeply under mean or modus of population. In 2016, the average salary of baker was around 637 EUR, while the average salary in the economy was at the level of 993 EUR, so salaries are approximately 64 % of average (Kozelský, Novák, 2018). This situation will probably exert pressure on growing salaries and subsequently on growing prices of bread products.

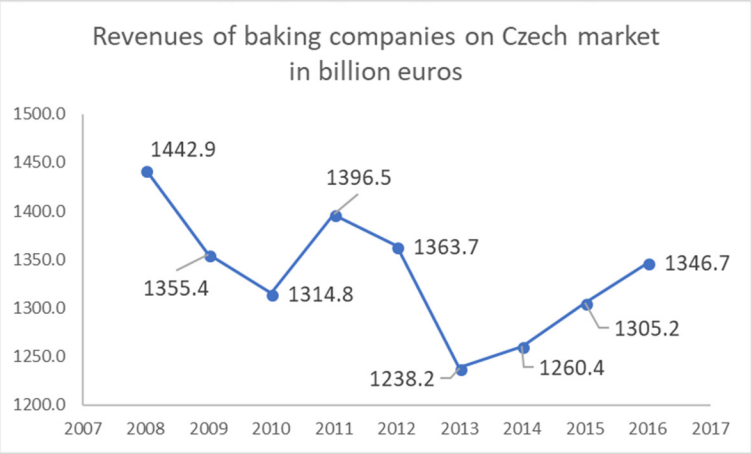

Fig. 9: Revenues of baking companies on Czech market in billion euros. (Self-plotted graph, data from Kozelský, Novák, 2018)

Analysis of German Bread Market

German bread market is one of the most developed markets in Europe. Slight difference from Czech market is, that baking products like bread rolls are as well very popular, a little bit different from standard czech roll, but slightly on decrease. German consumer spends approximately 10 % of his salary on food (for Czech consumer it was approximately 20%, but this problem could be caused by significantly higher salaries in Germany) (Brotexpert, 2017). Germans has higher purchasing power and prices for foods in supermarkets and mass stores are practically the same on both markets.

On German market there are 4 very strong retail groups: Edeka, Rewe, Schwarz (Lidl, Kaufland) and Aldi. These 4 players control approximately two thirds of food market. This pressure has impact as well for supply of frozen baking goods and one of the biggest player Aryzta reports bad results on this kind of market. Table 1 shows trend on the market of frozen semi-finished products. (Brotexpert, 2017). It is obvious, that as well as on the Czech market, there is a growing trend on German market.

Table 1: German market with semi-finished frozen baking products in thousand tonnes

Year	Production of baking products	Frozen baked goods	Import	Export	Pure export	Consume of bread products	Share of frozen products
2008	4,660.6	606.3	165.2	331.6	166.4	5,100.5	11.89%
2009	4,573.6	626.1	160.7	329.9	169.1	5,030.6	12.45%
2010	4,628.4	662.5	176.2	353.5	177.3	5,113.6	12.95%
2011	4,579.1	680.2	193.	370.2	177.2	5,082.2	13.38%
2012	4,947.9	685.2	200.7	389.7	189.	5,444.1	12.59%
2013	4,784.	715.4	224.2	420.4	196.2	5,303.2	13.49%
2014	4,827.5	749.1	217.3	423.6	206.4	5,370.3	13.95%
2015	4,922.7	791.8	258.1	461.8	203.7	5,510.8	14.37%
2016	4,943.4	828.5	262.7	497.2	234.5	5,537.5	14.96%

(Source: Data self-computed and self-customised from Statista, 2017)

To approximate share of frozen semi-finished baking products on the market, we have to find relevant data about all baking products on the market. We can see that on German baking market is pure export of baking products (which is not so significant and consists of) around 4%. Then we can approximate consume and from that equation we can calculate share of semi-finished frozen products on the market. Table 2 demonstrates how the calculation for finding trend works.

Table 2: Calculation of trend with frozen semi-finished products

Year	t	y_t	y_t*t	t^2	T_t	y_t^2	T_t^2
2008	1	0.11888	0.118878	1	0.119927	0.014132	0.014382
2009	2	0.12446	0.248916	4	0.123287	0.01549	0.0152
2010	3	0.12955	0.388649	9	0.126647	0.016783	0.016039
2011	4	0.13385	0.535385	16	0.130006	0.017915	0.016902
2012	5	0.12586	0.6293	25	0.133366	0.015841	0.017787

2013	6	0.13491	0.809449	36	0.136726	0.0182	0.018694
2014	7	0.1395	0.97647	49	0.140086	0.019459	0.019624
2015	8	0.14368	1.149412	64	0.143446	0.020643	0.020577
2016	9	0.14962	1.346615	81	0.146806	0.022387	0.021552
sum	45	1.2003	6.203075	285	1.200297	0.16085	0.160756
average	5	0.13337	0.689231	32	0.133366	0.017872	0.017862

(Source: Self-computed data using share of frozen products in Table 1)

According to (1) we will now demonstrate calculation of trend. From (2) and (3) we must calculate b_1 and b_0.

$$b_1 = \frac{0.689230607 - 0.133366303 * 5}{31.66666667 - 25} = 0.003359864$$

$$b_0 = 0.133366303 - 0.003359864 * 5 = 0.116566985$$

From these variables we can define trend function from (1) as:

$$T_t = 11{,}6567\% + 0{,}3360t\%$$

Data in 6th column are then estimated from our calculation and we can make prediction on next years. According to (5) and (6) we can calculate parameters s and h_P as following:

$$s = \sqrt{\frac{0.16085 - 0.160756}{9-2}} = 0.003657393$$

$$\mathrm{h}_{10} = \sqrt{1 + \frac{1}{9} + \frac{(10-5)^2}{285 - 9 * 25}} = 1.236033081$$

We decided to estimate trend for next 3 years, so similarly, we can calculate next parameter h_{11} = 1.3081 and h_{12} = 1.3884. According to (4) we can form interval and calculate standard error of estimation, we said that we will be trying to cover 95% of confidence interval, so from t-distribution $t_{0,975}[7]$ = 2,365; standard error will be:

$$\Delta_{10} = 2{,}365 * 0.003657393 * 1.236033081 = 1.0691\%$$

Interval with T_{10} = 15,0166 % will be then:

$$13.9474\% < 15{,}0166\ \% < 16.0857\%$$

And similar it will be with T_{10} and T_{11}:

$$14.2211\% < 15.3525\% < 16.4840\%$$
$$14.4876\% < 15.6885\% < 16.8895\%$$

For better vision, I plotted this trend into the Fig. 10. Dotted blue line represents computed trend, green line represents predicted values and red dashed lines represent 95% of confidence interval. As we can see, manual predictions can be time-consuming and more complex methods even more, so statistics programmes should solve this problem, but it is good for verification of theory.

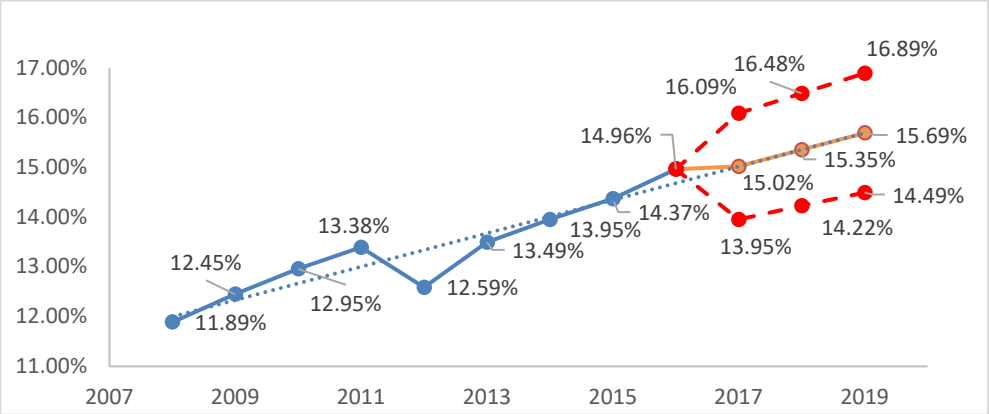

Fig. 10: Estimation of trend with frozen semi-finished products (Source: Self-plotted graph, data from Table 1)

Current new trends on German market shows, that Spelt flour is becoming very favourite, it is kind of ancient wheat, but overall, ancient cereals to gluten free becomes very popular. With this trend is connected demand for natural products with less preservatives or additives (Stumpf, 2018). More trendy are usually younger people and there are some volatile trends on the market. People are also willing to pay if they get high quality and trendy is performance food – healthy food that increases performance of people (Wolf, 2017). Allgemeine Bäckerzeitung (2018) states that current problem that German bakers face is aversion of some customers to plastic packages. Lobbying on recyclable packages is also increased and production is trying to adjust to be ecologically friendly.

What is interesting on German market, that unlike Czech Republic where foreign investments are relatively stable, in Germany is increase of these investments in baking industry. For example, swiss company Valora took over Backwerk chains and fast food brands in Germany in 2017. As was mentioned before, retails such as Aldi, Edeka or Lidl has two thirds of food market share. In some weak areas this led to closing of single or weak bakeries. Fig. 11 represents decline of bakeries in Germany (Ebner, 2017). Prices per kg of bread and per kilogram of bread products are plotted in fig. 12.

Each year GFK making their panel research about bread consume in households. Favour for individual types you can see in fig. 13. Brown bread in the graph is originally called Mischbrot in German language and it is kind of mix between wheat and rye flour.

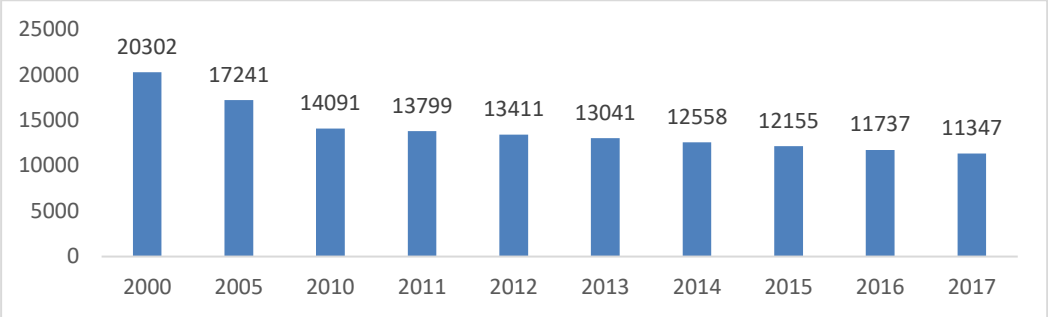

Fig. 11: Decline of bakeries in Germany (Source: Self-plotted graph, data from Statista, 2017)

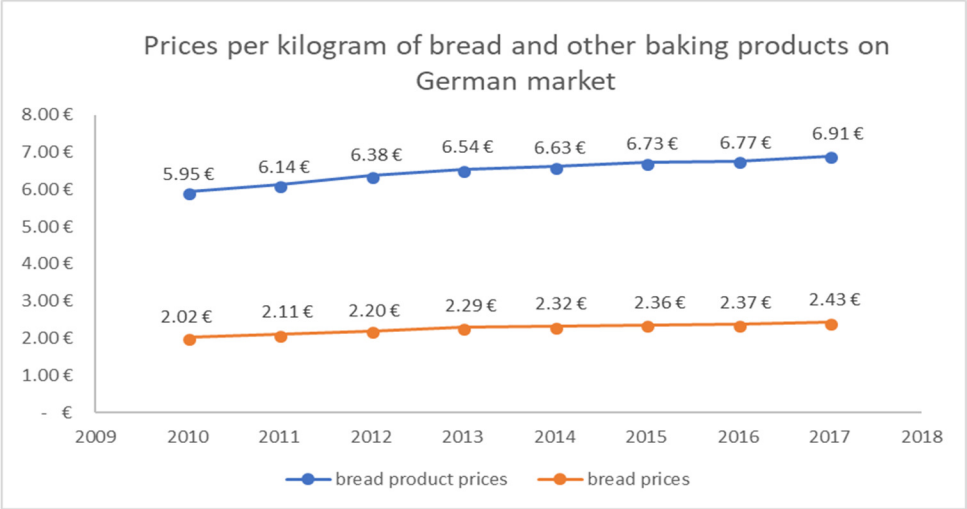

Fig. 12: Prices per kilogram of bread and other baking products on German market (Source: Self-plotted graph, data from Statista, 2017)

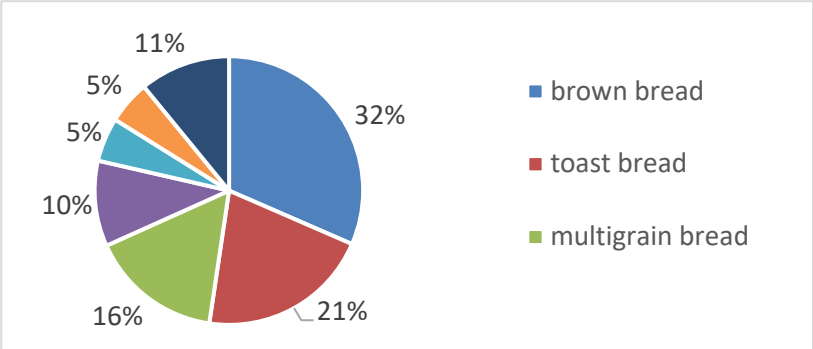

Fig. 13: German most favourite breads in 2016 (Source: Self-plotted graph, data from Statista, 2017)

Despite the fact, that Germans are becoming more opened (accepting new products, vendors, etc.) consumers, significant number of Germans prefer to buy bread in specialised shops (bakeries). Even though this number is slowly decreasing, Germans are compared to Czechs more quality focused and less price sensitive, so bakeries maintain strong position, and this can be one of the reasons why foreign investments persist or are on increase. According GFK in 2017 (Statista, 2017), 58% of respondents prefer to buy bread from baker.

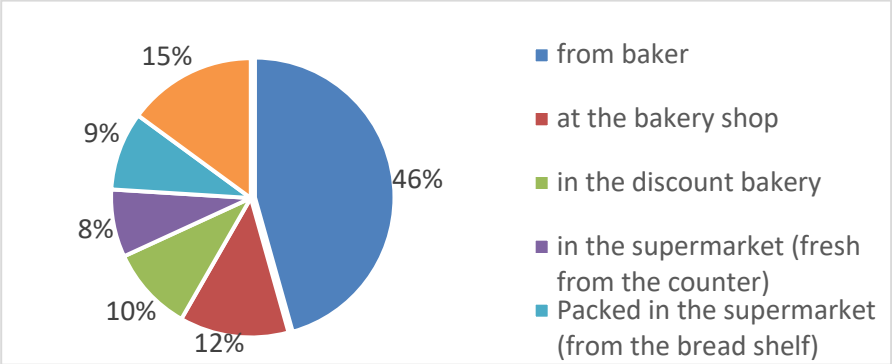

Fig. 14: German most favourite place to buy bread 2017 (Source: Self-plotted graph, data from Statista, 2017)

Conclusions and Discussion

As both countries had common history in several centuries, they had as well common habits. First bakeries were established in monasteries, in both territories worked regulations for bakers and bakers were respected people. German bread in some cities became very specific, especially favour for black bread was very rare, which was different than in Czech Republic or other European countries that time.

Current Czech bread market has growing trend in frozen semi-finished products, what proves good profit of the biggest company La Lorraine. Market is quite fragmented, what can be caused by low margins in the industry. One of the reasons is small purchasing power of Czechs. Consumption in baking products don't differ differently from past, but bread is on retreat, while other baking products are on the rise. Period after crisis in 2008 was very hard, but current numbers show stabilised number of bakeries. Slow trend is moving from price first to other important factors like quality.

German bread market has not significant growth in frozen semi-finished products, what is visible in losses of big company Aryzta specialised in this segment. Despite Czech market, slightly decrease noticing other baking products, while bread has much stronger position. Current new trend on the German market is return to ancient cereals (DINKEL), healthy diet, regionality and freshness. On German market is much higher number of foreign investments, the main reason is probably higher margins than it is in Czech Republic. Characteristics for both markets are better summarised and compared in following SWOT analyses in Table 3 and Table 4 from the perspective of new baker entering the market.

Table 3: SWOT analysis of Czech market

STRENGTHS	WEAKNESSESS
high demand for baking products	established bakeries on the market
lower costs (production and operating in relation to the economy)	weaker developed baking alliances
stable demand for particular products which comes from conservativism	still strong preference in price (slowly decreasing)
relatively high demand for products from soft dough	low margins from revenues
	weaker demand for bread

	prices strongly influenced by wheat markets
OPPORTUNITIES	**THREATS**
tolerance (demand) of baking products from frozen semi-finished products	increase of revenues in supermarkets
increasing demand for baking products instead of bread, can bring higher revenues	increasing consume of frozen semi-finished products
specialised shops can seduce increasing slowly increasing nr. of customers focusing on quality	increasing wealth and better lifestyle of citizens can lead to decrease in consume
increasing demand for smaller packages can increase margin	increasing trends for gluten-free products
increase for rye consisted products	decreasing number of bakers can increase production costs

(Source: Self-customised information)

Table 4: SWOT analysis of German market

STRENGTHS	WEAKNESSESS
strong baking alliances	established bakeries on the market
strong preference for bakeries	high costs (production and operating in relation to the economy)
preference in quality	higher bureaucracy - business environment is more controlled from governments
higher margins from revenues, comes from lower price sensitivity of Germans	prices strongly influenced by wheat markets
high, stabilised demand for bread	weak demand for products from soft dough
preferred smaller packages	relatively weak demand for baking products, large part is sold in supermarkets
OPPORTUNITIES	**THREATS**
willingness to try new tastes and specialities	strong group of supermarkets dominate food market
demand for performance food - connected with health lifestyle	increasing foreign investments
willingness of customer to pay if he is satisfied	large chains are extruding small bakeries from the market
accentuating regionality can seduce more customers	increasing trends for gluten-free products
quite strong demand for products made from controlled origin, especially bio or organic bread products	slow increase in frozen semi-finished products, because customers demand freshness
ecologically friendly packages can seduce people (there is significant part in population) caring about environment	

(Source: Self-customised information)

Secondary data in Czech market unveiled that bread products consumption on the market is higher that it is in German market. Differences in statistics are also caused by the fact that sourdough bread is popular in the Czech Republic. While in Germany they prefer whole grain products. Both markets are highly competitive, but problems in Czech market could cause lower purchasing power of people what leads to smaller margins of Czech bakers. Different are markets as well in the amount of foreign investments, German market attracts foreign investments more due to higher margins. Disadvantage of German market lies in high production and operating costs, so it requires higher initial costs.

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Effective Implementation of Lean Strategies

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Abstract

One of the conditions of manufacturing works survival in European competitive environment is to secure optimal performance and to reach maximum added value. Ability to satisfy customers and flexible response to their demands is a necessity. Company managers are presented with number of tasks by these demands in the framework of all company departments. One of them is machine and production facility maintenance. This part is intended to implementation of Six Sigma methodology. The aim of the paper is to define the procedure of individual steps so, that to lead to break through strategy to significantly improve customer satisfaction and shareholder value by reducing variability in every aspects of business. Thanks to this procedure can be expected enhancing the ability to delivery customer satisfaction and cost improvement results faster- within months from the start and sustains the rate of improvement on-going.

Keywords: Business process management, Six Sigma, customer satisfaction, phases of Six Sigma.

Introduction

This part is intended to use of Six Sigma methodology. A breakthrough strategy to significantly improve customer satisfaction and shareholder value (Klečka, 2014) by reducing variability in every aspects of business. It enhances the ability to delivery customer satisfaction and cost improvement results faster- according to Strachotová et al. (2018b) and Straka et al. (2016) within months from the start and sustains the rate of improvement on-going. The basic concepts of Six Sigma were developed at Motorola in the 1980's as they worked to improve the quality of their products and services (Tošenovský, 2003). They have been refined and improved over the years by many successful companies. By implementing a systematic, rigorous routine, they were able to improve their services or products and increase customer satisfaction, thus increasing profits. Six Sigma approaches business processes from a highly analytical point of view. It incorporates five levels of activity:

- Philosophy – the enterprise-wide embrace of defect reduction by making decisions based on hard data and customer focus. According to Straka et at. (2017), defect reduction applies to all enterprise processes. This aspect is important not only from the point of view of customers, but also has an impact on occupational safety and the environment (Botek, Strachotová, 2018; Strachotová et al., 2018b).
- This aspect is important not only from the point of view of customers, but also has an impact on occupational safety and the environment.
- Focus on the Customer - meet or exceed their requirements/expectations.
- Metrics – statistical focus to make process outcomes 99.9997% defect free, otherwise expressed as 3.4 defects per million opportunities (Barlow, 1999).
- Methodology – structured approach to solving problems that uses specific tools and process mapping to achieve the metric goal.

– Process based – the defects or errors introduced into products or services are based upon deficiencies in the processes (Abu-Taieh, Sheikh, 2007).

In short, George et al. (2002) state - Six Sigma allows an organization to reduce the variability in its products and services so that waste is reduced, efficiency is improved, and customer satisfaction is dramatically increased. Business problems are solved through rigorous application of data collection and analysis tools (Tošenovský, 2003). The training that Six Sigma users receive is quite intensive, progressing through several increasingly sophisticated levels based on experience and accomplishment. Professional Six Sigma consultants and practitioners usually work to become certified at the various levels (Gitlow, 2004), increasing their ability to help guide development and implementation of Six Sigma.

Theoretical Background

The methodology of Six Sigma is the key to its success. An organization follows a five-step progression (DMAIC) (Fig. 1) that uses information and statistical analysis to address the achievement of operational goals. There are some differences in the five steps depending on whether they are used to improve an existing process or design a new process. The end goal, though, is always to achieve the standard metric of 99.9997% defect free performance.

Fig. 1: The five phases of Six Sigma (Source: self-according to Gitlow, 2004)

1. Define. The Define phase is concerned with the definition of project goals and boundaries, and the identification of issues that need to be addressed to achieve the higher (better) sigma level.
2. Measure. The goal of the Measure phase of the Six Sigma strategy is to gather information about the current situation, to obtain baseline data on current process performance, and to identify problem areas.
3. Analyze. The goal of the Analyze phase of the Six Sigma quality effort is to identify the root cause(s) of quality problems, and to confirm those causes using the appropriate data analysis tools.
4. Improve. The goal of the Improve phase is to implement solutions that address the problems (root causes) identified during the previous (Analyze) phase.
5. Control. The goal of the Control phase is to evaluate and monitor the results of the previous phase (Improve).

Basically, identify an area where there is a process problem, measure it, work out why there is a problem and then fix it.

Project Selection

Proper project selection is one of the most critical factors influencing the outcome of consumer driven Six Sigma projects. Selecting a project that is too large will cause valuable time to be lost during the define phase as project teams struggle to scope their projects and develop “Problem statements” that can be addressed using Six Sigma. A fundamental formula used in Six Sigma is that “Y” is a function of “X”:

$$Y = f(X) \tag{1}$$

In mathematical terminology, “Y” is the dependent variable while “X” is the independent variable. Expressed in another way, “Y” is an output resulting from number of inputs or “X”. The typical diagram used to communicate this concept in consumer driven Six Sigma is as follows

$$Y = X_1 \; X_2 \; X_3 \; X_4 \tag{2}$$

Building on this concept, it canbe said that every "X" is correlated to "Y" at some deeper level in the process (Barlow, 1999). The diagram for this cascading relationship is as follows:

$$\begin{array}{l} Y = X_1\ X_2\ X_3\ X_4 \\ \Downarrow \\ Y = X_1\ X_2\ X_3\ X_4 \\ \qquad\qquad \Downarrow \\ \qquad\qquad Y = X_1\ X_2\ X_3\ X_4 \end{array} \tag{3}$$

This method of "drilling down" to the specific issues is the fundamental technique for both project selection and project scoping. Those trained in Six Sigma techniques are often heard describing issues in terms of the "X_s" and Y_s" (Tošenovský, 2003). On the Fig. 2 it has at one's disposal the example.

$Y = X_1\ X_2\ X_3\ X_4$ $\Leftarrow\Leftarrow$	The taste of a glass of lemonade (the "Y") is influenced by a number of factors including: º Type of lemon ingredient (an "X") º Amount of sugar added (an "X") º Type of water used (an "X") º Amount of ice added (an"X")
$\Downarrow$ $\Downarrow$ $\Downarrow$ $\Downarrow$	
$Y = X_1\ X_2\ X_3\ X_4$ $\Leftarrow\Leftarrow$	Extending the example, if the lemon ingredient factor was to be examined further, the "X" variables might include: º Fresh squeezed lemon (a potential "X") º Liquid concentrate (a potential "X") º Frozen concentrate (a potential "X") º Powdered lemon flavouring (a potential "X")
$\Downarrow$ $\Downarrow$ $\Downarrow$ $\Downarrow$	
$Y = X_1\ X_2\ X_3\ X_4$ $\Leftarrow$	Looking at "fresh squeezed lemons" might include examing: º Where the lemons were grown (an "X") º How the lemons were transported (an "X") º Age when squeezed (an "X") º How lemons were squeezed (an "X")

Fig. 2: Example for using Six Sigma methodology (Source: self-according to Tošenovský, 2003)

Y/X diagram on Fig. 3 illustrates how the project selection process is used to narrow high-level outcomes (big "Ys") down to specific actionable issues (project level "X_s"). Delivery conditions and delivery timing will be used throughout this part as example to explain Six Sigma tools and techniques.

Project selection is most often performed at the project champion level and is critical that black belts and project teams have specific issues to address (Barlow, 1999). Without clear direction, projects frequently stall in the define and measure phases as it becomes difficult to pinpoint what data to collect (George et al., 2002) and how to make use of it. To ensure that projects are appropriately selected, the champion can apply the project selection checklist appearing.

High level outcomes	$Y = X_1\ X_2\ X_3$	Y = the top line issue is what can be done to improve satisfaction, which can be broken down into sub grounds X_1 = consumers **X_2 = dealers** X_3 = internal customers
	$\downarrow$	
	$Y = X_1\ X_2$	Y = the decision is made to address dealer satisfaction, which is comprised of satisfaction with: **X_1 = processes** X_2 = product
	$\downarrow$	
	$Y = X_1\ X_2$	Y = focus is placed on satisfaction with processes, which include: **X_1 = inventory** X_2 = business management
	$\downarrow$	
	$Y = X_1\ X_2$	Y = inventory satisfaction includes satisfaction with: X_1 = ordering **X_2 = delivery**
	$\downarrow$	
	$Y = X_1\ X_2$	Y = attention is directed to inventory delivery, which includes: **X_1 = vehicle delivery** X_2 = parts delivery
	$\downarrow$	
Project level	$Y = X_1\ X_2$	Y = two issues influence satisfaction with vehicle delivery: **X_1 = condition** **X_2 = timing**

Fig. 3: Y/X diagram (Source: own)

Define phase

The purpose of the define phase is to further refine the Six Sigma project team's understanding of the problem to be addressed. In addition, the project team will use the define phase to get organized, determine roles and responsibilities, establish goals and milestones and review process steps. At the completion of the define phase, the project team will have:

- Defined the problem with a problem statement. Upon completion of this step, the team should have a problem statement that – describes the problem based on available data, does not include assumptions regarding possible cause or solutions, identifies key metrics.
- Specifically identified the process or product's customer
- Defined CTQs (Critical to Quality characteristics) from the customer's viewpoint

- Scoped the project
- Produced a refined problem statement

Identify customer – in this step, the project team will determine who is directly impacted by the problem and what costs can be associated whit that impact. During the identify customer step, the project team attempts to target a specific se of customers. Correcting the problem for this set of customers generates the largest benefit and improvement can usually be expanded to larger groups of customers.

Once a customer is identified, the project team will need to determine what is important to that customer from the customer's point of view. In Six Sigma terminology this process is referred characteristic (CTQs). Identification of CTQs ascertains how the characteristics appear when meeting customer expectations. After CTQs are identified, the project team must develop operational definitions foe each CTQ. Effective operational definitions:

- Accurately describe the critical –to-quality characteristic,
- Specifically annotate what is considered meeting the customer expectation,
- Are written to ensure consistent interpretation and measurement by multiple people.

Commonly used methods of identifying CTQs include, but are not limited, to focus group, surveys or interviews. Outputs of this step are CTQs, operational definitions and parameters for measuring too. When project team members the scope project do, must above all further specify project issues, develop a refined problem statement and brainstorm suspected sources of variation. Similar to the process used in project selection, team members must strive to reduce the scope of their project to a level that ensures the problem is within the team's area of control that ensures data can be collected to show both the current and improved states. A refined problem statement is a highly defined description of the problem. Beginning with the general problem statement and applying what has been learned through further scoping. Project team write and refined problem statement that describes the problem in narrow terms, indicates a level where the team will begin its work and identifies the extent of the problem and how it measured. Effective tools to scope projects include cause-and-effect diagram (fishbone), cause-and-effect matrix, FMEA and Y/X diagram.

Measure phase

The purpose of the measure phase is to establish techniques for collecting data about current performance that highlights project opportunities and provides a structure for monitoring subsequent improvements. Upon completing the measure phase, project team will have a:

- Plan for collecting data that specifies the data type and collection technique,
- Validated measurement system that ensures accuracy and consistency,
- Enough sample of data for analysis,
- Set of preliminary analysis results that provides project direction,
- Baseline measurement of current performance.

The key concepts of measure phase consist on sound data collection plan, identification of key process input variables (KPIV), variation displayed using pareto charts, histogram and run charts. The most important step of the measure phase is a well-prepared data collection plan. It is critical that the project team spends the appropriate amount of time developing the data collection plan. Investing time in developing the plan can help avoid collection errors that may result in data corruption or the collection of data that is not relevant to the project. Conversely, even the well-developed plan may require revisions as the project team becomes enlightened regarding. Process details. The project team should make certain that ample consideration has been given to the various factor (Xs) that might be causing variation in the process. It is very important that, where applicable, data be sub grouped to determine variation between the subgroups. For example, if the Xs were typos observed in a document, the project team might subgroup the data as follows: person-to-person, office-to-office, shift-to shift, week-to-week, etc.

In the next step must prepare perform measurement system analysis. It is important to ensure the information collected is a true representation of what is occurring in the process. At the conclusion of the measurement system analysis, the project team should know:

- Whether the measurement system is "capable" of gathering data that accurately reflect variation in the process,
- Whether there is measurement error, how big it is and method of accounting for it,
- What confidence level can be attached to the measurement collected,
- Whether or not measurement increments are small enough to show error,
- Whether the measurement system will be stable over time.

The project team member must conduct data collection, perform graphical analysis and conduct base analysis too.

Analyse and Improve Phase

As an outcome of the measure phase, the project team should be narrowing its focus on distinct groups of project issues and opportunities (Dyntar, Strachotová, 2015). The analyse phase allows the project team to further target improvement opportunities by taking a closer at the data. Upon completion of the analyse phase, project team members should be able to answer – what was the approach to analysing, what was the improvement opportunity, what are the causes contributing to the improvement opportunity, how was the data analysed to identify sources of variation or did analysis result in any changes to the problem statement or scope? (Strachotová, Pavlištík, 2017; Strachotová et al. 2017). The Fig. 4 shows mutual relations between single activities of analyse and improve phase and shows used tools too. To begin the analyze phase, the project team needs to confirm the type of data that has been collected, either attribute or variable. Based on the data type, the project team will use one of two sets of analysis tools:

1. Attribute data tools (attribute data reflecting one of two conditions such as Yes/No; Defect/No defect; Accurate/Inaccurate):

    - 1 proportion – test a data sample against a test proportion, target or defined standard; determines if there is statistically significant difference; Null hypothesis (Ho) = there is no significant difference between the sample data and the target; P-Value greater than 0,05 = accept null hypothesis; P-value less than 0,05 = reject null hypothesis
    - 2 proportions - test a data sample against one another; determines if there is statistically significant difference between the two data sample; Null hypothesis (Ho) = there is no significant difference between the two data samples (A=B); P-Value greater than 0,05 = accept null hypothesis; P-value less than 0,05 = reject null hypothesis
    - Chi-square – tests for independence between data samples (shows no relationship); Null hypothesis (Ho) = there is statistical independence between two data samples (no relationship exist); P-Value greater than 0,05 = accept the null hypothesis; P-Value less than 0,05 = reject null hypothesis.

2. Variable data tools (test for level of variation within a data sample):

    - F-Test - tests and compares two data sets for variance; assumes a random sample of normal data; Null hypothesis (Ho) = both data samples have the same degree of variance; P-Value greater than 0,05 = accept the null hypothesis; P-Value less than 0,05 = reject null hypothesis.
    - ANOVA (analysis of variation homogeneity of variance) - tests and compares there or more data samples for variance; Bartlett's requires normal data, levee's does not require normal data; Null hypothesis (Ho) = all data samples have the same degree of variance; P-Value greater than 0,05 = accept the null hypothesis; P-Value less than 0,05 = reject null hypothesis.

– 1-Sample T-Test – tests the data sample against a test proportion, target or defined standard; determines if there is statistically significant difference; Null hypothesis (Ho) = there is no significant difference between the sample data and the target; P-Value greater than 0,05 = accept the null hypothesis; P-Value less than 0,05 = reject null hypothesis.

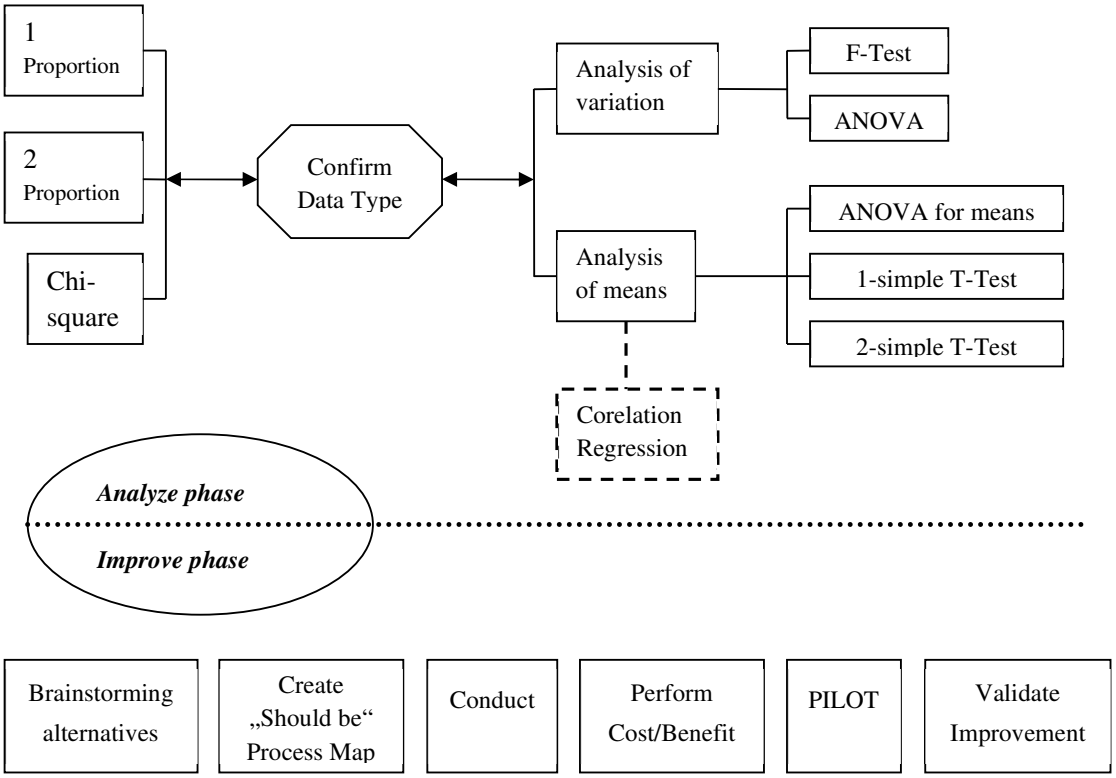

Fig. 4: Analyse and improve phase (Source: self-according to Tošenovský, 2003)

As an outcome of the analyze phase, project team members should have a strong understanding of the factors impacting their project, including – key process input variables (KPIV) – also the vital few "Xs" that impact the "Y". Including sources of variation – where the greatest degree of variation exists. The purpose of the improve phase is to generate ideas, design, pilot and implement improvements and validate improvements. The team members can use next key concepts: brainstorming, "should be" process map, FMEA, etc. at the conclusion of the improve phase, the project team will have identified alternative improvement, implemented the best alternative for improving the process, validated the improvement and prepared for transition to the control phase. Design of experiments (DOE) is an effective tool that can be used in both the analyse and improve phase of the DMAIC process. However, DOE can be a difficult tool to use outsider of a manufacturing. environment where small adjustments can be made to input factors and output can be monitored in real time.

Control phase

The purpose of the control phase is to institutionalize process/product improvements and monitor ongoing performance. Following the improve phase, the project team needs to transition control of the process back to the process owner. To facilitate a smooth transition and ensure the project team's work sticks, a detailed control plan will be developed. The objective of the control plan is to document all pertinent information regarding – who is responsible for monitoring and controlling the process, what is being measured, performance parameters, corrective measures. Key components of the control plan include mistake proofing, long-term MSA plan, control chart – statistical process control (SPC),

reaction plan, update standard operating procedures. Upon completion of the control phase, the process owner will understand performance expectations, how to measure and monitor X_s to ensure performance of the Y, and what corrective actions should be executed if measurements drop below desired levels. Likewise, after completion of the control phase, the project team members disband while the black belt begins the next consumer driven Six Sigma project with a new team.

Conclusions and Discussion

One of the most powerful ways to improve business performance is combining business process management (BPM) strategies with Six Sigma strategies. BPM strategies emphasize process improvements and automation to drive performance, while Six Sigma uses statistical analysis to drive quality improvements. The two strategies are not mutually exclusive, however, and some savvy companies have discovered that combining BPM and Six Sigma can create dramatic results. Six Sigma methodology teaches and deploys hard skills and business practices emphasizing.

Variable data is sometimes more desirable than attribute data to use, because it requires smaller sample sizes. However, some projects appear to provide only attribute data (damaged units, number of incorrect invoices). The design of experiment (DOE) is an extremely valuable tool not only in identifying key input variables causing variation but also in setting the operating tolerances (precise levels) of the key input. DOE works well in manufacturing processes where equipment can be adjusted incrementally, and output can be analysed over time (see Fig. 5).

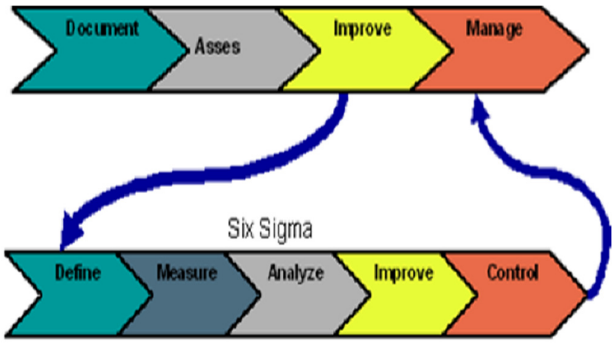

Fig. 5: Combining BPM and Six Sigma (Source: own)

With this basic understanding of BPM and Six Sigma in mind, it is easy to see how powerful it can be to combine the two practices. Their strengths complement each other and create a synergy that instils the entire operation with a focus on quality and performance. The strength of BPM lies in its ability to automate processes and workflow through modelling and examination of inputs, outputs and performance. It is not as strong, however, in its ability to analyse data associated with very difficult or multifaceted problems. Six Sigma fills this gap by providing the statistical analysis needed to deal with complex problems.

The strength of Six Sigma lies in its rigorous approach to data collection and analysis. Through this methodology it can identify even the smallest opportunities for process improvement, maximizing an organization's ability to institute necessary changes. It is not as strong, however, in its ability to monitor process improvements and ensure they are applied across the board. BPM fills this gap by providing tools to automate process improvements and connect those improvements across the entire organization. Both BPM and Six Sigma represent significant commitments on the part of a business or organization, and they take time to implement thoroughly. Tremendous organizational change is often required, leading most companies to start with a single department or pilot project and expand their use over a multi-year period. It is well worth the time and effort, though, to generate the substantial business improvements that are typical with BPM and Six Sigma.

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Use of Asset Maintenance Strategies for High Equipment Performance and Availability

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Abstract

To be prepared for requirements of the future, it is necessary to question the actual state of maintenance and to generate new ideas for future development. Tools are important for the maintenance process, using which the sustainability of a maintenance department can be checked and potentials for improvement can be realized. In this paper, the key ingredients that ensure successful implementation of enduring plant maintenance programs and improved equipment reliability are analysed the modern concepts of Strategic Asset Management (SAM). The authors determine completely alignment of resources to achieve to business goals of the organization at the lowest cots through SAM. The authors found out the benefits of successfully implementing SAM include: Improved product quality, Lower costs for system and equipment maintenance, Increased availability of production systems and equipment, Enhanced morale among management and the workforce and Reduction in costs. This paper will be describing some of the fundamentals regarding the concepts, practices and processes of SAM.

Keywords: Maintenance System, Maintenance Efficiency, Data Evaluation

Introduction

Maintenance improvement programs are often started with grandiose goals and much ado. However, most of these programs either run out of steam at an early stage. They come to be viewed as resource burdens rather than a means to enhance overall productivity and increase profitability (Legát, 2016). However, it should be a target of every company management to accept rules for so called productive maintenance. Productive maintenance is a part of quality system. Walt (2006b) says, that basic requirement for any quality system, hence for maintenance quality system as well, is its continuous improvement based on analysis of the system behavioe, identification of weak points and making adequate corrections. Altough there are a number of indicators wich synthesize the effects od low-level metrics. According Crespo (2012) the analytical tools, if properly algorithmized, enable to prepare regular analyses of maintenance efficiency including detailed analysis and identification of weak points.

Maintenance is a significant zone of productivity increase and reduction of costs from the production operations effectiveness view. Unfortunately, present-day means of production care does not have a position, which it deserves in the companies. Maintenance is a neglected service department, representing only necessary costs for most of the managers (Yoshikawa, 1995). However, from several aspects it is important for the company management to effectively apply production facilities maintenance. These are as follows:

- Maintenance demands above all result from capital globalisation, production and supply chain. These demands generate pressure on material flow acceleration through production process. Each production facilities breakdown however is at the same time a cause of the flow breach,

leading to stock increase and thus to cost increase as well. It is understandable that these features have an unfavourable impact on company effectiveness, which may jeopardise order date.

- Maintenance can be a source of competitive benefit too. Regarding the fact, that input prices into production operations (raw materials, energy, and labour) are dictated by market, the producers have comparable conditions in this area. Different effectivity may be given by the fact, how the management takes care of the production facilities. There is a considerable share of machines in tangible assets in most of the companies.
- One of the most important maintenance features is machine and facility maintenance in operational and fit state, foreseeing rise of breakdowns and low-class production. There is a logical consequence to secure operational security, thus decreasing environmental impact. After all the operational security is determined by legislative demands and each company must keep them (Cambell, 1995).

In the last century, the industrial world developed maintenance and maintenance tools. They contributed to economic growth by doing right things every day. Time is changing: a lot of stakeholders and players are nowadays embedded in a growing global market. Further companies are creating a new entrepreneurial environment that brings out the best of everyone – worldwide. In the western world, competition between different management disciplines is keen, e.g. between Real Estate Management, Facility Management, Life Cycle Management. Maintenance Management and Physical Asset Management. Facility Management is defined as the integration of processes within an organisation to maintain and develop the agreed services which support and improve the effectiveness of these primary activities.

Theoretical Background

Maintenance costs versus maintenance value

Direct maintenance costs in Europe are estimated at about 1,5 mld. Eur/year. (Walt, G., 2006) Reducing maintenance costs to a minimum has become a challenge. But indirect maintenance costs including down time costs, quality, productivity, lawyers, loss of company image, training, investment in spare parts, etc. are 5 times higher than the direct maintenance costs (Walt, 2006 a). Life cycle considerations are included but they are not mentioned in newest definition of Facility Management. Where to save? That is the critical question. What about Facility Management, Asset Management and Maintenance management? In several countries nowadays, Facility Management is focussing on buildings, manufacturing plants, infrastructure and corresponding services. Maintenance is included in the Facility Management. The Facility Manager is a provider following the market rules.

A physical asset is an entity creating, sustaining or destroying value at any stage of its life cycle. (Amadi-Echendau, 2016) Asset Management covers production plants, buildings, power stations, communication, railways, roads and public service. Maintenance is of course an important part of Asset Management. General strategic guidelines signed by the top-management are the key to success for determining maintenance concepts together with all partners within and outside of companies. The amount of real maintenance efforts should be in function of customers need. This brings us to the question: What is the technical knowledge indispensable for Maintenance Managers and Specialists.

Asset Management

Asset Management is a term that has been getting a lot of press recently. The term implies many things to many people, and there is no industry standard for application. Implied in the term, however, are some basic concepts (Legát, 2016):

- Business goals drive decision regarding the use and care of equipment assets.
- Asset strategy is determined by operational considerations.
- Maintenance and reliability are means to a defined goal, not an end in themselves.
- The intent is to optimize the application of all resources, not just maintenance.

There have been attempts to define Asset Management as life cycle cost management; it has been used in the phrase "asset management reliability", which seems to be redundant or confusing; the term has been seen as a substitute for maintenance or reliability practices. As a "father" of the concept is considered Mr. Bradley Peterson, USA, and hid definition is: "Asset Management is a global management process through which one consistently make and execute the highest value decisions about the use and care of the assets." (Peterson, 2016)

Nowadays people have begun to understand the even broader vision for Asset Management than has been previously articulated. By Brad Peterson this has been named Strategic Asset Management (SAM). SAM is an integrated set of process that systematically derive the highest value from plant assets, through a consistent philosophy, plans and objectives and cooperative involvement by everyone in the plant. SAM represents a higher level of performance than is currently practiced or even recognized by the manufacturing community today. Any useful model to guide action will have several characteristics:

- Simplicity. All the greatest ideas are simple in concept. If not kept simple, they are not fully understood or remembered, and fail as guiding principles.
- Intuitive. Readers should be able to understand the underlying principles without guidance.
- Utility. The model should work consistently in application.
- Completeness. All necessary elements of success should be contained.

The SAM model indicates how these criteria are met. However, make your own judgments. The base principles of SAM model are present on Fig. 1.

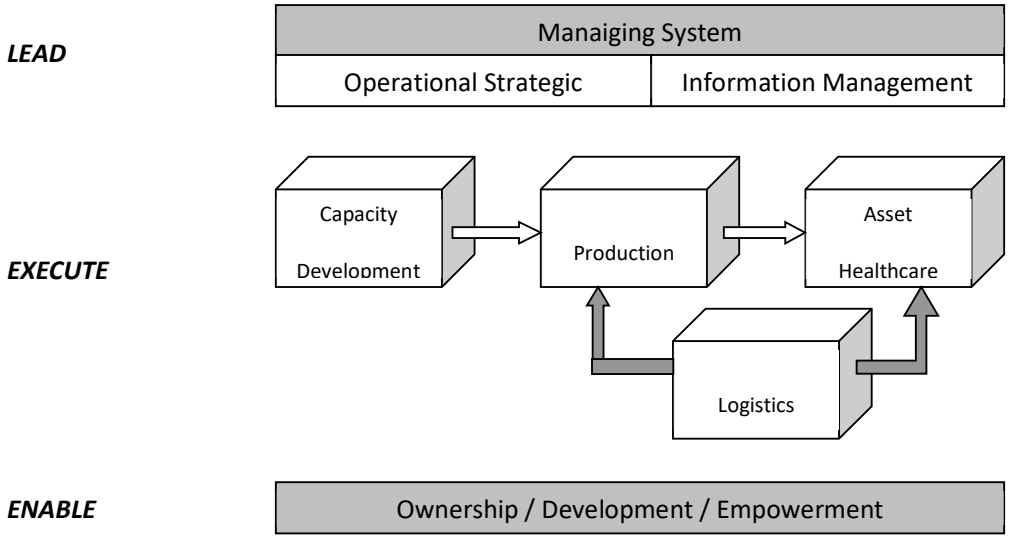

Fig. 1: The SAM Model (Source: Self-plotted according to Shenoy, Bhadury, 2011)

Lead. There are hundreds of books written about leadership and each of them has some valuable point to make. Frequently, though, the description is of individual leadership and often charismatic leadership. Leadership in the plant setting is creating consistency of purpose and action. Manufacturing is a large set of complex and interrelated systems of marketing, technology, finance, human resource, execution function and equipment. Physical Asset Management then must take all of these into account. Putting things as simply as possible into SAM model, the LEAD element consists of the Managing System, Strategic Planning and Information Management.

Execute. Four functional areas exist in any manufacturing environment. These areas are the typical focus of leadership. If done well, they lead to functional excellence.

- Capacity Development. Is usually considered to be the Design Engineering and Project Management functions in an organization. This function consumes hundreds of millions of Euro in what are often risky bets made in market assumptions. A thoughtful and disciplined method to assure excellence in the assumptions, design, construction and preparation for production can be a valuable tool.
- Production Management. Everyone in the plant believes with good reason that production is the reason we are all here. And indeed, this is the vehicle for value creation.
- Logistics include materials management, purchasing and movements of people and materials. This function can make or break the Production and Asset Healthcare Management functions.
- Asset Healthcare Management. Is this just another term for maintenance and reliability? Perhaps at some levels it is. But it is concerned with optimizing and integrating with all parts of the business based on risk and value, and so goes beyond the traditional boundaries of maintenance reliability. (Walt, 2006 b) The Asset Healthcare model is the well-known SAM Diagram (Fig. 2).

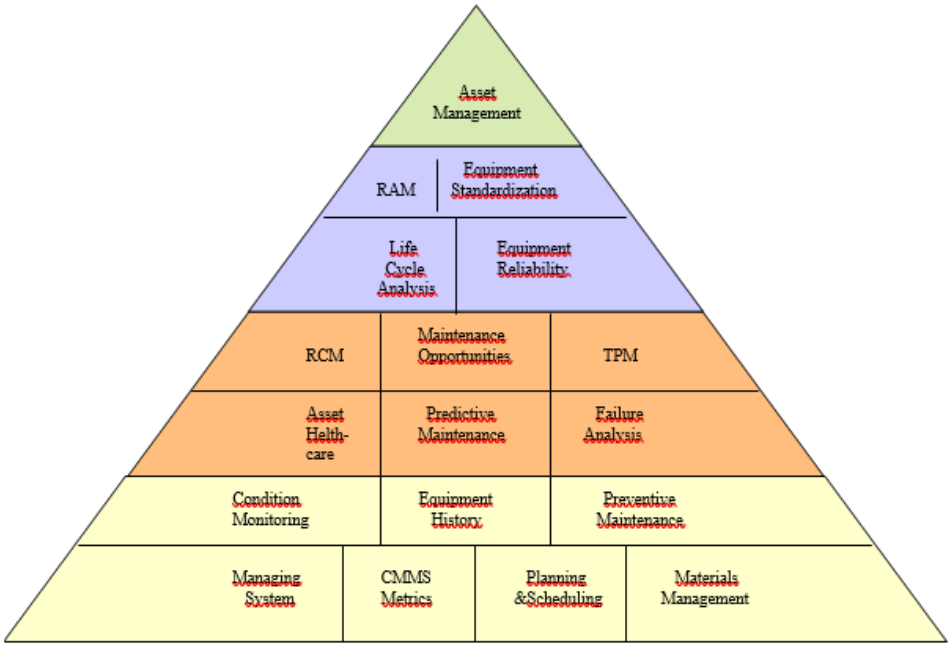

Fig. 2: SAM Model functional pyramid (Source: Self-plotted according to Shenoy, Bhadury, 2011)

Enable. Many programs for change are viewed as a simple matter of documenting procedures and providing training. If these things are done, change should happen, right? Wrong. Human nature does not work that way. Prescriptive formulations may work for machinery, but the human machine is more complex! Let me refer to what Mr. Peterson says: "Most of our corporate clients have a large number of related but disintegrated goals, Safety, reliability improvements, Six Sigma, Lean Manufacturing, Supply chain rationalization, etc." (Peterson, 2016) These are often presented to the plant as a series of corporate staff visits, all requiring the plants time and attention. If the plant acted on the sum of these "required programs" with full enthusiasm, they would quit producing product. Their time and attention would be taken in team meetings, developing procedures and trying to rationalize the differing demands of each program. Fortunately, plant personnel know their jobs are tied to making budgeted quantities

of quality product. So, their view of change is to ignore these directives until they evaporate from lack of momentum and commitment.

The usage of the model. Each of the four areas can be handled in a step by step development towards Operational Excellence. In the SAM model the development for each of the areas has been illustrated by a triangle. The usage of the SAM model is a completely alignment of resources to achieve the business goals at the lowest costs. If you will be able to study the SAM model closer you will note that this about enabling change, not about the core maintenance or production process. Normally organizations seldom fail because they don't understand best practise but because they can't get them implemented. Therefore, the implementation of the SAM model focuses on change because it is the critical barrier for success.

The core group dealing with the betterment process must be the whole plant population. They have the power, collectively, to determine whether they will proceed, and how they will proceed. People are ready for SAM when the leadership agrees that:

- Asset integrity and condition are among the top three goals for the plant, now and forever.
- The way to improvement is not a project, but a fundamentally different way of operating.
- They are willing to invest their own time to make it happen and understand there will be investments before results.
- Function heads (production, maintenance, engineering, procurement) are willing to work together for change.
- They are willing to be measured and respond to identified gaps.
- They need help and are willing to accept it.

The leadership alignment around the strategic direction of the organization may be the single most important result of implementing the SAM model. This cohesiveness within an organization will certainly lead to financial results as well. The users of the SAM model have achieved benefits in excess of several million Euros within a short period of time taking a strategic approach to operations excellence. (Legát, Jurča, Hladík, 2014)) It has been detailing financial benefits from increased efficiency and increased plant capacity versus the costs of implementing the SAM model over a period of a number of years.

Discussion

The base for successful maintenance management is demonstrated in a control cycle model for maintenance, where the classical tasks of maintenance are described, the main tasks – as planning, controlling, execution and analysis – with detail tasks belonging to them (see Fig. 3). Accordingly, this check and evaluation tool is subdivided in following main section, which are described briefly (the whole questionnaire contains more than 250 queries. We will list individual areas and examples of questions from these areas:

Organisational structure & human resources:

- Ratio of employees for the functions c1arification - planning/preparation/ execution?
- Level of competence of the leading staff and qualification of workmen?
- How is wages policy organised? Are achievement-oriented elements included?
- Has the company any apprenticeship training, how is internal education and training organised?

Productions plants & operating staff:

- Condition of production and auxiliary plants?
- Process technology and standardising?
- Are plants and/or equipment's known which are strategic important for production?
- Are production data permanently recorded and analysed?
- How is the professional qualification of operating staff?

- Are they able to perform simple maintenance tasks by themselves?

Maintenance strategies & methods

- What are the reason for selection of a defined strategy?
- Are there working plans for preventive maintenance measures?
- Are diagnostic systems used for assessing and monitoring equipment conditions?
- Are the activities for weak point analysis of plants (equipment elimination) of failure causes?

EDP & work order system

- Is an EDP supported system (CMMS) installed?
- Is it used in network, is it regularly updated?
- How is work order management organised?
- Are clear rules available for periodization of work requests/work orders?
- Which work order type is predominant – single or permanent?

Work & capacity planning, scheduling

- Are maintenance works planned for a longer period (e.g. at least on week)?
- Can you find out any time?
- Whether all actual workload of the department?
- How will be that back log for the next days?

Work performance

- What is the share of planned work orders (concerning time and content)?
- Are estimations of expected workload made for each planned job?
- How is the (professional) structure of working groups?
- How is supervision and reporting organised for finished jobs?
- What is the ratio overtime?
- How many jobs are executed by every employee per day average?

Working place & equipment

- Location and level of utilisation of workshops?
- Equipment of workmen and workshops (standard and special tools)?
- Organisation of f10w of work in workshops?

Material management & subcontractors

- Number and location of storages for spare parts?
- How is demand-oriented provision of spare parts organised?
- Which persons can take material from the storage?
- Accessibility of storages out of normal working time?
- Procedure for purchasing spare parts?
- What is the strategy for using / buying external (maintenance) services?
- Is a system available for evaluation of suppliers and providers?

Technical documentation

- Structure of asset documentation?
- ls it permanently up dated?
- Can you find also maintenance relevant information in asset documentation (asset live cycle history, etc.)?

Maintenance budgeting & controlling

- ls it evident, which maintenance objects are very "maintenance intensive"?
- Can it be verified by plant related maintenance budgets?
- Do pre and post calculations exist for (bigger) maintenance jobs?
- Do you have hourly rates for single trades I professions I workshops?
- What is included in these hourly rates?
- Is an interpretation and / or analysis of maintenance costs done by kind of costs (internal, external, material) and by kind of services (inspection, preventive maintenance, repair, revisions, etc.)?
- Are maintenance related key figures used?

Quality & safety management

- Are only legal requirements fulfilled or do you have an applied management system?
- Can we see documented process flows for the performance of important maintenance measures?
- Are reclamations recorded and does somebody work on them?

- Does an employee suggestion system exist, with which improvements of plants / equipment are initiated?
- How do you estimate the safety consciousness of maintenance staff?
- Are analysis and debriefings of accidents and near-by-accidents done?
- Are "tool-box-meetings" held?

Communication

- How communication between production and maintenance is organised (e.g. during crashes, after completion, etc.)
- Does a structured reporting system in writing exist?
- Will maintenance staff be informed about contents of these?

Most of these criteria can be found out by direct questioning of different persons in the maintenance organisation, the other part will be answered by personal impressions during a tour of the plant and workshops. It should be a target of every company management to accept rules for so called productive maintenance. Afterwards the word productivity entered modern organisation philosophy of machines and facilities care indicated as TPM (Total Productive Maintenance). The describe order has been used for TPM efficiency assessment to. At literature is introducing many similar applications for efficiency assessment. This contribution produces results of maintenance productivity audit serving to the assessment of value reached in the framework of the TPM programme. The report was carried out in a rubber industry company before / during / after implementation first and second step of TPM methodology. I have chosen a spider diagram for interpretation to get a clear picture of determined actual situation, where you can easily see the strength and weakness of the checked maintenance organisation (see Fig. 3)

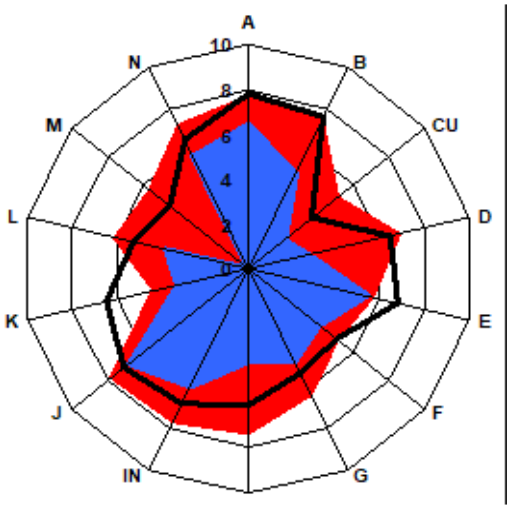

Fig. 3: Evaluation of Maintenance Organisation by OrgCheck (Source: own)

Conclusions

In the future, we will have to think in several dimensions: market – level of competence – design – operative and maintenance aspects – special branch knowledge, etc. It would be more natural and convenient to have all concerned discipline (Asset Management, Facility Management, Maintenance Management, etc.) under one roof. Strategic Asset Management is a systematic process that enables the dream of Operations Excellence. It emphasizes a logical approach to best practise through the development stages of the EXECUTE Triangles. Functional excellence will never be enough, however, to be the best. LEAD Functions are the glue that brings all the pieces together in an optimized set of systems, especially trough the mechanism of the Managing System and Strategic Plan. Finally, you can only be as successful as your workers endorsement and participation in this functional excellence practise. You must ENABLE your people to bring you the success you all desire.

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You & I Relationship

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Abstract

The world is no longer divided between male and female. The institute of a housewife disappeared. We have a unisex model, gender balance, asexual world. Polarization of society by possessions. It is only a partial list of facts that are linked with the You & I relationship. The authors analyzed available information on factors influencing the defined relationship with the objective to define a set of attributes affecting human society. They present a reflection to the reader in the discussion part. How is a view of current interpersonal relationships developing? They can be identified not only through the man and woman relationship, but also through the friendship, information exchange and the like. At present, the You & I relationship is becoming rather of a virtual nature. Information exchange takes place, but information no longer plays the role it once had. Rules in relationships are determined by ethics that can be seen as an algorithm, a program that defines more than just the emotional aspect of relationships. The dynamic balance in the You & I relationship takes on a spatial form. There is something that cannot be seen, something that represents a spiritual value that plays a certain role and counterbalances the material world.

Keywords: Marriage, Natality, Motherhood, Hormonal Anticonception

Introduction

An overpopulated planet and long-term shortage of workers in Europe and in the USA. What is the reason why the number of people in productive age in the Western World diminishes? (Zimmermannová, J., Hájek, M. and Rozenský, 2017) Not enough babies are born, the average natality in Western Europe is 1.4 baby per mother. Traditional values once fulfilling marriage and the You & I relationship are vanishing. The world is no longer divided between male and female. The institute of a housewife disappeared. We have a unisex model, gender balance, asexual world. Polarization of society by possessions. It is only a partial list of facts that are linked with the You & I relationship.

Businesspeople from industry, agriculture and service sphere in modern Western world have constantly reported – with some exceptions – a shortage of suitable labor force, which prevents them from expanding, while our planet is overpopulated. People are the predominant animal species whose requirements for resources keep growing. In Europe (and other developed countries such as the USA, South Korea, Japan, Singapore etc.) we have seen depopulation for at least past 30 years. Fewer babies are born than before. The average in Europe has been around 1.4 baby per mother in the past 30 years, the exception being rich countries such as Norway and Switzerland with average near 3. In the USA, the natality growth is mainly due to the Hispanic minority that has historically always had more children. The fundamental difference is quite obvious. Africa and a large part of Asia prefers quantity to quality, while Europe, the USA, Russia, South Korea, Japan, Singapore are heading the quality street. The policy of one child with the preference of a son was applied for decades in mainland China. Is it normal that we

decided, on our own accord, to decrease the population in the northern hemisphere? No member country from the G20, the most developed economies in the world, does not achieve – with the exceptions of aforementioned exceptions (Norway, Switzerland) – the reproduction value of 2.1.

The traditional marriage in traditional localities is decreasing. There is a growing number of unmarried couples and children who do not leave the household. Male fertility is descending. Women working in men's job positions postpone their motherhood and focus on their careers instead. The consumerist lifestyle and accumulation of assets is on the rise. There are more and more single parents and the traditional (i.e. Christian) model of family, with a husband and a wife raising their children together, is falling apart. The You & I relationship typically first has a sparkle alongside with passion, relationship, talking, but what is left in the end is just the talking. All that remains over time is only the relationship itself, although it is very important. The relationship in digital era is getting a new form. Emphasis is laid on lifestyle that differs from the one that our parents and grandparents had. There is no time for anything, the genuine family spirit is disappearing. Asia sees a formation of a principle of spiritual renaissance (Lípa 2018): searching for a soul mate that we find in the You & I relationship, i.e. in our closest circle. What are the consequences for the future? What changes does Industry 4.0 implement and what things will Society 4.0 substitute?

Theoretical background

Changes in the relationship between a man and a woman in the past 100 years

120 years ago, the modern role of a man and a woman was quite unambiguous in most of the G20 member states. The First World War, the Russian Revolution, post-war Spanish flu pandemic period, first urbanization pressure (work was hard to find in the country, it was hard to earn a living), migration waves to the USA, hyperinflation in Germany, all of these phenomena were the causes of the lack of labor force. Industrialists exerted big pressure requesting that women filled in the vacancies. After the First World War there were first women physicians, scientific workers (Bajtoš, 2003) and others. Women in many countries gained the right to vote with the principle: if we can work like men, we want the same rights like men. The Wall Street Crash of 1929 and the following economic crisis slowed down the situation. Meanwhile, Hitler's Third Reich returned back to the roots and the personality cult meant also preference of the cult woman seen as a mother and natality slightly rose. Nevertheless, after the outbreak of the WWII the problem with the shortage of labor force renewed. It was partially solved with forced workers from abroad (the UK and France used workers from their colonies, Germany from invaded countries). After the end of the WWII, Germany was short of 50 million people, other millions were captured in Russia. The population growth rose immediately after the war as many couples waited for the war to end before they decided to conceive. However, this population wave weakened in the course of the following years (the Iron Curtain in Europe, long-term lack of consumption goods, ratio system, changes in political regimes). All countries dealt with the shortage of labor force in a similar way. The UK and France searched for workers again in their (this time former) colonies. West Germany made use workers from today's Turkey. This caused another wave of anti-Semitism, racism and animosity in many countries. It did not break out fully in the 1950s but waited for the following generations. In the 1960s, hormonal contraception for women first occurred and women took over the right to decide when to have children and regulate their number. The 1970s saw another population wave. While it was artificially supported in some countries, it was mostly spontaneous for a single reason: it was perfect time for baby boomers to have children. At the same time oil shock caused first global changes (Strachotova, 2012) in terms of approach to the planet and natality. First globalization moments after 1980 caused several fundamental changes:

- Multinational corporations were established, their economic influence being larger than that of smaller countries.

- Transformation in society occurred, traditional pyramid structure changed, narrowed, it mostly kept only added value and all non-essential production or with low added value became outsourced from sub-supplier chains, often dispersed all over the world.
- Arrival of new technologies, the Internet, lifestyle started changing. Women took intensively once male roles, the institute of a housewife was abandoned, unisex menswear for women.
- First agglomerations with dozens of millions of inhabitants were formed. This led to economic pros such as high density of people, so advertising was not needed for most services: there were enough customers nearby and demand for anything that was once the domain of women (outsourcing of housework, equalization of man's and woman's roles).
- Emancipation in terms of sex, homosexuality stopped being a crime in many countries, but rather an expression of the opinion of the You & I relationship.

These historic changes in the relationship between a man and a woman correspond with economic changes shown in Kondratiev's cycles (Alexander, 2002) of economic-technologic development (see Fig. 1 and 2). The difference between identical charts is given by the use of different axis measures.

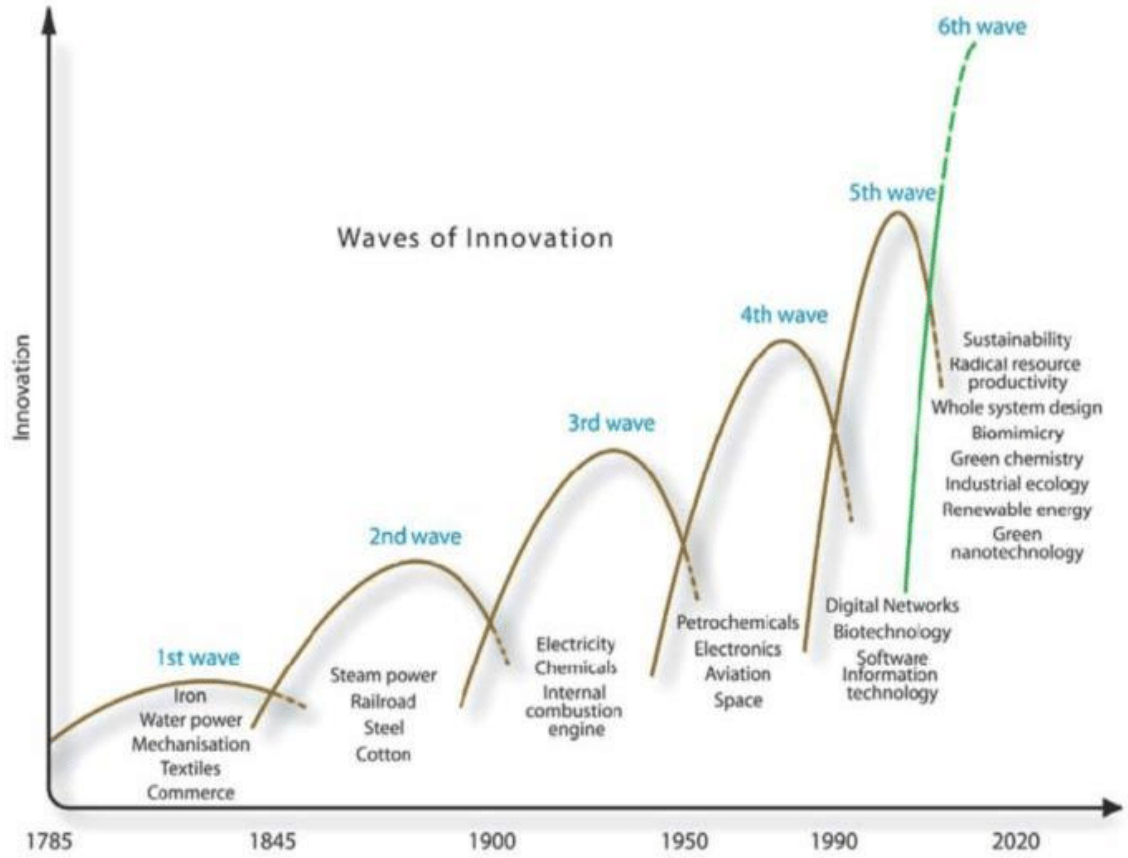

Fig. 1: Kondratiev /World Economy Act" (Source: Alexander M., The Kondratiev Cycle: A Generational Interpretation, Indiana, iUniverse, 2002, 41 page)

The contraception pill changed the world. It broke the rule that it is the man who decided about conception during an intercourse or is the one responsible for the use of contraception (prophylactic). The woman took over the right to decide when to have children, who with and regulate the number. From the perspective of the You & I relationship it was one of positive options for women, especially those from totalitarian countries and countries from the former Eastern Bloc. The dismal solution in the case of

unwanted conception was abortion. That was illegal in many countries (Dolista, 2017) and was considered a crime committed by the mother-to-be and the physician who performed it. This is one of the historic reasons in transfer between generations (typically mother-daughter). The frequency of use of hormonal contraception differs by countries (see Table 1).

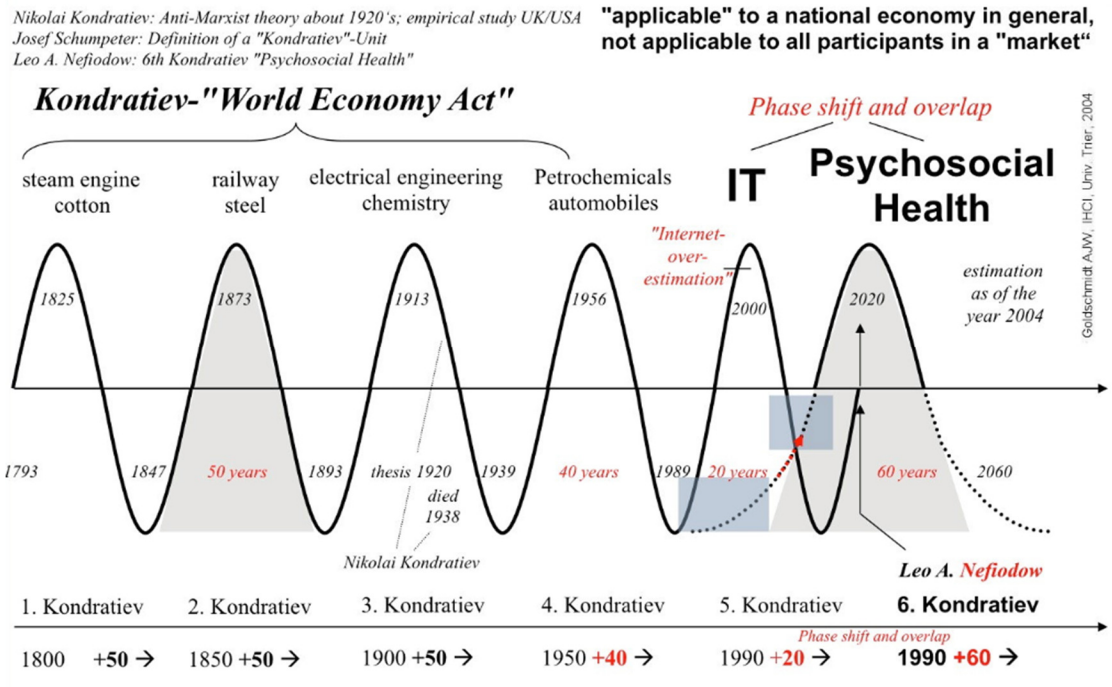

Fig. 2: Kondratiev /World Economy Act" (Source: Alexander M., The Kondratiev Cycle: A Generational Interpretation, Indiana, iUniverse, 2002, 76 page)

Hormonal Contraception

Table 1: Percentage of women using hormonal contraception

Czech Republic	52%
France	50%
Netherlands	41%
Germany	40%
Slovakia	32%
EU average	24%
USA	17%
China	1.2%

Source: Trends in Contraceptive Use Worldwide 2015, United Nations, New York, 2015

The proportion of women using hormonal contraception often shows the lobbing power of pharmaceutical companies in a given state. Much lower percentage in the USA is due to the fact that ethinylestradiol (synthetic estrogen) is considered a proved carcinogen in the USA (Maizes, 2010). Another difference between the USA and Europe is that there are more sterilized women and men in the USA (Harrison, 2012) than numbers of those using hormonal contraception!

What changed significantly was the attitude of once families and now women to their bodies. 100 year ago, a young lady first had her menstruation at around 17 years of age. Such a young lady went to a couple of balls under the supervision of a chaperone and she got married. Optionally, families made an arrangement about a marriage (Dolista, 2019). It was king of automatically expected that children would be born soon (Payne, 2019) and natality in Europe was multiple compared with today, in the Czech Republic it was 6 children per mother. Nowadays, young ladies have their first menstruation at around 12-13, while having firs menstruation at 9-10 years of age is no exception. Their body than has a long reproduction period in regular cycles. The legal age for sexual activities differs, typically it is 14-15 years of age. If a young lady starts to be active around this age and uses hormonal contraception (Roztočil, 2011), she can easily live through 20 years of sexually active life with a state of artificially induced infertility. This is one of the causes of complications when trying to get pregnant. (Vrba, 2017)

Another, and even more significant, adverse phenomena of using hormonal contraception is that the egg gets actually fertilized. The body assesses this wrongly (Hehlmann, 2010) and expels the fertilized egg (Adam,2003) from the reproduction process. This can happen several times over the 10-20 years of use and a woman may only notice it as stronger menstruation. Subsequently, when such a woman plans to conceive, her own body believes that conception is undesirable again (as it has been the case several times before), which leads to miscarriage. Last but not least, hormonal contraception alters chemistry in the couple. Although it is unscientific, this fact has been confirmed many times: while there was mutual attraction in the couple, after starting taking the pill (or vice-versa after stopping taking it with the view of conceiving) attraction between the man and woman vanished.

Situation in the Czech Republic after the 1989 change of regime

In the past 30 years since the change of regime, the Czech Republic has seen a wide range of changes. From the economic perspective, the purchasing power parity increased tenfold. The economy is extremely dependent on the automotive. Arms industry either totally ceased to exist or it reoriented. The Czech Republic is a leader in the field of nanotechnologies. The change of regime did not favor natality. New possibilities linked with open state borders meant that "Husák's" baby boomers born in 1970-1975 often postponed starting a family and women had their first baby at 30 years of age instead of once common 22. Economy set for the usual 180-190 thousand newborns a year switched to 140 thousand newborns. However, the Czech Republic needs approximately 180 thousand children a year to achieve the rate of natural increase. The Czech Republic has the highest rate of hormonal contraception users (52%). Natality has varied between 1.1-1.5 in the past 25 years. A positive trend could be seen in 2014-2019 when natality grew to 1.7. There are 23 thousand interruptions per year in the Czech Republic, which is partly given by abortion tourism (the Czech Republic has liberal attitude to abortions, unlike some neighboring countries). The number of IVFs is around 30 thousand cases paid from the public health insurance budget and another 15-20 thousand cases per year paid by private payers. The Czech Republic has – at least in Europe – the densest network of assisted reproduction and boasts high-quality medical care. Sadly, this is redeemed by impersonality, sometimes on the very border with cruelness, in provision of gynecological care. Most women undergo a gynecological intervention as outpatients (approximately 1 million interventions) while there are approximately 100 thousand surgeries (data from 2016).

The You & I relationship is affected by several factors. The worldwide trend of migration to anonymity of big cities. It the Czech Republic it is a common refusal of maternal model and extramarital children. While the number of unmarried couples living together was close to zero, nowadays therre are more extramarital children than children born in a marriage. The divorce rate is higher than the wedding rate. Until the 1960s, divorce was considered a taboo. This is also due to economic reasons, entitlement to a higher social contribution and/or allowances paid to single-parents that unmarried mothers are often considered. Furthermore, there is the effect of mummy's boys, meaning children who share one household with their parents until they are 25-30. This issue was given media coverage several years ago, Hollywood even shoots comedies about how parents can get rid of their overgrown kids by arranging a fake wedding. According to

available data, the percentage of 25-29 year-old men sharing a household with their parents is as follows 56% in Slovakia, 53 % in Bulgaria, 52% in Greece, 50% in the Czech Republic, 47% in Italy and 17% in Germany, 14% in Austria, 12% in France, 4% in Norway and 1.8% in Denmark (see fig. 3).

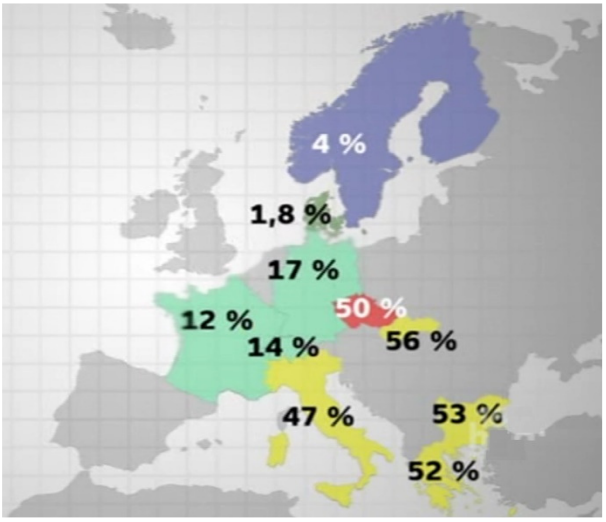

Fig. 3: Percentage of population under 30 living with parents in one household (Source: https://www.czso.cz/csu/czso/aktualni-populacni-vyvoj-v-kostce, picture author)

This problem is the case also in the Czech Republic. The data was obtained from the last census. 32.2% of mummy's boys in 1995 has grown to 50% of 25-29-year-old who share a household with their parents. The trend is slightly better with ladies: while in 1995 15.1% of 25-29-year-old women lived with their parents in one household, the number grew to 31.1% in 2014. According to the sociologists from the Institute of Sociology of the Czech Academy of Sciences this is merely evidence of the fact that it takes longer to mature and be ready to fly the nest and start a family. 25 years ago (in 1995), most 25-year-old women already had a baby. This has shifted and now the average age of primiparas is 30. The less independent a person is in a private life, the less independent they are at work and the more they are likely to avoid risks. The rule of thumb says that the weaker the will to take risks, the lower economic productivity. The US economy is still an environment where people are willing to take risks. By contrast, European economy prefers to be on the safe side.

Conclusions and Discussion

How are current human relationships evolving? Not only between a man and woman, but also in friendship, information exchange etc. Originally, the You & I relationship was based on friendship, communication, nonverbal meeting, practical aid etc. At present, the You & I relationship is shifting to the virtual world (sending text messages, giving likes, etc.). People are not in physical contact, which is in contradiction with the structure of nonverbal systems. Millions of years of evolution were based on physical contact and face to face information exchange. Looking from the neurologic perspective of the You & I relationship, it is an information flow. And the current form of the You & I relationship jeopardizes the information flow as it moves to a different level in terms of quality. In the future, digitization of the relationship will deepen even more, meaning it will take on some form of information exchange by the means of media, virtual reality or something similar. The biggest problem of digitization lies in the fact that it threatens security protocols that Mother Nature endowed us with. They concern the ability to process information, create an abstract image of reality built upon such information. If that is replaced with this immaterial, nonverbal, virtual milieu, a person receives far too much information that

they cannot cope with. A human body cannot function in the system of virtual reality. Information exchange does still take place, but fails to fulfil the task it should. Then the actual "self" works in a mode it has not been set for, not verbally nor sensorially. It does not utilize the thing that once formed a network of friendly relationships between people, friends and partners. And if this "self" is not formed, the basis is unstable.

In this sense, ethics ensures criteria significance of all information. That "self" transforms, because the criterion of significance of information in the human brain and its structures is the emotional code. An emotional code generates the structure classified as "important – unimportant", "vital – nonvital". Ethics is part of the emotional code. Should we put ethics aside, all we are left with is information about which we do not know if it is important or unimportant, good or bad. Ethics determines the rules, it is something like an algorithm, a program that defines, besides the emotional aspect, how to proceed within a program. If ethics and morality is absent, it is only an information flow with no structure whatsoever. Ethics arranges information hierarchically. It is the key paradox: with no ethics there is just an information chaos. If there are no rules, a relationship is not bound by anything. And when it is not bound, there is no fixed point – Euclid's "place to stand" (if it is found, the world can be moved).

Dynamic balance in the You & I relationship takes on a spatial form. It is a philosophy of "black and white" things. And then there is something that cannot be seen – a spiritual value that plays a certain role and counterbalances the material world. It influences the immaterial world as much as the material one. Chinese strategy of harmony and continuity proclaiming that continuity lies in a marriage persisting and harmony in that once "I am big, once you are big". Marriage was originally an economic relationship helping people survive, associate and form a group that had descendants and could survive more easily out in nature. Subsequently, there was a second stage of gradual asset accumulation and it was always more convenient to have own children so that they could inherit property. Obviously, then there was the problem with splitting the property. Today's family has transformed back into a smaller group and it contributes to the importance of the You & I relationship. The present problems are posed by economic stress, economic slavery, lack of time and lack of communication. The inability and unwillingness to accept information exchange within a family. It is substituted by the Internet, different communication channels and the like. A family is today primarily focused on what symbolizes its position within a society, i.e. social status degree of consumption etc. Such a family is not concerned about what could be referred to as the "genuine family spirit", i.e. connecting people in the closest circle. The main problem is that people claim to have no time. But do people actually care to communicate inside families? Or do they only bother to communicate about necessary things, but not about topics that really matter such as the meaning of life, what to endow children with, how to prepare them for life and similar. If this trend continues and digitization penetrates all problems it may easily happen that a family will no longer be the basic unit of society. Instead, the basic unit will be an individual with his or her ideas, desires, options and possibilities. And such an individual will be exposed to squalls in historic development as they will have no footholds. An individual's view of life is different. It alters consumption. What will individuals consider basic needs? Material assets, experiences or some type of sharing or communication via technical media? An individual may formally have 2,000 friends, but in fact none. Or will the principle of spiritual renaissance return? Looking for a kindred spirit, finding it first inside the family, i.e. in the closest circle and then in a broader circle in the water-circle-like way? Asians have discovered the need for spiritual renaissance. It is likely that something similar may happen in the "developed world". The question is how to create conditions and – most importantly – how to indicate people that face to face communication is irreplaceable, meaning how to show them what the basic principle of nonverbal systems from the perspective of human communication is.

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The Main Aspects of Poverty Prevention in Global Economic Development

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Abstract

Considering certain issues, it should be emphasized that poverty is a global problem that cannot be solved by the efforts of individual countries alone. This study provides a factual assessment of human well-being, with a particular emphasis on poverty, inequality and vulnerability based on the most relevant and accessible data. Particular attention is paid to the causes and its scope. The problem of poverty is an obstacle that impedes the development of each individual, each country and the world as a whole. The implementation of the proposed Individual Poverty Plan can be a financial solution for poverty prevention and elimination in the long term. According to the New Paradigm of Poverty, the perception of poverty needs reconsideration as a stage of life. The New Paradigm suggests a comprehensive analysis of what causes poverty.

Keywords: poverty, poverty measurement, Gini index, inequality.

Introduction

The community and economic development face many different issues. One of the most significant is poverty. It often refers to individual failure, and all programs address poverty once it has already occurred. It is one of the most critical issues for all types of communities regardless of economic system development nature. Nevertheless, profile, scope, depth of poverty has undeniable interregional differences.

Evolution of poverty consists of the following key stages:

1) XVII – mid-XIX century - formation of ideas about nature and causes of poverty as part of social Darwinism, egalitarianism and the statistical sociological approach;

2) The end of XIX – the beginning of XX century – formation of the concept of minimum subsistence level, an absolute approach which was based, on the minimum set of goods and services necessary for maintaining physical subsistence and its productivity;

3) The period of 1960-1980 – developing the concept of deprivation (relative approach), social exclusion, and culture of poverty.

Based on the above stages, we can consider the following theories of poverty (fig. 1).

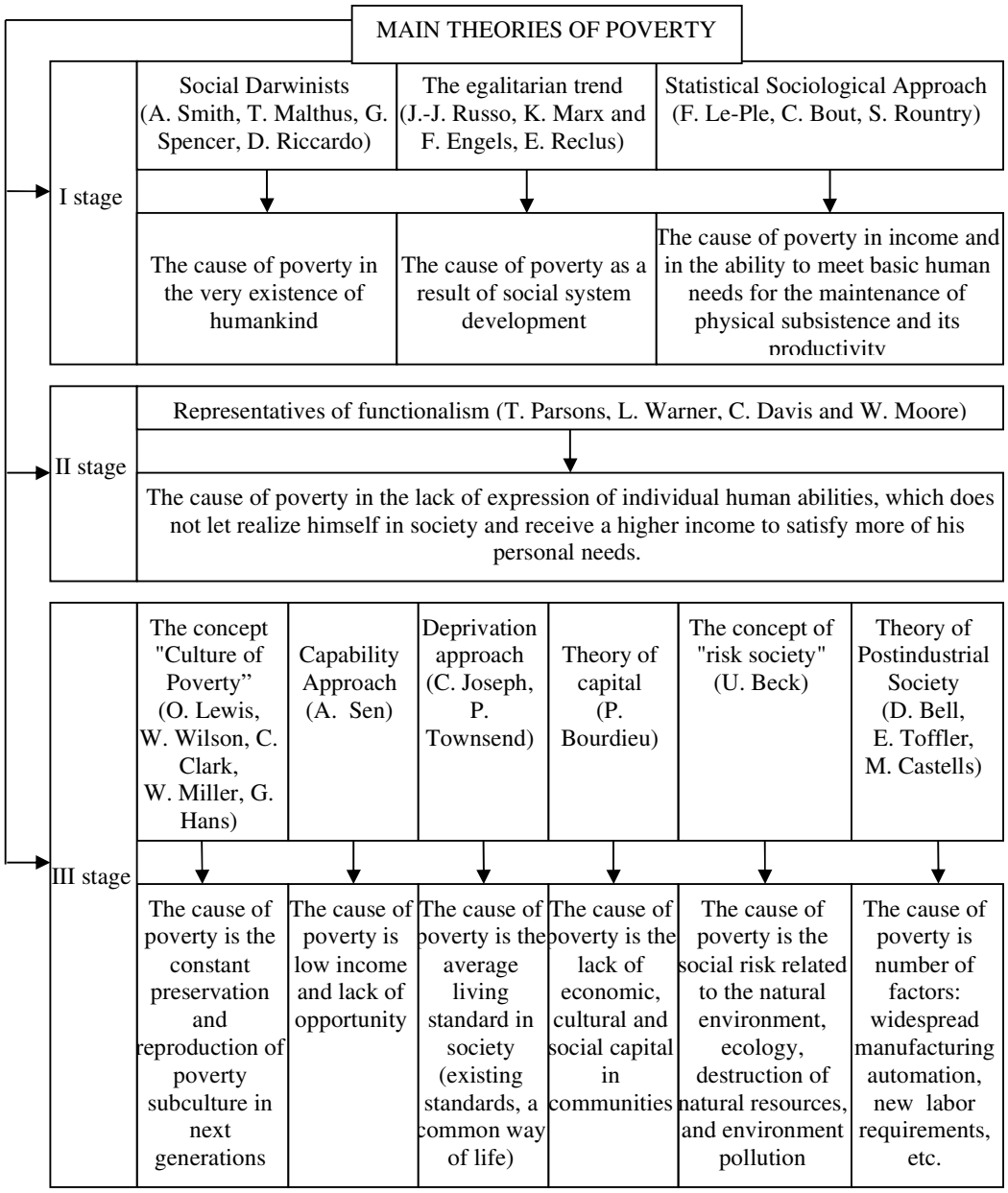

Fig. 1: Stages and main theories of poverty

There is no unified worldwide understanding of poverty despite the approaches to diversity in sociology. Interregional differences explained with the methodology of poverty measurement. Although the World Bank established an absolute poverty line of $1.90 per day, more developed countries apply a relative approach in its monetary and non-monetary expression.

Results

The UN General Assembly, in resolution 70/1 of September 25, 2015, identified the main goals in the field of sustainable development. The first goal is the complete and widespread eradication of poverty in the world in all its forms by 2030.

The problem of poverty and misery is one of the most urgent issues in the modern world, and it is most acute in developing countries, where the share of the poor often makes up 60–70% of the population. The World Bank's Poverty and Social Justice Database contains estimates for 168 countries, and over the past ten years, new estimates have been published for approximately 80 countries. At present, they are available from 1,500 annual data sets of observations in various countries — this is more than three times higher than in the early 2000s.

The statistics show that more than 19% of people live below the poverty line in New York City, 33,9% - in Ukraine, 19,7% - in Germany, 12,9% - in Russia, and the number of people living on the edge is only growing. Every member of all communities is likely to face poverty at least once per lifetime.

Based on the data of the Economist analytical magazine, a forecast of the level of poverty in stable and unstable countries was determined, which should have decreased to 9.9% by 2020, and by 5.4% by 2030, which makes 386 million people living in poverty. but it’s more a myth than reality because per capita consumption and consumption distribution in each country can change, and most likely the current level of 15.2% of poverty will remain the same in 2030 (figure 2).

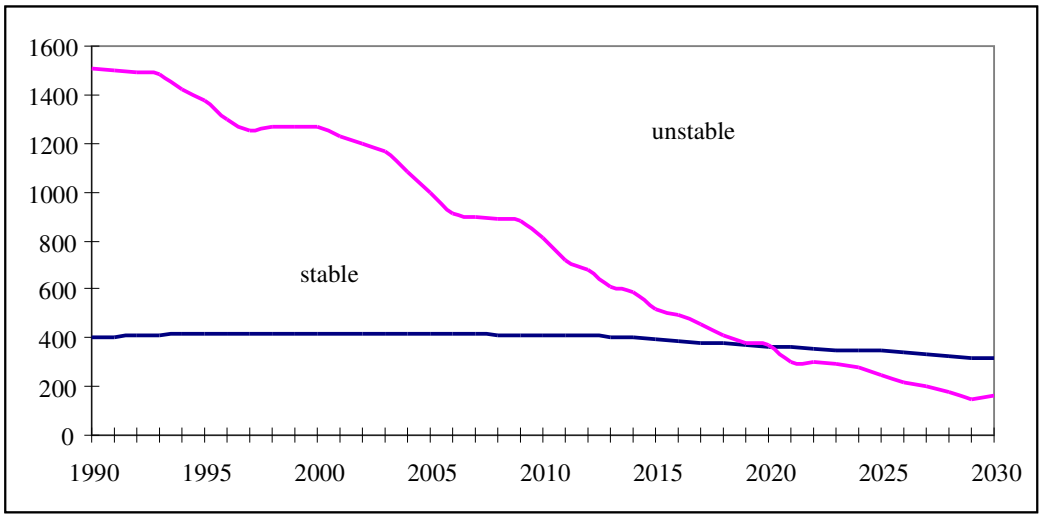

Fig. 1: The number of poor people in stable and unstable countries, million people

There is no single approach to the definition of poverty in the countries of the world. Hence, each government determines the poverty of its population by its standards, and it is simply incorrect to compare poverty indicators calculated by different methods. The same citizen, depending on the selected evaluation criteria, may turn out to be under the poverty line for one, and not for others.

Currently, poverty measures do not include any precautions methods for poverty awareness. The perception of poverty needs reconsideration as a stage of life, according to the New Paradigm of Poverty. The implementation of an Individual Poverty Plan can be a financial solution for poverty prevention and elimination in the long term.

The traditional description of community is people united on the same territory, or same religious or economic principles not prevalent in the bigger society (Sanders, 1970). The modern description does

not have a place limit and relates to the social relations that bond people (Bradshaw, 2008). Community development includes economic, social, and environmental pillars. The economic part is the most significant, but economic growth will not always have a positive outcome. Subsequently, developers conclude that increasing wealth and jobs may lead to inequality and destabilize the community (Leigh & Blakeley, 2013). In the process of global development, the population-level grew, but the economic gain did not match the trend in the long run (Firebaugh, 2003). The increase in the number of people did not boost the living standards in a long perspective and resulted in global income inequality and increasing poverty around the world. Inequality includes a different aspect of life, from money to power. It is common to define three forms of inequality – economic, political, and social (Rothman, 2005). Economic inequality reflects a difference in wealth and material resources, social – status and level of well-being, and political is power and authority. Therefore, the people from the lowest social class became the poor, and the poverty levels grew over time.

The Gini coefficient is a statistical indicator of the degree of stratification of society relative to any economic feature (annual income, property, real estate) used in countries with developed economies. The level of annual income is taken as a calculated indicator.

The distribution of population between countries allows for accurate and uneven distribution of income in society.

The value of the Gini coefficient ranges from 0 to 1. The more its value deviates from zero and approaches unity, the more income is concentrated in the hands of individual population groups, and the higher the level of social inequality in the state, and vice versa. The Gini Index is a percentage coefficient. The dynamics of the Gini index by country presented in Table 1.

Table 1: Ginit Index Dynamics by World Countries, %

Country	Years					
	1990	2000	2010	2014	2015	2016
Brazil	60,50	-	-	51,50	51,30	-
USA	-	40,40	40,40	-	-	41,50
Russia	-	37,10	39,50	39,90	37,70	-
Belarus	-	31,20	28,60	27,20	26,70	27,00
Canada	-	33,30	33,60	-	-	-
Germany	-	28,80	30,20	-	31,70	-
Turkey	-	-	38,80	41,20	42,90	41,90
Kazakhstan	-	-	28,00	27,00	26,90	-
UK	-	-	34,40	34,00	33,20	-
Spain	-	-	35,20	36,10	36,20	-
France	-	-	33,70	32,30	32,70	-
Austria	-	-	30,30	30,50	30,50	-
Ukraine	-	-	24,80	24,00	25,50	25,00
Slovenia	-	-	24,90	25,70	25,40	-
Denmark	-	-	27,20	28,40	28,20	-
Czech Republic	-	-	26,60	25,90	25,90	-
Uruguay	-	-	44,50	40,10	40,20	39,70
Vietnam	-	-	39,30	34,80	-	35,30

In the 2016 Human Development Report, the highest Gini indexes were found in countries such as South Africa - 63.4%, Haiti - 60.80% and Botswana - 60.3%. Minimum rates - in Sweden - 23.00% in 2005.

Data on the Gini index in the countries of the world are presented taking into account the available statistical information and survey data, which were conducted in several countries.

Among the countries represented in the table, countries with the highest Gini index on average for the period from 2000 to 2016 can be distinguished. The maximum indicator is noted in Brazil, but in dynamics, it shows a decrease of 9.2 percentage points, although Brazil remains among the countries with the highest level of income inequality. In 2000, the countries with the highest Gini index among the countries surveyed were the United States and the Russian Federation — 40.40 and 37.10%, respectively. In dynamics over 15 years, these indicators have changed slightly.

In 2010, Uruguay, 44.50%, Vietnam, 39.30%, and Turkey, 38.80%, can also be classified as countries with a high level of income inequality. The Gini index in Turkey is increasing and by 2016 is 41.90%.
Among the countries surveyed, the minimum Gini index was observed in Slovenia - 25.4%, Ukraine - 25.50%, and the Czech Republic - 25.9%.

The old or new paradigm describes poverty perception. The old paradigm concludes that individual failure is the cause of poverty (Rank, 2004). This view is tight to one-dimension only and does not consider the influence of other factors. The ideology behind it describes the economic system as the main generator of well-being and prosperity of opportunities. Besides, social welfare can encourage people to take benefit of government help and drop the school. The economic development resulted in the need for specially skilled workers, and those without special education becomes less valuable on the labor market (Rank, 2004). This concept is widely used in modern politics and government measures of poverty. The New York City issues a yearly report about poverty levels. In 2017, statistics showed that people under 18 and over 65, and females tend to be the poorest. From the ethnicity and race side, the highest level of poverty belongs to Asians and Hispanics, following by Black. The report shows the relation to the Old Paradigm because poverty analysis describes different individual characteristics.

As for Ukraine, there has been a decline in the poverty rate as measured by the state statistics Service, from 51,1 percent in 2016 to 34,9 percent in 2017. At the same time, the share of poor people covered by social support programs increased from 70,3 percent in 2016 to 73,6 percent in 2017. However, such aggregate statistics do not reflect the gendered profile of poverty in Ukraine. Single female-headed households and elderly women constitute the highest risk for poverty among families with many children. Moreover, some ethnic groups, e.g. Roma, experience severe discrimination and barriers in accessing services. Ukraine continues to face mounting problems due to its pension system. The deficit of the Pension Fund is currently at 6,4 percent of GDP. At the same time, the amount of payment distributed per person is extremely low. Around 12 million Ukrainian pensioners receive an average of less than USD 70 a month nationwide. The situation is further compounded for Ukrainians living in the non-government-controlled area (NGCA) due to the linkage between IDP registration and pension eligibility. As of August 2014, the number of registered pensioners in NGCA was 1,278,200 people. However, as of July 2018, it was reported by the Pension Fund that only 477,000 pensioners with NGCA residence registration received pensions. The Ministry of Education and Science (MoES) started implementing the 'New Ukrainian School' action plan, which aims to equip students with the knowledge needed to think critically, set and achieve goals, work with teams, and in multicultural settings. This new way of learning will be applied to all first-graders in the 2018/2019 academic year. There is currently a discrepancy between skills acquired through education vis-à-vis those sought after in the labor market. A survey conducted by the World Bank shows that 40 percent of firms in the key sectors of agriculture, food processing, information technology, and renewable energy report a significant gap between the skillset of their employees and those needed to achieve business objectives. In 2018, the health care system underwent major reforms. In March 2018, the National Health Service of Ukraine (NHSU) was established.

Measures intended to decrease the scope of poverty have a specific methodological base developed and adopted throughout the long-term studying of the problem.

Thereby the current situation in the world requires the involvement of government with specific social policies intended to alleviate poverty.

Considering this problem, it is worth saying that the modern world gives significant attention to its study. For instance, experts of the World Economic Forum, which takes place in Davos annually, calculated social mobility index which shows how citizens are attached to their socio-economic status – if those who were born in low-educated families or poor families can secure a better life for themselves.

Nine key socio-economic indicators were used for calculations: healthcare quality; accessibility of education; quality and equality of education; the possibility of continuous learning; availability of technology; employment opportunities; fair pay; working conditions; social safety; efficiency and transparency of public institutions. Moreover, each indicator assigns a score from 0 to 100. The more the country gets, the higher it stands in the rating.

The top ten were European countries: Denmark - 85.2; Norway - 83.6; Finland - 83.6; Sweden - 83.5; Iceland - 82.7; Netherlands - 82.4; Switzerland - 82.1; Austria - 80.1; Belgium - 80.1 and Luxembourg - 79.8. The United States were ranked #27.

Ukraine was ranked #46 with 61.2 points that brought her to the second part of the chart. The country is behind Romania (#42), Russia (#39), and Poland (#30). However, Ukraine is higher than in Greece (#48), Georgia (#53), and Turkey (#64).

Thus, the New Paradigm suggests a comprehensive analysis of what causes poverty. Multiple factors affect poverty, from structural failure to quality of life. The new paradigm begins with the consciousness of an insufficient number of jobs availability. The shortage of jobs leads to inequality because the system is granting jobs in priority to those who have more skills or better education. The lack of labor market increases the poverty risk for vulnerable groups. The quality of life plays a significant role in the ability of people to make a conscious decision. The poverty measures need to consider the condition and quality of life. Poverty impacts physical and mental health and can extend the time for an individual to find the job. The increase in crime exposure is growing in correlation to poverty. Families on the edge of poverty become victims of crime more often than those from higher social class (Rothman, 2005). The final factor considered under the New Paradigm is poverty as a stage of life. The risk that anyone can encounter is a poverty characteristic (Rank, 2004). Global economic development tends to change the need for certain professions, and implementing technology increases the vulnerability of individuals. That increases inequality and stratification. As a result, there is a need to create awareness through different programs, like poverty risk assessment and preparing financially and mentally.

The importance of estimating poverty as a risk can help prevent poverty. If an individual is prepared to take the risk, it needs less effort to overcome this stage of life. No poverty measures reflect community culture, which is necessary to understand because every community has a unique culture that is formed historically and may react uniquely to government programs (Lyon & Driskell, 2012). Considering all factors, there is a need for implementing an instrument that will prepare individuals to face poverty at any stage without taking into account their skills or knowledge. The financial part can be the most challenging for anyone. So, from banking experience, every fifth person does not have savings. The Individual Poverty Plan can help to support poverty when it is approaching. The implementation of the Individual Poverty Plan (IPP) can help to prepare people to face the risk of poverty and eliminate it in the long term.

The IPP is a financial product that requires the participation of private businesses, government, and individuals. Banks will initiate IPP in numerous communities throughout the retail channels. The presence of banks and insurance companies has a large footprint across the nation. The financial corporations are significant because they have access to those who have an account or insurance already and can encourage and educate about poverty. The role of government is in providing tax benefits for individuals willing to take advantage of IPP. Numerous investment products offer tax-

deferred options or pre-tax. Similar to Individual Retirement Plan (IRA), the Individual poverty plan needs to have a limit for the year equal to the threshold in the state of residence and determination the risk of poverty. The targeted segment is households that are close to the poverty line. For example, the 2017 New York City Poverty report declared more than 40% in this category. It creates an urgent need for an effective solution. In the case of a poverty event, the individual allowed to use funds to cover living expenses while looking for a job or starting the business. If poverty did not occur, the funds would transfer to the Retirement fund or be distributed towards a down payment for a house purchase. Government support has also to address the issue through poverty awareness programs, creating a sense of urgency for everyone. The awareness around poverty will motivate individuals to obtain the Individual Poverty Plan. The benefits for households include but not limited: emergency savings funds, pre-tax contribution, lower poverty risk, poverty awareness, and a potential increase in retirement funds.

Conclusions

Community development faces many different issues, and some of them are easier to overcome than others. While the modern approach does not limit to the place, we propose community as people united by the same needs and most likely share the same location. The primary goal of development is the satisfaction of current needs, and most importantly - address future needs. In our opinion, one of the most significant issues to face is poverty. Some areas are more vulnerable because of historical inequality. For sustainable development, it is critical to be prepared and aware of poverty. It requires the change of poverty perception and incorporating new effective programs. The idea of implementing an Individual Poverty Plan is a financial solution that can help minimize the impact of poverty once it is approaching or in the early stages. It will encourage individuals to create an emergency fund. The IPP is based on the Rank`s New Paradigm of Poverty. Poverty addressed as a stage of life and supports basic life needs, allowing find a new job or start a business. The investment side of the plan meant for funds to grow. The accessibility of the program will promote equality, and the role of every actor is critical. The successful implementation of the program will result in preparing individuals to face this stage of life, minimize the risk of becoming poor, and in the long term - eliminate it.

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Development of Small and Medium-Sized Enterprises on The Ecosystem Based: Russian Federation and Polish Republic Experiences

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Abstract

The article is devoted to the results of the research of small business development in Russia and Poland for 10 years. The data comes from the reports published by Polish Agency for Enterprise Development and the Russian SME Resource Centre (RCSME). The author analyzed the following indicators: the number of active SMEs, the amount of employees in SMEs and their contribution to Gross Domestic Product (GDP) both in Russian Federation and Republic of Poland. The concept of the ecosystem in terms of studying the changing processes considered in the article. SMEs have a key role in these processes. Recommendations for small and medium entrepreneurship development are given at the end of the article.

Keywords: Ecosystem, Small and Medium-Sized Enterprises, Gross Domestic Product, Innovation Models.

Introduction

The development of economic systems is now inextricably linked with international cooperation advantages, including the implementation of joint investments in the implementation of various interaction projects. The key strategic direction in these conditions should be the interaction of SMEs through the creation of new business models and processes based on ecosystem approach and through cross-border cooperation. The term "ecosystem" is quite complex and does not have a single definition. The fundamental idea of this concept is that enterprises build their strategies and create competitive advantages based on resource sharing, network externalities and spillover effects. Firms in this context of collaboration, recognize the holistic value in products and services for future customers, and create and capture value by actors. This collaboration involves producers, suppliers, distributors, financial institutions, research institutions, clusters, value networks, etc. The existence of an innovation ecosystem would provide platform to the organization to exchange products and services to the users of those

products and services. This requires the development of new theories and approaches that reflect real trends, one of which is ecosystem theory. Before moving on to the question of the company's development on ecosystem principles, let's consider the history of the establishment of small and medium-sized enterprises (SMEs) both in Russia and Poland.

The development of SMEs started only in the nineties of the XX century. The fall of communism released the entrepreneurship of the society, which was the trigger of the long process of economic transition. However, the process was not smoothly as the circumstances were changing, also for SMEs. One of the most important turbulence was the world economic crisis[1]. These facts encouraged the authors to make research about the development of small and medium-sized enterprises in Russian Federation and Republic of Poland in the years 1994-2016. They decided to analyze the following indicators: the number of active SMEs, the amount of employees in SMEs and their contribution to Gross Domestic Product (GDP).

The structure of the article is as follows. First, the literature review was done. Then the development of SMEs in Russian Federation and Republic of Poland was analyzed. The conclusion was presented at the end of the paper.

Definition of SMEs

According to Law 209-FZ, legal entities, individual entrepreneurs are deemed to be small or medium businesses if they meet three criteria regarding ownership structure, workforce and volume of revenue. Key components of SME classification in Russia are similar to those used in EU (figure 1):

1. Ownership structure: SME's stake held by one or several legal entities, which are not small or medium businesses, should not exceed 25%
2. Workforce: Number of employees should not exceed 250 people
3. Volume of revenue: Annual turnover should not exceed 25 euro mln.

These limits (regarding revenue only) are set by the Government of the Russian Federation once every five years.

[1] Woźniak M., *Access of enterprises to bank credit in Poland before and after economic crises,* in: J. Kaczmarek, K. Żmija (eds), *Expectations and challenges of modern economy and enterprises*: *problems – concepts – activities,* Cracow University of Economics, Department of Economics and Organization of Enterprises, Foundation of Cracow University of Economics. — Cracow 2016, pp. 117–124.

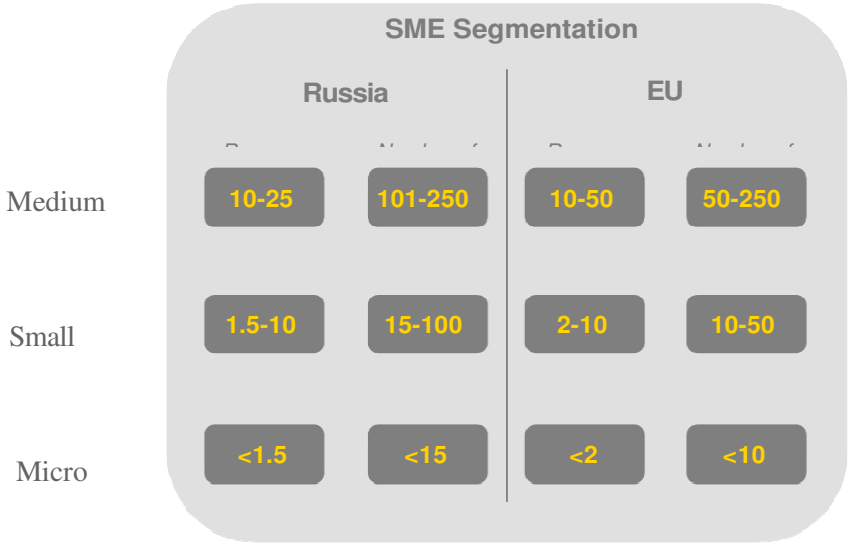

Figure 1:SME Segmentation

Source: European Commission, Small and medium-sized enterprises (SMEs): SME Definition; Federal law № 209-FZ "On small and medium business development in Russian Federation".

Many authors find the role of SMEs as significant in the economy. These enterprises are responsible for stimulation of economic growth, innovation and modernization of the economy, creation of new jobs, using of production factors or reduction of GDP fluctuations. Moreover, while economic transition, they also contribute to the creation of private ownership, employ human resources from the state sector, create economic infrastructure through the development of cooperation and subcontracting and the base for the development of large companies[2].

Nowadays, most of active entities in Poland are SMEs (over 99%). Furthermore, most of employees work in these companies (about 70%). SMEs have also significant contribution to GDP (a little more than 50%). The total number or registered operating SMEs in Russia as of January 2017 is 4.5 million, including micro-, small, medium-sized enterprises and individual entrepreneurs. They provide jobs for over 18 mln. people, which is 25% of total employment in Russia's economy. The core of the SME sector in Russia (94.3%) is composed of segment of individual entrepreneurs – 2.4 mln. or 53.3% of all SMEs - and micro enterprises – 1.9 mln. or 41% of all SMEs. Small enterprises account for 5.2% of all SMEs, while medium-sized enterprises make up 0.3% of all SMEs. Micro enterprises and individual entrepreneurs account for 55% of all jobs at the SME sector.

The development of SMEs is, however, connected with many factors for example the interest rates3 or policy of commercial banks4.

[2] Woźniak M., *System wspierania małych i średnich przedsiębiorstw w Polsce*, Wydawnictwa AGH, Kraków 2012.
[3] Woźniak M., Lisowski R., *Stopy procentowe NBP a wartość kredytów bankowych dla przedsiębiorstw w Polsce*, *Studia i Prace WNEiZ US* , Metody ilościowe w ekonomii. Vol. 2, no. 50/2, 2017, pp. 163–175.

The research questions are as follows:

1. How the number of active SMEs was changing in the years 1994-2016?
2. How the number of employees in SMEs was changing in the years 1994-2016?
3. How the contribution of SMEs to GDP was changing in the years 1995-2016?

The data comes from the reports published by Polish Agency for Enterprise Development and the Russian SME Resource Centre (RCSME).

Development of SMEs in Poland

The growth of small and medium-sized enterprises was very fast in the nineties of the XX century – see figure 2. The number of active entities reached almost 1.8 million in 1999. However, this amount was decreasing at the beginning of the XXI century, probably because of the slowdown of the Polish GDP growth. The number remained flat in the following years. In 2005 the amount of active SMEs started to rise again and reached almost 1.9 million. Unfortunately, the world economic crisis hit these enterprises in 2009. Nevertheless, their number started to increase again in 2010 and did not stop until 2016.

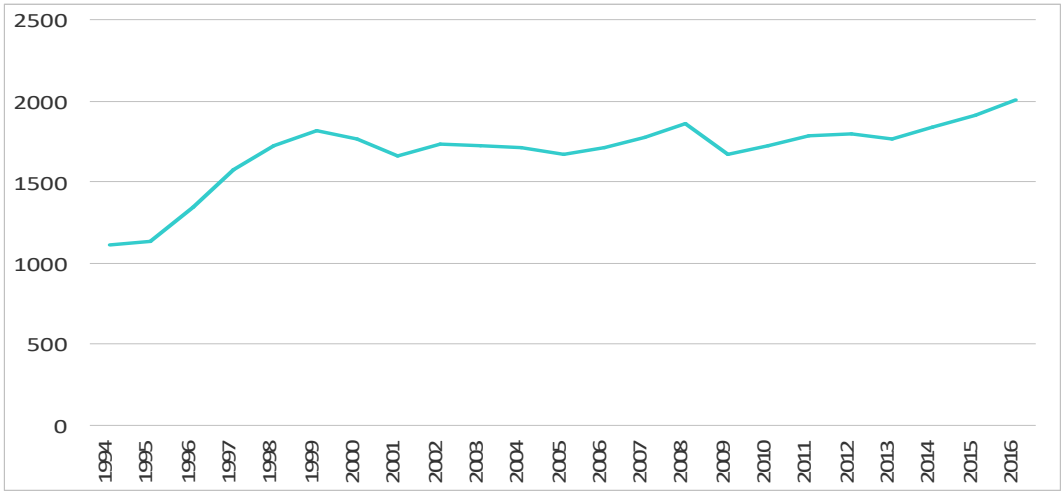

Figure 2: The number of active SMEs in Poland in the years 1994-2016 (in thousands)

Figure 3 presents the number of employees in SMEs. There was stable growth from the beginning of analyzed time span untill 2002. After the fall in 2003, the amount of employees in theses companies started to increase again. It peaked in 2008 – over 6.5 million of employees. However, there was a slight decrease in 2009 during the world economic crisis. Ever since, the number of employees in SMEs was quite stable in the following years.

[4] Duda J., Woźniak M., *Bank policies towards SME sector in Poland and selected countries worldwide, „Managerial Economics"* , vol. 19 no. 1, 2018, pp. 25–47.

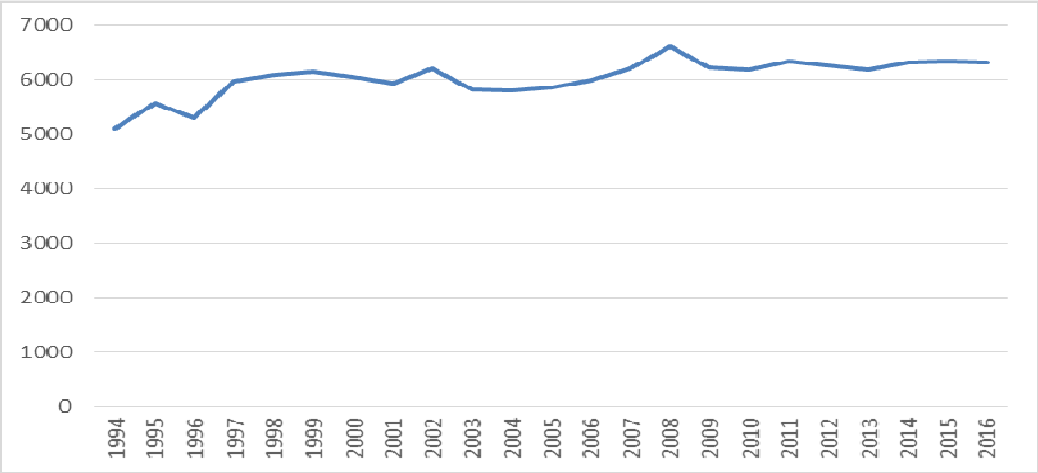

Figure 3: The number of employees in SMEs in Poland in the years 1994-2016 (in thousands)

Figure 4 presents the contribution of small and medium-sized companies to GDP. There was a significant increase (about 19%) between 1995 and 1998. The contribution of SMEs to GDP stabilized in the following years and amount 49%. Then, this number started to fall but not sharply. The low point was in 2008 – about 48%. After that, it started to rise slightly untill 2013. Ever since, it remaind flat – just over 50% of GDP.

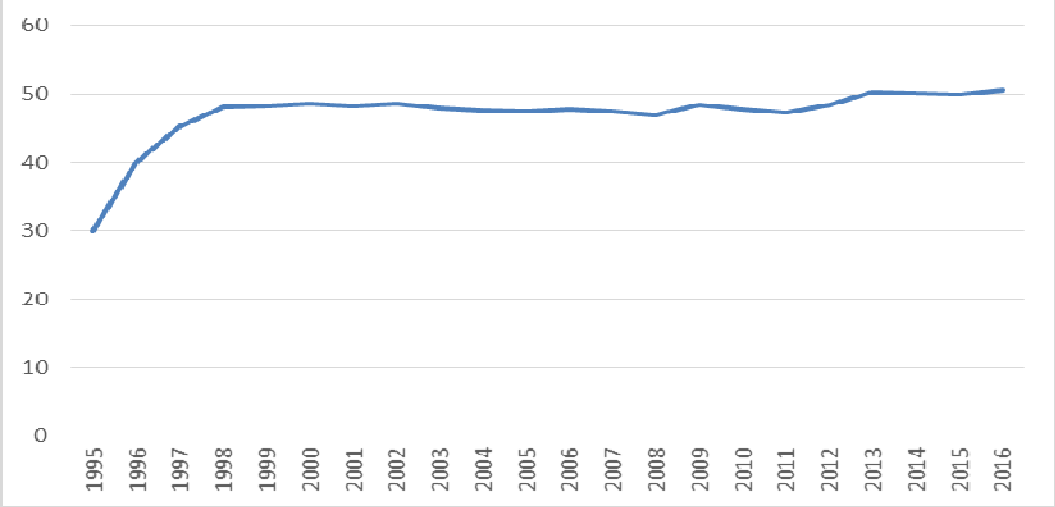

Figure 4: The contribution of SMEs in Polish GDP in the years 1994-2016 (in %)

Development of SMEs in Russia

In 2010-2014 the number of microenterprises steadily grew, although the growth rates in recent two years have decreased (figure 5). In fact, the number of micro- and small businesses has noticeably increased by 28% within 4 years, from 1644.3 thousand in 2010 to 2103.8 thousand in 2014. In 2014, the total number of microenterprises increased almost by 1/3, as compared to 2010, and attained 1868.2 thousand.

However, the number of new microenterprises in 2014 was only 40 thousand, as compared to 2013, or 2.2%.

The growth in number of micro- and small enterprises in recent 5 years has been accompanied by a lowering in number of medium-sized businesses.

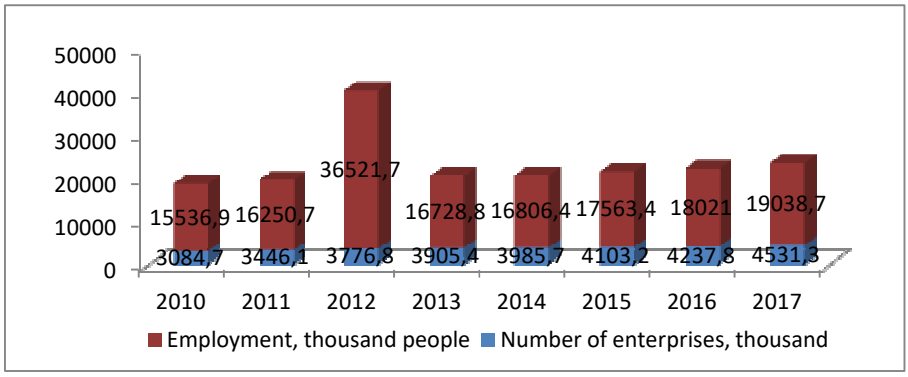

Figure 5. The number of active SMEs and employees in Russia in 2010-2017 (in thousands)

The five years, 2010-2014, demonstrated a noticeable 34% increase in employment at microenterprises, from 3.3 mln. people in 2010 to 4.4 mln. people in 2014. The total employment at micro- and small enterprises grew within four years by 10.2% - from 9.7 mln people in 2010 to 10.8 mln people in 2014. In the segment of medium businesses the total employment reduced from 2.4 mln people in 2010 down to 1.6 mln people in 2014, or by 35%.

The number of SMEs in Russia has grown on 1.3% in 2017, with all of that growth coming from microenterprises. The study found that the number of small enterprises actually shrank by 1.6%, while the number of medium-sized businesses fell by 3.4%.

The total sales revenues of micro- and small enterprises steadily grew within 5 years and attained 26392.2 bln RUR in 2017, which is 40% higher than that in 2010 or 18933.8 bln RUR. The total sales revenues of medium-sized enterprises decreased within 7 years from 7416.2 bln.RUR. in 2010 till 5027.8 bln RUR in 2017, or by 32%.

Rosstat published information about the share of the small and medium-sized businesses (SMEs) in Russia, RBC reports. According to data for 2017, the share of SMEs in the economy is 21.9%[5]. In monetary terms, the share of small and medium businesses amounted to more than 20 trillion rubles.

[5] Russia in figures, 2017. Federal State Statistics Service. http://www.gks.ru/free_doc/doc_2017/rusfig/rus17e.pdf

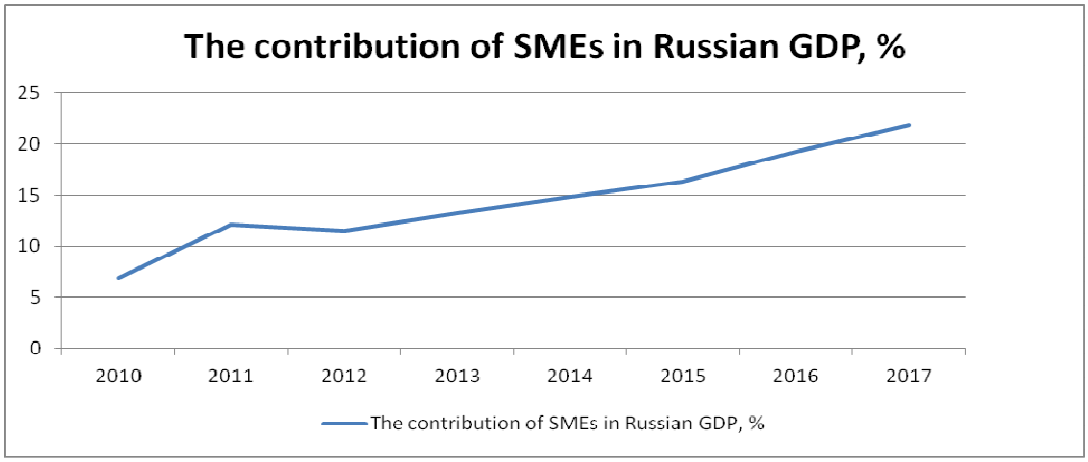

Figure 6: The contribution of SMEs in Russian GDP in the years 2010-2017 (in %)

Russia's Economic Development Ministry expects the share of small and medium-sized enterprises (SMEs) in the country's GDP structure to double by 2030 despite the economic downturn. Since 2005 the Ministry of Economic Development has run the federal program of SME financial support. The main priorities of this program are: innovative companies, mid-sized companies, assistance in the development of leasing for small entities, support for enterpreneurs by grants, creation of business incubators, individual parks and enterpreneurship.

Innovation Ecosystems for SMEs

Moving towards a collaborative innovation requires an internal change. Innovation models could be understood from the collaborative perspective. These models are directly related to the level of openness. Starting with the collaborative models by Barrett[6], innovation models are divided in the following categories:

- In the first model, called Ad hoc, there is usually an absence of policies to engage partners. In other words, there is no platform supporting the collaboration. The control is just on the focal form, and there is no interaction among 3rd parties
- The second model, hub-and-spoke is a closed platform, where there is an central platform for collaboration, but there is no interaction among third parties.
- The third model is a network model. The principles are the same as in the second model. The difference with the previous model is that the enables interactions between actors in the network.
- The forth model is an open platform model. In this model, all the involved interact with each other within an ecosystem. The control is distributed, the platform is shared among participants in the network, and interactions among thirds parties are common. The open platform model is the one with the biggest level of openness.

[6] Barrett et al., 2011. M. Barrett, C. Velu, R. Kohli, T. Salge and D. Simoes-Brown. Making the Transition to Collaborative Innovation: Issues of Readiness, Trust and Governance. Nesta, (May), 1–12, 2011.

An important trend in the evolution of innovation processes is the transition An important trend in the evolution of innovation processes is the transition to a model of open innovation, based on the use of internal and external sources of innovation, the transition to non-linear models of the organization of the innovation process. All these issues are important for the formation of an innovation ecosystem in the metallurgical industry of Russia. According to open innovation mode and business ecosystem structure, open innovation process is embedded into business ecosystem framework. Then, a theory model of open innovation based on business ecosystem is built which is shown below (figure 7).

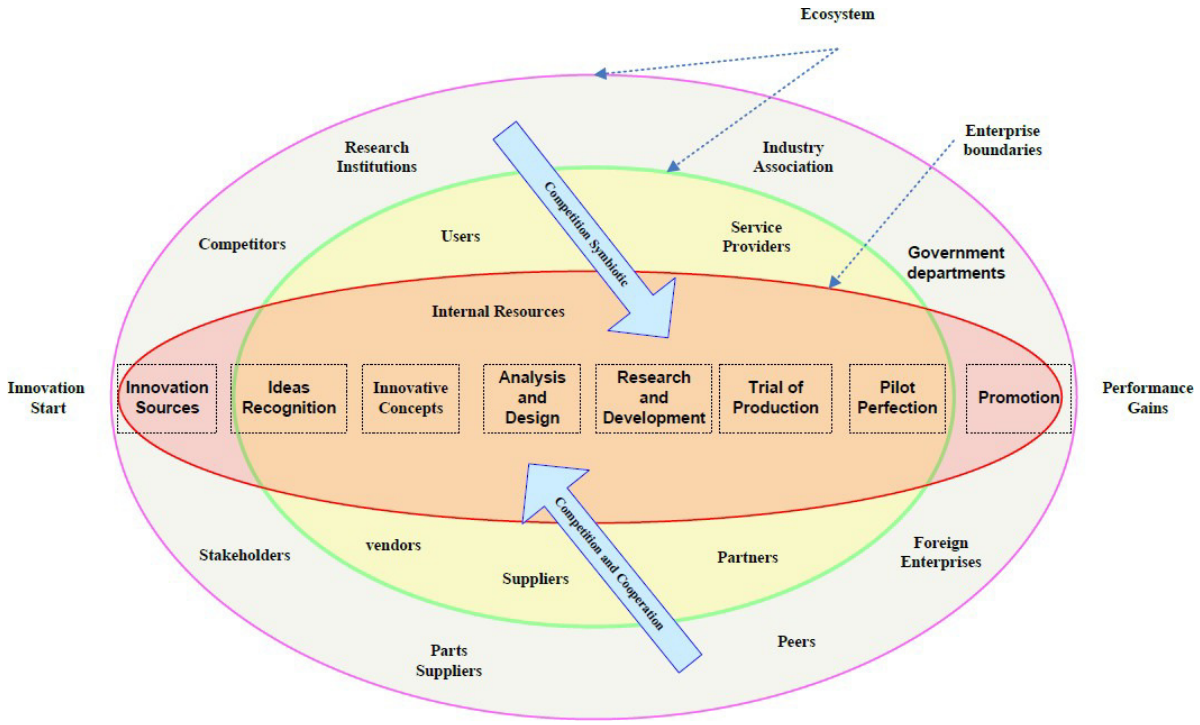

Figure 7: The open innovation based on business ecosystem

Source: ***Leveraging the Innovation Ecosystem for Business Advantage: A Cross-Border Study***

This model contains multiple main innovators such as producers, users, suppliers, partners and external environment, etc. It reflects the open innovation process of business ecosystem formed by many subjects. Open innovation breaks organization boundary, pays attention to the use of internal and external resources, and stresses labor division and cooperation. Because open innovation is implemented in relatively open environment and is a loose, flexible innovative mode. Although more new ideas and innovative thinking can be brought in, the difficulty and cost of management are also increased at the same time. In open innovation mode, enterprise can obtain necessary technology through outside world to reduce costs and improve product quality so that competitiveness can be improved. However, if it excessively relies on suppliers and partners, the technical health state itself may be affected.

In this regard, the triple helix is considered a universal model of the collaboration, since it forms the mechanism of self-development of complex non-linear systems of any level, based on the resonant interaction of three key subsystems.

Displacing the traditional management mechanism involving a hierarchical center, this model determines the institutional structure of both innovation clusters and the entire innovation economy, contributing to its clustering. Due to the continuous interaction of the state, science and business, the system generates so-called mutual information (new knowledge), which is distributed in the course of communication between all economic agents, which gives the system integrity and dynamic stability. An innovation ecosystem is said to be thriving and healthy when the resources invested in the research economy (either through private, government, or direct business investment) are subsequently replenished by innovation induced profit increases in the commercial economy. At that point, the two economies (research and commercial) exist in balanced equilibrium and the innovation ecosystem is deemed to be healthy.

Conclusion

The development of small and medium-sized enterprises both in Poland and Russia was significantly in the nineties of the XX century, taking into account all three analyzed indicators: the number of active companies, the number of employees in these enterprises and their contribution to GDP. However, this process stabilized from the beginning of the XXI century. The world economic crisis caused the fall in the amount of active entities and the number of employees in SMEs 2009. For the purposes of small and medium entrepreneurship development, increase of SME share in GDP, rise in employment and development of domestic competition, the State should provides support for SMEs. This support can take different forms: financial support, special tax regimes, renting or acquisition of property under favorable conditioning, provision of services or delivery of goods for state needs ect.
Recommendations for creating successful ecosystems SMEs:

• Increase cross-border collaboration;
• Build innovation centres that facilitate the innovations of others;
• Create places where young people feel they have ‘cultural self-confidence’ and where they can meet face to face, as experts say that is when successful innovations emerge;
• Ensure a friendly regulatory environment;
• Lower barriers to innovation by encouraging ‘balanced risk-taking’ and providing financial incentives to entrepreneurialism;
• Recognize which start-ups are more likely to succeed and channel the resources to them instead of trying to support as many start-ups as possible.
• Combine financing with commercial mentorship;
• Support the government in creating a modern workforce for the future.

Acknowledgements

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Decomposition of The Process of Release Of goods From the Warehouse by Implementing Risk Management

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Abstract

The rotation of goods in a warehouse facility is one of the basic elements for assessing the functioning of warehouse management. This aspect is most verified in the process of goods release from the warehouse. However, high goods turnover is conducive to the occurrence of distortions, therefore risk management is necessary. The purpose of the paper is to present a model for implementing risk management at the stage of stock release from the warehouse using process decomposition and maintaining an appropriate level of product rotation.
The method of decomposing the process of goods release from the warehouse allows to transform the stage of stock release from the warehouse, by separating it into individual subprocesses. The elements supporting the model development are the disposable time scheme and determination of the average enterprise work intensity. Entrepreneurs' awareness of the expected volume of releases from a warehouse will enable comprehensive risk management, without reducing the number of pallets issued from the warehouse.

Keywords: Decomposition, Release Process, Risk Management

Introduction

Comprehensive risk management is necessary for every logistics company, however, the fear of reducing the number of activities performed by employees discourages the implementation of risk management methods. The purpose of the article is to present a model for implementing risk management at the stage of stock release from the warehouse using decomposition of the process and maintaining an appropriate level of goods rotation.

The characteristics of the process decomposition method allows to transform the stage of stock release from the warehouse, by separating it into individual subprocesses to implement risk factor management. The elements supporting the model development are the disposable time scheme and determination of the average enterprise work intensity. The correct implementation of the risk management procedure makes it possible to maintain an appropriate level of product rotation in the warehouse, while maintaining the quality of work performed and executing shipments on schedule.

Risk management in the process of releasing goods from the warehouse

The entrepreneur's willingness to succeed is inherent in the need to contact risk, which is why proper and effective interference management is needed [1]. Risk management includes planned and purposeful analysis and control of risk occurring in the enterprise. An important link is the combination of all elements for comprehensive risk management in warehouse administration [7] [8]. Warehouses are divided into four zones related to the implementation of the storage process: receipts, storage,

picking and deliveries [9]. The most important task of warehouse management is the constant flow of movable goods to final recipients [3]. The stage of goods release from the warehouse is the last phase of the warehouse process. After this stage, the goods are transported from the storage or picking zone to the goods release zone, as ordered by the next link in the supply chain. An important element is the control of the released stock. It involves checking the goods issued with documentation. If the result of the check is positive, the goods can be loaded on an external means of transport [5] [11]. There are two types of goods release [6]:

- internal release – delivery of the goods within the same entity,
- external release – transport of inventory to the next link in the supply chain.

One of the methods to implement risk management is process decomposition. In logistics, this method allows for change of the composition of components and processes [4]. At the storage stage, decomposition consists in identifying elements that can be extracted by transforming material streams and using existing resources [2]. It makes it possible to add new elements to organization's activities, keeping in mind the disposable time and the intensity of work involved.

Research Entities

The research was carried out in 16 enterprises providing warehouse services in Poland. Among these enterprises, 10 entities provide warehouse outsourcing services (marked with the letters A-J), and 6 entities have an ownership warehouse (marked with the numbers 1-6). They stock goods belonging Fast Moving Consumer Goods industry which is a fast-moving industry. In terms of finished products, analyzed warehouses mainly store food, cosmetics, detergents, cigarettes and alcohol [10]. All research entities meet the following elements:

- mechanized warehouses,
- number of storage places 10,000 - 25,000 pallets,
- distribution and / or industrial warehouses,
- inventory storage method - shelf method.

At research facilities a logistic audit was carried related to the operation of warehouse management, on the basis of which the research was conducted.

Intensity of Labor Consumption

The intensity of labor consumption at the stage of goods release from the warehouse is very important to determine the time needed to complete the order and ship the goods on schedule. In order to determine the average labor intensity of research entities, the number of pallets issued within one shift (8h) was determined, based on the following formula:

$$p = \frac{s}{e * 8}$$

Equation 1 : Formula for average labor consumption

Source: Own study

where:

p - quantity of pallets in one work shifts
s - average spended goods in one week of one work shifts
e – employee

A table below presents the average number of pallets issued per shift in a given entity.

Table 1 : The average number of pallets issued per shift

Enterprise	A	B	C	D	E	F	G	H
Number of pallets issued	387	782	983	650	1052	972	481	658
Enterprise	I	J	1	2	3	4	5	6
Number of pallets issued	624	1173	363	825	1028	544	671	937
The average number of pallets issued per shift								**758,13**

Source: Own study based on data from enterprises

The average intensity of labor consumption in the process of goods release from the warehouse in the entities surveyed is approximately 758 pallets. It does not mean that forklift operators should dispatch 95 pallets from the warehouse within 1 hour, as they are required to perform additional tasks, including warehouse facility inspections, preparation of shipping documentation, or take a break during work performance. The diagram below shows the element that facilitates the optimal use of the time of warehouse operators at a given work intensity.

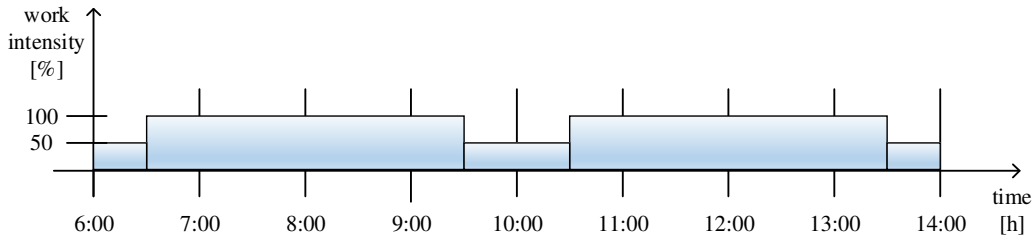

Figure 1: The disposable time diagram

Source: Own study

The labor intensity of 100% means that the potential of employees during the release of goods from the warehouse is at the maximum level, i.e. it can exceed the rate of 95 pallets/hour. On the other hand, the 50% labor intensity indicator indicates a reduced number of pallets issued from the warehouse, due to additional manipulation activities carried out by warehouse operators.

Risk management is an inseparable element of modern warehouse management. More and more companies are aware of the risk but are afraid of reducing product turnover by implementing a risk management procedure. There are numerous risk factors in the goods release proces. A table below (Table 2) presents the distortions.

Table 2: Risk factors in the process of goods release from the warehouse

Risk factors for the goods release process
1. Release of wrong goods from the warehouse,
2. Release of an incorrect quantity of items from the warehouse,
3. Picking the goods from the wrong place from the warehouse,
4. Damage to products when loading goods onto an external means of transport,
5. Issuing improperly prepared shipping documentation,
6. Goods release with a time delay.

Source: Own study based on data from enterprises

In the case of the entities surveyed, there is a probability of occurrence of all risk factors, which is why implementing risk management is so important. The decomposition of the process of goods release from the warehouse consists in dividing the goods release stage into subprocesses to implement the

risk management procedure while maintaining an appropriate level of product rotation. A model below presents the method of organizing the process of goods release from the warehouse.

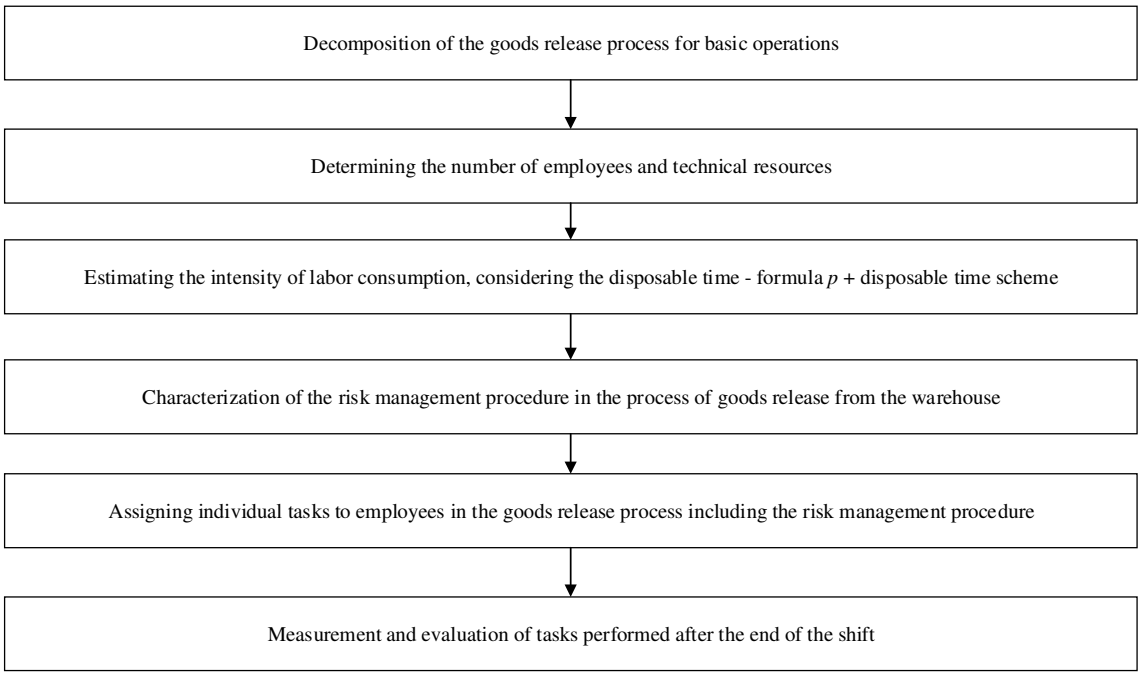

Figure 2 : Model of the organization of the goods release process from the risk managing warehouse

Source: Own study

The model of work organization in a warehouse facility consists of 6 stages. The most important element is the decomposition of the release stage into relevant subprocesses, taking into account the number of employees and technical resources. Based on this data, research entities can determine the average workload on a given day and put the relevant data on the disposable time scheme. The above elements will enable the implementation of risk management in the process of goods release from the warehouse, followed by constant measurement and assessment of performed activities.

Summary

The article presents a model for implementing risk management at the stage of stock release from the warehouse using process decomposition and maintaining an appropriate level of goods rotation. The model includes the involvement of existing technical and human resources in the researched entities. The decomposition of the process of releasing goods from the warehouse allows for transformation of the composition of the process, by dividing this stage into individual subprocesses for the purpose of comprehensive management of risk factors and maintaining an appropriate level of the release of goods from the warehouse. Awareness of disposable time, intensity of labor consumption and the need to manage risk factors enables correct and scheduled release of goods from the warehouse.

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Financial Intermediation and Finance-Growth Nexus in Nigeria

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Abstract

Nigeria, based on well-regulated financial standards, has a relatively highly developed financial system due to the sophistication level of its financial intermediaries and markets. However, there is need for improvement as well as some level of uncertainty about whether finance for growth interacts with credit to the private sector to significantly influence channelling funds for investible purposes, given Nigeria's unique characteristics. This article examines the role of credit towards private sector on finance for in Nigeria, with specific insight and implications for Nigeria over the period 1980-2018. For this purpose, the study utilises data from secondary sources from the central bank of Nigeria annual reports. The Autoregressive distributed lag (ARDL) and cointegration method of estimation are used to analyse the time-series data. The results show that among the finance for growth variables, stock market capitalisation and remittance inflows significantly and positively affect credit to the private sector in Nigeria. This study recommends policies that will further increase credit stock market capitalisation and remittance inflow be trailed vigorously by the government to encourage financial intermediation, which will assist in channelling funds for investible purposes and thus cause financial development in Nigeria.

Keywords*:* Financial Development; Credit; Economic Growth; Nigeria.

Introduction

Nigeria, based on well-regulated financial standards and best global practices, has one of the profoundly evolved monetary frameworks in Africa. This can be attested by the very high turn of events and modernity of its money related mediators and markets, just as by the size, profundity, and access to its monetary administrations (Ejemeyovwi and Osabuohien, 2018). Like some other financial framework, Nigeria's financial framework comprises of two exceptionally created portions – both the banking section and the market fragment. The bank-based share centre stage, however, with banks providing loans to private sectors for intended investment purposes, is therefore referred to as the "bank-based financial system" in Nigeria. The uniqueness of Nigeria's financial related framework can likewise be clarified by the nature and lop-sidedness of its budgetary foundations' administrative structure, just as by the legitimate system that oversees payment activities. Moreover, dissimilar to most African nations where just a couple of banks command the market; Nigeria presently has twenty-two dynamic commercial banks in the country (Central Bank of Nigeria-CBN, 2019).

The CBN has embarked on a financial sector deregulation exercise in the financial markets and banking institutions with series of financial reforms in order to keep up with the increasing demand for innovation in the world. These reforms comprised efforts to reduce financial repression, rehabilitate the financial infrastructure, reinforce the regulatory and supervisory environments also the legal framework, rejuvenation of the financial structure, that is, the banks and stock markets clearing and settlement transactions and general restoration of soundness in the banks. The recent emergence of a well-regulated financial system in Nigeria can be attributed to these reforms. The increased availability of Automated Teller Machine (ATM) in the banks shows portrays the transformation of the Nigerian banking sector. Nigerian Inter-bank Settle System (NIBSS), revealed in 2019 quarter I, that the total number of Automated Teller Machines (ATMs) in Nigeria is 18,321. While the total number of transactions performed is 650.06 million, the transaction value is N4.76 trillion. The record shows that 711,299,990 volume of transactions valued at N40.48 trillion took place in the first quarter of 2019. Credit extension towards the private sector has also been growing tremendously over the fiscal years. In the second quarter of 2019, the Nigerian banking sector has N15.3 trillion as the total value of credit towards the private sector (NBS, 2019). Similarly, the reform procedures correspondingly gave room for the increment in stock market performances; with Market Capitalisation (MC), growing by 15.37 per cent to N13.62 trillion as at quarter three (Q3) 2019, from N11.72 trillion at end-December 2018. Though, all-share index (ASI) declined by 11.62 per cent to 27,779.00 index points, as at quarter three (Q3) 2019 2019, from 31,430.50 index points as at quarter four (Q4) 2018 (CBN, 2019).

This study made use of the evolving demand method to finance – growth link grilling through the examination of the role of private sector credit in financing for growth. More specifically, how private sector financing interacts with growth finance to have a significant impact on the channelling of funds for investment purposes. We battle that unwinding the job of credit to the private part in the money related development connection is a researchable subject on account of the capacity of the banking sector to move financial capital accurately to net investors from net savers in an economy. The financial system in Nigeria is also highly developed and ranked among Africa's top financial sectors with its banking regulations. (IMF, 2018), given these financial successes, it is interesting to know whether there is any interaction between finance for growth and credit availability by the financial framework in Nigeria potentially has any noteworthy development outcomes.

In entirety, this examination endeavours to address first, regardless of whether there is a critical nexus between credit to private division and finance for growth. Second, research if the associations advance or weaken banks' capacity to move financial assets from net savers in an economy to net investors. Third, examine if credits requested by private segments from the banking segment moderate the finance-growth nexus. These three fundamental issues are examined with measurable notices from the national bank of Nigeria's yearly information traversing 1980-2018. Rather than a multi-nation investigation, we explain our choice to concentrate on a solitary nation concentrate on Al-Yousif's (2002) proposal that fund development nexus cannot be summed up across countries because financial arrangements are nation explicit. Their presentation relies upon the effectiveness of the organisations that execute them. The rest of the area of the paper is organised as follows; Section 2 tends to the assessment of literature while Section 3 presents the methodology and data utilised in the investigation, Section 4 contains the analytical conclusions and discussions, while the last segment finishes up with some policy options.

Review of Related Literature

Aljebrin (2018) examined the effect of private-segment bank advances on Saudi Arabia's economic development by applying the FMOLS strategy for the period 1990-2016. The investigation presumed that the drawn-out effect of household bank credit on financial development was both positive and critical. Ben et al. (2014) utilised the Autoregressive Distributed Lag (ADRL) model to investigate the connection between domestic credits and Tunisian economic development. The investigation reported that the effect of bank credit on economic development was positive and significant. Their discoveries showed that an expansion in private credit of 1% added to an ascent in genuine GDP per capita of 3.36%. Odhiambo (2008) analysed the causal course between monetary turn of events and financial development in Kenya by inspecting the effect of swelling on the money related

development nexus. The experimental outcomes uncovered that the monetary development of Granger is causing money related advancement in Kenya regardless of whether the causality is evaluated in a bivariate structure or a triradiate setting. The examiner reasoned that the development of the money related area in Kenya is, to a great extent dependent on, as opposed to gracefully, interest for budgetary administrations. Different discoveries show that Granger's monetary development is causing expansion, while Granger's swelling is causing money related improvement in Kenya. The discoveries apply independently of how the causality is estimated in the short run or over the long haul.

Adeleye, Osabuohien, Bowale, Matthew and Odutan (2018) utilised yearly information from 1980 to 2016 to analyse the impact of the money related changes using a credit card advancement in Nigeria. The examination work is centred around the hypothetical premise of the McKinnon-Shaw theory concerning the significance of money related changes in a slacking economy. Breaking down the information with the portrayal of mistake revision with autoregressive dispersed slack (ARDL) and jumping testing methods, the examination that there is expanded money related intermediation at a higher genuine loan cost as prove by credit advancement. Different outcomes detailed by the investigation are that reserve funds in the money related division, swelling rate, and per capita GDP are away from indicators of credit development and genuine loan fee (the Financial Reform Indicator), while short-run connections are constrained markers. What's more, the investigation shows that there is a drawn-out co-incorporation connection between local credit and different covariates, just as between the genuine loan fee and its regressors. This is similar to the submission made by Karakara and Osabuohien (2019) in the case of Burkina Faso and Ghana based on survey data.

Bongini et al. (2017) analysed the effect of bank advances on the monetary improvement of the nations of Central, Eastern, and South-Eastern Europe utilising bank advances as a pointer of money related achievement. The examination utilised the GMM approach for the investigation of the time arrangement 1995–2014. Gauge results demonstrated that bank credit is boosting financial development. Sufian, Kamarudin, and Nassir (2016) took a gander at the determinants of productivity in the Malaysian financial part, considering the effect that bank start would have on viability. Sufian et al (2016) considered six bank-explicit factors in the relapse model as a productivity measure, including the proportion of advance misfortunes over all-out stores, non-premium salary over all-out resources, non-premium expenses over all-out resources, net renting over complete resources, all-out resource log and investor value book valuation as a level of complete resources. The specialists utilised the advance misfortune proviso as an intermediary measure for credit hazard, non-premium benefit as an intermediary measure to broaden into non-conventional activities. In contrast, the non-premium cost was utilised to give subtleties on how the banks' operational expenses shift.

Osman (2014) investigates the impact of Private Sector Credit on Saudi Arabia Economic Growth (GDP) using Auto-Regressive Distributed Lag (ARDL) and cointegration techniques. The author contends that monetary establishments assume a crucial job in sifting data through screening loan specialists and topsy-turvy data. In this manner, their improved productivity is of fundamental significance in guaranteeing that Saudi Arabia's private segment acknowledges altered for unbalanced information. Comparative discoveries have been recorded from inquiring about directed by Al-Malkawi and Abdullah (2011) on the connection between monetary soundness and financial development in the UAE. To break down this organisation, this exploration utilised the ARDL strategy for cointegration and two measures. The examination distinguished a significant negative connection between credit-drove monetary creation by the private part and financial development. Fapetu and Obalade (2015) investigated the impact of the sectoral designation of store cash support credits and advances on financial improvement utilising a norm, least-square procedure. Results demonstrated that even the advantage doled out to approach, labourers, and masters had considerable positive supporters of the financial turn of events. In any case, it has been revealed that bank credits don not ordinarily make a noteworthy commitment to the monetary turn of events.

Summarily, the above review of related literature presumes that the finance-nexus issues are still contentious. Apart from being widely debated, the empirical literature appeared to be weakened by non-country-specific studies and an examination of how accurately banks can give out credits for various investible purposes (Ejemeyovwi, Osabuohien, & Osabohien, 2018; Ejemeyovwi, Adiat, &

Ekong, 2019). This study is an attempt to satiate such openings in the finance-growth nexus literature.

Method

Model Specification

Following the finance literature, the study adopts the model of Law and Habibullah (2009):

$$CPS = \beta_0 + \beta_1 DGS_t + \beta_2 SMC_t + \beta_3 RINF_t + \epsilon_{it} \quad (1)$$

Equation (1) depicts the long-run relationship between CPS and FFG measures. However, before estimating the Long-run model, the existence of Long-run relationship must be established. Following Pesaran *et al.* (1997, 2007) and Ang & Mckibbin (2007), an ARDL specification of equation (1) is as specified below;

$$CPS_t = \sigma_0 + \sigma_1 CPS_{t-i} + \sigma_2 DGS_{t-i} + \sigma_3 SMC_{t-i} + \sigma_4 RINF_{t-1} + \sum_{i=0}^{P} \varphi_i \Delta CPS_{t-i} + \sum_{i=0}^{q_i} \gamma_i \, \Delta GDS_{t-i} + \sum_{i=0}^{q_2} \delta_i \, \Delta SMC_{t-i} + \sum_{i=0}^{q_3} \theta_i \Delta RINF_{t-i} + \varepsilon_{it} \quad (2)$$

Where:

ε_t represents white error noise term, Δ is the first difference operator, CPS_t is a credit to the private sector (% of GDP), GDS_t is gross domestic savings (% of GDP), SMC_t is stock market capitalisation (% of GDP), $RINF_t$ is of remittance inflow (% of GDP). This model will be determined to utilise the ordinary least squares (OLS) method, (p+1)(q1 + 1)(q2 + 1)(q3 + 1) whole of relapses to be processed to acquire the lag-lengths of the condition. The utilisation will decide between various lag-lengths of information standards like Akaike (AIC) or Schwarz (SC). The Schwarz Information Criterion (SC) is increasingly perfect to AIC because it grades to plot progressively closefisted conditions (Pesaran and Shin, 1995; Acaravci and Ozturk, 2012). ARDL limits F test statistics which is determined through burden balance to zero imperative on every single unsurprising coefficient of the lagged level factors. Consequently, the hypothesis (null) of no cointegration to the alternative hypothesis of long-run cointegration presence becomes:

$$H \quad 0: \beta_0 = \beta_1 = \beta_2 = \beta_3 = 0$$

$$H_1: \beta_0 \neq 0, \beta_1 \neq 0, \beta_2 \neq 0, \beta_3 \neq 0$$

The model (long-run) shows the balancing relationship between long-run and short-run error correction model used in measuring short-run dynamic effect(s) identified when cointegration is found using the ARDL restricted error correction model (RECM) towards determining the long-run and short-run elasticity coefficients. A typical model showing a long-run relationship is:

$$CPS_t = \beta_0 + \beta_1 DGS_t + \beta_2 LSMC_t + \beta_3 RINF_t + \varepsilon_{it} \quad (3)$$

Short-run relationship model (RECM, Restricted error correction model) stated as;

$$\Delta CPS_t = \alpha_0 + \sum_{i=0}^{P} \varphi_i \Delta CPS_{t-i} + \sum_{i=0}^{q_i} \gamma_i \, \Delta GDS_{t-i} + \sum_{i=0}^{q_2} \delta_i \, \Delta SMC_{t-i} + \sum_{i=0}^{q_3} \theta_i \Delta RINF_{t-i} + \omega ECT_{t-1} \quad (4)$$

Where:

ω displays a coefficient of the error/equilibrium correction term '*ECT*'. This demonstrates the velocity of the variable to collide to equilibrium and predicted a large value which is found to be negative. The ECTt-1 variable error/equilibrium correction term found in equation (4) is one lagged value estimating the ordinary least squares (OLS) residuals in the long-run model as situated in equation (4). Coefficients of the Long-run with approximate αi coefficients can also be determined using the (UECM) spelt in full as 'Unregulated Error Correction Model'. The approximate long-run

connection for any regressor is gotten by; (β1⁄β0) performing diagnostic tests would check the functional type misspecification and residual assumptions in the minimal error correction model, for example, no serial correlation, normality, and homoscedasticity.

Data

This analysis made use of annual time series data, which covered the duration of 38 years (1980 - 2018). The data are obtained mainly from Nigeria's Central Bank annual reports and annual statistical bulletins (Economic Surveys and Statistical Bulletins) for the same period. Table 1 lists the variables used in the analysis.

Table 1: Description of Variables

Variable	Descriptions	Sources
The stock market capitalisation to GDP ratio (SMC)	This alludes to the number of offers recorded separated by GDP. Market capitalisation (additionally alluded to as market esteem) is the price tag in addition to the measure of gave protections. Recorded household firms are the locally consolidated firms recorded toward the year's end on the stock trades of the nation.	CBN (2019)
Gross domestic savings as a share of GDP (DGS)	Gross domestic savings was measured as GDP less total consumption spending (total consumption).	CBN (2019)
Remittance inflows to GDP (RINF)	This includes workers' remittances and employee compensation, current migrant workers transfers, and salaries and wages earned by non-resident workers.	CBN (2019)
Liquid Liabilities (LL)	This alludes to the money related framework's fluid liabilities (cash in addition to request and enthusiasm bearing liabilities of banks and non-bank monetary delegates) partitioned by GDP likens. It is a standard pointer of the money related extension and hence of the monetary delegate segment's full scale (King and Levine, 1993a).	CBN (2019)
Private Credit (CPS)	Equals the amount of loans to the GDP split private sector by financial intermediaries. The financial intermediation indicator is more than just a calculation of the scale of the financial sector.	CBN (2019)

Source: *Authors' Compilation*

Results and Discussion

The results of unit root test are based on three (3) different approaches, namely: The Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), and Dickey-Fuller GLS (DF-GLS), the results are presented in Table 2. The findings demonstrate that Commercial Central Bank Asset (CC), Private Sector Credit (CPS) and Domestic Savings (DGS) have unit roots [stationary] as the sequence is rejected at the point of 1 % and 5% conventional rates. These imply the series are integrated of order zero I (0).

On the other hand, the outcome clearly shows that the null hypotheses that the LL, RINF, and SMC have unit roots [are stationary] cannot be rejected at a level 1percent, and 10percent conventional under at least three test approaches. All together words, the outcomes clearly show that the null hypotheses that the LL, RINF, and SMC have unit roots [is stationary] can be rejected at the first contrast under the two alternatives. These infer that the arrangement is incorporated of request one that is, I (1). In this manner, to make every one of the arrangements fixed, they must be differenced once. It is, in this manner, worth reasoning that the arrangement has various requests of a mix that is,

both I(0) and I(1) and study continues to limits testing of ARDL way to deal with look at the short and since a long time ago run connections among the arrangement.

Table 2: Stationarity Test Results

Variables	@LEVEL		@1ST Diff.		Order of Integration
	No trend	*Trend*	*No trend*	*Trend*	
	Augmented Dickey-Fuller (ADF)				
CC	-1.842	-2.244	-4.920***	-4.929***	I(1)
CPS	-2.802*	-3.420*			I(0)
DGS	-4.471***	-4.601***			I(0)
LL	-1.776	-2.702	-4.308***	-4.242**	I(1)
RINF	-2.036	-2.581	-6.404***	-6.323***	I(1)
SMC	-1.871	-3.238*	-6.576***	-5.000***	I(1)
	Phillips-Perron (PP)				
CC	-1.836	-1.758	-4.810***	-5.095***	I(1)
CPS	-2.820*	-3.641**			I(0)
DGS	-4.556***	-4.623***			I(0)
LL	-1.928	-2.858	-4.309***	-4.243***	I(1)
RINF	-2.055	-2.582	-6.404***	-6.323***	I(1)
SMC	-1.886	-3.254*	-6.574***	-6.473***	I(1)
	Dickey-Fuller GLS (DF-GLS)				
CC	-1.600	-1.717	-4.994***	-4.976***	I(1)
CPS	-2.779***	-3.529**			I(0)
DGS	-3.736***	-4.518***			I(0)
LL	-1.616*	-2.762	-4.370***	-4.365***	I(1)
RINF	-1.853*	-2.677	-6.499***	-6.507***	I(1)
SMC	-1.748*	-3.233**			I(0)

Note: *CC is Commercial Bank Asset Ratio, CPS is Credit to Private Sector Ratio, GDS is Gross Domestic Savings Ratio, LL is Liquid Liabilities Ratio, RINF is Remittance Inflows Ratio, and SMC is Stock Market Capitalization Ratio; ***, **, and * denote significant at 1%, 5% and 10%, respectively.*
***Source**: Authors' Computation using EViews 10 Software*

Following the unit root result in Table 2, the study employed ARDL cointegration approach, which is the bounds test to investigate the presence of long-run relationships among the variables. The test is conducted on the variables considered in this model, and the result is presented in Table 3. The computed F-statistic value is 16.008, which is greater than the upper critical bound values of 5.61. This suggests that the null hypothesis of no cointegration can be safely rejected at 5% significance level and concludes that there is cointegration. Alternatively, this implies that there is a long-run relationship among the variables.

Table 3: ARDL Bounds Co-Integration Test for Credit to Private Sector and Finance for Growth Indicators

Test Statistic	Value	k		
F-statistic	16.00888	3		

Critical Value Bounds				
Significance	I0 Bound	I1 Bound		
10%	2.72	3.77		
5%	3.23	4.35		
2.5%	3.69	4.89		
1%	4.29	5.61		

Source: *Authors' Computation using EViews 10 Software*

To examine the association amid credit towards the Private Sector and the finance for growth indicators, the study employed the Autoregressive distributed lag (ARDL) approach. The choice of this model is informed by the fact that involved variables are not integrated of the same order. In this model, the dependent variable is the financial intermediation indicator (Credit to Private Sector-CPS). In contrast, the independent variables are Gross Domestic Savings Ratio (GDS), Remittance Inflows Ratio (RINF) and Stock Market Capitalisation Ratio (SMC) and lag of Liquid Liabilities (LL). The selected ARDL representation for the model presented is ARDL (1, 1, 1, 1).

From the result in Table 3, the F-statistics (2175.48; p = 0.000) is decidedly(highly) significant at level 1%. This confirms the usefulness of the model. Also, the R^2 (coefficient of determination) is 0.99.81, implying that about 99.81% of the variations in current LL is clarified by the finance for growth indicators. Another diagnostic that endorses the usefulness of the model is Durbin Watson statistics. The Durbin Watson statistics of 1.429 indicates the absence of serial correlation. Alternatively, it specifies no correlation amid successive error term of each of the models.

Table 4: ARDL Model for Credit to Private Sector and Finance for Growth Indicators

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOG(CPS(-1))	0.699288	0.083644	8.360269	0.0000
LOG(GDS)	-0.076690	0.127708	-0.600512	0.5530
LOG(GDS(-1))	-0.067766	0.130305	-0.520060	0.6071
LOG(SMC)	0.094563	0.086239	1.096519	0.2822
LOG(SMC(-1))	0.121411	0.090604	1.340028	0.1910
LOG(RINF)	0.085335	0.028893	2.953491	0.0063
LOG(RINF(-1))	-0.050729	0.031233	-1.624197	0.1155
C	1.298568	0.819574	1.584442	0.1243
R-squared	0.998165	Mean dependent var		6.238973
Adjusted R-squared	0.997706	S.D. dependent var		2.613731
S.E. of regression	0.125190	Akaike info criterion		-1.124842
Sum squared resid	0.438829	Schwarz criterion		-0.772949
Log likelihood	28.24715	Hannan-Quinn criter.		-1.002022
F-statistic	2175.487	Durbin-Watson stat		1.429205
Prob(F-statistic)	0.000000			

Note*: *** and * denote significant at 1% and 10*, respectively. Others are as defined in Table 2*
Source*: Authors' Computation using EViews 10 Software*

The result in Table 5 displays the long-run dynamics of the relationship between credit toward the private sector and finance for growth indicators. As seen in the result, a negative and insignificant relationship exists amid Gross Domestic Savings Ratio (GDS) and credit to the private sector (CPS) at 5% significance level. This implies that a unit increase in DGS will not significantly affect private sector credit in Nigeria. Stock Market Capitalization Ratio (SMC) exhibits a strong and positive relationship with credit to the private sector (CPS) at 5% significance level, and the positive relationship is very significant. The coefficient of Remittance Inflows Ratio (RINF) is positive and also significant (coeff. = 0.11; p-value = 0.05) at 5% level of significance.

Table 5: Long Run Coefficients for Credit to Private Sector and Finance for Growth Indicators

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GDS)	-0.480381	0.459143	-1.046255	0.3044
LOG(SMC)	0.718210	0.103804	6.918883	0.0000
LOG(RINF)	0.115083	0.085593	1.344533	0.1896
C	4.318313	2.135516	2.022140	0.0528

***Note**: ***, **, and * denote significant at 1%, 5% and 10%, respectively. Others are as defined in Table 2.*
***Source**: Authors' Computation using EViews 10 Software*

Conclusion

Commercial banks are business organisations established to carry out the banking operation and maximise return to their shareholders. Banks not only grant loans and advances to customers just to fulfil their operational function but to make profit. This profit can only be earned through the interest charged on loans and advances to customers. The interest charged by banks on loans are normally arrived at by taking into account the prevailing market rate as well as the rate of monetary policy from the Central Bank of Nigeria (CBN). The interest rate of banks is usually higher than the monetary policy rate of the apex bank and incorporated with other charges such as administrative fee, and handling/processing fee. as determined by the banks from time to time. Loaning is one of the primary exercises of business banks and other budgetary establishments in Nigeria as clear by the size of advances that structure banks' benefits and the considerable yearly increment in the measure of credit allowed to borrowers in the nation (Akujuobi and Nwezeaku, 2015).

The investigations on fund development nexus are very much reported in the account writing. In any case, this current examination looked credit to the private part inside the setting of account for development. This goal was accomplished by utilising the autoregressive circulated slack (ARDL)-Bounds testing strategy in breaking down time arrangement information crossing time of 39 years (1980-2018). The experimental investigation depends on the supposition that when account for development is first-rate, banks will be a better situation in directing assets for investible purposes. The examination discovered proof of noteworthy short-run cointegration between credit to private and money for development factors, yet irrelevant since quite a while ago run relationship. Given these outcomes, the examination suggests that strategies that will additionally expand credit securities exchange capitalisation and settlement inflow be sought after overwhelmingly by the administration to support monetary intermediation, which will help with diverting assets for investible purposes and along these lines cause money related improvement in Nigeria.

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The Dynamics of the Demographic Processes of the Mari El Republic in 1990-2018

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Abstract

The dynamics of the demographic processes of the Mari El Republic is determined by the socio-economic development of the republic, cultural features and political factors. Creating favorable conditions for a long and healthy life of people is the ultimate goal of the development of any progressive society. The analysis of trends in changes in the standard of living of the population shows how effectively the society copes with this task.

Keywords: Dynamics, Demographic Processes, Population, Basic Socio-Demographic Indicators

Introduction

The dynamics of changes in demographic indicators requires regular analysis and forecasting of demographic processes. The problems of depopulation in the republic negatively affect its socio-economic development. Studying the causes of changes in the population allows us to assess the situation in the republic correctly and identify objective trends in the further development of the population.

Materials and Methods

The purpose of the work is to study the characteristics of demographic processes in the Republic of Mari El, their interaction with the socio-economic development of the region.

The object of the study is the population of the Mari El republic.

The subject of the study is the demographic situation in the Republic of Mari El, its dynamics.

The theoretical basis of the study was the scientific works of famous demographers, sociologists and economists Antonov A.I., Borisov V.A., Vishnevsky A.G., Kvashi A.Ya., Korotaeva A.V., Chudinovskikh OS, Khoreva B.S. and etc.

The methodological basis of the work is the research in the field of analysis and forecasting of demographic processes.

In the course of writing the work, the analysis of special literature, statistical data, legislative and regulatory documents in the field of demographic policy was used.

Research Results and Discussion

The problem of demographic processes has acquired great importance in the modern period and its neglect can ultimately lead to significant economic problems.

Analysis of the demographic processes in the republic for 1990-2018 shows that the main trends of this period are:

- decrease in the economically active population;
- decline in living standards;
- depopulation of the population.

The Republic of Mari El is one of the Russian regions with a simultaneous natural population decline and migration flow. Migration is associated with the parameters of socio-economic development, the distribution of productive forces, urbanization intensity. Mostly young, partially middle-aged, the most mobile and healthy people with the best professional qualifications are involved in migration flows.

Table 1: Population Change *

year	At the end of the year, thousand people			In % of the total population	
	All population	urban	rural	urban	rural
1990	755,3	468,8	286,5	62,1	37,9
2000	739,1	464,8	274,3	62,9	37,1
2005	711,5	449,1	262,4	63,1	36,9
2010	695,5	439,5	256,1	63,1	36,9
2015	685,9	449,5	236,4	65,2	34,8
2016	684,7	450,7	234,0	65,6	34,5
2017	682,3	451,4	230,9	65,8	34,2
2018	680,4	453,4	226,9	66,2	33,8

** All tables are based on The Republic of Mari El in numbers: A Brief Statistical Digest (2019)*

As of January 1, 2019, the resident population of the republic amounted to 680.4 thousand people, and compared to the corresponding date of 1990 (over 28 years) it decreased by 74.9 thousand people. (table 1). Throughout the entire period under review (1990-2018), there has been an increase in the share of the urban population and a decrease in the rural population in the total population. The share of the rural population in the total population for 28 years in the republic decreased by 4.1%. The reason for the decrease in the rural population is the decrease in living standards and the migration of the rural population to the city.

In a research study by Drepa, E.N. (2009) an important role in demographic processes is played by the age-sex structure of the population. It accumulates and stores the stock of demographic inertia, the population growth potential, by virtue of which the population movement continues for a certain time after the driving forces of this movement have dried up or changed their direction to the opposite. Therefore, the influence of the age structure is always taken into account when analyzing the dynamics of demographic processes.

Table 2 shows the distribution of the specific gravity of the population in the Republic of Mari El by age groups.

Table 2: Distribution of the specific weight of the population of the republic by age groups

All population	Including old age,% (as of January 1, 2018)														
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70 and older
100	6,9	6,5	5,4	4,6	4,9	7,2	8,8	7,3	6,5	5,9	6,8	8,4	7,5	5,3	8,0

According to table 2, the number of children aged 1 to 15 years is 18.8%, and the population of 60 years and older is 20.8%, that is, the population of the republic is demographically aging.

The age composition of the population of the Mari El Republic is shown in table 3.

Table 3: Age structure of the population of the Republic of Mari El (in % of the total number)

Year	Population younger than working age	Population of working age	Population older than working age
1990	27,1	55,2	17,8
2002	19,5	61,9	18,6
2005	17,1	64,6	18,3
2010	16,7	62,7	20,6
2015	18,5	58,1	23,4
2016	19,1	56,8	24,1
2017	19,5	55,7	24,8
2018	19,8	54,7	25,5

The working-age population is 0.5% less in 2018 than in 1990, and the population older than working-age is 7.7% more. Thus, over the past 28 years (from 1990 to 2018) in the Republic of Mari El, the population has been increasing over the working age.

The most important characteristic of the current demographic situation is the age and sex structure of the population. Both in the last century and at present, a significant excess of the number of women over the number of men remains.

The ratio of the number of men and women for the period under consideration is shown in Figure 1. At the beginning of 1990, for every thousand men in the republic, there were 1,142 women, by the beginning of 2019, 1,145 women (Fig. 1).

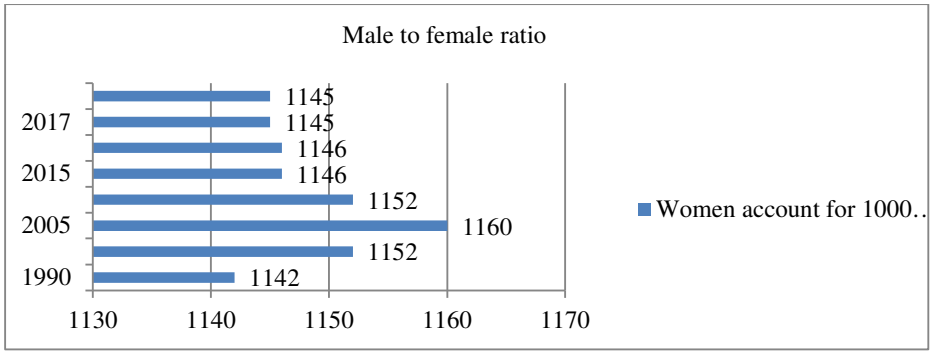

Fig. 1: The ratio of the number of men and women, people.

Table 4 summarizes the main socio-demographic indicators in the Republic of Mari El.

Table 4: Demographic indicators of the Republic of Mari El

Year	1980	1990	2000	2005	2010	2015	2016	2017	2018
Number of births per 1000 population	18,6	15,8	9	10,5	12,7	14,4	13,9	11,9	10,8
The number of deaths per 1000 population	11,4	10,3	14,6	17,2	15,2	13,8	13,2	12,4	12,7
Life expectancy at birth, years	…	68,8	64,6	63,4	67,3	69,8	70,8	72,2	71,7
The coefficient of natural increase (decrease) in the population (per 1000 people)	+ 7,2	+ 5,5	- 5,6	- 6,7	- 2,5	+ 0,6	+ 0,7	- 0,5	- 1,9

The nature of the birth rate, at present, is determined by social decisions on marriage, divorce, economic factors, the level of education of women and their employment.

Over the past twenty years, the death rate in the republic has exceeded the birth rate, with the exception of 2015-2016. Over the period under review, the natural decline in the population of the republic peaked in 2005, after 2010, a slight improvement began, the maximum of which was reached by 2016, mainly due to an increase in the birth rate. In 2017-2018 the number of deaths per 1000 population again exceeds the number of births, that is, there is a process of depopulation.

Depopulation is such a state of the society when each subsequent generation of the society does not make up for the previous one. The aggravation of this trend leads to the development of a demographic crisis, which is characterized by the fact that, along with depopulation, there is an absolute population decline, a sharp increase in mortality and other negative phenomena and processes leading to a demographic catastrophe.

Such demographic trends can lead to devastating consequences for the economy: a reduction in the share of the able-bodied population leads to a reduction in human capital and, therefore, can lead to a decrease in productivity; the pension system and social insurance system may become too burdensome; the growth of the elderly population requires a significant increase in health care costs.

One of the main family problems in the republic is a low level of cash income. Therefore, the problems of the demographic situation are largely related to the low level and quality of life of the population.

Table 5 shows the dynamics of cash incomes of the population in the Republic of Mari El

Table 5: Dynamics of cash incomes of the population of the Mari El Republic

Year	Indicators				
	Nominal cash incomes of the population, million rubles	Real cash income, in % of the previous year	Living wage per capita per month, rub.	The ratio of per capita income and living wage, times	Fund ratio (coefficient of income differentiation), times
2000	9500,9	104,1	868,6	1,2	10,5
2005	28563,9	116,5	2296	1,4	10,4
2010	86502,1	103,6	4847	2,1	13,0
2015	152546,9	97,6	8717	2,1	11,7
2016	153548,7	94,2	8852	2,1	11,6
2017	155127,7	97,5	9114	2,1	11,4
2018	157198,1	96,1	8968	2,1	11,1

Here is the dynamics of the average monthly nominal accrued wages in the republic for 2000-2018. (fig. 2)

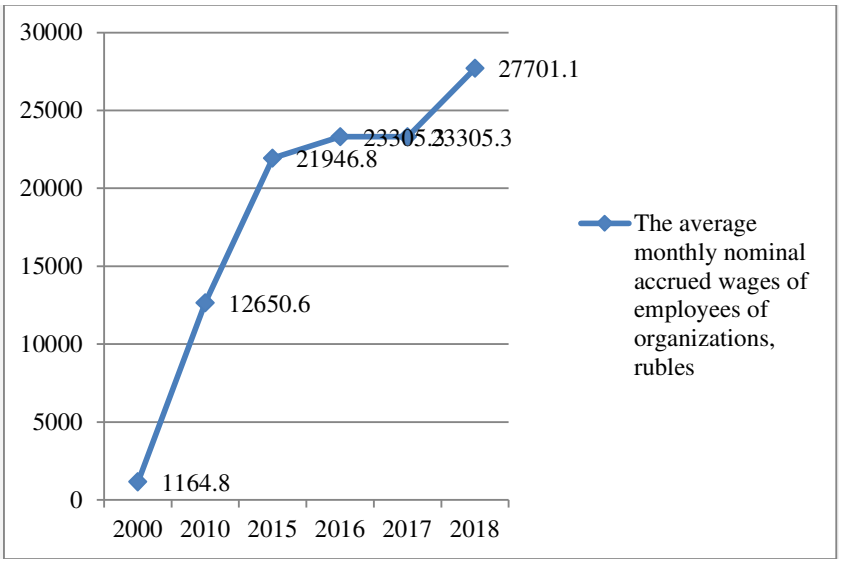

Fig. 2 : Average monthly wages for employees of organizations in the Mari El Republic for 2000-2018

As can be seen from the graph, there was an increase in wages in nominal values. But, nominal wages give little insight into changes in the welfare of the population. It is much more important to study the real indicators of the population's income from labor activity. To do this, we use the statistics of the inflation.

To analyze the real change in the values of the average monthly wage indicator in dynamics, we take the value of 2000 for the base year and recalculate the wage in accordance with the inflation rate. Recalculation is carried out according to the following formula (1):

$$k = \frac{100 - \text{Уровень инфляции}}{100}\% \quad (1)$$

уровень инфляции - inflation rate

The resulting coefficients are multiplied by the corresponding level of wages (table. 6).

Table 6: The dynamic characteristics of nominal and real wages in the Republic of Mari El in 2000-2018

Year	Average monthly accrued wages (nominal)	Growth rate,% of the previous year	Inflation rate,%	Recalculation	Average monthly wages in comparable prices (real)	Growth rate,% of the previous year
2000	1164,8	100	20,20	1	1164,8	100
2010	12650,6	10,86 p.	8,78	0,9122	11539,88	9,91 p.
2015	21946,8	173,5	12,91	0,8709	19113,47	165,6
2016	23305,3	106,2	5,38	0,9468	22065,46	115,4
2017	25439,5	109,2	2,48	0,9752	24808,60	112,4
2018	27701,1	108,9	5,53	0,9465	26219,09	105,7

We will display the dynamics of real wages in Fig. 3.

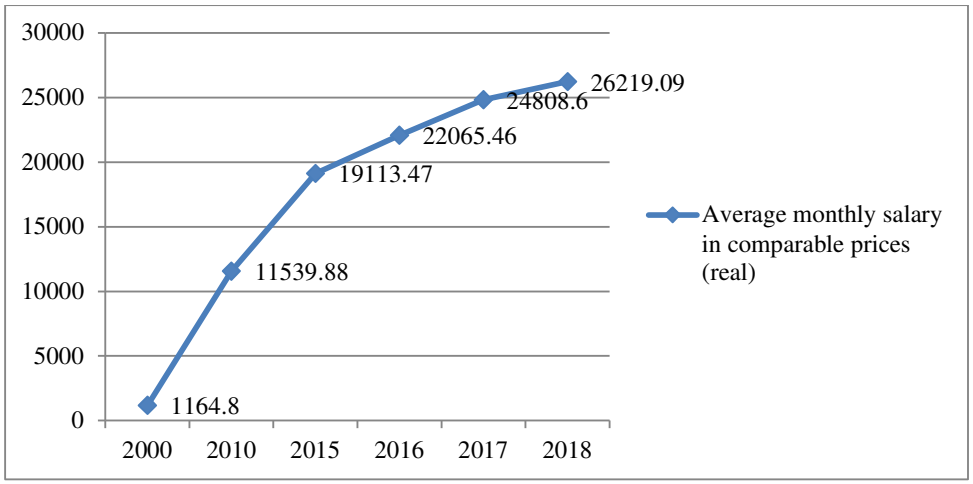

Fig. 3: Average monthly wages in comparable prices for employees of organizations in the Mari El Republic for 2000-2018

Real average monthly wages in general for 2000-2018 increased, but remained 7% less than the nominal average.

Conclusion

Thus, a decrease in the mortality rate and an increase in life expectancy in the Mari El Republic are possible with the implementation of large-scale regional programs to overcome the demographic crisis, including the growth of real incomes of citizens.

Only properly organized work on managing the demographic situation can overcome the demographic problems of the Mari El Republic and ensure the transition from degradation to demographic growth and development.

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Conceptual Approaches to Managing Investment Processes in The Region Based on The Principles of Economic Security

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Abstract

The article considers the importance of investment processes in ensuring the sustainable development of the region, defines the concept of "economic security" and the principles of building economic security at the meso- level, identifies risks and threats that affect investment activity of the region.
Theoretical and methodological approaches to the management of regional investment processes based on the principles of economic security are developed. A system of indicators is proposed to systematically characterize and monitor regional development in order to ensure economic growth and regional security.

Keywords: economic security, investment, investment process, socio-economic development of the region; economic stability, investment, investment process, socio-economic development of the region.

Introduction

In accordance with the National Security Strategy of the Russian Federation approved by Decree of the President of the Russian Federation dated December 31, 2015 No. 683, the main strategic threats to national security in economy include its low competitiveness, lag in the development and implementation of advanced technologies, imbalance in the national budget system, and uneven development of regions. At the same time, the global vector of development in the context of transition to a new technological structure is largely determined by the accelerated development of innovative sectors of economy and the implementation of innovative development strategies, including regional ones. Innovative development requires an awareness of the need to restore the structural balance of economy, increase the level of scientific and technological development and, consequently, activate investment processes.

Investments, acting as a system-wide growth factor and a key condition for the formation of quantitative (economic growth) and qualitative (economic development) vectors of evolution of the economic system determine the main parameters of modernization and expanded reproduction.

According to I.R. Prigozhin, transition to a new quality takes place at bifurcation points — critical states of the system in which the system becomes unstable with respect to fluctuations and uncertainty arises whether the system will become chaotic or it will transfer to a new, higher level of arrangment. Transitions at bifurcation points can lead to both progressive changes and regressive. In this regard, it is significant to strengthen the regulatory role of the state in the investment process on the basis of the concept of a cost-effective state that ensures national security in the context of internationalization of economy and the most important task of managing investment processes is to identify bifurcation points (threats, risks) in the socio-economic system at all levels, including the meso- level, to prepare adequate measures to prevent regression.

Thus, the importance of the research is determined by the increasing practical importance of solving the problem of vector formation, the role and tasks of the state in the investment process and substantiating the paradigm of managing investment processes based on the principles of economic security.

Materials and Methods

The main object of the study is investment processes in the region, management mechanisms for solving the problems of economic growth and ensuring economic security of the region.

The subject of the study is the risks and threats of regional development, a set of theoretical and methodological approaches to the management of regional investment processes.

The degree of development of the problem is characterized by a variety of studies in various areas of investment management.

In the study of the regional investment processes the basis is the theoretical provisions set forth in the works by I.V. Borzakov, E.V. Bykovskaya, A.G. Granberg, V.P. Zhdanov, A.S. Melnikov, M.I. Samogorodskaya and others; in the study of investment environment, investment climate and investment attractiveness – by L.L. Igonina, N.V. Nikitina, Yu.A. Pogodin, T.V. Teplov and other researchers. The results of studies by E. Bem-Baverk, I.A. Blanc, I.L. Vilensky, D.A. Endovitsky, V.V. Kovalev, V.N. Livshits, K.R. McConell, G.A. Makhovikov, A. Smith, F.U. Sharp were also analyzed.

To form the author's position on the importance of building an investment policy on the principles of economic security in order to ensure sustainable development the works by Abalkin L.I., Azarskaya M.A., Bendikov M.A., GlazyevS.Yu., Gradov A.P., Endovitsky D.A., Ilyin I.V., Ilyashenko E.A., Kleiner G.B., Larionov I.K., Oleinikov E.A., Ortynsky V.L., Pozdeev V.L., Senchagov V.K., Tambovtsev V.L., Tsukanov V.Kh. and other scientists were studied.

However, the current conditions of development of the regional economy, the need to introduce principles of economic security at the meso-scale and activate the role of the state in managing investment processes determine the urgency of the problem and the need for its further development.

The methodological base of the research is constituted by the provisions of the conceptual approach on a dialectical basis. Formal-logical and general scientific methods are used to ensure the required depth of the study of the problem: abstract-logical, historical, monographic methods, deduction, induction, synthesis, balance method, etc.

The study is based on the principles of objectivity in considering regional investment processes, historicism and investment coherence. The principle of objectivity in considering the investment processes involves the study of socio-economic phenomena based on a causal relationship, taking into account the peculiarities of the region development. The principle of historicism means consideration of issues of managing regional investments in development - the study of genesis and phased transformations. The principle of investment coherence means that all economic phenomena, processes, elements of regional investment management are considered in interconnection.

Investment coherence - the coordinated flow of time, space and resource support of investment processes, their management for transition of quantitative changes to new qualities - is reflected ultimately in synergistic and multiplicative effects. An increase in the efficiency of regional economy and a decrease in the entropy of regional investment processes (risk reduction, increase in investment security) are possible on the basis on achievement of internal coherence of investment processes, their streamlining (synchronization), adaptability (an adequate reaction of the regional investment process entities to environmental changes) in the economic system.

Research Results and Discussion

The economic security of the Russian Federation is largely ensured by the balanced, integrated and systemic development of its constituent entities and the effective activity of the regions. The increasing role of the regions is dominant in the economic and political life of the Russian Federation and the analysis and forecast of their development become especially relevant in the context of creating prerequisites for accelerated technological development. It is important to justify the priorities and tasks of regional development in accordance with the Strategy for Spatial Development of the Russian Federation for the period up to 2025, taking into account the risks, threats and restraining factors of regional development, the formation of an investment policy based on the principles of economic security as part of the general socio-economic policy of the region.

Obviously, the management of investment processes in the Russian Federation on the basis of the state-territorial structure of the country is a level system, the subjects and objects of which have a certain autonomy and diverse interests and goals. The top hierarchical level in the investment management system is management at the level of national economy, which ensures its sustainability. The next level is management at the regional economy level, then - management at the level of an economic entity.

The regional investment processes have specific features:

- variability of individual parameters of the system and its stochasticity, which allows to form regional development options;
- openness of the regional investment system, its ability to interact with the environment;
- stability as an ability not only to resist entropy (destroying the system) changes, but also to adapt to changing conditions and maintain equilibrium.

Peculiarities of regional investment processes, the uneven socio-economic development of the regions of the Russian Federation, differences in the production structure, transport accessibility and availability of resources, an impact on the country's administrative and distribution system processes in the region make it necessary to take into account the formation of the mechanism for managing the regional investment process along with macroeconomic factors (strategic goals and objectives of the national economy, national programs, projects) the factors acting at the meso- scale (goals and objectives of the socio-economic development of the region).

The study allowed us to determine conceptual approaches to the management of regional investment processes based on the principles of economic security.

The security of regional economy reflects the state of its economic potential, internal structure and management system, which ensures efficient use of natural, labor, material and financial resources, guarantees protection of the region from negative changes in external conditions, maintaining competitiveness and adapting to changing conditions and the boundaries of its economy . Despite the differences in approaches found in scientific literature characterizing the concept of “economic security”, the following is common: the economic security of a region means protection of its economy from external and internal threats, in which, based on the efficient use of resources, sustainable economic growth, socially oriented development of the region are ensured, which helps meet the needs of society.

Over the past century and a half three main approaches (paradigms) of theoretical economists have been formed to what should be considered the main threat to the national economy and how to deal with it:

1) the cameralistic concept - the concept of protecting foreign economic security (since the mid-19th century; revived by left-wing radical economists since the last third of the 20th century) (F. List, R. Prebish, A. Emmanuel and others): the main threat is external: competition of foreign states, among neoclassicists - inflation and low competitiveness of national business on a global scale; methods of struggle - protectionism, the integrated development of national economy;

2) Keynesian concept - the concept of protection against internal macroeconomic threats (since the second third of the 20th century) (J.M. Keynes): the main threat is the internal one: market "failures" - instability of economic growth, economic depression, unemployment, inflation; control methods - state regulation of production, employment and money circulation;

3) institutional concept - the concept of protection against administrative barriers (since the end of the 20th century) (E. de Soto): the main threat is internal: the "failures" of the state - administrative barriers - "bad" laws and / or poor implementation of "good" laws, rent seeking; methods of struggle - reduction of registration procedures and payments, the fight against bureaucracy and corruption.

The study showed that development of regions that are part of the country's economy is influenced by systematic risks affecting the country's economy as a whole (they cause external threats to the stability of the region) and risks specific to the region (they cause internal threats to the stability of the region). External risks may include instability in the global economy and the country's economy, imbalance in the national budget system, insufficient investment in the real sector of economy, poor innovation activity, natural disasters, changes in the structure of government, etc. Internal risks include geographical location, demographic indicators, climate conditions, low economic growth due to internal reasons, including limited access to long-term financial resources, insufficient development of transport and energy infrastructure, deterioration of fixed assets of the region's enterprises, etc. Among the threats that persist in Russian economy and have a restraining effect on it at all levels include weak control of export earnings, freedom to export capital abroad, offshoring, currency and financial speculation in financial market and absence of restrictions on the activity of foreign capital (national operation mode for non-residents), which determine the outflow of capital from the country and the lack of interest in investing in Russian economy, on the one hand; on the other hand, increased interest rates, an increase in the tax burden, which hinders the formation of internal and external sources of investment financing in conditions when access to foreign credit resources is limited as a result of sanctions.

Modern economic development more and more proves the need to change approaches, characteristic of the neoclassical and neo-Keynesian directions, to establish the functions of the state in a market economy, when the state regulates only what the market cannot regulate. The dynamism and unpredictability of economic processes, the changing role of international institutions in their regulation, globalization, the presence of external and internal threats to the development of economy necessitate the construction of state management of socio-economic development, including investment processes, based on the principles of economic security.

The principles of ensuring economic security are fundamental ideas, guiding principles that are determined by political, economic, spiritual, moral and other factors, guiding principles that reflect the nature, features and purpose of activities of specially authorized bodies and officials to ensure economic security. The key principles for building economic security at the meso -scale can be specified as follows:

- maintaining a steady rate of economic growth in the economic system of the region, budgetary security and sufficiency;
- ability to implement large-scale economic projects in current social and explosive situations in the troubled territories or economic miscalculations at the federal level;
- maintaining stability of labor resources and the level of employment in accordance with the reproductive needs of the region; maintaining a decent standard of living in the region;

- ability to pursue their own economic policies within the framework of the system of economic federalism and to adequately respond to force majeure situations at the federal level.

In the Russian Federation Institutions, mechanisms and tools for ensuring economic, including investment, security have been formed: Decree of the President of the Russian Federation dated May 7, 2018 No. 204 “On National Goals and Strategic Tasks of the Development of the Russian Federation for the Period until 2024” established national goals ; the Unified Plan for the achievement of the national development goals of the Russian Federation for the period up to 2024 defined the trajectory of indicators reaching target levels; The Ministry of Economic Development prepared an Action Plan to accelerate the growth rate of investment in fixed assets and an increase up to 25% of their share in gross domestic product, aimed at improving investment climate, financing investment activity. These documents provide for improvement of control and supervision system, licensing activities (completion of the reform of control and supervision activities, updating industry legislation), the establishment of stable "rules of the game" in taxation and non-tax payments (systematization and consolidation of uniform rules for introducing, amending and levying non-tax payments) and improvement of bankruptcy proceedings. But formation of mechanisms and tools is based on the extrapolation of the prevailing trends in the pre-sanction period and covers mainly the fiscal policy.

In the context of changes in the technological structure in order to stimulate innovative activity and investment activity, along with the fiscal policy being implemented, it is necessary to develop mechanisms of monetary, industrial and foreign economic policy in terms of stabilizing the ruble exchange rate, forming sources of investments, increasing the availability of credit resources and expansion of lending to industry through mechanisms for project financing and public-private partnerships, reducing the key rate to a level not higher than the profitability of an industry, reduction of tariffs of infrastructure monopolies, state support of certain sectors of economy, tariff regulation of foreign trade and export support, control over the targeted use of budget allocations and the movement of capital abroad, currency regulation. It is necessary to consider the issue of setting target parameters not only for inflation, but also for the ruble exchange rate, growth in monetary aggregates and changes in key rates. The development of mechanisms and tools for ensuring economic security, the system of its indicators at the meso -scale, the creation of a unified system for collecting, recording, analyzing and disseminating information to establish priorities and tasks for regional development also require elaboration.

Analysis of theoretical studies showed that when forming the modern paradigm of managing the region’s investment processes, one should take into account its socio-economic realities, which determine the need to build a system of monitoring the region’s socio-economic indicators and tools for regulating investors' activities to ensure economic security at the meso-scale.

A qualitative characteristic of regional development can be expressed through comparing one indicator selected as the main (for example, the value of the gross regional product), several priority indicators and aggregated indicators. Building a system of indicators for a systematic characteristic and monitoring of regions is important for the development of state regional policy, mechanisms and instruments of which should be formed taking into account economic, social, natural and other conditions that have a decisive effect on the formation of comparative advantages of the region in the framework of social division of labor.

Corresponding member of the Russian Academy of Sciences Hamidullin F.G. attributes to the main indicators characterizing interests of the region in security and ensuring acceptable living conditions and personality development for the majority of the population, the stability of the socio-economic situation, the integrity of society and economy the following : the ability of economy to function under expanded reproduction, the boundaries of critical dependence of economy on imports of the most important types of products, whose production at a required level can be organized in the region; financial system sustainability; a satisfactory standard of living of the bulk of the population, which allows to avoid the danger of uncontrolled social, labor, interethnic and other conflicts.

Taking into account the official statistical data, an assessment of security and sustainability of the region development can be carried out according to such key parameters as:

- the level of general economic development of the region and business activity,
- the level of development of investment infrastructure of the region,
- innovative development,
- demographic characteristics of the region.

When assessing the level of general economic development of the region we study the potential need for investment volumes, the possibility of forming investment resources with our own sources, the capacity of the regional market and the return on capital established in the region in various areas of investment activity. The composition of the analytical indicators used for such an assessment may include:

- the region share in GDP;
- index of physical volume of GRP; index of physical volume of GDP and GRP;
- dynamics of investments;
- the share of investments in fixed assets in GRP; the share of investments in fixed assets in GDP and GRP; correlation of investment and GRP;
- capacity growth index, capacity utilization;
- index of production volumes (industrial production index, industrial production volume, agricultural production volume);
- comparison of production and investment dynamics;
- the degree of asset deterioration, including machinery and equipment, return on assets, the coefficient of renewal of the asset, the coefficient of wear;
- labor productivity index;
- sources of financing investment activity, state financing, external sources (bank lending), foreign investment: structure, dynamics; share of credit in sources of financing investment activity; loan interest;
- liquid resources of the region;
- profitability level of enterprises, the proportion of unprofitable enterprises in the total number of functioning enterprises;
- rate of return on investment (amount of investment); index of return on investment (base - the average value in the country).

Additionally, the following indicators can be calculated:

- investments in fixed assets per 1 rub. of industrial products;
- the volume and dynamics of capital investment per inhabitant;
- the volume of industrial production per capita;
- the volume of production of certain types of agricultural products per capita.

When assessing the level of development of the investment infrastructure of the region, the possibilities of quick implementation of investment projects are investigated. In this case, the following indicators are considered:

- the number of contracting construction enterprises of all forms of ownership;
- volumes of local production of the main types of building materials;
- production of energy resources per capita;
- the proportion of transport in GRP;
- density of railways;
- density of paved roads, etc.

Innovative development is characterized by the following indicators:

- research and development costs as a percentage of GRP;
- the proportion of organizations engaged in technological innovation.

The demographic characteristics of the region are based on the study of otential volume of the population's demand for consumer goods and services and the possibility of attracting skilled workforce in invested production. The analyzed indicators include:

- the proportion of the population of the region in the total population of the country;
- coefficient of tension in the labor market (person / place);
- the proportion of the working-age population in the total population of the region;
- the availability of qualified specialists (share of employees with higher and secondary vocational education);
- the proportion of the population with incomes below cost of living.

Additionally, the following indicators can be calculated:

- the average level of wages of employees;
- the ratio of urban and rural residents;
- the proportion of the population employed in social production at enterprises of all forms of ownership.

A study of the region development on the basis of the above mentioned indicators provides an information base for monitoring compliance with the basic principles of economic, including investment, security of the region.

Conclusion

In the context of creating prerequisites for accelerated technological development based on vigorous investment activity, to ensure sustainable economic development of the region, it is necessary to form a regional investment policy based on the principles of economic security, taking into account risks, threats and restraining factors.

Generalization and systematization of various aspects of theoretical, methodological and applied research carried out within the framework of investment issues in order to highlight the general patterns in investment management, which are invariant in various regions, as well as studies on the issue of ensuring economic security, allowed convergence of approaches to ensure effective management of regional investment processes based on the principles of economic security.

Based on the use of unified statistics, a system of indicators is proposed for systematic characterization and monitoring of regional development in order to ensure economic growth and regional security.

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Comparative Analysis of CLIL and Other Methods of Integration of Teaching a Foreign Language and Non-Linguistic Disciplines

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Abstract

In modern conditions of globalization and internationalization of the society, the importance of knowledge of a foreign language(primarily English) by university graduates at a level that would allow them to fully realize the potential of international professional communication is growing. Various methods are effective in solving this problem, allowing integrating the study of a foreign language and non-linguistic subjects: Content and Language Integrated Learning (CLIL), English as a Medium of Instruction (EMI), English for Specific Purposes (ESP), Content-Based Instruction (CBI), language immersion, etc. The conducted study revealed the similarities and differences of these methods to determine the possibilities of their practical use.

Keywords: Content and Language Integrated Learning (CLIL), English as a Medium of Instruction (EMI), English for Specific Purposes (ESP), Content-Based Instruction (CBI), language immersion.

Introduction

With the globalization and internationalization of the society, the importance of knowledge of a foreign (primarily English) language by graduates of higher educational institutions at a level that would allow them to become full members of the international scientific, business, cultural community is growing. Moreover, even good knowledge of a foreign language for everyday communication is often not enough for a free orientation of specialists in industry market information, specialized literature, and effective communication with business partners from foreign countries. Only the study of a foreign language for professional purposes gives the university graduate the opportunity to participate in professional intercultural communication, is a key factor in the formation of professional and communicative competencies and, in general, a socially successful, competitive, professional person.

In international practice, Content and Language Integrated Learning - CLIL, English as a Medium of Instruction (EMI), English for Specific Purposes (ESP), Content-Based Instruction (CBI) have become known as effective methods for ensuring the formation of professional and foreign language competencies, language immersion, etc. The purpose of this study is to study the similarities and differences of these methods, to determine the possibilities of their practical use in the practice of Russian universities.

Materials and Methods

As research materials, we use the publications of foreign and Russian specialists who used the above methods in pedagogical practice and studied them as a subject of authors'scientific interests.

When conducting the study we applied:

theoretical methods: study, analysis and generalization of scientific literature in the subject area of research, synthesis, comparison, specification, interpretation, comparison,

general empirical methods: the study and generalization of pedagogical experience.

private empirical methods: the study of documents.

Research Results and Discussion

Content and Language Integrated Learning (CLIL), the use of which is recommended by the European Commission for education at various levels, including higher education, was considered as the main methodology, in relation to which a comparative analysis of approaches to the integration of foreign language learning and non-linguistic disciplines was conducted. This technique is gradually gaining popularity in the educational system of Russia.

The term CLIL was coined in the 1990s. by a group of EuroCLIC Network researchers from European countries who were involved in language education in Europe (Cenoz et al, 2014). Its leading representative is David Marsh, a specialist in multilingual education, the author of such works as Profiling European CLIL Classrooms: Languages Open Doors (2001), Content and Language Integrated Learning (2010), etc.

The book by Coyle et al (2010) gives a comprehensive definition of CLIL, which emphasizes its characteristic features: CLIL is a two-focus educational approach in which a foreign language is used to study and teach both academic discipline and a foreign language. Thus, CLIL is an "umbrella term" encompassing a variety of techniques (Marsh, 2008, Mehisto et al, 2008) but CLIL is distinguished by the guiding role of the content of a non-linguistic discipline. It is important that CLIL is not a way to learn a foreign language using the extended subject context as an example. It is not a way of studying the content of non-linguistic discipline, simply translated into a foreign language (Silva and Albuquerque, 2016). The key to CLIL is its bifocal focus on both teaching content through foreign language and teaching foreign language through content.

Currently, the concept of CLIL is interpreted quite widely, and in the scientific and methodological literature there are many different definitions of it. Despite the widespread use of the term CLIL, discussions about the essence of this approach, the search for its specificity in comparison with other methods of teaching subjects and a foreign language continue.

Some authors adhere to a categorical position, believing that the variety of CLIL definitions makes it impossible to identify the key characteristics of this technique, which would distinguish it as truly original and independent (Cenoz et al, 2014).

The authors of the work agree with those researchers who do not consider CLIL as a radically new approach, since foreign and second languages have long been used to teach various disciplines in secondary and higher education (Popova et al, 2018). We also support the view that CLIL cannot be understood as a kind of English for Specific Purposes (ESP) or to equate the concepts of CLIL and English as a Medium of Instruction (EMI) (Sidorenko and Rybushkina, 2017).

Here are a few arguments that support our point of view.

Firstly, although in practice the predominant part of educational programs using CLIL is implemented on the basis of English, which turns CLIL into CEIL (Content and English Integrated Learning), however, in general, CLIL is wider than ESP or EMI, since it can be implemented on the basis of other languages.

Secondly, CLIL is a convergence of subject content and language categories, which allows us to consider this approach on a par with the above methods, but CLIL is distinguished by numerous special didactic methods for providing integrated learning (fusion), which carry the novelty of the approach. Thus, problem-based learning, collaboration training, presentation skills, role-playing games, exercises on compiling intelligence cards, etc. are considered elements of novelty.

Thirdly, the ESP methodology is mainly aimed at teaching a foreign language directly, while the substantive aspects are of secondary importance (Popova et al, 2018). ESP programs are aimed at developing students' linguistic competence, therefore, the central link is the improvement of foreign-language communication skills, and knowledge of terminology, grammar and discourse features that are characteristic of the professional sphere are assessed (Khalyapina, 2017).

CLIL has an ambivalent focus on both special content and a foreign language, while EMI is not a methodology for teaching a foreign language at all: it is the use of a foreign language as a means of studying academic disciplines (Popova et al, 2018).

Since the ESP technique is designed to study the language, the teachers are not tasked with creating a logically structured and consistently revealing the topic of educational material (it is understood that the student already has knowledge in the subject and only needs to clothe them in a new form in a foreign language). EMI, on the contrary, assumes a sufficient level of students' knowledge of a foreign language and concentrates on the content of the subject, with almost no attention to the linguistic component. It is CLIL that allows us to maximize eliminate the shortcomings of each of these approaches, integrate language teaching and the content of a special discipline (Silina and Surinova, 2017).

CLIL also has an intersection with the basic ideas of language immersion and content-based learning - Content-Based Instruction (CBI). Immersion in the language environment significantly accelerates the process of learning a foreign language, and learning new things about a specific subject, rather than new ones about a language, increases students' motivation. As with CBI, language and discipline teachers often work together when using CLIL, directing their efforts toward solving common problems (Vyushkina, 2015).

Therefore, some researchers believe that the terms CLIL and CBI have the same content, while others indicate an important difference between them - CLIL is used in classrooms where a non-language subject is studied, and CBI is a method of teaching a foreign language on material related to subjects (Cenoz et al, 2014, Vyushkina, 2015, Dalton-Puffer et al, 2014).

Thus, Content and Language Integrated Learning covers situations of teaching a non-language subject “through the medium” of a foreign language. CLIL is a method of teaching subjects through a foreign language (teaching content through foreign language) and teaching a foreign language through the subject itself (teaching foreign language through content). CLIL assumes a dual unity of subject content and language learning. Thus, the language is used as a means of studying the content, and the content, in turn, is used as a resource for learning the language (Zaripova et al 2015).

A distinctive feature of CLIL is that it is not just an approach to teaching a foreign language or subject, but an integrated form of learning for both. Not only is the discipline taught through a foreign language, but a foreign language environment is created in which students are immersed. In the

classroom, they work with authentic materials, using a foreign language to study the real world. Teachers use not only language teaching methods, but also didactic methods of teaching non-linguistic disciplines.

Using CLIL, students can study one or more subjects in a foreign language. It is not assumed that students are able to speak a professional foreign language before starting to study a specialized subject. They learn the language at the same time as the special subject (Baturina et al, 2017). In the context of CLIL, a language that acts as a learning tool can be either a foreign language, a second state language, or a language of a national minority (Grigorieva and Yakhina, 2017). As a rule, the language of instruction is a foreign language that is rarely or never used in a social context outside the classroom. Classes form the main, and often the only, environment in which students can use the language they are studying (Filipovich, 2015).

Conclusion

Thus, techniques that use a foreign language in the process of obtaining subject knowledge have both similarities and differences. It should be noted that the diversity of approaches to distinguishing between methods of integrating language and academic disciplines is largely due to the peculiarities of using terminology in different regions. CBI represents American experience and is comparable to ESP; The appearance of the term CLIL is associated with European countries, but recently this approach has been widely used outside Europe and is used in a wide international context. In our opinion, the task of a clear separation of methods and their definitions does not have significant practical value. More important is the possibility of using a combination of methodological and didactic elements of various approaches in the interdisciplinary integration of a foreign language and professional disciplines of higher education in order to achieve the planned learning outcomes and form the required competencies of students depending on the characteristics of specific educational situations.

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Regional Differentiation of Innovative Goods Production in The Russian Federation

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Abstract

One of the most important indicators reflecting the level of development of innovative activity in the state is the volume of innovative goods produced in the country. At the same time it is important to take into account regional aspects, especially in connection with the recently growing role of regions as sources of innovative changes. Therefore the focus of this study is the regional differentiation of the proportion of innovative goods, works, services in the total volume of goods shipped, works and services performed, considered for the period of 2016-2018. As measures of the level of differentiation of the analyzed indicator the absolute and relative range, variance, standard deviation and coefficient of variation are calculated. It was revealed that the uneven production of innovative goods, works, services in the Russian Federation is high and it increased during the analyzed period.

Keywords: innovation, innovative products, regions, Russian Federation.

Introduction

Currently, innovation is the main driver of economic growth. It can be argued that science and innovation have become the main driving force of social progress, a measure of economic development (Golova and Sukhovey, 2017, Kokkinou, 2010, Maradana et al, 2019, Mayer et al, 2012, etc.).

When developing and implementing innovative policies it is necessary to take into account regional aspects, since the role of regions and cities as sources of innovative changes is currently being strengthened. The unevenness of innovative development of regions in a state is noted in many countries even small ones (Fil'a and Kučera, 2015, Hudec and Procházková, 2015, etc.).

The differentiation of Russian regions in terms of innovative indicators is very significant which is associated with uneven population composition, production structure and socio-economic development of various constituent entities of the Russian Federation with different historical, geographical and national characteristics (Golova and Sukhovey, 2017, Gubanova and Kleshch,

2019, Gusakov, 2014, NRU HSE, 2020, Nureev and Simakovsky, 2017, Piskun and Khokhlov, 2019, etc.).

The ongoing research of regional features of innovation in Russia analyzes mainly the indicators of resources of innovative development (research and development costs, characteristics of the educational system, the number and quality of organizations and personnel involved in research and development, etc.). However a fundamental condition for the effectiveness of innovation processes ensuring economic growth, increasing national competitiveness and other positive changes in the development of the country is the practical implementation of innovations in the economic activities of specific enterprises, therefore, in this study we focus on the rate of production of innovative goods, works, services. This work is a continuation of the research presented in earlier publications (Rodionova, 2019).

Materials and Methods

The basis of the study was the information presented in the statistical collection “Regions of Russia. Socio-economic indicators” (Rosstat, 2019).

According to the methodology of the Federal State Statistics Service (Rosstat) innovation activity refers to the type of activity associated with the transformation of ideas (usually the results of scientific research and development or other scientific and technological achievements) into technologically new or improved products or services introduced on the market, into new or improved technological processes or methods of production of services used in practice. Innovation involves a range of scientific, technological, organizational, financial and commercial activities and it is in their entirety that they lead to innovation.

As innovative goods, works, services, Rosstat considers goods, works, services, new or subject to technological changes of varying degrees over the past three years (Rosstat, 2019).

As indicators of the level of regional differentiation the authors calculate the absolute and relative range of variation, variance, standard deviation and coefficient of variation.

Research Results and Discussion

Content Table 1 presents the rating of the constituent entities of the Russian Federation with an indication of the federal district (FD) in terms of the volume of innovative goods, works, services as a percentage of the total volume of goods shipped, works and services performed for 2016-2018. Due to the limited volume of publications the first and last 20 positions in the ranking are given. The indicators of the Arkhangelsk and Tyumen Regions were taken into account with the inclusion of their constituent autonomous districts and the latter did not participate in the rating.

Table 1: the proportion of innovative goods, works, services in the total volume of goods shipped, works and services performed

Name	2016, %	Name	2017, %	Name	2018, %
Rating of regions					
1. Republic of Mordovia (Volga FD (VFD))	27.2	1. Republic of Mordovia (VFD)	27.5	1. Republic of Mordovia (VFD)	24.3
2.Republic of Tatarstan (VFD)	19.6	2. Khabarovsk Region (Far Eastern FD (FEFD))	23.8	2. Khabarovsk Territory (FEFD)	21.3
3. Bryansk Region (Central FD (CFD))	18.8	3. Republic of Tatarstan (VFD)	19.6	3. Republic of Tatarstan (VFD)	20.9
4. Samara Region (VFD)	17.7	4. Perm Region (VFD)	16.0	4. Perm Region (VFD)	18.4

5. Nizhny Novgorod Region (VFD)	16.5	5. Samara Region (VFD)	15.6	5. Nizhny Novgorod Region (VFD)	15.7
6. Udmurt Republic (VFD)	16.3	6. Nizhny Novgorod Region (VFD)	15.4	6. Belgorod Region (CFD)	14.9
7. Moscow Region (CFD)	15.8	7. Arkhangelsk Region (North-West FD (NWFD))	15.3	7. Samara Region (VFD)	13.5
8. Perm Territory (VFD)	15.5	8. Moscow Region (CFD)	14.7	8. Ulyanovsk Region (VFD)	13.4
9. Yaroslavl Region (CFD)	14.9	9. Republic of Mari El (VFD)	14.2	9. Moscow Region (CFD)	13.2
10. Rostov Region (Southern FD (SoFD))	14.5	10. Krasnodar Territory (SoFD)	14.1	10. Yaroslavl Region (CFD)	12.8
11. Khabarovsk Territory (FEFD)	14.1	11. Ulyanovsk Region (VFD)	12.8	11. Udmurt Republic (VFD)	12.6
12. Moscow (CFD)	13.6	12. Tula Region (CFD)	12.7	12. Tula Region (CFD)	12.2
13. Chuvash Republic (VFD)	13.1	13. Yaroslavl Region (CFD)	12.2	13. Kursk Region (CFD)	12.0
14. Sevastopol (SoFD)	12.8	14.Chuvash Republic (VFD)	12.2	14. Krasnodar Territory (SoFD)	11.5
15. Ulyanovsk Region (VFD)	12.3	15. Belgorod Region (CFD)	11.6	15. Chuvash Republic (VFD)	11.1
16.Tula Region (CFD)	11.2	16. Udmurt Republic (VFD)	10.8	16. St. Petersburg (NWFD)	9.9
17. Lipetsk Region (CFD)	10.5	17. Rostov Region (SoFD)	10.6	17. Tambov Region (CFD)	9.3
18. Republic of Adygea (SoFD)	10.1	18. Sverdlovsk Region (Ural FD (UFD))	10.3	18. Stavropol Region (North Caucasus FD (NCFD))	9.0
19. Novosibirsk Region (Siberian FD (SiFD))	9.7	19. Penza Region (VFD)	10.1	19. Kirov Region (VFD)	8.9
20. Stavropol Territory (NCFD)	9.3	20. Kostroma Region (CFD)	9.9	20. Republic of Adygea (SoFD)	8.0
…		…		…	
63. Republic of Ingushetia (NCFD)	0.9	63. Oryol Region (CFD)	1.1	63. Kabardino-Balkaria Republic (NCFD)	0.9
64. Kamchatka Territory (FEFD)	0.9	64. Republic of Sakha (Yakutia) (FEFD)	1.1	64. Murmansk Region (NWFD)	0.8
65. Chukotka Autonomous Region (FEFD)	0.7	65. Amur Region (FEFD)	0.9	65. Republic of Crimea (SoFD)	0.8
66. Primorsky Territory (FEFD)	0.5	66. Kabardino-Balkaria Republic (NCFD)	0.9	66. Irkutsk Region (SiFD)	0.8
67. Jewish Autonomous Region (FEaFD)	0.5	67. Irkutsk Region (SiFD)	0.8	67. Republic of Sakha (Yakutia) (FEFD)	0.8
68. Arkhangelsk Region (NWFD)	0.5	68. Republic of Kalmykia (SoFD)	0.7	68. Tuva Republic (SiFD)	0.7
69. Oryol Region (CFD)	0.5	69. Primorsky Region (FEFD)	0.5	69. Kemerovo Region (SiFD)	0.7
70. Republic of Kalmykia (SoFD)	0.5	70. Republic of Khakassia (SiFD)	0.5	70. Ivanovo Region (CFD)	0.6
71. Republic of Dagestan (NCFD)	0.4	71. Republic of Ingushetia (NCFD)	0.5	71. Chukotka Autonomous Region (FEFD)	0.5
72. Tuva Republic (SiFD)	0.3	72. Magadan Region (FEFD)	0.4	72. Trans-Baikal Territory (FEFD)	0.5
73. Republic of Karelia	0.3	73. Komi Republic	0.4	73. Magadan Region	0.4

(NWFD)		(NWFD)		(FEFD)	
74. Magadan Region (FEFD)	0.3	74. Republic of Karelia (NWFD)	0.3	74. Republic of Ingushetia (NCFD)	0.4
75. Altai Republic (SiFD)	0.2	75. Kaliningrad Region (NWFD)	0.3	75. Karachay-Cherkess Republic (NCFD)	0.4
76. Republic of North Ossetia-Alania (NCFD)	0.2	76. Republic of Dagestan (NCFD)	0.3	76. Republic of North Ossetia-Alania (NCFD)	0.4
77. Kaliningrad Region (NWFD)	0.2	77. Ivanovo Region (CFD)	0.2	77. Kaliningrad Region (NWFD)	0.3
78. Ivanovo Region (CFD)	0.2	78. Astrakhan Region (SoFD)	0.2	78. Republic of Dagestan (NCFD)	0.3
79. Republic of Khakassia (SiFD)	0.1	79. Sakhalin Region (FEFD)	0.2	79. Sakhalin Region (FEFD)	0.1
80. Karachay-Cherkess Republic (NCFD)	0.1	80. Tuva Republic (SiFD)	0.1	80. Republic of Khakassia (SiFD)	0.1
81. Chechen Republic (NCFD)	0.1	81. Karachay-Cherkess Republic (NCFD)	0.1	81. Astrakhan Region (SoFD)	0.1
82. Sakhalin Region (FEFD)	0.0	82. Republic of North Ossetia-Alania (NCFD)	0.1	82. Chechen Republic (NCFD)	0.0
Analytical indicators					
Average across Russia	8.5	Average across Russia	7.2	Average across Russia	6.5
Range	27.2	Range	27.4	Range	24.3
Relative range	3.20	Relative range	3.81	Relative range	3.73
Dispersion	40,86	Dispersion	35,98	Dispersion	31,91
Standard deviation	6,39	Standard deviation	6,00	Standard deviation	5,65
Coefficient of variation	0,75	Coefficient of variation	0,83	Coefficient of variation	0,87

The data in Table 1 indicate a decrease in the share of innovative goods, works, services in the total volume of shipment in the Russian Federation over the past three years from 8.5% to 6.5%. The share of innovative goods, works, services for the analyzed period decreased in 43 regions, growth is recorded in 34 regions and in 5 regions the share of innovative production remained unchanged.

It should be noted that the Strategy for Innovative Development of the Russian Federation for the period until 2020 (Strategy, 2011) involves an increase in the share of innovative goods, works, services in the total volume of goods shipped, works performed, services of industrial production organizations to 15.4% by 2016 and up to 25% by 2020 year. Obviously, the possibility of reaching the final level of the indicator planned by the Strategy is doubtful. Although the indicator analyzed by us in Table 1 was calculated by Rosstat for a wider range of production activities, its value of 6.5% in 2018 leaves little hope that in 2020 Russian industrial production will reach the level planned by the Strategy at 25%.

The change in the calculated differentiation indicators is not the same: the absolute and relative range of variation increased in 2017 and decreased in 2018, the variance and standard deviation tended to decrease. The coefficient of variation, which can be considered as the main measure of differentiation of regions by the level of production of innovative goods, works, services is very high and during three years increased from 0.75 to 0.87.

The largest number of leading regions by the analyzed indicator is concentrated in the Volga Federal District. The three regions that hold leading positions in the ranking - the Republic of Mordovia, the Republic of Tatarstan (Volga Federal District) and the Khabarovsk Territory (Far Eastern Federal District) - show a fairly significant gap in the relative volume of production of innovative goods from the rest of the Russian Federation. Throughout the entire analyzed period the republics of Mordovia and Tatarstan, Samara, Nizhny Novgorod, Moscow Region and Perm Territory retain their place in the top ten. It should also be noted that the Tyumen Region, excluding the Khanty-Mansiysk and

Yamalo-Nenets Autonomous Regions, is characterized by one of the highest rates of the share of innovative goods (15.8%, 17.8% and 19.5% in 2016, 2017 and 2018 respectively).

In the year 2018 24 subjects of the Russian Federation have the share of production of innovative goods, works, and services at the level above the average for Russia. An extremely low level of production of innovative goods is observed in a number of regions of the North Caucasian, Far Eastern and Siberian federal districts.

Significant changes in the level of production of innovative goods are observed in the Belgorod Region (an increase from 7.3% in 2016 to 14.9% in 2018), the Bryansk Region (decrease from 18.8% in 2016 to 3.3% in 2018), Moscow (decrease from 13.6 % in 2016 to 3.0% in 2018), Arkhangelsk Region (excluding the Nenets Autonomous Region - fluctuation from 0.9% in 2016 to 28.4% in 2017 and 12.4% in 2018, including the Nenets Autonomous Region - fluctuation from 0.5 % in 2016 to 15.3% in 2017 and 5.6% in 2018), Rostov Region (decrease from 14.5% in 2016 to 5.8% in 2018), Sevastopol (a decrease from 12.8% in 2016 to 4.5% in 2018), the Republic of Mari El (fluctuations from 8.2% in 2016 to 14.2% in 2017 and 2.8% in 2018), Trans-Baikal Territory (decrease from 7.2% in 2016 up to 0.5% in 2018), Khabarovsk Territory (fluctuation from 14.1% in 2016 to 23.8% in 2017 and 21.3% in 2018).

Conclusion

Thus uneven share of production of innovative goods, works, services in the context of the constituent entities of the Russian Federation is very high (coefficient of variation > 0.33) and over the three analyzed years it has increased even more. This state of affairs cannot be evaluated positively.

It is necessary to continue the study of indicators of innovative development of regions, including other indicators related to both creation and implementation of innovations. The urgent tasks are to search for the interconnection between the volumes of the regional resources for innovative development and production of innovative goods, determine the reasons for the low share of the output of innovative goods, works, services in most constituent entities of the Russian Federation, identify the factors of low innovative activity in outsider regions and establish the need to increase it.

The final goal of research of regional innovation in Russia should be to build a typology of regions identified by production, technological and socio-economic characteristics in order to formulate strategies for the innovative development of territories of different types, ensuring an efficient transfer of innovations, a rational level of production of innovative products and alignment of levels of development of innovative activities in the regions.

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The Structure of The Set of Risks of Discrete Economic Systems And Related Tasks of System Analysis

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Abstract

The work is devoted to the study of the structure of the universal set of abstract risks of the development of discrete economic systems under conditions of probabilistic uncertainty from a set-theoretic point of view, as well as the formulation of a number of related problems. In particular, the article shows a trivial characterization of a universal set of abstract risks in the form of an isomorphism of the corresponding factor monoid with the operation of calculating the joint risk of a monoid of integers by multiplication. Using the methods of information theory, the components of dividing the risk space, which form a subtler, in relation to the named isomorphism, characterization of the universal set of risks, are investigated. The relevance of entropy approaches to risk analysis is shown. The problem of risk factorization, interesting from the point of view of system analysis, is formulated. Formal statements of factorization problems are given.

Keywords: Algebraic Theory of Risk, Probable Uncertainty, Discrete System, Entropy, Complexity, Quotient Algebra.

Introduction

In the monograph by Urazayeva (2013), the most general formalism was proposed, which allows, on the one hand, to trace the pathways of risk genesis as a phenomenon of consciousness, and, on the other hand, to form new, more effective approaches to solving computational problems of the theory of risk of discrete systems under conditions of probabilistic uncertainty. This formalism is called the "algebraic theory of risk" (ATR).

Practice has confirmed the fruitful use of the ideas of the ATR, both in the socio-economic sphere (financial applications, papers by Urazaeva (2011, 2012, 2013, 2014), personnel management tasks, papers by Borodin (2014)) and in the study of technical systems, papers by Borodin (2014, 2015) and papers by Urazaeva (2010, 2015).

The most important abstractions of the ATR are the concepts of risk, multiple risks, and the algebraic operation of multiplying risks, interpreted in terms of the subject area as the operation of calculating the joint risk.

Risks in the ATR are represented by multisets whose carrier is the subset of the direct product $C \times \mathbf{I}$, where the set of all mappings of the state of the system onto itself C together with the composition operation of these mappings form a commutative monoid, and $\mathbf{I} = [0,1] \subset \mathbf{R}$ is the unit segment, where $\mathbf{R}$ is the set of real numbers. Accordingly, many risks are many multisets of the form

$$\mathsf{R} = \left\{ \boldsymbol{R} : \ \boldsymbol{R} \in \mathsf{A}, \Sigma_{x \in \operatorname{Supp} \boldsymbol{R}} \ k_{\boldsymbol{R}}(x) \operatorname{pr}_{\mathbf{I}} x = 1 \right\},$$

where $\mathsf{A} = \{ \boldsymbol{A} : \ \operatorname{Supp} \boldsymbol{A} \subset C \times \mathbf{I} \}$,

$\operatorname{Supp} \boldsymbol{A}$ – multiset carrier $\boldsymbol{A}$,

$k_{\boldsymbol{R}}(x)$ – the multiplicity of the element x in the multiset $\boldsymbol{R}$,

$\operatorname{pr}_{\mathbf{I}} x$ – the projection of the element x onto the set $\mathbf{I}$.

Thus, it is obvious that R is the set of all possible discrete probability distributions over C, otherwise, the set of all possible distributions of the development options of the discrete system.

Above R you can define the operation of multiplication (calculation of joint risk):

$$\boldsymbol{A} \square \boldsymbol{B} \underset{Def}{=} \left\{ k_{\boldsymbol{A} \square \boldsymbol{B}}(u) * u : \ k_{\boldsymbol{A} \square \boldsymbol{B}}(u) = \sum_{\substack{x \in \operatorname{Supp} \boldsymbol{A}, \\ y \in \operatorname{Supp} \boldsymbol{B}, \\ x y = u}} k_{\boldsymbol{A}}(x) k_{\boldsymbol{B}}(y), \right.$$

$$\left. u \in \bigcup_{\substack{x \in \operatorname{Supp} \boldsymbol{A}, \\ y \in \operatorname{Supp} \boldsymbol{B}}} \{ x y \} \right\}.$$

Here, the product of the elements is defined as follows:

$$z = x \mathrm{g} y \underset{Def}{\hat{\mathrm{U}}} \operatorname{pr}_C z = \operatorname{pr}_C y \circ \operatorname{pr}_C x, \ \operatorname{pr}_{\mathbf{I}} z = \operatorname{pr}_{\mathbf{I}} x \times \operatorname{pr}_{\mathbf{I}} y .$$

In the monograph by Urazayeva (2013), it was proved that algebra $\langle \mathsf{R}, \square \rangle$ is a commutative monoid. The use of this fact, as well as the development of the corresponding theory, allowed us to develop a number of new, more effective, risk analysis algorithms.

At the same time, the question of the structure of the set R remained outside the scope of the study, Urazayeva (2013). The study of the structure of the set R is not only fundamental, but, as will be shown below, has immediate practical significance, since it is associated with such risk characteristics as complexity and entropy.

The purpose of the study (Materials and methods)

We introduce the set of risks with the same (fixed) number of possible outcomes:

$$\mathsf{R}^{\#k} \underset{Def}{=} \left\{ \boldsymbol{R} : \boldsymbol{R} \in \mathsf{R}, \left| \boldsymbol{R} \right| = k \right\}, \; k \in \mathbf{Z}_0^+,$$

where $\mathbf{Z}_0^+$ – is the set of non-negative integers.

Using this definition, one can introduce on many risks the ratio of coincidence of the number of outcomes:

$$\boldsymbol{R}_1 \,\#\#\, \boldsymbol{R}_2 \underset{Def}{\Leftrightarrow} \exists k \left(\boldsymbol{R}_1 \in \mathsf{R}^{\#k}, \boldsymbol{R}_2 \in \mathsf{R}^{\#k} \right).$$

Obviously, the factor monoid $\langle \mathsf{R}, \square \rangle / \#\#$ is isomorphic to the monoid $\left\langle \mathbf{Z}_0^+, \times \right\rangle$. This is a trivial characterization of the structure of many risks.

Are less trivial characterizations of the structure of multiple risks possible? If possible, then what are the features of the identified components. The answers to these questions are the goal of this paper.

Not entirely trivial characterization of multiple risks

Note that this paper generalizes and substantially refines the results published in the papers Borodin (2016). Let us introduce another kind of subset of the set of risks - a set of risks, which includes all joint risks from two sets with a fixed number of outcomes:

$$\mathsf{R}^{\#m\#n} \underset{Def}{=} \mathsf{R}^{\#m} \square \mathsf{R}^{\#n} \underset{Def}{=} \left\{ \boldsymbol{R}_1 \square \boldsymbol{R}_2 : \boldsymbol{R}_1 \in \mathsf{R}^{\#m}, \boldsymbol{R}_2 \in \mathsf{R}^{\#n} \right\}.$$

Let us prove that $\mathsf{R}^{\#m\#n} \subset \mathsf{R}^{\#mn}$, or, otherwise, that $\mathsf{R}^{*mn} \underset{Def}{=} \mathsf{R}^{\#mn} \setminus \mathsf{R}^{\#m\#n} \neq \varnothing$. To do this, consider two multisets from R:

$$\boldsymbol{R}_1 = \left\{ k_{11} * (c_{11}, p_{11}), k_{12} * (c_{12}, p_{12}), \ldots, k_{1i} * (c_{1i}, p_{1i}) \right\},$$

$$\boldsymbol{R}_2 = \left\{ k_{21} * (c_{21}, p_{21}), k_{22} * (c_{22}, p_{22}), \ldots, k_{2j} * (c_{2j}, p_{2j}) \right\},$$

as well as their product:

$$\boldsymbol{R}_1 \square \boldsymbol{R}_2 = \left\{ k_1 * (c_1, p_1), k_2 * (c_2, p_2), \ldots, k_n * (c_n, p_n) \right\}.$$

Without loss of generality, we assume that these multisets do not contain elements insignificant from the probability theory, in other words, elements with a zero second component. Further, assuming that the elements of these three multisets are ordered by increasing their second component, we can talk about the compatibility of the following system of equations:

$$\begin{cases} p_{11}\ p_{21} = p_1, \\ p_{1i}\ p_{2j} = p_n, \\ p_{11}\ p_{2j} = p_r, \\ p_{1i}\ p_{21} = p_s, \end{cases}$$

where $r, s \in \{2, 3, \dots, n-1\}$.

Multiplying the left and right parts of the first and second, as well as the third and fourth equations in the system and comparing the obtained equations with each other, we obtain the compatibility condition of the system:

$$p_1\ p_n = p_r\ p_s, \quad r, s \in \{2, 3, \dots, n-1\}.$$

This condition is far from being satisfied for all fixed nonzero p_i, $i = 1, 2, \dots, n$ which proves the above statement.

It is known that the set of non-negative integers can be decomposed as follows, Vinogradov (1952):

$$\mathbf{Z}_0^+ = \{0, 1\} \cup \mathbf{P} \cup \left\{ p^e : p \in \mathbf{P}, e \in \mathbf{N}_{>1} \right\} \cup$$

$$\cup \left\{ \Pi_{i=1}^n\ p_i^{e_i} : p_i \in \mathbf{P}, e_i \in \mathbf{N}, i = 1, 2, \dots, n,\ n \in \mathbf{N}_{>1} \right\},$$

where $\mathbf{P} = \{ 2, 3, 5, 7, 11, 13, \dots \}$ – many prime numbers,

$\mathbf{N} = \mathbf{Z}^+$ – many natural (positive integer) numbers,

$\mathbf{N}_{>1} = \mathbf{N} \setminus \{1\}$ – - many natural numbers, large units.

Using this partition and the previously proved statement, many risks can be represented as follows:

$$\mathsf{R} = \{\varnothing\} \cup \mathsf{R}^{\#1} \cup \bigcup_{p \in \mathbf{P}} \mathsf{R}^{\#p} \cup \bigcup_{\substack{p \in \mathbf{P}, \\ e \in \mathbf{N}_{>1}}} \left[\left(\mathsf{R}^{\#p} \right)^e \cup \mathsf{R}^{*p^e} \right] \cup$$

$$\cup \bigcup_{n \in \mathbf{N}_{>1}} \bigcup_{\substack{p_i \in \mathbf{P}, \\ e_i \in \mathbf{N}, \\ i = 1, 2, \dots, n}} \left[\prod_{i=1}^n \left(\mathsf{R}^{\#p_i} \right)^{e_i} \cup \mathsf{R}^{*(\Pi_{i=1}^n\ p_i^{e_i})} \right].$$

This characterization of the structure of set of risks is no longer trivial; it contains members that, being in the same equivalence class of factor monoid $\langle \mathsf{R}, \square \rangle / \#\#$, differ significantly from each other in terms of complexity.

Information-Theoretical Analysis of the Components of the Set of Risks

We introduce two special constants. Let H_0 be the informational entropy of the procedure of equiprobable choice of one of the natural numbers, H_1 - the informational entropy of the procedure of equiprobable choice of some real number. Using the constants introduced, one can calculate the

entropy characteristics of the elements of the components of the set of risks R obtained in the framework of a nontrivial partition. These characteristics are shown in table 1.

Table 1: Entropy Characteristics of the Components of Set of Risks

Component number	Partition component	Power of multisets belonging to the component	Informational entropy of the multiset
1	$\{\varnothing\}$	0	0
2	$\mathsf{R}^{\#1}$	1	H_1
3	$\mathsf{R}^{\#p}$	p	$p\,H_1+(p-1)H_1=$ $=(2p-1)H_1$
4	$\prod_{i=1}^{n}\left(\mathsf{R}^{\#p_i}\right)^{e_i}$	$\Pi_{i=1}^{n}\ p_i^{e_i}$	$\Sigma_{i=1}^{n}\left[p_i\,H_1+(p_i-1)H_1+H_0\right]=$ $=n\,H_0+H_1\left(2\Sigma_{i=1}^{n}p_i-n\right)$
5	$\mathsf{R}^{*(\Pi_{i=1}^{n}\ p_i^{e_i})}$	$\Pi_{i=1}^{n}\ p_i^{e_i}$	$H_1\,\Pi_{i=1}^{n}\ p_i^{e_i}+\left(\Pi_{i=1}^{n}\ p_i^{e_i}-1\right)H_1=$ $=\left(2\Pi_{i=1}^{n}\ p_i^{e_i}-1\right)H_1$

It is easy to see that the informational entropy of the elements of the fifth component is greater than the entropy of the elements of the fourth component with equal powers of multisets. The fundamental significance of this difference lies in the ability to explain why sometimes risks of the seemingly same complexity are managed differently: for some risks, it is sometimes easy to find a compensation scheme, for others, it happens that we fail to do that at all. For example, one thing is a retail loan portfolio, papers by Urazaeva (2012, 2013), consisting of 1000 homogeneous agreements (2^{2000} outcomes, complexity $7H_1$), and quite another is an investment project lasting 1 year, when one or several random events occur during each business day, each of which affects the future development of the project (outcomes - at least 240, complexity, as a rule, at least $479H_1$). Another example in this area is the competitive advantages arising from the implementation of the concept of a managed contract, Variash (2005) and Urazaeva (2007) .

Tasks Associated with Building Multiple Risks

At the same time, a large number of works has been devoted to improving the accuracy of measuring risk and reducing the calculating resources. In this case, the following problem is often solved. Knowing the risks of developing individual subsystems, we assess the risk of developing the system as a whole. That is, in fact, we are talking about solving a direct problem. Significant progress in this process has been achieved within the framework of the development of the ATR; the corresponding algorithms are often more accurate and more stable than algorithms that implement, for example, the Monte Carlo method, Borodin (2014).

At the same time, another task is often of interest. We observe the implementation of risk events for the development of the system, accumulate statistics and want to understand: 1) is it possible to explain the behavior of the system as a “black box” by the presence of (independent) subsystems, is it possible to assess the risk of development of each such subsystem (identify the subsystems). In other words, we can talk about the relevance of solving the inverse problem.

Consider the options for setting inverse problems in the ATR, induced by the study of the structure of the risk set.

It was shown above that the factor monoid $\langle \mathsf{R}, \bullet \rangle / \#\#$ is isomorphic to the monoid $\langle \mathbf{Z}_0^+, \times \rangle$, however, this isomorphism does not fully reflect the structure of the universal set of risks R, the nature of the set of risks is more diverse than the nature of countable sets. In particular, already at $k \geq 4$ the family $\mathsf{R}^{\#k}$ already contains elements characterized by different informational entropies, depending on the possibility of representing these elements in the form of products of other elements from R.

The last remark leads to the idea that the possibility of representing the risk of a system as a product of simpler risks means simplifying the study of this system, its decomposition into simpler subsystems. Traditionally, the problem of dividing an element of an algebraic system into a product of other elements of this system is called the *factorization* problem. In the context of the topic under discussion, we can say that risk factorization is the identification of subsystems.

Successively consider a number of options for the formulation of the factorization problem.

1. The simplest statement of the problem of risk factorization: for some risk or its part $\boldsymbol{R} \in \mathsf{R}$, it is necessary to find out the possibility of representing it in the form of a product $\boldsymbol{R} = \prod_{i=1}^{n} \boldsymbol{R}_i^{k_i}$, where $n \geq 2$, $\boldsymbol{R}_i \in \mathsf{R}$, $k_i \in \mathbf{Z}^+$, $i = 1, 2, \ldots, n$, and, if the answer it is so, find this representation. Here $\mathbf{Z}^+$ is a set of natural numbers. In the presence of such a representation, the following (trivial) relation holds for the powers of multisets: $|\boldsymbol{R}| = \prod_{i=1}^{n} |\boldsymbol{R}_i|^{k_i}$.

Using the simplest example, we show that the factorization problem in this formulation is incorrect in the sense of ambiguity of the solution.

Let the mapping $c: \mathbf{R} \to \mathbf{R}$ be given by the correspondence $c: s \mapsto s + x_c$, $x_c \in \mathbf{R}$. Consider for this case the product of two risks with two outcomes in each:

$$\{1*(x_1, p_1), 1*(x_2, p_2)\} \circ \{1*(y_1, q_1), 1*(y_2, q_2)\} =$$

$$= \{1*(x_1 + y_1, p_1 q_1), 1*(x_1 + y_2, p_1 q_2), \{1*(x_2 + y_1, p_2 q_1), 1*(x_2 + y_2, p_2 q_2)\}$$

and another product:

$$\{1*(x_1 + z, r p_1), 1*(x_2 + z, r p_2)\} \circ \left\{1*\left(y_1 - z, \frac{q_1}{r}\right), 1*\left(y_2 - z, \frac{q_2}{r}\right)\right\} =$$

$$= \left\{1*\left(x_1 + z + y_1 - z, \frac{r p_1 q_1}{r}\right), 1*\left(x_1 + z + y_2 - z, \frac{r p_1 q_2}{r}\right)\right.$$

$$\left. 1*\left(x_2 + z + y_1 - z, \frac{r p_2 q_1}{r}\right), 1*\left(x_2 + z + y_2 - z, \frac{r p_2 q_2}{r}\right)\right\} =$$

$$= \{1*(x_1 + y_1, p_1 q_1), 1*(x_1 + y_2, p_1 q_2), \{1*(x_2 + y_1, p_2 q_1), 1*(x_2 + y_2, p_2 q_2)\},$$

where $z \neq 0$ and $r \neq 1$. Note that the right-hand sides of these relations coincide. In other words, factorization of the result is possible only up to two constants z and r.

2. From a probability-theoretic point of view, structurally different risks can be indistinguishable. To describe this situation, following the monograph by Urazayeva (2013), we introduce the concept of a congruence of indistinguishability. We introduce a map $\mathcal{K}: \mathcal{P} \to \mathcal{P}^1$ where

$$\mathcal{P}^1 = \left\{ \boldsymbol{R} : \boldsymbol{R} \in \mathcal{P},\ \forall x \left(x \in \operatorname{Supp} \boldsymbol{R} \right) \left(k_{\boldsymbol{R}}(x) = 1 \right) \right\}.$$

We define the mapping $\mathcal{K}$ as follows:

$$\mathcal{K}(\boldsymbol{R}) \underset{Def}{=} \left\{ 1 * \left(\mathcal{C} \sum_{\substack{x \in \operatorname{Supp} \boldsymbol{R}, \\ \operatorname{pr}_C x = \mathcal{C}}} k_{\boldsymbol{R}}(x) \operatorname{pr}_{\mathbf{I}} x \right) : \mathcal{C} \in \bigcup_{x \in \operatorname{Supp} \boldsymbol{R}} \left\{ \operatorname{pr}_C x \right\} \right\}.$$

Using the map $\mathcal{K}$, we introduce a congruence of indistinguishability k as follows:

$$\boldsymbol{R}_1 \, k \, \boldsymbol{R}_2 \underset{Def}{\Leftrightarrow} \mathcal{K}(\boldsymbol{R}_1) = \mathcal{K}(\boldsymbol{R}_2),\ \boldsymbol{R}_1, \boldsymbol{R}_2 \in \mathcal{P}.$$

In practice, there are also situations when some outcomes are realized with zero probability, otherwise, these outcomes are not observable. To formalize this situation, we introduce a congruence of significance, Urazaeva (2017). We introduce the mapping $\mathcal{S}: \mathcal{P} \to \mathcal{P}_{>0}$ where

$$\mathcal{P}_{>0} = \left\{ \boldsymbol{R} \in \mathcal{P} : \forall x \left(x \in \operatorname{Supp} \boldsymbol{R} \right) \left(\operatorname{pr}_{\mathbf{I}} x > 0 \right) \right\}.$$

We define the mapping $\mathcal{S}$ as follows:

$$\mathcal{S}(\boldsymbol{R}) \underset{Def}{=} \left\{ k_{\boldsymbol{R}}(x) * x : \operatorname{pr}_{\mathbf{I}} x > 0,\ x \in \operatorname{Supp} \boldsymbol{R} \right\}.$$

We determine the congruence s of significance using the mapping $\mathcal{S}$:

$$\boldsymbol{R}_1 \, s \, \boldsymbol{R}_2 \underset{Def}{\Leftrightarrow} \mathcal{S}(\boldsymbol{R}_1) = \mathcal{S}(\boldsymbol{R}_2).$$

Now we can formulate the factorization problem in an extended statement: for some risk or its part $\boldsymbol{R} \in \mathcal{P}$, we can find out the possibility of the inclusion $\prod_{i=1}^{n} \boldsymbol{R}_i^{k_i} \in \boldsymbol{R}a$, where $n \geq 2$, $\boldsymbol{R}_i \in \mathcal{P}$, $k_i \in \mathbf{Z}^+$, $i = 1, 2, \ldots, n$, $a \in \{k, s, k \times s\}$, and, with a positive answer to this question, find options for the left side of this inclusion.

3. The solution of the factorization problem in the second statement in the general case is ambiguous not only parametrically, but also structurally. To reduce structural ambiguity, we introduce a functional of information risk entropy $H: \mathcal{P} \to \mathcal{H}$, where $\mathcal{H}$ is a linearly ordered set of possible values of entropy in the model, a set endowed with the structure of an addition semigroup. Now we can reformulate the previous statement of the problem as follows:

$$< n^*,\ \boldsymbol{R}_i^*, k_i^*, i = 1, 2, \ldots, n^* > \ = \underset{\prod_{i=1}^{n} \boldsymbol{R}_i^{k_i} \in \boldsymbol{R}a}{\arg\min} \sum_{i=1}^{n} H\left(\boldsymbol{R}_i\right).$$

Asterisks mark the elements of the corresponding sets that deliver the minimum complexity (entropy) of the factorization result.

Research Results and Discussion

Summing up, we note that in this paper we studied the structure of the universal set of abstract risks of the development of discrete systems in the context of the analogy with the factorization of integers. Differences in the risk factorization potential and integers were found within the risk equivalence class and the non-negative integer isomorphic to it. The revealed difference is characterized by the partition of the corresponding equivalence class into two subsets whose elements differ significantly in the value of information entropy. Considering that the use of the entropy risk measure along with the traditional one allows more precise risk management, including in the conditions of incomplete or poor-quality information, Urazaeva (2007), we can talk about the fundamental role of this study for the development of ATR.

As for factorization, it is obvious that in the general case it is a difficult task. So the complexity of solving the problem of factorization of large natural numbers has generated a whole layer of cryptographic primitives, including such a well-known cryptosystem as RSA. The RSA cryptosystem today, more than four decades after its invention, is considered to be a practically stable cryptosystem, and all this is due to the complexity of the corresponding factorization problem, the progress in solving which for the mentioned period was not too significant. At the same time, as was shown in this paper, the risk monoid is isomorphic to the monoid of non-negative integers by multiplication. On the other hand, it is also shown here that, when examined in more detail, the risk monoid has a more complex structure with respect to the monoid of integers. This fact will be complicated or facilitated by the solution of risk factorization problems so far. The answer to this question is also an urgent problem. So far, there are no ideas for solving the risk factorization problem in the general case for the second and third statements. The development of the factorization algorithm in the first formulation is currently carried out by the authors of this article. Good prospects are visible in solving this problem.

In general, there is a certain interest in factorization problems in statements similar to those given not only in the field of computational risk theory. These are, for example, applications of mathematical physics, Maslov and Chebotarev (1999), and Chebotarev (1999), as well as problems of the theory of queuing systems, Borovkov (1972).

Conclusion

All the results presented in this article are new. Novelty is determined by the absence of studies in the open world literature similar to the development of the ATR in the monograph by Urazayeva (2013), which, in turn, served as the basis for this work.

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System of State Support for Agricultural Producers in Conditions of Digital Agriculture. Russian and Foreign Experience of Agriculture Digitalization

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Abstract

The aim of this work is to identify opportunities for digital transformation in the agro-industrial complex on the basis of state support. The research was based on the works of both domestic and foreign scientists on the theoretical and practical aspects of state support for digitalization of the agro-industrial complex, as well as official statistics and documents characterizing state and targeted programs for agricultural development. The methodology of the work was the dialectical method of cognition and a systematic approach. In the process of research, such general scientific methods and techniques as scientific abstraction, analysis and synthesis, grouping methods, and comparisons were used. This paper presents the main directions of financial support for agricultural organizations in Russia and foreign countries, and also analyzes the allocated support in foreign countries. The authors also reveal some issues of the application of digital economy technologies in the agricultural sectors of Russia. The digital backwardness of the country is emphasized, which creates significant barriers to the digitalization of individual sectors of the economy. The work also focuses on the informatization of agriculture in the context of the digital transformation of the economy. Analysis of statistical data over recent years allows us to conclude that the most positive results in this matter have been achieved in the Central, Ural and North Caucasus Federal Districts. To strengthen the positive results in the development of the agro-industrial complex, constant state support for the innovative development of agricultural producers in the Volga, Siberian, and North-West federal districts is necessary. To date, the necessity of providing state aid to agricultural producers is still very acute. In modern economic conditions, the key to sustainable development of an agricultural

enterprise is its optimal financial support. State support is an integral part of the system of state regulation of all sectors of the agricultural sector.
The factors hindering the development of digitalization in agriculture are highlighted. The directions of increasing the competitiveness of agriculture on the basis of its digitalization are formulated. The main parameters that determine the fate of digital innovation in agriculture are determined.

Keywords*:* Government Support, Agriculture, Digital Agriculture, Digitalization.

Introduction

A significant part of the costs of supporting agricultural producers is consolidated by the activities of the State Program for the Development of Agriculture and the regulation of agricultural products, raw materials and food markets for 2013-2020.

The implementation of the program involves the achievement of the following goals: ensuring the security of the Russian Federation, taking into account the territorial and economic affordability of agricultural products; a significant increase in the produced value added in the agro-industrial complex; growth in agricultural exports; increase in physical volume of investments in fixed assets of agriculture. The main target indicators in achieving these goals are the following (table 1).

Materials and Methods

As noted above, targeted programs have been implemented to manage budget expenditures in the agricultural sector for a long period of time. In the Russian Federation, a mechanism has been developed for direct state support of agricultural producers through subsidies and aimed at reducing the cost of agricultural products.

Table 1: Target indicators for the development of agriculture and markets for agricultural products, raw materials and food for 2018-2020

Name	2018	2019	2020
Agricultural production index (compared to 2015),%	99,4	107-109	109-111
Produced value added in agriculture, billion rubles	3600-3750	3750-3890	3890-4050
Growth rate of exports of agricultural products (compared to 2015),%	117-123	125-128	132-133
Index of physical volume of investments in fixed assets of agriculture (compared to 2015), %	111	111-112	111-113
The amount of household cash (on average per 1 household member per month), rubles.	17 100-17 450	17 460-17 800	17 900-18 300

Source: compiled by the author according to Rosstat.

Thus, the development of agriculture and agricultural markets is characterized by 5 target indicators, the value of which should increase by 2020.

The instruments of state financial support may include price regulation of the agricultural market and targeted subsidies, as well as soft loans and various kinds of compensation payments.

Agriculture is a branch of the economy aimed at providing the population with food and obtaining raw materials for a number of industries. The agricultural sector is one of the most important,

represented in almost all countries. In order for this industry to occupy a worthy position in our country, comprehensive state support is needed.

In the Russian Federation, state support is aimed at: the allocation of subsidies to agricultural producers, the formation and development of the structure of the agro-industrial complex and rural development.

Here is an analysis of the statistics provided by the Federal State Statistics Service. I would like to note that the volume of agricultural production of all agricultural producers in current prices during the period from January-September 2019 is 4098.7 billion rubles.

According to the Ministry of Agriculture of Russia, 118.8 million tons of all categories of grain were threshed in farms (in the initial weight), which is 7.1% more than in 2018. The number of cattle in farms of all agricultural producers amounted to 18.8 million heads, which is 0.5% less than the previous year, including cows - 8.0 million, pigs - 25.7 million, sheep and goats - 24.2 million, poultry - 560.8 million heads. Household farms accounted for 41.5% of the livestock, 11.0% of pigs, 46.1% of sheep and goats (at the end of September 2018 - respectively 41.7%, 12.2%, 46.9%). These indicators show us a large increase in indicators of agricultural production sectors in the Russian Federation thanks to the help from the state. Indices of agricultural production for 2017 and 2018 are shown in Figure 1.

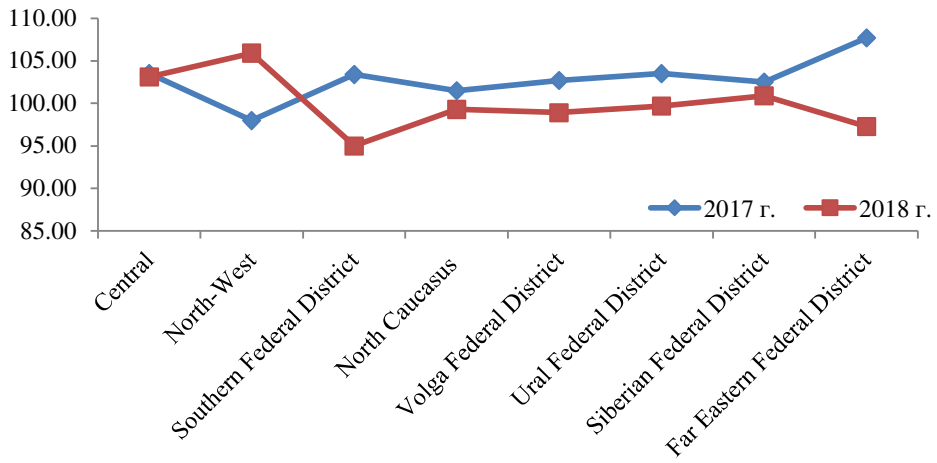

Figure 1: Index of agricultural production in the Russian Federation for 2017 and 2018.

Source: compiled by the author according to Rosstat.

We should not forget the volume of Russia's GDP, which for the II quarter of 2019 amounted to 26,188.0 billion rubles in current prices. The index of its physical volume relative to the II quarter of 2018 was 100.9%. The dynamics of GDP production over 5 years is shown in Figure 2.

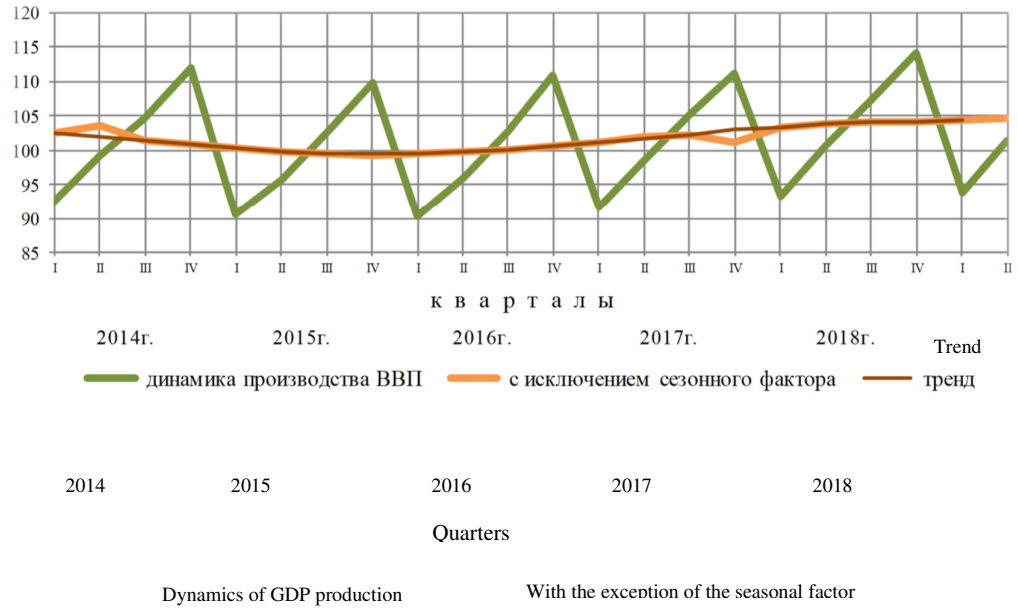

Figure 2: Dynamics of GDP production in % of the value of the conditional average quarter (1/4 of the nominal value of GDP for 2016)

Source: compiled by the author according to Rosstat with the exception of seasonal and calendar factors

Research Results and Discussion

Agriculture and its business entities occupy a special position in the conditions of market relations and cannot equally participate in intersectoral competition. According to various estimates of specialists, only due to price disparity, more than 250 billion rubles of financial resources are withdrawn annually from agriculture. This once again suggests that without special attention from the state many problems of modern agriculture cannot be resolved, and first of all, ensuring the food sovereignty of the state.

According to table 2, it is clear that the funds transferred to agricultural from the federal budget for the period under review in the Russian Federation increased by 11.2% or by 17 224.8 million rubles. and in the reporting period amounted to more than 170 million rubles. A significant increase in the structure of the constituent entities of the Russian Federation by means of state support to agricultural producers falls on the Central Federal District and amounts to 12.3% or 6657.6 million rubles. The least state support allocated to agricultural organizations falls on the Siberian Federal District and amounts to 1.3% of increase or 190.3 thousand rubles.

Table 2 : Amount transferred to agricultural producers from the federal budget, million rubles

Entities	2016	2017	2018	Deviations (+,-)	Growth rate
Central F.O.	54 028,2	52 642,9	60 685,80	6 657,6	112,3
North-West F.O.	8 874,1	8 152,7	9 364,50	490,4	105,5
Southern F.O.	16 966,5	14 390,0	18 406,30	1 439,8	108,5
North Caucasus F.O.	12 733,0	14 765,6	15 197,80	2 464,8	119,4
Volga F.O.	35 051,1	29 425,1	35 521,90	470,8	101,3
Ural F.O.	7 177,1	5 839,7	10 482,30	3 305,2	146,1
Siberian F.O.	14 833,8	13 295,1	15 024,10	190,3	101,3
Far Eastern F.O.	3 695,7	3 634,7	5 901,70	2 206,0	159,7
Total for the Russian Federation	153 359,5	142 145,9	170 584,40	17 224,87	111,2

Source: compiled by the author according to the Ministry of Agriculture of the Russian Federation

Let us analyze the state support in the Russian Federation and foreign countries. In foreign countries, an indirect form of state support predominates, in which it is possible to solve a whole range of problems of the industry and even society as a whole.

Table 2: Directions of state support for agriculture of foreign countries

The country	Direction of state support
Germany	Concessional lending for the implementation of specialized technologies in production. Cooperation is common among small farmers. The state provides for the provision of financial assistance and tax benefits. Indirect measures are taken to expand cooperation in the agricultural sector.
Austria	Agricultural investment loan and special agricultural loan. Tax incentives for calculating income tax.
France	Concessional lending is used for technical modernization, as well as for the purpose of increasing soil fertility
Great Britain	Benefits and subsidies are received through commercial banks.
Sweden	Income tax benefits Established incentives for investment growth.
USA	Direct financing of the production of the most necessary and significant agricultural products. Preferential targeted lending to the activities of industry entities. The system of lending to farmers. Stimulating the production of high-quality agricultural products. Protecting the interests of agricultural producers in the foreign market. Modernization and increase of technical equipment of production.
China	Targeted subsidies. Tax exemptions. Financing infrastructure projects and scientific activities in this industry. Concessional lending. Price regulation.
Italy	Credit cooperation system.
Spain	Agricultural insurance system.

	Subsidies and other mechanisms of state intervention in the framework of the pan-European agrarian policy are crucial for buffering the variability of prices for agricultural products.
Denmark	The state provides guarantees to farmers for their loans and soft loans to young farmers who have acquired their own farm.
Greece	Tax incentives, according to which agricultural producers are generally exempt from taxation.
Australia	Support is provided to compensate for losses caused by natural or man-made factors.

Source: compiled by the author based on an analysis of information from electronic sources.

Discussion

A significant difference between the foreign experience and the domestic one is the practice of interaction between state bodies and commercial structures, such as banks, insurance organizations, which allows expanding the possibilities of obtaining financial assistance by manufacturers, and also helps to attract private capital and public funds for the development of the industry.

Today the world does not stand still, and with it the economy is trying to move forward. In order to reduce the lag in labor productivity, crop yield and other indicators behind the countries with traditionally developed agriculture, Russian Federation pays more and more attention to the development of government support measures in terms of stimulating the development of digital technologies in the agricultural sector. The introduction of modern technologies in the agro-industrial complex was approved at the government level. The Ministry of Agriculture of the Russian Federation not only developed the concept, but also approved the departmental project "Digital Agriculture" as part of the segment development program until 2024.

The introduction of digital technologies in agriculture implies not only pilot technologies and other technologies of industrial modernization, but also integration and multi-layered forms of cooperation.

In Russia, the digitalization of the agro-industrial complex has already been made a priority at the national level.

As noted in the Digital Agriculture project itself, this platform will build work and provide a system of access to information about the counterparty, and this, in turn, will allow for prompt verification of enterprises to address serious issues such as financing of this organization, lending and insurance [6].

We agree with this goal of the project, because the development of agricultural organizations in both regions and organizations of the country as a whole, first of all, should be based on state financial support, which will strengthen their work, increase efficiency and solve the most important financial problems. We believe that, in turn, the effect of the introduction of digital technologies will create a data stream for creating end-to-end chains from agricultural production to consumption with integration into related sectors of the digital economy.

One of the main objectives of this project is to increase the effectiveness of government support measures in stimulating the digitalization of the agro-industrial economy by identifying and analyzing problems and conditions that hamper the development of digital technologies in the agro-industrial complex of the studied subject of the Russian Federation, as well as determining the main and most promising digital technologies from the perspective of agricultural producers [6].

When considering the term "digital economy", in the narrow sense, an economy based on digital technologies and including the sphere of electronic goods and services is considered. An expanded understanding of the digital economy, according to the Doctor of Technical Sciences of the Russian Academy of Sciences R. Meshcheryakov, is "economic production and the use of information and communication technologies", thus, covering all areas of activity.

Just recently, vehicle control panels, high-performance monitors, speed controllers, and automatically-controlled transport platforms were the focus of attention. Today, customer attention is shifting to artificial intelligence and machine learning solutions. The use of digital algorithms in mobile software for processing aerial photographs, scanned images is in demand.
Modern technologies allow agricultural producers to optimize resources, get larger crops and reduce costs. Thus, accurate fertilizer application along with sowing gives an economic effect of up to 30%, and the differential systems of plant protection application save millions of rubles.

V. Maslova, N. Zaruk, K. Fuchs and M. Avdeev note in their work that inorder to increase the level of production and the competitiveness of grain and its processed products in the EAEU countries, it is necessary to develop and introduce high-quality seed production, to introduce more intensively new low-cost technologies, improve price relations in the grain market, provide state support to the grain subcomplex, harmonize internal requirements for grain quality with the requirements of foreign producers, expand the export of flour and products of deep processing of grain, to develop internal and external infrastructure, and to improve the transport and logistics system of the grain market in the long term. We agree with the authors, because these factors are the key to successful production and achieving results with high profits and high-quality products. [7].

Usenko L.N. and Kholodov O.A. distinguish world leaders in this field, such as the USA, China, South Korea, Singapore, Germany, Sweden. At the same time, they note BGG's analytics on the global digital economy in the world, which will reach $ 16 trillion by 2035. Note that today the share of the digital economy of US GDP exceeds 10.9%, in Europe it amounts to 5.0% [8]. The share of the digital economy in the GDP of individual countries is shown in Table 3. Further digitalization, according to McKinsey analysts, can provide from 19.0 to 34.0% of Russia's GDP growth, and the share of the digital economy can be 8.0-10.0% GDP of the country.

Table 3 : The share of the digital economy in the GDP of individual countries as to 2017

	Digital Economy Indicators					
Countries	**Private consumption in the digital environment**	**Business investment in the digital economy**	**Government spending on the digital economy**	**Export control**	**Import control**	**The size of the digital economy**
USA	5,3	5,0	1,3	1,4	-2,1	10,9
China	4,8	1,8	0,4	5,8	-2,7	10,0
Great Britain, Germany, Italy, Sweden (average)	3,7	3,9	1,0	2,5	-2,9	8,2
India	3,2	2,7	0,6	5,9	-6,1	6,3
Brazil	2,7	3,6	0,8	0,1	-1,0	6,2
Czech	2,2	2,0	0,5	2,9	-2,1	5,5
Russia	2,6	2,2	0,5	0,5	-1,8	3,9

Source: developed on the basis of research materials.

We would like to understand what technologies are being applied today in Russian and foreign agriculture.

In South Korea, the experience of “smart animal husbandry” is developing with the help of biocompatible sensors that are mounted on animals and collect accurate data on their physiological condition. Spain can be a good example of robotic automatic harvesting technology. Dropcopter technologies have already been launched in the United States to disperse pollen into various crops (almonds, apple trees, cherries, pears). About 70% of rice in Japan is also “protected” by drones, and the amount of plant protection products is declining. Some manufacturers claim that the use of

agrodrons in combination with spot spray technology can reduce the volume of chemicals by 95% [2].
Harvest CROO Robotics (USA) is very close to launching its automated strawberry picker Berry 5 (B5). Neither a driver nor a garden tractor is required for the pick-up robot to move the machine along the landings.

We should also mention LindsayCorp in the United States, which has teamed up with TheClimateCorp (Bayer's digital farming ecosystem) to create an interface and exchange data. Information about accurate monitoring of irrigation, as well as data visualization will be available to general users. In Norway, the YaraWaterSolution network for irrigation planning is particularly interesting. The company's platform is based on water sensors that measure the smallest changes in the turgor pressure of a plant leaf, which is described as the plant's "blood pressure". Data is processed and visualized on the MyYara "contact portal". Then, the platform develops sound and specific recommendations for irrigation, which are offered to customers in an easily accessible form through web software [3].

In Canada, Semios has set up their automated, remotely controlled sensor networks for monitoring and treating plant diseases, identifying pathogenic insects on garden and nursery crops using laser technology. And FFRobotics in Israel is known as the developer of the already patented robotic fruit picker, which is due to appear on the US market in 2020. The robot provides a 10-times increase in fruit picking. This season, the system is being tested in the apple orchards in Washington [3].

To increase profitable agricultural business, Indian companies create their own special applications and programs. One of them is IFFCO Kisan-AgricultureApp, which is considered the most popular application for the farming community, a kind of assistant to the Indian farmer to make informed decisions by referring to individual agricultural information (latest prices on the local market, weather forecasts, agricultural advice, tips for the best practices related to agriculture, livestock, horticulture, as well as all government news related to agriculture) [2].

In China, a new technology has been developed, or rather, a device that is smaller than a conventional mobile phone, when you hover over the leaves, it shows how much nitrogen, phosphorus, potassium, chlorophyll, water and other elements are present in the plant, which allows you to accurately determine its condition. Then, these data are stored for subsequent analysis, comparison and forecasting [2].

We want to note that the European Commission unveiled a plan for transforming pan-European science and innovation policy for 2021–2027, presenting a new format for the seven-year framework program (FP) of the EU, called "HorizonEurope"*, and a number of related programs. One of the most important areas of the "HorizonEurope" is the formation of a European innovation "ecosystem" by expanding support for innovation [1].

In his speech at DATAGRI 2018, the forum on promoting digital transformation in the agri-food sector, held in Cordoba, EU Commissioner for Agriculture Phil Hogan said that we need to enhance the use of digital technologies in the agricultural sector, because the problems that crop producers face today are huge: they are asked to produce more and better products using fewer resources, and they should reduce the environmental footprint of production. In addition to changing consumer requirements, farmers will have to face climate change and price fluctuations in world markets [1].

Consider the Russian experience of agriculture digitalization. Today, Russia is part of a group of active followers, but continues to lag behind the leaders. The share of the digital economy in Russia today, according to various estimates, ranges from 2.0 to 4.0% of the country's GDP. In Bashkortostan, entrepreneurs decided to increase the productivity of the agricultural complex through automated control systems. They equipped part of the plantings with modern fog devices that create the best conditions for plant growth. The automated system independently regulates the humidity in greenhouse plantings according to sensors that respond to the rate of evaporation from the leaves. A sensor also controls field irrigation system, which starts working approximately once every six hours.

It should be noted that the technological level of agricultural enterprises of the Tomsk Region and the production culture achieved in the dairy complexes of the Tomsk Region were highly appreciated. "Smart greenhouse", built by the Zhigalevs farm in the Tomsk region, where strawberries grow all year round, all production processes are automated, energy-saving lighting and heating systems are used.

The introduction of digital solutions is a growth point for the agro-industrial complex, which helps to increase efficiency at different stages of the agricultural sector and reduce the impact of the human factor. The Krasnokamsk mechanical repair plant, which is part of the Rosspetsmash Association, is a good example. It has combined its innovative developments of forage harvesting machines assigning KRMZ Innovation brand to them. Using the GPRS or LoRaWan wireless protocol, online monitoring of the operation of the machines, the quality of the future fodder and the work of the operators can be carried out, as well as indicators affecting the quality of the prepared fodder and the efficiency of the operator can be evaluated. The data on the fodder are shown in your personal account in the form of tables, diagrams and graphs.

“Altaiskie Zakroma” Agroholding is also moving into the digital future. At the Novoelovskaya poultry farm, which is part of its structure, all stages of production, starting from fodder supply to climate control in the poultry houses, are monitored online (Smart Farm system).

In the Nizhny Novgorod open-field vegetable growing, the development of digital technologies began later, but is becoming increasingly important. Agrofirma Vesna,OOO (growing sugar beets and legumes, producing sugar) says that they first equipped all the equipment with geolocation sensors, formed a monitoring service, purchased servers, software for working with geodata, compiled electronic field maps and conducted agrochemical soil analysis. This year, they plan to introduce production software in order to make all operational and technological processes digital, form plans for the placement of crops and technological operations using electronic field maps, see the status of production stages online, record deviations and promptly make adjustments [15].

Food storage and processing has its own high-tech features. Thus, the MTS group has developed a project to increase the efficiency of vegetable stores - such a case of digital transformation is presented on the site of the Digital Economy ANO and was used in the Kirov region [15].

The implementation of the digitalization program of the economy can be an impetus for the implementation of future technologies, such as virtual and additional reality, robots, drones and artificial intelligence. Suppose an audit of the land fund using unmanned aerial vehicles. Using drones, enterprises can save on tax and rent payments. There will be an opportunity to use differentiated fertilizer application, which implies monitoring the territory: while the enterprise receives an index of vegetation and soil heterogeneity zones and forms a fertilizer application rate based on the current nitrogen content in the foliage. Another area is the differential application of plant protection products. Here we are talking about processing only areas with infected plants and weeds.

We have identified factors that impede the formation of a digital economy in agriculture, which are divided into external and internal (Table 4).

Table 4 : Factors Constraining the Development of Digitalization in Agriculture

External factors	Intrinsic factors		
	Production	**Economic**	**Factors due to the economic activities of the enterprise**
- natural and biological basis of agriculture; - deficiencies in legal regulation; - underdeveloped infrastructure providing the promotion and implementation of digital technologies; - underdevelopment of the digital technology market; - lack of financial support from the state (for example, difficulties in obtaining state subsidies for the introduction of digital precision farming technologies).	- difficulties in predicting the final results due to high production risks in agricultural production; - uncertainty of the timing of the implementation of digital technologies; - the dependence of the production process on natural and biological factors.	- uneven formation of stocks of own financial assets; - high cost; - duration of the payback period of digital technologies; - lack of information on sales markets; - presence of economic risks; - low consumer demand for digital technologies in agriculture.	- lack of qualified personnel; - lack of opportunities to attract investors, scientific organizations.

Source: compiled by the author based on studies

The main external factor is the low level of allocated state support for the implementation of digitalization. We believe that these factors should not be the case, agricultural organizations need to organize their work properly, and, above all, to work on the development of the concept of digital agriculture. As a solution to this problem, it can be proposed to establish interaction between the state and organizations, which will allow to obtain relevant information about the organization. The information collected will help to solve a number of issues, including those that allow optimal selection of a combination of state support measures.

Based on the analysis of the opinions of representatives of the agricultural business, the authors formulated a number of typical industry problems that can be solved by system digital solutions, including platform ones.

These problems are:

- duplication of industry reporting collected by state bodies;
- lack of systematization of economic indicators and the provision of open data needed by agribusiness;
- lack of a systematic base of digital solutions for agribusiness of domestic and foreign developers;
- underdeveloped infrastructure for the transmission of data collected by agricultural machines and units with telemetry equipment, etc.

Modern agribusiness feels the need to consolidate efforts with the state to determine the overall industry digitalization strategy and priorities, while giving preference to domestic solutions, therefore, an important part of agricultural digitalization at the state level is the creation of state-wide platforms for integrating industry information.

The development of the concept of a digital platform for agriculture, including the formation of target processes and mechanisms implemented by the platform, as well as the conceptual requirements for the platform for agricultural activities, should, in our opinion, include the following processes:

- development of regulations for the transfer of monitoring results and analytical information on agricultural resource facilities and products from the digital platform to the regional governing

bodies of the agro-industrial complex of the constituent entities of the Russian Federation for accounting, monitoring and analysis at the regional level;

- development of regulations for interagency cooperation (including the Ministry of Agriculture of Russia, Ministry of Economic Development of Russia, Rosreestr, Roscosmos, Roshydromet, etc.) for data transmission to a digital platform for the purpose of subsequent accounting, monitoring, analysis;

- development of options for integrated digital products for agricultural producers, including the best combination of government support measures for commercial agricultural services (financial, insurance, leasing, service, educational, consulting), and procedures for their transfer to agribusiness.

In order to stimulate the filling of the platform with data, it is necessary to develop measures of state support for agricultural producers in terms of subsidizing the transfer of data on resource objects (agricultural land, livestock, agricultural machinery), raw materials and finished products that can be sent to the platform through digital products and technologies.

The implementation of the presented functionality of the agricultural digital platform will contribute to the solution of the following tasks:

- Integration of the agricultural digital platform at the federal level with regional and municipal;
- Providing state support to agricultural producers through a single digital platform;
- Digitization and placement in the agricultural digital platform of all data on resource objects, agricultural raw materials and finished products.

The digitalization of agriculture will contribute to its development in such key areas as technical and technological improvement, economic growth, increasing environmental friendliness and human resources and, as a result, increasing the competitiveness of agriculture (Figure 3).

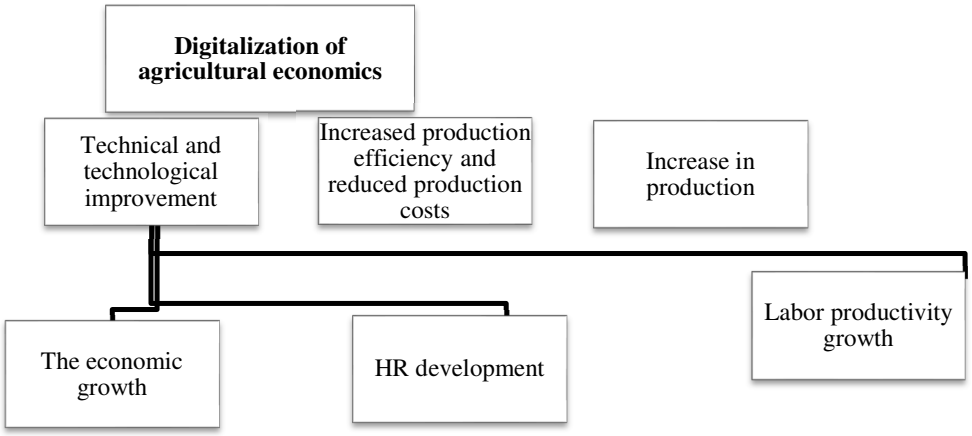

Figure 3: Directions for improving the competitiveness of agriculture based on its digitalization
Source: compiled by the author based on studies

The open question remains how to make new digital developments reach the agricultural producers. In this regard, it is proposed to intensify government support for the introduction and use of digital technologies in agricultural production.

To do this, it makes sense to concentrate more on stimulating agricultural producers, to apply digital innovations without stopping the work on the invention and the creation of these technologies.

State support should be divided into two areas. The first should relate to the production of those types of products for which the threshold level of self-sufficiency in the country has already been achieved

(grain, sunflower, poultry, etc.). Here the emphasis needs to be placed on the reorientation of the manufacturer from the modernization of existing technical and technological means of production to the use of digitalization elements based on the expansion of foreign trade and export activities.

The second direction should concern the production of agricultural products for which there is no minimum sufficient value to ensure food independence. In this case, you need to focus on the domestic market and carry out parallel development of modernization of existing production facilities and digitalization.
More and more new digital solutions are being created for the agricultural business. Some of them are widespread, others "stop working" at the stage of pilot trials. Many people want to know what information innovations take root in agricultural organizations? We conducted a study in which five key parameters were determined that determine the fate of digital innovation in agriculture. These parameters are presented in Figure 4.

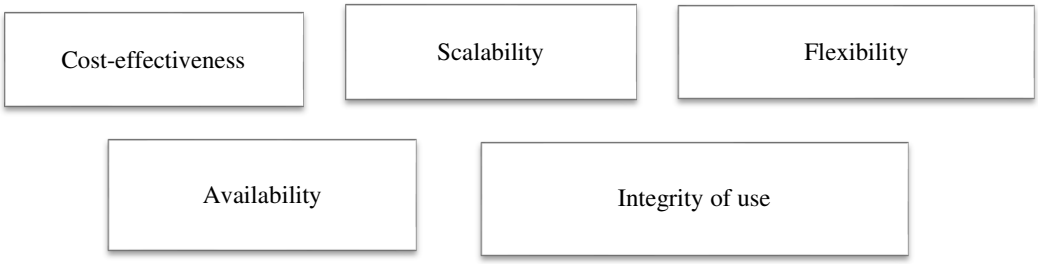

Figure 4: Key Features of Digital Innovations Affecting Their Distribution

Source: compiled by the author based on studies

The first factor determining the fate of any innovation is economic. If the new solution does not bring economic profit, it will eventually stop working. Any digital solution in agriculture should provide optimal productivity and maximum profitability for the producer. A digital solution will be successful if it is able to work effectively for many thousands of users who have simultaneously approached it with a wide range of requests in a wide geographical applicationt, so scalability is the second factor affecting the fate of innovations.

Flexibility is a term often used only in software development, in agriculture it needs a detailed definition, which should be built into the solution technology. This allows you to quickly find solutions based on already completed work: seeded crops, field characteristics and growing conditions. The fourth characteristic of an effective digital solution is accessibility. Agriculture, like no other market, needs solutions that will take into account the remoteness of the farm, the limited communication methods. Therefore, digital platforms for agriculture should be able to work in the cloud, as well as in limited local work conditions.

The ultimate feature of a viable solution is usability. Each digital solution for agriculture is a "digital double" of all real processes of growing plants and animals, as well as farm management processes. The user interface should be as simple and complete as possible.

As noted in their works, O. Frolova, V. Makarychev, N. Yashkova, l. Kornilova, A. Akimov: "The digital economy plays an important role in assessing the food security of the region. We believe that digital technology will contribute to:

- optimization of the logistics of supplies of raw materials;
- optimizing the composition of the raw material zone of the region according to predefined criteria;
- calculation of the necessary internal volume of food production, taking into account the population of the region and its gender composition;

- getting ahead of the required volume of production of raw materials in the region, as well as the need for resources for its production (sown area, livestock, livestock, agricultural machinery and labor), based on planned labor productivity.

We agree with the opinion of these authors and believe that to implement all plans for the future, starting with the digital transformation of Russian agriculture, it is necessary to create a sustainable business model that would facilitate the widespread use of digital technologies at all levels of the agricultural sector [12, p. 8].
We will answer the main question: how do we introduce digital technologies in the economy? Is there a support program at the moment? And here is the answer. Literally at the beginning of the new year 2020, the Innovation Support Fund began selecting applications for the Development program as part of the federal projects Infrastructure Information and Digital Technologies of the national program Digital Economy, the Fund's website reported.

The Development Program is aimed at supporting developed enterprises that have a positive business reputation and experience in selling high-tech products on the market, but feel the need for additional R&D to improve work efficiency by diversifying the developed types of products, creating and developing new sales markets.

The goal of this program is to accelerate the technological development of the Russian Federation, increase the number of companies implementing technological innovations, create and implement end-to-end digital technologies based on domestic developments.

This competition "Development - Digital Technologies" was launched on 13.01.2020 and is aimed at supporting small businesses that implement innovative projects to develop new types of high technology products in order to ensure the accelerated implementation of digital technologies.

The projects are selected in the areas of end-to-end digital technologies:
1. artificial intelligence;
2. virtual and augmented reality technologies;
3. new production technologies;
4. Internet of things;
5. robotics and sensorics;
6. 5G communication technology;
7. satellite communications;
8. distributed registry systems;
9. quantum computing;
10. quantum communications;
11. quantum sensorics and metrology.

It should be noted that the main parameters of support provided by the Foundation for the Promotion of Innovation under the Development Program are grants of up to 20 million rubles; extrabudgetary co-financing (at the expense of own or borrowed funds) - at least 30% of the grant amount, and one should not forget about the term of R&D - no more than 23 months.

Small enterprises that do not have unfinished grant agreements with the Innovation Assistance Fund can take part in the competition. Priority is given to projects with a large amount of extrabudgetary funds and a large planned revenue. Based on the results of the fulfillment of the contract, the grant recipient must file an application for registration of the results of intellectual activity abroad in accordance with the agreement on patent cooperation.

Conclusion

In the medium term, the strategic goal of the development of agricultural production should be the digital transformation of the industrial and economic relations of business entities through the use of a wide ICT sector.

The introduction of digital solutions is a growth point for the agro-industrial complex. They help to increase efficiency at different stages of the work of agricultural enterprises and reduce the influence of the human factor. Small farms and large agricultural holdings, both in Russia and in other countries, are interested in them.

Digitalization is beginning to come to the agricultural sector and is one of the main vectors of its development. The challenge facing the industry, and the challanges for developers, and most importantly, specialists who are involved in putting the developments into practice, is how they will be integrated. Such integration is impossible without the involvement of artificial intelligence, the systematization of large databases, since their volumes are growing exponentially. At the same time, we hope that in the near future many farmers in our country will be able to use the potential of digitalization to achieve conditions for sustainable economic growth in agricultural production.

For the introduction of digital technologies, there is state support for individuals and leading companies, which provides a digital transformation of priority sectors of the economy and social sphere by stimulating the development of end-to-end technologies, technological solutions and products based on them. Among these technologies are artificial intelligence, robotics and sensor components, quantum technologies, distributed registry systems, wireless technologies, new manufacturing technologies, virtual and augmented reality technologies.

Still, one of the main tasks of the state today is to make agriculture “smart” and technologically advanced. Advanced technologies and market developments and everything related to remote sensing of the earth, the use of drones, both air and ground, is a digitalization of the management and improvement of agriculture.

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The Development of The Agricultural Innovation System as A Factor in Increasing the Efficiency of The Agro-Industrial Complex

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Abstract

The article discusses theoretical and methodological approaches to the formation and development of an innovative agricultural system. Based on the analysis of theories of innovations, the authors clarify the essence of innovations and innovative systems, prove the need for a transition to innovative systems, taking into account current global trends and internal contradictions in the economic environment. The features of the process of formation of an innovative agricultural system as a result of transformation of the agro-industrial complex in the context of transition to an export-oriented economy are disclosed. A methodology based on an assessment of the institutional component of an innovative agricultural system is proposed. Based on the analysis of innovative development indicators, the influence of the level of the institutional component on the innovative activity of agricultural organizations in Russia is proved. The authors reveal the reasons for the low innovation activity in the agricultural sector and, on this basis, propose a system of measures and tools aimed at supporting and stimulating innovation in the agricultural sector.

Keywords: innovation, innovative agricultural system, food security.

Introduction

In the context of globalization and the ever-increasing influence of geopolitical processes, national economies need to reach a new level of development, which allows them to advantageously position themselves in the global economic space.

It is known that the competitiveness of the country as a whole will depend on the competitiveness of industries. Increasing competitiveness of the agricultural sector will not only meet the needs for food products, but also ensure the growth of efficiency of the entire agricultural sector.

The Doctrine of Food Security of the Russian Federation, approved by Decree of the President of the Russian Federation No. 20 of 01/21/2020 speaks about national interests of the state, including "... the creation of a highly productive sector in agriculture, developing on the basis of modern technologies and provided by scientists and highly qualified specialists."

The agro-industrial complex is closely connected with many sectors of economy and food security depends on its state. The formation of a highly competitive agricultural sector directly depends on the development of innovation in the agricultural sector. However, most of the scientific developments are unclaimed due to various reasons. The development of scientific results is proceeding at a slow pace in view of the lack of demand from farmers, there are gaps in legal support of innovations and their promotion in production, issues of legal regulation of intellectual property require improvement.

One of the problems of growing competitiveness of Russian agro-industrial complex is the export-raw model of economy of our country. This model has now outlived itself and slows down the progressive development of the country's economic system. At the present stage of development of economic relations, new approaches to ensuring economic growth are necessary, based on scientific, technological and innovative components.

Innovative food security systems are most promising. Most foreign countries made transition from extensive development paths to intensive innovative models back in the 90s of the XXth century. Through innovation not only food security is ensured, but also up to 90% of economic growth in agricultural production. Domestic experience indicates that a significant part of innovation, as before, enters the country from abroad. Economic sanctions call into question further interaction with foreign partners.

In this regard, the formation of the conceptual foundations of the study of innovative agricultural systems in order to increase the competitiveness of the country's agriculture is of particular importance. The analysis of the world experience in the development of innovative systems and the possibilities of using highly efficient models of innovative systems in Russian conditions is essential. Based on the foregoing, there is an essential need to generalize approaches and clarify the theoretical and methodological aspects of formation and development of the domestic agricultural innovation system.

Materials and Methods

The study was jointly attended by teachers and staff of Cheboksary Cooperative Institute and Chuvash State Agricultural Academy. The scientific problem was studied by use of available information resources, including electronic library networks, information and reference systems, official websites of state authorities of the Russian Federation, Rosstat (Russian Statistical Agency), HSE (Russian Higher School of Economics) research results, expert assessments and author developments. The objects of research are the elements and arising within the agrarian innovation system relations, the methodology for assessing its formation and development for the purpose of ensuring food security. In the process of research, the methodology of dialectical development, system analysis, methods of statistical, comparative analysis, analogies, rating estimates, methods of economic and mathematical modeling were used.

Research Results and Discussion

In modern conditions, it is impossible to carry out innovative activities based on a fragmented formal approach. The effectiveness of investment sphere will depend on the development of the innovation environment and investment climate.

The balanced development of innovative agricultural systems dictates the need for theoretical and methodological substantiation of formation of the national agricultural innovation system, which would contribute to sustainable economic growth and food security.

In the process of development of the innovation theory various approaches to the management of the innovation process in the foreign works of such authors as K. Aures (2004), K. Watanabe (2000) Itskovich (2000), L. Leydesdorf (2000), B. Lundvall (1992), Metcalf (1995), R. Nelson (1993), C. Freeman, (1995), K. Fakuda) (2000), I. Schumpeter (1948) were proposed.

The concept "innovation system" was first proposed by K. Freeman in 1987 when describing the economic growth of Japanese economy in the post-war period "... a national innovation system should be understood as a network of public and private sector institutions, whose activity, as well as joint work is aimed at creation, import, modification and diffusion of new technologies." In the works of K. Freeman the emphasis is on the institutional aspect of innovation.

What is important in our opinion is the conclusion that the institutions that make up the innovation system include not only the organizations where research is conducted, but also the way in which resources are managed at the level of both organizations and at the national level. The author formulated theories on technological revolutions, in which innovation leads to a change in the technological base of society and also empirically proved the influence of the main exogenous and endogenous factors on the development of national innovation systems.

R. Nelson concludes that market regulators in the mechanism of state innovation policy have the greatest effect. At the same time, the national aspect requires an individual targeted approach to the mechanism of state regulation, which in turn leads to the idea of only general laws that can be universally applied to achieve economic goals.

The focus of B. Lundwall` theory is on the relationship between producers and consumers of new knowledge and technologies. B. Lundwall is the developer of the systemic aspect of the concept of innovative systems. Elements of the system are formed together, consciously and spontaneously in order to achieve the effect.

In the XXI century. innovation is viewed from the perspective of the ecosystem approach.

Russian scientist Golichenko O.G. believes that a national innovation system is a combination of state private and public organizations and the mechanisms of their interaction within which activities are carried out to create, store and disseminate new knowledge and technologies.

Ivanova N.A. in her writings gives the following definition: "A national innovation system is a set of interconnected organizations engaged in the production and commercialization of scientific knowledge and technologies within national borders. At the same time, it is a complex of institutions of a legal, financial and social nature, ensuring innovative processes and having strong national roots, traditions, political and cultural features "[17].

Thus, an innovation system is a set of interconnected institutional structures working independently and in collaboration in order to ensure innovative processes taking into account national characteristics.

The need for development of the agricultural sector based on innovation is explained by the following reasons:

- globalization of economy;
- market stimulation of agricultural development;
- involvement of private sector in the processes of generation, diffusion and application of knowledge, information and technology;
- significant impact of biotechnology on agricultural production and processing systems;
- changes in the environment, climate change, degradation of ecosystems;
- transformation of the agro-industrial complex and creation of export-oriented agricultural economy.

The World Bank defines an innovative agricultural system as "a network of organizations, enterprises, individuals whose activities and interactions are focused on the implementation of new products, new processes and new forms of organization in economic practice in conjunction with institutions and policies that affect their behavior and performance efficiency. "

Derunova E.A. believes that the innovative regional agrosystem at the same time possesses the features of an innovation system and the specific characteristics of agricultural production. Consequently, the innovative agricultural system is an element of the national innovation system and a logical stage in the transformation of the Russian agricultural sector.

In our opinion, the elements of the agrarian innovation system, taking into account the conditions of a market economy, should include:

- a subsystem of knowledge generation, education and training (universities, research organizations, institutes, colleges, research funds);
- a subsystem of entrepreneurship and production of products, services (manufacturers of products, supply sectors, processing and transport organizations);
- a subsystem of technological infrastructure, the transfer of scientific knowledge and best practices (innovation entrepreneurship support centers, business incubators, consulting engineering firms, information centers, implementation services);
- a subsystem of innovative infrastructure (banks, financial, credit institutions, marketing and transport communications, etc.);
- demand subsystem (markets, consumers of products and raw materials);
- a management subsystem (regulatory unit, management and regulation unit that possesses a mechanism for integrating all subsystems and elements of an agricultural innovation system).

The principles of formation of agricultural innovation systems are:
- priority of the innovative scenario for the development of the agricultural sector;
- partnership between stakeholders, integration of science, education, production;
- taking into account regional features in agricultural innovations;
- improving management quality;
- elements of an innovation system are not only scientific research, but also social, human, financial and other resources available to society;
- organizations are called upon to show flexibility, interact in partnership, provide assistance, resolve conflicts, etc.

The methodology for formation of an agrarian innovation system includes such factors as:
- institutions involved in the transformation of the agricultural sector into an agricultural innovation system;
- causes, effects, and patterns of innovation processes in the formation of an agrarian innovation system based on their analysis and evaluation;
- evaluation of innovative models.

We will evaluate the innovative development of the domestic agro-industrial complex by analyzing the dynamics of indicators of innovative activity as well as investment, innovative and production potential of the agro-industrial complex.

To understand the general trend, we will conduct a comparative analysis of innovation activity in Russia and Western Europe.

Table 1: Indicators of the dynamics of the share of innovative goods, works, services in the total volume of goods shipped, work performed, services of Russia and European countries for 2007-2018,%

Country	2007	2013	2018	2018 (+,-) to	
				2007	2013
Russia	4,6	9,2	6,5	1,9	-2,7
Great Britain	8,5	14,1	15,5	7,0	1,4
Germany	19,2	13,0	14,0	-5,2	1,0
France	13,0	1,5	9,9	-3,1	8,4

The proportion of innovative products in Russia is noticeably inferior to that of Western Europe. Compared to 2007, in 2018 an increase of 1.9% is observed in the Russian Federation, however, compared with 2013 a decrease of 2.7% is observed.

In the UK in 2018 compared with 2007, there was an increase of 7.0%, in Germany and France a decrease of 5.2 and 3.1%, respectively. In 2018 compared with 2013, in all foreign countries the share of innovative goods, works, services increased by 1.4; 1.0 and 8.4% respectively.

Table 2: Dynamics of indicators of innovation in industrial production and in agriculture of the Russian Federation for 2016-2018

Indicators	2016	2017	2018	2018 (+,-) to	
				2016	2017
The proportion of organizations implementing technological innovations, in the total number of organizations, %					
- industrial production	9,2	9,6	9,4	0,2	-0,2
- agriculture	3,4	3,1	3,2	-0,2	0,1
The volume of innovative goods, works, services, million rubles at current prices:					
- industrial production	3723693,4	3403055,2	3693061,6	-30631,5	290006,4
- agriculture	22222,9	28446,0	33829,1	11606,2	5383,1
The proportion of innovative goods, works, services in the total volume of goods shipped, work performed, services,%					
- industrial production	8,4	6,7	6,0	-2,4	-0,7
- agriculture	1,4	1,8	1,9	0,5	0,1
Costs of technological innovation, million rubles					

- industrial production	777518,6	848045,9	886785,8	109267,2	38739,9
-agriculture	14963,3	15806,0	21960,5	6997,2	6154,5

Agriculture is characterized by a fairly low innovation activity, the share of organizations implementing technical innovations is only 3.2%, which is 0.2% lower than in 2016 and a slight increase of 0.1% is observed compared to 2017. Innovative products in agriculture is only 1.9%, the growth compared to 2016 is only 0.5% and compared to 2017 an increase of 0.1%. The costs of technological innovations in 2017 increased, but insignificantly and remained almost at the level of 2016, in 2018 the increase amounted to 6154.5 million rubles.

At the next stage, it is advisable to evaluate indicators of the innovative potential of the agrarian innovation system.

Table 3 : The dynamics of indicators of the investment potential of the agricultural sector of the Russian Federation for 2016-2018. [14.24]

Indicators	2016	2017	2018	2018, % to	
				2016	2017
State support for agriculture under the State Program for the Development of Agriculture, million rubles	295928	257529	249504	84,3	96,88
Investments in fixed assets aimed at development of agriculture, billion rubles	511	434	474,8	92,92	109,4
Costs of technological innovation, million rubles	14963,3	15806,0	21960,5	146,76	138,94

The amount of state support for the agro-industrial complex reduced throughout the analyzed period. So, in 2018 compared with 2016 the decrease was 15.7%, compared with 2017 by 3.22%.

Investments in fixed assets aimed at development of agriculture in 2018 compared to 2016 decreased by 7.18% and amounted to 474.8 billion rubles compared with 2017, an increase of 9.4% is noted. The costs of technological innovation increase throughout the analyzed period, namely by 46.76 and 38.94%

Table 4: Indicators of dynamics of innovative potential of the Russian Federation for 2016-2018

Indicator	2016	2017	2018	2018 , % to	
				2016	2017
The number of personnel engaged in innovative work, people	722291	707887	682541	94,5	96,4
Costs of technological innovation, billion rubles	1284,6	1405,0	1472,8	114,7	104,83
Number of organizations performing research, pcs.	4032	3944	3950	97,97	100,2

Despite the increase in technological innovation costs in 2018 compared with 2016 by 14.7%, compared with 2017 by 4.83%, the number of personnel engaged in innovative development has a steady downward trend. So in 2018 compared with 2016 the reduction in the number of employees amounted to 5.5%, compared to 2017- 3.6%.

The number of research organizations decreased in 2018 compared with 2016 by 2.03%, compared with 2017 a slight increase was noted at the level of 0.2%.

Table 5 : The dynamics of indicators of production potential and demand for innovation in agriculture of the Russian Federation [14,24]

Indicators	2016	2017	2018	2018 (+,-) to	
				2016	2017
The share of innovative products in agriculture in the total volume of goods shipped, work performed, services,%	1,4	1,8	1,9	0,4	0,1
Created varieties and hybrids of agricultural crops	356	369	---	13	---
New technology developed	258	256	---	-2	---
New food items developed	192	188		-4	---
Number of patents received	738	729	---	-9	---

Despite a slight increase in the share of innovative products in 2018 by 0.4% compared to 2016 and 0.1% compared to 2017, in general, there is a decrease in the production potential and demand for innovation in agriculture. Innovation potential remains low, despite rising costs of technological innovation. Further development of the agro-industrial complex is possible only on condition of effective mechanisms to stimulate innovative activity in the agricultural sector.

Conclusion

At present, the development of an agrarian innovation system is carried out under conditions of a sufficiently high level of scientific potential of the agro-industrial complex and low productivity of scientific activity against the background of a declining innovation activity of the bulk of agricultural producers. The reasons for low innovation activity are the lack of a systematic approach to the development of innovations, insufficient state financing of an innovation process, violation of proportions of inter-institutional interaction and high risks in the development and implementation of innovations.

Table 6 presents the directions of support and stimulation of innovation in the agricultural sector.

Table 6 : Directions for the development of innovation in the agricultural sector

Direction	Instruments	Result
1. State support for innovation in the agricultural sector	- program-targeted stimulation; - competitive basis for the implementation of projects; - preferential lending; - government insurance subsidies	- increase in profitability of investments; - minimizing the risks of project activities; - improving financial stability, solvency and innovative returns
2. Stimulating the process of knowledge generation, education and the commercialization of innovations in the agricultural sector	- organization of integrated scientific, educational and production structures, technological platforms; - motivational tools to support agricultural producers; - involvement of agricultural producers in the formation of programs of information and	- formation of a research base; - revenue growth from the sale of innovative products; - development of integration; - competent staff

	consultation centers; - high-quality training and retraining of personnel capable of working in conditions of intensified innovation	
3. Stimulating consumer demand	- conducting mass presentations, demonstrations, exhibitions, fairs of innovative products; - improving product quality due to new technologies, reducing costs and increasing labor productivity	- increase in the share of innovative products; - increasing the competitiveness of agricultural products% - formation of relations with innovative consulting and technical centers
4.Stimulating sales and expanding markets for innovative agricultural products.	- new product channels; - distribution networks; - formation of clusters	- growth in sales; - increase in market share; - increased demand for innovative products

The priorities for the development of an agricultural innovation system will be:

1) development of the agro-industrial complex, taking into account the directions of the state's innovative policy and the needs of the region;
2) development of agricultural science and education;
3) optimization of resources for the development of agribusiness;

Institutional factors should stimulate innovative activity, innovative activity of enterprises, it is necessary to improve the mechanism of state support, focused on the systematic implementation of domestic innovative solutions.

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The Socio-Economic Ideal in The Context of The Value Priorities of The National Culture

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Abstract

The article considers the problem of the correlation interaction of value orientations of the social ideal with the imperatives of the economic sphere of social reproduction. Awareness of the social ideal by society is nothing more than an awareness of the path of one's own civilizational development in general and of the methods of economic production as well. Potential opportunities and models of social ideals are projected onto a complex of methods of economic interaction. The economic ideal is a spiritual-worldview category and is recognized by society as an image of truth, goodness, culture. The economic system is a special sociocultural phenomenon, which on the one hand is organizationally included in the spiritual and moral potential of society, and on the other hand, it is initially influenced by its cultural priorities.

Keywords: socio-economic ideal; economic person; economic paradigm.

Introduction

Understanding the problems of organizing the economic system of social life cannot claim to be complete without addressing the problem of man. It is quite obvious that in scientific, strictly economic doctrines, a person is considered as a consumer of goods and services and the creator of goods and services, as well as the whole variety of material and spiritual elements of national and global wealth. However, the analysis of a person in anonymous form, only from the standpoint of the mechanical functioning of the economic system, has led to insurmountable obstacles in understanding the organization of people's activities in the economic sphere. Understanding the functioning of the economic system must be enriched by its study in the axiological and spiritual-anthropological aspect.

In this regard, it seems urgently necessary to consider the spiritual and value aspect of economic activity. A person as a subject of economic activity should be analyzed at the following levels:

- firstly, reproductive, revealing the importance of economic phenomena in the reproduction of man as a person and an equal member of society, which in turn allows us to determine the value of economic relations in the organization of the social system as a whole;
- secondly, on the ethnocultural one, which allows one to determine the ethnic specificity of the content of its economic motives, the hierarchy of cultural values (and economic values as well). A person is a special system that defines production activity as the initial basis for the construction of harmonious social relations, the achievement of which is directly related to the level of development of a complex of spiritual qualities, mental foundations, the degree of humanization of the system of scientific, industrial, state and political organization.

Methodological Framework

The methodological basis of the study was made by the principles of universal communication, systemicity, historicism, a comprehensive examination of the subject of research, a socio-anthropological approach, and a structural-functional method. The empirical base of the study was information borrowed from economic theory, history, social psychology.

Discussions

The production of material goods, determining the objective premise of the constitutionalization of economic relations, is also a form of production of the subject of economic activity. Economic activity from the standpoint of man, as a subject of social relations, acts as a form of production precisely of human life in all its rich content. Considering a person as a subject of economic relations, it is imperative to take into account the fact that the individual acts not only directly in economic relations, but in the totality of relations that arise in society at each stage of its development. Economic activity acts as a system for transforming the surrounding material, subject and social environment, which entails the need to determine the forms of economic life of the individual, as well as the place and role of various social phenomena acting within the framework of the socio-economic system.

Like any scientific model, the model of the person-subject of economic relations is built on abstraction, idealization, simplification. It must be agreed that the effectiveness of any model design to explain the phenomenon as a whole is limited. It includes only the main parameters characterizing the individual, and, first of all, the motives that stimulate the activity of his economic life, goals, and the methods used to achieve the goals. Economic theory considers a person through the prism of his functions in the process of creating, distributing and using material and wealth in conditions of limited resources, the possibility of an alternative system of production and distribution, etc. The model of man in economic science proceeds from the primacy of satisfying, first of all, his material needs (level of consumption), leaving natural, social and spiritual needs secondary roles. That is why the model of "economic man" is characterized by one-sidedness, since there are many other areas of public life in which a person has the opportunity to show his qualities (Mazhikeyev A., Edwards T.H., Rizov M. 2015).

In the great variety of approaches to creating a model of the subject of economic relations, three main approaches can be distinguished. The criterion for dividing can be the level of abstracting the essential characteristics of the model from the variety of individual, personal qualities of a person. Conventionally, the first direction may be represented by the English classical school. The basis of this direction is the idea of an economic person, as a product formed by the desire to multiply their own economic resources on the basis of increasing the efficiency of their activities. Monetary interest is the main motive for the activity of an economic person. Within the framework of this model, an individual formulates his behavior in such a way as to maximize the usefulness of his own actions, to extract the maximum possible result (primarily cash income). The behavior of an individual is determined by a rationalistic attitude towards achieving his goal at minimal cost under conditions of objectively limited opportunities. A rationalized economic person, in the classical model, acts as a person who is able to determine value priorities and work out ways to achieve them in an acceptable

way. Naturally, to implement a rational model of behavior, an individual must have certain abilities, freedom of action. The contradiction between the possible and the desired is the main condition determining the form of realization of rational behavior.

The following types of rational economic behavior are distinguished: full, limited, and organic rationality. Complete rationality presupposes the absolute triumph of the "cold" mind over ethical and aesthetic experience, achieving maximum results with absolute minimization of costs. The model of complete rationality assumes the unlimited possibilities for the implementation of rationalistic attitudes.

The concept of limited rationality comes from a more realistic attitude about the limited possibilities of man. When making business decisions, a person is objectively unable to use all the information available on a given problem, which is related to the inability to get full access to it. The imprint of the difficulties of analysis, and the limited cognitive resources of the person himself. The economic person in this concept proceeds from the opportunities available to him, he strives to maximize utility, but only within the limits of the level available to him.

Organic rationality states the existence and special role in the system of economic activity of various kinds of behavioral attitudes that an economic person follows. The theory of organic rationality suggests that in the process of economic interaction the rational activity of a person - the subject of economic relations is determined by formal and informal rules of behavior. Fear of breaking established stereotypes makes people act in accordance with tradition even when they do not consciously seek to rationalize their behavior. Conversely, the correspondence of the behavior model to group attitudes is characterized as rational.

The next direction is a product of understanding the place and role of man in the Keynesian school's economic system. The basis of this direction was the awareness of the limited motivational resource of economic activity. For example, it is an oversimplification to reduce the incentives of economic activity only to multiplying a monetary resource. D.R. Keynes as a stimulator of economic activity also notes the needs of a social, spiritual nature, including group ethics, habits, traditions. In such conditions, the achievement of goals by business entities through the implementation of the mechanism of free competition is not possible. In general, the Keynesian model of economic man is close to the concept of organic rationality (Mikova N., Eichhammer W., Pfluger B. 2019).

Another direction is represented by the interpretation of an economic person as a carrier of diverse, constantly changing needs, from the desire to improve the quality of life, to the need for freedom of expression through the implementation of economic activities. This model assumes a dynamic society based on pluralistic principles, with a high level of social mobility, suggesting the possibility of a free transition from one social group to another. Making his choice in a world of limited resources, a person in any economic system seeks to minimize costs and maximize benefits. The universality of this principle allowed G. Becker to formulate the theory of "economic imperialism", the essence of which is the application of the principles of economic rationality to analyze the lives of people outside the economic sphere.

The presented models of an economic person make it possible in an extremely general form to reflect the main characteristics inherent in human behavior in the process of implementing economic activity. Activities in the economic sphere in particular, and in general, as a kind of human activity, always acts as a social product, being a form of reproduction and development of the subject, a form of satisfying needs. The dialectics of the objective and subjective in the process of production of material values (economic activity) is manifested in the social property of the produced values and in the personal properties of their producer. Personal qualities are manifested in the process of creation, and in the emotional attitude to reality, and in its creative transformation. Moreover, both the organizers and managers of production and the direct producers act as the active subject of production relations.

Results

The concept of production we cultivate as the reproduction of not only a system of things, but also of a person, provides the basis for characterizing economic activity and as a form of meeting the needs of a higher order. Successful economic activity can satisfy the needs of a social and spiritual nature. The difference in the system of value priorities of social communities is the basis of pluralism of forms and methods of solving economic problems. The effectiveness of the economic system is directly determined by the level of acceptance by its subjects of economic activity, the degree of positively assessed changes. The ability of certain things to satisfy the needs of a person must be realized by him. An emotional assessment of economic phenomena is based on the correspondence of the phenomena of economic life to public ideas about an ideal economic system. The socio-economic ideal is a unity of the ultimate goals (values) and ways to achieve them, including the form of ownership and the form of organization of the economic system, and the way of distribution of benefits, etc.

Ideas about the ideal form the oldest element of the social worldview. In the scientific community, the term "ideal" means the following: "An ideal is what constitutes the highest goal of activity, aspiration, the perfect embodiment of something." The undisputed authority in the study of this problem is I. Kant, who speaks of the ideal as a state of perfection achieved, which we presented today. It cannot be practically realized in reality. In human material activity, the ideal acts as an a priori understood "regulatory principle". Fichte claims: "We know that ideals cannot exist in the real world, we only argue that they should judge reality and the latter is changed by those who feel within themselves the strength for this" (Moriconi S., Peri G. 2019).

By socio-economic social ideal, we understand the idea of a certain institution that is perfect and desirable for the whole society to organize production, distribution and consumption, material wealth, and create a type of existence on this basis. The socio-economic ideal is a kind of projection of social needs, in which there is no place for everything insignificant, unstable, random. The economic ideal is that image of perfect production and consumption of material values, which, from the point of view of the majority of members of a social group, is most consistent with their ideas of higher justice. The social ideal as a whole seems to be a multifaceted phenomenon, in this case it is right to speak of relatively independent economic, political, moral, aesthetic ideals. It should be noted that each of them does not exist in isolation from each other, but represents peculiar forms of manifestation of a single social ideal. The economic ideal captures the characteristics of production relations and productive forces, reflects the need for society to improve the economic structure of society, all aspects of its organization, all manifestations of its life. The idea of a perfect economic system is that social ideal that stimulates the progressive development of the economy, inspires people to realize their desired future (Agnello L., Fazio G., Sousa R.M. 2016).

The socio-economic ideal certainly carries with it the significance of the moral ideal, since it is based on public opinion and includes a positive moral assessment of the ideas about the desired order of economic relations and ties in this society. This gives the economic ideal a serious transformative moral force. Ideas about the ideal are influenced by constant moods, feelings, desires, various kinds of fantasies, dreams, etc. The ideas developed by the mentality are formed into a special formula of the ideal, the components of which are all kinds of value preferences, priorities, multiplied by a constantly stable emotional psychological condition. The solution of the question of the economic social ideal should be determined by the general, of course, recognized values of the phenomenon under consideration. We have in mind the idea of society about the ideal, which regardless of time and socio-economic situation is always the same, and the pursuit of which is the truth and the meaning of the existence of the national community as a whole.

Awareness of the social ideal by society is nothing more than an awareness of the path of one's own civilizational development as a whole and the methods of economic production as well. The social ideal, as a form of manifestation of the collective spirit, is the value core of the social worldview, which determines the strategic guidelines of the social and spiritual existence of society. Without an idea of collective ideals, a person will be unable to realize his own social identification, to determine

the direction of his development. In our opinion, the main idea on which the ideas about the national social economic ideal in the social spaces of Eurasia are based is the idea of social justice. It is in economic relations within the collective that justice acts as an appraisal phenomenon, an all-encompassing measure of retribution or moral claims against the results and methods of economic activity. Achieving justice is an essential component of the collectivist aspect in the spiritual Russian tradition, which, in fact, is based on national ideas about freedom (will and justice). Justice, in the understanding of the Eurasians, seems to be a materialization in the social relations of the biblical formulas of retribution - “to each his own” and “to each and every reward”. Moreover, justice is not perceived as a ready-made system of measures, acts, regulations, actions. They feel it in the fatum of events that contain the practical implementation of the above formulas (Guo H., Bao A., Liu T., Jiapaer G., Ndayisaba F., Jiang L., Kurban A., Maeyer P. 2018).

In the concept of “justice” in Russia they have been investing and are investing in understanding and evaluating events and actions of the individual from the point of view of historically established ideas about the correct order of things, in such an order that corresponds to popular beliefs about the truth. In this regard, the concept of “justice” for Russians is very consonant with the concept of “equality”. The presence of property and legal inequality and, above all, violation of the principle of equitable distribution is perceived by the mass national consciousness as extremely painful. The whole inner nature of the Russian ethnic group initially seeks to overcome any manifestations of this kind, which is reflected in folk tales, legends and songs dedicated to this topic, which expressed the innermost aspirations and dreams of a just social being. In many national fairy tales, one can track the path of people's hope in their spiritual searches and in the belief in the existence of a mythical country of happiness, where all people live in harmony among themselves, based, including on material wealth, which in turn was the result of an equitable distribution of responsibilities on the production of wealth and which is the basis for public well-being. In the national tales of the peoples of Russia, a wonderful, happy, collective consciousness was associated, first of all, with the active life position of a working man. Often, the main characters, despite the presence of magic items, prefer to live on their own natural abilities and labor skills, and use magical power only in the interests of the whole society. The leading characters of national everyday tales are ordinary people living on funds obtained by their own labor, people who, even for big money, do not want to renounce their professional skills that benefit people and respect their countrymen. A man who earns a living by physical labor is endowed in the tales of the peoples of Russia with the right to rejoice for restoring public justice, and has all the qualities necessary for this: resourcefulness, great quick wit, sharpness of mind and language, which helps him overcome the stupidity, greed and nonsense of egoists. The latter are often exposed as lazy people, for which they bear a fair and severe punishment - the loss of authority in society (Ploeg F., Poelhekke S. 2008).

Thus, justice in the Russian mentality was perceived primarily as a social category. “From each according to his abilities and to each according to his merits” - it is in this principle-thesis that the essence of the Russian national idea of social justice is expressed. Undoubtedly, social justice in the national sense is a problem, first of all, socio-economic. At the same time, the content in it of a real spiritual foundation is not in doubt since any violation of the principles of justice is reflected in the moral and spiritual-emotional state of any team. The idea of justice is the connecting spiritual link of a person with other people. Violating its principles, a person rejects the ideals of the collective, and therefore turns out to be spiritually and physically divorced from society (which was especially clearly manifested in the primitive history of mankind). The question of the social ideal is closely connected with the problem of the production of material goods, which, as you know, are created in the process of labor activity. Any work, even the most difficult, was, according to the people, the best way to distract from various vicious and difficult thoughts. Only in labor can a man be able to make happiness, only labor gives him true joy, only labor will provide comfort in grief: “Evil gruin - work will dissipate”, “Friendly work amuses the soul”. In labor, the Russian ethnos saw a means of satisfying its needs, since it is as a result of production activities that the physical, moral, creative and mental strengths of a person are revealed. This effect of labor on the individual is explained by the creative and creative nature of labor. Strength, wisdom, ingenuity, skills and abilities are invested in the material products of labor, the material embodiment of which cannot but please a person, giving him a sense of his own superiority over nature.

The problem of searching for a social ideal becomes especially relevant during periods of people's awareness of the loss of the meaning of their existence, which ceases to be whole and graceful, loses its universally significant goals for the majority of the nation, which in turn threatens the complete destruction of the traditional system of being. Based solely on the national archetype, on popular beliefs about the possibility of a fair socio-economic structure in Russia, the socialist idea managed to take root. In Bolshevik socialism, people have found hope that they will achieve a perfect model of economic structure, an image that meets their existential expectations, in which there is no exploitation of man by man, an unfair distribution of the goods produced, and their inefficient use. The society had the same hopes at the beginning of the reforms of the second half of the 80s of the XX century.

Conclusion and Recommendations

The economic ideal is a spiritual-worldview category and is recognized by society as an image of truth, goodness, culture. Society cannot and should not abstract from those traditional aspirations that in different historical epochs determined the essence of national ideals. The Russian national economic idea should first of all reflect the fundamental values of the national traditions of the economic life of all its peoples, become for them a single consolidating principle, its essence should be the idea of saving and developing the people. The main priorities of this idea should be the idea of collective norms of socio-economic justice. Economic life is an organized system that is the result of the ordered activities of subjects of economic relations, with their conscious activity, with their ability to establish connections between the interacting phenomena of economic reality, to construct a model of their behavior and even in the most general way to foresee the consequences of their actions.

Thus, the economic system is a special sociocultural phenomenon, which on the one hand is organizationally included in the spiritual and moral potential of society, and on the other hand, it is initially influenced by its cultural priorities. Potential opportunities and models of social ideals are projected onto a complex of methods of economic interaction. The large-scale changes experienced by Russia over the past century in all spheres of public life and in the economy in particular, unique in its complexity natural and economic conditions, undoubtedly need to be generalized and theorized. The deconstruction of the Soviet socio-economic system, and the subsequent destruction of the Russian economy, clearly demonstrated the characteristic aspects of real reality, which urgently required a review of the paradigms of economic theories traditional for official science.

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Legal and Organizational Problems of Industrial Development in the Russian Federation

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In modern Russia steps have been taken towards regulating industrial production. However, the development of industrial business in the Russian Federation still faces numerous problems, among which are the following:
- lack of effective financial and credit mechanisms, material and resource support of the industrial sector development;

- gaps in the current legislation;

- complexity of access to business information - information about the product, competitor, etc .;

- unresolved issues arising from protection of the rights of workers employed in industrial business;

- instability of an economic situation in the country;

- dishonesty of big business;

- access to credit resources and a high rate of lending;

- lengthy paperwork, especially on land, etc.

Persons carrying out activities in the industry also note the problem of too high tax rates, the complexity of the tax system, the complexity and imperfection of legislation that registers enterprises that regulate their activities, for example, product certification, licensing and so on. Obstacles to business are called “administrative barriers” [1].

Leaders of industrial companies consider the imperfection of state regulation to be the main problem in doing business.

Many managers of chemical enterprises also note the imperfection of state regulation. Manufacturers are concerned with high electricity tariffs and industry taxes, which negatively affect the industry.

Equipment manufacturers are in need of government funding, subsidies and investments. They, along with enterprises in the chemical industry, consider government funding the most attractive [2].

In our opinion, the law “On Industrial Policy in the Russian Federation” is too general. It lacks specificity both regarding the order of reflecting development priorities of domestic industry and regarding the forms of its support. The disadvantages include the following:

- in the goals and objectives of industrial policy there have nowhere been reflected how the state will specify the priorities of domestic industry development and what, in fact, will be understood as

priorities. This is not even fixed in the basic concepts with which the law operates. In our opinion, these priorities should include individual sectors (intersectoral complexes), as well as forms of territorial organization of the industry, which are designed to ensure the country's competitiveness and dominance in specific foreign markets;

- since the law on the country's industrial policy reflects strategic principles and directions of industrial development, it should be linked to the current legislation in strategic planning. Since July 2014, the RF law "On strategic planning in the Russian Federation" has been in force. It spells out in detail the levels of strategic planning and the types of strategic and program documents developed at each level. The law on industrial policy abounds in inconsistency of those documents, which should reflect the main provisions of industrial policy, to those documents that represent the basis of the strategic planning system in the country. For example, there are no inter-regional (district) strategies and programs for the development of the industry that are specified in the law on strategic planning;

- the law extremely poorly spells out directions, forms and specific mechanisms of state support for industrial development. It is not clear what is considered a priority for the state: providing support to specific industrial entities (enterprises), creating new advanced forms of territorial organization of the industry (clusters, industrial agglomerations, etc.), supporting development of industrial infrastructure or ensuring equal competitive opportunities for industrial entities. As for the latter, the law does not answer the question of whether it is necessary to ensure equal competitive opportunities for all industrial entities (domestic and non-domestic);

- the law does not affect mechanisms of public-private partnership in industrial development. They are largely spelled out in the RF law on PPPs and a number of other legislative acts. But in industrial policy (especially in industries that are strategically important for the country), such mechanisms should take their rightful place, taking into account their specific features;

- the law does not reflect the issues caused by development of national standardization and certification systems in the industry, adaptation to international production standards systems. The competitiveness of domestic industrial products in foreign markets and competitiveness of industrial enterprises themselves largely depend on this.

An important issue in regulating the safe handling of chemical products in the Russian Federation is considered to be inconsistent under the conditions of the legislation in force in this area.

Prior to the CU Agreement entry into force , the conformity of products to sanitary and epidemiological conditions was regulated by Federal Law No. 52 "On the sanitary and epidemiological welfare of the population", according to which the products were allowed to be circulated in accordance to sanitary and epidemiological conclusions or state registration certificates (old type). According to the information currently available on the official website of Rospotrebnadzor, for products that were previously subject to sanitary and epidemiological examination with the issuing sanitary and epidemiological conclusions, but which are now not included in the list of products that must be subject to state registration, documents will also be issued confirming product safety, mainly in the form of declarations of conformity. However, the question of how to draw up such documents remains open.

Another problem of this kind can be disagreements in the classification systems for chemical products existing in the Russian Federation. In Russia today, several conflicting classification systems operate simultaneously. This is due to the fact that the basic norms and rules containing conditions for ensuring safe handling of chemical products are reflected in various departmental regulatory documents: those of Rostekhnadzor, Ministry of Transport, Ministry of Health and Social Development, Ministry of Agriculture, Rosstandart, as well as in a number of federal laws of the Russian Federation, such as: Federal Law No. 7 , Federal Law No. 116 "On Industrial Safety", Federal Law No. 52, etc. It should be noted that absence of a law linking these documents into a single system has led to the fact that some documents of the above departments often duplicate each other or conflict with each other.

The same inconsistency is observed in the land law. The optimal, in our opinion, is considered to be a combination of the current land law provisions for regulating the sale of land and other natural objects in circulation with specific land law and other environmental regulations and restrictions that govern the use of land, other natural resources and environmental protection.

Over the past decade, we have seen rather slow development of Russian legislation in subsoil use. There are many problems, some relate more to economic issues than to jurisprudence, but in general we can say about the absence of a clearly defined concept for the development of legislation in this area.

You can also track two trends in the development of this area: the development of the system of administrative regulation and the development of the system of contractual relations. The administrative legal regime and civil legal regimes of subsoil use are reflected in "On the procedure for licensing subsoil use " and "On production sharing agreements," respectively. These two legislative acts represent two different subsoil use regimes, which speaks of the unresolved problem of choosing the path along which the system of regulation of subsoil use should develop.

Changing the current legislation on a contractual basis can be a way out to solve many of the problems that currently exist.

Currently, interactions in subsoil use are regulated by administrative methods. But the state does not take into account investors` interests and does not assume any obligations. But if we take into account the high risks of the subsoil user, the huge costs, as well as very long payback periods of invested money, there is a clear need for a more flexible approach regarding subsoil users.

A sharp reduction in investment is facilitated by the strengthening of state administrative measures, as well as the depletion of deposits. These reasons can lead to the transition of a number of areas to the category of unprofitable.

The current legislation does not specify the basic principles for the existence of state and municipal property, its role in a market economy, its subjects and objects.

If you pay attention to the regulation of subsoil use in other countries, then the legislation there is based mainly on a contractual basis, which includes a set of rules of business law, which is based on the rules of civil law.

In Russia, in turn, a license for the right to use subsoil is considered an administrative act and the concluded license agreements do not contain mutual consideration of interests of both parties to civil-law interactions. In fact, administrative regulation in subsoil use is fixed in the licensing procedure in the current legislation on subsoil.

Comparing the contractual procedure of relations in mining in foreign countries with the licensing of this activity in the Russian Federation, some experts talk about positive changes in subsoil use, if the contractual procedure is developed instead of the licensed one.

However, one can understand the state's fears regarding the application of the contractual procedure for subsoil use, which may not provide full protection of public interests, which is exacerbated by the lack of legislation for the effective application of a public contract.

In defense of contractual interactions, it can be said that such public contract may contain the same conditions as a license, but interactions between the parties vary significantly. These contracts are used as regulatory tools, which include administrative and legal methods of influence, but at the same time, although with certain restrictions, the principles of contractual relations. For example, in Germany, in accordance with their current legislation, the state requires subsoil users to provide a number of documents, among which there are various plans: mining and industrial activities of an enterprise, two-year plans and others. In addition, it is worth mentioning that in foreign countries there is no administrative regulation.

Foreign market investment may also be facilitated by certain market mechanisms: assignment of subsoil use rights, a pledge that can serve to receive additional loans or additional monetary resources, lease of a subsoil land provided for use, as well as trust management, albeit under state control. This will not only attract investment, but also attract subsoil land to economic turnover.

It is advisable to note that characteristics of contractual relations in mining can be considered solely from the standpoint of the fact that subsoil land cannot be removed from the state ownership. Factors such as the possibility of illegitimate seizure of the user's property, the impossibility to provide judicial protection of non-observed rights, as well as the restoration of such rights, the inability to challenge decisions of state bodies that do not comply with the law, the lack of compensation for damage caused by unlawful actions of state bodies, the absence of penalties regarding officials who did not comply with the current legislation hinder the development of the sector in question.

All these factors lead to the idea of introducing contractual relations into the current legislation, when the contract becomes an instrument for developing conditions agreed by the parties and will be based on the equality of participants in the relations. All these changes will allow large-scale project financing of Russian economy, as well as increase taxation.

However, the contractual procedure for cooperation in mining should contain a number of measures aimed at protecting state interests:

- a competitive way to select subsoil users;

- a clear procurement procedure regulated by law;

- clearly defined parameters for bidders selection, common to all;

- an approved list of possible additional conditions;

- approval of the standard form of the contract, where the boundaries of the site, the duration of the contract, the beginning and the end of work, the procedure for payments, other parameters for the extraction of raw materials, including schedules for extraction and construction of infrastructure, the procedure of completing the production process, conservation and restoration are prescribed [3].

It is also necessary to create specialized state structures, for example, the Ministry of Oil and Gas.

If we talk about the ideal solution to the mentioned shortcomings and problems of the current legislation, then the codification of legislation in all stages of development, production, storage and transportation would be a solution to these problems. It can be proposed to start the changes with a simple one, for example, by amending the current federal law No. 2395-1 "On Subsurface Resources" to define essential conditions for a license to use subsoil resources.

Based on the problem of a deficiency of the current legislation regarding this issue, we propose to supplement Article 12 with the sixth part of the following content: "The essential conditions for a license to use subsoil are: 1) the deadline for the commencement of work (preparation of a technical project, reaching full capacity, submitting geological information to the state examination); 2) forms, terms and conditions of payments for the right to use subsoil; 3) an agreed level of mining; 4) the terms of disposal of the extracted minerals; 5) the conditions for the protection of the subsoil and the environment, the safe conduct of work.

The introduction of these changes will allow subsoil users to clearly understand which license conditions are considered essential and, in addition, this will reduce the risk that the court will be able to interpret the concept of "essential conditions" differently.

As regards the regulation of light industry, the situation in the field of sale of industrial products is characterized by significant volumes of illegally imported products.

Federal Law of July 23, 2013 No. 195-FZ in Articles 81 and 82 of the Code of Criminal Procedure and Articles 29.10 and 32.4 of the Code of Administrative Offenses included rules according to which products of light industry removed from illegitimate sale are subject to destruction.

However, in practice, the implementation of these standards is difficult. In particular, the court decision on destruction of light industry products seized from illegitimate sales must contain information on the products to be destroyed with the indication of OKPD 2 codes. At the same time, the body authorized to reflect and assign the corresponding OKPD 2 codes to the seized from illegitimate sales was not assigned. The bodies that carry out the withdrawal from illegitimate sales of light industry products cannot independently assign the product OKPD codes 2 without conducting additional examinations.

Destruction is one of the most costly components after storing property. However, such products are considered the subject or object of misconduct or crime and must be destroyed. Assigning codes to such products, turning them into state ownership and allocating federal budget funds for the purpose of subsequent destruction is inappropriate.

We propose to attribute the costs of destruction of light industry products removed from the illegitimate sale to the procedural costs. This will allow the most efficient destruction of such products and will help reduce the cost of their storage.

The procedure for the destruction of light industry products seized from illegitimate sales should be regulated by a legislative act of the Government of Russia.

We also propose amendments to the Code of Administrative Offenses regarding the non-use of confiscation of the instrument of implementation or the subject of administrative misconduct as both the main and additional administrative punishment for administrative misconduct.

It is also proposed to exclude from the CAO the provisions on the list of products removed from the illegitimate sale of light industry, which must be destroyed. At the same time, it is proposed to consolidate the duty of a person who is liable to reimburse the costs of administrative misconduct in connection with the destruction of light industry products seized from illegitimate sales.

Also, amendments should be made to the Federal Law “On Customs Regulation in the Russian Federation”, recognizing as invalid the rules of destruction of light industry products confiscated or federalized, providing a simple and understandable procedure for the destruction of light industry products removed from illegitimate sale, which will be established by the Government of Russia.

At the same time, it is proposed to consolidate the duty of a person on whom the responsibility is imposed, to reimburse the procedural costs caused by the destruction of light industry products removed from the illegitimate sale.

At present, the strategic goal of modern Russia development is to achieve the level of economic and social development corresponding to the status of Russia as a leading world power of the 21st century, which occupies leading positions in global economic competition and reliably ensures national security and realization of constitutional rights of citizens. In 2015-2020, Russia should be among the five leading countries in terms of gross domestic product (purchasing power parity).

We will try to assess how the system of proposed measures and industrial policy actions in the main industry documents of the Ministry of Industry and Trade and the Order of the Government of the Russian Federation dated November 17, 2008 No. 1662-r (as amended on September 28, 2018) “On the Concept of Long-Term Socio-Economic Development of the Russian Federation in the period until 2020” is consistent with the goal (hereinafter referred to as Strategy 2020) [4].

Assessing these documents in terms of principles of strategic planning, we would like to note the following:

- the availability of these documents satisfies the principle of the need for planning, since a clearly formulated strategy, with clearly defined goals and developed tools for their achievement reduces uncertainty in industrial development and stimulates commercial activity in this sector of economy;

- non-observance of the principle of unity (according to R. Ackoff - holism) has led to the fact that the planned document Strategy 2020 of a higher level does not correspond in structure to industry documents of a lower level. So, in the development strategy of the aviation industry, developed by the Ministry of Industry and Trade, and Strategy 2020, neither the planning horizon nor the target indicators nor the values of the target indicators coincide;

- the principle of participation that has not been fully implemented, casts doubt on the choice of the target audience for which this strategy has been developed. The civil society, on which the success of the implementation of the goals and objectives will depend, is not familiar with these documents and investors understand the ambiguity and riskiness of these documents, since the country has a very short time to make such radical changes;

- using the principle of continuity, the strategic planning system is gradually expanding its horizons, but, unfortunately, these documents do not adequately reflect the basic conditions for the strategy implementation. Comparison of documents of different years, different in structure, as well as reports of various ministries on the implementation of the strategy does not give a complete picture of the achievement of planned indicators;

- the principle of accuracy is implemented in strategic plans for the development of the industry in the form of goals that are of a qualitative nature, the uncertainty of the external environment and the ambiguity of assessment of the available information increase;

- these strategies also comply with the principle of flexibility, are regularly discussed and adjusted: the Strategy for the socio-economic development of Russia until 2020 was developed in 2006-2007 by the Ministry of Economic Development in accordance with the instruction of the President of the Russian Federation V.V. Putin, in 2011 it was finalized by the Higher School of Economics, the Russian Academy of National Economy and public services.

The developed Strategy 2020 covers many aspects of the country's economic, political, social life, gives a clearer picture of the government's vision of the country development. Many targets of Strategy 2020 are unreasonably optimistic: a twofold increase in GDP, a four-fold increase in labor productivity, a two-fold decrease in the energy intensity of products and all this with a multiple increase in tariffs for energy resources and transportation. Moreover, the concept does not take into account many realities of modern society and its development: deterioration of the quality of education, a decrease of the population, social, political degradation of a society. But the fact that this document can serve as a motivation factor for a new generation, can cause loyalty to modern state power, become the basis for formation and maintenance of political power in the long term, is considered an indisputable fact.

Currently, the following national projects in the field of industry have been approved in the Russian Federation, developed by the Ministry of Industry and Trade of Russia pursuant to Decree of the President of the Russian Federation dated May 7, 2018 No. 204 "On National Goals and Strategic Tasks of the Development of the Russian Federation for the Period until 2024" [5]:

1. The national project "International Cooperation and Export" (approved by the Presidium of the Presidential Council for Strategic Development and National Projects (administrative misconduct act dated December 24, 2018 No. 16), providing for the solution of the following tasks:

- orientation of industrial policy, including the applied state support mechanisms, towards achieving the international competitiveness of Russian products in order to ensure their presence in foreign markets;

- reduction of administrative procedures and barriers in international trade;

- creation of a flexible line of financial instruments for export support (by 2021), including expanded pre-export, export and equity financing, leasing and long-term support measures;

- elimination of logistic restrictions when exporting products using rail, road and sea transport, as well as construction (modernization) of checkpoints across the state border of the Russian Federation;

- creation of a unified system of export promotion institutions, providing for the modernization of trade missions of the Russian Federation abroad;

- formation within the Eurasian Economic Union of common markets for products, services, capital and labor, including final elimination of barriers, restrictions and the abolition of exemptions in economic cooperation, while actively using mechanisms of joint project activities.

2. The national project "Labor Productivity and Support for Employment" (approved by the Presidium of the Presidential Council for Strategic Development and Priority Projects (administrative misconduct act of September 24, 2018, No. 12). It should solve the following tasks:

- stimulating introduction of advanced managerial, organizational and technological solutions to increase labor productivity and modernization of fixed assets, including provision of tax preferences;

- reduction of legislative and administrative restrictions that impede labor productivity growth, as well as replacement of obsolete and unproductive jobs;

- formation of a system of methodological and organizational support for increasing labor productivity in enterprises;

- formation of a training system aimed at teaching the basics of increasing labor productivity, including the use of digital technologies and platform solutions.

In conclusion, the legislative regulation of industrial sphere is considered the most important component of the state economic policy. In our opinion, the question of appropriateness of regulating the industrial development of business entities is especially relevant at the present time, when many Russian enterprises face problems posed by the global nature of modern economy. In this case, government intervention through the adoption of new and improvement of existing legislative acts in the industry will reduce the loss of transition from the use of the old portfolio of resources close to exhaustion, to a new one, the formation of which requires time and serious support from the state.

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Socio-Psychological Support of Students with Disabilities and Persons with Limited Health Capabilities

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Report

The article discusses the main goals, objectives, stages of work at socio-psychological support of students with disabilities and persons with limited health capabilities in higher education institutions. The experience of the Chuvash State Agricultural Academy in the socio-psychological support of students with disabilities and people with limited health capabilities is considered. The article presents research materials on the social adaptation of students with disabilities and with limited health capabilities. It is shown that to improve work with students with disabilities is to create special conditions at higher education institutions. Attention is drawn to the fact that the socio-pedagogical support of students with disabilities and persons with limited health capabilitiesinclude such forms of assistance and other forms of workas described in the plan of socio-psychological support.

Keywords: students with disabilities, limited health capabilities, social adaptation, socio-psychological support.

Introduction

Obtaining higher education for students with disabilities and people with limited health capabilities is an important opportunity to realize themselves in the future. This is primarily material independence, freedom of choice, adequate self-esteem, the formation of important volitional qualities such as stability, endurance, patience.

To date, a study conducted in different regions of the Chuvash Republic showed that only four out of a hundred aged 18 to 30 with disabilities have higher education. An analysis shows thatnot all individuals with disabilities seek to graduate. But those who want to get higher education are hindered by material difficulties, living conditions, limited physical mobility, low self-esteem, fear of society, etc.

Training and education of students with disabilities requires special conditions, specialized training and a high level of professional skill in the socio-psychological training of students of this category. Federal Law No. 273-ФЗ “On Education in the Russian Federation” dated December 29, 2012, Federal Law No. 181-FZ (amended on July 29, 2018) “On the Social Protection of Persons with Disabilities in the Russian Federation” dated November 24, 1995 (amended and added, entered into force on 01.01.2019), the Convention on the Rights of Persons with Disabilities of 2012 solve the problems associated with higher education for students with disabilities and people with limited health capabilities.

Materials and Methods

The object of the study is the process of adaptation through socio-psychological support of students with disabilities and people with limited health capabilities in a university. The methodological basis is empirical research methods, such as observation and research.

Research Results and Discussion

The sample consisted of 10 students with disabilities and limited health capabilities. The research methodology is "Adaptation of students in a university".

During the study an analysis was conducted of the level of adaptation of students with disabilities and limited health capabilities, which revealed a fairly low level of their adaptability, low communicative level which amounts to 40%. In the process of observation we saw a number of problems of adaptation of students with disabilities and limited health capabilities and they are associated with:

-low self-esteem;
- low communicative capabilities;
- low motivation for professional activity;
- sometimes the lack of desire to self-develop.

The Chuvash State Agricultural Academy solves not only a number of these problems but also the problems of organizing inclusive education and creating conditions for higher education for students with disabilities and special needs. After conducting a study the following work is supposed:

- organization of adaptation in higher educational institutions;
- improving the system of education by creating the necessary conditions and teaching faculty to work with students with disabilities and people with limited health capabilities;
- assistance in finding employment;
-organization of social and psychological support for students.

The purpose of the socio-psychological support of students with disabilities and persons with disabilities is to help adapt to the scientific process, to develop an independent personality and to support them socio-psychologically.

To achieve this goal it is necessary to solve the following tasks:

1.To create a welcoming atmosphere that facilitates the establishment of interaction with classmates, teachers.
2. To Help in early adaptation to the educational process.
3. To create conditions for the formation of such volitional qualities as determination, perseverance, discipline, confidence.
4. To identify interests and hobbies of students with disabilities and people with limited health capabilities.
5. To intensify the activities of students with disabilities and persons with limited health capabilitiesin extracurricular activities.
6. To assist curators of study groups in working with people with disabilities and people with limited health capabilities.
Based on these tasks a plan for the socio-psychological support of students with disabilities and persons with limited health capabilities was developed and implemented (Table 1).

Table 1 : The plan of measures of socio-psychological support of students working with people with disabilities for the academic year 2019

№ p/p	Eventtitle	Dates	Location	Numberof participants	Responsible person
1.	Conducting a survey to study the interests of students	January 10, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A.
2.	Round table on Russian Student Day “Tatyana’s Day”	January 25, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A.
3.	Organization and holding of a student conference: “Patriotic education of students of the Chuvash State Agricultural Academy”	February 22, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A.
4.	Organizationofthecelebration "Wide Maslenitsa"	March 6, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A.
5.	Conducting a survey to study the interests of students	January 10, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A.
6.	Conducting a survey to study the interests of students	January 10, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A.
7.	Round table on Russian Student Day “Tatyana’s Day”	January 25, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A.
8.	Organization and holding of a student conference: “Patriotic education of students of the Chuvash State Agricultural Academy”	February 22, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A.
9.	Organizationofthecelebration "Wide Maslenitsa"	March 6, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A.
10.	Training "Behavioral skills at employment"	March 12, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A..
11.	Seminar on the topic: “The list of guarantees for the disabled in the Russian Federation” with the participation of employees of the department of social support for the disabled of the Ministry of Health and Social Development of the Chuvash Republic	March 21, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A.
12.	Training "SuccessStrategy"	April 17, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A.

13.	Conducting a survey to study the interests of students	January 10, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A.
14.	Round table on Russian Student Day “Tatyana’s Day”	January 25, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A.
15.	Organization and holding of a student conference: “Patriotic education of students of the Chuvash State Agricultural Academy”	February 22, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A.
16.	Organizationofthecelebration "Wide Maslenitsa"	March 6, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A.
17.	Training "Behavioral skills at employment"	March 12, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A..
18.	Seminar on the topic: “The list of guarantees for the disabled in the Russian Federation” with the participation of employees of the department of social support for the disabled of the Ministry of Health and Social Development of the Chuvash Republic	March 21, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A.
19.	Training "Success Strategy"	April 17, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A.
20.	Psychological consultation with students with disabilities "Adaptation to collective groupinteractions ”	April 30, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A.
21.	Seminar on the topic: "Fundamentals of labor law. Features of the regulation of labor of persons with disabilities ”with the participation of employees of the department of social support for people with disabilities of the Ministry of Health and Social Development of the Chuvash Republic	May 6, 2019	Chuvash State Agricultura Academy	10	Sergeeva N.A.
22.	Individual correction work with physically challenged students and students with disability of health, having missing classes without	During the academic year	The Academy	10	Sergeeva N.A.

	valid excuse and with pure academic performance				
23.	Individual consultations on the issues of the students	During the academic year	The Academy	10	Sergeeva N.A.
24.	Finaldiagnostics (the analysis of monitoring satisfaction with the quality of educational services)	During the academic year	The Academy	10	Sergeeva N.A.

The study showed that implementing this plan of socio-psychological support of students with disabilities and limited health capabilities, students' adaptation is successful. It also revealed intellectual and creative opportunities of students of these categories. It showed that students with disabilities and limited health capabilities have developed stable social and moral personality traits like patriotism, honesty and justice.

In addition, the characteristics of these students are taken into account at the Chuvash Agricultural Academy and a favorable psychological atmosphere has been created that allows each of them to feel comfortable in the team.

In the process of the study a favorable psychological atmosphere was created which activated students with HIA to social activities through pedagogically correctly organized student activities. The benevolent atmosphere facilitated the establishment of interaction with classmates, teachers, as well as free thought and views expression.

So, Petrov V., a 2nd year student, 2nd group invalid, 3rd year student I. Havanskaya, 2nd group disabled person, active members of the Volunteer Corps. This year for the first timethey participated in the professional skills championship among disabled people and people with limited health capabilitiesAbilimpix in Moscow.

Conclusion

Thus despite the identified problems 80% of students with disabilities and limited health capabilities have developed a positive attitude towards learning, their adaptation is quite effective. Socio-psychological support aimed at adapting students with disabilities and with limited health capabilities, at solving their own problems positively built a relationship with others. An important place was given to the teaching staff, the closest associates who, together with a changing personality of the disabled, promptly guide but do not patronize, help to escape passivity, helplessness and direct them to the road of independence and responsibility.

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Innovativeness of Enterprises Vs Emigration – Example of Poland

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Abstract

The work is of an analytical character. It is aimed at analysing the impact of emigration on the innovativeness of Polish economy. On the grounds of the reports of The European Innovation Scoreboard and Oslo Manual, indicators on which emigration had specific impact were selected. As a result, correlations between particular indicators and the number of persons who had emigrated were obtained. On the grounds of the analysis conclusions have been drawn, which unequivocally indicate the close correlation between studied features.

Keywords: Emigration, Innovations, Entrepreneurship

Introduction

Innovations constitute a source of developing sustainable economic growth of countries, regions and economies. Knowledge-based economies raise interest of many researches, as they decide on the world's development directions. Knowledge and innovations constitute resources that contribute to creating wealth of the nations.

When in 2004 the Republic of Poland signed the Accession Treaty to the European Union, the European labour market was opened to Poles. Many used this opportunity and emigrated to, among others, Great Britain or Ireland. The economy has been especially devoid of young people, who are carriers of innovation and entrepreneurship energy. The research conducted by Anelli et al (2019) in Italy proved that per 1,000 emigrants, on average, 10 young, innovative enterprises were not established. If we refer to the research conducted by Nordhaus (2004) stating that the total excess on innovation is allocated to the creators thereof (companies) only in the amount of 2.2% (the author indicates the range between 1.3% and 3.3%) and the remaining part constitutes the society's share, then, the emigration of creative people has a significant impact on the economic future of the country from which the significant part of the society emigrated (e.g. Poland). The aim of the work is to study the impact of emigration on the innovativeness of Polish economy. To this end, the following research questions have been asked:

1. Is there a correlation between Poles' emigration and the economy's innovativeness?
2. What is the impact of citizens' emigration on innovations in Poland?

Answers thereto will allow to better understand the issue related to the emigration of people from less industrialised countries and impact thereof on the further deepening income distance related to the low innovativeness of the economy of the emigrant's country of origin.

Literature Review

Innovations and innovativeness constitute the source of the nation's wealth, therefore, it is so important that the organisations are able to create innovations and states support them in this scope. The subject literature concerning the knowledge-based economy indicates the following sources of innovations' development (Domański, 2010):

- human capital understood as people's competences and abilities to develop knowledge and implement innovations, as well as continuous improvement of their qualifications and skills during practical use of knowledge as a result of the R&D achievements in innovation processes;

- creating proper economic (including financial), organisational and legal conditions to create knowledge and its effective use in economy in compliance with the society's needs and expectations;
- knowledge flow and development during cooperation of enterprises and scientific institutions, R&D institutions, other participants of the online innovative environment, including transfer agents, funding innovations, organisations specialising in innovation development;
- using ICT technology and effective forms of funding innovations in the organisation's innovative activity;
- developing innovative culture inside the organisation and in the society, which encourages people's engagement in knowledge development and use to their benefit and to the benefit of economies.

The above factors cannot be considered separately, but have to be considered jointly. Human capital as an innovation carrier constitutes the main element of creative-innovative solutions. Countries which have the ability to attract talents, such as the United States of America, develop faster and their innovative products and services are sold internationally and thus, their enterprises collect high bonuses for innovations. Such skills constitute a precedence related to increasing the technological distance between countries and regions, which cannot or are not able to stop emigration, especially emigration of highly skilled employees. Works Kerr (2019) or Kerr and Lincoln (2015a), or Hunt and Gauthier-Loiselle (2010), who studied the impact of policy, economy and business on migrations of highly skilled talents from all around the world to the USA, proved that the concentration of talents has a significant impact on the growth and innovativeness of the economy of the United States of America. Stuen el al (2012) finds that international doctoral students contribute to knowledge production at scientific laboratories in the US, and argues that visa restrictions on the entry of high-quality students are particularly costly for academic innovation.

In the years 2006-2012, in the United States: Immigrant founders of engineering and technology companies have employed roughly 560,000 workers and generated an estimated $63 billion dollars in sales during this time. While the rate of growth of immigrant entrepreneurship has stagnated, these numbers nonetheless underscore the continuing importance of high-skilled immigrants to the maintenance and expansion of the national economy. These findings are interestingly complex, since the two major skilled-immigrant groups — Indian and Chinese — are starting companies at higher rates than they did previously. Across engineering and technology fields, immigrant entrepreneurs displayed the greatest concentration in the innovation/manufacturing related services (45 percent) and software (22 percent) fields. Historically and today, the United States continues to benefit directly from the contributions of such immigrants. Far from expendable, high-skilled immigrants will remain a critical asset for maintaining U.S. competitiveness in the global economy. (Wadhwa et al., 2012)

Factors related to attracting talents to a given country or region could be various. Ivus et al. (2019) believe that the problem of highly skilled persons' migration is related to protecting the intellectual property by particular regions. Northern states lead in the proper protection of intellectual property. Hall and Sena (2014) drew attention to the correlation between the intellectual knowledge diffusion and the quality of legal protection both, formal - patents and informal – confidentiality agreements etc., of the innovative invention or innovative technological solutions. Knowledge, innovative development of selected regions results from interactions between companies, decision-makers and institutions shaping the environment in which companies introduce innovations. Depending on the type of innovation, at the same time enterprises create legal barriers preventing from (for some time) imitations or absorptions of this solution. Migration of creative persons is also related to the environment in which they have the opportunity to use the cutting-edge technologies or innovative solutions. Kerr (2019) underlines the significance of the flexible employment system which has been implemented by the United States of America and allows selection of emigrants (with desired qualifications), guarantees direct employment upon arrival and allows fast access to specialists from all around the world. Simultaneously, this system quickly reacts to the changes occurring in the labour market, supplementing human capital shortages. In order for such a system to be created, first, the USA had to become the leader in offering the most attractive working conditions in order to absorb the best specialists.[1]

In Poland the issue of emigration was discussed in works by i.a. Chmielewska et al. (2019), Homoncik et al (2017), or Hybel (2016). The structure of emigration (Work Servce, 2018), selection of the target countries (e.g. Wnuk, 2019), the aims of the Polish emigrants (e.g. Krawczyk, 2017) and the impact of emigration on global changes were studied (Gieorgica, 2018). Engbom (2019) developed an equilibrium theory of joint firm and worker dynamics that captures the notion that older individuals are less likely to switch employers and enter entrepreneurship. When potential entrepreneurs age, the fall in firm creation implies fewer new better jobs for workers. Furthermore, Karahan et al. (2019) highlighted role the share young age in birth rate of start-ups.

The research gap constitutes the lack of the analysis of the emigration's impact on the economy's innovativeness.

Research Methodology

The research was conducted on the grounds of data collected by the Statistics Poland. The work concerns emigration, therefore, it has been considered justified to describe the manner of collecting data by GUS (2019), The European Innovation Scoreboard (2019), Oslo Manual 2018 (2019). Data for the years 2010-2018 concerned persons temporarily residing abroad for over 3 months. Persons often residing abroad, even for many years, who have not deregistered from the permanent residence in Poland due to the permanent relocation abroad, should also be considered as persons temporarily residing abroad. In principle, estimates' results do not include seasonal emigration of Poles which, due to the duration thereof – usually up to three months, in the majority of the EU states are subject to simplified formal-legal procedures or are not registered at all.

Another issue is the unequivocal manner of measuring innovations. In order to avoid errors, two sources of innovations: (EIS), Oslo Manual were used.

EIS Report presents innovativeness' results for particular countries by inputs and effects. The Summary Innovation Index – SII proposed therein, used for the innovativeness assessment of 27 European Union states, is calculated on the basis of 27 partial indicators. The report distinguishes 4 main areas influencing the innovativeness: Framework conditions (Human resources, Attractive research systems, Innovation-friendly environment), Investments (Finance and support, Firm investments), Innovation activities (Innovators, Linkages, Intellectual assets), Impacts (Employment impacts, Sales impacts). It studies the level of innovativeness in particular EU states. The analysis covered data from the years 2011 - 2018.

The innovation index, proposed by the OECD in Oslo Manual, identifies four types of innovation by object that is: product innovation, process innovation, marketing innovation and organisational innovation. The Report presents comparable results regarding the level of innovativeness in particular, and best developing global economies, on the basis of 7 groups (Types of innovation, Public financial support for innovation activities, Innovation cooperation partners, Intellectual property protection, Innovation and participation in international markets, Turnover from innovation, Employment-based innovation indicators), 36 indicators (Innovation-active firms as a percentage of total firms; Innovative firms as a percentage of total firms, Product and/or process innovative firms as a percentage of total firms; Product and/or process innovation-active firms as a percentage of total firms; Product innovative firms as a percentage of total firms; Process innovative firms as a percentage of total firms; Organisation innovative firms as a percentage of total firms; Marketing innovative firms as a percentage of total firms; Product and/or process innovation-active firms only as a percentage of total firms; Organisation and/or marketing innovative firms only, as a percentage of total firms; Product and/or process AND marketing and/or organisational innovations only as a percentage of total firms; Product innovative firms with innovations that were new to the firm's market, as a percentage of total firms; R&D active product and/or process innovative firms, as a percentage of product and/or process innovation-active firms; Firms receiving public support for innovation, as a percentage of product and/or process innovation-active firms; Firms receiving public support for innovation, as a percentage of total firms; Firms cooperating on innovation activities, as a percentage of product and/or process innovation-active firms; Firms cooperating on innovation activities with clients; Firms cooperating on

innovation activities with higher education or government institutions, as a percentage of product and/or process innovation-active firms; Firms engaged in national collaboration only, as a percentage of product and/or process innovation-active firms etc.), in three research areas (firm size, economic sector, R&D status). Since the last issue of Oslo Manual is from 2018, data presented therein comes from the years 2014 - 2016.

Data analysis consisted in estimating the matrices of correlations between measured indicators related to the SII and emigration, and indication of k-means clustering models for selected Oslo Manual indicators. In order to create matrices and k-means clustering models the statistical programme STATISTICA taking into consideration the level of significance p=0,1[2] was used due to the explorative character of the research.

Emigration of Poles

Emigration of population has an immense impact on the country's economy. This situation influences both, the labour market and the entities' financial results. According to GUS results, at the end of 2018, approximately 2,455 thous. Polish permanent residents temporarily resided abroad, i.e. by 85 thous. (3%) fewer than in 2017. In Europe, approximately 2,155 thous. persons resided (by 86 thous. fewer than in 2017), the majority of them – approximately 2,031 thous. – stayed in EU Member States (fig.1).

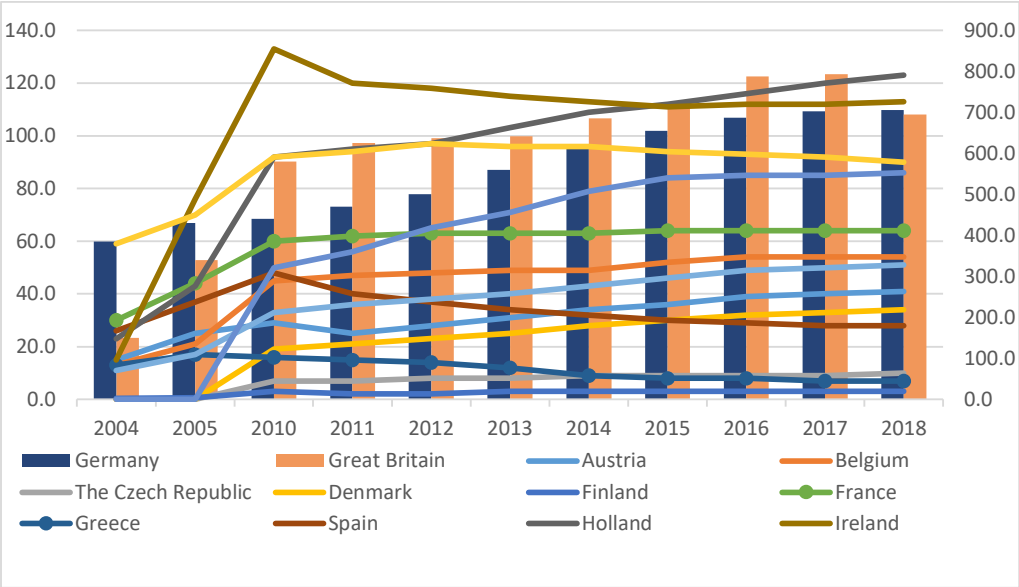

Fig. 1: Estimated value of Poles' emigration to the permanent residence in the years 2004 – 2008

Most often Poles reside in the territory of Great Britain and Germany (bar chart). These countries are selected by 57% of all emigrants from Poland. The country outside the EU that becomes the place of residence is Norway. In order to better understand the issue of emigration one should study the age structure (fig. 2).

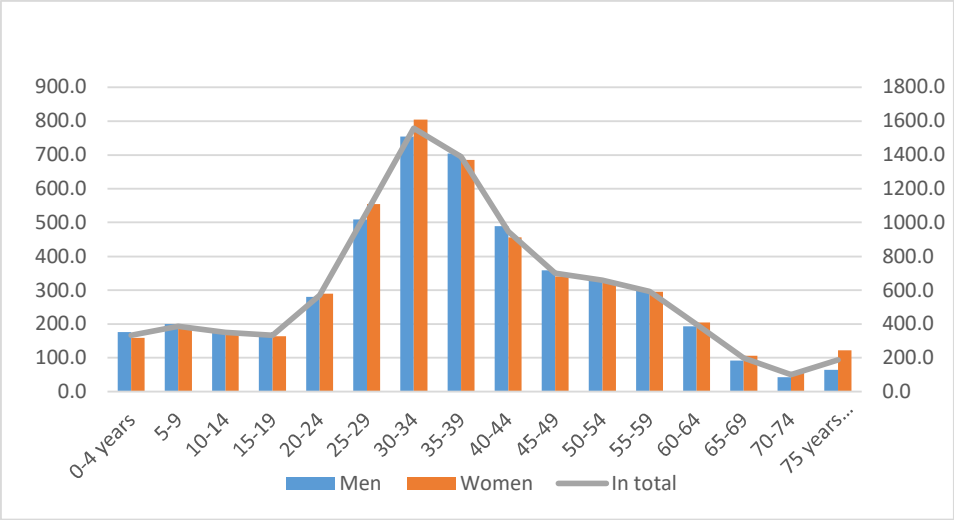

Fig. 2: Emigrants from Poland by age and gender

The working-age population of Poles who go abroad is between 20 and 59 years (76.6%). A significant number of young people after studies[3], 25-35 years, who decided to emigrate from Poland, should be noticed. This data is highly alarming, since young people are carriers or new ideas and are more prone to taking risks related, for example, to conducting innovative enterprises or start-ups. Emigration of young, educated people impoverishes the country's economy, which also incurred the costs of education, yet, cannot retain the creative human capital, which should be used for innovative and economic growth of the home country. Many Poles go abroad in search of better working conditions and start families there. Furthermore, the research implies that 4% more women emigrate than men (aged 25-34 years).

The impact of emigration on Poland's innovativeness indexes

The hitherto research concerning emigration is focused on two issues, that is, the social aspect (the impact of emigration on the issues of poverty and unemployment etc.) and the economical aspect (the impact of emigration on demographic indicators or the labour market). The research gap concerns the impact of emigration of the innovativeness indexes of the emigrant's home country, which significantly influences the issue of emigration.

Table 1: Correlation matrix of the level of emigration on the SII.

Variable	Correlations (innovativeness index with population emigration) Marked correlation coefficients are significant with p < .10000 N=8 (Lacks of data were removed by cases)
	Emigration of population from Poland
Summary Innovation Index	0.533145
Human resources	0.854422
Research systems	0.907663
Innovation-friendly environment	0.681626
Finance and support	-0.721029
Firm investments	0.814942
Innovators	-0.940984
Linkages	-0.848881

Intellectual assets	0.955824
Employment impacts	-0.276900
Sales impacts	-0.754187

Emigration of population from Poland in the research period has a weak (at the level of 53%) impact on the SII, yet, a strong (at the level between 68% and 96%) impact on other indicators comprising the Index. The correlation matrix unequivocally indicates that emigration has both, a positive impact e.g. on Human resources (0.85), Attractive research systems (0.91), Innovation-friendly environment (0.68), Firm investments (0.81) and Intellectual assets (0.95 – the highest level of correlations), and a negative impact i.e. Finance and support (-0.72), Innovators (-0.94), Linkages (-0.85), or Sales Impacts (-0.75). Explanation of this situation is extremely difficult, therefore, each indicator should be analysed separately. The **Human resources** indicator captures new doctorate graduates, population aged 25-34 with completed tertiary education and population aged 25-64 involved in education and training (EIS, 2019, p. 4), and, in fact, a large part of emigrants have higher education. However, it should be taken into consideration that their education is related to social sciences, which have a smaller impact on the innovativeness of enterprises. Moreover, the indicator covers the number of persons who are involved in education and training and those persons do not emigrate, which influences the stability of this indicator (the number of persons does not change despite emigration). Next indicator is the **Attractive research systems**, which includes three indicators and measures the international competitiveness of the scientific base by focusing on international scientific co-publications, most cited publications and foreign doctorate students. The positive correlation with the number of people who emigrate is related to the fact that young emigrants do not constitute the current (yet, they can do so in the future) academic staff. Their presence in the home country can have a positive impact on the domestic educational market, since well-educated young people are ambassadors in the countries, in which they reside (living advertisement of knowledge gained at domestic universities). The same refers to the quality of the academic staff, whose publication achievements are not related to the external migration.

Innovation-friendly environment captures the environment in which enterprises operate and includes two indicators – Broadband penetration among enterprises and Opportunity-driven entrepreneurship – measuring the degree to which individuals pursue entrepreneurial activities as they see new opportunities, for example resulting from innovation. To a certain extent emigration forces more frequent use of the Internet as the channel of distributing products by domestic enterprises. Due to emigrants, enterprises can benefit from the knowledge of persons staying outside the borders of their home country and their experience, as well as their being used to domestic products and brands. Expansion to foreign markets by using emigrants allows diminishing the risk related to the lack of knowledge on foreign markets.

Finance and support includes two indicators and measures the availability of finance for innovation projects by Venture capital expenditures, and the support of governments for research and innovation activities by research and development expenditures in universities and government research organisations. As results from the correlation, the increase in the number of emigrants is accompanied by the decrease in the amount of funding on scientific research. The situation is surprising, difficult to interpret. The irreversible consequences of such activity should be considered. Emigrants are a flagship and the competences they have also due to the education obtained in Poland allow them to achieve success also abroad. Therefore, the level of the education should not be decreased due to the lack of funding on scientific research, which can retain talented young people in the country.

Firm investments includes three indicators of both R&D and non-R&D investments that firms make to generate innovations, and the efforts enterprises make to upgrade the ICT skills of their personnel. The positive correlation is possible due to using the opportunity of entering new foreign markets where emigrants from Poland reside.

Innovators is another dimension of the innovativeness aspect, which includes three indicators measuring the share of firms that have introduced innovations onto the market or within their organisations, covering both product and process innovators, marketing and organisational innovators, and SMEs that innovate in-house. The correlation with the population emigration is negative, which

has a direct impact on the studied issue. Along with the outflow of intellectual capital from the domestic labour market, the level of innovative ventures decreases in the product, process, marketing and organisational sphere. Such a situation should be especially studied. Thus, in the further part of the work the attempt to explore this issue has been undertaken.

Linkages includes three indicators measuring innovation capabilities by looking at collaboration efforts between innovating firms, research collaboration between the private and public sector, and the extent to which the private sector finances public research and development activities. This aspect of innovativeness is also negatively correlated with emigration. The size and quality of emigration has a negative impact on correlations between the private and public sectors, which can prove a small adjustment of the staff from these sectors to mutual cooperation.

The value of correlation between emigration and intellectual assets is the highest among studied indicators. **Intellectual assets** captures different forms of Intellectual Property Rights (IPR) generated in the innovation process, including PCT patent application, Trademark applications and Design applications. The positive correlation shows that formal innovation value hedges are not a reason for emigration of highly skilled staff from Poland. Furthermore, domestic entities strive to hedge their intellectual assets against losing them, especially against exporting them by emigrants.

Export of medium and high-tech products, export of services requiring extensive knowledge and sales due to innovative activities (**sales**) have a negative impact on the size of emigration. If young, educated people can pursue their ambitions in the domestic market, they do not emigrate. This indicator, which measures the economic impact of innovations allows unequivocally stating the outflow of talents from the country has a direct impact on the innovativeness of enterprises.

The emigration especially influenced the Innovators. Thus, the indicators related to this area should be analysed in-depth.

Table 2: Correlation matrix of Innovators indicators with emigration

Variable	Correlations (innovativeness index with population emigration) Marked correlation coefficients are significant with p < .10000 N=8 (Lacks of data were removed by cases)
	Emigration of population from Poland
SMEs introducing product or process innovations as % of SMEs	-0.533943
SMEs introducing marketing or organisational innovations as % of SMEs	-0.938198
SMEs innovating in-house as % of SMEs	-0.653679

Emigration had the biggest impact on the decrease in innovative marketing or organisational solutions of SMEs, which confirms the thesis that young, educated people are carriers of innovations, and starting by them work outside the borders of the home country does not favour creative solutions and impoverishes the domestic market of innovative solutions. The result thereof may be the decreased number of established, new, innovative entities with larger emigration.

The analysis will be supplemented with clustering models for selected indicators from Oslo Manual 2018. Emigration had a significant impact on innovative solutions, therefore, the following indicators have been selected to the k-means clustering models: Innovation-active firms (product/process or ongoing/abandoned or organisational/marketing), Innovative firms (product/process or organisational/marketing), Product and/or process innovation-active firms (product/process or ongoing/abandoned innovation activities, regardless of organisational or marketing innovation), Product innovative firms (regardless of any other type of innovation), Product and/or process

innovation-active firms (product/process or ongoing/abandoned innovation activities, regardless of organisational or marketing innovation), Product innovative firms (regardless of any other type of innovation), Process innovative firms (regardless of any other type of innovation), Product innovative firms with innovations that were new to the firm's market, Turnover from new or significantly improved products, Turnover from new or significantly improved products that are only new to the firm, Turnover from new or significantly improved products that were new to the market.

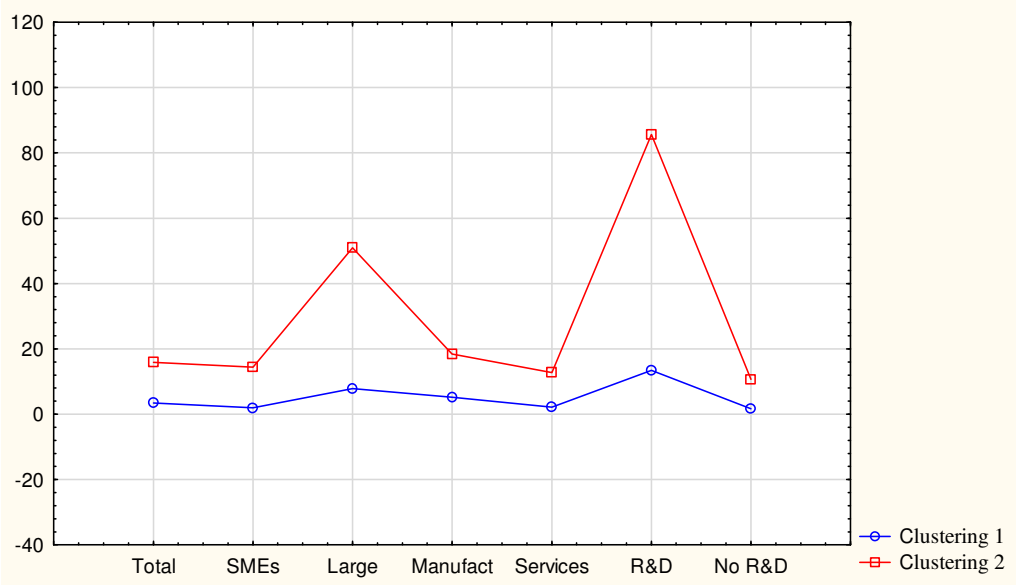

Fig. 3: Diagram of k-means clustering of selected indicators.

Table 3: Elements of clustering 1 and distances from the middle of relevant clustering

Indicators	Distance
Product innovative firms with innovations that were new to the firm's market	12.24382
Turnover from new or significantly improved products	2.295938
Turnover from new or significantly improved products that are only new to the firm	2.932471
Turnover from new or significantly improved products that were new to the market	3.219157
Emigration	6.420908

Table 4: Elements of clustering 2 and distances from the middle of relevant clustering

Indicators	Distance
Innovation-active firms (product/process or ongoing/abandoned or organisational/marketing)	8.398155
Innovative firms (product/process or organisational/marketing)	5.642839
Product and/or process innovation-active firms (product/process or ongoing/abandoned innovation activities, regardless of organisational or marketing innovation)	5.935562
Product innovative firms (regardless of any other type of innovation)	9.043666
Product and/or process innovation-active firms (product/process or ongoing/abandoned innovation activities, regardless of organisational or marketing innovation)	5.935562
Product innovative firms (regardless of any other type of innovation)	9.043666
Process innovative firms (regardless of any other type of innovation)	6.591228

The analysis by the k-means clustering method allows selecting groups with similar features. In the studied cases, the population emigration occurred in the first clustering, where, in particular, the indicators related to the trading in new products for the company or the market occurred. This group also included (the furthest) indicator: Product innovative firms with innovations that were new to the firm's market. Conclusions should be drawn that the hitherto emigration has influenced new, innovative solutions primarily related to the improvement or modernisation of the trade flow of companies. Further research should follow this observation.

Discussion and Conclusions

Creating innovations, the use and diffusion of knowledge constitute the sources of prosperity of the country, which is developing its economic and financial independence, also become the sources of prosperity for the local and international communities. Innovations as the source of the increase in effectiveness and productiveness become a part of analyses related to the research on economies in terms of the innovative abilities and/or adaptation thereof. Since the human capital and its ability to creatively create and solve problems constitute the carrier of innovations, the author considers it justifiable to study relations between the human capital and migration of population. The aim of the work was to analyse the impact of emigration from Poland on innovativeness. To achieve this aim two research questions have been asked: if there is a correlation between emigration and innovativeness of the Polish economy and what impact it has.

On the grounds of EIS and Oslo Manual, correlations between the number of persons who emigrated from Poland and economy innovativeness indexes were studied. The research implies that migration had the largest impact on indicators related to innovations of small and medium entities (- 0.94). Along with the increase in the number of persons emigrating from Poland, the number of new innovative economic entities is decreasing. The feature thereof has a negative impact on the future economic development where innovators establishing a start-up have opportunities to develop innovations especially of a creative character and not imitating or adaptive character. The results are consistent with ideas put forth by Anelli et al. (2019) or Karahan et al. (2019).

The positive correlation occurs, among others, with indicators related to the scientific capital (0.85) and scientific research (0.91). This phenomenon does not favour innovations so much, since it causes a change of a calculative character (the indicator's denominator is decreasing). Another positive correlation is related (0.81) to innovative in-house ventures (trade flow). Emigration favours entry of enterprises into new markets and absorption of new products and solutions for companies. Emigration is a characteristic phenomenon in the contemporary world. Nevertheless, one should consider, whether persons who leave the country do not cause intellectual and innovative impoverishment of this country. In the era of open labour markets, easy penetration of resources and information, the human capital constitutes the factor which will allow technical, technological and, primarily, intellectual development, especially in the era of knowledge-based economies. Further research should take into consideration the quality of emigrants and their impact on the innovativeness of economies of settlement countries.

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[1] The work is not aimed at describing the whole system of support for science and business of the United States, but at presenting the system that influences the increase in the USA's innovativeness most effectively.

[2]Controversies concerning indicating the level of significance allowed the author to specify the level as cited in: Aranowska and Rytel (2000).

[3] The research conducted by NBP implies that, depending on the state to which the emigrant goes, from 34% in the UK to 18.3% in Germany have higher education. Persons with higher education have a very diverse educational profile. The majority – from 4.0% to 11.0% of registered persons were those who graduated from social sciences (e.g. sociology, psychology, economy, management, social policy). Approximately 5.0% of persons in each country declared medical education (broadly understood as medicine, nursing, veterinary medicine, cosmetology, dietetics). Participation of

persons with IT education only in the case of Great Britain reached 4.0%, in the case of other states it was at the level of 1.0%. (Chmielewska et al., 2019).

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Quality Assessment of Websites of Rural and Urban-Rural Municipalities' Local Governments in The Silesian Voivodeship In Terms of Accessibility

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Abstract

The article is aimed at the quality analysis in terms of websites accessibility of e-offices of rural and urban-rural municipalities in the Silesian Voivodeship. The automatic web application detecting errors and warnings of municipalities' websites has been used herein. On the grounds of the statistical analyses, correlations between the quality of websites and the population, as well as the municipalities' income have been presented. The disclosed correlations can influence quality improvement and thus, accessibility of websites to digitally excluded people.

Keywords: Quality of Websites, Local Governments, E-Office.

Introduction

The ICT is the fastest growing global technology. In compliance with the report: Progress towards the Sustainable Development Goals (Report of the Secretary-General 2016, 2017, 2018, 2019) in 2015 the number of people residing in areas covered with mobile broadband networks amounted to 69% all around the world and in the countryside this share amounted to only 29%; whereas, in 2016, 95% of the world's population and 85% of people in the Least Developed Countries were covered with the mobile signal. Currently, almost all people around the world live within the cover of mobile networks, of which 90% live within the cover of 3G or higher quality network. However, this evolution of mobile networks is growing faster than the percentage of the population using it. The current system faces a challenge of the issue related to the digital exclusion of a part of society. The group of digitally excluded people primarily includes persons with sensory disabilities (blind, visually impaired, deaf, hearing-impaired and deafblind), persons with manual and intellectual disabilities, seniors, foreigners, as well as uneducated and not well-off persons. (The Ombudsman Report, 2013)

The website accessibility means the possibility of using contents published thereon by as large number of users as possible to the largest possible extent. It provides everyone with full access to information and sources of obtaining it without the necessity to leave the place of residence. Furthermore, social relationships, which allow entering interactions by creating so-called "social geometry" (Sztompka, 2016), are also established. An accessible website is a website that allows universal, convenient and intuitive use of its resources, with full access to the information sought by the user in a safe and certain manner. Due to such an approach, accessible websites can be used by all persons, especially those digitally excluded, without losing trust to the contents and form of transferred information or while entering digital interactions.

Safety of websites that belong to public entities is especially important. Persons using the websites' resources must be certain that contents included thereon are valid, since doubts undermine trust to both, institutions and the state system, as well as ICTs. Persons with disabilities are especially exposed to the threat of losing trust due to the lack of knowledge, limited perception, as well as the lack of experience in handling this technology.

This work is aimed at conducting quality assessment of websites in terms of their accessibility to digitally excluded people. The analysis covered websites of urban-rural municipalities (22 websites), and rural municipalities (96 websites) of the Silesian Voivodeship. The choice of the object of the

research is intentional due to the fact that the rural areas are inhabited particularly by persons from the group especially exposed to the risk of digital exclusion.

Accessibility of websites of public entities in the Polish legislation.

Accessibility of IT tools and the issue of adjusting them to the specific needs of persons with disabilities undoubtedly constitute the issue noticed by the domestic and international authorities responsible for law-making and stipulation of social policies. Legal accessibility guarantees are expressed in constitutional norms, international law acts, as well as statutory regulations and ordinances. The legal grounds binding globally are provided by the UN Convention on the Rights of Persons with Disabilities, which was adopted by the General Assembly of the United Nations on 13 December 2006. The Polish government signed the Convention on 20 March 2007, and it was ratified by Poland on 6 September 2012 (Dz. U. Nr 0, 2012). Article 9 "Accessibility" of the Convention especially underlines preventing digital exclusion of persons with disabilities.

Accessibility does not mean disclosing each information. In Poland, the Act on Access to Public Information (Dz. U. Nr 204, 2001) regulates the rules and modes of accessing information having a value of public information and specifies, in which cases the access to public information is subject to limitation and when the information requested by the applicant cannot be disclosed. Thereunder, *Bulletin of Public Information* (BIP) was developed, and which, pursuant to the provision of Article 8 of the specified Act, constitutes the official ICT publication for the purposes of announcing public information. BIP is a unified system of standardized pages in the ICT network, intended as the basic tool for sharing public information. Apart from the BIP homepage there is a series of so-called BIP subject pages administered by entities obliged to maintain them, among others: public authorities, local government units, business and professional self-government authorities, trade unions and related organisations, political parties and other entities performing public tasks.

In the doctrine and jurisdiction, public information is considered to be *"any message generated by or referred to the broadly understood public authorities and generated by or referred to other entities performing public functions in the scope of their performance of tasks of the public authorities and management of communal property or assets of the Treasury."* (Banaszak, 2012) Furthermore, the Act on Access to Public Information introduces the obligation to publish a specific type of information, the scope of which was gradually extended along with entry into force of consecutive articles. The discussed legal act specifies categories of data, which must be obligatorily disclosed in BIP, including: legal status or legal form of a given entity, the object of its operations and competences, authorities and persons exercising specific functions and their competences, assets they are at a disposal of, operation mode, manners of accepting and dealing with cases, information on kept registers, records and archives, as well as manners and rules of sharing data included therein. This is basic information, which the person visiting the website of a given institution should be able to learn. (The Ombudsman Report, 2013)

As of June 2015, pursuant to the Ordinance of the Council of Ministers on the National Interoperability Frameworks, all public websites must comply with the minimal (Web Content Accessibility Guidelines (WCAG) in version 2.0 at the level of A and AA) requirements of accessibility of public registers, exchange of information in electronic form and minimal requirements for ICT systems.[1] In 2019, the Act on the Digital Accessibility of Websites and Mobile Applications of Public Entities (Dz. U. 2019 poz. 848, Dz. Urz. UE L 327 z 02.12.2016), introduces requirements of WCAG in version 2.1. (Tab.1). WCAG is a collection of documents published by *Web Accessibility Initiative* (WAI), targeted at websites' developers and administrators. They include guidelines that allow developing webpages and websites accessible to all persons in compliance with the principle of equality, which means a specific architecture of a webpage that allows using it also by persons with disabilities without the necessity to use additional tools and applications. (The Ombudsman Report, 2013)

Table 1: Requirements from websites and mobile applications of public entities in Poland.

Principle	Requirements	Level A	Level AA
1. Perceptibility	1.1 Alternative text	1.1.1	
	1.2 Time-variable media	1.2.1 – 1.2.3	1.2.5
	1.3 Adaptability	1.3.1 - 1.3.3	1.3.4 - 1.3.5
	1.4 Possibility to distinguish	1.4.1 - 1.4.2	1.4.3 - 1.4.5 1.4.10 – 1.4.13
2. Functionality	2.1 Accessibility from the keyboard	2.1.1 - 2.1.2 2.1.4	
	2.2 Sufficient time	2.2.1 - 2.2.2	
	2.3 Seizures - Flickering	2.3.1	
	2.4 Possibility to navigate	2.4.1 – 2.4.4	2.4.5 – 2.4.7
	2.5 Manners of entering data	2.5.1 – 2.5.4	
3. Comprehensibility	3.1 Legibility	3.1.1	3.1.2
	3.2 Predictability	3.2.1 – 3.2.2	3.2.3 – 3.2.4
	3.3 Assistance in entering information	3.3.1 – 3.2.2	3.3.3 – 3.3.4
4. Reliability	4.1 Compatibility	4.1.1 – 4.1.2	4.1.3

In Poland, Accessibility is monitored by the Ministry of Digital Affairs for which public entities are obliged to fill in and submit the so-called: Accessibility Statement[2] (all public entities must submit it until 31 March starting from 2020 – for websites and until 2021 – for mobile applications (Article 10 of the Act on the Digital Accessibility)). The aim of publishing the Accessibility Statement is to enable reading the information on the accessibility of the public sector body. This information is primarily useful for persons with disabilities, who will be able to know what kind of assistance or supporting solutions are accessible with regard to the given entity.

The Accessibility Statement must be digitally accessible in full (in HTML format, in any version), even when the website or mobile application itself does not meet them. (Warunki, 2020)

Accessibility as the key right of each citizen to information and knowledge should become a basic right of each citizen of the European Union. Moreover, a special attention should be paid to the safety of information included on the website, as well as the safety of persons using such information. The fear, whether the accessibility is not introduced at the cost of safety becomes, in fact, justified. Therefore, the legislator should ensure monitoring and controlling pages in terms of the safety of collecting, processing and especially storing personal data of persons using the Internet or the mobile network of the public administration. It is a challenge for mobile networks' administrators of public administration offices.

The **Norton Cybercrime Report 2019** implies that 117 million adults, men and women, both young and older, all around the world have been affected by identity theft, also by shared information of public administration.

The General Regulation on Personal Data has been binding in the whole European Union for over a year. It constitutes the main element of coherent and modernised Union frameworks for data protection that also cover the directive on data protection in criminal cases and the regulation on personal data protection by EU institutions and bodies.[3] The public administration authorities are bound to appoint a data protection body monitoring and controlling all instances of violating citizens' privacy. Whereas, institutions and entrepreneurs owning websites and applications are bound to ensure users' data safety and protection. Such an approach forces local government members to ensure safety of citizens using their websites and mobile applications.

The object of the research and research methods

The Silesian Voivodeship in its current state was created on 1 January 1999 as a result of the administrative reform. It has an area of 12,333 km^2, and there are 4,548.2 thous. inhabitants, including 1,052.1 thous. people in the countryside. The number of persons collecting benefits from ZUS and KRUS amounted to 1,157.4 thous. persons. In the territory of the voivodeship there are 17 poviats, 19 cities with poviat status, 167 municipalities and 71 towns, 1,294 villages and 1,073 village representations.

The object of the research comprised websites of urban-rural municipalities' offices (22) and rural municipalities' offices (96) located in the territory of the Silesian Voivodeship. The choice of the object of the research was dictated by the fact that the Silesian Voivodeship is one of the fastest aging voivodeships in Poland (negative birth rate) and thus, the number of seniors is growing (post-working age people), and citizens residing in the rural areas are persons potentially digitally excluded due to their education and not being well-off. In the researched sampling the income tax per inhabitant amounted to PLN 1,431.75, whereas per voivodeship - PLN 4,481.57 (GUS, 2018).

The research focused on the accessibility of the website in the scope of electronic interaction with the target group of citizens (A2C - administration-to-citizen). Website addresses of entities were identified via Google Chrome search engine. Such an approach allowed verification, whether the address is easily accessible for a potentially interested person, who uses the most often used online tools.

The key to ensure accessibility is to adhere to the technical standards, thus, next websites were verified in terms of proper construction, requirements imposed by the WCAG standard and sharing documents in PDF format. The most often used tool that allows automatic verification is HTML Validator. This automatic tool for verification of the correctness of tags used in HTML or XHTML was created by the W3C (World Wide Web Consortium). Validator analyses, if the tags on the website are compliant with the characteristics of a given version of HTML. Therefore, the advantage of this tool consists in the easy analysis and continuous improvement and development of tools by the consortium, which allows on-going detection of errors on websites. (Kozłowski et. al., 2014)

Data collected with HTML Validator was analysed in terms of the quantity of detected errors and warnings on the entity's website. To this end, Statistica programme was used. Since the work is of an analytical character, it was also attempted to take into consideration the entity's income and the number of citizens in the given municipality. Thus, the following research questions can be asked:

1. Does the website quality depend on the number of citizens potentially using the services provided by the e-office?
2. Does the municipality's income influence the quality of the website?

It was attempted to answer thus asked questions with the use of the following statistical tools: correlation tables and descriptive statistics (median, arithmetic mean, normal distribution and box plot).

Research Results

The research was conducted in January 2020 on 118 webpages that belong to rural and urban-rural municipalities of the Silesian Voivodeship. One municipality does not have a website, on two websites

there was an error – websites did not open, and two websites were dangerous – google assistant alert, of which 113 websites were studied (96% of the research sampling).

The data analysis consisted in estimating correlations between lateral data and then, analysing descriptive statistics of errors and syntax warnings of codes noted by Validator.

Two data distribution models were analysed: warnings and errors. While verifying whether the given factor differs from zero, p=0.1 was adopted as the cut-off level of correlation significance due to the explorative character of the research.

Table 2: Table of correlations between errors and syntax warnings of codes noted by Validator for rural and urban-rural municipalities.

Variable	Correlations (assessment of municipalities' websites (B2:DK115)) Marked correlation coefficients are significant with p < ,10000 N=111 (Lacks of data were removed by cases)					
	Mean	SD	Income per capita	Population	Errors	Warnings
Income per capita	1440.44	459.011	1.000000	0.154836	0.216997	-0.129595
Population	10225.50	7227.513	0.154836	1.000000	-0.011947	-0.179128
Errors	40.31	110.065	0.216997	-0.011947	1.000000	0.209882
Warnings	22.63	17.025	-0.129595	-0.179128	0.209882	1.000000

The condition of significance has been met with regard to all variable data. The correlation coefficient indicates correlations between lateral variables. While analysing table no. 2. negative correlations between the number of people and the number of warnings related to the codes on websites of e-offices (-0.179) should be noted. Such a correlation indicates that along with the increase in the number of people, the number of warnings is decreasing.

As far as the number of errors is concerned, it depends on citizens' incomes and thus, municipalities' incomes (0.217). What is striking is the fact that along with the increase in incomes, the number of errors also increases, which proves that the incomes generated by municipalities' citizens do not influence the quality of the website. The positive correlation between errors and warnings (0.21) proves that the main reason for limited accessibility to services provided by e-offices of research entities depends on the administrators of websites and webpages. In conclusion, the accessibility of webpages related to the quality thereof depends on the number of potential users, citizens' incomes, however, primarily on the knowledge and experience of network administrators.

In order to have a better look at the quality related to the accessibility of websites, it has been decided to separately analyse errors of webpages' codes and warnings.

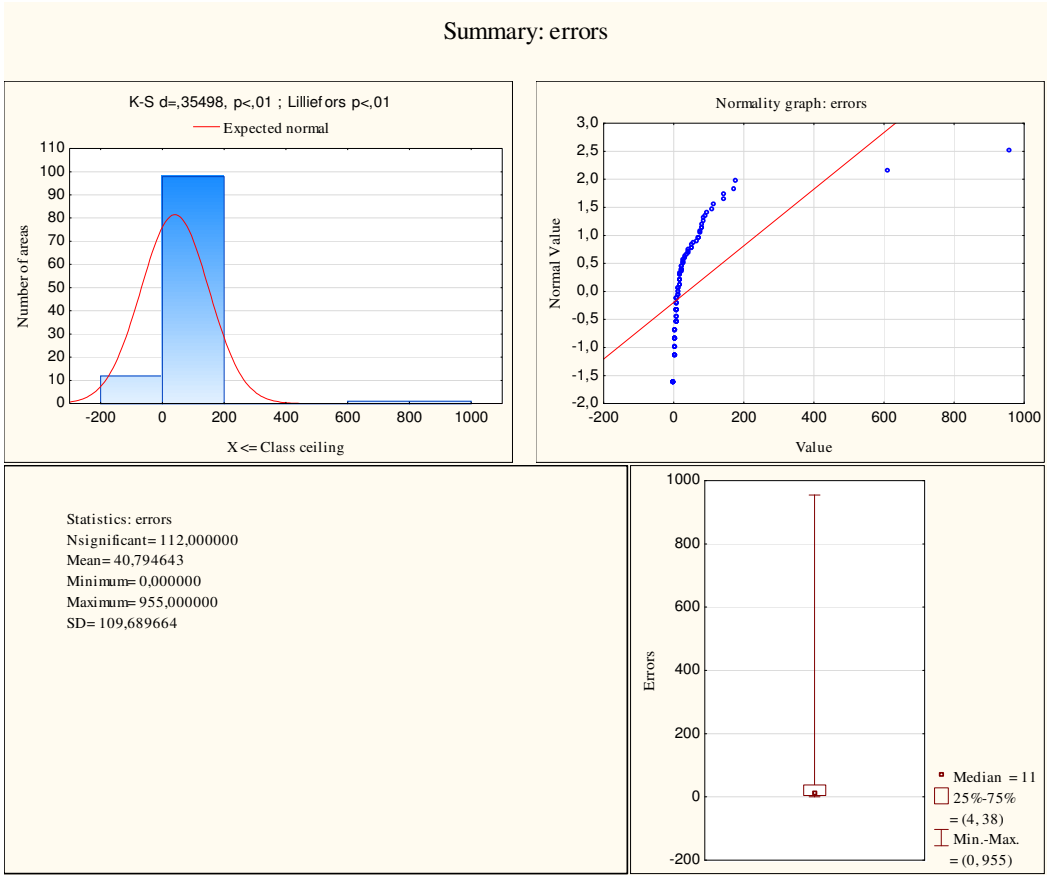

Fig. 1: Errors – summary of descriptive statistics.

While analysing errors of codes occurring on websites of municipalities' e-offices, one should pay attention to the number of these errors. Usually up to 200 errors per page were detected (98% of cases), whereas, mean is approx. 41 errors per website and the interquartile range is only 4.38.

The spread of the number of errors is huge and therefore, the quality of websites differs significantly (median amounts to 11, and the difference between minimal and maximal values amounts to as many as 96%). This situation is not satisfactory, since each error decides on the website quality and the municipal governments' care for citizens, who can use those websites. The errors' normality graph also presents the distribution of all studied cases. Two websites are negatively distinguished as compared to the other ones, thus, administrators of those websites should attempt to change the websites, as the number of errors is significant and deviates from the norm. It seems justified to state that the offices of municipalities of the researched voivodeship face a huge challenge of changes adjusting their websites to the Polish and international law provisions. The spread related to the number of errors is significant, which proves that some local governments have not dealt with the challenges of the digital reality.

Another studied factor influencing the quality of websites that belong to public entities - rural and urban-rural municipalities are warnings (fig. 2).

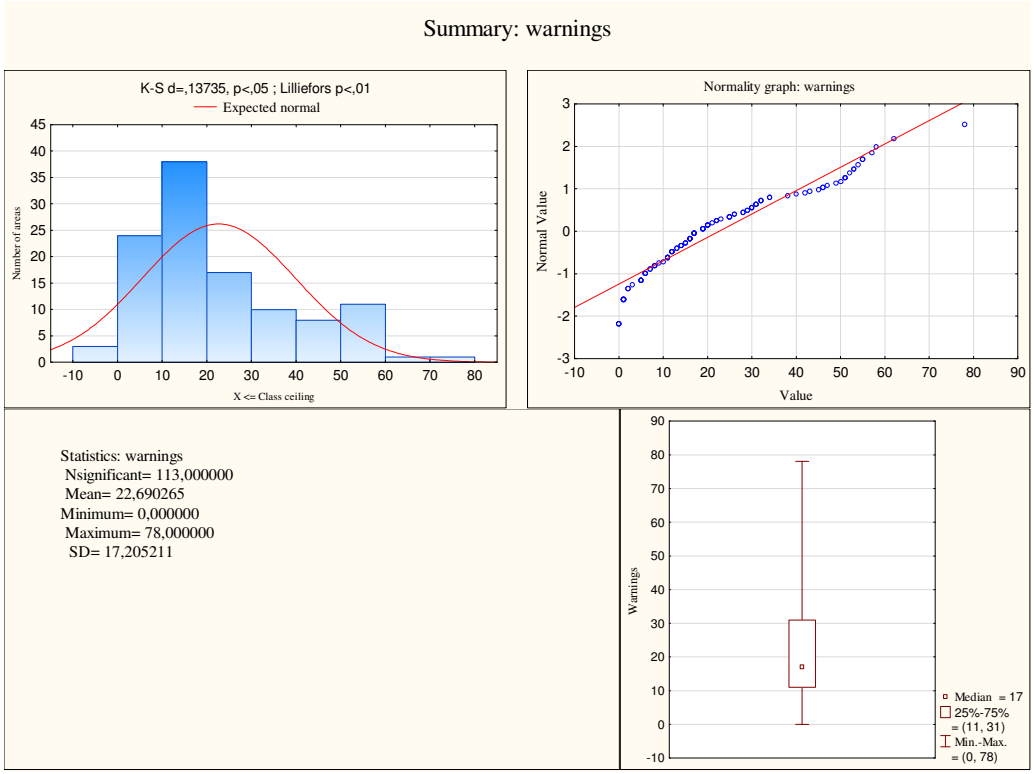

Fig. 2: Warnings – summary of descriptive statistics.

With regard to warnings, attention should be given to the fact of their lower number (maximum number of warnings is 78, in comparison to errors – 955). The mean of the number of warnings is 23, yet, on 72% of e-office websites up to 30 code-related irregularities were detected. The median of warnings is 17, which is a higher value than in the case of errors, that is, 50% of all detected irregularities per website is lower than 17. As far as the data spread is concerned, it is also lower and amounts to 78%. The interquartile range of the box plot amounts to 11.31, that is, it is higher than the interquartile range.

The normality graph of warnings also significantly differs from the errors' graph. The spread of cases is relatively equal, which results from lower qualitative differences between websites of studied entities. Moreover, no website is distinguished with a significant difference in the number of warnings. Such a situation should attract the attention of local government members and network administrators to the difference in the accessibility and quality of websites of these municipalities as compared with the voivodeship.

Summary

The work was of an analytical character. Two mediators: the number of errors and syntax warnings of HTML or XHTML codes detected by Validator were used for the analysis of the accessibility of websites of rural and urban-rural municipalities of the Silesian Voivodeship. The analysis proved that the number of warnings depends on the number of errors and the number of people residing in a given municipality. Whereas, the correlation between errors and warnings is positive, and the correlation with the number of people residing in a given municipality is negative. Drawn conclusions are unequivocal that the quality of websites primarily depends on the network administrators; if they have high competences, they react to errors quickly and thus, eliminate the number of warnings. What is interesting, the quality of network administrators depends on the number of potential e-offices' users, since along with the increase in the population, the number of warnings decreases.

If we analyse the number of errors, the correlation with municipalities' incomes is positive, which is a poor testimony for local government members. It results from the fact that the amount of funds in the municipality does not favour the quality of their webpages. It seems justified to state that persons responsible for developing and managing websites of municipalities' offices should take into consideration the fact of the law quality of their websites and adjust them better to the needs of persons using the Internet.

The discrepancy in the quality of websites suggests that some entities should change or archive webpages and replace them with new ones. In the future the challenges faced by local government members with regard to the quality and accessibility of websites should be supplemented with the opinion of digitally excluded persons. Administrators should design the architecture of websites based on the said opinion and thus, better adjust the contents and forms by sharing information publicly. The number of errors and warnings should also raise concerns of persons responsible for the safety of data held by municipalities. It is easily noticeable that the accessibility and safety constitute main tasks of the municipality's local government concerning the quality of websites and mobile applications of e-offices.

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Risk-Contributing Factors Within the Context of Provision of a Cooperative Organization's Economic Security

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Abstract

In modern conditions any organization experiences the influence of both external and external factors, and in this connection there arise many problems, risks and threats. In conditions of economic development mechanisms and tools for prompt response of the cooperative sector to changes taking place on the microfinance market are required. A more balanced research and practical approach to solving the given problems is needed. The aim of the study is systematization of theoretical and practical basics of assessment of risk-contributing factors of a cooperative organization and development of mechanisms of providing economic security of the cooperative sector in quickly changing conditions. As a result of analysis of risk-contributing factors that determine economic security of a cooperative organization, we suggested mechanisms enabling solving cyclic problems that arise in the cooperative sector and providing economic stability of cooperatives by means of internal reserves and proper attention to risks on all levels of management and regulation on the microfinance market.

Keywords: Risk-Contributing Factors**,** Economic Security, External and Internal Environment, Credit Cooperation.

Introduction

In modern conditions the need in being proactive remains to be relevant for economic development. Risks and economic security are the notions that accompany any actions both in business and in government control. Prevention of risks and elimination of threats to economic security are still popular and attractive notions both for theorists and practitioners. From the point of view of the popular scientific approach, risks and threats as well as elements of economic security have various uses, but common content. Often these notions are mixed and considered to be interchangeable. From the point of view of the research approach, different authors put their own content material in the basis of differences in risks for and threats to economic security, for example, S.V. Bank et al. (2018). In studies by M.V. Barsukova and L.P. Fedorova (2018) technologies and competitive advantages in risk management are examined traditionally in modern organizations, while formation and implementation of the economic security model by L.P. Fedorova and M.V. Barsukova (2019) are taken on the level of a region, and, generally, this category, in the most part of the study, concerns the

macroeconomic level. Cooperation as a key development sphere is examined in the studies of A.V. Tkach (2014), R. Yanbykh, R. Saraikin and Z. Lerman (2019), O.V. Litvinova, G.V. Kalinina and L.P. Fedorova (2017), T.N. Egorova, S.N. Bogdanov and E.V. Bogdanova (2016), C. Sanchez Bajo and B. Roelants (2011) and others. Management of financial risks with regard for corporation, intermediaries and portfolio-balance approach was studied by the following authors: J.A. Batten, P. MacKay, N. Wagner (2013), Tim R. Adam and Amrita Nain (2013), Craig O. Brown (2013) and others. In the present study the emphasis is made on revealing of factors having significant influence on activities of cooperatives reflecting cyclicity of its development posing both a risk for and a threat to economic security of the cooperative sector.

Materials and methods of the study

The materials for the study were the experience of organizations of credit cooperation, in particular, the consumer credit cooperative "Sodruzhestvo", the Chuvash Republic. The following methods of study were used: problem-based approach, factorial analysis, analogy, systematization, generalization, graphical interpretation.

Results of the Study and Conclusions

In Russia, comparing to developed countries, insufficient attention is paid to examination of risk and threats of the external environment, but greater interest is concentrated around the spheres of influence of business and the state, opportunities for cooperation, search for new markets or growth of the occupied share of business market. All this is done with the aim of creating the background for fast and sustainable economic growth, in order to use any opportunity for business development. All these early interventions with respect to future influence of the external environment are reflected in the innovation investment model by S.L. Blau, L.P. Fedorova (2016) built on the basis of mobilization of internal resources. The wider the sphere of activity is, the greater is the need in managing its economic security. It is follows herefrom that in case of widening of the company's interests it is more interested in studying the external surroundings and risk-contributing factors, although business activity expansion is feasible not in all spheres of economy and might have no required effect. This is connected, first of all, with state control of activities of individual sectors and legislative requirements.

A situation has formed on the microfinance market when many entities make emphasis on survival and prompt response to changes in the legislation and regulatory measures, and only "large players" who participate in implementation of strategic benchmarks of the state policy of Russian public authorities can concentrate on strategic development tasks. Globalization in all spheres dictates its requirements. For example, in Russia the cooperation sphere is increasing despite external economic sanctions. This concerns international integration, at present, not only of the European direction, but Asian one as well, and provides for the following: facilitating entry into new international markets; expansion of the system of integration with large transnational companies; development of public-private partnership mechanisms. The field of integration and cooperation enabling greater "control" of the environment or thus trying to "resist" impact factors is becoming wider.

A.V. Tkach in his studies (2014) examines cooperation as a key sphere in the agroindustrial complex of Russia. Consumer cooperation has special historical importance. All risks inherent in this sphere of activity are closely connected with agriculture branches and directly influence credit cooperation. Trends of its development are connected with seasonality and cyclicity of agricultural production processes. Cooperative tradition in Russia is investigated in studies of R. Yanbykh, R. Saraikin and Z. Lerman (2019). For example, revival of agricultural service cooperatives can in its turn give a new direction for credit cooperative development. Forms of further cooperation in these fields (areas) and industries can give a new stimulus for credit cooperation development. It should be noted that the sectoral structure of Russian small business remains unchanged, according to T.N. Prokopyeva's book (2009): trade and repair industry are leaders that occupy almost a third of small business market, they are followed by real estate operations and building industry, encompassing another third of small enterprises. Development of individual kinds of spheres of services and attraction of small business

entities to the social sphere can open new horizons for cooperation development.

The adaptation mechanisms in development of the agroindustrial sector examined in the studies of T.N. Egorova and A.G. Ilyina (2018) make it possible to view increasing needs in investigating factors of external market surroundings. Conventionally, in studies impact factors are divided into 2 categories by the nature of the impact: external and internal ones. In works of O.V. Litvinova, G.V. Kalinina and L.P. Fedorova (2017) factors of direct and indirect impact are distinguished in the external surroundings and are distributed by the character of influence. Among top-priority and prominent factors those of market environment are distinguished which, as a rule, belong to direct impact factors: 1) consumers, 2) suppliers, 3) competitors, 4) direct state regulation. In separate cases indirect geographic environment is also distinguished as a direct impact factor. We believe that the geographic environment, in this way or another, is formed by the above mentioned 4 direct impact factors. In this connection for a modern organization solving of problems of assessment of external impact on business, which is reflected in the work of T.N. Egorova and A.S. Yanov (2019), provides for use of various methods, including factorial analysis, SWOT and PEST analysis and others. Quality of analysis and classification of environmental factors must ensure reliability of an organization's development forecasts built on their basis and making of corresponding managerial decisions. Such solutions are developed with the aim of preparing a list of measures of prospective development of the organization's activity that reveals all existing and assumed elements of impact (change) of the above mentioned four direct impact factors. Analyzing direct impact factors is a way of forecasting business development. Use of the given classification of factors by their impact depends on dependent and independent variables of external and internal environment as well as on the content of the phenomenon or process being the object of analysis. However, from the point of view of methodology, it is more important to study the degree of this impact, distinguishing between factors with significant level of impact, i.e. a high or strong significance, and factors of low, insignificant impact. In terms of importance of analyzing the results of this impact factors with a significant level of impact on the business activity results, i.e. of key or primary importance factors, and factors of less importance, belonging to secondary positions, are distinguished.

Thus, one can suggest dividing the risk-contributing factors into two groups by significance: key (top-priority), important for business factors and secondary, less significant factors.

According to assessment direction of impact of factors, positive and negative impacts (or threats, risks, risk-contributing factors) are distinguished. Classification and analysis of external impact factors are carried out with the use of methods of ranging and probabilistic assessment of the nature of impact of the factors. At that, variants can be used:

1) impact factors with opposite (differently directed) values of assessment focus are selected. For example, gain in money income of the population is a positive opportunity, while reduction of population's income is a negative characteristic or a threat;

2) factors having no oppositely directed focus and independent ones. For example, entry into a new market is an opportunity that has no negative opposite factor in the analysis process. It can be viewed only as a positive characteristic. However, there arise numerous unsolved issues of negative connotation (risk of occurrence of assumed problems), for example, barriers for entry into the field, presence of competitors, increasing of costs, adherence with regulations and control of activity. According to this example, one can state that for individual organizations negative, risk-contributing factors can turn into positive ones and vice versa. For example, inflation in most cases is determined as a negative characteristic of economy, but some enterprises can turn this factor into a favorable opportunity to increase prices for their products. There are quite a few examples of this kind in Russian practice since annual inflation, seasonal rise of prices encourage business to raise prices with no adequate reasons therefor.

The situation on the microfinance market during the recent years has significantly changed, which made work of the market participants more difficult. The common problematic field of risk-contributing factors remains irrespective of development cyclicity – this is, first of all, low paying

capacity of the population against the background of the economic crisis; secondly, imperfection of legislation and its mismatch with the actual market situation; thirdly, a short term of loans with high interest rates, etc. The macroeconomic situation and change of general state benchmarks (strategy) in the country, as a whole, aggravate the course of unfavorable internal processes of the microfinance market. Debt overburden and financial ignorance of the population, absence of financial assurances upon stiffening of regulatory functions, introduction of new institutions, in particular, bankruptcy of individuals remain to be risk-contributing factors, all this impedes activity of its participants and causes development slowdown (and even reduction in the number of market participants).

Thus, having generalized stages of development of the given sphere, once can conclude that there were more favorable periods due to state support and target development programs as well as financing from different funds, including foreign ones. They were replaced by stricter regulation at times changing into pressure on the microfinance market, displacement of small businesses and acquisition by large players. This often leads to unfavorable consequences of risk-contributing factors, which we observe at present in the credit cooperation. However, there exists an opinion, for example, in A.F. Maksimov's article (2019), where a conclusion was made that regulation of activity, in particular, of agricultural credit consumer cooperatives (ACCC) on the part of the Bank of Russia is not the only determinant of the reduction of their number. As a whole, to reduce the regulatory load the state authorities, including the Bank of Russia, start to use the risk-oriented approach to organization of state control and supervision.

It should be noted that the microfinance market has used up its previous excess returns he had in the middle of the 2000s and entered a regulated stage during its cyclic slowdown. Because of it credit cooperatives were in unequal competitive conditions, and their survival experience can be transformed for other markets, which is proved by foreign experience of cooperative movement described in the investigatory monograph of Claudia Sanchez Bajo and Bruno Roelants (2011).

As an example, let's examine the activity of the consumer credit cooperative "Sodruzhestvo", one of large cooperatives of the Chuvash Republic, which has been operating on the financial market for 17 years (Fig. 1).

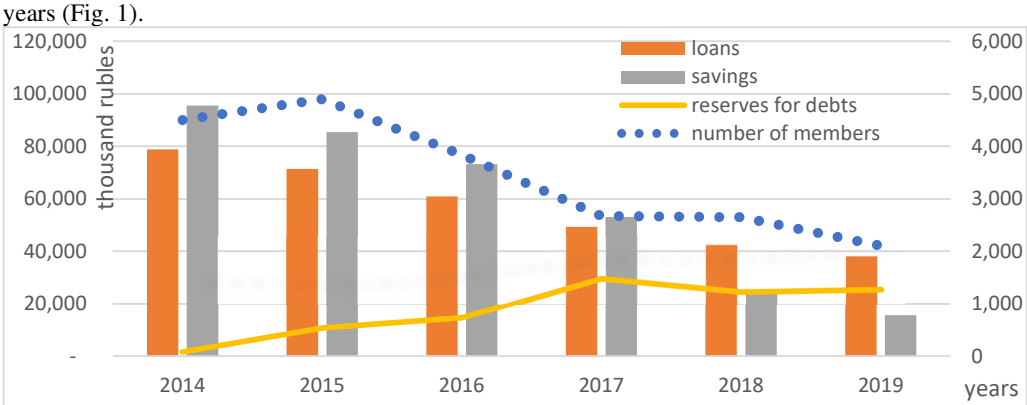

Fig. 1: Dynamics of the loan and savings portfolio of CCC "Sodruzhestvo" during 2014-2019

At the peak of activity in 2013 the loan portfolio increased comparing to the pre-crisis one of 2008 2.6 times. Opening of new divisions in regions of the republic had positive influence and the number of cooperative members increased during the first decade of operation almost 5 times. The loan portfolio grew up to 2014, incl. thanks to active work of the divisions – offices in the rural area. However, the crisis and turbulence in economy at the end of 2014 inevitably led to reduction in the loan portfolio volumes by 7 % with respect to the maximum of 2013, further reduction of the portfolio corresponds to the level of 2012, and for the period of the economic crisis from 2014 till present times the number of actual members has reduced almost twice, just like the loan portfolio, the outflow of savings - 6 times.

The reasons for aggravation of financial indicators of the cooperative since 2014 are interconnected risk-contributing factors, which include the economic crisis in Russia that led to reduction in the level of income of the population and growth of debt overburden of the population. The situation was further aggravated by stiffening of requirements to borrowers both inside the cooperative and in the external legislative environment. As a result, this led to provision of fewer loans in the cooperative, consequently, to loan portfolio reduction. Worsening of payment discipline on the part of borrowers led to an increase in the overdue amount by the loans provided. Untimely receipt of monetary means as repayment of loans from the borrowers started to create difficulties with fulfillment by the cooperative of its obligations with respect to its savers. In connection with active return of savings to members the cooperative cannot meet the financial ratios of its own and borrowed means. This is a cyclic problem faced by all cooperatives in different periods of financial recessions in conditions of self-regulation and regulation of the credit cooperation's activity by the Bank of Russia.

Higher rates of formation of reserves for possible loan losses (RPLL) during 4 years aggravated the market situation. Most cooperatives experienced these problems when by the end of 2017 they had to form 100 % RPLL to meet the requirements of the Instruction of the Bank of Russia "On the order of formation by consumer credit cooperatives of reserves for possible loan losses" No. 3322-У of 14.07.2014. The decision was made to direct a part of members' contributions for formation of RPLL as well as formation of a stabilization fund out of members' contributions. This measure solved a part of problems. However, the solution turned out to be unpopular in the beginning and caused panic among a part of savers that provoked their outflow. About 3% of the total number of members wanted to return their savings.

In our case the panic of a certain part of members was caused by the trend of closing of many well-known large and small credit cooperatives of the Chuvash Republic that had been operating on this market for over 10 years, which is present even nowadays. Also, credit cooperatives of other regions operating in the Chuvash Republic through representative offices are closed in the bankruptcy procedure. Well-known banks are deprived of licenses, which also increases "panic" mood of the population. The image of cooperatives as "financial pyramids" used by swindlers with the aim of non-refundable withholding of savings of the population is formed in the mass media. In conditions of financial ignorance of the population this negatively affects the image of the credit cooperation and leads to mistrust to the microfinance market sector, as a whole. So faithfully operating cooperatives have to maneuver, fighting difficulties that may arise on a standalone basis.

With the aim of ensuring financial stability a cooperative should have enough of its own resources. Different variants are suggested by us for formation of a "safety cushion". For example, it is creation of targeted funds (stabilization funds) by attracting members for its formation as well as the possibility of increasing members' contributions to the reserve fund.

The suggested measure of transition to mainly contribution-based operation will provide the cooperative with real possibilities of reducing the dependence on attracted members' savings to the level of less than 50% in the Fund of mutual financial assistance. Also, as an effective measure, there was a suggestion concerning payment by members of additional contributions for covering the losses by the results of RPLL formation that was adopted in 2018 and approved by the Board and the general meeting of cooperative members. The given measure enables increasing responsibility of members for observation by the cooperative of historical operation principles, including adherence with financial regulations of CCC.

In case of nonadherence with financial regulations a cooperative develops and implements a solvency recovery program, which is a measure of ensuring economic security. With the aim of preventing losses from RPLL formation the more favorable time period, according to practitioners, would be a period of minimum 7 years, instead of 4 years established by Instruction No. 3322-У. The given measure would enable formation of about 15 % of reserves annually, reduce members' burden and would not affect operation of faithful cooperatives oriented at stable and continuous functioning on the market. A top-priority task of the present time is to prevent increasing of overdue debts of a cooperative.

The authors (T.N. Egorova and S.N. Bogdanova (2019)) in their studies suggest using the measures of involvement of internal reserves of economic security. We distinguish internal elements of economic security of a consumer credit cooperative as the key ones the adherence with and implementation of which is possible within the framework of the Basic standards on risk management used in the sphere of activity of consumer credit cooperatives and approved by the Bank of Russia as a regulator of the microfinance market:

1) financial stability confirmed by adherence with financial regulations;
2) formation of required funds which are to be used in force majeure circumstances;
3) acquiring of objective information about loan portfolio quality and formation of reserves for possible loan losses;
4) organization of work with overdue debts, an example is studying operation of a department on collection of overdue debts (Table 1).

Table 1: Characteristics of key elements of economic security of a consumer credit cooperative

Name	Characteristic	Document	Result
1. Financia l stability	Adherence with financial regulations of CCC proven in dynamics by calculations and controlled on the part of the Bank of Russia as a mega-regulator and CCC SRO	Instruction of the Bank of Russia "On numerical values and the order of calculation of CCC financial ratios" dated 28.12.2015 No. 3916-У	Enables comparative assessment of entities' activity, sustainable and economically stable operation of a cooperative
2. Formation of funds and reserves	Use of the resources of CCC funds and reserve fund is provided for in case of economic instability on the market, a shortage of monetary means for provision of statutory activity of a cooperative as well as in force-majeure circumstances	Instruction of the Bank of Russia "On the order of allocation of resources of CCC reserve funds" dated 24.09.2015 No. 3805-У	Creates the required balance and prevents onset of negative circumstances in operation of a cooperative: gaps (shifts) in attraction and use of members' monetary means
3. Loan portfolio quality, share of overdue loans	Acquiring of objective information about loan portfolio quality by formation of reserves for possible loan losses	Instruction of the Bank of Russia "On the order of formation of CCC reserves for possible loan losses" dated 14.07.2014 No. 3322-У	Provides for statutory activity of a cooperative, ensures its stability and liquidity of CCC assets
4. Claim-related work of cooperative with overdue debts by loans provided	Formation of a service for collection of overdue debts, a center of out-of-court settlement (COS), a service (department) of internal control, appointment of persons responsible for supervision over fulfillment of contractual obligations and timely payments by borrowers for the loans provided, effective work of managers of overdue loans	Basic standard on risk management in the sphere of CCC activity, approved by the Bank of Russia, Protocol No. КФНП-11 of April 17, 2018	Systematic work with overdue debts, constant interaction between loan managers and members with overdue debts and a service of court bailiffs

A key task of a cooperative in conditions of risk-contributing factors is keeping trust of the most part of members and joint work between members and the management of a cooperative to escape a difficult situation. Undoubtedly, a cooperative has to continue providing financial mutual assistance, giving loans, along with returning savings to its members – this is one of the main conditions of its survival, operability, maintaining of the cooperative's financial stability. The management of CCC "Sodruzhestvo", together with the Board, employed its internal reserves, namely, it attracted the cooperative's members to solving of existing problems. One of important internal reserves specific namely for the cooperative form of organization is procurement, through mutual assistance of members, of the required resources for fulfillment of obligations with respect to all members and prevention of bankruptcy for stabilization of further operation. Solving of this problem provides the cooperative with possibilities of transition to a less risky form of contribution-based operation, which ensures its economic security.

A cooperative's development prospects, in lieu of formation of economic security, are seen by us as CCC sustainability and operation stability, attraction of new solvent borrowers, including those from competitors, provision of new, more competitive services on the financial market, winning over trust to itself, enlargement and integration with other cooperatives in the way enabling adherence with principles of cooperation community, ensuring economic security and preventing significant risk-contributing factors.

Thus, economic security of a consumer credit cooperative is perceived by us as an anti-crisis program of its stable operation. When outlining economic security elements, we considered their interconnection with the theory and practice of anti-crisis management and risk management. We suggested the following key elements: ensuring financial stability, formation of required funds and reserves; active use of tools of assessment of borrowers' risk profile for ensuring quality of the loan portfolio with a low share of overdue debts; adherence by the cooperative with the "Provision on risk management"; effective monitoring of borrowers' financial behavior and members' financial literacy; improvement of effectiveness of claim-related work, program-based scoring, tools of preventing loan-related fraud, etc.

Classification and analysis of external impact factors are concentrated around business impact spheres, forms of cooperation, search for new directions, so we should suggest classifying direct and indirect impact factors dividing them by the nature of impact into: key, top-priority, significant for business and secondary, less significant ones; by impact assessment positive impacts and negative impacts (threats, risks, risk-contributing factors) are distinguished, with the use of methods of ranging and probabilistic assessment of the nature of impact of factors.

The examined risk-contributing factors have critical influence on economic security of a consumer credit cooperative, i.e. they act as threats to economic security. This is, first of all, outflow of savers as a result of panic moods because of the existing market situation and, secondly, the risk of formation of overdue loans and the need in formation of reserves for possible loan losses, when a cooperative, having a loss, makes up for it using its own resources, including members' resources. Here lies the main difference between a cooperative and microfinance and other credit organizations. Active members' participation in the work of the cooperative existing for provision of mutual assistance to members within the framework of cooperative community ensuring transparency of its operation for members, improvement of their financial literacy and trust is believed to form economic security of organizations of the cooperative sector both in the past and in future.

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Uniformed Classes in Poland And Their Role in The Process of Shaping Young People's Pro-Defense and Citizen Attitudes

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Abstract

The purpose of this article was to present the impact and role of uniformed classes in shaping civic and patriotic attitudes among young people. A study was conducted on a group of 1,100 students in uniformed classes. The main purpose of this study was to show the role of uniformed classes in shaping civic and pro-defense attitudes of young people. The study showed that uniformed class students highly value civic attitudes, such as helping other people both in Poland and around the world, as well as understanding and accepting other people's views and arguments. Controlling the government's work, paying taxes, complying with the law or participating in elections also plays an important role for them. In addition, the study showed that young people attending uniformed classes exhibit pro-defensive attitudes. Uniformed class students are people who support education for safety or access to firearms. These are people who declare their readiness to give their lives for their homeland in the event of an armed conflict or planning to start working in uniformed classes in the future.

Keywords: uniformed classes, patriotic education, security, defense.

Introduction

The main purpose of this study was to learn about the role played by uniformed classes in shaping civic and pro-defense attitudes among young people. At the beginning, bearing in mind the problem situation described above, the research problem was adopted. It is based on indicating what kind of civic and pro-defense features students of uniformed classes manifest. In order to solve the assumed research problem, the attitude of uniformed students to the presented classes was analysed civic attitudes, such as paying taxes, complying with the law, participating in elections, controlling the work of the government, tolerance for other views, social activity, economic patriotism, or willingness to help other people, both in Poland and around the world. Further on, questions were asked regarding pro-defense attitudes of uniformed class students, such as attitudes towards military service, law, weapons, and education for security (Falkowski, 2013). This allowed the key conclusions to be established, as well as outlines of positions that affect the final conclusions.

In this study, the author used a deliberate selection of a research sample. The respondents were selected from uniformed students of three upper secondary schools. This study was conducted in November 2019. In this case, the targeted selection method used was most appropriate for the type of study. It is the most typical example of non-random selection. Its features include the use of subjectively selected units to obtain the fullest and widest range of information in the study.

Materials and Methods

In this study, the diagnostic survey method, the survey technique and the popular research tool, the questionnaire, were used. When planning the research, the author decided that this tool is the most helpful, and therefore and the most adequate for the subject studied, as it allows full transparency of the results obtained. The author wanted to maintain the variety of questions used. For this purpose,

among others, categorized questions that allowed receiving many answers from respondents. The survey questionnaire also includes closed questions.

The research group in the study was 1100 people, coming from high schools, leading uniformed classes. All respondents are students of uniformed classes (1st, 2nd and 3rd class). Some respondents refused to participate in the study. They motivated their decision by lack of interest and their negative attitude towards various types of surveys. It is worth mentioning that for many respondents a high level of interest in the subject of the study was observed. They showed this interest by requesting to receive the test results by e-mail.

On the basis of the record questions used, the characteristics of the studied population were analyzed. The majority of respondents are men in the number of 660 respondents, and the remaining part were 440 women. 46% of respondents attend class I and they constitute the largest group. 35% of participants attend Class II, while 19% attend Class III. The most numerous group consists of students living in a small town - up to 50,000 residents (390 people), then students living in the village (380 people) and residents of the average city from 50,000 up to 100,000 residents (290 people). The least people live in a large city - over 100,000 residents (40 people).

Results

The survey questionnaire consisted of 21 questions, divided into 3 parts: the first part concerned the citizens' attitudes of the students, the second part - pro-defense attitudes, while the third part was metric data. The article will present only part of the results of the survey.

The first panel of the survey concerned the determination of civic attitudes among students in uniformed classes. They were asked to indicate on a scale from "1" (definitely not important to me) to "7" (this is very important to me) of their attitude to the values and theorems presented. The average for individual statements was calculated based on the answers given by the respondents (Kaliński, 2000).

In the case of saying that you should take part in all elections, the vast majority of respondents, as much as 50% indicated the answer "7", which means that participation in the elections is extremely important for them. Answers "5", "6" and "7" testifying to the validity of a given statement were indicated in total by as much as 75% of respondents. A neutral response, i.e. "4" was given by 20% of respondents. Participation in elections is not significant only for 5% of respondents who indicated answers "1", "2" and "3".

In the statement about the obligation to pay due taxes, the largest number of respondents also indicated the highest level of significance, i.e. the answer "7", i.e. 43% of respondents. A total of 77% of respondents pointed to the high significance of this issue. A neutral answer was given by 13% of respondents, and an answer indicating the lack of significance of paying taxes to 10% of high school students from uniformed classes.

Another statement concerned the attitude to absolute compliance with the law. In this case, also the largest number of respondents indicated the highest importance of this statement - it was as much as 49%. A high level of importance of paying taxes was indicated by a total of 82% of respondents. A neutral answer was given by 10% of respondents, and the answer indicating a low level of significance of the statement only 8% of respondents.

In the case of the statement about the need to control the actions of the government, most respondents pointed to the highest importance of this statement - 44%. A total of 83% of respondents gave a high-level response. A neutral answer was given by 11%, while a low-answer answer was given by 6% of high school students.

Another statement was that one should try to understand other people's arguments and views. Here also the highest number of respondents indicated the highest level of significance - 44%. A total of 85% of

respondents indicated a high level of significance of this statement. Neutral answer was given by 11% of high school students, while the answer indicating low importance was 4% of high school students.

In the remainder of the study, respondents referred to the statement that one should be an active member of political and social associations. In this case, the majority of respondents indicated the moderate validity of this statement - 31%, and the neutral response. In total, 53% of high school students replied that this statement was valid. In turn, a neutral answer was given by 27% of respondents, and those providing low significance - 20%.

Another statement concerned whether to be guided by ethical, political or environmental considerations when purchasing a given product, even if the product should be more expensive. In this case, the highest number of "4" answers was given, i.e. the neutral - 28%. The validity of this statement was declared by 50% of respondents, and low level of significance was indicated by 27% of respondents.

In the case of the attitude of high school students from uniformed classes to helping other people in different parts of the world, the highest number of answers were given - 42%. In total, 90% of responses attesting to the importance of this statement. Neutral answer was given by 6% of high school students, and only 4% of respondents who testified to low significance.

The last of the statements, to which students of the uniformed classes were asked, concerned their attitude to helping people in Poland whose standard of living is worse than their own. In this case, the majority of respondents indicated the highest level of significance of this statement - 46%. In total, 90% of respondents declared high significance answers. A neutral answer was given by 6% of high school students, and a response indicating a low level of significance of this statement by 4% of respondents.

In order to analyze civic attitudes among students of uniformed classes, the average for individual theorems was calculated. Against the background of the results obtained, the importance of economic patriotism, respect for the environment or political considerations when purchasing a given product is relatively clear - here the average answer was the least - 4.11. A similar result was obtained in the case of social activity in the form of active participation in pro-defense associations and organizations - here the average answer was 4.59.

For a relatively large number of respondents, participation in elections (average 5.0) and unconditional payment of taxes (5.47) are of high importance. Even more important for high school students from uniformed classes is compliance with the law (5.79) and control of the government's work (5.81). Definitely the highest level of importance for them is helping people in need around the world (5.9), as well as understanding for other people's views and arguments (5.9). The highest average, and thus the highest level of importance for respondents is to help people in Poland whose standard of living is lower than the standard of living of the respondents (Chart 1).

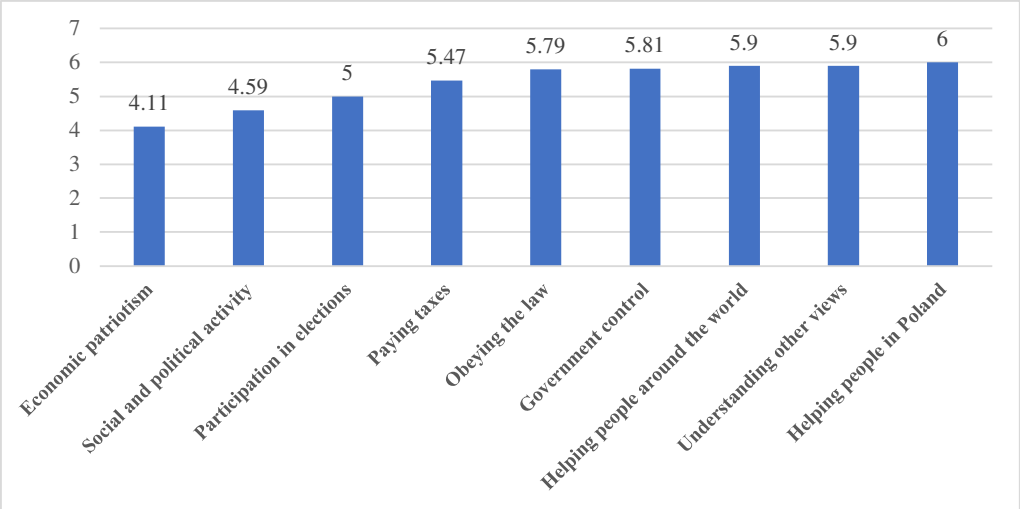

Chart 1: Attitudes of students in uniformed classes

The further part of the study concerned pro-defense attitudes among students of uniformed classes. In the first question of this panel, respondents were asked to indicate their opinion on military service. The majority of respondents, as much as 58%, indicated the need to maintain voluntary military service. Less than 38% believe that military service should be compulsory. 4% of uniformed students do not have an opinion on this topic. This shows that the majority of students in uniformed classes are people for whom voluntary attitude towards military service is of high value (Kanarski, Koter, Urych, 2014).

Another question related to the students' declarations whether in the event of a specific situation, e.g. armed conflict, they would be ready to give their lives for their homeland. The vast majority of respondents declared such readiness - 80%. The lack of readiness to sacrifice their life for their homeland was declared by 8% of respondents, and 12% of respondents have no opinion on this topic (Chart 2). This shows that students of uniformed classes are people who, in the event of armed conflict, declare their readiness to give their lives in defense of their homeland.

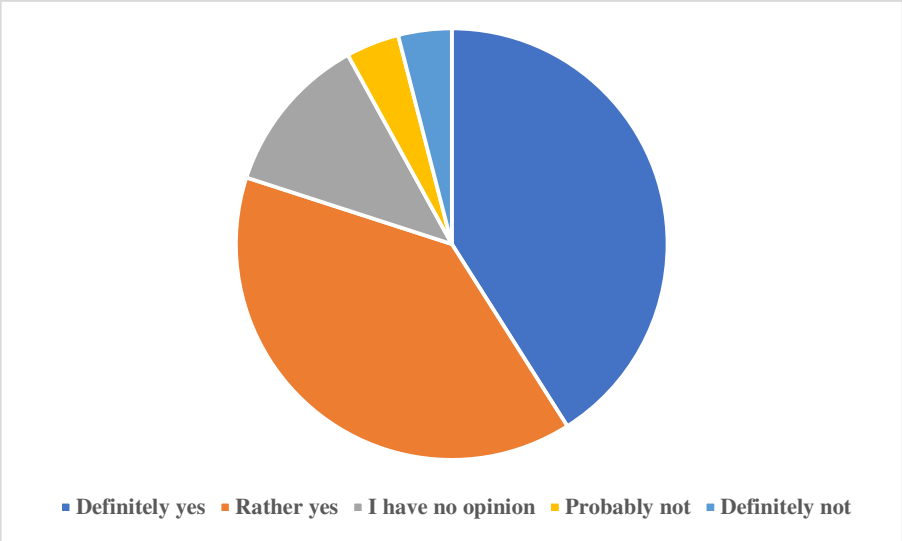

Chart 2: Opinion on readiness to give life for the homeland

In the next question, the respondents were asked to indicate whether they are in favor of further investing in increasing Poland's security. The vast majority of respondents are supporters of this

solution - they constitute 94% of respondents. Only 2% of respondents hold a different opinion. No opinion on this subject was declared by 4% of high school students from uniformed classes. This shows that students of uniformed classes are strongly supporters of spending more on Poland's defense.

In the further part of the panel examining pro-defense attitudes of uniformed class students, respondents were asked whether they plan to take up employment in uniformed services in the future. As many as 82% of respondents indicated that they intend to look for employment in uniformed services in the future. 11% of respondents have a different opinion and 7% have no opinion on this subject. This shows that for students of uniformed classes, the vast majority of them plan to work in any of the uniformed services in the future.

In addition to the desire to take up employment in uniformed services, an important aspect is also the prestige of this service in the eyes of uniformed class students. Students participating in the study were asked about this prestige. For 63% of respondents, work in the uniformed service has high prestige. Interestingly, none of the respondents indicated the low prestige of uniformed competitions. It is worth noting that as many as 37% of respondents indicated moderate prestige of work in uniformed services (Chart 3). This shows that the prestige of work in uniformed service is quite highly rated by students of uniformed classes, but actions should be initiated to increase this percentage.

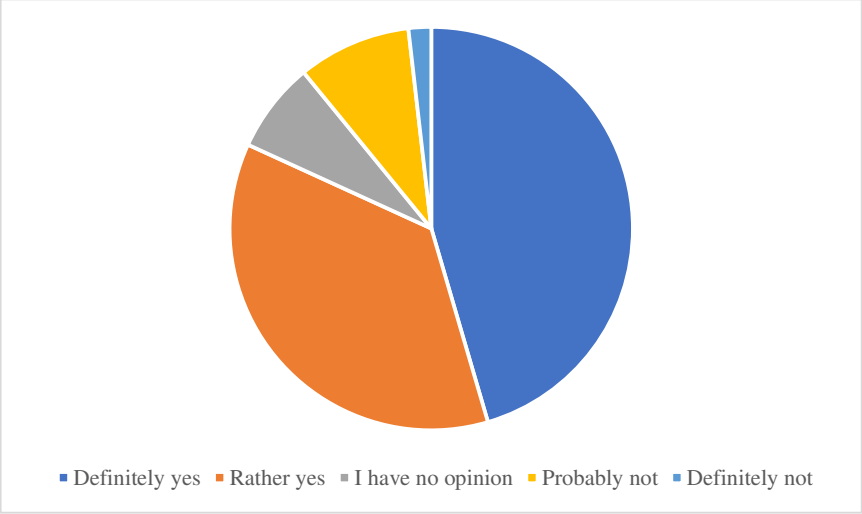

Chart 3: Opinion on taking up a job in the uniformed services in the future

The next question was whether the respondents belong to pro-defense organizations or associations. The vast majority, as much as 82% of respondents, do not belong to any organization of this nature. Only 18% of respondents belong to this type of organization. This shows that students of uniformed classes are reluctant to belong to associations or pro-defense organizations. It is worth taking actions to promote various types of organizations or associations (Skrabacz, Urych, Kanarski, 2016).

Respondents were also asked to indicate their attitude towards gun ownership. For the majority of respondents, up to 58%, weapons should be available to the public after meeting certain conditions. In turn, for 29% of respondents, access should be limited to special cases only. For 7% of respondents, weapons should be freely available, without any conditions. In turn, 5% of respondents have no opinion on this topic. Only 1% of respondents believe that access to weapons should be completely banned (Figure 4). This shows that students of uniformed classes are in favor of general access to firearms, but under certain conditions.

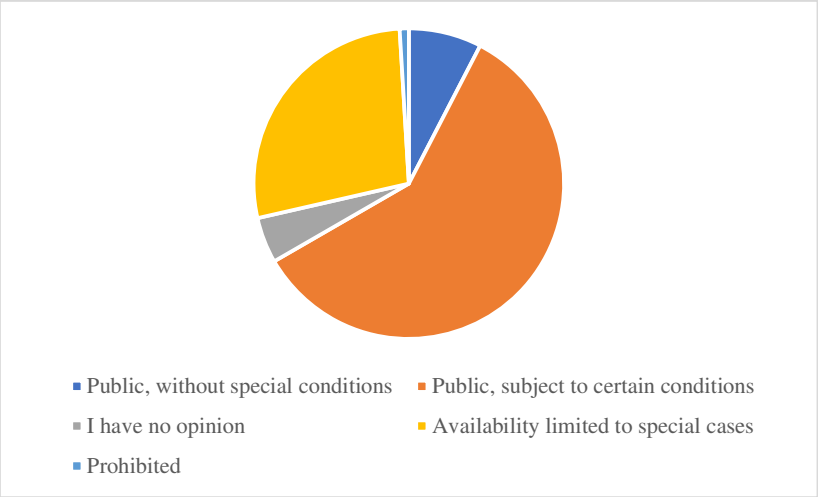

Chart 4: Opinion on access to weapon

In the next part of the study, respondents were asked to provide their opinion on whether introducing a compulsory subject Education for safety at school is a good idea. For the vast majority of respondents, as much as 87% is a good idea. No opinion on this subject was declared by 9% of respondents, and for 4% of respondents the introduction of such a subject is a bad idea. This shows that students of uniformed classes are for the most part supporters of education for safety at school level.

The last question was whether students of uniformed classes are considering leaving Poland permanently in the future, e.g. for work purposes. Interestingly, only 36% of respondents do not intend to go abroad. In turn, as many as 43% of respondents consider such a trip in the future. No opinion on this subject was declared by 21% of respondents. This shows that, unfortunately, most students in uniformed classes are considering leaving the country for good (Chart 5). It is worth taking action to encourage young people to stay in the future in Poland. Permanent travel abroad of young people, especially future graduates of uniformed classes, can have a negative impact on the defense capabilities of the country.

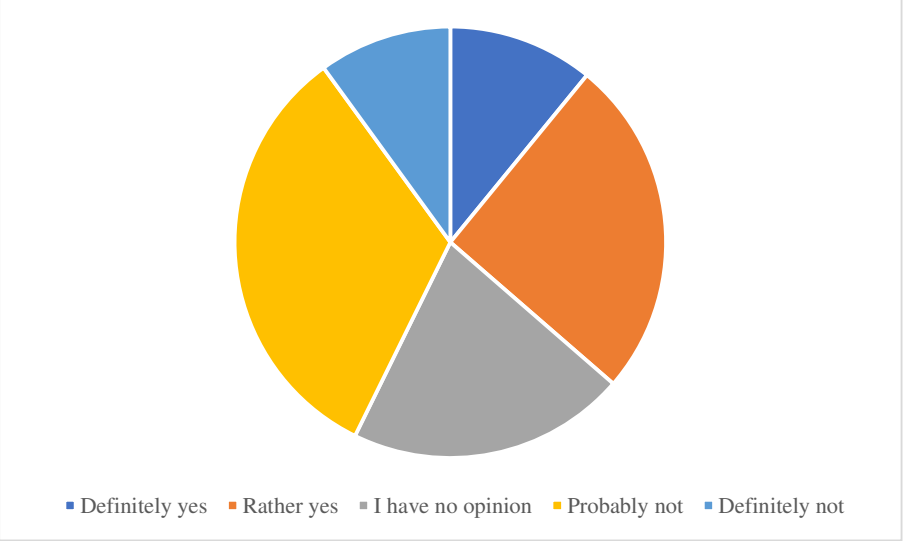

Chart 5: Opinion on the possibility of leaving the country permanently

Discussion

It is worth emphasizing that all civic attitudes mentioned in the survey were assessed as important for the majority of uniformed class students participating in the survey. Among the listed civic attitudes, students of uniformed classes consider to the least important such as following national, political or environmental prerequisites when shopping, as well as belonging and working in pro-defense associations and organizations. In the case of the first attitude, it is worth including in the educational program elements of knowledge on the impact of consumer choices on the economy or the environment. In the case of the second attitude, it is worth paying attention to appropriate promotion of pro-defense organizations and associations among uniformed class students. This could take place during all kinds of open days or classes organized by these associations and organizations in schools where uniformed classes are conducted (Kanarski, Koter, Loranty, Urych, 2014).

Most respondents indicated that military service should be the voluntary choice of a given person. This shows that for students of uniformed classes, an important aspect is maintaining the voluntary nature of military service, in accordance with current legislation. In addition, students of uniformed classes in the vast majority declare their readiness to give their lives for their homeland in an armed conflict. This is especially important in the case of national defense.

The vast majority of students in uniformed classes are people who support increased spending on Polish defense. Also, many students of this type of classes plan to take up employment in uniformed classes in the future, which should be of special interest to those responsible for recruitment to this type of service. This is particularly important in relation to the demographic decline and the situation on the flare market, which is not conducive to recruitment to uniformed services. Unfortunately, for a large percentage of students, work in uniformed services does not enjoy high social prestige. It is worth undertaking various types of promotional activities that can raise this type of rating.

Conclusions

The study can be considered as fully effective. The main goal was to show the role of uniformed classes in shaping civic and pro-defense attitudes of young people. For this purpose, a study was conducted in which a questionnaire was used as a research tool.

Most uniformed class students are in favor of general access to firearms when certain conditions are met. This seems to be in line with pro-defense attitudes. Uniformed class students are also supporters of education for safety. In their opinion, introducing such a subject to schools is definitely a good idea. Undoubtedly, it plays an important role in shaping pro-defense attitudes among young people.

Unfortunately, a large proportion of students in uniformed classes are considering the possibility of leaving Poland permanently in the future for work purposes. This can have a definitely negative impact on Poland's defense through the outflow of educated youth who could join the ranks of various types of uniformed services. It is worth considering wide-ranging activities in the field of education, economy or social policy, which would encourage young generations to plan their future in Poland. This is undoubtedly a task for those who rule in the state. This study allowed to effectively analyze the citizens' and pro-defense attitudes of young people. Further research is postulated on the issues discussed as it has a great impact on the future of Poland and Poles. In addition, it is postulated to continue the research on a larger research group that would allow for a broad generalization of the results obtained.

It is worth analyzing the pro-defense and civic attitudes of uniformed class students with students of classes with different profiles. Only such research will be able to fully demonstrate the role and influence of uniformed classes on pro-defense and civic attitudes. This seems necessary, especially with the current desire to introduce uniformed classes as a permanent element of the Polish education system. These types of activities seem to be not so much advisable as, in principle, necessary, but they should be carried out in an orderly and coordinated manner, and what is the most important together with the support of the world of science.

Acknowledgment

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An Approach to Supporting Decisions Regarding Condition-Based Maintenance (CBM) Using the AHP Method

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Abstract

Condition-Based Maintenance can be treated as a decision-making strategy, based on the data, information and knowledge collected from a manufacturing company. This article uses literature studies and the Analytic Hierarchy Process method, in order to determine the framework for the Supporting Decisions regarding CBM: (1) Maintenance Worker Selection Map, (2) the acquisition of data and information on the condition of machinery, (3) the amount of necessary repair costs entailed, (4) the creation of a data and information base, (5) a repair schedule, using the Analytic Hierarchy Process method, (6) and generating activity scenarios. The proposed approach is applied and validated in a real-case study.

Keywords: Maintenance, CBM, Competence, Decision Support

Introduction

Condition-Based Maintenance (CBM) can be treated as the strategy for potential maintenance schedules, based on prognostic models (Bousdekis et al., 2015). The development of methods and tools, supporting the implementation and realisation of this strategy, is in line with the concept of Industry 4.0. CBM, within manufacturing enterprises, enables failure to be predicted (Vafaei et al., 2019). However, for implementation of this strategy to be effective, it is necessary to develop and use decision making systems, in order to monitor machines (Kothamasu et al., 2006). One of the most important maintenance issues, for a manufacturing company, is the need to maintain a balance between a high level of reliability and economic cost. In CBM, strategy decisions can be made using historic data, collected during any manufacturing process. According to Shafiee (2015) the advantage, when using CBM, is that failures can be predicted; however, the disadvantage is the cost of the monitoring itself. The main our research question is whether, on the one hand, there is a decision model that combines the possibility of predicting failures, based on the historical values of parameters of the machinery and devices used in a maintenance department, while, simultaneously, taking into account the amount of necessary repair costs; moreover would such a decision model allow selection of the right employee to repair the machine? According to our previous research (Patalas-Maliszewska and Kłos, 2017) we have determined that the core competences of employees, in the context of Industry 4.0, are (1) technical competences, including general knowledge, expertise

and qualifications. (2) methodological competences, to include problem solving, the ability to organise work, creativity and analytical skills. (3) social competences, to include personal culture, the ability to work in a team, the ability to work with customers and communication skills. (4) personal competences, to include flexibility, the ability to undertake task-oriented work and work under pressure. Moreover, (in Patalas-Maliszewska and Kłos, 2019) we defined the most important competences of each maintenance worker as hard skills, knowledge-based skills, methodical skills, soft skills and experience. In this article, we assume that we have a specific number of employees in the maintenance department with suitable competences to repair a given machine, the 'Maintenance Worker Selection Map', so-called. (Patalas-Maliszewska and Kłos, 2019). We are looking for a machine repair schedule, depending on the amount of necessary repair costs to include labour costs, the cost of spare parts, downtime costs, penalty costs and the costs of lost benefits. In addition, we define in our approach, the needs of a maintenance department. in terms of the expected competences of the workers.Thus, motivated by the need to collect and store data and information about maintenance costs, the decision support model, for Condition-Based Maintenance (CBM), based on the identification of competence, is presented. The first element of the model is identification of those employees who have suitable competences, according to the 'Maintenance Worker Selection Map'. The values of the parameters of the machinery and devices used and also the amount of necessary repair costs, in a maintenance department, based on historical data, are then described. Using the Analytic Hierarchy Process method (AHP), the machine repair schedule is then constructed. Once all the competences held within a maintenance department are fully recognised, the final repair schedule can then be defined. On this basis, a decision-making model, for selecting the order in which machines were to be repaired was constructed, assuming minimum repair costs and according to suitable competences. In the last section of this paper, the implementation of our approach, based on a real case study, is presented.

A decision support approach for condition-based maintenance (CBM)

The collection of data and information during any manufacturing process is now easier because of the development of cyber-physical systems and also because sensors are cheaper; however, such data and information collection is still needed, in order to improve the decision-making process in CBM. Managers need ever more robust maintenance models, in order to implement predictive maintenance strategies (Park et al., 2016). According to Tsang et al. (2013) the important issue, within CBM, is what consequences - for the order process- will any potential malfunction have for a production line.

Vafaei et al. (2019) stated in the literature that a significantly increased use of intelligence techniques for monitoring and forecasting malfunctions can be observed in CBM; these include, decision trees (Bonissone and Goebel, 2001) and neural networks (Lee et al., 2006). The motivation for this paper was the study of Erosan (Erosan, 2019) in which was presented a method for identifying the critical components of the manufacturing system, using such as the AHP method.

We are looking for a model for collecting data about the parameters of the machinery and the devices used, within a manufacturing process and also about necessary maintenance and repair costs. The maintenance strategy of Zhao et al. (2018) is based on the minimisation of expected cost rates. We propose a more complex approach to monitoring repair costs including the following costs, viz., labour costs, the costs of spare parts, downtime costs, penalty costs and the costs of lost benefits. Moreover, in our model, we can identify which suitably competent employees should be given which machines to repair and finally we can recognise the competence needs of a maintenance department. The concept of the decision support approach for Condition-Based Maintenance (CBM) includes the following elements (1) the 'Maintenance Worker Selection Map', (2) the acquisition of data and information on the condition of machines, (3) the amount of necessary repair costs, (4) the creation of a data and information base, (5) a repair schedule, using the Analytic Hierarchy Process method, (6) generating activity scenarios. (Fig. 1).

In the first element of our approach, the value of the competence function $f(W_m)$ so-called, for each maintenance worker, is described. According to our work, (Patalas-Maliszewska and Kłos, 2019) each employee must complete a dedicated questionnaire for each competence, in order to acquire the

competence values, *viz.* hard skills, knowledge-based, soft skills and experience. A competence questionnaire is assigned to each resource, serviced by maintenance workers. Based on the defined rules and the test results of each employee, it is possible to calculate the value of the competence function $f(W_m)$ so-called, for each maintenance worker and for each resource, within a manufacturing company (Table 1). The higher the value of $f(W_m)$ for a given resource, then the more likely it is that this employee should be selected to repair a given machine.

The second element (Fig. 1) is to obtain the historical data on the work of a given resource. It should be assumed that employees in the enterprise use a cyber-physical system and that it is possible to obtain data regarding the time that spare parts 'k' are used for a given resource, $1 \leq k \leq 4$ - as also data regarding the time between failures for a given resource in this system. Table 2 presents the formulae for the first machine.

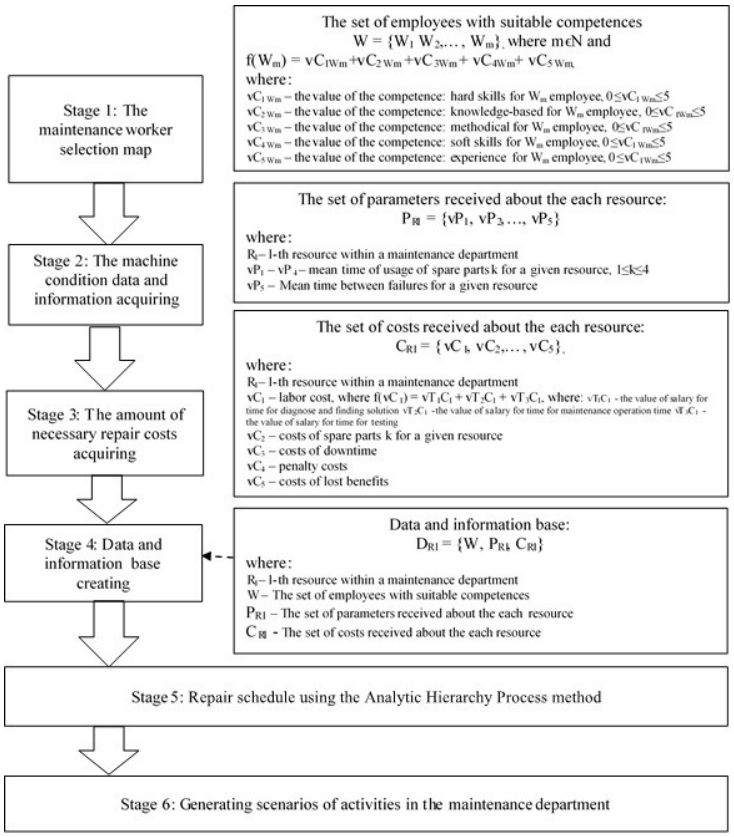

Fig. 1: The concept of the decision support approach for Condition-Based Maintenance (CBM).

Table 1 : The Maintenance Worker Selection Map

Resource within a manufacturing company	$f(W_1)$	…	$f(W_m)$
R_1	$0 \leq f(W_1) \leq 25$	…	$0 \leq f(W_m) \leq 25$
…	…	…	…
R_l	$0 \leq f(W_1) \leq 25$	…	$0 \leq f(W_m) \leq 25$

Table 2: Parameters received about each resource in one year

	1th data exchange for spare parts or data on failure	…	d-th data exchange of spare parts or data on failure	Mean time that spare parts were used
Spare part 1				vP_1
Spare part 2				vP_2
Spare part 3				vP_3
Spare part 4		…		vP_4
Failure				vP_5

The values of the necessary repair costs are then obtained from the cyber-physical system used, within a manufacturing company (Table 3).

Table 3: Values of the necessary repair costs received for each resource in one year

	The salary value for time taken up diagnosing and finding a solution	**The salary value for time taken up by maintenance operations**	**The salary value for time taken up by testing.**	**Costs of spare parts**	**Costs of downtime**	**Costs of lost benefits**	**Penalty costs**
1 Data exchange of spare part 1	vT1 C11	vT2 C11	vT3 C11	vT3 C21	vT3 C31	vT3 C41	vT3 C51
2 Data exchange of spare part 1	…	…	…	…	…	…	…
…	…	…	…	…	…	…	…
d-th Data exchange of spare part 1	…	…	…	…	…	…	…
1 Data exchange of spare part 2	…	…	…	…	…	…	…
…	…	…	…	…	…	…	…
d-th Data exchange of spare part 4	…	…	…	…	…	…	…
1 Failure data	…	…	…	…	…	…	…
d-th Failure data	vT1 C1d	vT2 C1d	vT3 C1d	vT3 C2d	vT3 C3d	vT3 C4d	vT3 C5d

Using the data and information on Tables 1-3, the knowledge base, for the resources in a manufacturing company, is constructed (Table 4).

Table 4: Data and information, based on one year's resources

	Resource 1	**Resource 2**	**…**	**Resource l, l∈N**
$f(W_m)$	max $f(W_m)$	max $f(W_m)$	…	max $f(W_m)$
vP_1	…	…	…	…
vP_2	…	…	…	…
vP_3	…	…	…	…

vP_4	…	…	…	…
vP_5	…	…	…	…
vC_1	…	…	…	…
vC_2	…	…	…	…
vC_3	…	…	…	…
vC_4	…	…	…	…
vC_5	…	…	…	…

Using the AHP method, the repair schedule is then constructed.

AHP is an effective method for dealing with complex decision making and may aid the decision maker to set his/her priorities, in order to arrive at the best decision. By reducing complex decisions to a series of pairwise comparisons, and then synthesizing the results, the AHP method enables us to capture the subjective and objective aspects of a decision. In addition, the AHP method encompasses a useful technique for checking the consistency of the decision maker's evaluations, thus reducing any bias in the decision-making process (Saaty, 1980). The AHP method considers a set of evaluation criteria and a set of alternative options from which the best decision is to be made. The AHP method can be implemented in the three following steps, namely, computing a vector of criteria weights, computing a matrix of option scores and ranking the options. In our approach, we created the following, pairwise comparison matrix A, based on Table 4:

(1) so-called process factors: $f(W_m)$- the competence function, P_1- mean time that spare parts 1 were used for a given resource; P_2- mean time that spare parts 2 were used for a given resource; P_3 - mean time that spare parts 3 were used for a given resource; P_4 - mean time that spare parts 4 were used for a given resource; P_5 - mean time between failures for a given resource.
(2) so-called cost factors: C_1 – labour costs C_2 - costs of spare parts k, for a given resource, C3 – costs of downtime, C4 – penalty costs, C5 – costs of lost benefits

The relative importance between the factors is measured according to a numerical scale from 1 to 9, where: 1-both criteria are equally important; 3- the first is slightly more important than the second; 5 – the first is more important than the second; 7 - the first the first is strongly more important than the second; 9 - the first is absolutely more important than the second and 2,4,6,8 - are intermediate values. The AHP method includes an effective technique for checking the consistency of the evaluations made by the decision maker when building each of the pairwise comparison matrices, involved in the process, namely matrix A and matrices B(j). Matrix B(j) is a n×n real matrix, where n is the number of options evaluated. Each entry of the matrix represents the evaluation, compared to the second option with respect to the first criterion. Based on the results of using the AHP method, we can indicate the order in which the machines should be repaired in an enterprise and finally generate activity scenarios in a maintenance department, based on the historical data regarding the state of resources and necessary costs, as well as in accordance with suitable competences in the company (Table 4).

Implementation of the proposed approach was presented in a real case study from a maintenance department.

A Case Study

In our case study, the enterprise is a manufacturer of car parts and accessories. 4 employees, servicing 8 resources in the company, work in the maintenance department. According to the first element in our approach, we identified the values of the so-called competence function for each worker and for each resource, based on the results from competence questionnaires (Table 5).

Table 5: The competence function values for maintenance workers

Resource within a manufacturing company	$f(W_1)$	$f(W_2)$	$f(W_3)$	$f(W_4)$
R_1	17	12	15	0
R_2	15	12	8	18
R_3	8	20	0	9
R_4	5	5	0	12
R_5	25	0	18	4
R_6	9	0	8	20
R_7	15	0	12	0
R_8	20	0	18	16

In addition, thanks to the definition of the competence function for each worker, it was pointed out that the competence of the W_3 employee should be raised, in order to be able to replace employee W_1. More detailed research on this issue will be discussed in future work.

Based on the data from the ERP system, implemented and used within a company, the data regarding the exchange of spare parts in each of the 8 resources, for one year, was then collected (Table 6) and the mean, usage time for the index values of the spare parts (day/per year) was also calculated.

Table 6: Data for the exchange of spare parts, from each of the 8 resources, for one year

Resource 1			
	1 Data	2 Data	Mean time that spare parts were used (day/per year)
Spare part 1	15.02.2019	02.09.2019	199
Spare part 2	10.01.2019	07.07.2019	178
Spare part 3	12.03.2019	15.10.2019	217
Spare part 4	15.02.2019	28.09.2019	225
Failure	10.01.2019	28.09.2019	261
Resource 2			
	1 Data	2 Data	Mean time that spare parts were used (day/per year)
Spare part 1	03.03.2019	23.09.2019	204
Spare part 2	05.02.2019	16.06.2019	131
Spare part 3	19.01.2019	27.08.2019	220
Spare part 4	17.02.2019	11.10.2019	236
Failure	05.02.2019	11.10.2019	248
Resource (…)			
Resource 8			
	1 Data	2 Data	Mean time that spare parts were used (day/per year)
Spare part 1	07.01.2019	14.09.2019	250
Spare part 2	07.01.2019	28.06.2019	172
Spare part 3	07.01.2019	23.05.2019	136
Spare part 4	07.01.2019	16.10.2019	282
Failure	07.01.2019	14.09.2019	250

In the third element of our approach, the values of the necessary repair costs, received for one year, 8 resources, were calculated (Table 7) based on the following rules:

- labour costs = (mean time that spare parts were used (day/per year) - (time for problem diagnosis and finding solutions + time for maintenance operation time + time for testing)) x salary/per day/worker,
- costs of spare parts – data form ERP system,
- costs of downtime = (mean time that spare parts were used (day/per year) – (time for problem diagnosis and finding solutions+time for maintenance operation time+time for testing) x cost of not completed in t this time order,
- costs of lost benefits = value of rejected orders from ERP,
- penalty costs = costs of delay in completing the order (cost for each day of delay) mean time of delay x penalty per day.

Table 7: The values of repair costs, for one year

Resource 1					
	Labour costs	Costs of spare parts	Costs of down-time	Costs of lost benefits	Penalty costs
Spare part 1	2500	1850	800	0	0
Spare part 2	3000	2270	3500	1500	5000
Spare part 3	1500	1230	500	0	0
Spare part 4	1000	1540	1500	2000	4000
Failure	4000	2410	8000	3500	5000
∑	12000	8600	14300	7000	14000
Resource 2					
	Labour costs	Costs of spare parts	Costs of down-time	Costs of lost benefits	Penalty costs
Spare part 1	2500	1500	800	2000	5000
Spare part 2	4000	2000	4000	0	0
Spare part 3	1000	1500	500	0	0
Spare part 4	1000	1000	500	0	0
Failure	2500	1000	6000	2000	5000
∑	11000	7000	11800	4000	10000
Resource …					
Resource 8					
	Labour costs	Costs of spare parts	Costs of down-time	Costs of lost benefits	Penalty costs
Spare part 1	500	1500	500	0	0
Spare part 2	2000	2000	3500	0	0
Spare part 3	5000	1200	3000	5000	8000
Spare part 4	500	1500	1500	0	0
Failure	1500	2200	3000	2000	5000
∑	9500	8400	11500	7000	13000

Finally, based on Table 5 and Table 7, the data and information base about resources for one year, is created at Table 8.

Table 8: Data and information, based on resources for one year

	R1	**R2**	**R3**	**R4**	**R5**	**R6**	**R7**	**R8**
$f(W_m)$	$f(W_1)$ =17	$f(W_4)$ =18	$f(W_2)$ = 20	$f(W_4)$ =12	$f(W_1)$ = 25	$f(W_4)$ =20	$f(W_1)$ =15	$f(W_1)$ =20
vP_1	199	204	149	185	145	216	191	250
vP_2	178	131	263	236	207	171	193	172
vP_3	217	220	162	157	220	255	233	136

vP_4	225	236	217	211	272	145	198	282
vP_5	261	248	222	234	245	211	232	250
vC_1	12,0	11,0	8,2	10,5	11,3	9,8	10,9	9,5
vC_2	8,6	7,0	6,5	7,7	8,2	7,9	7,6	8,4
vC_3	14,3	11,8	15,6	18,2	12,8	13,4	14,5	11,5
vC_4	7,0	4,0	5,0	8,0	9,0	6,0	6,0	7,0
vC_5	14,0	10,0	15,0	16,0	12,0	14,0	15,0	13,0

On the basis of the data presented in Table 8, the pairwise comparison of manufacturing resources in the AHP method could be performed.

In Table 9, the vectors of the criteria weights are presented.

Table 9: Criteria weight vectors

Resource selection	Process factor	Cost factor				
Weights	0,667	0,333				
Process factors	f(Wm)	vP_1	vP_2	vP_3	vP_4	vP_5
Weights	0,358	0,224	0,071	0,113	0,153	0,081
Cost factors	vC_1	vC_2	vC_3	vC_4	vC_5	
Weights	0,351	0,112	0,242	0,219	0,076	

In Table 10, the example of AHP pairwise comparisons, for manufacturing resources for cost factor vC_1, is presented.

Table 10: AHP pairwise comparisons for manufacturing resources for vC1 condition

R_1	**R_2**	**R_3**	**R4**	**R5**	**R6**	**R7**	**R8**
1,00	0,92	0,68	0,88	0,94	0,82	0,91	0,79
1,09	1,00	0,75	0,95	1,03	0,89	0,99	0,86
1,46	1,34	1,00	1,28	1,38	1,20	1,33	1,16
1,14	1,05	0,78	1,00	1,08	0,93	1,04	0,90
1,06	0,97	0,73	0,93	1,00	0,87	0,96	0,84
1,22	1,12	0,84	1,07	1,15	1,00	1,11	0,97
1,10	1,01	0,75	0,96	1,04	0,90	1,00	0,87
1,26	1,16	0,86	1,11	1,19	1,03	1,15	1,00

Using the AHP method, the repair order for the manufacturing resources could be properly planned. In Table 11, the ranking of resources is presented.

Table 11: The results of the AHP method – ranking the repair of the manufacturing resources

R_2	R_3	R_6	R_7	R_5	R_4	R_8	R_1
0,136	0,133	0,127	0,123	0,122	0,121	0,119	0,118

On the basis of the results of the AHP method (Table 11), the repair schedule of the manufacturing resources quite automatically once the main criteria can be defined. Therefore, the maintenance department can prepare repair scenarios for resources, by allocating workers W_1 and W_4 to those resources having the highest priority of repair. In our further work, in that context the problem considered can be solved with use of the logic programming techniques (Bocewicz et al., 2008). The

logic rules will be built for generating each step of the repair scenarios for resources depending on reasoning and exact way of expression.

In the example proposed, some process and costs factors are taken into account but the concept limits neither the number of factors nor the hierarchy of the criteria; this means that the proposed approach could be implemented in different sectors of industry.

Conclusions

In this paper, a model for the Condition based Management System, using the AHP method is proposed. The model enables the repair of manufacturing resources to be ranked according to priority, on the basis of selected process and costs factors by using the AHP method.

This paper demonstrates that using the AHP method for the repair schedule definition can improve CBM strategies with the aim of matching the right employees, according to their competence, to repair the given machine. To illustrate the proposed approach, we implemented our model in the polish small manufacturing enterprise of car parts and accessories to discuss its utility for improving CBM strategies. However it is still needed to provide the validation on our approach to assess its consistency. Summarizing, from the results obtained from real-life case study we can conclude that our approach to supporting decisions regarding Condition-Based Maintenance (CBM) using the AHP method contribute to improve CBM strategies.

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Model for Selection of Co-Operators for Carrying Out Joint Innovative Projects Among the Network of Polish Manufacturing Enterprises in Metal and Automotive Sectors

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Abstract

The problem area dealt with in this paper places into in the current and very important research area concerning innovation management, especially including the selection of cooperation partners for implementation of innovative projects in the manufacturing enterprises' networks in metal (processing) and automotive industries. Due to the fact that in the XXI century, the functioning of many enterprises depends on innovation projects, the selection of cooperation partners must be carried out on the basis of credible and reliable data. The sources of such data about a manufacturing company active in a particular industry are ERP (Enterprise Resource Planning) systems. Therefore, it has become useful to develop the decision-making model of selection cooperation partners for innovation project implementation based on data available in such systems in the networks of metal (processing) and automotive companies. This article has presented the results of the conducted surveys together with their interpretation as well as the model, method, and concept of software to support the selection of cooperation partners for the implementation of innovative projects in the manufacturing enterprises' networks in metal (processing) and automotive industries is presented.

Keywords: Innovative Project, Selection Of Business Partners, Metal And Automotive Industry, Ordered Logit Model

Introduction

In 21st century, development of Polish manufacturing companies active in metal and automotive sectors federated in various networks depends mostly on their innovative potential. An indicator of such a potential may be the number of innovative projects carried out jointly with other manufacturing partners (Technical Innovation Systems, 2018). The results of such projects should be implemented into the production process in the form of new products or processes (Mikołajczyk, 2013). Many of the enterprises need to face many problems while implementing the strategy of innovative projects management (Głuszczuk, 2016). These problems derive from, among others, selection of improper cooperation partners for realisation of the projects. In the process of co-operator selection, wrong decisions are made immediately or are influenced by customs and habits (Nowakowski and Werbinska-Wojciechowska, 2012). They lead to great losses of time and money by the company and derive from e.g. delays in the order realisation by the co-operator (Janowski, 2013). Such situations result in significant decrease of the enterprise competitiveness on the market.

Subject area fits in actual and important stream of research concerning manufacturing company management and innovation management with particular focus on the selection of co-operator for joint realisation of innovative projects. The importance of co-operation is frequently underlined in scientific literature due to the results of many studies which show that innovations often take place as a result of a combination of knowledge obtained within the company and knowledge gathered from the outside by co-operation with different partners (Bell, 2005). Methods for selection of co-operators available in the literature on this issue usually use the distribution of importance and values of particular criteria by a given expert. However, persons making such decisions may evaluate the issue in a subjective way (Goodwin and Wright, 2011). They may also see the possible future actions differently in the changing situation (Goodwin and Wright, 2011). Due to the fact that innovative projects determine the company development these days, the selection of co-operators for joint realisation of a project should be carried out based on real and objective data. In the article, an innovative project is understood as a temporary undertaking whose aim is to create a unique product or provide a unique service (Duncan, 2013). An example of such projects, carried out in the automotive industry, are those using alternative energy sources (electric and hydrogen engines), which involve the entire network of entrepreneurs - brand owners and OEM Original Equipment Manufacturer (Dąbrowski et al., 2018). Reliable data sources characterising companies are Enterprise Resource Planning (ERP) systems. Over the last decades, these systems have become significant tools supporting realisation of various processes taking place in an enterprise (Kłos, 2010). Undisputable advantage of such systems is combination of the production processes related to product manufacturing, logistic and administrative processes (Banaszak, et al., 2011). Characteristic feature of ERP systems is also a thorough current and historical data analysis which may constitute a great support in the process of making decisions in a manufacturing company (Banaszak, et al., 2011). Nevertheless, ERP systems are mainly used for data processing and information analysis and very rarely are treated as a source of knowledge (Cumbie, 2005). Therefore, it is highly recommended to develop a model and method of making decisions on the selection of co-operator for joint realisation of an innovative project on the basis of the data available in the ERP systems for company associations in the metal and automotive sectors.

Justification of the research subject area

There are various research and branch reports concerning companies only from metal and automotive sectors informing that these sectors are completely dependent on each other, i.e. when fewer orders are claimed for one sector the other automatically reports losses (PricewaterhouseCoopers, 2015). Nevertheless, these publications omit the fact that there is a number of manufacturing companies in Poland active in both sectors federated in various networks. Therefore, the research area presented in this paper was narrowed only to enterprises actively operating in metal and automotive sectors, who are members of associations and who implemented the standards ISO/TS or IATF 16949:2016. Such enterprises usually belong to the group of small and medium enterprises. Thus, with regard to innovation creation and implementation, they face the ordinary problems characteristic for this group of companies (SMEs). According to the literature, apart from insufficient financial and human resources, main issue limiting the enterprise innovativeness is lack of co-operation with e.g. other industrial partners (Skrzypek, 2017), (Duncan, 2013).

The analysis of the collected data on particular companies proved the necessity of support to manufacturing enterprises from the selected sectors federated in various networks in order to increase their competitiveness. Enterprises with the ability to produce unique products and technical solutions (implementing innovative projects) achieve increased revenues and are considered more attractive in comparison with the competition by customers (Szymanik, 2016). The literature often emphasizes the importance of cooperation in innovative projects because many research results indicate that innovations are often created thanks to cooperation with various partners (Bell, 2005). The methods of selection of partners available in the literature use the assignment of weights, importance and value of criteria by the expert (Dąbrowski and Skrzypek, 2016), (Skrzypek and Dąbrowski, 2015), (Skrzypek et al., 2015). However, the persons making such decisions may make subjective assessments and change their opinion over time (Goodwin and Wright, 2011). Therefore, as

innovative projects in the modern world influence the development of an enterprise, the selection of partners for joint implementation should be carried out objectively and using real data. The authors assumed that the enterprises function in a network (or networks) using Information Technologies and the model of data processing in the cloud, thanks to which it is possible to obtain the variable values for the model and method of the co-operator selection from ERP systems. It was also assumed that the risk of failure of co-operation decreases with the increase of the co-operator innovativeness level (Ujwary-Gil, 2009) and that the innovative project coordinator is its initiator or originator.

Solutions suggested

The authors, based on the literature review, decided to apply an integrated approach for co-operators selection for carrying out joint innovative projects among the network of manufacturing enterprises in metal and automotive sectors. Thus, the FAHP method using the R programme was combined with method presented by Chen and Yager (Chen, 2000), (Yager and Filev, 1993). Thanks to this combination, it was possible to apply the selection criteria of both, quantitative and qualitative nature, set the importance values of particular criteria by the decisive person (selecting the co-operator), carrying out the evaluation of different variants in the form of description (which makes the decision process easier and is understandable for the decisive person) as well as create a ranking list of the examined enterprises ordered linearly – from the most to the least complying to the accepted selection criteria.

It was assumed in the developed model that the enterprises function in a network (or networks) using Information Technologies and the model of data processing in the cloud, thanks to which it is possible to obtain the independent variable values (defining the agreed indicators of a company innovativeness) for the model and method of the co-operator selection from ERP systems. It was also assumed that in the network, there are only enterprises eager to exchange their own data and have the ISO/TS or IATF 16949:2016 standards implemented. Additionally, the authors assume that the risk of failure of co-operation decreases with the increase of the co-operator innovativeness level and that the innovative project broker and coordinator is its initiator or originator. The model is supposed to answer the question: “Which co-operators should be selected in order to successfully realise an innovative project?”.

According to the agreed research procedure, a hierarchical structure of multi-criteria analysis of potential co-operation enterprises (Fig.1) was created, whereas the selection criteria were price realisation time and innovativeness level of the evaluated company.

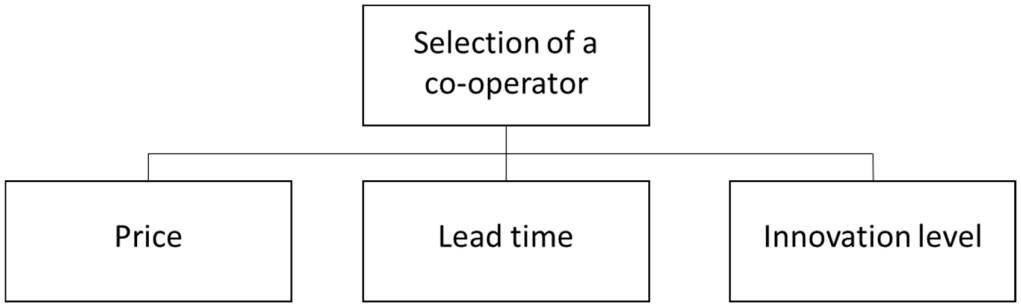

Fig. 1: The hierarchical structure in the develop model (Source: own study)

The review of the literature concerning Public Procurement Law in Poland showed that indeed price and realisation time are still the most frequently used criteria for selection of potential co-operators (Czerwinski and Werner-Wós, 2018). Nevertheless, the selection based on only these two criteria is often incorrect as very often they lead to incurring of significantly higher exploitation costs of the subject of the order as well as decrease of the provided services quality (Urząd Zamówień Publicznych, 2017). Hence, according to the assumption agreed upon the model, the authors decided

to apply the third most important criterion – the innovativeness level of the co-operating enterprise. The quality criterion was omitted on purpose because the considered group of companies have ISO/TS or IATF 16949:2016 standards implemented and they thoroughly define the requirements of providing quality of products and services. Based on the subject literature it may be claimed there is no single method suggested for measure the level of innovativeness of manufacturing enterprises. The existing measuring tools (i.a. InnScore method, a method recommended by OECD, Technical Innovation Systems method) use detailed measuring indicators which require very specified knowledge of the examined company (Głuszczuk, 2016), (Mikołajczyk, 2013), (Technical Innovation Systems, 2018). Thus, its application is very time-consuming and that is why these methods are mostly used for specialised innovation audits. In this paper, the authors present their own method for measuring of the company innovativeness level dedicated specifically to the manufacturing enterprises in metal and automotive sectors. In order to do so, a survey to collect data characteristic of the selected group of companies was carried out in the first stage. Next, in the second stage, a method of multi-nominal ordered logit models for evaluation of the innovation level of the selected manufacturing enterprises.

Survey

For the purpose of the research and based on the literature review, a questionnaire, whose aim was to unify the questions asked to entrepreneurs, was composed. The aim of the survey was obtain the data for development of the model and method for making decisions on the selection of co-operator for joint realisation of an innovative project on the basis of the data available in the ERP systems for company networks in the metal and automotive sectors as well as selection of a proper method for statistic modelling. The survey sample was selected on the basis of data obtained from the National Business Registry (REGON). The surveyed companies were manufacturing enterprises belonging to the group of small, medium-sized and large enterprises and active in the former year in metal and automotive sectors at the same time (verification based on NACE codes and reports submitted to and published by Statistics Poland) that had the ISO/TS or IATF 16949:2016 standards implemented and were members of the company network(s). The selected enterprises met all the requirements and assumptions agreed for the research.

The survey was conducted in 2017. The questionnaire was sent by e-mail to the group of 293 respondents located in the territory of Poland representing small, medium-sized and large manufacturing enterprises active in the desired sectors. From among them, the authors selected the ones active in both metal and automotive sectors at the same time (referred to in the business activity description as primary profiles) – 257 enterprises. The other 36 companies turned out to be active in other sectors, such as wood industry, shoe-making, etc. Next, this number was limited to the enterprises that were active in the former year (131). The data were verified based on annual reports submitted to Statistics Poland by the companies.

The survey consisted of a set of closed questions divided into four categories and a respondent's particulars where the respondents defined the size of the company and sector of business operation. The survey was anonymous, however, the surveyed employee had to state the position at a company. The respondents represented at least middle management (specialist, inspector, chief specialist, constructor, technologist/process engineer, manager, shift manager, president, board member, owner, director, managing director/CEO).

The questions in the questionnaire were related to i.a. evaluation of the innovativeness level of own enterprise, Polish manufacturing enterprises in metal and automotive sectors or the reasons for unsatisfactory innovativeness level of these companies.

Statistical analysis of the links between pairs of variables was performed for nominal variables with the use of Pearson's chi-square independence test. In case the assumptions of this test were not met, its p-value was determined by simulation using the Monte Carlo method (Hosmer and Lemeshow, 2013). The presence of monotonic correlation for variables measured on the ordinal scale was verified by the Spearman test. Additionally, the force of this dependence was also measured by

adding the r_s co-efficient of the Spearman correlation. In case of all the statistical tests, the significance value was defined at the level of 0,05. The statistical analysis was conducted with the use of R statistical block distributed on an open source licence [GPL] (R Core Team, 2014). The detailed results were already published by the authors in other publication (Skrzypek et al., 2019).

Assumptions to the method for evaluation of the innovativeness level in selected manufacturing enterprises

A variable of innovativeness level (dependent variable) was selected for modelling. The examined enterprise could be classified as: non-innovative enterprise, moderately innovative enterprise or innovative enterprise.

Based on the statistical analyses, literature review, preliminary model evaluation and then after application of the Akaike criterion (Gruszczyński, 2012), four independent variables were selected for modelling of the enterprise innovativeness level were selected:

- number of new products developed at the enterprise in the last 3 years,
- number of new technologies developed at the enterprise in the last 3 years,
- number of total employees with higher technical education in the last year,
- income percentage spent on R&D operations in the last year.

In case of the enterprises active on the market shorter than three years or having ERP system without historical data entered, it was agreed that time limit would be lifted and the indicators would reflect the situation from the beginning of the system functioning. In case of lack of data, 0 value would be automatically ascribed to particular variables.

Each variable had three reply variants (categories):

- 0 – 10 range,
- 11 – 20 range,
- above 20.

The reference category was 0 to 10 range.

There is no single recommended method to measure the innovativeness of manufacturing companies in the literature. Existing methods of measurement (e.g. the InnScore method, the method recommended by the OECD organisation, the Technical Innovation Systems method), using detailed measurement indicators, which require a very large, specialist knowledge of the surveyed organisation (Głuszczuk, 2016), (Mikołajczyk, 2013). Their use is therefore time-consuming, hence these methods are most often used to perform specialist innovation audits. To determine the level of innovation, the authors decided to use an multi-nominal ordered logit model. It is important that the values of individual explanatory variables can be determined on the basis of data stored in ERP systems owned by enterprises. The advantage of this approach is that the use of ERP systems eliminates the possibility of data manipulation, and thus, the assessment of the level of innovation can be made on the basis of objective data.

Multi-nominal ordered logit model

The approach suggested in this paper is the application of ordinal logit model which (Gruszczyński, 2012), (Hosmer and Lemeshow, 2013):

- enables modelling of dependent variable of ordered character,
- considers independent variables of qualitative and quantitative character,
- enables analysis of influence of particular variables on the dependent variable,
- enables creating forecasts of dependent variable for new values of the independent variables.

The model presented in the paper allows determining of the enterprise affiliation to one of the categories: non-innovative enterprise, moderately innovative enterprise, innovative enterprise and creating of forecasts of the innovativeness level for new enterprise, e.g. becoming members of a network at a later time (Skrzypek, 2017).

For ordinal logit model, the probability that for i – of this object, the dependent variable will get the value j – this category is formulated by a general formula (Gruszczyński, 2012), (Hosmer and Lemeshow, 2013):

$$p_{ij} = P(y_i = j) = \frac{\exp\,(\kappa_j - x_i{}'\beta)}{1 + \exp\,(\kappa_j - x_i{}'\beta)} - \frac{\exp\,(\kappa_{j-1} - x_i{}'\beta)}{1 + \exp\,(\kappa_{j-1} - x_i{}'\beta)} \tag{1}$$

where:

$i = 1,\ 2,\ \ldots, n\ \ (n \in \mathbb{N})$	–	object index
$j = 1,\ 2,\ \ldots, J\ (J \in \mathbb{N})$	–	the value taken by the explanatory variable
p_{ij}	–	the probability that for the *i*-th object the explained variable will take *j*
κ_j, κ_{j-1}	–	cut-off points
$x_i = [x_{i1}, x_{i2}, \ldots, x_{ik}]'\ (k \in \mathbb{N})$	–	explanatory *k*-value vector
$\beta = [\beta_1, \beta_2, \ldots, \beta_k]'\ (k \in \mathbb{N})$	–	vector of unknown model parameters with real values

Estimated in research multi-nominal ordered logit model

For modelling of an enterprise innovativeness level, for independent variables were selected:

- x_1 - number of new products developed at the enterprise in the last 3 years,
- x_2 - number of new technologies developed at the enterprise in the last 3 years,
- x_3 - number of total employees with higher technical education in the last year,
- x_4 - income percentage spent on R&D operations in the last year.

In research for multi-nominal ordered logit model estimated by the highest credibility/reliability method, the formula for affiliation probability of i – of this enterprise to one of categories (1 - non-innovative enterprise, 2 - moderately innovative enterprise, 3 - innovative enterprise) is in the form of:

$$\hat{p}_{i1} = \hat{P}(y_i = 1) = \frac{\exp(1{,}24 - m_i)}{1 + \exp(1{,}24 - m_i)} \tag{2}$$

$$\hat{p}_{i2} = \hat{P}(y_i = 2) = \frac{\exp\,(3{,}6 - m_i)}{1 + \exp\,(3{,}6 - m_i)} - \frac{\exp(1{,}24 - m_i)}{1 + \exp(1{,}24 - m_i)} \tag{3}$$

$$\hat{p}_{i3} = \hat{P}(y_i = 3) = 1 - \frac{exp\,(3{,}6 - m_i)}{1 + exp\,(3{,}6 - m_i)} \tag{4}$$

where:

$$\mathrm{m_i} = 0{,}39\mathrm{x_{i,1.2}} + 1{,}63\mathrm{x_{i,1.3}} - 0{,}85\mathrm{x_{i,2.2}} - 2{,}13\mathrm{x_{i,2.3}} + 1{,}1\mathrm{x_{i,3.2}} + 1{,}0\mathrm{x_{i,3.3}} + 1{,}42\mathrm{x_{i,4.2}} + 2{,}19\mathrm{x_{i,4.3}}$$

$i = 1, 2, \ldots, 131$ index of the enterprise

$j = 1, 2, 3$ value of the explanatory variable (level of innovation)

$\kappa_1 = 1{,}24, \kappa_2 = 3{,}6$ cut-off points

Denomination e.g. $x_{i,1.2}$ should be understood in the following way: value of the first independent variable for the second range - [11-20]. 0-10 range was selected as the reference category. All the calculations were performed with the use of R statistical block (R Core Team, 2014).

Model and method of selecting co-operators for joint innovative project realisation federated in a manufacturing enterprises network for metal and automotive sectors

Based on the selected FAHP method, Figure 2 presents the hierarchical structure of the multi-criteria problem, which is the selection of partners for the implementation of innovative projects in a network of metal and automotive manufacturing companies. Detailed description and formal record of the methods is described in publications (Łuczak and Wysocki, 2011), (Chang, 1996).

The first stage of implementation was to determine the evaluation criteria. The evaluation criteria included the price, order realisation times and the level of innovativeness of the partner. Due to the adopted assumption concerning standards, the quality criterion was intentionally omitted. These standards clearly describe what quality features should be met by the offered products and services. In order to assess the level of innovativeness of the cooperating company, an own method was proposed, using the theory of multi-nominal ordered logit model. The criterion of innovativeness was chosen as the key criterion in the process of selection of the partners, according to the assumed assumption that the failure of the cooperation decreases with the increase of the level of innovativeness of the partner.

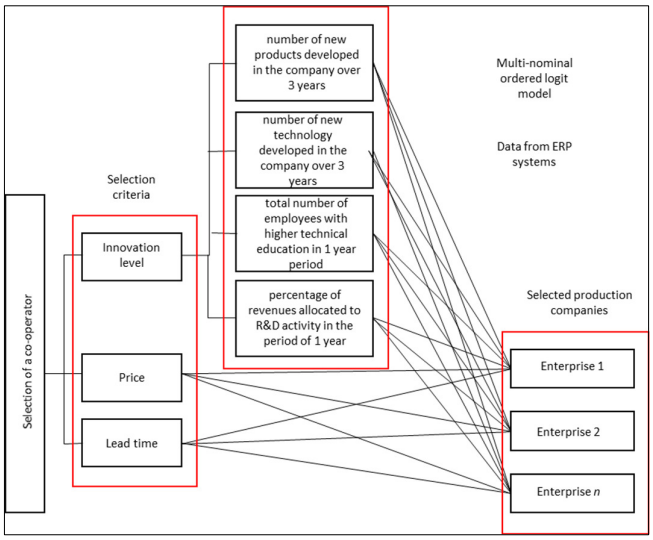

Fig. 2: Hierarchical structure of a multi-criteria problem selection of partners to implement innovative projects in a network of metal and automotive manufacturing companies. (source: own study)

In the next step, the level of innovation was determined by means of an estimated structured logit model for each potential partner. The statistical package R was used for calculations.

In stage 3, a fuzzy matrix of pair comparisons was created on the basis of opinions of 10 experts - project managers, supply or materials department managers and logistics department managers working in 3 manufacturing companies of selected industries (Table 1).

Table 1: Created fuzzy matrix of pair comparisons (source: own study).

	Innovation level	**Price**	**Delivery**
Innovation level	(1;1;1)	(6;7;8)	(8;9;9)
Price	(1/8;1/7;1/6)	(1;1;1)	(1/2;1;2)
Delivery	(1/9;1/9;1/8)	(1/2;1;2)	(1;1;1)

In the next step, data on innovation, price and delivery time were introduced. It was assumed that:

- the level of innovativeness will be defined as 1 when the production enterprise is non-innovative, 2 - moderately innovative and 3 – innovative (in accordance with the designations adopted in the logit model),
- depending on the complexity of the project, the values of the criteria will change: price and delivery time. In order to avoid mistakes, the person who makes the decision to choose the partners should assign the data to three thresholds set by himself. Preferred prices and deadlines in the first range will then receive 3 points, average preferred 2 and unacceptable 1 point.

Figure 3 presents the calculation process for a decision analysis using the R programme. After entering the data into the R program, and analyzing them using the FAHP method, the ranking was carried out using the methods proposed by Yager (defuzzified) and Chan (ranked). Detailed description and formal record of the methods is described in publications (Dudek and Jefmański, 2015), (Ruziyeva and Dempe, 2013), (Akkoç and Vatansever, 2013).

```
> print(fuzzyComparisonMatrix)
              C_1        C_2        C_3
C_1       (1;1;1)   (6;7;8)   (8;9;9)
C_2 (1/8;1/7;1/6)   (1;1;1) (1/2;1;2)
C_3 (1/9;1/9;1/8) (1/2;1;2)   (1;1;1)
> result = calculateAHP(fuzzyComparisonMatrix, values)
> fuzzyNumer = getFuzzyNumber(result, as.integer(2))
> print(fuzzyNumer)
      minimal modal  maximal
[1,] 2.759669     3 3.259724
> defuzzified = defuzziffy(result, "Yager")
> print(defuzzified)
          [,1]
 [1,] 1.002155
 [2,] 3.006464
 [3,] 2.905040
 [4,] 2.795525
 [5,] 1.103579
 [6,] 1.205003
 [7,] 2.803616
 [8,] 1.103579
 [9,]       NA
> rank = (nrow(values)+1) - sum(is.na(defuzzified)) - rank(defuzzified, na.last = "keep", ties.method= "max")
> print(rank)
[1]  8  1  2  4  6  5  3  6 NA
> ranked = compareFuzzyNumbers(result, "Chen")
> print(ranked)
           [,1]
 [1,] 0.05090015
 [2,] 0.85314107
 [3,] 0.81829455
 [4,] 0.77988602
 [5,] 0.09716716
 [6,] 0.14227313
 [7,] 0.78259275
 [8,] 0.09716716
 [9,]         NA
```

Fig. 3: Selected calculations in package R (source: own study).

Model and Method Verification

Verification of the developed model and method of selection of co-operators for joint innovative project realisation federated in a manufacturing enterprises network for metal and automotive sectors was carried out on the basis of archived data concerning innovative project realisation by manufacturing enterprises active in the sectors of interest to the authors. The projects were related to development and implementation to series production of new products. The enterprises did not agree to publish data related to new technologies. For the research purposes, a questionnaire with manual was created. The prepared questionnaire was sent to three manufacturing enterprises treated as innovative by organisations associating employers (associations "Organizacja Pracodawców Ziemi Lubuskiej", "Dolnośląscy Pracodawcy", "Konfederacja Lewiatan"). Furthermore, these enterprises were also evaluated as innovative by Polish Agency for Enterprise Development as well as Enterprise Europe Network offices (Enterprise Europe Network, 2018). The examined enterprises had three weeks to gather the data from their ERP systems. Next, direct interviews with the delegated employees were conducted. In any case, the respondents were director/manager of quality management, head of R&D unit, production manager (expert panel having knowledge in the tested/examined area). The questions were related to innovative project successfully carried out within the company, its management process and co-operation with co-operators among others.

Verification of the developed model of the co-operators selection was carried out on the basis of archived data concerning innovative project realisation by 3 manufacturing enterprises active in the metal and automotive sectors. In total, four innovative projects realised in the period 2012-2016 were analysed. In this paper, the specific data of only 3 projects are presented because one of the enterprises did not allow the authors to publish their data. The decision-making process for selection of co-operating partners and the consequences of these decisions for the realisation of a particular project were verified. All the necessary calculations were performed with the use of R statistical block (R Core Team, 2014). The summary results of the verification process are presented in Table 2.

Table 2: Verification of the model on the basis of the compiled results (Source: own study)

Indicator	Result
Number of enterprises surveyed	3
Number of projects analysed	4
Number of analyzed decision making processes concerning the selection of partners	4
Number of companies - potential cooperators	38
Number of correctly qualified co-operators by model	33
Number of co-operators whose assessment is inconclusive	2
Number of incorrectly qualified co-operators by model	3

As shown in Table 2, the model properly selected 87% of co-operators in the examined cases. This means the companies selected by the model successfully accomplished the ordered tasks in proper time, with proper quality and within the agreed budget. In case of 5% of the analysed enterprises, it is impossible to unambiguously decide based on the model whether these companies should be selected as co-operators or not. It is because these enterprises were evaluated with almost the same probability as either non-innovative or moderately innovative. Therefore it would be advisable to provide these enterprises with additional selection criterion. In case of improperly selected enterprises (8%), the model rejected the selection of these companies due to their innovativeness level. Nevertheless, the enterprises accomplished their tasks without any problems during realisation period of a particular innovative projects.

Summary and Further Research

The developed model of selection of co-operators for joint innovative project realisation federated in a manufacturing enterprises network for metal and automotive sectors presented in this paper is of utilitarian nature and may be applied in such organisations as clusters of manufacturing enterprises in the sectors specified in the paper (Auto-gration Consortium 2013), (Auto-gration Consortium, 2018). In case of other sectors, only the proposed own method of innovativeness level evaluation should be properly adapted. It should be verified whether for other group of enterprises, the set of independent variables influencing the modelled variable, innovativeness level, will not change.

Due to obligatory implementation of IATF 16949:2016 standard in 2018, the survey should be re-done with enterprises that have this standard implemented. The aim of the survey will be to obtain the data necessary for making the proposed method for evaluation of the co-operation partners innovativeness level more detailed. In this way, the model of selection of co-operators for joint innovative project realisation federated in a manufacturing enterprises network for metal and automotive sectors. After verification tests of this model, the works on designing and implementing of an IT tool should be initiated. After necessary tests and eliminating of errors and making all the necessary improvements, this IT tool should be implemented in a manufacturing enterprise. The next stage could be creating of analogous model, method of innovativeness level evaluation as well as IT tool for other sectors of Polish industry.

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Aggregation of Feature Assessments Expressed with Numerical Grades and Linguistic Values – Using Interval-Based Representation of Meaning

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Abstract

The paper presents a set of formal tools supporting design and implementation stages of an original strategy for aggregation and integration of a heterogeneous set of feature assesments built using the concept of grading scales and linguistic variables. Feature assessments are provided by a collective of respondents answering research questionnaires. The proposed tools, both of theoretical and conceptual nature, support the analysis and implementation of the first two stages of the aggregation and integration strategy responsible for collecting feature assesments and transforming them into computationally-oriented machine representations. In the approach, each individual opinion is finaly represented by a finite set of normalized numerical intervals, which as a whole set captures its meaning. The proposed interval-based machine representation of collective assesment is the input to an original adaptation and implementation of an algorithm for collective knowledge aggregation and integration defined over the universe of numerical intervals and presented elsewhere by other authors.

Keywords: Collective Assessment, Knowledge Aggregation, Knowledge Integration, Interval-Based Knowledge Representation.

Introduction

In work by Modliński et al. (2018) an original knowledge integration and communication algorithm was presented, designed for processing linguistically-oriented fuzzy-modal representations of collective beliefs. In the work the collected knowledge was given as a set of controlled natural language sentences, assumed to be generated by experts using values of linguistic variables (further called linguistic values). The algorithm was based on a decision model for choosing the so-called representation of numerical intervals profile, and therefore its utilizations in practical contexts could be effectively supported by a rich collection of computational well-verified tools dedicated to processing numerical intervals. It was an implementation of an original framework for the integration of distributed knowledge and further communicating the result of integration using linguistic and fuzzy-modal descriptions. The framework was presented elsewhere by Lorkiewicz et al. (2013).

In this work partial results of an original *R&D* project, currently being implemented, are reported, the gole of which is to design, implement and apply a modified version of the algorithm presented by Modliński at al. (2018). The adapted algorithm, set as part of a broader knowledge processing (integration) strategy, is intended to solve the task of collective knowledge aggregation and integration, provided that the knowledge is represented as a heterogeneous set of controlled natural language sentences, produced by respondents assessing the intensity of the occurrence of a certain gradation (fuzzy) property **P** in an object of control (management) to be collectively evaluated and then linguistically described. By gradation (fuzzy) property we mean any property that from the respondents' point of view may be observed (experienced) in target objects to be assessed with varying degrees of intensity. Obviously, a rich list of examples of practical situations that require solving such a knowledge management task can be found in the literature. An example of a task in which it may be necessary to aggregate and integrate collectively yielded assessments of the degree in which a particular feature is realized in an object to be evaliated, is a collective assessment of the

degree of friendliness of a particular human-computer interface, carried out by respondents participating in an interface usability study (see the work by Chynał et al. (2019) as a reference). Further examples or references are provided in works by Dweiri et al. (2006), Roszkowska (2011), and many other works.

The aggregation and integration strategy of heterogeneous collection of assesments (AAI strategy), in which it is planned to use the above mentioned adaptation of the algorithm presented by Modliński et. al (2018), consists of the following four stages:

```
Stage 1: The use of dedicated surveys to obtain assessments from a collective of
respondents.
Stage 2: Transformation of collected grades into computationally oriented machine
representation based on the micro- and macrostructure of the universe of
normalized numerical intervals.
Stage 3: Aggregation and integration of the set of collected assesments using a
selected method of object grouping and the adapted algorithm for choosing the
representation of profiles of numerical intervals.
Stage 4: Constructing the final linguistic summary of the result of aggregation
and integration using a controlled natural language with fuzzy and epistemic
modalities.
```

The forthcoming presentation covers some methodological and theoretical issues related to Stage 1 and Stage 2 of the AAI strategy just outlined above.

The model of input assessments built with numerical grading scales

Formulation of assesments based on predefined grading numerical scales is one of the most popular and simplest methods of obtaining assesments from respondents embedded in real practical contexts. The basis for constructing such assessments is usually a finite and linearly ordered subset of natural numbers. Obviously, the minimum numerical value, fixed for a particular graded scale, refers to situations in which the respondent perceives the object *u* as completely devoided of property **P**. In contrast, the maximum numerical value on the graded scale represents the cognitive states in which the respondent assesses the object *u* as exhibiting the property **P** to the full extent, i.e. without raising any doubt as to its occurrence in the object.

Let all grading scales, available to members of the target respondents' collective be denoted by $Scale_i, i = 1,..., N$, and given as:

$$Scale_i = [s_{i,1}, s_{i,2},..., s_{i,levels(i)}],$$

where the following three requirements hold:

$$\forall j \in \{1,2,...,levels(i)\}.(s_{i,j} \in Nat),$$

$$\forall j \in \{1,2,...,levels(i)-1\}.(s_{i,j+1} = s_{i,j} + 1),$$

$$\forall p, q \in \{1,2,...,N\}.(p \neq q \Rightarrow levels(p) \neq levels(q)).$$

The respondent's construction of an assessment based on a grading scale $Scale_i$ is interpreted as responding a request in a survey, the meaning of which can be communicated as follows:

(Based on everything you know), please indicate to what extent object u exhibits property P!

The respondent's response is to select a particular numerical grade from this particular list of grades $[s_{i,1}, s_{i,2},..., s_{i,levels(i)}]$ which is presented along with the request. The choice of a particular value $s_{i,j}$ should be interpreted as equivalent to the respondent's production of the following controlled natural language statement:

(For all what I know), I find the object u exhibiting property P with the degree $s_{i,j}$.

Obviously, when surveys are used, generation of statements is replaced by a manual indication of value $s_{i,j}$ by target respondents.

The model of input assessments built with values of linguistic variables

The second group of assessments considered in the discussed *R&D* project is constructed by target respondents using the value of a linguistic variable *var*(**P**) related to property **P**, the intensity of which the respondents assess for a particular object and in a particular practical context. The approach referse to the classic definition of linguistic variable as given by Zadeh (1975), with an additional requirement that in the set of possible linguistic values $\{P_0, P_1,..., P_j\}$ of variable *var*(**P**), for practical reasons, the so-called base linguistic value is distinguished, further denoted by P_0, being this value of the linguistc variable which is grounded directly in linearly ordered, permissible intensities of property **P**. For instance, for case of linguistic variable EFFICIENCY, with the following set of terms of its values {*efficient*, *inefficient*, *very efficient*, *slightly efficient*, *almost efficient*}, it is acceptable to choose term *efficient* as the basic linguistic value. The intuitions underlying this choice are quite obvious.

In the discussed approach to collective assesment processing, respondents can generate their assesments by choosing linguistic values, when replying to directly stated requests. In the logical and procedural sense, their formulation of an assesment can be treated as equivalent to converting the following formula:

Object u *is* Y,

Into a particular sentence by instantiating the variable Y with a particular linguistic value, chosen from set $\{P_0, P_1,..., P_j\}$, usually suggested along with the request. Obviously, in controlled natural languages each particula result of instantiation may usually be communicated in multiple ways, depending on lexical and semantic resources constituting this versions of a controlled natural language which is used by the respondent. However, without loss of generality it can be assumed that producing a particular assesment is semantically and pragmatically equivalent to producing the following sentence:

For all what I know, object u is P_j.

Similarly to the assesments built with the grading scales, the assesments under consideration should also be treated as communicating strictly subjective beliefs respondents can mentally (cognitively) develop while analyzing (experiencing) degree to which a particular object *u* exhibits a property **P**.

A model of unified interpretation of assesments meaning

In our approach it is assumed that the basis of an assesment meaning representation and interpretation is given by the numerical interval [0,1], provided that numbers in [0,1] are treated as numerical representations of the strength of beliefs mentaly developed by respondents, regarding the object's exhibition of property **P**. Such model for belief semantics, underlying linguistic production of assesments, refers in a direct way to the model of TRUTH linguistic variable, originally formulated by Zadeh (1975). The model suggests, in particular, that machine oriented interpretation of an assesment produced by a particular and external respondent, may be effectively represented in

computationally-oriented knowledge base by a set of sub-intervals of [0,1]. The machine-oriented model for determining semantics of assesments, which is presented below, is strictly consistent with such theoretical perspective.

A model of semantics for assesments built with grading scales

Let us consider the case of assesment built by the respondent using grading scales $Scale_i$. It is assumed that a respondent's reply is communicated with the sentence:

(For all what I know), object *u* exhibits property ***P*** with the degree $s_{i,j}$.

Obviously, for all implementations of the AAI strategy it is necessary to define a certain computationally-oriented semantic tool, allowing effective representation of individual grades' meaning. That is why a dedicated function f_{Scale_i} is defined for each $Scale_i$, further called the scale-related grade meaning function, where:

$$f_{Scale_i} : [0,1] \rightarrow \{s_{i,1}, s_{i,2}, \ldots, s_{i,levels(i)}\}.$$

For each $x \in [0,1]$ the function value $f_{Scale_i}(x)$ is determined according to the formula:

$$f_{Scale_i}(x) = \begin{cases} s_{i,1} \quad iff \quad x \in [0, x_1) \\ s_{i,2} \quad iff \quad x \in [x_1, x_2) \\ \ldots \\ s_{i,levels(i)-1} \quad iff \quad x \in [x_{levels(i)-2}, x_{levels(i)-1}) \\ s_{i,levels(i)} \quad iff \quad x \in [x_{levels(i)-1}, 1] \end{cases}$$

where numbers $x_1, x_2, \ldots, x_{levels(i)-1}$ fulfill the requirement $0 < x_1 < x_2 < \ldots < x_{levels(i)-1} < 1$ and determine the partition $[0, x_1), [x_1, x_2), \ldots, [x_{levels(i)-2}, x_{levels(i)-1}), [x_{levels(i)-1}, 1]$ of interval [0,1] such that each element of the partition is assigned one and only one grade from $[s_{i,1}, s_{i,2}, \ldots, s_{i,levels(i)}]$.

Defining a particular form of function f_{Scale_i}, to be used in a particular implementation of the AAI strategy, involves two goals: selecting specific numbers $x_1, x_2, \ldots, x_{levels(i)-1}$ and providing explicit formula for determining the function's value. Unfortunately, developing a certain form of the function may not be easy, because it should reflect actual expectations formulated for the level of compliance of the function with pragmatic commonsense rules governing actual use of the grades by target respondents, and and guessing the form of these rules is not easy at all.

In most *R&D* projects in the field of knowledge management, functions imitating cognitive processes responsible for language generation are usually developed in two steps. The implementation of the first step consists in formulating rational, preferably commonsense grounded postulates regarding the desired behavior of functions sought. The implementation of the second step is devoted to sometimes a very tedious search for a function whose behavior guarantees the fulfillment of the previously defined postulates. This approach can be described as an analytical and structural one.

Example

Let us assume that the following grading scale $Scale_a = [0,1,2,3,4,5]$ be used. A reasonable postulate for the behavior of its scale-related grade meaning function f_{Scale_a} may be formulated as follows: *It is commonly believed that at their cognitive (mental) level, the target respondents evaluate the difference between two adjacent grades as being the same for all possible cases of such pairs. Therefore it should be required that the same property be exhibited by the scale-related grade meaning function.* A rational proposal to fulfill the requirement is to use numbers $x_1, x_2, ..., x_{levels(a)-1}$ such that formula $\forall p \in \{1,2,...,levels(a)-1\}.(x_p = \frac{p}{level(a)})$ holds. Obviously, they fulfil the requirement $0 < x_1 < x_2 < ... < x_{levels(a)-1} < 1$. It can be argued, too, that in many ways the resulting partition of [0,1] divides this universe evenly.

Unfortunately, in practical contexts the analytical and structural approach can be treated as characterized by too much arbitrariness. Namely, the quality of the obtained result, in particular the achieved level of compliance of the function behavior with the actual cognitive processes, seem to depend too strongly on the completeness and correctness of the set of adopted postulates, both of which may be disputable even in the above presented proposal. In particular, one can strongly doubt whether the difference between the grades 0 and 1 is actually felt at the cognitive level as equal to the difference between grades 4 and 5.

To deeper understand the nature of the doubt just raised in the previous sentence one can start with the editorial work by Campbell (1992). Luckily yet, in the area of machine processing, one can find interesting examples of a significantly different approach to determining functions that model semantics of lexical tools used to represent and process gradual and fuzzy features of objects at the level of communication. In such approach, the form of the function f_{Scale_i} is suggested to be determined on the basis of empirical data collected with actual participation of target respondents rather than derived from a set of formally stated postulates. A deeper discussion and presentation of interesting aspects of such approach, relevan to developing implementations of the AAI strategy, can be found in the paper by Pedrycz (2008), where multiple computational and mathematical tools fulfilling the assumptions of the so-called user-centric approach to semantic systems design and analysis are proposed.

Model for semantics of assesments formulated with linguistic variables

Let $P_j \in \{P_0, P_1, ..., P_j\}$ be a particular linguistic value of variable *var*(**P**). The following two theoretical assumptions are made for each target implementation of the AAI strategy under consideration.

Firstly, actual processing of assessments, communicated by target respondents in form of the following sentences:

For all what I know, object u is P_j.,

is to be realized using the original model of linguistic variable formulated by Zadeh (1975). In Zadeh's approach the semantics of each linguistic value from $\{P_0, P_1, ..., P_j\}$ is defined as a function:

$$f_{P_i} : U_P \to [0,1],$$

where U_P denotes a particular universe of objects, each embedded in a practical context, and to be described by the above mentioned sentence. It is also assumed in Zadeh's definition of linguistic

variable that for each $u \in U_P$ the value $f_P(u)$ should be interpreted as representing the degree of cognitively (mentaly) perceived compliance of the meaning of sentence *Object u Is Pi* with an actual instance of object *u*, if such an instance were presented to the subject uttering the sentence to express anrelated internal belief.

Secondly, each linguistic value, possible to be used as part of the sentence *For all what I know, object u is P_j.*, is assigned the so-called linguistic activation threshold $\lambda_{P_i} \in [0,1]$. The threshold indicates the minimum required level of intensity of property **P** recognized mentally in an assessed object u, allowing the respondent to generate the sentence under consideration as an adequate linguistic representation of the experienced state of object u.

The collection of all semantic functions $f_{P_i}(u)$, $P_i \in \{P_0, P_1, ..., P_j\}$, along with the associated linguistic activation thresholds λ_{P_i}, make up a vitally important system of dedicated cognitive tools, both of semantic and pragmatic nature. The existence of such system is necessary for solving effectively multiple aggregation and integration tasks, carried out in practical contexts for the considered class of sentences (assesments).

Designing computational tools to carry out automatic implementations of aggregation and integration of assessments for some practical contexts may be a task of a relatively high complexity. It can follow from mulyiple reasons one of which is the complexity of the process of transferring (interpreting) linguistically or semi-linguistically expressed assessments into a necessary low-level, computationally oriented machine representation.

Another source of inherent complexity may be the nature of universe U_P, itself. Namely, in actual contexsts the universe U_P can be equipped, which usually happens, with the so-called macrostructure being a function:

$$d_P : U_P \times U_P \rightarrow (R^+ \cup \{0\}),$$

where $R^+ \cup \{0\}$ denotes real positive numbers with zero.

The role of a particular macrostructure, resulting from a certain practically context, is to map at technical and computationally oriented level the way in which objects of the universe U_P are usually compared by actual users at the level of real cognitive processes. It usually happens that macrostructures of real practical importance meet additional requirements, in particular the definition requirements imposed on similarity (dissimilarity) or distance functions.

Regarding the functions of linguistic value semantics, possible to be used in this approach, the following additional remarks should be made. Firstly, the accepted definition of semantics allows universes with very different nature and characteristics. In particular, target implementations of the AAI strategy can support processing linguistic values defined over the normalized interval [0,1], a sub-set of natural numbers *Nat*, as well as a set over which no linear order is defined at all. Secondly, similarly to the already outlined functions of grade semantics, a particular function of linguistic value semantics can be potentially defined the analytical and construction mode or derived from empirical data, maintaining the assumptions of user-centered approach. Again, for the latter case, see the work by Pedrycz (2008).

Computationally-oriented representation of assesments

The above-introduced semantics for grade-based and linguistic value-based assesements constitute the starting point for defining knowledge representation and knowledge processing tools used in

possible target implementation of the AAI strategy to built interpretation of collected assessments and construct computational-oriented machine representations of their meaning. In order to cover the aspects in a more technical way the following symbols are introduced:

Let $INTERVAL = \{[x, y] : x, y \in [0,1] \wedge x \leq y\}$ be the set of all subintervals of [0,1].

Let $\overline{\overline{2^{INTERVAL}}}$ be the set of all multisets $\{i_1, i_2, ..., i_m\}$, where $\forall i \in \{1,2,...,m\}.i_k \in INTERVAL$

Let GSA be the set of all statements *For all what I know, object x exhibits property P with the degree* $s_{i,j}$, further denoted by $v_{/s_{i,j}}$, and possible to be constructed by target respondents using grading scales $Scale_i, i = 1,..., N$.

Let LVA denote the set of all statements *For all what I know, object x is* P_j., further denoted by $v_{/P_j}$, possible to be constructed by target respondents, where $P_j \in \{P_0, P_1, ..., P_j\}$ are linguistic values used in the context of a particular implementation of the AAI strategy.

The computational interpretation of input assesements, yielding machine representations of assessments' meaning, can formally be understood as the function:

$$meaning : (GSA \cup LVA) \rightarrow \overline{\overline{2^{INTERVAL}}}.$$

For each assessment $v \in (GSA \cup LVA)$, the value of $meaning(v)$ is computed with respect to related semantic function f_{Scale_i}, $Scale_i, i = 1,..., N$, or $f_{P_i}(u)$, $P_i \in \{P_0, P_1, ..., P_j\}$, by a particular procedure, which should be different for grading scale – based and linguistic value – based assesments.

At first, let $v_{/s_{i,j}} \in GSA$ be considered. The related grading scale and semantic function are $Scale_i$ and f_{Scale_i}, respectively. Then, in each implementation of the AAI strategy the related $meaning(v_{/s_{i,j}})$ should be computed according to the formula:

$$meaning(v_{/s_{i,j}}) =$$

$$= \{[x, y] : x, y \in [0,1] \wedge f^{-1}_{Scale_i}(s_{i,j}) \subseteq [x, y] \wedge \neg\exists z \in [0,1].(f^{-1}_{Scale_i}(s_{i,j}) \subseteq [x, z] \subseteq [x, y])\},$$

where $f^{-1}_{Scale_i}$ is the inverse function of function f_{Scale_i}. Obviously, for all $v_{/s_{i,j}} \in GSA$ the value $meaning(v_{/s_{i,j}})$ is a singleton with one and exactly one sub-interval of [0,1] as its element. It is quite obvious, too, that the definition of f_{Scale_i} ensures the existence of inverse function $f^{-1}_{Scale_i}$.

At second, let $v_{/P_j} \in LVA$ be considered. In this case an adequate effective procedure for computing $meaning(v_{/P_j})$ requires a more significant reference to the above introduced concepts of linguistic value functions $f_{P_i}(u)$, $P_i \in \{P_0, P_1, ..., P_j\}$ and linguistic activation thresholds λ_{P_i}. Namely, setting

the threshold value λ_{P_i} for a specific implementation makes it possible to determine the following subset $U_P(\lambda_{P_i}) \subseteq U_P$, consisting of all objects in U_P for the description of which, the linguistic value P_i can be used, in accordance with commonsense rules accepted by users of the language LVA:

$$U_P(\lambda_{P_i}) = \{u \in U_P : f_{P_i}(u) \geq \lambda_{P_i}\}.$$

In turn, the assumption of the existence of a macrostructure d_P makes it possible to determine, store, and then even possibly update in a regular manner, the following related clustering of $U_P(\lambda_{P_i})$, which in a specific way corresponds to the threshold value λ_{P_i}:

$$U_P^{(1)}(\lambda_{P_i}), U_P^{(2)}(\lambda_{P_i}), \ldots, U_P^{(size_{P_i})}(\lambda_{P_i}), \text{ where}$$

$$\forall p, q \in \{1,2,\ldots,size_{P_i}\}.(p \neq q \Rightarrow U_P^{(p)}(\lambda_{P_i}) \cap U_P^{(q)}(\lambda_{P_i}) = \varnothing) \text{ and } \bigcup_{p=1}^{size_{P_i}} U_P^{(p)}(\lambda_{P_i}) = U_P(\lambda_{P_i}).$$

It is worthwhile of mentioning that the pragmatically – inspired assumption to compute and maintain a dedicated division of the universe U_P into disjoint classes of similar (or close) objects, for which linguistic value P_i can be used as an adequate linguistic label, is defined in this presentation with no relation to any particular grouping strategy or method possible to be used in actual implementation of the AAI strategy, see the work by Jain et al. (1999) for examples. In fact, the possibility to choose from multiple alternatives allows final implementations to be varied.

Particular clusters $U_P^{(q)}(\lambda_{P_i}), q=1,2,\ldots,size_{P_i}$ are used to determine the value $meaning(v_{/s_{i,j}})$. Namly, objects in each particular cluster $U_P^{(q)}(\lambda_{P_i})$, originally chosen from U_P using the function f_{P_i} and related linguistic activation threshold λ_{P_i}, they can also be used to determine the range of intensities of **P**, but supporting the semantics of basic linguistic value P_0. The final result is computed according to the following equation:

$$meaning(v_{/P_j}) = \bigcup_{q=1}^{size_{P_i}} \{(x,y) : x = \min_{u \in U_P^{(q)}(\lambda_{P_i})} (f_{P_0}(u)) \wedge y = \max_{u \in U_P^{(q)}(\lambda_{P_i})} (f_{P_0}(u))\},$$

and is a multiset belonging to $\overline{\overline{2^{INTERVAL}}}$, too.

The definition, just formulated above, completes all list of computational tools required for the first two stages of the AAI strategy to be successfully implemented, e.g. as follows:

```
Step 1: Collect input assesements {op₁, op₂, op₃, …., opₛ} from all target
respondents.                        /Stage 1

Step 2: OUTPUT := ∅.                /Stage 2

Step 3: Forall op∈{op₁, op₂, op₃, …., opₛ} do begin
             if v∈GSA then begin   /grading scale-based assesement
             extract sᵢ,ⱼ from v
```

```
        OUTPUT := OUTPUT ∪ meaning(v/s_{i,j})
        end
        else begin            /linguistic value-based assesement
        extract Pi from v
        OUTPUT := OUTPUT ∪ meaning(v/P_j)
        end
end.
```

where OUTPUT constitutes a rational input to actual implementations of Stage 3.

Final Remarks

In this paper an approach to implementing an original strategy for aggregation and integration of a class of linguistically and semi-linguistically expressed assesments was partially discussed, as well as few design, functional and theoretical assumptions for target implementations of the strategy presented. The strategy is being developed as a part of a R&D project in the field of distributed knowledge management and processing. The assessments are assumed to be provided by a collective of target respondends, responsible for evaluating the intensity of a particular property **P** in a particular management or control object. The target of the strategy is to aggregate and integrate the collective assessment and then describe the content of result back, using fuzzy-modal language of communication. The discussion carried out in the paper shows how the assessments expressed using numerical scales or linguistic values should be transferred into machine and computationally oriented representation t make effective aggregation and integration possible.

The major theoretical assumption for the strategy itself is that the internal machine representation of the meaning of each particular assessment is given as a multiset consisting of sub-intervals of the normalized interval [0,1]. This coincides with one of the main objectives of the broader R&D project, mentioned in the presentation, which provides for the practical application of a wide spectrum of computational tools dedicated to solve numerous optimization and decision tasks defined over the universe of numerical intervals.

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Occupational Safety and Health of Employees in the Automotive Industry – Case Study of Metal Casting Enterprise

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Abstract

Ensuring safe working conditions is the task of both employer and employee. Considering the risk arising from the production activity of the enterprise, it is necessary to take into account the exposure of employees arising from the system: human - technical object - the environment in which this activity is performed and affects the entire process. All elements of the system can be a source of danger, and each of them can relate to the consequences of the risk of accidents or occupational diseases. During the production of aluminium castings in the pressure casting process, many factors and substances that threaten the health and life of employees can be specified. The specificity of technological processes, as well as materials used and produced in the foundry make it an activity classified as a hazardous process for the employee. The article presents the assessment of occupational risk of foundry machines and devices operator in the automotive industry plant by using the Risk Score method.

Keywords: automotive industry, pressure die casting, occupational risk assessment, Risk Score method

Introduction

Occupational health and safety directly affects production efficiency, which is one of the basic factors influencing the company's profit. This point of view is influenced by the high requirements of manufacturers, expecting a high level and commitment to creating a culture of work safety. Certainly, an important role in this case is the awareness that avoiding breakdowns, damages, accidents and potentially dangerous events is appropriate for the company's operations. In this case, people's safety is a need inscribed in the company's business. Most people think that it is worth taking care of life and health in the workplace, but it does not always correspond to everyday behaviours, which often result from the culture of safety or its lack in the structures of the company by Nordlöf H. et. al. (2015). Technological development gives the employee increasingly perfect and complex tools and machines that contribute to the replacement of people's work. As a result of process automation and robotization, the working conditions at a given position are also changing. As a result of the above, in enterprises there is a significant increase in loads caused by the harmful effects of equipment, loads related to noise, and above all the phenomenon of transforming dynamic load into static by Mgonja (2017). The concept of health and safety (OHS) is related to both the conditions of work organization and employee behaviour. Occupational health and safety at work is the foundation for the proper functioning of the company, which is its inseparable element. The aspect of work safety is fully subject to European Union directives, which define the main tasks of employers. One of the key is the Framework Directive on health and safety at work by 89/391 / EEC , which introduced understandable principles into European legislation describing specific obligations in the field of the health and safety of employees and management by Council Directive 89/391/EEC (1989). The most important are the legal regulations contained in section X of the Labour Code regarding the proper functioning of the labour protection system in the country. In accordance with art. 66, first paragraph, of the Constitution of the Republic

of Poland, every person undertaking work has the right to obtain hygienic and safe conditions. This constitutional law is a response to the employer's obligation to ensure hygienic and safe working conditions for employees, which the legislator has recognized as one of the leading principles of labour law and is part of Art. 15 of the Labour Code. The provisions contained in the said chapter characterize and specify the principle of ensuring hygienic and safe working conditions for employees, specifying the obligations of employees and employers in this area. By Poździoch (2015). One of the main employer's obligations referred to in art. 207 of the Labour Code, is required to adapt the company to the principles of occupational health and safety and eliminate irregularities in their implementation, and thus comply with the recommendations dictated by the labour inspectorate. Article 207 of the Labour Code imposes on the employer the obligation to protect the life and health of employees, which should be met by ensuring hygienic and safe working conditions, using the achievements of technology and science. This risk accompanies every human activity and is generally associated with the possibility of loss. It is therefore a consequence of risk. When considering the risk associated with the company's production activities, exposure should be taken, resulting in the creation of a system: human - technical object - environment in which this activity is carried out. All elements of this system can be a source of danger, and each of them can refer to the consequences of accidents. Risk in the system: human - technical object - the environment can be defined in a different way, namely risk is a combination of the frequency or probability of occurrence of specific hazards and losses that may cause, is a measure of the probability of an adverse event and its effects are a combination of the probability or frequency of a dangerous event or the consequences of related events by Karkoszka, Szewieczek ; Broszkiewicz (2016); Pan, X et. al. (2020). Occupational risk is taken by the employee in accordance with the performance of the work. In the Ordinance of 26 September 1997 on general health and safety regulations, risk was defined as the probability of adverse work-related occurrences causing losses, and in particular adverse health effects of employees as a result of threats to the work environment or its operation. The same definition has been presented in Polish standards. Occupational risk, simply presenting the problem, is the likelihood of harmful health consequences associated with the work process (illness or injury), given their severity. The assessment of this risk should be the main element of any occupational health and safety management system and its main purpose is to provide effective protection for all employees by Obolewicz, Dąbrowski (2018). Also important in this case is occupational risk assessment, defined as a systematic and periodic examination of all work aspects. Risk assessment is carried out in order to detect hazards appearing in the work environment that may become the reason for deterioration of health or the cause of injury. It is important whether certain hazards can be eliminated, when this is impossible, protective measures should be taken to limit the risk. In the analysis of occupational risk, two main stages can be identified, including risk analysis and determination of its admissibility, thus making decisions on eliminating or reducing or accepting it. Hazards are identified based on the information collected in the occupational risk assessment. At this stage, knowledge on the occurrence of hazards at the analyzed workplace is primarily used. Occupational risk analysis is to enable the prevention of dangers before their negative consequences occur. Its result should be to identify any hazards arising from work and assess the likelihood and severity of their consequences by Geller, E. S. (2005) and Larsson Tholén S. et. al. (2013). As a result of the analysis, appropriate preventive measures can then be planned and implemented to reduce or eliminate potential threats. Given the above further on, the essence of occupational risk assessment will be discussed further in the article.

Literature Review

The work environment of employees in heavy industry, including metal foundry, is associated with many specific working conditions. In this case, there are a very large number of occupational hazards. This mainly concerns the threat of harmful and carcinogenic chemical substances and dust resulting from technological processes implemented in the above-mentioned industry by Daroń, Górska (2019); Zakaria, A. et. al. (2005) and Holtzer (2007). The work environment is defined as the environment in which certain professional activities are carried out. Therefore, the work environment consists of, among others, noise, plant and animal microorganisms, toxic substances, irritants, sensitizers, carcinogens, hot microclimate and the level of air dustiness as well as radiation. Exposure to chemical agents occurs when a chemical agent in the process enters the human body during work, usually through the skin or the respiratory tract. Inhalation of toxic chemicals, however, is the most common hazard in

working conditions when performing duties. Gases, dusts, vapours get mainly into the employee's body through the respiratory system during ongoing technological processes. The effect of toxic substances on an employee depends on the specific properties of the substance and the concentration of the dose introduced into the body. The World Health Organization indicates that 50% of the human population around the world spends a third of their lives at work. The work process takes place in a material environment, which is shaped by the factors present in it, such as: biological, chemical, physical, which have their source when carrying out processes in which raw materials and materials are processed. By Health and Safety Guidelines on the Management of hazards in the Metal Casting Industry New Zealand Inc (OSH) (1997). Dangerous, harmful and troublesome factors appear in the process environment. The degree of intensity of these factors determines whether the work environment is a threat to the health or life of an employee. Harmful or troublesome factors may cause a decrease in the employee's mental and physical fitness. They can also lead to poisoning, death or occupational disease by International Labour Office Geneva (2013). Metal casting is one of the most harmful metal production technologies. The process of forming metals into ingots or castings involves the production of metal parts by pouring the mold into liquid metal under pressure and then cooling. The next step is the process of separating the casting from the mold and removing the cores reproducing the internal shapes of the produced elements. The further process is cleaning the casting surface, technical inspection and finishing. Despite the continuous development of technology, increasingly advanced technologies, environmentally friendly raw materials, as well as safer devices and machines, they set up casting as a high risk profession. Despite the continuous development of advanced technologies and environmentally friendly materials, as well as safer devices and machines, casting is classified as high risk profession by Senthil Kumar R.P., Naveen K. (2016); Sadowski, Szykowny and Ciechacki (2010). There is a large amount of hazardous chemical, physical and psychophysical factors in this work environment. Physical factors mainly include moving parts of machinery and equipment, moving products and materials, noise, high temperatures, vibrations, electromagnetic fields, electric current and chemical dust. Other harmful and hazardous factors to which an employee is exposed are: vibration, noise, dust and industrial gases, which are found in processes carried out in the main workplace and in other locations. In further part the article will discuss each stage of the metal casting production process and associated occupational risk. The first stage of the production process in foundries is the production of models made of various materials, including plastics, metals and silicones. During the production of models, plastic processing is carried out, so the main source of threats in this case are the devices used for this processing (e.g. lathes, milling machines). Mechanical factors lead to immediate consequences in the form of injuries, including crushing, bruising, puncture and even loss of employee's life. We distinguish the following groups of mechanical factors: protruding, sharp elements, slippery surfaces, fluids under pressure, transported objects and moving machines, falling elements. The next stage of the process is the preparation of molding sands. These masses are very harmful to the environment. However, during casting, an equally important factor for the operator's well-being is the microclimate. The microclimate is influenced by factors such as humidity, temperature or heat radiation. The position of the casting machine operator is characterized by a hot microclimate. Working in hot conditions causes fainting and slows down the work of the heart, which is why the main responsibility of the management is to ensure an appropriate thermal conditions microclimate, which can be ensured, e.g. by adequate and effective air exchange by Scholz, et.al .(2008); Majidi. et. al. (2011) and Wan (2004). The main hazards in the casting process are also noise, vibration and dust. Noise in production plants is emitted mainly by working machines. If its value exceeds the operational threshold, it is the employer's responsibility to limit it. The permissible value of noise in production plants is 85 dB during eight hours of operation. In the event of noise exceedances, management should isolate the worker from the area exposed to noise and put in place appropriate personal protective equipment. The process of pouring and assembling casting molds is associated with a significant increase in hazards. The main threat in this case is the burn with liquid metal splashes, as well as the threat of products emitted from the decomposition of mass components and during the reaction of liquid metal with materials on the surface of the mold. Accidents can also occur when filling spoons and ladles with liquid metal, and in turn the introduction of water into the molten alloy can cause a violent explosion. The next step is to separate the castings from the molds and remove the cores. This stage involves mass separation by removing mold cores. Punching of castings is also a very onerous technological process. During this process, a significant amount of dust, steam, as well as large amounts of heat and noise values of up to 110 dB are released. Vibration also affects the well-being of the machine operator. There are three

main causes of vibration, namely: construction (when machines are equipped e.g. with a cam, technological (due to mounting inaccuracies, bearing clearances) and operational (looseness, machine wear, surface deformation, improper lubrication). Dust is also a serious hazard during grinding and there is also a high risk of explosion. The final step of production is quality control of castings. This test is often performed using X-ray tests, which are associated with the influence of ionizing radiation that causes diseases e.g. cancer. Unit manager assesses employee exposure. If the analysis required exposure limits, it sets further limits for them. In the event of high risk, measures should be taken to reduce the risk. If there is a medium risk, this should be considered. Management should review the effectiveness of actions taken, which are aimed, inter alia, at reducing radiation doses received by employees In the event of a measures should be taken to reduce such risk. If there is a high risk or medium risk of exposure to ionizing radiation, management should review the effectiveness of the actions taken, which are aimed to minimizing the radiation doses received by casting control employees by International Atomic Energy Agency; International Labour Organization; World Health Organization (2010).

Research Question

Regarding the subject analysed in the study, it should be considered which factors plays the most important role in risk assessment of die casting machines operator. This subject requires a detailed examination and diagnosis base on the Risk Score analysis of such area of the company. The main purpose of the article is to analyze the impact of metal casting process conditions and environment on the operator's health and occupational risk and the level of process safety. The analysis of the subject could was realized and evaluated after answering the following research questions:

1. What conditions determine and have a great impact on the increase of danger at the workplace of the foundry machine operator ?
2. What corrective actions must be introduced by the company's management board to ensure safe working conditions for foundry machine operators ?
3. Did the Risk Score analysis specify important factors improving the working conditions of foundry machine operators that will be taken into account when implementing work safety procedures in the foundry ?
4. What is the probability of implementing corrective actions obtained by the Risk Score method into industrial practice by the management board ?

Research Design and Methodology

This risk accompanies every human activity and is generally associated with the possibility of incurring a loss. It is therefore a consequence of the threat. Occupational risk is the likelihood of harmful effects that are hazardous to the employee's health in connection with the work process (illness or injury), depending on their severity. Risk assessment should be the main element of any occupational health and safety management system, and its main purpose is to provide effective protection for all casting machine workers. Therefore, the paper presents occupational risk assessment using the Risk Score method according to the current state of occupational safety in the enterprise. The risk assessment method is a universal method of occupational risk assessment. In this method, the probability of hazard occurrence is presented using two parameters. The first parameter is the employee's exposure to the type of hazard indicated, and the second is the probability of occurrence of the event. The estimation of risk assessment in the universal risk assessment method is carried out by determining three factors: probability of occurrence of the event, exposure to the hazard, consequence of the event. In this method, occupational risk assessment is based on an indicator that results from the following formula by Kinney et. al. (1976); Smolarkiewicz (2011):

$$\mathbf{R = S \bullet E \bullet P}$$

where:
R – risk,
S – consequences of the event,
E – exposure to the threat,

P – probability of occurrence.

The most important hazards which occur at foundry machines job position were identified and results of risk assessment using the Risk Score method are summarized in Table 1.

Table 1: Occupational risk analysis of foundry machines operator by Risk Score method

	Hazard type	Source of hazard	Effects of the hazard	Risk assessment before corrective action				Preventive solutions	Risk assessment after corrective action			
				S	E	P	R		S	E	P	R
MECHANICAL FACTORS												
1.	Protruding machine parts	Protruding elements that result from the design of the machines	Cuts, scratches, limb injuries,	1	6	6	36	Securing hazardous places, Using guards, Carrying out systematic, machine repairs, Health and safety training	1	3	3	9
2.	Rotating machine components and devices	Moving parts of foundry machines, Robots for moving and transporting castings	Body injuries, Limbs pulling in through moving parts	7	6	1	42	Take special care, Use covers, Follow procedures, Employees training	3	6	1	18
3.	Sharp edges	Sharp mold parts, Casting edges	Skin cuts, Serious injuries	1	6	10	60	Particular caution when changing the mold, Observing health and safety rules, Using gloves protecting against cutting the skin, Observing work instructions	1	6	3	18
4.	Surfaces on which a fall is likely	Slippery surfaces, Steps when changing molds,	Contusions, fractures of dislocations of limbs	3	6	3	54	The use of appropriate non-slip footwear, extreme caution, maintaining cleanliness at the workplace	3	6	1	18
5.	Electric current	Machines and devices powered by electricity,	Employee death	7	6	1	42	Caution when working with machines powered by electricity, Carrying out multiple checks of the condition of the electrical system, Using safeguards to prevent electric shocks	7	2	1	14
6.	Moving means of transport	Forklifts, Overhead Cranes, Handling Trucks	Fractures, crushes, bruises,	7	6	1	42	Moving only in marked places, Exercise extreme caution when moving around the plant area	3	6	1	18
PHYSICAL FACTORS												
7.	Noise	Production machines and equipment	Hearing loss, Hearing deterioration	3	6	1	18	The use of hearing protectors, if necessary, Systematic inspections of machinery and equipment that will allow reducing noise and systematic measurements of noise levels,	3	2	1	6
8.	**Explosion, fire**	Poorly heated liquid metal dosing spoon, Faulty gas installations, Contact of water with liquid aluminum, Grinding dust	Employee death	15	10	1	**150**	Correct heating of the bucket, Frequent inspection of the gas installation, No fire in hazardous areas, Separation of hazardous areas	15	10	0,5	**75**
9.	**Incorrect microclimate**	Hot and emerging microclimate from the presence of pressure casting furnaces	Fainting, Dry skin, Heat stroke, Reduced work performance, Weakness,	3	6	6	**108**	Adjustment of temperature to specified requirements, Ensuring efficient ventilation, Performing numerous measurements, Ensuring the possibility of cooling the body, Applying protection measures,	3	3	3	**27**
10	**Hot surfaces**	Preheated casting molds, Hot ready castings, Hot leads,	Burns with degree I, II or III,	7	6	10	**420**	Caution, Use of suitable gloves to protect against heat, Compliance with health and safety regulations and procedures	3	6	6	**108**
11	Inadequate lighting	Poor workplace lighting	Headaches, eye aches, lacrimation, visual defects, fatigue	3	6	1	18	Ensuring adequate lighting	1	6	1	6
12	Blowing with compressed air	Dizziness	Eye aches	3	6	3	54	The use of protective glasses, Preventive examinations of employees	3	1	1	3
BIOLOGICAL HARMFUL FACTORS												
13	Bacteria, viruses	Factors at the workplace	Skin reactions, gastroenteritis, allergies,	3	6	1	18	Keeping the workplace clean, taking care, maintaining personal hygiene	1	6	1	6
CHEMICAL HARMFUL FACTORS												
14	Chemical substances	Oils, Acids, solutions and alkalis for cleaning molds, Used chemicals for wetting and lubricating mold surfaces,	Skin burns, Allergies, rashes, Poisoning,	3	6	3	54	Compliance with workplace instructions and health and safety rules. Conducting regular preventive examinations of employees,	3	3	3	27
PSYCHOPHYSICAL FACTORS												
15	Physical load	Forced body position, Manual handling of castings and other loads,	Tearing, muscle strain, hernia, bone diseases	3	6	3	54	Frequent breaks, compliance with transport standards, appropriate handling,	3	6	1	18
16	Psychonergic load	Stress, night work	Deterioration of mental state, nervous disease, Absenteeism	3	6	3	54	Compliance with working time standards, Selection of employees in psychological terms, Conducting training and instructional meetings,	3	6	1	18

Source: own study based on information collected during an industrial internship in an analysed metal foundry

Results

The aim of a conducted analysis was to assess the occupational risk of foundry machines and devices operator by using Risk Score method. On the basis of this method, hazards and risks to which the operator is exposed were identified. The table 2 contains 16 most important threats base on which full occupational risk assessment was realized.

Table 2: Hazards and risks selected by Risk Score method for job position of foundry machines operator before and after implementation of corrective actions

HAZARD TYPE		RISK R	
		BEFORE CORRECTIVE ACTION	AFTER CORRECTIVE ACTION
MECHANICAL FACTORS	Protruding parts	36	9
	Rotating parts of machines and devices	42	18
	Sharp edges	60	18
	Surfaces where fall is likely	54	18
	Electric current	42	14
	Moving means of transport	42	18
PHYSICAL FACTORS	Noise	18	6
	Explosion, fire	**150**	**75**
	Incorrect microclimate	**108**	27
	Hot surfaces	**420**	**108**
	Inadequate lighting	18	6
	Blowing with compressed air	54	3
HARMFUL BIOLOGICAL FACTORS	Bacteria, Viruses	18	6
HARMFUL CHEMICAL FACTORS	Chemical substances	54	27
PSYCHOPHYSICAL FACTORS	Physical load	54	18
	Psychonergic load	54	18

Source: own study based on information collected during an industrial internship in an analysed metal foundry

The assessment presents factors which a metal foundry worker is most exposed. These factors are among others: hot surfaces, inappropriate microclimate, explosion and fire. They are typical factors for the working environment. Calculation of their value allowed to present the risk for each of the factors. These values were as follows: hot surfaces - risk level R = 420 (very high risk), inappropriate microclimate - risk level R = 108 (significant risk), explosion and fire - risk level R = 150 (significant risk). Risk related to hot surfaces assumed the value of R> 400, which allowed categorizing the risk as very large. Preventive activities must be used immediately in this case. After using particular preventive activities the risk is possible to reduce about more than a half. But, the risk of threats related to explosion and fire as well as improper microclimate have been categorized in the range of 70 <R ≤ 200, which proves a significant risk, in this case also an improvement is needed. Threats connected with the occurence of hot surfaces should be limited by special precautions when rebuilding the molds, and wearing clothes covering the entire body surface to eliminate the threats that also cause liquid metal splinters. In addition, it is required to use appropriate gloves to protect against high temperature body contact, and in addition it is recommended to comply with health and safety regulations and established procedures. After applying the adjustment, the risk decreased to the value of R = 108. The risk related to the occurrence of an inappropriate microclimate after applying preventive measures decreased to the level of R = 27. The key action which is necessary to minimalize the high level risk is providing efficient ventilation and, above all, adjusting the temperature to the set requirements. The last of the factors reaching a significant level of danger was the risk associated with explosion and fire. An important way to prevent it is to ensure that the spoon for dispensing molten metal is always in contact with liquid metal to be warmed up. What is more, a very important aspect is for liquid aluminium to never have contact with water or wet, moist elements. An employee hired as a casting machine operator must be qualified and be especially careful when performing his professional duties. Another important preventive factor is to abide by the stand instructions and particular caution when operating the furnace for heating and melting Al alloys. It is also important to separate hazardous areas where a fire ban would apply. Gas installations should be frequently inspected and checked. The level of risk after applying preventive measures decreased to R = 75 (table 1). In order to provide a comprehensive picture of the impact of prophylactic measures on reducing the level of risk, selected risks are summarized in Table 2 together with a comparison of the risk values before and after the adjustment. From the analysis of the hazards it might be stated that with the use of appropriate preventive measures in a facility being an object for occupational risk assessment, it is possible to reduce the occupational risk occurring

in the enterprise to an acceptable level. Occupational risk, unfortunately, cannot be fully eliminated but with use of proper preventive measures and actions it is possible. The risk, which is classified as very large, was reduced to the level of small risk using appropriate measures, while the other factors gained an acceptable level, which is a huge achievement for the company.

Discussion

The issue of occupational risk assessment is extremely important for all persons performing work. The analysis of the actual state of the plant was carried out using the Risk Score method, based on the recognition of a deviation from the required condition. The implementation of the proposed corrective actions was necessary to use their constitutional rights to safe and hygienic working conditions. The proposed actions, however, do not end only with the implications of ad hoc actions, but must take into account the process of continuous improvement of the occupational health and safety system in the plant. However it should be remembered that the effectiveness of the suggested corrective actions is determined in the main group of commitments of the management board. The proposed corrective and preventive actions will only be successful if they are introduced enough early. The plant is required to respond quickly to detected non-compliances related to the operation of the occupational health and safety management system. Undoubtedly, work safety has a huge impact on the external perception of the plant as a well-managed institution in terms of both production and maintaining human-friendly health and safety conditions at work. The organization should respond immediately to emerging irregularities by improving health and safety procedures at all job positions in the plant. It has been proven that the situation of the plant, in terms of work safety, is affected by a large number of factors. These are mainly hazards that appear in the work environment, which the plant should try to eliminate continuously. Based on the assessment of occupational risk carried out using the Risk Score method, attention was drawn to threats that are unacceptable in a work environment and have the most severe consequences. The analyzed plant boasts a high level of safety due to the lack of accidents in 2019. However, it was important to examine the employee's subjective assessment, which showed errors resulting from occurring deficiencies. The main problem was the lack of personal protective equipment used by employees, which significantly threatens the life and health of employees. As a preventive measure, frequent inspections and enforcement of employees to comply with applicable health and safety regulations and procedures were suggested. First of all, the employee should use personal protective equipment and keep the workplace clean, including machinery and tools. In addition, he must check on a regular basis whether the protective clothing is clean and intact. One should also remember about its frequent exchange. The analyses carried out by the plant after the introduction of preventive measures suggested as part of the study showed that the use of the Risk Score results has significantly improved the safety status of casting machine operators, which confirms that they have been properly identified. The conditions and occupational risk assessment presented in the paper as an operator of foundry machines and devices may be an introduction to the search for areas where an analysis and assessment of occupational risk allows assessing and indicating possibilities of improving occupational health and safety, as well as limiting occupational risk. The financial means incurred for the implementation of corrective and preventive actions will ultimately reduce the costs resulting from e.g. sickness absence, compensation after accidents at work, and thus lead to an increase in profits for the company. Continuous improvement of the OHS system is a consequence of the legal obligation, which is also contained in a situation in which the OHS system never reaches the standard state, and therefore there will be a constant need to improve it. The OHS system defined in a given plant has a positive effect on preventing hazards in order to completely eliminate their consequences. Its most important element is the occupational risk assessment, which should allow identifying and correctly defining threats and their consequences for both the employee and the workplace.

Conclusions

The purpose of this manuscript is to analyze the level of safety at a selected position in the metal foundry. Actions taken have led to a thorough assessment of the level of safety at the position of the operator of foundry machines and devices. First of all, after the implementation of corrective actions in the discussed position, its proper functioning is checked. Verification activities should be associated with auditing, monitoring, documenting and detecting non-conformities. Monitoring refers to checking

the employee and the proper functioning of the equipment in the plant in relation to applicable regulations and specific occupational health and safety policy. Documents related to the functioning of the occupational health and safety system should contain information on: identified threats, applicable rules and regulations, training received by employees in the field of occupational health and safety, results of risk analysis, accident analysis, control methods used, results of controls carried out by supervisory authorities Health and safety and management reviews. Using selected research methods, it was noticed that the situation in the plant in terms of health and safety at the examined position has improved. It has also been proven that many factors influence the situation in the plant in terms of work safety. The issue of occupational risk assessment is therefore extremely important for all persons appearing in the work process. The analysis of the actual state of the plant was carried out using the Risk Score method. On its basis, deviations from the expected level of occupational safety were identified. The implementation of the proposed corrective actions was necessary to ensure that employees have their constitutional rights to safe and healthy working conditions. The proposed actions do not end only with the implications of temporary actions, but include the process of continuous improvement of the OHS system in the plant. It should be remembered that the effectiveness of the proposed corrective actions is primarily determined by the involvement of the management board.

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Risk Factors Management in the Process of Real Estate Appraisal. Research Results

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Abstract

The issues addressed in the work concern the conditions of making decisions in the process of real estate appraisal that belongs to the area of management sciences. The paper aims to analyse and evaluate factors that affect the quality of the appraisal process and the final estimation of the real estate value. It constitutes the final report on the research on the risk factors of real estate appraisal, which was partly described in the article *Identification of Risk Factors in the Process of Real Estate Appraisal* prepared for IBIMA 2019, Madrid, Spain. The article contains the results of the analysis of the factors and their evaluation. A qualitative approach was used to describe the research results. The methods of scientific inference such as analysis and synthesis were employed as research methods. Although the survey was conducted among Polish property appraisers, its results are largely universal due to the advanced and continuously progressing valuation standardisation process worldwide. Therefore, they can provide a starting point for researchers from other countries to design their studies in this area.

Keywords: Management, Real Estate, Risk, Valuation.

Introduction

Value is one of the most fundamental economic categories, and its understanding determines the effectiveness of decisions made on the market. In the free market conditions, value is shaped by the exchange mechanism. The seller and the buyer create this mechanism by revealing their intentions and making specific choices related to the sale and purchase of specific goods. The exchange of goods takes place in the result of voluntary transactions between the seller and the buyer at a price set by them. Under efficient market conditions, the price reflects the value of the good. The more efficient the market is, the more prices match the value and the prices of the same goods have a smaller price range in the market. And vice versa (Wrzosek, 2002; Bryx, 2006). Therefore, knowing the value of a good is necessary for making economically rational choices. Estimating the correct value while deciding and projecting the future value of the good is a prerequisite for assessing the effectiveness of a decision whether to buy or sell the good. It applies to all goods. As far as real estate is concerned, it is particularly significant for several reasons.

Real estate has several characteristics that make the real estate market inefficient (Kucharska-Stasiak, 2004). These include its high heterogeneity as a commodity, lack of mobility, and high capital intensity. The real estate market is characterised by a relatively small (compared to other markets) number of transactions, high entry barriers due to the high capital intensity of the property, and low liquidity. Moreover, access to data on prices and information on transaction conditions is hindered. Hence, not all market information is reflected in the price, which is a necessary condition for the price to be a good measure of value (Koncepcje..., 2010). The real estate market is highly opaque (Kuraś, 2013). Lack of appropriate information leads to difficulties in achieving market equilibrium, and the lack of this equilibrium makes it harder to value property (Kucharska-Stasiak, 2006). Correct property valuation requires full knowledge of the market, i.e. both direct and indirect transaction conditions (Gawron, 2006).

The paper aims to analyse and evaluate factors that affect the quality of the valuation process and the final estimation of the property value. It constitutes the final report on the research on the risk factors of real estate appraisal, which was partly described in the article *Identification of Risk Factors in the Process of Real Estate Appraisal* prepared for IBIMA 2019 (Kuraś, 2019). The article contains the results of the analysis of the factors and their evaluation.

Theoretical Background

The value category has been an object of interest for many centuries, and some sources say that the first interpretations can be found in Xenophon – V-IV BC (Historia..., 2008). In modern times, it was dealt with by representatives of classical economics, such as A. Smith (Wartość..., 2004), D. Ricardo (Źróbek-Różańska and Źróbek, 2008), J.B. Say, J.S. Mill, or neoclassical economics, e.g. Jevons and Menger (McKnight, 1994). Further development of values-Walras (Landreth and Colander, 2005) and A. Marshal (Kucharska-Stasiak, 2012). Researchers were interested in the category of values as it was crucial for socio-economic relations and its understanding determined whether the decisions made by the parties to the transaction were beneficial or unfavourable to them. Value is essential in the market for commodities that are highly capital intensive. In this case, the consequences of incorrect value estimation are much more severe than for goods with lower unit prices.

The progressing process of globalisation of the economy manifests itself, among other things, in tendencies to standardise similar economic and financial processes, including such areas as property valuation. The increasingly free movement of capital has created new investment opportunities and new markets. The property valuation standardisation is a consequence of these processes. Different solutions have been applied in different countries. However, the global community of investors, lenders, accountants and valuers is interested in standardising approaches and methods of valuation. The *International Valuation Standards Council – IVSC* (International..., 2017), *The European Group of Valuers' Associations – TEGoVA* (European..., 2016), *The Royal Institution of Chartered Surveyors* (*RICS*) and the relevant European Union agenda have all been involved in the valuation standardisation process (www.rics.org).

As a general rule, valuation should be understood as a process to achieve value, which requires the proper planning of specific activities, their organisation, the correct implementation of previously planned and organised activities, and a critical assessment of all previous stages for the best possible final result (Szacowanie..., 2012). Being aware of differences in valuation assumptions from one country to another, certain elements of universal nature can be identified. The article analyses the process of valuation according to legislation binding in Poland.

In Poland, the valuation of property has been regulated by law (Ustawa..., 1997; Rozporządzenie..., 2004) and professional standards (Powszechne...) of property appraisers issued by *The Polish Federation of Valuers' Associations* – PFVA (www.pfsrm.pl). The regulations include the principles of using different approaches, methods and techniques of valuation, as well as the methods of determining the value for different purposes. A valuer carries out the valuation in the form of an appraisal report (Wilkowska-Kołakowska, 2010), the method, form and content of which are regulated by law. The appraisal report is a written opinion on the value of the property. It contains the information necessary to perform the valuation, including the legal basis and conditions of the activities performed, substantive solutions, the course of calculations and the result in the form of a specific number. The choice of approach and method of valuation is made by the property valuer taking the utmost account of the purpose of the valuation, the type and location of the property, the equipment level in the technical infrastructure, the state of development as well as available data on prices, income, and characteristics of similar properties. In the Polish valuation practice, there are the following approaches: comparative, income, cost, mixed.

The comparative approach consists in determining the property value in the effect of its comparison with similar properties that were traded on the market. The income approach assumes that the future buyer of the property being valued is willing to pay a price for it, which depends on the amount of income that the property may generate. The cost approach takes as its premise that the property is

worth as much as its replacement costs, considering the current level of its consumption. The mixed approach allows for the use of the different approaches listed. Various methods are employed within these approaches and a variety of techniques within the methods. That will depend on the characteristics of the property being valued and the availability of market data.

In Polish conditions, the market value that is the most essential in any market economy is most often determined (Kucharska-Stasiak, 2016). It is the estimated amount that can be obtained for a property if there are no special conditions of the transaction. The general course of the valuation process in the Polish conditions can get a specific framework, as presented in Figure 1.

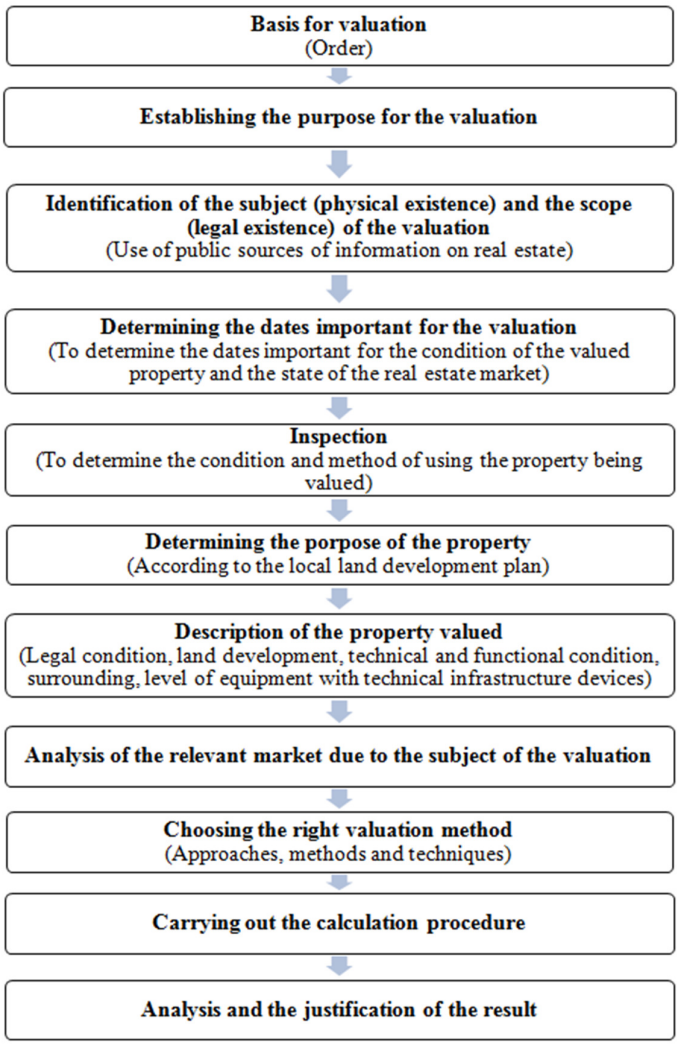

Figure 1: Scheme of the valuation process according to Polish regulations

Standardisation of the process of real estate appraisal contributes to the reduction of the risk of incorrect value estimation. That risk cannot be completely eliminated, however, proper actions can significantly limit its extend. The risk is an inevitable part of each activity and decision (Korombel, 2012).

Risk factors management includes identifying the risk factors, constructing a plan on how to limit them, and undertaking actions that can lead to risk reduction. The final stage of this process is checking whether undertaken actions gave the predicted result and if so, in which scope.

Research Methods

The article presents the results of an extensive survey, which lead to the formulation of research assumptions, development of a questionnaire, and then analysis of the data thus obtained. The research process began with an analysis of sources on practical aspects of valuation. The analysis included scientific articles, legal regulations, industry literature, articles in renowned newspapers and magazines, industry websites. In the study, the observation method was also applied to analyse the valuation process in practical terms and, as a result, comments and suggestions were recorded. The survey questionnaire construction was preceded by a standardised interview with several experts to identify possible errors and inaccuracies.

A survey followed the above. The questionnaire contained 27 questions, 6 of which were the so-called demographics, and the remaining 21 were specialist questions. The survey was conducted in June 2019, and its duration was 15 days. The survey used a publicly available database with basic valuers' data and their e-mail addresses to contact potential clients with them. In this way, 1627 addresses were obtained. A request together with a link to the online survey was sent to each address to complete the survey. Two hundred twenty-seven people took note of the content of the survey. Eventually, the survey was completed by 131 people, which constitutes 8% of all e-mails sent with the request to do so. All persons who decided to fill in the questionnaire did it completely and correctly.

The survey results were partially published in the article *Identification...* presented in the IBIMA 2019 materials. The paper contains the results and conclusions from the survey, which have the nature of the simple quantitative analysis, without the use of statistical methods.

Discussion of Research Results

The work was prepared based on the data from 131 questionnaires. Most experts who decided to fill in the questionnaires were women (56%) than men (44%). The largest group were respondents aged 30-39 (47%), followed by those aged 40-49 (21%). Both age groups are more than 2/3 of the total number of respondents. Experts with 5-10 years of seniority (41%), followed by 11-20 years of seniority (28%) were the largest group, while experts with less than five years of seniority were the least numerous (19%). The highest number of questionnaires was completed by respondents operating in cities with more than 500 thousand inhabitants (49%) and in cities with 100-500 thousand inhabitants (23%), in total it is almost ¾ of all respondents. The most numerous group was made up of valuers who carried out over 100 valuations (38%), over 1000 valuations during their professional activity were conducted by over 20% of the respondents.

Property appraisers in Poland are professionals who have the exclusive right to make valuations in certain cases under the relevant legislation. It always applies to properties that are part of the state treasury and local government. In other cases, there is no formal requirement to do so, as is the case when estimating the value of real estate as collateral for bank mortgages or private property transactions. In practice, however, banks, and the courts as well, frequently use qualified valuers. The court expert for property valuation does not have to be a person with professional qualifications issued by the relevant ministry, although there is obviously the principle of having appropriate, otherwise certified knowledge and experience to perform this function. Nonetheless, in these cases both banks and courts often use experts. In the author's view, the reason for this is the desire to reduce the risk of the valuation being undermined by one of the parties concerned in disputed situations. The structure of valuations made by the valuers surveyed is shown in Figure 2.

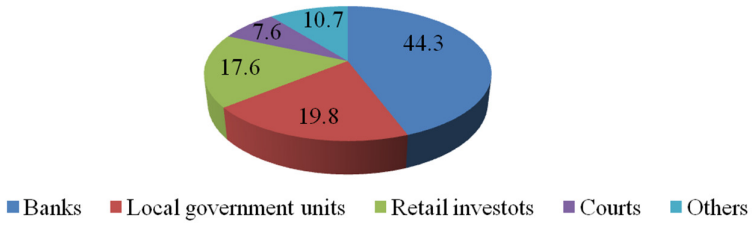

Figure 2: Structure of valuations made by the surveyed property appraisers

The largest recipients of valuations in Poland are banks (44.3%), followed by local government units (19.8%), retail investors (17.6%), and courts (7.6%). Slightly more than a tenth of all valuations are entities which belong to none of the institutions mentioned above.

The respondents' responses made it possible to determine the most vital, in their opinion, factors influencing the correctness of their valuations. They are described in detail in the article *Indentification...*Table 1 displays them in the synthetic approach.

Table 1: Most significant risk factors in the process of real estate appraisal

Risk factors	Risk area	Risk source	Manifestations of risk
Factors related to the identification of the object and scope of valuation (independent of the valuer)	Information in public real estate information resources	Information in land and building registers (geodetic information)	Non-compliance, non-validity, non-disclosure
		Information contained in court registers (information on legal status)	
		Information contained in the local law of local government units (information on the designation of real estate)	Accessibility
	Analysis of the real estate market	Sources of data and information about the market	Lack or small amount, level of credibility and reliability, topicality
	Pressure to distort the valuation result	Ordering party requesting or suggesting an over- or understatement of the valuation result	Wrong valuation result
Factors relating to the estimation procedure (totally or partially dependent on the valuer)	Inspection of the property	Intentional lack of inspection or inability to carry out the inspection on the date(s) relevant to the valuation or inspection carried out unreliably	Incorrectly established condition of the property and/or its market characteristics, errors in the selection of the market and comparative properties
	Determination of dates relevant to the valuation	Failure to understand or take into account special provisions (especially for rare cases)	Incorrect adoption of dates of the property's condition and market condition (price level)
	Formulating valuation assumptions	Incorrectly carried out analysis process and/or and defects in reasoning logic	Incorrect determination of the object, scope, area or period of analysis (incorrect assumptions)
	Choice of approach, method and techniques of valuation	Incorrectly conducted process of choosing the method of valuation due to incorrect determination of elements such as object, purpose, scope of valuation, purpose of the property	Incorrectly chosen method of valuation
	Degree of difficulty of	Complicated property or	Errors in the assumptions of the

	the estimation procedure	complicated valuation	procedure or the estimation procedure itself
	Selection of comparative properties	Difficulty in obtaining data, quality of market information	No or little similarity between the property being valued and comparative properties
	Determination of income losses from real estate	Lack of objective market data or difficulty in obtaining such data (e.g. on vacancy and rent arrears for the income approach)	Incorrectly estimated income losses and, consequently, the value of the real estate
	Determination of rates of return		Incorrectly determined rate of return and consequently the value of the property

In general, all risk factors in the property valuation process can be subdivided into those relating to the identification of the subject matter and scope of the valuation beyond the appraiser's control and others connected with the valuation procedure over which the valuer has total or partial influence and can, therefore, manage them.

The first group of factors includes the risk of obtaining incorrect, outdated or incomplete information from public property information resources primarily. In Polish conditions, the valuer is required to determine the surveying designation and the legal status (rights and restrictions) of real estate. A geodetic marking involves the necessity to obtain data concerning the location, area, boundaries, type and distribution of land application, etc., enabling the spatial identification of real estate. The information is obtained in location-specific departments of geodesy. Appraisers determine the legal status through the analysis of entries in real estate land and mortgage registers, i.e. registers of information about real estate understood as a legal entity. Land and mortgage registers are maintained by district courts competent for the location of real estate. The third source of information about real estate is the local law - spatial development plans. They are obtained in the municipality offices where the property being valued is located.

The survey asked whether appraisers in practice meet, and if so, how often, with the problem of incorrect, outdated or undisclosed data in public registers of real estate information. The results are presented in Figure 3.

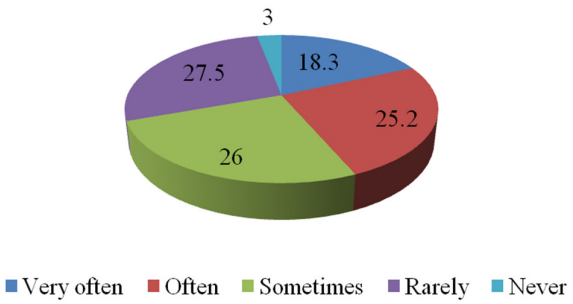

Figure 3: Frequency of flawed data in public registers of real estate information

Nearly all poverty appraisers faced a situation where entries in public registers had various flaws. As many as 18.3% of those surveyed stated that it occurs very often. A quarter (25.2%) sometimes encountered this problem. However, 27.5% of appraisers are rarely confronted with this problem. Only 3.0% have never met with such a situation. The frequency of incomplete records in land registers and map errors were asked to identify the source of the problem and the importance of flawed records for the valuation process. The results are displayed in Table 2.

Table 2: Frequency of occurrence of flawed data in geodetic registers

Frequency of occurrence	Land and Building Registers (%)	Maps (%)
Very often	1,5	5,3
Often	13,0	11,5
Sometimes	35,1	26,7
Rarely	42,7	42,0
Never	7,7	14,5

The distribution of responses about land registers and maps is similar. As many as 35.1 % of appraisers sometimes encounter incomplete records in the registers. For deficient maps, this was also a very high figure of 26.7%. Only 7.7% and 14.5% of the valuers respectively have never encountered such problems. The results reveal a surprisingly high number of irregularities, thus making public property information registers an essential source of risk.

Irregularities in the land and mortgage registers also constitute a significant source of risk. That is illustrated by the data in Table 3.

Table 3: Frequency of erroneous entries in the land and mortgage register

Type of error	Frequency (%)
Rightsholder (person of owner/co-owner)	17,6
Scope of rights to real estate	28,2
Restrictions on the disposal of real estate	20,6
Not applicable	33,6

There are far fewer errors in court registers than in the case of geodetic sources. One-third of the surveyed appraisers did not meet with flawed entries in land and mortgage registers at all (33.6%). Defects most often concern the scope of rights to real estate, primarily a failure to disclose the facts or changes in this respect. To a lesser extent, this concerns restrictions in the disposal of real estate and persons in charge of real estate.

One of the next questions referred to the availability of data concerning the purpose of the property. It was a resolution of the municipality council on spatial development in its graphic form in the form of a plan. Table 4 presents the results.

Table 4: Availability of data on the purpose of the property

Availability	Frequency (%)
Very good	12,2
Good	32,8
Average	32,1
Sufficient	9,2
Insufficient	13,7

Nearly half of the appraisers (45 %) rated access to information to determine the purpose of the property as good and very good, while 41.3 % as average or sufficient. By contrast, 13.7 % indicated that it is insufficient. The results prove that this element is not a significant source of risk of mispricing.

The quality of analysis of the relevant market is another element that affects the correctness of valuation. That is a critical area as an incorrectly conducted analysis results in wrong valuation

assumptions, which disqualifies the valuation, even though all the other steps have been carried out properly. The quality of the analysis and the accuracy of conclusions is affected by the quality of input data. Since the real estate market is opaque, there are often severe difficulties in obtaining the relevant data (in terms of quantity and quality) that give a high probability of a proper representation of the market. However, an appraiser can manage risk in this area by joining various initiatives undertaken by the professional community, creating own databases, monitoring the market, reports of consulting and advisory companies, and purchasing databases on a commercial basis. The survey asked whether the valuer assesses the role of market analysis in the valuation process. The results are presented in Figure 4.

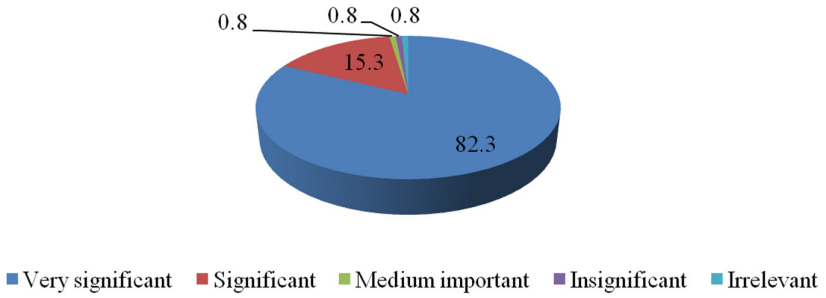

Figure 4: The importance of real estate market analysis for the correctness of valuation

Almost all experts considered that the analysis of the relevant market in terms of the subject matter of the valuation is either crucial or important. That means that valuers have a very good understanding of the importance of market analysis for the valuation process.

Another question was about the risk of pressure from the principal to distort the outcome of the valuation. There are always two parties to a property valuation whose interests conflict and who are interested in completely different valuation results. The expectation on the part of the principal is obviously not legally permissible and the valuer should be completely resistant to it. The survey asked whether valuers in Poland face such a problem. Figure 5 provides the results.

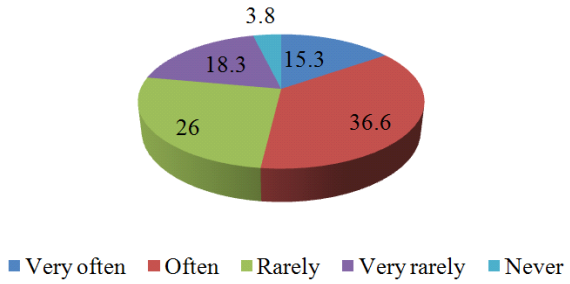

Figure 5: The frequency of pressure to distort the valuation results

More than half of the appraisers (51.9 %) are under pressure to distort the results explicitly or with such suggestions. Nevertheless, such irregularities are rarely encountered by another quarter of the professional community surveyed. That means that together as many as ¾ of the appraisers encounter such a problem in their work. Only 3.8% have never faced it.

The above part of the analysis closes the analysis of factors related to the acquisition of data and information on real estate and the relevant market. Further, the sources of valuation risk associated with the assessment procedure are considered.

Factors related to the property being valued include the inspection of the property. The inspection is necessary to determine the condition of the environment, the spatial development, the technical and utility condition, and the level of equipment in the technical infrastructure. The assessment of these elements is required under Polish conditions by the provisions of the relevant Act. Appraisers agree that for the valuation, the importance of visual inspection is crucial, very important or essential - respectively: 71,0 %, 22,9% and 5,3%. Only one person gave it minor importance (0.8%). It can be assumed that the source of risk is not so much in underestimating the visual inspection, but possibly in an incorrect assessment of the property based on the visual inspection.

Establishing dates relevant for the valuation is another fundamental element in Polish formal and legal conditions. It appears particularly important in the case of valuation for the assessment of various fees by relevant entities (e.g. municipalities). These are, for example, the fee for an increase in the property value caused by the construction of technical infrastructure facilities by the municipality, or the consolidation of fragmented plots of land and their redistribution (betterment levy), or the planning fee resulting from changes in the designation in the local zoning plan, when the effect is an increase in the value of the property. For these cases, it is vital to determine the condition and value of the property on specific dates, i.e., before and after the municipality's actions that brought the growth of the value of private properties. In market transactions, establishing dates is vital as well. As a rule, two dates should be established, i.e. the date on which the condition of the property is assumed, and the date of the market condition, i.e. the price level for this date. More than half of the appraisers believe that this is a key element 53.4%, 32.8% thinks that a significant one. On average, 11.5% of those surveyed consider it to be of medium importance, and 2.3% as insignificant. That proves that a small proportion of the environment underestimates the importance of this element for correct valuation.

A significant risk area is a stage of formulating valuation assumptions. Such sensitive points include the definition of similar properties. To this end, it is necessary to specify characteristics that determine the price differentiation of a property similar to the one being valued. In addition to identifying the market characteristics, it is required to establish their impact on the price range in the set of purchase/sale transactions of similar properties or differences in potential income that may be generated by the property or differences in replacement costs (depending on the valuation approach). In general, the best possible representation of the functioning of the relevant market in terms of valuation should be provided. The formulation of assumptions is a consequence of all the stages mentioned so far.

An important area of risk is the choice of the appropriate approach, method, and technique of valuation. Given it, the type of property, the purpose and scope of valuation and the purpose of the property should be taken into account. These are the main factors determining the choice of the right approach. On the other hand, the availability of relevant market data and the nature of the property or how the property may generate income influences the choice of the method and, in some cases, the valuation technique. The survey asked whether the results of market analysis in any way contribute to the choice of valuation method (approaches, methods, and techniques). The vast majority of appraisers - 86,2 % in total - are of the opinion that the role of market analysis in the choice of the valuation method is very significant (45 %) or significant (41,2 %). 8,4 % of the surveyed is convinced that it is medium-important; the weight is insignificant for 3,1 % and irrelevant for 2,3 %. The results indicate that a small group of appraisers do not see a cause and effect relationship between the analysis and the choice of estimation that should be obvious. The degree of difficulty of the procedures used in property valuation was also asked. The results are shown in Figure 6.

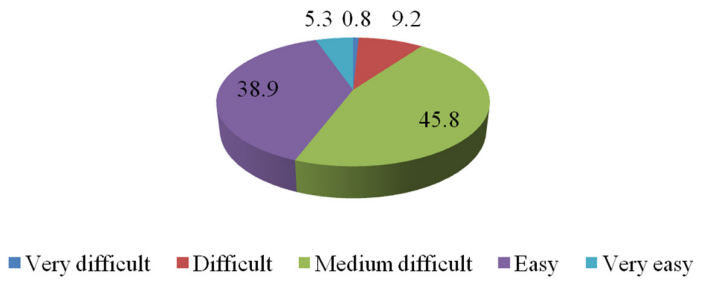

Figure 6: Level of difficulty in choosing an appropriate method of valuation

Most valuers believe that regulating valuation in Poland is medium-difficult (45.8%) or easy (38.9%). A total of 10% (9.2% and 0.8% respectively) consider them difficult and very difficult. However, 5.3% described them as very easy. These results allow the conclusion to be drawn that regulations are assessed as transparent in this respect and not very troublesome, which makes this element a source of low risk.

Property valuation is a complex issue and requires interdisciplinary expertise. It requires knowledge of law, economics, construction, geodesy, and agriculture. As a result, appraisers usually specialise in specific areas. Valuations from outside this area can be more difficult and sometimes even very embarrassing. It applies to complex commercial, industrial, agricultural or forestry properties. Different methods and techniques differ significantly in the degree of difficulty not so much in the calculation procedure as in the boundary conditions which determine the correctness of the valuation result. The results of evaluation of the level of difficulty of valuation procedures are displayed in Figure 7.

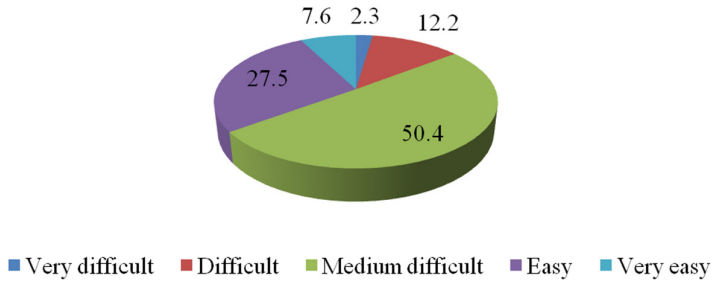

Figure 7: Level of difficulty of valuation procedures

The few assessors (2.3 % and 12.2 %) consider the estimation procedures to be very difficult and difficult. Half of them (50.4%) indicates that it is medium-difficult, and another quarter (27.5%) that quite easy. 7.6% of those surveyed found it easy. These results show that the estimation procedures do not pose any significant difficulties for them in carrying out their professional tasks and as such, are not a significant source of risk.

The survey also asked to what extent the selection of comparable properties affects the determination of market characteristics weights. As many as 90.1 % of the surveyed are of the opinion that to a very large extent (62.6 %) or to a large extent (27.5 %). 6.1 % rated it as having little impact, 0.8 % - little impact, and 3.1 % - no impact.

For income-generating properties, it is necessary to establish the annual net income to estimate their value, and this, in turn, requires the determination of income losses, e.g., from non-rented areas. Due to the low transparency of the market and demanding access to such data, this can pose problems for valuers. By contrast, incorrect input assumptions increase the risk of an improper valuation result.

Nevertheless, the appraiser can offset this risk by monitoring the market and gathering and exchanging the necessary information with other valuers. The above also applies to the determination of rates of return. The assessment of these valuation areas is presented in Table 5.

Table 5: Level of difficulty in determining rates of return and income losses

Level of difficulty	Determination of rates of return	Determination of income losses
Very difficult	19,1	19,1
Difficult	41,2	37,4
Medium-difficult	34,4	37,4
Quite easy	5,3	5,3
Easy	0,0	0,8

Appraisers generally consider the determination of rates of return and loss of income to be at least difficult - 60,3 % and 56,5 % respectively. 34,5 % and 37 % of the respondents, respectively, believes that these elements are medium-difficult. A very small percentage indicates that these elements are quite easy, and only one person considers the determination of income losses to be an easy task.

Conclusion

The article describes the results of the study that aimed to identify and evaluate the most critical areas and sources of risk in the property valuation process. These actions are necessary for rational planning of activities in the management of the property valuation process. They are also a starting point for decisions made during this process. Awareness of areas and sources of risk enables effective risk management.

The survey allowed for the identification of the most critical factors. The kick-off was the analysis of scientific and professional literature and interviews with experts. Besides, the observation method was applied. These activities ended with the construction of a survey questionnaire - the analysis of answers allowed for initial identification of the risk factors. The results were published in the article *Identification...*

This article presents the author's proposal of risk factors classification. They have been divided into two main groups. The factors concerning the identification of the object and the scope of valuation constitute the first group. The second one is those related to the estimation procedure. Additionally, those factors were assigned risk areas, and sources and manifestations were identified.

The first group includes factors which are not dependent on the valuer, i.e., they cannot be limited. However, awareness of their existence and importance should result in the application of the principle of limited trust towards public sources of information about real estate and sources of data about the real estate market, or preparation for pressure from the ordering party to distort the result of valuation. The second group of factors is characterised by the fact that an appraiser can manage them effectively as he/she has a significant influence on them. They relate to the estimation procedure. It concerns the activities of the inspection of the real estate, establishing the dates necessary for the valuation, formulating the assumptions of the valuation, choosing the methods of valuation, selecting the real estate for comparison, and determining the income from the real estate. The valuer has an exclusive influence on some of these elements, such as setting dates, while limited on others. For example, some market data is complicated to obtain since it is not publicly available. However, an appraiser can reduce the valuation risk in this area through activities such as active data mining, working with other professionals to continuously monitor the property market, understanding the relationship between the property market and other markets and the economy to recognise the mechanisms of value creation.

The issues raised are significant since the value is one of the essential economic categories, and its knowledge determines the effectiveness of decisions made in all markets, including real estate. Nonetheless, the issue is insufficiently researched, especially concerning Polish valuation conditions. This paper attempts to fill this gap. The author is aware of some limitations of the described research and the obtained results. The applied analysis method is straightforward, and statistical instruments do not support conclusions. Further research in this area needs to be undertaken. Despite those limitations, the author hopes that the presented study can become a source of inspiration for researchers from other countries and a starting point for designing their research.

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The Impact of Institutional Factors on IFRS Voluntary Adoption in EU Selected Countries

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Summary

The objective of the article is to identify the most important institutional factors affecting the voluntary use of IFRS in selected Western European countries. In the article factors affecting the voluntary adoption of IFRS were presented, they were divided into internal and external. The following institutional factors have been empirically verified: stock exchange and banking development, government efficiency, freedom from corruption, business freedom, investment freedom, judicial independence, protection of property rights, and legal enforcement of contracts. The analysis of these factors can be regarded as an relatively innovative approach in the literature. The subject of the analysis were annual reports of listed companies belonging to the manufacturing sector in countries such as: Germany, France, UK, Italy and Finland. Enterprises were divided into those applying IFRS and applying local accounting standards. Non-parametric Mann-Whitney test was used to check the significance of differences between companies using local GAAP and IFRS. The article proved that the institutional environment of enterprises affects the voluntary IFRS application.

Introduction

International Financial Reporting Standards are the world's most widely used accounting standards. IFRS is adopted and accepted in more than 120 countries of the world. The adoption of IFRS leads to a number of benefits. It improves the quality of of public disclosures (Bassemir and Novotny-Farkas 2018), IFRS decrease use of earnings management techniques (Yang and Abeysekera 2018) and improve usefulness of financial data (De George et al 2016; Tanko 2012; Kouki 2018). Also, it increases the transparency and comparability of financial reporting. It should be noted that the practical aspects of IFRS adoption can be different in particular countries. In some countries IFRS is mandatory for listed companies or the largest listed companies. In other countries IFRS for non-listed companies is voluntary, forbidden or mandatory.

There are a number of factors in business theory and practice which have an impact on IFRS voluntary adoption. Research studies in this field can be divided into those which focus on internal factors related to company activities and those which give attention to external economic or institutional factors. With regard to the first group, researchers refer to very different determinants of IFRS voluntary adoption. André et al (2012) analysed such factors as company size, auditor reputation, profitability, capital intensity, an economic entity's industry, shareholder structure, and employee productivity. Bassemir (2018) conducted an empirical verification of types of investors, development opportunities, indebtedness, financial rating, stock market activities, international operations, and cooperation with renowned certified auditors. On the other hand, Bessieux-Ollier and Walliser (2012) conducted empirical tests of such factors as overseas sales volumes, ownership concentration, indebtedness, share of fixed assets in balance sheet total, profitability, listed company status, and the examination of a financial statement by a renowned auditor. Matonti, and Iuliano (2012) regard the following to be the most significant factors: company size, type of investor, industry, cooperation with a foreign investor, indebtedness, profitability, membership in a capital group, listed company status, renowned auditor, and management shareholding.

The other group of researchers focuses on external, i.e. economic, institutional and macroeconomic factors. Shima and Yang (2012) stress that IFRS voluntary adoption is determined by political and

economic relations. The likelihood of IFRS voluntary adoption is greater in countries in which businesses record higher debt levels as well as those which apply common law system. IFRS adoption is more common in countries characterised by higher economic growth levels and higher economic advancement. Other significant factors include capital markets and their development, and tax and inflation rates. Francis, Khurana, Martin and Pereira (2008) conducted an empirical verification of such factors as economic advancement, legal systems, a given country's availability of financial resources, corruption rates, court efficiency, stock market and banking sector advancement, and the adoption of common and statutory law. Renders and Gaeremynck (2007) analysed capital market development, legal investor protection systems, and the scope of corporate governance instruments. Hope et al (2006) analysed relatively similar variables, regarding the following to be the major institutional factors of IFRS voluntary adoption: legal disclosure requirements, anti-director rights, public enforcement, the availability of share capital, GDP per capita, and capital market development. It should be noted that literatures have given much less attention to institutional factors, however, these concepts are still being developed in the literature (Pais and Bonito 2018, Damak-Ayadi et al 2020, Salem et al 2017, Zahid and Simga-Mugan 2019).

Institutional factors affect many areas of business financial management. Strong capital markets enable proper risk management (Öztekin and Flannery 2012). Strongly developed stock exchanges with a highly developed banking sector enable obtaining financing at a low cost (Francis et al 2008). In turn, low levels of corruption and high-quality legal systems affect the profitability of business units Lee and Hong (2012). Economic freedom and trade freedom cause that the value of investments is significantly increased. Therefore, a friendly institutional environment in a given country means that making numerous financial decisions is much easier and less costly. It is therefore worth considering whether the voluntary use of IFRS by the enterprise sector is also dependent on the institution's institutional development.

For the purpose of this work the authors focus their analysis on such areas as stock exchange and banking development, tax freedom, government efficiency, freedom from corruption, trade freedom, business freedom, investment freedom, judicial independence, protection of property rights, and legal enforcement of contracts. The analysis of these factors can be regarded as an relatively innovative approach in the literature. It is expected that a high-quality institutional environment necessitates the voluntary application of high-quality accounting standards, such as IFRS. The objective of the article is to identify the most important institutional factors affecting the voluntary use of IFRS in selected Western European countries. The paper aims to verify the impact of institutional factors on IFRS voluntary adoption in EU selected countries: Germany, France, UK, Italy and Finland. The analysis of nearly 500 companies was conducted in 2014-2018. Non-parametric Mann-Whitney test was used to check the significance of differences between companies using Local GAAP and IFRS. The choice of test was dictated by the fact that the analyzed variables did not have a normal distribution in the compared groups (as verified by the Shapiro-Wilk test), and thus the assumptions of the Student's t test were not met. The research results are important for users of financial statements, listed companies, policy makers, governments and their institutions as well as institutions supervising the stock exchanges or the banking sector.

Review of the literature

Decisions related to IFRS voluntary adoption depend, to a large degree, on the institutions which determine the quality of private contracts in a given economy. A country's effective institutions protect the interests of both investors and lenders. Therefore, all participants of the market are more inclined to enter into agreements in the conditions of the greater transparency, quality and comparability of financial statements (IFRS). Institutions are usually better developed in industrialised countries which have sufficient resources for their financing. In this context it is also necessary to ensure property rights and facilitate the process of concluding private contracts (Francis et al 2008). A similar opinion is expressed by Renders, and Gaeremynck (2007). They believe that companies often decide not to adopt IFRS for opportunistic reasons, especially in countries with low quality laws and weak institutional environments. In countries with low quality institutions the costs of IFRS adoption are regarded to be excessively high by management boards due to the possible loss of various private benefits. On the

other hand, in countries with effective investor protection systems and excellent corporate governance tools reduced private gains resulting from control procedures lead to lower IFRS adoption costs. An effective corporate governance system is capable of easing a company's internal and external tensions. Reducing the impact of managerial opportunism increases the quality, transparency and comparability of financial statements, advocated by IFRS. Some other authors, e.g. Hope et al (2006), believe that a reversed situation can occur – a negative correlation between an institutional environment (investor protection and legal enforcement) and IFRS adoption. The authors claim that IFRS adoption allows for mitigating local adverse business conditions through reducing investment risk thanks to adopting high quality and globally recognized and approved financial standards. Moreover, such a policy attracts international investment. It is also true for stock markets. IFRS adoption increases the comparability of financial statements, IFRS adoption improves the quality of disclosures and increases the decision making potential resulting from financial data.

The financial systems which provide necessary funds for corporate activities in a given country are usually based on stock exchanges or banking sectors. Well-developed stock exchanges and banks can finance the sector of enterprises to a similar degree. Developed stock exchanges mitigate investor risk and increase the effectiveness of the banking sector. However, effective control over the management boards of large companies can be hindered by a considerably fragmented shareholder shares (Yartey 2010). Investor interests are usually well protected on developed stock markets. In this context, protecting the interests of minority investors, who cannot affect the functioning of listed companies, is of key importance. Moreover, minority investors, unlike large or dominant investors, do not have easy access to financial data (Hope et al 2006). Developed stock markets are characterised by a larger number of the acquisitions of listed companies, which increases demand for high quality financial data (Demirgüç-Kunt and Levine 1999). The above capital market deficiencies can be partly compensated for by introducing high quality accounting standards. Undoubtedly, the development of capital markets – apart from the quality of shareholder right enforcement and disclosure requirements in equity markets – is influenced by the quality of accounting standards (López de Silanes et al 1998, La Porta et al 2006, Djankov et al 2008). In countries with developed stock markets and effective stock investor protection systems private gains resulting from control mechanisms are much limited (Renders and Gaeremynck 2007). In these countries the costs of IFRS adoption are relatively low because people operating in company internal structures cannot benefit much from potential private gains. The transparency and quality of accounting is greater in countries with developed stock markets and effective stock investor protection systems as compared with nations with less developed systems.

H1: The voluntary applicability of IFRS is more likely in countries with highly developed stock exchanges

A well-developed banking sector ensures business entities' easy access to preferential financing, and loan application procedures are more favourable for entrepreneurs (Öztekin and Flannery 2012). A well-developed banking system is the one in which lenders' rights are effectively protected, which is reflected in the creditor rights index (Demirgüç-Kunt and Levine 2005). The banks which enter into long-term cooperation with entrepreneurs can offer lower costs of funds. However, a significant role in the lending process is also played by the quality of financial reporting – the basis for assessing a company's creditworthiness. IFRS adoption has also a positive impact on the availability and cost of foreign capital (Tanko 2012).

H2: Enterprises voluntarily use IFRS more often in countries with a high level of banking sector development

The tax freedom index provides information on the costs and efficiency of central and local government institutions. The higher the index, the higher the profitability of companies (as a rule) (Aburime 2008). Therefore, it is necessary to achieve higher results before taxation in order to reach the owners' desired level of rates of return. Companies which face a large tax burden tend to downsize their operations in a given country (Devereux et al 2002). Countries with high income tax rates are characterised by higher costs of equity finance, and these be reduced as a result of IFRS adoption. High quality accounting standards can partly counterbalance lower rates of return for owners. In the conditions of high income

tax rates economic entities can rely more heavily on foreign capital. It implies the possibility of deducting interest on foreign capital from taxable income. In this situation equity finance is even less favourable.

H3: High tax freedom in a given country means that the scope of voluntary use of IFRS increases

IFRS adoption is also affected by the efficiency of governments and their institutions. In this context, a significant role is played by appropriate supervision of financial reporting and an effective corporate governance system, as well as the quality of public services, administration competences, government reliability, the stability of policies towards a broadly understood group of enterprises, and the stability of accounting regulations (Firth et al 2013, Ngobo and Fouda 2012, Gugler et al 2013). Undoubtedly, the inefficient work of administration staff increases the risk of investors who may require a larger extent of disclosures (IFRS). The lack of qualified administration staff and of the consistency between balance sheet law and globally recognized solutions leads, in the long run, to the necessity of adopting globally approved accounting standards. Another adverse impact on the efficiency of governments is the lack of political stability (Ngobo and Fouda 2012). Developing a modern economy, based on advanced technologies and participation of foreign investors, is not possible without the support of highly efficient government institutions.

H4: The low level of Government efficiency in a given country causes, that the scope of voluntary use of IFRS to increase

The corruption index in a given country reflects the ineffective enforcement of law and legal regulations. In such conditions shareholder interests are not well protected (Demirgüç-Kunt and Levine 1999), which leads to increased corporate financing costs and thus necessitates improvements in the efficiency of government institutions which combat the adverse phenomenon (Gugler et al 2013). Countries with a high corruption index are characterised by high transaction costs, and the concluded contracts are not effectively enforced (Öztekin and Flannery 2012). Corruption involves additional costs incurred by enterprises (Lee and Hong 2012). A high corruption index increases business risk and reduces corporate profitability, hence additional premiums required by stock market investors. Frequently, corruption implies unfair competition which distorts a company's financial result and financial standing (Aburime 2009). Corruption cannot be easily quantified, and it increases risk and uncertainty. It results in inappropriate capital allocation and changes the actual level of economic entities' profitability. Therefore, there is an increasing demand for reliable and high quality financial information, communicated on the basis of high quality standards (IFRS).

H5: High levels of corruption on the coutry level is correlated with increasing the demand for voluntary use of IFRS

Trade freedom facilitates the opening up of an economy to foreign trade, which translates to signing relevant international trade agreements. Business operations carried out on a given country's market by renowned companies indicates a more frequent adoption of such global standards as IFRS. Local companies which considerably increase the critical mass of their sales volumes and which intend to grow and compete with industry leaders show greater interest in IFRS adoption. They need to be more competitive to successfully face global rivalry. Simultaneously, it can lead to deterioration in local businesses' profitability (McMullen et al 2008). Such conditions can increase business risk for local enterprises (Agnello and Sousa 2013). IFRS adoption can mitigate this risk and increase a company's reliability.

H6: A high level of freedom of trade in a particular country results in greater voluntary applicability of the IFRS

Business freedom has a great impact on company operations. This concept indicates the freedom to start and carry out activities without the state's licences or permits (Muriu 2011). Numerous administrative restrictions imposed on economic activities make specific market entry and exit barriers difficult to overcome (Driffield et al 2013). It results in a smaller number and pace of implemented

investment projects, while companies' profitability deteriorates. In an unfavourable economic environment the providers of capital tend to require higher rates of return. High costs of capital (higher risk, lower profitability) can be counterbalanced by a higher level of accounting disclosures and higher quality accounting, compensating for higher institutional risk (IFRS). Deregulation ensures easier access to markets and rare resources, lowering agency and transaction costs (Driffield et al 2013).

H7: The low level of business freedom in a given country means that the applicability of IFRS in the corporate sector will be greater

Also, investment freedom can encourage IFRS voluntary adoption. Freedom in this area indicates the lack of restrictions for foreign entities and the possibility of investing in various sectors of national economies without any barriers, as well as the free movement of capital (McMullen et al 2008). Investment freedom indicates greater transparency of economic activities, as well as healthy and fair competition among business entities (Miller and Kim 2013). Greater transparency also implies the need for fully open settlement of business operations, which is reflected in a higher level of accounting disclosures. In such conditions it is easier to introduce high quality accounting standards (IFRS). Global accounting standards can arouse foreign investors' interest in a given company, especially in local markets not yet acquainted with high quality accounting standards. Investment freedom indicates easier access to foreign financing, reducing a company's overall business costs and increasing its profitability (Miller and Kim 2013, Bellak et al 2010). It is worth noting that foreign investors prefer investment in companies with dispersed shareholding, applying high quality accounting standards (IFRS) (Pichler et al 2018).

H8: The high value of investment freedom in a given country implicates, that the scope of voluntary use of IFRS will be greater

A significant role in a broadly understood economic environment is played by judicial independence. It can be treated as the independence of courts of a broadly understood political domain (Tevdovski and Ivanovski 2013). The independence of courts is much affected by the legal tradition of a given nation. The business practice of European countries is based on English, German, French and Scandinavian business laws. The independence of courts mainly originates from the tradition of English and Scandinavian laws (Demirgüç-Kunt and Levine 2005) rather than from German and French law. Legal systems can also be defined as those based on Roman law and statutory law (Gugler et al 2013). Statutory law systems are more independent, provide better protection for the owners of capital, and their enforcement procedures are more effective. Legal systems have an impact on the availability of various sources of financing. Systems based on common law are used in countries with highly developed stock markets – access to share capital is easier and its cost is lower. Countries with legal systems based on the tradition of Roman law are usually characterised by more developed banking systems as compared with stock markets (La Porta et al 1998). If IFRS adoption is more frequent in highly developed stock markets as compared with financing in economies based on well-developed banking sector, it can be assumed that IFRS adoption will be more frequent in countries based on common law. It can be concluded that judicial independence has an impact on IFRS voluntary adoption. Moreover, effective corporate governance systems, based on high quality accounting standards, are commonly used in countries with independent courts. Independent courts accelerate business operations and lower companies' transaction costs (Sill 2010). In such conditions IFRS adoption is likely to be more common. On the other hand, the lack of judicial independence increases risk and economic uncertainty. Therefore, companies in countries with insufficient judicial independence can also adopt IFRS to mitigate company risks.

H9: In countries with significant judicial independence, the voluntary applicability of IFRS by the enterprise sector will be greater

The protection of ownership rights is also a significant component of a broadly understood legal environment. It should be noted that an overwhelming majority of business operations involve ownership transfers. Respect for ownership rights affects business activities and the number of concluded agreements; it increases the capital engagement of stock market investors and provides

easier access to debt financing instruments (Gugler et al 2013). Without the full protection of private ownership investors are not inclined to invest funds in local companies due to increased investment risk. This risk can be mitigated by a more transparent communication of financial information, which is ensured by high quality accounting standards such as IFRS. Protection of ownership rights is of key significance in companies whose core activity is based on intellectual rights. Such entities are more vulnerable to the effects of violating ownership rights, hence their efforts aimed to counterbalance business risks in the form of effective corporate governance systems which are based, among others, on high quality accounting standards (IFRS).

H10: Low protection of property rights in a given country causes the need to use IFRS on a voluntary basis

A significant role in legal systems is played by effective contract enforcement procedures. In a practical sense, it involves the verification of whether contract provisions are effective and implemented in a proper manner, and whether local authorities do not interfere with contract enforcement processes. In countries with unsatisfactory enforcement procedures businesses tend to compensate for increased investor and lender risk by mitigating risks involved in financial reporting and by improving the quality of accounting. Strict adherence to contract enforcement rules indicates easier access to foreign capital and equity at lower costs (Demirgüç-Kunt and Levine 1999). Ineffective contract enforcement increases transaction costs (Lombardo and Pagano 1999). These costs can be lowered by adopting high quality accounting standards (IFRS).

H11: The low level of legal enforcement of contracts means that companies use IFRS on a voluntary basis

Research Methodology

The analysis encompasses listed production companies in Germany, France, UK, Italy and Finland. The analysis of nearly 500 companies was conducted in 2014-2018. Non-parametric Mann-Whitney test was used to check the significance of differences between companies using Local GAAP and IFRS. The choice of test was dictated by the fact that the analyzed variables did not have a normal distribution in the compared groups (as verified by the Shapiro-Wilk test), and thus the assumptions of the Student's t test were not met.

Statistical significance was at the level of 0.05. The following variables were analysed:

- IFRS (1;0) – IFRS adoption, or not,
- level of advancement of stock markets = stock exchange capitalization/GDP,
- advancement of the banking sector = value of loans made to the private sector/GDP,
- government efficiency is measured in the scale from -2.5 (the lowest value) to 2.5 (the highest value),
- freedom from corruption expresses the level of corruption (CPI) for a given country in the scale from 0 (very low level) to 10 (very high),
- tax freedom assumes values from 0 (lack of tax freedom) to 100 (the highest level of tax freedom),
- trade freedom assumes values from 0 (lack of trade freedom) to 100 (full trade freedom),
- business freedom - values range from 0 (lack of freedom) to 100 (the highest value of freedom),
- investment freedom assumes values from 0 (lack of freedom in implemented projects) to 100 (full investment freedom),

- judicial independence assumes values from 1 to 10, 1 indicates a complete lack of freedom, and 10 – full judicial freedom,
- protection of property rights is expressed by values from 1 (weak protection) to 8 (very effective protection),
- legal enforcement of contracts assumes values from 0 (the lowest level of enforcement) to 10 (the highest level of enforcement).

The empirical material comes from, among others, Orbis Database, Standard & Poor's, Global Stock Markets Factbook, World Bank, International Monetary Fund, International Financial Statistics, Heritage Institute, Transparency International, Heritage Institute, and Fraser Institute.

The Results of Empirical Research

An analysis of data presented in Table 1 indicates that IFRS is more frequently adopted in developed stock markets; hence the costs of implementation on stock exchanges already requiring high quality disclosures and financial reporting are not high (Renders and Gaeremynck 2007). Similar correlations are observed for the development of the banking sector – the higher the level of development, the more frequent IFRS voluntary adoption. Therefore, the quality of financial reporting and a broad range of disclosures have an impact on banks' lending decisions. Companies which carry out business activities in the environment of low taxes and openness to foreign trade are characterised by IFRS voluntary adoption to a similar degree, which indicates that stiff international competition (McMullen et al 2008) and low tax rates do not increase IFRS adoption. IFRS adoption is more frequent in countries with greater investment freedom. Therefore, there is a natural need for adopting IFRS in the countries which promote a free flow of capital and in which demand for a broad range of disclosures is high. It should be noted that IFRS adoption is more frequent is countries with lower central and local government efficiency and lower levels of freedom from corruption. In countries characterised by low government efficiency investor rights are not well protected (Demirgüç-Kunt and Levine 1999). In countries with lower levels of business freedom IFRS adoption is also more frequent, so difficulties in carrying out business operations discourage investors. The adoption of high quality accounting standards can attract investment and improve the image of a given company and economy. A similar interpretation of more frequent IFRS adoption applies to lower levels of judicial independence, lower ownership rights protection and lower legal enforcement of contracts. Greater investment risk and weak legal systems resulting from the lack of protection of capital providers necessitate risk reporting, i.e. additional disclosures, characteristic of high quality accounting standards (IFRS).

Table 1: Analysis of correlations between IFRS and institutional variables for publicly traded production companies in EU selected countries in 2014 -2018

Variable	IFRS Variable	Mean	Standard Deviation	Median	Q1	Q3	p
Tax freedom	0	58,48	4,85	58,5	53,2	61,8	p=0,06
	1	58,8	4,63	58,5	56,4	61,42	
Banking development	0	138,41	38,82	128,79	122,55	133,14	p<0,001
	1	167,26	42,49	148,87	128,79	209,74	
Stock exchange development	0	62,67	29,21	54,53	43,27	75,11	p=0,003
	1	73,13	42,29	68,9	32,65	122,65	
Government efficiency	0	1,66	0,34	1,55	1,49	1,59	p<0,001
	1	1,36	0,38	1,53	1,45	1,56	
Judicial	0	8,12	1,17	8,7	6,8	8,9	p<0,001

independence	1	7,59	1,78	8,7	6,5	8,7	
Protection of property rights	0	8,32	0,56	8,1	7,9	8,8	p<0,001
	1	7,81	1	8,1	7,8	8,5	
Legal enforcement of contracts	0	6,52	0,49	6,6	6,5	6,8	p<0,001
	1	5,82	0,94	6	4,7	6,6	
Freedom from corruption	0	79,51	8,98	79	74	86	p<0,001
	1	72,09	14,05	77	69	80	
Business freedom	0	90,39	3,78	89,9	88	94,9	p<0,001
	1	88,4	6,36	89,8	86,3	94,6	
Trade freedom	0	85,3	2,4	86	82,6	87,5	p=0,476
	1	85,2	2,46	86	82,5	87,5	
Investment freedom	0	75,06	13,53	80	60	85	p<0,001
	1	77,36	15,27	85	60	90	

**** significant correlation with p<0,001; ** significant correlation with p<0,01; * significant correlation with p<0,05*
Source: author's research based on Orbis Database, cited by Bureau Van Dijk.

Concluding Remarks

Most literatures in the field present verifications of variables dependent on a business entity, which affect IFRS voluntary adoption. The main variables include company size, indebtedness, risk, investor profile, renowned certified auditors, and company status (listed companies). Literatures do not present in-depth analyses of the impact of institutional factors on IFRS voluntary adoption. Hitherto verifications have focused on such factors as GDP per capita, capital market development, legal systems (common and statutory law), and the availability of capital for economic entities.

The work shows that a broadly understood institutional environment is related to IFRS voluntary adoption in listed production companies in EU selected countries. The impact of the institutional environment is diversified – certain factors increase IFRS voluntary adoption in developed markets, while other factors influence economies with less developed institutional sectors. Simultaneously, free trade turns out to be statistically insignificant. IFRS voluntary adoption occurs more frequently in developed stock markets, developed banking sectors and in countries with high levels of investment freedom and free movement of capital (highly developed markets). Also, IFRS adoption increases when selected factors are at a lower level. These factors include low government efficiency, higher corruption levels, lower business freedom indices, lower judicial freedom levels, inappropriate protection of property rights, and less effective legal enforcement of contracts (less institutionally developed economies).

Based on the above research results, it should be noted that the use of IFRS is an important element of the company's corporate governance system. In countries with low level of institutional environment development, the use of IFRS strengthens the credibility and image of enterprises and minimizes the institutional risk of doing business. It is particularly true in a situation of low government efficiency, high corruption levels, lower business freedom, lower judicial freedom, inappropriate protection of property rights, and less effective legal enforcement of contracts. Therefore, the low-quality external institutional system within a given country can be at least partly overcome by the internal element of the corporate governance system, which are high-quality accounting standards (IFRS). The research results are important for a wide range of users of financial statements, accountants, auditors, policy

makers, as well as institutions supervising the stock exchanges and the banking sector.

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Influence of Human Resource Management Practices on Job Satisfaction and Organizational Performance in Abu Dhabi Agriculture and Food Safety Authority

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Abstract

This research paper investigated the influence of Human Resource Management (HRM) practices on job satisfaction and organizational performance in Abu Dhabi Agriculture and Food Safety Authority. This research employed six HRM practices such selection and recruitment, career planning, training and development, performance management, incentives and rewards, empowerment and job security. Self-designed structured questionnaire was used to collect data from respondents, purposive sampling was employed in this research. Smart-PLS was used to analyze the data in order to determine the effect of HRM practices on job satisfaction and organizational performance. The result revealed that empowerment practice has the most significant influence on job satisfaction as indicated by a path coefficient of 0.234 which is significant (t-statistics = 3.577, P-value = 0.000). The second most influential human resource management practices on job satisfaction is the performance management as revealed by path coefficient value of 0.178 which is significant (t-statistics = 3.499, p-value = 0.000). The third most influential human resource management practice on job satisfaction is the training and development practice as indicated by path coefficient of 0.183 which is also significant (t-statistics = 3.102, p-value = 0.002). Similarly, on the influence on organizational performance, the result indicated that performance management practice has the most significant influence on organisational performance as indicated by a path coefficient of 0.145 which is significant (t-statistics = 2.671, P-value = 0.0008. The second most influential human resource management practices on organisational performance is the training and development practice as revealed by path coefficient value of 0.171 which is significant (t-statistics = 2.531, p-value = 0.011). The third most influential human resource management practice on organisational performance is the job security practice as indicated by path coefficient of 0.333 which is also significant (t-statistics = 2.381, p-value = 0.017).

Keywords: HRM, Organization, Performance, Job, Satisfaction.

Introduction

Human Resource Management (HRM) involves the management of the human resources needed by an organization and also being sure that human resources is acquired and maintained for purposes of promoting the organization's vision, strategy and objectives. In other words, HRM focuses on securing, maintaining, and utilizing an effective work force, which organizations required for both their short and long-term survival (Javed, Javed, Ahmed, and Anjum, 2019). The terms of human resource management (HRM) have largely replaced personnel management (PM) in the processes of managing people in the organizations. While human resource management is defined as a strategic and coherent approach for the organization's most valued assets behind on the workers, there is no upon description

of it. Personnel department is mostly to manage the paperwork around hiring and paying people (Mohammad, Miah, Rahman, and Rahaman, 2017).

Human resource management undertakes a critical role in organizations because its deals with humans which differ from other production elements in terms of characteristics, features, physiological disposition, social economic backgrounds, and cultural conditions. Under the behaviorism, managers shifted their more classical concern from the befits of employers towards employee-oriented approaches that seek to create common benefit for both employers and employees and respond to changes taking place in the internal and external environments, most importantly the changes in the characteristics of employees themselves. After all, employee in different managerial and technical places forms the hub of the institutional system and for manager's serves as leverage to achieve the organizational goals (Ling, Ning, Chang, and Zhang, 2018).

There is a positive relationship between HRM Practice and performance at the individual and organizational level, this positive relationship can help generate favorable outcomes such as organizational loyalty, rapid career progression, job satisfaction and organizational citizenship behaviors that all lead to high Performance (Nabi, Syduzzaman, and Munir, 2016).The relationship between perceived sufficiency of Human Resource Management practices, person-organization fit, and person-job fit has not been examined before (Sembe, and Ayuo, 2017).

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Organizations operate in an environment characterized by uncertainty, instability and change that provoke the appearance of various challenges (Sultan, Ismael, Mohammad, Abas, and Abdulla, 2019). Such environment includes many factors as increased globalization, rapid technological change, and the growing need for qualified employees and improved performance (Omar, Salessi, and Urteaga, 2017). This forces organizations to try and exploit the resources at its disposal to achieve a competitive advantage (Anwar, Tufail, and Mujahid, 2017). Human resources are considered critical factors contributing to an organization's success (Miah and Hafid, 2019). Organizational performance is the basic pattern of shared assumptions, values and beliefs considered to be the correct way of thinking about and acting on problems and opportunities facing the organization. It is what is important and unimportant in the organization. Kamal and Lukman, 2017) argued that the organizational performance is a holistic effort scheme aims to change and staff development by affecting their values, skills and behavior patterns and by changing technology used as well as the processes and organizational structures and a way for the development of human resources and an investigation of organizational goals.

However, job satisfaction is the phenomena that defines the harmony of employees' job satisfaction, expectations and job's characteristics. This phenomenon is a composition of social security, fair wages, job and work security, and balance between job skills and knowledge job-related pride, promotion opportunities, management policies and the social climate (Sharma, 2017). Employee's jobs satisfaction is mostly related with how the employees' jobs expectations meet with his needs and desires (Bastida, Marimon and Carreras, 2017). It is not possible to mention a satisfaction related with only physical and economic realities. In addition, there need to be a psychological satisfaction. Abu Dhabi Agriculture and Food Safety Authority is making great effort to ensure organizational opportunities that are meant to provide employee' satisfaction.

There are two distinct reasons to classify job satisfaction research as an employee and organization. Firstly, employees' views and feelings about their jobs have on both themselves and their jobs. Secondly, the impact on performance and productivity of employees' behaviors against their jobs is very important. Because job dissatisfaction leads to turnover, absenteeism, poor performance, mental and physical illness (Singh and Shilu, 2018). When these two approaches are considered together, the job satisfaction has its place as a basic concept in psychology and management psychology in means of making a connection between working conditions, individual and organizational results (Noreen, 2017).

Moreover, Organizational commitment is one of the highly asserted modern management concepts. Studies about the concept of organizational commitment have increased since the 1970s, although the history dates back to 1950. Commitment, as the word, means "show respect, love and loyalty against one" (Kampkötter, 2017). According to Meyer and Allen (1984), commitment is "an emotional return to a particular entity".

Organizational commitment is also one of the ultimate goals of the organizations to continue their existence. The reason is that employees who have been loyal to their organizations are more compatible, have more job satisfaction and productivity and work with a high degree of responsibility and a sense of loyalty. Consequently, those who work with high organizational commitment bring less costs to organizations (Khan and Khan, 2017).

Organizational commitment has become a vital issue for organizations depending on five reasons. The first reason is that organizational commitment seems closely related to absenteeism, quitting, retreat and job searching activities; the second reason is related to job satisfaction, behavioral, emotional and cognitive structures such as morale and performance, the third reason is related to features towards to employee's job and his role such as the autonomy, responsibility, participation and, sense of duty, the fourth reason is related to the personal characteristics of employees such as age, gender, education and duration of work. Finally, it is estimated that knowing the estimators of the organizational commitment that employees have would provide benefits greatly in the future and improving the organizational commitment organizational would greatly reduce the organizational costs (Prajogo and Cooper,.2017).

It has been considered that one of the main duties of the organization is to ensure satisfaction of employees with their organizations. Therefore, the importance of the concept of organizational commitment which is defined as adoption of the organization's goals and values, making efforts to achieve them and be willing to remain as a member of the organization is increasing.

Methodology

The methodology employed in this research was quantitative approach which falls within the positivism paradigm. However, the collection and analysis of quantitative data that helped the research to identify emerging themes within the relationship between Human Resource Management Practices, Job Satisfaction and Organizational Performance in Abu Dhabi Agriculture and Food Safety Authority. Purposive sampling was employed to collect data from the target audience. The data collected through questionnaire was subject to quantitative analysis using SPSS and Smart-PLS software (Nardi, 2018). This approach helped to bring coherence to the research while leading to an enriched understanding of perceptions and events.

Result and Analysis

Respondents Profile

Information about the respondents' gender, position, educational background, professional discipline, years of experience, as well as the emphasis they place on quality management were collected and presented in table 1.

Table 1: Respondents' Profile

S/N	Respondents' Details	Response	Frequency	Percent
1	Gender	Male	256	68.1
		Female	120	31.9
2	Age	Less than 21 years old	51	13.6
		21-30 years old	139	37.0
		31-40 years old	60	16.0
		41-50 years old	39	10.4
		51 years old and above	87	23.1
3	Educational Level	Diploma	117	31.1
		Degree	232	61.7
		Masters	19	5.1
		PH.D	7	1.9
		Others	1	.3
4	Human Resource Management	Yes	279	74.2
		No	97	25.8
5	HRM Equivalent	None	279	74.2
		Managing Director	2	.5
		Assistant Manager	13	3.5
		Finance Director	74	19.7
		Production Director	6	1.6
		Company Secretary	2	.5

The profile of the respondents is presented in Table 1. The table shows the demographic information of the respondents such as age, gender, and educational qualification as well as human resource management in the organisations. The result shows that majority of the respondents are males as indicated by 86.1 percent response and mostly below the age of 40 years old. Majority of the respondents have first degree as indicated by 61.7 percent response followed by those that have diploma as indicated by response rate of 31.1 percent.

279 respondents representing 74.2 percent of the sample indicated that they have dedicated Personnel/Human resource management department in their organisation. They remaining 25.8 percent of the respondents indicated that the human resource management function is performed by managing director, assistant manager, finance director, production director and company secretary. The result should that the alternative human resource management function is mostly performed by finance director as indicated by 19.7 percent followed by assistant manager as indicated by 3.5 percent response.

Level Human Resource Management Practices in Abu Dhabi Agricultural and Food Safety Authority

The research conceptualizes the human resource management practices to include selection & recruitment, career planning, training & development, performance management, incentives and rewards, empowerment and job security. These are individually presented in the following subsections.

Selection and Recruitment

The result for selection and recruitment human resource management practice is presented in table 2.

Table 2: Selection and Recruitment

Statements	Mean
Head of departments and Assistant Registrars participate in selection process	3.89
The selection system is highly scientific and rigorous	4.01
Valid and standardized test are used when required in the selection process	3.87
Selecting employees having desired knowledge, skills and attitude	3.57
Aggregate	3.84

Table 2 shows the selection and recruitment practice of human resource management in Abu Dhabi Agriculture and food safety authority. The result shows that the four items in the constructs have mean values ranging from 3.57 to 4.01 with aggregate mean value of 0.84 indicating high level of selection and recruitment practice in Abu Dhabi Agriculture and food safety authority human resource management.

Career Planning

The result for career planning human resource management practice is presented in table 3 below.

Table 3: Career Planning

Statement	Mean
Prefers an internal employee when vacancy occurs	3.80
Plans for career and development for me as an employee	3.90
I am aware of my career path	3.91
I have clear career paths	3.85
My personal and organizational growth needs are matched	3.89
Promotion is done based on merit	3.88
My career aspirations are known by my immediate supervisor	3.88
I have more than one potential position for promotion	3.78
Aggregate	3.86

Table 3 shows the career planning practice of human resource management in Abu Dhabi Agriculture and food safety authority. The result shows that the eight items in the constructs have mean values ranging from 3.78 to 3.91 with aggregate mean value of 0.86 indicating high level of career planning practice in Abu Dhabi Agriculture and food safety authority human resource management.

Training and Development

The result for training and development human resource management practice is presented in table 4.

Table 4: Training and development

Statement	Mean
Training needs are identified through a formal performance appraisal mechanism	3.79
New knowledge and skills are imparted to me to work in teams	3.85
There are formal training programs to teach new employees the skills they need to perform their jobs	3.81
Attending training programs every year	3.86
Training needs identified are realistic, useful and based on business strategy	3.91

Extensive training programs for its employees in all aspects of quality	3.88
Aggregate	3.85

Table 4 shows the training and development practice of human resource management in Abu Dhabi Agriculture and food safety authority. The result shows that the six items in the constructs have mean values ranging from 3.79 to 3.91 with aggregate mean value of 0.85 indicating high level of training and development practice in Abu Dhabi Agriculture and food safety authority human resource management.

Performance Management

The result for performance management human resource management practice is presented in table 5 below.

Table 5: Performance Management

Statement	Mean
Strong national and international linkages	3.82
Strong marketing and branding capabilities	3.71
Produces more products and services	3.82
Invest a lot funds in research and development	3.73
Adequate and best infrastructure and facilities compared to the competitors	3.82
Good reputation to attract customers	3.75
Managements are recognized by professional	3.80
Introduces new executive and professional development system	3.89
Produces globally marketable and outstanding employees compared to other organizations	3.88
Reputable international ranking among organization	3.81
Aggregate	3.80

The practice of performance management practice in human resource management in Abu Dhabi Agriculture and food safety authority is presented in table 5 above. The result shows that the 10 items in the constructs have mean values ranging from 3.71 to 3.88 with aggregate mean value of 0.80 indicating high level of performance management practice in Abu Dhabi Agriculture and food safety authority human resource management.

Incentives and Rewards

The incentives and reward practice of human resource management result is presented in table 6 below.

Table 6: Incentives and rewards

Statement	**Mean**
Compensation is decided on the basis of competence or ability of employee	3.96
The compensation is directly linked to my performance	4.03
Attractive compensation system	4.05
Salary reflects the standard of living	4.05
Salary comparable to the market	4.05
Job performance is an important factor in determining the incentives and compensation of employees	4.19
Aggregate	4.06

Table 6 shows the incentives and reward practice of human resource management in Abu Dhabi Agriculture and food safety authority. The result shows that the six items in the constructs have mean

values ranging from 4.03 to 4.19 with aggregate mean value of 4.06 indicating high level of incentives and rewards practice in Abu Dhabi Agriculture and food safety authority human resource management.

Empowerment

The result for empowerment human resource management practice is presented in table 7 below.

Table 7: Empowerment

Statement	Mean
My organization provides me the space to implement ideas for improvement	3.67
My ideas and suggestions are seriously considered	3.88
I have the opportunity of flexible working hours	3.89
I may contribute to the development of policy within the organization	3.92
I am well informed about the views and policies of the organization	3.82
I have the opportunity to give my opinion on work-related issues	3.95
I have the opportunity to be involved in decision-making within this organization	3.85
Aggregate	3.86

The practice of empowerment in human resource management in Abu Dhabi Agriculture and food safety authority is presented in table 7 above. The result shows that the 7 items in the constructs have mean values ranging from 3.67 to 3.95 with aggregate mean value of 3.86 indicating high level of empowerment practice in Abu Dhabi Agriculture and food safety authority human resource management.

Job Security

The job security practice of human resource management result is presented in table 8 below.

Table 8: Job Security

Statement	**Mean**
The duties of my job are clearly defined	3.52
My job has an up to date job description	3.70
I know very well what is expected of me from my job	3.73
The actual job duties are shaped more by myself than the formal job description	3.81
The job description for my job contains all the duties performed by me	3.77
Aggregate	3.71

Table 8 shows the job security practice of human resource management in Abu Dhabi Agriculture and food safety authority. The result shows that the five items in the constructs have mean values ranging from 3.52 to 3.81 with aggregate mean value of 3.71 indicating high level of job security practice in Abu Dhabi Agriculture and food safety authority human resource management.

Aggregate Level of Human Resource Management Practices

The overall human resources management practices used by the Abu Dhabi Agriculture and Food Safety Authority including the selection & recruitment, career planning, training & development, performance management, incentives and rewards, empowerment and job security are presented in table 9 below.

Table 9: Level of Human Resources Management Practices

Practices	Mean
Selection and Recruitment	3.84
Career Planning	3.86
Training and Development	3.85
Performance Management	3.80
Incentive and Reward	4.06
Empowerment	3.86
Job Security	3.71
Aggregate	3.85

The level of human resource management practices is presented in table 9 above. The result indicated that the most highly practiced human resource management by the Abu Dhabi Agriculture and Food safety authority is the incentive and reward practice as indicated by a mean value of 4.06 followed by career planning, empowerment, training and development, selection and recruitment, performance management, and job security with mean values of 3.86, 3.86, 3.85, 3.84, 3.80, and 3.71 respectively. Overall, the aggregate mean score for all the human resource management practices is 3.85 indicating that there is high level of human resource management practice by Abu Dhabi Agriculture and Food safety authority.

Job Satisfaction

The result of job satisfaction in the Abu Dhabi Agriculture and Food Safety Authority is presented in table 4.17.

Table 11: Job Satisfaction

Statement	Mean
I feel I am being paid a fair amount for the work I do.	3.70
There is really too little chance for promotion on my job.	3.77
My supervisor is quite competent in doing his/her job.	3.77
I am not satisfied with the benefits I receive.	3.90
When I do good job, I receive the recognition for it that I should receive.	3.74
Many of our rules and procedures make doing a good job difficult.	3.92
I like the people I work with.	3.79
Sometimes I feel my job is meaningless.	3.85
Communication seems good within this organization.	3.82
Those who do well on the job stand a fair chance of being promoted.	3.94
My supervisor is unfair to me.	3.88
The benefits that we receive are as good as most of the other organization offer.	3.86
I do not feel that the work I do is appreciated.	3.82
I find I have to work hander at my job because of the incompetence of people I work with.	3.95
I like doing the thing I do at work.	3.85
The goals of this organization are not clear to me.	3.98
People are get ahead as fast here as they do in other places.	3.81
My supervisor shoes too little interest in the feelings of employees.	3.70
The benefit package we have is equitable.	3.88
There are few rewards for those who work here.	3.88
I often feel that I do not know what is going on with my organization.	3.83
I feel a sense of pride in doing my job.	3.77

I feel satisfied with my chances for salary increase.	3.88
I am satisfied with my chances for promotion.	3.79
My job is enjoyable.	3.92
Aggregate	3.84

Table 11 shows the job satisfaction in Abu Dhabi Agriculture and food safety authority. The result shows that the twenty-five items in the constructs have mean values ranging from 3.70 to 3.98 with aggregate mean value of 3.84 indicating high level of job satisfaction in Abu Dhabi Agriculture and Food Safety Authority.

Organizational Performance

The employee job performance of Abu Dhabi Agriculture and Food Safety Authority is presented in table 12.

Table 12: Employees' job performance

Statement	Mean
The organization achieves its stated goals.	3.74
Work in this organization is easier because of laid down procedures	3.85
Each department understands the role it plays in achieving organizational goals.	3.73
The organization functions smoothly with a minimum of internal conflict	3.85
Resources needed for proper functioning of the organization are always available.	3.77
The organization is normally understaffed.	3.87
The organization has enough human capital to accomplish its goals.	3.81
The organization is able to satisfy the owner(s) /shareholders.	3.77
Customers/clients‟ expectations are met.	3.90
We do not have problems in dealing with state and local government.	3.93
Most suppliers are happy to work with my organization.	3.76
Employees are motivated to stay with this organization.	3.80
Aggregate	3.81

The level of organisational/employee job performance in Abu Dhabi Agriculture and food safety authority is presented in table 12 above. The result shows that the 12 items in the constructs have mean values ranging from 3.73 to 3.90 with aggregate mean value of 3.81 indicating high level of organisational/employee job performance in Abu Dhabi Agriculture and food safety authority human resource management.

Influence of human resource management practices on job satisfaction in Abu Dhabi Agriculture & Food Safety Authority

The first research objective of this paper is to find the influence of human resource management practices on job satisfaction in Abu Dhabi Agriculture & Food Safety Authority. The result of the PLS-SEM analysis to achieve the stated objective is presented in table 13.

Table 13: Influence of human resource management practices on job satisfaction

Paths	Coefficients	T-statistics	P-value
EMP -> EJP	0.234	3.577	0.000
PMG -> EJP	0.178	3.499	0.000
TDV -> EJP	0.182	3.102	0.002
SER -> EJP	0.146	2.595	0.010

JSC -> EJP	0.166	2.334	0.020
CPL -> EJP	0.096	1.666	0.096
IRW -> EJP	0.025	0.479	0.632

Table 13 shows the influence of human resources management practices on job satisfaction. The result indicated that empowerment practice has the most significant influence on job satisfaction as indicated by a path coefficient of 0.234 which is significant (t-statistics = 3.577, P-value = 0.000). The second most influential human resource management practices on job satisfaction is the performance management as revealed by path coefficient value of 0.178 which is significant (t-statistics = 3.499, p-value = 0.000). The third most influential human resource management practice on job satisfaction is the training and development practice as indicated by path coefficient of 0.183 which is also significant (t-statistics = 3.102, p-value = 0.002).

The least significant influential human resource management practice on job satisfaction are the selection and recruitment and job security practices as indicated by path coefficients of 0.146 and 0.166 respectively. The practices have t-statistics value of 2.595 and 2.334 as well as p-values of 0.010 and 0.020 respectively.

The human resource management practices with insignificant influence on job satisfaction are the career planning and incentives and rewards as indicated by path coefficients of 0.096 and 0.025 respectively. These paths are insignificant based on the t-statistics values of 1.666 and 0.476 as well as p-values of 0.096 and 0.632 respectively. Thus, of the seven human resources management practices, five have significant influence on job satisfaction and the remaining two are insignificant in influencing employee job satisfaction.

Influence of human resource management practices on organizational performance in Abu Dhabi Agriculture & Food Safety Authority

The second research objective sought to investigate the influence of human resource management practices on organizational performance in Abu Dhabi Agriculture & Food Safety Authority. The result of the PLS-SEM analysis to achieve the stated objective is presented in table 14 below.

Table 14: Influence of human resource management practices on organisational performance

Paths	Coefficients	T Statistics	P Values
PMG -> OP	0.145	2.671	0.008
TDV -> OP	0.171	2.531	0.011
JSC -> OP	0.222	2.381	0.017
CPL -> OP	0.114	1.736	0.083
SER -> OP	-0.108	1.438	0.151
IRW -> OP	-0.071	0.956	0.339
EMP -> OP	0.054	0.791	0.429

Table 14 shows the influence of human resources management practices on organisational performance. The result indicated that performance management practice has the most significant influence on organisational performance as indicated by a path coefficient of 0.145 which is significant (t-statistics = 2.671, P-value = 0.0008. The second most influential human resource management practices on organisational performance is the training and development practice as revealed by path coefficient value of 0.171 which is significant (t-statistics = 2.531, p-value = 0.011). The third most influential human resource management practice on organisational performance is the job security practice as indicated by path coefficient of 0.333 which is also significant (t-statistics = 2.381, p-value = 0.017).

The human resource management practices with insignificant influence on organisational performance are the career planning and selection and recruitment practices as indicated by path coefficients of

0.114 and -0.108 respectively. These paths are insignificant based on the t-statistics values of 1.736 and 1.438 as well as p-values of 0.083 and 0.151 respectively. Other insignificant human resource management practices on organisational performance are incentive and rewards as well as empowerment practices as indicated by path coefficients of -0.071 and 0.054; t-statistics of 0.956 and 0.791, as well as p-values of 0.339 and 0.429respectively. Thus, of the seven human resources management practices, three have significant influence on organisational performance and the remaining four are insignificant in influencing organisational performance.

Conclusions

This research paper investigated the influence of HRM practices on job satisfaction and organizational performance in Abu Dhabi Agriculture & Food Safety Authority, the current study used six HRM practices. On the basis of the findings of this research work, it can be concluded that the human resource management practices with insignificant influence on job satisfaction are the career planning and incentives and rewards as indicated by path coefficients of 0.096 and 0.025 respectively. These paths are insignificant based on the t-statistics values of 1.666 and 0.476 as well as p-values of 0.096 and 0.632 respectively. Thus, of the seven human resources management practices, five have significant influence on job satisfaction and the remaining two are insignificant in influencing employee job satisfaction, similarly, The human resource management practices with insignificant influence on organisational performance are the career planning and selection and recruitment practices as indicated by path coefficients of 0.114 and -0.108 respectively. These paths are insignificant based on the t-statistics values of 1.736 and 1.438 as well as p-values of 0.083 and 0.151 respectively. Other insignificant human resource management practices on organisational performance are incentive and rewards as well as empowerment practices as indicated by path coefficients of -0.071 and 0.054; t-statistics of 0.956 and 0.791, as well as p-values of 0.339 and 0.429respectively. Thus, of the seven human resources management practices, three have significant influence on organisational performance and the remaining four are insignificant in influencing organisational performance.

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State Policy of A «Weak State» In the Context of The Theory of Organization: Reintegration of Regions, Reconciliation, Reengineering of Public Administration

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Abstract

Purpose: This article is dedicated to the formation of the state policy of Ukraine in accordance with the challenges the country has faced and new needs of the state at the present stage of development, which can currently be characterized as a "weak state". As a result of the analysis of changes in the economy, civil society, public administration, the content and orientation of public policy need to be reviewed. It is important to look for effective tools and approaches that will stop external aggression, permanent influence and support by aggressors in uncontrolled territories, achieve border restoration and social reconciliation, and ensure the effective functioning of public administration institutions.

Methodology: Laws and principles of organizational theory were applied during the study, considering every system from the point of view of organizational order. Analysis of efforts of state bodies and civil society towards reconciliation and dialectical method were applied during the research of the relationships between the formation and implementation of state reintegration policy with complications of reconciliation and implementation of reengineering processes in public administration. Method of situation modeling was used as well as the overview of the successful practices of transformation of executive power and local self-government reform.

Conclusions: Clear results have been obtained on the characteristics of Ukraine, which make it possible to consider it a “weak state” under conditions of political instability and military conflict. The clear directions of the state policy concerning reconciliation, return of the occupied territories and development of effective public administration are defined.

Implications: A clear definition of the contemporary challenges and needs of the state, as well as the use of a systematic view of the situation from the standpoint of organizational theory have allowed us to gain a new understanding of the content of state policy, namely its information format, social and psychological orientation, as well as the security component.

Keywords: State Policy, Weak State, Theory of Organization, Reintegration, Reconciliation, Reengineering of Public Administration

Introduction

The problem of recent period of time is the presence of so-called "double standards" in human consciousness, as well as in social thought and in the behavior of certain communities within individual territorial associations and entire states. In the meantime, the perception of existing reality is based on the so-called "life in the realm of uncertainty". What used to be considered purely business terminology is quite relevant today as characteristics of public life, coexistence of groups of people, regions, states.

If we consciously take the starting point of particular events in the world as a whole and in a certain region or specific country, then there is a possibility of its clear characterization with determining the list of understandable circumstances and potential directions of their further development.

Over the last six years, Ukraine has experienced acute political, security and economic problems. Since the Maidan uprising in February 2014, the country has witnessed several major events, including the outbreak of the conflict in eastern Ukraine and the annexation of Crimea. From 2014 to 2019, the government implemented key reforms, including significant fiscal consolidation, moving to a flexible exchange rate, reforming energy and social assistance tariffs, increasing transparency in public procurement, simplifying business regulation, stabilizing and restructuring the banking sector, moving forward medical and pension reforms and the creation of anti-corruption agencies. The lack of trust in government institutions was the most fundamental. Corruption remained endemic - from the financial sector to the healthcare - and powerful oligarchs still dominated over the economy (The World Bank In Ukraine, 2019).

The situation should be considered systematically with using a comprehensive approach that allows to reconstruct the real state of affairs in society and in the state, to cite additional facts and to avoid uncertainties at a specific point in time in a particular place, namely, the second half of 2013 in Ukraine. It is necessary to underline, that that the GDP of Ukraine in 2013 was $ 183 billion. The country had moved market relations towards integration into the world economy, it had clearly defined borders, created legislation, harmonizing it with EU regulations. Russia was considered to be a friendly state with the longest border, common history and strong ties to Ukraine.

According to the terminology of the theory of organization, Ukraine got to the first, let's call it "basic", the point of bifurcation. At this point there are at least two different ways of further development of the system. These paths were accession to the European Union (Western vector) on the basis of associate membership or the Customs Union (Eastern vector). At the moment, Ukraine was an independent and united state according to both the Constitution and de facto.

As a result of the refusal of the incumbent President of Ukraine from the European vector, a political crisis in the form of popular uprising arose in the country, the President ceased to fulfill his duties and immediately left the territory of the country in early 2014.

This demonstrated the weakness of this branch of government and the signs of a state betrayal of certain first state officials. However, impeachment procedures were not followed and the country ended in unstable political state, led by weak politicians and institutions, and hence - temporarily unmanageable. Two hot spots have emerged: Donbass and Crimea. Both were eventually occupied by a neighboring country, the Russian Federation. Moreover, the Donbass was occupied indirectly, through comprehensive military assistance and targeted financing of the vital activities of the respective territories. The Crimea is directly annexed to the Russian Federation at the legislative level and the aggressor state officially declares the occupied peninsula as a part its territory.

As a result, Ukraine, remaining an independent state, lost its territorial integrity. This was followed by the election of a new president and beginning of a military conflict.

The current president, Vladimir Zelensky, was elected on April 21, 2019. He received 73% of the vote in the second tour, which brought him victory over the former president Petro Poroshenko. On July 21,

President Zelensky's party “Servant of the People” won the parliamentary elections and received 60 percent of the seats in the Rada (parliament).

Economic growth in Ukraine was strong, accounting for 3.2% in 2019. It was ensured by good harvest and industries, dependent on domestic consumption. The COVID-19 crisis is expected to affect economic activity in the country (The World Bank In Ukraine, 2019).

The problem of “strong” and “weak” states has been worrying professionals in Europe and the world for much longer than a decade. State policy has a special place in research of this area.

Michael M. Atkinson (2009) in his work «Strong States and Weak States: Sectoral Policy Networks in Advanced Capitalist Economies» emphasizes that the concepts of strength and weakness must pay much greater attention to specific bureaucratic arrangements and the relationships with key societal actors which, in company with bureaucratic agencies, form the core of ‘policy networks’ at the sectoral level.

Stefan Wolff and Tatyana Malyarenko (2018) in the article «The logic of competitive influence-seeking: Russia, Ukraine, and the conflict in Donbas» state that «that Russia has instrumentally used societal destabilization as a set of tools in the framework of its military and security doctrine of managed escalation-deescalation in order to avoid the consolidation of a stable, pro-Western regime in Kyiv as a second-best option short of achieving a stable pro-Russian regime. This has resulted in the creation of two new Russian-backed de facto states in the post-Soviet space that provide Russia with leverage over Ukraine and its Western partners and simultaneously serves as a “placeholder” before an opportunity may arise in the future for establishing a stable pro-Russian regime».

They point to the conclusion about Russia's competitive influence on a weak Ukraine: «The evolution of Russia’s tactics from nomadic, to creeping, to entrenching occupation, and ultimately to some limited form of state-building is consistent with our view that Russia’s neighborhood strategy in Ukraine is driven by the logic of competitive influence-seeking. Russia is hedging against the consolidation of an unfriendly and stable, Western-supported regime in Kyiv by consolidating its control over parts of eastern Ukraine and solidifying the dependence of local regimes there on Russian support. This gives Russia the opportunity to either maintain the current status quo or settle for favorable re-integration terms that establish Moscow-controlled regions with special status (and hence special powers) within Ukraine through which Russia can assert and sustain its long-term influence over Ukraine’s domestic and foreign policy orientation…».

Samuel Huntington (2003) says that when the pace of political modernization is too high, the expansion of political participation outstrips the pace of political institutionalization and can lead to disruption of political stability and even its degradation. In his view, in these circumstances, a strong authoritarian power is needed to prevent chaos and to consistently implement reforms, create a coalition of reform forces, and consider time factor.

Huntington, studying the effects of the changes of traditional institutions in the process of modernization, concluded that their destruction usually causes destabilization of political relations, increase of social conflicts, even creating, authoritarian regime of military character in some cases. Therefore, he believed that, above all, a stabilization of development was required, and this was possible with a strong authoritarian state power.

Robert I. Rotberg notes that nations-states fail because they are convulsed by internal violence and can no longer deliver positive political goods to their inhabitants. Their governments lose legitimacy, and the very nature of the particular nation-state itself becomes illegitimate in the eyes and in the hearts of the growing plurality of its citizens.

In his work Foreign Policies of Weak States Matter (2013), Nussaibah Younis considers that the lack of interest in Iraq as a foreign policy actor is a part of a wider problem in the field of international relations that focuses heavily on strong or powerful states. Such an approach underestimates the impact

that weak and unstable states can have on international politics. Despite its recurrent political crises, the way in which Iraq chooses to position itself will have an increasingly important impact on regional conflicts. Younis cautions us, for instance, to keep a close eye on the role that Iraq's communities are playing in the Syrian civil war. When discussing the complexities of Iraqi foreign policymaking, Younis refers to her recent trip to the Iraqi Kurdish cities of Erbil and Suleymaniyah. She was astonished to find the extent to which Iraqi Kurdistan is functionally independent of Baghdad and talked about the Iraqi Kurds having their own parallel foreign policy structures.

Yuriy Kovbasyuk, Konstantin Vashchenko, Yuriy Surmin (2014) focus on the content and purpose of public policy, considering it as set of value goals, state-administrative measures, decisions and actions, the order of implementation of state-political decisions (goals set by state authority) and the system state development management of the country.

Therefore, the development of modern state policy in the conditions of uncertainty or emergence of internal or external force majeure requires the public administration to systematically and comprehensively elaborate key conditions of a nuanced and reflexive approach in analyzing existing policy and developing its derivative forms.
Emerging bifurcation points can at any time lead a “stable state” to a “weak state”, “failed state”, or even more negative scenarios of a state's inability to fulfill its functions.

One of the main objectives of our study is to identify key criteria for a “weak state” speaking of Ukraine, and to identify specific directions for creating and implementing effective state policies that can prevent the state from collapsing in the most complex scenarios.

In order to avoid the historical recurrence of the situation in which Ukraine usually finds itself as a “ruin” (and the crisis in economy and politics are the first indicators of t), it should be mentioned that the first negative option is the complete seizure by another neighboring state, the second - the emergence of an authoritarian regime.

Our task – based on the laws and principles of organizational theory - is to build a new state policy on key issues and directions for Ukraine's development for the coming years and even decades. Information policy, reintegration and reconciliation policies, as well as public administration reform aimed at sustainable development of Ukraine, are one of the sets of areas that need to be developed at the level of policy analysis. Policy analysis should be transparent, open and based on public values (Kovbasyuk, 2014).

Analysis of the characteristics of a weak state on the example of Ukraine in the context of the theory of organization

Thus, the conceptual content of our study is to prove that Ukraine today has some signs of a weak state. The organizational component of public administration should take into account the alternative paradigms offered by the theory of organization. Their concept states that any chaos is also an order, though more complicated. And that is why the organization (in our case it is a state) must reflect in response to the transformation of the existing order into a certain chaos, create new conditions for the development of the system. In this case, the state becomes adaptive and flexible in response to threats and challenges. This leads to the emergence of additional properties, namely, self-regulation and self-development.

An example of the limited effectiveness/efficiency of the first paradigm is the recent history of Ukraine. The state ensured the creation of order out of chaos and further supported the created order, wasting resources. In another variant – chaos is rising again. This option can be considered "classic", but the problem is that it does not always work.

Our study looks at the moment when, at the next bifurcation point, state institutions were too weak to keep the situation under control, and when a powerful external influence from Russia emerged in 2014, the state began to demonstrate step-by-step patterns of non-performance in most areas: information,

security, diplomatic/international relations. The articles of the Constitution had been turned into meaningless phrases, which are not mandatory for a higher instance.

Weak states constitute a wide circle. These are:

1) naturally weak due to physio-geographical position or adverse ecological and economic situation and limitations of resources;
2) strong from the beginning, but showing weakness at some stage of their functioning through poor management, despotism, internal contradictions, or an external attack;
3) mixed-state are those which combine the characteristics of the two above.

The weak state is characterized by the presence of certain problems of religious, linguistic, ethnic orientation and other confrontational issues of intergroup coexistence. Such signs may at some point go from a latent phase to an open military confrontation. The economic development of a "weak state" is slows down fairly quickly, the level of corruption inside is maximum, and in most cases the political regime goes to the authoritarian one.

Weak state – can be defined as a country / state that has all the attributes of a democratic state (in particular, state-political institutions), but is not able to perform the basic functions of the state and provide its citizens with public services. This state can be a separate sovereign entity within the world community, be an independent actor in world politics. However, in these weak, hybrid states, there are undoubtedly all the hallmarks of a democratic regime – "democratic" elections are held, freedom of expression and assembly proclaimed and even "almost respected", citizens' rights respected, power arbitrariness reduced, in other words, the minimum procedural requirements are respected (Zelinska, 2019).

We are well aware that the main features of a state characterized as "weak state" are:

- loss of physical control of the territory;
- loss of the right (monopoly) of the state to lawful use of force;
- impossibility of making collective decisions by representatives of the authorities;
- increasing levels of corruption and organized crime;
- impossibility of collecting taxes;
- large-scale displacement of large numbers of refugees and demographic catastrophes;
- environmental disasters;
- invasion from outside.

If you give an assessment to modern Ukraine using the above list of features, you can surely say that half of them can be marked with a "+" sign, as confirmation of the presence of this feature. Among the features inherent in Ukraine are the following: loss of physical control of the territory (7% occupied, with Crimea officially annexed to Russia, which is legislated by the aggressor state, despite the fact that the world community not recognize this fact, the peninsula functions as an administrative unit of Russia); large-scale displacement of big numbers of refugees and demographic disasters - a feature fully present in the Ukrainian format; environmental disasters are increasingly becoming a permanent feature of Ukraine's map - fires, disappearance of lakes, massive deforestation plus a global pandemic can at some moment lead to a critical point of failure; invasion from outside is clearly tracked both in the Crimea and in Donbass (when fake states/republics create institutions such as the FSB, namely "MGB", use Russian-made military equipment and weapons, receive assistance from Russian military experts, financial aid for all institutions on in the occupied territories comes exclusively in Russian rubles, there is no doubt left about the occupation of certain regions of Ukraine by another state).

Moreover, it cannot be said that the state does not have a full policy on these issues, there is corresponding legislation on securing state sovereignty, the NSDC is working, and new ministries have been created. For example, in accordance with the Law of Ukraine "On Features of State Policy for Ensuring State Sovereignty of Ukraine in Temporarily Occupied Territories in Donetsk and Luhansk Oblasts".

The goals of the state policy for securing the state sovereignty of Ukraine in the temporarily occupied territories in Donetsk and Luhansk regions are:

1) liberation of the temporarily occupied territories in Donetsk and Luhansk regions and restoration of the constitutional order in these territories;
2) protection of the rights, freedoms and legal interests of individuals and legal entities;
3) ensuring the independence, unity and territorial integrity of Ukraine. (Law of Ukraine, 2018)

The past authorities have signed "Minsk Agreements" which, according to experts, have created the conditions for a long-term conflict and can be quickly implemented only at the will of only one side of the negotiations – Russia.

According to Malyarenko & Wolff, “Given the importance of Ukraine's case and the Russia-West relationship in the disputed neighborhood as a whole, this is obviously important for policymaking in terms of future scenarios in this region and and in terms of proposing policy recommendations."

The present state policy is focused on maintaining independence and sustainable development in the country. However, at the same time the state demonstrates a long-term plunge into the political crisis, economic decline and lack of systematic and integrated work to overcome the crisis. Accordingly, the positive results available are one-off and do not have the opportunity to become a trend.

In addition to these weakness indicators, it is also possible to consider additional options that have a positive or negative connotation. According to UNESCO Science Report: towards 2030 (2017) Ukraine's economy save most in 2009, by 15%; it is the only Black Sea country where GDP per capita remains below 2008 levels. The current economic crisis in Ukraine is associated with the ongoing conflict, which saw GDP drop by more than 6% in 2014. Many post-Soviet states suffer from diminished territorial integrity, which hinders their ability to focus on long-term development issues. They bear the stigma of what has been termed 'frozen conflicts,' the legacy of short-lived wars that have ice to part of their territory escaping their control: the mountainous Karabakh (Arcakh) region, disputed by Armenia and Azerbaijan since 1991, the breakaway Transnistria region in Moldova (since 1992), the breakaway regions of Abkhazia and South Ossetia in Georgia (both since 1990–1992) and, most recently, Crimea and the Donbass regions in Ukraine.

Noting UNESCO's updated human and financial resources for R&D for 162 countries and territories, we also do not find Ukraine in the top two. As part of the Sustainable Development Goal 9, countries have committed themselves to “create sustainable infrastructure, promote inclusive and sustainable industrialization and innovation. In particular, the objective is to stimulate innovation, increase technological capacity, significantly increase the number of researchers, as well as public and private R&D expenditures.

For example, Ukraine has an indicator of the number of researchers per 1 million, which is equal to 988, while in Russia - 2800, Germany - 5000, Finland - 6700, Israel - 8300. (2017)

Financial performance is the topic of a separate study, but compared to $ 183 billion in 2013, in 2019 we see a GDP of $ 153.2 billion.

The consequences of the political crisis of 2013-2014 and the simultaneous interference of Russia in the internal affairs of Ukraine require an analysis of the causes and the use of the dialectical method in the formation of a modern model of effective state policy on reintegration, reconciliation and reengineering of public administration.

The country's investment attractiveness has deteriorated sharply, even a certain outflow of investment resources has been present. Becoming member of European Community and NATO has been delayed, and it is clear that the country's sustainable development processes have slowed down.

However, against the backdrop of losses, Ukraine received support in Europe and the world, the experience of warfare stopped the aggressor at certain borders, while Russia made statements that free republics would be created across the Left Bank of Ukraine and the aggressor would receive a land route to Crimea. Ministries have started to set up reform offices, full-fledged reform of local self-government has begun, the country has received new police and many successful practices.

Yet some questions remain unanswered:
- what recourses does the state require to make a transition from a “weak state” to a “strong state”;
- what format of relations with Russia will be appropriate after the problems of Donbas and Crimea are resolved;
- how to eliminate the participation of Ukrainian oligarchs in public administration and to protect state’s own economic interests?

A new format for state policy: from declarations to content

Speaking of creating a new state policy, one must consider not only the internal factors, but also the policies of the countries around. Among them will be those who are interested in the positive scenario of Ukraine's development, and, of course, those who will direct their policy towards undermining the existence of our country.
Relying on a more practical area of public policy, namely, “policy analysis,” one can build a new model of public policy formation and its implementation.

Instead of the declarative approach in public policy we have outlined above (Law of Ukraine "On the Features of State Policy… ..), it is necessary to systematically define the policy goals, select effective tools and thus ensure the passage of a real cycle from problem definition to its solution.

The implementation of a policy, which is, the implementation of planned policy measures to solve a problem with respect to known goals and objectives, produces a variety of results, first and foremost, direct and immediate, which are called policy products. A product is one that is directly spent on budgetary resources allocated to the implementation of policy measures.

However, unlike the cost of resources, a policy product is not always easy to identify and measure, especially when it comes to purely "bureaucratic" measures. A similar problem arises when evaluating the activities of government agencies, when it is necessary to find out what is the product of a government agency, what it produces (Kovbasyuk Yuri, 2014).

Here are some examples that illustrate the importance of meaningful elaboration of public policy environment on reintegration, reconciliation and public administration reform. Elaborating a specific model has fundamental importance.

Interestingly, weaker states can also be seen as a condition for the survival of a neighboring powerful state. If a weakstate is in a vital strategic space (be it geography, resource security, economic potential, territory, population or competence, large states can act aggressively to gain control over this weak state.) Weak states in such circumstances will be forced to adhere to the strategy balance: and therefore, win, negotiate or, if they are lucky, remain neutral in an attempt to guarantee their own survival. Weak states can learn from their specific historical experience and, therefore, continue the policy of neutrality to ensure their continued existence. Other describe the passive policy of the existence of a state in the status of weak state; this policy may include rigid balancing (military campaign or global alliance for countering the threat), soft balancing (diplomacy or economic management of the state to counteract the threat), countering (neglecting the claims of the hegemonic state), blackmail (using threats to obtain some concession), slipping of the leash (increasing abilities irrespective of the existence of neighboring large states), connecting (linking a great power with weak power economically or through institutions) and gluing (the development of a "special relationship" with the powerful state) (Kassab, 2015).

However, there is also the opposite situation with the "bad neighbor" – experts recognized the "domino effect" as an extremely dangerous one, when conflicts in one weak state necessarily affect the fragile

stability of the same "weak" neighbors. An example of the spread of instability from one "failed" state to its weak neighbors was the situation around Liberia. Conflicts in this country, creeping in during the 1990s, crossed the border and captured Sierra Leone and Cote d'Ivoire. Together, these subjects formed the whole "failed region".

That is, in the situation in which Ukraine has been in 2014 with its "bad neighbor", it can already be said that the tactics of tight balancing (a military campaign or a global alliance to counteract the threat) have not yet led to significant changes in this conflict. And here it makes some sense to change the strategy of behavior in the context of reintegration policy and implementation of the Minsk Agreements. Again, Ukraine in its current state of weak state, in our opinion, can successfully apply the soft balancing tactics of diplomacy or economic governance to counter the threat) and blackmail (the use of threats to obtain some concessions).

If we analyze the actions of the previous authorities in this direction, the fatal mistake was not their attempts to "make friends" with the Russian Federation or make certain concessions in relations with it (which is a very common opinion among opponents of reintegration of occupied territories and any agreements with Russia) but the fact that Ukraine has been getting weaker during all this time. We had the chance to strengthen the army and strengthen the protection of the borders, but we felt that threats were emerging everywhere except our country. This is not the fault of the “bad neighbor”, but it is the fault of the internal policy of the state apparatus, the inability of the state to perform its functions, the corruption component, meaning, there is no impulse to strengthen the state.

Taking into account the traditional realistic view of international relations, international security challenges come from strong, aggressive states that seek to gain greater influence on the international scene and expand their area of responsibility. Speaking about new security challenges, they come not from force, but from the internal weakness of the state, which determines the social, economic and political factors of the state administration. Consequently, our attention is given to the view of the nature of modern international security and international conflicts that increasingly confirm the transformation of the Westphalian world order into the post-World Transparency, when internal and external factors of state policy affect international security in the same way. In fact, this approach recognizes that the inalienable right of the state to govern the sovereignty of the state within a single country and the inviolability of that sovereignty (a norm that has never been completely respected of the Westphalian) are no more absolute. If the state ceases to be the main actor of international relations, then conflicts are more likely characterized by civil wars, insurrections, the inability of states to perform their functions, and not intergovernmental wars (Mashura, 2015).

Particular attention needs to be paid to the reconciliation of the parties, because in the state of today it looks surreal. The military conflict in the East, ideological influences, the propaganda of the enemy and the worst thing - the deaths of loved ones testify to the current impossibility of reconciliation. Each policy contains a strategic component that needs to be implemented in the future, but we must work on the issue now. Unfortunately, there is no unity in this issue in Ukraine, and this is another sign of a weak state - a lack of consolidated thought. There are chances, but political PR is conquering common sense, and in the country again the key controversy concerns the return of occupied territories, the return not only of land but also of people who are temporarily lost. Instead of Poroshenko and Zelensky, we need a passionate and competent Lech Walesa, Vaclav Havel or the super-intelligent Zbigniew Brzezinski, who looks into the future even while pouring himself a glass of orange juice. Consolidation of society is one of the priority tasks of public policy, which involves both the information-ideological component and economy at the same time.

Public administration reform can only be implemented by new politicians. They can be both citizens of Ukraine and already well-known expats in Ukrainian society. Hatia Decanoidze is known for creating a new police force, Max Nefyodov is the driver of Prozorro's new public procurement system. Aivaras Abramavichus was a head of a ministry and rebooted it, cutting half of its staff by raising the payroll of the etc. Mikhail Saakashlvili headed the Odessa region, built the Odessa-Reni highway, made the regional authorities closer to the people and tried to break the corruption in customs. Vladimir

Zelensky did the impossible – proving that in a free country, an ordinary citizen without a political background can defeat an incumbent, very powerful president-businessman-oligarch.

Therefore, we are promoting our vision of public policy in the area of public administration reform. The system of public administration requires radical change, which is meaningful reengineering, both in the processes and in the officials' composition. Offices of reform, process automation, reloading of entire ministries and the creation of modern institutions are the ways to development. Digitization is a tool.

Here is an example of an effective format. The Ministry of Digital Transformation of Ukraine was established in Ukraine to ensure the formation and implementation of state policy in the field of development of national electronic information resources and interoperability. Specialists know what is possible to achieve to ensure interoperability, meaning the interoperability of heterogeneous information systems.

Local self-government reform was one of the most successful in terms of the new format of administrative division of the country. United territorial communities, the legislation that accompanies their activities, and most importantly, the financial consolidation of communities, prove that Ukraine has the potential for political, economic and social recovery.

Conclusion

Summarizing the theoretical research on the issues of formation of effective state policy in Ukraine in the context of modern approaches and paradigms of the theory of organization, and taking into account the conducted analysis of the political and socio-economic situation in which the country has been in during the last six years, we were given the opportunity to draw a certain list of conclusions and results of our study.

There is a certain list of signs of a weak state and we have found that Ukraine meets at least half of them. In this regard, it can be identified as a "weak state" by analyzing the reasons for getting into the relevant position and attempting to find effective ways to overcome crisis phenomena and achieve sustainable development.

The modern theory of organization assumes that any system and state are not always capable of forming a certain state system to hold it further. In certain situations and circumstances, the classic organizational paradigm does not work and order changes to chaos. Therefore, the state should develop adaptive state policies and become flexible through a systematic and integrated approach, setting both operational objectives and strategic goals.

There is an urgent need in the state to move away from the declarative approach to the formation of the state policy and to rely on the applied nature of "policy analysis" to build a new format for its creation and implementation, setting relevant goals, determining the need for an appropriate resource and understanding the size and content of expected results.

Ukraine is characterized as a weak state not only by the internal crisis, but also by a significant external factor - a "strong/powerful state" which is recognized by the world community as an aggressor and which has occupied 7% of the Ukrainian territory. Therefore, when considering the challenges of public policy formation, we focus on the reintegration of territories, the issue of reconciliation and consolidation of the state through the reengineering of the public administration system, which also implies a security component.

The dialectical method of research allowed us to consider all of these areas in relation to each other, offering different models of behavior of the state of Ukraine for the return of the occupied territories. A weak state must be flexible and adaptive, using every opportunity to strengthen its position.

Reconciliation requires certain conditions that Ukraine does not have yet. Therefore, in the nearest future, public policy should finally decide on the development of compromise behavior with the parties of the conflict and consolidate this ideologically in the people's minds. Today, we are consolidated and united in our vision of the many problems that need to be resolved.

Successful practices of reengineering public administration and breaking the existing system with the outdated ruling political elite and oligarchy testify to the considerable potential of the Ukrainian state. Reforming processes in state institutions, setting up reform offices, successful phased integration of territorial communities can be a powerful impetus to the derivative forms of innovative development of the state and regions. Such successful practices can be one of the arguments for the return of temporarily occupied territories and their inhabitants. However, the need for a charismatic figure(s) with relevant competencies remains unmet. Despite that, successful precedents are evidence of opportunity rather than of despair.

Therefore, in the case of a sound approach to the formulation of state policy, considering the policies of the neighboring countries and identifying key internal problems, Ukraine is able to overcome the crisis phenomena of the current period and gradually stabilize the situation and ensure sustainable development in all spheres of public life.

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Service Offer Integrator Business Model Adoption Scenarios for the RO-Smart Ageing Platform

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Abstract

During recent years the quality of IoT based monitoring services has continuously increased due to the growing market requirements, on the one hand, and with support of various technological advances like Cloud-IoT architectures, next-generation IoT with distributed intelligence, edge and fog computing, advanced analytics of heterogeneous data, on the other hand. Health monitoring is an important driver and a priority beneficiary of this evolution. Considering the complexity of IoT monitoring services, the service offer integrator role has the advantage of a unique point of contact in relation to service users and beneficiaries. To illustrate this approach the health monitoring architecture being currently implemented in the RO-SmartAgeing project is presented and two adoption scenarios of this business model are proposed, for the case of small medical units and large hospitals, respectively.

Keywords: Health Monitoring, Cloud-Iot Architecture, Sensing Service Integrator, Business Model.

Introduction

During the last years, the increasing market for high-quality IoT based monitoring services has fueled the development of IoT platforms. The Gartner's Emerging Technologies Hype Cycle from August 2018 edition already placed the IoT platforms on the peak, in the five major technology trends (Panetta, 2018). A decisive role in this evolution has played the integration of IoT and Cloud technologies, due to their inherent complementarity: on the one hand, the cloud computing was able to compensate limited computing and storage capacities of the IoT devices to support complex analysis of sensor-generated data, and on the other hand, the interaction with real-world specific to IoT devices enlarged the opportunities to diversify cloud-based services and applications (Diaz et al, 2016). Sensing as a Service model is a specific example of the potential of the Cloud-IoT approach to diversify and improve provided services. It is considered a win-win IoT ecosystem based on data sharing principle, where the data owners trade their data and decide about conditions of their usage, while the data consumers can benefit from a larger volume of data acquired through the data trading process, which enables the use advanced data analytics solutions to extract useful knowledge and insights (Perera, 2017). More recently, the next generation of IoT with distributed intelligence based on edge computing is characterized by the real-time collection of data, ubiquitous connectivity, distributed stored information, local computing power, cognize capability (analytics, real-time AI) and high potential to diversify services, interactions, business models (Vermesan et al., 2018). The role of edge computing as a complementary solution to dominating cloud computing was confirmed by Gartner's Hype Cycle for Cloud Computing, 2018 (Smith and Anderson, 2018).

A step further in diversifying computing and storage capabilities of the Cloud-IoT architecture, the fog computing was introduced as an intermediary provider of such capabilities between end devices and traditional cloud computing data centers, being considered suitable for real-time, low latency, and high response time applications, especially in healthcare (Mutlag et al., 2019). Its benefits include: minimized volume of data sent in the cloud, improved privacy of sensitive data stored locally, limited network communication impact on the time response performance, greater scalability in terms of the number of connected devices, and the amount of generated and collected data.

Health monitoring is one of the main drivers and also a priority beneficiary of advanced Cloud-IoT sensing services due to well known contextual reasons: demographic ageing trend and patients'

reluctance to leave their home environment, increasing impact of chronicle diseases and higher costs of clinical healthcare, the interest of medical staff to access high-quality decisions based on advanced analytics of data coming from heterogeneous sources (Shah and Bhat, 2020). Based on the reference architecture for an IoT platform dedicated to the Cloud-IoT services (Neagu et al., 2016), the service offer integrator (SOI) role was proposed as a unique point of contact with service users and beneficiaries. The viability of this role on the service market is influenced by the potential of the adopted business model to cover and orchestrate all specific contributions and business interactions that condition the successful delivery of the integrated service offer.

The project entitled "Non-invasive monitoring and health assessment of the elderly in a smart environment (RO-SmartAgeing)" has as its main objective a system for monitoring and assessing the health status of the senior patients, that integrates non-invasive motion and physiological wearable sensors for the collection of health parameters, a smart environment sensors to monitor daily activities and lifestyle, and a cloud platform for data storage and aggregation, including the presentation of advanced data analysis results (Ianculescu et al., 2019).

The remaining part of the paper is organized as follows: Section 2 presents the rationale of the service integrator approach in terms of specific roles and the characteristics of the business model ensuring its sustainability. Section 3 is devoted to the health monitoring architecture developed within the RO-SmartAgeing project – a seven-layer architecture covering all components of the integrated service offer. Two adoption scenarios of the service integrator business model in Health monitoring, in the case of small medical units and large hospitals, respectively, are outlined in Section 4. Some concluding remarks are presented in the final section.

Service Offer Integrator

The main ideas behind this approach were derived from the previous results in experimenting sensing services, where their successful implementation depends on the availability of various components of this type of service, their efficient configuration and operation to meet users' requests (Neagu et al., 2019).

Specific Roles

The Service Offer Integrator (SOI) is an IoT platform provider that intends to improve the quality of provided services with the aim to access the market of complex sensing services as it is the case of health monitoring. The other contributors on the provider's side are the Cloud Infrastructure Provider (CIP), the Sensor Device Owner (SDO), and the Extended Service Provider (ESP) for additional value-added services/applications to meet highly specific users' requirements.

On the consumer's side, the SOI should identify the Integrated Offer Beneficiary (IOB) whose problem has to be addressed by high-quality services. Complementary to the IOB role, the Integrated Offer User (IOU) has the expertise to evaluate the problem and to formulate requirements regarding the configuration of the integrated service offer. At the operational phase, the IOU can understand and interpret the provided results and formulate recommendations to the IOB.

SOI Business Model

The main reason for a business model is to describe the rationale of how the value is created, delivered, and captured. In our case, the business model is built on main business interactions between various business actors playing the SOI specific roles, as presented in Figure 1.

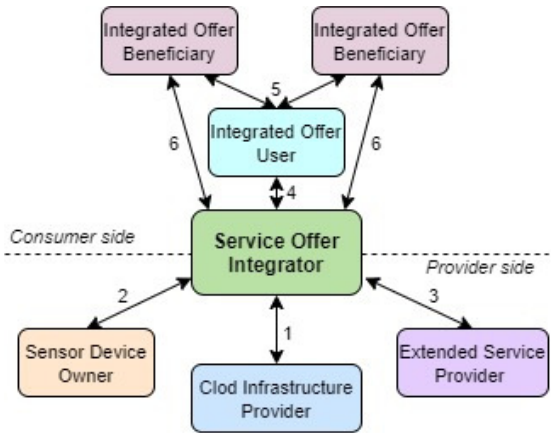

Fig. 1: The SOI business interactions

According to identified market opportunities, the SOI negotiates the access to the Cloud infrastructure (1), the availability of necessary sensor devices (2), and value-added services for advanced sensing data analysis and visualization (3). It should be mentioned that there may be different approaches to implement these roles and to simplify their interactions.

On the customer side, the IOU negotiates with the SOI the contract, which stipulates the configuration of the integrated service offer and the conditions of its activation and access, according to requirements derived from the analysis of the beneficiary's problem (4). Based on this contract, the IOU concludes a subsidiary contract with the IOB regarding her/his access, for a given period, to the negotiated services, as well as the outputs the IOU will deliver based on the interpretation of the service results (5). Finally, the IOB concludes the contract (6) with the SOI on activation and access conditions for services stipulated in the contract (5), as well as the assistance she/he should receive as a service user.

The main characteristics of the SOI business model are synthesized in Table 1, according to the nine building blocks structure proposed in (Osterwalder and Y. Pigneur, 2010).

Table 1: Main characteristics of the SOI business model

Building block	Characteristics
1. Customer segments	Within a specialized domain (e.g. Health monitoring) the most suitable market model is "segments with slightly different needs and problems", in terms of specific requirements regarding sensor devices, data collection, storage, cleaning and aggregation, event processing, value-added applications layer for analytical processing and visualization.
2. Value propositions (products and services that create value for a specific customer segment)	The main sources of value are: performance level of the Cloud-IoT infrastructure, the relevance of value-added services, service accessibility including data privacy and integrity issues, and usability of provided results.
3. Channels to communicates with and reaches its customer segments	The direct channel adapted to an emerging market: awareness rising, customized services, focus on the value proposition to customers, post-purchase customer support.
4. Customer relationship with specific customer segments	The direct, personal relation and dialogue with each customer is highly desirable for understanding specific needs, for diversifying value-added components of the integrated offer, and for the co-creation dimension of the customer relationship.
5. Revenue streams from each customer segment	From the consumers' side, the revenue streams are specific to service providers: usage fee or subscription fees, depending on

	how the customer needs to access the service results. From the providers' side, these streams are specific to the SOI business profile, which is closed to the classical Full-Service Provider model.
6. Key resources /assets required by the business model	The key resources are the Cloud-IoT infrastructure, the human resource expertise of providing integrated services, the intellectual resources represented by licensed software.
7. Key activities a company has to do according to its business model	The SOI is a service company, therefore its key activities are those providing solutions to customers' needs.
8. Key partnerships (suppliers and partners) that are relevant for key resources and key activities	The partnerships that optimize the allocation of resources and activities by complementarities of proposed contributions to the integrated service offer, and reduce risk and uncertainty regarding the availability of key resources (distributed infrastructure, the value-added applications).
9. The cost structure for key resources, activities, and partnerships	The cost structure includes fixed costs for infrastructure operation, variable costs for sensor devices, and value-added applications. Also, the economy of scale is specific to this business model (valorisation of IoT data through their sharing between more interested users).

RO-Smart Ageing monitoring architecture

Among the most important functionalities to be developed within the RO-SmartAgeing project in the benefit of senior patients are:

- non-invasive monitoring of the current health status to define a real elderly profile for presenting the current state of some health parameters (physiological and cognitive);
- defining a model for tracking the locomotor decline and fall prevention;
- monitoring of current activities and lifestyle;
- personal safety supervision;
- personalized ambient adaptation in the event of an abnormal health parameter or an unforeseen and dangerous event;
- supporting the remote assessment of the senior's current health status and early diagnosis;
- creating facilities to support the social interactions of the senior;
- facilitating the senior's empowerment and involvement in the optimal management of his/her health.

The six-layer architecture monitoring architecture is presented in Figure 2.

Data Acquisition Layer is responsible for collecting various types of health and ambient-related raw data from different types of sensors and devices.

Communication Layer is in charge of both vertical communication by sending the collected data through a gateway towards upper architectural layers, and horizontal communication specific to the data-gathering network.

Edge Layer implements context-awareness capabilities based on collected data storage and pre-processing close to the logical edge of the network, providing low latency reactive monitoring in case of risky events triggering and avoiding sending all the data towards upper layers.

Fog Layer provides the capacity of bringing larger storage and computational capabilities to the edge of the network to perform time-sensitive pre-processing of received from lower layers and giving a primary diagnosis. It plays the role of a smart gateway enabling data to be and stored and processed according to local necessities, and finally, to be aggregated and sent to the upper layers.

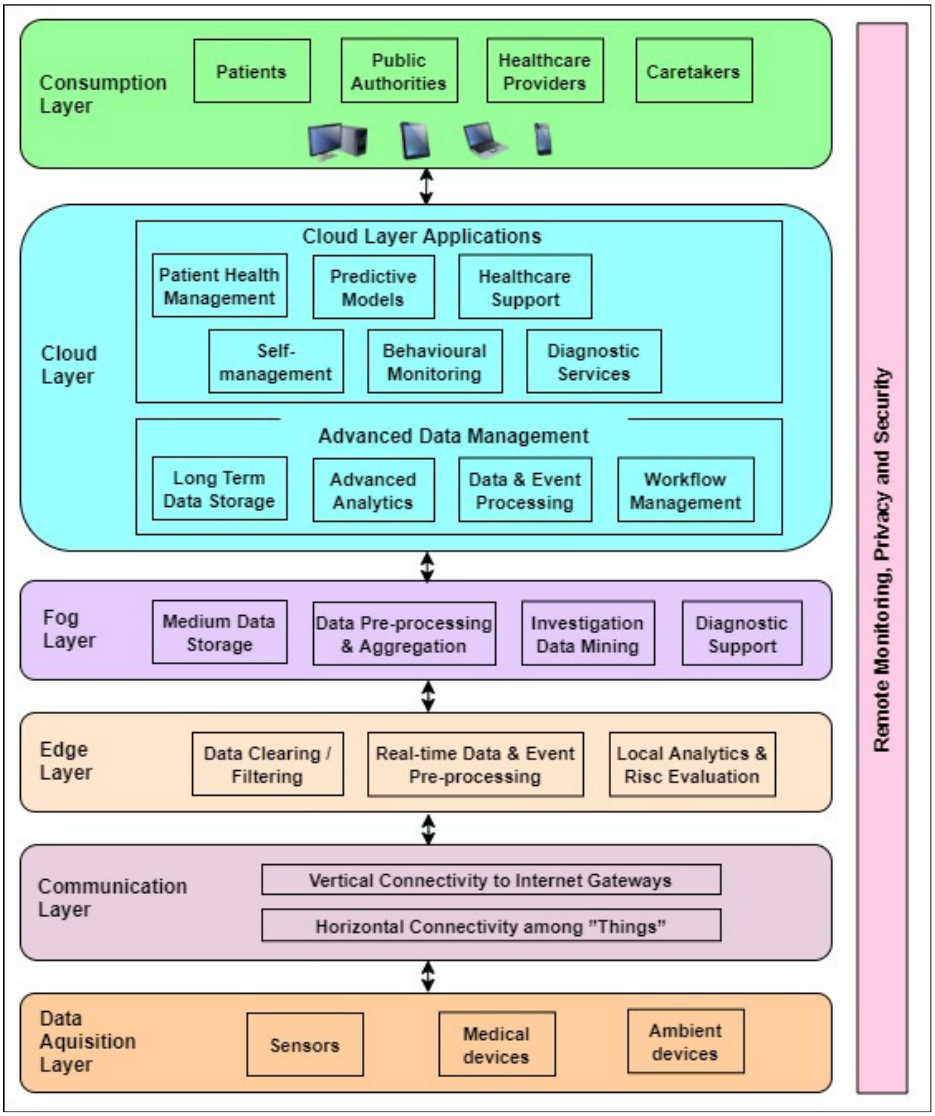

Fig. 2: RO-Smart Ageing architecture (adapted from (Ianculescu et al., 2019))

Cloud Layer ensures long-term and high volume storage, as well as computing power to support advanced data analytics generation insights specific to personalized healthcare decision-making, predictive analysis, and higher performance in remote monitoring of health status in cooperation with edge and fog layers. To leverage this potential, a whole range of advanced applications are deployed on this layer, including patient health management, behavioural monitoring, predictive models, and other advanced diagnostic support services.

Consumption Layer provides an interactive interface via standard web service protocols and service composition technologies to allow the targeted beneficiaries (as patients, healthcare providers, or public authorities) to access applications, data, and information available on the RO-SmartAgeing platform.

The architecture implements all identified contributions for highly performant health monitoring, providing full support for experimenting with the proposed SOI business model sustainability.

SOI Business Model Adoption Scenarios

There are envisaged two scenarios, adapted to two types of medical units. In both cases, the RO-SmartAgeing team is playing the SOI role as the provider of the IoT infrastructure and end-user specific services on the edge and fog layers. Also, the team will fulfill the advanced data management tasks and specific applications on the cloud layer and will provide the web-based user interface at the consumption layer.

The first scenario is specific to small medical units in the outpatient setting. At the consumer side, the IOB is a monitored patient, while the IOU is the medical unit which has neither the capability nor the interest to develop and administrate its own IoT oriented infrastructure, due to obvious reasons related with the technical complexity of this task and high QoS indicators regarding the service availability and scalability. The SOI negotiates with the IOU the integrated service configuration, terms of its activation, number of users, and their access rights per category of service consumers, according to requirements derived from the IOBs' needs. During the service activation period, each IOB interacts with the SOI for assistance regarding the service usage.

At the provider side, depending on customers' requirements, the SOI activates contractual relations with SDOs, the CIP, and the ESP for some advanced data analytics and implementation of predictive models on the cloud layer.

The second scenario addresses the case of large medical units (hospitals) with both the institutionalized patient and the outpatient setting. Specific for this case is the fact that the hospital might have the potential to implement and administrate locally the IoT infrastructure and its functionality through its IT department, outsourcing only cloud layer services. Also, the hospital may decide to administrate its stock of frequently used sensor devices and to ask the SOI assistance only for highly specific ones. Therefore the configuration of the integrated offer should be adapted and negotiated accordingly considering also its impact on the business model itself.

Conclusions

The paper proposes the service offer integrator approach having its main mission to achieve the match between requirements of a problem formulated on the market and the potential solution based on advanced IoT based sensing services. To consolidate this provider's place in the supply chain, its business profile was identified, its business interactions are identified and the main characteristics of the proposed business model have been described.

The approach is illustrated by two adoption scenarios in the case of small medical units and large hospitals, according to the health monitoring architecture being currently implemented in the ROSmart Ageing project.

Acknowledgment

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Information Management in the 4th Railway Package

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Abstract

A high level of safety in the implementation of transport processes is associated with quick access to reliable and current information as part of the Safety Management System. The amount of data and the speed of changes taking place in the environment necessitates the introduction of an information management system and their flow channels in communication with third parties. Proper management of information resources increases the efficiency and effectiveness of policy implementation and safety objectives. The article presents the possibility to identify channels of external and internal information flow of a railway undertaking by the safety requirements set out in the 4th Railway Package. Similar maps can be identified in infrastructure managers' Safety Management Systems by identifying critical elements of its functioning.

Keywords: Information Flow, Safety, 4th Railway Package

Introduction

Under the Act on rail transport of March 28, 2003, railway undertakings are required to have a safety certificate to gain access to infrastructure, and managers must have safety authorization to manage the infrastructure. Railway entities must develop and implement a Safety Management System to obtain these documents. The system must comply with several national and EU legal requirements. All those operating the railway system, i.e., railway undertakings and infrastructure managers, bear full responsibility for the safety of the system, each for their part, and the establishment of a properly functioning SMS is identified as the appropriate way to fulfil this responsibility. The purpose of the SMS is to ensure that the organization safely achieves its business objectives and complies with all the safety obligations that apply to it. These safety obligations must always be fulfilled in today's ever-changing and complex railway environment.

Safety Management System in the 4th Railway Package

The 4th Railway Package is a set of legislative texts designed to complete the single market for rail services (Single European Railway Area). It should revive the rail sector and make it more efficient and competitive with other modes of transport. It was divided into two areas, called pillars:

- technical pillar,
- market pillar.

The technical pillar, which was adopted by the European Parliament and the Council in April 2016, includes:

- Regulation (EU) 2016/796 on the European Union Agency for Railways and repealing Regulation (EC) n° 881/2004,
- Directive (EU) 2016/797 on the interoperability of the rail system within the European Union (Recast of Directive 2008/57/EC),

- Directive (EU) 2016/798 on railway safety (Recast of Directive 2004/49/EC).

The 'market pillar', which was adopted in December 2016, includes:

- Regulation (EU) 2016/2338 amending Regulation (EU) 1370/2007, which deals with the award of public service contracts for domestic passenger transport services by rail ('PSO Regulation'),
- Directive 2016/2370/EU amending Directive 2012/34/EU, which deals with the opening of the market of domestic passenger transport services by rail and the governance of the railway infrastructure ('Governance Directive'),
- Regulation (EU) 2016/2337 repealing Regulation (EEC) 1192/69 on the normalisation of the accounts of railway undertakings.

The market pillar will complete the process of gradual market opening initiated by the first railway package. It regulates the right of railway undertakings established in one Member State to provide passenger services throughout the EU. It also lays down rules aimed at improving impartiality in the management of rail infrastructure. It introduces the principle of a mandatory public tender for the provision of rail services Competition in rail passenger services markets will railway undertakings to improve their service quality and cost-effectiveness better. Competitive bids for public services will save public money. The market pillar is expected to provide European citizens with choicer and better-quality rail services, which is the overarching goal.

The technical pillar aims to increase the competitiveness of the rail sector by significantly reducing costs and administrative burdens for railway companies wishing to operate throughout Europe. As a result, companies will not have to submit costly multiple applications for operations outside one Member State. The European Union Railway Agency will issue vehicle authorizations and safety certificates for railway companies that are valid throughout the EU. Until now, railway undertakings and manufacturers had to be certified separately by each relevant national safety authority. It will:

- save businesses from having to file costly multiple applications for vehicle authorisations and safety certificates in the case of operations beyond one single member state,
- create a ‘one-stop shop’ IT tool which will act as a single-entry point for all such applications, using accessible, transparent, and consistent procedures,
- ensure that European Rail Traffic Management System (ERTMS) equipment is interoperable,
- reduce the large number of remaining national rules, which create a risk of insufficient transparency and disguised discrimination against new railway undertakings.

The executive acts applicable to the implementation and functioning of Safety Management Systems are also:

- Commission Delegated Regulation (EU) 2018/762 of 8 March 2018 establishing common safety methods on safety management system requirements pursuant to Directive (EU) 2016/798 of the European Parliament and of the Council and repealing Commission Regulations (EU) No 1158/2010 and (EU) No 1169/2010,
- Commission Implementing Regulation (EU) No 402/2013 of 30 April 2013 on the common safety method for risk evaluation and assessment and repealing Regulation (EC) No 352/2009,
- Commission Regulation (EU) No 1078/2012 of 16 November 2012 on a common safety method for monitoring to be applied by railway undertakings, infrastructure managers after receiving a safety certificate or safety authorisation and by entities in charge of maintenance.

Information Flow

According to the new legal requirements from June 2020, a railway carrier or railway infrastructure manager applying for a single safety certificate/authorization should demonstrate compliance with the relevant requirements for the Safety Management System set out in Commission Delegated Regulation

(EU) 2018/762. To this end, it should provide the National Safety Authority) or, where applicable, the European Union Railway Agency with evidence of the establishment of a Safety Management System by Article 9 of Directive (EU) 2016/798. The organization should describe the scope of the Safety Management System, considering legal requirements. During planning, developing, implementing, and reviewing its operational processes, the organization should ensure that risk acceptance criteria and safety measures are applied, plans are implemented to achieve safety goals, and information is collected for monitoring purposes.

The documentation includes a description of the Safety Management System, including:

- the identification and description of the processes and activities related to the safety of rail operations, including safety-related tasks and associated responsibilities,
- the interaction of these processes,
- the procedures or other documents describing how these processes are implemented,
- the identification of contractors, partners and suppliers with a description of the type and extent of services delivered,
- the identification of contractual arrangements and other business agreements, concluded between the organisation and other parties, necessary to control the safety risks of the organisation and those related to the use of contractors,
- reference to documented information required by this Regulation.

According to the regulations, it is necessary to define adequate communication channels to ensure that safety-related information is exchanged among the different levels of the organisation and with external interested parties, including contractors, partners, and suppliers.

To this end, procedures shall be used to ensure that safety-related information reaches those making judgments and decisions, the organisation shall manage the identification, receipt, processing, generation, and dissemination of safety-related information.

Also, the entity ensures that safety-related information is:

- relevant, complete, and understandable for the intended users,
- valid,
- accurate,
- consistent,
- controlled,
- communicated before it takes effect,
- received and understood.

Figure 1 presents proposals for external information flow channels for the railway undertakings. Relevant information provided in the legal requirements is included.

As part of the external information flow map (Fig. 1), third parties cooperating with the railway undertakings were identified, i.e.:

- National Safety Authority (NSA),
- National Investigation Body (NIB),
- emergency services and public authorities,
- suppliers,
- entities in charge of maintenance – ECM,
- railway undertakings,

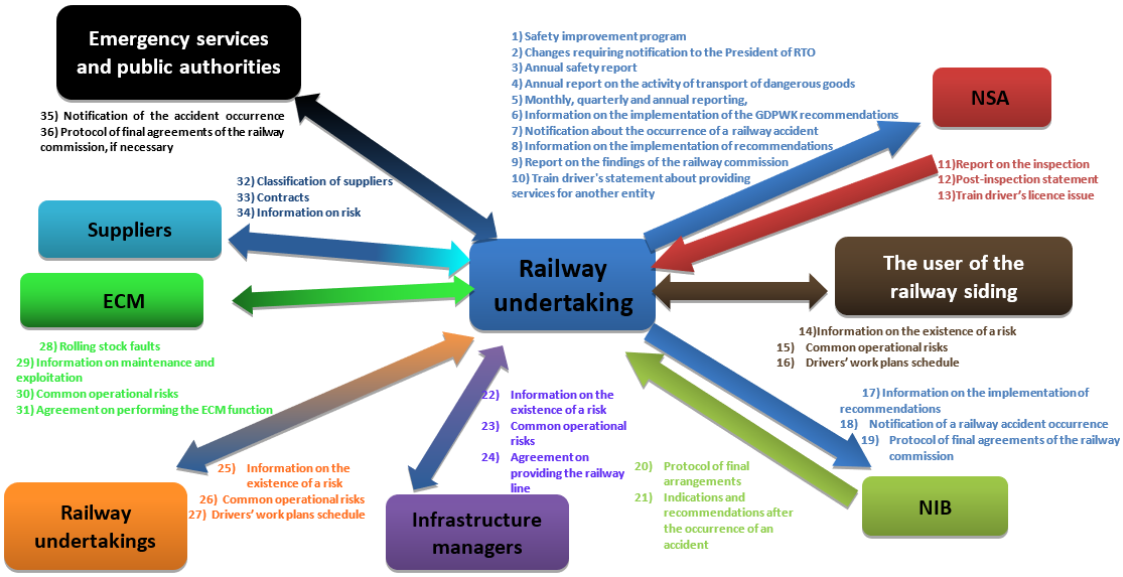

Fig.1: External information flow channels for the railway undertakings

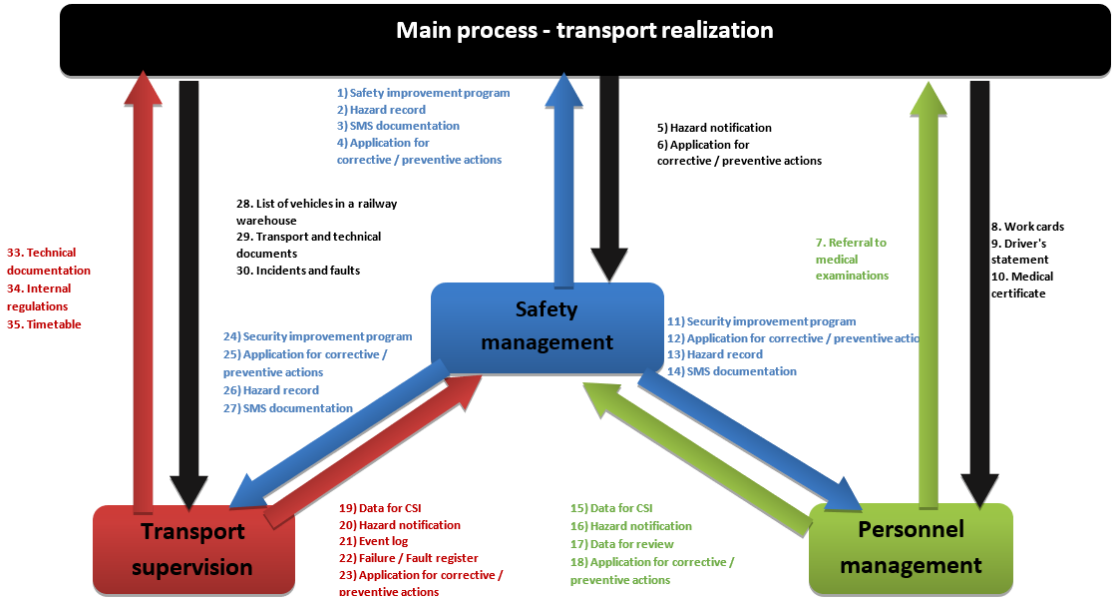

Fig.2: Internal information flow channels for the railway undertakings

- infrastructure managers,
- users of railway sidings.

The map describes critical safety information passed between identified parties, along with an indication of who the sender is and who the recipient is.

In the case of internal information flow (Fig. 2), the security management system was divided into four areas:

- main process - including transport implementation and planning,
- safety management - covering supervision, monitoring and risk management processes,
- personnel management - related to the supervision over the competences, tests, and training of personnel related to the system,
- supervision of transport - including audit, control, and supervision over the implementation of security management system processes.

The external information flow map describes the critical safety information passed between identified sites and an indication. From the map, we can read who the sender and recipient of this information are. This information includes, but is not limited to:

- safety improvement program,
- annual safety report,
- activity reports, also for the transport of dangerous goods,
- information from the NSA and NBI,
- information on railway events,
- information about the technical condition of vehicles,
- information on railway events,
- information related to the risk management process,
- contracts.

Key safety-related information has been identified in external information flow channels. These are information generated, sent, and used in the system, among them:

- system documentation,
- technical documentation,
- employee documentation,
- information on railway events,
- information related to the risk management process,
- internal rules and regulations.

Summary

The requirements for information supervision in the Safety Management Systems described in the publication require verification and updates of existing systems. In this regard, we are dealing with the evolution of existing requirements.

Obtaining a high level of safety is conditioned by quick access to reliable and up-to-date information about the processes taking place in the railway undertaking. The amount of information and the speed of changes taking place in the environment makes it necessary to identify their flow channels, especially in communication with third parties. Also, the railway undertakings must verify that the organization provides:

- application of risk acceptance criteria and safety measures,
- implementing plans to achieve the objectives in the field safety,
- exchange of information related to safety in system improvement.

The article presents the possibility of a formal description of the flow of external and internal information in a well-functioning railway carrier's Safety Management System.

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The Role of the Equipment Monitoring and Diagnosis System in Production Management

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Abstract

Equipment monitoring and diagnosis systems have become fundamental elements of production management. This paper presents production management in a manufacturing company, with a focus on operational and strategic decisions and their impact on production planning and control. The proposed operational decision-making support system consists of one measurement sensor and two tools for extracting production equipment performance characteristics from the measured signals. Implemented in production, it will provide performance data describing technical objects executing production processes, which could set the foundation for a more elaborate production management tool that would increase the competitiveness of an enterprise in the modern market.

Keywords: Diagnosis System, Production Process, Production Management, Operational and Strategic Decisions

Introduction

Growing consumption of goods spurs the demand for products, which are readily provided in a rich variety by manufacturers. Offering an extensive range of products constitutes a monumental challenge for manufacturing enterprises: it simultaneously determines the object of their economic activity, the functioning of the organisation and above all the production system itself. Given the circumstances, proper arrangement of production that embraces its construction, technological and organisational aspects requires considerable effort, not to mention the amount of difficulty involved in successful control and management of production.

Production activities are executed in an environment characterised by either steady or unsteady conditions. In the former case, working in a constant environment allows for high-probability estimation of future production levels, and, thus, enables to develop scenarios for remedial actions in anticipation of potential production risks. In the latter case, *i.e.* when working conditions are unstable, developing fixed action scenarios is impossible due to the unpredictability rooted in the sheer range of potential disruptions that could potentially occur, *e.g.* equipment and machinery breakdown through overrunning. For the reasons such as soaring demand, currently, it is the latter production environment that prevails in enterprises, however, it could be explained by other factors. One reason to consider is the high-degree customisation that is expected by customers. Manufacturers must keep abreast of changing trends in society, respond to the wishes of clients, their suggestions and comments. Meeting the requirements determines the company's chances for existing on the market.

Mounting requirements and the internal drive to minimise manufacturing costs means that designers and constructors are introducing products of increasingly complex geometry. Intricate geometry features are the source of additional technological difficulties during production. Moreover, their presence necessitates employing piece production, which raises the cost bar even further. The lack of repeatability, which is a characteristic feature of lot production, is blocking the emergence of good practices or organisational patterns of production structure, leading to the accumulation of errors in production control and management. Therefore, companies and scientists alike are actively seeking solutions that would lend support in handling the disruptions.

Although production monitoring and diagnosis systems have shown good effectiveness in tackling the emerging problems, this solution is typically overlooked by manufacturers faced with failure and error prevention problems in unstable production conditions. Their value for production cannot be undermined given that they generate data describing the actual state of production equipment (technical condition diagnostics). Moreover, the data can be fed into specialist control and production management systems (decision-making software, expert systems) to aid enterprises in dealing with uncertainty. Implementing such systems in the flexible production scheme can ensure high-stability and mitigation of uncertainty, *i.e.* typical features of mass production.

Production Management

Production management is a broad concept that encompasses a set of such activities as:

- planning (scheduling jobs and ensuring their effective execution),
- ordering/organising (allocation of production resources),
- management/leadership – motivating personnel and managing the execution of production jobs,
- controlling the production processes (assessment of job performance and implementing corrective actions.

Production management consists in making decisions related to the execution of production processes so that products are manufactured according to the specification, in the required quantity, on schedule and at a minimal cost. In production management, supervision involves overseeing the design process, the quality control as well as organising and controlling employees (Muniz, Batista, Loureiro (2010)).

The primary goal of production management is to assure that the goods are produced in the right quantity and required quality, using suitable equipment and machines and following the optimal production technology, so as to boost the competitiveness of the company on the market, bring maximum profit and guarantee the sustainability of the enterprise. To this end, various tools have been developed to support production management. Traditionally, production management models distinguish two domains: technical and social. The technical domain (the classic model) refers to the organisation of production, processes, activities, layout of equipment and material flow. The prevailing idea of this model is to focus on rationalising production organisation and maximising work efficiency. The social domain (the socio-technical model) concerns work organisation from the perspective of personnel. The central point of focus is the behaviour of employees at work, within the specified organisational structures and tasks. Employee satisfaction with tasks they perform is understood to improve work efficiency, which is why the socio-technical model attains excellence in terms of both technical performance and employee satisfaction.

The development of enterprises has been accompanied by the evolution of production management systems. Numerous solutions have been proposed and deployed to improve the level of functioning and innovation in modern enterprises. The most commonly employed production management methods (taking into account the operational specificity of various types of production) are as follows (Pałucha 2012), Kosieradzka 2012), (Borkowski, Ulewicz 2008):

- Material Requirements Planning (MRP) and related techniques – systems aiding production planning and scheduling. They enable controlling production type, quantity and dates. In contrast to rudimentary inventory control methods, MRP enables determining and predicting inventory levels, tracking and quantitative accounting.
- Just in Time – a method of planning and controlling production that aims to eliminate all waste from the production process by manufacturing the right products in the required quantity and time and by ensuring that they are delivered where and when required.
- Reengineering – fundamental and radical reinventing and redesigning of processes in the enterprise, leading to a dramatic (even ground-breaking) improvement in business performance (*e.g.* costs, quality, service).
- Kanban – the method aims to eliminate excess in production by controlling the stage of job processing and continuous striving for inventory reduction. Kanban identifies the "*7 x nos*" to

be eliminated from manufacturing: no defects, no delays, no stocks, no queues anywhere and for anything, no idle time, no unnecessary technological and control operations, no movements.

- Time-Based Management – a method that identifies time as the key factor of competitiveness. It focuses on reducing processing times (saving time), meeting deadlines (punctuality), reforming existing processes (time flow) or developing new products and processes (innovation). Time is given priority in management processes and prevails in all areas of the enterprise.
- Lean Manufacturing (Lean Production, Lean Management) – the method's assumption is to provide customers with exactly the products they demand and to do it in the easiest way, while showing respect to all employees of the company. The goal is to reduce waste, develop high-quality products, ensure timely delivery and reduce inventory.
- Agile Manufacturing – a concept which assumes that the activities are undertaken to build a competitive advantage through continuous improvement, rapid response, systematic quality improvement, social responsibility and focus on the needs of customers. Agile enterprises immediately respond to opportunities and threats emerging in the environment. An opportunity is an instantaneous circumstance – it is only by seizing the opportunities that a business can achieve the desired results or goals. Agility, on the other hand, is the major characteristic of an enterprise, it is the ability to make effective changes in the scope of operations, processes and business involvement in response to an ever-changing situation, both external and internal to the organisation.

All the solutions listed above share a common feature, a prerequisite of efficient production management – an efficiently working production system. The reliability of production management methods is rooted in the dependable execution of production processes and the work of technical equipment. The lack of knowledge about the operational capabilities of objects is the cause of instability and unpredictability of production; therefore, it is the technical condition of the machinery that plays a key role. As a result, the monitoring and diagnosis systems of technical facilities enhance the capacity of businesses on the way to competitive success.

Monitoring and Diagnosis Systems in Production

Monitoring and diagnosis systems have become an established element in manufacturing. The systems are available in various versions, either as general-purpose solutions or as stand-alone and dedicated systems, specialised for a specific diagnostic problem. In the early days, only approx. 38% of their users were satisfied with these solutions (Ketteler 1999); however, currently, they are rated positively by about 78% of users.

The definition of *monitoring* encompasses all tasks carried out in real time that consist in measuring, reading and recomputing variables of a given process for the sake of comparative analysis and contrasting with the previously specified limits, including alarming, *i.e.* ordering control and automatic signalling tasks. These tasks also include recording data (Pieczyński 2003). *Diagnostics*, on the other hand, is understood as a determination of equipment condition from monitoring and classing it under a relevant typology. A diagnosis provides a holistic cause-and-effect description of *e.g.* production, including determining its current phase and anticipating its further development (Kościelny 2001). This covers all theoretical and practical issues related to the identification and assessment of the past, current and future states of technical objects and their environment (Kościelny 2001). What can be synthesised from the two definitions is that monitoring and diagnosis systems perform real-time measurements of an investigated value along with simultaneous data archiving, analyse the measured value according to the implemented algorithm and correlate the assessment of the past, current and future states of an object with the measured value. Any technical object, machine, device or operation of the production process can be subjected to such an analysis. New areas of application of monitoring and diagnosis systems in production are being included on a regular basis; this is what contributes to their growing popularity. The systems allow us to determine:

- the object status at t (time),
- the object status at t + Δt, including scheduling its next diagnosis,
- the object status at t - Δt, the condition of the object at the time t - Δt, which includes determining the location of damage in an event of failure.

A technical object, *i.e.* any device or machine, generates a signal that contains information about its status. The diagnostic signal measured by means of a sensor is transmitted to the block, where it is subjected to analysis (*e.g.* filtration through a high- and low-pass filter or analogue-digital conversion). The prepared diagnostic signal is transmitted to the computer with the installed diagnostic software. The programme processes the signal according to the specified algorithm in order to extract the features that will allow the operator to correlate the measured signal with the actual condition of the object. By correlating and comparing it with the past statuses the performance characteristics of studied objects (operative/inoperative) may be determined. The proposed solution is a simple monitoring and diagnosis system.

The evolution of basic monitoring and diagnosis systems included the implementation of additional features, such as methods and techniques for extracting equipment performance characteristics of diagnostic signals or new sensors. Among the extensive variety of systems, two basic categories have been identified that systematise the diagnostic signal acquisition techniques: the direct and indirect methods. Direct status determination methods are divided into:

- optical methods,
- touch methods,
- induction methods,
- electrofusion methods,
- radiometric methods – employing radiation measurement and mass loss assessment.

A typical optical signal acquisition system consists of the analysed object, camera, image sensor and computer (Fig. 1).

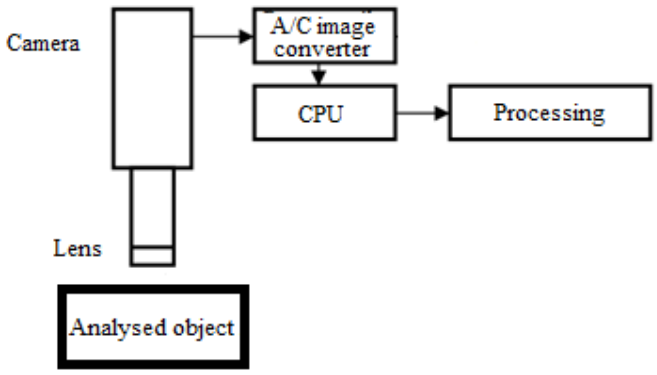

Fig. 1: A schematic diagram of the measuring system using image analysis

Camera images are discretised to the maximum pixel intensity values. By properly manipulating the pixels from the images it is possible to extract the investigated features describing the condition of the equipment.

The use of direct methods in industrial conditions is burdened with numerous shortcomings, including the insufficient accessibility to the monitored object during the performance of production jobs, let alone their inherent inefficiency, high time consumption and large measurement error. The methods are slow in action and rather inaccurate. At the same time, the condition of the object is described in a binary fashion: operative/inoperative. It is for these reasons that they are used rather infrequently in

flexible production systems. Indirect methods are far more widespread in industry. These methods are based on monitoring process variables using signals, which can then be subjected to processing to determine (predict) the operative condition of the object (*e.g.* degree of wear). In indirect methods, the signal is measured during equipment operation.

Indirect methods register and process secondary phenomena during the operation of the object. They measure the effects that processing jobs by a given object exerts on the machine itself. They employ a simpler technical estimation of the object's state than the direct methods, however, the results are still subject to uncertainty, which may result from inadequately understood or misinterpreted operational phenomena. The indirect methods typically measure the following physical quantities:

- forces and loads (static and/or dynamic),
- acoustic emission (50-400 kHz),
- temperature,
- vibrations (1-10 kHz),
- deformation,
- power consumption of the device or machine tool motors.

Unlike direct ones, indirect methods require a two-step procedure: measuring a specific physical quantity and establishing an appropriate relationship to infer about the state of the object from the measurement. The scheme of the indirect method measuring system is shown in Figure 2 below.

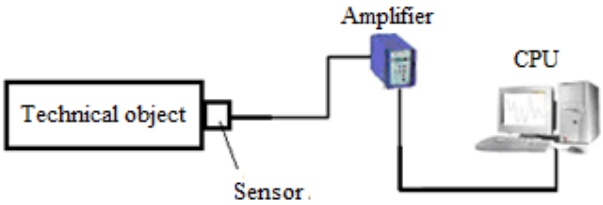

Fig. 2: The schematic of the monitoring and diagnosis system employing the indirect method

What emerged from previous experiments was that the parameters that show a strong correlation with the signal describing the state of a technical object are:

- acoustic emission,
- forces and loads,
- temperature
- the amplitude of the vibroacoustic signal.

Considering indirect methods, monitoring and diagnosis systems tend to base on a constant strategy of determining the measurement threshold, which consists in that the selected features of the measured signal are continuously compared with the pre-determined threshold of equipment degradation. A fixed threshold is defined for a certain set of object's operating conditions. This necessitates developing and storing a complete set of threshold values for various parameters of processes and types of objects. In addition, the threshold value must be pre-determined experimentally so that when the real process commences, properly determined limits effectively prevent further wear of the object.

Monitoring and diagnosing the condition of an object using indirect methods can be considered in two ways: theoretically and empirically. Theoretical techniques are based on analytical modelling of the main factors affecting the process conditions. On the other hand, theoretical models contain a series of simplifications that prevent their effective introduction in an industrial environment as self-teaching systems for the control of machine operating conditions. In order to employ empirical models in the design of control systems, it is necessary to precede it with a series of experiments to determine the permissible levels of safe operation of an object. This constitutes a serious disadvantage of empirical models as they require extensive experimental testing in industrial conditions, which leads to increasing

production costs and extending the reaction time. An ideal monitoring and diagnosis system would be one that combines the features of a theoretical and empirical model.

In recent years, the scientific researches on the development of multi-sensor monitoring and diagnosis strategies have been conducted with increased intensity. A multi-sensor system involves two or more monitoring and diagnosis systems simultaneously. The principle of operation is similar to that of single-sensor systems, except for the fact that multi-sensor systems employ a set of sensors to monitor and diagnose the same phenomenon and the same technical object. The combination of different systems enables determining the condition of equipment and various degrees of its degradation intensity with higher accuracy and precision. In industrial practice, solutions for estimating performance characteristics typically combine the measurement of forces and acoustic emission, forces and vibrations or forces and power consumption of the engine of an analysed object obiektu (np. (Chung, Geddam, 2003), (Cho, Asfour, Onar, Kaundinya 2005), (Liya, Xuemei, Jing, Chuanjiang 2020)).

Recent developments in the field of monitoring and diagnosing technical objects have been marked by the emergence of intelligent methods (expert systems, fuzzy logic, neural networks) (Snatkin, Karjust, Eiskop, Tungel 2018). Intelligent systems employ identical signal acquisition algorithms as the traditional methods, however, these are the novel signal analysis techniques that mark their superiority.

At present, multi-sensor systems are believed to be the most effective measures for controlling the condition of technical objects. However, in purely economic terms, this is a cost-intensive solution whose degree of complexity increases its susceptibility to failure. Therefore, cheaper solutions with comparable effectiveness are still being sought. From the currently conducted scientific considerations, it can be seen that AI-supported single-sensor systems based on two (or more) methods for the real-time estimation of object state characteristics exhibit a comparable capacity at a fraction of a cost and risk. The combination of actions is effective and eliminates the disadvantage of the threshold method, *i.e.* the difficulties in determining the threshold value itself from a series of tests. In addition, the threshold value is assumed as a constant value, regardless of variable operating parameters of monitored objects. The threshold value should be constantly updated in accordance with the real-time working conditions so as to increase the methods' applicability in the monitoring of technical objects.

Monitoring and Diagnosis Systems in Production Management

The role of monitoring and diagnosis systems in production is difficult to evaluate. On the one hand, the systems can determine the technical condition of objects at work, on the other, they increase the costs of manufacturing operations. In addition to elevating the cost-intensity of production (which becomes profitable in the longer time horizon, once the implemented monitoring and diagnosis systems increase the working efficiency of the technical objects), they significantly affect the planning system, production control and decisions.

Data obtained from monitoring and diagnosis systems can aid the process at two levels of decision-making distinguished in manufacturing, strategic and operational. The sphere of strategic decisions embraces the long-term preparation of the production system. At the goal-setting stage, when the production strategy is established, the data on currently used technical objects are capable of affecting investments in additional technical objects, as well as shaping the solutions pertaining to the organisational structure of the production system. The company's activities in the long-term horizon that are based on such operational data allow the management to focus on achieving market efficiency and ensuring the company's competitiveness.

The monitoring and diagnosis system has a far stronger impact on operational decisions than strategic ones. At the production structure level, operational decisions in production management are executive by nature. Implemented *in vivo*, they are focused on achieving operational efficiency of the enterprise. The decisions are made immediately when the problem occurs and, supported by data from operating systems, they should exhibit high accuracy and precision as well as streamline and shape production schedules. The character of decisions may contribute to more efficient use of production resources. The aim of operational decisions is to counteract the events accompanying production activities *(e.g.*

prevent failure). In addition, failure prediction is a step towards determining optimal levels of operation of company departments, including maintenance. It is for these reasons and purposes that the implementation of monitoring and diagnosis systems, and in the future predictive systems, is highly desirable for the economic success of enterprises.

There are two distinct phases in the execution of operational activities that facilitate manufacturing: planning and control. During the planning stage, production planning functions are performed, whereas in the control phase – the functions of ordering, management and control. These elements concern the effective management of material resources (supplying the production with materials) as well as technical resources (production capacity) of an enterprise. Their implementation is primarily aimed to answer the demands of effectiveness (meeting consumer needs), efficiency (minimising production costs) and the feasibility of production (balancing the production capacity and the size of production orders).

From the considerations presented in this section, it emerges that production management in an enterprise is a critical part of its operation that is present on the decision-making, production planning and control levels. In addition, it is closely integrated into monitoring and diagnosis systems. However, in order for such a system to attain market-effectiveness levels, it must be prepared to provide effective and continuous operation and support the resource flow management in production.

The proposed decision-making support system for operational decisions in production

The decision-making support system for aiding operational decisions in production, which is presented in this section, has been developed as a tool for the determination of the condition of technical objects in operation. The operating status of objects is considered on two levels: the standard level of operation (natural wear) and failure level (critical wear). The design of the developed decision-making system is shown in Fig. 2, and the operational signals were measured using the indirect vibroacoustic signal measurement method; as a result, a series of waveforms (amplitude *versus* time) were obtained (Fig. 3).

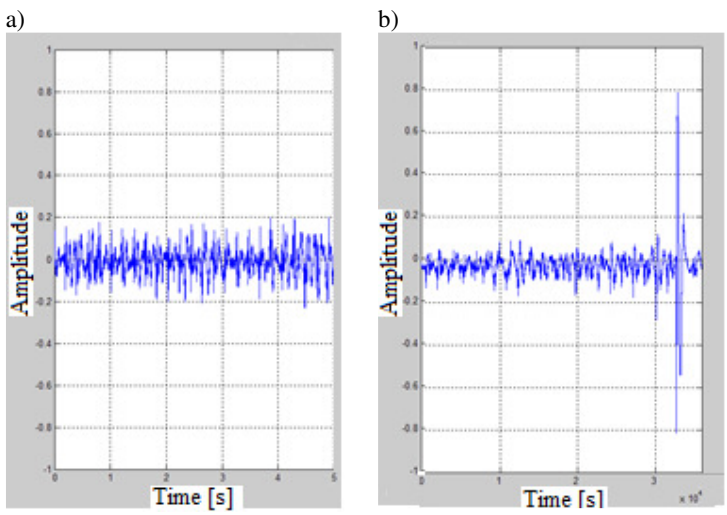

Fig. 3: Examples of recorded waveforms: a) the functional object, b) object in the state of critical wear

Subsequently, the recorded waveforms were used for machine wear assessment, which was performed by means of the Fast Fourier Transform for preliminary sensitivity analysis. The analysis confirmed

that during normal machine operation, the amplitude changes slightly (Fig. 3a), as the critical wear approaches, substantial changes can be observed (Fig. 3b).

The signal spectra obtained from the FFT analysis were subjected to a comparative analysis using the Euclidean distance formula between two vectors.

$$odl(x, y) = [\sum_i (x_i - y_i)^2]^{1/2}$$

where: *odl* – Euclidean distance, x – standard spectrum vector, y – current signal spectrum vector.

The analysis algorithm was then repeated and subsequent Euclidean distances were recorded and saved. The decision regarding whether a given machine was permitted to continue production was based on the dynamics of changes in the *odl* parameter.

The effectiveness of the algorithm was increased by means of wavelet transform – the Daubechies, Coiflet and Symlet wavelet families that were chosen. The signal was decomposed to represent particular forms of machine wear in order to boost the accuracy of interpreted results, and thus the correctness of decisions. From the results of signal decomposition levels, it emerged that above level three, wavelet decomposition did not bring the expected results. Examples of signals analysed using the wavelet transform are presented in Fig. 4.

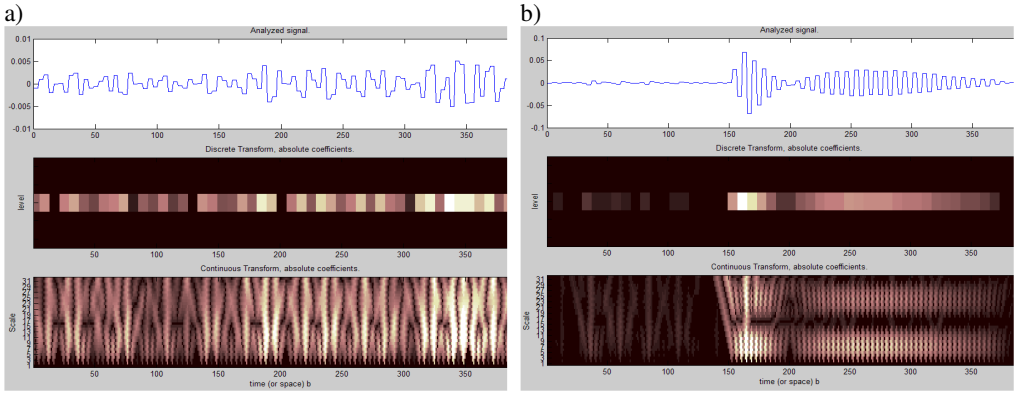

Fig. 4: Examples of wavelet transforms: a) an operative object, b) an inoperative object with failure

By employing the wavelet transform it was possible to determine the time intervals in which the signal energy is the highest. The determined time intervals enable complete documentation of equipment degradation and failure.

The next element of the machine failure prediction algorithm is the AI component, which serves to further improve the capabilities of the system. The three-layer MLP (Multilayer Perceptron Network) artificial neural network with 20 neurons in one hidden layer was trained with the backpropagation algorithm, from the family of linear activation functions. The function was shown to provide the best learning results that correctly predicted the actual wear rates from the modelled relationships. The network was verified with the test data set and taught until a 5% relative error level was attained. The ANN was tested on sets that were not involved in the learning process. The modelled data showed a good fit with the real data. A fragment of the neural network algorithm code is shown in Fig. 5.

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Cultural Conditions for The Allocation of German Capital in The Form of FDI In Poland

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Abstract

The article presents cultural attributes typical of German culture, which contribute to the success of German economy and the well-being of German society. Cultural features which determine the specific economic behavior and the nature of the internationalization of German investors include collectivism enhanced by a high level of social trust, the tradition of cooperation between enterprises and the state, increased propensity to avoid risk (resulting in the concentration of economic activity in medium-tech branches) and long-term orientation. An important element of this economy, which became a peculiar artefact of German culture, are family businesses. Many of them have successfully transformed into international corporations. Nowadays, this phenomenon is reflected in the managing strategy of these entities and in the positive perception of products labelled as *made in Germany* (country of origin effect) on international markets. The article shows that the cultural complementarity of Germany – the country of origin of capital and Poland – the host country is beneficial both for the investor and the host country.

Keywords: foreign direct investment (FDI), cultural dimensions, host economy.

Introduction

Being one of the world's greatest economical powers, Germany plays the leading role in internationalization. Due to the specific set of features German economy has become highly competitive and German society – wealthy. Internationalization has been one of the essential elements of German economic development, however, it was seriously inhibited during the First and Second World War. The following paper aims to present German internationalization as a process deeply rooted in culture. Investment expansion during system transformation in Poland has clearly demonstrated cultural inclinations towards this process such as the complementarity of cultural dimensions. This complementarity ultimately generates the synergy effect for both investors and economies participating in the capital flow.

Capital transfer in the form of foreign direct investment, owing to the complexity of this form of allocation, entails the necessity of business culture implementation, or at least adaptation of its elements in the host country environment. When the form of taking over the ownership is an acquisition or a merger with a foreign economic entity, there is an immediate confrontation of two different cultures on the level of national values, business culture but also on the level of organization. Also the greenfield investment is not a lonely enclave within the environment of a foreign country, because it employs local personnel, builds relations with local suppliers and business co-operators, who are affected by their culture. The process of culture confrontation takes place, despite its deferment in time. It is expedient to determinate the level of complementarity and difference of national and business cultures, which clash as a consequence of FDI. German investors, who are under discussion in the paper, represent a set of features allowing to determine the specificity of business culture of their country. The culture enjoys the reputation in the world, because of great efficiency of German companies, their competitive position on the international market. German organization and timeliness has won universal recognition. Germany's lasting role at the forefront of global FDI capital flows (3rd place worldwide in 2017, after the United States and Hong Kong in

terms of FDI stock WIR 2018) indicates internationalization in the form of FDI as a component of the success of the German economy. The example of investment expansion in Poland discussed in the article allows to answer the question: to what extent cultural factors favor this process and how they inhibit it.

Research Aim

The aim of this paper is to examine the role of cultural factors in the allocation of foreign capital in the form of FDI exemplified by German investments in Poland. Due to the form of capital allocation, FDI indicate not only the transfer of anonymous financial capital but also the whole set of values related to knowledge, technology, organizational culture, and even the values' system and standards typical of the investor's home country. The author investigates to what extent culture impacts internationalization theories and international enterprise management. The case study illustrates the role of German capital invested in Poland during the 30 years that followed Poland's political transformation. It also provides useful insights on the importance of cultural factors in the internationalization process, the role of the country's culture, the origin of capital and the host country, and potential synergies between them as a source of benefits for investors and the hosting economy. The long-lasting process of developing relationships, spatial closeness in the context of cultural conditions is seen as a premise for enhancing investment but also as a risk of a hasty assessment of investment conditions.

Literature Review

The character of modern competition necessitate active presence of a company in foreign markets, and in the process it requires it to function in the environment which is culturally and socially multinational. This phenomenon is a challenge for companies' management and a subject of scientific study for the researchers. In management theory, the cultural aspects in the decision-making processes were consider relatively late, in the 1980s.

It was the age of success for Japanese companies – culturally exotic in the western world, yet capable of successful competing with American or European corporations. Searching for the source of competitiveness of corporations from the land of the rising sun, as well as the attempts of copying their business solutions contributed to 'discovering' culture as a factor of competitiveness of a company and an economy. The success of the tigers of the Far East in the first and the second generation, and China's entering the arena of economic competition confirmed even more the importance of the factor.

In the last decades of the 20th century, there was a considerable increase in foreign investment activity of international corporations, including international mergers and acquisitions, which resulted in greater demand for the knowledge within the scope of management in a culturally diverse environment. Intercultural management, treated for many years as 'a business undercurrent', has become an integral element of the company's strategic management (Mintzberg, Ahlstrand, and Lampel, 2005). In the economics literature, Perlitz distinguishes two approaches connected with the role of national cultures in management:

- Culture free thesis, endorsing the thesis on universal methods of management, mainly represented by the researchers strongly marked by their own culture, and having little international experience.
- Culture bound thesis, indicating that different cultural conditions of countries, require diverse, adjusted to the environment, styles of management, represented by people who experienced cultural differences on their own (Perlitz, 1995).

The first approach is based on the assumption of advanced cultural convergence on the world's scale, corresponding to Bauman's futuristic thesis, that we are "perfect tourists, vagabond beyond remedy" with no roots, with loyalties subordinated to the interest of large corporations (Durska, 2003). In the era of globalization, the second approach is becoming more and more popular. Paradoxically, it is

globalization that forces us to take into consideration a broader spectrum of cultural differentials, where economic processes take place. As Doremus et al. (1999) prove in *The Myth of the Global Corporations,* "globalization increases the role of national differences in management, and not their erosion". The research of Hofstede et al. (2011) support the fundamental importance of cultural differences of individual countries and their influence the course of economic processes.

At the same time they challenge the theory on universal methods of management, effective under any conditions, independent of its location. The popularization of American business culture in the 1960s and 1970s, connected with American economic expansion in Western Europe, has strengthen the conviction about high effectiveness of American managerial solutions, as well as professional qualifications of managers on the basis of MBA studies, disregarding the cultural environment, in which the decision-making processes take place. An international activity of organizations which have their headquarters located in the USA: International Monetary Fund, World Bank – which imposed the American standards of business culture, as well as an opinion-forming power of American research centres in the field of economics (Durska, 2003) turned out to be great means of persuasion of universal effectiveness of American solutions. Furthermore, the phenomenon was fostered by the worldwide popularity of English language, and popularization of Anglo-Saxon institutional solutions in the countries which used to be the colonies of the British Empire.

The process of far-reaching convergence of economic behaviours of international companies, connected with creating 'a cross border civilization' and currently popularized by the media, applies to a narrow array of social behaviours, mainly consumer-oriented. Cultural autonomy, characteristic of individual countries, are one of the most lasting phenomena of human civilization. The notion of culture itself, imposing the imperative of differences, is explicitly defined by the researchers. Hofstede et al.(2011) define culture as the collective programming of the mind which has elements such as symbols, characters, rituals, and other immanent values of a given community. According to Cozier, culture is the way in which a group of people solves problems and resolves dilemmas (Crozier, 2009). The central issue concerning mankind, which forces men to make economic decisions, is a problem of rarity, and the way of solving it (specific for a given nation) is implicated in the cultural specificity. Basing one's knowledge of culture of a potential host country, and motivations of economic behaviours of its inhabitants, on the features perceived on the surface, without referring to those basic values, is comparable to estimating the size of an iceberg (Schein, 1984) on the basis of its tip jutting out of the water. In practice, the investment projects, whose managers ignore cultural factors, or treat them superficially from the angle of the tip of an iceberg, are in risk of economic catastrophe on the scale of the Titanic.

Some researchers of the phenomenon such as Hofstede, Hall, Gesteland, Hampden-Turner and Trompenaars attempt to characterize the cultural differences characteristic for individual nations on the basis of an array of features, treated as dimensions of cultures. A detailed cultural analysis of a potential country of internationalization, paying special attention to specific cultural characteristics, allows to optimize the selection of managerial tools and marketing strategies, hence creating favourable conditions for reducing the risk connected with capital allocation. Comparing the intensity of particular features allows to create a specific map of cultural similarities and differences, which is essential in terms of directions of internationalization activity. As its realistic exemplification, we can accept a map of similarities created as early as 1966, by Haire and Ghiselli enclosing not geographical, but motivation and attitude coordinates collected on the basis of psychological similarities and cultural differences (Chryssides and Kaler, 1999). This, indicated by the researchers, "third" dimension for the area of international capital allocation – cultural distance has not yet been reduced by the technological progress.

Bilateral flows between countries can be a certain confirmation of the thesis on the importance of culture factors in the internationalization of companies in the form of FDI. Very high concentration of capital transfers can be observed within the countries of the same language community, especially English-speaking countries. Language is a substantial component of culture, and its idioms and semantic allusions are in fact understandable only for representatives of a given nation. Language

often can be a more uniting factor than nationality, e.g. Flemish-speaking Belgians are more in agreement with the Dutch than with their French-speaking countrymen (Sznajder, 1999).

In the countries of the same language community, speech is not only important as a medium of communication, but also as a facilitator mirroring the similarities of values originated from the native tongue. It encourages mutual understanding between economic partners, which at the same time reduces the communication risk of an investor functioning in a foreign environment. For example, a high inflow of American capital to Ireland from the 1970s was the result of the same language community and social similarities to the inhabitants of the Emerald Isle. It is Ireland, and not Portugal or Spain, which has become a production stronghold of American IT concerns on the European market. Intensive historical Irish emigration to the USA resulting from the Potato Famine, also had a significant impact. Irish representatives in the management circle of American corporations, had an advantage of knowledge on their country of origin and its culture, which influenced the direction of investment expansion of these economic entities. The factor of personal connections emphasized by Y. Aharoni in the concept of FDI motivation finds its confirmation (Aharoni, 1996). A broader approach to global capital flows shows that more than a half of the global FDI stream circulates between European countries and the USA. Americans, apart from the Native Americans, to a great extent are emigrants from the old world , who are connected with Europe by cultural roots, on the basis of the Christian religion. This aspect reduces the gap and sense of cultural differences. A relatively low level of FDI absorption is still concentrated in countries located in other continents (except for South-East Asia), and especially African ones, which are characterized by distinct cultural differences in comparison to the countries – main capital exporters.

In the case of internationalization, where there is a clash of cultures which are fundamentally different in the values they hold, as in the case of the Islamic and Western world, which is defined by Barber as "Jichad vs. Mcworld", there are often conflicts (Baber, 1996). As remarked by Rymaryczyk, the consequences of dominance of the American way of thinking, as an effect of the activity of American corporations, are: xenophobia, aggression of local communities, as well as terrorism (Rymarczyk, 2007).

The inter-cultural preferences in management, as well as consumption processes, are often entirely superficial and reminds the "rain-dance" of the locals employed in the branches of foreign corporations, who on the outside adjust themselves to incomprehensible rules and rituals imposed on them by the investors, rooted in a different cultural environment (Trompenaars and Hampden-Turner, 2002). The result of such superficial cultural preferences is virtually no organization efficiency, and failure in reaching intended goals. When analysing the possibility of implementation of managerial solutions derived from one cultural region, to another one, Hofstede states that a workplace can marginally influence the change in an employee's system of values, and the system has an impact on the employee's susceptibility to motivation stimuli (Hofstede, 1994). Mintzberg points to the fact that a strategy of a company tried and true in specific cultural circumstances, in other cultural regions often proves ineffective due to different responses of the environment. The strategy can result in extremely strong resistance against strategic changes in the organization (Mintzberg, Ahlstrand and Lampel). Hofstede provides a vast array of unsuccessful mergers and takeovers (Leyland-Innocenti, Imperial Typewritere, Vereinigte Flugzeugwerke-Fokker, Citroen-Fiat), which ended in ignominious failures owing to, among other things, neglecting the specificity of cultural factors, and concentrating on strictly financial aspects during the decision-making stage (Hofstede, 2000). As an adequate example, one can mention a 1998 merger of German Daimler-Benz AG and American Chrysler, which became a spectacular flop after 10 years, and the reason for it is largely attributed to mismatching the cultures of the organizations, and the lack of strategies of their convergence. They can be described metaphorically as "as different as chalk and cheese."

German formalism on decision-making, importance of titles, dominant attitudes towards the employees of an acquired company, and the motivation system of German managers based to a lesser degree on quick individual achievements, collided with a relaxed, joint work way of problem solving, the emphasis on quick individual success, characteristic for American business culture. Instead of a

successful synergy, the merger resulted in shareholders' disappointment (Welge and Holtbrügge 1998).

In opposition to the attitude of neglect of cultural conditioning presented by the companies mentioned above, there is a strategy of one of the largest international corporations – General Electric, which attaches great significance to cultural differences characteristic for the host countries of direct investments. In many cases, the have a dominant influence on the final decision on a foreign merger or takeover. The process of acquisitions is preceded by preparation of transcultural analyses for the operation. If the differences harmed or prevented full integration of the acquired company, GE would abort the transaction, regardless financial aspects (Aniszewska, 2000). In the 1980s Lorach called for performing a cultural audit in the companies (Lorach, 1986). It allows the assessment of the risk resulting from cultural differences of the human factor, and at the same time the possibility of adaptation of the strategy derived from the country of origin of the corporation. Even if the financial effects are predicted to be advantageous, a negative cultural audit should induce to abort the operation. Cultural differences, usually treated as a barrier and an important risk factor of internationalization, can also become powerful non-material assets of the organization (Aniszewska, 2000). According to Hofstede "the cultural factors play more and more important role in gaining an economic advantage, whereas competing in technology and prices brings short-term effects." (Hofstede, 2000). Barney perceives culture as a source of the long-term economic advantage. At the same time, he defines the cultural specificity as an incredibly effective (even more than legal sanctions), long-term barrier for copying and imitating advantageous features of a company by the competition, originating from other cultural regions (Barney, 1991). One should consider that taking advantage of a company's achievements, not only technological ones, but also organizational, as in accordance to the theories of Hymer and Dunning (Dunning, 1988) is the source of the decision on realizing foreign direct investments (FDI) (Döhrn and Heiduk, 1999). Cultural differences support preserving the monopoly of knowledge and not making it accessible to the surrounding, which ensures foreign investors' advantage over local competitors of a host country. Many failed attempts at copying Japanese methods of management by American and West European companies in the 1980s support the thesis. Internationalization of companies has always been an activity undertaken on the verge of at least two cultures, which usually signifies the clash of social norms, values, and ways of thinking deeply rooted in the many century old tradition and history of the nations. The most advanced stage of internationalization of a company connected with making direct foreign investments, and in this way creating a foreign daughter company in the environment of an alien country, becomes one of the greatest challenges for the managers as it forces the managerial personnel to do their job in an alien environment in an institutional sense, but also in a sociocultural one. Apart form an anonymous financial capital transfer, the holistic character of FDI results almost always in professional people migration (mainly of managerial personnel, and specialist in the field of technology) with their specific knowledge, their business habits, and their interpretation of a business situation shaped by the culture of countries of origin. They are transferred to the environment of a host country, where they are accepted or rejected. Cultural dissimilarity of the environment, and, above all, the ignorance of its key features is a major risk factor in the internationalization of investment activity. It is also a source of cultural shock for managers transferred to work in foreign branch companies. Cultural differences can hold back the implementation of efficient business solutions of mother companies. One can take as an example the implementation of an American management instrument *Management by Objectives – MBO*, which requires co-operation and establishing mutual goals between a supervisor and a subordinate, and not general hierarchical subordination. This assumption eliminates the possibility of using the instrument in high power distance countries e.g. France (Perlitz, 1995). Awarding individual bonuses, in the form of a monetary reward, to above-average employees may turn out to be similarly ineffective. This instrument will not be a sufficient motivating factor in collectivist cultures such as Japan or Italy (Trompenaars and Hampden-Turner, 2002). Also organizational structure for international companies, as in the case of matrix structure, based on dual-reporting relationship, thus it clashes with so called "family business model" permanently rooted in the culture of Mediterranean countries (Trompenaars and Hampden-Turner, 2002). The similarities of cultures spatially close, especially better understanding of one another, result in the increased capital inflow in close geographical proximity. Beckermann defines this phenomenon as "the small psychological distance" connected

not only with the geographical union, but also the union of culture and language between investor's mother country and its host country (Kraszewski, 2004). The process of cultural interpenetration occurring in the countries in direct geographical vicinity, which is a result of migration and individual private contacts among other things, increases the tendency of internationalization of companies within the countries' economies. The impact of the cultural factor in the theories explaining the motives for FDI is not entirely ignored, however, it is not of the utmost importance. The cultural element of a host country is placed in the localization theory next to the market, cost and political factors. It is taken into consideration in the internationalization decisions, when a company considers the cost-effective alternative for selling of know-how assets or their transfer to the branches of foreign companies (Oziewicz, 1998). Also in Hymer's monopoly concept, in the calculation of gains resulted from discounting the monopoly of technological and organizational advantage in the environment of a foreign country, among other things one needs to take into consideration the costs ensuing from considering cultural differences. On the other hand, Y.Aharoni, referring to managers' particular motivations in the assessment of the foreign investment, pays special attention to the element of knowledge of foreign cultures possessed by managers (as a result of studies in foreign countries, being brought up in a heterogeneous family, individual private contacts, etc.) as a favourable factor in the decision on embarking on foreign investment expansion (Y. Aharoni , 1996). In this aspect, the complex economies, which consider a broad spectrum of human motivation, and are not limited to an artificial creation such as "homo economicus", can finally emphasize the importance of cultural elements in economic decisions, including internationalization. Naturally, it is not the issue of cultural determinism – yet another monocausal theory on FDI motivation – but of acknowledging the importance of the factor, which combined with other groups of identified determinants gives finally a proper perspective for the analysis and assessment of FDI phenomenon.

In the analysis of cultural differences in the process of internationalization, the stress is usually put on the cultural specificity of a potential host country. However, it turns out that the tendency of managers towards internationalization, connected with working in a foreign branch, is diversified, depending on the country of origin, and national culture, in which the managers are rooted. The results of the research by Hampden-Turner and Trompenaars suggest a strong tendency on the part of Swedish, Dutch, Swiss, and American managers towards internationalization. Whereas, the analysis points to French, Italian, and Spanish managers as the ones who display a relatively slight tendency towards mentioned economic activities (Trompenaars and Hampden-Turner, 1998). Clarification of the phenomenon partially relates to the specificity of development of a given nations and experiencing cultural diversity. According to Hofstede, the tendency towards internationalization, creating international enterprises, is expressed mainly by economic entities originating from the cultures that have low power distance, which is results in the facility of delegating the decision-making powers to foreign branches. The author states that the enterprises originating from the high power distance countries (measured by the power distance index), carrying out mergers and takeovers in the low power distance countries, usually experience serious problems. The managers of those companies do not accept the possibility of decentralization of power, and they are unwilling to agree to cultural opportunism. This asymmetry of power distance in the countries where there is capital flow, turns out to be a barrier for efficient functioning of direct investment enterprises, and eliminates a natural source of development inherent in the potential of a host country. According to Hofstede, success is achieved usually by organizations which come from the cultures that have low power distance and they decide on economic activity in the cultures with high power distance (Hofstede, 2000). The results of the research on managers' willingness to work abroad, published by Finance Magazine in 2007, showed practically identical gradation of managers' countries of origin to the case of the research by Ch. Hampden-Turner and F. Trompenaars on managers willing to work in foreign branches (Hampden-Turner and Trompenaars, 1998). The nations, where managers express more willingness to internationalization, are characterized by a relatively low value of the power distance index assigned by G. Hofstede. Power distance is not the only cultural variable influencing the managers' willingness to being economically active abroad. Listing a broader catalogue of cultural features (table 18) for individual groups of countries of a different level of willingness to internationalization measured by the FDI index per 1 inhabitant, allows to create a certain map of features, which just like DNA distinguishes individual groups of countries depending on the intensity

of foreign investment expansion. Naturally, the cultural factor, however important, should not be treated in an autonomous way in the face of economic variables, since the internationalization behaviour is influenced by the size of the home market, the level of external capital accumulation, as well as a wide array of motivation, presented in the first chapter of this paper. The importance of cultural factors is complementary to the other factors, and the character of the correlations is often in the form of feedback. It regards among other things, the tendency to save, and at the same time the capital accumulation, which in its own is strongly culturally conditioned. According to M.Weber cultures rooted in Protestantism are more willing to save. This feature is also known among representatives of Asian cultures rooted in Confucianism (Weber, 2007). A comparison of the cultural features and the internationalization activity suggests that a greater tendency is exhibited by the nations which:

- have relatively low power distance
- are individualistic
- have a universal approach to rules
- are fragmentary
- internally controlled

Accumulated cultural heritage has become a favourable or hindering factor to a company's competitiveness in the conditions of global market competition. Basic values shaped over the centuries, influence the willingness to migration and internationalization behaviours, as well as taking the risk of capital allocation outside the mother country, and often connected with the phenomenon – people migration. In M. Porter's diamond model, what is decisive to the competitive advantage of nations is a constellation of six groups of factors, which is supplemented by Dunning with the transnational economic activity (Porter, 1991). The internationalization tendency, treated by Dunning as a competitive factor, has its cultural reference. As previous discussions on the subject suggest, a greater tendency to foreign investment expansion is exhibited by economic entities originating from the cultures with specific features. This leads to the conclusion that open cultures, with low power distance, high risk-taking tendency, universalist, future-oriented, potentially increase their competitive advantage of their economies in the times of globalization. Javidan emphasized the aspect of cultural influence on competitiveness on macro, as well as microeconomic level. Owing to his empirical research, he confirmed the hypothesis that the future-oriented cultures, inspiring to rewarding and giving bonuses adjourned in time favours the competitiveness of their economies. Among the most future-oriented ones he placed Singapore, Switzerland, Netherlands, and in the other extremum are: Russia, Argentina, Poland, and Hungary. On the microeconomic level, Javidan points out to management problems in the muliticultural environment, when managers coming from the future-oriented cultures have difficulties in applying their managerial tools in the present-oriented cultures, with the short planning horizon (Javidan 2007).

Ignoring the differences exposes the employees directly involved in the process of internationalization, mainly expats, to a deep culture shock. The phenomenon is defined as a human's emotional state, which is a result of a contact with a foreign culture, which decreases the efficiency of managers and employees' economic activity, in some cases completely paralysing their work. Thus, it is a real cost of internationalization.

The internationalization of companies achieved through foreign direct investments is a process, which entails strong cultural interactions. Even though the process of globalization has caused certain standardization of management methods and behaviours, it has not had a substantial effect on the cultural convergence of the nations. Ongoing mental differences, dissimilarities in systems of values and in interpretations of a given situation, strongly influence the outcome of economic decisions in given countries. Modern international corporations, despite numerous similarities, and specific standardization of structures and behaviours, resulting from operating on a highly competitive international market, still bear specific features allowing to determine their national identity. These attributes are transferred together with the investment capital to host countries. Cultural dissimilarity of economic surrounding, where the activity of branches of international companies is done, may become an effective barrier for implementation of the organizational methods well-tried in the

country of origin, and the strategies adopted by the company. The cultural factor, which is difficult to submit to direct quantification, and has often been underestimated in the decisions on international mergers and acquisitions, in extreme cases can lead to substantial financial losses for the companies performing internationalization. Identifying the technological and organizational advancement of a company as equal to the cultural advancement is a trap of relativism, constituting a grave mistake on the part of managers. The ability to use cultural differences in management and to adjust them to the needs of employees and clients from different cultural regions, is an important competitive factor for the company in the era of globalization. In order to use the differences in management effectively, it is essential to recognize them properly, to determine the extent of cultural complementarity and the possibility of using it in the process of building the competitive position of a company. Nowadays, the need for complex recognition of cultural specificity and its implications for the management processes effects not only large international corporations, but also small and medium companies, which more and more confidently take part in the internationalization process, via direct foreign investments. Globalization is a powerful process of permanent internationalization, that is why economic activities on the verge of cultures, which essence one cannot change, should be flexibly adjusted according to the economic method in line within the process.

Results of the Study

Since introducing social and economic reforms in Poland in 1989, Germany has been consistently investing in the Polish economy. From 1989 to 2017, Germany invested EUR 35.1 billion in FDI. (data reported by National Bank of Poland) In 2017, 22.2% of foreign companies in Poland represented non-German investors and 17.7% of foreign capital originated from Germany.

The increased economic activity of German companies in Polish economy during transformation has been a natural continuation of economic relationship established between these two countries as far back as the beginning of the 18th century and the Kingdom of Poland when Franciszek Ksawery Drucki-Lubecki wishing to economically activate Polish lands, encouraged German craftsmen to settle on these Polish territories. In the interwar period, 26% of foreign investment in Poland came from Germany (Morawski, 2008).

In case of countries situated in such geographical proximity as Poland and Germany there is the temptation to ignore cultural differences in the analyses of conditions for international capital allocation. Ph. Very attracts the managers' attention and warns them against this problem. Ignoring cultural differences in case of close cultures is known as the "hasty assessment trap" which, later on, leads to serious unexpected problems. The practice shows that the due diligence analyses conducted before making investment usually omits cultural aspects (Aniszewska, 2004).

In the context of reasons for business culture adaptation in the country hosting the capital, Hofstede emphasizes the role of authority distance factor. Capital flow from countries characterized by low authority distance to countries with large distance creates certain predispositions to the success of investment enterprise based on cultural adaptation (Hofstede, 2000). By applying the author's observations to the organizational culture differences between Poland and Germany it is possible to answer the question to what extent they form predispositions to capital cooperation. According to his classification, German organizational culture is characterized by relatively low authority distance index, while Polish researchers (Pietrewicz, 2001; Bildhauer, 2005).

This culture is thus characterized by large authority distance, which results from the centralization of the decision-making process immanent for the imposing economy of the previous political system. As noted by Bildhauer, changes take place also in this area. As far as the managerial culture in Poland under the previous social and economic system built its authority on the seniority, loyalty or connection principles, nowadays is undergoes revaluation in favour of functionality, effectiveness and efficiency, which brings it closer to the standards present in international business. Therefore, in case of investment flow from our western neighbour, the flow from the country with relatively low authority distance to the country with higher distance takes place, which, according to the findings of Hofstede's research, is the foundation of good assimilation of managerial solutions from this country.

Considering the process of capital inflow to Poland in terms of the whole range of countries of its origin, one should pay attention to the fact that more than 50% of the capital comes from the countries characterized by low authority distance (PDI index value below 50) so one may speak of the positive social and cultural foundations for this process (Tab.1).

Table 1: Selected authority distance indices (*Power Distance Index*) for individual countries (the highest values correspond to the largest distance)

Country	Power Distance Index (PDI)	Country's participation in FDI in Poland in 2017 (%)
France	68	13.6
Belgium	65	2.8
Spain	57	2.7
Japan	54	0.8
Italy	50	2.6
USA	40	2.8
Netherlands	38	20.1
Germany	35	17.7
United Kingdom	35	4.1
Switzerland	34	2.0
Finland	33	1.0
Norway	31	0.6
Sweden	31	2.0
Ireland	28	0.1
Austria	11	2.4

When it comes to other cultural characteristics defined in a measurable manner by Hofstede (Fig.1), the greatest difference between the Poles and the Germans refers to the degree of uncertainty avoidance. The Poles are characterized by considerably greater willingness to take risks and improvise.

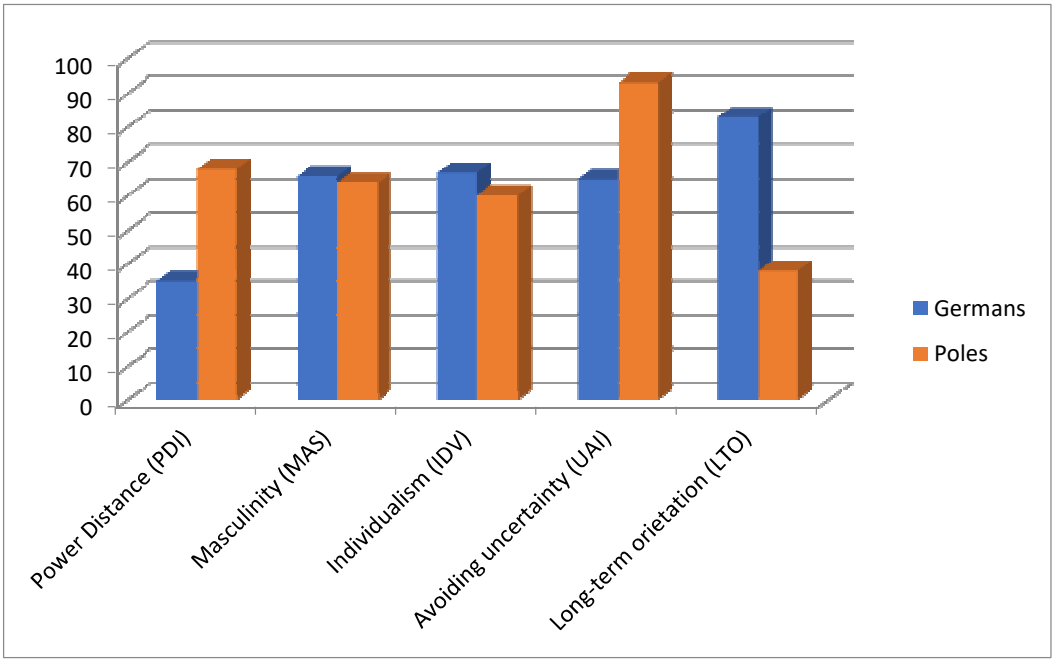

Figure 1: Culture dimensions for Poles and Germans (Hofstede, Minkow2011)

The most characteristic feature of the German organizational culture is its collectivism expressed by emphasis on cooperation and tendency to make decisions collectively. It is exemplified by the participation of employees in enterprise management which is permanently sanctioned by the German co-decision law of *Mitbestimmung*. The collective model seems to be closer to society under transformation like the Polish society than the one based on Anglo-Saxon individualism. According to Hampden-Turner and Trompenaars "German type of capitalism is closer to the former communist world not only in a geographical but also in psychological and ideological sense." In Germany, unlike Great Britain or the United States, many decisions are still being made at the meso-economic level, where employees work alongside with financial industrial and government representatives. (Hampden-Turner and Trompenaars, 1998). Some elements of economic behaviour developed within the social market (*Soziale Marktwirtschaft*) seem to be more acceptable in post-socialist societies. Similarly to countries of Central and Eastern Europe, the eastern federal states of Germany underwent a systemic transformation. Thus, Germany was the only country among the highly developed countries that absorbed the economic and social organism burdened with the legacy of the centrally controlled economy. In this sense, business entities have gained experience of functioning in the realities of a transforming economy. Therefore, they are easier to navigate in the Central European area. Naturally, the presence of German corporations' subsidiaries does not mean that they automatically transfer the multi-plane system of decision consultations between the enterprise's management and crew developed there to the Polish reality. The observation of the operations of companies with German capital, as well as other foreign companies, in our country points to the phenomenon of avoidance of trade unions in direct investment enterprises. Such employees' organizations are present by the principle of continuity in enterprises whose shares have been purchased in the process of privatization, while one may note their non-existence in entities established as *greenfield investment*. In this sense the process of internationalization of German enterprises may be treated as an escape from the over-developed form of employees' participation in their home country which dangerously restrains the competitiveness of German enterprises on the international market. However, certain model of the management-crew conflict solutions, forms of dialogue and consultations developed in Germany's organizational culture seem to fall on a fertile turf in the Polish reality. It is confirmed by low frequency of conflicts between the crews and employers originating from this country which are related in the media. It is also attested by the

research findings of Listwan's team concerning foreign capital companies operating in the Lower Silesia region. They generally point to good relations between foreign management boards of these enterprises with the representatives of the crews of such entities, particularly the German ones, which confirms the thesis of successful adaptation of their organizational culture in the Polish reality (Kawka, 2007). In case of German enterprises one deals with the transfer of certain tested behaviour patterns like the gradual introduction of an employee to their post and not "throwing in at the deep end" which is practiced in American enterprises. The employees' recruitment process in German capital enterprises is also primarily based on internal resources of the enterprise, as they rarely utilize the mediation of external companies (Przytuła, 2007), which is typical of the collective cultures. When it comes to the German tendency to collective activity, a typical phenomenon is the cooperation of enterprises with national and regional authorities in this country. German entrepreneurs are used to receive assistance of various kinds in return for the execution of certain liabilities towards the authorities. In this relation both parties are beneficiaries. In case of investments in Poland German entrepreneurs are surprised by the lack of such cooperation (Szumski, 2005).

A typical feature of German business culture is the tradition of close cooperation with banks, where industrial groups centred around the bank offer a stable financing system that allows German companies to implement long-term investments as effectively as American joint-stock companies do (Fukuyama, 1997). The German symbiosis between industry and banks was reflected in the character of the inflow of German capital to Poland, when industrial companies were supported by Commerzbank and Deutschebank banks developing a close involvement in the Polish economy, transferring know-how and proven business solutions.

The research in intercultural differences between the two nations indicate that the Poles very highly value the quality of technological solutions and work organization, which forms an important foundation for successful adaptation of German production and managerial solutions in Poland. Known in the literature as COE, i.e. *country of origin effect* (Drelich-Skulska, 2007), the phenomenon consisting in the positive association of the product's features with its country of origin is very clear with regard to the perception of German products and technologies in Poland. Similar phenomenon refers to nearly entire region of Central and Eastern European countries, which explains to some extent the activity of German capital in this area. Social perception of the quality of technological solutions identified with specific country of the investor turns out to be an important element of the attitude of the environment, including administrative entities, with which the investor starts negotiations already at the allocation site selection stage. The case study conducted by Globokar in the French motorization consortium's subsidiary in Slovenia indicated that the local authorities had approached the French investor's investment project with significant distance. This was caused by their image of the French. The Slovenes associated them more with comfortable life style (*bon Vivat*) than the symbol of advanced technology being the source of competitiveness on the world markets (Globokar, 2002). Local authorities did not hide their preferences being inclined towards German corporations. This situation proves the influence of the sphere of social images and stereotypes concerning the investor's country of origin on the investment climate.

While researching a group of Polish and German managers, Bildhauer identified similarities and differences between the two cultures which may affect the effectiveness of economic cooperation (Bildhauer, 2005). Among the latter he points to the role of emotional attitude in business relations. Unlike more practical Germans, the Poles value the emotional factor which influences the partner's evaluation and longer negotiation period. The same attribute is mentioned by T. Globokar who also adds that this element distinguishes the Poles even among the Central European nations (Globokar, 2002). Wurz who represents Belitz, an international company specializing in intercultural training courses for business clients, points to the Poles' attention to the role of personal contacts preceding the transaction which are of marginal interest to Germans (Wurz, 2006). As noted by Bildhauer, the Poles are more open to the outside, which corresponds to their great flexibility, kindliness, persistence and the need for harmony; they are unwilling to voice firm objections with the word "no" and they expect the same from their business partners. However, these are not differences that could form a significant barrier for economic cooperation. Bildhauer treats the above-mentioned distinctions in a more complementary way. In his opinion, the features of Polish employees that are

highly valued by Germans include flexibility, ability to improvise, openness and initiative. He sees the combination of Polish flexibility and ability to improvise, and German precise system of organization and management as the source of quick growth of German subsidiaries in Poland.

Complementarity does not mean the lack of differences, which is exemplified by their attitude to time and punctuality treated in Central and Eastern European countries less fundamentally than in Germany.

While analysing cultural differences between the two nations in business contacts from the point of view of a psychologist, Schroll-Mach identifies eight cultural standards that most frequently cause misunderstandings in business communication. They are as follows:

1. Objective vs. subjective orientation,
2. Organization vs. improvisation,
3. Control in accordance to consistent rules vs. control in accordance to people-oriented rules,
4. Monochromic vs. polychromic time experience,
5. Division vs. synthesis of individual areas of life,
6. Certainty and stabilization vs. "uncertain certainty",
7. Low context vs. high context,
8. Orientation towards confrontation and conflict vs. avoidance of conflict and confrontation .

Such synthetic picture is based to a large extent on the typologies of cultural differences as presented by Trompenars, Hofstede, Hall and Gesteland, while the author documented it further with her own broad experiences gained during her business activity.

Similar catalogue of features differentiating business cultures of the two nations is presented by Wojciechowski, who adds several vital German attributes like high ability to focus (Fukuyama, 1997) accompanied by the ability to create the atmosphere of concentration as opposed to certain chaos (frequent interruptions of meetings by mobile phone rings) of the Polish partners. This feature is associated with the polychromic nature of our culture, less linear perception of time and frequent reversion to the previously approved elements of the contract which are treated by Germans as unequivocally binding. The author also attracts one's attention to the Germans' high pressure towards goal achievement accompanied by a can-do spirit in the negotiations. This feature intimidates the Poles and lowers their negotiation performance (Wojciechowski, 2005). An essential observation made by Wojciechowski refers to the perception of law by the representatives of the two nations. Germans treat legal regulations as drafted by the authority, while the Polish understanding of the law is a mixture of respect and fear of the state authority, as well as recognition of the shrewdness of people who break the law with impunity. Such attitudes are vividly exemplified by "the uhlans' fantasy" and "the Prussian order". While characterizing Polish culture, Hofstede mentions the need of strong authorities and unwillingness to respect them, and refers to the Russian saying: "Poland is an animal that is difficult to break in and that will always throw you off its back." (Durska, 2003).

On the other hand, while analysing behaviour in international corporations, Murdoch pays attention to high contextuality of the Poles manifested in the usage of large number of allusions and metaphors which are difficult to understand, particularly to the representatives of low-context cultures like Germans. The Poles' communication process abounds with non-verbal means, proverbs and allusions to collective knowledge. Word play and peculiar coding of their utterances result partly from the 50 years of post-war history when censorship forced one to encode one's messages (Murdoch, 1999). Contextuality clearly distinguishes us from the western cultures, including the German one, where the messages transmitted are more understandable and unequivocal.

Cultural differences between the two nations refer to the whole range of non-verbal symbols and body language which are equally important in communication as language and tend to be interpreted in various ways. Poles are more expressive than Germans who definitely retain greater distance to their private space (Szkodny-Ciołek, 2005). Permanent eye-contact interpreted as importunity by Poles is – for Germans – a signal of good intentions (Wojciechowski, 2005).

Another general difference in attitude refers to the Polish fatalism as opposed to the Protestant optimism typical of Germans. As noted by Koźmiński, complaints are not treated in Poland as something negative, and melancholy is associated not with failure but with the positive values of romanticism and rich internal life (Koźmiński, 1995).

The above-mentioned differences in culturally conditioned behaviours affect the course of negotiations with Polish partners already at the initial stage of investment, and become acutely manifest during the operational stage of the enterprise and in the relations with local employees, clients, contractors and competitors. Hence, the vital role of improving intercultural skills of both parties. The recently growing number of surveys and publications on this subject is the foundation for improving intercultural knowledge of the practicians of life deciding about internationalization, and thus better adaptation of behaviours related to international investment activity. The knowledge of potential investors and managers diminishes the risk of faulty decisions, which affects the rate of return on the capital involved. According to the theory by Johanson and Vahlen the increase of knowledge about foreign locations, including the intercultural knowledge, contributes to further intensive capital involvement.

The range of differences in the area of analyzed cultures characterized by geographical proximity and direct contact that has been identified by researchers proves the relevance of cultural factor to internationalization. It seems that the FDI investment expansion in countries that are situated in spatial proximity is an experimental field for corporations where they gradually gain intercultural skills and thus master the difficult art of coping with differences and exploiting them as the source of enterprise's competitiveness, which forms the knowledge capital and instruments useful in much more difficult cases when the international process takes place in the areas marked with serious cultural differences.

The presented research findings are confirmed by the public opinion polls conducted in Poland, where nearly 60% of those questioned by Instytut Spraw Publicznych Polaków (Polish Institute of Public Affairs) (2005) believes that Germans are different from them, and only 9% claims that the two nations are similar. At the same time they emphasize the German modernity, good organization and professionalism. Large number of these answers corresponds to high assessment of organizational and technological culture of enterprises originating from this country. Polish respondents very highly value competences and professionalism of their western neighbours but they are relatively rarely willing to assign them with "soft" features like kindliness, openness and tolerance (Fałkowski, 2006). In the context of the organization of German enterprise operating in Poland this may generate some problems concerning interpersonal relations.

In certain conditions cultural diversity may constitute a valuable non-material assets of international corporation. To use Hofstede's terms, it constitutes the organization's psychological property influencing the ultimate financial results of the company.

As the mutual familiarity reduces problems with communication and interpretation of situations, it seems that the above-mentioned complementarity of features in the area of organizational cultures of both countries is a factor positively affecting the cohesion of enterprise organization of German corporations' subsidiaries in Poland.

Another aspect related to German investors is more broadly associated with the phenomenon of internationalization of German capital. It results from the role of Poland as a bridge in further internationalization of Eastern enterprises (Russia, Ukraine). Investment expansion of many German enterprises located in Poland into Eastern markets involves active participation of Polish management. This natural process results from the location and the knowledge of economic and social conditions of Poland's neighbours. On the other hand, Polish managers are experienced and know the modern environment of international corporations. This naturally involves them in this process, often as organizers and managers of new branches in these countries. The experience gained in organizing an international corporation combined with the knowledge of economic conditions and

social aspects of these societies, which share Slavic origins, enable them to intercede in further investment expansion.

The issue of social acceptance of foreign entities in the economic life and the attitude towards the phenomenon co-creates an important element of the investment climate ultimately manifested in the legal regulations concerning these matters. The previously presented social perception of foreign companies in the Polish economy points to the steady process of their assimilation in the social environment. Despite the fact that the range of disapproval of foreign companies' presence in the economy is relatively small, the degree of acceptance depends on the country of the investor's origin. Such polarization of attitudes is influenced by the stereotypes and prejudices against other nations, as well as other experiences rooted in the social awareness. Because of the historical past they are more firmly articulated in relation to our western neighbour, which favours the perception of capital cooperation in the categories of sovereignty threat or political expansionism. The violent history of mutual neighborhood, particularly the Second World War, formed the negative image of Germans in the Polish eyes. As noted by Gakan, it was additionally strengthened by the propaganda of the People's Republic of Poland which intended to keep the Polish society in the psychosis of permanent threat posed by Germany and thus legitimize the alliance with the Soviet Union (Gakan, 2007). The feeling of threat and fixed stereotype of our western neighbour influenced the results of surveys reflecting social atmosphere, particularly in the initial period of transformation. The survey conducted by CBOS (Public Opinion Research Centre) in the middle of the 1990s indicated that the relatively smallest acceptance in our country referred to investors from the following nations: Russians, Jews, Germans and the Japanese (CBOS [Public Opinion Research Center], 1995). On the other hand, in the survey conducted ten years later by the Institute of Polish Affairs the questioned Poles pointed to Germany as the main country with which Poland should intensify its economic cooperation (Ćwiek-Karpowicz, 2005). In this way our western neighbour got ahead of the countries previously considered as the pillars of Poland's economic cooperation like the United States of America, the United Kingdom and Russia in the public opinion ranking. The doubling increase in positive evolution of social attitude towards the Germans, reported by CBOS (Research report no. 31, 2020), which in 1993 was declared by only 23% of respondents, and by 46% in 2017 is a consequence of many processes that accompanied the Polish transformation, of which the public perception of the presence of German investors in Polish economic and social reality is very important. The positive evolution of social attitude towards the phenomenon of economic cooperation with Germany, of which capital flows form a vital element, is one of the symptoms of restoring normal relations between the two countries. It is also a part of a broader process which refers to the transformation of the society's mental sphere at the time of the economy's wide opening to the outside, multi-plane participation in the globalization processes and thorough system changes. In the course of the last 30 years the change in the social attitudes has been evidently witnessed by the reduced perception of our western neighbour in the category of threat to Poland. On the brink of transformation in 1990, 88% of the respondents pointed to Germany as a country threatening our sovereignty, while in 2017 this percentage dropped to 22% CBOS Research 2020.

Conclusions

In the light of the discussed cultural implications of internationalization, it is justified to claim that these implications form a favorable environment for the development of German companies in Poland in the form of direct investment. Additionally, investments as such contribute to transferring elements of organizational culture that lead to the international success of the German economy and incorporate well in Polish reality. It is also one of the most significant outcomes of the presence of foreign enterprises in the economy. The complementarity of cultural dimensions, which facilitates the implementation of management solutions typical of the investor's country culture, is a premise for achieving high efficiency in branches located in Poland.

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A Study on Product Color Ratio Based on Aesthetic Principles in Industrial Design Assessment

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Abstract

The present paper represents an objective approach in the aesthetic assessment of industrial products from the perspective of harmony ratios between colors. Currently, there are multiple studies that address the selection of colors in order to determine accordance relations between them, much further, it was observed that color can be approached quantitatively. The proposed study represents a subsequent analysis, based on extended work that has applicability in product design, therefore guidelines can be set for establishing the colored surfaces ratios of products, in order to assess color harmony in industrial design.

Keywords: Industrial Design, Color Harmony, Color Ratios, Product Aesthetics

Introduction

The aesthetic assessment of design is one of the most controversial fields of design, aesthetics being sometimes considered a subjective element (Bowie 2003), even though there are numerical approaches (Stiny, Gips, 1978). From an aesthetic point of view, industrial products can be analyzed from the perspective of the visual complexity (Dumitrescu 2017), the material used (Post, Blijlevens, Hekkert, 2014), sizing ratio (Elam 2001) or color schemes (Goethe 1840). Color is one of the easiest ways to differentiate products, with a strong impact on product significance. Starting from Newton's principle, that color is a form of light, light that when passes through a prism generates the seven spectral colors (DeLong, Martinson, 2012), based on the phenomenon of light dispersion, Goethe studied the effects and the way we perceive colors, as elements of contrast (Goethe 1840).

In product design, unlike other color approaches that are based on technological restrictions (color codes), cultural references (Yu 2014) and the psychological impact that color can have on human perception, harmony between colors and their relative position (Lara-Alvarez, Reyes, 2018), color aesthetics refers to harmony. Among the most thorough studies based on color harmony, generally accepted and used until now, Itten (1970) starts from the well-known color wheel and studies the link between the primary colors (red, yellow and blue), the secondary colors (green, orange and violet), as well as the symmetry relations between the complementary colors. As a result of color theory, harmonic relations can be interpreted in color selection, the extent to which certain colors are considered appropriate in connection to the others. Based on Goethe's (1840) studies, Ou and Luo (2006) also referring to the pure values of the intensities, they analyzed two color combinations in order to achieve color harmony, however, the estimated hue values need to be correlated with the harmonious areas, therefore a color that is defined by high intensity should cover less surface than a low intensity one. On this premise of study, Itten (1970) deepens the relationships of color-covered areas and combinations of defined harmony colors that can be generated. On the same principle of harmony ratios, Moon and Spencer (1944) proposed an algorithm for establishing color harmony, based on Birkoff's (1933) aesthetic formula, the same as Hsiao, Chiu and Chen (2008), their reference values are based on observers' preferences on color perception, whereas Goethe (1840) and Itten (1970) studies take into account the intensity of light and color hues as numerical values.

Profile of the quantitative model of harmony color ratios

The analysis of the optimal color ratios in surface coverage was carried out on the premises of numerical values of hue intensity. Referring to any given surface, the relations (1) to (3) are specific to the color quantity required as a degree of coverage needed in obtaining harmony for the complementary colors, the denominator representing the total value described in units of area (Itten 1970).

$$Yellow : Violet = 3 : 9 = {}^{1}/_{4} : {}^{3}/_{4} \quad (1)$$

$$Orange : Blue = 4 : 8 = {}^{1}/_{3} : {}^{2}/_{3} \quad (2)$$

$$Red : Green = 6 : 6 = {}^{1}/_{2} : {}^{1}/_{2} \quad (3)$$

As seen, the proposed ratios apply on primary and secondary colors only. Industrial products are often defined by non-colored surfaces, therefore, in order to set ratios for white, black and variations of grey, the author proposes a system that transforms Itten's values for color intensity ratios in values for gray scale (Fig 1). The non-color values already obtained were correlated with the corresponding grey scale ratios set from 1 to 10, where the minimum value 1 is for white and the maximum value 10 represents black, and thus used as numerical values of reference (Fig 2).

Fig 1. Color ratios transformed in gray scale

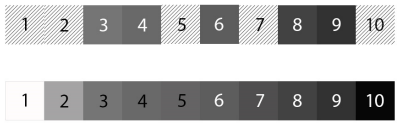

Fig 2. Proposed gray scale ratios

The values for colored surfaces as seen in relations (1) to (3) were correlated with the ones obtained for non-colors and mentioned in Table 1 as indicators.

Table 1: Colors and non-colors ratios relation

Color	Color C	Value V
Red	R	6
Orange	O	4
Yellow	Y	3
Green	G	6
Blue	B	8
Violet	V	9
White	Wh	1
Grey	Gr	2..9
Black	Bk	10

Extrapolating Itten's (1970) principles and adding the non-colors values, the color indicators were considered in a direct ratio towards their referenced value.

In order to determine the percentage of covered surfaces as a harmonious correlation, in any given scenario, regardless of how many colors are considered, the value to which the proposed relation refers to was defined as the sum of the numerical indicators.

$$C \in \{R, G, B \ldots Wh, Bk\} \tag{4}$$

$$\frac{C_1}{v_1} = \frac{C_2}{v_2} = \cdots = \frac{C_n}{v_n} = \frac{100}{\sum_{i=1}^{n} v} \tag{5}$$

where, C represents the color;
n – number of colors used in a certain relation;
v – corresponding value for each color.

Implementation Procedure

When assessing a product, it must be determined the dominant colors that define the product. In some cases, the product may contain colors that are used particularly with a technical purpose, such as red or green for on/off buttons, yellow signs to appeal attention etc. Usually, the ratio of technical colors is small and is part of fine details; in this case, the colored detail will not be used as part of aesthetic assessment, technical colors will be subtracted from the list of the product colors used in assessment and only the dominant surfaces will be considered. Even with colors, technical symbolism is considered highly important, as being one of the main elements that concern safety.

Considering the comparative assessment of different products, defined by different ratios of color covered surfaces, in order to increase the objectivity of the analysis it is important to reduce as much as possible variations regarding shape, material, sizing or any other difference that may interfere with the perception of aesthetic pleasure.

Fig 3. Product 1A

Fig 4. Product 2A

Fig 5. Product 3A

In the considered selection of product assessment, the products have the main surfaces colored in red, blue and white, and their correlation ratios were presented in relations (6) and (7).

$$\mathrm{P}_1 = \{\mathrm{R}, \mathrm{B}, \mathrm{Wh}\} \tag{6}$$

$$\frac{R}{6} = \frac{B}{8} = \frac{Wh}{1} = \frac{\%}{15} \tag{7}$$

In order to determine the best proportion of product colored surfaces using comparative assessment of multiple design concepts, after the main colors corresponding to the product were established, the next step is to compare the values obtained for each color from the algorithm with the values estimated for the product.

Table 2: Values and ratios for Product 1

P_1	Model values x_i	Estimated surface values y_i
Red	40% - 0.40	25% - 0.25
Blue	53% - 0.53	65% - 0.65
White	7% - 0.07	10% - 0.10

Table 3: Values and ratios for Product 2

P_2	Model values x_i	Estimated surface values y_i
Red	40% - 0.40	40% - 0.40
Blue	53% - 0.53	50% - 0.50
White	7% - 0.07	10% - 0.10

Table 4: Values and ratios for Product 3

P_3	Model values x_i	Estimated surface values y_i
Red	40% - 0.40	60% - 0.60
Blue	53% - 0.53	30% - 0.30
White	7% - 0.07	10% - 0.10

The value of deviation for P_{1A} was determined in relation (8).

$$s_{P1} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - y_i)^2}{N-1}} = \sqrt{\frac{0{,}0189}{2}} = 0{,}1375 \quad (8)$$

where, N is the number of colors (criteria in this case);

x_i - is the value calculated from the quantitative model;

y_i - is the product surface estimated value.

On the same principle, the deviation values for all three products s_{P1}(0.1375), s_{P2}(0.0300) and s_{P3}(0.2166) were determined. The results were compared and the minimum value obtained is for P_2, which is considered the closest to color harmony ratio.

Validation Procedure

The aim of this procedure was to determine the correlation between referenced values from the proposed quantitative model as a design assessment tool and consumer preferences of color ratios in product aesthetics. Based on the presented model of assessment, a survey was completed, in which 15 different products are presented, in groups of three. In order to increase the degree of objectivity of the survey, the products were strictly modified on the color ratios, the other elements of dimension, shape or material being unchanged.

Table 5: Deviation values for the products and the preferences percentage

Series	Type of value	P_1	P_2	P_3
A Series	Deviation	0.14	0.03	0.22
	Preferences	41.00%	34.60%	24.40%
B Series	Deviation	0.10	0.05	0.35
	Preferences	34.60%	39.70%	25.60%
C Series	Deviation	0.02	0.10	010
	Preferences	34.60%	21.80%	43.60%
D Series	Deviation	0.31	0.56	0.02
	Preferences	26.90%	32.10%	41.00%

E Series	Deviation	0.04	0.28	0.53
	Preferences	57.70%	28.20%	14.10%

The survey was carried out on a sample of 78 persons from different fields of activity (IT, financial, advertising, sales, economic, etc.), the observers being 15.4% with the age under 25 years, 76.9% with the age included between 25 and 45 years old and 7.7% over 45 years old. Regarding the educational level, 74.4% of the observers have higher education. In completing the survey of aesthetic evaluation of the color ratios, the observers were tasked to identify the product considered most attractive among the three variants for each proposal. For each product, from the five groups, using the quantitative model, the deviation values were determined and compared with the observer's preferences and noted in Table 5.

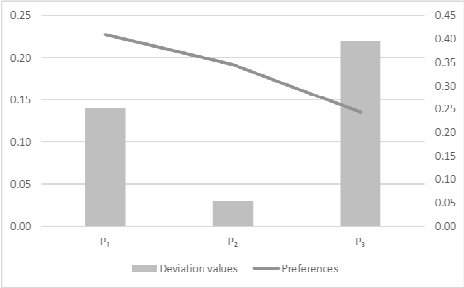

Fig 6. A series - deviation versus preferences

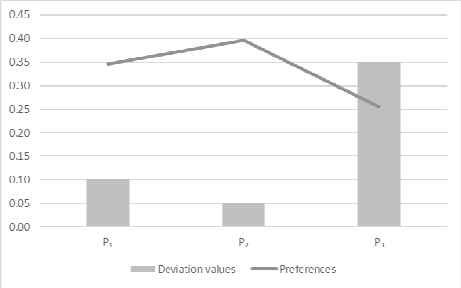

Fig 7. B series - deviation versus preferences

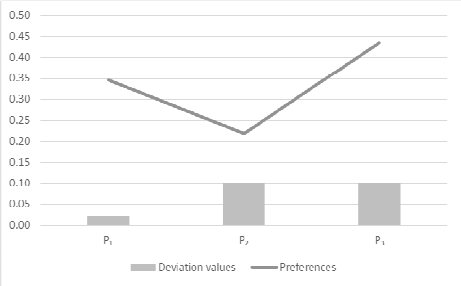

Fig 8. C series - deviation versus preferences

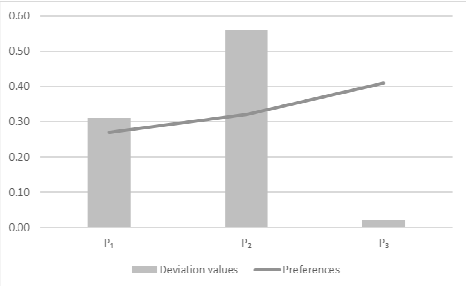

Fig 9. D series - deviation versus preferences

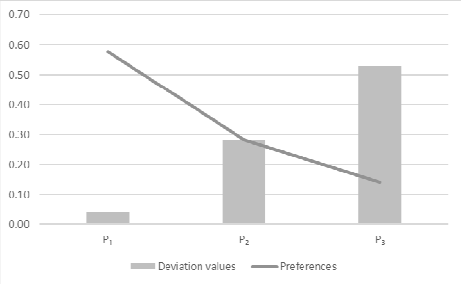

Fig. 10: E series - deviation versus preferences

When analyzing the data, it can be observed that, in the case of three of the five groups, preferences corresponded to the minimum deviation value as B series (0.05/39,70%), D series (0.02/41.00%) and E series (0.04/57.70%), the other two being associated with secondary deviation values as A series

(0.03/34.60%) and C series (0.02/34.60%). Reviewing the results with the Pearson analysis, when minimum deviation variable is referenced to maximum preferences, the value of the correlation coefficient is 0.6131, this highlighting the degree of applicability of the quantity model of aesthetic design assessment for color ratio products surfaces.

Conclusions

The proposed assessment model can facilitate design starting from the designing stage, so that the color harmony ratios can be early analyzed and related to the standard proposed guideline, and therefore, the process can help optimize the amount of color selected before the actual production phase. There is also the case where the model can be used, with unlimited number of colors, for a product, as a comparative analysis, in order to review multiple different products and determine the best amount of color combinations. Although the basic analysis proves its applicability, the presented method has limitations in terms of color variations, being analyzed as a reference study only basic colors, primary and secondary and intensities of grays in ten units range, thus for the best possible results, further studies are recommended for extended color palettes.

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Conditions of Work with Chosen Information Technologies in The Era of Digital Economy and Their Consequences for Management of The Enterprises

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Abstract

The article highlights the chosen changes in the modern labour sphere connected with the development of information society and digital economy. These phenomena affect the way employees perform work, the time of work, the tools of communication for the purpose of work, while also the scope of independence in performing professional duties. Moreover, the requirements of the competition on the global market influence the necessity of implementing new technologies and innovative solutions in the companies.
The aim of the study was to examine the level of use of the Internet and selected communication tools and its relation with creativeness and competitiveness in Polish companies and formulate some recommendations to enterprises management. It presents the results of the survey research conducted in 2019 on the 179 companies largest by revenue in Poland and the research conducted in 2018 on the 276 employees working in Częstochowa district. They showed that the majority of large Polish companies use communication technologies, but mainly the most common tools like e-mail or Intranet. The use of Internet in professional work correlates with creative and intellectual kind of work, as it results from the research of a regional scope on the various types of companies. The use of new technologies and innovative solutions characterise mainly the companies which require new technologies to stay competitive on the market. The results of the study may be of interest to the researchers of relations between new technologies and the performance of contemporary companies and practitioners of management.

Keywords: New Communication Technologies, Working Conditions, Digital Economy, Management

Introduction

The conditions of the business activities of modern companies undergo constant economic, social and technological changes. Globalization and the digitalization processes and the development of new technologies accelerate the pace of these changes. The way the companies are organized, the way they operate and cooperate with the environment are also changing. All of this influences the reality in which the employees perform their work, as well as the methods they are managed by.

Apart from the development of information and communication technologies, the major aspects of work which are changing are: forms of work together with occupations, flexibility of the workforce, the organizations in which employees work, the role of work in employees' lives, forms of education and job training (National Academies of Sciences, Engineering, and Medicine 2017, p. 80). Contemporary changes in the conditions of work provide many advantages and facilitations for both employees and employers, yet simultaneously they may be endangering to the quality of work or satisfaction from work of employees. This paper's goal is to investigate the level of use of the Internet and selected communication tools and its relation with creativeness and competitiveness in Polish companies and formulate certain recommendations to enterprises management.

Present situation may be a challenge to management of the enterprises, so the managers ought to take these conditions into consideration and their implications in order to adapt, e.g. the human resources

management or knowledge management and communication processes to the requirements of the digital economy. The whole organizational culture in the organization may be subject to gradual changes in order to meet this challenge.

Background and Literature Review

The digitalization and computerization phenomena both contributed to the change from industrial to the so-called digital economy, in which human knowledge and information technology are crucial for business processes (McKeown 2009). The report of Bangeman presented a summary of the changes which are taking place in modern society as a consequence of the popularization of Information Technologies (IT). It described the information society as an information-based revolution, in which technological development enabled processing and transferring information without the limits of distance, time or size (Europe and the Global Information Society 1994, p. 5). This revolution has changed greatly the way people communicate, learn, work and live.

In the era of digital economy, the implementation of information technology has become the source of competitive advantage for contemporary companies. The usage of information and communication technology facilitates development by raising the productivity levels of companies. Moreover, it increases work efficiency and stimulates innovation by enhancing people's creativity and first and foremost, it enables organizations to exist and compete on the global market (Berisha-Shaqiri & Berisha-Namani 2015, pp. 78-80, Zamcu 2014, pp. 3-8).

The popularization of the Internet and information and communication technology has changed the conditions in which organizations operate and people perform work. The temporal and spatial limits have become relative. The trends of cultural, economic and technological globalization have led to the unification of the world of business, consumer trends, fashion, lifestyles, as well as leading to a new style of work. ICT development enables the existence of virtual companies and virtual teams, remote work, outsourcing of business processes and facilitates the transformation of organizations from a hierarchical to a structural network (OECD 2017).

Virtual organizations are "a new type of entity, which was created thanks to the development of global information networks, especially the Internet, as a response to the needs of the market and necessity to adopt to its competitiveness" (Kisielnicki 2008 p. 355). They may also be described as: "a temporary coalition of reconfigurable, independent, networked, geographically dispersed organizations including high level trust and competencies that collaborate and share their resources and competencies in order to respond to the customer request" (Nami, Malekpour 2008, pp. 192). Information technology provides the infrastructure of management for the virtual organizations: e.g. the Internet, electronic exchange of data, multimedia transmission, e-mail, etc. Moreover, it fosters the emergence of the network society, which may be defined as "a society whose social structure is made up of networks powered by microelectronics-based information and communications technologies" (Castells 2004, p. 3).

New technologies facilitate innovations and internationalizing of companies, which are key factors in growth and survival among small and medium enterprises in a very competitive and technology driven global economy. Particularly innovation of services is highly significant in the more and more digitalized global trade. What is also very relevant in service industry is human capital management and employees' technological skills and abilities. (Vuorio, Torkkeli, Sainio 2020, p. 92)

Moreover, in manufacturing industry, the use of advanced manufacturing technologies (AMTs) facilitates standardizing and customizing, reducing transaction costs or the need for scale. Additionally, the implementation of information and communication technologies may result in an improved business decision-making, customer relations and maintaining customers' loyalty. (Coreynen, Matthyssens, Van Bockhaven 2016, pp. 42-43)

Information and communication technologies (ICT) also provide benefits for all type of organizations by reducing production and material costs, as well as the costs of marketing and distribution. They

improve customer service, internal functioning of organizations, while also their competitive skills and effectiveness. Electronic business optimizes business processes such as production, distribution, marketing, sales, etc., which enables the maintenance of relations with the environment, e.g. customers, distributors, suppliers and use of services such as accounting, legal and corporate finance services, etc. (Farooq, Ganaie and Ahirwar 2018, pp. 355-360; Berisha-Shaqiri and Berisha-Namani 2015, p. 81).

In the digital and knowledge-based economy, the role of intangible resources including information, knowledge and intellectual is growing. The intellectual capital of each organization includes structural capital and human capital (Pobrotyn 2012, p. 124; Robak and Słocińska 2017). Contemporary human capital management makes use of the new information and communication technology in performing the main management functions.

Human resources management of standard activities such as recruitment and selection, performance management, employee relation, training and development, communication and compensation may all benefit from ICT which enhances the effectiveness of the performance of tasks, as well as stimulating creativity, innovativeness and knowledge sharing among employees (Torres-Coronas and Arias-Oliva 2005, pp. 74-75; Ibarra 1993, pp. 56-87). The specific tools worth mentioning include the following: e-learning, internal networks, videoconferencing, document management systems, decision support systems, groupware, workflow and other.

The literature on the use of information technologies in Polish companies is wide and discusses it in various contexts. Among others, there are researches conducted about the general state of the e-business in Poland by Statistics Poland (national statistical office) (GUS 2018). Other general studies were carried out together with determining perspectives of IT development (E-gospodarka w Polsce 2010). The level of the use of information technologies Polish companies of all sizes was investigated, yet it was not detailed in terms of the particular tools and solutions used (Grzywińska-Rąpca 2014). The connection between the use of ICT as a factor improving the competitiveness of Polish companies were indicated (Leoński 2014). The most popular and numerous researches are those concerning the use of ICT in the small and medium enterprises (Adamczewski 2015, Wiechetek 2015, Gubik, Bartha 2017).This paper attempts to study, apart from the general use of the Internet, the chosen tools of new communication technologies in Polish companies and the relation of the use of new technologies with competitiveness of the large companies.

The requirements of constant availability, lifelong education, the pressure to be up-to-date in the information society may cause stress and burnout of the employees. All these aspects of changing work environment should be taken into account by the managers of contemporary companies. The digitalization of numerous processes in the organizations and usage of new technologies are one of the most important present changes in the companies, which is especially evident in the situation of Covid-19 pandemic and increasing significance of remote work.

Methodology

The paper presents the chosen aspects of implementation of new information and communication technologies (ICT) and tools into the practice of management of contemporary companies. The aim of the study was to investigate the level of use of the Internet and selected communication tools and its relation with creativeness and competitiveness in Polish companies and formulate certain recommendations to enterprises management. The research question of the paper is as follows: What are the consequences of the implementation of new ICT for the employees and the managers in the sphere of professional activity? The results come from two survey research projects: one conducted among the employees in one district of Poland and one among the managers of the largest companies in terms of revenue in Poland, thus it juxtaposes the opinions of the employees with the perspective of their supervisors. It provides some interesting conclusions about the perception of both parties regarding the conditions of performing professional duties in the information society. However, the limitations of one survey which is of regional scope should be taken into account while making generalizations.

The results presented in the paper facilitate the indication of strengths and weaknesses in the implementation and usage of a wide range of new communication tools and provides some suggestions as to how to benefit more from the possibilities which are offered by the new technologies in terms of management of an organization, including knowledge management and human capital management. Likewise, some potential directions of future research are proposed in the paper .

The method used in the study was the survey method. The survey of employees was conducted among the population of the Częstochowa district in the year 2018. The respondents consisted of the employees working in the Częstochowa district from companies of various sizes and industries. They filled in the traditional paper questionnaires anonymously - 300 questionnaires were distributed, 276 was returned, hence the return rate equals 92%. The additional survey of the managers and representatives of the companies chosen from the 500 companies with the largest revenue in Poland (according to the Rzeczpospolita newspaper ranking, which served as a sampling frame) was conducted in 2019 within the project entitled: 'New trends in human resources management in large enterprises' by a group of scientists from the Faculty of Management of Czestochowa University of Technology, which included the author of this article. The research adopted quantitative research methods and mixed techniques such as the following: the CAWI technique (Computer Assisted Web Interview - electronic questionnaire filled in by the respondent) and the CATI technique (Computer Assisted Telephone Interview- interview with the respondent by the phone). The combination of two quantitative methods was used to increase response rate. Research was started with the CATI method. Those who refused to participate in the study or who interrupted the survey were given the opportunity to complete the survey via dedicated online platform (CAWI method). The respondents consisted of managers and supervisors from the human resources management who provided facts and opinions on the issues concerning the whole company. The random sampling was used and statistical data analysis was carried out with the use of Statistica software. For the statistical testing purpose in the comparisons, $p<0,05$ was adopted.

Results

The survey conducted among the employees in the Częstochowa district covered mostly the subject of the use of the Internet in their professional activity, the type of work they perform in terms of its level of creativeness or routine and their well-being with relation to the work performed. The first aspect analyzed was the degree of the use of the Internet in a professional activity depending on the type of profession of the respondent. The answers are presented in Table 1.

Table 1: Answers to the question: "To what degree do you use the Internet and its tools in your professional work?", depending on the profession of the respondent. N=276

Internet usage in professio-nal activity	Public authorities, managers, directors	Specialists, usually with higher education	Technicians and other associate professio-nals	Office employees	Service and sales personnel	Industrial workers and craftsmen	Machine operators, unskilled workers, farmers
To a very low degree	0.00%	4.55%	23.08%	4.90%	**30.00%**	**61.54%**	**38.90%**
To a low degree	0.00%	0.00%	0.00%	11.76%	10.00%	7.69%	27.80%
To a medium degree	35.71%	21.21%	15.38%	16.67%	14.00%	23.08%	16.70%
To a high degree	**42.86%**	28.79%	23.08%	29.41%	22.00%	7.69%	11.10%

To a very high degree	21.43%	**45.45%**	**38.46%**	**37.25%**	24.00%	0.00%	5.50%
Sum total	100%	100%	100%	100%	100%	100%	100%

The Chi-square test value of 88,9 at p<0,05 (df=24) confirms the statistically significant differences in the responses and Cramer's V value of 0.28 indicates the medium strength of the test result.

Professions such as the representatives of public authorities, managers, directors, specialists with higher education, technicians and other associate professionals, as well as office employees are more likely to use the Internet in their professional activity to a high or very high degree (over 64%, 74%, 62% and 66% of the respondents respectively). The opposite is true when dealing with professions such as services and sales personnel, industrial workers and craftsmen, machine operators, unskilled workers and farmers, whose representatives use the Internet to a low or very low degree (40%, 69% and 66% respectively).

The respondents from the Częstochowa district assessed the level of creativeness of the work performed. Their answers were analyzed by considering the level of Internet usage in their professional activity (Table 2).

Table 2: Answers to the question: "To what degree do you use the Internet and its tools in your professional work?", depending on the answers to the question: "How would you describe your work on a "creative and routine" scale?". N=276

Internet usage in professional activity	Definitely routine	Rather routine	Partly creative, partly routine	Rather creative	Definitely creative
To a very low degree	**40.00%**	**23.17%**	8.06%	3.23%	7.14%
To a low degree	8.00%	15.85%	6.45%	0.00%	0.00%
To a medium degree	16.00%	19.51%	20.97%	16.13%	0.00%
To a high degree	8.00%	21.95%	**34.68%**	22.58%	14.29%
To a very high degree	28.00%	19.51%	29.84%	**58.06%**	**78.57%**
Sum total	100%	100%	100%	100%	100%

Rho Spearman value of 0.3665 indicates the statistically significant positive correlation of medium strength between the variables: the Internet usage in the professional activity and creativeness in the professional activity (p<0.05). The employees who intensively use the Internet in their work are more likely to describe their work as rather creative or definitely creative (cumulatively 80% and 92%), in contrast to the employees who rather marginally use the Internet who are more likely to describe their work as rather or definitely routine (48% and 39%).

The results of the research also show that almost 40% of the employees declare that they feel stressed with work to a high or very high degree, 31 % of respondents feel stressed to a medium extent and 29 % feel stressed to a low or very low degree. There is a weak positive correlation between the variables: feeling stressed at work and using the Internet in the professional activity (rho Spearman value of 0.1910, p<0,05).

The study of the largest companies in Poland investigated the issues of new communication technologies and tools used in a professional activity. The results are presented in Table 3.

Table 3: Usage of the chosen new communication tools in the largest Polish companies. N=179

Type of communication tool	Share of users in percentage (use of a tool at least to a medium extent)
E-mail	98.3%
Internal network (Intranet)	85.5%
ERP (Enterprise Resource Planning) systems	63.7%
Social media (e.g. Facebook, Twitter, Instagram)	42.4%
Internet communicators (e.g. Skype for business, Messenger)	39.6%
Online platforms of communication (document exchange, group work coordination e.g. Workflow, Google Docs)	33.5%
Webinars (online trainings)	21.8%
Systems monitoring work efficiency	18.4%

The most widely used communication tools are e-mail messages (over 98% of users) and internal network (over 85% of users). This is followed by Enterprise Resource Planning Systems (almost 64% of companies use it) and social media (over 42% of companies use it). Almost 40% of companies use Internet communicators such as Skype for business, Slack, Google Hangouts, Messenger and over 33% of respondents use online platforms of communication, e.g. document exchange, group work coordination e.g. Yammer, Skype, Workflow, Google Docs, Realtime Board). Around 20% declared using online trainings or webinars and systems that monitor work efficiency.

What is more, the respondents were asked if in the company's industry the use of new communication technologies is essential to maintaining competitiveness on the market. Figure 1 describes the results.

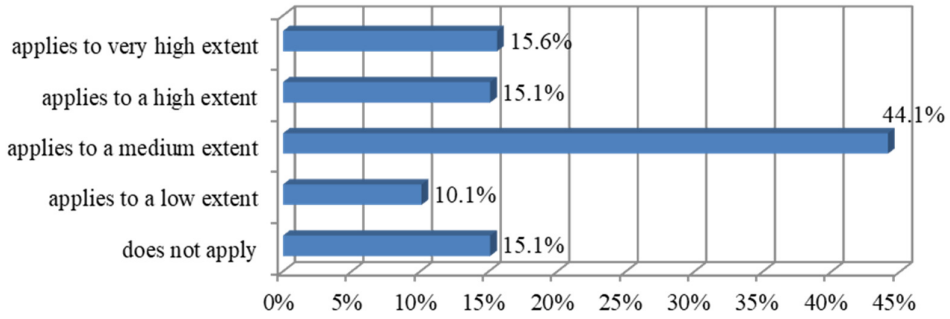

Figure 1: Answers to the question: "Is the use of new communication technologies in the company's industry essential to maintaining competitiveness on the market?". N=179

As the respondents indicate, the use of new communication technologies is essential to remaining competitive on the market to a high and very high extent in case of 30% of companies. This situation applies to a medium extent for over 44% of surveyed companies. This averaging answer may mean that the respondents did not have much to say on this topic or the question could have been surprising. In future studies this could be deepened and verified.

Another question was asked as to whether new technologies have been implemented in the company in the last two years. The answers are shown in Figure 2.

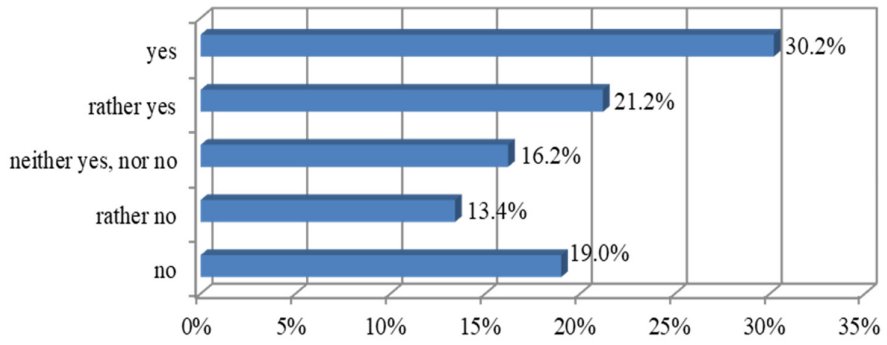

Figure 2: Answers to the question: "Have new technologies been implemented in the company in the last two years?". N=179

New technologies have been implemented in the last two years in over 50% of surveyed companies, while over 30% denied implementation of new technologies in the last two years. The positive statistical correlation between the implementation of new technologies and the necessity of using new technologies to stay competitive on the market has been observed (table 4).

The representatives of the companies were also asked if innovation is a key value in the company. The extent to which the respondents agreed to this statement is presented in Figure 3.

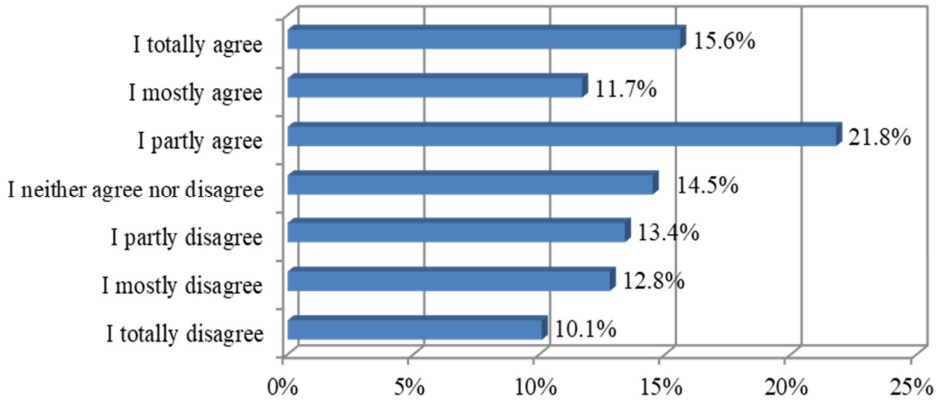

Figure 3: Answers to the question: "Is innovation a key value in the company?". N=179

Generally speaking, innovation is a key value for 27% of the companies and it is partly true for almost 22% of the companies. There is a sense of disagreement with this statement expressed by 36% of the companies. The companies, which stated that it is necessary to use new technologies to remain competitive on the market have been asked if the innovation is a key value in the company and if new technologies have been implemented in their company in the last two years (Table 4).

Table 4: Values of rho Spearman correlation between the chosen variables concerning new technologies usage. Value of p<0.05, N=179

Variables	Usage of new communication technologies is essential to remaining competitive on the market in the company's industry
New technologies have been implemented in the company in the last two years	0.2355
Innovation is a key value in the company	0.2833

The positive statistical correlation of weak strength measured with rho Spearman test has been observed between the variables: the usage of new communication technologies is essential to remaining competitive on the market in the company's industry and new technologies have been implemented in the company in the last two years (0.23, p<0,05), innovation is a key value in the company (0.28, p<0,05).

Discussion of Findings

The results of the research conducted among the employees of various companies and branches of the economy in the Częstochowa district have confirmed on a regional scale the assumption that the degree to which an employee uses the Internet and its tools in his or her professional work differs, depending on the profession of an employee. In the case of intellectual work, the Internet is used in the vast majority of cases to a high and very high extent. If the subject of work is connected with communication, the Internet tools are used more often. For instance, the lowest use among white-collar workers has been observed among technicians (e.g. physical, technical, chemical sciences, medical, pharmaceutical, nutrition, veterinary, optician, lifeguard, inspector, control technicians) in contrast to the rest of white-collar workers (managers, specialists with higher education, office employees), whose work is more based on communication than that of technicians.

The managers from the largest Polish companies distinguished the most often used communication tools connected with new technologies. They were those of general use and universal use such as email messaging, internal network or ERP systems (the majority of the surveyed companies use them at least to a medium extent). The minority uses more specialized communication tools on a regular basis (for specific purposes/tasks) or tools narrowed down in terms of the audience such as social media, internet communicators, online platforms of communication, online trainings or systems monitoring work efficiency. The relatively low level of social media usage may be surprising. These media sources seem to be underestimated in the case of a large proportion of Polish companies. Other research concerning widely understood social media in Polish companies indicated that almost 30% of companies used at least one kind of social media (GUS 2018, p.79-80). The responses of the respondents may be also the result of restraint in admitting to conducting marketing activities in social media.

Subsequently, there is a statistically significant positive correlation of medium strength between the variables: the Internet usage in the professional activity and the level of creativeness in the professional activity. The employees who use the Internet in their work to a rather high extent or very high extent are more likely to describe their work as "rather creative". Employees whose work is rather routine use the Internet to a lesser extent. The possibilities which are created by the Internet, e.g. its communication tools or knowledge resources are compatible with creative work and trigger creativity of an employee. Yet, it does not mean that it is the cause and effect relationship, because it may be a relationship of co-occurrence due to the fact that the Internet is simply supporting creative work. The key element stimulating employees' creativity is creation of the culture, work environment and climate conducive to creativity and innovation (Król 2017, p.42). One of the element of this work environment may be providing access to new technologies.

Not all branches and industries require new technologies to a high or very high extent, the most common answer was that "it applies to a medium extent" in the company's industry. The question concerning this result is if it really reflects the reality or if it shows the low level of awareness of the significance of new technologies of the respondents. In the majority of the surveyed companies, new technologies have been implemented in the last two years.

According to the PARP research (2019, p.24-25), in the years 2016-2018 only around 35% of companies operating in Poland was active in the sphere of innovation (i.e. introduced or tried to introduce at least one innovation). However, the innovation is claimed to be a key value by almost half of the surveyed companies. Still, it is not valid for one-third of the companies analysed.

The subject of new technologies is connected with the potential overload due to "technological stress", as its burden on the employees is noticed by the managers from the majority of companies surveyed, yet mainly assessed as applying to a medium extent. This poses a question as to whether managers properly monitor and assess this new type of stressor for their employees.

The implementation of new technologies, innovativeness being a key value in a company, as well as overload due to technological stress are all positively correlated with the recognition that the usage of the new communication technology is essential to remaining competitive on the market in the company's industry. ICT implementation is usually connected with environment characterized by flexibility and open organization (Stanos, Prastacos, Poulymenakou 2002, p. 670). The awareness of the significance of new technologies for the level of competitiveness on the market results in the pursuit to implement it, in order to seek innovative solutions, yet it also increases the level of employee stress connected with the use of new technologies.

ICT helps in performing the main managerial functions of an organization, enhancing innovations, knowledge management, talent management and the general functioning of organizations on the global market, particularly adapting to changes and networking. (Karczewska, 2012, pp. 238-249).

As the results of the research revealed, not all tools of ICT are used even by the largest companies in Poland or are used to a small extent. Social media is one of the latest marketing platforms and a very useful Customer Relationship Management tool, which is not appreciated enough by quite a large number of Polish companies. Similarly, the potential of online trainings, platforms of cooperation and online communicators is very high. They enhance the communication and cooperation processes and sharing knowledge, as well as stimulating creative and innovative solutions in organizations (Omona, Lubega, van der Weide 2012, pp. 1-19).

Such tools as online platforms of communication and collaboration, online trainings, not to mention the systems monitoring work efficiency, are all worth taking into account by the managers of Polish companies who are responsible for knowledge management or new personnel adaptation process. The benefits in terms of saving costs and time of these solutions are underestimated in a significant number of Polish companies.

ICT facilitates competitiveness by improving the efficiency of activities, adaptation to changes and enabling the existence on the global market. Moreover, they facilitate developing employee skills and knowledge, hence talent management and human capital management in general. It is advisable to increase the awareness of the significance of new technologies and its competitive potential of the managers in the companies.

Conclusion

The first study was conducted among employees of companies of all sizes on a regional scale, while the other study was carried out among managers of the largest companies on a national scale. The scope of issues concerned the chosen aspects of ICT and this may be expanded in the further research. It should be noted that in the second study, the answers concerning the whole company were provided by the managers or the supervisors in human resources departments, thus it would be

good to compare these opinions with the opinions of the employees of the company. The future research project might apply the present findings by examining and taking other aspects of communication technology into consideration, while also broaden the range of companies for analysis to small and medium ones on a national scale.

Modern companies face global competition and in order to meet this challenge, they need to include such concepts as innovativeness, knowledge management and the usage of new technologies into their management strategy and practice. They are all connected with the requirements of information society, in which the fast flow of information and the knowledge resources are one of the most important factors characterizing the activity of individuals and organizations.

The proper implementation of new communication technologies and the associated tools may be profitable for the company and facilitate its development and competitiveness on the market. This is especially clear in the situation of Covid-19 pandemic, in which new communication technologies support the development and implementation of remote work where possible on a wider scale. It is advisable to repeat the research in some time to compare the changes which took place in the companies after the pandemic.

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New Communication Technologies and Employees' Well-Being in The Management of Polish Largest Companies

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Abstract

In modern world the development of new technologies changes the rules of operation and competition of companies on the market. The need of innovativeness and adaptation to constant changes requires from the companies to implement new information and communication technologies into their activities. The changing operating conditions influence the way the employees perform their work and entail the necessity of acquiring new skills and knowledge.
This paper tries to answer the question of the scope of use of new communication technologies in the largest Polish companies and the consequences of their use to the employees well-being. It presents the results of the survey research conducted in 2019 on the 179 companies largest by revenue in Poland. The results suggest that for many companies the use of new communication technologies in their professional activity is essential for their existence and competitiveness on the market, but many of the newest information and communication technologies (ICT) are not equally in use. A lot of employees use new communication tools and remote work what influence their work-life balance and general well-being.

Keywords: Information and Communication Technologies, Technological Stress, Work-Life Balance

Introduction

Socio-economic conditions in which modern employees operate are constantly changing due to the progressing processes of globalization, digitalization and development of science and technology. Changes in the sphere of work concern among others more and more frequent contact with knowledge and information resulting from the development of modern information society, as well as organization of work and the manner and the time of performance of work.

The use of new communication technologies in managing the organization becomes necessary in many industries to successfully compete in the global market (Stare, Jaklič, Kotnik 2006, p. 287-302). Soft competences, especially communication competences become increasingly important in the work environment and human resource management. As recent situation connected with Covid-19 pandemic has shown, new communication tools may be a significant support for remote work in case of many crisis situations.

In the modern management of an organization the communication processes become very significant. The appropriate communication in an organization is the basis for cooperation among the employees and for creating and transferring knowledge in an organization. Effective knowledge management in an organization is essential for developing and adapting to changing environmental conditions as well as creating and implementing innovative solutions. The purpose of this article is to present and discuss the results of the research on new means of communication in the sphere of work in the largest companies in Poland and its consequences for the organizations and for the employees themselves.

Literature and Theoretical Background

The development of information and communication technologies (ICT) supports the creation of the network society while also enhances the creation of information and knowledge.

At the end of the last century, the organizations have undergone some major changes in way they are organized and operate. They started to transform from static, fixed structures with clear hierarchy into more networked, flexible entities. This is the main characteristic of the so-called culture of new capitalism. New communication technologies enabled creation of unlimited connections between different spheres and entities and the development of networked economy (Castells 2007, p. 86). According to R. Sennett (2010, pp. 33-39, pp. 71-84) with this phenomena came several major cultural changes in organizations. Old values of craftsmanship has been replaced with the talent management, mobility and orientation on the short-term attachment rather than long-term attachment to the organization. Moreover, in contemporary organizations prevail a focus on the development of modern production and communication technologies, the increasing importance of knowledge and growing independence of the individuals. However, not all types of companies are short-time oriented as Sennett claims, it may be more typical for the smaller companies, while larger ones are more prone to implement the rules of sustainable development and reach sustainable competitive advantage over the competition on the market (Adams, Lamont 2003, Kotabe, Murray 2003, Brown 2005, Krupski 2007).

Such phenomena as digitization, technological development and increasing importance of knowledge as a resource characterizes knowledge-based economy (Giju, Badea, López Ruiz, Nevado Peña 2010, pp. 27-36). The use of information and communication technologies results in constant availability of the employees to the employer, usually by maintaining email or telephone contact. The spatial mobility and the flexibility of the time of work of modern employees are increasing, resulting in both positive and negative consequences for the sphere of labour and the private life.

The digitalization leads to the situation, in which a share of work performed outside the companies and the share of self-employed people whose work involves realization of projects for different customers is rising. (EPRS study 2018, p. 5). The new style and form of work require new competences from the employees, such as the skills connected with operating a computer, organization of working time and maintaining a balance between work and private life.

There are numerous benefits of the use of information systems in the operation of a company and the digitalization of business processes. In recent years the infrastructure in the world of business has become digitalized to a very large degree, digital technologies has transformed the strategies, various processes of the companies as well as their products and services. Some researchers propose to join the business strategy and information technologies strategy into a digital business strategy, coherently co-occurring in the reality of global business (Bharadwaj, El Sawy, Pavlou, Venkatraman 2013, p. 471).

Larger companies are more advanced in the digitalization processes than small and medium-sized enterprises, what influences their effectiveness of performance. Such benefits of technological development of companies as creating new possibilities of communication, constant learning, enhancing financial performance and increase in innovativeness are indicated by the researchers. (Eller, Alford, Kallmünzer, Peters 2020, pp. 119-127). Developing the strategy which enables the employees to adapt and learn the skills connected with the use of new information and communication technologies is recommended. Thus, it is suggested by OECD to identify the set of skills required to enhance quality employment and active involvement in a digitalized economy while also to promote policies and aims to support ICT development and use (OECD 2017, p. 114)

One of the studies of over 320 European enterprises which use social media, big data, and information technologies in their business models showed positive overall companies performance effects. Social media enhance companies interaction with the customers and may improve the delivery of services. Big data is essential for marketing and customer relationship management as

well as optimizing internal processes. Incorporating new technologies greatly changes companies' business models. (Loebbecke, Picot 2015, pp. 149-157; Bouwman, Nikou, de Reuver 2019, pp. 1-2)

The development and new technologies may bring numerous benefits, however, it is also connected with some threats which human resources managers should take into consideration. Telework can be a facilitation for various professional groups, affecting the increase of productivity and satisfaction of the employees. However, as studies show, it may be associated with a sense of isolation and consequently a decrease in employee's satisfaction with work. (Rudnicka 2007, pp. 104-110) There is also an increase in the complexity of highly qualified work and a need for faster and faster assimilation of new knowledge and innovation (Ratajczak 2007, pp. 32-34). These aspects influence maintaining work-life balance and the well-being of an employee.

What is more, there is a danger of the exclusion of certain groups due to varying degrees of access to new technologies, e.g. the elderly people, employees living in regions with a less-developed telecommunications network. They may be exposed to digital exclusion and the creation of barriers preventing them from professional activity development (Bauman 2005, pp. 87-97; Rudnicka 2007, pp. 110-112).

Hence, the consequences of living in the information society may contribute to increased competition, exerting pressure on the employees and entrepreneurs, creating social exclusion, deepening the inequalities or lowering the level of the quality of life and work (Boswell & Olson-Buchanan 2007).

From the point of view of the effectiveness and competitiveness of the organization, it is desirable that the activities in the organization are enhanced by the use of new multimedia technologies and software enabling teamwork. Employees can use a variety of tools and forms of modern communication to improve their individual work: video conferences, online trainings and webinars, software facilitating teamwork or remote work like workflow etc. Using new technologies makes it easier to achieve the objectives of human resource management and the functioning of the organization as a whole, yet it is advisable to monitor the psychological aspect of working with new information and communication technologies.

Research Methodology

The article tries to answer the research questions: What is the scope of the use of new communication technologies in the largest Polish companies and what are the consequences of their use to the employees well-being? The quantitative research of enterprises was conducted as part of the project 'New trends in human resource management in large enterprises' carried out in 2019 (so it reflects the state of affairs before the COVID pandemic) by the team of scientists from the Department of Sociology, Psychology and Social Communication in Management at the Faculty of Management of Czestochowa University of Technology, which included the author of this paper. The study used quantitative research methods, using mixed techniques: CAWI technique (Computer Assisted Web Interview - electronic questionnaire filled in by the respondent) and the CATI technique (Computer Assisted Telephone Interview- interview with the respondent by the phone). The combination of two quantitative methods was used to increase response rate. Research was started with the CATI method. Those who refused to participate in the study or who interrupted the survey were given the opportunity to complete the survey via dedicated online platform (CAWI method). The survey sampling frame was a database of 500 companies largest by profit in Poland (according to the Rzeczpospolita newspaper ranking). The random sampling was used. In case of the refusal to participate in the project of a given enterprise, another one was drawn. As a result, a representative sample of 179 companies was tested according to the following parameters: size of the general population equals 500, confidence level equals 95%. The statistical data analysis was conducted with the use of Statistica software. For the purpose of statistical testing in all comparisons $p<0,05$ was adopted.

Results and Interpretation

Entities which were surveyed in the conducted research consisted of companies of various industries and branches of economy, with different profiles of activity. 179 entities out of 500 companies largest by revenue in Poland have been surveyed. The detailed specification is presented in the figure 1.

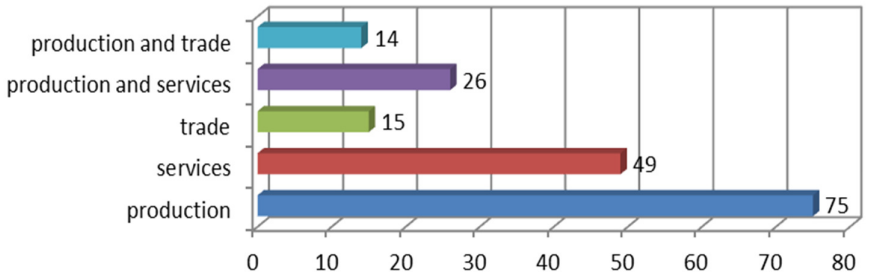

Figure 1: Characteristics of surveyed companies in terms of type of the activity. Number of companies. N=179

The largest share of the surveyed companies were those of production industry (75 companies) and those of services (49 companies). The companies from production and services (26), trade (15) and production and trade (14) were also surveyed. The answers to the questions on the issues regarding employees of the entire company were provided by the manager or Human Resources employee from a company.

Respondents from the surveyed companies among others answered the question: to what extent does your company use the enumerated modern technologies and communication tools? The answers show that there is no consistency in this matter and different kinds of tools are used to a different extent. The most common tool used in the professional activity by the majority of researched companies are traditional and popular e-mail messages (91,6% use it to a very high extent, around 7% use it to a lesser extent) and secondly the Intranet, which is used to a very high extent and to a relatively high extent by appropriately 28% and 50,3% of companies (jointly 78% of them). Next, very common communication tools are text messages (SMS) and MMS, which are used to a relatively high extent or more by jointly 77% of companies surveyed. The details are presented in figure 2.

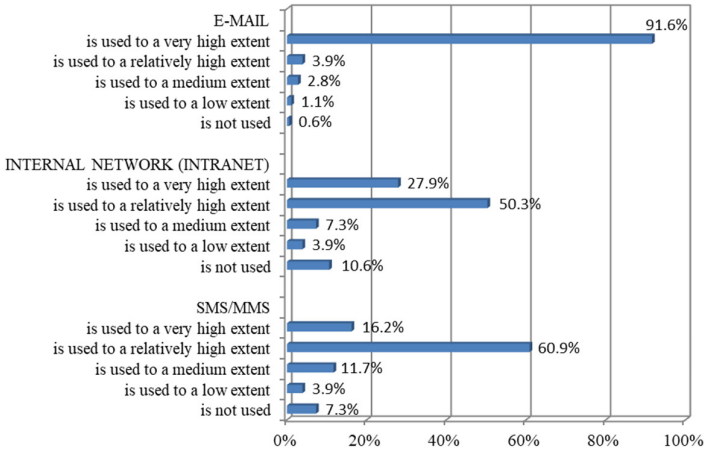

Figure 2: Answers to the question: To what extent does your company use the enumerated modern technologies and communication tools? E-mail, Internal network (Intranet), SMS,MMS. N=179

The popular tools used in the professional activity by a quite large share of companies are social media (42% of companies uses them to at least medium extent) and internet communicators (nearly 40%). Less, but still popular are online platforms of collaboration, which are used by one third of companies to at least medium extent. The detailed data are presented in figure 3.

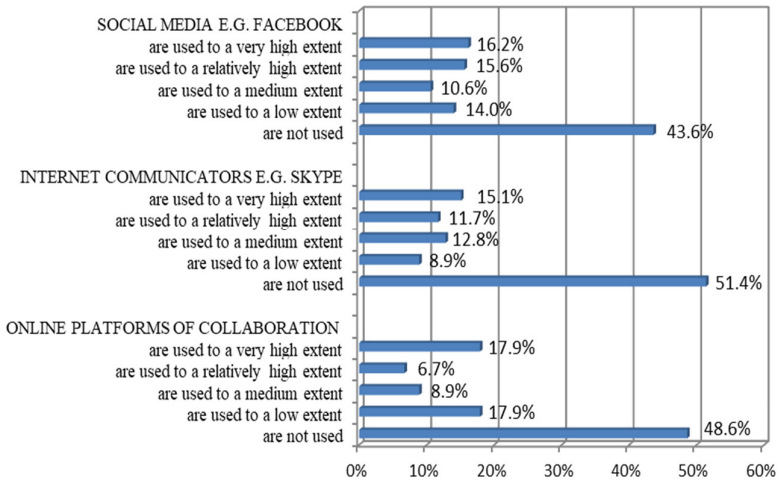

Figure 3: Answers to the question: To what extent does your company use the enumerated modern technologies and communication tools? Online platforms of collaboration (communication, document exchange, group work / projects coordination, e.g. Yammer, Skype, Workflow, Google Docs, RealtimeBoard), Internet communicators available to the public and for business (Skype for business, Slack, Google Hangouts, Messenger), Social Media (Facebook, Twitter, Instagram, Snapchat) N=179

The tools such as webinars are used to at least medium extent by almost 22% of companies (in over a half of companies they are used to a small extent) while Enterprise Resource Planning systems (ERP) are used by nearly 64% of surveyed units. Videoconferences or teleconferences are used relatively more often – nearly 68% of companies uses them to at least medium extent. More data are shown in figure 4.

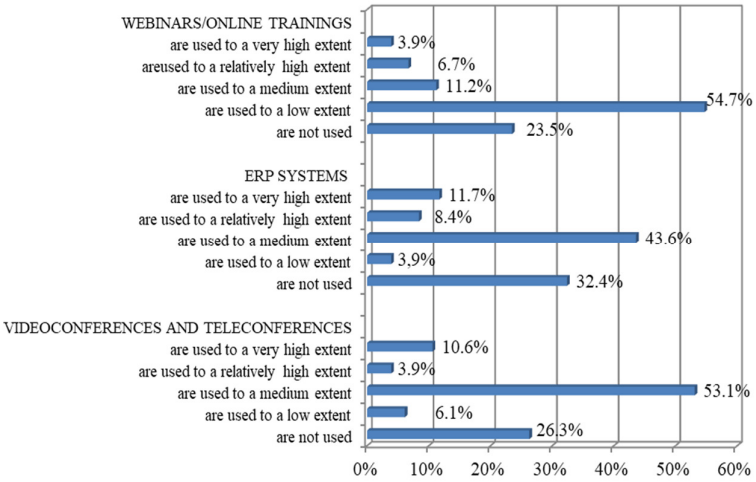

Figure 4: Answers to the question: To what extent does your company use the enumerated modern technologies and communication tools? Webinars/online trainings, ERP Systems (Enterprise Resource Planning), Videoconferences, Teleconferences. N=179

As the results of the study indicate, there are the differences in using certain tools of ICT among the companies in various industries. The level of usage of certain communication tools are presented in table 1, table 2 and table 3. Internet communicators are more often used by the manufacturing companies (nearly half of the companies use them to at least medium extent) than those dealing in trade (26,5%) and services (over 20%).

Table 1: Differences in using internet communicators between companies with main area of activity: manufacturing, trade and services. N=179

INTERNET COMMUNICATORS	Manufacturing	Trade	Services
are used to a very high extent	18,67%	16,33%	0,00%
are used to a relatively high extent	14,67%	10,20%	6,67%
are used to a medium extent	16,00%	8,16%	13,33%
are used to a low extent	8,00%	8,16%	26,67%
are not used	42,67%	57,14%	53,33%
Sum in a column	**100%**	**100%**	**100%**

Meanwhile, in case of social media, these are the service companies which use them more often (almost 67% of companies uses them to at least medium extent) while only 43% trade companies and 40% of companies in manufacturing industry use them. The details are shown in table 2.

Table 2: Differences in using social media between companies with main area of activity: manufacturing, trade and services. N=179

SOCIAL MEDIA	Manufacturing	Trade	Services
are used to a very high extent	16,00%	16,33%	26,67%
are used to a relatively high extent	14,67%	10,20%	33,33%
are used to a medium extent	9,33%	10,20%	6,67%
are used to a low extent	17,33%	10,20%	13,33%
are not used	42,67%	53,06%	20,00%
Sum in a column	**100%**	**100%**	**100%**

When it comes to the intranet, the vast majority of manufacturing companies uses this tool (nearly 90% of them to at least medium extent) and the majority of trade and service companies (over 80% and over 70% respectively). The results are presented in table 3.

Table 3: Differences in using intranet between the companies with main area of activity: manufacturing, trade and services . N=179

INTRANET	Manufacturing	Trade	Services
is used to a very high extent	25,33%	44,90%	13,33%
is used to a relatively high extent	60,00%	24,49%	40,00%
is used to a medium extent	4,00%	12,24%	20,00%
is used to a low extent	2,67%	4,08%	6,67%
is not used	8,00%	14,29%	20,00%
Sum in a column	**100%**	**100%**	**100%**

The respondents have been also asked if employees are in contact (available) with superiors or colleagues also after business hours. The 26% of companies claims that this applies to the working conditions in their company to a very high or high extent. What is more, nearly half of the companies admitted that this applies to their companies to a medium extent (figure 5).

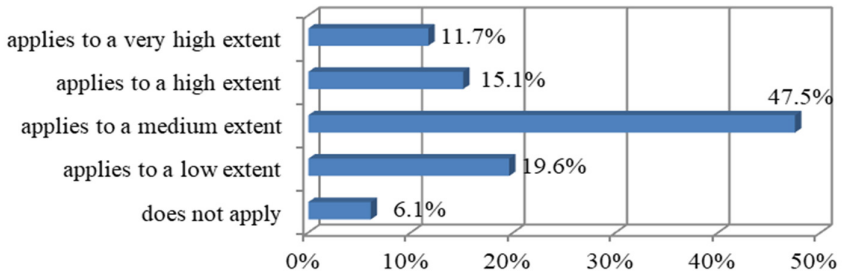

Figure 5: Availability after working hours. Answers to the question: Are employees in contact (available) with superiors or colleagues also after business hours? N-179

The level of importance of new technologies in company's activity correlates with the level of availability to the superiors or coworkers after working hours. Rho Spearman equals 0,18 ($p<0.05$)and indicates the statistically significant positive correlation of medium strength between the variables.

Another question concerned the presence of signs of a technological stress burden (associated with the use of new information technologies, information overload, etc.) in the case of the company's employees (Figure 6).

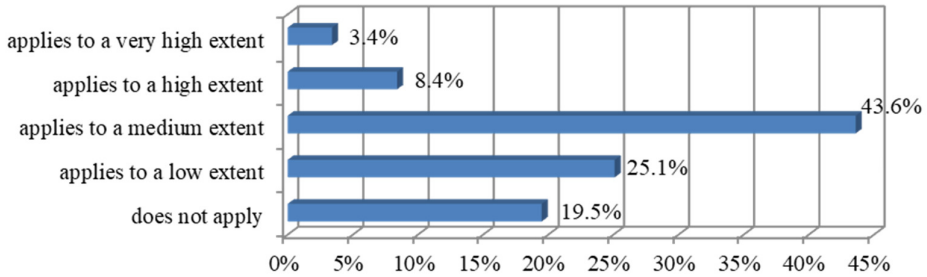

Figure 6: Answers to the question: Do the employees show signs of a technological stress burden (associated with the use of new information technologies, information overload, etc.)? N=179

The managers or supervisors of the HR departments who answered this question in the majority of cases claimed that this situation applies to their company to a medium or low extent. It does not apply at all in the case of almost 20% of companies and to a very high or high extent in the case of 11% of companies. It is debatable whether this definitely indicates a lack of stress or a lack of awareness of the supervisors of this problem.

The following variables are also correlated: the perception of necessity to monitor employees' psychological problems in the company and the extent to which (at least partial) remote work is currently implemented in the company. Rho Spearman equals 0,20 ($p<0.05$) and indicates the positive correlation of weak strength.

Rho Spearman value of 0,39 ($p<0.05$) indicates the statistically significant positive correlation of medium strength between the variables: level of importance of new technologies in the company's activity and the idea of a balance between work and private life of employees is reflected in the company's organizational culture. All the mentioned associations are presented in table 4.

Table 4: Correlations between chosen variables concerning the use of new technologies in a company and the psychological well-being and WLB of the employees. N=179

Variables		Correlation (rho-Spearman)
level of importance of new technologies in the company's activity	availability to the superiors or coworkers after working hours	0,18
level of importance of new technologies in the company's activity	the idea of a balance between work and private life of employees (WLB) is reflected in the company's organizational culture	0,20
the extent to which (at least partial) remote work is currently implemented in the company	the perception of necessity to monitor employees' psychological problems in the company	0,39

The correlations are of weak or medium strength, yet it shows some tendencies and are worth further research and analysis in the wider population of enterprises of different sizes and trades.

Discussion of Findings

The majority of largest companies in Poland implement and make use of the ICT in the their everyday activity. The ICT enable, among others, remote work, the increase in the pace and effectiveness of information flow in a company and in the flexibility of time of work. Whereas on the other hand, it may result in overloading the employees with the technological stress and disturbing their work-life balance.

Among the most commonly used communication tools are those rather traditional, not inducing costs and of general use: e-mail messages with over 90% of text messages (SMS) and MMS which are used by 77% of the companies surveyed. The companies acknowledge the benefits of the intranet network hence around 78% of companies implemented it. Less, but still popular are tools such as Enterprise Resource Planning systems and videoconferences or teleconferences, which have permanently entered the practice of companies' activity. They are used by over 60% of companies. The use of tools of remote communication, both audio and visual has become a necessity. It is particularly evident in present times of the pandemic lockdown and an increase in demand for remote work. Yet, the possibility of this kind of work does not apply to all the employees, only those with good access to ICT and the ability to control the use of time and technology (Grantham, Tsekouras 2004, p. 366).

The differences in the use of various types of ICT tools were observed among the companies in various industries. The level of usage of certain communication tools depends on the type of activity of a company, which require advantages of a chosen tool the most. The tools conditioned by the needs of a given industry are, among others: social media (commonly used in the service companies),the intranet (popular in the vast majority of manufacturing companies) and the internet communicators (used by the manufacturing and trade mostly). It is worth underlining that each process in a company may benefit from specific e-business solutions supporting its effectiveness and profitability, starting from the supply chain, through relations with partners and among employees to the customer service. (Żurak-Owczarek 2011, pp. 125-126)

The usage of new communication technologies in the professional activity of individuals results in the possibility of remote working and constant availability of the employees to the employer or the coworkers. It may result in a increase in the technological stress burden. This type of stress is connected with the information overload, the pressure of being up-to date, available to the clients or employer. Hence, it makes a threat to the work-life balance of the employees and may lower their satisfaction from work and life (Nam 2014, pp. 1017–1040

The companies which intensively use new technologies in company's activity note higher level of employees' availability to the superiors or coworkers after working hours. Companies which implement remote work at least partially tend to notice the necessity of monitoring psychological problems of employees. Similarly, the companies for which the use of new communication technologies is very important for the functioning of the company declare more often that the idea of a balance between work and private life of employees is reflected in the company's organizational culture. It is debatable if noting these problems and declaring the presence of policies supporting the well-being of employees means that the employees actually receive the kind and the scope of help they need. It is an interesting issue for further research, especially from the employees' perspective.

The benefits of new communication technologies usually go together with the threats and potential disadvantages. These largest Polish companies which often use ICT and remote work claim, that they tend to monitor and care for the work-life balance of their employees. It is necessary to provide support for the employees who are exposed to stress or burnout, including those working remotely and using ICT to a large extent (Wallace 2014, pp.70-77).

Conclusions

In present times, the era of globalization, information society and development of new technologies enterprises face challenges such as increasing competitiveness, innovativeness or adapting to changing market requirements. For many companies the use of new communication technologies in their professional activity is the basis for their existence and competitiveness on the market and managing crisis situations such as present COVID-19 pandemic crisis. This crisis situation showed that the companies which implement the new ICT solutions will be able to adapt to changing circumstances (e.g. conversion to e-commerce or remote work) and will increase their performance and effectiveness. It seems that not all of the Polish companies were prepared and able to adapt quickly to the requirements of the crisis. This issues are worth investigating in a future research.

Not all of the newest information and communication technologies are equally popular among the companies. The most common are those of general use and which are not cost-inducing. Solutions more expensive in implementation and functionally specialized are not widely used by the majority of the companies. They are usually used in particular industries and business sectors or for specific economic purposes. The level of usage of particular communication tools is related with the type of company's industry. Social media are more commonly used in service companies to maintain relations with the customers. The majority of manufacturing companies implement the internal network (intranet), which may enhance their performance and internal communication. Moreover, a large percentage of companies in manufacturing and trade use internet communicators such as e.g. Skype for business, Slack, Google Hangouts, Messenger as well. Thus, some activities specific for a given trade need advantages of certain tools more than the others.

The tools which may be used outside also the workplace and after work time may disturb work-life balance more than the tools used only in the time of work and at the workplace only to enhance working performance. The tools such as internet communicators, videoconferences, online platforms of cooperation may be a greater burden in terms of technological stress than intranet, ERP systems or the tools which can be turned off after work and do not enable constant availability to the employer. This assumptions are worth further research to confirm.

The benefits which are offered by new technologies are accompanied by potential risks. Information overload, constant availability to the employer, lack of monitoring of the psychological well-being and health of the employees are important risk factors. It is advisable for the companies which implement new technologies in their business activity to take into consideration potential threats of ICT to the work-life balance of their employees and monitor the level of stress and psychological health of the employees.

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The Performance of Health – System – A Theoretical Perspective

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Abstract

Countries should report health system performance to the public annually by use of a dashboard of key metrics (e.g., health outcomes, people's confidence in the system, system competence, and user experience). Achieving high-quality health systems requires expanding the space for improvement to structural reforms that act on the foundations of the system. First, health system leaders need to govern to obtain efficiency, effectiveness and equity by adopting a shared vision of quality care, clear strategies, strong regulation, and continuous learning. Countries should transform the health workforce by adopting competency-based clinical education, introducing training in ethics and respectful care, and better supporting. Health crises, such as the COVID-19 crisis, illustrate the need for resilient systems, defined as systems that can prepare for and effectively respond to crises while maintaining core functions and reorganizing if needed. An effective health system is an improvement in the nation's health status. Health systems are a powerful way for improving health equity

Keywords: Healthcare System, Performance, Resilient System, Effectiveness, Equity, Efficiency

Introduction

The WHO definition of health system is as following:" all the activities whose primary purpose is to promote, restore, or maintain health" (WHO, 2000). These activities are under complete or partial control of governments. In developing countries, the providers of health services and the primary funders are the governments. (Kruk & Freedman, 2008).

Performance measurement is essential for health system. Most health systems are in the early stages of performance. For improve and secure health system, policymakers should monitories performance.

Performance measurement is an opportunity for policy makers to secure health system and its aim is to improve the quality of decisions within the health system throw an active role of the government.

In assessing the performance of a health system, the first step is defining the goals. The goals defined by WHO are to deliver equitably, efficiently, and effective preventive and curative health services to the entire population. (WHO, 2000). These goals are the same in developed and developing countries. In 2010, Michael Porter proposed that health systems be fundamentally accountable for producing value, which should be defined around the user. (Porter, 2010).

States must ensure availability, accessibility, acceptability, and quality of health services (UN, 2000). The key aims of health systems are patient satisfaction, accountability and public participation in decision making process.
The governments play an important regulatory role also in the case of private sector in health.

Case study: The framework for Health Systems Performance

I described the state of health system. Also, I presented different indicators regarding health system effectiveness, health system equity and health system efficiency based on the literature review.

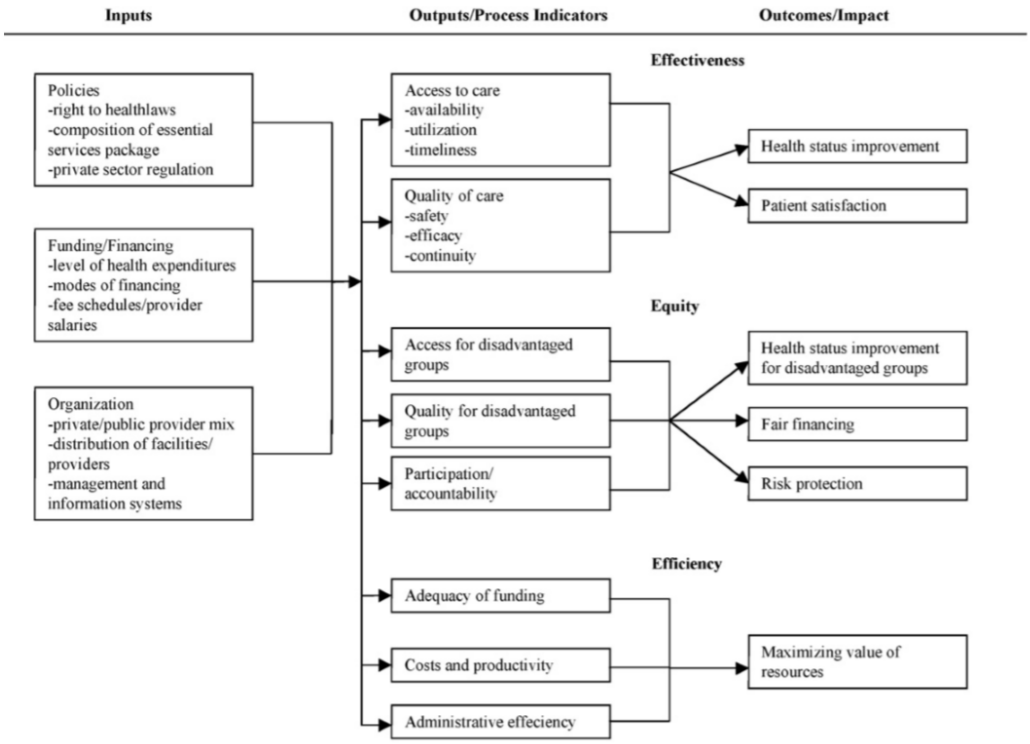

Fig. 1: Framework for health systems performance measures

Source: Kruk & Freedman, 2008

Indicators of health system performance cannot be seen in isolation. Process indicators should be linked to outcomes. Indicators that are applied to measure health systems performance are the most used indicators.

As it can be seen in figure 1, the inputs of the health system measurement are policies, funding/financing, organization. The outputs/ process indicators are: access to care, quality of care, access for disadvantaged groups, quality for disadvantaged groups, participation/accountability, adequacy of funding, costs and productivity, administrative efficiency.

The outcomes are health status improvement, patient satisfaction, health status improvement for disadvantaged groups, fair financing, risk protection and maximizing value of resources.

The inputs policies, funding/financing and organization mixed with access to care, quality of care contribute to effectiveness: health status improvement, patient satisfaction.

The inputs policies, funding/financing and organization combinate with access for disadvantaged groups, quality for disadvantaged groups and participation/ accountability contribute to equity: health status improvement, fair financing and risk protection.

The inputs mixed with process indicators: adequacy of funding, costs and productivity efficiency are the measurement for efficiency: maximizing value of resources.

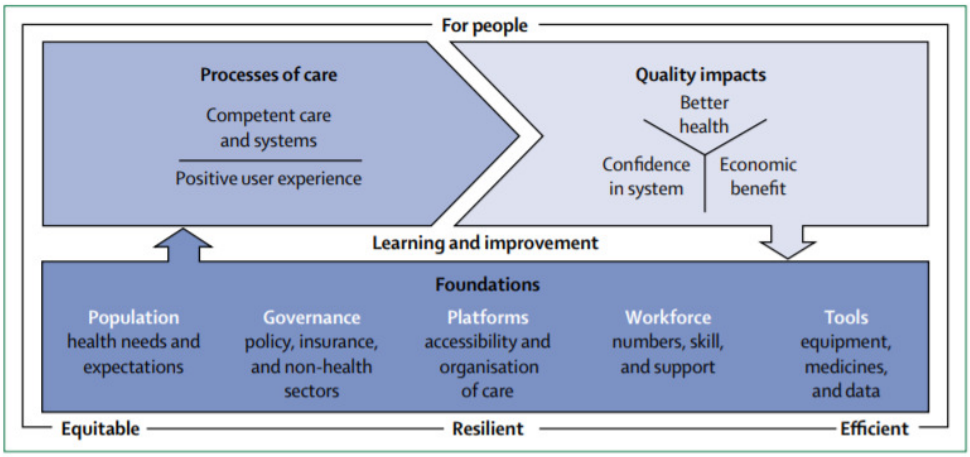

Fig. 2: High-quality health system framework

Source: Kruk, Gage, Arsenault, Jordan, Leslie, Roder-DeWan, ... & English, 2018, e1200

The authors propose a new conceptual framework for high – quality health systems. The key domains are: foundations, process of care and quality impacts.

Table 1: High-quality health system framework components

Quality impact	
Better health	Level and distribution of paticient – reported outcomes: functions, symptoms, pain, wellbeing, quality of life and avoiding serious health – related suffering
Confidence in system	Satisfaction, recommendation, trust and care uptake and retention
Economic benefit	Ability to work or attend school, economic growth, reduction in health system waste and financial risk protection
Process of care	
Competence care and systems	Evidence-based, effective care: systematic assessment, correct diagnosis, appropriate treatment, counselling and referral; capable systems, safety, prevention and detention, continuity and integration, timely action and population health management
Positive user experience	Respect: dignity, privacy, non-discrimination, autonomy, confidentiality and clear communication, user focus, choice of provider, short wait times, patience voice and values, affordability and ease of use
Foundations	
Population	Individuals, families and communities as citizens, producers of better wealth outcomes and system users: health needs, knowledge, health literacy, preferences and cultural norms
Governance	Leadership, political commitment, change management, policies, regulations, standards, norms and policies for the public and private sector, public health functions, financing, funding, fund pooling, insurance and purchasing, provider contracting and payment; learning and improvement, institutions for evaluation, trustworthy data, etc
Platforms	Assets: number and distribution of facilities, public and private mix, service mix and geographic access to facilities; care organizations, primary

	care, secondary and tertiary care, engagement of private providers, connective systems, emergency medical services, facility community outreach
Workforce	Health workers, laboratory workers, planners, managers, number and distribution, skills and skill mix, training in ethics, and people centred care, supportive environment, education, team- work and retention
Tools	Hardware, equipment, supplies, medicines and information system, software, culture of quality, use of data, supervision and feedback

Source: Kruk, Gage, Arsenault, Jordan, Leslie, Roder-DeWan, ... & English, 2018, e1201

Table 1 presents the components of the framework domains: quality impacts, processes of care, and foundations. The quality impacts include better health, reduced mortality and morbidity, confidence in system, trust in health workers. Trust motivates active participation in care and maximize outcomes. A good quality of care might require additional investments in health systems. A competent care and user experience are parts of the processes of care. A competent system provides health promotion and prevention. Patients expect to receive evidence-based care, careful assessment, counselling, appropriate treatment, and correct diagnosis.

A high-quality health system needs a strong governance, good policies, a strong financing. Health care leaders will have to inspire and sustain the values of professionalism and excellence

Health care is provided by three platforms: communities, primary care and hospital care. Health workers need equipment, medicines and supplies. Also, they need adequate numbers, preparation, professionalism, a supportive environment for obtaining the desired performance and high – quality competency. (Kruk & Freedman, 2008).

The authors believe that the quality of health systems should be primarily measured by these processes and impacts rather than by inputs. (Kruk, Gage, Arsenault, Jordan, Leslie, Roder-DeWan, ... & English, 2018, e1201).

Aspects Regarding Effectiveness, Equity, And Efficiency

Health System Effectiveness

The components of effectiveness are health status and patient satisfaction (outcomes) and access and quality of care (outputs) (Kruk & Freedman, 2008)

In developed countries access to basic services, aggregate access and continuity are measured less regularly than access for disadvantaged groups, quality, safety, equity and patient satisfaction.

In developing countries one of the major barriers to better health is access to basic services.

Some authors use as a synonym for effectiveness the term “quality”. Some specialists include in the term “quality” technical efficacy, safety and continuity.

The literature review show that patient satisfaction is used as an outcome indicator of the effectiveness.

In developed countries long life expectancies make measurement of the health systems impact on health outcomes.

In developing countries examples of health outcomes include: infant mortality, maternal mortality, perinatal/neonatal mortality, low birth weight and incidence of infectious diseases. (Kruk & Freedman, 2008)

The indicators such as survival rates from cancers, although this can also be seen as a measure of the quality of care (Hurst & Jee-Hughes, 2001).

Providing health services without guaranteeing a minimum level of quality is ineffective, wasteful, and unethical.

The IOM Committee defined quality of care as "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge". (Institute of Medicine Committee on Quality of Health Care in America Crossing the quality chasm: a new health system for the 21st century, National Academies Press, Washington, DC2001)

Patient Satisfaction

This indicator is particularly important in countries where health system is largely funded throw tax revenue or access to health is guaranteed by the Constitution. This indicator shows the ability of government to deliver on a key obligation.

In Canada and Britain health system performance is a key part of election debate.

American researchers found other indicators important for patients: caring behaviour, provider competence, being treated with respect, bedside manner, good information sharing, efficient care process and administrative simplicity of health insurance. (Jennings, Heiner, Loan, Hemman, & Swanson, 2005).

Common criteria of patient satisfaction are patient-centred care, access, communication and information, courtesy and emotional support, technical quality, efficiency of care, structure and facilities (Sofaer & Firminger, 2005)

Patient satisfaction is an important measure of the success of a health system.

Access

A measure of access is population coverage with essential health services. Service cover age is an example of an output indicator.

Population coverage of services has three components: availability, utilization and timeliness.

Availability of services is a process indicator linked to the policies, funding levels and organizational arrangements.

Availability is the level of input (physicians, nurses, hospitals, clinics per population or within a geographic area).

Health worker density has an important impact on improving certain health outcomes. Another aspect is organizational access.

Industrialized countries use utilization of screening test (brest and cervical cancer) as measures of access. Other indicators for access are: case detection rates for TB, use of malaria, bed-nets, contraceptive concepts, attended deliveries, equity in financing.

The need should be the first benefit of the users of health, not the social status. Financing for health services should be progressive. (Ensor & Ronoh, 2005)

Quality of care is a component of effectiveness. There is not a clear definition for quality of care, but it is similar with efficacy, safety and continuity (Bruce, 1990).

Safety of care is another dimension of quality. Kruk & Freedman, 2008)

Health System Equity

This requires eliminating health disparities, inadequate access to services, unhealthy living or working conditions manifested through wealth, gender, race or ethnicity.

Equity means the contribution for improving the health status of the poor

The markers of effectiveness: comprehensiveness, access, quality, continuity, patient satisfaction can be analyzed by income, ethnicity, gender, geographic location (Kruk & Freedman, 2008)

Continuity of care is an important aspect of technical quality. Another important feature of access is the notion of timely access.

Equity in financing includes protection for the poor from catastrophic health expenses. Public participation and accountability are means to realizing equity.

Improving access and fair financing are important in assuring equity.

Health System Efficiency

This concept includes the value of workers and patient time (Kruk & Freedman, 2008)

Efficiency is divided in allocative efficiency and technical efficiency. Allocative efficiency means to direct funds to activities that will maximize health gains. Technical efficiency is the highest possible sustained output and is a combination of workers, drugs and equipment – as resources.

Inputs such as costs and productivity are central aspects for efficiency. The health system efficiency can be influenced by the budgets and the modes of financing.

For example, national health system and social security system produce better outcomes such as reducing costs. The cost per case is a common measure that includes drugs, personnel, diagnostics, hospital beds, surgical supplies and recurrent costs for providing a full course of treatment. Also, this cost includes out- of pocket costs. This need to be included in the cost calculation.

Efficiency can be measured throw productivity of health care inputs.

Researchers considered that efficiency in Mexican health system can be measured throw output indicators such as physicians' consultations per day, hospital occupancy rates and length of stay and the number of contracts with the health system per person each year. (Kroeger & Hernandez, 2003).

Efficiency can be measure by health budgets spent on hospitals, economies of scale and scope for hospitals

Research in Vietnam demonstrated that provincial general and specialty hospitals were not as efficient as district hospitals were not as efficient as district hospitals in terms of costs per case given their number of beds (Weave & Deolalikar, 2004)

In Uganda, the costs per case for maternal health services were higher when performed in hospitals versus health centres. (Kruk & Freedman, 2008)

Administrative Efficiency

Efficient systems also maximize the value of health workers and the value of patients' time.

The systems which are poorly managed and funded have reduced performance, reduced quality and reduced demand for services.

This refers to availability of updated operational plans and work schedules, regularity of team meetings, adequacy of facility, level of workers motivation (Chukwuani, Olugboji, Akuto, Odebunmi, Ezeilo & Ugbene, 2006).

Health systems need to work with people not only to improve health outcomes, but also to generate non-health-related value, such as trust and economic benefit for all people, including the poor and vulnerable. (Kruk, Gage, Arsenault, Jordan, Leslie, Roder-DeWan & English, 2018).

Conclusions

Measuring health system is complicated. The health indicators are connected with the purpose of health systems and determine the degree of impact of healthcare.

A well- performing health system is effective, equitable and efficient.

As it can be seen, these indicators presented in this article are suitable for measuring the performance of a health care system. It is important to observe the quality and usefulness of each indicator. These indicators represent key aspects of health system functioning.

These indicators measure the performance of the systems and can best capture the performance of health systems.

Health systems are complex adaptive systems. The improvement of health outcomes is the sine qua non of health systems; these outcomes include longer lives, better quality of life, and improved capacity to function. In addition to better health, people derive security and confidence from having a trusted source of care when illness renders them most vulnerable.

Health systems should seek to improve performance on six dimensions of quality of care: safety, effectiveness, patient-centredness, timeliness, efficiency, and equity.

High-quality health systems are underpinned by four values: high-quality health systems are for people and are equitable, resilient, and efficient

Demotivated providers cannot contribute to a high-quality health system

High-quality health systems also need everyday resilience to respond to routine challenges, and this requires accountable leaders who respect and motivate their frontline staff. (Gilson, Barasa, Nxumalo, Cleary, Goudge, Molyneux, ... & Lehmann, 2017)

High-quality health systems also need everyday resilience to respond to routine challenges, and this requires accountable leaders who respect and motivate their frontline staff. (Gilson, Barasa, Nxumalo, Cleary, Goudge, Molyneux, ... & Lehmann, 2017)

There are important limitations of this article that are connected with the experience of these indicators on the ground and how these indicators can be applied to different research themes.

Acknowledgment

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Innovation Potential of a Company as The Basis of Its Competitiveness

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Abstract

The developed economies are currently in a transition from industrial to the digital society. Today, information and knowledge create a ranking of the most developed countries and economies, transferred through their productivity and performance. After studying history, a parallel can be found between the orientation of the economy and world trends. By analogy, the new economy is now a flow of innovation and adaptation. It marks several changes, not only quantitative, which have changed the structure and functioning of the economy since the 1980s. It is an economy of innovation, information and new ideas that are becoming a commodity. In the paper the authors are pointing to the importance of the innovation potential, which present the base of competitiveness in alimentary companies.

Keywords: Economics of Change, ITK, Innovation, Value Creation, Global Innovation Index, Competitiveness, Creativity

Introduction

This economy is bringing new opportunities and pushing for innovation, affecting employment growth and labour productivity growth. But it is also an economy of social tensions and income disproportions. It completes the effect of shifting the workforce from manual, labour-intensive industries to industries requiring knowledge and information. Today's global internet economy brings new opportunities that need new rules to be defined. Those playing according to its new rules will prosper, and those ignoring them will lose (Atkinson, 1998).

Spirkova, Caganova and Bawa note, that an important instruments for promoting competitiveness of regions, companies and economic growth are innovations. The level of science, research and innovation in individual countries depends on political decisions, institutions and other factors, which together act on the creation of an environment motivating to innovative activities (.Innovation plays a key role in moving manufacturing industries towards sustainable production. For example, evolving sustainable manufacturing initiatives – from traditional pollution control through cleaner production initiatives, to a lifecycle view, to the establishment of closed-loop production – can be viewed as facilitated by eco-innovation (Spirko; Spirkova; Caganova and Bawa 2016). The position of the innovative process of value creation is not equally applicable to individual types of companies. Based on the research, we state that not specific kinds of companies can meet all innovation goals due to different innovation processes and the innovation process, such as value growth or labour productivity. We evaluated the innovation goals defined in the model case 1 with following conclusion:

- particular types of companies can meet only some innovation goals,
- in the case of small and medium-sized enterprises, the innovative goals of value creation processes are met. The use of ICT products, the fulfilment and realization of all innovation goals can be expected in medium-sized and large enterprises,
- according to the model case - the impact of innovation on the performance and competitiveness of the company cannot be universally related or defined, because there are factors mentioned such as the number of employees, type of company, company size, size of production base.

This economy is also synonymous with the Internet economy (net economy), innovation economy, digital economy, the Internet, or knowledge economy.

The expansion of technology, digitalization and the Internet are behind all processes underway. These phenomena today affect the competitiveness of individual sectors and entire national economies and change the whole society, from households to governments.

The information and communication technology industries are today a network of industry. Today, networks are interconnected through multiple communication nodes. The extraordinary features of the IT-supported network industry are referred to as network externalities such as globalization, competition and technological change and they are interconnected. Individual actors and companies create nodes and binders. About the impact of the economy today, we can even say that there is not only e-economy but also e-society, e-policy, e-culture and all-e-world.

The role of innovation in the value creation process in terms of creating a competitive advantage for the company and from the view of increasing the productivity of the company is

- Use of Information and Communication Technology products,
- Innovation activities - value creation and product growth,
- In terms of the position of the industry,
- Challenges of innovation and competitiveness.

The paper aims to examine the economic aspects of the company innovation potential and the impact of innovation on the performance and competitiveness of the entrepreneurial economy.

Methodology

In the paper the authors drew mainly from the theory of innovation manufacturing in economic development according to several authors as: Wallas (1926), Schumpeter (1934), Drucker (1985), Atkinson and Court (1998), Menbere (2004), Heckova (2007), Tidd, Bessant and Pavitt (2007), Ritomský (2009),Schwab (2009), Spirkova, Caganova and Bawa (2015) etc. Statistical data for the analysis come from the European Commission materials, Statistical Office of the Slovak Republic and the Eurostat. The authors also analyzed the selected expert and Materials of European Union (Report of The Global Innovation Index 2019), World Economic Forum, conceptual documents and regulations of the Ministry of Economy of the Slovak Republic and the Slovak Innovation and Energy Agency (SIEA).

Discussion and Results

Contradictions in the view of a new economy

If we compared the old and the new economies, we would find differences both in the sectoral structure and orientation as well as in the workforce structure or government regulation. The old economy applied mass production; the importance of research was lower and concentrated on full employment in addition to a high degree of management control. The new economy is oriented towards flexible production, higher real wages contrary to full employment in the old economy, and market instruments contrary to regulations. The new economy is an economy that considers

knowledge as the capital and central resource of the economy. It understands managers at different levels as one of the means of their placement into practice. Although the old economy did not respect knowledge, it is evident that nowadays knowledge bears much more importance. Not only the use of primary production factors generates expertise and experience, but experience also affects more effectively the allocation of available resources. It changes their importance to a sort of dividing point and at the same time, a link between the old and the new economy. The new economy is also referred to as internet economy (net economy), innovation economy, digital economy, the Internet, or knowledge economy (knowledge economy). Behind all, the processes taking place in it are the expansion of technology, digitization, and the Internet. These phenomena affect the competitiveness of individual sectors, entire national economies, and the society, from households to governments. A prerequisite for a qualified expansion of innovations in the food industry are model cases investigated with two basic approaches (Adler, Kwon 2002):

the model case 1- the subject of the research was the impact of innovations on the performance and competitiveness of the company. We present the breakdown from the following points of view:

- the value creation process,
- use of ICT products,
- innovation activities,
- in terms of the position of the industry,
- the role of innovation and competitiveness,
- corporate competencies and innovations,
- starting conditions for innovation

and model case 2 - the subject of the research was the factual definition of the potential of the food industry.

Position of innovation in the process of value creation

Innovation is a dynamic element of production and growth. Without innovation, further development of enterprises, the economy and the society is impossible. Sustainable productivity development cannot be ensured without innovation.
The term innovation is based on recent innovations, i.e., to innovate, or to do something new. In this conception, it is the process transforming an opportunity into a new idea and transforming it into a widespread practice (Tidd, 2007, p. 64).
Based on further definitions, it can be stated that it is "a specific tool for entrepreneurs through which they use change to create opportunities to differentiate their products or services from competitors" (Drucker, 1985).
J. Schumpeter is considered as the "spiritual father" of innovation. He defined economic innovation in his work "The theory of economic development, 1934". He defines it as:

1. introduction of new products that customers are not yet familiar with or introducing better products
2. introduction of new production methods,
3. opening new markets to which the production sector has not yet entered,
4. the acquisition of new sources of raw materials and semi-finished products which have not yet been used in the production of goods,
5. to create a new way of organizing the production sector, creating a monopoly position, trusts.

Innovation can be manifested through new products, business directions, cost reductions, increased labour productivity, product quality, or in shaping or winning new markets.
However, its contribution can be both positive and negative. As already mentioned, innovation is a combination of knowledge. It may already exist as part of our experience, or may be the result of exploration of markets, technologies, stocks, competition, etc.

Innovation is also of crucial importance in the economic process. It is mainly through its ability to change production processes, the structure of the economy and thereby accelerate value creation. The importance of innovation in the process of value creation can be seen from two essential points of view:

- in terms of creating a competitive advantage for the company
- from the perspective of increasing business productivity.

Innovation affects the competitiveness of enterprises by creating new products or improving the quality of existing products. A competitive company must be able, using the potential of its own employees and social consensus, to generate and use innovation and thus respond to the rapidly evolving interests of customers and companies (Heckova, 2007). In terms of types of innovation, its benefits can be felt at different levels of business activity. In our studies, we have encountered several definitions and examples of innovations.

From our point of view, the division into product, process, position and paradigm innovations is particularly essential (Tidd, 2007, p. 11). A similar division is given in the above mentioned Frascatti Manual, which, apart from product, process of innovations, also recognizes as marketing (Ritomský, 2009, p. 10).

The relationship between innovation and competitiveness can be seen through another dimension - productivity. Innovation through the accumulation of knowledge enables the creation of entirely new guidelines that lead to new ways of doing things more efficiently. It, therefore, leads to resource savings, higher production volumes and strategic advantages.

In general, the most innovative industries traditionally have the highest productivity gains. The implementation of innovation increases the appreciation efficacy of both human and physical capital, which directly increases the proportion of the created added value.

The specific sector - Information and Communication Technologies (ICT) - deserves special attention in the analysis of the innovation impact on economic development. Among the most critical areas of innovation, it ranks as the first. Its effect on productivity growth is so impressive that it deserves a specific definition within the pillars of innovation.

In our work (Gust and Marquez, 2000), we have identified three channels through which the ICT industry contributes to overall productivity growth. The first channel is the contribution by which the information technology (IT) industry contributes to productivity growth, through the increased productivity achieved in the IT - computer, software, and high-tech industries. Although the share of these products in the final product is low, they can make a significant contribution to overall productivity through high productivity growth in these sectors.

The second channel is the use of ICT products in other sectors of the economy. It means that investigations in IT equipment (purchasing, not manufacturing) can improve the capital/labour ratio and thus contribute to the growth of labour productivity. Finally, information technology can create network effects in the form of promoting information dissemination, communication and thus providing to incarnate technical progress.

The actual development of ICT is not only a question of the amount of investments in the technology and capital equipment but also the efficient use of new technologies and investments in human resources (Bilsen, 2009).

The pillar of innovation in terms of creating new products, streamlining processes, contributes to increasing product volume and resource savings. It brings a competitive advantage for the company and the country and so increasing productivity growth.

Linking skills, competences, and qualifications in the synthesis of knowledge means linking specific aspects, impulses, and challenges to the potential of human capital. Analyzing the process of innovation without understanding the nature of human capital is thus incomplete.

Productivity and Innovation Pillars

It would be desirable to define a model that could provide theoretical and quantitative determinants of productivity development in Slovakia to ensure a stable rate of productive growth of the Slovak economy. This finding is analogous to the so-called paradox of IT sector productivity, which means that the increase in IT investments alone will not bring the expected effect without the necessary information infrastructure, such as the IT infrastructure, educated human capital, access to capital and technology (Menbere, 2004).

The external relations of the economic system, the level of interactions and the framework of potential future interdependencies must also be considered when defining the pillars. From the view of the Slovak Republic as an economy with a high degree of openness, the position and application within the broader economic-political grouping and the global economic position becomes a priority, modifying the parameters of productivity (Klas, 2005).

Globalization, as a significant factor in the development of the world economy, has significantly modified the position and importance of traditional manufacturing industries.

We note that global competitiveness requires the ability of a business to mobilize a range of skills and skills accumulated in the business, in different regions and even continents.

One of the criteria for assessing innovation activity and economic growth of individual countries is considered the Global Innovation Index (GII), which examines the innovation capacity of 129 economies (Schwab, 2009). From the above assessment, we chose V4 economies, whose position in the Global Innovation Index evaluation is presented in Tab. 1.

Table 1: Global Innovation Index - V4 Country Ratings

V4 countries	Rank from 129 countries	Count from 100
Czech Republic	26	49,4
Hungary	33	44,5
Slovak Republic	37	42
Poland	39	41,3

Source: Reported by The Global Innovation Index 2019 -The Human Factor in Innovation

Sub-index of innovative inputs and Sub-index outputs.

Innovation performance with the best prerequisites for effective integration into the innovation process should be a key priority. They should be able to focus on cutting-edge research and use the development potential given by the economic and social environment in the SR in a rational way. From the perspective of the European Economic Area, Slovakia must benefit from specialization in favour of strong economic sectors. On the national level in Slovakia, there are more critical strategic documents.

In 2000, European leaders adopted the Lisbon Strategy to stimulate employment and economic growth, setting a strategic goal for the next decade: to become the most competitive, dynamic and knowledge-based economy in the world able to sustain economic growth with more and better work and greater social cohesion. The Lisbon Strategy is built on three pillars: competitiveness - the economic pillar, social cohesion - the social pillar and sustainable development - the environmental pillar.

New challenges of innovation and competitiveness

The development of innovations is not only a question of individual economic entities by their economic activity contributing to the creation of value but also a matter of cooperation and common achievement of set goals. A broad area of innovation pillars, covering policymakers, various economic actors, but even individuals, requires mutual coordination of processes based on mutual acceptability. We can also see the relationship between innovation and competitiveness through another dimension. It is productivity. Innovation via accumulation of knowledge allows for new recipes, which lead to new possibilities to provide the issues more effectively. So, it leads to saving supplies, higher volume of productivity and reaching strategic advantages (Majernik et al., 2019)

The level of partnerships takes different forms depending on the level and position of the actors involved - international partnerships, regional, business and partnerships of different social groups, but also informal forms. We mean the so-called informal networks that represent a structured set of specific relationships within a department or environment.

The development of business competencies is an essential prerequisite for success in every innovation (Tidd, 2007, p. 64). It represents the ability of the company to use specific knowledge of the company in combination with the potential of the local company environment, with the possibilities of the macroeconomic environment, the character of the industry and the overall socio-economic environment. An enterprise located in a particular environment, or the industry is influenced by a range of factors, whose potential is either or is not able to exploit. In the area of innovation development, Tidd (2007, p. 72) further considers the following environmental factors.

Sector - characteristics, sector specificities, size of competition interfere with the innovation process.

Business Size - Small businesses have less access to resources, technology, and human capital, which are decisive factors for the development of innovation. Large and medium-sized companies mostly represent the medium-tech sector compared to the ICT sector. National systems - they represent different contexts of economic policies affecting the position of companies. In the Slovak Republic, there can be a significant support of the government, especially for large companies, which, as we have already mentioned, have a considerable representation in the manufacturing industry.

Investment incentives in the form of tax reliefs and various types of institutional support prefer the medium-tech sector.

Lifecycle - different phases of the life cycle require various aspects of innovation.

Novelty - each type of innovation requires a different way of applying it to your organization. In extreme cases, radical changes (disruptive) may also require the introduction of so-called "innovation". In this case, smaller, more flexible companies are an advantage.

External institutions - some sectors are significantly influenced by external factors, mostly in the form of standards, institutional regulations or certification permits.

The presented development factors can significantly influence the success rate of the innovation process under different initial conditions. On the one hand, they favour traditional, established companies based on their size, production experience, conventional links to the environment, on the other hand, the flexible ability of small companies to innovate dynamically, especially in the area of processes, contradicts. A qualified expansion of innovation envisages, besides identifying the core sectors of innovation development, support for other vital aspects of its development. We have analyzed and identified two main areas of imbalance in innovation performance development:

- support for innovation in small and medium-sized enterprises
- the efficiency of innovation processes.

At present, it is necessary to create an environment for the transfer of knowledge and technology to products and production processes and to support the establishment of links among institutions of the private, public and non-profit sectors. It is also essential to promote awareness of the need for expansion in terms of innovation development and competitiveness.

Innovative Development and Creativity

Creativity is an activity that brings up to now unknown and at the same time, socially valuable creation work - outputs. Socially precious creations are works that are valuable not only to the creator himself but also to a community, not necessarily for all people at the same time. In evaluating the output of a product, the time factor is essential. This factor causes the socially valued creation of a work to be subject to change, often passing from the initial affirmative acceptance through the various stages of devaluation or vice versa.

A product that deserves creative designation can take any form, an invention or an original machine, but just as well an organizational project, not only a work of art.

Novelty is based on the discovery of new truths but may also consists of justifications some long-time known facts. Modernity is sometimes associated with a reminder of important factors that are known for other areas than previously anticipated.

For the creative process is characteristic that it is not entirely determined by knowing and knowing in advance how to proceed elements of uncertainty, exposure to the risk of experimentation.

Secondary or Subjective Creativity

Secondary creativity is a situation where the product was created by the processes of a specific and close nature, such as processes that bring new and contemporary socially valuable results. It means separate cutting through the way that require similar effort and invention. This process is called secondary creativity, often also subjective creativity, based on own research:

assumptions of qualified expansion of innovations in the food industry. A model case in the food industry based on the impact of innovation on business performance and competitiveness. The model case is processed according to the EU definition of the business division.
The role of innovation in the value creation process:

A) in terms of creating a competitive advantage for the company
B) from the point of view of increasing the productivity of the company is

- Use of Information and Communication Technology products,
- Innovation activities - value creation and product growth,
- The position of the industry,
- The challenges of innovation and competitiveness.
- Business competencies and innovations

Creativity and Originality

Originality must, as far as possible, show similarity and a causal link with an authentic, fruitful creative process. Products are referred to as genuine. Where there is something original, we mean something extraordinary, rare, your own, not emulation. The original is not the same as "creative". The association is an inexhaustible source of novelty based on similarity, also called analogous thinking. Ribot (2003) has expanded two types of creating new things in fantasy based on analogy:

1. personification as the transfer of human qualities to objects the surrounding world,
2. transformation (metamorphosis) which, by using partial similarity, brings new as assemblies and creations.

He assumed asocianizmus as a one-sided and mechanical theory, unable to prevent and explain the entire complexity of the human psyche, or even the processes of thoughts that cannot be produced by association laws.

Creativity as a problem-solving process

It involves the problems of targeted thinking emerging in situations when we try to solve the task, also in management, for example. The creative process according to Wallas (1926) has the following primary phases:

1. Preparation
2. Incubation
3. Inspiration
4. Verification.

The basic principle of creativity

It is emphasised that new creations of man come from old elements. If this thesis is correct, the basic principle of the creative process is to select, reshape, and combine aspects of prior experience in which results combine novelty with some usefulness.

Creativity as penetration into science and education

For the direction of science and education and their management at the university today the boom of scientific knowledge and the development of sciences, the acquisition of information, its processing becomes extremely important. From a cyber perspective, management is an information process, processing and transmission of information, which implies, in particular at school, to review the laws of transformation of information to describe its structure in descriptive and prescriptive systems with the scientific involvement of descriptive information systems.
In this respect, the scheme of the information process for the school which is possible to be outlined is stated as follows:

Receiving rolling information

a) Treatment

- forecasting and systematizing information
- development of concepts / combining and process of variant building
- taking decisions and choosing options
- programming of decisions / drawing up of programs/plans; and
- management models

c) Transmission of information to the executive authorities

d) Feedback.

This scheme should be explicitly specified:
- in the field of education - own educational process
- in the field of science - research activities.

Modelling of education and science

The more complex the science-research process and the practical life of people become, the modelling method penetrates almost every human activity and becomes one of the primary methods of knowledge. Today, we can classify in some sense the features that characterize the current state and perspectives of scientific phenomena, the style of scientific thoughts, examined in the broadest

sense. Without exaggeration, it turns out that life and being of contemporary science is unthinkable without models. The previous triumph of the modelling method is due to the incredible results of cybernetics and its fruitful use in management practice.

There was a need for basic rebuilding, setting a whole new goal, meaning and tasks for the school system. Our school system lags the revolutionary changes in science and technology, the original structure and classification of sciences, the emergence of qualitatively new features and branches of knowledge, especially the altered relationship between science and practice. Today it is becoming increasingly clear that these emerging tasks cannot, in any case, be solved by existing methods and means of pedagogy. It also means that new pedagogical research is based on the agenda of the day, which must be found on the principle of new methodological and methodological means, the results of logic, cybernetics and general system theory.

The use of a model case for innovation for a specific company is based on the fact that the model presents a particular object or system that is understood from a certain point of view. The model case that we present is based on a summary of information obtained, where we want to verify the accuracy of previously known facts, which allows to answer research questions. The model case may not always be answered. In this article, we did not use a standard questionnaire survey as a research method, as all questionnaires are marked by subjectivity in the way of evaluation by respondents and thus the credibility of the output data of the questionnaire. Therefore, we chose a model approach, which is a more demanding, professional and credible procedure and through a questionnaire survey. At the same time, we used other suitable scientific methods. The examined model cases form a suitable output for the design and recommendations of innovations in the food industry.

Conclusion

Applying innovation potential is an important part of business management and the basis for the growth of the company's competitiveness. For this reason, businesses need to pay increased attention to innovation and their individual information and assessments, which they acquire and can use in managing business development and in choosing the next strategy.

The economic aspects of the company innovation potential should become an integral part of financial management and decision-making also in the conditions of these companies. It should become an instrument that enables SMEs to know their competitiveness and financial possibilities better, but also to understand how to develop trends.

Loss of competitiveness causes economic tensions in business practice, the increasing importance of maintaining or obtaining solvency, or the threat of bankruptcy, increasingly emphasizing the management and analysis of the company financial and economic situation.

It is only a matter of time before the measurement - assessment of business innovation becomes an element of the standard management and decision-making process in the practice of small and medium-sized enterprises, and not just the necessary turning point to satisfy creditors, curious investors or shareholders.

Management of each business entity should pay increased attention to the economic aspects of the company innovation potential concerning the advent of information and communication technologies. It makes possible to simplify and streamline any human activity while drawing on recommendations and solutions for the future and the existence of the business.

In the EU countries, innovation and innovation development has become a priority. Innovation policy is mainly implemented at the national level, with most Member States having relatively large programs to support innovation. The aim of the European Commission for the Information Society and Entrepreneurship is to strengthen the role of European research to consolidate the scientific and research base. In this way, the achievement of the desired synergy effects from this combination will allow the EU to increase its overall competitiveness more significantly.

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City Branding and Tourist Gaze: A Systematic Review in Tourism Research

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Abstract

Topic of city branding has attracted significant attention in academics fields in the past view years. As many cities tend to compete globally in attracting tourism or investment, the concept of brand strategy is increasingly being adopted from tangible products and has been applied to city development in order to improve the value of city life. City branding helps increase the status of a place as a tourist destination, housing, or business location. There are many places are primarily labeled as tourist destinations, where urban tourism is one of the promptest growing segments of the world tourism market. Tourism is a "way of seeing" where business stages visual experiences and tourists consume them visually. Focusing on the gaze brings out how the organizing sense in tourism is visual. Therefore, this paper intends to discover the essence of city branding related to tourism and the "Tourist Gaze" theory, city image, and the relationship between city image and its influence on tourist visiting decisions. Large databases were selected to search for published articles related to urban tourism. Thereafter, the retrieved articles were categorized and analyzed. Finally, a theoretical framework was provided for future studies on city branding and tourist gaze theory.

Keywords: City branding, Tourist Gaze Theory, Urban tourism, Tourism.

Introduction

Competition between cities to obtain tourists is increasing (Selby 2004). For this reason, more and more cities are investing in city branding. The branding strategy used typically has a dual purpose (Jansson and Power 2006): cities highlight the material characteristics of places for example buildings and events, or their non-material aspects, for example, stories, slogans, and logos. Like this, cities expect to distinguish themselves from rivalry and attract tourists. In this case, city branding can be a useful method for building tourist images. The idea of "Brand city" is one of the concepts applied in business administration and transferred to city literature. To make cities center of attraction and to provide competitive advantage are of the fundamental aims of the city's branding process. In this sense, city branding is a vision. Cities might be successful depend on the way they manage this process with a good strategic approach, determine their route map for the needs of the city by identifying their existing situations in its whole reality, observe it and monitor its results and revise their plans.

City branding can be seen as a process of differentiating and diversifying, in which local tourism organizations, cultural and artistic facilities, museums, historic conservation groups join and build the image of a place, helping in generating tourist sites with a common goal of attracting consumers and investment to a particular place. This process involves two main components, namely: (1) Making a place or building a city, (a process that makes a particular place more attractive) and (2) Imaging of the city or place (the process of promoting a place), (Anholt 2008; Avraham and Ketter 2008; Kavaratzis 2004). The main purpose of a city image is to give the impression of a particular city through perception, depend on the identity of the place and of course by understanding the local culture of the place. However, city branding is more than just the promoting and marketing of places, which is about building and reshaping

the image of the city from historical architecture and roads throughout the city, the image of the city heard or read, the art produced by its inhabitants, thereby attracting targeted consumers and maximizing consumer spending at the city. Therefore, city branding aims to: (1) develop new ways to communicate the city image; (2) achieving competitive advantage, and (3) strengthening the city's reputation, as well as increasing its economic welfares.

Building a good city image is an important mix of activity and structure. As successful brands benefit beyond the physical aspects of the city, there is an intense need to process visual images into unique brand images through clear strategies. As stated by Ashworth and Kavaratzis (2009), "city branding must be linked to the main things people must know about a place". Thus, the process of creating a brand requires the image produced by the media; urban brand project; city life, historic buildings, important architectural signatures, and the overall shape of the city, and should be synchronized with the main target's focus on how to develop a brand (tourism, investment, attracting new residents).

According to Költringer and Dickinger (2015), research in city branding, place marketing, and city image has received great attention among researchers and industry circles. The city sightsee in several aspects has produced added value with respect to the way city space is presented, which in turn will give a meaningful view to the viewers as well as provide added value in an effort to increase city branding. Initially, the concept of city branding was only used by city marketing professionals. This study seeks to find a relationship between the role of urban space on city image in increasing the competitiveness of cities, both in terms of physical and non-physical aspects.

However, up to now there is still limited research on strategies to build the city image in accordance with the established city branding, as well as efforts that can be done by the city to attract tourists and residents attention or in other words the factors causing a city can turn into a 'magnet' of tourists through the 'tourist gaze' theory approach (Urry 1990). Therefore, this paper presents the results of a systematic literature review of city tourism area and the role of city branding as a valuable tool for developing tourist gaze. The purpose of a systematic literature review is to systematically collect, document, examine and critically analyze previous research literature on marketing, city tourism, and city branding.

Literature Review

A brand is an identity that inherent in a product or service. Brands are also used in the area of tourism to give an identity to an area in order to have its own characteristics namely city branding. According to Anholt in Moilanen and Rainisto (2009), city branding is the management of a destination the image through strategic innovation and coordination of economic, social, commercial, cultural, and government regulations. They stated that city branding is a process or effort to create a brand of a city to make it easy for city owners to introduce their city to the target market (investors, tourists, talent, events) by using positioning sentence, icon, slogans, exhibitions, and various other media. Region brands are defined as marketing activities to promote a positive image of a tourist destination in order to influence consumers' decisions to visit the place (Blain, Levy, and Ritchie 2005).

Over the year, city branding evolved into various approaches. There are several approaches regarding city branding from various scientific fields. Kavaratzis (2004) views city branding in the context of communication from the image of a city through three stages of communication, namely primary, secondary, and tertiary. While Rainisto (2003) explains the place branding theory framework that focuses on efforts to market the city. Based on the explanation, it can be concluded that city branding is a strategy to market a region through economic, social, commercial, cultural, and government regulations to introduce the city to the target market.

According to Murfianti (2010), city branding is widely used by cities around the world in an effort to improve or change the image of a city by highlighting the advantages and uniqueness of the area. The benefits gained in implementing city branding are: (1) the area is widely known (high awareness),

accompanied by good perception; (2) considered appropriate for specific purposes; (3) It is considered appropriate for investment sites, tourist destinations, residential destinations, and organizing activities/events; and (4) perceived as a place with high prosperity and security.

On the other hand, a British sociologist, John Urry, develops a theory on why tourist travel for leisure and why they visit certain places in his book 'The Tourist Gaze' (Urry 1990, 2002). He convinces that city tourism without graphic images is hardly conceivable. Urry's theory of "Tourist Gaze" comes from the necessity for people to have a fun atmosphere, leave their daily activities and travel. This kind of trip usually raises the need for various things, both goods and services that they usually do not need in everyday life. Tourist pay for these things because they search for pleasure experiences that are considerably distinctive from their daily lives. These different experiences include views about various spaces and landscapes of the city and the atmosphere of life that they do not see in everyday life. While visiting a new place, they might look at the new environment with enthusiasm and with great curiosity. This illustrates how a person appreciates or at least considers places to visit. The initial concept of 'gaze' comes from a pure human perspective. Humans see the world through filters in the form of ideas, skills, joy, and hope, all of which are limited by social class, gender, nationality, age, and education (Berger 1972). Viewing in certain circumstances can also be conditioned individually by one's experience and memory, and is limited by habits and styles such as the circulation of images and writing in other spaces and places of the same type (Urry 2002).

In fact, the views do not merely belong to tourists who come to visit the city. On the contrary, everyone has their own views (Maoz 2006). Tourists have their own views about a city and the way people behave. City residents also have their own views about visitors coming to their city. None of them is more dominant or dominant since they are interrelated together (Cheong and Miller 2000). Urry (2002) argues that photography provides an increase in taste, especially in terms of sensory perception for instance sight, touch, aroma, and hearing. This leads to location and the phenomenon of dislocation in the feeling of space and the experience of being in space (Bruno 2002). Mahn (2014), in his study found that tourists already have a virtual picture of life in the location they will visit when they first arrive in Greece. That proved true because many of them brought two important things when visiting Greece, namely a travel guide book and a pair of glasses to watch the opera (Mahn 2014). A tourist's gaze distinguishes "seeing" from gaze or "gazing"; for example, the world can see the city through the view of an architect as a historic city because of the many heritage buildings in the city. This view is limited by social class, gender, nationality, age, and education (Urry and Larsen 2011). There is no universal tourist gaze (Urry 1990, 2002) and they have been manipulated to do so by a variety of multimedia channels constructing that gaze and those are enable be avoided, such travel websites, blogs and public photo-sharing sites (Hospers 2009). To facilitate the compilation of conceptual writing of this idea, the paper presents previous research that is in line with the design that is the focus of this study.

Research Method

This research employed a systematic review type of study in the area of interest. A systematic approach to literature review seeks to obtain a systematic overview of research publications. Such approach prioritizes empirical studies that are relevant to specific questions. Overall this systematic review uses data from major studies in areas of interest rather than from direct experiments. This literature review was conducted by analyzing academic journal articles in the scholarly journal namely: ScienceDirect, ProQuest, Emerald, and Google Scholar databases according to the interest keywords of the research. The subject areas of business administration and marketing, tourism and hospitality was used to define the scope of journals as the literature sources. Search strategies use search terms, such as "city branding", "place branding", "destination branding", "tourist gaze". The word "gaze" or "gazing" that appearing in the title, abstract and keywords were also scrutinized. Additionally, internet searches were also carried out to identify other publications and secondary references by the authors identified in previous searches.

Publication searches between 1990 and 2019 were completed to identify relevant studies that thoroughly explored the tourist gaze theory that became a reference in this further research. To facilitate a systematic analysis, with a possibility of using quantitative data, this search also focused on research-published articles in academic journals (Green and Hall 1984). Articles published in academic journals also assure a peer-reviewed quality, which is not the case with books and other non-academic material. It was decided to limit articles to those published after 2004 since these articles would be more relevant for this current global tourism trends. For the purposes of this article writing, publications on city branding related to tourist gaze criteria were reviewed and classified based on the paper structure. This includes the main objectives, types of study identified by the systematic review process, for example, whether qualitative or quantitative, data collection methods, samples, and data analysis methods. Findings from empirical studies were identified for review based on themes that emerged during the analysis, as well as the discussion part, and followed by recommendations. The first search process identified 150 papers that coverage journal articles and conference proceeding. Also, each of the papers was screened to verify that its content was pertinent to this paper purposes.

Findings and Discussion

Currently, urban tourism is one of the fastest growing world tourism market segments. The growing number of travel applications guided tourist trips around cities in the world is becoming increasingly popular. City trips organization and planning has become a part of more than half of the world's consumers by organizing their holidays through travel applications. Owing to this phenomenon, more cities are trying to invest in their city branding to attract those tourist segments. In their Research Report on the Nordic Innovation Center in Oslo, with the tittle "Image of the City: Urban Branding as Constructed Capabilities in Nordic City Regions", Jansson and Power (2006) states that branding strategies commonly used usually have a dual purpose namely material characteristics of places such as buildings and events, or immaterial characteristics such as stories, slogans and logos to distinguish the city itself from competition and attract tourists.

Indeed, city branding can be a useful tool in building tourist perception regarding the image of the city. However, actually how does this image building work? What can the city really do to attract attention? Why, for example, Rome, Paris or Venice are turning into tourist magnets? To better understand the phenomenon of why tourists prefer some cities over others, which may have the same historical value, the "tourist gaze" theory by Urry (2002), will be explored. The "tourist gaze" theory developed through the support of mass tourism which was triggered by the increase in the airway budget. At the same time, the similar thing happens to new industries, which are based on information technology, and are run by tourism and travel agents. According to MacCannel (1999), the increasing number of images that spread allows "site" to "sight" or a place to become a meaningful location. Tourists start visiting the church not for religious purposes but to take pictures at that location. In fact, something that is somehow special in a particular city is able to attract tourists. The most popular items are seen differently from what people usually encounter at home or at work, in terms of scale, meaning, or experience.

Tourists visit the city to gaze at objects built in the city environment. Based on Lynch's (1960) research, it is stated that most of the individual's perceptions about cities are as packages consisting of objects such as: patches (roads, railways, places where people travel); district edge (part of the city) with characters such as settlements, neighborhoods, etc.) nodes or vertices (strategically located meeting places such as squares, street corners, etc.); landmarks (special objects serve as general reference points). Lynch (1960) also found that the passages of the city that passed had the effect of making the image of the city stronger for humans, some cities were easier to remember than others. For tourists, edges and landmarks in particular have more functions to lift the image of the city, because it is more interesting, and easier to notice and remember.

Although the "tourist gaze" theory of Urry (2002) did not examine in the context of the city image, however, the notion of the tourists views is a lot of relevance to cities that want to build an image and

attract tourists. Therefore, if people visit places mainly because of photographic images, then the image of the city itself could help in providing and distributing these images. City branding can be a powerful tool in building a positive and trusting tourist outlook in providing experiences that resemble the images used in city branding. Although there is a pragmatic view of historical and socio-cultural reasons (Morgan, Pritchard, and Pride 2004), city branding is able to offer hope and possibilities for every place, town, city, village, region that is less well known for offering anything special.

In addition, tourists visit a city because they associate it with someone's personality, such as a famous painter, musician, writer, or others. It is not uncommon to claim sites that have special relationships with famous individuals are the result of city image. Thus, Ashworth (Ashworth and Kavaratzis 2009) calls this brand technique Gaudi Gambit after the creation of a successful Barcelona brand with its architect and designer Gaudi. Painter and music are the right icons for a city, whether related exclusively to the place in question or not. From a literature review with the intention of identifying the main study conducted on city branding from 2004 to June 2016, it is known that the current literature is typically limited to studies that focus on dimensions for example, negative and positive assets (Kerr and Johnson 2005); tangible and intangible elements in small town (Parkerson and Saunders 2004); physical and economic environment, culture, activities and facilities, psychological elements (Cheng and Taylor 2007; De Carlo et al. 2009; Hankinson 2004; Laaksonen et al. 2006), and logo design (Hayden and Sevin 2012), calling for the needs to bring a new approach to the topic. Regarding the site of study, predominantly the city branding research were conducted in the Europe and western countries. Table 1 specifies a brief of city branding surveys from various countries.

Table 1: Summary of previous research in city branding area.

Site	Author-date
UK	Parkerson and Saunders (2004) Hankinson (Hankinson 2004)
	Trueman *et al.* (2004) Yi-De (2015)
Germany	Zenker *et al.* (2010) Zenker and Backman (2013)
Italy	Vanolo (2008) De Carlo *et al.* (2009)
Greece	Clark *et al.* (2010)
Turkey	Altinbasak and Yalcin (2010) Hayden and Sevin (2012)
Croatia	Loncaric (2014)
	Blace *et al.* (2015)
Northern Ireland	Northover (2010)

Romania	Pinzaru (2012)
Finland	Laaksonen *et al*. (2006)
Kazakhstan	Cheng and Taylor (2007)
Israel	Herstein and Jaffe (2008)
Spain	Aguilar *et.al* (2016)
Portugal	Freire (2016)
Europe (others)	Moilanen (2015)
Colombia	Kalandides (2011)
India	Vaidya *et al.* (2009)
South Africa	Prayag (2010)
Macau	Sou, Joey Pek, *et.al* (2008)
Australia	Kerr and Johnson (2005) Baxter and Kerr (2011) Greenop (Greenop and Darchen 2016)
Indonesia	Yuwo *et al.* (2013)

Existing research on city branding initiate from the fields of marketing and urban studies, focus to follow parallel directions rather than interdisciplinary paths. However, study also shows that marketing and branding methods can also be employed to overcome negative opinions about a city. Hence, Urry agrees and comments that interest in tourist views has shifted over the years. This has been seen through theoretical lens changes such as for example. Visual theories, postmodernism, and new paradigms of mobility and empirical reality (eg, media saturation, globalization, the peak of oil, and changes in advertising). Urry views that how the sustainability and existence of a wide and globalized tourist outlook. He suggested that future research regarding the views of tourists should explore ways in which it could be localized and de-exotic and more virtual. There is a need to find out the views of tourists globally. Meanwhile Urry also emphasized the need to examine how the increasing number of non-Western tourists as seen seems to be a total focus on Western tourists. There have been several studies on how Asian tourists gaze and they all suggest that the views of tourists as explained earlier. Table 2 explained some focal research related to tourist gaze topic. However, from those papers, only few researches associated to the concept of city branding.

Table 2: Previous research in city branding related to the tourist gaze theory

Reference	Type	Methodology	Population Surveyed	Data Collection
Milos Debnar (2019) Coping with the Inbound Tourism in Gion: Resisting the Touristic Gaze	Empirical	Mixed-methods	520 Western and Asian visitors to Gion	Questionnaire survey and qualitative data
Tiago Miranda (2018) The touristic Porto – gazing over the city	Empirical	Qualitative	82 foreign tourists	semi-structured interviews
Laura Vitale Lollo (2018) City branding for tourism: the power of image selection A comparison of recent Dutch city branding strategies and images for the tourism market in The Hague, Utrecht and Rotterdam	Empirical	Qualitative Case study	3 cities in Nederland (Hague, Utrecht and Rotterdam)	three main stages: identity selection, target audience and visual communication
Wei-Jue Huang, Brian King, Wantanee Suntikul (2017) VFR Tourism and the Tourist Gaze: Overseas Migrant Perceptions of Home	Empirical	Qualitative	26 second-generation Chinese-Americans who have experienced traveling back to China	in-depth, semi-structured interviews
Philipp Wasssler and Ksenia Kirillova (2018) Hell Is Other People? A Sartrean Analysis of The Local Gaze	Empirical	Qualitative phenomenology	8 participants were recruited through experience-based, purposive sampling and interviewed in-depth	emic perspective through a grounded
Philipp Wasssler and Ksenia Kirillova (2019) Hell is other people? An existential- phenomenological analysis of the local gaze in the tourism	Empirical	Qualitative phenomenology	10 Local residents from different education background	Descriptive and hermeneutics
Mohan Li (2015) Tourist photography and the tourist gaze: An Empirical study of Chinese tourists in the UK	Empirical	Qualitative constructivism	30 Chinese tourists in the UK	Framing analysis and autoethnography

Deepak Chhabra (2010) How they see us: perceived effects of tourist gaze on the Old Order Amish (OOA)	Empirical	Mixed-methods.	42 Old Order Amish (OOA) family in Iowa, US	Semi-structured interview and questionnaire
Lesego S. Stone and Gyan P. Nyaupane (2018) The Tourist gaze: Domestic versus International Tourists	Empirical	Qualitative	30 Domestic and 60 International Tourists from Afrika, in Botswana	Qualitative questionnaire
Eko Nursanty, Atik Suprapti, and Joerson Alie Syahbanan (2016) The application of tourist gaze theory to support city branding in the planning of the historic city Surakarta, Indonesia	Empirical	Qualitative Case study	Tourist in Surakarta, Indonesia	In depth interview

Given the number of low-cost transportation operators, city travel is becoming increasingly popular. Clearly, competition between cities for tourists has increased (Huang, King, and Suntikul 2017). Because of this phenomenon, more cities are trying to invest in designing city branding. In designing city branding, the concept of tourist gaze theory is inseparable from it. City branding is also influenced by photography taken by tourists, who not only seeing objects taken in photographs but also the reasons for taking photos based on the objectivity of the images as memories to be shared by tourists with their friends and colleagues or even as a reason to revisit. There are some reasons that are seen from the psychological and sociology of the photographer as shooting. In the literature, three main categories of urban image carriers have been identified: the built environment, events characteristic and well-known personalities (Lynch 1960). This makes several views. First, tourists visit the city to see objects in an artificial environment. Based on extensive empirical research in American and European cities, Lynch (Lynch 1960) and his followers argue that most individuals view a city which is largely a set of objects that are built. Tourists also direct their gaze to the characteristic events that take place in the city. Some events repeat every year, while others only occur once. A city cannot only identify with activities organized during an event (for example, music, art or sports), but also show its organizing capacity with hosting it. Although the benefits of a typical event for the local economy are mostly too high, the impact on the local image can be very large.

Gillespie (Gillespie 2006) states in its issue of “Annals of Tourism Research”, the act of photographing places that are no longer used, the way is turned into a scene: thus tourists visit the church, not to pray, but to take pictures (Gillespie 2006) looking at the phenomenon as a sacralized site that has become the engine behind tourism, in an effort to become an expected place, the tourism industry has thus produced many pseudo authentic attractions (Richardson and Armitage 2012). Urry reports that not all mass tourism tourists are forms of tourism that involve tens of thousands of people going to the same resort at the same time and year (Urry and Larsen 2011). City branding can be a powerful tool in building a positive and trusting tourist outlook in providing experiences that resemble the images used in their branding. Despite a pragmatic view, regarding historical and socio-cultural reasons (Abbasian 2019), city branding can offer hope and possibilities for every place, town, town, village, region that suffers from not offering anything special.

As mentioned earlier, tourists tend to visit cities because of associations with personalities, such as famous artist, where very often, place affiliations with those individuals may tend to be the result of city

branding. Hospers (Hospers 2009) noted that for city brands, tourists are an attractive target group, especially in terms of urban and cultural tourism, seen as a growing market, where tourists are quite responsive to their branding techniques (Hospers 2009). Tourist gaze theory by Urry shows that people visit cities to see the truth, looking for certain features in the urban landscape that have been presented to them through pictures (Urry and Larsen 2011). This theory explains the effects that strengthen themselves in cities that become tourism magnets, such as Venice, Paris, New York, and others. Cities that can be seen that already have their image in the eyes of the public are attracting even more attention to well-known facts. Conversely, cities that have no effect must prevent the emergence of visual excess for tourist views, building stronger tourism images through new tourism facilities (Hospers 2009).

In the impetus to create a city brand, many city governments tend to support the importance of aspects of the local population, where this group is largely ignored in the process of building a city brand. However, the number of stakeholder groups with an interest in cities is potentially unlimited (Stone and Nyaupane 2018). Yet, in building a brand that must be admired by tourists and other short-term visitors, in many cases the population is neglected, regardless of their important role as loyal supporters. Thus, residents must be considered as a key factor in establishing an identity for city branding, a credible, attractive, and sustainable identity in the minds of stakeholders (Cohen 2011). Tourists may visit the city since they associate it with a personality as a famous person at the city. Often, place claims have special links with named individuals that are the result of city branding.

Conclusion and Recommendation

The city branding topic has attracted remarkable attention in certain scholars and policy makers. Because numerous cities are likely to compete worldwide in attracting tourist, investment or talent, the concept of brand strategy is increasingly being adopted from commercial advertisements and has been applied to the development of cities, regeneration and quality of city life. Previously published study on city branding derive from the disciplines of marketing and urban studies, tending to follow parallel directions rather than interdisciplinary paths. The parallelism drawn between city branding and tourist gaze has attracted the attention of many researchers back in recent years, due to the complexity and mobilization of theories by Urry in accordance with social psychology in marketing to tourists later. At this point the complexity of a city brand is determined by its accountability to address the broad spectrum needs of different target groups, and which may be different, from tourists, sports enthusiasts, fashion consumers and residents. However, research also shows that marketing and branding techniques can also be used to overcome existing negative perceptions about a city. Therefore, continued research has major challenges for cities that have independent branding and revolve around the issue of how to develop strong brands or umbrellas that can be coherent in different fields of activity with different target audiences. In addition, the target audience of city is varying from residents, potential investors, tourists and stakeholders or policy maker.

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Ecology: Between Ethical and Economic Reasons. The Attitude of Accounting Students Towards Pope's Francis Theses Formulated In "Laudato Si'" Encyclical

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Abstract

The study investigates accounting students' attitudes to the pope's Francis ecological theses formulated in "Laudato Si" encyclical. It confronts their ethical and economic assessment of its statements. The results prove the dissonance between the moral and economic perception of theses formulated in "Laudato Si'". The attitude towards them is more favorable when the ethical approach is taken rather than the economic one. The theses which are given the highest ethical assessment are characterized by clearness, concreteness, being easy to imagine, affecting respondents, and relating to their self-interest. The statements which are given the highest economic assessment are characterized by the use of economic terms (such as costs, risks, results) and relation to structures, processes, and infrastructure. The differences between ethic and economic assessment of pope Francis "Laudato Si'" theses can be attributed mostly to the explicit or implicit liberal economy and free-market assumptions of accounting education offered at business and economics universities.

Keywords: "Laudato Si'", ecology, accounting students, accounting education.

Introduction

Global and local ecological problems nowadays are becoming crucial not only for ethical but also for economic reasons. The most significant health, social, and economic challenge of today's world is to stop COVID19 and its influence on all aspects of the lives of single persons, societies, and humankind. Furthermore, the pandemic itself is attributed to many reasons, but lack of sustainability and ecological approach is one of the most important causes. For many decades economic education treated sustainability and ecologic issues as less serious matters. Wildlife preservation, moderate resource use, and decrease of rubbish and pollution were treated as the domain of biology, medicine, and technical sciences. The manifestation of ecological issues at business and economic schools and universities was scarce. The accounting education included those problems only from non-financial reporting, which is usually treated by accountants, auditors, and accounting educators as far less significant than financial reporting.

Surprisingly, the relations between ecology, ethics, and economics are widely discussed in a book of a religious character, namely encyclical of pope Francis, titled "Laudato Si'" (2015), which has the status of a Vatican document. The encyclical points out different problems of how people treat wildlife, natural resources, and other human beings and shows many deep cause-effect relations which manifest not only in the field of sustainability but also in economic and social life. In this manner, encyclical goes far above one-religion only character and becomes the source of exhibiting deep concern about humankind, wildlife, and its preservation and quality of people's life

Hypotheses Development and Research Method

Stankiewicz (2003) describes ecological philosophy (eco-philosophy) as a relatively new current of thought formulated in the 2nd half of the XXth century. It encompasses many concepts. They can be distinguished by the effort of changing the predominant cultural and scientific modern paradigm of nature, according to which it should be treated as a passive, supine, non-living object, into a perception, which encompasses human beings and nature as co-existing unity.

According to Hull (2006a, 2006b, 2012), the eco-philosophy has mostly two meanings. One of them relates mainly to ecological movements, and the second one concerns the academic way of understanding, defining, explaining, and evaluating and relates to the world, human beings, and their relations.IN the view of Dołęga (2006a, 2006b), eco-philosophy, as a science, encompasses different fields, such as general philosophical matters, anthropological matters, axiomatic matters, educational matters.

Tyburski (2006) argues that in the great mission of stopping nature degradation, many sciences should take effort. Technical and technological intervention is needed. Biology, the economy, and the law should be engaged. Moreover, humanists have a role to play. The humanistic approach to environmental preservation is called ecological humanism. It encompasses, as its integral elements, philosophical-ethical thought and co-exists with other humanistic disciplines, such as eco-pedagogy, eco-psychology, eco-esthetics, and eco-theology.

Eco-philosophy was incorporated into business mostly by such trends in economics and management and business as sustainable development and stakeholders' inclusion). In accounting, it became present with the necessity (or fashion) of making environmental and corporate social responsibility reports.

There is a vast amount of studies (Andon et al 2015, Brown et al. 2015, Chen et al. 2007, Ferguson at al. 2005, Ferguson at al. 2007 , Gray 2001, Gray et al 1995, Gray et al 1996, Gray et al 1997, Greenwood 2007) concerning the needs of incorporation of stakeholders' points of view (which often relates to ecological issues) into the company's action, including measurement and reporting. Regardless, the practice shows that in business such a trend is treated more as a public relation technique or legal obligation than as genuine care about the environment, sustainable growth, and responsibility towards different groups, which can be affected by the company's actions. Moreover, the managers and accountants produce more and more documents, such as social corporate responsibility reports, environmental reports, etc. Nevertheless their content is often very unclear, and a large amount of numbers makes the understanding of the real influence of the company's actions on the environment and society impossible. Often the reports relating to ecological issues are perceived in accounting departments as "necessary evil", as something that must be done but does no sense. Therefore motivation of this study emerges from the problems related to the gap between ecological, moral awareness and perceived lack of economic sense of some ecology-related actions. The research bases on the Pope Francis "Laudato Si'" as it is a complex document, formulating many ecology-related theses, which makes it possible to construct research based on those postulates. Moreover, it also encompasses social and economic problems related to sustainability issues.

The purpose of the paper is to identify the attitude of accounting students towards the theses of pope Francis encyclical letter "Laudato Si'". The hypotheses are the following:

1) The accounting students exhibit re is the strong agreement with "Laudato Si'" statements from the ethical point of view.
2) The accounting students exhibit re is the strong agreement with "Laudato Si'" statements from the economic point of view.
3) There is a dissonance between moral and economic attitudes of accounting students toward attitudes towards "Laudato Si'" theses.

In order to investigate the attitudes toward the encyclical theses, I have selected the typical statements from the encyclical. I have chosen only the statements without explicit religious connotations. The reason was to prevent the assessment from being influenced by respondents' religiousness or attitudes towards the pope. The list of selected theses is presented ion table 1. Some statements were adjusted to the needs of the survey (e.g. they were shortened, or their grammar format was changed). However, their merit remained unchanged.

Table 1: Statements selected from "Laudato Si'" for analysis

Number of statement	Article in encyclical	Statement
1	164 I	An interdependent world not only makes us more conscious of the negative effects of certain lifestyles and models of production and consumption which affect us all; more importantly, it motivates us to ensure that solutions are proposed from a global perspective, and not simply to defend the interests of a few countries.
2	165	Technology based on the use of highly polluting fossil fuels – especially coal, but also oil and, to a lesser degree, gas – needs to be progressively replaced without delay.
3	170	The countries which have benefited from a high degree of industrialization, at the cost of enormous emissions of greenhouse gases, have a greater responsibility for providing a solution to the problems they have caused.
4	172	For poor countries, the priorities must be to eliminate extreme poverty and to promote the social development of their people.
5	172	Poor countries need to acknowledge the scandalous level of consumption in some privileged sectors of their population and to combat corruption more effectively.
6	172	Poor countries are bound to develop less polluting forms of energy production, but to do so they require the help of countries which have experienced great growth at the cost of the ongoing pollution of the planet.
7	172	Taking advantage of abundant solar energy will require the establishment of mechanisms and subsidies which allow developing countries access to technology transfer, technical assistance and financial resources, but in a way which respects their concrete situations.
8	172	The compatibility of infrastructures with the context for which they have been designed is not always adequately assessed.
9	173	Relations between states must be respectful of each other's sovereignty, but must also lay down mutually agreed means of averting regional disasters which would eventually affect everyone.

10	174	What is needed, in effect, is an agreement on systems of governance for the whole range of so-called “global commons”.
11	175	It is essential to devise stronger and more efficiently organized international institutions, with functionaries who are appointed fairly by agreement among national governments, and empowered to impose sanctions.
12	177 II	The limits which a healthy, mature and sovereign society must impose are those related to foresight and security, regulatory norms, timely enforcement, the elimination of corruption, effective responses to undesired side-effects of production processes, and appropriate intervention where potential or uncertain risks are involved.
13	177	There is a growing jurisprudence dealing with the reduction of pollution by business activities. But political and institutional frameworks do not exist simply to avoid bad practice, but also to promote best practice, to stimulate creativity in seeking new solutions and to encourage individual or group initiatives.
14	180	On the national and local levels, much still needs to be done, such as promoting ways of conserving energy.
15	180	There should be favoring forms of industrial production with maximum energy efficiency and diminished use of raw materials, removing from the market products which are less energy efficient or more polluting,
16	180	There should be improvement of transport systems, and encouragement of the construction and repair of buildings aimed at reducing their energy consumption and levels of pollution.
17	180	Political activity on the local level could also be directed to modifying consumption, developing an economy of waste disposal and recycling, protecting certain species and planning a diversified agriculture and the rotation of crops.
18	180	Agriculture in poorer regions can be improved through investment in rural infrastructures, a better organization of local or national markets, systems of irrigation, and the development of techniques of sustainable agriculture.

19	180	New forms of cooperation and community organization can be encouraged in order to defend the interests of small producers and preserve local ecosystems from destruction.
20	181	Continuity is essential, because policies related to climate change and environmental protection cannot be altered with every change of government. Results take time and demand immediate outlays which may not produce tangible effects within any one government's term.
21	183 III	Environmental impact assessment should not come after the drawing up of a business proposition or the proposal of a particular policy, plan or program.
22	183 III	Environmental impact assessment should be part of the process from the beginning, and be carried out in a way which is interdisciplinary, transparent and free of all economic or political pressure. It should be linked to a study of working conditions and possible effects on people's physical and mental health, on the local economy and on public safety. Economic returns can thus be forecast more realistically, taking into account potential scenarios and the eventual need for further investment to correct possible undesired effects.
23	183 III	A consensus should always be reached between the different stakeholders, who can offer a variety of approaches, solutions and alternatives. The local population should have a special place at the table; they are concerned about their own future and that of their children, and can consider goals transcending immediate economic interest.
24	183 III	We need to stop thinking in terms of "interventions" to save the environment in favor of policies developed and debated by all interested parties. The participation of the latter also entails being fully informed about such projects and their different risks and possibilities; this includes not just preliminary decisions but also various follow-up activities and continued monitoring.

25	184	We need to stop thinking in terms of “interventions” to save the environment in favor of policies developed and debated by all interested parties. The participation of the latter also entails being fully informed about such projects and their different risks and possibilities; this includes not just preliminary decisions but also various follow-up activities and continued monitoring.
26	185	In any discussion about a proposed venture, a number of questions need to be asked in order to discern whether or not it will contribute to genuine integral development. What will it accomplish? Why? Where? When? How? For whom? What are the risks? What are the costs? Who will pay those costs and how?
27	186	Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a pretext for postponing cost-effective measures which prevent environmental degradation. Here the burden of proof is effectively reversed, since in such cases objective and conclusive demonstrations will have to be brought forward to demonstrate that the proposed activity will not cause serious harm to the environment or to those who inhabit it.
28	187	In case of technological innovations the profit cannot be the sole criterion to be taken into account, and that, when significant new information comes to light, a reassessment should be made, with the involvement of all interested parties. The outcome may be a decision not to proceed with a given project, to modify it or to consider alternative proposals.
29	189 IV	Politics must not be subject to the economy, nor should the economy be subject to the dictates of an efficiency-driven paradigm of technocracy.
30	189	In view of the common good, there is urgent need for politics and economics to enter into a frank dialogue in the service of life, especially human life.
31	190	Environmental protection cannot be assured solely on the basis of financial calculations of costs and benefits. The environment is one of those goods that cannot be adequately safeguarded or promoted by market forces.
32	191	Decrease in the pace of production and consumption can at times give rise to another form of progress and development.
33	191	Efforts to promote a sustainable use of natural resources are not a waste of money, but rather an investment capable of providing other economic benefits in the medium term.

34	191	More diversified and innovative forms of production which impact less on the environment can prove very profitable.
35	192	A path of productive development, which is more creative and better directed, could correct the present disparity between excessive technological investment in consumption and insufficient investment in resolving urgent problems facing the human family. It could generate intelligent and profitable ways of reusing, revamping and recycling, and it could also improve the energy efficiency of cities.
36	192	Productive diversification offers the fullest possibilities to human ingenuity to create and innovate, while at the same time protecting the environment and creating more sources of employment. Such creativity would be a worthy expression of our most noble human qualities, for we would be striving intelligently, boldly and responsibly to promote a sustainable and equitable development within the context of a broader concept of quality of life.
37	193	In any event, if in some cases sustainable development were to involve new forms of growth, then in other cases, given the insatiable and irresponsible growth produced over many decades, we need also to think of containing growth by setting some reasonable limits and even retracing our steps before it is too late.
38	193	Unsustainable is the behavior of those who constantly consume and destroy, while others are not yet able to live in a way worthy of their human dignity. That is why the time has come to accept decreased growth in some parts of the world, in order to provide resources for other places to experience healthy growth.
39	193	Technologically advanced societies must be prepared to encourage more sober lifestyles, while reducing their energy consumption and improving its efficiency
40	194	For new models of progress to arise, there is a need to change models of global development; this will entail a responsible reflection on “the meaning of the economy and its goals with an eye to correcting its malfunctions and misapplications.

41	195	Only when the economic and social costs of using up shared environmental resources are recognized with transparency and fully borne by those who incur them, not by other peoples or future generations, can those actions be considered ethical.
42	196	We should keep in mind the principle of subsidiarity, which grants freedom to develop the capabilities present at every level of society, while also demanding a greater sense of responsibility for the common good from those who wield greater power.
43	196	Today, it is the case that some economic sectors exercise more power than states themselves. But economics without politics cannot be justified, since this would make it impossible to favor other ways of handling the various aspects of the present crisis.
44	197	What is needed is a politics which is far-sighted and capable of a new, integral and interdisciplinary approach to handling the different aspects of the crisis.
45	197	A strategy for real change calls for rethinking processes in their entirety, for it is not enough to include a few superficial ecological considerations while failing to question the logic which underlies present-day culture. A healthy politics needs to be able to take up this challenge.
46	198	Politics and the economy tend to blame each other when it comes to poverty and environmental degradation. It is to be hoped that they can acknowledge their own mistakes and find forms of interaction directed to the common good.

Source: own elaboration based on Encyclical Letter Laudato Si' (24 May 2015) of the Holy Father Francis on Care of our Common Goods

After constructing the list of selected statements I asked the group of accounting students to assess the selected statements on the five-point Likert's scale (were 1 point meant "I totally disagree", 2- "I rather disagree", 3 – "I neither agree nor disagree", 4 – "I quite agree" and 5 – "I strongly agree"). The students were to assess the statements in two aspects: ethical and economical one. The students were not informed that the sentences were taken from pope encyclical. The reason for that was to prevent the answers from being formulated on the basis of respondent's personal attitude to the pope or his popularity.

The research was conducted among the students of the third year of bachelor studies of Wrocław University of Economics and Business majoring in accounting. The characteristic of the group is presented in table 2.

Table 2: Group of respondents

Respondents	Male	Female	Total
Number	14	42	56
Percent	25%	75%	100%

Source: own elaboration

As can be seen, 75% of respondents are female, and ¼ of the group is male. It is a typical situation for Poland, where both accountant's profession and accounting studies are feminized. It as discussed in various research papers and books. Some of them (Masztalerz 2018, Kabalski et al 2015) analyzed the phenomenon of Polish accounting feminization directly, and some of them (Nowak 2017, Nowak 2018, Nowak 2019) just were made on the groups of accounting professionals or students, and the respondents turned out to be predominantly female. Average age of respondents was 21 years old.

Results

After the collection of answers, for each sentence, the mean assessment was calculated. The results of ethical attitudes are presented in table 3, starting from the most popular thesis, which is characterized by the highest agreement, to the least popular one, which is characterized by the west agreement.

Table 3: Ethical attitudes towards statements

Number of statement	Article in encyclical	Statement	Mean assessment from an ethical point of view
14	180	On the national and local levels, much still needs to be done, such as promoting ways of conserving energy.	4,88
9	173	Relations between states must be respectful of each other's sovereignty, but must also lay down mutually agreed means of averting regional disasters which would eventually affect everyone.	4,82
16	180	There should be improvement of transport systems, and encouragement of the construction and repair of buildings aimed at reducing their energy consumption and levels of pollution.	4,71
4	172	For poor countries, the priorities must be to eliminate extreme poverty and to promote the social development of their people.	4,61
17	180	Political activity on the local level could also be directed to modifying consumption, developing an economy of waste disposal and recycling, protecting certain species and planning a diversified agriculture and the rotation of crops.	4,61
20	181	Continuity is essential, because policies related to climate change and environmental protection cannot be altered with every change of government. Results take time and demand immediate outlays which may not produce tangible effects within any one government's term.	4,59
30	189	In view of the common good, there is urgent need for politics and economics to enter into a frank dialogue in the service of life, especially human life.	4,57

46	198	Politics and the economy tend to blame each other when it comes to poverty and environmental degradation. It is to be hoped that they can acknowledge their own mistakes and find forms of interaction directed to the common good.	4,55
45	197	A strategy for real change calls for rethinking processes in their entirety, for it is not enough to include a few superficial ecological considerations while failing to question the logic which underlies present-day culture. A healthy politics needs to be able to take up this challenge.	4,54
26	185	In any discussion about a proposed venture, a number of questions need to be asked in order to discern whether or not it will contribute to genuine integral development. What will it accomplish? Why? Where? When? How? For whom? What are the risks? What are the costs? Who will pay those costs and how?	4,52
23	183 III	A consensus should always be reached between the different stakeholders, who can offer a variety of approaches, solutions and alternatives. The local population should have a special place at the table; they are concerned about their own future and that of their children, and can consider goals transcending immediate economic interest.	4,46
2	165	Technology based on the use of highly polluting fossil fuels – especially coal, but also oil and, to a lesser degree, gas – needs to be progressively replaced without delay.	4,41
12	177 II	The limits which a healthy, mature and sovereign society must impose are those related to foresight and security, regulatory norms, timely enforcement, the elimination of corruption, effective responses to undesired side-effects of production processes, and appropriate intervention where potential or uncertain risks are involved.	4,41
15	180	There should be favoring forms of industrial production with maximum energy efficiency and diminished use of raw materials, removing from the market products which are less energy efficient or more polluting,	4,41
18	180	Agriculture in poorer regions can be improved through investment in rural infrastructures, a better organization of local or national markets, systems of irrigation, and the development of techniques of sustainable agriculture.	4,41
19	180	New forms of cooperation and community organization can be encouraged in order to defend the interests of small producers and preserve local ecosystems from destruction.	4,41

22	183 III	Environmental impact assessment should be part of the process from the beginning, and be carried out in a way which is interdisciplinary, transparent and free of all economic or political pressure. It should be linked to a study of working conditions and possible effects on people's physical and mental health, on the local economy and on public safety. Economic returns can thus be forecast more realistically, taking into account potential scenarios and the eventual need for further investment to correct possible undesired effects.	4,41
13	177	There is a growing jurisprudence dealing with the reduction of pollution by business activities. But political and institutional frameworks do not exist simply to avoid bad practice, but also to promote best practice, to stimulate creativity in seeking new solutions and to encourage individual or group initiatives.	4,38
36	192	Productive diversification offers the fullest possibilities to human ingenuity to create and innovate, while at the same time protecting the environment and creating more sources of employment. Such creativity would be a worthy expression of our most noble human qualities, for we would be striving intelligently, boldly and responsibly to promote a sustainable and equitable development within the context of a broader concept of quality of life.	4,32
5	172	Poor countries need to acknowledge the scandalous level of consumption in some privileged sectors of their population and to combat corruption more effectively.	4,29
8	172	The compatibility of infrastructures with the context for which they have been designed is not always adequately assessed.	4,29
25	184	We need to stop thinking in terms of "interventions" to save the environment in favor of policies developed and debated by all interested parties. The participation of the latter also entails being fully informed about such projects and their different risks and possibilities; this includes not just preliminary decisions but also various follow-up activities and continued monitoring.	4,29
34	191	More diversified and innovative forms of production which impact less on the environment can prove very profitable.	4,22

3	170	The countries which have benefited from a high degree of industrialization, at the cost of enormous emissions of greenhouse gases, have a greater responsibility for providing a solution to the problems they have caused.	4,21
7	172	Taking advantage of abundant solar energy will require the establishment of mechanisms and subsidies which allow developing countries access to technology transfer, technical assistance and financial resources, but in a way which respects their concrete situations.	4,20
24	183 III	We need to stop thinking in terms of “interventions” to save the environment in favor of policies developed and debated by all interested parties. The participation of the latter also entails being fully informed about such projects and their different risks and possibilities; this includes not just preliminary decisions but also various follow-up activities and continued monitoring.	4,20
42	196	We should keep in mind the principle of subsidiarity, which grants freedom to develop the capabilities present at every level of society, while also demanding a greater sense of responsibility for the common good from those who wield greater power.	4,20
28	187	In case of technological innovations the profit cannot be the sole criterion to be taken into account, and that, when significant new information comes to light, a reassessment should be made, with the involvement of all interested parties. The outcome may be a decision not to proceed with a given project, to modify it or to consider alternative proposals.	4,16
39	193	Technologically advanced societies must be prepared to encourage more sober lifestyles, while reducing their energy consumption and improving its efficiency	4,14
33	191	Efforts to promote a sustainable use of natural resources are not a waste of money, but rather an investment capable of providing other economic benefits in the medium term.	4,13
31	190	Environmental protection cannot be assured solely on the basis of financial calculations of costs and benefits. The environment is one of those goods that cannot be adequately safeguarded or promoted by market forces.	4,09

37	193	In any event, if in some cases sustainable development were to involve new forms of growth, then in other cases, given the insatiable and irresponsible growth produced over many decades, we need also to think of containing growth by setting some reasonable limits and even retracing our steps before it is too late.	4,00
6	172	Poor countries are bound to develop less polluting forms of energy production, but to do so they require the help of countries which have experienced great growth at the cost of the ongoing pollution of the planet.	3,91
35	192	A path of productive development, which is more creative and better directed, could correct the present disparity between excessive technological investment in consumption and insufficient investment in resolving urgent problems facing the human family. It could generate intelligent and profitable ways of reusing, revamping and recycling, and it could also improve the energy efficiency of cities.	3,89
38	193	Unsustainable is the behavior of those who constantly consume and destroy, while others are not yet able to live in a way worthy of their human dignity. That is why the time has come to accept decreased growth in some parts of the world, in order to provide resources for other places to experience healthy growth.	3,86
40	194	For new models of progress to arise, there is a need to change models of global development; this will entail a responsible reflection on “the meaning of the economy and its goals with an eye to correcting its malfunctions and misapplications.	3,84
10	174	What is needed, in effect, is an agreement on systems of governance for the whole range of so-called “global commons”.	3,82
44	197	What is needed is a politics which is far-sighted and capable of a new, integral and interdisciplinary approach to handling the different aspects of the crisis.	3,79
1	164 I	An interdependent world not only makes us more conscious of the negative effects of certain lifestyles and models of production and consumption which affect us all; more importantly, it motivates us to ensure that solutions are proposed from a global perspective, and not simply to defend the interests of a few countries.	3,75
21	183 III	Environmental impact assessment should not come after the drawing up of a business proposition or the proposal of a particular policy, plan or program.	3,73

27	186	Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a pretext for postponing cost-effective measures which prevent environmental degradation. Here the burden of proof is effectively reversed, since in such cases objective and conclusive demonstrations will have to be brought forward to demonstrate that the proposed activity will not cause serious harm to the environment or to those who inhabit it.	3,73
32	191	Decrease in the pace of production and consumption can at times give rise to another form of progress and development.	3,70
43	196	Today, it is the case that some economic sectors exercise more power than states themselves. But economics without politics cannot be justified, since this would make it impossible to favour other ways of handling the various aspects of the present crisis.	3,52
41	195	Only when the economic and social costs of using up shared environmental resources are recognized with transparency and fully borne by those who incur them, not by other peoples or future generations, can those actions be considered ethical.	3,50
29	189 IV	Politics must not be subject to the economy, nor should the economy be subject to the dictates of an efficiency-driven paradigm of technocracy.	3,38
11	175	It is essential to devise stronger and more efficiently organized international institutions, with functionaries who are appointed fairly by agreement among national governments, and empowered to impose sanctions.	3,21

Source: own elaboration

Table 4 presents the division of theses into these, which assessment was higher than average (which means that for a 1-5 Likert scale, the mean assessment was higher than 3), average (mean equal 3), and lower than average (lower than 3). As can be observed, moral attitudes towards encyclical statements were highly positive when formulated from the moral point of view.

Table 4: Assessment of statements from the moral point of view

Assessment of statements	**higher than average**	**100%**
	average	0%
	lower than average	0%
	total	100%

Source: own elaboration

As presented in tables 3 and 4, all statements are assessed higher than neutrally when evaluated from an ethical point of view. There is a general high agreement with ecological theses included in pope's encyclical Laudato Si. Therefore accounting students acknowledge the moral significance of ecology-related actions and appreciate the care for the environment as highly moral.

There are also ten statements with a mean agreement above 4,5. The higher level of agreement (4,88) is related to the statement stating that on the national and local levels, much still needs to be done, such as promoting ways of conserving the energy. The statement is concrete and clear. Moreover, it can be applied to the macro-level (such as state or global) and personal level. Moreover, everybody can imagine different sources of energy and their promotion. The second statement in order of moral assessment (4,82) says that relations between state must be respectful of each other's sovereignty, but must also lay down mutually agreed means averting regional disasters which would eventually affect everyone. The statement connects with the question of international relations but also points out the problems which can emerge in each local community and affect everybody. Therefore once more, every person can imagine some bad effects of lack of international agreements on ecology-related matters. The third statement amongst the most popular ones (mean equal 4,71) is that there should be improving transport systems, and encouraging the construction and repair of buildings aimed at reducing their energy consumption and levels of pollution. Again, this statement is very concrete. Moreover, every person, especially living in a city, can imagine, and usually suffers from problems with transport and pollution. Furthermore, it is obvious that during their studies, students are becoming inhabitants of the city characterized by a huge pollution and transport problem. Therefore we can guess that the statements with the highest ethical assessment are not only characterized by clearness and concreteness but also as a field of personal interest of respondents who can suffer from problems diagnosed in the statement and profit from the implementation of the solution presented in the statement. Therefore it should be stressed that this can be kind of proof that ethical attitudes are determined to a large extent by self-interest. The fourth statement (mean assessment 4,61) argues that for poor countries, the priorities must be to eliminate extreme poverty and to promote the social development of their people. Again, this sentence is formulated in quite a clear manner. Moreover, its content is near to the generally agreed-upon demand of the modern world. The next statement (4,61 as well) says that political activity on the local level could also be directed to modifying consumption, developing an economy of waste disposal and recycling, protecting certain species, and planning a diversified agriculture and the rotation of crops. Again, the statement is quite clear, and it can be argued that it is more recommending solutions than presenting problems. It also relates to the issues which are probably encountered by most of the respondents, such as recycling. Moreover, because in Poland for several years the rubbish collection services are more expensive, and their price

depends on the rubbish selection to make recycling more effective, people are more aware of the value and necessity of reducing rubbish. Again, the reduction of rubbish can be perceived as an ethical issue, but the strong agreement with the statement can be affected by self-interest. The next statement (4,59) says that continuity is essential, because policies related to climate change and environmental protection cannot be altered with every change of government; results take time and demand immediate outlays which may not produce tangible effects within any one government's term. The statement again is very concrete and clear and refers to things known to all citizens, such as irresponsible changes in sustainability politics with every government change. It also refers to things that are everyday bread for each accountant and accounting student, such as costs and their incurrence. The next statement (mean 4,57) says that view of the common good, there is urgent need for politics and economics to enter into a frank dialogue in the service of life, especially human life. The sentence again refers not only to sustainability matters but can be perceived as the question of the self-interest of each human-being. It also exhibits an anthropocentric view on ecology. The next statement (mean 4,55) says that politics and the economy tend to blame each other when it comes to poverty and environmental degradation; it is to be hoped that they can acknowledge their own mistakes and find forms of interaction directed to the common good. The statement is quite clear. For students who are young people, it also can be important that the argument refers to politics and economy, which both can stand for people who rule the counties, institutions, and syndicates and who can be perceived by the students as kind of opposite to them. The students can simply understand politics and economy as symbolizing "those on the top", unknown powerful people, whereas environmental degradation (manifesting by rubbish and pollution) and poverty (manifested by homeless people) are phenomena that can be encountered by each student. The students can even themselves feel like victims of the "war on the top" between politics and economics. The next statement (4,54) refers to changes: "A strategy for real change calls for rethinking processes in their entirety, for it is not enough to include a few superficial ecological considerations while failing to question the logic which underlies present-day culture. A healthy politics needs to be able to take up this challenge." This sentence is also quite clear for people who study at the university of business and economics. Although respondents specialize in accounting, they all learn management and strategic management; therefore, they are aware of the necessity of long-term view and holistic approach. The last statement assessed from an ethical point of view above 4,5 (with mean 4,52) says that in any discussion about a proposed venture, a number of questions need to be asked in order to discern whether or not it will contribute to genuine integral development. What will it accomplish? Why? Where? When? How? For whom? What are the risks? What are the costs? Who will pay those costs and how? The questions which are enumerated here are understandable to the economy and business students, especially students of accounting, esp. when it comes to costs and risks. Also, the formulated questions are aimed to identify the true beneficiaries of ventures versus people and societies who actually will suffer from the disadvantages of venture implementation. Therefore the ethical context is again quite clear.

Also, the least popular (although assessed above average) statements need commenting. However, it should be stressed that only 2 of them were assessed with a mean lower than 3,5. The lower ethical assessment (3,21) was given to statement that it is essential to devise stronger and more efficiently organized international institutions, with functionaries who are appointed fairly by agreement among national governments, and empowered to impose sanctions. It can be attributed to the fact that people, especially young ones, treat big institutions, such as organized international institutions, with a certain degree of suspicion and usually do not think the to be moral. Therefore giving them power does not seem to be a particularly ethical idea to some students. The second least popular statement (3,38) says that politics must not be subject to the economy, nor should the economy be subject to the dictates of an efficiency-driven paradigm of technocracy. The lower assessment of this statement may probably be partly attributed to the fact that respondents were about to complete their economic studies; therefore, some think the economy is more important than politics. Also, there can be a question about self-prestige and self-importance and self-interest as well (future economists have aspirations of being those who are important, who govern, who set the rules for other people such as politicians).

Summing up the moral assessment of the content of "Laudato Si" encyclical several aspects of most popular theses can be distinguished. They are characterized by clearness and concreteness. The content is easy to envisage and imagine. Often they refer to the situations known by the respondents and reflecting some problems in their life. They also can be perceived from the self-interest of respondents themselves.

Table 5 contains statements and their assessment from the point of view of the economy. The list starts with the statement with the highest economic assessment and is organized according to the economic perception of statements.

Table 5: Economic attitudes towards statements

Number of statement	Article in encyclical	Statement	Mean assessment from an economic point of view
14	180	On the national and local levels, much still needs to be done, such as promoting ways of conserving energy.	4,41
26	185	In any discussion about a proposed venture, a number of questions need to be asked in order to discern whether or not it will contribute to genuine integral development. What will it accomplish? Why? Where? When? How? For whom? What are the risks? What are the costs? Who will pay those costs and how?	4,11
9	173	Relations between states must be respectful of each other's sovereignty, but must also lay down mutually agreed means of averting regional disasters which would eventually affect everyone.	3,86
8	172	The compatibility of infrastructures with the context for which they have been designed is not always adequately assessed.	3,79
45	197	A strategy for real change calls for rethinking processes in their entirety, for it is not enough to include a few superficial ecological considerations while failing to question the logic which underlies present-day culture. A healthy politics needs to be able to take up this challenge.	3,66
16	180	There should be improvement of transport systems, and encouragement of the construction and repair of buildings aimed at reducing their energy consumption and levels of pollution.	3,61
20	181	Continuity is essential, because policies related to climate change and environmental protection cannot be altered with every change of government. Results take time and demand immediate outlays which may not produce tangible effects within any one government's term.	3,61

25	184	We need to stop thinking in terms of “interventions” to save the environment in favor of policies developed and debated by all interested parties. The participation of the latter also entails being fully informed about such projects and their different risks and possibilities; this includes not just preliminary decisions but also various follow-up activities and continued monitoring.	3,59
30	189	In view of the common good, there is urgent need for politics and economics to enter into a frank dialogue in the service of life, especially human life.	3,59
13	177	There is a growing jurisprudence dealing with the reduction of pollution by business activities. But political and institutional frameworks do not exist simply to avoid bad practice, but also to promote best practice, to stimulate creativity in seeking new solutions and to encourage individual or group initiatives.	3,57
46	198	Politics and the economy tend to blame each other when it comes to poverty and environmental degradation. It is to be hoped that they can acknowledge their own mistakes and find forms of interaction directed to the common good.	3,55
33	191	Efforts to promote a sustainable use of natural resources are not a waste of money, but rather an investment capable of providing other economic benefits in the medium term.	3,52
36	192	Productive diversification offers the fullest possibilities to human ingenuity to create and innovate, while at the same time protecting the environment and creating more sources of employment. Such creativity would be a worthy expression of our most noble human qualities, for we would be striving intelligently, boldly and responsibly to promote a sustainable and equitable development within the context of a broader concept of quality of life.	3,52
17	180	Political activity on the local level could also be directed to modifying consumption, developing an economy of waste disposal and recycling, protecting certain species and planning a diversified agriculture and the rotation of crops.	3,50

35	192	A path of productive development, which is more creative and better directed, could correct the present disparity between excessive technological investment in consumption and insufficient investment in resolving urgent problems facing the human family. It could generate intelligent and profitable ways of reusing, revamping and recycling, and it could also improve the energy efficiency of cities.	3,48
12	177 II	The limits which a healthy, mature and sovereign society must impose are those related to foresight and security, regulatory norms, timely enforcement, the elimination of corruption, effective responses to undesired side-effects of production processes, and appropriate intervention where potential or uncertain risks are involved.	3,46
34	191	More diversified and innovative forms of production which impact less on the environment can prove very profitable.	3,45
44	197	What is needed is a politics which is far-sighted and capable of a new, integral and interdisciplinary approach to handling the different aspects of the crisis.	3,39
24	183 III	We need to stop thinking in terms of “interventions” to save the environment in favor of policies developed and debated by all interested parties. The participation of the latter also entails being fully informed about such projects and their different risks and possibilities; this includes not just preliminary decisions but also various follow-up activities and continued monitoring.	3,34
23	183 III	A consensus should always be reached between the different stakeholders, who can offer a variety of approaches, solutions and alternatives. The local population should have a special place at the table; they are concerned about their own future and that of their children, and can consider goals transcending immediate economic interest.	3,31
18	180	Agriculture in poorer regions can be improved through investment in rural infrastructures, a better organization of local or national markets, systems of irrigation, and the development of techniques of sustainable agriculture.	3,30

22	183 III	Environmental impact assessment should be part of the process from the beginning, and be carried out in a way which is interdisciplinary, transparent and free of all economic or political pressure. It should be linked to a study of working conditions and possible effects on people's physical and mental health, on the local economy and on public safety. Economic returns can thus be forecast more realistically, taking into account potential scenarios and the eventual need for further investment to correct possible undesired effects.	3,30
3	170	The countries which have benefited from a high degree of industrialization, at the cost of enormous emissions of greenhouse gases, have a greater responsibility for providing a solution to the problems they have caused.	3,29
19	180	New forms of cooperation and community organization can be encouraged in order to defend the interests of small producers and preserve local ecosystems from destruction.	3,29
21	183 III	Environmental impact assessment should not come after the drawing up of a business proposition or the proposal of a particular policy, plan or program.	3,25
28	187	In case of technological innovations the profit cannot be the sole criterion to be taken into account, and that, when significant new information comes to light, a reassessment should be made, with the involvement of all interested parties. The outcome may be a decision not to proceed with a given project, to modify it or to consider alternative proposals.	3,23
37	193	In any event, if in some cases sustainable development were to involve new forms of growth, then in other cases, given the insatiable and irresponsible growth produced over many decades, we need also to think of containing growth by setting some reasonable limits and even retracing our steps before it is too late.	3,23
4	172	For poor countries, the priorities must be to eliminate extreme poverty and to promote the social development of their people.	3,18
31	190	Environmental protection cannot be assured solely on the basis of financial calculations of costs and benefits. The environment is one of those goods that cannot be adequately safeguarded or promoted by market forces.	3,18

43	196	Today, it is the case that some economic sectors exercise more power than states themselves. But economics without politics cannot be justified, since this would make it impossible to favour other ways of handling the various aspects of the present crisis.	3,18
27	186	Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a pretext for postponing cost-effective measures which prevent environmental degradation. Here the burden of proof is effectively reversed, since in such cases objective and conclusive demonstrations will have to be brought forward to demonstrate that the proposed activity will not cause serious harm to the environment or to those who inhabit it.	3,14
40	194	For new models of progress to arise, there is a need to change models of global development; this will entail a responsible reflection on "the meaning of the economy and its goals with an eye to correcting its malfunctions and misapplications.	3,14
11	175	It is essential to devise stronger and more efficiently organized international institutions, with functionaries who are appointed fairly by agreement among national governments, and empowered to impose sanctions.	3,13
15	180	There should be favoring forms of industrial production with maximum energy efficiency and diminished use of raw materials, removing from the market products which are less energy efficient or more polluting,	3,11
42	196	We should keep in mind the principle of subsidiarity, which grants freedom to develop the capabilities present at every level of society, while also demanding a greater sense of responsibility for the common good from those who wield greater power.	3,11
7	172	Taking advantage of abundant solar energy will require the establishment of mechanisms and subsidies which allow developing countries access to technology transfer, technical assistance and financial resources, but in a way which respects their concrete situations.	3,07
32	191	Decrease in the pace of production and consumption can at times give rise to another form of progress and development.	3,05
39	193	Technologically advanced societies must be prepared to encourage more sober lifestyles, while reducing their energy consumption and improving its efficiency	3,02

41	195	Only when the economic and social costs of using up shared environmental resources are recognized with transparency and fully borne by those who incur them, not by other peoples or future generations, can those actions be considered ethical.	3,02
5	172	Poor countries need to acknowledge the scandalous level of consumption in some privileged sectors of their population and to combat corruption more effectively.	3,00
10	174	What is needed, in effect, is an agreement on systems of governance for the whole range of so-called “global commons”.	2,96
2	165	Technology based on the use of highly polluting fossil fuels – especially coal, but also oil and, to a lesser degree, gas – needs to be progressively replaced without delay.	2,89
6	172	Poor countries are bound to develop less polluting forms of energy production, but to do so they require the help of countries which have experienced great growth at the cost of the ongoing pollution of the planet.	2,89
29	189 IV	Politics must not be subject to the economy, nor should the economy be subject to the dictates of an efficiency-driven paradigm of technocracy.	2,89
1	164 I	An interdependent world not only makes us more conscious of the negative effects of certain lifestyles and models of production and consumption which affect us all; more importantly, it motivates us to ensure that solutions are proposed from a global perspective, and not simply to defend the interests of a few countries.	2,70
38	193	Unsustainable is the behavior of those who constantly consume and destroy, while others are not yet able to live in a way worthy of their human dignity. That is why the time has come to accept decreased growth in some parts of the world, in order to provide resources for other places to experience healthy growth.	2,41

Source: own elaboration

Table 6 presents the classification into the statements with the highest, average, and lowest level of acceptance.

Table 6: Assessment of statements from the economic point of view

Assessment of statements	**higher than average**	**85%**
	average	2%
	lower than average	13%
	total	100%

Source: own elaboration

It should be stressed that the assessment of encyclical statements made from an economic point of view is lower than moral assessment. Only two statements are assessed with the mean higher than four, and no assessment was given above 4,5. For the economic assessment, 85% of statements are higher than average (3), one is assessed with average (3), and 13% are given less than average mean of points (less than 3).

The first statement, with the order of mean (4,11), is that on the national and local levels, much still needs to be done, such as promoting ways of conserving energy. The statement includes both economic action (promoting) and the economic result (conserving energy). Therefore the high assessment of the statement from the economic point of view is not surprising. The thesis both discusses the need to motivate people, societies, and nations to energy-saving and the necessity of acting on different levels. This is very convincing for accounting students of the university of business and economics. As already mentioned, they passed the courses on management. Therefore the need for proper motivating people is known to them. So it is quite evident that they assess the theses highly from the economic point of view. Second, in the order of popularity (mean 4,11), is the following thesis: “In any discussion about a proposed venture, a number of questions need to be asked in order to discern whether or not it will contribute to genuine integral development. What will it accomplish? Why? Where? When? How? For whom? What are the risks? What are the costs? Who will pay those costs and how?" This statement is also very economy-oriented in terms of used vocabulary and aspects which were mentioned. Such terms as a venture, risks, costs, and payments are included. It can be assessed as reflecting economic reality and asking about economic facts, forecasts, and simulations. The next thesis (3,86) says that relations between states must be respectful of each other's sovereignty, but must also lay down mutually agreed means of averting regional disasters which would eventually affect everyone. This sentence refers to well-known economic issues such as organizations and structures (relations between states) and effects (disasters affecting everyone). The following statement (mean 3,79) says that the compatibility of infrastructures with the context for which they have been designed is not always adequately assessed. Again, this relates to economic issues, such as infrastructure and the context of its use. The next statement (mean 3,61) says that there should be improvement of transport systems, and encouragement of the construction and repair of buildings aimed at reducing their energy consumption and levels of pollution. Again,

this argument is the issue of managerial and engineering issues. The statement sounds very reasonable from an economical point of view as it refers to the savings (made by reducing energy consumption). Another statement with the same assessment (mean 3,61) says that continuity is essential because policies related to climate change and environmental protection cannot be altered with every change of government; results take time and demand immediate outlays which may not produce tangible effects within any one government's term.

The thesis with the lowest economic assessment (mean 2,41) is the following: "Unsustainable is the behavior of those who constantly consume and destroy, while others are not yet able to live in a way worthy of their human dignity. That is why the time has come to accept decreased growth in some parts of the world, in order to provide resources for other places to experience healthy growth." The disagreement from the economic point of view can be attributed to different reasons. First of them is rooted in western economic education done in a liberal free-market paradigm. From a market-oriented perspective, consumption is always perceived as a positive phenomenon that boosts the economy. Moreover, the free market economy point of view does not operate terms such as "human dignity". It also does not support the thesis that sharing is rational. Therefore it is not surprising that accounting students from the university of economics and business do not agree with the presented statement from an economic point of view. In the order of unpopularity, the second thesis (2,70) states that: "An interdependent world not only makes us more conscious of the negative effects of certain lifestyles and models of production and consumption which affect us all; more importantly, it motivates us to ensure that solutions are proposed from a global perspective, and not simply to defend the interests of a few countries." Again, the low assessment of this argument from the economic point of view is rooted basically in the free market paradigm, which is implicitly and explicitly present in our economic education. This paradigm does not accept the fact that there are some detrimental models of lifestyles, production, and consumption. It sees them only as profitable or unprofitable ones. Also, from the point of view of this paradigm, any interference in the free market is unacceptable. Therefore searching for and imposing global solutions is seen as acting against the market laws.

A close look at the statements which are assessed highly from an economic point of view leads to several conclusions. Most popular theses among accounting students are characterized by referring to matters such as management, processes, infrastructure, costs, and results. They use much economy-related vocabulary, although this vocabulary is often used in a broader context. They often raise questions relating to strategic management. The theses with low assessment often emphasize a need for sharing, help, intervention, etc. Therefore they oppose the self-interest approach and free-market paradigm.

The moral and economic assessments are especially interesting when they are confronted. Pearson's correlation between their means is 0,62. Therefore the correlation is significant. Moreover, for each statement, there was a difference between economic and moral assessment, and ethical assessment was always higher than the economic one. Table 7 shows for each statement difference between economic and moral assessment. The theses are presented in ordered of the level of disagreement (the difference between the means for two types of attitudes).

Table 7: Difference between ethical and economic attitudes towards statements

Number of statement	Article in encyclical	Statement	Difference between ethical and economic mean attitude towards statement
2	165	Technology based on the use of highly polluting fossil fuels – especially coal, but also oil and, to a lesser degree, gas – needs to be progressively replaced without delay.	1,52
38	193	Unsustainable is the behavior of those who constantly consume and destroy, while others are not yet able to live in a way worthy of their human dignity. That is why the time has come to accept decreased growth in some parts of the world, in order to provide resources for other places to experience healthy growth.	1,45
4	172	For poor countries, the priorities must be to eliminate extreme poverty and to promote the social development of their people.	1,43
15	180	There should be favoring forms of industrial production with maximum energy efficiency and diminished use of raw materials, removing from the market products which are less energy efficient or more polluting,	1,30
5	172	Poor countries need to acknowledge the scandalous level of consumption in some privileged sectors of their population and to combat corruption more effectively.	1,29
23	183 III	A consensus should always be reached between the different stakeholders, who can offer a variety of approaches, solutions and alternatives. The local population should have a special place at the table; they are concerned about their own future and that of their children, and can consider goals transcending immediate economic interest.	1,15
39	193	Technologically advanced societies must be prepared to encourage more sober lifestyles, while reducing their energy consumption and improving its efficiency	1,13
19	180	New forms of cooperation and community organization can be encouraged in order to defend the interests of small producers and preserve local ecosystems from destruction.	1,13
7	172	Taking advantage of abundant solar energy will require the establishment of mechanisms and subsidies which allow developing countries access to technology transfer, technical assistance and financial resources, but in a way which respects their concrete situations.	1,13
16	180	There should be improvement of transport systems, and encouragement of the construction and repair of buildings aimed at reducing their energy consumption and levels of pollution.	1,11
18	180	Agriculture in poorer regions can be improved through investment in rural infrastructures, a better organization of local or national markets, systems of irrigation, and the development of techniques of sustainable agriculture.	1,11

22	183 III	Environmental impact assessment should be part of the process from the beginning, and be carried out in a way which is interdisciplinary, transparent and free of all economic or political pressure. It should be linked to a study of working conditions and possible effects on people's physical and mental health, on the local economy and on public safety. Economic returns can thus be forecast more realistically, taking into account potential scenarios and the eventual need for further investment to correct possible undesired effects.	1,11
17	180	Political activity on the local level could also be directed to modifying consumption, developing an economy of waste disposal and recycling, protecting certain species and planning a diversified agriculture and the rotation of crops.	1,11
42	196	We should keep in mind the principle of subsidiarity, which grants freedom to develop the capabilities present at every level of society, while also demanding a greater sense of responsibility for the common good from those who wield greater power.	1,09
1	164 I	An interdependent world not only makes us more conscious of the negative effects of certain lifestyles and models of production and consumption which affect us all; more importantly, it motivates us to ensure that solutions are proposed from a global perspective, and not simply to defend the interests of a few countries.	1,05
6	172	Poor countries are bound to develop less polluting forms of energy production, but to do so they require the help of countries which have experienced great growth at the cost of the ongoing pollution of the planet.	1,02
46	198	Politics and the economy tend to blame each other when it comes to poverty and environmental degradation. It is to be hoped that they can acknowledge their own mistakes and find forms of interaction directed to the common good.	1,00
20	181	Continuity is essential, because policies related to climate change and environmental protection cannot be altered with every change of government. Results take time and demand immediate outlays which may not produce tangible effects within any one government's term.	0,98
30	189	In view of the common good, there is urgent need for politics and economics to enter into a frank dialogue in the service of life, especially human life.	0,98
9	173	Relations between states must be respectful of each other's sovereignty, but must also lay down mutually agreed means of averting regional disasters which would eventually affect everyone.	0,96
12	177 II	The limits which a healthy, mature and sovereign society must impose are those related to foresight and security, regulatory norms, timely enforcement, the elimination of corruption, effective responses to undesired side-effects of production processes, and appropriate intervention where potential or uncertain risks are involved.	0,95
3	170	The countries which have benefited from a high degree of industrialization, at the cost of enormous emissions of greenhouse gases, have a greater responsibility for providing a solution to the problems they have caused.	0,93

28	187	In case of technological innovations the profit cannot be the sole criterion to be taken into account, and that, when significant new information comes to light, a reassessment should be made, with the involvement of all interested parties. The outcome may be a decision not to proceed with a given project, to modify it or to consider alternative proposals.	0,93
31	190	Environmental protection cannot be assured solely on the basis of financial calculations of costs and benefits. The environment is one of those goods that cannot be adequately safeguarded or promoted by market forces.	0,91
45	197	A strategy for real change calls for rethinking processes in their entirety, for it is not enough to include a few superficial ecological considerations while failing to question the logic which underlies present-day culture. A healthy politics needs to be able to take up this challenge.	0,88
10	174	What is needed, in effect, is an agreement on systems of governance for the whole range of so-called “global commons”.	0,86
24	183 III	We need to stop thinking in terms of “interventions” to save the environment in favour of policies developed and debated by all interested parties. The participation of the latter also entails being fully informed about such projects and their different risks and possibilities; this includes not just preliminary decisions but also various follow-up activities and continued monitoring.	0,86
13	177	There is a growing jurisprudence dealing with the reduction of pollution by business activities. But political and institutional frameworks do not exist simply to avoid bad practice, but also to promote best practice, to stimulate creativity in seeking new solutions and to encourage individual or group initiatives.	0,80
36	192	Productive diversification offers the fullest possibilities to human ingenuity to create and innovate, while at the same time protecting the environment and creating more sources of employment. Such creativity would be a worthy expression of our most noble human qualities, for we would be striving intelligently, boldly and responsibly to promote a sustainable and equitable development within the context of a broader concept of quality of life.	0,80
34	191	More diversified and innovative forms of production which impact less on the environment can prove very profitable.	0,78
37	193	In any event, if in some cases sustainable development were to involve new forms of growth, then in other cases, given the insatiable and irresponsible growth produced over many decades, we need also to think of containing growth by setting some reasonable limits and even retracing our steps before it is too late.	0,77
40	194	For new models of progress to arise, there is a need to change models of global development; this will entail a responsible reflection on “the meaning of the economy and its goals with an eye to correcting its malfunctions and misapplications.	0,70
25	184	We need to stop thinking in terms of “interventions” to save the environment in favor of policies developed and debated by all interested parties. The participation of the latter also entails being fully informed about such projects and their different risks and possibilities; this includes not just preliminary decisions but also various follow-up activities and continued monitoring.	0,70

32	191	Decrease in the pace of production and consumption can at times give rise to another form of progress and development.	0,64
33	191	Efforts to promote a sustainable use of natural resources are not a waste of money, but rather an investment capable of providing other economic benefits in the medium term.	0,61
27	186	Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a pretext for postponing cost-effective measures which prevent environmental degradation. Here the burden of proof is effectively reversed, since in such cases objective and conclusive demonstrations will have to be brought forward to demonstrate that the proposed activity will not cause serious harm to the environment or to those who inhabit it.	0,59
8	172	The compatibility of infrastructures with the context for which they have been designed is not always adequately assessed.	0,50
21	183 III	Environmental impact assessment should not come after the drawing up of a business proposition or the proposal of a particular policy, plan or program.	0,48
29	189 IV	Politics must not be subject to the economy, nor should the economy be subject to the dictates of an efficiency-driven paradigm of technocracy.	0,48
41	195	Only when the economic and social costs of using up shared environmental resources are recognized with transparency and fully borne by those who incur them, not by other peoples or future generations, can those actions be considered ethical.	0,48
14	180	On the national and local levels, much still needs to be done, such as promoting ways of conserving energy.	0,46
26	185	In any discussion about a proposed venture, a number of questions need to be asked in order to discern whether or not it will contribute to genuine integral development. What will it accomplish? Why? Where? When? How? For whom? What are the risks? What are the costs? Who will pay those costs and how?	0,41
35	192	A path of productive development, which is more creative and better directed, could correct the present disparity between excessive technological investment in consumption and insufficient investment in resolving urgent problems facing the human family. It could generate intelligent and profitable ways of reusing, revamping and recycling, and it could also improve the energy efficiency of cities.	0,41
44	197	What is needed is a politics which is far-sighted and capable of a new, integral and interdisciplinary approach to handling the different aspects of the crisis.	0,39
43	196	Today, it is the case that some economic sectors exercise more power than states themselves. But economics without politics cannot be justified, since this would make it impossible to favor other ways of handling the various aspects of the present crisis.	0,34
11	175	It is essential to devise stronger and more efficiently organized international institutions, with functionaries who are appointed fairly by agreement among national governments, and empowered to impose sanctions.	0,09

Source: own elaboration

There should be a close look at the theses characterized by a high level of disagreement. The highest dissonance (1,52) relates to the statement that technology based on the use of highly polluting fossil

fuels – especially coal, but also oil and, to a lesser degree, gas – needs to be progressively replaced without delay. The difference can emerge from specific Polish conditions. Although students know the need for pollution reduction and assess it highly from the moral point of view, their economic assessment of the thesis is much lower. It is probably caused by the government's propaganda, saying that Poland is and should be a coal-based economy. Such behavior of the leading party is affected by the strong position of coal miners' labor unions and by the fact that they support the government. Moreover, previous Polish governments were also reluctant about reforms of the coal branch, which was a result of the strong position of coal labor unions and the threat of significant unemployment rate in the coal regions in case of closing mines. Therefore, although coal mines in Poland are not only polluting the environment but also causing substantial financial losses, there is a deeply rooted convenience that coal mines are the base of the Polish economy.

The second statement with a high level of dissonance between moral and economic assessment (1,45) is the following thesis: "Unsustainable is the behavior of those who constantly consume and destroy, while others are not yet able to live in a way worthy of their human dignity. That is why the time has come to accept decreased growth in some parts of the world, in order to provide resources for other places to experience healthy growth." Again, this statement contains vocabulary which is morality-related (e.g. dignity). It also criticizes socio-economic trends such as consumerism, which predominate in reach western countries. As the students at the university of economics and business often are convinced that high consumption leads to mostly positive economic outcomes (higher wealth, employment, and investments), they do not see the dark part of it, such as destruction of wildlife and widening the gap between rich and poor. Moreover, economic growth is usually perceived as an autonomic value itself. Therefore accounting students oppose the thesis that there is the necessity of economic decline.

Another high-dissonance (1,43) statement says that for poor countries, the priorities must be to eliminate extreme poverty and to promote the social development of their people. The difference probably emerges from the suggestion of the social transfers which are looked upon in the liberal economies. Moreover, accounting students probably think that social development is an issue which functions outside of the sphere of economy. That makes their level of economic agreement low. From another point of view, moral legitimacy of this argument seems evident as the elimination of extreme social poverty is one of the essential ethical postulations of today's world. Therefore the dissonance between ethical and economic assessment is getting huge.

The next thesis with the high level of disagreement between ethical and economic assessment (1,30) says that there should be favoring forms of industrial production with maximum energy efficiency and diminished use of raw materials, removing from the market products which are less energy efficient or more polluting. The enormous dissonance can be attributed to the fact that in a liberal economy, which is explicitly or implicitly preferred on economics and business universities, favoring any business or type of production is suspicious. From another point of view, students acknowledge the moral significance of reducing pollution and using environmentally-friendly forms of energy. That makes the gap between ethical and economic assessment very wide.

Conclusions

The moral assessment of the content of "Laudato Si" encyclical several aspects of most popular theses can be distinguished. They are characterized by clearness and concreteness. The content is easy to envisage and imagine. Often they refer to the situations known by the respondents and reflecting some problems in their life. They also can be perceived from the self-interest of respondents themselves. In the case of the statements which are assessed highly from the economic point of view, several conclusions can be formulated. Most popular theses among accounting students are characterized by referring to matters such as management, processes, infrastructure, costs, and results. They use much economy-related vocabulary, although this vocabulary is often used in the broader context. They often raise questions relating to strategic management.

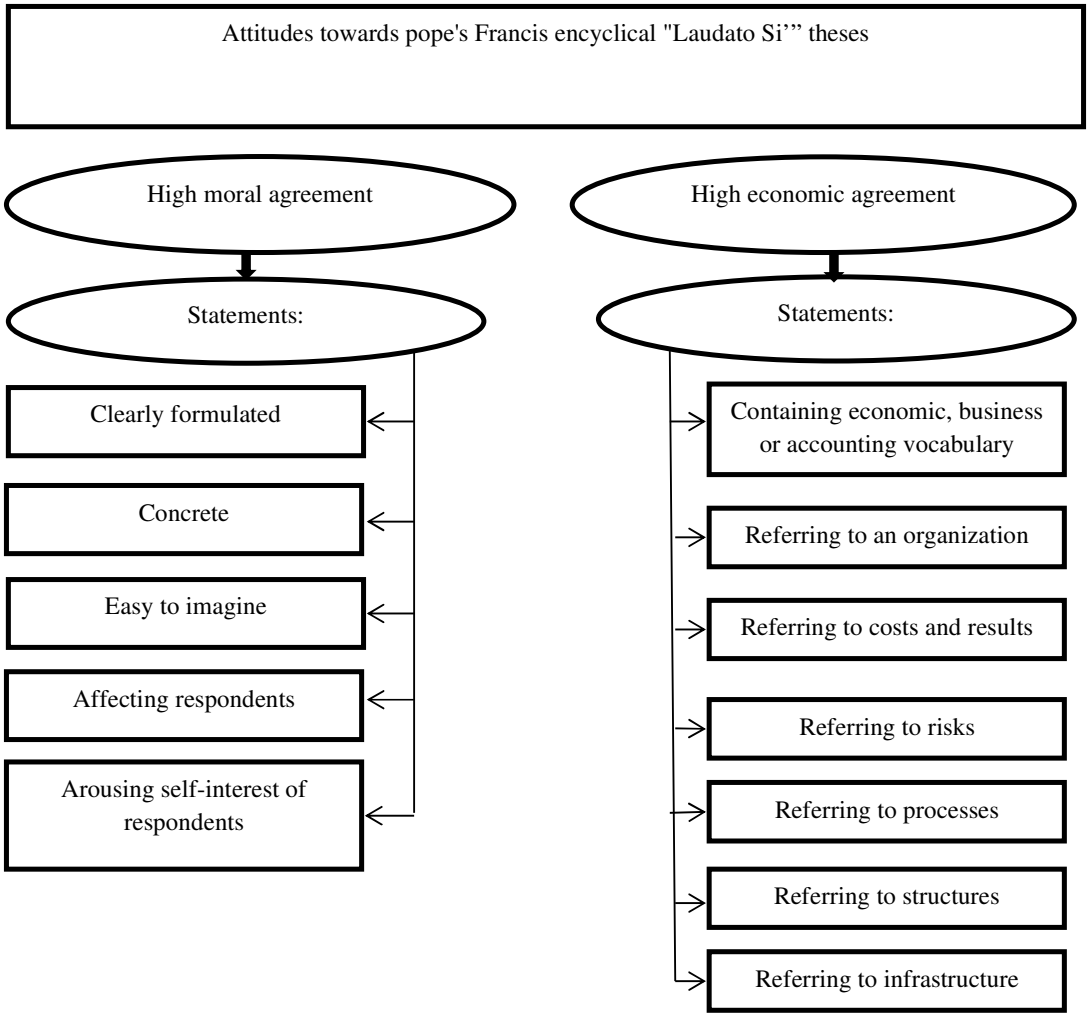

Fig. 1: Attitudes towards statements formulated in "Laudato Si'" formulated from the moral and economic point of view

It can be guessed that higher agreement from the moral than the economic point of view has its causes in demographic characteristics of respondents and in their education. Accounting education includes some aspects of corporate social responsibility, sustainability, and ecology. However, it is mostly technical, related to writing and reading non-financial statements, such as corporate social responsibility reports. Therefore, the students know the importance and are taught the ethical meaning of some actions. Nevertheless, this is not the core of accounting education. Therefore there is an understanding of the moral aspect of ecology. However, the economic approach sometimes seems to be separated from ecological issues.

Moreover, it seems that attitudes toward encyclical arguments differ depending on whether they are perceived from the moral or economic point of view, because of different paradigms which are used. It is especially evident that the lower assessment of statements from the economic viewpoint is caused by a liberal, free-market approach. This viewpoint is (implicitly or explicitly) forced upon the students during their education.

I argue that what can be a really significant outcome of this research is itself the fact of dissonance between the ethical and economic assessment. I should remain here that first economic theories were formulated by philosophers-ethicists. Therefore at the beginning of the development of economic studies, there was no gap between them and moral philosophy, as economic theories were built on philosophical assumptions.

The research was done long before the COVID19 pandemic. Therefore it would be interesting to replicate the study during and after it. It can be expected that after the economy suffers from the pandemic of the virus, which can be partly contributed to the lack of sustainability and insufficient ecological actions, the results would show high agreement with "Laudato Si" also from the economic point of view. Other further research could focus on different respondents groups, such as ethicists or biologists.

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Competitive Benchmarking:

Improving the Performance of a Transport Company

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Abstract

Due to the competitive environment they act in, companies are constantly looking for new ways to improve their performance. To this end, benchmarking becomes an efficient external management tool; it can be applied to the business practices of any company interested in finding the best practices in their industry, in knowing the market trends and competition in the field in which it operates. Also, benchmarking studies can be used in order to find new ideas that will materialize in future development plans. The aim of this paper is to highlight the advantages of groupage trips, LTL (less than truckload), compared to the complete ones, FTL (full truckload), by applying the benchmarking technique. The paper is based on real data obtained from competing companies whose field of activity is the international transport of goods. The study highlights the advantages of introducing the benchmarking process in the current activity of a company, while proposing a series of measures to reduce operational costs and efficient fleet management.

Keywords: Benchmarking, Transport, FTL, LTL, Costs, Performance

Introduction

Road transport is the most widely used mean of transport in the European Union, both for passengers and goods. The considerable increase of international trade led to a rising number of participants in these exchanges and, at the same time, to the diversification and specialization, especially as a result of technical - scientific and economic progress. All these contributed to the need to develop transport services.

The opening of the transport market and the increase of competition are the main direct effects of Romania's EU accession in 2007**.** Even for the transport field, performance is the motivation to carry out the activity. In order to be able to achieve it, the company needs to be oriented to continuously improve its processes, services, fleet, customer portfolio, and working methods.

This paper highlights an essential tool for improving the performance of a company, namely the implementation of a benchmarking process following an analysis of the strengths and weaknesses of a company whose field of activity is road freight transport.

The second section of the paper presents the relevant literature on benchmarking techniques, and the third one presents the methodology used and the method of collecting data for the study. The following section shows the results of applying benchmarking on two transport companies, while the fifth part identifies the ways to optimize the activity of one of the companies, as a consequence of previously mentioned results. We conclude with the main ideas we extract from our research and with further

directions for study.

Literature Review

Economy and society mean interaction and choice, and this socio-economic puzzle needs to be restored to get a map to guide people's actions towards shared progress (Nicolae, 2017). In this challenging economic context, "companies set their goals to such an extent that, if achieved, they improve performance" (Ionescu, 2014); improving performance is the permanent concern of any company that aims to stay sustainable on a market in which competition is fierce, and benchmarking provides the instruments for such improvement.

Practicing benchmarking is the equivalent of looking for the best methods used in a business. These methods allow the company to improve its performance, to understand the importance of costs and to identify opportunities to reduce them, but also to build a strategic advantage. Quite often, the benchmarking concept is understood to be an act of imitating or copying. But in reality, this proves to be a concept that helps in innovation rather than imitation, as stated by Thompson and Cox (1997).

Benchmarking was initiated in the 1980s by Rank Xerox as a method of achieving high performance and improving product quality. Due to the success it has had among companies that have used this technique, specialists have modified it and started to apply it in other sectors of activity, such as the production of consumer goods, tourism and even public administration services.

Allaire (1992), Chairman of Xerox Corporation said that "The prime objective of benchmarking is to understand those practices which will provide a competitive advantage in the marketplace; target setting is secondary". As an addition to that, Champ (1989) considers that benchmarking is the continuous process of evaluating our products, services and methods in relation to the most serious competitors or with the companies recognized as leaders in their sector. Due to that, benchmarking for Chiavenato (2005) is an inexhaustible source of ideas provided by other organizations; he emphasizes that this type of research allows the comparison of processes and practices, to identify the "best of the best" and to achieve a level of superiority or competitive advantage.

Ionescu and Bigioi (2016) consider that benchmarking is the only tool that teaches us how "good" can turn into "best" and that shows what is today's "best" and how to achieve this level of excellence.

Depending on the organization chosen for the comparative evaluation, authors such as Murray et al. (1997), Camp (1998), Owen (2002) and Chiavenato (2005), highlight the most common types of benchmarking:

- internal benchmarking, which takes place within the company, and
- external benchmarking, performed with entities outside the organization. This type of benchmarking can be classified as follows:
    - Strategic benchmarking: involves the analysis and evaluation of strategies that have generated high performance;
    - Competitive benchmarking: specific comparison with competitors on the product, method, processes. For this type of comparison between two directly competing companies, it is very difficult to obtain information.
    - Functional benchmarking: the comparison of similar functions between non-competing firms in the same industry for the detection of innovative techniques.
    - Generic benchmarking: comparison between companies from different sectors on processes or working methods.

Camp (1998) emphasizes that benchmarking consists of a process composed of five basic phases: planning, analysis, integration, action and maturity. These phases must take place dynamically and they should be followed by reviews on the principle of a continuous process. Camp's view is reinforced by Spendolini (1993), who points out that in order to use benchmarking properly, it becomes necessary to understand in a generic way, the five steps that summarize the basic process:

1) Determine what you want to do.

2) Form a team.

3) Identify comparison partners.

4) Collect and analyse information.

5) Develop and follow action plans.

Benchmarking should be used especially before launching a new business project or before starting work on a new project within an existing business. It can also be used when the aim is to bring the company to a higher level, but the initial stages are not very well known. In this situation, the method is perfect to offer those interested the opportunity to collect a wide range of information that helps to find new ideas and facilitates the exchange of experience.

Methodology

The main methodology used in this paper is benchmarking itself, as we want to show how it can be applied by real life companies. To achieve this aim, we used data from two companies: the companies that are the subject of the study are providers of road freight transport services. In order to ensure the data protection of the analysed companies, we chose to name the company that uses the benchmarking process - company “A”, and the reference company, the one we compare it to - company “B”.

All organizations want to constantly improve their performance in order to remain competitive; thus, the benchmarking process in the field of business emerged as a necessity implementing a form of competitive analysis, study of industrial fields and as a comparison of performance and functions. It is necessary for any company to have certain targets to reach or successful competitors with which constantly compare in order to evolve.

Benchmarking, even in the case of transport companies, involves comparing with others, analysing them and understanding their methods of achieving performance. As a result, new standards and objectives can be set, which will help to better meet customer requirements for the quality of transport services and their price. The benchmarking process can give companies in the transport industry the opportunity to add value to customers and differentiate themselves from competitors.

In order for competitive benchmarking to become an efficient process for the transport company “A”, mentioned before, the following aspects need to be assessed: evaluation of its own activity; identification of strengths and weaknesses (SWOT analysis); selecting a service that can be improved; identifying key values for performance; knowledge of competitors in its branch and identification of the company with which the comparison is made; collecting data on performance and common practices; data analysis and identification of opportunities for improvement; incorporating best practices into one's own business. All these, except the SWOT analysis, were included in this paper.

In order to complete the study, the data was collected by interviews with both companies, which are providers of freight services on the same routes.

Use of Benchmarking for The Implementation of Groupage Freight Transport. Case Study

Company “A” is a privately held company, which began its activity in 1999 on the local market. Subsequently, it expanded its activity in Europe, getting to be known due to the efficiency and quality of services offered to customers in the road transport of goods. It is a limited liability company, which has established as its main objective to become a reference company on the Romanian transport market, through the excellence of the services offered. To this end, the vehicle fleet has gradually expanded, from one truck to six trucks currently available for freight transport. The organization's strategy is to comply with contracts and customer relations, by carefully managing and controlling the truck fleet.

Following the analysis of the performance and processes of the company "A", we noticed the possibility that the company should focus on another way of transporting goods, namely group transport (LTL-less than truckload). But in order to identify the benefits of implementing this model of performing freight transport, it is necessary to perform a comparative analysis with a competing company, which is one of the leaders in freight transport in Romania. In general, when applying benchmarking techniques, the comparison partners are chosen according to criteria like the position of the respective organization within the branch in which it operates, average number of staff, and market share held.

The company that has been identified as a reference for the implementation of the benchmarking process is the competing company "B". This is a commercial company with Romanian private capital, which started its activity in 1989 and whose field of activity is also road transport of goods on the Romanian and European market. This company owns: 8 trucks (22 t); 2 trucks (10 t + crane); 10 trucks (7.5 t). The competing company performs group type transports (LTL- less than truckload).

Analysis of the costs of FTL (full truck load) transport services

The main link between the financial-accounting function and logistics is made through the information provided by costs. This information helps managers make logistics decisions. For example, when setting prices for the transport of goods or for their storage, important information on material, labour, maintenance, fuel, etc. costs is required, and negotiations with suppliers on purchase prices can only be done if accurate information on the cost structure is available.

Table 4.1 shows the average costs of a Romania - Germany - Romania itinerary for a tractor + semi-trailer assembly, 20 t payload, 4306 km travelled on average on a round trip Romania-Germany (loading and unloading locations vary), 129,180 km travelled on average per year, performing an average of 2.5 trips per month. Values do not include VAT.

Table 4.1: Detailed analysis of the costs related to a Romania - Germany - Romania trip

km/trip: 4306	**calendar days / race: 10**	
	Value	Measurement unit
1. Direct costs		
Tires (12 pieces) – 350 eur/piece	0.032	euro/km
Diesel fuel	0.343	euro/km
Motor oil	0.009	euro/km
Driver's per diem	0.077	euro/km
AUSTRIA motorway toll	224.595	euro
GERMANY motorway toll	225.160	euro
2. Variable costs		
HUNGARY motorway toll	0.200	euro/km
Parking Hungary	0.004	euro/km
Parking Austria	0.002	euro/km
Parking Germany	0.005	euro/km
Parking Romania	0.004	euro/km
Washing	0.005	euro/km
Accessories + Spare parts	0.036	euro/km
Phone expenses	0.007	euro/km
3. Monthly fixed costs		
CASCO + cargo insurance	225	euro/month
RCA insurance	55	euro/month
Administrative costs	330	euro/month
Amount to be amortized	1271.667	euro/month
Road taxes Romania	100	euro/month

License	25	euro/month
Periodic technical inspection and tachograph	20	euro/month
Local taxes	17	euro/month
Driver's salary	218.328	euro/month
Mechanic	75	euro/month
Financial expenses	2000	euro/month
4. Cost calculation / km = Total trip cost / no km		
Direct costs/trip	2434.82	euro
Variable costs/trip	310.03	euro
Fixed costs/trip	865.67	euro
Total trip cost	3610.52	euro
Cost/km	0.84	euro/km

Source: Authors' calculations based on data gathered from company "A".

Based on the data in the table above:

- **Analysis of direct costs**: Direct costs generally have a directly proportional behaviour to the number of km traveled and therefore they are recognized as direct costs / km. These direct costs include the costs related to the consumption of diesel, engine oil and tires. Also included in this category are the driver's per diem expenses. Although the daily allowance is generally calculated according to the number of days, after fairly elaborate calculations, for the simplification and efficiency of the model we chose to reflect this cost in euros / km, given the average per kilometer of expenses per driver's per diem. We consider this approach to be an efficient one, very close to reality and which is in fact quite common in modeling this type of cost.
    - Tires: 12 pcs were considered. Tires related to a truck-semi-trailer assembly, which must be replaced after traveling 130,000 km, the price of a tire being on average 350 euros.
    - Diesel: A consumption of 34 liters / 100 KM was taken into account; the price of diesel 0.94 euro / liter (an average price in Romania and abroad).
    - Austria Motorway Fee: it is currently 0.3255 Euro / km for 20 t trucks (on average 690 km in AU in one trip).
    - Germany Motorway Fee: is currently 0.13 Euro / km for 20 t trucks (on average 1732 km in DE in one trip).
    - The driver's daily allowance often varies depending on the number of loadings and unloadings, but also on his physical work that he submits by arranging goods in the truck. The daily allowance of 0.077 euro / km (table 4.1) is calculated according to the data in table 4.2:

Table 4.2: Daily allowance calculation for a trip Romania - Germany – Romania

DEPARTURE RO border		ARRIVAL RO border								
Date	**Time**	**Date**	**Time**	**Destination**	**Calc. number of days**	**Due days**	**Days granted**	**Per diem(*)**	**Currency**	**Value**
03/01/20	08:00	12/01/20	12:00	Germany	9d4h	9.5	9.5	35	euro	332.5

Source: Authors' calculations based on data gathered from company "A".

(*)According to the laws in force, the foreign daily allowance is granted from the moment of crossing by road the state border of Romania, both on departure and return to the country, depending on the number of days in which

the trip takes place, considering every 24 hours one day of delegation. For the fractions of time that do not amount to 24 hours, the daily allowance is granted as follows: 50% up to 12 hours and 100% for the period exceeding 12 hours. In the EU countries, the same minimum daily allowance level of 35 euro / day is provided.

- **Variable cost analysis:** These costs vary depending on the number of km traveled and include the costs of accessories and spare parts: bulbs, straps, ferrules etc.
- **Analysis of fixed costs:** Fixed costs are calculated monthly. These costs include the costs of insuring the car and goods, the licenses held, the salaries of drivers and mechanics, as well as the costs of depreciation for the cars. The value to be depreciated reflects in the accounting the wear of the car. The normal repayment period is five years, ie sixty months. For the truck + semi-trailer assembly, the initial value (acquisition cost) was 109,000 euros, and the residual value at the end of the five years is 32,700 euros. The depreciation method applied is the linear method. Therefore, the depreciation calculated and registered during the 5 years of use is 109,000 - 32,700 = 76,300 euros. (1271.667 / month) The inclusion of depreciation in costs allows the company to be able to purchase another means of transport at the end of the truck's life. This amortization does not include additional financial costs, which appear in the case of a leasing contract or when hiring bank loans.

Following the analysis of the costs of company “A” for the completion of a transport of goods Romania - Germany, in comparison with the good business practices applied by company "B", we noticed the possibility for the company to focus on another way of transport, namely in group mode LTL (less than truck load).

Analysis of the costs of LTL groupage transport services (less than truck load)

This section focuses on the strategy of company “B”, which applies a different strategy when it comes to loading its trucks: LTL (less than truck load) groupage transport services.

Freight transport in LTL groupage involves deliveries considered too small for FTL transport (full truck loading) and multiple loadings and unloading during transit. Therefore, quantities of goods below the total capacity of a trailer can be transported in a variety of shapes and packaging.

This service is addressed to a large number of customers, for whom, apart from an affordable transport price, the most important thing is the transit time of the package (it should be as close as possible to the transit time in full-truck mode).

The European road transport sector needs combined transport as an alternative for reasons of capacity, but also for commercial reasons related to flexibility in organizing drivers' working time, avoiding traffic bans and optimizing routes.

For the analysis, we chose a concrete example of transport on the route Romania - Germany - Romania, presenting the route itinerary in table 4.3. The trip lasts between five and twelve days, being influenced by the driving program, but also by the loading/unloading times at each point.

Table 4.3: Romania - Germany - Romania transport route itinerary in groupage regime

Nr. crt.	Date	Truck type	Activity	Location	Quantity
1.	10.01.2020	7.5t (I)	Loading	Bucharest	762kg (1 parcel)
2.	10.01.2020	7.5t (I)	Customs	Bucharest	-
3.	11.01.2020	7.5t (II)	Loading	Ploiești	2862kg (3 parcels)
4.	11.01.2020	7.5t (II)	Customs	Ploiești	-
5.	12.01.2020	7.5t (II)	Loading	Craiova	2504kg (5 epallets)
6.	13.01.2020	7.5t (II)	Loading	Scornicești	1000kg

Nr. crt.	Date	Truck type	Activity	Location	Quantity
					(4 epallets)
7.	13.01.2020	7.5t (II)	Customs	Bucharest	-
8.	13.01.2020	20t	Loading	Băicoi	2300kg (15 epallets)
9.	13.01.2020	20t	Loading	București	goods from the 7.5t trucks (7128 kg)
10.	16.01.2020	20t	Unloading	Reichenbach (code:07629)	8 epallets (from Baicoi)
11.	17.01.2020	20t	Unloading	Bremen (code:28357)	7 epallets (from Baicoi)
12.	17.01.2020	20t	Unloading	Bremen (code:28197)	7128kg
13.	17.01.2020	20t	Loading	Bremen (code:27798)	2 machinery (6.1ldm, 4650kg)
14.	19.01.2020	20t	Loading	Glinde (code:21509)	12 epallets (5300kg)
15.	19.01.2020	20t	Loading	Glinde (code:21509)	2 pallets (1500kg)
16.	19.01.2020	20t	Loading	Reinbeck (code:21465)	2000kg
17.	21.01.2020	20t	Unloading	Craiova	1 machinery
18.	21.01.2020	20t	Unloading	Slatina	1 machinery
19.	22.01.2020	20t	Unloading	Bucharest	in the 7.5t truck, the 2000kg loaded at Reinbeck
20.	22.01.2020	7,5t	Unloading	Buftea	2000kg
21.	22.01.2020	20t	Unloading	Ploiești	12 epallets +2 pallets (6800kg)

Source: Authors' calculations based on data gathered from company "B".

Transport costs are influenced by many factors and even if the distance between the point of origin and the destination is the most important, there are other factors that lead us to the conclusion that two transports between the same two points will cost differently (for example, the characteristics of the products to be transported, which determine distinct requirements of the transport system and implicitly distinct costs regarding human, financial and material resources).

For a clear record of the costs of the transport journey described in Table 4.3, they were broken down by truck type as follows (euro):

Table 4.4: Costs for a Romania - Germany - Romania transport route itinerary in groupage regime by type of truck

Truck type	Direct costs/trip	Variable costs/trip	Fixed costs/trip	TOTAL Costs/trip	Traveled distance (Km)	Cost/km (euro/km)
7.5t trucks	739.03	94.50	713.67	1547.20	587	2.63
20t truck	2466.16	328.46	1038.80	3833.42	4563	0.84

Source: Authors' calculations based on data gathered from company "B".

In the case of 20 t trucks, the direct, variable and fixed costs are calculated according to the calculation model presented in table 4.1.

In the case of 7.5 t trucks, 6 pieces of tires that must be replaced after covering 130,000 km were considered for direct costs: the price of a tire is on average 150 euros. The driver's per diem expenses, calculated according to the number of days, indicated an average for the entire journey of 0.04 euro / km. Regarding the variable costs / trip, we made an average of the expenses with the parking lots in Romania (0.007 euro / Km), with the washing of the truck (0.003 euro / km), with the accessories or spare parts (0.02 euro / km) and with expenses for the driver's mobile phone (0.005 euro / km). Fixed costs / month include: CASCO insurance (84 euros / month), MTPL insurance (22 euros / month), depreciated amount (254.68 euros / month), driver's salary, tolls (85 euros / month) etc.

Optimization Measures Following the Benchmarking Process

As a consequence of the benchmark analysis, we conclude that there are some aspects that can be improved in company's "A" activities: fleet monitoring and optimal route selection on one hand, in order to change full truck load by less than truck load, and, on the other hand fleet sizing, in order to improve costs.

Fleet monitoring and optimal route selection

Vehicle programming, routing and monitoring, transportation cost analysis and fleet sizing are ongoing activities, closely monitored by fleet management. It is important to use a fleet tracking computer system to reduce the level of operational costs. At the same time, thanks to the monitoring system, the drivers' behaviour towards the company's goods and implicitly the efficiency in using the cars can change. In order for the employee to be aware of the use of a monitored truck, he will follow the routes, will have to justify the breaks and the delay in the delivery of the goods. Inadequate driving will also need to be explained.

In search of the best route, for a round trip Romania - Germany, 5 possible routes were identified, highlighting both the number of kilometres and the potential costs of the freight service.

Route 1: Romania (București – Nadlac) – Hungary (Nadlac – Nickelsdorf) – Austria (Nickelsdorf – Passau) – Germany (Passau – Reichenbach)

Route 2: Romania (Bucharest – Bela Crkva) – Serbia (Bela Crckva – Batrovci) – Croatia (Batrovci – Bregana) – Slovenia (Bregana - Maribor) - Austria (Maribor – Salzburg) – Germany (Salzburg – Reichenbach)

Route 3: Romania (Bucharest - Ruse) – Bulgaria (Ruse - Dimitrovgrad) – Serbia (Dimitrovgrad - Subotica) – Hungary (Subotica - Pince) – Slovenia (Pince - Maribor) – Austria (Maribor- Salzburg) – Germany (Salzburg - Reichenbach)

Route 4: Romania (Bucharest - Nadlac) – Hungary (Nadlac - Rajka) – Slovakia (Rajka – Brodske) – Czech Republic (Brodske - Waidhaus) – Germany (Waidhaus – Reichenbach)

Route 5: Romania (Bucharest - Vidin) – Bulgaria (Vidin - Roszke) – Serbia (Roszke -Subotica) – Hungary (Subotica - Rajka) – Slovakia (Rajka - Brodske) – Czech Republic (Brodske – Waidhaus) – Germany (Waidhaus – Reichenbach)

Table 5.1: Highlighting routes and related costs

Transited countries	Route 1	Route 2	Route 3	Route 4	Route 5
Romania	✓	✓	✓	✓	✓
Hungary	✓		✓	✓	✓
Austria	✓	✓	✓		
Bulgaria			✓		✓
Serbia		✓	✓		✓
Croatia		✓			
Czech Republic				✓	✓
Slovenia		✓	✓		
Slovakia				✓	✓
Germany	✓	✓	✓	✓	✓
Number of km.	1.606.43	1.698.37	1.936.98	1743.71	1.814.05
Road tolls (euro)	204.36	220.16	241.49	180	269.02
Fuel costs (euro)	646.61	683.62	779.66	701.87	730.18
TOTAL Cost (euro)	850.97	903.78	1021.15	881.87	999.20

Source: Authors' calculations.

Referring to the example presented above, we made a calculation for the trip Romania - Germany (one way), assessing the ratio between costs and efficiency.

In case of opting for groupage regime trips, choosing the most efficient transport route is the most important step. The selection of the route (R) must take into account a series of constraints, the most important of which is to identify the route that would minimize the costs of the transport service (C), but also maximize efficiency (E).

$$R = f\ (\min C;\ \max E)$$

The shortest route is not necessarily the least expensive. Identifying an optimal route contributes substantially to increasing the quality of transport and, consequently, the logistics system. The aim is to minimize transport time or distance to the destination.

The costs to be taken into account in the route selection process are fuel costs and tolls. In terms of fuel consumption, it varies depending on each vehicle. For a 20-ton truck, the average consumption is 32 l / 100 km, and for a 7.5-ton truck, the average consumption is 16 l / 100 km.

It is essential for such a process that the loading or unloading points be as close as possible. For a trip with minimal costs, when the dispatcher is looking for customers who have goods to transport, he must follow the postal codes, because the addresses must be close.

Regarding the investment in a tracking system, we consider it essential for the good development of the company's activities. Management of transport routes and truck drivers is now easier and safer to do with the fleet monitoring application. The investment to be implemented is an opportunity to improve the company's performance by monitoring vehicles. The investment consists in installing tracking systems on trucks in order to reduce operating costs and for efficient fleet management.

Following the results obtained, the route with the lowest cost or the shortest route is chosen, if the customer requires the goods to reach their destination as soon as possible.

Fleet sizing

When operating your own fleet, an important aspect to consider is fleet sizing. This involves knowing or approximating an average monthly or annual quantity of goods to be delivered.

In practice, however, most of the time, the demand for goods is not constant, it can vary significantly over a year. Under these conditions, two major types of risks can occur:

- Impossibility to honour all orders at a time (and implicitly bear the negative consequences arising from this);
- Poor use of means of transport most of the time, when the fleet is oversized in order to be able to honour all orders received (and thus record much higher total transport costs).

To minimize these two risks, a company can opt for a solution that keeps costs to a minimum. This solution involves sizing your own fleet to honour an optimal level of orders, and for periods of overload of transport capacity to opt for vehicle rental.

Naturally, the selection and purchase of vehicles must take into account the two categories of costs: fixed and variable, respectively. Fixed costs do not depend on the annual number of kilometres travelled by the vehicle nor on the quantity of goods transported. Variable costs, on the other hand, depend directly on the annual number of kilometres travelled and are influenced by various factors such as fuel consumption or the number of hours paid to human resources.

Conclusions

Rapid changes in the business environment have led to the development of benchmarking as a process of comparing business practices and performance levels between organizations, in order to identify new opportunities for improvement for companies seeking competitive advantage.

Benchmarking requires a dedication to change, and therefore the organization must begin this process only if it is open to transformation and wants to improve performance. A major deterrent to the benchmarking process may be the refusal of the assessment partner, recognized in terms of performance, to disclose its business practices. At the same time, organizations need to understand that the success rate can differ significantly, because applying the best practices of a successful organization does not necessarily guarantee the success of the organization that adopted them. Organizations that decide to use it, especially small and medium-sized enterprises, must pay particular attention to the allocation of resources needed to implement this process, which must be justified by the returns provided.

Applying benchmarking in the field of transport is essential to obtain a complete understanding of the performance of a company in relation to competing companies. The main performance indicator are the transport rates, but there are other important indicators that help the company to determine if deliveries are made on time, complete and without defects. Improving the business practices of organizations gives them a competitive advantage in their logistics operations, in the current competitive environment.

Benchmarking promotes a “culture of learning”, which is essential for improving quality and long-term competitiveness, as benchmarking efforts can stimulate organizational learning and increase business performance and industry competitiveness. In fact, in a future research we aim to perform an analysis of the value of organizational learning in the context of using benchmarking.

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The Path to Build Loyalty: The Influence of Marketing Mix and Relationship Quality in Banking Industry

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Abstract

Previous studies show that in providing the best relationship quality of services, the marketing mix has important roles. The relationship quality of services has three important elements, namely satisfaction, trust and commitment. In this study, the authors focused on the marketing mix strategy applied by Bank Sumsel Babel as one of the 26 regional banks in Indonesia. This research aims to measure the attitudinal loyalty of customers of the Bank Sumsel Babel and future behavioral loyalty by looking at the relationship between relationship quality and dimensions of marketing mix for Services Company. The data was collected through the questionnaire that was disseminated to 280 customers of Bank Sumsel Babel. The data then processed and analyzed using Structural Equation Modeling (SEM). The results of the research show that all the relationship quality (satisfaction, trust and commitment) have positive and significant influence on attitudinal and behavioral loyalty. Furthermore, from all marketing mix variables, product quality is found to have the biggest influence on satisfaction, while place has the biggest influence on trust. These results are useful as inputs for banking industry in assessing performance and making management decisions to be able to formulate the right corporate strategy.

Keywords: Marketing Mix, Relationship Quality, Attitudinal Loyalty, Behavioral Loyalty.

Introduction

Marketing is an effort made to meet the needs and satisfy customer desires. A series of efforts to achieve this are stated in the marketing mix which consists of products or services offered, pricing, location or place of business and promotional efforts (Kotler, 1999). The service industry has a slightly different marketing mix and is an adaptation of the traditional marketing mix. In the service industry there are three additional important things, namely people, processes and physical evidence, which added in American Marketing Association (AMA) conference in 1980. The banking industry is one of the service companies that strives to deliver these elements into a good experience for customers. Providing an unforgettable customer experience is the main goal of banking today. Every element in the service marketing mix tries to be optimized to form a value that is expected to improve the quality of relationships with its customers. Every bank employee is an agent who tries his best to create good value in conveying customer experience so that it can lead to customer satisfaction, trust and commitment.

Banking industry in Indonesia still has resilience amid the current global turmoil. Digitalization carried out by many banks in Indonesia can be an opportunity for banks to implement efficiency, the application of digitalization can also increase the income of non-interest income or known as fee-based income. The competition in the banking world is quite dynamic, each bank makes many innovations to be able to compete with the aim of maintaining customer loyalty. Maintaining customers is very important for banks engaged in consumer banking.

One of the banks that is present to assist economic growth and development in the region is the Regional Development Bank. As the function of banks in general, the Regional Development Bank also performs the same function, namely by intervening between the owner of the excess funds and the party who needs the funding, usually in the form of loan. The function of Regional Development Banks is to assist regional development by providing financing in the framework of National Development Planning. Bank Sumsel Babel (BSB) that will be discussed in this study is one of the banks owned by the regional government of South Sumatra and Bangka Belitung. Bank Sumsel Babel collected third party funds from individuals and companies into savings, current accounts and deposits and then channeled them back into loan and other transactions. Distribution of funds to the public other than credit, other banking services, including sending money, leasing safety boxes, bank guarantees, credit cards, buying and selling foreign exchange and others.

Banks must maintain the quality of relationships with customers in order to survive in this industry. Lu and Wang (2017) define relationship quality refers to the overall assessment of the strength and depth of relationships between a business and its customers in achieving their goals, expectations and desires. The focus of relationship quality is to develop an increasingly better process of maintaining and improving individual relationships with consumers which results in an interesting perception (Nguyen and Waring, 2013). In the quality of the relationship there is an element of trust, satisfaction and commitment which serve as benchmarks to foster good quality relationships.

Customer loyalty is obtained when the customer comes back for the product or service offered. Griffin (2002) revealed that loyalty can be identified through buying behavior, loyal customers are customers who make regular repurchases, buy products or other services from the main product line, provide advices to other people / parties, and the customer is immune to the influence of competitors. To measure customer loyalty, Buttle and Maklan (2015) has 2 (two) approaches, which are based on attitude, this loyalty approach is measured from the attitude component, namely beliefs, feelings and desire to buy and behavior, this loyalty approach is measured from buying behavior available to the customer by seeing whether the customer is still actively buying. Along with this, Ledikwe *et al* (2019) confirms that loyalty can be defined and measured based on behavior and attitudes. In this study, researchers will examine: (1) How do service marketing mix variables influence customer satisfaction and trust? ; (2) How do satisfaction and trust influence customer commitment? ; (3) Is there an influence of customer satisfaction, trust and commitment on customer attitudinal loyalty? ; (4) Is there an influence of customer attitudinal loyalty on behavioral loyalty?

Literature Review

Customer Loyalty

Customer loyalty according to Tunggal (2008) is customer attachment to a brand, store, manufacturer, service provider, or other entity based on a favorable attitude and good response, such as repurchase. Based on these definitions, it can be concluded that there are behavioral and attitude elements in customer loyalty. Customer loyalty is obtained when the customer comes back for the product or service offered. Brand loyalty is related to the customer's deep sense of commitment to the product or service consistently in the future (Izogo, 2016). Shobri *et al*. (2012) agree with this definition, they commented that brand loyalty reflects the tendency of consumers to join themselves with certain brands, regardless of price adjustments or changes in product features. Buttle and Maklan (2015) has 2 (two) approaches which are based on attitude, this loyalty approach is measured from the attitude component, namely beliefs, feelings and desire to buy and the second is based on behavior, this loyalty approach is measured by the buying behavior of the customer by seeing whether the customer is still actively buying. Along with this Huang (2017) confirms that loyalty can be defined and measured based on behavior and attitudes. This is confirmed by research conducted by Nyadzayo *et al* (2018) and Ledikwe *et al* (2019) which proves brand loyalty actually exists when attitudes and behaviors are considered when determining consumer purchase intentions in the future.

Relationship Quality

The key of relationship quality is to establish a systematic process that individually preserves and improves customer relationships resulting in a favorable image (Nguyen and Waring, 2013). There's ambiguity in some literature when deciding the relationship between trust, satisfaction, and commitment. Researchers don't always make a clear distinction between these three constructs (Crosby et al. 1990). According to Athanasopoulou *et al*. (2013), the quality of relationships is multidimensional. Agariya and Singh (2011) said that trust, commitment and satisfaction are the most frequently cited dimensions of relationship quality between 1982 and 2010. These three variables have been adopted in this study to examine the quality of relationship.

Trust

Munnukka *et al*. (2016) note that trust is linked to the degree to which other parties in a partnership can honestly provide accurate information. This concept emphasizes confidence, creating a feeling of faith in organizations' statements and commitments to preserve relationships (Van Tonder, 2016). Ndubisi *et al*. (2011) argue that the strength and quality of a relationship depends on the degree of trust: the higher the confidence degree, the better the partnership.

Satisfaction

Satisfaction has been defined as the fundamental marketing target, because the core marketing aim is to please customers. Kim *et al*. (2016) suggest that satisfaction refers to consumers' overall emotional reaction during the brand experience after the last purchase. Thaichon and Quach (2016) reinforce this view, arguing that satisfaction represents the state of happiness, satisfaction and enjoyment that consumers get from a brand and its goods or services through their overall perceptions and brand experiences. Thus satisfaction is an important determinant of customer decisions to continue or terminate their relationship with the business, as shown if the perceived performance of the product or service meets the desired expectations (Ndubisi *et al*., 2011).

Commitment

According to Mpinganjira *et al*. (2017) commitment refers to the ability to preserve the importance of a relation. Bojei and Alwie (2010) add that commitment exists when the exchange partner believes that it is very important to have an ongoing partnership with another partner so as to guarantee full effort to sustain it. Customers who are committed add value and benefits to service providers as well as ensure continuity of the business, so commitment is a key factor for the success of any long-term relationship (Zeithaml *et al*., 2001), As a result, when commitment exists, This helps minimize feelings of insecurity when interaction occurs and provides social space to establish long-term relationships (Mpinganjira *et al*., 2017).

Service Marketing Mix

The concept of marketing mix formalized by Neil Borden in 1953, McCarthy (1960) summed up all the 12 Borden elements to 4Ps. The service marketing practitioners found that the marketing mix does not address their needs (Helm and Gritsch, 2014). Services are basically is not the same in comparison to physical products (Fukey *et al*., 2014), the three additional Ps are added to meet the marketing challenges posed by the characteristics of services such as people, physical evidence, and process. Nowadays, customers have a lot of options, they can turn easily from one service provider to another that covers better coverage at lower cost (Bhardwaj, 2007). So the focus of banking services now has been completely shifted from a transactional marketing approach to a customer oriented approach. In this regard. According to Wilson *et al*. (2008), marketing services mix can be a critical component in the effective operation of a company in today's economy. Furthermore, it will change the essence of the marketing operation and will influence the decision-making and execution of the service marketing mix (Lovelock *et al*, 2011).

Hypothesis Development

Some literary analysis shows that the definition of marketing mix and the addition of three P marketing services are identified by many marketing researchers in different contexts and industries. The marketing mix does not produce a marketing strategy of only one component but is an interaction of all 7P elements at the same time.

Relationship between Marketing Mix and Relationship Quality

Product Quality

A product is anything offered to the market for exchange or consumption (Kotler, 2000). In banking, the product is described as services given to people like various customer banking accounts, such as current accounts and saving accounts. The key components of this group are banking products such as savings accounts, current accounts, fixed deposits and investment options (Estiri *et al*., 2011)

Service Quality

Adopting Hyun's research (2010), which states that service is a very important thing and is the key in creating trust and satisfaction where the element of elegance in assessing service in this study is very closely related to People and Process, the researchers include these two variables as gauges of quality service in the banking industry. Process is a system and sequence of customer services that were planned according to the interest the company promised (Lovelock, 2001). In the case of banking, according to Shokrani and Haghihi (2019) the service employees are often the primary contact points for the customer. The quality of services is highly related to the way of presentation to the customer. The customers' perception of the performance among services employees is a matter when the customers are evaluating the service (Barnes *et al*., 2004).

Environment

Within the reach of banking services, the service environment commonly referred to as servicescape or physical evidence. According to Lovelock (2007) these are relating to the nuances or arrangement of the room and also the elements that come in contact with consumers in the place where the service is performed. Services are often intangible and the standard cannot be accurately measure by the customer. The appearance of buildings, landscaping, interior furnishing equipment, staff members' uniforms, signs, communication materials, and other visible items such as noise levels, odors, temperatures and colors all provide tangible evidence of the service quality of a firm (Fukey *et al*., 2014).

Place

A place or distribution channel is a way for transferring the products (goods) to the customer. In regard to services, this term refers to the places where the services are being offered. According to several studies a place also refer to the opening hours, distance to reach a bank, parking places and automated teller machines (ATM) availability (Levesque and McDougall, 1996; Wu, 2011).

Price

In the banking sector, price includes fees, bank charges, interest rates and the interest paid on the deposits (Gerrard and Cunningham, 2004). Pricing is yet another strong variable of the marketing mix (Shanker, 2002). Many studies finding that pricing is an important key driver for different customer related variables such as attraction, satisfaction, trust, retention and loyalty (Low, 2012; Lees *et al*., 2007; Z Mavri and Ioannou, 2008; Manrai and Manrai, 2007).

Promotion

Promotion reflect business communications, including ads, public relations, personal sales and sales promotion. (McCarthy and Perreault, 1993). Hence, promotional activities such as community relations, event management, flash media, and corporate identity programs have relevance and they should be used innovatively and effectively (Kotler, 1986; Trainor, 2012).

Marketing mix does not result in a single marketing 'P' strategy. It may be the interplay of all the elements of 7P at the same time (Kushwaha & Agrawal, 2015). Banks' desired service standards can

be fast, convenient, value-added, low-cost, with advanced technology, easy and smooth, secure and reliable via modern branch configuration (Wilson *et al*, 2008; Gronroos and Vioma, 2013). With the right and agile strategy on marketing mix a firm can achieve the competitive advantage from its competitors and surpass the competition. It significantly influences the creation and delivering of superior value, customer satisfaction, customer trust, competitive advantage, growth opportunity, and profitability of the firm (Shamah, 2013; Lytle and Timmerman, 2006; Gronroos and Vioma, 2013; Haas *et al*., 2012 ; Gounaris and Venetis, 2002). On these grounds, we propose the following hypothesis:

H1. Product quality has significant influence on Trust
H.2 Service quality has significant influence on Trust
H.3 Environment has significant influence on trust
H.4 Price has significant influence on Trust
H.5 Place has significant influence on Trust
H.6 Promotion has significant influence on Trust

H.7 Product Quality has significant influence on Satisfaction
H.8 Service Quality has significant influence on Satisfaction
H.9 Environment has significant influence on Satisfaction
H.10 Price has significant influence on Satisfaction
H.11 Place has significant influence on Satisfaction
H.12 Promotion has significant influence on Satisfaction

Relationship between trust and satisfaction to commitment

De Wulf *et al*. (2001) describe commitment as the persistent desire of a customer to continue his relationship with a retailer followed by the ability of that customer to make efforts to preserve it. Commitment also plays a significant role in inter-firm relationships and being characterized by stability and sacrifice where members are willing to make temporary sacrifices to maintain long-term stable relationships (Wu *et al*. 2004). Considering commitment involves potential vulnerability and sacrifice, it is unlikely that the organization would be willing to commit to a partner unless trust has been established. Trust is therefore a necessary prerequisite for developing relationship commitment which is achieved when the customer has the confidence that the supplier will meet demand (Caceres and Paparoidamis 2007). Customer satisfaction contributes to strong customer-organization relations and is related to commitment (Rexha *et al*. 2003). On these grounds, we propose the following hypothesis:

H.13 Trust has significant influence on Commitment
H.14 Satisfaction has significant influence on Commitment

Relationship between Relationship Quality and Loyalty

Customer satisfaction is defined as an emotional response to a consumption experience, which translates into attitudinal loyalty (Babin and Griffin, 1998). The affective judgments of satisfaction lead to the formation of an attitude which is embodied in the construct of attitudinal brand loyalty (Bennett, 2001; Carpenter, 2008). The positive impact of customer satisfaction on attitudinal loyalty has been widely confirmed (Huang (2017) and Ledikwe et al (2019). On these grounds, we propose the following hypothesis:

H.15 Satisfaction has significant influence on Attitudinal Loyalty

Prior research implies two forms of commitment - affective commitment and calculative commitment (Gustafsson *et al*., 2005). Affective commitment reveals the emotional commitment of a customer to the service provider and the outcomes of an evaluation of affective relations (Mattila, 2006; Tsai, 2011). Affective commitment based on emotional attachment create strong attitudinal loyalty (Evanschitzky *et al*., 2006). Several of empirical studies have have shown that affective communication has a positive impact on attitude loyalty (Gustafsson *et al*., 2005; Richard and Zhang, 2012; Wu *et al*., 2012; Ledikwe *et al*., 2019). On these ground, we propose the following hypothesis:

H. 16 Commitment has significant influence on Attitudinal Loyalty

In the field of relationship marketing, Watson *et al* (2015) finding trust as the important factor of any long-term relationship. Trust also build an exchange relationships that are highly valued and therefore promotes attitudinal loyalty (Morgan and Hunt, 1994). Chaudhuri and Holbrook (2001) found that trusted brands are purchased more often and evoke a high degree of attitudinal loyalty. Research demonstrates a positive connection between trust and attitudinal loyalty (Chaudhuri and Holbrook, 2001; Watson *et al*., 2015; Sarkar *et al*., 2016). Based on that, we create propose following hypothesis:

H.17 Trust has significant influence on Attitudinal Loyalty

The conceptual framework of loyalty has evolved from a behavioral approach to a cognitive (attitudinal) approach and finally to a hybrid approach (Watson *et al*., 2015; Bilgihan *et al*., 2016). The majority of researchers conceptualize and calculate loyalty based on the behavioral dimension, focusing on sum and frequency of purchase (Carpenter, 2008; Lee *et al*., 2012). Attitudinal loyalty includes psychological commitment to a brand and include product / service superiority as well as positive and accessible brand reactions (Liu-Thompkins and Tam, 2013). Therefore, in line with various researchers this study proposes a comparative measure of customer loyalty in line with different studies, integrating both behavioral and attitudinal dimensions. For this study behavioral loyalty is seen as the readiness of consumers to buy back the service provider's services and maintain a partnership with the business. Based on that, researcher build a hypothesis:

H.18 Attitudinal Loyalty has an influence on Behavioral Loyalty

Figure 1 below depicts the proposed conceptual model for this study.

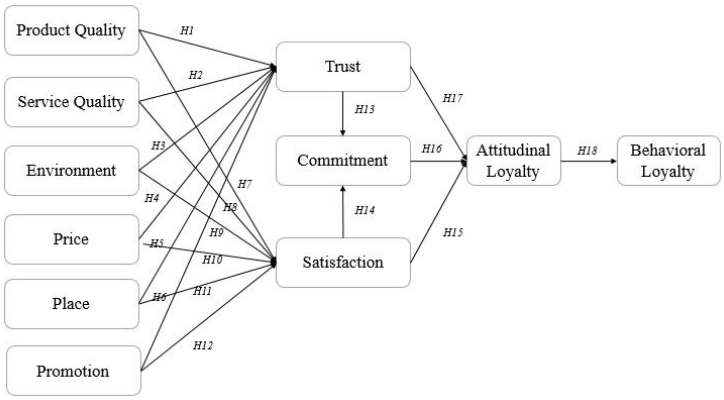

Fig. 1. Proposed Conceptual Model

Methodology

Questionnaire and Sampling

For quantitative descriptive research, researchers used a program using the Structural Equation Modeling (SEM) program in constructing data generated from questionnaires distributed. The use of SEM is used for social studies because SEM is able to connect between latent variables of the observed variables. There are 11 variables in this study, namely: 6 variables that act as antecedents (Product quality, Service quality, Environment, Price, Place and Promotion), 3 variables in Relationship Quality (Trust, Satisfaction and Commitment), variables Attitudinal Loyalty stands as a mediating variable and Behavioral Loyalty as a dependent variable.

In this research process, the stage of determining operational variables is very important because this stage serves as a link that connects the deductive thinking patterns towards inductive thought patterns. Through the operationalization of variables, the research hypothesis is transformed into data. The data will then be analyzed and tested hypotheses. Thus in quantitative approach-based research the stages

of measuring variables are crucial things that determine the success or failure of a study explaining a phenomenon

The marketing mix variables are adapted from Shokrani & Haghighi (2018) for product, price, location and promotion. Hyun (2010) for people, process and physical evidence, with as many as 20 (twenty) item questions. For the Relationship Quality variable, the authors adapted the question items from Hyun (2010) for satisfaction and trust, and Alnsour (2018) for commitment with as many as 11 (eleven) items. To examine attitudinal loyalty and behavioral loyalty variables, indicators were adapted from research of Choi *et al* (2017), with 6 (six) item questions. All indicators are measured with six-point likert scale.

Table 1. Demographic data of participants

Category	N	Percentage (%)
Gender		
Male	116	41.43
Female	164	58.57
Age		
<20	5	1.79
20-30	98	35.00
31-40	119	42.50
41-50	27	9.64
51-60	28	10:00
> 60	3	1.07
Education Level		
Elementary	1	0.36
Junior High School	2	0.71
Senior High School	46	16.43
Under Graduate	33	11.79
Graduate	171	61.07
Post Graduate	27	9.64

The population of this study is all customers of the Sumsel Babel Bank in the operational area of the Sumsel Babel Bank which have been active in transactions and saving in the past year. The application of non- probability sampling technique is used in determining respondents, in this case the researcher will conduct judgment sampling to select respondents in accordance with predetermined criteria that have been active customers for 1 year at the Bank Sumsel Babel. The demographic data of participants are shown in Table 1.

Data Analysis

Researchers collected primary data through questionnaires distributed to customers of the Bank Sumsel Babel, *Likert scale* were used to measure the indicators. The data obtained was processed using SEM analysis with AMOS version 20. The data analysis steps taken by the researchers are tabulating the results of the answers from the respondents 'questionnaires, conducting pre-tests for validity and reliability testing, conducting descriptive analysis of respondents' responses, conducting SEM assumption tests, checking outliers and looking at normality of data followed by conducting structural analysis models.

Results

Pre-Test

We distributed questionnaires to 30 respondents in order to conduct preliminary exams before collecting primary data. Questionnaires that were distributed had been done by wording test, by paying attention to sentence structure, concordance, words, diction and language so that later it would be easily understood by prospective respondents. Preliminary tests carried out consist of Validity and Reliability

Tests, and the results will be reflected in the Cronbach Alpha value, where the value if above 0.5 then the data is declared reliable. While the validity test is done by looking at the value of KMO (*Kaiser Mayer Olkin*) and component matrix, if the number is more than 0.5 then the data is valid. Pre-test results of this study show that all variables and indicators are valid reliable.

Measurement Model Assessment

After conducting a preliminary test, the researchers distribute further questionnaires to obtain primary data. From the questionnaire distributed there were 298 responses received, however only 280 respondents passed the screening question as explained before.

Validity indicates the extent to which the gauge measures what you want to measure. Indicator measurement is appropriate in constructing a construct if the value of standardized regression weight> 0.50, whereas to see consistency in the measurement of a construct the construct reliability value is calculated and its value is expected to be greater than 0.70, but if the resulting construct reliability value approaches 0.7, then it can be said this value is enough to justify a research result. The researchers also evaluate the measurement model with square root of average variance extracted, if the AVE value is greater than 0.5 then it can be said to be good. Average extract variants with values> 0.5 used as a determinant of convergent validity. From the tests conducted, the data used are valid and reliable and the existing validity is valid, as can be seen on Table 2.

Structural Model Assessment

A structural model was used to assess the links between the constructs and to validate the research H1 – H18 formulated for this study. Tests on the goodness of fit model must be carried out to ensure that the structural model that has been prepared can explain the direction of the relationship and the direction of influence precisely and does not cause estimation bias. Based on Table 3 below, it appears that the results of the model evaluation for the full structural modification model have shown better criteria where for each measure of goodness of fit values are appropriate, so as a whole it can be concluded that the structural model that has been modified has been able to produce an estimated level is expected. Further, table 4 shows the result of hypothesis testing using the SEM analysis.

Table 2. Validity and Reliability results

Variable	Item	SLF	Composite Reliability	AVE
Product quality	P1.1	0.921	0.943	0846
	P1.2	0.921		
	P1.3	0.917		
Service quality	P2.1	0896	0.942	0.801
	P2.2	0896		
	P2.3	0896		
	P2.4	0.892		
Environment	P3.1	0.954	0.957	0.882
	P3.2	0.958		
	P3.3	0.905		
Price	P4.1	0.939	0.930	0816
	P4.2	0.919		
	P4.3	0849		
Place	P5.1	0.854	0.918	0790
	P5.2	0.906		
	P5.3	0.905		
Promotion	P6.1	0877	0.917	0.734
	P6.2	0871		
	P6.3	0.880		
	P6.4	0795		
Satisfaction	S1	0.955	0.980	0.943
	S2	0.977		
	S3	0.981		
Trust	T1	0.942	0.968	0.882
	T2	0.944		
	T3	0.928		
	T4	0.943		
Commitment	C1	0.809	0.948	0821
	C2	0.949		
	C3	0.947		
	C4	0.912		
Attitudinal Loyalty	AT1	0.961	0.974	0.925
	AT2	0.958		
	AT3	0.966		
Behavioral Loyalty	BL1	0.947	0.964	0899
	BL2	0.946		
	BL3	0.951		

Table 3. Goodness of Fit Full Structural Model Testing

Goodness of fit index	Cut-off value	Model results	Information
RMSEA	≤ 0.08	0.060	Good
GFI	≥ 0.90	0821	Marginal
AGFI	≥ 0.90	0789	Marginal
TLI	≥ 0.95	0.958	Good
Cmin / DF	≤ 2.00	1,991	Good
CFI	≥ 0.95	0.963	Good

Discussion

The Relationship between Marketing Mix Variables and Trust

H1, H2, H3, H4, H5 and H6 which proposed Product Quality, Service Quality, Environment, Price, Place and Promotion, respectively, has a positive influence on Trust was supported, because all of T-values are greater than 1.65 and the value of $p < \alpha = 0.05$. Therefore, it can be concluded that Trust can be significantly influenced by all the proposed Marketing Mix Variables.

Table 4. Hypothesis testing result

Hipotesis	Estimate / SLF	CR (T-Value)	P.	Kesimpulan
H1	0.173	2.317	0.021	Hypothesis Accepted
H2	0.218	2.058	0.040	Hypothesis Accepted
H3	0.167	2.271	0.023	Hypothesis Accepted
H4	0.172	2.333	0.020	Hypothesis Accepted
H5	0.223	2.376	0.018	Hypothesis Accepted
H6	0.106	2.001	0.045	Hypothesis Accepted
H7	0.300	3.956	***	Hypothesis Accepted
H8	0.128	1.208	0.227	Hypothesis Rejected
H9	0.086	1.175	0.240	Hypothesis Rejected
H10	0.167	2.256	0.024	Hypothesis Accepted
H11	0.198	2.119	0.034	Hypothesis Accepted
H12	0.161	2.988	0.003	Hypothesis Accepted
H13	0.362	4.483	***	Hypothesis Accepted
H14	0.319	4.036	***	Hypothesis Accepted
H15	0.189	2.547	0.011	Hypothesis Accepted
H16	0.813	10.488	***	Hypothesis Accepted
H17	0.224	2.913	0.004	Hypothesis Accepted
H18	0.876	28.978	***	Hypothesis Accepted

The Relationship between Marketing Mix Variables and Satisfaction

H7, H10, H11, and H12 which proposed Product Quality, Price, Place and Promotion, respectively, has a positive influence on Satisfaction was supported, because all of T-values are greater than 1.65 and p value $<\alpha = 0.05$. Therefore, it can be concluded that Satisfaction can be significantly influenced by Product Quality, Price, Place and Promotion.

H8 and H9 which proposed Service Quality and Environment, respectively, has a positive influence on Satisfaction was not supported, because the T-values are smaller than 1.65 and p value is bigger than $\alpha = 0.05$. Therefore, it can be concluded that Service Quality and Environment cannot influence Satisfaction significantly.

The Relationship between Relationship Quality (Trust, Satisfaction and Commitment) and Loyalty

H13 and H14 which proposed Trust and Satisfaction, respectively, has a positive influence on Commitment was supported, because all of T-values are greater than 1.65 and p value $<\alpha = 0.05$. Therefore, it can be concluded that Commitment can be significantly influenced by Trust and Satisfaction.

H15, H16 and H17 which proposed Satisfaction, Commitment and Trust, respectively, has a positive influence on Attitudinal Loyalty was supported, because all of T-values are greater than 1.65 and p value $<\alpha = 0.05$. Therefore, it can be concluded that Attitudinal Loyalty can be significantly influenced by Satisfaction, Commitment and Trust.

H18 which proposed Attitudinal Loyalty has a positive influence on Behavioral Loyalty was supported, because the T-value is greater than 1.65 and p value $<\alpha = 0.05$. Therefore, it can be concluded that Behavioral Loyalty can be significantly influenced by Attitudinal Loyalty.

Conclusion and Managerial Implications

This study proposes a composite measure of customer loyalty incorporating both behavioral and attitudinal dimensions by looking at relationship quality that has been built based on Marketing Mix that applied to Bank Sumsel Babel. Based on the problems that have been formulated, the results of the research conducted obtained the majority of marketing mix elements significantly influence trust and satisfaction, but Service Quality and Physical Evidence do not significantly influence satisfaction.

The results of this study indicate that the product quality is the most influential variable on satisfaction, this can be seen from the high enough estimate value (SLF: 0.300) and the high T-Value (3.956). This shows that the products being marketed, product diversity and product compatibility with customer needs are important factors in determining overall satisfaction. This research also shows that the place variable is the variable that has the greatest influence on trust (SLF: 0.223) and a high T-Value (2.376). This shows that the accessibility of bank office, the availability of ATM and quietness of branches are important factors in determining overall trust.

This study also found that satisfaction and trust have a significant relationship to commitment. It can be concluded that the increase made in trust and satisfaction will provide a significant increase in commitment. This is in line with the results of research conducted by Kaur and Soch (2018) and Ledikwe *et al* (2019) that suggested the same thing.

The results also obtained that trust, commitment and satisfaction of customers of Bank Sumsel Babel may significantly influence attitudinal loyalty. From the results obtained it can be concluded that the three variables in Relationship Quality have an influence on Attitudinal loyalty. This is in line with the results of research from Ledikwe *et al* (2019) who found the same relationship. This study also found a positive and significant association between attitudinal loyalty and behavioral loyalty. The results confirm prior studies, for example Bilgihan *et al*. (2016), Choi *et al*. (2017), Kaur and Soch (2018) and Ledikwe at all (2019) who also found a similar relationship.

Bank Sumsel Babel must pay attention in building the quality of relationships through trust, satisfaction and commitment because this has a significant effect on attitudinal loyalty. The firm can increase the quality of trust, commitment and satisfaction. To build customer commitment, company must first build trust and satisfaction. In terms of increasing the trust and satisfaction, the company is expected to give attention to products quality that have a strong influence on satisfaction and improve place attributes which are significant in influencing trust in customers. To achieve this, the company must pay attention to location and accessibility of branches if the company want to open new office. The company also need to maintain the quietness of the office and also make sure the availability of ATM is maintained. Furthermore, company is also expected to continue to innovate banking products and features that are tailored to customer needs to improve customer satisfaction. Those strategy are expected to create strong and sustainable customer loyalty.

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Considerations Regarding the Influence of Insurance on the Economic Growth in Romania

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Abstract

Insurance is an economic sector with high potential that needs to be capitalized effectively by the authorities responsible for quantifying this opportunity of economic growth, considered the engine of progress and development of a nation. As part of the financial system through the function they perform, they act as an agent that contributes to improving the economic growth. The insurance sector does not only help the development of the financial sector, but it indirectly promotes economic growth. Consequently, the role of insurance varies for different levels of economic development and largely depends on the indicators used to measure this type of activity. The goal of this paper was to focus on an extremely relevant topic for the specialized economic literature, namely, the influence of insurance on economic growth. The motivation for approaching this theme is a theoretical and methodological preamble for the analysis and identification of diverse aspects and effects of inflation on the insurance sector in the process of economic growth, approach that will be later continued in another study through an econometric model which will evaluate the intensity and direction of influence of this sector in Romanian economy.

Keywords: Insurance sector, Economic growth, Banks, Financial markets, Inflation, Romania.

Introduction

The insurance activity in a modern economy plays an important role and more attention needs to be paid to understanding its environment and its interaction with other sectors of economy. A well-organized insurance sector, with good governance on regional or national level, is one of the catalysts of the socio-economic process of a country or of a region (Ciurea & Ianoș, 2019). The insurance sector plays, in fact, a fundamental role in the functioning of a modern economy as many activities cannot be achieved without insurance. The importance of insurance, the presence of financial institutions is vital for the sustainable economic growth of any country.

Particular attention must be paid to the socio-economic necessity of insurance and its influence on economic growth. Economic growth can be influenced by the insurance sector; still, the hypothesis is not generally available. The idea emerges from the comparative chronological analysis obtained by other researches who have studied this problem and have used diverse research methods, among which we can mention: regression models, statistical correlations, causality tests, co-integration tests, statistical analyses, cross-section analyses. In Romania, there is no correlation between the insurance markets, measured by the degree of insurance penetration and the degree of density and economic growth, measured by GDP per capita (Preda, 2012).

Ward și Zurbruegg (2000) were the first to explore the relationship between insurance and economic growth for the OECD countries. They measured insurance by total purchasing of gross issued premium

as they applied the Causality Granger Test in order to study supply or demand, as well as the influence of insurance on economic growth.

Other authors, (Webb, Grace & Skipper, 2002), presented how life and public liability insurers can contribute to economic growth due to various aspects, such as: life insurance can increase productivity by reducing demand for liquidity and through a more efficient use of available resources, or insurers have the potential to stimulate return on investment by reducing the costs of financing risks.

Outerville (2013) addresses in his paper the relationship between the insurance sector and the economic growth from the perspective of demand, while multinational organizations become aware of the importance of insurance in achieving economic growth.

In another research, Cristea, Marcu și Cârstina, (2014) studied the influence of economic growth on the trend of gross issued premiums in the European Economic Community (EEC) countries. Thus, by using a panel-type model: cross-cutting with fixed effects, where the real increase of the premiums was explained by the growth of the GDP, they showed that the growth potential of the insurance market in the EEC countries is highly correlated with the rate of the economic growth in that area.

Ul Din, Abu-Bakar & Regupathi (2017) studied the relationship between insurance and economic growth in 20 countries for the period 2006 – 2015, where the insurance activity was measured in terms of net issued premiums, of insurance penetration and density, identifying a positive and significant relationship between life insurance, measured through the respective variables and the economic growth for developed countries, the same is true for the developing countries when insurance is measured by the degree of insurance penetration.

Consequently, all the studies carried out on the theme of insurance influence on economic growth so far do not have a common denominator because the approach is different in all cases.

It can contribute to economic growth both as a financial intermediary and through the function of supplier and risk transfer identifier, respectively by achieving an effective risk control and by mobilizing the savings of the population. Over the last decades, there has been a rapid growth of insurance market, especially in the developing markets, due to the financial liberalization and integration, which has raised questions regarding the impact of this sector on the economic growth. A large volume of papers in the literature has been devoted to the way financial systems influence savings and investment decisions and, implicitly, the rhythms of long-term economic growth through several ***functions***, among which the following can be mentioned (Levin, 2005; Măcriș, 2009): *exercising corporate governance; trading, diversification and risk control; mobilization and investment of savings; conductor of exchanges of goods and services; attenuator of negative consequences which random shocks can have on capital investments.*

Financial intermediations support economic growth by improving these functions and ameliorating market frictions such as the costs of acquiring information, conducting transactions and concluding contracts, respectively allowing the economic environment to allocate resources to investments in a more efficient way. However, the positive effects of financial development are tailored by macroeconomic policies, laws, regulations, financial infrastructure and by strengthening the rules applied across countries and times.

The insurance sector can contribute to the economic growth (Skipper & Klein, 2000) in several ways as one can notice in Figure 1.

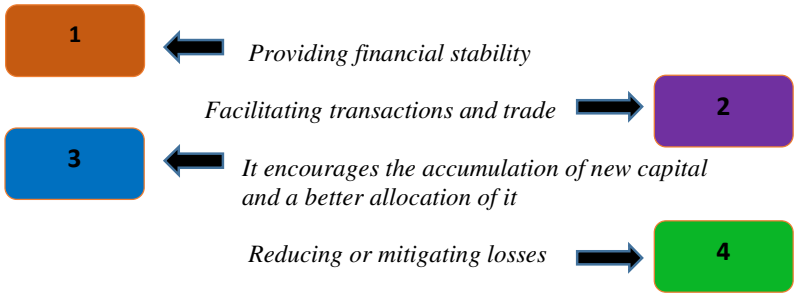

Source: adapted from Skipper & Klein, 2000.

Fig. 1: The ways insurance contributes to economic growth

In addition, it is desirable that there be various effects on economic growth from the side of life or non-life insurance (property - bonds), given that these two types of products insure households and corporations against different types of risks which affect economic activity in different ways. Moreover, life-insurance companies facilitate long-term investments rather than short-term ones, as in the case of non-life insurance companies.

Aspects of the interaction between the insurance activity, banks and financial markets

The literature in this field has been more concerned with the potential interdependence or the substitution effect between banks and financial markets. On the other hand, the emphasis is laid on the fact that banks, rather than financial markets, play a crucial role in reducing information frictions and in reducing transaction costs, respectively in improving the allocation of resources. Similarly, the role of financial markets is emphasized rather than that of banks due to the corporate nature of markets in encouraging innovative and growth-enhancing activities. The development of the banking sector can strengthen the insurance activities through a more effective payment system which will allow the improvement of financial intermediation of services (Beck & Webb, 2003; Webb, Grace & Skipper, 2002). In addition, the development of the banking sector provides liquidity to insurance companies which allow them to meet the payment claims for damages.

In the last two decades, the interdependence between banking activities and insurance activities has increased a lot due to risk transfer. As a result of the fact that banks and insurance sector have mutual exposure in many areas, banks spread credit risks to insurance providers mainly; both by securing loan portfolios (valuing bank securities and collateralizing debt bonds) and by derivatives (credit exchanges with difficulties). From the insurance sector side, insurers have transferred credit risk to banks through liquidity facilities and letters of credit. At the same time, the development of financial markets can strengthen the development of insurance activities because liquid capital markets help insurance companies to invest the resources collected through premium payments. This is especially important for insurance companies which want to compensate long-term bonds for long-term assets that are not normally available through banks. Finally, what is true for banks is also verified in the case of the links between insurance companies and financial markets, for risk transfer reasons.

According to Rule (2001), insurance companies transfer to financial markets not only the market risk, through the hedging options included in the life-insurance portfolios, but also the insurance risks related to natural disasters. From the insurance sector side, financial markets can transfer market risk to insurance companies when the latter write options and buy bonds with included options (for example: bonds which can be withdrawn before deadline).

The demand for life insurance has rapidly grown over the past few decades, significantly surpassing global income growth. The wide spread of socio-economic changes has favoured this development, in

particular, the dramatic extension of life expectancy and the high enrolment rate in tertiary education. Nevertheless, these factors contribute to the rising cost of dependency and provide reasons to cover life insurance. In addition, the limits of social welfare, as tax pressure reaches a critical threshold, are largely anticipated as the stimulators of life insurance consumption in the coming years, as households anticipate that public institutions will cover less of their financial needs (Zouhaier, 2014).

The evolutions in the market structure have similarly contributed to the growing popularity of life insurance. The magnification of the opening of domestic markets to foreign competition as a result of international trade agreements, in particular the Uruguay Round, has resulted in the emergence of more attractive and better priced products, that are better placed in consumers' demand. Moreover, the development of financial savings in the perspective of retirement is seen as a factor which has strongly supported the demand for life insurance in the fast-growing economies.

Approaches rearding life insurance and the determinants of insurance demand

Life insurances have a great potential to contribute to the Romanian economic growth. In the much more advanced European economies, life insurance plays an important role in alleviating the risk of poverty by ensuring the financial security of individuals and families if confronted with unexpected events, such as death or disability. At the same time, they also act as savings instruments for the population, channeling significant volumes of long-term funds towards financial markets and to other sectors in need of investments, thus contributing to the economic growth and stability as a whole.

An insurance policy provides financial support to the dependent persons and to the beneficiaries designated by the insured person. In addition, it provides a measure of financial security for the policyholders (family, loved ones) so that after the death of the insured person they are able to assume financial responsibilities. Policy payments can be made in a lump sum or in several instalments. The most common ***types of insurance*** are:

- ***Term life insurance*** – the policy is available if only the death occurred in a certain period of time which coincides with the term when the insured person makes monthly payments. A term life insurance policy pays benefits to the beneficiaries if only the policyholder dies during the period for which the policy was initially contracted and remained current through monthly or annual premium payments.
- ***Lifetime/ Permanent insurance*** – has no time limit as in the case of term life insurance. Moreover, it remains effective as long as the insurance payments are paid and other contract obligations with the insurance company are met, these types of policies also increase the cash value.

Consequently, there are two basic types of life insurances: *the term life insurance,* which can be purchased for a fixed period of time and *the lifetime insurance*, which retains its effects until the death of the insured person. In addition, with no time limit, all permanent life insurances build cash value with a form of investment otherwise taxed or with a savings plan. Due to this investment component, the premiums are significantly higher than in the case of term life insurances.

Based on the information taken from the literature, we can identify the main socio-economic characteristics and the market conditions of the product for which there is data available, which could affect the demand for life insurance. **These factors are presented as follows:**

- ***Disposable income*** – is a central variable in the insurance demand model that positively affects the consumption of life insurance. In addition, as the value of life insurance products increases, a high income results into a greater loss of the dependents' anticipated utility in the event of an early death of the income earner. The effect that occurs increases the value covered by the life insurance and, therefore, it contributes to the positive relationship with income. By analysing the data on households' income, the insurance demand increases with the husband's future earnings (and decreases with the wife's future earnings). Most empirical analyses on national panels use nominal GDP per capita as a proxy variable for disposable income.

- ***Life expectancy*** – according to Lewis (1989) theoretical development, in which the goal is to maximize the anticipated utility of the dependents during their lifetime, the consumption of life insurance is considered as ascending with the probability of the death of the salary earner. Considering that life expectancy is reversely correlated with the probability of death, it is expected that there should be a negative relationship between life expectancy and insurance consumption. One explanation may be that a longer life expectancy will also diminish the price of life insurance and, consequently, it will stimulate consumption.

- ***Number of dependents*** - Campbell (1980) argue that the dependents' protection against financial difficulties represents the major driving force of life insurance consumption. As Lewis showed (1989), the demand of life insurance increases with the anticipated value of the lifelong consumption of the dependents. This anticipated value obviously increases with the number of dependents. Hence, the greater need for security against the premature death of the salary earner.

- ***Level of Education*** – the level of Education positively affects the demand for life insurance in two ways. Truett and Truett (1990) argued that a higher level of Education is associated with a greater desire to protect the dependent persons and their living standard, too. Browne and Kim (1993) explained that a higher level of Education results into a greater concern about the uncertainties of life, hence a better awareness of the benefits covered by life insurance. In addition, the level of Education is associated with the degree of dependence of the descendants, resulting into an increase in the need to protect beneficiaries through life insurances.

- ***Social insurance expenses*** – social insurances are a factor that reduces the demand for life insurance. Social insurance spending represents a proxy variable for national welfare, which can be seen as a substitute for what life or car insurance covers, risk coverage. Skipper and Klein (2000) show that generous social insurance programs reduce the cost of dependency. Following tis theoretical development, Lewis (1989) argues that social insurance spending represents a form of mandatory life insurance that can replace taxes, which reduce available income for the purchase of life insurances; the high level of social insurance expenditure is assumed to be a factor that reduces life insurance consumption.

- ***Financial development*** – is associated with the wide spread of insurance cash-flows, which allow households to insure their future income by holding financial assets. By offering similar benefits, it is expected that life insurance generate higher sales in countries with a higher level of financial development.

- ***Foreign market share*** – the high levels of domestic market penetration by foreign firms can reflect market attractiveness for foreign insurers and suggest a high level of insurance consumption. A low level of foreign firms' participation may also reflect the high degree of competitiveness of the domestic market, as well as a possible saturation of this market.

- ***Anticipated inflation*** – the negative effect on the demand for life insurance, turning it into a less attractive product. Fortune (1973) explains that inflation erodes the value of life insurance, making it a less attractive product. Some authors (Măcriș, 2013), have provided empirical evidence which demonstrates that anticipated inflation has a negative effect on life insurance consumption. As Babel (1981) also demonstrated, using data from the Brazilian economy in a period characterized by rapid inflation, even when adjusted insuranc

- e products are used, the demand for these products is affected by the harmful effects of inflation.
- ***Real interest rates*** – one of the theoretical justifications of this influencing factor is that high rates of real interest can reduce the insurance cost and thereby stimulate the demand for insurance. On the other hand, they can determine the consumers to reduce the number of purchases due to the anticipation of high revenues

In their work (Beck & Webb, 2003), they detected a positive relationship using interest rates on loans. However, it can be noted that the interest rates on loans contain a credit risk premium that varies from one country to another, depending on their experience on lending systems

The role of insurance markets in the Developing Countries

The insurance industry plays an important role in our society and in other developing countries by encouraging better risk management and protecting the insured person when something bad happens, the protection granted to the people and the companies where they are employed, and insurance stimulates economic growth and stability through association with long-term investments.

The developing countries are not only consumers, but also providers of insurance services. In a domestic market, the general insurance offer consists of services provided by national companies, with local and/or foreign capital, as well as foreign companies and agencies or their subsidiaries. Insurances, as well as other financial services, have gained importance in the process of general development of the financial institutions. The Governments of many developing countries have induced, throughout history; the vision that the financial systems they had inherited could not adequately serve the development needs of their countries so that, in the recent years, they have directly made considerable efforts to change the structure of these financial systems, which are considered as crucial components of the developing programs (Umoren & Joseph, 2016). The life insurance sector is restricted in many developing countries because life insurance can be considered irrelevant or inappropriate for ideological, cultural or religious reasons or because the economic security is provided by the family.

According to the studies made by Liebenberg, Carson and Dumm (2012), a function of demand for life insurance derived from the optimization of the consumer's utility function should be dependent on welfare, income trend, a vector of interest rates, a vector of prices, including insurance premium rates and subjective discounting functions of the consumer in terms of the utility functions of consumption and welfare, which are affected by the level of financial development of the market.

The fundamental reasons for savings in developing countries should be similar to those in industrialized countries. However, the environment in which decisions for savings are made is extremely different. Under the life cycle assumption of savings, capital markets are supposed to be perfect so that lending and borrowing are assumed to be in such a way that decisions regarding income and savings be separated. According to this formulation, the standard instantaneous utility functions (concave in consumption) will generate a relatively flat consumption demand throughout the life cycle, because the income obtained is described as an age function, which does not follow the same form, there is only the assumption that a change in the population growth rate does not affect the intergenerational distribution of income, under the conditions of the life-cycle assumption.

Another concern refers to the fact that an increase in the population growth rate determines the existence of an asymmetric distribution of personal income. A rapid growth of the population determines a large share of the young population, which tends to consume more than it produces. In this context, Luciano, Outreville and Rossi (2015) shows that an increase in the population growth rate, caused by the increase of fertility rate, implicitly reduces aggregate savings. The widespread belief, that a more ethical distribution of income encourages the savings of low-income groups, is confronted with a difficult problem for many developing countries, since personal savings are only made by a very small segment of the population. The connection with the distribution by age groups is even more difficult to be achieved in relation to the insufficiency of the available data. Moreover, a relatively large share of the households derives their income from agriculture, and the income is subject to some large fluctuations caused by the variations in global prices of agricultural commodities and climatic conditions.

Finally, the structural characteristics of markets and financial institutions play a major role in determining the efficient allocation of demand and supply of financial services. Distortions also occur when the Government imposes a set of control and tax measures. A variety of factors, especially in the economies of developing countries, can determine the prevalence of price distortions.

The Romanian insurance market is still in an early growth stage, specific to the developing countries rather than to an UE Member State. Despite optimistic forecasts, (a turnover of 10 billion euro in 2010 and around 20 billion euro in 2020), the level of the insurance market in Romania is still low. The contribution of the insurance industry to the formation of the GDP in Romania is still under the European average. Therefore, we remain on the last position in terms of insurance density and insurance penetration in GDP (ASF Romania, 2019).

The Romanians are reluctant when it comes to life insurance, reluctance that comes from superstition and fatalism "*I'm not talking about some illness as this way I attract it and what is about to happen will happen anyway*". We note that the internet access and the communication with the Romanians working abroad are factors which contribute to the change in the perception of those who want to take out insurance.

From the investigations performed, we cannot say that there is homogeneity between states; on the contrary, we notice great discrepancy among states, generated by the economic power of each of them. The way European citizens invest is most striking. Thus, while Scandinavian countries and the most economically developed ones lay emphasis on life insurance, there are also exceptions, such as the case of the Netherlands, which give priority to private health insurance.

The effects of inflation on life insurance contracts

The inflation effects on life insurance contracts are particularly pronounced due to the following factors: these contracts are usually specified in fixed nominal monetary units and most are intended to cover long periods of time. Since the values of life insurance are specified in fixed nominal monetary units, these do not adjust to compensate for the value erosion produced by inflation and, considering that the contracts are on long-term, the accumulated erosive effects of inflation on the insured value may be substantial (Dragoș, 2014; Ciurea, 2019). Thus, while life insurance products are designed to provide protection against long-term hazards and premature death, inflation and a rising cost of living may undermine this protection. If the insurance is a term life insurance policy for only a few years, then inflation may not be considered a major factor, but if we deal with long-term insurance policies – for example, for 20 years or more – then the future value of money should play an important role in calculations.

In assessing the effect of inflation on the cost of life insurance, the consumer may be influenced, to various degrees, by "the monetary illusion". Consumers can estimate the net cost of life insurance in either nominal or real terms. More than that, they can link these costs to the nominal or real values of the life insurance that provides protection. By combining these alternatives, **there are four general classifications of the approaches that the consumers can make**: *"monetary illusion", "partial monetary illusion", "policy illusion" and "no illusion"*.

The consumers who suffer from monetary illusion may realize that inflation is present, but they fail to admit the impact of inflation on real costs and of the value of their life insurance policies. Moreover, if insurers are able to reduce the burden of the premium due to the higher income of the investments with higher interest rates, the consumers who suffer from this degree of monetary illusion could actually believe that the cost of life insurance decreases. Their focus is on nominal costs and on nominal levels of protection and when inflation affects these nominal values, consumers won't recognize the impact of inflation on life insurance. Such consumers could use a number of specific costly procedures, which may lead to growth or to the reinforcement of their illusion.

While a consumer who relies on monetary illusion would be tempted to believe that inflation has no effect or if inflation determines insurers to reduce the burden of the premium and/ or the increase of dividends and of the cash values or that it only has a reducing effect of the cost of life insurance, a consumer with partial monetary illusion would be tempted to believe that inflation determines the increase of the cost of life insurance (Cummins & Weiss, 2009). Consumers who are at this stage are somewhat less naive in their thinking. They realize that the identification or the cash payment value, if it's actually received, it will bring him a value which is eroded by the inflation that occurs in the period

between the date of the policy purchase and the date of its completion at death, renouncement or maturity. This phenomenon often leads to the criticism of life insurance products on the grounds that premiums are paid with "good money" while the benefits are received in "bad money", or in money whose value has been eroded by inflation.

A more subtle error is made when consumers are short-sided in their view of life insurance, considering the net cost in terms of the actual or present value of a policy which provides a given number of units of the actual insurance. Their attention is incorrectly directed to the vehicle (be it the policy contract) rather than to the project (be it the protection provided) of the life insurance purchased. This focusing error is called the "policy illusion" and it is a case of monetary illusion. In discussing this type of monetary illusion, attention is paid to the elaboration of the capital budgeting procedure, usually based upon the measuring impact of inflation on the costs and benefits associated with life insurance. If consumers are affected by monetary illusion, partial monetary illusion or policy illusion, they are inclined to see the influence of inflation as generating costs of life insurance which are uncovered, higher or lower ones, respectively.

The current context of the specifics of the inflation rate in Romania

For Romania, the inflation rate was 4.04% at the end of 2019 and it was above the level forecast by the NBR by 0.55%. As a result of a strong base effect at the level of the fuel group, the evolution reflected the combined effect of some shocks from the supply side in the case of some agricultural food products (such as: fruit and pork), whose transmission in the final prices was facilitated by the maintenance of pressure from fundamental factors. The slight depreciation of Romanian's currency, 'leu', towards the end of the year, in relation to the main currencies, also acted in inflationary sense (The National Bank of Romania (NBR), 2019; 2020).

According to the AGERPRESS press release of April the 4th 2020, the average rate of consumer prices for the last 12 months (April 2019 – March 2020) compared to the previous 12 months (April 2018 – March 2019), calculated on the basis of the CPI is 3.7%.

According to the NBR Inflation Report on February 2020, in conjunction with that from November 2019, the annual rate of CPI inflation indicates its return and maintenance within the interval of variation around the central target over the coming quarters, being projected at 3% at the end of 2020 and at 3.2% in December 2012. As compared to the previous edition of the Report, the value recorded in December 2019 was by 0.2 percentage points higher while for the end of the current year the projection was revised down by 0.1 percentage points. The return of the inflation rate in the specified range will be mainly due to the attenuation of the dynamics of the exogenous components of the consumer basket and, to a lesser extent, to the adjusted CORE2 index, preponderant on the base effects determined by the unfavourable developments in the first part of the previous year. Such maintenance is due to the persistence of inflationary pressures from the domestic environment, associated with the excess of demand and inflation anticipations while, in the medium-term, an increase in the pressures coming from imported inflation is also expected. Similarly, the risk balance in projecting the annual inflation rate is assessed to be inclined in the direction of deviations upward from the trajectory described in the baseline scenario, mainly due to the influence of internal factors.

Expressed as the annual average, the inflation rate remained at the level registered at the end of previous quarter: the value determined according to the national methodology reached 3.8% in December 2019, while the indicator calculated on the basis of harmonized structure reached a level of 3.9%. However, Romania remains the country with the highest level of the annual average HICP rate among the Member States of the EU for 18 months in a row, the difference compared to the European average being of 2.4

percentage points, given the marginal decline of the EU average. This aspect is also shown in the table below.

Table 1: Annual average HICP in the UE at December 2019

Curr. No.	Country	HICP (average annual variation %)
1.	Romania	**3.9**
2.	Hungary	3.4
3.	Slovakia	2.8
4.	Latvia	2.7
5.	Netherlands	2.7
6.	Czech Republic	2.6
7.	Bulgaria	2.5
8.	Estonia	2.3
9.	Lithuania	2.2
10.	Poland	2.1
11.	United Kington	1.8.
12.	Sweden	1.7
13.	Slovenia	1.7
14.	Luxembourg	1.6
15.	Austria	1.5
16.	Malta	1.5
17.	Germany	1.4
18.	France	1.3
19.	Belgium	1.2
20.	Finland	1.1
21.	Ireland	0.9
22.	Spain	0.8
23.	Croatia	0.8
24.	Denmark	0.7
25.	Italy	0.6
26.	Cyprus	0.5
27.	Greece	0.5
28.	Portugal	0.3
29.	European Union	**1.5**

Source: adapted from National Institute of Statistics of Romania (NSI), The National Bank of Romania (NBR), www.eurostat /statistics-explained.

From the analysis of the investigations carried out on the evolution of inflation in the UE Member States, the period 2014 – 2016 was characterized by a decreasing evolution of prices in most of the EU states, influenced by lower energy prices across the world, and starting with the year 2016, it placed on an upward trajectory as a result of the propagated effect of lower oil prices, as well as of the favorable developments in the labor market. Across the EU as a whole, the annual inflation was 1.5% in December 2019.

Although Romania registered a negative inflation at the end of 2016 (-1.5%), occupying the best place, from this perspective, in Europe, its effect was felt negatively in 2017, in the sense that the inflation rate was on an upward trend, located at 1.3% at the end of that year and growing continuously until the level of 2019.

Unlike the NBR, the statistical data, calculated on the basis of their CPI from the previous year, is not optimistic and positions Romania with the highest inflation rate, as one can see from the table below in conjunction with table 1.

Table 2: Evolution of inflation rate

%	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Inflation rate (end of year)	7.96	3.14	4.95	1.55	0.83	-0.93	-0.54	3.32	3.27	4.04
Inflation rate (annual average)	6.09	5.79	3.33	3.98	1.07	-0.59	-1.50	1.3	4.6	3.8

Source: NSI, calculations performed based on the NBR Annual Inflation Reports

As one can see in the graph below and as stated in the explanations given by EUROSTAT at the end of 2019, the highest inflation rate was recorded for food, alcohol and tobacco (2.2%), followed by services (1.8%), as well as for non-energy industrial goods (0.5%)

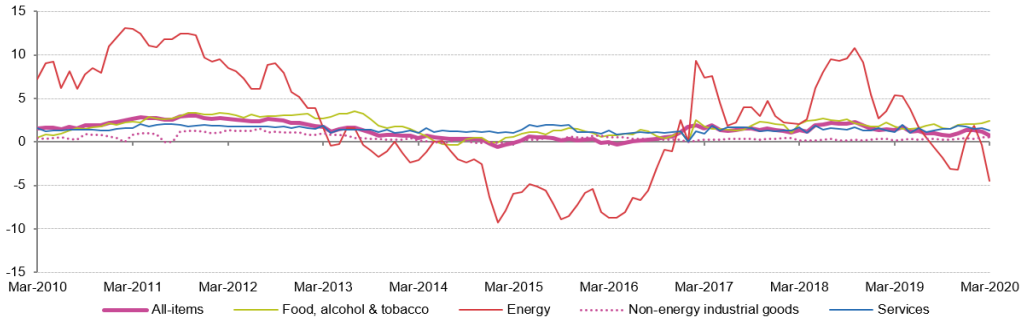

Source:https://ec.europa.eu/eurostat/statisticsexplained/index.php?title=File:Euro_area_annual_inflation_and_its_main_components_(%25),_March_2010_-_March_2020.png

Fig.1: Evolution of inflation rate in the European space and its main components during March 2010 – March 2020

The main uncertainties and risks associated to the perspective of inflation arose from the future conduct of fiscal and revenue policy, especially in the context of 2019 – 2020 election calendars, and the level and trend of the current account deficit remained worrisome. Increased uncertainty continued to be associated with the growing weakening of the euro economy area and of the global economy, as well as with the increase in risks, in the context of the trade war and of Brexit.

In the current context of the rapid spread of the corona virus, a number of international organizations and financial institutions have revised down their economic growth forecasts for 2020, signaling the possibility of even more abrupt deterioration of economic growth rates. Given the fact that the fundamental objective of the NBR is price stability, it is natural to understand the determinants of inflation rate, the way it evolves and its future prospects.

For the insurance sector, the cognition of inflation is important because it erodes the value of money, vitiates the correlations between the relative prices of various goods and services, enhances uncertainty and risk, etc.

Conlusions

The evolution of the insurance market in the Romanian economy in the last decade is due to the strongest players that entered the market, the services provided by the insurance companies, whose products have evolved a lot to meet the requirements of the consumers and to familiarize them with this type of investments. In our country there is a high potential demand because of the large number

of citizens, but the actual demand is reduced because of the low economic power of the citizens and because of their perception on the use of insurance. The reality is that, at present, the insurance market is becoming more and more important for Romania. This process of redefining the operational structures has caused a number of effects, represented by the new dimension of the market, both in terms of quality and quantity. The Romanian insurance market has experienced a significant increase in product quality and a great diversification of services in the recent years. The presence of a high level of companies in the market proves that the Romanian scene has a real potential for growth and development, being at the same time one of the most attractive markets for foreign investors. This is the result of the diversification of supply, especially in the field of life insurance, where competition is growing. The fact that many companies operating in this market are financial groups with international experience and recognition is a strong argument in favor of quality and significant contribution to economic growth.

The share of life insurance activity in the total insurance sector in Romania, from the perspective of the volume of gross written premiums, is at a low level as compared to other EU analyzed states. Nevertheless, in recent years, there has been a more pronounced growth of the life insurance sector in Romania, which indicates a growing trend of the Romanians' interest towards life insurance products. Although Romania has recorded lower levels of insurance indicators as compared to the European average, the development prospects of this sector remain favorable. Launching new insurance products and adapting them to the needs of the population, increasing the consumers' degree of confidence into the insurance sector and enhancing financial education prove to be effective ways to strengthen the insurance sector in Romania and to significantly contribute to economic growth.

The global macroeconomic context was marked in 2019 by a series of challenges, mainly related to the US – China trade tensions and by the uncertainties over the outcome of Brexit negotiations. The year 2020 started with a reduction, to some extent, of the risks at global level, simultaneously with the emergence of some new risks related in particular to the emergence and spread of Covid -19, declared a pandemic by the World Health Organization in March this year. A reduction in geopolitical tensions was based on the signing of Phase 1 of the China – US Agreement and of the negotiations between the EU and Great Britain which clarified trade relationships between the EU and Great Britain by the end of 2020.

However, uncertainties about the US trade policies, on the one hand, and the long-term relationships of the EU with Great Britain, on the other hand, remain relevant. In this context, the trend of attenuating the economic growth rates of the EU states and, implicitly, of Romania continued.

Nevertheless, the emergence and spread of Covid -19 represents the main source of concern at global level, as well as for Romania in terms of public health and economic activity, the restrictions imposed by the states affecting the mobility of people and the trade relationships between countries with a negative effect on the already reduced economic growth and the global economy that is still balance, a relatively fragile one.

Therefore, in order to better understand the relationships between insurance and economic growth, the decision-maker factors, that is the Government and the regulatory authorities, will have to adopt a series of measures for sustainable economic development and will have to recommend the promotion of educational programs aimed at spreading the benefits of insurance and at orientating the consumers' interest towards it.

From the analysis made in this paper, we can conclude that the insurance sector makes an important contribution to the economic growth through its contribution to the formation of the gross domestic product, as well as through its function of supplier and risk transfer identifier, respectively by achieving an effective risk control and by mobilizing the savings of the population. Carrying out the same activities in parallel and/or selling the same products to the banking sector have contributed to the emergence of new risks and of some techniques also, especially regarding the actuarial system. Thus,

the joint effort obtained with the banking sector makes the development of insurance business to encourage bank lending by reducing the market cost of capital for economic entities, influencing economic growth through an increase in the demand of financial services. The deepening of insurance and of the banking system seem to play complementary roles in the growth process, though the insurance and the banking field make separate positive contributions to economic development, their individual contributions are far more significant when they are both present.

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Utilization of Multi-Criteria Assessment in Purchasing Medical Equipment – Case Study for the Czech Republic: Instruments for Cataract Diagnostics

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Abstract

This study provides a structured methodology based on a multi-criteria approach (technique for order of preference by similarity to ideal solution – TOPSIS), which is suitable for supporting hospitals and ophthalmologic centers when selecting the optimum instrument for cataract diagnostics. Purchases of technology in general (not only in healthcare) are a much-discussed issue.The main task when selecting a diagnostic instrument is to optimize the diagnostic output due to the suitable technical parameters of the instrument, but also with regard to operator user-friendliness. This study considers cataract diagnostics in three main steps: measuring the axial length of the eye with the corresponding calculation; measuring the corneal curvature; and verification measurement of the axial length of the eye complemented by two-dimensional B-scan and ultrasound (UBM -– Ultrasound Biomicroscope) measurements. Within each step, a pair of instruments available on the Czech market was identified and, in each category, ten key criteria were established by an expert group. Weight values for individual criteria were then established with the aid of Saaty's matrix, and costs related to one-year operation as well as other effects entering into the cost-efficiency analysis (CEA) were evaluated with the aid of the TOPSIS method. The new generation of diagnostic instruments, i.e., the IOL Master 700 and Pentacam 70700, are better from the cost-efficiency viewpoint in the first two steps of the diagnostics, while in the third step of the diagnostics, the DGH Scanmate biometer, distinguished by a unique three-star quality-assessment system, has a worse level of cost efficiency than the OTI-Scan 2000.

Keywords: Cataract, Diagnostics, Cost Efficiency, Costs, TOPSIS

Introduction

According to a review by the WHO, cataract is the most frequent global cause of worsening visual acuity (Bourne *et al.*, 2017). Surgical intervention is an efficient solution for patients suffering from cataract; nonetheless, establishing the exact diagnostics of the cataract severity prior to surgery is a sheer necessity to ensure not only the safety of the patients but also the overall quality of the treatment (Xiong, Li and Xu, 2017). Diagnostics in the Czech Republic are based on a thorough ophthalmologic examination and also with regard to the patient's overall health condition and additional diseases. Within a detailed anamnesis, the visual acuity is assessed (both short- and long-distance; as well as without correction and with the best available correction), the eye adnexa are examined, the intraocular pressure is measured with a tonometer, and eye biomicroscopy is made on a slit-lamp in the mydriasis (direct or indirect ophthalmology of the *fundus oculi*). The remaining measurements and thorough diagnostics are, in principle, carried out in three main steps – cf. Fig. 1.

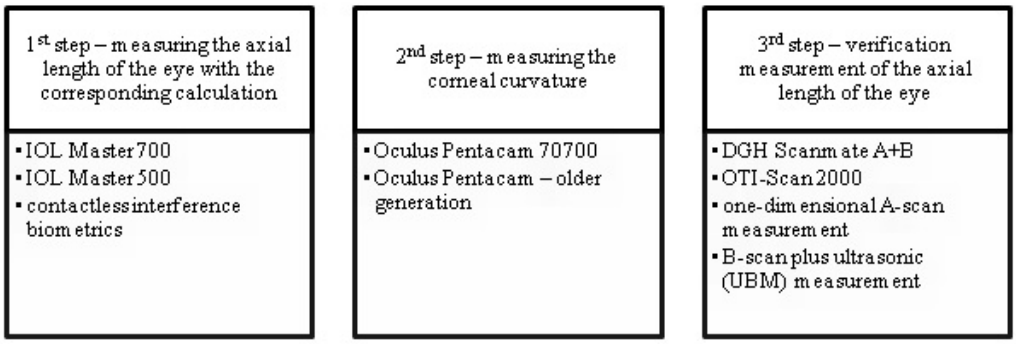

Fig. 1: Diagnostic approach to determine the cataract severity and calculation of the IOL value with the aid of the instruments available on the Czech market

For a successful surgery and ensuring excellent visual acuity, it is very important to exactly measure the axial length of the eye and calculate the parameters of the IOL – intraocular lens (Kunavisarut *et al.*, 2012). A problem arises with the correct calculation of the IOL if the patient has undergone – very popular nowadays – laser treatment for dioptric correction. If this is the case, the direct use of the measured topographic/keratometric values without any corrections leads to an inaccurate IOL calculation. There are several reasons for the inaccurate IOL calculation after keratorefractive surgery (Borasio, Stevens and Smith, 2006). At the last stage of the thorough diagnostic, the axial length of the eye and distances between structures present along the eye axis are measured (Qureshi and Laghari, 2010).

We can observe that approaches to cataract diagnostics are strongly dependent on the territory. For example, Guo (Guo *et al.*, 2015) says that in China, effort has been being taken to develop computer systems for comfortable and cost-efficient diagnostics, namely, diagnose the cataract severity on the basis of analyzing the fundus oculi, obtaining information on the recommended treatment from ophthalmologists. The trend goes towards developing the analysis of the retinal image (based on automatically recognizing the cataract severity), thus relieving the load put on ophthalmologists. This approach is particularly advantageous in countries in which there is a lack of doctors (ophthalmologists). A study in Australia (Dimock *et al.*, 1999), confirmed that the popularity is ever-growing of objective measurements to determine the type and severity of cataract. As an example, let us mention taking a digital photo of the lens with subsequent densitometric digital analysis. This method is currently accepted as the best method for recording the changes in cataract. A serious disadvantage of this method is its high-level costs. This approach is also confirmed by the study (Xiong, Li and Xu, 2017), which evaluates the blurriness for cataract diagnosis with vitreous opacity removal. Other study (Tabatabaei *et al.*, 2020) recommends SS-OCT-based preoperative examinations for all patients suffering from traumatic cataract. In low-income countries (LIC) it is, in the opinion of next study (Singh *et al.*, 2019), important to introduce remote retrieval of eye-related information via mHealth, which allows non-specialized ophthalmic practitioners to provide low-cost, high impact eye care in resource-limited regions. As examples, the PEEK retina device, the HelpMeSee simulation system, etc. are listed.

When deciding about purchasing a suitable diagnostic instrument, not only should its technical parameters be considered, but also the information about the controls, defect rate, quality of outcome and, of course, the cost aspects (Rosina *et al.*, 2014). In this instance, utilizing the methods of Multiple-Criteria Decision-Making (MCDA) (Rogalewicz and Jurickova, 2014)(Oliveira, Mataloto and Kanavos, 2019) has proved to be suitable. MCDA enables us to take into account several parameters and weigh them in line with experts' preferences (Rogalewicz and Jurickova, 2014). Rossi (Rossi, Marciano and Cabassa, 2019) suggests multi-criteria methodology to select the best ultrasound device capable of optimizing workers' well-being and satisfying company production objectives. Other author (Ivlev, Vacek and Kneppo, 2015) developed a methodology to be used as support for purchasing medical devices under uncertainty; subsequently, they demonstrated their theory on an MRI example. Abdel-Basset (Abdel-Basset *et al.*, 2019) described similar applications;

in fact, Neutrosophic TOPSIS applied to an MCDM problem; namely, the selection of a sugar-analyzing device for diabetics, was concerned.

A combination of the results achieved by the above-mentioned authors was an inspiration for applying this approach in decision-making about purchasing diagnostic instruments for ophthalmology.

Methods

Cost-Efficiency Analysis (CEA) includes the effects (MCDA results), and also costs adjusted to one year of the instrument's operation. In other words, the one-year-operation costs were thus calculated as a sum of the following expenses: procurement, repair and maintenance, safety and technical inspections, spare parts, sterilization, labor, energy supply, etc. A group of experts defined the criteria to be applied to the instrument selection and the weights of individual criteria. The group consisted of: a biomedical engineer, optometrist and nurses, for whom the requirement was at least five years of practice in the given ward and a university education.

Saaty's matrix was used to determine the weight values (Rogalewicz, 2019). This matrix is based on evaluating relative significance, i.e., decisions on how much the i-th index is more significant than the j-th one. The values are written as integer entries v_i in a square matrix (usually 1, 3, 5, 7, and 9). The second value in the pair to be compared is set to $1/v_i$. The weights for individual criteria are calculated as follows:

1) Summing up all n entries s_{ik} in the k-th column of Saaty's matrix,

$$\sum_{j=1}^{n} s_{jk}$$

2) The entries in each column are divided by the corresponding sum, i.e.,

$$t_{jk} = \frac{s_{jk}}{\sum_{j=1}^{n} s_{jk}}$$

3) Entries in each row in the T matrix are summed up, i.e., all entries t_{ij} in the j-th line

$$\sum_{k=1}^{n} t_{jk}$$

and then all entries of the entire T matrix are summed up:

$$\sum_{j=1}^{n}\sum_{k=1}^{n} t_{jk}$$

4) Quantified values of the indices' relative significance are calculated via normalizing the row sums,

$$v_j = \frac{\sum_{k=1}^{n} t_{jk}}{\sum_{j=1}^{n}\sum_{k=1}^{n} t_{jk}}\,.$$

Now we apply the TOPSIS method, which appears to be suitable for evaluating the purchases of medical devices by health-care centers (clinics, hospitals, etc.) (Rogalewicz and Jurickova, 2014). The method is based on choosing the alternative that is the closest to the ideal variant represented by the vector (H_1, H_2,…, H_k) and the farthest from the basal variant represented by the vector (D_1, D_2,…, D_k) (Rogalewicz and Jurickova, 2014).

This approach consists of the following steps:

1. Converting the minimization criterion to a maximization one.
2. Setting up a normalized criteria matrix as follows:

$$r_{ij} = \frac{y_{ij}}{\sqrt{\sum_{i=1}^{p}(y_{ij})^2}}$$

where y_{ij} stands for the evaluation of the *i*-th criterion by the *j*-th expert, *i = 1, 2, … , p, j = 1, 2, … , k.*

3. Calculation of the weighted criteria matrix W

$$W = \begin{bmatrix} w_{11}, & w_{12}, & \dots, & w_{1k} \\ w_{21}, & w_{22}, & \dots & w_{2k} \\ \vdots & \vdots & \vdots & \vdots \\ w_{p1}, & w_{p2}, & \dots & w_{pk} \end{bmatrix} = \begin{bmatrix} v_1 \cdot r_{11}, & v_2 \cdot r_{12}, & \dots, & v_k \cdot r_{1k} \\ v_1 \cdot r_{21}, & v_2 \cdot r_{22}, & \cdots, & v_k \cdot r_{2k} \\ \vdots & \vdots & \vdots & \vdots \\ v_1 \cdot r_{p1}, & v_2 \cdot r_{p2} & \cdots & v_k \cdot r_{pk} \end{bmatrix}$$

4. Establishment of the ideal (H) and basal (D) variants on the basis of the weighted criteria matrix W.
5. Calculation of the distance from the ideal variant:

$$D_i^+ = \sqrt{\sum_{j=1}^{k}(w_{ij} - H_j)^2}$$

and from the basal variant:

$$D_i^- = \sqrt{\sum_{j=1}^{k}(w_{ij} - D_j)^2}$$

6. These distances from the ideal and basal variants are used for calculating the relative index of the distance from the ideal variant with the aid of the following formula:

$$c_i = \frac{D_i^+}{D_i^+ - D_i^-}$$

Further, a cost-efficiency analysis (CEA) was performed. The calculation of CEA is one of the HTA (Health Technology Assessment) cost-approach methods (Goodman, 2014). Real prices are replaced with costs, while the MCDA results are deemed the values of the effects. We can thus obtain the monetary value per unit of effect (Rosina *et al.*, 2014). CEA is given as

$$CEA = \frac{C}{E}, \text{ where}$$

C … cost (EUR),

E … effect (natural expression).

The CEA value determines a ratio between the incremental costs and gains (ICER), which enables us to assess the cost efficiency for the intervention to be evaluated, as compared with the comparator. The ICER value is a ratio between a difference of total costs and a difference of total gains for the interventions to be evaluated and to be compared. It is calculated as follows:

$$ICER = \frac{C_1 - C_0}{E_1 - E_0},$$

where C_1 and E_1 stand for costs and effects (respectively) for the intervention to be evaluated, while C_0 and E_0 stand for costs and effects of the comparator. ICER expresses the costs to be additionally incurred on obtaining one additional unit of effect (Bang and Zhao, 2012).

Finally, the threshold analysis was performed (kind of sensitivity analysis), by which it is possible to observe how the outputs of the model will be changed if the values of the selected parameter in the whole range will be modeled. In our case, the outputs of the model are the results of CEA and the acquisition costs are considered as a chosen parameter, which will be changed. The main advantage of this analysis is to determine a threshold value at which the main output of the model can vary.

Results

Evaluation of instruments for the 1st step of the diagnostics – measuring the axial length of the eye with the corresponding calculation

For this comparison, we have chosen a pair of instruments, the IOL Master 700, and its older generation IOL Master 500, both made by Carl Zeiss. The expert group identified the criteria (parameters) and, for each criterion, the functionality for the given criterion and its significance were evaluated. The weights of individual criteria were then calculated with the aid of Saaty's matrix –cf. Table 1.

Table 1 : Weights of the criteria for the IOL Master 700 and IOL Master 500

Criterion	Weight
Measurement speed	0.146
Measurement accuracy and calculation correctness	0.269
Eye photo quality (important for toric IOLs)	0.076
Database of examinations	0.048
Data transmission to the system	0.031
Calculation modes (SRK/T, Hoffer, Holladay)	0.207
Measurement scope	0.110
User-friendliness	0.019
Necessity to calibrate	0.079
Optional RDP (Remote Desktop Protocol)	0.013

The TOPSIS method identifies the IOL Master 700 as more efficient with a value of 0.549; the IOL Master 500 has a value of 0.451. When calculating the costs for one year of operation, only different items were considered. Identical items (i.e., the average costs on repairs and maintenance, technical safety inspections, sterilization, spare parts, consumables and labor) were disregarded. The acquisition price of the IOL Master 700 is higher than the other one and amounts to 42,440 EUR including VAT (also including training costs). The annual energy-supply costs are very low, namely, 28 EUR. The total costs adjusted to one-year operation of the IOL Master 700 (for a five-year life cycle) amount to 8,516 EUR/year. The acquisition price of the IOL Master 500 amounts to 37,724 EUR including VAT, and the energy supply costs are also very low – namely, 56 EUR. The total costs adjusted for one-year operation of the IOL Master 500 (for a five-year life cycle) amount to 7,601 EUR/year. The CEA outcome is 15,512 EUR/effect for the IOL Master 700 and 16,854 EUR/effect for the IOL Master 500. The ICER value (when the IOL Master 700 is taken for the comparator) is 9,337 EUR/effect.

Evaluation of instruments for the 2nd step of the diagnostics – measuring the corneal curvature parameter

The Pentacam 70700 and its older generation made by OCULUS, l.t.d. were now compared. The expert group identified the criteria (parameters) and, for each criterion, the functionality for the given criterion and its significance were evaluated. The weights of individual criteria were then calculated with the aid of Saaty's matrix –cf. Table 2.

Table 2 : Weights of the criteria for the Pentacam 70700 and Pentacam of an older generation

Criterion	Weight
Measurement speed	0.060
Measurement accuracy	0.284
Examination modules (topography, pachymeter, cataract grading)	0.151
Database of examinations	0.084
Comparison with the preceding examination	0.110
Photo quality	0.197
PC licensing	0.021
Internal network connectivity	0.035
Report generating	0.047
Optional RDP (Remote Desktop Protocol)	0.012

Effect values were calculated for both instruments with the aid of the TOPSIS method, resulting in 0.882 for the Pentacam 70700 and 0.118 for the older-generation Pentacam. The one-year operation costs amount to 30,651 EUR including VAT for the Pentacam 70700; only the acquisition costs are considered because all the remaining costs are identical and have, consequently, been disregarded. The corresponding costs amount to 28,293 EUR for the older-generation Pentacam. The one-year operation costs amount to 6,130 EUR for the Pentacam 70700 and to 5,659 EUR for the older-generation Pentacam**.** The CEA outcome amounts to 6,950 EUR/effect for the Pentacam 70700, and to 47,954 EUR/effect for the older-generation Pentacam. The ICER value (when the Pentacam 70700 is taken for the comparator) is 617 EUR/effect.

Evaluation of instruments for the 3rd step of the diagnostics – verification measurement

The DGH Scanmate A+B made by DGH Technology and OTI – Scan 2000 made by Optos Hialeah were subject to this comparison. The expert group identified 10 criteria and, for each criterion, the functionality for the given criterion and its significance were evaluated. The weights of individual criteria were then calculated with the aid of Saaty's matrix –cf. Table 3.

Table 3: Weights of the criteria for the DGH Scanmate A+B and OTI-Scan 2000

Criterion	Weight
Measurement speed	0.121
Measurement accuracy and calculation correctness	0.275
Calculation modes (SRK/T, Hoffer, Holladay)	0.145
Ultrasound B -scan quality	0.096
Ultrasound B -scan loop length	0.095
Size of the instrument	0.162
Internal network connectivity	0.020
User-friendliness	0.033
Necessity to calibrate	0.042
Optional RDP (Remote Desktop Protocol)	0.011

The effect value has, with the aid of the TOPSIS method, been identified as 0.296 for the DGH Scanmate and 0.704 for the OTI-Scan 0,704. The acquisition price of the DGH Scanmate A+B amounts to 11,317 EUR including VAT. The acquisition price of the OTI-Scan 2000 amounts to 22,163 EUR including VAT. The one-year-operation costs amount to 2,263 EUR for the DGH Scanmate and to 4,433 EUR for the OTI-Scan. The CEA outcome amounts to 7,647 EUR/effect for

the DGH Scanmate A+B and to 6,296 EUR/effect for the OTI-Scan 2000. The ICER value (when the DGH Scanmate is taken for the comparator) is 5,317 EUR/effect

Treshold Analysis

In figure 2 purchase price of IOL Master 700 was changed, purchasing price of IOL Master 500 was constant.

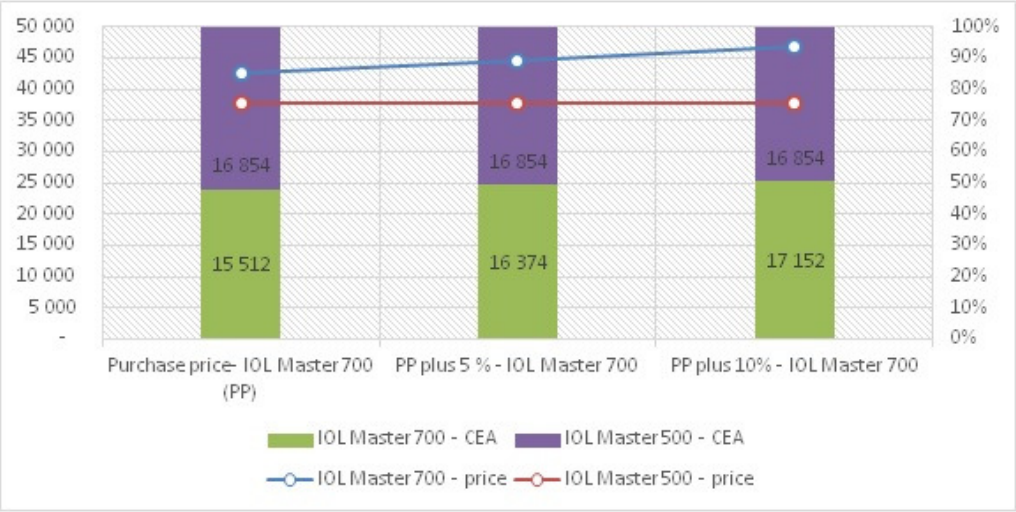

Fig. 2: Impact on the CEA result in the case of the price modeling (EUR) – IOL Master 700

In figure 3 purchase price of Pentacam 70700 was changed, purchasing price of Pentacam – old generation was constant.

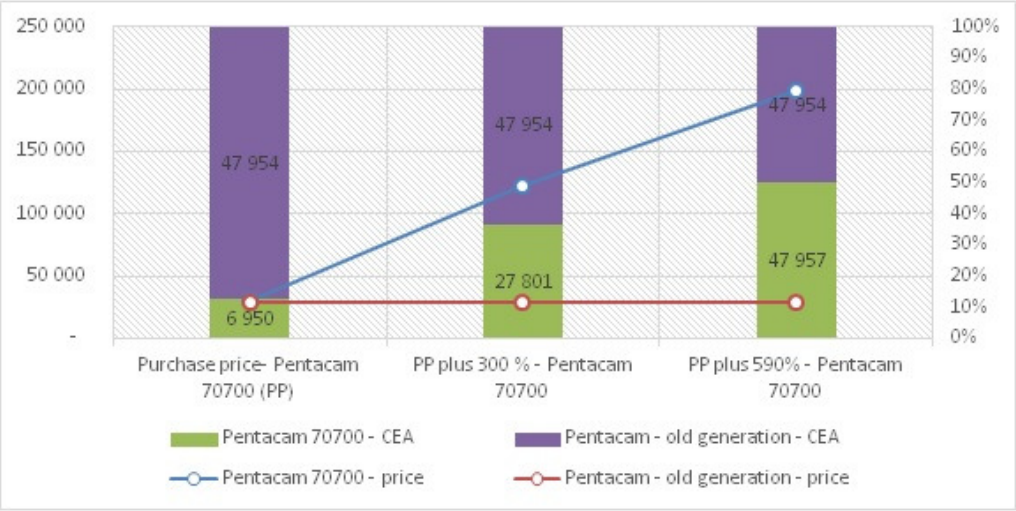

Fig. 3 : Impact on the CEA result in the case of the price modeling (EUR) – Pentacam 70700

In figure 4 purchase price of OTI - scan was changed, purchasing price of DGH Scanmate – old generation was constant.

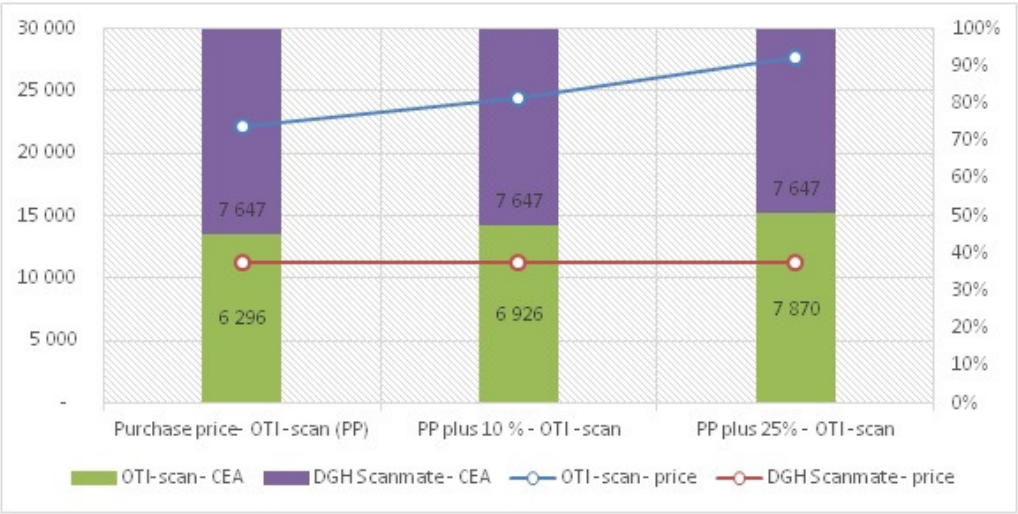

Fig. 4: Impact on the CEA result in the case of the price modeling (EUR) – OTI-scan

Discussion

When evaluating instruments in the first step of thorough diagnostics, the TOPSIS method identifies the Master 700 as more efficient. This higher level of efficiency is mainly implied by a higher level of quality of the photos to facilitate the correct assessment of suitability and implantation of a toric IOL; the older-generation IOL Master 500 cannot cope with that task and, thanks to this feature, the IOL Master 700 has a better value of cost efficiency than the IOL Master 500. These new contactless interference biometrics utilize the method of partial coherent interferometric measurement to determine the axial length of the eye based on reflection of the interference signal from the retinal pigment epithelium. This technique is deemed 10-times more accurate than the acoustic method – in a normal cataract eye without pathologies, and even in an eye filled with silicon oil (Kunavisarut *et al.*, 2012). The IOL Master 500 makes use of a contactless method for measuring, with the aid of image processing, the axial length (LA) and keratometric value (K), white to white (WTW) and the anterior chamber depth (ACD) from the corneal epithelium to the frontal surface of the lens. The measurement technique utilized by most instruments available on the market is based on partial interferometric coherence. The most recent technique is that of optical coherence tomography (OCT) with the so-called swept-source optical coherence tomography (OCT-SS). This technique is employed by the IOL Master 700, which measures the LA, K, ACD, and WTW values, as well as the lens thickness and the mean thickness of the cornea. We can observe that there are statistically significant differences between these two generations of the IOL Master family; namely, in the values of the axial length (LA) and the anterior chamber depth (ACD) (Saucedo-Urdapilleta *et al.*, 2019). An additional study has proved that the IOL Master 700 has excellent ability to carry out biometric measurements in comparison with the IOL Master 500 (Yoo *et al.*, 2017). Use of sensitivity analysis was verified - if the purchase price of IOL Master 700 has changed by 10 %, the sequence of purchase variant would also change. This situation (IOL Master 700 the purchasing price would increase 10 %) makes IOL Master 500 more cost-effective.

Within the framework of evaluating instruments for the second step in thorough diagnostics, the instruments made by Oculus-Pentacam have been considered for the Czech market. These instruments can determine or estimate the front and rear curvature of the cornea. The measured values can be put into the formula for Gauss optics to calculate the corneal thickness in a laser-non-operated eye, but also an eye after keratorefractive surgery (Borasio, Stevens and Smith, 2006). The TOPSIS method identifies the Pentacam 70700 as substantially more efficient than the older-generation

Pentacam. It can be observed that this innovated version has a great degree of importance with respect to the quality and accuracy of measurements. The new Pentacam 70700 model is only 2,358 EUR more expensive than the older version, which means that it has a better level of cost efficiency. Use of sensitivity analysis was verified - if the purchase price of Pentacam 70700 has changed by 590 %, the sequence of purchase variant would also change. This situation (Pentacam 70700 the purchasing price would increase 590 %) makes Pentacam – old generation more cost-effective. in this case, it is clear that a change in the order of the variants is unlikely.

The instruments can carry out not only the A-scan (one-dimensional) examinations but also the B-scan (two-dimensional) ones, even if the corneal opacity is high. This feature is particularly advantageous for patients with an associated diagnosis (such as age-related macular degeneration, or diabetic retinopathy). If a massive loss of visual acuity occurs, the condition of the retina can be directly checked (Qureshi and Laghari, 2010). For the last category of instruments, the TOPSIS method has proved that the effect of the OTI-Scan 2000 is much larger than that of the DGH Scanmate A+B. The acquisition costs of the OTI-Scan are nearly doubled, but its CEA is better despite this difference in prices. These results cannot be compared with the literature abroad because no papers have yet been published on this topic. Use of sensitivity analysis was verified - if the purchase price of OTI – scan has changed by 25 %, the sequence of purchase variant would also change. This situation (OTI - scan the purchasing price would increase 25 %) makes DGH Scanmate more cost-effective.

In the coming decade, we can expect great systemic changes in diagnostics. According to Yusuf (Yusuf *et al.*, 2019) these changes will mainly be based on an automated process, namely, a web-based Computer Aided Diagnostic for cataract detection system using a Convolutional Neural Network. The formal methods for detecting cataract, such as physical examinations, tests, and diagnostics, are clinically and professionally bound. For this reason, it is necessary to move the process towards non-professionals outside the clinic environment.

Conclusions

The TOPSIS multiple-criteria decision-making method has been used for establishing cost efficiency with respect to diagnostic instruments. Costs for one year of operation were calculated, because they also enter the CEA. In the available literature, no papers have been found on evaluating cost efficiency with respect to cataract diagnostic instruments.

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A Literature Review of The Factors Influencing Financial Reporting Quality

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Abstract

The paper presents a review of the literature about factors influencing financial reporting quality (FRQ). It aims to gather recently described factors and some new findings of previously investigated ones. It can be useful as for now some literature reviews have been done on particular factors, i.e. IFRS adoption, however, there is no such paper allowing to create a complex set of different factors. Further research can be focused on extending this set. Also, the extension of previously conducted research on particular ones, e.g. cross-country research, can be beneficial.

Keywords: Financial Reporting Quality, Literature Review

Introduction

Financial reporting quality is of key importance for all stakeholders of the reporting entity. It is worth understanding the factors that can significantly affect the level of FRQ. A review by Dechow et al. (2010) contributed significantly to the understanding of FRQ. The authors described the determinants of earnings quality, dividing them into six categories: (1) firm characteristics, (2) financial reporting practices, (3) governance and controls, (4) auditors, (5) equity, market incentives, and (6) external factors. Having in mind theirs and other authors' work I present in this paper a brief review of factors recently described, giving some new light on previous results. Firstly, I discuss the relation between IFRS adoption and FRQ. I aim to provide facts being not consistent with general belief and research results about the positive influence of IFRS adoption on FRQ. Secondly, I describe some of the recent findings of the relation of internal audit and FRQ. Then I present works on the relation between debt and FRQ in the way it has not been so widely described – the influence of debt on FRQ, not the opposite way. Finally, I mention four factors that have been recently researched for the first time (or there was little evidence before). It is worth noting that FRQ can be defined or measured by authors in different ways. Here I do not assess the conceptions of FRQ, however, it is also a matter I focus on in my scientific work. This paper focuses on FRQ as reported by entities before performing an external audit.

Accounting Standards

The first factor investigated in the literature with a significant influence on FRQ is the level of compliance with accounting standards. While two main systems of accounting standards, IFRS and US GAAPs, define qualitative characteristics of useful financial information and emphasize the importance of information quality, it leads to the assumption that the level of compliance with these standards should be a proxy for FRQ level. To verify this, analyzing the results of the research made by W. Newman et al. (2016) can be useful. The authors review the literature to determine whether and how IFRS adoption increases FRQ. Their article concludes that, even though this field of research has already been deeply investigated, there is equivocal evidence on how IFRS adoption affects reporting quality. The authors emphasize that previous papers which determined this relation analyzed mainly the situation in developed countries. The research focused on less developed countries showed no significant relation. The conclusion is that FRQ depends on a variety of factors. Similar conclusions are made by Emmanuel T. De George, Xi Li, Lakshmanan Shivakumar. They point out that it is difficult to determine whether the increasing level of reporting quality is a result of IFRS adoption or possibly any other institutional changes taking place at the same time. Basing on Italian cases from 2005 to 2008 (Cameran, 2014) the decrease in quality of reporting is a fact for non-listed (private) entities. Authors

present that in this case IFRS, allowing a more flexible attitude to reporting, causes using the regulations for company's own interests. In this section of the paper, the conclusion is that compliance with IFRS is not a definition of high-quality financial reporting and its influence on FRQ depends on many different factors. The effects differ especially between developed and less developed countries.

Internal Audit

Another factor influencing FRQ is internal audit, which can be considered as a mechanism of corporate governance. The first research worth mentioning is one by Abbott et al. (2016). They investigate the influence of Internal Audit Function (IAF) quality defined as its competence and independence – relating to cases from US companies. They emphasize the role of independence of internal auditor explaining that other competencies can allow detecting errors, but independence is crucial in the meaning of taking proper actions. They conclude FRQ strongly depends on the auditor's independence. Another research was related to German listed companies. Its results mainly support those from the USA. Authors note that the high quality of IAF assures earnings management which means improving FRQ. They also formulate other suggestions, like benefits from certifications of IAF and IAF employees, that positively influence their performance together with reporting quality as a result. It could be considered by regulators to introduce obligatory certification in this field. Bajraa et al. (2018) also performed research on internal audit but focused on audit committees. They related to the 8th EU Company Law Directive which introduced an obligation of the presence of an audit committee in publicly listed companies in the EU. Its results present that FRQ depends on the audit committee's competencies and effectiveness. However, the fact of the presence of the committee affects the level of quality negatively. Authors explain these results as the existence of an audit committee is not enough for increasing reporting quality if the committee's competencies are not sufficient. To sum up – the role of corporate governance for FRQ is unquestionable. However, the existence of an internal audit committee itself is not enough to provide better reporting quality. Auditors must have strong competencies and independence and this last one is crucial.

Debt

Most of the research on the relation between debt and reporting quality considers the influence of reporting quality on the cost of debt. While this is not the subject of this work, it is worth investigating the potential opposite relation. Research by Hasik (2018) focuses on the influence of changes in debt mix in Polish listed companies from 2006 to 2017. In this period there was a significant increase in bond debt in Polish companies. Economic reality suggests that increasing market debt in place of bank debt should be related to better reporting quality. It would lower the cost of debt by lowering the risk perceived by market investors. However, the research provides evidence that the growth in reporting quality, in terms of disclosure, has not increased with the rate of growth of bond debt. Another study of debt as a factor of FRQ is research performed on Portuguese private firms from 2013 to 2015 (Paiva, 2018). The author analyzed reporting quality in terms of earnings smoothing, discretionary accruals, and timeliness of disclosure. The evidence shows that increase in contracting of debt is a proxy for an increase in FRQ. Both authors suggest a need for further research on more types of entities, as well as conducting cross-country research.

Other Factors

In addition to the ones mentioned above, the factors also worth describing are director tenure, management's personal ideology, company reputation, and innovation.

The first of them is investigated by Kim and Sun (2014) – director tenure, meaning a period the present director works on the board. Basing on Korean listed companies, authors investigate FRQ in terms of discretionary accruals, earnings persistence, and the earnings response coefficient. Their findings show a positive relation in directors' tenure and FRQ. The most probable explanation is that the advantages in case of long tenure are directors' experience and expertise. This research is the first and, for now, the only one investigating such a relation. I find useful performing similar research in a cross-country context, as well as, consistently with authors' suggestion, using different proxies for FRQ.

Relatively new research of Notbohm et al. (2019) investigates one of the manager-specific factors – management's personal ideology. Ideology is considered primarily in terms of conservatism. Using data from US Federal Elections Commission, authors verify their two hypotheses: (1) that the level of earnings management is lower in firms whose managers represent more conservative ideologies and (2) that those firms manage earnings less. In this case, the results seem consistent with intuition, that conservatism leads to providing more accurate information. It is true for accounting in general, however, in my opinion, the influence of managers' ideology itself was not so obvious and worth to confirm.

Cao et al. (2012) ask a question if the company's reputation matters for financial reporting. Reputation is a factor that strongly determines an entity's position on the market. To check the relation with financial reporting quality authors use the scores from Fortune's Most Admired (MA) Companies List. FRQ is measured by CEO tenure, corporate governance, and audit fees together with performance-matched discretionary accruals. Authors prove positive relation between reputation and FRQ. The company's reputation can strengthen corporate governance leading to a reduction in agency problems. There is one more interesting relation according to FRQ – regarding innovation. Lobo et al. (2018) prove that innovation negatively affects the level of FRQ. They explain the reason is that innovative activities cause an opaquer environment. Entities may take advantage of that in managing their earnings. This is worth noting while innovative firms are exposed to greater business risk and lower quality in reporting adds another risk factor for potential investors.

Conclusion

The article demonstrates diversity in factors influencing financial reporting quality. Relatively new research added more factors relating to FRQ and put some of them in different light, e.g. accounting standards. This short paper will be extended as part of my research. Additionally, I find a wider field for further research. Firstly, it is to verify the influence of newly presented factors in cross-country research. Secondly, in some cases, there is a need to investigate factors using other known proxies for FRQ. Finally, what is in the center of my scientific interest, to create a set of conditions conducive to the high level of FRQ.

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Board Composition and Board Effectiveness of Small and Medium Industries (SMEs)

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Abstract

A preponderance of studies has been conducted to investigate the importance of board composition for board effectiveness, particularly in large firms. Nevertheless, little has elucidated how board composition is essential for board effectiveness in SMEs. This study, therefore, purports to explore from the standpoints of SMEs on the components of board composition that help to bring board effectiveness. In doing so, the study employs a qualitative approach in which a series of interviews are conducted as the main instrument of the data collection. There are 18 participants including professionals and SMEs directors have been interviewed. Besides, the company profiles of 100 SMEs of which have won E50 awards was analysed to corroborate the interview. The study unfolds two mains findings. First, board size is suggested to be essential for board effectiveness in SMEs. Second, the company profile indicates that gender diversity is vital for board effectiveness as compared to ethnic diversity.

Keywords: Board Composition and Board Effectiveness

Introduction

Several researchers found that board composition plays a vital in ensuring board effectiveness which in turn spurring the firm performance (Marimuthu, 2008; Abdullah and Ismail, 2013; Hassan and Marimuthu, 2016). As a matter of fact, it has been given due consideration in several written guidelines of corporate governance practices issued by some countries. For instance, Malaysia has issued the Malaysian Code on Corporate Governance (MICG) which was primarily envisioned for public listed companies. In this code, corporate governance mechanisms such as board independence and board diversity are clearly promoted and embedded in the code. However, this is not the case for Malaysian SMEs. They are starved for attention in corporate governance systems that oversee the shareholder and stakeholders' interests. The following discussion will fold into several sections. First, it discusses the literature review that underscores the main elements of board composition and followed by the methodology of the study. Finally, result, discussion and conclusion in the closing section.

Literature Review

Board Composition

The term board composition is typically referred to board independence, i.e. the proportion of inside and outside directors, the board size, CEO duality (board leadership structure) and board tenure (Bammens, Voordeckers, and Van Gils, 2008; Fiegener, Brown, Dirk, and Jr, 2000; Finkelstein and

Mooney, 2003; García-Ramos and García-Olalla, 2011; Minichilli, Zattoni, and Zona, 2009; Voordeckers et al., 2007). The empirical evidence shows that whether board composition can affect firm performance is still not conclusive. Some found that board composition may positively or negatively influence firm performance contingent on various ways. As Van den Berghe and Levrau, (2004) commented that board composition had been much discussed by academic researchers on which agency and stewardship theories are based.

Gender and Ethnic Diversity

Abundant studies, especially in large companies, found that diversity can influence a better board (Lisa M. Fairfax, 2006; Miller and Del Carmen Triana, 2009). Most of the studies in board diversity referred diversity to the involvement of women and multi-racial ethnic in the boardroom. First, with regards to the participation of women in the boardroom, many studies found that the advantages of appointed women are enormous. From the perspective of agency and resource dependency theory, it is believed that women offered better monitoring and supervising as compared to their counterpart (Azmi and Barrett, 2013). A study among 10,786 SMEs in Spain using panel data analysis found that the ratio of women on the boards of Spanish SMEs are more than in listed companies (Minguiz-Vera and Lopez-Martinez, 2010). It is found that gender diversity in the boardroom exerts a positive effect on firm performance (Minguiz-Vera and Lopez-Martinez, 2010). Studies also found that the presence of women on board positively affects firm financial performance and shareholder value (Campbell and Mínguez-Vera, 2008; Carter, Simkins, and Simpson, 2003; Smith, Smith, and Verner, 2006). Second, empirical evidence also showed that diversity in ethnic in the boardroom offers a positive relationship with firm reputation and innovation (Miller and Del Carmen Triana, 2009).

Board Size

Size of the board becomes one of the debatable antecedents in board composition, particularly in large companies. However, it is still ambiguous whether board size factor will affect significantly in the SMEs board. The typical size of the SMEs board is smaller than large companies. It is contended that a small number of boards will mitigate the possibility of free-riding yet heighten the accountability of the individual member of the board (Dzigba, 2015). Evidence in the banking sector found that a bank needs a smaller board so that it can make a swift decision (Aminu, Aisha, and Muhammad, 2015).

Conversely, abundant of studies supported larger boards exerted positive impact monitoring and increased board diversity (C. M. Dalton and Dalton, 2005), higher management skills and strategic decision (Zahra and Pearce, 1989)**.** In India, it is found that a bigger board has a positive effect on firm valuation and suitable for a board in a developing country (Saibaba, MD, and Ansari, 2012). This is in line with the agency theory, which underpins the notion that larger board size offers more monitoring function and at the same time reducing the CEO supremacy and in turn leads to the firm performance. Similarly, resource dependency theory assumes that greater board size offers more valuable resources. Likewise, more directors on board can perform better in relation to innovation performance as it provides more valuable resources coming in, especially from the external points of view (Shapiro et al., 2015).

However, along with positive connotations, there were studies that found a negative effect on firm performance. They implied that bigger boards would invite more intense and challenging to control and thereby less effective and therefore smaller boards are more effective (Eisenberg, Sundgren, and Wells, 1998; Lopez-iturriaga et al., 2005;De Andrés et al., 2005; Eisenberg et al., 1998). Along the same line, Arosa et al., (2013) found a negative impact of board size on firm performance among 307 SMEs in Spain. More contradictory, García-Ramos and García-Olalla, (2011) studied in publicly traded family firms where they found two distinct results. First, board size positively affects firm performance when they are led by non-founder. Second, it is the contra-wise result when those firms led by the founder of the firms. Nevertheless, to date, it is still debatable as to the ideal board size for SMEs. A study in the 234 UK listed SMEs employing unbalanced panel data regression analysis found that board size has a significant negative impact on the performance of both small and medium companies (Afrifa and Tauringana, 2015). Similarly, a recent study among listed companies in India showed that board

size exerted firm performance as far as Tobin's Q and market capitalization is the performance measure. Given the present evidence, it can be inferred that the ideal board size is contingent on the type of company and type of performance measurement (Nidhi Bansal and Anil K. Sharma, 2016).

Board Independence

Board independence refers to a number of outside directors who have no conflict of interest in the company. In a practical way, outside directors are also known as independence director or non-executive director (NED). In agency theory, the role of the outside boards is to mitigate the agency problem such as agency costs notably in supervising the conduct of executive management, heightening shareholder value and at the same time minimizing opportunism (Fama and Jensen, 1983). In doing so, the board is structured and composed with a mixture of inside and outside directors. Listed companies in Malaysia through MCCG refers to board independence as board composition. The code strongly encourages listed companies to have at least half of board encompassing of independent directors. Even for large companies, the majority of the board members shall comprise of independent directors. Nevertheless, it is still contentious with regards to the number of independent directors should be in smaller firms like SMEs. Some scholars argued that since there is no hard and fast rule regarding the ideal number of independent directors in SMEs, the optimal board structure may depend on the case by case basis. Larger companies may need more independent directors taking into account their operational complexity and the risk arising out of mismanagement (Christensen et al., 2015)

Conversely, SMEs may not need a more significant number of independent directors for board effectiveness as the majority of managers themselves own the firms (Christensen et al., 2015). For this reason, the quality of the decision depends much on the profound insights, values, and attributes of the owners. More importantly, owners are self-responsible for whatever decisions that they have made. It is evident that small firms with a small number of independent director is performing better than their counterparts (C. Daily and Dalton, 1994).

Board Leadership Structure

Elsayed (2011) refers board leadership structure as a practice of a firm whether to exercise the combined roles of CEO duality (CEO and the chairman) or non-CEO duality, i.e. CEO and the chairman of a different individual. Research on this domain has its roots on the agency and organization theory (Daily and Dalton, 1997) as well as the team production approach (Gabrielsson, Huse, and Minichilli, 2007). Drawing on the agency theory, several scholars or even codes of corporate governance in many countries strongly recommend the separation of roles between the CEO and board chair. Having said that, the evidence adduced an incompatible result in relation to the firm performance. As such, preponderance studies employing meta-analyses revealed that CEO duality does not exhibit any evidence of a relationship with firm performance. (Daily and Dalton, 1997; Dalton et al., 1998; Krause and Semadeni, 2014). Zona (2014) extended this finding that the effects of board leadership structures are varied from one case to another. A call for future research to take into account other factors such as time and length of tenure as a CEO may produce a distinctive result (Zona, 2014).

Based on the above reviews, a proposition arises as follow;

1. Is board composition considered to be essential for the effectiveness of Malaysian SMEs boards, and why are they important?

Methodology

Given the exploratory nature of this study, the qualitative method is employed to investigate the manner in which board composition is essential for board effectiveness. This method is plausible for the study to seek the complexity of the board composition using an interview strategy. Alongside, the data are gathered through the information and close interaction with the participants, which involves the richness of data.

Selection of Samples and Interviews

In terms sampling method, the study adopts a purposive sampling strategy of which only a selected list of targeted participants has been interviewed. Those targeted interviewees are mainly the board directors from SMEs as well as those individuals or professionals who have been engaging SMEs directors closely for business consultancy. There were 18 participants have been selected for interview sessions either via face to face or over the phone call. The in-depth interview technique was based on open-ended and semi-structured design. In qualitative research, an interview is common but yet an effective technique to collect the evidence. The interviews took place about 45 minutes to an hour, contingent on the information given and other factors. Geographically, the participants are from several parts in Peninsular Malaysia such as Penang, Kuala Lumpur, Selangor, Pahang and Johore. Most of the interview sessions are carried out in person while a few only have been conducted through telephone call due to the long-distance as well as the participants' preference. The following table shows the basic background of the participants. The names of the participants are disguised for the purpose of confidentiality

Table 1: Basic Background of the Participants

No.	List of Participants	Professions	Years of Experience	Gender
1	Yat	Lawyer	30	Female
2	Than	Accountant	32	Male
3	Sabar	Company secretary	20	Female
4	Rod	Accountant	25	Male
5	Saif	Company secretary	18	Male
6	Ahmed	Lawyer	16	Male
7	Zai	Company secretary	18	Female
8	Shah	Company secretary	15	Male
9	Ida	Company secretary	23	Female
10	Pai	Lawyer	16	Male
11	Rafiz	Lawyer	18	Male
12	Lim	SMEs Director	10	Male
13	Poh	SMEs Director	40	Male
14	Hijrah	SMEs Director	13	Male
15	Azha	Director of SME Bank	30	Male
16	Mohd	SMEs Director	35	Male
17	Man	SMEs Director	20	Male
18	Emy	Company secretary	10	Male

One of the compelling reasons in which the data need to be collected through the interview is due to the inaccessibility of data through observation. As Patton, (2002) observed that in certain conditions like behaviours, feelings, thoughts, and intention are impossible to be reached by the presence of the observer (Patton, 2002). Thus, the objective of an interview is then to be inside of the respondents' standpoints by gathering their stories. In contrast to quantitative methods, the interview is capable of analysing the finding by allowing respondent's life (Alshenqeeti, 2014). Besides, company profiles, internal memos, and employee's personnel files for secondary evidence were gathered and analyzed as the secondary data collection.

Secondary Data

In order to strengthen and corroborate the finding, a set of 100 SMEs company profiles were purchased through Company Commission of Malaysia. These companies were selected on account of their achievement in receiving E50 awards from 2014 until 2017.

Data Analysis

Qualitative data normally form in a non-numerical data stemming from opinions, feelings, thoughts, policies, reports and so on and so forth. One of the advantages of qualitative data is that they tend to be collected in the nexus of the situation, such as interview and observation (Miles et al., 1994). It can answer some curiosities that quantitative data unable to riposte. To date, there is no hard and fast rule regarding data analysis in qualitative research. Nonetheless, many scholars cautioned that qualitative data analysis should be conducted with a cautious and vigilant manner (Miles et al., 1994; Patton, 2002). There are several approaches in which qualitative data can be analysed. For instance, (Miles et al., 1994) introduce three concurrent flows of analyzing qualitative data, i.e. data condensation, data display and drawing and verifying conclusions. The interviews were audio-taped recorded and were then be transcribed to allow for data analysis which was based on inductive technique, featuring processes based on data reduction, data display, and drawing conclusions and verification (Miles and Huberman, 1994). This study uses the latest qualitative software to analyse the data called NVivo 12 software of which was purchased from the website.

Validity and Reliability

In this study, the feedback given by participants was validated by using a member check strategy. Merriam and Tisdell, (2016) comment that a member check strategy is a common method for ensuring internal validity and credibility. The purpose of referring back to the participants is to avoid any misinterpretation on the data that has been transcribed. This is also to minimise any biases on the interpretation and therefore escalate the level of validity. Alongside, the initial result of the interview was sent back to all participants in order for them to revisit their opinions as well as reconsider the others' opinions.

Results

This section summarises the findings and contribution made in the study. The purpose of our study is to investigate the manner in which board composition is essential for board effectiveness. Whether a small or large board is laudable for board effectiveness is still ambiguous. Some studies found that a smaller board is worthier as it can mitigate free-riders, and therefore, the board can arrive at a decision swiftly (Aminu, Aisha and Muhammad, 2015; Dzigba, 2015). Whereas, others found that bigger size can stimulate an encouraging effect towards the board (Dalton and Dalton, 2005; Saibaba, MD and Ansari, 2012; Zahra and Pearce, 1989). To the best of our knowledge, it is hard-pressed to find a study of board size of SMEs. For this reason, the following findings are beneficial to gain insights, especially on the right size of the SMEs board. There were 18 participants who were willing to participate in the interview sessions. However, only 11 were willing to verify others' opinions. The rest decided to withdraw from participating in the verification procedures. During the interview sessions, a small number of participants commented on board size as follows;

> *"Generally, not necessary but if he can give a piece of fruitful advice for the betterment of the company, why not.. Size of the board should not be too large. 3 to 5 persons is just enough. Otherwise, there would be many unwarranted conflicts taking place and the issue of profit sharing as well." (Ahmed)*

> *"There must be odd in number so that easier for them to make a final decision. A number of 3 to 5 to me is just more than enough in SMEs. Otherwise, there will be*

unnecessary debates in the board meeting. Diversity may not help much in influencing board effectiveness. It depends on the individual as long as they can work." (Pai)

"Outside directors and diversity generally hmmm…. are not necessary for the board effectiveness contingent on the need and size of the business. Similarly, the size of the board varies on the necessity of the companies. Companies with two directors are better than one and three are better than two. Bearing in mind, companies may take all accounts while appointing directors, including the cost incurred as well as duties that the director shall perform upon his appointment." (Sabar)

"Board with bigger size will face more troublesome. There would be a lot of unresolved ideas. In other words, the smaller the company is, the smaller board will be. The best size is 3-5 members of the board is more than enough." (Shah)

"The ideal board size should be within 3 to 5 members. The more members will make the board chaotic and less effective……. These three characters must present for the board to be effective. The chairman leadership, along with the small size of the board will make the board more effective because the board with many members always in chaotic with enthusiastic members giving and defending their owns opinions." (Yat)

"Size that ideal for SMEs board is between 2 to 5. The lesser the better. If I were to be a secretary 2 directors in a private limited company is more opportune. The more number of directors invite more hassle at the boardroom."(Zai)

Based on the above interviews, board size is recurred and comes up as a theme that attracts participants' concerns. Table 1 summarised the breakdown of board size of SMEs for board effectiveness. Closer inspection of the table shows the majority of participants (8/11 participants) are in the opinion that 2-3 directors or 4-5 directors in the board room are most suitable for SMEs. Of 11 participants, three indicate that the board size should match the company's need. While nobody perceives six directors and above are ideal for board effectiveness of Malaysian SMEs.

Table 2: Ideal Board Size for Board Effectiveness

	Board Size	Interview Result	After Verification
1.	2-3 directors	3/18 participants	4/11 participants
2.	4-5 directors	3/18 participants	4/11 participants
3.	6 directors and above	1/18 participants	0/11 participants
4.	Match to the company's requirement	1/18 participants	3/11 participants

The above interviews results are corroborated with the profile company's data of 100 SMEs. As shown in table 2 it is apparent that the majority (97%) of SMEs that have won E50 awards are led by 2 to 5 directors. The lowest percentage (3%) of companies are run by 6 or more directors.

Table 3: Board Size in 100 SMEs

Board size	Frequency	Percentage
2 to 3	70	70.0%
4 to 5	27	27.0%
6 or more	3	3.0%
Total	100	100%

Ethnicity

In this study, the ethnic diversity in the boardroom is explored whether it is important for board effectiveness. Based on the interview results, there was no participant who commented on this. However, secondary data have shown some information to answer this phenomenon. The following table demonstrates the proportion of directors which is based on the ethnic. Based on the figure, it can be clearly seen that there is a large discrepancy among the races that make up in the boardroom. Evidently, out of 296 directors, the Chinese is by far lead to be the members in the boardroom amounting to 166 (56.1%) people. While the Malays rank the second recording 109 (36.8%), directors, this is followed by the Indians with only 15 (5.1%) directors. Other local ethnic and foreigners with 1 (0.3%) and 5 (1.7%) directors respectively.

Table 4: The Overall Proportion of Directors from Ethnic Base

Ethnic	Frequency	Percentage
Malay	109	36.8%
Chinese	166	56.1%
Indian	15	5.1%
Other locals	1	0.3%
Foreigners	5	1.7%
Total	296	100%

Comparatively, table 3 illustrates the composition of the board, which is based on the ethnic of 100 SMEs companies that have been awarded E50 awards. It also shows how diverse the board is composed as far as ethnicity is concerned. The figure shows an interesting fact from which this study can be learned. Apparently, it is exactly half of 100 companies composed of all Chinese ethnic in the boardroom. The rest is followed by the Malays and Indian with 33 and 3 companies respectively is presided by the same ethnic. In terms of diversity of the board, only 14 companies are run by different ethnic across the board.

Table 5: Board Composition Based on Race and Company

Board Composition	Frequency	Percentage
All Malays	33	33.0%
All Chinese	50	50.0%
All Indians	3	3.0%
Diverse	14	14.0%
Total	100	100%

On the whole, a close inspection of both tables shows that in terms of the overall ethnic population, was dominated by Chinese. Further, with regard to diversity of ethnics among 100 companies that won E50 awards shows little account on it. Thus, it may be suggested ethnics diversity is not important for board effectiveness.

Gender

The preponderance of evidence suggests that gender diversity is important for firm performance (Campbell and Mínguez-Vera, 2008; Carter et al., 2003; Minguiz-Vera and Lopez-Martinez, 2010; Smith et al., 2006). Studies also found that the presence of women in the board room offered better monitoring and supervising as compared to their counterpart (Azmi and Barrett, 2013). However, in this study, evidence from the interview showed the opposite result. Several participants commented:

> *"Other factors, like gender, is not important at all." (Ahmed)*

> *"The age must be 18 years and above irrespective the gender as long as he or she has the knowledge and skills relating to the business. The board shall have the knowledge to govern the company in accordance with the companies act." (Rod)*
> *"To me age, gender and qualification are not important for the effectiveness of the board. Gender, either a male or female director, has no bearing on the board effectiveness." (Saif)*

> *"It is a matter of whether you have a gut to learn and improve yourself. Nothing to do with gender, colour, education or age it is a matter of personal attitude." (Than)*
> *"Gender is not the priority and has to be set aside as the predictor in board effectiveness. Both male and female directors have a positive and negative side, and there are pros and cons as female are more meticulous, committed and of no-nonsense as compared to their counterparts. While male directors are more relaxed and flexible, but they are hesitant and quite defensive in accepting women's ideas in the board meeting." (Yat)*

All in all, all participants viewed that gender irrespective of women or men is of no account for board effectiveness. In fact, they were prone to relate to other factors such as knowledge and skills and experience rather than gender factor. We are now turning to the secondary evidence.

Table 6: Directors with Gender Base

Gender	Frequency	Percentage
Male	219	74.0%
Female	77	26.0%
Total	296	100%

Table 5 shows the proportion of gender in the boardroom of 100 E50 awards winning companies. The figure demonstrates the leading number of males that dominates female directors. The board is overwhelmed by 219 male directors. In comparison, only 77 female directors. Evidently, it shows a crystal-clear a male domination in the boardroom. However, when it comes to gender diversity, the data showed another interesting discovery: The following table has a detailed explanation about this contention.

Table 7: Gender Composition with Company Base

Gender Composition	Frequency	Percentage
All Males	39	39.0%
All Females	0	0%
Diverse	61	61.0%
Total	100	100%

Nevertheless, in terms of gender composition, a large number of companies have a diverse gender composition. What is revealing in table 6 is that there are 61 companies is presided by mix male and female directors while only 39 companies are dominated by male directors.

On the whole, both table 5 and 6 must be read together. Although the board are dominated by male directors in terms of the overall number, looking at the company base, it has a contradictory explanation. While the board is dominated by males as shown in table 5 but table 6 suggests a different perspective that diversity in gender may be workable in the board as the majority of the company promotes gender diversity in the boardroom.

The data from the interviews as well as the secondary data were coded using Nvivo 12 software. The following figure 1 shows the coding procedures.

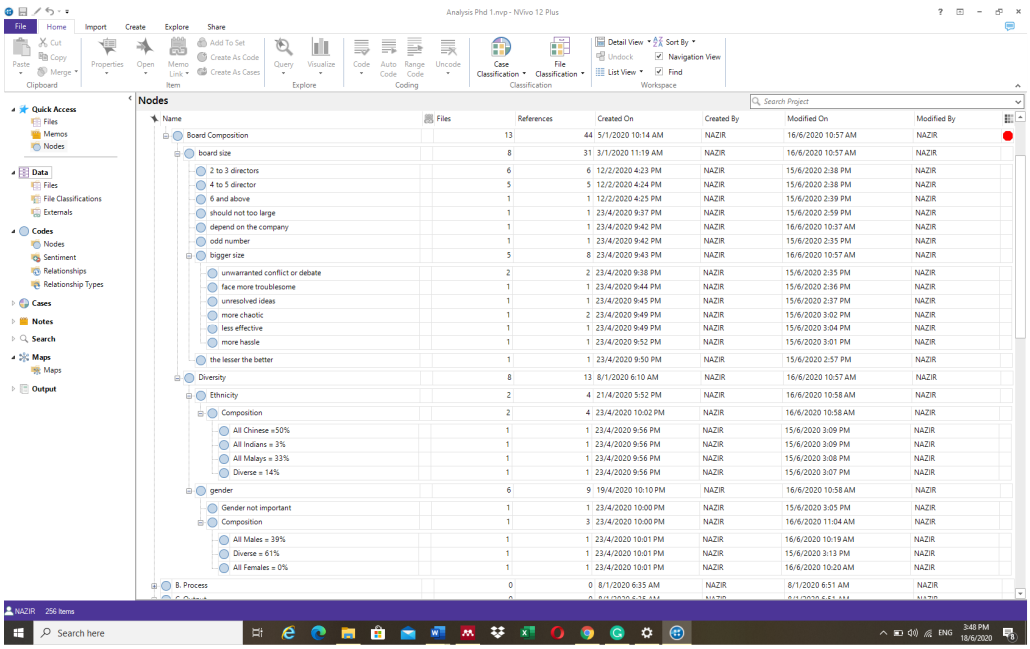

Figure 1: Coding Procedures in Nvivo 12

Next, the following project map is the outcome of the analysis using Nvivo 12 software. It illustrates how board composition is essential for board effectiveness.

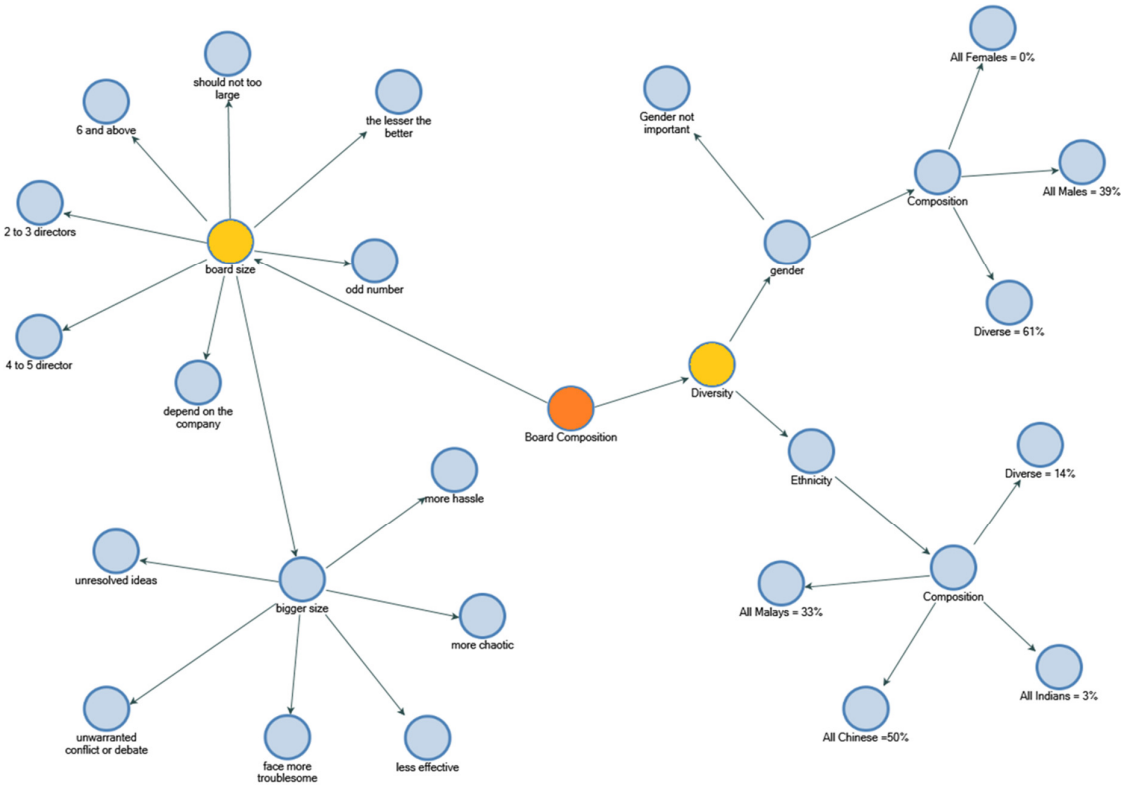

Figure 2: Board Composition Project Map of SMEs

Discussions and conclusion

In this study, two main findings pertaining board composition is unfolded. First, the majority of the participants and the data suggested that the number of board members of SMEs should range between 2-3 and 4 to 5 members for board effectiveness. Accordingly, some participants are in the opinion that a larger board tend to drag the board into unnecessary debates and conflict. Second, the study found the diversity in gender is suggested to be important for board effectiveness.

The existing evidence, along with the previous works demonstrated that board size plays an important role in board effectiveness. (Zona and Zattoni, 2007; Levrau and Berghe, 2009; Levrau, Berghe and Van Den Berghe, 2009; Lorca, Sánchez-Ballesta and García-Meca, 2011; Mensi, Boubaker and Aloui, 2012; Mehta et al., 2017). The proponent of the agency theory underscored the importance of the right size of the board since a larger board tends to be less effective (Mensi, Boubaker and Aloui, 2012). Once again, the question arises on the ideal number of members of which a board is composed. To the best of our knowledge, there is little information available regarding the right number of the board, especially among SMEs. Nevertheless, findings of this study have given some insights to the small and medium firms regarding the ideal number of members in a SMEs board based on the opinion of the SMEs owners as well as the professionals. The threshold number of the board should range between 3 to 5 members. This result may be explained by the fact that given the nature of SMEs themselves with limited resources, it needs a small yet ideal number of board members to optimize the operation cost.

The study also confirms that gender diversity is important for board effectiveness. This finding broadly supports the work of other studies in this area linking gender with firm performance (Campbell and Mínguez-Vera, 2008; Carter et al., 2003; Minguiz-Vera and Lopez-Martinez, 2010; Smith et al., 2006). Surprisingly, the finding of ethnic diversity in this study produces the other way around. This outcome

is contrary to that (Abdullah and Ismail, 2013; Marimuthu, 2008; Upadhyay and Zeng, 2014) who found ethnic diversity is important for firm performance. A plausible explanation for this might be that previous studies were conducted mostly in public listed companies of which requires diversity in a variety of forms to grow exponentially. While our study is SMEs base of which founders are among family members from the same ethnic background.

Conclusion

This project was undertaken to investigate the manner in which board composition is helping board effectiveness. The results of this investigation show that the importance of board size in bringing the board to be effective in SMEs. Further, it also suggests that the ideal number of board size an effective board is ranging from 3 to 5 members. The second major finding was that gender diversity is also essential for board effectiveness. However, ethnic diversity suggests the opposite result. These results are subject to certain limitations. For instance, it does not take into account other factors like age, tenure and board independence. Despite its exploratory nature, this study offers some insights into the issue of board composition in SMEs, especially regarding its size and board diversity. Given the limitations of this study, further works need to be done using a quantitative method to explain the causality of board size and diversity in Malaysian SMEs. Finally, this study suggests the policymaker to develop corporate governance mechanisms or guidelines exclusively for SMEs by taking into account the board composition, as suggested in this study.

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Supervisory Management System for Waste Recycling

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Abstract

Today, one of the main goals of the EU policies is an adequate management for the waste recycling with minimizing environmental impact. This paper presents a supervisory management system (SMS) used to obtain the optimal solutions for the waste recycling. The system requires a database with codes for each resources and recycling modes, each manufacturer offering the recycling solutions.

Keywords: waste recycling, supervisory management system, COVID-19 pandemic

Introduction

The improvement in the living standards leads to an increase in the consumption of natural resources and a negative impact on the environment. The world waste production is estimated to be around 27 billion tonnes per year by 2050. Thus, the management of natural resources and the waste are important global issues.

The current society uses inefficiently the materials, even wasting them. Municipal waste can be a source of raw materials but they can also be toxic waste due to the dangerous components.

By maximum extraction of resources from waste and by using fewer materials in the production processes it works less wasteful and the toxic substances released are reduced, thus reducing their effects on the environment and the population health.

In the last ten years, the quantity of natural resources used in Europe decreased. However, the efficient use of natural resources varies from state to state, from a quantity of about 12 tonnes per capita in Italy to 38 tonnes per capita in Finland.

In Europe, about one third of natural resources used is turned into waste. So it is a large amount of waste, the percentage of recycled waste being 30%, the percentage of incinerated waste is 21% and the percentage of composted waste is 13%. The 43% of municipal waste is sent to landfills (Eurostat, 2019)

Fig. 1 : Waste generated by a person in the EUMember States in 2017
Source: Eurostat, Packaging waste statistics, 2019

In Fig.1 it can be observe how much th waste per capita is produced. In 2017 the largest production of municipal waste in Europe was 781 kg per capita, in Denmark. In Romania, the quantity of waste produced was 272 kg per capita. This difference is due to the fact that Romanians usually buy from the open markets, where the products are sold without packaging, this causes much less waste.

The waste incineration is a source of air pollution representing the risk factors for the health of population. The incineration plants generate CO_2, dioxins, furans, polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), mercury and other toxic substances.

So, the main objectives of European Union's environmental policy are the efficient use of natural resources, the reduction of waste produced and the conversion of a larger quantity of waste into resources.

This paper presents a supervisory management system to determine the optimal solutions regarding the exploitation of natural resources and the recycling of waste.

At first, this system can be used in the home appliance industry and then to be extended to other industries.

The supervisory management system needs a public database with the codes for each natural resource and with the recycling modes, each manufacturer offering the recycling solutions.

The proposed system requires a special international legislation to codify and to use of natural resources.

Literature Review

The current society faces a multitude of environmental problems, many of these can be solved by modeling and simulation of the environmental processes (Gavrilescu et al., 2005; McDougall et al., 2001). The models have a simple or complex structure and they include equations that describe the behavior of the system and an algorithm to solve the system of and they include equations that describe the behavior of the system and an algorithm to solve the system of equations.

The waste management is a complex and multidisciplinary problem, it involves the economic and technical aspects and many constraints regarding the minimum requirements for recycling.

To solve the problems of waste management, one of the best solutions is a supervisory management system, most managers prefer this option. These systems are designed to help the decision makers to create the integrated programs to choose the optimal solution for the waste management such as: recycling, treatment, incineration or disposal.

Many of the supervisory management systems developed in recent years are based on the different methods such as: cost-benefit analysis, life cycle assessment, environmental risk assessment, multi-criteria decision analysis, environmental impact analysis. (Kirkeby, 2005), (Costi et al., 2004; Hung et al., 2007; Morrissey and Browne, 2004).

In urma cu cincizeci de ani, sistemele suport de decizie pentru managementul deșeurilor se bazau pe modele pentru optimizare rutelor de transport a deseurilor, metodă care se mai aplică și acum în țările în curs de dezvoltare (Helms and Clark, 1974; Hung et al., 2007; Sahoo et al., 2005; Truitt et al., 1969). In the last years, the supervisory management systems for the waste management are based on: cost-benefit analysis models (CBA), multicriteria analysis models (MCA) and life cycle analysis models (LCA).

The supervisory management systems based on the cost-benefit analysis were developed by: Begum and collaborators (2006) to minimize the construction waste; Tam (2008) to recycle the concrete; Lavee and collaborators (2009) found the uncertainty about the price of materials for recycling may induce

the municipality to prefer the storage of waste instead of recycling; Finnveden and Moberg (2005), Villanueva and Wenzel (2007) used the method to determine the priorities in the field of natural resources and the environmental impact; Gasparatos and collaborators (2008) made a comparison between the cost/ benefits in the future and the cost/ benefits in the present.

The supervisory management system system based on the multicriteria decisions analysis were developed in the field of environment by: Hermann and collaborators (2007), Cziner and collaborators (2005) and others.

In their papers, Morrissey and Browne concluded that the multicriteria methods are aplicable to any complex decision taking into account the various criteria such as: risk, economic, safety.

Also, an important advantage of using the multicriteria analysis method is that both quantitative and qualitative data can be incorporated.

Based on these methods, Behzadian and collaborators (2010) developed a PROMETHEE method used with ARGOS software for the waste management.

The production, the collection and the treatment of waste were considered based on several criteria such as: the volume of waste per household, the number of households, the use of collection means, the duration between two collections; the distance between the households frequency of waste collection, the payment of taxes for the waste management, etc.

The supervisory management systems based on the life cycle method were built by: Banar and collaborators (2009), Consonni and collaborators (2005), De Feo and Malvano (2009), Khoo (2009), Rigamonti and collaborators (2009), Iriarte and collaborators (2009), Dimitrios Aidonis and collaborators (2019). These systems were built to compare several methods (recycling, reuse, treatment/ disposal or export) to select the optimum scenario for the waste management and to quantify the impact on the environment of the systems for the selective waste collection.

All these presented systems are based on a lot of data, on solving some systems with many mathematical equations and with many parameters and on the experience of the decision makers, and the waste reduction techniques are not considered.

Challenges of the waste recycling during the COVID-19 pandemic

- The consumer concerns about hygiene lead to a high consumption of disposable items. This requires a high packaging usage.
- Currently, the amount of recycled polyethylene terephthalate, recycled polyethylene, recycled polypropylene and recycled polyolefins decreased. The recycled polyolefins are used for automobile, construction, bags, packing, outdoor furniture, etc.
- The fear of spreading a SARS- COV-2 virus lead to many municipalities suspend the work in the recycling centers.
- The money reserves of recyclers are reduced.
- Long-term investments are limited both in the mechanical recycling as well as in the chemical one.
- The prices for the R-PET (Recycled Polyethylene Terephthalate), the R-HDPE (Recycled High Density Polyethylene) and the R-PP (Recycled Polypropylene) are higher than the virgin plastic.
- The logistic problems involve that some companies create the stocks in order to handle any disruption. Other recycling companies avoid new order requests (ex: An Australian company recycled the bottle caps and turned them into plastic hand and arms for the children. This project, called “Envision Hands”, was stopped. Until recently the bottle caps were not recyclable).

Environmental and Human Health Effects of Waste

Some of the electric and electronic waste items contain hazardous materials, among which the most important are the heavy metals (mercury, lead, chromium, cadmium, cobalt, manganese etc) and chemicals such as ozone depleting chlorofluorocarbon or various flame retardants (Balde et al., 2017). Usually these materials listed above are in the e-waste.

When this waste is arbitrary disposed in the landfills, the toxic compounds are slowly dissolved by rain water and transported into subsurface water reservoirs. Therefore, the e-waste items must be adequately manipulated, stored, dismantled and recycled.

The proper recycling of e-waste permits the recovery and neutralization of these hazardous substances, avoiding the environmental pollution associated to their disposal into landfills or non-controlled incineration. Alternatively, the recycling of e-waste permits the diminution of virgin metal and plastics production, associated with a reduction in greenhouse gas emissions.

The energy saving associated to the recovery of the metal and plastics from e-waste is accompanied by avoidance of greenhouse gas emissions and generation of low value by products. As shown by Kumar et al. (2017), besides the energy saving, the recycling 10 kg aluminum avoids the generation of 13 kg of bauxite residue, 20 kg of carbon dioxide and 0,11 kg of sulfur dioxide.

Besides the environmental negative impact, the hazardous substances present in the e-waste are also a threat for the people health and safety. The e-waste items may impact the human health, particularly by direct contact with hazardous substances, when people are working in primitive recycling processes, in improper conditions. Long time exposure in the space of e-waste storage or direct contact with the substances contained in the e-waste boards, circuits and welding area may affect the kidney, lung and liver or induce carcinogenic effects. Details regarding the potential hazardous effects of different components present in the e-waste are detailed by Grant et al. (2013), Kiddee et al. (2013) and Kumar et al. (2017).

Supervisory Management System for Waste Management

The long term objective of EU policies is to avoid getting waste. In case this situation is inevitable, it is preferable to use the waste as a resource. Thus we tried to build a supervisory management system to help achieve the objectives required by the EU.

In Fig.2 we present schematically the concept of this supervisory management system.
It comprises two main subsystems, namely: a database and a decision making system regarding the recycling of waste.

The database is public. Each manufacturer of different industrial component or packaging products introduces the informations about the manufactured products. These informations include the composition of the product (natural resources used) and the recycling mode, each manufacturer offering the recycling solutions for each component of the product.

During manufacture process, each component/ subassembly designed as an independent module (for example: engine block, various plates, circuits, tires, sheet metal, furniture tops, equipment housings, etc) receives a CRRC coded label in the QR code (https://en.wikipedia.org/wiki/QR_code).

CRRC labels can also be placed at product level consisting of several components, depending on the situation. For example, it doesn't make sense to read all components of a washing machine or a refrigerator. In this case, the label specifies that it is a set of components and the label contains the references to all informations about the components.

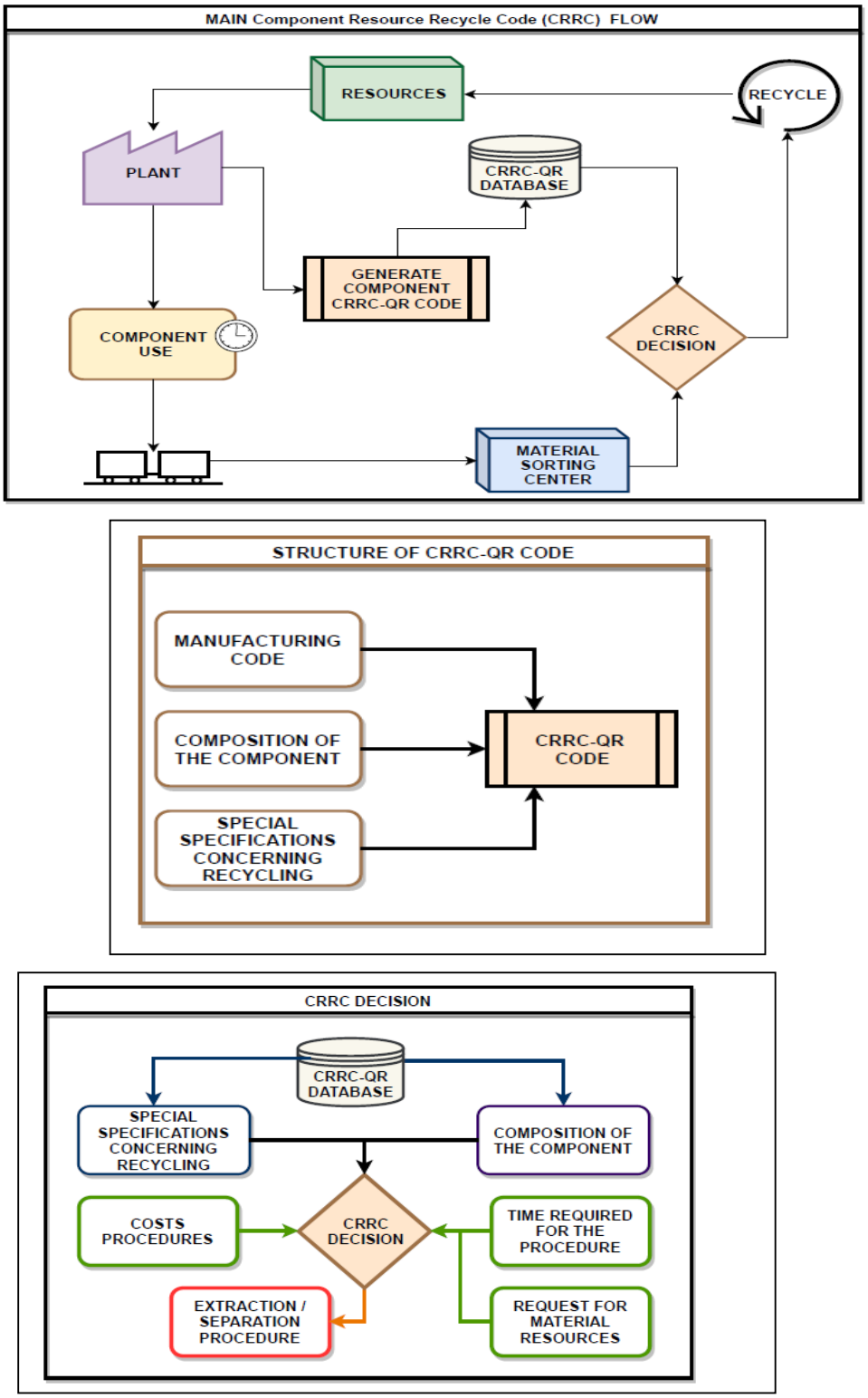

Fig. 2 : Supervisory management system for the waste recycling

Source: Own sources

The CRRC label sticks to a protected area of the product. A damage CRRC label can be identified in the public database according to several product characteristics such as: manufacturing series, model/ year, etc.

By reading the CRRC label of product and by querying the public database we find out all information made available by the manufacturer regarding the recycling of product, starting from the type of materials used up to the recycling modalities.

The decision block of the supervisory management system decides whether or not the recycling can be done.

The automatic supervisory management system can be provided by a simple software application with fuzzy decision trees. In this subsystem the following are taken into account: the materials from which the product for recycling is built; the market requirement of these materials; the recycling procedures and their costs; the time during which the whole recycling process takes place.

Both the recycling costs and the recycling time must be within certain maximum limits.

In order to establish the maximum limits of the recycling costs, it is necessary to take into account the current policies of states to encourage recycling at certain higher costs. For example, higher labor costs may be admitted (jobs appear) but high energy costs are not accepted.

Testing this system can begin with the home appliance industry then it can be generalized to other industries as well, so that each manufactured product has associated an information for its recycling. So, it is easy to estimate the level of resources required, the impact being essential on the resource exploitation industry and its limitation. Thus, many precious elements including rare metals can be identified and recycled.

The application is simple but it requires the worldwide legislation regarding the coding of resources. This system cannot function when there are products whose manufacturing materials are secreted.

Conclusions

An increase in the standard of living leads to the new tendencies in the modern life style and so the natural resources are reduced and the amount of waste increases continuously.

The long term objectives of EU policies are: efficient use of natural resources, avoiding waste as much as possible, use of an adequate waste management with selective collection, recycling / reuse respecting the concept of „waste hierarchy", with minimizing the impact on the environment.

In this paper we present a supervisory management system for the efficient use of natural resources and for the recycling of waste. This system requires the worldwide legislation regarding the coding of resources.

The advantage of using this system is that all manufactured products have associated the information for recycling. The level of resources required is estimated easily, the impact being essential on the resource exploitation industry and its limitation. Thus, many precious elements, including rare metals, can be identified and recycled.

The characteristics of this system are:

- contains a public database with the composition of each product (the natural resources used) and the recycling solutions;
- has the ability to collect and to manage the descriptive knowledge and other types of knowledge (procedures, rules);
- has the ability to present the knowledge as soon as the database is queried;

- has the ability to select a subset of knowledge to be viewed or to derive other knowledge needed in the decision making process;
- it can interact directly with decision maker and it allows the flexibility in choosing the solutions and the knowledge management.

Testing this system can start with the home appliance industry, then it can be generalized to other industries as well.

This system cannot work for the products whose materials are secreted.

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Diagnostics and Directions for Improving the Armed Forces Career Management System

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Abstract

The article contains postulates regarding conditions and procedures for the development of the Polish Armed Forces professional soldiers' career. The authors note that the decisions to appoint candidates to subsequent official positions are made to a large extent intuitively, without proper recognition of the professional soldiers' competences and appropriate selection procedures.

Keywords: Military Career Development, Polish Armed Forces

Introduction

The issues of the functioning of systems (models) of human resources development in the organization are represented in the literature of management sciences quite abundantly. Particular attention is paid to linking development systems with employee assessment systems and training (professional development) systems. The development of human resources by many authors: [Armstrong, (2009), Listwan (2010), Pocztowski (2019), Mis et al, (2007)] is perceived as a key human capital management process, while the overall goal of human resource development is to provide employee organization with such characteristics as the organization which needs to achieve her goals, i.e. increase and increase efficiency.

A significant number of scientific studies [Majewski (2013), Witaszek (2006), Zaloga et all (2018), Kacala, Michaluk (2010)] does not translate into the improvement of real solutions in the field of official pragmatics. There is no specific "link" that would translate into available theoretical solutions with official practice, in many aspects - it seems - contradicting existing, and even verified in other institutions, knowledge. In management sciences, attention is paid to the phenomenon of ignoring the results of analyzes and projects of improvement solutions. It is also common to "justify" management decisions as the "personal experience" of decision makers. In many situations, these phenomena can even bring short-term successes, but in the long run they are definitely ineffective. Especially in hierarchical institutions with a strong decision-making center, there is little chance of "breaking through" solutions other than those presented by the top management.

The interpretation of the concept of "career" is not explicit due to the diverse approach of researchers to this problem. For the purposes of this study, it has been assumed that the individual's career is a "unique sequence of professions and positions, values and roles played by the individual during his life, shaped by the period preceding his professional career and affecting the later period", Krol, Ludwiczynski, (2006).

Therefore, a career is a certain sequence and a specific consequence of the positions held by the employee, functions performed or works performed by Jamka (2011). It may concern the sphere of

economic life, but also political, cultural, scientific or even sports. It means then obtaining a specific title or a high position in a given area of activity. On the other hand, the concept of employee career is identified mainly with displacements closely related to professional development in larger enterprises, in which a multi-level hierarchy of jobs can be distinguished.

The human resources management of the Polish Armed Forces, and especially the personnel policy of the Ministry of National Defense, are extremely strongly determined by cultural factors and a long tradition. The sequence of military ranks received through promotion is one of the oldest ways of conceiving a military career in all armies of the world, from antiquity. This "bright" side of career and military promotions may be disturbed by his supervisor (commander). The only way to eliminate this incidental phenomenon is reliable and coherent personnel policy systems, enabling "maintaining highly qualified personnel resources, as well as ensuring a stable number and quality structure of professional staff through proper recruitment, selection, training and education as well as rational use of personal resources for the needs of the Polish Armed Forces "

The article will present the conclusions from the analysis of the career management process of professional soldiers of the Polish Armed Forces and directions for its improvement.

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Soldiers' Career Management - System Diagnosis

Research on the personnel policy of the Ministry of National Defense, and in particular on the personnel development system in the Polish Armed Forces, was focused on both theoretical areas of broadly understood career management and personnel practice implemented in individual types of armed forces or personnel corps. In particular, the research was focused on those areas of the armed forces that have a measurable impact on the ministry's personnel police.

The main areas that have been diagnosed are:

1. Organizational culture. The dominant type of organizational culture in the Polish Armed Forces is hierarchical culture. It is characterized by high formalization and hierarchization. Procedures decide how soldiers and their commanders (leaders) should function. The main goal of the Polish Armed Forces is to maintain their smooth functioning and long-term pursuit of durability, predictability and efficiency. Organizational coherence is ensured by detailed standards, regulations, laws and principles. The rules for appointment to subsequent positions (promotions) are determined by precise procedures. However, the study found that bureaucratic procedures to set out rules for commanders (supervisors) or personnel bodies are not sufficiently accurate or, worse, widely used. Areas of "free interpretation" of applicable rules do not guarantee the required quality of decisions made. In many places we deal with market culture with elements of adhocracy rather than traditionally understood bureaucracy. Soldiers must take actions themselves in the design of their career paths, instead of entrusting this task to competent supervisors and specialized human resources bodies. Thus, independent search for vacancies in the structure of the armed forces is quite common, which is also associated with taking specific actions to employ in a given unit (institution) bypassing the formal selection procedure.
2. Leadership in military organization. It is identified with firmness, expansiveness and results orientation, but also tends to maintain (preserve) conformist behavior. Strong personalities with elements of charisma to a large extent go to the army, because they tend to "lead", maintain order in the organization based on fear and forcing subordinates to give up their professional ambitions. Although the term of office has eliminated the phenomenon of many years of "prescription" in official positions and activities of "blocking" subordinates, there are again tendencies to repeat the term of office in a given position, preventing the development of subordinates waiting for promotion. There is a noticeable lack of mutual trust, showing respect and involving subordinates in the process of solving problems and making decisions. Soldiers declare that they expect to be shown a vision of further service and to design a strategic path to achieve individual goals.

3. Style of management (command). In the course of research, it was found that the organization prefers mainly employment security, subordination, predictability and immutability of interpersonal relations. The consequences of this approach mean that soldiers are often not interested in taking on various challenges if it involves the necessity to change the place of service. Therefore, they prefer to remain in the same degree longer (not necessarily in the same position) than to be promoted to a higher position in a distant place. This phenomenon intensifies with the increase in the size of the town where the soldier serves. Conducting research also found increasingly fierce competition for positions, especially if it involves promotion in the degree. Therefore, attempts to influence the increase of the full-time position of a given position in the hierarchy of the armed forces are also observed.
4. Coherence of organization. It is ensured by formal rules and regulations, including military provisions of the nature of an act, ordinances of the Council of Ministers and ordinances or decisions of the Minister of National Defense. The condition for this coherence is proper care for the legal side of these military regulations. Their quantity is not a special problem, but quite often they are subject to amendment. Updating individual entries (articles, points) often necessitates changes in other regulations. This causes low stability of the law, which in the absence of its knowledge among soldiers (despite widespread Internet versions) hinders the correct decision-making process and, as a consequence, also an appeal.

The Personnel policy of the Ministry of National Defense regulates personnel procedures in sufficient detail and to a sufficient degree. The basic task, which is the starting point for shaping the personnel policy of the Ministry of National Defense in the field of filling official positions in military units and institutions, is the general assessment of the personnel situation. The analysis of the personnel situation is carried out in two stages:

a) reporting and executive, implemented from 1 October each year in the bodies referred to in art. 44 section 1 of the Act [Act of 11 September 2003 on the military service of professional soldiers];

b) analytical and decision-making, implemented until the last day of February of the following year at the office of the Minister of National Defense.

The assessment of the personnel situation is prepared in a given calendar year, for the period from 1 January to the end of the assessed calendar year, by the authorities competent to appoint and dismiss from official positions [Regulation of May 9th, 2014].

The results of the personnel situation assessment are sent by the commander of the military unit to the immediate superior, directors of organizational units present the personnel situation assessment to the Minister of National Defense through the Director of the Human Resources Department.

Career Management of Professional Soldiers - Legal Conditions

The condition for issuing the decision [Regulation of September 9th, 2014] on the appointment of a professional soldier for a higher official position and assuming duties in this position is the prior issue of a decision appointing this soldier for a military rank corresponding to the full-time rank of that official position.

A professional soldier is appointed to the official position, by way of decision, according to the needs of the armed forces, depending on the required professional qualifications specified in the description of the official position and assessment included in the official opinion, and the professional soldier in the permanent service also from the individual prognosis set for him professional military service. The determination of the individual prognosis of the professional course of military service of a professional soldier in permanent service is based on models of the course of service

A professional soldier may perform professional military service in the same official position for no more than two terms, if he holds the position whose name includes the term "commander". The period of holding the position with the same full-time position is at least three years. If the needs of the armed forces speak for it, this period may be shorter, but not less than eighteen months.

The designation of a soldier for an official post is deemed to have been made after all of the following conditions have been fulfilled: the decision to designate the soldier for the official post and the commander of the military unit, in the daily order, the date on which the soldier took up his duties in the official post.

Professional career management in the Polish Armed Forces - research conclusions

The current state of the personnel development system in the Polish Armed Forces, presented above, was verified based on the opinions of professional soldiers. Previously, surveys were conducted, subjecting verification of research tools.

The research was carried out in two areas. On the one hand, selected decision-making procedures in the field of personnel, issued by military bodies with personnel competence, were analyzed, including the role of the successors of the so-called managers of personal corps, i.e. persons (bodies) responsible for service models in individual corps and personal groups. On the other hand, the research included a group of officers in terms of meeting expectations as to the quality of the applicable system of business opinions, forecasting the course of service and appointing and dismissing from positions.

The diagnosis of business practice used, due to the size of the sample, should be treated as emerging trends.

The first proposal concerns an issue that requires improvement in official practice, namely the provision of a statutory provision on equal access for professional soldiers to higher official positions. This means that the procedure for appointing soldiers to official positions should ensure that all soldiers who apply for them can be included in it.

During the analysis, military personnel formulated the need to create in the personnel management structures an independent unit to counseling individual career paths, because HR cells in military units are not objective in this role, being subordinated to their direct commanders.

In a situation where the number of candidates is greater than the number of appropriate positions, a selection is organized, as a result of which the best candidate will be selected. As officers postulated in the survey, the final choice should be decided by the authority responsible for designating a soldier for a specific position after consulting the soldier who is the head of the given position.

Such qualification should take into account:

1) results of official opinions;

2) opinions of other authorities, if the obligation to draw up such opinions results from separate provisions;

3) compliance of qualifications with the requirements set out in the job description card for which the officer is to be appointed after appointment;

4) professional experience and career path;

5) seniority in military rank;

6) predisposition to occupy specific official positions;

7) information about criminal record and whether preparatory proceedings are being conducted against the soldier.

In the selection procedure, the body designating the official position must have the official opinions of all candidates.

Therefore, it would be advisable to introduce a system of official opinion on soldiers, which will gradually determine in which direction their career path should develop. This gradual matching process

should also take into account the views of those concerned about where to continue their service (type of military unit, city).

In the first stage, a soldier would only be judged for results in service in the position he held. A high result of this assessment would be the basis for proposing a soldier for another higher position. Lower results of this assessment could be the basis for a possible retention of a soldier in an occupied position or referral to equivalent positions, or dismissal from military service.

In the second stage of service in a position, a soldier would also be assessed for the results obtained in the position held (this is about confirmation of his involvement in the service), but a forecast would also be formulated as to further service in a specific category of positions. This would be the basis for qualifying a soldier for improvement training in terms of gaining new competences.

In the third stage of service as a soldier, he would be assessed not only for the results achieved during the entire term of office, but also in terms of meeting the requirements specified for the new position. Then, in the closer forecast, one could already write down a specific position, which he could apply in the selection process.

The three-stage selection presented above could also take into account the possibility of variant formulation of forecasts of further service.

Successive changes in the Polish Armed Forces undoubtedly contribute to a significant modification of the approach to professional career management.

The traditional approach to professional careers focused primarily on selection, development management, evaluation, counseling, staff mobility and consequence planning should be enriched with such elements as self-improvement, mentoring, "learning organization", information systems, contact networks and flexible work organization.

The very definition of possible forms of promotion or career paths does not yet guarantee the proper development of professional soldiers. The point is that the interest of the Ministry of National Defense in the professional development of professional soldiers should be no less than their own interest. Therefore, all human resources bodies responsible for human resource management play an important role here. In addition to developing possible career paths, they should also:

• forecast careers, i.e. identify staffing needs and adapt staffing to the existing supply of human resources,

• plan careers, adapt the needs and aspirations of soldiers to the needs and expectations of staff resulting from career anticipation, so that benefits are derived from both sides,

• advise on the issue of career, that is, carry out all activities related to the assessment of the current service of soldiers and on this basis provide advice on further career development; Specialists in personnel matters or other bodies responsible for personnel matters in the department of HR must play an important role here,

• help in professional development by creating opportunities for further education, training, long-term leave for further training or assistance in starting or continuing studies.

Human resources management and career planning should be strategic and closely related to the strategy for the development of the armed forces, as well as the development of the potential of official positions. They allow mutual benefits, reducing selection costs, as well as strengthening the organizational culture in the armed forces and reducing the number of conflicts between soldiers' personal goals and their organizational tasks.

Good development of a career path brings benefits in the form of higher qualifications of soldiers, better matching their interests to the performed service in the position and greater satisfaction, which results.

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Excellence Management Models and Multidimensional Assessment of Their Impact on The Organization's Branding Strategies

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Abstract

The frequency of using models of management excellence in business practice, as well as the intensification of brand communication activities, provide evidence that there is space (knowledge gap) for scientists to contribute to management practice, developing theories that will help answer the question to what extent and in what context the introduction of the management excellence model influences the organization's branding strategies and the mechanisms of this correlation. This paper refers to an ongoing project and presents research in progress which authors are carrying out as a part of a grant. The research goal of the project is to identify the level of impact of the excellence management model introduced in the organization on the branding strategies of the organization, and to define areas of this impact . Therefore, the research problem will be the answer to the question how the excellence management model introduced into the organization's activities influences the organization's branding strategies. The implementation of the project goal will therefore focus on defining the impact factors and specific criteria determining the level of impact of the implemented model of excellence on the branding strategies of the organization in its many dimensions. After a systematic review of the literature in the first period of the project, both qualitative research is planned.

Keywords: Excellence Model, Assessment, Branding, Strategy

Introduction

Many researchers, such as D. Aaker (1991) and K. Keller (2003) paid a lot of attention in their publications to the issue of the brand's life cycle, thus joining the wide -international debate (among scientists and business practitioners) on concepts of constantly changing and modifying branding strategies. However, this debate lacks specific theories about the impact of a given management models (such as excellence management models) on branding strategies (Schultz, Hatch, 2003) and holistic approach to the creation of the company strategy and branding strategy (simultaneously) with the usage of the given tool, which is defined in the literature as a research gap (Merrilees, Miller, 2008). Referring to the business practice, excellence business models are also consider as a management tool, with small attention to how their impact marketing filed of the company, and so the authors of the article finds the issue of the connection of the excellence business model and their marketing/ branding meaning as of a high importance.

The increasing frequency of using models of management excellence in business practice, as well as the intensification of brand communication activities, provide evidence that there is space (knowledge gap) for scientists to contribute to management practice, developing theories that will help answer the question to what extent and in what context the introduction of the management excellence model influences the organization's branding strategies and the mechanisms of this correlation.
This paper refers to an ongoing project and presents research in progress which authors are carrying out as a part of a grant.

The aim of the project is to fill the scientific gap by identifying the factors and mechanisms of the impact of implemented business excellence models on the branding strategies of the organization based on extensive research conducted among medium and big enterprises.

Literature Review

The concept of excellence is an example of a systemic approach to management. It is created in accordance with the evolution of the external environment and at the same time is considered as a modern way to achieve perfection. Consequently, the transition from quality to perfection can be observed.

The evolution of the path of perfection was shown in their work by P. Hermel and J. Ramis-Puyol (2003), anticipating the concept of integrated improvement, the so-called "Perfection 5.0", what are the characteristics of today's most important models of excellence. The path of evolution Perfection was as follows: "Perfection 0.0" was evolving from stage to stage before the publication of the book by Peters and Waterman In Search of Excellence in 1982, results-oriented, among which maximizing value was the most important goal of perfection. "Perfection 1.0" was based on Peters theory and Waterman. "Perfection 2.0" emphasized the importance of change, "Perfection 3.0" was about learning and "Perfection 4.0" was about designing models of excellence as a basis for comparison and self-assessment. In contrast, "Perfection 5.0" is a concept integrated improvement, based on system view on management taking into account all dimensions of the organization (Stańczyk - Hugiet E 2014).

In management sciences and business practice, one can find many different models that are designed to help in achieving business excellence. That models can be classified in three areas:

- global / national models,
- academic models,
- corporate models.

In a research study by Wagner et al. (2011) 94 models of excellence, that are used in 83 countries around the world have been identified. Global models that have become the canvas of models of excellence, including national models, are:

• Deming model by Douglas and Fredendall (2004)- was created in 1951 and thanks to it the Japanese economy achieved high quality products and reduced costs, became so competitive for the American market and threatened its competitiveness;
• Malcolm Baldrig's Model of Excellence (MBNQA) (chart1.) was created in 1987 (NITS, 2020) as a response to the needs of American companies to increase their competitiveness. Over time, it has gained recognition as a global standard in the field of customer-oriented management systems and the search for good practices. It is partly modeled on the Canadian Quality Award model, which was created in 1984. In Australia (The australian Business Excellence Framework) the model was created in 1989;

Chart 1: Baldrige Excellence Framework

Source: Baldrige Excellence Framework: Leadership and Management Practices for High Performance. Gaithersburg, MD: U.S. Department of Commerce, National Institute of Standards and Technology. https://www.nist.gov/baldrige.

• The EFQM model was created in 1991 with the support of the European Quality Management Organization and the European Commission (EFQM, 2013). The main purpose of creating the model of excellence was to strengthen the position of Western European companies on the global market. His task was to accelerate the implementation of quality and then excellence as a global strategy to achieve competitive advantage in global markets.

Chart 2: EFQM model

Source: https://www.efqm.org/index.php/efqm-model/ access 12.04.2020

EFQM, Deming and MBNQA models have become the basis of national models around the world. Literature analysis (Dahlgaard-Park, 2008, Doeleman and Diepenmaat, 2014) indicates that the values and goals of these models are similar and focus mainly on improving the competitiveness of companies on the domestic and global market. The key areas of improvement are leadership, employees, customers, strategy orientation, process management, etc. Important aspects of improvement are strong stakeholder orientation, the environment and long-term orientation to the success of the company. The assessment criteria for these models are similar and focus on both business results and stakeholders on the one hand, as well as internal areas of the organization, i.e. leadership, strategy, processes and

knowledge management. Socio-cultural conditions have a key role in creating the principles of excellence models. According to B. Talwar (2011) western countries mainly focus on the development of the individual, developing freedom, creative thinking or entrepreneurship, while in Asian countries they focus on the development of the group and "Eastern philosophy."

Until the middle of the previous decade, the world was divided into areas of influence of individual models. Analysis of enterprise assessments (EFQM made by the assessors of the EFQM Foundation indicates that the EFQM model has also become popular in companies around the world, i.e. in Asia, Arab Countries and Central and South America.

The analysis of model assumptions indicates that the use of Models of Excellence facilitates the implementation of a modern management system and further improvement of the organization thanks to: obtaining an overview of the whole organization, identifying the strengths of the organization and areas for improvement, the ability to check the effectiveness of actions taken, the possibility of comparing with other organizations, help in identifying and sharing best practices within the organization, increasing employee involvement in continuous improvement, or improving internal communication, and integrating various pro-quality and improvement initiatives.

Literature analysis (Bou-Llusar et al., 2005, 2009; Boulter, Bendell, Abas,Dahlgaarh et al., 2005; George et al., 2003; Jackson & Bircher, 2002; Sanchez et al., 2006) indicates that BEM can give an immediate picture of where the enterprise is located and show the way to its continuous improvement. This is achieved thanks to two key elements of the model implementation process, i.e. self-assessment and benchmarking.

It seems that the self-assessment of enterprises based on the Model of Excellence, in comparison with other assessment systems, takes into account the richer range of issues that comprehensively refer to various activities for quality and excellence. Model criteria show the image of the organization being assessed, including social and environmental aspects. Criteria regarding "Results of operations" are of key importance, which impose the necessity to assess, among others the company's level of competitiveness on the market, as well as its ability to meet the expectations of shareholders. Non-financial factors such as effective working time and productivity are also taken into account during the assessment.

Kacala and Kolaczyk (2012) mentioned that the model gives organizations the opportunity to improve their activities in such areas as:

- strategic management by creating a set of key results necessary to monitor progress in the implementation of the vision, mission and strategy, enabling leaders to make effective decisions;
- customer value by clearly defining and communicating it, as well as engaging it in the product design process
- shaping leaders' skills to adapt, respond and gain the involvement of all stakeholders to ensure the lasting success of the organization
- organization of processes enabling implementation of the strategy of balance between the strategic goals of the organization and the expectations and aspirations of employees
- stakeholders as a potential source of creativity and innovation by developing and engaging them in cooperation
- partnership relations by shaping lasting and mutual benefits, outside the supply chain
- responsibility for the actions taken by the organization and impact management as it evokes in society.

Another goal of this tool is to encourage and motivate organizations to systematically improve their operation, identify the next stages of improvement Organizations can apply for such a level of recognition that reflects their degree of maturity and the results obtained in applying the model. The key advantages of using the model by Kacala and Kolaczyk (2012) are the possibility of implementing a modern management system and further improving the organization due to the possibility of comparing with other organizations, assistance in identifying and sharing best practices within the organization, increasing employee involvement in continuous improvement, improving internal communication and integrating various pro-quality initiatives and improvement methods.

In the book by Haffer (2011)the basic difficulties that have been identified by independent assessors in implementing the model and confirmed in surveys conducted among entrepreneurs are:

- lack of organizational resources to work with the model (people, knowledge and time);
- difficulties in learning the principles and criteria of the model and translating them into the language of the organization;
- lack of awareness and commitment among management and employees;
- organizational difficulties in creating a new approach and management paradigm in the organization
- the complexity of self-assessment and the time needed to write a report;
- quality and involvement of external assessors;
- direct and indirect costs of implementing the model.

Effective implementation of the EFQM model principles should ensure greater efficiency and positive results of running the business in the short and long term.

Interesting from the point of view of analyzing the behavior of companies in the approach to improvement are studies in which the author (Mann et al. 2011) draws attention to three basic motivators of activities, i.e.

- procedural benefits - related to the improvement of the company's internal processes and operations
- marketing benefits - resulting from certification and affecting customer perception
- external market conditions - related to pressure from the industry market and competitors

It is worth noting that such an approach may have an active dimension - resulting from the need to shape and improve relations on the market and in the industry, as well as a passive dimension - consisting only in responding to the current market situation.

Research Problem

The research goal of the project is to identify the level of impact of the excellence management model introduced in the organization on the branding strategies of the organization, and to define areas of this impact (both in the external dimension - brand communication, internal branding and in the employer branding layer). Therefore, the research problem will be the answer to the question how the excellence management model introduced into the organization's activities influences the organization's branding strategies.

Based on the literature review authors formulated the hypothesis: **the factors that determine the level of impact of the implemented excellence management model and branding strategy of a given organization (firm) are in particular: type of the excellence model (external factor) and: accumulated knowledge of the market, holistic approach of marketing and management, as well as participatory management style towards internal and external stakeholders (internal factors).** The implementation of the project goal will therefore focus on defining the impact factors and specific criteria determining the level of impact of the implemented model of excellence on the branding strategies of the organization in its many dimensions. To achieve the research goal it will be necessary to:

• defining the factors that determine the impact (including the translation of values brought into the organization) of the management excellence model on the organization's branding strategies;
• creating a scale to determine the level of impact;
• creating a multifactorial model illustrating the hypothetical relationship between the introduced management excellence model and the organization's branding strategies.

Research Method

After a systematic review of the literature in the first period of the project, both qualitative research is planned, including: Individual In-depth Interviews, with representatives of the management of entities that have already introduced a model of management excellence (N = 15), as well as quantitative research carried out by means of standardized interviews using the online questionnaire (CAWI-type computer aided interview) with representatives of companies that have introduced a selected management excellence model in their activities (N = 450). The collected data will be subjected to computer processing and quantitative analysis using descriptive statistics and the use of the SEM / PLS structural model.

The applied research method will allow to generate (in the systematic literature mode) a multifactorial model of hypothetical relationships; then, based on qualitative research (interviews with business practitioners), it will be possible to specifically clean the model by narrowing the model factors to the most common ones - based on practitioners' indications (this is necessary due to the time and financial constraints of the project). Quantitative research will be conducted on its own using the survey tool created as part of the project, thanks to the database of international companies made available by the EU Development Foundation in Wrocław that has introduced a model of management excellence. Quantitative research will allow verification of assumptions, and thus verification of the main hypotheses, that has been formulated based on the literature study.

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Obstacles to Digitalization for Construction and Engineering Companies in Lebanon

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Abstract

Digitalization plays an important role in 21st century business success or failure. Companies founded after the 1990s built digitalization into their startup plans, whereas companies started before the 1980s had to reconfigure themselves to compete in a digitalized world. Companies in developing countries have less access to digital resources compares to developed country and these companies must often spend more of their budget on basic needs. In Lebanon, Engineering and construction (E & C) all of the problems mentioned above and rely on systems and methods used prior to the digital age. To the author knowledge, Lebanon lack behind in digitalization and does not currently have the infrastructure needed to support digitalization. This study was undertaken to assess the obstacles to digitalization currently faced by C & E firms in Lebanon with the goal of helping companies find ways to overcome these obstacles and enter the digital age. Findings showed that employee resistance and lack of training are not as big a problem in Lebanon as in other areas. The biggest problem, lack of infrastructure, will take a considerable amount of time and energy to overcome. Engineering and construction companies who wish to become digitalized must work not only at the local level but at the national level to help build an infrastructure capable of supporting Lebanon's digitalized and globally connected companies.

Keywords: Digitalization, Construction, Engineering, Construction and Engineering Companies, Lebanon.

Introduction

Digitalization plays a vital role in 21st century business success or failure (Wertz, 2018). The process of digitalization, however, can present significant problems. Some businesses, given their products or length of time in the marketplace, can be digitalized more easily and naturally than others. Companies started after 1990 can build digitalization into their startup plans whereas companies started before the 1980s must reconfigure themselves to compete in a digitalized world (Harsh, 2016). Obviously reconfiguring a company for digitalization takes longer, is more complicated and more expensive than building a company where digital systems are incorporated into the original plan. Another impediment to digitalization is the country in which a business is located. Companies located in countries with money to invest in digital infrastructure and training in digital processes have access to more digital resources (Hanna, 2017). Companies in developing countries must often spend more of their budget on basic needs (UNCTAD, 2019).

Certain types of companies find it easier to incorporate digitalization into their systems. For example, companies dealing primarily with information face fewer obstacles to digitalization than those with multiple sites, products, suppliers, subcontractors or collaborators.

Engineering and construction (E & C) companies in Lebanon face all of the problems mentioned above. E & C companies established after 1980 still rely on the systems and methods used prior to the digital age. Lebanon does not currently have the infrastructure needed to support digitalization on a country

wide or local scale. E & C companies deal with multiple work sites, multiple stakeholders, multiple suppliers and funding sources, and widely varied projects.

This study seeks to determine the obstacles to digitalization currently faced by C & E firms in Lebanon with the goal of helping companies find ways to overcome these obstacles and enter the digital age.

Literature Review

Despite evidence of the benefits of digitalization (Blanco et al, 2017; Global Industry Council; Halsey, 2016) the E & C industry has made few advances into the digital age (Ismail, 2019; Okumu, 2019). According to the World Economic Forum (Chew, 2019), "the E&C industry continues to operate today as it has for the past 50 years, heavily relying on manual labor, mechanical technologies and legacy business models". This is true even in countries with a digital infrastructure in place and being used in both the public and private sector. Okumu (2019) found "the civil engineering and construction sector is one of the world's least digitised sectors, particularly in Europe".

E & C companies face many obstacles to digitalization (Blanco et al, 2017; EYGM, 2018; Ibem EO, et al, 2018; Sandle, 2018). Okumu (2019) categorized the obstacles as follows: "unclear definitions of the meaning of digital, poor integration of digital technologies, lack of sustainable improvements, lack of replication (projects differ widely), decentralization (funding comes from multiple sources, projects take place in numerous locations), constant change (workforce turnover, changing teams and organizations), and fragmentation (a project could have several organizations, companies and disciplines working on it)." Ernest & Young (2018) characterized E & C industries as "conservative and reactive" (Ernest & Young, 2018) leading to a reluctance to change even when the change is beneficial. "Companies interested in digitalization report other obstacles including: poor return on investment, employees who resist learning digital systems, companies are interested in digital systems but don't want to be the first adopters, lack of digital systems designed for the E & C industry" (Ernest & Young, 2018). Pressure for digitalization comes from outside the industry as well as from within (EYGM, 2018). A survey conducted by Oliver Wyman (2018) showed the following outside pressures: "evolving client expectations, new technological capabilities, booming start-up environment, supportive legal frameworks, launch of large infrastructure projects" (Oliver Wyman, 2018).

E & C companies in countries with a weak or nonexistent digital infrastructure face even greater obstacles (Hanna, 2017; Ibem EO, et al, 2018; UNCTAD, 2019). While Lebanon recognizes the need for digitalization, the country is struggling to become a digitalized nation. "Currently, Lebanon lags behind in terms of digital adoption and captures only 4.7% of its digital potential, well below the 8.4% average for Middle Eastern countries, highlighting a large untapped growth and potential jobs resource" (World Bank, 2019). At a 2019 conference on digitalization, "speakers from an entrepreneurial start-up background expressed their concerns with launching digital applications in Lebanon, citing the lack of local awareness that would enable them to succeed locally" (Mezher, 2019). Lebanon does not have the necessary infrastructure nor does it have enough people trained in digital processes to build and maintain an infrastructure. Funding is another issue that must be addressed before Lebanon can become digitalized. The problems might seem unsurmountable however Lebanon has taken significant steps in addressing them. A ministerial committee for digital transformation has been established, chaired by the Prime Minister (AbdulMalak, 2019) The committee oversees establishment of guidelines for governance, implementation and monitoring for public and private digitalization. While these steps are important in the nation's digitalization process, companies operating in Lebanon do not have access to the same level of digital resources as those in countries with a well-designed and comprehensive digital infrastructure.

Research Question

The literature review discusses obstacles to digitalization that are common to C & E companies in general and to companies in developing countries in particular. While some research has been conducted on digitalization in Lebanon, few studies address digitalization obstacles for Lebanon's C & E companies. This study seeks to expand on the literature by asking the following question: What

are the greatest obstacles to digitalization currently faced by owners of C & E firms operating in Lebanon?
The hypotheses for this study are:

H1: The belief that the company has insufficient internal skills has a significant negative impact on C & E readiness for digitalization.

H2: The belief that their employees are resistant to using digital technology has a significant negative impact on C & E readiness for digitalization.

Methodology

The Order of Engineers list of C & E companies in Lebanon will be consulted and 50 companies that operate in Lebanon selected from the list. Consent forms will be sent to the owners of the selected companies. Those who agree to participate will be sent surveys by email or hard copy. Participants will also be given the option of filling out an online survey. The survey will consist of 13 questions, see below, asking the owners to rate the significance of perceived problems of digitalization and impediments to digitalizing using a Likert scale. Appropriate statistical tools (e.g., T-test, average, standard deviation) will be used to analyze the survey results. The study results will be shared with E & C companies and with appropriate government agencies.

Survey questions

1. Digital technology does not allow the flexibility needed in my business.
2. Using digital technology will cause errors in measurement.
3. My data will not be safe if I use digital technology.
4. It will be hard to train my employees to use digital technology.
5. Changing over to digital technology costs too much.
6. My employees don't have the skills to use digital technology.
7. My business is successful without using digital technology.
8. I don't know how we would integrate digital technology into my business.
9. I don't like using digital technology.
10. My investors/backers don't want to spend the money on digital technology.
11. Lebanon doesn't have the infrastructure to support use of digital technology in my business.
12. My employees are resistant to using digital technology.
13. Other

Results Presentation

A total of 27 people responded to a questionnaire consisting of 20 questions. Questions one through seven asked for demographics. Questions eight through 19 asked participants to rate their responses to statements about technology using a Likert scale of one (strongly disagree) to five (strongly agree). Question 20 provided space for additional quiet comments.

Question one asked if the firm was a sole proprietorship, partnership, or limited liability company. Eight respondents (29.6%) were in a sole proprietorship. 12 (44.4%) were in a partnership and seven (25.9%) were in a limited liability company.

Question two asked about the age of the firm. Eight participants (29.6%) had firms that were less than five years old. 10 participants (37.0%) were worked for firms that were 6 to 10 years old. One participant (3.7%) was in a firm that was 11 to 15 years old. Eight participants (29.6%) worked in firms that were more than 15 years old.
Question three asked about the number of employees in the firm. 11 respondents (40.7%) worked in firms with less than five employees. Six respondents (22.2%) worked in firms with more than 5 to 10 persons and 10 respondents (37.0%) worked in firms with more than 10 employees.

Question four asked about the type of services provided by the firm's three persons (11.1%) worked in firms that only did design. 15 respondents (55.6%) worked in firms that did both design and construction. Four respondents (14.8%) worked in firms that provided project management. Five respondents (18.5%) worked in firms that provided construction services.

Question five asked if the firms had any of the following social media presences: website, Facebook page, Twitter account, other. 17 respondents (63.0%) stated their firms had a website. 15 respondents (55.6%) had a Facebook page for their firm. Four respondents (14.8%) had a twitter account. Seven respondents (25.9%) answered other, listing the following: platinum holding, both website and Facebook page, email, and Instagram.

Question six asked about the presence of Internet services in the respondent's offices. 26 persons (96.3%) answered yes while one person (3.7%) said no.

Question seven asked about the participants' educational background. Zero respondents had a Bachelor of Science degree. 17 respondents (63.0%) had a bachelor of engineering. Eight (29.6%) had a Masters and one respondent (3.7%) had a PhD. One respondent (3.7%) replied other, civil engineer.

Questions eight through 19 (Question 1 through 11, indicated previously) asked for responses to statements about digital technology. Respondents were asked to rate their answers based on a Likert scale of 1 to 5 with one being strongly disagree, two disagree, three neutral, four agree, and five strongly agree.

Question eight stated "digital technology does not allow the flexibility needed in my business". 10 persons (37.04%) strongly disagreed, eight (29.63%) disagreed, seven (25.93%) were undecided to (7.41%) agreed and zero persons strongly agreed. The mean response for question eight was 2.04 with a 0.98 standard deviation.

Question nine stated "using digital technology will cause errors in measurement". 10 persons (30.04%) strongly disagreed. 10 persons (37.04%) disagreed, three persons (11.11%) were undecided, four persons (14.81%) agreed, no one strongly agreed. The average response was 2.04 with a standard deviation of 1.06.

Question 10 stated "my data will not be safe if I use digital technology". Seven persons (25.93% strongly agreed. 10 persons (37.04%) disagreed. Six (22.22% were undecided. Four (14.81%) parentheses agreed. No one strongly agreed. The average response for question 10 was 2.26 with a standard deviation of 1.02.

Question 11 stated, "It will be hard to train my employees to use digital technology". Five persons (18.52%) strongly disagreed. 14 persons (51.85%) agreed. Five persons (18.52%) were undecided. Three persons (11.11%) agreed. No one strongly agreed. The average response was 2.22 with a standard deviation of 0.89.

Question 12 stated, "Changing over to digital technology cost too much". Space zero respondents strongly disagreed. Nine persons (33.33%) disagreed. Seven persons (25.93%) agreed. Two persons (7.41%) strongly agreed. The average response was 3.07 with a standard deviation of 0.96.

Question 13 stated, "my employees don't have the skills to use to digital technology". Five respondents (18.52% strongly agreed. 13 (48.15%) disagreed. Four respondents (14.81%) were undecided five persons (18.52%) agreed. No one strongly agreed. The average response was 2.33 with a standard deviation of one.

Question 14 stated, "My business is successful without using digital technology." Two persons (7.41%) strongly disagreed. Seven persons (25.93%) disagreed. Eight persons (29.63%) were undecided. 10 persons (37.04%) agreed. No one strongly agreed. The average response was 2.96 with a standard deviation of 0.98.

Question 15 stated, "I don't know how we would integrate digital technology into my business. Three respondents (11.11%) strongly disagreed. 12 (44.44%) disagreed. Six (22.22%) were undecided. Six (22.22%) agreed. No one strongly agreed. The average response was 2.56 with a 0.97 standard deviation.

Question 16 stated, "I don't like using digital technology." 11 persons (40.74%) strongly disagreed. 12 persons (44.44%) disagreed. Four persons (14.81%) were undecided. None of the respondents agreed or strongly agreed. The average response was 1.74 with a standard deviation of 0.71.

Question 17 stated, "my investors/backers don't want to spend money on digital technology. Two persons (7.41%) strongly disagreed. 10 persons (37.04) disagreed. 10 persons (37.04%) were undecided. Five persons (18.52%) agreed. No one strongly agreed. The average response was 2.67 with the standard deviation of 0.88.

Question 18 stated, "Lebanon doesn't have the infrastructure to support use of digital technology in my business." No one strongly disagreed. Five people (18.52%) disagreed. Six persons (22.22%) were undecided. 12 persons (44.44%) agreed. Four persons (14.81%) strongly agreed. The average response was 3.56 with a 0.97 standard deviation.

Question 19 stated, "my employees are resistant to using digital technology". Five persons (18.52%) strongly disagreed. Nine persons (33.33%) disagreed. Six persons (22.22%) were undecided. Seven persons (25.93%) agreed. No one strongly agreed. The average answer was 2.56 with a standard deviation of 1.09.

Question 20 allowed space for additional comments. Three persons responded with comments as follows: I would like to add from my previous experience working in the field of digital transformation for the public sector that the resilience of change is not usually coming from the employees (at least in my case) rather than from local governments. In fact, yes our infrastructure is not ready yet but it all depends on the mindset and the company's culture. Many corporate and Lebanon have moved to the cloud services and trained their employees for using digital technology, a proof that this can be done; the older the company, the harder and the more expensive the change to digital technology will be.

Discussion

The questions can be grouped into five categories: 1) beliefs about employees (questions 11, 13, 19), 2) manager lack of knowledge or motivation (questions 14, 15, 16), 3) could cause problems for my business (questions eight, nine, 10), 4) cost (questions 12, 17), 5) lack of infrastructure space (question 18).

The first category, beliefs about employees, including questions about employees' skills in using, ability to be trained and, and resistance to the use digital technology. 62.96% of the respondents believed their employees would be open to the use of digital technology, and either had the skills or could be trained in the use of digital technology. 18.52% were undecided while only 18.52% believed it would be difficult to train their employees or that their employees didn't have the skills or were resistant to using digital technology, Refer to Table 1.

Beliefs about Employees
11 It will be hard to train my employees to use digital technology.
13 My employees don't have the skills to use digital technology.
19 My employees are resistant to using digital technology.

Table 1: Survey results for questions 11, 13 and 19

Q	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
11	18.52%	51.85%	18.52%	11.11%	0
13	18.52%	48.15%	14.81%	18.52%	0
19	18.52%	33.33%	22.22%	25.92%	0
Average	**18.52%**	**44.44%**	**18.52%**	**18.52%**	**0**

Category two, refer to Table 2, the respondents' lack of knowledge or motivation, showed some interesting results. While 37.04% indicated their businesses were successful without using digital technology, 85.18% of the respondents either strongly disagreed or disagreed with question 16, I don't like using digital technology. 55.55% of the respondents indicated they knew how to integrate digital technology into their businesses. 22.22% were undecided while the remaining 22.22% indicated they did not know how to integrate digital technology into their businesses. These results indicate that resistance to using digital technology is more about the belief that digital technology would not add to the quality or quantity of business rather than an innate unfamiliarity with, dislike or suspicion of digital technology.

Manager lack of knowledge or motivation
14 My business is successful without using digital technology.
15 I don't know how we would integrate digital technology into my business.
16 I don't like using digital technology.

Table 2: Survey results for questions 14, 15 and 16

Q	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
14	7.41%	25.93%	29.63&	37.04%	0
15	11.11%	44.44%	22.22%	22.22%	0
16	40.74%	4.44%	14.81%	0	0
Average	**19.75%**	**38.27%**	**22.22%**	**19.75%**	**0**

The third category related to respondents' beliefs that digital technology could cause problems for their businesses – responses are summarized in Table 3. An average of 12.34% of the respondents agreed that digital technology could cause problems more problems than it solved in their business. However, none of them strongly agreed. 67.91% of the respondents disagreed, indicating they believed that digital technology would not cause more problems in their business. 19.75% were undecided. These results suggest that managers see digital technology as potentially useful.

Can cause more problems for my business
8 Digital technology does not allow the flexibility needed in my business.
9 Using digital technology will cause errors in measurement.
10 My data will not be safe if I use digital technology.

Table 3: Survey results for questions 8, 9 and 10

Q	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
8	37.04%	29.63%	25.93%	7.41%	0
9	37.04%	37.04%	11.11%	14.81%	0
10	25.93%	37.04%	22.22%	14.81%	0
Average	**33.34%**	**34.57%**	**19.75%**	**12.34%**	**0**

For cost, category four (shown in Table 4), the results were almost evenly spread with 38.9% saying cost is not a factor, 35.19% saying they were undecided and 25.94% stating cost was definitely a factor. The questions did not discriminate between the investors and backers not wanting to spend money or company management not wanting to spend the money on digital technology. Therefore, it is impossible to say which of those two factors are most important when it comes to cost.

Cost
12 Changing over to digital technology costs too much.
17 My investors/backers don't want to spend the money on digital technology.

Table 4: Survey results for questions 12 and 17

Q	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
12	0	33.33%	33.33%	25.93%	7.41%
17	7.41%	37.04%	37.04%	18.52%	0
Average	**3.71%**	**35.19%**	**35.19%**	**22.23%**	**3.71%**

The results in category five, lack of infrastructure, indicated companies are uncertain if Lebanon has the necessary infrastructure for supporting the use of digital technology. A total of 59.24% believe that it does not with an additional 22.22% undecided. Only 18.52% believed Lebanon did have the necessary infrastructure and no one strongly believed that it did. Table 5 shows a summary of the survey results for question 18.

Infrastructure

18 Lebanon doesn't have the infrastructure to support use of digital technology in my business.

Table 5: Survey results for question 18

Q	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
12	0	18.52%	22.22%	44.44%	14.8%

Conclusion

Employees' lack of skills and resistance to using digital technology were two of the greatest obstacles to digitalization found in the literature. Employee training in the use of digital technology, allocating funds for digitalization, professional seminars and workshops on the value of the digitalization are all affirmed as important factors in this study. The biggest obstacle to use of digital technology for the participants in this study, however, was Lebanon's lack of infrastructure. As mentioned before, Lebanon is in the process of strengthening its digital infrastructure. One way that companies could contribute to this is to form consortiums advocating for improvement of the country's digital infrastructure and providing resources for Lebanese initiatives.

On a local level, managers can participate in professional development and workshops on digitalization in the engineering and construction sector. They can also contact managers, academics, and other professionals around the world who have knowledge or expertise in the area of digital it digitalization in engineering and construction industry. Managers tend also provide training for their employees in preparation for digitalization of their companies. They can act as advocates for digitalization with others in the organization the organization (e.g., coworkers, subordinates, investors) by providing research, feasibility studies and examples of successful digitalization projects.

The results of this study show that employee resistance and lack of training are not as big a problem in Lebanon as in other areas. The biggest problem, lack of infrastructure, will take a considerable amount

of time and energy to overcome. Engineering and construction companies who wish to become digitalized must work not only at the local level but at the national level to help build an infrastructure capable of supporting Lebanon's digitalized and globally connected companies.

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Consequences of Green Certificates Oversupply on The Polish Energy Market

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Abstract

The purpose of the publication was to discuss the financial situation of wind farms in Poland in the period 2010 - 2018 when this sector was undergoing a crisis caused by the excess supply of green certificates. The publication discusses the genesis of the phenomenon, actions taken to resolve the crisis, and its impact on the wind farm sector. The paper, as one of the few, presents the financial aspect of this phenomenon, combining the issues of sustainable development with the economic viability of entities from the green energy sector. As it turns out, at least in Poland, these entities had severe financial problems, and many wind farms were liquidated. In order to make comparisons, we used financial data for wind farms in the United Kingdom as a reference. Wind farms in the United Kingdom, as one of the few in Europe, are profitable, and one of the government support systems was also the system of tradable renewable energy certificates.

Keywords: sustainable development, TREC, RES, financial analysis

JEL classification: Q01, Q56, O33

Introduction

In the period 2005 - 2014, Poland used only the system of tradable renewable energy certificates (TREC) to support wind companies. The TREC system is colloquially called the green certificate system. The main legal act regulating this system is the Energy Law (Paragraph of 10 April 1997, Journal of Laws of 1997, No. 54, item 348 as amended). The green certificate system has been in force in Poland since the first of October 2005.

The scheme covers not only wind farms but also: solar farms obtaining energy from solar energy, plants producing electricity using geothermal sources, power obtained from waves, currents and tides, as well as the fall of rivers and derived from biomass.

The concept of the system assumed that producers producing renewable energy receive a negotiable certificate for each unit of electricity generated. In this way, they receive revenues both from physical energy sales and from trading certificates (Gnatowska, 2010, p. 147). Industrial (TSO) and distribution (DSO) system operators are required to purchase renewable energy. Energy companies producing or selling electricity to end users are required to obtain and submit for redemption a certain number of green certificates (Renewable Portfolio Standard - RPS).

In the assumptions, the system was, therefore, to increase wind farm revenues by proceeds from the sale of green certificates, and the market was to decide on the prices of green certificates. The ceiling of these prices was controlled with the substitute fee, which was set by the ministry of energy, and it could be paid instead of the certificates.

The system functioned correctly until around 2012 (Mikołajewicz-Woźniak, 2013, p. 97) when the oversupply of certificates appeared on the market and increased until 2016. The oversupply resulted from many reasons. One of them was the launch of a large number of new wind farms, which along

with technological progress, produced energy significantly cheaper than the old-technology wind farms. Another reason was the generation of electricity by burning straw and coconut shells, which was also categorized as electricity production from renewable sources. Yet another reason could be the storage of green certificates and postponing the submission of these certificates for redemption (Mikołajewicz-Woźniak, 2013, p. 102) or choosing a substitute fee despite overproduction of green certificates on the market which was popular among vast energy holdings in Poland.

The process oversupply s green certificates have been described in the literature (scarcely), among others, by Mikołajewicz-Wozniak (2013), Adamczyk-Graczyk (2020), or Wędzik et al. (2017). The authors have focused on the causes of oversupply, the estimation of its scale, and only mention how devastating it was for the wind farms sector. This paper intends to fill this research gap and analyze the financial situation of the wind industry in Poland.

In contrast and for comparison, we related the financial situation of Polish wind farms with the condition of wind farms in the United Kingdom. The United Kingdom, like Poland (as well as Romania and Italy among others) also used the system of certificates of origin (until 2017), although this is not the only scheme of financial support for wind farms in this country (also Poland after 2014 introduced the auction system and started slowly departing from the certificates of origin system). In both countries, however, certificates continue to operate because the wind farms covered by this system are still operational. However, while there was no disturbance in their market in Great Britain, in Poland this system collapsed at some point. Unlike Poland, Romania, or Italy, wind farms in the United Kingdom as a sector throughout the period analyzed in the article remained profitable.

State of the Art

The development of installations generating electricity from renewable sources is an essential element of the European Union's sustainable development policy. According to the Directive EU 2009/28 / EC (Directive 2009/28 / EC "Of The European Parliament And Of The Council of 23 April 2009 on the promotion of the use of energy from renewable sources", by 2020 the European Union has to achieve the share of renewable energy in final energy consumption of at least 20%. This goal applies to the entire European Union, while each member country has a described goal set at a different level because different countries have different possibilities in this respect. For example, for Poland, the target is 15%, and for Sweden, 49%.

Looking at the Eurostat data presented in Table 1 (the last available data refer to 2018), one can see that already in 2018 the goal was achieved by 12 countries, and four states were very close to their goals (the distance from the target did not exceed one percentage point).

Table 1: Share of renewable energy in gross final energy consumption

time	2018	target	2018-target	target-yes?
Austria	33.43	34.00	-0.57	close
Belgium	9.42	13.00	-3.58	no
Bulgaria	20.53	16.00	4.53	yes
Croatia	28.02	20.00	8.02	yes
Cyprus	13.88	13.00	0.88	yes
Czechia	15.15	13.00	2.15	yes
Denmark	35.71	30.00	5.71	yes
Estonia	30.00	25.00	5.00	yes
Finland	41.16	38.00	3.16	yes
France	16.59	23.00	-6.41	no
Germany	16.48	18.00	-1.52	no
Greece	18.00	18.00	0.00	yes

time	2018	target	2018-target	target-yes?
Hungary	12.49	13.00	-0.51	close
Ireland	11.06	16.00	-4.94	no
Italy	17.78	17.00	0.77	yes
Latvia	40.29	40.00	0.29	yes
Lithuania	24.45	23.00	1.45	yes
Luxembourg	9.06	11.00	-1.94	no
Malta	7.98	10.00	-2.02	no
Netherlands	7.39	14.00	-6.62	no
Poland	11.28	15.00	-3.72	no
Portugal	30.32	31.00	-0.68	close
Romania	23.88	24.00	-0.13	close
Slovakia	11.90	14.00	-2.10	no
Slovenia	21.15	25.00	-3.85	no
Spain	17.45	20.00	-2.55	no
Sweden	54.65	49.00	5.65	yes
United Kingdom	11.02	15.00	-3.98	no
EU27 (from 2020)	18.88	20.00	-1.12	no
EU28 (2013-2020)	17.98	20.00	-2.02	no

Source: Eurostat.

Looking at Table 1, it would seem that due to such specific goals to be achieved in 2020, each country will try to favor green energy producers to stimulate private sector investment in this area and achieve the goal imposed by the EU Directive 2009 / 28 / EC. In fact, in some countries, after the first period of active support for green energy producers, they began to move away from it and reduce it. This was due to various reasons - high costs of this support, increased technology efficiency (which reduced the cost of generating energy), and sometimes the desire to change the structure of the market (e.g., supporting small energy producers instead of large holdings). Examples of regulations hindering the operation of wind farms were, for instance (Blau and Hubik, 2019; Gonzales and Lacal-Arantegiu, 2015): the Distance Act in Poland, which requires maintaining considerable distances between wind turbines and residential houses, suspension of government assistance for large farms wind Cyprus and Portugal, suspension of existing aid schemes for the promotion of new energy installations in Spain, the abolition of Feed-inn- Tariff in the Czech Republic, the introduction of special taxes for new and existing wind installations by Wallonia, limiting the maximum power generated by a single wind farm in Bulgaria (maximum power generation), imposing a levy on the gross income on all operating RES (Renewable Energy Systems) projects in Greece, finally slashing mandatory quotas for green certificates in Romania.

One of the countries in which the crisis of financial assistance for wind farms was evident seems to be Poland. This effect was not intended; nevertheless, in 2017, about 70% of wind farms in Poland ended the year with financial losses. It resulted from very low prices of green certificates on the stock exchange. As can be seen in Table 2, in 2017 prices of certificates of origin fell in Poland from PLN 265 in 2009 to PLN 37 in 2017 (a decrease of 86%). For comparison, prices in the UK increased from PLN 173 (for comparability, prices expressed initially in British pounds were converted to Polish zlotys) to PLN 221 in 2017 (an increase of 28%, despite the weakening of the British pound to the Polish zloty).

Table 2: Average prices of green certificates in years 2009 – 2020 in Poland and the UK (for comparison)

Year	Poland, price PLN/1 certificate	UK, price GBP/1 certificate	UK, price PLN/1 certificate	Poland, energy price PLN/MWh	UK, energy price GBP / MWh	UK energy price PLN/MWh	total Poland, PLN/MWh	total UK, GBP/MWh	total UK, PLN/MWh
Jan-Mar 2020	142.37	50.05	246.63	235.44	34	167.54	377.81	84.05	414.17
2019	131.78	48.78	238.96	245.44	43	210.64	377.22	91.78	449.60
2018	102.85	47.22	227.45	194.30	58	279.37	297.15	105.22	506.82
2017	37.24	45.58	221.50	169.70	46	223.54	206.94	91.58	445.04
2016	70.26	44.77	239.09	181.11	43	229.64	251.37	87.77	468.73
2015	122.91	44.33	255.67	169.99	41	236.47	292.9	85.33	492.14
2014	181.84	42.3	224.81	164.7	44	228.44	346.54	86.3	453.25
2013	167.17	42.02	207.69	195.84	52	257.02	363.01	94.02	464.71
2012	246.63	40.71	210.08	201.36	46	237.38	447.99	86.71	447.46
2011	281.60	38.69	183.66	198.9	49	232.57	480.5	87.69	416.23
2010	274.05	36.99	172.33	195.32	44	204.98	469.37	80.99	377.31
2009	265.30	35.76	173.66	197.21	38	184.54	462.51	73.76	358.20

Source: tge.pl (archive), [Online] [Retrieved: 10.06.2020] https://www.ofgem.gov.uk/data-portal/wholesale-market-indicators.

The reason for the certificates' prices drop in Poland was a large oversupply of green certificates on the market which began in 2012 (oversupply began to decrease in 2019, but it persisted until the time of writing this publication), and this, in turn, resulted from the opening of many new wind farms, co-firing of imported biomass (on, for example, coconut shells, compare in Table 3 the "co-firing " line), the small number of redeemed certificates and the lack of expiration date of these certificates (they could be kept in the portfolio indefinitely). Another reason (Adamczyk, Graczyk, 2020) was the inclusion in the system of large hydropower plants with a capacity of more than 10 MW in the green certificates system, which generated 2/3 of all certificates. As can be seen in Table 3, all this led to a sharp increase in the number of certificates on the market and a persistent high oversupply since 2009. For comparison, in the UK, the certificate system covered only new hydroelectric plants and existing power plants with a capacity below 20 MW. As Table 4 shows, there was never a large surplus of certificates in Great Britain, although in 2014 it also occurred. However, it began to decline from the next year and did not cause a drop in certificate prices on the market.

Table 3: Certificates of origin issued and cancelled in a particular year, Poland, years 2005 – 2018

year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
biogas GWh	n.a.	119	151	215	287	358	393	493	643	785	826	826	1,191	1,027
biogas - no of certificates of origin	n.a.	0.31	0.448	0.625	0.828	1	*1.2**	2	2	2	2	2	3	2
biomass GWh	n.a.	582	540	487	555	784	983	1,282	598	4,098	5,582	4,873	4,218	3,793
biomass - no of certificates of origin	n.a.	0.055	0.052	0.057	0.087	0.118	*0.14**	0.175	0.094	0.28	0.272	0.235	0.208	0.218
wind energy GWh	n.a.	237	441	816	942	1,595	2,629	4,324	5,386	7,930	8,876	10,326	16,782	13,459

year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
wind energy - no of certificates of origin	n.a.	0.318	0.723	1	2	3	*4.38**	6	8	9	10	9	14	11
hydropower GWh	n.a.	2,100	2,181	2,221	2,244	2,869	2,444	2,021	2,411	2,254	1,764	792	918	663
hydropower - no of certificates of origin	n.a.	3	4	5	5	5	*5.8**	6	7	7	6	5	6	4
co-firing GWh	**n.a.**	**1,412**	**1,690**	**2,306**	**3,686**	**5,375**	**4,224**	**8,615**	**1,447**	**6,173**	**4,362**	**1,751**	**1,313**	**725**
co-firing - no of certificates of origin	**n.a.**	**0.118**	**0.175**	**0.125**	**0.237**	**0.273**	***0.203 ****	**0.392**	**0.091**	**0.308**	**0.204**	**0.098**	**0.067**	**0.059**
solar power GWh	n.a.	0	0	0	0	0	0.03	1	1	2	32	52	101	101
solar power - no of certificates of origin	n.a.	0	0	0	0	0	*0.01**	0.021	0.042	0.163	0.722	1	2	1
total RES GWh	**n.a.**	**4,450**	**5,003**	**6,044**	**7,714**	**10,981**	**10,673**	**16,736**	**10,487**	**21,243**	**21,443**	**18,619**	**24,522**	**19,769**
total no of certificates of origin	**n.a.**	**4,112**	**5,540**	**6,851**	**8,228**	**10,039**	**10,673***	**14,798**	**17,131**	**19,417**	**19,544**	**18,021**	**24,531**	**18,924**
Adamczyk Graczyk – no. of cert of origin issued in a given year	**902**	**4,450**	**5,003**	**6,044**	**7,714**	**10,981**	**10,673**	**16,736**	**10,487**	**22,243**	**22,661**	**18,619**	**15,628**	**n.a.**
volume in GWh of cancelled certificates	**3,209**	**3,884**	**3,509**	**6,433**	**4,963**	**8,227**	**11,081**	**11,696**	**11,307**	**17,999**	**12,502**	**19,622**	**26,703**	**21,532**
number of cancelled certificates in a given year	4,536	4,659	4,470	7,897	6,331	8,781	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Adamczyk Graczyk No of cert cancelled in a given year	2,064	2,941	3,509	6,433	4,963	8,227	11,081	11,696	11,307	17,999	12,502	19,622	n.a.	n.a.
difference between issued and cancelled MWh in certificates	-2,233	566	1,493	-389	2,751	2,754	-408	5,039	-820	3,244	8,940	-1,003	-2,181	-1,764
accumulated difference in GWh	-2,233	566	2,059	1,670	4,421	7,175	6,766	11,806	10,986	14,230	23,171	22,168	19,987	18,223

**estimates based on Adamczyk, Graczyk (2020).*

Source: Biuletyn Urzędu Regulacji Energetyki, Warszawa, URE, 2006, 2007, 2008, 2009, Sprawozdanie z Działalności Prezesa Urzędu Regulacji Energetyki, Warszawa, URE, 2009, 2010, 2011, 2012, 2013, 2014 2015, 2016, 2017, 2018.

Table 4: Renewable obligations issued and cancelled in a particular year, the United Kingdom, years 2002 – 2018 (every year's end is on 31. March).

Year	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
waste MWh	542	735	836	982	1206	1504	1111	963	1133	1254	1589	1578	1776	2206	1970	2166	2242
waste - no of certificates issued	7	27	34	32	33	24	9	0	0	0	0	12	32	136	117	152	226
anaerobic digestion MWh	0	6	9	9	16	19	21	39	99	223	452	633	981	1291	1784	2265	2266
anaerobic digestion - no of certificates of origin	0	6	9	9	14	19	21	73	186	333	615	725	880	1086	1398	1779	2084
landfill gas MWh	2,002	3022	3589	3,966	4,259	4,506	4,690	4,885	4,986	5,026	4,976	4,900	4,767	4,529	4,205	3,812	3,487

Year	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
landfill gas - no of certificates of origin	2,002	3019	3562	3,928	4208	4491	4682	4874	4,986	5,024	4,968	4,859	4,704	4,457	4,141	3,752	3,429
sewage gas MWh	134	227	277	371	403	419	473	540	614	667	647	705	790	849	853	915	876
sewage gas - no of certificates of origin	134	227	276	370	403	418	473	537	614	667	641	688	746	780	775	780	732
biomass MWh	584	905	1142	1,251	1,056	1,212	1,550	1,838	1,925	1,938	4,013	8,536	10,605	14,108	12,027	17,607	19,894
biomass - no of certificates of origin	579	871	1017	1,038	1017	1165	1538	2571	3098	3,144	6386	10626	12692	16684	15012	16945	16526
offshore wind energy MWh	2	10	200	426	687	800	1,427	1,899	3,002	5,084	7,467	11,489	13,369	17,388	16,435	20,529	26,558
offshore wind energy - no of certificates of origin	2	10	200	423	686	800	1,427	2,311	4,378	7,825	13,052	21,007	24,710	32,719	31,079	35,808	40,656
onshore wind energy - MWh	718	1184	1578	2,412	3563	4480	5,987	7,576	7,155	10,725	12,020	16,583	18,093	22,288	20,235	27,842	29,832
onshore wind energy - no of certificates of origin	718	1184	1562	2,392	3556	4479	5,985	7,574	7,131	10,637	11,792	16,238	17,512	21,135	18,905	26,058	27,898
hydropower MWh	370	894	3721	4,091	4,428	4,505	4,501	5,093	3,188	5,085	4,632	4,128	5,250	5,582	4,682	5,076	4,746
hydropower - no of certificates of origin	370	894	1920	2,135	2,113	2,429	2,391	2,496	1,668	2,515	2,421	2,169	2,646	2,795	2,377	2,452	2,296
co-firing MWh	94	**505**	**1209**	2,612	**2,375**	**1,834**	**1,953**	**1,703**	**2,425**	**3,090**	**1,828**	**337**	**1,649**	**2,556**	**4,747**	**50**	**145**
co-firing - no of certificates of origin	**94**	**505**	**1,193**	**2,612**	**2,359**	**1,834**	**1,953**	**1,210**	**1,230**	**1,565**	**953**	**148**	**1,411**	**2,229**	**4,226**	**25**	**124**
solar power MWh	0	0	0	0	1	2	4	11	52	706	1,393	2,217	4,053	7,703	9,798	10,730	11,557
solar power - no of certificates of origin	0	0	0	0	0	1	3	9	5	3	17	667	2718	6610	8,568	9,503	10,394
tidal stream - MWh	0	0	0	0	0	0	0	1	2	1	3	4	1	0	0	4	9
tidal stream - no of certificates of origin	0	0	0	0	0	0	0	1	4	1	7	9	6	0	0	21	46
advanced gasification - MWh	0	0	0	0	0	0	0	0	1	2	1	6	19	20	18	46	69
advanced gasification - no of certificates of origin	0	0	0	0	0	0	0	0	0	4	2	12	37	40	34	85	125
standard gasification - MWh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	69	98
standard gasification - no of certificates of origin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	69	129	178
total RES GWh	**4,446**	**7,488**	**12,561**	**16,120**	**17,994**	**19,281**	**21,717**	**24,548**	**24,582**	**33,801**	**39,021**	**51,116**	**61,353**	**78,520**	**76,791**	**91,111**	**101,779**
total no of certificates of origin (Renewable Energy Foundation)	**3,906**	**6,743**	**9,773**	**12,939**	**14,389**	**15,660**	**18,482**	**21,656**	**23,300**	**31,718**	**40,854**	**57,160**	**68,094**	**88,671**	**86,701**	**97,489**	**104,714**
total no of certificates of origin (Ofgem)	**5,563**	**9,972**	**10,856**	**13,767**	**14,964**	**16,152**	**18,996**	**21,228**	**24,885**	**34,754**	**44,299**	**62,820**	**71,311**	**90,431**	**86,170**	**100,581**	**105,948**
number of cancelled certificates in a given year (Ofgem)	5,451	7,610	10,860	13,700	14,610	16,470	18,950	21,340	24,970	34,400	44,770	60,760	71,280	84,440	90,214	103,221	107,644

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
volume in GWh of cancelled certificates (Ofgem)	5,451	7,610	10,860	13,700	14,610	16,470	18,950	21,340	24,970	34,400	44,770	60,760	71,280	84,440	90,214	103,221	107,644
difference between issued and cancelled MWh in certificates (Ofgem)	111	2,362	-4	67	354	-318	46	-112	-85	354	-471	2,060	31	5,991	-4,044	-2,640	-1,696
accumulated difference in MWh	111	2,473	2,469	2,536	2,890	2,572	2,619	2,507	2,421	2,775	2,304	4,363	4,394	10,385	6,341	3,702	2,006

Source: Renewable Energy Foundation (@: www.ref.org.uk/energy-data, download date: 19.06.2020), and The Renewables Obligation: Annual Report 2002-2003, 2003-2004, 2004-2005, 2005-2006,2006-2007, 2007-2008, 2008-2009, 2009-2010, 2010-2011, 2011-2012, 2012-2013, 2013-2014, 2014-2015, 2015-2016, 2016-2017, 2017-2018, 2018-2019.

The Polish government, when realized the situation, took measures to resolve the crisis, but it was not easy. In 2015 the government passed the Act of Renewable Energy Sources (RES), which drastically reduced financial support for plants that were using co-firing; by virtually withdrawing them from the system. Another group removed from the system were large hydro-plants. In 2015, the already quoted Act of Renewable Energy Sources introduced the auction system, and this new auction system covered all new RES producers. The system of green certificates was ended, and it only was maintained for the producers that were already participants of this system. The amendment to the RES Act introduced on January 1, 2016, presented additional blue certificates to support agricultural biogas plants, which were then excluded from the system of green certificates.

In October 2018, special auctions were launched, under which existing installations could switch from the green certificate system to the auction system. However, the auctions did not include wind farms or solar farms. In 2018, another amendment to the RES Act introduced further assistance instruments for selected installations: feed-in- tariffs and feed-in- premiums (Adamczyk, Graczyk, 2020, p. 6585). Also, the Energy Regulatory Office (pl. URE – Urząd Regulacji Energetyki) began inspections and investigations to determine why energy suppliers did not redeem their certificates, which could be regarded as attempts to manipulate the market. The URE reports contain huge fines imposed for failure to comply with the obligation to redeem certificates or to pay a replacement fee (the URE sets its level).

Another measure aimed at reducing the oversupply of green certificates was the amendment of the RES act introduced in 2018. The amendment contains a provision that significantly limits the use of the substitution fee (payment instead of submission of green certificates). The Act states that if the price of certificates from the previous year is lower than this year's fee calculated as 125% of last year's price, one cannot use a substitute fee. To enable substitute fees, the prices of green certificates would have to be very high. In practice, under this new regulation, no substitution fee could have been paid for the level of certificate prices in 2012-2020.

Besides, the government increased the obligatory share of green energy in the final electricity consumption. In the following years, this share is raised, which also helped to reduce the oversupply of certificates (Table 5).

Table 5: Required minimum share of renewable energy (without blue certificates) in final electricity consumption in Poland and the UK

year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Poland	0	0	0	0	4.80	5.10	7	8.7	10.4	10.4	10.4	10.9	11.4	20.0	19.35	15.4	17.5	18.5	19.5
The UK without North Ireland	3	4.3	4.9	5.5	6.7	7.9	9.1	9.7	11.1	12.4	15.8	20.6	24.4	29	34.8	40.9	45.2	48.4	47.1
North Ireland	0	0	0	2.5	2.6	2.8	3	3.5	4.27	5.5	8.1	9.7	10.7	11.9	14.2	16.7	18.5	19	18.5

Source: Minister of Economy, National Renewable Energy Action Plan, Warsaw, 2010, [@:] https://www.ebb-eu.org/legis/ActionPlanDirective2009_28/national_renewable_energy_action_plan_poland_en.pdf, p. 90 and the Act of renewable energy sources, download date: 15.03.2020, European Commission, State aid No N 362/2004 – the United Kingdom Renewables Obligation Order 2005, Brussels, 23.II.2005, C(2005)480 [@:] https://ec.europa.eu/competition/state_aid/cases/164583/164583_508737_27_2.pdf, download date: 19.06.2020.

Summing up, as one can see, the government went to many lengths to solve the oversupply of green certificates problem. Many changes made in Poland were similar to British solutions: exclusion of large hydroelectric plants from the system, arrangements to reduce co-firing, and finally abandoning the system of certificates. The problem persisted, however, for many years and had a significant and negative impact on the financial situation of wind farms in Poland.

Description of the Research Method

The purpose of the publication was to analyze the financial situation of the Polish wind farm sector during the described oversupply of the RES certificates period in Poland. For this purpose, we calculated the median ratios of liquidity (current ratio and quick ratio), profitability (return on equity and return on capital employed), debt (solvency ratio calculated as equity divided by total assets), interest coverage, and days in payables. As a benchmark, we compared the Polish median sector results with the British counterpart.

The data used for the calculations came from the van der Vijk Orbis database, the Polish Power Exchange (PGE), reports from the Energy Regulatory Office (Polish Energy Office), Ofgem, and Renewable Energy Foundation reports and datasets. (Since many wind farms belonged to the same owner, and they only prepared one financial statement for the entire company, we could not analyze only the wind farms which participated in the green certificates system, we had to analyze the whole sector). We obtained financial statements for 287 wind farms in Poland and 549 wind farms in the United Kingdom. Tables 6 and 7 show the results of calculations for (respectively) Poland and the United Kingdom.

Table 6: Median financial ratios for wind farms in Poland, years 2010 - 2018

itemized	2010	2011	2012	2013	2014	2015	2016	2017	2018
median CURR	1.76	2.36	1.31	0.91	0.41	0.50	0.61	0.92	0.95
observations	**40**	**67**	**70**	**69**	**76**	**69**	**54**	**97**	**84**
median LIQ	1.75	1.25	1.36	0.82	0.48	0.49	0.50	0.85	0.95
observations	**31**	**54**	**51**	**55**	**56**	**54**	**41**	**82**	**65**
median ROCE	-7.22	-4.66	-5.86	-1.73	-0.88	1.62	2.03	0.33	3.09
observations	**11**	**22**	**26**	**20**	**17**	**22**	**23**	**36**	**22**
median ROE	-6.39	-3.28	-6.97	-7.02	-1.41	-1.01	-0.34	-0.53	-0.35

itemized	2010	2011	2012	2013	2014	2015	2016	2017	2018
observations	**41**	**52**	**41**	**36**	**50**	**49**	**43**	**66**	**56**
median interest cover	-3.26	-4.25	-7.25	-0.83	-0.83	-0.28	-0.24	-0.40	-0.14
observations	**14**	**29**	**31**	**29**	**30**	**34**	**32**	**47**	**29**
median solvency ratio	85.23	58.77	16.67	1.51	28.77	26.20	31.19	38.03	34.59
observations	**53**	**77**	**81**	**69**	**83**	**79**	**60**	**120**	**100**
credit period (days)	365	22	40	23	31	10	27	29	17
observations	**10**	**11**	**14**	**12**	**16**	**23**	**26**	**34**	**32**

Source: Orbis database.

Table 7: Median financial ratios for wind farms in the UK years 2010 – 2018

itemized	2010	2011	2012	2013	2014	2015	2016	2017	2018
median CURR	1.00	1.00	1.00	0.99	0.83	0.61	0.50	0.34	0.26
observations	**295**	**274**	**271**	**269**	**234**	**199**	**165**	**137**	**105**
median LIQ	1.00	0.99	1.00	0.83	0.54	0.49	0.45	0.26	0.22
observations	**296**	**274**	**271**	**269**	**234**	**198**	**163**	**136**	**105**
median ROCE	9.05	8.30	5.07	7.66	8.66	9.04	9.45	15.04	7.31
observations	**133**	**124**	**122**	**97**	**78**	**76**	**59**	**52**	**39**
median ROE	13.20	11.35	5.40	11.29	3.77	18.36	10.31	28.49	6.52
observations	**141**	**123**	**109**	**107**	**91**	**81**	**75**	**56**	**43**
median interest cover	1.60	1.17	0.63	0.97	0.83	1.28	0.91	1.52	0.81
observations	**147**	**140**	**128**	**109**	**98**	**90**	**73**	**58**	**47**
median solvency ratio	16.26	14.80	12.61	7.91	10.85	8.77	7.06	10.27	8.34
observations	**354**	**322**	**326**	**322**	**293**	**262**	**225**	**189**	**146**
credit period (days)	2.73	2.25	6.42	2.80	2.08	1.79	1.67	1.98	2.09
observations	**166**	**152**	**142**	**113**	**92**	**81**	**65**	**48**	**41**
oversupply (TWh)	2.42	2.77	2.30	4.36	4.39	10.39	6.34	3.70	2.01
RES certificate prices (PLN/MWh)	172.33	183.63	210.08	207.69	224.81	255.67	239.09	221.50	227.45
RES certificate prices with recycle payment (PLN/MWh)	239.18	200.63	229.02	211.15	226.63	255.67	266.33	249.92	n.a.
co-firing (TWh)	1.23	1.565	0.953	0.148	1.411	2.229	4.226	0.025	0.124

Source: Orbis database

Table 6 presents the medians of the most popular financial indicators for Polish wind farms, focusing on those indicators that should show the deterioration of wind farms' financial situation. In Table 7, one can see the benchmark values calculated for the wind farms in the United Kingdom. The results presented in Table 6 and Table 7 are also shown in Figures 1 - 7. The data shows that the most massive cumulative oversupply of green certificates in Poland was recorded in 2015 - 2016, but a very high level also remained in the years 2017 and 2018. The lowest prices of certificates took place in 2017, which can be interpreted as a delayed market reaction to this oversupply.

Therefore, one could expect that the lowest values of financial ratios for wind farms in Poland should also take place in 2017 (in the year 2017, around 70% of wind farms in Poland ended the year with a financial loss; for comparison, whereas only 17% of farms in the UK sustained financial losses). In reality, the lowest level of liquidity ratios was observed in 2014, and they remained at a very low level until 2016 (Fig 1 and Fig 2). From 2015 Poland introduced the auction system (and ended the green certificates system), and probably it was the new wind farms operating in the auction system that improved the financial liquidity of the entire sector in 2017 (and bankruptcies of less efficient old-technology wind farms). So contrary to expectations, liquidity ratios for wind farm sector were the lowest not in 2017, but in 2014 (when the oversupply only began to accumulate, and the prices of energy with green certificates only dropped from 462.51 PLN/MWh in 2009 to 346.54 PLN/MWh in 2014, that is, by 25% - until 2017 the total price drop was 55% compared with the year 2009). It seems that the 25% income drop between 2009 and 2014 was sufficient to reduce the sector's liquidity and cause many bankruptcies. In our sample of 287 wind farms, 92 of them were in the state of liquidation. So 32% of the analyzed sample was constituted of wind farms that went bankrupt during the analyzed period. At the same time, British farms maintained an adequate level of financial liquidity, which began to deteriorate only in 2017 and 2018, i.e., before Brexit.

As for the profitability ratios of wind farms in Poland, they remained negative throughout the entire period until the end of the green certificate system and implementation of the auction system (in 2015). There is no deterioration correlated with the decrease in green certificates prices. It should be remembered, however, that 32% of the analyzed winds farms went bankrupt at the time of low green certificates prices, and the configuration of entities constituting the sector changed. As for British wind farms, the lowest median of profitability ratios can be observed for 2012 and 2014, when the market also had the lowest total energy prices (the wholesale price of electricity together with revenues from the sale of renewable obligations). Low energy prices continued in the United Kingdom, also in 2015, but the profitability of wind farms has already improved this year. This could be due to the launch of the auction system in 2015. What is clearly seen in Fig. 3 and Fig, 4 is that the introduction of the equity system in both countries - both Poland and the United Kingdom has improved the profitability of the wind farm sector.

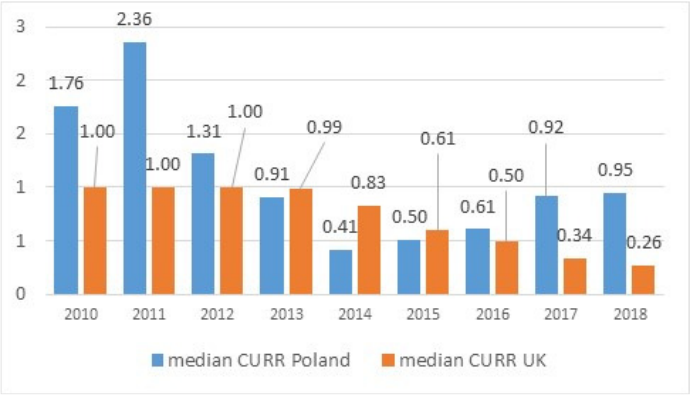

Fig. 1: The median current liquidity ratio for wind farms in Poland and the UK, years 2010 – 2018

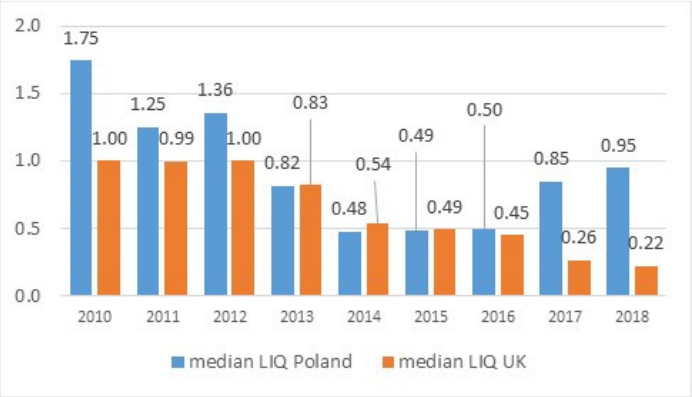

Fig. 2: The median quick liquidity ratio for wind farms in Poland and the UK, years 2010 – 2018

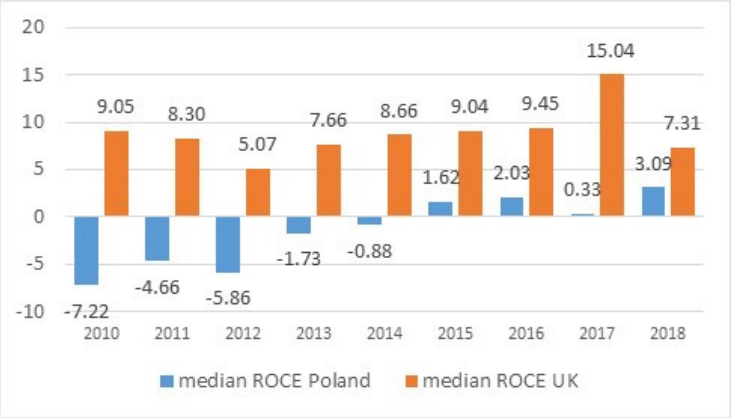

Fig. 3: The median return on capital employed for wind farms in Poland and the UK, 2010 – 2018 [%]

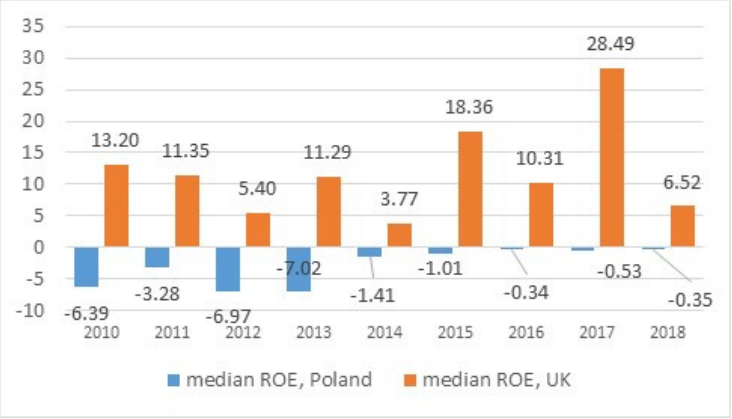

Fig. 4: The median return on equity for wind farms in Poland and the UK, years 2010 – 2018 [%]

Debt ratios for wind farms in Poland (interest coverage and solvency ratio depicted in Fig 5 and Fig 6) were the lowest in 2012 - 2013, after which they improved. The median of interest coverage ratio for farms in Poland was, however, negative throughout the entire analyzed period, while for British farms, it was all the time positive. The coverage ratio was the lowest in the years 2010 – 2014 and improved after 2014 when Poland left the certificates of origins system and implemented the auction system. In contrast, apart from 2013, the median solvency ratio for wind farms in Poland was higher compared to wind farms operating in Great Britain, which indicates higher overall wind farm debt in the UK.

The worst level of debt ratios in Poland dates to the period of oversupply formation on the certificates market (compare Fig 6), not to the time when the oversupply reached its maximum, probably due to bankruptcies of many farms, the opening of new farms and the transition in 2015 to the auction system. Regarding farms in Great Britain, debt ratios remained relatively constant throughout the entire analyzed period.

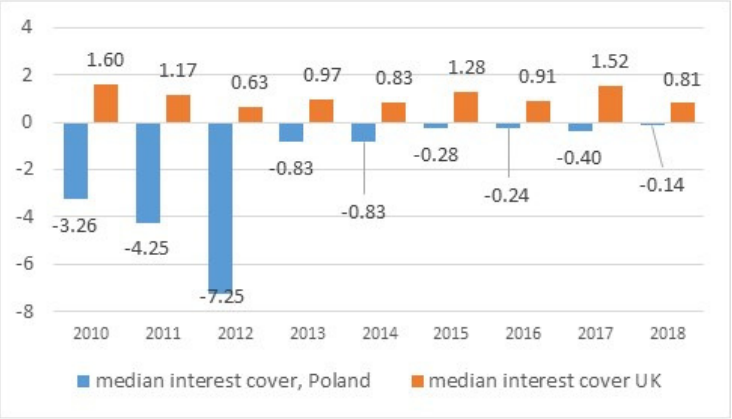

Fig. 5: The median interest cover for wind farms in Poland and the UK, years 2010 – 2018

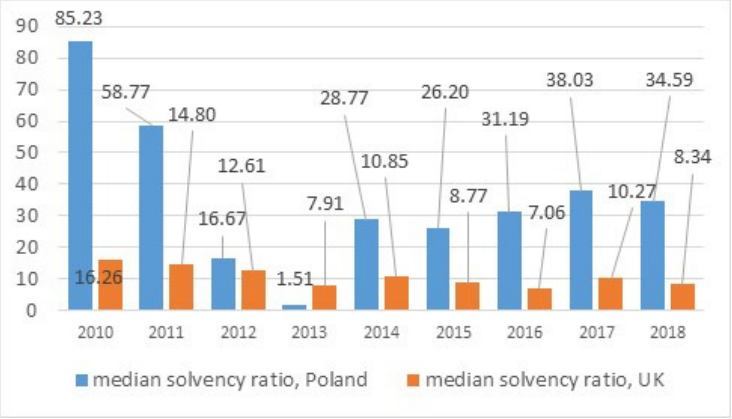

Fig. 6: The median solvency ratio (equity/total assets) for wind farms in Poland and the UK, years 2010 – 2018 [%]

Due to the unusually high median of days in payables ratio for Poland in 2009 (the median of days in payables ratio was then 365 days), it is easier to analyze the values contained in Table 6 and Table 7 to observe its changes, not the Fig. 7. As can be seen in Table 6 and Fig. 7, the days in the payables ratio for Polish farms except for the year 2009 fluctuated in the range of 10 - 40 days, and for British farms, it was in a range from 2 to 7 days.

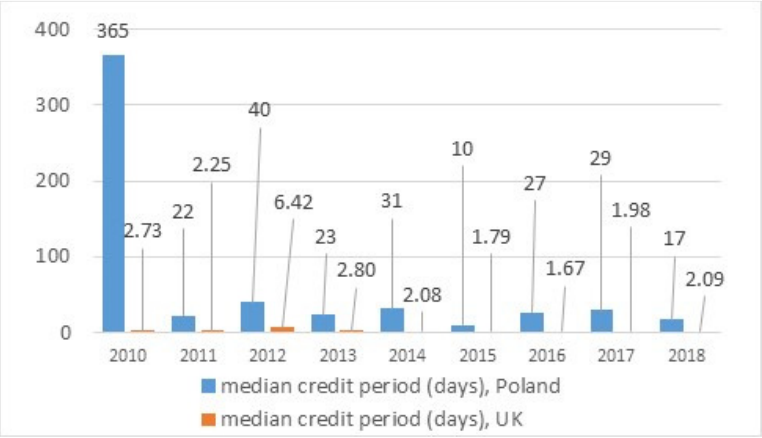

Fig. 7: The median days in payables ratio for wind farms in Poland and the UK, years 2010 – 2018
[days]

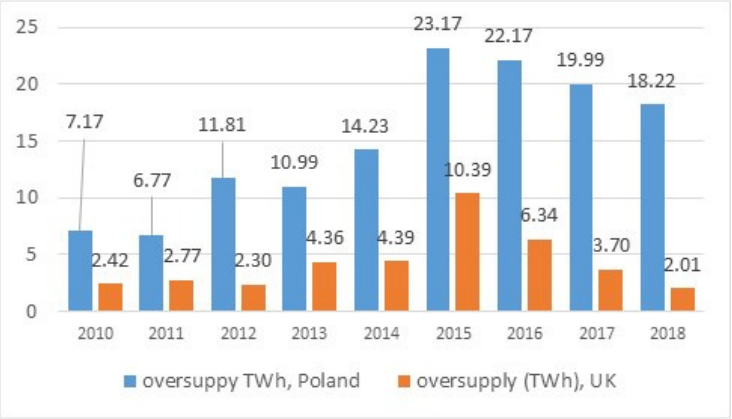

Fig. 8: Difference between green certificates creation and cancellations in Poland and the UK, years 2010 – 2018 [TWh]

The last three charts, i.e., Fig 8, Fig 9 and Fig 10 show (respectively) the difference between the number of generated and redeemed certificates of origin, average certificate prices and the number of certificates generated by co-firing. Fig 8 confirms the significant oversupply of certificates in Poland compared to the United Kingdom, and Fig 9 shows a sharp decline in their prices in Poland in 2012-2017. In 2009 and 2010, certificate prices were more than 1/3 higher than in Great Britain, in the years 2011 – 2014 they leveled out between countries, and then fell to around 16% of the UK price level in 2017 and about 40-50% in 2015 and 2018. Figures 8, 9, and 10 constitute a graphic illustration of the problem, which was discussed in the theoretical part (and in Table 2, Table 3, and Table 4), which is the collapse of certificate prices in Poland. Fig 10 shows the level of co-firing, as it was one of the reasons for this situation.

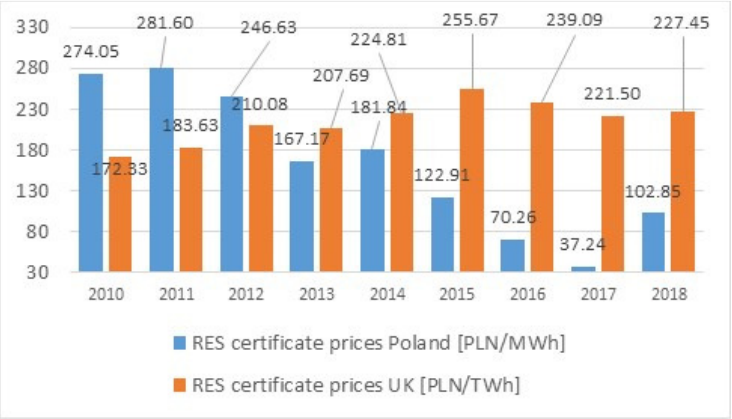

Fig. 9: Average annual prices of green certificates in Poland and the UK, years 2010 – 2018 [PLN]

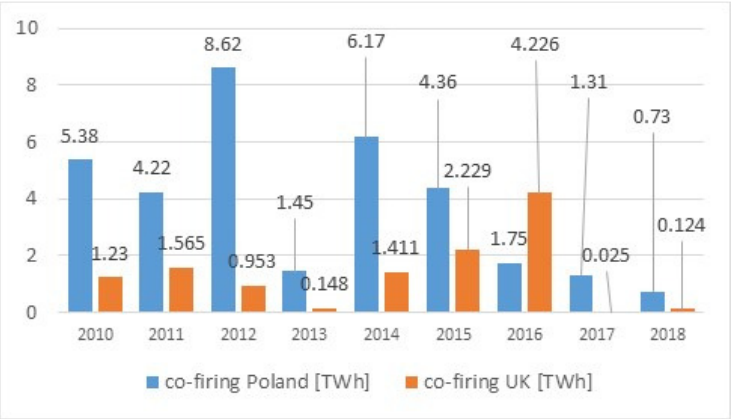

Fig. 10: Amount of MWh accepted for the green certificates generated with co-firing in Poland and the UK, in years 2010 – 2018 [TWh]

Conclusions and Recommendations

Analysis of the data presented in the article shows inconsistency in the picture of the financial situation of wind farms as an entire sector. This is undoubtedly primarily due to the bankruptcies of a large part of these entities (in terms of reports that were available in the Orbis database).

The analysis of the financial situation of wind farms showed that, in fact, the liquidity ratios of farms in Poland indeed deteriorated during the oversupply of certificates, but more at the beginning of the oversupply period than during the highest level. The apparent improvement in the sector's liquidity resulted from the wave of the bankruptcy of many units; in the analyzed population, it was 32% of the wind farms (in Poland). Financial liquidity could also be improved recently by the entry of new generation wind turbines, which allow electricity to be produced more cheaply than coal-fired power plants.

As for profitability ratios, they were negative throughout the entire period of functioning of the green certificate system in Poland, and their improvement occurred (median for the sector) since 2015, i.e., since the departure from the certificate of origin system in favor of the auction system. The profitability of wind farms in Poland, however, throughout the entire study period much lower than British farms, which could be due to differences in wind conditions between countries, but also to higher energy sales prices (including subsidies).

In the case of the interest coverage ratio, as in the case of profitability ratios, the change between the period 2009-2014 and the period 2015-2018 is more visible, i.e., the transition between the period of functioning of the certificates of origin system and the period of operation of the joint-stock system. This indicator has significantly improved for wind farms in Poland after the implementation of the auction system. This behavior of the interest coverage ratio is due to its design - it has an operating result in the numerator. Therefore, this indicator had to at least partly behave like profitability indicators. The solvency ratio based on the relationship of assets, equity, and liabilities does not depend directly on the financial result in a given year, but on the financial results for the last few years. This indicator also reached its lowest level in 2012-2013, i.e., during the beginnings of the oversupply process in Poland.

The days in payables ratio showed no response to the oversupply of certificates and fluctuated between 10 and 40 days or to a change in the support system for renewable energy producers.

The presented indicators confirm the financial problems of the wind energy sector in Poland and that these problems at least partially were caused by the oversupply of the certificates of origin. Research results also suggest that the situation is slowly improving (in 2020). Wind farms established in the years 2006 - 2012 assumed in their business plans the level of green certificate prices around PLN 200-250 (Wyrobek et al., 2018, Wędzik et al., 2007, Mielcarek 2014, Suska- Szczerbicka, Weiss, 2013), so for many of these farms, the prices of the certificates are still insufficient. However, they are still better off financially than in the worst years 2015-2017.

The current situation in the market still poses the risk of further bankruptcies, which may cause consolidation of the sector and push out of small producers with low capital resources. Recent legal changes (in 2019) favor the development of small installations, but the strongest market players buy many older farms. Support for small installations concerns mostly new windmills, not already existing plants.
To sum up, our analysis shows that, indeed, Polish wind farms had significant financial problems in recent years, and the proper legal adjustments and government support were delayed in time by three years. The oversupply appeared in 2012, and the reaction of appropriate bodies occurred in 2015. The numerical analysis also shows that at least partially, this problem was caused by large hydropower plants and co-firing of straw and coconut shells in traditional hard-coal power plants. They produced so many green certificates that their prices dropped by almost 90% compared to earlier years. These problems did not occur in the United Kingdom, where the financial situation of the wind farm sector was much more stable and predictable.

Acknowledgments

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The Role of Language Policy of State in Crisis Management: A Case Study on The Example of Access to Information and Public Services in Polish Sign Language During Epidemic of SARS-Cov-2

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Abstract

The paper analyses the impact of sign language legislation and its implementation and the public safety on the example of the Republic of Poland during the epidemic of SARS-CoV-2. The first part (I) of the paper describes a legal framework of the language right during epidemic in Poland. Is it is divided into three sub-sections on the basis of the main subject matter of the analyzed regulations: (1) Constitutional emergency measures – state of natural disaster, (2) A state of epidemic emergency, (3) Sign language legislation in the Republic of Poland. Legal analysis is followed by a case study regarding implementation of the language rights of Polish Sign language users during the state of epidemic emergency. The final section titled: "Beyond discrimination: critical assessment of legal compliance with policy measures in the context of public safety" includes an evaluation of the national legal instruments and its implementation by state authorities in Poland. The third part is followed by conclusions, where critical areas for further research are designated.

Keywords: language rights, language policy, deaf persons rights, sign language

Introduction

Sign languages are natural languages of deaf people, equivalent in terms of complexity, grammar and semantics with spoken (oral) languages. This fact well established in language and social sciences does not – yet - translate into universal recognition of status of national sign languages by states worldwide. Thus, national legislators are challenged to include their citizens with hearing losses which impair communication via official spoken languages by a variety of legal means in order to comply with international standards and prevent discrimination in access to areas of life such as education, work, health care or public administration.

The paper argues, that inclusion of sign language into states' language policy has a far-reaching consequence relevant for public safety and protection of basic human rights. The relation between sign language legislation and its implementation and the increased danger to public safety is demonstrated on the example of the Republic of Poland during the epidemic of SARS-CoV-2. The limitation of proposed research problem to one country is justified due to the abovementioned lack of international or even local (i.e. European) model or a standard of regulation of the matters related to the protection of language rights of Sign language speakers. However, a thorough analysis of the legislation of this matter in Poland in the perspective of national emergency laws confronted with its implementation shall serve as a reference framework and basis for further research, especially comparative legal analysis.

The first part (I) of the paper describes a legal framework of the language right during epidemic in Poland. Is it is divided into three sub-sections on the basis of the main subject matter of the analyzed regulations: (1) Constitutional emergency measures – state of natural disaster, (2) A state of epidemic emergency, (3) Sign language legislation in the Republic of Poland. Legal analysis is followed by a case study regarding implementation of the language rights of Polish Sign language users during the state of epidemic emergency. The final section titled: "Beyond discrimination: critical assessment of

legal compliance with policy measures in the context of public safety" includes an evaluation of the national legal instruments and its implementation by state authorities in Poland. The third part is followed by conclusions, where critical areas for further research are designated.

Legal Framework

Constitutional Extraordinary Measures – State of Natural Disaster

The Constitution of the Republic of Poland of April 2, 1997 provides for three categories of emergency states: state of emergency, martial law and state of natural disaster. In the current public debate among lawyers there is agreement that the SARS-CoV-2 epidemic meets the constitutional prerequisites for a declaration of the latter one - a state natural disaster, therefore only this category of emergency measures will be discussed in greater detail. It should be emphasized that at the time of submission of this paper, the state of natural disaster was not declared by polish government, and instead extra-constitutional measures were adopted. The analysis of provisions regulating this issue is, however, necessary to show the difference of scope of protection of language rights depending on the chosen mode of governmental crisis regulation for preventing an epidemic. Moreover, it cannot be excluded that a state of natural disaster could be introduced in the future.

According to the art. 232 of the Constitution: *In order to prevent or remove the consequences of a natural catastrophe or a technological accident exhibiting characteristics of a natural disaster, the Council of Ministers may introduce, for a definite period no longer than 30 days, a state of natural disaster in a part of or upon the whole territory of the State*. The prerequisites for introducing the state of natural disaster correspond to the criterion of "exceptional public danger which threatens the life of a nation" known from international human rights pacts.25 In the course of work on the International Covenant on Civil and Political Rights, it was agreed that this clause also includes natural disasters. It was noted, however, that a natural disaster can justify a derogation of human rights only if in a given area it is a "rare and extraordinary" phenomenon, and that "*force majeure* can be an excuse for restricting some human rights, but not for their derogation ".

Article 232 of the Constitution applies to the damages caused by forces of nature itself (natural disaster) and damages caused by devices created by man and using forces of nature (technical failure). In the second case, however, it is not about every technical failure, even if it bears the mark of a "special risk" that cannot be removed by ordinary constitutional measures, but a failure bearing the signs of a natural disaster. The mode of introduction and removal of the state of natural disaster, as well as the principles of operation public authorities and the scope of restrictions on the freedom and human and citizen rights during a natural disaster were specified in the Act of 15 September 2017 on the state of natural disaster.

According to art. 3 clause 1 point 3 of the Act on the state of natural disaster, the term "technical failure" should be understood as "sudden, unforeseen damage or destruction of a building, technical device or system of technical devices causing a break in their use or loss of their properties". According to art. 3 clause 2 of the Act on the state of natural disaster, "a natural disaster or technical failure may also be an event caused by a terrorist activity". Both, natural disaster and technical failure must bear the characteristics of "natural disaster". In the light of art. 3 clause 1 point 1 of the Act, a natural disaster should be understood as "a natural disaster or technical failure, the effects of which threaten the life or health of a large number of people, property of large sizes or the environment in large areas, and assistance and protection can only be effectively taken using extraordinary measures, in cooperation with various organs and institutions as well as specialized services and formations operating under uniform management". In summary, a state of natural disaster is limited to the situations causing a threat to human life and health, as well as property of large proportions, regardless of whether their relationship to the disruption of the national economy can be ascertained.

From the perspective of the research goal, the key issue in this context is the scope of permissible limitation of human and citizens' liberties and rights, including language rights, during a state of natural disaster. This problem is primarily regulated in art. 233 of the Constitution. Due to its unfortunate structure, it is quoted below in its entirety:

Article 233

1. *The statute specifying the scope of limitation of the freedoms and rights of persons and citizens in times of martial law and states of emergency shall not limit the freedoms and rights specified in Article 30 (the dignity of the person), Article 34 and Article 36 (citizenship), Article 38 (protection of life), Article 39, Article 40 and Article 41, para.4 (humane treatment), Article 42 (ascription of criminal responsibility), Article 45 (access to a court), Article 47 (personal rights), Article 53 (conscience and religion), Article 63 (petitions), as well as Article 48 and Article 72 (family and children).*
2. *Limitation of the freedoms and rights of persons and citizens only by reason of race, gender, language, faith or lack of it, social origin, ancestry or property shall be prohibited.*
3. *The statute specifying the scope of limitations of the freedoms and rights of persons and citizens during states of natural disasters may limit the freedoms and rights specified in Article 22 (freedom of economic activity), Article 41, paras. 1, 3 and 5 (personal freedom), Article 50 (inviolability of the home), Article 52, para. 1 (freedom of movement and sojourn on the territory of the Republic of Poland), Article 59, para. 3 (the right to strike), Article 64 (the right of ownership), Article 65, para. 1 (freedom to work), Article 66, para. 1 (the right to safe and hygienic conditions of work) as well as Article 66, para. 2 (the right to rest).*

The Constitution of the Republic of Poland in this respect is fully consistent with the standards of international protection of human rights. The article consists of three parts. A negative clause was adopted for martial law and the state of emergency, and a positive clause for the state of natural disaster. According to the adopted solution, art. 233 par 1 regulates - in a negative form - the scope of restrictions on human and citizen freedoms and rights during martial law and the state of emergency. Article 233 par 3 regulates - in a positive form - the scope of restrictions on human and citizen freedom and rights during a state of natural disaster.

Based on Article. 233 par 3 of the Constitution, the Act determining the scope of restrictions on the freedoms and rights of man and citizen in a state of natural disaster may limit the freedoms and rights specified in the Constitution. Following this delegation, restrictions are further specified in art. 21 par 1 of the Act on the state of natural disaster. The Act provides that restrictions on the freedom and human and citizen rights of all natural persons residing or temporarily staying in the area in which the state of emergency was declared, as well as - respectively - legal persons and organizational units without legal personality, having their registered office or conducting activity in the area subject to the state of emergency (Article 20 of the Act on the state of natural disaster). The restrictions indicated in it do not, however, relate to language rights or the right to information.

Article 233 (1) 2 of the Constitution states that it is unacceptable to limit the freedom and human rights of citizens of exclusions due to race, sex, language, religion or lack thereof, social origin, birth and property. Compared to international human rights pacts, the constitution does not contain a clause that requires no contradiction with other "obligations under international law." Putting this provision between the regulation of the state of martial law and the state of emergency and the regulation of the state of natural disaster is very unfortunate, as it could suggest that it refers to only to the state of martial law and the state of emergency. According to Prokop (2005), such a conclusion would obviously be wrong. Since it is difficult to assume that the legislator would allow for the restriction of human rights and freedoms and the citizen, and for the reasons indicated in this provision in the case of statutory regulations regarding the state of natural disaster ".

On the contrary, Safjan and Bosek (2016) argue, that the internal systematics of the provision indicates that the prohibition of discrimination provided for in para. 2 applies only to the restriction of freedoms and rights during martial law and the state of emergency, but does not apply to the restriction of freedoms and rights during a state of natural disaster. However even if such interpretation would be accepted, in such a case Article 32 of the Constitution containing general prohibition of discrimination in political, social and economic life would apply.

The last element requiring clarification is whether the scope of discrimination on grounds of language also includes Polish Sign Language. The Constitution uses the terms 'language' and 'official language'. In accordance with art. 27 of the Constitution: “Polish shall be the official language in the Republic of Poland. This provision shall not affect the rights of national minorities arising from ratified international agreements”. This implies the interpretation according to which “a language” is every structured system of communication, in other words every natural language. The fact that Polish Sign Language is a natural language was recognized by the legislator in the Act of 19 September 2011 on Sign Language and other means of communication.

Extraconstitutional Measures - State of Epidemic Emergency

Following the official declaration of epidemic in the Republic of Poland, national authorities decided to apply extra-constitutional measures on the basis of secondary legislation instead of declaring state of natural disaster.

Pursuant to the Act of 5 December 2008 on preventing and combating infections and infectious diseases of humans, the state of epidemic threat or the state of epidemic shall be declared - in the event that the epidemic threat or epidemic covers more than one voivodship – by way of a regulation by the Minister of Health in consultation with minister competent for public administration at the request of the Chief Sanitary Inspector.

The announcement of the state of epidemic emergency or state of epidemic allows the Council of Ministers to determine the affected area and several types of zones. They can be so-called zero zones - defined as areas where epidemic conditions have occurred, directly around the virus outbreak. They are subject to bans, orders and control measures. Authorities may prohibit infected or potentially infected persons from leaving the zone.

A buffer zone may be established around the zero zone. This is an area subject to such restrictions as a ban on the movement of people. The government may also specify other types of zones - e.g. threats, where the risk of an epidemic is likely; the affected area - one or more units of the territorial division of the country and the quarantine zones.

The state of epidemic allows to introduce a temporary restriction on the specific manner of movement and functioning of institutions or workplaces. Pursuant to the Act, it may be ordered to provide access to real estate, premises or areas and to provide vehicles for anti-epidemic activities.

The introduction of the state of epidemic threat and the state of epidemics also allows for the introduction of temporary restrictions on the supply of certain types of articles, the obligation to undergo medical examinations and the use of other preventive measures and treatments by infected and potentially infected persons, including mandatory quarantine and a ban on leaving the established area. In the absence of medicinal products, medical devices or other means necessary for the patient, the Minister of Health may recommend their release from the Material Reserves Agency, and the agency is required to replenish stocks as soon as possible.

Implementation of the described measures took place in two stages. Firstly, the state of epidemic emergency was announced on the basis of the Act of 2 March 2020 on specific solutions related to the prevention, prevention and eradication of COVID-19, other infectious diseases and crisis situations caused by them. The Act takes into account the need for deaf citizens to use sign language in art. 15o paragraph 1 point 1: “For reasons related to counteracting COVID-19, whenever in accordance with the Act of 12 March 2004 on social assistance, a family environmental interview or update is required, in particular with a person or family who have been quarantined in connection with suspected infection or contagious disease, determination of personal, family, income and property situation instead of conducting family environmental interview or updating it can be made on the basis of: 1) telephone conversation with a social worker, and in the case of people with disabilities due to hearing impairment using support measures communication referred to in art. 3 point 5 of the Act of 19 August 2011 on sign language and other means of communication (…)”.

Subsequently, on the basis of the Regulation of the Minister of Health of 20 March 2020, the state of the epidemic was declared. There are no separate provisions directly related to communication in Polish Sign Language, but the regulation provides for the use of technical means that allow the implementation of such solutions (video interpreter). Pursuant to § 8 point 1 of the Regulation: "During the period referred to in § 1, entities providing healthcare services via ICT systems or communication systems confirm the identity of the recipient referred to in art. 50 paragraph 2 point 1 of the Act of 27 August 2004 on healthcare services financed from public funds based on the data provided by this recipient through these systems, including by phone".

Sign language legislation in the Republic of Poland

The issue of access to information and public services in Polish Sign Language is defined by two acts: Act of 19 September 2011 on Sign Language and other means of communication and the Act of 19 July 2019 on ensuring accessibility for people with special needs.

National sign language in the Republic of Poland is the Polish Sign Language (PSL). There is also artificial Polish Sign-Language System (*Polski System Językowo-Migowy*) which could be defined and manual code for spoken language. Both were acknowledged in the Act of 19 September 2011 on Sign Language and other means of communication, along with Communication Systems of Deafblind Persons and means supporting communication (such as text messages or video interpreting). The Act defines PSL as natural language, however it does not include a general freedom of using it except for the circumstances provided therein, that is in contacts with public administration, state emergency health service, health care providers and Police, State Fire Service, municipal services and voluntary units operating in the area (referred to as "obliged entities"). Only spoken (oral) Polish language is recognized as official language of the Republic of Poland, and language of polish administration as provided in the Constitution and the Act of 7 October 1999 on Polish language, however, the latter states that Polish is a language of public entities unless otherwise provided.

The Act of 19 September 2011 on Sign Language and other means of communication entitles persons who permanently of temporarily experience difficulties in communicating to freely choose the form of communication when they interact with one of the entities listed above. In case of interpreting, entitled persons have a right to be assisted by the "assisting person", that is a person who is at least 16 years of age and was chosen by the entitled person to facilitate communication and assist in settling matters with obliged entities. Assisting persons must not prove their knowledge of Sign language or any other form of communication.

Alternatively, persons with hearing loss have a right to receive help of a chosen Sign language interpreter or guide-interpreter and the obliged entities shall ensure that such help can be obtained. The more detailed obligations are addressed solely to public administration bodies, including free access to interpreter. Even then, an entitled person must first obtain a certificate of disability and the statutory remuneration for the interpreter is relatively low. In other situations, including health care provision, persons who need a help of an interpreter can apply for funding to the National Fund for the Rehabilitation of the Disabled Persons.

In addition, the provisions contain an exemplary catalogue of means supporting communication, which should be understood as solutions or services enabling contact, in particular through: the use of electronic mail, sending text messages, including the use of SMS, MMS or instant messaging, audio-visual communication, including using instant messengers, sending faxes and websites meeting the accessibility standards for people with disabilities. De facto, the legislator therefore also provided for the fourth form of communication, i.e. communication in Polish in writing (e-mail, SMS, MMS) messengers). It is the remote forms of translation (video translator) that are most often used in practice in the implementation of statutory obligations, which was reflected in the Act of 19 July 2019 on ensuring accessibility for people with special needs.

The Act of 19 July 2019 aims to improve the accessibility of public entities to people with special needs in such a way that they can use public services in a more independent way. Addressees of this act include persons who, due to their external or internal characteristics, or due to the circumstances in which they are located, must take additional actions or apply additional measures to overcome barriers that prevent or hinder their participation in various spheres of life based on the principle of equality with other people.

As part of providing the indicated accessibility, the public entity is obliged to undertake actions aimed at (1) considering needs of those persons in the activities planned and conducted by the entity, (2) removing barriers as well as preventing their formation. In terms of digital availability, the public entities are required to comply the requirements set out in the Act of 4 April 2019 on the digital availability of websites and mobile applications of public entities.

In addition, in terms of information and communication availability, public entities are obliged to:

- provide services with the use of means supporting communication, referred to in art. 3 point 5 of the Act of 19 August 2011 on sign language and other means of communication (Journal of Laws of 2017, item 1824), or by using remote online access to the translator's service through websites and applications,
- installation of equipment or other technical means to support the hearing impaired, in particular induction loops, FM systems or devices based on other technologies whose purpose is to support hearing,
- providing on the website of a given entity information on the scope of its activities - in the form of an electronic file containing machine-readable text, recordings of content in Polish sign language and information in an easy-to-read text,
- ensure, at the request of a person with special needs, communication with a public entity in the form specified in that application.

Implementation of the language rights of Polish Sign language users during the state of epidemic emergency

On March 9, 2020, the National Health Fund introduced a separate helpline (chat) for people using sign language. In principle, this right solution was available from Monday to Friday from 8am to 4pm. For a long time, it was the only top-down initiative for deaf people. Due to the lack of access to official information related to the threat, the Polish Deaf Association intervened.

The Polish Association of the Deaf is the largest organization in Poland that associates the deaf, hard of hearing and deaf. Currently PDA has about 100,000 members. The Associations' activities include education, rehabilitation, and offering legal services and representing deaf, hearing-impaired and speech-impaired communities before authorities and other institutions and organizations. The Main Board of the PDA is a member of the World Federation of Deaf and European Union of the Deaf.

On March 11, 2020, PDA called for sign language information on coronavirus to be indicated, stating that "there must be no consent for the Deaf community, Polish citizens, to be deprived of access to information so important to their health." Then, the deaf community sent a petition to the Prime Minister and the Minister of Health stating: "The deaf community, who are full Polish citizens, does not agree to discrimination and disregarding access to information transmitted through the mass media on the most important topic currently is the threat of the new SARS-Cov-2 coronavirus causing COVID-19 disease. Press conferences on the safety and protection of human life, where important information related to counteracting the spread of coronavirus is transmitted, is conducted in a way inaccessible to our society, because it is not translated into sign language. We are part of society and, just like hearing people, we should be guaranteed equal access to media and information. In the current situation, we feel discriminated because the constitutional rights and those arising from the Act "On ensuring accessibility for people with special needs" are ignored by the Polish Government". Then, in a letter of 16 March 2020, PDA pointed to the lack of real access for deaf people to public healthcare

poinys, also arguing that the constant restriction of access to government news and press information causes constant fear in the deaf society".

Due to the continued lack of reaction, the Ombudsman in a letter of 20 March 2020 addressed the Prime Minister. Ombudsman noted in it that the adopted solutions are insufficient (not all information is translated) and that the translation did not meet the needs of the deaf (the windows in which the translation was displayed were too small). The Ombudsman also reminded that providing access to information for deaf people, not only in an emergency, is the responsibility of the Polish government also having its source in international law, i.e. the Convention on the Rights of Persons with Disabilities, drawn up in New York on December 13, 2006.

In response, Prime Minister's Office announced that it aims to ensure that all citizens, including persons with disabilities have equal access to information. Therefore, press conferences held in the office of the Prime Minister are currently translated into sign language, the interpreter is also provided by Polish Television. It was pointed out that work is underway to disseminate sign translations from other events in which members of the Council of Ministers take part. The law firm also said that the Ombudsman's speech was forwarded to all ministries with a request to consider the possibility of introducing changes proposed by the Ombudsman, aimed at increasing the availability of relevant information for people with disabilities.

Finally, PDA took over the implementation of comprehensive translation services for deaf people, creating a 24-hour helpline in PSL. The helpline was created thanks to the support of the Ministry of Funds and Regional Policy, a subsidy from the PGNiG Foundation of Ignacy Łukasiewicz and own resources of the Polish Deaf Association. The line operates around the clock, seven days a week.

The situation related to the translation of ministerial websites and conferences, however, still needs to be improved. The position of the Ombudsman and the Commission of Experts on Deaf People at the Ombudsman of April 9, 2020 reads: television stations and public authorities still do not apply translation standards in PJM, which means that the translator / translator and subtitles are not visible or very difficult to receive (they are obscured or the translator / translator is too small). Because of this, the deaf receive only fragmentary information. This is not conducive to understanding what is happening, does not allow to know and understand the decisions and actions taken by the authorities. This, in turn, affects the deepening state of confusion and additional frustration, intensifies the sense of danger and a much higher level of anxiety. This is even more dangerous because the deaf have much less opportunity than hearing the opportunity to use psychological support".

Further, it was recommended to adopt and widely use translation standards of PSL translation, developed by the University of Warsaw, as necessary to limit discrimination against deaf people in accessing information. The second key element is education among public institutions. The Ombudsman's office pointed out how big the problem can be when wearing deaf masks for deaf people in public space. Prevents deaf people from reading their lips, for whom this is an important way of understanding information provided in Polish. City guards and police officers must know different ways of communication between deaf people and allow them to choose the way of communication that is most convenient for them (in writing, through the application with the PJM translator or the application editing the audio message).

The situation shows, that the whole burden of protecting deaf people during an epidemic has been shifted to those concerned. Only non-governmental entities were able to provide efficient remote access to translators and had adequate competence to perform translations. Due to the prevailing restrictions, also contact with representatives of the Police and Guards will be possible only using the technical means offered by the non-governmental sector.

Beyond discrimination: critical assessment of legal compliance with policy measures in the context of public safety

The study showed that comprehensive regulating access to information and public services in Polish Sign Language is in force in Poland, and this issue is not overlooked when adopting emergency measures during an emergency. The legislative activities undertaken, however, do not translate into effective performance of the imposed obligations by state authorities and other entities obliged to comply with them. This applies in particular to ensuring adequate, competent human resources and technical facilities enabling the implementation of statutory solutions in an efficient and effective manner. For this reason, the organizational burden related to sign language communication is passed on to its users and the regulations remain an empty declaration.

According to the data reported by the Polish Ombudsman (2014) there are between 50,000-100,000 of PSL users and up to 100 PSL interpreters. EUD reports 50,000 PSL users and 200 PSL interpreters. The number of deafblind persons is a bit more certain approximately 2500 (Deafblind Assistance Association, 2016). Given the scale of the spread, Covid 19 is a huge risk group. In fact, preventing such a significant group of citizens from accessing health care drugstuffs and information on appropriate prevention, and providing such access with a significant delay in the presence of infected persons among them can be critical in the spread of the disease and at the same time constitutes a direct exposure to their lives. The above argues that policy towards sign language should be distinguished as a separate risk factor when analyzing crisis management on the national level.

Conclusions

In conclusion, it should be noted that the problems that have occurred in Poland are not isolated. European Union of Deaf, an NGO representing Deaf European Citizens rights in the European Union issued a following statement (2020): „In light of the outbreak of the coronavirus (COVID-19) the European Union of the Deaf (EUD) is deeply concerned by the lack of accessibility of information provided by the European Institutions when responding to the outbreak of COVID-19. The EU leaders must lead by example ensuring that the information about the COVID-19 outbreak and European Union's response to it is accessible to all of the citizens in the EU, including to the deaf EU citizens who are sign language users. EUD reminds that the EU is legally committed under the United Nations Convention on the Rights of Persons with Disabilities (UN CRPD) to ensure full access to information under UN CRPD Articles 9 and 21, especially during the times of emergencies as such. Therefore, EUD urges the European Commission and all relevant EU leaders to make their announcements available in International Sign. EUD sees this as a matter of high importance and requests the televised or streamed (whether live or pre-recorded) announcements related to the coronavirus outbreak to be interpreted in real time into International Sign with sign language interpreters being on screen and clearly visible the entire time of the broadcast, as the EU has a legal obligation to make its communications, announcements and information accessible to all". The presented area shall be a subject of further analysis in the comparative and supranational context.

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Correction of Marketing Tools in The Context of a Coronavirus as A Reaction to Changing Patterns of Consumer Behavior

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Abstract

The article presents the results of a study of trends in traditional patterns of consumer behavior, attitudes and habits of consumers in the context of the COVID-19 pandemic. Based on the analysis of Internet resources and expert analytics, the authors identified sectors of the economy that were most affected by the pandemic, and revealed approaches to adjusting marketing tools caused by radical changes in consumer behavior patterns. Their implementation in practice will increase the effectiveness of marketing planning and, ultimately, accelerate the recovery of the domestic economy.

Keywords: Marketing, Marketing Tools, Marketing Response, Coronavirus, Coronavirus Crisis, Consumer Behavior Patterns.

Introduction

Crisis phenomena in the economy caused by the coronavirus pandemic have no analogues in practice. In addition, until now, most of the hypotheses related to possible development scenarios and the consequences of a pandemic are purely probabilistic in nature. As a result, the timing and way of overcoming the economic crisis remain unclear.

However, it is possible to highlight trends associated with changes in consumer behavior patterns, established consumer habits, which are likely to continue after COVID-19. Their analysis and use in the development of anti-crisis marketing strategies will increase the effectiveness of marketing planning and, ultimately, accelerate the recovery of the domestic economy. All this actualizes the problem of studying changes in consumer behavior in a pandemic.

Results and Discussion

The forecast of changes in consumer behavior in Russia can be formulated based on the experience of other countries. For example, at the height of the epidemic in China, consumer demand fell by 85–90%, and negative dynamics were observed even in the “Food Products” category, where the decline was 50–70% compared to last year. Similar situation was observed in European countries (Bashkatova A., 2020).

According to Sberbank of Russia, only in the first week of quarantine, the financial activity of Russian consumers decreased by more than 22%. The peak of the fall was in the service sector, where non-cash expenses fell by 58% compared to the same period last year. Demand for goods decreased by more than 11% (Chernyshova E., 2020). In the following weeks of self-isolation, the described trend continued and stabilized. According to the apt remark of Andrei Movchan, the coronavirus epidemic will bring the world changes comparable in scale to those caused by world wars (Uskov N., 2020).

Naturally, under quarantine conditions, there is a drop in consumer interest in the segments of "air travel", "tourism", "sports", "beauty industry", HORECA and "entertainment". At the same time, a similar trend is observed in the markets of clothes, shoes, furniture, home furnishings, household appliances, electronics and others, which experienced a sharp drop at the beginning of quarantine and continue to fall (Chernyshova E., 2020).

It should be noted that prolonged stress, in which the world's population lives due to a pandemic, is highly likely to lead to massive post-traumatic stress disorder for consumers. It is associated with a complex of factors:

- sharp drop in household incomes caused uncertainty and seriously hit demand, shaking consumer confidence;
- anti-epidemiological efforts by governments hit the supply, causing sharp changes in the markets for goods and services, structural unemployment and high labor market turbulence;
- forced self-isolation and prolonged anxiety for one's life and health of loved ones led to an increase in depressive disorders in society.

Thus, the emergency situation changed the social life of the society, as a result of which the priority was mainly for the lower needs of consumers - food, safety, self-preservation. Social psychologists believe that the longer a pandemic lasts, the more mental resources of a population will be depleted, and the more consumer-like "caution" will be expressed when it ends. According to Sandro Galea, a mental health expert at Boston University, with whom the authors agree, the large-scale consequences of the COVID-19 pandemic will be traced for many years (Naralenkova O., 2020).

In addition, in the course of self-isolation, social distancing of consumers will continue to intensify. Despite the fact that at present it is positioned as a temporary measure, the risk is great that after the end of COVID-19 social distance will remain in many ways, causing accelerated atomization of society, encapsulating consumers in their life problems and the further growth of virtual communities and identities. In this situation, the digital environment will survive even greater globalization, an indirect confirmation of which can be found in the fact that one of the few markets that survived during the period of self-isolation is not a fall, but growth, is the digital goods market (+17.4%) (Chepurenko A, 2020, Chernyshova E., 2020).

As a result, it is likely that after the pandemic, consumers will significantly change their behavior, showing increased caution in the consumption of goods and services. In turn, the markets, having experienced a coronavirus crisis, will face a recession and will recover for a long time, which will require systematic marketing efforts and new marketing tools. Let us analyze what market trends are currently being traced.

Firstly, according to the authors, one of the most significantly affected by the pandemic is the key sectors of the economy of impressions - show business, media, event and film industry, museums, offline services and entertainment (hairdressing, fitness, sports), etc. Secondly, serious damage was also inflicted on foreign trade, air and road transport. Finally, it should be noted that there are also sectors that have benefited from coronavirus: e-commerce, especially products and ready-made food;

online entertainment; production and sale of medicines; medicine, including remote; production and sale of food (Korischenko K., 2020).

The situation is complicated by the fact that it is precisely the branches of the economy of impressions that have so far had a significant impact on the life of the largest Russian cities. In connection with the pandemic, the considered industries will be forced, according to the authors, to modify the systems of marketing interaction with consumers. Opportunities for the development of marketing activity will be largely associated with going online, with the creation and digital promotion of their own virtual platforms (Chepurenko A., 2020).

One of the most severely affected sectors of the coronavirus crisis is tourism, whose services are at the top of the Maslow pyramid. The damage from quarantine measures in tourism is so great that, according to the authors, it is already important for the industry to make systematic efforts to restore the reputation of tour operators and comprehensive customer support.

First of all, tour operators need to implement and consistently implement a comprehensive anti-crisis PR-management program. Its goal should be to maintain customer confidence. It is important that the program solves the problem of explaining to consumers what steps the industry and the tour operator are taking to address the emergency and the steps of the client. At the outlet, the consumer must be convinced that everything possible is done to protect his interests. The consumer must clearly understand the terms and conditions for solving their problems.

At the same time, the practice of tour operators is not free from marketing mistakes. An analysis of the official websites of tour operators showed that anti-crisis information is insufficient and incomprehensible to consumers, which exacerbates an acute crisis of confidence. Experts believe that the restoration of the tourism market will be slow and phased due to the likelihood of several waves of the epidemic and a high level of consumer anxiety (Rykova A., 2020). The restoration of the tourism industry is possible, according to the authors, through the implementation of the following measures:

- gradual increase in business trips with the subsequent shift of emphasis on recreational and other types of tourism;
- adjustment of tour offers in terms of providing greater antiviral protection for tourists;
- implementation of comprehensive PR programs that reduce the level of consumer anxiety and aimed at informing them of the security measures taken.

Another trend is the spasmodic development of corporate and delivery services, previously unevenly represented in different segments of the consumer market. It can be argued that the delivery market for several weeks of self-isolation has grown more than for the previous year. According to the representative of the online hypermarket Ukonos Danny Perekalsky, “the need for online stores on some days increases from 200 to 400% of past performance… Utkonos today uses all its resources to meet customer demand… over the past two weeks we have increased the staff by 600 people… our growth is limited only by a small warehouse area” (Uskov N., 2020).

The efforts in the field of emergency organization of delivery services are undertaken by the restaurant business. However, the development of this area is associated, according to experts, with difficulties and limitations. So, the Russian consumer basically independently provides himself with products that he buys in stores. At the same time, consumer is inclined to limit secondary expenses, including those associated with ordering restaurant food, which creates restrictions in the development of delivery services (Sapozhnkov P., 2020).

In addition, if the restaurant has not previously been engaged in delivery, it will take time to begin this activity, to change the technological processes of production. It can be argued that the restaurant business needs to strengthen consumer loyalty, the formation of communities of loyal consumers based on their taste preferences, time and frequency of food consumption. As a result, the role of digital marketing is growing, the use of artificial intelligence and the Internet of things is being updated (Sapozhnkov P., 2020).

An interesting trend was the development of cross-distribution projects and after-sales interaction with consumers, which can significantly increase business opportunities. An example here is the delivery of books from the Chitay-gorod online store to retail stores of the Pyaterochka chain.

In general, according to experts, all online trading is experiencing explosive sales growth. If it was predicted before the pandemic that it would exceed the traditional one in 2036, now this can happen earlier. The outflow of the audience after the pandemic is possible, but the demand is likely to decrease only in comparison with the period of isolation. Online purchases are expected to be tested by people who have not used them before. They will transfer part of the purchases to the digital world. As a result, the percentage of people shopping online will increase (Babenko L., 2020, Parshin I., 2020).

So, the main marketing tools to neutralize the effects of coronavirus crisis are:

- development of technologies to engage consumers in interacting with the brand, focusing communication activity on key customers and projects, which may reduce overall sales, but significantly improve the quality of projects and client base;

- restyling of corporate values in terms of increasing meaningfulness, avoiding formalization, optimizing communications with clients and employees;

- digital transformation of business processes, partial or complete transition to remote, and, in the future, human-independent technologies for interacting with consumers. In this regard, it is worth mentioning, first of all, the sphere of education, healthcare, psychological assistance, after-sales services, etc.

The implementation of these measures will provide an adequate marketing response to the challenges of the coronavirus crisis.

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Statistical Analysis of The Energy Poverty in the EU. Is the Geographic Location or The Time of Accession the Main Reason for Differences?

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Abstract

Objectives: The paper aims at emphasizing the differences between the old and the new member states with respect to the range of energy poverty. An additional goal is to classify the countries according to the energy poverty levels. **Background:** Energy poverty is a distinct form of poverty and consists of difficulties in meeting the basic energy needs of household members. Despite growing awareness of its importance, there are still no widely accepted methods for measuring the extent of energy poverty and comparing between countries because of the diverse climate, housing base and relationship between income and energy costs. However, a common framework for measuring energy poverty is needed, and knowledge of the dynamics of energy poverty in the long term can be crucial for a wise and effective policy to tackle this phenomenon. **Results:** The EU Member States are not a homogenous group with respect to energy poverty but the differences between the countries are diminishing. We proved that the time of accession is no longer the main factor that differentiates Member States with respect to energy poverty levels. Nowadays the energy poverty level is rather determined by the geographic location of a country. **Policy Implications:** The results of our work can be used as a recommendation for measuring and tackling energy poverty at the EU and country levels. They can also be treated as a statistical evidence to support the use of certain measures within the social and housing policy areas.

Keywords: Energy Poverty, Indicators, Convergence, Ranking

JEL: C43, I39, R29

Introduction

Energy is a fundamental factor in ensuring sustainable socio-economic development and improving the living conditions of households. It creates comfortable conditions for work and rest thus making life more comfortable and safer. It is necessary for lighting the apartment, preparing meals, heating water, as well as heating the apartment in winter and cooling it in summer.

Some EU households have problems meeting their energy needs due to high energy costs, low income, energy-inefficient buildings or electrical appliances, leading to high energy bills. These households save energy, e.g. by limiting heating, lighting or the use of plugged-in appliances.

In 2018, more than 7 % of all households declared that they were unable to heat the apartment according to their needs. In the group of households at risk of poverty or social exclusion, this percentage rises to almost 18%, i.e. almost one in five poor Europeans has struggled with this problem. The worst situation is in Bulgaria, where 56% of the poor and one in four people who are not at risk of poverty cannot keep their homes warm. The lowest percentage of positive responses was in Finland (1.7% of all households and 3.1% of households at risk of poverty).

Every fifth (21.9%) poor European lives in a poorly insulated house (14% for all households). 6.6% of households in the whole of the EU were in arrears in paying their utility bills on time, and in the group of households at risk of poverty or social exclusion, this percentage was reaching 16%.

All these symptoms are manifestations of energy poverty. Energy poverty is a global problem that can relate to two types of social inequality - affecting different countries in different ways. In developing countries, the term has traditionally been used to describe situations where access to modern energy services is limited due to a lack of electricity grid in a given country/region, or the use of outdated energy generation technologies or inefficient fuels to supply homes with energy for cooking, heating or lighting (e.g. cooking on the burning fire). In Europe (and other developed countries), this term, also known as fuel poverty, refers to situations where households have to bear a disproportionately high proportion of their income to meet their energy needs, a cost they cannot afford (Maxim et al., 2016).

One of the effects of energy poverty, if not addressed properly, is the destruction of homes and buildings caused by low temperatures and humidity. The link between the condition of a building and human health cannot be neglected either. This relationship is known in the literature as Sick Building Syndrome and defined by the WHO: "Sick Building Syndrome (SBS) describes a medical condition where people in a building suffer from symptoms of illness or feel unwell for no apparent reason" (Fabbri, 2019).

In Sweden, multi-family residential buildings exposed to moisture were examined and a significant increase in symptoms consistent with SBS was found. Moreover, a relationship was established between building dampness and the levels of certain inflammatory markers. This means that humidity in a dwelling can lead to chronic systemic inflammation (Sahlberg, 2012).

The effects of energy poverty are mainly manifested in the range of adverse consequences for people's health, especially among children (Liddel and Morris 2010), the elderly (O'Sullivan, Howden-Chapman, and Fougere 2011) and the chronically ill (Snell, Bevan, and Thomson 2015). The persistent cold in the home and the resulting humidity can lead to respiratory (e.g. asthma, inflammation) and cardiovascular problems. Energy poverty not only affects physical health but also has a visible, negative impact on human mental health. Poor housing conditions may lead to isolation and social exclusion of an individual and, in the longer term, to depression (Libor and Bouzarovski 2018).

Another effect of energy poverty is the growing indebtedness of the household to the energy supplier. It is important to note that the necessity to pay high energy bills leads to a reduction in household income that could be spent on other needs: purchase of medicines, recreation, education and culture, etc., as well as on improving housing conditions. An important effect of energy poverty is also an increase in CO2 emissions, which leads to a deterioration in air quality and hinders policies directed at the fight against climate change (Hills, 2012).

There is a broad consensus that energy poverty in Europe is predicated upon high energy prices, low household incomes, inefficient buildings and appliances (Thomson, Bouzarovski, and Snell 2017). Energy poverty has two important aspects: financial (energy prices and household affordability on utility bills) and technical (energy efficiency of the building).

There are two main approaches to defining metrics for energy poverty in the literature. One of them is the expenditure-based approach and the other one is consensual-based. Expenditure-based metrics define energy poverty based on information on the household's energy expenditure and income. On the other hand, consensual-based indicators are metrics that identify those households that declare that they have difficulties in meeting basic energy services ('perceived deprivation') (Rademaekers et. al, 2016).

An example of the first type of metrics are indicators like 10% energy cost ratio (household has to spend more than 10% of their income on all household fuel use – an official threshold in Northern Ireland) (DSDNI, 2011) and LIHC (low-income high-cost indicator, calculated in the UK) (Hills 2012). Consensual-based approaches are derived from surveys and rely on subjective answers of respondents to issues related to energy poverty, such as their ability to keep home adequately warm or to pay their utility bills on time or regarding living in a dwelling with e.g. damp walls. At the European level, data from the European Survey on Income and Living Conditions (EU-SILC) is available, and for this reason many studies on energy poverty conducted in this geographic area are based on consensual indicators (Rademaekers et al., 2016; Thomson and Snell, 2013; Szamrej-Baran and Baran, 2014).

Most analyses of the phenomenon of energy poverty are based on microdata and they aim at identifying individual households as energy-poor or non-energy-poor. We aim to develop a methodology for assessing the phenomenon of energy poverty on a macro scale using aggregate data available in the Eurostat database. The objective is to determine whether a given country is moving in the right direction and reducing the extent of energy poverty. Various quick monitoring indicators are useful for this purpose. We propose a slight change in the approach from an arbitrary to a more statistics-based one.

Data and Methods

Energy poverty due to its complexity and multidimensionality is not easy to identify. An additional difficulty is the availability of statistical data, which should be consistent and comparable between countries. Such features are characteristic of the data from the Eurostat database, derived from the EU-SILC survey. Therefore, the variables selected for the following analysis come from this survey. The list of variables has been complemented by 2 variables from the ECHP (European Community Household Panel) and 4 variables from energy statistics.

The analysis of the range of energy poverty was conducted using multivariate statistical methods and a consensual approach. Statistical methods used include agglomerative clustering and multi-attribute methods of object assessment, such as the Hellwig's method described below (Hellwig, 1968). Such an approach is both flexible and efficient. It allows the researcher to include and exclude variables in a mostly objective way. The weakness of the method is the lack of comparability of the results between years, but it can be circumvented by scaling the data into a range observed throughout the whole surveyed period rather than scaling each year separately. The Authors' plan to make this amendment in their next paper.

The survey covered all 28 countries belonging to the European Union in the years 2005, 2010, 2015 and 2018. An initial list of 23 variables potentially characterizing energy poverty was further statistically analyzed and reduced to 11 variables, based on the correlation matrix. In the last step, another way of reducing the number of features was used. The remaining variables were divided into separate groups using the Ward method, and then the variables representing these group were selected arbitrarily. The results of the grouping are presented as a dendrogram (Fig. 1).

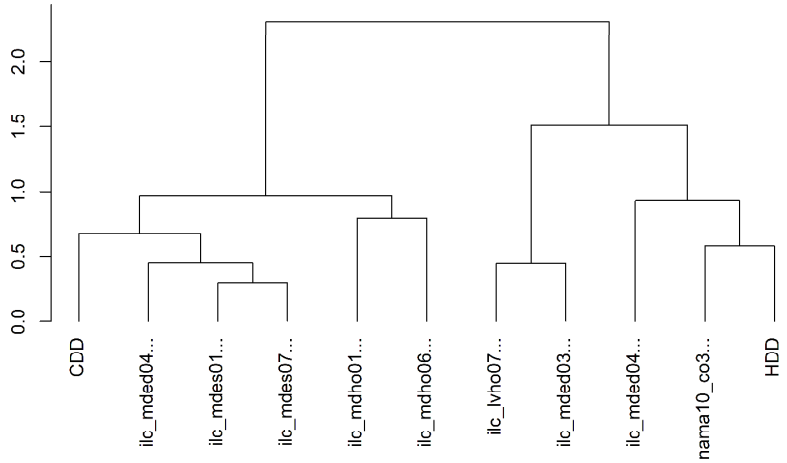

Fig. 1. Hierarchical clustering of a pre-selected group of 11 variables, 2018 data.

The final list of features contained 7 variables:

- 3 variables from the "Economic strain" area:
  - (ilc_mdes01_B_MD60) - inability to keep home adequately warm (households below 60% of median equalized income),
  - (ilc_mdes07_B_MD60) - arrears on utility bills (households below 60% of median equalized income),

- (ilc_mded04_B_MD60_BUR) - financial burden of the total housing cost (households below 60% of median equalized income).
- 2 variables from the "Housing conditions and material/housing deprivation" area:
  - (ilc_lvho07a_B_MD60) - housing cost overburden rate (households below 60% of median equalized income),
  - (ilc_mdho01_B_MD60) - total population living in a dwelling with a leaking roof, damp walls, floors or foundation, or rot in window frames or floor, (households below 60% of median equalized income).
- 1 variable from the "Final consumption" area:
  - (nama_10_co3_p3_CP045_PC_TOT) - share of electricity, gas and other fuels expenditure in final consumption expenditure of households (COICOP 3 digit).
- 1 variable from the "Energy statistics" area:
  - (HDD) - heating degree days by country in °C - annual data, (table: nrg_chdd_a).

Even merely measuring the range of energy poverty is not straightforward. In order to assess this range, one needs to measure and weigh several indicators and the lists of indicators used in the literature vary significantly. We have used the above-prepared list of variables to conduct the calculations.

To maintain comparability with other research, an approach proposed by Bouzarovski (2014) was used in part of our survey. Composite fuel poverty indicator (hereafter CFPI) is a measure aggregated from four variables coming from the EU-SILC survey. First, we add three variables describing the different aspects of energy poverty (housing cost burden – ilc_lvho07, arrears in bills payments – ilc_mdes07, and housing deprivation – ilc_mdho01) with equal weights of 1/3 and then add another variable to the outcome – the share of affirmative answers to the question if the respondent's home cannot be heated as needed – ilc_mdes01:

$$CFPI = \frac{1}{3} \cdot (ilc_lvho07 + ilc_mdes07 + ilc_mdho01) + ilc_mdes01. \quad (1)$$

This simple measure allows for a quick calculation and can be easily compared between various groups of countries and between years. However, this approach is based on an arbitrary choice of variables and weights and does not allow for the use of variables of a different nature (e.g. indicators of other aspects of energy poverty). This is the reason why we propose to use common multivariate statistical tools instead.

In the next step, the EU Member States were ranked according to the level of energy poverty, which was described using previously selected 7 variables. For this purpose, a version of a method for the linear ordering of elements (in our case the objects are the EU's Member States), based on an aggregate - a taxonomic (synthetic) measure of development (hereafter TMR), proposed by Hellwig (1968), was applied.

At the beginning of this procedure, each variable was normalized with a formula

$$z_{ij} = \frac{x_{ij} - \min_i x_{ij}}{\max_i x_{ij} - \min_i x_{ij}}, \quad (2)$$

Where

x_{ij_j} – j-th explanatory variable for i-th Member State, i = 1, ..., 28, j = 1, ..., 7
z_{ij} – j-th normalized value of xij.

As a result, the range interval was set to $\langle 0,1 \rangle$ for each variable (the normalized value was set to 0 for the minimum value of the explanatory variable and 1 for the maximum value of the explanatory

variable). Then for every entity Euclidean distance from an artificially constructed reference point is calculated as

$$d_i = \sqrt{\sum_j \left(z_{ij} - z_{0j}\right)^2}, \tag{3}$$

Where

d_i – Euclidean distance from *i*-th Member State to the reference object,

z_{ij} – normalized value of *j*-th variable for *i*-th Member State,

z_{0j} – value of *j*-th variable in the reference point, with the normalization (2) z_{0j} is by definition equal to 1, hence the whole formula (3) renders to

$$d_i = \sqrt{\sum_j \left(z_{ij} - 1\right)^2}. \tag{4}$$

In the end the TMR – a synthetic measure of energy poverty risk, an aggregate of all selected variables is calculated as

$$TMR = 1 - \frac{d_i}{\max_i d_i}, \tag{5}$$

Then the ranking of EU countries by level of energy poverty given by TMR was constructed. This procedure has been repeated for each of the years under examination, i.e. 2005, 2010, 2015 and 2018.

In the next step, the countries were divided into clusters according to a group of seven energy poverty indicators listed above in search of an intrinsic grouping present in the years 2005 and 2018. Then Kruskal-Wallis tests were performed along with Dunn tests to confirm the differences between the groups of countries obtained in the procedure as well as for the groups of countries based on membership duration and geographic location.

Research Results

The research was divided into three parts. In the first part of the survey, we calculated TMR for 2005, 2010, 2015, and 2018. Although the values of the measure cannot be directly compared between years, we can compare rankings based on them. Comparison of such four rankings is depicted in Fig. 2

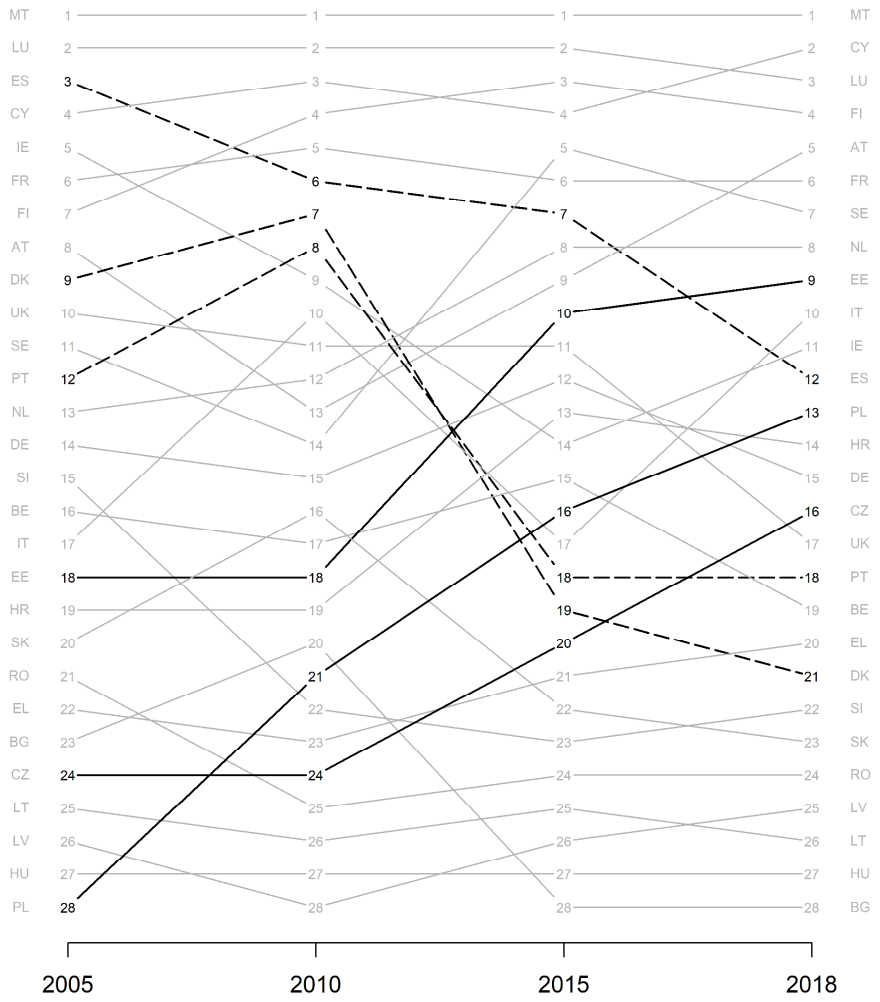

Fig. 2: Change in the rankings based on TMR over the period 2005-2018

Three countries that gained many positions in the ranking are Poland (15 positions), Estonia (9 positions) and Czechia (8 positions, all marked with solid black lines in Fig. 2). The most notable declines in the ranking (marked with dashed lines) are those of Denmark, Spain, and Portugal. The fact that the 'new' Member States are gaining while at the same time the 'old' Member States are losing positions can be seen as an indication of convergence between the 'old' and the 'new' Member States which is described below in more detail.

Our study revealed that the overall level of energy poverty in the EU decreased over the period 2005-2018 and that convergence between the Member States can be observed. This was done using a different approach, described below.

The second part of the work was designed to be comparable with the results of other studies. We calculated the CFPI given by Bouzarovski (2014) for the 2005 and 2018 data jointly. After disaggregating the index into two dimensions – one containing the three variables in the brackets in (1), i.e. housing cost, arrears in bills payments, and housing deprivation, and the other being the inability to keep home warm. This allowed us to observe changes in the value of the measure as a move in two directions. Most of the countries converged to a lower level of the two energy poverty dimensions defined this way. Said convergence in the CFPI is depicted in Fig. 3. We observe significant

changes in the order of countries and the values of the indicator over the period under examination (Fig. 4, 5, and 6). The most notable changes are those of Poland, Bulgaria, or Lithuania. It is worth noting that 12 out of 13 'new' Member States improved their status (Fig. 6), and many of these changes are huge. The same is true for 7 out of 15 'old' Member States, but the changes are less significant. In Fig. 6 we can see that the largest change in value is for Poland, gaining 14 positions over the period (second worst in 2005, thirteenth in 2018). A big change in CFPI value for Bulgaria was too small to gain position in the ranking (ranked 28th in both 2005 and 2018), and a significant increase in Greek CFPI made the country fall from position 20 in 2005 to 27 in 2018. The average level of energy poverty measured for the whole EU has also decreased slightly (shown with the dashed arrow in Fig. 3).

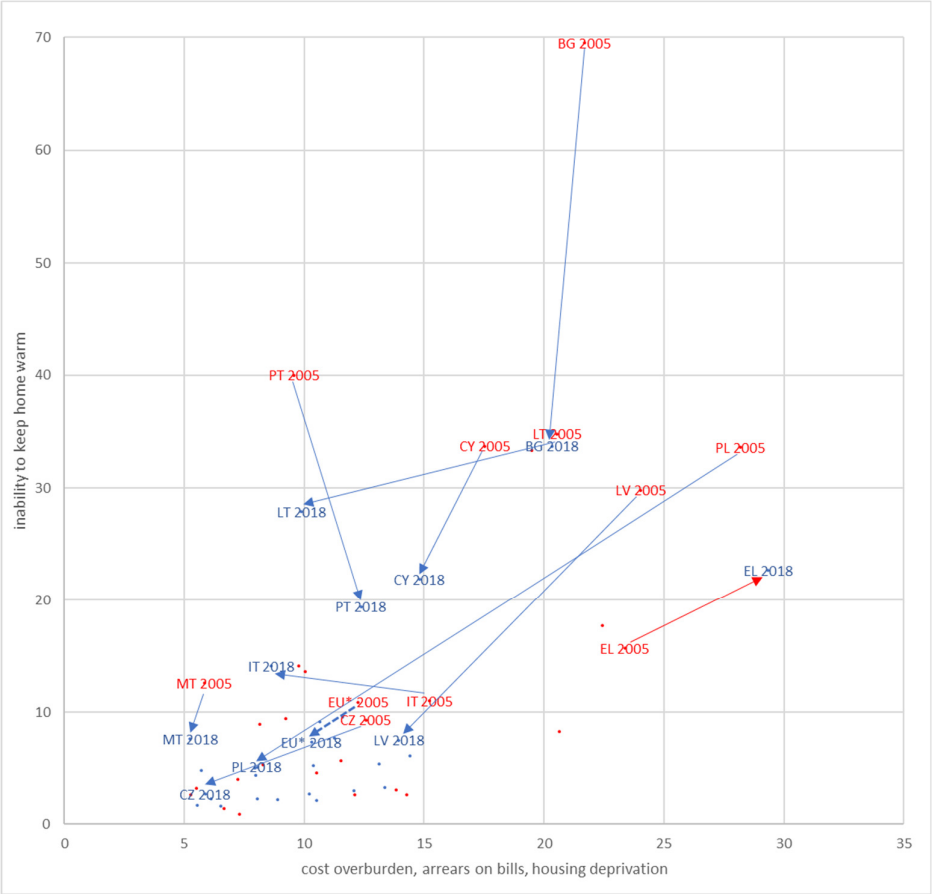

Fig. 3 : Convergence in energy poverty (CFPI disaggregated) among EU Member States over the period 2005-2018 (selected countries shown)

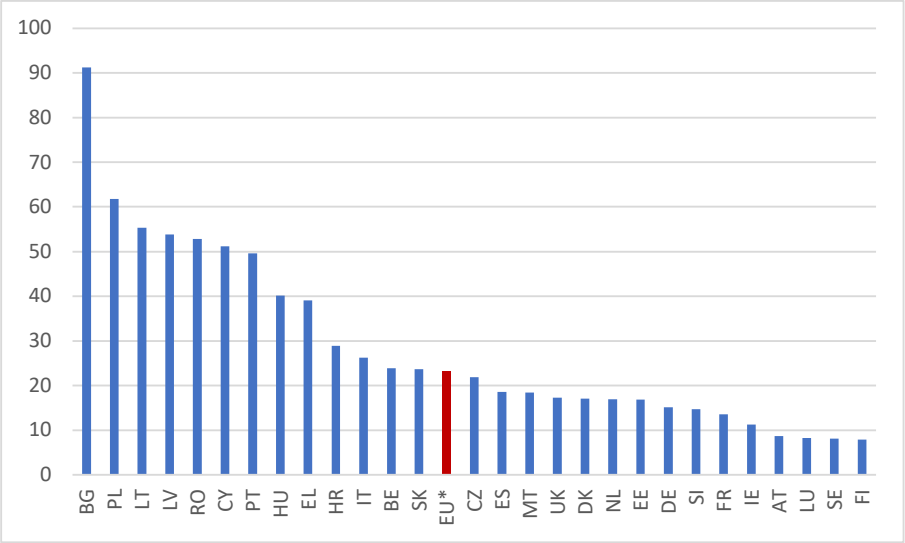

Fig. 4: CFPI levels and CFPI-based ranking of EU Member States in 2005.

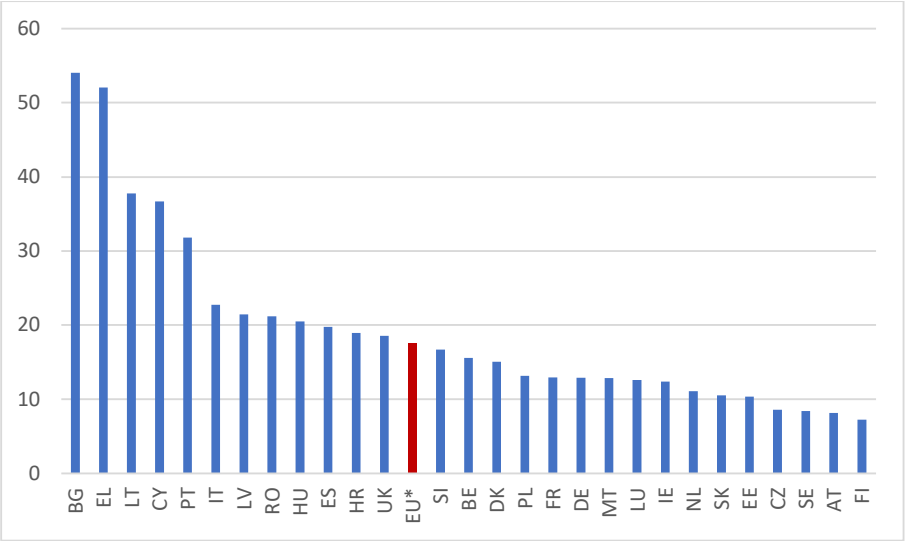

Fig. 5: CFPI levels and CFPI-based ranking of EU Member States in 2018.

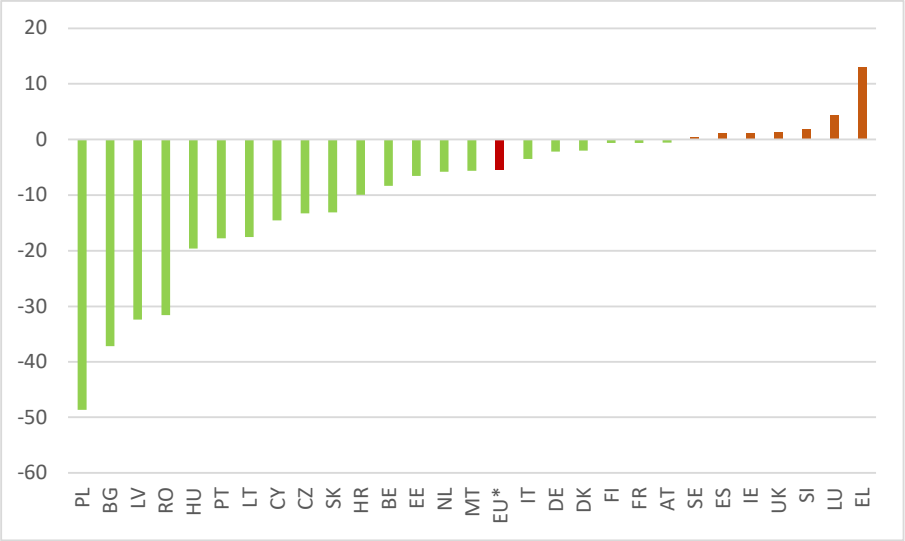

Fig. 6: Change in CFPI value over the period 2005-2018

In the third and last part of the study, we wanted to confirm that the EU Member States are not a homogenous group according to energy poverty level and that there exist easy to spot groups of countries. First, we assumed that we would confirm differences between the 'old' and the 'new' Member States. We also wanted to find out if the countries could be divided into groups based on their geographic location. Beside those two points, we assumed that there may exist a natural grouping of countries, other than location-based or membership-durability-based. In order to confirm this assumption, we used hierarchical clustering outcomes. The clustering was provided using the 7 variables described in paragraph 2 as derived from 2005 and 2018 data. The Kruskal-Wallis test was used in all cases, supplemented by the Dunn test on occasions when multiple comparisons between groups were made (Y2005NAT3, Y2018NAT3, and GEO3).

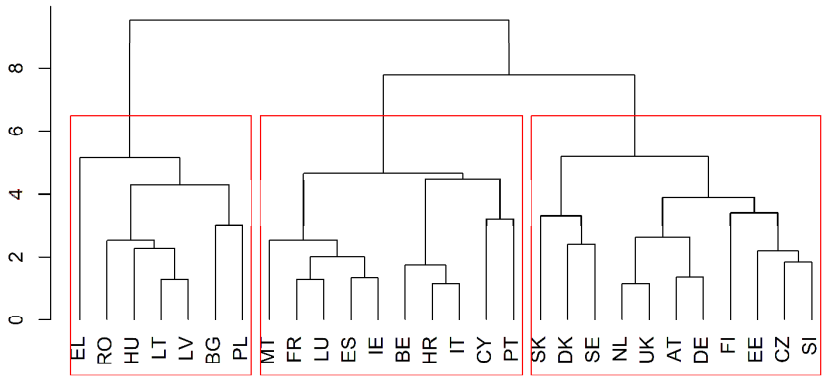

Fig. 7: A dendrogram and a clustering of EU countries into three groups, 2005 data

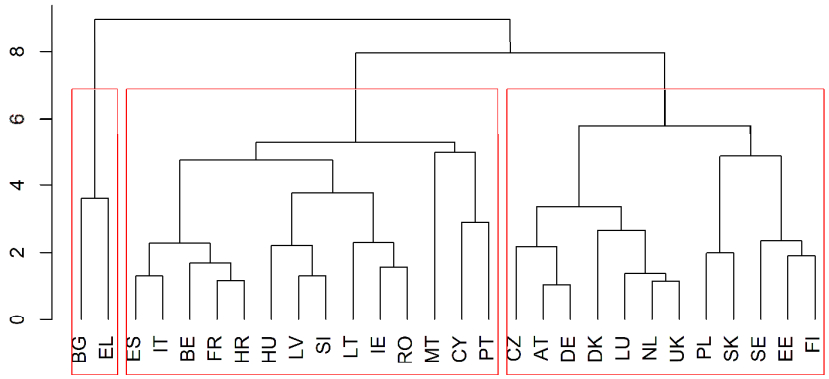

Fig. 8: A dendrogram and a clustering of EU countries into three groups, 2018 data

Table 1: Partitions of the EU Member States used in the study

	OLDNEW	Y2005NAT	Y2018NAT	GEO2	GEO3
AT	1	3	3	1	1
BE	1	2	2	1	3
BG	2	1	1	2	2
CY	2	2	2	2	2
CZ	2	3	3	1	1
DE	1	3	3	1	1
DK	1	3	3	1	1
EE	2	3	3	1	1
EL	1	1	1	2	2
ES	1	2	2	2	2
FI	1	3	3	1	1
FR	1	2	2	1	3
HR	2	2	2	2	2
HU	2	1	2	1	1
IE	1	2	2	1	3
IT	1	2	2	2	2
LT	2	1	2	1	1
LU	1	2	3	1	3
LV	2	1	2	1	1
MT	2	2	2	2	2
NL	1	3	3	1	3
PL	2	1	3	1	1
PT	1	2	2	2	2
RO	2	1	2	1	1
SE	1	3	3	1	1
SI	2	3	2	1	3
SK	2	3	3	1	1
UK	1	3	3	1	3

The partitions of countries into groups are shown in Table 1. The groupings designated as GEO2 and GEO3 require a comment. In the former case, a group of eight southern European countries was named (Bulgaria, Croatia, Cyprus, Greece, Italy, Malta, Portugal, and Spain); in the latter case, an additional

group of seven countries was distinguished, mainly from Western Europe (Belgium, France, Ireland, Luxembourg, the Netherlands, Slovenia, and the United Kingdom). Thus, GEO2 is a division into two groups (having 8 and 20 members), GEO3 is a division into three groups (8, 7, and 13 members each). The partitions Y2005NAT and Y2018NAT are the effects of agglomerative ('natural') clustering of 2005 and 2018 data, respectively, stopped at 3 groups (the variables were standardized, clustering was done using Ward method with Euclidean distance) – cf. Fig. 7 and Fig. 8.

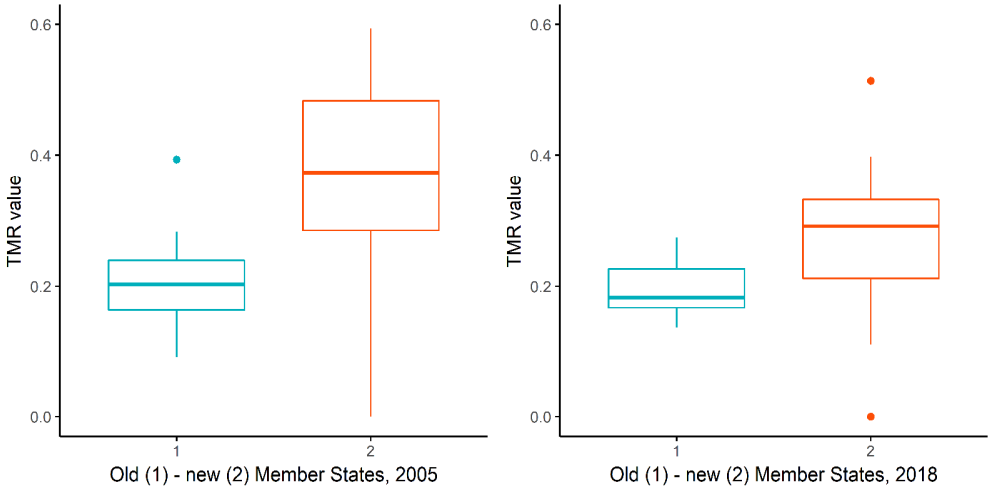

Fig. 9: The 'old' and the 'new' Member States TMR values distribution in 2005 (left panel) and in 2018 (right panel)

As we can see in Fig. 9, the 'old' and the 'new' Member States differed significantly in 2005 according to TMR values (left panel) but the values converged before 2018 (right panel). In Table 2 we can find evidence that the values of TMR converged between the groups of 'old' and 'new' EU countries (χ^2 gets lower with time). The same is true for CFPI values, but the convergence was faster in that case. We can also see that, probably because it consists only of four variables, CFPI does better differentiate countries in geographic groups. Table 3 provides us with further results confirming the observation. CFPI differentiates the countries better than TMR also when there exist three groups of countries based on their location. The partitions obtained from the agglomerative procedure are natural, so we expected good differentiation here. The case of TMR not performing well in 2018 is supposedly again connected with the convergence of the EU Member States. It may also be a side effect of TMR inability to differentiate in specific circumstances. We plan to investigate it in our further works on the topic.

Table 2: Results of Kruskal-Wallis tests for partitioning into 2 groups

Measure, grouping variable, year	Kruskal-Wallis test	Measure, grouping variable, year	Kruskal-Wallis test
TMR OLDNEW 2005	χ^2 = 8.2891 (**)	TMR GEO2 2005	χ^2 = 0.5819 (–)
TMR OLDNEW 2010	χ^2 = 8.026 (**)	TMR GEO2 2010	χ^2 = 1.7483 (–)
TMR OLDNEW 2015	χ^2 = 5.4117 (*)	TMR GEO2 2015	χ^2 = 0.1267 (–)
TMR OLDNEW 2018	χ^2 = 3.6546 (–)	TMR GEO2 2018	χ^2 = 0.3129 (–)
CFPI OLDNEW 2005	χ^2 = 8.8281 (**)	CFPI GEO2 2005	χ^2 = 4.3474 (*)
CFPI OLDNEW 2010	χ^2 = 6.0754 (*)	CFPI GEO2 2010	χ^2 = 8.1126 (**)
CFPI OLDNEW 2015	χ^2 = 2.8271 (–)	CFPI GEO2 2015	χ^2 = 10.5931 (**)
CFPI OLDNEW 2018	χ^2 = 1.3798 (–)	CFPI GEO2 2018	χ^2 = 8.7000 (**)

**significance level 0.05; ** significance level 0.01*

Table 3: Results of Kruskal-Wallis and Dunn tests for partitioning into 3 groups

Measure, grouping variable, year	Kruskal-Wallis test	Dunn test		
		Class 1 – Class2	Class 1 – Class 3	Class 2 – Class 3
TMR GEO3 2005	χ^2 = 5.7139 (–)	Z = 1.5374 (–)	Z = 2.2654 (–)	Z = 0.7172 (–)
TMR GEO3 2010	χ^2 = 5.2001 (–)	Z = 1.9093 (–)	Z = 1.8579 (–)	Z = 0.0252 (–)
TMR GEO3 2015	χ^2 = 2.1486 (–)	Z = 0.8506 (–)	Z = 1.4219 (–)	Z = 0.5495 (–)
TMR GEO3 2018	χ^2 = 1.5290 (–)	Z = 0.9234 (–)	Z = 1.1028 (–)	Z = 0.1971 (–)
CFPI GEO3 2005	χ^2 = 6.7416 (*)	Z = −1.3761 (–)	Z = 1.5473 (–)	Z = 2.5963 (*)
CFPI GEO3 2010	χ^2 = 8.3699 (*)	Z = −2.4663 (*)	Z = 0.5073 (–)	Z = 2.6009 (*)
CFPI GEO3 2015	χ^2 = 10.593 (**)	Z = −3.0278 (**)	Z = 0.0057 (–)	Z = 2.6341 (*)
CFPI GEO3 2018	χ^2 = 8.7255 (*)	Z = −2.8042 (*)	Z = −0.1596 (–)	Z = 2.2901 (–)
TMR Y2005NAT 2005	χ^2 = 15.9610 (**)	Z = 3.9645 (**)	Z = 2.7723 (*)	Z = −1.4038 (–)
CFPI Y2005NAT 2005	χ^2 = 15.8237 (**)	Z = 2.5725 (*)	Z = 3.9707 (**)	Z = 1.4923 (–)
TMR Y2018NAT 2018	χ^2 = 4.2155 (–)	Z = 1.3669 (–)	Z = 1.9498 (–)	Z = 1.1588 (–)
CFPI Y2018NAT 2018	χ^2 = 16.5860 (**)	Z = 1.4474 (–)	Z = 3.1568 (**)	Z = 3.3477 (**)

**significance level 0.05; ** significance level 0.01*

Conclusions

Our study proves that even relatively simple statistical methods can contribute to a more complete and accurate description of energy poverty. The use of multivariate statistics makes it possible to select criteria more objectively and to make use of different types of data, which is crucial for phenomena as complex as energy poverty.

The convergence of EU countries in terms of energy poverty has been shown to be taking place. The 'new' Member States are improving faster in this respect. At the same time, the overall level of the phenomenon is improving, i.e. the reach of energy poverty is decreasing, and this is evident in most countries over the period 2005-2018.

We have proven that the time of countries' accession to the EU was an important differentiating factor, but the convergence mentioned above has meant that in 2018 there is no strong evidence for this claim. The level of Member States in terms of energy poverty is now much more evenly distributed and the 'new' Member States are no longer different from the 'old' EU countries. On the other hand, we still observe differences between groups of countries resulting from geographically based division. Regarding the question stated in the title, we believe that the geographic location is the main reason for differences in the range of energy poverty. According to our results the time of accession is no longer a variable that differentiates the Member States in that respect.

The results of our study may be of interest to economic decision-makers in energy poverty prevention policies, both as a proposal for proven tools as well as schemes of using them in macro-level analysis.

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Logistics 4.0: Readiness and Technology of Internal Logistics Processes of Companies and Design of a Maturity Model for Warehousing

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Abstract

We are at the beginning of the fourth industrial revolution, which is already fundamentally influencing how goods are produced and distributed. Also, the rapid progress of the digitizing wave is exacerbated by the increasing availability of automated machines. Autonomous machines are no longer and may not be part of large companies, but today even smaller companies can afford them. Companies can start with a higher level of automation and show a significant advantage over the competition. How companies are prepared for the Industry 4.0 concept, and their current level can be assessed based on readiness models. Although this modern concept has a wide range, it focuses on the field of logistics, within the concept is extended the concept of Logistics 4.0 This article focuses on the field of internal logistics, which enter and apply the principles and technologies of the concept of Industry 4.0. Warehousing is selected from internal logistics. The introductory sections define terms such as Logistics 4.0, warehousing and individual modern elements that enter this area and aim to improve the current level and readiness of the company. In order to assess the current level and readiness, the maturity models are used, which are described in the next part of the article. The models are analysed, and based on their evaluation, a new model of readiness is created, conceived in the field of the warehouse. The primary purpose of this article is to design a model of readiness for warehousing and to characterize all levels. The highest levels will correspond to the principles of Industry 4.0.

Keywords: Internal Logistics, Logistics 4.0, Warehouse, Maturity Model, Readiness

Introduction – Internal logistics

According to Schulte (1994), logistics can be divided in several ways according to various criteria. One of the many divisions, according to the breadth of focus, is on the study of material flows, i.e. the division into macro logistics, micro logistics and the logistics company (metal logistics). Macro logistics deals with complete logistics chains beyond individual companies. Within our article, it is essential to define micro logistics (internal logistics). Micro logistics deals with logistics chains within one company, or only one part of it (specific plant, hall, and warehouse), so this logistics focuses only on logistics processes within the company.

Lambert et al. (2005) mention that the view of logistics can affect the way logistics activities are provided, but also the way employees are involved in logistics activities, their participation in projects aimed at ordering, purchasing, internal handling and transportation, forecasting and management inventory, distribution, planning and management of warehouse systems. This creates one of the possible

insights into the concept of logistics and the classification of logistics management in the company, which is based on a process view, so company logistics is divided.
According to Lambert et al. (2005) is in the form of four groups:

- supply logistics,
- production and internal logistics,
- distribution logistics,
- reverse logistics.

Production and internal logistics focus on the solution and optimization of material flows, the creation of handling systems, the use of space and working conditions during and other tasks related to the product.

Based on the publication of the author Heinrich (2011), it is possible to mention the main key areas of internal logistics, which are further divided into sub-parts. The primary operational functions of internal logistics are handling, warehousing, internal transport within the company (warehouse, production, etc.), picking and packaging.

Internal logistics is, therefore, the essential part of the factory's production processes and an integral part of the supply chain. Continuous supply of input lines to production lines and workplaces is one of the company's key processes. Internal logistics covers the planning, implementation, control and efficient flow and storage of materials, semi-finished and finished products in production processes and the production environment, and the term internal logistics will be used in this article

Storage and main functions

Warehousing is part of every logistics system. It is a crucial link between the manufacturer and the customer, and warehousing plays an essential role in the logistics system. If we define the areas of warehousing, the author Gross (1996) mentions in his publication that warehousing helps the company in improving the quality of services provided and thus achieve a better level of customer satisfaction and at the same time can reduce costs through warehousing. Cost savings can be achieved mainly by the concentration function of warehouses, the possibility of postponing final operations until the customer orders goods or by storing seasonal items, sending bulk orders. All this will allow us to use the warehouse capacity evenly. Warehousing, therefore, contributes to improving customer service by increasing and facilitating product availability.

Other authors such as Sixta and Mačát (2005) and Daněk and Plevný (2009) also recognize three essential storage functions in their books:

1) Product transfer
    - Receipt of goods
    - Storing goods
    - Completion of goods according to the order
    - Transhipment of goods
    - Dispatch of goods
2) Storage of products
    - Temporary storage
    - Time-limited storage
3) Information transfer
    - Stock status, information on stocking and removal of goods

Logistics in the concept of Industry 4.0

The main principles of Smart Logistics intersect in many respects with the principles of Industry 4.0. We are already focusing on the description of the Logistics 4.0 concept. However, we briefly characterize the Industry 4.0 concept, from which the technologies that are integrated into internal logistics are based. Terms such as Logistics 4.0, Smart Logistics are used according to the author Horenberg (2017).

According to Botlik and Botlíková (2020) Industry 4.0 and its implementations suggest changes in business paradigms and production models that will be reflected at all levels of production processes and supply chains, including all production process workers, managers, cyber system designers and end-users. The implementation strategy of the Industry 4.0 concept in corporate sectors means the introduction of independent automation, configuration, diagnostics and problem solving, as well as new knowledge and intelligent decision-making.

The author Mařík (2015) mentions in his publication that new networks will be created based on the interconnection of production equipment into cyber-physical systems - CPS. These systems are an essential element of the creation of intelligent factories, and they will be able to autonomously exchange information, trigger the necessary actions in response to current conditions and mutually independent inspections. Sensors, machines, components and IT systems will be interconnected and will interact and analyse data on an Internet basis. Emerging smart products will be identifiable and localizable. Vertical production processes will be horizontally interconnected within the company's systems, which will flexibly respond to individual customer requirements in real-time. The authors also define the essential characteristics of intelligent factories with the principles of the Industry 4.0 concept, some of which are appropriate and suggestive of how logistics could work within this concept. Mutually communicating robots, ancillary equipment, production equipment and products make autonomous decisions in real-time. Automated logistics equipment in all areas of internal logistics (handling, storage, packaging) uses autonomous logistics elements and robots and adapts to production needs.

Necessary technologies of Industry 4.0 include the CPS systems, Big Data, autonomous robots, sensors, cloud computing and data storage, as well as additive manufacturing, augmented reality. The entire scientific discipline of cybernetics and artificial intelligence forming thought and technology the core of the ongoing industrial revolution, according to a source National Industry Initiative 4.0 (2015).

According to Tomek and Vávrová (2017), digitization and robotization cannot be stopped. It does not only appear in large companies but also applies to small businesses. Small and medium-sized enterprises use new possibilities, new technologies and principles with an appropriate application

Logistics 4.0 - technology and applications

According to the authors Hofmann and Rüsch (2017), logistics represents a suitable area of application of the principles of Industry 4.0. The integration of Cyber-Physical Systems (CPS) and Internet of Things (IoT) systems into logistics promises to enable real-time monitoring of material flow, better manipulation of handling units and accurate risk management. Industry 4.0, in its pure form, can only become a reality in this area if logistics can provide production systems with the necessary input factors at the right time, in the right quality and the right place.

The authors Barret, Amaral and Pereira (2017) mention that, the term Logistics 4.0 is used to denote the combination of the use of logistics with innovation and the addition of CPS applications. Logistics 4.0 is a logistics system that can increase flexibility, adapt to market changes and approach the company's needs. This will improve the level of customer service, optimize production and reduce storage and production prices. The authors mention technologies and principles based on the research of the Industry

4.0 concept, which are then applied to logistics areas such as resource planning, warehouse management systems, traffic management systems, intelligent transport systems and information security.

Internet article by William (2019) describes, Logistics 4.0 enables process improvement through several technological innovations, including intelligent robotics, driverless transport vehicles and automated systems for handling parts inside warehouses and factories. The authors mention that everything is not just technology or digital applications, but a new way of managing the supply chain, where client processes and stakeholders are fully interconnected. The authors list some important technologies, such as industrial WLAN, RFID, RTLS (internal GPS) and DMC (Data Matrix Code) for precise positioning and free navigation (ANS +), automation automats PLS (Proximity Laser Scanner), AI modules, camera readers, control software.

Author Wang (2016) states that the development of IoT, IoS and Big Data will significantly reduce the work required for human intervention at every step of the supply chain. New technologies, such as the automatic guidance vehicle (AGV) and the storage robot, are replacing the process that people perform and make decisions. Internal logistics or the movement of goods within the factory are fully automated using autonomous forklifts, AGVs and robots with a routed program that is based on predictive logistics. All logistics activities will be based on information obtained from an internet platform used by all stakeholders. Logistics 4.0 needs support for the rapid development of many technologies, such as smart sensors, large-scale mining technology, computing, mobile Internet technology, and intelligent robots and AGV systems.

Logistics 4.0 is part of the Industry 4.0 concept and will support the development of this concept. There is no Industry 4.0 without Logistics 4.0. The technical aspects of Logistics 4.0 in specific areas are based on technological assumptions and principles from the comprehensive general concept of Industry 4.0. The sources for Logistics 4.0 mention the principles that will be a necessary part of logistics processes in a company that will apply the attributes of Industry 4.0, the areas of internal logistics are one of the critical areas of the company. In particular, the use and importance of the development of IoT, IoS, Big Data, CPS systems, intelligent robots, automatic identification of RFID, sensors and more are mentioned.

The Logistics 4.0 paradigm can, therefore, be summarized as optimizing incoming and outgoing logistics, which must be supported by intelligent systems built into software and databases, from which relevant information is provided and shared via the IoT to achieve a significant degree of automation.

Warehouse 4.0 – technology

More detailed, we can discuss the part of the Logistics 4.0., the Warehouse 4.0 section. A Smart Warehouse is defined by authors Liu, Cao and Yang (2018) an automated, unmanned, and paperless warehouse when conducting the operations of a pickup, delivery, and bookkeeping. Using intelligent management that's adopted and implemented correctly by supporting Industry 4.0 principles, together with hardware and software technologies results in changes in warehousing systems. This can be called Warehouse 4.0., and this can change some already adopted warehousing management systems in companies. Also, authors Juntao and Yinbo (2016) introduce the IoT technology with concrete applications within the warehouse operations like RFID technology, management and control technology, sensor technology. Adopting this technique requires simultaneous treatment of production and warehouse infrastructure, transport-warehouse technology and warehouse management systems. Warehousing 4.0 represents a brand-new area of storing and retrieving goods by using shuttle-based storage and retrieval systems rather than fixed-crane automated warehouses, and this is described by the author Lerher (2018).
The goal is to avoid wasting warehousing costs to a minimum. In some cases, we attempt to eliminate them. This can be thanks to possibility thanks to process orders from consumer's suppliers at the identical time. In keeping with the publication, according to Wang (2016), transforming warehouse management into Warehouse 4.0. Needs Industry 4.0. components implemented into technical logistics.

One of the core components of Warehouse 4.0. is automation. If the PC collects technology-based data, we will speak about developing automation. Within the context of Warehouse 4.0. the automation technology was applied within the form of bar-codes, smart-cards, tablets, RFID, real-time locating systems – to spot automatically and track the situation of products, smart scanning technology (smart sensing) – to detect the condition of products or environmental changes that occur around the item. AGV is integrated into the warehouse the net of thing, and this can be associated with warehouse/truck loading automation.

However, there are some limitations to using new technologies. In 2016, a report from Zebra Technologies (2016) stated that the retail, wholesale, transportation and logistics sectors are transitioning to "best-of-breed" warehouse management systems that take automatization to new heights – from equipping workers with mobile devices that increase speed and accuracy of order picking to the roll-out of RFID for real-time inventory visibility. However, the authors Vijayaraman and Osykseveral (2006) mention that concerns still exist, and scepticism remains (cost savings or a positive ROI).

They are using CPS when transforming from traditional Warehouses to Warehouse 4.0. is the best way, because they create a virtual copy of the real-world (workplace, component, industry processes). Thus we will know the status of every component in real-time even before the particular process running. CPS can combine virtual and physical worlds and communicate and interact through smart objects. This also means fewer errors, waste management and better end up in the shape of efficiency and accuracy. The CPS – based smart warehouse contains four main components: thousands of CPS devices working together (affixed through RFID or NFC tags, Wi-Fi, Bluetooth technologies, cameras). They need to have communication scheduled among them efficiently. Inventories which know their status and site context in keeping with the info reported by the attached devices. Robots who collaboratively accomplish repetitive and harmful to people tasks. Humans recognize their gestures or other activities to do operations (answerable for sending instructions to the warehouse and monitoring operation).

Readiness models of evaluation companies with a focus on Logistics 4.0

After studying several sources, we can generally define models for assessing the readiness of companies within the Industry 4.0 concept as a model, which can be used to identify and evaluate the current state of the company in various areas within the Industry 4.0 concept or seek to improve the state of preparedness for the future. The analysed areas (dimensions) are always defined. For some models, the dimensions are further extended to sub-dimensions. In addition to dimensions, the method of evaluation is also essential. Individual levels of maturity give the similarity in the method of evaluation in the given areas (dimensions). Degrees or levels have their names and their characteristics of requirements and properties for meeting a given degree within a given area (dimension).

Basic models of readiness

The critical concept behind most types of preparedness models is the Capability Maturity Model (CMM), the later developed Capability Maturity Model Integration (CMMI), and the word integrated means that the model integrates several standards. The model was created under the auspices of the Sofware Engineering Institute (2010).

CMM by Paulk et al. (1993) provides a framework for organizing evolutionary steps into five levels of maturity. These five levels of maturity define the ranking measure for measuring the maturity of an organization's software process and its ability to evaluate the software process. In CMM, these are the following levels of maturity:

1) Initial: Teams at this level do not perform defined processes or only partially.
2) Managed: Project management is established, and activities are planned.

3) Defined: Procedures are defined, documented and controlled.
4) Quantitatively Managed: Products and processes are quantitatively managed).
5) Optimizing: The team is continually optimizing its activities.

The current version of the CMMI model is very related to the SPICE (Software Process Improvement and Capability Determination) initiative. Based on SPICE, other models for process assessment were created, especially Automotive SPICE for the automotive industry. According to a book by Bruckner (2012), the SPICE model works with six levels of readiness, from level 0 and an incomplete process to level 5, where the process is optimized. The individual models are based on the same or very similar principles, which are based on the principle of CMMI models.

Readiness models evaluating internal logistics – warehousing

A total of 20 preparedness models were found, which evaluate companies within Industry 4.0 and their readiness for this concept. There are a large number of models. However, the scope of Industry 4.0 is extensive, and in this article, we focus on the evaluation of internal logistics, or warehousing. In terms of quality and relevance, a selection was made, and models were worked on that contain the potential for evaluating internal logistics. In the area of internal logistics, there is a solved area of warehousing. The models were not only academic but also models of practical associations or consulting companies. Characterized models of readiness are of different qualities and scope of processing, and some are very complex, some more concise forms. The individual models were analysed with the main characteristics and attributes.

These attributes include the origin of the source, the further analysed dimensions and areas where the dimensions are in the number from a minimum of 3 dimensions to 9 dimensions, in some models the dimensions are still divided into sub-dimensions. Furthermore, the potential of the logistics dimension is sought, if one of the areas of internal logistics is not directly in the model, we are looking for the perspective and potential of some of the activities of internal logistics within other dimensions. Another critical attribute is the method of assessing readiness - Evaluation has a very similar methodology to some models, and individual dimensions are evaluated, or their sub-sub-dimensions, which are evaluated according to specific criteria. Models with several levels, often from 4 to 6 levels, are used for the final evaluation, and these levels are characterized. The last attribute is the intent of the model, where the preparedness model can have a descriptive, comparative purpose with other companies, or prescriptive, where, in addition to evaluation, other necessary steps and instructions are provided to achieve higher levels of maturity.

The readiness models, which contain the potential for evaluating internal logistics, were analysed in detail, and the area of warehousing was sought. There were 6 of these models out of the total, the reasons were in terms of quality, relevance for our research and the design of a new model of readiness with a focus on warehousing. The models described were:

1) Impuls - Industrie 4.0 Readiness by Cologne Institute for Economic Research (2015)
2) PwC Industry 4.0: Building the Digital Enterprise by Geissbauer, Vedso and Schrauf (2015)
3) A Maturity Model for Assessing Industry 4.0 Readiness and Maturity of Manufacturing Enterprises designed by Carolis et al. (2018)
4) WMG - An Industry 4 Readiness Assessment Tool designed by authors from the International Institute for Product and Service Innovation (2018)
5) The Singapore Smart Industry Readiness Index developed by Singapore Economic Development Board (2018)
6) The Logistics 4.0 Maturity Model is described by Oleskow - Szlapka and Stachowiak (2018)

Table 1 provides an overview of all analysed readiness models with a description of the main attributes.

Table 1: Analyzed readiness models and main attributes

Readiness model	Origin of individual source	Analysed dimensions/areas	The potential of the logistics	Method of assessing readiness	The purpose of the model
Impuls – Industrie 4.0 Readiness	Academic Practical association	6 - Strategy and Organization. Smart Factory. Smart Operations. Smart Products. Data-based services. Employees.	YES	Evaluation of 6 dimensions, divided into 18 criteria. Use a 6-level readiness model	Comparative Descriptive Prescriptive
PwC Maturity Model	Consulting company	7 - Digital business models and customer approach. Digitization of products and services. Digitization and integration of value chains. Data tools. Agile IT architecture. Security compliance, legal and tax area. Organizations, employees and digit. culture.	YES	Evaluation of 7 dimensions. Use a model of 4 levels of readiness with characteristics.	Descriptive
Maturity Model for Assessing	Academic Practical association	5 - Design and Engineering. Production management. Quality management. Maintenance management. Logistics management.	YES	Evaluation of 5 dimensions according to 4 criteria. Use a model of 5 levels of readiness with characteristics.	Descriptive
An Industry 4 Readiness Assessment Tool	Academic Consulting company	6 - Products and services. Production and operation. Strategy and organization. Supply Chain. Business model. Legal aspects.	YES	Evaluation of 6 dimensions, divided into 37 criteria. Use a model of 4 levels of readiness with characteristics.	Comparative Descriptive Prescriptive
The Singapore Smart Industry Readiness Index	Practical association	3 - Process (Operations, Supply Chain, Product Life Cycle). Technology (Automation, Connection, Intelligence). Organization (Talent Readiness, Structure and Management).	YES	Evaluation of 3 dimensions, divided into 8 pillars and further divided into 16 criteria. 6 levels of readiness with description.	Descriptive

The Logistics 4.0 Maturity Model	Academic	3 - Management. Material flow (automation and robotics in warehouses and transport, IoT, 3D printing, 3D scanning, augmented reality). Information flow (data services, Big Data, RFID).	YES	Evaluation of 3 dimensions. Use a model divided into 5 levels of readiness.	Descriptive

Readiness models evaluating storage – evaluation

Warehousing did not occur as a dimension/area in any of the analysed models. Therefore the area of internal logistics was also examined in general. After reviewing and analysing the readiness models, it can be stated that none of the models comprehensively evaluates the company's readiness within the concept of Industry 4.0 in the field of internal logistics and does not focus specifically on the given area of warehousing. It does not evaluate the overall area of internal logistics, nor its partial activities or the very concept of logistics activities within the company.

There are models where, in general, internal logistics is included within one dimension/area, or it is addressed by partial dimensions or criteria for questions in various questionnaires and evaluation forms. However, it is only a more briefly defined form of focus and evaluation. The models work with different levels of readiness (0 to 6), and each contains the minimum requirements that must be met for the level to be completed. For some models, the disadvantage is the evaluation according to the very general levels for them, and there is only a brief verbal description for each dimension, which unfortunately is not very telling.

Design of a new readiness model focused on warehousing

Although no analysed readiness model focuses in detail on warehousing processes and does not evaluate this area, these models were the inspiration and cornerstone for designing a new readiness model evaluating the storage area within internal logistics. In the newly designed model, the parameters that occur in all models enter the intersection. It is always an area of dimension. This is generally the area we are evaluating. This area can be assessed in several sub-areas. Another main parameter is the level of evaluation of the given dimension. The thorough analysis provided the basis for the creation of a new model of readiness with defined main 3 parameters. These parameters are:

- warehousing dimensions
- areas for evaluation of warehousing processes (technology, information, people)
- levels of evaluation of logistics processes

Determination of the main parameters for a new model of readiness in the field of warehousing

The model for assessing readiness will, therefore, be based on 3 parameters, similar to other models of readiness. The difference from other models, however, will be that this model is focused in detail on the area of internal logistics - warehousing. One of the main parameters is, therefore, already established, it is a dimension of warehousing. In this, the proposed model differs from the others. The models are instead general, and they evaluate several dimensions within the whole company. However, they are not detailed, and the evaluation is, therefore, not relevant.

Another critical parameter is the levels of readiness. These levels then determine the actual readiness of the business. As mentioned in the evaluation of the analysed models, the models use different numbers

and characteristics of levels. The Singapore Smart Industry Readiness Index (2018) was the inspiration for this proposed model. This model has a total level of 6 for evaluation, because the model also has a zero level, next to the name is a brief definition and description of the degree. A thorough analysis of this model provided the basis for the creation and partial modification of new levels of preparedness.

At this stage, with a brief definition, these are the following levels:

- Level 0 - Processes are not explicitly defined.
- Level 1 - Certified process management.
- Level 2 - Digitized data collection (from processes), implementation of automation.
- Level 3 - Part of the processes is automated, connection to an external data source.
- Level 4 - Processes are automated, with limited human intervention.
- Level 5 - Processes are automated, human-made.

The next part is to determine the main areas for evaluating the warehousing dimension. For the dimension, 3 main areas will be evaluated, which are sufficient coverage of the whole dimension. These are the areas:

- Information provision
- Technological support
- Human safety

An essential part of the whole concept of Industry 4.0 is the transfer of information. This, of course, plays an essential role in storage areas, even if they are internal processes, each accompanied by a flow of information and securing is a crucial part. Principles and technologies Logistics 4.0 is also entering the technologies used in warehouses. These are leading technologies for manipulating from the receipt of goods, storage to location and removal of material for the manufacturing sector. The last area for evaluation is human security and the gradual change of cooperation of employees with processes according to the increasing level of readiness. From the lowest level, the role of the worker gradually changes.

Demonstration of a model of readiness for the evaluation of the warehousing within internal logistics

The main parameters (dimensions, areas and levels) are included in the new model of readiness for the storage area. The design of the new model is shown in Table 2. The levels are from the lowest level 0 to level 5. For each level, the area for technological security, information security and human security are characterized. Although the characteristics of each level are in a concise form, it should concisely describe the level.

Table 2: Design of a new model of readiness for warehousing

Level	Characteristics of the area at a given level		
	Technology	**Information security**	**People**
0	Warehousing technologies are human-controlled. Standard method of storage without the use of information technology.	Paper documentation, insufficient IS implementation. No interconnection of data sources.	Processes are controlled by humans based on experience and regime. Ignorance of IS.

1	Warehousing technologies automatically provide data in given process certification. Records in printed documentation or in IS.	Electronic data processing in simple IS, manual data collection, low capacity of data warehouses.	Basic possibilities of an employee using an information system. Combination of essential activities and IS.
2	Introduction of basic tools for data collection. During the actual storage, the material identifiers of the material and the warehouse location are read.	Data knew from all processes/areas, better storage conditions thanks to databases.	The employee makes full use of the possibilities of the standard IS and is fully trained to do so.
3	Warehousing technology connected to IS. Introduction of automated robotic devices and equipment.	Creation of automatic information processing using simple algorithms, continuous transmission and sharing of cloudy information.	Worker with the ability to control automated systems.
4	Warehousing technologies are integrated into the information environment. Robotic devices receive real-time instructions on which material to store. In the case, people receive instructions.	Automatic information processing using progressive algorithms. Comprehensive connection to external data sources, including automatic processing, the interconnection of warehouse systems.	The employee interferes minimally in the processes. Use of automated and robotic technologies with close cooperation.
5	Warehousing technologies are automatically controlled by IS. The complex warehouse system is controlled by intelligence or advanced algorithms, online and is fully digitized.	Automatic data entry into IS, and their processing without human intervention, automatic material identification, the connection of IS with handling robots.	The employee only controls the processes but does not interfere with them. IT specialists, programmers, data analysts.

Thus, a new model of readiness for the area of internal logistics - warehousing is proposed. The model is designed to cover the broadest possible range of equipment and current status according to levels, and each company could be characterized in the field of warehousing to a certain level. The model is also designed about modern technologies and principles according to the concept of Industry 4.0. Levels 4 and 5 correspond to this concept, where especially for level 5 it is a matter of setting in a smart factory. There, all machines and equipment in both production and storage are interconnected and can communicate and transmit input data together, respond to situations and evaluate them according to chips, sensors and software. However, level 4 also corresponds to Industry 4.0, but at this level, we can say that it is a collaborative environment where machines and people still work together. Most processes are automated here.

Conclusion

Internal logistics is one of the active factors involved in increasing the overall production performance of the company, as internal logistics has a direct impact on optimizing the use of resources, reducing product production time, optimizing production inventory, stock utilization and increasing production quality.

Absolute visibility within the company is a necessary prerequisite for the emerging trend of individualized production, where each finished product meets the parameters precisely according to customer requirements. Interconnected production and warehousing systems must know precisely where, when and in what quantities a particular component is so that this modern approach to production is feasible at all. Industry 4.0, based on digitization and automation, presents not only enormous challenges for logistics but also opportunities for further growth and development.

The introductory part of the article deals with the application of technologies and principles of the Industry 4.0 concept in the field of internal logistics. Within internal logistics, the area of warehousing has a significant influence and potential on the economic side of the company. With the integration of the technologies of this modern concept into the field of internal logistics or warehousing, the field of warehousing is emerging in the fourth industrial revolution - Warehouse 4.0. How companies are prepared for this concept, they evaluate models of readiness, which are conceived in different areas. However, in the models, the area of internal logistics - warehousing after analysing the models is often not occupied and therefore, there is excellent potential to develop specialized models in this area. The primary purpose of this article is to create a design of a readiness model for the evaluation of the storage area. The model is a primary input form and will be further developed and more specified for the researched area. The characterized areas are brief, but they are apt for the assigned level. The proposed model has the potential for further development in several areas to make the model detailed. Other steps to determine a detailed model applicable in practice include, for example, a detailed definition and description of the level. Furthermore, it is appropriate to assign logistics active and passive elements to all areas. It is essential to create some link between the levels, and the next task will be the need for an evaluation tool. This can take the form of questionnaires, checklists and also the implementation of logistical audits and inspections.

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Tourist Experience Evaluation in A Cross-Border Region

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Abstract

The development of tourism in cross-border regions has been attracting the interest of several international researchers in this area. This article aims to evaluate the tourist experience in the Eurocity Chaves–Verín region, in particular, to identify the relationships between the characteristics of the trip, the individual profile and the experience perception based on the 4 E's, on the behavioural intentions of tourists, regarding the intention of recommending the destination, through a proposed hypothesis: the length of stay, the tourist resources visited, and the individual profile of the tourist positively influence the perception of the 4E's and the intention to recommend the destination. A total of 166 visitors/tourists were interviewed, 87 in Chaves and 79 in Verín. In the evaluation of the data obtained in Chaves and Verín, for the global model, all the dependent variables are related to the independent variables, statistically significant: the intention to recommend the destination Chaves is superior for those who spend 3 to 5 nights compared to those who spend 5 to 10 nights, and for those who visit the Way of St. James; the intention to recommend the destination Verín is superior for those who visit religious heritage/religious festivals/pilgrimages, and for those who do not visit natural spaces/landscape/nature.

Keywords: Cross-Border Regions, Tourism, North Portugal, Galicia, Chaves-Verín

Introduction

Cross-border destination

History shows that the relationship between Galicia and northern Portugal is very old. In fact, between these two regions there have been, over time, strong ties, as Pereiro and Silva (2000) refer to. Also, according to the same authors, the two regions share a historical, cultural, geographical reality and the economic patterns of Northern Portugal and Galicia are not very divergent. Another characteristic that gives uniformity to this region is its peripheral character in relation to the political and economic decision-making centres of the two countries. Cross-border tourism marketing is a relatively new trend, which comes to the forefront in the globalizing era, and a good promotion and management will allow mutual exploration, cultural exchanges and knowledge enhancement regarding a growing regional competitiveness (Dredge & Jamal, 2013; Herrero de la Fuente, 2001; Ioannides et al., 2006; Cancela, 2008; Prokkola, 2010; Pardellas, 2011; Castañer & Feliu, 2012; Blasco et al., 2014; Trillo, González & Carril, 2015; Liberato, Alen, Liberato & Dominguez, 2018; Liberato, Alén, Búa, & Liberato, 2020;

Liberato, Alén & Liberato, 2020; Tatar, Studzieniecki, Czimre & Penzes, 2020). The Eurocity Chaves – Verín, the region addressed in this investigation, has been considered as a pioneer project in the Iberian Peninsula, which, in addition to having become a European Grouping of Territorial Cooperation (EGTC), has developed a valuable work in entities such as the Atlantic Axis, the Galicia - Northern Portugal Working Community, the Iberian Network of Cross-Border Entities (RIET), and a platform, recently created, only for the tourist activity – Portuguese-Spanish tourist border which aims to create a border tourism product, promoted with the administrations of cross-border cities, and the existing Eurocities (Guadiana and Chaves – Verín), – with the aim that the tourist does not cross it, to go through it, thus knowing the entire border offer. The Eurocity Chaves–Verín was awarded for the strategic vision, with the European Oscars of the European Commission as the best European project – won the RegioStars 2015 award in the CityStars category, an initiative organised by the European Commission since 2008 that distinguishes the most innovative and inspiring projects in Europe funded by EU cohesion policy funds (for the positive impact of collaboration between the two localities, both at institutional, economic, social, cultural and environmental level. In addition to the results achieved in the development of structures of cooperation and joint development in the areas of youth, cultural events, commerce, sports, leisure, tourism and entrepreneurship, and the strategic vision of putting together services and instruments, equipment, infrastructure, which already existed separately but were optimized by common use because they lowered costs and optimized their effectiveness and quality). In the words of Trillo et al. (2015) we are faced with two cities that cooperate across the border, cooperation justified by proximity, affinity and historical relations; opportunities for economic growth and development; which avoids duplication of equipment and costs, as well as the practical application of the principle of European integration, presented in the document "Eurocity Strategic Agenda" which created three main objectives (Trillo et al., 2015): Euro-citizenship, sustainable development, and economic dynamism. In the tourism sector several initiatives have been presented, through networks of collaboration and cooperation, following a bottom-up strategy: the brand "Visit Chaves – Verín" as the first cross-border destination of the Iberian Peninsula.

Literature Review

Experience Model

The experience economy model developed by Pine and Gilmore (1999) has stood out among the various applications of the experimental view of consumer behaviour, considering four fundamental domains: Entertainment (passive, absorption), Educational (active, absorption), Escapist (active, immersion), and Aesthetic (passive, immersion), concluding that the richest experiences include aspects of all four realms. Pine and Gilmore (1998, 1999) agree that consumers increasingly buy experiences rather than products or services (figure 1). The vertical axis studies the connection of the consumer with experience (absorption and immersion); the horizontal axis addresses consumer participation in the tourist experience (passive and active). From the relationship between these four positions in relation to experience, the four realms evaluated emerge: entertainment, educational, aesthetics and escapist (evasion).

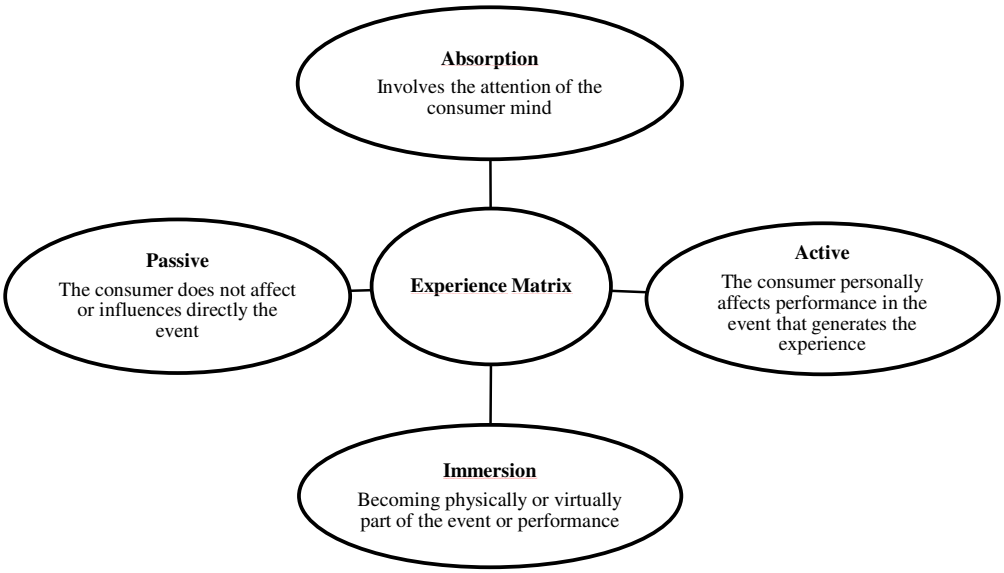

Figure 1: Experience realms in Tourism

Source: Pine & Gilmore (1998, 1999), Adapted

This model has already been applied in several types of tourist destinations, such as historical cultural routes, by Hayes and MacLeod (2007), in special events by Pullman and Gross (2003), and others. realmsThe incorporation of these four realms fully enriches the tourist experience as well as the memories associated with it, and the evaluation of the tourist experience (Gilmore and Pine, 2002), being the memorable tourist experiences associated with positivism, commitment to others, and acquisition of new knowledge (Kim, 2010; Tung and Ritchie, 2011). Also, the positive evaluations concerning a tourist experience and resulting in a high degree of satisfaction have been investigated by authors such as Bigné et al. (2001), Bigné and Andreu (2004), Mendes et al. (2010), Eusébio and Vieira (2011), among others, being determinant in the positive consequences on the behavioural intention of the visitor/tourist, which materialize in the intention to recommend and return to the destination visited. Based on the main objective, the partial objective was defined "to identify the relationships between the characteristics of the trip, the individual profile and the respective perception of the experience based on the 4 E's, on the behavioural intentions of tourists, in particular, in the intention of recommending the destination".

Methodology and Results

Based on the studies by Gilmore (1999), Pine and Gilmore (1999), Bigné, et al. (2001), Gilmore and Pine (2002), Pullman and Gross (2003), Bigné and Andreu (2004), Hayes and MacLeod (2007), Tussyadiah and Fesenmair (2009), Kim (2010), Mendes et al. (2010), Eusébio and Vieira (2011), Tung and Ritchie (2011), the objectives related to visitors/tourists were established, and the main objective of the research was to evaluate the tourist experience in the Eurocity Chaves – Verín region. The sample consists of 166 elements. 87 tourists/visitors were surveyed in Chaves (52.4%) and 79 visitors/tourists in Verín (47.6%).

Table 1: Sample individual profile

	Frequency	Percentage
Chaves	87	52,4
Verín	79	47,6
Total	166	100,0

Gender	Frequency	Percentage
Male	57	34,3
Female	109	65,7
Age	Frequency	Percentage
18-24	11	6,6
25-34	15	9,0
35-44	66	39,8
45-54	58	34,9
55-64	9	5,4
+65	7	4,2

Qualifications	Frequency	Percentage
Ensino secundário	49	29,5
Curso médio	7	4,2
Ensino superior ou equivalente	110	66,3
Rendimento mensal ilíquido (Individual)	Frequency	Percentage
Até 1000 €	39	26,0
1001 – 2000 €	60	40,0
2001 – 3000 €	50	33,3
> 3000 €	1	,7
NS/NR	16	9.6
Região de Origem	Frequency	Percentage
Portugal	85	51,2
Espanha	72	43,4
Internacional	9	5,4
Total	166	100,0

Source: compiled by the authors

Based on the main objective, this research proposed an Hypothesis: **H1-**The length of stay, the tourist resources visited, and the individual profile of the tourist positively influence the perception of the 4E's and the intention to recommend the destination.

Dependent Variables (DVs) and Independent Variables (quantitative factors) are presented:

1. Dependent Variables (DVs):

Educational Realm
Evasion Realm
Aesthetic Realm
Entertainment Realm
Intention to recommend the destination

2. Independent Variables (quantitative factors):

11. Length of stay (nights)
12. Eurocity is the main destination or a route area
13. Tourism Resources
13.1 Religious heritage/ Religious festivals/ Pilgrimages
13.2 Thermal Spa
13.3 Museums
13.4 Natural spaces/Landscape/Nature
13.5 Way of Saint James
13.6 Gastronomy
13.7 Gastronomy and Wine
13.8 Hotel offer
13.9 Tourist routes
1. Gender
2. Age (years)
3. Qualifications
4. Gross monthly income (Individual)
5. Country of Origin

For Visitors/Tourists of Chaves:

Table 2: Tests of Effects between Subjects

Source	DV	Sum of Square	gl	Square Average	F	p	*Partial Eta²*
Model	Educational Realm	86,332(a)	18	4,796	31,872	** 0,000	0,898
	Evasion Realm	45,870(b)	18	2,548	49,054	** 0,000	0,931
	Aesthetic Realm	14,450(c)	18	,803	13,478	** 0,000	0,789
	Entertainment Realm	77,103(d)	18	4,283	47,891	** 0,000	0,930
	Intention to recommend	37,512(e)	18	2,084	42,824	** 0,000	0,922
Interception	Educational Realm	41,347	1	41,347	274,763	** 0,000	0,809
	Evasion Realm	25,303	1	25,303	487,060	** 0,000	0,882
	Aesthetic Realm	36,277	1	36,277	609,067	** 0,000	0,904
	Entertainment Realm	27,226	1	27,226	304,396	** 0,000	0,824
	Intention to recommend	65,369	1	65,369	1343,248	** 0,000	0,954
a.11 Length of Stay	Educational Realm	42,965	2	21,482	142,757	** 0,000	0,815
	Evasion Realm	18,073	2	9,037	173,951	** 0,000	0,843
	Aesthetic Realm	6,149	2	3,075	51,621	** 0,000	0,614
	Entertainment Realm	23,893	2	11,947	133,567	** 0,000	0,804
	Intention to recommend	6,291	2	3,145	64,631	** 0,000	0,665
A12.Eurocity main destination or route area	Educational Realm	2,827	1	2,827	18,786	** 0,000	0,224
	Evasion Realm	1,842	1	1,842	35,457	** 0,000	0,353
	Aesthetic Realm	1,018	1	1,018	17,087	** 0,000	0,208
	Entertainment Realm	1,465	1	1,465	16,378	** 0,000	0,201
a13.3Museums	Educational Realm	3,711	1	3,711	24,661	** 0,000	0,275
	Evasion Realm	,699	1	,699	13,461	** 0,000	0,172
	Aesthetic Realm	,644	1	,644	10,820	** 0,002	0,143
	Entertainment Realm	3,148	1	3,148	35,198	** 0,000	0,351
	Intention to recommend	,349	1	,349	7,163	** 0,009	0,099
a13.4 Natural spaces/Landscape/Nature	Educational Realm	17,789	1	17,789	118,213	** 0,000	0,645
	Evasion Realm	6,623	1	6,623	127,485	** 0,000	0,662
	Aesthetic Realm	,104	1	,104	1,747	0,191	0,026
	Entertainment Realm	7,003	1	7,003	78,293	** 0,000	0,546
	Intention to recommend	27,380	1	27,380	562,620	** 0,000	0,896
a13.5 Way of Saint James	Educational Realm	4,840	1	4,840	32,165	** 0,000	0,331
	Evasion Realm	1,390	1	1,390	26,761	** 0,000	0,292
	Entertainment Realm	7,895	1	7,895	88,267	** 0,000	0,576
	Intention to recommend	1,325	1	1,325	27,233	** 0,000	0,295
a13.9Touristic Routes	Educational Realm	,907	1	,907	6,027	* 0,017	0,085
	Intention to recommend	,224	1	,224	4,596	* 0,036	0,066
a1. Gender	Educational Realm	,511	1	,511	3,395	0,070	0,050
	Evasion Realm	,223	1	,223	4,298	* 0,042	0,062
	Aesthetic Realm	,346	1	,346	5,810	* 0,019	0,082
	Entertainment Realm	,548	1	,548	6,130	* 0,016	0,086
a4. Gross monthly income	Educational Realm	,520	2	,260	1,728	0,186	0,050
	Evasion Realm	,164	2	,082	1,581	0,214	0,046
	Entertainment Realm	,672	2	,336	3,757	* 0,029	0,104
a.5Country of Origin	Educational Realm	1,043	2	,521	3,464	* 0,037	0,096
	Evasion Realm	,627	2	,313	6,031	** 0,004	0,157

a R^2 = ,898 (R^2 Adjusted = ,870) *p<0,05; **p<0,01 Source: own elaboration based on SPSS outputs

b R^2 = ,931 (R^2 Adjusted = ,912)

c R^2 = ,789 (R^2 Adjusted = ,730)

d R^2 = ,930 (R^2 Adjusted = ,910)

e R^2 = ,922 (R^2 Adjusted = ,901)

*For the global model, all Dependent Variables (DVs) are statistically significant (**p<0.01).*

By analysing the values of partial Eta squared (whose value is equal to the coefficient of determination r^2), we can also verify which dependent variables are most related to the independent variables, since this value represents the percentage of variation in the dependent variables that is explained by the independent variables.

Individually for each independent variable:

—to "11. Duration of stay" has a significant relationship with all DVs;
—to "12. Eurocity is the main destination or a route crossing area" has a significant relationship with all 4E's realms, but not with the "Intention to recommend the destination";
—of the tourist resources/ attractions you have visited/enjoyed, only the following statistically significant relationships are verified: between "13.3 Museums" and all DVs; between "13.4 Natural Spaces/Landscape/Nature" and the Educational, Evasion and Entertainment realms and the Intention to recommend destination; between "13.5 Ways of St. James" and the educational, evasion and entertainment realms and the Intention to recommend destination; between "13.9 Tourist routes" and the Educational realm and the Intention to recommend destination;
—the "1. Gender" has a significant relationship with the Evasion, Aesthetics and Entertainment realms.
—the "4. Gross monthly income" has a significant relationship with the Entertainment realm.
—the "5. Country of Origin" has a significant relationship with the educational and evasion realms.
—to "2. Age" and the "3. Qualifications" have no significant relationship with the DVs.

Table 3: Estimates of model parameters

DV	Factor	B	Standard Error	t	p
Educational Realm	Interception	3,985	,448	8,896	** 0,000
	[a11. Length of stay=1]	-1,824	,562	-3,248	** 0,002
	[a11. Length of stay =2]	-1,845	,374	-4,933	** 0,000
	[a12.Eurocity_main destination or route area=1]	-1,334	,308	-4,334	** 0,000
	[a13.3Museums=0]	1,621	,326	4,966	** 0,000
	[a13.4Natural Spaces_Landscape_Nature=0]	1,521	,140	10,873	** 0,000
	[a13.5Way of Saint James=0]	-1,829	,323	-5,671	** 0,000
	[a13.9Touristic routes=0]	,464	,189	2,455	* 0,017
Evasion Realm	Interception	3,135	,263	11,914	0,000
	[a11. Length of stay =1]	-,733	,330	-2,220	* 0,030
	[a11. Length of stay=2]	-,857	,220	-3,901	** 0,000
	[a11. Length of stay=3]	,723	,211	3,432	** 0,001
	[a12. Eurocity_main destination or route area =1]	-1,077	,181	-5,955	** 0,000
	[a13.3Museums=0]	,704	,192	3,669	** 0,000
	[a13.4 Natural Spaces_Landscape_Nature =0]	,928	,082	11,291	** 0,000
	[a13.5Way of St. James=0]	-,980	,190	-5,173	** 0,000
	[a1. Gender=1]	,142	,069	2,073	* 0,042
	[a5. Country of Origin=2]	,524	,173	3,027	** 0,004
Aesthetic Realm	Interception	3,845	,282	13,646	0,000
	[a11. Length of stay=1]	-1,283	,353	-3,630	** 0,001
	[a11. Length of stay=2]	-1,030	,235	-4,377	** 0,000
	[a12. Eurocity_main destination or route area =1]	-,801	,194	-4,134	** 0,000
	[a13.3Museums=0]	,676	,205	3,289	** 0,002
Entertainment Realm	Interception	3,211	,345	9,300	0,000
	[a11. Length of stay=1]	-,643	,433	-1,484	0,143
	[a11. Length of stay=2]	-,692	,288	-2,401	* 0,019
	[a11. Length of stay=3]	1,111	,277	4,017	** 0,000
	[a12. Eurocity_main destination or route area =1]	-,961	,237	-4,047	** 0,000
	[a13.1 Religious Heritage/Pilgrimage/Religious Festivals =0]	,144	,220	,656	0,514
	[a13.3Museums=0]	1,493	,252	5,933	** 0,000

DV	Factor	B	Standard Error	t	p
	[a13.4 Natural Spaces_Landscape_Nature =0]	,954	,108	8,848	** 0,000
	[a13.5 Way of St. James=0]	-2,336	,249	-9,395	** 0,000
	[a1. Gender=1]	,223	,090	2,476	* 0,016
	[a4. Gross Monthly Income =1]	-,385	,153	-2,507	* 0,015
Intention to Recommend the Destination	Interception	4,059	,255	15,936	0,000
	[a11. Length of stay=1]	-,270	,319	-,847	0,400
	[a11. Length of stay=2]	-,217	,213	-1,018	0,312
	[a11. Length of stay=3]	,699	,204	3,426	** 0,001
	[a12. Eurocity_main destination or route area =1]	-,292	,175	-1,667	0,100
	[a13.1 Religious Heritage/Pilgrimage/Religious Festivals =0]	-,262	,162	-1,619	0,110
	[a13.3 Museums=0]	,497	,186	2,676	** 0,009
	[a13.4 Natural Spaces_Landscape_Nature =0]	1,887	,080	23,720	** 0,000
	[a13.5 Way of St. James=0]	-,957	,183	-5,219	** 0,000
	[a13.9 Touristic Routes=0]	,230	,107	2,144	* 0,036

Source: own elaboration based on SPSS outputs *$p<0,05$; **$p<0,01$*

For statistically significant relationships, it is verified that:

— to "11. Length of stay (nights)" being "No overnight" causes a decrease of 1.824 in the DV Educational Realm, compared with "from 5 to 10", to "11. Length of stay (nights)" being "From 1 to 2" causes a decrease of 1.845 in the DV Educational Realm, compared with overnight stay "from 5 to 10", that is, the Educational Realm is lower for those who do not sleep overnight and for those who pass from 1 to 2 nights compared to those who spend "5 to 10" nights, statistically significant;

— to "12. The Eurocity" being "Main Destination" causes a decrease of 1,334 in the DV Educational Realm, compared to being "Route Area", i.e. the Educational Realm is lower for those who have Eurocity as their main destination, in a statistically significant way;

— not visiting "13.3 Museums" causes an increase of 1,621 in the DV Educational Realm, compared to visiting this resource, that is, the Educational Realm is superior for those who do not visit Museums, statistically significant, contrary to what would be expected given that it is a tourist resource that is associated with the Educational Realm;

— not visiting "13.4 Natural Spaces/Landscape/Nature" causes an increase of 1,521 in the DV Educational Realm, compared to visiting this resource, that is, the Educational Realm is superior for those who do not visit Natural Spaces/Landscape/Nature, in a statistically significant way;

— not visiting "13.5 Way of Saint James" causes a decrease of 1,829 in the DV Educational Realm, compared to visiting this resource, that is, the Educational Realm is superior for those who visit Way of Saint James, in a statistically significant way;

— not visiting "13.9 Touristic Routes" causes an increase of 0.464 in the DV Educational Realm, compared to visiting this resource, that is, the Educational Realm is superior for those who do not visit Tourist Routes, in a statistically significant way;

— to "11. Length of stay (nights)" being "from 3 to 5" causes an increase of 0.699 in the DV Intention to recommend the destination, compared with "from 5 to 10", that is, the Intention to recommend the destination is higher for those who pass 3 to 5 nights compared to those who spend "5 to 10" nights, statistically significant;

— not visiting "13.3 Museums" causes an increase of 0.497 in the DV Intention to recommend the destination, compared to visiting this resource, ie the Intention to recommend the destination is superior to those who do not visit Museums, in a statistically significant way;

— not visiting "13.4 Natural Spaces/ Landscape/Nature" causes an increase of 1,887 in the DV Intention to recommend the destination, compared to visiting this resource, that is, the Intention to recommend the destination is superior to those who do not visit Natural Spaces/Landscape/Nature, in a statistically significant way;

— not visiting "13.5 Way of Saint James" causes a decrease of 0.957 in the DV Intention to recommend the destination, compared to visiting this resource, that is, the Intention to

recommend the destination is superior to those who visit “Way of Saint James”, in a statistically significant way;

— not visiting "13.9 Touristic routes" causes an increase of 0.230 in the DV Intention to recommend the destination, compared to visiting this resource, ie the Intention to recommend the destination is superior to those who do not visit Tourist routes, statistically significant.

Therefore, in conclusion:

For the city of Chaves, the "Hypothesis H1: The length of stay, the tourist resources visited and the individual profile of the tourist positively influence the perception related to the 4E's and the intention to recommend the destination", is confirmed for the statistically significant relationships listed above.
Assumptions of the MANOVA model (when qualitative variables are used as factors):

To analyse the assumption of homogeneity of variances of dependent variables (DVs) between the groups, the Levene test is used, which tests the null hypothesis that the variance of the DVs remains constant in the various categories studied.

Table 4: Levene test for homogeneity of variances

	F	*gl1*	*gl2*	*P*
Educational Realm	26,880	83	66	** 0,000
Evasion Realm	9,577	83	66	** 0,000
Aesthetic Realm	2,145	83	66	** 0,001
Entertainment Realm	24,193	83	66	** 0,000
Intention to recommend the destination	3,662	83	66	** 0,000

Source: own elaboration based on SPSS outputs *** p < 0,01*

The results indicate the rejection of the hypothesis of equality of variances within the groups for all DVs ($p<0.05$). Thus, there is no assumption of homogeneity of variances. However, since the sample under study can be considered large, the non-verification of this assumption does not invalidate the results obtained. To apply this model, it is necessary to verify the assumption of normality of the distribution of standardized residues of the model, with the K-S test.

Table 5: Assumption of normal distribution of standardized waste of the model, with the K-S test

	K-S (a)		
	Statistics	Gl	Proof value
Standardized Waste: Educational Realm	,141	84	** ,000
Standardized Waste: Evasion Realm	,191	84	** ,000
Standardized Waste: Aesthetic Realm	,123	84	** ,000
Standardized Waste: Entertainment Realm	,159	84	** ,000
Standardized Waste: Intention to recommend the destination	,215	84	** ,000

a Lilliefors significance correction ***p<0.01* *Source: own elaboration based on SPSS outputs*

The normality of the distribution of standardized residues does not occur, because the test value is less than 5%, so the null hypothesis is rejected. However, as the sample is large, the non-verification of this assumption does not bring problems for the developed model.
For Visitors/Tourists from Verín:

Table 6: Tests of Effects between Subjects

Fonte	DV	Sum of squares	gl	Average of Square	F	p	*Partial Eta²*
Model	Educational Realm	77,298(a)	13	5,946	49,360	** 0,000	0,925
	Evasion Realm	40,831(b)	13	3,141	56,523	** 0,000	0,934
	Aesthetic Realm	12,421(c)	13	,955	4,824	** 0,000	0,547
	Entertainment Realm	42,580(d)	13	3,275	42,140	** 0,000	0,913
	Intention to recommend destination	16,567(e)	13	1,274	7,872	** 0,000	0,663
Interception	Educational Realm	32,996	1	32,996	273,911	** 0,000	0,840
	Evasion Realm	19,065	1	19,065	343,092	** 0,000	0,868
	Aesthetic Realm	33,085	1	33,085	167,022	** 0,000	0,763
	Entertainment Realm	20,096	1	20,096	258,559	** 0,000	0,833
	Intention to recommend destination	53,904	1	53,904	332,988	** 0,000	0,865
a11. Length of Stay	Educational Realm	11,984	1	11,984	99,488	** 0,000	0,657
	Evasion Realm	4,841	1	4,841	87,122	** 0,000	0,626
	Aesthetic Realm	1,764	1	1,764	8,904	** 0,004	0,146
	Entertainment Realm	7,799	1	7,799	100,340	** 0,000	0,659
	Intention to recommend destination	2,358	1	2,358	14,565	** 0,000	0,219
a13.4 Natural spaces/Landscape/ Nature	Educational Realm	1,601	1	1,601	13,295	** 0,001	0,204
	Evasion Realm	,321	1	,321	5,783	* 0,020	0,100
	Aesthetic Realm	,228	1	,228	1,152	0,288	0,022
	Entertainment Realm	,750	1	,750	9,652	** 0,003	0,157
	Intention to recommend destination	3,085	1	3,085	19,056	** 0,000	0,268
a2. Age	Educational Realm	,095	3	,032	,264	0,851	0,015
	Evasion Realm	,124	3	,041	,747	0,529	0,041
	Aesthetic Realm	2,453	3	,818	4,128	* 0,011	0,192
	Intention to recommend destination	3,727	3	1,242	7,674	** 0,000	0,307

a R^2 = ,925 (R^2 Adjusted = ,906) *p<0,05; **p<0,01 Source: own elaboration based on SPSS outputs
b R^2 = ,934 (R^2 Adjusted = ,917)
c R^2 = ,547 (R^2 Adjusted = ,433)
d R^2 = ,913 (R^2 Adjusted = ,892)
e R^2 = ,663 (R^2 Adjusted = ,579)

For the global model, all DVs are statistically significant (**p<0.01). By analyzing the values of partial Eta squared (whose value is equal to the coefficient of determination r^2), we can also verify which dependent variables are most related to the independent variables, since this value represents the percentage of variation in the dependent variables that is explained by the independent variables. Individually for each independent variable:

- to "11. Duration of stay" has a significant relationship with all DVs;
- to "12. Eurocity is the main destination or a route crossing area" has no significant relationship with the DVs;
- of the tourist resources/ attractions you have visited/enjoyed, there is only a statistically significant relationship between "13.4 Natural Spaces/ Landscape/ Nature" and the Educational, Evasion and Entertainment realms and the Intention to recommend the destination.
- to "2. Age" presents a significant relationship with the Aesthetic realm and the Intention to recommend the destination.
- the "1. Gender," the "3. Qualifications" or "4. Gross monthly income" and "5. Country of Origin" has no significant relationship with the DVs.

Table 7: Estimates of model parameters

DV	Factor	B	Standard Error	t	p
Educational Realm	Interception	6,004	,403	14,893	0,000
	[a11.Length of Stay=1]	-2,726	,327	-8,332	** 0,000
	[a11. Length of Stay =2]	-2,752	,276	-9,974	** 0,000
	[a13.1 Religious heritage/Religious festivals/Pilgrimages =0]	-1,715	,151	-11,394	** 0,000
	[a13.4 Natural Spaces/Landscape/Nature =0]	1,790	,491	3,646	** 0,001
Evasion Realm	Interception	4,691	,274	17,135	0,000
	[a11. Length of Stay =1]	-1,758	,222	-7,911	** 0,000
	[a11. Length of Stay =2]	-1,749	,187	-9,334	** 0,000
	[a13.1 Religious heritage/Religious festivals/Pilgrimages =0]	-1,956	,102	-19,134	** 0,000
	[a13.4 Natural Spaces/Landscape/Nature =0]	,802	,333	2,405	* 0,020
Aesthetic Realm	Interception	4,739	,517	9,167	** 0,000
	[a11. Length of Stay =1]	-,991	,420	-2,361	* 0,022
	[a11. Length of Stay =2]	-1,056	,354	-2,984	** 0,004
Entertainment Realm	Interception	4,825	,324	14,903	0,000
	[a11. Length of Stay =1]	-2,171	,263	-8,263	** 0,000
	[a11. Length of Stay =2]	-2,220	,222	-10,017	** 0,000
	[a13. Religious heritage/Religious festivals/Pilgrimages =0]	-1,467	,121	-12,129	** 0,000
	[a13.4 Natural Spaces/Landscape/Nature =0]	1,225	,394	3,107	** 0,003
Intention to Recommend the Destination	Interception	5,374	,467	11,500	0,000
	[a11. Length of Stay =1]	-1,223	,379	-3,224	** 0,002
	[a11. Length of Stay =2]	-1,221	,320	-3,816	** 0,000
	[a13. Religious heritage/Religious festivals/Pilgrimages =0]	-,509	,175	-2,918	** 0,005
	[a13.4 Natural Spaces/Landscape/Nature =0]	2,484	,569	4,365	** 0,000
	[a4. Gross Monthly Income =2]	-,335	,146	-2,299	* 0,026

Source: own elaboration based on SPSS outputs **p<0,05; **p<0,01*

For statistically significant relationships, it is verified that:

- to "11. Length of the stay (nights) "Without overnight" causes a decrease of 2,726 in the DV Educational Realm, compared with "from 5 to 10", to "11. Duration of stay (nights) "From 1 to 2" causes a decrease of 2,752 DV Educational Realm, compared with overnight "from 5 to 10", that is, the Educational Realm is lower for those who do not sleep overnight and for those who pass from 1 to 2 nights compared to those who spend "5 to 10" nights, statistically significant;
- not visiting "13.1 Religious heritage/Religious festivals/Pilgrimages" causes a decrease of 1,715 in the DV Educational Realm, compared to visiting this resource, that is, the Educational Realm is superior for those who visit religious heritage/Religious festivals/Pilgrimages, in a statistically significant way;
- not visiting "13.4 Natural Spaces/Landscape/Nature" causes an increase of 1,790 in the DV Educational Realm, compared to visiting this resource, that is, the Educational Realm is superior for those who do not visit Natural Spaces/Landscape/Nature, in a statistically significant way;
- the reading of statistically significant relationships between the variables under study and the other realms is made in a similar way to the previous ones.
- to "11. Length of stay (nights) "without overnight stay" causes a decrease of 1.223 in the DV Intention to recommend the destination, compared with "from 5 to 10", to "11. Length of stay (nights) "from 1 to 2" causes a decrease of 1.221 in the DV Intention to recommend the destination, compared with "from 5 to 10", that is, the Intention to recommend the destination is lower for those who do not sleep overnight or who pass from 1 to 2 nights compared to those who spend "5 to 10" nights, statistically significant;
- not visiting "13.1 Religious heritage/Religious Festivals/Pilgrimages" causes a decrease of 0.509 in the DV Intention to recommend the destination, compared to visiting this resource, that is, the Intention to recommend the destination is superior for those who visit the religious heritage/Religious Festivals/Pilgrimages, in a statistically significant way;
- not visiting "13.4 Natural Spaces/Landscape/Nature" causes an increase of 2,484 in the DV Intention to recommend the destination, compared to visiting this resource, that is, the Intention

to recommend the destination is superior for those who do not visit Natural Spaces / Landscape / Nature, in a statistically significant way;

— the "4. Net monthly income (Individual)" being "1001 – 2000 €" causes a decrease of 0.335 in the DV Intention to recommend the destination, compared to "> 3000 €", i.e. the Intention to recommend the destination is lower for those with illiquid monthly income between "1001 – 2000 €" compared to those who have "> 3000 €", statistically significant.

Therefore, in conclusion, the "Hypothesis H1 for Verín: The length of stay, the tourist resources visited and the individual profile of the tourist positively influence the perception related to the 4E's and the intention to recommend the destination", for the statistically significant relationships listed above.
Assumptions of the MANOVA model (when qualitative variables are used as factors):

Table 8: Levene test for homogeneity of variances

	F	*gl1*	*gl2*	*P*
Educational Realm	6,335	34	31	** 0,000
Evasion Realm	3,743	34	31	** 0,000
Aesthetic Realm	2,877	34	31	** 0,002
Entertainment Realm	10,508	34	31	** 0,000
Intention to recommend the destination	3,600	34	31	** 0,000

*Source: own elaboration based on SPSS outputs ** p < 0,01*

The results indicate the rejection of the hypothesis of equality of variances within the groups for all DVs ($p<0.05$). Thus, there is no assumption of homogeneity of variances. However, since the sample under study can be considered large, the non-verification of this assumption does not invalidate the results obtained.

Table 9: the assumption of normal distribution of standardized residuals of the model, with the K-S test

	K-S (a)		
	Statistics	Gl	Proof value
Standardized Waste: Educational Realm	,289	66	** 0,000
Standardized Waste: Evasion Realm	,240	66	** 0,000
Standardized Waste: Aesthetic Realm	,217	66	** 0,000
Standardized Waste: Entertainment Realm	,145	66	** 0,002
Standardized Waste: Intention to recommend the destination	,130	66	** 0,007

*a Lilliefors significance correction **p<0.01 Source: own elaboration based on SPSS outputs*

There is no normality of the distribution of standardized waste as in the previous case. However, as the sample is large, the non-verification of this assumption does not bring problems to the developed model.

Conclusion

The objective of this research was to identify the relationships between the characteristics of the trip, the individual profile and their perception of the experience based on the 4 E's, on the behavioural intentions of tourists: **H1**-The length of stay, the tourist resources visited, and the individual profile of the tourist positively influence the perception of the 4E's and the intention to recommend the destination.

Dependent Variables (DVs) were established for the analysis of this hypothesis: Educational Realm; Realm Evasion; Aesthetic Realm; Realm Entertainment; Intention to recommend the destination; and Independent Variables (quantitative factors): Length of stay (nights), Eurocity is the main destination or a route crossing area, Religious heritage/Religious Festivals/Pilgrimages, Thermal Spas, Museums,

Natural Spaces/Landscape/Nature, Way of St. James, Gastronomy, Gastronomy and Wine, Hotel Offer, Touristic Routes, Gender, Age, Qualifications, Gross Monthly Income (Individual), and Country of Origin. In the evaluation of the data obtained in Chaves and Verín, for the global model, all The DVs are related to the independent variables, statistically significant (**p<0.01).

For the destination Chaves and in the analysis in H1, it is observed, for statistically significant relationships, for example: the Educational Realm is lower for those who do not sleep overnight and for those who pass from 1 to 2 nights compared to those who pass from 5 to 10 nights, and for those who have Eurocity as their main destination, and superior for those who do not visit Museums, contrary to what would be expected given that it is a tourist resource that is associated with the Educational Realm, for those who do not visit Natural Spaces/Landscape/Nature, for those who do not visit Touristic Routes, and for those who visit the Ways of Santiago. The intention to recommend the destination is superior for those who spend 3 to 5 nights compared to those who spend 5 to 10 nights, for those who do not visit Museums, for those who do not visit Natural Spaces/Landscape/Nature, for those who do not visit Tourist routes, and for those who visit the Way of St. James.

With regard to the data obtained in Verín, and for the statistically significant relationships, it is verified, for example, that: the Educational Realm is lower for those who do not stay overnight and for those who spend 1 to 2 nights compared to those who spend 5 to 10 nights; and is superior for those who visit religious heritage/Religious festivals/Pilgrimages, and for those who do not visit Natural Spaces/Landscape/Nature. The intention to recommend the destination is lower for those who do not stay overnight or who spend 1 to 2 nights compared to those who spend 5 to 10 nights and for those who have an illiquid monthly income between 1001 – 2000 € compared to those who have more than 3000 €. The Intention to recommend the destination is superior for those who visit the religious heritage/ Religious Festivals/Pilgrimages, and for those who do not visit Natural Spaces/Landscape/Nature.

The discussion around the development of tourism activity in cross-border regions has been widely debated by regional DMO's and the scientific community. The joint valuation of tourist resources, transforming them into tourist products and joint promotion by the DMO's of both regions, Northern Portugal, and Galicia, should be considered, with a strong investment in the resources less valued in this research.

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Non-Financial Reporting Practices in The Chilean Healthcare Sector

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Abstract

Healthcare organizations from all over the world have recently developed a culture of sustainability by integrating social, environmental and economic concerns into their values, strategy and decision making process. Social responsibility and social responsiveness in the healthcare sector imply a new social dimension of care as well as new organizational patterns. Being a sustainable healthcare organization is more and more frequently communicated by issuing non-financial reports, containing information about social responsibility related activities. The aim of the paper is to examine the non-financial reporting practices among healthcare organizations in Chile. The aim was achieved through studying the GRI Sustainability Disclosure Database where non-financial reports are published and performing their content analysis. The key findings are the following: (1) non-financial reporting practices in the Chilean healthcare sector are not widespread, (2) all Chilean healthcare organizations chose to follow international reporting standards – Global Reporting Initiative (GRI) guidelines, and more specifically GRI G.3, GRI G3.1, GRI G4 and GRI Standards, (3) the majority of CSR disclosure categories are included in their non-financial reports, while the information regarding financial data on CSR, measurement of CSR and value created EC-1 are in most cases missing.

Keywords: Non-Financial Reporting, CSR Reports, Healthcare Sector, Chile

Introduction

Sustainability cannot be attained and entrenched in the culture of organizations without the application and balance of environmental, social, and economic elements (Ramirez et al., 2013). According to Block (2016), sustainability is best understood as actions designed to drive triple-bottom-line results around economic prosperity, environmental stewardship and social responsibility. He points out that healthcare organizations struggle with the design, development and implementation of a wide range of activities, supporting environmental and social sustainability, while simultaneously integrating them into their daily operations. Boone (2012) claims that sustainability in healthcare sector represents a particularly ambitious undertaking as it necessarily encompasses the wide variety of facilities, operations and activities in a typical healthcare organization. In his opinion, the scope and size of healthcare's social and environmental impact represent tremendous opportunities for the industry. Nevertheless, effectively implementing sustainability in healthcare organizations presents a unique challenge. He underlines that healthcare is one of the most complex and rapidly changing industries. Tehemar (2012) finds this industry one of the most operationally difficult. He emphasizes that corporate social responsibility (CSR) could play a major role by highlighting the performance of the healthcare organizations in a transparent and sincere way and result in better understanding from the community about the variety of challenges that this sector faces, such as stringent regulatory compliance, intense labor shortages in nursing, increased and costly technological advancements, implementation of international quality standards and substantial community dependence. The Report of the International Bioethics Committee of UNESCO on Social Responsibility and Health (2010) has addressed the concept of social responsibility in the context of healthcare, thus proposing its new paradigm.

As healthcare organizations pursue to evolve worldwide in search of improved quality outcomes, patient safety, cost-effective services, and equitable access to health services, stakeholders continue to demand a higher level of accountability and sustainability of care (Ramirez et al., 2013). Being sustainable (socially responsible) healthcare organization is more and more frequently communicated

by issuing non-financial reports, containing information about CSR-related activities. The aim of the paper is to examine the non-financial reporting practices among healthcare organizations in Chile. The aim was achieved through studying the GRI Sustainability Disclosure Database where non-financial reports are published and performing their content analysis.

Non-Financial Reports Issued by Healthcare Organizations in Latin America

GRI Sustainability Disclosure Database comprises 2400 non-financial reports (CSR reports) published by 629 healthcare organizations from all over the world, including 809 reports issued by 245 organizations delivering healthcare services and 1591 reports prepared by 384 organizations involved in manufacturing and selling healthcare products. The empirical analysis shows an increased interest in publishing non-financial reports in the healthcare system in the last 10 years among Latin American countries. The first three reports related to social, environmental and economic activities were elaborated and issued in 2007 by Brazilian healthcare organizations. In subsequent years a growing number of CSR reports, prepared by organizations operating in the healthcare sector in Latin America, appearing in the GRI Sustainability Disclosure Database may be observed (Figure 1).

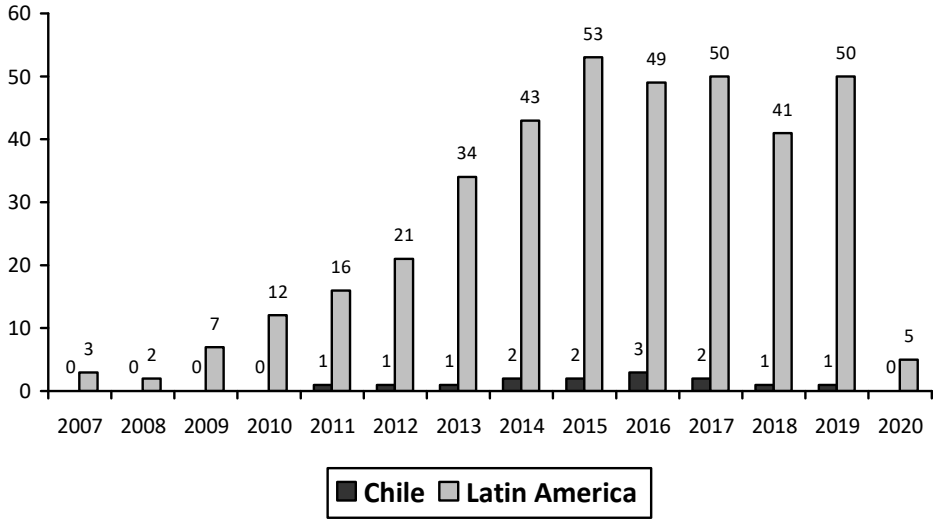

Figure 1: Number of non-financial reports issued in Latin America in 2007-2020

Source: own work based on https://database/globalreporting.org/

In total, 115 organizations from the healthcare sector in Latin America prepared and published 386 CSR reports in the GRI Sustainability Disclosure Database from 2007 to 2020: 60 organizations from Brazil, 19 from Colombia, 12 from Argentina, 7 from Peru, 5 from Chile, 5 from Mexico, 4 from Ecuador, 1 from Bolivia, 1 from Honduras, and 1 from Uruguay. The information for the last 3 reporting years (2018-2020) is incomplete due to ongoing data collection and the Standards Report Registration process. The idea of corporate social responsibility has recently become increasingly relevant in the healthcare context among Latin American countries, thus the growing interest in communicating about CSR involvement of healthcare organizations and a large number of CSR reports comparing to the first years when the non-financial reporting practices were recognized. A noticeable increase occurred in 2013, 2014 and 2015, respectively. Since 2015, when the number of non-financial reports amounted to 53, it remains roughly at the same level – approximately 50 CRS reports annually. Some healthcare organizations have just started their experience with the disclosure of CSR information, for others it is already a routine practice.

Results of the Conducted Research

In Chile, there is no legislation imposing the disclosure of CSR-related activities with respect to any organizations, regardless of their type, size or activity profile. Therefore, all CSR reporting initiatives are totally voluntary. As it may be noticed in the Figure 1, the values regarding Chilean healthcare organizations are not high. Non-financial reporting practices in the healthcare sector in Chile are not widespread. The Table 1 presents the name, size and type of five Chilean healthcare organizations disclosing non-financial information, the number of CSR reports issued in 2011-2020 and their number of pages, the guidelines according to which these reports were prepared, the statement if the report is the integrated one, if it was verified by the external auditor, and if it contains the contact person data.

Table 1: Characteristics of healthcare organizations and CSR reports issued in Chile in 2011-2020

Name	Size / Type	No of CSR reports	Year of publication	Guidelines	No of pages	Accessibility	Integrated reporting	External audit	Contact person
Clínica Ciudad del Mar	Large PC L HS	2	2018	GRI G4	95	Pdf file	-	-	√
			2017	GRI G4	99	Pdf file	-	-	√
Clinica Las Condes	SME PC NL HS	3	2017	GRI G4	103	Pdf file	-	-	√
			2016	GRI G4	204	Pdf file	-	-	√
			2015	GRI G4	135	Pdf file	-	-	√
Empresas SB	Large PC NL HP	3	2019	GRI Standards	62	Pdf file	-	-	√
			2016	GRI G4	92	Pdf file	-	-	√
			2015	GRI G3.1	108	Pdf file	-	-	√
Mas Vida	SME PC NL HS	4	2014	GRI G3.1	117	Online	-	-	√
			2013	GRI G3.1	-	-	-	-	-
			2012	GRI G3	-	-	-	-	-
			2011	GRI G3	-	-	-	-	-
Mutual de Seguridad CChC	Large NPO NL HS	2	2016	GRI G4	429	Pdf file	√	√	√
			2014	GRI G3.1	400	Pdf file	√	√	√

Source: own work based on https://database/globalreporting.org/

Legend: L – Listed; NL – Non-listed; NPO – Non-profit organization; PC – Private company; HS – Health services; HP – Health products

The first non-financial report issued in Chilean healthcare sector was elaborated in 2011 by private company delivering health services named Mas Vida. Unfortunately it is inaccessible, hence its analysis is not possible; the same applies to two consecutive CSR reports published in 2012 and 2103 by Mas Vida. Among all five Chilean healthcare organizations which reported their sustainability performance, two of them issued their reports for the second time, two for the third time, and one for the fourth time. 1 report–has only online version, while 10 were prepared and published in a traditional way in the form of separated reports. 2 reports were examined by external auditors and they constituted integrated reports. All five organizations chose to follow international reporting

standards – Global Reporting Initiative (GRI) guidelines, progressively evolved year after year (GRI G3, GRI G3.1, GRI G4, and GRI Standards).

A content analysis of CSR reports published by Chilean healthcare organizations in the GRI Sustainability Disclosure Database has been applied in order to examine the area of disclosures regarding environmental, social, and economic issues (Table 2).

Table 2: Area of disclosures in CSR reports issued by Chilean healthcare organizations

Name	Stakeholders	Clients / Patients	Employees	Local society	Environment & ecology	Values	Corporate governance	Code of ethics	Risk	Human rights	Business model	Anticorruption and bribery	Financial data on CSR	Negative impact	Measurement of CSR	Value created EC-1
Clínica Ciudad del Mar	√	√	√	√	√	√	√	√	√	√	-	√	-	√	-	-
Clinica Las Condes	√	√	√	√	√	√	√	√	√	-	√	√	-	√	-	-
Empresas SB	√	√	√	√	√	√	√	√	√	√	√	√	-	√	-	√
Mas Vida	√	√	√	√	√	√	√	√	√	√	√	√	-	√	-	√
Mutual de Seguridad CChC	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Source: own work

As it may be noticed, the main areas of disclosure, completed in 100% by each Chilean healthcare organization, are the following: stakeholders, clients (patients), employees, local society, environment and ecology, values, corporate governance, code of ethics, risk, anticorruption and bribery, negative impact. The content information of CSR reports differs only in a few categories: financial data on CSR and measurement of CSR, which are the most difficult to perform (only one healthcare organization undertook the effort to calculate and present them, probably because their reports were integrated), as well as value created EC-1, business model, and human rights.

Conclusions

Sustainability appears to be a complex and multidimensional organizational phenomenon, which consists on re-evaluating and recalibrating the relationship between the organization and its wider context. In the last decade, non-financial reporting appears as a new trend in healthcare organizations in Latin America. The number of CSR reports is growing and further countries start to communicate their CSR-related activities, and so does Chile. The key findings are the following: (1) non-financial reporting practices in Chilean healthcare sector are not widespread, (2) all Chilean healthcare organizations chose to follow international reporting standards – Global Reporting Initiative (GRI) guidelines, and more specifically GRI G.3, GRI G3.1, GRI G4 and GRI Standards, (3) the majority of CSR disclosure categories are included in their non-financial reports, while the information regarding financial data on CSR, measurement of CSR and value created EC-1 are in most cases missing. The research sample is small, so in the near future, the healthcare sector in Chile should be monitored and new non-financial reports, becoming available in the GRI Sustainability Disclosure Database, ought to be studied. In addition, the detailed level of conformity with the international guidelines and recommendations could be verified at the next stage of the study. A content analysis of these reports and a comparative analysis among non-financial reports, published by healthcare organizations form other Latin American countries, would be an interesting topic and could bring remarkable conclusions.

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Microservices, A Dynamic Response for Accelerating the Assessment of Patient-Centric E-health Solutions

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Abstract

Nowadays healthcare systems are undoubtedly relying on digital technology to support, improve and deliver medical services. The unceasing emerging of more performant technologies, together with the increased access to information, have led not only to enhanced healthcare delivery, but also to the augmented empowerment and awareness of the patients regarding the relationship with their healthcare providers, shifting that towards a partnership. In this context, the patient-centric feature of eHealth solutions has strengthened and become imperative. Therefore, microservices, a relatively recent approach in software architecture, have been more and more chosen to accelerate the assessment of this category of solutions. Their particular characteristics drive to improvements in terms of efficiency, scalability, composability, resiliency, or flexibility of the developed eHealth solutions. Not least, microservices facilitate a real customization of the functions and capabilities of eHealth applications. This paper aims to emphasize the main aspects related to microservices and their closed link with patient-centric eHealth solutions. The added value brought by microservices in this area is endorsed by the brief presentation of RO-SmartAgeing system, which main objective is to framework a remote monitoring in a smart environment in order to allow an elderly person to continue his life with dignity in a familiar space, while receiving the best health surveillance, treatment and physical support. RO-SmartAgeing system is currently developed by the author together of a team from ICI-Bucharest; as it is in the general architecture design phase, the involved developers aim to take advantage of the opportunities provided by microservices in order to lend it well-defined features like scalability and flexibility to make it age-friendly and customizable.

Keywords: Microservices, E-health, Patient-Centric, Empowered Patient.

Introduction

Information and Communication Technologies (ICT) have become a *sine qua non* reality in our present-day life, therefore in the healthcare landscape all over the world. ***eHealth*** is defined by World Health Organization (WHO) as the use of ICT in large health-related areas like treating patients, pursuing research, public health, health education etc. (eHealth at WHO, 2019]).

eHealth implies the implementation and the use of digital tools, technologies and devices for sustaining, supporting and promoting diagnosis of diseases, treatments, preventative strategies, health and daily behavior.

The three main functions associated with eHealth according to (van der Kleij R.M.J.J. et al., 2019) can be extended to:

a. monitoring health status, environmental and lifestyle parameters;
b. collecting and communicating data and information;
c. applying analytics, getting insights for supporting healthcare procedures;
d. providing (smart) support for medical decision-making;
e. sustaining the identification and implementation of preventative and diagnosis methods and protocols;

f. ensuring appropriate healthcare managements and business models for good practices, health strategies and programs.

There are a number of issues that have a direct and dynamic impact on an adequate evolution of eHealth: healthcare and ICT developments, medical research advances, health and ICT literacy of patients and health professionals, digital infrastructure, access to internet and ICT, the lack of unitary standardization in the field, national and cross-border interoperability, security, privacy and confidentiality of health data, ethical aspects, and last, but not least, patient empowerment that leads to a shift of the healthcare systems towards a patient-centric approach (Ianculescu, Alexandru, and Rădulescu, 2018).

The broader access to health information, the growing skills of an increasing number of populations in daily use of ICT have led to the rising of a well-aware and informed patient that is willing to be better informed and to have better access to more opportunities related to his health status. Consequently, the relationship with the doctor has converged to a partnership and the eHealth solutions have been developed more and more with the patient in their core.

Microservices (microservice architecture as is also called) is a quite recent approach for designing and developing software applications that allow the functionalities of the application to be associated uniquely to a single well-established component. Basically, the loosely coupled components that communicate with each other through Application Programming Interfaces (APIs) are the architectural solution for making the complex applications more efficient from many points of view as an independent deployment, fault tolerant or readiness for market (Nadareishvili I. et al., 2016). Microservices come with the solid potential of being usable and quickly adaptable to vary contexts in short time, with fewer human resources and with less financial effort.

This paper aims to highlight the added-value of microservices in the nowadays eHealth domain. In section 2 the main principles that characterize microservices are presented. Section 3 introduces the benefits of choosing microservices for designing and developing eHealth solutions. Section 4 concentrates on a specific type of eHealth solution, namely the patient-centric one. In order to demonstrate the advantages brought by selecting microservices for those, an underdevelopment eHealth application – RO-SmartAgeing system - is briefly presented, emphasizing some main features. Section 4 concludes about the potential of microservices to push forward the eHealth solutions towards the requirements imposed by the higher engagement of the patients in the 21th century.

Fundamental Principles of Microservices

The Change from Monolithic Architecture to Microservices

A monolithic architecture implies that the application is built and developed as a single unit, and all the components, being tightly coupled, are developed and deployed as a whole item, as a single executable logical.

The main features of monolithic architecture are:

- there is a single codebase;
- since there is a unique programming language, the developers should all have good knowledge of it;
- data being centralized, a shift of data model has impact on the whole database;
- one function of the application depends on another one/ones;
- for debugging and upgrading the application (even when it's a matter of a single component) an updated version must be developed and redeployed; therefore, there is a restricted number of reuses;
- the application will be tested without external dependencies because all the components are inside;

- in earlier stages, a monolithic architecture has a lower level of complexity compared with the one gained in time after multiple upgrading and increased size and functionalities;
- because the components are tightly coupled, a single one can't be scaled, and thus the monolithic architecture can be scaled in only one dimension;
- it is difficult to migrate towards a new technology - or even an updated version of the same technology - because the entire application has to be re-written.

Taking into consideration the weakness of some of the above features, microservices approach entails when it comes about more complex applications that ask for individual component management.

"Microservice architecture is a style of engineering highly automated, evolvable software systems made up of capability-aligned microservices" (Nadareishvili I. et al., 2016). Each component has a single functionality and thus delivers a single service.

Some of the most consistent reasons for shifting from monolithic architecture to microservices are:

- increased scalability, deployment velocity and availability are obtained, mainly because of the opportunity to develop new components in cloud;
- as each component provides a single function/business capability, it can be many times reused in different contexts;
- augmented possibility to choose other technologies / programming languages for new components to be added to the already developed application;
- developers with different programming skills can be easily integrated in the team;
- cost-efficiency in terms of financial and human resources and speed to market.

Characteristics of Microservices

The wider spread of microservices approach is rooted by reliable characteristics presented as follows:

- well-defined organization around business capabilities;
- decentralized data management and standards;
- independently running multiple components;
- possible different codebases and technologies;
- autonomous developing;
- failure tolerance;
- self-sustaining monitoring and debugging capabilities for each service;
- optional security mechanisms for each service;
- decreased operational complexity;
- enabled evolutionary design for future unpredicted capabilities (Nadareishvili I. et al., 2016), (Kumar M., 2020), (Filip I. D. et al., 2018).

Benefits of Microservices

This architectural solution brings many benefits that make it appropriate for complex applications:

- as the most suitable programming language and technology can be chosen differently by the developers, the building of the application is faster, more accurate and cost-efficient;
- getting advantage of the opportunities brought by the emergence of new technology or versions is facilitated by the possibility of adding or upgrading a service without negative upshot on the existing ones, due to the independent feature of microservices;
- well-defined and strict component boundaries are very expedient for extended teams;
- integrating databases is dropped out as each service can have its own manageable database;
- faster and complete fault isolation leads to an uncompromised continuous functioning of the application;
- the unique business capability associated to each component allows it to be reused as another service either in the same application, or in a different one and contexts;

- the easier understandability of the capabilities of the application implies smaller, faster deployments and composability;
- improved scalability and performance are achieved (Taibi D. et al.., 2017), (Dragoni N. et al. (2018), (Hasselbring W. et al., (2017).

Disadvantages of Microservices

Despite the established advantages associated to microservices, there are some disadvantages that have to be taken into consideration for adopting this architectural style, namely:

- the developing and testing management of the whole application is more difficult and has to be attentively coordinated, since the communication among services is complex, there are multiple databases, each service has also to be tackled independently, different programming languages can be used, etc.;
- more diverse ICT skills of the developing team might be required;
- the more services are generated, the more resources are needed;
- the number of operations is increased;
- for a small company it might be too overwhelming to properly deal with the complexity of microservices.

Considerations for choosing the microservices for eHealth solutions

Advantages Brought by Microservices To E-health Solutions

Nowadays eHealth solutions have to meet the intricate problems arisen from the burden put on the healthcare systems by the increasing number of people, aging population, higher cost of medical services, lower number of professional caretakers, appearance of new diseases and drug-resistant aspects, etc.

Although there is a great amount of issues associated to a substantial number of diseases and health dysfunctionalities, a remarkable number of eHealth capabilities addressing some of these issues can be replicated with minimum changes, for a faster development of new ICT tools, devices, solutions or applications.

Microservices represent a practical and fruitful driver having the power to urge the development of comprehensive, agile and re-usable applications. Whether they are Hospital Information Systems, public health large systems, remote monitoring applications, or personalized patient-centric solutions, if they are built on microservices-based architecture, they have the potential to evolve quickly and effectively.

Health data is crucial in every aspect of healthcare systems (Dobre C. et al., 2019). Due to the burst of smart technology commonly used by average citizens and healthcare providers, the amount of health data has been reaching unexpected levels, opening new ways for innovation, including customization of medical procedures according to the patient particularities, but also enabling multiple entities that generate and absorb data.

The lack of a wide adoption of standards, established interoperability models, the need to respond faster than before to the dynamic requests for implementing new flexible models of good practice are some of the most important aspects that sustain the use of microservices in designing eHealth solutions.

According to a recent report (Transparency Market Research, 2020) the adoption of the microservices by the worldwide healthcare systems can be structured based on: component (i.e. platforms and services), deployment (i.e. cloud-based and on premise) , organization size (i.e. small & medium and healthcare organizations), end-user (i.e. healthcare providers, healthcare payers, life science

organizations, and clinical laboratories), and region (North America, Middle East & Africa, South America, Europe, and Asia Pacific).

The main advantages brought by microservices specifically to eHealth solutions are:

- the extensive use of Big Data and the compliance with the General Data Protection Regulation (GPPR) - in Europe - and HIPAA (Health Insurance Portability and Accountability Act (HIPAA) –in USA- regulations are easily accepted, because microservices are data and function-oriented;
- as data can be easier managed and drawn out, microservices provide capabilities for customizing the presentation of health data according to the specificities of the end-users;
- an augmented resiliency is gained due to the fault tolerance characteristics;
- they enable dynamic cross-functional teams with different skills and specializations able to reconfigure quickly an application by reusing components and adding new services obtained from adapting the former built components, gaining thus an accelerated time to healthcare market.

Microservices and use cases in healthcare domain

Microservices approach provides the opportunity to directly support the use cases for health data management.

For instance, a Healthcare Information System can be structured on sets of services appropriate for every specific applications like Clinical Information Management, Demographic Information Management, Picture Archiving And Communication System, Radiology Information System Laboratory Information Systems, Computerized Physician Order Entry, Clinical Decision Support, User Authentication, Medical Recording Apps, Scheduling (Gutierrez P. P., 2019). Once the Health Information System is developed on microservices-architecture, it has a strong portability feature, so it can be quite easily adapted and reused completely or partially in another medical unit located in another place, with another extent, structure or organization.

Regarding Electronic Medical Records and Electronic Health Records, where multiple categories of health specialists need different outcomes of the same centralized data, the use of microservices approach allow building highly modular applications, with loosely coupled components that can be aggregated in significant numbers of solutions able to respond to changing legal regulations, healthcare services and business needs (CitiusTech, 2018).

In the healthcare domain, microservices facilitate an enlarged development, fast deployment and rapid integration of emerging advances required by the extended use of Internet of Things (IoT), bioinformatics, Artificial Intelligence, Data mining, blockchain. As the services are more granular, they provide the capacity to build a highly composable new application according to the end-users needs.

Patient-Centric E-health Solutions Better Enabled by Microservices

Patient-centric approach in the landscape of eHealth

The more a patient is aware about the importance of adopting a sane behavior on daily-basis, preventative methods and habits, of improving his health-related knowledge through continuous informing, the more he is empowered and engaged in choosing the best decisions regarding his own health status. He becomes an informed and agile healthcare consumer that claims an improved control of the available resources for reaching the best personalized services.

Nowadays patient demands a more open relationship with his direct health providers which, in their turn, must evolve into team members ready to sustain patient involvement and choice. Deloitte has defined the profiles of eight archetypes of healthcare providers that underline the patient-centric approach (Gordon R. L. et al., 2019) (see Figure 1). In the light of patient empowerment, healthcare

providers should better take into consideration the patient's personal values and needs, should better adapt to his level of education and literacy for bridging the gaps, and, unquestionably, they must keep a close contact with the eHealth technologies and solutions that are unceasing progressing at a rapid pace.

A reliable patient-centric eHealth application should minimize the constraints in accessing health information and services; it must carefully choose the most appropriate and secure methods and technology to manage personal health data alongside the whole flow, from generating and collecting it, till it is analyzed by healthcare analytics to gain insights, support decision-making and predict risks of chronic disease; it should support a fast provision of related business models and good practices; it should be tailored according to the patient's personal health profile; it should drive to long-term cost efficiency.

A patient-centric approach implies designing eHealth solutions taking into account the patient's insights, data and information, the most convenient technology for obtaining high compliant functionalities and improved health outcomes. In this context, microservices represent one of the most suitable drivers for adjusting the patient-centric systems, applications or other types of eHealth solution able to meet all the above-mentioned challenges and requirements.

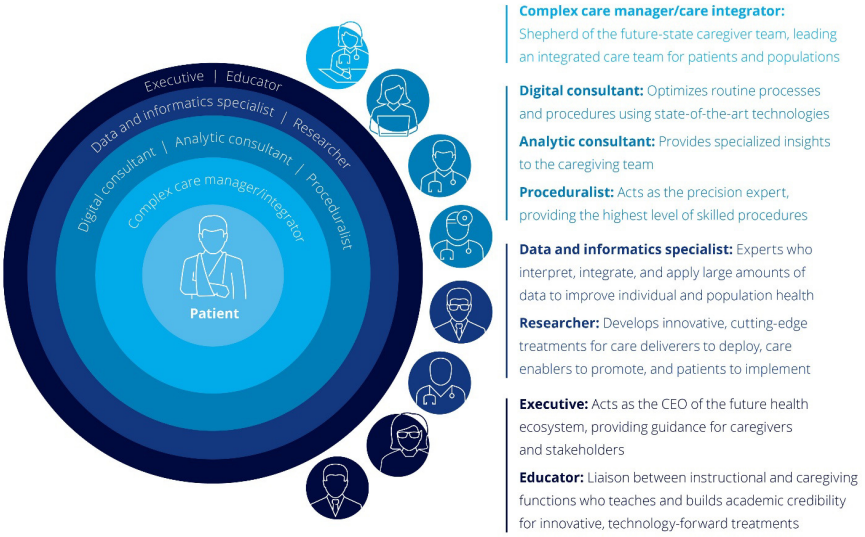

Figure 1: Nowadays patient, the main target of healthcare providers and eHealth solutions (Gordon R. L. et al., 2019)

Case study: How microservices can better trigger RO-SmartAgeing system

a. Brief introduction of RO-SmartAgeing System

"Non-invasive monitoring and health assessment of the elderly in a smart environment (RO-SmartAgeing)" is an is an underdevelopment project whose outcomes will be able to support the provision of more advanced elderly patient-centric healthcare services by facilitating the orientation of medical practice to prevention and personalized assistance (Ianculescu M. et al.., 2019).

The main objective of the RO-SmartAgeing system is to provide services for a better quality and safety of life at home of the elderly, to support him in daily activities, to create a monitoring system both for health status, lifestyle and daily activities, and for his home environment, as well as to improve the relationship between the elderly with caregivers, doctors and family.

The services provided can be expanded based on the needs of the elderly, adding with minimal effort, and new personalized services through extensible configurations or plug-ins (Alexandru et al., 2019). The implemented services will be integrated in the user interface. Interfaces for the elderly are intended to be created with a simple design to increase the usability of the system.

The most important general functionalities are:

- RO-SmartAgeing system is an independent system, capable of gathering, storing, displaying and transmitting (via a communication link) data and information about the elderly.
- It is a patient-centric eHealth solution that provides support for data storage-transmission, as well as real-time remote monitoring and consultations, creating a complete technological basis for a wide range of healthcare services;
- RO-SmartAgeing system is able to manage and store data and information, including, but not limited to, the registration of the elderly's health and environmental data, remote monitoring / consultations / diagnosis, based on the legislation in force;
- personal data is associated with unique identifiers for physicians, the elderly and caregivers;
- the physicians and caretakers of the elderly can view at any time his medical history, respectively his current health status;
- RO-SmartAgeing system ensures a secure manner of data exchange, which guarantees the validity of the data transmission and acceptance, the confidentiality and privacy of the elderly's personal data;
- the functions provided by RO-SmartAgeing system ensure support for personalized healthcare services as reports based on the evolution of the elderly's profile inside a smart environment, trigger alerts in case of emergencies, a database that can be analyzed with analytics tools for establishing customized preventative procedures or predictive models;
- RO-SmartAgeing system is designed to allow an easy integration with other systems from the Romanian Unique Integrated Information System (SIUI), in accordance with standards such as HL7 and applicable legislation;
- the architecture of RO-SmartAgeing system is designed to be scalable with modular functionality.

By implementing the project "Non-invasive monitoring system and assessment of the health of the elderly in a smart environment" (RO-SmartAgeing)" the following outcomes will be achieved: increased quality of life of the elderly by providing smart non-invasive remote services such as: monitoring, diagnostics, assistance for daily activities, trigger alerts; improved knowledge in the field of non-invasive smart services for the elderly, in the analysis and modeling of health and quality of life in relation to health, in evaluating the acceptance and usefulness of technological solutions in the field of healthcare.

The personalized smart environment for an elderly patient that is developed in this project integrates IoT technologies (physiological, motion and environmental sensors), data analytics and cloud computing technologies, interconnected digital devices able to provide services for sustaining the well-being of the elderly, continuous and remote monitoring of his daily activities, health status and safety (Alexandru and Coardos, 2018).

b. Added value of microservices to RO-SmartAgeing system

The main beneficiary of RO-SmartAgeing system is an elderly person. As it is known, an elderly is a person that may suffer from multiple diseases in different stages and might have different cognitive and physical age-related dysfunctionalities. In the same time, the type of disorders and the degree of dysfunctionalities is different and completely variable from one person to another. The reactions to a standard therapeutic protocol or preventative method are also distinct. Therefore, all these dissimilarities should be tackled in a customized manner in order to reach the best health outcomes.

RO-SmartAgeing aims to deliver personalized support for healthcare services, and thus the microservices approach matches perfectly to its objective and provides the necessary capabilities to build it.

The proposed architecture (see Figure 2) is designed around a group of loosely coupled microservices that allow an increased scalability, portability and maintenance of the system. Containers are associated to microservices for a faster and easier development, or cloud migration.

The microservices-based architecture of RO-SmartAgeing grants to this system some specific features like agility and scalability (as it can be easily adapted to different elderly persons), composability (it can be reused in reduced time), independent manageability (for every component), or increased efficiency.

Data Collection Layer has the purpose to create the framework for gathering the input data from physiological, motion and environmental sensors / IoT, from additional information given by the elderly himself (for instance, about his lifestyle or accidental behavior), or by the current physicians and caretakers.

The data is taken over by *API Gateway* and sent to *Data Analyzing Layer* where distinct microservices parse, validate, process and prepare it to be stored. REST API calls based on HTTP protocols were chosen for the communication model.

Data Storage Layer sets up specific tools for managing data, as a database storage engine, log files, etc. Data management is decentralized as each service uses its own database.

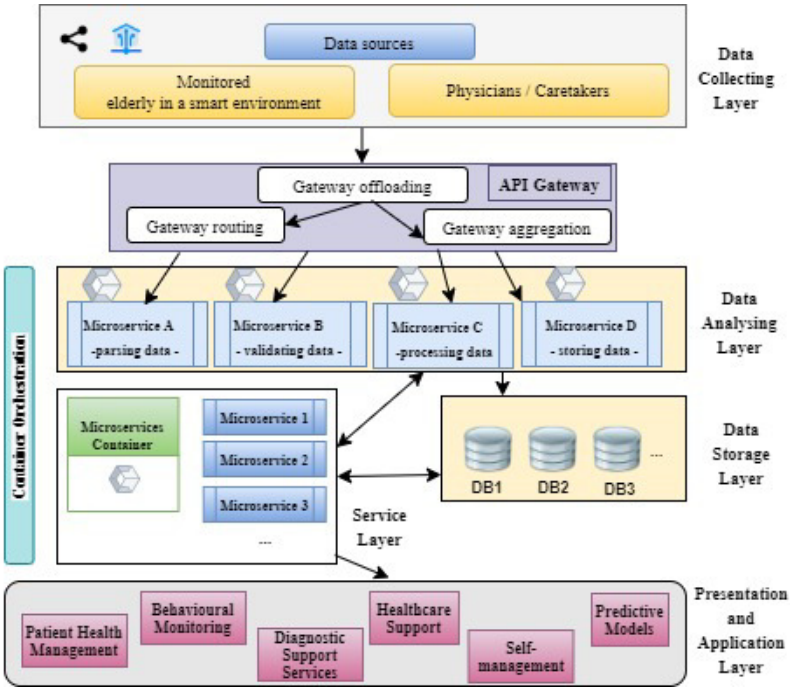

Figure 2: The architecture of RO-SmartAgeing system highlighting the microservices approach

Service Layer is the level where there are a flexible number of microservices with a single associated business task. They can be replicated for another business task, as it might be the management of different data gathered by another type of sensor.

Presentation and Application Layer includes all the patient-centric applications like patient health management, diagnostic support services, behavioral monitoring, predictive models for preventative health protocols, triggered alerts.

The *Container Orchestration* goal is to automate all the issues associated to coordination and management of the containers and their dynamic environment.

Each microservice is structured on several layers: Data Access, Business Logic, API Interface and User Interface. The API layer enables the client request to reach the microservice and the communication among microservices. The Business Logic layer deals with a unique functionality/task.

Each microservice can be written in a different programming language that best suits the envisaged functionality.

As each microservice is loosely coupled, it can be isolated, debugged or replaced without affecting the functionality of RO-SmartAgeing system. This resiliency feature is particularly useful for the remote monitoring that implies attentive and accurate continuous connection with the elderly patient. If something gets wrong somewhere along the flow of data management (from collecting it, till providing insights from it), the identified microservice is isolated, but the rest of monitoring process goes on unaffectedly.

Conclusions

The increasing advances and availability of digital technology and the growing engagement of the nowadays patients in the management of their health status have imposed the need to identify new ways to develop faster more personalized healthcare applications. Microservices have emerged as a dynamic answer for minimizing the limitations of monolithic architectures. Their associated features have made them appropriate for better development and deployment of eHealth solutions, including those with a patient-centric approach. This paper was intended to demonstrate the potential brought by microservices to the development of patient-centric eHealth solutions and the fact that they are consistent with the outcomes generated inside an underdevelopment research project, RO-SmartAgeing.

RO-SmartAgeing system is currently designed by a team from ICI-Bucharest in an ongoing research project (2019-2022) and it is in its third phase of development, i.e. the general architecture design. Taking into consideration that the elderly usually have manly co-morbidities and the fact that those can degenerate in quite short and unpredicted period of times, RO-SmartAgeing team has designed the architecture of the system so as to make it agile, adaptable, scalable and easily to be personalized according to the particularities of a specific elderly person, his/her lifestyle and home environment. RO-SmartAgeing system will be further developed and changed (if necessary) in the next phases of the project taking into account the emerging technologies that might become available.

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PGNiG SA as a Leading Enterprise in The Fuel and Gas Sector in the Polish Economy

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Abstract

The purpose of this article is to present the financial situation and the development prospects of PGNiG SA (Polskie Górnictwo Naftowe i Gazowe Spółka Akcyjna [Polish Oil and Gas Joint Stock Company]) as a leading enterprise in the fuel and gas sector in the Polish economy. The novelty of the article consists in diagnosing the state of the Polish economy during the ongoing systemic and economic transformation. The author puts forward the thesis that the driving force behind the development of the Polish economy are strong enterprises of strategic importance for the Polish state and with a large share of the State Treasury, such as PGNiG SA.

Keywords: Polish Economy, Financial Statements And Their Analysis, Energy Security, Oil And Gas.

JEL classification: G30, G39, M41

Introduction

The strength and stability of a country's economy depends on many factors. One of them are big and strong enterprises of strategic importance which constitute a driving force for the economy. In Poland, PGNIG SA (with 71.9% of its shares owned by the Treasury) can be seen as a model example of such enterprises. The company operates in the oil and gas sector and its mission is to ensure Poland's energy security and prevent the country from overreliance on gas supplies from only one source. The situation of this company was assessed on the basis of financial statements and their analysis. The novelty of the article consists in painting the picture of the financial situation of PGNiG SA as a company of strategic importance for Poland against the background of changes in the Polish economy and in terms of its future development. The limitation of this article lies in focusing the whole research on only one Polish company and conducting only a preliminary analysis of the company's financial statements.

The characteristics of the Polish political transformation and the Polish economy

The Polish economy has been undergoing the system transformation since 1989, moving from socialism to capitalism, from the so-called "planned economy" to the free market economy. The socialist system was imposed in Poland after the World War II, when the country was incorporated into the Eastern Bloc, dominated by the USSR. The transformation period has not finished yet and has brought all kinds of defects, mistakes, scandals and costs, but also numerous advantages and social, economic and political benefits. On 1st May 2004 Poland joined the European Union in order to be able to act in the community of the European states and in the common European market, as well as in order to regain its due place in Europe, to which it has belonged for a thousand years. The accession was preceded by long-term pre-accession negotiations and depended on Poland's ability to meet numerous requirements. The EU was enlarged not only by Poland, but also by the Czech Republic, Hungary, Slovakia, Estonia, Lithuania, Latvia, Slovenia, Malta and Cyprus. Only the last three countries did not have the socialist economy. Among these countries, Poland is the largest. The 16th anniversary of Poland's accession to the EU, which was celebrated in 2020, provides an opportunity for summarizing the costs and the benefits of this deed and for reflecting on the state of

the Polish economy, but this aspect, though largely determining the Polish economy, lies beyond the framework of this article.

The problems of the Polish economic transformation have been analyzed by many Polish economists and their evaluations have always differed significantly. The main authors include, most of all, the transformation author, L. Balcerowicz (1992, 1997) and critics of the course adopted in the transformation: G.W. Kołodko (1990, 1992, 1999, 2007) and T. Kowalik (1997, 2007). A critical evaluation of the transformation was also presented by W. Kieżun (2013), who pointed at a number of pathological phenomena in the Polish transformation. The above mentioned author believes that it was a mistake to open wide the borders for trade, especially for free import as a way of fighting inflation, which, in the situation of great imbalance between the internal market and the global market, led to the bankruptcy of many domestic producers and to the liquidation of the Polish industry and a quick growth of unemployment. It was also a mistake to leave the overwhelming majority of the domestic bank sector to foreign capital. Jarmołowicz and Piątek (2013) presented theoretical foundations of the economic transformation and showed the course and the results of the shock therapy on the example of Poland. Another evaluation of the transformation, 25 years after its implementation, was presented by S. Gomułka (2016), who discussed positive and negative effects of the transformation to the market economy. He stated that some popular and negative evaluations of the transformation simply contradict the facts. He also indicated the reforms and policies that are necessary for Poland to continue the process of catching up with the most advanced countries in order to bridge the civilization gap. In a wider context and a longer time horizon, the Polish economic system was described by S. Swadźba (2007, 2009, 2019). The Polish economy was also analyzed by foreign authors. The work by Andreea N. Kiss, Wade M. Danis, S. Tamer Cavusgil (2012) on international research on entrepreneurship in emerging markets shows that emerging economies comprise various countries in terms of geography and development level. The research on entrepreneurship conducted in 51 emerging economies indicated that the most frequent ones were in China (23), Russia (14), Poland (11) and Taiwan (10). The greatest attention was paid to Europe and Central Asia, with the most frequent research being conducted in Russia, Poland and Hungary, then in East Asia and in the Pacific, where the research on China, Taiwan, South Korea and Singapore dominates.

On the other hand, the underground gas storage containers and their role in ensuring energy security were presented by S. Nagy and J. Siemek (2009). The influence of the liquefied natural gas terminal on the distribution network and gas bunkering in Poland was discussed by E. Chłopińska and M. Gucma (2018). The Polish gas market was compared to the European markets by G. M. Niewiński, K. Badyda and J. Kopałka (2017). Poland's energy security and the opportunities, threats and tasks it brings were analyzed by K. Czerniewicz (2015). The causes of the decreasing gas prices were discussed by T. Furman (2019). Also the www.pgnig.pl website provides a lot of information on the gas market in Poland. We can ask about the state of the Polish economy today, over 30 years after the political and economy transformation. What type of economy can it be classified as: the developing economy, the emerging one or the advanced economy? The division of economies into developing, emerging and advanced economies was applied by Colwell and Narayanan (2010) in the presented model of conditional entrepreneurship policy. For each of the distinguished economies they proposed a transformation policy and a policy of improvement and described activities implementing these policies. The state of economic development, whether it is an economy at an early stage of development (developing), an economy at a higher stage of development and thus an emerging one (promising growth), or an already advanced economy, is determined, inter alia, by the pursued entrepreneurial policy. A brief description of these entrepreneurial activities for individual economies is presented in Figure 1 below.

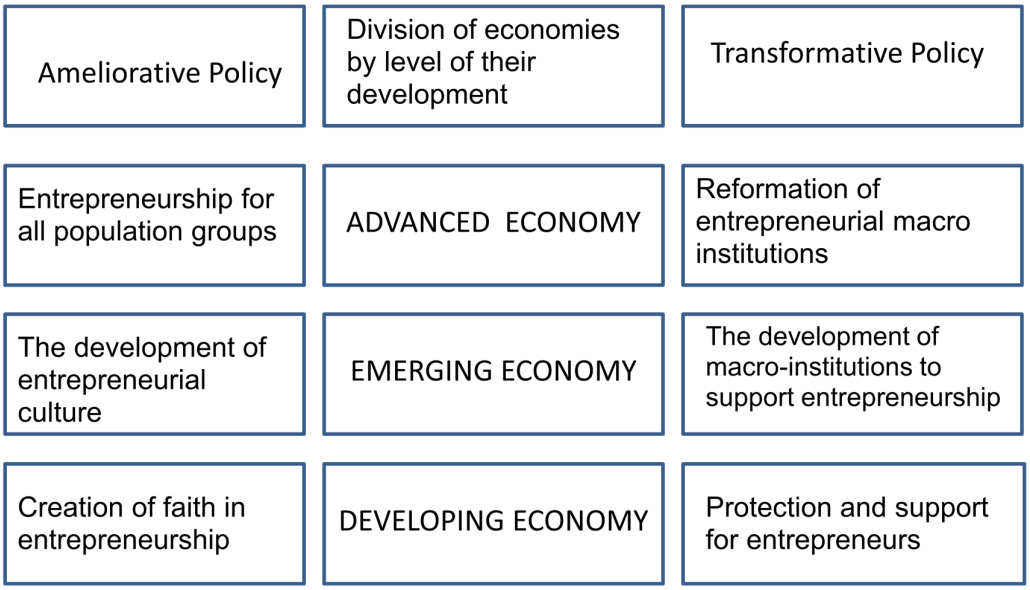

Figure 1: Division of economies in connection with entrepreneurship policy

Source: Own elaboration on the basis Colwell, K. & Narayanan, V.K. (2010), p. 300.

In September 2018 the Polish economy was officially considered the advanced economy in the FTSE Russell index (belonging to London Stock Exchange – LSE), where it was positioned on the 23rd place. FTSE Russell stated that the index of advanced markets includes 37 Polish companies. PKO Bank Polski is in the group of large companies. Medium companies include: PKN Orlen, Grupa Lotos, PGE, PGNiG, KGHM Polska, Bank Pekao, PZU, BZ WBK, mBank, LPP, Dino Polska, CD Projekt, Cyfrowy Polsat. Among small companies we can find: Bank Millennium, AmRest Holdings, Bank Handlowy. JSW, Alior Bank, CCC, Play Communications, Orange Polska, Grupa Azoty, Enea, Tauron Polska Energia, Kernel Holding, Kruk, Asseco Poland, Budimex, Eurocash, Ciech, Energa, PKP Cargo, Lubelski Węgiel Bogdanka, GPW, Boryszew, Neuca. Poland had waited for this promotion since 2011. This is the result of the continuous growth of the capital market in the country and the constant growth of the GDP. Thanks to it, Poland has become the biggest economy in Central and Eastern Europe and the only economy in the region classified as an advanced market (2018). [Online]. https://www.money.pl/gospodarka/wiadomosci/artykul/dolaczylismy-do-elitarnego-grona-polska,23,0,2416663.html

Along with obvious benefits, this situation may also bring some threats, since in the previous group of economies Poland was the leader and now it is at the end of the list. In the author's opinion, advanced economy is one in which there is a large share of processed products intended for the acquired markets. It is an economy that has something to export and the customers to buy it, and the Polish economy currently does not meet these requirements. This issue, however, remains open for discussion and is well beyond the scope of this article. Since the Polish economy officially joined the group of advanced economies, it has been widely accepted that it can develop thanks to strong domestic enterprises of strategic importance. The article puts forward a thesis that the essential catalysts of the Polish economy development are big and strong national enterprises of strategic significance, such as companies from the “fuel and gas sector”, including PGNiG SA. This company should guarantee energy security of Poland, therefore its asset and financial situation and its financial results, obtained from the published financial reports, as well as the prospects for its activities, shall be presented in this article as the justification of the proposed thesis.

PGNiG SA analysis and assessment based on financial statements and market data

Thanks to a detailed description of the company's real condition, financial statements create a strong basis for thorough control and analysis of its operations as well as for formulation of conclusions, assessments and forecasts as to its future. The aim of these statements is to show the financial position of the company, according to the primary accounting principle of true and fair view. The general purpose of financial reporting has been formulated in "Conceptual assumptions for financial reporting" and the purpose of financial statements in IAS 1. Both regulations relate to the usefulness of financial information, the former describes this feature for investors, lenders and other creditors (IFRS, 2016, par.C1, p.34) and the letter for a wide range of users (IFRS, 2016, par. 9, p.844).

Financial statements are used to disclose the financial results of the company's operations that have their origin in changes in the value of assets and capitals (funds). A financial report is an ordered collection of information about the company's situation, prepared for a given period using the required formulas for description and presentation, based on data from entries in the accounting books. The basic financial statements under the Polish Act on Accounting are: balance sheet, profit and loss account, additional information, and in addition the cash flow statement and statement of changes in equity. Additional statements become mandatory for entities subject to the annual audit of financial reports (Act on Accounting, art. 45 item 2 and 3). Financial reports are also submitted to the relevant court register and made available and announced (Act on Accounting, Art. 69, 70 and 70a). Financial statements, together with accounting records (bookkeeping) and cost calculation, constitute an integral part of accounting and are its final product. The accounting discipline itself can be considered as theory (Hendriksen, van Breda, 2002, pp.37-44). Accounting is now considered social and applied science, i.e. it is not pure theory or art (Jaruga, 1991, pp.12-13).

In this empirical part of article, following a brief description of the financial statements, I analyzed the financial statements of PGNiG SA for the 2014-2018 period. In order to conduct the preliminary analysis of the financial statements and to present the results of the research in a more convincing way, I made some tables containing appropriate reported data in PLN million and the calculated analytical ratios. I analyzed balance sheets (reports on financial situation), profit and loss accounts and cash flow statements of PGNiG SA for the 2014-2018 period.

Then the following detailed research theses were adopted: 1) the political and economic activities of the European countries and the risk posed by oil and gas prices in the world exert significant influence on the company activities, 2) aiming at ensuring Poland's energy security, PGNiG is involved in investment activities, thanks to which it consolidates its position in the domestic market and implements the strategies of entering foreign markets. The proposed theses were positively verified on the basis of the analysis of changes in the prices of oil and natural gas in recent years, on the basis of the analysis of financial indicators, and also by examining the investment activity shown in the cash flow statements and the analysis of the current political and economic events.

Below the reader can find three tables (No 1, No 2 and No 3), containing PGNiG SA balance sheets, profit and loss accounts and cash flows in the 2014-2018 period. Table 1, presenting the preliminary analysis of assets and liabilities, shows us that on 31st December 2018 the balance amount was PLN 36,993 million and was the highest in the analyzed period. It increased by 10.6% compared to the balance amount as of 31st December 2017, which amounted to PLN 33,447 million and was the lowest in the analyzed period. The amount from 2017 was 6.5% lower than that at the end of 2016, reaching PLN 35,769 million and 3.7% higher than the balance amount at the end of 2015, which was PLN 34,489 million. The balance from 2015, on the other hand, was 2.5% lower than the amount of PLN 35,356 recorded at the end of 2014.

The PGNiG SA assets oscillate around PLN 35 billion. The fluctuations observed in the sum of assets and liabilities were not high. Fixed assets of the balance sheet account, on average, for 70% of the balance sum, whereas the current assets – 30%. The sum of fixed assets in 2018 was PLN 25,742 million and compared to 2017 it grew by 6.2%, whereas in previous years there had been some decreases. The biggest share of fixed assets in 2018 (just like in previous years) was occupied by tangible fixed assets, interests and shares, as well as loans granted. The current assets in 2018

accounted for 30.4% of the balance sum (in 2017: 27.5%, in 2016: 28.0%, in 2015: 25.1%, in 2014: 22.8%). The current assets value grew from PLN 7,969 million in 2014 to PLN 11,251 million in 2018, which constitutes a 41% rise. The biggest share in the current assets in 2018 was occupied by cash and other monetary assets (8.5%), stocks (7.30%), receivables (6.40%), cash pooling (4.90%). The granted loans, derivative finance instruments and other financial assets had a relatively small share in the asset structure.

In 2018, the liabilities structure was composed in 78% by own capital, 8% - long-term liabilities and 15% - short-term liabilities. The share capital grew from PLN 23,780 million in 2014 to PLN 28,833 million in 2018, which constituted a 21% growth. The own capital is composed of share capital and reserve capital from sales of shares above their nominal value and in the overwhelming part – retained profits.

Table 1. Preliminary analysis of the financial statements (balance sheets) of PGNiG SA for the 2014-2018 period

Item	Year					Change %				Structure				
ASSETS	**2018**	**2017**	**2016**	**2015***	**2014***	**2018/2017**	**2017/2016**	**2016/2015**	**2015/2014**	**2018**	**2017**	**2016**	**2015**	**2014**
Tangible fixed assets	12 116	12 021	12 476	13 234	13 520	0,80%	-3,60%	-5,70%	-2,10%	32,80%	35,90%	34,90%	38,40%	38,20%
Concessions and right to mining exploitation and geological information	120	54	54	100	124	122,20%	0,00%	-46,00%	-19,40%	7,30%	0,20%	0,20%	0,30%	0,40%
Assets due to deferred tax	45	79	-	86	469	-43,00%	-	0,00%	-81,70%	0,10%	0,20%	0,00%	0,20%	1,30%
Shares and stocks	9 846	9 800	9 489	8 623	8 611	0,50%	3,30%	10,00%	0,10%	26,60%	29,30%	26,50%	25,00%	24,40%
Derivative financial instruments	214	-	-	-	-	-	-	-	-	0,60%	-	-	-	-
Loans receivable	2 881	1 553	3 162	3 130	4 204	85,50%	-50,90%	1,00%	-25,50%	7,80%	4,70%	8,80%	9,10%	11,90%
Other assets	520	727	578	643	459	-28,50%	25,80%	-10,10%	40,10%	1,40%	2,20%	1,60%	1,90%	1,30%
Fixed assets	**25 742**	**24 234**	**25 759**	**25 816**	**27 387**	**6,20%**	**-5,90%**	**-0,20%**	**-5,70%**	**69,60%**	**72,50%**	**72,00%**	**74,90%**	**77,50%**
Receivables	2 691	2 231	1 942	1 638	2 506	20,60%	14,90%	18,60%	-34,60%	7,30%	6,70%	5,40%	4,70%	7,10%
Należności	2 365	2 442	1 474	1 133	1 276	-3,20%	65,70%	30,10%	-11,20%	6,40%	7,30%	4,10%	3,30%	3,60%
Receivables due to cash pooling	1 825	284	524	197	31	542,60%	-45,80%	166,00%	535,50%	4,90%	0,80%	1,50%	0,60%	0,10%
Derivative financial instruments	453	189	375	346	991	139,70%	-49,60%	8,40%	-65,10%	1,20%	0,60%	1,00%	1,00%	2,80%
Loans receivable	592	2 042	426	312	802	-71,00%	379,30%	36,50%	-61,10%	1,60%	6,10%	1,20%	0,90%	2,30%
Other assets	-	-	-	-	20	-	-	0,00%	-100,00%	-	-	0,00%	0,00%	0,10%
Other financial assets	181	41	137	74	400	341,50%	-70,10%	85,10%	-81,50%	0,50%	0,10%	0,40%	0,20%	1,10%
Cash and other monetary assets	3 144	1 984	5 132	4 973	1 942	58,50%	-61,30%	3,20%	156,10%	8,50%	5,90%	14,30%	14,40%	5,50%
Cash and other monetary assets	-	-	-	-	1	-	-	-	0,00%	-	-	0,00%	0,00%	0,00%
Current assets	**11 251**	**9 213**	**10 010**	**8 673**	**7 969**	**22,10%**	**-8,00%**	**15,40%**	**8,80%**	**30,40%**	**27,50%**	**28,00%**	**25,10%**	**22,50%**
TOTAL ASSETS	**36 993**	**33 447**	**35 769**	**34 489**	**35 356**	**10,60%**	**-6,50%**	**3,70%**	**-2,50%**	**100,00%**	**100,00%**	**100,00%**	**100,00%**	**100,00%**
LIABILITIES AND EQUITY														
Share capital and supplementary capital from sales of shares above their nominal value	7 518	7 518	7 518	7 640	7 640	0,00%	0,00%	-1,60%	0,00%	20,30%	22,50%	21,00%	22,20%	21,60%
Reserve capital	867	-	-	-	-	-	-	-	-	2,30%	-	-	-	-
Capital due to security accounting	72	7	-	-	-	928,60%	-	-	-	0,20%	0,00%	-	-	-
Accumulated other total revenues	13	23	103	-518	-185	-43,50%	-77,70%	-119,90%	180,00%	0,10%	0,10%	0,30%	-1,50%	-0,50%
Retained profits	20 363	18 485	17 607	16 616	16 325	10,20%	5,00%	6,00%	1,80%	55,00%	55,30%	49,20%	48,20%	46,20%
TOTAL EQUITY	**28 833**	**26 033**	**25 228**	**23 738**	**23 780**	**10,80%**	**3,20%**	**6,30%**	**-0,20%**	**77,90%**	**77,80%**	**70,50%**	**68,80%**	**67,30%**
Debt liabilities	-	-	-	4 513	4 498	-	-	-100,00%	0,30%	-	-	0,00%	13,10%	12,70%
Derivative financial instruments	105	-	-	-	-	-	-			0,30%	-			
Employee remuneration liabilities	255	222	208	159	134	14,90%	6,70%	30,80%	18,70%	0,70%	0,70%	0,60%	0,50%	0,40%
Reserve for costs of liquidating drills	1 569	1 376	1 252	1 260	1 365	14,00%	9,90%	-0,60%	-7,70%	4,20%	4,10%	3,50%	3,70%	3,90%
Other reserves	28	28	28	43	49	0,00%	0,00%	-34,90%	-12,20%	0,10%	0,10%	0,10%	0,10%	0,10%
Subsidies	519	554	590	623	667	-6,30%	-6,10%	-5,30%	-6,60%	1,40%	1,70%	1,60%	1,80%	1,90%
Deferred tax liabilities	-	-	4	-	580	-	-	0,00%	-100,00%	-	-	0,00%	0,00%	1,60%
Other liabilities	75	108	62	69	92	-30,60%	74,20%	-10,10%	-25,00%	0,20%	0,30%	0,20%	0,20%	0,30%
Long-term liabilities	**2 551**	**2 288**	**2 144**	**6 667**	**7 385**	**11,50%**	**6,70%**	**-67,80%**	**-9,70%**	**6,90%**	**6,90%**	**6,00%**	**19,30%**	**20,90%**
Debt liabilities	2 298	1 998	4 993	469	656	15,00%	-60,00%	964,60%	-28,50%	6,20%	6,00%	14,00%	1,40%	1,90%
Derivative financial instruments	406	72	99	814	423	463,90%	-27,30%	-87,80%	92,40%	1,10%	0,20%	0,30%	2,40%	1,20%
Liabilities due to supplies and taxes	2 194	2 002	2 109	1 675	2 114	9,60%	-5,10%	25,90%	-20,80%	5,90%	6,00%	5,90%	4,90%	6,00%
Liabilities due to cash pooling	171	622	759	562	300	-72,50%	-18,10%	35,10%	87,30%	0,50%	1,80%	2,10%	1,60%	0,80%
Liabilities due to employee remuneration	109	98	87	110	43	11,20%	12,60%	-20,90%	155,80%	0,30%	0,30%	0,20%	0,30%	0,10%
Reserve for costs of liquidating drills	91	53	20	33	28	71,70%	165%	-39,40%	17,90%	0,20%	0,20%	0,10%	0,10%	0,10%
Other reserves	287	229	248	363	444	25,30%	-7,70%	-31,70%	-18,20%	0,80%	0,70%	0,70%	1,10%	1,30%
Other liabilities	53	52	82	58	183	1,90%	-36,60%	41,40%	-68,30%	0,10%	0,10%	0,20%	0,20%	0,50%
Short-term liabilities	**5 609**	**5 126**	**8 397**	**4 084**	**4 191**	**9,40%**	**-38,90%**	**105,60%**	**-2,60%**	**15,20%**	**15,30%**	**23,50%**	**11,80%**	**11,90%**
TOTAL LIABILITIES	**8 160**	**7414**	**10 541**	**10 751**	**11 576**	**10,10%**	**-29,70%**	**-2,00%**	**-7,10%**	**22,10%**	**22,20%**	**29,50%**	**31,20%**	**32,70%**
TOTAL LIABILITIES AND EQUITY	**36 993**	**33 447**	**35 769**	**34 489**	**35 356**	**10,60%**	-6,50%	**3,70%**	**-2,50%**	**100,00%**	**100,00%**	**100,00%**	**100,00%**	**100,00%**

Source: Own elaboration on the basis of single financial statements of PGNiG SA for the 2014-2018 period.

Table2. Preliminary analysis of the profit and loss account of PGNiG SA for the 2014-2018 period

Item	Year					Change %				Structure				
	2018	2017	2016	2015*	2014*	2018/2017	2017/2016	2016/2015	2015/2014	2018	2017	2016	2015	2014
Revenues from sales of gas	18 349	15 846	13 877	15 511	19 932	15,80%	14,20%	-10,50%	-22,20%	82,10%	83,10%	80,80%	83,20%	84,00%
Other revenues from sales	3 995	3 215	3 306	3 135	3 806	24,30%	-2,80%	5,50%	-17,60%	17,90%	16,90%	19,20%	16,80%	16,00%
Sales revenues	**22 344**	**19 061**	**17 183**	**18 646**	**23 738**	**17,20%**	**10,90%**	**-7,80%**	**-21,50%**	**1,70%**	**100,00%**	**100,00%**	**100,00%**	**100,00%**
Cost of sold gas	-14 663	-12 228	-10 050	-12 157	-13 835	19,90%	21,70%	-17,30%	-12,10%	-65,60%	-64,20%	-58,50%	-65,20%	-58,30%
Consumption of raw materials and materials	-1 361	-1 177	-1 628	-1 217	-1 266	15,60%	-27,70%	33,80%	-3,90%	-6,10%	-6,20%	-9,50%	-6,50%	-5,30%
Employee remunerations	-685	-619	-632	-704	-750	10,70%	-2,10%	-10,20%	-6,10%	-3,00%	-3,30%	-3,70%	-3,80%	-3,20%
Transmission, distribution and storage services	-954	-1 144	-1 074	-1 171	-3 341	-16,60%	6,50%	-8,30%	-65,00%	-4,30%	-6,00%	-6,30%	-6,30%	-14,10%
Other outside services	-1 503	-1 188	-821	-665	-815	26,50%	44,70%	23,50%	-18,40%	-6,70%	-6,20%	-4,80%	-3,60%	-3,40%
Depreciation	-798	-766	-767	-799	-722	4,20%	0,10%	-4,00%	10,70%	-3,60%	-4,00%	-4,50%	-4,30%	-3,00%
Taxes and fees	-301	-292	-289	-199	-194	3,10%	1,00%	45,20%	2,60%	-1,30%	-1,50%	-1,70%	-1,10%	-0,80%
Other operating revenues and costs	-349	-115	96	-404	-498	203,50%	-219,80%	-123,80%	-18,90%	-1,60%	-0,60%	0,60%	0,00%	-2,10%
Costs of services to satisfy own needs	8	7	7	13	10	14,30%	0,00%	-46,20%	30,00%	0,10%	0,00%	0,00%	0,10%	0,00%
Write offs for fixed assets and intangible values and their reversal	252	-434	-745	-549	-694	-941,68%	-41,70%	35,70%	-20,90%	1,10%	-2,30%	-4,30%	-2,90%	-2,90%
Dividends	1 726	1 197	1 629	834	530	44,20%	-26,50%	95,30%	57,40%	7,70%	6,30%	9,50%	4,50%	2,20%
Financial revenues	51	100	313	346	436	-49,00%	-68,10%	-9,50%	-20,60%	0,20%	0,50%	1,80%	1,90%	1,80%
Revenues from interests calculated with effective interest rate	156	185	-	-	-	-15,70%	-	-	-	0,70%	1,00%	-	-	-
Financial costs	-52	-177	-371	-357	-377	-70,60%	-52,30%	3,90%	-5,30%	-0,20%	-0,90%	-2,20%	-1,90%	-1,60%
Loss on not including financial assets valued in the depreciated cost	-69	-	-	-	-	-	-	-	-	-0,30%	-	-	-	-
Revaluation of financial assets	-125	-120	-	-	-	4,20%	-	-	-	-0,60%	-0,60%	-	-	-
Total	-18 667	-16 771	-14 332	-17 029	-21 516	11,30%	117,00%	-15,80%	-20,90%	-83,50%	-88,00%	-83,40%	-91,30%	-65,60%
Profit before tax	**3 677**	**2 290**	**2 851**	**1 617**	**2 222**	**60,60%**	**-19,70%**	**76,30%**	**-27,20%**	**16,50%**	**12,00%**	**16,60%**	**8,70%**	**9,40%**
Income tax	-388	-256	-275	-145	-327	51,60%	-6,90%	89,70%	-55,70%	-1,80%	-1,30%	-1,60%	-0,80%	-1,40%
Net profit	**3 289**	**2 034**	**2 576**	**1 472**	**1 895**	**61,70%**	**-21,00%**	**75,00%**	**-22,30%**	**14,70%**	**10,70%**	**15,00%**	**7,90%**	**8,00%**
Weighted mean number of ordinary	5 778	5 778	5 778	5 900	5 900	0,00%	0,00%	-2,10%	0,00%	-	-	-	-	-
Earnings per share, basic and dilute	0,57	0,35	0,45	0,25	0,32	62,90%	-22,20%	78,70%	-22,30%	-	-	-	-	-

Source: Own elaboration on the basis of single financial statements of PGNiG SA for the 2014-2018 period. *transformed data.

Table 3. Cash flow statement for PGNiG SA in the 2014-2018 period

Item	2018	2017	2016	2015	2014
Cash flow from operating activity					
Net profit	**3 289**	**2 034**	**2 576**	**1 472**	**1 895**
Depreciation	798	766	767	799	722
Interests and dividends	-1 810	-1 334	-1 620	-850	-716
Investment activity result	-153	548	849	594	750
Other non-cash adjustments	664	397	361	71	514
Paid income tax	-467	-224	-286	-340	-498
Income tax for current period	388	256	275	145	327
Changes to working capital	-51	-1 581	-420	596	988
Changes to working capital	**2 658**	**862**	**2 502**	**2 487**	**3 982**
Net cash flow from investment activity					
Expenditure on tangible fixed assets related to searching for and evaluating mineral deposits	-835	-720	-599	-981	-797
Expenditure on intangible assets and other tangible fixed assets	-379	-250	-364	-235	-392
Expenditure on loans granted	-914	-1 049	-357	-441	-678
Expenditure on derivative financial instruments	-62	-97	-109	-162	-180
Expenditure on acquiring shares in affiliate entities	-32	-416	-926	-66	-400
Other expenses	-27	-33	-118	-75	-989
Revenues from loans granted	943	785	432	2 027	524
Revenues from sales of short-term securities	-	100	-	989	-
Revenues from derivative financial instruments	55	118	95	175	199
Received interests	117	250	87	125	115
Received dividends	1 726	1 197	1 629	834	530
Revenues from sales of shares in affiliate entities	-	-	4	4	-
Other revenues	52	27	26	28	223
Net cash flow from investment activity	**644**	**-88**	**-200**	**2 222**	**-1 845**
Cash flow from financial activity					
Revenues from issuance of	2 295	1 996	199	309	474
Revenues from derivative financial instruments	-	166	89	84	84
Expenditure on purchasing own shares	-	-	-645	-	-
Paid dividends	-404	-1 156	-1 062	-1 180	-885
Expenditure on repayment of credits and loans	-	-2 152	-	-	-
Expenditure on buying out debentures	-1 996	-2 700	-309	-474	-1 502
Interests paid	-36	-158	-199	-192	-220
Expenditure on derivative financial instruments	-	-20	-78	-81	-98
Other net items	3	7	4	4	-2
Net cash flow from financial activity	**-138**	**-4 017**	**-2 001**	**-1 530**	**-2 149**
Net cash flow	**3 164**	**-3 243**	**301**	**3 179**	**-12**
Cash and other monetary assets at the beginning of the period	1 680	4 923	4 622	1 443	1 685
Cash and other monetary assets at the end of the period	**4 844**	**1 680**	**4 923**	**4 622**	**1 673**
Including: cash with limited possibilities of use Including: cash with limited possibilities of use	456	648	471	506	451

Source: Own elaboration on the basis of single financial statements of PGNiG SA for the 2014-2018 period.

Table 2 presents the preliminary analysis of the profit and loss account in PGNiG SA for the 2014-2018 period. We can see that the company presents the profit and loss account in the comparative variant. As sales revenues it distinguishes between revenues from sales of gas and other revenues. Other operating revenues and costs, as well as financial revenues and costs are presented in one column, without marking these groups. In the whole analyzed period the company had net profit, the biggest one – PLN 3,289 million in 2018, then PLN 2,576 million in 2017, and the lowest one – PLN 1,472 million – a year earlier.

Revenues from sales from 2014 to 2016 showed a downward trend, just as costs by nature and total costs, other operating revenues and costs, as well as financial revenues and costs. Revenues from sales fell in 2016/2015 period by 7.8%, whereas in the 2015/2014 – by 21.5%. 2017 marked the increase in the revenues from sales by 10.9% compared to 2016, and in 2018 – by 17.2% compared to 2017. In 2018 revenues from sales amounted to PLN 22.344 million, but did not reach the level of 2014 – PLN 23,738 million. The revenue structure is dominated by the revenues from sales of gas, accounting for over 80% in all analyzed years (the lowest ratio – 80.8% was in 2016, the highest – 84% in 2014). The highest revenues from sales of gas, PLN 18,349 million, were recorded in 2018, including methane-rich gas – PLN 17,067 million. In 2016 PGNiG SA started selling this gas outside Poland, therefore revenues from such sales grew significantly. The second strategic product is nitrogen-rich gas, with its sales in 2018 amounting to PLN 1,396 million. The revenues from sales of other services, products, goods and materials in the analyzed years did not reach 20%; in 2018 they accounted for 17.9% of all revenues. The biggest revenues in this group are obtained by the company from the sale of electric energy and crude oil with gasoline and the right to use the storing installations. Other services include sales of gas, maintenance, transport, geology, mining services and renting real estate properties.

The most important cost item is the cost of the sold gas, which covers the cost of purchasing gas, both in Poland and abroad, part of system and transaction costs, costs of excavating gas and removing nitrogen. The cost of the sold gas reveals a strong correlation with the revenues from the sales of gas and, analogically, it fell in 2015-2016, only to increase in 2017-2018. The share of this cost in the revenues from the sales of gas was: 69.4% in 2014, 78.4% in 2015, 72.4% in 2016, 77.2% in 2017 and 79.9% in 2018. The second biggest cost item is the consumption of other raw materials and materials. These are mostly costs of energy used for trading purposes, and also other raw materials and materials. These costs were kept on a similar level in 2014-2015, but grew significantly in 2016 (by 33.8% compared to 2015), whereas their growth in 2017/2018 amounted to 27.7%, and in the 2018/2017 period – 15.6%. On the other hand, the costs of transmission, distribution and storing services, which decreased significantly from PLN 3,341 million in 2015 to PLN 1,171 million in 2014 (by 65%) in the next years oscillated around PLN 1 billion. The costs of other outside services are most of all costs of re-gasification[1], costs of written off negative drills, costs of other geological, search, renovation and exploitation services, etc. The company also obtained high revenues from dividends from affiliated entities.

Table 3 presents the cash flows in PGNiG SA in the 2014-2018 period. The company makes the report on cash flows using the direct method[2]. In all analyzed years net profit was shown. This profit was corrected in cash flows from operating activity with standard corrections. The flows from the company's operating activity were positive each year. They were mostly affected, apart from the financial result, by interests and dividends. Other important items also included: results of the investment activity and depreciation. The financial result in operating activity flows was in 2018 corrected by -PLN 601 million, in 2017 by –PLN1,172 million, in 2016 by –PLN74 million, in 2015

[1] The appearance of the re-gasification costs in 2016 was associated with the opening of the LNG terminal in Świnoujście and the contract concluded with Polska LNG SA, valid until 2034, according to which PGNiG undertakes to restore the gas from the liquefied to the gas form.

[2] Cash and other monetary assets shown by PGNiG in the report on the cash flow at the beginning of the period differ from the balance of cash and monetary assets at the end of the previous period. There is also a difference between the state of the funds shown in the report on cash flow and the balance of the funds in the report on the financial situation. The difference is attributed to the contract signed in 2014 on managing cash inside the group (the cash pooling contract).

by –PLN1,015 million and in 2014 by –PLN2,087 million. The positive cash flows from operating activity must be interpreted positively, especially as PGNiG SA has an established position in the market and has been a major player in this market for many years. Positive flows from operating activity occur in all analyzed years, therefore we cannot claim the company ever had, even temporary, financial problems.

The cash flows from investment activity were positive in 2018 and 2015, and negative in 2017, 2016 and 2014. In 2018 the balance was PLN 644 million. The biggest revenues came from the dividends from affiliate entities (PLN 1,726 million) and from given loans (PLN 943 million). The biggest expenditure was incurred for giving loans (-PLN 914 million) and for tangible fixed assets related to seeking and evaluating mineral deposits (-PLN 835 million), but also for intangibles and other fixed assets (-PLN 379 million). The net cash flows from financial activity in all analyzed years were negative, however, in 2018 they amounted to only –PLN 138 million, whereas in 2017 they were –PLN 4,017 million, in 2017 –PLN 2,001 million, in 2015 –PLN 1,530 million and in 2014 –PLN 2,149 million. This type of flows is mostly affected by the dividend, which was paid out in each analyzed year. The total net cash flows should also be evaluated as beneficial. In 2018, 2016 and 2015 they were positive, whereas in 2017 and 2014 they were negative. The highest positive flows – exceeding PLN 3 billion – were reported in 2015 and 2018. The negative flows in 2017 resulted from the lowest in the whole analyzed period, though still positive flows from operating activity (PLN 862 million) and the highest negative flows from financial activity in the whole period (-PLN 4,017 million) due to repayment of credits and loans in the amount of PLN2,152 million. In 2014 the total net cash flow was –PLN 12 million. However, taking into account the high flows from operating activity and the expenditure on investment and the fact that a significant item then was the expenditure on buying out debentures, the negative net cash flows in 2014 definitely do not reveal the bad situation of the company. Moreover, in each year the company obtained a positive financial result. This is a very beneficial situation, taking into account positive cash flows from operating activity in all analyzed years. This means that the company is profitable in conducting its core operating activity and also obtains profit, taking into account all investments and expenditure and revenues from the financial activity.

The financial situation of PGNiG SA is also affected by economic and political factors. There is no doubt that such a large company is susceptible to external risks, which may appear in the next years and which cannot be identified directly from financial reports. Such risks may significantly affect the financial and asset situation of the company. The financial situation of PGNiG SA may largely depend on trends on the natural gas and crude oil markets. Figures 2 and 3 show the prices of natural gas and Brent crude oil – we can observe high fluctuations of rates over the past ten years 2010-2020, but there is a clear downward trend. Comparing May 2010 to May 2020, the price of natural gas fell by 52,58%, whereas the price of crude oil – by 49,03%. The two figures show heavy dependence of PGNiG SA on changing prices on raw material markets. The most profitable segment of the activity is trading and storing (82% of total revenues from sales). As we can see from the financial report data, revenues from sales are decreasing and the volume of natural gas sales is growing – this clearly confirms the influence of prices in the natural gas market. In conclusion, we can say that the financial situation of the company depends heavily on the prices of natural gas in global markets.

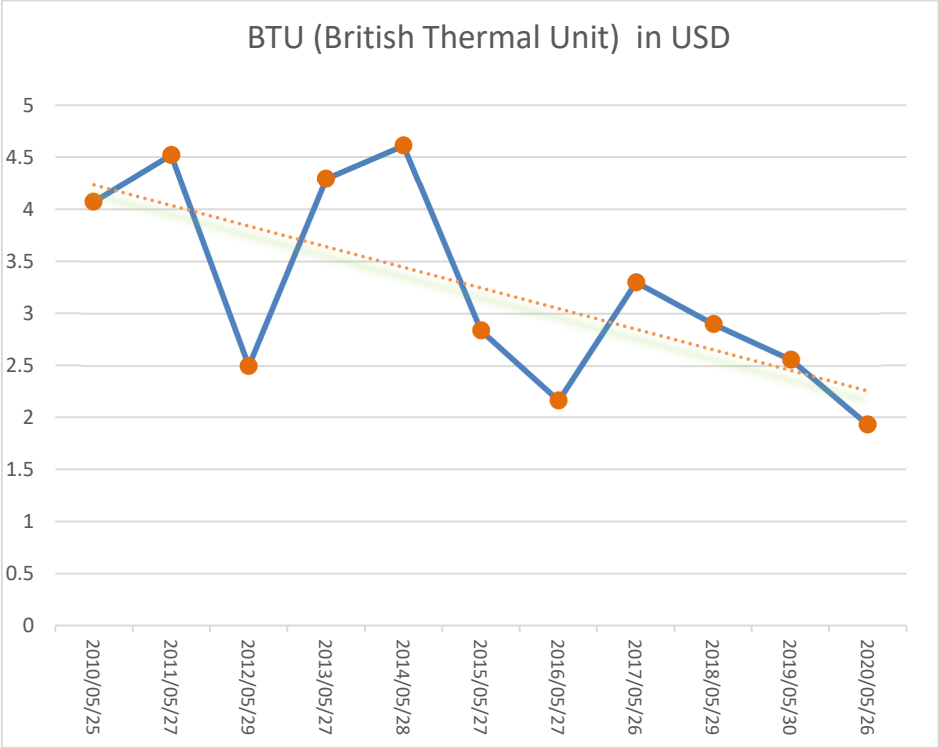

Figure 2: The price of natural gas in USD/million BTU

Source: Own elaboration.

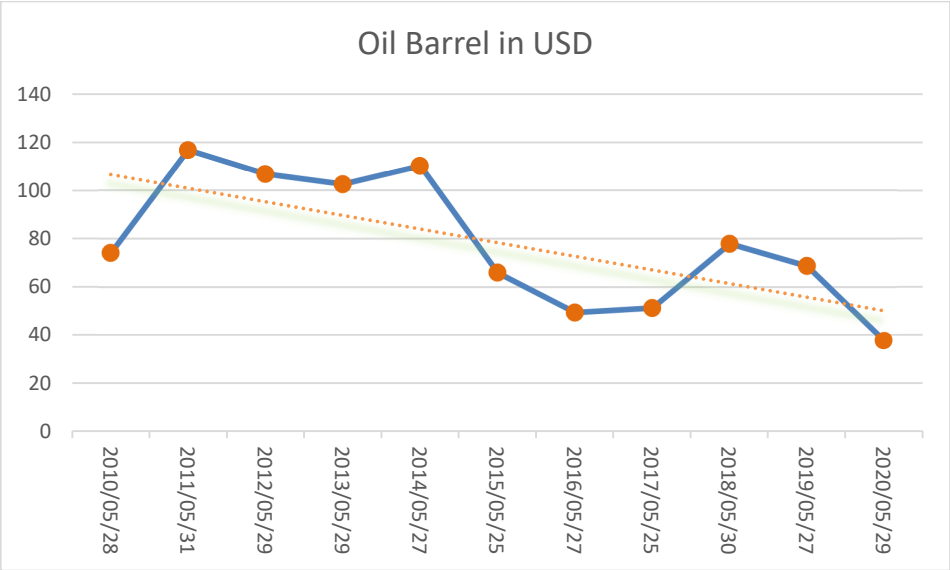

Figure 3: The price of Brent crude oil in USD/barrel

Source: Own elaboration.

PGNiG SA is a strategic company belonging to the Treasury and the most important company for the energy security of our country. The Yamal-Europe pipeline, connecting Europe and the Russian Yamal peninsula, where natural gas deposits are located, goes through Poland. PGNiG owns 48%

shares in the company which owns EuRoPol GAZ S.A. pipeline. The same percentage of shares is owned by the Russian state concern excavating natural gas – Gazprom. This means that PGNiG must cooperate with the Russian enterprise. The construction of the Nord Stream 2 pipeline constitutes a major threat to the company. In 2010 the Nord Stream pipeline was opened, connecting Russia and Germany. It omits Poland, going straight through the Baltic Sea. Even that pipeline accounts for the deterioration of the energy security of our country – Poland must obtain hydrocarbons in the East as its own supplies are not sufficient (Czerniewicz, 2015). The agreement, thanks to which the construction of Nord Stream 2 was to start, was signed in 2015. The construction was objected by the Polish Office of Competition and Consumer Protection in 2016. However, this did not stop the plans of building another line of the pipeline. Nord Stream 2 was to be put into use at the end of 2019, but its construction has not yet been completed and is being prolonged due to many reasons, including political ones. The Nord Stream 2 gas pipeline may pose a significant threat to PGNiG SA, which wants to diversify its sources of gas and oil supplies not only from the east but also from other directions, including the north and west. Focusing on one source of supply of such important raw materials as crude oil and natural gas is not desirable by PGNiG SA, as it may cause economic dependence. The goal of this company is to obtain supplies of raw materials from various sources. Lower diversification of the sources of supplies by concentration on one supplier may lead not only to economic overdependence, but also to political one. It is important, therefore, to keep the gas bunkers full – in Poland at the end of 2016 the level of gas filling was 77%, whereas the European average was 66% (The Report of the Board of PGNiG S.A. and GK PGNiG S.A. for 2016. PGNiG SA faces a daunting challenge of maintaining gas supplies, becoming the company which does not pursue the financial result growth, but which ensures energy security for Poland.

The construction of another line of the Nord Stream pipeline should provide the Company with some impetus to make new investments and, as a result, to become more independent of external supplies. Due to natural reasons, which are beyond the control of PGNiG, it is practically impossible to increase production in the domestic market. It is hard to expect the discovery of new gas deposits, but the works on the already developed deposits can be expanded. A good solution here could be to develop production in other countries. The PGNiG Capital Group invests in deposits in other countries, namely in Norway, Pakistan, Libya, Germany and Iran. It also conducts seismic work in some European and African countries. The investment expenditure in the search and excavation segment in Poland in 2016 amounted to PLN 830 million, whereas projects implemented in Norway cost PLN 343 million. The shares in search and excavation concessions in the Norwegian Sea, the Northern Sea and the Barents Sea are owned by PGNiG Upstream International, which is owned in 100% by PGNiG. In the context of the efforts made to become independent from external sources of supplies, investments in deposits in Poland and Norway must be evaluated positively.

Conclusions

Based on the review of PGNiG SA financial statements for the 2014-2018 period, the financial situation of the company was evaluated as positive, the company assets have been increasing, reaching now the value of PLN 36,993 million. In all the analyzed years the company generated net profit – the highest in 2018 – PLN 3,289 million. In each analyzed year the company achieved substantial positive flows from its operational activity, which confirms its good financial standing. In 2018 net cash flow was positive and amounted to PLN 3,164 million, of which the flow from operational activity was PLN 2,658 million and from investment activity – PLN 644 million, compared to negative flow from financial activity – minus 138 million. Such relations between the flow directions in particular types of activity indicate the mature stage of the company operations and the assessment of its situation caused by cash flow. The earned profits and the means from positive cash flows are allocated by the company for investment and for payments of the dividend to its shareholders. The financial indicators are generally correct, the solvency ratios demonstrate that the company is able to pay its current liabilities. I also checked how the price of natural gas in the markets accounted for the decreasing revenues from sales in 2014-2016. This only confirms the significant influence of market prices of gas on revenues from sales and the serious risk over which the company, unfortunately, has no influence. Nevertheless, since 2017 the revenues from gas sales have been growing and in 2018 they amounted to PLN 18,349 million. To conclude, the financial

situation of PGNiG SA can be evaluated positively. PGNiG SA is a strategic company owned by the Treasury and exerts the greatest influence on the energy security of Poland. The completion of the Nord Stream pipeline and the plans to build the second line – the Nord Stream 2, encourage the Board to invest – not only in utilizing the deposits in Poland, but most of all – abroad. The aim of the company should not be only to obtain profits and positive cash flows, which was accomplished in the analyzed years, but most of all to ensure the energy security of Poland. The investment in the Norwegian deposits should be viewed positively, especially in the context of the threat of the Russian gas blackmail. Also the talks with Norway and Denmark concerning the construction of the Baltic Pipe must be seen as a positive aspect. The pipeline will allow the Company to transport gas directly from the deposits of the Norwegian continental shelf (where PGNiG has obtained concessions for exploitation) to Poland. Thanks to this, Poland will not be dependent on the Russian supplies which should lead, inter alia, to greater competition in the European market and thus to cheaper gas for domestic clients. Therefore it is necessary to conduct investment activities aimed at building the Baltic Pipe and to monitor continuously the construction of Nord Stream 2. Poland lies in the middle of Europe, so we can make a final conclusion that a strong Polish state and its stable and dynamically developing economy can guarantee the strength and development of other European countries and the whole of Europe. However, it should be also noted, that in the current situation of the announced Covid-19 pandemic, the Polish economy has slowed down a bit, like other world economies, and has to make up for losses and meet new challenges in order to return to its normal state and pace of development.

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Selection of Optimal Water and Sewage Infrastructure Development Project Under The Idea of Smart City

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Abstract

This article presents the hierarchical structure of EU criteria in the field of Green Public Procurement (GPP) with regard to environmental protection. The presented criteria are recommended when awarding public contracts for water and sewage infrastructure projects, however the choice of these criteria is left in line with the project goal. Based on the adopted criteria, a multi-criteria project evaluation model was presented, taking into account the importance of individual criteria. On the basis of the model constructed in this way and the assumptions made, it is possible to simulate optimal solutions and, as a result, thoroughly analyze the projects and determine the optimal design.

Keywords: Multi-Criteria Programming, Water And Sewage Infrastructure, Smart City

Introduction

Nowadays, great emphasis is placed on the use of the latest technologies in such a way that they serve the city residents best and facilitate their everyday life: universal access to information about the city, quick settlement of matters in offices, efficient public transport, the safety of city residents, etc. this is the intensive increase in the population in the largest cities, which in turn generates new tasks related to the maintenance and planning of technical infrastructure. Technical infrastructure by Borcz (2000) "is a set of basic facilities, equipment, and installations, such as roads, bridges, energy, and telecommunications networks of a service nature, indispensably needed for the proper functioning of society and production sectors of the economy". Technical infrastructure includes transmission networks and related facilities providing the necessary services for a given spatial and economic unit in the field of energy, heat, water, sewage and waste disposal, transport, etc. By Rutkowska G. (2007) "technical infrastructure consists of all types of transport, energy and communications systems and water and sanitary facilities, which include: roads, bus stops, railways, stations, river and seaports, gas, power, drainage network, telecommunications and post facilities". One of the essential elements of technical infrastructure is water and sewage infrastructure in spatial development plans of cities, municipalities, and villages. It conditions the quality of life of the inhabitants and influences the social and economic development of these regions.

The current proposal to solve the issue of municipal infrastructure is the idea of Smart City. Technological facilities of water and sewage infrastructure cannot be only elements of the urban structure that carry out separate tasks. They should implement new IT and exploitation and management technologies, as well as should be designed as firmly integrated elements of one managed structure to improve the quality of life of residents without excessive burdening the environment: the systematic raising of requirements for the quality of water treatment and the degree of wastewater treatment, taking into account free-market economy, low service costs, high quality of operation. Companies providing water and sewage services should look for technological and technical solutions aimed at highly active water and wastewater treatment that affect faster socio-economic development. One of the answers are:

1. increasing the technological and functional efficiency of the treatment plant

2. implementation of technical solutions ensuring low energy consumption and recovery of part of energy in the technological process

3. minimizing the volume of sludge after the end of the technological process

4. proper municipal waste management - e.g., joint processing of sludge from water treatment with sludge from sewage treatment plants, sewage sludge with municipal or industrial waste.

This article presents the hierarchical structure of EU criteria in the field of Green Public Procurement (GPP), the use of which is recommended when awarding public contracts for water and sewage infrastructure projects (Urząd Publikacji Unii Europejskiej (2013)). GPP criteria should be seen as an opportunity for wastewater management authorities to build and use water and wastewater infrastructure in an environmentally friendly way. Public authorities do not have to implement all the criteria. They can analyze the whole set of rules and identify those that are relevant in the context of a given project.

Model of Assessment

Assessment models are often developed to identify the evaluation of complex projects to determine which of the proposed projects that best meet the criteria. They are usually prepared at the initial stage of the project and then improved, up to the award stage.

This part of the article describes an exemplary model of project evaluation from the water and sewage infrastructure at the offer evaluation stage. It is a proposal dedicated to supporting the qualification process of infrastructure projects. This model takes into account economic, technical, and environmental criteria that the public authority can apply when awarding the contract for water and sewage infrastructure facilities. This model takes into account the variability of weights of individual rules and sub-criteria. The final choice of criteria and the importance of different elements depends on local conditions and the priorities of the contracting authority.

The hierarchical structure of the criteria is presented below (by Urząd Publikacji Unii Europejskiej (2013)):

1. Financial evaluation - one of the variants of cost evaluation presented in items 1.1-1.3 may be chosen for the economicassessment. The assessment against this criterion may be an assessment expressed in monetary units or points.

1.1. The cost of construction, operation, and maintenance
1.2. Standard LCC
1.3. Environmental LCC
2. Technical evaluation
2.1. Process and technology of wastewater treatment
2.1.1. Proven technology
2.1.2. Reliability
2.1.3. Flexibility to handle different amounts and quality of input sewage
2.1.4. The scope and quality of the process and efficiency guarantees
2.2. Plant and equipment
2.2.1. Equipment quality and performance
2.2.2. The look and layout of the plant
2.2.3. Ease of use and maintenance
2.2.4. Processcontrol and automation
2.3. Other environmental impacts
2.3.1. Environmental management plan (EMP)
2.3.2. Architectural design and visual effect
2.3.3. Odorcontrolmeasures
2.3.4. Noise control measures
3. Environmental assessment
3.1. The efficiency of wastewater treatment

3.1.1. The purification efficiency of the total nitrogen content
3.1.2. The purification efficiency of the complete phosphorus content
3.1.3. The efficiency of purification from lead and its compounds
3.1.4. The effectiveness of purification from mercury and its compounds
3.1.5. The efficiency of purification from nickel and its compounds
3.1.6. Purification efficiency of di (2-Ethylhexyl) phthalate (DEHP)
3.1.7. Naphthalene purification efficiency
3.1.8. Efficacy of purification from nonylphenols and octylphenols
3.1.9. The efficiency of purification from benzo (a) pyrene (representative of polycyclic aromatic hydrocarbons (PAHs))
3.1.10. The effectiveness of purification from tramadol and primidone
3.1.11. Efficacy of purification from pathogens
3.2. Energy performance requirements
3.2.1. Total energy consumption per m3 of wastewater
3.2.2. Energy consumption by aeration systems (kg of oxygen introduced into water per consumed kWh)
3.2.3. Sludge dewatering equipment (kWh per tonne of dewatered sludge)
3.3. The efficiency of flue gas purification - point assessment of this criterion granted depending on the percentage level indicated in legal regulations
3.3.1. Purification efficiency (energy consumption per tonne of sludge)
3.3.2. The efficiency of nitrogen dioxide purification
3.4. Other - the number of points awarded depending on the percentage level indicated in legal regulations
3.4.1. Total water consumption
3.4.2. Consumption of coagulants

A Hierarchical Model of Evaluation of Water and Sewage Infrastructure Projects

Based on the criteria described in point 2 papers, the following designation marks were adopted under individual rules:

1. Financial evaluation FE_i (assessment of the Level 1 criterion)

1.1. The cost of construction, operation, and maintenance FE_COM_i

1.2. Standard LCC FE_S_i

1.3. Environmental LCC FE_E_i

1. Technical assessment TA_i (evaluation of the Level 1 criterion) and its sub-criteria (Level 2)

2.1. Process and technology of wastewater treatment PT_i

2.1.1. Proven technology PT_pt_i

2.1.2. Reliability PT_r_i

2.1.3. Flexibility to handle different amounts and quality of input sewage PT_f_i

2.1.4. The scope and quality of the process and efficiency guarantees PT_sq_i

2.2. Plant and equipment PE_i

2.2.1. Equipment quality and performance PE_e_i

2.2.2. The look and layout of the plant PE_ll_i

2.2.3. Ease of use and maintenance PE_eu_i

2.2.4. Process control and automation PE_pca_i

2.3. Other environmental impacts OE_i

2.3.1. Environmental management plan (EMP) OE_e_i

2.3.2. Architectural design and visual effect OE_mp_i

2.3.3. Odor control measures OE_ad_i

2.3.4. Noise control measures OE_nc_i

3. Environmental assessment EA_i (Level 1 criterion assessment) and it's Level 2 sub-criteria

3.1. The efficiency of wastewater treatment $E-wt_i$

3.1.1. The purification efficiency of the total nitrogen content E_nc_i

3.1.2. The purification efficiency of the complete phosphorus content E_pc_i

3.1.3. The efficiency of purification from lead and its compounds E_l_i

3.1.4. The effectiveness of purification from mercury and its compounds E_m_i

3.1.5. The efficiency of purification from nickel and its compounds E_n_i

3.1.6. Purification efficiency of di (2-Ethylhexyl) phthalate (DEHP) E_di_i

3.1.7. Naphthalene purification efficiency E_np_i

3.1.8. Efficacy of purification from nonylphenols and octylphenols E_no_i

3.1.9. The efficiency of purification from benzo (a) pyrene (representative of polycyclic aromatic hydrocarbons (PAHs)) E_pah_i

3.1.10. The effectiveness of purification from tramadol and primidone E_t_i

3.1.11. The efficiency of purification from pathogens E_p_i

3.2. Energy performance requirements EPR_i

3.2.1. Total energy consumption per m3 of wastewater EPR_tec_i

3.2.2. Energy consumption by aeration systems (kg of oxygen introduced into water per consumed kWh) EPR_ec_i

3.2.3. Sludge dewatering equipment (kWh per tonne of dewatered sludge) EPR_sde_i

3.3. The efficiency of flue gas purification - point assessment of this criterion granted depending on the percentage level indicated in legal regulations EFG_i

3.3.1. Purification efficiency (energy consumption per tonne of sludge) EFG_p_i

3.3.2. The efficiency of nitrogen dioxide purification FG_n_i

3.4. Other - the number of points awarded depending on the percentage level indicated in legal regulations O_i

3.4.1. Total water consumption O_twc_i

3.4.2. Consumption of coagulants O_cc_i

The presented model assumes taking into account the importance of individual criteria and sub-criteria. To this end, variables describing the validity of the requirements have been introduced. The validity of the Level 1 criteria is presented by the Wk (*k*-Level 1 criterion) variable. It is assumed that

the validity of the requirements are specified in the range [0,1], which is related to the condition that the sum of the criteria weights must be 1.

$$\sum_{k=1}^{K} W_k = 1. \tag{1}$$

The validity of Level 2 criteria (sub-criteria of Level 1 criteria) is given in the form of a variable (*k* - Level 1 criterion, *l* - Level 2 criterion). The validity of the requirements are specified in the range [0,1], and the sum of the weightings of the rules must be 1.

$$\sum_{l=1}^{L} W_{kl} = 1.$$

(2)

The validity of Level 3 criteria (sub-criteria of Level 2 criteria) is given in the form of a variable (*k* - Level 1 criterion, *l* - Level 2 criterion, *n* - Level 3 criterion). The validity of the requirements are specified in the range [0,1], and the sum of the weightings of the rules must be 1.

$$\sum_{n=1}^{N} W_{k\ln} = 1. \tag{3}$$

This article assumes that the considered projects belong to a finite set:

$$P = \{P_1, P_2, ..., P_m, ..., P_M\}, \qquad m = 1, ..., M, \tag{4}$$

Since the values of project assessments to individual criteria are treated as the degree of fulfillment by the 1st project of a particular ideal condition within the limits of a given rule, the values of these assessments should be normalized. For the criteria whose value should be maximum to optimize the location assessment value, the normalization takes place according to the formula (5). For example, for the technical criterion assessment - process and technology of wastewater treatment sub-criterion PT_t_i - reliability, the equation describing standardization is as follows:

$$PT_t'_i = \frac{PT_t_i}{\max\ (PT_t)} \tag{5}$$

For the criteria against which the assessment should be minimized, the variables are normalized as follows (example for the criterion - construction, operation and maintenance costs - if the assessment is determined in monetary units):

$$FE_COM'_i = \frac{1 - FE_COM_i}{\max\ (FE_COM)} \tag{6}$$

After standardization, variables $PT_t'_i$ and $FE_COM'_i$ are the new binding variables respectively PT_t_i and FE_COM_i

Based on specific normed assessments against Level 3 criteria, you can then specify the total project ratings for Level 2 criteria as a weighted sum of the grades within a given group of rules.

1. Assessment against the criterion The financial rating is normalized according to the formula (5) if we are based on point grades, or according to the method (6) if we are based on cost values

2. Before determining cumulative assessments, the level 3 criteria values are normalized. Based on standardized grades, the total level 2 criteria are determined.

3. The comprehensive evaluation within the rule - Process and technology of wastewater treatment is presented below PT_i

$$PT_i = \frac{V_{211} \cdot PT_pt_i + V_{212} \cdot PT_t_i + V_{213} \cdot PT_f_i + V_{214} \cdot PT_sq_i}{V_{211} + V_{212} + V_{213} + V_{214}}. \quad (7)$$

4. Total assessment within the criterion - Plant and equipment PE_i

$$PE_i = \frac{V_{221} \cdot PE_e_i + V_{222} \cdot PE_ll_i + V_{223} \cdot PE_eu_i + V_{224} \cdot PE_pca_i}{V_{221} + V_{222} + V_{223} + V_{224}}. \quad (8)$$

5. Cumulative evaluation under the rule - Other environmental impacts OE_i

$$OE_i = \frac{V_{231} \cdot OE_e_i + V_{232} \cdot OE_mp_i + V_{233} \cdot OE_ad_i + V_{234} \cdot OE_nc_i}{V_{231} + V_{232} + V_{233} + V_{234}}. \quad (9)$$

6. Cumulative assessments under the rule: sewage treatment process and technology, plant and equipment, as well as other environmental impact factors, are then subject to standardization following formula (5).

7. Total assessment within the criterion - technical assessment (evaluation of Level 1 criterion) is a weighted assessment of standardized assessments of Level 2 sub-criteria:

$$TA_i = \frac{V_{21} \cdot PT_i + V_{22} \cdot PE_i + V_{23} \cdot OE_i}{V_{21} + V_{22} + V_{23}}. \quad (10)$$

8. Cumulative assessment under the criterion - Efficiency of wastewater treatment E_wt_i

$$E_wt_i = \frac{V_{311} \cdot E_nc_i + V_{312} \cdot E_pc_i + V_{313} \cdot E_l_i + V_{314} \cdot E_m_i + V_{315} \cdot E_n_i + V_{316} \cdot E_di_i}{V_{311} + V_{312} + V_{313} + V_{314} + V_{315} + V_{316} + V_{317} + V_{318} + V_{319} + V_{31-10} + V_{31-11}} +$$
$$+ \frac{V_{317} \cdot E_np_i + V_{318} \cdot E_no_i + V_{319} \cdot E_pah_i + V_{31-10} \cdot E_t_i + V_{31-11} \cdot E_p_i}{V_{311} + V_{312} + V_{313} + V_{314} + V_{315} + V_{316} + V_{317} + V_{318} + V_{319} + V_{31-10} + V_{31-11}}. \quad (11)$$

9. Cumulative assessment under the criterion - Energy performance requirements EPR_i

$$EPR_i = \frac{V_{321} \cdot EPR_tec_i + V_{322} \cdot EPR_cc_i + V_{323} \cdot EPR_sd_i}{V_{321} + V_{322} + V_{323}}. \quad (12)$$

10. Total assessment under the criterion - Effectiveness of exhaust gas purification EFG_i

$$EFG_i = \frac{V_{331} \cdot EFG_p_i + V_{332} \cdot EFG_n_i}{V_{331} + V_{332}}. \quad (13)$$

11. A total score under the criterion - Other O_i

$$O_i = \frac{V_{341} \cdot O_twc_i + V_{342} \cdot O_cc_i}{V_{341} + V_{342}}. \tag{14}$$

Cumulative assessments under the rule: effluent treatment efficiency, energy performance requirements, flue gas cleaning efficiency, and others are then subject to standardization following formula (5).

12. Total assessment under the criterion - environmental assessment EA_i (Level 1 criterion assessment) is a weighted assessment of standardized Level 2 sub-criteria assessments:

$$EA_i = \frac{V_{31} \cdot E_wt_i + V_{32} \cdot EPR_i + V_{33} \cdot EFG_i + V_{34} \cdot O_i}{V_{31} + V_{32} + V_{33} + V_{34}}. \tag{15}$$

Cumulative assessments under the rule: financial assessment, technical assessment, and environmental assessment are then normalized according to the formula (5). Taking into account the validity of these criteria, we determine the weighted global evaluation of projects according to the formula:

$$OG_i = \frac{V_1 \cdot FE_i + V_2 \cdot TA_i + V_3 \cdot EA_i}{V_1 + V_2 + V_3}. \tag{16}$$

Based on the algorithm presented, each project is described by a number relative to the common criterion. On their basis, it is possible to indicate a project that is the optimal project from the adopted structure of rules and the importance of standards and sub-criteria.

Summary

The paper proposes a hierarchical model of evaluation of water and sewage infrastructure development projects. The model can also be used to support the process of technical and technological development of the Smart City idea. The purpose of the work is to support the development of regions within the Smart City idea, including activities in the search for solutions aimed at highly active water and wastewater treatment, exploitation of water supply and sewage systems in connection with caring for water quality and the environment. The direction of further research will be analyzes of the relationship between the level of water and sewage infrastructure and the quality of economic and social development.

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Consequences of Implementing the Industry 4.0 Concept in the SME Sector in Poland

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Abstract

Industry 4.0, which is a concept of data exchange, technology, and computerization of an enterprise, becomes the basis for building a competitive advantage. It is a modern concept of enterprise automation and computerization. First of all, it is the answer to the need to adapt enterprises to the constantly changing external environment. It is a new, emerging ideology already being implemented in many enterprises. This paper presents the assumptions of the doctrine of Industry 4.0. Theoretical considerations were supported by research results on the consequences of implementing the concept of Industry 4.0 in the SME sector in Poland.

Keywords: Industry 4.0, implementation consequences, SME sector.

Introduction

The concept of Industry 4.0 appeared in 2011 in the strategy of high techniques of the German government regarding the promotion of computerization of production processes. The underlying meaning in the development of the concept was the increase in the use of information technologies in the business. Customers' requirements regarding products and their properties have become a key factor. Customers are increasingly becoming designers of their products. At the same time, demanding that its price be a price close to the price of a product produced in mass production. P. Wittbrot and I. Łapuńka (2017).

The literature on Industry 4.0 is rich, also in Poland. D. Stadnicka, W. Zielecki, and J. Sęp (2017) focus in their publication on the concept of Industry 4.0, assessing the possibilities of its implementation. J. Grzywacz also dealt with the implementation problem (2017). He presented the benefits of using Industry 4.0. There is no shortage of works comparing the achievements of Polish enterprises with enterprises of other countries. Götz M. and Gracel J. deal with such topics (2017) comparing Polish enterprises with German ones. The authors state that Polish companies still have a lot to do in the context of Industry 4.0. They emphasize that if Polish enterprises do not understand the need to implement Industry 4.0, they will lose their competitiveness in international markets within seven years. However, they note that Polish enterprises have great potential to build an economy based on Industry 4.0. They point to the most significant asset they have - young, well-educated staff. In 2019, four reports about Industry 4.0 were published in Poland. The summary of reports is presented by Z. Piątek in his publication (Piątek 2019). These reports show that more than half of Polish enterprises in Poland met with the date of the fourth industrial revolution. Many companies have already begun to implement Industry 4.0 technology solutions. A significant conclusion is that companies have specific business needs and are aware of areas that need optimization.

Until recently, Industry 4.0 was only available to large industrial enterprises. At present, enterprises belonging to the SME sector in Poland have understood that Industry 4.0 is a requirement and a necessity for them. The Simens Financial Services report shows that the "critical point" of the adaptation of new technologies, i.e., the moment when more than 50% of all producers will switch to the Industry 4.0 model will occur in the SME sector, in Poland in 9-11 years. It seems to be an extended period, but this time cannot be wasted. Industry 4.0 may turn out to be a standard business model without which enterprises will not be able to manage on the market.

The purpose of the article is to present the results of research on the consequences of implementing the concept of Industry 4.0 in enterprises of the SME sector in Poland. The author has identified four areas of influence of Industry 4.0 solutions: production speed, digitization, flexibility, and robotization of production processes.

The article consists of two parts: theoretical and practical. The theoretical part is a discussion about the idea of the concept of Industry 4.0 and the benefits of using this ideology in the enterprise. The second part is practical and relates to research that has been carried out among Polish enterprises of the SME sector in Poland.

The idea of the concept of Industry 4.0

The fourth stage of the industrial revolution that is currently taking place is identified with the concept of Industry 4.0 (Kopp 2014, Stadnicka 2017). The first industrial revolution took place in the XVII century. It was primarily associated with the use of water energy, mechanization of work, and the invention of the engine. The use of steam power was the most significant breakthrough in the history of human production. Since then, steam engines have been used in industrial production. The second industrial revolution began in the nineteenth century. Its primary manifestation was the use of electricity and assembly lines. The third generation started in the 1970s with the implementation of partial automation of production and computers. At present, the era has come, which, due to the development of new technologies, is to lead to the integration of suppliers, customers, machines, processes, systems, and products. The combination of these elements is to point to the creation of an intelligent factory. It will continually deepen automation, optimize products and processes, process massive data sets in real-time. The implementation of the idea of Industry 4.0 will allow the development of production systems that will have the ability to self-organize and self-control (Wittbrodt 2017).

It was assumed that the company according to the concept of Industry 4.0 is an information system and numerically controlled machines. Production systems due to the diversity in the industries of the term Industry 4.0 cannot be generalized. The definition of Industry 4.0 should be considered individually for each enterprise.

The concept of Industry 4.0 means full integration of the real world of production machines with the world of virtual Internet. Devices, people, and IT systems exchange information on an ongoing basis, convert data sets, make necessary decisions.

The Industry 4.0 concept uses the following technological solutions presented by Hermann et al (2015), Knop (2014) and Wang (2016):

- Internet industrial of things (IIoT),
- direct communication between machines (M2M),
- simulation techniques,
- vertical and horizontal integration of software;
- augmented reality technologies (VR);
- prognostic techniques;
- cyber-physical systems,
- autonomous robots;
- mass individualization;
- additive technique;
- innovative methods of collecting and processing vast amounts of data along with the possibility of cloud computing potential (Clouds).

The concept of Industry 4.0 includes areas associated with numerous technologies that lead to the full integration of enterprise resources better and to integrate the resources at the enterprise's disposal.

Benefits of implementing the concept of Industry 4.0

The main goal of the Industry 4.0 concept is to get a company that will be more efficient and customer-focused. The benefits of implementing the concept of Industry 4.0 in enterprises will be related to the digital transformation of production. The essential advantages of Industry 4.0 are (Hermann 2015, Piątek 2019):

– increase in efficiency,
– improving working conditions,
– better product quality, thanks to monitoring the production process in real-time,
– better process quality,
– better use of resources,
– optimization of business planning,
– increase in sales revenues,
– obtaining information about the entire production process in real-time,
– increased operational reliability,
– low failure rate,
– personalization and adaptation to the needs of customers.

Industry 4.0 solutions will have an impact on improving productivity, increasing flexibility, quality, and speed of the production process. The implementation of systems that will collect and analyze data from the entire production process affects the rate of the production process and the time of the production cycle.

Robotization of the production process, which is another element of the Industry 4.0 concept, will improve the flexibility of the production process. Intelligent control systems, smart sensor technology will result in better adaptation of the production process to changing conditions. It will also cause the possibility of rapid production change, the possibility of producing products in short production series.

Industry 4.0 solutions will also affect product quality. The use of sensors that will inform in real-time about any deviations in the production process will eliminate defective products. Ultimately, this will improve production and product quality.

Consequences of implementing the concept of industry 4.0 in the SME sector - research results

The research was carried out among enterprises of the SME sector in Poland in the period December 2019 - February 2020. 580 SME enterprises were examined. A diverse research group was taken into the sample in terms of employment and turnover. Table 1 shows the number of enterprises participating in the survey by employment size. All enterprises belong to the SME sector.

Table 1: number of enterprises participating in the study by employment size

Employment volume	Number of enterprises	%
up to 10 people	279	48,10%
from 10 to 49 people	221	38,10%
from 50 to 250 people	80	13,79%
Sum	580	

Source: Own study

48,10% of the surveyed enterprises are micro-enterprises employing up to 10 employees. 38,10% of the surveyed enterprises employ between 10 and 49 employees. 13,79% are enterprises operating between

In the first question, the respondents were asked to answer the question of whether the implementation of the concept of Industry 4.0 increases the speed of production processes. Figure 3 shows the number of specific answers to the problem. The chart clearly shows that the surveyed enterprises do not show that the implementation of the concept of Industry 4.0 influences the increase of production processes. 39,14% of surveyed companies declare ('Yes' and 'Rather yes') that the implemented Industry 4.0 solutions increase the speed of the production process. 26,21% find it difficult to state. In 34,66% of enterprises, on the other hand, the answers did not significantly improve the speed of the production process.

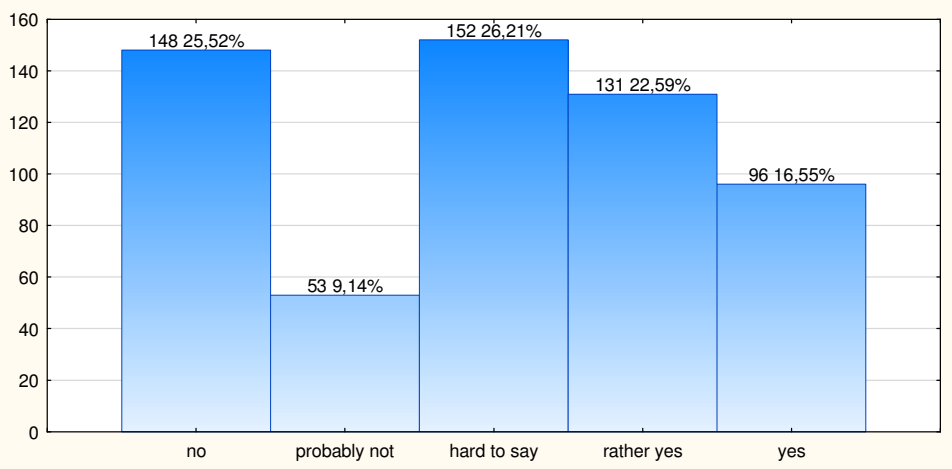

Fig. 1: The number of definite answers to the question: Does the implementation of Industry 4.0 solutions increase the speed of production processes in your organization.

Source: Own study

The ANOVA analysis (Fig. 2) for the answer examining the impact of industry 4.0 solutions on improving the speed of production processes shows that there are differences in the average responses for individual enterprise sizes. The larger the company, the more significant the impact of Industry 4.0 solutions on the speed of production processes.

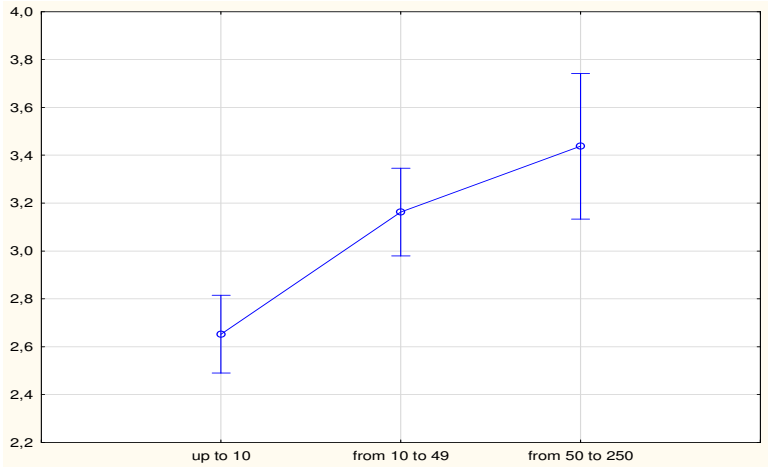

Fig. 2: The difference between means in the ANOVA analysis for a question examining the impact of Industry 4.0 solutions on the speed of the production process

Source: Own study

Also, the Tukey test (Fig. 3) identified two groups similar in terms of answering the question examining the impact of solutions on the speed of the production process. One group is a micro-enterprise, while the other includes enterprises employing 10 to 49 people and 50 to 250 people.

	HSD Homogeneous groups, alfa = ,05000 Error: MS intergroup = 1,9152, df = 577,00			
Nr	Employment volume	Process Speed Average	1	2
1	up to 10	2,652330		****
2	from 10 to 49	3,162896	****	
3	from 50 to 250	3,437500	****	

Fig. 3: Tukey HSD test for the answer regarding the impact of Industry 4.0 solutions on increasing the speed of the production process

Source: Own study

Another question concerned the digitization of the production process. As in the case of the previous problem, there are no significant differences between the answers of the surveyed enterprises (Fig. 4). The impact of Industry 4.0 on the digitization of the production process was observed in 43% of the surveyed enterprises. 24% replied that it is difficult to say that Industry 4.0 influenced the digitization of the production process in their enterprises. In 24% of enterprises, however, did not report such an impact.

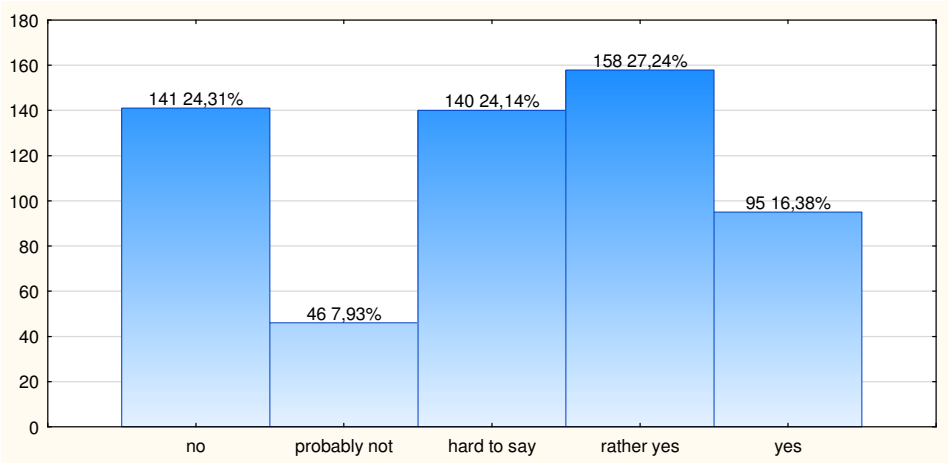

Fig. 4 : The number of answers to the question: Does the implementation of Industry 4.0 solutions influence the digitization of production processes in your organization.

Source: Own study

ANOVA (Fig. 5) for the answer examining the impact of industry 4.0 solutions on the digitization of production processes shows that there are differences in the average responses for individual enterprise sizes. The larger the company, the more significant the impact of Industry 4.0 solutions on the digitization of production processes.

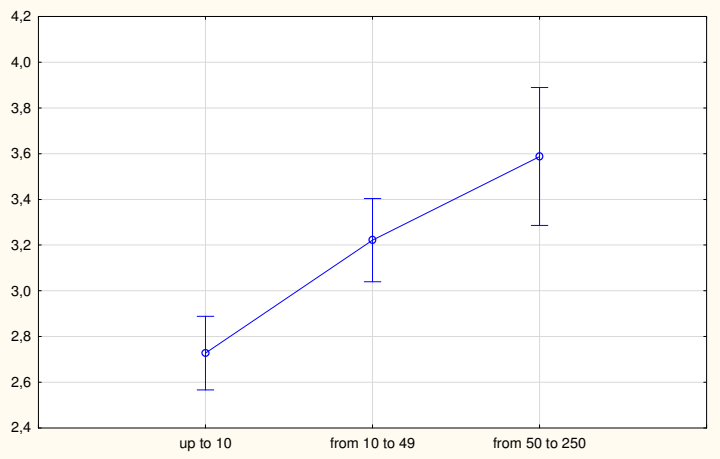

Rys. 5 : The difference between means in the ANOVA analysis for answering the question about the impact of Industry 4.0 solutions on the digitization of the production process

Source: Own study

Tukey's test identified two groups among the surveyed enterprises in terms of employment in responses regarding the impact of Industry 4.0 on the digitization of the production process. One group for enterprises employing up to 10 people. The other is enterprises employing from 10 to 49 people and from 50 to 250 people.

Nr	HSD Homogeneous groups,, alfa = ,05000 Error: MS intergroup = 1,8275, df = 577,00			
	Employment volume	Flexibility Average	1	2
1	up to 10	2,637993		****
2	from 10 to 49	3,149321	****	
3	from 50 to 250	3,475000	****	

Rys. 6: Tukey HSD test for the answer regarding the impact of Industry 4.0 solutions on the digitization of the production process

Source: Own study

The third question was about the impact of the Industry 4.0 concept on the flexibility of the production process (Fig. 7). In 26,38%, no such effect was observed. Only 13,79% of the impact was observable. 26,38% of enterprises say there is instead an impact. In 33,45% of the surveyed enterprises, such effect was not noticeable.

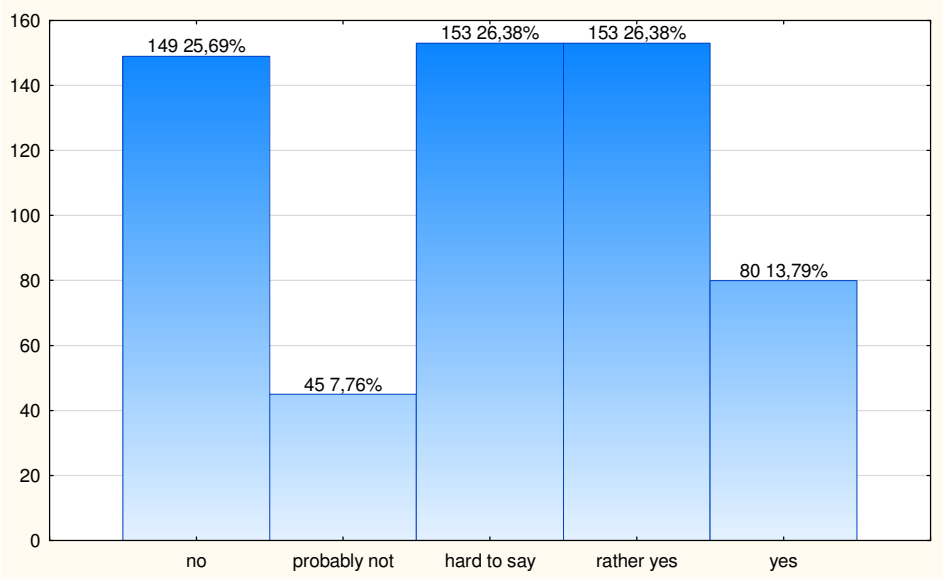

Fig. 7: The number of answers to the question: Does the implementation of Industry 4.0 solutions affect the flexibility of production processes in your organization.

Source: Own study

Similarly to research on the speed and digitization of the production process, also in the case of research on flexibility, one can notice differences in the responses between individual groups of enterprises (Fig. 8).

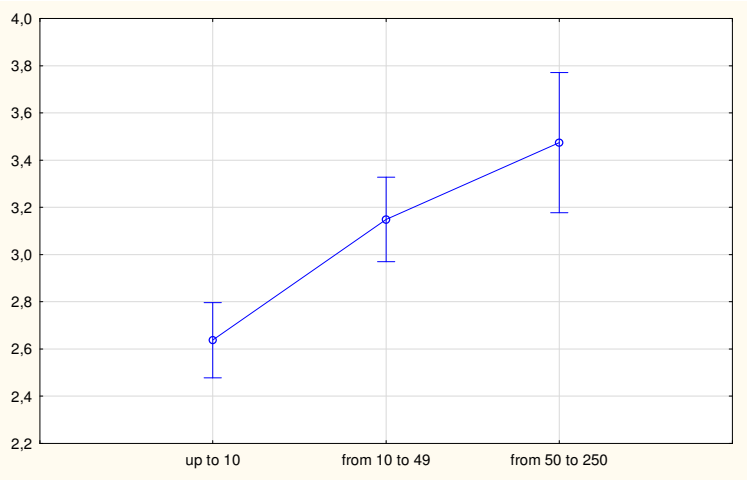

Fig. 8 : Difference between means in the ANOVA analysis for the answer to the question about the impact of Industry 4.0 solutions on the flexibility of the production process

Source: Own study

The Tukey test for the question about the impact of Industry 4.0 on the flexibility of the production process also identified two groups of similar enterprises: enterprises employing up to 10 people and enterprises employing 10 to 49 people and 50 to 250.

	HSD Homogeneous groups,, alfa = ,05000 Error: MS intergroup = 1,8275, df = 577,00			
Nr	Employment volume	Flexibility Average	1	2
1	up to 10	2,637993		****
2	from 10 to 49	3,149321	****	
3	from 50 to 250	3,475000	****	

Fig. 9: HSD Tukey test for the answer regarding the impact of Industry 4.0 solutions on the flexibility of the production process

Source: Own study

Another question concerned the impact of Industry 4.0 on the robotization of the production process (Fig. 10). Figure 10 shows that more SMEs sector enterprises did not notice the effects of Industry 4.0 on the robotization of the production process. 40,52% did not see any significant impact on Industry 4.0 on the robotization of the production process. 12,07% are convinced that there is preferably no such impact. As many as 24,14% believe that it is difficult to say whether the effects of Industry 4.0 on robotization exists. However, only 9,48% believe that such an impact has been observed in their enterprises.

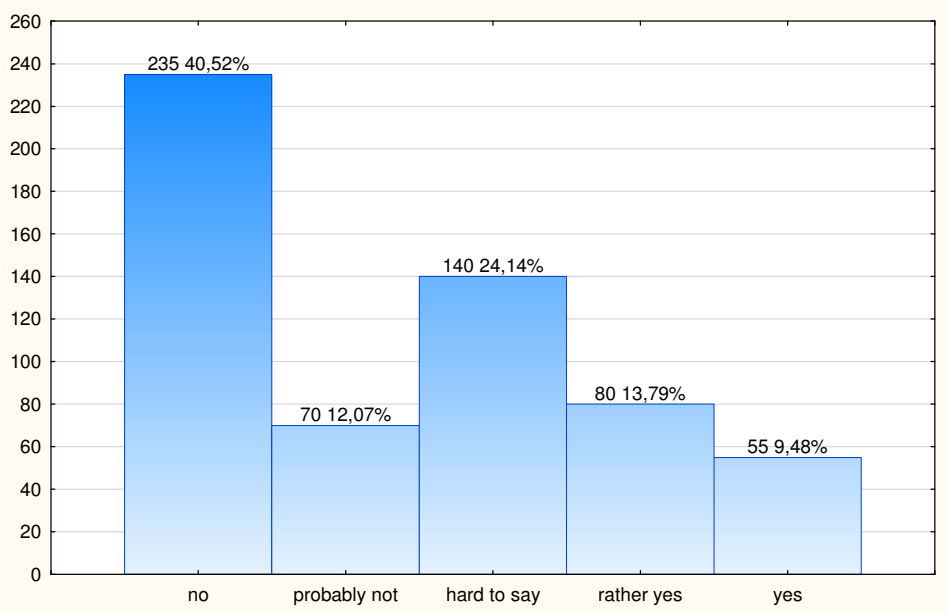

Fig. 10: The number of answers to the question: Does the implementation of Industry 4.0 solutions affect the robotization of production processes in your organization.

Source: Own study

Figure 10 presents differences in means for answering the question about the impact of Industry 4.0 solutions on robotization. There are differences between the groups of companies between the answers. As in the previous issues, two groups were selected using the Tukey test (Fig. 12): enterprises employing up to 10 people and enterprises employing 10 to 49 people and 50 to 250.

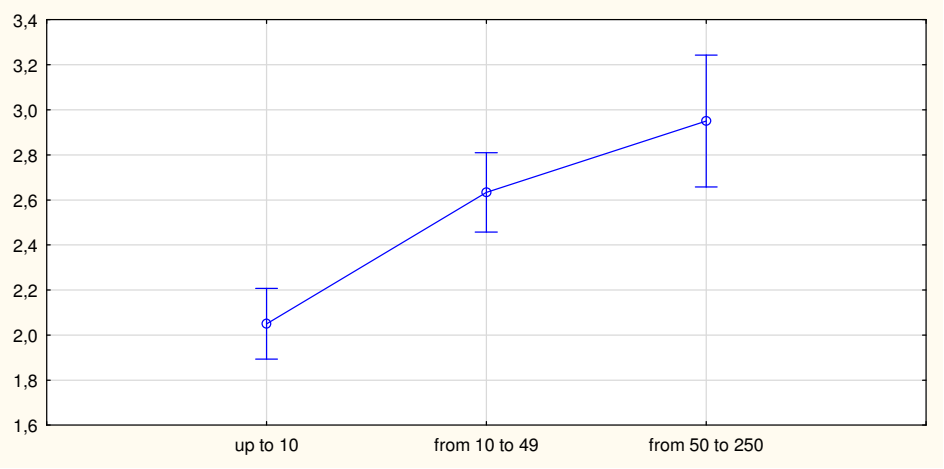

Fig. 11: Difference between means in the ANOVA analysis for the answer to the question about the impact of Industry 4.0 solutions on robotization of the production process

Source: Own study

Nr	HSD Homogeneous groups, alfa = ,05000 Error: MS intergroup = 1,7823, df = 577,00 Employment volume	Robotic Average	1	2
1	up to 10	2,050179		****
2	from 10 to 49	2,633484	****	
3	from 50 to 250	2,950000	****	

Fig. 12: Tukey HSD test for the answer regarding the impact of Industry 4.0 solutions on robotization of the production process

Source: Own study

Conclusions

The concept of Industry 4.0 is intensively developed. In practice, more and more of its elements are implemented in enterprises. As a rule, the idea of Industry 4.0. It is crucial and essential that Polish enterprises also apply the concept in question. It also seems necessary to implement the concept in the SME sector.

The purpose of the article was to present the results of research on the consequences of implementing the concept of Industry 4.0 in Poland. The author has identified four areas of influence of Industry 4.0 solutions: production speed, digitization, flexibility, and robotization of production processes.

In the conducted research, enterprises indicated the extent to which Industry 4.0 affects specific areas. A total of 580 enterprises were tested. In none of the four emerging planes of influence did the enterprises indicate that Industry 4.0 had a significant impact in any selected area. This attitude may be related to the SME sector. Considering the research (Gotz 2017) that stated that Polish enterprises do not implement Industry 4.0 solutions, the results of this work seem to confirm their opinions. The SME sector has insufficiently implemented solutions to be able to talk about its impact on production speed, flexibility, digitization, or robotization.

However, the research has selected groups into which the SME sector in Poland can be divided. One group was small enterprises employing up to 10 people. The second enterprise employs from 10 to 49 and from 50 to 250 employees. This indicates that micro-enterprises stand out from the others without noticing the advantages of the Industry 4.0 concept. Given the necessity and legitimacy of implementing the concept of Industry 4.0, this is a worrying conclusion. At the same time, it should be noted that the surveyed companies are aware of the need to implement the concept of industry 4.0. The research presented in the paper to some extent directs their application.

Acknowledgment

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Treasury Support in The Russian Federation as The Tool to Improve the Efficiency of The Use of Budget Funds

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Abstract

The research is devoted to the study of the concept and process of applying the Treasury support tool in the field of public administration as an integral component of the modern system of distribution and redistribution of state financial resources in order to increase the efficiency of use of budget funds. The purpose of the study is the analysis of the Treasury support instrument using modern approaches to improving the efficiency of the use of budgetary resources, as well as the prospects for the development and application of this tool in Russia. The authors use general scientific (analysis, synthesis, induction, deduction) and special research methods, as well as methods of economic theory. The study analyses treasury support procedure, as well as the application of the treasury letter of credit, the most important tasks the procedure can help to solve, and the development prospects. As a result of the study, the authors revealed both the positive results of introducing the mechanism of treasury support, including the use of treasury letters of credit, as well as some shortcomings and problems that impede the full use of this mechanism in order to increase the efficiency of spending budget funds. The authors come to the conclusion that today, the emergence, implementation and further improvement of treasury support as a tool to increase the efficiency of the use of budget funds, in particular in the implementation of government contracts, is a new stage in the development of state financial control. Further study of this topic will allow a deeper understanding of the possibilities and prospects of integrated introduction of this tool into the general government sector.

Keywords: State Financial Control, Public Procurement, Budget Funds, Government Contract, Advance Payment, State (Municipal) Acquisitions

Introduction

The structural and economic transformations that are taking place in the field of public administration under the influence of information technology help significantly improve the quality of processes and simplify their mechanism in the provision of public services. This, in turn, makes it possible to increase the level of citizens' trust and the transparency of modern state processes. New approaches and economic models create conditions for maximum efficiency in terms of the use of all resources in the state, as well as a favorable environment for development and investment in the future.

State financial control is a necessary element of public administration, which is carried out at all stages of the budget process in order to identify, prevent and suppress illegal actions in the process of formation, distribution and use of budget funds.

Improving the mechanisms and methods of control, creating new ways of analyzing information leads to an increase in the quality of control and expert-analytical measures carried out by state financial control bodies.

Methodology

At present, the application of financial control is most relevant in areas with the greatest risk of illegal use of budget funds. The Federal Treasury identifies the following budget risks with a high level of significance: unjustified overpricing of government contracts, lack of transparency in settlements between co-executors of government contracts, incompleteness and / or inaccuracy of budget reporting data, and others.

Thus, one of the most risky is the sphere of state (municipal) acquisitions of goods, works and services, which is confirmed by the annual reports of the Accounts Chamber of the Russian Federation. So, for example, according to the results of 2016, it was revealed that about 56% of the total volume of violations (541.3 billion rubles) was accounted for by violations in the formation and execution of budgets, including the implementation of state (municipal) acquisitions and purchases by individual types of legal entities.

The organization and implementation of effective control over the spending of budget funds aimed at the execution of state contracts is one of the most labor-intensive areas of state financial control in the view of the fact that in general the acquisition system in the field of state (municipal) acquisitions in the Russian Federation is fully operational for 4 years under the Federal Law "On the acquisition system in the field of procurement of goods, works, services to meet state and municipal needs" dated 04.04.2013.

The functions for monitoring in this area at the Federal level are carried out by:

1. Accounts Chamber of the Russian Federation - conducting an audit in the field of procurement of goods, works and services carried out by objects of audit (control) based on the Federal Law "On the Contractual System in the Sphere of Procurement of Goods, Work, and Services to Ensure State and Municipal Needs";
2. The Federal Treasury of the Russian Federation as a federal executive body that exercises enforcement functions in cash servicing budget execution of the budget system of the Russian Federation based on the Federal Law "On the Accounts Chamber of the Russian Federation";
3. The Ministry of Finance of the Russian Federation is the federal executive body for regulating the contract system in the field of procurement of goods, works, services to ensure state and municipal needs based on the Federal Law "On the Federal Budget for 2018 and the Planning Period of 2019 and 2020";
4. Federal Antimonopoly Service of the Russian Federation - a federal executive body authorized to exercise control (supervision) in the field of state defense order and in the field of procurement of goods, work, services to meet state and municipal needs, as well as approval of the use of closed methods for determining suppliers (contractors, contractors) base on the Federal Law "On the Federal Budget for 2018 and the Planning Period of 2019 and 2020".

The existing legislation governing this area is still imperfect, so the presence of violations, in particular inappropriate and inefficient use of funds allocated by the corresponding budget is inevitable. The main violations identified in 2016 by the Accounts Chamber of the Russian Federation include:

- violation of the conditions for the execution of contracts (agreements), including the timing of implementation, including the timeliness of settlements under the contract (63.5% of the total amount

of violations identified); violations in substantiating and determining the initial (maximum) price of the contract, the price of the contract concluded with a single supplier (13.2%);
- violations in the acceptance and payment of delivered goods, work performed, services rendered that do not comply with the terms of the contracts (agreements) (8.1%).

In order to ensure the full functioning of the acquisition system and prevent the unlawful use of budgetary funds in this area, a new control mechanism was developed - Treasury support, which is designed to reduce the likelihood of such violations. It is used both in the implementation of state contracts, and in contributions to the authorized capital, the provision of subsidies.

Treasury support involves the following: personal accounts (co-executors) under state contracts, including those implying the presence of advance payments, to recipients of budget investments and subsidies are opened by a personal account by the territorial authority of the Federal Treasury in the institutions of the Central Bank of the Russian Federation. All earmarked funds are transferred to the personal accounts of the territorial bodies of the Federal Treasury, and not to the accounts of credit organizations, as it was before. Validation of expenses at the expense of these earmarked funds occurs exclusively after the submission of documents confirming the fact of delivery of goods, provision of services and performance of work.

It is important that in this way there is a constant analysis (operational control) of cash flows. As the result all interested parties (the state customer, the federal executive body that provided subsidies and budget investments) receive reports on transactions with specific target funds.

According to the Chairman of the Accounts Chamber of the Russian Federation, the solution to most of the problems in the field of public (municipal) acquisitions should be the creation of an integrated system that implies a direct relationship between the budget and the public procurement registry with mandatory Treasury support of the entire process.

The cooperation of the Ministry of Finance of the Russian Federation and the Federal Treasury of the Russian Federation, with the necessary powers in this area, will make it possible to build an integrated information system. So, for example, in the Decree of the Government of the Russian Federation of August 26, 2013 No. 728 at the beginning of 2017, amendments were made to transfer to the Ministry of Finance of the Russian Federation powers in the field of public procurement, which were previously assigned to the Ministry of Economic Development of the Russian Federation, thus laying the foundation for subsequent interaction of the Ministry of Finance of the Russian Federation with the Federal Treasury of the Russian Federation.

The new function of the Federal Treasury of the Russian Federation is significantly different from its function of cash servicing the budgets of the budget system of the Russian Federation, because with Treasury support, the subjects are not participants in the budget process. In the strategic map of the Treasury of Russia, designed for the period 2017-2021, one of the strategic goals is to provide Treasury support of funds. The social effect of achieving this goal is assessed as increasing the efficiency of using the financial resources of the state, as well as trust in the authorities on the part of citizens. Improving the availability and transparency of information disclosing financial activities in the public sector will also significantly affect the social and economic situation in the country.

Results and Discussion

Treasury support is a control tool not only for legal entities, but also means increased control over expenditures by the constituent entities of the Russian Federation from the federal level and, accordingly, over expenditures of municipalities from constituent entities of the Russian Federation, which are carried out through the provision of inter-budget transfers of targeted use from the top-level budget .

The formation and application of this innovation is caused by objective factors. Firstly, the presence of advance payments that accompany large government contracts. It often happens that the budget

funds provided are placed on deposits with commercial banks (or, for example, for the purchase of foreign currency), so they were not used to fulfill a state order. The participation of one-day firms in advance schemes is also a common practice.

The provision of significant amounts of advance payments has led to the formation of receivables in the amount of 4 trillion rubles.

Secondly, until 2015, targeted subsidies, budget investments, advance payments were transferred to accounts opened by legal entities with credit organizations, which is a potential opportunity for misuse of allocated budget funds. For example, subsidies could be transferred to a legal entity at the same period of time for the same purpose but by the different government bodies. Transfer and storage of budget funds in the personal accounts of the Federal Treasury of the Russian Federation will exclude the possibility of a similar situation.

The application of the following mechanism has begun in 2015 for certain types of government contracts. The first prerequisites for implementation were laid down in the Federal Law dated 01.12.2014 "On the federal budget for 2015 and for the planning period 2016 and 2017". Article 5 of this document on the features of the use of budget funds in 2015 stipulates that the target funds of certain legal entities (not participants of the budget process) that are recipients of subsidies, budget investments and in some other cases are subject to crediting and debiting from the personal accounts of these legal entities opened in the territorial bodies of the Federal Treasury of the Russian Federation. In relation to state contracts, it has been established that advance payments are carried out according to the same scheme in cases where the amount of the state contract exceeds 1 billion rubles.

In 2016, the scope of the Treasury support mechanism has expanded significantly, the main provisions of which were also enshrined in the Federal law on the federal budget for the corresponding year. In paragraph 1 of Article 5of the law the specific name of the new control instrument was recorded: “To establish that in 2016 ... the territorial bodies of the Federal Treasury carry out Treasury support of state contracts, agreements (agreements), as well as contracts, agreements, agreements concluded in the framework of their execution ... ". The same article records the list of objects for which Treasury support is established. The amount of the state contract, to which the use of this mechanism is not necessary, has decreased to 100 million rubles, and the fact of the presence of advance payments is not important based on the Federal Law "On the Federal Budget for 2016".

In the same year, detailed regulation of actions with Treasury support was included in various regulatory acts of the Government of the Russian Federation, in particular the Ministry of Finance and the Federal Treasury.

The full implementation of the Treasury support was introduced on January 1, 2017 based on the positive experience of using this method in the previous two years. A provision about the implication of this application for the calculations for the state defense order with the contract amounted more than 100 million rubles or availability of advance payment from 30 to 80% of the amount of the contract has also been introduced. Since 2018, Treasury support has also extended to contracts with a single supplier. Thus, the Federal Treasury is responsible for monitoring settlements between all levels of cooperation, including verifying the actual execution of government contracts.

Despite the fact that this mechanism has been finally introduced, the concept of Treasury support is not included in any regulatory act. At present, a draft Federal law is being developed “On Amending the Budget Code of the Russian Federation ... in terms of treasury execution and the system of treasury payments”, one of the points of which is to include the provisions in the Budget Code of the Russian Federation regarding Treasury support. New changes imply not only the definition of this mechanism, but also a detailed list of areas for spending budget funds allocated from both the federal and regional budgets, which are subject to Treasury support.

The use of the Treasury support mechanism defines a new principle in budget execution: the allocation of funds occurs exclusively "on demand", i.e. at a specific time of payment of the obligations assumed. The first results of its implementation were a decrease in accounts receivable (by 9% as of January 1, 2017 compared to January 1, 2013), in particular for subsidies to legal entities, as well as a reduction in unused balances (from 242.6 billion rubles to 6 billion rubles in the same period).

The implementation of such strategic projects as the construction of the Kerch Bridge, the preparation of the World Cup for football: the construction (restoration) of stadiums by 2018, as well as information support for the event, demonstrates a significant effect from the introduction of this mechanism.

The introduction of new provisions in the implementation of this mechanism is not yet completed. In 2018, it was planned to use a payment instrument on the basis of Treasury support - treasury bonds or treasury letter of credit. This payment document confirms the obligation of the recipient of the trust funds to pay the obligations of the contractor of the state contract / agreement on the provision of trust funds when the conditions specified by the contract / agreement are met. Thus, the treasury letter of credit can be used as a partial or full replacement of advance payments, due to which there is an increase in accounts receivable for budget expenditures of the budget system of the Russian Federation.

The figure below shows the process of providing a treasury letter of credit with Treasury support (Fig. 1). If it is absent at the 3rd stage of this procedure, a receivable arises. Moreover, the use of a treasury letter of credit prevents the situation of using additional personal accounts for the transferred powers.

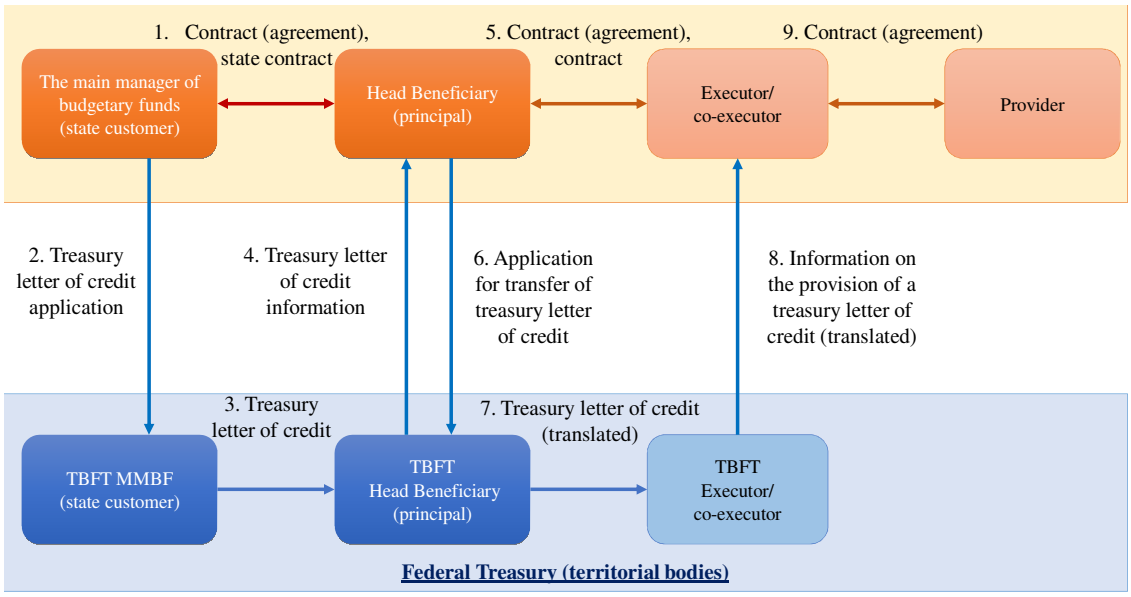

*TBFT - Territorial bodies of the Federal treasury
MMBF - Main manager of budgetary funds

Fig. 1: Scheme for the provision of a treasury letter of credit as part of Treasury support of budget funds

(developed and compiled by the authors)

Thus, settlements under the treasury letter of credit are carried out exclusively after the contractor (co-contractor), having received the goods, work and services from the supplier, submits to the territorial bodies of the Federal Treasury a payment document confirming the fact of fulfilled conditions. The territorial bodies of the Federal Treasury of the executor sends a request for the

execution of the treasury letter of credit to the inter-regional operational department of the Federal Treasury, which transfers the amount to pay for deliveries.

It is mandatory to inform about the settlements under this treasury letter of credit both the territorial bodies of the Federal Treasury of the recipient of the subsidy (head contractor) and, accordingly, the recipient, and the territorial bodies of the Federal Treasury of the main manager of budget funds (state customer) and the main manager of budget funds.

One of the first who participated in the experiment on the application of the treasury letter of credit as part of Treasury support was the state atomic energy corporation Rosatom, acting as the state customer for the state contract for the amount of 150 million rubles with an advance payment of 28.4 million rubles.

A treasury letter of credit was issued in the amount of the advance payment, however, the execution amounted to only 9%. The experiment was conducted on the basis of three government customers, the total advance payments for all three government orders amounted to 1,451.4 million rubles, however, treasury letters of credit were executed only for 509.8 million rubles (35%). Already from this we can conclude that the use of this payment instrument in the framework of Treasury support is quite effective in order to ensure the targeted use of budget funds, in particular, allocated under state contracts.

Despite the positive results of introducing a mechanism of Treasury support, including the use of treasury letters of credit, there are some flaws and problems that impede the full use of this mechanism in order to increase the efficiency of spending budget funds.

These include the imperfection of the integration of the electronic budget information systems with the unified public procurement information system. In the absence of the necessary interaction, which ensures the receipt of complete and reliable information about the subjects and objects involved in the process of using budget funds, it is rather difficult to carry out the procedures of Treasury support and, accordingly, the authorization of expenses. As mentioned above, the Ministry of Finance has legislatively fixed the regulatory functions in the field of public procurement, which will allow for closer cooperation with the Federal Treasury in this area, in particular in the information sphere.

The strategic goals of the Federal Treasury for 2017-2021, which is the operator of the Unified Information System in the field of procurement, include stabilization of this system and ensuring the necessary interaction with the state integrated information system "Electronic Budget", as well as the overall further development of these systems.

The Chairman of the Accounts Chamber appreciates the introduction of this mechanism positively, but believes that Treasury support should be further improved. For example, due to the use of the new tool in almost the entire sphere related to the provision of budget funds to legal entities (with some exceptions, enshrined in the federal law on the federal budget for a specific year), recipients of targeted funds began to change the essence of the provision of subsidies. The reports on the funds used by them, in most cases, do not include the required information justifying the appropriateness of their use. As indicated above, Treasury support is directly related to the advance of contracts, however, not all contracts provide for advance payments. In their absence, the company can use banking support, avoiding control by the Federal Treasury. This problem was practically solved by expanding the scope of Treasury support: for example, in 2018, regardless of the advance payment, all state contracts under the state defense order, the amount of which exceeds 100 thousand rubles, are subject to Treasury support.

Conclusion

Summing up, we can make an unconditional conclusion that the emergence, implementation and further improvement of Treasury support as a tool to increase the efficiency of the use of budget funds, in particular when implementing government contracts, is a new stage in the development of

state financial control. The socio-economic effect of the introduction of this mechanism is to increase the transparency of cash flows and the quality of fulfillment of obligations, ensuring the safety and targeted use of budget funds, and others.

It continues to develop a treasury letter of credit as part of treasury control, as well as budget monitoring, as an instrument of operational control over the use of budget funds. The legal framework has substantially replenished with new provisions, resolutions, and in the long term - the introduction of new articles in the Budget Code of the Russian Federation. Also, a new system of organization of internal state financial control is being formed based on a risk-based approach in the framework of the "Concept of increasing the efficiency of budget expenditures until 2023", one of the provisions of which is to ensure operational efficiency by improving the procedure for Treasury support of budget funds and expanding the scope of treasury letters of credit.

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COVID-19 Pandemic – A Permanent Socio-Economic Change?

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Abstract

The purpose of this paper is to explore the most important effects of Coronavirus appeareance all over the world from psychological, social and economic perspective. The pandemic situation determined the public authorities to impose protective measures, in order to ameliorate the Covid-19 spreading. These measures have had important consequences for every person and for the society as a whole.
After Coronavirus will disappear, nothing will be the same and people will significantly change their lifestyle. The paper identifies the most popular measures imposed, the changes that took place in people's lives due to these measures, the future modifications that have to be taken into consideration and people will have to deal with. The originality of the paper consists in describing the future situation after Coronavirus will permanently disappear. The present research was based on the literature review of the official statistical data and the publications related to this subject. The conclusions will determine the readers to realize the huge differences in the way they are used to live and will convince them to study new ways of coping with the future changes.

Keywords: Pandemic, Covid-19 Social, Economic, Changes

Introduction

The idea of the article comes from the present pandemic situation and the urgent changes that people have to deal with in order to live. It seems like Covid-19 showed the humanity its weakness in fighting a new virus which naturally appeared probably from a "harmless" Chinese bat.

In spite of the colossal advancement made by the scientific world, there are still many threats that people have to cope with.

This new virus just remembered the humanity that nature will always dominate humanity and will dictate the rules in their lives.

Consequently, after the pandemic situation will vanish, people will permanently change the way they used to live. This implies the appearance of economic and social differences.

The article illustrates the image of the future based on the official data and logical deduction.

The sacrifice represented by the lives' losts should disciplinate the people and should impose new directions for the future public investments.

Literature Review

The World Health Organization's (WHO) declared, on the 30th of January 2020, the epidemic of coronavirus a Public Health Emergency of International Concern.The eruption started from four patients that were workers in Wuhan seafood market and also dealing with some wild animals. The

idea that COVID-19 was sheltered by a bat came from the fact that it contains 96% identical at the whole – genome level. (Fang et al., 2020)

As a response to this COVID – 19 eruption, the Chinese government took protective measures such as: "early detection, early isolation, early treatment, adequate medical supplies, patients' being admitted to designated hospitals, and comprehensive therapeutic strategy"(Fang et al., 2020), which are presented in the following Table 1:

Table 1 : Chinese protective measures against Coronavirus

Measures	Decembrie 2019	January 2020	February 2020
Early detection of the SARS-CoV-2			
Preliminary control			
(1) Public health level 1 response of 31 provinces			
(2) Strict exit screening			
(3) Medical support from other regions of China			
(4) Cancellation of mass gatherings			
(5) Methodological improvement on the diagnosis and treatment strategy			
(1) Public health level 1 response of 31 provinces			
(2) Strict exit screening			
(3) Domestic and international medical support			
(4) The larger scale of cancellation of mass gatherings			
(5) Further methodological improvement on the diagnosis and treatment strategy			
(6) Spontaneous household quarantine by citizens			
(7) Two newly built hospitals' put into use			
(8) A clinical trial of perspective medicines			
(1) Public health level 1 response of 31 provinces			
(2) Strict exit screening			
(3) Further medical support from home and abroad			
(4) Massive online teaching in a postponed semester			
(5) Orderly resumption of back to work			
(6) Addition of new diagnosis method—clinically diagnosis in Hubei province			
(7) Interagency mechanism			
(8) Further exploration of effective therapeutic strategy			

Source: adapted from Fang et al. (2020)

In China, these measures have reduced the number of new cases of Coronavirus with 90%. However, the public protective measures did not work in all the affected countries. Italy was particularly affected.

It is imperative for all the health systems to be prepared with proper medical equipments and treatments. (Remuzzi, A. & Remuzzi, G., 2020)

However, there are many cases of countries that suffer from lack of preparedness. In one study entitled *Straining the System: Novel Coronavirus (COVID-19) and Preparedness for Concomitant Disasters* elaborated by two American authors Nathaniel Smith and Michael Fraser stated that "*Advancing world-class data and analytics to support public health decision-making is vital to our disease surveillance and response activities*." They also blame the system from United States for using old technology, such as: faxes, to report information about the public health and use paper forms to follow up. The paper is still used to record important health data and spreadsheets are completed manually. Considering the unbalanced state of technology's evolution, the public health data system urgently needs a modernization (Smith & Fraser, 2020).

In the United States after the terrrorist attacks from September 11, 2001, significant investments were made to increase the level of public health preparedness. In addition, in 2018 the authorities created a special Reserve Fund for the public health system during epidemics and other kinds of urgencies. Nonetheless, the budget established for public health has been diminished from 2002 to 2019 by aproximately one third. The American authors sustain that increasing the budget for public health back to the level from 2002 should be a priority for the authorities, considering threats like COVID-19 (Smith & Fraser, 2020).

Anyway, the pandemic situation affects many sectors besides public health systems and medical care. It also generates social and economic vulnerabilities especially in cities with high population density. Consequently, specialists in managing urban data can have an important contribution to respond and better prevent different similar viruses. In this perspective, urban intelligence can bring value through means of continuous risk assessment and assist economic recovery. Therefore, to properly cope with this pandemic, it is necessary to invest in applying the best practices in urban intelligence. The next Table 2 presents several practices in urban intelligence which were grouped by five main components of urban intelligence (Lai et al., 2020):

Table 2: Examples of urban intelligence –related measures against pandemic

Components	People	Movement	Facilities	Engagement	Information
Sources	Community survey Population census	Air flights Ground transportation GPS tracing Cell phone pings	Facility catalogue Infrastructure performance Resource inventory	News and social media Open data portal Digital platforms	User agreement and protocols for data exchange
Measures	Provide additional services to vulnerable population groups and communities	Transportation control, checkpoints, identify quarantine zones, contact tracing	Logistical distribution and human resources, capital planning	Broadcast news and crowdsource local information	Integrate and manage data across various resources and agencies

Source: adapted from Table 1. A summary of five critical urban intelligence components for a pandemic response Lai et al (2020)

The problem of a possible pandemic situation was predicted by Bill Gates and other disease and flu experts. Bill Gates warned the public authorities that they should invest in the pandemics' preparedness. Furthermore a former official from the White House also sustained the idea of an upcoming pandemic threat. (Hoffower, 2020)

Regarding the prediction of the end of the COVID-19 pandemic situation, scientists from Singapore University of Technology and Design (SUTD) attempted to discover the answer by using a mathematical model. They predicted that the end will be in December. However, this date will differ from nation to nation depending on the start date. (Macaulay, 2020)

From a psychological perspective the pandemic situation COVID-19 has been undoubtedly affecting people all over the world. In a survey of people at higher risk of being infected with Coronavirus, the rates of depression, traumatic stress, generalized anxiety and insomnia reached alarming values (Sherman, 2020). The following Figure 1 illustrates them:

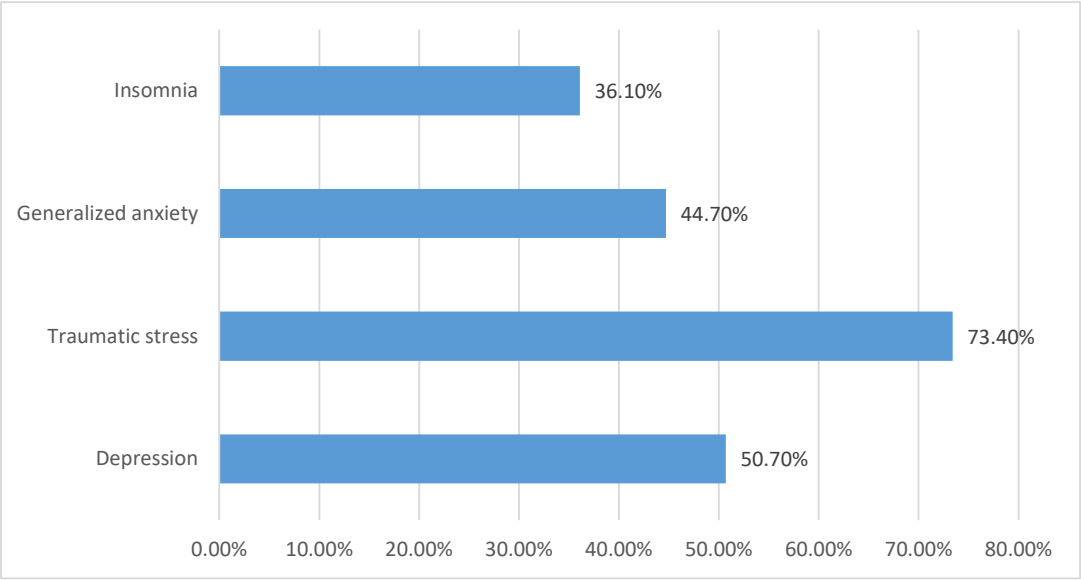

Figure 1: Results of survey on psychological impact

Source: based on information from (Sherman, 2020; Liu et al., 2020)

These results are quite shocking, but if they are compared with previous research materials on the psychological impact of other similar eruptions, it has been demonstrated that fear related to being infected is connected with anxiety, post-traumatic stress and suicidality (Sherman, 2020; Chong et al., 2004; Wheaton et al., 2012; Wu et al., 2009; Yip et al., 2010).

Another correlation discovered in the study is the higher level of coronavirus anxiety that people of younger age and higher education levels tend to have (Sherman, 2020).

Furthermore, in 2003 during SARS epidemics there was a positive connection between the virus related anxiety and the aversion to Chinese people, food and products (Sherman, 2020; Keil & Ali, 2006).

Covid-19 has created a massive panic world-wide and it has been compared with an "angel of death, a relentless and soulless invader that has infected the global psyche with fear and the bodies of our most vulnerable citizens" (Polizzi et al., 2020).

The pandemic managed to affect every aspect of people's lives such as: the way people earn their living, how they communicate with other people, the way they spend their spare time and other similar

ones. People are permanently concerned about the future, whether they and their families and friends will survive the virus. None of the previous pandemics created such prolonged perturbations as Covid-19 did. (Polizzi et al., 2020)

From an economic point of view, the negative impact of COVID-19 has started to be increasingly visible. People make stocks of food, hand sanitizer and other necessary products. Considering that the schools are closed, some parents give up work to stay home with their children. Other families are wondering about what will their children eat. Moreover, universities have closed, meanwhile the authorities imposed travel restrictions and some students have been stranded. Weddings and other similar events were all canceled. (*Science in the time of coronavirus*, 2020)

All these changes generate financial losses for people and for their countries. Some of the most powerful countries in the world have announced their intention to develop investments of thousands of billions for sustaining the economy as global production cannot be stopped and money needs to circulate regardless the COVID-19 global crisis' level of severity. Any hesitation in this way would cause incalculable consequences. Therefore, the powerful countries' governments declared from the beginning of the pandemic that they will implement immediate measures to sustain the economy. (*The big states are fighting coronavirus with colossal investments in the economy. Romania is calm and analyses*, 2020)

The next Table 3 illustrates the numbers associated with these investments and some details:

Table 3: Investments for sustaining economy

COUNTRY	INVESTMENT FOR SUSTAINING ECONOMY	DETAILS
GERMANY	550 billion €	The German Minister of Finance, Olaf Scholz, declared that companies will receive all the financial support they need during the pandemic situation.
ITALY	32,5 billion €	The Prime Minister Giuseppe Conte announced to allocate these funds in order to sustain the economy to face the Coronavirus pandemic's devastating impact, Italy being one of the most affected countries.
FRANCE	45 billion €	The Ministry of Finance, Bruno Le Maire, announced to use this investment in order to help the French companies during the pandemic. The President Emmanuel Macron promised that the government will guarantee credits of 300 billion € for the French companies to overcome the crisis.
SWEDEN	28 billion €	The investment aims to help the companies face the economic consequences caused by Coronavirus. In addition, the state will ensure the salaries for the employees that encounter problems due to their employer's activity reduction. Moreover, companies can postpone the taxes' payment.

SWITZERLAND	29 billion €	The banks consider to develop a loaning program for the thousands of businesses affected by the Coronavirus pandemics. The government announced that will create a fund for immediate assistance in order to ameliorate the pandemic's impact.
EUROPEAN UNION	40 billion €	The European Union can offer between 28 and 40 billion € for sustaining the small and medium enterprises (SMEs) which are affected by the pandemic. However, European Investment Bank requested additional guarantees from the Member States' governments that the bank can use for maintain the access to finance for SMEs.
UNITED STATES OF AMERICA	700 billion $	The Federal Reserve of USA has reduced the reference interest rate with 1%, has ameliorated the regulations for the banks and has launched a program for quantitative relaxation in order to protect the economy from the negative effects of the pandemic. The Federal Reserve of USA will procure treasury securities of at least 500 billion $ and mortgage-backed securities of at least 200 billion $. The Federal Reserve encouraged the banks to use the money in order to consolidate their capital buffers to sustain companies and households affected by the pandemic.
CHINA	170,6 billion €	The Chinese Central Bank has reduced the level of compulsory minimum reserves for sustaining the economy. Reducing the quantum of money that the banks have to preserve at the Central Bank, the banks were encouraged to offer more credits to companies in order to sustain the economy.
NEW ZEELAND	6,5 billion €	The Ministry of Finance, Grant Robertson is aware of the future economic recession. However, the authorities developed a relaunching plan consisting of grants for salaries, reduced taxes, support for health services.
INTERNATIONAL MONETARY FUND	50 billion $	The International Monetary Fund (IMF) has announced that it is providing 50 billion $ to emerging and low-income countries through its fast-track financing facility amid the Coronavirus epidemic.

Source: (The big states are fighting coronavirus with colossal investments in the economy. Romania is calm and analyses, 2020)

Based on the information provided by Eurostat, during the first quarter of 2020, the Gross Domestic Product (GDP) decreased by 3,5% in the European Union, compared with the previous quarter while GDP diminished with 2,7% in the first quarter of 2020, compared with the first quarter of 2019. The following Figure illustrates the evolution of the GDP growth rates from the last economic recession in 2008 (Eurostat, 2020, page 1):

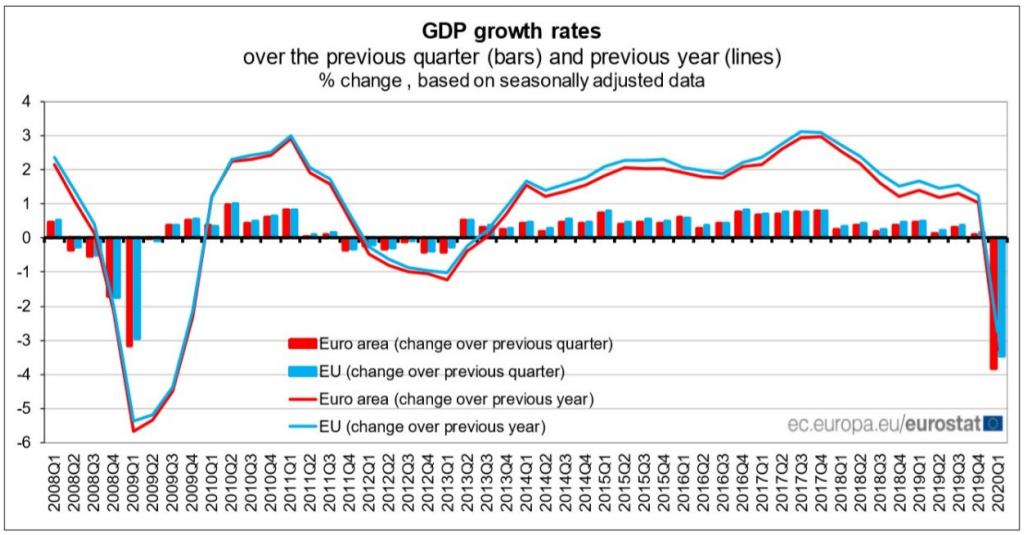

Figure 1: European evolution of GDP growth during 2008-2020

Source: (Eurostat, 2020, page 1)

It can be observed that the negative difference of the GDP growth due to the Coronavirus pandemic is significantly high but not higher than the one recorded in 2008.

According to the Bureau of Economic Analysis (BEA) estimates, the United States' GDP growth decreased by 4,8% in the first quarter of 2020 in comparison with the previous quarter. The next Figure 2 exposes visually this change of GDP's evolution in US (Bureau of Economic Analysis, 2020):

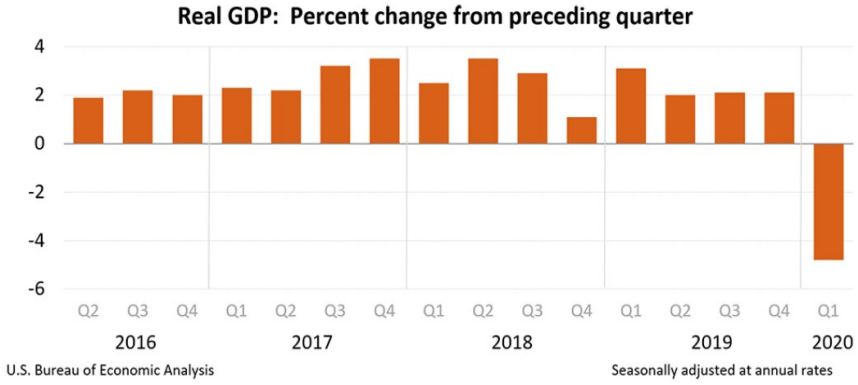

Figure 2: GDP evolution in US,

Source: (Bureau of Economic Analysis, 2020)

In conclusion, the global economy will record high financial losses due to the COVID-19 pandemic situation.

However, the world succeeded to pass through similar situations by analysing all the pandemic's effects and identifying efficient solutions to cope with them.

Most of the public authorities from world-wide implemented the correct measures to cope with the pandemic situation from a socio-economic perspective.

The next chapter highlights the most important changes brought by COVID-19, changes that the world has to accept and to adapt to them. Therefore, the world has to adapt to the new directions imposed by COVID-19, directions that reveal the new "normality".

Potential irreversible changes after COVID-19

It is well-known the fact that the world has the capacity to overcome COVID-19 as in the past, economy managed to rebound after similar crisis.

The novelty of the current pandemic is represented by several potential changes that the world might have to accept. People are waiting to return to their lives before COVID-19 appeared. Unfortunately, this is not likely to happen because the pandemic situation imposed changes that will influence the world's evolution.

The next Table 4 displays some of the mentioned changes predicted by thinkers, experts and scientists:

Table 4: Potential changes after COVID -19

Subject	*Potential permanent changes*
People's interaction	People will prefer to avoid meet new people online. (Coronavirus Will Change the World Permanently. Here's How, 2020).
Hygiene	People will avoid to shake hands and touch their faces and will wash their hands more often. (The legacy of the pandemic: 11 ways it will change the way we live, 2020)
Recognition	People will consider doctors and nurses true heroes as they do with military veterans. Therefore, medical personnel will receive increased salaries, holidays, corporate discounts and other benefits. (Coronavirus Will Change the World Permanently. Here's How, 2020).
Public investment	Public authorities will make major investments in medical equipment, treatments, disinfectants and other necessary medical products. Another priority for the public authorities will be to invest in digitalization of public services.
Telemedicine	Telemedicine will be practiced and empowered to avoid queues and crowds in the hospitals. (Coronavirus Will Change the World Permanently. Here's How, 2020).
Education	Online public schools will be created in order to protect children's health.
Teleworking	If possible people will choose to work from home in order to avoid wasting time with transport and to have a more flexible program. (Coronavirus Will Change the World Permanently. Here's How, 2020). Employers will save money with office spaces.
Generosity	Teachers already offer free online classes to people.
Technology	Virtual reality glasses will be used for courses or psychological consultation or other activities.
Pharmaceutical industry	Pharmaceutical industry will be managed by the public authorities in order to produce the necessary treatments and vaccines with priority.

Voting	The public authorities will offer people the possibility to vote online for an extended period of time. (Coronavirus Will Change the World Permanently. Here's How, 2020).
Cooking	People will cook more being used during the pandemic crisis to do so. (Coronavirus Will Change the World Permanently. Here's How, 2020).
Economy	Many restaurants, tourism agencies, hotels, shops, malls, private kindergartens, schools and universities will be closed. Payments will be made mostly using cards, online banking, instead of using cash. Exchange value will be less important and mutual aid will become the guiding principle in the economy. After this crisis people will realize that "success came in states where government, civic and private-sector leaders joined their strengths together in a spirit of self-sacrifice for the common good"(Coronavirus Will Change the World Permanently. Here's How, 2020)
Real estate	The rents and prices for city apartments will decrease while the prices for houses with yards in the suburbs will increase. Families will prefer to move in the suburbs after realizing how important is for children to have enough space to play and enjoy fresh air.
Religion	Religion will accept the online future. (The legacy of the pandemic: 11 ways it will change the way we live, 2020)
Pollution	The air will be cleaner and the public authorities will impose similar rules in order to maintain it this way.

Sources: own contribution and adapted from (Coronavirus Will Change the World Permanently. Here's How, 2020; The legacy of the pandemic: 11 ways it will change the way we live, 2020)

Some of these changes might not happen but the world has to accept that this is the time for a radical change being so vulnerable in front of a very little virus.

Conclusions

The present Coronavirus pandemic has caused over 240.000 deaths and has seriously affected people's lives from psychological, social and economic perspectives.

Nevertheless, the world will successfully overcome the COVID-19 pandemic and will find the proper methods to adapt to the new reality.

Moreover, people have to learn the lessons offered by this pandemic, appreciate health and hope for a better world in which the guiding principle is the life's protection.

Public authorities, people, private companies and NGO's have to form a capable team that can win the war against climate changes, nature hazards and new viruses. In addition to that, people should remember to resist human weaknesses as greed, arrogance, vanity and egoism.

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Who are loyal voters? – Implications for Political Marketing

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Abstract

As well as the customer is in the centre of marketing, the voter is (and should always be) in the centre of political marketing. It is crucial to understand voters' attitudes, needs, desires, and behavior to be able to influence their political decisions. One of the main aims of political marketing activities is to create and to retain a loyal voter. To be able to create and retain a loyal voter, it is necessary to understand their attitudes and behavior. The aim of this paper is to divide voters into clusters according to their political loyalty. The primary research was conducted in five counties from Eastern Croatia using a highly structured questionnaire. For the purposes of obtaining survey results, univariate statistics (frequencies and arithmetic mean) and cluster analysis techniques were performed with the Statistical Package for Social Sciences (SPSS) 21.0. Results of cluster analysis provide specific socio-demographic, psychographic and behavioural characteristics of each segment obtained (inactive floating voters, inactive stabile voters, and active loyal voters). These results deliver valuable insights for political parties and candidates regarding political marketing voter segmentation. The limitations of this research are referred to the sample because only one Croatian region was covered. Based on that, the recommendations for further research would be to expand the research nationally and also to include some additional segmentation variables.

Keywords: Political Marketing, Voter Segmentation, Loyal Voters

Introduction

Although in the latter decade the academic interest in political marketing is growing, there are still quite some gaps in the theory. One of these gaps can be found when looking at the subject of voter loyalty. In the period from the fifties to the eighties, an average of two-third of voters in democratic countries used to vote for the same party in sequential elections (Shachar 2003). Ever since, political analysts have observed a general worldwide decrease in voter loyalty. This decrease was attributed to the continuing evolution of the media and the weakening of social divisions (Butler and Harris 2009; Negrine and Lilleker 2002).

Because of the decline in voter loyalty, political parties find it difficult to balance acts of appealing to floating voters while still keeping the loyal voter base satisfied. Political marketers often focus on the floating voters, forgetting their loyal voter base (Lilleker 2005). This neglect of loyal voters does not seem reasonable, particularly when comparing politics to a conventional business setting. Namely, companies also try to attract new customers, but simultaneously devote many resources to retaining existing ones, even creating special customer loyalty programs (Dowling and Uncles 1997; Dubé et al 2009). Taking their voters for granted can lead to voters unexpectedly switch parties (Dann and Hughes 2008). The fact that politician marketers sometimes underestimate the value of voter loyalty seems to be an indication that voter loyalty is the subject that should get more attention.

The purpose of this research is segment voters according to their level of voting loyalty in order to obtain some valuable socio-demographic, psychographic, and behavioral characteristics of each segment. Political parties/politicians need to be aware of who loyal voters are and how they behave so they could build successful marketing strategies targeted directly to them in order to retain them.

Literature Review

Political marketing and brand loyalty

The emergence of a multi-party system, that is, parliamentary democracy, inevitably created a competition between individual parties, programs and candidates in the political market. The very existence of competition creates the need for marketing activities, which, in the context of the political market, help to better "sell" certain ideas or programs.

There are numerous definitions of political marketing. Maarek (1995) considers political marketing a complex process, the outcome of a global effort that embraces all factors of political communication, and also emphasizes that political marketing is the main method of political communication. From his point of view, marketing has become its integrated and vital component. The same author argues that the main areas of application of political marketing campaigns are focused on building image and election campaigns. Lock and Harris (1996) emphasize that political marketing is focused on communication with party members, the media, potential donors, and the electorate. Wring (1997) defines political marketing as the use of opinion polls and environmental analysis by political parties or political candidates to build and promote a competitive political program that will meet organizational goals on the one hand, and groups of voters on the other in exchange for their votes. Lilleker (2005) defines political marketing as a discipline that applies theories and concepts from commercial marketing to understand and explain the organizational behavior of political parties, candidates, governments, government departments, and pressure groups. All of the previous definitions have one common key thing, which is voter satisfaction. Voter satisfaction is the key to achieving and maintaining political loyalty. In order to achieve political loyalty, politicians/political parties need to build a strong political brand.

Brand loyalty can be applied in explaining voter behavior from several aspects. First, brands can simplify choice and reduce dependence on detailed product information in much the same way as party labels relieve voters of the need to familiarise themselves with all the party's policies (Duckowrth, 1991). Secondly, brands promise standardization and replicability, generating trust between producer and consumer as much as parties emphasize unity and coherence in order to build up voter trust (Feldwick, 1991). Thirdly, brands, like parties, are aspirational, evoking a particular vision of the “good life” or holding out the promise of personal enhancement (van Ham 2001). And fourthly, in order to be successful, brands must be perceived as authentic and value-based, necessitating congruence between the internal values of the product or company and its external message. In the same way, successful parties must link their external presentational strategies to a set of core values, if they are to retain voter support (Morzano 2000). In politics and the marketplace, voters and consumers must negotiate the conflicts between loyalty to trusted brands and the novelty of the new, while making sense of complex and conflicting product information (Needham 2005).

Needham (2005) points out that party brands provide a basis for long-term loyalty in an environment where products (policies) are fairly fluid. Initial patterns of support — for political parties as for other infrequent purchases such as financial products — are likely to be shaped by family, but the process of detachment from these formative social settings appears to be intensifying. One of the most important aspects of a political brand are political leaders. Smith (2001), in his research, proved that the image (of leaders and parties) was a greater determinant of voting behavior than the parties’ policies. Needham (2005) concludes that, using the party leader as the brand, it is possible for parties to reconfigure loyalty in an era where institutional ties are weak. Besides the latter, the same author points out that brands are the basis for ongoing relationship marketing through which incumbent parties can keep their winning coalitions together in order to ensure repeat sales.

Voter loyalty

Customer loyalty represents a significant concept in marketing. Harris and Goode (2004) described obtaining and maintaining customer loyalty as “the ultimate aspiration” for many companies. The

positive influence of loyalty on firm performances has even been called essential for a company to succeed (Anderson and Srinivasan 2003). Besides many economic and competitive advantages that loyal customers bring to the company, they are also less susceptible to competitors' marketing efforts and may even engage in favorable word-of-mouth advertising (Dick and Basu 1994).

Rubin (1993) has identified four crucial benefits of loyalty:

1. an increase in customer/new constituencies that have a positive description of the corporate/political party;
2. customer/new constituencies with positive recommendations tended to be loyal;
3. a rise in earnings/electability as a result of many customers/ constituents being loyal; and
4. the decline in the cost of promotion and advertising.

Those benefits are applicable to political organizations. Loyal voters are characterized by a strong desire to provide information by word of mouth that can not only bring new voters, but also reduce spending on advertising, promotion, and publicity, especially ahead of elections or simply to build the image of the political party (Baker 2014). Loyalty to a political party is a major asset because it can determine the life and death of a political party/politician.

Suaib et al (2017) describe voter loyalty as a multidimensional term. They emphasize that loyalty should be reflected by the involvement, bonding, and support for a political party. The support can be seen from the active participation in events such as party meetings and political rallies. Also, support should be reflected with a given vote in an election. Previously mentioned authors as dimensions of loyalty also include the desire and motivation of loyal voters to continue propagating forms of support in the future and the desire, commitment and concrete action to try to attract people outside the party to provide support and choose the party.

Previous researches in both conventional marketing and political marketing identify a number of variables that seem to play a role in voter loyalty. In conventional marketing, satisfaction is often seen as a prime influence on customer loyalty (Hallowell 1996). This variable is also frequently mentioned in political marketing as an important means of building brand loyalty (Lees-Marshment 2001; Osuagwu 2008). Shachar (2003) emphasizes the habit as a large role in voting. This variable is also thought to influence customer loyalty in conventional marketing (Aarts et al 1998) and to play a moderating role on the relationship between satisfaction and loyalty (Anderson and Srinivasan 2003). Lastly, some authors (Needham 2006; Taylor et al 2004) argue that brand equity seems to be an important factor in both conventional marketing and political marketing. In political marketing, a strong party brand can increase loyalty even if the political product changes a lot (Needham 2006).

Cluster analysis of voter loyalty

The aim of the analysis was to make clusters based on the level of respondents' political loyalty and to describe their socio-demographic and certain psychological characteristics. The research was conducted in five Croatian counties using an in-person survey method. Interviewers have administered paper questionnaires to participants over 18 years of age who are eligible to vote. Interviewers were instructed to choose one male and one female respondent from different age groups (18-31 years, 32-45 years, 46-59 years, and over 60 years old). The research was conducted in the year 2017, and 681 questionnaires were obtained. After preliminary analysis, 19 questionnaires were eliminated due to a large number of missing values, and 662 questionnaires were analyzed. The data analysis was performed with the statistical program SPSS 21.0. The study sample is described in Table 1.

Table 1: Sample description

		%
Gender	M	49.7
	F	50.3
Age at the time of the survey (years)	18-31	25.9
	32-45	25.7
	46-59	24.8
	≥60	23.6
Education	Primary school	9.4
	High school	56.5
	Faculty	31
	Master's degree	2.4
	Doctorate	0.7
Place of residence	Village	22.9
	Suburb	13.6
	Town/city	63.5
Employment status	Student	16.6
	Unemployed	9.7
	Employed	48.3
	Retired	25.4
Household income (€/month)	<400	10.3
	401-800	29.5
	801-1200	26.6
	1201-1600	19.8
	1601-2000	8
	>2000	5.8

Source: Author's work

Two-step cluster method was used to determine clusters of political loyalty. Measurement of cohesion and separation values were above the recommended value of 0.0. Analysis has resulted in three clusters. Table 2 shows the items that were used in cluster analysis and their means for each of the three obtained clusters.

As it was previously mentioned, political loyalty is reflected by the involvement, bonding, and support for a political party. The support can be seen from the active participation in the work of a certain political party and events such as political meetings and rallies. In addition, support should be reflected with a given vote in an election. Loyalty also becomes evident when there are a desire and motivation to continue propagating forms of support in the future. The cluster analysis has included four different dimensions that measured political loyalty: *voting stability*, *conventional political participation*, *conventional political participation intention*, and *trust in a political party*.

Voting stability scale was adapted from the research of O'Cass and Pecotich (2005). Respondents were given three statements about their voting stability by evaluating it on the scale from 1 to 5 their level of agreement or disagreement (1 – I completely do not agree; … 5 – I completely agree).

Conventional political participation is referred to as participating in the activities related to the political party or a politician. It was measured by the author's construct, and it consisted of nine statements about the level of political participation of the respondents in the past. Respondents were asked to evaluate on the scale from 1 to 5 how often they participated in certain activities (1- never, 2 – rarely, 3 – sometimes, 4 – often, 5 – very often).

Conventional political participation intention was also measured by the author's construct, comprised of eleven statements. Respondents were asked to evaluate their conventional political participation intention on the scale from 1 to 5 (1 – I completely do not agree; … 5 – I completely agree).

Trust in the political party was measured from three aspects: general trust in the political party, trust in political party leaders, and trust in political party's program. The statements were adapted from the research of Banerjee and Chaudhuri (2016).

The analysis has resulted in three significantly different clusters, which were, based on their characteristics, named: *inactive floating voters*, *inactive stabile voters*, and *active loyal voters* (Table 2).

Graph 1 shows the sizes of the three obtained clusters. As can be seen in Graph 1., 54% of respondents belong to the cluster called *inactive stabile voters*, 28,9% of respondents belong to the cluster called *inactive floating voters*, and 17,1% of the respondents belong to the smallest cluster, called *active loyal voters*.

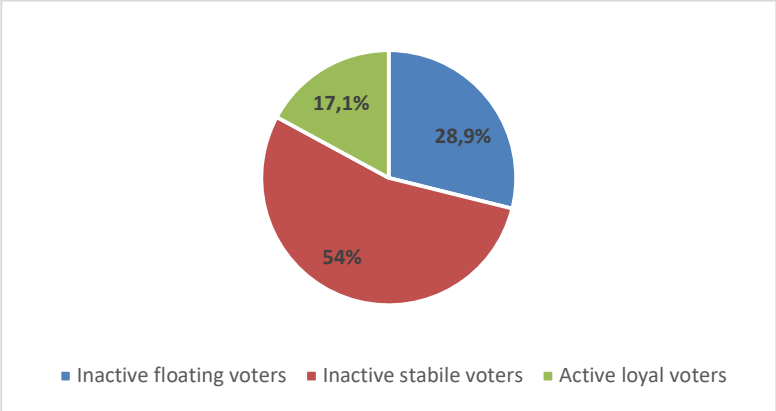

Graph 1: Cluster sizes (Source: Author's work)

Table 2: Means for obtained clusters

Variable	Cluster 1 **Inactive floating voters** N=191	Cluster 2 **Inactive stabile voters** N=357	Cluster 3 **Active loyal voters** N=113
I am loyal to one political party.	1,15	2,95	3,97
I strongly prefer one political party.	1,12	3,00	3,81
I always vote for the same political party.	1,29	3,09	3,98
I have started and lead political discussion.	2,17	2,66	3,26
I have affected the voting decisions of people close to me.	1,51	1,85	2,72
I have worn badges and marks as a sign of support to the party.	1,06	1,17	2,21
I have publicly expressed my political attitudes.	1,64	2,32	3,07
I have paid a membership fee to a political party.	1,03	1,04	2,23
I have actively participated as a member of a political party.	1,02	1,11	2,88

I have visited political rallies.	1,12	1,35	3,21
I have volunteered for a political party.	1,02	1,04	2,57
I have actively participated in a political campaign.	1,00	1,04	2,53
Trust in a political party.	1,63	2,90	3,19
Trust in a party leader.	1,66	3,26	3,60
Trust in certain political party's program.	1,68	2,84	3,15
I have the intention to start and lead political discussions in the future.	1,43	2,18	2,97
I have the intention to influence the voting decisions of people close to me.	1,24	1,71	2,71
I have the intention to influence the voting decisions of other people.	1,14	1,59	2,57
I have the intention to visit political rallies.	1,12	1,48	3,21
I have the intention to wear badges and marks as a sign of support to the party.	1,03	1,10	2,17
I have the intention to pay a membership fee to a political party.	1,04	1,07	2,39
I have an intention to participate in political meetings of the party I support.	1,03	1,16	3,21
I have the intention to actively participate as a member of a political party.	1,01	1,13	3,14
I have the intention to visit political rallies in the future.	1,03	1,22	3,23
I have the intention to volunteer for a political party.	1,04	1,13	2,88
I have the intention to actively participate in a political campaign.	1,03	1,05	2,28

Source: Author's work

The largest cluster (54%), called *inactive stabile voters*, is characterized by low values of political participation but high values of voting stability. Members of this cluster also express higher levels of trust to a certain political party, mostly in the party's leader. 28,1% of the respondents belong to the cluster called *inactive floating voters*. Those voters are characterized by low values of political participation and low levels of voting stability. They also have no trust in political parties, their leaders, or the program. The smallest cluster with 17,1% of respondents, called *active loyal voters* are characterized by a higher level of political participation, a high level of political stability, and a high level of political trust.

The results of cluster analysis also provided some socio-demographic and psychological characteristics of each segment.

Psychological characteristics were measured by a set of different variables: informing about politics through different media (adapted from the research of Park and You 2015), political cynicism (adapted from the research of Pinkleton and Austin 2009), perceived political risk (adapted from the research of O'Cass and Pecotich 2005), political involvement (adapted from the research of O'Cass and Pecotich 2005), perceived political knowledge (adapted from the research of Winchester et al 2016), religiousness (construct developed by the author), political orientation (adapted from the research of Bagić and Gvozdanović 2005) and satisfaction with the political party (adapted from the research of O'Cass and Pecotich 2005). All of the variables were measured with Likert type scale from 1 to 5 (1 being the strongest level of disagreement and 5 being the strongest level of agreement). Political orientation was measured as 5 being right-oriented and 1 being left-oriented. These variables, as well as socio-demographic characteristics (gender, age, education, and income), were included as evaluation

fields in performed cluster analysis. The analysis has resulted in the description of three main clusters depicted in Table 3.

Table 3: Cluster description

Cluster characteristics	Inactive floating voters	Inactive stabile voters	Active loyal voters
Socio-demographic			
Gender	Female	Female	Male
Age	18 - 45	Above 46	18-31
Education	High school	High school	High school
Income	801-1200€	401-800€	401-800€
Psychographic and behavioral			
Informing about politics through television	3,36	4,08	3,86
Informing about politics through radio	2,30	2,81	2,19
Informing about politics through printed media	2,46	2,97	3,14
Informing about politics through internet pages	3,02	2,91	3,19
Informing about politics through social networks	2,39	2,40	2,86
Political cynicism	4,43	3,88	3,50
Perceived political risk	3,66	4,11	4,24
Political involvement	1,18	1,66	2,74
Perceived political knowledge	1,94	2,50	3,26
Religiousness	3,62	3,86	3,85
Political orientation	2,36	2,48	2,88
Satisfaction with the political party	2,16	3,71	4,15

Source: Author's work

Inactive floating voters are mostly female, from the age of 18-45, with high school education and monthly income 800-1200 euros. They mostly inform about politics through television and internet pages. They are characterized by a high level of political cynicism and an extremely low level of perceived political knowledge. This segment does not vote for the same party but does vote. That is why this segment is called floating voters. Their inactivity is shown at an extremely low level of political participation – they do not engage in higher levels of conventional political participation.

Inactive stabile voters are mostly female, above 46 years of age, with high school education and monthly income 401-800 euros. They mostly inform about politics through television and printed media. This segment also expresses rather high levels of political cynicism and high levels of perceived risk. They are not really satisfied with the party they vote for (which can explain their inactivity in promoting the political party) but they do continuously vote for it.

Active loyal voters are mostly men, age 18 – 31, with high school education and monthly income 401 – 800 euros. They mostly inform about politics through television, internet pages, and printed media. They express high levels of perceived political risk, and in regards to other segments, lower levels of political cynicism and higher levels of perceived political knowledge. They trust their political party, especially the party leader. They also express an extremely high level of satisfaction with their political party. They are the ones who participate in the party's activities, and often they are formal members of that party. They express the intention to continue participating and promoting their political party.

Conclusion

This research provided some interesting findings that may be familiar to academics, but the value lies in the application of the results to the field of political marketing. Segmenting voters according to their loyalty provides findings that can be used for better understanding voters and as a basis for creating strategies to obtain and to retain voters' loyalty.

Three identified segments: *inactive floating voter*, *inactive stabile voter*, and *active loyal voter* are described by different characteristics. *Inactive floating voters* are voters who do not express any dimension of voter loyalty. Those voters usually have no interest in politics and consider politics and politicians corrupted and selfish. To attract this segment of voters, political party/politician would first have to work on eliminating high levels of cynicism and gaining trust. To turn this type of voter into a loyal one would require much work, but it is not impossible. However, it would be easier to concentrate on the segment of *inactive stabile voters* since they already have a certain amount of trust in the political party. They always vote for the same party but cannot be seen as a loyal voter because they do not participate in the party's activities and do not have an intention to do so. They also do not promote their party and have no intention to. These types of voters are also politically cynical and require strategies that will eliminate this cynicism. It would be interesting to investigate the reasons why these voters always vote for the same party that they are not really satisfied with it. It could be out of habit, the influence of family and friends, or simply because they think that they do not have a better choice. Lastly, the segment of *active loyal voters* is the one that political parties should concentrate on. Those are satisfied voters that participate in the party's activities and have a great deal of trust, especially to political leaders. This proves the importance of political brand. It is crucial to retain these voters and to mobilize them to promote the party with good word of mouth. These voters are a valuable asset of a political party and need a great deal of marketing attention.

The main limitation of this research is the sample. The research was conducted on the convenient sample in only one region in Croatia, so the results cannot be generalized, especially in some other countries because of the influence of cultural, economic, and political differences. Future research should address to a deeper investigation of these segments and include more different variables. Also, it would be interesting to conduct research in different countries to make a comparison and to identify some crucial differences.

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The Development of Kazakhstan's Agro-Food Market and Its Impact on The Country's Food Security

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Abstract

Analysis of the food supply of the country's population shows that food security problems arise due to the low level of economic development of the country, the lack of development of its own agricultural production, which is reflected in the low productivity of agricultural industries, the use of predominantly extensive factors in the management of the agro-industrial complex, the lag of productivity in the domestic agricultural sector from the same indicator in developed countries. In order to address these problems and to ensure food security, agricultural production must be increased through the introduction of innovative technology, that international trade is well conducted and subsidies, subsidies and other government support measures are provided to producers in a timely manner. In the transition to a market economy, the purposeful installations have undergone significant changes. The state serves as the basis for social stability and at the same time stability ensures the existence of the state. The interaction of elements in ensuring food security is determined and regulated by the market and the state through the production and processing of agricultural products, food consumption by the population, regulated by imports, exports and stocks, and formed by the conditions for food consumption according to consumption standards.

Keywords: Food Security, Social Stability, Agro-Food Market, Consumption Rate.

Introduction

Today Kazakhstan's priorities in solving the country's food security problem are becoming priorities to improve the efficiency of domestic agricultural production, develop the food and processing industry, improve the mechanism of state regulation of the agro-food market, as well as implement the relevant interests of national producers of foreign trade policy. The level and quality of food security directly depends on the state of development of agriculture and related sectors of the agro-industrial complex. The reliability of food security is ensured by sufficient food production in the country, the availability of funds for food imports with a low degree of vulnerability of supply in the event of complications (rising prices, lack of currency) and violations in interstate food supplies (embargoes, etc.). In General, the country's food security refers to the ability of the state, regardless

of external and internal threats, to meet the needs of the population for food in volumes, quality and assortment that meet accepted standards and norms. Food security should be a criterion for food security, according to physiological consumption standards. How this problem is solved in the country can be studied and analyzed through the assessment of its economic indicators (Sigarev & Syzdykov., 2017). Analysis of food of the population shows that the problem of food security caused by low level of economic development, lack of development of own agricultural production, resulting in low productivity sectors of agriculture, using mainly extensive factors in the management of agro-industrial complex, the lag in productivity in the domestic agricultural sector from the same period in developed countries. These problems also occur in the Kazakh agricultural market.

Methods

The peculiarity of Kazakhstan's agricultural market is that its production depends directly on the prevailing natural and climatic conditions in the country. The range of cultivated products is influenced by the specialization of farms in the regions, which also depends on the prevailing natural and climatic conditions and the state of fertility of agricultural land. Many farms are located far from the place of processing of agricultural producers and the final consumer. Many commodity producers suffer lesion from untimely sale of grown products. Due to lack vehicles and unscrupulous intermediaries accounted for sell products at a low price. Therefore, it is necessary to ensure agriculture related market infrastructure.

The market infrastructure development of the agro-food market in the country is a priority in the maintenance of the food and economic security of any state.

It is necessary for maintaining independence, stability and dynamic, economic development of the country.

In the world to assess food security, as mentioned above, there are many indicators that are widely used in practice. In our view, food security will be achieved in part in the country if the following conditions are met:

- the country's population is provided with domestically produced food by at least 85% and these products are environmentally friendly and healthy. This standard is close to that adopted by the International Food Organization (IFO);
- prices for these products are available to the majority of the country's working population;
- strategic food stocks are limited and do not provide a sustainable supply to the population in the event of an emergency;
- production capacity can increase food production;
- the scientific and technical base, although lagging behind the level of the highest: the world's reach of the region but is developing.

The country's food security will not be achieved if:

- the country's population is provided with environmentally friendly and healthy food products of domestic production by 60-80%;
- strategic food stocks are depleted or lacking; production capacity does not allow to increase food production (Abdimomynova et al., 2019).

Results.Kazakhstan's food market, in terms of these aspects, is not yet fulfilling its intended role.

A number of problems need to be solved here. It should be noted that not all programs adopted in Kazakhstan are implemented in practice. For example, a program adopted in 2002-2003 on import substitution. Kazakhstan still imports agricultural products from other countries. The country has not properly developed channels of delivery of products from production to the consumer. There is still a lack of processing capacity enterprises, places of wholesale storage, as well as special equipment for transportation of products during the transformation The main problems of the economy of the Republic Kazakhstan is a decline in agricultural production, due to serious miscalculations made

what affected the goals of agricultural production - full support of population with domestic food and industry with raw materials.

Kazakhstan's agriculture in its role in the structure and reproduction of the economy as a whole is basic. In accordance with the Development Strategy until 2022, the agro-industrial in a set of seven priority sectors should fully realize their industry advantages and large-scale potential (Nikitina, 2013).

In order to provide the population with domestic agricultural products, it is necessary to achieve stable development of this industry. Therefore, the problem of sustainable agricultural development must be addressed. In the course of research, factors have been identified that negatively affect the sustainability of the development of the crop and livestock industries. The common factors that reduce resilience are presented in Table 1.

Table 1: Factors reducing sustainability of agricultural development

Plant growing	Livestock
1	2
Decline fertility land and insufficient introduction of mineral and organic fertilizer	Small-scale production, low level of specialization
Non-compliance with evidence-based crop rotation and poor development of seed production	Extensive development industry accompanied by an increase in livestock while maintaining low productivity
Low concentration commodity production in a number of industries	Insufficient level feeding, irrational structure feed, predominance of purchased feed
Extensive industry leadership - the main increase in production due to growth sown area	Weak breeding and poor product quality
Lack of state boost support land fertility, productivity and quality products at optimum publicly necessary expenses	Not enough state small business support
Weak labor motivation, low incomes, imperfection the system sales and promotion of goods, as well as the mechanism partner relationships	Underdeveloped sales system and weak labor motivation
Declining solvent demand with rising consumer prices	Declining solvent demand with rising consumer prices
Source: own development based on the research results	

Specific factors that adversely affect sustainability of crop and livestock industries.

Grain production: unsustainable external customer demands the market, rising costs with a continuing trend of instability yields and prices. Great exposures to weather conditions, as grain growing regions are located in the risky farming zone. Weak material and technical base.

Sugar production: lack of resource-saving technology, not perfection of industrial and economic relations in the system production - sugar beet processing and trade.

Vegetables and potatoes: low concentration of production and high seasonality, low range and quality of products, high imports early vegetables and the lack of a modern field storage system production and consumption.

Dairy cattle breeding: high marketability of milk, high imports dairy products, lack of an effective system of measures to create specialized commodity farms in raw materials processing zones enterprises.

Beef cattle breeding: lack of pastures prepared for cattle meat production, weak introduction of advanced technology, poor development of product promotion on foreign markets.

The food industry of the country is characterized by: insecurity raw materials, underdeveloped system of procurement, transportation and storage of raw materials and lack of working capital for its purchase. All of the above problems in the republic require their solution.

Thus, the product offer in the agro-food market Kazakhstan acquired such specific features as small commodity production, historically recognized by economists as ineffective any production because it does not allow you to create a win on the basis for cost reduction and growth competitiveness of any market products.

In the structure of gross agricultural output of the republic livestock production is 44,6%, including agricultural enterprises -5,0%, peasant farms – 6,2%, households – 33,4%, products crop production – 55,4%, including agricultural enterprises – 18,8%, peasant households – 24,8%, households – 11,8%.

In the structure of gross output to the share of agricultural the enterprise accounts for 572,0 billion tenge or 24%, the share of peasant households – 734,4 billion tenge (30.8%) and households – 1079,7 billion tenge or 45,2%.

In the crop sector, the share of agricultural enterprises is 18,8%, or 443,3 billion, tenge, to the share of peasant farms – 24,8% (587,3 billion tenge) and 11,8% (282,4 billion tenge) accounted for by households.

Specific weight agricultural enterprises at structure gross agricultural products of the republic in 2018 amounted to 24%, peasant farms - 30.8%, households - 45.2% (Smailov. 2019) (Picture 1).

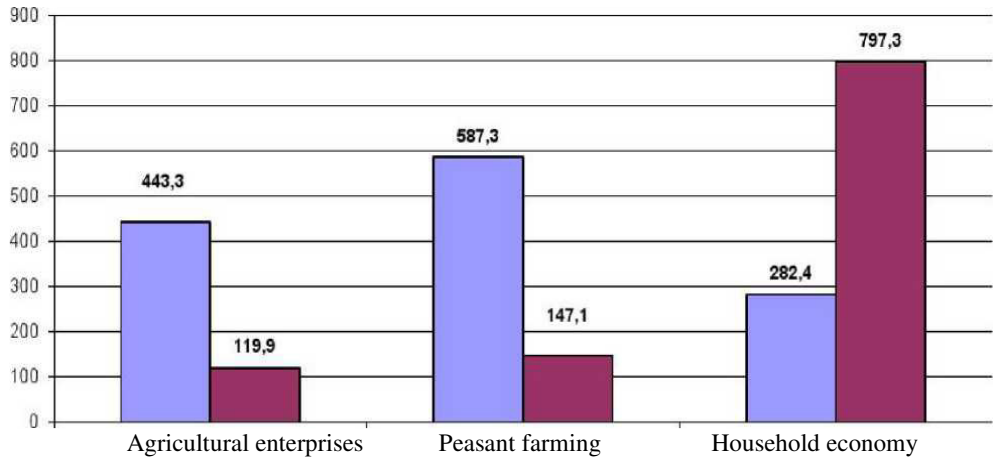

Source: own development based on the research results

Fig. 1: The structure of gross agricultural products in the context of all forms farms for 2018, billion tenge.

In the structure of crop production in the total volume of all categories of farms by region, the main share is: in the North Kazakhstan region – 14,7% (192,5 billion tenge); Almaty – 14,4%

(189,3); Akmola - 13% (169,4 billion tenge). Low level of development crop production celebrated in Mangistau (0,1%) and Atyrau region (1,0%).

The largest share in the structure of livestock products Almaty has - 17.5% (186.7 billion, tenge), East Kazakhstan - 16% (168.8 billion, tenge), Turkistan region - 12% (127.5 billion tenge).

It should be noted that domestic production indicators agricultural producers significantly lag behind world level standards, which indicates the weak competitiveness of Kazakhstan enterprises. Average annual milk yield per dairy cow in 2018 in agricultural enterprises amounted to 2280 kg, the average annual cut wool from one sheep 2,4 kg, and the average annual egg production of laying hens – 220 pc. In the cost structure for livestock production the largest proportion is feed. Therefore the need improving production technology in this industry is one of main tasks for the medium term. If these questions are not resolved in the near future, then domestic enterprises will not stand competition in comparison with Eurasia countries.

World experience shows that this development is ensured through the creation of large commodity agricultural structures that will ensure food security, increase labor productivity and produce products for export to external market.

Today, about 7 thousand large enterprises work in the country's agribusiness agricultural enterprises, 184 thousand agricultural producers and more than 2 million people are employed, of which 1.5 million are considered self-employed. This indicates that small-scale production predominates in agriculture, which does not allow domestic agricultural products successfully compete in the global agricultural market (Berikbolova et al., 2016).

An analysis of agricultural production indicates about the growth of its effectiveness. Gross output in 2018 compared since 2017 has grown in all categories of farms by 45,0%, including products crop production by 41,0%, livestock - by 51,0%, in agricultural enterprises - by 54,0%, including crop production by 43,0%, livestock production 2,0 times, in households - 36.0%, including plant growing - by 32,0%, livestock - by 38,% (Bekenov, 2018).

The key task of the agricultural sector of the country is to protect interests of domestic producers, which requires research not only common problems inherent in this market, but also analyze problems of each regional market separately. Here you have to decide following problems: attracting investment, improving quality products increase production environmentally friendly clean food products, eliminating price disparity between manufacturing and processing industries etc. Should note that the development of regional markets depends on nationwide agro-food market of the country. Therefore talk about the food market as a separate market country concept conditional, as it is one of the constituent elements national markets.

The balance of export-import of key processed products shows Kazakhstan's great import dependence for a number of products (Table 2).

Table 2: Import dependence of Kazakhstan in the main types of products

Product	Import in %
Condensed milk and cream	74.2
Canned fruits and vegetables	70.5
Confectionery	67.4
Cheeses and cottage cheese	58.3
Cookies	48.7
Sausages	44.8

White sugar	40,2
Chocolate	34.2
Butter	32.8
Source: own development based on the research results	

Scientists believe that if the import of a certain type of product is 20 % of the volume of domestic production, we can talk about stagnation of this production. If this figure reaches 60%, then production perishes. Our indicator of food imports averages 40%, i.e. domestic agricultural sector is a step away from death.

In addition, it should be taken into account that Kazakhstan must maintain equal trade with Eurasian Economic Union, which is an objective trend economic development.
However it should be noted that:

- most agricultural sectors in the country are located in less favorable climatic conditions compared with leading exporting countries;
- agricultural production has a weaker technical security;
- underdeveloped market infrastructure and distribution system domestic products to the consumer (Balabanov, 2013).

Therefore, it is proposed to regularly monitor production agricultural products (supply volumes, stocks and prices for main strategic types of food) and develop activities on export and import of food products. If necessary use food import quotas.

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Conclusion

Therefore, it is proposed to regularly monitor production agricultural products (supply volumes, stocks and prices for main strategic types of food) and develop activities on export and import of food products. If necessary use food import quotas.Today, one of the main tasks is the development of economic mechanisms to protect domestic agricultural producers from dumping of imported food products. It is well known that with Kazakhstan's accession to the WTO and during financial crises risk will increase many times. This situation in the food market will lead to lower economic growth and food security independence of the country.

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Adaptability Revised: Process-Aware Information System in Modern Organization Management

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Abstract

Acquiring the ability to adapt has been one of the most important challenges since the very beginning of history. Evolutionarily always important to an individual, it has now become equally crucial for many business organizations. The business and social environment is turbulent and less predictable. In the age of global economy, mass connectivity, and ubiquitous computing, there is a need to better understand the nature of this change, in both organizational and technological terms. There is also a need to reconsider the approach to understanding adaptability as an organizational quality, and as a result, instead of just adjusting to the change, be able to truly embrace it and gain a real, sustainable advantage. The paper attempts to analyze the intrinsic ideas behind the concept of systemic and organizational adaptability, with a particular focus on attaining this quality of organization as an implementable feature of its information system. Based on Kant's analytic–synthetic distinction, a revised approach to understanding adaptability is presented and discussed. In this context, Process-Aware Information System (PAIS) is being examined as an architectural and technological reference point in establishing the premises and objectives for "synthetic adaptability", i.e., the proposed theoretically-revised view on the concept under consideration.

Keywords: Adaptability, Adaptive Systems, Process-Aware Information System (PAIS), Business Process Management (BPM).

Introduction

Achieving adaptability has been one of the most important challenges since the beginning of human history. Evolution-wise, in the long term virtually no other physical characteristic or skill has been ever as important and, literally, vital in pursuing survival and expansion—the ultimate goals of the competitive struggle. What has always been so crucial to individuals is now becoming equally important to business organizations in the marketplace. We are living in the world of global economy, mass connectivity, and ubiquitous computing. In many market segments everyone is competing with everyone. There is often no easy way to develop a strategy that could secure the already gained position, even for the segment leader, or to be able to measure own position on the market if the boundaries are unclear or fluid (Reeves and Deimler, 2011). It is getting harder and harder to find a safe niche unless you can create it yourself. The information is in abundance and same sources can easily be accessible to many competitors. It can be collected and processed in large data sets, used for discovering relevant patterns, then integrated and accessed from anywhere via low-latency broadband internet connections.

The change is frequent and rapid, leaving often no chance to hold on to the traditional model of planning in advance for many years. To survive and grow, organizations need to develop a novel attitude towards adaptation. This requires a new understanding of the current business context, leveraging technological opportunities, and rethinking the concept itself. What does it mean to adapt? How to foster adaptive capabilities in your own organization? How to develop awareness of a broader business context, identify and filter meaningful signals? The key to finding answers to these questions is to see adaptability as a quality that goes beyond the scope of a single organization and is fostered through integration, cooperation, and exchange of experiences with external environment. The foundation for this vision is adaptive, process-aware information system.

This paper is organized as follows. In Section 2 we try to investigate the concept of adaptability by juxtaposing two perspectives: organizational and systemic, with selected technological aspects and interdisciplinary view on related work and literature references. Section 3 introduces a theoretical perspective on the approach to defining "synthetic adaptability". It contributes the idea of considering organizational adaptability as a synthetic feature based on Kant's analytic–synthetic distinction. In Section 4 we use Process-Aware Information System (PAIS) as an architectural and technological reference point for discussing the applicability aspects. Next, in Section 5, we establish the premises and objectives for "synthetic adaptability" as an information system feature. Finally, in Section 6, we conclude with a summary.

Understanding Adaptability

The concept of adaptability is interdisciplinary in nature and has been a subject under investigation in many areas of science for a considerably long time. Although originated and firmly rooted in the natural sciences, such as the evolutionary biology or ecology, it has been successfully applied and assimilated in various other fields, from cybernetics to business operations and organizational management. Taking the standard dictionary definition as a starting point, it can be described as "*the quality of being able to adjust to new conditions*" (The New Oxford Dictionary of English).

Quality vs. feature

That first attempt on expressing the core idea indicates straightaway the first dualism in perception worth to be reflected upon: quality vs. feature. Adaptability is an invariably desirable characteristic of every development-oriented organization. Business environment is constantly changing and success in a long run is always the domain of the best fitted. Adaptability as the quality that an organization can manifest outwardly and leverage as competitive advantage on the market shall, therefore, be reflected inwardly and become the intentionally implemented feature of its information system as well. Proper alignment of these matters has long been reported as one of the very desirable yet equally difficult and challenging objectives to achieve (Gillies, 2011).

Object vs. Subject of Adaptive Change

From the standpoint of how organization is perceived, its operational behavior is highly dependent on the implementation of business processes and that, in turn, relies nowadays on the corporate systems and the information technology in use. This raises the question whether such a system is to be considered as the object or the subject of adaptive change. The first one implies merely some kind of passive capability of being adapted (i.e., a possibility of becoming the object of change initiated and conducted externally), the latter introduces a more complex behavior based on exercising system's autonomy and the ability to adjust to the new conditions by itself. For the reasons discussed later in this paper, it is the second one that enables the significant progress in what such a self-adaptive system can introduce to modern organizational management.

However, it is still common for organizations to think about information systems just in terms of software tools that are purchased as the solutions for once articulated concerns and pre-defined requirements. The ISO/IEC 25010:2011 (SQuaRE) Product Quality Model regards adaptability as a sub-characteristic of *portability* and defines it as a degree to which a system can effectively and efficiently be adapted for different or evolving operational or usage environments (Estdale and Georgiadou, 2018; ISO Standard, 2011). The software product quality metric for adaptability acceptance to organization's environment (Galin, 2018) is calculated with regard to the number of functions that failed adaptability testing, out of all functions required to be adapted. This example demonstrates a valid but narrow, technical view that focuses entirely on the low-level aspects, e.g., the scalability of internal capacity or suitability for individualization, and is insufficient to adequately address the current adaptability needs at the higher, organizational management level.

Nature and scope of adaptive change

As the environment becomes increasingly turbulent and unpredictable, organizations are challenged to identify and process increasingly complex signals, and make adaptive decisions within a very limited time frame. This affects the nature and scope of what can be applied as an adaptive response, beyond the constraints already imposed by the type of organization and its management style. According to Jahan, traditional organizations are perceived as valuing stability and predictability at the cost of limited flexibility, and overall readiness and agility in introducing changes to their businesses (Jahan, 2016). On the other hand, modern organizations prefer flattened structures, rely on empowerment and delegation of authority in the decision-making chain, and, what appears to be most important in the context in consideration, they aim to leverage the new potential of large data sets and the usage of advanced information technology.

This orientation on technology and data has been visible for many years now. Sousa describes it as "a fifth strategic dimension needing to be accounted for in many companies" (Sousa and Moço, 2017). Reeves and Deimler mentioned it a decade ago while defining the four organizational capabilities behind attaining adaptive advantage, pointing out that the new technology facilitates creative experimentation with business processes and models, and enables establishing and managing complex systems of co-operation, exceeding corporate boundaries (Reeves and Deimler, 2011). As they noted, "the speed of adaptation is a function of the cycle time of decision making" (ibid.) With the support of IT, it is possible not only to automate business processes (fully or partially), but also implement sophisticated mechanisms of real-time monitoring and control. This raises the possibilities of what can be achieved in terms of adaptability to the level of instantaneous reactivity in the environment where all competing sides have access to similar information and response time is crucial in seizing the opportunity. Considering the recent achievements in the field of artificial intelligence and its applications in business (Barta and Görcsi, 2019), effective solutions can be applied to automate the decision-making process or at least filter the information noise to relieve decision-makers of the burden of performing it all manually.

Design-time vs. run-time

Organizations act in a way that can be designed—at least to some, usually large, extent. One common example of this is Business Process Management (BPM) (van der Aalst, 2013). In this approach the crucial, value-creating organizational processes are identified and expressed as workflows, structurally analyzed for soundness, and gradually improved based on redefined goals and the insight from the enactment and monitoring of their prior versions. Creating business process models is a well-established practice of documenting and, in fact, formalizing effective and desired behaviors in organizations. These artifacts, as well as other internal regulations, policies, and codified procedures, can be together considered as a design of how the organization operates.

What was designed can be then observed in action. Since these models are usually just an attempt to structure predominantly human work, their enactment in practice may, for obvious reasons, be different from the intended course. In particular, these processes can exhibit a certain degree of discretionary interpretation, due to people's natural ability (or tendency) to react spontaneously on changes and emergencies, e.g., by not following formal rules blindly, by improvising, or simply being subjective and creative. Human factor in this way contributes to the natural adaptability on the operational or execution level. However, at the same time we can observe the opposite, i.e., negative impact on flexibility, when technology is applied to automate business processes. To mitigate these issues, the problem must be addressed from several perspectives, combined in a business process model, and on different IT levels. Reichert and Weber published a comprehensive work on fostering flexibility for various phases of the process life cycle (Reichert and Weber, 2012).

IT systems, like any properly applied software solution, introduce efficiency gains and reduction of errors when a well-structured process is automated and implemented. In traditional approach, the behavior exhibited by a system when it is in use (i.e., during run-time) is directly the result of what

was decided in the design-time. Fig. 1 depicts the BPM life cycle and its main phases in relation to the design-time and run-time. If the system can perform any self-adjustment during run-time, it is still considered to be the result of featuring a functionality implemented in the design-time. Therefore, any significant changes or alterations in functioning, the need for which has been identified already after the system has been run, require going through a full cycle: redesign, amended implementation, reconfiguration, and, finally, re-launch of the updated version.

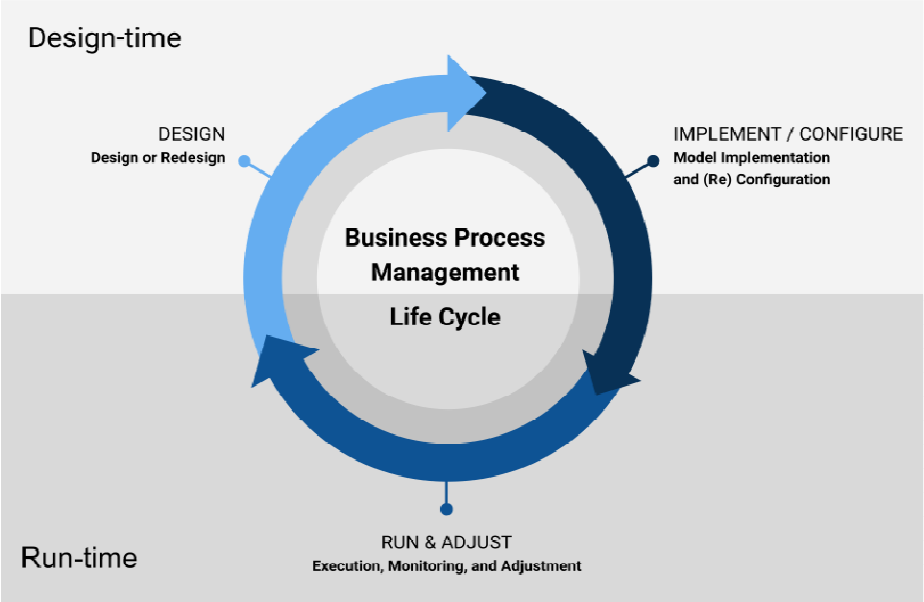

Fig. 1: The BPM life cycle. Three main phases: (1) design / redesign, (2) implement / configure, (3) run and adjust (cf. (van der Aalst, 2013))

Organizational adaptability as a synthetic feature

In his work "Critique of Pure Reason", the German philosopher Immanuel Kant introduced a semantic distinction called the analytic–synthetic dichotomy. It refers to distinguishing statements (especially affirmative subject–predicate judgements) into two types of propositions: *analytic* and *synthetic*. In the first case, the concept of the predicate is semantically contained within the concept represented by the subject, and, from the cognitive point of view, serves as a clarification. In the second case, although the predicate relates to the concept of the subject, it lies entirely outside of it and because of that provides cognitive amplification. Kant juxtaposed this distinction between analytic and synthetic statements with another one: *a priori* and *a posteriori* proposition. The *a priori* propositions are those which can be known independent of experience and their justification does not rely upon it. On the other hand, the *a posteriori* propositions are based on experience and validated by it (cf. (Huemer and Audi, 2002)).

Analytic Adaptability

We can use the above outlined epistemological approach to revise the concept of organizational adaptability, with a special regard to the role the organization's information system plays in this context. Let us first consider organization's adaptability as a quality that is analytic in Kant's sense. Since the combination "analytic" and "*a posteriori*" has been rejected by Kant himself as self-contradictory (being analytic excludes any reference to experience), the only valid way to define it would be as "analytic" and "*a priori*". Analytic adaptability (DTAA) shall therefore imply, that the ability of the organization to adapt is understand as its intrinsic quality (based entirely on its internal

structures and properties) and is expressed solely as the designed capability, e.g., implemented as a feature of its information system, conceptually fully controlled and understood within the scope of the organization (v. Fig. 2). In design science, however, constructs are usually created in an iterative way and are developed using, e.g., continuous integration approach. Moreover, considering reflective paradigm, meta-programming, etc., we cannot rule out the situation in which system could be capable of changing its behavior by adjusting the design and making that alteration persistent. That opens up the possibility for interpretation, that the "*a posteriori*" variant (RTAA) might be a valid case.

	a priori	***a posteriori***
analytic	design-time (DTAA) (*design, redesign*)	run-time (RTAA) (*adjust the design*)
synthetic	design-time (DTSA) (*implement, configure*)	run-time (RTSA) (*run and adjust*)

Fig. 2: Adaptability decomposed as Kant's analytic–synthetic and *a priori–a posteriori* dichotomies

Synthetic Adaptability

Synthetic adaptability (SA) can be perceived as both an "*a priori*" and "*a posteriori*" concept. Unlike AA, SA can be considered as an extension to the foundation (i.e., AA), that introduces new capabilities based on interaction with the external environment. It offers functional and operational amplification, and can be defined in two distinctive ways. The first one, the "*a priori*" SA, is just a conceptual enhancement of AA, achieved by adding new adaptive abilities utilizing external resources but remaining within the organization's scope of control and under its own formal specification created in the design-time (DTSA). The second one, which we will refer to as run-time synthetic adaptability (RTSA) or just (the full) "synthetic adaptability", is the "*a posteriori*" concept. It takes DTSA as the foundation and extends it with advanced adaptive autonomy, available to experience only in the run-time. Conceptually, it requires implementing in the information system functional and behavioral features, that are developed in the design-time, but relay on external systems, data, and behavior, which cannot be determined *a priori*, i.e., without actual participation in an interaction with the external world.

To understand the practical implications of such theoretical revision, it is worth finding and discussing a more practical, technological reference point, facilitating comprehension, and providing some insight on the feasibility aspects.

Process-Aware Information System (PAIS)

Dumas et al. define Process-Aware Information System (PAIS) as "a software system that manages and executes operational processes involving people, applications, and/or information sources on the basis of process models" (Dumas et al., 2005). Such systems extend what has been previously defined as the domain of the Workflow Management (WfM) Systems (Reijers and Van Der Aalst, 2005) by offering support for additional phases of the full BPM life cycle, including business process analysis, redesign, implementation, execution, and monitoring.

Business process models and process awareness

Being "process-aware" means that the information system is not only delivering the technological support for enacting business processes, but is also capable of handling the needs and maintenance

requirements of their models. The model can be externalized and serialized using meta-model-based languages with visual notation and formal specification like, e.g., Business Process Model and Notation (BPMN) managed by OMG (Object Management Group, 2013). In scenarios with full business process automation, it allows for altering the organizational behavior by introducing changes to the (next iteration of the) process model without the need of making any significant modifications to the software or in the technological layers and IT infrastructure. The system engine acts as the middleware layer providing access to the functionality implemented in other corporate systems and business applications, exposing granularity level compatible with tasks and subprocesses, and delivering auxiliary services, like messaging or event handling. It maintains the execution context for every instance of any running processes and collects execution data, which can then be used for process mining and other analytical tasks targeted towards improving understanding of how the organization's processes are executed in reality and whether there are any discrepancies worth investigation during such a *post-mortem* analysis.

Context-Awareness and Reflection

The PAIS is aware of the business process, but in case of the discussed synthetic adaptability the process must be aware of the context and even aware of itself. The term *context* is used in many different areas of science and can have a very different meaning depending on the selected perspective. For the purpose of this study, we can define it concisely after (Chalmers, 2011) as the circumstances relevant to the interaction between a process and its execution environment. Context-aware process is able to scan and catch the relevant events occurring in its environment, interact with the whole ecosystem by communicating (triggering) its own events, thus possibly invoking and influencing the behavior of others. The capability of a system to understand the context and translate this understanding into action is the essence of context awareness. Systems featuring this capability are often referred to as "intelligent", "smart", or "adaptive" (Mahalle and Dhotre, 2020).

In computing, *reflection* is the ability of a process to access, examine, and even alter (consciously) its own state and behavior through a well-defined programming interface. By analogy, it is a similar concept to what in the field of artificial intelligence is described as "self-awareness". Such properties, although accessible in the same way as regular (meta-) data structures, are typically observable only from some external (meta-level) viewpoint (Sobel and Friedman, 1996). Since in PAIS processes are instantiated based on the process models, that opens the possibility for modification of not only the behavior of a single (current) instance of the process in its run-time, but (by altering the model) also all the future instances of that model, hence making the adaptive change in behavior persistent.

Event-driven vs. state-driven behavior

In a stable environment, system's behavior can be designed and implemented as a set of predefined states. Such a system can still manifest certain level of flexibility or ability to identify some changes in its surroundings and adapt to them, but the task of constantly monitoring the environment must be implemented in the state machine. Event-driven paradigm introduces another common behavioral policy: event-condition-action (Erradi et al., 2006). System is able to react to predefined events and, based on the evaluation of the condition, decide which action should be performed. In PAIS these types of conditions can be defined as embedded attributes in the process model (e.g., as a conditional expression of an exclusive alternative gateway in BPMN) or externalized and delegated for storing and managing in a central business rule repository. In some situations, such business rules may be calculated in real time, on a per-instance basis. That introduces new possibilities in terms of injecting intelligent, flexible behavior into a business process in the run-time—an interesting approach has been presented in (Patiniotakis et al., 2019). With the use of Big Data technologies, AI, and advanced analytic techniques, it becomes possible to achieve new levels of adaptive, data-driven behavior.

An example of such an attempt, i.e., to create a framework combining Big Data analytics and BPM paradigm has been discussed in (Hassani and Gahnouchi, 2017). This trend in computing can be successfully applied to PAIS-based enterprise solutions, as it is by design modular and suitable for

injecting integration links to external systems delivering additional functionality. In a complex, interorganizational business scenarios, it may involve integrating PAISs of several business partners and realizing in practice complex multicompany process-oriented systems, as was envisioned almost a decade ago by (Reeves and Deimler, 2011).

Premises and objectives of synthetic adaptability

The original premise of Business Process Management and process-orientation in the information system development was to use process models as means of capturing, documenting, and constantly improving well-structured business processes. In real-world scenarios, about 80% of the process model instances follow the structure expressed by 20% of the process variants; pursuing the remaining 20% in order to achieve the complete behavioral representation is much more challenging (van der Aalst, 2019). Designing the PAIS-based enterprise solutions emphasizes the role of this model-based approach and proves that it can be very effective, especially considering future process automation. However, in the age of constant change, even the externalized process model may be not enough to satisfy the needs and expectations of modern organizations' managers.

Languages such as BPMN are great tools for modeling structurally sound processes, but they are not well suited for modeling dynamic, adaptive processes, that are hard to describe in the classic imperative manner. There are already attempts to fill that gap, e.g., Case Management Model and Notation (CMMN) standard managed by OMG (Object Management Group, 2016), that introduces more human-centric and adaptability-oriented way of thinking about processes. It does not bring the same level of maturity or technological robustness as the well-established BPMN tools on the market, but it manifests the direction in which the development will certainly head: towards adaptive capabilities that leverage technological advancements. Moreover, considering advances in cognitive computing, we can expect the new category of knowledge-intensive processes to emerge and redefine the approach to implementing flexibility (Hull and Motahari Nezhad, 2016).

Table 1: Synthetic vs. analytic adaptability—feature comparison

Feature	Analytic adaptability	Synthetic adaptability
Modus operandi	State-driven, data-oriented	Event-driven with complex event processing
Behavior style	Deterministic, reactive within the defined scope	Autonomous, proactive
Change introduction possible phase	Design-time	Design- and run-time
Interaction mode with the environment	Well-structured protocols, predefined events	Ad hoc, self-learning, discovering patterns
Available level and scope of change	Process model	Process model and process instance

The main objective of the proposed synthetic adaptability is to open it for better integration with what is already available in the cloud and externalize more than just a process model from the host information system's workflow engine. Event-driven processes are nothing new, but with current level of variability and unpredictability in the business environment, it is more and more a challenge to identify what is the real signal for adaptation. Data analytics offers a new way of defining complex events and allows for implementing near real-time processing. Behavior of a process can be adapted in run-time at the instance level, and the most accurate information available can be used for that in

the decision-making process. Adaptability as a concept needs to be revised. Table 1 gives a summary of selected features comparing the two discussed.

Conclusion

The business environment is constantly changing, and the dynamics of these fluctuations are more rapid and unpredictable. Embracing the change is now the basis for maintaining the *status quo* and planning the strategy for further development and expansion in the future. The ability to adapt has become one of the most important qualities of every competitive organization, and requires special attention and thorough consideration by the management. In this paper we have addressed the problem of understanding the concept of adaptability from two different but closely interrelated perspectives: as an organizational quality, and as a feature of organization's information system. While the perception of the role of information system and technology in general in fostering adaptability of an organization is widely known and recognized, we argue that this is no longer a sufficient understanding of the matter. There is a need to rethink the approach in which the behavior of an organization is predominantly conveyed in rigid, formally defined, and well-structured business processes, and move towards much more flexible, knowledge-intensive, hybrid models. Adaptability is no longer to be defined once and then forged in the system design.

In order to revise the concept of adaptability, the novel approach based on Kant's analytic–synthetic dichotomy has been introduced and discussed. The main idea behind this attempt is to extend the perception of flexibility from what has been strictly planned and implemented in the information system's design-time, to also include the possible *ad-hoc*, adaptive behavior enacted or experienced during the run-time. The revised concept defined as "synthetic adaptability" has been confronted with Process-Aware Information System as a technical reference point and implementation background for discussing the applicability issues. With the latest technological advancements, organization's adaptive capabilities can now be amplified through external interactions and shared with other business entities in the environment. The adjustments in behavior shall be considered not only from the perspective of a separate, external business process model, but also of its individual, context-aware instances and their abilities to discover and persist the new, improved behavioral patterns. Future IT solutions for modern organizational management, when identified as "intelligent" or "smart" should be considered in terms of the level of their synthetic adaptability.

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The Impact of the COVID-19 Coronavirus Pandemic on Tourism - A Perspective on the Influence of the Brand on Tourism in the Current Context

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Abstract

The article presents an overview of the tourism industry in the context of the COVID-19 coronavirus pandemic, as well as a perspective on how the brand of tourism service providers can help to relaunch companies affected by this crisis.
Travel is an important component of active people in 2020, and tourism is a field strongly affected in this difficult period for public health. Therefore, it must be the subject of debates and solutions must be identified in order to overcome the current situation.
Furthermore, the article presents a series of real current challenges, but also measures that can be taken to reduce the effects of the health crisis which also affects the tourism industry.

Keywords: tourism, coronavirus, pandemic, recovery measures, brand, tourism services
JEL classification: L83, I12,I15, M31

Introduction

The tourism industry is one of the most vulnerable sectors when it comes to a potential threat related to an economic, health, military or other crisis that may cause people to think twice before traveling. This is natural, because, first of all, people will most probably give up traveling being scared of the effects of these crises worldwide on themselves or on economic mechanisms. Whether we are talking about restricting travel, traveling only in cases of necessity or in the interest of work, people will tend to minimize their own exposure, the risks that may arise and, obviously, they will save money for difficult moments that they will go through.

The health crisis brought about by the COVID-19 coronavirus pandemic currently experienced by humanity is a moment of hardship for the health system of each state, testing people's resilience to stay in their own homes without being allowed to enjoy the freedom of a trip, a city break, a hike or even a quiet walk in the park, in the conditions of social distancing that we all have to respect, so that the epidemic does not increase and does not perpetuate endlessly.

In this context, people in 2020, for whom a trip to almost any corner of the world was possible until recently, are faced with restrictions and challenged, while they also find themselves surrounded by the fear of the unknown, an unseen enemy and the lack of a predictable reality at least in the short term.

For people, one of the most dangerous fears is that of leaving the comfort zone, respectively, in this case, traveling to another area than the comfort of one's own home (one's own country). People will always feel that they are more protected at home or in their country of residence and this explains why a high number of citizens returned to their countries of origin when this pandemic started, on the one hand due to job losses in the countries where they lived and on the other hand out of fear of getting sick, dying or being locked in a country other than their country of origin, away from family and friends.

In this conjuncture, people will consider very carefully the need to travel, on the one hand for vacations or trips out of personal interest, on the other hand for business trips, while more and more managers have understood that working from home can be more useful for employees and for their safety against the disease, but even in the case of medical trips, which people used to make until a few months ago either for emergencies or for cosmetic interventions in countries where costs were more convenient or there were higher quality services compared to those in their country of origin.

Research Methodology

Taking into consideration the fact that the COVID-19 coronavirus pandemic is ongoing, the research method is a continuous one, based on collecting the information that is transmitted and the events that take place from one day to the next. However, in order for the article to present a more accurate image of the current reality, the research method used was the analysis of data from secondary sources, such as articles from books and magazines, the written press and recent market studies. The aim was to identify the issues highlighted in the specialised literature on the influence and role of brands on tourism services so far, but also the extent to which they can remain relevant in the context of an international health crisis. Also, the article is formulated as a starting point to conduct future quantitative and qualitative research, based on the hypotheses launched and testing their validity in different environments and on various target audiences.

The ***hypotheses*** of the article are presented as follows:

-> the brand in tourism represents a guarantee for the consumer regarding the observance of the ethical, moral, safety and hygiene norms to perform the activity from the departure point of the tourist to the travel destination and back home;

-> the coronavirus pandemic experienced by humanity at this moment can highlight the importance of the brand of a tourist service provider for the tourist;

-> tourism service providers can use the brand in the current promotion, in order to create a favorable attitude in the minds of consumers at the end of the health crisis.

The current state of knowledge and directions of influence of the brand in terms of the current challenges in tourism – Analysis

The COVID-19 pandemic is a global challenge for all industries. Out of them all, however, without a doubt, tourism is among the most affected, as it has been almost completely stopped, by limiting or permanently banning travel on all continents. If in certain areas or countries travel has not yet been banned, the fact that it has been stopped in most countries is a blockage of the mechanism of free movement of people and, implicitly, a limitation or a complete cessation of tourism activity.

The linguistic origin of the term “tourism” is closely related to the meaning of the Latin words “tornare” (to turn) and “tornus” (circular movement) and designates a journey (circular movement) returning to the departure point.

In July 1991, the World Tourism Organization (WTO) Conference in Ottawa redefined the basic concepts of tourism, assimilating the term tourism to „activities that are undertaken by people during their travel or stay in places outside the residential environment for a period of more than 24 hours or at least one night, without exceeding one year, for leisure, business or other reasons, for purposes other than performing a remunerated activity in the place visited.”

The trend to diversify and increase the complexity of consumer needs, manifested in recent years as a result of a growing level of education of consumer behavior, has contributed to the introduction of new activities in the service delivery process. In the case of tourism services, this involves, in most cases, activities grouped in the following types of services (Nistoreanu P., 2012): accommodation, food, transport, leisure and treatment.

Thus, the article aims to bring to the readers' attention the impact of the COVID-19 pandemic on these tourism services, the role of tourism providers brands, but also several measures to reduce the disaster that could hit tourism if not acted upon as soon as possible ifor a worldwide recovery. The damage will be on several levels, but the two most important to mention are without question the job loss of a large number of tourism employees and the financial losses both from the lack of customers and from investments not recovered by tourism players for the current year.

In the definition provided by the American Marketing Association (AMA) and later taken over by other authors, the brand is „a name, a term, a sign, a symbol or a design, or a combination of these elements, with the role to allow the identification of goods or the services coming from a vendor or group of vendors and their differentiation from the competition" (Kotler, 2008).

Given this definition, it is noticed that the brand, by its nature, helps companies to differentiate themselves from the competition and, therefore, to act in various ways in times of hardship or crisis regardless of the field they belong to, whether it is tourism, agriculture, clothing or anything else.

Therefore, both the challenges and the measures taken, despite being common, must be viewed separately by each tourism company, in accordance with the values transmitted by its brand until that moment in order to remain credible for tourists.

The results of the Research

What should be done? Considering all the services that support tourism and, basically, those which shape it and make it exist, it is necessary to align them with the current reality and present them in a way that develops the confidence of potential tourists, so that they have the intention to travel again, to interact with all the service providers in this process and, of course, to enjoy their experience - the main purpose of tourism, besides recreation, relaxation and travel in itself.

Following the analysis of the current situation presented in a series of specialized articles and in the writings of well-known specialists in tourism, we will present the present challenges, but also a set of measures that tourism workers can consider in order to recover and restart the activity soon, so that their human resource does not suffer, and the tourists can enjoy their long-dreamed trips as soon as possible.

The ***biggest challenges*** identified, generated by the health crisis, are the following:

-> Cancellation of reservations and / or requesting the refund by tourists;

-> Tourists who were caught in the middle of a trip during the pandemic, those who were stuck / isolated in their respective destinations and how travel agencies or countries of origin manage these situations;

-> Managing customer relations both by phone and online, through social networks, as tourists have a lot of questions, concerns, dissatisfaction, fears, anxieties about the money paid in advance for the holidays and it is important not to lose contact with them, to reassure and maintain them as loyal customers;

-> The danger of job losses by tourism employees, in the context of losing the basic activity, stopping it temporarily or fully digitising certain positions that until now required the presence of a person to perform those tasks;

-> Managing short, medium and long term resources by both parties, both tourism companies and tourists; thus, we are talking about loans, utility expenses, payment to hotels in advance - from the perspective of travel agencies and, on the other hand, overdue loans, job losses and running out of resources - from the perspective of tourists;

-> People's reluctance to travel.

All these challenges are real for the tourism industry, but a solution for the recovery of this health crisis by tourism workers with caution and responsibility can be the observance of certain measures so necessary for all fields worldwide. Thus, the proposed measures are divided into two categories:

those of a managerial nature, which concern more the organization of the activity of tourism service providers from a strategic, financial and administrative point of view and those of safety, hygiene and maintenance of social distancing between tourists, recommended to hotels, restaurants and other tourism fields.

A. The managerial measures proposed to travel agencies, hotels and other tourism service providers are the following:

-> Negotiations with suppliers to freeze or postpone certain invoices for several months (as appropriate) and relaxation of payment terms;

-> Maintaining cash to keep employees in the pre-crisis formula for as long as possible;

-> Stopping short-term investments in technology or research;

-> Contracting certain loans for enterprises, if the financial situation allows / requires it;

-> Discussions and support from the state (states / European Union) regarding the granting of time to pay taxes and access to certain investment funds;

-> Orienting investments towards employees, especially towards the sales force and the communication force of the company;

-> Trying to maintain the employees' jobs after resuming the activity, even if it will have a slow start;

-> Completely moving the activity online, in order not to endanger the tourists or the company's employees;

-> Limiting the interactions with the company's partners in order to protect them, but also their own employees;

-> Restoring the budget for 2020, having in the foreground the reorganization of expenses and investments and the redirection of revenues to important directions regarding the maintenance of the agency, hotels and related staff;

-> Maintaining permanent contact with customers, employees and suppliers through the online environment and on all means of communication which, as much as possible, do not involve face-to-face interaction;

-> Continuing to promote the company's services, without the clear purpose to sell; people need to stay connected with values, services and sales forces, but they need understaing in a time of more limited resources; don't sell aggressively, without empathy, a service to which people will return anyway, for the simple reason that they will wish to escape the daily routine in a dream trip at the end of the coronavirus pandemic;

-> Relaxed payment terms for tourists, cancellations without penalties for the emergency/pandemic period, special offers, extension of the early booking period (in collaboration with hotel service providers and other suppliers in the chain), fee reductions where applicable, offering vouchers for certain services included in the package;

-> Flexibility regarding reservations made by tourists;

-> Streamlining online promotion activities;

-> Strategies and offers for tourism inside the country more than the external one which may involve several services included in the package with a risk factor, for example air transport; promoting rural tourism, in nature, in areas with large green spaces for walking, where tourists will not interact with crowds and will be able to respect the social distancing;

-> Personalized approach to each request for postponement or cancellation, as each customer is different and has a different history or travel wishes;

-> Massive communication of the measures taken, both offline and especially online, in order for the message to reach all parties involved in the tourism carried out by the company and, especially, in order not to create confusion, misunderstandings or missing relevant information by customers (tourists) and company partners.

B. The safety, hygiene and social distancing measures between tourists recommended to hotels, restaurants and other tourism service providers, are the following:

-> A specific strategy and procedures to act in case a tourist has a fever and presents symptoms specific to COVID-19;

-> Protection equipment for all staff;

-> Waiting places at the reception, in the restaurant, cafes, terraces, elevators, halls or wherever crowds can be created;

-> Daily monitoring the temperature of the employees upon arrival at work and of the tourists, upon check-in or when returning to the hotel after a trip.

-> Setting disinfectant mats, disinfectant gel devices, disinfectant dispensers, antimicrobial foil, sanitary bootees, disposable masks and gloves at the entrance;

-> Setting plexiglass protection panels at the reception, between the customer and the receptionist, similar to those present between the sellers from the supermarket and the customer;

-> Simplification of the check-in procedure by completing it either online or through certain devices installed at the entrance of the hotel, or when booking and confirming payment to the agency/hotel;

-> Hygiene procedures at the reception, for luggage carts, in elevators, for railings, and for all surfaces frequently touched by tourists;

-> Removing magazines, leaflets, maps and any other printed materials that could contribute to the spread of the virus;

-> Dividing tourists into series for breakfast, lunch and dinner (as appropriate, depending on the type of meal services offered by each hotel or restaurant); making reservations in advance at the reception in the order of first come first served / based on age / other options identified as convenient for both parties involved;

-> Replacing the Swedish buffet with the a la carte menu (preferably) and offering the option to eat in the room with no additional cost;

-> Adapted cleaning procedures in the room and in open / common spaces;

-> Sanitizing children playgrounds several times a day, with increased attention to the surfaces most frequently touched;

-> Placing sunbeds on the beach, at the pool or in the garden respecting the rules of social distancing;

-> Increased procedures regarding hygiene at swimming pools, saunas, massage rooms, beauty, care and body relaxation salons;

-> Providing disposable booties for tourists to be used in common areas, as is done, for example, in private medical centers, SPAs, gyms or private kindergartens and nurseries;

-> Temporary closing the common toilets inside the accommodation unit, so that tourists can use only the toilet in their room to avoid contact with other people;

-> Maximizing the space outside the hotel / restaurant, if it exists and if the place allows it.

It is essential for tourism service providers to understand that these challenges, but also the measures proposed to address them, must be correlated with the company's brand policy. A tourist who trusts a travel agency which has not disappointed him for years regarding their services will first contact this agency for a new journey even after the pandemic, as the faithfulness relationship has already been created, and now can easily be turned into a loyalty relationship through effective communication and empathic promotion methods towards the customer.

Conclusions

Therefore, we can understand from the analysis performed the fact that tourism is a strong sector challenged by this health crisis. Serious losses in all business segments are highlighting this: airlines have reduced their flight schedules as passenger traffic has been stoppee; cruise lines stopped operations for the next few months, several hotels have been closed and thousands of workers in the industry have already been laid off.

\However, if we see the situation as a whole and with optimism about the future, we can gradually notice that sooner or later, the crisis will pass or diminish in magnitude like other crises in the history, and specialists in the field will have to think about what they will do from now on. It is obvious that things will not be the same for at least a good period of time, or maybe never, but people will continue to travel and will want to do so perhaps even more, given their prolonged isolation at home, in contrast to the numerous trips they usede to go on until not long ago, an ascending worldwide trend.

People will continue to visit places, but they will be more careful and will want to convince themselves that it is safe to travel again after noticing effective measures and results that will convince them.

It is expected that travel behavior will change, with an upward trend towards nature tourism, outdoor adventure parks, camping and recreational activities, car trips on your own and individual household travel. Also, for tourists with high financial possibilities, there is a growing demand for renting or buying private islands, somewhere to be expected in the case of those who can afford these tourist extravagances, for both privacy and increased protection against the virus.

On the other hand, tourists will feel safer in hotels than in apartments rented from strangers, which was usually very popular until the beginning of 2020.
In addition, it is predictable that people will expect price declines, and this could destabilize tourism players who expect a recovery only starting in 2021.

But above all, humanity will remain with an important lesson that needs to be understood as soon as possible, although people should have done so by now: personal hygiene and public hygiene are two topics that must not and cannot remain taboo any longer, both for authorities and for citizens, who need to understand that only by starting with our own example can we make a change in the world and that protecting others is the solution to change ourselves.

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Influence of Wages on The Labor Market in Agricultural Organizations

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Abstract

The problem of employment and retention of agricultural personnel is an extremely urgent problem, both for the Russian economy and in the general scientific context. Qualified personnel ensure the effectiveness of any territorial production system. At the same time, not all sectors are equally attractive. First of all, applicants pay attention to the level of wages, compensation package, social package. The topic is also being updated due to the specifics of agriculture as the most important industry ensuring the country's food security. The purpose of this work is to analyze the features of employment of agricultural staff in the Sverdlovsk region. During the study, methods of analysis and synthesis, as well as deduction, were used

Keywords: Salary, Staff Remuneration, Labor Market, Employment, Agriculture.

Introduction

Labor in agriculture has specific characteristics, namely, it is characterized by sectoral characteristics of production and changes under the influence of technical factors. The working period in agriculture often does not coincide with the period of production (the result manifests itself after a sufficiently long time); the efficiency of the use of labor resources depends to a large extent on natural factors; labor is seasonal; work is carried out with living organisms, which requires universal qualifications from workers.

The population as of January 1, 2019 was 146.8 million people (a decrease of 0.07% compared to the level of 2018). At the same time, the rural population decreased by 0.79%. Since 1995, the rural population has declined from 40.1 million to 37.3 million.

Characteristics of Employment in Agriculture

In 2018, 4,936.6 thousand people were employed in the agriculture of the Russian Federation (about 6.9% of the total number of employees in the country), which is 2.7% lower than the level of 2017, Figure 1.

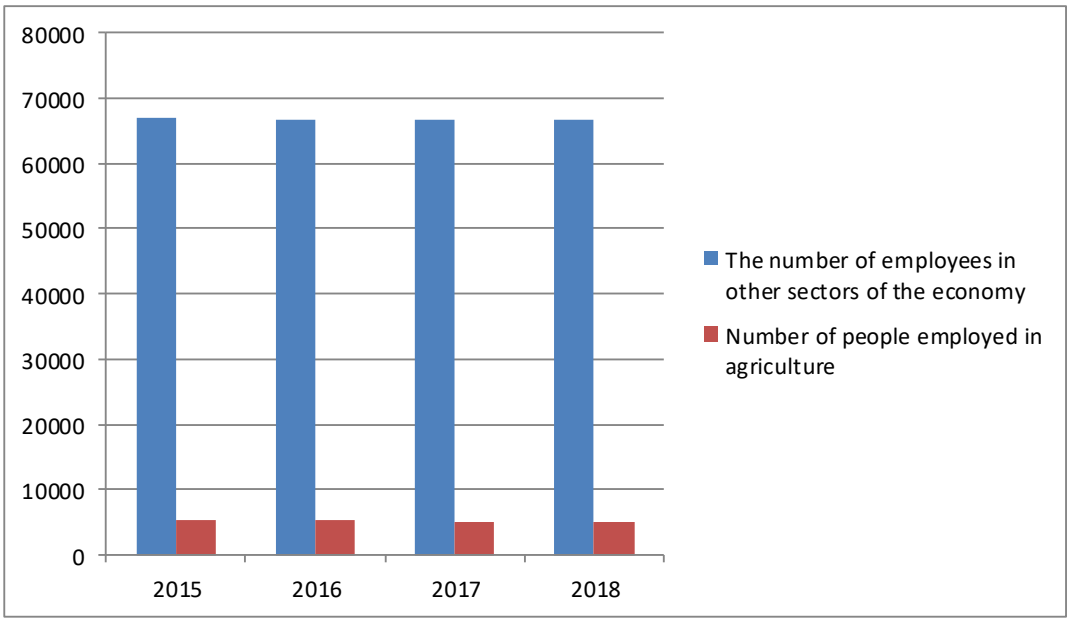

Fig. 1: The number and structure of employed in agriculture, relative to the total number of employed in the Russian Federation for 2015-2018

Analyzing the data presented in Figure 1, we note that from 2015 to 2018, the number of people working in agriculture in Russia decreased by 481.4 thousand people.

Problems of Unemployment in Agriculture

Rosstat data show that the unemployment rate fell by 0.7 percentage points. Favorable changes are also taking place in terms of reducing unemployment among people living in rural areas, over a period of duration, Figure 2.

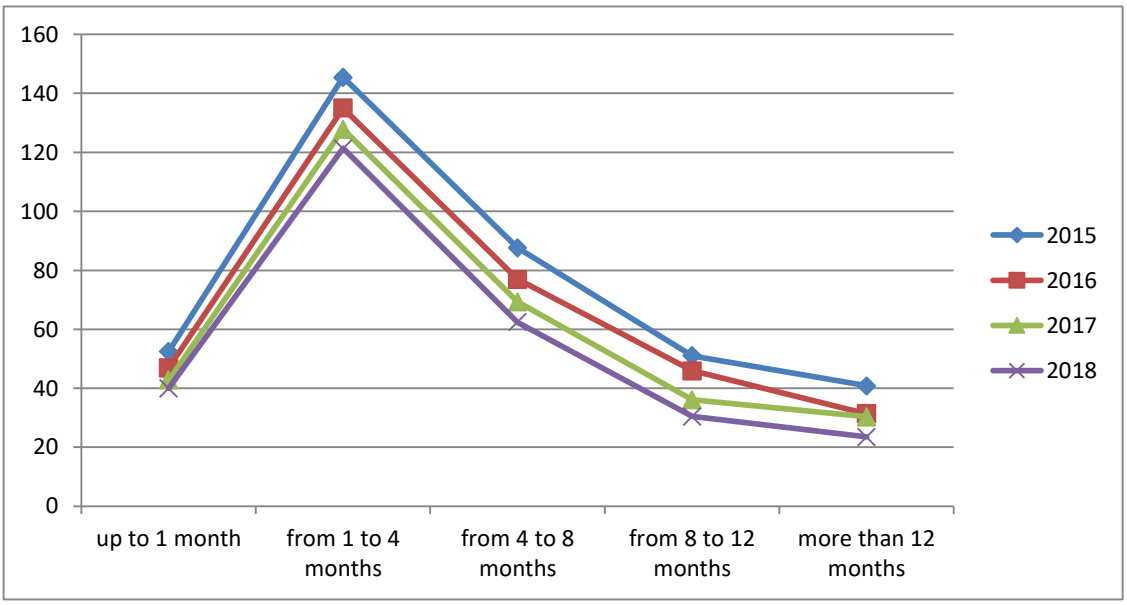

Fig. 2: Indicators reflecting the number of unemployed by the length of the period of unemployment, people living in rural areas in 2015-2018, thousand people

The largest number of unemployed living in rural areas, according to employment services, are registered to search for a new job from 1 to 4 months. [1]

The problem of unemployment remains unresolved, despite the creation of jobs in agriculture (in 2017 - 61.6 thousand new jobs, in 2018 - 62.6 thousand). The number of vacant jobs is also growing. In 2018, their number amounted to 28181 places (an increase of 135.79% over the year), which is about 3% of the payroll number of employees.

In recent years, there has been a significant reduction in the number of educational institutions in the countryside, which indicates the loss of the social infrastructure of rural areas. The number of general educational organizations and evening general educational organizations decreased. At the same time, the number of students per educational organization is increasing.

Another unresolved problem is the reduction in the number of graduates (skilled workers and employees) from 19.3 thousand people to 17.2 thousand people. Thus, we can talk about a reduction in the number of young qualified personnel employed in agriculture.

The most important factor affecting the formation of labor resources and the attractiveness of the industry is the level of remuneration. We calculated in table 1 indicators of the level of wages in agriculture.

Table 1: The level of nominal accrued average monthly wages of workers employed in agriculture

Indicators	**2015**	**2016**	**2017**	**2018**	**Rates of growth, %**
The average monthly wage in	34030	36709	39167	43724	128,49

the economy, thousand rubles					
The average monthly salary in agriculture, thousand rubles	20670	22915	25671	28699	138,84
The ratio of the average monthly wage in agriculture and the economy as a whole,%	60,74	62,42	66,31	65,64	+4,87

Data on the average monthly wage indicate that a significant difference continues to remain between the level of wages of workers employed in the economy as a whole and workers employed in agriculture. So the gap in the wages of agricultural workers and other sectors of the economy decreased over the study period from 40 to 35%. Despite the narrowing of this gap, the agricultural sector in terms of labor remuneration remains unattractive for young professionals who either live and work in the city, or for highly qualified specialists with experience who move to the city. [2,5] youth in rural areas is actively involved in the state. Various programs are being developed and implemented to attract people to the countryside, various benefits are offered, including to support agricultural producers [3, 4].

Characteristics of the labor market of the Sverdlovsk region

The number of labor, including those employed in the economy of the Sverdlovsk region, over the past 5 years is shown in Figure 3.

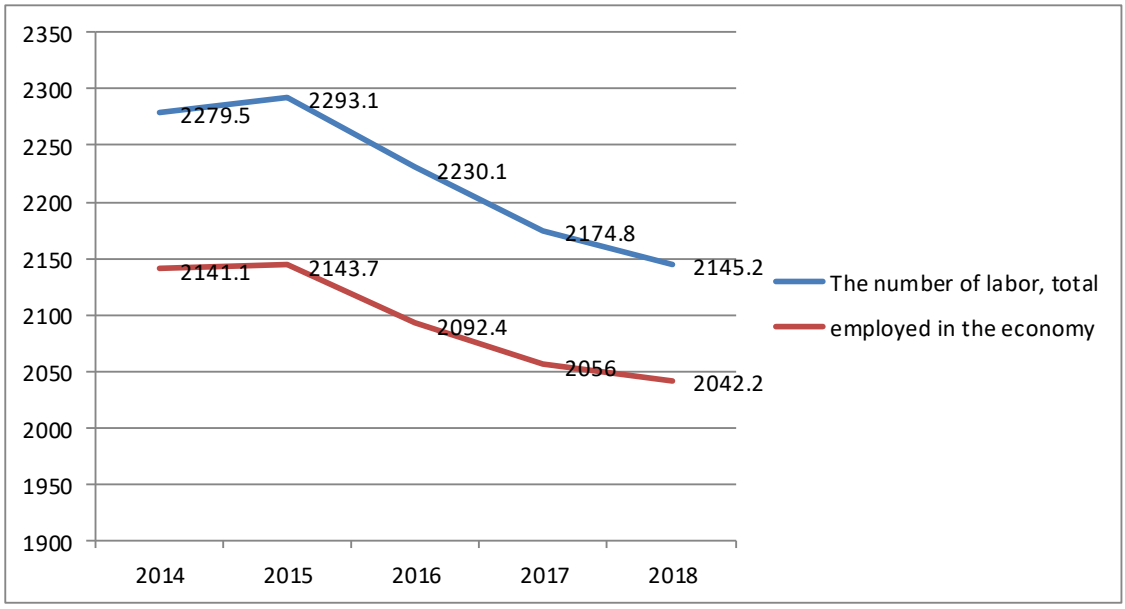

Fig. 3: The number of labors, including those employed in the economy of the Sverdlovsk region for 2014-2018, thousand people

The number of labor in the Sverdlovsk region has been declining over the past five years (5.9%) [6]. There has been a decrease in the employed population in such economic activities as agriculture, as well as mining, manufacturing, construction, and education.

According to the forecast of the balance of labor resources of the Sverdlovsk region, the population of the Middle Urals is expected to grow by an average of 0.23% per year, and according to estimates by 2035 it will reach 4,497.0 thousand people. The population that will be of working age will decrease by 87.2 thousand people and is expected in the amount of 2279.9 thousand people.

The ratio of expected and estimated wages in the labor market.

Despite the increase in unemployment, for example, in Yekaterinburg (with readiness to move), there is a mismatch between supply and demand in the labor market, table 2.

Table 2: Assessment of discrepancies in supply and demand in the labor market for agricultural specialties (fragment).

Profession	Demand in the labor market of Yekaterinburg		The offer on the labor market of Yekaterinburg	
	Number of vacancies, units	Average proposed salary, rub.	Number of resumes, units	Average offered salary, rub.
Agronomist	18	42352	41	48125
Veterinarian	24	29550	103	43280
Livestock specialist	3	38000	42	42714

Thus, the proposed average monthly wage is lower than expected by applicants by 18%, which leads applicants to seek other employment options.

With such a mismatch between the expected and real level of wages, a decrease in the working-age population and a migration outflow are possible.

Thus, we can talk about the low competitiveness of the agricultural sector in terms of wages.

Such a mismatch in the level of wages can aggravate the situation of unemployment in the region.

These vacancies indicate the level of education - higher. Almost all applicants (more than 87%) are ready to move. At the same time, their salary expectations are higher than the employer is prepared to offer.

The efficiency of use of labor resources, including in agriculture, is estimated according to labor productivity. In agriculture, to assess the effectiveness of the use of human resources, it is advisable to use in-kind indicators, for example, labor costs per unit of output.

To reduce the number of vacancies in agricultural organizations, it is necessary at the state level to make a decision to increase the amount of state support. Particular attention should be paid to the development of rural infrastructure, the improvement of housing improvement for rural residents, and the creation of jobs paid at a level not lower than the average for the economy.

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Legal Problems of Application of Cash Register Equipment for Small Business Enterprises

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Abstract

Background: At the moment, our country undergoes significant reform, concerning each person. The transition to a new procedure for the use of cash registers is to follow the requirements of modern realities associated with the use of technological progress. *Object*: Analysis of the use of cash registers by small businesses, the consequences for their economic activities, as well as ways to solve applied problems for taxpayers. The following methods were used in the work: formal-legal, description, generalization. *Findings*: The main provisions of the new legislation, past and resolved problems were described. As the most vulnerable part of entrepreneurship, small businesses strongly felt the changes brought about by the reform of the use of cash registers. *Conclusions*: This article discusses applied issues of practical importance for entrepreneurs. The legal collisions of legislation on cash registers, the complexity of the transition to a new order of cash discipline are revealed.

Keywords: Cash Register Equipment, New Order, Online-Working Tills, Legislation, Small Business Subjects.

Introduction

The purpose of the study is to analyze the use of cash registers by small businesses, the consequences for their economic activities, as well as ways to solve applied problems for taxpayers. The relevance of this study is due to the scale and significance of the reform relating to the use of cash registers, not only for the state, but also for business entities. Since July 15, 2016, after preliminary "voluntary" testing in Moscow, the Moscow and Kaluga Regions, and Tatarstan, the legislation of the Russian Federation has been amended to change to a new procedure of using cash registers when making cash payments and settlements using electronic means of payment.

Literature Review

Over the past 5 years in Russia, the idea of the use of cash registers has been raised repeatedly in professional circles. However, often, in the scientific community, specialists did not have time to analyze the changes that took place in the legislation. Small business activities have proven to be an experimental platform for reform. In 2017, an article by Zvereva A.O., Golubtsova E.V., Ilyashenko S. B., was published that disclosed certain aspects of the use of cash registers in retail trade (Zvereva, Golubtsova and Ilyashenko, 2017). These authors spoke about the difficulty of using online cash registers for small businesses and the emerging trend of expansion of large network structures. Some authors, such as Magomedov R.M., Fomicheva T.L. and Pavlova E.S. (2018) are of

the opinion that online cash registers contribute to the transparency of the economy, improving technologies in the field of small business.

Methods

General scientific methods of cognition, including the principle of objectivity, are consistency, induction, deduction. Along with general scientific methods of cognition, private scientific methods were used: descriptive, comparative legal. The legislation of the Russian Federation on the use of cash registers in the time period since 2003 has been investigated, the current problems associated with the use of cash registers have been considered.

The first edition of the Federal Law d.d. 22.05.2003. No. 54-FZ was called "On the use of cash registers when making cash settlements and (or) settlements using payment cards," to the present date, more than 13 editions have been used. Changes in the legislation on the use of cash registers at the same time not only change the behavior of users of cash registers, but also oblige users to purchase newly created technical equipment to comply with changing laws.

The use of cash registers may vary for individual groups of entrepreneurs. So, from 01.07.2016 it is forbidden to trade in strong alcoholic drinks for retailers of alcoholic products not registered in the unified state automated information system (EGAIS). At the same time, the use of cash registers is a licensing requirement for the sale of alcohol products, and the multifunctional transport module (MTM) of EGAIS, through which alcohol products must be legally sold, can only be used with certain models of cash registers, which forced alcohol retailers to purchase appropriate cash registers.

Starting 01.07.2017 a new procedure for the use of cash registers has entered into force. Changes in the legislation on the use of cash registers related to the use of "online cash registers" are unprecedentedly large-scale and affecting all participants in the market for trade and services, which determines the relevance of this research topic (Chrástecký, 2016; Osipova, 2018).

The legislation of the Russian Federation on the use of cash registers consists of the Federal Law of 22.05.2003. 54-FZ "On the use of cash registers when making settlements in the Russian Federation" and normative legal acts adopted in accordance with this law, which primarily include the Federal Law of 03.07.2016. No. 290-FZ "On amendments to the Federal Law" On the use of cash registers when making cash settlements and (or) settlements using payment cards "and certain legislative acts of the Russian Federation", which indicate the main stages of the transition to the new procedure application of cash registers. The current situation in the legal sphere of application of cash registers is unique, users of cash registers, the federal tax service as a public authority controlling the use of cash registers are compelled to follow the provisions of several versions of Federal Law No. 54-FZ when carrying out their activities.

The definition of the term cash register equipment is now given in 1.1 of Federal Law No. 54-FZ - these are electronic computers, other computer devices and their complexes that provide recording and storage of fiscal data in fiscal drives, generating fiscal documents, ensuring the transfer of fiscal documents to tax authorities through the fiscal data operator and printing fiscal documents on paper in accordance with the rules established by the legislation of the Russian Federation on the application of cash registers, essentially, does not differ from the definition given in the revised Federal Law No. 54-FZ in force until 15.07.2016, where the following definition was given - it is cash registers equipped with fiscal memory, electronic computers, including personal, software and hardware systems, but it is more specific and indicates that cash registers should not only print fiscal documents and store fiscal data, but also transfer them to a third party - the fiscal data operator.

New concepts have appeared - this is primarily the concept of calculation, a fiscal memory device, an office of cash register equipment, a fiscal data base. So, a fiscal memory device is the hardware of cash registers that the user changes upon reaching the limit of operations or after a certain time, ensuring the operation of cash registers in fiscal mode and subsequent storage of fiscal data (Defossez, 2017). Cash registers can also be registered through the "cash registers" section of the

taxpayer's personal account on the website www.nalog.ru. The section contains data on cash registers registered by the entrepreneur. The data transmitted by the user of the cash register equipment are accumulated in the fiscal data base and further processed and analyzed. The concept of settlement before changes was usually used with the words "cash", "cashless". Currently, the concept of settlements combines the entire reception and payment of funds in any form.

In the scope of cash register equipment, new participants appeared - these are fiscal data operators, the technical service centers of cash register equipment disappeared, which were the participants before the changes came into force and provided the use of cash register equipment for more than 15 years. Until 2017, the conclusion of an agreement with a technical service center was mandatory, the technical service center itself received accreditation from the manufacturer of cash registers, was a third party and participated in all actions of entrepreneurs to register, re-register, deregister cash registers in accordance with the requirements of administrative regulation for the registration of cash registers No. 94n dated 29.06.2012. After 01.02.2017 when registering cash register equipment, entrepreneurs are required to register cash register equipment in accordance with the provisions of Article 4.2 of Federal Law No. 54-FZ as amended after July 15, 2016, where there are no references to technical service centers.

Clause 1.1 of Federal Law No. 54-FZ gives the following definition of a fiscal data operator - it is an organization created in accordance with the legislation of the Russian Federation, located on the territory of the Russian Federation, and received, in accordance with the legislation of the Russian Federation on the use of cash registers, processing fiscal data. When registering cash registers for the transfer of fiscal data, an entrepreneur is required to conclude an agreement with the operator of fiscal data, the details of which are indicated in the application for registration of cash registers. Currently, 19 organizations have received permission to process, their register is maintained by the Federal Tax Service.

The legislation identified the following key dates for the reform of the use of cash registers:

- starting 15.07.2016 - amendments to the Federal Law d.d. 22.05.2003 come into force. "On the use of cash registers when making settlements and (or) settlements using electronic means of payment". You can register online cash desks and work with their application;

- starting 01.02.2017 - registration of cash registers is terminated in accordance with the provisions of the administrative regulations for the registration of cash registers approved by order of the Ministry of Finance of 29.06.2012. No. 94n;

- starting 01.07.2017 - there is an obligation to use cash register equipment for organizations and individual entrepreneurs, with the exception of payers of a single imputed income, a patent tax system, entrepreneurs providing services that perform work, as well as for activities carried out through vending. The registered cash registers of the old type are deregistered by the federal tax service unilaterally and are not subject to further use;

- starting 01.07.2018 - cash register equipment is required to apply payers of the single tax on imputed income and payers of the patent system of taxation, with the exception of legal entities and individual entrepreneurs engaged in retail trade, providing catering services without involving workers with whom labor contracts are concluded, as well as individual entrepreneurs providing cosmetic and hairdressing salons services, repair services of radio equipment, computers and communication equipment, transportation of passengers and cargo by water and land transport, veterinary services, physical education and sports classes, rental services, hunting services, medical or pharmaceutical activities, a person licensed for these types of activities, dairy products, commercial and sport fishing;

- starting 01.07.2019 - cash registers are required to apply when making payments to all entrepreneurs;

- starting 01.02.2021 All users of cash registers are required to indicate on the cash receipt the name of the goods sold, work performed, services rendered. Until 01.02.2021 this obligation is only for entrepreneurs selling excisable goods.

Entrepreneurs whose obligation to use “online cash desks” did not occur on a specific date are required to make settlements in accordance with the requirements of Federal Law No. 54-FZ as amended up to July 15, 2016.

Less than half of organizations and individual entrepreneurs falling under the third stage of cash reform use online cash desks. This is evidenced by the results of a survey as of the 2nd quarter of 2019, conducted by the NAFI Analytical Center together with the manufacturer of the online cash register “Evotor”.

The old procedure for using cash registers involved fixing the purchase and receiving money to pay for the goods or services using the control tape, which duplicates all the amounts that the cashier “passes through” and issues a receipt directly to the buyer, then the adopted amendments change the whole process and make it more specific.

Modern cash registers have a memory card and are connected to a computer, so all the money received at the cash register is recorded and stored in the device itself and the cash book, which the cashier keeps and fills.

In carrying out inspections, the tax authorities compared the correspondence between the reflection of received funds in the cash book and the data of the fiscal memory of the device itself.

And if the cash register was a kind of intermediary between two parties to the transaction: the seller and the buyer, then the new order is significantly different from the current one (Iordachi and Timus, 2017; Nagy, Gergely and Katona, 2018).

Now, not only the seller and the buyer participate in the purchase and sale transaction, but also the fiscal data operator (FDO), as well as tax authorities, each of which has its own functions.

All cash registers must be connected to the Internet, and fiscal memory is replaced by a fiscal drive. From a technical point of view - this is a more advanced device, with the ability to protect against changes in the information received and transfer it to the operator of fiscal data (Gorbatov, Zhukov and Murashov, 2018).

Let’s try to track how everything will look with the help of a standard situation when a buyer comes to a regular grocery supermarket and walks to the checkout lane with a shopping basket.

The cashier pass all the goods through CRE and sends the FDO (fiscal data operator) information about the purchase and the amount of money received via the Internet.

The FDO processes the check, places it in its database and sends back to the seller’s cash register a unique number that is assigned to the check, then all information about the completed purchase is sent to the tax service server.

The buyer receives a paper check from the cashier and additionally (at his request) an electronic version must be sent to his Internet mail or phone.

At the same time, information about the details where the electronic check should be sent is provided to the seller by the buyer before it is passed through.

Despite the apparent complexity of the entire operation, it is assumed that this will take a split second.

According to the requirements of the adopted law, it is assumed that the receipt will look a little different, it will have a QR code, thanks to which it can be identified on the website of the FDO and the tax service.

The receipt should contain the following information:

- about the fiscal data operator, its website;
- date, time and place of purchase;
- the seller himself and his tax system;
- type of operation: incoming or outgoing;
- the amount payable with VAT;
- about the form of payment: cash, by credit card or through electronic wallets.

The fiscal registrar has a wide range of functions: it is able to generate informative receipts, detailed cash reports, invoices and other documents. However, most models do not have their own display and keyboard. All settings and actions are performed through the service mode or using a computer on which the appropriate software is installed.

The cashier must be trained and instructed. Then he gets access to the cashier desk, cash of exchange and receipt tape. The first action at the beginning of the day is to open a shift. To do this, the cashier prints a shift opening report, which is sent to the fiscal data operator and includes information about the device, the shift and the cashier. The shift is closed at the end of the day, the cashier deposits cash and generates a report on the closing of the shift.

When the amendments were adopted, the goal of innovations was declared, according to which the rights of the consumer are protected, which even with the loss of a paper check can always prove the fact of purchase using its electronic duplicate.

Well, the main goal, according to financiers and lawyers, is to control cash flows and withdraw from the shadow of some segments of economic and civil legal relations (Appleman, 2016).

Indeed, now trading on the Internet should also be accompanied by the issuance of receipts, and due to the fact that information is immediately transmitted through the FDO to the IFTS server, all monetary transactions become transparent (Imanpour *et al.*, 2019).

The fiscal data operator is a new face in the financial world, a kind of intermediate link between the consumer, seller and tax authority. Any organization that has received permission from the Federal Tax Service to process information from cash desks connected to its information and electronic database can act as an operator. The current list of fiscal data operators can be found on the official website of the tax office.

This activity should be carried out by legal entities with technical equipment that allows real-time processing of each receipt, passed through the CRE. Moreover, all information arriving at the FDO server must be protected in a cryptographic manner and inaccessible to other persons.

Results

The transition to a new procedure for the use of cash registers is a large-scale task that has priority for the Russian economy, the fulfillment of this task is entrusted to the Federal Tax Service. The Federal Tax Service carries out registration actions, checks compliance with the laws of the Russian Federation on the use of cash registers, and carries out information work. At the same time, the

procedure for the delivery of cash registers from the manufacturer to the end user, the regulation of prices for it, the procedure for the maintenance of cash registers, which are complex electronic equipment, are practically not regulated by anyone, these issues were dealt with by the maintenance centers of cash registers, which have long occupied the field of application of cash registers. Entrepreneurial, technical experience and established contacts with users of cash registers which allowed the reform of the legislation of cash registers to go much easier than it could be. Almost nothing has changed for the user of cash registers from the service side - they go to the technical service center where they were previously serviced, which is also an agent authorized to conclude contracts on behalf of one of the fiscal operators.

After 01.07.2017, the first problems with logistics appeared - not all models of cash registers could be purchased by entrepreneurs in the regions, manufacturers could not provide existing cash registers with fiscal drives. At the end of 2017, entrepreneurs experienced a massive malfunction in cash register equipment related to its automatic update. A cash failure occurred on December 20, 2017, it was reported by retailers, gas station operators and fiscal data operators themselves. The reason is a software failure that disabled part of the online box office of the manufacturer "Shtrikh-M". According to some estimates, in particular, the Association of Internet-trading companies, retailers could receive about 10 billion rubles due to non-working cash registers. More serious losses were avoided by an explanation from the Federal Tax Service. After the notice of the biggest failure since the system was launched, the Federal Tax Service explained: organizations and individual entrepreneurs who have cash registers blocked can temporarily sell goods and services without registering cash, but then, when the equipment works, it will be necessary to draw up a cash register correction, to record unaccounted income.

Discussion

The possible problems of the transition to a new procedure for the use of cash registers of individual entrepreneurs, whose activities have always been exempted from the use of cash registers, but who are required (will be obliged) to use cash registers, are causing concern. This problem is not only psychological in nature, this category of entrepreneurs will incur expenses that they did not bear before - to pay for the services of fiscal data operators, purchase cash registers, purchase fiscal drives, purchase communication services, expenses related to training cashiers, etc.

In order to comply with the requirements of the law, the cashier must comply with the following rules:

- do not work during a power outage (otherwise the cash register will not have information for transfer to the tax authorities);
- if there is no connection with the FDO, it is possible to issue receipts only within 30 days, after this period the online cash register is blocked and it will need to be replaced;
- the seller must not leave the workplace if the cash register is in working condition and allow unauthorized persons to access it;
- the cashier is obliged to provide an electronic version of the receipt if the client provided a QR code from the FTS application or said his phone number or e-mail.

Thus, the legislation on the use of cash registers does not contain exceptions for entrepreneurs in case of technical failures with cash registers. There are no explanations about the use of cash registers at low temperatures (in open air outlets).

Starting from July 1, 2019, in addition to the listed details when purchasing in cash or using cards, representatives of organizations must indicate additional details: name of the buyer-client (legal entity or individual entrepreneur), TIN, information about the country of origin of the goods, excise tax amount, registration Number of customs declaration. This is indicated in paragraph 6.1 of Article

4.7 of Federal Law No. 54-FZ “On the Use of Cash Register Equipment in Settlements in the Russian Federation”. The seller must indicate these details if the buyer has presented a power of attorney on behalf of the legal entity.

The obligation to accept cash on incoming cash orders is set out in clause 13 of the Procedure for conducting cash transactions d.d. 22.09.93 No. 40, which is approved by the Central Bank of Russia. The procedure also established that a cash receipt voucher with the necessary signatures and details is issued on the receipt of money. This Order has not been canceled. For this reason, now, along with the cashier's receipt, sellers are obliged to issue to the buyer a cash receipt vousher. However, the law does not establish penalties if paragraph 13 above is violated. According to Art. 15.1 of the Code of Administrative Offenses imposing an administrative fine entails the following violations of the procedure for working with cash and cash transactions: - extrabudgetary cash settlements with counterparties; - incomplete recognition of the cash; - non-compliance with the procedure for storing free cash; - accumulation of cash in excess of the established limits. Non-receipt or incomplete recognition of cash is expressed in the fact that the sales revenue actually received is not reflected (not fully reflected) in the cash book. This means that the amount shown in the financial statements used by CRE exceeds the amount indicated in the cash book. Judicial practice also refers to this violation as untimely reflection in the cash book. In both cases, this is a violation of paragraphs 22 and 24 of the Procedure for conducting cash transactions. If cash is transferred through cash register, the amount of revenue per shift is present in the control tape and is recorded in the cash book in the same amount, then there are no violations of the Procedure.

The question is the universal access to the Internet at the place of installation of cash registers for transferring fiscal data by an entrepreneur, the adopted provisions on “hard-to-reach” and “remote” areas do not solve this systemic problem. Sales outlets can be located in buildings where there is no Internet, and the GSM-module of the cash register equipment will not be able to transmit fiscal data due to interference.

The degree of responsibility of legal entities and individuals for the non-use of cash registers, or the sale of goods, the performance of work or the provision of services in the absence of established information is determined by the Code of Administrative Offenses of the Russian Federation in accordance with Article 14.5.

First of all, the size of the sanctions is affected by the amount earned for the period of work without a new standard CRE.

The repeated commission of an administrative offense provided for in paragraph 2 of Article 14.5 of the Code of Administrative Offenses of the Russian Federation, if the amount of settlements made without the use of cash register equipment, amounted, in total, to one million rubles or more, shall entail disqualification of officials for period from one year to two years; in respect of individual entrepreneurs and legal entities - administrative suspension of activity for a period of up to ninety days.

It is not enough to correctly issue the receipts. Part 4 Article 14.5 of the Code of Administrative Offenses indicates that organizations that use non-conforming or incorrectly registered cash registers are held liable. The verification of the use of CRE is carried out exclusively by the tax authorities, guided by the administrative regulations (approved by Order of the Ministry of Finance of the Russian Federation of October 17, 2011 No. 132H).

Specialists of the federal tax service have the right to organize a scheduled inspection or randomly visit a sales outlet, if there are grounds for this, for example, a statement from the consumer.

Fines for individual entrepreneurs for non-use of CRE are set in the following amounts:

- work without an online cash register after a period established by law - 25-50% of revenue, but not less than 10,000 rubles;

– repeated violation, when the income for both times is from 1 million rub. and more - suspension of entrepreneurial activity for a period of 1 to 2 years.

The fine is also imposed for failure to provide information on time at the request of the tax inspectorate, failure to send the check to the buyer electronically, and failure to issue a paper copy of the check.

As explained by the Supreme Arbitration Court of the Russian Federation in the resolution of July 31, 2003 No. 16 "On some issues of the practice of applying administrative responsibility ..." when applying Art. 14.5 of the Code of Administrative Offenses of the Russian Federation, the courts must proceed from the fact that this article does not specify otherwise, that these persons are liable for officials. In this case, it is required to prove not only the fact of the commission of an illegal act by the entrepreneur, but also the presence of his guilt. Therefore, if it is confirmed that CRE was not applied due to the fault of the employee of the entrepreneur, and the employer himself took all measures to prevent the commission of illegal actions (inaction), then the penalty should be imposed on the employee but not on the businessman. Thus, it is in the interests of the employer to hire a competent, trained cash register employee, or to train an existing one.

There is also dissatisfaction with small businesses, which is amplified by the lack of law, the lack of clarification on significant issues. This is due to significant costs for the purchase of CRE (completion), installation and maintenance of new cash registers. For most small and medium-sized businesses, the cost of switching to online cash registers is quite substantial, and for some, it is not high. In general, the purchase of a new cash register with a fiscal drive, its installation, the services of telecom operators and fiscal data will cost the entrepreneur an average of 35,000 - 40,000 rubles. In the future, the annual maintenance of one cash register will cost about 10,000 rubles. When the fiscal drive expires, it will be necessary to pay for its replacement, an average of another 6,000 to 8,000 rubles. For micro-business, such loads are significant, which again entails some businessmen to go “off the radar”.

Conclusion

Most of the problems associated with the use of online cash registers in Russia are associated with the imperfection of the legal framework and the complex tax system (Dovbiy, 2017). Undoubtedly, the introduction of online cash registers allows us to strengthen tax administration, reduce the number of on-site inspections, thereby reducing government spending. The existence of special tax regimes, such as the patent system of taxation, a single tax on imputed income in this regard, becomes impractical both for the state and for small businesses. Small businesses can generally go off the radars, or go into the status of self-employed citizens (Barysheva, 2018). The main feature of this category of taxpayers is lightweight taxation and certain concessions in the use of cash registers. Self-employed citizens have the right not to use online cash registers. It can be concluded that the legal structure of small business will undergo significant changes. How simple the administration of such a changing structure of the tax system in Russia could be is another question (Osipova, 2018).

Thus, in order to assess the implementation of this reform with qualitative and quantitative indicators, the completeness of data from not only the tax authorities, but also a large-scale joint economic, sociological, statistical study of certain public and state institutions is necessary.

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Public Sector Project Office: From Information Repository to Coworking Center

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Abstract

The speed of project management growth of in Post-Soviet countries is ahead of technological and institutional changes. Today, the project management in government is becoming very trendy, and this entails both positive and negative consequences: project offices are created, but the regulatory legal framework for project management has not been created; management expects initiatives from citizens, but programs and projects traditionally descend from top to bottom; various information software products are used, but they are not integrated into a single national project management system, as a result of which tools for manual control of projects continue to dominate. There is a lack of understanding of the essence of the project approach at all levels of government, which is aimed not so much at creating project documentation or organizational structure as at predicting changes and benefiting from the results of changes. The article proposes to consider the project office in terms of public benefit: how public servants - project managers can manage changes with the active participation of citizens.

Keywords: Project Management, Public Administration, Project Office, Citizens.

Introduction

Digital technologies, like technical changes and other factors of economic development, are part of the growth process. However, according to the Nobel laureate D. North, the key to economic growth is the effective organization of the economy, i.e. an organizational factor that plays a more important role than the technical ones, since they lead to a change in institutions, which, in turn, have a significant impact on economic development (North, 1997).

With regard to public administration, the mission of which is to serve the people, institutions should not be created or changed on their own (this is not a startup in which the risks of failure are passed on to the owner or venture fund), but in response to a society's request, on the one hand, and global challenges development - on the other. For example, the development of IT technologies and the spread of the Internet has led to the creation of e-government in all countries, and the population's need for accessibility and transparency of information has led to an open government. The state has accumulated a demand for information as a means of political decision-making in the implementation of government programs, which led to the transformation of non-governmental structures into independent analytical organization, known as think tanks. Think tanks have become not only one of the forms of expression of public opinion, but also the nodal points of public policy, in which initiatives are formed to solve public problems in the course of mass communication.

Relevance of the Topic

The fourth industrial revolution requires the transformation of corporate and public administration institutions into project-oriented integrated structures with overlapping management functions on the one hand and the formation of autonomous teams with a high level of initiative, involvement and responsibility of employees and stakeholders on the other hand.

In corporations, the project-oriented business is due to increased competition based on time, acceleration of the product life cycle, and, consequently, a reduction in the total amount of net profit

received over the life period of the product. The creation of project offices in corporations is accompanied by the development of a rigid system of quantitative indicators for evaluating project activities, ranging from profit to ROI (return on investment).

In the public sector, project orientation is caused by the requirements of society for obtaining a quality product - public service and profit - the social effect of implemented programs and projects, increasing the customer focus of civil servants, minimizing hierarchical levels, the effectiveness of each unit and the personal responsibility of employees.

Available databases provide enough publications on the experience of preparing and transforming the organizational environment of project management of reputable professional managers. E. Larson and K. Gray (2011), A. Polkovnikov (2017), V. Voropaev and others (2014), Gergert D.V. (2019) explore the problems of evaluating the effectiveness of project offices in companies. However, the topic of the appropriateness of creating project offices in the public sector has not been sufficiently developed both in post-Soviet countries and abroad. Also, to date, there are no practices in the formation of autonomous temporary project teams in government agencies and measuring their effectiveness (Issenova, 2018, 2017).

The purpose of this study is to develop practical recommendations for the public sector on the creation of project offices focused on the benefits of citizens and other stakeholders.

Project office concept came to us, as usual, from international standards and experience in which the field of knowledge or the Organization process is described in details. The PMBOK (Project Management Body Of Knowledge, 6th edition) considers under such a body an organizational structure Project Management Office (PMO) that solves the problems of structuring project management processes, sharing resources, tools, methodology and methods (Project Management Institute, 2018). The standard allows for multiple options for the responsibility of project offices and types their structures: project management service; project management office; office of the project; project office.

The ISO 21500: 2012 (International Organization of Standardization) standard does not regulate the organization of a project management office, limiting itself to listing its possible functions: management, standardization, project management training, project planning and monitoring (International Organization for Standardization, 2012).

Organizations see a project office as a tool to increase coherence, efficiency, and better manage costs. “The project office helps to achieve a level of coordination that is difficult to achieve by simply managing projects well. It gives more clarity, focuses the company on strategies, and new opportunities for effective coordination of projects”- Margot Nack, PMP, Adobe Systems (Greengard, 2013).

Various models of project offices have appeared, for example:

The “chancellery”, “information repository” or “repository” model, in which the project management office or project office (hereinafter - PMO) serves to collect information about completed projects, accumulates experience and forms a knowledge base on projects for subsequent use. In fact, this is a kind of knowledge bank, an archive of reports and lessons learned on current projects in the organization.

Mentor, center of responsibility or manager model. This model is often found in companies with a large number of external projects, performing mediation and control functions. PMO is on a par with other functional units: planning and control of resources, schedules, project budgets, assessment of assumptions and risks (Kendall and Rollinz, 2009). If this model is used, project managers are employees of the PMO, and the project office manager is responsible for coordinating projects, results, costs.

The profit center model is the coordination of the actions of the main functional units.

The Ambulance model is a service center for answers to questions raised by project managers, curators, administrators, and other project participants in the company. The main task is to find and give the necessary information.

The analysis of models of project offices shows that a functional approach is used in their creation. For example, in government bodies of Russia, "functional", "basic", "supporting or managing" project offices are created as additional departments for ordinary administrative functions by ordinary employees who have basic programs and projects knowledge and experience: collecting data, following the general methodology, paperwork, coordination and control (Figure 1, Figure 2).

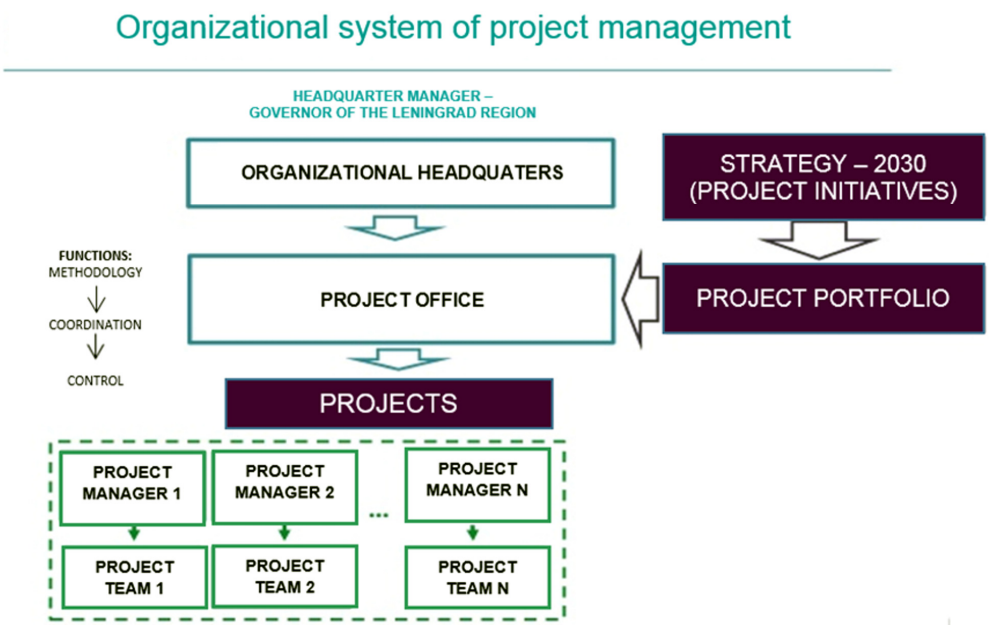

Fig. 1: Organizational structure of project management in the Leningrad region, Russian Federation (Voronov and Grineva, 2010)

Civil servants at their workplaces are implementing action plans for programs that are being lowered from ministries and are accountable for their implementation to management. Some subprograms are allocated to separate projects, or, as it is fashionable to call them, initiatives that also go down from the top, or are combined into other programs, which are also reported on, but to another management.

In Russia and Kazakhstan, PMO are headed by heads of state bodies, who, in accordance with their official duties, are already responsible for the implementation of programs, or authoritative leaders of public opinion, who perform, to a greater extent, the representative function.

An additional vertically hierarchical project management structure is being created in government bodies in the form of various add-ons: organizational and coordination headquarters, implementation headquarters, coordination offices, and offices for supporting the activities of project committees. New roles appear in the organizational structure of project offices: methodologists, specialists in the implementation and development of motivation, chief designers (Razumnyi, 2016), project curators, project office curators, curators - customers, etc. At the same time, Kazakhstan and Russia approved national standards for project management, which lack the above conceptual framework.

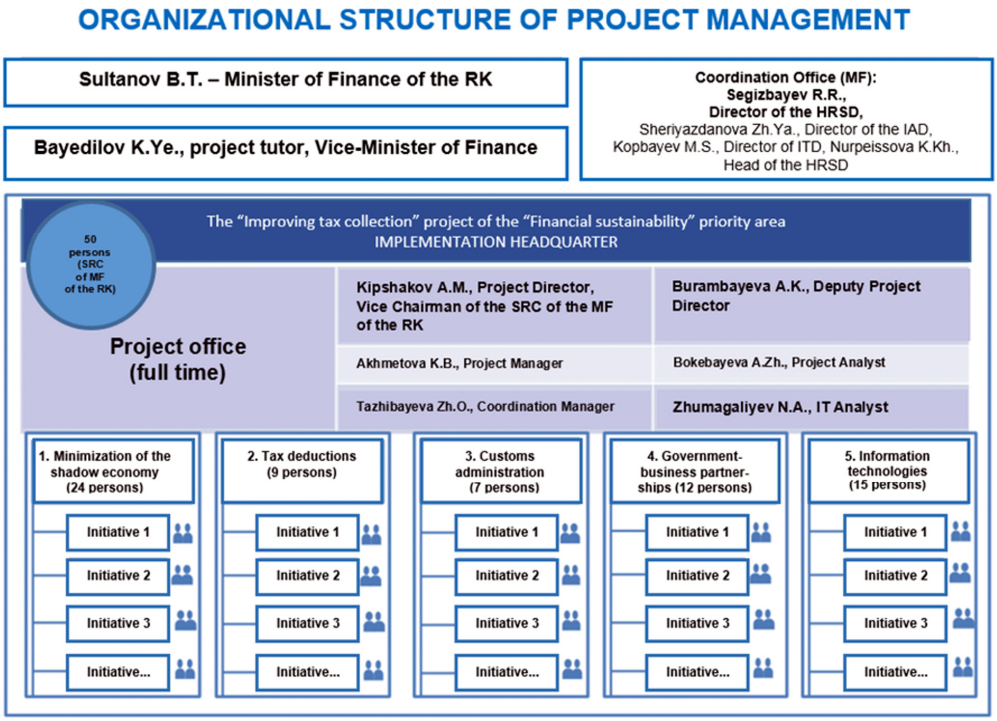

Fig. 2: Organizational structure of the Implementation Headquarter on the "Improving tax collection" project of the "Financial sustainability" cross-cutting area of the State Revenue Committee of the Ministry of Finance of the Republic of Kazakhstan (The Ministry of Finance of the Republic of Kazakhstan, 2017)

Funding for projects is carried out, like ten years ago, in the framework of budget programs. Financing of PMO as a structure is not provided, but due to the staffing limit, whole positions of civil servants are allocated who are seconded to the project office and are responsible for the development of project passports, schedule of events and reporting.

The motivation system for project teams and project offices does not facilitate the influx into the public sector of highly qualified certified project managers, for example, PMP (Project Manager Professional), PRINCE 2Practitoner. The current motivation system is clearly demonstrated by the head of the department of design and analytical work in the Belgorod region of the Russian Federation Irina Kirilova: "... the employee may not be distracted by the working hours of the project, he/she can do this at night or during vacation. People really do it. Their motivation: to participate in the project is an honor, it is a recognition of your expert qualities, it is also an opportunity to light up and get an opportunity for career growth" (Voronov and Grineva, 2010).

Thus, the appearance of implementing project management is created, in which the functions of the organization and the motivation system do not change.

World experience shows that project offices are created when signals from the community are received:

- low level of citizen's satisfaction;
- lack of projects transparency;
- significant discrepancies in project results.

It turns out a paradoxical situation: the society signals that there is no transparency in the projects, there are significant differences in the results of the projects, a low level of satisfaction of citizens, and in response: the methodology, compliance with the strategy, a service center for project managers, new structures and positions, etc.

Of course, all this is important: maintaining the methodology, matching the strategy, concentrating information, training employees and disseminating the project culture.

However, the purpose of the project office in the public sector, according to the author, is somewhat different.

According to the analysis of 157 difficult projects financed by the World Bank, A. Golan, director of the World Bank's Institute for Economic Development, sees the key problem of large infrastructure projects in the unclear definition of the roles of the customer, project manager and contractor and the lack of differentiation of responsibilities (Shestopalov, 2016). According to PwC, approximately 1/3 of all project offices in the world do not achieve the desired results (Greengard, 2013).

The author sees the main reason for the low efficiency of project offices in the traditional, functional approach to creating a project office. When deciding to create a project office, managers do not question themselves: What changes citizens are waiting for? How will the project office help to engage stakeholders, citizens in the development and implementation of programs and projects funded by taxpayers? How will the project office affect changes in the quality of public service delivery or the effectiveness of the state program? What is the contribution of the project office to achieving the goals of the organization's strategy in the face of constant change? What problems will it solve? Are there any means and resources for creating a project office? And most importantly, are there people who have the knowledge and skills of project management, a high level of emotional intelligence, who are able to think creatively and implement ideas into projects?

In the period from November - December 2018, April - May 2019, the author conducted surveys of 64 government officials in the branch of the Academy of Public Administration under the President of the Republic of Kazakhstan, 12 heads of non-governmental organizations and 8 representatives of social flax-vulnerable populations. The survey was preceded by training respondents in the basics of project management according to the standard ST RK 21500:2014 (national standard of the Republic of Kazakhstan).

According to civil servants, project offices today act as the next intermediate link in the hierarchy of government bodies, endowed with the function of collecting information on the achievement of only project results. This leads to duplication and complication of reporting, inefficient use of resources.

65% of civil servants and 98% of the leaders of non-governmental organizations and representatives of socially vulnerable groups noted that project offices should be accountable to the population.

The rural akims called one of the main obstacles to the implementation of project management in the public sector "lack of a single standard for project management", a different interpretation of the concepts "project", "results", and "benefits". For example, in the Law "On Public-Private Partnerships in the Republic of Kazakhstan", the concepts of "bottom line", "benefits", "stakeholders" are absent (Parliament of the Republic of Kazakhstan, 2015).

Representatives of non-governmental organizations and socially vulnerable groups of the population pointed to inter-agency disunity in the implementation of socially significant projects. Often, the same project is implemented by several government agencies, while allowing for blurring of goals, objectives and results.

Seven Insights Before Deciding to Create a Project Office

From the point of view of project management, the creation of a project office, like any organizational structure, is also a project. In accordance with the international standard ISO 21500:2012, which is selected as the only standard for use in government bodies of Post-Soviet countries, the first stage of the project life cycle is initiation. The CEO of IPA, the UK Government Project Office, Tony Meggs, considers the initiation phase to be the foundation of the project's future success (Infrastructure and Projects Authority, 2016).

But before deciding to initiate the creation of a project office in the public sector, an understanding of seven insights is needed.

The first key insight. Used by ISO, the term "project" (International Organization for Standardization, 2012) does not bind it to a unique practical result or to the customer, although, according to the author, any project is initiated to change what does not bring benefits and advantages to the organization in the ordinary course of business (Benefits implementation - BRM (International Organization for Standardization, 2012), and for citizens - a solution to the problem.

The ISO project aims to bring a new set of processes or new stakeholders or new resources to new practical results. Moreover, this practical result should be maximally efficiently implemented in operational activities within a certain time frame so that the organization receives benefits or a solution to the problem (International Organization for Standardization, 2012).

In Figure 3, the author shows a project management scheme in a government organization to achieve benefits through practical project results. Awareness of the problem, the formulation of goals for its solution and the receipt of benefits is carried out at the strategic level of the organization and transferred to the appropriate strategic level of the project. At this level, a decision is taken to initiate a project that is temporarily withdrawn from its core business. The interim project manager at the task level and the temporary project team (operational level), using a unique set of processes and resources, get a practical result and pass it on to the organization. It should be noted that the levels of organization and project management are identical.

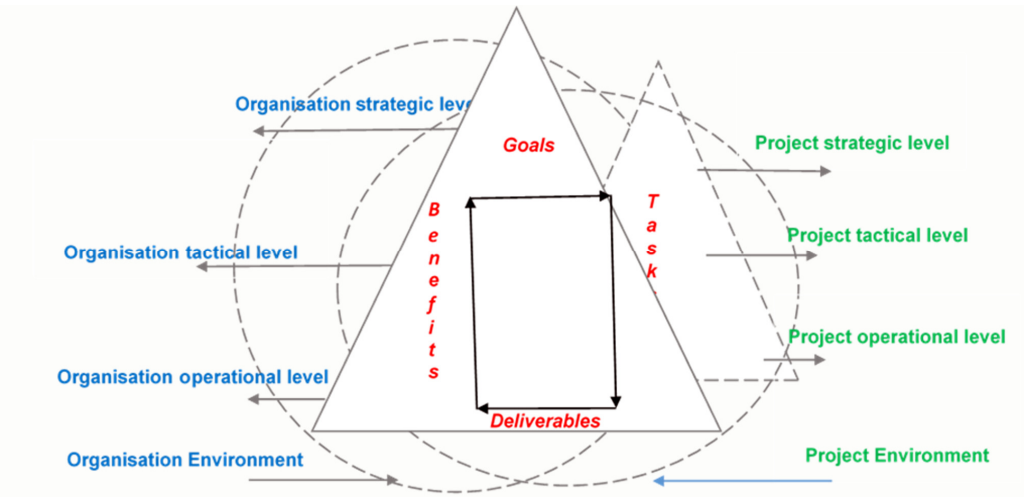

Fig. 3: Goals-tasks-result-project and Organization's benefits relationship (designed by author)

But the practical result of the project, even adopted by the customer organization, in the public sector is not a criterion for the success of the project. The value or success of the project is determined in the

post-project period, from the moment the organization receives benefits from operating activities in which the practical results of the project are tested and a specific problem is solved.

The author focuses on the external environment of the project, including stakeholders, which may temporarily not coincide with the environment of the organization. But this temporary environment significantly affects the goals, objectives and practical results of the project and the benefits of the organization.

The second insight. The organization is thinking about creating a project office from the moment of increasing the number of projects combined into programs and projects and, at the same time, expanding the environment of the organization and stakeholders. If the state body implements one project, then there is no need to create a project office.

Before deciding to create a project office, management should see a "big picture", i.e. place of the project, project office in the organization and its relationship with the external environment.

Unfortunately, in practice, often the authority of the project office is replaced by an external Project management - the strategic level of the project. The "project management office" in government bodies includes all project managers. Project managers report to the project office, which contradicts ISO 21500:2012.

In other government agencies, the PMO is located at the operational level (Figure 4).

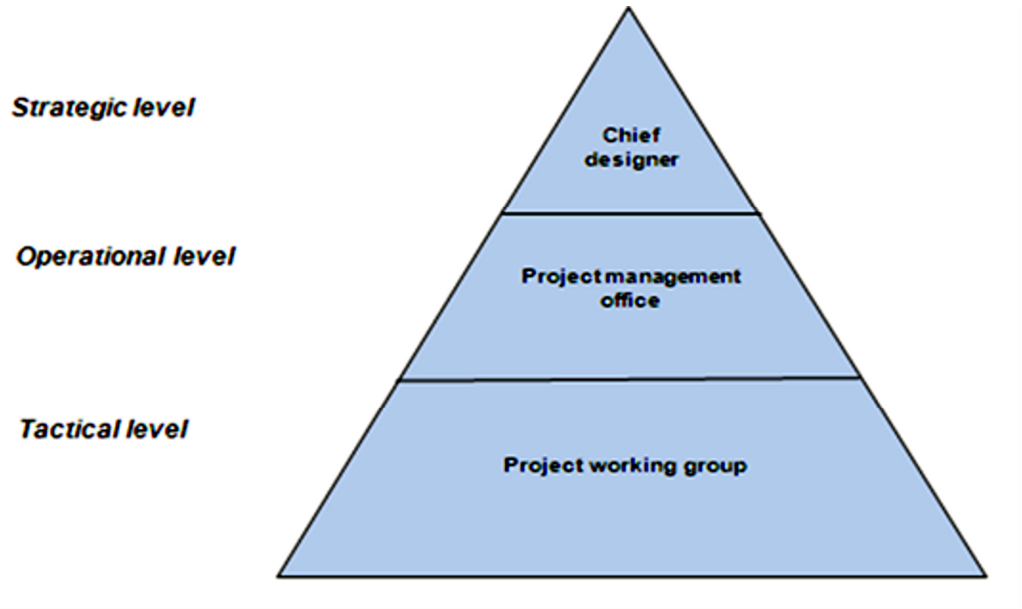

Figure 4: Project management model of the Administration of the Head of the Komi Republic and Komi Republic Government, the "Information Technologies Center" autonomous public institution, "Information Security Center" public budgetary institution of the Komi Republic (Boldyrev, 2011)

In the project management system (Figure 5), developed by A. Polkovnikov, there is no project office at all.

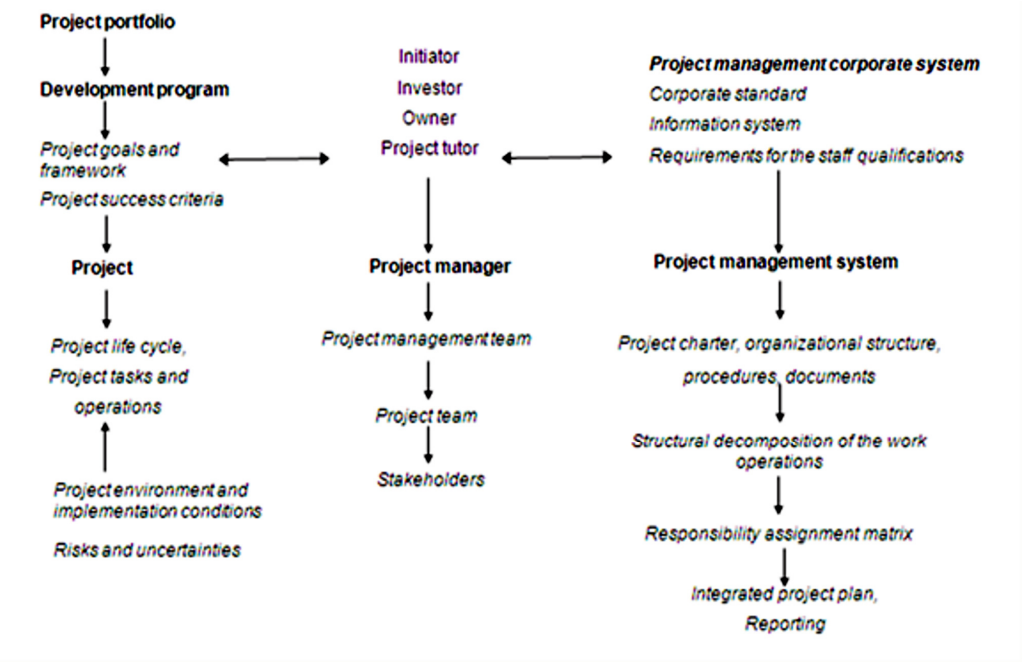

Fig. 5: Project management system (Polkovnikov, 2017)

This, according to the author, proves that the project office is considered as an auxiliary, secondary, providing unit, not included in the project environment (Project environment).

Such an understanding of the project office contradicts the management philosophy and all international project management standards.

In order to understand the place of the organization's project office, we use Figure 6.

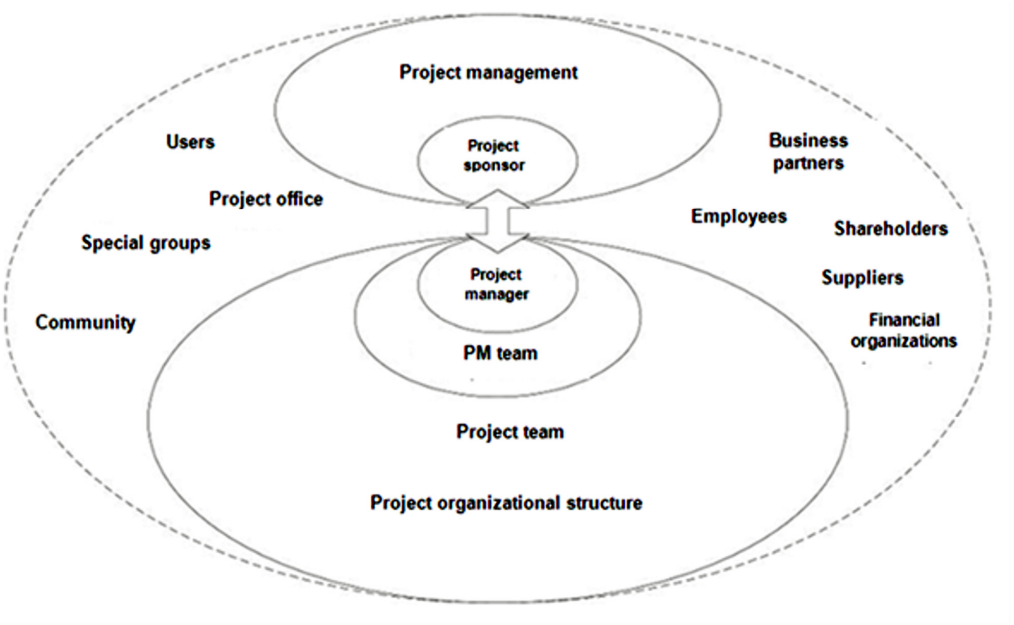

Fig. 6: Stakeholders and project organizational structure (Infrastructure and Projects Authority, 2016)

The ISO standard takes the project office out of the organizational structure of the project and puts it higher than the external management of the project, placing it on the same line with the project stakeholders. The place of the project office is symbolic next to users (beneficiaries), special groups and the public. This arrangement once again emphasizes the focus of the project on the expectations and problems of citizens, and not just the customer.

By the way, among the stakeholders of the project, ISO distinguishes the employees of the organization who are not included in the project or in the PMO. This is a very important remark, confirming the author's opinion that the project office goes beyond the organization, and therefore cannot be its structural unit. In addition, the environment of the PMO, as well as the environment of the project, is not necessarily the environment of the organization.

Due to the fact that the ISO standard does not describe the processes associated with program management, the project portfolio, the author offers his own vision of the place of the PMO and organization.

In Figure 7, the PMO is presented by the author in the form of a rectangle, emphasizing the absence of a vertical hierarchy in the project office, as well as its isolation from the tactical and operational level of the projects. The boundaries of the project office are indicated by a dotted line, which means the temporality of the organization.

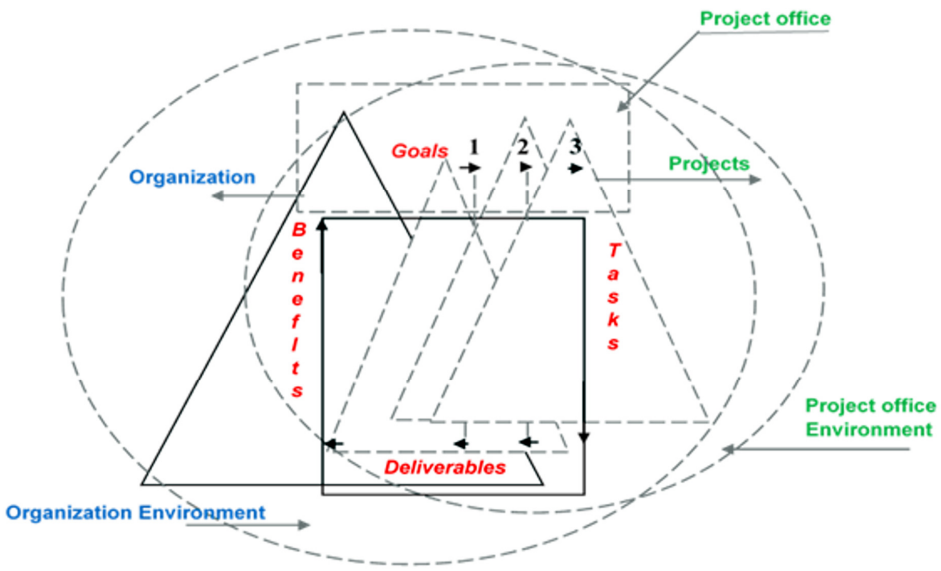

Fig. 7: Position of the Project office in the Organization (designed by author)

The PMO, according to the author, in the conditions of constant changes in the requirements of the external environment, customers and citizens is the link between the organization's leadership - the person responsible for the implementation of the program or portfolio of projects, the strategic management of the projects and everyone who is outside it.

Another question is what is the organizational form and legal status of the PMO. The status "division of a state institution" does not reflect the specifics of the PMO as a link between project teams, customers, contractors and ultimate beneficiaries.

In the era of the transformation of the vertical bureaucratic structure of state bodies into a project-oriented one based on horizontal connections (see page 2), the status of a PMO in the form of a coworking center is interesting. This is the center where expert groups representing all stakeholders, primarily citizens, evaluate projects from design to public benefits. This is the center where, in the framework of public consultations, civil servants listen and hear the problems of citizens, solving them together as partners. This is "think tanks" of the organization through which mass communication is carried out to solve a social problem.

PMO in the form of a coworking center will ensure earlier involvement of stake holders in the development and implementation of projects and consensus, both on the prioritization of projects, the main constraints, and the expected benefits.

The third insight. Before the creation of project offices, a full-fledged legal framework should be developed on the methodology of project management in the public sector. Roadmaps, headquarters, competitions, guidelines are not an appropriate basis for the implementation of project management and the creation of PMO in government agencies. Legislation should provide for the concepts of "temporary structure", "temporary public office" or "temporary technical position" and an appropriate system of remuneration and motivation. It is necessary to harmonize the legal base of project management with the current budget legislation in the field of public service and the national standard ISO 21500. This should be a single methodology without confusing the concepts and principles of other international standards and approaches in order to avoid double interpretation and enforcement.

The fourth insight. The information system of state bodies should be ready for integration with the information system of managing state programs and projects. There are examples of government agencies copying information systems of other countries that work according to international standards PRINCE 2, PMBOK or which are applications to other information systems, such as 1C - Accounting. Project management information systems operate autonomously, which is unacceptable in the conditions of transparency and accountability of public administration to citizens.

The fifth insight. The horizontal matrix structure of project management has nothing to do with the traditional vertical hierarchical structure. The organizational structure of the project office should not detract from the independence of project managers.

In Figure 8, the author shows that the PMO focuses only on the level of goals - the benefits of the organization, stakeholders and projects. The project office does not interfere with the activities of project managers, in turn, the organization's management does not interfere with the activities of the project office and does not control it.

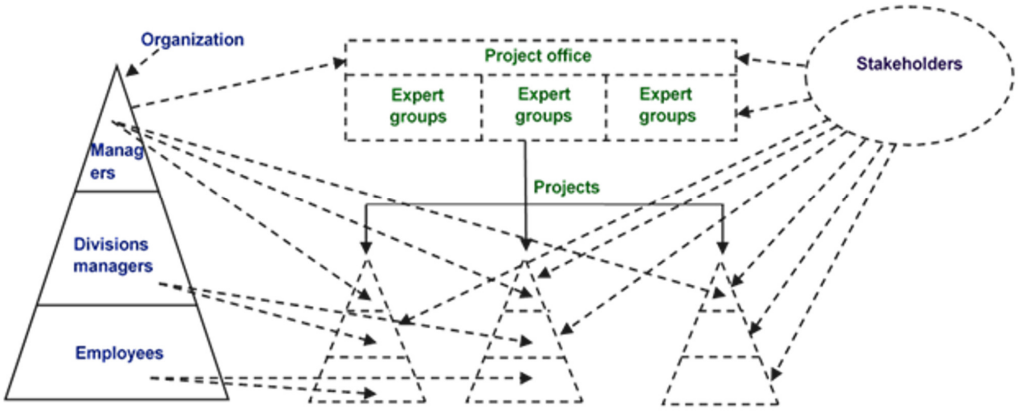

Fig. 8: Project office organizational structure (designed by author)

Many functions for developing a project management methodology, monitoring its compliance, benchmarking and implementing best practices, organizing training for civil servants and everyone involved in project management processes, the author recommends transferring, for example, to the Project Management Development Center of the Russian Academy of National Economy and public service under the President of the Russian Federation (RANEPA) or the Academy of Public Administration under the President of the Republic of Kazakhstan.

And monitoring the effectiveness of projects and financial audits should be outsourced.

A unified project management methodology, a unified information system, understanding of the project location and project office and its purpose will help to avoid bureaucratization of project management, managerial links and new roles that are not provided for by international standards.

A separate issue is the qualification requirements for the competence of civil servants working in project offices, as well as in project teams.

It is logical that when selecting candidates for the positions of the head of the PMO and experts, in addition to excellent knowledge of the national standard, best practices of project management, ownership of the information system, it is necessary to take into account the experience of developing and implementing successful government projects.

Sixth insight. Prior to initiating a project to create the PMO as part of the pre-project activity, an assessment is carried out of the opportunities provided by the strategy of the state body and the search

for the "bottleneck" (Goldrat and Koks, 2009), which prevents the organization from achieving strategic goals.

At the same time, there is a collection of requirements for the future PMO, which it should be from the point of view of legislation, the ISO national standard and stake holders: senior management, organization employees, partners, project customers and citizens. It is in the pre-project period that the author proposes to first develop a register of stake holders, and then an analysis of their needs and requirements. Prior to the initiation phase, the organization should have a clear idea of what the stake holders expect to see at the exit, do the objectives of the projects meet the expectations of citizens?

The next important step in the pre-project activity is the analysis and assessment of risks when creating a project office. The main goal of risk analysis is to minimize losses that may occur during the implementation of the project.

The pre-project period is completed by the development of a brief business case for the project to create a project office, for example, based on the cost-benefit analysis methodology. The entire set of sociological and economic methods is used to collect relevant information and calculations. At the same time, so-called public consultations with stake holders and citizens play a special role.

The seventh insight. The outsourcing of administrative functions of the classical models of project offices, the shift of the focus of attention to the expectations of stake holders, according to the author, will make it possible to concentrate the following functions in it:

- selection of projects based on regulatory impact assessment (Organisation for Economic Co-operation and Development, 2004);
- improvement or optimization of business processes for project management, repeated in several projects, or change in their relationship;
- optimizing the resources of several projects to achieve their effective use;
- involvement of new stakeholders in the projects based on the results of public consultations with the non-governmental sector and initiative groups of citizens;
- post-project monitoring: assessment of the benefits of implementing practical project results in operational activities for the organization and stakeholders.

Conclusions

Thus, a new approach to creating project offices as coworking centers with the participation of citizens, the main stakeholders, is the basis for transparency and accountability.

The project office in the public sector is an independent institution with the maximum participation of citizens and other stakeholders.

The project office is an integrated structure with overlapping management functions on the one hand, and autonomous teams with a high level of initiative, involvement and responsibility of professional employees and stakeholders on the other hand.

The functions of the project office should be aimed only at assessing the public benefit of the projects being implemented, which, in turn, is an assessment of the activities of the project office and the organization as a whole, increasing the confidence of citizens in the public sector.

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Social Responsibility as a Strategic Priority and the Key Pillar of Business Viability

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Abstract

This article contemplates on the conceptual and methodological fundamental framework for corporate social responsibility as an institutional innovation and the key pillar for enabling sustainable development of businesses. This paper analyzes the practices to create the corporate social responsibility (CSR) framework in Russia and explores the ways to set CSR standards and the mechanism for arm's-length evaluation and monitoring non-financial reporting in the country. The work also contemplates on regional-level efforts to bring about social welfare partnership schemes and the Russian business community's charity policies. The study concludes that social in-vestments by businesses constitute an efficient viability tool, and that the social responsibility concept is effective economically as a corporate viability driver.

Keywords: corporate social responsibility, business viability, social investments, social accountability of a business.

Introduction

In today's modern world, including Russia, businesses have consistently become more social-oriented and relevant, and implementing social responsibility programs and growing the corporate governance quality has become more of a priority for them. Contemporary businesses align their interests with other social actors as a key element of their competitive strategies. With the corporate social responsibility and the modern social relationships between employers and their employees, a new social and economic relationship framework has started to exist not only municipally, regionally and nationally, but also internationally, as it has reflected the global changes such as accelerated integration and the world going global. It is apparent that the more socially responsible a business is, the more economically viable it becomes.

As transaction costs have been constantly surging up due to the globalization of markets, growing numbers of stakeholders involved and tougher competition, such costs can be minimized by creating legal institutions for aligning interests between all key market actors, that is, businesses, state, and the people. Amid this backdrop, businesses have to assume the responsibility for many aspects of social development that are not even in the least directly associated with its operations, spanning environmental welfare and social programs in education, healthcare, occupational safety, culture, and sports).

As the rest of the world tends to do, Russian businesses have adopted social responsibility practices, which has become the determinant for choosing areas for and understanding the scale of balanced and efficient socially responsible investing. With pillar industries bouncing back after a deep downturn, with businesses set to use innovative ways of development, and with the government implementing

national projects, we can understand that studying the prerequisites for the development of corporate social responsibility, its role and avenues is essential and of immediate interest today.

As today's nation and its communities evolve, they face a growing number of risks and challenges, so the state is unable to handle social issues without a significant support from businesses and community organizations. As a Russian businessman and politician Vladimir Pligin told in his interview to the *Expert* magazine, "we cannot just believe that a socially-oriented state is here to rely on without doing anything to make this happen. We not just cannot do that. That would be really stupid to do that." (Gurova, 2018, p. 71). That is why, for the civil society to be able to operate soundly, it is essential that various institutions (including the business community) and community organizations and associations become more active socially and politically.

As experts note (Biryukova and Okhotnikov, 2018; Igumnov, 2012; Ostroukhova, 2012; Banket, 2014), businesses' becoming progressively more active socially is based on an extensive historical, social, and cultural background, and this process is induced not only from the side of companies and business organizations, but also from the side of the government and the society as a whole, which raises a question of mutual responsibility of the government, business community, and community organizations. To give rise to the process of distribution of social responsibility and to so create more degrees of freedom for the businesses, the balance between the government regulation and business activity needs to be clearly defined and to develop the mechanism for transferring the authority, and to ensure that the businesses are willing to take charge of solving multiple social challenges and have the professional capabilities for doing it.

This article explores this given topic along its specific purpose and objectives, because it is really vital for today's Russia to study, understand and overcome practical challenges in the field of creating the national corporate social responsibility system. The purpose of this work is to study the global academic narrative regarding the emergence and evolution of the corporate social responsibility concept and its application nationally in Russia. Thus, the objectives set are to study the essence, key underlying drivers, the prerequisites for CSR to start to exist, and the ways it affects the viability of national businesses; and also to analyze the national CSR standard-setting practices and the mechanisms for externally evaluating and monitoring the corporate social responsibility activities and reports in Russia.

Key Points

The corporate social responsibility phenomenon has long attracted the attention of social and political scientists and economists, with the book by an American economist Howard R. Bowen titled *Social Responsibilities of the Businessman* (1953) considered the foundation for the modern concept of corporate social responsibility. Howard Bowen originally defined corporate social responsibility as "the obligations of businessmen to pursue those policies, to make those decisions, or to follow those lines of action that are desirable in terms of the objectives and values of our society." (Igumnov, 2012, 5, p. 75).

Bowen's ideas were extended and revisited by Keith Davis and Robert Blomstrom. In the first edition of their Business and its Environment textbook, Keith Davis and Robert Blomstrom (1966) defined social responsibility by stating that "social responsibility is the obligation of decision-makers to take actions which protect and improve the welfare of society as a whole along with their own interests" (Banket, 2014, p. 69).

The libertarian economists and proponents of corporate egoism theory Milton Friedman and David R. Henderson (Henderson, 2003, p. 24-26) challenged the concept of the corporate social responsibility by arguing that if a business does not evade taxes, sets acceptable salary levels and complies with the occupational safety and environmental requirements, it is considered to be operating in good faith and so acts in a socially responsible way. The only responsibility of corporations is to maximize profits for stockholders. In his Capitalism and Freedom book (1962), Milton Friedman advocates that social responsibilities have to be assumed by individuals, and not by corporations. According to Milton

Friedman, the government actually makes corporations resolve social problems it should resolve itself by imposing the social responsibility concept (Friedman, 2006, 14, p. 157-160).

Over 1972 to 2002, J.D. Margulis and J.P. Wallish analyzed 127 research works exploring how corporate activities to promote social welfare are linked to corporate financial figures. And the analysis proved that such activities had positive impact in slightly more than in 50 percent of cases (Savchenko, 2009, p. 86), which evidences the efficiency of socially responsible investment and corporate social initiatives' effectively driving profits and contests Milton Friedman's idea that socially responsible activities "distort economic freedom" and that the government forces corporations to be socially responsible.

In September 2007, Grant Thornton polled more than 500 executives about what they think about the impact of the social corporate responsibility practices on their companies' business. According to the poll findings published by The Holmes Report, 75% of the respondents believed that socially responsible activities driver greater profits, 77% of them expect that the corporate social responsibility would be an important determinant for their business over the coming 7 years; and 68% of the people polled said they expected statutory environmental reporting to be introduced in 3 to 5 years to come (CSR, n. d.).

The pollees identified 3 key advantages of a socially responsible business: favorable public opinion; improved company-customer relationships; competitive strength for hiring talent, while 4 main hurdles to success of CSR programs were: focus on short-term outcomes, high CSR program costs, complex performances and ROI assessment, and absence of relevant background in terms of the corporate culture.

The poll by the Economist concerning if CSR affected business capitalization proved that the one was actually linked to the other. The opinion poll with more than 1,200 global major's executives interviewed was held in February 2008 and proved that the level of companies' social responsibility affected the value of its traded securities, with businesses that said they performed really well in terms of social responsibility reporting profits increase by 16% and equity price growth by up to 45%. Meanwhile, the companies with a reportedly weaker focus on the CSR said their profits rose by 7%, and their equity prices grew by 12% (CSR, n. d.).

For many people corporate social responsibility means sponsorship and charity. This idea is based on the ideas developed by economists advocating ethical (conditional) egoism (A. Smith, F.A. von Hayek et al.). The ultimate outcome of this approach is the argument that occasionally lower profits due to socially-oriented spending enables favorable social environment thus driving sustainable progress of the business, that is, being socially responsible is a good deal for a business that can so avoid the long-termprofitloss. By spending its money to finance social welfare and philanthropic programs, companies earn less in the short-term, but then affects a favorable social context to drive its future steady profits.

From the standpoint of socially responsible behavior, businesses enhance their social standing by running charitable and social programs. A proponent of this theory Joseph Galaskiewicz believes that the key factor of motivation for businesses is to gain a higher social status by gift-giving (Yakimets, 2004, p. 246-247).

The outcomes of the corporate social responsibility studies are logically coherent according to the conclusions made by a US economist and a pioneer of business-society interaction discussion Archie Carroll (Carroll, 1979), whose idea is to distinguish between four levels of social interaction (Figure 1): economic, legal, ethical, and philanthropic.

Fig. 1: Carroll pyramid of corporate social responsibility

If a business behaves in a socially responsible way at all of the four levels, it is considered a socially responsible one, which is achieved by inter-complementing the economic, legal, ethical and philanthropic responsibility.

In the end of 20th century, the *corporate* citizenship *concept* was developed. The term was coined by Howard Bowen and was later made part of the philanthropic responsibility level of the CSR pyramid by Archie Carroll. The corporate citizenship is thus the level of a business' social responsibility when its objective is to improve the quality of life and wellbeing in the communities where they operate while maintaining strong profits for the stakeholders. As noted by management study experts J. Longsdon and D. Wood, *corporate citizenship* is not about the relationships with stakeholders, but is about focusing on the challenges and needs of the local community where a business operates, often through charity. 'Corporate citizens' are companies that position themselves as 'good corporate citizens' (Igumnov, 2012, 5, p. 81) and perceive themselves as individual citizens in terms of social obligations.

Another noteworthy and offbeat approach is the 3P Model (People, Planet, Profit). As noted by Vera Ostroukhova in her study (Ostroukhova, 2012, p. 26), the model's 3 elements interact symbiotically all the time, and evolution an element triggers the evolution of the rest of them. The 3P model is also called triple bottom line (3BL, TBL) principle that is used as a corporate social accounting framework. Companies using the 3P model must cover economic, environmental and social aspects in their corporate social reports. The triple bottom line was introduced as a term in 1994 by John Elkington, the co-founder of Sustainability and a major CSR concept researcher.

Another foundation of the corporate social responsibility concept is the stakeholder theory. This theory became popular in the 1980s due to the works by American philosopher and professor of business administration R. Edward Freeman (Blagov, 2012, p.109-115). In this context, stakeholder means any individual, group or organization affecting decisions made by a firm or who are affected by such decisions, including the firm's employees (workforce), investors, stockholders, partners, consumers, public authorities, and non-government organizations. Businesses see the society and communities as a system of stakeholders groups that have their specific requirements and expectations with respect to a business. Therefore, companies have to find balance between the often conflicting expectations of stakeholders and their own interests.

Company-stakeholder relationships may be either direct or indirect. The company interacts with the society directly when it operates in order to derive profits by meeting consumer's needs as its key objective. The direct company-stakeholder relationships shape the strategies of businesses and illustrate the important role of stakeholders in the company's doing business. Direct stakeholders include the company's employees, stockholders, lenders, suppliers, rivals, and customers.

Secondary stakeholders are third parties (entities, groups or individuals) are interested in a company's activities, its business outcomes and performances, and how it affects the environment. The relationships between a business and indirect stakeholders stem from the company's main business operations. Indirect stakeholders include actors who directly or indirectly influence a business or are associated with it outside its core operations. Such indirect stakeholders include federal, national and local authorities, other countries' governments, activist groups, mass media, business promoter groups, general public, and local communities.

Indirect stakeholder relationships are no less important for the operations of a business that the direct ones. They are indirect not because they do not directly concern a business, but because they are caused by a company's main business. The interaction between the direct and indirect stakeholders triggers the stakeholder dialogue. On the one hand, the stakeholder dialogue model acknowledges the fundamental role a business plays as an economic contributor to the social welfare progress. While on the other hand, in a stakeholder dialogue, managers are expected to take decisions and actions benefitting the overall society and promoting the company's economic interests at the same time.

Today, most experts study corporate social responsibility in keeping with the fact that companies generally willingly seek to resolve most vital social challenges and to use their own resources to do that. It is acknowledged that corporate social responsibility concept virtually reflects companies' unenforced choice to contribute to improving social welfare and protecting environment. This understanding emphasizes the unenforced mature of the socially relevant activities taken by businesses.

Therefore, corporate social responsibility means all the obligations that companies' management are willing to assume obligations to pursue important in-house and external social programs that are created together with key stakeholders. By implementing the CSR practices, businesses are able to progress sustainably in a competitive market (by growing outputs, boosting products and/or services quality, etc.), to build a better reputation, shape their corporate identity, develop corporate brands, and to enhance partnership with the government, business partners, local communities, and civic institutions.

As businesses all over the world have adopted the CSR concept, harmonized CSR and CSR-related standards came to exist, either focusing considerably on the social security of employees or covering CSR aspect only. Today, the main regulation constituting global framework for corporate social responsibility is the UN Global Compact. In addition, it is recommended to use international business CSR review framework is constituted by principles, rules and CSR disclosure indicators developed by reputable international organizations.

Businesses use multiple formats to account for their CSR activities: first, reports created using their own formats; second, integrated London Benchmarking Group or Corporate Social Citizenship triple bottom-line reports or similar TBL reports; and, third, standard reports such as AA1000, SA8000, ISO 26000, GRI, etc.).

Corporate social responsibility accounting is business CSR reports containing comparable indicators, with specific figures verified by external auditors. In 1997, Global Reporting Initiative(GRI) was created by multiple corporations, non-government organizations, and UN agencies. The key idea of the GRI is that a company's CSR reports shall be based on the same principles as ordinary financial statements do.

In 2010, the International Organization for Standardization (ISO) as the world's leading international standard-setter, offered its understanding of the fundamental CSR principles and recommendations by issuing ISO 26000:2010 (Guidance on Social Responsibility). The standard guides the companies to integration of the social responsibility principles (transparency, accountability, ethical practices, etc.) into business processes covering all activities and management levels. So far, ISO 26000:2010 may be considered the basic corporate social responsibility standard. It offers guidance on the CSR underlying principles, key CSR topics and challenges, and the ways to integrate socially responsible behaviors into companies' strategies and practices.

Like in the Western countries, in today's Russia, non-financial (social) reporting is considered a very important tool for informing all the stakeholders about the companies' progress in acting to become sustainable, and to enable social welfare and environmental security. In Russia, the framework for the social accountability and socially responsible business practices was laid by launching the *Russian Business Culture* national program. *Doing Business in Russian* principles were created and multiple industry codes were adopted. In September 2000, professional ethics code was adopted by the Russian appraiser industry. And in July 2002, Code of Conduct and Business Ethics was adopted by Troika Dialog.

In December 2002, Russian Union of Industrialists and Entrepreneurs (RSPP) approved its Business and Corporate Ethics Charter (Social Responsibility Charter). As of January 01, 2020, the Social Responsibility Charter for Russian businesses was signed by 268companies and entities, together employing 7 million people (RSPP, n. d. b).

Over recent years, the RSPP has been developing regulations to provide guidance regarding corporate social responsibility practices. In 2005, RSPP issued the guidelines (recommended practices) for assessing the business performances and preparing non-financial reports called *Five Steps Towards Social Sustainability of Businesses*. As decided by the RSPP Management Board on June 21, 2006, National Registry of Non-Financial Reports was created, that was maintained since then in order to maintain a common national database of corporate non-financial reports (with reports available to stakeholders);to align, classify, bring together and share the non-financial reporting practices; to promote information transparency of businesses and further progress of voluntary non-financial reporting, and to offer information-based support to advertise socially responsible efforts on the part of the business community.

By January 01, 2020, the National Registry has featured non-financial reports from 186 companies and1,034records about the reports issued from 2000 to 2020, including environmental reports (88), social welfare action reports (361), sustainable development report (358), and integrated reports (RSPP, n. d. a).

The key aspects of Russian CSR reports are employee policies, charity, and regional development. Normally, it is major businesses who act as socially responsible investors financing public amenities. Such investments provide an appreciable long-term support across various fields and illustrate how businesses work together informally with the national government, as both big companies and the government work to balance their interests and responsibilities. A regulatory avenue for promoting CSR by the Russian government is issuing of regional SME development acts.

To illustrate this point, a number of regional acts may be cited focusing on mechanisms for socially relevant public-private partnership and charity policies. The examples include *Development of Small and Medium Businesses in the Vladimir Region* act (No. 90-OZ, dated October 07, 2010), with the key focus of this act being the partnership between the public authorities and businesses to encourage businesses to do charity and pursue sponsorship, and to support socially relevant efforts; *Social Responsibility of Businesses* bill (Yakutia) that primarily aims to establish the framework for regulating the social, economic and environmental interaction between public authorities, business communities, and local people. There are also other best CSR practices created regionally, including the *Guidelines for Assessing the Voluntary Corporate Social Responsibility Performances for the Saratov Region* (*Guidelines for Assessing the Voluntary Corporate Social Responsibility*

Performances for the Saratov Region, n. d.), settingout the methods used and the annual voluntary CSR performance rating procedure.

On March 15, 2013, GOST R ISO 26000:2012 national standard was adopted nationally in Russia after it was approved by the President of the Federal Agency for Technical Regulation and Metering (Order No. 1611-st. dated November 29, 2012). GOST R ISO 26000:2012 is harmonized with ISO 26000:2010 (Guidance on Social Responsibility). As mentioned above, the standard is aimed at integrating CSR principles into the business processes spanning all activities and management levels. Another step in this direction was made by the RSSP that offered to the business community the *Guidelines for Self-Assessment under ISO 26000*). And Sakhalin Energy was the first Russian company that implemented complete diagnostics and self-assessment of its business processes and operating performances across core areas of its socially responsible business practices using the ISO 26000 standard. After that, the company designed and implemented the action to improve its practices and management systems based on the ISO 26000 self-assessment.

The new CSR project conceived by the Russian Union of Industrialists and entrepreneurs is constructing of the corporate social responsibility index. Its purpose is to promote public corporate accountability and the tools for external assessment of socially responsible business practices, and to create a platform to enable continuous monitoring of the CSR developments. The index construction guidelines for *the Responsibility and Transparency* (‘Otvetstvennost' i otkrytost’’) and the *Sustainability Dimension* (‘Vektor ustoychivogo razvitiya’) indices were developed by the RSPP together with the European University in Saint Petersburg (RSPP, 2015).

To assess the performances and progress of businesses who are active in the field of charity, a joint project was created 11 years ago by Financial Donor Forum (association of major grantors operating in Russia), PricewaterhouseCoopers (PwC) and the *Vedomosti*, called *Corporate Charity Leaders* (Social Welfare Donors Forum, n. d.). The purpose of the project is to identify the best charity program practices and share the corporate charity information in the business and wider community.

The project is a major corporate charity rating project in Russia. Over 11 years, it was participated in by more than 250 Russian and international companies operating in Russia, with annual turnovers topping RUB100 million. One of the project’s aspects is the corporate charity assessment research that is based on a dedicated approach and produces the rating of companies covering only sector leaders having implemented dedicated charity frameworks and policies, complemented with the best corporate charity program contest. This approach enables companies not only to report the amounts of the money they have donated to finance charity efforts, but also to highlight their projects’ message and to showcase their mission, methods, expectations, and outcomes.

The facts explored prove that the CSR in Russia is evolving intensely. Businesses tend to move towards assuming greater amounts of social obligations (becoming more socially responsible) and adopting corporate accountability, where the national government makes such action legitimate and sets the CSR framework. Therefore, it is important to highlight that it is critical that such efforts are supported and promoted by the state. And the key priority here should be the ability of both the businesses and the government to attain real interests and benefits on an equal partner basis.

Conclusion

To conclude, the following takeaways may be made:

1. Social responsibility of businesses is perceived by modern Russian society as benefitting both the business and the society.

2. By acting in a socially responsible way, Russian companies become able to improve the management quality and boost their app for investors, thus enabling sustainability of Russian businesses in a competitive environment.

Though the resources Russian companies could bring to the table to resolve social issues has not been completely unlocked, it is apparent that businesses tend to act in a more socially responsible manner. At the same time, it is evident that with insufficient social responsibility framework, most of businesses are unable to fully use their socially relevant potential to achieve best results. Socially responsible businesses should be strategically and tactically aware that the economic operations and social efforts are complementary.

There are two critical aspect to highlight in this respect: first, the two dimensions (business and socially relevant efforts) need to be balanced as far as businesses own staff is concerned, while they need to be optimized at the same time as the business viability prerequisite, because business and social welfare directly impact the operating and financial performances of a business; second, the further evolution of a business is determined by how a company's business policies affect its CSR policies and vice versa. Ability to derive profit is a CSR principle for businesses, since no corporation can be socially responsible unless it is a profitable business.

As far as the legal framework is concerned, today's Russian business community is convinced (speaking unofficially) that "the more assets you get, the more opportunities you have". This means that while in the West private businesses are restricted by own regulations and does not interfere with the public sector, in Russia, national projects are if not privatized by businesses, but then significantly 'moderated' by them. A compelling proof of the negative impact of the model where businesses dominate the public sector that hurt the people, the state, and eventually businesses themselves, are the outcomes of the 1990s economic transformation in Russia.

Therefore, for Russia to be able to really become part of global community and to transform its economy in a fully viable system globally, it must, among other things, adopt a different relationship model. And a key element of such model is the corporate social responsibility of businesses and the regulatory framework to implement it. The corporate social responsibility obligations fails to be explicitly set out in the Russian Constitution. Such obligations may be deduced from the provisions saying that while each person may freely use its abilities, resources and assets in order to do business, Russia is a socially-oriented state, whose policy purports to bring about the environment fostering people's wellbeing and unrestricted development (Articles 7 and 34). So we can reasonably conclude that Russian lawmakers are responsible for creating a legal framework to promote the balance between the interests of businesses and Russian people.

From the standpoint of economic performance, all big and medium businesses need their socially-related policies revisited to enable active and sustainable adoption of socially-oriented model instead of the business-performance-driven one. They key overarching concept should be that boosting economic performances means growing the people's wellbeing as much as growing the people's wellbeing means boosting economic performances. Cheap workers cannot be efficient. And the low level of wellbeing hurdles national economy from progressing dynamically amid technological modernization.

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The Run-Up to The Economic Transformation of Poland

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Abstract

Poland faced unprecedented challenges after the disastrous Second World War. Between 1950 and the mid-1970s the communists managed to slightly narrow the huge gap between Poland and the US in terms of GDP per capita (PPP). In the subsequent 15 years the average growth was highly unsatisfactory. In the mid-term horizon the ambitious import substitution and export-led growth strategy proved to be a failure. The country overburdened by foreign debt was practically insolvent. As the reforms introduced by the communists lacked adequate impetus the country seemed ready to the systemic transformation. In certain spheres (such as relatively high share of the private sector) Poland was better prepared for this unprecedented undertaking.

Keywords: socialism, economic reform, the lost decade, the 1980s, Poland

Introduction

Poland is often perceived as a leader of both political and economic transition among the countries from the former Eastern Bloc. Indeed, the end of communism in Poland was famously announced on the main Polish news by a TV presenter Małgorzata Szczepkowska on 4 June 1989, hence five months before the fall of the Berlin wall (November 7 1989). During the very same day (June 4) partly democratic parliamentarian elections (35% upper limit for opposition in Sejm, i.e. Lower House) took place. Pro-democratic 'Solidarność' ('Solidarity') trade union and civic movement won 35% seats in Lower House and in Senate (Upper House) - with no upper limit for opposition - it won spectacular 99% of seats. In the first round of the elections (4 June 1989) candidates from 'Solidarity' won 160 seats in Lower House out of 161 seats which were available also for opposition (35% limit out of total 460 seats) and in completely democratic election for the Upper House (Senate) 92 seats out of total 100 seats. As noted by Dudek (2016) and Roszkowski (1992) 65% of seats (i.e. 299) in the Lower House were in advance granted to the members of communist party, two satelite parties (including peasant party) and three pro-governmental catholic organizations.

Earlier suggestions or preliminary arrangements between the communists and "Solidarity" were more favourable for democratic opposition: 60% of seats in the Lower House were reserved for communists and their allies, while 40% could be won in democratic elections by opposition (such as "Solidarity"). The deadlock was solved by surprising proposition by Aleksander Kwaśniewski (one of communist leaders from young generation): in exchange for government variant in the Lower House, elections to Senat were totally democratic (Dudek 2016: 28) (Terlecki, 2018: 271).

This peaceful turnaround towards democracy in Poland was preceded by the so-called Round Table meetings that started already on 6 February 1989. The Round Table documents were signed by the ruling communist party (with its small parliamentarian satellite parties) and the outside-parliamentarian, pro-democratic and newly re-legalized movement (trade union) 'Solidarity' on 5 April 1989. In fact, before and during Round Table talks a number of more cameral and informal negotiations between high rank communists, the trade union leaders and even clergy took place in Magdalenka (a village near Warsaw) were the representatives from opposition acknowledged that the future president will be general Jaruzelski - the undisputed communist leader since 18 October 1981 (i.e. just before the introduction of the martial law in December 1981). These talks in Magdalenka started already in September 1988.

For advocates, the Round Table is the symbol of sensible accord that started pro-democratic and bloodless political and socio-economic transformation towards free market and Western Europe. For opponents, it was a compromise that enabled smooth transformation of communist leaders into democratic politicians and led to the division and weakening of Solidarity movement in the 1990s. The constructed system, according to critics, was a combination of crony capitalism with 19th century version of capitalism characterised by high unemployment and brutal hyper-individualism.

Undoubtedly, Poland was a leader of pro-democratic movement in Central and East European countries in the late 1980s. In Hungary the end of communist ruling was announced on 23 October 1989 which was also the consequence of the round table negotiations. The beginning of the demolition of the Berlin Wall started on 9 November 1989, while the uprising against Romanian dictator Nicolae Cauşescu broke out on 16 December 1989.

Poland's early leadership, however, had its price: partly democratic elections and legitimisation of communist elite. The bulk of communist crimes remained unpunished. Lech Wałęsa – the symbol of the pro-democratic change and the Peace Nobel Prize winner – replaced Wojciech Jaruzelski and became first democratically elected president on 9 December 1990. Once in office Wałęsa seemed to postpone first democratic parliamentarian elections (Zaremba 2010: 103) which finally took place on 27 October 1991 - i.e. more than 2 years and 4 months after partly democratic, contract elections. To put it into perspective the aforementioned agreement reached during the Hungarian round table in October 1989 directly led to free elections in March 1990. Therefore, "the country "jumped" directly into democracy [...] and Hungarians avoided any form of pseudo-democracy or government of national unity" (Žídek 2014: 57). Interestingly, also in the Czechoslovakia the political changes were much faster and more decisive than in Poland. Already on 29 December 1989 (i.e. only one month after the Velvet Revolution) Vaclav Havel became the 10th President of Czechoslovakia. In contrast, Wałęsa had to wait almost one year to be elected President of the Republic of Poland. By no means communist elite was well prepared for the change of the system.

The turnout in first wholly democratic parliamentary election after the fall of communism in Poland on 27 October 1991 was surprisingly low and amounted only to 43.2%. By contrast, the turnout during parliamentarian elections in 1922 amounted to 67.7%, while in the following elections it reached 78.3% (Dudek 2016: 183). Again, Poland was one of the last post-communist countries to conduct wholly democratic parliamentary election. Certainly, it was a clear sign of failure of young democratic system and all political class (Dudek 2016:183-184). Those that did not take part in the elections were mainly: less educated, young, with low income and indifferent attitude to religion, living in small towns and villages (Markowski 1992). The most passive voters constituted of people that suffered most during transformation and those who did not believe that the election could change their fate (Dudek 2016: 184).

The misery of the late 1970s and 1980s

This seemingly peaceful and bloodless transformation was not that easy to achieve. Poland was the biggest (in terms of population and area) satellite country of the former Soviet Union. Both Hungary and Czechoslovakia (the country peacefully split into the Czech Republic and Slovak Republic on 1 January 1993) could boast higher standard of living and better connection with the West European countries. East Germany was not only more developed but also received massive financial support from West Germany especially in the 1990s.

This backwardness even in comparison with a number of former socialist neighbours was partly the consequence of Polish tragic history. It is worth noting that for 123 years (1795-1918) Poland lost its independence and was split into three neighbouring countries. Already in 1920 the newly independent country managed to defeat Soviet army in the Warsaw battle and then 19 years later it was invaded by Nazi Germany (1 September 1939) and Soviet Union (17 September 1939). During the Second World War Poland lost the highest percentage of its population i.e. 20%. In the case of Yugoslavia it was 11.7%, USSR - 8.9%, Greece - 6.8%, Austria - 5.7%, Germany - 5% (Zawistowski 2010, p. 185). The overall losses were much greater because of the territorial changes and emigration. In consequence, the population declined from 35 million in 1939 to less than 24 million, i.e. by about

34% of its pre-war population (Eisler 2018: 73). As the consequence of the Second World War a third of Polish city dwellers were dead. The country lost over 50% of lawyers, 40% of doctors, one third of university professors and catholic priests, many government administration workers, military officers, sportspersons, artists, secondary school teachers, journalists and engineers. Among killed intelligentsia by Third Reich substantial part comprised of assimilated Polish Jews (Kotkin, Gross:103). In fact, the Polish intelligentsia were exterminated by both totalitarian regimes: Third Reich (Sonderaktion Krakau, AB Action and many other murders were committed especially in west and central former Polish territories) and the Soviet Union (for example the murder of nearly 15 thousand, Polish, mostly higher rank POW and civil servants in Katyń and other places).

Population of Poland returned to its pre-war level as late as mid 1980s. In addition, the country lost 20% of its territory as eastern part of the country was taken over by the Soviet Union. A number of Polish cities were also massively ruined. In some cases loses amounted to 70-80 percent as in the case of Warsaw, Wrocław, Gdańsk and many others. In July 1945 it was estimated that out of 30017 industrial factories more than 60% were completely or partly destroyed (Landau, 1985; Skodlarski, 2000). The situation in villages was also miserable where 22% of the farmhouses were either destroyed or damaged, the livestock of horses declined by 57%, cattle by 67% and pigs by 83% (Eisler 2018: 74). Eisler (2018: 73) also notes that the national income declined by about 60% and the total costs of the destruction during the war was nearly thirteen times greater than the level of national income in 1938.

Undoubtedly, the new communist regime in Poland faced dramatic socio-economic challenges. According to OECD database and Maddison (2003) Poland's GDP growth per capita between 1950 and 1990 was modest especially in comparison with some West European countries (table 1).

Table 1: GDP per capita (1990 International dollars) and GDP dynamics 1950-1990 (1950 = 100)

	1950	**1989**	**1950-1990**
Poland	2447	5684	232
Czechoslovakia	3501	8768	250
USSR	2841	7098	250
Sweden	6739	17593	261
Denmark	6943	18261	263
UK	6939	16414	273
Hungary	2480	6903	278
Netherlands	5996	16695	278
Belgium	5462	16744	307
Ireland	3453	10880	315
France	5271	17730	336
Finland	4253	16946	398
Austria	3706	16369	442
Italy	3502	15969	456
Portugal	2086	10372	497
Greece	1915	10086	527
Spain	2189	11582	529

Source: János Kornai (2006: 23) based on OECD database and Maddison (2003).

The centrally planned Polish economy under the so-called real socialism underwent several crises. Janusz Beksiak (1984) identified the following four ones: 1953/1954-1956, 1962-1963, 1970 and 1975/1976-1984. This is very much consistent with the classification provided by Zbigniew Landau (1995) who divides the the Communist rule in Poland into four periods

Generally, in the second half of the 1970s and 1980s there was an ongoing economic crisis characterised by lack of goods in shops, long queues, economic stagnation and pessimism in the society. Mass demonstrations that broke out in June 1976 in Radom, Ursus and to lesser extent in Płock against the planned increase of prices were brutally pacified by special militia troops. Protest were particularly vocal in the province were living conditions and wages were lower than in the capital. This is contrary to common perception that communist or real socialist countries focus on even development of the whole country. It could be argued that the changes of the administrative division of Poland that came into force in June 1975, i.e. the introduction of 49 instead of 22 (including five separated cities) voivodeships was an effort to limit the widening gap between the centre and the periphery. Nevertheless, the protests of 1976 were a clear sign of crack in the government's economic policy led by progressive leader of Polish communist party (i.e. first secretary) Edward Gierek (December 1970- September 1980) whose ascent to power was in big part the consequence of mass protests in December 1970 (the so called wydarzenia grudniowe) in the Pomerania region. These protests were brutally pacified: during the massacre over forty people get killed and about one thousand were seriously wounded (Dobrowolski 2018: 20). The turmoil was fuelled by the planned increase of administered prices. It was an untimely move as it shortly preceded Christmas. During the fourteen-year-long rule of Władysław Gomułka such operation was conducted for the third time. K. Modzelewski (2013: 222) illustrates it by providing data on the price movement of an ordinary sausage per kilo which was perceived as the most strategic good at that time: in the first case in 1959 its price was lifted from 18 zł to 26 zł, in the second in 1967 from 26 zł to 36 zł and the third attempt which proved unsuccessful the prices were supposed to increase from 36 zł to 42 zł. Generally, meat was dubbed the strategic good. Its real availability to the clients and low prices functioned as a barometer of the social climate – by not increasing prices of meat and its by-products the government "bought" the social peace (Eisler 2018: 273). However, it does not necessarily mean that the demands of the Polish society were exaggerated. At that time the government conducted the policy of the restraint of wages. In the second part of the 1960s the real wage growth in Poland which stood at 1-2% annually was practically indiscernible for the society and was markedly lower than in other Eastern Bloc countries where it amounted to 2.4% in Hungary, 3% in USSR, 3.5% in Czechoslovakia and 4.1% in Bulgaria (Eisler 2018: 275). J. Eisler (2018: 275) also notes that the situation in Poland was getting worse as the annual real wage dynamics declined from about 3.5% in 1966 to 2.5% in 1968 and only 1.5% annual growth in 1969-1970. Taking into account the data provided by J. Eisler the crude average annual growth in Poland was slightly above the range of 1-2% and amounted to 2.25% in 1966-1970.

After the strike in Łódź the new leader (E. Gierek) finally decided to back down from the planned increase, what according to K. Modzelewski (2013: 222) blocked the already malfunctioning mechanism of price adjustment to the market equilibrium. Hence, the problem of shortages, instead of being resolved only gained momentum.

E. Gierek took on foreign credit in order to modernise heavy, chemical and car industry, residential building, transport infrastructure and cooperative farming. However, this investment boom ended up with shortages of basic goods. Putting of price increases at a time of high wage growth and several poor harvests (1974-1980) and floods (1977 and 1979) contributed to serious economic imbalances, especially in the food market. The scheduled price hike of many goods in June 1976 led to the acute social protests. It was estimated that in 1980 meat and chocolate stocks could cover 75% of demand, margarine could be bought by 79% of the people and cheese by 80% (Zawistowski: 207).

It needs to be stressed that economic policy conducted in the 1970s was also shaped by the demographic situation. At that time massive number (about 700 thousand) of post World War II baby boomers were entering the labour market every year what exerted unprecedented pressure on limited possibilities of university education, as well as access to own housing and desired social and employment positions (Adamski 2014: 30). Kabaj (2016: 210-211) claims that at that time (i.e.

1970s) Poland faced a danger of 2-3 million unemployment. Certainly, the communist party wanted to defuse this demographic bomb by increased investment and production of consumer goods (especially consumer durable goods). There was also a speed up of construction of residential housing.

In the 1970s the economic ties with the West were intensified. The symbol of opening up to the West was the deal with Italy to introduce mass production of Fiats in Poland). These efforts to avert the looming crisis proved unsuccessful. According to IFiS PAN in 1980 still almost 50% of workers at the age of 30 and above were waiting for their own apartments and the queue was even lengthening (Adamski 2014: 30). Nevertheless, E. Gierek's plan to increase employment was successful (in total about 2.5-3 mln jobs were created) (Kabaj 2016: 212).

Part of the government's success in the labour market was the consequence of the channelling relatively small amount of money from large central investment into development of small extensive projects in industry, handicraft and services. Thanks to this shift it was possible to create 20 jobs instead of one in spectacular capital intensive mega-projects (Kabaj 2016: 211).

However, with time this communist achievement proved counterproductive. Assuming the objectivity of central statistical office (GUS) the was a spectacular growth of excess demand for labour, especially in the 1980s. Indeed, numerous evidence even in the popular discourse at that time point to growing absenteeism and falling commitment to work, especially in these sectors of industry which were too small to receive special treatment from the central government. This also applies to cooperative sector with also relatively low wages.

Table 2: Excess demand in the Polish labour market (ration of vacancies to job-seekers) in 1978-1989

1978	**1979**	**1980**	**1981**	**1982**	**1983**
10.2	20	9.8	4.6	27.5	46.8
1984	**1985**	**1986**	**1987**	**1988**	**1989**
52.4	66.5	57.6	44.5	86.8	90.1

Source: data from GUS presented by Kramer (1995: 77).

Surprisingly, it took place when investment to GDP ratio markedly decreased in comparison with the previous decade. Part of the explanation of this phenomenon was substantial increase in private entrepreneurship already in the 1980s and post-martial law wave of emigration to the West.

Growing openness to the West in the 1970s together with favourable situation in the labour marked (despite growing working age population) led to the mounting dissatisfaction with the poor access to consumer goods. The year 1980 is famous for the so-called carnival of "Solidarity" – in August 1980 almost 300 factories were on general strike that covered all Pomerania region. Finally, on November 10 1980 the statute of this independent trade union was officially registered. It is worth mentioning that USSR had it own carnival at that time as it organized Olympic Games in Moscow in summer 1980. The cost of the games were quite substantial as they were held in several soviet cities and included building a road between Moscow and Minsk (which is currently the capital of Belarus). The trade in the Eastern Block was conducted in artificial (not market) prices and the partners (unofficially) accused one another of propping up terms of trade. In particular, the USSR authorities claimed that they cheaply sell commodities (especially crude oil and gas) to satellite countries (Orłowski 2010:113). The satellite countries, in turn, argued that they sell industrial products below market prices to the USSR (especially in relation to the input of components purchased for hard currency from Western countries). Orłowski (2010: 113) claims that there is no way to resolve this disagreement, however he acknowledges that there are solid grounds based on (Brus 1986) to claim that USSR used its dominant position (advantageous terms of trade) in relation with satellite countries in the 1950s. In fact, cancelation of any payment claims (the so called "zero option") between Poland and Soviet Union in the early 1990s was possible thanks to the Polish specialist

working at Centralny Urząd Planowania (CUP) who proved that the prices of Soviet gas imported by Poland many times exceeded the global market prices (Ancyparowicz :237).

Poland's hopes of political and socio-economic transformation initiated by massive popularity of "Solidarity" in 1980 was preceded by the spectacular choice of Polish archbishop from Cracow to become the new Pope in 1978. This optimism markedly faded with an assassination attempt on John Paul II in May 1981 and the introduction of the martial law (13 December 1981 - 22 July 1983) by the communist leader – general Jaruzelski. In consequence, sanctions were imposed on Poland through credit and export restrictions and the suspension of the MFN (most favoured nation) clause (Lavigne 2018: 3173). According to Śleszyński (2018: 56) "after martial law a quarter of people with higher education left Poland what made an enormous hole in the human capital as the number of tertiary students at that time was relatively low and the people with a master's degree constituted absolute intellectual and technical elite."

The ending of the martial law did not stop persecutions of the pro-democratic opposition. For example, the year 1984 was tragically marked by assassination of charismatic and very popular chaplain of industry workers Jerzy Popiełuszko by communist internal secret service. Mysterious deaths or disappearances of pro-democratically oriented people (including priests) occurred as late as 1989, hence shortly before the Round Table talks. Priests Stanisław Suchowolec and Stefan Niedzielak were murdered in 1989 (Błażejowska 2019: 8) (Woroszylski 2019: 155)

Macroeconomic indicators point to dramatic worsening of the situation in the country, especially in the early 1980s. Between 1980 and 1983 the national income produced decreased by 12.4%, while total investment outlays plunged by 25.1%, both figures in constant prices (see table).

Table 3: National income and investment outlays in Poland (constant prices) (1950 = 100)

	1946	**1950**	**1960**	**1970**	**1980**	**1983**
National income produced	56.8	**100**	207.5	373.8	632.1	553.5
National income produced per capita	59.5	**100**	174.2	285.3	441.5	377.7
Total investment outlays	41.8	**100**	259.6	531	1000	749
Including investment outlays in the public sector	24.2	**100**	249	526.9	1000	702.8
Investment outlays per capita	43.3	**100**	217.9	405.2	714	508.4

Source: GUS and Marcinkowski (1987: 619-620).

In the mid 1980s the economic situation got worse also in the Soviet Union. Already in March 1985 young reformist Mikhail Gorbachev became the general secretary of Communist Party of USSR. It was partly the consequence of President Reagan's Star Wars initiative (which was supposed to show that USSR cannot keep pace with the US in expensive and technologically advanced arms race). As put forward by Hanson (2014: 191) Soviet Union started to have difficulties in crude oil production in 1985 and there was also a decline in world oil prices in 1986.

While in Poland (net oil importer) food rationing was partly abandoned in 1986. Positive changes in global crude oil prices did not markedly prop up the Polish economy. The economic stagnation was not only the consequence of inefficient central planning.

The country desperately needed hard currency in order to service its foreign debt that greatly increased during the era of E. Gierek. There is a clear parallel between Poland and Latin American countries that were also caught in a debt trap in the 1980s.

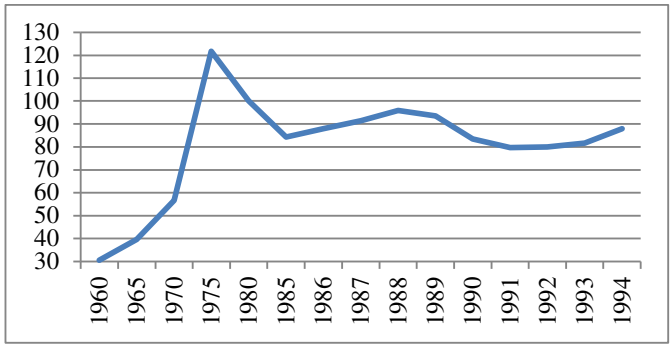

Fig. 1: Investment outlays (constant prices) (1980=100) in Poland

Source: GUS

Hence, ambitious import substitution industrialization strategy conducted by a number of developing countries reached a dead end. For example, import substitution industrialization in Argentina was conducted in 1950-1976 with an average annual growth rate of 3.5 (Amico, Fiorito 2014: 216). Export oriented strategy of growth in Poland was a failure. According to Dariusz Ledworowski (2014) the looming debt trap was visible from the beginning by the professor Witold Trzeciakowski and some of his colleagues from Institute of Economic Cycles and Prices (Instytut Koniunktur i Cen). It quickly turned out that the economy opened up to import and there was a lack of export promoting elements (Ledworowski 2014).

According to Witold Bień (1984), the economic woes originated from payment imbalance rather than the sheer size of the debt. Export denominated in hard currency was too low in comparison with the size of the debt. In 1980-1981 "the total indebtedness of the USSR and Eastern Europe combined exceeded USD 80 billion, more than four times its level of the end of 1974" (Lavigne 2018: 3174). Debt per capita in Poland was almost half of that in Mexico and Brazil and more than 50 percent lower than in Chile, but its debt to export ratio was alarmingly high (table 2).

Table 4: Debt (in hard currency) and export (in hard currency) in 1982 of selected countries

	Debt as of end of 1982 (bn USD)	Export of goods in 1982 (bn USD)	Debt to export ratio (%)	Debt per capita (USD)
Poland	**24.8**	**5**	**496**	**681**
Yugoslavia	18.3	5.9	319	832
East Germany	11.3	8	141	677
Romania	9.4	6.2	152	418
Hungary	7.5	4.9	153	701
Mexico	87	21	414	1222
Brazil	85.2	20.2	422	672
Argentina	36.5	7.6	480	1285
Philipines	24.5	5	490	471
Turkey	22.3	5.7	391	472
Chile	17.2	3.7	465	1470

Source: compiled by W. Bień (1984). Based on: Morgan International data, February 1984; Rocznik Statystyczny GUS, 1983; Die Wirtschaft der Rgw - Länder 1982/1983.

Since February 1981 Poland was neither servicing its debt owned by governments from Western countries nor guaranteed by these governments but was still servicing it in relation with private banks (Gomułka 2016, p. 104). The moratorium on debt servicing preceded the introduction of the martial law by 10 months. Hence, the development of anti-communist "Solidarity" movement was partly the consequence of mounting socio-economic problems in the late 1970s and early 1980s.

The economic stagnation in Poland and many other net oil-importers from the Eastern Block also sprang from the dramatic increase of crude oil prices especially during the second oil crisis in late 1970s. When the prices collapsed in 1984-1985 the oil-rich Soviet Union caught the "Polish disease" as it was forced to take on credit from capitalists to satisfy desires of their own consumers (Kotkin, Gross: 38). To be more precise, crude oil prices – after their spectacular jump from 13.20 USD/bbl in November 1978 to their peak of 40.75 USD/bbl in November 1979 (the second oil shock) – were in the downward trend. In January 1986 price lowered to 24.68 USD/bbl and then dropped to 9.62 USD in July 1986 (figure 2).

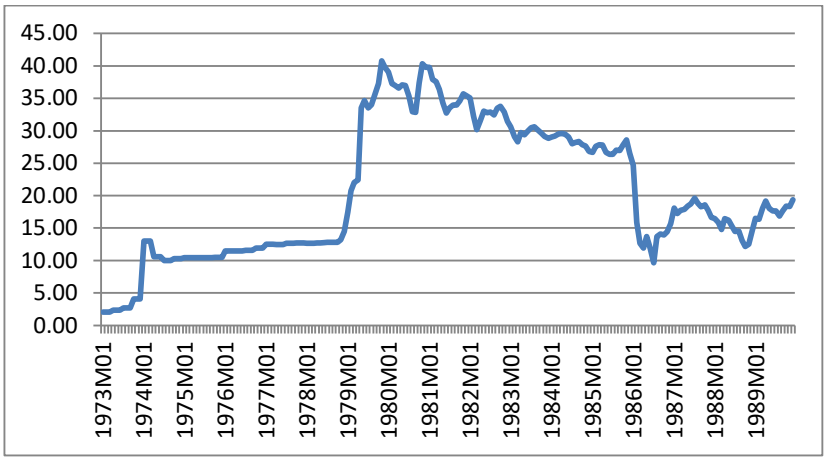

Fig 2. Crude oil, average (USD/bbl) (monthly prices in nominal US dollars)

Source: World Bank

Of course, the rising costs of servicing debt were also the direct consequence of highly restrictive monetary policy conducted by Paul Volcker (the chairman of Fed) in the first half of 1980s (his policy started already in October 1979). It is estimated that the 60% appreciation of USD between 1980-1985 led to the reduction of 1.8 million jobs in the US (Levinson 1992: 43-44), but also deepened the insolvency crisis in a number of highly indebted developing countries in Latin America and Central and Eastern Europe. It needs to be stressed that USD also strengthened against West European currencies. For example, since the end of 1979 till February 1985 total appreciation of USD against German Mark amounted to 47.9% (Krugman et al. 2018: 381).

The economic situation of Poland was particularly difficult as the bulk of its debt was denominated in hard currency (including USD) (table 5).

Table 5: Indebtedness* of Poland in the years 1960-1990

	Debt to first payment area (million transfer roubles)	Debt to second payment area (million USD)
1960	432	690
1970	604	1077
1980	1450	24128
1990	5100	48500

** Including overdue interest payments* *Source: Historia Polski w liczbach. Handel (1995: 191)*

The country needed to strengthen its ties with international financial institutions. In late 1981 (a couple of days before the introduction of martial law on December 13 1981) the country applied to re-access the IMF. It was rather an empty gesture as, according to some historians from IPN, the preparation to introduce the martial law lasted almost one year. Because of the sanctions, Poland was admitted to the IMF much later in 1985 (Polska transformacja, 2014).

Undoubtedly, the 1980s was a lost decade for Poland. The new calculations conducted by ZBSE (i.e. Zakład Badań Statystyczno-Ekonomicznych – a unit within Polish Statistical Office and Polish Academy of Sciences directed by prof. L. Zienkowski) revised downward the level of average annual growth in the 1980s to mere 0.8% (Nowy szacunek 1999). In 1989 Poland, a country rich with arable land, received food support from West European countries. Yet according to GUS problems with debt slightly eased, i.e. debt denominated in currencies of socialist countries decreased by 100 million roubles from December 1988 to the end of May 1989, while the debt denominated in currencies of capitalist countries fell because of the USD movements against other hard currencies from 39.2 bn USD at the end of 1988 to 36.9 bn USD at the end of May 1989. This debt markedly increased to 48.5 bn USD in 1990.

To put it into perspective, according to data collected by Roszkowski (2008: 120) the gross sovereign debt of Eastern bloc countries in 1989 amounted to: 9 billion USD in Bulgaria, 5.1 billion in Czechoslovakia, 20.6 billion USD in East Germany, 39.9 billion USD in Poland, 1.4 billion in Romania, 20.6 billion USD in Hungary and 48.3 billion in the Soviet Union. It is clear that more adequate relative measures of sovereign debt (such as debt per capita and debt to GDP ratio) reached the highest levels in Hungary and Poland.

Summary

This rather murky picture of socio-economic situation in the late 1970s and 1980s could be brightened by several positive developments. The tragic crisis in the 1980s reined in conspicuous investment projects which would prove not profitable in the new capitalist system. In this regard, the situation in Poland was better than in several other former Soviet satellite countries which continued their investment boom in the 1980s. The intensification of investment in Poland in the 1970s partly defused demographic problems (caused by baby boom generation entering the labour market). Certain free market reforms were also initiated at that time. According to Kołodko (2001) "the reforms of the 1970s and 1980s significantly influenced later transformation. Thanks to these reforms – despite conceptual mistakes and errors during implementation at the beginning of the 1990s – the duration of the recession was rather short (...) and certain market mechanisms started functioning earlier than in other post-socialist economies which had not made an effort to reform earlier, as in the case of Czechoslovakia and Bulgaria." Communists tried several times to reform the system. For example, the second phase of reform was introduced in Autumn 1987 and included rather deep and qualitative changes of the economic system (Wilczyński 1996: 22). Socialism (centrally planned economy) was not homogenous. Different countries implemented different versions of this system (Swadźba 2019: 24-25). The system also underwent different phases within one country.

Despite much effort the economic situation in Poland was worse than in Hungary and Czechoslovakia. The consumer goods market in Poland was overstretched and not well prepared for growing demand caused by baby boom generation. At the same time, it is worth noting that many other Central and East European countries had similar demographic situation. Also gains from investment projects were unsatisfactory. The export led growth strategy was not functioning good enough. At the same time, rather modest spending on centrally planned investment projects in the 1980s, coupled with relatively high share of the private sector (family-owned farms, small family business), better prepared Poland for economic transformation. Yet, the introduction of the martial law in December 1982 further deepened the economic, social and political crisis. Hopes for democracy and economic stability proved illusory. These hopes were raised again in 1989.

Doubtless, the study of the final years or even months of communist ruling should be continued. This especially applies to the countries (such as Poland) with surging inflation. To acquire broader perspective it is indispensable to conduct detailed comparative studies of Eastern Bloc economies in this pivotal time.

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The Role Industry 4.0 Tools in Preventing Supply Chain Disruptions – Framework and Future Research Directions

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Abstract

Contemporary management of global supply chains takes place in conditions of permanently increasing uncertainty and a relatively high risk of disturbances occurring in supply chains. This paper describes nine pillars of the Industry 4.0. In addition, this work addresses the very important, according to the authors, topic of interrupting the continuity of processes flow implemented in modern supply chains. Verifying the hypothesis formulated in this article the authors of this paper indicated potential influence of Industry 4.0 tools, as well as their usage, on particular supply chain disruptions. Furthermore, as part of this article the authors pointed out main Industry 4.0 tools implementation of which enables levelling of interference arising at individual stages along the smiling curve. This paper is the basis for the development a framework for future research focusing on the methodology of selecting Industry 4.0 tools, the usage of which could be helpful in preventing supply chain from breakage, or compensate for its effects, caused by a crisis situations (currently an example is a coronavirus pandemic).

Keywords: Supply Chain disruptions, Industry 4.0, Smiling Curve

Introduction

Global supply chains are changing constantly. These changes are forced by the need to meet different expectations and needs of locally dispersed clients. Customers whose satisfaction is the most important factor conditioning the way processes are implemented in the supply chain.

The effectiveness of the supply chain is conditioned by the ability to not only adapt products and/or services to customer requirements, but also the ability to anticipate their needs before the recipient demonstrates a requisition for a given product or service. The wider and the longer the supply chain is, the more difficult it becomes to respond to the changing needs of customers and fulfil their requirements. Continuous communication between supply chain partners becomes a key element, regardless of the range and the length of the given supply chain. Hence the continuous exchange of data, providing by the usage of intelligent, digital solutions can contribute to increasing the effectiveness of processes and more effective response to consumer requirements, especially in crisis situations, such as the current coronavirus pandemic.

The purpose of this article is to investigate the research problem related to disturbances occurring in all phases of the supply chain and the possibility of using Industry 4.0 tools to prevent the appearance of disturbances and to compensate for the effects of existing problems.

The authors of this article have formulated the hypothesis that Industry 4.0 tools have the potential to prevent and also enable quick response to disturbances that may appear in particular phases of the supply chain.

According to the authors, Industry 4.0 and its impact on supply chains, often also called Smart Supply Chains, continues to be an area that requires a number of studies to be provided that the authors would like to address, as part of developing this topic. The results of future research will enable the development of mechanisms of using the tools supporting the increase in the efficiency of processes pursued as part of the flow of products and services through subsequent links of the chain regarding preventing Smart Supply Chains from disruption.

Industry 4.0

The term Industry 4.0 was first used in Germany in 2011 (Kosacka-Olejnik and Pitakaso, 2019). Industry 4.0 is a concept that combines digital technologies and automated as well as autonomous tools and solutions that allow many companies to exceed the process efficiency barrier achieved so far by them and even open up to the unlimited possibilities of processes implemented by Smart Factories (Venkateswaran, 2020). Industry 4.0 is a concept based on the digital transformation of processes implemented both along and across the value chain (Ellefsen et al., 2019).

When defining Industry 4.0, reference should be made to the key elements underlying the concept. Industry 4.0 includes (Rojko, 2017):

- Cyber-Physical Systems (CPS),
- Internet of Things (IoT),
- Information and Communications Technologies (ICT).

In addition, it is very important to also remember about elements regarding Industry 4.0 such as Big Data, Cloud Computing or Process Simulation (Tay et al., 2018).

CPS integrates both physical objects such as machines, devices, but also Smart Products with their users enabling both people and autonomous machines to communicate with each other in real time. Data flow between system components is possible thanks to Internet of Things, which provides the possibility of autonomous data exchange between system components, which does not require the initiation of information flow by users (people), nor is it dependent on human who mans the machine (Frank, Dalenogare and Ayala, 2019).

The authors of this article define Industry 4.0 by referring to nine pillars listed, among others, by Alcácer V. and Cruz-Machado V. (2019).

These dimensions of Industry 4.0 will be used to determine which tools of the 4th Industrial Revolution can be used to prevent supply chain from disruptions in each of its phases and how they can be used to compensate for the effects of problems arising in the supply chain.

The first pillar of Industry 4.0 is the Industrial Internet of Things (Alcácer and Cruz-Machado, 2019). The main assumption of IIoT is to ensure a permanent connection with all elements as well as users of CPS for continuous exchange of data in real time. IIoT enables production machines to acquire key data for the process for analysis as well as self-learning activities and becoming more intelligent devices. Machines equipped with appropriate sensors are able to independently download data or obtain them in a different way, e.g. from other machines organized within the same CPS or also system users (people). What is also very important, the sensors can be installed in both new and used machines (Majeed and Rupasinghe, 2017).

Due to the growing number of data that is generated every day by users and machines the use of existing tools becomes ineffective and makes it barely impossible to make independent, effective decisions. Big Data are tools based on advanced algorithms used for automatic and autonomous data collection,

storage and processing to support decisions made inside the entire supply chain. Data analysed using advanced intelligent algorithms allow decisions to be made to ensure that the purposes set by the supply chain are gained (Szymańska, Adamczak and Cyplik, 2017).

Cloud Computing enables the development of enterprise functionalities integrated within the supply chain, providing them the continuous real-time access to data collected by Big Data tools or licensed software for supply chain's process management which is not physically installed in the company's IT environment. Thanks to the possibility of using functionalities located in the cloud, managed by a specific group of software providers, the systems become practically maintenance-free in terms of IT and hardware, allowing also small companies access to cloud solutions that were previously unattainable due to the high costs (Oztemel and Gursev, 2020).

Process simulation is another important tool used in Industry 4.0. The simulation makes it possible to reflect a system, e.g. a factory, in a virtual way to identify all activities that do not add value. Process analysis carried out as part of the simulation enables identifying activities ensuring the increase in the efficiency of the activities carried out, improving the quality of the processes or services offered and reducing the operating time. The simulation also results in lowering process costs or increasing the quality of created products (Alcácer and Cruz-Machado, 2019).

Augmented Reality connects the virtual world with the real one, supporting the processes performed so far with innovative technologies, which results in reducing the time of processes implementation, lowering costs and minimizing the number of errors. AR allows not only to increase the efficiency of processes, but also allows you to implement activities related to predictive maintenance (Tay et al., 2018).

The next pillar of Industry 4.0 is Autonomous Robots capable of communicating with each other and making autonomous decisions that do not require human intervention. When talking about Autonomous Robots, Artificial Intelligence should also be mentioned, thanks to which machines are becoming more intelligent, much more flexible in terms of adapting to customer requirements and guaranteeing increased process efficiency and reduced costs (Oztemel and Gursev, 2020).

Additive Manufacturing, including spatial manufacturing technologies, is another important aspect of Industry 4.0. AM assumes a departure from traditional methods produced as a result of the use of rapid production technology based on computer models, which allows to significantly reduce the long-term design and prototyping phase of products and thus reduce production time and costs of the manufacturing process. An example of the use of Additive Manufacturing can be 3D printers or digital manufacturing (Schöning, 2018).

The eighth pillar of Industry 4.0 is the Horizontal and Vertical System Integration allowing continuous flow of information and material stream both inside factories and links located on the same layer of the chain as well as subsequent links in the process. In addition, horizontal and vertical integration assumes the possibility of product tracking throughout the entire life cycle, i.e. from the moment of collecting production raw materials through the production, distribution phase to the final recipient as well as monitoring of products used by the customer (end-to-end). The use of system integration also contributes to reducing the differences between successive stages of processes implemented within the supply chain, including reverse logistics and product decommissioning (Alcácer and Cruz-Machado, 2019).

The last pillar of Industry 4.0 is Cybersecurity, which is an intelligent solution for securing the system that collects huge amounts of data against hacker attacks, data theft and also inappropriate, often unconscious, use of the system by employees. Ensuring security with such a high level of integration and sharing sensitive data is a key role in the development of Industry 4.0 (Schöning, 2018).

Transformation of supply chains in the context of shaping added value and its resistance to interference

A characteristic feature of global supply chains is undoubtedly the fragmentation of their production, manifested, inter alia, in the transfer of its individual works, but not people performing them, to countries offering mainly cheaper materials and lower labour costs. This phenomenon, or even a process, is somewhat simplified by the smiling curve (shown in Figure 1 based on United States International Trade Commission, 2010, p. 2-4 and OECD, 2013, p. 214), which presents the share in the added value of individual activities along the global value chain.

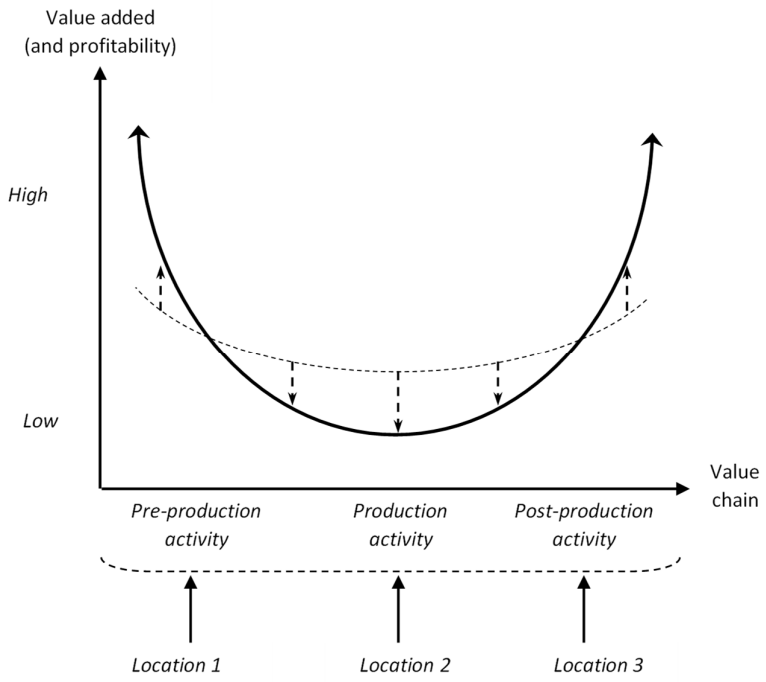

Fig. 1: Smiling curve and offshoring phenomenon

The description of the smile curve three main phases are distinguished: pre-production activity (including research and development, project development, design), production activity and post-production activity (including sales and distribution, marketing, services). Each of these aggregated phases reflects a contribution to creating added value along the global value chain, which is high at first, then falls and increases again. Shape of this curve resembles the "U" letter (United States International Trade Commission, 2010; OECD, 2013).

In the era of observed disruptions in global supply chains (among others caused not only by a pandemic), there are premises to suppose that some global supply chains will start to break away from their links, transferring production activity back to the home country. In this case the authors are talking about the opposite tendency to offshoring, which is reshoring. Reshoring means return of previously transferred works, but not transferring people who are responsible for performing the process, due to the significant cost increase in the traditional low-cost countries (LCC).

Industry 4.0 as a tool preventing supply chain from disruptions

By analysing the literature related to the main reasons for the interruption of the supply chain, the authors of this article attempted to consider the most likely areas of implementation of Industry 4.0 tools to prevent supply chain interruption and compensation of its effects.

G. Wieteska in her publication indicates the areas which, in relation to processes implemented in the supply chains are most exposed to the appearance of distortions that may cause its interruption (Wieteska, 2018):

- supply logistics,
- production process,
- production logistics,
- order management for individual and institutional clients as well as distribution logistics.

Furthermore, analysing the considerations presented in the publications (Ivanov, Dolgui and Sokolov 2018; Alcácer and Cruz-Machado, 2019), the authors of this article have noticed the impact of Industry 4.0 tools on the possibility of preventing disruptions in individual phases of the supply chain.
Based on the nine pillars of Industry 4.0 and their characteristics, the authors assigned the tools of the Fourth Industrial

Revolution to the identified disturbances of supply chain due to indicate their likely impact on emerging disturbances application (Ivanov, Dolgui and Sokolov 2018; Alcácer and Cruz-Machado, 2019). The impact of Industry 4.0 tools on supply chain disruptions refers to both the ability to counteract existing problems and to compensate for the effects of emerging disruptions, adding value to this paper. Industry 4.0 tools have been assigned to selected disturbances that may occur in particular phases of the supply chain. These tools are divided into three categories (preventive, responding to the effects of disruption or preventive and responding to the effects of disruption) due to their likely impact on the resulting interference. In addition, the authors indicated the recommended application of specific tools, the use of which can lead to prevention or rapid response to disturbances that may arise in each phase of the supply chain. The authors' considerations are presented in the Tables 1-4.

Table 1: The impact of Industry 4.0 tools on supply chain disruptions in the supply phase

DISRUPTION CATEGORY	INDUSTRY 4.0 TOOLS	TOOL INFLUENCE ON SC DISRUPTION	RECOMMENDED USAGE OF TOOLS
Delays in supplies	IoT	Responding to the effects of disruption	Input data for load tracking and optimal route selection
	Big Data and Cloud Computing	Responding to the effects of disruption	Real-time data access from any place on Earth enabling verification which partner will be able to complete the process without delay
Failure to meet quality standards for raw materials	Big Data and Cloud Computing	Responding to the effects of disruption	Supports the quality control process based on analysis of customer needs and accepted quality standards
	Augmented Reality	Preventive	Identification of defective product components; instructions for the process of quality control

DISRUPTION CATEGORY	INDUSTRY 4.0 TOOLS	TOOL INFLUENCE ON SC DISRUPTION	RECOMMENDED USAGE OF TOOLS
Lack of real-time access to information about the next link production plans, which may result in a unavailability of resources capable of covering demand	Horizontal and Vertical Systems Integration	Preventive	Product life cycle analysis enriched with the ability to control during its use by the customer (end-to-end integration)
	Big Data and Cloud Computing	Preventive	Predictive analysis of the manufacturer's needs
	IoT	Preventive	Ability to connect supplier and recipient systems to identify real raw material needs; real-time product traceability
	Cybersecurity	Preventive	Secure two-way information flow between supplier and manufacturer
Raw materials prices fluctuations	Big Data and Cloud Computing	Responding to the effects of disruption	Real-time access to offers enables choosing the best supplier in terms of defined criteria
Errors in quantities of raw materials orders/supplies received	Big Data	Preventive	The use of predictive analysis to optimize the size of orders placed
Excessive stock	IoT	Responding to the effects of disruption/Preventive	The use of predictive analysis to optimize the level of inventory - reducing excess by inventory sharing within supply chain partners
	Big Data and Cloud Computing		
	Cybersecurity		
No availability of production raw materials	Big Data and Cloud Computing	Responding to the effects of disruption	The use of tools to locate potential suppliers, analysis of needs and their inventory levels to secure the continuity of process flow in the supply chain
Fluctuations and variability of demand	Big Data and Cloud Computing	Preventive	Predicting fluctuations in demand, creating forecasts that guarantee the link protection against demand volatility or its effects
	Additive Manufacturing	Responding to the effects of disruption	Producing missing components using 3D printing in unit production

Table 2: The impact of Industry 4.0 tools on supply chain disruptions in the production phase

DISRUPTION CATEGORY	INDUSTRY 4.0 TOOLS	TOOL INFLUENCE ON SC DISRUPTION	RECOMMENDED USAGE OF TOOLS
Low flexibility level in products adjusted to customers' needs and requirements	Additive Manufacturing	Preventive	Using 3D printing to produce products that meet the needs of customers by significant shortening the design and prototyping phase
	Autonomous Robots	Preventive	Intelligent robots able to select the appropriate parameters of production processes to adapt the product to the needs of customers
	Simulation	Preventive	Supports the production of items based on the process model used to verify the correct selection of process parameters, machine and product settings, shortening the production cycle
Machines breakdowns	IIoT	Preventive	The machine is able to identify the causes of failure and prevent them e.g. by reporting and sending diagnostic data
	Augmented Reality	Responding to the effects of disruption	Machine failure does not require a service call - an employee with the right tool will be able to locate the fault and repair it as soon as possible
	Autonomous Robots	Preventive	Machines that do not require operator control use IIoT to communicate with an employee or service in the matter of the need to perform a review
	Simulation	Responding to the effects of disruption	Simulation of failure compensation (analysis of available solutions and selection of the optimal option)
No availability of production raw materials	Big Data and Cloud Computing	Preventive/Responding to the effects of disruption	Access to information on suppliers' inventory, in the absence of the possibility of ordering a fine amount of raw materials, the tool will allow to react early enough and find another source of supply
	Cybersecurity		
	Horizontal and Vertical Systems Integration	Responding to the effects of disruption	Full integration of all links in the supply chain - compensation of deficiencies by other supply chain partners
	Additive Manufacturing	Responding to the effects of disruption	Producing missing components using 3D printing, especially in unit production

DISRUPTION CATEGORY	INDUSTRY 4.0 TOOLS	TOOL INFLUENCE ON SC DISRUPTION	RECOMMENDED USAGE OF TOOLS
Demand fluctuations due to changing customers' requirements	Big Data and Cloud Computing	Preventive	Predicting fluctuations in demand, creating forecasts that guarantee the link protection against demand volatility or its effects
	Autonomous Robots	Responding to the effects of disruption	Intelligent robots capable of continuous operation and compensating for fluctuations in demand
No employees / no qualified employees	Autonomous Robots	Preventive/Responding to the effects of disruption	Robots able to replace human work, in particular repetitive activities affected by errors arising from the human factor
Errors arising from the human factor	Augmented Reality	Responding to the effects of disruption	Process execution supported by the use of real-time instructions for its implementation
	Autonomous Robots	Preventive/Responding to the effects of disruption	Robots able to replace human work, in particular repetitive activities affected by errors arising from the human factor
Quality errors in production process	Big Data and Cloud Computing	Responding to the effects of disruption	Supports the quality control process based on analysis of customer needs and accepted quality standards
	Augmented Reality	Responding to the effects of disruption	Identification of defective product components; instructions for the process of quality control
	Simulation	Preventive	Selecting production parameters and the product itself guaranteeing the production of a product that meets the intended quality standards
Insufficient efficiency of the production process	IIoT	Responding to the effects of disruption	Responding to performance decrease. Management decentralization - machines and devices capable of making autonomous decisions, communicating with each other
	Big Data		Identification of elements reducing process efficiency based on the analysis of key parameters for the process
	Augmented Reality and IIoT	Responding to the effects of disruption	Real-time process monitoring (e.g. KPI analysis)
	Simulation	Preventive	Protecting the process against performance loss by simulating and preventing performance-degrading situations
		Responding to the effects of disruption	Reconfiguration of the system in the event of disruptions

DISRUPTION CATEGORY	INDUSTRY 4.0 TOOLS	TOOL INFLUENCE ON SC DISRUPTION	RECOMMENDED USAGE OF TOOLS
Delays in production process	Simulation	Responding to the effects of disruption	Reconfiguration of the system in the event of disruptions
	Big Data and Cloud Computing	Responding to the effects of disruption	Real-time data access from anywhere on Earth enables identification of delays causes and respond to them

Table 3: The impact of Industry 4.0 tools on supply chain disruptions in the distribution phase

DISRUPTION CATEGORY	INDUSTRY 4.0 TOOLS	TOOL INFLUENCE ON SC DISRUPTION	RECOMMENDED USAGE OF TOOLS
Delays in picking process	Autonomous Robots	Preventive/Responding to the effects of disruption	Intelligent robots used in the picking process entitled to make independent decisions without human intervention (e.g. placement of goods in the warehouse)
	Augmented Reality	Preventive/Responding to the effects of disruption	Shortening the picking time, eliminating errors arising from the human factor through real-time availability for picking instructions
Inefficient use of storage space	Autonomous Robots	Preventive	Robots responsible for the placement of goods in the warehouse - no need to use forklifts - the possibility of reducing the width of transport routes between racks
	Augmented Reality	Preventive	Tips for optimal placement of goods / picking up goods from appropriate storage locations reducing the number of errors affecting the efficient use of storage space
No availability of information of product location in the distribution network	Horizontal and Vertical Systems Integration	Responding to the effects of disruption	Product life cycle analysis enriched with the ability to control during its use by the customer (end-to-end integration)
	Big Data and Cloud Computing	Preventive/Responding to the effects of disruption	Real-time data access from any place on Earth enabling verification which partner will be able to complete the process without delay
	IoT	Preventive	The ability to real-time product identification
	Cybersecurity	Preventive	Secure two-way information flow between supplier and manufacturer
Delays in deliveries	Horizontal and Vertical Systems Integration	Responding to the effects of disruption	Product life cycle analysis enriched with the ability to control during its use by the customer (end-to-end integration)

	Big Data and Cloud Computing	Preventive/Responding to the effects of disruption	Real-time data access from any place on Earth enabling verification which partner will be able to complete the process without delay
Quantity errors and errors in orders (assortment)	Big Data	Preventive	Predictive analysis used to optimize the size of orders placed
No availability of products	Big Data and Cloud Computing	Responding to the effects of disruption	Real-time data access from any place on Earth enabling verification which partner will be able to complete the process without delay
Quality errors in delivery processes	Big Data	Responding to the effects of disruption	Supports the quality control process based on the analysis of customer needs and adopted quality standards
	Augmented Reality	Preventive	Identification of defective product components; instructions for the process of quality control
Demand fluctuations due to changing customers' requirements	Big Data and Cloud Computing	Preventive	Predicting fluctuations in demand, creating forecasts that guarantee the link protection against demand volatility or its effects

Table 4: The impact of Industry 4.0 tools on supply chain disruptions in the reverse phase

DISRUPTION CATEGORY	INDUSTRY 4.0 TOOLS	TOOL INFLUENCE ON SC DISRUPTION	RECOMMENDED USAGE OF TOOLS
Lack of customer knowledge of how to return a product	IoT	Preventive	Providing information to customers about the destination of returns in value chain, automatically preparing return documentation (e.g. labels). The system suggests when to return the product and how to do it
	Cloud Computing	Preventive	Availability of procedures, method of returning the goods
Lack of means ensuring the return of goods from the client to production or supply chain links	Big Data	Preventive/Responding to the effects of disruption	Analysis of deliveries to customers and effective planning of the return process without increasing costs
	Horizontal and Vertical Systems Integration	Preventive/Responding to the effects of disruption	Supports planning of the transport process throughout the entire supply chain by tracking the product life cycle
	IoT	Responding to the effects of disruption	Access to vehicle location in real time and indication of the units responsible for collecting goods from the customer

DISRUPTION CATEGORY	INDUSTRY 4.0 TOOLS	TOOL INFLUENCE ON SC DISRUPTION	RECOMMENDED USAGE OF TOOLS
Product failure (product under warranty)	Horizontal and Vertical Systems Integration	Responding to the effects of disruption	Product life cycle analysis enriched with the ability to control during its use by the customer (end-to-end integration)
Incorrect assessment of the condition of the product that can be reused	Simulation	Preventive	Simulation of the product consumption process to verify which components will be reusable
	Augmented Reality	Responding to the effects of disruption	Product condition analysis and verification of its usefulness in terms of re-development
	Big Data and Cloud Computing	Preventive	Tracking the product life cycle and the ability to predict when the product will no longer meet customer expectations - planning how it can be reused in the production process or processing it into raw material - recycling
Inappropriate allocation of withdrawn products to the links of the chain	Simulation	Responding to the effects of disruption	Optimal allocation of product components after analyzing scenarios of allocation of its components
	Big Data and Cloud Computing	Preventive	Predictive analysis of the needs of previous links in the context of reusable components
	Horizontal and Vertical Systems Integration	Preventive	Product life cycle tracking, also at the customer's, and information about the product's condition and suitability can also be obtained during use
Uncertainty of origin of products affecting the delay of the recall process or errors / fraud related to products used by customers	IoT	Responding to the effects of disruption	Confidence about the origin of the product due to life cycle tracking, visibility, transparency
	Horizontal and Vertical Systems Integration	Preventive	Product life cycle tracking, also at the customer's, and information about the product's condition and suitability can also be obtained during use
Lack of knowledge about the time of expiry of the product's usefulness and possibilities of its reuse	Horizontal and Vertical Systems Integration	Preventive	Product life cycle tracking, also at the customer's, and information about the product's condition and suitability can also be obtained during use
	IoT	Preventive	Smart Products integrated through the use of IoT as part of Cyber-Physical Systems

The above tables were used by the authors to indicate the main tools of Industry 4.0, the use of which allows levelling the interference arising at individual stages along the smiley curve, which in graphic terms is presented in Figure 2.

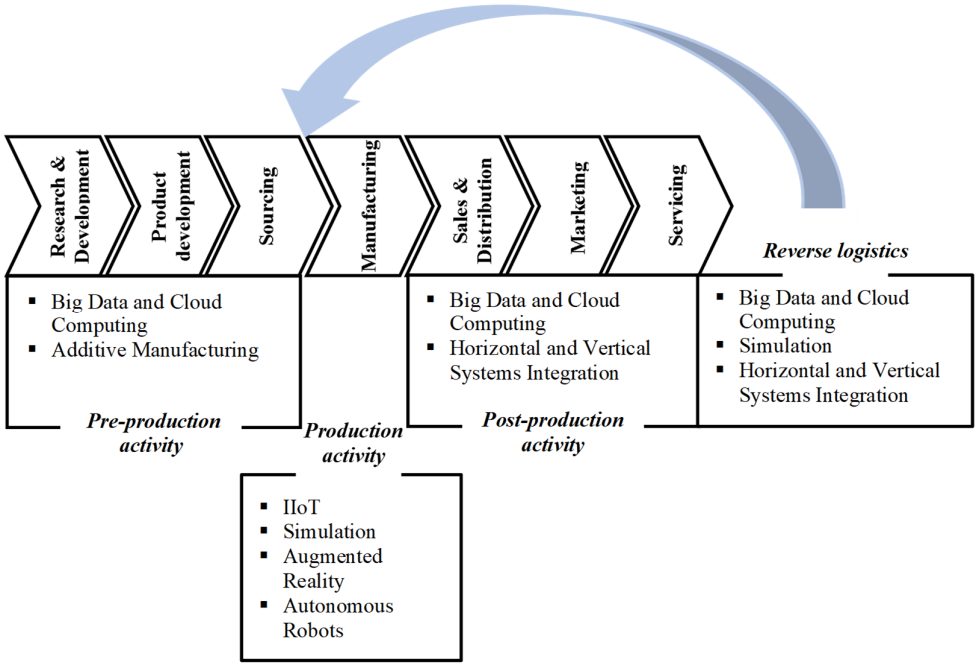

Fig. 2: Potential application of Industry 4.0 tools in particular stages of supply chain which leverage the biggest impact on preventing supply chain from disruptions

After analyses, it has been pointed out that in the pre-production phase using of Big Data and Cloud Computing enables the creation of predictive analyzes, the use of which helps secure the supply chain against unplanned changes in demand. In addition, the use of, among others 3D printers as part of Additive Manufacturing makes it possible to secure the process against arising material shortages in unit production and assumes responding to interference as part of the production of spare parts for machines.

The key tools of the production phase included IIoT integrating machines, devices as well as intelligent robots and people. It allows to manage and control the manufacturing process, increasing its flexibility. Process Simulation enabling the creation of Digital Twin being a virtual reflection of the enterprise's system. The simulation is used to reconfigure the system in the event of interference - simulation of alternative scenarios for the functioning of the system. In addition, Autonomous Robots able to make decisions independently were awarded in the production phase. Robots capable of continuous, uninterrupted operation are used in the absence of human resources. Augmented Reality used to real-time process control, assess product quality or maintain the operation of machinery and production equipment.

In the post-production phase, Big Data and Cloud Computing, as well as Horizontal and Vertical Systems Integration, play a key role again, enabling tracking the product life cycle not only along the smiling curve, but also during customer use, which enables process control and protects it against any process delays distribution.

In the reverse logistics phase, Big Data and Cloud Computing tools as well as Horizontal and Vertical Systems Integration were again considered as key ones. In addition, a significant impact of the ability to simulate product consumption, to verify which components would be reusable, was also recognized.

In the opinion of the authors of this article, these areas should be further analysed in order to verify the correctness of the assumptions and conclusions regarding the possibility of preventing supply chain breaks.

Summary

The considerations made in the article allowed the authors to emphasize the essence of the Industry 4.0 concept relating to the nine pillars constituting the tools of the Fourth Industrial Revolution. A literature review regarding the possible use of Industry 4.0 tools has considered their impact on prevention and response to examples of disturbances arising in individual phases of the supply chain. Impact of tools was grouped into preventive, responding to the effects of disruption and simultaneous interaction of both elements. In addition, the recommended use of each of the tools used is also indicated, depending on the impact on example disturbance categories.

In addition, the authors referred to the main Industry 4.0 tools that may affect the prevention or response to interference arising at individual stages along the smiling curve.
Thanks to this, it is possible to secure global supply chains against their interruption, as well as to compensate for the consequences associated with delay or suspension of processes implemented by individual links in the chain.

The main purpose of this paper was achieved as a result of confirming the hypothesis that Industry 4.0 tools have the potential to prevent and also enable quick response to disturbances that may appear in particular phases of the supply chain.

These tools, due to the ability to respond in real time, are an attractive solution for both the industrial and logistics industries. Customer requirements, constantly changing, specialized impose on modern chains the need for maximum process security, preventing the interruption of the flow of a product or service within the supply chain.

The implementation of intelligent solutions supporting the performing of processes becomes particularly important in crisis situations, requiring real-time decision making, or even well, decisions made in advance.

The authors of this article would like to elaborate on the considerations made in this paper in subsequent publications regarding methodologies of using Industry 4.0 tool in preventing supply chain from ruptures.

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Psychological Support for Employees in Polish Companies in The Context of Selected Variables Based on The Results of The Survey "New Trends in Human Resources Management in Large Enterprises"

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Abstract

The article presents selected results of research carried out as part of the project: "New trends in human resources management in large enterprises". The objective of the project was to identify social and psychological factors supporting the development of employees in organisations, identification of intangible assets as well as processes used for the management of social capital and trust in organisations.

Purpose: The purpose of this study was to identify selected factors related to offering individual support in enterprises. The relationship between the provision of psychological support in companies and such characteristics as: annual revenue, number of employees, type of business activity was analysed

Methods: Sample: The survey involved 179 representatives of enterprises randomly selected from among the 500 largest businesses in Poland. Measures: Quantitative methods of measurement were applied in the study – CAWI online survey and CATI telephone survey techniques were used. Procedure: The CATI or CAWI survey was addressed to representatives of companies with substantive knowledge of the subject matter of the study.

Findings: Of the factors measured by the study, a statistically significant relationship was revealed only for the revenue factor. This means that the amount of material income can have a significant impact on the decision to provide psychological support to workers in the form of individual counselling.

Research limitations: The research was carried out using survey tools.

Practical implications: On the basis of the results, according to which the decision to employ a psychologist depends on financial conditions and the related market standing of the company, some practical recommendations can be formulated. It is advisable to introduce systemic solutions that would support entrepreneurs in the process of implementation of mental health care systems for employees. Such solutions should include financial but also formal and organisational aid. Furthermore, it would be advisable to motivate entrepreneurs in their efforts to promote the mental well-being of employees by raising their awareness of the benefits of such efforts – both individual and also those for the entire company.

Keywords: companies, mental health, psychological support, psychological counselling, work, workers

Introduction

Mental health problems are becoming increasingly common. A report by the World Health Organisation (WHO) suggests that by 2020 mental disorders will take second place among the leading causes of the global burden of disease (World Health Organisation, 2001). The report of the European College of Neuropsychopharmacology (ECNP) and the European Brain Council (ECB) published in 2011 attempted to estimate the occurrence of mental disorders in Europe (Wittchen et al., 2011). The research project lasted 3 years and covered a total population of 514 million. The results revealed that 164.8 million Europeans (38.2%) suffered from mental health problems every year. Furthermore, the study shows that the most common mental health disorders were: anxiety disorders (14%), insomnia (7%), depression (6.9%), somatic disorders (6.3%), disorders caused by the use of alcohol and psychoactive substances (>4%). Given the scale of mental health problems, their impact on every area of human activity is not without significance. An extremely important area of impact is the area of professional activity. Mental health problems can affect activity in the working environment in different ways. Significant consequences are related to absenteeism at work and the so-called

presenteeism which occurs when employees are at work, but their cognitive energy is not devoted to their work (Gilbreath, Karimi, 2012). As researchers emphasise, emotional disorders and overall mental health are strongly associated with presenteeism, resulting in a significant reduction in productivity at work (Burton et al., 2004; Burton et al., 2008; Collins et al., 2005). According to the WHO, in many developed countries as much as 35-45% of work absence is caused by mental health disorders (World Health Organization, 2003). Mental health problems are also associated with more frequent errors at work, decision-making difficulties, decreased motivation and commitment, tensions and conflicts between colleagues (Harnois, Gabriel, 2000). These arguments justify the need for different types of support and mental health systems at the workplace. This is also important because of the role of work in the context of the psychological well-being of employees. Work can have a health-promoting effect – protecting against mental health problems or encouraging recovery when they occur but, in some cases, it can increase the risk to the well-being of an employee, e.g. when there is a constant high level of stress.

Research Background

The Bureau of Labour Statistics (USA) predicts that by 2022 employment of industrial-organisational psychologists will increase by approx. 53% (Richards, Terkanian, 2013). Many workplaces employ a psychologist in order to increase the competences of their employees and thus develop the potential of the company, improve communication within the organisation, etc. (Chudzicka-Czupała, 2007). However, psychologists are increasingly employed in the business sector not only as coaches or recruiters, but also as specialists focused on protecting the mental health of employees (Hauk, 2010). One of the forms of psychological assistance that an employer can provide to their employees is individual support. This type of aid relates to the possibility of individual counselling session on a one-off basis or a series of meetings aimed at solving a specific problem for a particular employee. These problems may result from the functioning of the employee (e.g. mood disorders, addictions) or from responding to stress related to the nature of the workplace (e.g. being a witness or victim of a work-related accident). The model of individual psychological work should be adapted to the nature of the employee's problem. According to the guidelines developed for the UK Employee Assistance Programmes (EAP)[i], psychological assistance can be based on different therapeutic approaches (UK Employee Assistance Professionals Association. Counsellors' guide to working with EAPs, 2014). Including:

- Solution Focused Brief Therapy – short-term therapy, which usually does not exceed 8 meetings. The therapeutic work in this case is primarily focused on needs rather than the reported problem (Kosman, 2013). It is the resources and strengths of the client that are important, not their deficits and disorders.

- CBT – a therapy which, in classic approach, is short-term, structured and aimed at a specific client problem (Madej, 2010). This model offers specific techniques to address specific problems, such as anxiety or anger management techniques.

In addition, the psychologist may also apply practices taken from other therapeutic models or based on selected scientific theories, adapting them to the type and severity of the reported problem in order to achieve the desired effect (UK Employee Assistance Professionals Association. Counsellors' guide to working with EAPs, 2014). An example is Eye Movement Desensitisation, which is most frequently used in the treatment of post-traumatic stress disorder.

Psychological support in the form of individual counselling for employees, although it appears more frequently in different workplaces, still seems to be a practice insufficiently appreciated by entrepreneurs. The project also analysed the occurrence of various forms of psychological support in the largest enterprises in Poland. The results of this study are presented in Table 1. Individual support covered 12.8% of the responses of the surveyed representatives of enterprises. On the other hand, the most frequently (14.8%) offered form of support turned out to be training focused on specific skills or problems. What is important, as much as 60.1% of the responses are included the category *We do not offer such support to employees.* Nevertheless, the level of awareness of the importance of the mental well-being of employees for the functioning of the company seems to be high. In this survey, as many as 63.7% of the 179 company representatives stated that psychological problems of employees should be monitored in relation to their impact on productivity and working environment. In Polish companies,

the practice of psychological assistance for employees is being implemented slowly, systemic solutions supporting this practice, such as "Program Wspierania Pracowników" (equivalent to the *Employees Assistance Program* - EAP) are gradually being introduced (Leśnikowska-Marciniak). However, an important question arises as to what is conducive to decisions on providing psychological assistance for employees and whether the factors determining the characteristics of the company are relevant. Identifying these factors may facilitate the process of implementing psychological support programmes for employees in the workplace.

Table 1: Forms of psychological support offered to employees in companies

What forms of psychological support does the company offer for its employees? (choose all matching answers)	**number of responses**	**% of all responses**
Individual employee support	26	12.8
Support groups for employees	3	1.5
Training regarding communication, motivation, resolving conflicts, dealing with stress, occupational burnout, dealing with pathologies in the organisation (e.g. mobbing, discrimination, sexual harassment)	30	14.8
Workshops regarding developing diverse competences, dealing with stress, occupational burnout, dealing with pathologies in the organisation (e.g. anti-mobbing workshops)	14	6.9
Other	1	0.5
We do not offer such support to employees	122	60.1
I have no opinion	7	3.4

This article presents selected results of the study within the project: *New trends in human resources management in large enterprises,* illustrating the relationship between the existence of psychological support in the form of individual support and the revenue of the company, the number of employees and the type of business activity.

Methods

The study was conducted as part of a research project *New trends in human resources management in large enterprises*. The objective of the project was to identify social and psychological factors supporting the development of employees in organisations, identification of intangible assets as well as processes used for the management of social capital and trust in organisations.

Sample

The sampling frame was a database of the 500 largest companies in Poland classified on the basis of the ranking of the *Rzeczpospolita* daily newspaper by revenue for 2018. Random sample selection was used. In case of refusal to participate in the project, another company was randomly selected. As a result of the random selection, a survey was carried out on a representative sample of 179 companies according to the following parameters: general sample size – 500, confidence level: 95%.

Measures

The research within the project was carried out using quantitative research methods with mixed techniques: Computer Assisted Web Interview (CAWI) and Computer Assisted Telephone Interview (CATI). The combination of two quantitative methods served to increase the response rate.

Procedure

The study was started with representatives of companies using the CATI method. Those who refused to participate in the survey, interrupted the survey or declared other time frames were given the

opportunity to complete the survey via a dedicated web platform (CAWI). The survey was addressed to employees with substantive knowledge of the subject matter of the study. The study was conducted in the first half of 2019.

Statistical Analyses

To measure the relationship between the variables, the chi-square test ($\chi 2$) and Cramér's V were used.

Results

For the purposes of this article, selected results of the study regarding the relationship between the forms of psychological support used in enterprises based on individual counselling and the enterprise's revenue, number of employees and type of business were used. The results are presented in Table 2. In addition, Figure 1 illustrates the percentage distribution of enterprises with regard to annual revenue.

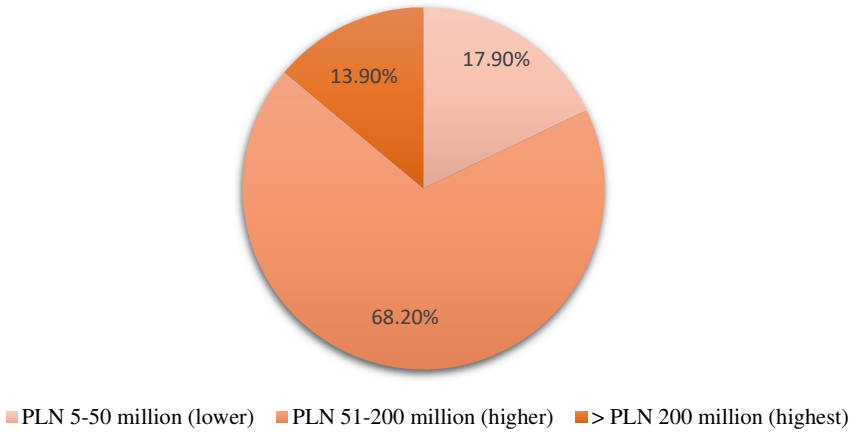

Figure 1: Percentage distribution of the surveyed enterprises according to revenue

The largest number of enterprises surveyed (68.2%) declared annual revenue between PLN 51 and 200 million. The lowest number of the surveyed companies (13.9%) were those which reported revenues of over PLN 200 million.

For the purpose of this study, the revenues of companies in the range of PLN 5-50 million were defined as lower, PLN 51-200 million - higher, while over PLN 200 million – highest among the largest companies in Poland.

Table 2: Psychological support for employees in the form of individual counselling with regard to the revenue of the company

Annual revenue of the company	Individual employee support		Total
	present	absent	
PLN 5–50 million			
n	12	20	32
%	37.50%	62.50%	100%
PLN 51–200 million			
n	11	111	122
%	9.02%	90.98%	100%
> PLN 200 million			

n	3	22	25
%	12%	88%	100%

χ2	df	p
16.7153	df=2	p=0,00023
Cramér's V		
0.3056		

Statistically significant differences were identified between the responses indicating the existence of a form of individual employee support and the amount of revenue of the company (p=0.00023). Of the companies that have defined their revenue in the range of PLN 5-50 million (lower), 37.5% indicated that psychological support in the form of individual counselling is offered to employees in their company. Among the companies with the highest revenue (> PLN 200 million), 12% of respondents indicated that this form of support is present in their company. These results must be treated with caution due to the low number of companies in this group (n=3). The lowest percentage (9.02%) in terms of the presence of individual support was found in the case of larger companies (PLN 51-200 million).

Table 3: Psychological support for employees in the form of individual counselling with regard to the number of employees

	Individual employee support		Total
Number of employees	present	absent	
201-500 employees			
n	18	113	131
%	13.74%	86.26%	100%
over 500 employees			
n	8	40	48
%	16.67%	83.33%	100%

χ2	df	p
0.2423	df=1	p=0.62257

There were no statistically significant differences between the responses indicating the existence of individual employee support and the number of employees in companies (p= 0.62257).

Table 4: Psychological support for employees in the form of individual counselling with regard to the type of business activity

	Individual employee support		Total
Type of business activity	present	absent	
production			
n	65	10	75
%	86.67%	13.33%	100%
production and service			
n	23	3	26
%	88.46%	11.54%	100%
service			
n	38	11	49

%	77.55%	22.45%	100%
commerce			
n	13	2	15
%	86.67%	13.33%	100%
production and commerce			
n	14	0	14
%	100%	0.00%	100%

χ2	df	p
5.1469	df=4	p=0.27255

There were no statistically significant differences between the responses indicating the existence of individual employee support and the type of business activity (p=0.27255).

Discussion

The article presents selected results of research under the project *New Trends in Human Resources Management in Large Enterprises* concerning the relationship between the individual psychological support offered to employees and selected variables describing the enterprise. Of the relationships studied, a significant correlation appeared only in terms of the revenue of the company. This means that the existence of psychological support for employees in a given company is related to the financial situation of that company, which, in the context of the study, seems to be understandable according to the regularity with which large, wealthy companies are able to afford additional investments in their employees. In large companies, psychological support is generally offered more frequently than in small and medium-sized enterprises (SMEs), as the results of some studies show. Based on UK reports of the *Health and wellbeing at work: a survey of employees* only 1 in 10 SMEs offer occupational health support compared to 8 in 10 large organisations (Stevenson, Farmer, 2017). The research presented by Weinberg et al. (2019), where awareness and implementation of National Institute for Clinical Excellence (NICE) guidance on workplace psychological health were analysed, shows a similar relationship. The availability of mental health support was significantly less among SMEs than in large organisations. Interestingly, the awareness and implementation of support systems were higher in public sector companies compared to private companies. This study uses the criterion of understanding of SMEs according to European Union standards, where these mean companies with less than 250 employees and an additional criterion may be an annual revenue of less than EUR 50 million (Berisha, Shiroka Pula, 2015). This study did not reveal a statistically significant relationship between the psychological support offered to employees and the number of employees in the company, however, the study did not apply the criteria for classifying the size of the company based on the number of employees. The surveyed companies were defined as the largest in Poland on the basis of the criterion of revenue, in accordance with the rules of the list created by *Rzeczpospolita* daily. However, when comparing the criteria for SMEs, a certain proportion of the companies surveyed (number of employees between 200 and 249) would be categorised as SMEs rather than large enterprises. Perhaps the inclusion of employment size criteria according to EU size definition standards (companies with up to 250 employees and companies with more than 250 employees) would have a significant impact on the relationships obtained.

The distribution of statistically significant relationships was interesting. The largest number (37.5%) of companies which indicate offering their employees support in the form of individual counselling are smaller companies (revenue between PLN 5 and 50 million). Among larger companies (revenue between PLN 51 - 200 million), this percentage was much lower and amounted to 9.02%. Similarly, among the largest companies (> PLN 200 million), only 12% confirmed individual support for employees, but in this case the results must be treated with great caution due to the small number of companies in this group (n=3). It can be assumed that the group of smaller companies includes relatively more of those which are developing companies, strongly focused on increasing competitiveness, competing for market position. Investment in mental health programmes could be one of the means to achieve this objective. As it is emphasised in the literature on the subject, programmes

promoting health in the workplace influence the increase of productivity by, among others, reducing sick leaves, reducing presenteeism or increasing the involvement of employees (Goszczyńska, 2017). It is also one of the forms of taking care of the company's image and building employer branding. S. Bevan's review of research (2010) indicates that those employers who care about their employees, including their health, increase the chances of attracting the best candidates maintaining their employment. In the long time frame, these measures lead to increased profits for the company. The authors of the British report published by the Department of Health in London presented estimates indicating possible savings for the company resulting from the implementation of various forms of mental health support for the employee (McDaid et al., 2011). In the case of a company with 500 employees, where support for mental well-being will be provided to all employees, it is estimated that an initial investment of £ 40,000 will result in a net return of £ 347,722 in savings. Thus, in the case of smaller companies, development considerations aimed at increasing competitiveness on the market may be a significant motivator for the introduction of psychological assistance in the form of individual counselling for employees. In the case of larger companies, whose competitive position on the market is usually relatively more stable, investments in such programmes may be assessed as unnecessary expenditure.

The study did not reveal the relationship between psychological support in the form of individual counselling and the type of business activity of the company. Perhaps the business activity sector does not determine the decision to provide support to employees as much as other factors. The aforementioned *Health and wellbeing at work: a survey of employees* report presents the distribution of health and wellbeing policies in companies with different business activity profiles (Department for Work and Pensions, 2014). The policies also include protection of mental health. The results of the survey indicate that 48% of companies from the banking and finance sector provide extended health and wellbeing policies, while from the manufacturing sector – 53%, construction – 49%, distribution, hotels and restaurants – 44%, and from the energy and water sector – 66%. The differences between the industry sectors are mostly small. Perhaps more important than the type of activity in this case is the form of company ownership (public/private), which is confirmed by the results of the aforementioned study (Weinberg et al., 2019).

Several limitations of this study should also be mentioned. The study was a questionnaire and was therefore based on a subjective assessment by the representatives of the companies concerned. This implies a certain likelihood that those who completed the questionnaire had incomplete knowledge of the situation in the company or misinterpreted the questions. Another restriction may have resulted from a non-heterogeneous group of surveyed entities, which were companies or branches of companies.

Conclusion

The scale of the prevalence of mental health problems in Poland and globally makes their impact on various areas of human functioning increasingly clear. This impact also applies to the professional environment, where it results in significant consequences such as, among others, employee sick leaves, presenteeism, and a decrease in involvement in work. These problems lead to a gradual increase in the demand for psychologists working in business, not only as HR personnel, but also as employee mental health professionals. Psychological support in the form of individual counselling is one of the possible forms of assistance provided to employees. It can be offered both in the case of problems not directly related to work – typical for a given employee (e.g. addictions) or problems resulting from the nature of the workplace (e.g. long-term stress at work).

The article presents selected results of a survey conducted as part of the project *New Trends in Human Resources Management in Large Enterprises*. The purpose of this study was to identify selected factors related to offering individual support in enterprises. The relation between the provision of support in 179 enterprises from the group of enterprises classified as the largest in Poland (according to the ranking of the *Rzeczpospolita* daily newspaper) and such characteristics as: annual revenue, number of employees, type of business activity. A statistically significant relationship was revealed only for the revenue factor. This means that the amount of material income can have a significant impact on the decision to provide psychological support to employees, with support systems appearing relatively more frequently in large companies than in companies categorised as SMEs. Within the scope of the

discussed dependence, detailed relationships emerged, where from among the surveyed enterprises – the percentage of occurrence of the individual support was the highest (37.5%) in relatively smaller organisations (revenue of 5-50 million PLN). It is possible that these companies, forced to strive for market position more intensively than larger companies, decide to invest in their employees, seeing this practice as a way to increase their competitiveness.

The results of the study emphasise the importance of the financial situation of the company as the key – among other respondents – factor related to the psychological support offered in the company. Therefore, if the decision to hire a psychologist is a decision that mainly depends on financial conditions and the related market standing of the company, some practical recommendations can be worthy of consideration. A significant improvement would be the development of systemic solutions common in the Western world that would support entrepreneurs in the process of implementation of mental health care systems for employees. Such solutions should include financial but also formal and organisational aid and could be offered e.g. by government organisations. It is assumed that the prevalence of the forms of psychological assistance, even among the smallest companies, will increase when their availability is increased by full or partial compensation of the financial costs. It is worth motivating entrepreneurs by making them aware of the fact that enabling employees to take advantage of psychological counselling can significantly improve productivity within the company. In the long run, this investment may prove to be extremely profitable – as the consequences will include reduced sick leaves and presenteeism, as well as an increase in productivity, motivation and involvement of employees in their work. In addition, regardless of the issue of revenue, all entrepreneurs should be encouraged to pay particular attention to the mental well-being of their employees and to intervene appropriately when that well-being is at risk. This awareness should be considered as binding in every work environment – wherever a human is present.

[ii] The goal of EAP is identifying 'troubled employees' (e.g. at risk of alcohol use disorders), motivating them to resolve their troubles, and providing access to counselling or treatment for those employees who need these services (Hartwell et al., 1996).

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How Cooperatives Innovate for The Energy Transition? Case of Housing Cooperative Wroclaw South

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Abstract

Global Economy faces a challenge of the need for rapid decarbonisation. Households are responsible for 17,8% of CO_2 emissions. As vast part of this emission is used for heating and electricity, we are in need of innovations and original solutions in this area. Hence, the paper reflects the exploratory research carried out during the innovation process co-created by the Housing Cooperative Wroclaw South and District Heating Provider. Potential innovators are going to replace the existing unsustainable district heating system with more sustainable hybrid system combining air-heat pumps, powered by the electricity produced from photovoltaics and supported by district heating. This research paper based on grounded theory and multilevel perspective is a discourse on the source of innovation, participators' motivations, innovation functionalities, and challenges of innovation in its initial phase. The paper contribution to science concentrates on the exploration of academically underrepresented social energy transition projects from the Central and Eastern European region, where the traditional district heating system constitutes the dominant part of the market.

Keywords: Housing Cooperatives, Energy Cooperatives, Renewable Energy Sources Projects, Energy Transition, Multilevel Perspective, Grassroots-Led Innovation

Introduction

Nowadays, energy transition constitutes the most important multi-level transformation process of the economic and socio-technological system intended to increase its environmental sustainability and social fairness. It is also a key item on the political agendas of European countries, presented by the European Green Deal new growth strategy. The European Union is turning an urgent climate and environment challenge into a unique opportunity to steer the economy and society to a sustainable path. The aim of this strategy is to eliminate net emissions of greenhouse gases in 2050 and detach economic growth from the use of resources, supporting the shift towards a low carbon and circular economy, and increasing the use of renewable energy sources while promoting energy efficiency approach. At the same time, this transition must be just and inclusive. The strategy needs new policies for clean energy supply in all sectors: industry, transport, agriculture, and construction in order to achieve climate neutrality by 2050. Decarbonisation of the energy system is an effective way

of achieving that goal. European Green Deal will include policies and instruments supporting this transformation: regulation and standardisation, investment and innovation, national reforms, as well as dialogue with social partners.

The transformation into renewable energy is one of the most important environmental, social and economic processes. A variety of actors are involved; some support transformation, others are against it. The specific situation of Poland shows that governmental policies and actions slow the transformation down by rigidly regulating energy cooperatives, and that bottom-up activities of households and housing cooperatives (HC) are trying to accelerate it. The necessity of transition to renewable energy is crucial. Poland will not achieve its 15% target for the share of energy from renewable sources in 2020, as set out in the Renewable Energy Directive (2009/28/EC). The urban energy transition can be supported by important actors – housing cooperatives, which play a crucial role in the housing sector especially in Poland. Scientists state that an important factor in the process of energy transformation in countries that achieve the planned share of renewable energy in the energy mix is civic energy. Collaborative action of citizens contributes to transition in all the fields of renewable technologies (Bauwens, 2013) A vital role in this transition is performed by community energy initiatives, such as energy co-operatives and the like (Yildiz et al., 2015)

Legal and organizational difficulties obviate creating and functioning of energy cooperatives in Poland. In the absence of energy cooperatives – housing cooperatives have capacities to contribute to the energy transition processes. We argue that due to the scale of impact, the number of inhabitants and the competences of management boards could play a role in mobilising civic energy in Poland. In the centralised energy production system (the mainstream) in Poland, changes are difficult. That is why the cooperative's role is crucial. It is favoured by global trends in the development of the renewable energy sector and the attitudes of citizens who see the opportunity to reduce emissions and smog, while creating a chance to improve health. UE regulations (Renewable Energy Directive and Electricity Market Directive) put civic energy at heart of energy transition. The housing cooperatives initiatives can have substantial scalability and impact on renewable energy transition. Their action happens outside mainstream regimes and is challenging existing rules and solutions. Seyfang says that "Community energy projects are one example of this type of grassroots-led innovation, which aim to create more sustainable energy systems. They encompass a wide range of initiatives such as locally-owned renewable energy generation, community hall refurbishments, collective behaviour change programmes, and are claimed to bring additional public engagement benefits to top-down policy initiatives." In the paper, two dimensions of successful urban renewable energy transition were investigated. First, the housing cooperative as an actor of innovative urban energy transition with potential to challenge existing barriers. The second, the ability of HC to produce PV energy and combine it with the urban district heating (DH). Researcher confirmed that it is economically beneficial to convert excess power to heat when the market price of electricity is lower than the DH heat tariff (Pakere, Romagnoli and Blumberga, 2018). Especially during the summer season, the power produced by the solar heating system can be efficiently used, increasing the share of renewable heating (Lazzeroni and Repetto, 2016).

Regulations limiting the production and consumption of RES in housing cooperatives are at the same time opening opportunity to use excess of own PV electricity and to redirect it to heat HC buildings. We investigated this issue and asked the question what is the potential to increase RES share in the energy mix in Poland by expanding usage of PV electricity for heat pumps.

The central question is whether local renewable energy initiatives can be seen as a radical innovation or whether – and to what extent – can they contribute to the transition towards renewable energy production and consumption in Poland?

Our research approach consists of several steps. Introductions present the importance of HC innovation in energy transition in Poland. Then we review existing literature and complement it with insights from an ongoing Scalings project. The next step of the research process is an analytical framework based on Multilevel Perspective, Niche Management and grassroot innovation theory. This paper ends by discussing the application of grassroot innovation conceptualisation to Housing

Cooperative Wroclaw South (HCWS) case, drawing conclusions and discussing future research directions.

Methodology

The purpose of this study was to investigate how the res-coops innovative initiatives can speed up energy transition in Poland. Research methods have been adjusted to the purpose of the research. The article is using the multilevel perspective created by F.W. Geels - effective in the analysis of the energy transition. The energy transition is a part of a broader sustainable transition. Specific characteristics of these transitions is: multi-dimensionality, multi-actors process (politics, academia, industry, civil society and households), stability and change, long-term process, uncertainty. MLP is based on the assumption that the transformation is not a linear process, but a joint effect of occurrences observed on three distinct levels: in niches – as areas associated with radical innovations; in the dominant economic, technological and social system (the existing patterns of production, consumption, management, and legislation – the socio-technical regime); in the external economic, social and technological environment (demographic trends, political ideologies, financial crises, social values, and macroeconomic principles – the socio-technical landscape). Energy transition is the end result of all interactions that occur between processes on each of the aforementioned levels. In this view, niches are the environment involved in the initiation of changes with the potential to accelerate changes in the dominant system, while processes observed in the external surrounding exert pressure upon the system (Kemp, Schot and Hoogma, 1998). Destabilisation of the dominant system, in turn, forms windows of opportunity for further innovations generated at the niche level (Geels F. , 2011). Johan Schot cited by Savacool says that: ”a central finding from the MLP is that transitions happen only when niches are built up sufficiently to change or challenge a regime, usually through indicators such as deep and broad learning, deep and broad networks, or robust and specific expectations. Such acceleration of niches, regimes, and landscapes in sociotechnical transitions niches can create tensions or help to destabilise existing regimes; the sociotechnical landscape can also create pressures attuned to change. The key is the interaction between all three levels: the niches, the regime, and the landscape (Sovacool and Hess, 2017). Housing cooperative is the subject of our paper, so we apply also as a methodological framework of the grassroot innovation theory. Grassroots innovations are defined as: “networks of activists and organisations generating novel bottom–up solutions for sustainable development; solutions that respond to the local situation and the interests and values of the communities involved. In contrast to mainstream business greening, grassroots initiatives operate in civil society arenas and involve committed activists experimenting with social innovation as well as using greener technologies. (Seyfang and Smith, 2007). Grassroots innovations align with MLP by emphasising diverse actors including cooperatives, voluntary organisations and community initiatives, rather than firms; they are grounded in local and collective values, based on notions of solidarity, rather than efficiency and profit-seeking; and their niche protection consists of being a space for alternative – i.e. green, sustainability-oriented – values to be expressed, as opposed to shielding from market forces (Seyfang and Smith, 2007).

Preliminary selection of potential research entities has shown that HCWS is a promising case. The object of the study was the HCWS, whose pioneer Wroclaw Solar Power Plant (WSPP) project is the largest dispersed power plant of this type in Poland. The research had been carried out between December 2018 and March 2020, and is still ongoing. The study used the participant observation during which selected three key project meetings for the project were selected.

The study employed the use of partially structured interviews and document analysis. In total, eight interviews were conducted with key actors, including two interviews with members of the project team (including one with a member of the management), four interviews with residents and two with other partners (from the Provincial Environmental Protection Fund and the photovoltaic system contractor). All interviews were recorded with the consent of the respondents. The interviews were performed in a semi-structured format. The semi-structured format allowed the interviews to unfold in a conversational manner, offering the interviewees a chance to pursue issues they consider to be important. The research methods like the participatory observation were used also.

Case observation

The Housing Cooperative Wroclaw South (HCWS) manages 102 buildings and almost 11,000 apartments with approximately 30,000 inhabitants. The HCWS members are mainly retired people with low income. Therefore, improving buildings' insulation, changing windows in the stairways, introducing heat energy monitoring and management lasted decades. Thanks to this solution building operating costs decreased. Based on its previous experiences, HCWS has created Wrocław Solar Power Plant project (WSPP) on the roof of a 10-storey building, the largest rooftop power plant in Poland (Rozwadowska and Szymański, 2019) (Ryszawska, Haczkowska and Szymański, 2020). The WSPP was to organise a solar power plant and was developed in consultation with inhabitants. Thus, at the beginning of the WSPP, the overall project aim concentrated on decreasing the cost of electricity in the common areas of the building. During the process of co-creation, the next aim was established. Cooperative members leaders of change indicated that the second crucial aim should be a decrease of CO_2 emission. Due to project harsh legal regulations of the funding programme, PV were installed only on 35 buildings. The main obstacles include:

- the use of electricity produced only for the needs of the common parts of buildings and the associated lack of possibility to use the electricity produced for the individual needs of residents,
- unprofitability of investments in photovoltaics in 4-storey buildings, where the demand for electricity in common areas is relatively low.

These restrictions meant that HCWS could neither fully exploit the potential of its roofs, nor include a significant part of the cooperative's residents (residents of 4-storey blocks) in the project. The implementation of the WSPP helped the cooperative gain competence and experience, as well as encouragement on the part of the inhabitants to implement further and more challenging pro-ecological projects. Thanks to the enthusiastic public reception of the first project, HCWS developed ambitious goals for their own energy transformation materialising with the second project.

The second project is still in the incubation phase. There were over a dozen internal and external meetings during which project ideas were considered. Three participatory observations were a crucial source of data from the perspective of this paper. During the first meeting in June 2019, representatives of the company's management board pointed out the key functionalities of the project and the project's main direction. During the second meeting in September 2019, the cooperative's vice president responsible for the project and the cooperative's operational employees (representing the estate manager and technical services) discussed technical and architectural details with the architect and representatives of a consulting company looking for the sources of project financing. During the third meeting in February 2020, cooperative's representatives agreed on the functionality of the hybrid system with representatives of the Fortum – district heating provider in Wrocław (DHP)[1]. During these meetings HCWS authorities articulated that after the success of WSPP, HCWS management board filled the HC members' pressure to create a similar project for 4-storey buildings. Hence the second project – Wrocław Hybrid Heat System (WHHS) is created as a consequence of unmet community needs. In this case, economic and environmental aims were widespread on standards of living improvement. The idea of this project of energy transition merges RES technology (photovoltaics and air source heat pumps) with the existing district heating system delivering heat and hot water to the HCWS buildings.

During the last project meeting both parties (HCWS and DHP) agreed that the prepared solution has to combine the following functionalities:

1. raising the comfort of life in 4-storey buildings by adding lifts (most of the residents of the estate are retired people),
2. reduction of costs of electricity consumption from non-renewable sources in common parts of the buildings (installation of lifts will significantly increase the demand),

[1] The next meeting planned for March 2020, in which representatives of contractors were invited to participate, was cancelled due to the risk associated with the COV-19 pandemic.

3. reduction of thermal energy consumption for heating and domestic hot water purposes from non-renewable sources,
4. reduction of the carbon footprint associated with the operation of 4-storey buildings.

To achieve the second, third and fourth functionality, it was decided to install photovoltaic panels on the roofs of 4-storey buildings to power common parts of the buildings, including lifts and air-heat pumps. Preliminary estimations show that energy obtained from PV and used for heat pumps will be multiplied four times.

The hardest challenge in the project is the integration of air-heat pumps with the already existing sources of heat energy and hot utility water supplied by the district heating (DH). Currently, the municipal heating system is managed by two independent entities. One of them is heat generation, and the other district heating network. HCWS and DHP plan air-heat pumps to be a supplement to the existing heating system, not a complete replacement. The heating system in HCWS buildings is based on radiators that require high-temperature water feeding the system. In contrast, air-heat pumps are the most effective in low-temperature heating solutions requiring underfloor heating systems in buildings. Heat pumps can also supply domestic hot water to the building.

The interview with the DHP representative shows that the company is interested in this project due to its strategy, which assumes that one of its important goals is to carry out operations in the spirit of sustainable development. At the same time, the company is aware that in addition to the benefits, a decrease of revenues from the sale of heat to HCWS will be a side effect. And in case of scaling this project to other buildings or other housing cooperatives, this change in revenue streams could be even more significant. DHP recognises that such innovations are inevitable and chooses to adapt to expected changes on the district heating market. In a larger scope, it can align with the company‘s sustainability strategy and unexpectedly generate new profits from the demand of other cooperatives. The DHP co-creating this investment with HCWS has the opportunity to participate in the copyright of this solution and offer it to other customers in the future. The DHP could benefit from this innovation. The participation in this innovation creates new prospects for the DHP. Based on this co-created design, a new product may be created with a smaller carbon footprint for system heat recipients. At the same time, due to the gradual expansion of the district heating network (DHN) in the city‘s downtown districts, and assuming the spread of the hybrid solution, it will be possible to connect more buildings which are still using hard coal stoves for heating purposes to DHN.

While working on the new project, the main goals shared by both sides were pointed out. Representatives of management, administration and residents of HCWS and representatives of the DHP, initially agreed on the main operating factors of the hybrid system:

- Ecological (carbon footprint), – reduction of emissions, cleaner air in the city, mitigation of climate change,
- Economical for residents, – the effective funding system and the reduction of cost for residents,
- Secure heat system and hot water supply, – the smooth and reliable heat and hot water supply,
- Thermal comfort of building residents – the technological efficiency of the heating system

At this stage of work, no hierarchy has been defined as to which parameters will have priority and how they will affect the hybrid system control algorithm.

The parties engaged in this initiative are full of optimism and energy, but they realise that many problems (especially technical, digital, and concerning property rights) are still unsolved, simultaneously many other unexpected risk factors may occur.

Applying Multi-Level Perspective to HCWS case analysis

How does the existing energy regime in Poland influence the project of Housing Cooperative Wroclaw South?

Strong economic and political interdependence of the state and energy sector was created during communist period that imposed nationalisation and centralisation. This interdependence prevailed after the collapse of communist regimes. The energy system was serving the heavy industry and was based on coal. Electricity market is cartelised and dominated by four big publicly held companies (publicly traded companies) controlled by the government. As a result, any process of decentralisation of energy production was not desirable and seemed economically inefficient. Therefore, constraints of Polish renewable energy market are also currently maintained (Jankowska and Ancygier, 2017). Despite many voices arguing that large centralised energy systems should be replaced by the energy Internet paradigm (Popkiewicz, 2015), the incumbent regime is resistant to changes. The HCWS case indicates that change is happening outside the dominant regime (Berlo, Wagner and Heenen, 2016). Meanwhile, the centralistic narrative in Poland dominates the tension between what is central and what is local. Despite European trends in the development of civic energy, large state-owned energy providers with the support of the public funding intend to implement large-scale investments in RES.

The investigated Housing Cooperative is located in the city of Wrocław - the capital of the Lower Silesian Voivodeship. The population in 2019 was 641,607 – making it the fourth largest city in Poland. The statistics show that 62% of the Wrocław citizens (50% on average in Poland) buy heat energy from district heating companies. Fortum Power and Heat Polska is the owner of the district heating network in Wroclaw. The length of the district heating network in Wroclaw is over 500 km (Picture no. 1). The heat is produced in cogeneration with electric power at KOGENERACJA S.A., and it comprises of three production plants: EC Wroclaw (263 MW of electric capacity + 812 MWt of thermal capacity), EC Czechnica (100 MW of electric capacity + 247 MWt of thermal capacity) and EC Zawidawie (2,677 MW of electric capacity + 21,35 MWt of thermal capacity), and the total electric capacity of 365,7 MW and thermal capacity of 1080,4 MWt. KOGENERACJA S.A. is the producer of heat and electric power mainly in the process of cogeneration. Hot water is produced for the needs of central heating, hot tap water or for technological processes. As a source of energy they use mainly coal (93.3%) and in small extent biomass (6.7%). Using coal in Poland as a main source of energy causes huge emissions of CO_2 – 103 t CO_2/TJ in 2010 (48 t CO_2/TJ on average in Europe). Thus phasing out coal and turning to renewable will be the biggest transition challenge in Wroclaw, Lower Silesia region and in Poland. District heating companies in Poland are using second generation of district heating (high pressure and the temperature more than 100°C). Third generation of district heat in Poland is still a very rare solution.

Picture 1: District heating network and Heat Power Plant in the city centre of Wrocław
Source: own work

Landscape

The landscape of the energy sector consists of three levels: global (international), national and local. The energy consumption for heating applications in Europe is expected to stay at a very high level for the upcoming decades. The situation is challenging as fossil fuels must be phased out to limit climate change effects, to make Europe less dependent on unreliable supplies of imported energy sources (natural gas, oil), and to avoid the health and environmental hazards from burning coal. Moreover, the United Nations Environment Programme (UNEP) stresses the pivotal role of DH in keeping the global temperature rise below 2 degrees.

Recent decisions and revised legislation in 2017 in the energy sector will lead to an increased role of coal in energy supply compared to past plans and a much slower expansion of renewable energies than in the recent years, in particular for wind power. Polish plans in the energy sector will not contribute to significant further emission reductions in the future. As Poland is the fifth largest EU emitter, this may slow down overall EU progress in emission reductions. Polish cities have a very large, yet untapped potential for generating energy from renewable sources.

Polish state policy analysis indicates a lack of political support for renewable energy. Lack of transparent and reliable policy framework towards Energy transition is visible. At government levels, there is no consensus on the anthropogenic aspects of climate change and the need for radical action to implement effective climate policies (Ceglarz, Benestad and Kundzewicz, 2018). European initiatives in this area are sometimes contested (Marcinkiewicz and Tosun, 2015)The high level of public funding for conventional energy (Gençsü et al., 2017) confirms the commitment of governments of all options to support this industry. Existing Polish energy policy is fit for the interests of large coal plants (Skjærseth, 2016).

This process translates into a lack of support for local, grassroots and decentralised renewable energy initiatives. Building public support for energy from renewable energy sources, in particular from

distributed energy systems, is crucial for the development of this branch and the success of the energy transformation (Seidla, von Wirth and Giaslason, 2018). The level of social support for renewable energy cannot be seen as a barrier in the case of Poland and solar energy (Ropuszyńska-Surma and Węglarz, 2019). Based on the case study of **Household Cooperative Wroclaw South**, we observe a high level of citizens' support for renewable energy technologies. According to residents' declarations, trust in cooperative administration employees has contributed to trust in technology. Technical knowledge and efficiency in the implementation of the project team's investment contributions were indicated as one of the factors. Appropriate participation and inclusion of numerous residents and other actors in the design of the project ensures social support for the technologies used in the projects (MacArthur, 2015). Research conducted in Poland indicates a significant degree of social acceptance for green electricity (Kowalska-Pyzalska, 2018).

This discrepancy between the social acceptance of renewable energy sources and the lack of this support from the government indicates that the Polish energy transformation is currently supported mainly by grassroots initiatives. Removing barriers that accompany bottom-up collective initiatives would contribute to achieving low-carbon goals faster. The energy transition project is part of the urban climate neutrality program and anti-smog programs. Local authorities have a favourable attitude towards such initiatives.

Niches as a place for grassroot innovations The ability of energy cooperatives to provide innovations for the energy transition process

Energy cooperatives are entities where innovation takes place. Cooperatives generate "grassroots innovations" that drive user-led change. Users/ EC members are not eager in innovating for innovation's sake. They seek solutions to reconfigure the reality that does not meet their expectations. The key of innovation of user-led change in reconfiguring existing technical solutions into new social, legal or economic results. Their innovative approach results in diverse outcomes. Configurational work combines off-the-shelf technologies with novel technical and non-technical ideas and concepts. Instead of trying to make explicit changes to existing devices they innovate in the field of business models and social concepts for local energy needs (de Vries, Boon and Peine, 2016). Using off-the-shelf solutions, but introducing an important non-existent novelty dedicated to the local community. Another inherent part of cooperative innovation is their ability to innovate within local and regional contexts. These contexts and the ways in which innovation and transition processes co-evolve with and transform existing systems (Wieczorek, Raven and Berkhout, 2015).

The successes in small-scale applications (niches) can under certain circumstances be up-scaled and become the new standard in the energy market (new regime) (Köhler i inni, 2019). Successful niches facilitate the diffusion of innovative sociotechnical practices and systems, and theory suggests three ways by which niches can influence the regime: by enabling replication of projects within the niche, bringing about aggregative changes through many small initiatives; by enabling constituent projects to grow in scale and attract more participants; and by facilitating translation of niche ideas into mainstream settings (Seyfang i Haxeltine, Growing Grassroots Innovations: Exploring the Role of Community-Based Initiatives in Governing Sustainable Energy Transitions, 2012). Niches therefore help to diffuse innovations more widely (Kemp, Schot and Hoogma, 1998).

In our case the niche area means HCWS (and potentially other housing cooperatives in Wroclaw) that is challenging the existing regime of energy production and provision. Facing obstacles occurring from existing regime energy cooperatives formulate innovative answers. Those obstacles being:

a. Prosumers are "punished" for oversizing of PV installations. Possible excess electricity generated by PV installations over the needs for the common parts of a given building during the settlement period cannot be used by the cooperative, it can be sold with an uneconomical ratio.
b. Housing cooperatives may only produce electricity for common purposes, hence not for individuals

Regulations forced HCWS to reduce their PV potential to ⅓. HCWS is advanced in preparation project which combine photovoltaic systems with air heat pumps. Thanks to this solution, photovoltaic installation will be efficient in 4-storey buildings, and air-heat pumps will lower the cost of heat energy and electricity for inhabitants.

The team‘s design work indicates that such disruptive solutions do not yet exist in Poland, hence there are many legal, technical and organisational problems to be determined. Overcoming these hardships would mean that project developers can set a new standard in the sector of DH and renewables. At the same time, each of these problematic areas can be a source of conflict between partners and cause the project to collapse.

The breakthrough of niche-innovation should be accompanied by powerful actors joining support networks (Geels and Schot, 2007). Having the DHP joining the co-creation process is a sign of project capacity to conduct a niche created change in the regime. HCWS co-creates solutions which combine electricity and heat production against all legal limitations in order to include 4-storey buildings in an energy transition process. HCWS is using the fact that the heat energy market is less regulated and decentralised on the national level but strongly concentrated on the local level.

HCWS‘s idea is breaking the existing centralised district heating system with centralised heat production and supply, decentralised heat consumption (Picture no. 2). HCWS and DHP have no doubt that the forthcoming system (HCWS and DHP innovation) is forward-looking. This system has to be hybrid heating, partly centralised, and partly decentralised heat production and supply with decentralised heat consumption). The heart of this system will be an air–heat pump powered by PV and supported by district heating (Picture no. 3).

Cogeneration Power Plant (heat and electricity producer) | District Heating Network (DHP owner) | Buildings of the Housing Cooperative Wrocław (heat consumer)

Picture 2: Existing heat production, distribution and consumption system in Wrocław

Source: own work

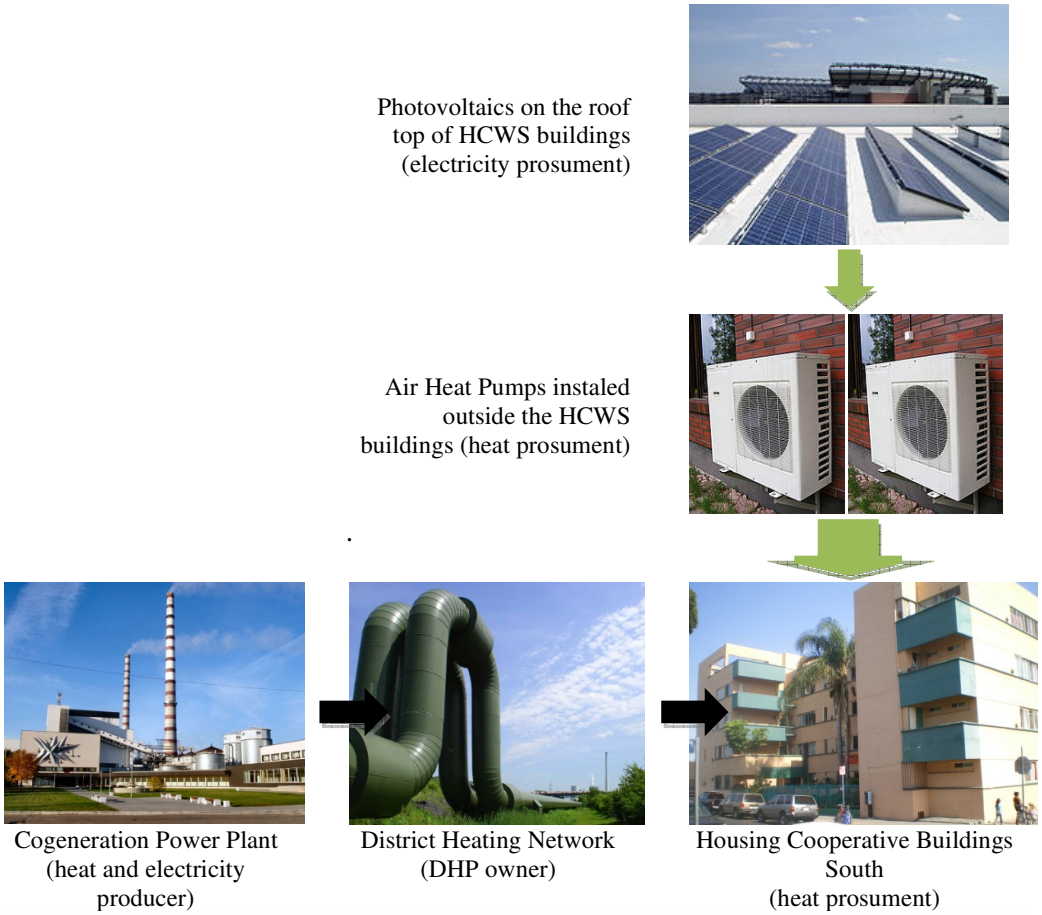

Picture 3: Hybrid heat production, distribution and consumption system in Wrocław projected by HCWS and DHP.

Source: own work

The overview of the CO_2 emissions of different heating technologies per kWh of thermal energy shows that more efficient heat pump technology combined with green electricity has the potential to nearly fully decarbonise heating. According to the European Heat Pump Association analysis, HP combined with green electricity provides us with an opportunity to decrease CO_2 emissions from 600 kg per KWH in case of district heating based on coal to 23 per KWH (*Heat Pumps,* 2018). Hybrid heat production, distribution and consumption system in Wrocław projected by HCWS and DHP gives the opportunity to radically decrease carbon footprint and harmful emissions associated with heat production (Table no. 1).

Table 1: Existing and projected by HCWS and DHP hybrid system consequences for carbon footprint and harmful emissions

Passive buildings using energy from air or ground – heat pumps powered by electricity from photovoltaics					
Hybrid solution – Buildings using energy from air-heat pumps powered by electricity from photovoltaics and energy from district heating produced in cogeneration from fossil fuels				**HCWS 4-storey buildings at the end of the project**	
Hybrid solution – Buildings using energy from air-heat pumps powered by electricity from fossil fuels and energy from district heating produced in cogeneration from fossil fuels					
Buildings using energy from district heating produced in cogeneration from fossil fuels		**HCWS 4-storey buildings now**			
Buildings where the heating energy is based on individual coal-fired ovens.					
	The highest	Carbon footprint and harmful emissions associated with the exploitation per unit of energy obtained			The lowest

Source: *own work.*

We know from the research that solar energy has become a reasonable solution for power and heat production due to the continuous advancements of solar technologies. There are several solar system technologies available for heat production in district heating (DH) – solar thermal collectors (SC), photovoltaic (PV) panels for power production and self-power consumption coverage of heating plants, as well as photovoltaic thermal panels (PVT) which can generate both power and heat energy. In addition, the authors of this research consider the integration of heat pumps, which can convert surplus of solar power from PV and PVT panels into heat when it is economically beneficial (Pakere and Blumberga, 2020).

The project implemented by HCWS introduces hybridisation of the solution that affects:

- organisational aspects,
- technological (PV with heat pumps and DH),
- business model.

Hybridisation of the technical solutions and creation of new organisational models could affect the system by cascading effects of the project outcome (Kemp, Schot i Hoogma, 1998). The project has great development capacities from niche to other units of this type ranging from the clients of a DHP in Wrocław, to its clients in other countries. Only in Wrocław, with approximately 700 thousands inhabitants, a dozen housing cooperatives exist. Only five of the biggest housing cooperatives in Wrocław manage more than 82,000 dwellings for approximately 246,000 inhabitants. On the national

level, there are approximately 3,680 housing cooperatives in Poland, with approximately 4 million members, which manage thousands of buildings that could be included in the developed innovation.

The DHP conducts operations in the Nordic countries, Baltic countries and India. Interviews with company representatives show that they are aware of the unique nature of the project and are ready to transpose it to other locations. Representatives of DHP face many challenges, but their awareness of friction and forces present in the landscape enabled them to see these factors as an opportunity, not a threat.

This process may cause interactions between multiple systems which will result in reconfiguration processes (Geels F. , 2007) (Papachristos, Sofianos and Adamides, 2013) (Konrad, Truffer and Voss, 2008) (Raven, 2007) (Raven and Verbong, 2009).

Cooperative projects often exceed sectors and combine separate regimes‘ frameworks. These are phenomena that can also be observed as part of the case study. The example of HCWS also exemplifies that cooperatives create more than just technical innovations in the field of renewable energy. The project bears social aspects as well – the process of energy transition in HCWS is co-created with the participation of residents who, through their local leaders, participate in meetings with DHP experts and the management board, expressing opinions and voicing their concerns. As a result, institutional, technological and social changes are created in a symbiotic way. The relationships that form in the system, determine the effectiveness of crossing niches (Raven, 2007). Openness to the co-creational approach, used in the HCWS, brought greater public acceptance for new solutions and that may cause a revolutionary effect (Avelino et al. 2019).

The project is still in its initial phase, which has been interrupted due to coronavirus hazard. Additional unforeseen uncertainty has been introduced in the process, which may result in both later acceleration of works in the future, or even withdrawal from the project.

Conclusions

Housing cooperatives can introduce solutions and innovations related to energy transformation in diverse ways. HCWS case study shows the ability to propose and implement disruptive innovations in the renewable energy sector by combining technologies (heat pump with PV), as well as through unprecedented business models and unique organisational solutions. Integrating PV installations into one solution in order to produce electricity for common areas of buildings (courts, elevators, staircases), and the energy produced to drive heat pumps that will provide heat and hot water to residents throughout the whole year. Therefore, housing cooperatives' renewable energy usage could increase and fuel energy transformation in cities and in the country. The project shows significant potential for scaling up in Wrocław, in Poland and in other European countries – mostly in Central-Eastern countries where DH constitutes a crucial part of the heat market.

Obstacles created by policymakers, regulators in one area (electricity production – decentralised electricity production from PV) limit prosuments' activity, and simultaneously provoke or force them to create other innovations in similar areas (heat production – district heating and air-heat pump production powered by electricity produced from PV). Innovations that arise in energy cooperatives go beyond strictly technological solutions. These projects are cross-sectional and take into account social and local context, building trust and confidence within the local society.

Materialising heat energy projects through community initiatives is difficult due to the shortage of people with the required expertise. Establishing partnerships is therefore vital for advancing the heat energy transition (Proka, Hisschemöller and Loorbach, 2018). Hybrid heat innovation (district heating network combined with air-heat pumps powered by PV) creates a lot of economic, technological, and legal challenges for both parties (prosument and district heating provider), which need to be resolved in order to avoid disrupting the innovation process. Those challenges and uncertainties in the project create risk and potential conflict. Further research will investigate the development process of creating innovations, which is currently suspended due to the threat of a

pandemic. The early stage of the project makes it difficult to definitively identify the phenomena occurring in the project. The final results of the research will be published after the conceptual part of the project is completed. Additionally, there is a possibility of future co-creative process led by Scalings' scientists and HCWS stakeholders to establish live lab to experiment with energy innovations and support other entities in Wroclaw's region, and to join the process of "learning by doing". The expertise of board management in technological aspects paired and enhanced with the ability to create partnership and win-win solutions could also be transferred into the learning process as a future part of engaged research. Subsequent study should include housing cooperatives operating in Wrocław to observe and compare differentiation factors creating innovation in energy transition projects.

Exploration of social energy transition projects from the Central and Eastern European region, underrepresented in the current academic research, is an important contribution to science. The next stage of research is scheduled as an international case comparison in the field of urban civic energy.

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Impact of The Complexity of The Legal and Tax System on The Effective Income Tax Rate in European Companies

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Abstract

The purpose of the article was to examine the impact of the complexity of the tax system on the effective income tax rate. The research group comprised companies from the European Union. The results of the study confirm the existence of a relationship between the complexity of the tax system and the effective income tax rate. The study used regression analysis and correlation analysis. This is a preliminary study covering only one reporting year - 2018.

Keywords: Income Tax Rate, European Companies, Accounting

Introduction and Literature Review

The scientific goal of the paper is to find out the determinants of tax avoidance in European countries with particular emphasis on countries from Central and Eastern Europe. The term "tax avoidance" in the study is defined as a set of activities resulting in a reduction of tax burden. A characteristic feature of tax avoidance is a legal action, which means that it is not a fraud (Kovermann 2019 a, Belz et al. 2019). This phenomenon of tax avoidance is particularly visible in developing countries, where awareness of social responsibility for the sustainable development of society is still low.

Tax avoidance by companies is a fact that has been noticed by many researchers (Kovermann 2019 a, Belz et al. 2019). On the basis of reviews of 79 scientific papers from the years 2006 to 2018 concerning tax avoidance (Kovermann 2019 a), it can be stated that most of studies included companies from developed countries, mainly from the United States. Dyreng et al. (2017) also conducted an analysis of American companies. In most papers (Kovermann 2019 a) research samples covered periods ended in 2011. It suggests that research results might be outdated. The problem of outdated research results is also confirmed in other publications (Akhtar et al. 2017). Based on the conducted research (Thomsen, Watrin 2018) it is stated that companies from the United States do not avoid taxes to a greater extent than companies from 12 largest European countries. The limitation of the study of these authors was the selection of only the largest European countries. Authors omitted or removed from the research smaller countries from Central and Eastern Europe. Verification of the hypothesis formulated in articles were made using mainly quantitative variables (Richardson 2007, Akhtar et al 2019 , Kovermann 2019b).

The article will examine large companies (division according to the definition of BvD Orbis) from countries belonging to the European Union. Due to the nature of the study, the preliminary study, the analysis concerns one year - 2018. In subsequent articles, the research period will be extended.

Tax avoidance is measured using the effective tax rate. There are many formulas of effective tax rate (Graham et al. 2012). In practice, it is stated that the gross result determined in accordance with the accounting law differs from taxable income, hence the effective tax rate is different from the statutory corporate income tax rate (CIT). The countries that belong to the European Economic Area have been trying to legally limit tax avoidance, as demonstrated by EU Council Directive 2018/822. At present, there is a gap in a knowledge how financial and non-financial factors influence the effective tax rate. Most studies in the field of tax avoidance cover highly developed countries (Kovermann 2019 a). Additionally the period of conducted research may indicate outdated results (Akhtar et al. 2017). Determinants used in majority of papers include varied quantitative and not qualitative factors (Belz,

et al. 2019, Chen, Chen et al. 2010; Badertscher et al. 2013). According to the applicant assumption, non-financial variables possess high information potential and should be used to a greater extent in tax avoidance studies.

Due to different statutory income tax rates in European countries, the analysis will be based on the deviation of the effective tax rate from the statutory tax rate. Negative deviations (STR-ETR) between tax rates will indicate that the effective tax rate is higher than the statutory tax rate. This means that there may be permanent book tax differences as well as companies that bear a higher tax burden. It may also indicate inefficient use of deferred income tax procedure. Positive deviations indicate that the accrued income tax is lower than the statutory income tax rate, which may indicate the use of tax optimization. Additionally, the research introduces a variable specifying the size of companies to check the legitimacy of political power theory or political cost theory.

In the research on the impact of the quality of corporate accounting on tax avoidance, the impact of the choice of an audit company on tax avoidance was examined. In the studies of Kanagaretnam et al. (2016) and Richardson et al. (2013) and Gaaya al. (2017) it is indicated that the choice of an auditor from the "big four" reduces tax avoidance. On the other hand, the research by Hogan, Noga (2015) and Apostol, Pop (2019) indicate that there is a positive relationship between the costs of legal and tax services and tax avoidance. Tax burdens are in focus of various tax authorities (national tax administration). The interest of state authorities may affect tax avoidance (research in this area was conducted on a group of American companies Kubick et al. (2016), Jiménez-Angueira (2018)).

The impact of legal regulations and tax administration on the effective tax rate will be measured on the basis of the average time tax preparation by companies. This measure objectively shows how much time it takes to prepare a income tax reports. It is assumed that the longer the tax preparation time, the more complicated the legal regulations are.

The article sets out two research hypotheses:

H1: There is a relationship between the complexity of law and the effective tax rate.
H2: There is a relationship between the size of companies and the effective tax rate.

Methodology

The survey will be conducted on a group of large companies. It is assumed that for large companies there are no simplifications regarding deferred income tax. This means that the difference between the statutory income tax rate and the effective tax rate results from the existence of permanent differences. The effects of permanent differences cannot be adjusted by applying deferred tax. Due to the fact that in different countries there is a different statutory rate of income taxation, the analysis will be based not on the effective income tax rate, but on deviations between the statutory income tax rate and the effective income tax rate.

The verification of the research hypothesis will be carried out using Spearman correlation analysis and regression analysis. The following variables were identified in the study:

- (STR-ETR) – statutory tax rate for a country minus effective tax rate
- ETR – effective tax rate, income tax rate from P&L divided by gross income
- TIME – „Time to prepare and pay taxes is the time, in hours per year, it takes to prepare, file, and pay (or withhold) three major types of taxes: the corporate income tax, the value added or sales tax, and labour taxes, including payroll taxes and social security contributions."[1]
- LNA – natural logarithm of the sum of assets

The list of country ISO code:

[1] Based on https://www.theglobaleconomy.com/rankings/Tax_preparation_time/ [access 27/04/2020]

AT -Austria
BE – Belgium
BG - Bulgaria
CZ – Czech Republic
DE - Germany
DK - Denmark
EE - Estonia
ES – Spain
FI - Finland
FR – France
GR - Greece
HR - Croatia
HU - Hungary
IE - Ireland
IT - Italy
LT - Lithuania
LU - Luxembourg
LV - Latvia
MT - Malta
NL - Netherlands
PL - Poland
PT - Portugal
RO - Romania
SK - Slovakia

There are many measures of effective income tax rate. Some measures use actual income tax expenses, others use the tax burden on the income statement. In the case of actual income tax expenditure, it is difficult to obtain reliable data. Due to the limitations of available databases (BvD Orbis, EMIS), it seems that the best measure of effective income tax rate should base on data obtained from annual financial statements. In the research group (large European Union companies), all entities determine deferred income tax, so the methodology for determining the tax burden on companies is the same.

Figure 1 presents income tax rates in European countries.

Figure 1: Box Plot of STR

Source: https://www.theglobaleconomy.com/rankings/Tax_preparation_time/ [access 27/04/2020]

Based on Fig. 1, it can be concluded that in the European Union there are countries with very high statutory income tax rates (exceeding 30% - eg. France, Malta), as well as countries with very low tax rates (below 10% - eg. Hungary, Bulgaria). Such a large discrepancy proves the sense of analysing the deviations between the statutory income tax rate and the effective tax rate.

Figure 2 shows the values for the TIME variables in individual European countries.

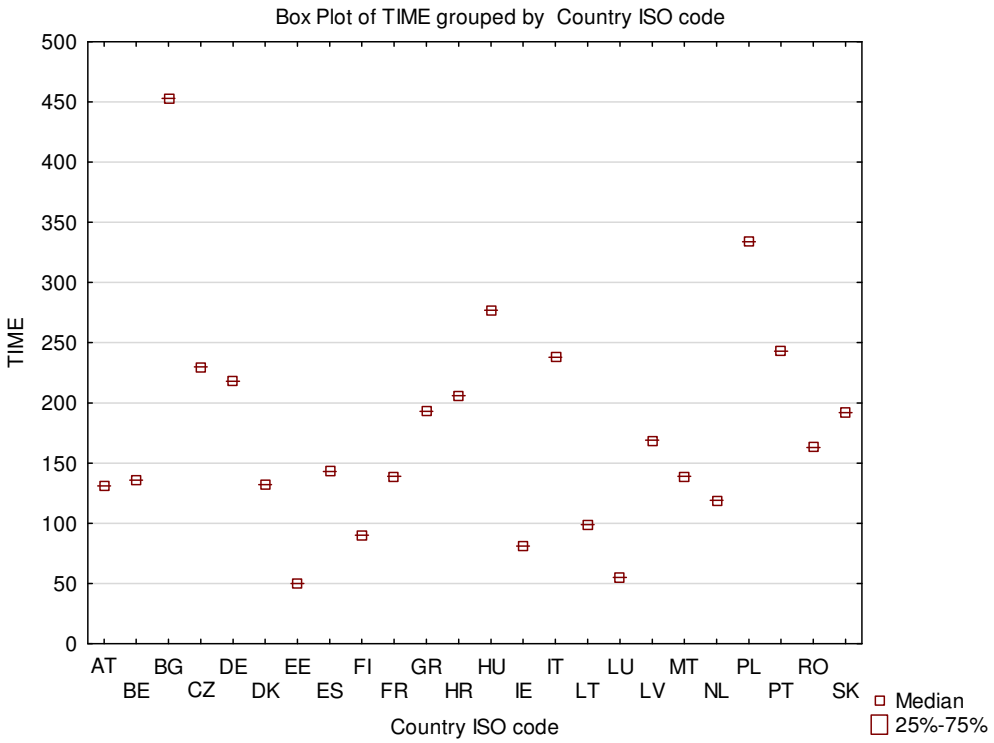

Figure 2: Box Plot of TIME

Source: https://www.theglobaleconomy.com/rankings/Tax_preparation_time/ [access 27/04/2020]

One can notice large discrepancies between the time of preparing the tax settlement in individual European countries. If time is an indicator of the complexity of the tax system, the most complex tax system is in Bulgaria, Poland and Hungary.

Figure 3 presents an analysis of the size of companies in European countries (in the study group).

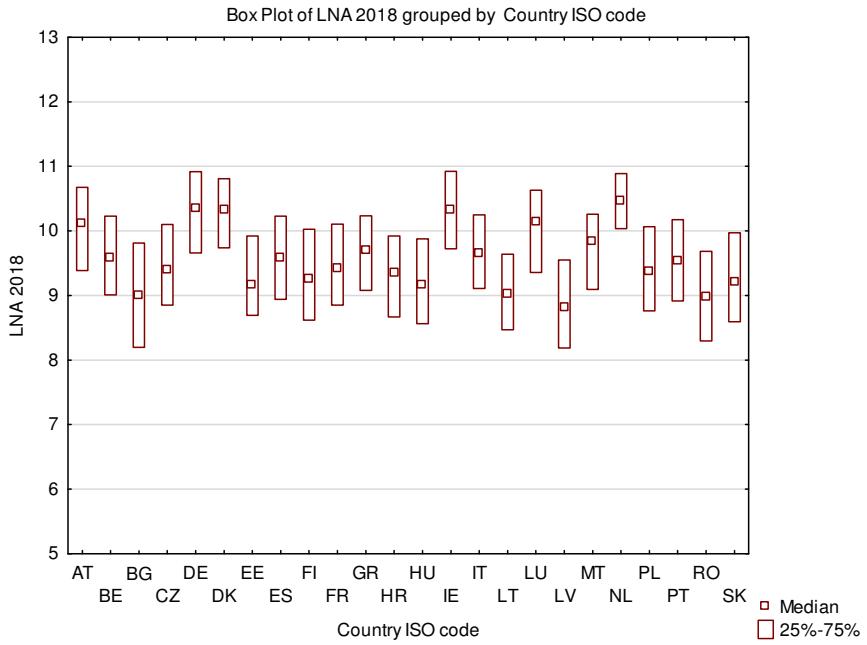

Figure 3: Box Plot of LNA

Source: own study

Based on Figure 3, it can be seen that even in the group of large companies there are differences in the size of companies in European countries.

On the basis of available financial data of large European companies (BvD Orbis), I received 67.022 companies that published financial data in the year 2018. Selection of the research sample is conducted in accordance with the recommendations contained in the papers Thomsen (2018) and Richardson (2007) and is as follows:

Full research sample covering the year 2018 - 137.316 companies,
Removal of companies with gross loss – 89.434 companies remaining,
Removal of companies with income tax lower than 0 – 76.018 companies left,
Removal of companies with an ETR higher than 1 – 72.334 companies left,
Removal of companies with missing data – 67.022 companies remained.

The removal of companies with a gross loss is caused by the interpretation difficulties of the final results and conclusions. In addition, in entities which disclosed a tax burden below 0 it may indicate settlement of tax losses over time or excessive optimism in disclosing deferred income tax assets.

Research Results

Based on descriptive statistics of explanatory and explained variables, it can be concluded that in Europe, on average, preparation and settlement of tax obligations takes 200 hours. Assuming an average work month as 160 hours (20 days multiply 8 hours per day), the accountant needs more than one month for tax settlements. Based on Table 1, it can be noticed that there are countries where tax settlements take only 50 hours (slightly more than a week) and there are countries where these settlements take over 450 hours (over 11 weeks). The study indicates that the complexity of legal regulations has an impact on the time of tax settlements.

Table 1: Descriptive statistics

Variable	Descriptive Statistics					
	Valid N	Mean	Median	Minimum	Maximum	Std.Dev.
TIME	67022	200,21	218,00	50,00	453,00	72,42
LNA	67021	9,57	9,55	3,64	12,93	0,98
STR-ETR	67022	-0,02	0,00	-0,90	0,34	0,14

Source: own study

Figure 4 presents deviations of the effective tax rate from the statutory tax rate in European countries. Based on Figure 4, it can be seen that in most countries the median deviation of the effective tax rate from the statutory tax rate is close to 0. This might indicate that the accounting system effectively corrects accrual income tax calculations.

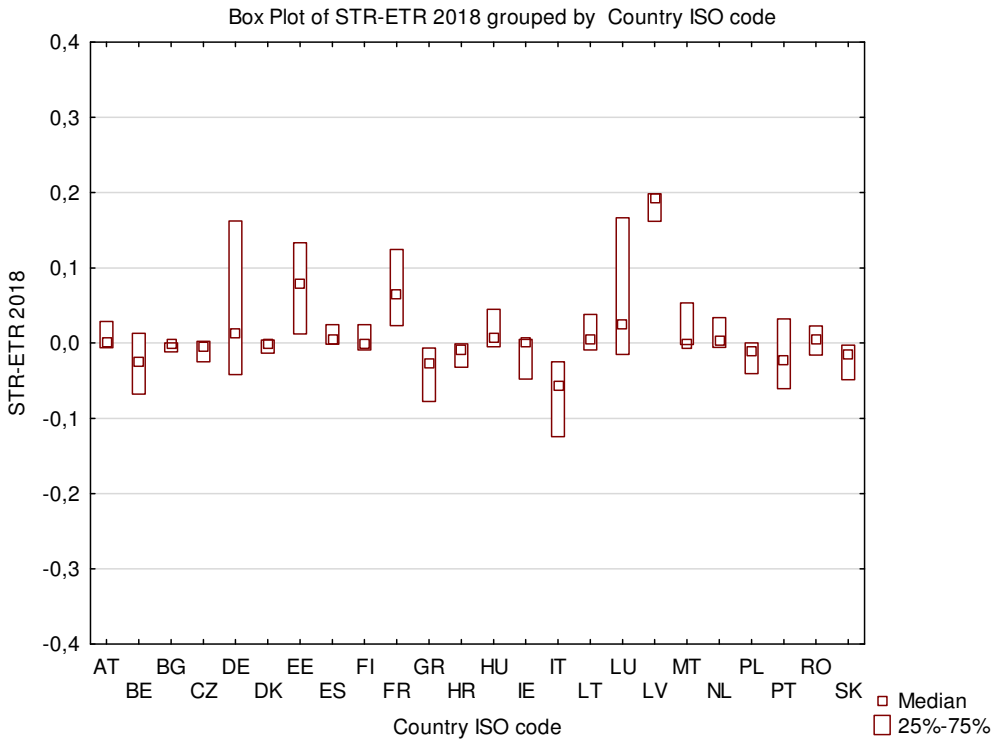

Figure 4: Box Plot of STR-ETR

Source: own study

The verification of research hypotheses is carried out on the basis of correlation and regression analysis. Table 2 shows Spearman's correlation analysis.

Table 2: Spearman correlation

Variable	Spearman Rank Order Correlations MD pairwise deleted Marked correlations are significant at p <,05000		
	TIME	STR-ETR	LNA
TIME	1,000	**-0,333**	**-0,042**
STR-ETR	**-0,333**	1,000	**0,051**
LNA	**-0,042**	**0,051**	1,000

Source: own study

Based on Table 2, it can be concluded that the extension of the tax settlement preparation time reduces the deviation between the effective income tax rate and the statutory income tax rate. This situation may result from greater precision in determining deferred income tax, which requires more time expenditure. Additionally, it can be seen that the size of the company increases the deviation between the statutory tax rate and the effective tax rate. This may result from shifting higher tax burdens to large companies (as part of corporate social responsibility).

Table 3 presents the coefficients of the linear regression function in which the explained variable is the STR-ETR variable.

Table 3: Regression analysis

Effect	Parameter Estimates Sigma-restricted parameterization			
	STR-ETR (Param.)	STR-ETR (Std.Err)	STR-ETR (t)	STR-ETR (p)
Intercept	**-0,02005**	**0,00538**	**-3,72503**	**0,00020**
TIME	**-0,00039**	**0,00001**	**-53,91772**	**0,00000**
LNA	**0,00841**	**0,00053**	**15,86793**	**0,00000**
Dependent Variable	Multiple (R)	Multiple (R2)	Adjusted (R2)	
STR-ETR	**0,215999**	**0,046656**	**0,046627**	

Source: own study

Regression analysis indicates that there is a relationship between the TIME variable and STR-ETR. The coefficient for the TIME variable is negative, which means that reducing the time to prepare tax settlements will affect the distance from the effective tax rate from the statutory tax rate. If the TIME variable means complicated legal provisions, it cannot be said that the more complicated legal provisions, the greater the deviation between the statutory tax rate and the effective tax rate.

The size of companies is the other analysed variable. Based on Table 3, it can be concluded that the factor at the LNA variable is positive. This means that the larger the company, the greater the deviation between the statutory tax rate and the effective tax rate. Large companies reveal higher effective tax rates, which may be related to higher tax burdens.

Conclusions

The aim of the paper was to check the relationship between tax burdens of companies and the size of entities, as well as the time necessary for tax settlement in European Union countries. In the paper I positively verified two research hypotheses saying that there is a relationship between the dependent variable STR-ETR (deviation of the statutory rate and effective tax rate) and the TIME variable and

the LNA variable. The research is a preliminary study covering only 1 financial year (2018). The selection of the research sample, large companies, was dictated by the accounting regulations regarding the disclosure of deferred income tax. The research results show that the more complicated the legal system is (TIME variable), the difference between the effective tax rate and the statutory tax rate is bigger. This may indicate a prudent principal to determining the amount of tax burden by introducing permanent differences. On the other hand, the size (variable LNA) of the company reduces the deviation between the statutory tax rate and the effective tax rate. This may indicate a greater propensity for tax risk in the group of large companies.

Further studies will analyse the longer time series as well as introduce additional variables measuring the complexity of the tax system.

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Managerial Overconfidence and Corporate Investment

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Abstract

Managerial overconfidence plays a substantial role in corporate decisions, particularly investment decisions. Company predictions are subject to representative biases, which lead to distortions in decision making. As a result, companies with overconfident managers are likely to show higher levels of corporate investment. Investment literature conducted in Indonesia, mostly linked investment decisions with company conditions such as cash flow, financial constraint, or agency problems. Therefore, this study focuses on the subject of the investment decision maker which rarely been conducted and give information for investor and management to understand that managerial overconfidence will affect corporate investment. This research aims to examine the influence of managerial overconfidence on corporate investment using a sample of 230 non-financial companies listed on IDX between the years 2008 and 2018. Data was collected from Thompson - Reuters (Eikon) and company's audited financial reports. Managerial overconfidence was measured by OC_FIRM4, OC_FIIRM 5, and OC_SCALA indices. Cashflow, opportunity growth, company size and corporate governance are used as control variables. All data for this study was generated using panel regression in Eviews. This research found that managerial overconfidence has a positive correlation on corporate investment. OC_FIRM4 and OC_SCALA has a significance of 0.01 meanwhile OC_FIRM5 has a 0.10 significance. As predicted, cash flow and opportunity growth had a positive correlation on corporate investment; company size had a negative correlation on corporate investment. Corporate governance in this research used a ratio of independent commissioners compared to total commissioners. This ratio had inconsistent significance for corporate investment.

Keywords: Managerial Overconfidence, Overconfidence Bias, Corporate Investment

Introduction

The goal of a company is to maximize its shareholders' wealth (Dayananda et al, 2002). To maximize value, top management plays a substantial role in company decisions regarding financing decisions, which focus on the firm's optimal capital structure; dividend decisions, which concern the form in which returns will be distributed to shareholders; and investment decisions, which deal with how funds raised are employed in a productive way to achieve a firm's goals (Dayananda et al, 2002).

WeWork is a start-up company founded by Adam Neumann. In 2011, WeWork has valuation no more than $10 million. But for the year between 2017-2019, it had a rapid change in valuation. In 2017, SoftBank invested $ 4.4B to Wework, this investing helped WeWork to expand its business and flourish its valuation (Peters, 2019). But in 2019, WeWork's valuation plummeted from $ 47B to $6,94B and failed to make its IPO happened (Alpeyev et al, 2020). Adam Neumann is considered overconfidence on WeWork's investment. Zeitlin (2019) stated that Neumann has a vision to make empire company from WeSleep to WeSail to WeBank. On top of that, Adam Neumann has conducted investment activities over his overconfidence decision with a total of $13 Million for a room with artificial wave (WaveGarden) and a school for elementary level start-up students (WeGrow). Consequently, the overconfidence decision failure led to bankruptcy and WeWork has laid off more than 2,400 employees globally.

Microsoft acquired Nokia for $ 7.9B in September 2013 and produced Lumia (Martin, 2016). Microsoft targeted to compete with Apple and Samsung in mobile phone industry. Unfortunately, as one of the Nokia's product, Lumia did not have big impact for the company, International Data Corporation

reported that in Q1 2013 dan Q1 2014, Samsung and Apple dominated the market with 30.8% and 15.2% respectively. With that result, in 2014 Steve Ballmer left Microsoft, then in 2015 Microsoft write off 96% of its Nokia's investment (Bass dan Ewing, 2015). Moreover, Hwang et al (2020) argued that the failure may be caused due to agency problems (CEO power) and CEO Overconfidence (managerial hubris).

Lippo Group is a prominent business group in Indonesia. It has subsidiary companies named PT Global Ecommerce Indonesia and PT Multipolar. PT Global Ecommerce Indonesia as an e-commerce business, had project namely MatahariMall.com. Meanwhile PT Multipolar has subsidiary company named PT Matahari Departement Store. In 2017, PT Matahari Departement Store invested in PT Global Ecommerce Indonesia for Rp 590 Billion (about $43 Million) in accordance to win in online market industry. In 2018, the net profit of PT Matahari Departement Store has declined by 42% compared to the previous year due to a decrease in investment value at MatahariMall.com (Rahmawati, 2019).

By looking at WeWork, Microsoft and Lippo Group, companies should consider internal and external conditions to review the feasibility of an investment. Internal condition can be seen from the amount of cash owned by the company. If the company has excess cash from its business operations, it means that the company is able to do an investment. Researches conducted by Fazzari et al, (1988) and Abel (2018) show a direct influence between cashflow and corporate investment.

Besides of its internal condition, management also needs to consider external condition such as macroeconomic policy, and the capital market. A company must also evaluate the potential impact of the investment on its external situation, including areas such as social and environmental impact, government perception, and the effect of the investment on the company's image (Dayananda et al, 2002).

Both internal and external condition need to be assessed using professional judgement. Therefore, this study focuses on the decision-maker; top management. The subject who made the investment decisions might have irrational behavior such as overconfidence which caused by the illusion of control or success trap. Malmendier and Tate (2005) argue that overconfidence arises when the CEO overestimates the future returns of the company (feeling "above average"). According to the report by Gervais et al, (2011), the CEO's overconfidence has a positive influence on the investment. The CEOs are committed to optimizing their company's investment, so they tend to find relevant information and attempt to increase the level of investment success. Gervais et al, (2011) also highlighted that exaggerated confidence has a negative impact for the corporate.

Although managers have incentives regarding the company's performance, and shareholder do not suffer from information asymmetry, it is still possible for managers to make non-optimal investments. However, since investment decisions are crucial to maintaining the company's going concern and value creation, companies should have policies to optimize corporate governance so that the company can control overconfident manager. As seen with WeWork, Microsoft, and Lippo Group, irrational and biased decision making can lead to negative consequences for the company. Investment decisions can be distorted by managerial overconfidence and may negatively impact the company's going concern.

Literature Review and Hypothesis

Investment decisions, focus how funds raised are employed in a productive way to achieve a firm's goals (Dayananda et al, 2002). A company's funds can be invested in short or long-term assets (Dayananda et al, 2002). In the long term, the company uses capital budgeting for either intangible or tangible assets to assess their investment feasibility. A company is able to make internal or external investments, such as mergers and acquisitions, in accordance with wealth maximation. This study focuses on the influence of managerial overconfidence on companies' internal investments.

A company refers to the capital budgeting process to identify and implement investment decisions and to ensure the decisions are in line with corporate goals (Dayananda et al, 2002). This evaluation process is required for the company to determine which investments to pursue. It includes strategic planning, identification of investment opportunities, preliminary screening, financial appraisal, evaluation of projects, an acceptance/rejection decision, project implementation, and monitoring, as well as post-implementation audits.

To ensure the feasibility of investment, net present value, internal rate of return, payback period, and Monte Carlo analysis are the assessment instruments that company relies on. These assessments require subjective judgment to calculate it. For example, to determine cash flow projections, a discount rate and risk assumption are involved. Professional judgement also needed to asses external conditions applied to the project and company.

Managerial Overconfidence

Managers have various psychological characteristics that affect their decision-making. One individual characteristic that influences decision-making is overconfidence. Overconfidence may originate in an individual's personality, or it may be generated by contingent situations. Overconfidence can be caused by the illusion of control, which can arise from an individual's faith that positive results from their decision-making on past occasions demonstrate the individual's capabilities.

Decision-making may be biased due to optimism and overconfidence. Statman and Tyebjee (1985) explained that decision-makers who are aware that their decision relies on a forecast display optimism bias. According to Baker and English (2011), overconfidence bias is related to the representativeness heuristic, in which decision-makers believe the decision is similar to other issues they have already dealt with. Kahneman and Riepe (1998) stated that human mindsets seek out logical patterns; this encourages the decision-maker to conclude that events occur due to rational and predictable patterns, even if the events are actually occurring randomly. Moreover, people may believe, incorrectly, that lucky conditions are a controllable factor. Kahneman and Riepe (1998) added that financial decisions are made in highly complex and complicated situations, therefore, the decision-maker relies on intuition.

According to Roll (1986) decision-making may be biased due to overconfidence traits, and irrational bias may appear when top management make a business decision. Gervais et al, (2011) explained that overconfident people tend to believe that their estimations are accurate, particularly at the CEO level. Furthermore, Malmendier and Tate (2005) explained that the CEO tends to overestimate the return of their investment opportunities and underestimate the risks related to their investments.

Research related to managerial overconfidence and corporate investment has been carried out in several countries.

In China, Ying et al, (2019) studied the influence of managerial overconfidence on internal financing decisions and investment efficiency. Internal financing causes excessive investment, especially for companies with managerial overconfidence.

In Korea, Koo and Yang (2018) found that managerial overconfidence intensified by self-attribution bias induced investment-cashflow sensitivity to get stickier, indicating corporate investment distortion.

In Tunisia, Baccar et al, (2016) found that corporate investment was affected by psychological biases, including overconfidence, on corporate decisions.

Kamoto (2014) tested the interaction between internal financing with managerial overconfidence. This research found that internal funding was correlated to the influence of managerial overconfidence about investment decisions. Companies with higher internal financing invested more.

Ben-David et al, (2013) found that subjects tended to miscalibrated due to overestimating the precision of their forecasts and underestimating the volatility of risk. It showed that optimistic executives tended to invest large amounts and rely on debt.

In Taiwan, Hsiao et al, (2011) examined the relationship between managerial sentiment and corporate investment, as well as the relationship between investment and corporate value. They found that optimistic managers tended to overestimate their investments.

In the U.S.A, Malmendier and Tate (2005) investigated the relationship between managerial overconfidence and corporate investment. They defined CEO overconfidence as a CEO who cannot reduce their personal exposure to company-specific risk. This research indicated a significant relationship between executive overconfidence and corporate investment.

Therefore, the following hypothesis can be proposed:

Managerial Overconfidence has a Positive Correlation on Corporate Investment

Control Variables

The fundamental matter in investment is the financing made by the company which can be viewed from two perspectives; financial constraint and agency problem. Financial constraint reduces the ability of company to obtain capital source; the agency problem involves on the conflict of interest between the principals (shareholders) and agents (managers).

In an imperfect capital market, asymmetric information leads to an expensive external financing compared to internal financing. Lewellen and Lewellen (2016) assert that the company tends to invest more if the internal financing has a lower cost than the external one. This is in line with the research conducted by Fazzari et al, (1988) and Carpenter and Guariglia (2008), which added that cashflow plays a substantial investment role in companies with financial constraints.

The agency problem refers to a conflict of interest between principals and agents (Jensen, 1986). The agent believes that the distribution of return to shareholders will reduce the agent's access to resources that can be used for investment. Furthermore, as Jensen (1986) explained, agents prefer to use free cash flow as an investment source since it is controlled by management, and this results in the principal receiving a minimum amount (or zero) of return. Chen et al, (2020) found a positive influence of CEO overconfidence on corporate cash holdings. Malmendier & Tate (2005) found positive influences of cash flow on corporate investment.

The use of internal financing also related to pecking order theory where management as an agent is assumed to understand the condition of the company better than the shareholders. Myers and Majluf (1984) stated that agent prefers to protect the interests of shareholder rather than to issue a debt to finance an investment which they believe that the company's valuation is undervalued on the market.

A company with high growth opportunities tends to maximize its growth. Growth opportunity can be assessed using the company's Tobin's Q (Lang et al, 1989). Q describes the ratio between the firm's market value and the replacement cost of the firm's physical assets. Tobin (1978) explained that if the company has Q greater than 1, then additional investment would be rational, since the profits generated would exceed the cost of the firm's assets. Malmendier and Tate (2005) found that Q has an insignificantly positive influence on corporate investment as a control variable.

Small-scale companies tend to have higher levels of investment. A negative relationship between the company's size and its investments may be caused by the heterogeneity of the company's investment opportunities. Research by Gala and Brandon (2016) showed that company size has an inverse influence on investment. The researchers sorted sample companies into separate decile portfolios; they found that the larger the company size, the lower the investment level. Gala and Brandon (2016) further determined that company size is as important as Tobin Q or cashflow in explaining corporate investment.

The principal-agent theory focuses on information asymmetry between the agent and the principal. The agent has better internal information compared to the principal, and the principal has difficulty ensuring that the agent will act in the principal's best interest—by maximizing shareholder value—rather than pursuing the agent's own self-interests.

A combination of managerial overconfidence and lack of corporate governance mechanisms can lead companies to choose investments with a negative present value (unfavorable for the company). Therefore, it is necessary for a company to ensure that corporate governance controls its investment decisions. Malmendier and Tate (2005) used corporate governance as a control variable in their research into managerial overconfidence and corporate investment. Francis et al, (2013), researching emerging markets, found that companies with better corporate governance mechanisms had better corporate investment allocation and were better able to mitigate financial constraints.

Research Method

This study aims to analyze the influence of managerial overconfidence on corporate investment. Using panel regression, this study analyzed 2530 data of 230 companies listed in IDX for the years 2008-2018. A sample of the research is as follows:

Table 1: Research Sample

Sub-Sector	Total Company
Agriculture	6
Basic Industry	42
Consumer Goods Industry	27
Infrastructure, Utilities and Transportation	19
Mining	18
Miscellaneous Industry	28
Property, Real Estate and Construction	31
Trade, Service and Investment	59
Total Sample	230

The independent variable in this research is managerial overconfidence, while corporate investment is the dependent variable. This study used cash flow, company growth, company size, and corporate governance mechanisms as control variables. The data in this study was generated from Thompson Reuters Eikon and the companies' own financial reports.

The dependent variable measured by capital expenditure normalizes with beginning-of-the-year capital. Managerial overconfidence as independent variable was measured using OC_FIRM indexes, refers to Schrand & Zechman (2012). OC_FIRM indexes are constructed from five components below:

Table 2 : Managerial Overconfidence Measurement

No	Category	Measurement	Remarks
1	Industry-adjusted excess investment	Firm's residual from a regression of total asset growth on sales less the industry median residual.	It indicates managerial overconfidence if the company's residual value is higher than the industry median.
2	Industry-adjusted net dollars	Industry-adjusted net dollars from an acquisition made by the company.	If the value of the acquisition exceeds the industry median, it shows overconfidence.
3	Industry-adjusted debt to equity ratio	Long-term debt scaled by the market value of the company, less the median industry.	Debt-to-equity ratio exceeding the industry median shows overconfidence.
4	Risky debt	If the company has preferred shares and/or convertible bonds.	Having preferred shares and/or convertible bonds indicates overconfidence.
5	Dividend policy of company	Dividend Payout Ratio of the company less industry median.	A dividend payout ratio under the median industry indicates overconfidence.

This research uses three indexes of OC_FIRM:

- OC_FIRM4 equal 1 if at least two of the four components indicates overconfidence, otherwise 0.
- OC_FIRM5 equal 1 if at least three of the five components indicates overconfidence, otherwise 0.
- OC_SCALA is indicated by total components (valued between 1 – 5).

The occupied variable control measurements in this research are as follow:

- Cashflow
  Adopted from Malmendier and Tate (2005), cashflow is calculated by EBITDA compared to the total capital at the beginning of the period.
- Growth opportunity
  Growth opportunity is measured by Tobin's Q at the beginning of the year. This research uses approximate Q, as per Chung and Pruitt (1994), the formula is (market value of equity + preferred stock +short term liabilities – short term assets + long term debt): total assets.
- The size of company
  Adopted from Malmendier and Tate (2005) and Francis et al, (2013), the size of company is measured by the natural logarithm of total assets at the beginning of the year.
- Corporate governance is measured by the ratio of independent commissioners compared to the total commissioners.

To test the hypotheses, this study uses panel data regressions as follows:

$$D_INVSt=\alpha+\beta OC_FIRM4t+\beta CASHFLOWt+\beta GROWTHT-1+\beta SIZEt-1+\beta INDPCOMMt+\mathcal{E}$$

$$D_INVSt=\alpha+\beta OC_FIRM5t+\beta CASHFLOWt+\beta GROWTHT-1+\beta SIZEt-1+\beta INDPCOMMt+\mathcal{E}$$

$$D_INVSt=\alpha+\beta OC_SCALAt+\beta CASHFLOWt+\beta GROWTHT-1+\beta SIZEt-1+\beta INDPCOMMt+\mathcal{E}$$

Where D_INVS is an investment as a variable dependent; OC_FIRM4, OC_FIRM5, and OC_SCALA are proxies of managerial overconfidence. Control variables are denoted as CASHFLOW, GROWTH (Company Growth), SIZE (Company Size), and INDPCOMM (Corporate Governance).

Result and Discussion

Table 3 shows the data distribution for each variable before Winsornize. Variables such as D_INV, CASHFLOW, and GROWTH have skewness values outside of -2 and 2. These indicate that the data are not distributed normally. According to Bodie et al, (2014), in order to normalize the data, outlier data can be replaced with values from calculated Mean ± (3 x Standard Deviation). OC_FIRM5 has a skewness value outside of -2 and 2, since it is dummy variable, there is no need to Winsornize.

Table 3: Statistical Descriptive Before Winsornize

	Mean	Median	Max	Min	STd.Dev	Skewness	N
D_INV	0.1286	0.0471	83.6787	-0.3999	1.6941	47.6033	2530
OC_FIRM4	0.2794	0.0000	1.0000	0.0000	0.4488	0.9830	2530
OC_FIRM5	0.0842	0.0000	1.0000	0.0000	0.2777	2.9949	2530
OC_SCALA	1.2285	1.0000	5.0000	0.0000	0.9147	0.4452	2530
CASHFLOW	0.1850	0.1403	9.0418	-10.9460	0.3911	-2.4251	2530
GROWTH	1.1265	0.5917	40.1791	-0.7688	2.2995	8.3819	2530
SIZE	28.3224	28.2772	33.3208	22.7426	1.7009	0.0625	2530
INDPCOMM	0.3953	0.3750	1.0000	0.0000	0.1289	0.4315	2530

Table 4 shows the data distribution for each variable after Winsornize which are used for the next statistical procedure.

Table 4: Statistical Descriptive After Winsornize

	Mean	Median	Max	Min	STd.Dev	Skewness	N
D_INV	0.0793	0.0471	0.4278	-0.3999	0.0924	1.8635	2530
OC_FIRM4	0.2794	0.0000	1.0000	0.0000	0.4488	0.9830	2530
OC_FIRM5	0.0842	0.0000	1.0000	0.0000	0.2777	2.9949	2530
OC_SCALA	1.2285	1.0000	5.0000	0.0000	0.9147	0.4452	2530

CASHFLOW	0.1716	0.1430	0.8007	0.9884	0.1756	0.7240	2530
GROWTH	0.9334	0.5917	4.4123	-0.7688	1.0673	1.7920	2530
SIZE	28.3224	28.2772	33.3208	22.7426	1.7009	0.0625	2530
INDPCOMM	0.3953	0.3750	1.0000	0.0000	0.1289	0.4315	2530

According to the Pearson correlation, value below 0.8 indicates that there is no relationship between independent variables or multicollinearity does not found in the model. However, OC_FIRM4, OC_FIRM5, and OC_SCALA will be tested separately because all of them measure the managerial overconfidence.

Table 5: Correlation Between Independent Variables

Correlation								
Probability	**D_INVS**	**CASHFLOW**	**OC_FIRM4**	**OC_FIRM5**	**OC_SCALA**	**GROWTH**	**SIZE**	**INDPCOMM**
D_INVS	1.0000							

CASHFLOW	0.3496	1.0000						
	0.0000	-----						
OC_FIRM4	0.0978	0.0062	1.0000					
	0.0000	0.7551	-----					
OC_FIRM5	0.0534	-0.0076	0.4868	1.0000				
	0.0071	0.7014	0.0000	-----				
OC_SCALA	0.0695	-0.0265	0.7555	0.6278	1.0000			
	0.0005	0.1811	0.0000	0.0000	-----			
GROWTH	0.2034	0.3861	-0.1003	-0.0409	-0.1381	1.0000		
	0.0000	0.0000	0.0000	0.0395	0.0000	-----		
SIZE	0.0865	0.1255	0.1360	0.0457	0.0941	0.1413	1.0000	
	0.0000	0.0000	0.0000	0.0215	0.0000	0.0000	-----	
INDPCOMM	0.0018	0.0395	-0.0069	0.0027	0.0070	0.0068	0.0797	1.0000
	0.9259	0.0468	0.7264	0.8897	0.7229	0.7302	0.0001	-----

Table 6 shows the regression results of OC_FIRM4, OC_FIRM5, and OC_SCALA as managerial overconfidence measurement toward to corporate investment.

Table 6: Regression Output

VARIABLE	**OC_FIRM4**		**OC_FIRM5**		**OC_SCALA**	
	t-Statistic	Prob	t-Statistic	Prob	t-Statistic	Prob
Overconfidence	4.040807	0.0001	1.647161	0.0997	3.129819	0.0018
CASHFLOW	9.660553	0.0000	9.139066	0.0000	9.484627	0.0000
GROWTH	5.262928	0.0000	5.404915	0.0000	5.395847	0.0000
SIZE	-6.062351	0.0000	-5.724329	0.0000	-5.956613	0.0000
INDPCOMM	1.126153	0.2602	1.676147	0.0938	1.565799	0.1175

R^2	0.664378	0.663404	0.667244
Adjusted R^2	0.630158	0.629084	0.633316
F-Stat	19.41478	19.33017	19.66642
Prob Stat	0.000000	0.000000	0.00000

Form the regression, we conclude that models simultaneously influence corporate investment with Prob-stat 0.00000. All models have R^2 values between 66.3 – 66.7, this indicates that the models have 66.3% - 66.7% influence on corporate investment; the remaining ±34% is affected by variables outside the models.

OC_FIRM4, OC_FIRM5, and OC_SCALA have consistent results with regard to corporate investment. OC_FIRM4 and OC_SCALA have a significance level of 0.01. Meanwhile, OC_FIRM5 has a significance level of 0.10. We conclude that managerial overconfidence has a significant correlation on corporate investment. This result follows research conducted by Malmendier and Tate (2005) in the U.S.A., Ying et al, (2019) in China, Koo and Yang (2018) in Korea, and Hsiao et al, (2011) in Taiwan. We have now confirmed that corporate investment in Indonesia is correlate with managerial overconfidence; the more overconfident top management is, the greater investment will be.

CASHFLOW, GROWTH, and SIZE have a significant influence on corporate investment. But corporate governance reflected by INDPCOMM, unable to support the role of mechanism of corporate governance on corporate investment.

CASHFLOW and GROWTH have a significance level of 0.01, and have a positive correlation on corporate investment. This result follows research conducted by Malmendier and Tate (2005), Fazzari et al, (1988), Lewellen and Lewellen (2016), and Carpenter and Guariglia (2009). The Tobin Q, in this study, has a positive correlation on corporate investment, which mirrors the positive results of Malmendier and Tate (2005).

As predicted, SIZE has a negative correlation on corporate investment, with a significance level of 0.01. This is the opposite of the result found by Malmendier and Tate (2005). They found that company size had a positive correlation on corporate investment. Company size may have negative correlation on corporate investment in Indonesia, due to Indonesia is an emerging-market country in which companies in the growth stage are the majority, and most companies have a higher spending rate in this growth stage of the business cycle.

Meanwhile, corporate governance yields different results for each model. Corporate governance was predicted to control the spending level of corporate investment. The result found that corporate governance has no significant role in evaluating the efficacy of corporate investment.

Conclusion

Based on the results of the study, managerial overconfidence has a positive correlation on investment decisions. We conclude that overconfidence leads to higher investment spending levels. This accords with the results reached by Malmendier and Tate (2005) in the U.S.A., Ying et al, (2019) in China, Koo and Yang (2018) in Korea, and Hsiao et al, (2011) in Taiwan. In order to achieve a more in-depth understanding of managerial overconfidence, future research might investigate the impact of managerial overconfidence on over- and underinvestment, since this study was unable to capture the degree of overinvestment made by overconfident managers.

Cash flow as a control variable has a significant role in corporate investment decisions. This result is in line with those of Malmendier and Tate (2005), Fazzari et al, (1988), Lewellen and Lewellen (2016), and Carpenter and Guariglia (2009).

Growth opportunity has a positive correlation on corporate investment. This result accords with the findings of Malmendier and Tate (2005) that Q has a positive influence on corporate investment, even though Malmendier and Tate's result (2005) had no significance.

Company size has a negative correlation on corporate investment. Corporate governance has a positive correlation on corporate investment with different levels of significance. This indicates that our measurements were unable to capture and evaluate corporate governance mechanisms. In future

research, researchers may use qualitative aspects to represent corporate governance, such as educational background, experiences background, and else.

Research about managerial overconfidence is rarely conducted in Indonesia. Therefore, future researchers will have many opportunities to extend this research and achieve a more in-depth understanding of managerial overconfidence and its impact in terms of behavioral finance. We hope that an increasing body of literature on managerial overconfidence in Indonesia will provide managers with insight about decision-making in the corporate context.

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A Fair Tax Policy as A Source of Competitiveness Of the National Economy

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Abstract

In addition to globalization, increasing freedom in trade and progressing economic integration in the world, the issue of tax regulations, taxation and interaction between tax policy and the real economic sphere is invariably an essential factor determining the level of competitive advantage of enterprises and the competitiveness of the country's economy on the international arena. In this article, the author focuses on the issue of fair taxation, its impact on the existence of the informal economy, and thus on the level of economy's competitiveness, including tax competitiveness. The author attempted to examine the relationship between the level of competitiveness, the size of the shadow economy and the level of taxation in OECD countries. The conclusion states that low and fair taxes can reduce the shadow economy and increase the competitiveness of the national economy.

Keywords: tax policy, tax competition, shadow economy, economy's competitiveness.

Introduction

On the one hand, the sphere of regulations, the modern model of state policy have a significant impact on economic growth and development, and on the other - organizational structures, e.g. international trade, production, capital and technological connections. Global competitiveness has become a sort of common denominator for the quantifiers of the system of functioning of the economy mentioned above. It is a category that has gained significance in the face of new conditions (new challenges) in which economies must function - the global financial crisis, an aging society, the increasing interdependence of economic and political systems, negative climate change or shrinking natural resources in the face of an increasing population. It seems that the statement that the development of modern economies largely depends on the degree of their international competitiveness, which in turn also depends on fair tax policy, is fully justified.

The dynamic development of enterprises is currently one of the most critical issues regarding the prospects of sustainable growth and the good condition of the economy in the aspect of its place on the global economic arena. The process of economic integration has become a strong impulse for identifying economic factors that are stimulants or destimulants in the development of enterprises in the desired direction for them, especially in the aspect of increasing their economic efficiency and gaining more and more competitive advantage. For this reason, all activities in the fiscal sphere surrounding business activities are important here. The main role in supporting the development and level of competitiveness of the economy should be played by economic freedom, although the role of the state, in addition to guaranteeing an efficient framework for conducting economic activity, which can be reduced to building broadly understood institutions and concern for the existence of proper infrastructure. It must also consist in actively creating a good economic climate for entrepreneurship and its development. In this way, the state and the market will constitute complementary regulators of economic processes, creating the right environment for business operations of enterprises.

The purpose of this study is to analyze the relationship between the level of competitiveness, the size of the shadow economy and the level of taxation in OECD countries in the period 2005-2017 from the point of view of the problem of fair taxation. For this reason, by analyzing statistical data, an

attempt was made to answer the question whether these instruments, by creating a fiscal business environment, contributed to the international competitive advantage of the economy.

Competitiveness of the Economy

The competitiveness of the national economy is both a relative and a subjective concept. Over time, different importance is attached to specific competitiveness factors in countries with different levels of development. Authors of the known *World Competitiveness Yearbook Report* from the International Institute for Management Development (IMD) define competitiveness as the country's ability to create added value, and thus to increase wealth by managing resources, processes, attractiveness and aggressiveness, globality and proximity, and transforming the above relationships into an economic and social model (Garelli, 2003). A country is competitive if it generates proportionally more wealth than competitors on the world market (Institute for Management Development, 2009). In subsequent reports, the so-called academic definitione appears, where the competitiveness of countries is understood as "*the area of economic knowledge that analyzes facts and policies that shape the country's ability to create and preserve an environment conducive to the creation of greater value by enterprises and greater well-being of residents*". The OECD defines competitiveness as "the ability of enterprises, industries, regions, countries or transnational areas to generate, as a result of exposure to international competition, a relatively high income from factors of production and a high employment rate based on solid foundations" (Globalisation…, 1996).

An example of a multidimensional understanding of competitiveness is the definition of the World Economic Forum. According to this definition, competitiveness is a set of institutions, policies and factors determining the level of productivity of a given country. An economy is competitive if it has high productivity allowing it to achieve high incomes and a high standard of living for the citizens of a given country, as well as higher rates of return on investment. According to the *Global Competitiveness Report* initiated in 1979 by the WEF, there are 12 pillars that make up the GCI (*Global Competitiveness Index*), which affect the level of competitiveness, namely: institutions, infrastructure, macroeconomic environment, health and primary education, higher education and education, the efficiency of the commodity market, labor market efficiency, development of the financial market, technological readiness, market size, degree of business development and innovation. In 2001, the IMD transformed the typology of factors determining the international competitiveness of the economy, dividing them into four basic groups (World Competitiveness..., 2001): 1) economic situation (national economy, international trade, foreign investment, employment, prices); 2) government efficiency (public finances, fiscal policy, institutional structures, favorable legal conditions for enterprises, education); 3) business efficiency (productivity, labor market, financial markets, management practice, the impact of globalization); 4) infrastructure (basic infrastructure, technological infrastructure, scientific infrastructure, health and environment, value system).

As a result of globalization, the nature and intensity of competition processes on international markets have changed. Enterprises compete, but one cannot ignore the fact that e.g. state policy - as rules and regulations - exerts influence, among others on business processes. The increase in enterprise productivity is not determined in a vacuum, but by the features of the national economic system and increasingly by the quality of its interrelationship with the outside world (Hautbauer and Stephenson, 1995). Changes in the economic law of many countries and a favorable political climate create an incentive to create such transnational forms of economic activity.

In this context, a huge role is played by the state's policy supporting the creation of a business-friendly fiscal environment related to bearing certain tax burdens constituting the state's tax system, which individual elements may now become an important factor motivating potential investors to develop investments in a given country. The rational tax policy of the state should manifest itself in defining the shape of the tax system that stimulates economically effective ventures.

Economic activity is aimed at making profits, and any tax burden reduces the taxpayer's existing or future capital resources. Therefore, the taxpayer's natural behavior is to avoid such consequences of taxation or to minimize its negative impact. From the point of view of international economic organisms, the most advantageous would be the possibility of accumulating all profits in an enterprise which registered office is in the country with the most liberal tax system (relocation), because it is not without significance that transnational companies (Dicken, 1998) are guided primarily by the principle that their business activities should be subject to the lowest possible tax burden. Therefore, they will be highly sensitive to the level of taxation of such activities in a given country (Devereux and Hubbard, 2000).

The taxpayer's conduct may be reduced among others to legal optimization of the level of taxation by using the flexibility of the tax structure or by tax migration to countries with lower tax burdens, thereby using tax competition between countries. Tax competition is a phenomenon involving public authorities' use of such tax policy instruments designed to increase the attractiveness of a given territory as a potential or current location for business operations. Tax competition must be seen as a manifestation of a kind of struggle for potential investors and capital for the development of a given country.

International positive tax competition can be regarded as a favorable phenomenon and resemble perfect competition, in which countries compete with tax rates for mobile factors of production, in such a way as to achieve a balance between flows of factors of production and tax revenues. Mobile production factors move from countries with higher taxation to countries with lower taxation, unless the level of delivered public goods is high enough in a given country to compensate for the high tax burden. In other words, at the level of remuneration for the factor of production, it is important to achieve a stable relationship between the benefits received from the state and the tax burden. Therefore, the effect of international tax competition should be to equalize tax rates at a socially effective level, i.e. ensuring maximization of social well-being. The existence of fair tax competition is a stimulus to the increase in public finance discipline and may improve the efficiency of spending public funds through rational investment directions. As a result, tax competition leads to tax alignment at a socially effective level. This phenomenon is accompanied by the migration of taxpayers seeking the optimal relation for them of the received public goods to the taxes paid (Edwards and de Rugy, 2002). Tax competition based on general tax regimes, i.e. universally applying tax rates and a uniform tax base, is fair (Cerioni, 2005), and the migration of enterprises towards countries with more favorable tax regimes has a positive impact on the level of international competitiveness of these entities. Creating incentives for investing is particularly important for countries in which the economy is transforming due to the significant impact of foreign direct investment on this process (Sedmihradsky and Klazar, 2002).

In the conditions of globalization, it is necessary to shape the tax system in such a way that it encourages investment, innovation and creation of new jobs. Therefore, it is very important to create an optimal tax system that limits the possibility of escaping from taxes or illegal tax evasion by moving to the shadow economy.

The currently observed phenomenon of tax competition between countries appears - due to the globalization of economic processes in the world - an important (though not always and not everywhere the most important) factor in shaping the competitive advantage of a given country's economy on the global market. Undoubtedly, however, the increasing tax competition between countries encourages the transfer of profits (*transfer pricing*) in the form of manipulating prices in turnover between their companies which headquarters are in countries with different legal and tax systems), which causes problems on the line entrepreneur - tax authorities.

Alternatively, entities for which transaction costs associated with the migration of activities are too high are trying to operate in the shadow economy, hiding, in whole or in part, the sources of their income from economic activity, which is as unfavorable for a given country as the process of relocation or transfer pricing. However, the issue of defining the limits of taxation, and more

importantly the designation of such limits, which are fair and do not cause negative implications in the sphere of the economy, is not easy. It is difficult to determine the optimal level of tax burden, both in terms of fiscal and non-fiscal aspects, because it is not easy to reconcile the objective of efficiency and fairness of taxation in the tax system, while taking into account its social and economic dimension.

Already in the nineteenth century in France, P.J. Proudhon argued that the state budget revenues from taxes should not be more than one-tenth of the national income. It is also difficult to expect that in the near future the theory of economics and public finances will develop universal, within specific economic and social conditions of a given country, methods of determining such a tax limit.

An exemplification of the problem of the impact of the general level of tax burden on the dynamics of economic growth were the results of polish research, according to which the increase in the level of fiscalism by 1 percentage point causes a decrease in the economic growth rate per capita by 0.14 percentage points (Adamczyk et al, 2003). Leibfritz et al (1997) also showed in their research that in OECD countries for 1980-1995, the average (weighted) tax rate increased by approx. 10 percentage points resulted in a reduction of the GDP growth rate by approx. 0.5 percentage points with indirect taxes decreasing economic growth to a lesser extent than direct taxes.

The issue of the impact of fiscal burdens on economic activity, and thus on tax revenues of the state budget has become the subject of research and analysis, including of Laffer and Miles (1982), who formulated the relationship between the level of tax rate and the amount of tax revenues to the budget. In a broader sense, the relationship described using the Laffer curve addresses the problem of tax optimization on a macroeconomic scale. Various incentives occurring in the tax system may imply the emergence of often lasting habits, and thus strengthen certain behaviors, including negative ones. These behaviors will usually be a reflection of the fiscal policy pursued towards entrepreneurs and a response to it.

The issue of Fair Taxation

Tax is one of the tools of the instrument of economic policy of the state, which allows influencing the form of socio-economic relations between the state and taxpayers. However, the most important issue from the point of view of effective achievement of fiscal and non-fiscal goals of tax policy should be the even and moderate burden on taxpayers with public law levies. Gomułowicz (2013) wrote: "*The history of taxation is also the vastness of human harm, humiliation, lawlessness, rebellion, and at the same time pride, self-confidence and arrogance of power, convinced of its infallibility. Authority that felt exempt from thinking about the effects that taxation causes on the taxpayer's assets. The authorities who did not want to understand that her mistakes and wrong choices made the germ of a radical tax revolt*".

Undoubtedly, taxes, which in the social sense are unfair, too high, unevenly, poorly distributed, can be a serious determinant of the growth and duration of the shadow economy, because a kind of "overplaying", deceiving the state in this field is an opportunity to settle accounts on the citizen-state line, ipso facto achieving a higher level of social justice.

Already in ancient times, Aristotle pointed to the fact that justice is a virtue of the spirit that allows harmony to be achieved. The use of justice in interpersonal relations allows the cooperation of the whole society in the structures of the state (Aristotle, 1999; Szumlakowski, 2013). According to Rawls (1999), all public goods should be distributed equally, everyone should have the same rights to fundamental freedoms, and social and economic inequalities are to lead to the improvement of the lives of people in difficult financial situation. Proponents of egalitarian theory perceive justice as the state's ability to provide public goods and services to low-income individuals (Nowak-Far, 2011).

There are two independent concepts of justice in the literature on the subject of equality. This is horizontal justice and vertical justice (Musgrave, 1990). Horizontal justice consists in equal treatment of equals, i.e. units that are identical in all material respects. In turn, the principle of vertical justice consists in differentiating taxation in relation to what is unequal in terms of taxation. So if some are able to pay higher taxes, they should do so. However, the following problems arise: firstly, who - as a rule - should pay taxes at higher rates, secondly, how to formulate adequate law in accordance with this principle, and thirdly, it must be determined whether if the given entity is able to pay higher taxes (due to higher tax rates), how much more should they pay compared to others (Stiglitz, 2000). The answer to the postulate of applying the principle of horizontal justice is the use of a relatively low, proportional flat rate in taxation with a broad and equal tax base. In turn, relatively strong progression and a significant number of various tax breaks and exemptions are an expression of the implementation of the vertical justice principle in the tax system. Although the degree of this progression is a matter of separate discussion and opinions are divided here, there is an agreement that the steep progression contributes to the destruction of tax sources, is contrary to the idea of payment capacity and negatively affects the development of entrepreneurship.

Nozick (1974) directly recognized taxation as unfair and equated it morally with forced labor, because it violates the rights of the individual. In turn, according to Murphy and Nagel (2002), private property is a legal convention, partly defined just by the tax system, therefore the tax system cannot be assessed by analyzing its impact on private property, understood as something that has an independent existence and importance. Taxes should be assessed under the general system of property rights that they help create. Tax justice or injustice can only mean justice or injustice in the system of property rights and rights arising from a particular tax system. In their view, social justice, not tax justice, should be the value that drives tax policy. Rights have budget costs and "*nothing that costs money can be absolute*" (Holmes, Sunstein, 1999). A democratically elected and organized public authority is an indispensable tool for effectively mobilizing and directing the dispersed resources of communities that are struggling with specific socio-economic problems. Enforcing rights is therefore cost-effective, and taxation is a necessary instrument to protect rights (Farrelly, 2004). The fact that rights come with costs means that redistribution is ubiquitous. This does not happen only if the government takes the money from taxpayers and gives it to the needy. Redistribution also takes place to protect wealthy people from violence and threats of violence (Holmes and Sunstein, 1999). Public goods have to be paid for and it is therefore necessary for everyone to have a fair share of it, although this is where disputes may arise regarding what is meant by "fair share".

According to Stiglitz (2012), however, it is evident that those who are at the top of the income pyramid and pay 15 percent from the reported income (while collecting hidden money in tax havens) do not contribute to the financing of these goods to the appropriate extent. Democratic states rely on trust and cooperation in matters related to paying taxes. However, if every citizen would devote as much energy and resources to avoid paying the tax as the wealthy devote to it, the tax system would either collapse immediately or should be replaced by a much more repressive and restrictive model. A market economy cannot function if every contract must be enforced legally. You can only talk about trust and cooperation if you believe that the system is fair. Recent studies have shown that the belief that the system is unfair undermines the ability to cooperate and undermines the efforts made. Currently, it is becoming increasingly clear that Americans are concluding that their economic system is not fair and the tax system is the best example.

Achieving tax justice is not easy, there are no universal methods of its implementation. The legislator's most noble intentions may not (and often in practice are not) received in the expected way by all taxpayers. Some of them will always think that they have been treated unfairly (Głuchowski, 1999). It should be realized that even if the tax rate, and thus the share of tax revenues in GDP, would be reduced to 1%, there will be a group of taxpayers operating in the shadow economy and justifying it with small benefits.

Justice in the concept of learning the law of public finances should be seen through the prism of the amount of taxes and emerging legal problems with an equal tax burden on society. The choice of a fair formula should create conditions that would stop the envy of other individuals, which affects the

functioning of social well-being (Nowak-Far, 2011). The principle of tax justice clarifies the principle of social justice in the context of justice of fiscal burdens of citizens, but it does not mean granting equal rights and obligations to all citizens.

A. Smith, who formulated the principle of fair taxation, argued that each state's subjects should contribute to maintaining the government as closely as possible to their capabilities, i.e. in proportion to the income each of them receives under the protection of the state. Smith (2012) compared the state economy to the private economy, which is governed by the principle of mutual benefits (equivalence). He also noted the ability-to-pay of the taxpayer, who should not pay more taxes than he is able to pay.

In everyday life, there is no unambiguous criterion that would allow us to state unequivocally that, e.g. only the amount of income obtained is the basis for specific differences in tax or social policy. Here are the questions: what about the different family situation or the different health status of two people with identical income - should this be taken into account or not, and if so, to what extent? How to create "fair" tax regulations that take into account all these variables? (Gwiazdowski, 2001).

Justice, however, means, among other things, equality of law, but equal rights are not the same as equal income. All people have the right to enjoy the fruits of their work and make their work fruitful. This does not mean, however, that they have the right to the fruit of other people's work. The biggest injustice is the same treatment of hard-working and lazy people, truthful and liars, good and depraved. In nine cases out of ten, inequality is due to differences in intelligence, strength, dynamics, dexterity, beauty, and other physical and mental qualifications. Meanwhile, J. Rawls is trying to search for a concept of justice that eliminates the impact of accidental salary with natural attributes on achieving political or economic benefits (Gwiazdowski, 2001).

Nowadays, the principle of fairness of taxation primarily means that a given tax does not cause excessive burdens for the state, especially by people living on the border of minimum subsistence, it is evenly distributed and adapted to the ability of a given taxpayer to pay it. In addition, the design of the tax must guarantee its universality, as well as eliminate or impede the shifting of taxes to other than those who, according to the intention of the legislator, is to bear the tax (Gajl, 1992).

Undoubtedly, unfair taxation is one of the reasons for tax avoidance in a given country (including the development of the shadow economy), as well as internationally, which in turn is a complex and multifaceted phenomenon, because it is no longer limited to aggressive tax optimization, but it is also related to with harmful tax competition between countries.

The problem of Informal Economy

The issue of unfair taxation, and consequently tax avoidance and the development of the informal economy, is one of the most important topics related to the implementation of fiscal policy. The shadow economy is located on the border of law and economy. Its size and the effects it causes for fiscal policy of the state are typical economic problems. In turn, the legal aspect of the shadow economy is e.g. legal regulations that stimulate or discourage action in the informal economy.

On the one hand, this informal economic activity may result in reduced tax revenues (and consequently the supply of public goods and services), lower tax morale and less compliance with tax regulations, as well as higher costs of control and lower rates of economic growth. On the other hand, the shadow economy can be a powerful force to accelerate institutional changes and can increase the overall production of goods and services in the economy. The shadow economy has implications that go beyond the economy to political order (Enste, 2018).

The main reasons for the occurrence and development of the informal economy include:

- **Tax burden and amount of social security contributions** – distortions of the general tax burden affect the choice of workplace and economic activity, can stimulate the supply of labor in the so-called shadow area. The greater the difference between the total cost of labor in the official economy and earnings after tax (from work), the greater the motivation to reduce the tax wedge and the shadow economy (Thomas, 1992; Johnson et al, 1998a; Johnson et al, 1998b; Tanzi, 1999; Schneider, 2005; Dell'Anno et al, 2007).

- **Quality of institutions and corruption** – bureaucracy, unclear law, lack of respect for property rights in connection with highly corrupt government officials stimulates the shadow economy (Teobaldelli, 2011; Hassan and Schneider, 2016).

- **Regulations** – legal regulations are an important factor limiting the freedom (choice) of private individuals in the official economy. Countries with a high degree of economic regulation usually have a larger share of the shadow economy in total GDP (Johnson et al, 1997).

- **Public sector services** – the increase in the shadow economy may lead to a reduction in state revenues and, consequently, a reduction in the quality and quantity of public services (Feld and Schneider, 2016).

- **Tax morality** – taxpayers are more likely to pay their taxes fairly if they receive valuable public services in return (Feld and Frey, 2007).

- **Deterrence effect** – the threat (amount of penalties) is not clearly and sufficiently researched as a factor affecting the level of the shadow economy in the economy. The size of the shadow economy may affect the level of penalties, but the level of penalties does not reduce the shadow economy (Pedersen, 2003).

- **Development of the official economy** – is another key factor in the development of the shadow economy, namely the lower the GDP growth (and higher unemployment rate), the greater the motivation to work in the shadow economy, *ceteris paribus* (Williams and Schneider, 2016; Feld and Schneider, 2010).

- **Self-employment** – the higher the self-employment rate, the more activities can be implemented in the shadow economy, *ceteris paribus* (Williams and Schneider, 2016; Feld and Schneider, 2010).

- **Size of the agricultural sector** – the larger the agricultural sector, the more opportunities to work in the shadow economy, *ceteris paribus* (Hassan and Schneider, 2016).

To sum up, the size of the informal economy is a resultant of many factors which significance is related to the historical, social and economic conditions of a given country. Economic entities operating in the shadow economy violate the rules of fair market competition, and their expansion is a serious challenge for the official sector (both its public and private segment). However, an informal economic activity sometimes constitutes a kind of economic buffer, absorbing shocks and crisis phenomena in the official sector (e.g. through employment offers for the unemployed). In the overall balance, however, negative implications prevail, both in macroeconomic (smaller budget revenues) as well as microeconomic (losses of specific enterprises) and social dimension (erosion of business ethics, moral norms etc.).

It can be seen that the observed tendency to reduce the informal economy level is to some extent correlated with the level of taxation of profits of economic entities and the level of competitiveness of individual economies. Of course, this is not a close relationship, its degree varies greatly from country to country, however, a certain regularity can be seen by juxtaposing the size of the shadow economy in individual countries with the level of corporate income taxation.

Results

Analyzing the years 2005-2017, it can be seen that the average value of the level of competitiveness (as the Global Competitiveness Index - GCI) for OECD countries increased and the average level of the shadow economy (as percentage of GDP) as well as the total tax rate (TTR, as percentage of profit), which can be considered a very positive fact. Analyzing individual countries, specific variables develop differently and with varying intensity. However, the vast majority of 2/3 of OECD countries recorded an increase in GCI (most Turkey). What's more, the TTR decreased in 30 out of 36 OECD countries (in Italy by 28.7 p.p.), as well as even 33 countries dropped the shadow economy level (most Lithuania). Is there any dependence and regularity due to this? Do lower (and therefore usually more just and even) tax burdens contribute to the reduction of the informal economy and a higher level of competitiveness of the economy? This is not a common correlation, which means that non-tax factors also determine the level of competitiveness, but also the informal economy.

Table 1: Global Competitiveness Index (GCI), Shadow economy, Total tax and contribution rate (TTR) in OECD countries, 2005-2017

Country	Shadow economy (% of GDP)		TTR (% of profit)		GCI (score)		Pearson's correlation (r) 2005-2017		
	2005	2017	2005	2017	2005	2017	GCI and shadow economy	GCI and TTR	Shadow economy and TTR
Australia	12.1	11.6	52.1	47.5	5.21	5.19	0.84	0.76	0.65
Austria	7.6	7.1	57.2	51.8	4.95	5.25	-0.76	-0.54	0.67
Belgium	18.1	16.5	60.1	57.1	4.63	5.23	-0.91	-0.84	0.88
Canada	12.7	12	47.5	20.9	5.1	5.35	-0.54	-0.57	0.52
Chile	16.4	16.8	25.3	33	4.91	4.71	0.43	-0.44	0.57
Czechia	15.1	11.7	48.7	46.1	4.42	4.77	-0.81	-0.58	0.82
Denmark	12.6	11.7	32.6	23.8	5.65	5.39	0.48	0.92	0.46
Estonia	23.7	20.1	50.4	48.5	4.95	4.85	0.73	-0.45	-0.16
Finland	11.3	10.8	49.5	38.4	5.94	5.49	0.64	0.75	0.04
France	12.5	11.7	68.3	62.6	4.78	5.18	-0.76	-0.29	-0.07
Germany	10.9	10.4	47.7	48.9	5.1	5.65	-0.41	0.4	-0.22
Greece	23.5	24.8	54	51.7	4.26	4.02	-0.18	0.52	0.62
Hungary	22.3	19.8	53.6	46.4	4.38	4.33	0.79	-0.15	0.13
Iceland	12.1	10.8	26.8	29.9	5.48	4.99	-0.16	-0.79	-0.01
Ireland	12.2	9.6	25.4	26	4.86	5.16	-0.89	0.75	-0.87
Israel	21.6	17	35.5	27	4.84	5.31	-0.77	-0.73	0.99
Italy	21.2	19.8	76.7	48	4.21	4.54	-0.51	-0.9	0.17
Japan	11.5	10.8	51.7	47.4	5.18	5.49	-0.59	-0.46	0.49
Korea	25.6	21.8	36.8	33.1	5.07	5.07	0.51	0.08	0.42
Latvia	22.8	18	36.2	35.9	4.29	4.40	-0.58	-0.96	0.35
Lithuania	26.4	19.7	51.2	42.7	4.3	4.58	-0.96	-0.84	0.94
Luxembourg	9.8	8.8	20.2	20.5	4.9	5.23	-0.25	0.54	0.07
Mexico	28.7	28.1	55.7	53.4	3.92	4.44	-0.45	-0.48	0.32
Netherlands	9.6	8.8	47.7	40.7	5.21	5.66	-0.68	-0.68	0.7
N. Zealand	11.0	9.7	36.6	34.5	5.09	5.37	-0.57	-0.36	0.71
Norway	11.8	12.7	41.1	37.7	5.4	5.40	0.65	-0.27	-0.65
Poland	24.6	19.9	43.2	40.5	4	4.59	-0.96	-0.7	0.6
Portugal	20	16.1	43.8	39.8	4.91	4.57	0.83	0.54	0.86
Slovakia	14.9	13.1	50	50.1	4.31	4.33	0.17	-0.24	0.23

Slovenia	22.9	19	39.2	31	4.59	4.48	0.36	0.79	0.73
Spain	20.6	20.3	60.4	46.9	4.8	4.70	-0.41	0.62	-0.3
Sweden	11.4	10.7	54.1	49.1	5.65	5.52	0.38	0.78	0.12
Switzerland	6.4	5.4	28.8	28.8	5.48	5.86	-0.78	0.55	-0.26
Turkey	28.8	28.6	46.1	40.4	3.68	4.42	-0.66	-0.94	0.67
UK	10.3	9.4	34.7	30.7	5.11	5.51	-0.46	-0.53	0.42
USA	7.4	5.7	45.5	43.8	5.81	5.85	0.00	-0.01	0.84
OECD avg.	16.4	14.7	45.7	40.4	4.87	5.02	-0.45	-0.57	0.81

Source: own calculations based on: The World Bank [Online] [Retrieved March 5, 2020] http://databank.worldbank.org; Medina and Schneider (2019), The Global..., (2005 and 2017).

In the analyzed period 2005-2017 for OECD countries there was a strong negative Pearson correlation between the level of competitiveness (GCI) and the size of the shadow economy (r_{2015} = -0.759; r_{2017} = -0.794), while the correlation between the GCI and TTR index was also negative but weak (r_{2015} = -0.289; r_{2017} = -0.241). Similarly weak but positive correlation occurred between the shadow economy level and TTR. When examining the above relationships for individual OECD countries in 2005-2017, it can be seen that at that time 2/3 of countries showed a negative correlation between the GCI and the size of the shadow economy, including a weak correlation for four countries. The correlation between GCI and TTR was again negative for 2/3 of OECD countries, including a weak correlation for five countries. In contrast, Pearson's linear correlation between informal economy and TTR was positive for 26 countries in the period under review, including a weak correlation for six countries.

Conclusions

Any positive impact of public authority on the economy, using available tools, in particular fiscal policy instruments, in the process of strengthening the competitive position of domestic economic entities in the global economy, is desirable. The creation of a rational institutional and legal framework for entrepreneurs' economic activity is a *sine qua non* condition enabling them to strengthen the competitive position of enterprises and the entire economy.

Countries with higher tax revenues achieved thanks to lower, fairer taxation, a smaller scale of legal regulations and more simple regulations, as well as lower levels of corruption, usually have a lower level of informal economy and a higher level of competitiveness.

Public authorities should perceive unregistered work and activities of business entities as a signal for actions aimed at reducing the attractiveness of the shadow economy through better tax law regulations, a fairer and more transparent tax system, as well as more efficient institutions. That is why it is important to create mechanisms and procedures that would eliminate dishonest players from the market and support economically effective ones. This is all the more important as too restrictive tax regulations may reduce the benefits of globalization, as well as limit the inflow of foreign direct investment, which for developing countries with low own capital resources could cause a slowdown in economic growth.

To conclude, it should be noted that the only way to properly implement the function of taxes and at the same time meet the condition that they are objectively fair in the public perception is to coordinate the activities of public authorities with the activities of economic entities and households. In the era of dynamic changes in the situation on world markets, finding a balance between market mechanisms effectiveness and the fairness of product distribution and income generated by the market.

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Security and Encryption of Classified Information Shamir Data Sharing System

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Abstract

What about cyberattacks? We are all responsible for disrupting, blocking, destroying, degrading or maliciously controlling an information system / infrastructure, affecting the integrity of availability, confidentiality, authenticity and non-repudiation of data or theft of information with restricted access. For example, sensitive data (contracts, projects, etc.) can be ex-filtrated by computer attackers or recovered by them using specialized programs in case of the loss or theft of a portable device (smartphone, tablet, laptop, etc.). To secure classified information we have to use encryption system. It is a way to increase the integrity of information. We propose here a method who can be easy implemented, with low costs and maximum effectiveness. It is a safe solution in military information systems. The goal of this paper is to contribute to a better clarity regarding encryption and threats to the security of computer networks and military information systems.

Keywords: Encryption, Security, Information, Data, Shamir Encryption Method

Introduction

In this research we followed two steps. The first one was to develop a list of terminologies in cybersecurity and security frauds. The second step was to analyze the Shamir's encryption system applied in military information systems.

One element in the cybersecurity configuration is antivirus. As we all know this is a computer program designed to detect, prevent and eliminate the installation of any form of malware (viruses, Trojans, adware, spyware, etc.) on the computer systems. Updating it is especially important, because it have to be able to cope with the latest versions of malicious programs. On the same note we are aware that computer virus is a program that can self-replicate within a system, later spreading to other computers on the network without the user's knowledge. It may adversely affect the functionality, integrity, availability of the system or the data contained therein.

[https://www.kaspersky.com/resource-center/threats/computer-viruses-vs-worms] A computer worm is a malware that can self-replicate and spread in a computer network and beyond (other systems or networks), using network resources, without attaching to another program or process.

Threats to the security of Computer Networks

Threats of the security regarding a computer network can have the following causes:

- equipment failures
- human operating or handling errors
- frauds (or attempted fraud)

In the threats due to deliberate actions, there are two main categories of attacks:

- Passive
- Active

Passive attacks - are those in which the intruder observes the information passing through the "channel", without interfering with the flow or content of messages. As a result, only the traffic analysis is done, by reading the identity of the communicating parties and "learning" the length and frequency of the messages conveyed on a certain logical channel, even if their content is sometimes unintelligible. Like Lorrie F. (2007) wrote, the passive attacks have the following characteristics:

- Does not cause damage (data is not deleted or modified);
- Violate privacy rules;
- The objective is to "listen" to the data exchanged through the network;
- They can be achieved through a variety of methods, such as:
    - supervision of telephone or radio connections;
    - data routing through additional less protected nodes, etc

Active attacks - are those in which the intruder engages in:

- stealing messages
- delete, delay or modify messages
- inserting false or older messages
- changing the order of messages, in a certain direction, or in both directions of a logical channel

Masquerade - is a type of attack in which one entity claims to be another entity. For example, a user is trying to substitute for another or a service pretends to be another service, with the intention of taking secret data (credit card number, password or encryption algorithm key). A "masquerade" is usually accompanied by another active threat, such as replacing or modifying messages, as Henry I. (2012) mentioned in his report.

Resume - occurs when a message or part of it is repeated (repeated), with the intention of producing an unauthorized effect. For example, it is possible to reuse the authentication information of a previous message. In bank accounts, the resumption of data units involves doubling and / or other unrealistic changes in the value of the accounts.

Message modification - causes the message data to be altered by modification, insertion or deletion. It can be used to change the beneficiary of a loan in the electronic transfer of funds or to change the value of that loan. Another use can be to modify the recipient / sender field of the e-mail.

Denial of Service: Occurs when an entity fails to perform its own function or when it takes actions that prevent another entity from performing its own function.
Repudiation of service - occurs when an entity refuses to recognize a service performed. It is obvious that in electronic funds transfer applications it is important to avoid repudiation of the service by both the issuer and the recipient.

Types of destructive programs

Viruses - represent programs inserted in applications, which multiply themselves in other programs in the resident memory space or on disks; then, it either completely saturates the memory / disk space and locks the system, or, after a fixed number of multiplications, they become active and enter a destructive phase (which is usually exponential).

"Bomb" software - is a procedure or part of code included in a regular application, which is activated by a predefined event. Its author announces the event, letting it "explode", that is, to do the programmed destructive actions.

Trojan - is an application that has a well-known function of use and which, in a hidden way, fulfills another function. It does not create children. For example, a hacker can replace the code of a normal "login" control program with another code, which does the same thing, but additionally copies to a file the name and password that the user types in the authentication process. Later, using this file, the hacker will easily penetrate the system.

Type I and II cybercrime

Type I cybercrime it is generally represented by an isolated event when viewed from the perspective of the victim of a cybercrime. For example, the victim unknowingly downloads a Trojan from the Internet that installs a keystroke logger on its device. Alternatively the victim of the attack receives an email containing a link that comes from a known entity, but in reality is a web threat. It is usually facilitated by crime-ware programs such as keystroke loggers, viruses, rootkits, Trojan.

- Software defects and vulnerabilities in computer systems often provide support to the cybercriminal in criminal resolution. For example, criminals who control a particular website can take advantage of the vulnerabilities found in the web browser to place a Trojan Horse-type computer threat.

Cybercrime type II includes in addition to cyberstalking and harassment, child pornography, embezzlement, manipulation of capital markets, blackmail, corporate espionage and industrial espionage, planning terrorist attacks.

- It is generally a causal chain of a series of events involving repeated interactions with the target of the attack. For example, the victim is from a virtual relationship environment such as a chat room, and over time an attempt is made to obtain a close relationship with him by the attacker. If the virtual relationship succeeds, the attacker will take advantage and commit the crime.
- It is generally facilitated by programs that do not fall under the genre of crime-ware programs. For example, conversations can be done using a program like IM (instant messaging), but those involved can transfer files using FTP (File Transfer Protocol).

Threats to computer systems can be summarized as follows:

- Malware threats is represented by any malicious software, programming language or code created in such a language that is available in the criminal resolution in order to compromise or prejudice the right holder of certain patrimonial values without his knowledge.
- Hacking threats who can be defined as the intentional framework of all attempts to obtain or alter information with patrimonial value, without authorization or by exceeding the limits of authorization, by counteracting the logical security mechanisms. Hacking is advantageous in the case of remote targeted attacks because it allows attackers to enjoy anonymity and, in general, this method is more difficult to measure.
- Threats through the engineering of social networking sites

- Attacking users use tactics of manipulation, intimidation or inducing a state of disappointment to victims or use the skill in capitalizing knowledge (Know-how) to their advantage, in order to steal data that can be used in a subsequent criminal resolution.
- Computer threats through the use of abuse who can be defined as the use of the resources of a trusted organizational system or the privileges offered by such a system for any purpose or manner that is contrary to the rules established by that organization.

Attachment surprise - E-mails and their attachments play a very important role in carrying out cyberattacks. When receiving an email, pay attention to the following:

- the identity of the sender is not guaranteed, check the consistency between the sender and the content of the message;
- do not open attachments from strangers. They may contain software made for illegitimate or malicious purposes;
- do not reply to e-mails containing requests for personal or confidential data.

Cybercrime networks, through actions of manipulation of people (social engineering), distribute to several users unsolicited electronic messages (spam), with an apparent commercial content, advertising for products and services, to infect users.

Cybersecurity is a Very Dynamic Environment

Cybersecurity is a frequently discussed topic in recent years, being a dynamic environment. The technologies used are constantly being replaced, updated and modified, thus presenting new and new challenges in the context in which the level of awareness of Internet users is still very low.
The online environment has more and more connections with physical space, and many of the things we do in virtual space have real implications. Thus, when security is compromised in the virtual world, users may experience some of the most unpleasant consequences in the real world.

The password is an authentication tool used to gain access to a piece of equipment and its data. For the protection of your data, choose passwords that are difficult for the attacker to identify with the help of automated tools ("brute force") or to be guessed by him. The attacks aim at identifying the password and accessing the information restricted by that password. The most used methods of attack of this type are "dictionary attacks" and "brute force". "Dictionary attack" seeks unauthorized access to computer resources or systems by successively attempting passwords / decryption keys in a predefined list of words or phrases.

Periodically update the software Manufacturers generally assess software vulnerabilities and make patches - software updates to remove previous bugs / vulnerabilities. From a computer point of view, vulnerability is a weakness in the design and implementation of cyber infrastructures or related security measures that can be exploited by an attacker. These can be corrected by the manufacturer, who, after identifying them, can issue security updates to the software. The operating system must be updated as often as possible so that the equipment (computer, laptop, server, router, phone, tablet, etc.) runs optimally and is as vulnerable as possible to cyberattacks. There are vulnerabilities in every operating system.

Shamir's confidential system used in military systems for encryption

Shamir’s system is an alternative to to transmit classified information to higher structures.
The algorithm is complex and it is a form to protect information an secure them, like he describe in Shamir A. (1979).

Let t and w be two positive integers, $t \leq w$.

A confidential system (t, w) is a method of sharing a key K between the members of a set P of w participants, so that any association of t participants can calculate K, which is impossible for associations of t − 1 or fewer participants. The previous example is therefore a confidential system (2, 3). The value of K is chosen by an arbiter D. We will assume that D "∉" P. D will secretly distribute components of the key to the members of group P, so that no participant knows the components of the others and is not able to be part of its component. to be able to recompose the K key. Subsequently, participants in a subset B ⊆ P can pool the key components they know (or give them to an authority they trust) in order to determine K.

They must be able to succeed in this attempt if and only if card (B) ≥ t.
To note:

$P = \{P_i \mid 1 \leq i \leq w\}$ the set of w participants.

K is the space of all possible keys,
and S is the component space (all possible key components). The system presented in this section is due to Shamir and was created in 1979.

Let p ($p \geq w + 1$) be a prime number and $K= Z_p$, $S= Z_p$. So keys and components are numbers in Z_p. Shamir's confidential system, presented below, is based on a random polynomial a(X) of degree t at most t − 1, where the free term is K. Each participant P_i finds a point (x_i , y_i) on the graph of this polynomial.

Let now be a subset $\{P_{i1} , . . . , P_{it}\}$ of participants who want to reconstruct the key. They know the values x_{ij} and $y_{ij} = a(x_{ij})$ for $1 \leq j \leq t$; $a (X) \in Z_q[X]$ is the (secret) polynomial used by D. Since its degree is at most t - 1, we can write $a (X) = a_0 + a_{1X} + . . . + a_{t-1}X^{t-1}$ where a0 = K and $a_0, . . . , a_{t-1} \in Z_q$ are unknown. They are solving the linear system of equations $y_{ij} = a(x_{ij})$. If the equations are independent, the solution is unique, and the value of a_0 is even the key K.

A secret sharing scheme divides a secret into sub-secrets that are distributed to users. The secret can be reconstructed only by certain groups, groups that form the (authorized) access structure of the sharing scheme. Secret sharing schemes have been introduced independently by Blakley and by Shamir, as a solution for storing cryptographic keys. Secret sharing schemes can be used in any situation where access to an important resource must be shared. Access to a bank deposit or launching nuclear missiles are two such examples. The process of selecting cryptographic modules is as follows: - Planning phase In the planning phase, the purpose of the activity is to define the objectives that cryptographic techniques and methods must take into account. These objectives are based in part on applicable national and international regulations. These objectives are also established according to the existing (or proposed) security environment, as well as in connection with a preliminary analysis of the identified risks and vulnerabilities. - Security policy

Security policy (IT) is generally defined as the activity of establishing information security (electronic) decisions. Included here are the managerial policies regarding:

a. Creation of a security program for electronic communications networks, with the establishment of tasks and responsibilities,
b. Specifying security rules for certain computer systems,
c. Developing the necessary policies within the organizations. System design includes hardware and software implementations, procedures, environmental requirements, physical security considerations, etc.

An example of application regarding wiener attack is presented in figure 1, developed in C++.

```
: Edit  Format  View  Help
        writeResult.close();


id WienerAttack::writeEncryptedTextInFile() {
        ofstream writeText(ENCRYPTED_TEXT, fstream::trunc | fstream::out);
        writeText << outputtedCriptotext;
        writeText.close();


id WienerAttack::prepareAttack() {
        WienerRandomGenerator::generateData();
        initializePublicKeyFromFile();
        initializeMessageFromFile();
        encrypt();
        writeEncryptedTextInFile();


id WienerAttack::attack() {
        // We measure the time spent decrypting.
        LARGE_INTEGER frequency;
        LARGE_INTEGER start;
        LARGE_INTEGER end;
        double interval;
        QueryPerformanceFrequency(&frequency);
        QueryPerformanceCounter(&start);

        initializePublicKeyFromFile();
        initializeCryptotextFromFile();
        attackRSA();
        decrypt();
        writeDecryptedMessageInFile();

        QueryPerformanceCounter(&end);
        interval = (double)(end.QuadPart - start.QuadPart) / frequency.QuadPart;

        cout << "Time spent using basic decryption: " << interval * 1000 << "milliseconds.\n"
```

Fig. 1 : Wiener Attack

Usually, security policies are based on the need to protect IT resources, data and information. In an organization, security policies exist at all levels, from general situations to specific applications. There are also security policies at the national level, which apply to all organizations or agencies and, from this point of view, a precise course of action is guaranteed for the protection of national IT resources. As we will see below, the next important step in the planning phase is risk assessment, after which it will be possible to develop policies on the use of evaluated operating systems and cryptographic modules under certain environmental conditions. We give, below, only some of the problems that must be taken into account when elaborating the cryptographic requirements and policies:

1) the way of using the algorithms and the configuration of their parameters;
2) the classes of users who will use cryptographic methods and the privileges associated with these attributions;
3) defining confidentiality and integrity controls, as well as authentication techniques;
4) audit procedures;
5) key management, including distribution, generation, use and destruction;

A decryption code is presented in figure 2.

```
e  Edit  Format  View  Help
ragma once
nclude<NTL/ZZ.h>
nclude<fstream>
nclude<iostream>
nclude"Declarations.h"
nclude <stdlib.h>
nclude <windows.h>

ing namespace std;
ing namespace NTL;

ass Decryption {
ivate:
        static void initializeCryptotextFromFile();
        static void initializePrivateKeyFromFile();
        static void decrypt();
        static void decryptUsingCRT();
        static void writeDecryptedMessageInFile();

blic:
        static void decryptText(bool ultraMode);


id Decryption::initializeCryptotextFromFile() {
        ifstream criptotextReader(ENCRYPTED_TEXT);
        criptotextReader >> cryptotext;
        criptotextReader.close();


id Decryption::initializePrivateKeyFromFile() {
        ifstream privateKeyReader(PRIVATE_KEY);
        privateKeyReader >> compositeNumber;
        privateKeyReader >> privateKey;
        privateKeyReader >> firstPrimeNumber;
        privateKeyReader >> secondPrimeNumber;
        privateKeyReader.close();
```

Fig. 2 : Decryption code in C++

Conclusions

Cybercrime is a major problem in societies that widely use information technology, and in the absence of a standardized and unanimously accepted definition and the lack of credible statistics in the field, the study and legal examination of this new genre of crime, which has covered the whole world, is very important. The virtual environment, generated by cyber infrastructures, including information content processed, stored or transmitted, and actions performed by users, is already an integral part of personal and professional life, but security is an element taken into account far too rarely.

However, new technologies involve new risks that can seriously affect the individual or the organization, given that there are many hostile actions carried out in cyberspace that could affect the availability, integrity and confidentiality of the operation of information systems.

- Creating a vision and principles that should be translated into an information security policy;
- Implementing this policy within the organization and clearly defining roles and responsibilities;
- Development of an appropriate culture and mood, through the correct implementation of information security principles.
- The user represents the first wall of defense against threats behind the monitor, the first and sometimes the last sensor in identifying dangers and, depending on the case, reporting them to the IT manager of the institution. The user is also the one who can prevent the creation of substantial damages both for himself and for the institution in which he operates.

Using an encryption method is a solution for management of classified information and minimizing the risks of stolen information.

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Swot Analysis for The Marketing Strategy of Tourist Destinations on The Example of The City of Międzyzdroje – Case Study

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Abstract

The marketing strategy requires that Międzyzdroje be interpreted as a specific territorial product. Such a product is a set of conscious and purposeful projects whose task is to achieve goals and shape a team of benefits for residents, tourists and investors associated with Międzyzdroje. The purpose of the article is an analysis that allows determining the marketing position of the city against the background of the region and competitive cities by comprehensively examining the market realities of tourism and investment in Międzyzdroje. The information obtained and conclusions based on this analysis can be used to prepare detailed action plans for creating a territorial product in the tourist sense.

Keywords: Economics, Marketing, Tourism Strategy, Territorial Product, Tourism.

JEL classification: A11, D60, E71, F63, H41, M31, O21, R11.

Introduction

The city of Międzyzdroje is a commune with unique climate conditions and a very good basis for tourism development. Additional assets are primarily environmental and financial aspects, making Międzyzdroje a very attractive tourist municipality for foreign and domestic tourists (Municipal Office in Międzyzdroje, 2018). The city and commune development strategy presents a vision of shaping a modern, competitive tourist commune, but also fulfilling other very important tourist and business functions. The Międzyzdroje region has a great opportunity to become a big competitor on the national and international market, but it is important to take advantage of the opportunities facing the municipality and the city that can help and lead to significant development of the municipality not only in economic terms. The Międzyzdroje commune is surrounded by strictly protected natural areas of the Wolin National Park, and the basis of its development is the tourist function. On the one hand, this is a great opportunity to make Międzyzdroje a commune with extremely attractive tourist conditions, competitive in this respect in the region, the country and Europe. On the other hand, however, it introduces some restrictions that should be considered problematic. However, undoubtedly, the assumptions of the city and commune development strategy should be assessed

positively, which assumes that the tourist and recreational function is particularly important in the case of Międzyzdroje.

Literature Review

The marketing strategy requires that Międzyzdroje be interpreted as a specific territorial product. Such a product is a set of conscious and purposeful projects whose task is to achieve goals and shape a team of benefits for residents, tourists and investors associated with Międzyzdroje. The purpose of the analysis is to determine the marketing position of the city against the background of the region and competitive cities by comprehensively examining the market realities of tourism and investment in Międzyzdroje. The information obtained and conclusions based on this analysis will be used to prepare detailed marketing action plans aimed at:

• acquiring external investors with capital and know-how,
• tourist promotion of the city,
• building the territorial identity of entities operating in Międzyzdroje.
Marketing analysis of Międzyzdroje concerns two key elements of the resort's activity. The first of these is the market of investments implemented in the commune. The second element is the tourist market, i.e. people choosing Międzyzdroje for their vacation. Both markets are closely related and dependent, both in terms of marketing and economics (Aho, 2001). Marketing activities are an integral part of the social and economic policy of the local government (Alejziak, 1999).

The most important role of strategic marketing is the analysis of needs, which allows observation of market evolution and identification of existing and potential product markets (Altkorn, 1998). All activities should be geared to the needs of the client and user (Cabiddu et. al., 2013). Therefore, marketing management extends to the entire culture and atmosphere of the organization. The main goals of the marketing strategy include (Orlicki, 2010):

1. Increasing the tourist and investment attractiveness of Międzyzdroje.
2. Shaping a positive image of the region.
3. Increasing the level of residents' satisfaction and increasing economic benefits for the entire region from promotional activities carried out by the authorities.
However, in the operational objectives of the marketing strategy we distinguish (Orlicki, 2010):
1. Creating new channels for presenting the tourist offer.
2. Increasing the level of knowledge about attractions available in the region.
3. Adjusting the offer to the needs of individual market segments.
4. Integration of tourist environments in Międzyzdroje.
5. Creating a common accommodation base.
6. Creating a uniform visual identification system for promotional offers.

Activities carried out to achieve the above objectives should take into account the resources, resources, features and capabilities of the city and commune (Echtner and Ritchie, 2003). Proposed marketing and promotional solutions included in the city and commune development strategy must be subject to verification by the city authorities (Woodside A.G., Dubelaar, 2002). The actions suggested in the article are to be the driving force of tourist and investment development in Międzyzdroje.

The marketing strategy can be assessed due to the results arising from the implementation of the adopted marketing strategy in the areas of products, distribution channels, prices and marketing communication (Lambin, 2001). The normative types of marketing strategy include (Jędrzejczak, 2000):

• development - focused on the increase in production, sales, investments, and thus related market position and profit,
• maintaining the achieved market position,
• selective development, i.e. the development of specific products or services.

The marketing strategy can also be assessed from the point of view of the correctness of the construction, completeness and scope of the tools used (Gołębiewski, 2001). However, a marketing strategy can only be effective if it is based on detailed market knowledge (Miciuła, 2016). Implementation and implementation can only take place if there is consistency between market penetration plans and price, advertising and distribution policies. The marketing strategy is composed for specific tasks and goals facing the given organization. This may be a problem with making a profit or maintaining the current market position. Indirect goals tend to be towards the main (direct) goal. Therefore, one of the criteria for assessing a marketing strategy may be its final effect, for example regarding the generated profit, i.e. in our case economic benefits for the city and commune of Międzyzdroje.

The stages of building a marketing strategy include (Lambin, 2001, p. 121):

• needs analysis by segmentation,
• market attractiveness analysis,
• competition analysis,
• portfolio analysis,
• choosing an overall strategy and creating a strategic marketing plan.
Three phases of activities were carried out to create a marketing strategy at the Municipal Office in

Międzyzdroje (Green House Paweł Kranc, 2013):

• initial - research phase - identification of the market, objectives, segmentation,
• instrumental phase with sub-segments: product, price, distribution channels and promotions,
• audit phase - distribution and mobilization of funds.
That is why, as part of a detailed analysis, both micro and macro environments were recognized for the city and commune of Międzyzdroje. Thanks to this analysis, it was possible to identify tourist market segments for Międzyzdroje. Then, the goals of tourism development in the commune were presented, and a SWOT analysis of the tourist economy in the Międzyzdroje commune was made, as well as its development prospects.

Results of the Research

Identifying and characterizing the recipients of marketing activities, the so-called segments is one of the basic marketing issues of each territorial unit (Kruczek and Walas, 2004). The segment includes a group of relatively homogeneous entities to which we address an appropriate composed tourist, recreational and investment offer (Camilleri, 2018). Marketing activities of Międzyzdroje should be targeted at tourists visiting the resort (Sirakaya and Woodside, 2005). The group of vacationers should be divided into segments based on the following criteria:

• Age: people from 18 to 25 years old, from 25 to 35 years old, from 35 to 50 years old, over 50 years old.
• Children: children without children, families with children.
• Ways to spend your free time: sunbathers, enthusiasts of active recreation, patients, enthusiasts of exploring and exploring the area, connoisseurs of seaside cuisine.
• Marital status: single people, people living in informal relationships, marriages.
• Nationality: Poles, Germans, Norwegians, Swedes, Scandinavians.
• Place of residence (applies to Polish residents): Szczecin, Poznań, Wrocław and other cities of Lower Silesia, Gorzów Wielkopolski, areas of the western borderland belt of Poland.
• Assets: wealthy people choosing a higher standard of leisure, less well-off people looking for cheaper accommodation and tourist services.
• Time spent at the resort: 2 - 4 days, 4 - 7 days, 7 - 14 days.
• Purpose of stay: leisure (entertainment), training (conference), treatment (improvement of health).

Features from individual segments can combine to form more complex subgroups (Andrades and Dimanche, 2014). Representatives of the hotel industry are reporting a growing number of young

tourists up to the age of about 25 years, with a high standard of living. In addition to enjoying the charms of the beach and gastronomy, tourists most often ask about clubs, discos, places of entertainment. The period of stay in Międzyzdroje is shortening. The most frequently chosen period is a 2-4 day stay. It is also noticeable that longer stays are chosen by families with children and people over 35 years of age. Over the past five seasons, the cities from which tourists most often come to Międzyzdroje have not changed. "Pearl of the Baltic" is most often visited by the inhabitants of Szczecin, Poznań, Gorzów Wielkopolski and Lower Silesia. Tourists from Germany come mainly from around Berlin and Hamburg. Among the representatives of the above-mentioned segments of the tourist market, the number of people who expect a higher standard of leisure, professional service and comprehensive information about the region and the surrounding area is increasing (Stępień & Miciuła, 2017).

When segmenting the consumer products market, only a few segments from a wide range are most often selected. The situation is slightly different in the case of the Międzyzdroje tourist market. The tourist offer should be varied enough to provide the opportunity to meet the needs of the widest possible audience (Meyer, 2006). The abovementioned segments are to serve as guidelines for organizing the tourist offer, its distribution into individual regions of the city and appropriate targeting of the marketing offer. Also a very important, potential group of tourists are businessmen and people of science - participants of congress tourism. Their expenses are 2 to 3 times higher than those of other tourists (Tourist Market, No. 11 November 2009). In addition, this type of tourists can come all year round. To meet the needs of this group of tourists, local authorities should think about investments in the development of the necessary infrastructure. Conference rooms are located in the largest hotels in the city of Międzyzdroje, i.e. Rybak, Aurora, Wolin. It often becomes a chance for them to experience the dead tourist season lasting for many months. Serious clients can be attracted by establishing a specialized unit dealing with the acquisition of international congresses (table 1).

Table 1: Characteristics of segments of potential tourists of the Międzyzdroje commune.

	Segment 1	**Segment 2**	**Segment 3**	**Segment 4**	**Segment 5**
Net income per person	500 – 1000 PLN	200 – 500 PLN	1200 – 1800 PLN	800 – 1500 PLN	700 – 1000 PLN
Age	25 – 40 years	12 – 17 years	18 – 30 years	above 40 years	above 30 years
Education	Medium and higher	School youth	Vocational, secondary, students	Irrelevant	Higher
Time of visit	5 – 7 days	2 – 3 days	About one week	Above one week	2 days
Purpose of arrival	sightseeing	Teaching trips	Active recreation, entertainment	Health goals, rest	Conferences
The method of spending time	Trips, educational paths	Educational paths, monuments and museums	Sports and tourist attractions	Wellness treatments	Restaurants, discos, sports relaxation
A form of tourism	Walking, sightseeing	Staying, sightseeing	Active	SPA	Congress

Source: own study based on: (Hałub, et. al., 2005, pp. 68-69).

The investor market is divided into two basic segments. The division criterion is the type of planned investment. The first segment are investors planning to build residential, multi-family buildings, the so-called apartment. The second group consists of investors planning to build hotels. Acquiring investors from the first group guarantees higher revenues from the sale of plots for investment. However, subsequent "apartment" buildings are increasingly disapproved by the inhabitants of Międzyzdroje. Residents interpret subsequent apartment buildings as a short-sighted way to raise budget funds. "Apartment buildings" do not generate high budget revenues after construction (lower property tax). In this respect, acquiring an investor from the hospitality industry is more appreciated by the local community (Business Consulting DGA S.A., 2018). This gives a sustained budget impact in the long run, additionally guarantees the promotion of the hotel, and thus also Międzyzdroje. An additional advantage perceived by residents is the creation of new jobs in this way (Wojtaszek & Miciuła, 2018).

Entrepreneurship of the Międzyzdroje commune is based primarily on small companies oriented on tourism service. During the summer season entrepreneurs involved in selling souvenirs become active. Their location is mainly in the city center and on the promenade. As part of the accommodation base, private owners of pensions and hotels play a big role, outdoing each other in creating better and better conditions of stay for residents and tourists. Międzyzdroje has a diverse range of accommodation, from rooms for less demanding guests to luxury suites for businessmen and more affluent guests (table 2).

Table 2: Hotel facilities in the records of the city of Międzyzdroje

Specification	Number of Objects	Number of beds
Total facilities being in the commune records	367	10390
Holiday resorts	39	3480
Camp centers	15	2400
Recreation and training centers	1	35
Teams of generally accessible houses	3	25
Campgrounds	3	700
Farm stays	8	39
Guest rooms (private accommodation)	280	3100
Other objects reported to the commune records	10	490

Source: Municipal Office in Międzyzdroje, 2018.

According to the authors, the present times are very favorable for Międzyzdroje. Our membership in the European Union gives great opportunities for new investments and improvement of the current state. The city and entrepreneurs, thanks to the help of EU funds, have an unprecedented opportunity to match or even surpass the competitiveness of foreign seaside resorts (Miciuła, 2018). The main tourist asset of the area are still wide sandy beaches and numerous bathing areas allowing for the development of sun-sea-beach-type recreational tourism. In addition, the coastal area is characterized by extremely favorable microclimatic conditions, which, combined with the presence of spa resources (sources of brine, peat peat and mineral waters) creates favorable conditions for the development of spa and health tourism (Kotler et. al., 2017). The main product areas of the coastal belt include (figure 1):

• recreational tourism,
• health and spa tourism,
• active tourism.
Whereas supportive forms are:
• business tourism,
• urban and cultural tourism,
• specialized tourism,

• traveling tourism,
• sea tourism.

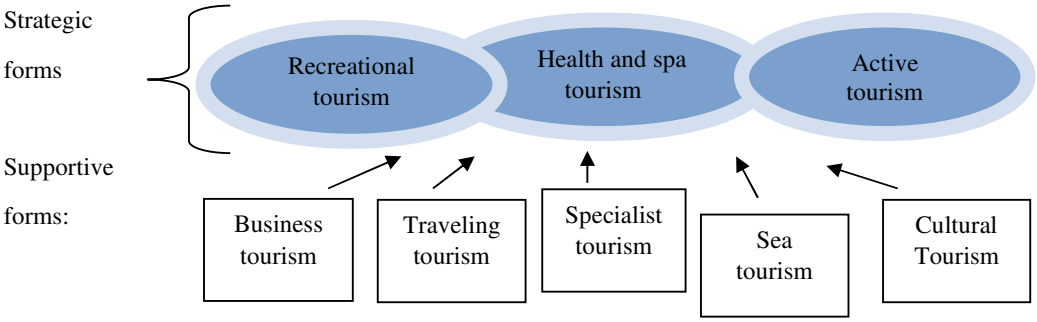

Figure 1: Outline of product concept for the Maritime Zone region.

Międzyzdroje is an ideal resort for foreign tourists, especially German tourists, mainly because the location of the city and commune is very convenient. The state border is about 25 km from the resort. The fact that the connection from the border from Kołbaskowo to Międzyzdroje is quite convenient and fast is also of great importance. The seaport in Świnoujście plays an important role, many tourists from Scandinavia come to Poland for economic reasons, and Międzyzdroje as a resort located very close to Świnoujście is becoming an extremely attractive place for foreign tourists. Mentioning the connections should not forget about the airport in Goleniów, which, although not so important in transporting tourists, it could significantly affect the transport of people from the interior of the country and the international population, in the face of the development of Międzyzdroje.

The experience gained through cooperation with the investor operating in Międzyzdroje allowed to develop a model of actions and expectations of a potential investor (Green House Paweł Kranc, 2013, p. 53). These observations may contribute to improving investor service and to better meeting his expectations. An investor assessing the investment attractiveness of a given location makes a comparison between two groups of values. The first group consists of the values and benefits of local government in a given area. Those are:

• shared land, buildings and premises,
• available natural resources,
• subsidies and subsidies (public aid),
• information provided, services provided,
• transferred movable goods - machines, devices, tools, semi-finished products, raw materials,
•workers,
• marketing image of the city and region,
• access to markets,
• access to economic, technical and social infrastructure,
• social atmosphere - acceptance of the inhabitants.

The investor decides on the location of the project not so much on the basis of the assessment of the benefits proposed by the city, but on the basis of the balance of benefits and costs (Gaworecki, 2006).

The other side of this specific account consists of various costs that the investor must bear when deciding to operate in a given area. These costs include:

• financial costs of launching the investment - availability and price of the land,
• costs of involving production factors - material and personal,
• costs of shaping the distribution system,
• costs of acquiring technology (e.g. construction on unfavorable ground),
• costs of time spent - unproductive time associated with the investment (eg waiting for administrative decisions),

• costs of mental involvement of staff (eg socio-cultural differences related to the need for temporary resettlement of staff).
Knowledge of the investor market will allow the city and commune authorities to acquire them for investment purposes for development and obtaining measurable benefits throughout the region.

SWOT analysis of the tourist economy on the example of the city of Międzyzdroje

A synthetic combination of opportunities and threats as well as strengths and weaknesses gives the opportunity to take a broad look at the current market situation of the described region (Panasiuk, 2010). SWOT analysis is an excellent tool supporting the formulation of marketing goals and strategies, based on which the local government can implement the next stages of marketing strategy (Hejduk, 2016). The SWOT analysis aims to thoroughly assess the broadly understood resources of Międzyzdroje from the point of view of the resort's competitive ability and achieved market position. It is a comprehensive and combined use of conclusions arising from both the analysis of the environment and the analysis of the city's resources (Stabryła, 2002). Below are the opportunities, threats, strengths and weaknesses of Międzyzdroje in a four-element matrix (table 3).

Table 3: SWOT analysis of the city of Międzyzdroje

Strengths:	**Weaknesses:**
1. Unique geographical distribution on Wolin Island, Wolin National Park, 2. Spa status, spa tradition, 3. Great interest among tourists from Germany and Scandinavia, 4. A rich and diverse range of accommodation, 5. High expenditure on the promotion of the city, 6. A strong brand of the "Festival of Stars", 7. Numerous tourist attractions, 8. Międzyzdroje ring road, 9. Low operating costs of the office, 10. Experience in attracting investors from the construction industry, 11. Performing a tourist audit, 12. Established position of the resort among the inhabitants of western Poland, 13. An extensive gastronomic offer, 14. Key investments started to develop the tourist offer, including the pier, promenade, amphitheater, 15. Development investments successfully completed in previous years, which may become the driving force of other investors, 16. Municipal plots for sale located in places attractive for tourists, 17. Conference facilities, 18. Support of residents for local government activities, 19. Good access from western Poland, 20. High marketing and promotional awareness of the City Hall employees, 21. Lack of industry - pollution, 22. Modern pier with the possibility of mooring passenger ferries, 23. City and commune known on an international scale.	1. Lack of a unified comprehensive database of accommodation and leisure offers, 2. Low level of investments intended for hotel operations in comparison with housing investments, the so-called apartamentowymi, 3. Poor condition of pavements in the most representative parts of the city, 4. Insufficient parking spaces for visitors, especially in high season, 5. The reputation of a holiday town with particularly high prices, 6. Difficult access from other than western part of Poland, 7. Trace use of renewable energy sources in the commune, 8. A small number of gas stations in the city, 9. bacteriological threat on the beach in 2008 10. Low quality of internal passenger transport, 11. A small number of international flights served at the nearby airport, 12. Poorly developed tourism management system at regional and local level 13. Potential threat to biocenosis and natural landscape values, 14. Employment of a large part of the local society only for the seasonal period.

Chances:	**Threats:**
1. Growing interest in Międzyzdroje as an excellent resort for organizing industry conferences, 2. Growing interest in Międzyzdroje among young, active and wealthy tourists, 3. Low value of Polish zloty on the currency market, which increases the price attractiveness of the resort among tourists from abroad, 4. Expansion of the tourist information system related to attractions available in the commune, 5. Rising costs of recreation abroad, which may attract native tourists to the Polish coast 6. Systematic expansion of road connections, especially in western Poland, 7. Sector cooperation in the hotel and recreation industry 8. Creating a comprehensive database of holiday offers in Międzyzdroje 9. Attracting investors from the hotel industry 10. Increasing tourists' awareness of the tourist attractions available in the commune, 11. Participation in tourist fairs and presentations, 12. Fashion for spending free days around Christmas at the Baltic Sea, 13. Germany as the most numerous nationalities visiting Poland for tourism purposes, 14. The reputation of Polish resorts abroad as cheap and hospitable places, 15. Promotional cooperation of the town hall and representatives of the hotel industry, 16. A steady increase in the number of international tourists, 17. Great interest in active forms of recreation in resorts such as Międzyzdroje, 18. Development of sea tourism (passenger ferry cruises), 19. Big profits for the city thanks to special economic zones.	1. The economic crisis as a factor deteriorating the financial condition of development enterprises, 2. The announced construction of a liquefied gas terminal, so-called the gas port in Świnoujście, which may affect the attractiveness of the west coast 3. Planned reduction of household expenditure on tourism 4. Possibility to popularize information about problems with bacteriological cleanliness of the beach 5. High position of other seaside resorts in terms of tourism and investment 6. Decisions about a holiday trip to the Baltic Sea are taken a short time in advance 7. Shortening the average stay at the sea, 8. Decreasing profitability of a number of services increasing the attractiveness of the tourist offer and increasing tourists' expenses, 9. Disputes between the city and entrepreneurs about issues related to renting space for erecting souvenir boxes, 10. Low sense of tourists' safety (state of public safety in cities and on roads), 11. The increase in the number of tourists affecting the intensification of natural environment exploitation, uncontrolled degradation of the natural environment.

Source: Own study based on: (City Hall in Międzyzdroje, 2018; The Green House Paweł Kranc marketing agency, commissioned by the Municipal Office in Międzyzdroje, 2018).

The analysis presented has many possible practical implications, both for institutions responsible for the development of the studied regions and individual enterprises focused on a given type of clients. The conducted case study also allows to use the illustrated research process together with the use of tools and methods used for other cities or tourist regions.

Summary

The creation and development of competitive tourist products is one of the most important areas of the "Development Strategy of the city and commune of Międzyzdroje". Creating and developing a diversified and competitive market of products is a priority task for 2020 for the tourism sector and regions in Poland. The objectives of this area include both the construction of new products and the improvement of quality and increasing the competitiveness of the range of products already on the market. The creation of attractive products at the local, regional and supra-regional level is only one of the stages of the competitive tourist product development program. Actions aimed at improving

products, processes of their modernization and increasing quality will also be supported. The development of brand tourist products, including the creation of modern and market-competitive offers, is a significant opportunity for dynamic development of regions. It will allow, among others for tourist activation within the entire area covered by the action, building a broad partnership around the program, increasing the synergy effect and achieving a lasting and significant economic effect for the region. This development also opens up great opportunities for interregional cooperation, including improving coordination of activities and conducting an effective policy of balancing development through tourism. Attention should also be paid to supporting the development of a specialized, personalized offer, in line with global trends, flexibly adapting to market needs. It is necessary to develop assumptions and concepts for the development of a group of competitive niche and specialized products, using primarily the so-called market niches that appear most often in areas of newly realized and created tourist needs. These types of products, according to global tourism development forecasts, will be gaining more and more popularity and market share. In the case of Poland, niche products should be created primarily at the level of regions depending on the specificity of tourist values of areas and assumptions of regional policy.

The vision of the city and the commune in 2015 presents the commune of Międzyzdroje as a popular health resort in Poland and Europe, possessing valuable natural and landscape assets and creates conditions for rest and provides its residents with access to work, education, culture and social care in accordance with their needs. As part of modernization and development of tourism, Międzyzdroje is a recreation, sport and tourism center of the western part of the Baltic coast that develops in a sustainable way, providing its inhabitants with prosperity and development opportunities. Such development perspectives and actions of local authorities towards their implementation should be assessed positively.

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Mediating Effects of Staff Training on The Relationship Between Geoinformation And Natural Disaster Management in United Arab Emirate

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Abstract

Recent developments in the UAE have progressed towards the concept of disaster resilience. However, preparations for any impending disaster have been slow and in fact, due to the country's recent legal establishment as a nation, disaster preparation has featured on national agenda. In light of the new nuclear development at Braqa and other expansions in UAE energy sector, it is important to understand vulnerabilities of the sector as a means of preparedness for future natural or man-made hazards. However, over the last decades, awareness of the range of potential threats to the UAE has increased. In response to this, the National Emergency Crisis and Disasters Management Authority (NCEMA) was established in 2007 (NCEMA). NCEMA is a specialised authority that regulates and coordinates the disaster response efforts at the national level. In this organization (NCEMA) training plays a very crucial role among the staff in which well-trained employees performs better than less-trained employees in terms of disaster management. Therefore, this research explores the Mediating Effects of Staff Training on the Relationship Between Geoinformation and Natural Disaster Management in United Arab Emirate. The findings of this research papers show that there is a significant mediating effects of staff training on the Relationship Between Geoinformation and Natural Disaster Management in United Arab Emirate.

Keywords: Natural Disaster, Geoinformation, UAE, NCEMA.

Introduction

Increasing frequency and intensity of disasters have resulted in severe disruptions to communities and built environment facilities around the world. There is an evident increase in human and property losses from disaster events over the past few decades. In the period between 2000-2011, 2.7 billion people have been affected by disasters, 1.1 million of which were fatalities and the financial cost of disaster impact was estimated at $1.3 trillion (Wex et al., 2014). Evidence suggests that disaster risks are rising at a rate faster than affected communities can build resilience (Albano, & Sole, 2018). Fast growing cities and urban areas of the world increase disaster vulnerability due to economic growth and fast population expansion. Cities, where more than 50% of the global population resides and where much of the economic assets can be found (Haworth et al., 2015), are very much the epicentre for destruction and loss brought about by natural and man-made disasters.

Growing urbanisation results in increased built environment facilities such as buildings and infrastructure, and thus a greater exposure of potential human populations and services to natural or man-made hazards (Garcia, Istomin, Slesareva, & Pena, 2018). The need to address disaster vulnerability of built environment facilities such as infrastructure is becoming increasingly important. How, these facilities are designed and built, and where they are located, is critical to their ability to withstand different types of natural or man-made hazards. The energy sector is a strategic component of any modern society. As the demand for electricity and energy grows, so do the complexity of the system and the need to protect it. The significant increase in consumer demand and population in both developed and developing countries means that not only society dependents upon the energy sector, but also that more people and businesses require an increasing energy supply, in order to operate normally (Khalid et al., 2015). Failure to protect the energy system and build resilience into the infrastructure could have severe affects, should these assets have subjected to a natural or man-made disaster.

The disasters that have frequented the United Arab Emirates (UAE) or at least have the potential to do so, such as storms, earthquakes, tsunamis, terrorist attacks, are complex and diverse in origin as they are in effect. Energy sector dominates in the UAE economy, especially in terms of its production and supply, and holds a very important global position in the world's economy. The protection of these systems and assets and within the energy sector especially, the safeguarding of oil and gas infrastructure from any natural or man-made hazards should become the top priority of the UAE (Kunz et al., 2014). Recent developments in the UAE have progressed towards the concept of disaster resilience. However, preparations for any impending disaster have been slow and in fact, due to the country's recent legal establishment as a nation, disaster preparation has featured on national agenda only very recently. In light of the new nuclear development at Braqa and other expansions in UAE energy sector, it is important to understand vulnerabilities of the sector as a means of preparedness for future natural or man-made hazards (Saleh et al., 2015). Similarly, in toppling disaster in any nation, staff capacity is of greatest importance in which only capable staff could handle the disaster and defeat it if they have appropriate training and adequate equipment. Therefore, this research explores the mediating effects of staff training on the relationship between geoinformation and natural disaster management in United Arab Emirate (UAE).

Methodology

The methodological framework that was used in attaining the stated objective of this study is based on positivist paradigm i.e quantitative research methodology. It shows how the research hypotheses postulated were empirically determined and examined through relevant methodological approaches adopted in the study (Mackey and Bryfonski, 2018). The research design, types and sources of data was examined along with the procedure employed in testing the hypothesis and accomplishing the study objective. The methodology of this research paper focused on the study populations/sample frame and its characteristics, sampling technique chosen, and a description of the choice of data collection instruments, questionnaire design, methods of data measurement, analysis and presentation. The methodology employed was quantitative in nature and SPSS and Smart-PLS software were used to analyse data collected from the respondents in the National Emergency Crisis and Disasters Management Authority (NCEMA).

Result

Respondents' Demographics

The profile of the respondents is presented in table 1 below. It contains information on the gender of the respondents, their age, marital status, and the highest educational qualification attained by the respondents.

Table 1: Respondents' Profile

S/N	Respondents' Details	Response	Frequency	Percent
1	Gender	Male	274	83.3
		Female	55	16.7
		18-29 years old	48	14.6
		30-39 years old	140	42.6
2	Age	40-49 years old	103	31.3
		50 years old and above	38	11.6
		Single	73	22.2
3	Marital Status	Married	244	74.2
		Divorced	12	3.6
		Secondary Certificate	10	3.0
4	Educational Level	Diploma	36	10.9
		Degree	231	70.2
		Masters	35	10.6
		PH.D	17	5.2

Table 1 is used to present the respondents' information regarding their gender, age, marital status and educational level they attained. The result shows that the respondents are predominantly male as indicated by 83.3 percent response while females account for the remaining 16.7 percent response. Similarly, Majority of the respondents are within the age bracket of 30-39 years as indicated by 42.6 percent response followed by those within the age bracket of 40-49 years as indicated by 31.3 percent response rate. The younger respondents of between 18- and 29-years account for 14.6 percent while the elderly above 50 years account for the remaining 11.6 percent. Majority of the respondents have degree qualification as indicated by 70.2 percent followed by those with Diploma and Masters as indicated by 10.9 percent and 10.6 percent response respectively. 5.2 percent of the respondents have PhD qualification and the remaining 3 percent of the respondents have secondary school certificate.

Mediating Effects of Staff Training on the Relationship between Geoinformation and Natural Disaster Management

This section provides information on the role staff training played in natural disaster management in UAE. The result of the descriptive analysis conducted is presented in table 2 below.

Table 2: Training

	Mean
Staff training is paramount in working with disaster management gadgets	3.67
Trained staff perform better than untrained staff in tackling disaster	3.75
Training give staff more understanding in solving disaster management	3.76
Trained staff manage more resources than untrained staff in disaster management	3.79
Trained staff used new tools in disaster management	3.90
Training (Aggregate)	**3.7757**

Table 2 is used to show the influence of staff training in natural disaster management in UAE. The result shows that respondents agree that Staff training is paramount in working with disaster management gadgets; Trained staff perform better than untrained staff in tackling disaster; Training gives staff more understanding in solving disaster management; trained staff manage more resources

than untrained staff in disaster management; and Trained staff used new tools in disaster management as indicated by mean values of 3.67, 3.75, 3.76, 3.79 and 3.90 respectively. Aggregately, staff training has high application in tackling natural disasters in UAE as indicated by 3.776 mean value response.

Evaluation of Structural Model

The structural model establish the causal relationships between the measurement models in the structural model (Hair et al., 2016). The specified interrelationships are intended to answer the research question and to test the research hypothesis. The major objective of structural model evaluation is to assess the model quality based on its ability to predict the endogenous constructs. The structural model is evaluated by assessing the path coefficients and their significance through bootstrapping procedure; the coefficients of determination (R^2) of the endogenous construct; the effect sizes of the exogenous measurement model through Cohen's f^2; the model's predictive relevant using cross-validated redundancy (Q^2); and the global goodness of fit of the model (*GoF*) (Goh, Ali, & Rasli, 2014; Hair et al., 2014; Hair).

The structural model is presented in figure 1 depicting first run model's coefficients before final modifications.

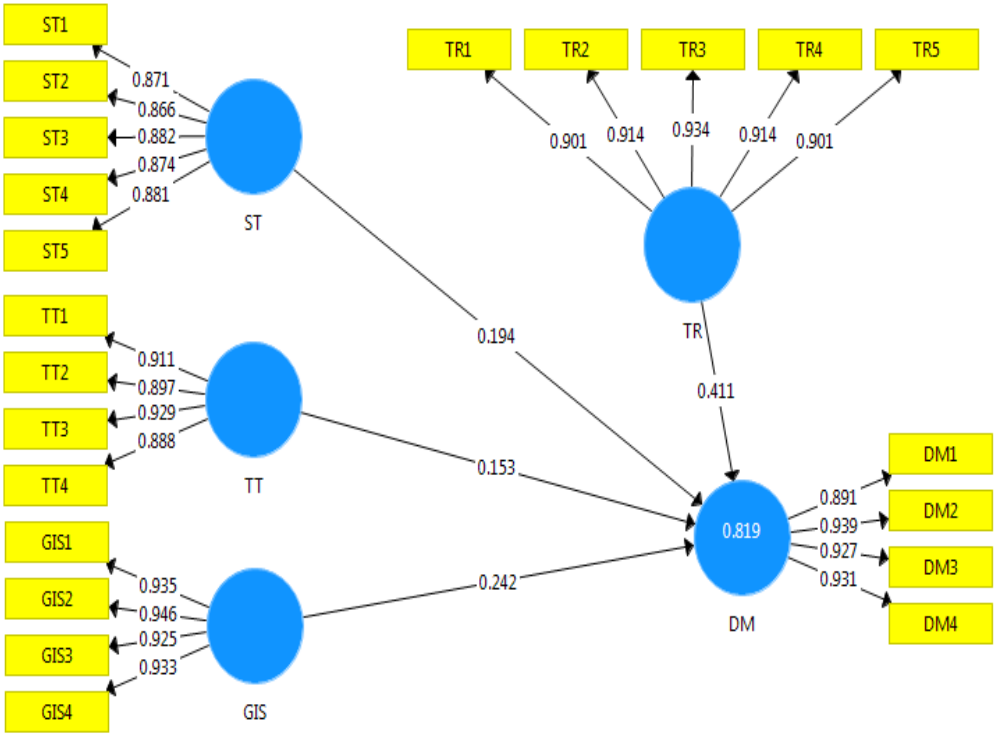

Figure 1: First Run Structural Model

After the modification on the first run model, the final structural model for the research paper is presented in Figure 2 below.

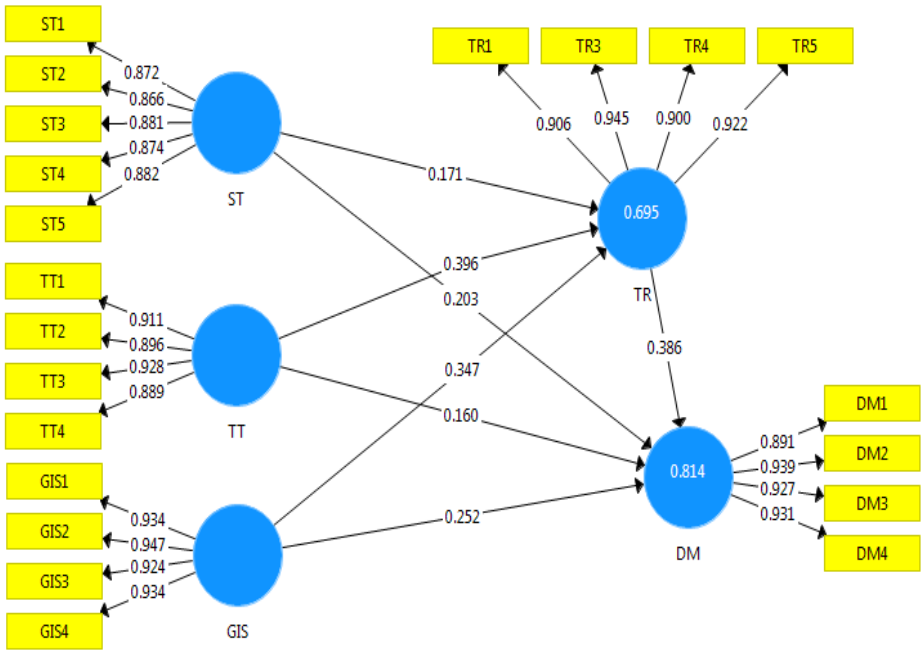

Figure 2: Final Model

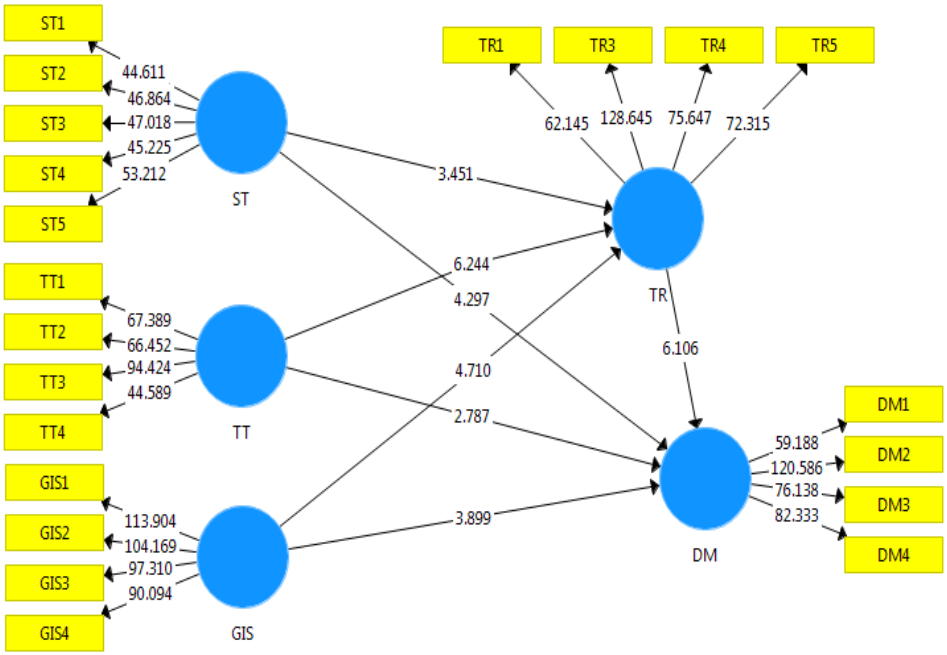

Figure 3: Final Model T-statistics

Figures 2 and 3 are used to present the final model and its t-statistics respectively. The coefficient of determination (R2) and the path coefficients are presented in Figure 2 while the t-statistics which shows the significance level is presented in figure 3. The information in the structural model is used in testing the formulated hypotheses.

The model's path coefficient and their significance provide the required information for testing the stated research hypothesis. The hypotheses are tested as presented in table 3 below.

Table 3: Hypothesis testing

Paths	Hypothesis	Path Coefficient	T Statistics	P Values	Remark
ST -> DM	H1	0.203	4.297	0.000	Supported
TT -> DM	H3	0.160	2.787	0.005	Supported
GIS -> DM	H6	0.252	3.899	0.000	Supported
TR -> DM		0.386	6.106	0.000	Supported
ST -> TR		0.171	3.451	0.001	Supported
TT -> TR		0.396	6.244	0.000	Supported
GIS -> TR		0.347	4.710	0.000	Supported
ST -> TR -> DM	H2	0.066	2.887	0.004	Supported
TT -> TR -> DM	H4	0.153	4.700	0.000	Supported
GIS -> TR -> DM	H5	0.134	3.465	0.001	Supported

In the structural model, there are 10 paths out of which 6 of them represent the earlier formulated hypotheses of the research. From table 3, it shows that all the hypotheses are supported. The result indicted that there is significant causal relationship between space technology and disaster management as indicated by path coefficient of 0.203 with t-statistics value of 4.297 and p-value of 0.000. Thus, supporting hypothesis H1. Similarly, tunnelling technology also has significant causal relationship with disaster management as indicated by path coefficient of 0.16 with t-statistics of 2.787 and p-value of 0.005 therefore supporting hypothesis 'H3'. H6 hypothesised significant relationship between GIS and disaster management. The research found significant causal relationship between GIS and disaster management as indicated by path coefficient of 0.252 with t-statistics of 3.899 and p-value of 0.000.

Training is modelled as mediating the relationship between space technology, tunnelling technology and GIS with disaster management. The result shows that all the disaster management technologies have significant relationship with training. Similarly, training significantly mediates the relationship between space technology, tunnelling technology, and GIS with disaster management as indicated by specific indirect effects of ($\beta = 0.066$, t-value = 2.887, p-value = 0.004), ($\beta = 0.153$, t-value = 4.700, p-value = 0.000), and ($\beta = 0.134$, t-value = 3.465, p-value = 0.001) respectively.

Cumulatively, about 81.4 percent of the variance in disaster management in UAE is explained by space technology, tunnelling technology, GIS, and training as indicated by coefficient of determination (R^2) value of 0.814.

Path Coefficients Evaluation

PLS-SEM has a major aim of predicting the causal relationship between research exogenous constructs and the endogenous constructs which are normally formulated in hypotheses. After running the model, the hypotheses are tested using the path coefficients (Hair et al., 2014). Path coefficients are used to measure the strengths of the relationships between the research's constructs in the structural model. The coefficients represent the strength of a relationship with coefficients closer to 1 showing strong positive relationship (Hair et al., 2014). The significance of the path is assessed using the t-statistics through the process of bootstrapping (Kock, 2014). The path coefficients and their significance level indicate evidence of model's internal quality. To ensure quality of the inner

model, the path coefficients are required be significant (Wong, 2016). The path coefficients of this study are presented in table 4 below.

Table 4: Path Coefficients

Paths	Path Coefficient	T Statistics	P Values	Remark
ST -> DM	0.203	4.297	0.000	Significant
TT -> DM	0.160	2.787	0.005	Significant
GIS -> DM	0.252	3.899	0.000	Significant
TR -> DM	0.386	6.106	0.000	Significant
ST -> TR	0.171	3.451	0.001	Significant
TT -> TR	0.396	6.244	0.000	Significant
GIS -> TR	0.347	4.710	0.000	Significant
ST -> TR -> DM	0.066	2.887	0.004	Significant
TT -> TR -> DM	0.153	4.700	0.000	Significant
GIS -> TR -> DM	0.134	3.465	0.001	Significant

The entire 10 paths in the structural model have significant coefficients. It can be concluded that the research structural model has the required quality as all the path coefficients are significant.

Conclusion

This paper is on the mediating effect of staff training on the relationship between geoinformation and natural disaster management in UAE with the case study of National Emergency Crisis and Disasters Management Authority (NCEMA). The research employed quantitative methodology to collects data from the respondents in the National Emergency Crisis and Disasters Management Authority (NCEMA). SPSS and Smart-PLS were used to analyse data collected from the respondents. The findings of this research papers show that there is a significant mediating effects of staff training on the Relationship between Geoinformation and Natural Disaster Management in United Arab Emirate.

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Logic of Information Knowledge

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Abstract

Digitalization of all social processes and phenomena requires the creation of an information environment in accordance with the semantic representation of reality and adaptation-value invariants of personality identification from the point of view of mathematical knowledge. The effectiveness of information processes in the methodology of cognition requires the algorithmization of cultural codes in the discourse of scientific schools. The possibility of unrealistic objective information about an object as a form of existence does not depend on subjective knowledge and is created independently of thinking. Since truths arising from pure concepts are objectively possible, and truth-in-itself is a direct object of cognition, purely logical means are the criterion of the truth of information knowledge. Thus, it can be assumed that the criterion of the truth of the event (expected) information is the form of the language within the framework of logical procedures. The principles of encoding logical information lead to the analysis of only definitions of concepts in statements. Specific intrasystemic interference created by the transmission channel of the evidence by its consumers comes to the fore. Such interference is subtracted in the form of a priori, external consumer attitudes, accompanying or preventing the receipt of evidence. These hindrances are objective in the sense that any subjective thinking in the process of receiving (perceiving) evidence has a priori information that in general does not coincide (at best, partially coincides) with the original premises of the proof logic and its codes.

Keywords: information, logic, knowledge, logical forms. thinking, truth, verbal-logical discourse.

Introduction

Looking through event information through logical procedures, one can single out the concepts of J. Bernoulli and B. Bolzano. These concepts underlie the theory of information. The first concept is defined by such probabilistic representations that occur in the absence of information, and the initial probabilities can be calculated solely on the basis of research and understanding of the properties of objects of interest (in other words, by obtaining and processing a certain amount of information about the object). This is a significant difference between the concept of J. Bernoulli and the concept of P. Laplace, in which the principle of the absence of any information about the properties of the object of interest is the main [2]. The second concept is defined by the philosophy of B. Bolzano, which relies on an overabundance of information about the object. This idea is reflected in the doctrine of ideally

existing "objective" truths, sentences and self-representations, acting as a constant opportunity of past, present and future subjective, human imaginable representations and events [1].

In the future, the classification of information about the events of J. Bernoulli was reflected in B. Russell's type theory, which will be discussed later. The methodological basis of the theory of types by J. Bernoulli is the concept of a “probabilistic event”, characterized by a lack of information about the process or phenomenon. This is due to a mismatch between the scientific and intuitive understanding of the phrase "probable event". The concept of "probability" is defined through the "reliability" of information, now understood not in the ontological, but in the epistemological sense. J. Bernoulli defines probability as the degree of reliability of information that differs from the latter as part of the whole. This definition can be interpreted as a definition of informational subjective probability, since J. Bernoulli, inclined to deny the objectivity of the case, argues that the probability of obtaining information does not relate to a thing in itself, but to our knowledge of it [3]. O. B. Sheinin believes that under the “true probability” of obtaining information about the event, J. Bernoulli means the “classical” probability previously defined by him. However, in a number of examples cited by him, the calculation of the “classical” probability is in principle impossible already for the reason that there is no system of equally possible events, i.e. equally probable information. Having defined the probability through the ratio of favorable cases to equally possible (classical definition), we can talk about similarity or congruence, which justifies the principle of insufficiency of bases, which implies the equal possibility, due to certain information about the properties of the studied object [7].

Aim and research problems

There is some problem that poses and solves J. Bernoulli. It consists in the following: with an increase in the number of observations, the statistically calculated probability of an event (similar to probability in information theory) becomes arbitrarily close to the true information probability of the event. Hence, based on the definition of probability as a degree of reliability and calling one of several events more probable, we can talk about subjective information probability. Moreover, the true value of event information can be understood as the objective probability of an event, as well as the subjective probability, corresponding to the level of our knowledge of the phenomenon [4].

An excess of information, as noted earlier, is determined by the concept of B. Bolzano. He distinguishes two kinds of existence of objective information: a) the existence of real information - "directly given"; b) the existence of unrealistic, but possible information - the existence of "in itself." Therefore, an emphasis is placed on the qualitative characteristics of information, and in conjunction: objectivity - subjectivity, reliability - unreliability, completeness - incompleteness, relevance - irrelevance, value - futility, intelligibility - incomprehensibility [8]. The possibility of unrealistic objective information about an object as a form of existence does not depend on subjective knowledge and is created independently of thinking. Since truths arising from pure concepts are objectively possible, and truth-in-itself is a direct object of cognition, purely logical means are the criterion of the truth of information knowledge. Thus, it can be assumed that the criterion of the truth of the event (expected) information is the form of the language within the framework of logical procedures. From here, firstly, the very concept of "intensional information" is clarified, which leads to a revision of our ideas about descriptions of cases (descriptions of states) [15].

It is necessary to dwell on the transfer of true information of logical procedures in communication processes. This is the second aspect of the presentation of logical information. The first is determined by event, internal information and the process of coding it. The second is due to dispositional, external information and the process of its transmission. The methodological basis of the second aspect of information in logical procedures is the philosophical definition of the concept of information, recognizing it as an attribute of matter, equivalent to matter and energy, which allows us to interpret information as a thin material structure with properties unusual for the physical world [5]. However, recently this position has been transformed, and the emphasis is on the existence of information in the world of personal psychology, where there are artistic images, scientific knowledge, myths about the past and dreams about the future. The analysis of logical procedures in

communicative processes shows that the blurring of the line between event and dispositional information is carried out on the basis of a subjective representation of reality as a discourse.

Speaking of personal psychology, one cannot ignore the existence of objective knowledge without a knowing subject. According to K. Popper, this idea is knowledge objectified in books, magazines, etc. Moreover, since the existence of information without a knowing object is recognized, it should be recognized for the subjective knowledge of individual individuals, because it is they that generate the objective information. In the objective world, there are innumerable properties and relationships within matter and energy, as well as between matter and energy. Some of them are perceived by the senses, recognized, that is, converted into an image (semantically transformed into a model of objective reality) and subjectively recognized as information [9]. Within the framework of the logical procedures of consciousness, information is subjective reality, since consciousness is a subjective image of the objective world. Information is the central concept of information communication. It can be objectified if presented in symbolic form and transferred to an external medium. The principles of communication draw attention to such an element of logical knowledge as evidence. The principles of encoding logical information lead to the analysis of only definitions of concepts in statements [14]. Specific intrasystemic interference created by the transmission channel of the evidence by its consumers comes to the fore. Such interference is subtracted in the form of a priori, external consumer attitudes, accompanying or preventing the receipt of evidence. These hindrances are objective in the sense that any subjective thinking in the process of receiving (perceiving) evidence has a priori information that generally does not match (at best, partially coincides) with the original premises of the proof logic and its codes [6]. This information to one degree or another conflicts with the evidence, interferes with its adequate reception, and impermissibly coarsens the input of the receiver, increasing beyond measure the thresholds for detecting and distinguishing signals. With especially intense interference, collisions like “I don’t want to understand”, “I don’t understand, then it’s wrong”, etc. are possible. Under these conditions, the “channel encoder” must take into account the nature and intensity of such interference and introduce adequate redundancy in the proof logic, for example , through the mechanisms of repetition, testing, analogies, etc. If we consider a posteriori uncertainty in the definition of concepts through the unconditional entropy of a statement as a measure of its a priori uncertainty, then the maximum unconditional entropy of the information source and it is achieved at the equiprobability possible states.

Results of the research

Therefore, the source of information is the initial statement, which, from the point of view of proof, has two states: truth and falsehood. But it is impossible to build on only two values because there will be no exact equiprobability, but only a replacement in the semantic meaning of the concept. The finite duration of the proof does not allow to realize the entire possible range of arguments in favor of its reliability. Therefore, the arguments should be selected so that their total information content is, if possible, equivalent to the information content of the vast majority of this spectrum [10]. There is a property of additivity of information. In signal theory, the concept of the width of the equivalent spectrum of a signal is used, which characterizes its hypothetical finite rectangular energy spectrum, equal in area (in the spectrum-frequency coordinate system). Both spectra are equivalent. Often the equivalent signal spectrum is called effective. By analogy, the proof should contain a finite number of arguments, equal in information content (as far as possible) to their real number. Conventionally, such a proof is defined as effective [13].

Thus, the key characteristic of philosophical proof, as, indeed, of any other, is its information content. One can prove something only through mutual understanding, achieved in a certain field interaction through its information component while eliminating the distorting (noisy) influence of the power component. The traditional information-energy, "costly" evidence of how management should give way to a purely informational, resource-saving understanding as a connection. This is precisely the hermeneutic essence of the dialogue of cultures; the implementation is seen in low-energy information processes eliminating the noisy sign transformations of the encoding – transmission – decoding of information that are characteristic of the traditional dialogue. The width of the equivalent spectrum of information transmission indicates a strong "coverage" in the process of discourse of

diverse information, hence the difficulty arises in establishing its truth [12]. Therefore, verbal-logical discourse cannot be a guarantor of reliable evidence. Attempts to find it in the principles of verifiability and coherence of statements are also hopeless. It can be assumed that the cause of this problem should be seen in the discrete nature of the discourse itself, which, due to this genetic discreteness, is incapable of proving substantively the significance (truth / falsity) of statements, the meaning of which is continual in nature. The relevance of this presumption is confirmed by the emergence along with two-valued clear logic (values of "true" or "false") of "fuzzy" logics based on linguistic variables [11]. However, fuzzy logic based on a finite set of values of linguistic variables is discrete, because, like two-valued logic, it can guarantee only the plausibility of the proof. The discourse will be more flexible, adequate.

The justification of the completeness of information as the degree of correspondence of the information received to its true value is expressed as the main categorical-conceptual forms of information: reliability, adequacy, accessibility and relevance

Reliability is the degree of correspondence of the received information to its true value. Information is reliable if it reflects or does not distort the true state of affairs. Objective information is always reliable, but reliable information can be both objective and subjective. She helps make the right decisions. Inaccurate information can lead to misunderstanding or wrong decisions.

Adequacy - the degree of compliance with the real objective state of affairs. Inadequate information can be formed when creating new information on the basis of incomplete or inaccurate data. However, complete and reliable data if inadequate methods are applied to them can lead to the creation of inadequate information. The lack of adequate methods for working with data in many cases leads to the use of inadequate methods, resulting in the formation of incomplete, inadequate or inaccurate information.

Availability is a measure of the ability to receive information. The degree of its availability is simultaneously affected by data availability and adequate methods for their interpretation.

Relevance - the degree to which information corresponds to the current moment in time. Often relevance, as well as completeness, is associated with the commercial value of information. Relevance - importance, materiality for the present. Timely information received can bring the necessary benefits. Outdated information is irrelevant. When working in constantly changing conditions, it is important to have relevant, that is, relevant information, information.

Conclusion

Logical form is the ability of an image to be an image. Logical space is determined by the internal relationships of the totality of characters. The creation of an adequate recording system that would demonstrate that the so-called logical constants (facts), which mean nothing, is necessary. The truth operations, which in terms of language correspond to logical constants, can be reduced to the explication of internal relations between sets of signs through logical following. The information content of logical forms lies not in the field of subjective representations, but in the explication of architectonics of the objective domain of meanings.

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Digital Skills of European Citizens: To Be on Time

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Abstract

The paper presents an overview of European Union policy regarding digital inclusion and digital transformation. It describes the impact of the digital skills to rising digital inclusion level. Special attention is required to analyze different types of digital skills within geographical groups of countries – Western Europe, Northern Europe, Southern Europe, and Eastern Europe. The dataset covers 2018-2020, obtained from Eurostat and other sources. The results of the analysis reveal that Nordic countries demonstrate the highest level digital skills, followed by the Western and Southern countries, and Eastern European countries have much lower rates. An exception among these countries is Ukraine, which is developing a digital society, focusing on the Association Agreement between the European Union and its Member States, of the one part, and Ukraine, of the other part (2014). The case study, based on Ukrainian experience, meanwhile, identifies a digital divide among citizens and discovers a set of tools for improving present situation, in particularly from Ministry of Digital Transformation of Ukraine. The paper concludes with the need to provide the targeted government decisions in European Union countries, as well as Ukraine.

Keywords: digital skills, digital inclusion, European countries, Ukraine.

Introduction

Digital inclusion are highly important for citizens` engaging in economic, social, cultural, civic and others areas of state and personal life. And digital skills decidedly are one of determinative indicators for evaluation of digital inclusion in different countries. The importance of this indicator was stressed in a number of official documents and research publications. Thus, Pillar 6 of the Digital Agenda for Europe directly related to digital skills in the context of enhancing digital literacy and inclusion. It denotes that on 2010 150 million Europeans (30%) have never used the Internet and emphasizes on the digital skills necessity for innovation and growth [1].

The new Skills Agenda for Europe adopted by the European Commission in 2016. It indicates that almost half the European Union population lacks basic digital skills; with around 20% of people having none at all. Thereby, digital skills are lacking in Europe at all levels, though the rapid digital transformation of the economy and society in general requires adequate digital skills [2]. So, the European Union made digital literacy and skills a priority of its policies, launched the Digital Skills and Jobs Coalition, and leading to the need for every citizen to have at least basic digital skills in order to live, work, learn and participate in the modern society. Regulations and digital inclusion practice have been spread out across Europe, as well as digital skills have been distributed amongst different socio-demographic groups of citizens within European countries.

According to Helsper (2014), the main definitions of digital inclusion are 'access', 'skills', 'motivation', 'engagement' and 'content'. Moreover, they can be linked to particular social outcomes for particular socio-demographic groups in particular countries. Helsper stressed, that digital skills should be thought of at a basic technical, operational level, as well as in relation to the critical, social and creative literacies [3].

There are different approaches to classify digital skills. For instance, in survey, conducted in the United Kingdom by Helsper and Eynon, they determined technical, social, critical, and creative skill types and divided them for two categories: 1) operational (creative and technical) and 2) strategic (social and critical) [3]. Another arguable question is measuring the level of digital skills. Helsper and Van Deursen (2015) noted, that the Eurostat indicators measure different types of use rather than skills. And regarding the achieving certain digital literacy goals, a number of European countries have digital skills initiatives that focus on schools or libraries or community centers training and assist to increase digital literacy in vulnerable groups [4].

This paper attempts to reveal the present level of digital skills in European countries, compare Ukrainian data, and find out what relevant decisions the governments need to make to increase digital inclusion in their countries.

The paper applied empirical methods, historical methods, relevant legislation and literature analysis, statistical methods (mostly descriptive statistics – tabular, numerical methods, and grouping for summarizing and describing data), comparison, and other research approaches. Data for the international comparisons are obtained from the European Commission, e.g., Key Indicators of the European Information Society [5], Worldometer [6], Hootsuite [7], and Ministry of Digital Transformation of Ukraine [8].

Data gathering and Analysis

The European Commission regularly overviews how digital literacy is distributed across European households and individuals, such comparative data are collected yearly by Eurostat. Table 1 reveals digital skills level in European countries according to statistics 2019. The authors grouped European countries using the regional principle, since the results of many studies indicate that within the group there are similarities and groups are often compared.

Table 1: Digital skills level of European countries citizens in general

	Country	**Total population, 2020**, thou	**Digital skills, 2019**, % of population		
			Low	**Basic**	**Above**
	European Union – 28 countries (2013-2020)		28	25	33
	Western Europe				
1	Austria	9 006,4	21	26	39
2	Belgium	11 589,6	29	27	34
3	France	65 273,5	32	26	31
4	Germany	83 783,9	22	31	39
5	Liechtenstein	38,1	n/a*	n/a	n/a
6	Luxembourg	624,0	30	29	36
7	Monaco	39,2	n/a	n/a	n/a
8	Netherlands	17 134,9	16	30	50
9	Switzerland	8 654,6	19	27	49
	Northern Europe		n/a	n/a	n/a

10	Denmark	5 792,2	27	21	49
11	Estonia	1 326,5	28	25	37
12	Finland	5 540,7	19	26	50
13	Iceland	341,2	13	24	62
14	Ireland	4 937,8	36	19	34
15	Latvia	1 886,2	42	19	24
16	Lithuania	2 722,3	25	24	32
17	Norway	5 421,2	16	31	51
18	Sweden	10 099,3	24	26	46
19	United Kingdom	67 886,0	20	25	49
	Southern Europe				
20	Albania	2 877,8	n/a	n/a	n/a
21	Andorra	77,3	n/a	n/a	n/a
22	Bosnia and Herzegovina	3 280,8	46	16	8
23	Greece	10 423,1	24	27	23
24	Croatia	4 105,3	26	18	35
25	Holy See	0,8	n/a	n/a	n/a
26	Italy	60 461,8	32	19	22
27	Malta	441,5	29	18	38
28	Montenegro	628,1	n/a	n/a	n/a
29	North Macedonia	2 083,4	50	16	15
30	Portugal	10 196,7	22	20	32
31	San Marino	33,9	n/a	n/a	n/a
32	Serbia	8 737,4	31	26	20
33	Slovenia	2 078,9	28	24	31
34	Spain	46 754,8	31	21	36
	Eastern Europe				
35	Belarus	9 449,3	n/a	n/a	n/a
36	Bulgaria	6 948,4	38	18	11
37	Czech Republic (Czechia)	10 709,0	24	36	26
38	Hungary	9 660,4	31	23	25
39	Moldova	4 034,0	n/a	n/a	n/a
40	Poland	37 846,6	35	23	21
41	Romania	19 237,7	43	21	10
42	Russia	145 934,5	n/a	n/a	n/a
43	Slovakia	5 459,6	29	27	27
44	Ukraine	43 733,8	38	22	25

**not available*

Source: Authors – based on the data of Eurostat, 2019, Worldometer, 2020, Ministry of Digital Transformation of Ukraine, 2019

As we find out from Table 1, the Nordic countries demonstrate the highest level digital skills (43% average), followed by the Western (40% average) and Southern (26% average) countries, and Eastern European countries have much lower rates (21% average). The situation in the latter group is explained by the fact that some countries have joined the European Union recently and some ones are not members of the European Union. Therefore, the European Union digital programs and standards are not implemented in these countries. Besides, there are the lack of assessment of digital skills level

of their citizens. An exception among these countries is Ukraine, which is developing a digital society, focusing on the Association Agreement between the European Union and its Member States, of the one part, and Ukraine, of the other part (2014).

Whether a person has digital skills is determined on the basis of his or her performance in four areas. These are: 1) information (e.g. looking up information on the internet, transferring files, and saving photos in the cloud); 2) communication (e.g. sending emails, making internet phone calls, and using social networks); 3) problem solving (computers/online services, e.g. online shopping, installing apps, and taking online courses); 4) software skills (e.g. using software to edit photos, videos, or files).

An official data 2019 Eurostat are presented in Table 2, last update: 15.04.2020. For every country 'Information skills' includes 'Individuals who have basic and above basic information skills'; 'Communication skills' – 'Individuals who have basic and above basic communication skills'; 'Problem solving skills' – 'Individuals who have basic and above basic problem solving skills'; 'Software skills' – 'Individuals who have basic and above basic software skills'. General data calculated for 28 European Union countries.

Table 2: Digital skills level of European countries citizens in competence areas, 2019

	Country	**Information skills**	**Communi-cation skills**	**Problem solving skills**	**Software skills**
		% of population			
	European Union – 28 countries (2013-2020)	81	83	78	60
	Western Europe				
1	Austria	83	83	80	69
2	Belgium	85	89	83	62
3	France	82	85	83	60
4	Germany	91	91	88	71
5	Liechtenstein	n/a	n/a	n/a	n/a
6	Luxembourg	87	92	87	68
7	Monaco	n/a	n/a	n/a	n/a
8	Netherlands	93	94	94	80
9	Switzerland	92	94	91	80
	Northern Europe				
10	Denmark	95	95	95	71
11	Estonia	86	86	86	62
12	Finland	93	93	95	77
13	Iceland	97	98	97	86
14	Ireland	85	85	82	54
15	Latvia	78	81	79	44
16	Lithuania	79	76	74	58
17	Norway	96	97	98	83
18	Sweden	93	94	93	74
19	United Kingdom	89	93	91	75
	Southern Europe				
20	Albania	n/a	n/a	n/a	n/a
21	Andorra	n/a	n/a	n/a	n/a

22	Bosnia and Herzegovina	65	68	60	25
23	Greece	72	69	61	56
24	Croatia	77	74	69	56
25	Holy See	n/a	n/a	n/a	n/a
26	Italy	61	71	59	45
27	Malta	80	82	74	58
28	Montenegro	73	n/a	69	54
29	North Macedonia	66	80	54	34
30	Portugal	69	73	62	55
31	San Marino	n/a	n/a	n/a	n/a
32	Serbia	73	72	63	50
33	Slovenia	79	78	72	59
34	Spain	83	83	78	60
	Eastern Europe				
35	Belarus	n/a	n/a	n/a	n/a
36	Bulgaria	58	65	50	31
37	Czech Republic (Czechia)	83	84	80	64
38	Hungary	76	78	68	50
39	Moldova	n/a	n/a	n/a	n/a
40	Poland	75	73	70	47
41	Romania	70	71	74	35
42	Russia	n/a	n/a	n/a	n/a
43	Slovakia	80	79	76	55
44	Ukraine	74	75	56	29

Source: Authors – based on the data of Eurostat, 2019, Ministry of Digital Transformation of Ukraine, 2019

Analyzing the digital skills level in order to find out the competence characteristics, we note that most countries in Northern and Western Europe are above the average European Union dimension. The exceptions are Latvia, Lithuania, and Ireland (regarding software skills). Southern Europe countries demonstrate both rather low digital skills level and big difference within group. The lowest digital skills level have Eastern Europe countries. An exception is Czech Republic – its digital skills level corresponds to the level of Northern and Western Europe countries.

Different EU countries conduct special advanced research and share additional information about digital literacy level their citizens. Thus, according to statistics, the Netherlands is one of the countries in Europe with the largest number of citizens with proficient digital skills. In 2019, half of the Dutch population aged 16 to 74 years had 'above basic' overall digital skills, versus an average 33 percent in the European Union. In the area of information, the share of Dutch people with above basic digital skills was 89 percent, while the EU average stood at 71 percent. The Netherlands` citizens were also showed above basic skills in 'communication' and 'problem solving': 83 and 81 percent respectively, and the EU average was 67 percent for 'communication' and 59 percent for 'problem solving' [9].

The OECD Survey of Adult Skills in Austria (2017) defines digital problem-solving skills as the capacity to solve problems using a computer. These skills include writing an e-mail and browsing the web (level 1), implementing more advanced tasks involving multiple steps (level 2), and the capacity to use both generic and specific software applications with inferential reasoning (level 3). It was emphasized that job tasks change due to digitalization – almost all jobs need interaction with

computers and basic or above-average digital skills, or a combination of professional skills and IT skills [10].

Table 3: Digital behavior in Eastern Europe, 2018

	Country	**Total population, 2018**, million	**Internet users**, % of population	**Active social media users**, % of population
1	Belarus	9,46	71	49
2	Bulgaria	7,06	66	52
3	Czech Republic (Czechia)	10,62	88	50
4	Hungary	9,71	79	60
5	Moldova	4,05	71	25
6	Poland	38,14	78	45
7	Romania	19,63	70	51
8	Russia	144,0	76	47
9	Slovakia	5,45	83	50
10	Ukraine	44,12	58	29

Source: Authors – based on the data of Hootsuite, 2018

Table 3 presents survey data Digital in 2018 in Eastern Europe [7]. Six of the 10 analyzed countries are Member States of the European Union, and Ukraine is considered together with three other countries, which are not Member States (Belarus, Moldova, and Russia).

The biggest amount of Internet users is in Czech Republic – 88%, Slovakia – 83%, Hungary – 79%. Ukraine takes the last rank – 58%. The biggest amount of Active social media users is in Hungary – 60%, followed by Bulgaria – 52%, and Romania – 51%. Ukraine takes penultimate rank – 29%, and the last is Moldova – 25%.

In the last years in Ukraine we sight such growing occurrence as a digital divide – widening gap between elderly and young, with high and low income, urban and rural habitants with regard to access to and the using of the Internet, as well as digital technologies. So, digital divide includes basic digital skills and media literacy, access to digital technologies, digital inclusion, and digital participation [11].

As we already mentioned, Ukraine doesn`t gather statistic data in accordance with Eurostat indicators. However, the newly established Ministry of Digital Transformation (2019) conducted a comprehensive study the digital literacy in collaboration with partners, including UNDP, the Eastern Europe Foundation, EdEra and others [12]. To determine the level of digital skills was used the methodology of the European Commission – the Digital Economy and Society Index, and all four digital literacy indicators – information, communication, problem solving, and software skills were calculated.

The research shows that: 1) 53 percent of Ukrainians (aged 18 to 70) have a 'below average' level of digital skills; 2) 15.1 percent of Ukrainians do not have any digital skills at all; 3) of digital skills, communication skills and information skills are the most developed among the population of Ukraine; 4) problem solving and software development skills require the most improvement.

With the aim of bridging this digital divide, the Ministry of Digital Transformation of Ukraine announced their ambition plan to involve 6 million citizens in digital skills development programs in partnership with Ukrainian Library Association and public libraries. Thereby, in January 2020 was

launched the National Digital Literacy Platform 'Diia: Digital Education' [8]. Nowadays it presents a number of educational videos (series), which are accessible to everyone, are designed to bridge the digital literacy gap and provide people with more opportunities to develop [11]. Facing the coronavirus COVID-19 pandemic, a new training video about mechanical (artificial) ventilators has been filmed for Ukrainian doctors use.

Conclusion

To be on time in digital era means to go ahead from digitization, through digitalization towards digital transformation. The stage of digital transformation implies doing things differently, and digital skills are first steps on this way. Because as soon as possible we should at least feel free and friendly in interacting with robotics, artificial intelligence, big data etc.

According to Ukrainian experience, to raise the digital skills level and digital literacy level of citizens in general is possible through development the infrastructure, education, and informing component. In our opinion, the biggest challenge will be engaging residents to use the digital learning platform.

There need more effective and efficient government policies, that links different digital skills and indicates how this relates to the needs of particular groups. We should fully understand, that inequalities in digital skills will not automatically disappear, unless clearly targeted government decisions are implemented. It is important to keep in mind that finally it is not the matter of digital skills or digital inclusion, but the facing and overcoming everyday challenges.

Endnotes

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The Role of Rental Housing Policy in The Economy of Slovakia

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Abstract

The functional real estate market and housing have an impact on the economy at almost all levels and via each aggregated variable in the marketplace. It creates conditions to utilize an area potential as well as to attract a qualified workforce into an urban area. Low work mobility, high indebtedness, missing institutional environment in Slovakia is also related to the utilization of housing stock in which housing occupied by owners dominated while rental housing sector compared to developed European countries is significantly undersized. The authors aim to point to functional institutional environment related to insufficient rental housing in Slovakia.

Keywords: Housing associations, rental housing market, institutional environment in Slovakia

Introduction

Markets work the same way for housing as other goods in the economy, determining value based on supply and demand. It is both a good, being consumed by the consumer, as well as an investment, based on its re-sale value. The real estate market belongs to the most critical sectors of the national economy. Its independent development and the value of real estates markedly influence the development of national economy and long-term growth of gross domestic product (GDP). Fundamental quantities of the real estate market, demand and offer form a cyclic development of the real estate market, which subsequently have an impact on macroeconomics and GDP. The long-term practice of developed European countries with market-oriented economy shows that the best tool for the global solution of the housing problem is the creation of functional market with real estates for housing, the part of which must be the sector of rental housing. Its lack prevents people from the easy movement at searching for work opportunities.

A crucial institutional condition for the development and functioning of the housing market mainly in the segment of rental housing is housing organizations, which are an essential part of its institutional environment.

The housing market in Slovakia

The significant transformation (privatization|) of the housing sector performed after the year 1990 in the Slovak Republic, still more confirms a visible lacking development in the field of the rental housing at present. According to the census in the year 2011, the overall housing stock presented in Slovakia 1,994,897 housing units, 205,729 of them are not occupied. It consisted of 90.5% of apartments in private ownership, 6% were rental flats (out of them there were 3% of council rental flats and 3% private rental flats), and 3.5% flats were owned by housing cooperatives (Housing Europe, 2017).
On the other hand, Slovakia significantly has moved in the structure of ownership housing within the last twenty years (Fig. 1), which undoubtedly contributed to already low mobility of the Slovaks.

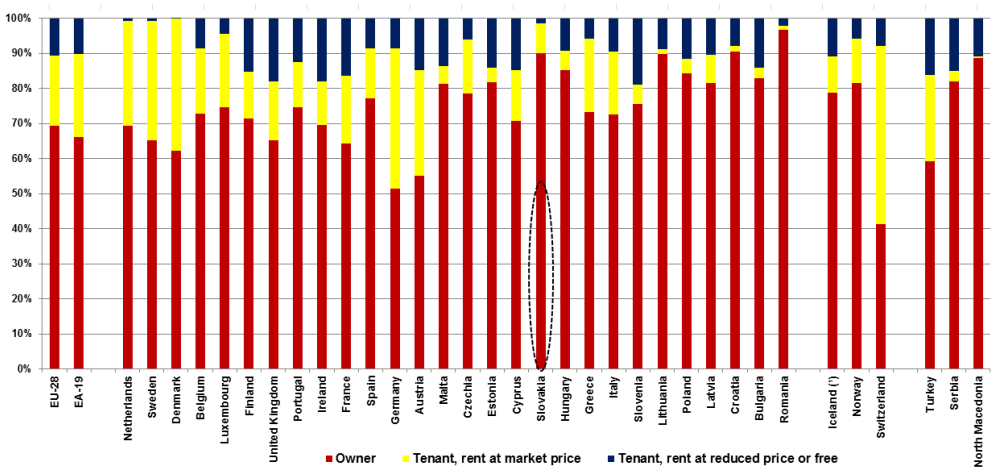

Fig. 1: Distribution of population by tenure status
(% share of the total population, Eurostat, 2019)

In this context we can assume that there is an existing relationship between an increase in ownership of flats and growth of unemployment, i.e. the purchase of housing units restricts its owner's possibility to search for work outside of his domicile. The study of Andrew Oswald (1996) brought impressive results where he points out that each ten additional percentage points of the ownership of flats mean the growth in unemployment by two percentage points. The study says that owners of apartments are in case of lost occupation less willing to move to rental flats due to higher cost of movement (there is also implemented the cost related to the sale of the flat and payments for two apartments until the sale of the original one). Thus, owners of flats are in case of lost occupation longer without work than tenants. Oswald, based on his research, remarks that regions with a higher share of home ownership usually have a more rigid adjustment of territorial planning and land legislature, which restricts the development of entrepreneurial activities. Oswald's analyses were the subject of investigation for other authors who confirmed the correlation between ownership and unemployment; however, with significantly lower impact (Green, Hendershott, 2001).

Another significant problem is high credit indebtedness of Slovak households which might lead on the one hand up to executions and loss of home ownership and on the other hand to disruption of the stability of the bank system. Moreover, growing household indebtedness is a problem exceeding the field of the financial sector. In the most crucial age groups already more than 70% of the workforce have credits. At the same time in several age groups, many clients have an instalment to repay the debt higher than 50% of their income, which means they have just low capacity to apply for additional credits. In this connection, it needs to be said that in the pre-recession period 2007 to 2008 Slovakia belonged to countries with a relatively lower increase in indebtedness and at the same time the year-to-year decrease of the household consumption in the year 2009 was quite mild. At present, the situation is different; the growth of Slovak household indebtedness has been for several years the

fastest in the EU (Fig 2). Therefore, it might be expected that also implications on their consumption will be higher in the case of the economic cycle change (Kalman, 2019).

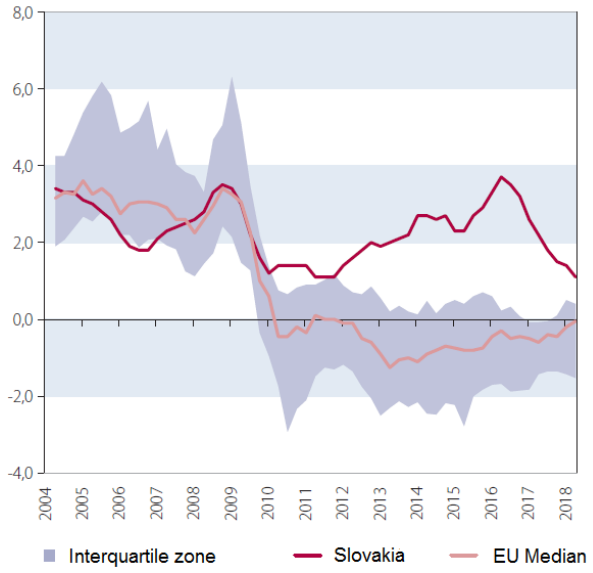

Fig .2: Growth of Slovak household indebtedness belongs among the fastest in the EU (in %l) (Kalman, 2019)

Among European countries, several programmes were created to support vulnerable households. For example in Italy and Spain to solve this issues there were created programmes to support the households that were not able to repay the credits for housing with the help of solidarity founds, in Hungary and Ireland there were created schemes for the remission of mortgages. (Cár, 2015).

Cár further states that at present many European countries try to make rental housing more attractive and to create it as functioning and affordable, where also the European Union gets significantly financially involved. In the Netherlands, they try to implement the system which will be based on the division of the rental sector to the regulated social sector and non-regulated rental sector, which should also attract private investments. It needs to be emphasised that the effort of several countries to reform and make rental housing more attractive encounter the significant tendency of households to own real estates for housing.

Excessively indebted households might have in bad times the problem to repay the credits or might be forced to significantly restrict their consumption, which will worsen the process of repeated renewal of economic growth (Kalman, 20190. Negative impact on the present worldwide pandemic COVID-19 is also confirming it, which has a significantly negative impact on all economies. Moreover, growing indebtedness of households in Slovakia is a society-wide problem, which might have besides the impact on economic growth also the impact on the social position of households. Several analyses show that 10% of Slovak households did not have any financial reserves before this crisis. Twenty per cent have reserves maximum for one month; thirty per cent have reserves maximum for a month and 60% of households for less than six months. It means that the problem of growing indebtedness of households needs to be solved on several levels.

Several legislative measures were adopted, which should have helped to indebted households to repay the mortgage to reduce the negative consequences of the pandemic in Slovakia. In the wording of the adopted equitable adjustment (the act No 75/2020 Coll. as amended) it is the deferment of repayment of the mortgage for the period which is not longer than nine months since the day of

maturity of the nearest unpaid credit instalment. Unpaid interests for the period of the postponement of the mortgage repayment will be arranged into the remaining instalments of the credit, which are due after the expiry of the postponement of credit repayment.

It needs to be emphasised that the situation of a long-term indebted household will not be solved by present legislative about the postponement of repayment of mortgages which was adopted concerning pandemic COVID-19. Any postponement or lowering of instalments has an impact on the future instalments of the credit in already highly indebted households.

We might assume that those who nowadays finance housing through mortgages will stop being able to repay them, and they will lose their present housing. In the horizon of several years, there will be a new group of people who will have a problem with availability of housing not only because of the chance to gain a mortgage but also due to quite a high market rent in bigger towns. In the Slovak Republic, it is predominantly the capital city Bratislava, where the price of rent is in the long term high - at the level of mortgage instalments.

(Non) Functional Institutional Environment

The residential market (construction of a block of flats) nowadays in big metropolises oligopolies and divides among big players who concentrate on big developer projects. An important part of the developed institutional environment of the real estate market in the developed countries is flat organizations. These organizations work mainly in the field of rental housing, and their activities are the most important in the European countries as the Netherlands, Austria, France, Sweden, Denmark and the USA. The built flats are mainly for inhabitants with middle or low incomes. A dominant role among these organizations is played by flat associations, flat co-operatives and flat societies of natural entities. They also act as public trading societies with limited liability, flat co-operatives, joint-stock companies (at which there is for example forbidden the payment of dividends) or non-profitable organizations. Gradually there are also organized new types of housing societies that have the potential to utilize the gaps in the market, which is otherwise ruled by oligopoly - e.g. smaller or vacant sites. At the same time with this, they increase the demanded, and oligopoly-limited competition. So, new types of housing companies might support the origination of urban communities with a positive impact on social and economic sustainability, safety and genius loci locations (Spirkova, Stepanek, Machajdikova, 2019). The authors also state that these new forms of housing corporations might also bring new forms of the interconnection between the interest of flat users with public interest. The public sector (municipalities, state, public institutions) might be involved in the form of a share in the block of flats, project (e.g. Baugruppe), which they supported in advance for example with providing a building site under favourable conditions, to influence the functioning and sustainability of the project, to prevent its undesirable transformation (e.g. to Airbnb business).

International experience from the development of non-profitable housing sector is undoubtedly interesting also for Slovakia, where just this part of the institutional environment is missing. At present in Slovakia, there are just two such non-profitable housing organizations. One of them was created as PPP project of a financial institution and the capital city Bratislava (2004), and in case of the second one, the 100%-founder was the town (2005). Their priority interest should have been the development and increase in the share of rental flats for those inhabitants who have a regular income. Still, this income is not high enough to buy the flat or to cover all costs in a rental flat with market rent. We have to say that despite partial legislative support for the origination of such new types of organizations in the SR as well as the support and experience of Dutch partners at the foundation of the mentioned housing societies, the state support and interest is not felt for the more dynamic origination and development of such societies.

Uneven economic development also causes a significant disproportion in the field of prices of housing, which naturally negatively influences the availability of housing for lower and middle-income groups of inhabitants. Until now, the development of the housing market has not covered and probably still a long time will not cover the needs of all income groups of inhabitants. In this frame, it

looks as that non-profitable organizations might contribute to the solution of the housing problem mainly for young people who do not have accumulated sufficient sources for the purchase of a flat into the ownership, or for those who travel for work and use the rental housing as a temporary one.

Data and theoretical basis

In the paper, there were used statistical data and analyses done by Eurostat and the Statistical Office of the Slovak Republic. Further, there were analysed the selected documents and regulations of the Ministry of Transport, Construction and Regional Development of the Slovak Republic (Information on housing construction in the Slovak Republic within the years 2005 - 2019) etc. From the in-depth analysis of the documents of the EU states related to the housing policy results that at the EU level, a common definition of social housing is absent. The individual states have different definitions related to a different level of public interventions in this sector. The common feature is the fact that the purpose of social housing is the general interest, the increase of affordable housing supply for disadvantaged groups of the population. And that concrete social housing objectives are based on the socio-economic status and risk factors present.

Result and Discussion

The indebtedness of Slovak households presents a high risk which would also reflect the prices of real estates, the year-to-year growth during the last year (2019) reached the level close to 10%. Thus, the growing indebtedness of households stays one of the important risks. Generally, we might state that:

- The problem of growing indebtedness of households is still impossible to see in the perception of the ownership of the real estates as an evaluation of the social status of a human being,
- High prices of commercial rentals of flats - at the level of mortgage instalments,
- Low-interest rate induces a high interest in available mortgages - the interest rates at the end of the year 2019 decreased from 1.5 to 1.3 per cent. With the lower monthly instalment, they opened even bigger opportunity to grant credit for a low-income group, which s very sensitive in worse time and in provided tests it looks like the one with the highest probability of failure.
- The on-going fast growth of credits for housing (prevailingly for the purchase of a flat into the ownership) is supported by the supply and well as the demand side of the credit market.
- The non-functional institutional environment in the field of rental housing in the Slovak Republic,
- Almost not existing available rental housing has an impact on the mobility of workforce - ownership of a flat restricts the possibilities to search work out of the permanent address and so on.

Conclusion

In the paper, we aimed to point to selected problems related to almost non-existing available rental housing in the Slovak Republic. The mentioned fact is one of the causes of high indebtedness of Slovak households. The issue of the Slovak Republic is also (non)functional institutional environment, which we consider as an essential determinant in the development of the rental housing and mature market of the real estate market. Creation of the space and more prominent state support for the origination of housing societies in the Slovak Republic should contribute to the increase in the share of rental housing not only from the view of the social rental housing but also with the creation of further levels of rental housing for groups of inhabitants with the middle and higher income. Finally, we could say that the accommodation is one of the basic human needs and the quality of

housing and its availability is often perceived as the determinant for the evaluation of the standard of living of the society.

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- Zákon č. 75, ktorým sa mení a dopĺňa zákon č. 67/2020 Z. z. o niektorých mimoriadnych opatreniach vo finančnej oblasti v súvislosti so šírením nebezpečnej nákazlivej ľudskej choroby COVID-19 (The Act No 75 amending the Act No 65/2020 Coll. on some extraordinary measures in the financial field related to the spread of dangerous contagious disease COVID-19).

Towards Circular Economy Implementation in Context of Automotive Industry

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Abstract

The circular economy presents a complex system which tries to keep raw materials and materials in the marketplace for the longest possible time to save natural resources and lower the human waste on our planet. Non-renewable natural sources are gradually becoming exhausted, which reflexes in the increase or fluctuation of prices of raw materials. Thanks to circular principles, the number of material entries into the production might be lowered. Then the risk of this might be avoided. The circular economy is one of the significant ways how to secure the economic growth of the society. It might be approached as a scientific model concept of a sustainable development of the economy, which we might also call a type of green economy. The paper focuses on the examples of the circular economy in the automotive industry, which has a dominant place in the Slovak Republic.

Keywords: Circular economy, technologies, automotive industry

Introduction

The circular economy is one of the significant ways how to secure the economic growth of the society. It might be approached as a scientific model concept of a sustainable development of the economy, which we might also call a specific type of green economy. Thus, it is an economic model, in which are some of unused natural sources in any available form, either from recycling or repeated utilization returned to the production process. As natural sources are not permanent and inexhaustible, they are becoming a global problem for the member states of the European Union. The countries are preparing the measures for the most effective utilization. They are developing strategies for implementation of the circular economy. In the strategy, it probably looks as that the models, imaginations or simulations will be created. They consist of incoming raw material, production. After the production there follows the consumption of raw materials, origination of waste and assessment of the amount of produced waste. Just with elaborated models, the concrete steps and measures might be subsequently implemented, which then create a system of the circular economy. These models might help to work on analyses and identification of narrow places, to avoid the origination of waste and to support waste management. The circular economy is an integrated set of activities which prevent the origination of waste and vice versa - supports the repeated return of materials or ready products, sometimes recycled or repaired, into the life cycle (Cséfalvayová et al., 2017, Kanianska et al., 2017).

Jurišová (2017) states that the circular economy aims to save and effectively utilize limited natural sources, to streamline the production of highly effective products and low consumption of sources and low emissions. It involves prevention and lowering of waste production and subsequently the sources of pollution up to recycling when the sources return to the economic cycle. It is still more urgent from the practical point of view. Thus, the wastage is minimized as well as the cost of entry of

material and energy needed for the production of new products lowers. From a practical point of view, the circular economy is a strategy of sustainable development, which creates functional and healthy relationships between nature and human society. It is essential to mention in this paper that the pillar for the laying the foundation of the circular economy for the states and also enterprises in the countries are following the three principles '3Rs' (Reduce - Reuse - Recycle), which are an economic codex of behaviour:

- *The principle of lowering* - presents the orientation of economy to scientific and technological progress and innovation with the aim of the most effective utilization of sources with the lowest consumption of raw materials and energy.
- *The principle of reuse* - it means to require the production of reusable goods and packaging materials. It becomes still more inevitable that producers and designers concentrate on the creation of durable and reusable products, and so to prolong their life cycle.
- *The principle of recycling* - it means that after the end of life of the product, it is reused as an available source. There is the need to build and support the development of the recycling industry, which brings waste and scrap (created inter-mediate products, raw materials and other materials) again to the production or for various use. It is either the reuse in the frame of the process, through which the material in another form has already gone once or several times, or their use in the frame of the completely different sector, field or process.

Circular Economy and Ecology

The relation between the circular economy and ecology means the provision of opportunities for all. 'It is necessary to regurgitate the myths that there is a discrepancy between the economic and ecological status of society. Thanks to intelligent policies and well-targeted investments the countries might protect the environment with the growing economy, to create suitable work opportunities and to speed up the progress in the society' (Šimo-Svrček et al., 2017).

Many professionals and specialists make comment on and assess the system of circular economy as a new phenomenon. According to them, its priority is saving and effective use of restricted natural sources, streamlining of goods production at high effectiveness and lower consumption of sources and low (or even zero) production of emissions. It involves prevention and lowering of waste production and subsequently the sources of polluting materials up to recycling when the sources return to the economic cycle, which has still more urgent practical importance.

Circular Economy

The circular economy presents a complex system which tries to keep raw materials and materials in the economy for the longest possible time to save natural resources and lower the human waste on our planet. Circular economy (CE) is a concept currently promoted by the EU, by several national governments including China, Japan, UK, France, Canada, the Netherlands, Sweden and Finland as well as by several businesses around the world. The European Commission recently estimated that circular economy-type economic transitions could create 600 billion euros annual economic gains for the EU manufacturing sector alone (Korhonen, Honkasalo, Seppälä 2018).

The concept 'the circular' economy involves goods of a wide spectrum of origination and subsequent utilization. The only products which are not at present part of the circular economy and probably they even cannot become potential adepts for the circular economy are foods. In the countries where the circular economy does not function, the process of lifespan runs as follows: After gaining necessary raw materials taken from natural sources there follows the production of a concrete product. The product is distributed to sales places. When the product gets to a customer who utilizes it somehow, it subsequently becomes, in most cases, a waste. It is taken to waste disposal sites and places for waste collection.

On the other hand after the process when the product or good fulfilled its aim and should according to the original scenario become waste, but it is not carried away to waste disposal site but to in advance agreed place, where after a certain treatment/processing becomes raw material again. That could be used for production of the same or different product. We speak about recycling of the waste or possibly about its repeated utilization for the same, i.e. primary or secondary purpose. The secondary purpose means associated process to the primary process, in the frame of which the product was used, until it becomes waste. The reuse of the waste in any suitable form might also be realized within a completely different process. If the given material or product in the frame of the given process fulfils all requirements. Concerning the final manufacture, a new product might have or does not have to have the same design. It strongly depends on the process of production - whether the process of the production is the same as the process of the production of the primary product or it is different - adjusted to the fact that the product will be used for a secondary purpose. It also depends on the type and material pliability from which it consists. In the process of production, it goes through re-processing and the ready product is designed for reuse and consumption at a customer or is used in the frame of the exact process or it performs another purpose. If the situation requires, a customer is informed about it.

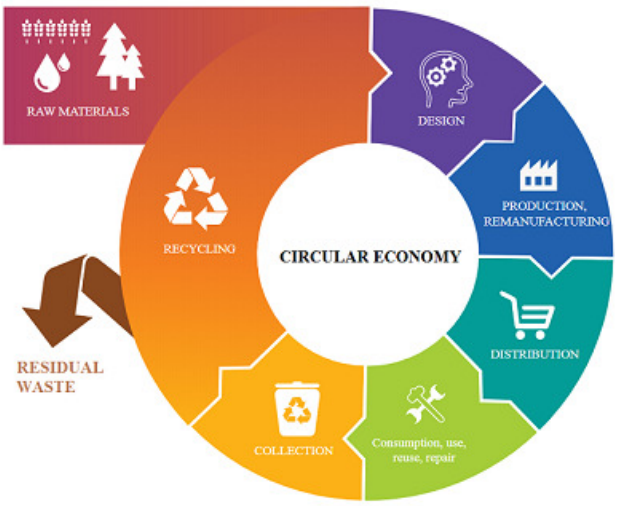

Fig. 1: The principle of the circular economy (The European Parliament)

In Fig 1 a model is explaining the system of the circular economy step by step - after the entry of materials or raw materials to primary production process (it means into the process, the result of which is the product in the form for which was primarily determined). After the production, there might be running refurbishment. After the production of the product, there follows its distribution either directly to a customer or the sales chain from were either immediately or later gets to the end-user. Then its utilization, use and consumption follow, or possibly already in this stage with the contribution of a customer after the end of the functionality, the product could come to their repair and subsequent reuse. Failing that after the end of the functionality, such products are collected, at the best sorted out and collected. Some products as, e.g. paper, glass and so on are recycled which ensures their reuse for the same purpose. Other products due to their quality after processing cannot be used for the same purpose, in the same or another sector. If it is not possible to place the product into the life cycle, it becomes waste and is not part of the circular economy of the country.

Result and Discussion

Appreciation and utilization of the waste

Correctly chosen way to dispose of the waste or its return to the circulation is an absolute basis in the fight against the increase in the amount of produced waste. In Slovakia, e.g. we can sort the cans based on plastics. However, for experts is not too good solutions as cans decompose significantly shorter time and it might be considered if also cans besides recycling might be classified among materials belonging to the circular economy and after their processing undergoe heat and hygienic process. It would ensure their reuse. Cans, tin containers, barrels or other products have their place in the frame of a wide spectrum of their use. Decomposition of mentioned products made of plastics or PET bottles is between 100 up to 1000 years. However, separation of plastics in most more developed countries and already in Slovakia is at a high level. Their processing for reuse also has its drawbacks. Until now the circular economy of plastics might be provided just with cleaning, disinfection and provision of classical circulation of reuse. We talk mainly about PET bottles. At various plastic packages it depends on their condition or damage after usage, which in most cases did not fulfil the conditions of further use and therefore they often end in waste immediately after the first use. Recent years in Slovakia, we can still more frequently find collecting vessels for batteries and electro-scrap. As a dangerous product (freely dropped in nature or as a part of common waste) we might also consider a little battery with the decay time approximately 200 up to 500 years. Their presence in communal waste will destroy the entire content, in which it occurs, and so the waste which could go to compost cannot be used. At the processing of such destroyed waste, there are released dangerous materials, which pollute the air, groundwater, soil and act toxically to all surrounding living organisms. Separation and subsequent processing of electro-scrap and used and non-functional batteries, chargers, cables and so on is significant and inevitable.

The most common processing of waste, which is neither dangerous nor polluted with dangerous materials, but at the same time cannot be separated, recycled or possibly proceeded to reuse is incineration. In Slovakia, many companies have already been engaged in this field; it means to catch and utilize the heat, or any other type of energy originated at the activation of a process. At incineration, it is a system of recuperation, where gradually created heat is caught. Subsequently, this heat might be utilized in many ways, e.g. for heating of the nearest buildings. It might be heat collection, which is subsequently with the help of recuperation unit processed and transformed in a needed form into the same or similar facilities or for other purposes. In lifting equipment, there is used electric energy gained with recuperation during the descent of lifting platform from above to down (Blažiak, 2017).

The examples of a functional system of the circular economy in the automotive industry in Slovakia

In the Slovak Republic, the automotive industry has a dominant position - in per capita, it is the biggest producer of passenger cars worldwide. The share of the automotive sector in the overall GDP of the country is about 5% and when considering the industries related to the automotive industry is even 13% of the Slovak GDP. Its share in export is up to 26% of the overall export. In the automotive industry, there are about 400 companies that deliver components for finalization of the final product. Several of these companies gradually implement concrete measures related to the system of the circular economy, and subsequently, the amount of produced waste is continually lowering. It is mainly in these fields:

Material appreciation of synthetic textile waste (textile creates about 2.5% of the overall weight of a car) from automotive industry the company PR Krajné patented technology *Stered.* The production is 3 to 5 times energetically more economical than the production of traditional insulating materials made from stone or glass. The final products have several usages. Besides other, they might serve as heat and acoustic insulations, railway absorber of noise or pavements, car parks and green roofs able to retain rainwater and not to accumulate heat. The mentioned company is known as functional according to the principles of the circular economy 3R. One of the initiatives was also a

reconstruction of the disused production area for the seat of their new factory. The latest research proves that textile fibres can be recycled again and again without their weakening, but these technologies have not been spread, yet. A good local example in this field is the company SK-Tex with the seat in Senica, which yearly return approximately 4,500 tonnes of textile waste and changes them to materials determined for cleaning in the industrial companies or various types of insulation with extraordinary parameters. These products are suitable for automotive, furniture and construction industry and after the end of lifespan are again recyclable.

Processing of old tyres might have various forms of final products as, e.g. quality granulated material from rubber with the fraction 0-4 mm, which is at the same time an input raw material into a technological line, which produces the final goods from quality rubber granulated material (Fig. 2). Other input products might be pressed rubber mats suitable as noise walls or areas for sports grounds, playgrounds and stables.

Fig. 2: Rubber granulated material: Backfill into artificial lawns, the fraction 1.0 - 3.0 mm (the company AVE SK)

A unique example and the same time topic of one of the studies originated from the field of the chemical industry. Components of several waste which originates in the frame of automotive production might be also interesting for many companies. For example, newly found element cryolite or in other words bauxite originating in the process of varnishing of cars, might serve as one of the essential construction elements to produce aluminium and so also aluminium products. The companies which might be interested in the purchase of this element are also in Slovakia.

Conclusion

In Slovakia, there are in case of the circular economy and primary topic wastes. It results from the whole situation, the main problem of which is a high rate of waste disposal and low rate of sorting and recycling. The solutions in the shape of avoiding the origination of waste and are gradually penetrating the daily practice. However, they are still a minority way of solutions to problems with waste. At present minimum in Slovakia, compared with other developed European countries it comes more likely to prefer to use new products with high quality. Insufficiently in the world, we repair, recycle or utilize the components from used materials or even from the waste to produce other, not new products but products with the same quality. Recycling at the same time does not represent final, and at the same time attractive solution, as its processes are energetically demanding and in general they mean the degradation of materials - all this leads to increase in demand after genuine original materials and frequently discourages the end-users

As Matiova and Musova issues (2016), the circular economy is more than just recycling as it goes behind the borders of recycling being based on renewing industrial system leading to the extinction of waste. It should be taken as one of the basic principles of functioning.

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Human Capital as seen from the Level of Education – the EU Perspective

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Abstract

The development and modernization of economy result in increased demand for high quality human capital. The main aim of the paper is to assess human capital in the EU countries from the perspective of the level of education. The following detailed objectives are adopted in the paper: assessment of education as a factor shaping human capital in the EU countries and assessment of the "human resources" factor included in the SII. The reflections presented in the paper showed the existing diversity in the sphere of education between the European Union countries. They pointed to egalitarianism of education in the EU states, to an increase in the degree of tertiary education and to an unsatisfactory level of lifelong learning in the EU countries. The paper is based on a critical literature review and analysis of secondary data.

Keywords: human capital, education, EU countries

Introduction

Determinants of knowledge-based economy as well as social and economic transformations caused intangible resources to gain importance in the context of economic activity. In the conceptual age, increasing rank is attributed to (in the international and national scale and in the scale of individual entities) human capital, whose essential elements include knowledge, skills and qualifications acquired in most part in the course of education. The condition of human capital is determined by i.a. the state of the level of education. It is assumed that an increase in the level of education positively affects the quality of human capital and vice versa. Therefore, states, striving to create knowledge-based economy and wishing for their economies to be more competitive, must focus particularly on the effectiveness and efficiency of their education and training systems.

Given the above, the main aim of the paper is to assess human capital in the EU countries from the perspective of the level of education. The following detailed objectives are adopted in the paper:

1. Assessment of education as a factor shaping human capital in the EU countries.
2. Assessment of the "human resources" factor included in the SII.

Implementation of the main aim dictates the paper's layout. Part one introduces theoretical concepts of the subject-matter of human capital and education. Part two presents the state of the level of education in the EU countries. The paper is based on a critical literature review and analysis of secondary data.

Education as an element of human capital - introductory issues

The concept of human capital has been appearing in scholarly papers since the second half of the 20th century. It needs to be emphasized that even before that researchers had pointed to this type of capital. In the 1950s and 1960s the term "capital" began to be used to specify the "the role of education and expertise in generating prosperity and economic growth" (OECD, 2007). Whereas the 1980s showed the real force of the impact of human capital on the development of contemporary economy.

The literature is not consistent as to a single approach to the definitional term "human capital". For instance, T.W. Schultz treats it as a resource of knowledge, skills, health and vital energy in a given society/knowledge. Human capital is a resource which is a source of future satisfaction, earnings or generally speaking services of some value. It is part of an individual and is associated with him. It is human because it is embodied in an individual, and it is a capital because it is a source of future satisfaction and future earnings, or both of those (1971). T. Listwan in turn assumes that it is a collection of properties inherent in people, such as knowledge, skills, professional experience, psychological features, health and behaviours (2005) (cf. Tittenbrum 2017, Herbst 2007).

However, there are a few common points in various approaches to "human capital". It is, inter alia, pointed out that this capital, contrary to other types of capital, cannot be separated from an individual. Human capital cannot, moreover, change owners since it is created by a given person, therefore it is inextricably linked with them. It is not an object of market transactions either, but it can (and even should) be subject to continuous development which is dependent not only on individual talents, skills, qualifications or genetic features, but also on the contexts in which individuals operate. This capital can be constantly enhanced and development by investment in expanding knowledge, advancement and raising skills and qualifications (Milewski, Kwiatkowski, 2005).

The literature identifies two basic approaches to it, namely a narrow and broad approach. In the first case it refers to qualitative features of the resource of knowledge available in the economy, which is an effect of investment in education and training. Whereas in the broad approach, the outlays that form or increase the resource of human capital include not only investment in education and training, but also investment in health, culture and environmental protection because they do or may affect the improvement of qualitative features of human work (Janoś-Kresło, 2002). Additionally, when analysing human capital, it is essential to point out to which level this term refers. Authors of various studies point to three different areas, that is the macro-economic scale, an organization and an individual.

For the need of reflections included in this paper it is assumed that human capital means "the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being" (OECD, 2001). The above definition points to a multidimensional structure of the concept of human capital. The concept of knowledge, included in this definition, may be divided into theoretical (abstract) knowledge and empirical, technical and practical knowledge. These classifications may in turn be divided into professional, managerial, social and international classifications. Competences and "other attributes" (for example those concerning professional orientation) also play an important role and include awareness and responsibility on the one hand and creativity, innovativeness and entrepreneurial spirit on the other.

Some economists, as for example T. Shultz, have noticed that "people invest in their education and training to build up a stock of skills and abilities (a capital) that can bring a long-term return. This investment can also benefit national economies and help fuel economic growth" (Human Capital…, 2007). S. Domański also points out that human capital may be gathered, used or wasted, but it can also be increased by investing in it (cf. Perechuda, 2005) by, interalia, (1993):

- expanding broadly understood health care-related services,
- training at various levels, also training adults,
- migrations in order to find better employment or adapting to changing conditions,
- searching for information about the economic situation of companies and professional perspectives,
- scholarly research, leading to expansion of knowledge and opportunities of applying it.

It also needs to mentioned that investment in human capital may be done under various organizational forms. Therefore, there is a possibility of advancing people's skills through a national education system, the system of employment agencies or the system of scholarly research, conducted both by universities and private companies. Another form involves all personally undertaken steps by individuals in order to advance their knowledge, skills and qualifications (Domański, 1993). In addition, it is important to emphasize that human capital (in reference to an individual) continues to

develop throughout one's life. Hence the importance of the element of effort to continue education throughout one's life, i.e. lifelong learning.

In addition, it is important to emphasize that human capital (in reference to an individual) continues to develop throughout one's life. Hence the importance of the element of effort to continue education throughout one's life, i.e. lifelong learning, the idea of which was present as early as in the works by Dewey or Lindeman at the beginning of the 20th century (Jarvis, 1995). Lifelong learning is based on the principle of systematic gaining of knowledge, keeping it up-to-date and education in terms of new practical skills and enhancing qualifications as a response to the changes occurring in daily life of a contemporary society, with emphasis on the individual's self-actualisation. It emphasizes individual's motivation for self-training. Lifelong learning is understood also as preparing an adult to direct their own life, developing a habit of constant pursuit of knowledge and identifying one's experience with reception of knowledge (Bagnall, 1990).

One also needs to take into account the occurrence of barriers that hinder a part of society's making investment in human capital or preventing them from doing so, namely social inequalities. They are often accompanied by circumstances such as persistent unemployment, poverty or marginalisation, all encouraging loss of human capital, as a result of which the real level of accumulation of human capital is lower than possibly attainable. These phenomena, observable on many labour markets in the spatial plane, inhibit people's access to knowledge, which negatively affects the development of human capital. The learnt helplessness of certain groups is called negative human capital. The decrease of human capital is also impacted by migrations of highly-qualified staff away from these areas (Mikuła, 2006).

The literature, both from past and at present, demonstrates the existence of dependencies between the level of economic development and the level of education and training. Breakthrough significance to the analysis of these relationships was brought by the emergence of the theory of human capital and human investment by T.W. Schultz (1961, 1971) and G.S. Backer (1962, 1975). They demonstrated profitability of investment in education in their studies. Similar findings came from research by F. Haribson and Ch. Meyers (Research on the impact of training and development of education on economic growth. Their results allow an assessment of interrelations between the level of economic development and the education level in individual countries. The authors pointed out the existence of an essential interrelation between the human capital index which included mainstreaming secondary and higher education and national income per capita. They also demonstrated a significant relationship between national income and popularization of higher education. They also proved that investment in human capital is necessary for a country to be able to develop) (1964), by M. G. Kaser (He identified a correlation between gross national income and higher education development indexes. The higher the level of development of education in a given country, manifested by the length and achieved levels of education and the number of people in training, the higher the correlation.) (1966), by F. Edding (He demonstrated a relationship between investment in education and economic growth. He concluded, inter alia, that most often, though not always, the relationship between investment in education and an increase of the gross national income is positive, that there is a positive relationship between the wealth of a country and its investment in education, where less well-off countries in reality allocate more and more resources to education, that the amount of funds allocated to education from the budget is not always strictly related to the expenditure on education of one learner (1963) or from research conducted at the turn of the 20th and 21st centuries by e.g. Saxton (2010). However, one needs to note that at the turn of the 20th and 21st centuries research findings began to emerge on the basis of which it was possible to conclude that raising the level of education does not unequivocally have to influence the economic growth in a positive way. Certain determinants are necessary for a productive use of human capital. They include an adequate quality of human capital, efficient institutional-governmental environments, large demand for educated persons, adequate quality of teaching, size of corruption and migrations (Rogers, 2008).
To conclude, one can ascertain that education is one of the main elements affecting the state of human capital. It is in its course and through improved education systems by individual countries that obtaining and developing knowledge, skills and qualifications (which are the main components of

human capital) occur. In the age of striving for knowledge-based economy, improving the quality of human capital by i.a. the process of education seems priceless, indispensable or even necessary.

The level of education in the European Union

In the context of the targets set by the European Union for itself, the Europe 2020 strategy shows its visible direction towards i.a. increasing competitiveness (especially in relation to highly-developed countries or emerging economies such as China or India). It is significantly associated with the observable trend to direct the UE labour market towards an increase in the demand for employees with higher qualifications, which is directly related to the undertaken activities that serve to improve the state of education. Examining the level of education in the EU one needs to pay attention in particular to two issues, namely: the EU-28's population's level of education and the level of lifelong learning.

This is reflected in, inter alia, the goals concerning education adopted in the Europe 2020 strategy. A target on educational attainment which tackles the problem of early school leavers by reducing the drop out rate to 10% from 15%, whilst increasing the share of the population aged 30-34 having completed tertiary education from 31% to at least 40% in 2020.

Data analysis shows that in 2019 16 Member States reached their national targets already in terms of early leavers from education and training. In needs to be noted that an individual target level was set for each of the EU countries, taking into account their circumstances (the established national targets hover from 4% for Croatia to 16% for Italy). For the EU states, the percentage of early school leavers continued to drop steadily from 13.9% in 2010 to 10.3% in 2019. Among the EU countries there is an observable differentiation in terms of the development of the said indicator (Table 1).

Table 1: Target indicators for early education leaving and the degree of their implementation in the EU-28 in 2010, 2019 (%)

Country	TARGET	2010	2018	2019	Country	TARGET	2010	2018	2019
EU-28	**10**	13.9	10.5	10.3					
Belgium	**9.5**	11.9	8.6	8.4	**Lithuania**	**9.0**	7.9	4.6	4.4
Bulgaria	**11.0**	12.6	12.7	13.2	**Luxembourg**	**10.0**	7.1	6.3	6.8
Czechia	**5.5**	4.9	6.2	6.2	**Hungary**	**10.0**	10.8	12.5	12.0
Denmark	**10.0**	11.5	10.4	10.1	**Malta**	**10.0**	23.8	17.4	16.7
Germany	**10.0**	11.8	10.3	10.4	**Netherlands**	**8.0**	10.1	7.3	7.4
Estonia	**9.5**	11	11.3	10.5	**Austria**	**9.5**	8.3	7.3	7.5
Ireland	**8.0**	11.9	5.0	5.3	**Poland**	**4.5**	5.4	4.8	5.1
Greece	**10.0**	13.5	4.7	4.3	**Portugal**	**10.0**	28.3	11.8	10.7
Spain	**15.0**	28.2	17.9	17.2	**Romania**	**11.3**	19.3	16.4	15.7
France	**9.5**	12.7	8.9	8.3	**Slovenia**	**5.0**	5.0	4.2	4.5
Croatia	**4.0**	5.2	3.3	3.1	**Slovakia**	**6.0**	4.7	8.6	8.0
Italy	**16.0**	18.6	14.5	13.7	**Finland**	**8.0**	10.3	8.3	7.6
Cyprus	**10.0**	12.7	7.8	8.3	**Sweden**	**7.0**	6.5	7.5	6.8
Latvia	**10.0**	12.9	8.3	8.8	**United Kingdom**	:	14.8	10.7	11.0

Source: compiled on the basis of Eurostat data.

The second educational target of the Europe 2020 strategy, that is increasing the share of the population aged 30-34 having completed tertiary or equivalent education to at least 40%, was achieved in 2018 (40.7%) (Table 2). Also in the case of this target its level was set individually for separate EU countries on the basis of national determinants. Most countries adopted a target indicator equal to or higher than the one proposed by the EU. An analysis of statistical data shows that in 2019

18 countries achieved their targets, two countries, i.e. Croatia and Hungary, approached their national targets by less than one percentage point.

Table 2: Percentage of people who have completed tertiary education aged 30-34 in the EU-28 countries in years: 2010, 2018 and 2019

Country	TARGET	2010	2018	2019	Country	TARGET	2010	2018	2019
EU-28	**40**	33.8	40.7	41.3					
Belgium	**47**	44.4	47.6	47.5	**Lithuania**	**48.7**	43.8	57.6	57.6
Bulgaria	**36**	28.0	33.7	32.7	**Luxembourg**	**66**	46.1	56.2	56.5
Czechia	**32**	20.4	33.7	34.9	**Hungary**	**34**	26.1	33.7	33.9
Denmark	**40**	41.1	48.4	49.1	**Malta**	**33**	22.1	34.7	36.9
Germany	**42**	29.7	34.9	35.2	**Netherlands**	**40**	41.4	49.4	50.1
Estonia	**40**	40.2	47.2	46.6	**Austria**	**38**	23.4	40.7	42.3
Ireland	**60**	51.4	56.3	55.9	**Poland**	**45**	34.8	45.7	46.6
Greece	**32**	28.6	44.3	43.6	**Portugal**	**40**	24.0	33.5	35.5
Spain	**44**	42.0	42.4	44.4	**Romania**	**26.7**	18.3	24.6	25.4
France	**50**	43.2	46.2	47.3	**Slovenia**	**40**	34.8	42.7	43.7
Croatia	**35**	24.5	34.1	34.3	**Slovakia**	**40**	22.1	37.7	39.8
Italy	**26**	19.9	27.8	27.5	**Finland**	**42**	45.7	44.2	46.6
Cyprus	**46**	45.3	57.1	58.2	**Sweden**	**45**	45.3	51.8	52.3
Latvia	**34**	32.6	42.7	43.4	**United Kingdom**	:	43.1	48.8	49.1

Source: compiled on the basis of Eurostat data.

Reflecting further on the level of education in the EU, one needs to additionally point to a number of essential issues in particular, namely:

- establishing the level of school enrolment for various levels of education (thus universality of education)[1],
- the level of education of the EU-28 population,
- the level of lifelong learning.

A growing educational activity of the societies of EU countries is noticeable in the analysed period. This trend is maintained mainly by the progressing promotion of education at the secondary level and the more and more frequent undertaking of studies in higher education institutions. The data presented in Table 3 shows that the majority of EU countries have seen an increase in enrolment indexes at the secondary and tertiary levels, though differences in the scale and time frames in individual countries are noticeable. An interesting situation is observed in Finland and Sweden (an increase in the gross enrolment index for ISCED levels 2-4, and a decrease for ISCED levels 5-8).

[1] Gross enrolment index was adopted for the analysis due to the wish to point to the number of people in education at a given level (regardless of their age) against the number of people in the age group specified as corresponding to the level of education.

Table 3: Gross enrolment index at the level of primary, secondary and higher education in the EU countries in 2005/2006, 2010/11, 2016/17

Country	Years	Pupils and students as % of a given age group		
		Primary schools (ISCED 1)	Secondary and post-secondary schools (ISCED 2-4)	Higher education institutions (ISCED 5-8)
Belgium	2005/06	100.7	161.0	61.7
	2010/11	101.9	156.6	69.8
	2016/17	103.9	158.5	79.7
Bulgaria	2005/06	103.4	89.7	47.2
	2010/11	103.6	93.8	59.0
	2015/16	91.1	99.7	71.2
Czechia	2005/06	100.0	96.0	50.1
	2010/11	100.8	95.8	65.6
	2016/17	100.2	104.6	63.7
Denmark	2005/06	99.3	120.0	79.0
	2010/11	100.8	122.7	76.8
	2016/17	101.3	129.1	80.6
Germany	2005/06	104.2	103.1	.
	2010/11	102.5	103.8	.
	2016/17	104.0	98.4	70.2
Estonia	2005/06	97.7	103.1	67.9
	2010/11	101.7	107.4	70.4
	2016/17	97.2	117.5	69.6
Ireland	2005/06	103.0	109.6	58.4
	2010/11	103.4	115.8	67.8
	2016/17	100.9	125.3	77.8
Greece	2005/06	97.7	100.8	90.1
	2010/11	98.3	103.2	109.2
	2016/17	99.6	104.5	136.6
Spain	2005/06	103.7	117.3	68.5
	2010/11	104.6	120.9	80.0
	2016/17	102.7	126.0	88.9
France	2005/06	104.3	106.9	53.9
	2010/11	102.7	106.6	55.6
	2016/17	102.5	103.8	65.6
Croatia	2005/06	100.7	94.9	45.6
	2010/11	93.5	99.2	57.2
	2015/16	98.2	98.9	66.5
Italy	2005/06	102.3	98.9	65.6

	2010/11	101.5	102.5	66.1
	2014/15	101.2	103.2	62.9
Cyprus	2005/06	102.4	96.6	33.4
	2010/11	101.2	92.8	46.5
	2014/15	99.3	99.8	60.1

Source: compiled on the basis of GUS data.

The pace of changes in education at the tertiary level observed recently in the countries of the European Union entitles one to state that it is becoming increasingly egalitarian in the EU states (this generally applies to highly-developed countries). It can be assumed in the near future that it will have the character of mass education in the Union countries, similar to primary and secondary education. Without a doubt it is a beneficial situation, since education at the higher level is extremely important for a modern economy because increasing specialization- and competence-related requirements, as well as the technological progress and the advancing globalization force the undertaking of efforts to supply the market with adequate staff. Additionally, appropriately constructed and implemented study programmes should equip students with qualifications and competences that will enable them to find employment in line with their field of education, and effects of education and professional training which the students obtain in the course of studies should be evidence to how gifted they are in order to be competitive on the labour market after graduation.

Another aspect directly related to the enrolment index that should be noted when assessing the level of education in the EU countries is the level of education of the population.

The data in Table 4 shows that in all countries that currently make up the EU-28 in 2019 there was a drop as compared with 2010 in terms of the percentage of people at the lowest level of education - the greatest for Portugal, by 19.3 percentage points and for Malta, by 18 percentage points. In 2019 the countries leading in terms of the lowest value of this indicator included the Central and Eastern European states (the former Eastern Bloc) - Lithuania11.4%, Czechia 12.2% and Poland 13.3%. In turn, the highest percentage of people with only lower-secondary education was observed for Portugal 48.0%, Malta 42.3%, Spain 39.9% and Italy 39.9% - with the UE-28 average of 25.0%.

Table 4: Percentage of population according to the level of education for people aged 15-64 in the EU-28 in 2010, 2018 and 2019

	Less than primary. primary and lower secondary education (levels 0-2)			**Upper secondary and post-secondary non-tertiary education (levels 3 and 4)**			**Tertiary education (levels 5-8)**			**Upper secondary. post-secondary non-tertiary and tertiary education (levels 3-8)**		
Country	**2010**	**2018**	**2019**	**2010**	**2018**	**2019**	**2010**	**2018**	**2019**	**2010**	**2018**	**2019**
EU- 28	30.8	25.5	25.0	46.5	45.9	45.7	22.8	28.7	29.3	69.2	74.5	75.0
Belgium	32.6	26.3	25.8	36.7	37.7	38.0	30.7	36.0	36.2	67.4	73.7	74.2
Bulgaria	25.1	21.5	21.8	55.1	53.6	53.6	19.7	24.8	24.7	74.9	78.5	78.2
Czechia	14.4	12.1	12.2	71.1	66.2	66.2	14.5	21.7	21.5	85.6	87.9	87.8
Denmark	32.1	26.6	26.2	40.5	41.0	40.9	27.3	32.4	32.8	67.9	73.4	73.8
Germany	21.0	19.6	19.5	56.3	55.2	54.8	22.7	25.2	25.7	79.0	80.4	80.5
Estonia	18.2	16.8	16.1	51.8	47.3	47.7	30.0	35.9	36.2	81.8	83.2	83.9
Ireland	29.9	21.5	21.2	36.2	38.0	38.1	33.9	40.5	40.7	70.1	78.5	78.8
Greece	38.5	28.7	26.7	40.6	43.6	45.5	20.9	27.7	27.8	61.5	71.3	73.3
Spain	48.1	40.8	39.9	23.4	25.2	25.2	28.4	34.0	34.9	51.9	59.2	60.1

France	31.9	24.4	23.7	41.9	42.8	42.9	26.2	32.8	33.4	68.1	75.6	76.3
Croatia	25.4	18.7	18.2	58.8	59.3	59.4	15.7	22.0	22.4	74.6	81.3	81.8
Italy	46.3	40.3	39.9	40.7	42.6	42.7	13.0	17.1	17.3	53.7	59.7	60.1
Cyprus	29.6	21.9	21.3	38.3	38.7	38.5	32.1	39.4	40.2	70.4	78.1	78.7
Latvia	19.5	15.3	15.0	57.8	54.7	54.3	22.6	30.1	30.7	80.5	84.7	85.0
Lithuania	17.1	11.7	11.4	56.0	52.3	51.2	26.9	36.1	37.4	82.9	88.3	88.6
Luxembourg	28.9	27.6	27.0	40.8	34.2	32.9	30.3	38.3	40.1	71.1	72.4	73.0
Hungary	24.4	20.2	20.1	58.5	58.1	57.5	17.1	21.7	22.4	75.6	79.8	79.9
Malta	60.3	42.9	42.3	25.6	32.4	32.0	14.2	24.6	25.7	39.7	57.1	57.7
Netherlands	31.8	26.0	25.7	40.5	40.9	40.5	27.7	33.0	33.8	68.2	74.0	74.3
Austria	23.2	18.9	18.6	60.5	51.0	50.4	16.2	30.1	31.0	76.8	81.1	81.4
Poland	18.0	13.5	13.3	62.6	59.3	58.7	19.4	27.2	28.0	82.0	86.5	86.7
Portugal	67.3	49.8	48.0	18.8	27.6	28.3	13.9	22.5	23.6	32.7	50.2	52.0
Romania	30.6	26.3	25.4	57.5	58.2	58.7	11.9	15.5	15.9	69.4	73.7	74.6
Slovenia	20.9	16.4	15.9	58.9	54.9	55.0	20.2	28.7	29.1	79.1	83.6	84.1
Slovakia	16.3	14.4	14.4	68.7	63.6	62.6	15.1	22.0	23.0	83.7	85.6	85.6
Finland	23.6	17.7	17.1	44.8	45.1	44.7	31.6	37.3	38.3	76.4	82.3	82.9
Sweden	25.0	20.9	20.8	46.7	42.0	41.6	28.2	37.1	37.6	75.0	79.1	79.2
United Kingdom	24.1	19.7	19.4	44.2	41.0	40.4	31.6	39.3	40.2	75.9	80.3	80.6

Source: compiled on the basis of Eurostat data.

The percentage of people with education at levels 3-4 in individual countries of the EU-28 was very diverse. In 2010-2019 there was no noticeable rising or falling trend for all EU-28 countries as it was the case of the analysis of the percentage of people with education at levels 0-2. There was a noticeable falling trend for Austria (a drop by 10.1 p.p.), Luxembourg (a drop by 7.9 p.p.), Slovakia (a drop by 6.1 p.p.), whereas a rising trend was observed for Portugal (an increase by 9.5 p.p.) and Malta (an increase by 6.4 p.p.). The group of countries with the highest percentage of people with education at levels 3-4 in 2019 comprised Czechia (66.2%), Slovakia (62.6%), Croatia (59.4%) as well as Romania and Poland (58.7%). The lowest value of the analysed indicator in 2019 was noted for Spain (25.2%), Portugal (28.3%) and Malta (32%) – with the EU-28 average of 45.7%.

In the analysed period, an increase of the percentage of people with higher education was noted for all EU-28 countries (an increase for the EU-28 from 22.8% in 2010 to 29.3% in 2019). The greatest increase was noted for Austria (from 16.2% in 2010 to 31.0% in 2019), Malta (from 14.2% in 2010 to 25.7% in 2019) and for Lithuania (from 26.9% in 2010 to 37.4% in 2019). The greatest values for this indicator in 2019 were noted for Ireland (40.7%), the United Kingdom and Cyprus (40.2%) as well as for Luxembourg (40.1%). The lowest for Romania (15.9%), Italy (17%) and Czechia (21.5%).

The growing level of education observed in recent years is the effect of i.a. an increase of education-related aspirations of young people and their parents, which result primarily from the wish to ensure the best possible position on the labour market but also social prestige associated with a better education level. Unfortunately, this conceals the so-called "paradox of overstated educational aspirations" (Bondyra, 2008), which is proof to the discrepancy between social awareness and labour market reality. Unfortunately, despite a general rising trend of the level of education among the EU-28 citizens (especially levels 3-8), some of them do not refresh, improve or advance their general and professional qualifications throughout their entire lives. It is a worrying phenomenon especially given the changes occurring in the labour market (especially technological ones).

The data included in Table 5 shows that the percentage of people aged 25-64 in the EU-28 in 2019 who participated in lifelong learning was 11.2% and was only 1.9 p.p. higher than in 2010. The greatest increase in the analysed indicator in the investigated period was observed for France (from 5.0% to 19.0%), Sweden (from 24.7% to 34.1%) and Estonia (from 11.0% to 20%). The greatest drop, in turn, was noted for Denmark (from 32.7% to 24.8%) and the United Kingdom (from 20.1% to 14.6%). Throughout the analysed period Romania was the country where the percentage of people aged 25-64 who participated in lifelong learning was very low, even worrying (1.2% in 2019). Whereas the countries where the value of the analysed indicator was the highest were the Scandinavian countries: Sweden (34.1% in 2019), Finland (28.6% in 2019) and Denmark (24.8%) - despite the visible falling trend for this country.

Table 5: Lifelong learning of people aged 25-64 in the EU-28 in 2010, 2018 and 2019 (%)

Country	2010	2018	2019	Country	2010	2018	2019
				Latvia	5.4	6.7	7.0
EU -28	9.3	11.1	11.2	**Lithuania**	4.4	6.6	6.9
Belgium	7.4	8.5	8.3	**Luxembourg**	13.5	18	18.6
Bulgaria	1.6	2.5	2.0	**Hungary**	3.0	6.0	6.0
Czechia	7.8	8.5	8.2	**Malta**	6.2	10.9	12.3
Denmark	32.7	23.5	24.8	**Netherlands**	17.0	19.1	19.2
Germany	7.8	8.2	8.2	**Austria**	13.8	15.1	14.8
Estonia	11.0	19.7	20	**Poland**	5.2	5.7	4.9
Ireland	7.1	12.5	12.2	**Portugal**	5.7	10.3	10.3
Greece	3.3	4.5	4.0	**Romania**	1.4	0.9	1.2
Spain	11.2	10.5	10.5	**Slovenia**	16.4	11.4	11.1
France	5.0	18.6	19.0	**Slovakia**	3.1	4.0	3.6
Croatia	3.0	2.9	3.4	**Finland**	23.0	28.5	28.6
Italy	6.2	8.1	7.9	**Sweden**	24.7	31.4	34.1
Cyprus	8.1	6.7	6.2	**United Kingdom**	20.1	14.6	14.6

Source: compiled on the basis of Eurostat data.

Wanting to obtain an adequate quality of human capital, in needs to be ensured that i.a. adequate educational outlays are made. It is worth remembering that there is a direct link between long-term economic growth and the growth of educational potential. Thus it is worrying that at the level of the EU-28, government expenditure on 'education' as a ratio to GDP decreased over the 2010-2018 period (Eurostat database) . Only for three countries, that is Belgium, Croatia and Cyprus, a growth of the percentage of GDP allocated to expenditure on education was noted in 2018 as compared to 2010 (Table 6).

Table 6: Total general government expenditure on education, 2010, 2018 (% of GDP)

Country	2010	2018	Country	2010	2018
EU - 28	5.2	4.7			
Belgium	6.0	6.2	**Lithuania**	5.9	4.6
Bulgaria	3.6	3.5	**Luxembourg**	5.7	4.6
Czechia	5.1	4.6	**Hungary**	5.5	5.1
Denmark	7.1	6.4	**Malta**	5.6	5.2
Germany	4.4	4.2	**Netherlands**	5.6	5.1
Estonia	6.5	6.2	**Austria**	5.1	4.8
Ireland	4.6	3.2	**Poland**	5.5	5.0

Greece	4.1	3.9	**Portugal**	6.7	4.5
Spain	4.5	4.0	**Romania**	3.3	3.2
France	5.6	5.1	**Slovenia**	6.5	5.4
Croatia	3.7	5.3	**Slovakia**	4.5	4.0
Italy	4.3	4.0	**Finland**	6.5	5.5
Cyprus	6.5	5.2	**Sweden**	6.4	6.9
Latvia	6.2	5.8	**United Kingdom**	6.3	4.8

Source: compiled on the basis of Eurostat data.

Total expenditure on education of the government and local government sector broken down into pre-primary and primary education, secondary education, pre-primary and primary education, post-secondary non-tertiary education, tertiary education, education not definable by level, subsidiary services to education (e.g. expenditure on providing school busses), R&D education (i.e. R&D related to education not all R&D undertaken for example in universities) and education not elsewhere classified in 2018 is presented in Figure 1.

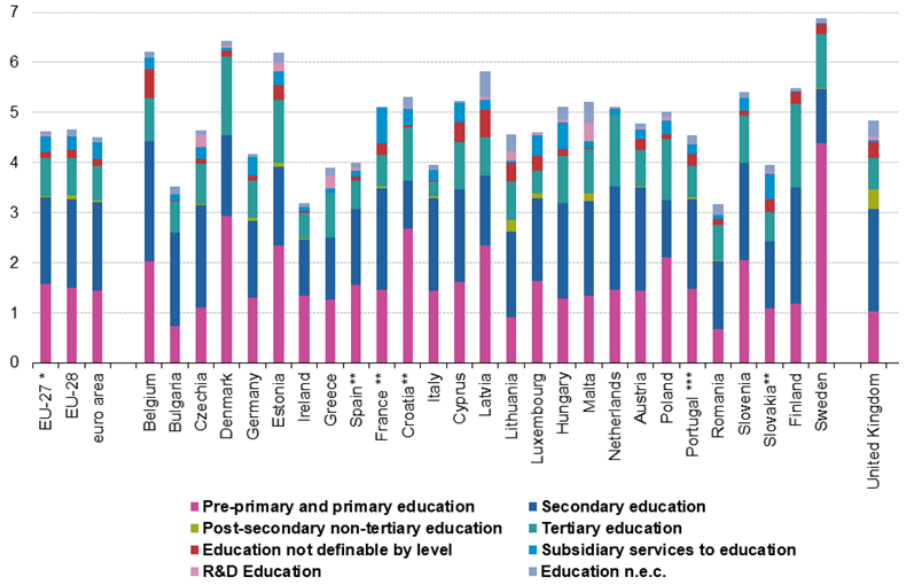

Fig. 1: Total general government expenditure on education, 2018 (% of GDP)
Source: (Eurostat, 2020).

As a percentage of GDP, the highest amounts were reported by Sweden (6.9 % of GDP), Denmark (6.4%), followed by Belgium and Estonia (both 6.2 % of GDP) and Latvia (5.8 % of GDP). In 2018 Romania and Ireland spent least on education (3.2%), Bulgaria (3.5%), Greece (3.9%), Slovakia, Italy, Spain (4.0%) and Germany (4.2%).

Due to the fact that increasing innovation of economies of the Member States was considered one of the fundamental tasks included in the Europe 2020 strategy one needs to pay special attention to the level of human capital which is dependent to a great extent on the level of education. For this reason the level of the "human resources" factor was assessed, where this factor is an element of a synthetic indicator - the European Innovation Scoreboard (EIS), used for the assessment of the level of innovation mainly in the European Union countries.

The human resources dimension comprises 3 indicators. Their characteristics is presented in Table 7.

Comparing the change between performance in 2018 relative to the EU average in 2011 and performance in 2011 relative to the EU average in 2011 in the development of the value of the human

resources composite indicator it is noticeable that the situation is poorest for Romania, Slovakia and Hungary, whereas it is best for Spain, Estonia and Bulgaria (Table 8).

Table 7: Partial indicators for the human resources indicator taken into account in the EIS

Indicator	Definition numerator	Definition denominator
New doctorate graduates per 1000 population aged 25-34	Number of doctorate graduates	Population between and including 25 and34 years
Percentage population aged 25- 34 having completed tertiary education	Number of persons in age class with some form of postsecondary education	Population between and including 25 and 34 years
Lifelong learning	The target population for lifelong learning statistics refers to all persons in private households aged between 25 and 64 years. The information collected relates to all education or training, whether or not relevant to the respondent's current or possible future job. Data are collected through the EU labour force survey (LFS). The reference period for the participation in education and training is the four weeks preceding the interview as is usual in the LFS.	Total population of the same age group, excluding those who did not answer the question concerning participation in (formal and non-formal) education and training

Source: (European Innovation Scoreboard, 2019).

Table 8: Performance change in 2011-2018 concerning the SII and HR composite indicators and partial indicators forming the HR indicator

Country	Performance change 2011-2018				
	Summary Innovation Index	**Human resources**	**New doctorate graduates**	**Population completed tertiary education**	**Lifelong learning**
EU-28	8.8	22.3	45.2	19.4	2.1
Belgium	11.7	14.6	36.7	7.5	0.0
Bulgaria	2.4	33.0	70.5	21.6	7.3
Czechia	3.5	18.3	28.3	27.6	-2.1
Denmark	0.2	28.1	82.1	3.7	0.0
Germany	-0.9	11.3	-1.3	27.6	6.3
Estonia	16.5	39.2	31.8	23.1	64.6
Ireland	4.2	17.6	49.2	4.5	0.0
Greece	20.2	26.4	33.7	32.1	12.5
Spain	8.4	39.8	107.2	15.7	-2.1
France	4.2	9.1	8.6	14.9	3.1
Croatia	3.5	3.2	-4.2	19.4	-7.3
Italy	10.9	11.0	-12.2	26.1	17.7
Cyprus	0.2	15.1	34.4	22.4	-12.5
Latvia	17.7	14.0	3.7	16.4	21.9
Lithuania	25.7	8.5	-10.4	19.4	15.6
Luxembourg	6.0	14.4	33.8	17.2	-8.3

Hungary	2.8	-3.3	12.0	-11.9	-9.4
Malta	17.2	26.7	25.3	52.2	0.0
Netherlands	16.1	20.9	25.9	23.9	12.5
Austria	11.5	9.1	-8.1	14.2	20.8
Poland	7.8	2.5	3.5	6.7	-3.1
Portugal	12.6	0.8	-5.4	23.1	-17.7
Romania	-10.7	-23.6	-66.9	-2.2	-3.1
Slovenia	-10.6	4.9	34.0	23.9	-45.8
Slovakia	5.8	-14.9	-92.2	49.3	-7.3
Finland	14.3	15.2	2.4	-0.7	45.8
Sweden	4.3	8.8	-14.3	12.7	28.1
United Kingdom	17.0	6.7	60.4	17.9	-60.4

Source: compiled on the basis of Eurostat data.

Analysing the level of partial indicators, the situation is as follows. For the "New doctorate graduates" indicator in 2018 compared to 2011 the least beneficial change occurred for Slovakia (as much as -92.2) and Romania (-66.9), the most beneficial for Denmark (82.1), Spain (107.2) and among the countries of the Central and Eastern Europe: for Bulgaria (70.5). For the "Population completed tertiary education" indicator the least beneficial change occurred for Hungary (-11.9) and Romania (-2.2), the most beneficial for Malta (52.2) and Slovakia (49.3). For the "Lifelong learning" indicator, the least beneficial change occurred for the United Kingdom (-60.4) and Slovenia (-45.8), the most beneficial for Estonia (64.6) and Finland (45.8).

Summary

Human capital is one of the elements in contemporary social and economic reality (rapid technological progress, increasing level of global competition, observed increase in demand for specialized and educated employees on the labour market who mainly have technological skills) that is attributed a great rank. Its quality and condition depends i.a. on the level of education - particular importance is attributed to tertiary education.

The reflections carried out in the paper show that there is a noticeable differentiation in the area of education between the EU countries, which is determined by economic, social and cultural differentiations. It needs to be emphasized, that in the last dozen or so years popularisation of education has been observed (that is its egalitarianism) at all levels throughout the EU. In can be assumed that this process will carry on and it will accelerate in some of the EU countries. However, it needs to be borne in mind that egalitarianism of education may result in educational inflation or over-education of society. The analysis of data has also shown that in the last decade all Member States have advanced in raising the level of tertiary education (noticeable mainly in the implementation of their education-related targets included in the Europe 2020 strategy), where best results were achieved by the countries of Northern and Central Europe. The increase in the percentage of people with higher education is a trend characteristic not only to the EU countries, but also to a majority of countries throughout the world. Due to the constant increase in the level of education in the recent years, the younger generation has higher qualifications than the older generation.

The quality of human capital is also effected by the level of lifelong learning. The conducted analyses show that the awareness of the need for continuous learning, improving skills and extending one's knowledge is growing, though very slowly. Intensified action needs to be taken in this areas striving to boost performance and to increase the competitiveness of economies.

The European Union, striving to create the knowledge-based economy in which a high quality of human capital is important, should pay particular attention to the operation of the education and training systems in its Member States - supporting their improvement (taking into account i.a. observed trends on the labour market), to expenditure allocated to education and to the sources of these investments.

In the end it is worth suggesting some questions to be considered in the analysed areas. For instance, in what direction should changes in the education system go so that they can best contribute to raising the level of quality of human capital in the EU countries? What models is it best to adopt? What main criteria should be adopted when establishing them?

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Simulation Approach in Queue Management at Supermarkets in the COVID-19 Era

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Abstract

How to prevent and control of epidemic spreading of diseases (for example COVID-19) in supermarkets? To answer this question, a simulation approach was proposed. A number of simulation experiments were performed. The likelihood of close contact with carrier in different ticket queue configurations was compared. Based on the results, several tips and advices were developed for customers and market managers.

Keywords: COVID-19 infection prevention, simulation-based approach, discrete event modeling, queue management, supermarket checkout.

Introduction

COVID-19 and Managers' Reactions

How to behave during the COVID-19 pandemic, described in the FAQ of NJHealth (2020)? How to reduce the risk of a pandemic spreading? How to avoid infection? These are also questions posed by customers and sellers in self-service stores today. The widely proposed solutions include: the use of disinfectants, the use of gloves, masks, helmets, plastic curtains, the requirement to apply social distance rules, preferring to pay bills with a payment card, determining the range of hours in which only older people can stay in the store, and finally limiting the number customers in the store (proportional to the number of checkouts or store space). Managers are wondering how to increase safety in supermarkets and the following solutions were implemented, mentioned in the ITV Report (2020): reducing opening hours (to help staff clean and fully restock shelve), reducing the number of checkouts, introducing screens to protect staff (installing protective screens on checkouts), drawing new floor markings in the checkout (or other key) areas, introducing one-way aisles, queuing systems outside stores, limiting the number of people in store, outlining two meters between customers, bringing in special hours for NHS workers (or giving NHS staff priority checkout service), introducing contactless drop-offs, access to facemasks and hand sanitizer for staff, employing marshals to monitor and observe social distancing.

Research Motivation

The inspiration to study the impact of factor not accounted for in legal restrictions, i.e. the configuration of the queue of customers in supermarkets, were visits to various shops. The following queue configurations were noted: separate queues for checkouts (cash registers) served by cashiers, a common queue for checkouts served by many cashiers (each cashier serves one checkout) and shared queues for a self-service checkout (and their multiples). The last variant will not be considered in this study due to the strong relationship between the hypothetical model and the specific spatial configuration and specific checkout devices. We are interested in organizing the queue and not in setting up checkout devices. Similarly, we do not take into account the time of arriving from the queue to checkouts.

Close, Unsafe Contacts and Supermarket Queues

It has been assumed that information about the danger of infection due to staying too long in the vicinity of the infected person are true (to be precise, it is about breathing the same air and, above all, being within the range of a cloud of droplets excreted by a coughing and sneezing person). Being within the range of the pathogen is treated as "close contact" or "unsafe contact": Yong et al. (2020) wrote: “A close contact was defined as anyone who had prolonged contact within 2 m of the case.”. Author of NJHealth FAQ (2020) mentioned that “In general, close contact means being within 6 feet of a person for longer than 10 minutes “. Sometimes this concept is extended to 15 minutes and 2 meters, for example in Public Health Blog (2020). We see precise warnings like: “face-to-face contact in any setting within two meters of a case for 15 minutes or more”, written by Ministry of Health, 2020). It was also assumed that it is possible to determine the percentage of infected people in a given period of time, for example in Galgelt, Germany or New York City (above 15% symptomatic and asymptomatic carriers, according to Carvalho (2020)). Calculations about the frequency of infections are also available: “We found that the attack rate does not differ significantly by age, with on average 7% of close contacts becoming infected, around 80% of these contacts showing any symptoms, and 3% of infections manifesting severe disease at initial assessment”, according to Bi et al (2020) but sometimes seem smaller, as claimed by Otto (2020): “The transmission rate of coronavirus disease 2019 (COVID-19) was 1%-5% among 38,000 Chinese people in close contact with infected patients”. We assume that in similar places people can visit a supermarket.

In our current research it has been assumed that individual checkouts are sufficiently separated from each other as well as sufficient protection of cashiers against infecting customers and against infecting the customer from the cashier. We do so because of the fact that in a given store configuration every customer must appear sooner or later in front of the checkout. We assume that each client (customer) can be involved in a maximum of two contacts: We assume that dangerous/unsafe contacts (meetings) start in the following situations: when an infected client arrives in the queue and takes a place behind the client who is not infected. Unsafe contact also begins when the last person in the queue is an infected client and the next place is occupied by a person who is not infected. Dangerous contact ends when the source of the "threat" or the "endangered" person goes to the checkout. Note that each infected client can pose a threat to two people: preceding and following. Any client who is not infected can be threatened by two people: one preceding and one following the client.

Simulation-based Approach and the Model

Simulation-Based Approach

We want to answer the question: is the probability of dangerous contacts different for a shared queue and a set of separate queues for the same number of checkouts? And if it's not equal, which configuration seems more secure? Will the recommendation always be the same? A simulation-based approach and the Extendsim tool, created and presented by Krahl (2012) were used to consider the answers to the above questions. The simulation-based approach (and more precisely: discrete event simulation) is often used to verify the suitability of queue system configurations. For example, Wenjie et al (2015) compared the single-queuing system and the double-queuing system. Xian et al. (2016) based on simulations with Arena software recommended changes in the organization of the examined system by introducing shifts and adding another payment counter in the morning. Zhang (2012) studied (with NetLogo software) the impact of introducing dynamic control of the number of checkouts in a supermarket on the waiting time in queues.

The model

It has been assumed that the model will apply to a supermarket with a number of checkouts from 1 to 10. However, the model can be expanded with additional checkouts, this requires the declaration of additional tables in the database. The model was designed with a modular structure. The main events

and activities in which the customer participates are implemented using standard blocks, whose equivalents are available in most simulation tools (generator, writing and reading attribute values, queue, service station, exit). However, in some places of the model blocks whose operation is defined by the ModL code (an example is given below).

The model has the following modules:

- input stream generation module (objects = clients) and their attribute values (Carrier: 0 or 1), (Exposed: 0 or 1 but always equal to 0 at the beginning), Index (object number given in the order of arrival to the model) and Delay - time of payment transaction (a random distribution of assigned parameters). We have two sources of objects: the stream of objects (random distribution of intervals) and object generator at the initial state (occupied checkout, initial length of queues)
- module for multiplication of objects; it was used to observe the behavior (path) of individual objects in model branches, identifiable on the basis of the value of the index attribute, in individual queue configurations, represented by model branches,
- module with a common (shared) queue in front of the multi-channel service station (checkouts). Its purpose is to control the correct operation of other branches implemented in the hierarchical blocks technology,
- a module with a hierarchical block representing a group of checkouts: it could be any number of separate checkouts or a common queue for many checkouts,
- a module with a repeated hierarchical block; blocks work in parallel mode. It is a representation of individual queues in front of individual ticket offices. It was assumed that the client chooses the queue of the shortest length. To increase the even use of checkout, a queue draw has been added when there is more than one queue of the smallest length. A fragment of the module is shown in Fig. 1.

The generalized point of sale (checkout) module consists of the following elements:

- individual index submodule for a given cash register: InternalIndex,
- a submodule whose task is to mark the attributes of Carrier = 1 objects and their surroundings (it's about detecting if a given person can be assigned the value of the Exposed = 1 attribute) and also organizing the calculation of contact time between successive objects in the queue,
- queue submodule with blocks counting the contact time between successive objects in the queue.

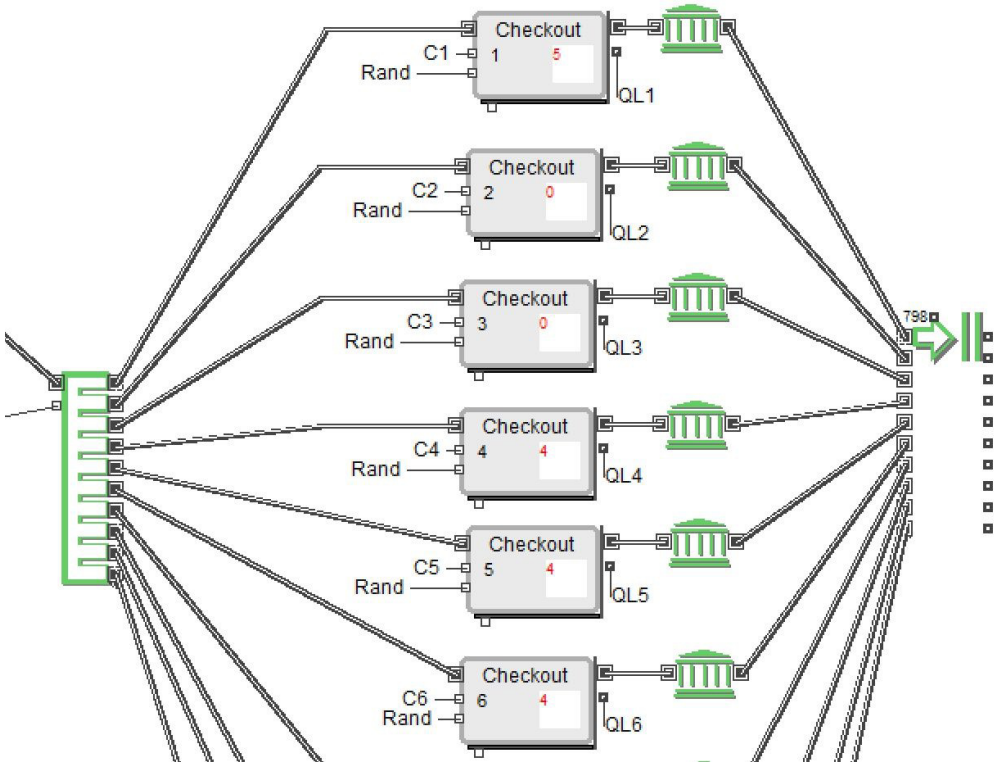

Fig .1: Part of the module showing checkouts with separate queues

The model also contains a database, which consists of a set of tables (one table per checkout). Each table contains information about the object (client): arrival_time, departure_time, queue_lenght, IntervalWithPrev, IntervalWithNext, Wait, Carrier (0/1), PrevIsCarrier (0/1), NextIsCarrier (0/1). Changes in the value of record fields in tables are made as a result of the appearance of a given record in a specific place of the system but also depending on the state of the objects in its vicinity. The model is equipped with the ability to communicate with MS Excel sheets. In a separate MS Excel application it is possible to view and analyze the results of simulations regarding individual cash registers as well as perform sensitivity analysis, e.g. examining the dependence of the number of actually dangerous contacts on the limit of contact time with infected persons determined by epidemiologists. It should be noted that a person who is not infected can get infected from his predecessor and successor, so contact times should be added together. In this way, we take into account the intensity of pathogen exposure.

The following is a piece of program code (ModL language, very similar to C) responsible for identifying the host environment. This code is executed immediately after joining the queue.

```
if                                                    (Carrier==1)
 {
        if                                            (IntIndex>1)
         {      outExposedPrev=1;
                outIntIndexPrev=IntIndex-1;
         }
        else

         {
                outExposedPrev=0;
```

```
                    outIntIndexPrev=1;
            };
          outExposedNext=1;
          outIntIndexNext=IntIndex+1;
  }
else
  {
          if (IntIndex>1)
            {
                    outExposedPrev=0;
                    outIntIndexPrev=IntIndex-1;
            }
          else
            {
                    outExposedPrev=0;
                    outIntIndexPrev=1;
            };

          outExposedNext=0;
          outIntIndexNext=IntIndex+1;

  }
```

Description of the Research Procedure

Preliminary Experiment

The first part of the experiments concerns determining the value of the intensity of the stream of incoming customers and the distribution of service time at checkouts. We want to keep the queue relatively stable (Fig. 2). The length of the queue should also be proportional to the number of cash registers. Thanks to this, we will be able to reduce any significant impact of queue length variation on the epidemiological effects of various cash register configurations. It was assumed that no more than 800 objects will be observed. The running time is 800 minutes.

It was assumed that the intensity of the stream of objects is described by an exponential distribution with an average of 1 or 2 minutes.

Based on the research of Mielczarek (2009), it was assumed that the service time distribution can be described by a triangular distribution and tends to be more likely to be close to the maximum (non-isosceles triangle). It is known that the mean value for a triangular distribution can be calculated using the formula mean = (a + b + c) / 3 where a = minimum b = most likely and c = maximum.

It is assumed that there are 7 cash desks in the supermarket and that at the start of the simulation in the queue (immediately 7 will go to the open cash desks) 21 = 7 * 3 people will wait, so after starting the simulation there will be 14 = 7 * (3-1) people . We care about maintaining this queue length (as we expect, the long-lasting interpersonal contacts are particularly dangerous). Note that in an equivalent time-waiting situation for configurations with separate queues, 2 people will wait in each queue.

Interpretation of results (Tab. 1). We will select parameter values for further research so that the desired queue lengths belong to the smallest width confidence intervals, have the largest width (maximum-minimum), i.e. that they take into account the largest percentage of transactions. Therefore, we choose the combinations: Mean (Input) = 2, triangular distribution (7; 20; 15) and Mean (Input) = 1, triangular (5.5; 8; 7.5) (in minutes).

Table 1: Results of the initial experiment: the impact of the parameters of the triangular distribution and the intensity of the customer input stream on queue length statistics

Mean (Input) [min]						Expected Queue Lenght	
2						is in conf. interval	
minimum	most likely	maximum	mean	std.dev.	conf.interval +/-	21	14
11	15	16	21,1	14,6	6,8	Yes	
10	15	17	20,8	14,0	6,4	Yes	
9	15	18	22,1	13,6	6,4	Yes	
8	15	19	27,7	19,5	9,1	Yes	
7	15	20	18,9	13,7	6,4	Yes	Yes
6	15	21	26,7	18,1	8,5	Yes	
5	15	22	23,7	15,6	7,3	Yes	
4	15	23	25,1	16,6	7,8	Yes	
Mean (Input) [min]							
1							
minimum	most likely	maximum	mean	std.dev.	conf.interval +/-	21	14
5,5	7,5	8	16,7	7,9	4,6	Yes	Yes
5	7,5	8,5	16,1	8,3	3,9		Yes
4,5	7,5	9	15,9	7,6	3,5		Yes
4	7,5	9,5	14,2	7,7	3,6		Yes
3,5	7,5	10	17,5	8,0	3,8	Yes	Yes
3	7,5	10,5	16,9	9,4	4,4	Yes	Yes
2,5	7,5	11	16,8	8,7	4,1		Yes
2	7,5	11,5	17,0	10,1	4,7	Yes	Yes
1,5	7,5	12	16,9	10,1	4,7	Yes	Yes
1	7,5	12,5	18,7	10,9	5,1	Yes	Yes

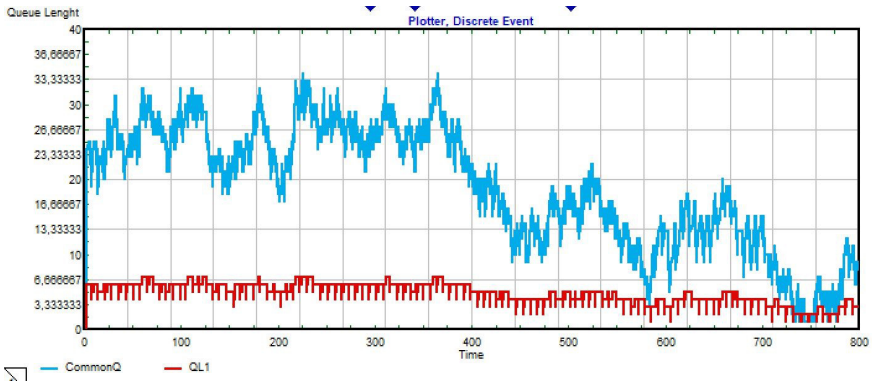

Fig. 1: Part of the module showing checkouts with separate queues

Main Experiment

Issues to consider: how the frequency of unsafe contacts are affected by: the intensity of the customer stream, service time schedules. How does the degree of infectivity affect the frequency of dangerous contacts? Which configuration: common queue or separate queues to checkout is safer depending on the contact time we consider to be dangerous?

Assumptions. Based on reports of the percentage of people showing SARS-CoV-2 antibodies, we assume that (Gangelt, Germany) 15% of customers may pose a threat to other people waiting in the queue. Information is also available that you should avoid people-to-people contacts that last over 15 minutes and relate to distances below 2 meters. However, this may be the case for SARS-CoV-2.

Perhaps these warnings should be modified for other infectious pathogens.

We carry out an experiment for 7 active cash registers. We check the frequency of dangerous contacts in an experiment lasting 800 minutes (12.5 hours) during which 400 or 800 customers can be served to the tested system (the intensity of the input stream is Mean (Input) = 2 minute or Mean (Input) = 1 minute, respectively).

Table 2 *:* Comparison of the number of dangerous contacts for Mean (Input) = 1 and Triangular (5.5; 8; 7.5), in minutes. Case: high input stream but short service time

COMMON QUEUE		SEPARATE QUEUES											
			Queue ID										
Boundary Contact Time	Unsafe Contacts	Boundary Contact Time/Unsafe Contacts	1	2	3	4	5	6	7	8	9	10	SUM
0	188	0	18	20	33	25	17	22	23	0	0	0	158
0,5	187	0,5	18	20	33	25	17	21	22	0	0	0	156
1	186	1	18	20	32	25	17	20	22	0	0	0	154
2	178	2	18	20	32	25	17	20	22	0	0	0	154
3	175	3	18	20	32	25	17	19	22	0	0	0	153
4	173	4	18	20	29	24	16	18	22	0	0	0	147
5	168	5	18	19	28	24	15	18	22	0	0	0	144
6	164	6	18	19	26	22	15	17	21	0	0	0	138
7	157	7	15	16	26	20	14	15	19	0	0	0	125
8	151	8	12	15	24	18	13	14	18	0	0	0	114
9	148	9	12	15	23	18	13	14	17	0	0	0	112
10	140	10	11	15	23	18	13	14	17	0	0	0	111
11	136	11	11	14	23	17	13	14	16	0	0	0	108
12	132	12	10	13	23	17	12	12	14	0	0	0	101
13	125	13	8	11	22	13	11	10	10	0	0	0	85
14	119	14	6	9	21	11	10	6	8	0	0	0	71
15	111	15	6	9	18	8	7	6	5	0	0	0	59
16	108	16	6	9	18	8	7	5	3	0	0	0	56
17	105	17	6	9	18	8	4	4	2	0	0	0	51
18	100	18	6	9	15	8	3	3	2	0	0	0	46
19	91	19	6	8	11	7	3	2	1	0	0	0	38
20	85	20	4	7	9	4	3	1	0	0	0	0	28
30	10	30	1	1	1	0	0	0	0	0	0	0	3
40	5	40	1	0	1	0	0	0	0	0	0	0	2
50	1	50	0	0	0	0	0	0	0	0	0	0	0
60	0	60	0	0	0	0	0	0	0	0	0	0	0
90	0	90	0	0	0	0	0	0	0	0	0	0	0

As we can see (Tab. 2), it is possible that the number of unsafe contacts for a common (shared) queue is greater than for configurations with separate queues, regardless of the time limit above which danger exists.

We also examined other configurations. In most cases, in terms of security, a configuration with separate cash registers is better. Slightly (at most 3 contacts out of almost 200) a shared queue is better when queues are of considerable length (high intensity of the stream of customers and long service time). The shared queue has a significant advantage when it is sufficient to infect (deem a dangerous contact) relatively short time (less than 15 minutes) assuming that the variability of service time at cash registers has been reduced to zero (a constant service time).

Table 3*:* Results for high infection level (15%). In left and right cases separate queues are better (smaller)

high number of infections mean = 2 and short service time

Boundary Contact Time	COMMON QUEUE Unsafe Contacts	SEPARATE QUEUE Unsafe Contacts
0	4	3
0,5	4	3
1	4	3
2	4	3
3	4	3
4	4	3
5	4	3
6	4	3
7	3	1
8	3	0
9	3	0
10	2	0
11	2	0
12	2	0
13	2	0
14	2	0
15	1	0
16	1	0
17	1	0
18	1	0
19	1	0
20	1	0
30	0	0
40	0	0
50	0	0
60	0	0
90	0	0

high number of infections mean = 1 and long service time

Boundary Contact Time	COMMON QUEUE Unsafe Contacts	SEPARATE QUEUE Unsafe Contacts
0	203	204
0,5	203	204
1	203	204
2	203	204
3	203	204
4	203	204
5	203	204
6	203	204
7	203	204
8	203	204
9	203	204
10	203	204
11	203	204
12	203	204
13	203	204
14	203	204
15	201	202
16	201	202
17	200	202
18	200	202
19	200	202
20	200	202
30	198	200
40	197	198
50	195	198
60	193	195
90	180	183

high number of infections mean = 1 and short service time

Boundary Contact Time	COMMON QUEUE Unsafe Contacts	SEPARATE QUEUE Unsafe Contacts
0	161	158
0,5	161	158
1	161	158
2	161	158
3	161	158
4	161	158
5	161	158
6	161	158
7	161	158
8	161	157
9	161	155
10	161	155
11	161	155
12	161	154
13	161	151
14	161	149
15	160	148
16	158	148
17	158	147
18	157	147
19	153	145
20	152	140
30	135	73
40	39	20
50	9	5
60	6	2
90	1	0

Table 4: Results for lower infection level (7.5%). In right case common queue is better (smaller) for higher infectivity (smaller boundary contact times)

lower number of infections mean = 1 and long service time

Boundary Contact Time	COMMON QUEUE Unsafe Contacts	SEPARATE QUEUE Unsafe Contacts
0	98	96
0,5	98	96
1	98	96
2	97	95
3	97	95
4	96	95
5	96	95
6	95	94
7	95	94
8	94	93
9	94	93
10	94	93
11	94	93
12	94	92
13	94	92
14	94	92
15	94	92
16	94	92
17	94	91
18	94	91
19	94	91
20	94	90
30	90	89
40	90	87
50	88	82
60	79	78
90	72	73

lower number of infections mean = 1 and short service time

Boundary Contact Time	COMMON QUEUE Unsafe Contacts	SEPARATE QUEUE Unsafe Contacts
0	105	93
0,5	105	93
1	105	93
2	104	92
3	103	92
4	102	89
5	99	87
6	96	85
7	93	79
8	93	79
9	91	78
10	86	76
11	84	72
12	84	70
13	82	66
14	78	55
15	**75**	**52**
16	74	52
17	72	50
18	67	46
19	59	44
20	56	36
30	24	3
40	1	1
50	1	1
60	1	0
90	0	0

lower number of infections mean = 1 and short service time triangular: 0; 13.5; 7.5

Boundary Contact Time	COMMON QUEUE Unsafe Contacts	SEPARATE QUEUE Unsafe Contacts
0	115	92
0,5	115	91
1	112	89
2	109	81
3	106	77
4	103	73
5	94	59
6	85	53
7	76	47
8	74	40
9	69	32
10	62	29
11	57	25
12	52	22
13	42	20
14	36	17
15	**26**	**11**
16	18	9
17	10	5
18	8	5
19	8	3
20	6	2
30	1	1
40	0	1
50	0	0
60	0	0
90	0	0

lower number of infections mean = 1 and short service time constant time: 7

Boundary Contact Time	COMMON QUEUE Unsafe Contacts	SEPARATE QUEUE Unsafe Contacts
0	108	112
0,5	108	112
1	108	112
2	108	112
3	108	112
4	108	112
5	108	112
6	108	111
7	108	111
8	108	111
9	108	111
10	108	111
11	108	110
12	108	110
13	108	110
14	108	109
15	**108**	**106**
16	107	103
17	106	96
18	106	87
19	104	75
20	102	71
30	53	26
40	19	1
50	5	1
60	4	0
90	0	0

Discussion and Conclusions

We assumed that cash registers and individual queues do not interact (as for epidemiological issues). It seems that this can be ensured by installing physical barriers between checkouts and passageways where customers are waiting for service.

In the light of the experiment results presented above, we recommend configuration with separate queues. Thanks to the right choice, we can reduce the frequency of dangerous contacts from as much as 75 to 52 (out of 800 clients) even with a half reduction in the number of infected people known from Gangelt (for example). If we additionally assume that there are customers whose service time is short, close to zero, then we can observe a reduction in the number of dangerous contacts from even 26 to 11.

Recommendations for customer: When you see a very large crowd - choose a common queue. When you know that there is high infectivity and you buy little, choose self-service checkout (or you belong to a high risk group) but be careful with the neighbor (at another self-service checkout) and the checkout panel (put on gloves). This work did not investigate the impact of the queue organization on the safety at self-service checkouts. It seems that in this case the spatial configuration of this cash register module has the greatest impact. Observation shows that in that case it cannot be assumed that the individual checkout are separated from each other and the time of potential unsafe contact with a customer from a neighboring checkout should also be taken into account. In this situation, it seems

that you should choose checkout located extreme, closest to the exit, to protect against meeting clients from both neighboring checkouts registers (and clients still waiting in the queue).

Suggestions for further research: it seems that the research can also be extended to consider the use of store space provided for queuing customers. It is also worth considering the possibility of getting infected from a greater distance (e.g. 2-3 people preceding us in the queue). It seems that organizational changes could be considered in the case of a common queue: let people approach the computer separating customers to the checkouts from both sides (left and right) and be invited sequentially. Another problem is emerging: how will the cash register failure affect the epidemic in individual configurations?

Evidence Before this Study

Prevention of COVID-19 infections is a serious challenge. Managers try to secure store staff and customers. Queue management in supermarkets was supported by a simulation-based approach.

Added Value of this Study

The scope of applications of the simulation-based approach was expanded to include the study of the impact of the frequency of close contacts between customers in store queues, including pathogen infectivity. Two main configurations were tested: a common and separate checkout queue. The presented research shows that in most cases it is safer to organize separate queues to checkouts.

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The Circular Economy in the Context of the Green Economy and Sustainable Development: A Theoretical Approach

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Abstract

The circular economy has the potential to generate new resources, to create new opportunities and sustainable business models. In a society where we are constantly searching for new sources of self-sustaining economic growth, the current paper illustrates that the circular economy can be the answer. Identifying sustainable solutions for optimizing resource consumption for closing loops is an important goal at European level. Capitalizing on products and secondary resources are vital aspects for the circular economy to take place in optimal parameters. In this regard, the development of this new market has an important role in the practical implementation of resource efficiency. In the first part, the author presents a current overview of sustainable development whereas the second part underlines the concept of circular economy, its main implications and its urgent necessity. In the last part of the paper, the author underlines the main directions in which the sustainable development should be approached such as sustainable production and consumption models, development of new skills etc. emphasizing on the circular economy.

Keywords: Circular Economy, Sustainability, Green Economy

Introduction

Currently, there is a consensus that sustainable economic and social development requires adequate management of raw materials, waste, by-products, energy to conserve the planet's limited natural resources and protect the environment.

The consumer society emerged at the end of the twentieth century, along with the global population growth trend, intensification of the urbanization process development and dissemination of information and communication technology, continuous increase in living standards, reduction of product life cycle have contributed to increasing the volume and diversification of waste streams.

Given the sharp decline in natural resources, the rapid deterioration of air, water, soil quality and the deterioration of natural ecosystems, international concerns about waste management have become dynamic in identifying the best solutions and technologies. In this context, waste management has become a fundamental problem of future socio-economic evolution, a direct result of a present linear economic development. (Lacy, P., Long, J., Spindler, W., 2020).

The transition to a circular economy, in which the value of products, materials and resources is kept in the economy for as long as possible and the production of waste is kept to a minimum, has gained special attention, being on the agenda of public authorities, of the business environment, research institutes and non-governmental organizations. Lately, the concept of circular economy has experienced an exponential development through the active involvement of all stakeholders.

The Circular Economy concept in the framework of Green Economy and Sustainable Development

The European Commission defines the circular economy as the economy in which "the value of products and materials is maintained as much as possible. Waste and resource use are kept to a minimum, and when a product reaches the end of its life, it is used again to create added value; this can bring major economic benefits, contributing to innovation, growth and job creation".

The circularity concept is very close to the concept of efficient utilization of natural resources on system level, on the full life cycle of the products also with transformation of the waste in new resources for other industries.

The circular economy it is not applicable only to one of the activity levels or only to some of the resources, it can be extended to all the activity levels using different synergies associations, which can generate positive or negative cumulated effects.

We believe that anticipation and adaptation processes can be useful approaches for minimizing the risks associated with negative synergies at economic, social and environmental levels. Identifying the emerging aspects of the circular economy is the first step in establishing the types of synergies and associated measures that are required.

The challenges associated to the circular economy are also involving the necessity of a political commitment related to circular economy, to develop standards for the efficient use of resources on each waste stream or other types of resources, to finance innovation and research in the development of new technologies, but also to promote initiatives in the field of information technology.

Achieving a circular economy, which blends harmoniously with green growth, brings to the fore the need to implement a sustainable approach to economic activities.

The transition to a circular economy promotes sustainable production and consumption patterns that can be implemented in a society in constant search of new sources for self-sustaining economic growth. (Lacy, P., Long, J., Spindler, W., 2020) The process of transforming the classical-linear model into a circular one involves reconsidering unsustainable aspects in order to identify future development opportunities.

The circular economy is part of sustainable development, bringing to the fore the need to optimize resource consumption to prevent, reduce waste and promote reuse.

The development of a circular economy needs new approaches to the life cycle, which will allow to overcome the barriers associated with the takeover at the level of the consumer market of the latest technological innovations in this field.

The circular economy and the green economy are an integral part of the concept of sustainable development, as formulated by the Brundland Commission (1987), as "meeting today's needs without sacrificing the ability of future generations to meet their own needs".

The circular economy and its potential to generate new resources, to create new opportunities and sustainable business models, has gained special attention, being on the agenda of public authorities, the business environment, research institutes and non-profit organizations.

The preservation, respectively the recirculation of raw materials, of the secondary resources in as many production circles as possible is an objective included in the policies and strategic plans of the private and public environment.

From a simplistic approach, the implementation of the circular economy mainly targets two areas, with specific problems: industrial/professional and residential/municipal. At some level, they are interdependent and synergistically influenced (e.g., designing for better reparability / reuse of products can make both reuse and recycling easier at the end of use).

The circular economy it is connected to the aspects of increasing competitiveness. Achieving an optimal use of resources implies the existence of an interoperable electronic system for traceability and reporting of data based on an efficient collection infrastructure.

At the same time, this concept brings with it a series of benefits, but also challenges to which all stakeholders must respond, both private and public, or ordinary citizens. The impact of waste on the environment has recently received special attention at international and European level, including marine litter.

The circular economy applies to all sectors of activity with the capacity to achieve synergies, which by cumulating can determine new development opportunities. That is why there is a need for active involvement not only at the level of public policy, but also at the level of implementation in the territory. In this respect, local public authorities have an important role to play in designing an efficient collection system, including at source, for all types of waste. "Pay as you throw" schemes allow the implementation of the "polluter pays" principle in practice.

The concept of circular economy, it is a derivation of other concepts used before it, the most important being sustainable development and the green economy.

The concept of sustainable development had as its starting point the global ecological crisis 1929-1933 and was later developed by encompassing all economic, social, and human spheres, reaching that today, sustainable development is the new path of humanity. The idea behind this concept is to ensure a better quality of life for all the inhabitants of the planet, both for the present generation and for future generations.

The principles of the Circular Economy

The circular economy offers multiple value creation mechanisms, which are decoupled from the consumption of finite resources. (OECD 2018) In a true circular economy, consumption only happens in efficient bio cycles. Resources are regenerated in the biological cycle or recovered and restored in the technical cycle. In the biological cycle, natural processes regenerate matter with or without human intervention. In the technical cycle, with sufficient energy available, human intervention recovers the materials and recreates the product. Maintaining or raising capital has different characteristics in the two cycles. The principles are:

1. Preservation and enhancement of natural capital by controlling finished stocks and balancing the flow of renewable resources.

2. Waste is a raw material. The biological and technical components of a product are designed to fit into a material cycle where they can be disassembled / disassembled and used for other purposes. The circular system intelligently selects and chooses technologies and processes that use renewable resources, with better performance, where possible. Technical components: plastics, polymers, alloys, glass and other manufactured materials are designed so that they can be reused with minimal effort and energy consumption.

3. Optimizing resource yields by circulating products, components and materials with the highest utility and priority. This means that remanufacturing, reconditioning and recycling of circulating components and materials can effectively contribute to the economy. Circular systems are distinguished by extending the life of products and optimizing reuse. Sharing increases the use of the product. Circular systems maximize the use of biodegradable materials as basic materials, with the use of biochemical materials being used less and less.

4. Promoting the efficiency of the system by denouncing and combating the harmful effects of the current industrial economic system, also called system-level thinking. Thus, the ability to understand how the parties interact and influence each other is essential. This means reducing the negative effects that some products and services have on humans. We are talking about food, transportation, shelter, education, health, entertainment, and the effects of mismanagement, such as misuse of land, air, water, and noise, the release of toxic substances, and climate change.

5. Diversity is strength. Versatile systems with many connections are more elastic in the case of external shocks, unlike those whose only creative object was efficiency. Sustainable development is the form of economic growth that meets the needs of society in terms of welfare in the short, medium and long term it must meet current needs, without endangering those of future generations. This notion reconciles between the environment and the economy, representing a path of development that supports human progress for the entire planet and for a long future. This approach aims at the interaction of the compatibility of four systems: economic, human, environmental and ecological, so as to ensure the satisfaction of the needs of the present, without compromising the ability of future generations to meet their own needs. The sustainable development strategy includes simultaneous progress in all four dimensions.

Global development has the general goal of improving human life and ensuring the necessary conditions for people to reach their full potential. Achieving this global goal requires the fulfilment of the following objectives: the analysis of the present through the prism of the future, by introducing ecological security instead of maximizing profit. This being the true goal of sustainable development; changing consumption and production trends; establishing population growth; distribution to the entire population of the benefits of economic development; achieving effective governance, i.e. developing a political system that ensures respect for human rights and freedoms; the permanent and safe compatibility of the man-made environment with the natural environment.

Sustainable development cannot be ensured without environmental protection. Sustainable development includes environmental protection, while environmental protection conditions sustainable development. The European Union requires a new approach to global environmental issues, related to the effects and pressure on the environment, of all the consequences of socio-economic development. Aware of the need to continue economic and social development, it is imperative to protect and improve the state of the environment as the only possibility for creating and maintaining the welfare of both present and future generations, this balance being the factor that can and must ensure the development of society as a whole. . This is the key issue for sustainable development. (European Commission, 2017).

The green economy results in improved social welfare and equity, while significantly reducing environmental risks and ecological deficit. The transition to a green economy means policies and investments that will decouple economic growth from increasing current intensive consumption of raw materials and energy. A green economy can be thought of as a low-emission economy, through the efficient and sustainable use of resources and ensuring social inclusion. In a green economy, revenue growth and employment should be driven by public and private investment that reduces carbon emissions and pollution, increases energy efficiency and resource efficiency, and prevents the loss of biodiversity and ecosystem services.

Conclusions

Potential for improving the degree of recycling on each waste stream exists, and identifying the best ways to act in this area is the key to growth resource use productivity.

One of the challenges is to minimize resource losses, which could re-enter the economic circuit through excessive use of storage and incineration. In this regard, it is necessary to change the mentality of all stakeholders for promotion of ecological behavior.

Encouraging the development of new skills and jobs for the reconversion of the unemployed and among young people can make it easier to prepare the market for the circular economy. Another area that can be considered is the consultation of stakeholders in the promotion of the transfer of human capital taxation to the taxation of resource consumption which can be a signal positively transmitted to the economic environment.

The promotion and implementation in practice of sustainable production and consumption models bring in the foreground the need to identify and support economic development niches in order to be able to obtain social and environmental benefits. Increasing consumer awareness of placing on the market new products obtained from waste has a key role to play in promoting sustainable business models. (De Angelis, R., 2018)

The place on the market of new recycled or recovered products can only be done in compliant safety and human health standards and product-specific legislation. At these add the aspects related to the re-labeling of new products, as well as the degree of openness of consumers to them.

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Health communication in Poland: Barriers Precluding Hope For Good Physician-Patient Communication

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Abstract

The article describes the specificity of health communication in Poland. A qualitative analysis of the relevant literature, legislation and regulations for the education of doctors was carried out. The text identifies barriers that prevent effective doctor-patient communication: (1) legal anchoring in the paternalistic model, (2) a patient treated as a legally undefined, subordinate element of the system, (3) (still) limited education of physicians in social skills, (4) no tradition of health communication in Poland.

Keywords: Health Communication, Barriers, Physician, Patient

Introduction

In education and other social sciences, health is defined as a value that gives the highest meaning to individuals' lives and profoundly affects their actions (Piasecka, 2008). Nearly three hundred definitions of health have been coined so far (Woynarowska, 2013). They are divided into biological, functional and biological-functional classes. Over the years, a range of categories, such as *realist*, *nominalist*, *ontologist*, *physiologist*, *normativist, descriptivist, subjectivist* and *objectivist*, have been invented and applied to classify concepts of disease (King, 1954; Nordenfelt, 1993; Sundström, 1987; Lennox, 1995; Kovács, 1998; Hofmann, 2001). However, the theoretical discourse on communication about health, illness and treatment is still not compatible with the practice of health communication. The paradigms prevailing in therapeutic practice do not keep up with changes in scientific perspectives and social expectations.

In defining health, we usually rely on the terminology constructed by global and/or national opinion-leading organisations, such as the World Health Organisation, and, in doing this, we tend to neglect social interpretations of health (Pallai&Tran, 2019).

Although the internationally recognised categories listed above are common currency in Polish scientific theory, the images of health, illness and treatment, as well as attitudes to people with diseases or complaints, are formed above all socially in Poland. The "scientific paradigm" is systematically shaped by the prevalent social worldviews and the public perceptions of the actual role of physicians in the treatment process (cf. Domaradzki, 2013). In this way, the scientific paradigm becomes part of the social paradigm – of the context in which scientific research is conducted (Fleck, 1980). As a result of this "extension" of health-related thinking beyond the academic world, definitions of health, illness and treatment are inherently culture-dependent and culture-specific (Payer, 1988). Given this, they should be constructed and modified in relation to the changing political and economic situation, environmental and social conditions, and the legal and educational systems in place (Sokołowska, 1980). The models of communication concerning health, illness and treatment should evolve accordingly. Therefore, health communication should be explored in and take into account a comprehensive context. Specifically, factors to be considered include not only individuals' physicality and psyche, but also their social entanglements (Parsons, 1991) and "spiritual well-being" (Chirico, 2016, 11-16), as well as the relevant legal guidelines, cultural norms and

cultivated traditions, complete with social perceptions of patients and health care professionals (Pallai&Tran, 2019).

There is a lack of consistency in communicating about health, illness and treatment in Poland. This results from divergent social paradigms, incoherent legal principles imposed by the authorities and varying instructions on medical practice modelled (and sometimes directly verbalised) by decision-makers of medical facilities, who fall back on medical education-instilled intervention patterns, which are often at odds with the expectations of the public increasingly aware of their rights. This article discusses such educational, communicational and legal inconsistences in the context of patient care in order to capture the main barriers to communication about health, disease and treatment in the Polish health-care realities.

Specifically, the aim of this article is to describe the realities of Polish communication about health, illness and treatment in health care institutions and to establish whether such circumstances preclude hope for good physician-patient communication (Piasecka, 2015). The article addresses the problem of mixed paradigms which the staff of Polish medical facilities apply in their work with patients. Another purpose is to show which paradigms are instilled by education, which are imposed by the legislation, and which are usually used by physicians in their daily work.

Materials and Methods

The first stage of the study involved a systematic review of the literature to assess the viable definitions of health, illness and treatment in order to outline the background of health communication in Poland. Subsequently, a qualitative analysis of medical education programmes and curricula was carried out, including the current legislative provisions relating to the training of medical practitioners (education) and to the performance of the physician's professional responsibilities (legal regulations). The research study was capped by an analysis of theoretical and practical models of physicians' work in Poland, indicating the main causes behind barriers in health communication in Poland.

Results and Discussion

The culture in which people grow up determines the way they perceive and understand concepts. The phenomenon of health communication in Poland is discussed below in the context of the legislative, educational and mental barriers that affect the process of communication.

Barrier 1: Legal anchoring in the paternalistic model

Polish physicians are legally embedded in the paternalistic model. Legal guidelines for the patient-physician relationship are developed in the directive paradigm. How are doctors supposed to communicate about health, illness and treatment?

The Polish law does not contain any official definition of the medical profession. The term "medical profession" was officially introduced in the Law of 30 August 1991 on Health Care Facilities (Journal of Laws 1991 No. 91, item 408). This document describes a person performing the physician's job as someone who **is qualified and licensed to provide medical care in a particular scope**. This definition was restated in the Act of 15 April 2011 on Medical Activity (Journal of Laws 2011 No. 112, item 654). Although legally binding, this definition is quite inconsistent. The document defines and authorises a person practising the medical profession as having professional medical qualifications **to provide health services** in a specific scope or a specific field of medicine.

The work and behaviour of this person are governed by the legal stipulations for the medical profession, which set the standards of its performance. For the profession of the medical and dental surgeon, this is regulated by the Medical Doctor and Dentist Profession Act of 5 December 1996 (Journal of Laws 1997 No. 28, item 152; Journal of Laws 2018, item 617, 650, 697, 1515, 1532, 1544, 1629, 1669, 2435; Journal of Laws 2019 No. 69, item 60), while for the profession of the

psychiatrist, this is standardised by the Act of 19 August 1994 on the Protection of Mental Health (Journal of Laws 1994 No. 111, item 535). The Acts put medical doctors, dentists and psychiatrists under an obligation to undertake interventions with a view to maintaining, saving, restoring or improving health, to engage in other medical procedures necessitated by the treatment process or by other regulations governing the implementation of these procedures, and even, in the case of psychiatrists, to apply direct coercion measures, such as the immobilisation or isolation of the patient, under certain circumstances.

In Polish publications on the medical profession and the medical work ethics, the physician is described as a person who "is qualified and licensed to systematically (...) **undertake and perform medical** interventions that affect **the patient's body** and meet the current medical standards" (Karkowska, 2012, 72). The medical professional ethics is sometimes described as **actions focused on protecting the life and the health** of the sick and/or the suffering. The physician abides by "a certain code of morality and ethics that affirm particular values" (Nawrocka, 2008, 23). He or she is obligated to provide medical assistance and information about the patient's health status, but he or she also has the right to invoke the Conscience Clause (Article 39), i.e. **to refrain from providing health services that are incompatible with his or her conscience**. However, he or she must inform the patient about the viable possibilities of obtaining this service from another doctor or in another medical facility, register and justify this fact in the medical records and notify his or her superior about the decision in writing.

Although the Polish Constitutional Tribunal recognised the provision on the use of the conscientious objection clause to be partially incompatible with the principle of correct legislation stemming from the Constitution of the Republic of Poland (Article 2, Article 53 paragraph 1, Article 31 paragraph 3; Journal of Laws of 16 October 2015 item 1633. Ruling of the Constitutional Tribunal of 7 October 2015, reference number K 12/14), the clause is still used in practice and **empowers the physician to be a decision maker** in the area of the patient's life and health.

The terminology of the definitions provided by Polish laws which regulate the work of physicians represents health in a highly reductionist fashion by scaling it down to biological categories. It does not embed health in a broader social context and severs the "body/organism" from the values endorsed by the individual and the norms to which he or she adheres. This dissociation is supposed to guarantee medical professional values, such as objectivity, impartiality, the repeatability of analyses and the comparability of results, which are prerequisite for precise diagnostic, therapeutic and research procedures. This understanding of the role of the medical practitioner puts him or her in the position of a powerful and dominant agent who holds all the strings.

Therefore, possessing expert knowledge translates into an asymmetry of social positions, with the physician being invested with power over others (patients) who do not have this knowledge (and, consequently, power). For its part, power furnishes the physician with the mandate and opportunities for top-down interventions. Thus, the Act obligates physicians to work within the directive paradigm, to implement so-called positive control and to modify patients' behaviour. Doctor are required to follow the paternalistic model and develop effective action templates, as evidenced by the vocabulary of the medical legislation, which focuses on the form of delivery: giving, leading, guiding, undertaking, etc., relegates patients to the object-position and presupposes the possibility of refusal to provide health services. This is in contradiction both to "personalised medicine" – as promoted by the experts of the European Science Foundation (ESF) and the European Medical Research Council (EMRC) in European health systems (Wagner, 2015, 213-223; ESF, 2012) – and to human rights, such as access to information, decision-making and self-determination, as well as to a comprehensive concept of patient subjectivity (Malmgren, Törnvall, Jansson, 2014, 143-150).

Barrier 2: The patient is a legally undefined, subordinate element of the system

Since the Polish legislation does not define patients' rights, it is difficult both to respect them and to indicate who actually communicates in the communication process in the first place.

The Act of 6 November 2008 on Patients' Rights and the Patients' Ombudsman (Journal of Laws of 2009 No. 52, item 417; Journal of Laws of 2019, item 1127) defines the patient as a person who applies for health services or uses health services provided by a facility which offers medical services or by an individual who practices the medical profession. Regarding the rights of the patient, the same Act does not specify what these rights actually are. Instead, it focuses on stipulating how these rights should be respected and cautions what violations of these rights are compensable in money (based on Article 448 of the Civil Code).

With the reductionist approach combined with the lack of the definition of patients' rights in the Polish law (Paszkowska, 2018, 1239-1244), paternalism in the doctor-patient communication relationship seems to be a legally expected and desirable state. I**nvolving an ambiguous and imprecise entity**, with an unclear legislative status (i.e. the object of medical interventions), in matters related to treatment and decision making is after all hardly feasible. It is particularly difficult when the status of the medical staff, their organisational structure and their mandate to control and exercise power (and knowledge) over patients are legally codified and structured. The privileged position of the medical personnel is additionally secured and strengthened by a number of mechanisms, among which the key role is played by their command of goods (health, pharmaceuticals, knowledge about the treatment process and the capacity to apply therapies to patients, who cannot do without them), patients' dependence on the public health services and impeded access to (a small number of) specialist physicians (Wagner, 2015; Biesaga, 2005).

The latter of these mechanisms is probably especially pernicious. Impeded access to specialists results from staff shortages in health care facilities. As of 31st October 2019, the Central Register of Physicians of the Republic of Poland, kept by the Supreme Medical Council, listed 178,693 individuals as performing the profession of a physician and/or a dentist in Poland. Thereof, 140,273 were physicians, 37,973 were dentists, and 447 were people with a double licence to practise both professions (Supreme Medical Chamber in Warsaw, Central Register of Physicians of the Republic of Poland, 2019, Online). Given that the population of Poland is 38,386,000 people (as of 30 June 2019), there are 272 patients per one doctor (regardless of his or her specialty) and over 999 patients per one dentist. This means that there are 3.66 physicians and... just 1 dentist per 1,000 inhabitants of Poland. Even lower figures are cited in the OECD report *Health at a Glance 2018*, developed in collaboration with the European Commission. According to this report, Poland has the third lowest ratio of doctors per capita in Europe (just behind Great Britain and Romania). The data in this report indicate that there are only 2.4 doctors for every 1,000 Poles (4.6 according to the estimates of the Supreme Medical Chamber in Warsaw).

For Polish patients to be treated as conversation partners and to make informed decisions about the kind and course of treatment, they would have to have physical access to the medical staff. If this condition is not met, the process of communicating about health, illness and treatment may not be achieved. The medical staff should devote to patients enough time for their decisions to be made consciously and thoughtfully. The above statistics alone suggest that the modicum of time that the medical staff are actually able to devote to a patient is by no means sufficient for judicious decision-making on his/her part. This is additionally aggravated by the fact that the medical staff's time is also consumed by other duties, such as keeping medical records, participating in medical case conferences and consultations, performing medical procedures, etc.

The patient as a person is not a legally defined concept. In addition, patients usually have no university-level medical training. Therefore, they are not able to decide with full responsibility on health and life. The legislator has assessed that this is the competence of physicians as people who undertake treatments. Consequently, in legal terms, "top-down communication" without any need for feedback (other than the requisite consent to treatment) perfectly suffices to conduct the therapeutic process.

Barrier 3: The Polish medical staff receive a limited education in social skills

The long and noble tradition of Polish medical history, ethics and philosophy is barely reflected in the current medical curricula. Until 2019, the combined bachelor's and master's degree course for medical **doctors** included the total of 120 hours of the humanities (e.g. Psychology for Doctors – 30 hours; Sociology in Medicine – 30 hours; Ethics for Doctors – 30 hours; and The History of Medicine – 30 hours). The minimum required for the basic training was 1,635 classroom hours. The humanities made up just above 7.34% of all the subject courses in this group. The entire course of study, including both the basic and the specialist training, comprised the total of 3,990 coursework hours, in which the humanities accounted for a mere 3.01% of all the subjects (Annex No. 54, Ministry of Science and Higher Education). Due to the budget cuts, the amount of training provided by medical universities did not go beyond the legally required minimum, which well represented the real situation of medical education (Ministry of Science and Higher Education, Training Standards). More training in the humanities was offered to **nurses**. The bachelor's degree course in nursing comprised 4,605 hours of training, whereof 285 were in the humanities (6.19%). The basic training (the total of 810 hours) included 195 hours devoted to the humanities (24% of all the coursework): Psychology (60 hours), Sociology (45 hours), Pedagogy (60 hours) and Law (30 hours). The specialist training (the total of 3,795 hours) included 90 hours of Philosophy and Ethics for Nurses (2.37%). The master's degree course offered Psychotherapy (30 hours out of the total of 45 hours of the basic training, i.e. 66.67%) and Management in Nursing (45 hours out of the total of 285 hours of the specialist training, i.e. 15.79%). All courses in the humanities included in the nursing degree programme added up to a total of 360 hours of classes, which was 7.29% of all the coursework (Annex No. 80, Ministry of Science and Higher Education). The students of **dentistry** received the least training in the humanities. The dentistry programme included only 30 hours of training in Clinical Psychology (out of the total of 1,500 hours of basic training) and 30 hours of Work Safety and Ergonomics in Dentistry (part of specialised training, the total of 2,480 hours). So the total of 60 hours (1.5% of all the courses) covered the entire training in the humanities which a dentist had to do to obtain a degree (Annex No. 55, Ministry of Science and Higher Education).

These figures may be astonishing. Doctors can hardly be expected to embrace a personal approach to their patients, as a mere 30 hours of psychology training at the medical school will not substantially improve their communication skills or enhance their intra- and interpersonal competencies.

Despite the transformation of Polish Medical Schools into Medical Universities and despite the fact that educational systems around the world are withdrawing from teaching the content that "can be readily obtained through an advanced ITC system if one knows how to use it" (Brzeziński, 2007, p. 36; Suchorzewska, Olejniczak, 2011, pp. 7-9), the humanities in the Polish medical training system remain in a didactic recession. At the same time, patients' expectations are growing as they acquire "world class medical knowledge" by watching TV series and documentaries, where "doctors," or actors, with excellent humanistic and sociological training, showcase their therapeutic methods.

The current situation may be slightly altered by the recent Regulation of the Minister of Science and Higher Education of 26 July, 2019 on the standards of education preparing for the professions of a doctor, dentist, pharmacist, nurse, midwife, laboratory diagnostician, physiotherapist and paramedic (Journal of Laws 2019, item 1573). The new standards make it mandatory for medical university authorities to increase the number of course hours devoted to the social sciences and the humanities to 420 hours. Yet the same document also specifies that medical students should receive at least 120 hours of English instruction and earn no less than 5 ECTS credits for the humanities or social sciences module (fixing the lower ECTS limit and apportioning a considerable proportion of coursework to English encourage medical universities to reduce their humanities modules to a bare minimum). How medical students' social competences will develop with the new principles in place will be shown in the near future.

Barrier 4: There has been no tradition of health communication in Poland

Health communication is a robust subdiscipline of social communication in the world. HC is a field of science and practice that is developing very vigorously in the US and Western Europe. In Poland, the role of HC is still being established. However, there is a long tradition of related fields, such as preventive medicine, school hygiene, health education, environmental medicine, health education and medical history (Demel, 1972; Szotowa, Serejski, 1976; Więckowska, 1984; Woynarowska, 2000).

Until the end of the 1960s, the concept of health in Poland was dominated by the category of disease (as the lack of health). It was only in the 1970s that scientists began to focus more closely on the concept of health and its social dimensions. The following decade also saw appeals and attempts to study health and the health condition of Poles in the context of social structures and lifestyles (Piątkowski, 2002, 19). In the 1990s, health-related categories were redefined, emphasising the importance of research into health-promoting behaviours instead of, as had been the case before, the social consequences of illness and treatment (Nosko, 2005, 5-6). Yet even though the social context raised an increasing interest, further exploration of the historical and cultural aspects of health behaviours and public health proved inspirational predominantly to historians, anthropologists and ethnologists (Płonka-Syroka, 1994, 497-512).

The new millennium has brought about a scientific shift as a result of which health in the aspect of positive health communication has come into the orbit of social communication (Hofman, 2019), which encompasses both direct interpersonal (face-to-face) communication as well as media-mediated communication and communication in organisations (Jacennik, 2010; Jacennik & Hulewska & Piasecka, 2012; Goban-Klas, 2014; Piasecka & Hulewska, 2015). It was then that health communication started to be explored within a broader theoretical framework of the social sciences. Attention was paid to the practice of communicating about health in health care institutions and to the urgency to change communication modes in the doctor-patient relationship (Hulewska, Kozłowski, 2012; Hulewska, 2015), moving away from a strictly biomedical approach to health and disease in favour of sociomedical and psychomedical models (Nowina-Konopka, 2016). Such an interdisciplinary approach to the health and well-being of patients still poses a considerable challenge to the medical community in Poland, channelling changes in the doctor-patient communication relationship.

Conclusions

1) The definition of health most frequently quoted in the Polish literature is the definition adopted by the WHO. In the years 1980-2019, the Polish version of this definition was referred to in 761 publications. It was invoked nearly 19.5 times a year (Harzing's Publish or Perish resources, 2020);
2) Although the popularity of the holistic model of health is gradually increasing, “health communication” in Polish medical practice is limited to the biomedical paradigm. Physicians’ professionalism continues to be measured primarily by their knowledge and professional skills as well as the apt construction of patients’ clinical pictures;
3) Polish psychiatry exhibits a more pronounced tendency to conceptualise disease in subjective terms as a sense of discomfort (illness).
4) In Poland, patient-physician communication is regulated by a number of laws and regulations. However, many of these directives are methodologically contradictory, which causes chaos in the legislatively acceptable “health model” and in educating and communicating about health. It also hinders healthy doctor-patient relationships.

Polish medical practitioners (physicians, nurses and other medical professionals) are doomed to navigate a legislative and practical dissonance. They are placed at a crossroads between the official directive definition of the medical profession and other provisions and stipulations of the medical legislation which, residually yet unmistakably, insists on patient-doctor partnership. This uneasy position is made even more precarious by the necessity to negotiate the WHO’s expectations and popular visions of dedicated, self-sacrificing doctors. At the same time (in the same acts of law),

medical professionals are exhorted to extend "an older brother's" tolerant help and support, characteristic of the liberal approach underpinned by the ideas of humanistic psychology (Cf. Kozielecki, 1997). This is in line with social expectations regarding the humanisation of medical professions and the popular understanding of their work.

In Polish culture, the ethos of medical professions specifically envisions their work as an activity focused on protecting the life and health of sick and/or suffering people. Doctors should epitomise morality and "significant moral and ethical attitudes that are an affirmation of certain values"; as such, they should embody and display the humanistic view of people and the world (Nawrocka, 2008, p. 23). This definition of the work of medical professionals has little in common with actual Polish realities. Although the interpretative research paradigm and doctors' humanistic perception of patients preclude defining health as an abstract concept dissociated from specific conditions (Sokołowska, 1980), Polish physicians still prioritise reflecting an objective reality rather than understanding the meaning of social activities. A doctor assuming the role of an interpreter of patients' behaviour and a humanist focused on understanding patients' feelings, emotions and experiences, analysing patients' mental states, anticipating the future and determining the stimulators and inhibitors of the implementation of future plans, would not stand much chance of surviving under the current legal status in Poland. Asking questions such as *Who is my partner in the process of medical advice? What is he or she experiencing? What is he or she guided by when entering into dialogue with me (doctor)? What are my motives for action? What are we both bringing into this relationship? What facilitates and what limits our communication?* would involve discarding the systemic approach, characteristic of the positivist paradigm on which the medical and natural sciences have been based for years.

Such a physician would abandon the strict formulation of cause-and-effect laws and consciously dismiss quantitative research, rationalism and instrumentalism in order to treat patients as unique cases, being the sums total of equally unique meanings, senses and values. Such a doctor would leave behind what he or she was taught in medical school. He or she would renounce the impartiality and objectivity that have so far governed his or her conduct to the limits of precision and protected him or her from ... a medical error, which is as a matter of fact undefined in the Polish legislation.

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Technological Gap Concept: Applied Analysis of the E7 and G7 National Innovation Systems

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Abstract

The world economic crises of 1998, 2008 and 2014 form the phenomenon of asymmetry in understanding of academic and applied concepts of economic growth since the middle of the 20th century. Content and comparative analysis show that these views have not been transformed into a universal economic policy designed to solve the problem of recession either in developed or developing countries, and also sufficiently able to take into account the particularities and limitations of a certain social and economic system. The article contains a theoretical rethinking of theories of economic growth from the point of view of the knowledge generation systems, areas of diffusion of innovation and processes of absorption of new technologies, as well as an empirical verification of the modern understanding of the concept of the technological gap for E7 and G7 countries.

Keywords: innovation, knowledge, growth, factor of production, productivity, gap, E7, G7, diffusion, labour, capital, ratio.

Introduction

Since the middle of the 20th century within the theory of economic growth the research focus has seriously changed several times. For a long time, the explanation of the rate of capital accumulation has been put at the forefront. Little bit later, researchers focused on the actual mechanisms, which determine the process of technology development and accumulation of the human capital. And after that, researchers' interest shifted to the discussion of institutional growth factors. So, the economic growth is a steady annual increasing in production and consumption. In the leading countries of world development economic growth turned out into the one of the most spread phenomena of recent centuries and became a subject of constant interest of economists.

Growth diagnostics is an applied static approach to identifying the most serious constraint that slows down growth in a certain economy at a particular point in time. This approach doesn't involve the preparation of long-term development plans due to its implicitly that argues that the plan may not make sense at all. Indeed, according to the growth diagnostics it should be marked that after successfully weakening the restriction, the next steps are to search for new restrictions and to focus on them. At the same time, it is extremely difficult and even if at all possible, to foresee the role of this or another limit of growth in the future. Recognizing the importance of progress in the fundamental factors of development, we assume that the consistent solution of individual tasks to identify and remove the most serious constraints will ultimately lead to progress on the side of such factors.

The article is devoted to analyze the methodology and conceptual provisions of various theories that form the growth basis of socio-economic systems, which are based on the use of basic factors of production (labor, capital), their proportions (also known as productivity and capital ratio) in order to determine the role of innovation as a way to overcome the technological gap between countries with its subsequent empirical verification.

The main debate regarding the factors of global growth slowdown and current recession focused on studying the degree of influence of new technologies on the level of labor productivity and total factor productivity (TFP) in national economies under the influence of a technological factor. One popular approach [15; 19] affirms that all the basic innovations of human civilization that led to technological revolutions (steam energy, electricity, an internal combustion engine, microprocessors, etc.) are all done, so in the next 25 years the dynamics of the efficiency of production factors in developed countries will not exceed 0.4% per year. The domino effect, in turn, will determine the recession of the global economy as a whole. The opposite point of view is proved by the paradox of productivity, which is explained only by the imperfection of statistical measurements [7; 27]. It should be noted that the primarily restrictions are associated with the rapid emergence of new types of economic activity and even the formation of new industries. They are beyond the traditional statistics approaches. Trying to evaluate the beneficial effect of using artificial intelligence and other the newest digital technologies, proponents of this theory predict labor productivity growth in developed countries at a level of at least 2% per year [11].

Methodology and Research

The output of finished goods is determined by the increasing of basic factors of production - labor, capital and total factor productivity, i.e. the technological factor which represents the extrema of production function. We must remember that it can maintain a stable maximum in the long term only with positive non-decreasing returns rate. The trajectory of the actual output relative to potential one is determined by the combination of fundamental and market (short-term) factors. The approach of the economy to the level of its potential output is observed during periods of “overheating”, the situation when the potential output corresponds to the maximum possible (for the economy) approximately to the conditions of full utilization of production capacities and complete usage of existing labor resources. Moreover, it is noteworthy the situation of the time factor inclusion in the analysis. It this case there three types of situations arise that can describe the continuity of the functions extremum sets: sequence, parallelism and the gap.

If the first two situations are quite academically predictable and partly described from a theoretical point of view and in some measure verified in practice, the phenomenon of “technological gap” has not yet received a modern rethinking and empirical verification, taking into account the modern challenges of overlaying cycles N. Kondratiev, J. Kitchin and C. Juglar.

Based on the usage of the general philosophical method of dialectical cognition (to understand the essence of the scientific and technological progress influence on the dynamics of economic growth in their integrity, development and inconsistency), methods of abstract logical analysis (to study the categories of “productivity”, “cost”, “innovation”, “growth”, “gap”) and system-structural and economic-statistical analysis (to assess the vectors of formation and development of the technological gap phenomenon, to decompose the imperatives and pragmatics of knowledge forms and technological gaps, as well as to characterize the crucial features of the integrated system criteria for construction of a knowledge economy as one of the applied tools for overcoming mentioned previously technological gaps).

Thus, here arises the requirement to search for theoretical and applied tools for combining the links of the “total factor productivity - technology - labor productivity - technological gap” chain, which will provide either rethinking of the existing sluggish recession or formation of the predicting economic growth basis for the system of technological transformations within the framework of human civilization. This aspect becomes extremely important in the context of digitalization of a significant part of socio-economic relations during the transition to the next technological mode and the rapid formation of new business opportunities within the framework of Industry 4.0.

Results

Two years ago, Paul Michael Romer of New York University and William D. Nordhaus of Yale University were awarded the Nobel Memorial Prize in Economic Sciences for researching theories of long-term and sustainable economic growth. Before them, in 1987, Robert Merton Solow, a professor at the Massachusetts Institute of Technology, also was awarded the Nobel Memorial Prize in Economic Sciences for fundamental research in the theory of economic growth. More than thirty years gap in research in this area actualizes the problem of searching for the future model for achieving economic growth. On the other hand, modern economic sciences have to identify the causes of cross-country technological gaps as an actual trigger for economic growth.

Many theories of the growth of socio-economic systems experienced two peaks during their evolution: the first peak was observed in the 1950s and 1960s, when the theory of exogenous economic growth was created by the model of R. Solow, Ramsey –Cass – Koopmans model and the model of overlapping generations. The second peak came in the 1980s, when the theory of endogenous economic growth appeared, which over the next decade was transformed into several separate areas.

Up to now, there are a lot of scientific papers devoted to the analysis of the directions and cause-effect relationships between technologies, total factor productivity, labor productivity and the availability of factors of production in general have been already published. But one general conclusion should be done: there is no universal model that describes the technological policy of all (or at least the most) countries - they differ significantly in the nature of such a connection. Moreover, the results of the analysis for one country may vary depending on the chosen time period, step of observations and even the method of econometric analysis of the data. This is hardly surprising - economic policy may change over time, taking into account the accumulated successful or unsuccessful experience, as the overall priorities of the technological policy are adjusted, etc. In this case, it is very interesting to look thought the set of research where the direction cause-effect relationships is studied for a group of triggers within the same model over the same time period.

In general, the complete set of theoretical and methodological approaches and concepts that describe economic growth can be grouped into two blocks depending on the factors origin nature and the way of influence in order to achieve the positive dynamics in the development of socio-economic systems, namely: external - exogenous and internal - endogenous (fig. 1).

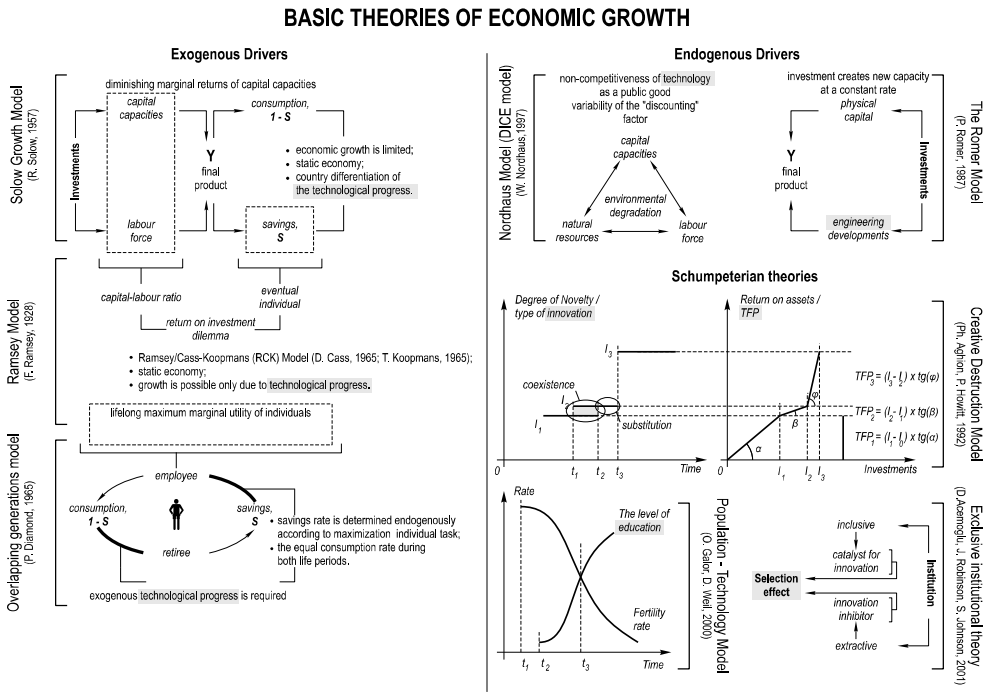

Fig. 1: The set of the economic growth theories

The R. Solow model is basic on, therefore its logic is extremely simple. It represents the ratio of the accumulation of capital capacities in the economy producing the final product *Y*, which can be used either for savings (*S*), which over time are transformed into investments or the consumption (*1 - S*). The final product *Y* is the result of the interaction of two basic factors of production - capital and labor. If, as an axiom, we assume that the labor factor is characterized by constant returns, then economic growth can be achieved solely through an increase in capital accumulation capacities due to an increase in the level of investment.

It should be noted that R. Solow proved that investment should be considered as a limited source of growth. In this case, the statement about the diminishing marginal utility of capital investments becomes obvious. If the accepted axiom of labor constancy is valid, then as the capacities accumulate and the economy grows, but there a recession appears. The economy loses the only source of growth and goes into a stationary state i.e. recession [36].

It becomes apparent that technological progress transforms into the link between the declining returns on capital investment and labor. It's only one source of labour efficiency increasing in the conditions when the formation of the basis for bridging the innovation gap appears, which is internationally represented as technological one. In this case, technological progress allows the labour to interact with a large number of capital capacities. In these conditions, a dualistic concept of the influence of technological progress and capital-labor ratio (the ratio of capital capacities to labor force) on economic growth is being formed. If the first aspect justifies slow growth in developed countries, the second one becomes the trigger for the faster growth in developing countries. It becomes the basic dilemma of the technological gap concept within the cross-country analysis of the levels of innovative development.

Thus, actually in the frames of the basic theory of economic growth, at the least two, in our opinion, objective elements are still there and don't lost their relevance up to now, namely: technological progress and country stratification of the technology influence on achieving high level of productivity and economic growth in general.

The following problem arises at the next stage of analysis that deeply interdepends with the basis of the Ramsey model: to find the optimal ratio between of savings and consumption that helps to understand the dynamics of investments better [32]. The modern version of this model was adapted by D. Cass and T. Koopmans in the 1960s [12; 25] as an applied tool for cross-country comparison.

The Ramsey – Cass – Koopmans model takes into account the savings rate as an eventual criterion of the labour, which is formed on the basis of maximizing one's utility from consumption throughout whole life. For example, the overlapping the technological gap in a poor country with low capital – labour ratio, where the returns on capital are larger brings additional benefits for individuals. This benefits argues the individuals to reduce current consumption and increase the savings rate, which through investment increases the growth of industrial capital. By and large, the theoretical and methodological basis of the F. Ramsey model is identical to the R. Solow model, since it doesn't explain the nature of economic growth. Consequently, either exogenous or endogenous nature of the savings rate ensures that the economy enters a stationary condition where the future growth is possible only due to technological progress.

Nobel Prize in Economic Sciences winner Peter Diamond from Massachusetts Institute of Technology proposed a model of economic growth, which is based on two synchronous stages of labour as a factor of production - economically active population and pensioners [16]. The labour stages substitute each other, but at the same time a new young generation appears in each period, and the previous young generation retires. Thus, at each moment of time, within the framework of the economic system, there are two generations of people, which have a different tendency to consume and to save, i.e. to invest. At a working age, individuals earn money from existing facilities and save some of their earnings in retirement, which are invested in the economy. This situation allows increasing the flow of industrial capital, and therefore allows the next young generation to work more efficiently, i.e. to increase labor productivity. In this way, economic growth take place and the rate of savings is determined endogenously, based on the maximization task of an individual who is trying to maintain approximately the same level of consumption during both life periods.

There appears a need for a more detailed understanding of the technological factor influence due to its cyclical nature. The main idea of P. Romer's theory consists on thesis that the company making investment in new technological development temporarily obtains the status of a monopolist in the market within one technological cycle. This monopoly condition is guaranteed either by the complexity of the technology for copying, or by secrecy, or by patent law. At the same time, it must be borne in mind that after some time this technology becomes a public domain, increasing the overall technological level in the economy in general [33].

The Dynamic Integrated Climate-Economy model (DICE) [28] became the basis for studying the paradox of the primacy of economic growth and global temperature changes. It should be noted that this model is a computer-based integrated assessment model developed by 2018 Nobel Laureate William Nordhaus that "integrates in an end-to-end fashion the economics, carbon cycle, climate science, and impacts in a highly aggregated model that allows a weighing of the costs and benefits of taking steps to slow greenhouse warming. This model has been highly criticized by the economists. Harvard Kennedy School of Government economist R. Pindyck summarized criticisms of this type of model in 2013 [31]. The main field of criticism consists of a large number of assumptions, which are actually arbitrary and this fact destroys the possibility of highlighting the "discount factor" - an obligatory indicator for making possible to compare the benefits and losses by using new technologies at present and in the future. It means that the technological gap begins to form not only in space, but also in time.

Ph. Aghion and P. Howitt model of growth through creative destruction [6] describes the replacement of the old technology by the new one. Each inventor who has created an innovation raises not only the overall technological level in the economy, but also force out a company producing an obsolete product or an actual one but by means of old technology, i.e. at lower level of labor productivity. Obviously, this theory repeats the idea of J. Schumpeter about «creative destruction". Note that within the framework of endogenous growth theories (P. Romer, Ph. Aguillon and P. Howitt), the key

triggers of innovative activity during the 20th century were the same and did not differ between countries. This fact highlights the problem of the technological gap between countries.

O. Galor and D. Wile [17] put forward a theory in order to prove two conjectures: economic growth is endogenous and cyclical. The logic of the theory affects not only the quantitative, but also the qualitative characteristics of labor as a factor of production. Given that technological progress changes exponentially and is rather slow but albeit at non-zero level, this circumstance allows the population to grow, and the individual income remains unchanged at a low level. As technology spreads and penetrates into the sphere of material and intangible production, a lot of families have started to improve the quality of their labour. These families reduced the number of children and increased investment in human capital, first of all in primarily education. Cumulatively, we have met a variation in two trends: the first - population growth slowed sharply down, but the quantity of educated people who are able to generate new ideas highly increased, accelerating technological progress at new level like the theory of P. Romer explains. It should be recognized that the shift of mentioned previously trends did not occur simultaneously in different countries, in other words, it was formed a new «gap» in the technological gap theory.

The next theory of economic growth involves the institutional environment ("rules of the game" or restrictions) as the triggers. The main idea of this theory lies in the process of differentiation growth paths in different countries, which are explained by the different functional purpose coexisting institutions - catalysts and inhibitors of economic growth. The main authors of this theory are D. Asemoglu, S. Johnson and D. Robinson [3].

In the framework of the theory, all institutions are classified into inclusive (creative) and extractive. Inclusive institutions form a motivation for creative activity, help to create a new product, to innovate and to generate profit. These institutions are inherent in all models of endogenous growth, which were described earlier and contribute to economic growth. In turn, extractive institutions are inhibitors of innovation and investment at any level of management. As a result, investment dynamics in research and development (R&D) reduced and, as a result, there is no scientific and technological progress and economic growth.

Thus, the models of exogenous growth, in turn, could not explain the observed facts because of the assumption of diminishing returns on the main factors of production, including capital capacities and labour. Indeed, there is hardly an industry where would be no decrease in returns when a certain level of capital is reached. The key idea of the second-generation theories was that the skills and technologies that created in one industry are transferred to others, and in this way the return on investment in innovation ceases to be diminishing for the economy as a whole. At the same time, cross-country movement of technologies is not taken into account, and therefore it becomes the object of both theoretical understanding and applied analysis.

So, here it is the theoretical basis of economic growth models, especially the concepts that generically forms the so-called neo-Schumpeterian direction of economic science [2; 5]. Within the framework of this trend, it is advisable to note that the free transfer (diffusion) of new technologies, innovations and knowledge between firms at the state level can be a factor in achieving growth only in case if lagging behind technological leaders will be proportionally dependent on the growth rate of those working at the technological border, i.e. at the borders of the technological gap.

OECD outlook [30] on global trends in labor productivity as a factor in achieving economic growth, argued that there are a number of reasons for the slowdown in the case of the spread of new technologies from global leading firms to national leaders, as well as lagging enterprises in national economies. Analysis of OECD countries statistical data shows that over the past 15 years, world leaders have shown steady growth, while the gap in technology used between global leaders and other enterprises becomes wider [8]. The lag of national leaders and especially the least productive firms in separate countries leads to a general slowdown in average productivity growth rates, and therefore highlights the second block of conditions for the emergence of technological gaps.

At the same time, national statistical agencies show a widening gap between global leaders and less efficient enterprises. Especially large technological gaps are formed in the labor productivity of human resources. This case in first approach be explained by the differentiation of total factor productivity. It underlines the fact that the diffusion of new technologies does not occur freely and that there are obstacles to lagging behind in the absorption of new technologies that are already being used by global leaders.

It means that the productivity paradox is caused in many respects by the weak functioning of the market mechanism of "creative destruction" according to the ideas of J. Schumpeter. The creation of a new and more productive good accompanies by competitive processes of forcing out the old and less effective one [35]. The insufficient efficiency of the redistribution of the basic factors of production and the weak dynamics of the innovations spread regarding to the challenges of the technological revolution can restrain productivity growth even in conditions of intensive technological progress, which also emphasizes the technological gap relevance.

Traditionally, labor productivity is defined as the ratio of GDP (in US dollars at PPP) to labor costs (the annual number of hours worked by all people employed in the economy or the total number of employees). The capital-labor ratio is the rate of the value of the fixed capital stock (it is measured in dollars or at PPP for capital) to labor costs. Thus, multifactorial productivity can be contrasted with total factor productivity (Solow Balanced Growth Path) and be defined as the gap in labor productivity between countries beyond the differences in capital-labor ratio and quality of human capital [1].

It becomes obvious that the gap situation occurs when a significant supply level is not covered by real demand. This context leads to the situation when the accumulated human capital leader country moves to the set of outsider countries in terms of labor productivity, i.e. the rate of its use efficiency. Skilled human capital supply encourages production by providing an important productive resource. In other words, the supply of skilled labor creates demand for it, and it, in turn, adjusts the supply. As a result, both processes run in parallel, but they are in a race mode [18].

The next criterion of the technological gap between countries is the heterogeneity of the total factor productivity dynamics. Researchers identify a persistent productivity gap between technology leaders and lagging enterprises either in developed or developing countries [10]. The positive TFP dynamics is defined as the growth in output of the finished product, which is observed in a certain period and which cannot be associated only with increasing in the use of basic factors of production in the same period [36; 24; 21].

Any enterprise uses an individual combination of basic factors of production (labor and capital) to produce the final product. If we reduce the final product cost to the costs of labor and capital, then the residue will determine the part of the growth of the final output, which can't be explained by the increase in the quantity of labor and capital. This explains the possible improvement of technology in the industry or to a more optimal combination of labor and capital uses in a particular enterprise in particular [22; 23]. The logic of understanding can be formalized by the following formula:

$$\Delta TFP = \frac{Y_1 - Y_0}{Y_0} - \alpha_1^K \frac{K_1 - K_0}{K_0} - \beta_1^L \frac{L_1 - L_0}{L_0} = \frac{\Delta Y_t}{Y_0} - \alpha_1^K \frac{\Delta K_t}{K_0} - \beta_1^L \frac{\Delta L_t}{L_0}, \quad (1)$$

where ΔTFP – is the dynamics of total factor productivity; ΔY_t – increment in the output of finished goods; ΔK_t – increment of fixed capital; ΔL_t – increment of labor; ; α_1^K and β_1^L – are the rates of the cost of fixed capital and labor in period *t*.

Thus, the TPF dynamics is empirically defined as the unexplained remainder of the growth of the final product. On the one hand, the effects of technological and organizational innovations fall into this remainder due to its diffusion or transfer of knowledge, which determine technological progress

in the industry and affect the shift in the production function. On the other hand, the statistical errors of measurements and a shift in the production function caused by the system's ability to absorb new innovations, knowledge and technologies may fall into this residue.

The widening of the technological gap leads to an increase in cross-country inequality not only within the framework of TFP, but also differentiations in welfare due to different dynamics of economic growth. A special role in the framework of national innovation systems is acquired not so much the diffusion of new technologies, as the quality of the labour as the main knowledge generator. The labour quality as an ability the ability to generate new knowledge can be regarded connecting link in endogenous and exogenous theories of economic growth. The economic growth achievement depends at the least on the nature of the source of technology's origin, and the technological gap will be determined by the ability of the core elements of the economic system to generate and absorb knowledge.

The role of technological knowledge and access to them for the improving of innovative development is described in detail in the scientific literature and papers [34; 29; 20; 13; 14].

However, in the framework of the modern rethinking of the technological gap concept, there are theoretical problems that impede a sufficiently complete description of economic phenomena associated with the processes of creation, dissemination and use of knowledge. At the same time, the role of knowledge (explicit and implicit) as a key imperative of the assumption of the homogeneity of production factors, primarily human capital, remains out of sight. The existence of various types of knowledge and sources of their origin narrows the possibilities of analyzing the processes of knowledge absorption.

At the micro level, the absorption capacity is the firm's ability to "identify, assimilate, and use knowledge from the external environment" [13]. These abilities are associated not only with the potential of employees engaged in the R&D, but also with the results of intra-company interactions that can affect not only aggregate, but also multi-factor productivity.

A lot of studies promotes that the absorption capacity is correlated with the transfer and subsequent use of external knowledge in the processes of creating and diffusing innovations, which determines the endogeneity of theoretical approaches. However, despite the fact that a number of authors indicate the existence of different types of knowledge [14; 26], absorption capacity is often understood as an attribute of homogeneous economic agents, and knowledge absorbed by them is considered as a homogeneous resource. But this makes it impossible to explain the formation of competitive advantages of firms [9] in various models of their innovative behavior depending on the absorption of such a heterogeneous resource as external knowledge, and as a result - to establish complex processes of transfer / flow of knowledge at the level of either firms or the state.

So, the mentioned previously concepts, scientific directions and theories have formed a theoretical basis for identifying cause-effect relationships in understanding the economic growth of complex hierarchical systems including the national economy. The cornerstone of the proposed comparative studies is the comparison of labor productivity and capital-labor ratio of the national economies, which are defined as the ratio of GDP and fixed capital increment to the number of labour. This allows us to carry out the first stage of verification of the technological gap concept within the framework of well-known groups of countries E7 and G7, which are stratified by GDP per capita (fig. 2).

The next step of verification the technological gap concept is a cluster analysis of the efficiency levels of the generating and absorbing new knowledge, technologies and innovations systems in E7 and G7 countries.

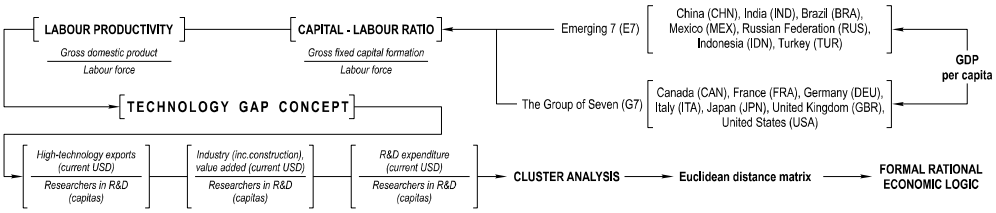

Fig. 2: The logic of empirical verification of the technological gap concept

The core of the analysis is based on indicators of high-technology exports, value added in the industry (including construction) and R&D expenditure per one scientist – researcher for the period from 1990 to 2018 (fig. 3).

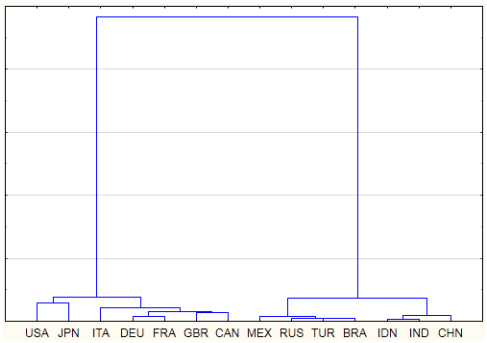

a) GDP (PPP, current international USD) per capita

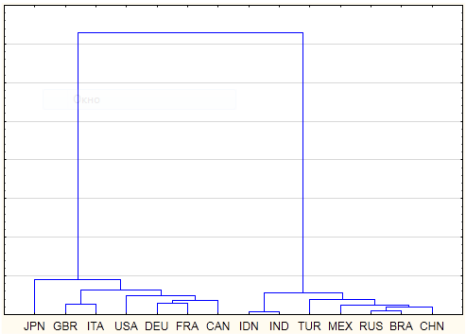

b) Gross fixed capital formation (USD) per labour force (capita)

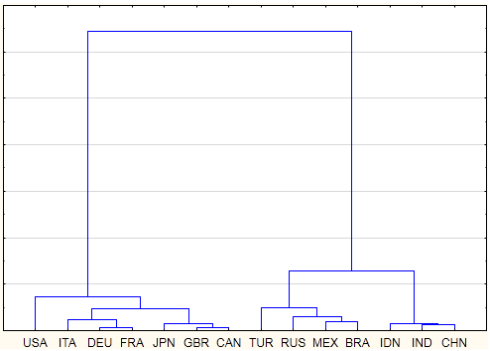

c) Gross domestic product (USD) per labour force (capita)

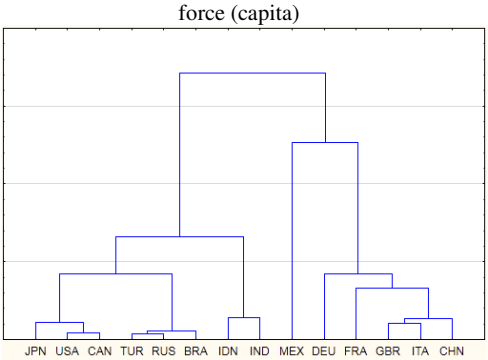

d) High-technology exports (current USD) per researcher (capita)

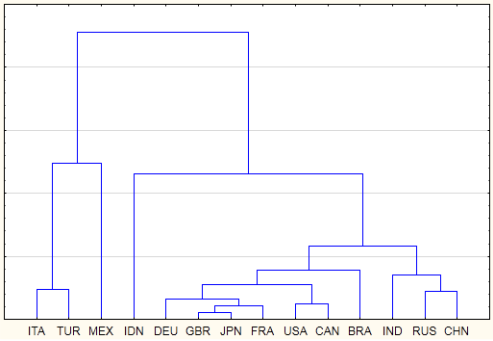

e) Industry (inc. construction), value added (current USD) per researcher (capita)

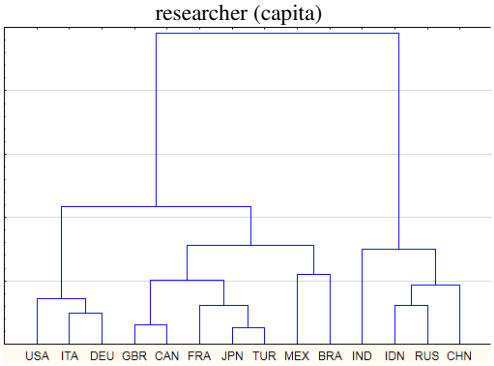

f) R&D expenditure (current USD) per researcher (capita)

Fig. 3: Cluster analysis of key indicators of E7 and G7 countries [37]

In our opinion, it will allow us to assess the degree of effectiveness of the knowledge generation system, the diffusion of innovation and the absorption of new technologies.

The obtained values of the Euclidean distance within the framework of the clustering process allowed us to form the following subsets of clusters according to the corresponding criteria (table 1).

Table 1: Country E7 and G7 clusters by series of technological development of national economies

Series	Cluster	CHN	IND	BRA	MEX	RUS	IDN	TUR	CAN	FRA	DEU	ITA	JPN	GBR	USA
GDP (PPP, current international USD) per capita	1st	+	+	+	+	+	+	+							
	2nd								+	+	+	+	+	+	+
Gross fixed capital formation (USD) per labour force (capita)	1st								+	+	+	+		+	+
	2nd												+		
	3rd	+	+	+	+	+	+	+							
Gross domestic product (USD) per labour force (capita)	1st			+	+	+		+							
	2nd	+	+				+								
	3rd								+	+	+	+	+	+	+
High-technology exports (current USD) per researcher (capita)	1st	+								+	+	+		+	
	2nd				+										
	3rd		+	+		+	+	+	+				+		+
Industry (inc. construction), value added (current USD) per researcher (capita)	1st							+				+			
	2nd	+	+	+		+	+		+	+	+		+	+	+
	3rd				+										
R&D expenditure (current USD) per researcher (capita)	1st	+	+			+	+								
	2nd										+	+			+
	3rd			+	+			+	+	+			+	+	

For next step of analysis, it seems necessary to study the homogeneity and degree of variability of the country representation according to the indicated clustering criteria, which was implemented within the framework of the presented study using the indicator of cross-country matrix of Euclidean distances.

As was noted, the study of the homogeneity of the clusters of the E7 and G7 countries according to the select indicators of macroeconomic statistics becomes obvious, namely: firstly, checking the density of ties within the analytical groups according to the declared features and identifying the core of a homogeneous set; secondly, comparing the results of cluster analysis according to the indicated signs within the samples of E7 and G7 countries with identifying the most effective models of the impact of technology on economic growth; thirdly, a comparison of the best examples of the functioning of knowledge generation systems, areas of diffusion of innovation and processes of absorption of new technologies outside the boundaries of the general sets of E7 and G7 countries in order to determine the foundation for the formation of an applied understanding of the concept of technological gap (table 2).

Table 2: Homogeneity of clusters and the formation of technological gap boundaries

Sets	Countries	CHN	IND	BRA	MEX	RUS	IDN	TUR	CAN	FRA	DEU	ITA	JPN	GBR	USA	E7 (160/62)	G7 (62/180)
E7	CHN		5	3	2	4	5	2	1	2	2	1	1	2	1	21	10
	IND	5		4	2	5	6	3	2	1	1	-	2	1	2	25	9
	BRA	3	4		4	5	4	5	3	2	1	-	3	2	2	25	13
	MEX	2	2	4		3	2	4	1	1	-	-	1	1	-	17	4
	RUS	4	5	5	3		5	4	2	1	1	-	2	1	2	26	9
	IDN	5	6	4	2	5		3	2	1	1	-	2	1	2	25	9
	TUR	2	3	5	4	4	3		2	1	-	1	2	1	1	21	8
G7	CAN	1	2	3	1	2	2	2		5	4	3	5	5	5	13	27
	FRA	2	1	2	1	1	1	1	5		5	4	4	6	4	9	28
	DEU	2	1	1	-	1	1	-	4	5		5	3	5	5	6	27
	ITA	1	-	-	-	-	-	1	3	4	5		2	4	4	2	22
	JPN	1	2	3	1	2	2	2	5	4	3	2		4	4	13	22
	GBR	2	1	2	1	1	1	1	5	6	5	4	4		4	9	28
	USA	1	2	2	-	2	2	1	5	4	5	4	4	4		10	26

An analysis of the general set of E7 countries suggests that the degree of homogeneity, and therefore the identity of the development of the knowledge generation system, the diffusion of innovation and the absorption of new technologies are very high. At the same time, India (25 common clusters), the Russian Federation (26 common clusters) and Indonesia (25 common clusters) are as similar as possible in these areas, since they take the first place in terms of the number of common clusters with the formation of the core "India - Indonesia", which all clustering indicators for the specified period of time are as identical as possible. It should be noted that in all these countries the degree of similarity with the principles of the functioning of the knowledge generation system, the diffusion of innovation and the process of absorption of new technologies of E7 countries is 38.75%, which may indicate the formation of the prerequisites for the emergence of a technological gap.

Attention should be paid to the higher level of homogeneity of the connections of G7 countries according to the principles of the functioning of the knowledge generation system, diffusion of innovation and the process of absorption of new technologies than E7 - 180 countries to 160 common clusters, but at the same time the full similarity of the intergroup identity of 62 common clusters in the E7 → G7 direction and vice versa. It should be noted that among G7 countries the degree of similarity with the principles of functioning of the knowledge generation system, diffusion of innovation and the absorption of new technologies is 34.4%, which may indicate the development of technological autarky.

The results of homogeneity in countries such as Brazil, Canada, France, and the United Kingdom are interesting. First, these countries demonstrate the maximum "cross-cutting" identity in terms of the effectiveness of the functioning of the knowledge generation system, the diffusion of innovation and the absorption of new technologies. Secondly, they are at the bifurcation point, which is characterized by the uncertainty of the direction of the bias towards maximizing the production of new technologies as a driver of economic growth or absorption of old technologies, but with maximum marginal utility. Thirdly, these countries open a clear technological gap, which becomes decisive for further economic growth of both E7 and G7 countries.

Despite the obvious technological gap, the driver of future economic growth has not been determined yet for each of the subset of countries of these groups: there will be a transformation of the knowledge generation system in E7 countries under the influence of the quality of labor resources, and the scope of innovation absorption in G7 countries will change under the influence of reaching the maximum value marginal utility of TFP.

Thus, in the next decade, a new paradigm of achieving economic growth will emerge, for which the determining factor will be the way to bridge the technological gap not only between countries, but inside their socio-economic systems.

Discussion

In order to create the scientific value of the proposed methodology, it's proposed to introduce some imperatives, which can be regarded as the anchor characteristics of the technological development of the socio-economic system:

within the framework of the research, it is proposed to consider a new technology as the result of revolutionary rather than evolutionary transformations with a high level of uncertainty and turbulence of consequences;

the life cycle of innovations and introduced technologies, especially in the last decade, caused the appearance of the Fourth Industrial Revolution prerequisites with their inherent technological lag, which accompany the formation of bifurcation points at any time at any point of the Foster's S-curve;

the comparative cross-country analysis of the knowledge transfer and its derivative - technologies, based on a comparison of macroeconomic indicators of labor productivity and the complexity rankings determine the possibility of coexistence of technological solutions related to different structures, provided that the economic efficiency of their application is maximized;

ceteris paribus, a fundamental feature of Industry 4.0 is the symbiotic interaction of digital and physical technologies with the support of machine learning tools and artificial intelligence unlike the previous ones, which affects the ability to separate and specify the parameters of the S-shaped curves set that describe technological gap.

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Paradigm Shift – Heterodox Perspective on Economic Transformation in Poland

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Abstract

At the turn of the 1980s and 1990s Poland underwent spectacular socio-economic transformation from real socialism to capitalism. This systemic shift is analysed through the lens of institutional and heterodox economics. The study shows that the shock therapy followed the rules of the Washington Consensus. The pendulum has swung from one extreme (inefficient collectivism) to the other: neoliberal turbo-capitalism.

Keywords: systemic transformation, real socialism, neoliberalism, heterodox economics, Poland

Introduction

The meeting of Communism and Christianity in a country such as Poland presents incredible spectacle (Tischner 2018: 231). Competition or even the battle of ideologies does not mean that they do not share various similarities. For example, both real socialist regime and a new neoliberal turbo-capitalist (Szahaj 2017) system whose creation was started in 1989 encompass many spheres, structure new set of values and ambitiously crave for totality. Both arrangements also, at least in theory, had a noble aim – human liberation. Freedom, however, has many definitions and types. For example, Isaiah Berlin differentiates between two kinds of freedom. In popular discourse often dubbed negative and positive freedom. The first one is referred to as “freedom from”, i.e. from government interference and coercion, while the second is also dubbed “freedom to”. It seems that new liberalism or neoliberalism concentrates solely on negative freedom. Positive freedom – freedom to – with its emphasis on fulfilment and upward mobility is hardly recognized by neoliberals. Similarly, according to left wing Italian political philosopher Domenico Losurdo (2005), the views expressed by a number of distinguished classical liberal thinkers (such as John Locke, Alexis de Tocqueville, Edmund Burke, John Calhoun, Jeremy Bentham, Thomas Jefferson, Benjamin Franklin, Abbe Sieyes, John Stuart Mill) could be labelled "anty-liberal" not only from current perspective, but also in comparison with progressive standpoints of their time. According to Moll (2018: 112) Losurdo (2005) claims that "liberals had the tendency to protest in the first place against abstract, not concrete suppression. It enabled them to promote such vision of freedom which safeguarded their own profits and profits of their social class".

Paradigm Shift

The characteristic feature of Polish neoliberalism has been its idealization and deification of freedom. As noted by a Polish scholar Andrzej Szahaj (2017: 170) this enthusiastic and indeed crude promotion of “freedom” is “very typical of neoliberalism and often takes the form of a blackmail: if you do not like the current form of capitalism or globalization, thus you are the enemy of freedom in itself, most likely a hidden Bolshevik.” It is really an unfounded rhetoric as those who opposed neoliberal shock therapy were usually ardent anti-communist and anti-Soviet members of Solidarity. Neoliberals, in turn, wanted to preserve Round Table status quo with Communist elite, fiercely opposed de-communisation and did not object (and even advocated) the “nomenklatura” privatization. In fact, such tricky (and simply misleading) metaphors were not solely typical of Poland. They were used in other CEE countries: "socialism - as a zombie and ghost - is important in the production of neoliberal monoglossia and guilt by association for those who challenge the dominant wisdom of trickle-down economics, thus supporting the worldview and, ultimately, the interests of the winners of post-1990 transition. (...) Zombie socialism arguments have become a

convenient and strategic ideological device for furthering social dumping, increasing inequalities, and reducing support for redistributive policies" (Chelcea and Druţă 2016: 522, 537).

The hierarchy of values promoted by neoliberals is clearly visible even in the title of economic books. There is a clear contrast between two books by Leszek Balcerowicz (one of the architects of shock therapy in Poland): "Freedom and development. Economics of free market" (1995) and "Freedom, development, democracy" (2017) and, on the other hand, "Development as freedom" by Amartya Sen (1999) – a Nobel prize winner in economics from India. For A. Sen the poor lack many kinds or forms of freedom, which are perceived as obvious for the rich. "Development is something more than economic progress measured by the quantity of goods produced. (...) It is a social development: i.e. the increase of the number of people experiencing freedom springing from gaining the abilities indispensable to reach adequate standard of living" (Kishtainy 2017: 226). The idea of freedom was so powerful that Democratic Union (a party comprising many former top Solidarity activists) after its merger with KLD (Liberal-Democratic Congress) (comprising economic liberals, especially from Gdańsk) formed a new party Freedom Union with Tadeusz Mazowiecki as a leader and Donald Tusk as a vice-leader.

Every ideology creates its specific language. Some words are created, other gradually disappear. There is, however, another possibility that some concepts are not properly or even not at all defined. Curious at is may seem, it is the case of "neo-liberalism". This entry cannot be found in a number of economic dictionaries such as: (Black 2002), (Bannock, Baxter, Davis 1992). Even sizeable "The New Palgrave Dictionary of Economics" did not include its proper and separate entry. Here, under the entry "Latin American Economic Development" the Washington Consensus is treated as synonymous with 'neo-liberalism'. Certainly, Washington Consensus and neo-liberalism cannot be limited to Latin America as they were very much present in Poland and many other CEE countries.

Paradoxically, for most right wing conservatives and a group of younger left wing activists (with no communist background, sometimes referred to as a new left) it is clear that Poland undertook a neoliberal transformation. The bulk of mainstream, technocratic policymakers and the proponents of the shock therapy would not share this view. They would often use the formula: "there is no definition of neoliberalism" ergo neoliberalism does not exist and they cannot be dubbed neoliberals. Senior mainstream technocratic economists and policymakers prefer to be called free market economists/advocates or liberals.

Philip Mirowski (2013: 37) is well aware of this phenomenon: "most people whom outsiders would identify as neoliberals would reject the label outright, and indeed, deny the position exists as a coherent doctrine. For them, it is just another swearword bandied about by their opponents, rather like "fascism" or "equality." Some go further, adopting the nominalist position that if "we refuse to call ourselves neoliberal, then no one else has the right to do so, either." Daniel S. Jones (2012: 7) notes that "the people associated with the doctrine *did* call themselves "neo-liberals" for a brief period lasting from the 1930s to the early 1950s, but then abruptly stopped the practice." It was a very clever decision as it is rather difficult (if not stupid) to criticize something that does not exist. Similarly, it is very problematic, if not groundless, to criticise something that is coined "natural" such as the term "natural rate of unemployment" or "natural rate of interest". Neoliberalism would act as an invisible veil or matrix which tightly structures lives of individual humans and capitalist societies.

Vague definition of neoliberalism and its modest understanding by the public (at least in Poland) does not mean that it is a term with positive connotations. In some spheres of the society disillusioned by transformation (consisting of many former "Solidarity" activists) neoliberalism is evidently connected with painful shock therapy and crony turbo capitalism. It is worth noting that famous postulates of "Solidarity" included various social demands.

However, in the first half of the 1980s some people in communist Poland started their fascination with liberalism and neoliberalism. Some intellectuals such as Janusz Lewandowski and Jan Szomburg studied works by Friedrich August von Hayek, Raymond Aron, Ludwig von Mises and Walter Lippmann already in the 1970s. Particularly, the liberals from Gdańsk gained importance and formed the so-called Gdańsk liberal school. In spring 1983 they set up and started publishing in

underground liberal paper "Przegląd Polityczny". As noted by libertarian economist Witold Kwaśnicki in the foreword to the book by the eminent figure of Gdańsk liberal school – Janusz Lewandowski (2013b: 7) the paper reprinted many works by Popper, Friedrich August von Hayek, Milton Friedman, Raymond Aron and Walter Lippmann. Kwaśnicki also adds that liberals from Gdańsk distanced themselves from Solidarity. They did not distinguish Solidarity as a trade union, they would rather treat it as a civic movement which aimed to change communist status quo (Lewandowski 2013b: 8). Liberals such as Donald Tusk and Jan Krzysztof Bielecki sticked with Wałęsa and less with Solidarity (Zaremba 2010: 43). Therefore, active support of this pro-democratic trade union by liberals from Gdańsk seems to be rather instrumental.

As noted by Janusz Lewandowski (2013a: 64) "the University of Gdańsk, then a newcomer among Polish universities, was probably not too prolific scientifically, but it proved to be remarkably fertile in terms of educating various personalities who back then did not know they were carrying a mace in their rucksacks, but subsequently had a major impact on the fate of the reborn Polish statehood." Indeed, a number of liberal and free market oriented politicians made great political career. Both Jan Krzysztof Bielecki and Donald Tusk became Prime Ministers, Janusz Lewandowski was a minister dealing with privatisation.

In 1991 Tusk noted in the foreword to the book by Lewandowski: "Five years ago fascination with neoliberalism, free market and individualism seemed exotic and slightly pretentious for many of our friends. Today the canon of liberal virtues in many circles became obligatory, even self-evident" (Lewandowski 2013b: 16). In light of the above, one has to agree with Hall and Elliott (1999: 306) who claim that "the intellectual antecedents of shock therapy include neo-liberal thinkers such as James Buchanan, Milton Friedman, and Friedrich Hayek".

Balcerowicz views changed since he gave lectures to Solidarity in 1981. His views evolved in strong liberal direction so that in 1985 they were very close to that expressed by Stanisław Gomułka (Gomułka 2016: 76). Already in the mid 1980s Balcerowicz was well acquainted with Anglo-Saxon liberal or rather neoliberal version of capitalism when he conducted seminars at leading Polish university of economics – SGPiS in Warsaw (currently called SGH). Both Balcerowicz and Gomułka expressed negative opinion on the book "Economics of Shortage" by Janos Kornai and Kornai's stance on soft budget constraint (Gomułka 2016: 76). A couple of years later Balcerowicz's career gained enormous momentum as he became one of the architects of the shock therapy, the Deputy Prime Minister of Poland and Minister of Finance (September 1989 – December 1991 and October 1997 – June 2000) and President of the National Bank of Poland (January 2001 - January 2007).

The careers of both Leszek Balcerowicz and Jeffrey Sachs developed very fast. Balcerowicz, holding a PhD degree and having participated in several stipends, at the age of 34 became Deputy Chairman of the Polish Economic Society (1981-1982), while Sachs in 1983 at the age of 28 became a tenured professor at Harvard. Both economists were ardent proponents of neoliberalism. Jeffrey Sachs got acquainted with the works of the leading members of the Mont Perelin Society – Friedman, Hayek, and Von Mises (Wilson 2014: 306) when he "was placed under the tutelage of Abram Bergson, a neoclassical economist and an expert on the Soviet economy" (Ofer 2005). Bergson was not a doctrinaire neoliberal, yet he "considered his work on Russia to be a confirmation of Hayekian theory" (Wilson 2014: 317) (Ofer 2005). In 1985, a 30 year old Sachs assisted in the managing hyperinflation in Bolivia.

Four years later Sachs became the economic advisor to Solidarity. Interestingly, as prices in Poland were rising fast J. Sachs was invited by the Polish embassy in Washington to provide advisory assistance (Ancyparowicz :253). According to Kowalik (2012: 47) "in early 1989, most probably during the Round Table negotiations, a messenger of the Polish embassy in Washington, Krzysztof Krowacki, was sent to Sachs. He suggested a visit to Poland to discuss the problems of reforms." Therefore, the communist government was looking for the Western expert in fighting hyperinflation when inflation rate in Poland still remained well below hyperinflation threshold. Initially, Sachs declined the invitation and started visiting Warsaw usually with David Lipton when "the Round Table Agreements foretold the legalization of Solidarity" (Kowalik 2012 :47). "These visits were paid for by the American billionaire George Soros" (Kowalik 2012 :47).

Already on August 24 1989 appeared a text in influential opposition newspaper "Gazeta Wyborcza" with a photo of Jeffrey Sachs which informed that "after the Big Bang price changes will stabilize within several months, shortages on the market will be eliminated, real incomes of factory workers will be protected and carefully prepared program does not have to lead to the fall in the standard of living" (Kieżun 2013: 213). It seems that leaders of both democratic opposition and communist party in Poland sought neoliberal solution to economic woes and hyperinflation. This clearly resembles the situation in Bolivia where both Banzer and Estenssoro turned out to be the advocates of the neoliberal shock therapy. Both in Bolivia and Poland the hyperinflation episode proved instrumental to undertake decisive and broad change of economic system without serious revamping of the political scene. In both countries the implementation of drastic program was preceded by the behind the curtain negotiations and was actually conducted by the pro-democratic side of the political scene. In a sense, Bolivia and Poland experienced passive revolution.

Passive Revolution

Partly democratic Parliamentarian elections in Poland (also dubbed contract elections) that took place in June 1989 are a sign of the aforementioned "passive revolution". The coalition government (with Tadeusz Mazowiecki from "Solidarity" as a Prime Minister) that was formed on September 12 1989 comprised 12 ministers from civic opposition ("Solidarity"), 5 from the Polish Communist Party (PZPR) and 7 from communist satellite parties (ZSL – a peasant party and SD).

Already on 3 July 1989 Adam Michnik an influential "Solidarity" activist and chief editor of leading pro-democratic newspaper "Gazeta Wyborcza" expressed a proposal to Communists: "your president and our prime minister". Shortly after this declaration on July 19 1989 communist leader general Wojciech Jaruzelski was elected president of the Peoples Republic of Poland by both chambers of Parliament. It was a victory by a very slim margin (two votes) and would not be possible without direct support of some pro-democratic parliamentarians. He was the only candidate for this post.

Poland, once a leader of democratic transformation, was overtaken by several post communist countries such as: Hungary (free parliamentarian elections took place in March 1990), Czechoslovakia (Vaclav Havel became the President already in December 1989), Bulgaria (totally free and democratic parliamentarian elections were conducted in June 1990) (Dudek 2016: 67), while the fate of the Romanian dictator was tragic. To put it into perspective, in Poland free presidential election took place in December 1990, while first totally free parliamentarian election was conducted as late as October 1991.

Accidental course of transformation in Poland and neighbouring countries could be the consequence of this cautious politics (Korzycki 2018: A26). The victory of post-communist SLD in parliamentarian elections in 1993 and subsequent triumphs of Aleksander Kwaśniewski in presidential elections in 1995 and 2000 was a sign that post-communist social group could not be marginalized (Matyja 2018: 99). It is worth stressing "the far-sightedness of communists in USSR and Poland who with great imagination dealt with programming changes that would safeguard their safety during the process of radical systemic reforms at the turn of the 1980s and 1990s" (Zenderowski, Rudowski 2018: 21).

This "revolution without revolution" in Poland, however, describes only the situation in the political elite sphere. First, fully democratically elected government in Poland was formed in December 1991 by Jan Olszewski (anti communist Solidarity dissident and lawyer). This right wing government preferred gradualist economic transformation. It dismissed shock therapy and reduced the speed of privatisation. On the other hand, it wanted to intensify (what turned out to be politically premature) the process of de-communisation. Therefore, Olszewski's government proved short lived and was toppled six months after its formation on June 4 1992 by a broad coalition of parties including free-market liberals, peasant party (PSL), post-communists and the President of Poland Lech Wałęsa.

Some commentators claim that the contract with communists elite enabled peaceful and bloodless turnaround. It is worth stressing that the Soviet Union collapsed on December 25 1991 and first unit

of Soviet troops started leaving Poland on April 10 1991 while the last Russian soldiers left the country on 18 September 1993.

In the light of the above, one may question that Poland's early transformation experience complies with the following diagnosis put forward by Bernard Chavance: "The first step in dismantling socialism can be either the introduction of democracy - as in Eastern Europe or the attenuation of economic control by the state as in China". For over two years the shock therapy in Poland was conducted by governments formed by contract (not-fully democratically elected) Parliament. The changes in the social and economic domain were definitely more robust and, in some cases, even revolutionary in comparison with cautious and gradual political shift.

It is highly surprising how Solidarity - the 10 million people strong social-democratic movement - so quickly and systematically turned into marginalized extension of right wing (i.e. not communist) parties. Kowalik (2009: 192) identifies four main causes of this decline: the martial law, the exodus of most active Solidarity leaders and its advisors to the top government positions, the opinion expressed by Lech Wałęsa that strong trade union is an obstacle to reforms and, finally, ideological and political invasion of Reaganomics and Thatcherism. It seems that also substantial emigration of well educated pro-democratic activists in the 1980s (after the martial law) allowed relatively smooth and fast installation of neoliberal system.

Solidarity charm and popularity markedly diminished as it acted as a “political umbrella” or “protective umbrella” against public anger during the implementation of drastic free market reforms. This ungrateful role was intelligently allotted to Solidarity by Communists in 1989. In consequence, “the union’s efforts to expand its ranks were proving abortive even in the private sector. With a reported membership of only around 1.6 million by 1993, including many workers who were no longer active as well as elderly employees who had been kept on the rolls after retirement, Solidarity was just a shadow of its former self” (Kramer 1995: 95) (Rzeczpospolita 1993: 1). Similar function was fulfilled by Solidarity (or rather its Parliamentarian offshoot - AWS) in late 1990s when L. Balcerowicz was again the Deputy Prime Minister and the Minister of Finance.

According to Kowalik (2009: 193) "Wałęsa supported anti-trade union and anti-labour Balcerowicz program without even knowing its contents (...) and in December 1989 proposed to equip the government in very vast prerogatives (...) what meant a complete retreat of the trade union to the benefit of authoritarian rule". This behaviour of the iconic leader of Solidarity and the Peace Nobel Prize winner seems puzzling, just as the accusations of his improper relations with the Communists in the 1970s (Economist 2016).

Terms such as ‘passive revolution’ and a ‘revolution without a revolution’ (Adamson 1980: 186) evoked by Shields (2012: 80) perfectly fit into Poland’s transformation.

According to Gramsci „accumulation strategies remain elite-engineered, failing to garner or form hegemonic consensus from wider society” (Shields 2012: 80).

“Poland’s revolution, passive or otherwise, has sought to co-opt and assimilate post-communist elites into a broader neoliberal historical bloc sharing the assumptions and class interests of dominant fractions of capital in the global political economy, to the detriment of those who struggled most to establish freedom and democracy” (Shields 2012: 80). Paradoxically, Gdańsk turned out to be the cradle of both massive, social, democratic, patriotic and bottom-up labour movement and, on the other hand, the transplant of individualistic and elitist neoliberal school of thought into Poland, i.e. Gdańsk liberals.

The question remains whether there was a choice to conduct more gradualist and balanced transformation. For example, Tadeusz Kowalik opted for Swedish model. According to Krzysztof Jasiecki (2018: 10) it was problematic how to practically undertake this third road in the initial condition - if we conduct neoliberal model 50% of our debt would be cancelled, if we do not do it, it will not happen (...) Alternative, left wing propositions did exist, but they lacked capital and institutional support." Consultation group (Polish government advisory body) prepared 700 page

report which analysed the possibilities of making use of Swedish experience (the result of a study trip to Stockholm at the turn of January and February 1989). Kowalik (2009: 110) is not sure whether the report was available to the participants of Round Table talks as it was published as late as June 1989.

In a sense the shock therapy may also refer to the idea of creative destruction by Joseph A. Schumpeter. Witold Kieżun (2013: 210) agrees with Waldemar Kuczyński (1992) that George Soros treated Polish economic transformation as an experiment before the more challenging reform in the Soviet Union. This ambition of G. Soros could explain the pressure to conduct the Polish experiment fast (Kieżun, 2013). It needs to be stressed that Kuczyński was the chief advisor to the Prime Minister Tadeusz Mazowiecki.

Bałtowski and Miszewski (2006: 192) acknowledge that already at the beginning of 1990 in the socio-economic publications appeared critical views on the way the stabilization program was prepared and conducted. It was stressed that the restrictiveness of the program and, in consequence, the scale of economic depression in 1990-1991 was excessive. Both conceptual mistakes and mistakes made during the implementation of the stabilization program were pointed out. Bałtowski and Miszewski (2006: 192) enumerate critical voices from left-wing (P. Bożyk, J. Kaleta, R. Bugaj) and ring-wings economists (S. Kurowski and R. Krawczyk), and also a few Polish economists working at West European and US universities (K. Łaski, K. Z. Poznański).

Of course, the list of the critics of the shock therapy should be extended by other well known Polish economists: Grzegorz Kołodko – former minister of finance in the government formed by post-communists and peasant party), Tadeusz Kowalik – one of the advisors to workers on strike in Gdańsk Shipyard in 1980 and the founder of socially oriented party Unia Pracy (Labour Union) in 1992 and Witold Kieżun – the member of International Academy of Management in the USA, former director of UN projects in Africa and brave participant in the Warsaw Uprising in 1944). Kowalik (1995) stance on the transformation was very harsh:"The most massive labour movement conducted the turnaround from which emerged one of the most unjust social system in the post-war Europe."

It is worth noting that the design of shock therapy was also criticized by right wing (conservative) parties. For example, on 10 June 1991 Christian-democratic and later more conservative party "Porozumienie Centrum" (PC) (with Jarosław Kaczyński as a leader) harshly criticized politics of Leszek Balcerowicz and suggested his resignation (Roszkowski 1992: 422). In 1991, according to Jan K. Bielecki (the Prime Minister at that time), Kaczyński perceived three ministers (that dealt with financial, rural and informational politics) as inadequate and suggested their resignation (Gomułka 2016: 236-237). Balcerowicz, however, stayed in office and continued his politics as the minister of finance, despite general strike that broke out in May 1991. Also, conservative politician Adam Glapiński (the vice-lider of PC in 1990-1993) together with Sławomir Dąbrowski numerously criticized the neoliberal course of Polish transformation already in the first half of the 1990s (Glapiński, Dąbrowski 2000). In June 2016, A. Glapiński was appointed by the Sejm of the Republic of Poland as President of NBP (the central bank in Poland).

In the light of the above the first part of another powerful diagnosis expressed by Kowalik (2009A: 193) is not precise: "starting with the victory in the election on June 4 1989 a right wing turnaround took place, in consequence of which emerged one of the most unjust socio-economic systems in Europe in the second half of XX century."

Liberal and socialistic way of thinking, a least in theory, means that one thinks of perfection and social ideal. Conservatives are more down to earth and state: "it s better to take shorter steps, and do not think of any revolution" (Glapiński 2016:123-124)."

Interestingly, accoding to Bałtowski and Miszewski (2006: 192) "there were few leading Polish economists among the defendants of the method and way chosen by L. Balcerowicz. The list, among others, includes: S. Gomułka, A. Lipowski, W. Wilczyński, J. Winiecki and to some extent C. Józefiak". The most influential among them is probably Stanisław Gomułka who was a lecturer at LSE in 1970-2005 and one of the top economic advisors to L. Balcerowicz at the turn of the 1980s

and 1990s. Already in mid 1980s Gomułka and Balcerowicz knew each other and exchanged visits in their hometowns in London and Warsaw (Gomułka 2016).

With the triumph of the Washington Consensus and the new neoclassical synthesis, the dominance of neoliberal perspective was overwhelming. Parties with different socio-economic perspectives lacked funds and broader access to mass media. In the absence of serious debate on socio-economic issues (such as income inequality and unemployment) the public disputes revolved around biopolitics and issues that do not require much social spending from the central government. "On the basis of extensive literature, it could be stated that neoliberalism is an ideology which was purchased and paid by big capital, big business and financial markets" (Oręziak 2016: 352).

Growing unemployment greatly increased the competition between workers. Mounting tension led to predatory behaviour. The have-nots and unemployed were treated with contempt and often unfairly stigmatized. The idea of freedom even in its narrow sense (the equality of opportunity) turned out to be an empty phrase.

Summary

The so-called big bang or shock therapy was engineered to rapidly impose neoliberal economic system in Poland. More cautious methods of transformation lacked support from influential circles and were rejected. Collectivism and social security was replaced by hyper individualism and a dog-eat-dog world. Poland with its vast and relatively well-educated labour force was hit hard by consecutive neoliberal reforms.

Economic policy was especially focused on fighting inflation and paid little attention to unemployment. This is a typical bias in neoliberal systems both in developed and developing countries. The hyperinflation that started in the second half of 1989 was prompted by liberalization (i.e. hikes of regulated and administered prices). At least some of them were unnecessarily high. Inflation was partly driven by excess demand. In 1989 it was led by food price deregulation and generous indexation (engineered by policymakers).

Therefore, hyperinflation was intentionally created to reduce the excess amount of money (excess demand and supposedly excess savings) in the socialist economy stricken by shortages of consumer goods and even food products. Sudden outburst of hyperinflation necessitated the implementation of fast and irreversible economic transformation (shock therapy).

The changes in the political sphere were far from revolutionary. This passive revolution was bloodless but, on the other hand, cemented the neoliberal orthodoxy in the coming decades.

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Fit or Stretch – Organisational Adaptation Strategies In the Time Of COVID-19 Pandemics

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Abstract

COVID-19 pandemic is redefining the economic reality. Disruption resulting from the global lockdown led to a reevaluation of business models and business routines. There are two main adaptation strategies that organisations take on to respond to the environmental change. Strategic fit in which a company seeks a match between opportunities and resources and strategic stretch when a company follows their aspiration (strategic intent) despite insufficient resources and/ or opportunities. The gap is closed through innovation and leverage. The main goal of this paper is to examine theory and examples of strategic fit and strategic stretch as a way of adaptation to the pandemic reality. Examples of organisations such as Red Noses International, Decathlon, Ford, Tesla Motors or schools and Universities are used to illustrate strategic stretch. GAP, Zoom, Teams, Uber Eats, Veclaim and PKN Orlen are illustrating strategic fit.

Keywords: Strategic Fit, Strategic Stretch, Exploration, Exploitation, COVID-19

Introduction

The COVID-19 pandemic is going to redefine our lives both in social and in economic terms. Disruption resulting from the global lockdown has led to a redefinition of business models and business routines, with more changes yet to come. There is no more "business as usual" – purchasing patterns and consumer behaviour are changing (Jones, 2020), past distribution channels are becoming irrelevant with significant growth in e-commerce (Columbus, 2020) and supply chains are restructuring to deal with the international lockdown (Barua, 2020; Fernandes, 2020). The pandemic has affected all major economies (Baldwin, di Munro, 2020) and the outbreak spread is likely to lead to a global recession (Fornaro, Wolf, 2020).

Such a dramatic shift in business environment is rarely precedented. Lockdown has led to a stall in consumption and some industries, such as transport, tourism or culture experienced an overnight plummet of transactions. The change was not only sudden, but also long-lasting. It created conditions in which spontaneous business adaptation under extreme environmental distress can be observed and researched.

There are two main adaptation strategies that companies take on to respond to the environmental change. *Strategic fit* is a strategy in which a company seeks coherence between the environmental conditions and the organisational skills and assets. Matching resources with opportunities is the main underlying logic of strategic fit. *Strategic stretch* happens when a company follows the ambitious strategic intent disregarding the lack of resources and/ or opportunities, hence having to innovate or leverage the discrepancies (Hamel, Prahlad, 1993).

In the time of COVID-19 pandemic businesses and non-profit organisations have been confronted with the environmental distress and in order to survive in the new reality – had to undertake one of the two adaptation strategies. **The main goal of this manuscript is to examine theory and examples of strategic fit and strategic stretch as a way of adaptation to the pandemic reality**. The main research question is how organisations manage change and what kind of *fit* or *stretch* solutions are present and effective.

In the first section of the paper we present an overview of the strategic fit and strategic stretch theory and juxtapose it with exploration vs. exploitation theory in search for synthesis. In the following section we present two bigger and a few smaller cases – exemplifying strategic stretch and strategic fit as a way adaptation to the COVID-19 pandemic and then conclude with the final remarks.

Theoretical background – strategic fit vs. stretch, exploitation vs. exploration

The main assumption underlying the concept of fit and stretch is that strategic choices result from the interplay of 3 components (Hamel, Prahlad, 1993): resources, opportunities and aspirations (strategic intent). Resources refer to the company's internal environment – assets, capabilities, competences or strengths. Opportunities refer to the external environment and could be described as trends and factors with potentially positive impact on the organisation. In strategic fit a company seeks such an allocation of recourses that matches the observed opportunities. This leads to a fit and coherence between the external needs and the company's internal potential. However, in search for strategic fit between resources and opportunities the aspirations may suffer. The ambitions may need to be trimmed to match what the market is ready for and already needs. Hence, strategic fit is a conservative and realistic approach, which limits the risk. It is characteristic to positioning school of strategy (Porter, 1985). The adaptation happens through market analysis, searching for the niches and responding with the company's current resources.

The alternative approach is strategic stretch (Hamel, Prahlad, 1993). Stretch happens when there is a misfit between the company's resources and its aspirations (strategic intent) or between the opportunities and the strategic intent. Stretch is a result of a gap between the ambitious intent, a great vision and the scarcity of resources or lack of market readiness. It's experienced as tension and since, it drives motivation. A combination of a vision with the scarcity of resources requires innovation and leverage. Stretch strategy encourages introduction of new business models and changing the rules of the market game. A company lacking resources appeals to resourcefulness instead. This type of adaptation strategy is considered idealistic, even impossible and risky. Rather than looking for a fit between resources and opportunities, strategic stretch directs a company towards exceeding its limitations in order to realise the ambitious strategic intent. A good example of strategic fit is McDonald's re-branding its restaurants to respond to the healthy lifestyle and ecological interests trend among its potential customers. On the other hand, SpaceX is using strategic stretch while following the intent to move humanity to Mars, despite the gap between the available resources, opportunities and aspirations. In the further part of the paper examples of strategic fit and strategic stretch in the time of COVID-19 pandemic will be considered.

Strategic fit and strategic stretch could also be explained with the reference to exploitation-exploration theory of learning (March, 1991). Exploitation – similar to strategic fit, is founded on such priorities as: refinement, efficiency, quality improvement and implementation. In exploitation the competitive advantage is sought through efficient improvement and refinement of the current activities and products. Exploration, on the other hand, is similar to strategic stretch and captures terms such as: variation, risk taking, experimentation, flexibility, discovery and innovation (March, 1991). Competitive advantage comes from the ability to boldly innovate in new areas.

In strategic fit/ exploitation, a company adapts through existing skills and technologies, further meeting the needs of the current customers (Harry & Schroeder, 2000) and penetrating the customer base (He, Wong, 2004). Processes, including market analysis and decision making, are usually formalised and there is a top-down knowledge flow (Benner & Tushman, 2003; Jansen et al., 2006; Mom, Van den Bosch, & Volberda, 2007; Zollo & Winter, 2002). Strategic fit is about commitment to quality improvement, product positioning and fine-tuning in the way, that responds to the market opportunities and customers' expectations (He, Wong, 2004). The prevailing mental model is narrowing the attention and concentration on finding the fit (Laureiro-Martínez, Brusoni, & Zollo, 2010).

In strategic stretch/ exploration however, the company proactively responds to the environmental changes by seeking revolutionary innovations (Harry & Schroeder, 2000). Innovation is often driven

bottom-up, and senior managers are persuaded to abandon their old routines and make a commitment to a new course of action (Wooldridge &Floyd, 1989). Decentralisation enhances creativity (Cardinal, 2001; Jansen et al., 2006). This approach is based on the resources stretch, so it requires development of new skills. Strategic stretch is about exploration of new technologies and new markets, about novel ideas "outside the box" and creative ways to satisfy customers' needs and actively addressing new customer groups (He, Wong, 2004). The prevailing mental model is broadening attention in search for alternatives and creative solutions (Laureiro-Martínez, Brusoni, & Zollo, 2010).

Strategic fit and stretch under COVID-19 – method and cases

COVID-19 outbreak turned out to be the environmental disruption for most businesses. Many had to close down or drastically reduce operations. However, other started adaptation processes to secure business' survival. Among the observable approaches there are examples of both fit and stretch strategies. In strategic fit – the companies are looking for a match between their existing resources and the opportunities resulting from COVID-19 socio-economic situation. In strategic stretch, however, there is a gap between the organizational skills and assets and their vision. The companies are looking for innovation in order to leverage lack of resources or destroyed opportunities and follow their strategic intent. This happens through innovation, new business models or redefining the markets.

In this part of the manuscript we are giving an overview of two main case studies from Polish context – one of strategic stretch and one of strategic fit in the times of the pandemic. The case studies are complemented with a few smaller examples. This is work in progress – the first stage of the research project which will include qualitative analysis of multiple case studies, aimed at understanding organisational behaviour in the time of environmental disruption. The goal of the whole research project will be to understand individual and organizational antecedents of strategic decisions and explore how strategic fit and strategic stretch processes are managed. This paper however presents concise examples of how companies managed the three strategic components: resources, opportunities and aspirations, in their adaptation to change resulting from the COVID-19 outbreak. The descriptions are based on secondary resources, companies' publications and personal interviews.

Strategic Stretch

Red Noses Clowndoctors International (www.rednoses.eu) – the case of the Polish division (Czerwone Noski Klown w Szpitalu). Red Noses was founded in 1994 in Austria as a non-profit artistic organisation, bringing humour and laughter to people in need of joy. Today, Red Noses Clowndoctors is one of the largest clown doctor groups in the world with almost 400 clowns in partner organisations in 10 countries. In Poland the organisation is present since 2012 and their main beneficiaries are sick children undergoing hospital treatment. Red Noses are present in children wards in 4 major cities in Poland where they perform regular visits. COVID-19 outbreak brought a sudden stop to the Red Noses operations. All the hospital wards were locked down due to epidemiological concerns. Also, all the patients who didn't require life-saving treatment were released home. In these circumstances the functioning became impossible. However, Red Noses employees brainstormed and developed innovative ways of adaptation through leveraging their resources and addressing new beneficiary groups. The adaptation strategy included two directions: (1) changing the medium of contact from direct visits to online and indirect visits with patients, (2) exploring new groups of beneficiaries, unavailable within the "old" model of functioning. In the first weeks of the pandemic lockdown the organisation developed a program of videoconferencing visits, sketches and films supporting children in hospitals. This adaptation led to the biggest innovation. Videoconferencing clown visits opened new possibilities with regards to the target beneficiary groups. Red Noses started developing a new network of contacts with geographically dispersed foster home families in which they are supporting children in distress. This was only possible due to the leveraged resources and newly developed remote contact possibilities. Red Noses adaptation in Poland is an example of strategic stretch.

Other examples of strategic stretch in the times of the pandemic include engineers at Italian ***ISSINOVA*** teaming up with ***Decathlon*** to convert full-face snorkeling masks into medical emergency ventilator

masks through 3D printed valve adaptation. Also, ***Ford*** and ***General Motors***, as well as ***Tesla Motors*** or ***Volkswagen*** initiating cooperative ventures with medical device producers to start ventilators and respirators production. ***Schools*** and ***Universities*** in the lockdown, moving all their teaching activities online, without much previous preparation, technical equipment and tools, trying to leverage lack of resources and lack of readiness of their students with innovativeness and fast learning – is another example of stretch strategy.

Strategic fit

Matching resources with the unveiling opportunities is the main logic of strategic fit. This is a common adaptation strategy in the time of COVID-19. The first example of strategic fit is ***PKN Orlen*** (www.orlen.pl) – a state owned major Polish oil refiner and petrol retailer. At the outbreak of the epidemic in Poland there was an overwhelming shortage of personal protection materials. The company decided to change their production lines in one of the factories from windscreen washer, grease and coolant to disinfecting sanitiser. The adaptation of the machines and preparation of the workers took only 10 days. The biggest challenge was the acquiring of the certificates and permissions for biocidal product development. Soon the factory established 24/7 production, stabilising at 1.2 mln liters a week. PKN Orlen used their existing resources (machine lines, workers' skills) to respond to the environmental needs and opportunities as a way of adaptation.

Strategic fit can be observed when companies use their existing resources to respond to the changing customer needs due to the pandemic. One of the examples are online communication companies such as ***Zoom*** or ***Microsoft*** (Teams) expanding their server base and targeting free versions of their products to education, in the same time expanding their future customer groups. ***Grocery shops*** developing home delivery services or ***Uber Eats*** offering no contact drop off are another good example. Clothing companies such as ***GAP*** starting the production of face masks, which are turning into a fashion item is also an example of strategic fit. Mass scale lockdown gave an inspiration to clothes producers – for example ***Veclaim***, elegant garment company announced their new line of casuals to be comfortably worn at home.

Conclusions

The time of the pandemic is changing our lives. A new order will appear as a result of this distressing period both for societies, businesses and non-profit organisations. Disruption of this magnitude is enforcing major redefinitions of how all of them function. Industry standards, customer needs, people's lifestyles are changing so organisations are trying to adapt to the new emerging normal.

Many organisations will not survive the change, but the ones that will – are likely to use one of the two adaptation strategies: strategic fit or strategic stretch. Strategic fit, with the logic of matching resources with the new opportunities, seems like a more easily available strategy. It is a strategy of incremental adaptation in which existing resources are used to match the new opportunities. All the organisations that are adjusting new distribution channels (online) or following the needs of a lockdown population through exploitation of the existing resources – are a good example of fit.

Some organisations though will also use a more demanding approach of strategic stretch. In this case the lack of resources or market opportunities is leveraged through innovation and bold, risky and creative actions. The driving force here is an aspiration, ambitious strategic intent. Companies that overcome their limitation through innovation and exploration of new products and markets are likely to rewrite the rules of the new game.

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The Evolution of the Publishing Industry – the Impact of Vanity Publishing

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Abstract

Publishing industry has a long history, and its impact on human history is unprecedented. It has a reputation of a stable and conservative industry. Recently, however, since the birth of the Internet and the digital economy, the publishing industry has become vulnerable to considerable fluctuations. Moreover, other phenomena take place, changing the shape for the whole industry. The purpose of the paper is to present the emergence of the new phenomenon in the studied industry – vanity publishing and present its economic significance. A vanity publisher is a company which would publish any book in exchange for a payment from the author, and the procedure usually employs little or no selection. The author of this paper will attempt to study this phenomenon for various stakeholders: vanity presses (a company offering vanity publishing), authors of vanity publications, readers, commercial (traditional) publishers and other authors (mainly from the same literary genre). The primary method of analysis in this paper is a case study; the author supplemented it with direct interviews with experts to assess problems emerging from the vanity publishing for various groups of industry's stakeholders. The main finding is that vanity publishing, becoming an increasingly popular phenomenon, leads to the emergence of a new market within the publishing industry. Such a process, in turn, changes the competitive constraints upon commercial publishers and might lead to some unexpected outcomes for readers. Vanity publishing shifts significantly the balance of power within the publishing industry, which leads to noteworthy changes for all stakeholders.

Keywords: Publishing, Opportunism, Vanity, Competitive Constraint, Book

Introduction

The publishing industry has a long history. Its origins can be traced back to Gutenberg's invention of the movable (interchangeable) type around 1440. Over the second half of the 15th century, around 8 million books were published thanks to this invention, probably more than the scribes in Europe had managed to rewrite since Constantinople was founded in 330 (Clapham, 1957, p. 377). Although the above statement is challenging to be substantiated, and its author does not support it with evidence, E. L. Eisenstein cites the example of the printing a translation of Plato's "Dialogues" in 1483 by the Ripoli Press. While the submission and publication cost three times more than hiring a scribe for this work, the printer printed 1025 copies, and the scribe delivered one at the same time (Eisenstein, 1979, pp. 45–46).

Apart from its long history, the publishing industry is characterised by conservatism. It happens primarily because of the specificity of the process and the fact that the whole procedure of publishing a book has not changed significantly since the Renaissance. This process involves several activities in which various actors may be required, intending to provide the reader with a publication. It consists of creation (a creative process of writing a manuscript), acquisition (buying the rights to publish by a publisher), editing (refining and improving a work), production (proofreading, designing and typesetting), printing (or preparing for digital publication), advertising and distribution.

Moreover, the publishing industry in the 21st century is undergoing several significant changes related to economic, social, and cultural developments. Firstly, computerisation, digitisation, and the emergence of new media and equipment (computers, game consoles and mobile devices) have forced the publishing industry to adapt to new substitutes, among others. Secondly, the development of the

Internet posed both a threat and an opportunity for the industry. On the one hand, it can be treated in a broad sense as a substitute as well as the mean of the distribution of substitutes. On the other hand, it can be a new distribution channel or platform for the development of innovation. Thirdly, the places where readers buy books are changing. The Internet distribution mentioned above has appeared, but books are also distributed in supermarkets, press kiosks, as supplements to magazines or in huge chain bookstores. Fourthly, many new and innovative substitutes have emerged. In a broad sense, any activity aimed at spending free time, including cinema, television, radio, streaming services, video and mobile games, or even sports or watching them, can be identified as a substitute. In a narrow sense, a printed book could be substituted by its electronic or audio version (audiobook). However, since the content of all three goods is the same, it must be assumed that they are simply various forms of the same product distributed differently from an author to a reader.

It all means that the publishing industry might be caught up, entangled in innovations in other areas: software and hardware related but also related to the situation of other leisure industries. Such phenomena are well explored, and studies of such changes are well-grounded in various disciplines.

Within this broadly described environment, a relatively new phenomenon emerges. Vanity publishing is a process which is performed by a vanity publisher (or vanity press), a company which publishes books in exchange for payments from authors of publications. In the traditional process of publishing, manuscripts undergo rigorous selection, the process which is generally absent in the vanity publishing (Strauss, 2019).

There is no effortless way to estimate the scale of vanity publishing in comparison with the publishing industry. However, to make the reader aware of the extent of this phenomenon, it can be pointed out that one of the publishing houses offering "co-financing" in Poland publishes about 170 new books each year in this model, and additionally 30, which are financed only by the publishing house (Tenderenda-Ożóg and Waszczyk, 2017). Vanity publishing seems to have become an increasingly popular phenomenon all over the world. To further substantiate the widespreadness of vanity publishing, one can find a plethora of guides for debuting authors circulated in various media (newspapers, Internet), which warn against this model of publishing. Moreover, librarians are also voicing their strong concerns against vanity publishing, as they struggle to keep consistency and integrity in their collections (Laquintano, 2013).

Scientists from various discipline supply scarce analysis of vanity publishing. The author of this publication is not familiar with any scientific article referring to this subject and analysing it within economic sciences. The purpose of the paper can be summarised in three goals which form the logical sequence of research:

- to present vanity publishing and show its place within the publishing industry,
- to describe the plausible outcome for various groups of stakeholders,
- to show the consequences of this phenomenon in markets, industries, and the economy.

Modern Publishing Process

As it was said above, the publishing procedure can be divided into several subprocesses. The root of the publishing lies in the creative process performed by the author, who invents and realises the concept of a publication, creating the manuscript. Later comes commercialisation, it is the stage, where publishers purchase the right to publish the work of an author. It might seem inconsequential; however, publishing houses employ strict procedures of selection to ensure the quality and therefor sellability of the book – very few submitted manuscripts get published. When the publisher acquires the script, the editing starts. The most important task on this stage includes refining and improving the publication, in the process of making it more legible and potentially interesting for readers. Then comes production, which consists of proofreading, designing, and typesetting, among others, and printing. In the world, where digital distribution is available, printing can be substituted by digital processing. The last part of the publication process is as important as the others. To be able to talk about sales at all, advertising and distribution must be adequately prepared.

In general, the commercial publishing process may take three forms. The first one consists in preparing a traditional printed version of the publication. The second one includes publishing in electronic version: e-books, or audiobooks. The third one involves self-publishing, where the author takes over all or part of the roles and responsibilities of the parties involved in the publication.

With vanity publications, a new, completely different model of book publishing has appeared in the industry. In this model, the author hires a publishing house to publish his book. It differs from self-publishing in that the author receives a part of the profits from the sale (if any). Moreover, the author usually loses (by the power of the contract) her or his economic copyrights to the publisher. Besides this, the flow of money is different, and the intentions of the vanity press are usually predatory.

Within the whole ecosystem of the publishing industry, the development of digital distribution is beginning to play a leading role. This phenomenon is manifested firstly by the development of two new book forms: e-books and audiobooks, and secondly by the emergence of new methods of publication distribution. The diagram of the connections and individuals taking part in the publishing process is presented in fig. 1.

Between the author and the readers, there are several entities whose aim is to enable the latter to familiarise themselves with the work of the former. The most vital individuals involved in this process can be distinguished: apart from authors and readers, these are publishers, distributors, and retailers. However, there are several ways to configure this process depending on the choice of the author and the scope of expertise of the companies involved in the publishing.

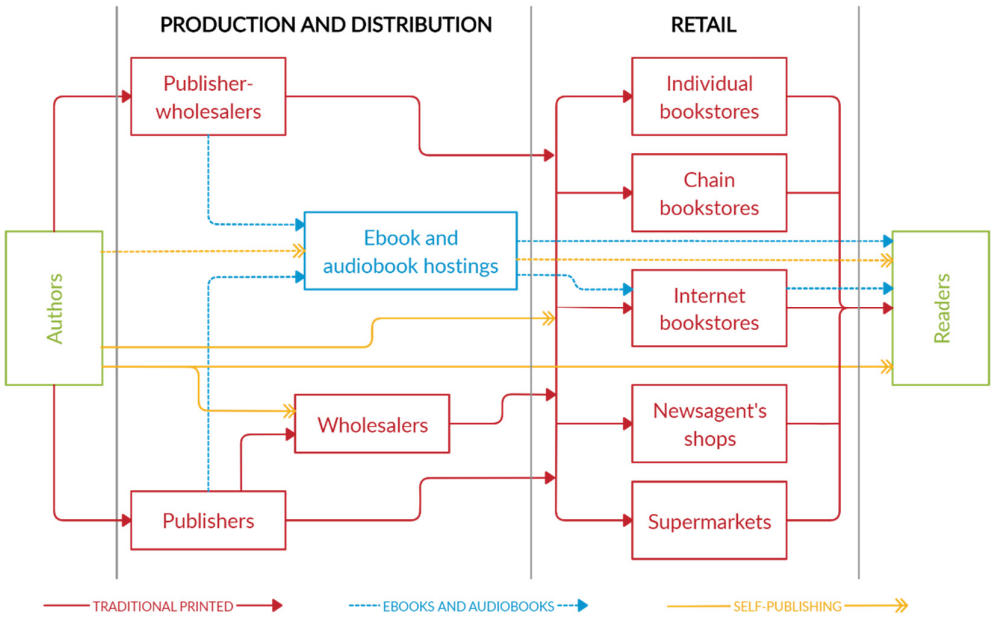

Fig. 1: Simplified procedures and entities involved in the publishing process
Source: own elaboration

The first and the most common way of publishing is when the author hands over the manuscript to the publisher, and the latter, when the decision to acquire it is made, prepares its printed form (editing, designing and ordering it from a printing house). The printed publication goes to a distributor (wholesaler) who, through his contacts, places it at diverse types of retailers, where it is bought by readers. There are two additional variants of this procedure. The first variant is when the publisher and wholesaler are vertically integrated, which might simplify the process, cutting some of the transaction costs and avoiding double marginalisation. The second variant is when the publisher tries to bypass the

distributor and decides to place the publication in retail on its own. In fig. 1 this way of a publication is marked with solid red lines with triangular arrowheads.

The second type of publication process relates to the preparation and selling the electronic version of the manuscript, as either an e-book or audiobook. Here, the publisher usually distributes the publication through hosting services which include various channels of reaching the readers. It can be done by offering it via Internet bookstores or doing it directly from the hosting platform. The method of delivery might also differ, it can either be a direct sale of the electronic file in multiple formats (EPUB, AZW, PDF, MP3 or other) or provision of the digital version through streaming or paid subscription lending services. In fig. 1 this way of a publication is marked with blue dashed lines with triangular arrowheads.

The third type of reaching the readers is through self-publishing. Here, the most crucial part is that the author of the manuscript takes over the roles of various individuals in the first two, above mentioned types, bypassing them and organising the components or the whole of the process as she or he pleases. The author may replace the publisher, distributor, retailer or any combination of the three, as the broadest form of self-publishing assumes that the author does not use any intermediaries, takes care of the whole process himself and sells his work directly to readers. Here, a small exception is made for the digital versions of a book, since the author will typically use a file hosting to a greater or lesser extent. In fig. 1 this way of a publication is marked with yellow solid (for printed version) or dashed (for digital version) lines with double arrowheads.

In addition to the three general types of production and distribution of publications mentioned above, there is a fourth type, different from the others, which is the subject of this analysis: vanity publishing.

A "new" phenomenon in the publishing industry – vanity publishing

Very few authors supply a full and complex scientific analysis of vanity publishing. However, it should be noted that vanity publishing has been noticed by many, including those who have issued warnings against them. Among others, the Advertising Standards Authority, together with the Committee of Advertising Practice in the United Kingdom, a non-governmental organisation with the task of self-regulating the advertising industry, gives a very concise and straightforward definition of vanity press. According to them, vanity publishing "is a service whereby authors are charged to have their work published" (Committee of Advertising Practice, 2014, para. 1). ASA identifies vanity publishers as the ones who "generally offer to publish a book for a specific fee or to include short stories, poems or other literary or artistic material in an anthology, which the authors are then invited to buy" (Committee of Advertising Practice, 2014, para. 1). They advise advertisers to be aware while providing advertising to such companies, because, in broad terms, there might be "four areas where ads for vanity publishers have the potential to run into trouble: merit; costs; financial gain; and marketing and promotion" (Committee of Advertising Practice, 2014, para. 2).

Even though vanity publishing seems to be developing very dynamically recently, this phenomenon is not as new as it may seem. It must be said that there is a thin line between vanity publishing and self-publishing. In both ways of publishing, it is the author who decides to publish and bears the costs. The difference lies in areas of control over the publishing process and intellectual property rights. In the case of self-publishing, all copyrights remain with the author as well as the control over the publishing process; in the vanity, the economic rights are transferred to the publisher, so in addition to the payment from the author, he is entitled to some or all of the profits from sales – the author theoretically receives production and distribution services. However, even pricing might not be under his or her control, let alone the way the publication is distributed.

In the nineteenth century, self-financing was a relatively popular form of publishing one' s literary and scientific works. Many noted writers and poets either financed the publication from their funds or collected donations or private scholarships. This way, some of their masterpieces were published by Virginia Woolf, Allan Poe, Mark Twain, Jane Austen, George Bernard Shaw, Marcel Proust, Emily Dickinson, Ezra Pound, Laurence Stern and Walt Whitman.

Contemporary authors also choose self-publishing as a form of publication of their work. Such was the case of E. L. James, the author of the erotic romance novel entitled "Fifty Shades of Grey", who in 2011 published it in the form of e-book and the print-on-demand system, to later sign a contract with a traditional publisher (Balson, 2013). The same thing happened with Andy Weir's novel "The Martian", which was similarly published in 2011, to be re-released in 2014, already in a traditional publishing house (Dickerson, 2015). Both novels have already been adapted as motion pictures.

It is easy to distinguish self-publishing from vanity publishing if the author assumes all responsibilities in the former form of publication. It becomes significantly harder to it if one looks at the publication from the perspective of time. We might not have enough data to find out how the nineteenth-century book was financed, published and distributed.

Nowadays, the term "vanity publishing" is considered pejorative, and the name itself suggests that the author of the manuscript publishes it out of vanity, self-admiration and against the opinions of others who may think that the work will not achieve commercial success. Such an author may also not have sufficient skills and knowledge to engage in self-publishing. Then a vanity publisher appears. Commentators point out that such publishers use deception against often unaware writers. They may pose as "traditional publishers", but those who have a "lower acceptance threshold" and are open to young and talented authors (Castillo, 2011; Lundin, 2009). Vanity publisher may use various psychological techniques, aiming at awakening and further using conceit, egocentrism and megalomania of its authors-clients (Clifford, 2014; Rue, 1994, pp. 151–152).

Based on the analysis of offers, vanity publisher provides de facto a slightly extended printing service to ignorant authors. The service mentions editing and proofreading, which is very low in quality, resulting in abysmal reviews of the publication. Usually, books published in this way are not adequately prepared in terms of editing and content and do not undergo qualitative verification. Additionally, such a publisher organises the dispatch of obligatory copies to libraries and indicates its marketing and distribution potential. In the process, the importance of obtaining an ISBN is emphasised, in which of course such a publisher can help. Thanks to this, the publisher retains control over the publication and its possible reissues by strengthening power over the copyright of the work (Strauss, 2019). Very often, when in contact with a prospective client, vanity publishers mention profit, however, it is very rarely for authors choosing this form of publication to recoup their costs, let alone gain financially from book sales (Committee of Advertising Practice, 2014). The fee that is paid by the author to the vanity press already includes the profit for the publisher and any premium for the risk. However, it should be stressed that this form of publication leaves the entire risk to the author by definition and the risk to the publisher is minimal, since even the payment for the service is made in advance. Traditional publishers behave like investors in the process: they offer to publish the acquired book in exchange for fees to the author and part of the revenue. The rest of the sales revenue is used to recoup the money invested and what is left is the publisher's profit.

Stakeholders involved in the vanity publishing

It is necessary to identify the main stakeholders in this process, their possible actions in this context and the likely consequences of this process on them to give a full picture of how vanity publishing can affect the publishing industry. There are six essential groups of stakeholders: vanity publishers themselves, authors of vanity publications, readers of books in general, commercial publishers, distributors and retailers and other authors not using vanity publishing. The following analysis was carried out based on the author's direct interviews with industry professionals, discussions on literature held on various sites and in groups in social media, and the study of comments and reviews on popular literature websites.

Vanity Publishers

As it was mentioned above, the term "vanity publisher" is pejorative. For this reason, publishers of this type use different terms for what they do: subsidy publishing, joint-venture publishing, co-operative publishing, shared responsibility publishing, (incorrectly) self-publishing, publishing with co-financing or even pose as traditional publishers. They use various psychological techniques to increase the conceit and false self-appreciation for the manuscript. At the same time, they demonstrate an interest in the

publication of the work, pointing to its (unsupported) potential for commercial success, promising quality and professional help. In reality, what they offer is a slightly extended printing service (Clifford, 2014).

Interestingly, the vanity publishing for the untrained eye looks similar to traditional publishing. However, looking at it closely, significant differences begin to emerge. Firstly, the cost of publishing in the vanity model exceeds the actual cost of publishing the book. As mentioned above, the fee (which is absent in traditional publishing) already includes the publisher's profit, and given the poor quality of service, an author can get much more for the same money (Kasperek, 2016; Zwierzchowski, 2015). All of this together might result in higher than average prices of vanity books.

Secondly, the vanity press is not interested in selling the books it publishes, as it earns money from fees of authors (hence the overpricing). Sometimes it merely sends the whole circulation to the author (at his expense). The interest of the vanity publisher is simple: to maximise the profit by increasing the number of published books. In this situation, it is not a matter of quality, but quantity. Vanity publishers benefit from increasing (or constant) returns to scale, and the quality of the publication is irrelevant – the more books titles they publish, the higher the profit. Traditional publishers are interested in books of high commercial potential – the more copies of one particular book they sell, the higher the profit, where the number of sold copies is a function of, among others, quality. Improvement of quality requires additional cost spent on editing, which will diminish profits of a vanity publisher and possibly increase the profits of a commercial publisher. Books published by the vanity press are often ridiculed because of the number of linguistic, factual or logical errors that appear in them. The quality of the idea itself might also be subpar, which may indicate the reason for the author's failure to publish through a commercial publisher (Cambridge Scholars Publishing, 2015). If by some chance, the book will sell, revenue from the sales will increase already elevated profit of the publisher. The activities of vanity publishers are practically risk-free. All costs are covered by an author, and a publisher does not invest significant amounts of money in this process.

Concurrently, such publishers aggressively promote their activities through various channels, also using the Internet and social media - mainly due to the possibility of better reaching the target group and lower costs of such activities. For example, they organise competitions in which the main prize is the publication. Hundreds of participants can enter such a competition, the best of whom will be able to cover the costs (sometimes not even the whole) of the publication. The rest will receive a "consolation prize" in the form of the possibility of publishing the work in return for a fee. Vanity publishers also promote books by maintaining a "book blog culture", where people who are usually young, inexperienced, incompetent and not familiar with literature and publishing industry receive copies of books for review from the publisher (at the expense of the author, of course). The quality of reviews leaves a lot to be desired; often, bloggers feel honoured and "repay" with good appraisals.

The appearance of such publications is a consequence of opportunism on the part of publishers and the asymmetry of information to the detriment of authors, which results in moral hazard, both in the aspect of hidden activities (in the form of refraining from acting - e.g. marketing actions) and hidden information (e.g. the real value of the published "work").

Authors of vanity publications

Publishing books with self-financing by vanity press also has some consequences for authors. Such authors are perceived as talentless hacks. Due to the sub-par quality of the process, published books are often ridiculed. Initially, the vanity presses pose as publishers who provide the realisation of dreams and quick satisfaction of needs. After some time, when a book published in this way is not widely distributed, and the sales are usually minimal (if any), there comes a reality check. An author will experience the effect of "pulling the rug from under his feet", it might be a disappointment, and this situation could build frustration with failure (Crump, 2010).

Because of these relationships, publishing a vanity publication is unprofitable and seldom brings profits to the authors. Moreover, it also seems to be the most expensive method of publishing work, and the works published in this way are usually of inadequate quality.

Some also point out that the author who used vanity publishing in the past has a significantly reduced chance of publishing traditionally in the future. It creates the effect of being "locked-in-vanity", where no traditional publisher is interested in the author's work, and what is left is another vanity publication. What can happen is also the situation, when an author, often unconsciously, does not try to publish in a traditional publishing house. Vanity publishers maintain good PR campaigns where they try to discredit traditional publishers, by presenting them as conservative, closed to innovations, blocking the access to young and fresh authors. It is quite frequently possible to read in the internet discussions statements like: "do not even bother sending your work to a traditional publisher, they are not accepting new authors, your only choice is Publisher XYZ". Vanity publishers tend to maintain friendly and frequent contacts with prospective authors. In the experiment conducted by Pawel Pollak, where he sent a sample of the specially prepared very poor quality manuscript to several vanity publishers, the fastest acceptance letter came after two hours (Zwierzchowski, 2015).

Readers

There are also some consequences for readers. Firstly, books published in this way may not be available in broad distribution. Thus the readers might have difficulty purchasing it, even if they wanted to. Secondly, it is difficult to distinguish a vanity publication from commercial one (either self or traditional). There is a higher probability that the former is potential "lemon" as compared with the latter being potentially a "peach", subject to a rigorous selection and intensive work of editors. Thirdly, encountering a sub-par vanity publication (sometimes by accident or by a recommendation of vanity publisher's "befriended" reviewer) may cause discouragement to literature.

Each of these effects hurts the condition of the industry and the readership level (Doonan, 2017). Through selection, publishers provide literature that meets specific minimum quality criteria. The activities of vanity publishers can cause a drop in trust in literature and other long-term effects, e.g. in literacy level.

Commercial publishers

It is also possible to show some potentially significant outcomes of vanity publishing on commercial publishers. Firstly, vanity publishers are new, strong competitors in the industry whose actions influence the mark-up. They use a different revenue model, which is, due to the asymmetry of information, quite successful for them. Traditional publishers maintain some quality criteria, which makes the whole process more exclusive and less accessible to new authors (Strauss, 2019). Secondly, by decreasing the demand for literature due to a large amount of low-quality publication, traditional publications will also lose out. Thirdly, there may be an adverse selection phenomenon present, where low-quality literature will crowd out higher-quality literature. Due to the information asymmetry and the inability to assess the quality of work before consumption, writing books might gradually become less profitable, when a talented author could be overwhelmed by the vanity authors and resign from writing. It will, of course, only occur if the vanity publications appear in the distribution, which unfortunately happens.

Distributors and retailers

Similarly to the traditional publishers, also distributors and retailers might see some adverse effects on their financial result. In the presence of vanity publishing, they might be forced to use additional selection methods to maintain the consistency and integrity of the assortment they sell. Also, the number of low-quality books being distributed might reduce sales revenue, as buyers, disillusioned by the quality of the literature, would turn to different methods of spending their free time.

Other authors of non-vanity publications

This group of stakeholders might also be influenced significantly by the vanity publishing. One of the problems, which was already mentioned, is a thin line between vanity and self-publishing. As a result, self-publishing can be identified with vanity. Through the actions of the vanity publishers, the whole of self-publishing can be seen as an inferior way of publishing. The growing bad reputation of vanity publishing might pull self-publishing down. There is an increasing opinion that all books published by authors on their own are of inferior quality to those published traditionally (Strauss, 2019). As it is also hard to distinguish beforehand which publishers use the vanity publishing model and which are

traditional ones, there might be a decline in interest in literature (in general) or specific genres (in detail).

Moreover, young authors, through increased pressure on traditional publishers, will have even greater difficulty with their debut in the traditional model. The effect of reinforcement (snowball effect) may start to appear in the whole industry, as such young authors would be pushed in the hands of vanity publishers.

Vanity Publishing as a Market

J. D. Macdonald, who warns against vanity publishers in his educational campaign, coined a rule: "money should always flow toward the author" (Nielsen Hayden, 2003). In the case of vanity publishing is the opposite – "publisher" is being paid by the author, instead of the author being paid by the publisher. D. Bricker compares it with the situation of "paying someone to take a vacation for you so you can get more work done" (Bricker, 2013).

In the traditional multi-staged[1] market for non-scientific literature, regardless of the form in which the publication is provided, the good that is supplied is, simplifying, a book. In such market authors create the supply, it is the author who ensures the stream of manuscripts for which the demand in the production chain is created successively by publishers, distributors, retailers and finally readers. Therefore, the good, book, reaches the buyer through a series of intermediaries which produce and distribute it. The self-publishing model is analogous to the traditional model, so it should be included together in the same market. The author is simply a publisher here.

In the case of vanity publishing, the situation is different. What is being sold is a service of preparing the publication, ordered by an author, who creates demand and is offered by a publisher, which creates supply. The money equivalent for the service is transferred in the traditional direction, from buyer to supplier, so there is nothing special about this relationship in terms of the trade relations.

Due to the reversed flow of money as compared with the traditional publishing process, it has to be assumed, that vanity publishing (treated as a service provided to an author) and traditional publishing (treated as a process of book production) do not belong to the same market. Even though the same publisher can engage in both, we have to presume that with the vanity presses (and imprints) a new market is beginning to emerge within the publishing industry, where the service of publishing a book is a product. Vanity publishing is simply a new revenue model for a publisher. The company engages in similar activities in the same industry; however, the way the revenue is generated is different.

Concluding Remarks

The intensification of vanity publishing, judged by the increasing number of publishers which engage in such activities have created the motivation for more in-depth study.

The development of vanity publishing has been overlapped by the development of modern media, which seems to intensify this phenomenon. In this process, authors create demand for the service of book publishing, and publishers provide such a service. Such interaction is a reversal of the traditional publishing process, in which a publisher invests in the work of an author, which is rewarded by him. Usually, in vanity publishing, only the publisher benefits, because his profit is already included in the fee paid by the author. On the other hand, there are potentially many negative consequences for other stakeholders in the process. The authors of the vanity feel a painful clash with reality when they understand that they have fallen victim to the scam and will not get their money back. Readers may be deterred from literature by the inability to distinguish between vanity and commercial publications. Commercial publishers must face falling demand and adverse selection among authors. Distributors are losing sales volume. Other authors, with falling demand, may see their revenue fall and the increased difficulty of traditional publishing. All this allows vanity publishing to be assessed as a detrimental practice in the publishing industry.

Endnotes

1. Such market consists of at least three stages: production, wholesale and retail. Depending on the scope of the analysis, it might be suitable to delineate market differently, e.g. studying the market for retail distribution of non-scientific literature, if we are interested in how bookstores operate. Here, because the whole process is in the scope of the analysis, it is not necessary to make such distinctions.

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Project Delay as A Consequence of Project Activities Start Times Delays – Fuzzy Approach

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Abstract

The paper refers to the problem of delays in the starts of project activities and their influence on project completion time. This problem has been hardly treated in the literature, while it is important in some project types, where there occur frequent problems related to the launching of individual activities. The problem of the risk of delay of project activities start times is considered and related especially to the construction sector. The delays in project activities starts are modelled by means of type 2 fuzzy numbers and project activities durations by type 1 fuzzy numbers. An algorithm for calculation of the influence of the risk of delaying project activities start times on the total project duration is proposed. The resulting estimation of the total project duration is a type 2 fuzzy number. It can be analyzed for various risk events and compared with the estimated non-fuzzy project duration. The proposal is illustrated by means of a real-world construction project.

Keywords: Project Critical Time, Risk, Type 1 Fuzzy Number, Type 2 Fuzzy Number, Project Delay

Introduction

Serious delays of projects – of construction projects, but not only - are a common phenomenon which each citizen is often a witness of (e.g. in one of countries 75% of construction projects are delayed (Alsuliman 2019), in another one (Senouci et al. 2016) 72% of public projects) and the deviations are considerable (project are delayed on the average by as much as 44% (Urgilés et al. 2019). It is needless to say that these delays create considerable cost for the society. The consequences linked to project delays are not only the delays itself, but numerous other phenomena (e.g. for construction projects cost overruns, dispute and claims, arbitration, litigation and even total project abandonment (Mukuka et al. 2015)), which inevitably create social, human and obviously financial cost. That is why the objective of this paper is to propose a method which would facilitate the estimation and management of the risk of project delay.

The problem of project delays has been studied in the literature for many years. The focus is almost always put on project activities features, above all their forecast duration and the resulting duration of the critical path(s) of project networks, e.g. (Mukuka et.al. 2017), (Kogan and Shtub 1999), (Sireesha 2012), (Guida and Sacco 2019). However, all the existing approaches to modelling project activity features in terms of duration refer to the total activity duration or to the finish time of activities. The finish time of individual activities is of course of primordial importance, as it is decisive for the length of the critical path(s) and thus the project duration. However, in our opinion concentrating on the total duration of project activities or on their finish time obscures one important aspect: the difference between an activity which started immediately once all its predecessors had finished and took more time than planned (thus, whose duration was longer than planned) and an activity which did not start even if all its predecessors have finished. In the literature the latter case is not explicitly analysed.

Of course, in both cases the final activity finish time may be the same, but the management of both situations will be fairly different. If an activity has started, it means that all the procedures, permissions, signatures and other conditions enabling its start have been performed or fulfilled and the resources necessary for the activity performance are, at least for the moment, available. Then, the management of the activity duration covers the management and the maintenance of the conditions and resources which are already there. But the management of a situation when an activity cannot start even if all its predecessors have finished is different. Such a situation means that the starting conditions for the activity have not been fulfilled: either there is no permission for the start or the resources are missing or some other starting conditions have not been satisfied. Here, other measures are necessary: no continuous processes like motivating and maintaining are required here, but rather abrupt and very intensive actions are needed in order to attain the starting conditions for the activity (searching for access to the responsible authority, looking for resources substitute etc.). That is why our aim is to propose a model which would help the decision maker to manage the risk of project delays due, among others, to the delay in the starting moments of individual activities. Here lies the main novelty of the paper, as we have not identified any other paper treating this problem.

Modelling of risk, variability and uncertainty of activity features is performed by means of stochastic concepts (e.g. (Pontrandolfo 2000)) or fuzzy ones (e.g. (Chanas and Zieliński 2001), (Gładysz et al. 2015)). The discussion on the difference and superiority of one approach over the other has been going in on the literature for many years (e.g. (Sun and van Kooten 2009), (Cheeseman 1986)), but there is an almost general consensus that both approaches complement each other and that the fuzzy approach is superior in the case of vagueness (defined as the lack of statistical data) and of experts who are not familiar with mathematical concepts. There exist methods of dialogue with experts which help to translate their knowledge and opinions into fuzzy information (Türkşen 2011). That is why we have chosen to use fuzzy representation for risk and uncertainty. Thus, to make our objective more precise, we are aiming at proposing a new method of project delay analysis and management based on fuzzy modelling, focused on the management of project activities starting times delays.

Fuzzy sets (and their special case, fuzzy numbers) have been intensively used since their invention in the 60s (Zadeh 1965) and have been subject to numerous modifications, which have enhanced their modelling potential. The basic idea of fuzzy numbers is that experts can assign the degree of possibility or plausibility or truth to certain values or objects. And it is normal that experts may disagree or simply have different opinions. That is why so called type 2 fuzzy numbers were introduced (Mendel 2002), where the above mentioned degrees can differ among experts. Type 2 fuzzy numbers have already been applied to the project delay problem (see e.g. (Dorfeshan et al. 2018), (Dorfeshan et al. 2019), (Gładysz 2020)). In our approach we have decided to use both traditional (so called type 1) and type 2 fuzzy numbers. In this paper, type 2 fuzzy numbers are used to model the most important and original element of our paper (the delays in the starting times of individual activities) and type 1 fuzzy numbers - to model the duration of individual activities. It should be mentioned already in this moment that also the latter aspect can be modelled by means of type 2 fuzzy numbers, which we dropped here for simplicity reasons.

To sum up, the goal of our paper is to propose a method of managing the risk of project delays due to the delays in the start times of individual activities in conditions of risk and uncertainty. Due to limited space, we are not entering deeper into the discussion on the differences between the two, which can be found in the literature (Wyrozębski 2016). The uncertainty will generally be understood as the lack of knowledge as to the precise value of a magnitude, e.g. an activity duration or a starting time. The model will take into account so called risks (understood as events which may, but do not have to occur, and if they do, they will have a negative influence on activities starting times).

The outline of the paper is as follows: In Section 2 we present the definition of type 1 and type 2 fuzzy numbers, in Section 3 we describe our approach, in Section 4 we apply the approach to a real world example. The paper terminates with some conclusions and research perspectives.

Basic Notions

In 1965 Zadeh proposed his concept of possibility theory (Zadeh 1965). We will present the basic notions of this theory. First, we will present the concept of a trapezoidal fuzzy number (type 1 fuzzy number). A type 1 trapezoidal fuzzy number $\tilde{A} = (a_1, a_2, a_3, a_4)$ is defined by four crisp numbers $a_1 \leq a_2 \leq a_3 \leq a_4$ and a so called membership function μ_A, defined on the set of real numbers with values in the interval [0,1], depicted in Fig. 1 for $a_1 = 1, a_2 = 4, a_3 = 6, a_4 = 11$.

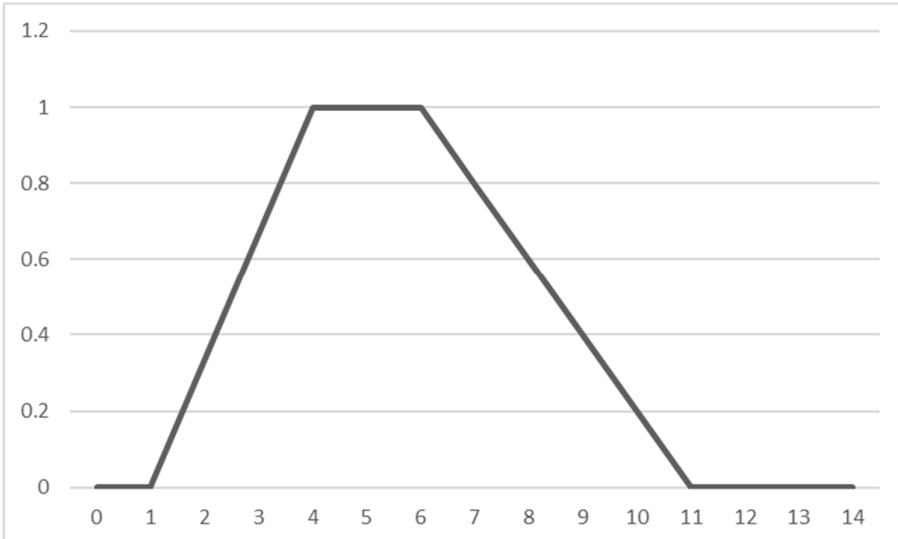

Fig. 1: The membership function μ_A of the trapezoidal type 1 fuzzy number $\tilde{A} = (1, 3, 6, 11)$

Trapezoidal fuzzy numbers may be interpreted in many ways, but here we will follow the following interpretation of μ_A: each element of the *x* axis represents a possible actual value of a yet unknown magnitude (for example, the duration or the starting moment of a project activity), and $\mu_A(x)$ represents the degree of possibility, given by an expert or a group of experts who have arrived at a consensus, to which x will be the actual value of the magnitude in question. Thus, in case of Figure 1, the expert(s) think(s) that the values in the interval [3,6] are most possible to be the actual values of the magnitude in question, the values over 11 and under 1 are impossible to occur in this role and the occurrence possibility of the other values is between 0 and 1: the smaller, the bigger the distance from interval [3,6].

There exist easy to use definitions of arithmetical operations (addition, multiplication, maximum, minimum) on trapezoidal fuzzy numbers (Vahidi and Rezvani 2013), which among others have allowed to work out fuzzy counterparts of critical path algorithms (see e.g. (Chanas and Zieliński 2001).

The following notion will be useful too:

<u>Definition 1</u>: For a trapezoidal type 1 fuzzy number $\tilde{A} = (a_1, a_2, a_3, a_4)$ the interval $[a_1, a_4]$ is called the support of $\tilde{A}$.

The problem with all type 1 fuzzy numbers, among them trapezoidal fuzzy numbers, is that we can consider only one expert or all the experts have to arrive at a consensus as to the possibility degrees represented by the membership function. The problem is that experts, by their very nature, may have different opinions. That is why type 2 fuzzy numbers have been introduced ((Mendel and John 2002), (Ngan 2013)), where the possibility degree $\mu_A(x)$ can be a fuzzy number itself (e.g. a trapezoidal one). It represents then the opinion on the possibility degree of many experts.

For practical purposes, it is useful to consider a simplified representation of type 2 fuzzy numbers, called fuzzy footprint of type 2 fuzzy number (Wang 2014). It considers only the support of $\mu_A(x)$ (for all x's). We will consider here the case of type 2 trapezoidal fuzzy numbers whose footprint is a couple of two trapezoidal fuzzy numbers, the so called upper membership function *UMF* and the so called lower membership function *LMF*. Figure 2 presents the footprint of a trapezoidal type 2 fuzzy number $\tilde{A}$.

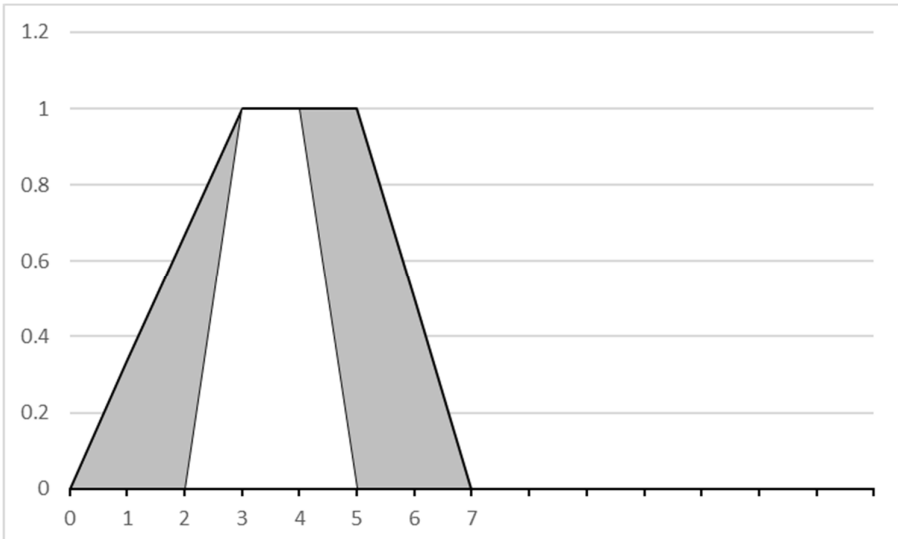

Fig. 2: The footprint of trapezoidal type 2 fuzzy number $\ddot{A} = \big((2,3,4,5),(0,3,6,7)\big)$, defined by $LMF = (2,3,4,5)$ and $UMF = (0,3,6,7)$

The type 2 trapezoidal fuzzy number $\tilde{A}$ presented in Figure 2 in the form of its footprint allows to reflect differences in the perception of the possibility degree of the occurrence of individual values on the x axis. These differences are shown by the grey area between the two trapezoidal membership functions (*LMF* and *UMF*): for example, number 1 is perceived by some of the experts as possible to the degree 0 and by some as possible to the degree 0,3, and number 5 is perceived by some of the experts as possible to the degree 0 and by some as possible to the degree 1. All the experts agree only with respect to the numbers in the interval [3,4]: they are seen by all of them as being possible to the degree 1.

Arithmetical operation on type 2 trapezoidal fuzzy numbers can be defined on the type 1 fuzzy numbers *LFM* and *UFM* which determine them. If *LFM* and *UFM* are identical, we are dealing with a type 1 trapezoidal fuzzy number. Thus, each type 1 trapezoidal fuzzy number is a special case of a type 2 trapezoidal fuzzy number.

Analysis of the duration of a project in function of the starting times of selected activities

Let a project be represented as set of nodes (events) $N = \{1, \dots, n\}$ and let $A \subset N \times N$ be the set of arcs (project tasks, activities). Let us denote the fuzzy duration of task $(i,j) \in A$ as $\tilde{T}_{ij}$. The exact form of these fuzzy durations is chosen on the basis of expert opinions. For example, we can ask the expert, for each task $(i,j) \in A$, to determine the optimistic duration t_{ij}^{opt}, the most possible duration m_{ij} and the pessimistic one t_{ij}^{pes}. Then the durations of the activities would be represented as trapezoidal type 1 fuzzy numbers in the following form:

$$\tilde{T}_{ij} = \left(t_{ij}^{opt}, m_{ij},, m_{ij}, t_{ij}^{pes}\right) \tag{1}$$

Let us denote the resulting project network as PRN.

Now we come to the main novelty of the paper: the uncertainty of activities duration times is one aspect, widely treated in the literature, but, as we justified in the introduction, we think it is important to consider separately the uncertainty related to the times when the activities will start, because this issue requires a special managerial approach. Let us assume that experts determine a list of risks $\boldsymbol{R} = \{R_1, .., R_K\}$ whose actual occurrence may delay the start of individual activities. For each risk they also indicate which activities start it will influence in case of occurrence and estimate the delay in the start of activity (i, j) as a consequence of the occurrence of the *k*-th risk. Let us assume that the possible delay in the beginning of task (i, j) is a trapezoidal type 2 fuzzy number of the following form:

$$\tilde{L}_{ijk} = \left(\left(0, \Delta t_{ijk}, \Delta t_{ijk}, \Delta t_{ijk}\right)\left(0, 0, \Delta t_{ijk,} \Delta t_{ijk}\right)\right) \text{ for } (i, j)\epsilon A, k = 1, \dots, K \tag{2}$$

Figure 4 presents the footprint of number (2) for Δt_{ijk}=5.

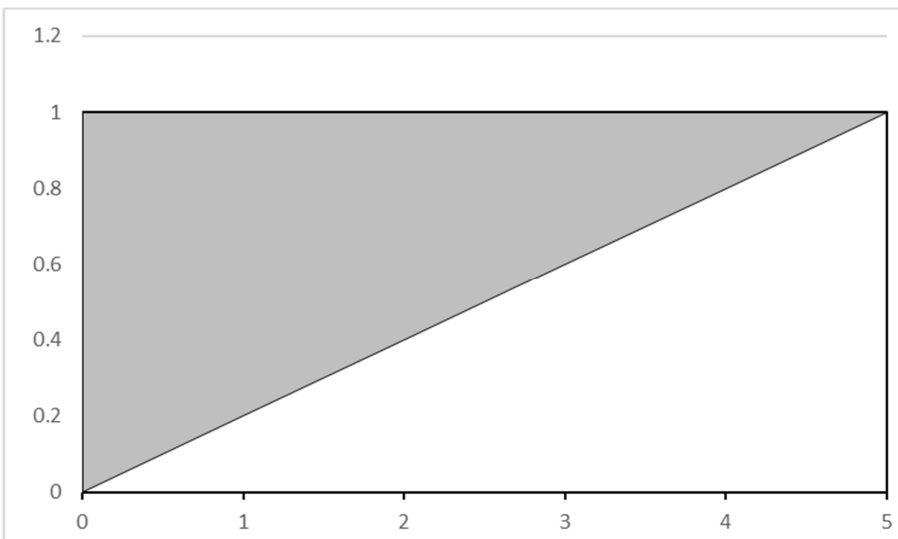

Fig. 2: The footprint of a trapezoidal type 2 fuzzy number $\tilde{A} = \left((\mathbf{0}, \mathbf{5}, \mathbf{5}, \mathbf{5})(\mathbf{0}, \mathbf{0}, \mathbf{5}, \mathbf{5})\right)$

Thus, we assume that the highest difference in the experts opinions regards the occurrence possibility of low values of the delay of the activity start: some experts think they are little possible, some think they are highly possible. Generally here all the experts are rather pessimistic: the high delays of the activity start (5 or close to 5 in Figure 2) are considered to be possible to the highest degree.

We assume here that we have at our disposal an algorithm which determines the length of critical path(s) for a project in which the activity durations are represented by type 2 trapezoidal fuzzy numbers (we can take e.g. the algorithm from (Y. Dorfeshan et. al. 2018) or extend the algorithm from (Chanas and Zieliński 2001) to the case of type 2 fuzzy numbers). Let us call the selected algorithm *ALG*. $ALG(PRN)$ will stand for the result of the application of the algorithm to the project network PRN, which may have type 1 or type 2 trapezoidal fuzzy numbers as arc lengths. $ALG(PRN)$ contains at least the (fuzzy) duration of project critical path(s), thus the fuzzy project duration.

Then for each risk R_k $(k = 1, \dots, K)$ we propose to modify the project network according to the following procedure: For each $(i, j)\epsilon A$, if $\Delta t_{ijk} > 0$, replace arc (i, j) with two arcs (i, i') and (i', j)

such that the length of arc (i, i') is equal to $\tilde{L}_{ijk} = \left((0, \Delta t_{ijk}, \Delta t_{ijk}, \Delta t_{ijk})(0, 0, \Delta t_{ijk}, \Delta t_{ijk})\right)$ and that of arc (i', j) is equal to $\tilde{T}_{ij} = \left((t_{ij}^{opt}, m_{ij}, m_{ij}, t_{ij}^{pes})(t_{ij}^{opt}, m_{ij}, m_{ij}, t_{ij}^{pes})\right)$. Arc (i, i') represents the delay in the starting time of the activity due to the considered risk, arc (i', j) the activity duration.

Let us denote the resulting network as $PRN_k, (k = 1, \dots, K)$. This network takes into account the risk of the delay in activities start times. This risk is separated from the uncertainty linked to the activities duration, which is a novelty with respect to the literature. Applying *ALG* to the modified network gives us the result $ALG(PRN_k)$, which shows the influence of the delay in the starting times of project activities, caused by the *k*-th risk, on total project duration. Various risks can be then analysed from the point of view of their influence on the project duration.

Example

Let us consider a real world project whose objective was "the construction of a sales and service center" (Gładysz et al. 2015). The building was designed as a 2-segment, 4-storey, non-basemented construction, with vertical communication through 2 staircases and 2 external passenger-cargo lifts. The project was composed of 18 tasks, see Figure 3.

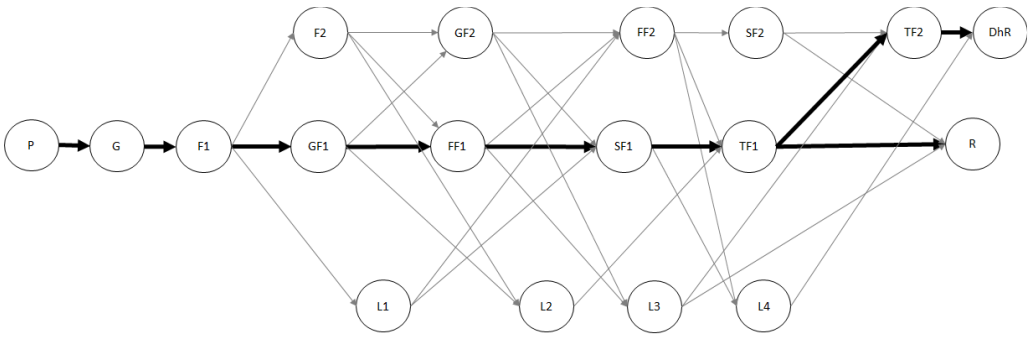

Fig 3. Networks of the project "the construction of a sales and service center"

Their duration was estimated in the form of trapezoidal fuzzy numbers, thus they were judged as uncertain, but additionally to this uncertainty experts have listed risks that may influence the starting times of individual activities: computational errors in the design (R_1), errors in the bill of quantities (R_2), imprecise formulations in the contract (R_3), incorrect fieldwork (R_4), technological changes (R_5), equipment breakdowns (R_6), delays in the delivery of materials (R_7), construction disaster or accident (R_8), low quality of the work on site (R_9), low quality of materials (R_{10}), disadvantageous weather (R_{11}). An AHP analysis was performed for these tasks and the following indicators of hierarchy were determined: $w_1 = 0.183$, $w_2 = 0.092$, $w_3 = 0.092$, $w_4 = 0.061$, $w_5 = 0.046$, $w_6 = 0.037$, $w_7 = 0.061$, $w_8 = 0.184$, $w_9 = 0.092$, $w_{10} = 0.092$, $w_{11} = 0.061$.

Table 1: Fuzzy duration of the tasks in the project and the risks influencing individual tasks

Name of task	Symbol	Predecessors	Risks	Time
Preparation work	P	-	11	(9,10,10,11)
Ground work	G	P	1,4,6,8,9,10,11	(14,15,15,16)
Fundaments (stage 1)	F1	G	1,3,4,6,7,8,9,10,11	(19,20,20,21)
Fundaments (stage 2)	F2	F1		(7,9,9,11)
Ground floor (stage 1)	GF1	F1	1,2,3,5,7,8,9,10,11	(28,30,30,32)
Lift shaft (stage 1)	L1	F1	1,2,3,5,7,8,9,10	(16,17,17,18)
Ground floor (stage 2)	GF2	F2, GF1		(9,11,11,13)
1st floor (stage 1)	FF1	F2, GF1		(21,23,23,25)
Lift shaft (stage 2)	L2	F2, GF1		(16,17,17,18)

1st floor (stage 2)	FF2	GF2, FF1, L1		(14,16,16,18)
2nd floor (stage 1)	SF1	GF2, FF1, L1		(29,30,30,31)
Lift shaft (stage 3)	L3	GF2, FF1, L1		(18,19,19,20)
2nd floor (stage 2)	SF2	FF2, SF1,L2		(14,16,16,18)
3rd floor (stage 1)	TF1	FF2, SF1,L2		(38,40,40,42)
Lift shaft (stage 4)	L4	FF2, SF1,L2		(16,17,17,18)
3rd floor (stage 2)	TF2	SF2, TF1, L3		(4,6,6,8)
Drainage on the roof above the 3rd floor	DhR	TF2, L4	2,5,7,8,9,10,11	(11,12,12,13)
Roof above 3rd floor	R	SF2, TF1, L3	5,7,11	(18,19,19,20)

Applying *ALG* to the project from Table 1 (without taking the risks influencing the starting times of individual activities into account), we obtain the project duration as equal to (176,187,187,199).

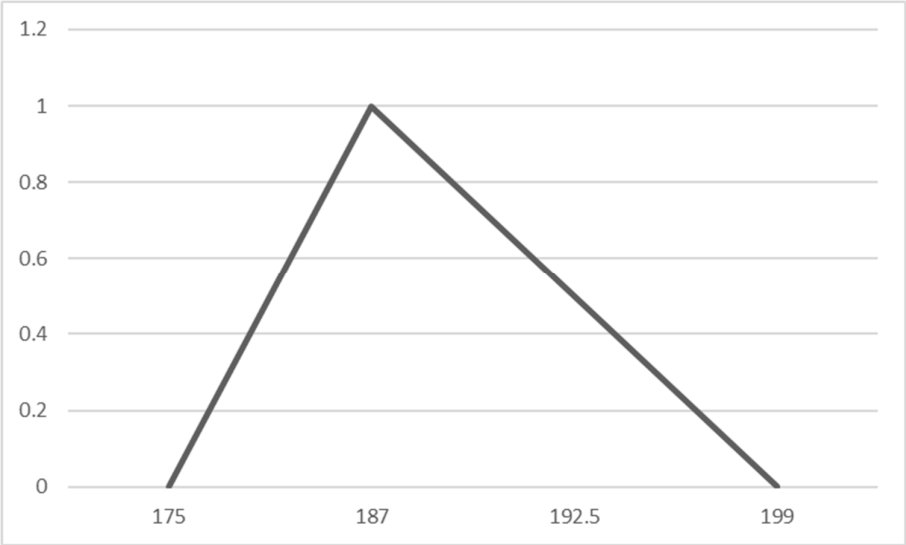

Fig. 4: Fuzzy duration of the example project without taking into account the risk of delays in project activities starting times.

The project will take most possibly (if delays in project activities starting times are not taken into account), about 187 days, however, all the values between 175 and 199 days are to some extent possible. Two critical paths occur here:

I. 'preparation work' (P), 'ground work' (G), 'fundaments' (stage 1) (F1), 'ground floor' (stage 1) (GF1), '1st floor' (stage 1) (FF1), '2nd floor' (stage 1) (SF1), '3rd floor' (stage 1) (TF1), 'roof above the 3rd floor' (R);

II. '3rd floor' (stage 2), 'drainage on the roof above the 3rd floor' (Dhr) instead of 'roof above the 3rd floor (R)'. The rest of the tasks are the same in both paths.

Then an analysis of the influence of the risks which may delay project activities starting times on the project duration was performed. Here we limit ourselves to three selected risks:

- computational errors in the design (R_1)
- incorrect fieldwork (R_4)
- delays in the delivery of materials (R_7)

In Table 2 estimations of their influence on the project activities starting times are given (determined by experts, here as a percentage of the activity duration). Each risk's influence was estimated separately, thus we assume that at the most one of the three risks will actually occur. Each influence estimation has the form $\left((0, \Delta t_{ijk}, \Delta t_{ijk}, \Delta t_{ijk})(0, 0, \Delta t_{ijk}, \Delta t_{ijk})\right)$ (see (2)) thus only the parameter Δt_{ijk} is given in the table.

Table 2: Fuzzy delays in project activities start times caused by risks R_1, R_4, R_7 (represented by the parameter Δt_{ijk}, see (2))

Symbol	R_1	R_4	R_7
P			
G	1.47	0.48	
F1	1.93	0,63	0,6
F2	101	0.33	0.32
GF1	2.93		0.92
L1	1.65		0.52
GF2	1.19		0.37
FF1	2.29		0.72
L2	1.65		0.52
FF2	1.65		0.52
SF1	2.84		0.89
L3	1.83		0.57
SF2	1.65		0.52
TF1	3.85		1.21
L4	1.65		0.52
TF2	0.73		0.23
DhR			0.37
R			0.57

Let us now apply the procedure from Section 3 to the project network for each of the three risks and compare the resulting project duration estimation with that without the risk of delays in project activities starting times, from Figure 4.

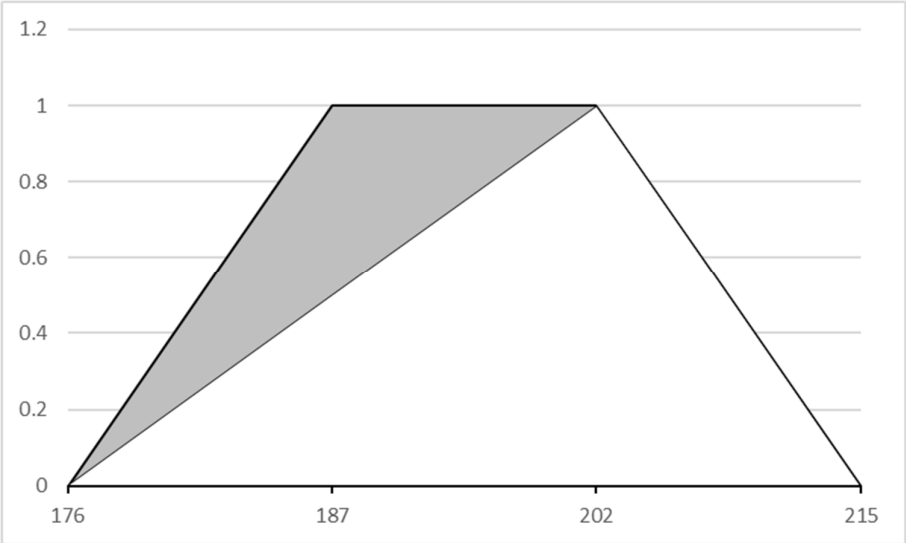

Fig. 5: Fuzzy duration of the example project with risk R_1 influencing delays in project activities starting times.

We can see that risk R_1 prolongs the pessimistic possible project duration with respect to the situation when its influence on the starting activities times was not considered (Figure 5). There is a grey surface in Figure 4, showing the difference in opinion among the experts: according to the more optimistic experts project durations close to 180 days are highly possible even taking into account risk R_1 and its influence of project activities starting times, other experts estimate their possibility lower.

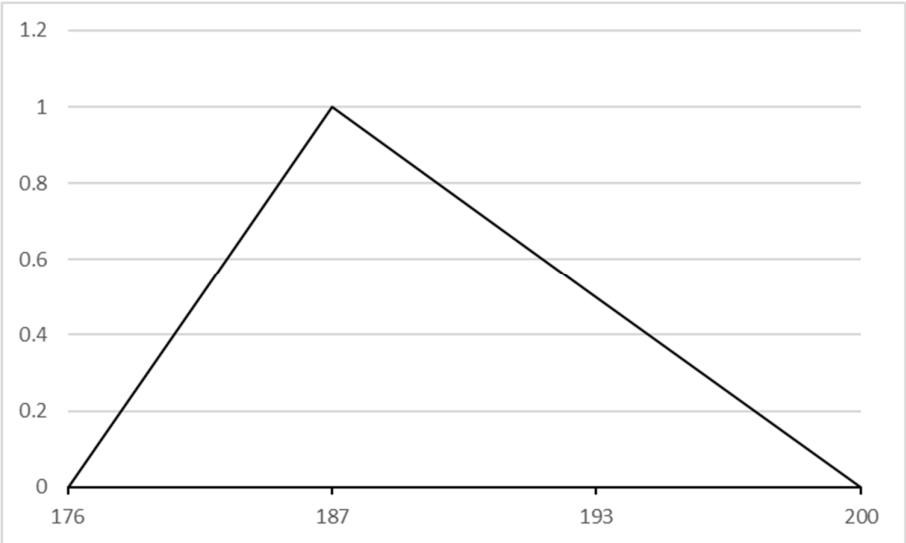

Fig. 6: Fuzzy duration of the example project with risk R_3 influencing delays in project activities starting times.

Risk R_3 prolongs the pessimistic project duration much less than risk R_1, and in the estimation of the total project duration the disagreement among experts is absent.

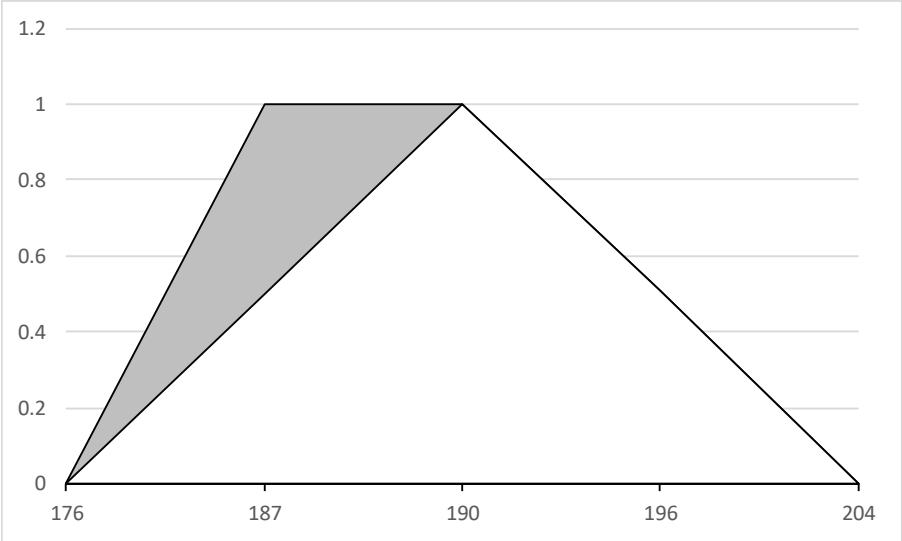

Fig. 7: Fuzzy duration of the example project with risk R_7 influencing delays in project activities starting times.

We can see that risk R_7 also has a small effect on the pessimistic project duration (smaller than R_1 and bigger than R_3), but there is a disagreement among experts as to the possibility degree of lower project duration times (similarly as in case of R_1).

In all the three cases we have two critical paths, the same as the ones listed above. But generally of course each risk, causing a delay in the start times of some activities, may change critical paths.

Conclusions

In this paper we have proposed to analyse separately the risk of delaying project activities starting times. According to our knowledge, this problem has not been considered in the literature so far, in spite of a large number of literature items covering the problem of risk and uncertainty of project duration. All the contributions take into account the total duration of activities, without separating the time lost due to the lack of the possibility of starting individual activities. And the management of non-started activities is fairly different from the management of activities which have already started, but for some reason are dragging on.

We proposed an extension of critical path algorithms for the case when project activities durations are given in the form of fuzzy numbers, which allows to analyse the influence of selected risks on the delay in the start times of selected activities and then on the total project duration. The algorithm was applied to a real world construction project. The construction sector is especially sensitive to delaying activities starts: the lack of a formal permission, the protest of local ecologists, bad weather, an unexpected discovery of archaeological remnants: all this may make it impossible to start certain project activities. Thus, further research will have to encompass new case studies and interviews with project managers from the construction sector in order to verify the proposed approach and extend it so that it covers the practical issues encountered in practice. Certainly, the gap has to be crossed between the practitioners and the researchers language: the modelling of expert opinions in terms of type 1 and type 2 fuzzy numbers may be not evident to practitioners, but it is only them who have the practical experience and intuition and may deliver close to reality models.

The usage of type 2 fuzzy numbers allows to take into account (and visualise graphically) different opinions of experts and lead to fruitful discussion among them. In our opinion the development of formal dialog procedures with experts and making them get acquainted and accept this modelling tool might contribute to a better management of all types of delays in projects.

Acknowledgment

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Analysis of Spatial Theories Regarding the Economy and Optimization of Power Plant Location

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Abstract

The article presents an analysis of the functioning theories of optimal locations for agricultural and industrial activities. He also describes the spatial theory of substitution according to Predöhl, which defines the factors determining the location of an enterprise in general and the so-called general theory of spatial management according to Löschema. As part of this analysis, an attempt was made to identify problems and development perspectives for the field of knowledge which is spatial management. The theories presented in the article allow to optimize the location of power plants. This is of great importance for the economy. It allows to use local resources and receive renewable raw materials and process them will take place at an appropriate distance from suppliers due to the high costs of direct delivery to the power plant. At the same time, it will increase employment and create a new sales sector as well as introduce innovations, for example more modern and ecological processes of energy production.

Keywords: Spatial Management, Location Theories, Socio-Economic System.

JEL classification: A13, E61, H42, J08, O11.

Introduction

When planning a business, you should first consider the location of your business so that it is positioned in the best possible way, i.e. at the best possible distance from customers and suppliers. Spatial management deals with this problem. This science comes from urban planning, economic sciences, regional studies and economic geography. Spatial management has developed as an independent current in economics since the 19th century.

The research scope of spatial management is very wide and complex. That is why it is difficult to formulate a clear and simple definition. Secondly, also because spatial management is both a field of knowledge and a field of practical activity. Both areas are not autonomous, but are interrelated. The development of spatial economy results from the demand reported by practitioners, which is why science provides the necessary tools and knowledge to undertake the so-called spatial decisions. Dębski pointed out the link between practical and theoretical aspects of spatial management, which built a three-step definition of spatial management as (Dębski, 2001):

1. Practical activities aimed at creating spatial order in existing development, bearing in mind the good of the individual and society in the widest possible time perspective.
2. Reality covering all phenomena occurring in space, from the natural environment, settlement, technical infrastructure and the national economy.
3. Science dealing with the past and current state of spatial development of specific areas and looking for their hidden and complex structures that determine the functioning of the whole.

This way of defining spatial management aims to match different views on its essence. It also results from the fact that it concerns various aspects of social and economic life, taking into account the elements of space and methods of controlling and planning the development of the reality that surrounds us.

Theories in economic sciences appreciate the huge role of space in the economy (distance, transport costs, land value). Since the spread of classical theory, attempts have been made to organize the principles of management in space. Certainly the first of these was the theory of Johann von Thünen (first half of the 19th century).

Literature Review

The theory of von Thünen

The theory is related to the nineteenth-century economist Johann Heinrich von Thünen, who was the first to lay the groundwork to appreciate the role of space in the economy and to organize the principles of space management. Thünen pointed out how the disseminating classical economy functions in the agricultural area surrounding the city.

Thünen was looking for an economically rational distribution of agricultural zones around the city that would be the outlet for their products. This arrangement occurs when each scrap is utilized and gives the largest possible rent, i.e. the difference between the revenue from sales and the cost of transport (Borsa, 2004). The concept has the following assumptions:

• agricultural space with equally fertile soil is undifferentiated,
• there is one consumption center consuming agricultural products from the surrounding area, not having links with other centers and areas,
• transport costs are a function of distance and weight of loads,
• sales prices are uniform for all products of a given type.

Agricultural production is the closest to the market, because it bears the highest production cost (Gołębiewski, 2001). Then according to production per hectare. The problem is complicated by real assumptions, e.g. assuming that the intensity of land use and production per hectare changes within one type of production and one zone, and different products are transported at different transport costs per tonne-kilometer, and rent gradients change from the line straight on the curve. Therefore, they can intersect not only once, but twice or more times. With these assumptions, the layout of the zones changes.

Thünen model formula:

$$LR = E\,(p - a) - E\,(f * k) \qquad (1)$$

where:

E - production,
p - price received (gross income),
a - production cost for a given location,
f - cost of transport ($ / ton-km),
k - the region's distance from the market.

Thünen pointed out that clean income will fall as you move away from the city where the product must be sold (Baldwin et.al, 2003). Net profit was falling because of the cost of transport. A more complex case occurs when we deal with many agricultural products. In this case, the market price and transport rate differ for each product. The market price depends on the supply and demand for a given product, and the transport price depends on the impermanence, size and ways of transporting the products. W. Launhardt (1882) and A. Weber (1909) formed the principles of location selection for industrial enterprises. A. Lösch included the foundations of the theory of spatial management in his work in 1940.

Location of an industrial enterprise according to Weber

Weber's theory is based on the following assumptions:

• the subject of the theory is the location of a single enterprise producing one product in a given quantity,
• the location of consumption places and sources of raw materials is determined,
• transport costs per tonne-kilometer are taken as uniform,
• technical production indicators are accepted as fixed,
• Location is considered optimal when it minimizes transport costs.

Thanks to the above assumptions, Weber solved Varignon's problem (Figure 1).

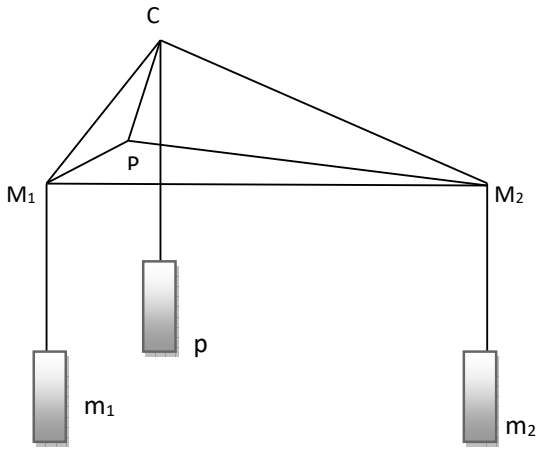

Fig. 1: Varignon location triangle

Source: (Domański, 2006, p. 160).

When we know the point of consumption, i.e. point C and sources of supply with raw materials, i.e. points M1 and M2. Combining these points, we form a triangle, and from the vertices of the triangle we make threads that correspond to the product of the weight of the load (purchased or received at a given point) and the unit cost of transport, i.e. the cost per tonne-kilometer. Then the node is located at the point of balance of forces, which is also the point of optimal location of the industrial enterprise, assuming that the criterion of optimality is the minimum transport costs (Jones, 2017). We can increase the number of supply sources and outlets, provided that the drawn polygon is always convex. When setting wages for the location of an industrial enterprise, Weber assumes that wages are spatially variable and for this reason may cause a deviation or deviation of the location from the point of minimum transport costs. If the company's goal is to minimize the total costs of transport and labor, the spatial diversity of labor costs is an indicator of the optimal location. Weber uses the isodapan technique to determine the minimum cost point and optimal location for the enterprise (Kirsch, 1996). When the optimal location P0 has been pre-determined, which corresponds to the point of minimum transport costs.

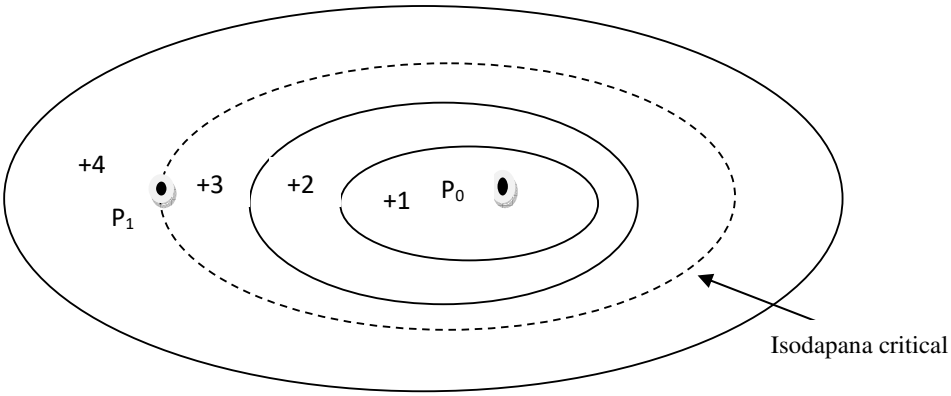

Fig. 2: Izodapany - lines of equal total transport costs per production unit

Source: (Parysek, 2007).

The first isodapane connects points around P0 for which transport costs due to deviation from the minimum increase by one unit. The second isodapana connects points for which transport costs increase by two units. Similarly, you can plot isodapana 3 and later. We then compare the increase in transport costs with the level of labor costs, which may decrease with the distance from the point of minimum transport costs. The line connecting the points where the increase in transport costs is equal to the decrease in labor costs is called critical isodapped (Figure 2). Location costs at each of the points located on this line are equal to the costs at the initial point of P0 minimum (Krugman, 1991). These points are therefore relative to the starting point minimum indifferent. The second factor, apart from labor costs, is the so-called The deviation factor, i.e. moving the company away from the point of minimum transport costs are the benefits of agglomeration. It can more than cover the increase in transport costs and labor costs, attracting industry to places with transport costs and labor costs higher than the optimum P0 at the beginning. At point P1, higher transport costs are offset by lower labor costs. When a new optimum is determined, it is graphically complex and opaque. To this end, other computational methods (techniques) are used, e.g. linear programming.

Spatial substitution according to Predöhl

In the case of Predöhl's theory, it has been shown that there is no connection between the spatial theory of economics and location, because logical connections and constructional principles have not formed. This is because both these areas of research have developed separately and there is no relationship between the general theory of economics on the one hand and the specific theories of agriculture and industry on the other. This gap can be filled by the theory of location derived from economic methods from economic theory. Predöhl used the concept of substitution to introduce space into general economic theory and developed the general theory of location. He showed that production and location are two sides of the same study. Location is then a case of a general economic problem, i.e. a problem of rational choice (Tabuchi and Thisse, 2011). He believed that the same approach as for spatial analysis of an enterprise could be used for location analysis.

Changes in the location of the enterprise attributed to the substitution of factors of production located in different places (Snell, 1992). Substitution is a function consisting of the price of factors of production and the cost of transporting them. Factors located in different places have different properties and prices. As a result, the factors used to obtain the same production in different locations have different proportions. In enterprises, you can replace the less efficient factors with more efficient factors and reduce production costs in individual places. Where land area is determined and all other factors are merged, land substitution for these factors or vice versa can be measured for each location. Other substitution effects can be measured identically. The substitution process may continue until a state where further improvement of the ratio of factors is impossible, i.e. a change in the use of factors

will bring more losses than benefits. After obtaining the most effective combinations of production factors for given places, one can calculate the total costs of obtaining specific production in each place. Places with equal costs are connected by lines of indifference (indifference). In these places, the location is equally beneficial for the enterprise. In this way, a spatial balance is established.

Predöhl not only created a bridge between the theory of equilibrium and the general theory of location. He also presented the connection between his general theory and the earlier location theories of Thünen and Weber. He sees the main difference in the assumptions of both theories in the different nature of the space in which business is conducted. In the case of Thünen, where the activity is continuous, the location factors and transport costs are the factors determining the location. However, in the case of Weber's theory, space is discontinuous with the centers of consumption, work and obtaining resources scattered on it. Location factors include additional factors such as different location factors, and capital and labor costs. In both cases, location factors are matched differently, both Thünen and Weber studied the same, i.e. a combination of different factors. Both theories take into account the principle of substitution, and differ only in the selection of factors due to the difference in agriculture and industry. According to Predöhl, the theories of Thünen and Weber are special theories of his general theory of location. Critics of this theory pointed to its limitations. Assuming the principles of substitution, this theory only applies to a single enterprise and a short period of time, and is based on the assumption of constancy of technology.

General theory of spatial management according to Löschem

The researcher developed a general theory of location assuming profit maximization in contrast to Weber, who was looking for a point of minimum cost. This difference has location consequences. In the case of demand for industrial products, it is not permanent and presents flexibility in terms of prices and income. Then the production and location are different with the criterion of minimizing costs and maximizing profits. According to Löschema, competing enterprises are interdependent. Given the free competition, the number of companies on the market will increase. Each subsequent one will reduce the market area of its competitors until the extraordinary profits disappear. As a result of free competition, there is a desire to maximize the number of business entities. The location results from two opposing assumptions:

• maximizing individual profits,
• maximizing the number of business entities.
Decisions based on these assumptions are to lead to a spatial balance of economic activity. He introduced several real premises to Thünen's theory, namely:
• unit cost of production per hectare,
• production volume per hectare in natural units,
• market prices for agricultural products.

With the above assumptions, the distribution of agricultural production will differ significantly from the arrangement of Thünen zones. It is possible to obtain a more realistic system of mixed farming. He analyzes the advantages of agglomeration from the production and consumption side. Connects with this concept the problem of location of business units with the problems of location of human settlements. The merits of Lösch's work is the theory of the economic region (economic landscape). He derived it from purely economic premises. Apart from the notion of a region, or an administrative and political point of view (Hall, 2009). These reasons are:

• the existence of a large homogeneous plain with an evenly distributed agricultural population and equal transport conditions in all directions,
• occurrence of economies of scale in production and agglomeration benefits,
• moving products involves transport costs,
• tastes and preferences of the population are the same, while flexible demand,
• the price system is used as a manufacturing warehouse,
• enterprises strive to maximize their profits,
• the whole system should be spatially organized so that the total transport costs are minimal.

Economies of scale appear in production, which allows raising profit per unit of production (Karwińska, 2008). As a result, the spatial layout of production is the result of economies of scale and agglomeration, and the cost of transport.

According to Lösch, the economically suitable shape of the market area is a regular hexagon, which of all regular polygons differs the least from a circle. Thanks to this, it minimizes transport costs in meeting the demand. In other words, it maximizes the demand of the population living in the area thus designated. The size of the hexagons forming a network of market areas is different for goods of all kinds (Stabryła, 2006). After superimposing these networks, you'll get a chaotic picture. This chaos can be sorted out with the help of two treatments. First, all networks should be arranged to have one common center point. At this point, the conditions will be created for the development of a big city thanks to the advantage of agglomeration. Secondly, networks around this center should be rotated until six sectors with numerous production locations are obtained. This arrangement has the following properties:

• the largest number of locations converges at the same points,
• the largest number of purchases can be made on the spot (local market),
• the sum of distances between industrial locations is the smallest and as a result, not only transport, but also the length of transport lines are kept to a minimum.

Results of the Research

Optimization of power plant location based on the theories presented is possible due to the use of agricultural raw materials for energy production. The reasons why it becomes possible to use agriculture for the production of energy resources are:

1. The use of production surplus in agriculture that can be used as an energy raw material (waste, inferior quality raw material),
2. Waste from the agri-food industry,
3. Unused land (fallow land, fallow land, meadows),
4. A significant share of arable land with low productivity,
5. High share of excessively contaminated (locally) land that can be used for energy crops,
6. The need to apply the principle of sustainable development and use of renewable energy in the primary energy balance.

In Poland, various forms of renewable energy sources can be used depending on regional and local conditions. The greatest importance is attributed to the possibility of using biomass, because in the case of other renewable sources there are situations limiting their use. The use of biomass from energy crops in the process of combustion (or gasification) contributes to the ecological balance at zero level, i.e. the CO_2 emitted during combustion is equal to the amount of CO_2 absorbed during photosynthesis during the plant growth period. It should be remembered that Poland has the majority of energy imports for energy exports, in particular covering the deficit in oil (18.8 million tons) and natural gas (10.3 billion m3) (Central Statistical Office of Poland, 2019). It should also be remembered that Poland relies mainly on hard coal and brown coal contributing to the greenhouse effect. The West Pomeranian Voivodship has particularly favorable conditions for biomass production for energy purposes, without damaging the country's food security. The use of biomass in Poland already reaches 11.5% (Official Publications of the European Communities, 2019). Combustion technologies are of the greatest importance for biomass such as wood or straw. Combustion is understood as the oxidation reaction of a fuel substance, which is accompanied by the release of energy contained in this fuel. The power sector plays a special role in the development of renewable energy because:

• access to energy allows for dynamic development of the country's economy,
• electricity generation will increasingly be associated with reducing emissions of harmful compounds into the atmosphere.

The above points are important for forecasting the development of the power industry and including this sector to co-create the principles of the green energy market as well as for legal and organizational solutions allowing the effective use of biomass, which at the same time contributes to ensuring the energy security of the country (Healey, 2009). Due to belonging to the European Union and the implementation of the National Development Plan, the Sectoral Operational Programs associated with it, constituting a program of using structural assistance funds also related to environmental protection, allow using instruments to increase the importance of renewable energy in the production of energy and heat (Hejduk, 2016). Rural development should be sought through direct contact with an energy producer, where local governments play a large role (Korenik S., Słodczyk, 2005). As a result of these measures, the use of undeveloped areas for agricultural purposes will increase. Thanks to the production of plants, especially for energy production, it will contribute to increasing the economic efficiency of their use (Duranton and Puga, 2000). Thanks to the synergy of activities related to the cultivation of energy crops as well as techniques and technologies, it will reduce the areas excluded from agricultural use, increase the number of jobs and encourage local communities to do business (Kabus and Nowakowska-Grunt, 2016). From the side of energy producers, the most important is the increase in biomass used in energy production as a result of expectations of an increase in the share of "green" energy generated. It is also required to improve the biological balance of local ecosystems and material flows in the economy by using local energy resources (Stępień and Miciuła, 2016). To strengthen the relationship between energy producers and renewable fuel producers, promote:

• development of technologies for the production and energy use of biomass in the regional aspect,
• development of new technologies and launching pilot biomass production facilities, as well as preparation and use of its final products,
• education, consulting and computerization.

Thanks to the ecological policy and strategy for the development of renewable energy in Poland, you can count on the efficient production and use of biomass as well as providing professional power industry with prospective development and meeting your needs.

Ecological benefits:

1. Reduction of emissions of substances harmful to the environment, including SO2, NOx and organic pollutants, heavy metals,
2. Reduction of CO2 emissions, responsible for the greenhouse effect (correlation with the amount of biomass released for combustion),
3. Limitation of environmental degradation as a result of fossil fuel extraction and deposit of biomass waste in the environment,
4. Reduction of environmental degradation as a result of unorganized, bio-degradation processes of deposited biomass.

Economic and social benefits:

1. Saving fossil, non-renewable fuel resources,
2. Utilization of biomass energy potential,
3. Reducing the cost of energy resources,
4. Stimulating the development of modern technologies,
5. Development of local labor markets,
6. Development of many sectors of the economy,
7. Improving the living conditions of the population, increasing the country's energy security,
8. Implementation of international obligations to reduce emissions of harmful substances into the atmosphere.

The situation of the energy sector in Poland within the country and abroad is not entirely comfortable. The slow pace of reforms contributes to this as well as the departure of the state from the role of the owner of the above sector. It was only the consolidation of state-owned companies, producers and distributors, and the creation of four energy holdings that gave a financial injection to plan the expansion of production capacity. Following consolidation, competition has deteriorated because

companies in their markets are a monopoly by placing customers dependent on supplies under the price dictate wall (Figure 3).

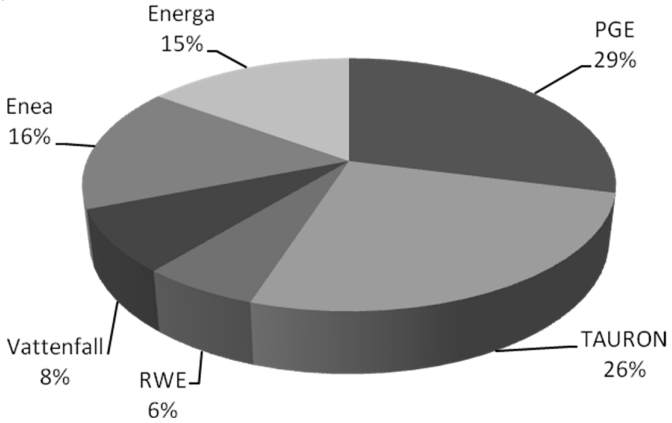

Fig. 3: Percentage market share among energy companies.
Source: own study based on data: (GUS, 2019).

Technologies enabling co-firing of biomass with coal enjoy the most common interest of domestic power and heating companies. There are approximately twenty energy installations co-burning biomass with basic fuels in the country, of which fifteen are system power plants. When co-firing, the most commonly used fuel is wood biomass in the form of sawdust, wood chips, dust and biogas, and also classified as biomass - waste from animal and plant production, e.g. rapeseed pomace, or cereal coffee pomace. Co-combustion of biomass with conventional fuels used as the primary fuel such as hard coal, lignite or peat is carried out in parallel in approximately 150 energy installations in the world, of which 100 co-firing installations operate in Europe and the rest are in the United States. Co-firing contains various fuel configurations for different types of basic fuels as well as biomass and technological fuels including grate, dust and fluidized bed boilers. The electrical power of energy facilities performing the co-firing process is in the area of 50-700 MW. Within ten years, co-firing technologies will have a large share in the implementation of European and international commitments:

- conventional fuels,
- biomass,
- biogas.

The main barriers to the use of biomass resources in co-firing processes in the power industry are technical limitations resulting from currently existing boiler installations. In the case of technological restrictions, they relate to:

- transport and fuel supply installations,
- mill installations because they are prepared for other nominal fuel, e.g. hard coal or lignite. The development of renewable energy based on biomass co-firing requires an impulse consisting in connecting biomass producers with energy producers and priority should be given to the development of energy crops.

Thanks to the increasing production of energy from renewable energy sources, Poland will be able to fulfill its commitment to the European Union and reduce its independence from foreign supplies (Miciuła and Stępień, 2019). This process will also contribute to the development of regions. To this end, it is necessary to find the optimal location for the power plant so that it functions efficiently and the process is beneficial and economically efficient (Miciuła & Nowakowska-Grunt, 2019). Due to the fact that the cost of transporting biomass to an energy company is high and in order to develop regions, the company should build power plants as close as possible to suppliers (selection of suppliers through tenders) or as close as possible to areas of at least the average area with energy crops (Figure 4), because from these areas delivery will last for a long time.

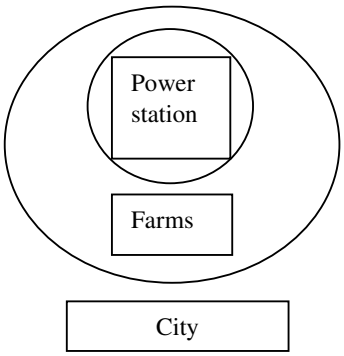

Fig. 4 : Scheme of cooperation between power plants and farms.

The use of biomass for energy purposes should be an absolute priority in the economic development strategy due to:

• lack of local fossil raw materials in large quantities,
• existing heating infrastructure located in small towns and rural settlements,
• environmental conditions enabling comprehensive use of biomass from agriculture and the agri-food processing industry as well as sludges from sewage treatment plants and organic municipal waste,
• predispositions of agriculture with favorable agrarian structure, dominance of large-scale farms,
• unused arable land (fallow and fallow land), unused areas of meadows and pastures,
• significant areas of low quality land, not suitable for consumption crops,
• significant amounts of industrial biomass waste (distilleries, slaughterhouses, agri-food production plants, sugar factories) that require utilization of organic waste, and at the same time are an excellent raw material for biogas production (Ministry of the Environment, 2019),
• activation of rural areas,
• neutralization of problems of overproduction of agricultural agricultural raw materials,
• creating local and regional energy security,
• creating many new jobs in rural areas,
• creating a safe region in terms of energy and implementing modern technologies (intelligent energy),
• creating a self-sufficient energy region with full food security in the medium term,
• in the medium term, energy (agro-energy) agriculture can ensure sustainable profitability of agricultural production, resulting from the extension of sales possibilities to two large independent markets, ie food and energy.

With the help of the theories discussed in the article, the question can be answered about the distance from the factory to places for biomass processing and in what form it should be supplied to obtain the most energy (TJ). This will allow assessing the efficiency of the biomass supply chain to power plants and will enable a favorable selection of biomass suppliers (maximizing energy production with economic efficiency).

Summary

Spatial management as a young scientific discipline does not yet have a general superior theory. That is why she uses many methods, borrowing them from many other scientific disciplines. Spatial management is not part of macroeconomics, as its scope is broader and includes, apart from economic issues, environmental issues as well as demographic, cultural, settlement and technical infrastructure problems. In addition to these fields, a new field appeared, i.e. regional studies, whose initiator and organizer was Isard (Parr, 2014). He created a methodological and theoretical construction for it, which combined economics with geography. Economic geography belongs to the disciplines that pay special attention to the analysis of the location of the phenomena in question, i.e. their spatial aspect.

We can talk about effective and effective spatial management when regulatory systems and intervention of public authorities in spatial management markets take into account specific mechanisms

and laws governing user behavior. The economic rationality and economic effects of spatial policy are the subject of scientific research and analysis as well as practical activities. Location factors have an impact on attracting investors and then on the effectiveness of invested capital. The relations between economic efficiency and the organization of space are indisputable. On the one hand, the interdisciplinary nature of problems of spatial management causes the interest of scientists and practitioners in this subject, and on the other hand results in problems of a classification, methodological and practical nature for this field of knowledge. It also results in the impact of many other areas of regulation and social and economic activities. Spatial management requires further research and the classification and definition of theories at the interface of many sciences, but possible to apply in this science.

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Safe-Deposit Services in The Reality of The Banking Crisis of Confidence. The Case of The Polish Market

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Abstract

The subject of the study is the analysis of safe-deposit services available, the importance of which increases during periods of market turbulence and less confidence in storing money in bank accounts. Excluded from the analysis are storage services of dematerialized financial instruments (cash, deposit, trust and brokerage accounts), escrow and custody accounts for dematerialized securities. The issue was analyzed on the example of the Polish market. The problem is rarely present in studies on banking services. However, the significance of the topic is considerable and still increasing, along with the increasing demand and increasing wealth of the society, as well as the decreasing confidence in banks and fiat money during crisis periods. Banks underestimate the problem, and at the same time an offer of non-banking entities remains insufficient. The aim of the study is to show a widening supply gap in the offer of Polish banks. Paradoxically, this is one of the few examples of services scarcity on the banking services market. Due to the nature of the subject matter and the poverty of professional literature, the author bases the analysis on banking information, media communications and his own expert knowledge as a long-time private banking manager at renowned international banks.

Keywords: Safe-Deposit Services, Banking Crisis, Vaults Operators.

Introduction

Safe and deposit services have been gaining in importance in recent years, especially during financial crises. In the era of digital services and money, increased demand for so-called safe haven assets, also in material form (gold coins or bars, US dollar or Swiss franc banknotes, valuable collector's items, etc.) occur during periods of increased uncertainty or even panic on the financial markets and growing distrust of banks. This took place especially both in autumn 2008 and in early spring 2020 and certainly will repeat from time to time.

Vast quantitative and qualitative easing monetary programs introduced by many central banks and governments make fiat currencies depreciate. National Bank of Poland (NBP) implemented it for the 1st time in history in mid-March 2020, starting to buyback through next 2 months some PLN 90 billion of Treasury or Treasury-guaranteed bonds. In the 1st quarter of 2020 NBP issued a record value of banknotes (30 billion PLN, +13,1%), beating the previous record of the 4th quarter of 2008 (+12,6%). At the same time Poland had record negative official real interest rates among all OECD countries (-4,1% in March 2020 vs. March 2019). It really does not stimulate savings.

Deponents are increasingly asking themselves questions about the security of funds accumulated on bank accounts. Negative real interest rates on deposits last years do not encourage saving term deposits, and the memory of the partial nationalization of some cash deposits in some even European countries (Poland - 1950, Cyprus - 2013) is still alive.

The analysis covers the segment of safe-deposit services in the Polish market in the context of market turbulences. Instruments in place are insufficient while demand arises. Inflexible bank offer is decreasing, while non-bank institutions' offer is still insufficient, but with a hudge growth potential.

In the situation of market imperfection, an important role, both positive and negative, may be played by the legislative and the regulatory bodies.

The aim of the study is to show a widening supply gap in the safe-deposit services offer of Polish banks. Paradoxically, this is one of the few examples of services scarcity on the banking services market. The problem of safe-deposit services, even if well-known and described in the scientific literature on private banking services, is quasi absent in the context of its scarcity. This analysis tries to fill the gap.

The paper consists of 4 sections. In the first one the scope and specificity of treasury and depository service is analyzed. In the second section, the question of security of deposited valuables is presented. Next two sections go deeper into the issue of safe-deposit services availability and analyzes existing constrains in Poland, then going into some alternative solutions in neighbouring countries.

Scope and specificity of treasury and depository services

Growing number of people are looking for a safe place to store valuable movables, including non-financial ones. The main motives for specific search are:

- maintaining 'iron' reserves for a 'rainy day' in assets traditionally considered certain (precious metals and precious stones, collector's valuables);
- protection against loss (destruction, takeover by third parties) of extremely valuable movable property, especially of a personal nature: family souvenirs, important documents, even of not necessarily high objective value; keys.

Safe and deposit boxes are used to store small valuables, paper or electronic documents (on data carriers), valuable souvenirs and personal items. It is forbidden to deposit illegal, dangerous items (e.g. explosives), perishables or animals.

Vaults have many benefits:

- security, through an appropriate physical and electronic security system, including 24-hour supervision;
- discretion and anonymity, by placing the vault in a separate, solidly reinforced and protected room, often underground, reminiscent of a treasury, out of reach of bystanders; however the anonymity is not absolute, because the safe operator knows the customer;
- flexibility, by offering several different sizes of lockers: from small, book size, to larger, cube sizes with sides of about 40-60 cm long, and even the size of a wardrobe; the latter available only abroad (outside Poland), costing up to several thousand euros a year;
- availability, during the bank's working hours or - in some institutions - even 24 hours a day.

There are 3 types of safe-deposit services:

- Safe deposit boxes permanently embedded in a bank safe, with two variants:
  - Vaults opened in the presence of a bank employee and only during the office's business hours; opening / closing a locker requires the use of two keys (or cards) at the same time: one permanently in the customer's possession, and the other - the so-called closing device - at the disposal of the banker, who, however, has no insight into the vault;
  - Self-service safe deposit boxes, available 24 hours a day, 7 days a week, served by the client, without the presence of a banker.
- Safe boxes - unlike the more common boxes, the boxes are not permanently fixed in the bank safe, but are given to the bank for storage; they are usually smaller and cheaper than lockers;

- Bank deposits (in value or in kind) - bank deposits in special boxes or envelopes are subject to, for example, material securities (bonds, shares, savings vouchers), other documents, keys, magnetic storage media.

Modern vaults use multi-level access. In addition to (or instead of) physical keys, electronic keys (codes) and / or magnetic cards are used. The key should be supervised because there is only one copy. Any loss will expose the tenant to the high price associated with the need to obtain a duplicate or forcibly opening the box.

Security of Deposited Valuables

Confidence in bank accounts is limited, especially when the client deposits assets larger than those guaranteed, in accordance with EU directives, by the national deposit guarantee systems that cover deposits of the equivalent of up to 100,000 euro only. During periods of greatest panic on financial markets, in autumn 2008 and spring 2020, there were also cases of withdrawing banknotes from a bank account and depositing them in bank safes, also in Polish banks, to avoid the risk of a possible bankruptcy of the bank or money seizure by the State. A case of deposits ‘haircut’ in Cypriot commercial banks in spring 2013 might be recalled…

Some conceal their property not only from the tax office or creditors, but also from family members. Hiding valuables at home (in a safe or other vault) or buried in a garden (in a "land bank"), although (not necessarily) cheaper, does not guarantee security, due to e.g. the risk of losing location coordinates or (accidental) discovery by unauthorized persons, e.g. a thief.

The bank is responsible for the integrity of the vault, i.e. keeping it whole. The liability of the safe operator is excluded or limited in the event of the deposit being lost as a result of force majeure, e.g. fire, military or terrorist activities. In the event of a burglary into a bank locker and its contents being taken away, the bank should compensate for the resulting losses, provided however that the customer authenticates the loss, i.e. presents bills for the purchase of e.g. lost jewelry and proves that it was in the locker. The very word of the client may not be enough, which can lead to litigation. It is difficult for the bank to refute the testimony of the injured customer, because due to the requirements of discretion, the bank's monitoring cameras do not reach a separate place where the boxes are opened by customers. That was also the meaning of the judgment of the Polish Supreme Court of 27 June 2014.

The deposited valuables, despite the bank's complex physical and electronic security features, are not absolutely secure. Unlike bank cash deposits, the contents of the safe are not covered by guarantees of deposit protection systems in the event of loss or destruction. Instead, they are covered by insurance bought by the bank, but only up to a certain sum insured. The customer may, however, purchase additional insurance to protect the deposited items.

Items deposited in a vault are also not completely safe from being taken by law enforcement authorities. At least two scammers found out about it, extorting PLN 16 million from tens of thousands of users of the Polish online auction site Sknerus.pl. They were arrested in February 2020, and in their flats and deposit boxes the police found EUR 2 million and over PLN 3.5 million, as well as gold bars.

Unlike funds deposited in bank accounts, items stored in safes do not become the property of the bank, seen in its balance sheet. The contents of the safe, as well as securities registered on fiduciary or brokerage accounts, are not included in the bankruptcy estate of a bank or other trustee, unlike cash on accounts. However, a temporary inconvenience in the event of the bankruptcy of the bank operating the boxes may be a temporary lack of access to them, in the event of the bank's branches closing.

Unlike similar solutions in offshore banks, bearer boxes in banks are not allowed, e.g. in Poland. The tenant's anonymity is not absolute. Admittedly, access to the contents of the locker is limited only to

its tenant and any representative, excluding bank employees, and even more so to third parties, but the tenant's identification data is known to the bank. As a consequence, data about the possession of the cache (but not about its content!) can be transferred to authorized entities, e.g. court, police, customs officers or border guards, special services agents, or a prosecutor, as part of criminal proceedings, or - bailiff - in the event of enforcement proceedings. However, 'hunters' must first come to such a vault, and knowledge of its existence may not be easy to obtain if the tenant does not leave information about it.

In Poland, the anonymity of safe users may have decreased after the introduction of the Central Account Database (CBR) Act, which luckily did not finally come into force. The agreement on the provision of a safe deposit box was to be treated as any other bank account (*sic!*).

Identification and contact details of the vault holder and any proxies, in the case of opening / closing / modifying the account, were to be provided by the so-called 'institutions obliged' to the CBR, administrated by the Ministry of Finance. Access to information gathered in the CBR was to have: judicial institutions, police, special and tax services, bailiffs, SEC, etc. Officially, this was to facilitate the fight against crime and money laundering, but also to increase the level of surveillance of all citizens. By oversight (?), Obligated institutions include only banks and other financial institutions, but not non-financial entities, which also offer safe-deposit services. Due to the greater level of discretion, this could open up great opportunities for non-financial vault operators in Poland...

Safe-deposit services offer. A case of the Polish market

Traditional banking safe-deposit services

The storage of items and securities and the provision of safe deposit boxes are included in banking activities, provided they are performed by banks, although they are not restricted to banks, as stated in the Article 5 § 2 point 6) of the Polish Banking Law of August 29th, 1997. As public trust institutions, banks have naturally been devoted to provide these services for many centuries.

Boxes or cassettes are rented for various sub-periods: for several days (from several zlotys a day), for months (from several dozen zlotys) or for a year (approx. 300-500 zlotys annually, depending on the bank). Some banks also charge for a magnetic card or magnetic lock. Agreements are usually concluded for 1 year and usually renewed after each year for the next. If the customer does not empty the box after the contractual period, the bank may open the box and transfer its contents to a deposit less protected than the safe.

The level of fees depends on: the length of the rental, the bank, the size of the box and the demand on the micro market. The fees are not low, but for people depositing valuable things, the costs are still lower than the independent purchase and installation of a home safe, monitoring, insurance, installing gratings on windows, door locks, etc.

In turn, the storage of so-called standard (documents or keys) deposit is carried out in so-called secure envelope or cashier's box. The fee is fixed (on the item, e.g. keys), e.g. several dozen zlotys at once or monthly. For securities and valuables, banks charge a commission (e.g. 1%) on the value as per the bank's fees and commissions table. The cost of storing a small item other than valuables (e.g. duplicate keys) in the deposit is usually lower for the customer than renting a safe box. Non-standard deposits are charged with non-standard fees, sometimes determined by individual negotiations.

At present, safe-deposit boxes or deposit boxes are available in only few larger Polish banks and only in selected branches of these banks. Usually these are large facilities with appropriate housing and technical infrastructure. The conditions are usually met by 'old' branches, existing for several dozen years, located in large, already outdated, but solid and often basement buildings, most often with treasures, mainly in larger cities. New, 'light' facilities, for economic reasons, are usually deprived of such amenities due to housing restrictions.

As a result, banks offer this service only in one or at most few of their flagship branches (Banks: mBank, Alior, ING Bank Śląski, Getin, BGŻ BNP Paribas, Millennium). Only the 3 largest 'old' banks: PKO BP, Pekao SA and BZ WBK each have over 100 branches with safe deposit boxes, i.e. in approx. 10% of their branches, sometimes also in smaller cities. In total, there are approx. 400 bank branches with safes throughout Poland. If in each of these branches there are on average several hundred lockers, and their occupancy reaches about 90%, it means that in Poland 100-200 thousand customers use safe services, i.e. approx. 1% of bank clients.

Safe deposit boxes are also offered by around 10 smaller cooperative banks, but they are rather single branches in smaller towns, physically less well protected than large branches of large banks from large cities. Access to the lockers is usually limited to few hours of branch's working day.

Virtual bank safe and deposit services

As part of electronic banking, few banks offer an electronic (virtual) safe. It is a space available only for the client on the bank's disk on which the client can store his digitized documents. Unlike publicly available virtual disks (e.g. Dropbox), the virtual safe is located in the bank's secure IT environment, ensuring an appropriate level of secrecy and security.

The first electronic safe in Poland was introduced by one of the smallest commercial banks in Poland, Toyota Bank, in March 2007. It was mainly used for archiving correspondence between the client and the bank, statements, etc. However, the client could also use a separate, private disk space to store his private documents, contracts, etc.

As part of the so-called IdeaCloud service for smaller entrepreneurs, virtual safe has been offered by Idea Bank since February 2015. To remove a file from the safe, you must provide a one-time code received by SMS, which also protects against accidental loss of data.

In 2017, a virtual safe was introduced for ING Bank Śląski customers. In addition to the ability to store files in popular formats (doc, pdf, jpg), it is also possible to save e.g. receipts or bills of sale.

Non-bank safe-deposit services in Poland

The gap that arose after the banks left the safes segment is being developed by non-banking companies. There are only few of them on the market, and only for several years.

For example, the ephemeral Skarbiec77 company, operating in 2014-2015, offered a professional, armored deposit vault in Pabianice, central Poland.

Similar services have been offered since the beginning of 2015, mainly to Polish and Ukrainian clients, by the Lublin-based company Twojskarbiec.pl, administering 400 lockers in a tenement house with a converted former treasury facility, bought from Bank Handlowy.

The safe offer of the Śląskie Sejfy company (Silesian Safes Ltd.) operating since 2017, which uses the secure and stylish premises from the pre-war Katowice branch of State-owned Bank Gospodarstwa Krajowego (BGK), is also appreciated among clients.

Discreet and 24-hour deposit boxes have been offered since 2017 by Wrocław Safe 24, which is operated by NPS S.A. company. Deposit boxes are of different sizes and the price of the smallest starts from 55 PLN per month. A large box (400 × 400 × 190 mm) for rent costs PLN 2,670 a year. The facility and assets held therein are protected by insurance provided by the largest Polish insurance company, PZU SA.

At the end of 2020, Skarbiec Warszawa, a branch of the European safe industry giant, the British network of vaults, Merrion Vaults, is supposed to start operating in Warsaw. Due to the pandemic crisis and as its result – a global gold rush – year 2020 seemed to be nearly a perfect timing for the opening, however unplanned. But it proved also to be slightly premature, because initial opening date had to be postponed by half a year, probably due to the crisis lockdown.

Despite the use of professional collateral (and insurance), non-bank safe operators remain ordinary commercial law companies, with relatively small equity, and as such more susceptible for bankruptcy. They are of shadow banking sector, with all kind of risks that it may entail. Banks are supervised by the Polish Financial Supervision Authority (KNF) and as such enjoy greater credibility that is crucial in that kind of business.

In Poland, trade and storage of metals and precious stones are also provided by specialized non-banking mints (in Polish a mint means *mennica*): Mennica Polska, Mennica Wrocławska, Mennica Małopolska, and Mennica Złota. However, gold is not stored there in individual boxes (except for the Gold Mint), but on the shelves of collective warehouses. Investors have also access to the global companies offer, also operating via the Internet. For instance, in the world's largest physical gold, silver and platinum BullionVault website (https://zloto.bullionvault.pl/), one can trade these metals, but also deposit them (gold - for 0.01% of the value per month) in secure vaults, e.g. in Zurich or London.

Warehousing and luggage storage

The storage service as such, even for many months, can be provided by professional companies dealing with the transport and storage of furniture, e.g. for people moving out and temporarily looking for a place to store their belongings. There are rooms of various sizes, usually up to a dozen square meters, as well as mini-boxes, with a cubature of up to several cubic meters.

One can find self-service luggage lockers and lockers that are cheap, or free, at railway stations, in malls, large-format stores or large cultural / sports facilities. Luggage storage facilities are also available at large stations and airports.

Service regulations do not allow long-term storage of items (up to a few days), neither more valuable items. They are poorly protected and barely monitored. The advantage, however, is the wide availability and low or no price.

To some extent, post office may play a role of a safe, but in the short term (up to 2-4 weeks) and rather only for parcels. Additional insurance should be required from the owner to protect any valuables left.

Bank safe-deposit shortage as a manifestation of a market gap

In Poland, the supply is decreasing and the demand for safe-deposit services is growing, especially during periods of high economic and political instability in the world, which is particularly evident in recent years. The vault is also useful in areas threatened by natural disasters, e.g. floods. Like in any other country, demand also increases during the holiday season, when depositors want to secure their valuables for trips.

Most boxes are rented for years and new safes are not being built. These are expensive investments in banking infrastructure, whose profitability is relatively low. The cost of building a large treasury facility can be demonstrated by a failed National Bank of Poland's (NBP) investment, which wanted to rebuild the Polish equivalent of the Fort Knox, near Fort Zegrze, to the north of Warsaw. The main treasury facility of the NBP was supposed to be located there, moved from the cramped and outdated treasury facility at Świętokrzyska Street in Warsaw. The assumed cost of the investment was to

amount to PLN 264 million, but the 2007 tender offers were twice as high (PLN 470 and 568 million). As a result, the NBP abandoned the investment, thus unsuccessfully trying to sell the plot and losing about PLN 30 million on the entire investment.

Commercial banks lockers already rented are rarely released, and the informal waiting queue is usually long. Rental prices are rising and lockers are becoming a rare, even luxury, good. A director of the bank branch (e.g. at Pekao SA) has great freedom in determining the price of such a service. Banks rather prefer investing in mobile banking innovations and would prefer to give up archaic and not very profitable vaults. However, customers will still need them probably for a long time, if not always.

It is more and more common for a bank branch to be liquidated as a result of network restructuring, and then users of safes in this branch, to their dissatisfaction, must empty the safe and move the valuation to another location, found on their own.

Other reasons for banks' lack of interest in creating new safes include: the reluctance of banks for potential reputational risk of storing dangerous or illegal items. Moreover, banks also encourage customers to keep cash on bank accounts which can be transformed into loans, or to keep money in securities (bonds, stock, investment funds units sold with high up-front fees) held in bank's paid custody accounts, rather than in alternative investments (gold, valuables etc.) stored in safes, but purchased usually outside the bank.

Paradoxically, demand does not increase supply. The non-banking offer is small, and even absent in some regions of the country. Luggage lockers do not solve the problem, and foreign solutions are distant and expensive. Starting new vaults is capital intensive and credibility is gained over the years. Activities are not facilitated by the other shadow banking entities scandals last years, and lack of supervision of state institutions (KNF). Although, this lack promotes greater discretion.

Foreign institutions' offer of safe-deposit services

Safes that are hard to reach in Poland can easily be found abroad at the southern and western neighboring countries. Safes facilities are located in the underground, professionally secured, electronically and physically, against burglary, fire, flooding. Temperature and humidity monitoring is provided.

Each box is insured as standard: in Viennese companies, for EUR 35-40,000. Czech safes are insured for about 4 times smaller amounts, but the customer is free to buy additional individual insurance. Some safes are available 24 hours a day, others - during business hours only, e.g. at 10-20.

Vaults may be rented for a week, a month, several months or a year, with the option of extension. In practice, most of them are usually rented for many years. The price is relatively lower for longer tenors, although the annual rental costs from approx. 300-400 to even over EUR 6,000 per box, depending on the company and size of the box.

For example, Vienna has Das Safe company (www.dassafe.com), Palais Coburg company (https://palais-coburg.com/) and Sparta Safe Services company (www.spartasafe.com). At Sparta Safe, renting the smallest safe box costs EUR 70 per month, the largest - up to EUR 1,050.

Safes in Prague are cheaper, where prices, in the case of the smallest safe deposit boxes, start from approx. 400 CZK per month (www.24safe.cz; www.praguesafedeposit.com/).

In Germany, companies of this type usually engage in trading in precious metals, also offering a natural complement to their offer - safes in which one can store bought gold bars and coins. Many Hamburg-based gold brokers are available, e.g.: Hameko (https://hameko.de/schliessfaecher/), Goldkontor Hamburg (https://feingoldhandel.de/schliessfach) or Pro Aurum (https://proaurum.ch).

The range of safes in the United Kingdom is also very rich, with several dozen safes operators, including more than a dozen in London agglomeration, not to mention bank safes.

Safe services are also offered by almost every respectable bank in Western Europe (especially in Switzerland and Luxembourg) which offers private banking services for wealthy individuals.

Comparing with Polish banks, in addition to absolute discretion, operators of foreign safes also offer larger dimensions of lockers. Services are not cheap, which does not bother affluent people, for whom property protection is a priority.

Conclusions

Deposit and safe services in Poland constitute an unused gap, which is widening as banks gradually withdraw from this segment, and a poor offer on the part of non-banking entities. Limited supply does not respond to growing market needs. In a more and more wealthy society, the role of deposit services is growing. The group of collectors and safe haven valuables owners for whom lockers are an essential protective element is expanding. This reduces the security of potential depositors who are forced to invest in home safes and other security measures (monitoring tools…), which, however, does not necessarily eliminate the personal risks associated with burglary.

In addition, in the era of market turbulence, such as the 2008 financial crisis or the 2020 pandemic crisis, the demand for deposit services and the ability of deposit gold, 'hard' currencies, important documents and various valuables are rapidly increasing.
Forthcoming years should bring an increase in the supply of this type of services, although, on the other hand, restrictive legislative initiatives aimed at combating crime can channel the demand and supply rather towards non-banking solutions, including foreign ones. The legislator should consider extending the operation of such national entities to the supervision of the regulatory body. This would increase the level of security of valuables deposited by customers and reduce systemic risks, although it would reduce the level of anonymity.

The paper explores the situation on the Polish market. Further research should be taken under consideration for other markets. Also further and deeper study should be also conducted inside some chosen banks or even within the banking sector as a whole, in order to detect economic and financial constrains that make this kind of services so unattractive for contemporary banks to develop.

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Sustainability in the Context of Investment Decisions on Financial Markets

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Abstract

The paper addresses sustainability concept implementation in the context of investment decisions maked on modern financial markets. The starting point of the research is theoretical analysis of sustainable investment as a scientific category. It creates required methodological prerequisites for the characteristics of the world market for sustainable investment. The research is based on a systems approach. In the framework of this approach, general scientific and special financial research methods are applied including methods of systematization, classification, and descriptive statistics. Major research results contains: a) revealing the content of the sustainable investment concept in relationship with categories of socially responsible investment (SRI), responsible investment (RI) and social or socially directed investment (SI or SDI); b) providing a systematic view on the market segment of the sustainable investment system; c) considering the global profile of sustainable investment decisions on financial markets. The reported study was funded by RFBR according to the research project № 19-010-00526.

Keywords: Sustainable Investment, Responsible Investment, Sustainable Finance, Financial markets.

Introduction

The sustainability concept is a debatable issue and its financial perspective is not the exeption (Lvova et al, 2019a). In the context of investment decisions, its content can be revealed from a position of the theory of public goods, presuming that investment make certain contributions to their formation (Ivanova

2013, p. 32). It is also common to draw parallels between resposible investment behaviour and sustainable financial solutions that in a first approximation allows to divide traditional investment decisions from those of responsible investment. In the first case (traditional investment), the expected profitability, risk, liquidity are the determining guidelines for the investor's decision to invest. In the second case (sustainable investment), sustainability is added to the listed characteristics (Wallis, Klein, 2015, p. 63). Thus, sustainable investment can be considered as investment, decisions about which are made taking into account the sustainability factor. Todate, sustainability in the context of investment decisions on modern financial markets covers three related terms: socially responsible investment, responsible investment and social investment. Misunderstanding of the relationship between these terms leads to an erroneous assessment of market dynamics. Another important gap concerns the characterization of the sustainable investment system, the knowledge of which is to some extent fragmented. To fill these gaps, we turn to theoretical analysis of the sustainable investment concept and the sustainable investment system and then provide the characteristics of the world market for sustainable investment.

The Sustainable Investment Concept

The content of the sustainable investment concept addresses financial decisions in field of socially responsible investment, responsible investment and social investment. Consider the relationship between these related terms in more detail.

In the strict sense, the term 'socially responsible investment' (SRI) is more suitable for such a broad definition, while 'responsible investment' (RI) suggests that the principles of responsible financial behaviour appeal to Economic, Social and Governance Principles (ESG-principles) (UNEP FI 2007, p. 59, 63, 65; UNEP FI and UN Global Compact 2019, p. 4). However, the ESG principles are not clearly defined (UNEP FI and UN Global Compact 2019, p. 4). Therefore, the line between 'responsible' and 'socially responsible' investment is rather blurred. As a result, two opposite trends can be observed in academic and professional practice. The first consists in combining terms related to the concept of responsible investment. For example, the US Forum for Sustainable and Responsible Investment (US SIF) combines sustainable, responsible, impact (also referred to as SRI) into one thematic area of investment decisions. Besides, it notes that these terms are used in some cases as synonyms, along with such as 'ethical investment', 'value-based investment', 'green investment', etc. (US SIF 2019). The second trend is to identify the specifics of the discussed terms content, which allows a more detailed analysis of the structural component of the concept (inter alia, Miroshina, Golubev 2018, p. 250-251).

A significant body of scientific research is devoted to a comparative assessment of the return on traditional and responsible investment at a given level of risk. The results obtained cover all potential alternatives. Some authors argue that the returns are comparable. Others believe that traditional investment is more effective or demonstrate the benefits of responsible investment. A detailed literature review on this subject is given in the work of M. Wallis and C. Klein (2015). An example of a comparative assessment of traditional and responsible investment according to data on Russian companies is presented in the article by N. E. Annenskaya and E. V. Kiselyova (2018). The authors conclude that the asset portfolio, compiled on the principles of responsible investment, has comparative advantages. However, these advantages are realized only when the formation of the portfolio takes into account the basic principles of eliminating undesirable investment assets.

The problem of comparative profitability at a given risk level brings us the question of the relationship between the categories 'responsible investment' and 'social investment'. The second category is also commonly referred to as 'socially directed investment' (SDI). The difference between them lies in the fact that responsible investment is focused on market profitability, while social investment initially assumes a return below market (Wallis, Klein 2015, p. 70). Note that, a complete rejection of profitability does not allow, in principle, to talk about investment. Correspondingly, non-financial motives are more significant for social investment, than financial ones, or, perhaps, the investor expects a delayed and not

completely obvious economic effect. Combining the above, corporate social responsibility (CSR) programs are more appropriate to link with socially directed investment (not responsible or socially responsible). The concepts of SRI, SDI, and RI form the sustainable investment universe and can be represented as the following chart (fig. 1)

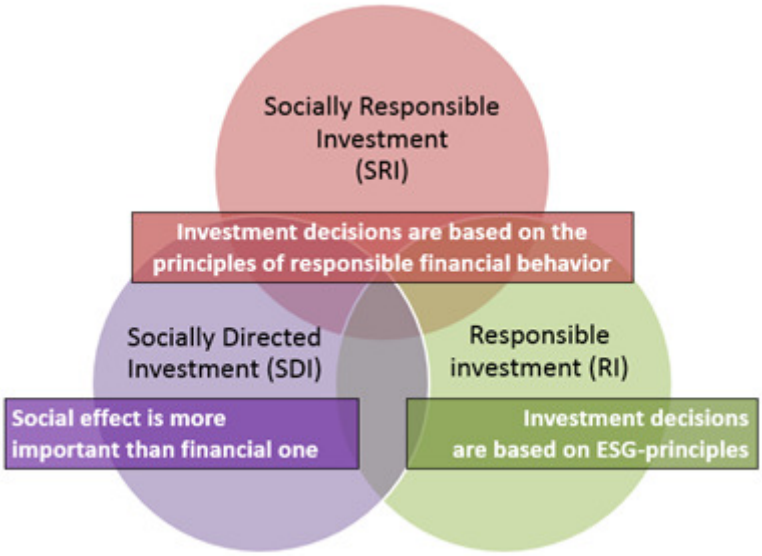

Fig. 1. The sustainable investment universe

Source: authoring

The market segment of the sustainable investment system

For research purpose, we suggest that main elements of the sustainable investment system are the subjects (investors) and objects (recipients of financial resources) of investment process, as well as financial mechanisms providing redistribution of financial resources. While considering sustainable investment it is difficult to ignore schemes with state participation. It couses the question of a wider representation of the sustainable investment system, in which, of course, there is a room for budgetary financing, legislation, supervision, and regulation (Damianova et all 2018, p. 35). Nevertheless, within the research framework we turn to the sustainable investment in the context of market relations (the sustainable investment market). This prerequisite defines the perception of market volumes and development drivers.

The main subjects of the sustainable investment market include individuals, credit unions, public funds and development banks, venture funds and specialized real estate funds, hospitals and medical educational institutions, religious organizations, etc. (US SIF 2019). Depending on the mechanism and threshold of investment, these entities are usually divided into private and institutional ones. In order to characterize the global market for sustainable investment, it is assumed that private investors (qualified and unqualified) mainly use collective investment mechanisms. This, in particular, allows investing relatively small amounts of money. Qualified institutional investors (pension funds, insurance companies, universities, etc.) – mainly use direct investment mechanisms and, therefore, investment products with wholesale characteristics (GSIA 2018, p. 11).

Institutional investors are actively involved in developing and promotion of sustainable investment standards. In particular, at the initiative and with the support of the UN, institutional investors developed Principles for Responsible Investment – 'PRI' (UNEP FI and UN Global Compact 2019, p. 5,7).

According to the PRI, sustainable investors are obliged to: 1) include the ESG issues in investment analysis and decision making process; 2) be active owners and incorporate ESG issues into ownership policies and practices; 3) seek from the investment objects proper disclosure of information on the ESG issues; 4) promote the adoption and application of PRI in the investment sector; 5) To work together to increase efficiency in the application of PRI; 6) report on their activities and progress in applying the PRI. The PRIs were first introduced on the New York Stock Exchange in 2006. Today, this initiative is supported by more than 2,000 investors accumulating over USD 80 trillion in their assets (UN PRI 2020).

The main objects of the sustainable investment market are represented by companies and projects that meet the criteria for sustainable investment. An approximate list of these major criteria appeals to ESG principles and, accordingly, can be detailed in three components (tab. 1).

Table 1: Major criteria of sustainable investment

Groups of criteria	Corresponding criteria
Environmental (E)	• Climate change • Greenhouse gas emission • Depletion of natural resources (including water) • Waste and environmental pollution
Social (S)	• Working conditions (including the use of slave and child labour) • Relations with local communities (including indigenous peoples) • Health and safety • Employee relations, diversity in the composition of the staff
Governance (G)	• Payments to top managers • Bribery and corruption • Management structure and diversity • Tax strategy

Source: UNEP FI and UN Global Compact 2019, p. 4.

Interaction between subjects and objects of sustainable investment market can be organized using various traditional and innovative financial instruments. Sustainable investment with the participation of financial intermediaries may consist in purchasing a share of a specialized investment fund, in providing a bank loan to a target company, in opening a deposit at a financial institution financing the corresponding companies or projects. Besides, multi-instrumental schemes, which are characteristic for financing large investment projects (project financing), are applied as well as different forms of alternative investment (including without the participation of financial intermediaries). However, main financial flows on the sustainable investment market are mobilized by institutional investors applying financial market instruments. They include investment units, stocks, bonds and other securities that meet the requirements of special investment strategies. These strategies are classified differently. In particular, the GSIA classification includes seven basic types of such strategies – they are marked in gray (see: tab. 2).

Table 2: Key sustainable investment strategies

Strategy groups	Strategy subgroups	Basic types of strategies	Description of basic types of strategies
1 Passive ownership strategies	1.1 Investment portfolio management strategies	1.1.1 Negative screening	Exclusion of specific sectors, companies or practices from the fund or portfolio based on individual ESG criteria
		1.1.2 Positive screening	Investing in sectors, companies or projects, the choice of which is the result of a positive assessment by ESG criteria, compared to peers in its class
		1.1.3 Norms-based screening	Verification of investment for compliance with the minimum requirements of international standards of

			business practice
		1.1.4 ESG integration	A systematic and clearly traceable inclusion of environmental, social and managerial factors in the financial analysis conducted by investment managers
		1.1.5 Sustainability themed investing	Investments in activities or assets that are directly related to sustainability (e.g. clean energy, green technology or sustainable agriculture)
	1.2 Impact investing		Targeted investment aimed at solving social or environmental problems, including investment in community development, in which capital is provided to individuals or groups of people traditionally experiencing financial services deficit, as well as direct financing of companies that implement specific social or environmental goals
2 Active ownership strategies	1.3 Corporate engagement and shareholder action		Using the powers of shareholders to influence corporate behaviour according to the ESG principles, including through direct corporate participation (for example, negotiations with senior management and/or companies boards of directors), preparing and participating in the preparation of shareholders' proposals, voting by proxy

Source: GSIA, 2018, p. 7; Wallis, Klein, 2015, p. 68; authoring.

As it shown in the table 2, the basic types of strategies can be combined into three subgroups depending on the mechanism for implementing responsible investment behaviour. Notably, impact investing (as one of subgroup and simultaneously a basic strategy) is a rather controversial issue for unambiguous characteristics. Some authors consider them to be a hybrid of RI and SDI since they can be applied at different levels of expected profitability, including a below market profitability (Babenko, Bik, Postnova 2018, p. 16). Finally, two first subgroups of strategies are commongly contrasted with the third one in order to evaluate sustainable investment results (both financial and non-financial).

Sustainable investment decisions in Global Market Practice

According to the Global Sustainable Investment Alliance (GSIA), at the beginning of 2018, the total volume of the five largest markets for sustainable investment exceeded USD 30 trillion. The United States, accounting for an average of about 41% of professionally managed assets (for comparison, two years earlier, the values of similar indicators were about USD 23 trillion and 31% of the assets, respectively) (GSIA 2018, p. 3, 9). The leaders in terms of financial assets in the market are the developed countries of Europe and the United States, followed by Japan, Canada, Australia and New Zealand (fig. 2).

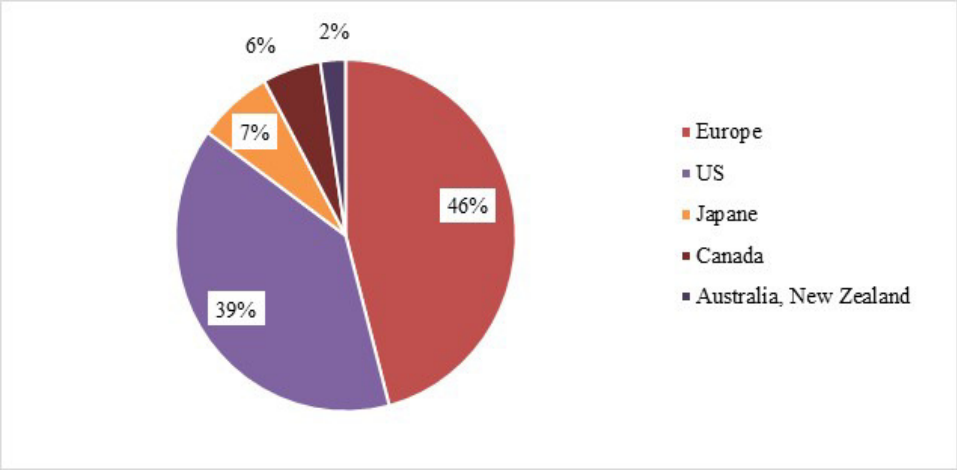

Fig. 2: Geographical structure of the world sustainable investment market, % of total financial assets

Source: GSIA 2018, p. 8, 9; authoring

According to the GSIA methodology, the following countries are included in the list of the analysed European countries: Austria, Belgium, Great Britain, Germany, Denmark, Spain, Italy, Netherlands, Norway, Poland, France, Sweden, Switzerland. The share of other countries in the global volume is not so insignificant. Thus, the total volume of financial assets in the market for sustainable investment in African countries (Botswana, Ghana, Zambia, Zimbabwe, Kenya, Mauritius, Namibia, Nigeria, Rwanda, Swaziland, Tanzania, Uganda, South Africa) is estimated at USD 428.3 billion for the same period) (GSIA2018, p. 19). Asian market size excluding Japan (Bangladesh, Vietnam, India, China (excluding Hong Kong and Taiwan), Hong Kong, Taiwan, Indonesia, Malaysia, Pakistan, Singapore, Thailand, Philippines, South Korea) in 2016 amounted to USD 52.1 billion (GSIA, 2016, p. 16, 25) (for a later period, data on the methodology of the commented global report are not presented).

The structure of investors is dominated by institutional ones, but their share in the market for sustainable investment is gradually decreasing. Thus, in 2012 they accumulated 89% of the market, while at the beginning of 2018 their share decreased to 75% (GSIA 2018, p. 12). The main assets in the sustainable investment market are represented by equity (including private equity, venture capital and, predominantly, public equity) as well as fixed income securities. The share of other assets (shares in hedge funds, deposits, commodities, investment in infrastructure and real estate) is less significant (fig. 3).

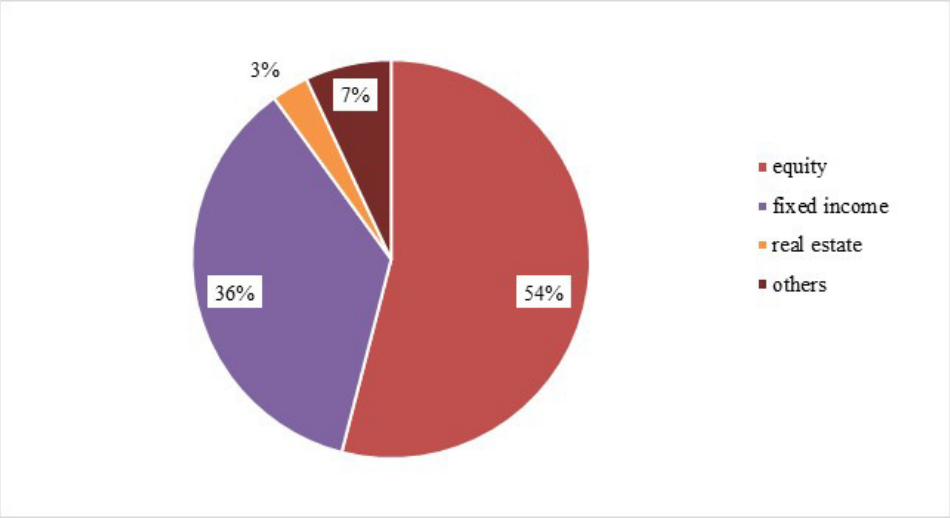

Fig. 3. Instrumental structure of the world sustainable investment market, % of financial assets

Source: GSIA 2018, p. 12; authoring

Most often, for the purposes of sustainable investment, negative screening is used, which is the leading strategy only in Europe, while ESG integration is mostly typical to the USA, Canada, Australia and New Zealand, and the involvement of shareholders to Japan, (GSIA, 2018, p. 10). However, the profile of applied strategies is changing. It can be expected that it will gradually become more diversified (fig. 4).

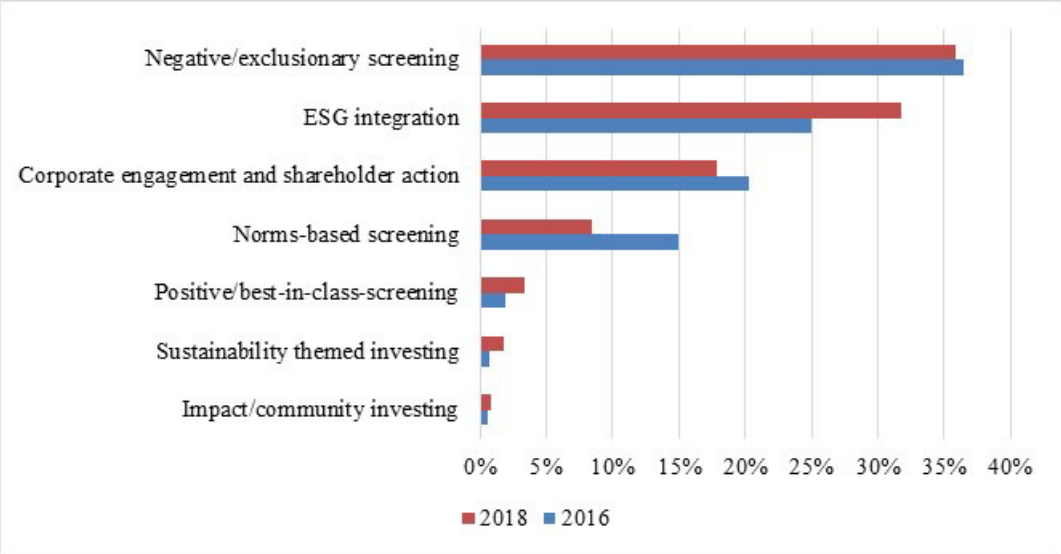

Fig. 4: Application of sustainable investment strategies, % of total financial assets

Sources: GSIA, 2018, p. 10; GSIA, 2016, p. 8; authoring

A generalization of studies on the direct impact of sustainable investment on business practice allows us to conclude that a significant expected effect is achieved by the strategy of involving shareholders, while the results of implementing strategies aimed at redistributing capital are uncertain and depend on specific conditions (see more details: Kölbel et all 2019). Regarding the indirect effects of sustainable investment (effects of condemnation, support, best practices, demonstrative) (Kölbel et all 2019, p. 12-14) its results are even more unobvious. Do these findings affect the popularity of the strategies? As a matter of interest, international practice says the opposite. In general, the market for sustainable investment is at a stage of active growth, which creates new challenges and opportunities for the common financial market of the EAEU.

It should be noted that the instrumental structure of the sustainable investment market, as a rule, does not include a credit component. However, the share of sustainable lending in comparison with the total market size is not so significant. The global volume of loans related to ecology and sustainable development (the interest rate on such loans is tied to the borrower's ESG indicators) reached almost USD 100 billion in 2018. (Fig. 5).

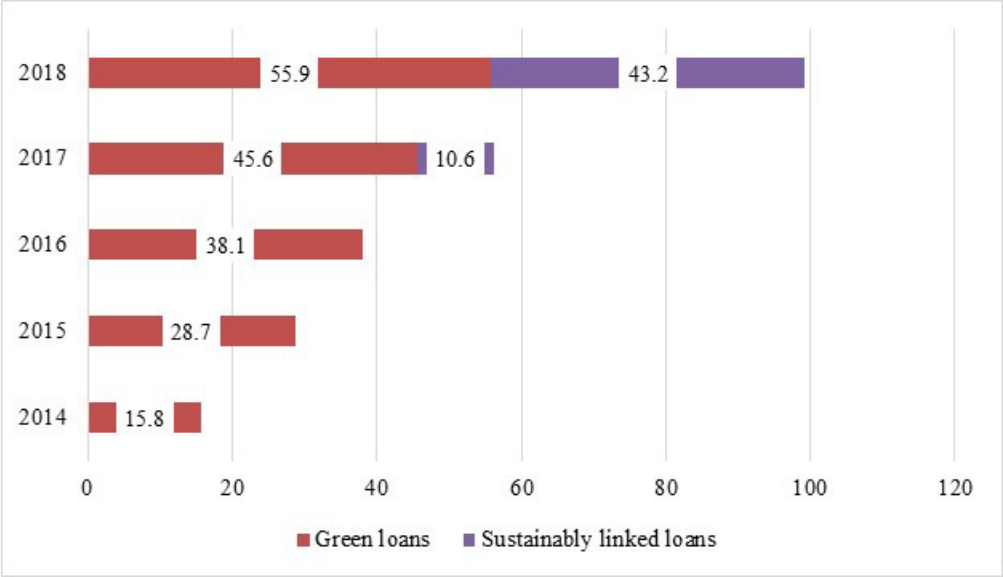

Fig. 5: The total volume of loans issued related to the ESG indicators of the borrower, USD bln

Source: Linklaters LLP, p. 11; authoring

The activity of sustainable lending is clearly growing, and the growth rate is increasing from year to year. This may be of interest in developing a strategy for sustainable segments of emerging financial markets, since the financial systems of these countries are primaraly debt-oriented and generally bank-based. For instance, it is the case for the Russian financial market and the future common financial market of the Eurasian Economic Union (Lvova et al, 2019b).

Conclusion

Sustainability deserves close attention in the context of investment decisions and financial markets' development. The concept of sustainable investment continues to transform, reflecting the trends on financial markets, where more and more impressive volumes of assets are managed by the ESG

principles. The research allow revealing the content of the sustainable investment concept, providing a systematic view on the market segment of the sustainable investment system, considering the global profile of sustainable investment decisions on financial markets. There is clear evidence that the studies of the theory and international practice of sustainable investment are relevant, especially in countries where the corresponding market segment is just being formed (as in the Eurasian Economic Union). This determines the prospective directions of further research.

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Analysis of Contagion in Financial Markets Using Conditional Correlation Coefficient and Conditional Copula Functions – Polish Stock Market Versus Other Markets

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Abstract

Our definition of contagion in financial markets is a significant increase in cross-market linkages after a shock to one or group of countries. Contagion occurs if cross-market co-movement increases significantly after the shock. In this article, the author attempt to answer the question whether the selected world stock exchanges and economies are infecting each other within the meaning of the definition provided. Conditional copula functions and conditional Spearman's correlation coefficient will be used as a tool. Main goal of this paper analysis of changes in dependence between Polish stock market (WIG20) and chosen groups of world stock markets using conditional copula function and conditional correlation coefficient and dynamic correlation coefficient.

Keywords: contagion in financial markets, conditional measure of concordance, conditional copula function

JEL: C43, C58, G100

Introduction

Financial crises are an important phenomenon for the economy because in time of the crisis the cost of intermediation and the cost of credit increases, access to credit is also more difficult. This results in a reduction in activity of the real sector which may lead to the crisis in this sector.

The quite high incidence of financial crises may lead to the conclusion that the financial sector is particularly sensitive to various types of disturbances. In particular, the crisis of recent years has shown how the global economy is sensitive to disturbances in the era of globalization (BIS, 2009; Brunnermeier, 2009; Coffee, 2009; Guillen, 2009; Kolb 2010; Shiller, 2008). For the purposes of examination of determinants of the spread of the financial crisis, one of the methods to analyze the linkages between global capital markets was used in this paper. They should give an answer to the question whether the crisis is a significant increase in the relationship between markets, which in part explains this rapid spread of the crisis.

In literature on contagion most of authors analyses relationship between stock market indices (e.g. see Baig and Goldfajn, 1999; Forbes and Rigobon, 2002; Bae *et al.*, 2003; Baur and Schulze, 2005; Bekaert *et al.*, 2005; Boyer *et al.*, 2006; Chandar *et al.*, 2009; Horta *et al.*, 2010; Markwat *et al.*, 2009 and Dungey *et al.*, 2010 among others). Baur (2012) analyses connection between stock and real markets but he used data only from financial markets, divided on sectors. In our paper we analyse dependence between financial market.

A tendency to increase the relationship between financial markets during the crisis, compared with dependency beyond the crisis was one of the phenomena associated with financial crises that have occurred over the past several years. As already mentioned, this property is called financial contagion and because of its fairly serious effects it drew the attention of many theorists and practitioners dealing with finance. Several methods to check the contagion were proposed. Most of these methods focus on

finding changes in a multi-dimensional distribution of the return rates in times of crisis and beyond these periods. The basics of this approach and further literature on the subject are presented in papers (Forbes and Rigobon, 2002; Bae, *et al.* 2003; Pericoli and Sbracia, 2003; Dungey et al., 2005; Rodriguez 2007).

Another approach was introduced a few years ago in papers of (Bradley and Taqqu, 2004; 2005a; 2005b]. The authors have assumed that market contagion from market X to market Y occurs when the dependence between the market X and Y is greater when the market X is in period of above-average declines than when the market situation X is normal. In other words the dependence is greater when the market X returns are in the left tail of the distribution than in its central part. Since this definition does not focus on the period in which there is a crisis, but the manner in which "place" of distribution we are, contagion defined in this manner is called spatial contagion.

Most often, it is assumed that the contagion in financial markets occurs when in the crisis period correlation between price movements in various financial markets is much greater. In this article, the authors attempt to answer the question whether the selected world stock exchanges and economies are infecting each other within the meaning of the definition provided. Conditional copula functions and conditional Spearman's correlation coefficient will be used as a tool.

Main goal of this paper is to analyze changes in dependence between Polish stock market (WIG20) and chosen groups of world stock markets. The problem of the rising dependence between the markets in the periods of financial turmoil is already very well-known, proved in many empirical studies and with the application of several econometric methods (multivariate GARCH models, Dynamic Conditional Correlation models (DCC), copula-based models (see Marçal, *et al.*, 2008; Naoui, *et al,*. 2010; Lim 2013)).

The methodology of Empirical Research

The definition of the copula function is as follows: *2*-dimensional function C: $[0, 1]^2 \rightarrow [0, 1]$ is referred to as the copula function if it meets the following conditions (Joe, 1997; Nelsen, 2006):

a) $C(u, v)$ is an increasing function regarding u and v,
b) $C(u, 0) = 0$, $C(0, v) = 0$,
c) $C(u, 1) = u$, $C(1, v) = v$.

The importance of the copula function in the multivariate analysis stems from Sklar's theorem (Sklar, 1959; Schweizer and Sklar, 1974):

Let H be the two-dimensional cumulative distribution function whose marginal distributions are respectively denoted by F and G. Then there is a relationship C where

$$H(u, v) = C(F(u), F(v)). \tag{1}$$

If the F and G are continuous, then C is uniquely determined. In addition, if F and G constitute cumulative distribution functions, the function H defined by the above equation is the two-dimensional cumulative distribution.

In other words, this function gives the full dependence structure between the marginal cumulative distributions, creating along with these distributions a multidimensional one, of course subject to the assumptions set forth above.

Let $C_{(U,V)|S}(u,v)$ be a two-dimensional conditional copula function, conditioned on a subset S of the set $[0, 1] \times [0, 1]$ where U and V are cumulative distributions of returns of two stock market indexes: $U = F(X)$, $V = G(Y)$. X is distributions of returns of first stock market index, Y – of the second market. In the remaining part of the paper X and Y will also mean the first and the second market.

To explore the concept of contagion, we can consider the following subsets S (Durante and Jaworski, 2010):

$$
\begin{aligned}
S_L &= [0, \alpha] \times [0, 1] \\
S_R &= [1-\alpha, 1] \times [0, 1] \\
S_D &= [0, 1] \times [0, \alpha] \\
S_U &= [0, 1] \times [1-\alpha, 1] \\
S_{LD} &= [0, \alpha] \times [0, \alpha] \\
S_{RU} &= [1-\alpha, 1] \times [1-\alpha, 1] \\
S_V &= [\beta, 1-\beta] \times [0, 1] \\
S_H &= [0, 1] \times [\beta, 1-\beta] \\
S_M &= [\beta, 1-\beta] \times [\beta, 1-\beta].
\end{aligned}
\tag{2}
$$

Sets S_L, S_R, S_D, S_U, S_{LD} and S_{RU} are called tail sets, and S_V, S_H, S_M are called central sets. Conditional copula functions are defined as conditional on the domain, which in this case is one of the above sets, and are labelled for example C_{S_L}.

Comparing in a certain way the conditional copula function based on one of the tail sets with a function based on one of the central sets, you can examine whether the phenomenon of contagion between the two analysed variables exists, in this case between the chosen indices rates of return.

In this paper, for the purposes of comparing the two copula functions so-called positive quadrant dependence PQD is used (Durante and Jaworski, 2010). We define $C_1 \ll_{PQD} C_2$ if for all pairs $(u, v) \in [0, 1]$ $C_1(u, v) \leq C_2(u, v)$, in other words C_2 is greater than C_1 with regard to PQD, if for each pair (u, v) C_2 has higher values than C_1. This means that the dependence between u and v is stronger in the case of the function C_2 than C_1. Using this fact, the construction of sets S and the notion of contagion, you can define such cases:

Market X is contagious to Y, if $C_{S_V} \ll_{PQD} C_{S_L}$.
Market Y is contagious to X, if $C_{S_H} \ll_{PQD} C_{S_D}$.

In case $C_{S_M} \ll_{PQD} C_{S_{L,D}}$, we have symmetrical contagion.

Contagion is defined here as an increase in dependence on the lower left tail of the cumulative distribution, compared with the central region of the distribution. This definition does not need to determine directly when we are dealing with a period of crisis, and when with a normal period, but indirectly it is assumed that the crisis occurs when the marginal cumulative distribution function of return rates is lower than the present level α on one or both markets.

There are at least two ways to analyse empirically the relationship between the given conditional copula functions. The first is an attempt to fit a copula function to the data and estimate its parameters. On this basis, you can try to determine the conditional copula functions, and thus determine whether the contagion conditions are met. This approach, however, involves two major problems. Firstly, the fitting of the copula function to the real data usually results in estimation errors which may be multiplied in the process of fitting the conditional copula function. Secondly, determination of the conditional functions can be difficult, especially if you fail to get an explicit formula of this function (Durante and Jaworski, 2010).

Therefore, in this study other non-parametric approach was used following the work of Durante and Jaworski. They proof that it is possible to estimate of the correlation coefficients without using any knowledge about the type of the copula function (Durante and Jaworski, 2010). As we have seen, all the definitions of contagion are based on the comparisons among copulas in the PQD ordering. This ordering is also known to be a concordance ordering in the sense that if $C \ll_{PQD} D$, then $\kappa(C) \leq \kappa(D)$,where κ is any measure of concordance, such as Kendall's τ or Spearman's ρ (Nelsen, 2006; Scarsini, 1984).

Using this fact, one can examine the occurrence of contagion, checking the occurrence of the following relationships:

Market X is contagious to Y, if $\kappa(C_{S_V}) \leq \kappa(C_{S_{I.}})$.
Market Y is contagious to X, if $\kappa(C_{S_H}) \leq \kappa(C_{S_D})$.

In case $\kappa(C_{S_M}) \leq \kappa(C_{S_{LD}})$, we have symmetrical contagion.

A measure based on Spearman's rank correlation coefficient ρ is used in the remaining part of the paper. Because this ratio is calculated for the conditional copula function, it is referred to as the conditional correlation coefficient (Dobric, Frahm, Schmid, 2007).

$$\rho_S = \frac{12}{n_S} \sum_{i \in I_S} \frac{r_S(u_i)}{n_S} \frac{r_S(v_i)}{n_S} - 3, \tag{3}$$

where: ρ_S – conditional Spearman's rank correlation coefficient,
n_S – number of observations in set S,
I_S – index of observation belonging to set S,
r_S – rank of observation in set S.

To assess the statistical significance of the results, a bootstrap method was used (Schmid and Schmidt, 2006; 2007).

There were five steps in calculations of conditional Speraman's ρ:
1. Choose pair of measures/indexes
2. Specify subsets S for $\alpha = 0.05$ and $\beta = 0.1$, for a given lag
3. Compute ρ_S for the subsets S
4. Compute confidence intervals of ρ_S (Schmid and Schmidt, 2006; 2007) with confidence level 0.05, 10 000 iterations.

Data Description

To validate financial contagion hypothesis we used logarithmic weekly returns from 19 chosen world market indexes, and split them into 6 groups. One of the main criterion of choosing these particular markets was availability of data for the longest possible period January 1998 – April 2020, encompassing several normal and crisis times:

1. Leading European markets: Germany, France, United Kingdom.
2. Smaller European Markets: Greece, Spain, Italy.
3. Emerging European Markets: Poland, Hungary, Czech Republic.
4. North America: USA, Canada, Mexico.
5. South America: Brazil, Argentina.
6. Asia: Japan, China, India, Hong Kong, Singapore.

Table 1 reports summary statistics of stock market indices' weekly returns for all 19 countries. The statistics are based on the entire sample period and show significant differences in mean and variance. From results of Augmented Dickey-Fuller test (ADF) (Dickey and Fuller, 1979) we see that all-time series are stationary.

Table 1: Descriptive statistics of log returns

	Germany	**France**	**United Kingdom**	**Greece**	**Spain**
Number of observations	1165	1165	1165	1165	1165
Mean	0.00080	0.00037	0.00108	-0.00072	-0.00005
Variance	0.03287	0.03041	0.02543	0.04390	0.03215
ADF statistic	-34.52956	-35.92455	-32.83053	-32.59908	-35.53090
ADF p-value	Less than 0.01	Less than 0.01	Less than 0.01	Less than 0.01	Less than 0.01
	Italy	Poland	Czech Republic	Hungary	Canada
Number of observations	1165	1165	1165	1165	1165
Mean	-0.00028	0.00009	0.00050	0.00126	0.00070
Variance	0.03355	0.03456	0.03028	0.03611	0.02452
ADF statistic	-33.35453	-33.63339	-31.37681	-33.60952	-35.76092
ADF p-value	Less than 0.01	Less than 0.01	Less than 0.01	Less than 0.01	Less than 0.01
	United States	Mexico	Brazil	Argentina	Japan
Number of observations	1165	1165	1165	1165	1165
Mean	0.00095	0.00168	0.00178	0.00332	0.00022
Variance	0.02534	0.03165	0.04108	0.05156	0.03086
ADF statistic	-36.67814	-35.11357	-35.33417	-32.82673	-35.27931
ADF p-value	Less than 0.01	Less than 0.01	Less than 0.01	Less than 0.01	Less than 0.01
	India	China	Hong Kong	Singapore	
Number of observations	1165	1165	1165	1165	
Mean	0.00187	0.00074	0.00072	0.00045	
Variance	0.03193	0.03255	0.03224	0.02901	
ADF statistic	-32.67746	-31.96620	-34.38559	-33.76997	
ADF p-value	Less than 0.01	Less than 0.01	Less than 0.01	Less than 0.01	

Source: Own analysis

Empirical Results

In this section we present results of estimating contagion from and to Polish stock market. First part of results are presented in table 2 where in row S_H ρ_S values are provided for set S_H, columns S_{Hd} and S_{Hu} contain respectively lower and upper boundaries for confidence intervals of ρ_S for set S_H. In column S_D ρ_S values are provided for set S_D, Columns S_{Dd} and S_{Du} have analogical meaning. If $S_{Dd} - S_{Hu}$ is greater than zero, the dependence between markets in times of distress in the second market is significantly (significance level is 5%) greater than dependence in normal times, which can be acknowledged as a proof of contagion from second market to Polish market. These situations are marked in bold.

Table 2: Contagion to Polish stock market from other stock markets

	S_H	S_{Hd}	S_{Hu}	S_D	S_{Dd}	S_{Du}	$S_{Dd} - S_{Hu}$
Germany	0.4376	0.4368	0.4384	0.4012	0.3744	0.4280	-0.0639
France	0.3952	0.3944	0.3959	0.3475	0.3207	0.3742	-0.0752
United Kingdom	0.3990	0.3983	0.3998	0.2790	0.2522	0.3057	-0.1476
Greece	**0.2681**	**0.2673**	**0.2690**	**0.4271**	**0.3974**	**0.4568**	**0.1284**
Spain	**0.3898**	**0.3890**	**0.3906**	**0.4630**	**0.4355**	**0.4906**	**0.0448**
Italy	0.3732	0.3724	0.3740	0.3392	0.3118	0.3666	-0.0622
Hungary	**0.3957**	**0.3950**	**0.3965**	**0.5493**	**0.5235**	**0.5751**	**0.1271**
Czech	**0.4048**	**0.4040**	**0.4055**	**0.5067**	**0.4806**	**0.5328**	**0.0751**
USA	0.4046	0.4038	0.4053	0.2318	0.2044	0.2592	-0.2009
Canada	0.3424	0.3416	0.3432	0.2060	0.1777	0.2343	-0.1656
Mexico	0.3647	0.3639	0.3655	0.1584	0.1301	0.1867	-0.2354
Brazil	0.3332	0.3323	0.3341	0.2463	0.2168	0.2759	-0.1173
Argentina	**0.2271**	**0.2262**	**0.2280**	**0.2875**	**0.2560**	**0.3189**	**0.0280**
Japan	**0.2750**	**0.2741**	**0.2758**	**0.3113**	**0.2814**	**0.3413**	**0.0056**
China	**0.0997**	**0.0988**	**0.1007**	**0.2140**	**0.1802**	**0.2478**	**0.0795**
India	0.2738	0.2729	0.2747	0.0750	0.0438	0.1062	-0.2309
HongKong	0.4159	0.4150	0.4167	0.3365	0.3067	0.3663	-0.1100
Singapore	0.3287	0.3278	0.3295	0.2546	0.2251	0.2842	-0.1044

Source: Own analysis.

Second part of results are presented in table 3 where in row S_V ρ_S values are provided for set S_V, columns S_{Vd} and S_{Vu} contain respectively lower and upper boundaries for confidence intervals of ρ_S for set S_V. In column S_L ρ_S values are provided for set S_L, Columns S_{Ld} and S_{Lu} have analogical meaning. If $S_{Ld} - S_{Vu}$ is greater than zero, the dependence between markets in times of distress in the Polish market is significantly greater than dependence in normal times, which can be acknowledged as a proof of contagion from Polish market to second market. These situations are marked in bold.

Table 3: Contagion from Polish stock market to other stock markets

	S_V	S_{Vd}	S_{Vu}	S_L	S_{Ld}	S_{Lu}	$S_{Ld} - S_{vu}$
Germany	0,4252	0,4244	0,4260	0,3237	0,2970	0,3504	-0,1290
France	0,4227	0,4219	0,4234	0,3389	0,3122	0,3655	-0,1112
United Kingdom	0,4267	0,4260	0,4275	0,3473	0,3206	0,3740	-0,1069
Greece	**0,2651**	**0,2642**	**0,2659**	**0,4803**	**0,4506**	**0,5100**	**0,1846**
Spain	**0,3787**	**0,3779**	**0,3794**	**0,4615**	**0,4341**	**0,4890**	**0,0547**
Italy	0,3716	0,3708	0,3724	0,2248	0,1973	0,2523	-0,1750
Hungary	**0,4202**	**0,4195**	**0,4210**	**0,6664**	**0,6406**	**0,6922**	**0,2196**
Czech	**0,4153**	**0,4146**	**0,4161**	**0,5089**	**0,4828**	**0,5350**	**0,0667**
USA	0,4223	0,4215	0,4231	0,2324	0,2049	0,2599	-0,2182
Canada	0,3683	0,3675	0,3691	0,3139	0,2857	0,3422	-0,0835
Mexico	0,3863	0,3855	0,3871	0,1761	0,1478	0,2044	-0,2393
Brazil	0,3563	0,3554	0,3572	0,3511	0,3213	0,3809	-0,0359
Argentina	**0,2295**	**0,2286**	**0,2304**	**0,4454**	**0,4139**	**0,4770**	**0,1835**
Japan	0,3177	0,3168	0,3186	0,0788	0,0489	0,1087	-0,2697
China	**0,0777**	**0,0768**	**0,0787**	**0,3104**	**0,2767**	**0,3441**	**0,1980**
India	**0,2496**	**0,2487**	**0,2505**	**0,3555**	**0,3243**	**0,3866**	**0,0738**
Hong Kong	0,3685	0,3677	0,3694	0,2088	0,1790	0,2385	-0,1904
Singapore	**0,3225**	**0,3217**	**0,3234**	**0,4041**	**0,3746**	**0,4336**	**0,0512**

Source: Own analysis.

As we can see, in most cases there is symmetric reaction to distress in Polish and second market, contagion works in both ways. This can be said in case of markets in Greece, Spain, Hungary, Czech, Argentina, China, India and Singapore. Only in case of Japan there is only contagion from market in Japan to market in Poland.

Those results were tested for robustness using bootstrap methodology not reported for brevity, which positive return.

Conclusions

We have positively verified hypothesis of existing of financial contagion using conditional correlation coefficient methodology. But very interesting is fact, that this methodology failed to uncover for example contagion from US market to Polish market, instead there is present contagion from smaller markets. This phenomenon of this methodology deserves more research, including tests with other methods, like dynamic correlation or copula functions with dynamic coefficient. This will be future pursuits of author.

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Assessment of The Impact of European Union Funds on The Socio-Economic Development of Provinces in Poland With the Use of The Grey Systems Theory

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Abstract

In 2015, the 40th anniversary of the cohesion policy was established by the European Union. During this period, this policy has evolved along with the changing priorities of the European Union. The main goal, however, remained unchanged–reducing disparities in the development of regions. Changes in cohesion policy have been reflected in research conducted by various groups of scientists. One of the most important problems in the literature is to determine the impact of funds on socio-economic development. The paper, using the Theory of Grey Systems, examined the impact of funds under regional operational programs on selected variables characterizing socio-economic development. The study covered all provinces in Poland in 2007-2013, is during the financial perspective under which the European Union allocated a total of 308 million euros for cohesion policy, of which Poland received 20%. The results of the analyses carried out in the paper are of practical nature and can be used to shape the distribution of funds from the European Union.

Keywords: Regional Development, Regional Operational Programs, Grey Systems Theory, Grey Incidence Analysis

Introduction

Structural funds are divided into two groups: the European Social Fund created in 1958 and the European Regional Development Fund founded in 1975. The ERDF is currently the most important instrument of the European Union (EU) regional policy and at the same time the most focused on supporting regional development. However, empirical research indicates that the effects of the ERDF go beyond its main goal of strengthening economic and social cohesion in the EU (Tosun, 2014, p. 371). Additionally, in literature on the subject, various positions related to the impact of structural funds on the economic development of regions can be found. For example, Dall'erba and Le Gallo (2008) stated that financial transfers from the EU do not affect regional growth and development. Puigcerver-Penalver (2007), Ramajo and MárqEUz (2008), Becker, Egger, and von Ehrlich (2010) concluded that structural funds helped regions develop faster. Torres, de Freitas, and Pereira (2003) stated that the impact of financial transfers from the EU did not affect the economic growth of regions (Pinho, Varum and Antunes, 2015, p. 3).

The objective of the study is to examine the relationship between funds under regional operational programs with socio-economic development of provinces (regions at NUTS-2 level) in Poland between 2007–2013. In order to characterize the socio-economic development of regions (provinces), various indicators can be adopted that can be associated with regional policy.

To achieve the assumed objective, the Grey Incidence Analysis, derived from the Grey Systems Theory, was used. The use of the indicated method resulted above all from its wide range of applicability, especially in the case of short time series analysis. For a small-scale data set, the use of classical statistical and econometric methods is essentially unjustified. The study is divided into four main parts - the first part describes the concept of socio-economic development and presents the results of selected studies on the impact of structural funds on regional growth and development. The second part covers the characteristics of the Grey Systems Theory; the third part presents the research method used, while the fourth part presents the results of empirical research.

Essence of Socio-Economic Development

Socio-economic development is a concept that appeared in literature relatively recently. For a long time, only concepts of economic development and economic growth were used in economics. However, over time, new categories that characterize the degree of prosperity began to be recognized and used. Socio-economic development includes not only issues related to industrialization, income growth, employment growth, but also other determinants such as educational and health services (Louzano, Abrantes, Ferreira, & Zuccolotto, 2019, p. 612).

Economic development is a broader concept than economic growth, as it includes not only quantitative, e.g. related to production, but also qualitative changes (Jones, 2016). The concept that covers both economic growth and development is the aforementioned socio-economic development. Parysek (2018, p. 39) indicates that socio-economic development is "the entirety of changes or transformations that both society and the economy undergo. It is a complex and lengthy process". Additionally, as emphasized by Parysek (2018), one of the most important distinguishing features of socio-economic development is complexity, which should be understood as changes in specific properties of given components of the socio-economic system, i.e. its distinguished elements that affect the formation of appropriate structures. Examples of socio-economic development measures are presented in Figure 1.

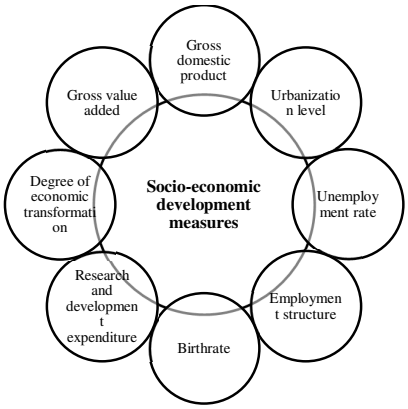

Fig. 1: Selected measures of socio-economic development

Source: (Parysek, 2018).

There is an intense discussion in literature on the subject about theories explaining socio-economic development of regions. Jańczuk (2013, p. 123) lists polarization theories, neoclassical growth model and demand-side theories.

Analysing research on the impact of EU funds on socio-economic development, one can see that there is no clear position on the issue of its direction (positive, negative, or neutral) (Table 1).

Table 1: Summary of studies on the impact of structural funds on regional growth and development

Author/authors	Results	Period	Sample
(Llussa & Lopes, 2012)	Structural policy tends to increase convergence within Member States, contributing to regional convergence	1989	194 regions at the NUTS-2 level (EU-14)
(Rodríguez-Pose & Novak, 2013)	Improving return on investment with structural funds. Returns are higher in richer and more developed regions of the country	1994-1999 and 2000-2006	133 regions at the NUTS-1 and NUTS-2 level (EU-15)
(Fiaschi, Lavezzi, & Parenti, 2011)	The impact of structural funds on efficiency gains is positive, but the most important role is played by the funds under Objective 1.	1980-2002	173 regions at the NUTS-2 level (EU-12)
(Mohl & Hagen, 2010)	Only payments under Objective 1 affected regional growth	1995-2005	126 regions at the NUTS-1 and NUTS-2 level
(Becker, Egger, & von Ehrlich, 2010)	Increasing payments under Objective 1 per capita did not have a positive impact on employment growth	1989-1993,1994-1999 and 2000-2006	3301 regions at the NUTS-3 level (EU-12/25)
(Dall'erba & Le Gallo, 2008)	Convergence occurs, but the structural funds have no impact on this	1989-1999	145 regions at the NUTS-2 level
(Esposti & Bussoletti, 2008)	The impact of policies within Objective 1 on regional growth is limited	1989-1999	206 regions at the NUTS-2 level (EU-15)
(Puigcerver-Peñalver, 2007)	Structural funds have a positive impact on regional growth and development in regions covered by Objective 1 of Cohesion Policy	1989-1999 and 1989-1993	41 regions at the NUTS-2 level (EU-10)
(RodrígEUz-Pose & Fratesi, 2004)	Limited impact of structural funds; only investment in education and capital is profitable	1989-1999	152 regions at the NUTS-2 level (EU-8)
(Cappelen, Castellacci, Fagerberg, & Verspagen, 2003)	EU regional support has a significant and positive impact on the performance of European regions. Structural funds have been more effective since the 1989 reform. Stronger influence of funds can be observed in more developed regions	1980-1997, 1980-1988 and 1898-1997	105 regions at the NUTS 1 and NUTS-2level (EU-9)

Source: (Pinho, Varum, and Antunes, 2015, pp. 4–5).

Essence of Grey Systems Theory

The beginnings of the Grey Systems Theory date back to the 1980s. In 1989, J. Deng published the first study of the Grey Systems Theory in English, entitled "Introduction to Grey Systems Theory". The subject of the Grey Systems Theory is modelling information uncertainty (Liu, Forrest 2007). The Grey Systems Theory is particularly applicable when uncertainty manifests itself through a small information base, incompleteness of data and the use of qualitative data with a low level of precision (Więcek-Janka et al. 2019). Whether a given method belongs to the Grey Systems Theory determines the use of one of the grey operators - grey numbers or the function of weight whitening or distributive understanding of grey systems (Mierzwiak, et al. 2018).

Within the Grey Systems Theory, a number of methods can be distinguished that can be assigned to one of three main groups (Liu et al. 2017):

- GIA models (*grey incidence analysis*) – group of models enabling the analysis of relationships between data sets (in particular time series),
- GP models (*grey prediction model*) - group of forecasting models based on differential equations, the main advantage of which is the possibility of forecasting from very short time windows,
- GDM (*grey decision making*) - group of decision models based on one of three grey constructs, i.e. grey numbers, weight whitening functions and distributive understanding of greyness.

In recent years, the Grey Systems Theory has found a number of applications - in relation to economic, social, technical, and natural systems. Grey models have been used, among others in:

- diagnosis of industry development (Su et al. 2017),
- defining policies regarding numerous aspects of sustainable development (Bouzon et al. 2018), (Wu et al. 2018),
- assessing the satisfaction of customers of public services (Javed et al. 2019),
- occupational risk assessment (Nowak et al. 2020), (Tabor, Cioca 2019),
- health care management (Song et al. 2018),
- comparing results of the banking sector (Yüksel et al. 2017),
- managing labour migration (Liu et al. 2017).

Research Methodology

The objective of the study is to examine the relationship between funds under regional operational programs with socio-economic development of provinces (regions at NUTS-2 level) in Poland between 2007–2013. The diversification of the development of regions on the economic and social level is a common phenomenon and an area of interest for representatives of various fields of science, as well as institutions, including the European Commission or Statistics Poland. Various indicators can be used to characterize socio-economic development of regions, however, to link them to regional policy, the following set of variables proposed by Skrzypa was adopted (2009, p. 13):

- gross domestic product (GDP) *per capita* (in PLN),
- investment outlays *per capita* (in PLN),
- internal expenditure on research and development *per capita* (in PLN),
- gross value added per employee (in PLN).

To achieve the objective of the study, the Grey Incidence Analysis was used. By using the indicated method, it is possible to examine the relationships between variable sets (and also special cases of sets, which are time series). The main advantage of the GIA over statistical and econometric methods is the possibility to conduct research of small-scale time series. In addition, in the GIA method both quantitative and qualitative variables can be used. The indicated premises make the GIA a reliable tool for examining the relationship between the amount of funds under regional operational programs and socio-economic development of provinces in Poland.

The essence of the Grey Incidence Analysis model is to determine the geometric similarity between two vectors defining time series. The higher the similarity, the higher the relative degree of grey incidence indicator (in Grey Incidence Analysis, it is also possible to use other indicators than the relative degree of grey incidence). The similarity of vectors can be a premise for a cause-and-effect relationship, although it does not have to be so. The determined relative degree of greyness indicator is an analogy to the correlation indicators used in statistics reflecting similarity in the behaviour of two time series. The advantage of the relative degree of greyness indicator is, however, the possibility of analysing the similarity of two short time series. The model for determining Grey Incidence Analysis using the relative degree of grey incidence indicator between two time series can be presented as a 4-step procedure.

Step 1. Determination of the set of vectors (time series) subject to Grey Incidence Analysis

In the proposed model, the analysis is carried out for *m* decision-making entities. For each of the decision-making entities a reference vector (time series) is defined. The reference time series has the following form:

$$X_k^{\text{ref}} = [x_{k1}^{\text{ref}}, x_{k2}^{\text{ref}}, \dots, x_{kj}^{\text{ref}}, \dots, x_{kl}^{\text{ref}}] \tag{1}$$

X_k^{ref}– reference vector for the *k*-th decision-making entity, where $k = 1,2,..,m$
j – j-th value in the reference vector for the *k*-th decision-making entity, $j = 1,2,\dots,l$
The set of remaining vectors for a given decision-making entity is as follows:

$$X_k^{\text{i}} = [x_{k1}^{\text{i}}, x_{k2}^{\text{i}}, \dots, x_{kj}^{\text{i}}, \dots, x_{kl}^{\text{i}}] \tag{2}$$

X_k^i– i-th empirical vector for the *k*-th decision-making entity, where $i = 1,2,..,n$
j – j-th value in a time series for the *k*-th decision-making entity, $j = 1,2,\dots,l$

Step 2. Normalization of time series

Normalization of time series takes place in two stages. The first is to divide all elements of the series by the initial value according to formulas (3) and (4).

$$Y_k^{\text{ref}} = \left[\frac{x_{k1}^{\text{ref}}}{x_{k1}^{\text{ref}}}, \frac{x_{k2}^{\text{ref}}}{x_{k1}^{\text{ref}}}, \dots, \frac{x_{kj}^{\text{ref}}}{x_{k1}^{\text{ref}}}, \dots, \frac{x_{kl}^{\text{ref}}}{x_{k1}^{\text{ref}}}\right] = \left[y_{k1}^{\text{ref}}, y_{k2}^{\text{ref}}, \dots, y_{kj}^{\text{ref}}, \dots, y_{kl}^{\text{ref}}\right] \tag{3}$$

$$Y_k^{\text{i}} = \left[\frac{x_{k1}^{\text{i}}}{x_{k1}^{\text{i}}}, \frac{x_{k2}^{\text{i}}}{x_{k1}^{\text{i}}}, \dots, \frac{x_{kj}^{\text{i}}}{x_{k1}^{\text{i}}}, \dots, \frac{x_{kl}^{\text{i}}}{x_{k1}^{\text{i}}}\right] = \left[y_{k1}^{\text{i}}, y_{k2}^{\text{i}}, \dots, y_{kj}^{\text{i}}, \dots, y_{kl}^{\text{i}}\right] \tag{4}$$

The second is to reset the initial elements of the series according to formulas (5) and (6).

$$\begin{aligned} Y'^{\text{ref}}_k &= \left[y_{k1}^{\text{ref}} - y_{k1}^{\text{ref}}, y_{k2}^{\text{ref}} - y_{k1}^{\text{ref}}, \dots, y_{kj}^{\text{ref}} - y_{k1}^{\text{ref}}, \dots, y_{kl}^{\text{ref}} - y_{k1}^{\text{ref}}\right] \\ &= \left[y'^{\text{ref}}_{k1}, y'^{\text{ref}}_{k2}, \dots, y'^{\text{ref}}_{kj}, \dots, y'^{\text{ref}}_{kl}\right] \end{aligned} \tag{5}$$

$$\begin{aligned} Y'^{\text{i}}_k &= \left[y_{k1}^{\text{i}} - y_{k1}^{\text{i}}, y_{k2}^{\text{i}} - y_{k1}^{\text{i}}, \dots, y_{kj}^{\text{i}} - y_{k1}^{\text{i}}, \dots, y_{kl}^{\text{i}} - y_{k1}^{\text{i}}\right] \\ &= \left[y'^{\text{i}}_{k1}, y'^{\text{i}}_{k2}, \dots, y'^{\text{i}}_{kj}, \dots, y'^{\text{i}}_{kl}\right] \end{aligned} \tag{6}$$

Step 3. Determination of parameters for $|s'_{\text{ref}}|$, $|s'_i|$, $|s'_{\text{ref}} - s'_i|$ model

Model parameters, i.e. $|s'_{\text{ref}}|$, $|s'_i|$, $|s'_{\text{ref}} - s'_i|$ are determined in accordance with formulas (7)-(9).

$$|s'_{\text{ref}}| = \left|\sum_{j=2}^{l-1} y'^{\text{ref}}_{kj} + 0.5 \cdot y'^{\text{ref}}_{kl}\right| \tag{7}$$

$$|s'_{\text{i}}| = \left|\sum_{j=2}^{l-1} y'^{\text{i}}_{kj} + 0.5 \cdot y'^{\text{i}}_{kl}\right| \tag{8}$$

$$|s'_{\text{ref}} - s'_i| = \left|\sum_{j=2}^{l-1} \left(y'^{\text{i}}_{kj} - y'^{\text{ref}}_{kj}\right) + 0.5 \cdot \left(y'^{\text{i}}_{kl} - y'^{\text{ref}}_{kl}\right)\right| \tag{9}$$

Step 4. Calculation of the relative degree of grey incidence $r_{\text{ref}-i}$

The relative degree of grey incidence $r_{\text{ref}-i}$ is determined using formula (10).

$$r_{\mathrm{ref}-i} = \frac{1 + |s'_{\mathrm{ref}}| + |s'_{\mathrm{i}}|}{1 + |s'_{\mathrm{ref}}| + |s'_{\mathrm{i}}| + |s'_{\mathrm{ref}} - s'_{i}|} \tag{10}$$

The scope of values that can be assumed by the relative degree of grey incidence is in the (0-1) range. The lower the value of $r_{\mathrm{ref}-i}$ the lower the geometric similarity of two time series. The higher the value of $r_{\mathrm{ref}-i}$ the higher the geometric similarity of two time series.

Results of Empirical Research and Discussion of Results

The purpose of empirical research was to determine the relationship between the amount of funds under regional operational programs per capita in Poland in 2007-2013 for Polish provinces and selected parameters of socio-economic development, i.e.:

- Gross domestic product per capita between 2007-2013 in a given province,
- Investment outlays per capita between 2007-2013 in a given province,
- Internal expenditure on research and development per capita between 2007-2013 in a given province,
- Gross value added per employee (in PLN) between 2007-2013 in a given province.

The research was carried out in accordance with the procedure presented earlier.

Step 1. Determination of the set of vectors (time series) subject to Grey Incidence Analysis

In empirical research, the developed model was used for 16 decision-making entities - Polish provinces. The reference vector for each province was a time series determining the amount of funds under regional operational programs per capita between 2007-2013 that a given province obtained (X^{ref}). Table 2 presents set of reference vectors for Polish provinces.

Table 2: The amount of funds under regional operational programs *per capita* between 2007–2013 – regional perspective

Province	2007	2008	2009	2010	2011	2012	2013
Lower Silesia	71.34	72.97	74.62	72.30	77.97	81.38	83.44
Kuyavia-Pomerania	75.95	77.65	79.33	77.33	82.99	85.52	87.52
Lublin	25.16	25.80	26.41	26.10	27.27	27.41	28.18
Lubusz	64.53	65.98	67.44	65.62	69.25	71.60	73.41
Łódź	49.48	50.49	51.46	50.36	51.11	50.76	51.89
Lesser Poland	74.78	76.61	78.46	76.56	82.31	85.67	87.91
Masovia	70.90	72.33	73.75	71.97	73.36	72.49	74.22
Opole	59.08	60.50	61.88	60.22	61.48	61.52	63.15
Subcarpathia	55.16	56.32	57.40	56.00	59.75	60.96	62.26
Podlaskie	74.80	76.71	78.62	76.83	79.98	80.81	83.15
Pomerania	57.74	59.32	60.79	60.81	73.88	83.77	85.83
Silesia	56.12	57.21	58.23	56.33	60.22	62.99	64.26
Holy Cross	55.20	56.65	58.09	57.32	60.06	61.65	63.41
Warmia-Masuria	61.05	62.45	63.80	62.16	72.30	81.18	82.91
Greater Poland	85.87	87.84	89.83	87.08	90.18	91.54	93.9
West Pomerania	139.88	143.47	147.04	143.72	152.08	157.53	161.95

Source: the author's own elaboration based on https://cohesiondata.ec.europa.eu/.

Tables 3-6 present the remaining sets of empirical vectors for Polish provinces, specifying the following variables:

- Gross domestic product per capita between 2007-2013 in a given province (X^1),
- Investment outlays per capita between 2007-2013 in a given province (X^2),
- Internal expenditure on research and development per capita between 2007-2013 in a given province (X^3),
- Gross value added per employee (in PLN) between 2007-2013 in a given province (X^4).

Table 3: Gross domestic product *per capita* between 2007–2013 – regional perspective

Province	2007	2008	2009	2010	2011	2012	2013
Lower Silesia	33,942	36,507	38,845	42,295	46,296	47,986	48,179
Kuyavia-Pomerania	26,854	28,965	29,746	31,127	33,231	34,365	35,280
Lublin	21,745	23,956	24,489	25,875	28,282	29,648	30,449
Lubusz	27,778	29,265	30,388	31,723	33,738	35,078	35,786
Łódź	28,751	31,324	32,822	34,747	37,620	39,403	40,145
Lesser Poland	27,739	30,257	31,651	32,909	36,119	37,334	38,167
Masovia	48,330	51,600	55,738	59,666	64,473	67,389	69,028
Opole	26,176	29,043	29,892	30,818	33,237	34,152	34,640
Subcarpathia	21,961	24,191	25,159	26,122	28,545	29,554	30,585
Podlaskie	23,113	24,599	26,130	27,381	29,672	30,288	31,374
Pomerania	30,729	32,259	34,829	36,017	39,054	41,341	41,457
Silesia	32,915	36,146	38,339	40,201	43,693	44,863	44,796
Holy Cross	24,762	27,762	28,090	28,968	30,957	31,642	31,392
Warmia-Masuria	23,009	24,886	25,988	27,197	29,257	30,232	30,776
Greater Poland	32,895	35,669	38,431	39,454	42,753	44,774	46,150
West Pomerania	27,539	30,205	30,821	32,061	34,116	35,453	35,851

Source: the authors' own elaboration based on https://bdl.stat.gov.pl/BDL/dane/teryt/jednostka.

Gross domestic product *per capita* was at the highest level in the Masovia province (at the end of 2013 GDP *per capita* amounted to PLN 69,028) also in terms of the average annual growth rate, the situation in this province was the best. The lowest values were observed in the Lublin province (at the end of 2013, GDP *per capita* amounted to PLN 30,449), while in terms of the average percentage increase the lowest results were observed for the Holy Cross province - an increase of 4.03% year-on-year.

Table 4: Investment outlays *per capita* between 2007–2013 – regional perspective

Province	2007	2008	2009	2010	2011	2012	2013
Lower Silesia	6,041	6,420	6,519	6,155	6,916	6,729	7,092
Kuyavia-Pomerania	3,925	4,817	5,375	5,064	5,392	4,561	4,434
Lublin	2,799	3,526	3,673	3,799	4,751	4,543	4,509
Lubusz	4,529	4,382	4,380	7,329	7,810	5,644	5,168
Łódź	5,403	5,791	5,250	5,382	6,641	7,165	6,680
Lesser Poland	4,637	4,905	4,526	4,811	5,431	5,468	5,231
Masovia	8,023	9,108	8,723	8,244	8,680	8,781	8,908
Opole	3,581	3,778	4,409	4,590	4,628	4,266	4,746
Subcarpathia	3,351	3,759	4,064	4,837	6,306	5,902	5,643
Podlaskie	3,572	4,046	3,892	4,194	5,423	4,585	4,610
Pomerania	5,627	6,310	7,903	5,753	6,118	6,496	6,031

Silesia	5,285	5,883	6,117	5,672	6,506	5,988	6,002
Holy Cross	3,217	4,384	4,861	5,250	5,242	5,090	3,895
Warmia-Masuria	3,769	4,140	4,101	4,503	5,334	5,190	4,275
Greater Poland	4,880	5,939	5,390	5,487	6,038	6,093	5,450
West Pomerania	4,100	5,332	5,034	4,816	5,092	5,741	6,249

Source: the authors' own elaboration based on https://cohesiondata.ec.europa.eu/.

The analysis of the amount of investment outlays *per capita*, similarly as in the case of GDP *per capita*, indicates that the highest values occurred in the Masovia province (at the end of 2013, the GDP *per capita* amounted to PLN 8,908). Taking into account the pace of changes, investment outlays *per capita* occurred fastest in the Subcarpathia province, where the increase occurred on average by 9.0% year on year. The slowest average annual rate of change occurred in the Pomerania province - 1.16% year on year.

Table 5: Internal expenditure on research and development *per capita* (in thousands PLN) between 2007–2013 – regional perspective

Province	2007	2008	2009	2010	2011	2012	2013
Lower Silesia	393,540	457,358	581,262	629,979	725,160	971,439	908,833
Kuyavia-Pomerania	109,481	129,391	346,781	204,193	187,286	304,351	228,935
Lublin	246,119	239,927	295,920	362,235	377,977	652,227	402,076
Lubusz	25,916	28,240	28,962	45,453	56,027	70,014	94,695
Łódź	372,779	424,686	492,864	553,156	578,457	762,811	676,985
Lesser Poland	799,844	895,304	922,629	1,091,427	1,210,507	1,638,115	1,660,345
Masovia	2,742,268	3,322,052	3,498,088	4,248,689	4,675,571	4,886,302	5,688,835
Opole	36,285	40,435	68,403	38,525	84,181	66,069	79,267
Subcarpathia	156,446	177,383	189,038	508,286	542,220	634,405	793,711
Podlaskie	55,427	74,706	66,252	103,865	139,520	138,966	204,697
Pomerania	340,860	398,167	397,353	488,380	625,347	1,011,149	933,658
Silesia	587,103	609,160	956,520	848,800	1,033,728	1,298,482	1,268,915
Holy Cross	35,601	92,210	146,669	167,856	142,960	121,518	140,265
Warmia-Masuria	96,611	80,550	115,538	173,759	201,136	212,075	161,539
Greater Poland	563,747	611,485	845,854	777,764	910,104	1,360,504	996,477
West Pomerania	110,990	125,171	117,834	173,791	196,525	224,487	184,557

Source: the authors' own elaboration based on https://cohesiondata.ec.europa.eu/.

Considering internal expenditure on research and development *per capita*, it can be generally noted that the pace of change was the fastest in the least developed provinces (Subcarpathia, Holy Cross, Podlaskie, Lubusz). In economically underdeveloped provinces, the slowest increase in R&D expenditure was also noted. As in the case of previous indicators, the highest values in absolute terms occurred in the Masovia province (at the end of 2013 over PLN 5.6 billion).

Table 6: Gross value added per employee (in PLN) between 2007–2013 – regional perspective

Province	2007	2008	2009	2010	2011	2012	2013
Lower Silesia	87,516	88,741	98,070	106,963	115,773	121,169	122,993
Kuyavia-Pomerania	69,449	71,787	78,043	82,922	88,000	92,635	96,860
Lublin	54,028	57,776	61,290	65,566	70,675	75,128	77,814
Lubusz	76,313	77,919	84,855	87,611	92,294	97,990	102,128
Łódź	66,685	69,900	76,664	81,891	88,198	94,194	97,136
Lesser Poland	68,537	71,983	77,029	80,018	87,037	90,587	93,312
Masovia	98,430	102,118	111,306	120,823	129,778	136,099	141,571
Opole	75,039	79,413	83,660	88,524	94,605	99,050	101,689
Subcarpathia	55,690	59,205	64,767	67,343	72,109	75,757	79,312
Podlaskie	60,097	61,299	68,018	73,508	78,665	81,459	85,316
Pomerania	81,460	82,539	91,754	94,238	102,478	110,703	112,225
Silesia	82,135	86,694	94,618	99,101	106,839	110,880	112,582
Holy Cross	59,555	64,057	68,188	72,330	76,231	79,327	79,910
Warmia-Masuria	67,657	70,475	78,322	81,052	86,635	91,332	94,320
Greater Poland	73,569	77,014	86,360	88,696	94,994	100,075	104,354
West Pomerania	76,883	80,746	87,474	92,795	98,125	103,950	107,015

Source: the authors' own elaboration based on https://cohesiondata.ec.europa.eu/.

In terms of value added *per capita*, the fastest growth rate was recorded in the Łódź, Lublin and Masovia provinces (over 6.2%), while the slowest in the Opole, Holy Cross and Lubusz provinces (below 5.21%).

In each of the next steps of the empirical procedure, an example of calculations in the Masovia province is presented. The method of determining the relative degree of grey incidence is analogous for each voivodeship. Collective results of the entire procedure for each province are presented at the end of the article.

Step 2. Normalization of time series

Normalization of time series was carried out according to formulas (3) - (6). For the Masovia province, the effect of the first stage of time series normalization is as follows:

Y^{ref} = [1.00, 1.02, 1.04, 1.02, 1.03, 1.02, 1.05]
Y^{1} = [1.00, 1.07, 1.15, 1.23, 1.33, 1.39, 1.43]
Y^{2} = [1.00, 1.14, 1.09, 1.03, 1.08, 1.09, 1.11]
Y^{3} = [1.00, 1.21, 1.28, 1.55, 1.71, 1.78, 2.07]
Y^{4} = [1.00, 1.04, 1.13, 1.23, 1.32, 1.38, 1.44]

The effect of implementing the second stage of normalization of time series for the Masovia province is as follows:

Y'^{ref} = [0.00, 0.02, 0.04, 0.02, 0.03, 0.02, 0.05]
Y'^{1} = [0.00, 0.07, 0.15, 0.23, 0.33, 0.39, 0.43]
Y'^{2} = [0.00, 0.14, 0.09, 0.03, 0.08, 0.09, 0.11]
Y'^{3} = [0.00, 0.21, 0.28, 0.55, 0.71, 0.78, 1.07]
Y'^{4} = [0.00, 0.04, 0.13, 0.23, 0.32, 0.38, 0.44]

Step 3. Parameter determination for $|s'_{\mathrm{ref}}|$, $|s'_i|$, $|s'_{\mathrm{ref}} - s'_i|$ model

The parameters of the grey incidence analysis model were determined on the basis of formulas (7) - (9). The following model parameter values were obtained for the Masovia province $|s'_{\mathrm{ref}}|$, $|s'_i|$, $|s'_{\mathrm{ref}} - s'_i|$: $|s'_{\mathrm{ref}}| = 0.16$; $|s'_1| = 1.40$; $|s'_2| = 0.48$; $|s'_3| = 3.06$; $|s'_4| = 1.32$; $|s'_1 - s'_{\mathrm{ref}}| = 1.24$; $|s'_2 - s'_{\mathrm{ref}}| = 0.33$; $|s'_3 - s'_{\mathrm{ref}}| = 2.90$; $|s'_4 - s'_{\mathrm{ref}}| = 1.16$

Step 4. Calculation of the relative degree of grey incidence $r_{\mathrm{ref}-i}$

The relative degree of grey incidence indicator was determined in accordance with formula (10). For the Masovia province, the results of the relative degree of grey incidence calculations are as follows: $r_{\mathrm{ref}-1}$= 0.67; $r_{\mathrm{ref}-2}$= 0.83; $r_{\mathrm{ref}-3}$= 0.59; $r_{\mathrm{ref}-4}$= 0.68. This means that for the Masovia province, the largest geometric similarity occurs between the series determining the amount of funds under regional operational programs per capita between 2007-2013 and the time series determining investment outlays per capita between 2007-2013.

Table 7 presents the designated indicators of the relative degree of grey incidence between the reference vector determining the amount of funds under regional operational programs per capita between 2007-2013 for all Polish provinces and selected parameters of socio-economic development at the regional level.

Table 7: Designated indicators of the relative degree of grey incidence $r_{\mathrm{ref}-i}$ for all Polish provinces

Province	Gross Domestic Product per capita between 2007-2013	Investment outlays per capita between 2007-2013	Internal expenditure on R&D per capita	Gross value added per employee (in PLN) between 2007-2013
Lower Silesia	0.731	**0.947**	0.596	0.755
Kuyavia-Pomerania	**0.790**	0.721	0.565	0.767
Lublin	**0.737**	0.638	0.616	0.730
Lubusz	**0.796**	0.700	0.574	0.790
Łódź	0.682	**0.773**	0.596	0.675
Lesser Poland	0.766	**0.972**	0.644	0.789
Masovia	0.673	**0.834**	0.592	0.681
Opole	0.712	0.706	0.582	**0.719**
Subcarpathia	**0.733**	0.627	0.539	0.730
Podlaskie	**0.745**	0.719	0.564	0.731
Pomerania	0.988	0.913	0.663	**0.999**
Silesia	0.723	**0.825**	0.599	0.737
Holy Cross	**0.782**	0.635	0.528	0.761
Warmia-Masuria	**0.888**	0.867	0.662	0.871
Greater Poland	0.706	**0.750**	0.596	0.709
West Pomerania	**0.788**	0.713	0.633	0.761

According to the conducted research, it turned out that as many as eight provinces showed the strongest relationship between the amount of funds under regional operational programs per capita between 2007-2013 and gross domestic product. These provinces are: Kuyavia-Pomerania, Lublin, Lubusz, Subcarpathia, Podlaskie, Holy Cross, Warmia-Masuria, and West Pomerania. Considering the wealth of a given province measured by GDP, this group includes the five poorest provinces in Poland. Of the

three remaining provinces, none are in the top five of the wealthiest provinces. For six provinces the strongest relationship between the amount of funds under regional operational programs per capita between 2007-2013 and investment outlays per capita was demonstrated. This group includes the wealthiest Polish provinces, i.e. Masovia, Lower Silesia, Greater Poland, Silesia, Lesser Poland and Łódź. In two cases, the strongest relationship was found between the amount of funds under regional operational programs per capita between 2007-2013 and the gross value per employee - i.e. for the Opole and Pomerania provinces.

The obtained results of research indicate that:

- there is a significantly greater relationship between European funds obtained and economic growth measured in GDP for poor provinces than for rich provinces,
- for rich provinces there is a strong relationship between the value of European funds and investment expansion,
- it has not been reported that the amount of European funds for any of the provinces was strongly linked to internal expenditure on R&D.

The results obtained reflect the situation that was observed in Poland between 2007-2013. European funds obtained by poor provinces constituted an important element of their economic growth. This resulted from the large scale of funds obtained in relation to the very low level of the size of economies. For rich provinces, the funds obtained did not play such a large role in the context of the scale of their regional economies. In addition, it was demonstrated that European funds from the financial perspective 2007-2013 did not significantly affect the increase in the level of R&D of Polish enterprises, regardless of the region.

Summary

The objective of the study was to examine the impact of funds under regional operational programs on the socio-economic development of provinces (regions at NUTS-2 level) in Poland between 2007–2013. In order to characterize the socio-economic development of provinces, regional policy indicators were adopted (GDP per capita, internal expenditure on R&D, investment outlays, gross value added). The GIA was used to conduct the impact analysis, which is an extremely useful tool to study short time series (Cempel, 2014).

The results of the conducted analyses indicate that funds under regional operational programs have the smallest impact on GDP per capita, while the largest on internal expenditure on R&D. Such results may indicate that the effectiveness of European Union policy in terms of innovation and supporting research and development activities is high.

The conducted research indicates that it is justified to undertake analyses regarding the impact of funds from the European Union on the broadly understood socio-economic development. In the future, similar research and comparative analyses can be carried out at the regional level across the European Union.

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Corporate Governance in The Context of Interdependent Stakeholder Relationships

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Abstract

The current debate in corporate governance is about the fundamental purpose of business, shareholder value maximization versus meeting stakeholder claims. Proponents of the value maximization principle say that a firm exists to maximize shareholder value. Proponents of the stakeholder theory say that a firm exists to satisfy the claims of its all stakeholders. The concept of corporate directing describes the integrative process of governing and leading in action, i.e. the enacting of directors' roles both individually and collectively. It is a relational concept, only known and brought about through other people, and includes all aspects of directors' symbolic actions. Pfeffer (1981) described management as symbolic action: it is argued here that directing is symbolic (en)acting. However, there are several tensions underlying this concept, which will be outlined in this discussion.

Keywords: Corporate governance, leadership, stakeholder

Corporate Governing

The idea that top management is somehow different to ''other'' management has been around for a long time. Hambrick and Mason (1984) identify and distinguish characteristics and values of these ''higher echelons'' (see also Nadler & Tushman, 1990; Tichy & Charan, 1995; Finkelstein & Hambrick, 1996). The general view is that not only are they different to other managers but also that they make a difference to their organizations (Pye, 2001). According to agency theory, the separation of ownership and control that characterizes the modern corporation creates many situations in which the interests of managers and owners may be expected to differ (Berle & Means, 1932). Owners must either seek to align interests through compensation contracts with managers or rely on monitoring to ensure that managers act in the owners' best interest (Fama, 1980). Proponents of agency theory have identified the board of directors as a primary monitoring mechanism (Fama & Jensen, 1983). Miller and Friesen (1977) have argued that without strong, unified leadership firms may be unable to take the decisive actions that set strategic direction. This unity also confers legitimacy on the organization to those who hold the belief that strong leadership and clear sense of direction are necessary to success (Maccoby, 1976; Pfeffer & Salancik, 1978).

Hence, this paper draws together these three themes of governing - power, learning and organizational knowledge - and leading together into the concept of the processual view of leadership towards building stakeholder relations.

Before we describe our view, which was tested in the study, we discuss the definition of corporate governing, in which stakeholder aspirations may play the main role in increasing the performance of the corporate board decision making process. As the discussion of the basic theoretical background in the following section will make clear, the connection of stakeholder aspirations to the learning process and knowledge management and effectiveness depends on the relations, which are being examined. Corporate governance is mostly studied within the framework of agency theory, where the modern corporation is perceived as contract agreement between principals/shareholders and agents/managers,

and various mechanisms are needed to align the interests of principals and agents (Fama, 1980; Fama & Jensen, 1983; Jensen & Meckling, 1976) due to the potential separation of ownership and control (Berle & Means, 1932). Agency theory is derived from Berle and Mean's (1932) work on the separation between ownership/shareholders and control/management. Separation of ownership and management provides the opportunity for managers agents - to act in their own self-interest by maximizing their own wealth and power at the expense of the owners - principals (Fama, 1980; Jensen & Meckling, 1976). Agency costs result when managers pursue their own interests to the detriment of the interests of shareholders (Fama & Jensen, 1983). From an agency theory perspective, corporate governance is put in place to monitor managers on behalf of shareholders (Eisenhardt, 1989; Jensen & Meckling, 1976). The idea of the stakeholder approach to corporate governance, suggests that managers must formulate and implement processes which satisfy all and only those groups who have a stake in the business. The central task in this process is to manage and integrate the relationships and interests of shareholders, employees, customers, suppliers, communities, and other groups in a way that ensures the long-term success of the firm. A stakeholder approach emphasizes the active management of the business environment, relationships, and the promotion of shared interests. The relation among stakeholders is used to determine and control the strategic direction and performance of organizations. At its core, corporate governance is concerned with ensuring that strategic decisions are made effectively (…) can also be thought as a means corporations use to establish effective relationships between parties whose interest may be in conflict (…) reflects and reinforces company values. (Hoskinsson, Hitt & Ireland, 2003: 342). Pye (2002: 156) also indicates the distinguishing difference between governance and governing: governance implies something static and a box that can be ticked, whereas governing implies a social process and collective phenomenon, i.e. done with and through relationships with other people.

Therefore, for this study, we define the working definition of corporate governing as a process, which influences the broad strategic decision-making process used to reconcile different stakes and aspirations among several groups of stakeholders to improve organizational performance. It is similar to definitions proposed by Kooiman (2003:4), while aforementioned, the mainstream definitions of corporate governance within the framework of agency theory focus on separate organizational ownership and control. This also illustrates the key point in appreciating the process of governing, which is that there are two sides to this relationship. It is not simply enough to say that companies have to widen their reporting function to include, for instance, corporate social responsibility and the like, but they must actively manage the information, knowledge flows in ways that are credible and informative for other stakeholders.

The link between stakeholders and knowledge management, organizational learning and power towards effective leadership.

In this formulation, stakeholder aspirations management is part of the corporate governing process but in no way drives that strategy. The firm's relationships with its stakeholders enter into its strategic calculus, and the types of relationships that produce the best prospective outcomes for the firm are pursued. Thus, our first overall proposition states the strategic stakeholder management model: Managers will attend to stakeholders' interests to the extent that those stakeholders can affect effectiveness. But very little research has been done to help identify which stakeholders really count to managers. Mitchell, Agle, and Wood (1997) developed a theoretical model that advances the idea that managers proportionately value stakeholders in the context of stakeholder three attributes power, legitimacy, and urgency. Agle, Mitchell and Sonnenfeld (1999) test Mitchell et al. (1997) model and discover that the three stakeholder attributes, power, legitimacy, and urgency, significantly increase stakeholder salience.

Donaldson and Preston (1995) argue that stakeholder interests have intrinsic worth. Therefore, certain claims of stakeholders are based on fundamental moral principles unrelated to the stakeholders' instrumental value to a corporation. These claims cannot be ignored because they are against the company’s strategic interests. Stakeholder interests should be perceived as independent of and crucial to corporate strategic consideration and essential to the corporate strategy itself. Mitchell et al. (1997) suggest that researchers might identify stakeholders by applying sorting criteria to the field of

possibilities. In order to narrow the definition of stakeholder, it is essential to define the legitimacy of a claim on a firm, based upon, for example, contract, exchange, legal title, legal right, moral right, at-risk status, or moral interest in the harms and benefits generated by company actions. Moreover, to keep the definition broad, stakeholders' power to influence the company's behavior must also be taken into account. Therefore, the two main attributes defining stakeholder salience are power and legitimacy and when combined, they constitute authority. (Weber, 1947). The attribute of urgency is the degree to which a stakeholder's claim calls for immediate attention. The inclusion of urgency adds a catalytic/dynamic component to the process whereby stakeholders attain salience in the minds of managers (Mitchell & Agle, 1997; Mitchell et al., 1997: 864).

For the purpose of this paper, we accept the definitions of these three attributes, power, legitimacy and urgency presented by Mitchell et al. (1997): "(1) that stakeholder power exists where one social actor, A, can get another social actor, B, to do something that B would not have otherwise done (Dahl, 1957; Pfeffer, 1981; Weber, 1947), (2) that stakeholder legitimacy is a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions (Suchman, 1995; Weber, 1947), and (3) that stakeholder urgency is a multidimensional notion that includes both criticality and temporality, with a stakeholder claim considered to be urgent both when it is important and when delay in paying attention to it is unacceptable (Mitchell & Agle, 1997; Mitchell et al., 1997)." Further, Freeman (1984) observed that managers' priority perceptions might attach to stakeholder groups as well as to specific stakeholder claims. And, in addition to arguing that stakeholder attributes function as variables--not as steady states--and can change for any particular group or stakeholder-manager relationship, Mitchell et al. (1997: 868) argued that the existence (or the degree present) of each attribute as a matter of managerial perceptions is a reality constructed over time rather than an objective reality. The outcomes of corporate activity matter. Clarkson (1995) wrote that performance counts because it can be measured and evaluated, whether a corporation and its management are motivated by enlightened self-interest, common sense, or high standards of ethical behavior. However, as noted in the quotation from Selznick (1996) at the beginning of this article, the only conventional measurement of corporate success has been the satisfaction of and creation of wealth for one stakeholder--the shareholder--although it has been demonstrated that the pursuit of this single measure is self-defeating (Clarkson, 1988). Further, a significant relationship has been found between profitability measures such as return on equity and corporate social performance (CSP) measures such as employee relations, product innovation/safety, environmental stewardship, and community relations (Waddock & Graves, 1997). Thus, as we attempted to include the construct of corporate performance in our research model, we were led to consider those variables as indicators.

According to the problems mentioned above, in our opinion, a fundamental problem in many collaborations relates to the transfer of knowledge. Knowledge transfer is costly. Indeed, Hayek (1945) treats knowledge as so idiosyncratic that most specialized knowledge may not be transferable or is only transferable at a prohibitive cost. Knowledge transfer costs arise because of cognitive limitations. For instance, Simon (1945) argues that human minds are limited in the rate at which knowledge can be assimilated, in the amount of knowledge that can be accumulated, and in the amount of knowledge that can be applied. In collaboration, knowledge sets from the various partners must be transferred among each other in order to collaboratively choose trials; else, different knowledge sets held by the different actors are likely to either diminish the likelihood of finding a valuable solution or lead to conflict in trial selection. This would slow and possibly halt progress towards finding a solution. As a problem increases in complexity so too does the number of distinct specialized knowledge sets and, because of cognitive limitations, the number of actors involved in transferring and receiving knowledge But in terms of the levels of analysis, several authors in the organizational learning and knowledge management fields (e.g., Kogut & Zander, 1992; Nonaka & Takcuchi, 1995) have proposed that learning occurs and that knowledge exists at the individual, group, organizational, and inter-organizational or network levels. This fourth level of analysis has attracted a great deal of attention from researchers interested in the role of learning in alliances, joint ventures, strategic groups, and inter-firm relationships in general (e.g., Doz, 1996; Inkpen & Crossan, 1995; Lyles & Salk, 1996). However, other scholars associate learning and knowledge with only the individual level or with a specific subset of these four levels. The debate in the literature mostly focuses on the organizational

level because of concerns about anthropomorphism. On one side, Simon (1991: 176) states that "all learning takes place inside individual human heads; an organization learns in only two ways: (a) by the learning of its members; or (b) by ingesting new members who have knowledge the organization didn't previously have." On the other side, Hedberg (1981: 6) argues that "although organizational learning occurs through individuals, it would be a mistake to conclude that organizational learning is nothing but the cumulative result of their members' learning... Members come and go, and leadership changes, but organizations' memories preserve certain behaviors, mental maps, norms and values over time."

Researchers are not unanimous in their views on the impact of learning and knowledge on firm performance. Cangelosi and Dill (1965), Fiol and Lyles (1985: 803) demonstrate a positive link between these constructs, underlying the positive impact of learning on performance. Similarly, according to Barney (1991) only valuable, rare, inimitable and non-substitutable knowledge could result in an advantage over competitors. Argyris & Schon (1996), March & Olsen, (1975), Levitt and March (1988) present the opposite approach and claim that there is no direct relationship between learning, knowledge, and performance. Moreover, Huber (1991) notices that if during the learning process incorrect content is learned correctly, or correct content is learned incorrectly, this learning process does not increase learner's performance. Leonard (1992) argues that inflexibility in thinking inherent to knowledge sets stifle innovation and creativity.

Summing up, company's good scope of knowledge may result in increased competitive advantage, while the poor scope of knowledge may deteriorate company's advantage over competitors. Crossan et al. (1995) conclude that in some cases, learning may have negative implications on performance and that good performance not necessarily originate from learning. Since many studies support the direct impact of learning and knowledge on performance (Appleyard, 1996; Bontis et al., 2002; Decarolis & Deeds, 1999; Hitt et al., 2001; Yeoh & Roth, 1999), it should be underlined that the relevance of this learning and knowledge is the most essential for the positive effects on performance. (Crossan, 1991).

Theoretically, corporate governing is concerned with the strategic process of influencing by which organizational participants and stakeholders recognize, interpret, and enact opportunities using common purpose, shared values, and commitment to keep new wealth creation in a proactive, innovative and risky way. The way of governing is viewed in practice, underpins the dimension in our view of leading. Leadership is reflected in just about everything an organization does, not just in what the executive team does, although there is still a curious assumption that the further up the organization you go, the more leadership you do. And somehow, the assumption goes, this kind of leadership is different from other kinds of leadership as you might find elsewhere – usually lower down – in an organization. What is important about the leadership at this level that might distinguish it from other kinds of leadership? If you could actually define what you meant by (other kinds of) leadership, it might make it a bit easier to answer this question! Generally, it is taken to mean leadership performed by those in a director role, which is then differentiated between the executive and non-executive directors. When put like this, it is hardly surprising that traditional views of leadership appear more appealing, as it is much simpler to rely on an inspiring and energizing figurehead than to try to identify shared or collective leadership. For example, ''motivation, alignment, cohesion and the ability to focus followers on goals, values and visions are the central features of good leadership'' (Kotter, 1988) is somehow more palpable than ''a process of transformative change where the ethics of individuals are integrated into the mores of a community as a means of evolutionary social development'' (Barker, 2001).

Finkelstein and Hambrick (1996) in their strategic leadership theory suggested that information processing and strategic decision making are reflections of the psychological make-up (e.g. values) of the top manager and the top management team. From our point of view, it is clear that leading – effective leadership - at this level happens through communication as well as through a host of organizational processes that support particular strategic initiatives. That is, while leading is usually thought of through face-to-face social influence, there are multiple ways in which organizational structures and systems influence the actions stakeholders take and the direction in which the collective goes. Leadership is a dynamic process that does not reside solely within a given person or a given situation; rather, situations create an interplay of needs, and effective leaders work to continually

identify and meet them (Kozlowski, Gully, Salas, & Cannon-Bowers, 1996; Pierce & Newstrom, 2000). Taxonomies of leader behavior like Yukl's (1989) provide information about what leaders do. Yet there exists little theory or research providing information about how these behaviors combine to create the dynamic process of leadership that meets situational needs. In this study, our goal was to develop a model of effective external leadership that reveals the process through which leader behaviors combine to facilitate team self-management and team effectiveness. The benefits of such an approach lie in the questions it can answer about effective leadership and in the new questions it can surface.

Conclusion

The concept of corporate directing describes the integrative process of governing and leading in action, i.e. the enacting of directors' roles both individually and collectively. It is a relational concept, only known and brought about through other people, and includes all aspects of directors' symbolic actions. Pfeffer (1981) described management as symbolic action: it is argued here that directing is symbolic (en)acting. However, there are several tensions underlying this concept, which will be outlined in this discussion.

The impact of stakeholders' approach on corporate governance theory is difficult to establish. Much of contemporary debate and commentary is trapped in the rhetoric of stakeholders versus shareholder debate. So, what are the critical issues facing the stakeholders' approach to corporate governance? Discussion about the nature of stakeholders' approach focuses on how stakeholders redraw the picture of the enterprise. This idea of stakeholders' approach with corporate governance interpretation, suggests that managers as leaders must formulate and implement processes which reflect the creation, enhancement, realization, and renewal of value for all stakeholders. This stakeholder approach encourages leaders to develop organizational strategies, identify and invest in all the relations that will ensure long term success. From this perspective, it becomes clear that there is a critical role of values and value-based management within the corporate governance process.

Based on our considerations, there are a few questions that appear: Does the group have a moral, ethical or legal claim on the enterprise? Does the stakeholder group have the power to affect the enterprise? Is the stakeholder making a claim for urgent action? Is the group demanding immediate attention from the enterprise? These and other questions should be asked for characteristic influence, whether a manager will pay attention to the stakeholder group or not. It may show that managers thinking about building a competitive advantage should use them together. Some would argue that we are again on the threshold of a major shift in perspective from a stakeholder theory to shareholder theory of corporations in society. We can conclude that the corporate governance process should be considered as an integrated approach, which treats the corporation as embedded in a network of interdependent stakeholder relationships that are evolving and that a business ecosystem consists of multiple stakeholder relationships. Within that business ecosystem, corporate decision-makers and stakeholders cooperate, compete, and co-evolve, as each develops new capabilities and forces others to grow and change. The findings of this study suggest that corporate governance does matter and that it is possible to identify the proper relations employed for different types of stakeholders. Beyond the obvious theoretical implications, both practitioners and consultants may benefit it to improve corporate governance.

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A New Method for Planning Needs in Terms of Security

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Abstract

The article deals with a research problem that focuses on the process and method of planning needs in the Polish Institution in terms of security, based on expenditure forecasting in the retrospective aspect. The study was started by comparing retrospective data on planned needs and expenses incurred to secure them in dynamic terms. The obtained results became the premises for further analyzes and evaluations of retrospective data of expenses incurred to cover planned needs in the procurement department. Results obtained gradually became the premises for the use of further research tools and then for the choice of method and forecasting for the future. The obtained forecasts were subjected to empirical verification through the use of comparative analysis and mean absolute percentage error.

Keywords*:* Management, Expenditure, Planning Of Needs, Forecasting, Security.

Introduction

The needs planning process plays an important role in terms of the role and importance of management of such an organization as the Polish Institution in the context of security. It should be emphasized that nation security is often defined as a state of equilibrium of a sovereign entity which includes existing threats and the defense potential of the state [12]. In theoretical terms, issues related to the process of planning needs in the Polish Institution have not yet found, apart from the authors' publications, an appropriate place in scientific research and they are only regulated by laws, regulations, guidelines and instructions. On the other hand, the practical approach has many disadvantages associated with the planning process currently used in the Polish Institution which result from the lack of an effective method of calculating needs which so far nobody has formulated.

The main goal of the study is to present a new method of planning needs by applying a forecast for the future of retrospective data in the procurement department in the economic unit.

The subject of research is the process of planning needs in the economic unit. The needs planning process is extensive and consists of subprocesses and activities that must be carried out in a timely manner by designated participants at various levels of command. Visual observation and own experience in the field of needs planning allow to state that defects occurring in the process of needs planning in one economic unit are a mirror image of all others. This phenomenon results from the specificity of the hierarchical organization which is the Polish Institution and the legal basis of the needs planning process. This became a premise for choosing the subject of research. The research object of the work is the Polish Institution. The analysis and evaluation of the planning process of expenditure of supplies were carried out on the basis of a economic unit. The article presents a retrospective study of the currently used method of expenditure planning on empirical material in dynamic approach.

The article uses research methods in the form of literature analysis which deals with issues related to expenditure, needs planning, forecasting, analysis of source documents, computer simulation method and comparison. Furthermore, the following research tools were used: quartile chart, autocorrelation, partial autocorrelation, multiple regression, histogram, Shapiro-Wilk test.

The article consists of the introduction, five substantive points, summary and conclusions.

Literature Analysis

As a result of critical analysis of the literature, it was found that the most important issues covering the problem presented in the article can be divided into studies in the field of management and planning [11, 13] of needs.

Analysis of the subject literature indicates that there are different interpretations of the concept of 'management' within the field of management. There are a number of definitions of this term and it is often equated with the term 'direction'. This is understandable because in translations of English-language studies into Polish, the concept of "management" is translated as "management" or "direction". In Polish literature, these two concepts are interpreted differently, although in practice they are similar. Both concepts have their origin in the concept "control", i.e. the interaction of one system with another to achieve a specific result. In Polish literature, direction is basically about people, while management is about organization.

In the Polish Institution there is a concept of leadership. According to L.J. Krzyżanowski [9] leadership is a type of organization management and adopts the formal competences of the manager as the dominant criterion. The author considers the concept of direction to be broader than management and leadership. An analysis of the concept of leadership found in the literature indicates that it is considered on two levels: as power and as a process. Leadership is most often assumed to be a specific form of direction.

Analysis of the literature on the subject indicates that certain functions can be identified in hierarchical activities. Most often they include: planning, organizing, motivating and controlling. Planning is the first and most important management function. It is the beginning and the basis of all activities of the organization including the Polish Institution.

Extremely important issues related to the planning of needs in the Polish Institution relate to matters related to expenditure. In the Polish Institution, expenditure is defined as cash expenditure spent from the bank account of the organization, which is the Polish Institution, on the implementation of goals and tasks. There are differences in the interpretation of costs and expenses in the literature. Costs are incurred to generate income [7]. Table 1 summarizes the definitions of the term expenditure.

Table 1: Summary of definitions of the term expenditure

Source of definition	Definitions
E. Nowak [10]	Expenditure means spending of cash from an enterprise's cash or bank account in connection with payment for specific goods or services and in connection with the settlement of various obligations of the entity.
H. Poetschke [6]	Expenditure means any decrease in cash, irrespective of the purpose for which it is incurred.
K. Czubakowska [3]	Expenditure is a decrease in cash which increases other assets.

Various groups of expenditure are used in the Polish Institution [14] which are regulated by relevant ordinances.

The planning of the expenditure of supplies in the Polish Institution results from the planning of needs and is closely related to expenditure. The calculation of future expenses requires careful estimation [2]. The need is understood as the subjectively reflected discrepancy between the actual and the expected condition [1]. In the Polish Institution, needs are divided into financial and material ones. Financial needs expressed in PLN result from the functioning of organizational units and cannot be secured as

part of material resources. On the other hand, material needs are logistic resources and services necessary to carry out tasks, expressed in units of measurement, sorted by procurement departments.
Forecasting is one of the forms of planning that results from critical literature analysis. According to P. Dittmann, forecasting is a rational, scientific prediction of future events [4]. Forecasting should be based on the correct analysis of time series which is one of the parts of the statistics used in economic practice. It allows to learn about the mechanisms that caused the phenomenon to proceed in this way and to perform simulations related to predicting observed trends in the future. A time series in the literature is defined as a non-random function x (t), which is the implementation of the stochastic process X (w, t) for a given elementary event w_o [8].

Analysis of the current state of the needs planning process in the Polish Institution

The method of examining documents allowed the author to state that planning of material needs is an essential element of the system for financing tasks implemented by the Polish Institution. The process of planning material needs begins after the guidelines regarding the planning of operations in the Polish Institution and the development of activity plans for the planning year at various levels of direction and leadership. The planning process is carried out at all levels of direction and leadership. Planning in the Polish Institution consists in determining the needs to secure tasks carried out in accordance with specific orders and plans. Then, specific needs are verified at individual organizational levels of the Polish Institution. The final product of the needs planning process is verified lists of needs correlated with the financial plan in the aspect concerning budget expenditure.

The study analyzes data regarding planned needs and expenses incurred to secure them in the years between 2014-2018 in the procurement department in the economic unit. For this purpose, Figure 1 summarizes the planned needs in the procurement department in 2014-2018, along with expenditure incurred for their implementation in dynamic terms.

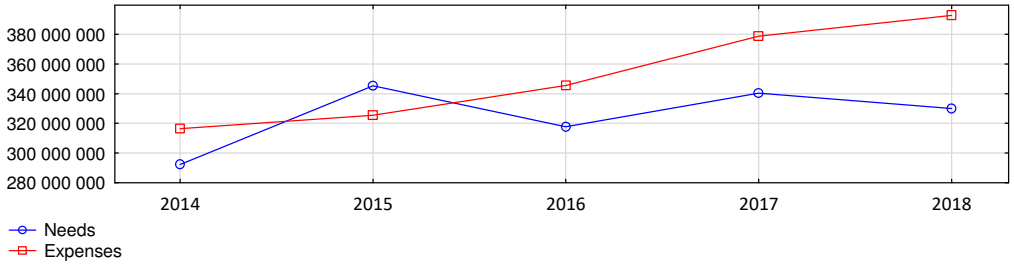

Fig. 1: Line chart of planned needs and expenses incurred to cover them in the procurement department in 2014-2018

The evaluation of Figure 1 is the lack of balancing of the planned needs with the expenses incurred for their supply. The average absolute percentage error of planned needs in the procurement department for years was 10% in 2017 while in 2018 - 16%. This became a direct premise for further research in order to look for a new effective method of planning needs. Research in this matter began with identifying the method used to calculate needs and suggesting a new one.

Method of Planning Needs

Performing the calculation of needs in the Polish Institution currently requires knowledge of the following information

a) numer of staff,
b) the quantity and type of equipment used to carry out the tasks
c) investments.

The basis for the calculation of needs is included in the following documents:

- ✓ training programs
- ✓ exploitation plans
- ✓ purchasing priorities for the financial year
- ✓ plans resulting from perspective tasks (including modernization),
- ✓ tables and standards of equipment quantity, and others

Figure 2 presents the current condition of the method of calculating needs in the Polish Institution.

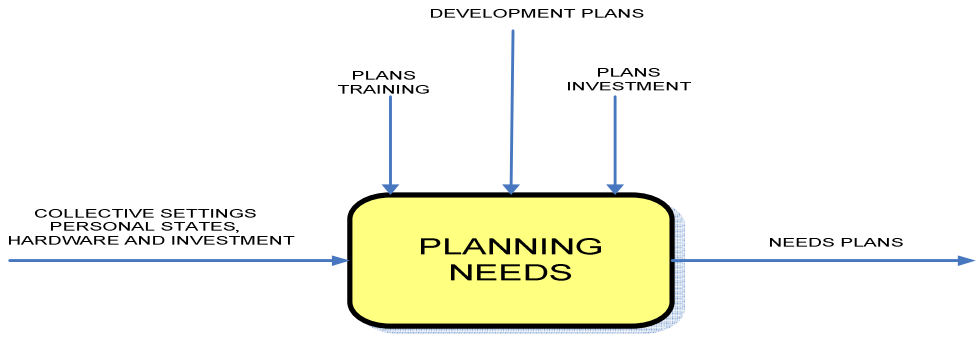

Fig. 2: Current condition - a method of calculating needs in the Polish Institution

At the moment, the calculation of needs in the Polish Institution is created by comparing the personnel, equipment and investment conditions with standards resulting from branch documents as well as specialized instructions, and others (Figure 2). It is a method that causes the balancing of planned needs with the expenses incurred to secure them.

Figure 3 suggests a new method based on forecasting retrospective data on expenditure incurred in dynamic terms.

Fig. 3: A new method of calculating needs in the Polish Institution

The new method will require recorded expenditure in procurement departments. When there is no time series of expenditure in retrospective terms, the old method will be used. Over time, expenditure will appear and the new method of calculating needs could be applied. The old method will apply to newly created institutions or units. In time, however, it will be replaced by the method based on forecasting expenditure for the future.

The next stage of research is forecasting retrospective data of expenditure in the procurement department in the economic unit. This activity was preceded by a thorough analysis and evaluation of retrospective data of recorded expenditure in the procurement department in question. The obtained evaluation was used to select the method on the basis of which the forecasting was made.

Analysis and forecasting of expenditure

The first stage of the research was to outline retrospective data on expenditure incurred in the procurement department in between 2014-2018, broken down by months in Figure 4.

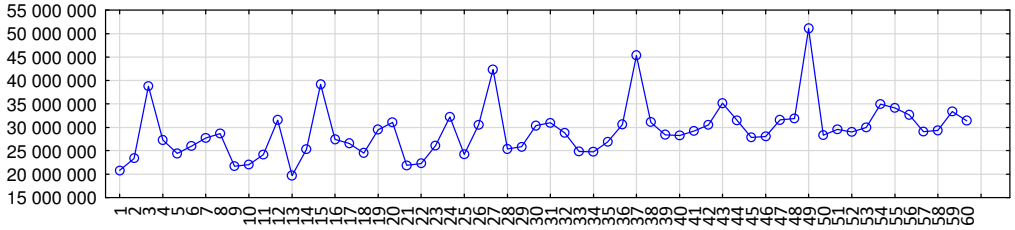

Fig. 4: Line chart of expenditure incurred in the procurement department at the Economic unit in between 2014-2018 broken down by months

Visual observation of Figure 4 made it possible to detect trends (2014-2016) and its shift in 2017-2018. Critical analysis of literature and evaluation of Figure 4 have become direct premises for the conversion of places in retrospective data in 2017-2018 from March to January. The series after transformation is outlined in Figure 5 and defined as research.

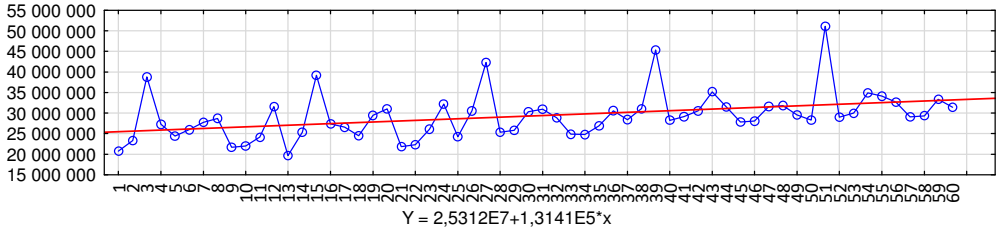

Fig. 5: Line graph of expenditure incurred in the procurement department at the Economic unit in between 2014-2018 broken down by months after adjustment (research series) along with a trend line and its formula

The evaluation of Figure 5 is the detection of a rising linear trend. The trend is outlined in Figure 5 with a red line and described in the footer with the formula. The next stage of the research was the analysis and evaluation of the distribution of the research series. For this purpose, research tools were used in the form of a histogram (Figure 6) and a normality chart with the Shapiro-Wilk test (Figure 7).

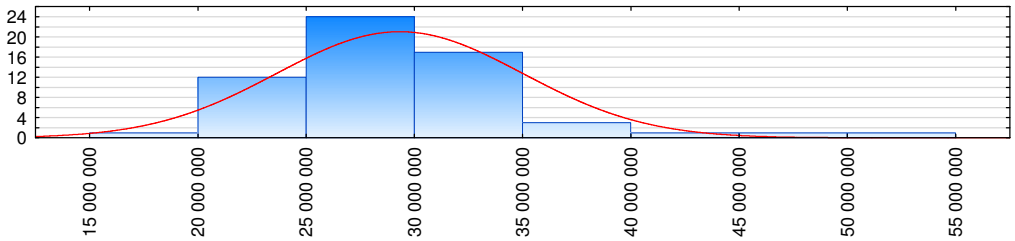

Fig. 6: Histogram of the research series

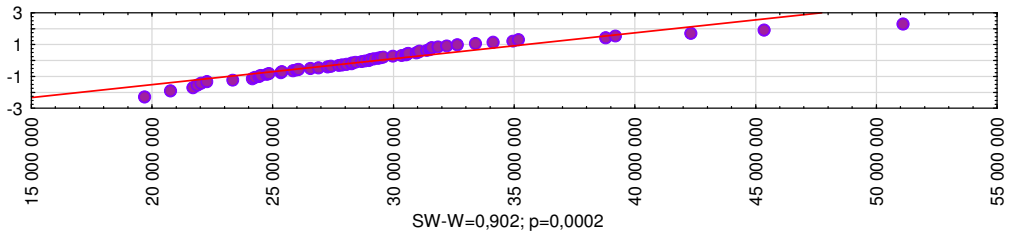

Fig. 7: Normality chart of the test series with the Shapiro-Wilk test

The evaluation of the distribution analysis performed in Figures 6 and 7 is that the distribution is not normal. The premise of a lack of normality may be the occurrence of outliers and extreme values.
The next stage of research was the search for the existence of outliers and extreme values. For this purpose, a box plot chart was used along with the outlined median and raw data.

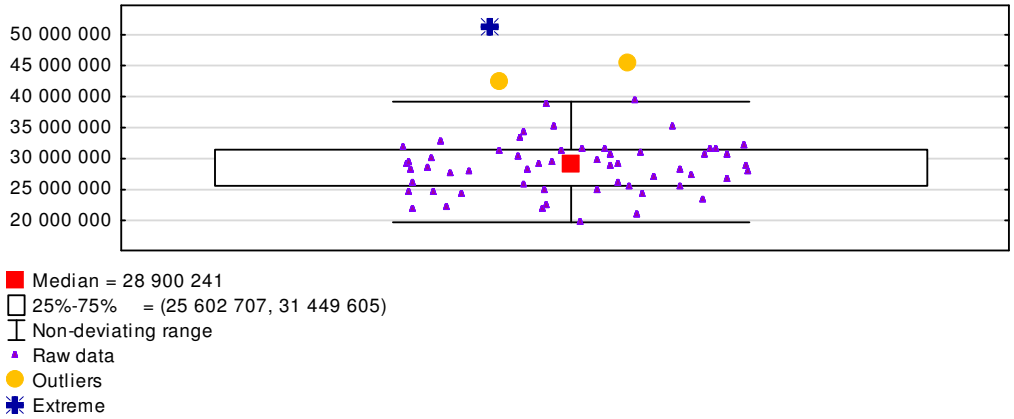

Fig. 8: The box plot chart along with the outlined median and raw data of the research series

The evaluation of Figure 8 is the indication of the existence of two outliers: March 2016 and 2017. The extreme value was March 2018.

Then, the relationships in the delays of the analyzed research series were examined. For this purpose, research tools were used in the form of: autocorrelation (Figure 9) and partial autocorrelation (Figure 10).

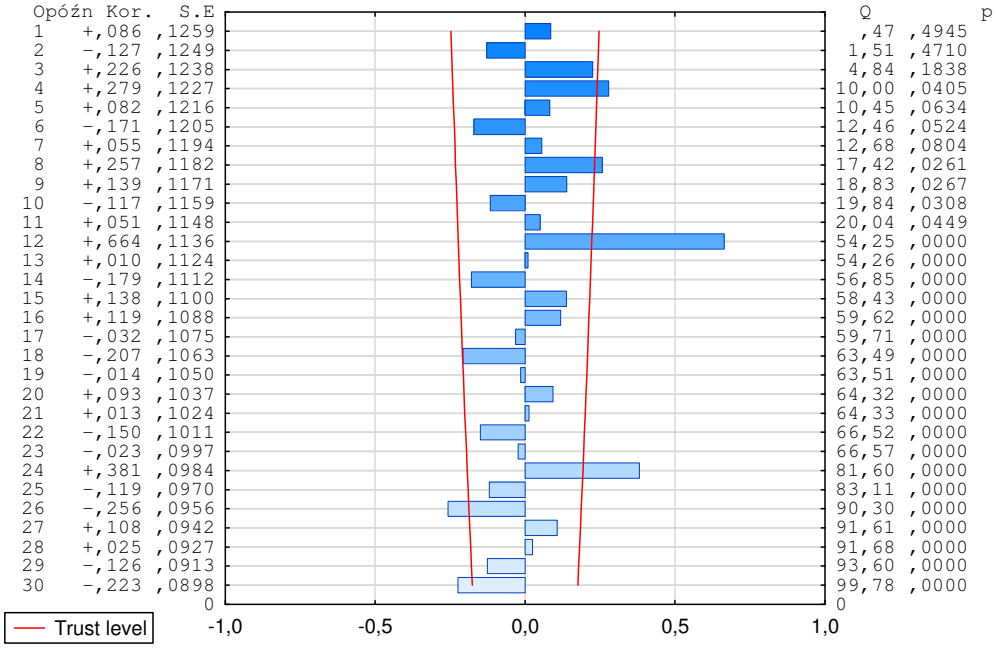

Fig. 1: Autocorrelation of the research series

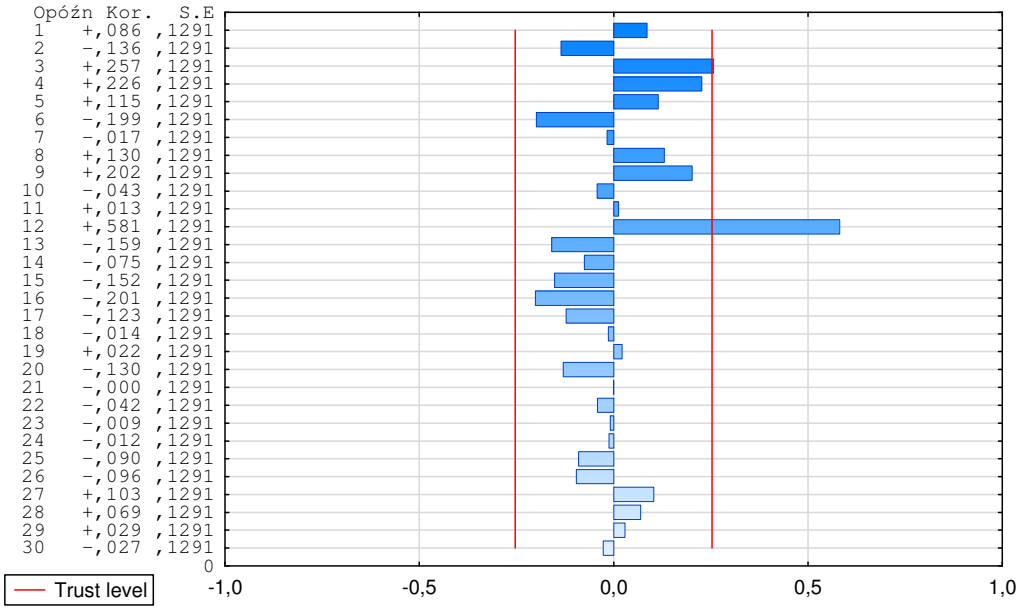

Fig. 2: Partial autocorrelation of the research series

The evaluation of the research tools used in the form of: autocorrelation (Figure 9) and partial autocorrelation (Figure 10) is that the analyzed research time series is non-stationary. It shows seasonality and a slight trend.

This became a direct premise for building a zero-one model of multiple regression to confirm the existence of seasonality and trend. For this purpose, fourteen predictors were used in the form of variables: t, t^2, lnt and eleven months as zero-one variables. Based on the analyzes and their evaluation, January was omitted. The built matrix had 900 elements. Significant predictors are summarized in Table 2.

Table 2: A zero-one model of multiple regression

N=60	R= ,95341381 R^2= ,90899788 Adjusted R^2= ,89042602 Standard error of estimation: 1882238,93158296					
	b*	Standard error	b	Standard error	t(49)	p
Word free			20 607 120,4670	652 935,6135	31,5607	0,0000
t	0,4366	0,0437	142 153,2837	14 218,9128	9,9975	0,0000
February	0,1673	0,0478	3 413 002,1461	974 246,3147	3,5032	0,0010
March	0,9265	0,0477	18 900 764,0303	973 381,2559	19,4176	0,0000
April	0,1408	0,0477	2 872 407,2746	972 723,2967	2,9530	0,0048
May	0,1208	0,0477	2 463 488,2369	972 272,8576	2,5337	0,0145
June	0,2150	0,0476	4 385 664,7032	972 030,2270	4,5119	0,0000
July	0,3174	0,0476	6 475 461,9854	971 995,5605	6,6620	0,0000
August	0,2639	0,0477	5 384 136,6157	972 168,8805	5,5383	0,0000
November	0,1389	0,0477	2 834 550,7165	973 934,9821	2,9104	0,0054
December	0,2839	0,0478	5 792 245,7308	974 937,8091	5,9411	0,0000

The evaluation of a zero-one model of multiple regression is that ten predictors are significant. These include variables: t, February-August, November and December. This confirms the existence of a linear upward trend and seasonality on an annual basis. The built model was well fitted. Multiple R^2 was 0.91. The evaluation of all analyzes carried out is the detection of a growing linear trend and seasonality on a monthly basis. Due to the short research time series (60 elements), the Holt-Winter's exponential smoothing method was used to forecast for 2019 (twelve months). The results of the forecast are summarized in Figure 11 and Table 3.

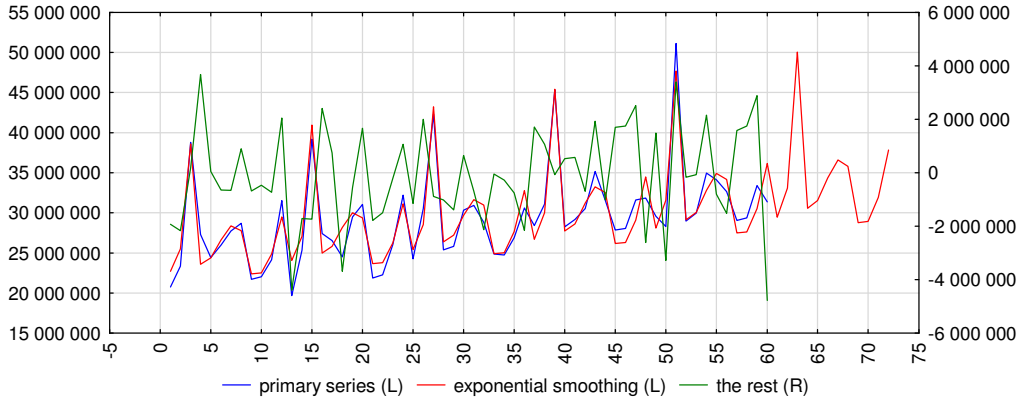

Fig. 11: Forecast of research time series with Holt-Winter's exponential smoothing method for twelve future periods (2019)

The evaluation of Figure 11 is the indication of an upward trend in the forecast obtained and a continuation of the retrospective phenomenon of seasonality.

Table 3: Forecast of the research time series made with the Holt-Winter method for twelve future periods (2019)

Order number	Forecasting H-W
61	29 464 177,4810
62	33 095 887,1707
63	50 049 974,0360
64	30 560 457,7943
65	31 509 088,4608
66	34 370 320,0967
67	36 601 917,0876
68	35 792 300,9794
69	28 787 671,5724
70	28 919 432,1086
71	31 939 200,8602
72	37 830 426,4401
Sum	408 920 854,09

The data presented in Table 3 indicate that the forecast for 2019 in the procurement department is 408 920 854.09.

The next step was to re-transform the forecast. To this end, the positions of January and March have been exchanged. The results are outlined in Figure 12.

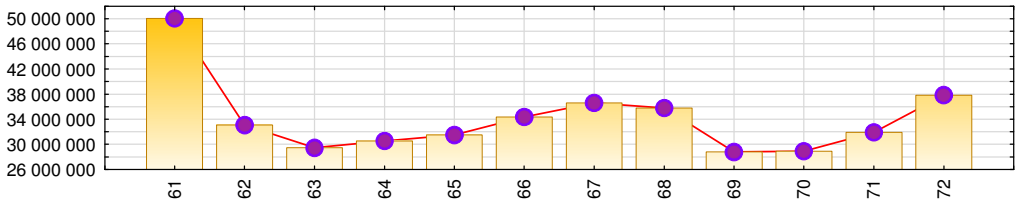

Fig. 12: Forecast of research time series with Holt-Winter's exponential smoothing method for twelve future periods (2019) after re-transformation

The evaluation of Figure 12 is that the highest forecast in 2019 should be visible in January - 50 049 974.0360 and the lowest one in September - 28 787 671.5724. The next stage of research will be empirical verification of obtained forecasts.

Empirical verification of the new method of needs planning

The research in the scope of empirical verification of the new method of planning needs began with the compilation of data on planned needs in the procurement department in the years between 2014-2018 with the forecast presented by economic unit and made with Holt-Winter's method (Figure 13).

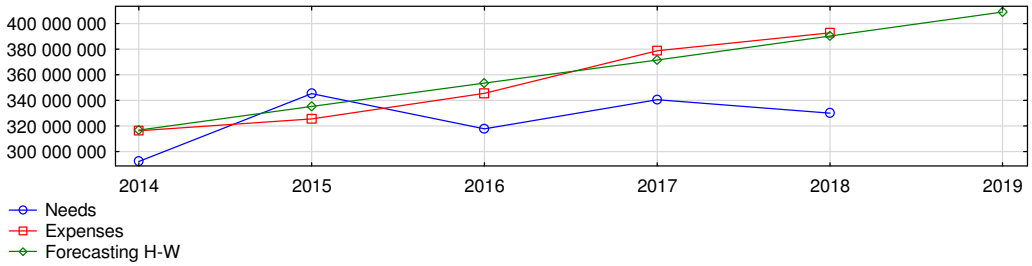

Fig. 3: A summary of data on planned needs in the procurement department in between 2014-2018 with the forecast provided by economic unit and made with Holt-Winter's method

Visual observation of Figure 13 clearly shows that the best method for forecasting is Holt-Winter's method because the differences between the empirical values of this forecast and the expenditure incurred are lowest in dynamic terms.

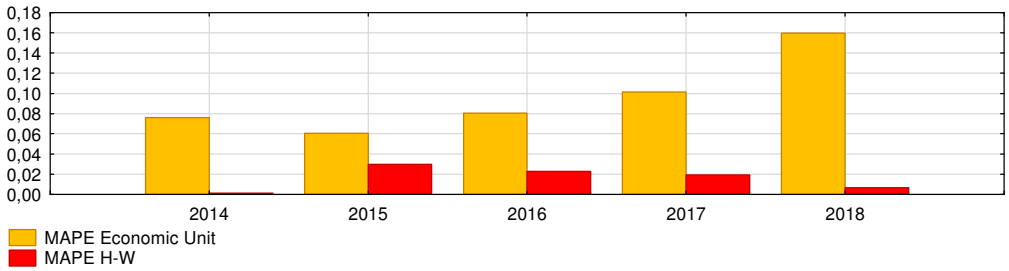

Fig. 4: Summary of data on the average absolute error of the forecast made in between 2014-2018 by economic unit and with the use of Holt-Winter's method

The evaluation of Figure 14 is confirmation that the best method for planning needs in the procurement department is Holt-Winter's method. The mean absolute percentage error (Figure 14) was lowest for

Holt-Winter's method. The decrease of the difference in the average absolute percentage error between the forecast made by economic unit and with Holt-Winter's method in 2017 was 8.19% and 2018 - 15.31%.

Summary, Conclusions and Synthesis

The newly developed needs planning method meets the requirements of the Polish Institution regarding the improvement of the current planning process in terms of national security. This requires a change in the approach to the current concept by implementing effective tools for calculating needs. The work attempts to implement a new method of planning needs. Implementation of the plans began with a review of domestic and foreign literature on the function of planning in management sciences.

The purpose of the work was to develop a new method of calculating needs in the Polish Institution. The goal of the work has been achieved. The method of calculating needs was developed. The application of the new method of calculating needs was preceded by a broad analysis of source materials through the use of existing research tools. In institutions where the current method of planning needs will be used, over time, there will be expenditure forming time series that will be reasonable to forecast using the available models.

The research scope of the work, in which the needs planning process was analyzed and evaluated, covered the years 2014-2019. The forecasting was carried out on the basis of a time series of expenditure in the procurement department for 2019.

Positive empirical verification of the new needs planning method, which was used, justifies its use in the Polish Institution.

Synthesis
The application of the developed method of calculating needs in the planning process explains the phenomena occurring in the management function in question, will lead to an improvement in the results of balancing the needs in terms of supplies in the Polish Institution with the expenditure incurred to secure them and eliminate its current disadvantages in terms of national security.

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Vulnerability Detection Approaches on Application Behaviors in Mobile Environment

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Abstract

Several solutions ensuring the dynamic detection of malicious activities on Android ecosystem have been proposed. These are represented by generic rules and models that identify any purported malicious behavior. However, the approaches adopted are far from being effective in detecting malware (listed or not) and whose form and behavior are likely to be different depending on the execution environment or the design of the malware itself (polymorphic for example). An additional difficulty is added when these approaches are unable to capture, analyze, and classify all the execution paths incorporated in the analyzed application earlier. This suggests that the functionality of the analyzed application can constitute a potential risk but never explored or revealed.
We have studied some malware detection techniques based on behavioral analysis of applications. The description, characteristics, and results obtained from each technique are presented in this article wherein we have also highlighted some open problems, challenges as well as the different possible future directions of research concerning behavioral analysis of malware.

Keywords: Android Security, Malware detection approaches, Behavior Detection, Dynamic analysis, Malware classification.

Introduction

The year 2019 has witnesses yet again Android dominance by 72.2% (StatCounter Global Stats 2020) of smart-phones worldwide market share. The large adoption of Android sets it as the preferred target of mobile cybercrime (Figure 1).

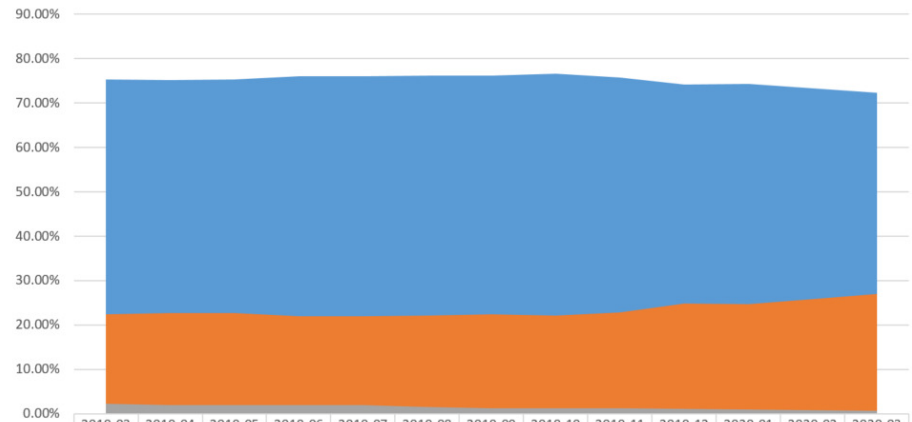

	2019-03	2019-04	2019-05	2019-06	2019-07	2019-08	2019-09	2019-10	2019-11	2019-12	2020-01	2020-02	2020-03
Android	75.33%	75.22%	75.34%	76.03%	76.08%	76.23%	76.24%	76.67%	75.82%	74.13%	74.30%	73.30%	72.26%
iOS	22.40%	22.76%	22.66%	22.04%	22.01%	22.17%	22.48%	22.09%	22.90%	24.79%	24.76%	25.89%	27.03%
Other	2.26%	2.02%	2.00%	1.93%	1.92%	1.61%	1.27%	1.22%	1.27%	1.09%	0.93%	0.82%	0.69%

Fig. 1: Mobile Operating System Market Share Worldwide (2020)

Victim of its popularity, Android is an opportunity for hackers to get their hands on a large amount of victim data (SMS, GPS location, etc.) with less effort by taking advantage of free access to the source code of Android (known under the name AOSP). This makes installing and spreading malware easier compared to a closed operating system (iOS, BlackBerry, etc.).
The Android ecosystem also plays a role in the emergence of new vulnerabilities and the spread of hacker attack vectors. Indeed, several mobile manufacturers (Smartphone or Tablet) manage to design and market several products adapted to the needs and financial capacity of the consumer. These products do not host Android as published by Google but adopt a modified version including new proprietary components essential for its proper functioning (device driver for example) or presentation layers to stand out from the competition.

Specific and personalized developments made by manufacturers, and which are subsequently integrated into Android OS, may also contain vulnerabilities whose impact is of serious comparable to those found in applications installed by the user (Wu et al. 2013) or even in AOSP. The detected vulnerabilities affect the preinstalled components of specific manufacturers or specific ranges for a given manufacturer (Farhang, Kirdan, et al. 2020) (Elsabagh et al. 2020). This makes the Android ecosystem and its security segmented more and more (within the same manufacturers), and it only increases the risks associated with any equipment running Android such as Farhang, Laszka, and Grossklags (2018) shown in their study. With the evolution of mobile attacks, which have become increasingly stealthy (McAfee 2020), any flaws introduced by the manufacturer or developers of third-party applications can constitute a gateway for hackers to gain access to sensitive resources and data of hardware and the user by acquiring system privileges and permissions in an illegal manner, and without the consent of the end-user.

To address the various threats, in particular those caused by malware or those intentionally introduced into applications installed by the manufacturers or by the user, several analysis methods and approaches have been proposed by Kouliaridis et al. (2020) and others. In this work, we will focus on existing detection approaches based on malware behavioral analysis and the potential they have for identifying and detecting malicious behaviors that malicious applications may carry once installed in an adequate environment to start their malicious mission.

The rest of this article is organized as follows: Part 2 presents the different techniques for detecting vulnerabilities. Part 3 describes in detail the approach to behavioral malware analysis and the various solutions proposed. Part 4 presents possible future research prospects regarding the behavioral analysis of malware. Finally, Part 5 concludes the article.

Vulnerability Detection Techniques

Several detection approaches and techniques have been proposed to ensure efficiency in the various phases of the analysis and the detection process to decide whether the application analyzed is malicious or not. To identify the functionality and how the malware activates, executes, and manipulates its data or stolen data, two main analysis techniques are used: static and dynamic analysis.

Static Code Analysis

Static analysis of an application consists of reconstructing, scanning, and analyzing the code of the application without executing it. Its advantage is that it tries to cover and explore all possible paths of control and execution and examine the functionalities programmed without invoking them in order to extract, identify and analyze any malicious or legitimate action but which could be used maliciously by malware (system and API call (Aafer, Du, and Yin 2013), permission (Saracino et al. 2016), etc.).

All these processing can consume a lot of time and require resources in terms of calculation and storage without forgetting that the executable of the application must first undergo a treatment of "Reverse Engineering (RE)" (Eilam 2011), the latter is essential to have exploitable source code. However, RE is becoming increasingly unreliable (easily bypassed) and expensive because of the obfuscation techniques (Dalla Preda and Maggi 2017) (Suarez-Tangil et al. 2017) that the creator of malware adopts when compiling its source code. In several studies (those based on Machine Learning, such as Xi et al. (2019)), the static characteristics extracted from the analyzed applications which will be normalized, processed are used as input data to machine learning algorithms to decide whether the application is malicious or benign.

Dynamic Behavior Analysis

Unlike static analysis, dynamic analysis of an application consists of observing and studying the behavior and actions taken by this application during its execution. It consists of listing and examining all activities related to the file system as Cabau, Buhu, and Oprisa (2016) proposed, to the network (Nari and Ghorbani 2013), to the sequences of API and system calls (functions, parameters, instructions, associated data flows) (Martinelli, Marulli, and Mercaldo 2017) (Egele et al. 2008), etc. Dynamic analysis is generally carried out in a controlled and virtual test environment where several monitoring software components are installed. This customization of the test environment can influence the normal and natural execution of malicious applications because it can generate a completely different behavior compared to a similar execution in a real environment. This will weaken the effectiveness of dynamic analysis in reducing the probability of the malware detection since the verification of rules and models already classified will be based on system calls and data generated by artificial behaviors that do not reflect the reality. Dynamic analysis requires continuous monitoring, adaptation, and updating for effective automation in the analysis or classification of malicious behaviors to follow the continuous evolution of the techniques used in malware. The complexity and the transformation capacity of a certain type of these malware (Polymorphic and Metamorphic malware) allow it to escape from the various traditional detection methods, thanks to the self-adaptation of malware functionalities according to the environment in which they are executed.

There are also hybrid detection techniques that try to merge the strengths of static and dynamic analysis (Anderson, Storlie, and Lane 2012) to improve the assessment and classification of the applications analyzed based on the collection and analysis of the functionalities detected via machine learning. Other approaches monitor the application during its execution to report any malicious behavior that may occur in the Smartphone (Faiella et al. 2017).

Analysis of Behavior Detection Techniques

Because of the integration of advanced techniques in the design and development of malwares (Wazid, Zeadally, and Das 2019), the detection of the latter is now more and more difficult despite the various works done in this direction. Its algorithms can be effective in specific cases for a context Well-defined. However, analyzing the behavior of malware in a real execution environment can be an important factor in identifying and detecting the impacts associated with the malicious behavior of malware and its future targets.

For an effective analysis of the integrated vulnerabilities in the applications or in AOSP itself, implicitly or explicitly (security flaws in the code), the behavioral analysis of the launched processes must be implemented and remain in active listening in order to control the various flows and interactions between its processes and the resources (of which they have access or not) from Smartphones. The data provided by these can contain information on behaviors that can be considered inappropriate or malicious, even if the resources used can already be made available to the applications, the source of their behaviors, thanks to the permissions granted upon installation or they are, in one way or another, put within its reach because of a security breach (following an elevation of privileges for example).

Techniques for Detecting and Analyzing Malware

To minimize human intervention in understanding and analyzing new malware, it is essential to automate its tasks in order to “robotize” their detections so that the potential risks associated with their malicious behavior can easily be identified. Despite the increase, diversification, and complication of the technics of malicious applications, the analysis, extraction, and sample classification processes of these applications must be capable of extracting models or images representing the identity of its malware. Its representations can then be used for the classification of any new application whose behavior is likely to harm the security and normal functioning of the end user’s devices.

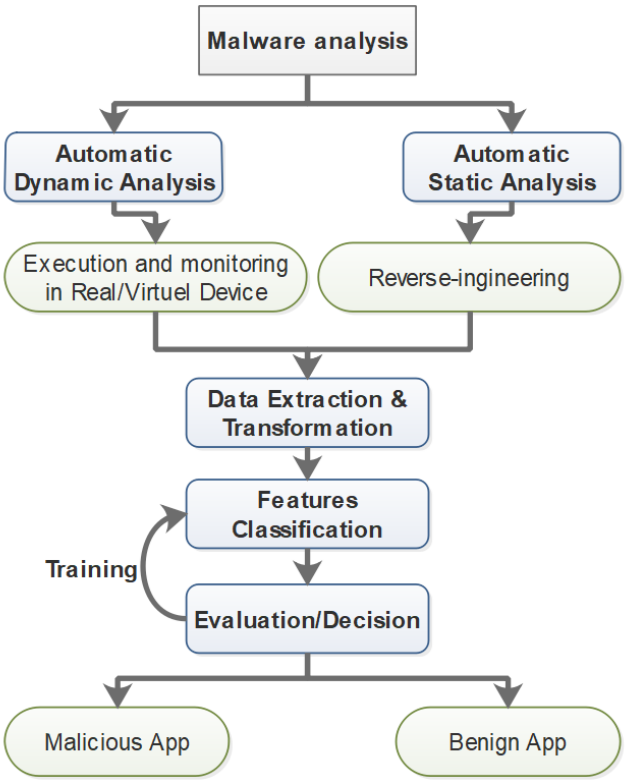

Fig. 2: Malware detection schema

The detection of a malicious application is mainly based on four steps (Figure 2):

- Analysis of the application: after receiving the executable of the application to be analyzed, the system begins the analysis step, which can be dynamic, static, or both:
    - Dynamic analysis: consists of the execution and monitoring of the application in a real or virtual machine. The observation of the activities of the application can relate to the launched processes, the network requests, the modifications made on the system files, the registry, etc.
    - Static analysis: consists of applying "Reverse-engineering" to the application to be able to decompile the executable and reconstruct its source code so that it can be used in the following steps.
- Data Extraction and Transformation: data mining techniques (Graph model, n-tuple, n-gram, etc.) can be used in this step to extract data that may contain characteristics, specifications, and functionalities (unitary or combined). This is geared towards determining the benign behaviors (representing the normal functioning of applications) or malicious behavior which could constitute a potential risk for the security of system resources and the integrity of sensitive user data. The extracted data can undergo transformations in order to eliminate unnecessary data (noise-tolerant) and then generate signatures, behavioral models, graphs representing the image of the extracted functionalities.
- Feature Classification: uses the Machine Learning to classify the characteristics of the analyzed application by referring to the generic rules and models previously built based on the characteristics already extracted from the application samples (benign and malicious) during the training phase of the system.
- Evaluation/Decision: in this step, the characteristics extracted from the analyzed application are compared with the signatures or behavioral model previously-stored the system database, and following this comparison, the system can deduce whether the analyzed application is malicious or not.

Malware Behavior Detection Approach

Several studies have been elaborated to describe the different malware detection approaches based on their behavioral imprint extracted during their interaction with the environment on which they are hosted. The nature of the latter, which can be a real environment, Sandbox, or a virtual machine, and its architecture play a decisive role in identifying the different application execution paths (malicious or not).

1) MADAM:

Saracino et al. (2016) proposed Madam, which is an Android malware detection system based on behavior monitoring at the level of the user (their activity/inactivity), the application (critical APIs), the package (permissions requested), and the kernel (system calls, etc.). After having classified most of the behavioral characteristics of real and known malware in misbehavior classes, the system ensures the extraction, analysis, and correlation of the functionalities of installed applications with behavioral models, previously generated, in order to be able to effectively detect and block any malicious activity. This system has shown its effectiveness in detecting more than 96% of malicious applications with a low rate of false alarms.

2) M0droid:

This technique about detecting Android malware had been proposed by Damshenas et al. (2015). It consists of two elements: a light client agent and an analyzer server. The client agent is installed in mobile devices that communicate with an analysis server, the latter analyzes the behavior of Android applications (invoked system calls) and creates signatures representing the malicious activities that malware can carry out; its signatures are used by client agents to identify and detect any vulnerability threatening users. The client-server architecture of this framework allows the end-user to minimize the consumption of resources and phone energy. The latter runs the client agent in the background and transmits to the analyzer server the various data collected regarding the installed applications. The analyzer server takes care of the analysis of the applications in an emulator by injecting it with random events both to invoke the system calls corresponding to the processing, and to cover the maximum of the possible paths of execution of the analyzed application. The behavior of the latter is captured and then used to create a standardized signature that will then be classified and compared with the blacklist of signatures that are previously constructed by this framework. Outsourcing the detection functionality to the cloud overcomes the limitations related to the performance of the end user's mobile device. 60.16% is the malware detection rate with 0.4% false negatives and 39.43% as a false positive rate.

3) DroidDetector:

The functionalities of dynamic and static analysis of Android applications have been combined in Droiddetector (Yuan, Lu, and Xue 2016), this hybrid solution is based on a Deep Learning method based on the Deep Belief Network (DBN) to extract, investigate and classify static characteristics (calls system, permissions, ...) and dynamics (behavior categories) of benign and malicious applications analyzed. The result of these treatments is used to feed the DBN network so that it can be used afterward by the DroidDetector mobile application previously installed on the end user's device. With a sample of 1,760 malicious applications, 192 static and dynamic characteristics were extracted, which allowed the level of detection accuracy to reach 96.76%.

4) Andromaly:

Andromaly (Shabtai et al. 2012) is a Host-based malware detection system that continuously monitors and classifies the various events dynamically generated by the mobile device while applications are running. Other features (related to network traffic, battery level, number of running processes, etc.) are also monitored by this system. Using Machine Learning algorithms, the behavioral characteristics collected are classified according to their nature (malicious or not), and then used to assess the level of infection of the mobile device. The alert history is also used and combined with the results obtained to reduce the rate of the false positives that are obtained. Even if the experiments are not done on samples of real malicious applications, the obtained results confirm that their solution is effective on the applications analyzed.

5) ServiceMonitor:

With the system proposed by Salehi, Amini, and Crispo (2019), malicious behaviors are identified using Machine Learning algorithms. Indeed, ServiceMonitor consists of generating a precise representation of the behavior of applications based on its different interactions with the service and system resources. The use of these resources is classified and represented by a statistical model (in the form of Markov chains) making it possible to monitor their exploitation by the various running applications. With a sample of 18,058 applications processed (10,024 benign and 8,034 malicious), ServiceMonitor was efficient and precise in detecting malicious behavior with an accuracy rate of 96.7%.

6) ***HIDROID****:*

Ribeiro et al. (2020) developed a novel Host-based IDPS for Android (HIDROID), which is a standalone Intrusion Detection and Prevention Systems that runs entirely on a mobile device without the need for a remote server. The behavior of applications with the device's resources (battery, CPU, memory, etc.) is monitored using a detection engine, which collects data in real-time and builds up a model representing benign behaviors by using a combination of statistics and Machine Learning algorithms that will help detect vulnerabilities (known or not). Any suspicious behavior is communicated to the user in the form of an alert, and countermeasures are taken to reduce the risk of an attack or intrusion. HIDROID has the ability to analyze, learn, and classify behaviors without the need for any malware data.

The summary of behavioral malware detection techniques described in this section is presented in Table 1.

Table 1: Comparative behaviors analysis of existing techniques

Techniques	Features	Accuracy of detection
Madam	Behavior monitoring is carried out at the user, application, package, and kernel level.	The detection accuracy is 96.9% on a sample of 2,784 malicious applications, with a low false-positive rate.
M0droid	The Framework is composed of an analyzer server and a lightweight client. The analysis and detection are based on the system call invoked by the analyzed application.	60.16% is the malware detection rate with 0.4% false negatives and 39.43% as a false positive rate.
DroidDetector	This hybrid solution is based on a Deep Learning method (Deep Belief Network - DBN-) to extract, investigate, and classify the static and dynamic characteristics of the analyzed application.	With a sample of 1,760 malicious applications, the detection accuracy reached 96.76%
Andromaly	For better efficiency, the alert history is combined with the analysis results made on the dynamic characteristics of the monitored applications	Achieve accuracy in between 87% and 99%
ServiceMonitor	Static models representing the use of resources, and call systems are made based on the behavior of applications with the different used resources.	Malicious applications are detected with an accuracy rate of 96.7%
HIDROID	Learning and classifying behaviors are performed without the use of any malware data.	Detection accuracy reached 0.91 with a false positive rate limited to 0.03.

Despite the multitude of methods for observing, analyzing, and investigating the applications analyzed, some malicious behaviors can remain undetectable. This can be due to: (1) non-satisfaction of the conditions required for its triggering (Smartphone brand or a specific version of Android for

example). (2) the difficulty of identifying similarities between the characteristics previously extracted with those detected during the analysis of a behavior; this is due to the complexity linked to determining clearly and exhaustively the different functionalities of behavior and its associated characteristics. (3) or it is because of the nature of the runtime environment. Indeed, the use of a virtual environment (emulator) can be easily detectable thanks to the methods already implemented in malware. This will give malware the opportunity to mask their malicious behavior and remain undetectable.

Possible Future Research Prospects

Cybersecurity researchers have the interest of improving the effectiveness of current approaches to detecting malicious applications and especially those interested in behavioral analysis of malware. This type of analysis has shown its effectiveness in several studies; hence the need to concentrate efforts in improving the capacities of this component.

The use of a few features by benign and malicious applications creates some confusion in the classification of these features and increases the false positive rate. To overcome this malfunction and improve detection performance, it is necessary or even essential to add other layers of analysis using other detection techniques (static or heuristic for example) in order to confirm or reverse a decision before communicating it. These layers will have the mission of verifying the suspect functionalities and characteristics, and not redoing a new independent analysis as suggested by some hybrid approaches. This will also help to ensure an adaptation to the different reactions and transformation that malware (normal, polymorphic or other) can undergo depending on the deployment environment (real, virtual device, etc.), the version of Android or even according to the nature of overlay added by the manufacturer.

The approaches based on Deep Learning have given satisfactory results and may also be an area of research that can be explored by experimenting all the algorithms proposed by this method in order to improve the classification of the characteristics and functionalities processed and, thus, improve the performance of the decisions taken.

Having complete coverage of the execution and control paths of an application is considered a major challenge to reveal and block any activity likely to harm the security of devices; and this requires the adoption of a new distributed architecture allowing a better inventory of the different behaviors of the analyzed application. The launching of several simultaneous dynamic analyzes of the latter in different environments will allow the identification and capture of new behaviors (data flow, system calls, etc.). Ouaguid, Abghour, and Ouzzif (2018) had already proposed a similar architecture based on the Blockchain (ANDROSCANREG) but intended only for the static analysis of Android applications. Adopting such an architecture in the dynamic analysis will help improve the detection of malicious behavior which activates if specific conditions are satisfied.

Conclusion

In this article, we have presented some techniques for detecting malicious applications and we have specifically examined some dynamic approaches based on malware behavioral analysis. These malware are increasingly sophisticated and difficult to detect in the real world despite the integration of Machine Learning and Deep Learning methods in the classification of generic characteristics, rules, and models identifying the behaviors captured.

We believe that the solution to these limits is to have a hybrid method based on a hierarchical combination of different analysis techniques in a distributed environment (based on Blockchain technology for example). Such solution will allow better accuracy in the classification of functionalities extracted during the dynamic analysis of an application or from application samples (benign and malicious) that are analyzed during the training phase of the system. This direction deserves an in-depth study and could open up other opportunities to improve the detection of

malicious behavior from more sophisticated malware (polymorphic for example) which changes its representations, its behavior and it is triggered if specific conditions are satisfied.

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The Challenges for Local Government Units in The Face of The Silver Economy – Evidence from Poland

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Abstract

The paper undertakes the issue of challenges carried by demographic changes for the functioning of local government units. The review portion of the paper discusses the concepts of silver economy as responses to population ageing. The empirical part comprises an analysis of results of research which covers diagnosis and assessment of problems that affect the elderly in the context of development of the silver economy. Research was conducted using the CAWI method and concerned local government units in Poland. Nevertheless, it must be pointed out that the undertaken problem has not been a subject of in-depth analysis so far. Hence, the article fills the identified research gap in this field.

Keywords: Silver Economy, Local Government, Ageing, Public Policy

Introduction

The demographic changes (population ageing) which have occurred over the several past decades have complicated implications at a socio-economic level. These changes are observed in numerous areas of operation of the state and society (Błędowski at el., 2012). Nevertheless, it seems that in the current policy and long-term development strategies, the significance and consequences of these changes are often underestimated, and it is observed by documents and studies which tackle this issue in the context of problems and threats rather than in the category of opportunities and challenges. Furthermore, the main emphasis in considerations on the implications of population ageing is put on the national dimension (e.g. pension policy, health policy, education policy). Meanwhile, the local aspect is at least as important. In accordance with the principle of subsidiarity, it is communes that bear the greatest burden of tasks which will be particularly affected by population ageing. It is also noted that in accordance with the concept of the silver economy, the growing percentage of older people in the population translates into an increase in the aggregate purchasing power of older consumers, which can be used as a stimulus for local development.

The main objective of research was defined as the diagnosis and assessment of problems affecting the elderly in the context of the development of the silver economy. Realisation of this goal is achieved by verifying three research hypotheses formulated in the methodological part of the study.

The source of data for analyses presented in the study is an investigation conducted among the communes of the Malopolska Voivodship in September-December of 2018 in cooperation with the

Regional Chamber of Audit in Cracow. Research methods used in the review portion include demographic analysis, as well as critical analysis of the literature and the synthesis of conclusions drawn from it. The empirical portion comprises an analysis of survey results, which involves the use of statistical tools, including descriptive statistics and methods of statistical inference.

Demographic changes in Poland and the silver economy

The demographic changes taking place in the European Union countries in the coming years will be more strongly felt. The effects of these changes are particularly noticeable in Poland, which for many years has ranked amongst the top 30 demographically old countries in the world. Demographic forecasts for Poland prepared by both international (UN, OECD) and national (GUS, 2014) institutions point to three significant effects of the ageing of society. First, there will be a decrease in population, which will be accompanied by a change in its structure (Figure 1). With a view to 2050, the total population of Poland will decrease by over 4.5 million compared to 2018. People in the post-working age will constitute an increasing share, while the percentage of people in the pre-working and working ages will drop. The demographic dependency ratio calculated as the ratio of the number of people in non-working age (0-19 and 65+) to the number of those in working age (20-64) is used to assess the advancement of population ageing. For example, in 2018 it was 60.12% in Poland, and in 2050 it will be at a level of 96.03%.

Secondly, in the group of people in post-working age an increasing share will be constitute by people over 80 years of age (Figure 1). This phenomenon is referred to as *double ageing* and it consists in a faster than usual growth rate of the share of population aged 80 and over (Błędowski *at el*., 2012). In 2025-2050, the percentage of people aged 80 and over in the elderly group (60 years and more) will increase from 16.1% to 25.8% in 2050. This process is a result of the third observed demographic trend, i.e. duration of life. Still in 1950 the life expectancy for males was slightly above 56 years, while for female it was almost 62 years. Currently, males in Poland live 17.7 years longer than in the middle of the last century while the life of women has been extended by 20 years (GUS, 2019).

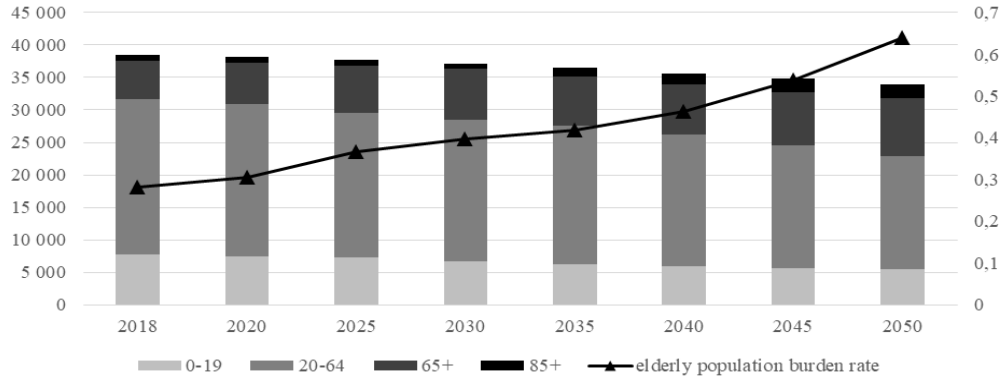

Fig. 1: Projected population changes in Poland across age groups in the years 2018-2050
Source: prepared by the authors based on data of GUS (Population forecast for 2014-2050, Studies and statistical analysis, Główny Urząd Statystyczny, Warsaw 2014)

The observed ageing of society is now impacting the design of political sciences; whereby as a rule its implications are treated mainly as threats for chosen areas of the state's functioning, and in particular pension systems, healthcare, social policy or education, often overlooking the new opportunities created by demographic change. Rapid demographic changes are not only a major challenge of public spending, workforce and consumptions patterns but also a substantial opportunity for new jobs and growth. Hence, public policies should on the one hand target limiting the negative implications of population ageing, while on the other take into account activities that will allow the use of new conditions for the implementation of public tasks to raise the level of economic development, and thus the quality of life of people, in particular the elderly.

The literature on the subject does not lack examples confirming the thesis that the ageing of the society is treated as a threat, or an obstacle for economic growth. Already in 1939, Hensen named the negative implication of population ageing on growth and development a "secular stagnation," claiming that older people generate a surplus of savings relative to investment (Barković Bojanić and Erceg, 2017). Bloom et al. (2011), Creedy and Scobie (2002), Alders and Broer (2004), Sobotka et al. (2010) indicate lower productivity, smaller labour force participation and fewer investments in human capital as a result of demographic change. Maestas at el. (2016) emphasise that the increase in the percentage of the 60+ population reduces the GDP growth rate per capita, which in more than 60% stems from a slower increase in the work efficiency of older workers, and in 30% from a slower increase in the size of labour force. Feyrer (2007, 2008) showed that the relationship between worker age and total factor productivity has an inverted U shape; i.e. productivity raises as the percentage of employees aged 40-49 increases and decreases as the percentage of older people increases. Lindh and Malmberg (1999) analysed 1950–1990 data for OECD countries and found that workers aged 50–64 years help increase productivity, workforce members aged 65 years and above negatively impact productivity, and the younger workforce has no significant impact on productivity. Batini at el. (2006) suggest that while population ageing may reduce growth in industrialised countries, in the case of developing countries, the increase in the share of people of working age contributes to boosting economic growth. In turn, Lisenkova at el. (2012), Brooks (2003) see threats to economic growth as a result of the ageing of society as a change in the economic structure of expenditure, consisting of a predominance of public expenditure on social security and the medical system over expenditure on education and other forms of development. On the other hand, Gordon (2016) notes that an older population means a decreased activity and productivity of labour force and indicates it as the reason for inhibited economic growth.

It should be noted however that literature also includes views opposite to those discussed, according to which demographic changes are also a major opportunity for new jobs and growth. Prettner (2013) conducted studies on the impact of demographic changes on long-term economic growth prospects. He indicates, among other things, that population ageing is favourable to long-term economic development, and the occurring demographic changes do not necessarily inhibit the growth of economic prosperity. Concurrently, the reduction in the number of births and deaths may even lead to an increase in the rate of economic growth. A similar stance is presented by Aksoy at el. (2019). In turn, Bloom et al. (2008) suggest that the key role as for the impact of ageing on economic growth can be seen in an institutional context, i.e. pension policies, healthcare, and labour market efficiency. Moreover, many studies stress the need for a multifaceted view on the effects of ageing. In this context, Barković Bojanić and Erceg (2017) cite Barković and Nedić (2015) on ageing and discrimination in the labour market, or Mansfield and Biddison (2007) on ageing and gerontechnology. Rogelj and Bogata (2019) presented an interesting review of the literature on specialised housing solutions and dwellings for the elderly and a further research agenda to develop optimisation models and paradigms supporting optimal planning, operations and control of services for the elderly based on the intelligence of the environment.

The discussed studies accentuate the need to remodel the economy associated with its adjustment to a new demographical structure fit into the broader concept known as *silver economy.* In a broad sense, the *silver economy* is defined as a sector of the economy focused on satisfying the needs emerging from an ageing population (OECD, 2014), or one of the contemporary megatrends and may be recognised as the third world economy after USA and China (Gordon, 2017). Selected definitions of *silver economy* are presented in Table 1.

Table 1: Selected definitions of silver economy

Author	Definition
Borzaga et al., 2017	Silver economy is defined as the sum of all economic activity serving the needs of those aged 50 and over including both the products and services they purchase directly and further economic activity that this spending generates.
Radvanský and Páleník 2011	Silver economy is an adaptation of the economy to future needs of growing population of those over 50 years. This phenomenon creates new market possibilities, which are not sensitive to economic crisis.
Urbaniak, 2016	Silver economy is an abstract concept, which is to impress the scale of socio-economic transformations caused by ageing of societies and the related possibilities and limitations of the development of economic systems.
Kryńska 2012	The concept of silver economy is rather a bottom-up initiative to tackle the conventional approach to ageing modern societies of highly developed countries.
Rudnicka and Surdej, 2013	A broad system of services and creation of goods focused on using the purchasing potential of older people, and satisfying their consumption, living and health needs.

Source: prepared by the authors based on (Maj-Waśniowska at el. 2018).

The concept of the silver economy treated as a response to demographic challenges is also extensively discussed in Poland. The vast majority of research concentrates on the development of the concept of silver economy and its implications on the economic development. In recent years, however, chances and new opportunities emerging in the era of ageing societies are increasingly recognised (Majewska and Przybylczak, 2018; Bieńkowska, 2018; Sobolewska-Poniedziałek, 2016, 2017; Klimczuk, 2016; Urbaniak, 2016; Niewiadomska and Sobolewska-Poniedziałek, 2015).

Attention is drawn to the fact that the majority of previous studies does not take into account the local aspect of the development of silver economy linked with the impact of society's ageing on the implementation of tasks by local government units. A few studies discussing the implications of society's ageing in the local dimension include one by Zimnoch (2013), in which the author elaborates on the chances resulting from the concept of silver economy for the development of regions considering their level of prosperity. Kubejko-Polańska (2017a, 2017b, 2017c) also addressed these issues by examining the extent to which local authorities of individual cities and communes undertake specific actions regarding the direct elimination or reduction of the negative effects of society's aging and exploiting the potential of the silver economy. In turn, Warwas and Wieczorek (2018) analysed interest in the elderly and care for their broader development, social and professional activity, and well-being at the local level.

Research Methodology

The presented empirical analyses are supported on a survey realised by the authors in cooperation with the Regional Chamber of Audit in Cracow in September-December 2018 as part of the project "Problems and challenges of local government units in the era of an ageing society". The subject research was the opinion of communes regarding the chances and opportunities carried by society's ageing and the development of silver economy for the realisation of tasks.

The study was conducted using the CAWI[1] method among all communes of the Malopolska Voivodship. Complete answers were provided by 131 units, which gives a level of participation in the

[1] In a few cases, given the technical conditions, it was also possible to provide a questionnaire survey on a paper form containing a set of questions identical to the electronic version. During the research, it turned out that in some communes, answering individual questions required the exchange of

study at over 71.9% (cf. Figure 2). On behalf of individual communes, answers were mainly given by the treasury (49.62% of all respondents), office secretaries (16.79%), heads of relevant departments or papers (13.74%), heads of local government units (6.87%), as well as persons acting as inspectors (3.05%) and deputy heads of local government units (1.53%) and deputy treasurers (1.53%).

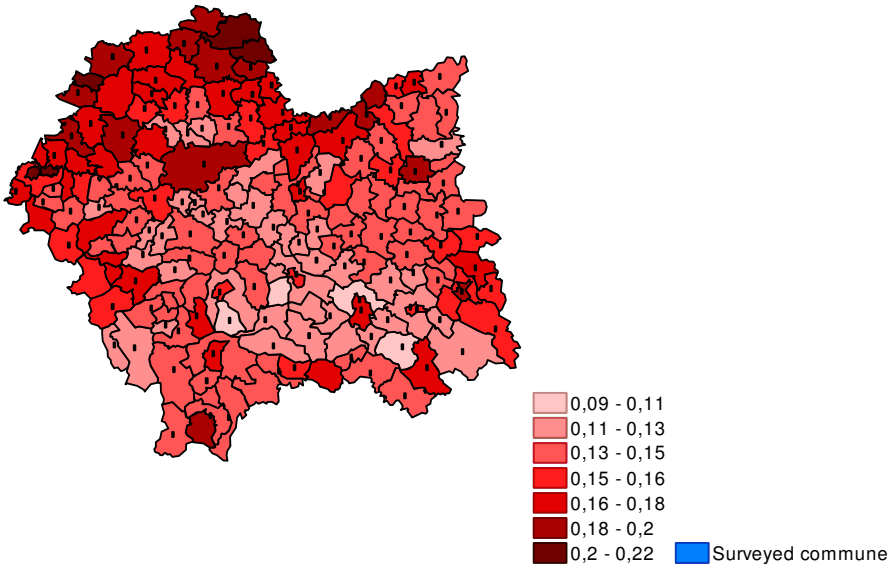

Fig. 2: Age structure of communes in Malopolska Voivodeship and communes participating in the survey (percentage of people over 65 years of age).

Source: prepared by the authors on the basis of a survey and Local Data Bank database (https://bdl.stat.gov.pl/BDLS).

With a view to the considerations outlined in section 2 on the society's ageing and the development of silver economy, three research hypotheses were formulated which were then subject to empirical verification.

H.1: *The degree of performance of individual tasks of municipalities that meet the needs of older people is varied,*

H.2: *Problems affecting the elderly create a field for silver economy development in the local dimension,*

H.3: *Actions aimed at improving the situation of the elderly taken by communes are a stimulus for the development of silver economy.*

Furthermore, as part of the research we also verified whether the obtained outcomes are impacted by the demographic type and structures of analysed communes. Due to the type, the division of communes into urban communes (7 communes participating in the research), urban-rural communes (33), rural communes (88) and cities with poviat rights (3) were taken into account. In turn, with a view to demographic structure, all communes of the Malopolska Voivodeship were divided with the k-means cluster analysis into two subgroups - "old" communes and "young" communes. The first group included 74 communes, in which the percentage of people over 65 years of age exceeded 15.2% (the average percentage of people over 65 in this group was 17.2%). The second group included 108 communes with an average share of people over 65 years of age at 13.2%. Referring the

information between physically distant departments and the survey available at one computer station hindered the formulation of credible answers.

applied division to communes participating in the study, 49 old communes and 82 young communes were subjected to detailed analysis.

As part of the test procedure, the research hypotheses were verified on the basis of analysis of the distribution of answers to individual questions in the survey where responses "I don't know" or "I have no opinion" have been omitted. The analysis of results involved the use of statistical tests to study significance of differences - Chi-square and Mann-Whitney U tests, which are one of the most commonly used techniques of statistical data analysis (Aczel 2000). In the case of each test, relevant p-values were calculated, whereby when making the decision about rejecting a given hypothesis, the significance level $\alpha = 0.05$ recognised in social sciences was adopted. Conclusions formulated during the research are based primarily on inductive reasoning based on the synthesis of conclusions from the analysis of provided answers and the statistical inference carried out.

Results and Discussion

Verification of hypothesis H.1. was based on the distribution of answers given by the surveyed units to the question: *How do you assess the degree of implementation of tasks by the commune in selected areas?* Respondents representing municipalities answered this question on a 5-point Likert-type scale (very bad, bad, medium, good, very good). In order to provide a synthetic graphical presentation of the obtained results, individual answers were assigned numerical values (from -2 to 2) and arithmetic means of response values were calculated (cf. Figure 3). Beside a summary of the answers given by all surveyed units, the figure presents the obtained answers broken down into two sections taken into account in the study (demographic structure and type of commune). In-depth analyses, including the statistical verification of hypotheses, were conducted on raw data.

The obtained results indicate that the surveyed communes assess the degree of implementation of all analysed tasks relatively well. Interpreting this result, we must bear in mind that the respondents were individuals who represented particular communes, and therefore the obtained outcomes can be burdened towards positive answers. However, regardless of the possible burden on the response, there must be a large variation in the assessment of the implementation of individual tasks. The studies concluded that communes have particularly low assessment of the implementation of tasks in the field of housing and healthcare. On the other hand, against the background of other tasks, a noticeably higher grade is seen in the degree of realisation of tasks such as: public safety, education, social assistance and family policy. Therefore, referring to the posed research hypothesis (H.1.) it should be stated that there are grounds to claim that the degree of implementation of individual tasks of communes that addresses the needs of older people is varied.

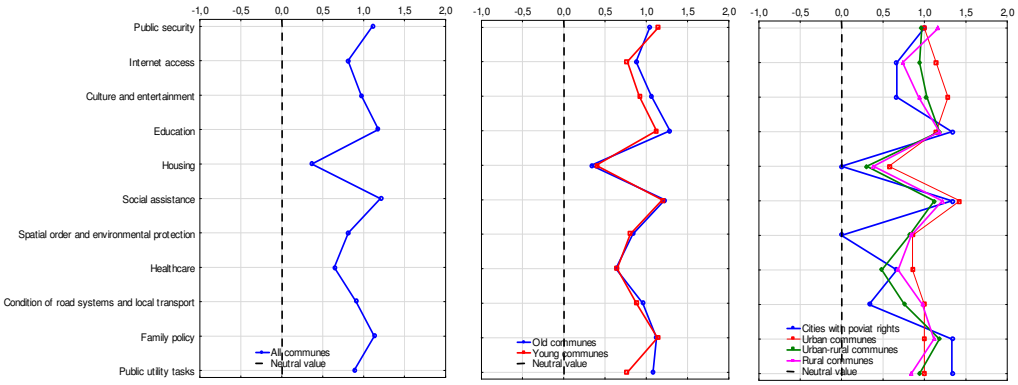

Fig. 3: The degree of performance of communes' tasks in selected areas
Source: prepared by the authors

The analysis of obtained results per young and old communes leads to the conclusions that, with a few exceptions (Internet access, culture and entertainment, education and tasks in the scope of public utility), the commune's demographic structure does not affect assessment of the degree of performance of tasks in the investigated areas. Whereby, Mann–Whitney U tests confirm the statistical significance of the observed differences only when assessing the performance of public service tasks. The obtained test statistics dictate rejection of the hypothesis about the equal distribution of answers in both groups of investigated communes (cf. Table 2). This observation is all the more surprising as against the background of deliberations on this issue in previous sections of the paper, it is difficult to justify why demographically older communes realise precisely such tasks as supply of water, gas, electricity, sewage access and waste management more extensively. This topic seems of current interest in further research using other investigative techniques, such as in-depth interview.

Table 2: Diversification of the degree of performance of communes' tasks in selected areas

	Commune structure	**Type of commune**
	p-value (U Mann–Whitney test)	p-value Kruskal–Wallis test
Public security	0.7991	0.1042
Internet access	0.4187	0.3349
Culture and entertainment	0.2279	0.6348
Education	0.2536	0.9786
Housing	0.6347	0.6464
Social assistance	0.5379	0.6571
Spatial order and environmental protection	0.9810	0.1157
Healthcare	0.8342	0.3510
Condition of road systems and local transport	0.6790	0.1984
Family policy	0.7973	0.5939
Public utility tasks	**0.0317**	0.5700

Source: prepared by the authors

A broad range of variation in the degree of performance of tasks is observed in the classification of communes by type. The largest units (cities with poviat rights) are more strict than other types of communes in assessing the level of performance of tasks in the field of culture, housing, spatial order and environmental protection, as well as the road systems and local communication. One can suppose that this assessment stems from the specificity of the needs of communities living in large cities, and in some areas also from the more stringent requirements set for local government units by urban communities. It is also worth highlighting the fact that the assessment of the performance of tasks such as Internet access, culture and entertainment, social assistance, health care and the condition of the road systems and local communication carried out by municipalities stands out among other types of communes. This observation appears consistent with intuition, which suggests that municipalities focus more on this type of task in their policies. They also typically have larger budgets, which allow the redirection of some funds for the implementation of tasks in the field of culture, spatial order and environmental protection. It should, however, be noted that none of the discussed differences in the distribution of responses were confirmed statistically (cf. Table 2). To conclude this part of analysis, it should be stated that the type or demographic structure of the commune has not been shown to significantly affect the degree of implementation of its tasks in the examined areas.

In the second part of the study, to verify hypothesis (H.2), we analysed the answers to the question: *What problems most often affect older people in your commune?* The respondents provided answers on a three-point scale, where 1 meant that the phenomenon was not a problem and 3 meant that it was a serious problem. As before, for the purpose of synthetic presentation of data, Figure 4 shows arithmetic means of response values, while in-depth analyses and statistical verification (cf. Table 3) were carried out on raw data.

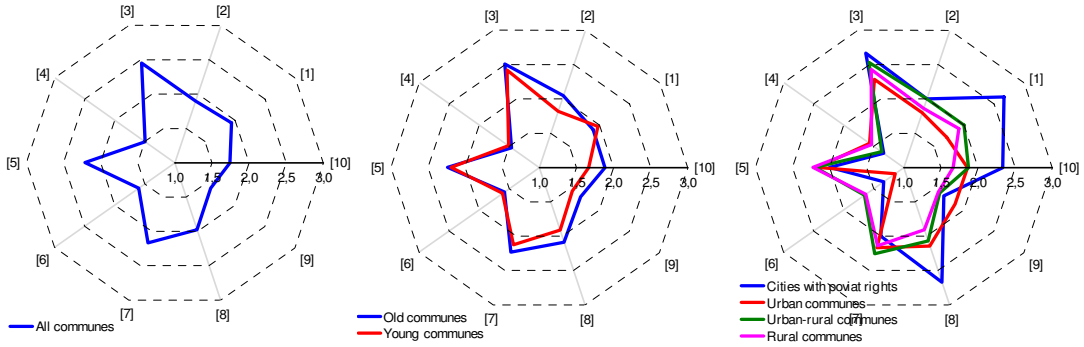

For an explanation of symbols, see Table 2.

Figure 2: Selected problems affecting the elderly in different types of communes.

For an explanation of symbols, see Table 3.

Fig. 4: Selected problems affecting the elderly in different types of communes.

Source: prepared by the authors.

The obtained results indicate that the three greatest problems affecting older people are elderly diseases, disability and loneliness. The surveyed communes go on to indicate poverty, architectural barriers and a lack of family support. Interestingly, the results of the study suggest that the cultural offer and access to sports and recreation infrastructure are a much smaller concern for the elderly. Referring the above observations to the verified research hypothesis (H.2), it is concluded that it finds partial confirmation in empirical observations. Certainly, the need to solve some of the indicated problems of older persons will be an important stimulus for the development of silver economy in the local dimension. These are primarily: the problem of loneliness, disability and the need to overcome architectural barriers, followed by adjusting the cultural offer and expanding recreational infrastructure. It should be noted, however, that not all identified problems can be solved at the local level (e.g. old age diseases, the issue of poverty). Therefore, they will have an impact on the development of the silver economy, but mainly in the national dimension.

Table 3: Differentiation of problems of the elderly in communes

	Commune structure	**Type of commune**
	p-value (Chi-square test)	p-value (Chi-square test)
[1] Architectural barriers	0.0510	0.0527
[2] Lack of family support	0.0679	0.6240
[3] Elderly diseases	0.4635	0.8198
[4] Unsuitable cultural offer	0.5317	0.7277
[5] Disability	0.3130	0.2825
[6] Limited access to sport and recreation infrastructure	0.1693	0.5194
[7] Loneliness	0.3707	0.2835
[8] Poverty	0.1686	0.0519
[9] Hindered access to care services	0.4181	0.8482
[10] Hindered access to healthcare	0.2698	0.1748

Source: prepared by the authors

The analysis of the occurrence of individual problems in older and younger communes demonstrated that older communes to a greater extent understand the importance of problems linked with a lack of family support, loneliness and poverty of the elderly, as well as those resulting from hindered access to care services and to health care. Statistical verification did not show, however, that the observed differences in the distribution of responses in any of the analysed problems were significant (see Table 3).

Preliminary analysis of the occurrence of individual problems in different types of communes appears to indicate their varying severity in the studied groups. For example, cities with poviat rights to a greater extent identify problems related to architectural barriers, poverty and hindered access to health care. On the other hand, in urban centres (cities with poviat rights and municipalities) much less often than in other units there is a problem with limited access to sports and recreation infrastructure. Yet, similar to the analysis based on the demographic structure of communes, the results of statistical verification did not show that the observed differences were statistically significant (Table 3). Therefore, it is not accurate to say that the demographic structure or type of commune significantly impacts the problems affecting the elderly.

Hypothesis (H.3) was verified on the basis of the answer to the question about what actions aimed at improving the situation of the elderly are undertaken in the examined communes. Based on the given answers, a simple indicator of the intensity of undertaking actions aimed at improving the situation of the elderly in the commune (IUA) was created. This indicator was calculated as an arithmetic mean of numerical representations of individual answers (no data on activities in the commune - 1; activities undertaken to a moderate extent - 2; activities undertaken in its full scope - 3). Values of the indicator calculated for individual analysed activities in all the examined communes, as well as broken down by the demographic structure and type of commune, are presented in Table 4. The table also contains a summary of the statistical verification of the significance of differences in the distribution of responses provided by individual types of communes and communes with different demographic structure.

Table 4: The indicator of intensity of activities aimed at improving the situation of the elderly undertaken by the surveyed communes

Activity		Demographic structure			Type of commune				
	All communes	Old communes	Young communes	p-value (chi square test)	Cities with poviat rights	Municipalities	Rural-urban communes	Rural communes	p-value (chi square test)
Adaptation of housing for the elderly to their needs and fitness	1.37	1.38	1.36	0.4140	2.00	1.40	1.25	1.38	**0.0006**
Computerisation and dissemination of access to new technologies	1.96	1.93	1.97	0.9404	2.33	2.00	1.97	1.94	0.9722
Popularisation and promotion of a healthy lifestyle	2.06	2.13	2.03	0.3656	2.33	2.33	2.19	1.99	0.5007
Promoting the involvement of volunteers and community organisations to help the elderly	1.81	1.84	1.78	0.7671	2.33	2.17	1.93	1.71	0.2228
Staff trainings of the commune's organisational units in the scope of support for the elderly	1.89	1.94	1.86	0.5411	1.33	2.00	1.91	1.89	0.8260
Support for institutions and organisations working for the elderly by transferring subsidies to foundations and associations	1.92	2.04	1.84	0.2823	2.67	2.33	2.07	1.80	**0.0641**
Non-monetary social support by	2.32	2.29	2.33	0.4638	2.67	2.00	2.38	2.31	**0.0278**

municipal units									
Payment of additional cash benefits for older people	1.87	1.93	1.84	0.6884	1.67	1.80	1.90	1.88	0.8100
Providing access to day-care centres	2.02	2.35	1.83	**0.0008**	2.67	2.00	2.17	1.95	0.3759
Providing support in emergencies	2.34	2.29	2.36	0.7592	2.00	2.00	2.48	2.32	0.2385
Improving the accessibility to health care and rehabilitation services	1.84	1.89	1.81	0.8103	2.00	2.33	1.71	1.84	0.1531

Source: prepared by the authors

IUA values indicate that in order to improve the situation of the elderly, communes most often implement activities consisting in providing support in situations requiring assistance, and the highest intensity of this type of activities is observed in the case of urban-rural and rural communes. Almost equally often, the surveyed communes provide them with non-monetary social support as part of improving the situation of the elderly. In this case, there is also a diversity of the examined types of communes - urban communes are the least willing to provide this type of assistance. The least popular activities include adapting dwellings of the elderly to their needs and fitness, with such activities being increasingly undertaken by cities with poviat rights and municipalities (differences in the distribution of responses are statistically significant here). It is also worth noting the diversification of the intensity of support provided to institutions and organisations working for the elderly in different types of communes. In general, the more urbanised a commune, the more attention is paid to such activities. Interestingly, a similar situation, although to a lesser extent and not confirmed statistically, also takes place in the case of other analysed activities (computerisation and dissemination of access to new technologies, popularisation of healthy lifestyles, promotion of the involvement of volunteers and social organisations to help the elderly). On the other hand, rural and urban-rural communes more frequently declare the payment of additional cash benefits for the elderly and provide direct assistance in emergencies. Therefore, claims about the diverse nature of support provided to older people in different types of municipalities seem justified.

From the point of view of the issues raised in the paper, the analysis of actions taken to push for an improved situation of the elderly by old and young communes is especially interesting. The survey results have indicated accuracy of the claim according to which old communes take greater measures to improve the situation of the elderly. The exceptions are only computerisation and dissemination of access to new technologies, non-monetary social support and providing support in emergencies, where the IUA values for young communes are slightly higher. When analysing IUA values, it is also worth noting that old communes provide access to day-care support facilities much more often than young communes. Furthermore, old communes more often declare support for institutions and organisations working for the elderly and popularise and promote a healthy lifestyle.

The synthesis of results obtained in this part of the study leads to a positive verification of the statement according to which communes with older demographic structure are taking more actions to improve the situation of the elderly. Extrapolating this statement, it can therefore be assumed that the progressing ageing of society will increase the intensity of this type of activity in individual LGUs, and on the scale of the whole country. In the light of these considerations, it should be concluded that there are no grounds for rejecting hypothesis (H.3). It can therefore be assumed that actions aimed at improving the situation of the elderly taken by communes are a stimulus for the development of silver economy.

Conclusion

Population ageing as a challenge of the 21st century implies a necessity to redefine public policies to take account of new conditions for the implementation of public tasks. In this context, the concept of the silver economy seems to be a response to the threats arising from demographic change. The

results of the conducted research already indicate a large diversity in the degree of implementation of tasks that meet the needs of older people. At the same time, it is pointed out that these tasks are mainly performed by local government units, and thus the concept of silver economy in the public sector should be implemented to the greatest extent at local level. Our belief is that it should be treated as a stimulant of local development. It is also worth noting that in the countries of Central and Eastern Europe the concept of silver economy is less developed (Maj-Waśniowska at al. 2018), which creates extra chances for its proper targeting and optimal use of its potential by implementing appropriately designed public intervention

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Forecasting Sales Volume by Minimizing the Expected Forecast Error Cost

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Abstract

Forecasting sales volume is an important element of a company's operations. When forecast that are used for making further decisions turn out to be incorrect, a company incurs additional costs. Costs resulting from forecasting error may be caused by either over- or underestimation. In each of these cases, the costs may be different. Managers' knowledge and intuition along with observations of the past allow for estimating the cost function, whose independent variable is the size of the error.
This article proposes the forecast to be taken as the value from the given range which minimizes the costs of an incorrect decision. This approach is in accordance with the forecasting according to minimum loss rule. For solving this problem, Savage's minimax regret criterium was used, generalizing it for continuous variables. The error cost was described by the use of an asymmetrical loss function, known from confidence theory.

Keywords: Sales Forecasting, Asymmetrical Loss Function, Savage's Criterium

Introduction

Forecasting demand and sales is an extremely important aspect of a company's operations, whose correctness affects every aspect of operations, i.e. purchasing processes (raw materials, semi-finished goods), human resources, production, logistics, finance, sales and customer service. If a forecasts turn out to be incorrect, many undesirable effects take place. When an overestimation takes place (i.e. the forecast exceeds the actual amount), the following may occur: excess inventory, excess storage costs, cash freezing, loss of liquidity, increased credit costs, deviations from pricing strategy (necessity of price decreases) and loss of profitability. Other direct losses for companies in cases of forecast overestimation take place when forecasts are used for making decisions regarding supply of products with a short period of usefulness, and unsold inventory must simply be utilized. Consequences of underestimation (when the forecast value turns out to be lower than the actual) may include delays in deliveries, customer dissatisfaction, exhausting of budgets and lack of operational continuity, and problems with timely customer service and complaint handling.

Forecast under- and overestimation are both connected with costs, which may be estimated and presented as a forecast error function. This does not have to be symmetric or continuous. In general, the higher the absolute value of the forecast error, the higher the costs connected with the error. This dependency is not proportional, and its shape may be different for positive and negative errors. For example, insufficient supply generates different costs then oversupply.

This article aims to present methods for finding the optimum forecast from the perspective of the decisions that are to be taken, i.e. a forecast for which the error cost is at a minimum. The forecast error cost is presented in this article as a loss function as described by Thomson and Basu (1996), and for finding the optimal forecast, Savage's minimax regret criterium was used.

Loss Function – Review of Literature

In classical statistical forecast theory, it is assumed that overestimating and underestimating an unknown parameter by the same amount for making a decision has the same effect, and the loss function is a quadratic function of the form (Granger, 1969):

$$L(d) = d^2,$$

where d is the error amount.

However, since many years, research has indicated the necessity of using asymmetrical loss functions with regards to decisions taken in the real world (Varian, 1974; Christoffersen, 1996; Metiri et al, 2016; Yamamoto et al, 2017).

The first to indicate this problem was Varian (1974). In researching losses caused by incorrect real estate valuations, he noticed that underestimating real estate value results in an approximately linear profit loss, while overestimating results in roughly exponential losses. Zellner (1986) on the other hand noticed that underestimating and overestimating the water level in water reservoirs results in different economic and social consequences. He introduced a non-symmetrical loss function, asymptotically exponential from one side of zero and linear on the other side. Also, in insurance, under and overestimating the premium by the same amount may result in different financial consequences for the insurer (Ferreira, 1977; Denuit and Dhaene, 2001). When the insured is underestimated, the insurer losses money, while if the premium is overestimated, the insurer may lose the policy.

A family of asymmetrical loss functions was defined by Thomson and Basu (1996). The loss function $L(d)$, where d is the error size, has the properties:

(1) $L(0) = 0$,
(2) $L(d) > 0$ for $x \neq 0$,
(3) $L(d)$ is convex,
(4) $L(d)$ is increasing on one side of zero, and decreasing on the other side,
(5) the rate of change of function values on both sides of zero is different
The sales forecast error may be presented as a function from the asymmetrical loss function family.

The forecast error cost function as a loss function

When forecasting the sales volume, a manager may often determine with an almost 100% certainty that the actual value x_0 will be contained in the interval $[a, b]$. The final sales forecast x^* which will be used by a company for e.g. supply planning, must be one value from the given interval. Knowing the character of forecasted variable and having information about its past, the costs connected with estimating x^* as a value lower or higher than the actual may be estimated.

Determining the sales forecast x^*, in accordance with the minimum loss rule, may be reduced to the following problem:

An interval $[a, b]$ is given, to which the unknown actual value x_0 of variable X belongs. From this interval, one x^* value (an estimate of x_0) must be chosen so that costs due to the differences between x_0 and x^* and the incorrect decisions that were made as a result are minimized. The optimal solution is that $x^* = x_0$, which is however impossible due to the uncertainty of the actual value.

The forecast error in estimating x_O may be expressed as the difference:

$$d = x_O - x^*; \; d \in [a - b, \; b - a] \qquad (1)$$

Every error is connected with a cost K, which may be determined using an asymmetrical convex function:

$$K(d) = \begin{cases} f(d)\ for\ d < 0 \\ g(d)\ for\ d \geq 0 \end{cases} \tag{2}$$

where:

function $f(d)$ is decreasing and function g(d) is increasing,
$f(0) = g(0) = 0$,
$f(d) > 0$ and $g(d) > 0$ for $d \neq 0$.
Function $K(d)$ therefore fulfills the properties of an asymmetrical loss function according to the definition of Thomson and Basu (1996). A graph of an example K function is shown in figure 1.

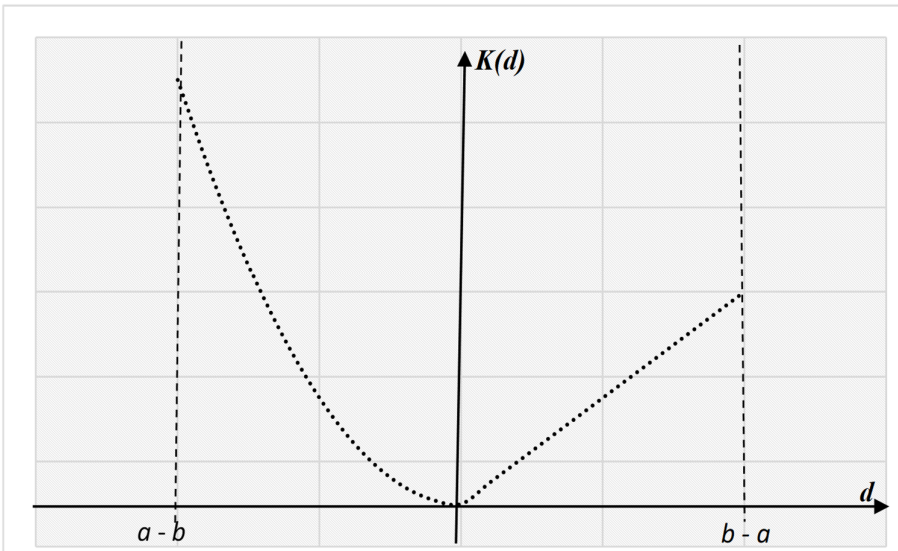

Fig. 1: An example of graph of function *K*(*d*) with respect to the size of the error
Source: Own work.

The form of function $K(d)$ may in practice be estimated based on experts' opinions, for example sales managers in a company. It is just necessary to determine the additional costs generated by underestimating sales by a chosen number of units, and also what costs are connected with overestimating this value.

Determining the sales forecast according to Savage's criterium.

In order to solve the above-formulated problem, Savage's criterium (the minimax regret criterium) was used, generalizing it for continuous variables. Savage's minimax criterium is a decision making criterium first presented in 1954 by Leonard Savage. This criterium minimizes the loss expected by the decisionmaker connected with making a non-optimal decision for a given state of nature. Therefore, during the decision-making process a strategy for which the relative loss is lowest is chosen. According to this rule, the forecast must be chosen for such an x^* value so that the maximum losses with respect to the optimal decision $x^* = x_0$ are minimized.

Assuming that the decision maker has chosen an arbitrary value from the interval $[a, b]$, the maximum error in overestimating value x_{O-} (negative error) is $a - x$, while the maximum error in underestimating (positive error) is $b - x$. Therefore, for each x the maximum loss (error cost) may be determined as

$$L(x) = \max\{K(a - x); K(b - x)\} \tag{3}$$

Therefore, according to Savage's criterium the solution x^* must therefore be lowest value of the $L(x)$function in the interval $[a, b]$, or:

$$x^* = \min L(x) = \min \max\{K(a-x); K(b-x)\} \quad (4)$$

To obtain functions $K(a-x)$ and $K(b-x)$, the function $K(x)$ must undergo the following linear transformations:

1. $K(x) \rightarrow K(a-x) = K(-(x-a))$ (5)
2. $K(x) \rightarrow K(b-x) = K(-(x-b))$ (6)

As a result of transformation 1., the graph of function $K(x)$ is shifted to the right by a units and symmetrically reflected across the y axis. As a result of transformation 2., the graph of function x is shifted to the right by b units and also symmetrically reflected across the y axis. This has been shown on figure 2.

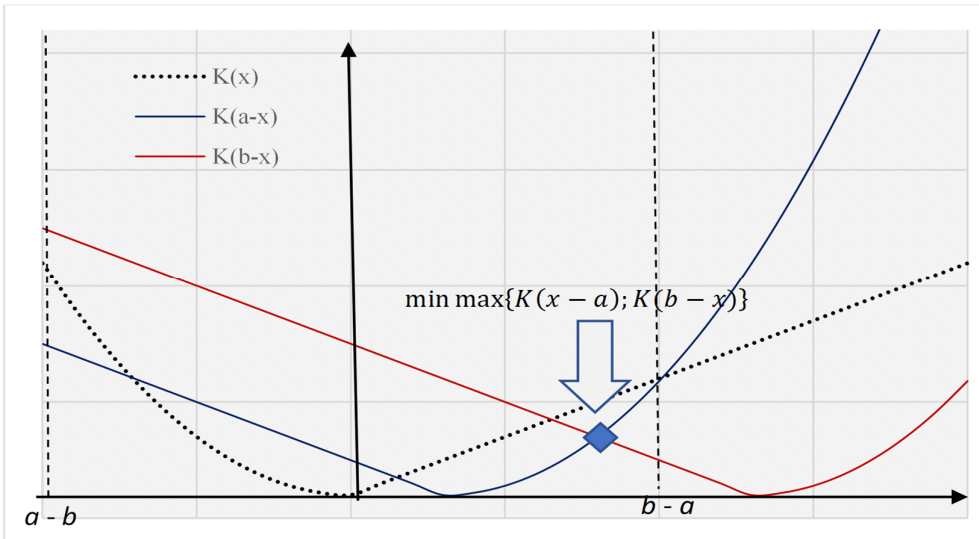

Fig. 2: Transformations of the graph of function K(x) and solution x^* that has been found
Source: Own work.

The properties of function (2) and transformations (5) and (6) show that the graphs of the transformed function have one common point. Solution (4) determines the intersection point of functions $K(a - x)$ and $K(b - x)$. Therefore, to obtain the forecast x^*, knowing the error function $K(d)$ of the form (2), the following equation must be solved:

$$K(a-x) = K(b-x) \quad (7)$$

In the interval $[a, b]$.
This solution is in accordance with Savage's criterium, and minimizes the forecast error cost.

Practical Example

A certain company that sells IT equipment must plan the number of units of a new notebook of a certain brand that is to be ordered. The managers of this company have estimated with almost a 100% certainty that in the near future the company may sell 10 to 100 of these notebooks.

This company will incur a loss both when it orders too many notebooks relative to sales volume as well as when there will be not enough to cover demand. The losses incurred in both cases will be different. If not enough notebooks are ordered, the company will lose sales profits of around 120 euro per unit. In the case of an excess amount of units ordered, cash will be frozen and storage costs will be incurred. It has been estimated that in the case of ordering one unit too many, the costs will be of the order of 25 euros, and with increasing amounts of unsold notebooks the losses will increase quadratically.

Based on the information above, the sales forecast error cost function may be presented as:

$$K(d) = \begin{cases} 25d^2 & for\ d < 0 \\ 120d & for\ d \geq 0 \end{cases} \tag{8}$$

Let us take x as the sales forecast that is to be found. The actual sales value will belong to the interval [10; 100], and therefore the cost of maximum positive and negative error is respectively:

$$K(10 - x) = 25(10 - x)^2$$
$$K(100 - x) = 120x$$

To find the solution in accordance with formula (4), which minimizes the forecast error costs, the following equation must be solved in the interval [10; 100]:

$$K(10 - x) = K(100 - x),$$

or

$$25(10 - x)^2 = 120(100 - x)$$

The equation has two solutions, $x_1 = 28{,}52, \quad x_2 = -13{,}32$, where only x_1 belongs to the interval in question.

Therefore, the best decision for this company, which generates the lowest losses if it is incorrect, is be to order 29 notebooks.

Discussion and conclusions

Sales forecasting is a necessary source of information for creating plans concerning for example supply, production, and distribution. A forecast is usually associated with some error, and ideal forecasting methods that would avoid these errors do not exist. Therefore, the fact that forecasts may be incorrect has to be accepted, and a method of planning should be found which would allow for minimizing the costs of differences between actual and assumed sales volumes.

This article presents one of the possible solutions of this problem. It has been proposed that planning should be based on such a sales forecast for which an error generates the lowest losses. Having a given interval [a, b] which contains the future sales value, it has been shown how to choose one forecast value. To this end, Savage's minimax regret criterium has been used, generalized for continuous variables.

For choosing the forecast, the probability that the forecasted variable will have a given value from the interval [a, b] has not been taken into account. Therefore, it was assumed that each value from the given interval has an equal probability of occurring, or that the forecasted variable has a uniform distribution. This is of course a simplification. Introducing other, also asymmetrical, distributions for describing the probability distribution of sales volumes would certainly be more justifiable. An interesting solution for determining the final forecast would be taking into account both the distribution of the forecasted variable as well as the forecast error costs. Such an approach would simultaneously use two forecast rules: prediction based on the expected (or modal) value, and prediction according to the minimum loss rule. Proposing such a „hybrid" approach is a goal of further research for the author.

The forecast error costs have been described in this article with the help of asymmetrical loss functions from the family proposed by Thomson and Basu. In the presented example, the costs of a negative error

were described by a quadratic function, and the costs of a positive error by a linear function. In practice, the error cost function may have an analytically more complicated form. It may not be a continuous function outside of zero. For different error intervals, their costs may be different – they may have different rates of increase, and for some intervals they may be constant. The minimax solution proposed here may be found also for such cases.

Another problem which may be an inspiration for further research is determining the analytical form of the forecast error cost function. Historical data may be used to this end – information concerning the accuracy of earlier forecasts and costs connected with incorrect forecasts. Expert opinions, such as a company's management or employees connected with sales, may also be useful in finding the forecast error costs function. To this end, questions to experts should be formed in such a way so that answers would allow for determining the parameters of the function

There are many directions of research which may be a continuation of this topic. This article presents one of the possibilities of solving the problem of determining sales forecasts for minimizing the costs of the expected error. This solution was based on generalizing for continuous variables one criteria for making decisions in conditions of uncertainty. From the point of view of maximizing a company's profits, utilizing a prediction based on the minimum loss rule may be more justified that forecasting according to the expected value. The approach presented here may be a useful tool for decision making, particularly for forecasting and planning sales volumes

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Literature

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Influence Of Innovation And Cost-Cutting Strategies In The Competitive Advantage - Impact In The Production Industry In Romania

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Abstract

One fundamental problem in the field of management and also technology is how generally, SMEs develop and sustain competitive advantage in the markets through innovation and cost-cutting strategies. In the last decades, there are many ways in which the firms' competitiveness can be understood in the related literature. Nowadays, the small and medium enterprise (SME) represent a very important segment of the Romanian economy. The SME sector, together with the ITC sector represents in Romania, one of the most important pillars of the economy, starting with the last 10 years. This paper aims to redefine the influence of innovation and cost-cutting strategies on the Romanian SME's in the production sector and also shows a systematic review of how information together with technology has a powerful impact on how competitive advantage was obtained. The main purpose of this study is to identify the relationship that may occur between certain strategies, processes, and the competitive advantage of the production sector from Romanian SMEs. The article is based on a survey conducted between some SMEs of the big cities from Romania and provides the readers with an overview of the competitive advantage and how the innovation impacts it, while also highlighting several opportunities for the business sector in Romania.

Keywords: competitive advantage, innovation, market competitiveness, cost-cutting strategies

Introduction

The economic growth is closely linked to the SMEs and to their ability to provide some jobs opportunities to the society, especially in the less developed areas from Romania. Many researchers have already studied the success and failure factors of SMEs to sustain and gain competitive advantage but no study was 100% convincing. Some researchers may suggest that the linked key to obtaining the competitive advantage is the capability of the SMEs to develop some unique products and services and last but not least their flexibility in implementing future technologies. In order to obtain a competitive advantage in the Romanian marketplace, some researchers suggest that it's necessary to involve the SMEs directly into the field of technology.

There are so many different papers that suggest different things about the competitive advantage of the SMEs. In general, small companies, as SMEs, are facing so many barriers in order to innovate such as internal funds problems, lack of managerial skill, and lack of market access, but this is the key to success. Knowing their weaknesses, they will be able to find a different solution in order to adapt to a stormy market, through innovation and cost-cutting. (Lynchm R, 2000)

Even if it is an easy area to approach, only a limited number of studies have been focused on the relationship between presented strategies and competitive advantage in the SME sector. In Romania, this type of study on the influence of the innovation on competitive advantage was conducted just in the retail industry, using only large brands as samples. Even if this bond between innovation and competitiveness can be much better materialized, just 44% of the Romanian SMEs, with 15% less than the EU average, are sustainable and have a direct impact on the national GDP, in 2018.

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Despite knowing the direct impact of the economic system, the innovation process in SMEs is still on hold in Romania, due to political problems and poor knowledge of the market economy. Several market economy adjustment measures were attempted, because in Romania, especially in the urban area, there are so many SMEs with an increased potential to became regional and global players in the UE western market. (Visconti, 2019)

Thus, research related to the influence of innovation on competitive advantage has never been done in a certain area of the SMEs, especially in the local production sectors. Such a connection between innovation and competitive advantage is even rare, therefore, this study attempt to fulfill the research gaps. This paper aims to explore the influence of innovation on competitive advantage in manufacturing SMEs in Romania and also to investigate what effect is on this relationship from a managerial perspective. (Zhan, 2016) The main questions to be answered are: Is there a positive effect of innovation on competitive advantage? Are Romanian SMEs based on a cost strategy or a development strategy? To what SMEs the influence of the innovation on competitive advantage will work? For those who embrace a managerial ideology or for those who rely more on instinct? Understanding that topic of the article will help us to understand to whom innovation support should be emphasized and how this will works. (Ong, 2008)

Literature Review

The technical definition of the micro, small, and medium-sized businesses present differences from a country to another. According to the European Commission, SMEs are divided as:

Criteria	Micro	Small	Medium
Maximum number of employees	< 10	10 - 49	50-249
Maximum annual turnover	≤ 2 million EUR	≤ 10 million EUR	≤ 50 million EUR
Maximum annual balance sheet total	≤ 2 million EUR	≤ 10 million EUR	≤ 43 million EUR

Figure 1 : Criteria for defining the SMEs in Europe

Source:– Adapted from European Commission

SMEs are very important for economic and social details. In Romania, as in the EU, small and medium-sized businesses (SMEs) are defined as businesses that provide services or products to manufacturing, that employ less than 250 people and have a net annual turnover of up to 50 million euros and/or also hold assets of up to 43 million euros. Globally, SMEs were described as the engine of the economy which encompasses innovation and growth processes and also helps to eliminate the phenomenon of poverty due to its stimulating nature of job growth. (Beck, 2013)

The SMEs' definition is based on some different theories as well, studied over time. They are defined as businesses that have all the assets, the characteristics, the capabilities, the knowledge, and the information controlled, that enable the firm to implement different strategies that will improve the efficiency and effectiveness of the sector in which it operates but also to develop their future. The (Barney, 1991) model relies especially on the fact that competitive advantage is not directly dependent on market and industry structural characteristics, but it directly depends on superior internal resources in a firm. Generally, a business is said is going to have a competitive advantage if it can offer quality products at lower prices than its competitors, and be able to offer the best services for the same amount of money. (Porter M. , Competitive Advantage., 1985)

The construction of competitive advantage in a competitive market through the development of a competitive strategy implies the direct comparison of the competitive position of one's own company with that of competitors in the market itself. In a certain period of time, (Porter M. , Competition in Global Industries, 1986) manages to formulate a new ideology, where managers of the companies themselves should be able to identify competitors in their market by their own means of analysis and determination. These theories have been developed and analyzed in several papers through time, however, there are still some problems in identifying the particular industry where companies are struggling to integrate. Besides that, there is no reason to assume that the managers of the companies use the same particular elements of analysis, as researchers, in defining direct competitors of companies. (Clark, 1999)

However, perspective has been changed over time and many companies managed to adopt a customer-focused or competitor-centered perspective with central management consideration. While the balance of these two perspectives is good to be considered, research has already shown that most of the companies will make a statement regarding one of these two perspectives and that tilt is generally towards a supply-based or a competitor, rather than a customer ideology. (Chursin, 2015)

In order to be competitive, the past literature suggests that managers or owners need a significant period of time for analyzing the other competitors, this thing greatly delays decision-making in terms of competitive advantage. Generally speaking, (Ireland, 2003) study highlight that an important relationship exists between competitor firm involving directly so different perspective, such as economics, business strategy, and marketing processes. However, papers confirm that, in reality, managers simplify the process of analyzing by general grouping together the competitors that have similar performance and results. On the same page, the research shown also the idea of identifying the competitor as a process of categorization, where the manager of a particular firm, which is the core of the whole analyzing process, make some observations about other firms, which are namely “target firms”, in order to determine which or the target firm are the competitor of the core firm. (Shan, 2013)

Often, it is said that strategic management is very important just for the big companies, as they are known as “corporations”, due to lack of attention of this entire process of management from the SMEs. The concept of the competitive advantage was a mix of different theories from Barney and Michael Porter, based on the firm sustainability of the competitive advantage when it is implemented with the strategy of the value creation that is not implemented by the other competitors. (Porter M. , Competition in Global Industries, 1986) Competitive advantage is in the fact, the ability of an organization to do their activity in a way or another, different than the other competitors on the market, in a way that cannot be realized by them. (Kotler, 2000) Competitive advantage is the starting base for a good strategy for the company itself, and a good strategy creates a competitive advantage. As can be seen, is a strong relationship between these two. Competitive advantage has been increased these last decades, together with the theories linked to Michael Porter and it is considered as an objective of a strategy itself.

According to (Porter M. , Competitive Advantage., 1985), who managed to popularise the term “competitive advantage”, the idea of competitive advantage is mainly to measure the firm’s success relative to competitors. The relative success could also be measured by his economic value that the company can generate in order to obtain attention on the market. By economic value, it can be understood as the difference between the apparent benefits of the final supplier and the economic cost of the company itself, in order to achieve the proposed objectives. Thus, the competitive advantage focuses all its attention on the relative success of companies in the market, it is not necessary to be the player with the greatest potential in the market in order to achieve a competitive advantage. (Porter M. , Competition in Global Industries, 1986)

In the same line with Porter's philosophy, the competitive advantage can be described by the context of a resource-based vision, where the actual cost must be achieved through lower cost or a differentiation advantage on the profile of their product or service. Lowering the cost means a stable vision of efficiency of the company in producing goods or services, near the same quality of the competitors but to a net lower price, to be able to transfer the difference in cost into a superior return.

The differentiation advantage is the phase where a company produces something unique, a superior value item or service which is intended for the premium price in the market, for the premium market class, in which the difference between them can be sent into superior return as well for the company itself. (Porter M. E., 1998)

Constantly, changing customer preferences make a statement that leads to continued research for new products and services, that may help their clients. As a consequence, SMEs, and especially the Romanian SMEs needs to be engaged in more innovative activities to achieve some superior performance and competitive advantage, in order to have more clients. Value, inimitability, and nonsubstitutability together with rarity, are the commonly cited characteristics that provide the core logic making a competitive advantage the main core of the managerial process. Based on several types of research that have been made over the years, the conclusion that it can be drawn represents, in fact, the characteristics of the firm performance. (Sirmon, 2011)

Some research strongly suggests that SMEs can get even better if they managed to develop and make a strong communication between their systematized processes, in order to embrace the innovation orientation. Innovation is defined, by the greatest researchers as a mental process through which, a series of new concepts and new phenomenons, in the form of new services, products, and even new techniques can appear, ready to be embraced by the world. Statistically, there are different types of innovations suitable for the SMEs, which include:

- product innovation – applicable to goods, services and different ideas
- organizational innovation – applicable to marketing, sales and purchasing, management and administration sectors
- market innovation – applicable to different territorial areas, different market segments (Nurul, 2015)

Even if, generally, SMEs are more flexible in innovation and have a positive response to the change in customer demand, they have no ability to innovate compared to the biggest companies in the markets. The most likely answer to this appointment is that the large companies have bigger financial availability and capability, thus, provide a better environment to change and exploit new technology as well as have the capability to benefit from the real economy. (Kraja, 2013)

Research Methodology

This research intends to identify the relationship that may occur between some certain innovation and cost-cutting strategies and the competitive advantage of the production sector from the Romanian SME market. Firstly, the main objective of this paper is to find out if the business area from Romania, particularly the SME industry, is concerned about the ability of the Romanian SMEs, to adapt to the new requirement of the market itself through innovation or cost-cutting, in the uncertain period of time. This study is trying to implement a philosophy of innovation in the practice of production businesses through competitive advantage and the impact of the innovation itself on this uncertain market, where businesses need to be more sensitive to the efficient use of all resources globally.

In order to obtain an accurate result, for this research, a questionnaire was used as a research instrument. The questionnaire was randomly sent from February to April 2020 via e-mail and different online platforms, to a number of 116 companies with an average number of 22 employees. The answer rate was 66% is a relatively low response rate due to the pandemic situation. All the answers were processed via Microsoft Excel and IBM SPPS 20 software, and the questionnaire also included different other methods of proceeding like, Likert Scale type of questions.

A various number of rating scales were developed in order to measure different things directly. Worldwide, the most used rating scale that is used by many researchers is the Likert Scale. The Likert Scale is created as the simple sum of different answers from a questionnaire on different several Likert items. Likert Scaling assumes that the distance between every answer (each choice) is equal and together with the items itself, it can create an eloquent answer of the statement. Likert item is a simple

and chronological statement, where the interviewees are asked to evaluate by giving a quantitative value on any kind subjective or objective dimension, with five or seven levels of agreement/disagreement. The most usual variable is represented by the statement with 5 levels of agreement/disagreement. In order to obtain a perfect level of agreement, the Likert Scaling can be measured in various ways, such as frequency, quality, importance, and so on. (Wikipedia, 2018)

The format of the typical five-level Likert Scale used in this questionnaire is the following:

Value	Importance
1	Unimportant
2	Slightly Important
3	Moderately Important
4	Important
5	Very Important

Figure 2: Likert Scale Survey

Source:– Adapted from WIKIPEDIA

A higher score will indicate a positive attitude and a lower score will indicate a negative attitude regarding the trial. This paper uses the standard version of scaling with values from 1 to 5 with the standard ratio base. Based on the questionnaire submitted, the research targets to obtain relevant information about the impact of the innovation on competitive advantage in the Romanian business. Similarly, the second objective of this paper is to find if the Romanian production market is open to embrace the implementation of innovation processes in order to obtain a competitive advantage through a sustainable philosophy by using reusable products with the smallest cost on the market.

The model that it was made, contains Romanian SMEs, older than 10 years on the market, with a big experience in the production industry, but with lack of innovation system actively. Making a short review of the respondents, the questionnaire was framed in 4 grading system, as is follow:

- The active respondents - the response rate was 47%, actively identified in business with an average of 40 employees, and with an average profit ratio of 15%.
- The stable-increasing respondents – the response rate was 13% actively identified in business with an average of 33 employees, and with an average profit ratio of 22%.
- The stable respondents – the response rate was 29% actively identified in business with an average of 18 employees, and with an average profit ratio of 2-3%.
- The declining respondents – the response rate was 11% actively identified in business with an average of 10 employees, and with an average profit ratio of 7%.

All the businesses were chosen randomly from an international database of the Romanian production SMEs with an active business around the country.

Type of Analyses and Interpretation

Analysis

Firstly, the questionnaire is basically created and designed for the Romanian SMEs, to highlight the perception of these businesses regarding the impact of the innovation on the competitive advantage all over the country, especially how it these characteristics influence the activity of the companies itself and how they can resist in a competitive market in those days. Essentially, the problem in Romania with the innovation amongst SMEs it is an old problem, since the end of the communist regime, trying different stabilization solutions to stabilize the market competitiveness.

To be more specific, the lack of an economic vision together with the lack of involvement of the authorities has made the innovation among the SMEs to be at a historical minimum, and this thing is the best observed in times of crisis. The health crisis that Romania is going through, had a direct impact on all the companies in the country, particularly in the loss of some material resources which affected the flow of development and innovation. As is shown in Figure 3, a succession of three economic variables with particular importance for the production business itself but also for the Romanian economy was selected: economic innovation, technological innovation, and services innovation.

The information that was collected from the questionnaire was carefully analyzed and as a conclusion, it could be noticed that company management considered that all three variables were directly involved in the development of the companies and have a powerful impact on their competitive advantage in the market. The variables that were selected have obtained an average score above 4.34 out of the maximum 5 possible. The most important variable of the three of them from the perspective of the analyzed companies was the technological innovation with a value of 4.96 which was very close to hitting the maximum value of 5.

Assumed these results, it can be quantified that the Romanian SMEs considered that the most important variable between these three for their businesses is the technological innovation value, although the other values are a point of interest for them. These results put in good light the interest in creating a competitive advantage in the Romanian market because all the interviewed companies answered positively to market changes.

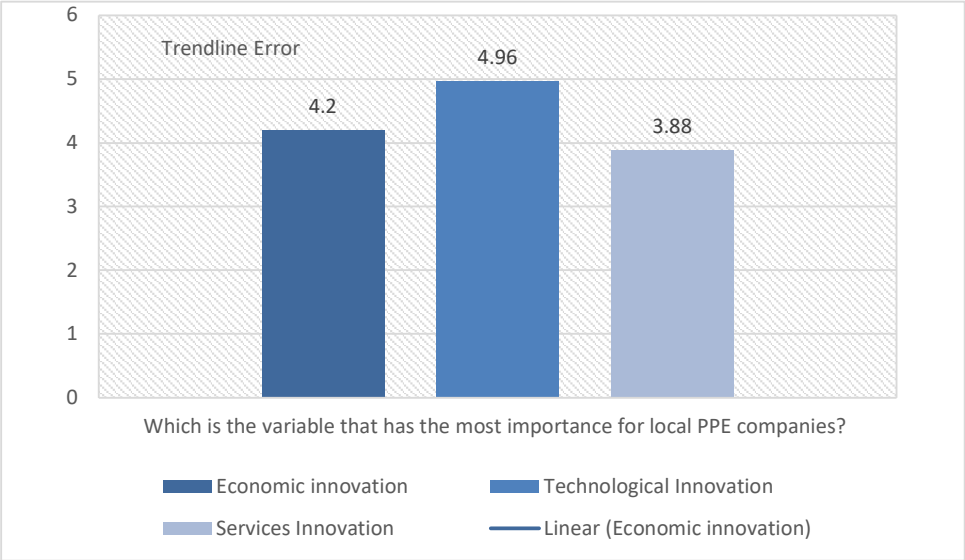

Figure 3: Economic variables with the most influence on the Romanian SMEs
Source: survey responses - author

The second statement approached in this questionnaire was the respondent's opinion about which is the best strategy that is involved in the development of the company, in order to obtain a competitive advantage in the Romanian market. The purpose of the statement was to identify which strategy in the Romanian market it's more reliable for obtaining a competitive advantage and by what methods it may influence the future development in the actual market situation of the SMEs.

A total of 55% of the company management considered that the strategy of cost reduction is more reliable for the actual condition market, due to the economic uncertainties caused by the global crisis situation. In a world where cost-cutting is boundless, Romanian SMEs believe that the entire process of cost-cutting is most effective in gaining competitive advantage, although this method involves

several risks factors for the businesses. The most common types of cost-cutting are reliable especially to big companies, who have big development budgets, which have several long-term management strategies, and also who know how to use efficiently the time management. The only way for the Romanian SMEs to keep pace with the big companies is by innovation. Even if, it's a technological innovation, a product innovation, or a service innovation, this is the simplest method by which SMEs can obtain competitive advantage without losing their market share in the grey times.

The other percentages of the analysis were randomly divided to the other processes from the questionnaire, because the owners or the managers that were interviewed, consider that these variables cannot have a direct impact on their competitive advantage and especially on the profit rate on a short time range.

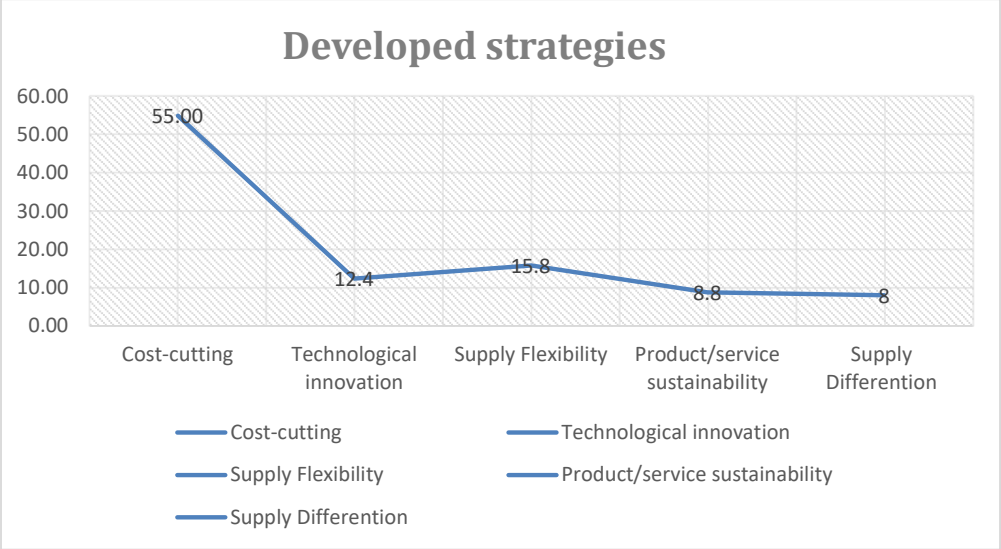

Figure 5 : Involving strategies of the businesses

Source: survey response – authors

Gathering all the ideas together, it could be concluded that Romanian SMEs are directly interested in obtaining a competitive advantage through a strategy of cost-cutting, even if, above, the answers also showed a direct relationship with the innovation strategies, especially with the technological innovation. This idea shows up that companies understand the potential development in the market and the achievement of competitive advantage through innovation, but the primary intention is to cut the costs, in order to obtain a better position in the market. The next two issues addressed in our questionnaire were meant to identify how the Romanian SMEs will treat the future. Through innovation strategies or through cost-cutting strategies? Can SMEs keep up with the accelerated changes in their market? Can their products or services be sustainable through cost-cutting or through innovation?

For a different result, it was used a Likert Scale, as it can be noticed in Figure 6. The two questions highlight, the managers' interest in the Romanian market development and in resolving the actual problem by different managerial strategies. Results show that the managers are completely aware that the actual crises can affect their longer-term plans regarding the strategic development process.

Thus, for the first statement, the score was 0.66 which means that the users totally agreed that their businesses could use cost-cutting strategies in order to be more competitive on the market in the long term situation. For the second statement, the score was -0.23 which means that the managers that have answered this questionnaire, disagree that the product or service they are currently offering may provide a long-term competitive advantage for their business through innovation. They feel slightly unprepared

regarding their products or services since they do not want to be involved in a development process through innovation.

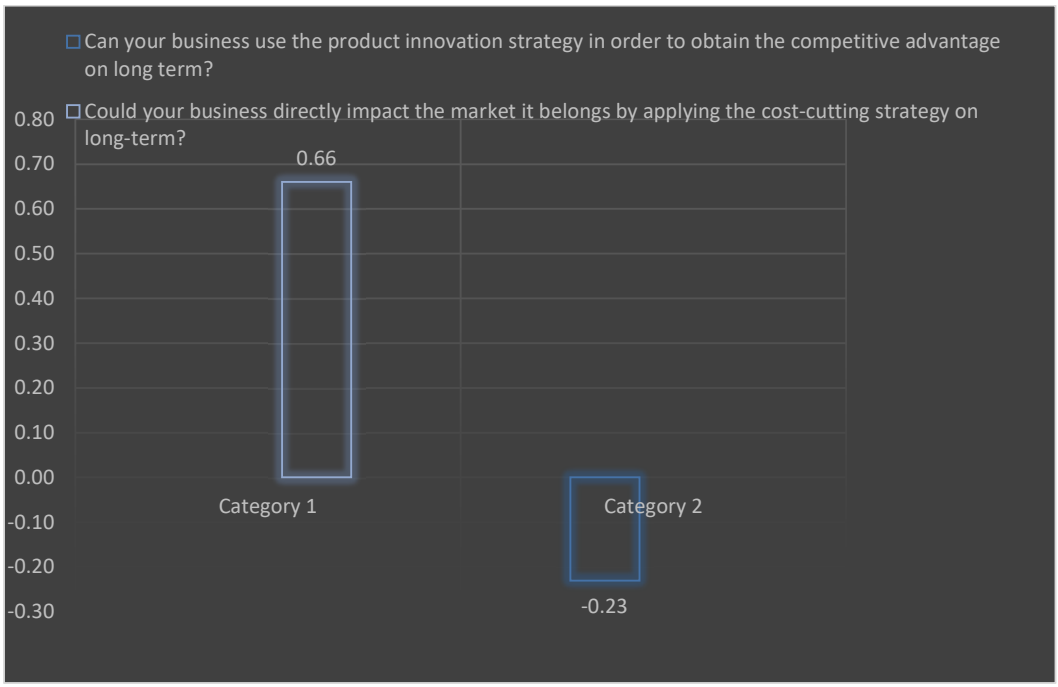

Figure 6 : Liker Scale Graphic

Source: survey response – authors

As a short conclusion, respondents believe that a cost-cutting strategy is the best way to make an impact directly on the market, especially in a long period of time in the Romanian market. Though, this market underwent major changes during this uncertain period of time, at least declaratory, the managers do not agree with the idea of implementing a product innovation strategy.

Correlation

In order to obtain more accurate and valuable results, Pearson's correlation was conducted for this questionnaire. This correlation helps the questionnaire to make some tests, whether there is or isn't an interdependence relation between the variables in the test questionnaire.

For the statistic population of the research, the critic value R, in Pearson's correlation was equal to 0.232. In order to go the further direction of the questionnaire with the data analysis, the identified values need to be at least equal or greater with 0.232, regardless of whether the values are positive or negative.

Table 1: Bivariate correlation of a number of certain variables

		O1	O2	Q3	O4	O5	O6	O7	O8
O1	Pearson Correlation	1	.153	.232*	.064	.361**	.106	.191	.109
	Sig. (2-tailed)		.187	.044	.582	.001	.364	.099	.347
	N	76	76	76	76	76	76	76	76
O2	Pearson Correlation	.153	1	.463**	.142	.137	-.208	.010	-.173
	Sig. (2-tailed)	.187		.000	.221	.239	.072	.935	.135
	N	76	76	76	76	76	76	76	76
Q3	Pearson Correlation	.232	.463**	1	.155	.226*	-.106	-.022	-.196
	Sig. (2-tailed)	.044	.000		.181	.050	.362	.848	.089
	N	76	76	76	76	76	76	76	76
O4	Pearson Correlation	.064	.142	.155	1	-.074	.034	-.017	-.056
	Sig. (2-tailed)	.582	.221	.181		.524	.771	.886	.632
	N	76	76	76	76	76	76	76	76
O5	Pearson Correlation	.361**	.137	.226*	-.074	1	.251*	.131	.087
	Sig. (2-tailed)	.001	.239	.050	.524		.029	.259	.454
	N	76	76	76	76	76	76	76	76
O6	Pearson Correlation	.106	-.208	-.106	.034	.251*	1	.238*	.240*
	Sig. (2-tailed)	.364	.072	.362	.771	.029		.039	.037
	N	76	76	76	76	76	76	76	76
O7	Pearson Correlation	.191	.010	-.022	-.017	.131	.238*	1	.136
	Sig. (2-tailed)	.099	.935	.848	.886	.259	.039		.242
	N	76	76	76	76	76	76	76	76
O8	Pearson Correlation	.109	-.173	-.196	-.056	.087	.240*	.136	1
	Sig. (2-tailed)	.347	.135	.089	.632	.454	.037	.242	
	N	76	76	76	76	76	76	76	76

In order to obtain a better result for this questionnaire, Pearson's correlation was used to determine if it is a strong or a week relationship between 76 companies' thoughts regarding the influence of the innovation to the competitive advantage of their entire business. Based on the analyzed information, the identified values from the table showed a total of 7 correlations, none of which are strong or very strong. From these 7 correlations that we identified in the questionnaire, just four correlations are with a moderate impact, and two of them with a week impact on the statistical sample. In this analysis, it can not be identified a strong or a very strong correlation which means there is not a direct impact factor in the final result.

The rest of the correlations presented in Table 1 are very week correlation with no impact factor on the final result, so that means the statistical samples are not relevant to this questionnaire. Also, the p-values for the correlations presented between types of global strategies are more than 78.55% upper than the significance level of 0.05, which indicates that the correlation coefficient is not significant.

Making an optimal analysis of the results, it can be said that only a small part of the local companies consider that innovation represents the vital process in the sustainable development of the Romanian market. Even if, the respondents thought that the key to innovation is by technology, few of them consider that the adoption of an innovational strategy through technology or products as a real solution to the long term period. But the real question in general, is why do some companies choose product innovation while others go for cost-cutting as their main long-term business strategy? Why Romanian SMEs, especially the production companies, try to use cost-cutting as a long-term business strategy? As a short conclusion based on the answers in the questionnaire sent, it was identified that managers of the Romanian SMEs are generally scared of what the innovation process itself means and how it

should proceed in their future, as a company. Managers cannot understand how innovation strategies and the entire process of the implementation of these strategies can directly impact their competitive advantage and their rise in the Romanian market. Generally, young firms were more likely to go with cost-cutting strategies than with technology innovation because they may receive easier acceptance on the market through this strategy of cost-cutting, by a short period of time. Afterward, there is a necessity for a change in the strategic system and a more careful identification of management solutions and the best way to do it it's through innovation. – even if it's product, service, or technological innovation.

At the last conclusion, it was identified that managers who participated in the questionnaire directly, have a lack of confidence in the innovation strategy of the products or services that they offer, especially in terms of the lack of knowledge in the managerial field together with the fear of losing the market share that has already built in the past.

Conclusions

In the new economic environment following the last financial crisis of the last decade, strategic management has become, a pillar in the competitiveness of a firm, especially of small and medium-sized businesses that are trying to make a great impact on the market in order to obtain a competitive advantage. The major reproach of this decade, especially for the Romanian SMEs, is that businesses are more and more disposed to a reactive attitude regarding the market and allow themselves to be directly controlled by all the events around them. Unfortunately, they have not reached the maturity to control their own destiny through their own decisions, regardless of the current situation in the market.

This study has nuanced these statements by clarifying how the Romanian SMEs will improve their market share and how they will obtain a competitive advantage by clarifying their long-term strategies and the impact of these strategies on their products and services. The long-term strategies that were involved in this discussion are the technological innovation strategies and cost-cutting strategies. It was made a short story about how the business itself is ready to implement these types of strategies in order to obtain a competitive advantage by maintaining and developing a better market share system.

Technology and productivity, together with innovation are inseparable and impenetrable. Technology innovation improves productivity, and productivity is one of the most important forces of competitiveness. Without productivity, companies cannot obtain a competitive advantage at an optimal level of direct market participation. Unfortunately, this research has confirmed the opposite. Mostly, the Romanian SMEs are feared of adopting long-term business strategies that imply innovation, relying in particular on cost-cutting strategies, because as they said, it's easier to adopt and implement in their managerial system. But will this thing work on a long-term idea?

Despite the idea that Romanian SME has already developed, it's unknown if this type of strategy will work on a business for a long-term period or it's just something temporarily. Despite, the innovation strategies are more present in the other economic sector in the western European Union countries, in Romania, this term it's still as unknown as ever. For big companies, in Romania, it is a must to develop these innovation strategies, because they came with an occidental mindset and with a different managerial culture. But this is not generally true for small and medium-sized companies, despite their age, structure, and employee number.

The results indicate, that the Romanian small and medium-sized companies managers consider that they work in an unstable environment and the only way for them to obtain competitive advantage is by a strategy of cost-cutting. In Romania, the opportunity to grow in an unstable market is literally huge, the companies being able to test all the strategies in order to obtain a competitive advantage. Best practices shared by them can be taken as reference, adapted, and implemented by the local companies in order to have a safer and healthier growth. As a future direction for research, given the complexity of the topic, we would suggest looking more into the innovation strategies by companies involved in the production, focusing on the Romanian market and trying to identify, whether or not this type of strategy will be developed and adopted in the near future.

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It in Management and Functioning of Enterprises in A Coronavirus Pandemic Situation - Advantages and Dangers

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Abstract

It is hard to imagine the functioning of modern man without IT elements. They allow to speed up and improve work. The development of computer networks, telephony and especially the Internet gives the opportunity to work remotely. Currently, it seems that this functionality is the best tool in counteracting negative, not only economic effects of the coronavirus. It allows to carry out previous tasks in a way that does not require direct meetings of employees, employees with clients or students with teachers. However, the scale of the phenomenon and the immediate necessity to switch to this style of operation suggest that this is not easy for many enterprises. IT is not only tools used at work. It also includes all devices enabling people to receive and transfer information. In this regard, everyone gets a huge amount of information about the coronavirus every day. This is the vast majority of information about negative emotional background. As research shows, it has an impact on human effectiveness. The purpose of the publication is to show undeniable advantages of using IT tools in the age of coronavirus. The goal is also to present risks associated with it. The paper presents results of surveys carried out by the author after the spread of the virus. Other authors' research was also used. In addition to the survey results, the author's participating research results and information obtained during his interviews will be presented. Correlations between the results allow to better analyze and understand the essence of the problem under consideration. Due to the complexity of the subject, research areas have been proposed, which should now be of interest to researchers in the field of management sciences, but not only. A feature of the current threat is, according to the author, the need for multicriteria analysis, looking from many points of view - interdisciplinarity. Only this allows to understand the real essence of the problem and propose solutions for the future.

Keywords: Management, IT, Teleworking, COVID-19

Introduction

At the end of 2019, first cases of new virus in China were reported, which is referred to as COVID-19. Due to physical distance in many countries of the world, this threat was treated for a long time as a problem "which will not reach us". As the following weeks showed, these opinions were completely wrong. The virus, which is a real threat to life, as a result of lack of recognition, exceptional ease of transmission, lack of medicine and vaccine, "hit" the basis of human functioning - freedom of action. The only real way to protect people in threatened areas (now almost all over the world) is isolation. People were forced to lock themselves in their homes, limiting mutual contact as much as possible. The situation concerns private and professional life.

Thanks to the development of ITC, these restrictions apply only to the sphere of life in the physical dimension - real contacts. At the same time, they do not concern the sphere of functioning which is based on the transmission of information at a distance. New, completely unpredictable challenges have emerged before the unit. Among many of them one can indicate the need for remote work. This is a problem with many dimensions, one of the most important elements of which are: the transition from stationary to remote performance of duties, simultaneous remote work of all who are isolated from the outside world and remaining in the same limited physical place, the need to adapt the company infrastructure to this type of work, the limitations of IT tools that allow to carry out professional tasks properly (this applies to working people and students at every stage of education), overwhelming everyday life, overwhelming negative information, attacking people from all sides.

Many enterprises, especially their management, faced the necessity of adapting to new realities practically immediately. The problem is not just technical adjustment, it seems even the smallest challenge. The basic problem is the complete reorganization of employees' functioning, limiting the impact on their professional functioning, and the inability to limit external factors disrupting work.

In the above aspects, the subject of this paper is the importance of IT in the management and functioning of enterprises during the epidemics. The basic guiding idea of the paper is that IT is one of the most important elements conditioning the ability of enterprises to operate in times of the epidemic crisis.

Considering that human is the basic element of IT and the fact that all known technical elements of this technology affect his professional functioning, which is noticeable especially now, a detailed assumption was adopted, according to which: there is a number of factors affecting the reduction of productivity and comfort of work using IT in crisis situations. The study is based on a survey sent electronically, which was carried out during the epidemic. As it is shown, the author's participating research as well as conversations and interviews conducted by him during the pandemic are also of particular importance.

IT and conditions of its use during the COVID19 pandemic

The key factor, never before unprecedented, affecting the companies are now conditions of their functioning. Virtually all European countries and very many around the world have introduced mobility restrictions. In this way, humanity has been to a large extent closed in homes. Many companies cannot carry out their tasks normally. The only means of communication, which has always been the basis of every action, are technical means: telephone and computer with appropriate software. Another important element of the work is a computer connected to the Internet with installed software dedicated to specific duties. It should not be forgotten that the same tools (except for work-dedicated programs) serve everyone as the basic means of interpersonal communication that is the basis for the normal and proper functioning of societies. An important factor affecting ability, productivity and, ultimately, the quality of work, is the close proximity of people of very different ages in close relationships - families. Each of them has its own habits and needs, including those related to the use of IT tools. Due to the organization of life, they usually occur at the same time.

IT and in particular ICT information and communication technology, are closely related to the technological development of humanity. This applies especially to the area of information and information management, which has always been the basis for human functioning (professional and private life) (Bigi et al, 2018). Information technology consists of information processing methods and tools related to their identification, selection, collection, registration, storage, processing, transmission and deletion. The key element of IT is human. He decides about the effectiveness of its use. In this regard, IT can be defined as "the ability to effectively use means and tools and sources of information, to analyze, process and present information, to model and measure devices and events, and to control them"(Michałek, 2011).

IT is therefore a basic element of work and study (Zovko, 2016), and as a result of the development of the Internet also everyday life. Research has shown that over 80% of citizens use the Internet in Poland (Ponad, 2020). As weighed at the Polish Ministry of Digitization, "Poles, which results from our study, do not use the Internet only when they are sleeping. They want to be online all the time. And they use the Internet as the tool that improves the quality of life" (Ministerstwo, 2020). This situation applies to the entire world. (Raport, 2020)

This widespread use of IT in virtually every area of life, while limiting leaving home, with limited technical resources of work-enabling stations, combined with interpersonal conflicts and constant stress, are a great challenge for a person living in the time of COVID-19. This problem is particularly important because of the continuity of the functioning of communities, countries, which is strictly dependent on the ability of normal human functioning. It consists of two basic levels: professional and private. In the epidemic, they are constantly intermingling, like never before. At the same time, they heavily rely on IT.

IT in the pandemic - benefits and threats

The development and introduction of IT in enterprises was caused by the desire to improve the area related to the acquisition, transmission, collection and use of information. In general, with the decision-making process (Kadiria et al., 2016). The basic benefits of IT in management are (Nisa et al., 2019): effective management of employees' time, task allocation, organization of processes, document circulation, availability of documents and information, reduction of costs associated with traditional paper circulation of documents, greater level of data security, better organization of information disposal and allocation of rights, reduction of office space, better possibility of supervision and information control, improving the quality of the customer service process - both external and internal, the ability to perform many tasks and duties from places with Internet access. From the point of view of the topic discussed in the paper, the benefit of distance work should be considered as the key one.

Teleworking is defined as "the way in which work is organized and carried out using IT techniques under an employment contract or employment relationship, where work that could be performed in the workplace is regularly performed outside the workplace" (Wiśniewski, 2014). This way of performing duties is different from the traditional one. Providing remote work capabilities requires organizational adaptation. Among advantages of this way of working in times of pandemic there should be indicated: isolation (prevention of infection), emphasis on the effects of work, the possibility of employing employees living even at the considerable distance, adjusting the workplace to the individual needs of the employee. It is assumed that remotely employed employee is more efficient than a full-time employee (de Viries, 2019). This advantage, however, occurs only in enterprises and in positions adapted and dedicated to this style - organized and introduced earlier. In a coercive situation, it is unlikely to occur, although it is not excluded that this may occur. Considering general chaos, stress, fear and coercion, performance degradation should be expected, especially in the initial period (Cewińska, 2016). This is indicated by the author's research results, which are presented later in the publication. This is also indicated by research carried out in this respect by other researchers (Jak, 2020). Considering the issue of IT in business management in the time of COVID-19 it should be stated that the basic benefit is safety, health and the possibility of further functioning. All other factors that make up pros or cons are of minor, secondary importance.

The disadvantages of telework include: difficulties in managing human resources, high initial costs, the phenomenon of isolation and limited cooperation with superiors, limiting the level of security and confidentiality of information, increasing the impact of equipment failures on work efficiency, increasing stress resulting from the lack of clear boundaries between working time and rest, family relations, earnings dependence from the effects, social isolation, lack of organization and supervision of work (may cause limitation of competences), limitation of ties with the company, extension of the time needed to carry out specific activities, communication problems within the team (Oleksiejczuk and Oleksiejczuk, 2009). Considering the benefits and disadvantages of teleworking during COVID-19, it should be noted that benefits are reduced while disadvantages are increased. The disadvantages are compounded by additional factors, among which are: job insecurity, fear for one's own and loved ones' health, rapidity of the phenomenon, family conflicts in the situation that is unprecedented in most cases of the necessity of being in the same company constantly, the amount of negative information provided from each source, organizational chaos, higher than normal initial costs (resulting e.g. from lack of experience, including real needs), limited rest options, the need to work in positions that often have insufficient tools to protect privacy and data security (COVID-19, 2020). Many of issues related to benefits and disadvantages of teleworking in the current pandemic are analyzed in the research part of the paper.

Among the most important factors facilitating and improving the transition to remote work, the structure of the organizational structure should be mentioned. It is much easier to switch to new conditions and meet the challenges of those enterprises that previously had a flexible structure (Nordbäck, 2017). It is much more difficult for entities with previously formalized structure. The new "reality with a virus" has shown the undeniable advantage and advantages of a flexible structure. It also showed the importance of knowledge, experience, cooperation skills, trust, reliability and ethical approach to employees and the client. A flexible structure is rightly associated with doing business in

times of globalization, uncertainty and dynamic change. It is considered in this regard as something indispensable.

The concept of flexibility is multidimensional. It is associated as something contrary to stability and rigidity, and as a synonym of adaptation. Fitting speed plays a very important role in flexibility (Flaszewska and Zakrzewska-Bielawska, 2013). The appearance of COVID-19 in relation to economic effects was a very sudden phenomenon, practically unpredictable, requiring immediate, huge scope of activities. Flexibility as a feature was a necessary factor for adaptability, based in most enterprises entirely on IT.

One of the most important problems in functioning during the pandemic, including in the professional area, is stress. From the technical point of view, its basis is information. Importantly, there is a lot of it every day. This is directly influenced by the widespread use of IT tools and an innate tendency to search for and obtain information related to everyday life. COVID-19 is the main area of interest. Information about it is provided by every news program on TV or radio, it is the basic issue in printed messages and placed on the Internet. It is one of the most important topics raised in everyday conversations among people forced to remain in seclusion.

A remote working unit, using the computer for this purpose, often "rests" browsing news pages. COVID-19 is present everywhere in every area of IT use. In the information society, in which IT is the basis of functioning, stress is considered in the context of information stress.

In the information stress, the main excitation factor is the excess (in relation to the possibility of processing, delivered to the unit) information that is delivered to the recipient at a high speed and from every possible source. As the result, there is a cognitive impairment and individual response to external factors. The basis of information stress is the amount of information received. Currently, during COVID-19 there is also the factor of negative significance of the majority of information received and uncertainty of the future in every aspect of life, both professional and private. This obviously intensifies effects of stress, negatively affecting work efficiency (Morin et al., 2017).

Performing work remotely requires computerized position. Not all companies had the opportunity to provide the employee with the necessary technical facilities. That's why many people work on their own computers. Their level of security is not always sufficient (Praca, 2020). This increases the risk of important data being lost or leaked. According to research results during the pandemic, hacker attacks have intensified. As results of the research show, the concern about the possibility of losing confidential data during COVID-19 is expressed by 71% of specialists and 95% of people working remotely (Koronawirus, 2020). Awareness of the often top-down disposition of important data at home and awareness of leaks in the data protection system are the natural concern for employees. Thus increasing their stress.

IT in the professional life of employees during COVID-19 - results and analysis of the conducted research

The study uses following research methods: traditional survey (PAPI), individual in-depth interviews (IDI) and participatory observation study. The survey was conducted in the initial period of introduction of the epidemic emergency in Poland from March 14, and ended on April 4, i.e. two weeks after the introduction of the epidemic. The study was conducted on the group of 183 people who the author reached by sending an electronic survey form. Due to the topics taken up, the study involved persons working between ages of 18 and 65. The survey was sent to 178 people, with a request to spread it among friends. Given the age at which the author of the publication is influencing the target group of the study, it was assumed that in the family remaining in the place of residence, in most cases there are at least two working people and at least one remaining in compulsory education. Some sources have given more than one completed questionnaire. Given the general chaos, fear and uncertainty, the survey was not long and complicated, it consisted of 11 questions related to the use of IT during the epidemic. It was carried out during the rapid transition to the remote work of employees in many companies. Although the study was started before the epidemic was introduced, it

was widely known that it was only a matter of time - action to enable adaptation measures (this time was very limited). The presented research sample results from the author's limited possibilities to reach people who may have been interested in completing the survey. It also results from the approach of people to participate in the study in the period in which it was conducted. General stress, uncertainty, fear and chaos were factors that negatively affected the willingness to engage and express their opinions. Therefore, the author considers obtaining 183 answers a success. Due to restrictions on the research sample, this part of the study, which is related to participant observation and the author's conversations / interviews, becomes particularly important. It seems that this way of research in the issues raised in the work and especially the time of their implementation, allows the collection of information free of distortions arising from the awareness of the individual in the process of completing the survey. The factor that negatively influenced the number of surveys, i.e. fear, stress, uncertainty and chaos, was also important. In such a state, people behave more naturally, express honest opinions, do not have time to distort and blur their daily reactions. The most valuable seem to be the information that is not subject to analysis processes by the source when it is expressed. At the same time, the author is aware of the limitations of participant observation resulting from operating conditions during COVID-19.

The analysis of the results was carried out in a logical order resulting from the publication layout. The following main hypothesis was formulated in the paper: IT is one of the most important elements conditioning the ability of enterprises to operate in times of the epidemic crisis. Considering the reality of functioning during COVID-19, in order to verify the main hypothesis, the following detailed hypothesis was put forward: there are a number of factors affecting the reduction of efficiency and comfort of work using IT in crisis situations.

Among participats of the survey, 3.28% said that as a result of actions taken in companies in connection with COVID-19, they lost their jobs. Only the traditional, stationary way of working at that time was declared by 39.89% of respondents. 56.83% of them confirmed the remote work. The research currently available on the Internet indicates that in Poland, about 33% of citizens perform remote work in connection with coronavirus (Praca, 2020). The difference between the results of the author's research and those cited may be due to the environment in which the author operates - being an academic teacher. Although it should be pointed out that remote work in the author's research also applies to people working in (state) administration, judiciary, wholesalers (administration). The results of the survey are confirmed by interviews / conversations conducted during the pandemic. 83.65% of respondents who declared remote work are between 27 and 60 years old. 8.65% - 18 to 26 years, 7.69% over 60 years old.

One of the most important questions about IT at work in coronavirus was about remote work performance. 64.42% of respondents said that this performance is lower, of which 13.46% much lower. 25.96% did not notice the difference in this respect. 9.62% believe that their productivity through remote work has increased.

Work without leaving home requires access to appropriate IT tools. In the next step of the study, it was checked whether employers were able to technically secure their employees in such a short time and in such a difficult situation. 13.46% of respondents said that the employer did not provide them with hardware and software. At least to the limited extent, this was done for 86.64% of employees. Therefore, the situation is not very bad, although it should be noted that 59.62% of people said that their hardware and software were guaranteed only to a limited extent. This is probably due to organizational difficulties in enterprises.

Since it was stated that employers provided elements of the necessary IT infrastructure with a limited number of employees, it was necessary to check their availability in places of residence during retreat (fig. 1). Only according to 10.58% of respondents (working remotely) the number of available positions is fully sufficient. At the same time, according to 26.92%, there are definitely too few of them. The largest percentage of respondents - 62.50% believe that accessibility problems are noticeable in their places of residence, but they expressed the view that they are somehow dealing with this problem. Among the reasons for the relatively low assessment of the availability of IT infrastructure one should mention the number of people staying together in a place of seclusion who

during their daily existence in COVID-19 have to use it. It should be noted that they are not only adults and working people. A very large group that have to connect remotely every day are students who acquire knowledge at all levels of education. Since all classes take place in the morning hours, this group occupies a significant number of equipment. At the same time, it should be assumed that in not many families the number of computer workstations is the same as the number of people forced to use them at the same time. In response to the question about the number of people living together whose work and / or school duties require the use of IT infrastructure, the respondents indicated that in 8.65% of cases there is only one, 20.19% two, 62.50% to 4, and 8.65% even more. This clearly shows that this is a real problem of remote work performance during COVID-19.

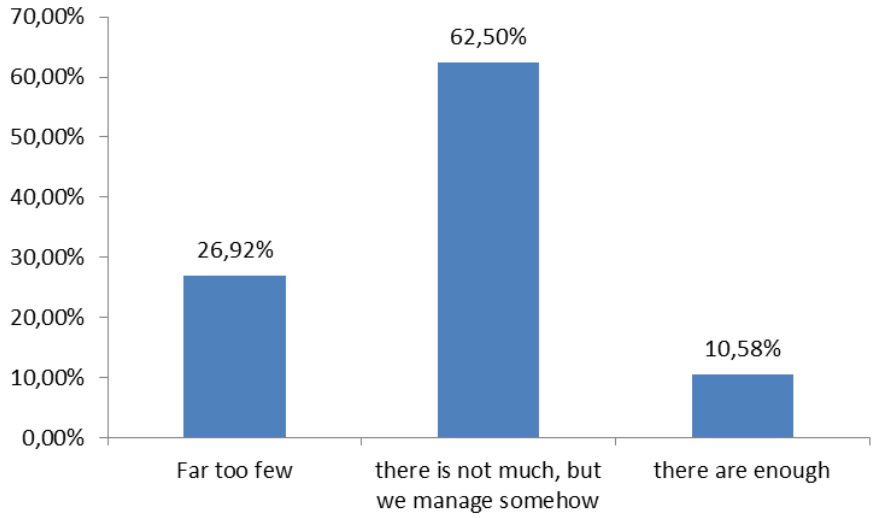

Fig. 1: Is there a sufficient number of (IT) positions at your place of residence during the pandemic to allow all interested persons to complete their duties (professional, school) without conflicts?

Source: Own elaboration

Experience in remote work is also influenced by experience. Of the survey participants who were faced with the need for this type of work, as many as 43.27% did not have any experience in this area. 35.58% of people declared little experience. Only 19.23% did this often before, and 1.92% work this way every day. As shown, 78.85% of respondents did not have any experience in remote work, or it was very limited. Analyzing the impact of this fact on the efficiency of remote work, one can use the distribution of answers obtained in the question about the assessment of the initial stage of work - after such a need arises. Only 23% of respondents said that the transition (including 2 people to continue) to remote work was easy or very easy. According to 11.54% of people, it was very hard for them. The largest group of people, 61.54% believe that it was difficult process for them. 4.81% were unable to determine this. It should be presumed that these problems were mainly caused by fear of the future, stress and chaos. It is characteristic that older people suffered transition to remote work the worst. Only one in eight people over the age of 60 marked the answer “difficult to answer”, for the rest it was a very hard or heavy process. These types of answers also often appeared in the group of people aged 46 to 60. The explanation may be the fact that, as research shows, the percentage of people using IT on this Internet decreases with age (Aktywność, 2020).

The transition to remote work in connection with COVID-19 was caused by a threat to human health and life. It was treated as a voluntary action of employers, but also resulted from the relevant provisions of law. In this regard, the respondents were asked about the factor that in their opinion is the most important advantage of teleworking during a pandemic (Fig. 2). As expected, the largest percentage of people gave an answer related to ensuring health - reducing the possibility of infection

- 60.58%. This tendency is confirmed by the results of other studies (Praca, 2020). In second place in terms of the number of selections there was an answer related to the possibility of work, the alternative of which would be temporary (unpaid leave) or permanent (job loss) loss of earnings - 25.00% of responses. The smallest number of people in this regard indicated the possibility of staying at home - more time for the family - 14.42%. It is characteristic that with the inflow of completed questionnaires one can notice a certain regularity. In the initial period, most people indicated the health protection factor and more time for the family, but over time the opportunity to earn for living became more important than family contacts. At the same time, the difference between the number of answers health and earning decreased.

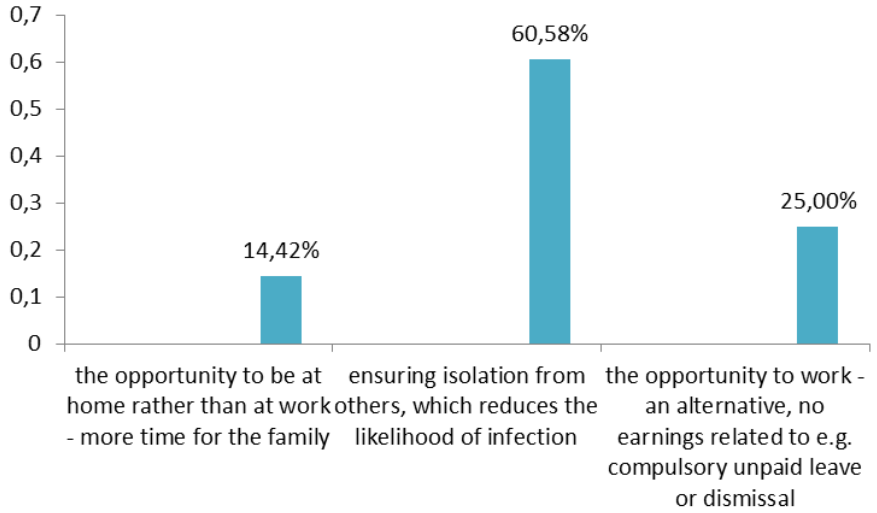

Fig. 2: Which of the following factors do you think is the most important advantage of being able to work remotely during COVID-19? (only one answer can be given)
Source: Own elaboration

The next question deals with the subject of defects and / or problems related to the use of IT during COVID-19 (more than one answer could be given). Placing this question in the survey resulted, among others from the analysis of statements of people during the author's conversations / interviews. The respondents often pointed to broadly understood stress, problems with the distribution of work (due to the number of people remaining locked up), or the lack of appropriate equipment. Another reason for this question was that IT is just one of elements used at work. Its part is everything that serves human activities based on information. And modern human, who is the most important part of IT, in large part, thanks to IT, is constantly receiving large amounts of information (Przeciążenie, 2020). Too many of them cause information stress. Its scale and strength of impact during the pandemic is very large and compounded by the amount of negative (stress-generating) information.

The respondents stated that the biggest disadvantage of using IT elements during COVID-19 were difficulties in determining the daily work schedule of individual people (remote work) - 79.81% of responses. In second place in terms of the number of selections was: stress related to switching to remote work - 75.00%. Lack of appropriate hardware and software was indicated by 61.54% of people, and stress resulting from too much information reaching, 45.19% of respondents. At the same time, it should be pointed out that, according to over 94.23% of respondents, COVID-19 is important, very important or even the most important topic of talks and / or seeking information.

Conclusion

As shown in the results of the research presented in the publication, the use of IT, as predicted, turned out to be an important issue in human functioning during COVID-19. It has contributed to increased security, limiting the speed and scope of spread and the possibility of continuous earning. The scale

of the problem associated with COVID-19 was so large and dynamic that it exposed many of problems of modern human. They also did not bypass the IT sphere. It turned out that the same technology that can help the person, is able to negatively affect everyday life. The huge amount of information reaching the individual, which in itself is the cause of information stress, supplemented by their unequivocally negative effect on humans. And it is IT elements that increase its information capabilities. Unpreparedness of most organizations to such a rapid action in the field of remote work resulted in chaos and the stress associated with it. At the same time, this problem does not concern only the professional sphere, but the second main sphere of human life outside private life - education. The need for widespread use of IT, often at the same time, has caused organizational problems in many isolated families, adding to the general stress and uncertainty of tomorrow. In addition, hackers have become very active on the network, who, using the general chaos, have intensified activities aimed at unauthorized access to sensitive data, phishing, access to accounts. It all happens in the IT area. These are problems, the solution of which for the future is, according to the author, the necessity. The more that, as reported (provided thanks to IT), the appearance of further unknown viruses can be expected.

Issues presented in the paper have been described only to the limited extent. Accordingly, the author believes that it should be continued. In particular, all individual areas that reduce the efficiency of work, but also the life of the remote person should be examined. How to prepare yourself organizationally (work, education, everyday life), how to limit the severity and impact of stress (on various levels), how to secure data, access to accounts, are questions that modern man will have to answer. Science plays an extremely important role in this respect. Due to the fact that it is difficult to identify the specific field that completely deals with such diverse problems, it is necessary to conduct interdisciplinary research from the beginning. Only extensive research teams are able to propose timely solutions that will allow modern people to hope that they are "reasonably" prepared for new threats. This applies, among others, to the sphere of IT application in he company management as one of the related particles in the general structure called human life.

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Evaluation of The Potential of The Polish Intermodal Terminals in The Aspect of Operational Quality

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Abstract

The purpose of the paper was to assess the quality of the intermodal terminals in Poland. The essence of the operational quality of the technical objects being the intermodal terminals was justified. The next part of the paper defines the measures of the operational quality and the technical parameters of the Polish terminals. On this basis, the nominal parameters of the intermodal terminals were determined together with justification of these values. For the purposes of assessment of the potential of the terminals, the Servqual method modified by the authors was proposed. Its applicability is shown on the example of 38 Polish terminals with reference to 12 criteria based on the available characteristics. In this way, the possibility to differentiate the level of the operational quality of the terminals was confirmed.

Keywords: Assessment of Operation Quality, Intermodal Terminals

Introduction

The key goal of the European transport policy in the light of the need to reduce the greenhouse gas emissions is to shift one-third of the road transport (300 km and longer distance) to rail and inland waterway transport by 2050. The Eurostat statistical data [7] indicates that the level of share of the long-distance container road transport in Poland in tonnes-kilometres in the total container transport (75%) was much higher than the European average (41%). It still means a low level of use of the intermodal transport. The necessary system changes and greater use of the reloading terminals should be expected in the near future. According to the data of the Central Statistical Office (2018), reloadings at the intermodal terminals in 2017 increased by over 26% compared to the last year, which proves this direction. In this context, it is therefore important to assess the readiness of the operation of the Polish intermodal terminals for meeting of the needs associated with the increase of the land reloadings. Assuming that operational efficiency is one of the most important features of the operational quality of a vehicle and can be a criterion for assessment of its operational usefulness [13], an analogous assessment may be attempted for the reloading terminals.

The purpose of the paper is to assess the quality of the intermodal terminals in Poland. For the purposes of this assessment, the Servqual method was used. This method was modified and adjusted to the needs of the assessment of the intermodal terminals as well as to the scope of the available data on the terminals.

Intermodal Terminals as Technical Objects

The systematic increase of the exchange of goods in the international trade determines the development of the transport technologies and the role of the individual transport branches in cargo movement. Therefore, the intermodal terminals play a special role in the cargo transport systems. These terminals provide the reloading & storage services for the intermodal transport units as well as other services connected with operation of these units.

According to the definition adopted by the European Conference of Ministers of Transport (ECMT), the United Nations Economic Commission for Europe (UNECE) and the Organization for Economic Community and Development (OECD), a terminal is an area intended for warehousing of intermodal loading units, which is equipped with machinery and reloading devices for handling of the intermodal loading units. According to another definition [10], an intermodal terminal is a spatial object with its proper organisation and infrastructure enabling reloading of the intermodal transport units: containers, swap bodies and semi-trailers between the means of transport belonging to different modes of transport as well as performance of operations on these units in connection with their storage and use.

In addition to handling of the intermodal units, the terminals also perform the function of a kind of an empty container warehouse to enable quick service of a customer reporting their demand for transport of goods in a container. Additionally, they may perform functions related to the logistic service of the cargoes delivered in the intermodal units. The scope of service of the intermodal units depends on the size of the terminal, its location and the needs of the customers in its catchment area. The main tasks of the intermodal terminal include:

- acceptance and dispatching of the intermodal trains,
- performance of the manoeuvres connected with replacement of the wagon groups in the transit trains,
- acceptance of the wagon groups waiting for incorporation in the appropriate intermodal train for a halt,
- reloading of the intermodal units in various relations (wagon - wagon, wagon - road vehicle, wagon - yard, yard - wagon, yard - road vehicle),
- ordering and grouping of the intermodal units on the storage yard and storage lanes,
- delivery and removal of the intermodal units by the means of road transport in the terminal service area,
- commercial clearance of the shipments in the intermodal units,
- repairs and washing of the containers.

The above-mentioned tasks should include the possibility to service vessels in case of sea and inland terminals.

The scope of the functions performed by the terminals is determined on their designing stage. Different methods oriented on the needs of the stakeholders are developed [2], [10], [16], [5], [11], [12]. In the recent years, research both on the attempts to assess and improve the operational efficiency [3], [17], [6], [1] and to expand of the scope of the services of the terminals [14] has been conducted [15].

Due to the area of impact of the intermodal terminals, their location is important. As the points of cargo reloading and changing of the means of transport as well as the points of concentration of service activities, the intermodal terminals are located in the places that provide access to the linear transport infrastructure (rail network and public roads) and provide the opportunity to combine transport within various modes of transport in accordance with the rules applicable to the combined intermodal transport. From the point of view of the location of the terminals as well as of the serviced means of transport, they can be basically divided into intermodal land and sea terminals.

In addition to the intermodal terminal infrastructure ensuring performance of its tasks, the reloading devices which allow for moving of the intermodal units between the distinguished zones are also important. In the intermodal sea terminals, cranes and quay cranes, track cranes, road cranes,

reachstackers, mast trucks, forklifts, straddle carriers, terminal tractors with terminal trailers and automated guided vehicle (AGV) systems are used. Due to the serviced means of transport, the intermodal land terminals (rail & road and rail & road & river ones) usually use container cranes as well as various types of container wagons (jib, mast and fork-lift trucks) [10].

The number of the devices as well as the variety of their applications requires in-depth analyses from the technologists in order to plan the resources in an optimum way to ensure the best possible process efficiency [8], [4].

Technical Parameters of Intermodal Terminals in Terms of Operational Quality

According to the Office of Rail Transport, in 2018 there were 38 intermodal terminals in Poland, of which 6 are sea terminals [9]. The location of intermodal terminals is shown in 0.

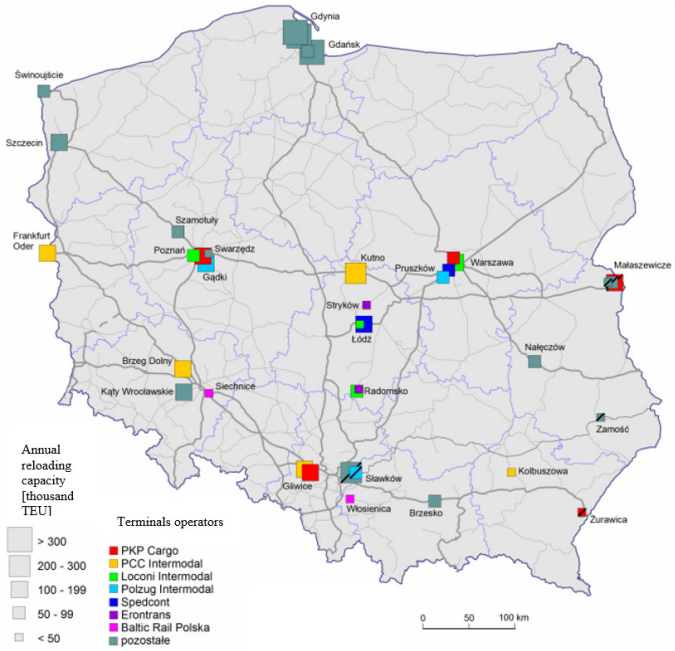

Fig. 1. Location of Intermodal Terminals in Poland

Source: file:///C:/Users/user/Downloads/9.-t.-bochenski-transport-intermodalny-w-przewozachrozproszonych-w-polsce-technologie-transportowe-09.03.2017%20(1).pdf

The selected technical parameters of the Polish terminals are presented in table 1.

Table 1. Summary of the current values of the selected technical characteristics of the Polish intermodal terminals

Γ_n – terminal number	Number of serviced transport branches	Length of railway tracks [m]	Number of railway tracks	Distance of the terminal from the national road [km]	Parking of road vehicles [number]	Total terminal area [ha]	Number of reachstackers	Other container wagons	Number of container supply sources	Number of cranes	Total track length for standard gauge railways [m]:	Annual reloading capacity [TEU/year]	Swap body service	Semi-trailer service	Repair of intermodal units	Washing of intermodal units
													1 – YES, 0 – NO			
Γ_1	4	675	5	4	80	66,2	3	2	680	28	2752	1200000	1	1	0	0
Γ_2	3	640	7	5.1	0	19.6	5	1	1	20	1925	636000	0	0	1	1
Γ_3	4	618	4	2	66	74	1	1	1072	48	2500	3000000	0	0	0	0
Γ_4	3	257	2	0.7	25	6.7	2	1	95	4	1130	70000	0	0	0	0
Γ_5	4	0	0	1	88	12.7	3	1	157	6	3041	150000	0	0	1	1
Γ_6	4	0	0	0.1	100	20	2	2	157	0	24000	70000	0	0	0	0
Γ_7	2	900	0	18	0	X	2	0	0	0	0		0	0	0	0
Γ_8	2	350	1	1.5	0	1.6	3	1	10	0	600	40000	0	0	1	1
Γ_9	2	610	2	5.5	5	2.8	3	0	1	0	1419	117000	1	1	0	0
Γ_{10}	2	610	5	1.2	16	16	6	2	32	0	3050	385400	1	1	1	1
Γ_{11}	2	0	0	9	70	10	0	5	30	0	4067	135000	1	1	1	1
Γ_{12}	2	650	4	40	0	9	4	0	72	0	3484	110000	1	1	1	1
Γ_{13}	2	764	1	1.5	30	5	6	0	12	1	764.5	75000	1	1	1	1
Γ_{14}	2	580	2	21	0	6.8	3	0	0	0	1040	100000	1	1	1	1
Γ_{15}	2	320	1	2	10	3	4	0	8	0	3680	77000	1	1	0	0
Γ_{16}	2	300	4	4.5	10	4.46	0	8	0	0	650	96000	1	1	1	1
Γ_{17}	2	700	5	3	0	11	5	1	76	2	3500	250000	1	1	1	1
Γ_{18}	2	320	1	2	0	1.6	2	0	1	0	320	1600	1	1	0	0
Γ_{19}	2	400	2	6	0	9.2	4	0	5	4	1400	80000	1	1	0	0
Γ_{20}	2	600	1	10	20	12.4	3	0	0	0	600	70000	0	0	0	0
Γ_{21}	2	600	1	0.5	30	6. 41	3	0	0	0	1800	80000	0	0	1	1
Γ_{22}	2	320	1	3	5	1.2	2	0	1	0	370	10000	1	0	0	0
Γ_{23}	2	650	4	10	50	5	2	1	60	4	2400	150000	1	1	1	1
Γ_{24}	2	410	2	2	20	6.5	3	0	20	1	1995	128000	1	1	0	0
Γ_{25}	2	625	4	3	10	16	4	2	32	0	2375	233600	1	1	1	1
Γ_{26}	2	700	7	4	90	91	3	0	90	3	24256	284810	1	1	1	0
Γ_{27}	2	366	6	0.5	100	10.5	1	0	3	0	5000	108000	0	0	1	1
Γ_{28}	2	510	1	0.5	0	X	2	0	0	0	0	16000	1	1	0	0
Γ_{29}	2	600	1	10	30	2.5	1	0	0	0	600	10000	0	0	0	0
Γ_{30}	2	0	0	1	30	13	0	0	1	2	2383	80000	1	0	0	0

Γ_n – terminal number	Number of serviced transport branches	Length of railway tracks [m]	Number of railway tracks	Distance of the terminal from the national road [km]	Parking of road vehicles [number]	Total terminal area [ha]	Number of reachstackers	Other container wagons	Number of container supply sources	Number of cranes	Total track length for standard gauge railways [m]:	Annual reloading capacity [TEU/year]	Swap body service	Semi-trailer service	Repair of intermodal units	Washing of intermodal units
													1 – YES, 0 – NO			
Γ_{31}	2	435	4	3	15	14	0	2	6	4	2194	223380	1	1	0	0
Γ_{32}	1	0	5	3	5	0.8	0	0	6	2	180	23800	0	0	0	0
Γ_{33}	1	0	3	0.5	10	1	0	0	170	3	300	20000	0	0	0	0
Γ_{34}	2	600	2	25	20	10	1	0	0	0	1200	50000	0	0	1	0
Γ_{35}	2	400	1	X	10	10	1	0	6	0	400	50000	0	0	1	0
Γ_{36}	2	400	2	5.5	20	1.6	1	0	12	0	1600	40000	1	0	1	1
Γ_{37}	2	660	2	X	10	6	0	0	15	1	5400	18000	1	1	1	1
Γ_{38}	2	590	1	0.4	30	5.8	2	0	0	3	702	6800	0	1	1	1

Source: own study based on https://www.utk.gov.pl/pl/dostep-do-infrastruktur/dostep-do-infrastruktur/mapa-obiektow-infrastru/terminale-intermodalne

Pilot Assessment of Operational Quality

The varied values of the characteristics describing the terminals initiated an attempt to assess their potential in terms of the operational quality.

Taking into account the previously specified quality assessment criteria and the availability of the data, the research was limited to the following criteria:

- Y_{PW} - ability to receive and dispatch the intermodal trains with the train length of 600 m;
- Y_{PP} - possibility of parking of the road vehicles waiting for acceptance of the intermodal unit,
- Y_{OT} distance of the terminal from the national road;
- Y_{LK} - number of isothermal containers simultaneously connected to power sources;
- Y_{TK} - number of railway tracks;
- Y_{RE} - number of reachstackers;
- Y_{WK} - number of other container wagons;
- Y_{ST} - number of cranes;
- Y_{NW} - service of swap bodies;
- Y_{NS} - service of semi-trailers;
- Y_{NJ} - repair of intermodal units;
- Y_{MJ} - washing of intermodal units.

The trial assessment of the operational quality of the intermodal terminals using the given criteria will take the form of the following function:

$$\beta_n^E(t) = f[Y_{PW}(t), Y_{PP}(t), Y_{OT}(t), Y_{LK}(t), Y_{TK}(t), Y_{RE}(t), Y_{WK}(t), Y_{ST}(t), Y_{NW}(t), Y_{NS}(t), Y_{NJ}(t), Y_{MJ}(t)] \quad (1)$$

The pilot assessment of the operational quality was carried out with the use of the *Servqual* method. The terminal characteristics are divided into two main areas: terminal infrastructure, terminal suprastructure (reloading machines) and rendered services. Application of this method to assessment of the characteristics of the intermodal terminal required definition of their nominal values. The nominal values of the parameters of the intermodal terminals will not be the same for every terminal. A good example here is lack of the need to install the quay cranes at the intermodal land terminals or lack of the need to use the container cranes in the terminals with very low daily rotations and a small storage area, which consequently results from the subordinate nature of such a terminal.

In addition, weights indicating significance of the characteristics should be assigned to the individual terminal characteristics (Table 4). It is necessary to calculate the Servqual weighted mean.

The individual values of the nominal parameters of the intermodal terminals, together with justification of these values, are presented below. Additionally, these parameters are compiled in table 2.

Characteristics of Intermodal Terminal Infrastructure

The characteristics of the terminal relating to terminal infrastructure and analysed as *meeting* the *requirements* (1) / not *meeting the requirements* (0):

- Y_{PW} - ability to receive and dispatch the intermodal trains with the train length of 600 m - 600 m length of the rail tracks in the intermodal terminal allows one-time acceptance of the entire train composition. Terminals equipped with shorter tracks must separate the train into wagons of the total length corresponding to the length of the loading tracks in the terminal.
- Y_{PP} - possibility of parking of the road vehicles waiting for acceptance of the intermodal unit - parking spaces for 30% of road vehicles bringing/taking the intermodal units within a working day should be provided for in the intermodal terminals. The number of the needed parking spaces will vary from terminal to terminal. In connection with availability of the data on the annual reloading capacities of the individual terminals (expressed in TEU) as well as the number of working days in a year (250 days in 2018), daily terminal turnover of the terminals was determined. Due to the fact that the road vehicles bring/take various types and sizes of the intermodal units, the calculations assumed (according to the data of the Office of Rail Transport) that the share of 20', 40', 45' and 30' container units in the daily turnover would be 35%, 58%, 7% and 1% of the daily turnover respectively. In addition, it was assumed that in the case of the sea terminals, due to the specificity of the container transhipments carried out there, only half of the daily turnover of the terminals would be subject to road transport. The remaining part of the daily turnover are intermodal units transported in rail and sea transport.
- Y_{OT} - distance of the terminal from the national road - the guidelines for the location of the intermodal terminals indicate the need to build the terminals near the public roads. When analysing the distance of the terminals from the public roads in Table 1, it was assumed that the nominal distance should not exceed 1 km.
- Y_{LK} - number of isothermal containers simultaneously connected to power sources - based on the determined daily terminal turnover and share of the isothermal containers in the transport, the number of the necessary storage places equipped with power sources was determined. According to the data of the Central Statistical Office, 4.5% of the weight of the cargoes carried in the containers is food, drinks and tobacco. On this basis, for the purposes of the research it was assumed that 3% of the cargoes were the cargoes transported in the isothermal containers. In addition, it was assumed that a standard for storage of this type of containers at the terminal was 2 days.
- Y_{TK} - number of railway tracks - for the purposes of the research it was assumed that the nominal number of the railway tracks (allowing the train to wait for unloading and possible shunting work) was 2, with the assumption that the terminal would meet this condition if the length of a single track was at least 600 m.

Characteristics of the Superstructure (Reloading Devices in the Terminal)

Terminal characteristics relating to availability of the reloading devices and analysed as *available* (1)*/unavailable* (0):

- Y_{ST} - number of cranes.
- Y_{RE} - number of reachstackers.
- Y_{WK} - number of other container wagons.

Characteristics of Services Provided by Terminals

Terminal characteristics relating to availability of the services provided by the terminals and analysed as *available* (1)*/unavailable* (0):

- Y_{NW} - service of swap bodies
- Y_{NS} - service of semi-trailers
- Y_{NJ} - repair of intermodal units
- Y_{MJ} - washing of intermodal units

Table 2. Summary of the nominal values *N* of the analysed technical parameters of the Polish terminals

Γ_n – terminal number	Y_{PW} - railway track length [m]	Y_{TK} - number of railway tracks	Y_{OT} - distance of the terminal from the national road	Y_{PP} - parking of road vehicles [number]	Y_{LK} - number of container power sources	Y_{RE} - number of reachstackers	Y_{WK} - other container wagons	Y_{ST} - number of cranes	Y_{ZP} - annual reloading capacity [TEU/year]	Y_{NW} - service of swap bodies	Y_{NS} - service of semi-trailers	Y_{NJ} - repair of intermodal units	Y_{MJ} - washing of intermodal units
Γ_1	600	2	1	483	193	1	1	1	1200000	1	1	1	1
Γ_2	600	2	1	256	102	1	1	1	636000	1	1	1	1
Γ_3	600	2	1	1208	483	1	1	1	3000000	1	1	1	1
Γ_4	600	2	1	28	11	1	1	1	70000	1	1	1	1
Γ_5	600	2	1	60	24	1	1	1	150000	1	1	1	1
Γ_6	600	2	1	28	11	1	1	1	70000	1	1	1	1
Γ_7	600	2	1	0	0	1	1	1	0	1	1	1	1

Γ_8	600	2	1	32	6	1	1	1	40000	1	1	1	1
Γ_9	600	2	1	94	18	1	1	1	117000	1	1	1	1
Γ_{10}	600	2	1	310	62	1	1	1	385400	1	1	1	1
Γ_{11}	600	2	1	108	21	1	1	1	135000	1	1	1	1
Γ_{12}	600	2	1	88	17	1	1	1	110000	1	1	1	1
Γ_{13}	600	2	1	60	12	1	1	1	75000	1	1	1	1
Γ_{14}	600	2	1	80	16	1	1	1	100000	1	1	1	1
Γ_{15}	600	2	1	62	12	1	1	1	77000	1	1	1	1
Γ_{16}	600	2	1	77	15	1	1	1	96000	1	1	1	1
Γ_{17}	600	2	1	201	40	1	1	1	250000	1	1	1	1
Γ_{18}	600	2	1	1	0	1	1	1	1600	1	1	1	1
Γ_{19}	600	2	1	64	12	1	1	1	80000	1	1	1	1
Γ_{20}	600	2	1	56	11	1	1	1	70000	1	1	1	1
Γ_{21}	600	2	1	64	12	1	1	1	80000	1	1	1	1
Γ_{22}	600	2	1	8	1	1	1	1	10000	1	1	1	1
Γ_{23}	600	2	1	120	24	1	1	1	150000	1	1	1	1
Γ_{24}	600	2	1	103	20	1	1	1	128000	1	1	1	1
Γ_{25}	600	2	1	188	37	1	1	1	233600	1	1	1	1
Γ_{26}	600	2	1	229	45	1	1	1	284810	1	1	1	1
Γ_{27}	600	2	1	86	17	1	1	1	108000	1	1	1	1
Γ_{28}	600	2	1	12	2	1	1	1	16000	1	1	1	1
Γ_{29}	600	2	1	8	1	1	1	1	10000	1	1	1	1
Γ_{30}	600	2	1	64	12	1	1	1	80000	1	1	1	1
Γ_{31}	600	2	1	179	35	1	1	1	223380	1	1	1	1
Γ_{32}	600	2	1	19	3	1	1	1	23800	1	1	1	1
Γ_{33}	600	2	1	16	3	1	1	1	20000	1	1	1	1
Γ_{34}	600	2	1	40	8	1	1	1	50000	1	1	1	1
Γ_{35}	600	2	1	40	8	1	1	1	50000	1	1	1	1
Γ_{36}	600	2	1	32	6	1	1	1	40000	1	1	1	1
Γ_{37}	600	2	1	14	2	1	1	1	18000	1	1	1	1
Γ_{38}	600	2	1	5	1	1	1	1	6800	1	1	1	1

Comparison of the expected (nominal) and current values of the individual characteristics of the intermodal terminal allows to answer the question about the operational quality of this logistic facility (table 3). When for the individual characteristics of the terminal the nominal values of the parameters are lower than or equal to the values of the current parameters, it should be assumed that the expectations towards the terminal are met. Otherwise, the quality of this object in the analysed scope does not meet expectations.

For the purposes of the research carried out in this paper, a modification of the Servqual method was proposed. The modification consists in the fact that the value of the assessment of the individual characteristics of the terminal will be 1 if the terminal meets the specified requirements (indicated in table 2) or 0 in the opposite case. The results of the comparison are summarised in table 3.

Table 3. Results of comparison of the current values of the characteristics of the terminals (table 1) with the nominal values (table 2)

	Infrastructure					**Suprastructure**			**Services**				**Results**		
Γ_n – terminal number	Y_{PW} - railway track length [m]	YTK - number of railway tracks	Y_{OT} - distance of the terminal from the national road	Y_{PP} - parking of road vehicles [number]	Y_{LK} - number of container power sources	Y_{RE} - number of reachstackers	Y_{WK} - other container wagons	Y_{ST} - number of cranes	Y_{NW} - service of swap bodies	Y_{NS} - service of semi-trailers	Y_{NJ} - repair of intermodal units	Y_{MJ} - washing of intermodal units	**Total results (infrastructure)**	**Total results (suprastructure)**	**Total results (services)**
Γ_1	1	1	0	0	1	1	1	1	1	1	0	0	3	3	2
Γ_2	1	1	0	0	0	1	1	1	0	0	1	1	2	3	2
Γ_3	1	1	0	0	1	1	1	1	0	0	0	0	3	3	0
Γ_4	0	0	1	0	1	1	1	1	0	0	0	0	2	3	0
Γ_5	0	0	1	1	1	1	1	1	0	0	1	1	3	3	2
Γ_6	0	0	1	1	1	1	1	0	0	0	0	0	3	2	0
Γ_7	1	0	0	1	1	1	0	0	0	0	0	0	3	1	0
Γ_8	0	0	0	0	1	1	1	0	0	0	1	1	1	2	2
Γ_9	1	1	0	0	0	1	0	0	1	1	0	0	2	1	2
Γ_{10}	1	1	0	0	0	1	1	0	1	1	1	1	2	2	4
Γ_{11}	0	0	0	0	1	0	1	0	1	1	1	1	1	1	4
Γ_{12}	1	1	0	0	1	1	0	0	1	1	1	1	3	1	4
Γ_{13}	1	0	0	0	1	1	0	1	1	1	1	1	2	2	4
Γ_{14}	0	0	0	0	0	1	0	0	1	1	1	1	0	1	4
Γ_{15}	0	0	0	0	0	1	0	0	1	1	0	0	0	1	2

Γ_{16}	0	1	0	0	0	0	1	0	1	1	1	1	1	1	4
Γ_{17}	1	1	0	0	1	1	1	1	1	1	1	1	3	3	4
Γ_{18}	0	0	0	0	1	1	0	0	1	1	0	0	1	1	2
Γ_{19}	0	0	0	0	0	1	0	1	1	1	0	0	0	2	2
Γ_{20}	1	0	0	0	0	1	0	0	0	0	0	0	1	1	0
Γ_{21}	1	0	1	0	0	1	0	0	0	0	1	1	2	1	2
Γ_{22}	0	0	0	0	1	1	0	0	1	0	0	0	1	1	1
Γ_{23}	1	1	0	0	1	1	1	1	1	1	1	1	3	3	4
Γ_{24}	0	0	0	0	1	1	0	1	1	1	0	0	1	2	2
Γ_{25}	1	1	0	0	0	1	1	0	1	1	1	1	2	2	4
Γ_{26}	1	1	0	0	1	1	0	1	1	1	1	0	3	2	3
Γ_{27}	0	1	1	1	0	1	0	0	0	0	1	1	3	1	2
Γ_{28}	0	0	1	0	0	1	0	0	1	1	0	0	1	1	2
Γ_{29}	1	0	0	1	0	1	0	0	0	0	0	0	2	1	0
Γ_{30}	0	0	1	0	0	0	0	1	1	0	0	0	1	1	1
Γ_{31}	0	1	0	0	0	0	1	1	1	1	0	0	1	2	2
Γ_{32}	0	1	0	0	1	0	0	1	0	0	0	0	2	1	0
Γ_{33}	0	1	1	0	1	0	0	1	0	0	0	0	3	1	0
Γ_{34}	1	1	0	0	0	1	0	0	0	0	1	0	2	1	1
Γ_{35}	0	0	1	0	0	1	0	0	0	0	1	0	1	1	1
Γ_{36}	0	0	0	0	1	1	0	0	1	0	1	1	1	1	3
Γ_{37}	1	1	1	0	1	0	0	1	1	1	1	1	4	1	4
Γ_{38}	0	0	1	1	0	1	0	1	0	1	1	1	2	2	3

First, according to the Servqual method, the total unweighted result was calculated for the characteristics of the groups (*infrastructure, suprastructure, services*). Consequently, the arithmetic mean for the results from the individual groups of the characteristics was determined, which as a result allowed for determination of the unweighted Servqual result by adding together the previously determined mean values and dividing the result by the number of the analysed groups of the characteristics (table 5).

After determination of the arithmetic measures of the individual types of the characteristics (*infrastructure, suprastructure, services*) for each of the terminals (table 3), it was necessary to determine the weights. Due to the fact that the reloading capacities of the intermodal terminals are basically decided on by their infrastructure (loading tracks, storage yards) as well as the used equipment, it was found that it was these groups that would be assigned the highest values of the weights. According to the guidelines of the Servqual method, the sum of the weights cannot exceed 100. The weights of the individual groups of the characteristics are summarised in table 4.

Table 4. Set of weights for the analysed groups of the characteristics of the intermodal terminals

Group of the characteristics of the terminal	Weight
Infrastructure	40
Suprastructure	40
Services	20

For the purpose of determination of the total weighted measure of the quality of the intermodal terminals, the arithmetic values of the examined groups of the characteristics obtained in the previous step were multiplied by the weights assigned to them. The obtained result is called the Servqual weighted mean. Then, the Servqual weighted means for the individual groups of the characteristics were divided by the number of these groups to obtain the total measure of the quality of the intermodal terminals (table 5).

Table 5. Values for the overall unweighted Servqual result and the overall measure of the quality of the intermodal terminals

Γ_n – terminal number	Arithmetic mean (infrastructure)	Arithmetic mean (suprastructure)	Arithmetic mean (services)	Total Servqual scores	**Overall unweighted Servqual result**	Servqual weighted mean (infrastructure)	Servqual weighted mean (suprastructure)	Servqual weighted mean (services)	**Total measure of the quality of the intermodal terminal**
	a	b	c	a+b+c		a*40	b*40	c*20	
Γ_1	0.6	1.0	0.5	2.1	0.7	24.0	40.0	10.0	**24.7**
Γ_2	0.4	1.0	0.5	1.9	0.6	16.0	40.0	10.0	**22.0**
Γ_3	0.6	1.0	0.0	1.6	0.5	24.0	40.0	0.0	**21.3**
Γ_4	0.4	1.0	0.0	1.4	0.5	16.0	40.0	0.0	**18.7**
Γ_5	0.6	1.0	0.5	2.1	0.7	24.0	40.0	10.0	**24.7**
Γ_6	0.6	0.7	0.0	1.3	0.4	24.0	26.7	0.0	**16.9**
Γ_7	0.6	0.3	0.0	0.9	0.3	24.0	13.3	0.0	**12.4**
Γ_8	0.2	0.7	0.5	1.4	0.5	8.0	26.7	10.0	**14.9**
Γ_9	0.4	0.3	0.5	1.2	0.4	16.0	13.3	10.0	**13.1**
Γ_{10}	0.4	0.7	1.0	2.1	0.7	16.0	26.7	20.0	**20.9**
Γ_{11}	0.2	0.3	1.0	1.5	0.5	8.0	13.3	20.0	**13.8**
Γ_{12}	0.6	0.3	1.0	1.9	0.6	24.0	13.3	20.0	**19.1**

Γ_{13}	0.4	0.7	1.0	2.1	0.7	16.0	26.7	20.0	**20.9**
Γ_{14}	0.0	0.3	1.0	1.3	0.4	0.0	13.3	20.0	**11.1**
Γ_{15}	0.0	0.3	0.5	0.8	0.3	0.0	13.3	10.0	**7.8**
Γ_{16}	0.2	0.3	1.0	1.5	0.5	8.0	13.3	20.0	**13.8**
Γ_{17}	0.6	1.0	1.0	2.6	0.9	24.0	40.0	20.0	**28.0**
Γ_{18}	0.2	0.3	0.5	1.0	0.3	8.0	13.3	10.0	**10.4**
Γ_{19}	0.0	0.7	0.5	1.2	0.4	0.0	26.7	10.0	**12.2**
Γ_{20}	0.2	0.3	0.0	0.5	0.2	8.0	13.3	0.0	**7.1**
Γ_{21}	0.4	0.3	0.5	1.2	0.4	16.0	13.3	10.0	**13.1**
Γ_{22}	0.2	0.3	0.3	0.8	0.3	8.0	13.3	5.0	**8.8**
Γ_{23}	0.6	1.0	1.0	2.6	0.9	24.0	40.0	20.0	**28.0**
Γ_{24}	0.2	0.7	0.5	1.4	0.5	8.0	26.7	10.0	**14.9**
Γ_{25}	0.4	0.7	1.0	2.1	0.7	16.0	26.7	20.0	**20.9**
Γ_{26}	0.6	0.7	0.8	2.0	0.7	24.0	26.7	15.0	**21.9**
Γ_{27}	0.6	0.3	0.5	1.4	0.5	24.0	13.3	10.0	**15.8**
Γ_{28}	0.2	0.3	0.5	1.0	0.3	8.0	13.3	10.0	**10.4**
Γ_{29}	0.4	0.3	0.0	0.7	0.2	16.0	13.3	0.0	**9.8**
Γ_{30}	0.2	0.3	0.3	0.8	0.3	8.0	13.3	5.0	**8.8**
Γ_{31}	0.2	0.7	0.5	1.4	0.5	8.0	26.7	10.0	**14.9**
Γ_{32}	0.4	0.3	0.0	0.7	0.2	16.0	13.3	0.0	**9.8**
Γ_{33}	0.6	0.3	0.0	0.9	0.3	24.0	13.3	0.0	**12.4**
Γ_{34}	0.4	0.3	0.3	1.0	0.3	16.0	13.3	5.0	**11.4**
Γ_{35}	0.2	0.3	0.3	0.8	0.3	8.0	13.3	5.0	**8.8**
Γ_{36}	0.2	0.3	0.8	1.3	0.4	8.0	13.3	15.0	**12.1**
Γ_{37}	0.8	0.3	1.0	2.1	0.7	32.0	13.3	20.0	**21.8**
Γ_{38}	0.4	0.7	0.8	1.8	0.6	16.0	26.7	15.0	**19.2**

Assuming that the intermodal terminal meets all of the criteria considered in this paper (the values of the individual characteristics assume the value of 1), the **total quality measure of such intermodal terminal would be 33.3**.

The schematically obtained results are shown in the figure below

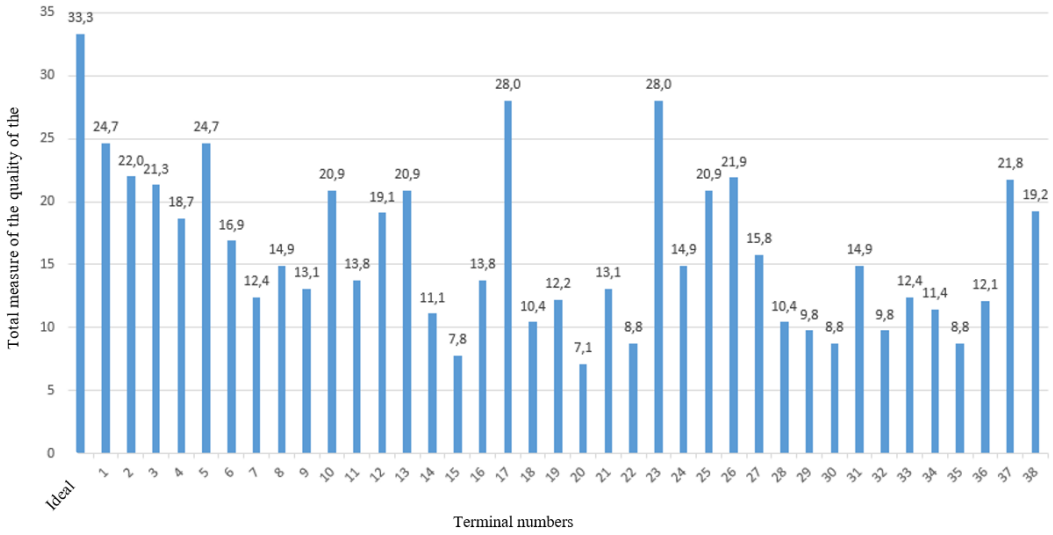

Fig. 2. Results of the assessment of the intermodal terminals

The pilot assessment of the operational quality of the terminals based on 12 criteria confirmed on one hand the possibility to differentiate its level and on the other hand the diverse level of the potential of the assessed terminals. In this way, the following elements were distinguished:

a) 4 terminals that significantly meet the operational quality requirements (with the minimum score of 22.2),
b) 25 intermediate objects (with the score of 11.1-22.1),
c) 9 weakest terminals (with the score below 11.1).

The obtained result shows preparation of the terminals to an unsatisfactory degree, since only 10% of the terminals perform their functions and 20% of the terminals perform them at the lowest level.

These results allowed to draw a conclusion about the purposefulness of further work on the assessment method and its particularisation by further criteria corresponding to the operational quality features. To this end, referring to the individual elements of the infrastructure, suprastructure and services as well as the operational quality features, an extended assessment model may be developed.

Conclusions

Using the author's criteria, the available data and the modified Servqual method, the intermodal terminals in Poland were assessed in terms of their operational quality. It allowed for determination of the state of adjustment of the Polish intermodal terminals to performance of deliveries within the last mile. The presented assumptions show that only 4 terminals meet 70% of the conditions of the presented standard, which constitutes about 10% of all terminals in Poland. On the other hand, as many as 7 terminals achieved a result below 30% of the standard, which is approx. 18% of all terminals.

Considering the dynamic development of the intermodal transport and the current potential of the Polish terminals it may be concluded that this transport segment will be intensively developing in the coming years.

The author's pilot assessment in terms of 12 criteria confirmed the possibility of quantifying the level of the operational quality of the intermodal terminals. It may turn out to be useful for the overall assessment of the potential of the Polish terminals in the light of the challenges of their future development. In order to analyse the specific terminals thoroughly and to specify the directions for

improvement, it is necessary to take into account more criteria, which is the direction for further research in this area for the authors.

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Formulation of Taxation Policy for e-Commerce Transactions in Indonesia

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Abstract

This research examines the process of tax policy formulation for trade transactions through e-commerce in PMK Number 210 / PMK.010 / 2018 where this provision is revoked before implementation. The results of the formulation analysis in this study provide input on the design of tax treatment policies that can accommodate e-commerce activities in Indonesia. The research methodology was conducted with a qualitative approach and descriptive objectives. Data collection is done with literature studies and field studies through in-depth interviews. The policy formulation process is carried out in accordance with the available stages, but the policy formulator is not profound in formulating the problem, pragmatic in setting the policy agenda as well as in selecting alternative policies and does not conduct a public test before making the policy. In the future the government must issue regulations that are more binding or maximize the dissemination of tax knowledge to improve the taxpayer compliance.

Keywords: Digital Economic, E-commerce, Policy Formulation

Introduction

One of the advantages of globalization is the economic activities become smoother because of reducing of tariff and non-tariff barriers in trade and investment. (Setyowati, 2015) The development of world internet usage is very rapid, in 2018 it is known that 55.1% of the world population has used the Internet, especially in Indonesia there are predicted to be around 143 million internet users (internetworldstats.com, 2018). From a number of internet users, it is known that they spend an average of 531 minutes each day to access the internet where the average number occupies the fourth position in the world (wearesocial.com, 2018). Furthermore, if you look at data from Alexa (2019) and SimilarWeb (2019), among the top 20 sites most frequently accessed by Indonesian people are Tokedia, Bukalapak, Shopee and OLX, and social media, namely Facebook, Instagram, and Twitter. The behaviour of modern society which prioritizes practicality which is also supported by the rapid development of information technology has an impact on the shifting tendency to conduct conventional trading transactions to be online. This is one of the factors triggering the development of trading business through e-commerce as a new business platform. Based on data released by Statista, the number of e-commerce consumers in Indonesia in 2018 was 106.96 million people and is predicted to increase to 113.42 million in 2019. In addition, the value of e-commerce retail sales transactions in Indonesia in 2018 will reach USD9.536 billion and is predicted to increase to USD11.445 billion for 2019. These statistics place Indonesia as the country with the largest number of consumers and e-commerce transaction values in Southeast Asia (Statista, 2019).

The potential of e-commerce into activities that can drive the Indonesian economy going forward is quite high by looking at the behaviour of the people who strongly support the development of e-commerce activities. Therefore, the government began to pay more attention in supporting e-commerce activities in Indonesia by issuing Presidential Regulation (Presreg) 74 of 2017 on the Roadmap of an Electronic-Based National Trading System that functions to optimize the potential of electronic-based economies and one of the concerns in this provision is in the taxation field. The government through the Directorate General Taxation (DGT) has issued a circular letter SE-62 / PJ / 2013 concerning affirmation of tax provisions for e-commerce transactions and SE-06 / PJ / 2015 concerning withholding and collecting income tax on e-commerce transactions and to respond to the development of e-commerce activities In this commerce the government issues PMK 210 / PMK.010 / 2018 regarding the policy of tax treatment of trade transactions through e-commerce. PMK 210 / PMK.010 / 2018 is issued by the government with the aim of providing a level playing field between e-commerce actors and conventional traders, providing convenience in fulfilling tax administration obligations, as well as government efforts in collecting data related to e-commerce activities. However, on March 29, 2019 this regulation was revoked by the Minister of Finance before it was put into effect which was supposed to be on April 1, 2019. Therefore, this study wanted to analyze the process of formulation of PMK 210 / PMK.010 / 2018 to review the process of formulating these provisions as well as the design of policies that if possible, to accommodate e-commerce activities in Indonesia.

Literature Review

1. Policy Formulation

According to Anderson (Winarno, 2007, p.93), the formulation of policies involves efforts to answer questions about how alternatives were agreed upon for the problem being developed and who participated. In this process, this will help policy analysts find hidden assumptions, diagnose the causes of policy problems, combine conflicting opinions, map out possible goals, and design possible new policies (Dunn, 2003, p. 26), so that public policy formulation must done correctly, because it will have an impact on the implementation of the policy. As stated in Directorate General of Taxation's Vision has been updated to be "to be a trusted tax administration institution that treats all taxpayers fairly and delivers excellent service technology." It can be interpreted as moving towards trusted tax administration institution by treating taxpayers fairly and by providing best technological-based services. (Salifida, 2019) The public also believed that any government acts are always be based on the aim to achieve common goods or to protect public interests. This indicator would come up only when the government always acts on behalf of public interests in formulating policies. (Andika, 2019)

Winarno (2012) divides the stages of public policy formulation into four stages that must be passed, consisting of (Winarno, 2012, p.122-126):

a. Formulation of The Problem

At this stage, an attempt is made to determine the identity of a policy problem by understanding the nature of the problem that will facilitate policy formulation in the policy formulation process of the problem. In this case, the policy formulator must identify the problem to be faced by finding, recognizing, and formulating a problem first and then making the formulation of the problem as clearly as possible - the problem in society.

Patton, Sawicki, & Clark (2012, p.140) suggest there are basic methods that can be used by analysts and policy makers in interpreting or translating a problem, namely (1) back-of-the-development calculations to estimate how massive a problem is; (2) quick decision analysis to identify key components or the nature of a problem; (3) creative operational definition to reduce the ambiguity of a concept; (4) political analysis which aims to not exclude non-quantitative factors; and (5) the issue-paper concept for us to decide whether further studies are needed.

b. Policy Agenda

In this regard stated that not all the issues included in public affairs and in the policy agenda. Issues that are public and entered at this stage will be discussed by policy makers and have fulfilled the requirements that require special handling to be resolved and implemented immediately based on their level of importance.

c. Alternative Policy Choices

The selection of alternative policies is a stage after several public problems formulated by policy makers agree to include the problem in the policy agenda, resulting in several policy alternatives to solve the problem. In this stage, the policy makers choose the best policy to solve the problems that have entered the public agenda. This stage also involves the process of drafting regulations for each alternative policy that includes sanctions, prohibitions, rights and obligations, and other policies or rules, and articulates to whom the provisions will apply and have an impact. In the process of choosing alternatives to be recommended as a policy, policy makers must consider technical, economic and financial aspects, political aspects and administrative aspects (Patton, Sawicki, & Clark, 2012, p.194).

d. Policy Setting

This stage is the final stage of the policy formulation process in making decisions aimed at solving problems. Determination of policies chosen by making policies that have binding legal force and are the result of compromise of the various interest groups involved. The four stages of policy formulation above can be summarized in Figure 1.

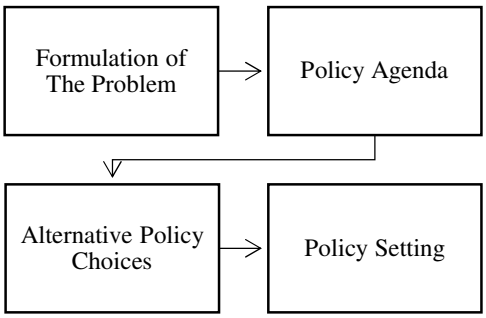

Fig. 1: Policy Formulation Stages

Source: Processed from Winarno, 2012

In general, a policy aims to bring about fundamental changes to the current policy which, in policy formulation, according to Anderson (2006), policy formulation does not always end with the issuance of laws and regulations, however, policy makers often decide not to take action on a problem and let it be solved by itself. Policy formulation involves the process of developing proposals for related and acceptable actions (can be referred to as alternatives, proposals, or options) to deal with public issues (p.103-109).

2. *E-Commerce*

Brynjolfsson and Kahin (2000) as quoted by Shaw (2015) say that the term "digital economy" is actually an economic transformation in both the national and international sectors that are driven by economic activities based on e-commerce. Zwass (1996) defines E-commerce as a business activity, which business activities with an internet network as the main container for the conduct of this business. This business activity includes the dissemination of business information, maintenance of business

relationships, and implementation of business transactions by means of internet networks as an intermediary. E-commerce is not only a type of business with new infrastructure, but e-commerce also changes everything in aspects of the business as a whole and encourages traditional types of businesses to adapt to this new type of business.

Steinfield, Bouwman and Adelaar (2002) argue that the influence of e-commerce changes aspects of the business that were previously in the form of brick-and-mortar or there is a physical place that is seen in carrying out its activities into a click-and-mortar whose business activities focus on the internet network but still has a physical domicile as its main office or even carry out all its activities virtually or purely virtual commerce that can provide various facilities to its business actors. Bidgoli (2002) says that e-commerce can be interpreted as buying and selling activities via the internet as its main foundation. If e-commerce is defined as buying and selling activities, then what is interpreted as those who carry out business activities through e-commerce is e-business. E-business includes all activities carried out by a party related to buying and selling activities through communication technology and computers, namely the internet as its main channel.

Mitchell in Bhalekar, et al (2014) explained that e-commerce refers to the transfer of paperless business information using electronic data transactions or internet-based technology. E-commerce is defined as the automation of processes that previously used manual labor and the use of paperwork. Namehkaran (2013) defines e-commerce as the process of offering goods and services, business management and business transactions, as well as the process of maintaining business relationships both with vendors and with consumers that are carried out by utilizing telecommunications networks. There are three important components in e-commerce, including them:

1) Infrastructure, is the first component in e-commerce that includes hardware, software, databases and communications that can be used in information exchange.
2) Service, is the second component in e-commerce that can support the ability to find information related to business partners, negotiations and approvals.
3) Products and Structures, this last component includes the supply of goods, services and other information related to trade to consumers and business partners as well as the organization's internal and external cooperation activities in regulating the supply of goods.

3. Tax Treatment of Trade Transactions through e-Commerce

There are three basic principles developed in the taxation of e-commerce transactions according to Dunahoo (1998, p.5-6) in Sahetapy (2015), namely:

1) The taxation treatment of transactions conducted electronically must not be treated differently from transactions carried out not electronically.
2) When there is a possibility to apply to e-commerce transactions, then this is the condition that is applied.
3) There is an agreement between the tax regimes of each country to avoid double taxation conflicts.

The OECD (1998) also provides a reference to the principles of tax treatment that must be applied to e-commerce like conventional trade. These principles are:

1) *neutrality*, where the taxation treatment must be neutral or balanced between the e-commerce business itself and between e-commerce and conventional business. Taxpayers who conduct business in the same conditions must get the same treatment.
2) *efficiency*, where costs incurred by taxpayers and by the Tax Administration must be minimized.
3) *certainty and simplicity,* where tax regulations must be clear, simple, and easy to understand so that taxpayers can easily anticipate the consequences of taxation and their transactions.
4) *effectiveness and fairness,* where taxes must be able to determine the amount of tax at a particular time, so that the potential to darken and avoid taxes can be reduced.

5) *flexibility*, where the taxation system must be flexible and dynamic so that it can accommodate changes caused by technological developments.

Research Method

This research was conducted with a qualitative approach that has descriptive objectives because this study aims to analyze the tax treatment policy formulation of trade transactions using e-commerce as stipulated in the Minister of Finance Regulation (PMK) No. 210 / PMK.010 / 2018 by first describing the stages of policy formulation. This research is purely academic in nature because it is carried out for the development of knowledge in the aspects of taxation in e-commerce, especially for the basic tax treatment of e-commerce transactions. Researchers provide an analysis of the process of policy formulation of trade transaction tax treatment using e-commerce. The time period of this research was carried out at one time from January to June 2019. Data collection was carried out with literature studies and field studies through in-depth interviews.

Discussion

The development of community activities in cyberspace has led to the emergence of digital economic phenomena. One form of this digital economy is the rise of e-commerce, which allows the sale and purchase transactions and the delivery of goods and services easily via the internet. The potential of the velocity of money that occurs in e-commerce trading is very large so that it has the potential to become a pillar of the economy. For the great potential generated from the economic aspect, e-commerce activities in Indonesia received great attention by the government, which was marked by the issuance of Presreg. No. 74 of 2017 concerning Road Map of Electronic-Based National Trading System (Road Map e-commerce) for 2017-2019. Presreg. No. 74 of 2017 contains the direction of government policy in regulating e-commerce in various aspects including funding programs, taxation, consumer protection, education and human resources, communication infrastructure, logistics, cyber security.

In the context of implementing Presreg No. 74 of 2017 in terms of taxation, the government needs to make policies related to tax treatment of e-commerce. This is necessary because the potential for tax revenue for e-commerce activities itself is very large looking at the money circulation that occurs. The Government through the DGT in 2013 actually issued a Circular Letter of the Directorate General of Taxation Number SE-62 / PJ / 2013 concerning Affirmation of Taxation Provisions for E-commerce Transactions. However, the regulation only confirms that there are no new types and tariffs for e-commerce transactions and explains in general that the tax applicable to e-commerce transactions is the same as the tax for conventional trading actors so that the same provisions apply under the tax laws. Then in 2015 the Directorate General of Taxation Circular Letter No. SE-06 / PJ / 2015 was also issued, which was also in the form of an affirmation regarding the obligation to withhold and / or collect income tax on e-commerce transactions. Still related to SE-62 / PJ / 2013, SE-06 / PJ / 2015, and Presreg No. 74 Year 2017, on December 31, 2018, the government through the Minister of Finance issued PMK 210 / PMK.010 / 2018 in order to further regulate aspects taxation treatment of e-commerce where in this regulation the most spotlight is a new obligation for e-commerce actors in the form of a marketplace platform.

There are obligations for the marketplace platform listed in Article 7 paragraphs (2) and (3) in PMK 210 / PMK.010 / 2018. The obligation is to report a recapitulation of trade transactions conducted by traders and / or service providers conducting e-commerce activities through the marketplace platform. The recapitulation of the trade transaction must then be reported by attaching it in the VAT Period SPT of the marketplace platform provider. In addition, there is also an obligation for traders and / or service providers under the marketplace platform to notify the Tax Identification Number (TIN) or mostly known as NPWP in Indonesia, or Population Identification Number (NIK) to the marketplace platform in accordance with Article (7). This then made the mainstream media noisy due to different interpretations of the public regarding the issuance of this regulation. But a few days before the date of

implementation, PMK 210 / PMK.010 / 2018 regarding the policy of tax treatment of trade transactions through e-commerce was revoked based on the decision of the Minister of Finance.

An ideal policy is not made immediately, according to the opinion of Dye (2005) which states that how a policy is made is to consider a number of activities or processes that occur in the political system. Therefore, the stages of policy formulation have four stages, namely the formulation of the problem, the policy agenda, the selection of alternatives in solving a problem, then the final stage, namely the determination of the policy. This research focuses on the policy formulation process of tax treatment of trade transactions through e-commerce that is regulated in PMK 210 / PMK.010 / 2018. Those who should be involved and influential in the process of policy formulation according to Theodolu and Kofinis cited by Rahmi (2013, p.23-24) include the bureaucracy (the bureaucracy), interest groups, think tanks and policy entrepreneurs.

1. Fornulation of The Problem

In the stage of problem formulation there are five issues raised namely related to level playing field demands between online and offline trade transaction actors, the government does not yet have data related to e-commerce activities in Indonesia, there is still a lack of VAT administration compliance in retail, tax administration arrangements are required in the field of e-commerce which has different characteristics from conventional trading, as well as the need to regulate tax obligations on import transactions through the marketplace platform.

A public policy aims to resolve a problem that arises in the community (Thoha, 2003), so that the PMK 210 / PMK.010 / 2018 was made because the government assesses there are problems related to tax treatment of e-commerce that needs solutions to solve. The identification process is the initial stage in the problem formulation process which becomes the stage of the policy formulation process. In this discussion, there are a number of issues that are being considered by regulators in formulating PMK.210 / PMK.010 / 2018, even though previously regulations have been issued relating to e-commerce, namely SE-62 / PJ / 2013 related to affirming aspects of the provisions General and Tax Procedures, Income Taxes, and Value Added Tax and Sales Tax on Luxury Goods for e-commerce transactions, then two years after it was published SE-06 / PJ / 2015 which is a special affirmation related to the obligation to withhold and / or collect taxes income from e-commerce transactions. Both regulations are considered not able to answer the existing problems related to taxation treatment of e-commerce, so PMK 210 / PMK.010 / 2018 was issued.

2. Policy Agenda

The next stage is the stage of the policy agenda where the policy agenda process is carried out by all stakeholders who have direct interests with PMK 210 / PMK.010 / 2018. In this stage, various problems that have been previously formulated will be sorted out in advance by policy makers to distinguish which are indeed public problems that are urgent enough to be continued on the policy agenda.

In the process of formulating this policy, Fiscal Policy Agency or mostly known as BKF as a leader because in the formulation of PMK 210 / PMK.010 / 2018 the DGT and Directorate of Customs and Excise (DJBC) both have an interest to regulate so there is a need for BKF as a harmonizer so that the formulation of this regulation goes well. BKF became the coordinator then DGT and DJBC more formulated related substances in accordance with BKF's own authority which was more general policy such as related to subjects, objects, and tariffs, while DGT and DJBC were more related to administrative issues. In the process of formulating this policy, BKF, DGT and DJBC as well as from the Ministry of Finance and stakeholders namely idEA together as the main team in the formulation of PMK 210 / PMK.010 / 2018 held a meeting to discuss the formulation of this policy together with. After an agreement is reached, then the BKF submits the provisions to the Minister.

In the formulation of PMK 210 / PMK.010 / 2018, several parties from the DGT internal are also directly involved in the formulation of tax treatment policies for e-commerce. DGT internal parties who have the biggest role in the formulation are the Directorate of Taxation Regulations I (Dit. PP I) which is even the initiator of this provision. Part of Dit. PP I, which has the responsibility for the

formulation of this regulation, is held by the PPN and Trade Regulations Section II. Furthermore, DGT internal parties directly involved in the formulation of this policy in addition to the Directorate of Taxation Regulations I, include the Directorate of Business Process Transformation (Directorate of TPB), Directorate of Technology, Information and Communication Transformation (Directorate of TTKI), Directorate of Taxation Technology and Information (Directorate of Taxation). TIP), and the External Data Processing Office (KPDE).

Directorate's involvement. TPB in the formulation of tax treatment policies for e-commerce aims to make it easier for taxpayers to meet tax obligations without disrupting existing business processes. Then Dit. TTKI has the duty to develop applications due to the need for data reporting media by the marketplace, which is then when data enters will be handled by the Directorate TIP so that they also make preparations in the process of this formulation. Then the last is the KPDE which is tasked with managing electronic data received from external parties such as BI and BPS. KPDE acts as a mouthpiece from the DGT to receive data related to taxpayers from external parties. Other parties involved in the formulation of PMK 210 / PMK.010 / 2018 include Bank Indonesia, the fintech association, and BPS in discussing policy alternatives. Then the Ministry of Trade to discuss the retail process. As well as the Ministry of Communication and Information as the party responsible for the ITE Law.

Factors supporting the formulation process of PMK 210 / PMK.010 / 2018 are the existence of encouragement from the public who demand clarity of regulations on tax treatment in e-commerce, in addition to the government's efforts to reach the playing field level, it is felt that this regulation can be achieved. Then the inhibiting factor of the formulation process is the resistance in the process of aligning interests between the government and stakeholders.

3. *Alternative Policy Choices*

In the process of policy formulation, the government should have several policy alternatives in an effort to solve a problem and then the selection is made to determine the best policy which can then be implemented as a solution to solve the problem. According to Jann and Wegrich (Fischer, 2007), the choice of alternative policies will be determined by a number of substantial basic parameters including economic resources and political support in the policy making process. In addition, the allocation of competencies held by various actors also plays an important role in determining policy.

The third stage is the alternative policy selection stage where in this stage there are several alternative policies including policies that only regulate purely administration, the collection of VAT and Income Tax through the marketplace platform, the collection of VAT and Income Tax by the payment gateway, and only reporting data for the marketplace platform. From these alternatives, the alternative policy chosen will be implemented is only reporting data for the marketplace platform. In the process of selecting alternative policies, there is no public test conducted by the government.

In the process of formulating PMK 210 / PMK.03 / 2018, there are several alternative policy options considered by the policy makers, namely:

a. Pure Administration, namely the provisions that only regulate administration related to taxation in e-commerce. The regulation in question is related to the procedure of collection and does not cause a new tax object.

b. VAT and Income Tax collection via the marketplace platform
This second alternative arises because at first the DGT aimed to simplify where the shipper who took shelter in the marketplace platform did not need to carry out tax obligations on Value Added Tax (VAT) and Income Tax. For Income Tax referred to in this concept is related to business entity who use the final income tax with Government Regulation / PP Number 23 tariff. This concept was adopted by the DGT from the regulations implemented by other countries in taxing cross-border transactions. The problem that is found when cross border transactions is where the tax authority is difficult to reach the seller, so asking for the help of the marketplace platform to become a tax collector.

c. VAT and Income Tax collection by payment gateway

Policy makers had considered the option to appoint payment gateways such as Doku and Ovo as third parties to collect VAT and Income Tax. The reason why this alternative occurred to them was because they were money traffic which logically, they could carry out tax collection in a systemic manner. However, this option was not continued because it was felt to be too burdensome for the payment gateway.

d. Only data reporting for the marketplace platform
The last alternative which was then chosen to be applied in relation to the taxation treatment of e-commerce is as follows:
   a) For marketplace platform providers and sales / service providers such as marketplace platform providers, they must have a NPWP and be confirmed as VAT Enterprises;
   b) The Trader or Service Provider is required to notify the NPWP or NIK to the Marketplace Platform Provider;
   c) Marketplace Platform Providers are required to report recapitulation of trade transactions conducted by Traders and / or Service Providers through Marketplace Platform Providers to the Directorate General of Taxes;
   d) Marketplace Platform Providers submit applications for registration to the Head of Customs Office which has a high frequency of imported goods whose transactions are carried out through the Marketplace Platform Providers;
   e) Marketplace Platform Providers must submit e-invoices for each shipment of goods and e-catalog transactions;

   This alternative was chosen because it was considered to be able to accommodate the policy agenda set out in the formulation of PMK 210 / PMK.010 / 2018. The main concern in this chosen alternative is the marketplace platform because BKF feels that the marketplace is generally a fairly large company and has a better system than other e-commerce actors. On the other hand, the advantage of supervision that will be obtained by the government is to be able to oversee many taxpayers collected in the marketplace platform through the marketplace platform.

4. Agenda Setting

The final stage in this formulation process is the stage of determining the policy. PMK 210 / PMK.010 / 2018 promulgated on 31 December 2018 where the purpose of the issuance of PMK 210 / PMK.010 / 2018 for taxpayers is to confirm the level playing field between conventional traders and e-commerce and in the context of collecting data on e-transactions commerce through the marketplace platform. The provisions of PMK 210 / PMK.010 / 2018 should have been implemented on April 1, 2019 but there were many protests from stakeholders, especially the e-commerce association (idEA) after this regulation was issued. The protests continued until finally this regulation was revoked by the Minister of Finance.

The government has the option to issue Government Regulations / PP as a basis for taxation arrangements related to e-commerce which are then followed by the issuance of implementing regulations to regulate technical matters such as data collection, confirmation of taxation treatment of certain activities carried out by e-commerce actors, as well as fulfilment of tax administration obligations through electronics. Another option is to keep implementing existing provisions without issuing new PMK nor PP but maximizing socialization activities to increase the knowledge of e-commerce taxpayers in order to increase tax compliance.

For a series of stages in the formulation of the tax treatment policy for e-commerce to produce a decision agreed upon by the policy makers, the final stage is that the results of this policy formulation must be ratified so that the policy can be immediately implemented and run effectively because it has a clear legal umbrella. Determination of the tax treatment policy for trade transactions through the electronic system (e-commerce) in PMK 210 / PMK.010 / 2018 carried out after prior approval by the Minister of Finance and subsequently enacted by the Ministry of Law and Human Rights. PMK 210 / PMK.010 / 2018 was promulgated on December 31, 2018, but for its entry into force on April 1, 2019. The provision of PMK 210 / PMK.010 / 2018 aims to provide a level playing field between conventional business actors and e-business actors commerce by asserting that the taxation treatment between conventional traders and e-commerce is equal.

Conclusion

The government in conducting the formulation of PMK 210 / PMK.010 / 2018 has fulfilled the stages in policy formulation. However, there are several things that cause the formulation process at each stage of formulation to be less than optimal, including in the policy formulation stage the attention of the government is still too narrow. BKF and DGT do not have reliable data related to e-commerce activities in Indonesia, so that in the process of formulating this policy is still not supported by real data and facts. At the alternative policy selection stage there are no public tests conducted by the government. As well as the latest in the policy making phase there are indications that no agreement was reached as seen from many protests from stakeholders, especially the e-commerce association (idEA) after this regulation was issued. In the end, this provision was revoked through a direct decision from the Minister of Finance even though the implementing regulations in the form of the Director General had been formulated.

Furthermore, the design of a tax treatment policy for e-commerce that can be applied is to issue a Government Regulation / PP governing e-commerce where the provisions must prioritize the principle of self-assessment and intensify the socialization related to taxation rights and obligations where the government cooperates directly with stakeholders. Indonesia can also provide clarity and fairness of taxation treatment to e-commerce actors in applying the provisions of tax treatment of e-commerce by making comprehensive tax liability guidelines for various types of e-commerce activities that precisely describe the obligations that must be fulfilled by taxpayers such as those done by Singaporeans. Then in the framework of the government's efforts to support the development of the e-commerce industry where one of them is to collect data on the e-commerce industry which can then be used as a consideration for the government to be able to issue good taxation regulations, the government can imitate China which makes new laws which regulates e-commerce as a basis for the tax treatment regulations for e-commerce going forward.

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Diversity Management: Employees 50+ and the Achievable Benefits – the Case of Polish Enterprises

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Abstract

The article determines whether diversity-management-oriented activities addressed to employees above 50 years of age, which are carried out at enterprises, have an impact on obtaining certain benefits with regards to managing human resources. The formulated research hypothesis assumes that the implementation of the concept of diversity management on behalf of employees above 50 years of age does not provide the particular benefits stemming from the implementation of such solutions. Two groups of enterprises have been compared. The first group, consisting of 49 enterprises, was that of enterprises, which did not carry out activities in the scope of diversity with regards to older employees. The second group, consisted of 60 enterprises, which contained in the scope of diversity efforts, *inter alia*, the group of older employees above 50 years of age. For the purpose of verifying the research hypothesis the Mann–Whitney U test (also called the Wilcoxon rank-sum test) has been applied, at an assumed level of significance of p=0.05.

Keywords: Diversity Management, 50+ Employees, Benefits of Diversity Management

Introduction

The article determines whether diversity-management-oriented activities addressed to employees above 50 years of age, which are carried out at enterprises, have an impact on obtaining certain benefits with regards to managing human resources. The formulated research hypothesis assumes that the implementation of the concept of diversity management on behalf of employees above 50 years of age does not provide the particular benefits stemming from the implementation of such solutions.

The main goal of the article is determining whether diversity-management-oriented activities addressed to employees above 50 years of age, which are carried out at enterprises, have an impact on obtaining certain benefits with regards to managing human resources in Poland. For this purpose, the Author has utilized the results of the research entitled "The state of diversity management at Polish companies". The awareness of the potential impact in the scope of diversity management undertaken with regards to particular groups of employees have an educational and promotional value. The Author intends that the analysis results presented in the article will contribute to promoting efforts furthering the concept of diversity management – especially those addressed to employees over 50 years of age – among managers, which could later translate into implementing the necessary tools for managing diverse teams of employees at organizations, which allow for obtaining additional benefits.

Diverse Human Resources - The Essence and Challenges

Modern organisations today, have to face challenges such as globalisation, competition and changes on the labour market. The society changes rapidly and demographic changes taking place in the world at large and in Poland can potentially influence multiple aspects of managing organisations. Hence, organisations are increasingly characterised by diversity, both in terms of their external and internal surroundings. Maximising and tapping into diversity in the workplace is an important issue for the quality of managing human resources (and not only) today (Gross-Gołacka, 2016, p. 28).

Similarly to the trend worldwide, one of the most important challenges facing Europe and Poland, comes in the form of demographic changes and in this part of the world the population will continue to age (Global Population Procpects, 2019). Today's median age (30 years) will increase to 36 years in the year 2050 and 42 years in the year 2100, while today one fourth of the people in Europe is 60+ years old. These changes are being observed in all European countries and the aging of the population constitutes one of the most significant socio-economic challenges for Europe and Poland.

The phenomenon of aging influences different spheres of the public discourse. The main spheres of impact of the process of an aging population are social security, the labour market and employment, education, health service, income and savings distribution, and finally, the relations between different generations. The research concerning the phenomenon of aging, focuses increasingly more on its influence on the labour market and managing diversified human resources. These changes are, and will be, a challenge primarily for domestic labour markets, since they could cause a decrease of human resources and increase the share of older people in the production age. Forecasts indicate that this trend will prevail at least until the year 2060. The population of the Poland will admittedly be slightly smaller compared to the year 2015 and also significantly older.

Demographic changes will have a key impact on the labour market over the next two decades (and later) in Poland (and in the rest of Europe), which creates a bigger challenge for HR management (HRM) specialists – as they employ, train, manage and maintain a completely new generation of employees in an organisation. Thus, the discussed trends have a large impact on HRM policy, since the workforce is becoming increasingly more diversified, which forces organisations to make meaningful changes to their approach to human resources management. In reality, soon the "average employee" of today will cease to exist, whereas workplaces may become diversified in terms of gender, age and culture. Meanwhile, today's strategies employed by HRM departments may become redundant and obsolete.

Based on the above, the fundamental challenge facing the Polish economy is filling the gap, left behind by the people born in the 1950s and mid-1960s, who are withdrawing from the labour market (Bukowski, 2008). Even now, employers are met with problems while managing age and – more broadly – different generations of employees. These problems will surely intensify in the case of human resources shortages (Kołodziejczyk-Olczak, 2014, p. 20). Moreover, contrary to the mythologised opinion, older people do not have to become a burden for the economy, but a source of accumulated knowledge and experience, as well as an increasing purchasing power on the labour market and in the workplace (Rudnicka, Surlej, 2013).

The progressing socio-economic changes cause the following:

- The labour market is changing and so are the working conditions, lifestyles and employment profiles;

- Traditional models of employment, consumption and ways of thinking are becoming less relevant. This is influenced by whom we employ, to whom goods and services are being delivered to and who delivers them;

- Multicultural and ethnic communities are being formed. The relevance of so-far marginalised groups – such as people over 50 and women – is increasing on the labour market and on the goods and services market. Managers, increasingly more often, manage people from all over the world, who speak different languages, have different sets of values or have a different view on what is good teamwork, how to organise work or how to solve problems.

Managing Human Resources Diversity in an Organisation

The demographic trends presented above will have serious consequences for organisations and managers in the decades to come. Implications include: the need for a better understanding and awareness of different social groups and appreciating how diversity can bring benefits for organisations. Although, this does require elasticity at work, while ensuring quality work through

creating non-discriminating environments inside organisations and a better integration between work and life.

Classically, (see e.g.: Mor Barak, 2017, pp. 136-145; Thomas, 1999; Thomas 1991; Loden & Rosener, 1991) diversity has been defined as a mosaic of characteristics brought to the organisation by employees; characteristics such as gender, age, race, ethnicity, religion, family conditions or physical abilities. Diversity among employees can also be concerned with the diversity of functions in a given organisation. It also includes lifestyle, sexual preferences, origin, work experience at an organisation, the status of being let go or employed. Diversity, in its broad definition, can relate to any perceived difference and similarity between people, both observable and otherwise (the effect will be a wide and universal approach). Furthermore, the aspect of diversity should be perceived from the perspective of its influence on the unit and the organisation. Diversity is generally connected with approval, understanding, acceptance and appreciating differences between people. The effect of said diversity in an organisation is a valuable and diversified team, which inter alia contributes to: the conception of diversified experiences, a different point of view contributing to teamwork, creative problem-solving, innovation and creativity. Whereas managing diversity should be defined as broadly as possible, and understood as systematic efforts of a company, aimed at involving diversified human resources in the activity of a company and treating it as a strategic advantage. Fundamentally, managing diversity concerns (Gross-Gołacka, 2018):

- utilising all talents available in an organisation, without making references to ethnocentrism and stereotypes,

- with regards to a group of employees – conducting policy on behalf of diversity, contributing to the growth of innovativeness and creative activity, decreasing shortages in the workforce with specific abilities and improving the quality of customer service,

- with regards to the company – satisfying the needs of different clients, widening the market, in terms of individual clients, as well as employees and stakeholders.

The concept of age management is mentioned in the literature on the subject. Nonetheless, it is worth taking into consideration that the notion of age management, although related to different dimensions of HRM, does have a clear relation to aging (Walker, 2005, p. 685), including the fight against age discrimination, based on stereotypes and prejudices. According to I. Kołodziejczak-Olczak (2013, p. 43), managing age means a company utilising solutions friendly to senior employees – usually people above 50 years of age. All of this suggests that age management is one of the aspects of the diversity management strategy, where the latter includes not just the age of the employees, but also their gender, race and religious beliefs. Thus, human resources diversity management strategies are utilised in order to make age diversity an asset and obtain the most benefits for the company and its employees. The HRM instruments employed in this regard are implemented consciously with regard for teams of employees, which are diversified in terms of age. They are primarily aimed at concentrating on what is most important for the company, i.e. qualifications, competences and skills of the employee without discriminating against age, creating an environment that allows for taking full advantage of the employee's strengths and neutralising their weaknesses related to age, allowing to take full advantage of opportunities and perspectives, resulting from the cooperation of employees of different ages and minimising threats resulting from this, creating an environment enabling stable, integrated, motivated and loyal working teams (Schimanek, Kotzian, Arczewska, 2015, p. 7).

Benefits of Implementing the Diversity Management Concept

A review of the literature on the topic and experience of practitioners allows one to observe that the implementation of the concept of diversity management ensures the ability to improve the operational results of an organisation the short and medium -term perspective as well as strategic assets of the company in the long-run. Investments made towards managing diversity contribute to creating and reinforcing human and organisational capital, which today is an important element influencing effectiveness. It therefore seems that diversity in an organisation carries many benefits, including those in a macroeconomic perspective – which contributes to increasing efficiency, increasing

innovativeness and creative activities, or gaining new markets and maintaining current ones. Whereas the improvement of goods and services for the benefit of the clients, attracts talents from the widest possible group of potential employees, reduces any lacks of human resources and limits fluctuations of employees – these are all benefits from a micro-economic perspective. Fundamentally, in the topic literature and in the presented points of view of practitioners, it is pointed out that managing diversity contributes to benefits, which can be assessed from a perspective of the time needed to attain them (Table 1).

Table 1: Benefits stemming from implementing the concept of diversity management based on the time needed to attain them

Benefits stemming from implementing the concept of diversity management	
Short-term	**Long/medium-term**
• Influence on managing talents • Increasing innovativeness and creativity • Forming a culture based on tolerance • Reinforcing the image and reliability of the company externally, among clients and business partners • Good reputation among employees • Ensuring loyalty from employees, clients and business partners • A better understanding of phenomena occurring on the inside of an organisation • Creating a diverse environment, making learning and experience exchange easier • Increasing the flexibility of the organisation • Breaking through known schemes and routine activity	• Reaching new groups of candidates on the labour market • Increasing the ability of recruitment and retention of talented employees • Conquering new markets • Development of new products and services • Better response to the needs of (new) diversified customers • The ability to reach a larger number of recipients of products and services • Better response to the needs of diversified customers • Lowering the costs associated with fluctuations of employees and their absence • Reducing the number of lawsuits and legal costs

Source: author's own research, based on E. Gross-Gołacka (2018,2019), G. Kirton, A.M. Greene (2017), M.E. Mor Barak (2017).

Diversity within human resources can potentially lead to the creation of conflicts, however if well-managed, it can result in a synergy effect, as the results of working together are improved, even if compared to the sum of individual activities, which has been proven in the '80s by an American researcher M. Belbin. The ability to manage teams comprising of diversified employees in terms of their age, race and gender, is beginning to amount to common practice in global firms. As pointed out by A. Pocztowski, a crucial role in the context of diversity among human resources is played by building a leadership sensitive to cultural differences (and not only), one that is able to focus employees coming from different cultural circles and having different preferences in terms of leadership behaviour.

The benefits outlined above can be measured quantitively and their relationship with investments in diversity management policy can be established. However, this relationship only remains partial. At the same time, there is a lack of transparency with regards to the employed indicators used in research, as both in managing human resources and in managing diversity, it is difficult to indicate a direct and singular dependency of the activities on the financial profit of the firm.

According to the author, it seems that the character and reach of the undertaken activities in organisations can depend on the size, scope and character the company's activities. Organisations employ diversity management policies for more than one of the aforementioned reasons, which interact with each other and are considered collectively and reflect strong impulses to meaningful

internal changes within an organisation. But the relative importance of each of these reasons has changed also depending on the organisation and its characteristics.

Research Methodology

The goal of the analysis was determining if activities from the scope of diversity management addressed to employees of 50 years of age influence achieving certain benefits with regards to managing human resources in enterprises located in Poland. The analysis took into account the opinions of representatives of enterprises (HR and staff department employees, as well as those dealing with managing human resources). The opinions were collected in frames of a nation-wide survey entitled "The state of diversity management at Polish companies" – which was completed in Q1/2019 – the aim of which was determining the state in which diversity management is found at Polish companies as well as determining the state of activities undertaken in companies in frames of health policy oriented efforts as well as those aimed at improving employees' well-being and WLB policy. The study has been realized by the Forum for Responsible Business (Forum Odpowiedzialnego Biznesu – FOB), an NGO, which deals with coordinating the implementation of the Diversity Card in Poland. The size of the research sample was 200 enterprises. Due to the topic of the research, companies employing fewer than 10 employees were omitted. In the analysis of the results, analytical weights have been applies, in order for the structure of the firms to reflect the characteristics of the general population. In the Poland-oriented module, the first part of the research pertains to the awareness of the diversity management policy. The next stage was identifying the engaged companies, which are conducting activities in the scope of diversity management – these companies were asked the same questions, which were asked of the Signatories of the Diversity Card. The unengaged companies, on the other hand, were asked questions aimed at determining the reasons why they were not interested in the topic.

The article compares two groups of enterprises. The first group, consisting of 49 people, was that of enterprises, which did not carry out activities in the scope of diversity with regards to older employees. The second group, consisted of 60 enterprises, which contained in the scope of diversity efforts, *inter alia*, the group of older employees above 50 years of age. The research hypothesis stated that the implementation of the concept of diversity management on behalf of employees above 50 years of age does not provide the particular benefits stemming from the implementation of such solutions. The analysis included, seven potential benefits stemming from implementing this concept at enterprises:

x1 – employee loyalty,

x2 – attracting and retaining talented people,

x3 – innovativeness and creativity of employees,

x4 – the effectiveness and cooperation of employees,

x5 – motivation and engagement of employees,

x6 – satisfaction of employees,

x7 – knowledge, abilities and competences of employees.

Statistical Analysis Result

Measuring the individual benefits stemming from diversity management at enterprises (x1-x7) has been conducted with the utilization of a 5-point ordinal scale (1-definetely no, 5- definitely yes). Due to the scale of measurement of the variables, for the purpose of the verification of the research hypothesis, the Mann–Whitney U test (also called the Wilcoxon rank-sum test) has been applied, at an assumed level of significance of p=0.05.

Table 2: Frequency of indications on the applied measurement scale (Group I)

Benefits	Group I				
	Categories				
	1	2	3	4	5
x1	0	15.2	30.4	39.1	15.2
x2	6.4	14.9	34	25.5	19.1
x3	2.2	19.6	30.4	34.8	13
x4	2.2	13	26.1	43.5	15.2
x5	0	17.8	22.2	46.7	13.3
x6	2.2	17.4	28.3	39.1	13
x7	0	10.6	44.7	36.2	8.5

Source: own calculations using the R program.

Table 3: Frequency of indications on the applied measurement scale (Group II)

Benefits	Group II				
	Categories				
	1	2	3	4	5
x1	10.2	3.4	37.3	32.2	16.9
x2	13.6	8.5	30.5	30.5	16.9
x3	8.5	6.8	40.7	37.3	6.8
x4	5.1	5.1	28.8	39	22
x5	3.4	8.5	33.9	35.6	18.6
x6	6.9	6.9	32.8	36.2	17.2
x7	6.8	3.4	35.6	33.9	20.3

Source: own calculations using the R program.

Table 4: Aggregated frequency of indications on the applied measurement scale (Group I)

Benefits	Enterprises, which did not implement (Group I)		
	Categories		
	1-2	**3**	**4-5**
x1	15.2	30.4	54.3
x2	21.3	34	44.6
x3	21.8	30.4	47.8
x4	15.2	26.1	58.7
x5	17.8	22.2	60
x6	19.6	28.3	52.1
x7	10.6	44.7	44.7

Source: own calculations using the R program.

Table 5: Aggregated frequency of indications on the applied measurement scale (Group II)

Benefits	Enterprises, which did not implement (Group II)		
	Categories		
	1-2	3	4-5
x1	13.6	37.3	49.1
x2	22.1	30.5	47.4
x3	15.3	40.7	44.1
x4	10.2	28.8	61
x5	11.9	33.9	54.2
x6	13.8	32.8	53.4
x7	10.2	35.6	54.2

Source: own calculations using the R program.

Table 6: Results of verification of hypotheses

Benefits	W Statistic	p-value	Hypothesis H_0
x1	1404	0.753	Accept
x2	1403.5	0.914	Accept
x3	1405.5	0.7442	Accept
x4	1260	0.512	Accept
x5	1314.5	0.913	Accept
x6	1270.5	0.666	Accept
x7	1212.5	0.2426	Accept

Source: own calculations using the R program.

In none of the cases has the zero hypothesis been rejected. Therefore, according to the entrepreneurs, implementing activities in the scope of diversity management on behalf of employees above 50 years of age does not provide the particular benefits.

However, observing the distribution of the frequencies of answers of respondents, it should be underscored that implementing activities in the scope of diversity management on behalf of employees above 50 years of age, to the greatest degree has a positive impact on the level of knowledge, abilities and competences of all employees (x7). Carrying out initiatives on behalf of diversity management aimed at employees above 50 years of age, according to employers, should also have a positive impact on retaining talented employees and contribute to the effectiveness and cooperation of employees (x2). Enterprises have, however, not observed a positive impact on activities undertaken in the aspect of diversity management on behalf of employees 50+ years of age on the level of loyalty of employees (x1). Similar results have been also observed in relation to creativity and innovativeness of employees (x3). It should also be underscored that in both of the mentioned cases (x1, x3), an increase in the number of answers suggesting a lack of benefits from the undertaken activities has been observed.

Conclusion

Competition, globalization and five generations working alongside each other are obvious elements of today's reality. The key to success of an organization is applying proper motivation techniques for a diversified employee base. It is therefore worth aiming at awakening strong internal motivation amongst employees, which will allow them to feel an emotional loyalty towards the organization and with regards to each other. However, such an approach demands awareness of the needs and expectations of employees at an organization, for instance, in certain age groups or based on gender. Whether this multi-generational workspace makes employees feel productive and engaged or stressed and disengaged, to a large degree depends of the management policy or organizational culture and workplace atmosphere. These challenges are addressed by the concept of diversity management. With relation to the goal of the paper, namely the attempt to determine whether diversity management activities aimed at employees above 50 years of age carried out at organisations have an impact on achieving specific benefits with regards to managing human resources. The conducted studies show that the aforementioned activities have a positive impact on the level of knowledge, skills and competences of all employees as well as the issues pertaining to talented employees and the effectiveness and cooperation of employees. Certainty, in today's times an employee above 50 years of age is an experiences employee, who is able to share their extensive knowledge with the younger generation. Moreover, in return for stable employment conditions, they are loyal towards their employer on a scale far greater than in the case of other generations. They are more flexible time-wise, as more often than in the case of younger co-workers, their private life is settled and more predictable. Therefore, a diversified work environment offers benefits not only from the perspective of the employer, but also all employees. Age diversity means several points of view, which give the ability to create better products and services. Thanks to friction between different points of view, it is possible to make more informed decisions, which take into account many factors, perspectives and experiences. For instance, younger colleagues, who are only at the beginning of their professional career, can feel more confident, when learning from experienced co-workers. They have the ability to take on new responsibilities faster and have the ability to discuss choices made in the workplace in advance. A further benefit, which is worth mentioning in the context of employing experienced employees, is a significant engagement in the work they carry out and the need to stabilize employment, which directly translates to a reduced rotation of employees at a firm. This is one of the main benefits for employers, who are challenged by today's labor market. Generally, experienced employees have their soft skills developed and the experience they have is often missing among younger employees on the labor market. For many younger employees they can act as a mentor and offer rational support, for instance in a crisis situation. Many organisations attempt to make the workplace more attractive and respond to the expectations of applicants. While the quality of the application is extremely important, the scope of seeking new employees should also be developed.

On the other hand, research has confirmed that enterprises have not observed a positive impact of activities undertaken in frames of diversity management on behalf of employees above 50 years of age, when it comes to creativity and innovativeness of employees. Different comments can be made regarding this, but in many instances they are determined by stereotypes. Employees over 50 years of age often, but unfairly, are perceived as people who struggle with absorbing new knowledge and taking command of new technologies. In some cases, they are viewed as ones, which are unable to think beyond fixed patterns, which translates to the inability to find new and non-standard solutions.

To summarize, diversity-based activities at enterprises can differ, as can the potential benefits from activities aimed at diversified groups of employees. In light of the above, it is worth recommending that organizations study the needs and expectations of their employees or simply the motivating factors relevant for specific social groups at an organisation, for instance, young people, older people, women, people of different nationalities or beliefs. From the point of view of employers and managers, it is necessary to possess knowledge about managing a diversified workforce. As such, research priorities on diversified human resources at an organisation emerge, specifically in the scope of the benefits, which an enterprise can obtain from diversity management, which is also in the interest of science. Hence, future research should determine, how situational factors can influence relations between age and managing diversity. Secondly, to what extent can solutions aimed at

diversity management impact creativity, innovativeness, loyalty or obtaining and retaining talented people.

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Innovations in the Financial Sphere: Analysis of the Prospects for the Implementation of Challenger Banks in Russia

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Abstract

The modern world is on the verge of the fourth industrial revolution. The massive introduction of information and communication technologies has contributed to the formation of a new type of economy – the digital one. The digital economy is an economy that is based on the introduction of innovative digital technologies. Today, the share of the digital economy is from 15% to 30% of the traditional one. One of the leaders in the development of the digital economy is the financial sector, which ranks second after telecommunication companies in introducing modern innovative digital technologies. Today, a new development direction has been formed in the financial sector, which is called Fintech. This direction is a fusion of financial and digital technologies, which allow to form not just innovative banking products but to form completely new types of financial institutions, providing both innovative forms of management and new channels of interaction with clients. One of the innovative forms within the Fintech area is the emergence of challenger banks, which represent a completely new organizational form of a financial institution, to a greater extent based on the technological approach to building a company based on the introduction of digital technologies, and on its basis, the possibilities of providing financial services are considered. The digital forms of financial institutions are analyzed in this article, various types of their classifications are examined, the types of neobanks are defined, and approaches to their formation are considered. A full-scale analysis of the global market of challenger banks is carried out in this study, both quantitative and financial indicators are defined that determine the number of neobanks in the world, the pace of development, quantitative indicators of the client base, as well as the size of their assets. The Russian market is paid special attention in this study, its specificity is analyzed compared to global trends in the implementation of neobanks, the nature of the interaction of challenger banks with traditional financial institutions is determined, the dynamics of the introduction of neobanks in the Russian financial sector are analyzed, their financial indicators are examined, service delivery formats in innovative financial institutions are considered. Based on the analysis, the prospects for further implementation and use of neobanks in the Russian financial sector are determined.

Keywords: Information Technology Management, Digital Economy, Innovation, Challenger Banks, Global Market, Russian Market, Specifics, Development Prospects

Introduction

Today's economic development cannot be imagined without the full implementation of innovative digital technologies. The introduction of information and communication technologies has contributed

to the digital transformation of the global economy. Digital technologies have used in all economic sectors without exception, which contributed to the formation of a new type of economy, called digital. The digital economy is one of the fastest-growing areas in the world. This is an important engine of innovation and enterprise development. Its influence has become noticeable in the scale of the competitiveness of countries with the transition to the age of digital technology. The digital economy is an economic activity focused on digital and electronic technologies. The growth of the digital economy has a huge impact on the economy as a whole. With globalization and the active development of innovative technologies such as blockchain, artificial intelligence and cloud computing, the digital economy has become an integral part of the global and national economies.

One of the drivers of the digital economy is fintech. Fintech is an industry consisting of companies that use technology and innovation to compete with traditional financial institutions represented by banks and intermediaries in the financial services market. Currently, numerous technology startups, as well as large established organizations trying to improve and optimize the provided financial services, include themselves as fintech. (Arslanian and Fischer, 2019)

One of the innovative forms of financial institutions formed within fintech is challenger banks, which represent a completely new form of financial organization, radically different from classical financial institutions. This innovative form of financial institution appeared recently. In the UK, the first challenger bank - Atom bank - appeared in 2014, which began operations in early 2015. In a relatively short period, the number of neobanks has grown significantly and today amounts to more than 150 such financial institutions around the world. (Lu, 2017)

Such an innovative form of credit organization has implemented in many countries of the world, both with developed and developing economies. In the Russian financial sector, the first bank of this format appeared in 2015 and received the name Tochka Bank, which appeared on the basis of Bank 24.ru. This date can be considered a starting point in the formation of a new format of a financial institution in the Russian market. (Rudskaya, 2018)

The development of the new innovative form of financial institutions is at the initial stage. Many researchers have not yet developed a clear understanding of what needs to be understood as a challenger bank: some see it as like Internet banking, others see it as a type of digital bank, not taking into account such a point that today there are different types of digital banks, which have a completely different nature of formation and completely different configurations in architecture. It should also be noted that in recent years there has been a dynamic implementation of such innovative financial forms, which requires careful analysis and study.

Key Research Findings

Definition of a challenger bank

Today, the concept of digital banks covers a wide range of banking forms, for example, Internet banking is considered one of the forms of digital banking in some studies.

IBM formulated the definition of a digital bank in its Designing a Sustainable Digital Bank report, representing not just the introduction of a mobile application or abandonment of branches, but a bank that has most of its products and services in digital form. At the same time, clients use digital channels for everyday banking activities. The infrastructure of such a bank is optimized for real-time digital interactions, and the internal culture implies a high rate of change in digital technologies.

According to IBM, digital banks can be divided into four groups (Dermine, 2017):

1. Model A. It is a classic bank with a huge number of legacy systems and business processes that are constantly trying to get closer to a new digital client, who wants the brand to be digital and meet new requirements. Such banks open up new brands with unique offers and products created specifically for

the younger generation - and, as a rule, these brands use the existing banking infrastructure. Examples of such banks: FRANK Bank OCBC in Singapore and LKXA from CaixaBank in Spain.

2. Model B. Model B banks build an organization aimed at improving the user experience, use the back office and bank license of existing banks and resell their products through a more convenient user interface. Examples of such banks: Moven in the US and Rocketbank in Russia.

3. Model C. It combines two approaches: digital user experience and new business processes. Large banks may find that their systems have too much inertia and are too closed to start a digital bank. Model C banks organize a separate division - a practically separate organization with a more flexible and modular back-end, which allows for better customer experience. Examples are Hello Bank from BNP Paribas.

4. Model D. Banks of this model build their entire product offer on digital technologies. These are not necessarily banks without branches; however, customers of such banks expect interaction primarily through digital channels, for example, Fidor Bank in Germany and TKS.

According to this classification, digital banks are considered in relation to the classical form of a financial institution. Digital Bank in this sense is considered as a classic financial institution, which is modernized through the introduction of digital technology.

Challenger bank is a financial institution that is built on completely different principles. It is based on the construction of a technology company that provides financial services. In fact, the architecture of the challenger bank is different from the architecture of the classical financial institution; the construction of the neobank is carried out without reference to the structure of the credit institution and is built from scratch, which is a distinctive feature of this financial institution. This credit organization is built immediately without physical offices and its operation is fully carried out on the Internet.

Challenger bank is a small financial institution that operates in the retail business, creating a competitive environment for traditional credit organizations, very often specializing in areas that are not part of the business of traditional financial institutions. A distinctive feature of the challenger bank is the introduction of modern innovative technologies in the field of information and communication technologies, such as online operations, which help to avoid the costs and difficulties of running a banking business. (Bril, et al, 2018; Han, et al, 2017)

Analysis of approaches to formation of challenger banks

Today, there are three main approaches to creating a challenger bank, because the main problem of this is to win enough customers to conduct their business.

The first approach can be called traditional. It include financial institutions such as Atom Bank, Starling Bank and Tandem Bank, which gave priority to the presence of the bank's charter capital before it began to operate and offered an appropriate set of services that require a certain level of cash to ensure the reliability of the functioning of the financial institution. For example, Atom Bank launched a savings account service and lending to small and medium businesses after approval by regulatory authorities.

The biggest drawback of this approach is too long procedure for obtaining a license, without which it is impossible to start banking, and therefore not the ability to develop a client base.

Another disadvantage of this approach is the need to maintain authorized capital at a certain level, a decrease in which may lead to the revocation of a banking license. For example, Tandem Bank lost its license after it was unable to provide the necessary level of capital after the acquisition of Harrod Bank. Another approach to the formation of a challenger bank is an approach called the semi-traditional bank. It includes the financial institutions Monzo and N26, which, in order to develop their customer base, provided incomplete banking functionality, which allowed to provide quick access to the market that

does not require capital adequacy financial institution. In particular, they offered credit cards for possible quick recruitment of customers and achieved impressive results when the growth of customers amounted to about 60 thousand new customers per month. (Kidwell, et al, 2016)

This model has its disadvantages relating to the transition to a full banking functionality and obtaining a full banking license, it is possible to limit customer growth due to the need to re-register current customers.

Another drawback of this approach is that the financial institutions that are formed with this approach have to cooperate with credit organizations that have full licenses to carry out transactions, and therefore pay for these operations, which generally reduces the profitability of the business.

The third approach to creating a challenger bank is the fast-lane model, the essence of which is to win the market and attract customers, not through banking products, and products related to the financial sector, but not requiring a banking license. Revolut Financial Institute received a license for electronic money and was engaged in currency exchange operations, in particular for people traveling to different countries.

The next step in the development of the financial institution was the creation of an application that allows working with digital currencies, which significantly expanded the client base to 1.5 million people in 2017 and provided the opportunity to obtain a banking license to provide full banking functionality for its customers.

The most promising model is the fast-lane approach, which does not have the drawbacks of the two previous ones and allows building up a client base before starting a full-fledged banking activity, as well as achieving the necessary financial results to obtain a full-fledged banking license.

Analysis of the global challenger banks market

Challenger banks have been developing quite rapidly around the world. In 2015, there were only about 15 credit organizations, however, the number of such banks would reach more than 200 by 2020 (Fig. 1). (Saunders, 2019)

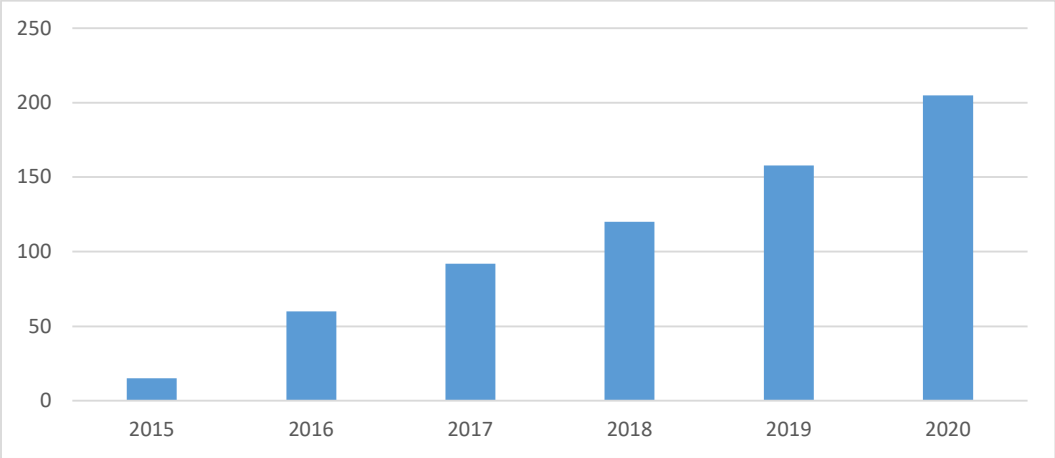

Fig. 1: Changes in the number of neobanks in the world, units

The average annual growth rate of the number of challenger banks worldwide is about 29.3%, which is a high indicator.

The leader in the global market for neobanks is the United Kingdom, where this form of financial institutions come from. In 2019, their total number in this country was about 59 credit organizations (Fig. 2). (Okunevych and Hlivecka, 2018)

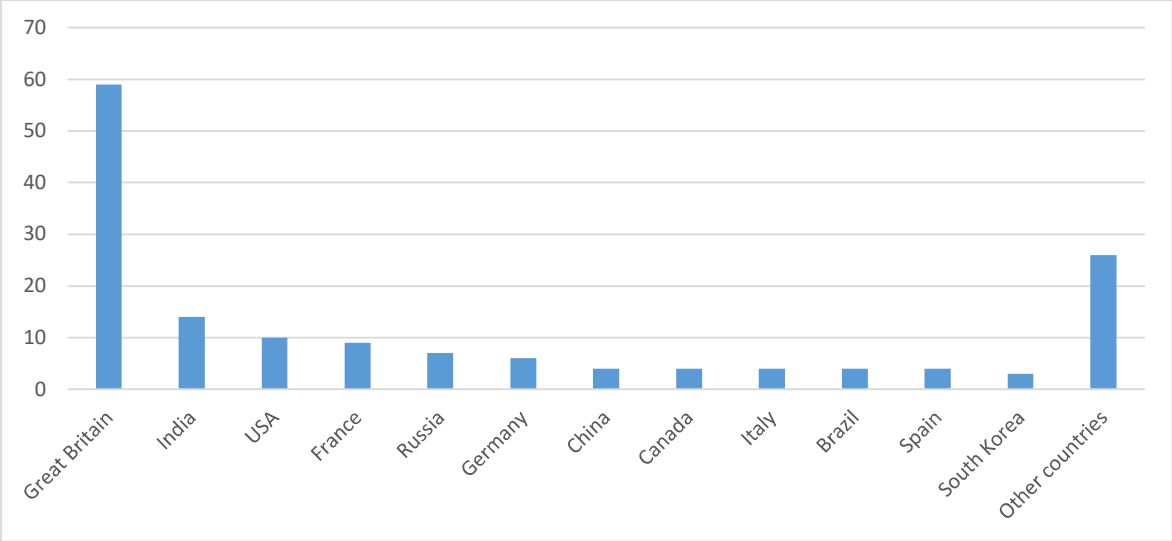

Fig. 2: Leader countries by the number of challenger banks, units

The UK accounts for about 38.1% of all challenger banks in the world. Such leadership is explained by quite liberal legislation in the country, as well as by a not very high degree of coverage by the branch network of banks. The second place is taken by India, which accounts for 14 such financial institutions. Neobanks are introduced and developed in countries with developing economies primarily because the costs of introducing and using neobanks are relatively small compared to the classical financial institution. The United States is in the third place, whose figure is 10 challenger banks. As for Russia, it is among the five leaders in this indicator with a value of seven credit organizations of this type.

Challenger banks' client base is growing with the increase in their number all over the world. By 2020, the client base of neobanks will exceed 22.2 million people worldwide (Fig. 3). (Ketterer, 2017)

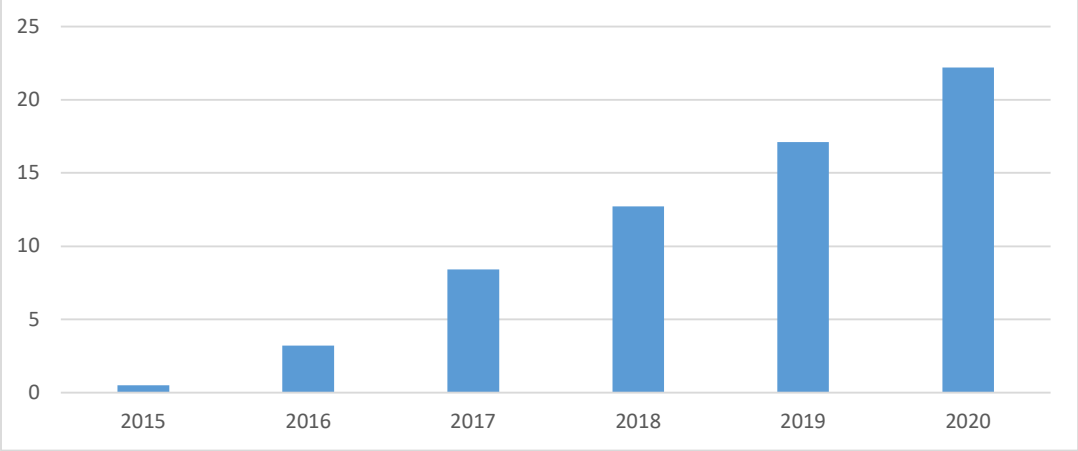

Fig. 3 : Challenger banks' customer base growth in the world, millions of people

If to look at the growth rate of the client database of financial institutions, it can be noted that from 2015 to 2020, the number of customers is expected to increase by 44.4 times, which is an unattainable result for the classical forms of financial institutions.

An increase in the customer base of challenger banks and a growth of the number of operations performed by their customers increase the profit of neobanks. In 2019, it amounted to around 0.71 billion dollars worldwide (Fig. 4). (Martin, 2019)

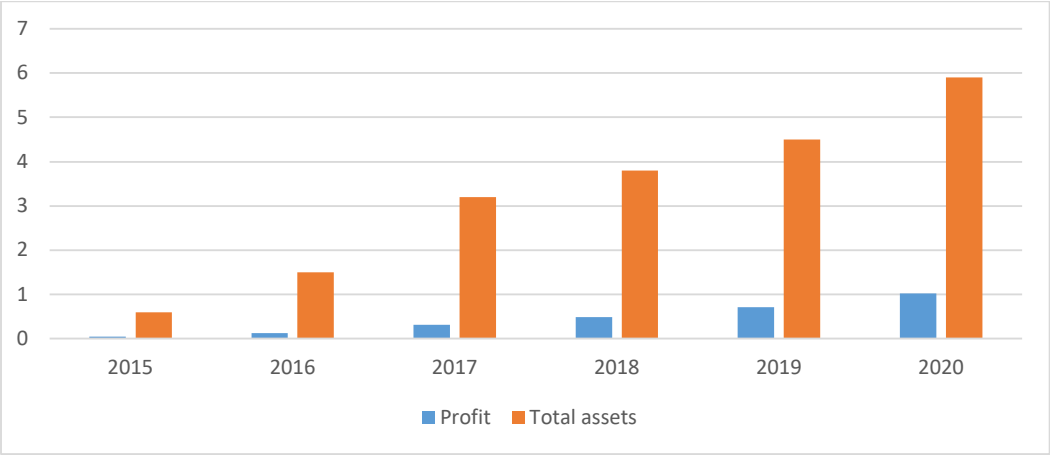

Fig. 4: Key financial indicators of challenger banks in the world, billions of dollars

According to forecasts, by 2020, the total cost of assets of challenger banks in the world is expected to reach $ 5.9 billion.

Despite the high growth of challenger banks compared to financial institutions, the volume of the market segment they occupy is less than 0.1%. Today, challenger banks are only trying to establish a niche in those areas that are not very attractive to traditional financial institutions. Nevertheless, classical banks see a new form of organization of a financial institution as their competitor and try not to let them squeeze themselves in the financial market. One of such methods is the affiliation of a challenger bank with a traditional financial institution. Today, only about 30% of all challenger banks in the world are independent credit organizations, the remaining 70% in one form or another are managed by classic banks. (Yang, et al, 2017)

Thus, in the near future challenger banks will continue developing at a fairly rapid pace around the world, while investments in traditional financial institutions that do not want to lose such an attractive direction will be invested in their development. The number of challenger banks that currently occupy an independent position will be reduced in the future and only those who managed to occupy a stable position in the financial market remain.

Prospects of challenger banks' implementation in Russia

In Russia, credit institutions have been reducing over the past ten years. The number of financial institutions decreased from 1,136 in 2008 to 561 banks in 2019. The number of bank branches decreased by 11 thousand over the past five years since 2014. Such a sharp decline is primarily due to the tightening of the financial policy of the Central Bank, imposed Western sanctions against the financial system of Russia and the introduction of information and communication technologies for providing services to customers of financial institutions via remote channels. (Akatkin, 2017; Khayrallah, 2015)

If the implementation of Internet banking is widely used in most Russian banks. According to recent data, more than 80% of credit organizations have such a service system, but the introduction of digital banks is not widely used nowadays, despite the advantages that they give:

- minimization of costs for the construction of the main office and a wide branch network, as well as for maintaining paper workflow;
- flexible online customer service;
- cheap banking fees compared to classic financial institutions;
- personal approach to each client;
- convenience of obtaining banking services.

It should be noted that Russia has all prerequisites for the implementation of challenger banks. (Soloviev, 2018)

First, the average Internet connectivity in Russia is over 78%.

Secondly, over 60% of Russians use mobile communication devices (smartphones and tablets).

Thirdly, a high level of competition of traditional banks for a client, although in recent years this indicator has significantly decreased due to a decrease in the number of Russian financial institutions. Fourth, the high level of applied technologies, which make it possible to provide flexibility and personalization in customer service.

Fifth, a rather high level of digital literacy of the population, more than 28% of Russians own modern information technologies.

Nevertheless, despite the above possibilities, the number of challenger banks is small in the Russian financial market. In 2019, only seven credit organizations functioned on the territory of Russia, which can be attributed to challenger banks (Fig. 5). (Komkov, 2017; Mamrayeva, 2018)

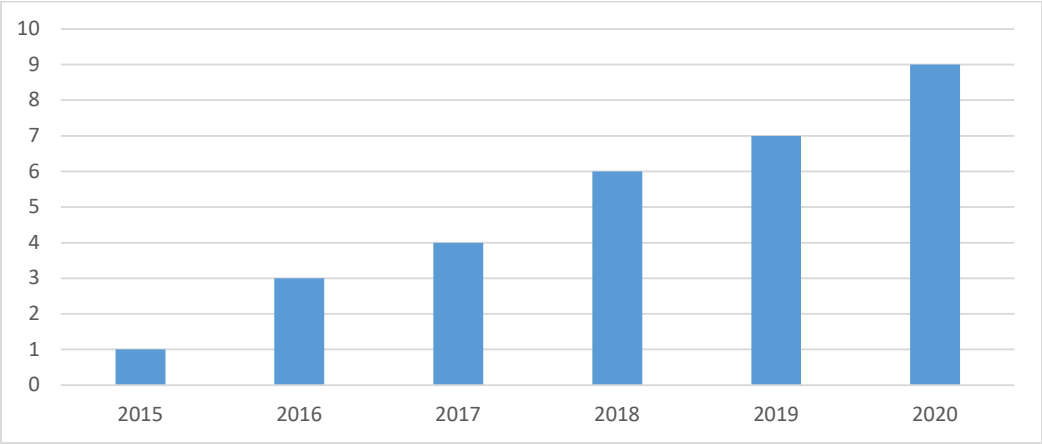

Fig. 5: Changes in the number of challenger banks in Russia, units

The number of neobanks in Russia is growing at a slow pace, about one financial institution of such a formation per year. For example, in 2019, a basic banking license was issued for operations to a financial institution called Bank 131, which is registered in the city of Kazan.

Nevertheless, despite the low dynamics of the number of neobanks in Russia, their client base is growing and is projected to reach almost 1.9 million people by 2020. (Fig. 6). (Sigova and Khon, 2017)

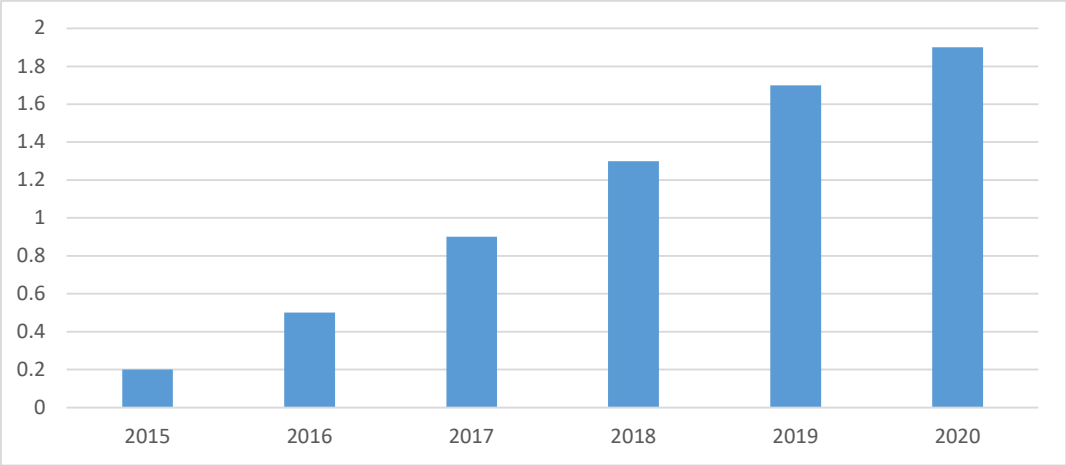

Fig. 6: Challenger banks' customer base growth in Russia, millions of people

In 2019, the profit of all Russian challenger banks amounted to about ten million dollars (Fig. 7). (Budanov, 2017)

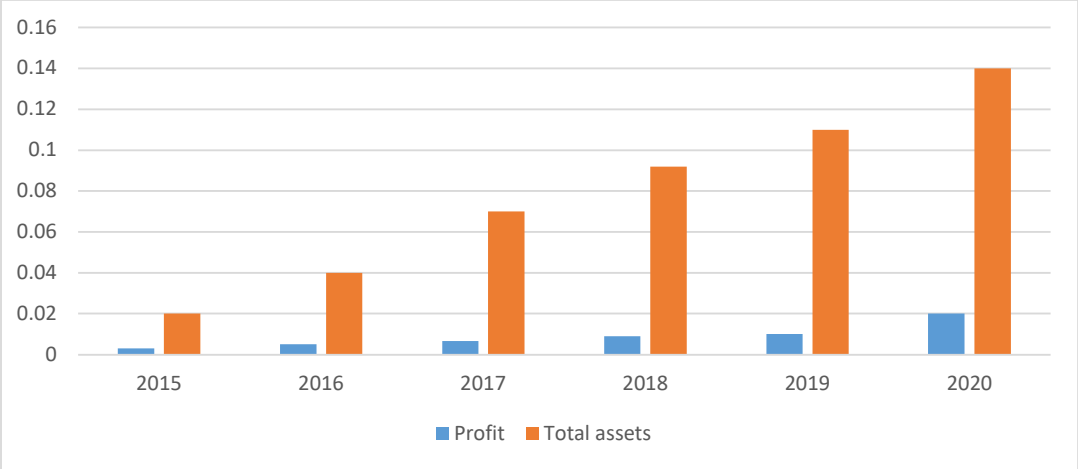

Fig. 7 : The main financial indicators of Russian challenger banks, billions of dollars

By 2020, the total value of the assets of all Russian challenger banks is expected to be about 0.14 billion dollars.

Such low indicators are explained by a number of reasons, the main of which is the lack of legal regulation in this area (Fig. 8). (Terlizzi, 2016)

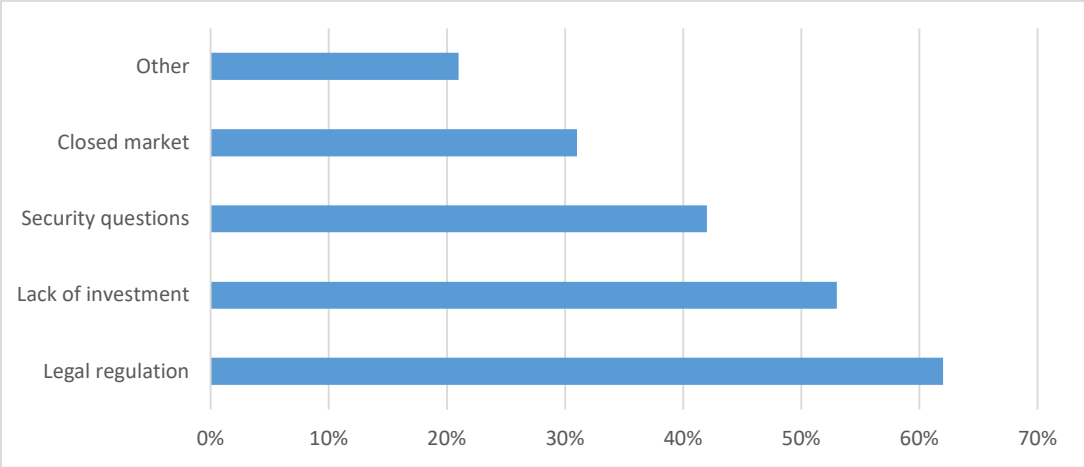

Fig. 8: Barriers to the implementation of challenger banks in Russia, in percent

On the other hand, a number of reasons, primarily due to the distrust of potential customers in such financial institutions, hinder the growth of the client base of challenger banks (Fig. 9). (Glushchenko, 2019; Fedotova, et al, 2018)

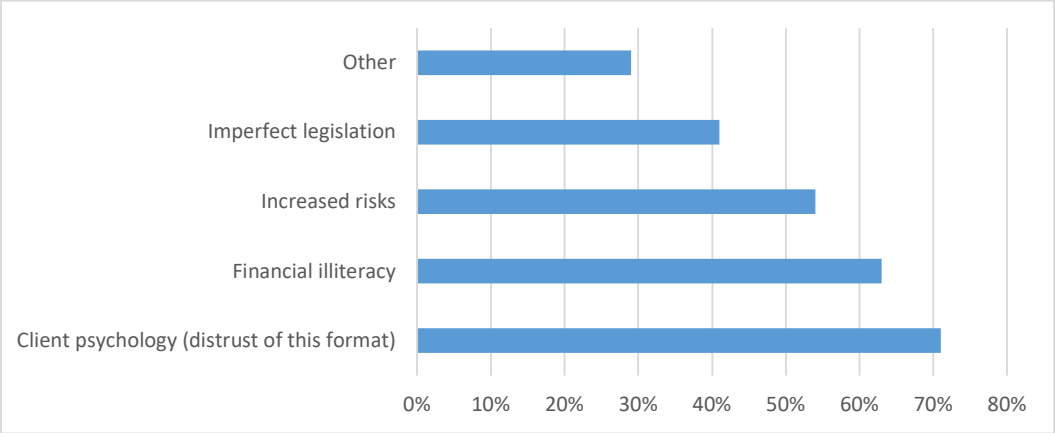

Fig. 9: Barriers hindering the growth of the customer base of challenger banks in Russia, in percent

The combination of these reasons significantly slows down the large-scale implementation and use of neobanks in Russia, despite all the advantages they provide.

Conclusions

In the modern world, there is a large-scale introduction of information and communication technologies that led to a digital transformation in all economic sectors. This led to the formation of a new direction - the digital economy, which in some economic sectors occupies up to 30% of the traditional economy;
One of the main drivers of the digitalization of the economy is financial institutions, which take second place after telecommunication companies in introducing innovative digital technologies. It is no coincidence that a new direction of Fintech has appeared in the financial sector, which is a synthesis of financial and information and communication technologies;
Not only innovative banking products are formed within the Fintech area, but completely new organizational forms of financial institutions are created. They are able to provide not only new formats

of customer service, but also form unique ways of managing created credit organizations, which allow new business developments;

One of such innovative forms of a financial institution created within Fintech is recently challenger banks, whose configuration is fundamentally different from the traditional banking model. This type of financial institution is a technology company, the core of which is the IT department, which uses innovative digital technologies for banking services for the organization. A distinctive feature of neobanks is their architecture, which is fundamentally different from the classical financial institution. This type of credit organization is a direct competitor for traditional banking organizations, primarily in the field of small and medium enterprises, occupying niches that are not very attractive to ordinary financial institutions;

Despite challenger banks appeared less than five years ago, their number in the whole world is growing quite rapidly. In 2019, there were more than 150 credit organizations, while the average annual growth rate of neobanks is about 30%. At the same time, the growth dynamics of the client base of neobanks shows impressive results: for the period from 2015, when the number of customers was less than 0.5 million people, and according to the forecast, their number is supposed to exceed 22 million people by 2020. At the same time, financial indicators of challenger banks also show fast dynamics. Over the past five years, the total profit of these financial institutions has grown from $ 50 million to $ 1.02 billion, and total assets have changed from $ 0.6 billion to $ 5.9 billion. In connection with such high rates, this type of credit organization has become a competitor to traditional banks, which are currently trying to either create affiliate forms of challenger banks or absorb existing neobanks. Today only 30% of such financial institutions are completely independent;

The implementation and use of challenger banks is a promising direction for countries with developing economies, because they do not require high costs for opening. However, they allow getting quite high dividends. It is no coincidence that the second place after the UK, which has 59 credit organizations of this kind, is in India with 14 challenger banks, Russia closes the top five with 7 neobanks;

Despite there are all the possibilities for introducing and using challenger banks in Russia, for example, the average Internet prevalence is over 78%, and the population of mobile communication devices exceeds 60%, the dynamics of development of such credit organizations are small. On average, one challenger bank appears within one year, which is relatively small for the Russian financial sector. At the same time, indicators on the growth of the client base are low. According to forecasts, the number of clients of such financial institutions is expected to reach about 1.9 million people by 2020, and the total profit of all Russian neobanks will be $ 20 million, while the total value of assets amount to 0.14 billion dollars. Relatively low indicators are explained primarily by the lack of legal regulation in this area. This is indicated by 62% of experts in this field, lack of investment is in second place, as indicated by 53% of experts, and security problems in this area are in third place, as indicated by 42% of experts. Besides, the growth of the client base of challenger banks is imposed by the psychology of people who in Russia do not yet trust virtual financial institutions that do not have real branches. This is one of the main reasons that accounts for 71% of experts' opinions, in second place financial illiteracy of the population, which cannot independently deal with the services provided online, accounts for 63%. And the third place in terms of limiting the growth of the client base is associated with increased risks when working with credit institutions, it accounts for 54% of the opinions of experts in this field. In connection with all of the above, rapid growth of challenger banks in the Russian financial sector cannot be expected; it is even possible to slow down the existing growth rate due to restrictions in the field of financial and legal regulation by the Central Bank.

Acknowledgement

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Innovation in the Russian Economy: Evaluating the Prospects for the Implementation and Use of Blockchain Technology

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Abstract

The current development of the global economic system cannot be imagined without the widespread introduction and use of innovative digital technologies, which have led to the complete transformation of some economic sectors. The innovative potential of some modern information and communication technologies enables us to radically modernize the entire economic system, allowing it to move to a new stage of development. Today many experts are talking about the fourth industrial revolution, which should provide a new qualitative leap in creating a "smart economy" based on innovative potential to meet the needs of each individual in accordance with his or her requests. One of such revolutionary technologies that enable changing the economic landscape of entire areas of economic development is blockchain technology, which originally appeared as part of the Fintech area in the financial sector, but currently has been used in many other economic areas. It is no coincidence that many countries with developed and developing economies pay attention to the development and use of these technologies, investing huge amounts of money both from the private business and through government support through various programs. In Russia, the implementation and use of these technologies are at the initial stage, however, over the past few years, blockchain technologies have become used in the Russian economic sectors. The innovative potential of blockchain technologies was considered in this study, the basic principles of blockchain technology as a distributed database capable of functioning within the information network space were analyzed. This analysis identified the features of this technology, from the standpoint of its formation and development as a new entity within innovative information technologies. The Russian potential for the development and application of blockchain technology has been analyzed; the Russian market for this technology has been evaluated: the volumes of the Russian market, growth rates and its key players have been determined. The main areas of using blockchain technologies in the Russian economy are analyzed in this paper, the main barriers to their implementation are revealed. Based on the analysis, the prospects for the introduction and use of blockchain technologies in the Russian economy are estimated.

Keywords: Information Technology Management, Digital Economy, Innovation, Blockchain Technology, The Russian Market, Growth Rates, Prospects for Use.

Introduction

The beginning of the twenty-first century was marked by the rapid introduction of innovative digital technologies into the global economic system, forming a new direction of development - a digital economy based on the introduction and use of the most advanced information and communication technologies.

The digital economy has caused the emergence of completely innovative directions in areas traditional for the economic system - this is Industry 4.0 in industry and fintech in the financial sector. The main drivers of the digital economy development were cyberphysical systems, the Internet of things technologies, the introduction of industrial robots with artificial intelligence, big data and much more. A blockchain was one of the breakthrough technologies that was used in 2008 to create a new form of money within the fintech direction, on the basis of which the world's first cryptocurrency - Bitcoin - was created. It has received circulation in more than 110 countries along with other traditional types of currencies. Today there are more than two thousand types of cryptocurrencies around the world.

Blockchain technologies are not used only in the financial sector. Today these technologies are used in industry, healthcare, and there is great potential for the development and use of blockchain technologies in the public sector. It is no coincidence that currently, the governments of many countries invest a lot of money in studying and the possibility of using blockchain technologies for state information systems.

Today the leaders in using blockchain technologies are the United States, which occupy more than 43% of the global market, and the American companies, IBM and Microsoft, are leaders in the research and implementation of these technologies, taking together more than 32% of the global market.

In the past few years, countries in Western Europe, China, Japan, and Canada have joined the race for the development and use of blockchain technologies. Japan is the leader in terms of growth in investment in blockchain technology, whose rate is about 23% per year. (Tsvetkova, 2018)

In Russia, blockchain technologies began to be introduced with a large delay compared to other countries and their development is quite slow. However, it should be noted that it was in Russia that the world's second largest cryptocurrency was capitalized, Ethereum, which indicates a sufficiently high potential for the introduction of blockchain technologies to the Russian economy.

Today, there are very few qualitative studies in the field of development and use of blockchain technologies in Russia, they mainly relate to the study of using these technologies in the field of cryptocurrencies, while blockchain is used in other areas. So, it is necessary to conduct comprehensive analysis in the implementation and use of blockchain in the Russian economy, which allow to evaluate its innovative potential for the modernization of the entire economy as a whole.

Key Research Findings

The Innovative Potential of Blockchain Technology

Innovation does not stand still; in the age of rapid development of high technologies, the emergence of such a breakthrough development as blockchain was predictable. In 2008, Satoshi Nakamoto proposed introducing a concept from a blockchain in which security was to be laid at the level of database protection. However, it first appeared only in 2009 and was used as a component for digital currency - bitcoin. Initially, the blockchain played the role of a data registry for all transactions with digital currency. Bitcoin introduced the world a new technology of fast, inexpensive and guaranteed transaction system, which, of course, interested many Internet users.

Blockchain is a distributed database in which storage devices are not connected to a common server. This database stores an ever-growing list of ordered records called blocks. Each block contains a time stamp and a link to the previous block.

Blockchain technology is currently used in many systems. Many high-tech companies strive to implement it due to its great innovative potential.

Blockchain technology is secured by a decentralized server that establishes network connections of the same rank with specific timestamps. As a result, an autonomous database is formed, which does not have a single head center. All information that is updated in the database changes throughout the

system. In this regard, a whole chain of blocks is formed, which registers, records and processes events with data. For greater reliability, the system introduced the ability to confirm the authenticity of the source and identification of a person.

A few years ago, the future of the blockchain seemed uncertain, today it is taking on ever-clearer outlines. Traders, investors and venture funds are already trying to master the young market for investments in blockchain technology by introducing the system into production, trading on the cryptocurrency market, creating and maintaining projects based on ICO.

It is necessary to formulate the essence of this innovation in order to understand the potential of technology. In essence, blockchain is a publicly accessible, decentralized and guaranteed reliable database.

This technology, of course, has become a popular tool for companies working in different fields. Firms seeking to implement innovative technologies have already paid close attention to blockchain. Together with the largest blockchain laboratories, various ways are developed to adopt the innovative potential of the new technology. Now there are protocols for the implementation of this technology in various fields, such as:

- secure network administration;
- digital certificate storage;
- secure bilateral transactions without involving a guaranteeing third party;
- fixing the time of placement of documents, allowing to solve issues of patenting, copyright;
- product authentication confirmation;
- proof of ownership;
- creation of public electronic business cards, information on which is automatically updated.

The substantial potential for further growth and connectivity of technology into all new sectors of the economy and field of application is obvious. The most characteristic segments within the technology are separately investigated: distributed registries, smart contracts, mining, consensus algorithms, and cryptocurrencies.

The innovative potential of blockchain technology is confirmed by a huge number of patents in this field (Fig. 1). (Anderson, 2018; Soloviev, 2018;)

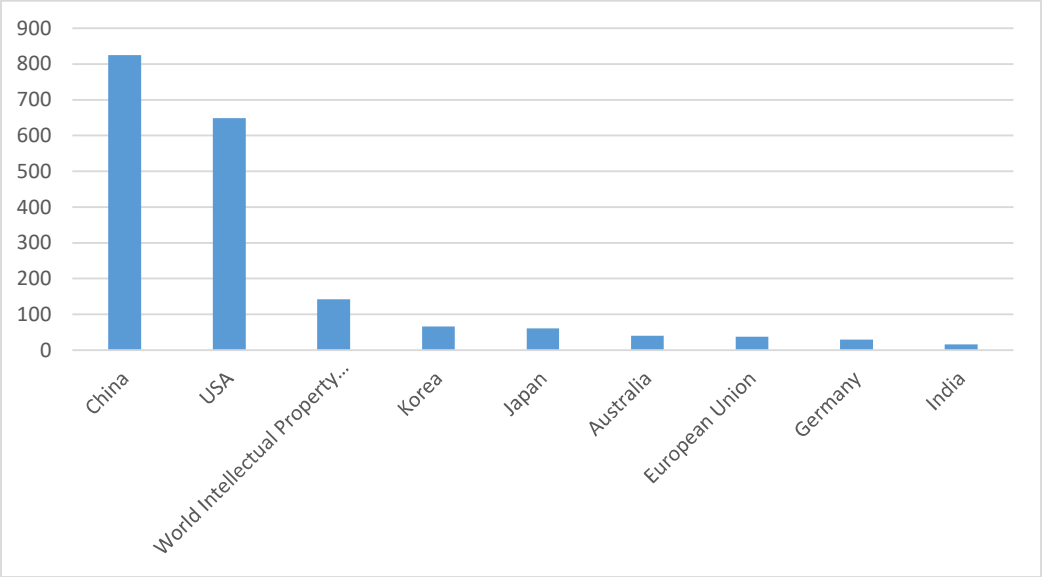

Fig. 1 : Countries by the number of blockchain technology patents

The leading positions in the number of patent publications are held by China and the United States; activity indicators are significantly higher in this area in these countries than in others. Market leaders are conducting large-scale and expensive work on patenting a wide range of blockchain technologies, while the process of forming regulatory bases is not a stopping factor for the further development of blockchain technologies and creating new application concepts.

Analysis of the Russian blockchain technology market

In 2019, this study was conducted to assess the possibility of the development and use of blockchain technology in certain countries. The study was conducted on the basis of a methodology that includes an assessment of the legal, political and infrastructural conditions in various countries from the standpoint of friendliness to a business using blockchain technology. First of all, the study focused on the changes that the economies of different countries underwent under the influence of the blockchain and related technologies. Russia took 18th place from 23 countries in this rating (Table 1). (Bogdanov et al, 2018)

Table 1: Rating of countries with the best conditions for the development blockchain projects

	Political Environment	**Legal Environment Index**	**Infrastructure Environment**	**BC Regulation Index**	**Country Rank**	**Description**
Estonia	7	7,2	9,31	7,84	1	Rather enabling
Australia	7	6,89	9,58	7,82	2	Rather enabling
Singapure	7	6,4	9,7	7,7	3	Rather enabling
United Kingdom	7	5,27	9,67	7,31	5	Rather enabling
Japan	7	5,53	9,17	7,23	4	Rather enabling
Switzerland	6	6,35	9,04	7,13	6	Rather enabling
Germany	6	6,02	9,35	7,12	7	Rather enabling
Sweden	5	6,24	9,55	6,93	8	Rather enabling
Denmark	6	4,9	9,86	6,92	9	Rather enabling
Republic of Korea	7	3,42	9,77	6,73	10	Rather enabling
Spain	7	3,85	9,05	6,63	11	Rather enabling
Canada	7	3,65	9,09	6,58	12	Rather enabling
Belarus	7	3,95	8,51	6,49	13	Rather enabling
Iceland	5	4,81	9,08	6,3	14	Rather enabling
United States	6	2,56	9,56	6,04	15	Neutral
South Africa	7	2,95	7,37	5,77	16	Neutral
Argentina	6	3,92	7,37	5,76	17	Neutral

Russian Federation	6	2	8,72	5,57	18	Neutral
Kazakhstan	6	2,04	8,51	5,52	19	Neutral
Turkey	7	1,51	7,88	5,46	20	Neutral
China	6	1,75	7,49	5,08	21	Neutral
India	7	1,3	6,61	4,97	22	Neutral
Ukraine	6	1,25	7,17	4,81	23	Neutral

It is worth noting that in Russia there are big problems with legislative initiatives in the legal regulation of blockchain technologies, many government programs in the field of digitalization do not have sufficient funding. At the same time, China, which is ranked lower than Russia, occupying the 21st position, allocated over $ 6 billion for the development and use of blockchain technology under the state program, while the entire Russian market was estimated at 24.3 million dollars in 2019 (Fig. 2). (Babkin et al, 2018; Vovchenko et al, 2017)

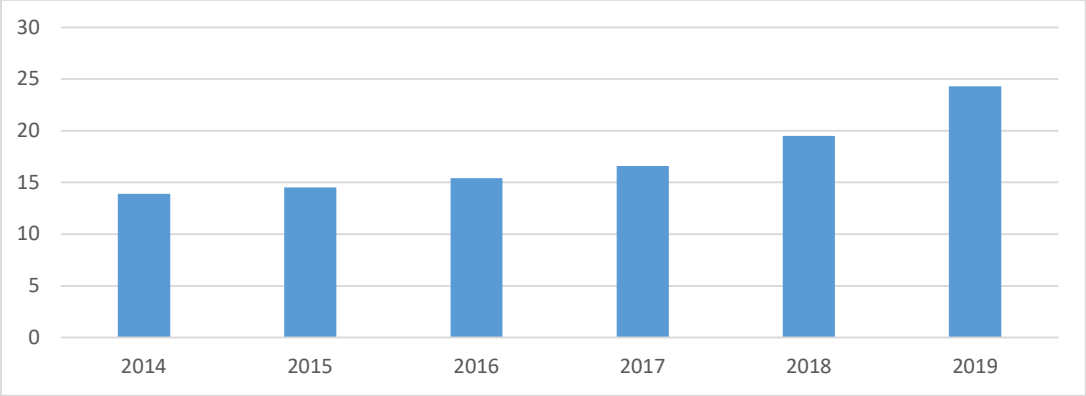

Fig. 2: The Russian blockchain technology market, millions of dollars

The volume of the Russian market is about 2.3% of the world, while the average annual growth rate of the Russian market with an indicator of 12.1% is inferior to the global market, which has this value of about 16.1%. The low dynamics is explained by the Russian market is quite small and is in the initial state, and as mentioned earlier in Russia, there are no favorable conditions for investing in these technologies.

A global trend aimed at developing a public blockchain is also present in the Russian market, occupying over 85.7% (Fig. 3). (Biktimirov et al, 2017)

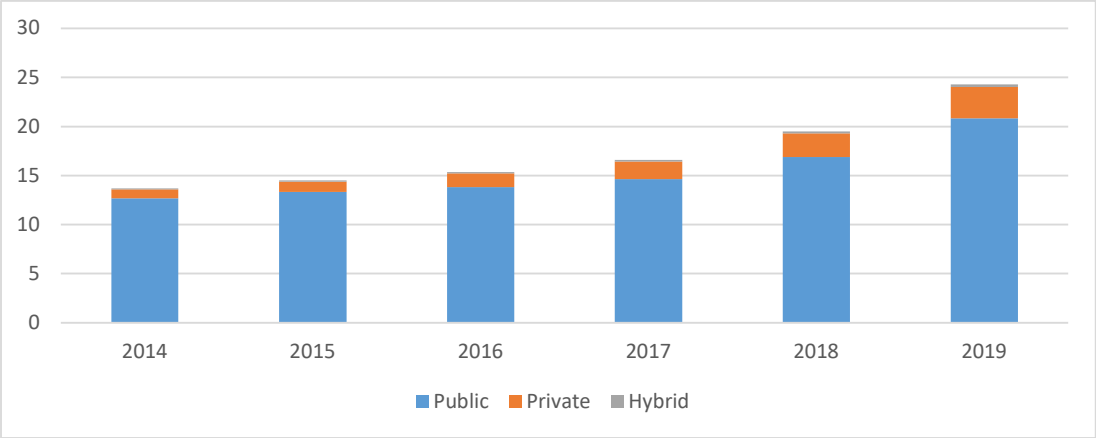

Fig. 3: The Russian blockchain technology market by segments, millions of dollars

Russia is significantly inferior to global market leaders in terms of its performance, for example, the United States whose market size is 18.1 times greater than the Russian one. Today, we have to admit that Russia is not even in the top 10 countries that implement and use blockchain technologies.

About 100 companies operating in one form or another of blockchain projects operate on the Russian market today (Fig. 4). (Chernov and Chernova, 2018)

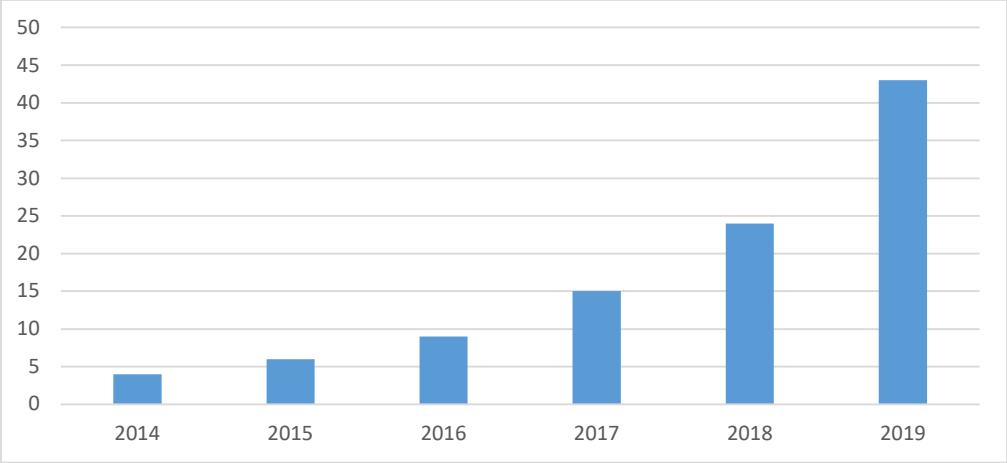

Fig. 4: Russian companies involved in the development and implementation of blockchain projects, units

Represented Russian companies mostly work in the financial sector related to the development and implementation of cryptocurrencies.

Nevertheless, at present there exist Russian companies that are developing blockchain projects in other areas. For example, the Orbit Blockchain Practical Application Center is involved in many projects related to the public sector, in particular in real estate transactions.

According to experts, about 490 large blockchain projects were launched in Russia in 2019 (Fig. 5). (Chakraborty, 2018; Prusty, 2017)

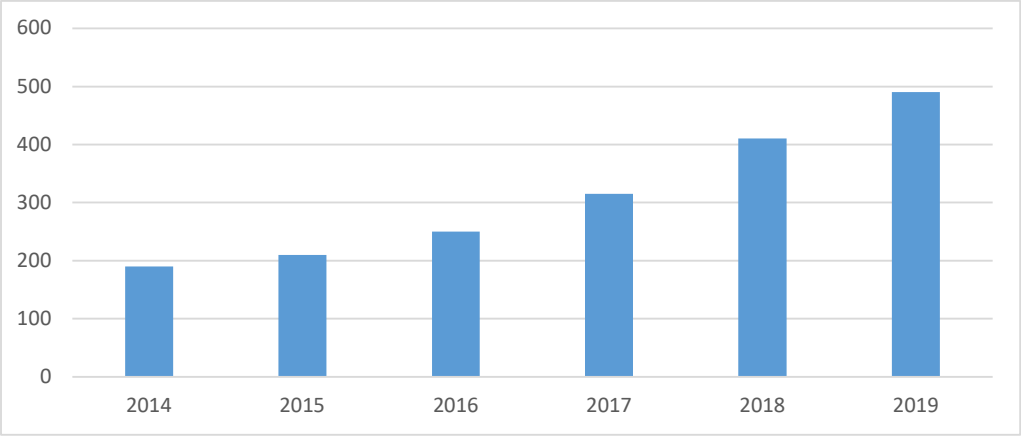

Fig. 5 : Blockchain projects in the Russian market, units

For example, the Russian Ministry of Education and Science has become a customer of a digital platform for knowledge sharing and copyright management. This project should be implemented in 2019; the company Neolant is engaged in its development. The agency has allocated over one million dollars for development.

The attractiveness of the development of blockchain technologies in Russia is also confirmed by the increase in the salaries of relevant specialists. In 2019, the average salary of a developer was about ten thousand dollars a month, which is comparable to the average salary in the USA, which was about 130 thousand dollars a year (Fig. 6). (Arslanian and Fischer, 2019; Shvetsova, 2018)

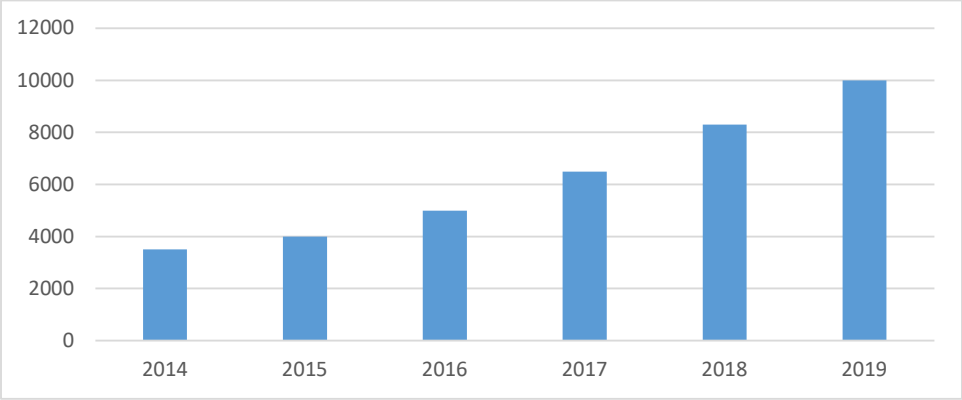

Fig. 6: Dynamics of salaries of developers of blockchain projects in Russia, dollars

Despite such high salaries in the Russian market, there is a shortage of specialists in this area, which greatly affects the prospects for the development and application of blockchain technologies.

Areas of using blockchain technologies in the Russian economy

The main users of blockchain technologies in the Russian market are financial institutions, which account for more than 64% of all investments (Fig. 7). (Bril, 2017; Savrukov, 2018)

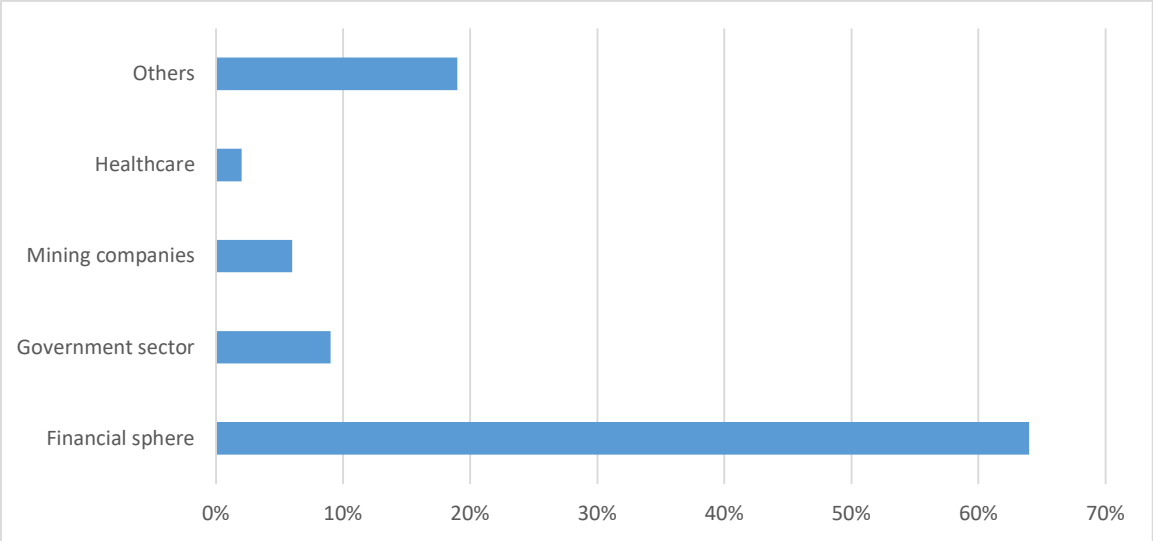

Fig. 7: Areas of implementation and use of blockchain technologies in the Russian market, in percent

According to many banking experts, blockchain technology will allow financial institutions to make transactions as transparent, fast and efficient as possible, and most importantly - safe. In addition, using blockchain technology significantly saves operating costs, regulatory reports, real-time interbank settlements, customer identification and other benefits.

Today, the leading banks of the country, Sberbank and VEB, are implemented large projects using blockchain technology. For example, Sberbank, together with the Federal Antimonopoly Service, prepared a pilot project for document management on the blockchain. Its innovation lies in the fact that various organizations will have the opportunity to refuse the services of telecom operators in the exchange of documents, which reduces the costs of companies.

Using blockchain technologies in the public sector allows for the efficient and transparent implementation of all operations related to the storage and ensuring reliable data protection in state information systems. In 2019, Rostec State Corporation, together with the Russian government, signed an agreement of intent on the participatory development of four high-tech areas - distributed registry technologies, quantum sensors, and the latest generations of narrow-band wireless communications for the Internet of things and short- and medium-range communications, as well as the latest generations of mobile wireless communications (5G). This agreement states the fact that the introduction and use of blockchain technologies is one of the priority areas in the development of the information space of Russia for the further digital transformation of the economy.

Payments and settlements prevail among the main operations used in systems based on blockchain technology, which account for more than 34% of all operations (Fig. 8) (Nikolova, 2017; Rodionova, 2018)

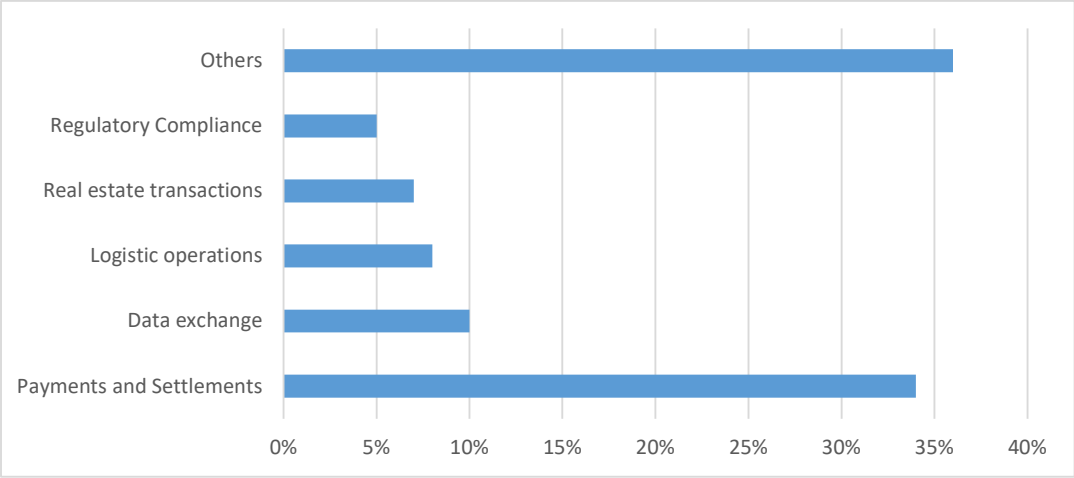

Fig. 8: The main operations in systems based on blockchain technologies in the Russian market, in percent

Further development and application of blockchain technology will significantly expand the range of operations performed in various fields, including production, for which it is also possible to use these technologies, for example, in the field of supply control.

Prospects for the development and use of blockchain technologies in Russia

Despite blockchain technology is one of the breakthrough areas in the field of innovative information technologies today, it should be noted that the development and use of these technologies in the Russian economy are quite difficult. The main obstacle to the implementation of this technology in Russia is the lack of a legal framework (Fig. 9). (Lebedev, 2018)

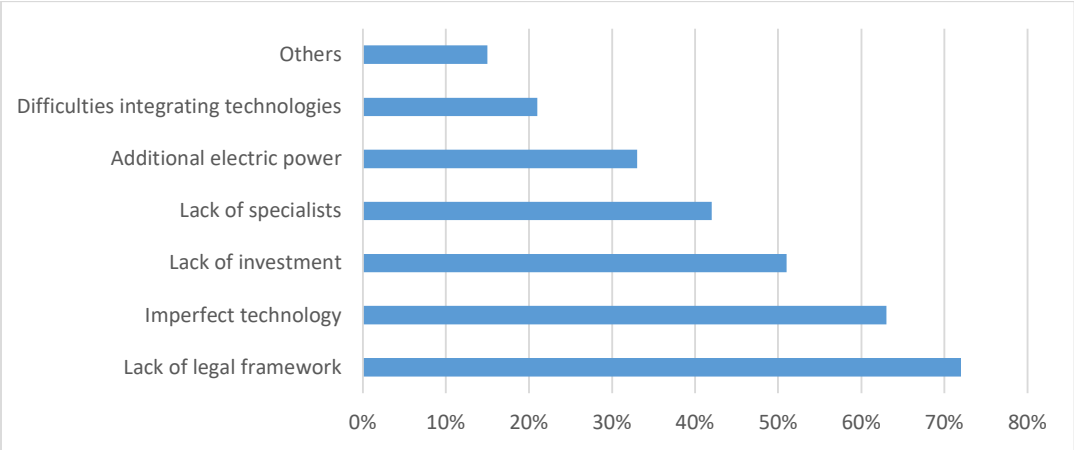

Fig. 9 : Barriers hindering the implementation of blockchain technologies in the Russian economy, in percent

At present, the players of the Russian market take a sort of wait-and-see attitude and wait for the successful implementation of blockchain projects abroad, so that later they can apply it in domestic conditions. This position may be losing because the lack of investment in these technologies may ultimately lead to a lag in the race for blockchain technologies.

Despite all the difficulties associated with the development and application of blockchain technologies in the Russian economy, nevertheless, it is expected that the Russian market for blockchain projects will increase and reach over 75 million dollars by 2025 (Fig. 10). (Du, 2019; Komkov, 2017)

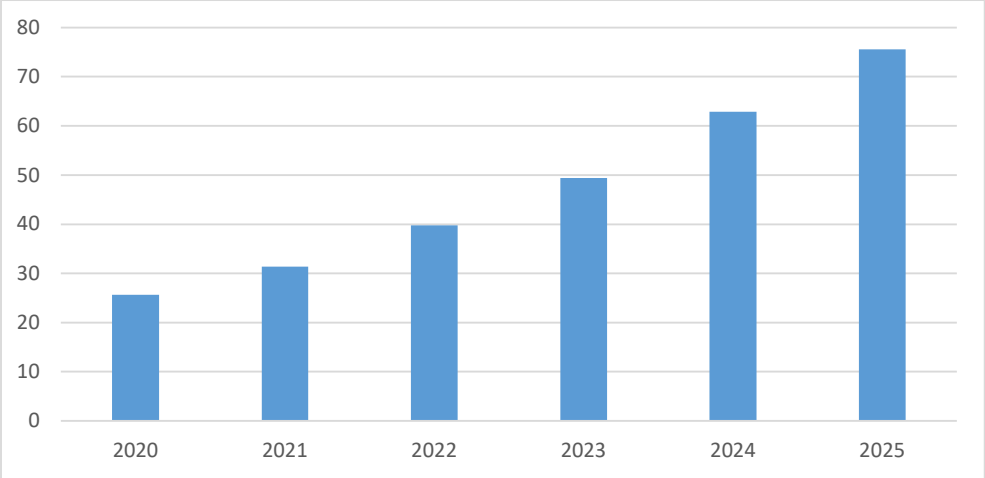

Fig. 10 : Forecast for the development of the Russian blockchain technology market, millions of dollars

At the same time, the average annual growth rate of the Russian market is expected to almost double to 24.1% from 2020 to 2025, this dynamics can be achieved by expanding the area of application of blockchain technologies, including in the Russian manufacturing sector, which is also starting to undergo digital transformation.

Conclusions

The wide-scale introduction of innovative digital technologies has contributed to the formation of a new type of economy - the digital one, based on the latest achievements in the field of information and communication technologies, in this area innovative directions have appeared in traditional economic fields, in industry - Industry 4.0, in the financial sector - Fintech;

One of the breakthrough technologies in the field of information storage formed within the Fintech was the blockchain technology used to create the first cryptocurrency in the world of bitcoin in 2008. This was the starting point in the development and application of this technology;

Today, many countries participate in research on blockchain technologies, both developed and developing economies. Many countries have adopted programs at the state level that promote the introduction and use of blockchain technology. Annual government investment is about $ 6 billion a year in China, while the entire Russian blockchain technology market amounted to about $ 24 million in 2019, with an average annual growth of 12.1%, which is lower than the global growth rate of 16.2%;

The Russian blockchain technology market is at the initial stage of its formation and so far, there has been no significant progress in its development. This is primarily due to the low attractive investment opportunities, lack of a legislative base, and lack of specialists, so, it is no coincidence that Russia takes 18 position from 23 countries that can introduce blockchain technology;

The main area of application of blockchain technology is the financial sector, which accounts for over 64% of the entire market, and the second place is occupied by state-owned companies and ministries, which account for about 9% of all investments;

On the whole, the Russian market takes a wait-and-see attitude related to obtaining information about the success of blockchain projects abroad for their possible use in Russian conditions. Nevertheless, despite such conditions, the growth of the Russian market will be continued and, according to forecasts, reach over 75 million dollars by 2025, while the average annual growth rate compared to the current ones will double and reach a value of 24.1%. This is explained by the expansion of the development

and application of blockchain technologies in many other economic sectors in addition to the financial one.

Acknowledgement

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Policy Implementation for Providing Income Tax Holiday

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Abstract

Tax Holiday is one of income tax incentives that is being intensified by the Government of Indonesia to be able to increase foreign investment in Indonesia, which is included in the policies listed in the Economic Policy Package XVI. This study will discuss regarding implementation of tax holiday policy in PMK Number 150 / PMK.010 / 2018. This research was a qualitative approach and descriptive research. The results showed that there were three factors that caused tax holiday policy in previous regulations to not run optimally, namely the uncertainty factor in granting tax holiday decisions, bureaucratic factors and difficult requirements, and other factors besides tax, in the form of legal certainty, economic stability, and availability of infrastructure. The rules set forth in PMK No. 150 of 2018 are better compared to previous regulations, which are indicated by tax holiday policy that prioritizes certainty, convenience, and trust in taxpayers.

Keywords: Policy Implementation, Tax Incentives, Tax Holiday, Income Tax.

Introduction

Investment is one of the most important factors in increasing economic growth and development in a country. The emergence of globalization drives a country to pay attention to the tax system by making adjustment through tax reform in order to intensify fiscal climate which has implication on investment. (Setyowati, 2015) Based on economic development theory it is said that between investment and the level of economic growth has a reciprocal principle, where the greater the level of investment of a country, the higher the level of economic growth in the country. Indonesia as one of the developing countries, of course, also urgently needs investment to support the country's economic growth and development. There are several main driving factors that can influence investors in making investment decisions. In terms of benefits, the factors affecting investors are market reach, human resources, operational activities, property, and accessibility. In terms of risk, factors that are considered by investors are economic, political, environmental and security risks. While in terms of costs, the main considerations of investors are labor costs, taxation fees, incentive packages, and property costs. (Capital Investment Coordinating Board, 2018) Of the various factors that influence investment, the factors that also influence investment is the taxation cost and incentive package, therefore the Indonesian government is currently seeking to increase investment through a policy of providing tax incentives. There are many countries that drive tax incentives to attract more capital inflow to their countries. (Setyowati, 2018)

Many developing countries offer income tax incentives to encourage investment. Most often incentives are given to direct investors rather than portfolio investors. (Hardianti, 2019) One of tax incentives given by the Government of Indonesia is a tax holiday. Tax holiday is a form of tax incentive in the form of reducing Corporate Income Tax. Currently the tax holiday policy is regulated in the Minister of Finance Regulation (PMK) Number 150 / PMK.010 / 2018 concerning the Provision of Corporate Income Tax Reduction Facilities. PMK Number 150 Year 2018 was just issued on November 26, 2018,

which regulation is the result of revision of PMK Number 35 Year 2018 which was also actually just issued on April 4, 2018 to amend the tax holiday provisions from those previously stated in PMK Number 103 2016 which is a change from PMK Number 159 of 2015.

However, in fact the tax holiday policy stated in the previous provisions has not been able to fully meet the initial objectives of the establishment of the tax holiday policy. There are still many shortcomings and weaknesses contained in these provisions, where one of them can be seen from the lack of interest in investors who take advantage of the tax holiday policy. The reason is that tax incentives are not necessarily one of the main things needed by investors in investing in Indonesia. Therefore, considering that there are still many deficiencies in the previous tax holiday regulations which cause the main objective of providing tax incentives cannot be achieved, in 2018 the government made a major revision of the tax holiday provisions which resulted in the form of PMK legal product No. 35 of 2018 which came into force on April 4, 2018, where the regulation was made in such a way by the Government to be truly effective in attracting investors to invest in Indonesia. The existence of this policy is expected to increase investment enthusiasm in Indonesia, especially for basic and upstream industries. which is currently still very weak because it requires a large investment.

But not long after the enactment of The Tax Holiday policy as outlined in PMK Number 35 of 2018, recently the government revised the tax holiday provisions by issuing PMK Number 150 Year 2018. Whereas the tax holiday provisions in PMK Number 35 Year 2018 only lasted for 6 months , and the level of efficiency and effectiveness cannot yet be assessed considering the very short implementation period of the regulation. The latest tax holiday provisions listed in PMK No. 150 of 2018 are part of the XVI Economic Policy Package which is intended to encourage increased investment in Indonesia. In this regulation, the pioneering industry which has an investment value of at least Rp. 100 Billion is entitled to a reduction in corporate income tax on the income it receives. A tax reduction of 100% will be given to new investment companies with a value of at least Rp. 500 Billion, and a tax reduction of 50% will be given to new investment companies with a value of at least Rp. 100 Billion and less than Rp. 500 Billion. Through this provision the government has re-expanded the sectors entitled to receive tax holiday facilities, simplified the process of filing tax holiday facilities through a new method, and also introduced a mini tax holiday arrangement scheme. (Directorate General of Taxation, 2018)

Therefore, it is expected that the issuance of PMK No. 150 of 2018 is one of the Government's real efforts to revise the tax holiday provisions from what has been regulated in previous regulations. However, the question that still needs to be examined here is whether the revision of the regulation by the Government can really answer all the challenges that still exist in the previous regulation and whether the existence of this latest regulation can increase the interest of business actors to utilize the facilities. In consequence, this study will analyze what factors make the tax holiday policy before the issuance of PMK Number 150 Year 2018 is still not optimal and also the analysis of the implementation of the tax holiday policy contained in PMK Number 1150 Year 2018.

Literature Review

One of the fiscal policies provided by the government is the provision of tax incentives. According to Gunadi (2013), tax incentives are deviations from general tax provisions that reduce the tax burden on companies in order to encourage investment in certain projects or sectors. UNCTAD (2000) classifies tax incentives into several types, namely: *Reduce Corporate Income Tax Rate*, *Loss Carry Forward*, *Tax Holiday*, *Investment Allowance*, *Investment Tax Credit*, *Reduce Taxes on Dividend and Interest Paid Abroad*, *Presential Treatment of Long-Term Capital Gains*, *Deduction for Qualifying Expenses*, *Zero or Reduce Tariffs*, *Employment Based Deduction*, *Tax Credits for Value Addition*, dan *Tax Reductions/Credit for Foreign Hard Currency Earning*.

This research used policy implementation theory of Grindle (1980), theory which states that the success of the implementation of public policy is influenced by two main variables namely the content of the policy (content of policy), and the implementation environment (context of implementation). Both of these variables also include things such as the extent to which the interests of a group or targets or

target groups are contained in the contents of the public policy, the types and benefits that will be received by the target groups, as well as the extent of the desired changes from the public policy.

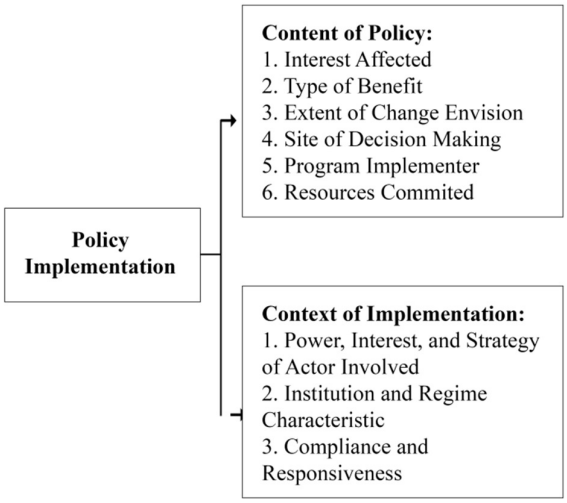

Fig 1. Research *Framework*

Source: Grindle, Marilee S. (1980)

In conducting research on the implementation of tax holiday policy in PMK Number 150 of 2018, researchers analyzed what factors made the tax holiday policy before the issuance of PMK Number 150 of 2018 was not running optimally. As well as analyzing how the policy implementation process runs by outlining each of the indicators contained in Grindle theory, namely content of policy and context of implementation. Factors that caused previous tax holiday policy to be still not optimal are (1) Uncertainty in granting tax holiday decisions; (2) Bureaucracy and difficult requirements, and (3) Factors other than taxes, such as legal certainty, economic stability, and the availability of infrastructure.

The following is a table of research results regarding the implementation of the tax holiday policy which is described based on each indicator:

Table 1: Matrix of Indicators of Content of Tax Holiday Policy in PMK Number 150 / PMK.010 / 2018

Indicators	Discussion
Interest Affected	The implementation of the tax holiday policy is in accordance with the interests of industry players who expect policies that are easier and more certain and is in accordance with the interests of policy makers who want this policy to be a factor driving investment.
Type of Benefit	Provides many benefits in the form of optimization and improvement of company feasibility and can increase the contribution of tax revenue in sectors other than corporate income tax.
Extent of Change Envision	Tax Holiday can provide a change in the form of increased investment in Indonesia, which can be seen in the long term.

Indicators	Discussion
Site of Decision Making	The decision to award a tax holiday is appropriate because it was carried out by the Director General of Tax on behalf of and for the Minister of Finance.
Program Implementer	The implementation of the tax holiday program has not been able to run optimally, because there are still some weaknesses such as the OSS system that is not ready to be directly used by taxpayer.
Resources Committed	Policy makers have succeeded in designing a tax holiday policy that is much better, but in fact the implementation process is still not as good as previously planned.

Table 2: Matrix on Environmental Indicators for Tax Holiday Policy Implementation in PMK Number 150 / PMK.010 / 2018

Indicators	Discussion
Power, Interest and Strategy of Actor Involved	The power, interests, and the strategies set forth in the implementation of the tax holiday policy can already be implemented properly, so to create a policy that is far better than before.
Institution and Regime Characteristics	The characteristics of Indonesian government institutions and regimes show that the Indonesian government still has weaknesses in the form of a difficult bureaucracy and licensing system.
Compliance and Responsiveness	The response of the industry players is quite good as evidenced by the increasing number of parties utilizing the tax holiday policy, but the industry players also still have criticisms related to weaknesses found in the process of implementing the tax holiday policy.

Research Method

Research on tax holidays conducted by researchers focuses on analyzing implementation of tax holiday policies as set out in PMK Number 150 of 2018 and also analyzing the factors that cause tax holiday policies before the issuance of PMK Number 150 of 2018 is not optimally utilized. In the process of qualitative analysis, the researcher will develop understanding and generalization that is close to concrete data or contexts, the author also usually uses fewer abstract theories. In general, the data analysis stages in this study include conceptualization, data coding / codification, and data interpretation. Qualitative data analysis begins by organizing data into categories based on themes, concepts, or other criteria. This stage includes making interview transcripts, scanning all available material, typing field notes, cataloging all visual material, and sorting and organizing data into various categories according to the source of the information. (Creswell, 2014) The next stage is to codify the data we have, that is, the researcher will organize the raw data into conceptual categories and form a theme or concept. This stage involves taking all data or images obtained at the data collection stage, making sentence segmentation or making categories of images, and making labels for those categories with a term.

In this study, researchers will use data collection techniques in the form of field research by in-depth interviews or qualitative interviews. Field research is a data collection technique, where the writer will conduct direct research and record records of human behavior in a natural background for a certain period. The author will conduct in-depth interviews with several industry players listed in 18 pioneering industry sectors in PMK Number 150 Year 2018 so that the author can dig up information about how the process of implementing the tax holiday policy in PMK Number 150 Year 2018 from the perspective of industry players. In addition to further supporting the analysis, in-depth interviews will also be conducted with tax holiday policy makers to find out how the tax holiday policy implementation

process is in PMK Number 150 of 2018 from the point of view of policy makers and implementers and to find out how their views related to policies this tax holiday.

The final stage in qualitative data analysis is to interpret the data that has been organized and codified in the previous stage. This interpretation can take the form of a personal interpretation of the researcher, the understanding that the researcher brings to the research that comes from personal culture, history, or experience, and can also be a meaning obtained from a comparison of research results with information obtained from a theory or literature.

Discussion

Factors That Cause Tax Holiday Policy Before PMK Number 150 Year 2018 Are Not Utilized Optimal

Before the issuance of the tax holiday policy in PMK Number 150 of 2018, the tax holiday policy had been implemented in Indonesia starting in 2011 as outlined in PMK Number 130 of 2011. However, tax holiday policy adopted in PMK Number 130 of 2011 had not been able to attract the interest of investors to take advantage of these policies. So that in 2015 the Government of Indonesia finally tried to improve the provisions on tax holidays by issuing PMK No. 159 of 2015. But in fact, the results obtained are still the same, the tax holiday provisions still cannot attract investors. Based on the data obtained there are only 5 companies that utilize tax holidays based on PMK Number 130 of 2011, whereas after the Government launched the revised tax holiday policy in PMK Number 159 of 2015 there were still no companies interested in utilizing the facility.

Departing from this fact, the Government of Indonesia finally in 2018 decided to make a radical change regarding the tax holiday policy as evidenced by the issuance of PMK Number 35 of 2018 which was then followed by the issuance of PMK Number 150 of 2018. Then after the publication of the latest provisions on this tax holiday little by little many investors began to look at the policy. Only in the period of 6 months since the issuance of PMK No. 35 of 2018 there have been 10 Taxpayers who have utilized the tax holiday facility. This certainly shows that the renewal of the tax holiday policy carried out by the Government was quite successful to begin to increase investor interest in utilizing the policy. So, there are many factors that cause the tax holiday policy in the previous provisions are still less attractive to investors and are still not running optimally. The following will be explained about these factors:

1) Uncertainty in Granting Tax Holiday Decisions

One of the factors that made the tax holiday policy in the previous provisions still not optimal and did not have many enthusiasts was due to the uncertainty factor in granting facility decisions. This uncertainty is caused because in the previous tax holiday provisions, namely in PMK No. 159 of 2015, the amount of tax reduction provided was not a fixed percentage and period. In Article 3 of PMK Number 159 Year 2015 it is stated that the reduction of Corporate Income Tax can be given at most 100% and at least 10% of the amount of Corporate Income owed. In addition, the period for reducing Corporate Income Tax is also given in a period of no longer than 15 tax years and a minimum of 5 tax years.

From these provisions, there is uncertainty for taxpayers who have applied for a tax holiday to get a reduction in corporate income tax. Because the deductions provided are in the range of 10% to 100%, a case may occur where two taxpayers with the same investment value get a different percentage of corporate income tax reduction. This is because in PMK Number 159 Year 2015 there are no special provisions that explain the amount of the percentage reduction in Corporate Income that will be obtained by the Taxpayer for investment invested. The provisions only state that taxpayers who can get a tax holiday are taxpayers who have a new investment of at least 1 trillion Rupiah. But there is no stipulation on what percentage the taxpayer will get if he invests 1.5 or 2 trillion Rupiah. In addition, the time period given also ranges from 5 years to 15 years, there is no definite provision that states that taxpayers with a certain amount of investment will get a reduction in a period of years. In the absence of a standard amount of reduction of Corporate Income Tax and a definite period of

reduction of Corporate Income Tax, it will automatically affect the interest of Taxpayers in utilizing the facility.

2) Bureaucracy and Difficult Requirements

The tax holiday provisions in the previous regulation do have a very long filing mechanism. In PMK 130 of 2011 taxpayers who wish to submit tax holidays must first submit an application to the Ministry of Industry or BKPM, which later on the request the Ministry of Industry and BKPM will first study the availability of infrastructure, absorption of domestic workers, fulfillment pioneering industry criteria, technology transfer plans, and tax sparing fulfillment in domicile countries. Only after the study is completed will the Ministry of Industry and BKPM then submit a proposal to the Minister of Finance to facilitate taxpayers to get a tax holiday. After the proposal is accepted by the Minister of Finance, a Verification Committee will be formed to verify and research the suitability of the business of the Taxpayer with the pioneering industry category. Only after the research has been completed and the Taxpayer is deemed to have met the requirements to obtain a tax holiday, the Verification Committee will then make a recommendation to issue a Minister of Finance Decree that the Taxpayer has the right to receive a tax holiday.

In addition to the complicated and time-consuming tax holiday submission process, one of the factors that also makes tax holiday applications even more difficult is the Verification Committee meeting must be held first. In the previous regulation, taxpayers can not directly determine that the industry belongs to the category of pioneers, although in its provisions it has been explained what industries are categorized as pioneering industries. So that taxpayers must go through the stages of the verification meeting in advance to find out whether it is true that the business is included in the type of pioneer industry that can get a tax holiday. This certainly provides uncertainty for taxpayers; the article is not necessarily the results of the verification meeting agreed that taxpayers are included in the category of businesses that can get a tax holiday. Seeing the tax holiday submission process, which is very difficult, it is only natural if this becomes one of the factors that is very influential why the previous tax holiday policy attracted only a few interested people.

3) Other Factors Than Tax

In addition to the two factors mentioned earlier, it turns out there is also one other factor that makes the tax holiday policy not yet run optimally, namely the non-tax factor. Which means that the main point of the issuance of the tax holiday policy is to increase investment and also to encourage investors to want to invest in Indonesia. Therefore, the Government of Indonesia issues a tax holiday policy in the hope that the facility can make investors more interested in investing in Indonesia. But another thing that actually must also be considered is, there are many other factors that can actually influence investors in investing their capital in a country other than the tax factor itself. The tax factor is not the only thing that investors consider in investing in a country.

There are other factors besides tax such as legal certainty, where legal certainty is one of the most important factors considered by investors to invest in a country other than the presence or absence of a tax incentive. In addition, there is also an economic stability factor, where investors will certainly prefer to invest in a country that has a high level of economic stability, because it can affect the sustainability of the business being run. As we know that economic conditions in Indonesia have not been able to show high stability. This of course also affects investor interest, where they would prefer to invest in countries that have high economic stability compared to countries that provide tax incentives but with low levels of economic stability. Another factor that also influences is the availability of infrastructure, with the existence of good infrastructure in a country will certainly be an attraction for investors to invest their capital. The current condition of Indonesia's infrastructure is also not yet fully adequate. Investors are still complaining about the poor quality of Indonesia's infrastructure, which is one of the main obstacles for Investors in investing in Indonesia. The tax holiday policy offered by the Government of Indonesia is meaningless for investors if the condition of Indonesia's infrastructure itself still has many weaknesses.

a. Implementation of Tax Holiday Policy in PMK Number 150 of 2018

Departing from the problems in the form of factors that made the previous tax holiday policy not optimal, in November 2018 the Government of Indonesia re-issued the latest regulation on tax holidays as outlined in the Minister of Finance Regulation (PMK) Number 150 of 2018. The latest provisions for this tax holiday expected to improve the previous tax holiday provisions and make it more optimal. Therefore, in this section we will explain how the tax holiday policy implementation process as set out in PMK No. 150 of 2018 will also be analyzed using Grindle's implementation theory (1980). In addition, the author will also explain about any fundamental changes contained in PMK Number 150 of 2018.

1) Basis for Amendment to Provisions in PMK Number 150 Year 2018

The first amendment, which is again expanding the scope of the pioneering industry to 18 sectors, where in PMK 35 of 2018 there are only 17 pioneer industry sectors. The second amendment, namely the introduction of a new scheme, namely a mini tax holiday, for investments with a value of 100 billion to less than 500 billion Rupiah, will still be able to obtain a 50% reduction in corporate income tax for a period of 5 years. The third amendment, namely the mechanism for filing a tax holiday in PMK No. 150 of 2018, has also been made through the Online Single Submission (OSS) system. The fourth amendment is to uphold the principle of certainty with a list of pioneering industrial sectors and a detailed list of KBLI for industries that are entitled to a tax holiday. So that for the Taxpayer whose business is already listed in the pioneering industry list and his KBLI is already listed in the KBLI details, if he submits a tax holiday, he will automatically get a reduction directly in accordance with the amount of investment he proposed if all his requirements have been met. The fifth amendment, namely there is a mechanism for filing tax holidays for industries that are not included in the pioneering industrial sector. The last change is, giving trust to WP to design investment plans according to the desired premises and will only be examined when it starts entering the stage of Beginning of Commercial Production (SMB).

Content of Tax Holiday

Based on Grindle's theory, one of the variables that can influence the implementation of public policy is the content of the policy itself or the content of policy. Therefore, in this section the researcher will analyze how the contents of the tax holiday policy set forth in PMK Number 150 of 2018 correspond to the matters covered therein as stated by Grindle (1980).

a) ***Interest Affected***

The interests of parties involved in a policy can certainly affect the implementation process of a policy. Same thing with the tax holiday policy set forth in PMK Number 150 of 2018, in the process of implementing the tax holiday policy, of course there are the interests of many parties who can influence the course of the implementation. The implementation of the tax holiday policy in PMK No. 150 of 2018 is influenced by the interests of the policy makers and the industry players. The interests of industry players demand that a tax holiday policy is easier and more certain. In addition, there are also interests of policy makers who indeed expect that this policy can be one of the factors that can encourage investment growth.

b) ***Type* of *Benefit***

In implementing a policy, there are certainly benefits that can be generated from the policy. One of the types of benefits generated by implementing the tax holiday policy is to help the development and growth of the industry. The benefits of the tax holiday policy for the company can also be in the form of increasing the feasibility or feasibility of the company itself. In addition to Indonesia's own taxation conditions, the tax holiday policy can provide benefits in the form of tax contributions in other sectors. With the tax holiday policy indeed, tax revenue from the Corporate Income Sector will be reduced, due to the exemption of Corporate Income Tax. However, the decrease in income from this income tax can be substituted with increased tax revenue from other sectors, for example revenue from the VAT or Income Tax article 21 sector.

c) *Extent of Change Envision*

One of the changes to be achieved by implementing the tax holiday policy is to increase investment growth in Indonesia. With the provision of tax holiday facilities, the Government of Indonesia hopes that the policy will become an attraction for investors to invest their capital in Indonesia. In addition, the tax holiday policy itself is intended to attract investors from the upstream industry, where the government hopes that the provision of these facilities can help the growth and development of the upstream industry. Providing facilities to the upstream industry is also carried out considering the upstream industry is a capital-intensive industry, which means that there will be a lot of labor absorbed, a lot of raw materials used, as well as a lot of capital goods invested, so this will hopefully have an impact on economic growth in Indonesia.

d) Site of Decision Making

In PMK No. 150 of 2018 the decision regarding the granting of reduction of Corporate Income is in the hands of the Minister of Finance. Article 6 of PMK No. 150 of 2018 states that the granting of a reduction in Corporate Income Tax is decided by the Minister of Finance after receiving a proposal for reducing the Corporate Income Tax submitted through the OSS system after the Taxpayer has completed all the application requirements. The authority to reduce the Corporate Income Tax is then delegated to the Director General of Tax to act on behalf of and for the Minister of Finance.

e) *Program Implementer*

The process of implementing the tax holiday policy in PMK No. 150 of 2018 especially for the implementation of the OSS program has not been able to run optimally. There is still a gap between when the policy is issued and when the OSS system can be fully used by the taxpayer. The OSS system could finally be completed and ready to be used around March or April 2018. This is certainly very detrimental for taxpayers who immediately want to apply for a tax holiday at the time the policy was issued. Taxpayers who should have been able to get a Decree granting the reduction of Corporate Income tax for a long time, must experience delays considering the OSS system cannot be fully used.

f) Resources Committed

HR involved in the process of implementing tax holiday policy consists of the policy makers as well as the industry players as the party that utilizes the policy. In the implementation of the tax holiday policy in PMK No. 150 of 2018, many parties played a role in the successful implementation of the policy. Policy makers have indeed succeeded in designing tax holiday policies that are far better than previous regulations, but in fact in the process of policy implementation there are still many shortcomings or problems that make the implementation of these policies cannot be as good and as good as what was previously planned.

2) Context of Tax Holiday Implementation

According to Grindle's theory, other indicators that also influence policy implementation are the implementation environment or the context of implementation. Therefore, in this section the researcher will analyze how the environment of the implementation of the tax holiday policy as set forth in PMK Number 150 of 2018 in accordance with the matters included in it as stated by Grindle (1980).

a) *Power, Interest, and Strategy Involved*

The highest authority in the implementation of the tax holiday policy is in the hands of the Minister of Finance, where the Minister of Finance will give the decision to grant the Corporate Income Tax reduction facility through the Director General of Taxes. In addition, in terms of interests, the tax holiday policy is certainly one of the tools or weapons used by the Government to encourage investment in Indonesia. With the growth of investment in Indonesia, it is certainly expected to help economic growth in Indonesia. So that the tip of the benefits targeted by the Government in implementing the tax holiday policy is for revenue productivity. Whereas for the strategy carried out by the Government, it is stated in Article 12 paragraph 3 of PMK Number 150

Year 2018 that for the income received and obtained by the Taxpayer from the main business activities, then there will be no deduction and collection of Income Taxes during the use period of the reduction of Corporate Income Tax without having to issue Free Certificate (SKB) withholding and collecting income tax.

b) ***Institution and Regime Characteristic***

As we know, the current Indonesian Government still has weaknesses in the form of a bureaucracy and a difficult licensing system. So, this also affects the process of implementing the tax holiday policy. Where in the implementation of the tax holiday policy in PMK No. 150 of 2018, although currently the mechanism for filing tax holidays has been increasingly shortened and carried out through the OSS system, but the requirements requested often still complicate taxpayers and the submission process is also often still beyond the term predetermined time. So it can be said that the successful implementation of PMK No. 150 of 2018 is very dependent on the conditions of the current Indonesian Government. All regulations that have been updated by such a way as to create a good and ideal regulation will be in vain if in its implementation the Government of Indonesia cannot commit to implementing the policy in accordance with the regulations.

c) ***Compliance and Responsiveness***

Since the issuance of PMK No. 35 of 2018 in April 2018, the number of companies utilizing tax holidays has increased significantly compared to the previous provisions. Only in a period of about 6 months, there have been 10 companies that managed to get a tax holiday facility. Then in November 2018, the Government renewed the tax holiday policy by issuing PMK Number 150 Year 2018. With the renewal of this reform, an increase in parties utilizing the tax holiday policy based on PMK Number 150 Year 2018 was also seen again. Until now the tax holiday policy set forth in PMK Number 150 of 2018 has been successfully utilized by 6 taxpayers. Therefore, tax holiday policy reform carried out by the Government by issuing PMK 35 of 2018 and PMK Number 150 of 2018 in fact was able to attract investors to take advantage of the policy. The reason is that only within 1 year of the issuance of changes in the tax holiday policy provisions, there have been 16 taxpayers who succeeded in getting the decision to grant a tax reduction. This is certainly far different from the policies set forth in PMK Number 130 Year 2011 and PMK Number 159 Year 2015, which within 5 years the policy only attracted 5 investors to take advantage of the policy. This shows that the tax holiday policy in fact can bring enough investment value to be invested in Indonesia.

However, with the increasing interest of the tax holiday policy in PMK No. 150 of 2018 it does not mean that the implementation of the tax holiday policy has been carried out perfectly and has no shortcomings. There are still many criticisms and suggestions from industry players regarding the implementation of the policy. Some criticisms that are still made by industry players include criticism about the implementation of the OSS system itself which often still makes it difficult for taxpayers and critics about the demands of taxpayers who want investment not only for new investments but also for their industrial activities.

Conclusion

Factors that caused the tax holiday policy before the issuance of PMK Number 150 Year 2018 did not run optimally include, the uncertainty factor in granting tax holiday decisions, bureaucratic factors and difficult requirements, and other factors besides tax, in the form of legal certainty, economic stability, and the availability of infrastructure.

The implementation of the tax holiday policy in PMK No. 150 of 2018 has been done quite well. Where the rules set forth in PMK No. 150 of 2018 are far better compared to the previous regulation, which is indicated by the tax holiday policy that prioritizes certainty, convenience, and trust in the taxpayer. The tax holiday application has also been carried out with the OSS system which makes the submission process shorter and more practical. But there are still some weaknesses in the implementation of the current tax holiday policy, such as the OSS system that is not immediately ready for use, and the time period for filing a tax holiday that cannot be completed within 5 working days.

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Improvement in Organizations - Decision-Making Problems

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Abstract

Modern businesses need to continuously improve their operations. Of course, they have many quality management instruments at their disposal, but they do not always know when and how to use them. The purpose of this paper is to prepare universal guidelines for companies introducing improvement activities. The paper presents a possible way to conduct research that enables easy diagnosis of the areas of operation of a company that require improvement, determination of their importance, and proceeding with their improvement. Moreover, it stimulates employee involvement in the process of improving the functioning of the company, which is consistent with the concept of continuous improvement. For these purpose, qualitative research (survey) was carried out among the personnel of the selected production company. The survey was carried out in few stages (initial and in-depth - regarding selected areas) using appropriately constructed questionnaires. Furthermore, there were carried out analyses of areas that were considered to be improved (information flow and quality of manufacturing processes). The analyses were conducted using quality management tools, such as: process mapping, pFMEA, Pareto-Lorenz diagram and System Utility Scale index. The presented analyzes confirm the need of introduction changes in the areas indicated by the employees.

Keywords: Improvement, Management, Quality

Introduction

In the modern economy, due to the processes of globalization and the growing competition, the importance of quality in all spheres of business management is increasing. Quality may relate to the product, the processes, the management and its methods, the functioning of company's departments, etc. The level of quality is constantly increasing. This is related to the improvement of offered products and implemented processes, which enable more effective use of owned and acquired resources in order to meet the growing needs of the market. Improvement of the entire organization can be achieved using specific quality management standards developed by ISO. However, some studies confirm that the operating efficiency of companies certified for compliance with the ISO 9000 standard deteriorates significantly, even though their sales revenues steadily increase (Chris et al. 2018). Moreover, the need for improvement may vary in different areas of a company. The question that arises is: How can one in an easy way diagnose the areas that need improvement in the first place? The authors considered this to be an interesting research area. Therefore the adopted goal of the paper was to present universal guidelines for companies concerning implementation of improvement measures. In addition, the justification for introducing changes in the indicated areas of enterprise functioning, according to the proposed method, was verified on the basis of analyses carried out on the example of a specific enterprise.

The structure of the work includes literature review, research questions, research subject characteristics, research methods and research results, followed by a discussion and conclusions.

Literature Review

One should bear in mind that quality is an essential element that determines a company's position on the market, its organizational development, and its ability to acquire new customers. It is impossible to imagine a company that operates on the market without meeting basic customer requirements and does not improve its functioning or the products it offers. However, only those companies that consider quality as a philosophy that constitutes a basis of their development have a chance to thrive in the market (Čiarnienė and Vienažindienė 2015). For example, Adam et al. (2001) treat quality as a vital component of the business strategy, while quality improvement is, according to them, a strategic variable in a highly competitive economy. In every business, regardless of its size, there are quality problems, which may concern its core business or supporting processes (Bozarth and Handfield 2019). In order to maintain the level of quality required by the market or to stay ahead of the competition in a given area, companies should implement the continuous improvement model proposed by Deming (1952). M. Imai (1986) also drew attention to the importance of small steps in the pursuit of perfection. Continuous improvement is a part of comprehensive quality management (TQM). According to Konecny and Thun (2011) TQM is a kind of management philosophy that helps manage the organization in order to improve its effectiveness and performance. There is a lot of research proving that continuous improvement affects the quality, innovation of enterprises, employee participation, customer satisfaction and other areas of enterprise functioning (e.g. Zehir et al. 2012, Besterfield 2009, Ahmad et al. 2012 etc.). Effective management of the improvement process is becoming a problem for managers making decisions regarding the areas of the enterprise's operation that should be improved, as well as the scope of required changes. Moreover, Stashevsky and Elizur (2000) suggest that participation in decision-making is the most important component of the TQM process that affects the improvement efforts and individual performance of enterprises.

The scientific literature on quality management includes multiple studies on improvement methods and instruments available to companies (Ślusarczyk 2016, Baskiewicz 2017). However, there are no specific guidelines for a simple diagnosis of the functioning of company's individual areas that require improvement. One of the most interesting studies in this area is the study by Sanchez et al. (2020), who prepared and tested a method for studying quality management systems by analyzing key performance indicators of sustainable scorecards in production environments. Another example is the roadmap for industrial practitioners with a diagnostic tool for companies, presented by Bastas and Liyanage (2019*),* combined the principles of quality management, supply chain integration, and sustainable development of an organization. However, the path of improvement presented in this paper is universal and can be applied in any entity present in the market.

Research Questions

The achievement the purpose of this paper, which was to prepare guidelines for companies concerning implementation of improvement activities, required posing several research questions:

1. How else can one diagnose the areas which need to be improved?
2. How can one determine the importance of these areas in terms of the need for improvement?
3. What are the benefits of implementation of the proposed improvement path?

Answers to the above questions were found during the implementation of a study conducted using the example of a specific company, in which the proposed path of improvement was implemented.

Research Design and Methodology

Characteristics of the studied entity

For the purpose of this study, a furniture industry company was selected that operated in the Łódź Province and manufactured various types of kitchen furniture sets for both individual (85%) and business customers (15%) from Poland and abroad. The number of its customers in 2010-2018 is shown in Figure 1.

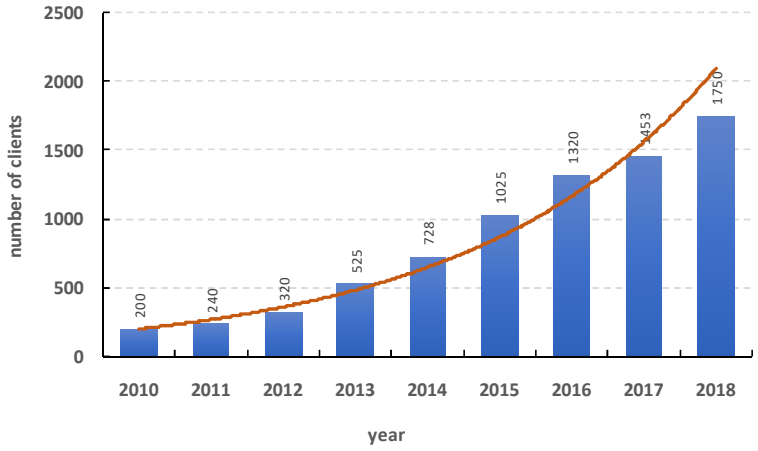

Fig1: Number of customers of the studied company in the years 2010-2018
Source: own elaboration

The fulfillment of orders from business clients (developers, public institutions) brings about 55% of the company's revenues. Currently, the company is one of the largest manufacturers of kitchen furniture in central Poland. In addition to its production plant, the company has branches in Romania, Ukraine, Slovakia, and the Czech Republic, where some of the orders are fulfilled. The company had to increase its workforce from 15 in 2010 to 184 in 2019.

Methodology

Table 1 shows one of the possible procedure of the decision-making process to obtain information on the functioning of processes taking place in a company and the need of improvement.

Table 1: Procedure of the decision-making process regarding the improvement of enterprise functioning

Phase I. Preparation for design of a study
– Getting initial management approval; – Definition of the main objectives of the study; – Education of mid-level management and other staff concerning the conduct of the study; – Preparation of a continuous improvement program.

Phase II. Design of the concepts of the study - preliminary diagnosis
– Separation of information sources (forecasts, recovery programs, expertise, strategies, audits, annual reports, business plans, knowledge and experience of internal stakeholders, executives, specialists, and employees; knowledge and experience of external stakeholders, supervisory board, shareholders, and others); – Analysis of the collected empirical material and indication of initial directions of improvement or areas for improvement.
Phase III. Design of the study
– Definition of the objectives and results of the study; – Development of the rules for evaluation of specific phenomena; – Development of the scope of the study; – Development of the instruments to be used in the study; – Definition of problem areas, i.e. who influences the study and who is to be influenced by it; – Formulation of requirements for the studies to be carried out; – Determination of the time and date of the study; – Determination of the outlays and costs of the study.
Phase IV. Performance of the study
– External environment of the company; – Internal environment of the company.
Phase V. Analysis and evaluation of the results
– External analysis (experts); – Internal analysis (managers).
Phase VI. Use and implication of the results
– Control of the processes of the study; – Continuous restructuring of the study.

In fact, the people responsible for making decisions on improvement activities can adapt these guidelines to their needs. So it was in this case – using the guidelines a study was conducted, which consisted of several stages.

In the first stage of the study, there was conducted a survey among the personnel of the selected enterprise. The study concerned the areas of the company's operations that, according to the staff, needed to be improved. The research tool used was a questionnaire addressed both to superiors (managers) and operational staff (the so-called first-line employees). The respondents answered questions about the functioning of the enterprise, i.e. the need to introduce changes, areas in which changes should be introduced, the involvement of their and superiors in the process of improving the functioning of the enterprise, the frequency, legitimacy and effects of introducing changes in the area of operation of the enterprise in which they participate, etc. In the survey, a total of 7 main questions were asked, most of which were closed and 1 semi-open - allowing to add own answer (in this question the option of selecting more than 1 answer was also used). In some questions, the Likert scale was used. During this part of the study, 124 questionnaires (including 11 from superiors) were collected.

On the basis of the results obtained, an in-depth study was prepared to determine the impact of these areas on the functioning of the company. As a result of the in-depth study, 164 questionnaires were

collected, including 149 from the so-called lower-level employees and 15 from superiors. The respondents had to assign the rank (Likert scale) to individual area types (AT) in the context of their importance for improving the functioning of the enterprise. The following scale was adopted: 1- area currently the least important for improving the functioning of the enterprise to 6 - the most important area in the context of improving the functioning of the enterprise. The data collection process in both surveys was very short - 2-3 business days, because each employee was given a survey, which took no more than a few minutes to complete.

Then, in the AT of greatest importance, analyses based on the company's internal data on the share of non-compliance in these areas were carried out. Available quality management tools - process mapping, pFMEA, as well as System Utility Scale - were used to examine these areas to indicate the legitimacy of introducing changes and possible directions of these changes.

Results

As a result of first survey, many areas for improvement were identified and grouped into six AT: quality of manufacturing processes (QMP), costs (C), order fulfillment lead time (OFLT), occupational safety (OS), information flow (IF), and environmental impact (EI). A graphic interpretation of the importance of AT is shown in Fig. 2.

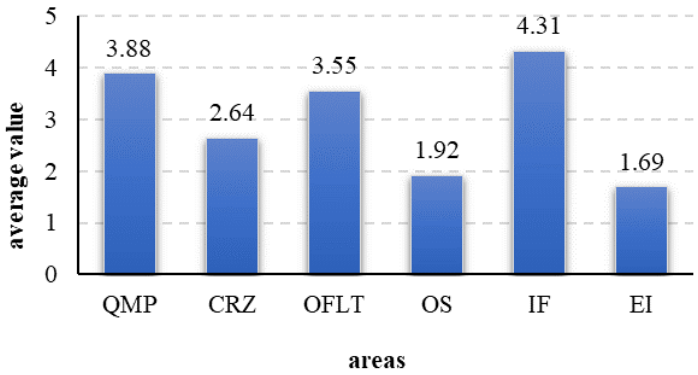

Fig2: Structure of importance of the opinions for the following factors: QMP, C, OFLT, OS, IF, and EI

Source: own elaboration

On the basis of the study conducted with the participation of the company's employees, the areas which are priorities for its operation improvement were identified, namely:

"IF" > "QMP" > "OFLT" > "C" > "OS" > "EI."

Due to the fact that the quality of manufacturing processes (QMP) and the information flow (IF) turned out to be the priority areas in the operation of the company in the opinion of the employees, a decision was made to analyze them in more depth. The other areas were considered as ones that did not require major changes at the time of the study.

The quality of manufacturing processes

In the studied case, only the main manufacturing process is presented. However, in order for it to begin, it must be preceded by the design phase which includes measurement, design creation, and ordering and storage of materials and semi-finished products. Then, there was performed an analysis

of the company's documentation concerning the existence of non-conformities and the reasons for their occurrence in the production process. Figure 3 shows the percentage share of non-conformities in the years 2010-2019.

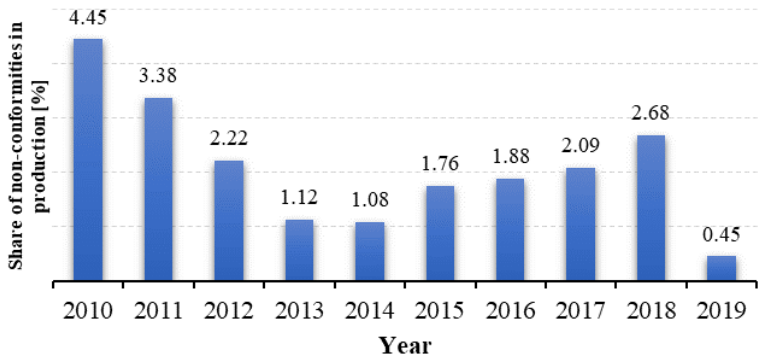

Fig. 3: [%] Share of non-conformities in production in the years 2010-2019
Source: own elaboration

In order to assess the course of the manufacturing process, a generalized model was developed (fig. 4).

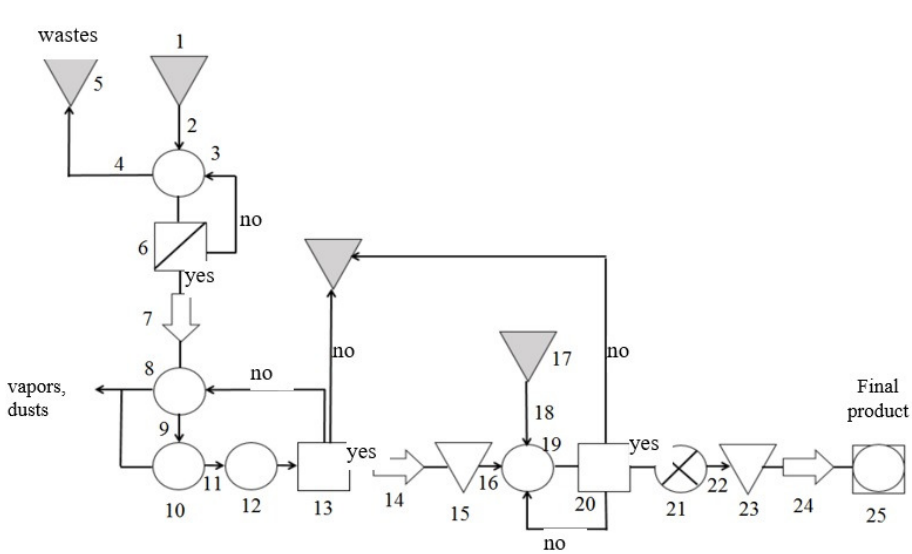

Fig. 4: Diagram showing the technological process pertaining to the product
Source: own elaboration

The most important operations (fig 5) include:

1. Taking boards from the materials and raw materials warehouse.
2. Transportation of boards to the board saw stand.
3. Board cutting operation.
4. Transportation of waste to the place of storage.
5. Storage of waste.
6. Checking the dimensions of the boards.

7. Interdepartmental transport to the grinding station.
8. Grinding operation (dusts and fumes are produced).
9. Transport to the painting (veneering) station.
10. Painting operation (dusts and fumes are produced).
11. Transport to the drying station.
12. Drying operation.
13. Inspection of components.
14. Interdepartmental transport to the inter-departmental warehouse.
15. Storage in the inter-operational warehouse.
16. Transportation to the assembly station.
17. Taking other components (handles, feet, screws, drawer and cabinet mechanisms) from the materials and raw materials warehouse.
18. Transportation of finished components to the assembly station.
19. Pre-assembly operation.
20. In-process control.
21. Finishing + packaging.
22. Transport to the warehouse.
23. Storage of finished products.
24. Transport to the customer.
25. Final assembly + control.

The activities comprising the production process selected on the basis of the process diagram (Fig. 5) became the starting point for the pFMEA. The pFMEA was used to indicate the type, place and causes of non-conformities. The pFMEA was performed in the following manner: each non-conformity assessed was assigned a number on the scale of 1 to 10 according to the following three criteria:

- frequency of the defect (risk of defect occurrence – O);
- importance of the non-conformity to the customer (S);
- level of detection (probability that a given non-conformity will not be detected by the manufacturer and will reach the customer – D).

Based on the estimated criticality figures, the Risk Priority Number (RPN) was calculated. In the production process covered by the study, it was assumed that the level of the RPN that is considered acceptable is 100, and if it is reached or exceeded, appropriate corrective action must be taken. The results of the pFMEA (Tab. 2) were also compared to the opinions of the employees supervising the analyzed process.

Table 2: Results of the pFMEA

Stage of the process	Type of non-conformity	Effect	Cause	O	S	D	RPN	Corrective actions
Board cutting operation	Achieving the wrong dimensions	Lack of ability to continue the process, Increase in costs, Increase in time	Haste, Incorrect design, Incorrect machine settings	9	8	4	288	Design control, Coordination of machine settings
Grinding operation	Achieving the wrong surface	Destruction of material, Increase in costs, increase	Incorrect machine settings, Haste	6	4	7	168	Design control, Information flow control, Materials control, Human

		in production time						resources coordination
Painting operation (veneering)	Achieving the wrong surface	Destruction of material, Increase in costs, increase in production time	Incorrect machine settings, Haste	6	4	7	168	Design control, Information flow control, Materials control, Human resources coordination
Drying operation	Achieving the wrong surface	Destruction of material, Increase in costs, increase in production time	Inappropriate drying conditions	5	4	7	140	Design control, Information flow control, Materials control, Human resources coordination
Taking materials from the warehouse	Taking the wrong materials	Lack of ability to continue the process	Haste, Wrong design	8	1	1	8	Design control, Information flow control, Materials control, Human resources coordination
Assembly operation	Achieving the wrong end product	Increase in costs, Increase in production time	Haste, incorrect design, lack of appropriate tools	2	8	1	16	Information flow control, Design stage control, Human resources coordination
Control	Accepting an incorrectly made product	Customer dissatisfaction, increased costs, Increased production time	Lack of employee focus, Haste, Wrong design	1	7	2	14	Design control, Information flow control, Materials control, Human resources coordination
Finishing	Achieving the wrong end product	Increase in costs, Increase in production time	Haste, incorrect design, lack of appropriate tools	3	7	2	42	Design control, Control of finished items, coordination of human resources
Storage of finished products	Damage to the finished product	Increase in costs, Customer dissatisfaction	Haste, improper packing, improper storage	2	9	3	54	Control of the storage stage, coordination of human resources
Installation at the customer's house	The finished product does not meet expectations	Increase in costs, increase in production time Loss of customer’s trust	Haste, improper design, improper storage of the product	4	10	1	40	Design control, Control of finished items, coordination of human resources

Source: own elaboration based on the company's source data

The pFMEA demonstrated that the highest risk of non-conformity occurs in the board cutting process (RPN = 288). Another important mistake is to achieving a surface that does not conform to the accepted process description, both during the grinding process (RPN = 168) and the painting process (RPN = 168). Repairing errors that occur during the grinding and painting operations requires a considerable amount of time and delays the next stages.

Information - flow

An important element indicated by the respondents is the information flow, which is largely responsible for the proper functioning not only of the manufacturing process, but also of the entire company. The following ways of information flow in the company were distinguished: correspondence (C), information board (IB), newsletter (N), electronic information flow (EIF - messenger software, filling in data in the IT system), consultations (CN), and meetings (M). Due to fact that EIF is used to implement the company's basic activities, a study was conducted on the generation of non-conformities arising in the course of its use. Fig. 5 shows the percentage share of non-conformities generated with the use of the EIF system in the company.

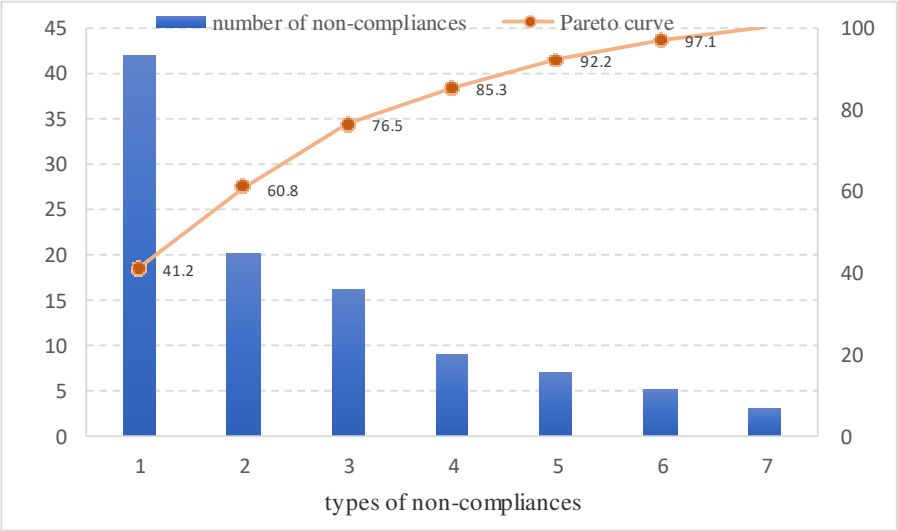

Fig. 5: Pareto-Lorenz diagram showing the percentage share of non-conformities and their cumulative share for the adopted test period: 1-non-conformities with regard to the quantity of stock in the warehouse, 2-non-conformities with regard to the type of stock in the warehouse, 3-missing materials accepted into the warehouse, 4-incorrect scheduling of production time, 5-incorrect cost calculation 6-incorrect planning of semi-finished products for work in progress, 7-overload of working nodes.

Non-conformities generated by the EIF system result mainly from incorrectly conducted inventories, mainly due to the haste of the employees and disruptions in the communication between organizational units, and from incorrectly entering data concerning the amount of materials, components, and semi-finished products in the warehouse into the system. Another common issue is failure to record the use of materials, components, and semi-finished products in the IT system.

In view of the results concerning the non-conformities arising with the EIF system, a decision was made to take a broader look at the specific method of communication by simply method - System Usability Scale (SUS) created by J. Brook. There was developed a questionnaire consisted of ten deliberately designed and appropriately organized questions, which concerned the effectiveness of the IT system in the company's production activities. The survey involved 40 employees who directly used the analyzed system. In their assessment, the respondents used a 5-point Likert scale. For questions 1, 3, 5, 7, and 9, the respondents awarded from 0 points, if they strongly disagreed, to 4 points, if they strongly agreed, and for questions 2, 4, 6, 8, and 10, the reverse scoring method was applied. On the basis of the results, the value of the SUS (System Utility Scale) index was calculated.

The value of the SUS index was calculated in this case by adding the points obtained and multiplying the result by 2.5, and then calculating the average. When interpreting the result obtained, a rule was adopted according to which the higher the value of the SUS index, the higher the usefulness of the IT system in the production activity of the company. In the case covered by the study, it was assumed that the value of the SUS index exceeding 68 would be a satisfactory indicator.

Table 3: Evaluation of the effectiveness of the IT system used in the company covered by the study

No.	Aspects of effectiveness of the system	evaluation					Score according to the SUS
		0	**1**	**2**	**3**	**4**	
1	*When working on a project, I often use the system*	0	0	6	10	24	138
2	*I use the system to generate all data necessary for performance of individual project tasks*	0	0	18	4	18	120
3	*For tasks related to the implementation of individual technological operations, I often use other sources/applications that are not a part of the IT system*	0	10	5	5	20	115
4	*I need additional technical support while using the system*	31	4	5	0	0	14
5	*System functions are easily accessible*	27	12	0	1	0	15
6	*There are many inconsistencies in the system I use*	24	11	5	0	0	21
7	*I am afraid that using only the current IT system for production activities may provide incomplete data on the technological processes being carried out*	0	5	1	17	17	126
8	*The system is cumbersome to use*	0	18	15	7	0	69
9	*The use of the IT system improves the course of the production processes in progress*	0	16	16	8	0	72
10	*Using the system makes it possible to manufacture high quality products that are always in line with the design objectives*	0	0	1	25	14	133
							SUS=51.44

Source: own elaboration

According to the study, the main aspects that need to be corrected or improved are the functions of the system, its lack of coherence, and the use of additional tools due to the lack of their inclusion in the system. According to the SUS at the level of 51.44, it was found to be unsatisfactory for the company and, therefore, targeted action should be taken.

Discussion and Conclusion

In order to meet the customer's requirements, modern company is forced to manage its processes so as to respond to the growing changes in the environment and the individualization of customer needs and expectations. Management of the processes taking place in a company is defined as the control of

the information and decision-making system implemented at different levels of the organization, which is intended to ensure elimination of existing and potential threats detected in the environment, as well as taking advantage of emerging opportunities. Information in an organization and in management of processes taking place in a company can be used for the purpose of a thorough analysis of production structures and the principles and effectiveness of their activities, as well as for developing concepts for improvements and development forecasts. Thanks to the information and the design of its flow, the company can better adapt to the requirements of its environment. However, in the event of excessive quantities of data, which an average manager finds difficult to process, a particularly valued functionality of information systems is a way of performing the process of data acquisition and development that, after appropriate processing, is a source of knowledge used, among others, in the processes of improvement of the organization. The main contribution of this paper is proposal of a path related to making decisions on improving given areas of the enterprise. This path involves all employees in the decision-making process, which is important for the company's achievements (Stashevsky and Elizur 2000). Moreover, it is distinguished by its simplicity and ease of implementation, because it consists of collecting information from employees involved in given processes. Using a simple ranking assessment made by employees, the importance of areas for improvement can be determined. Furthermore, it is noted that it does not require consultation of industry specialists to help improve the management system, as is the case with the methodology proposed by Sanchez-Marquez et al. (2020), which focuses on efficiency management. In addition, the study presented herein contains an example of the application of the proposed path of improvement, which is lacking, for example, in the study of Bastas and Liyanage (2019) which links quality management, supply chains, and sustainability.

An additional advantage of the study is the verification of the legitimacy of introducing changes in the areas indicated by the respondents, which was carried out by analyzing the share of non-compliance. In the case of the QMP, share of non-conformities in production in the years 2010-2019 is presented. The pFMEA for this area showed that the greatest risk of non-compliance occurs in the board cutting process (RPN = 288). The corrective actions recommended during the aforementioned operations include design control, coordination of the work of employees, and development and adaptation of the information flow for the process. An appropriate division of responsibilities can help to eliminate the rush which, according to the opinions expressed by the employees during the consultations, is the cause of most of the mistakes made.

However, in the case of the IF, the share of non-compliance with their types was presented over a period of one year - 2019. The most frequent non-compliance were errors in data regarding the quantity (41.2%) and type of inventory in the warehouse (19.6%). In turn, thanks to the use of the SUS tool, it was possible to indicate the aspects in which changes are needed (system functionality and the need to use technical support).

Of course, there are some limitations to this method of determining the improvement needs. The survey is based on the respondents' answers, which are employees of the company. One can imagine a situation when an employee directed by his own motives assesses well the process in which there are many errors. Therefore, it becomes important to make employees aware of the importance of continuous improvement for the functioning of the enterprise.

The proposed path for determining the directions of improvement includes both qualitative and quantitative research (survey and quality management tools). However, the proposed path must be repeated to contribute to continuous improvement. This raises new research questions - regarding the frequency of its use, the choice of whether it is to be used periodically or only after making changes in processes, and regarding the risk of routine adversely affecting respondents in completing the necessary surveys. Nevertheless, the effects of corrective actions taken in the surveyed enterprise should be checked by repeating the research.

On the basis of the study conducted for a specific company, it was proved that the recommended path of improvement is feasible. Following the guidelines provides valuable information on the areas of the company's operations that need to be improved. A simple ranking can be used to determine the importance of areas that require improvement. What is more, this method engages all employees in the improvement process, which is the basis of quality management in a modern company.

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Process Management of Patient Engagement – A Challenge for The Health Care System

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Abstract

The provision of high quality, safe, effective and patient-oriented health services requires a comprehensive and coherent approach to the management of processes implemented in the health care system. It is particularly important to cooperate at all levels of the system to engage patients in decision-making regarding health services. The involvement of patients, their families and communities is a broad concept of capacity building of the patient to actively participate in managing their own health and care. The result of such an approach are the benefits relating to the quality of health services, focusing on the patient, better health outcomes and effectiveness of the health system. In order to ensure the effectiveness of undertaken actions, it is necessary to manage processes of patient engagement, which means a comprehensive, continuous and systematic use of methods and tools for influencing the processes undertaken to meet the needs of patients and the system in terms of increasing participation. The issues discussed in the article concern the key issues of process management of patient engagement. The purpose of the article is to present and analyse the essence and role of patient involvement and to identify the premises, conditions and ways of managing engagement in a process approach. The article is a conceptual and research and was developed based on an in-depth analysis of literature, documents and interviews. Based on the analysis, a conceptual model of process management of patient involvement was proposed, taking into account the main tasks and participants responsible for their implementation at the organisational level.

Keywords: Patient Engagement, Health Care System, Health Care Management, Process Management.

Introduction

The smooth functioning of the health care system is a challenge for policy makers responsible for social policy. In the face of globalisation challenges, especially of a social, demographic, environmental, technological, economic, as well as political and legal nature, health care systems are forced to search for new concepts, approaches and methods of action to ensure effectiveness. According to the World Health Organization, the health care system includes all activities whose main purpose is to promote, restore or maintain health (WHO, 2000). In this context, the system's activity has a wide, complex and multi-faceted scope and requires the participation of many entities at various levels: macro (system level), meso (inter-organisational) and micro (institutional - directly related to the performance of activities). In a broad sense, "health care system is a whole of political, economic and cultural, technical and organisational factors, relations, processes and elements, in which individuals, groups and communities interrelate, having the goal to satisfy their health needs" (Kovacic and Jaksic, 2013, p. 101). The main components of the effectiveness of the health care system include patient health status, patient satisfaction and access (availability, utilisation, timeliness) and quality of care (efficacy, safety, continuity) (Kruk and Freedman, 2008). In a well-functioning health system, the provision of services should have the following features: comprehensiveness, accessibility, coverage, continuity, quality, person-centeredness, coordination, accountability and efficiency (WHO, 2010).

High-quality health services, ensuring patient satisfaction, require proper definition of the role of patients and the use of their potential in the treatment process by engaging them in decision-making and organisational (communication) processes. The primary premise should be focus on the patient and his needs, strengthening the role of the patient, conducive to ensuring efficient communication enabling active participation of the patient in the decision-making process regarding care.

Research Procedure

The starting point in the research process was the assumption that patient engagement is an important component of health services, covering a wide area of activity at the system and organisational level. In this context, it should be assumed that for the smooth functioning of the health care system, a comprehensive and coherent approach to engaging patients in decision-making about care, directed at conscious and active cooperation for the health condition, is necessary. To ensure effectiveness, a process-based approach to patient engagement management is necessary, which means targeted, comprehensive, continuous and systematic action, integrated within the entire health system and coherent with the objectives of the implemented health policy. In the article, the authors attempted to answer the following research questions:

- what is the essence of the patient engagement and his role in the health care system,
- what are the premises and conditions for managing process of patient engagement,
- what activities are key aspects of managing patient engagement in the process approach.

The article is a conceptual and research and aims to analyse the essence of patient engagement and its role in the functioning of the health care system, and to identify the premises and determinants of management aspects of involvement in a process approach. To achieve the adopted goals the following research methods were used: literature study (a review and in-depth analysis of scientific literature), document analysis (review and analysis of documents, reports and legal acts), and to explore the research problem - preliminary individual semi-structured interviews with experts (hospital managers). Based on the analysis, a conceptual model of process management of patient involvement was proposed, taking into account the main tasks and participants responsible for their implementation at the organisational level. During the analysis and evaluation of the examined process, mapping methods were used, enabling the development of graphic form of the model. For this purpose, iGRAFX software was used. The final stage of the research procedure is the formulation of conclusions and recommendations relating to the conditions for managing patient engagement in a holistic, integrated and consistent manner at the system level.

The Essence and Role of Patient Engagement in The Health Care System

One of the fundamental functions of health systems is the provision of patient-centred care. The World Health Organization defines this concept as services that are organised around the person, not the disease or the financing, which are perceived by people (being partners in their own health care) as responsive and are accepted by them, and the target population takes part in service delivery design and assessment (WHO, 2010). Patient focus is not just a guideline for health care providers on pro-quality activities. It means a way of thinking based on treating service recipients as equal partners and recognising their rights to participate in planning, developing and monitoring care to ensure that their needs are met (Health Innovation Network, 2016). This approach requires strengthening the patient's position in the system and engaging to actively participate in deciding on the treatment process. Strengthening the patient's position (patient empowerment) involves undertaking a range of activities including: facilitating patient communication with medical professionals, educating and providing access to health knowledge (promotion, raising awareness and stimulating self-criticism), enabling access to personalised medical information, supporting self-care and commitment to health management , helping them make informed decisions regarding the choice of care options (defining the problem, presenting options and consequences, value elicitation and referral to support services) and providing contacts with other patients (supporting self-education and individual responsibility, encouraging to take initiatives to help other patients) (Alpay et al, 2011).

As a consequence of this approach, the position and role of patients in the system changes radically. They become not so much recipients of health services but above all conscious participants in the treatment process. To make this possible, there must be a number of changes in the system that will enable the patient to be involved in making decisions about his own health and medical care. The concept of patient engagement means the "process of building the capacity of patients, families, carers, as well as health care providers, to facilitate and support the active involvement of patients in their own care, in order to enhance safety, quality and people-centredness of health care service delivery" (WHO 2016, p. 3). In general, it is "a broad concept that combines a patient's knowledge, skills, ability and willingness to manage his or her own health and care" (Strudwick et al, 2019, p. 4). The broad context of this concept refers to the significant scope of impact. Engagement applies to the patients themselves, as well as their families and representatives, health professionals, operating under active partnership at various levels throughout and also to the entire health care system (direct care, organisational design and governance) to improve health and care health (Carman et al, 2013). Such multilateral cooperation is necessary because engagement is a complex concept; it can involve various aspects of care such as participation in the decision-making process, self-treatment, self-monitoring, patient education, goal setting or participation in the treatment process (Longtin et al, 2010).

This inclusive approach to patients, giving them subjectivity generates benefits for both the patient and the health system. In the individual dimension, it contributes to the improvement of treatment results, while in the institutional and systemic dimension it is a source of benefits in the areas of management, organisation (organisational culture), and economic and educational. Patient engagement in their own care, as a function of improving communication between the patient and the provider and facilitating information transparency, fills the gap between patients' expectations and the services provided (Birkelien, 2017).

This concept is recognised as a critical part of the continuously learning health care system or a necessary condition for the redesign of health care systems, the implementation of which are supported by aspects such as: a) benefits of work related to patient- and family-centred care and joint decision-making reflecting and accelerating the changing roles of patients and families in health care (patients become more active, informed and influential), b) effects in the form of better health outcomes (quality and safety of patients), as well as c) control of health care costs (Carman et al, 2013).

It is pointed out that the engagement of patients, their families or communities is the foundation of effective management practices, and approaches to increase community members' perspectives are widely promoted in management education and professional standards (Linnander et al, 2017). In addition, it is one of the strategies that allow achieving a triple goal of improving health outcomes, better patient care and lower costs (James, 2013). Taking into account the multidimensional nature of the patient engagement, it is considered as a "meaningful and active collaboration in governance, priority setting, conducting research and knowledge translation" (SPOR, 2014, p. 5).

In conclusion, it should be emphasised that patient engagement, being the immanent feature of health services characterised by high quality, focus on the patient and effectiveness, can play an important role in improving the health system and developing health services. However, in order for the benefits of this approach to be felt by the patient, as well as participants and stakeholders of the health system, a systematic management approach is necessary, focused and collaborative, taking into account the specificity of processes involved in engaging patients.

Premises and Conditions of Process Management of Patient Engagement

Restoring or maintaining the health of patients, as the goal of health systems, requires state efforts to define a framework for action and provide resources according to the policies of health, which is part of social policy. In this sense, economic efficiency and clinical effectiveness of the health system are important, but at the same time the attitudes of people using the services of this system are particularly significant (Nojszewska, 2011). Designed healthcare management systems should

therefore take into account the special role of patients, their changing needs and the impact of their attitudes and behaviours on the effectiveness of medical processes.

In a systemic approach, health care management is defined as “the process of achieving health care objectives through human, financial, and technical resources – includes strategic and operational management activities such as supply chain management, human resources management, performance management and improvement, financial management, and governance, without which resources cannot be effectively deployed to maximise health outcomes” (Linnander et al, 2017, p. 555). The goal of care management is to assist patients and improve their functional health status, enhance care coordination, reduce costs, eliminate duplication of services, and reduce the need for medical services (Bodenheimer and Berry-Millett 2009).

Management of patient management includes a number of processes necessary for building capacity of patients to a conscious and active participation in decision-making related to health care. The complexity and multidimensionality of these processes is related to three critical aspects of patient engagement such as: engagement activities range along a continuum (from consultation to partnership and shared leadership), engagement occurs at different levels and many factors affect patients' willingness and ability to engage (Carman et al, 2013). Patient engagement is a “process-like and multi- dimensional experience, resulting from the conjoint cognitive (think), emotional (feel), and conative (act) enactment of individuals toward their health management" (Graffigna et al, 2014, p. 1).

Taking into account the safety aspect of health care, the World Health Organization identifies five main categories of factors affecting patient engagement, relating to: patient (demographic characteristics, health literacy), health conditions (disease severity), health care professionals (knowledge and attitudes), tasks (degree difficulties, competence challenges) and the health care setting (e.g. primary or secondary care) (WHO, 2016). Among the factors related to medical professionals that negatively affect the patient's engagement are: willingness to maintain control, time needed to train the patient and respond to his opinion, type of disease, personal beliefs, specialisation, ethnic origin and insufficient training in the concept of increasing patient engagement (Longtin et al, 2010). Therefore, at the institutional level, it becomes necessary to support workers, improve their communication skills, establishing rules, standards strengthen the organisational culture oriented on the active cooperation of the patient, his family and surroundings.

The ability and willingness of patients to engage in health matters is also significantly influenced by the cultural context of the country or community, including social norms, legal regulations, beliefs and social determinants of health (Edgman-Levitan et al, 2013). Factors with a broader impact that affect the participation of patients and their families and caregivers in health care decision-making processes include: development of patient-centred health care systems to ensure the improvement of the quality of treatment for all patients, the possibility of individual therapeutic treatment for each patient, better understanding of diseases and treatment effects, promoting scientific research and communicating results to the public, participation of caregivers in representing the charges and increasing awareness about health and diseases in the whole society (ELF, 2020).

The multiplicity and complexity of tasks related to patient engagement justifies a process-based approach to management, manifested in the purposefulness, coherence and wide range of activities, integrated into the entire health care management system. Process management is "comprehensive, continuous and systematic application of appropriate concepts, methods and tools for influencing the processes taking place in the organisation, aiming at achieving the organisation's goals and the best satisfaction of the needs of its external and internal clients" (Nowosielski 2009, p. 75). For the process approach in management, the systematic treatment of the organisation, which is a set of interrelated and interpenetrating processes, is characteristic (Hammer and Champy, 1996). In process organisation, the client is in the centre of attention, and therefore the key to management are those activities that allow quick and effective identification and satisfaction, as well as creating the needs and expectations of clients (Grajewski, 2016).

By adopting this approach to managing patient engagement, it is possible to achieve the goals of the health system. This involves enabling the necessary changes such as (A Leadership, 2013):

- at the individual level - changes aimed at encouraging and supporting patients and their families to be active participants in care and decision making;
- at the level of health care teams - changes ensuring preparation and support of teams for cooperation with patients, families and other members of the care team;
- at the organisational level - changes aimed at assigning accountability, encouraging partnerships and incorporating the patient and family perspective in all aspects of provider planning, implementation and evaluation of programs and services.

In this context, process management of patient engagement is a comprehensive impact on processes implemented at the system level (regulatory, supervisory, educational, research and development) and the organisational level (service, management, communication, training and education).

Key Aspects of Process Management of Patient Engagement

The adoption of process orientation for managing patient engagement is a multi-stage activity involving a number of participants and stakeholders of the health system, including patients, their families, communities, social organisations, government and public institutions performing tasks under health policy, health service providers, research institutions (universities) and the media. Management of engagement as a multidimensional concept requires consistency of goals and functioning at the system, institutional and direct patient relationships. The concept of process management implementation includes the following stages (Grajewski, 2016):

1. determination of the organisation's purpose,
2. identification of processes in the area of mega processes distinguished according to the client (recipient) criterion,
3. designing reference processes - creating process maps,
4. development of process measures and internal market relations principles,
5. development of an IT system to support the operation of the organisation.

The goal of patient engagement management is to support the functioning of the health system, rationalise the number and effectiveness of health services, and increase the role of prevention and health promotion to reduce the need for inpatient, highly specialised treatment, which consequently improves the performance of service providers and patient relationships. Therefore, patient focused quality interventions are needed to improve health literacy, clinical decision-making and patient safety (Coulter and Ellins, 2007). They form the basis for identifying the main processes focused on creating value for the patient. The main areas of impact of patient engagement management are: knowledge, skills, ability and willingness of patients to manage health and care for themselves and family members; a culture of health care organisation that prioritizes and supports patient involvement and active cooperation between patients and health care providers to design, manage and achieve positive health outcomes (5 Elements 2014). Patient engagement relates to six key options for building relationships between individuals, families, communities, health care professionals and decision makers, which include: education (stimulating changes in behaviour at various levels of engagement, learning new partner communication skills), research (a key factor shaping health policy, professional practice and patient results), community health, direct care, organisational design and governance, and public policy (Edgman-Levitan et al, 2013).

After identifying the processes, it is necessary to develop their course (preparation of maps). For this purpose, graphic methods are used, including: activity flow cards, Clark charts, Bernatene-Grün charts, Gantt charts, schedules, classification schemes, Sankey charts, Ishikawa diagram and relationship diagram (Starbyła, 2012). Due to the complexity, variability and dynamic nature of health care processes, process mapping is not limited to the visual presentation of the analysed process, but should include social aspects such as interaction between participants (Antonacci et al, 2018).

To assess the effectiveness of implemented processes, a measurement system should be developed, under which reporting structures using multiple communication channels will be created, and the value of engagement initiatives will be evaluated, using measures related to a given process (e.g.: level of patient and/or family member representation or patient, family and project team satisfaction) and its results (e.g.: overall satisfaction with engagement activities, clinical/patient outcome improvements, number of engagement goals or objectives achieved or level of knowledge or information obtained) (Strudwick et al, 2019).

To ensure the efficient implementation of processes related to patient engagement, an IT management support system is required. E-health plays a special role in multilateral communication processes. The European Commission defines eHealth as "the use of ICT in health products, services and processes combined with organisational change in health care systems and new skills, in order to improve health of citizens, efficiency and productivity in health care delivery, and the economic and social value of health. eHealth covers the interaction between patients and health-service providers, institution-to-institution transmission of data, or peer-to-peer communication between patients and/or health professionals" (European Commission, 2012, p. 3). Information and communication tools and techniques form the basis for the efficient conduct of main processes such as: education, communication and training.

Modelling of Patient Engagement Management Process

Modelling activities are helpful in process design. Process models used in process management have an analytical function and support the rationality of decision making. The purpose of modelling management systems is, in particular, to recommend a specific decision, to forecast system behaviour, and to train and improve staff in decision making (Grudzewski and Wilimowska, 2017). The components of the process model are design decisions regarding the identification of actors involved in operations, operational activities, performers of individual activities, inputs and outputs of activities, determination of the sequence of activities (dependence of activities, the possibility of parallel implementation) (Pietroń, 2011).

As a result of the analysis of the nature and conditions of process management of patient engagement, a conceptual model was developed, taking into account the identified specific features, determinants and requirements of this concept. The process management model includes main actors of the process involved in processes at the institutional level – health care providers (decision makers and performers: management, medical personnel in direct relations with the patient (medical professionals, care coordinators), and support personnel: IT specialists, administration, etc.). This model presents the sequence of the main tasks and activities of processes implemented in the area of patient engagement management in two phases: preparation (Figure 1) and executive (Figure 2).

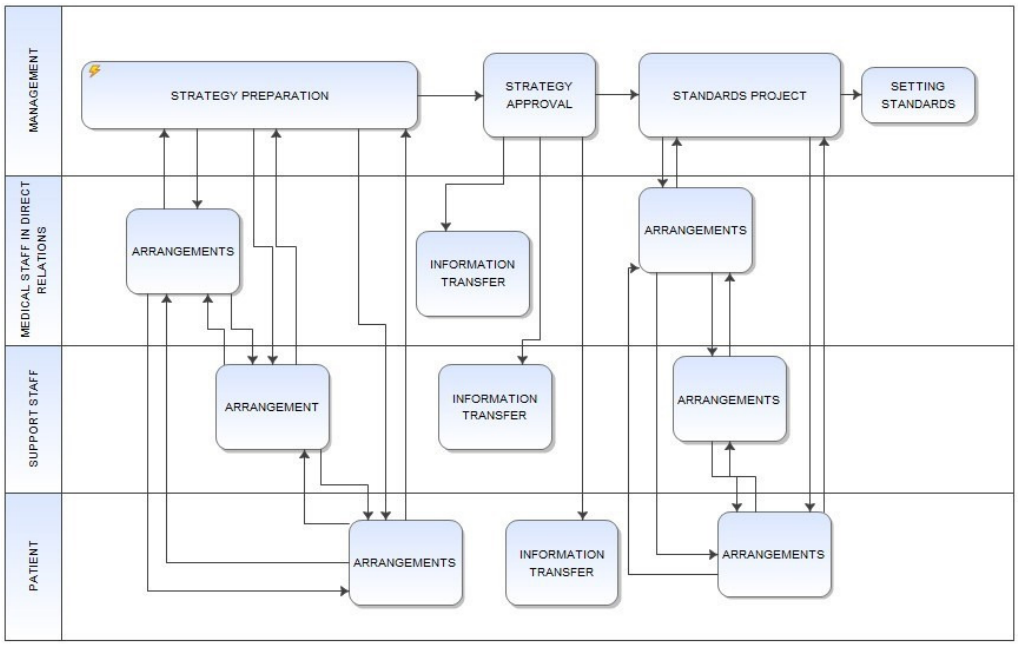

Figure 1: The conceptual model of process management of patient engagement - preparatory phase

Source: Authors analysis.

Input data was determined as the need to implement process management of patient engagement in the organisation. Input data was determined as the need to implement process management of patient involvement in the organisation. The expected result (output) is to achieve patient engagement - readiness and participation in decision-making about care. To present the course of activities, a flowchart diagram was developed, using the iGRAFX program. The following stages have been distinguished in the model:

- preparation of patient engagement strategy, arrangements with employees and patients (representatives, community, patient organizations, etc.),
- strategy approval and transfer of information to all participants,
- designing standards, norms and procedures necessary to implement the strategy,
- division of tasks and activities, creation of interdisciplinary teams, appointment of leaders, care coordinators,
- preparation of an IT system to ensure communication and information and knowledge transfer,
- staff training, creating an organizational culture that supports engagement,
- preparation of programs, tools and channels of communication with the patient, education, providing ongoing personalised consultations, advice,
- strategy implementation at all levels,
- measurement and evaluation of the effects, the study values, benefits, satisfaction of patients and staff, identification of irregularities,
- implementation of adjustments and streamlining the process.

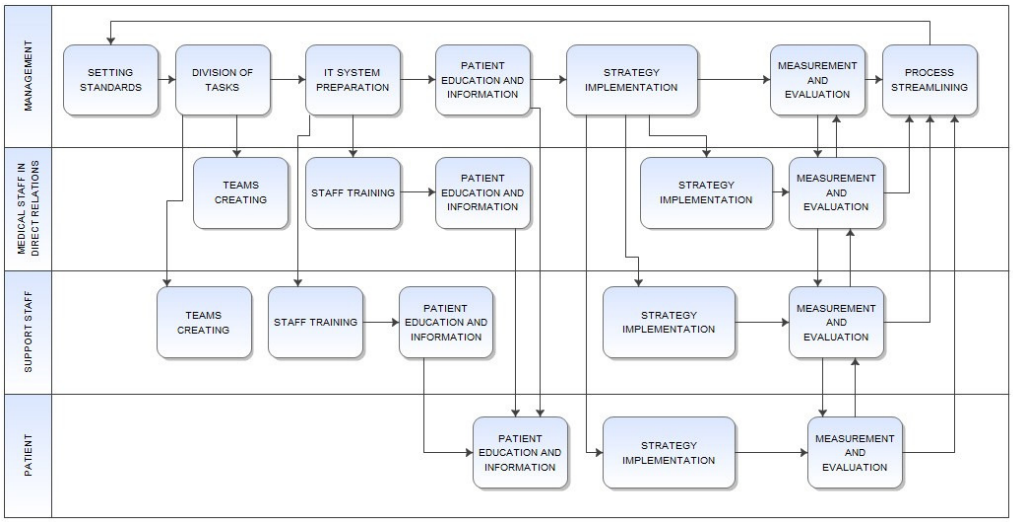

Figure 1: The conceptual model of process management of patient engagement - executive phase.

Source: Authors analysis.

The proposed model is simplified and requires detailed modelling of sub processes associated with the identified main processes, but it can, however, be a starting point for designing a patient engagement management system. It should be emphasised that the usefulness of modelling, and consequently the correctness of analysing, designing and implementing the proposed systems depends on a number of factors, including the modelling methodology itself. One of the critical factors is the acceptance by all participants of the process, its goals, implementation method and measurement methods. Therefore, the participation of employee representatives, patients, their families, the community and decision-makers is necessary in modelling the process of patient engagement management.

Conclusions

Patient engagement is an interesting concept in the scientific and practical dimension, which can contribute to increasing the quality, safety, focus on people and the effectiveness of health care services provided. However, the implementation of this concept is a challenge for health systems due to its complex, multi-entity nature. To ensure the integrity of the principles and practices necessary to implement the concept of patient engagement in all levels (the health system, health care providers, and medical professionals), a process-based approach to management is necessary. Considering the issue of patient engagement in the context of processes allows you to focus on creating and delivering value to patients and the health system. A prerequisite for engagement is patient orientation throughout the process at all levels of interaction. The organisational efficiency of service providers requires support from decision-makers in the area of legal regulations regarding norms, standards, information systems, data security, acidification and training requirements, community-wide health education campaigns, health-promoting behaviours and the possibility of influencing health care. Another important factor is the understanding and acceptance of the patient's role in the health system and a strong awareness of employees regarding their responsibility in terms of building value. In the organisation it is necessary to build strong relationships that facilitate the integration of solutions, transfer of knowledge and information, a flexible approach to the structure, creation of interdisciplinary teams and continuous improvement of processes taking into account the changing needs of patients and external conditions. Patient engagement is a complicated and lengthy process, but due to the specificity of health and its social and economic health value, the role of this concept will increase.

The article is valuable to identify, systematise and emphasise the role of the process approach to managing patient engagement and is the starting point for further, more detailed research.

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Real Business Cycles Synchronisation and Characteristics in Selected African Countries

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Abstract
The 2007/2008 global financial crisis highlights the need for an extensive business cycle fluctuation research. The study examines business cycle fluctuations in selected African countries. It establishes and characterises business cycles in Africa countries by the investigation of business cycle synchronisation across African countries using the Hodrick-Prescott filter to verify the existence of business cycles in Africa as well as the cyclical characteristics. The results indicated that business cycles exist in Africa. The cyclical features are also described using the Hodrick-Prescott filter. The pair-wise correlation matrix was utilised in investigating the existence of business cycle synchronisation in Africa. From the results, it is discovered that the business cycle synchronisation exists in Africa. The degree of synchronisation, however, varies across different countries. The existence of a strong procyclicality between government spending and real GDP indicates the strong influence of government spending on macroeconomic fluctuations. Therefore, the study recommends that the government and its institutions should carry out a proper fiscal policy plan alongside monetary policy to stabilise the economy in periods of recession and expansion. Furthermore, the study highlights the need for diversification of the export base of most Africa countries from agricultural raw materials to consumer goods.

Keywords*:* Real Business Cycle, Africa, Bayesian Panel VAR

Introduction

The economic behaviour in terms of growth and fluctuations, has been a major concern for economists and policymakers in recent decades. Such swings in macroeconomics may be referred to as business cycles. Business cycles may exhibit unusual characteristics depending on economic fundamentals. Nonetheless, it has some simple common features such as fluctuations in aggregate economic activity, which simultaneously affect all economic indicators such as GDP, interest rate, and unemployment rate. Such cyclical patterns are not the same as any other period-like seasonal cycles or regular cycles. Although seasonal and annual cycles are attributed to variations happening within a year typically due to weather changes or business practices, business cycles are not regular. The length, scope, and intensity of each phase in the cycle vary greatly (Burns, 1969). It, therefore,

becomes difficult to predict how long a particular phase can last, and its effect on the economy as a whole.

Studies on the business cycle usually apply to the perception of cyclical boom times and deflation. The knowledge of business cycles is thus key to a thorough study of economic trends and to predict potential developments. Considerable attention is now being given to long-term growth with the need to reduce economic fluctuations. This is apparent because long-term policy interventions (structural policies) most often have as their primary objective economic growth. Conversely, short-term policies (stabilisation policies) have as a primary objective the reduction of these economic fluctuations (European Commission, 2003). These are policy issues in developing economies due to the convergence of business cycles across all economic sectors, especially the banking, industrial and commercial sectors, in particular (Burns, 1969). This suggests that shocks can easily be transmitted to other economic sectors within one sector, which could affect the economy as a whole.

After the global financial crisis of 2007/2008, the stability of macroeconomic factors became a highly important policy priority in several developed countries in Africa. The global economic and financial slowdown witnessed in 2007/2008 that started as the 2007 U.S. sub-prime mortgage chaos transformed into a financial crisis that caused an economic decline in developing economies by 2008 and further triggered a growth crisis in Africa by 2009. The unprecedented nature of the crisis has resulted in a continuous and significant downward trend in Africa's major macroeconomic indicators (Osabuohien et al, 2018; Asongu et al, 2019).

Besides, owing to globalisation, the RBC principle has been used to demonstrate a type of market cycle synchronisation through countries (McGrattan & Prescott, 2014). It means that identical variations in macroeconomic aggregates can occur in other countries. The synchronisation of these business cycles was evident from the wide-spread effect of the US-born global financial crisis of 2007/2008. Consequently, African countries have been significantly affected by international economic events. These are evidenced by the effects of the financial crisis, economic depression and shocks resulting in declining investments, collapse of commodity prices, decline in the capital market, increase in the unemployment rate, which has led to the economic contraction of most countries on the continent (Asogwa, Ugwuanyi, Obidike & Eze, 2014; Beecroft et al, 2020).

Stemming from the foregoing, this study examines business cycle fluctuations using the case of in selected African countries. The main objective of the study is to establish and characterise business cycles in African countries. Furthermore, it underscores the kind of business cycle synchronisation that exist in the selected countries. The rest part of the study is organised in sections as follows: next to this introductory section is the insight from the literature, which is followed by the method of analysis. The discussion of results and conclusion are contained in sections four and five, respectively.

Insights from the Literature

This section highlights insights and reviews relevant literature, which examine the characteristics of business cycles in Africa as well as synchronisation of these business cycles across the African countries. The empirical review shows a few existing research work findings in Nigeria, Africa, and other industrialised countries. Fiess (2007) in his study titled Synchronisation of the Business Cycle and Regional Integration, for Central America. The analyst tests the degree of synchronisation of the business cycle between the United States of America and Central America. This was to consider the need to assess macroeconomic cooperation risks and benefits.

Business cycles are short-run fluctuations around the long-term growth which have expansionary and contractionary behaviour and by implication, have costs on the economy. Hence, the ability of the governments to properly manage countercyclical and procyclical macroeconomic policies would contribute to the growth that economy. Alege (2008) explained that in many less developed countries, macroeconomic policies are procyclical (exacerbating rather than alleviating the adverse impacts of the boom and depression on the long-term growth. Alege (2008) further emphasised on the cost of a procyclical policies in these developing countries, which include: imprudent fiscal spending that leads to inefficient resource allocation, which further leads to macroeconomic instability.

Business cycle literature predates as far back as Kyland and Prescott (1982) with the introduction of the Real business cycle (RBC) model built on the rational expectation hypothesis, Kyland and Prescott (1990) using atheoretical methods, while Kydland and Zarazaga (1997) following suit, applied the atheoretical methods to a study carried out in Argentina. Artis, Kontolemis and Osborn (1997) also examined the international characteristics of the cyclical movements of the business cycles across different countries. Within the same period, Gregory, Head and Raynald (1997) investigated where the similarities and co-movements in aggregate fluctuations for the G7 countries lie (Canada, United States of America, Japan, France, Italy, Germany and the United Kingdom).

Agenor, McDermort and Prasad (2000) documented the business cycle (macroeconomic fluctuations) for 12 developing economies using quarterly time-series data. The study was based on the cross-correlation between other macroeconomic variables and industrial output. The result of the study showed the existence of similarities in the macroeconomic fluctuations in the developing and developed economies. Additionally, Output volatility was observed to be greater in developing countries compared to the developed economies. In contrast, the terms of trade and output were strongly correlated, and there was no consistent relationship between the balance of trade and fluctuations in output.

As regards empirical studies on synchronisation of the business cycle, Calderon, Chong and Stein (2003) studied whether trade intensity and synchronisation of the business cycle are different in developing countries. They used information from 147 countries from 1960 - 1999 using 33,676 pairs. The researchers found that countries with higher bi-lateral trade exhibit higher synchronisation of the business cycle, and countries with asymmetric production structures exhibit a lesser synchronisation of the business cycle. They also discovered that trade integration has a greater impact on business cycles across industrial countries compared to developing ones.

Rand and Tarp (2002) attempted to find out if business cycles in developing countries are any different. The authors stated that the nature and characteristics of business cycles in developing countries differ from that of developed countries. The authors went further to state that cycles are shorter and more diverse across developing countries than that of industrialised countries. The study relied on 15 developing countries from Africa, Latin America and Asia, using five countries in each region. The results influenced claims that shocks from developed countries are essential drivers of macroeconomic fluctuations in developing countries. Also, on business cycle synchronisation, Fidrmuc and Korhonen (2009) analysed the sources and causes of business cycle convergence and divergence between the two largest emerging economies in Asia (China and India) and the Organisation for Economic Cooperation and Development (OECD) countries. The study found that the dynamic correlation analysis was low in Asia relative the findings from the OECD countries.

Coleman (2011) investigated business cycle synchronisation in West Africa, as a result of the sustainability of the West African Monetary Zone (WAMZ). The author examines the degree of business cycle synchronisation in order to understand better the level of economic and monetary integration in West Africa. Five individual countries were utilised with data spanning 30 years. The results obtained showed an inconsistent pattern of synchronised business cycles. The author, therefore, opined that this raises a form of concern on the economic sustainability of the WAMZ. Tatomir and Popovici (2013), presents a picture of the degree of synchronisation across the European Union. The authors utilised the Hodrick-Prescott to capture business cycle trends and the Pearson correlation coefficient to measure the degree of synchronisation. It was discovered that the Euro-area exhibited varying degrees of synchronicity.

Diallo and Tapsoba (2014) investigated the extent to which Africa's business cycle is synchronised with that of the rest of the world. The study employed Hodrick-Prescott filter to examine business cycle correction covering periods from 1970 to 2010. Their findings suggest that Africa's business cycle has not only moved in the same direction as that of the rest of the world but has also gradually drifted away from the G7. The increase in aggregate import demand as a result of international trade was presented as an argument for their findings. However, the cyclical characteristics in African countries and the test for synchronisation across the region have not sufficiently been addressed and discussed. Hence, this study makes a contribution to the literature by filling this observed gap.

Method of Analysis

Technique of Estimation

In this study, the cyclical characteristics of the selected African countries are observed using an atheoretical method which utilises the Hodrick-Prescott (H.P.) filter. The atheoretical methodology establishes the need for no theory or no empirical model to carry out the analysis. The cyclical behaviour of real GDP and its main components are examined, presented and discussed as it is fundamental in the analysis of real business cycles. This is carried out by examining the relationship between aggregate output volatility and its major components, namely: consumption, investment, government expenditure, import and export. The approach used in achieving this objective was influenced by Agenor *et al*. (2000). It consists of obtaining a detrended series, the cross-correlation between the trend in aggregate output and the trend in the main components of aggregate output, and a correlation coefficient to measure the cyclical behaviour of the variables.

Other statistics were also utilised in explaining the cyclical characteristics of the business cycles. The volatility and relative volatility are derived and are used in explaining the level of fluctuation of GDP and its main components. The direction of movement of the variables is also taken into account in explaining the cyclical components of business cycles. The study applies a bi-variate cross-correlation analysis to determine the degree of association between two different variables. Agenor *et al*. (2000), documented that the degree of co-movement of two different time series data set can be measured by the cross-correlation coefficient δ_j. The decision rule for interpreting the co-movement of variables is stated as follows:

Procyclical if $\delta_j > 0$

Countercyclical if $\delta_j < 0$

Acyclical if $\delta_j = 0$

Lastly, the phase shift is also observed in explaining the cyclical characteristics of business cycles. This shows that if the variables change prior to the changes in real GDP or if these changes in the variables occur preceding the changes in the real GDP. In determining the phase shift, the cross-correlation coefficient (δ_j) is used in the decision rule. In order to determine the phase shift of y_t, relative to the cycle in x_t,

y_t leads the cycle if δ_j is maximum for the positive value of j

y_t is synchronous with the cycle if δ_j is maximum for j = 0

y_t lags the cycle if δ_j is maximum for negative value of j

Data, Data Sources and Measurement

This study utilises annual time series data for the selected macroeconomic variables to examine the characteristics and the synchronisation within selected African countries. The time dimension for the dataset spans 15 years (2001 – 2015) while the country dimension spans 15 countries which include: Botswana, Burundi, Kenya, Liberia, Malawi, Mauritius, Mozambique, Namibia, Nigeria, Rwanda, Sierra Leone, South Africa, Swaziland, Tanzania and Uganda. The selected variables, measurements, as well as the data source, are found in Table 1.

Most of the variables including Real GDP, gross fixed investment, total import, total export, government expenditure and household consumption are measured in millions of constant (2010) U.S. dollars as sourced from the World Bank database. This ensures unison and uniformity of data. Agricultural materials and terms of trade are measured as indexes calculated by the various credible data sources. More details are shown in Table 1.

Table 1: Variables Definition, Mean, and Source of Data

Data	Data Source	Measurement
Real Gross Domestic Product (RGDP)	World Bank (2018)	Million at Market Price Constant 2010 (US$)
Gross Fixed Investment (GFI)	World Bank (2018)	Million at Market Price Constant 2010 (US$)
Total Import (IMP)	World Bank (2018)	Million at Market Price Constant 2010 (US$)
Total Export (EXPT)	World Bank (2018)	Million at Market Price Constant 2010 (US$)
Terms of Trade (TOT)	World Bank (2018)	Price Index
Agricultural Raw Materials (COMP)	IMF (2016)	Price index (2005 base year)
Government Expenditure (GEXP)	World Bank (2018)	Million at Market Price Constant 2010 (US$)
Household Consumption (HCON)	World Bank (2018)	Million at Market Price Constant 2010 (US$)

***Source**: Compiled by the Authors'*

Results and Discussion

Cyclical Characteristics in Africa

From Tables 2(a), 2(b) and 2(c), it is observed that volatility of real GDP for the majority of the countries was greater one which indicates high volatility. Only two countries, namely Mozambique and Tanzania exhibit real GDP volatility of less than one, with 0.92% and 0.81percent, respectively. As shown in Tables 2(a), 2(b) and 2(c), consumption expenditure can be observed to exhibit a higher volatility than that of real GDP for most of the countries presented on the table. This is not in line with theoretical expectation. The contemporaneous correlation between consumption expenditure and the cyclical component of real GDP showed that nine countries were procyclical while six countries were discovered to be countercyclical. The procyclical nature of consumption expenditure is in line with theoretical expectation as consumption levels tend to increase with income levels but not in the same proportion according to the absolute income theory of consumption. These statistics show that shocks to income level have a significant effect on consumption level. In terms of phase shift, consumption expenditure was found to be a lagging indicator for ten countries which conforms to theory as a change in income precedes a change in consumption levels. However, the cross-correlation coefficient showed consumption expenditure as a leading indicator for Botswana, Burundi, Liberia, Nigeria, and Rwanda.

Investment is more volatility than real GDP across all the selected countries. In Tables 2(a), 2(b) and 2(c), it can be observed that the contemporaneous correlation statistic indicated a procyclical relationship between investment and the cyclical component of real GDP for most of the countries. Which is in line with expectation as increased levels of income is expected to increase savings and investment. However, a countercyclical relationship was discovered for three countries, namely Botswana, Mozambique and Nigeria. Liberia and South Africa have a strong level of procyclicality with contemporaneous coefficients of 0.90 and 0.88, respectively. The phase shift also shows conflicting results across the countries. Investment leads in Botswana, Burundi, Liberia, Namibia, Nigeria, South Africa and Tanzania. This result is in line with theoretical expectation, as investment generally induces economic growth. Investment, however, lags for the other countries, and this may be as a result of the nature of financial markets in Africa, it is then rational for investors to act when the economy is in prosperity (Ejemeyovwi, Osabuohien, & Osabuohien, 2018; Ejemeyovwi, Osabuohien, Johnson & Bowale, 2019).

Table 2(a) : Cyclical Behaviour of Real GDP and its Main Components

	Botswana	Burundi	Kenya	Liberia	Malawi
RGDP Volatility	0.0339	0.0209	0.0178	0.1044	0.0242
Consumption Expenditure	Countercyclical	Procyclical	Procyclical	Procyclical	Countercyclical
Contemporaneous Correlation	0.0029	0.1148	0.8459	0.4861	0.2624
Volatility	31.7%	2.37%	3.69%	14.6%	5.78%
Relative volatility	9.35	1.13	2.07	1.39	2.39
Phase Shift	Leading	Leading	Leading	Leading	Lagging
Gross Fixed Investment	Countercyclical	Procyclical	Procyclical	Procyclical	Procyclical
Contemporaneous Correlation	0.1434	0.2106	0.5289	0.9027	0.3021
Volatility	3.29%	20.9%	9.39%	18.5%	28.4%
Relative Volatility	0.97	10.04	5.28	1.77	11.7
Phase shift	Leading	Leading	Lagging	Leading	Lagging
Government Expenditure	Procyclical	Procyclical	Countercyclical	Procyclical	Procyclical
Contemporaneous correlation	0.1495	0.3438	0.2899	0.7773	0.5899
Volatility	6.08%	13.09%	3.54%	27.7%	11.6%
Relative Volatility	1.79	6.26	1.99	2.65	4.8
Phase Shift	Leading	Leading	Leading	Leading	Lagging
Total Imports	Procyclical	Countercyclical	Procyclical	Procyclical	Countercyclical
Contemporaneous Correlation	0.4888	0.1550	0.4838	0.8339	0.5956
Volatility	9.47%	15.21%	7.78%	5.85%	12.5%
Relative Volatility	2.79	7.28	4.37	0.56	5.15
Phase Shift	Leading	Lagging	Lagging	Lagging	Leading
Total Exports	Procyclical	Procyclical	Procyclical	Procyclical	Countercyclical
Contemporaneous Correlation	0.8193	0.0493	0.2192	0.3024	0.2364
Volatility	17.5%	12.21%	4.06%	19.0%	17.8%
Relative Volatility	5.19	5.84	2.28	1.82	7.34
Phase Shift	Lagging	Leading	Leading	Leading	Leading

Source: Authors' compilation using E-views 9.0

Tables 2(a), 2(b) and 2(c), show that a majority of the selected countries have a procyclical relationship with real GDP. These countries include Botswana, Burundi, Liberia, Malawi, Nigeria, Sierra Leone, South Africa, Swaziland, Tanzania and Uganda. The procyclical nature of the variable in these countries could be explained by the high level of government involvement in economic activities. Government expenditure in most African economies is a major component of real GDP, the high contemporaneous correlation attests to this statement. This is also consistent with the opinion of Keynes, which advocated for increased Government participation in clearing markets and restoring equilibrium conditions. Kenya, Mauritius, Mozambique, Namibia and Rwanda all exhibit a countercyclical relationship between government expenditure and real GDP. Government expenditure exhibits a leading phase shift in eight countries; this confirms that government policies influence changes in output levels. From observation, seven other countries exhibit government expenditure as a lag indicator. This shows that government policies are not yielding the proposed benefits (Ejemeyovwi & Osabuohien, 2020).

Table 2(b): Cyclical Behaviour of Real GDP and its Main Components

	Mauritius	Mozambique	Namibia	Nigeria	Rwanda
GDP Volatility	0.0144	0.0092	0.0214	0.0524	0.0165
Consumption Expenditure	Countercyclical	Procyclical	Countercyclical	Countercyclical	Procyclical
Contemporaneous Correlation	0.0231	0.1809	0.2028	0.0127	0.6755
Volatility	1.43%	4.97%	6.37%	11.2%	3.38%
Relative volatility	0.99	5.4	2.98	2.15	2.05
Phase Shift	Lagging	Lagging	Lagging	Leading	Leading
Gross Fixed Investment	Procyclical	Countercyclical	Procyclical	Countercyclical	Procyclical
Contemporaneous Correlation	0.7725	0.3335	0.0141	0.3294	0.5888
Volatility	6.50%	19.6%	9.67%	16.5%	6.88%
Relative Volatility	4.51	21.3	4.52	3.14	4.17
Phase shift	Lagging	Lagging	Leading	Leading	Lagging
Government Expenditure	Countercyclical	Countercyclical	Countercyclical	Procyclical	Countercyclical
Contemporaneous correlation	0.0754	0.1892	0.1843	0.8734	0.3044
Volatility	2.49%	4.22%	5.42%	40.8%	4.09%
Relative Volatility	1.73	4.59	2.53	7.79	2.48
Phase Shift	Lagging	Leading	Lagging	Leading	Lagging
Total Imports	Procyclical	Countercyclical	Countercyclical	Countercyclical	Procyclical
Contemporaneous Correlation	0.3101	0.1902	0.2883	0.0766	0.2662
Volatility	4.78%	17.8%	11.9%	22.1%	7.78%
Relative Volatility	3.32	19.3	5.54	4.23	4.72
Phase Shift	Leading	Lagging	Lagging	Leading	Leading
Total Exports	Procyclical	Procyclical	Procyclical	Procyclical	Countercyclical
Contemporaneous Correlation	0.5015	0.2267	0.3761	0.1472	0.1455
Volatility	6.07%	6.63%	5.31%	15.5%	9.63%
Relative Volatility	4.22	7.2	2.48	2.95	5.84
Phase Shift	Lagging	Lagging	Lagging	Leading	Lagging

Source: Authors' compilation using E-views 9.0

Total import also exhibited both procyclical and countercyclical relationships across the countries. Total imports are expected to be countercyclical according to theory. However, not all the samples countries exhibited counter-cyclicality. Botswana, Kenya, Liberia, Mauritius, Rwanda, Sierra Leone South Africa, Tanzania and Uganda all showed a procyclical relationship between total imports and real GDP. This could be explained by the import-dependent nature of most African countries. Furthermore, total imports is a lagging indicator in seven countries while it leads in eight countries, as seen in tables 2(a), 2(b) and 2(c).

Table 2(c) : Cyclical Behaviour of Real GDP and its Main Components

	SIERRA LEONE	SOUTH AFRICA	SWAZILAND	TANZANIA	UGANDA
RGDP Volatility	0.0798	0.0183	0.0173	0.0081	0.0198
Consumption Expenditure	Procyclical	Procyclical	Procyclical	Countercyclical	Procyclical
Contemporaneous Correlation	0.6862	0.8928	0.1098	0.2540	0.5885
Volatility	9.06%	2.32%	3.62%	2.37%	3.49%
Relative volatility	1.14	1.27	2.09	2.93	1.76
Phase Shift	Lagging	Lagging	Lagging	Lagging	Lagging
Gross Fixed Investment	Procyclical	Procyclical	Procyclical	Procyclical	Procyclical
Contemporaneous Correlation	0.0405	0.8883	0.0525	0.3906	0.6638
Volatility	34.9%	6.54%	2.77%	4.50%	5.06%
Relative Volatility	4.38	3.57	1.60	5.56	2.56
Phase shift	Lagging	Leading	Lagging	Leading	Lagging
Government Expenditure	Procyclical	Procyclical	Procyclical	Procyclical	Procyclical
Contemporaneous correlation	0.0913	0.4850	0.0885	0.5224	0.2352
Volatility	8.83%	1.56%	6.65%	9.65%	10.4%
Relative Volatility	1.11	0.85	3.84	11.9	5.24
Phase Shift	Lagging	Leading	Leading	Lagging	Lagging
Total Imports	Procyclical	Procyclical	Countercyclical	Procyclical	Procyclical
Contemporaneous Correlation	0.4275	0.8696	0.0834	0.0769	0.8293
Volatility	22.9%	7.82%	3.03%	9.13%	8.32%
Relative Volatility	2.87	4.27	1.75	11.3	4.2
Phase Shift	Lagging	Lagging	Leading	Leading	Leading
Total Exports	Procyclical	Procyclical	Procyclical	Procyclical	Procyclical
Contemporaneous Correlation	0.8092	0.8024	0.4947	0.3066	0.5284
Volatility	33.2%	5.61%	5.55%	5.48%	13.4%
Relative Volatility	4.16	3.07	3.21	6.77	6.75
Phase Shift	Lagging	Lagging	Leading	Lagging	Leading

Source: Authors' compilation using E-views 9.0

Total export is procyclical with the cycle for all the selected countries except for Malawi and Rwanda. This result of a procyclical nature of total export is in line with theoretical expectation, and it indicates that income has a positive relationship with the exportation of goods and services. The low contemporaneous correlation of Nigeria at 0.14 is not consistent with other studies as Nigeria regarded as an oil export-dependent nation. In addition, the variable leads in seven countries while it lags in eight countries, as shown in tables 2(a), 2(b) and 2(c).

Business Cycle Synchronisation in Africa

In order to document stylised facts on business cycle synchronisation in Africa, the study used a sample of selected African countries. A pair-wise correlation matrix is used to achieve this objective. The real GDP data for 15 African countries was transformed using the Hodrick-Prescott filter to compute the pair-wise correlation. The degree of co-movement is measured by a standard correlation coefficient. The correlation coefficient ranges from -1 to +1. A negative correlation coefficient indicates the existence of a negative relationship between the variables, while there exists a positive linear relationship when the correlation coefficient is positive. However, if the correlation coefficient is 0 (zero), this indicates that no relationship exists between the two variables.

A country's cyclical component of GDP with a correlation coefficient above 0.50 with that of another country indicates that their business cycles are highly synchronised. This means that both countries experience similar co-movements in macroeconomic fluctuations. Whereas a less than 0.50 correlation coefficient even though it indicates a presence of co-movement, it is, however, a weak one.

From Table 4.4 it can be observed that the cyclical component of GDP for a majority of the selected countries are positively highly synchronised or shows strong signs of correlation. The correlation coefficient was 0.9 for a majority of the selected countries indicating a presence of similar co-movements overtime. All the coefficients are also observed to be statistically significant. This implies that business cycles are highly synchronised in Africa. Some countries, however, exhibit signs of weak positive correlations with correlation coefficient less than 0.50. This confirms the existence of business cycles in Africa as well as a form of synchronisation across the selected countries.

	Botswana	Burundi	Kenya	Sierra Leone	Liberia	Malawi	Mauritius	Mozambique	Namibia	Nigeria	Rwanda	South Africa	Swaziland	Tanzania	Uganda
Botswana	1.00														

Burundi	0.57	1.00													
	0.00	-----													
Kenya	0.97	0.71	1.00												
	0.00	0.00	-----												
Sierra Leone	0.77	0.91	0.87	1.00											
	0.00	0.00	0.00	-----											
Liberia	0.44	0.45	0.51	0.60	1.00										
	0.01	0.01	0.00	0.00	-----										
Malawi	0.97	0.67	0.99	0.83	0.50	1.00									
	0.00	0.00	0.00	0.00	0.00	-----									
Mauritius	0.99	0.55	0.96	0.75	0.45	0.97	1.00								
	0.00	0.00	0.00	0.00	0.01	0.00	-----								
Mozambique	0.98	0.56	0.97	0.78	0.53	0.97	0.99	1.00							
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-----							
	Botswana	Burundi	Kenya	Sierra leone	Liberia	Malawi	Mauritius	Mozambique	Namibia	Nigeria	Rwanda	South Africa	Swaziland	Tanzania	Uganda
Nigeria	0.96	0.72	0.98	0.88	0.51	0.97	0.96	0.96	0.98	1.00					
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-----					
Rwanda	0.85	0.78	0.91	0.91	0.72	0.90	0.85	0.88	0.89	0.92	1.00				
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-----				
South Africa	0.97	0.64	0.98	0.85	0.56	0.97	0.97	0.98	0.98	0.98	0.91	1.00			
	0.00	0.00	0.00	0.00	.0.00	0.00	0.00	0.00	0.00	0.00	0.00	-----			
Swaziland	0.99	0.56	0.95	0.74	0.36	0.96	0.98	0.97	0.97	0.95	0.82	0.95	1.00		
	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-----		
Tanzania	0.97	0.69	0.99	0.86	0.53	0.98	0.97	0.98	0.99	0.99	0.92	0.99	0.96	1.00	
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-----	
Uganda	0.99	0.58	0.97	0.78	0.47	0.98	0.99	0.99	0.99	0.97	0.86	0.98	0.98	0.98	1.00
	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-----

Business Cycle Synchronisation across Africa

The cyclical components of GDP for the selected countries presented in table 4 was presented using real GDP data for the selected African countries from 1980 to 2015 in order to observe the

fluctuations over time. The data were tested for stationary and was ascertained of being stationary before computing for the business cycle statistics. In accordance with the cross-correlation statistics presented in Table 4.4, it can be seen from the figures that there is no much distinction from each of the country's cyclical component of GDP. This confirms that a form of business cycle synchronisation exists across Africa. It can be observed that there are similar upturns and downturns in the fluctuations for all the countries over the period covered.

Based on the analysis, the summary of the findings with respect to achieving duo objectives, some regularities based on the results discussed above are highlighted as follows: (a) Real GDP is highly volatile in the majority of the selected African countries. Liberia exhibited the highest real GDP volatility of about 10.4%, followed by Sierra Leone with 7.98% and Nigeria with 5.34%. (b). Private consumption is also highly volatile across Africa and is procyclical in the majority of the selected African countries. It is also a lagging indicator in most of the countries. (c). Investment across Africa is more volatile than real GDP. Investment if also seen to be procyclical in 12 of the 15 counties considered for this study. This implies than there is increased investment during expansion and reduced investment during a recession. (d). Government expenditure is also procyclical in most of the selected countries; this confirms the active involvement of Governments across African countries in economic activities. It is also highly volatile and a leading indicator in most of the countries considered. (e). Total import and total export are procyclical in the majority of the selected African countries. This also confirms the high import-dependence of African countries and mono-cultural export dependence on either agricultural produce or oil in the case of Nigeria. Imports and exports are also seen to be highly volatile. (f). Business cycle synchronisation exists across the selected countries, although the strength of association may vary between countries. This shows that business cycle synchronisation exists in Africa.

Conclusion

Based on the results, the existence of business cycle has been established in Africa. Real GDP variability around the selected African countries was found to be strong, and this supports observational results from other scholars (Alege, 2009; Alege & Ogundipe, 2016; Adu, 2017). There was also a type of correlation between the observed cyclical features and the evidence from the literature defined the business cycle. Also discovered was the presence of business cycles in Africa and the presence of a type of business cycle synchronisation throughout the selected African countries.

The existence of a form of business cycle synchronisation across the selected African countries was investigated using the pair-wise analysis. This was carried out by computing the cross-correlation between cyclical components of GDP for the selected countries. In order to capture the fluctuations over an adequate period time, real GDP data was compiled from 1980 to 2015 for all the selected African countries. Haven certified that the data were all stationary. The results from the correlation analysis indicate a presence of similar business cycle fluctuations across the selected African countries. The strength of the correlation, however, varies across the countries. The correlation matrix showed the existence of a regional business cycle in Africa, although the correlation coefficients varied across countries. Most countries exhibited a correlation coefficient of above 0.5, which is indicative of a positive co-movement.

In conclusion, the study has established that business cycles exist in Africa, showing the cyclical characteristics of GDP and its components. GDP and its main components were observed to be highly volatile across African countries. The cyclical characteristics of the macroeconomic variables provide a better understanding and useful knowledge for policymakers. It has been observed that African countries experience more frequent fluctuations explained by the high volatility of their real GDP and its main components. In addition, these contributions of the study provide relevant information with the aim of influencing proper stabilisation policies. The main components of GDP were also observed to be highly procyclical across most of the countries considered. However, the phase shift differed across countries and variables.

Government spending shows signs of strong procyclicality across most of the selected African countries. This explains the active involvement of the government in economic activities across Africa; total imports and exports are also observed to be procyclical in nature across the selected Africa countries. The observed cyclical characteristics of total imports and exports are accredited to the import-dependent nature of African economies to consumer goods and mono-cultural export dependence on either oil or agricultural raw materials.

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The Structure of Human Capital and Its Assessment Methods

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Abstract

With the onset of era of instability and constant changes related to rapidly developing e-learning, the rapid expansion of social networks boundaries, the introduction of cyborgization, as well as the approach to technological and economic singularity, the human role in social and labor relations and social and economic mechanisms of labor management is changing. The achievement of competitive advantages by economic entities today is not carried out at the expense of raw material resources, but through human capital, which accumulates experience, abilities and personal skills embodied in people. Due to the fact that human capital is proclaimed one of society economic development factors, the study of man, his competences, is one of the current problems that modern science is faced with. In order to effectively manage human capital, generally accepted methods of measuring, accounting and economic assessment are necessary, which are currently lacking. In this regard, the study of scientific and methodological problems of managing human capital, namely its measurement and economic assessment of individual human capital, attracts theoretical and practical interest.

Keywords: Individual Human Capital, Corporate Human Capital, Regional Human Capital, National Human Capital, International Human Capital.

JEL Classification: E24, J24, O15.

Introduction

One of the strategically important directions of the state economy development in the twenty-first century will be a smooth transition to the innovative development economy, the basis for which will primarily be knowledge, professionalism of employees, creativity and innovation. The development of innovative society directly depends on investments in human capital. Exploring this term, we proceeded from the basic conceptual provisions of the theory, founded by the American economist, the Nobel Prize laureate of 1979, Theodore Schulz. He substantiated his idea that human capital, like any kind of capital, should be fueled by investments, for example, in education and vocational training. Another American economist, Gary Stanley Becker, developed the concept of human capital, justifying the effectiveness of investments in human capital, and formulated an economic approach to human behavior. Thanks to the active development of the human capital theory, investments in employee began to be considered as a source of economic growth (Fix, 2018, p 16).

Human capital is similar to physical capital, but it has clear differences. Such kind of capital is a long use benefit, but with a limited service life. The depletion can occur due to professional skill disruption. Due to the rapid development of technology, not all employees have time to improve their professional level. Human capital, as well as physical one, is an exhaustible resource and requires special expenses for its "maintenance". Its distinguishing feature is that it becomes obsolete faster than physical capital. Its value can grow and fall depending on changes in the complementary production factors supply and in the demand for their joint products.

The term "human capital" was proposed in the 1960s by economist T. Schulz to show the value of human potential. He considered that in human capital, as in any kind of capital, it is possible to make investments, for example in education and training (Simeonova-Ganeva, 2010, p. 131). He composed the definition of "human capital": "Human capital is a form of capital in general, because it contains within itself a source of future income. The peculiarity of this capital form consists only in the fact that it is inseparable from the human being. According to this approach, it is education that

appropriately influences the production process of goods and services, accelerating and optimizing it, therefore education is a capital."

In order to manage human capital effectively, it is necessary to use established practices of its measuring, accounting and economic estimates which are currently lacking. In this regard, studies of scientific and methodological issues associated with human capital in its measurement and economic estimates are of theoretical and practical interest (Kim, 2018).

The main objective of the study is the development of theoretical principles and practical recommendations for assessing human capital.

In accordance with the objective set in the study, the following tasks are outlined:

- to research, specify and structure the conceptual apparatus, meaning to reveal the concept of human capital, and clarify its classification;
- to analyze the assessment methodology in relation to individual human capital in enterprises.

Methodology

General scientific methods, such as analysis, induction, and deduction, acted as methodological tools.

In the course of the study, a balanced model for the classification of human capital and a methodology for its assessment were proposed.

To date, there is no clear definition of the notion "human capital". After analyzing numerous authors definitions of domestic and foreign researchers, we came to the conclusion that all scientists consider human capital at one of five levels:

- at the level of the individual;
- at the level of the work collective or organization;
- at the level of the region;
- at the level of the state;
- at the level of several states.

Results and Discussion

Human Capital

The structure of human capital in the modern sense is as follows: micro-level – individual human capital, meso-level – corporate human capital, macro-level – regional human capital, meta-level – national human capital, mega-level – international human capital (Fig. 1).

The largest element of human capital is mega-level, or international human capital. *International human capital* is the average value of the intellectual potential index between all countries. This indicator began to be studied with the globalization development in the second half of the XX century. Let us specify that international human capital is able to influence macroeconomic indicators, which, with the advent of globalization, began to take on completely different forms, and this is connected with the smoothing of territorial boundaries. There is a merger of banks with financial institutions, as well as the absorption of one by another. Such behavior of the banking sector contributes to the development of a single financial and credit space and the deregulation of financial institution activities. Decrease occurs in the level of control over the movement of financial and intellectual capital both within one state and between countries (Bontis and Fitz-enz, 2002).

One of the most significant advantages of modern globalization is the creation of a fundamentally new human-oriented international economy aimed at raising international human capital, improving social conditions, as well as increasing human development index (HDI). Such capital has the ability for creativity and creation of innovative society. At the same time, this indicator development rate directly depends on international financial values (GDP, international investment).

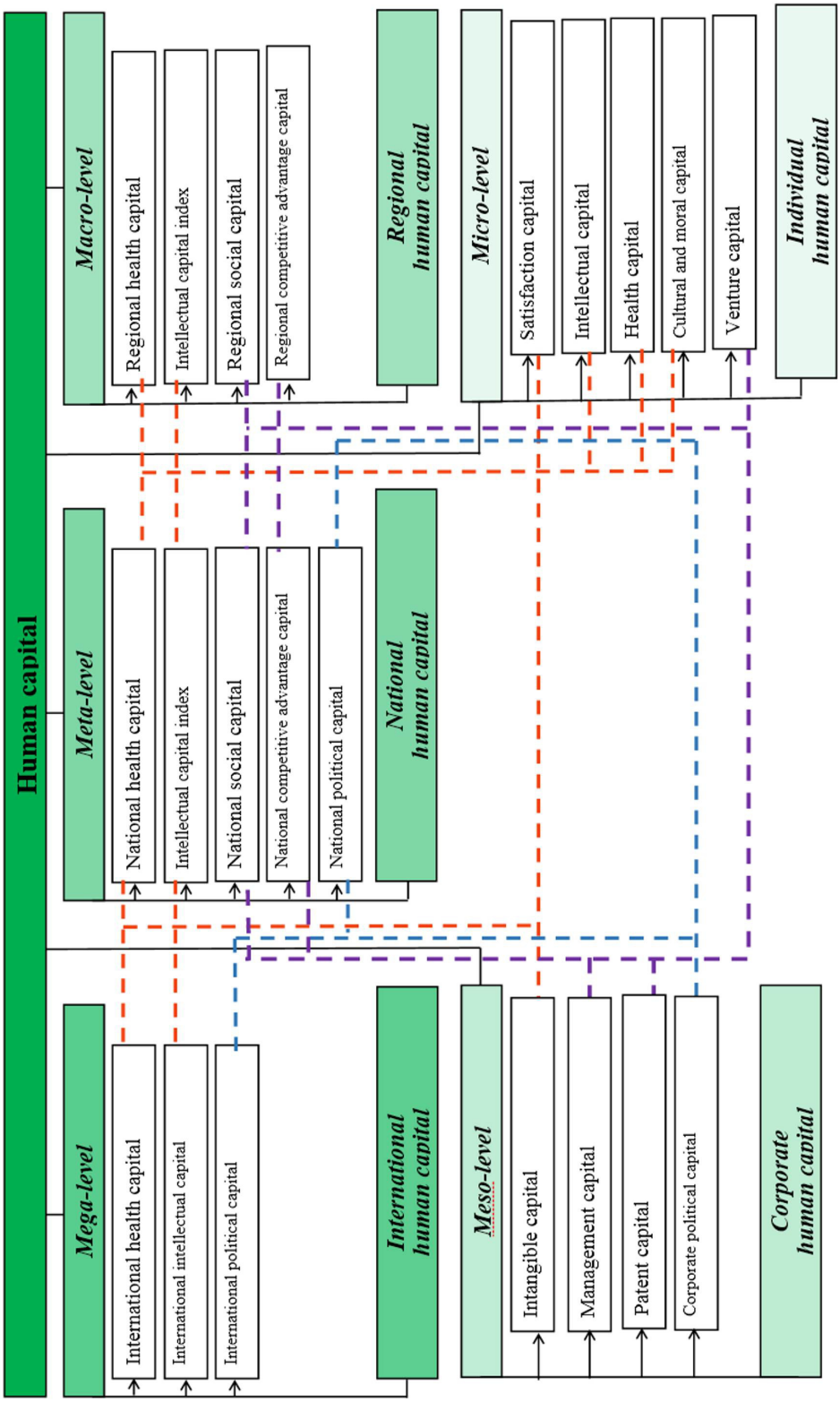

Fig. 1: Human capital structure

During the USSR existence period, in most countries that were part of this alliance, a powerful scientific and technical potential was formed. Excellent results were achieved in scientific fields. At the time of the Union collapse, the human development index was 0.920. About 7% of GDP was allocated to education and health care. At the same time, GDP itself was the highest in the world. After the Soviet Union collapse until the beginning of the 2000s, there was a strong economic downturn in the countries of the Union, and international human capital also declined (IPUMS International, n.d.).

Let's note that among countries that formerly were part of the USSR, a single scientific space has been created, which has contributed to the internationalization and globalization of education and health care. The goal of creating a single scientific space is to make countries competitive and successful on the world stage.

The meta-level refers to the national human capital, which refers to the human capital of a single state, which is an integral part of its national wealth. *National human capital* consists of national health capital, intellectual capital index, national and social capital, national competitive advantage capital, national political capital (Institute of Education Sciences, n.d.). Each type of capital has its own methods of influence, which help to effectively manage the country's national capital:

1. National health capital:
- improving the quality of medical services;
- organization of motivating events at the level of sports and recreation complexes;
- impact on environment.

2. Intellectual capital index:
- increase in expenditure on education;
- increase in expenditure on culture.

3. National social capital:
- increase in the life expectancy index;
- improvement of living standards through public institutions.

4. National competitive advantage capital:
- professional training for managers at the national level;
- professional training for staff at the national level.

5. National political capital:
- maintaining ideological views at the national level.

Macro level is a regional human capital. It consists of regional health capital, intellectual capital index, regional social capital and regional competitive advantage capital. The following exposure methods can be distinguished:

1. Regional health capital:
- improving the quality of medical services in region.

2. Intellectual capital index:
- increase in expenditure on education.

3. Regional social capital:
- improvement of living standards through public institutions.

4. Regional competitive advantage capital:
- professional training for staff at the regional level (Filmer *et al.*, 2018).

Meso-level is a corporate capital, i.e., a set of knowledge, skills, abilities of a group of individuals that make up the collective of an organization. *Corporate human capital* is a kind of organization's value, and it should be given not less attention than to other resources of the organization. By multiplying this type of savings, high labour productivity can be ensured. Corporate human capital includes following elements:

1. Intangible capital:
- knowledge of individual workers, especially specialists;
- system of formal and informal relations of the organization.

2. Management capital:
- management decision-making system;
- production process decision-making system;
- design decision-making system.

3. Patent capital:
- intellectual property protection.

4. Corporate political capital:
- maintaining ideological views at the corporate level.

At the micro-level, human capital considers an individual person. It follows that human capital must be reduced to the size of individual human capital. According to the author, considering the classification of human capital, it is impossible not to pay attention to the industry in which it begins to develop from a professional point of view. There are the following methods of influence to the elements of individual human capital:

1. Satisfaction capital:
- methods of influence through motivation and stimulation.

2. Intellectual capital:
- knowledge audit.

3. Health capital
- analysis of the health level of the individual;
- maintaining a health level.

4. Cultural and moral capital:
- management of the economic totality of costs associated with the development of the cultural characteristics of the individual.

5. Venture capital:
- costs for the development of entrepreneurial abilities.

Let us consider in more detail the individual human capital, since it is the basis for the formation of all human capital. The definition "*individual human capital*" is interpreted as a set of inherited abilities of a person, as well as a general stock of professional knowledge and skills of an employee, that allow him to receive super-profit that a person who does not possess the same stock of knowledge, skills and professionalism cannot receive. The cost for investments in individual human capital is usually attributed to: expenses for the maintenance and upbringing of children before the age of majority or up to working age; expenses for special (professional) education; expenses for maintaining a professional level to ensure social mobility, i.e., ensuring competitiveness in the labor market.

Individual human capital is one of the components of human capital. Individual human capital forms in its totality corporate human capital, and that, in its turn, forms national human capital. These three components are the human capital of modern society (Jankalova and Janka, 2017). Thus, individual human capital is an objective component of human capital. As the key evidence, the author presented an updated definition, namely: *Individual human capital* is the accumulated knowledge, experience, as well as the inherited advantages of an individual, which help transform intelligence into financial capital to meet their needs. The formation of such capital occurs from birth and lasts until the end of life. There are a number of indices that capable to assess the human capital of an individual: intellectual development index and health capital index. The criteria for determining intellectual capital will be a maturity certificate, a diploma in the specialty, certificates and awards testifying to the achievements of a person. The health capital index can be traced through a medical record, a medical history, and disability lists.

Individual human capital is particularly liquid if compare it to other types of capital. It is absolutely inseparable from the physical person and cannot exist without him. The peculiarity of this type of capital is also in the fact that by sharing his knowledge and experience with other individuals, a person does not lose his individual human capital.

One of the main problems in the management of human capital is its specific form. It does not have its reflection, since it cannot be the property of the organization. Human capital "comes" by 9 am to work and leaves at 6 pm. This is a kind of property that is transferred for temporary possession and use, that is, for rent. All costs for staff training and raising its human capital are borne by the organization. At the same time, there are no guarantees that a person who has received additional education at the expense of the organization will not quit the next day. Human capital management can not be viewed from the position of capital as a direct asset of the organization (Juneja, n.d.). You can put human capital on the balance by changing the concept of management accounting. The cost of maintaining and increasing this type of capital can be attributed to investment costs. Often, the management of the organization, in order to avoid employee turnover and bind employees to a given place, resorted to such tricks as selling a share of the shares to its own employees. Both the manager of the organization and its staff benefits from this incentive method. Since the payment of dividends directly depends on the profits of the organization, each of the employees can influence the remuneration, increasing the quality of their work. This method of stimulation resorts to one of the richest companies in the world – Apple. To retain valuable personnel and to improve the quality of their work, the main bonus is the sale of own shares at preferential prices. Even after the dismissal, former employees are in no hurry to part with Apple shares, as the value of shares has been growing at an incredible rate over the past few years.

It is difficult to assess human capital because of the integration of people. The anthropological component of this capital characterizes a person as a separate individual, as a person belonging to a particular social group and country. Integration or combination of human knowledge should be considered at macro- and micro-levels. Integration of human capital of employees within one firm can increase labor productivity by several times. Combination of knowledge, skills and experience of several employees increases the overall productivity level. G. Becker transferred human capital to the micro-level, where human capital of an enterprise was primarily defined as a combination of knowledge and skills of all employees of the company. As an investment in this type of capital, he assessed the upgrading of workers through additional courses. G. Becker assessed the economic efficiency of education primarily for the worker himself. The integration of individual capital forms the total turnover of the firm's total human capital.

Considering this issue at the macro-level, it can be noted that when the mind is integrated in transnational companies such as Microsoft Corporation, Coca-Cola, IBM, Nokia, Toyota, this leads to the fact that they become leaders in their market. To preserve the leading position among competitors, great attention is paid to the department for the development of know-how, image and brand of the company. For such departments, special ways of raising human capital are created. Special training of employees forms the competitive advantages of the company (Table 1).

The combination of human capital of employees within one company in a creative interaction gives a programmed synergistic effect that promotes the development of intra-company trust and teamwork.

Table 1: The most expensive brands in the world (2018)

Rating position	Brand	Market value ($/billion)	Change in market value in relation to 2017 (in %)
1	Coca-Cola	70.452	+2
2	IBM	64.727	+7
3	Microsoft Corporation	60.895	+7
4	Google	47.800	+36
5	General Electric	42.808	-10
6	McDonald`s	33.578	+4
7	Intel	32.015	+2
8	Nokia	29.495	-15
9	Disney	28.731	+1
10	Apple	21.143	+37

The residence place of a person has an impact on human capital. An example is a person whose mental abilities allow him to develop and increase his human capital, but his place of residence will inhibit its development. Suppose a person has directorial skills. He lives in a small town, which does not prepare specialists of such kind of profession. Consequently, his residence place will not allow a person to develop his abilities, and even the opposite, the effect of the accumulation of human capital will be negative.

Perhaps a person already has the necessary education, work experience, skills, but, changing his residence place, he is not able to find a job. Consequently, the development of its human capital will not occur. The residence place of a person is an external factor that can have both positive and negative effects on the development of human capital.

In connection with the large-scale increase in environmental pollution as a result of industrialization, we are faced with a number of environmental problems affecting human health. Today, in almost every country, the issue of environmental safety is regulated at the international level. Cancer incidence is largely determined by the concentration of carcinogenic substances in the atmosphere. One of the important causes of diseases of the upper respiratory tract (the death rate for which is still high in our country) is dust. Poor environmental conditions in the country or region, as a result, destroy the health infrastructure due to migration to other areas more comfortable for living.

Study of Human Capital Assessment Methods

Modern views on the human capital assessment have a mathematical justification. Thus, today the human capital assessment through the indicator "goodwill" is one of the most popular. Initially, the goodwill indicator included only the territorial location of the object, which used to be one of the strongest advantages over competitors. To date, there is no clear interpretation of this concept. At the same time, the entire scientific community is united in the fact that goodwill is a key factor for successful business, since it allows you to extract extraordinary profits without attracting additional assets.

Goodwill combines the intangible benefits of organization. With proper use of such resources by management, the company can guarantee a competitive advantage, as well as profit growth for a long period. To mathematically analyze this indicator, consider it on the example of three employees – S_1, S_2, S_3. Suppose that the knowledge, experience and qualifications of each must be assessed on a 10-point scale: Z_1= 9; Z_2= 6; Z_3= 3.

Make the ratio of indicators of the first employee to the third:

$$A = \frac{Z_1}{Z_3} = \frac{9}{3} = 3. \tag{1}$$

The employee S_1 is three times more important at the enterprise than the employee S_3. Most likely, the qualification experience of the first is several times greater than the experience of the latter, therefore, the significance of the work performed will be distributed depending on the experience. The more qualified the specialist, the more difficult the work. Therefore, the more important he is for the organization.

$$\mathbf{A} = \begin{pmatrix} \frac{Z_1}{Z_1} & \frac{Z_1}{Z_2} & \frac{Z_1}{Z_3} \\ \frac{Z_2}{Z_1} & \frac{Z_2}{Z_2} & \frac{Z_2}{Z_3} \\ \frac{Z_3}{Z_1} & \frac{Z_3}{Z_2} & \frac{Z_3}{Z_3} \end{pmatrix} \tag{2}$$

For any *i*-th value, the equality is $a_{ii} = 1$, true, that is, $a_{11} = \frac{Z_1}{Z_1} = 1$. It should be noted that when $a = \frac{Z_1}{Z_3}\frac{Z_3}{Z_1}$ value will also be equal to 1. That is, when two specialists with different levels of qualification work together, the result will also be achieved, and the work will be performed qualitatively. In collective work, a specialist with a low level of human capital will increase his knowledge, and consequently, in the future will be able to perform this work independently, then his indicator equals the value $\frac{Z_1}{Z_1}$.

There is an easier way to calculate human capital through goodwill indicator. The following indicators are included in the basis of the methodology for human capital assessment: Z – estimated or paid wages; *I* – investment in education; t – time; S – employee cost assessment; G_{HC} – goodwill of human capital.

$$G_{HC} = \frac{S}{Z*I*t}. \tag{3}$$

Another modern way of finding human capital mathematically is using a discount coefficient. To find the minimum level of future income, at which the costs of human capital formation will be compensated, that is, the acquisition of professional knowledge and skills, the following formula should be followed:

$$\sum_{i=1,\dots,n} E_{t+i} \geq \sum_i I_{t+1}(1+r)^{n-I}. \tag{4}$$

where: I_t – investment value;

E_t – income received in the same year;

r – future period discount coefficient;

$\sum_{i=1,\dots,n} E_{t+1}$ – total income earned over n years of investment.

As follows from formula 4, the lower bound indicator should show the justification of investment risk. It should also be noted that the human capital formation is based not only on financial costs, but also on labor, as well as personal qualities of a person. The effectiveness of the investment spent may be unjustified in the event of a banal decrease in the health level (loss of health capital), therefore this method of human capital assessment cannot be objectively accurate.

Lets analyze one more method of mathematical finding of human capital – through the discount coefficient. Human capital assessment can be calculated by the following formula:

$$HC = \frac{(1+r)^n - 1}{r} * Cst, \quad (5)$$

where NK (HC) is human capital, monetary valuation of labor costs;
r – discount coefficient;
Cst – the cost of life support;
n – number of years.

Investigating the question of the methodology for human capital assessment, the author proceeded from the basic conceptual provisions described in the works of many domestic and foreign authors. But as we could see, none of the methods can provide an accurate assessment of the human capital level of an individual or organization as a whole.

Analyzing the above methods and substituting data of real people, we identified inaccuracies and errors in the calculations, since many indicators are impossible to calculate, or the calculations did not take into account inflation, unemployment, geographical location and many other factors.

Lets clarify, that human capital can be assessed on a 10-point scale. We single out four components of this concept – age, education, professional experience and health. These categories should be converted to coefficients that will help determine the human capital level.

To determine the age indicator, it is necessary to divide the employees by age groups: from 14 to 25 – 0.5; from 26 to 35 – 1; from 36 to 45 – 0.9; from 46 to 55 – 0.8; from 56 to 75 – 0.6; from 76 and up – 0.5. The quality deterioration of the product produced (during physical labor) for women occurs after 50 years, and for men after 55.

The health coefficient (K_z) is an indicator responsible for the employee's health capital.

The education coefficient K_o begins to form from the birth of a person. Basic knowledge is laid during school years. On the basis of this knowledge, the employee's professional knowledge will then be formed. We formulate specific values for finding the education indicator:

- 1.00 – for persons with higher education, working in the specialty;
- 0.80 – for persons with secondary technical and incomplete higher education;
- 0.70 – for persons with secondary vocational education;
- 0.60 – for persons with elementary vocational education;
- 0.30 – for persons with complete secondary education.

The professional experience coefficient K_{PO} should take into account work experience in the position held, providing for professional development once every three years. This indicator begins to decrease with the age of the employee, since with the advent of new technologies, problems may arise with the qualification level of the employee.

Human capital can be found by the following formula:

$$ЧК = (O * K_o) + (V * K_v) + (Z * K_z) + (\frac{C}{2} * K_{pO}), \quad (6)$$

where: ЧК (HC) – human capital;
V – age indicator in the group;
C – indicator of work experience in the group;
Z – health indicator in the group;
O – education indicator.

We calculate the human capital of a twenty-five-year-old worker with a higher education, working in the specialty for three years. During this time, the employee did not miss work due to illness.

$$HC = 1 + 0{,}5 + 1 + \left(\frac{3}{2} * 3\right) = 7 \text{ points.} \quad (7)$$

As it was mentioned earlier, the maximum point for the accumulated capital can be equal to 10. For this example, 7 points is also a very high indicator, and it is due to the ideal health capital. At the same time, the experience of an employee is small, and this, on the contrary, reduces his professional qualities. With age, his capital will grow.

Such methods of calculation are among the most accurate. This is due to the large number of indicators that are defined by criteria. Errors in the calculations may be due to K_z, which should be given special attention.

Conclusion

Summarizing the above, it should be noted that among the many theories of human capital value assessment and the developed mathematical models there are common elements that unite the data of the theory. The author identifies four basic elements that will allow a more accurate human capital assessment in practice (Formula 6).

To date, in all developed countries, it is human capital that predetermines the pace of economic development and scientific and technological progress. The role of human capital, human knowledge, skills and training has increased.

Human capital is an important factor of production and has a direct impact on the well-being of the individual, company and state. Improving the quality of human capital training can lead to a reduction in the share of production costs and sales growth. Thus, the marginal costs of the enterprise are reduced, the company can further sell its product at lower prices and with better quality. Human capital is a mean of labor in production. As a result of studying various sources, we came to the conclusion that such a definition as "human capital" should be considered as an economic category with a multi-level structure.

In conclusion, let us clarify the author's concept of human capital.

Human capital is a combination of such elements as knowledge, professional experience, health and inherited qualities of an individual, as well as a person's ability to increase their income, material and spiritual ones, and share their capital in the form of professional experience with other people without reducing knowledge and without reducing accumulated capital (Kobzistaya, 2016, p. 155).

The author also undertook a study that allowed to offer a balanced model to practitioners to calculate the cost of human capital, which will allow as follows:

- to improve information and analytical support for the management processes of the intangible component of the company;
- to increase justification and quality of decisions made regarding intangible capital;
- to provide the possibility of rational redistribution of intellectual resources.

Moreover, the above indicators can be used as guidelines in developing the company's strategy for the development of corporate capital.

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Immigrants in Polish Economy – The Quantitative Analysis

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Abstract

The paper presents the definition of immigration and its positive and negative effects. The problem of immigration in Poland has also been described here. It has been shown that the main reason for immigration to Poland is the economic aspect, i.e. economic migration. Based on the data provided by the Office for Foreigners and the Ministry of Family, Labour and Social Policy, it has been outlined how trends related to the presence of economic immigrants on the Polish labour market are shaped. The aim of the article is also to prove that there has been a growth of foreign workers in Poland in the last six years and that a large group of them is doing all the formalities for their employment in companies. The data collected allowed analysing information on the nationality and gender of foreigners in Poland. It has been proved that the most numerous group are people in the age category from 20 to 39, and the majority of immigrants entering Poland come from Ukraine. It has also been shown that in the last six years most documents entitling to stay in Poland and work permits have been issued for immigrants from Ukraine, which proves that foreigners from this country are increasingly visible on the Polish labour market and are willing to undertake work, which may help to make up for staff shortages. A report has also been presented to show that the main reason for Ukrainian citizens to come to Poland is higher earnings and the desire to improve their standard of living. The report also showed that their work often diverge from their qualifications and level of education, which means that the potential of immigrants coming to Poland is not fully exploited.

Keywords: Economic Migration, Barriers, Labour Market, Work Permits,

Introduction

Human migration is a social and political phenomenon and has accompanied humanity virtually from beginning. The current reality is to a large extent the result of migration processes and their consequences. Nowadays, the main factor that encourages migration is the desire to find a better place for oneself and one's family to increase the chance for personal growth and to raise the standard of living. The course of migration processes contributes to the improvement of the material situation of many social groups and the economic development of entire countries. This increases national income and investments (Suduł, 2013). Migration has many positive aspects, but also negative ones, such as illegal migration, thus migration can also be divided into legal and illegal. There can be many reasons for migration to a country, for example, for political or economic or religious aspects. Immigration is generally understood as the arrival of people in a given territory. It is commonly called an arrival in a country for a long-term residence, which may last more than three months. This concept is also closely related to emigration, which means the departure of people from a given country (Kaczmarczyk, 2015). An influx of people where the stay lasts more than three months, if the purpose of arrival is tourism, visit, religious pilgrimage or military mission does not count as immigration. The remaining cases can be considered as immigration. This phenomenon can also be divided into long-term or short-term immigration. Immigration can be called economic if a citizen of a given country comes to another country in search for better living conditions or job opportunities (Bińkowski, 2017; Kilic, Yucesan & Ozekicioglu, 2019). This type of immigration is most often mentioned when people come to another country to earn a living (Skoczyńska- Prokopowicz, 2018; Tvaronavičienė, 2018). In many countries, the immigration phenomenon leads to numerous conflicts. Local people often see foreigners as a threat to the labour market. Foreigners who have not found a job may also require financial support. It also happens that illegal employment of foreigners leads to

large financial losses in the economy (Valaskova, Kliestik, & Kovacova, 2018). The growing conflicts between foreign cultures are also a negative phenomenon. Immigration also has positive aspects, such as profitability in employing foreigners by companies, as well as increasing competitiveness on the labour market, which makes employees more efficient and entrepreneurial. Mixed teams also lead to the exchange of experience between employees. Many foreigners also assimilate quite fast in new conditions. A positive phenomenon of immigration is also the fact that it significantly affects economic growth, which is a key factor increasing the level of wealth in a country. Immigrants can be divided into two main groups.

The first of them are people with higher education, who may affect the growth in the number of highly skilled workers, e.g. engineers and physicians (Klimek, 2015). Educated foreigners are an extremely valuable human capital, which may lead to an increase in the number of qualified people on a given labour market. This is related to the difference in the quality of education obtained in another country, the level of knowledge and the speed of acquiring foreign languages, different than for natives, which may affect the integration process and employment of foreigners in a given country (Sharaf, 2013, Kurowska-Pysz, Szczepańska-Woszczyna, Štverková, Kašík, 2018). The second group involve people with a lower level of education, e.g. warehousemen or construction workers as well as other professions that require intensive labour (Peri, 2013). The reasons for such economic migration may be an increase in the minimum wage and better social benefits in a country for such workers (Boffy- Remirez, 2013; Krutova, 2019; Haque & Oino, 2019). The fact that immigrants are diverse in terms of education and skills on the labour market means that they can be delegated to various tasks. However, the earnings of foreigners may be lower than those of native citizens and the achievement of a satisfactory income for immigrants may extend significantly over time (Arigna, Lucifora, Pagani, 2015). The reason for the difference in earnings is the occurrence of the occupational mobility phenomenon and its consequences, because many immigrants often experience negative changes in their career status when looking for new jobs and rotation between companies during their stay in another country (Javdani, McGee, 2018). For many groups of foreigners the difference in remuneration is significant and the reasons may be their skills, origin and language level (Myślicki, 2016). It is therefore necessary to support countries and political changes which will facilitate the adaptation of immigrants, may reduce entry barriers and facilitate the process of cultural assimilation (Anderson & Huang, wol.IZA.org), as a result attracting foreigners. Different countries have numerous programmes to support immigrants in their mobilisation due to their unfavourable situation on the labour market. It is often the case when immigrants have less chance of being employed than native citizens and are often listed as unemployed. To facilitate the situation of immigrants on the labour market, European governments use Active Labour Market Programmes, which can include language courses, job search assistance and numerous training programmes, which are an effective tool to support both working as well as job-seeking immigrants, effectively reducing the number of unemployed immigrants (Butschek, Walter, 2014). Such support programmes can also contribute to improving cultural assimilation increasing their overall level of satisfaction and sense of belonging to a country (Kóczán 2016).

Characteristics of Immigrants Entering Poland

Although foreigners are increasingly visible on the Polish labour market (Matkowska, 2013), the demand for foreigners in Poland is constantly growing. This proves that employing foreigners is not only a current and dynamic trend, but even a necessity in the context of maintaining the current growth pace of the Polish economy, taking into account current demographic trends (Chorągwicka - Majstrowicz, 2018).

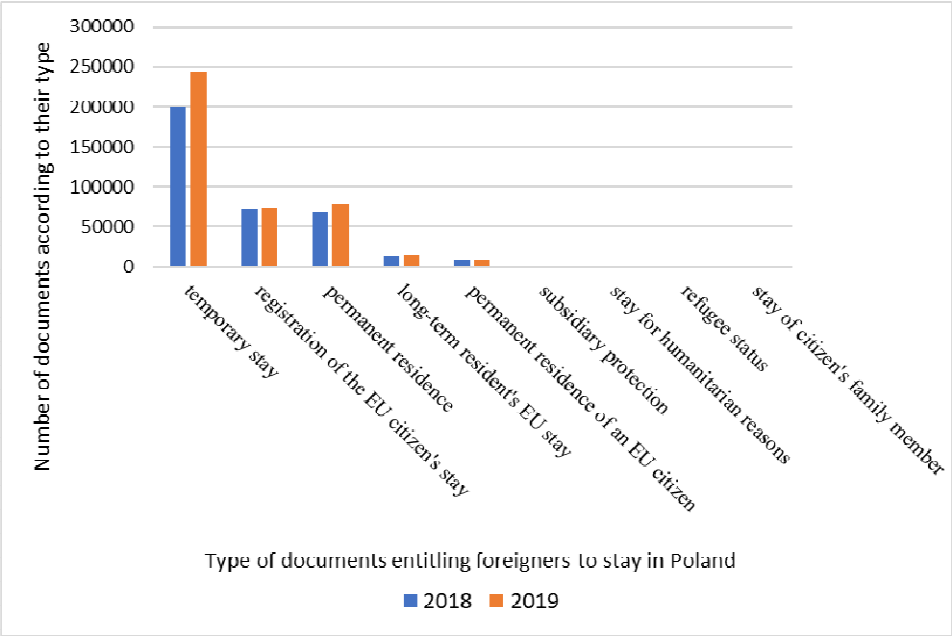

Figure 1: Number and type of valid documents held by foreigners entitling to legal residence in Poland in 2018.

Source: Own study based on: https://migracje.gov.pl/statystyki

In 2018, the number of persons holding valid documents entitling to stay in Poland was 367,225 figure 1 In 2019, the statistics of persons holding valid documents entitling to stay in Poland increased slightly. The number of persons holding documents authorising temporary stay in 2019 was 244.544, i.e. over 44 thousand more than in the previous year. In 2019, the number of persons entitled to permanent residence also increased by more than 10 000 compared to the previous year.

Most people have documents entitling them to temporary residence or EU citizenship registration. More than 77,000 people in 2019 also had documents authorising permanent residence. The smallest number of people has documents entitling them to stay in Poland for humanitarian reasons or only proving their refugee status.

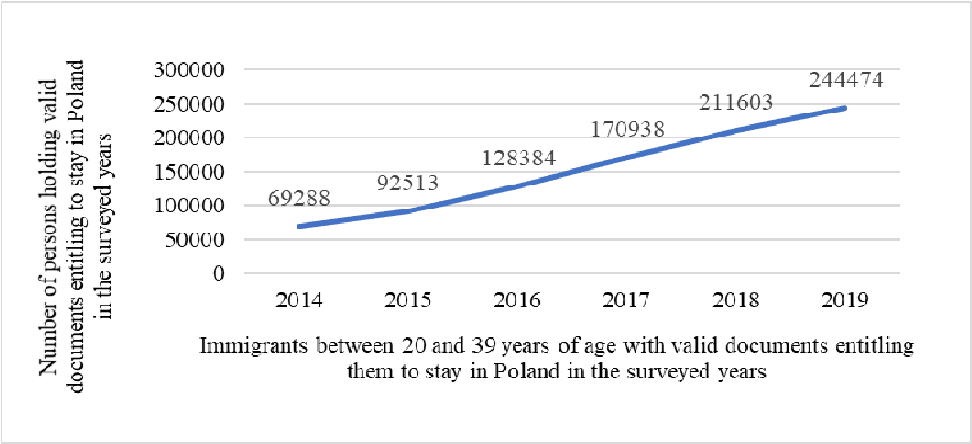

Figure 2: Age of foreigners holding valid documents entitling them to stay in Poland between 2014 and 2019.

Source: own study based on: https://migracje.gov.pl/statystyki

From the data presented in figure 2. it appears that mainly young and middle-aged people have come to Poland over the last 6 years. In 2014, the age structure of people with valid documents was shaped in such a way that over 16 thousand people under 20 years of age had valid documents entitling them to stay in Poland, and in the age category from 20 to 39 years of age, nearly 70 thousand. In the age category from 40 to 59 years of age, there were about 38,000 foreign citizens with valid documents. The least numerous groups were persons over 60 years of age, with a total of 10 thousand people in 2014. In 2019, the age structure was similar, but the number of immigrants with valid documents increased significantly. The number of foreigners under 20 years of age was over 52 thousand, and in the age category from 20 to 39 nearly 245 thousand. In 2019, the number of people from 40 to 59 years old was over 110 thousand. (migrations.gov.pl) an increasing trend can be observed among immigrants entering Poland over 6 years under study, from 2014 to 2019. The most numerous group was the group of people between the age of 20 and 39.

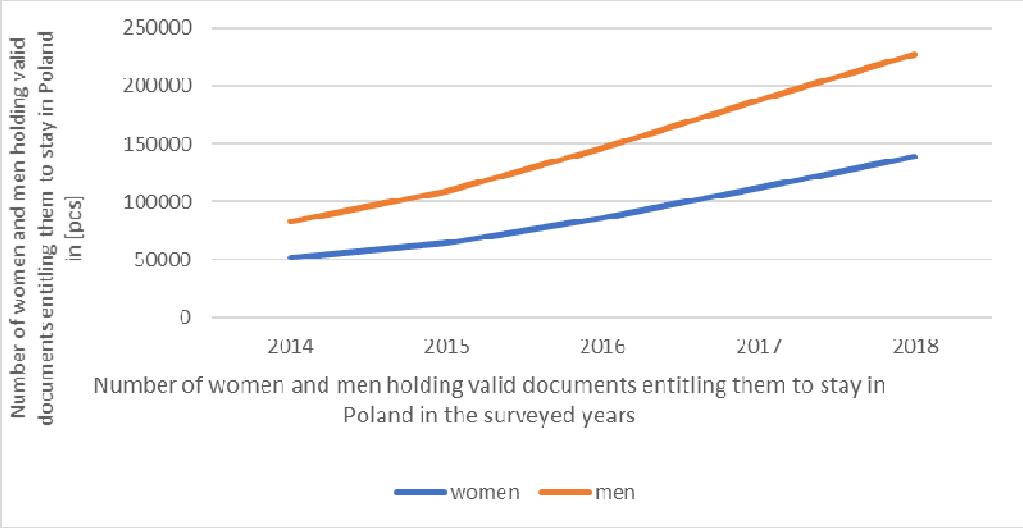

Figure 3: Gender and number of foreigners holding valid documents entitling to stay in Poland between 2014 and 2018.

Source: own study based on: https://migracje.gov.pl/statystyki

Analysing statistical data figure 3 which concern the gender of immigrants entering Poland, it can be observed that much more men than women enter. In 2015, there were over 109,000 men with valid documents and only nearly 65,000 women. In both cases, the trend is increasing; however, the gap is increasing by the year. In 2019, the number of women reached 165,000 and men over 260,000. (migracje.gov.pl, 2019) As can be seen, in 2019, the gap between women and men is higher than in previous years. The number of men holding valid residence documents is nearly by 95,000 more than the number of women.

Figure 4 shows that the structure of foreigners holding valid documents by nationality.

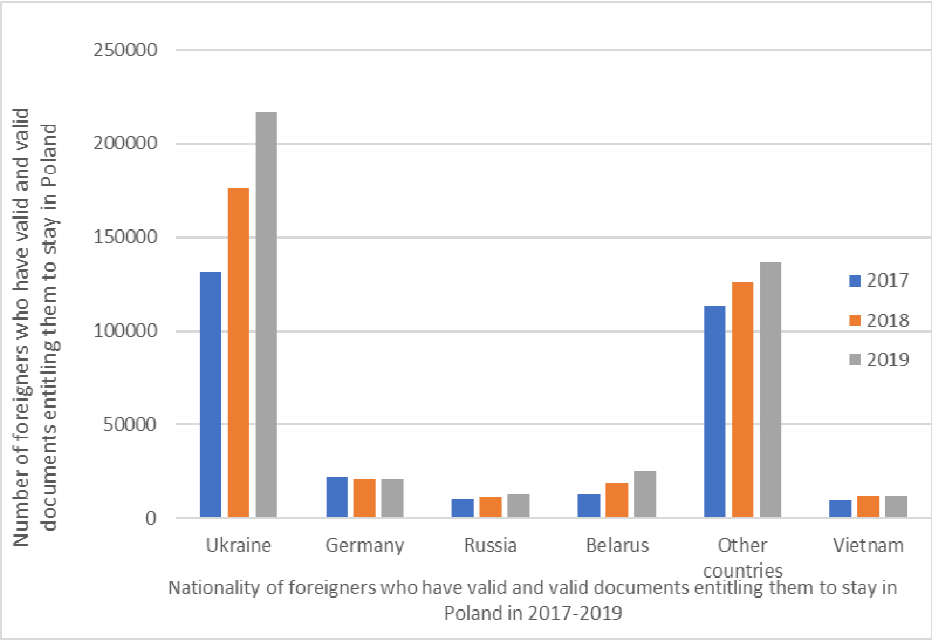

Figure 4: Nationality and number of foreigners holding valid documents entitling to stay in Poland between 2014 and 2018.

Source: own study based on: Country, charts, https://migracje.gov.pl/statystyki

The data presented in the figure 4 show that most immigrants with valid documents entitling to stay in Poland came from Ukraine. In 2019, their number was over 21 thousand people, i.e. 40 thousand more than in the previous year. Nearly 684 thousand citizens from Ukraine had valid documents entitling them to stay in Poland over six years, from 2014 to 2019. It should also be taken into account that not all immigrants have such documents, so the actual number of immigrants in Poland may be much higher. Another nationality with a growth in the number of persons holding valid documents entitling to stay in Poland are Belarusians. Between 2014 and 2016, the number of holders of valid documents totalled over 20,000, but in the following years the dynamics increased significantly. In 2019, over 25 thousand people from Belarus had valid documents. The remaining countries had a small share in the people entering Poland. For example, more than 20 thousand Germans came to Poland over 6 years from 2014 to 2019. The total number of German citizens with documents entitling them to stay in Poland is about 130 thousand people. In 2019, their number also decreased slightly compared to the previous year. In 2015, a visible group of immigrants with valid documents were Italians, whose number was over 6 thousand, but since 2017 such interest in Poland is no longer observed by Italian citizens. Since 2016, however, immigrants from Vietnam are noticeable with nearly 12 thousand people holding valid documents entitling them to stay in Poland in 2019.

According to the data of the Ministry of Family, Labour and Social Policy concerning work permits for foreigners in Poland, the employment of immigrants is becoming increasingly noticeable nationwide.

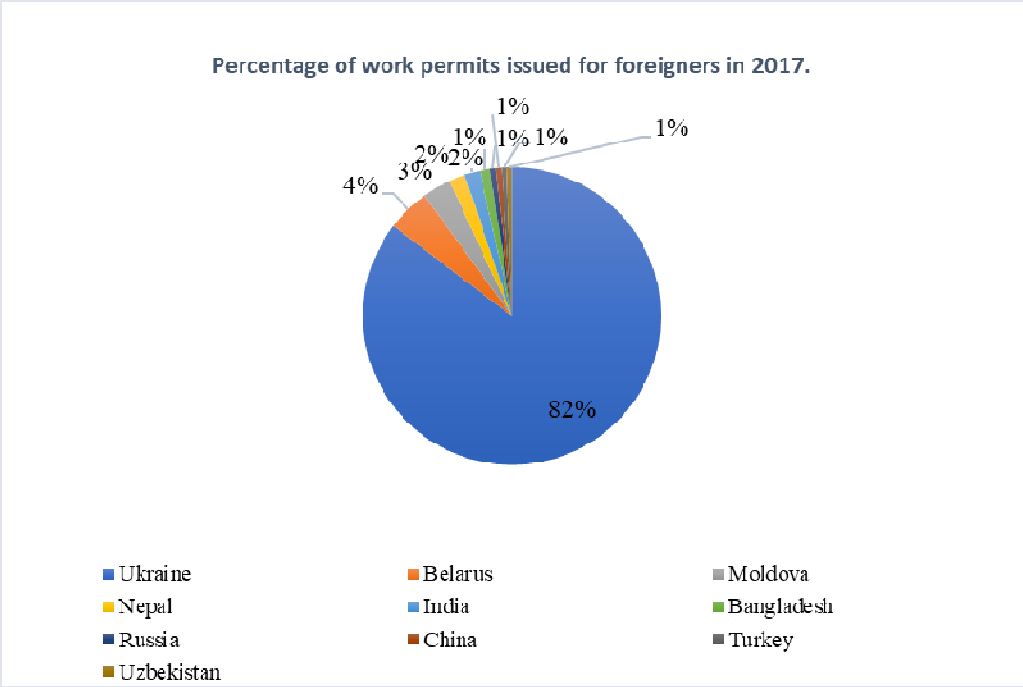

Figure 5: Work permits for foreigners issued in 2017 by 10 most represented citizenships in a given year [%].

Source: own study based on: Work permits for foreigners, https://archiwum.mpips.gov.pl/analizy-i-raporty/cudzoziemcy-pracujacy-w-polsce-statystyki/

In 2017, most work permits figure 5 were issued to foreigners from Ukraine. Their share in all permits issued was almost 82%. Belarusians come second with less than 5%. Nearly 3% of permits were issued to Moldavian citizens and 2% each to nationals of India and Nepal. Other countries with a low score are China, Turkey, Uzbekistan, Russia and Bangladesh. Only 1% of the citizens of these countries get work permits in Poland. The above data from 2017 showed that foreigners entering Poland from countries other than Ukraine are of marginal importance.

The figure 6 shows a list of declarations registered by poviat employment agencies in 2015 - 2017.

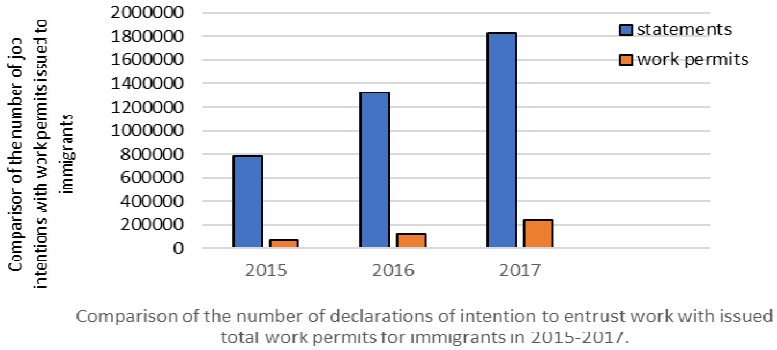

Figure 6: Number of declarations and number of work permits registered/issued between 2015 and 2017. Source: own study based on: Work permits of foreigners, https://archiwum.mpips.gov.pl/analizy-i-raporty/cudzoziemcy-pracujacy-w-polsce-statystyki/

In 2013, nearly 236 thousand declarations of intent to work in Poland were submitted by foreigners, however, in 2015, this number increased to nearly 783 thousand. In 2016 and 2017, this number exceeded one million. In 2016, 1,314,127 declarations of intent to work were submitted, and in 2017, 1,824,464. However, significantly fewer work permits were issued in relation to the number of declarations. In 2017, only nearly 236 thousand work permits were issued for immigrants entering Poland. (mpips.gov.pl) Most work permits were issued to Ukrainian citizens, who are the most numerous group of immigrants among other immigrants entering Poland.

To sum up, it is currently impossible to accurately estimate the number of foreigners entering Poland, especially from Ukraine, but it is estimated that there are already over a million immigrants from this country. Immigrants systematically fill the personnel gaps and contribute to the decrease in unemployment in Poland.

A study analysing the general level of satisfaction of immigrants from Ukraine working in Poland shows that the main reason for coming to this country was higher earnings. Such an answer was indicated by 76% of the respondents, 37% responded that the main reason was also a higher standard of living and 22% a lack of appropriate work in Ukraine. 21% of respondents also replied that the reason for leaving the country was better social conditions and 10% that the reason for emigrating from Ukraine was the fact that it is safer in Poland. When asked about the compatibility of their education with their work, more than 66% of the respondents answered that their work does not match their education and works below their qualifications. Only a small group of 6% replied that their work was above their qualifications. This applies to people with higher and secondary education. When asking the respondents about the general level of satisfaction with work in Poland and the quality of cooperation with Poles, the majority of citizens from Ukraine answered positively. 79% of people answered that they were satisfied with their work in Poland and 85% answered that the cooperation with Poles is going well (workservice.com)

Summarizing the above study, it can be concluded that the majority of Ukrainian citizens, despite the lack of personnel in Poland, work below their qualifications. This is especially true for people who have higher education. This means that the potential of people entering Poland is not fully exploited, especially that there is still a shortage of specialists on the labour market.

Summary

Summing up the analysed research problem, it can be concluded that, over the past few years, the growing immigration trend has caused that a large group of workers from Ukraine are currently living and working in Poland and their presence is becoming increasingly noticeable not only by ordinary citizens but also by entrepreneurs . The increase in the number of employees from Ukraine on the labour market is also an opportunity for the Polish economy and for improving the demographic situation in the country. Citizens from Ukraine enter Poland to improve their quality of life and to earn more; however, most of them work below their qualifications, which may also affect their lower earnings. Despite the fact that there is still a shortage of workers on the Polish market for specialists, Ukrainian citizens often perform professions incompatible with their education. Although currently the level of job satisfaction among immigrants is quite high, there is a risk that immigrants who decide to change will find employment in another country, which may result in a growing shortage of workers on the Polish market. It is also worth remembering that immigrants are extremely valuable due to the unfavourable ageing society trend. Poland should pay more attention to the arriving immigrants and provide more assistance by offering aid programmes for foreigners.

Compared to immigrants from Ukraine, immigrants from other countries coming to Poland are of marginal importance. However, statistics show that more and more immigrants of different nationalities are arriving each year.

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Targeting the Financing of Science in the Context of Strategic Planning

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Abstract

This study is devoted to assessing the possibilities of financial support for achieving strategic guidelines in the development of science and technology. The article analyzes the dynamics and structure of one of the most common indicators that make it possible to assess the country's scientific and technological development - an indicator of research and development domestic expenditure. The transformation of the goal-setting that has been carried out in relation to the development of science within the framework of strategic planning has been revealed - a shift in emphasis from the quantitative determination of established absolute values to relative values, which allows us to evaluate not only the dynamics, but also the structural changes in the observed phenomenon. The impossibility of achieving the established values of one of the main strategic indicators of the development of science in the conditions of preserving the existing trends of its financing is shown.

Keywords: development of science, research and development domestic expenditure, gross domestic product, state program.

Introduction

The choice of directions of scientific and technological development of the country is impossible without an assessment of the scientific and scientific-technical potential, which, in turn, is objectively determined by the logic, dynamics and regular trends of world scientific and technological progress. The competitiveness of such a potential of any country is characterized, first of all, by competitive advantages in comparison with the corresponding potential of a competing country. Unfortunately, the scientific and scientific-technical results are not sufficiently demanded by the real sector, and the solution to the task of creating a “smart” economy is determined precisely by the need for the advanced development of science and technology and increasing the efficiency of using the results. In this regard, the study of the possibilities of financial support for achieving strategic guidelines becomes particularly relevant.

Methodology and Research Methods

In the course of the study, the transformation of the goal-setting system carried out as part of the strategic planning for the development of science was assessed, and the structure and dynamics of the main indicator, which is used to evaluate the country's scientific and technological development, are analyzed, including taking into account international comparisons, conclusions are formulated

regarding the possibility of achieving the set target value of the ratio of research and development domestic expenditure to gross domestic product.

Such scientific methods as analysis, synthesis, generalization, induction, comparison, formalization, as well as methods of comparative, statistical and economic analysis were used for research purposes

Results and Discussion

One of the most common indicators to assess the scientific and technological development of the country is a figure of the volume of domestic expenditure on research and development (RosStat, no date).

By volume total R&D domestic expenditure in absolute terms Russia hold a position in the top ten leading countries of the world (Fig. 1).

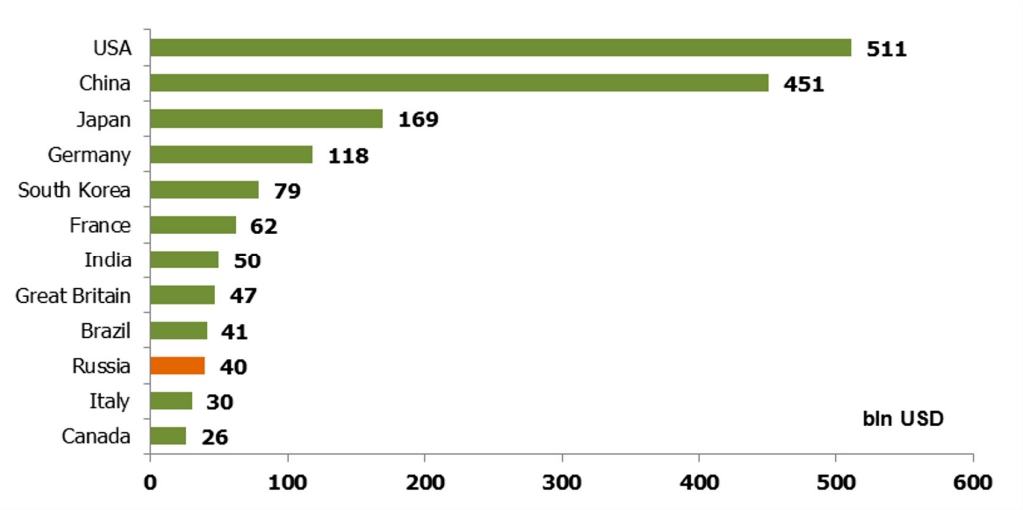

Fig. 1: R&D domestic expenditure, billion US dollars on a purchasing power parity basis of national currencies, 2016 (or the coming years for which data are available) (Gokhberg *et al.*, 2019)

However, in order to carry out a comparative analysis at the intercountry level, this indicator is used in relative terms, for example, relative to population size. Most often, to take into account when measuring the differing economic power and potential of individual countries and to increase objectivity, indicators are used reflecting the size of R&D domestic expenditure in comparison with the gross domestic product (GDP) of the corresponding national economy. Thus, in terms of the volume ratio of R&D domestic expenditure to GDP Russia is ranked 34th in the world (1.1%) between Ireland (1.18%) and Greece (1.01%) and significantly inferior to the leaders (Israel - 4, 25%, the Republic of Korea - 4.23%, Switzerland - 3.37%, Sweden - 3.25%, Japan - 3.14%) (Vlasova *et al.*, 2018; Gokhberg *et al.*, 2019).

Over the past few years, the program documents of the Russian Federation have been declaring the importance and necessity of outrunning scientific and technological development; in this regard, such a serious delay leads to increased attention of the authorities to the need to increase the volume of R&D domestic expenditure in relation to GDP and to include the corresponding indicator in program and strategic documents

It was determined by the concept of long-term socio-economic development of the Russian Federation for the period until 2020 (approved back in 2008), that R&D domestic expenditure s should rise to 2.5–3 percent of gross domestic product in 2020 (2007 - 1.1 percent of gross domestic product) with a dramatic increase in productivity. At the first stage (2012) R&D expenditure (private and state expenses) accounted 1.4 - 1.6 percent of gross domestic product (Government of the Russian Federation, 2018).

Strategy of innovative development of the Russian Federation for the period until 2020 (from 2011) (Government of the Russian Federation, 2011) envisaged that by 2020 the value R&D domestic expenditure should be 3% of GDP, with 43% of which should be provided from the budget, and 57% from extrabudgetary sources.

Decree of the President of the Russian Federation of May 7, 2012 No. 599 (President of the Russian Federation, 2012) determined the need to increase by 2015 the volume of R&D domestic expenditure to 1.77 percent of the gross domestic product.

The 2016 Russian Science and Technology Development Strategy set a target for the development of science - increasing research and development costs and bringing them to at least two percent of the gross domestic product, including a proportional increase in private investment, the level of which should not be lower than state ones by 2035 (President of the Russian Federation, 2016).

One of the most important strategic tasks defined by Decree of the President of the Russian Federation No. 204 of May 7, 2018, was the task of pro-active increase in R&D domestic expenditure from all sources compared with the growth of the gross domestic product of the country (President of the Russian Federation, 2018).

It is necessary to note the transformation of goal setting that has taken place in recent years: a change of emphasis from the quantitative determination of established absolute values towards relative values, which make it possible to evaluate not only the dynamics, but also the structural changes in the observed phenomenon.

Unfortunately, in the case of Russia, the shift to relative R&D domestic expenditure indicators doesn't indicate a transition to a qualitatively new level of assessment of the phenomenon, but rather an attempt to find out the reasons for the failure to reach the previously established values of the indicator and, as a consequence, the transition to the formulation of the problem of increasing extrabudgetary funding for research and development. This thesis is indirectly confirmed by the fact that the new state program "Scientific and Technological Development of the Russian Federation" provides four indicators related to R&D domestic expenditure (Government of the Russian Federation, 2019).

Fig. 2 visually characterizes the failure to achieve the set goals for the share of R&D domestic expenditure in GDP: neither 1.4% - 1.6% by 2012 ("The concept of long-term social and economic development of the Russian Federation for the period until 2020"), nor 1.77% by 2015 (Decree of the President of the Russian Federation of May 7, 2012 No. 599) was never achieved. It is also unlikely that the planned value of 2.5% - 3% will be achieved in 2020 ("Strategy for the innovative development of the Russian Federation for the period until 2020"). There is no obvious positive dynamics of volume indicator in the R&D domestic expenditure as a percentage of GDP in recent years, the indicator value has a stable run at about 1.1 percent.

In this regard, the objective of increasing the growth rate of R&D domestic expenditure for Russia remains to be relevant. At the same time, in order to accomplish the objectives set, it is necessary to change the structure of the economy, which is characterized by the growth rate of R&D domestic expenditure significantly exceeding the GDP growth rate.

It should be noted that, for example, in 2013-2016. Only the China (only up to 2015 - the USA, Germany, Great Britain) was able to solve the problem of the growth of R&D domestic expenditure

with rates exceeding GDP growth (Fig. 3). Thus, the world practice of recent years testifies to the high complexity of the task, and in the notation "a significant excess of the growth rate of R&D domestic expenditure in relation to GDP" - it makes it practically unsolvable in the framework of the existing paradigm of the development of science in Russia.

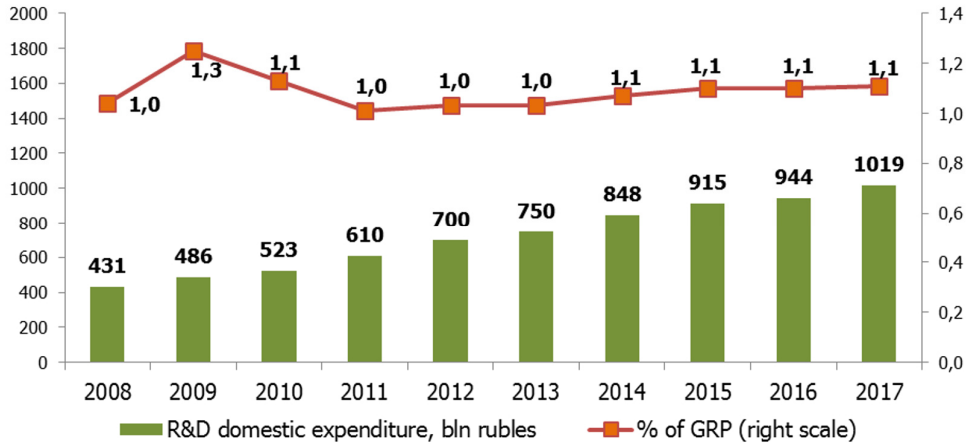

Fig. 2: Volume dynamics of R&D domestic expenditure and the share of R&D domestic expenditure in GDP in the Russian Federation (RoStat, 2019b)

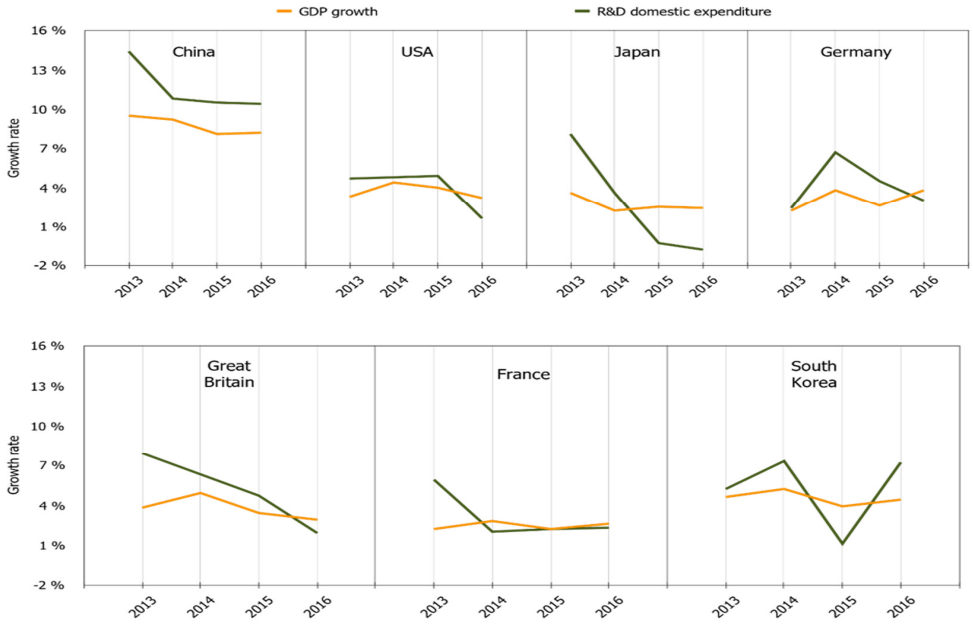

Fig. 3: Volume dynamics of R&D domestic expenditure and the share of R&D domestic expenditure in GDP in the Russian Federation Indicators of the dynamics of GDP and the volume of R&D domestic expenditure in some national economies (Authors' calculations; Ditkovsky *et al.*, 2018; World Economic Outlook, 2018; Gokhberg *et al.*, 2019)

The emergence of the corresponding task for Russia is due to the need to form a “knowledge economy” and a powerful scientific foundation that will help make the transition to a new technological structure. Consider the possibilities available for this.

In the structure of R&D domestic expenditure in Russia in recent years (2012-2017), state funds have consistently dominated, accounting for more than 66%, which is significantly higher than similar values for other leading countries in scientific and technological development (Fig. 4), including and China. Funds from universities make up only about 1%, private NPOs from 0.1% to 0.3%, funds from foreign sources decreased from 4% to 2.5%. The funds of the business sector, although slightly increased, make up only about 30% of the total volume of domestic costs (Gokhberg *et al.*, 2019).

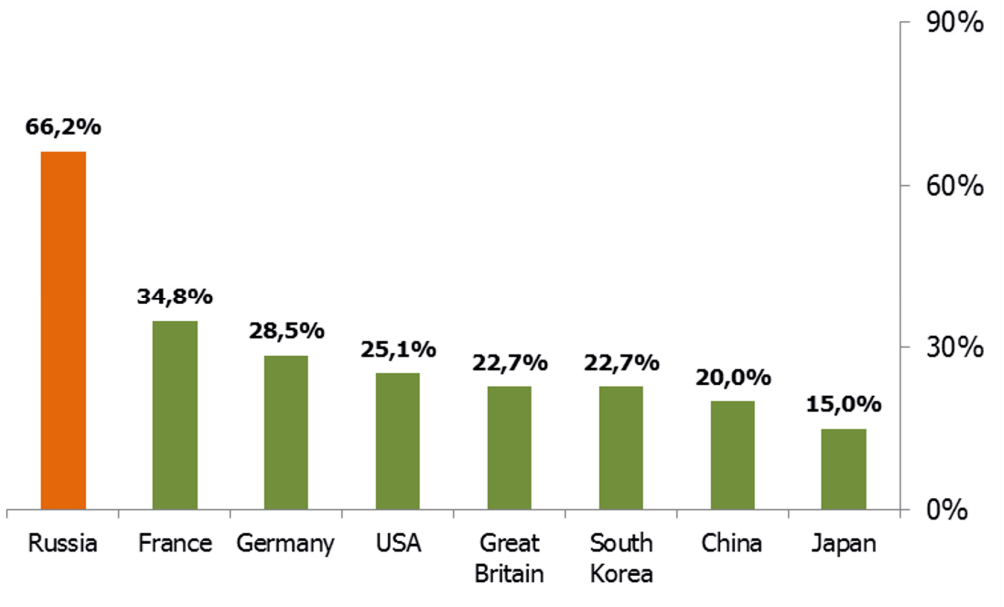

Fig. 4: The share of public funds in R&D domestic expenditure for selected countries, 2017 (or the coming years for which data are available) (Gokhberg *et al.*, 2019)

At the same time, state funds are considered as mainly federal budget funds. The Law "On Science" (Government of the Russian Federation, 1996) establishes a plurality of sources of financing for scientific activity both at the expense of budgets and at the expense of individuals, but it is specifically stipulated that the main source of funding for basic and exploratory research is the federal budget, as well as funds support of scientific, scientific-technical, and innovative activity (Dmitrishina *et al.*, 2018). The interconnection of forecasting, goal-setting, planning and programming is the most important condition for increasing the effectiveness of the entire strategic system, including its regional component (Klimanov, Budaeva and Chernyshova, 2017), which emphasizes the requirement to improve the system of strategic documents both at the regional (Budaeva and Klimanov, 2016) and at the industry level (Dmitrishina and Uskov, 2016). For more information about the coverage of science and the technical policy of modern Russia in strategic planning documents see, for instance, the references (Dmitrishina and Uskov, 2015; Ministry of Science and Higher Education of the Russian Federation, 2015).

In this regard, the Russian Federation aims not only to switch to faster growth in GDP of R&D domestic expenditure, but also to change the structure of R&D domestic expenditure itself, reduce the share of budget financing and significantly increase the share of extra-budgetary. Thus, the equally traditional task of increasing the share of extrabudgetary sources of financing for science

(Mikhaylova and Uskov, 2017), which has also been on the agenda of recent decades, is becoming even more difficult for the economic and scientific authorities of the Russian Federation and requiring new approaches and methods to solve it.

A data analysis in shows that the Government of the Russian Federation is aware of the complexity of the task: the solution of the problem of financing science, mainly at the expense of state funds, is being postponed to a more distant future of the year 2035. In accordance with the Strategy for innovative development of the Russian Federation for the period until 2020, a balance between state and non-state sources of financing should have been achieved between 2016 and 2020, but now we can talk about the failure in fulfilling of this task. Let us consider, however, the dynamics of growth in the volume of federal budgetary financing of science as one of the sources for the formation of of R&D domestic expenditure.

Table 1 shows the GDP growth rates and the comparative growth rates for financing science at the expense of the federal budget. However, the task set on outstripping growth of R&D domestic expenditure in relation to GDP even in terms of budget financing is performed only for the year 2018 and at the project level for 2020. The growth rate of budgetary funding for science doesn't exceed the planned GDP growth rate, which indicates an insufficient amount of budgetary funding and, in fact, "planned" failure to fulfill the objectives of the Decree in 2019 and the projects planned for 2021-2022.

Table 1: Comparative GDP and budget financing of science growth rates

Year	Financing of science at the expense of the federal budget, billion rubles	Annual growth, %	Volume of GDP, billion rubles	Annual growth, %	The share of budget financing in GDP, %
2013	375,8	117,4	73 133,90	107,3	0,51
2014	372,3	99,1	79 199,70	108,3	0,47
2015	366,2	98,4	83 387,20	105,3	0,44
2016	366,3	100	86 148,60	103,3	0,43
2017	355,2	97	92 037,20	106,8	0,39
2018	407,9	114,8	98 234,00	106,7	0,42
2019	422,1	103,5	105 820,00	107,7	0,4
2020*	506,2	119,9	112 863,00	106,7	0,45
2021*	518,9	102,5	120 364,00	106,6	0,43
2022*	540,7	104,2	128 508,00	106,8	0,42

*Note: * – in accordance with the federal law "On the federal budget for 2020 and for the planning period of 2021 and 2022".*
Source: Authors' calculations; Ministry of Finance of the Russian Federation, no date; RoStat, 2019a)

The data indicate a planned decrease in the growth rate of federal budget expenses on science (except 2020), thus, the share of budget financing in GDP as a whole will undergo a decrease. However, substitute and outstripping growth of extra-budgetary expenses is required for a positive assessment of this phenomenon, which is not confirmed by statistical data. The main reasons for the low growth rate of extrabudgetary funding in science include the following:

1. Lack of motivation for investment in science, high risks of non-return on investment, poor development of technologies for commercialization.

2. Skepticism about science in society caused, among other things, by the reputational losses of the Russian Academy of Sciences, a long campaign in the media to discredit the Russian Academy of Sciences.

3. Underdeveloped mechanisms for attracting private investment in science. The concentration of a significant part of the scientific potential in state scientific institutions, which are largely confidential and closed.

4. Lack of an effective state economic policy aimed at stimulating innovation and scientific activity.

However, when deciding on the choice of measures to stimulate the involvement of extrabudgetary sources in financing research and development, it is necessary to take into account that, despite the more realistic goal setting (Klimanov and Safina, 2017) at present, such decisions will undoubtedly increase the burden on economic agents. Moreover, an increase in administrative regulation and/or pressure in order to attract additional amounts of extrabudgetary funds may cause other problems in the economic system (for example, massive concealment of profits and, consequently, a decrease in the tax base for this tax, in case mandatory deductions from corporate profits and organizations for research and development are confirmed). To avoid a disbalance in the economic system, it is necessary to make balanced and thoughtful decisions. The main direction of changes should be an increase in the share of industries with high surplus value in the Russian economy. A possible solution to the problem may be to improve the statistical tools for accounting for R&D costs, as well as to stimulate enterprises and organizations of various forms of ownership to classify expenses as research and development and to reflect them in statistical accounting.

Conclusions and Scientific Novelty

During the research, a transformation of the goal-setting that has been carried out in relation to the development of science in the framework of strategic planning has been identified. A shift in emphasis from quantitative determination of the absolute values established to relative values, which make it possible to evaluate not only the dynamics, but also the structural changes in the observed phenomenon. An analysis of the dynamics and structure of one of the most common indicators that make it possible to assess the country's scientific and technological development, which is the indicator of R&D domestic expenditure, showed the impossibility of achieving the established values of one of the main strategic indicators of the science development in the context of maintaining existing trends in its financing, including due to the lack of replacement and outstripping growth of R&D extrabudgetary costs. Moreover, we identified the main reasons for the low growth rate of extrabudgetary funding in science and proposed directions for stimulating the involvement of extrabudgetary sources in financing research and development.

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Social Media in Online Learning among Accounting Business Students in Nigeria: Africa in View

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Abstract

This short paper surveyed undergraduate students' consciousness and the application of social media for the business of learning. In this introductory study, respondents were accounting students of universities in Nigeria. We used a survey questionnaire to gather data for this ongoing study. Preliminary results affirm that accounting undergraduates use social media for many purposes but rarely for online learning. Instagram and YouTube are the most patronized social media outlets, determined mostly by the student's age. The conclusion, for now, is that beyond expectation, the majority of accounting undergraduates in Nigeria do not use social media for learning. Therefore, we recommend that scholars should conduct similar researches in other academic disciplines and regions of Africa.

Keywords: Social Media, Internet, Accounting, Business, University Undergraduates

Introduction

Subject area	Business Communication
More specific subject areas	Social Media Learning, Marketing Communication, Advertising, Public Relations Execution of the study
A s	urvey carried out with the use of a questionnaire.
Study format	Quantitative methodology
Experimental factors	For this study, we gathered data from 294 undergraduates of accounting studies. We collected answers to research questions from the instrument of the questionnaire. Objectives and problems of the study focused on undergraduates' awareness and application of social media applications for learning purposes. Tables and bar charts represent the preliminary results. We used Analysis of Variance (ANOVA) other statistical tools of the Scientific Package for Social Sciences (SPSS) for this initial study.

Experimental features	These include information on the business of academic and professional accounting, use of social media, and undergraduates disposition towards online learning.
Preliminary study location	Nigeria
Data accessibility	Original data is available to compare with similar investigations in other African countries.

Value of Study

1. This preliminary study lays the foundation for similar studies in as many African countries as possible. It will show whether results identical to that of Nigeria could come out of other African countries.
2. The study would generate massive data which the whole world could use to understand the teaching, learning, and practices of accounting business undergraduates.
3. The multifaceted platform of this study consist of the following:
    a. Business accounting scholarship and professionalism as well as social media application. Sample in
    Boyd, *et al.* (2014), Iyoha, *et al.* (2013), Makinde, and Adesopo, (2006), van Mourik, and Walton, (2014), Kommers, *et al.* (2015), Noor Al-Deen, and Hendricks, (2012), Patel, (2019), Saunders, *et al.* (2015), Shrivastava, (2013)**.**
    b. Fundamentals and applications of integrated marketing communication. Sample in Odiboh and Oladunjoye (2019), Odiboh, *et al.* (2020a), Odiboh and Ajayi (2019), Odiboh, Ezenagu, and Okuobeya (2019).
    c. Public relations actions of institutions of education, accounting, and universities. Sample in Adelua, *et al.* (2020a), Adelua, *et al.* (2020b), Adelua, *et al.* (2020c), Adelua, *et al.* (2020d), Aiyende, *et al.* (2020a), Aiyende, *et al.* (2020b), Fayemi, *et al.* (2020a), Fayemi, *et al.* (2020b), Fayemi, *et al.* (2020c), Fayemi, *et al.* (2020d), James, *et al.* (2020a), James, *et al.* (2020b, James, *et al.* (2020c), James, *et al.* (2020d), Ndubueze, *et al.* (2020), Ndubueze, *et al* (2019), Nejo, *et al.* (2020a), Nejo, *et al.* (2020b), Nwosu, *et al.* (2020a), Nwosu, *et al.* (2019), Nwosu, *et al.* (2020b), Olabanjo, *et al.* (2020a), Olabanjo, *et al.* (2020b), Olabanjo, *et al.* (2019), Omokiti, *et al.* (2020a), Omokiti, *et al.* (2020b), Salau, *et al.* (2020a), Salau, *et al.* (2020b)

Experimental Design, Materials and Methods

Survey method provided the data used in this short length paper. We applied a questionnaire to 294 undergraduate students of accounting business in Lagos, Nigeria. The respondents were selected using the multi-stage sampling technique. Below are some of the preliminary results of the survey.

Preliminary Study Results

Table 1 shows that accounting business undergraduates are aware of the innate purpose of social media.

Table 1: Awareness of social media by accounting business students

S/N	Items	Yes		No	
		Freq.	(%)	Freq.	(%)
1	Are you aware of the use of social media for academic purpose?	285	96.9	9	3.1
2	Do you see social media as a personal online learning environment?	201	68.4	93	31.6
3	Are you aware of the educational discussion and collaborative work done on the platform?	208	70.7	86	29.3
4	Can you rely on the information received from these bodies?	294	100.0	-	-
5	Are you aware of the use of social media to gather data?	291	99.0	3	1.0

Source: Computed Data (2019)

Table 2 revealed that the respondents do contribute to comments on informative academic and professional posts on social media.

Table 2: Cross-tabulation of subscription and application of social media by accounting students

S/N	Items	Yes		No	
		Freq.	(%)	Freq.	(%)
1	Do you have a social media account?	276	93.9	18	6.1
2	Do you share learning resources on your social media account?	169	57.5	125	42.5
3	Do you pay attention to educational discussions shared on the platform?	265	90.1	29	9.9
4	Do you request for comments or ask questions on an educational post?	197	67.0	97	33.0
5	Has any of the platforms introduced you to professional bodies in accounting?	201	68.4	93	31.6
6	If yes, do you use your social media platforms to gather professional data?	291	100.0	-	-

Source: Computed Data (2019)

ANOVA results on Table 3 showed that the differences in respondents' perception of media usage by levels ($\lambda 2 = .651$, $P>0.05$) was not statistically significant while gender ($\lambda 2 = .037$, $P<0.05$), and age ($\lambda 2 = .017$, $P<0.05$ are high.

Table 3: Gender, age and levels of the respondents' usage of social media for learning.

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
GENDER	Between Groups	1.059	1	1.059	4.375	.037
	Within Groups	70.642	292	.242		
	Total	71.701	293			
AGE	Between Groups	1.518	1	1.518	5.733	.017
	Within Groups	77.285	292	.265		
	Total	78.803	293			
LEVEL	Between Groups	.226	1	.226	.206	.651
	Within Groups	320.699	292	1.098		
	Total	320.925	293			

Conclusion

The first findings of this study confirm social media addiction among Nigerian undergraduates of accounting business studies. Also, the study affirmed the popularity of Facebook, Twitter, Instagram, and YouTube over other social media. The gap in accounting students' application of social media for learning is also exposed. This study raises the concern about whether the same trend applies in other African countries. Managers of accounting training and researchers in social media, marketing communication and public relations studies need to pay attention to the disconnection between undergraduates' attachment to social media and their lack of interest in channelling its application for learning purposes. African continental collaborators on this study are needed.

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Public Relations Practices and Bootlegging in Nigeria's Publishing Industry

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Abstract

Public relations tools and practices are the backbones of every organisation. Publishing industries have different sectors working to achieve organisational goals. Nevertheless, is the practices of the PR typical in the publishing industry? This study examines the organogram and internal functions of the public relations unit and the causes of bootlegging, including its effect on distribution and price. The study also focused on the damages bootlegging cost publishers and how public relations tools can tackle bootlegging. However, the Two-Symmetrical public relations model by James E. Grunig was adopted. The study focused on Stirling-Horden, HEBN, Safari books publishing industries, public relations agency and booksellers which were selected purposively. The population which is in Ibadan was selected based on the proximity it has to publish productions. The publishing firms were selected based on publications of Education, Academic and General Books. Results further indicate that both public relations practitioners and agencies are uninterested in educational, academic and general publishing. Therefore, this study recommends that publishing organisation should be encouraged to have a PR department, and the government support them with protective laws.

Keyword: Public Relations, Piracy, Bootlegging, Publishing Industry

Introduction

Public Relations (PR) is a term with different definitions. It is a management function which need recognition in organisations. The Mexican definition of PR states that it is the art and science of analysing trends, predicting their consequences, counselling organisation leaders, and implementing planned programmes of action. These actions serve both the organisation and public interest (Ndubueze, Odiboh, Nwosu, & Olabanjo, 2019). It also evaluates public attitudes and behaviour, including working towards the organisational goal and policies in order for better understanding and relationship between the publics and the organisations. Public relations practices are the catalyst for a healthy organisation. The PR should always have an effective plan in line with the organisational goals for the better functioning of an organisation (Chizobam & Obinna, 2018).

In the publishing industry, public relations practices are limited even though they are suffering from bootlegging. Bootlegging or piracy is the reproducing of published books without authorisation from the author or publishers.

Statement of the Problem

The publishing industries provide people with knowledge, information and entertainment. It is essential in building a nation because it is a powerful tool. The challenge this study focuses on is the problem of bootlegging, which has eaten up the publishing industries. Pirates in Nigeria now have a very lucrative business due to public patronage. Even though there are associations under the publishing industries to regulate and help to curb bootlegging, pirated books are everywhere in the country. While focusing on the practices of the PR in publishing industries, the study will find out the causes of bootlegging, the effects, and how PR can use their tools to achieve a pirate free sector.

Research Objectives

The following are the purposes of this study:

1 Examine the organogram and internal functions of the public relations unit.
2 To find out the causes of bootlegging and its effect on distribution and price.
3 Examine the damages bootlegging cost publishers.
4 To find out how public relations tools or practices can help to tackle bootlegging.

Literature Review

Public relations (PR) as a management function, has so many engagements towards achieving the goals and objectives of the organisations (Odiboh & Oladunjoye, 2019). The PR engages in press releases activities in order to inform the public through the media about the organisation's operations. A PR maintains the policy of an organisation, create mutual understanding, and attain the goals of the organisation. Relationship building together with effective communication and the power to listen are practices of the PR.

However, the publishing industry produces books, periodicals, newspapers through the use of ink, paper, gum and machines. Publishing industries like Education, Academic and General books are the various genres of the publications done in such industries. Education books are those books for secondary schools, and academics are basically for tertiary education. General books consist of fictions and religious books. With the advent of different publishing industries, bootlegging has joined and is causing severe havoc for the industry (Odiboh, & Ajayi, 2019).

Bootlegging

Bootlegging, which is a synonym of piracy, is illegal to manufacture, distribution or sale of goods (Oxford living dictionaries). It is an unauthorised reproduction or distribution of materials which is under the protection of Nigerian copyright commission (Nwosu *et al.*, 2020a; Nejo *et al.,* 2020b; Olabanjo *et al.,* 2020a; Omokiti *et al.,* 2020b; Salau *et al.,* 2020a; Salau *et al.,* 2020b; Nwosu *et al.,* 2020b). When music, movie, books, broadcast, painting or other copyrighted works lack authorisation is also called piracy or bootlegging (Waziri, 2011). In this context, publishing industry is the focus because the reproduction of books by pirates is massive (Adelua *et al.,* 2020a; Adelua *et al.,* 2020b; James *et al.*, 2020d; Nwosu *et al.,* 2019; Adelua *et al.,* 2020c; Adelua *et al.,* 2020d; Aiyende, *et al.*, 2020a).

The Nigerian Copyright Commission is one of the significant legal bodies established to protect intellectual materials from unauthorised users (Nwosu et al., 2019). Copyright covers all kinds of literary works for over 50 years after the death of the author. In case of more than one authors to a work, the duration starts counting after the death of the last surviving author (James *et al.,* 2020a; Ndubueze *et al.,* 2019; James *et al.,* 2020b; James *et al.*, 2020c; Ndubueze *et al.,* 2020; Nejo *et al.,* 2020a; Olabanjo *et al.,* 2019). The protection of intellectual works is paramount for the advancement of the publishing industry. Such protections will encourage authors to write more and equally enjoy the profit of their hard work (Onoyeyan & Awe, 2018). Section 1 (1) of the Nigerian Copyright Act (1999) states that the categories of works protected are books and other literary documents.

Copyright law states that a work must be creative and in a permanent format. Also, it is necessary to

seek the consent of the author or creator of a work before using it. However, in the case of using an author's work for educational purposes, consent is not needed. In July 2003, the Nigerian Commission revealed the arrest of over 143 book pirates. Involved in this piracy were about 3000 copies of textbooks worth 3 million Naira belonging to various publishing firms across the country (Aiyende *et al.*, 2020b; Fayemi *et al.,* 2020a; Fayemi *et al.,* 2020b; Fayemi *et al.,* 2020c; Fayemi *et al.,* 2020d; Olabanjo *et al.,* 2020b; Omokiti *et al.,* 2020a)

Bootlegging works on two significant factors, which are the price of the books and their demand. The books in low demand will not face too much bootlegging like the highly demanded ones' (Ndubueze et al., 2019). Such books which are high in demand and suffering piracy are the educational books such as; secondary school textbooks and novels in schools curriculum (Ahmadu, 2017).

Additionally, according to Ndubueze, Odiboh et al., (2019), New general mathematics, Junior English project, Business Accounting, New Method English dictionary, Brighter grammar, student companions, Romeo and Juliet, Hamlet, Merchant of Venice, Commercial typewriting, Pitman new Eva shorthand, Animal Farm, Tales from Shakespeare, New school physics for senior secondary schools, new chemistry for SSS among so many others have excess pirated copies. 'The depreciation of Naira made Nigerians purchase cheaper products not minding the quality. Such a behaviour boosts increased bootlegging of school books at low prices' (Ahmadu, 2017).

Causes of Bootlegging

According to James *et al.* (2020c), bootlegging in publishing industries is high because of the high price of books. Thus, so many factors engage bootlegging in Nigeria:

1. Due to lack of employment in Nigeria, the poverty rate is high which makes people to soughing for income to indulge in producing pirated books and selling them at a lower price (Ndubueze *et al.,* 2019).
2. Most people indulging in the crime do not know about copyright law and bootlegging to be a criminal offence because of ignorance.
3. The high cost of books makes Nigerians patronise sellers of a cheaper alternative. Cheaper ones are mostly the pirated copies because people tend to be more interested in the content and not its originality.
4. High in demand of a particular book which is limited can encourage more pirated copies (Ahmadu, 2017).
5. Inadequate funding makes the copyright commission to be inactive (Omeiza, & Lanre, 2019).

Curbing Bootlegging

Bootlegging affects publishers, cinemas and other media industries, designs, artworks (Olabanjo *et al.,* 2019). The following suggestions will help to curb this menace:

1. A campaign should be carried out by both government and professional bodies to enlighten the public on the dangers of piracy (Adelua *et al.,* 2019).
2. Every author should register their works with Nigerian Copyright commission, National Library of Nigeria as well as Association of Nigerian Authors.
3. Printers should also be encouraged not to print pirated books but to work with diligence.
4. The Nigerian lawmakers should implement a more severe punishment for pirates and make the public see how serious the crime is (Odiboh, Olonode, Adesina & Yartey, 2018).
5. Most people who engage in producing pirated books are jobless; therefore, with the alleviation of poverty in the country, bootlegging will eventually subside (Nwosu, Odiboh, Ndubueze & Olabanjo, 2019).
6. Advanced technology that can detect pirated books is available. Also, the Internet can monitor pirates' activities (Omeiza & Lanre, 2019).
7. The public should be discouraged from patronising street booksellers and those bookstores not approved by the government. Most of the street booksellers sell pirated books (Odiboh, Adeyeye & Ekanem, 2018).

Theoretical Framework

We adopted the two-way symmetrical model of public relations for in this study. Grunig propounded it, and the theory focuses primarily on the interest of an organisation towards its publics. An organisation makes decisions which will benefit both the organisations its audiences (Grunig, 2001). This theory embraces negotiation between the organisation and its publics, and one that also fosters mutual understanding (Severin, 1997). Therefore, organisations (publishing industries) should make decisions that will interest the public and not only themselves. When the organisations' priority is the publics, satisfaction and interest are protected. Bootlegging, which is an issue for both the industry, authors and audience should be the priority for publishing industries to tackle because the interest of both the public and the authors is at stake. With a solution, there will be a mutual understanding for both the organisations and its publics (Odiboh, Ezenagu & Okuobeya, 2019). However, effectiveness in solving the problem of bootlegging needs public relations expertise accordingly as the middle man.

Research Design and Methodology

The researcher adopted a qualitative method of gathering data through the use of an interview guide. Here, the respondents give their opinions and comments directly (Converse, 1987). An in-depth interview was adopted, and the population were selected purposively. Stirling-Horden publishing (Educational books), HEBN publishing (General books), Safari books publishing (Academic books) were purposively selected. They cover the three genres of books. Also, Booksellers and Public Relations agency were purposively selected and interviewed. The results of the interviews were analysed by a critical discussing the findings based on the research questions.

Results

Based on the results from the interview, all the three publishing firms Stirling-Horden, HEBN, Safari books, have an organogram. However, the title of each of the offices or departments is different. Nevertheless, they have similarities in functions. One of the participants stated that "each publishing house has a structure hardly will you find two publishing houses that have the same structure".

The participants acknowledged that publishing firms do not have a public relations department. One of the publishing firms stated that it is rare for a publishing firm to own one. "The reason is that the publishers are close to so many teachers".

All the participants have a different title for departments that deals with reaching out to the public. Therefore, they distribute their books through marketers, and they reach their readers through schools, booksellers and teachers because they do not deal with the public directly. Common to all the three publishing firms, and booksellers who also deal with the customers directly without the help of Public Relations.

Similarly, the public relations agency interviewed agreed with the above-stated findings that they do not deal with publishing firms. However, one of the participants added that a few big publishing houses could have a Public Relations department. Also, the Nigerian copyright commission is the body responsible for curbing piracy and not Public Relations in this regard.

Thus, two participants agreed that pirates have no business with books that are not selling. Most of the participants agreed that the high demand for money made people become pirates. One of the participants stated that the high cost of publishing materials makes original books unaffordable to average Nigerians who would prefer a cheaper book. Mostly pirated are the cheaper books. A bookseller said that "customers will feel that well, our books are too expensive, so they prefer to go outside, for pirate books".

However, all the interviewees agreed price of books encourages piracy. However, one of the participants made a more detailed comment by stating that "when a book is pirated, instead of 10,000 copies, one ends up selling only one". If a book sells for 5,000 Naira in the bookshop and the same content is in a pirated copy; the counterfeit could sell for 500 Naira. That is 10% of the price of the original". When a publishing firm has books which are popular and in high demands, it attracts pirates who reproduce the books, sell them, and take over the market because theirs' is cheaper. Therefore, the

publishers do not benefit from their production, and they will be unable to pay their employees and also unable to pay authors royalties. All these are damages which harm the publishing firm.

"Some years ago in Nigeria, without pirates, the education system of Nigeria would have collapsed because the publishers could not buy papers to meet rising demands for books". So, there was this kind of gap which the pirates filled" was opined by one of the five participants. While other participants were looking at the negative aspect of piracy, one of them chose to bring out one of the positives. However, he stressed that the point was not to support piracy in Nigeria.

Conclusion

This study which is an in-depth interview with three publishing firms, booksellers and PR agency, shades more light on piracy in the various genre. Based on the response from the publishing industries, booksellers and Public Relations, it is seen that public relations practices are limited. More robust policy and actions by government agencies should curtail piracy. The marketing department should perform the functions of PR to deal with piracy using other communication (Odiboh *et al.*, 2020a; Odiboh *et al.,* 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019). Also, the Nigerian Copyright Commission, together with other bodies related to publishing curb bootlegging. Therefore, all the publishing industries' interviewed did not see a need for PR practices in the workplace. Therefore, it is clear that they underrated PR practitioners. The booksellers also suffer from bootlegging but equally lack the practices of a PR.

Recommendation

Based on the outcome of this study, PR practitioners should seriously consider helping the curb piracy and bootlegging in the publishing industry. All kinds of publishing industries, be it small for a large company, there should be a PR department, or they should hire the services of a PR agency.

Secondly, despite the suggestion of having a PR department, the government should make laws regarding copyright more strict and compromised publishers should receive severe punishment.

Finally, the Nigerian Copyright Commission should be more active, more than just being heard. Because of the importance of PR in any organisation, their presence will provide solutions in a time of crisis. Therefore, the PR department should be in place or hire a PR practitioner to curb bootlegging and maintain the goodwill of the industry.

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Made-In-Nigeria Automobiles and Public Relations: Three Professionals' Perspectives

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Abstract

This research reviews the viewpoints of public relations professionals in the Nigerian automobile industry. The study involved three interviews using a qualitative method of data collection. Each interview was from two Nigerian automobile manufacturers and a public relations agency. Companies sampled were Coscharis Motors Limited, Honda Manufacturing Nigeria Limited and SoulComms Limited, which is a perception and reputation management subsidiary of SO&U, an integrated marketing communication consultancy. The study is rooted in Grunig and Dozier's Excellence Theory. It shows that despite the challenges in acceptance of these domestic products, the automobile industry players sampled continue to make calculated and concerted efforts to improve the relationship with their different stakeholders. Also, the sampled PR professionals suggest increased advocacy to stimulate stakeholders and policymakers in the creation of an enabling environment to encourage more production and acceptance of Nigerian-manufactured automobiles.

Keywords*:* public relations, automobile industry, professional practice, vehicle manufacturing

Introduction

Public relations performs a vital task of connectivity in the relationship which links an organisation with its stakeholders. PR practise aims at creating a two-way communication, attempting to create a common ground or situations of mutual interest and understanding based on truth, knowledge and complete information (Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019). Organisations, no matter how carefree they may be, are aware that they need to build strong relationships with their publics. However, it is clear that no matter how hard an organisation tries to project an image, internal and external relationships could threaten its survival (Odiboh, Adeyeye and Ekanem, 2018; Odiboh, Ezenagu and Okuobeya, 2019). In as much as crises warranting strategic public relations actions are unavoidable, it is essential to develop well-planned methods to avoid the occurrence of crises. In crises, how public relations managers use their training and knowledge for intervention and resolution is crucial (Adelua *et al.,* 2020a; Adelua *et al.,* 2020b; James *et al.*, 2020d; Nwosu *et al.,* 2019; Adelua *et al.,* 2020c; Adelua *et al.,* 2020d; Aiyende *et al.*, 2020a).

Many people are concerned about the place of PR practitioners in growing the manufacturing industry (James *et al.,* 2020a; Ndubueze *et al.,* 2019; James *et al.,* 2020b; James *et al.*, 2020c; Ndubueze *et al.,* 2020; Nejo *et al.,* 2020a; Olabanjo *et al.,* 2019), with the automobile industry not left out. It is therefore beneficial to examine direct responses from professionals in order to explore the problems or difficulties encountered in contributing to a holistic import substitution industry. This research work assesses the position of public relations in the automobile industry in projecting the image and management of the relationship with stakeholders and potential stakeholders in order

to influence the acceptance of made-in-Nigeria automobiles. The study also looks at the opportunities and areas for improvement in the performance of the automobile industry, as stated by the public relations professionals examined.

Statement of the Problem

The 2014 National Automobile Policy meant to licence indigenous auto manufacturers has not fully yielded increased production of cars (Nwosu *et al.*, 2020a; Nejo *et al.,* 2020b; Olabanjo *et al.,* 2020a; Omokiti *et al.,* 2020b; Salau *et al.,* 2020a; Salau *et al.,* 2020b; Nwosu *et al.,* 2020). There is also a challenge of gross importation of fairly used automobiles, despite the availability of local manufacturers. This situation has affected the indigenous manufacturing industry, which started running again after its previous failure, prompting the new policy. There is, therefore, the need to assess the positions of the automobile industry's public relations practitioners and public relations agencies regarding their advocacy for general acceptance locally assembled cars.

Olabanjo *et al*. (2019) note that emerging indigenous industries have a challenge of acceptance which affects their productivity as a result of issues like piracy and poor quality control. The success of every manufacturing industry depends mostly on its reputation for making quality outputs in the eyes of stakeholders. However, the realisation of the quality standard has been a problem to indigenous manufacturers (Aiyende, *et al.*, 2020b; Fayemi *et al.,* 2020a; Fayemi *et al.,* 2020b; Fayemi *et al.,* 2020c; Fayemi *et al.,* 2020d; Olabanjo *et al.,* 2020b; Omokiti *et al.,* 2020a). Strong emphasis on the maintenance of quality control policies of the indigenous industry is however indispensable at this time to bring about acceptance and good relationship with stakeholders (Adelua *et al*., 2019; Fayemi *et al., 2019*).

Study Objectives

This study seeks to examine the roles of PR practitioners of automobile manufacturers and consulting agencies for the automobile industry in bringing about the acceptance of their automobile products. In doing this, the study would examine the tools of these professionals, their target publics, their evaluative measures for assessment of campaign effectiveness, and how they engage their stakeholders. Following the objectives mentioned above, the following research questions are as follows:

1. What activities and tools does the PR set ups of Nigerian automobile manufacturers use?
2. How effectively does the Nigerian automobile industry ensure it executes its PR activities by?
3. How do Nigerian automobile manufacturers ensure engagement in their public relations campaigns?
4. How can public relations practice in the Nigerian automobile industry be improved?

Literature Review

The Nigerian Automobile Industry and Public Relations Actions

Some private companies spearheaded the Nigerian auto industry in the beginning of the 1960s after they set up automobile assembly lines which utilised semi-knocked down (SKD) or completely knocked down (CKD) components. Notwithstanding, it is noteworthy that the initial production scale of automobiles were minimal. The era saw the industry make a yearly roll out of 108,000 cars, 56,000 commercial vehicles and 6000 tractors (Abiodun and Omosule, 2015).

United Africa Company Limited (UAC) pioneered the assembly of Peugeot 404 pickup trucks. This move was then succeeded by Federated Motors Industries and SCOA Motors which was set up for the assembly of buses and Peugeot 404 pickup trucks. Sequel to the realisation of the essential position which the infant auto industry had in the growth of the Nigerian economy, the Nigerian Government came into the sector at the end of the Nigerian Civil War in the beginning of the 70s. Within 1975 till 1983 however, Nigeria was resident to six vehicle assembly plants. Among the

companies that were involved in assembly comprised Peugeot Automobile Nigeria (PAN), Kaduna, Volkswagen of Nigeria (VON) in Lagos, Anambra Motor Manufacturing Company (ANAMMCO), Enugu, Steyr Nigeria Limited, Bauchi, National Truck Manufacturers (NTM) in Kano and Fiat Leyland Nigeria, Ibadan (Oigiagbe, George and Owoyemi, 2012). Howbeit, out of these assembly plants, two were acquired, while the other four were at the brink of bankruptcy as at the end of 1990 (Aminu, 2016).

At the close of 2010, four plants had shut down, and in two more years (2012), no single assembly line was in operation (Oigiagbe *et al*., 2012). Low production scales, high costs as well as uncontrolled importation of Fully Built Units (FBU) failed the assembly plants (Aminu, 2016). However, as a result of increased vehicle importation, most of which were second-hand automobiles, the Nigerian economy incurred costs of $4.2 billion in 2010 and $3.4 billion in 2012 (Nigerian Bulletin, 2013). The harmful effect of greenhouses gases from vehicle emissions was also a big problem of second-hand vehicles (Jaja, 2010). In response to the dwindled industry, the Federal Government of Nigeria, in 2013 renewed its efforts at attracting investors who would set up assembly lines to roll out vehicles once again and bring to a halt vehicle importation. In an attempt to achieve this, the National Automotive Policy was brought to bear (National Automotive Council, 2013).

Through the new policy, the Nigerian Government accredited 35 organisations to assemble automobiles (Oga, 2016). A few of the licensed vehicle manufacturing industries include Briscoe Nigeria, Richborn Nigeria, Toyota, General Appliance West Africa, Honda and Perfection Motor Company. Sinotruk, Nigeria-China Manufacturing Company, Coscharis Motors, Globe Motors Nigeria, Century Auto-Assembly Nigeria and DAG Motorcycles Industry Nigeria were also licensed (Premium Times, 2015).

African Business Central (2015) notes that the refreshed auto production policy of creating an enabling environment for vehicle production lines created a 35% cut rate in terms of duties for fully built units. Other incentives included, a twenty per cent (20%) duty reduction rate for indigenously produced commercial automobiles; tax exemption and non payment of duties for production equipment; a restriction on vehicle importation and smuggling. However, with the introduction of these incentives, the Federal Government projects an increase in available and functional vehicle assembly lines in Nigeria to 80 by the year 2023 from the current figure of 48 production plants (Premium Times, 2015; Udodiong, 2015).

In spite of these benefits and motivating factors as well as the enthusiasm of policymakers, the projected performance has not been realised. Beyond the four years of implementation, just a few of the authorised production companies have begun rolling out new automobiles into the Nigerian market (Oga, 2016). Some of the vehicles now successfully assembled include Nissan (Stallion Group), Ford (Coscharis Group), Kia (Dana Motors), among others. Low production was the outcome of an unfavourable climate for policy realisation (Oga, 2016). However, for a successful realisation of the policy, there is the need create an investor-friendly environment like Brazil, China, South Africa and Mexico did in the past (Harrison, 2011; Ambe and Badenhorst-Weiss, 2010). In those countries, automotive and electronics assembly plants have successfully attracted other investments in the value chain and contributed to these countries' economic development.

Concerning public relations in the automotive industry, some issues have contributed to the limitation of the industry. These are inadequate support in terms of patronage from private Nigerians and procurement from government, weak as well as unhealthy climate for production, little available capital, low output of local service providers or suppliers as well as outdated methods and technologies (Abiodun and Omosule, 2015). Abiodun and Omosule opine that the attitude of Nigerians towards indigenous automobiles, resulting in low patronage linked to quality perceptions in comparison with foreign automobile manufacturers in recent times. Also, the low level of embrace of Nigerian-assembled vehicles can be attributed to the insufficient faith in the level of innovation of the industry. Many Nigerians choose to acquire an automobile from foreign auto manufacturers regardless of the high expenditure and cost of clearing the vehicle due to trust and faith in the technology of the foreign industry.

Public relations actions carried out by indigenous automobile manufacturers/assemblers in recent times have included advocacy. Investors in the indigenous manufacturing industry, backed by the National Automotive Council (National Automotive Design and Development Council, 2013) and National Automotive Design and Development Council (NADDC) have continued to advocate for a drastic reduction in vehicle importation and also increased tariffs on imported vehicles (Ezeoha, Okoyeuzu, Onah and Uche, 2018; Ndubueze *et al.*, 2019).

It remains unclear how these PR functions ought to change the negative general perception of indigenous automobiles. (Odiboh *et al.*, 2020a; Odiboh *et al.,* 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019). Hence this study examining the public relations actions of the made-in-Nigeria automotive industry and its effects on awareness and perception of the Nigerian public.

Theoretical Background

The theoretical basis in this study centres on the Excellence theory of public relations. It is an encompassing theory of PR that stemmed from a 15-year study of professional practice in communications and organisational studies sponsored by the International Association of Business Communicators (IABC) Research Foundation. The PR theory propounded in 1985 integrates several PR theories, theories of the publics management and organisational theories.

The Excellence Theory postulates that the effectiveness of PR functions lies in the organisation or efficient handling of such public relations functions. A worthy relationship linking an organisation with its publics is helpful for an entity or corporate body to establish and accomplish mutual interests, regulate needless and unhealthy corporate information; and raise organisational income (Grunig, 2013).

Grunig and Dozier (1992) explained that the importance of PR to organisations and the society rests on the level of accountability to the society as can be seen from the quality of corporate decision making and the value of relationships within stakeholders or publics. This theory suggests that an active organisation must solve relationship issues and manage the expectations of its publics and its management. If the contrary is the case, the publics will force the corporate entity to alter the approach to the fulfillment of its expectations or would outrightly reject it in such a manner that may prove costly to the organisation and affect its existence.

With regards to the Excellence theoretical principles about the essence and value of PR, professionals ought to function in such a way that their value is maximised. Primarily, Grunig and Dozier's research portrayed strategic communication management is an essentially critical constituent of excellent public relations. According to Grunig and Dozier, PR managers perform a tactical management and administrative function. They also suggest that PR executives ought to act out their management role as they ought to have an input in top organisational decision-making.

With respect to the tenets of the theory, for PR in the automobile industry to be effective, manufacturing organisations must integrate PR that incorporates the public. The public must be given due consideration in planning public relations programmes. With proper public relations strategy, mutual relationship between organisations and their strategic publics would vitally serve as a yardstick for measuring PR effectiveness in the automobile industry. Proper public relations would also help in advancing organisational targets and objectives anticipated by the automobile industry and stakeholders alike as well as lower the effect of negative publicity. Excellent public relations in the automobile industry requires automobile manufacturers to act responsibly with acceptable moral standards. In other words, the automobile companies must reassess their industry, pinpoint and distinguish the particular stakeholders adversely impacted by corporate policies. In achieving this, auto industry players ought to interact in line with stakeholders in order to develop satisfactory feedback mechanisms which would lead to enduring connections and partnerships.

The principles of Grunig and Dozier's Excellence theory imply that for PR to be worthwhile in the automobile industry, PR personnel ought to observe a tactical administrative function. They would do

this by ensuring that PR personnel express their technical know-how in major administrative policies and decision making. Excellence Theory, in ensuring the effective use of public relations in administration sees PR as a unique role in corporate communication and management.

Method and Materials

This study adopted the qualitative method of data collection. An interview guide instrument provided questions used in in-depth interviews. Question and answer sessions held with professionals who provided expert answers to the stipulated research questions. Two indigenous automobile manufacturers with significant output and reach were selected, viz.: Coscharis Motors Limited and Honda Manufacturing Nigeria Limited. A public relations agency, SoulComms Limited, was randomly selected for expert opinions. The in-depth interview was backed by an interview guide with well-structured questions to allow the sampled PR professionals to be as expressive as possible. The results appeared in reported speeches, quotations and summary statements, after which followed by a discussion of findings.

Results

In terms of PR activities, all three interviewees from Coscharis, Honda and SoulComms state that they engage in media relations, government relations and diplomatic relations. For Coscharis Motors, their most significant relationship is with the media. They said 'it is the media that bring us closer to our stakeholders". Also, Coscharis, Honda and SoulComms agree that their public relations activities ensure that their media selection cuts across both the traditional and new media. 'For our traditional media selection, we relate with motoring editors across all traditional media. They help us to put out our brand offerings. They are also our gatekeepers. They guard against bad and unwholesome bad press; not the kill-the-story type.' These were the standard submissions of the interviewees.

All the interviewees also stated that they leverage the new media to build their relationships by working with blogs and auto-related platforms, websites and e-mail services. The same also goes with the British with their Jaguar-Land Rover and Rolls Royce brands and also the American mission that resonates with their Ford dealership. The Sixt vehicle rentals franchise is also Coscharis' German affiliation, proving them to be veritably involved in diplomatic relations. Honda Manufacturing Nigeria Limited also engages in diplomatic relations with the Japanese mission as completely knocked down (CKD) and semi-knocked down (SKD) parts get shipped in from Japan. Concerning governmental relations, both Coscharis and Honda say that they relate with regulators such as the National Automotive Council, Ministry of Transportation, the Finance Ministry as well as the Nigerian Customs Service. SoulComms, on another other hand, stated that they help automobile manufacturers such as Coscharis and Peugeot Automobile Nigeria Limited to gain social media presence.

The automobile manufacturers examined also state that they also engage in customer relations. 'Customer relations for us is all about organising goodwill campaign messages relating to aftersale service.' Those mentioned above was a common denominator of the automobile manufacturers studied. They explained that customer relations is the act of 'communicating an organisation's offering or a portfolio, such as repairing and replacement of non-warranty car parts for certain target customers.' All three interviews further stated that they conduct audience research and survey through corporate social events to know customers' feedback or response to improved or new products. Shedding more light on their public relations activities, both Coscharis and Honda revealed that they sponsor government and educational events. Honda states that they have a training school, for their personnel and partners nationwide. They also provide in-house workshop and counselling to members of staff on how to uphold the vision and reputation of the organisation. They learn about customer relationship management as well as handling and settling issues to prevent crises.

In terms of public relations tools used by the Nigerian automobile manufacturers studied, Coscharis state that they use 'luxury or high-class magazines to target our high net worth individuals.' These magazines they say 'can be found in top grade hotels, first-class cabins of airlines and private jet hangars.' They add that they also 'use displays, exhibitions and experiential pitching to bring about

awareness of our organisation and brand offerings.' Coscharis states that it also integrates digital media to pitch its stories to its target publics while also consulting PR agencies for some of the PR solutions.

Honda Manufacturing Nigeria Limited, on the other hand, also makes use of both the traditional and new media. Honda states that it uses newspapers, magazines, radio jingles, phone calls, electronic mails, short message services, social media handles and websites.' Meanwhile, SoulComms public relations agency also state that they use social media platforms heavily because every endeavour today has gone digital. SoulComms work with 'Instagram handles, Facebook, Twitter, blogs and also the traditional media.' They, however, point that electronic and print media also appeal to automobile brands.

In an examination of evaluation of PR effectiveness, both Coscharis Motors and Honda Manufacturing Nigeria state that their 'feedback system serves as the evaluation mechanism.' They go on to reveal that their websites, e-mails, phone lines, service centres all over Nigeria are centres for feedback and evaluation of their activities. Coscharis explicitly stated that when it makes inroads into organisations and other government parastatals, it is a measure of its effectiveness. At the same time, Honda added that online ratings, traffic of clients to their showrooms or workshops and primary level of sales determine the accomplishment of their PR activities. Also, the PR agency, SoulComms opined that it uses audience 'talkability' as a yardstick to evaluate engagement. SoulComms cautioned that social media impressions do not guarantee an effective campaign. The reason is that 'people see brands or organisations online every day, but the way to evaluate is by social media debate and engagement.'

In an assessment of how Nigerian automobile manufacturers ensure engagement in their PR campaigns, Coscharis Motors revealed that it embarks on partnerships, collaborations, sponsorships. Coscharis explicitly stated that it once sponsored the Gulder Ultimate Search, where it gave out the Ford Explorer to the winner. 'The Explorer signifies toughness, strength, ruggedness and off-road capabilities. We did this so our Explorer brand would resonate with the rugged expeditionary contest.' 'We also sponsored the Knorr Cooking Contest organised by Unilever. There, we introduced the Ford EcoSport, which appeals to the female gender, which in turn also gets reported in women magazines, thereby engaging more women.' These were the submissions of the Coscharis campaign executive regarding engagement and experiential public relations. Coscharis noted that as an organisation, all its offerings appeal to what resonates within its audience; 'during showroom activations or exhibitions, we do not put our vehicles on a ramp. We put them on the ground, we give experiences, and we make people see that these cars are meant for them and not just to show them from afar.' Coscharis' campaign executive stated that his organisation offers test drives. This action showcases interior vehicle components, and lets stakeholders have their feel while letting them describe their personal experience. .

Honda stated that they are deliberate in their campaign messages which are handled by their media team. In contrast, the public relations agency SoulComms opined that since in the society, people see but might not ask, they go on to integrate experiences in their public relations activities. 'We involve them online, ask for their opinions and create a debate for opinions' was a denominator SoulComms upheld. The agency also added that they launch ideas or offerings in the minds of their stakeholders to resonate with their needs and is the best way to ensure engagement.

The Nigerian automobile manufacturers interviewed had significant suggestions as to how public relations in the automobile industry can be improved. All interviewees agree that it is the dream of all automobile industry players in Nigeria to have local assembly plants. They also concur that indigenous manufacturing, especially in the automotive sector, brings economic growth in which Nigeria is a very fertile market. They spoke about the new need for better infrastructure; electricity primarily. The interviewees revealed that due to the reduced power supply, it is tough to produce and sell automobiles at the same price as imported automobiles. The result is an extremely high cost of production.

The three interviewees sampled revealed that there is an increased need for 'advocacy'.Coscharis, Honda and SoulComms agree that if they could remove importation and boost local industry, they will reduce the prices of brand new cars. Coscharis Motors specifically called on other members of the automobile industry to lobby policymakers to ratify a policy that can sustain the auto industry. Coscharis added that it needs to improve it is after sales communication. Also, Coscharis Motors suggests that better feedback mechanisms, more training for personnel, social networking are the areas needing improvement.

Honda, on the other hand, stated that PR in the automobile industry might need improvement through the training of more PR practitioners. At the same time, SoulComms PR agency upholds the need for PR managers in the automobile industry to continue advocacy while creating more awareness. Also, SoulComms suggested that it would be highly beneficial for the automotive industry to provide credit facilities for the public. That way, people would afford brand new cars, which would consequently boost the sale of indigenous vehicle brands.

Discussion of Interview Results

Results indicate that the Nigerian automobile industry has low public trust. Despite the challenges of public rejection of these indigenous vehicles, the public relations activities of the selected automobile companies did not stop. However, their level of resolve is another area that can be studied. It is interesting to see that the interviewees recognise the relevance of social media and audience engagement in excellent public relations and relationship building with stakeholders. Coscharis Motors Limited sees the value of consulting PR agencies which goes a long way in effective activations. One may attribute that to the global premium automobile brands for which they have succeeded in obtaining a franchise. Honda Manufacturing Nigeria Limited, however, does not say much about outsourcing PR functions. They seem geared towards the marketing aspects of the business than public relations. Coscharis Motors Limited seem more grounded in handling activations such as showroom and facility tours, government relations and media relations.

However, current feedback mechanisms seem ineffective. An example is Honda Manufacturing Nigeria Limited, where public relations feedback is solely through phone calls, correspondence and volume of sales. Honda Manufacturing Nigeria Limited stated the importance of research which is remarkably essential to successful performance of any PR campaign or programme. An absence of research would mean that objectives for programmes or campaigns would be inappropriate; and accomplishing audience engagement would be an uphill task (Odiboh, Olonode, Adesina, and Yartey, 2018; Olabanjo, Odiboh, Nwosu and Ndubueze, 2019).

Ultimately, the PR professionals sampled continue to call on government and the advocacy of relevant groups to create an enabling environment to encourage more production. If the government does not step in, the auto industry may go moribund again. It would be more challenging to resuscitate, given the rate of inflation in the economy that continues to scare investments.

Conclusion and Recommendation

The results of the interview established that despite the challenges and apathy towards their industry, automobile manufacturers continue to make efforts to improve the perception of their industry. However, public relations does not operate in a vacuum but with the support of stakeholders. PR with good government policy is the only way the automobile industry can gain prominence. It is therefore mandatory for the automobile industry to build their relationship with the government for the mutually-beneficial automobile industry.

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Activation of Public Relations by Professionals: A case study of Zaron Cosmetics and House of Tara

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Abstract

The significance of a manufacturing company's image lies in how it underpins its brand's market power and risk exposure to counterfeiting. The beauty and cosmetics industry is one of the fastest-growing industry in the world right now because of its massive blow to the image of the industry. In building a sharp brand image that can survive the enormous storm of counterfeiting, the application of public relations is essential. Therefore, this study examined the public relations activities of the industry and how the applications of public relations tools can deal with counterfeits in the beauty and cosmetics industry. The study anchors on the two-way asymmetrical theory of PR. The in-depth interview used elicited responses from our subjects. Hence, the responses were analysed and used to answer the research questions. Findings from this study show that public relations applications are essential for successful anti-counterfeit measures in the beauty and cosmetics industry.

Keywords: Beauty, Cosmetics, Counterfeits, Public Relations.

Introduction

Public relations is the lifeline of any company whose brand offerings gums with its image (Adelua *et al.,* 2020a; Adelua *et al.,* 2020b; James *et al.*, 2020d; Nwosu *et al.,* 2019; Adelua *et al.,* 2020c; Adelua *et al.,* 2020d; Aiyende *et al.*, 2020a). For counterfeiters, a strong brand is a moving target, particularly if it serves social-adjustive rather than value-expressive roles according to Hamelin, Nwankwo and El Hadouchi (2005). In building a sharp brand image, public relations remains a veritable tool for the beauty and the cosmetics industry. A corporate image should be positive and unique. Most of the time, consumers purchase products or services based on their perception of the manufacturer (Nwosu *et al.*, 2020a; Nejo *et al.,* 2020b; Olabanjo *et al.,* 2020a; Omokiti *et al.,* 2020b; Salau *et al.,* 2020a; Salau *et al.,* 2020b; Nwosu *et al.,* 2020b). Public relations helps the public to understand a company and its products. Thus, public relations is the most valuable tool of communication for countering the problem of piracy in the beauty and cosmetics industry (Odiboh, Ezenagu, & Okuobeya, 2019).

Public relations is the management role which assesses public attitudes.It defines the practices and procedures of a person or association for the public interest, and introduces an intervention plan for public awareness and acceptance (Miller and Dinan 2007; Siriramesh and Vercic 2003; Gruing 1992, Hailu, 2018). Public relations is one of the primary tools used by the beauty and cosmetics companies. Thus, public relations is a management function that deals with organisational communication activities. It evaluates public attitudes, analyses strategies, implements action programs, and maintains a public interest in order to gain public attention and recognition. In sum, PR is imperative and highly significant (Olabanjo, Odiboh, Nwosu, & Ndubueze, 2019).

From the above premises, one can understand that counterfeit is an impediment to the growth of the of the beauty and cosmetics industry and the application of public relations is an indispensable and inevitable part of the industry. Hence, public relations in this aspect becomes very essential(Nwosu, Odiboh, Ndubueze, & Olabanjo, 2019). The current research is a laborious endeavor to examine the effectiveness of public relations tools in curtailing the menace of piracy in Nigeria's beauty and cosmetics industry.

Statement of The Problem

Counterfeiting is a heavy burden in the beauty and cosmetics industry. As the industry continues to rise, accounting for up to 2.5 per cent of world trade, a look at the counterfeit beauty industry is particularly apt (The fashion law, 2017). As pointed out by Ojo and Ojo (2012), the issue that is counterfeiting could damage a company's reputation (Bosworth and Yang, 2002). The stylised model, however, argues that without counterfeits, the customer is better off. This trademarks and other IPRS are necessary to guarantee competition on a level playing field (Bosworth and Yang, 2002; Nwosu et al., 2019). However, the major problem this paper seeks to address is the issue of counterfeits concerning the organisational image. It would examine how the application of public relations activation could tackle the issue.

Objectives

1. To examine the PR activities and the organogram of the selected beauty and cosmetics companies in Nigeria.
2. To assess the PR tools and objectives used by the selected beauty and cosmetics companies in Nigeria.
3. To ascertain the effectiveness of PR activities in curtailing the menace of piracy in the selected beauty and cosmetics industries in Nigeria.
4. To recommend PR and its positive effect on the beauty and cosmetics industries in Nigeria.

Research Questions

1. What are the PR activities and the organogram of the selected beauty and cosmetics industries in Nigeria?
2. What are the public relations tools and objectives used by the selected beauty and cosmetics industries in Nigeria?
3. How practical is the public relations activities in curtailing the menace of piracy in the selected beauty and cosmetics industries in Nigeria?
4. What are the public relations solutions and effect on the beauty and cosmetics industries in Nigeria?

Beauty and Cosmetics: An Overview

Cosmetics include skin-care creams, lotions, powder, perfumes, lipstick, fingernails and toenail polish, eye and facial makeup, permanent waves, coloured contact lenses, hair dye, hair sprays and gel, deodorants, baby products, bath oils, bubble baths, bath salts, butter and many other types of products. Nowadays, the beauty and body care industry is a critical industry which makes a significant contribution to the world Gross Domestic Product (GDP) (Kumar, 2005; James et al., 2019). Cosmetics are a multi-billion-dollar industry today.

As such, the development of beauty products, perfumes and body care items can also be dated back to the ancient Egyptian, Greek and Roman era. Used at that time were components such as butter, sugar, lemon juice, stone, mud and even arsenic for visual enhancement (Odiboh *et al.*, 2020a; Odiboh *et al.,* 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019). Here are few historical instances. The neanderthal man painted his face with red, brown, and yellow colour substances gotten from clay, mud, and arsenic. Bones were used for curling hair. Makeup, tattoos, and ornaments were used to express the necessary social knowledge. Ancient Greek surgeon, Galen formulated the cold cream. The Romans used oil-based perfumes on their bodies, in their baths and fountains, and applied them to their weapons. Thirteenth-century crusaders took fragrances from the Far East back to Europe. During the 16th century the perfumes produced were powders or thick pastes. Natural fragrances have originated from a range of aroma-bearing components (Kumar, 2005).

The cosmetics industry is highly creative, fast-paced and science-driven. Cosmetic products are an integral part of people's daily lives and bring significant functional and emotional benefits (Cosmetics Europe- the personal care association, 2016; Odiboh and Oladunjoye, 2019). The USA is the world's largest economy yet France is the world's largest beauty products exporter. Market expansion has moved from the Western world to emerging areas in South America, Eastern Europe, and Asia in particular China; consuming over 10.4% CAGR per annum over the last five years. In spite of the global economic downturn, the cosmetics and perfume sector continued to perform excellently with an average growth rate of nearly 5% across the sector. (Kumar, 2005; Odiboh & Ajayi, 2019).This industry, also known as Beauty and Toiletries or Body Care Products, has demostrted both its ability to achieve steady and sustainable growth and its durability potential under adverse economic circumstances. Sales of beauty and personal care grew steadily during the first decade of the 21st century, reaching the average of 4.5 % (CAGR) in the initial half and 4.4 % (CAGR) in the second half.. As for everything else, the cosmetics sector was affected by the global financial crisis in 2009 but nevertheless strengthened as the economy changed(Lopaciuk & Loboda, 2013; James et al., 2019).

The performance of the Nigerian beauty and personal care market during 2014 recorded impressive growth over that of previous years. This rise was led by a increasing middle class, demographic rise (especially among young people and children), urbanisation and an increase in informal jobs (Aiyende *et al.*, 2020b; Fayemi *et al.,* 2020a; Fayemi *et al.,* 2020b; Fayemi, *et al.,* 2020c; Fayemi, *et al.,* 2020d; Olabanjo, *et al.,* 2020a; Omokiti *et al.,* 2020a). In formal jobs, men and women are more likely to opt for makeup and personal care products of a higher standard. They strive to improve their reputation and self esteem (Bank of Industry, Nigeria, 2018; Adelua et al., 2020c). Some of the notable players in the Nigerian cosmetics and beauty care products include Procter and Gamble, Unilever, PZ Cussons, House of Tara International, Zaron cosmetics, and Soulmate Industries Ltd.

Industrialisation of African market preferences, shifts in general economic conditions and projected decrease in dependency ratios (the proportion of the total number of dependents in the world – i.e. those under the age of 15 to those aged 65 to older – to the working-age population) all result in a possible growth factor of demand for luxury products such as hair care, beauty care, cosmetics and so on in the east African market (Beauty Africa, 2016; Ndubueze, Odiboh, Nwosu, & Olabanjo, 2019). So many women are facing the terror of applying makeup on their faces in the East African research region and have thus welcomed the use of makeup for their maintenance. Men have also followed suit and turned up for manicure, pedicure and haircuts in beauty salons.

Public Relations and Its Application

Grunig and Repper (1992) stress that, in order for PR to be reputable and utilised effectively by senior managers, it must function expediently. It has to give the company real meaning and help it meet its corporate goals. They argue that practitioners should examine the features of their target groups in order to better understand how they can react and respond to the communications of the company.(Fayemi et al., 2019). PR professionals will then identify target audiences more efficiently, and customize communications activities based on specific characteristics.

Theoretical Framework

This paper will sit on the two-way asymmetrical model of public relations. This type of PR is rooted in persuasive communications. This aims at creating consensus between the company and its audiences by putting them in the way of thought of the company. This paradigm utilizes analysis techniques in the social sciences to improve the influence of messages (Laskin, 2009). This theory emphasises the persuasive power of effective public relations practice, and how to persuasive communication can be used to gain the trust of the public and in turn, build the image of the organisation. The ability to get feedback from the public also makes the theory a useful model of public relations. Professionals in public relations use surveys, conferences, and focus groups to evaluate audience interactions and plan campaigns that would attract critical public support.

Research Methodology and Design

The qualitative sample approach is the data collection tool used for this research. The survey allows the use of objective methods for selecting applicants, gathering data and reporting findings (James *et al.,* 2020a; Ndubueze *et al.,* 2019; James *et al.,* 2020b; James *et al.*, 2020c; Ndubueze *et al.,* 2020; Nejo *et al.,* 2020a; Olabanjo *et al.,* 2019). In this study, the interview method was the method of data collection. Drawn up interview questions, focused on study questions, elicited answers from the interviewees. They expressed their opinion on the issue of counterfeiting. They spoke about how public relations actions could curtail counterfeiting in the beauty and cosmetics industry.

This study focussed on leading players in the beauty and cosmetics industry. Leading public relations professionals also participated in the study. Purposive sampling method produced the subjects of the interview in order of their importance and credibility. The interviewee public relations professional was selected based on their work experience and relationship within the beauty and cosmetics industry. Zaron cosmetics company was selected. Zaron is a reputable indigenous manufacturer of beauty and cosmetics product in Nigeria.

Results

Findings from in-depth interviews conducted among the two interviewees revealed that the companies execute significant public relations actions. One of the interviewees also mentioned that they also carry out digital campaigns. The major points from the responses is that organisation majorly carry public relations to drive sales promotion.

According to the responses deduced from the interviewees, the crucial public relation tools used by the industry are the digital media, speaking of the social media, blogs and online influencers. Others include, the traditional media and the interviewees also mentioned the fact that they partner with external regulatory bodies to help drive their communication actions. Accordingly, digital media is the most utilised public relations tools.

According to one of the interviewee, the organogram of the organisation is as follows. She said " the business development department, with one of many departments that comes under managements. Furthermore, within this department, we have a team that handles our partnership while another team handles the new market. We have a team that handles digital marketing, and another that handles public relations. We have a team that manages our foreign market, and then all of these work hand in hand with the marketing department". Simply put, different roles are delegated at different levels to guarantee a seamless and effective running of the organisation.

When asked about the effectiveness of public relations in aiding the beauty and cosmetics industry, both respondents answered in the affirmative. According to both respondents, the use of public relations is very, very important and very useful in every organisation. Sustained use of public relations tools is highly encouraged. Public relations is not as effective in curtailing piracy as it seems but through proper education, and proper utilisation of the tool.

The interviewee answered a question on recommended ways to enhance corporate reputation in the beauty and cosmetics industry. One of the respondents said, "the best way to ensure sustainability is for organisations to continue doing a good job and keep putting it out there. While doing a good job, organisations need to partner with good public events and social engagements to promote their brand. While doing a good job, they also need to amplify it to promote their brands". The other respondents also said "focus on the positive and not negative. It does not mean not trying to improve on the negatives but a more focus on the positive".

Conclusion

This study reaffirms that public relations are a useful tool for creating awareness for the beauty and cosmetics industry in Nigeria and also a veritable tool in fighting piracy in the industry. When we talk about building a strong relationship between industry and a brand, public relations takes the upper hand. So the importance of public relations in the beauty and cosmetics industry can never be overemphasised. Thus, in order to curtail piracy in the beauty and cosmetics industry, public relations tools must be used consistently by the manufacturers and distributors of the products. Companies and organisations need to know that they need to make use of public relations constantly. Organisations need always to put their excellent work out there for people to see.

Recommendations

Proper considerations should be given to the following findings based on the study;

- Beauty and cosmetics industry must properly utilise the use of public relations tools in order to fight piracy.
- Industries must learn to build a mutual relationship with their key publics through feedbacks.
- The government should enact bodies that will penalise offenders.

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Professional Public Relations Practices in Nigeria's Banking Industry

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Abstract

This study aims at examining Public Relations practices by professionals in the banking industry. It also examines areas of improvement which the public desire of selected banks. This study employs the qualitative research method via the In-depth interview approach. The public relations professionals in the banks and agencies were interviewed to get their insights on stated problems. This paper reveals that despite the professional's claim of ensuring a joint advantageous relationship between the Bank and its public, a lot still needs to change. The paper concludes that banks need to focus more on public relations especially in the areas of public trust, empowerment activations, educational programmes, and customer relations.

Keywords: Banks, Public Relations, Professionals, Trust

Introduction

To remain unique, companies generally want to have something that helps achieve this goal as the business world is intensely competitive. These companies desire to possess a factor or a tool that makes them stand out as the best to the media and their public (James, Odiboh, Adelua and Fayemi, 2020a; Ndubueze, Odiboh, Nwosu and Olabanjo, 2019; James, Aiyende and Salau, 2020b; James, Nwosu and Fayemi, 2020c; Ndubueze, Odiboh, Adelua and Fayemi, 2020; Nejo, Odiboh, James and Fayemi, 2020a; Olabanjo, Odiboh, Nwosu and Ndubueze, 2019). Having a positive image is beneficial to any organisation as it helps with their sales as well as aiding the avoidance of negative publicity which could ruin the good standing of the organisation and reduce their sales. To ensure that the media and the consumer public of an organisation has proper knowledge of the operations of the organisation, public relations (PR) is of utmost importance (Aiyende, odiboh, Adelua and Omokiti, 2020b; Fayemi. Odiboh, James and Olabanjo, 2020a; Fayemi, Odibo, James and Aiyende, 2020b; Fayemi, Nejo and Salau, 2020c; Fayemi, Oyesomi, Nwosu and Olabanjo, 2020d; Olabanjo, Odiboh, Nwosu and James, 2020b; Omokiti, Odiboh, Salau and Nejo, 2020a).

In time past, Banking was quite easy and people kept their accounts as well as their loans in local banks which are in close proximity to their homes. The Banking world was less competitive at the time and as such, Public Relations was not so important. However, in recent times, things have evolved contrary to the times when Banks could hold on to customer loyalty based on the personal interactions it had with its customers. There has been a reduction in day-to-day human interaction with customers as Automated Teller Machines (ATMs) have been put in place as well as online platforms for banking applications. To this end, a personal touch to interact with its public has been lost by the Banks (Ndubueze, Odiboh, Nwosu and Olabanjo, 2019). No matter how large their existing and target customers are, Banks must implement all necessary measures to remain unique as there is an increasing domination in the banking industry as well as a requirement for a continued creation of new products and services (Adelua, Odiboh, Aiyende and Omokiti, 2020a; Adelua, Odiboh, Nejo and Fayemi, 2020b; James, Odiboh, Olabanjo and Adelua, 2020d; Nwosu *et al.,* 2019; Adelua, Odiboh, Olabanjo and Ndubueze, 2020c; Adelua, Odiboh, Oyedepo, Olabanjo and James,

2020d; Aiyende, Odiboh, James and Salau, 2020a). Therefore, Banks are utilising Public Relations to promote their products and services (Fayemi, Nejo and Salau, 2019).To excel in banking, Public Relations professionals are needed and the reputation of the Bank in the eyes of the public rests on their hands. Public relations professionals of banks have to use their tools to educate the public on how their products and services stand out. To this end, the paper seeks to address and explain how Professionals in the banking industry carry out their PR activities, measures put in place to ensure a positive perception of the banks by the publics.

Statement of the Problem

The image of an organisation lies within the PR professionals. There is a general misconception about banks in Nigeria, which is avoidable if the PR professionals carry out their PR activities effectively. A school of thought holds that professionals generally do not carry out enough PR activities to ensure that the public sees banks in a positive light.
This paper looks at the PR activities carried out by the banks, the PR tools used by the organisational structure of the banks.

Research Objectives

This research aims at examining the PR practices in the banking industry, the PR tools and objectives of the banks as well as the organogram and internal functions of the PR unit banks and public relations agency.

Literature Review

Modern Banking in Nigeria was as a result of the African Banking Corporation created in 1883 (Nwosu, Ndubueze, and Olabanjo, 2019). This corporation gave way to the British Bank of West Africa which was established in 1884.The British Bank of West Africa has had name changes over the years including Standard Bank of West Africa and its current name the First Bank of Nigeria PLC. Union Bank of Nigeria PLC was among the other foreign Banks that were created soon after the British Bank of West Africa. These Banks in their initial creation stages were governed by policies that only protected the foreign owners and discriminated against the indigenous business people. The mainstream of the economy saw indigenes not being able to obtain credit facilities from these banks and as such, a feeling of alienation was created among the nationalist of these Banks in Nigeria (Olabanjo, Odiboh, Nwosu, and Ndubueze, 2019)

Bank of Industry

There are several development financing institutions in Nigeria, however, The Bank of Industry Limited (BOI) is Nigeria's oldest, largest and most successful. It faced a reconstruction in 2001 as before then it was called the Nigerian Industrial Development Bank (NIDB) Limited, which was incorporated in 1964. With an available authorised share capital of 2 million (GBP), the Bank started business in 1964. It was made up of several private foreign and domestic investors as well as the International Finance Corporation which held about 75% equity and put in place its first Chief executive.

The Bank was successful and was able to be in charge of addressing the country’s economic profile as its authorised share capital increased from N50 billion in 2001 to 250 billion. The Bank has since then been put in charge of the provision of long term financing loans to the Nigerian industrial sector due to the success of its previous institutional, operational and financial reconstructing in 2002. The Bank has become efficient and very effective in carrying out its primary mandate.

Banking Public Relations

The perception of the public about the banks is often times predetermined by previous contacts, biased notions and false beliefs. It is therefore necessary for the banks to build an image that is well respected through the use of its Public Relations professionals to change such perceptions (Odiboh and Oladunjoye, 2019).

Public Relations management is made up of incomplete research analysis, putting in place measures and steps to provide more understanding and build specific relationships (Odiboh, Ezenagu, and Okuobeya, 2019). Public Relations services help to build the Bank's image by deepening good traits like integrity, consistency, trustworthiness, goodwill and efficiency.

The public is not satisfied with the Banks due to different reasons. Some of these reasons were listed by (Olasore, 1979) during the conference held alongside the 20th anniversary of the Central Bank of Nigeria titled "Why banks are unpopular", one reason is the herculean process of getting bank credit. The other reasons are poor information on the guiding principles around banking services, the assumption that banks make large profits due to high tariffs collected, poor coordination of customers to keep them informed about the condition of their accounts as well as errors made when their bank statements are sent. The last reason given is the despotic demeanor of the Bank staff as well as the difficulty in opening bank accounts.

The wrong notions held by the Bank's public need to be corrected and fully concentrated on by the Public Relations professionals to help the Bank excel. The traits mentioned earlier must be emulated by the Bank's management team to ensure that the views of the public towards the Bank are positive. Public Relations activities in line with integrated marketing communication are required to change the wrong notions of the public about the banks (Odiboh, Amodu, and Ekanem, 2020a; Odiboh, Fasanya, Adegoke, Afolabi and Ofor, 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019).

Theoretical Framework

The Two-way symmetrical Model was employed in this study. The model is the best of all the other models. In this case, both the communicator (the organisation) and the receiver (the public) are mutually communicating. The messages take into account the needs, demands and interests of the public.

This model is supports this study in not only designing or packaging a message but also in helping an organisation to adjust concerning the needs of the public. The argument of the two-way symmetrical model is that the Public Relations expert should serve as a connection between the company and its public, rather than as a persuader (Odiboh and Ajayi, 2019).

In this model, experts are arbiters and employ communication to ensure that all participants are beneficiaries. The term "symmetrical" explains the model's attempt to establish a joint beneficial situation. Professionals should aspire to utilise the two-way symmetrical model in their daily operations and strategies, as it is the most ethical of all models (Simpson, 2014).

This model is relevant to this study because it clearly states how the banks' consider the messages relayed to the public. Here the professionals are made to act as a link between the company and its public, which will in turn, sharpen how the public views them.

Methodology

The researcher adopted the qualitative method of gathering data through the use of an interview guide. Here, the respondents gave their opinions and comments directly. An in-depth interview was adopted, and the population were selected purposively. The selected interviewees are Bank of Industry, Covenant Microfinance bank and Red Gecko PR agency. Bank of Industry is the first and

only financial institutions purposely established to support business organisations at all level. Covenant Microfinance Bank is the financial institution of the leading university in West Africa. Red Gecko is the most decorated young PR company in Nigeria.

Results

Findings from the In-depth interviews conducted among three interviewees revealed that the PR tools the banks adopt have been useful over the years. However, two of the interviewees agreed that there are not so many negative perceptions about the banks from their end. At the same time, one noted that there might be some challenges sometimes. However, they have been continuously educating the public on specific issues they might be facing. Also, two of the interviewees said they use social media as their primary tool for creating awareness. In contrast, the other said the bank use fliers to create awareness about its activities.

However, one of the interviewees said the bank usually research to find out the deficiencies of the clients they work or. "We create solutions that fit the need of the client's deficiencies, and we advise them on ways to improve". On measures being put in place to build the relationship between the bank and its publics, an interviewee stated that they build a relationship by creating awareness. Another interviewee highlighted that they build relationships by solving the problems of the customers. However, the other said the bank consistently create solutions to meet the needs of its clients. By that, they build an everlasting relationship.

Interviews conducted with Bank of Industry, Covenant Microfinance Bank and Red Gecko PR agency show a low level of their PR activities. Especially Covenant Microfinance Bank, there is little or less effort to activate its PR activities.

Results indicate that CMFB does not have a well-structured PR department. The bank relies majorly on its website for PR activations. Human resources for PR activations do not exist. The organisation can do better by establishing a well-structured Public relations department. The organisations adopt electronic, print, and social media to reach their publics. The exception is Covenant Microfinance bank which uses only one means to create awareness. Another exception is the Bank of Industry which relies only on electronic media. To this end, it will be necessary for banks to focus on better managing their public misperception. They need to improve their tools of trust by professionally activating their Public relations programmes.

Conclusion

The message that a Bank sends out to its public must be as convincing as possible as well as remaining unwavering. This can only be achieved through effectual Public Relations which is characterised by confidence, proper communication and well explained messages. Through Public Relations, the Bank is able to reach its target audience in a manner that builds trust and allows for the proper delivery of its well created messages. The best means to achieve this is through Public Relations which help to create a brand, improve awareness and build customer base.

Banks offer similar services and as such an average customer is torn between making the decision of choosing the Bank to follow. The Public Relation campaign is therefore necessary to help the client by differentiating its brand from that of the competing Banks. Over the last five years, the Banking industry has experienced at least 60 mergers. As such, customers become frustrated and confused as they do not know what their Banks really are. The Bank and its competition will always have a few factors that distinguish them. However, it is the job of the Public Relations initiative to find these factors.

This study concludes that Bank of Industry must balance its PR tools and adapt them to specific public activities. The bank needs electronic and traditional media for successful PR actions. Covenant Microfinance bank, on the other hand, must improve on its PR activity and what it carries is low and not efficient.

Recommendations

Guarantee Trust Bank should be more open to public interviews to correct the misperception of the public. Bank of Industry should adopt the PR 2.0 model of digital media as well. Covenant Microfinance Bank must endeavour to restructure its PR department, adopt more tools to reach out to its public, carry customers along in its dealings. Organisations generally should contribute to the development of society and better the lives of its customers by providing excellent and maximum service.

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Professional Public Relations Practices in High Schools in Nigeria

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Abstract

Professional public relations allow institutions like schools to easily recognize their strengths, shortcomings, and connect when they succeed and when they don't. This research explores the views and experiences of high school public relations practitioners in Southwest Nigeria about their activities in the field of public relations. Three interviews were conducted using 10-question interview guide to assess the validity of this research's conclusion and recommendations. The first interview was conducted in the sampled schools with a PR firm and the other two with staff in charge of the public relations activities. The Principle of quality has been used as the theoretical basis for this research. However, findings show that there is no department / unit for public relations in high schools, most directors of secondary schools are yet to accept and participate in their activities with PR tools; this clearly means that there are no formal activations in high schools for public relations. In the meantime, non-professional PR tasks conducted by subject teachers are added to the teacher's responsibilities. In addition, given the appreciable degree of frustration, members of public relations in these high schools are still making efforts to strengthen the situation with their limited working information of how PR activities should be performed. In conclusion, however, given the level of competition and trust of current and prospective employers, public relations is not only about rhetoric, but about practice. Therefore it is proposed that secondary school administrators have some responsibilities to perform better in order to generate a good picture for their schools. They need to generate the support of parents and the happiness of the students. They will strive to set up successful divisions for public relations, or work with experts to help do things right.

Keywords: High Schools, Professional, Public Relations, Practices in Nigeria.

Introduction

The digital age has dramatically increased the level of communication and has made public expectations become more complex (Komlos, 2014). The evolution of western education has introduced the world to various stages of tutelage and fosters learning in its entire sphere. As a result of this, high schools in Nigeria are limitless, and over one thousand (1,000) high schools established globally and at local regions (Fayemi *et al*., 2020). This however, suggests the needs for professional PR personnel who will develop and execute its communication plans through both print/electronic media and face-to-face communication (Schraeder, 2019). To also afford Professionals to handle relationship with the organization's (school) publics and with the multitude of media that calls for information to be disseminated about the organization (Vajda, 2017). Publicizing positive news about student/staff achievements and programs attract public's interests. According Sandl, (2016), It is necessary to develop a coordinated proactive, rather than a reactive approach that anticipates

problems before they develop; when there are no positive communication provided by the schools managements, the critics' voices will take over. Public relations help define professional practices.

Public relations is not limited to one definition, it is primarily a management function. It performs a leadership role of maintaining relationships, through communication practices, between the institution and its many publics (Aiyende *et al.*, 2020b; Fayemi *et al.,* 2020a; Fayemi *et al.,* 2020b; Fayemi *et al.,* 2020c; Fayemi *et al.,* 2020c; Olabanjo *et al.,* 2020b; Omokiti *et al.,* 2020a). Public relations has much impact in the molding of an institution's image and promoting them in a positive light to their target audience (James *et al.,* 2020a; Ndubueze *et al.,* 2019; James *et al.,* 2020b; James *et al.*, 2020c; Ndubueze *et al.,* 2020; Nejo *et al.,* 2020a; Olabanjo *et al.,* 2019). Public relations is intentional, consistent communication which encourages mutual, positive beneficiary relationships (Nwosu *et al.*, 2020a; Nejo *et al.,* 2020b; Olabanjo *et al.,* 2020a; Omokiti *et al.,* 2020b; Salau *et al.,* 2020a; Salau *et al.,* 2020b; Nwosu *et al.,* 2020b). Homby and Richard (2010) public relations are practices of organizations to provide public information so as to create good impression about such organization. Scott (2010) posited that in order to create relationships with the public, essentially, institutions should encourage feedbacks. PR should not just be encouraged only during crisis because of its important when there is good news to share.

Moore (2009), explains that the responsibility of PR professionals are not to cover up information, but provide the publics with the school's positive news, these don't only serve as effective, two-way communication but helps schools succeed; these professionals play an essential role in secondary schools by identifying target publics which include government officials, host community, students, Chief executive officers (CEOs)/ directors of industries (DOIs), employees, employers and alumni associations. (Odiboh *et al.*, 2020a; Odiboh *et al.,* 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019; Galloway and Swiatek, 2018).

Statement of Problem

The essence of professionalism in public relations in the services of high schools is a significant duty that managements should engage. Professionalism is vital because it enables them to remain relevant in today's competitive environs. This way, it creates a better understanding of what such schools stand for and the values they place on their publics. Professional public practitioners understand that assumptions do not help the image of an institution. Schools and parents are not supposed always to assume the activities, the standard of qualities and relevance of a school. Most of the time, the social expectations from high schools, are not just limited to the parent but also, the public. Unmet expectations lead to problem, especially image challenges. Also, schools' management teams can be the ones assuming they are doing well in the eyes of their publics; meanwhile, the public does not even see these good works.

A public relations programme that is adequately communicated and effectively implemented can help correct such negative assumptions and misconceptions for the good of the general public. Professional public relations (PPR) enable feedbacks on how the public's sees the school and their level of knowledge. According to Ozioko and Usman (2019), good public relations programmes/practices can help high schools to gain continued goodwill, patronage, as well as financial and emotional support. With the rate at which high schools in Nigeria is fast-growing, high school that wishes to remain in business will need to embrace professionalism at all cost. Therefore, this study investigates professional public relations practices in high schools in Nigeria. From these perspectives, this study will seek the opinions of professional public relations practitioner.

Objectives

1. To scrutinize public relations practices in private and public high schools in Ota, Nigeria.

2. To determine what tools are used by private and public high schools, Ota, Nigeria.

3. To study the internal functions and practices of public relations agencies working for private and public high schools in Ota, Nigeria.

4. To find out the organogram of the school system.

Literature Review

Good schools' public relations planning and activations rely on two-way communication between the institutions and stakeholders (Nwosu *et al.,* 2019, 2020b). Public relations practices keeps expanding greatly; from the various forms of written communication, to an increased need for face-to-face communication (Odiboh, Ezenagu, & Okuobeya, 2019). Public relations professionals gives organization the opportunities to put the public's interest first, this way, common misconception are avoided such as; PR in the secondary school setting is structured to handles crisis (Adelua *et al.,* 2020a; Adelua *et al.,* 2020b; James *et al.*, 2020d; Nwosu *et al.,* 2019; Adelua *et al.,* 2020c; Adelua *et al.,* 2020d; Aiyende *et al.*, 2020a). However, PR Professionals don't just handle crises but establish good relationships with publics by building a good relationship between schools which helps publics overcome the issue of trust and negative perception. (Adelua, *et al.,* 2020a; 2020b).

Public Relations as an Operational Tool in any institution

In order to for an institution to move forward, PR professionals as part of their duty should encourage transparency and effective communication with the internal and external publics; co-operation of all employees is vital. According to Smith (2007), Public relations needs to an integral part of any managerial operation and to produce better result, institutional workforces are to be kept informed and engaged with the goals which the institution seeks to achieve; this way, emphasizes are laid on the part they play (p2). The role of PR is to connect with communities and the publics in general, typically using the media to deliver messages. However, Gilheany (2006) observes that professional PR practices might go beyond most school's budget, so it is important to devise a more appropriate media strategy of building a local media network, sending out regular press releases, drafting a crisis management plan. Mr. so so… argues that if school managements are doing it right, there should be no need for public relations practices in secondary schools. Contrarily, Mr. so so… explains that PR professionals are consist of individuals in the school system uniquely positioned to influence decision makers which affect both the internal and external publics of the institution. Educational sectors are increasingly competitive, therefore it is more important to ascertain that the public's perception of the school matches the reality (n.d). It is ensuring that they build a relationship between the public and itself to overcome the issue of trust and negative perception. PR professionals should as well focus more on areas that will benefit the public, such as empowerment programs (Adelua*, et al.* 2020a: 2020b)

Professional Public Relations in Secondary Schools

According to Hazlett (2005), Professional PR practices can improve the quality of the school as a brand; this way, the school's identity is promoted and supported. Branding (mascot, colors, chosen typeface for materials, and the school's communication tone) presents the overall look of the institution to the world. Paswan (2008), posited that schools should create a distinct and memorable impression which enhances communication efforts of establishing long lasting trust with the identified publics, giving such school an edge in the community. A standout amongst the most significant concerns for PR practitioners in the management of the institutional image made by its diverse publics; based on this image, consumers settle on their choices, when they have needed to satisfy, and the public develops altruism or hesitance toward the institution, considered as a social element. Based on this image which the public will establish contact or pursue transactions with the institution, or not. (Ndubueze, *et al.,* 2019)**.**

However, Thompson, Warren, and Carter (2004), opines that Professional PR practices connect the school and its community; especially the school's primary publics who needs to be aware and understand their connection to the school. The professional PR tools are the key to reach these

publics; Parents of existing and prospective students, community members government agencies and so on. School's communications are being encouraged and meetings should be accessible so that more than just, parents of existing students can attend. This way, the school is well connected to the community which gives room for favorable publicity; allow publics adjust their schedules for productive discussions and get a chance of presenting the school's financial needs to those who can support. Bradshaw (2009), in his own research explains that Professional PR practices impact school's marketing efforts; marketing are great tools in public relations, it helps professionals focus on promoting the school whereby, increasing students enrollment. Professional PR practitioners give ears to their customers and provide services based on their preferences and needs (Bradshaw 2009). However, Marketing and PR efforts are cyclical processes that work together to bring in new students and retain existing students. School marketing consists of the information the school is giving to its publics, meanwhile, word-of-mouth is what the publics are saying to each other behind the school's back which can be positive or negative. When schools uses PR to listen and respond to their publics, then, marketing and things they are saying will start to align. (Olabanjo *et al.,* 2019).

Theoretical Framework

Excellence Theory by James Grunig in 1985; 2008 gives further theoretical insight on the importance of professional PR practices in an organization, these means every institution should embrace the practices of public relations in promoting a well structure relationship with the publics. This also explains that basics organizational values lie in the roles PR plays in secondary schools which brings about a two-way communication strategic. As described by this theory, secondary schools need to make effort toward identifying and building intentional relationship with publics who can easily affect the school's policies; the practices of excellence theory as a Professional public relations representative in secondary schools in Nigeria helps to reduce the level of unfriendly relationships and replace it with a more sustainable one. Because for institutions to be capable, it must empower public relations as a critical management function this way, public relations executives play managerial roles as well as administrative roles. However, useful institution communication function must build both internal/external communication and relationship on excellence theory.

Research Design and Methodology

This study analyses the discourses in In-depth interviews conducted with a practicing professional of a Public Relations agency and a public relations representative of a private and public high school each in Ota, Nigeria. The interview questions were based on the research objectives using a pretested interview guide. In the Interview guide, were ten (10) questions for the public relations agency practitioner and eleven (11) questions for the high schools' public relations persons. These help to show how public relations activities in high schools.

Results

All interviewers in this session generally agreed that public relations play an essential role in high school; because "it aid relationships with the public and it quickens both Parents and relevant/targeted audience's actions in some matters". Subsequent agreements include that high schools should establish a strong public relations departments or consult experts alternatively. PR works directly with the members of the public. Thus, getting public relations tools right is pertinent. Providing gadgets that help with prompt dissemination of information is crucial. Also important is a timely passage of information from management to the P.R.O's office, easy access to the internet, stable power supply. These were the majority of the suggestions which the interviewees pointed out.

Findings show that high schools do not have formal public relations departments. Therefore, subject teachers act as public relations personnel. As amateurs, the teachers could only do little since they are untrained for additional responsibility.

Of duty could only identify few out of various activities that should be carried out by a P.R professional in their schools, such as, Seminars, Parents Meetings and Community relation, whereas,

public relations activities should not be limited to all they mentioned but other activities such as; Press release, Press conferences, Community relations activities and activities through various practical and well-selected communicating platforms, which can also be public relations tools and they include; Television, Radio, Newspapers, Social media, Billboards, flyer, Posters, Press Conferences, Seminars.

Also, the majority mentioned at least two to three targets audiences (majorly parents, teachers and the host community) out of several high school publics. According to an interviewee, the schools should establish a PR monitoring and evaluations system. Also, there should be regular and frequent researches. Provide suggestion and opinion boxes provided at strategic places in the school building area". Moreover, the majority also agreed that getting feedbacks from the parent and other target audiences is an effective way of evaluating.

The interviewees provided the organograms of the school system.

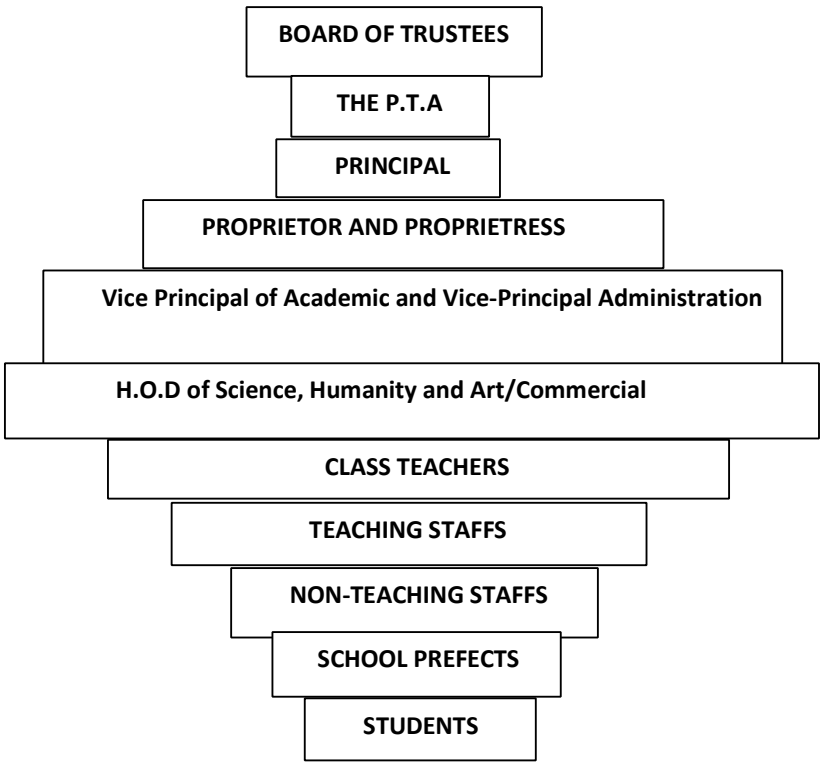

Conclusion

The interview results established that there is no public relations department/unit in high schools. Moreover, the PR activities are executed by subject teachers, thereby giving them additional daily routine, about which most of them are not happy. However, despite the level of dissatisfaction Public Relations representatives in high schools are still making efforts to improve the situation with their little working knowledge of how public relations activities should go. However, public relations are not just about rhetoric but action. It is, therefore, obligatory for high school managements to perform better in order to continue to build a positive image of their schools to foster co-operation and satisfaction. Public relations activities can improve in high schools by establishing public relations departments; alternatively, consulting experts in the field that will work directly with the public to the benefit of the educational institutions.

Recommendation

The study recommends that high school managements get professional public relations practitioners to handle their schools' affairs and public related activities. There is a need for the creation and improvement of the public relations departments/units. Moreover, from the experts' view, establishing public relations departments or consulting experts in the field will bring more significant goodwill to the schools. That will work directly with the members of the public this way, getting the public relations tools right because parents are the most critical stakeholders of the schools. Therefore, School(s) needs to do more is building substantial relationships with the public by communicating their healthy activities, facilities and expertise always. Public relations in secondary schools should provide the messages to be communicated to the publics and relationships should also be established with the public of the school. As soon as secondary schools directives practice public relations, they will improve their school brand, connect with the community, and definitely boost their marketing efforts.

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Publishing, Public Relations and the Public in Ibadan, Nigeria

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Abstract

Public Relations is an important sector which operates in organisations due to its power to promote an organisation, manage crisis and maintain goodwill among others. However, this study finds out the perspective of students and teachers on the practices of Public Relations in publishing firms. The study also examines how bootlegging affect pricing, distribution of books. In the study, Two-symmetrical Public Relations model of James E. Grunig was adopted with a random sampling method using survey design. Two hundred fifty copies of the questionnaire got to respondents, and only 200 were retrieved. Also, the results were processed using SPSS (Statistical Package for the Social Sciences). Therefore, the study indicates that both the teachers and students lack knowledge about Public Relations practices in publishing firms.

In contrast, few of the students and teachers made mention of public relations. The respondents failed to state Public Relations responsibilities. Instead, the government was mostly mentioned as the agent to curb bootlegging in publishing industries. Thus, because of the limited functions of the public relations in publishing industries, the publics lack knowledge of the possible responsibility or how public relations can help in curbing piracy. Therefore, this study recommends that publishing industries should always seek the counsel of public relations experts to assist in managing public goodwill. They should hire public relations agencies to help in maintaining a good relationship between them and readers in order to curb piracy.

Keyword*:* Perspective, Publishing, Public Relations, Bootlegging

Introduction

At the mention of a publishing company, the first thing which comes to mind is books. Books have been an old existing source of documented history. Book are multi-faceted, dynamic product and great assets of every society (Oyeyinka, Aganbi & Adebayo, 2016, p 1). It enlightens scholars, teachers and students as a catalyst for knowledge, pleasure and development in a society. These made so many scholars conclude that books have a significant impact on people. Therefore, a developed society is that which reads (Oyeyinka *et al.,* 2016). Book publishing plays a vital role in the development of a country. Great intellectuals of the world such as Aristotle, Socrates, Plato, and so many other works would not be known if unpublished. As much as publishing is for intellectual purposes, it is also a social responsibility. Likewise, it is a medium of mass communication because it aids in disseminating information to an audience.

Moreover, publishing is an old business in Nigeria traceable to the first printing press established in Calabar in the year 1846 by Rev. Hope Waddell of the Presbyterian Church of Scotland mission mainly for the production of bible lessons and later instructional materials for schools (Omeiza & Lanre, 2019, p. 5). Publishing deals with a printing works for distribution and sales to people, mostly the learned who can read and write. The process of publishing includes: having an idea of what to write, submission of manuscript, proofreading, editing, typing and printing which is done mainly for profit by the publishers based on Nigerian context (Omeiza & Lanre, 2019).

With the advent of publishing, bootlegging followed to destroy creativity and diminish writing talents; subsequently resulting in the intellectuals not benefiting from their works, therefore, causing more concern by the authors and publishers. Bootlegging is a constant, prevalent, worldwide phenomena that have for long challenged organisations especially publishing firms (Nwosu *et al.*, 2020a; Nejo *et al.,* 2020b; Olabanjo *et al.,* 2020a; Omokiti *et al.,* 2020b; Salau *et al.,* 2020a; Salau *et al.,* 2020b; Nwosu *et al.,* 2020b). Due to bootlegging, the Nigerian Copyright Commission (NCC) emerged to protect the intellectual properties of individuals; and penalise violators. The International Intellectual Property Alliance (2006) reports that bootlegging level in Nigeria is nearly 85% for all sectors with estimate among the highest in the world (Ahmadu, 2017, p.104)

Public Relations has many definitions. However, it is a management function with the leadership role of maintaining relationships through communication practices, between the organisation and its publics (Nwosu *et al.,* 2019). The functions of the Nigerian Copyright Commission are substitutable with that of Public Relations. Because the P.R. department or agency would focus on only one organisation at a time in order to tackle the problems. However, Public Relations has to do with an effective and a two-way communication system (Aiyende *et al.*, 2020b; Fayemi *et al.,* 2020a; Fayemi *et al.,* 2020b; Fayemi *et al.,* 2020c; Fayemi *et al.,* 2020d; Olabanjo *et al.,* 2020b; Omokiti *et al.,* 2020a). Therefore, Public Relations can be a department or an agency representing a publishing firm. Both ensure that a publisher has an excellent public image by preventing the excess flow of pirated publications. Additionally, it is paramount for an organisation to know the central goal of its publics to satisfy them. Moreover, this goal is achievable by the presence of the Public Relations practitioners who engage in relationship building with stakeholders (James *et al.,* 2020a; Ndubueze *et al.,* 2019; James *et al.,* 2020b; James *et al.*, 2020c; Ndubueze *et al.,* 2020; Nejo *et al.,* 2020a; Olabanjo *et al.,* 2019).

Statement of the problem

Even though Nigerians may not be too obsessed with reading, there are yet publishing industries which are at the disposal of the people. Ibadan is Nigeria's city of publishers of various genres of books. In this regard, the assumption is that publishers only have readership problems. However, on the contrary, the most faced problem is that of bootlegging. Bootlegging is a synonym for piracy which tampers with the price and distributions of books. Public awareness and knowledge of public relations in publishing firms are central to this study. Public relations support and build a healthy relationship between the public and the organisations. Also, the goals and objectives of Public Relations must be tied directly to organisational goals and objectives in order to achieve success (Adelua, *et al.,* 2020a; Adelua *et al.,* 2020b; James *et al.*, 2020c; Nwosu *et al.,* 2019; Adelua *et al.,* 2020c; Adelua *et al.,* 2020d; Aiyende *et al.*, 2020a). Therefore, this study will focus on the perspectives of both students and teachers regarding Public Relations practices in publishing industries in the middle of the piracy crisis.

Objectives of the study and research questions

This study will find out the perspectives of both students and teachers regarding public relations functions in publishing industries. The study will examine the patronage of pirated books. It would also find out the reason for bootlegging and its effect on distribution and price and to establish a solution to curb bootlegging.

1) What are the perspectives of the public regarding Public Relations functions in publishing industries?
2) Which books are more patronised? Originals or pirated?
3) Are there reasons for bootlegging? How does it affect price and distribution?

4) What is the solution to the problem of bootlegging?

Literature Review

Overview of Books and Publishing Industries in Nigeria

In every discussion concerning the publishing industry, books come to the mind. Books have been existing for many years. Books have a different name in various parts of the world when it first emerged. Books are non-periodicals; printed and published. The Greeks and the Egyptians around 3000 B.C. used the papyrus roll as books and kept in libraries. The Romans were also not left behind in the discovery. However, in this case, only the rich had books in their possession. All this show the gradual evolution of books to what it is today. The first book to be printed was a bible by Johannes Guttenberg who invented the first movable printing press. This invention paved the way for printing and publishing (Oyeyinka *et al.,* 2016).

Gradually, the invention reached Nigeria through the Presbyterian Missionaries who established a printing press in 1846 at Calabar, Cross Rivers state. The publication was not for educational purpose but was basically for religious purposes. Also, another printing press evolved in Abeokuta. Since then, more printing firms commenced with newspapers and books in circulation (Oyeyinka *et al.,* 2016). Since then, many Nigerians venture into the publishing business, which is growing at a fast pace.

Publishing and Piracy

Publishing industries are significant in the development of a nation because books inform, educate and also entertain people. Publications can be periodicals, newspapers, books, magazines including electronic media. Despite the fast growth of the publishing, the rate of piracy or bootlegging and lack of funding is affecting the industries massively. Piracy as the unauthorised use or reproduction of an author's work. Also, bootlegging, which is synonymous to piracy, means the activity of selling books illegally.

Piracy or bootlegging affects the publishing industries by limiting the circulations of their books. Pirates sell more than publishers because it is cheaper and always available in the market. The high cost of Ink, Paper and gum reduces the original books expensive and sometimes scarce. The government needs to implement laws that are effective enough to stop pirates from operating (James *et al*., 2019).

In safeguarding publishing industries, different bodies have emerged to help curb the challenges faced. The regulatory bodies are Nigerian Publishers' Association (NPA), Nigerian Booksellers Association, Association of Nigerian Printers, Association of Nigerian Authors and Nigerian Library Association (Olabanjo *et al.*, 2019). The mentioned associations make sure that publishing industries and the authors disseminate protected information. The Nigerian Copyright Commission serves as the body which enforces copyright laws in order to prevent piracy (Ubogu, 2018). Despite all the bodies mentioned, bootlegging is still a severe issue faced in publishing industries. What could be missing?

Public Relations and Publishing

Public Relations is the deliberate planned and sustained effort to establish and maintain mutual understanding between an organisation and its publics (Odiboh & Oladunjoye, 2019). Public relations is concerned with or devoted to creating mutual understanding among groups and institutions. Public relations monitors, surveys and researches issues and happenings in the environment (Odiboh & Ajayi, 2019). Public relations are the creations of the establishment of mutual understanding between an organisation and its publics. It suggests that public relations are not a haphazard process (Ndubueze *et al.,* 2019). Also, about counselling and implementing planned programmes to serve an organisation and its publics. The three main elements of public relations are to inform people, persuade people and integrating people with people (Adama & Okechukwu p.3, 2019). Apart from the mentioned elements, Public Relations communicates basically through social media, the traditional media and the new media (Olabanjo *et al.,* 2019). The publics are to be fully aware of the responsibilities of Public Relations in

all fields (Nwosu, Odiboh, Ndubueze & Olabanjo, 2019). The public mostly considers the Nigeria Copyright Commission (NCC) as the main body for regulating the publishing firms. However, the definitions of Public Relations shows that it is beneficial in dealing with all kinds of organisations (Odiboh, Ezenagu & Okuobeya, 2019). Publish relations practices extend to different works of life. Creating awareness about their roles and services can make other organisations such as publishing firms value and trust their expertise in tackling bootlegging. Therefore, it will be necessary for organisations to focus more on managing the public misperception of public relations itself (Adelua *et al.,* 2019). The missing link in most studies is the disconnection between publishing and public relations. Thus, looking at the functions of a public relations practitioner; this study will attempt to close the gap between the two by finding out the perspective of the public regarding public relations functions in the publishing industry.

Theoretical Framework

James E. Grunig conceptualised two-way symmetrical model of public relations. This model deals with the concern a company has about its customers or publics' interest without only bothering about its own needs (Grunig, 2001). Decisions are to be mutually beneficiary to both parties that is, both the organisations and the public. In this case, the company is responsible for meeting the interest of its stakeholders, employees, the public, and society. It is also essential to be transparent and accountable towards the public to maintain trust between the two parties. Therefore, this theory applies to this study by confirming publishers' responsibility towards authors, booksellers and its publics. Public relations can help the publishing industry to keep the public interest at heart. Public relations can help build a relationship between the public and the industry so that publishers can work towards the goals and interest of its publics. The public relations focuses on the needs of the public by making the needs of the clients a goal for the organisation in order to maintain the public image of the company (Odiboh, Olonode, Adesina & Yartey, 2018).

Research Design and Methodology

This section discusses research design, population, sampling technique/ sample size and the data collection instruments (Odiboh *et al.*, 2020a; Odiboh *et al.,* 2020b; Odiboh & Oladunjoye, 2019; Odiboh & Ajayi, 2019; Odiboh, Ezenagu & Okuobeya, 2019). This study adopts the survey method. Survey research design has an unbiased representation of the population of interest and by gathering of the same information from each participant (Owens, 2002).

In order to get responses from the respondents, the researcher formulated a questionnaire out of the research questions. It is about the perceptive of the publics toward Public Relations in publishing industries and how to curb bootlegging. The questionnaire consisted of open and close-ended questions whereby, the copies of the questionnaires were administered to the population by the field assistants to the researcher. After the administering of the questionnaires to the students and teachers, the data gathered was coded into the Statistical Package of the social science software and tabulated for easy understanding of data collected. The population was selected based on a random sampling technique because the school population cannot be all selected due to a large number of students. Therefore, the random selection gave a chance for different categories of students and teachers to fit into the study. The school in Ibadan was selected because Ibadan is the home of publishing firms and students are more often the consumers of books. The sample size for the study is 250 respondents, but only 200 questionnaires came back from the field.

Results

After the collection of data, it was analysed through frequencies and percentages by the use of SPSS (Statistical Package of the Social Science) software. The tables interpret the findings.

Statistics

		Gender	Have you bought pirated books?	Religion	Which one do you prefer?	Is Public Relations responsible for bootlegging control? State why	Age bracket	What do you think is the reason for bootlegging/piracy?	Suggest a solution for tackling bootlegging	Why do you think there are pirated books?	Why do you buy poorly bond or poorly printed books?
N	Valid	200	200	200	200	199	196	179	178	163	143
	Missing	0	0	0	0	1	4	21	22	37	57

The statistics table shows that all the 200 respondents answered the question regarding gender, 200 respondents answered the question on religion, preferences and 196 answered the question regarding age bracket. On the poor patronage of poorly bonded books, 57 did not respond. Thirty-seven did not respond to why there are pirated books. One failed to answer if public relations is responsible for bootlegging control, 21 left the question to the reason for bootlegging/piracy. Lastly, 22 out of 200 failed to suggest a solution to bootlegging.

Table 1: Gender

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Female	115	57.5	57.5	100.0
	Male	85	42.5	42.5	42.5
	Total	200	100.0	100.0	

Table 1 shows that 115 (57.5%) are females while 85 of the respondents (42.5%) are males, while. These show that majority of the respondents are females.

Table 2: Age bracket

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	15-18	132	66.0	67.3	67.3
	19-22	27	13.5	13.8	81.1
	23-25	16	8.0	8.2	89.3
	25-above	21	10.5	10.7	100.0
	Total	196	98.0	100.0	
Missing	System	4	2.0		
Total		200	100.0		

Table 2 indicates the age bracket of the respondents stating that 67.3% are between the ages of 15-18, 13.8% are between the ages of 19-22, the lowest which is 8.2% consist of ages 23-25. In comparison, ages 25-above has a percentage of 10.7%. Therefore, the highest age bracket which engages in this exercise is ages 15-18 (67.3%) with 4 (2.0%), non-respondents.

Table 3: Religion

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Christianity	121	60.5	60.5	97.5
	Islam	74	37.0	37.0	37.0
	Traditionalist	5	2.5	2.5	100.0
	Total	200	100.0	100.0	

Table 3 indicates the different religion engaged in filling the questionnaire. Christians have the highest respondents of 121 (60.5%) followed by Islam with 74 (37.0%) and the list in the respondents were the traditionalist who consists of only (2.5%) 5 of the population of 200 respondents.

Table 4: Why do you buy poorly bond or poorly printed books?

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	The high price of the original	89	44.5	62.2	62.2
	Unavailability of original	37	18.5	25.9	88.1
	Poor quality	17	8.5	11.9	100.0
	Total	143	71.5	100.0	
Missing	System	57	28.5		
Total		200	100.0		

Table 4 indicates that 89 (62.2%) of the respondents, which is the highest agreed that the high price of original books makes them buy poorly printed books which turns out to be pirated copy. Thus, 57 (28.5%) of this question was unanswered. Also, 37 (25.9%) responds that the unavailability of original books in circulation compels them to purchase pirated books whose features are mostly poor printing. More so, 17 (11.9%) agrees that they purchase pirated books despite the low quality because it is affordable. This study indicates that most of the respondents go for pirated books because it is cheaper for them to afford.

Table 5: Have you bought pirated books before?

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	100	50.0	50.0	50.0
	No	100	50.0	50.0	100.0
	Total	200	100.0	100.0	

In table 5, 100 respondents (50%) agreed that they had bought pirated books before subsequently, the other 100 (50%) disagreed by stating that they have never bought a pirated book before.

Table 6: Why do you think there are pirated books?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No idea	55	27.5	33.7	97.5
	Cheap	41	20.5	25.2	25.2
	Poverty	36	18.0	22.1	47.2
	Unemployment	15	7.5	9.2	56.4
	Greed	12	6.0	7.4	63.8
	Unavailability of originals	4	2.0	2.5	100.0
	Total	163	81.5	100.0	
Missing	System	37	18.5		
Total		200	100.0		

Table 6 indicates the reasons why bootlegging exists. Majority of the respondents 55 (33.7%) said they have no reason for the piracy of books. In comparison, 41 (25.2%) stated that pirated books are cheap, unlike the expensive originals, this makes the pirates produce more books because of the high demands of cheaper books. 36 (22.1%) of the respondents said poverty makes youths to indulge in the act. Likewise, unemployment 15 (9.2%) is also a factor which pushes people into the act. Greed 12 (7.4%) and unavailability of original books 4 (2.5%) are also factors which bring about piracy. Pirates only go after books which are high in demand. That means, if the pirates produce the same book at a cheaper rate, the public will rush for it. Then demand will shift from publishers to pirates.

Table 7: Is Public Relations responsible for bootlegging control?

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	No	101	50.5	50.8	71.4
	Not sure	57	28.5	28.6	100.0
	Yes	41	20.5	20.6	20.6
	Total	199	99.5	100.0	
Missing	System	1	.5		
Total		200	100.0		

According to table 7, Most of the respondents 101 (50.8%) stated that Public Relations have no responsibility in controlling bootlegging in publishing firms. When analysing this result, 57 (28.6%) of the respondents have no idea of the responsibilities of a Public Relations, especially in a publishing firm. Public Relations is as responsible for curbing bootlegging by 41 (20.5%) of respondents. Lastly, 1 (0.5%) respondent failed to respond to if Public Relations is responsible for bootlegging control.

Table 8: Which one do you prefer?

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	An original but expensive book	172	86.0	86.0	100.0
	A pirated but low price book	28	14.0	14.0	14.0
	Total	200	100.0	100.0	

In this table, the respondents responded to the question of their preference. Asked if they prefer a low-priced pirated book to high-priced original book; 172 (86.0%) respondents said that they prefer an original book no matter the price. Rather than purchase a pirates book of lower price. 28 (14.0%) respondents prefer pirated books because of the cheap rate.

Table 9: What do you think is the reason for bootlegging/piracy?

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	High price/no access to originals	58	29.0	32.4	59.8
	Quick money/ unemployment	42	21.0	23.5	27.4
	No idea	25	12.5	14.0	100.0
	Poverty	22	11.0	12.3	86.0
	Greed	15	7.5	8.4	68.2
	Poor government policies towards publishing	10	5.0	5.6	73.7
	Ignorance	4	2.0	2.2	3.9
	Laziness	3	1.5	1.7	1.7
	Total	179	89.5	100.0	
Missing	System	21	10.5		
Total		200	100.0		

Majority of the respondents 58 (32.4%) agrees high price and lack of access to original books causes bootlegging because the public purchase the cheap books. In comparison, 42 (23.5%) states that quick money-seeking and unemployment are some of the reasons. Also, 25 respondents (14.0%) said that they have no idea what the reason for bootlegging is, 22 respondents (11.0%) outlines that poverty results in people doing anything to survive without thinking of the damages it might have on others while 21 (10.5%) respondents failed to respond to the question. Greed on the side of the pirates to earn double of what they did not produce is a reason for bootlegging, which was identified by 15 (8.4%) of the respondents. Likewise poor government policies 10 (5.6%) towards publishing is a serious issue as

the government neglects the industry. If the government takes the publishing firms serious, it is possible to curb piracy. The 4 (2.2%) respondents' said many Nigerians are ignorant of bootlegging being a crime which makes it a reason why they indulge in the act. The 3 (1.7%) respondents in table 9 stated that Laziness is a factor or reason which encourages bootlegging as many people are not hardworking enough to earn for a living.

Table 10: Suggested solutions to bootlegging

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid					
	Penalty	80	40.0	44.9	60.1
	Job creation	27	13.5	15.2	15.2
	Effective laws	24	12.0	13.5	92.1
	Make it affordable	17	8.5	9.6	78.7
	Awareness	16	8.0	9.0	69.1
	No idea	14	7.0	7.9	100.0
	Total	178	89.0	100.0	
Missing	System	22	11.0		
Total		200	100.0		

Table 10, which is the last table, answered the question suggestions on how to tackle or curb bootlegging. Majority of the respondents 80 (44.9%) stated that in order to solve bootlegging, the piracy should have a penalty. In comparison, 27 (15.2%) respondents suggested that when there are jobs, crimes like piracy will reduce correspondingly. Some of the respondents, 24 (13.5%) suggested effective laws by both government and publishing firms and 22 respondents failed to respond. Also, 17 (9.6%) said that when original books are affordable and in circulation, piracy will reduce. Some of the respondents, 16 (9.0%), suggested that people should be made aware of the serious implication of bootlegging and the damages it causes both publishers and authors. In comparison, 14 (7.9%) respondents said they have no idea about how to tackle bootlegging,

Discussion of findings

RESEARCH QUESTION 1: To find out the perspectives of both Teachers and Students regarding Public Relations functions in publishing industries

This study shows in Table 7 that the majority of the public do not know the responsibilities of public relations in publishing companies when it comes to piracy. When analysing this result, 57 (28.6%) of the respondents are unaware of P.R. control of bootlegging. One hundred and one respondents (50.8%) stated that public relations practitioners have no responsibility in bootlegging control in publishing industries. While bootlegging control is seen as the responsibility of PR by 41 (20.5%) of the respondents. Also, the respondents who said that P.R. is responsible for bootlegging control failed to state what the responsibilities are. This result shows that the respondents do not know the responsibilities of P.R. in publishing firms regarding bootlegging.

RESEARCH QUESTION 2: To find out if there is more public patronage of original or pirated books.

In answering this research question, Table 8 indicates more patronage for original copies of books more than the pirated ones. Therefore, the publics are ready to spend more in order to get an original book in circulation than having a pirated copy. Another study opposes the findings of this study by stating that educational books are the most pirated books. Therefore, the high price of the original books and scarcity makes the publics to patronise pirated books encouraging pirates to keep producing pirated books in the market. This very act affects the distribution of the original books, thus, affecting the development of publishing businesses in Nigeria (Ahmadu, 2017). On the other hand, majority of the respondents (33.7%) in table 6 said they do not know the reasons for bootlegging. In comparison (25.2%) responded that pirated books are cheap and accessible.

RESEARCH QUESTION 3: To find out the reasons of bootlegging and its effect on distribution and price

Table 9 shows the number of factors responsible for causing bootlegging. The high level of unemployment (23.5%) in the country causes the youths to indulge in different criminal acts such as bootlegging. However, (12.3%) respondents agreed that bootlegging is the product of poverty in the country. While some of them are fully aware of the wrong they are engaging in by selling other people's work, (2.2%) respondents agreed that some are ignorant. That reproducing of any literary work, sculpture, painting or any kind of creation under the protection of the Nigerian Copyright commission if not authorised, is a crime. The government should take the publishing firm seriously as they are the backbone to the educational sector in Nigeria. Because the original books are not in access in the market like the pirated, people rush for the pirated because it is cheaper, therefore, reducing the circulation rate of the books and the price drops. After all, no one is buying. Furthermore, another study supports these findings by stating that poverty, ignorance, the high cost of books, inability to gain access to original books, inadequate funding of regulatory agencies such as Nigerian copyright commission. Its effect is the economic, social and intellectual damages it causes the country (Emmanuel & Folorunsho, 2019).

RESEARCH QUESTION 4: To establish a solution to curb bootlegging

Table 10 answers this objective question. In order to curb bootlegging/piracy, (44.9%) respondents stated that both the government and the publishing firms should establish an enforceable law. Piracy and bootlegging need legal punishment. The two crimes affect not only the publisher but also the authors of the publications. Also, the study found out that when original books are sold at an affordable price and in circulation, the rate of piracy will reduce because some buyers only purchase cheap books. Most of the cheap books are the pirated ones. According to Onabajo (2017), the tools public relations should use are; news release, advertisement, the favourable public image of the organisation as well as award programmes for the staffs. The tools can be a starting point for reducing the rate of piracy. Likewise, the perspective of the public will change towards the responsibilities of public relations in the publishing industry. Emmanuel and Folorunsho (2019) support that professional bodies such as the media should be involved in solving the problem of bootlegging. In this regard, public relations is utilisable in the publishing industry to curb piracy and bootlegging. On the other hand, the Nigerian parliament should enforce strict laws and severe punishments for pirates and discourage the street selling of books.

Conclusion

The study concludes that bootlegging is a severe issue which some of the public is ignorant. About while most of the population buy pirated books because of how cheap it is and always available for distribution, unlike the original copies. Pirates operate based on the books that are high in demand. The respondents suggested awareness programmes, offenders' punishment and legal protection of the industry in order to curb piracy and bootlegging. Most of the respondents failed to state the responsibilities of the Public Relations, which shows that they are unaware of how useful and essential

public relations in the publishing industry could be. This finding also indicates that public relations activities in publishing industries are limited.

Recommendation

An important recommendation is that the government should give the publishing industry priority attention in order to reverse the dwindling reading culture among Nigerians. Because it is the backbone of the educational system of Nigeria. By the same token, if the publishing business crumbles to bootlegging, students will not have books to read, and young author's creative talents will disappear.

Also, the policies of the Nigerian copyright commission should be strengthened and made capable of curbing bootlegging in Nigeria.

Finally, the respondents failed to mention a public relations responsibility as a means of solving bootlegging and piracy problems. Since the copyright commission has not tackled piracy and bootlegging, publishing firms should create a public relations department to do the job. Publishers could hire P.R. agencies and consultants to help alter public dispositions towards the industry. Also, public relations will help publishers to acquire an excellent public image. Furthermore, customers will not patronise pirated books.

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Made-In-Nigeria Automobile Industry and Public Relations Actions: An Examination of Public Awareness and Perception

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Abstract

Nigeria's automotive policy aimed to turn out locally produced vehicles for public purchase and usage. However, haemorrhaging importation of automobiles retains the policy as a dream rather than reality. This study examined the public relations angle of the Made-in-Nigeria auto conversation. Specifically, it surveyed public awareness and perception of corporate activities within the country's auto industry. It also assessed the level and implications of extant public relations strategies towards creating mutual understanding, trust and goodwill between assemblers and the motoring public. Built on the theoretical framework of Grunig's Two-way Symmetrical public relations model, stratified sampling technique was employed with the aid of the survey research design. We administered a structured questionnaire to elicit public opinions of residents of Lagos metropolis. Findings show that the awareness level of PR actions in the indigenous auto industry is low, with a significant percentage of respondents expressing a negative perception of the industry. The study concluded that despite the government's imposition of restraining tariffs on imported vehicles, docile public relations of local manufacturers had not helped the public to accept indigenous automobiles patriotically. The study recommended that Nigerian automobile manufacturers should outsource their PR programmes and undertake engaging productions of motoring documentaries. Moreover, the organisations should create public acceptance advocacy for locally assembled vehicles.

Keywords: Made-In-Nigeria, Automobiles, Indigenous Industry, Public Relations, Awareness, Perception, Manufacturing

Introduction

The automobile industry is a catalyst for development and industrialisation globally. The PR industry is a critical tool for advancing the transportation sector of any economy (Olabanjo *et al*, 2019). It facilitates the value chain of allied manufacturing activities such as production of iron and steel, electrical equipment, manufacturing of rubber, plastics as well as construction of roads which would subsequently make for development in terms of urban and rural advancement (Agbo, 2011; Black and McLennan, 2016). The auto industry could help establish a vibrant economy which is essential for an increased standard of living of the people. Not many industries command a massive range of technologies and production methods or the use of as various unfinished products, machinery and tools as the automotive industry (Black, Makundi and McLennan, 2017).

The Made-in-Nigeria automobile industry is more than four decades old, three-quarter of which was infancy. At the onset, the industry was controlled by privately owned organisations that set up assembly lines shortly after Nigeria's Independence in the 1960s. The growth in the global motoring industry resulted in many leading manufacturers to start joint-venture partnerships with indigenous automobile manufacturers (Adebanjo, 2008). The continued desire for a fully indigenous automobile industry led to the creation of Innoson Vehicle Manufacturing (IVM) Company Ltd, located in Nnewi, South-Eastern Nigeria in 2007. It was subsequently commissioned by 2010 via a Sino-Nigerian auto manufacturing partnership (PwC, 2016).

In an attempt to consolidate an import-substitution strategy, Nigeria, like other developing economies, decided to develop and localise the automobile industry in order to achieve total indigenous production within specific time frames post-commencement. The National Automotive Policy of the 1970s and 1980s was to midwife the idea of domestic vehicle manufacturing. However, after the initial successes, subscribing assemblers in the country have experienced a steady decline since the year 2000. Many automobile assembly plants that of the 70s and 80s have shut down. Approximately 75% of existing automobile companies in Nigeria today deal only on sales; while about 80% of automobiles used in the country fairly-used imports (PwC, 2016).

The decline in automobile production and public patronage influenced the government of Nigeria by 2013 to introduce the National Automotive Industry Development Plan (NAIDP) to revive the industry. However the revitalisation has increased production activities in the local industry. The National Automotive Design and Development Council (NADDC) approved 35 automobile manufacturers' licences to manufacture cars. Broad-based communication provides platforms for the automobile industry to thrive. One of these platforms is public relations (Aiyende *et al.*, 2020b; Fayemi *et al.,* 2020a; Fayemi *et al.,* 2020b; Fayemi *et al.,* 2020c; Fayemi *et al.,* 2020d; Olabanjo *et al.,* 2020b; Omokiti *et al.,* 2020a).

With the National Automotive Policy in active implementation since 2015, this study aims to assess the public relations actions of the made-in-Nigeria automobile industry in bringing about general acceptance and utilisation of indigenously produced automobiles given the continued importation of fairly used automobiles and slow adoption of these indigenous brand new vehicles even at the corporate level. This study will also assess public awareness and perception of the local vehicle manufacturing industry. Many factors affect public affinity with the industry. The primary factor is organisational behaviour and reputation, especially in the automobile industry (Hagan, 2003; Fayemi *et al.*, 2019). This study looks at public relations as a relevant factor.

Statement of the Problem

Consolidating local manufacturing sector, policies encouraging indigenous manufacturing companies to thrive now exist in Nigeria further to enhance the import substitution plan of the Nigerian economy. However, the automobile industry is facing setbacks in production and public acceptance of products as a result of gross importation of fairly-used automobiles. This development has significantly challenged automobile companies which are already unsettled by high product pricing. Reduced public trust to deliver world-class after-sales services and existing negative perception of indigenous products are other challenges. This study, therefore, seeks to examine how automobile companies are applying public relations tools to increase public awareness and change the negative perception of Nigeria-made vehicles.

Study Objectives and Research Questions

This survey assesses the awareness levels and perception of stakeholders to the PR activities of indigenous automobile companies. It investigates the public relations tools and actions of indigenous automobile assemblers. Also, this study aims to obtain public opinion on the way forward for local auto assemblers towards the delivery of acceptable made-in-Nigeria automobiles. In tune with the foregoing objectives, these research questions were drawn:

A. To what extent are Nigerians aware and perceive the public relations practices of indigenous automobile companies?
B. What are the public relations tools and actions of indigenous automobile manufacturers?
C. What is the opinion of the public on the way forward for local auto assemblers towards the delivery of acceptable made-in-Nigeria vehicles?

Review of Related Literature

This study examines public relations actions of the local vehicle manufacturing industry. It compares public awareness and perception so as to explain how PR as a strategic organisational function, performs an essential task in the acceptance and attitude towards domestic automobile products. An underlying issue causing this indifference is the issue of trust and low confidence in products locally manufactured (Olabanjo *et al*., 2019).

There is inadequate literature on Nigeria's vehicle manufacturing and the in public relations actions. However, there are published researches in the automobile industry. These researches come under crisis communication and customer relations management. Excellent public relations is thoughtful, truthful, open, strategic, and symmetrical communication with stakeholders (Odiboh *et al.*, 2020a; Odiboh *et al.,* 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019). In this case, current and potential customers of automobile manufacturing. Though public relations is not limited to one definition, it is primarily a management function with the crucial role of maintaining relationships, through interaction and information sharing amongst organisations and stakeholders.

The Public Relations Concept and the Importance of its Practice in the Automobile Industry

Public relations is the process of analysing the character, actions and perceptions of stakeholders, distinguishing the policies and methods of a person or an entity in relations with the satisfaction of stakeholders. It is about coming up and implementing an actionable programme to elicit mutual support and empathy (Wilcox, Cameron and Reber, 2015; Odiboh and Oladunjoye, 2019). It is the information-sharing administrative role of management whereby organisations evolve, adjust or sustain their ecosystem to achieve organisational goals (Abitbol, 2017; Fayemi *et al.,* 2019). From those as mentioned above, public relations is expediently relevant in an organisational setting, especially in the context of the automobile industry. One aspect of an industry like the automobile industry is production and sales. However, the relationship that ensues before and after transactions such as after-sale services, vehicle recalls and other communication aspects of the administration is of the utmost importance.

In the automobile industry, product quality, as well as the industry-public relationship in every aspect, influences the organisation's reputation (Adelua *et al.,* 2020a; Adelua *et al.,* 2020b; James *et al.*, 2020d; Nwosu *et al.,* 2019; Adelua *et al.,* 2020c; Adelua *et al.,* 2020d; Aiyende *et al.*, 2020a). Likewise, excellent product quality and functional interactions within an organisation and its sphere of stakeholders help to build as well as sustain an admirable stakeholder perception or at the least counteract or mitigate the adverse impacts on the perception of such organisation (Hagan, 2003; Odiboh, Olonode, Adesina andYartey, 2018). Given the importance of relationship and communication, public relations ought to have a direct role in managing and communicating to the Nigerian public about the importance of embracing indigenously manufactured automobiles which in turn would boost economic growth and development (Nwosu *et al.*, 2020; Nejo *et al.,* 2020b; Olabanjo *et al.,* 2020a; Omokiti *et al.,* 2020b; Salau *et al.,* 2020a; Salau *et al.,* 2020b; Nwosu *et al.,* 2020).

Issues Faced by the Automobile Industry Involving Public Relations Actions

The scandalous situation German auto manufacturer Volkswagen (VW) got into is an avid case in point of how players in the automobile industry face issues of trust, reputation and acceptance that necessitates public relations actions. VW hitherto aspired to become the renowned auto manufacturer by 2018. However, the scandal resulted in the company losing a third of the company's market capitalisation (Ayiteh, 2019).

In a move to bring about restitution as a result of the infringements, VW facilitated a vehicle recall, tendered an open apology which also saw the resignation of the Chief Executive Officer and top directors. Volkswagen was also hounded with legal actions, and indicted with illicit behaviour. This threatened the existence of the auto giant. On the affirmative, policy formulators and regulators, as well as worldwide customers, expressed shock as to how an organisation could commit such ethical violations for a prolonged period on such a magnitude. However, with the introduction of a new line of electric and hybrid vehicles, they are starting to rebuild trust (Zhou, 2016). For an industry where reputation depends on the quality of the vehicles it produces, safety-related recalls can quickly diminish an automaker's reputation and shareholder value and even destroy a brand (Hagan, 2003; James *et al*., 2019).

Another portrayal of good public relations was in the Toyota scandal of 2009. Toyota Motor Corporation is renowned as one of the largest in the automotive industry, located in, Aichi Prefecture, Japan. Decades after the Japanese corporation was founded in 1937, there has been a lengthy record of manufacturing dependable, cost-effect and premium standard automobiles. Currently, the auto manufacturer rolls out automobiles and vehicle spares from 53 manufacturing locations in 27 nations and territories over the world, also possessing a number of flagships such as Lexus and Scion as well as models like the saloon Camry, sport utility Rav4, and light duty Tacoma truck. Toyota is also renowned for the first hybrid vehicle (the Prius). Toyota was forced to call back nine million automobiles around the world with its flagships and models affected. This was a result of throttle defects which caused affected vehicles to speed up inadvertently. The Toyota crisis escalated as a result of an initial dilly-dallying. When Toyota finally spoke up, it was unsatisfactory (Feng, 2010). Nevertheless, when Toyota stepped up to the challenge to sustain its reputation it took no more than a quarter of a year to bounce back to its leading status in the automotive sphere. Relatively, Toyota's vehicle carpets and defective gas pedal recall are in tandem with methods widely known to manage crises. Nevertheless, Toyota went on to employ few crisis communication tenets while also coming up with its own approach (Stewart, 2010). Toyota leveraged on its track record which was a focal point in its defence that sustained confidence in restoring its publics' trust. Although, in handling the situation, Toyota took advantage of rhetoric renowned with maintenance of identity which may not be associated with crises (Knoespel, 2011).

To some PR executives and administrative personnel, a relationship exists between the function of PR, reputation and public perception, mainly at times of crisis (James *et al.,* 2020a; Ndubueze *et al.,* 2019; James *et al.,* 2020b; James *et al.*, 2020c; Ndubueze *et al.,* 2020; Nejo *et al.,* 2020a; Olabanjo *et al.,* 2019). Roschwalb (1994) once interviewed 259 chief corporate communication officers at large corporations in the United States. When they asked the chief corporate communication officers what the primary mission of their corporate communication programme was, they most often rated reputation as expedient to success. Of the chief corporate communication officers interviewed, most said they would turn to a public relations expert first if their business had a problem of perception.

Theoretical Framework

This survey is built on James Grunig's (1984) Two-Way Symmetrical model of public relations. Grunig proposed the framework, together with other modern-day models, that seeks to incorporate all models and theories in public relations. This model explains the operations and purpose of PR, as it seeks to achieve shared values, support and partnership within organisations and their stakeholders. The framework, suggests that PR managers use research and information exchange to come about the shared interest for both organisations and stakeholders (Grunig, Grunig and Dozier, 2002). Strategies required in this model include negotiation, accord and conflict resolution to obtain mutual understanding and to alter behaviours and attitudes of both the publics and the organisation (the made-in-Nigeria automobile industry, in this case). The theorists posit that the model is the most efficient, as well as accepted professional standard and guiding principle for public relations as communication and feedback, are achieved. This fact, however, points out the need for symmetrical public relations strategies in the Nigerian automobile industry to change the attitude of Nigerians towards locally manufactured vehicles and raise the level of trust as well as reduce the apathy between the Nigerian motoring industry and members of the society.

Research Design and Methodology

This study incorporated a survey research design aided by a well-structured questionnaire with both open-ended and close-ended questions for data collection. We processed the data results using Statistical Package for the Social Sciences (SPSS). We selected two hundred seven respondents using stratified random sampling. Stratified random sampling is a sampling technique that entails the distribution of a population into strata or smaller groups. This sampling technique is utilised based on similar attributes or characteristics shared by individuals constituting the study as Denzin and Lincoln (2017) justifies. Lagos metropolis was selected because most of the made-in-Nigeria automobile manufacturers coagulate in metropolitan Lagos. Another reason is that vehicle assemblers in other parts of Nigeria have dealerships and sales offices in Lagos. Examples are Innoson Vehicle Manufacturing and Peugeot Automobile Nigeria (Nwagwu and Oni, 2015; PwC, 2016). Individuals sampled their own, drive or had general or specific knowledge about the indigenous motoring industry from the different strata of the population.

Data Presentation and Discussion

Table 1: showing if respondents are aware of Nigerian-made automobile manufacturers

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	154	74.4	74.4	74.4
	No	37	17.9	17.9	92.3
	Not Sure	16	7.7	7.7	100.0
	Total	207	100.0	100.0	

Table 1 shows that most respondents (74.4%) are aware of Nigerian-made automobile manufacturers. In comparison, 17.9% and 7.7% indicate that they are not aware or not sure about Nigerian-made automobile manufacturers, respectively.

Table 2: Showing if respondents are aware of public relations activities or programmes of Nigerian automobile manufacturers

Variable	Frequency	Percentage	Valid Percent	Cumulative Percent
Yes	79	38.2	38.2	38.2
No	27	13.0	13.0	51.2
Not Sure	101	48.8	48.8	100.0
Total	207	100.0	100.0	

Regarding awareness of public relations activities or programmes of Nigerian automobile manufacturers, Table 2 shows that 38.2% are aware of the PR activities of indigenous automobile manufacturers. In comparison, 13% indicate that they are not aware of the PR activities. However, 48.8% constituting almost half of respondents sampled indicate that they are not sure if they are aware.

Table 3: Specific public relations activities are known

	Variable	Frequency	Per cent	Valid Percent	Cumulative Percent
	After-sale services	15	7.2	20.8	20.8
	organising children's competitions and educational support activities	4	1.9	5.6	26.4
	Free maintenance and servicing	19	9.2	26.4	52.8
	Festivity gifts	10	4.8	13.9	66.7
	Community development projects such as partnering with the Federal Road Safety Corps	3	1.4	4.2	70.8
	Career Mentorship programmes	1	.5	1.4	72.2
	Auto maintenance tips	4	1.9	5.6	77.8
	Facility tours/showroom invitation and the inauguration of car clubs	16	7.7	22.2	100.0
	Total	72	34.8	100.0	
Missing	System	135	65.2		
Total		207	100.0		

A small section of the public is aware of the PR activities in the made-in-Nigeria automobile industry. The result shows that 7.2% of respondents say they are aware of communication and information dissemination regarding after-sale services. Another set of respondents constituting 1.9% indicate that they are away from activities revolving around children's educational support and competitions. 9.2% indicate that they are aware of free vehicle maintenance and servicing. In comparison, 4.8% say they are aware of gifting activities during festivities. Respondents constituting 1 .4% of respondents say they are aware of activities such as community development projects such as partnering with the Federal Road Safety Corps. In contrast, 0.5% and 1.9% indicate career mentorship programmes and auto maintenance tips, respectively. Finally, 7.7% of respondents indicate that they are a way of facility tours, showroom invitation and the inauguration of car clubs as PR activities of Nigerian automobile manufacturers.

Table 4: How respondents became aware of public relations activities of made-in-Nigeria automobiles

	Variable	Frequency	Per cent	Valid Percent	Cumulative Percent
	Facebook	15	7.2	10.3	10.3
	TV	12	5.8	8.2	18.5
	Newspaper	21	10.1	14.4	32.9
	Twitter	24	11.6	16.4	49.3
	Instagram	11	5.3	7.5	56.8
	Billboards	2	1.0	1.4	58.2
	Relatives/friends	11	5.3	7.5	65.8
	Press conferences and seminars	2	1.0	1.4	67.1
	Word of mouth	31	15.0	21.2	88.4
	Radio	6	2.9	4.1	92.5
	Others (involvement of employers in activities, posters, personal experience of activities)	11	5.3	7.5	100.0
	Total	146	70.5	100.0	
Missing	Missing System	61	29.5		
	Total	207	100.0		

Table 4 shows the media through which respondents became aware of public relations activities of made-in-Nigeria automobile manufacturers. The majority (7.2%) indicate Facebook, 5.8% say television, 10.1% indicate newspapers, and 11.6% choose Twitter. Another 5.3% reveal that they got aware via Instagram, while 1% chose billboards as a channel of awareness. Relatives and friends were choices of 5.3%. In comparison, another 1%, 15%, 2.9% and another 5.3% achieved awareness via press conferences and seminars, word of mouth, radio, and other means (involvement of respondents' employers in PR activities, posters and witness of activities personally) respectively.

Table 5: if public relations activities/ programmes influenced respondents' decision to purchase a made-in-Nigeria vehicle

Variable	Frequency	Per cent	Valid Percent	Cumulative Percent
Yes	70	33.8	33.8	33.8
No	102	49.3	49.3	83.1
Not sure	35	16.9	16.9	100.0
Total	207	100.0	100.0	

Table 5 shows that 33.8% concur that it was these PR activities that prompted them to purchase a Nigerian made vehicle. Almost half of the respondents constituting 49.3% of respondents say PR activities of these home-based manufacturers have not prompted them to purchase a vehicle. In comparison, 35% of respondents are not sure if PR activities have caused them to purchase one or not.

Table 6: If the survey participants are pleased with the PR activities of Nigerian automobile manufacturers

Variable	Frequency	Per cent	Valid Percent	Cumulative Percent
Yes	56	27.1	27.1	27.1
No	83	40.1	40.1	67.1
Not sure	68	32.9	32.9	100.0
Total	207	100.0	100.0	

From Table 6, which measures respondents' satisfaction with public relations activities of local automobile manufacturers, 27.1 % say they are satisfied. In comparison, 40.1% say they are not satisfied with the PR efforts of the manufacturers, while 32.9% admit that not sure if they are satisfied.

Table 7: showing if public relations activities/programmes of indigenous vehicle manufacturers have added knowledge about the local automobile industry and its potentials

Variable	Frequency	Per cent	Valid Percent	Cumulative Percent
Yes	86	41.5	41.5	41.5
No	78	37.7	37.7	79.2
Not sure	43	20.8	20.8	100.0
Total	207	100.0	100.0	

Table 7 shows that 41.5% of study participants agree that they have gained new knowledge from the public relations activities/programmes of indigenous vehicle manufacturers.

Table 8: Showing how public relations activities of indigenous automobile manufacturers have added to knowledge about the indigenous industry

Variable		Frequency	Per cent	Valid Percent	Cumulative Percent
	Automobiles are adaptable to Nigerian terrain and road conditions	11	5.3	14.7	14.7
	Patronage helps boost the Nigerian economy	7	3.4	9.3	24.0
	Succeeded in creating belief in the potentials of the Nigerian industry	24	11.6	32.0	56.0
	Being instrumental in the reduction of the economic effects of importation	3	1.4	4.0	60.0
	Mirrored the challenges of production while showing that local production is attainable	8	3.9	10.7	70.7
	The automobile industry aims to be the biggest in Africa	19	9.2	25.3	96.0
	Sheds more light about the National Automotive Policy	3	1.4	4.0	100.0
	Total	75	36.2	100.0	
Missing	System	132	63.8		
Total		207	100.0		

From Table 8, 5.3% of respondents admit that the PR activities of indigenous manufacturers revealed to them that their vehicles are suited to Nigerian terrains and road conditions. 3.4% said that the PR activities showed them that patronage of the domestic industry vehicles helps boost the Nigerian economy. In comparison, 11.6% opine that the PR activities of the local industry have caused them to believe in the potentials of the Nigerian automobile industry. Also, 1.4% of respondents said that PR activities have added to their knowledge by attempting to advocate for the reduction of the economic effects of importation. In comparison, 3.9% said the PR activities of the indigenous automobile industry have helped to mirror the challenges of local production as well as showing that local production is attainable. Finally, 9.2 % of respondents say they discovered that the automobile industry aims to be the biggest in Africa. In comparison, 1.4% of respondents admit that they got to know more about the National Automotive Policy.

Table 9: showing how respondents rate the frequency of information dissemination and other public relations actions of indigenous vehicle manufacturers?

	Frequency	Per cent	Valid Percent	Cumulative Percent
Excellent	7	3.4	3.4	3.4
Above Average	46	22.2	22.2	25.6
Average	73	35.3	35.3	60.9
Below average	48	23.2	23.2	84.1
Very poor	33	15.9	15.9	100.0
Total	207	100.0	100.0	

Table 9 indicates that a meagre 3.4% of respondents believe that the frequency of information dissemination and other public relations actions of indigenous vehicle manufacturers is excellent. However, 35.3% think that frequency of information dissemination is average. In comparison, 23.2% and 15.2% believe that it is below average and very poor, respectively.

Table 10: Showing how respondents think local automobile manufacturing companies can improve their information dissemination and other public relations functions?

Variable	Frequency	Per cent	Valid Percent	Cumulative Percent
Partnership with government and agencies, sponsorships and continuous advocacy for import substitution	28	13.5	14.4	14.4
Focusing on engagement across all major social media for products to be at the fingertips of Nigerians	129	62.3	66.2	80.5
Advocating for the creation of packages and schemes to facilitate the easy acquisition of made-in-Nigeria vehicles	1	.5	.5	81.0
Outsourcing their public relations functions for quality performance	9	4.3	4.6	85.6
Better customer relations	10	4.8	5.1	90.8

	Production of motoring documentaries with placement both on traditional media and on social media as done in developed climes to better engage and create an online followership	18	8.7	9.2	100.0
	Total	195	94.2	100.0	
Missing	System	12	5.8		
Total		207	100.0		

Table 10 shows that 13.5% of respondents suggest that indigenous automobile manufacturers should improve their information dissemination and public relations functions. They also advocate for an increase in sponsorships and continuous advocacy for import substitution, which would increase production and acceptance. Moving on, 62.3% of respondents want local vehicle manufacturers to focus more on engagement across all major social media platforms for products to be at the fingertips of Nigerians. However, one respondent (0.5%) suggested that the creation of packages and payment schemes to facilitate easy acquiring of made-in-Nigeria vehicles should bring about support and a trickle effect of acceptance. Some respondents (4.3%) think an improvement in public relations functions of the local automobile industry would come by outsourcing their public relations functions for quality performance. In comparison, 4.8% think that the focus should be on better customer relations management in order to get more referrals and acceptance of indigenous products. Finally, 8.7% of respondents think that the made-in-Nigeria motoring industry should take on the production of motoring documentaries and shows with placement both on traditional media and on social media.

Discussion of Findings

The results above are as a result of this discussed in line with the research questions:

Research Question 1: To what extent are Nigerians aware and perceive the public relations practices of indigenous automobile companies?

Table 1 confirms that most respondents (74.4%) are aware of Nigerian-made automobile manufacturers. However, from Table 2, 38.2% are aware of PR activities or programmes of indigenous automobile manufacturers. In comparison, 13% indicate that they are not aware of the PR activities. Furthermore, 48.8% constituting almost half of respondents sampled indicate that they are not sure if they are aware. This result means that many Nigerians; making generalisations from the Lagos metropolis drawn as a sample, do not have much awareness about the made-in-Nigeria automobile industry. The reason is not farfetched because, in the last three decades, Nigeria has experienced up to 80% rate of importation of fairly-used automobiles, hence the obscurity of indigenously manufactured automobiles (Ezeoha, Okoyeuzu, Onah, and Uche, 2018).

In terms of perception, most Nigerians do not perceive the PR activities of indigenous vehicle manufacturers as satisfactory as seen in Table 6. Only 27.1 % say they are satisfied while 40.1% say they are not pleased with the PR programmes of manufacturers, while 32.9% are not sure if they are content. Also, Table 5 reveals that 33.8% concur that it was these PR activities that prompted them to purchase a Nigerian made vehicle.

Examining specific knowledge Nigerians have gained from the PR activities of the local automobile industry, only 36.2% of respondents hold a positive perception. In this regard, the local industry has to step up in consumer satisfaction, engagement on the online space, in sponsorships and partnership with the government for more support.

Research Question 2: What are the tools and acts of indigenous automobile manufacturers in terms of public relations?

From the results in Table 12, the major platforms for information dissemination by indigenous auto manufacturers as selected by respondents were relatively marginal. However, the social media (Twitter especially), mainstream media (predominantly newspaper), and word of mouth communication (constituting 15% of respondents' choice) were selected by respondents as the primary channels of communication. The activities of these manufacturers on social media especially Twitter is commendable because it possesses one of the highest levels of engagement (Cortado, Chalmeta and Ntim, 2016; Odiboh, Ezenagu and Okuobeya, 2019; Ndubueze, Odiboh, Nwosu, Olabanjo, James, Adelua and Fayemi, 2019). There should, however, be an increase in social media engagement and experiential PR to keep up the debate in these virtual communities until there is a general awareness of the social space.

Activities such as after-sale services, organisation of children's competitions and educational support activities, free vehicle maintenance and servicing, and festivity gifts should be regular. Community development projects such as partnering with the Federal Road Safety Corps, career mentorship programmes, auto maintenance tips, facility tours/showroom invitations and the inauguration of car clubs are recognisable PR actions of indigenous automobile manufacturers. Though these actions can be said to be commendable, only a limited number of respondents are aware of these activities (34.8%) of respondents. After-sales service, free maintenance and servicing, facility tours and showroom visits, as well as festivity gifts, are mostly known by these respondents.

Research Question 3: What is the opinion of the public on the way forward for local auto assemblers towards the delivery of acceptable made-in-Nigeria automobiles?

From Table 10, most respondents (62.3%) would rather indigenous vehicle manufacturers focus more on engagement across all major social media platforms for products to be at the fingertips of Nigerians. Reasons for their choice are not farfetched as social media has made the world not only a global village but a source of engagement (Öksüz and Genç, 2018; Odiboh and Ajayi, 2019). Respondents also suggest that indigenous automobile manufacturers should improve their information dissemination and public relations functions. They also call for an increase in sponsorships and continuous advocacy for import substitution strategies which would increase production and acceptance (Aminu, 2016).

Some respondents also think an improvement in public relations functions of the local automobile industry would come by outsourcing their public relations functions for quality performance. In contrast, others think that the focus should be on better customer relationship management in order to get more referrals and embrace indigenous products. Outsourcing PR functions to agencies and consultancies most of the time is the best bet for corporate organisations. It would help them to focus on more on core business responsibilities. Consultancies and agencies are also vast inexperience as a result of their dealings with so many diverse clients in different industries and understand different audiences and how to maximise reach (Igbinoba and Olukunmi, 2014; Olabanjo *et al*., 2019). Respondents also suggest that PR handlers of local automobile assemblers should take on the production of motoring documentaries and shows with placement both on traditional media (Suzor, 2016).

Conclusion

This study established that though most Nigerians are aware of the made-in-Nigeria automobile industry, most are not in tune with the information and public relations actions of the industry. However, a lot still needs to be done in order to bring about acceptance of made-in-Nigeria automobiles. The study also establishes that increased tariffs on imported new and used vehicles call public relations practitioners in the industry to action.

It is, therefore, obligatory to encourage policymakers to exercise political will in providing a conducive environment, thereby consolidating the automobile industry. On this note, the indigenous automobile industry must not only start paying more attention to good and professional public relations but also partner with the government continually in order to achieve tremendous support. However, beyond government policy and political will, the private industry is expected to change the narrative by utilising the media to brand the indigenous automobile industry in order to bring about acceptance and joint public advocacy for full indigenisation of the automobile industry.

Recommendations

In relations to the review of the literature and the results of this study, the following recommendations will be of immense benefit.

1. Nigerian automobile manufacturers should outsource most of their public relations planning, research and activities to public relations agencies and consultancies in order to exploit their vast experience and understanding of different audiences and how to reach them as a result of their dealings with so many diverse clients in different industries.

2. It would be beneficial local automakers to initiate engaging PR organisation of motoring documentaries and shows such as Amazon Prime's 'The Grand Tour' or the British Broadcasting Corporation's 'Top Gear'. Electronic public relations on social media would help to engage better and create online followership, debate and bring about advocacy for locally assembled vehicles.

3. It is beneficial that the government does not relent in the implementation and enforcement of protective policies to enable the attraction of investors and the overall growth of the indigenous automobile industry. Alongside, the National Automotive Council (NAC) and National Automotive Design and Development Council (NADDC) should continue
4. PR advocacy to reach government and other essential stakeholders.

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Piracy in Beauty and Cosmetics Industry and the Application of Public Relations Tools in Nigeria

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Abstract

This study examines the application of public relations in the beauty and cosmetics industry and how usable it is to curb piracy. Cultivation theory forms the fundamental basis of the study. The purposive sampling method is adopted using the survey design. Thus, a questionnaire is used to gather respondents' opinion; and the data gathered is processed with the Scientific Package for the Social Sciences (SPSS). Key findings show that product launch and makeup are the top public relations activities of beauty and cosmetics companies with which the public is cognizant. Billboards, Instagram and Twitter, are the predominant media of public awareness of public relations activities of the beauty and cosmetics industry. Public relations is confirmed as a useful tool in influencing the thoughts of the public and curbing piracy in the beauty and cosmetics industry. Accordingly, the study recommends that the government should establish regulatory bodies to monitor and punish perpetrators of piracy in the beauty and cosmetics industry.

Keywords: Beauty, Cosmetics, Piracy, Public Relations.

Introduction

Counterfeiting and piracy are chronic, widespread, trends that have long puzzled administrators and researchers throughout the world. As noted by the International Chamber of Commerce (ICC), Counterfeit and pirated goods are endangering public health and safety worldwide. It is robbing tax revenues, incomes and legal jobs from states, companies and communities (Nwosu *et al.,* 2019). Other comments are in Olabanjo *et al* (2019). The adverse effects of counterfeiting and piracy could sap US$ 4.2 trillion from the world economy and threaten 5.4 million legal jobs by 2022(Bascap, 2019). The ease of copying and sharing electronic data over the Internet has contributed to an outbreak of piracy. As a result, counterfeiting and piracy have drawn tremendous interest from academics, thus causing great fear for managers (Bush *et al.* 1989; Yang *et al.* 2004; Berman, 2008; Wilcock & Boys 2014; Cesareo, 2016).

Counterfeiting and piracy have long been an enticing target market for organized criminals, with particular focus on lucrative fields such as consumer goods, clothing, pharmaceuticals, digital media, and luxury items such as handbags and perfumes. Over the past two decades, however, the illegal practice of counterfeiting and piracy has expanded to cover nearly every commodity market, including fake food and beverages, books, electrical appliances, additives, mobile phone batteries, spare parts and toys (Adelua *et al.,* 2020a; Adelua *et al.,* 2020b; James *et al.*, 2020d; Nwosu *et al.,* 2019; Adelua *et al.,* 2020c; Adelua *et al.,* 2020d; Aiyende *et al.*, 2020a). The worth of this underground economy has erupted Commensurately (Bascap, 2013). This illegal practice has also penetrated the beauty and cosmetics industry. Moreover, it is causing an incessant loss and danger to the industry and the consumers. It affects the profit of the businesses and the health of the consumers. Counterfeit goods are rapidly entering the supply chain and placing producers at risk. The prevalence of counterfeits is a concern for almost any commodity, organization, supply chain, government and industry; and the problem is aggravating. (Basu, Basu & Lee, 2015). Potential investment in research and technology is

at stake because of the unfair competition arising from counterfeits (Maldonado & Hume, 2005; Olabanjo *et al.,* 2019).

From the above premises, one can understand that counterfeit is an impediment to the growth of the beauty and cosmetics industry and application of public relations is an indispensable and inevitable part of the industry. Hence, public relations in this aspect becomes very important. The current research makes an industrious attempt to examine the efficacy of public relations tools in curtailing the menace of piracy in the beauty and cosmetics industry in Nigeria.

Image quality exposes many factors which influence public awareness and perception of corporate organizations. Negative image, for instance, is poor image quality (Aiyende *et al.*, 2020b; Fayemi *et al.,* 2020a; Fayemi *et al.,* 2020b; Fayemi *et al.,* 2020c; Fayemi *et al.,* 2020d; Olabanjo *et al.,* 2020b; Omokiti *et al.,* 2020a). Proper image management through positive public relations actions helps to control public perception of organizations.

Statement of The Problem

The beauty and cosmetics industry has grown but still faced with many challenges. One of the significant challenges faced by the industry is the problem of piracy, and it has posed many threats to the continuous growth of the industry. This problem has affected both the industry and their publics. Piracy damages the free market economy significantly, and it also damages intellectual property rights such as trademark laws, copyrights, patents. It takes businesses many years to move from the introduction stage to the maturity stage.

Moreover, after efforts of the company's employees, a firm builds a brand. However, counterfeits destroy their achievements by creating a negative image of a company. The major problem which the research seeks to address is piracy. The importance of public relations cannot be underrated as it poses to be an essential tool in curtailing the impending threat of piracy in the industry. Hence, the survey will examine the effectiveness of public relations in addressing the threats. It will also provide solutions to the identified problems.

Research Objectives

1. To examine the PR tools and objectives used by the selected beauty and cosmetics companies in Nigeria.
2. To investigate public awareness and perception of the PR practices in the selected beauty and cosmetics companies as well as the industry in Nigeria.
3. To determine the effectiveness of PR activities in curtailing the menace of piracy in the selected beauty and cosmetics industry in Nigeria.
4. To recommend solutions to maintain and enhance PR and its positive effect on the beauty and cosmetics industry in Nigeria.

Theoretical Framework

The cultivation theory forms the fundamental basis for this study. Cultivation theory was proposed by George Gerbner, who tried to determine the influence of media advocacy on viewers' understanding of the environment they live in (Littlejohn, 2002). Gerbner realized that the dominance of television created a standard view of the world and made all cultures to have conventional thinking (Ndonye, 2014). Cultivation theory contends that persuasive content over time imbues symbols, messages, images and meanings that dominate and eventually absorbed as truth. Also, public relations practitioners must keep their message consistent and persistent until the target audiences achieve behavioural change.

Beauty and Cosmetics: An Overview

Since ages the term "cosmetics" has been known to the human race; it is human nature to desire beauty. At the same time, the need to appear practical and desirable for each person may also be a psychological requirement despite the top position for ages in hierarchy. Nevertheless, knowing the precise meaning of the term "cosmetic" at the beginning would be important from multiple sources.

Cosmetics are products to be rubbed, painted, powdered, sprayed, added or otherwise applied to some portion of the human body in order to convey attractiveness. They are meant to scrub, cover, embellish, encourage appeal or change appearance (Ali, 2018; Odiboh, Ezenagu, & Okuobeya, 2019). Cosmetics are substances used to improve or protect human body appearance (Manikandan & Ramshida, 2014). European Regulation 93/35/EEC describes cosmetic products as any material or treatment meant to be placed in contact with the different external sections of the human body (Aziz, Taher, Muda & Aziz, 2017). These definitions are quite comparable in that they all classify cosmetics as products that enhance appearance but have no therapeutic advantages in contrast to drugs.

The fast rise in online makeup purchases can be convincing. In 2010, internet sales were worth more than 11 billion US Dollars. As technologies develop, the cosmetics industry is also seeking to take advantage of the new developments and to engage more effectively with customers. Organic beauty products are becoming ever more visible on the global market (Odiboh *et al.*, 2020a; Odiboh *et al.,* 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019). Other comments are in Odiboh and Oladunjoye, (2019). They arose from a niche that a small number of companies had previously occupied and integrated into the mainstream market. Such goods meet regular outlets, such as department stores and supermarkets (Lennard, 2011).

As pointed out by Lennard, (2010), Lopaciuk and Lobodo, (2013), Colour cosmetics (makeup) are the world's third-largest beauty market, measured by sales. Their share remains steady at 12-13% and is aligned with the competitive growth of the market. This segment is fueled mostly by developments to which it managed to achieve market growth of 8% in 2008, even in the competitive and developed industry of Western Europe. It may also be that this traditional market is the only position where the lipstick hypothesis can be affirmed - even a 3% growth was reported in the recession year of 2009. The cosmetics industry further boosts sales by introducing items that meet the needs and preferences of diverse people with specific ethnic backgrounds, skin and hair types, and genetic features (James *et al.,* 2020a).

Sub-Saharan Africa, dubbed as the next business hot-spot, is witnessing the world's second-fastest economic growth. As a result, there are about 821 million customers in the African economy scrambling to purchase a wide variety of cosmetics and beauty products. Because of its high birth rates and rising middle class, Africa could be the next significant growth region. The market leaders – South Africa and Nigeria – will be followed by five key frontier markets: Kenya, Ethiopia, Tanzania, Ghana and Cameroon (Beauty Africa, 2016).

Counterfeit or Piracy in The Beauty and Cosmetics Industry: The Big Issue

With counterfeiting the beauty and cosmetics industry has evolved hand in hand. Cosmetics counterfeiting represents a loss in income for the owners of the counterfeit products, and therefore decreased their share of investments. This includes job losses, opportunities for illicit jobs and a rise in emissions, not to mention the serious damage to public wellbeing (Economic Development Ministry, Rome). Counterfeiting is an act of making a product by copying or imitating an actual product's physical appearance in attempt to mislead consumers that it is the product of another Group. Items that violate patents, violations of copyright and advertising, naming and brand laws are accused of counterfeiting (Tommy, 2012; Nwosu *et al.,* 2019).

Counterfeit products range from twisted brand names, look-alikes and unconvincing imitations (Harvey, 1987). Thus, counterfeiting can be either deceptive or non-deceptive based on the quality of the replica (Grossman & Shapiro 1988; Nwosu *et al.,* 2019). In the former, when the products sold are falsified, the falsified deceives the buyer, and in the latter, and the deception spreads to customers who

intend to make a transaction. Consumers willingly choose the false alternative and become the counterfeiters' accomplices (Cesareo, 2016). The issue of piracy is an intellectual property crime that is infiltrating the beauty and cosmetics industry in Nigeria. A transitional approach is needed to address the transitional problem of intellectual property crime, locally and internationally.

Public Relations As A Tool For Limiting The Problem Of Piracy

Public relations is the practice that looks after the image of the organization and seeks to gain understanding and respect and control sentiment and action (James *et al.,* 2020a; Ndubueze *et al.,* 2019; James *et al.,* 2020b; James *et al.*, 2020c; Ndubueze *et al.,* 2020; Nejo *et al.,* 2020; Olabanjo *et al.,* 2019). Many scholars have a public relations understanding and are often in agreement about what it is. In all, it's a discipline that deals with an organization's interaction with its publics. That is, what the organization is communicating to its public and what they are reacting to or responding to it (Odiboh & Ajayi, 2019). Because it creates a better perspective and transforms negative perceptions to beneficial (Samson, 2018). Grunig and Repper (1992) emphasize that, in order for public relations to be valued and used efficiently by senior managers, it must work carefully. It must deliver real value to the organization and help it attain its corporate objectives (Nwosu *et al.*, 2020a; Nejo *et al.,* 2020b; Olabanjo *et al.,* 2020a; Omokiti *et al.,* 2020b; Salau *et al.,* 2020a; Salau *et al.,* 2020b; Nwosu *et al.,* 2020b). Public relations is a veritable tool in building an organizational image. Its application in the beauty and cosmetics industry will address the issue of piracy.

Research Design and Methodology

This research applied the survey method of data collection. A survey is the compilation of information from a number of people through responses to questions (Check & Schutt; 2012, Olabanjo *et al.,* 2019). This type of research method allows the use of various methods for recruiting participants, collecting data and using the different information methods. Survey research may either be quantitative (using numerically graded questionnaires), qualitative (using open-ended questions) study approaches, or using both techniques. The questionnaire is the type of data collection instruments used in the survey method.

The questionnaire was drawn from the research questions to deduce from the respondents their awareness and perception of the public relations activities of the beauty and cosmetics industry. The survey instrument provided both open and close-ended questions about how piracy in the industry can be combated with public relations. The researcher self-administered the questionnaires to the population size through the application of the google form. The researcher used the google form because that is the easiest way of getting across to our study subjects.

Sampling

This study was conducted among 200 randomly selected people through purposive sampling. The study subjects included career women, distributors, makeup artists, and personal makeup shoppers. Also, the top five beauty and cosmetics industry in Nigeria qualified for proper study. They included House of Tara, Zaron cosmetics, BM Pro, Kuddy Cosmetics and Lise Beauty.

Results

The data were analysed and presented in tables through frequencies and percentages. The tables show how exposed the publics are to the public relations activities of the beauty and cosmetics industry. And their level of awareness of these public relations activities, opinion about piracy in the beauty and cosmetics industry. Also, what they suggest to curtail the threats piracy has on the industry.

Table 1: Respondents shopping for cosmetics

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Very often	104	52.3	52.3	52.3
	Often	76	38.2	38.2	90.5
	Rarely	19	9.5	9.5	100.0
	Total	199	100.0	100.0	

Out of 199 respondents, 104, which represents 52.3% of the respondents said they shop for beauty and cosmetics very often, 76, which represents 38.2% of the respondents affirmed that they often shop. In contrast, 19, which represents 9.5%, affirmed that they rarely shop for beauty and cosmetics product. The above information illustrates that the respondents shop for beauty and cosmetics at one point or the other, hence, only a few of the respondents affirm to shopping rarely, while none affirmed to never shopping.

Table 2: How often respondents shop

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Monthly	65	32.7	32.7	52.8
	Twice a year	49	24.6	24.6	92.5
	Quarterly	30	15.1	15.1	67.8
	Bi-monthly	27	13.6	13.6	20.1
	Yearly	15	7.5	7.5	100.0
	Weekly	11	5.5	5.5	6.5
	Daily	1	.5	.5	.5
	Bi-weekly	1	.5	.5	1.0
	Total	199	100.0	100.0	

The table shows that majority (32.7%) of the respondents stated that they shop monthly for beauty and cosmetics product. On the other hand, 24.6% of the respondent said they shop for beauty and cosmetics product twice a year. However, 15.1% of the respondents stated that they shop quarterly. In comparison, 13.6% affirm that they shop bi-monthly.

Table 3: Awareness of the beauty and cosmetics industry in Nigeria

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	195	98.0	98.0	98.0
	No	3	1.5	1.5	99.5
	Not sure	1	.5	.5	100.0
	Total	199	100.0	100.0	

As noted in this table, 195 which represents 98.0% of the respondents are aware of Nigeria's beauty and cosmetics sector, three which represents 1.5% of the respondents are not aware of Nigeria's beauty and cosmetics sector. This result shows that almost all respondents are aware of Nigeria's beauty and cosmetics sector.

Table 4: The beauty and cosmetics industry respondents are familiar with

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	House of Tara	93	46.7	46.7	46.7
	Zaron cosmetics	70	35.2	35.2	81.9
	BM pro	13	6.5	6.5	88.4
	Kuddy cosmetics	12	6.0	6.0	94.5
	Others	11	5.5	5.5	100.0
	Total	199	100.0	100.0	

Table 4 reveals that 46.7% of the respondents agree that they are familiar with the House of Tara as a beauty and cosmetics industry in Nigeria. On the other hand, 35.2% of the respondents are aware of Zaron cosmetics as a beauty and cosmetics industry in Nigeria. In comparison, 6.5% are aware of BM Pro as a beauty and cosmetics industry in Nigeria. From this outcome, it is obvious that the respondents are more aware of House of Tara and Zaron cosmetics as a beauty and cosmetics brand in Nigeria.

Table 5: Awareness of public relations activities

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	180	90.5	90.5	90.5
	No	14	7.0	7.0	97.5
	Not sure	5	2.5	2.5	100.0
	Total	199	100.0	100.0	

Table 10 shows 90.5% of respondents agree that they are aware of the beauty and cosmetics industry's public relations activities of the in Nigeria; 7.0 % responded in the negative. By contrast, 2.5% said they were not certain. Based on this finding it is clear that the respondents are aware of the beauty and cosmetics industry's public relations activities.

Table 6: Respondents familiarity with public relations activities

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Product launch	98	49.2	49.2	96.0
	Makeup fair	74	37.2	37.2	37.2
	Press conferences	19	9.5	9.5	46.7
	Others	8	4.0	4.0	100.0
	Total	199	100.0	100.0	

According to this table, 49.2% of the respondents agreed that they are aware of a product launch as the public relations activity of the beauty and cosmetics industry. Meanwhile, 37.2% of the respondents mentioned that they are aware of makeup fair as the public relations activity of they carry out. Only 9.5% of the respondents mentioned press conferences. In comparison, 4.0% of the respondents mentioned others which means, makeup fair and product launch as the significant public relations activities they know.

Table 7: How respondents became aware

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Billboards	36	18.1	18.1	78.9
	Instagram	35	17.6	17.6	37.7
	Twitter	23	11.6	11.6	49.2
	Seminars	18	9.0	9.0	60.8
	Friends	18	9.0	9.0	95.0
	Relatives	14	7.0	7.0	85.9
	Word of mouth	13	6.5	6.5	16.6
	Newspaper	8	4.0	4.0	10.1
	Facebook	7	3.5	3.5	20.1
	Radio	7	3.5	3.5	6.0
	Press conferences	5	2.5	2.5	51.8
	Television	5	2.5	2.5	2.5
	Others	10	5.0	5.0	100.0
	Total	199	100.0	100.0	

According to this table, 18.1% of the respondents listed billboards as a means by which they became aware of the beauty and cosmetics industry's PR practices On the other hand, 17.6% mentioned Instagram, 112% said through twitter, 9.0% said they became aware through friends, 9.0% also mentioned seminars, 7.0% through relatives, 6.5% mentioned word of mouth. Which means the primary tools through which people become aware is through billboards and Instagram predominantly.

Table 8: Exposure to public relations actions

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	1-3 times a year	86	43.2	43.2	43.2
	4-6 times a year	62	31.2	31.2	74.4
	7-9 times a year	35	17.6	17.6	92.0
	More than ten times a year	16	8.0	8.0	100.0
	Total	199	100.0	100.0	

From this table, 43.2% of the respondents mentioned that they are only exposed to these actions 1-3 times a year. Meanwhile, 31.2% mentioned 4 - 6 times a year; 17.6% mentioned 7 - 9 times a year, while only 8.0% only mentioned that they are exposed to these actions more than ten times a year.

Table 9: How respondents rate the success of public relations activities in fighting piracy in the industry

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Excellent	92	46.2	46.2	46.2
	Above average	75	37.7	37.7	83.9
	Average	18	9.0	9.0	93.0
	Below average	8	4.0	4.0	97.0
	Very poor	6	3.0	3.0	100.0
	Total	199	100.0	100.0	

This table shows how the respondents rate the success of public relations in fighting piracy. 46.2% stated that the activities are excellent; 37.7 % stated that it is above average, 9.0% stated that it is average. In comparison, 4.0% and 3.0% respectively, stated that it is inadequate.

Table 10: To know if quality public relations activations change respondents perception about the beauty and cosmetics industry

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	163	81.9	81.9	81.9
	No	24	12.1	12.1	94.0
	Not sure	12	6.0	6.0	100.0
	Total	199	100.0	100.0	

Table 10 indicates that 81.9 % of respondents believe that high-quality public relations efforts have improved their view of the beauty and cosmetics industries; 12.1 % responded negative. By comparison, 6.0 % said they were not certain. From this result it is clear that the beauty and cosmetics industry's public relations efforts go a long way towards improving consumer image.

Table 11: Respondents satisfaction with the activities carried out by the beauty and cosmetics industry

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	141	70.9	70.9	70.9
	No	44	22.1	22.1	93.0
	Not sure	14	7.0	7.0	100.0
	Total	199	100.0	100.0	

As shown in the table, 70.9% answered in the affirmative that they were satisfied with the beauty and cosmetics industry's public relations activities, 22.1% answered in the negative. In comparison, 7.0% stated that they are not sure if they are satisfied or not.

Table 12: Whether the respondents want improvement in the delivery of public relations activities

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	108	54.3	54.3	54.3
	No	80	40.2	40.2	94.5
	Not sure	11	5.5	5.5	100.0
	Total	199	100.0	100.0	

According to table 12, 54.3% agreed that they would want the beauty and cosmetics to improve in the deliveries of their activities, 40.2% said no. In comparison, 5.5% of the respondents said they are not sure.

Table 13: Respondents area of improvement in the delivery of the public relations actions

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	publicity/adverts	23	11.6	11.6	39.2
	use of social media	18	9.0	9.0	20.1
	use of traditional media	15	7.5	7.5	27.6
	use fliers	14	7.0	7.0	7.0
	invest in PR	12	6.0	6.0	95.0
	Every area	10	5.0	5.0	100.0
	use bloggers/influencers	8	4.0	4.0	46.7
	promotional sales	8	4.0	4.0	11.1
	Use of registered suppliers/distributors	7	3.5	3.5	42.7
	not sure/nil	84	42.2	42.2	88.9
	Total	199	100.0	100.0	

The respondents listed some of the areas they would want the beauty and cosmetics industry to improve in the deliveries of their public relations activities.42.2% mentioned that they are not sure. However, 11.6% mentioned publicity/adverts; 9.0% mentioned social media, 7.5% traditional media, 7.0% mentioned the use of fliers, 6.0 mentioned that they should invest in more public relations.

Table 14: How respondents identify fake beauty and cosmetics products.

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Packaging	56	28.1	28.1	28.1
	quality of the content	35	17.6	17.6	100.0
	relatively cheap	25	12.6	12.6	49.7
	ease of access	18	9.0	9.0	37.2
	black marketing	14	7.0	7.0	64.3
	does not last on the skin	12	6.0	6.0	57.3
	sometimes difficult to identify	6	3.0	3.0	67.3
	gives skin reaction	3	1.5	1.5	51.3
	not sure/nil	30	15.1	15.1	82.4
	Total	199	100.0	100.0	

This table shows how the respondents can identify fake beauty and cosmetics companies. A majority, 28.1% said through the packaging. However, 17.6% said through the quality of the content., 15.1% are not sure, 12.6% mentioned price, 9.0% ease of access, 7.0% mentioned black marketeering, 6.0% indicated that it doesn't last on screen, 3.0% said sometimes it is difficult to identify while only 1.5 said it gives skin reaction. This table shows that the principal way through which the respondents identify counterfeits products is through the packaging.

Table 15: Measures respondents think can be taken to curtail the threats

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	re-branding	32	16.1	16.1	34.2
	create awareness/customer sensitization	30	15.1	15.1	74.9
	authentication code	28	14.1	14.1	18.1
	government intervention	27	13.6	13.6	47.7
	regulatory bodies formulation	24	12.1	12.1	59.8
	refer customers to their website	17	8.5	8.5	88.9
	punish offenders	11	5.5	5.5	80.4
	trademarking	8	4.0	4.0	4.0
	not sure/nil	22	11.1	11.1	100.0
	Total	199	100.0	100.0	

These tables show us the measures which the respondents suggested in curtailing the threats of piracy in the beauty and cosmetics industry. A majority (16.1%) of the respondents suggested re-branding; 15.1% mentioned that companies should create awareness and sensitize consumers, and 14.1% suggested the use of authentication code. Meanwhile, 13.6% suggested government intervention. Furthermore, 12.1% suggested regulatory bodies; 11.1% said they are not sure, or they do not know; 8.5% said to refer customers to their official website. Lastly, 5.5% said to punish offenders, while 4.0% suggested trademarking. The use of the authentication code remains the leading measures suggested by the respondents in curtailing the menace.

Discussion of Findings

The tables above show the findings from the respondents. We will be using the tables above to analyse and answers to the research questions guiding this study. It would show our respondent's awareness of the public relations tools used by the beauty and cosmetics industry. Moreover, the public relations tools of the beauty and cosmetics industry are aware of and their suggestions on ways to reduce the rate of piracy in the beauty and cosmetics industry. The findings from this study will be discussed based on how it has answered the research questions posed for this study.

RESEARCH QUESTION 1: *What are the PR activities of the selected beauty and cosmetics companies in Nigeria?*

This research question attempts to deduce the respondents' awareness of the beauty and cosmetics industry's public relations practices in Nigeria.Based on the survey results, the analysis showed that the respondents are well aware of the beauty and cosmetics industry's public relations practices. Findings in this regard are available in table 5. The public relations activities that the respondents are cognizant of include; product launch, which was identified by the majority and makeup fair. See findings in this regard can be found in table 6. Deduced from this is the fact that the respondents are fully aware of these public relations activities, and they can identify these activities.

RESEARCH QUESTION 2: *What are the PR tools and objectives used by the selected beauty and cosmetics companies in Nigeria?*

This research question tries to identify the public relations tools through which the respondents became aware of the public relations activities of the beauty and cosmetics industry in Nigeria. From the data generated from in table 7, essential tools through which the respondents became primarily aware of the PR activities are traditional billboards and social media Instagram.

Means that the primary tools through which respondents get awareness are through billboards, followed by Instagram and Twitter. Two of these tools are social media which means social media is a vital tool in creating awareness and also the use of the billboards is vital.

RESEARCH QUESTION 3: *What are the public awareness and perception of the PR practices in the beauty and cosmetics companies in Nigeria?*

Tables 10 and 11, respectively, shows how the respondents perception of the PR practices of the beauty and cosmetics industry in Nigeria. From the outcome of Table 10, it is clear that the beauty and cosmetics industry's public relations efforts go a long way towards shifting consumer attitudes. Also, as shown in table 11, 70.9% answered in the affirmative that they were satisfied with the beauty and cosmetics industry's public relations activities, 22.1% answered in the negative. In comparison, 7.0% stated that they are not sure whether or not they were happy.

This result denotes that the PR activities of the beauty and cosmetics industry are effective in influencing the thoughts of the public. If PR does not warn and affect public actions and decisions, then the primary goal of establishing a mutual relationship has failed to be achieved.

RESEARCH QUESTION 4: *Are PR activities effective in curtailing the menace of piracy in the beauty and cosmetics industry in Nigeria?*

Based on the data generated from the survey in tables 8 and 9, the table shows how the respondents rate the success of public relations in fighting piracy. 46.2% stated that the activities are excellent; 37.7 % stated that it is above average, 9.0% stated that it is average. In comparison, 4.0% and 3.0% respectively, stated that it is inadequate. Means that the respondents see public relations tools as a useful tool in fighting piracy; hence, the importance of public relations in fighting piracy is essential. Therefore, public relations tools are necessary for the war against piracy in the beauty and cosmetics industry, and the result will help in building a favourable image of the industry.

RESEARCH QUESTION 5: *What to do to maintain and enhance PR and its positive effect on the industry?*

Based on the data from the survey, in tables 13 and 15, respectively, the respondents gave insights into the areas of improvement in the beauty and cosmetics industry in Nigeria. That is the area of improving the delivery of their activities. The tables, as mentioned earlier, show the suggested areas of improvement. Hence, the primary area mentioned by the respondents is the use of publicity/adverts and the use of social media. Also, the use of authentication code and government intervention are significant measures in order to win the battle against piracy. Also, it is a need for customer sensitizations about how to tackle piracy in the industry.

Conclusion

This study informs that PR is essential and necessary in creating awareness for the beauty and cosmetics industry in Nigeria and also a veritable tool in fighting piracy in the industry. When we talk about building a strong relationship between an industry and a brand, public relations takes the upper hand. So the importance of public relations in the beauty and cosmetics industry can never be overemphasized. Thus, in order to curtail piracy in the beauty and cosmetics industry, the use of public relations tools must the order of the day in the beauty and cosmetics industry. Companies and organizations need to know that they need to make use of public relations always.

Recommendations

The following recommendations are sufficient, based on the aims, findings and conclusion of this study:

1. The beauty and cosmetics industry needs to avail itself the social media for public engagement and interaction. It will bring them closer to their consumers. That way, they can begin to

sensitize them about the side effect of using a fake product on their skin and the side effect on their health in general.

2. The government need to enact regulatory bodies that will watch the activities of the beauty and cosmetics industry and fight the issue of piracy. Through these bodies, the government can always do market raids and destroy any shop that sells counterfeits products.
3. Companies need to undergo a severe rebranding and make sure they do a constant rebranding of their product. They also need to trademark their brand; that way, it will be easier to punish perpetrators.

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Public Relations in Secondary Schools:

A Case Study of Private and Public Secondary Schools in Ota, Nigeria

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Abstract

United Nations' Sustainable Development Goal four is about quality education. This goal is significant partly because of the humongous numbers of stakeholders and investors in secondary school education all over the world. In Nigeria, there are half a million public and private secondary schools catering to the instructional needs and future careers of 42 million pupils. Parents and guardians, educational agencies and tertiary institutions, among several other groups are interested in the image and reputation of secondary schools. Public relations provides the best communication platform for projecting and affirming the image and reputation of any secondary school that offers quality education. The study aims to investigate the public awareness/perceptions of public relations actions of selected public and private secondary schools in Ota, Ogun State, Southwest Nigeria. Built on a theoretical framework of Grunig's Two-way Symmetrical public relations model, stratified sampling of two hundred and fifty (250) respondents is applied using the questionnaire instrument. Findings indicate that the public relations activities of secondary schools are known majorly through the word-of-mouth channel of communication and during Parents-Teachers' Associations meetings. The study recommends the creation of public relations departments /or engagement of professional PR consultants in order to connect positively with parents and guardians, teachers and several other relevant stakeholders and investors in secondary schools in Nigeria.

Keywords: Public Relations, Secondary Schools, Private, Public, Teachers, Parents and Guardians

Introduction

As described by Galloway, (2018); Hong, (2014), Public relations actions involve the process of transparency in communication which maintains an honest, meaningful, long-term working relationships with an identified publics of an organization. It is an act of communicating mutual assurances and benefits between an organization and its publics (Nwosu *et al.*, 2020a; Nejo *et al.,* 2020b; Olabanjo *et al.,* 2020a; Omokiti *et al.,* 2020b; Salau *et al.,* 2020a; Salau *et al.,* 2020b; Nwosu

et al., 2020b). Public relations moulds an organization's image, portraying it in a positive light to their target groups of people (James *et al.,* 2019). Excellent public relations stand on thoughtful, truthful, open, strategic, and symmetrical communication of an organisation's real state of affairs (Aiyende *et al.*, 2020b; Fayemi *et al.,* 2020a; Fayemi *et al.,* 2020b; Fayemi *et al.,* 2020c; Fayemi *et al.,* 2020d; Olabanjo *et al.,* 2020b; Omokiti *et al.,* 2020a). As opined by Adelua *et al.,* (2020a, 2020b) and Fayemi (2020), everyone's actions (words, impressions, views) about schools, helps to create the images that forge the relationships which end up building the reputation of such schools. Communication helps schools welcome outsiders in meaningful ways; it accommodates the diverse communication needs communities have and ensures that they build a relationship between the public and themselves in order to overcome mistrust and negative perception.

Significant public relations actions include public enlightenment and empowerment programmes (James *et al.,* 2020a; Ndubueze *et al.,* 2019; James *et al.,* 2020b; James *et al.*, 2020c; Ndubueze *et al.,* 2020; Nejo *et al.,* 2020a; Olabanjo *et al.,* 2019). Also, typical and tangible tools of public relations media such as brochures, newsletters, websites and others help in disseminating critical institutional information. However, successful communication involves both listening and talking, teaching and learning and giving and receiving between schools and communities. (Shircliffe, Dorn & Cobb-Roberts, 2006). In secondary schools, the target publics are parents and guardians, guardians, government, communities, pupils, operators of tertiary institutions, employees, employers, governing boards and old students' associations. Carrying all these along all the time could be arduous yet profitable for secondary schools (Galloway & Swiatek, 2018).

Statement of the Problem

Public Relations entails deliberate actions which actively deal with image building and establishing mutual relations with publics. However, secondary schools need to consistently and adequately communicate effectively to their publics. Engagement of schools' PR activities will help them to gain the trust and goodwill of their publics; this could also enable publics to support and get involved in public relations actions actively. Rick (2018) opined that though school district leaders often overlook PR, it is important to understand that it serves as an incredibly role in the positioning of the school in the community.

Parents and guardians expect their children's schools to be safe and secure while providing quality education. These expectations are not only from parents and guardians but also the public. Lacuna occurs with unprofessional communication of these expectations between the public and the schools. Secondary schools which are meeting these expectations but not able to organize public relations actions to communicate their achievements, unknowingly create room for public misunderstanding. Schools which are unable to meet the expectations but lack public relations actions to communicate it are even worse. It is one thing to execute public relations actions; it is another matter if the public is involved and value the actions. The study is to investigate the public awareness/perceptions of public relations actions of selected public and private secondary schools in Ota, Ogun State,

Southwest Nigeria to determine whether such programmes exist to the best of their knowledge. From these perspectives, this study seeks the opinions of parents and guardians and teachers, because they are critical operational stakeholders in secondary school education anywhere in the world.

Research Objectives and Questions

This study examines the public relations actions of private and public secondary schools in Ota, Southwest Nigeria**.** Also, the study seeks to discover the level of public awareness and public relations activities of schools in the selected scope. This would investigate the public's perceptions of these selected schools to highlight areas for improvement. Based on these objectives, this study answers the following questions:

1. What are public relations practices in selected private and public secondary schools in Ota, Nigeria?
2. What are the sources and level of public awareness of the public relations practices of private and public secondary schools in Ota, Nigeria?
3. What is the public perception of secondary schools' public relations tools used to communicate with target stakeholders?
4. What can secondary schools do better to handle their public image through appropriate public relations actions?

Literature Review

Public relations do not operate in a vacuum but with the support of stakeholders (Nwosu *et al.,* 2019). It involves an intentional, consistent communication plus active attention toward audiences in such a way that establishes, nurtures a positive, mutually beneficial relationships (Handley 2011). Public relations monitors, surveys and researches issues and happenings in the environment for the promotion of organizations in public minds (James *et al*., 2020a, 2020b). John (2007) argues that in order to establish mutually beneficial relationships with the public, it is essential to provide them with opportunities to give feedback and engage them in two-way conversations that establish connections. Well-structured public relations activities in a secondary school setting basically rely on listening as well as communicating. It helps to allay the fears and concerns of customers. In marketing communication which houses public relations, the customers have options for every service imaginable because of this, they are considered Kings; including school's customer service which is no exception (Odiboh & Ajayi 2019, Odiboh 2020a).

Parents/Guardians when faced with decisions about the choices of schools for their kids; they ask friends, family, look at schools' websites for reviews and recommendations. Public relations gives organization the opportunities to put the public's interest first, this way, common misconception are avoided such as; PR in the secondary school setting is structured to handles crisis (Adelua *et al*., 2020a; James *et al*., 2020d; Nwosu *et al.,* 2019; Aiyende *et al.,* 2020a) However, if schools make the efforts of building trust and respect with publics when times are good, they are going to create room for the benefit of the doubt when a crisis hits. The school will have established habits of consistency

and transparency that is key in dealing with crises. Public relations for schools is just as important, if not more important when there is good news to share (Brooks, 2016).

The Role of Public Relations in Secondary Schools

Public relations serve an educational and rhetorical role by providing the media with suitable materials, packaged in a form that facilitates media consumption. The symbiotic relationship with the media is crucial and of great communicative significance. Useful P.R information is the bedrock of every growing organization today because such information can affect the existence of an organization. PR activities can be carried out through the media which helps to position the organisation as an information source on issues relevant to its operations. Today, society has moved into an age in which one cannot control all of the messages about an organization, especially schools. If organizations do not provide positive messages and a strong impression, they would be vulnerable to crisis. It can be said to be negligent if an organization fails to recognise the need for PR (Ball, 2006). According to …. Experts in the field believe commitment or the lack of it on the part of senior management and their willingness to devote time and resources to the internal communication function will determine their organisation's success. L'Etang (2004) corroborated this when he posited that P.R practices present to the public the real image of an organisation and the articulation of its aims and objectives.

Smith (2007) suggests that public relations are all about recognising performances, being kind, and then letting people know about the organization goodwill. His position also dismisses any impression that PR is a device to mask organisational shortcomings. Effective PR depends on the worth of an organisation or individual. Thus, the role of PR practitioners is to increasingly work out the success of the organisations to develop more honest and transparent policies which will be easily able to promote; This will enable them reach larger publics of the organization with whom they must communicate effectively, and emphasis the necessity of an open, transparent and positive image, however, schools have been slow to appreciate the benefits of developing a PR strategy (Clark, 2013). Furthermore, a well planned P.R gives an organisation the possibility of being proactive to respond to situations with a more coherent message(s). P.R roles also encourage building positive public perception which is an everyday process that involves the entire working comprehensive plan of the school.

Why Public Relations in Secondary School?

McClellan and Gann (2002) highlighted some of the changes in attitude and pressure on schools to be publicly accountable for their policies; McClellan and Gann (2002) pointed to technological advances of free information which has impacts on organisations such as schools. Schools and media organisations need each other to afford them with a symbiotic relationship; this can be achieved through the help of P.R engagement in secondary schools. According to …. Doing nothing leads to negative misconceptions, difficulty in recruiting staff and lack of motivations among both staff and pupils which can also deter guardians from sending their children to that school. As opines by Gilheany, (2006) "A good reputation raises expectations about the organisation's success, and the

organisation's success will enhance its reputation". Also, organizations cannot buy or bribe their way to a good reputation, or advertise for it; except through relationships with publics (Gregory, 2010). Public relation enhances the reputation of secondary schools which is critical in developing the public perception of the schools; more so, image, identity and reputation are closely linked. Identity contributes to the image and both conditions the reputation, however, schools with strong track records in these areas have a head start in projecting a favourable image, and even schools with 'unfavourable' characteristics can improve their image through a targeted campaign (Odiboh, Ezenagu, & Okuobeya 2019, Odiboh, 2020b).

Image Branding in Public Relations

According to Olabanjo, *et al*. (2019, 2020b), brand images should be positive and unique, because consumers are not only purchasing the product or service but also the image associated with that product or service built over time with the function of public relations. Danesi (2006) opines that branding is ultimately a social act, it is the product, service or company inserting it as an element of the web of meanings that constitute a culture (Odiboh *et al.*, 2020a; Odiboh *et al.,* 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019). It is equivalent to the process of bringing human beings into the social order by giving them a name. Moorhead (2011) adds that appropriate branding in schools; it boosts confidence makes a school unique to the people outside it. These heightening of awareness over the importance of a school's image co down to several factors. However, one competition for students' enrolment in overlapping catchment areas can affect school's finances. Secondly, the need to disallow negative reputation, which could further damage the schools' chances of attracting potential students.

One of the most significant concerns for PR practitioners in the management of the organizational image is what the public thinks about the institution. Based on this image, the public settles on their choices, when they have information to clarify. Existing public relations culture of connection influences public altruism or hesitation towards an organization. Image attracts or repulses, connecting or disconnecting depending on how an organization transacts with it in the open (Adelua *et al.,* 2020a; Adelua *et al.,* 2020b; James *et al.*, 2020d; Nwosu *et al.,* 2019; Adelua *et al.,* 2020c; Adelua *et al.,* 2020d; Aiyende *et al.*, 2020a).

Theoretical Framework

The Two-Way Symmetrical model of public relations developed by James Grunig in 1984 gives backing to this study. With regards to the historical development of public relations practice in the United States of America, Grunig and Hunt (1984) proposed the model, among others, to encompass all models and theories in public relations. The P.R model describes the role and function of modern-day public relations, as it aims to achieve mutual understanding between an organisation and its publics. In this model, public relations practitioners use research and information interchange to bring about mutually beneficial changes for both an organisation and publics. Negotiation, accord

and conflict resolution are some of the strategies used to obtain understanding and change behaviours of both the public and organisations such as secondary schools. Grunig and Grunig (2002) opined that the two-way symmetrical model is the most effective as well as the most ethical framework for public relations. It tells a lot about the need for the two-way symmetrical public relations strategies in the secondary schools in Nigeria to possibly reduce the level of unfriendly relationships between the political class and members of the society.

Research Design and Methodology

A quantitative methodology with a survey design applies in this study. Thus, a questionnaire was the instrument used to collect data processed with the Scientific Package for the Social Sciences (SPSS) software. Olufemi (2012) posited that "a questionnaire gives a good opportunity for the researcher to collect raw data, especially if the questions are well worded and the questionnaire well administered" (pg.46). Two hundred and fifty respondents received copies of the questionnaire. The respondents were selected using the stratified random sampling procedure. However, only 200 copies returned adequately filled. Stratified random sampling is a technique that involves the distribution of a population into smaller groups or strata. For the selection of the representative sample. This sampling technique is utilised based on members' shared attributes or characteristics, as Onabanjo (2010) justifies.

Two hundred and fifty teachers and parents and guardians of pupils in four (two private and two public) secondary schools form the strata of participants in equal proportions. The study took place in Ota, a town of mixed industrial and residential areas housing 41 public and private secondary schools. The questionnaire contains two sections (A and B). Section A queries the respondent's awareness and perceptions of secondary schools' public relations activities; while elicits the demographic attributes of the respondents.

Data Presentation and Analysis

Table 1: Awareness of public relations

Option	Per cent
Yes	95.0%
No	4.5%
Missing system	.5%
Total	100.0%

Table 1 illustrates that (95.5%) respondents knows about Public Relations, while (4.5%) respondents does not know about it.

Table 2: Awareness of public relations activities in the selected schools

Option		Per cent
	Yes	62.5%
	No	35.5%
	Missing system	2.0%
Total		100.0%

Table 2 indicates that (63.8%) respondents are aware about public relations activities in the selected secondary schools; while (36.2%) respondents are not aware about public relations activities in the schools.

Table 3: Schools' public relations activities which the respondents know

Option		Per cent
	PTA Meetings	12.5%
	Seminars	7.0%
	Open day events	2.5%
	Cultural day events	2.5%
	Social media platforms	4.5%
	Newsletters	2.0%
	Pamphlets or newspapers	5.5%
	Billboards	2.0%
	12 Others	16.0%
	Missing System	45.5%
Total		100.0%

Table 3 shows the type of PR activities respondents are aware of. 22.9% respondents knows PTA Meetings; 4.6% respondents knows Open day events, 4.6% respondents knows Cultural day events, 12.8% knows Seminars, 8.3% respondents knows Social media platforms, 3.7% respondents know

Newsletters, 10.1% respondents know Pamphlets or Newspapers, 3.7% respondents know Billboards. In comparison, 29.4% respondents stated others.

Table 4: Media through which the respondents become aware of those activities

Option		Per cent
	Word of mouth	29.5 %
	TV	17.0%
	Newspaper	8.5%
	Billboards	7.0%
	Radio	6.5%
	Facebook	4.5%
	Seminars	4.0%
	Press conferences	2.0%
	Twitter	1.0%
	Instagram	.5%
	Friends	.5%
	23 Others	14.0%
	Missing System	5.0%
Total		100.0%

The media through which the respondents became aware of the schools' public relations activities feature in Table 4. The table shows (17.9%) respondents said through TV; (6.8%) respondents said through Radio; (8.9%) respondents said Newspaper; (31.1%) said Word of Mouth; (4.7%) respondents said Facebook; (.5%) respondents said Instagram; (1.1%) respondents said Twitter; (2.1%) said through Press Conferences; (4.2%) respondents became aware through Seminars; (7.4%) respondents said Billboards; (.5%) said through Friends, and (14.7%) respondents said others.

Table 5: Whether PR plays an essential role in the schools' image

Option		Per cent
	Yes	90.5%
	No	3.5%
	Not sure	5.5%
	Missing system	.5%
Total		100.0%

According to Table 5, (91.5%) respondents think that public relations play an essential role in the schools' image, (3.5%) believe it does not; while (5.5%) are not sure if it does.

Table 6: To find out whether the respondents are satisfied with the public relations activities of the schools

Option		Per cent
	Yes	56.0%
	No	43.5%
	Missing System	.5%
Total		100.0%

Table 6 illustrates that (56.3%) respondents are satisfied with the public relations activities in the school, while (43.7%) respondents are not satisfied.

Table 7: The contribution of P.R activities to the respondents' knowledge about the schools' image

Option		Per cent
	Yes	59.0%
	No	22.0%
	Not sure	15.5%
	Missing System	3.5%
Total		100.0%

Table 7 shows that public relations activities have added to what (59.0%) respondents know about the schools and what they stand for. meanwhile, it has not added to what (22.8%) respondents know about the schools. Nevertheless, (16.1%) respondents are not sure if it does.

Table 8: Ways which public relations has added to the respondents' knowledge about the schools.

Option		Per cent
	Gives knowledge about happenings around the school	29.5%
	Gives a better understanding of the student-teacher relationship	5.5%
	It has helped to improve communication and interaction with others	6.0%
	Others	18.0%
	It has not added to my knowledge	.5%
	Missing System	40.5%
Total		100.0%

Table 8 states ways public relations have added to respondents' knowledge of the schools. (49.6%) respondents said it allows them to know happenings around the school; (9.2%) respondents said it allows them to understand the student-teacher relationship better. (10.1%) respondents said it had improved their communication and interaction with others; (30.3%) said others. Meanwhile, (.8%) respondent said it has just added to their knowledge.

Table 9: Whether the respondents get updates on new policies, activities and general information about the schools

Option		Per cent
	Yes	75.0%
	No	23.0%
	Total	98.0%
	Missing System	2.0%
Total		100.0%

From Table 9, (76.5%) respondents claim that the schools update them with new policies, activities and general information about their programmes. However, (23.5%) respondents said that the schools do not update them.

Table 10: Rating the information received through the schools' public relations activities

Option		Per cent
	Average	36.5%
	Above average	26.5%
	Excellent	21.5%
	Below Average	10.0%
	Very Poor	5.0%
	Missing System	.5%
Total		100.0%

According to how respondents rated the frequency of information they get about the school's public relations activities in Table 7, (21.6%) said Excellent, (26.6%) said Above average, (36.7%) said Average, (10.0) said Below Average while (5.0%) said is very poor.

Table 11: Respondents' perception of the schools

Option		Per cent
	Above Average	35.5%
	Average	30.5%
	Excellence	24.5%
	Below Average	5.0%
	Very Poor	5.0%
	Missing System	2.5%
Total		100.0%

Table 11 reveals the perceptions of respondents about the school which (25.0%) responded Excellent; (36.2%) responded Above average; (31.1%) responded Average; (5.1%) responded Below average; and then (2.6%) responded very poor.

Table 12: Areas to improve in the information dissemination and other public relations functions of the schools

Option	Per cent
Creating of or improvement of the public relations office	40.5%
Embarking on PR & Information dissemination programmes	11.0%
Social media	9.0%
Use of a communication book	4.0%
12 Others	17.5%
Missing System	18.0%
Total	100.0%

The following are ways respondents think the schools can improve in Table 12, (11.0%) said they should make use of Social media; (4.9%) said the use of Communication books; (13.4%) said Embarking on PR & Information dissemination. In comparison, (49.4%) respondents said Creation of or improvement of the public relations office, and (21.3%) said other means of improvement.

Summary of Findings

According to the findings of this survey, Table 3 shows that 25 (22.9%) respondents are only familiar with PTA Meetings as PR activities in the school apart from 32 (29.4%) respondents which indicated others and were not specific enough. However, in Table 4, the more significant number of these respondents, which are 59 (31.1%) in number became aware of those activities by Word of Mouth.

According to Table 5, 181 (91.0%) respondents think public relations play an essential role in the school because Table 7 shows that public relations activities have added to what 118 (59.0%) respondents knows about the school and what they stand for. Furthermore, 59 (49.6%) respondents said it allow them to know about happenings around the school in Table 8. Nevertheless, in Table 6, 87 (43.7%) respondents were not still satisfied with P.R activities in the school.

From Table 9, 150 (76.5%) respondents think the school keep up to date with new policies, activities and general information about their programmes, on the other hand, Table 7 indicates that 73 (36.7%) respondents rate the information frequency about the school's activities as being average. While Table 11 reveals that the perceptions of 71 (36.2%) respondents about the school are Above average.

The following are ways respondents think the school can improve in Table 12, 18 (11.0%) respondents suggested Social media, 8 (4.9%) respondents said they use of Communication books, 22 (13.4%) said Embarking on PR & Information dissemination. In comparison, 81 (49.4%) respondents said Creation of or improvement of the public relations office.

Discussions of Finding

RQ1: What are public relations practices in private and public secondary schools in Ota, Nigeria?

The public relations practices in secondary schools include; PTA meetings, cultural day events, social media platforms engagements, seminars, the use of newsletters, the use of Billboards. According to Table 3, respondents are mostly familiar with PTA meetings. The reason is that some are not enlightened enough to know what public relations activities are and how public relations activities are to be carried out. It also means that the secondary schools' Public Relations' practices are majorly limited to Parents-Teachers meetings. Whereas, other practices, mainly social media engagement should be one of the most prioritize since the world is now a global village (Mcluhan, 1992).

RQ2: What public relations tools do private and public secondary schools in Ota, Nigeria use?

The findings in Table 4 identified the tools; Television, Radio, Newspaper, Word of Mouth, Facebook, Instagram, Twitter, Press Conferences, Seminars, Billboards, Friends. However, here, majority of respondents become aware of PR activities or get to know about a school through Word of Mouth; word of mouth can also be in the form of testimonies (speaking the goodwill of the school) and public's satisfaction. All the public relations tools listed above serves a very crucial role in setting the image and building goodwill for the school. Publics do not need to struggle for information about the school if the tools of information dissemination are used adequately.

RQ3: What is the level of public awareness and perception of public relations practices in private and public secondary schools in Ota, Nigeria?

As mentioned previously, some respondents are not enlightened enough to know what public relations activities are and how public relations activities are to be carried out. This assertion does not imply insufficient information about activities but as a result of apathy from field observations and also from submissions of public relations personnel in secondary schools. The ones that are quite familiar with public relations activities thinks public relations play an essential role in the school, and this shows in Table 5. Consequently, in Table 6, specific percentages of these same respondents are not satisfied with the public relations activities in the school. As such, public relations in secondary school need to keep up to date with new policies, activities and general information about their programmes. These updates will help improve the level of awareness and create a healthier mutual relationship with publics.

Conclusion

The research has shown that successful school's PR and communication programs help schools earn the trust of the public, their support and the involvement of the communities. If secondary schools can get their public relations activities right, it would be beneficial to the point of receiving immediate feedback, because it is one took that enhances the development of the school. This way, secondary schools that takes proactively defined P.R approaches benefits great images and reputation. The study also shows that majority respondent's advice that there should be creation and improvement of the public relations office as well as consulting experts in the field that will work directly with the members of the public. The most important stakeholders are parents/guardians of the school's pupils; however, they are the ones whose word of mouth can create most positive benefits for the image and reputation of a school. Improved newsletters and well-designed website can create essential points of contact, therefore, more than anything else, PR is secondary schools can establish a more open and transparent attitude toward targeted publics.

According to National School Public Relations Association (2018), Students do better when guardians (parents) and community gets involved with schools activities. Reliable communication is essential to creating the foundation for effective partnerships with parents/guardians and the community. Schools and educators need to carefully talk and listen as they build the collaborative environment that meaningful engagement needs to work genuinely. Excellent schools need great teachers, dedicated administrators, safe facilities and responsive programs. Nevertheless, all of these components combined can fail to produce successful students and schools if the mix is missing of vital ingredient: the active involvement of parents and guardians and the community. Parents and guardians to have particular expectations for school communication. Furthermore, those demands have been expanding as changing media and greater access to information-on-demand places more pressure on schools to be open, responsive and transparent.

Recommendations

The study recommends the creation and improvement of the public relations office in secondary schools. Establishing public relations departments or consulting experts in the field that will work directly with the members of the public is necessary. This way, getting public relations tools right becomes easy. It would boost relationships with relevant stakeholders, especially the parents and guardians of pupils. Therefore, School(s) needs to do more is building substantial relationships with the public by communicating their healthy activities, facilities and expertise always. Public relations in secondary schools have to do with the messages communicated and the relationships established with publics. More of PR activities in secondary schools will promote school's brand, associate with the community, then, boost marketing efforts. The consistent, deliberate messaging coupled with the end goal of creating and nurturing relationships with the public are keys to school's success. And secondary schools needs to do better job at keeping their publics informed about their daily engagements.

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Image Management Through Public Relations in Nigeria's Food and Beverages Industry

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Abstract

This paper seeks to evaluate the image of the food and beverage industry in the eyes of the public in Nigeria. The intention is to find out how food and beverages customers in the Festac Town, Lagos, Nigeria, perceive the corporate image of the industry. In order to achieve this objective, we adopted a survey research design with the use of a questionnaire as the instrument for data collection. Two hundred buyers of indigenous foods and beverages were randomly selected in four markets surrounding Festac Town. Copies of the questionnaire operated on the respondents provided the data which was processed with the Scientific Package for the Social Sciences. The findings show that the majority of the public have a positive perception of the industry. However, one primary barrier is that the public is not aware of the PR activities of the industry.

Keywords: Public relations, image management, awareness, perception, food and beverage

Introduction

The image of an organization corresponds to the psychological model that its several distinct publics conjecture. It resembles an idea or a description, containing intellectual, emotional and sensorial data. An image emerges through the data that individuals get about the organization, which they first get and then sort out in their 'information bank', in a personal way.

Image management insinuates the moves made to make, keep up, and when essential, package a perfect image as per organizational stakeholders (Willi, Nguyen, Melewar and Dennis, 2014). An organization's image "is a sweeping and clear impression held by an individual or a specific social event towards an organization and is an eventual outcome of sense-production by the get-together and correspondence by the organization" (Hatch and Schultz, 1997, p. 359). Research exhibits that organizations must support a charming image to be successful (Fariaa and Mendes, 2013). Besides, organizations that do not partake in successful image management increase the odds for disappointment (Gilpin, 2010; Seeger, Sellnow, and Ulmer, 1998).

Organizations must manage their image to earn a good reputation. They need to understand that it is their good reputation that boosts brand patronage as well as sustain brand loyalty. Most organizations participate in various advances and systems to ensure that they keep up a positive image, as demanded by their stakeholders. This reality is proof that without a doubt, there is a stable constructive relationship between the way by which individuals see an organization and the intended corporate picture, then there is no brand patronage.

Each organization has its image whether the organization takes care of business or not. This image is reliant on the stakeholders' impressions and public conversations (Odiboh *et al.*, 2020a; Odiboh *et al.,* 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019). An organization's image to an immense degree impacts stakeholder's response to corporate activities. Images are the psychological photos of an organization. It is the entire of these explicit attributes of the enterprise that we suggest as the corporate image.

Oxford Advanced Learner's Dictionary (2000) describes a corporate existent as an organization with a business concern. Formbrun (1996) describes a corporate image as a broad estimation of an organization in the eyes of its friends and foes. As shown by Rayner (2003), the corporate image presents distinct central points and benefits on organizations. It demonstrates that it is hard to impersonate. Meanwhile, it performs its normal duties irrespective. Consequently, organizations proceed with their corporate image through stable and steady relationship with most of their constituents. Examples of such constituents are clients, providers, monetary specialists, arrangers, and government (Formbrun, 1996).

Also, as opined by Villanova, Zinkhan and Hyman (2000), image is a general impression of the organization held by various sections of individuals all in all. It is the mental picture an individual form about an entity. An organizational image is the product of discourse among individual and group stakeholders (Erdem, 2013). Because of the dialogic idea of organizational images, organizations must strategically speak with stakeholders to foster specific images and discourage others. As Garbett (1988) argues, even though the image is real, it is entirely possible as well as desirable to select and promote those characteristics that fit with the strategic plans of the organization. Improvement of a firm's image requires a regular reassessment of the organization in all ramifications of marketing communication (Odiboh & Ajayi, 2019).

Statement of The Problem

The quality of the image of foods and beverages companies is of great value and importance to the industry in any country, worldwide. Nigeria is not an exception. There are regular complaints about the environments, packaging, tastes and communication deceptions about some foods and beverage products. These complaints directly and indirectly touch on the image of the manufacturers and marketers of such products. The argument in public spaces is that only a bad organization will produce and offer the public bad food or poorly beverages. Proper image management through positive public relations actions helps to control such public perception of organizations. An image is "something projected" by the organization, and "something saw or interpreted by others" (Cheney and Vibbert, 1987, p.176; Willi *et al*., 2014). Subsequently, this work takes a look at public mindfulness and impression of selected food and beverage organizations in Nigeria and what their different "publics" think about the industry. It additionally takes a gander at the control instrument connected by organizations in dealing with their image.

Research Objectives

The following are the objectives of this study:

1. To examine the image problems in the food and beverage industry in Nigeria.
2. To determine the PR tools applied to control the image problem of the food and beverages industry.
3. To find out the public understanding of image quality of food and beverage companies in Nigeria.
4. To investigate public awareness of the PR activities of food and beverage companies in Nigeria.
5. To examine the public perception of the food and beverage industry in Nigeria.
6. To find out if the public knows and understand the image control actions of food and beverage companies in Nigeria.

Literature Review

Students of history differ on the first date of public relations (PR) practice. Generally, Americans are known to concoct PR. However, Chinese researchers have called attention to their rulers who practised something akin to contemporary PR, over 5,000 years ago. Although the simple primary practice of PR may have started thousands of years prior, it has been an occupation just for around 100 years within marketing communication umbrella (Odiboh, Ezenagu, & Okuobeya, 2019). It is as of late, in any case, that PR has formed from occupation into a profession in numerous nations. In other words, PR has been something that individuals did to acquire monthly salary.

There was no formal instruction in PR (The International Public Relations Association, 2003). PR is an occupation that has been characterized more by its procedures than by its hypothesis. As indicated by Reddi (2009), most PR practitioners have been the experts of various systems. They have realized

how to ensure media inclusion, prepare press releases, and compose and plan leaflets. They also produce video news syndication, arrange special corporate occasions, or prepare annual general meetings (James *et al.*, 2019). Notwithstanding being an occupation characterized by methods, PR practitioners have likewise given the vast majority of their endeavours to imparting through the broad communications. Most have trusted that they could influence enormous quantities of individuals through publicity alone.

The Role of PR in the Food and Beverage Industry

In Nigeria, the food and beverage industry is one that is image-focused. Numerous individuals buy the brands of most food and beverage organizations dependent on their mental picture about the manufacturers. In any case, public relations is one extraordinary apparatus that helps shape the image of this industry. An image is what individuals think, and a great many people have an independent perspective (Reddi, 2009). PR practitioners help various publics to develop constructive images about the organization when they counsel the organization to carry on in manners that individuals outside the organization need (James *et al.,* 2020a; Ndubueze *et al.,* 2019; James *et al.,* 2020b; James *et al.*, 2020c; Ndubueze *et al.,* 2020; Nejo *et al.,* 2020a; Olabanjo *et al.,* 2019). Refined PR practitioners understand that they should serve the interests of individuals influenced by organizations (Grunig, 2001).

Public Relations departments help organizations become progressively powerful by structured relationships with publics that influence the organizations or are influenced by the organization's exercises (Grunig, 2001). Grunig further shows that a food and beverage organization with excellent relationships with its key publics may need to consolidate the public nutrition into its central goal. Over the long haul, it will almost certainly seek after its objectives more viably than it would on the off chance that it disregarded or battled the objectives of publics. Subsequently, high PR enables an organization to make a superior image by providing better administrations to clients (Aiyende, *et al.*, 2020b; Fayemi *et al.,* 2020a; Fayemi *et al.,* 2020b; Fayemi *et al.,* 2020c; Fayemi *et al.,* 2020d; Olabanjo *et al.,* 2020b; Omokiti *et al.,* 2020a).

At the point when the PR division enables an organization to construct significant relationships with publics, it increases the nutritional and healthcare value of the society just as to organizations' profitability. Grunig avers that PR ought to be a necessary piece of the management of each organization. PR capacity enables the organization to connect with the partners in its condition both to achieve its central goal and to carry on in a socially capable way. An astounding PR staff cannot serve this job, be that as it may, except if research and estimation are an essential piece of the capacity (Fayemi *et al.*, 2019).

Developmental research is vital to distinguish what the public wants to eat or drink and decide how to create and keep up relationships with them to meet this need. Evaluative research is essential to build up the adequacy of PR programs and their commitment to organizational viability. PR works all in all can be evaluated by contrasting them with a hypothetical benchmark and by their commitment to the moral and socially capable conduct of the organization.

Regularly, the food and beverage industry continues creating new offers, and this draws in more shoppers to the organizations. However, realizing how to support the feeding enthusiasm of these individuals is what is fundamental. When we talk about continuing interest, it is the job of the PR practitioner to comprehend what to do about these individuals (Nwosu *et al.* 2019). They recognize what to impart and how to convey to these individuals to support their advantage. It is consequently no uncertainty that each organization needs a PR office on the off chance that they expect to keep going for quite a while. Organizations exist in a domain, and that condition comprises of numerous gatherings numerous vital publics. Organizations include relationships inside their group of workers and with networks, governments, purchasers, financial specialists, and the media. Organizational scholars call these gatherings' essential bodies electorate. PR scholars call them partners or publics (Odiboh & Oladunjoye, 2019). Critical bodies electorate or publics make up the earth of an organization. These publics can bolster or restrict the objectives of an organization. They need organizations to seek after

objectives that are critical to their survival. However, not really to the organization, for example, occupations for labourers, safe products, less contamination, and a sheltered network.

Publics have a stake in organizations, and they endeavour to impact the missions and objectives of these organizations. Organizations are compelling, when they pick and accomplish objectives that are imperative to their circumstance and public interest (Nwosu *et al.*, 2020a; Nejo *et al.,* 2020b; Olabanjo *et al.,* 2020a; Omokiti *et al.,* 2020b; Salau *et al.,* 2020a; Salau *et al.,* 2020b; Nwosu *et al.,* 2020b). When an organization disregards or contradicts the interests of the public, the groups concerned usually become restive, ready to challenge the organisation. Subsequently, PR serves society by working with groups of people to determine the contentions that destroy corporate existents (Grunig, 2001).

According to Grunig (2001), PR ought to be arranged, and overseen by experienced practitioners; it should fit into a social order (Adelua *et al.,* 2020a; Adelua *et al.,* 2020b; James *et al.*, 2020d; Nwosu *et al.,* 2019; Adelua *et al.,* 2020c; Adelua *et al.,* 2020d; Aiyende *et al.*, 2020a). Publics comprise of social gatherings who react to the outcomes that organizations have on them and thus, endeavour to take an interest in management choices in manners that serve their interests. PR professionals are specialists in utilizing communication to manufacturing relationships. PR staff draws out the problems and perspectives on publics both representative publics and outside publics, to the consideration of different supervisors in making pivotal choices.

Theoretical Framework

The theory of organizational image management is the foundation of this study. It holds that an essential objective of an entity is the creation and support of an organization's image (Massey, 2011, 2010). Organizations discuss deliberately with partners to support alluring images and dishearten bothersome ones. Organizational image management theory is from the speculations of image management and self-introduction at the dimension of the individual (Goffman, 1959; Tedeschi & Riordan, 2013). Even though organizations are not the same as people in significant ways, organizations can be and are treated similarly as people by numerous scholars and practitioners. The view here is that an organization's image is the recognition that partners have about it (van der Merwe & Puth, 2014). So it is adjusted most intimately with the "imparted image" of Gioia and Thomas (1996). This view is a significant refinement in that it recommends that discourse is essential for the formation of an organizational image. In particular, an organizational image is grown dialogically by the organization and its partners after some time.

Method of Study

This study adopted the survey method because of the reliability and validity of its outcomes. A survey is the best method of collecting data for the description of a population too large to observe directly. According to Asika (2004), the survey technique focuses on population characteristics and its representative sample.

Population of Study

The population for this study refers to the individuals, items or subject examined. They are the population of interest to the researcher, and they are the objects that possess the information sought by the researcher Asika (2004). The population consists of buyers and traders of food and beverages products. The researchers selected four markets in Lagos, where products of this industry are highly patronized. The food and beverages markets include National Trade Fair (Aspanda), Mile 2, Okokomaiko and Featac which serve the 697,000 people living in Festac Town in mainland areas of Lagos State (National Office of Statistics, 2006). Festac Town was chosen because it is the largest residential estate in Nigeria housing virtually all the tribes in the country. A huge population translates into a large daily demand for food and beverages. Hence, based on the high demand for the products in these various markets, the researcher seeks to find out the image the public has about the manufacturers of the foods and beverages which they consume.

Sample size and Sampling Technique

For sample size, the researcher picked 200 respondents from all the markets to be a representative of the Festac Town population. The 200 respondents were evenly distributed in the four markets at 50 each. Hence, the sampling technique used here was the simple random sampling which gives every item in the population the likelihood of being selected.

Results

Through frequencies and percentages, the data were analyzed and presented in tables. The tables show the extent to which publics are aware of the public relations activities of tertiary institutions.

Public Awareness of Public Relations Activities

Table 1 through to table 6 answered question 1 to 4 and 6 in the questionnaire that seeks to know if the public is aware of the food and beverage industry in Nigeria and the public relations activities carried out by the industry.

Table 1: Awareness of the food and beverage industry in Nigeria

Options		Per cent
	Yes	43.5%
	Not Sure	29.%
	No	27.5%
	Total	100.0%

Out of 200 respondents, 43.5% said they are aware of the food and beverage industry in Nigeria. However, 29% of respondents said that they are unsure, while 27.5% said they are not aware of the food and beverage industry. The above information illustrates the respondent's awareness of the food and beverage industry in Nigeria.

Table 2: Food/beverages company they are familiar with

Options		Per cent
	Cadbury	47.7%
	Nestle PLC	18.1%
	UAC Foods	8.8%
	CWAY Foods	5.7%
	Rite Foods	6.7%
	Missing System	13.0%
	Total	100.0%

When asked to tick the companies they are familiar with, 47.7% said they are more familiar with Cadbury, 18.1% said Nestle, and 8.8% chose UAC foods. However, 5.7% went for CWAY foods, 6.7% said Rite foods. Hence, they are most familiar with Cadbury. However, there are other companies in Table 3 which the respondents listed that they know.

Table 3: Other companies known to the public

	Options	Per cent
	Golden Penny	10.90%
	Givens	8.30%
	Honeywell	4.70%
	Dufilprima LTD	3.60%
	CHI Foods	3.10%
	Real Milk	2.60%
	PZ limited	2.60%
	Glaxosmith LTD	2.10%
	Dangote	1.60%
	Others	60.60%
	Total	100.00%

Although there was a section for respondents to tick the companies, they are familiar with, and many respondents listed other companies that were not in the box. As seen in Table 3, 8.3% mentioned Givanas, 10.9% said Golden Penny, and 4.7% of the respondents mentioned HoneyWell. Meanwhile, 3.6% says Dufilprima LTD, 2.6% says Real Milk and PZ LTD, 1.6% says Dangote, 3.1% says CHI Foods and 2.1%, Glaxosmith LTD. This result contributes to the knowledge that they are indeed aware that Nigeria has a large food and beverage industry.

Table 4: Awareness of their PR activities

	Options	Per cent
	No	54.97%
	Yes	33.7%
	Not Sure	3.1%
	Missing System	8.3%
	Total	100.0%

Table 4 illustrates that the majority of the respondents are not conscious of the PR practice of the industry, because only 33.7% said that they are aware of the PR activities of the industry. More respondents (54.9%) say they are not aware, and 3.1% are not sure if they even know about PR in the industry. Therefore, from the data obtained, we can say public relations practice is not recognized.

Table 5: PR activities they are familiar with

Options	Per cent
Repair of bad roads	17.6%
Provision of Water	13.5%
Building of Schools	13.5%
Press Conferences	12.4%
Seminars	7.8%
Provision of a recreational centre	4.1%
Others	31.1%
Total	100.00%

Table 5 shows that 17.6% said repair of bad roads, 13.5% said they are aware of their provision of water and building of schools, 12.4% say one of the PR activities they are aware of is Press Conferences, while 7.8% says it is award seminars. However, 4.1% of the respondents said provision of recreational centres. There are several other PR activities mentioned which are insignificant to this result.

Table 6: How they became aware of these activities

Options	Per cent
Newspapers	16.60%
Radio	11.90%
Press Conferences	8.80%
Word of Mouth	7.30%
Television	5.20%
Instagram	5.20%
Twitter	3.60%
Seminars	3.60%
Billboards	2.60%
Friends	2.60%
Facebook	1.60%
Relatives	0.50%
Others	30.60%
Total	100%

Table 6 shows that 16.6% say they became aware of the PR activities of the industry through Newspapers, 11.9% became aware through Radio, 7.3% mentioned Word of mouth, 5.2% through Instagram, 5.2% through Television. However, 1.5% became aware through Facebook, and 3.6% through Twitter. Others are 8.8% through Press conference, Seminars have 3.6% respondents, 2.6% of

the population became aware through Billboards, 0.5% became aware through relatives, and 2.6% became aware through friends while 30.6% were missing systems.

Public Perception of Public Relations Practice

Questions 7, 8 to 16 in the questionnaire determined to identify the perception of the public to the public relations activities carried out in the various institutions.

Table 7: PR influence on thoughts about the industry

Options	Per cent
Not Sure	72%
No	20.2%
Yes	7.8%
Total	100.00%

Table 7 demonstrates that out of 200 respondents, 7.8% agree that the public relations activities carried out helped their thinking about the industry, 20.2% disagreed to this while 72% said they are not sure. Table 7, affirms that the public relations activities of the industry do not in any way shape the thinking of the respondents.

Table 8: The success of their PR activities in building the image of the industry

Options	Per cent
Above average	19.7%
Average	17.6%
Below Average	11.9%
Excellent	8.8%
Very Poor	6.7%
Missing System	35.2%
Total	100.0%

Table 8, shows that 19.7% rate the activities above average, 17.6% rated it average, 11.9% says it is below average, 8.8% of the respondents rate the success of the activities focused on building the image of the industry excellent, while 6.7% say it is deplorable.

Table 9: Food and Beverage Industry in Nigeria have the right image

Options	Per cent
Strongly Agree	66.3%
Agree	14.5%
Undecided	5.2%
Disagree	5.2%
Strongly Disagree	5.2%
Missing System	3.6%
Total	100.0%

Table 9 shows that majority (66.3%)of the respondents strongly agree that the food and beverage in Nigeria have the right image. However, 14.5% agree that the industry has the right image, 5.2% are undecided, disagrees and strongly disagrees. Therefore, we can say that the PR activities in the industry are compelling.

Table 10: Purchase decision is influenced by the image of the industry

Options	Per cent
Agree	45.6%
Strongly Agree	20.2%
Undecided	17.6%
Disagree	2.6%
Strongly Disagree	3.1%
Missing System	10.9%
Total	100.0%

Although 66.3% of respondents from Table 10 strongly agree that the industry has the right image, 45.6% agree that the PR activities of the industry also influence their purchase decision. On the other hand, 3.1% strongly disagrees, 2.6% say they disagree. In comparison, 17.6% say they are undecided. Therefore, the result affirms that the image has a lot to do with the purchase decision of the public.

Table 11: Food and beverage industry has a clear structure

Options	Per cent
Undecided	39.9%
Strongly Agree	23.8%
Agree	19.2%
Disagree	6.7%
Strongly Disagree	2.6%

	Missing System	7.8%
	Total	100.0%

39.9% of the respondents from the table says they are undecided if the industry has a clear structure, 23.8% say they strongly agree, 19.2% say they agree, 2.6% strongly disagrees, and 6.7% disagree. This result signifies that they do not know or they are not sure, and this is not a positive statement.

Table 12: Food and beverages companies in Nigeria have the right image

	Options	Per cent
	Strongly Agree	26.4%
	Disagree	21.2%
	Undecided	14.5%
	Agree	14.5%
	Strongly Disagree	4.1%
	Missing System	19.2%
	Total	100.0%

While Table 10 seeks to address the image of the industry in general, Table 12 addresses the image of the companies in the respondents' mind. It shows that 26.4% of the respondents, which is the majority strongly agree that the companies have the right image, 14.5% say they merely agree. Meanwhile, 21.2% disagree, while 4.1% say they strongly disagree.

Table 13: I can vouch for the food and beverages industry in Nigeria

	Options	Per cent
	Strongly Agree	26.4%
	Undecided	21.8%
	Agree	19.2%
	Disagree	10.4%
	Strongly Disagree	9.3%
	Missing System	13.0%
	Total	100.0%

This table shows the percentage of respondents that can boldly vouch for the industry and it shows that 26.4% would do that, 21.8% are undecided if they would, 19.2% agree that they would, 10.4 % disagrees, and 9.3% of the respondents strongly disagree that they can vouch for the food and beverages industry in Nigeria.

Table 14: I will be inclined to defend the food and beverage industry

Options		Per cent
	Strongly Agree	26.4%
	Undecided	21.8%
	Agree	17.1%
	Disagree	15.0%
	Strongly Disagree	6.2%
	Missing System	13.5%
	Total	100.0%

When allowed to say something about the industry, 26.4% says that they will defend the industry, 21.8% are undecided, 17.1% agree, 15.0% disagrees to this and 6.2% strongly disagrees. This result shows the respondents' level of loyalty and trust for the industry.

Table 15: Food and beverages companies have a bad image

Options		Per cent
	Strongly Agree	22.3%
	Disagree	18.7%
	Undecided	18.7%
	Agree	13.5%
	Strongly Disagree	9.3%
	Missing System	17.6%
	Total	100.0%

Table 12 asked whether the food and beverages industry has the right image. The answer provided was mainly yes. Nevertheless, Table 15 shows the contrary with 22.3% of the respondents saying they strongly agree that the companies have a terrible image, 13.5% agrees, 18.7% are undecided and also disagrees while 9.3% strongly disagree.

Table 16: The communications platform of the industry is good

Options		Per cent
	Strongly Agree	24.9%
	Undecided	17.1%
	Disagree	17.1%
	Agree	16.6%
	Strongly Disagree	9.3%
	Missing System	15.5%
	Total	100.0%

Communication is paramount in every organization and based on this table. It seems that organisations in the industry communicate well with their publics because a majority of the respondents (24.9%) say that they strongly agree that the industry communication platform is excellent. Both 17.1% of the respondents say they are disagreeing and at the same are undecided if the communication platform of the industry is good leaving 9.3% saying they strongly disagree that the communication platform is good.

Areas of Improvement on PR Activities

Question 23 and 24 in the questionnaire seek to find out about the improvement of the public relations activities in the food and beverages industry. Tables 17 and 18 show the response of respondents to this question.

Table 17: Satisfied with the PR activities carried out by the industry

Options		Per cent
	Not Sure	33.7%
	No	28.0%
	Yes	10.4%
	Missing System	28.0%
	Total	100.0%

Table 17 shows that many of the respondents (33.7%) are not sure if they are satisfied with the PR activities in the industry**,** 28.0% said they are not satisfied. **Nonetheless,** 10.4% said they are satisfied.

Table 18: Suggestions on how activities can be improved

Options	Per cent
Engage in Scholarships	8.3%
Repair roads	8.3%
More Publicity	4.7%
Donate to schools	4.1%
Engage in electricity projects	4.1%
Health care services	3.6%
Social amenities provisions	3.6%
Cleaning roads projects	3.1%
Waste disposal projects	2.1%
Skill and acquisition programmes	2.1%
Others	56.0%
Total	100.0%

Table 18 lists suggestions of PR activities for the industry. Two significant suggestions are the provision of educational scholarships and the creation of more publicity. A majority (8.3%) says the industry should engage in scholarships as well as repair bad roads, 4.7% suggested the industry engage in more publicity, 4.1% said they should engage in electricity projects and donate to schools, 3.6%

respondents said health care services and also provide social amenities, 2.1% said waste disposal projects and put into consideration organizing a skill and acquisition program.

Discussion of Findings

Public relations is an integral part of any organization to take seriously. Here, the discussion part of this study focuses on the research questions in line with the objectives. This research aims to find out the awareness of the public to the public relations activities carried out in tertiary institutions.

RESEARCH QUESTION 1: ***What is the image problem faced in the Food/Beverages industry in Nigeria?***

Image is everything to both an individual and an organization. It has a lot to do with how people relate to the organisation in every aspect. In respect to this question, Table 10, which answers the question on purchase decision, go further to show that when an organization has an image problem, consumer's purchase behaviour is affected. Hence, from Table 11, it shows that one major challenge the industry could face is from its structure. It is essential to know that the structure of the organization also affects the image of the organization. If the structure is unorganized, then the services of the organization will stagger, which will lead to image problems. It is, therefore, necessary that the industry considers structure when it comes to its operations, and this is the role of the PR practitioner. To ensure that there are no fluctuations in the structure of the organization.

RESEARCH QUESTION 2: ***What are the tools used to control the image problem in the industry?***

Table 6 shows the importance of newspapers as an appropriate medium for disseminating information in the food and beverages industry. To add to this, Table 16 supports that this tool has been very active as many of the respondents strongly agree to the fact that the communications of the industry are generally good. This result is fair enough, although other various platforms can be useful for image management. The PR practitioners in the industry must exhaust all channels of media in this aspect.

When addressing the need for awareness, the PR tools used is a contributing factor to how the publics get informed about the organisation's PR activities. Thus, just relying on bulletins is not enough. As a PR practitioner, it is crucial that we exhaust all PR tools when reaching across to our audience, especially a broad audience. The tools used and their application will go a long way to enhance as well as boost the image of the institution. A PR practitioner needs to know that tools of information are essential to creating awareness. Every PR department in any organization is the foundation of that organization. We can either make or mare an organization. Every information about an organization is dependent on us, and we are always the first people our audience come to when they need any information. Pressing on the need to exhaust every PR tool during communication, it is important to first identify the interest of the audience. Grunig (2001) agrees to this saying a refined PR practitioner is one who understands that they should serve the interests of individuals. Therefore, the practitioner must access the tools of communication and exhaust all media to help strengthen not only the image of the organization but also the relationship with identified publics as well sustain their interest.

RESEARCH QUESTION 3: ***What is the public understanding of Image quality in the industry?***

Table 12 answers this question as it shows that the public strongly agrees that the industry has the right image, and this is a very positive response. Table 13 shows that based on the excellent image of the industry, the public can vouch for the reputation of the industry at any point in time. Public relations is said to have reached a high point of excellence if the public can vouch for the organization at any point in time. This result means that the organization is working had to build a stable relationship with its publics.

RESEARCH QUESTION 4: ***How do the public become aware of the PR activities carried out in the industry?***

Low public awareness of the PR activities in the food and beverage industry causes concern according to the results of this study. Majority of the respondents says they are not aware of the PR activities, yet the industry has a positive image. Furthermore, this is not a suitable response that contributes to the image of the industry. Sales and other communication elements contribute more than PR to the image

under focus. For the respondents that say they are aware of the PR activities, Table 7 shows how they become aware of the activities of the industry where most of them said through Newspaper. The table shows the media which provide the majority of the publics of the industry with information about the executed PR activities. From the table, it shows that many PR practitioners have not well consumed online media. The responses on the public's awareness through the online platform is shallow. There is a need to use traditional media. However, online media is one of the aggressive ways to get across to a broad audience. It is not only the faster but also one of the most convenient ways to reach a wide audience at the same time. Through using the online media, everyone has quick access to the organization messages and this also creates a big room for quick feedback from the audience regarding any subject matter.

RESEARCH QUESTION 5: ***What is the public perception of the Food/beverages industry in Nigeria?***

Perception indeed leads to the image people have about an organisation. From the tables presented above, one of the tables that address the question of perception is Table 7. The table shows that the respondents are not sure if the PR activities carried out by the industry have anything to do with what they think about the industry. This result shows that the PR activities of the industry are not one of the factors that make them have the right image of the organization.

One of the significant aims of public relations is to influence the decisions of the public., and build a strong relationship between an organization and its publics. However, if corporate activities do not influence the identified publics, then the primary purpose of public relations is lost.

RESEARCH QUESTION 6: ***Do the public know and understand the image control actions of the industry?***

Based on all Tables from Table 9 to Table 16 and the responses, it clearly shows that the industry has done a lot for the respondents to have a positive response about them. This is very necessary. When an organization audience can identify positive efforts towards sustaining their interest, it builds loyalty and trust. They begin to trust the organization to always have their best interest at heart. Besides, Table 5 shows contribute to the image control actions of the industry. From the table, it indicates that the public knows some of their image control actions. This is very relevant in terms of crisis management and it also shows transparency on the part of the industry.

Conclusion

This study exposes the fact that although the public is not aware of the PR activities carried out by the organization, they still have a positive response in terms of the image of the industry. Hence, when we talk about image management, the PR practitioners in the industry has done an excellent job in sustaining the image of the industry. This study shows the need for every organization to have a PR department that will, in one way or the other help in promoting the image of the organization, both consciously and unconsciously. Nevertheless, it is still essential for organizations to know that engaging in PR activities is very necessary. This study further shows that PR practitioners do a lot in managing the image of the industry. However, they must engage in more publicity to make their public aware of the PR activities they carry out.

Recommendations

Ohaja (2003) purport that research is not only done for academic purposes. One of its primary goals is to understand social and physical phenomena to proffer solutions to problems where they exist. Based on the literature review and the findings of this study, the following recommendations will be of great value to:

- PR practitioners should engage in public evaluation on the PR activities carried out in their respective industry, identify those loopholes and carried out activities and fill those loopholes. By so doing, the public will start feeling the impact of the PR activities and therefore, become aware of the activities.

- Image management is a big deal; hence it essential that PR practitioner should exhaust forms of communication is building the image of the industry. Newspapers as much as they are well detailed, it is also limited. Therefore, the industry should move to other channels to communicate their PR actions. This action will help to build public awareness of the public as well as promoting the image of the industry.

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Banking Public Relations and Customers' Consciousness in Nigeria

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Abstract

This study aims at examining public consciousness and the view of public relations projects in banking services. This study employed the quantitative survey design, using the questionnaires to gather the opinion of the banking public. The paper adopts the two-way symmetrical theory. In this paper, it is revealed that the public generally has the issue of trust with their banks which has tried but still unable to solve this problem over the years. They should as well focus more on areas that will benefit the public such as more empowerment programs, more educational programs and better customer relations. The paper concludes that the bank needs to ensure that they build a relationship between the public and itself in order to overcome the issue of trust and negative perception. It recommends that Covenant Microfinance Bank should adopt a PR activity, adopt the social media tool, e-banking system, and be proactive in its dealings. More awareness by Banks in correcting the negative perception of the public is needed.

Keywords: Banks, Public Relations, Covenant Microfinance, Guarantee Trust Bank, Trust

Introduction

The Banking Industry is of the most critical sectors of the economy. The origin of the industry can is traceable to the colonial era when the colonial banks met the commercial needs of the colonial government. Public relations tools must be the order of the day in every industry. Companies and organisations must always make use of public relations (Nwosu, Odiboh, Olabanjo and Fayemi, 2020a; Nejo, Odiboh, Omokiti and Adelua, 2020b; Olabanjo, Odiboh, Adelua and Fayemi, 2020a; Omokiti, Odiboh, Aiyende and James, 2020b; Salau, Odiboh, Adelua and Fayemi, 2020a; Salau, Odiboh, Omokiti and Nejo 2020b; Nwosu, Odiboh, Oyedepo, James and Adelua, 2020b).

According to Herth (2011), Public Relations, being a management function, puts in place and sustains a two-way complementary relationship and communication between a firm and the public. The management function in Public Relations includes research in progress, data analysis, provision of measures and the evaluation of these measures to create, understand and advance specific relationships (Odiboh, Ezenagu, and Okuobeya, 2019). The dimensions of Public Relations are investor relations, soliciting/lobbying, relations with the government and general public, media/blogger relations, employee relations as well as crisis management and international relations.

Trust is the foundation of the banking business. Thus, its success is dependent on how much trust it earns from its publics or customers. Trust in banks determines how professionals and customers perceive them. It is noteworthy that without Public Relations, successful banking is nearly impossible (James, Odiboh, Adelua and Fayemi, 2020a; Ndubueze, Odiboh, Nwosu and Olabanjo, 2019; James, Odiboh, Aiyende and Salau, 2020b; James, Odiboh, Nwosu and Fayemi, 2020c; Ndubueze, Odiboh, Adelua and Fayemi, 2020; Nejo, Odiboh, James and Fayemi, 2020a; Olabanjo, Odiboh, Nwosu and Ndubueze, 2019).

Public Relations are deliberate and congruous communication. Fully engaging the audience and listening to them builds and nurtures positive mutually advantageous associations (Aiyende, Odiboh,

Adelua and Omokiti, 2020b; Fayemi, Odiboh, James and Olabanjo, 2020a; Fayemi, Odiboh, James and Aiyende, 2020b; Fayemi, Odiboh, Nejo and Salau, 2020c; Fayemi, Odiboh, Oyesomi, Nwosu and Olabanjo, 2020d; Olabanjo, Odiboh, Nwosu and James, 2020b; Omokiti, Odiboh, Salau and Nejo, 2020a). Over time, image management has been the concern of organisations. They participate in various advances and systems to ensure that they keep up a fair image, as indicated by their stakeholders. Without a doubt, there is a stable constructive relationship between the way by which individuals see an organisation and corporate identity. (Ndubueze, Odiboh, Nwosu and Olabanjo, 2019).

Most times, it is the views of the banks' public and staffs that earn them public trust. As such, it is usually a herculean task to have successful banking without Public Relations. The Public Relations department of the Bank is in charge of polishing the Bank's image in a way that earns the trust and confidence of the public. Public Relations builds beneficial joint understandings between the organization, its staff and the public (Adelua, Odiboh, Aiyende and Omokiti, 2020a; Adelua, Odiboh, Nejo and Fayemi, 2020b; James, Odiboh, Olabanjo and Adelua, 2020d; Nwosu, Ndubueze and Olabanjo, 2019; Adelua, Odiboh, Olabanjo and Ndubueze, 2020c; Adelua, Odiboh, Oyedepo, Olabanjo and James, 2020d; Aiyende, Odiboh, James and Salau, 2020a).

To deal with extreme situations like impairment, apathy and ignorance, Public Relations is the best tool employed by the Banks. The competition in the Banking industry necessitates the deepened use of Public Relations as this will help the Banks survive with the growing competition. The Banks use the Public Relations tools to educate the public on how special their products are in relation to similar products provided by other Banks. Public Relations tools should always provide explanations on double standards (if any) when dealing with different types of customers. Customers' time is very important and as such, the Banks should always educate the public about the efforts in place to ensure that time remains valued.

Excellent public relations based on thoughtful, truthful, open, strategic, and symmetrical communication of a product's defect or safety-related issues can influence the relationships with stakeholders (Odiboh, Amodu and Ekanem, 2020a; Odiboh, Fasanya, Adegoke, Afolabi and Ofor, 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019). This paper would be useful to Banks as it will reveal the perception of professionals and customers as well as the fact that the creation of a good Bank image is not the sole function of the Public Relations department. A joint effort is needed to create a competitive and unique Bank image.

In line with public perception, a corporation is expected to turn Public Relations into a crisis. However, the fact is, Public Relations is of utmost importance when there is pleasant and interesting news (Fayemi, et al., 2019). The bank employees must, therefore, utilize all chances to make a customer happy. This will help energize the Public Relations effort to improve the Bank's image and in turn, position the bank to remain competitive in future.

Statement of the Problem

Banks all over the world deliver financial services and most importantly trust. However, public complaints about banks' service delivery have been mounting in Nigeria. Central to this service delivery challenges is the issue of trust, which brings about the misconception of the public relations actions of Banks.

A significant issue facing the Public Relations operation in Nigeria's banking industry is the management of the publics' view on the Banks. Overtime, efforts by the Bank's Public Relations team to amend some of the misreading of the public have been met with resistance. This work looks at the current public recognition and views of the banking industry, the Public Relations actions of some banks, and what the future holds for the industry.

Research Objectives

This research aims at determining the PR tools and objectives of selected banks. It seeks to investigate public awareness and perception about banking services and also to examine areas the public want selected banks to improve on. In line with the following objectives, the research questions are:

Research Questions

1. What are the PR tools Selected Banks adopt?
2. What are the awareness level and the PR activities of selected banks?
3. What is the view of the public about PR practices in Banking that needs improvements?

Literature Review

An Overview of Banking Business in Nigeria

Banking business as defined by the Banks and Other Financial Institutions (BOFI) Act of 1991 "is the business of collecting current and savings accounts deposits; as well as other similar accounts and the payment and collection of cheques paid by customers. There are other key components of operations through which the Bank makes enormous profits. As such, the description of banking business given by the BOFI Act was criticised by (Abdulai, 1993).These other components could be foreign exchange sale which is the most profitable and important banking business in Nigeria; with authorized dealership up till 1992. The groups of banking business in Nigeria are: Microfinance Banking, Development Banking, Central Banking, and Commercial Banking (Olabanjo, Odiboh, Nwosu, and Ndubueze, 2019).

Corporate images should be positive and unique. Consumers are not only purchasing the product or service but also the corporate image associated with that product or service built over time with the function of public relations. (Olabanjo, Odiboh, Nwosu and Ndubueze, 2019). The objectives of Public Relations in Banks are intended to make changes in the knowledge of the public, and in viewpoints and behaviours relating to an organisation (Wells *et al*., 2003). These objectives normally focus on the creation of trust, the delivery of quality information as well as establishing positive images. Typical public relations objective include: the display of the image of the organisation to the public, provision of explanations to the public on the company's perception on public issues, the creation of legitimacy for the company's operations, educate the company on the publics' opinion on its activities, create and maintain joint understanding between the company and the public, establish corporate brands, put in place products as well as the repositioning of the company.

In general, the goal of Public Relations is to establish a beneficial joint understanding between the company and its public, which will in turn; create goodwill (Odiboh, Olonode, Adesina, and Yartey, 2018). According to Merenda (2004), the improvement of the demand for a company's services will create trust and credibility. When service is being marketed, the best way is through its promotion by advertising and in turn supporting its arguments using Public Relations to create trust and credibility. Another importance of Public relations in the banking system is the help it provides in winning back lost customers. Proper and intense public relations helps in creating positive public image for the banks (Odiboh and Oladunjoye, 2019). Public relations which deal with the public have a much impact in the moulding of an organisations image and promoting them in a positive light to their target audience. (James, Odiboh, Adelua and Fayemi, 2019).

Public Relations is required by Banks to properly sensitise their public. It is very essential to counter the negative effects of the public on their activities. To protect their interest, futuristic and goal driven banks do not just lay in wait for their public image to erode, they put in place necessary measures like Public Relations to protect their interests (Ndubueze, Odiboh, Nwosu, and Olabanjo, 2019). Hon (1998) emphasized that the goals and objectives of Public Relations have to be exact and be connected directly with goals and objectives of the company. The findings of Hutton et al. (2001) corroborate that of Hon (1998). It specifies very different opinions on the use of Public Relations and it maintains that the difference in Public Relations measures is constantly a stagnant problem. At the end of the day, companies require different philosophies and objectives.

Guarantee Trust Bank (GTB)

According to the GTB official website, Guaranty Trust Bank became a limited liability company in 1990 and was given the license to give commercial services as well as other banking services to Nigerians. In February 1991, the Bank started operations and has over the years joined the league of respected and service focused banks in Nigeria. After consolidation, Guaranty Trust Bank plc decided strategically to actively embark on retail banking. This was followed by a major rebranding action in June 2005; which led to the emergence of the Bank as a Bank that offered improved services, driven by an intense expansion technique as well as a vibrant orange identity.

Covenant Microfinance Bank

According to Covenant Microfinance bank official website, CMFB emerged as a private limited company on May 6 2003. It commenced operations on March 15, 2004, as a Covenant University Community Bank Limited (CUCB Ltd). It converted to a microfinance bank in line with the directive of the Central Bank of Nigeria to all community banks. It further commenced business on January 11 2008. It received a license to operate as a State Microfinance Bank in December 2012 having met the prescribed N100 million minimum capital requirements.

In 2014, it became one of the first microfinance banks to provide the 10-digit Nigeria Uniform Bank Account Number (NUBAN) for all its customers after successfully signing up for integration to NCS. (Odiboh, Adeyeye, and Ekanem, 2018).

Theoretical Framework

This study adopts the Two-way Symmetrical Model. The model is the best among all the other models. In this case, both the communicator (the organisation) and the receiver (the public) are mutually communicating. The messages take into account the needs, demands and interests of the public. This model is dependent on research in not only designing or packaging a message but also in helping an organisation to adjust concerning the needs of the public (Sanda 1993).

The argument of the two-way symmetrical model is that the Public Relations expert should serve as a connection between the company and its public, rather than as a persuader. In this model, experts are arbiters and employ communication to ensure that all participants are beneficiaries. The term "symmetrical" explains the model's attempt to establish a joint beneficial situation. Professionals should aspire to utilise the two-way symmetrical model in their daily operations and strategies, as it is the most ethical of all models (Simpson, 2014).

This model is relevant to this study because it clearly states how messages of the public are in consideration. Here, the banks and their publics (professionals and customers) communicate. There is a mutually beneficial relationship between the banks and the public (customers and professionals) which makes it easier for customers to have a perception about the affairs of the bank. The question is whether this is the case with banks in Nigeria.

Research Design and Methodology

This study employed the survey research method of data collection. A survey is the putting together of relevant information from various individual samples based on their answers to asked questions (Check and Schutt, 2012). This type of research allows different techniques for obtaining respondent as well as the collection of data and the employment of different information methods.

The method of data collection used under the survey method is the questionnaire. The questionnaires were directly administered by the researcher to the study population. The questionnaire was used to obtain public answers on the awareness of the Public Relations operations of banks. Specifically, the survey tool provided respondents with open and close-ended questions on applied public relations devices utilised to build the awareness and recognition Banks Public relations operations.

The sample size for this study is 200 respondents living in semi-urban Ota, Ogun State, Nigeria. The respondents were chosen based on the focus of the selected banks, as Covenant Microfinance Bank only operates in Ota, Ogun State. In contrast, Guarantee Trust Bank operates in every corner of Nigeria; for proximity reasons, it is best to gather data at a location. A survey research design with 200 respondents was selected from Ota in Ogun State with focus on people who have an account with Covenant Microfinance Bank and Guarantee Trust Bank, which are a Commercial Bank and Microfinance Bank respectively.

Purposive sampling was employed in this research. This sampling type is made up of a group of other non-probability sampling methods. Also known as judgmental, selective or subjective sampling, purposive sampling relies on the researcher's opinion in the selection of focus units. As applied by Odiboh and Ajayi (2019), these units include people, cases/organisations, events, pieces of data. This sampling technique is utilised based on members' choice of Bank as Wimmer and Dominick (2011) justify.

Results

The data obtained in this research were analysed through frequencies and percentages. They were presented in tables using the Statistical Package of the Social Science (SPSS) software. In the tables, respondents' awareness of the Public Relations operations of selected Banks was displayed. This was followed by the presentation of public level of satisfaction with bank's operation and ideas for improvement. Out of 200 copies of the distributed questionnaire, 182 returned filled without any flaw. Eighteen (18) questionnaire copies failed acceptance due to errors or emptiness. Respondents' account with selected banks was the first poser of the questionnaire. The results obtained are presented in the following tables.

Table 1: An account with any of the following banks:
Guarantee Trust Bank(GTB), Covenant Microfinance Bank (CMFB)

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	179	98.4	99.4	99.4
	No	1	.5	.6	100.0
	Total	180	98.9	100.0	
Missing	System	2	1.1		
Total		182	100.0		

Out of 182 respondents, 179 respondents which represent 98.4% said they have an account with GTB or CMFB while one which represents 0.5% said they do not. The above shows that a lot of the respondents have an account with the bank. 1.1% of the respondents did not answer this question.

Table 2: Banks the respondents have an account with

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	GTB	124	68.1	69.3	69.3
	CMFB	55	30.2	30.7	100.0
	Total	179	98.4	100.0	
Missing	System	3	1.6		
Total		182	100.0		

Table 2 reveals that 124 respondent which represent 68.1% have an account with GTB. In comparison, 55 respondents which represent 30.2% has an account with CMFB, which means that the majority of

the respondent are people who have an account with Guarantee Trust Bank.

Table 3: Public Relations activity that is being carried out by the respondent's bank.

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	129	70.9	71.3	71.3
	No	45	24.7	24.9	96.1
	Not sure	7	3.8	3.9	100.0
	Total	181	99.5	100.0	
Missing	System	1	.5		
Total		182	100.0		

The Table shows that 129 respondents which represent 70.9% are aware of any PR activity being carried out by their bank. In comparison, 45 respondents which represent 24.7% are not aware of any PR activity being carried out by the banks. Also, seven respondents which represent 3.8% said they are not sure if the bank carries out any PR activity. This result shows that a large number of respondents are aware of the PR activity being carried out by their bank. 0.5% of the respondent ignored this question.

Table 4: The activities carried out by the banks that the respondents are aware of

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Birthday messages	83	45.6	61.0	61.0
	Social events	37	20.3	27.2	88.2
	Educational support and empowerment programmes	5	2.7	3.7	
	Giving gifts to customers	4	2.2	2.9	91.2
	Prompt messaging and customer care service	4	2.2	2.9	94.9
	Deposit and saving plans	3	1.6	2.2	97.8 100.0
	Total	136	74.7	100.0	
Missing	System	46	25.3		
Total		182	100.0		

This Table reveals the PR activities known to the respondents. Eighty-three respondents who are 45.7% are aware of birthday messages as the only bank's PR activity. Thirty-seven respondents which represent 20.3% are aware of social events. Five respondents which represent 2.7% also noted that they are aware of the bank's educational support and empowerment programmes. Four respondents which represent 2.2% said they are aware of their bank giving out gifts to customers. Four respondents which represent 2.2% said they are aware of prompt customer care service. In comparison, three respondents which represent 1.6% are aware of deposit and saving plans. This result reveals that the bank focuses more on sending birthday wishes to customers as their significant PR activity.

25.3% of the respondents ignored this question.

Table 5: Trust issues with the bank

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	No	87	47.8	51.2	48.8
	Yes	83	45.6	48.8	100.0
	Total	170	93.4	100.0	
Missing	System	12	6.6		
Total		182	100.0		

Table 5 shows that 87 respondents, which represent 47.8% do not have trust issues with their bank. In comparison, 83 respondents which represent 45.6% have trust issues with their bank. This data proves that there is a thin line margin between those who have trust issues and those who do not, which simply means the issue of trust exist. 6.6% of the respondent ignored this question.

Table 6: Public Relations tools the respondent's bank uses

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Social media	74	40.7	45.4	45.4
	Television	25	13.7	15.3	60.7
	Newspaper	20	11.0	12.3	73.0
	Billboards	20	11.0	12.3	87.7
	Fliers	20	11.0	12.3	100.0
	Magazine	4	2.2	2.5	75.5
	Total	163	89.6	100.0	
Missing	System	19	10.4		
Total		182	100.0		

Table 6 reveals that 74 respondents which represent 40.7% are aware of social media as a vital PR tool adopted by their bank. Twenty-five respondents which represent 13.7%, on the other hand, says television is the banks' PR medium of awareness. Twenty respondents which represent 11.0% variously said that it is newspapers, billboards and fliers. This result shows that a large per cent of the respondent is aware of social media as the primary PR tool the bank uses. 10. 4% of the respondent ignored this question.

Table 7: Perception of the Public relations practice of the bank

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Satisfactory	50	27.5	31.4	31.4
	Good	50	27.5	31.4	62.9
	Poor	31	17.0	19.5	97.5
	Fair	24	13.2	15.1	78.0
	Indifferent	4	2.2	2.5	100.0
	Total	159	87.4	100.0	
Missing	System	23	12.6		
Total		182	100.0		

Table 7 reveals the perception of the respondent about the PR practice of their bank. Fifty respondents which represent 27.5% said the PR practice is satisfactory. Another 50 respondents which represent 27.5% also said the PR practice is good; 31 respondents which represent 17.0% said the PR practice of their bank reduced. In contrast, 24 respondents which represent 13.3% said the PR practice of the bank is fair, and 4respondent, which represent 2.2%, feels indifferent about the PR practice of the bank. While it may seem that a lot of the respondent said the PR practice of the bank is good, more than a quarter still feels the PR practice is weak, which means there is need for improvement. 12.6^ of the respondent ignored this question.

Table 8: Satisfaction with the Public relations practice of respondent's bank

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	YES	112	61.5	63.3	63.3
	NO	65	35.7	36.7	100.0
	Total	177	97.3	100.0	
Missing	System	5	2.7		
Total		182	100.0		

Table 8 shows that 112 respondents which represent 61.5% are satisfied with the PR practice of their bank. In contrast, 65 respondents which represent 35.7% said they are not satisfied with banks' PR and this shows that a more significant part of the respondents is satisfied with their bank's PR activities, while others are not satisfied. 2.7% of the respondent ignored this question.

Table 9: If there are Areas the respondents want the banks to improve on as regards their Public relations practice

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	YES	93	51.1	53.8	53.8
	NO	80	44.0	46.2	100.0
	Total	173	95.1	100.0	
Missing	System	9	4.9		
Total		182	100.0		

Table 9 reveals that despite being satisfied with the bank's PR practice, a substantial number of respondents want them to improve on their PR activities. 51.1% of the respondent said some areas need improvement while 80 respondents which represent 44.0% said there is no need for improvement. 4.9% of the respondent ignored this question.

Table 10: Areas the respondents want the banks to improve on as regards their public relations practice

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Improvement in customer relations	40	22.0	24.4	24.4
	Improvement in the use of social media and communication channels	25	13.7	15.2	42.7
	Community development	6	3.3	3.7	48.8
	Improved use of internet and technological services	5	2.7	3.0	27.4
	Reduction of bank charges	4	2.2	2.4	45.1
	None	58	31.9	35.4	84.1
	Others	26	14.3	15.9	100.0
	Total	164	90.1	100.0	
	Unanswered	18	9.9		
Total		182	100.0		

Table 10 reveals different areas the respondents want the bank to improve on. 58, which represent 31.9% said there are no areas to improve on. In comparison 22.0% of the respondent said there is need for improvement in customer relations. 13.7% said there is a need to improve the use of social media and other communication channels. 2.7% said the internet services need improvement. 2.2% said there should be a reduction of bank charges, and 3.3% said there is a need for community development. 9.9% of the respondent ignored this question. While the majority of the respondents do not see any area needing improvement, other respondents request that there should be an overall improvement on all services.

Discussion of Findings

The tables above show the findings from the respondents. We will be using the tables above to analyse the findings based on the research questions. Therefore, the findings from this study will be discussed based on how it has answered the research questions posed for this study.

Research Question 1: What Are The PR Tools Selected Banks Adopt?

The above research question is to determine the tools through which selected banks adopt in carrying out their Public Relations activities. Findings in this respect are in Table 6. The Table reveals that 45.4% of the respondents know that bank adopts social media for public relations activations. 15.3% states that the banks use television as its principal PR medium. Twenty respondents (12.3%) acknowledge that the bank uses Newspaper as its primary tool. In comparison, 20, which represents 12.3% of respondents says that the bank adopts the use of fliers. Four which represents 2.5 of the respondents said that the bank adopts billboards as its tool to carry out these activities. This finding simply means that social media is the principal tool the banks adopt for its PR practice.

Research Question 2: What are the Awareness Level and the PR Activities of Selected Banks?

The above research question seeks to determine the public's awareness of banks' public relations. From the data generated from the questionnaires, the level of the public's awareness varies.

Findings to this respect can be found from tables 3 and 4, respectively. The data on table 3 reveals that 129, which represent 71.3% of the respondents are aware of the public relations activities of the banks,

45, which represent 24.9% of the respondents are not aware. In comparison, seven which represent 3.9% are not sure if they are aware of these activities. This reveals that a large number of respondents are aware of the PR activities of their bank.

Data on Table 4 shows that 61% of the respondents say that the banks send birthday messages as a PR action. About 27.2% of the respondents say that the bank organises social events as a PR activity. Four respondents say that the banks gift customers. Five which represent 3.7% says that banks carry out educational support and empowerment programmes, four which represent 2.9% respondents says that banks send prompt messages and customer care, three which represent 2.2% says that banks have a deposit and saving plans for its customers. Meaning that birthday messages are the major activities the bank carries out.

Research Question 3: ***What are The Views of the Public about PR Practices in Banking and the Areas of Improvemen*****t?**

This research question focuses on the public's perception about the PR practice in the banking sector as well as areas the public will want the bank to improve on. It was observed based on the findings in table 5 that 87 respondents (51.2%) do trust the bank. In comparison, 83, which represent 48.8% of the respondents have trust issues with their bank. One can see that the margin between those who have trust issues and those who do not is a skinny one; the issue of trust is paramount to Nigerian banks.

In Table 8, 112 respondents which represent 63.3% of the participants are satisfied. Sixty-five respondents which represent 36.7% say that they are not satisfied. Despite this, the respondents, however, states in table 9, 93, which represent 53.8% of the respondents that there are areas the PR in the banking sectors should improve on. In comparison, 80, which represent 46.2% of the respondent said there are no areas. As much as some of the respondents are satisfied, there is still room for much improvement. Based on the data generated from the questionnaires, in tables 10, the respondents gave insights on the areas they would love the banks to focus more and improve in the deliveries of their service.

Conclusion

From the findings of this study, the summary is below:

1. Covenant Microfinance Bank does not carry out any PR activity. So it brought about a low response from customers of Covenant Microfinance Bank, as seen in Table 7, there was more of Guarantee Trust Bank respondents in the findings.
2. Customers generally have issues of trust with their banks.
3. There is a high level of awareness of banks' PR activities. However, more of the activities focus on sending messages than providing live support for educational programmes, excellent customer care, fast response to messages, and empowerment programmes.
4. Although the majority of the respondents see the PR activity as satisfactory, there is always room for improvement.

Public relations does not operate in a vacuum but with the support of stakeholders. (Nwosu, Ndubueze and Olabanjo, 2019). This study concludes that banks should focus more on public relations actions with local content. Furthermore, ensure that they build better public relations profile. Between the public and itself to overcome the issue of trust and negative perception, they should as well focus more on areas that will benefit the public such as more empowerment programs, more educational programs, and better customer relations.

Recommendation

Covenant Microfinance Bank should endeavour to carry its customer is along in its activity. It is not enough to just receive deposit money but necessary to update customers about routine and other

banking essentials. The bank should adopt a PR activity, adopt the social media tool, e-banking system, and be proactive in its dealings. CMFB lacks an evidence-based PR activity, about which the customers complained. The bank should treat its customers rightly regardless of its position. Above all, banks need to correct some of their negative perceptions by the public.

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Marketing and Communication of Herbal Products as Male Reproductive Solutions

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Abstract

This short paper highlights public awareness and behaviours towards herbal products that are marketed and communicated as remedies for men's reproductive challenges. As a pilot study intended for future collaborations, this paper surveys the opinions of men and women living in Lagos mainland, Southwest Nigeria. We operated one thousand copies of a questionnaire on the respondents. Preliminary results show the high level of awareness of men's reproductive problems needing solutions. Facilitating this awareness, according to the respondents, were marketing communication tools used by corporate manufacturers to position their herbs as solutions to manhood problems. This pilot study recommends counter actions against deceptive marketing and communication of herbal aphrodisiacs. It also presents opportunities for collaborations for further researches on the same topic.

Keywords: Marketing, Communication, Herbal Products, Men's Health, Male reproduction

Introduction

Subject area	Marketing Communication
More specific subject areas	Healthcare Marketing, Health Communication, Advertising, Public Relations
Study execution	A survey carried out with the use of a questionnaire.
Study format	Quantitative methodology
Experimental factors	As a preliminary study, 1,000 respondents equally divided among men and women received the questionnaire to fill. Study objectives include assessing the awareness of men and women about male reproductive problems; their knowledge of herbal solutions and the marketing communication tools used by the corporate manufacturers. Bar charts represent the preliminary results.
Experimental features	Data on herbal products, their marketing communication tools and corporate manufacturing activities appear in this preliminary study.
Preliminary study location	Lagos, Nigeria
Data accessibility	Original data is available to compare with similar investigations anywhere in the world

Value of Study

1. Similar studies in different parts of the world could be executed based on the principles, objectives and methodology of this study.
2. Data which similar studies could use as background information are available through this study. The data covers herbal marketing communication, male and female position concerning male reproductive problems as well as companies' activations in different formats and styles.

3. The multidimensional focus of this study consists up of the following:

    a. Men's health. Sample in Ajayi (2017), Akubue (2009), Anucha (2009), Cleveland Clinic (2015), Colker (1999), Fleischer *et al*., (2004), Kilham (2013), Mayo Clinic (2016), Michael (2017), Onana (2017), Oni (2016)
    b. Herbal products. Sample in Odiboh *et al*. (2018a), Odiboh *et al.*, (2018b), Odiboh *et al.* (2017a), Puri and Puri (2011), Roybal and Skowronski (2000), Sahelian (2004), Sanders and Winter (2007), Sharma (2007), World Population Review. (2018)Yoruba (2014), Yusuff (2005)
    c. Tools of integrated marketing communication. Sample in Odiboh and Oladunjoye (2019), Odiboh, *et al.* (2020a), Odiboh and Ajayi (2019), Odiboh, Ezenagu, and Okuobeya (2019).
    d. Public relations actions of manufacturers of herbal products. Sample in Adelua, *et al.* (2020a), Adelua, *et al.* (2020b), Adelua, *et al.* (2020c), Adelua, *et al.* (2020d), Aiyende, *et al.* (2020a), Aiyende, *et al.* (2020b), Fayemi, *et al.* (2020a), Fayemi, *et al.* (2020b), Fayemi, *et al.* (2020c), Fayemi, *et al.* (2020d), James, *et al.* (2020a), James, *et al.* (2020b, James, *et al.* (2020c), James, *et al.* (2020d), Ndubueze, *et al.* (2020), Ndubueze, *et al* (2019), Nejo, *et al.* (2020a), Nejo, *et al.* (2020b), Nwosu, *et al.* (2020a), Nwosu, *et al.* (2019), Nwosu, *et al.* (2020b), Olabanjo, *et al.* (2020a), Olabanjo, *et al.* (2020b), Olabanjo, *et al.* (2019), Omokiti, *et al.* (2020a), Omokiti, *et al.* (2020b), Salau, *et al.* (2020a), Salau, *et al.* (2020b)

Experimental Design, Materials and Methods

Survey method generated the data in this short study. Five hundred men and five hundred women totalling 1,000 were the respondents drawn from Mainland Lagos, Nigeria. The respondents were selected using the multi-stage sampling technique. Bar charts below show some of the preliminary results of the survey.

Preliminary Study Results

According to Figure 1, Friends, the Internet, hospitals and relations provide information to the respondents on male reproductive problems. Herb sellers provide lesser information. The traditional media are the least sources of information about male reproductive issues.

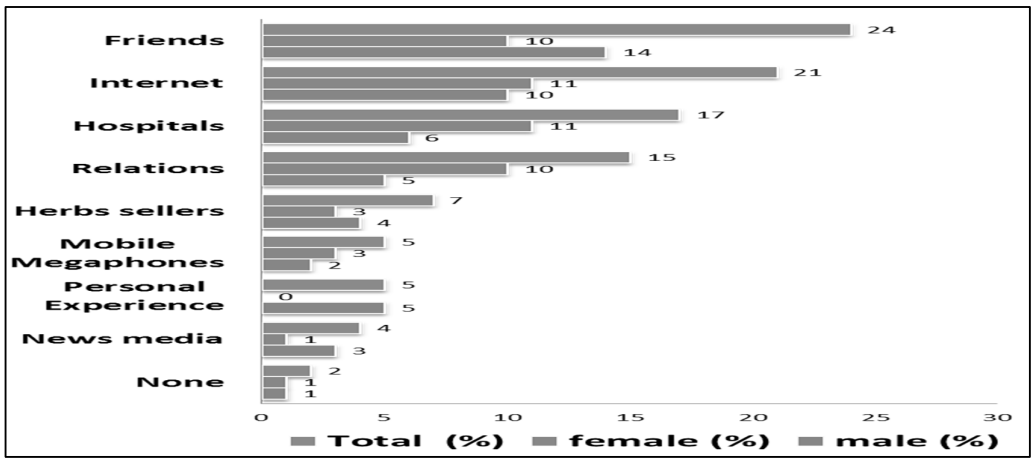

Fig. 1: Sources of knowledge of male reproductive problems

Respondents are not sure of why they recommend herbal remedies for male reproductive problems according to Figure 2. However, affordability, availability, efficacy and usefulness are key reasons why they recommend herbal remedies for men's male reproductive problems.

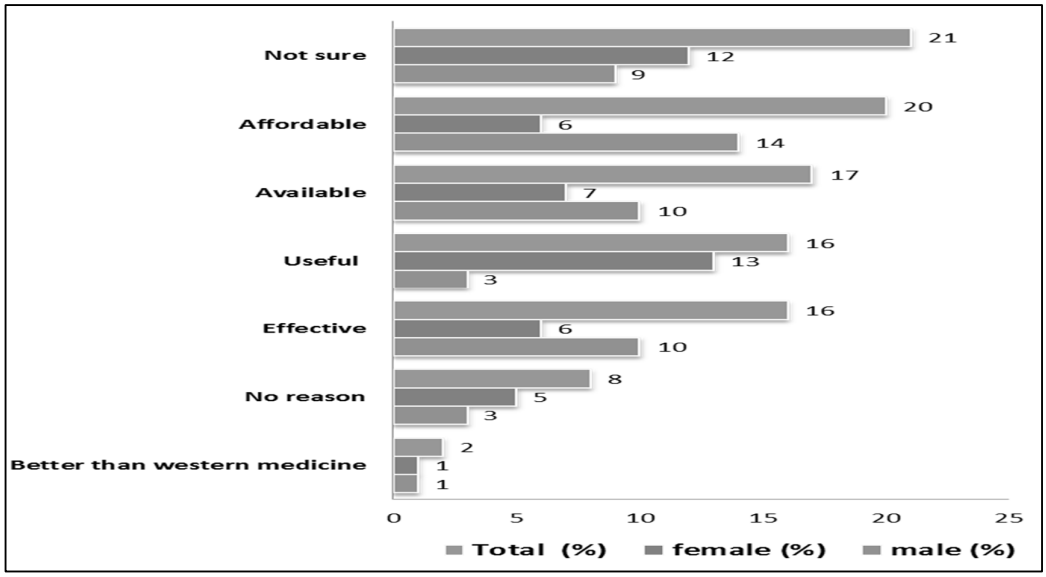

Fig. 2: Reasons for recommending herbal remedies for men's male reproductive problems

Marketing communication tools used in promoting herbal products as male reproductive solutions include Mobile advertising, personal selling, sales promotion, newspaper advertising and publicity. This result shows in Figure 3.

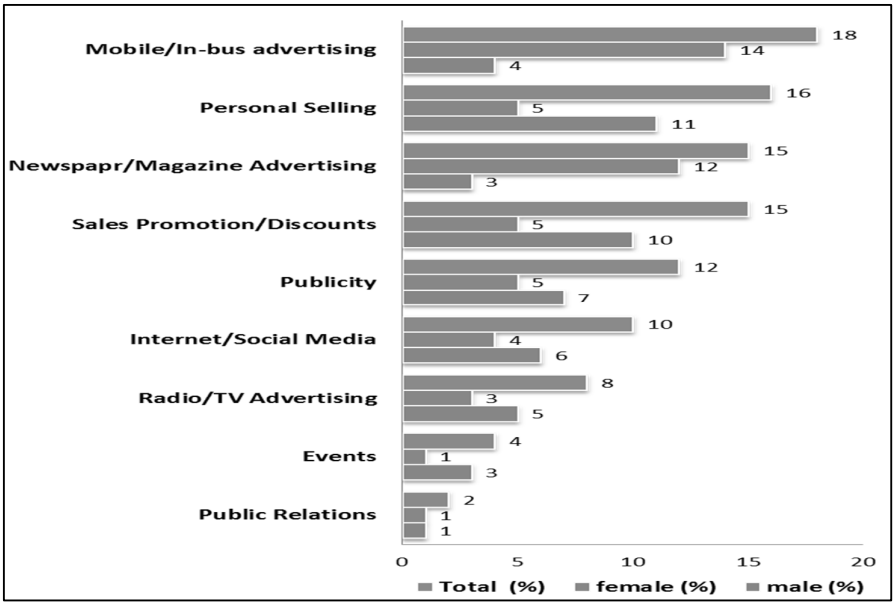

Fig. 3: Herbal marketing communication outlets for men's male reproductive problems

Conclusion

Preliminary results of this study show the people's awareness of the marketing communication tools used by manufacturers to promote male reproductive products in Lagos, Nigeria. There are health implications of encouraging public consumption of unapproved herbal products; more so, where the people openly recommend herbal remedies for men's male reproductive problems. Manufacturers of herbal male reproductive products and their activities need to need monitoring through constant research which this study is at the forefront. More reviews and collaborations are necessary for the achievement of greater success in ensuring better health for men's reproductive property.

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The Content of the Concept of Cost for Accounting Purposes

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Abstract

The most important indicator of the economic efficiency of production is cost which reflects all aspects of economic activity and accumulates the results of the use of all production resources. The rate of expanded reproduction, financial performance and the financial condition of the economic entity depend on its level. Therefore, this indicator remains a tool for accounting assessment and the basis for calculating financial results. Practitioners always needed to know the boundaries of cost in which in a particular market one can get predicted profits. With the beginning of market relations in our country a new concept of accounting system began to take shape; the attitude towards industry regulatory documents reflecting the specifics of the production process has changed in the accounting community. This is not entirely justified since each industry and organization functioning in it has its own specific features. Differences arise in many ways including the formation of the cost of finished products (works, services), the proportion of its economic elements. They are associated not only with the industry specifics of production processes but also with different levels of technical equipment and the peculiarities of objects of labor.

Keywords: Cost, Expenditures, Expenses.

Introduction

At present, the theoretical and practical importance of the economic category of cost is of universal scientific interest. In fact, it exists regardless of ownership and types of economic activity since only its practical purpose, structure and system of assessment are changing, but not the economic nature and impact on the financial result. Quite often in scientific sources the term "cost" is replaced by such categories as "expenditures" and "expenses" which are often perceived as synonyms. Therefore, it is important to understand and distinguish between these economic categories.

Materials and Methods

To achieve this goal it is necessary to get acquainted with the scientific views of academic economists in the field of accounting and analyze various situations. Such an approach will allow a more detailed understanding of the semantic content of the concepts of cost, expenditures and expenses. To understand the concept of cost in modern economic theory and practice it is necessary, first of all, to consider such economic categories as “expenditures” and “expenses”. Very often in the domestic economic literature at the level of an economic entity these concepts are used as synonyms. We do not support this view.

The economic definition of expenses today is given in the Russian accounting standard – Russian Accounting Regulation “Organization Expenses” (RAS 10/99). It recognizes expenses as “a decrease in economic benefits resulting from the disposal of assets (cash, other property) and (or) the emergence of obligations that lead to a decrease in the capital of the organization, with the exception of a decrease in deposits by decision of the participants (property owners)”. The conclusion suggests itself here: all that reduces assets are expenses, in other words, they are flows of values leaving the company.

It can be noted that the criteria for recognizing expenses in Russian accounting standards (hereinafter RAS) are closer to the International Financial Reporting Standards (hereinafter IFRS). The Conceptual Framework for Presenting Financial Statements (http://minfin.ru/) discloses the definition of expenses and the conditions for their recognition in accordance with IFRS. Thus, expenses are understood as “a decrease in assets or an increase in liabilities that lead to a decrease in equity, not related to its distribution in favor of holders of claim rights in respect of the organization’s equity”.

To In accordance with the Conceptual Framework for Financial Statements, in case of sale of an asset expenses may be reflected in the statement of financial performance:

1. In the historical value of the sold (consumed) asset.
2. At the fair value of the asset sold (consumed).
3. At the cost of using the sold (consumed) asset.
4. At the current replacement cost of the sold (consumed) asset.

In this case, the cost estimate directly depends on the accepted valuation of the organization's assets. At the same time, the choice of the assessment method should correspond to the qualitative characteristics of useful information - the relevance and veracity of the presentation:

• The relevance of the information provided on the basis of the assessment depends on the characteristics of the asset or liability and their contribution to future cash flows;
• The faithful representation of information provided using the valuation method depends on the inconsistency and uncertainty of the valuation.

In international accounting there is no single standard governing expenditures and their accounting. Each cost element is reflected in a specific standard. So, for example, IFRS (IAS 2) “Inventories” regulates the assessment of expenditures for materials, IFRS (IAS 16) “Fixed assets” - the expenditures on depreciation. The term “expenditures” is used in IFRS when it comes to the accumulation of spent resources, income from which will be received in the future. It turns out that the expenditures are a monetary estimate of the resources used. In the financial statements they are included in the assets of the organization until they are recognized as expenses or losses.

Today in Russian theory and practice there is no officially fixed concept of expenditures. This gives rise to a variety of interpretations, both in the economic literature and in various regulatory acts. M.S. Koske and Yu.G. Mishuchkova quantitatively described the terms “expenses” and “expenditures” in Russian accounting standards. The frequency of use of the term "expenditures" is equal to or greater than the frequency of use of the term "expenses". Of the 24 current accounting regulations the term “expenditures” is not used in 12.

In the national accounting standards the terms “expenditures” and “expenses”, in our opinion, are used as synonyms. Kaverina O.D. and Lebedeva P.M. rightly note that "the uncertainty of terminology gains even greater importance due to the fact that there is no strict division of expenditures (expenses, costs) based on the principle of conformity, according to which expenses reduce revenues of the same reporting period." This fact prevents the computer formalization of accounting and leads to tax violations. We mean here applying the accrual principle or the cash basis to reflect in the accounting operations related to the calculation of profit.

We systematize different points of view on the economic categories of expenditures and expenses considered in various Russian literary sources (Table 1).

Table 1: Comparative analysis of the terms "expenses" and "expenditures" in scientific and methodological sources

Author / Literary Source	Description of the concept of expenses	Description of the concept of expenditures
1. Conceptual Framework for Financial Statements	a decrease in assets or an increase in liabilities that result in a decrease in equity not related to its distribution in favor of holders of claim rights in respect of the organization's equity	No description
2. RAS 10/99 "Organization Expenses"	a decrease in economic benefits resulting from the disposal of assets (cash, other property) and (or) the occurrence of obligations leading to a decrease in the capital of this organization, with the exception of a decrease in deposits by decision of the participants (property owners)	No description
3. Rumyantseva E.E. New Economic Encyclopedia // 2nd ed. M .: INFRA-M 2006. - 810 p.	1. Consumption of resources in the process of production of goods and services. 2. Cash spendings of the organization during the reporting period as a result of economic activity	Category of accounting, documented expenses actually incurred on a specific date
4. Reisberg B.A. Dictionary of modern economic terms // 4th ed. M .: Rayris-press – 2008. -480 p.	Material and cash resources spent in the production process and for consumption	Spent resources, expenses (including time) for the production, purchase of goods, services
5. Badmaev Ch.A., Badmaeva E.A.	Part of the expenses incurred by the organization corresponding to the income received (products produced and sold in the reporting period) or limited by the end of the reporting period	The monetary value of the used material, labor, financial, natural and other types of resources for the production and sale of products, the value of which must be measured with sufficient reliability
6. Efremova A.A.	A decrease in economic benefits during the reporting period taking the form of an outflow or depletion of assets or an increase in liabilities leading to a decrease in capital, not related to its distribution between shareholders	Something that does not reduce the capital of the organization. Expenditures result in either assets or expenses
7. Druzhilovskaya T.Yu.	Decrease in economic benefits due to a decrease in assets or an increase in liabilities, expressed in a decrease in capital not related to transactions with owners	Material and labor resources consumed in the process of production, provision of services, performance of work, expended in the process of creating or acquiring assets, or aimed at paying off liabilities
8. Konstantinov V.A.,	Part of the expenditures incurred by the	Cash payment for purchased

Ginover M.E., Alimov S.A.	company in connection with income	goods and services, which over time will be deducted from profit (as expenses)
9. Kuvaldina T.B.	A decrease in assets or an increase in liabilities expressed in a decrease in the capital of an organization that is not related to its distribution between shareholders.	Cash payments related to the acquisition of resources (tangible, intangible, labor, financial) that are consumed in the course of the current, financial and investment activities of the organization and are accumulated in the reporting period in the form of assets in the balance sheet or in the form of expenses in the income statement
10. Sokolov Y.V.	Everything that the organization spends. The part of expenses that relates to future reporting periods is capitalized and shown in the asset balance	The part of expenses related to this reporting period

The list of interpretations of the concepts of expenses and expenditures can be continued since a lot of scientific work has been devoted to these economic categories at the present stage of economic development. Obviously, the interpretation of the above economic categories in literary sources is so diverse that today accounting professionals are concerned with the problem of ensuring the terminological accuracy of these categories, since accounting should reflect reliable information about the property status and financial performance of the company.

The absence of a formalized concept of expenditures which would be used in RAS 10/99 “Organization Expenses” and a number of other Russian accounting standards, gives rise to a variety of points of view in the economic literature and regulatory acts. Probably in this situation accounting specialists need to rely on professional judgment, which in essence is a professional assessment of all the available objective factors that can affect decision making in the face of uncertainty. Hence the need for high professionalism of practitioners and their clear understanding of the essence of the considered economic categories.

In foreign publications these economic categories are indeed regarded as synonyms. So, for example, the English word “cost” has many meanings, among which are costs, expenses, price. Words such as “cost” and “expenses” often replace each other. In fact, the English word “expenses” means expenses, expenditures and costs. In the dictionary of accounting terms (J. J. Siegel) it is only noted that when the benefits associated with the acquisition of a good or service are exhausted the cost of their acquisition becomes a loss or expense. The meaning of English words which in essence mean the same thing changes when they are accompanied by other words, e.g. direct cost, administrative expenses.

The question arises: "What is the sequence of expenditures and expenses from the point of view of accounting?" The authors join the opinion of specialists who believe that expenditures are the monetary value of the material, labor, financial and other resources used in the economic activity of the organization for the reporting period. Expenditures arise when a company acquires economic resources. They can be charged either to assets or to expenses. Expenses, in the general sense of the word, are one of the factors that affect the financial result of a company along with incomes that have the opposite direction, and allow to get a result in the form of profit or loss as a result of economic activity, ordinary or other. Therefore, we can assume that the expenditures relate to assets or expenses depending on their implementation target. If the objective is to create a fixed or current asset the expenditures are recognized as assets. If there is no such setting then it is obvious that the

expenditures incurred reduce the economic benefits of the company without creating any property and are reflected as expenses.

An interesting approach is expressed by professor Ya.V. Sokolov to the terms “expenditures” and “expenses”. He believes that "the expenses that are reflected in management accounting should be considered expenditures, while financial accounting is about expenses."

Kiryanov I.V. concludes that “expenses are part of the expenditures but one that did not lead to the formation of an asset.” At the same time putting an equal sign between availability of economic benefits and creation of an object of property seems to us not entirely legitimate. We can disagree with I.V. Kiryanov’s opinion since the following question arises: what about other expenses that will never be expenditures? Indeed, in accordance with RAS 10/99 “Organization Expenses”, expenses are divided into expenses from ordinary activities and other expenses. It is necessary to clarify that part of the expenditures are, after all, expenses from ordinary activities. Expenses are one of the elements of the statement of financial results along with incomes. It turns out that expenses are either reflected on account 90 “Sales” or on account 91 “Other Expenses and Income”.

A.A. Gribanov and M.V. Kudinov believe that “the concept of expenditures cannot be defined unambiguously, it is necessary to study it within the framework of individual business processes and distinguish the following groups:

1) expenditures associated with the acquisition of inventories, their storage, internal movement, etc .;
2) expenditures that arise directly in the production process and due to the manufacturing technology of finished products (works, services);
3) expenditures related to the process of sale of finished products.”

We dare to disagree with the fact that in the process of selling finished products expenditures arise since at the time of sale of finished products expenditures are transformed into expenses.

In our opinion, overhead and general expenses are of particular interest. So in accordance with RAS 10/99 “Organization Expenses” general business expenses can be distributed between types of finished products and reflected in account 20 “Main Production”, or without distribution can be immediately transferred to account 90 “Sales”. These types of expenses have a dual nature. In the first case, general expenses are recognized as expenditures and in the second case as expenses. In accordance with the chart of accounts these expenses are recorded on account 26 "General Business Expenses". In this connection the question begs: "Why only expenses"? It might be more correct to rename it to “General Business Expenses (Expenditures)”. A similar situation has developed with account 25 “General Production Expenses”. General production expenses are indirect expenditures which at the end of the reporting period should be allocated and charged to account 20 “Main Production”. Consequently, the organization incurs expenditures, but not expenses, and it would be more accurate to define account 25 as general production expenditures.

We consider A.V. Zonova’s point of view to be interesting, according to which “general business expenses and expenses of future periods should be excluded from the composition of objects of accounting for the production process, and with a certain reorganization, those serving production and economy should also be excluded. The expenses for these facilities not included in the cost of products (works, services), will be immediately charged to expenses of the period. ” But what if these accounting objects are included in the cost of labor products? Then they will be recognized in the account as expenditures and their exclusion from the structure of objects of accounting of the production process will be unlawful.

Research results and discussion

The interpretation of such categories as “expenses” and “expenditures” will be more understandable and in demand when specifying an equally important economic category of cost. The economic nature of prime cost has always been and still is among the scientific and practical priorities. The term denoting cost is relatively new for Russia. Studies by leading economists indicate that the term appeared in the Russian language in 1912 and is associated with the works of A.P. Rudanovsky, M.P. Ter-Davydov and N.F. Von Dietmar. According to Rudanovsky A.P., “prime cost is a probable value” because it is calculated at actual expenditures and is one-sided due to the difference in the price level for the same materials. Until that time the concepts of “own value”, “value”, “production value”, etc. were used.

Since then various interpretations of cost have appeared in scientific sources on accounting and analysis (Table 2).

Table 2: Description of the concept of cost proposed in the special literature on accounting

Author / Literary Source	Cost is
Vakhrushina M.A.	a set of expenditures of an enterprise for the production and sale of products expressed in monetary terms
Ivashkevich V.B.	
Kiryanov I.V.	objectively necessary connection of the elements of expenditures providing through quantitative indicators the integrity of the implementation object, allowing by the specifics of its formation to uniquely identify the agent of economic relations as an independent business entity
Anthony R., Rhys J.	monetary value of resources used for specific purposes
Needles B, Anderson H., Caldwell D.	production costs for manufactured but unsold products, i.e., as if materialized expenditures, and that is why they can be taken stock of

Each of the above definitions in Table 2 is based on determining the amount of resources spent in monetary terms without specifying that they should operate on the concept of expenditures, not expenses. Expenditures are transformed into expenses from ordinary activities as a result of the sale of a product of labor in the reporting period, and otherwise into company assets. Therefore, expenditures cannot be interpreted as the cost of finished goods. It must be clarified that this position is valid only for the production cost of finished products. The full cost differs from the production cost in the way that it is supplemented by selling expenses which are recorded on account 44 “Sales Expenses”.

Basically, the prevailing opinion among academic economists is that cost is the total expenditures of an enterprise for the production and sale of products, expressed in cash. In the previous Regulation on the composition of the costs of production and sale of products (works, services), and on the procedure for the formation of financial results taken into account in the taxation of profit, it was said that the cost of products (works, services) is considered as a valuation of natural resources, raw materials, fuel, energy and labor resources, used in the production of products (works, services), as well as other costs of production and sales. According to the document, cost can include all expenditures that are of a production nature and the expenditures associated with the sale of labor products. But since 2002 the term denoting prime cost is not officially enshrined in regulatory documents in our country.

In our opinion, the ratio of the categories “expenses”, “expenditures” and “cost” can be represented as follows (Fig 1).

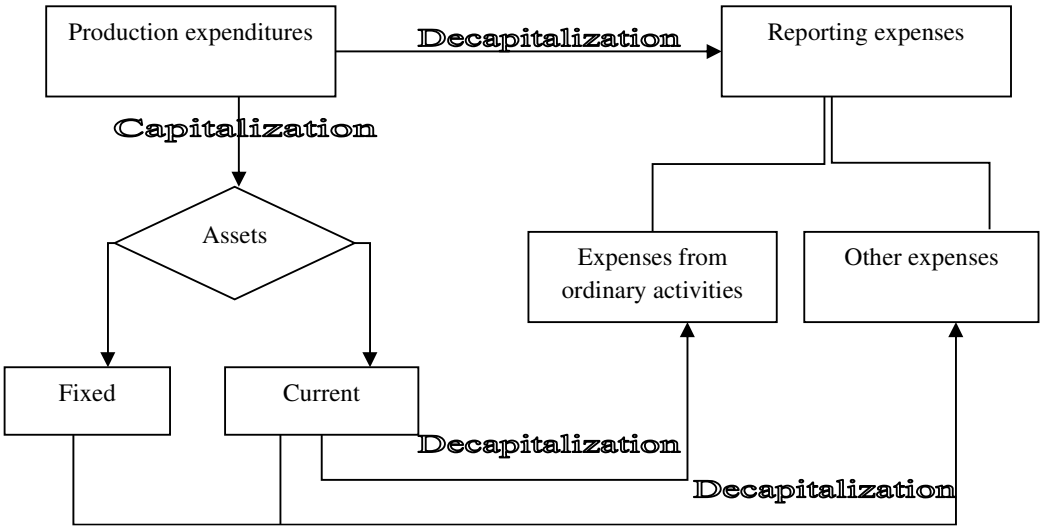

Fig. 1: The ratio of the categories "expenditures" and "expenses"

From the above figure it is seen that in case of capitalization of expenditures fixed assets (accounts 08, 01, 04) or current assets (accounts 10, 43, 20, 23, 25, 26, 28, 29) arise in the organization. In case of decapitalization of expenditures they are transformed into expenses of the reporting period and are reflected in the statement of financial performance. In case of decapitalization of fixed assets they will be written off as other expenses (account 91 "Other Income and Expenses"), upon disposal of current assets they will be reflected as expenses from ordinary activities (account 90 "Sales"). In this case the cost of work in progress is reflected in the balance sheet as the balances of accounts 20 "Main Production", 23 "Auxiliary Production", the cost of finished goods - as balances of account 43 "Finished Products", the cost of sales will be shown in the statement of financial results as expenses from ordinary activities. Thus, the cost of production can be reflected both through the category of expenditures and through the category of expenses. Therefore, the cost of production is probably one of the most controversial economic indicators that accounting specialists deal with in theory and practice. It is very difficult to find the only true definition of cost that would satisfy all its aspects.

In this regard, one can agree with the views of individual researchers who believe that the cost of products (works, services) is a synthetic indicator. In any case, cost is a quantitative indicator in the monetary measure of production expenditures and expenses associated with the sale of product (Fig 2).

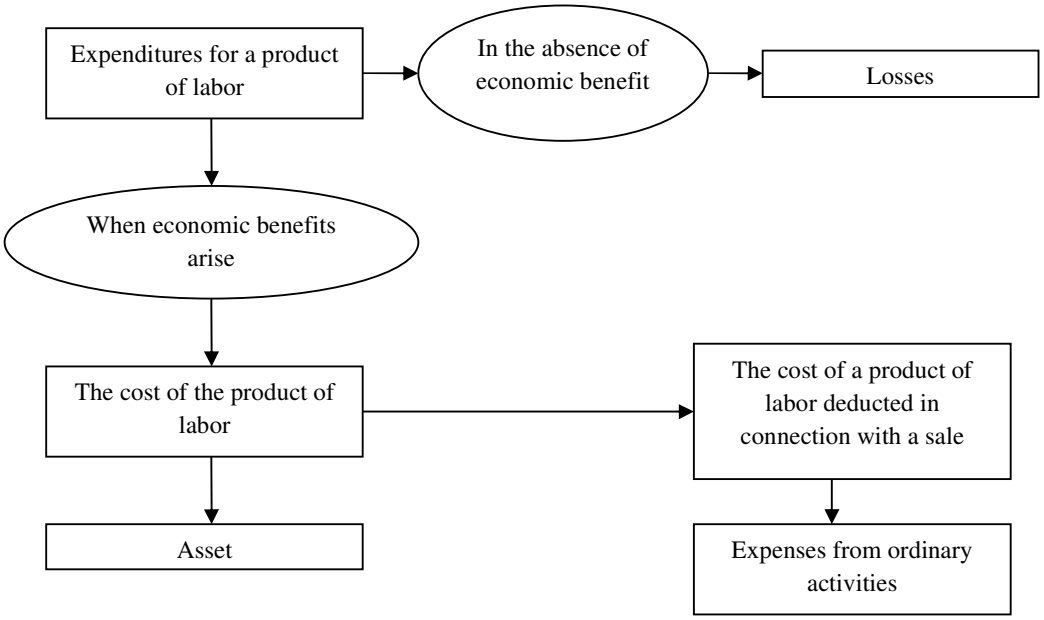

Fig. 2: The relation between expenditures, costs and the cost of a product of labor

Conclusion

To summarize the above, we can draw the following conclusions. The concept of cost arises in the production process, it shows a monetary value of the resources spent in the production process, that is, the expenditures incurred. In relation to the manufactured products the prime cost is formed at the end of the production process, and in relation to the sold products at the end of the sales process. It turns out that there is a relation and interdependence between the analyzed categories of expenditures and expenses. Their common features are manifested in the concept of the cost of a product of labor. In this regard, the cost of a product of labor refers to the amount of actual expenditures incurred in its production. The cost of labor products written off as expenses in connection with the sale is a qualitative indicator of the company and reflects the efficiency of its work, as well as the main factor in generating profit. The cost of a product of labor turns into expenses for ordinary activities only when the product is sold. Until the moment of sale products (works, services) are accounted for as part of the company's assets at cost.

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Methodological Assessment Approaches and the Results of Modern Bank Profit Management Practices

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Abstract

Increasing the efficiency of the bank and, as a result, strengthening its financial stability requires the implementation of effective management in the field of managing bank profits and profitability, which determines the need and significance of relevant research.
The purpose of this work is to identify reserves for growth in profitability, improve the quality of the income base and, on this basis, formulate recommendations for adjusting the banking policy in the field of passive and active operations. The scientific novelty of the study is as follows: the author's classification of income and expenses is proposed, allowing them to be structured both by categories of banking business types of services in the financial markets, and taking into account the stability of sources of income base.
This makes it possible to identify profitable / loss-making centers by types of banking operations; destabilizing factors of revenue and profit management of leading Russian banks were identified; reasonable recommendations are given to improve the efficiency of this area of banking management.

Keywords: Bank, Financial Management, Analysis, Revenue And Profit Management

Introduction

The issues of improving the analysis methodology, developing the theory and practice of managing financial results of banking activities in order to identify reserves for increasing profits and ensuring profitable activities are very relevant in the financial management of the bank and strengthening its market position. Without a competent analysis of the financial results of the bank and identification of both driving and destabilizing factors affecting income and profit, it is impossible to ensure the necessary level of bank profitability and its steady growth.

Management of income and profit of the bank is a complex multifunctional mechanism, consisting of individual links that are closely related. In this article, from the perspectives of development and improvement, we consider such elements of the methodology of the above management as the

analysis of the income and profits of a commercial bank, the use of methods to assess the quality of the income base, structure and level of stability of banking profit, the development of recommendations on the current regulation of the bank's income and profits (Yanikkaya H., 2018, Aydemir R., 2016, Meijer E., 2017).

Materials and Methods

The study involved teachers and students of the Chuvash State Agricultural Academy. The scientific problem was studied using data from PAO 'Sberbank of Russia' as the largest bank in the banking system of the Russian Federation, and other banks that are leading ones at the federal and regional levels.

The studied methods of the analysis of income and profit of the bank record that the analytical work necessary to be conducted should include the following blocks: the analysis of the structure and dynamics of income and expenses, calculation and analysis of indicators of profitability of assets, including their constituent elements; calculation and analysis of cost indicators of resources attracted for investments; analysis of the structure and dynamics of profit, calculation and evaluation of profitability and bank margin indicators, factor analysis of profit and profitability indicators (Alekseeva N.V., 2017).

We believe that the analysis and assessment of the optimality of the structure of the bank's revenue base is a determining unit in the management of profit and profitability of the bank. At the same time, the effectiveness of this work and the validity of the conclusions directly depend on the rationality of the applied income classification, the correct choice of the methodology for their analysis. According to the authors in the field of banking financial management, it is advisable to classify bank income for the purpose of subsequent analysis according to the criteria listed below (Alekseeva N.V., 2017, Starodubtseva E.B., Markova O.M., 2018, Gilyarovskaya, L.T., 2012, Scherbakova, G.N., 2007, Ahamed M.M., 2017, M. Chen, 2017): by a type of business (lending, operations with securities, settlement services, etc.); by nature income is divided into operating (related to banking operations and transactions) and others; operating income is classified according to the form of income on interest and non-interest ones; according to the form of income (interest, commission, exchange rate differences, etc.); in terms of stability.

At the same time, relatively stable sources of income include interest income and commission income from banking services; unstable - income from operations in speculative financial markets (securities market, foreign exchange market, precious metals market), from unforeseen (one-time) operations (sale of property, fines and penalties, sale of collateral, etc.). The studied methods establish that the desired direction of the bank's development is income growth due to stable sources, the absence of significant influence of unstable sources of income on profit growth (Shcherbakova, G.N., 2007).
The expenses of a commercial bank are classified, in addition to the criteria listed above, by the method of accounting, by the impact on the tax base, by the method of limitation (the possibility of rationing). Based on a generalization of the applied classifications of income and expenses of the bank, it is necessary to develop a structuring that combines the accounting of the basic classification criteria (Alekseeva N.V., 2019).

This new approach to revenue structuring will allow developing and applying in an effective analysis indicators characterizing the quality of the income base and allowing to identify the reserves for the formation of the optimal structure of bank income and profit; eventually this makes it possible to identify profitable / loss-making centers by types of banking operations (Shcherbakova, G.N., 2007, Belousova V., 2018, Djalilov, K., 2016,).

To achieve the goal and objectives of the study, general scientific approaches and methods were used - system analysis, abstract-logical, analogies, generalizations and systematization.

Research Results and Discussion

Based on the results of a generalization of the applied classifications of income and expenses of the bank, we proposed structuring that combines the consideration of classification criteria such as the nature, form of income (expense), type of business from which income (expense) is derived, and the level of stability. According to the results of the recommended classification of incomes, we have accessible, easily identifiable data that allows us to group the income base items by degree of stability and evaluate its level. In general, this differentiation of incomes (expenses) allows us to more fully, comprehensively assess the optimality of the structure of incomes (expenses) and identify the centers of profitable (unprofitable) activities of the bank by business categories and types of operations (Alekseeva N.V., 2017).

To conduct this analysis, we have developed and proposed the following forms of analytical tables (table 1, table 2). PAO "Sberbank of Russia" was selected as the object of income and profit analysis (the analysis was carried out using the data on the financial results report as part of quarterly bank statements for Sberbank of Russia, available on the Central Bank of RF website).

Table 1: Structure and dynamics of income of PAO Sberbank of Russia for 2016–2018.

Indicator	01.01.2017		01.01.2018		01.01.2019		Rate of change%	
	Amount, million rubles	Specific gravity, %	Amount, million rubles	Specific gravity %	Amount, million rubles	Specific gravity %	2017 to 2016	2018 to 2017
I Operating income	105088194	99,9	61627663	99,9	81 859 205	99,9	58,6	132,8
1. Interest income	1 985 375	2,0	1950 211	3,3	2 000 450	2,4	97,7	98,4
2. Non-interest income, including:	103008 428	97,9	59595492	96,6	79 858 755	97,5	57,8	134,0
2.1 operations in foreign currency	94 778 893	90,1	56616873	91,8	74 906 115	91,5	59,7	132,3
2.2 commission, including:	360 619	0,3	443 631	0,7	581 635	0,7	123,1	131,1
- for cash management services	275120	0,2	323 780	0,5	451 402	0,5	117,4	139,6
2. on investments in securities	24 877	0,0	39 550	0,1	38 614	0,1	156,0	97,7
2.4 other operating income	7 844039	7,5	2 495 438	4,0	4 332 391	5,2	31,8	173,6
II Other income	105 194	0,1	24 318	0,1	24 580	0,1	22,8	101,2
Total	105193388	100	61651981	100	81 883 785	100	58,6	132,8

According to the table, the total volume of the bank's revenue base increased in 2018 by 20,232 billion rubles. or 32% and as of 01.01.2019 amounted to 81,883 billion rubles. The basis of the

bank's operating income is non-interest income, their share increased by 0.9 percentage points in 2018 and as of 01.01.2019, it amounted to 97.5%. The largest share in the structure of non-interest income is occupied by income from operations with foreign currency (income from the purchase / sale of foreign currency and positive revaluation) and other operating income (mainly represented by income from the restoration of the amount from reserves).

Interest income makes up a small part of the bank's income; and their share, significance in the revenue base decreases - by 0.9 percentage points for 2018.

It should be noted that interest income for a bank operating in a stable economy, the basis of which is lending, should also determine the basis of the income base - 50-60% of the amount of income in accordance with the recommendations of experts. Low interest income for 2016-2018 indicates that the total income of the bank and the financial result is little dependent on credit operations.

In general, the bank's stable incomes make up a low share, their share was: 2.3% of the revenue base as of 01.01.17, 3.1% as of 01.01.19

Based on the results of the analysis of the structure and dynamics of the bank's revenue base, we will assess its quality according to table 2.

Table 2: Dynamics of income quality indicators for PAO Sberbank of Russia for 2016-2018.

Indicator	2016	2017	2018	Absolute change., +/-	
				2017 year from 2016	2018 year from 2017
The share of stable income in the revenue base,%	2,3	4,0	3,1	1,7	-0,9
The share of interest income on credit operations in the income base,%	1,8	3,0	2,2	1,2	-0,8
The share of income from operations in speculative financial markets,%	90,1	91,9	91,6	1,8	-0,3

According to the table, the share of stable incomes remains extremely low and indicates a high dependence of the income base and financial result on the effect of the bank's activity on speculative markets, which means a low level of quality of the income base and the instability of the bank's performance.

Comparison of income and expenses classified according to the proposed methodology makes it possible to identify centers of profitable (unprofitable) activities of the bank by business categories and types of operations. To conduct this analysis, it is proposed to use table 3.

Table 3: Dynamics of profit indicators of PAO Sberbank of Russia for 2016–2018.

Indicator	Amount, million rubles			Rate of change%	
	2016	2017	2018	2017 to 2016	2018 to 2017
1. Interest income	1201 559	1301 788	1275 961	108,3	98,0
-interest income	1 985 375	1950 211	2 000 450	98,2	102,5
-interest expenses	878 207	730 383	724 489	83,1	99,2
2. The costs of ensuring the activities of the bank	583 937	626 982	688 424	107,4	109,9

3. Profit before tax	647 895	845 885	1 002 587	130,6	118,4
-income	105193 388	61 651 981	81 883 785	58,6	132,8
- expenses	104545 493	60 806 096	80 881198	58,1	133,0
including for individual elements:					
3.1. Profit from operations with foreign currency	42 219	26 348	27 467	61,9	104,2
- income	95 066 976	56 616 873	74 906 115	59,7	132,3
- expenses	95 024 757	56 590 525	74 878 648	61,2	132,2
3.2. Profit from commission operations:	338 961	386 343	433 082	112,5	112,2
- income	381 922	443 631	514 912	115,9	116,2
- expenses	42 961	57 288	81 830	132,5	143,8
Profit for the reporting period	498 289	653 565	782 182	131,1	119,7

According to the analysis, the following main sources (centers) of profitable activities of the studied bank were identified:

- profit from traditional deposit-lending activities (interest income); despite the fact that interest income (expenses) occupy an extremely insignificant share in the bank's income (expenses), interest income is the main source of positive financial result of PAO Sberbank of Russia, which is determined by the size of the margin at the rates of placement and attraction of resources;
- the importance of profit from commission operations of the bank is growing (formed due to stable sources of income);
- during periods of increased instability of financial markets, a significant source of net profit of the bank becomes profit from operations with foreign currency, the income of which is estimated as unstable, negatively affecting the stability of the financial result.

For further growth in the volume of profit and ensuring its stability, the following regulatory measures of financial management in the bank are necessary:
- ensure the outstripping growth of interest income in relation to interest expenses, interest margin;
- ensure the outstripping growth of commission income and bank profits; a determining influence on the dynamics of profit of stable sources of income and profit will determine the stability of its growth, a high level of forecasting accuracy;
- limiting the impact on the size and dynamics of the bank's profit of financial results from operations in the foreign exchange market, the income and expenses of which are unstable, speculative in nature, which determines the element of instability, uncertainty in profit planning.

To assess the results of modern practice of managing income and profits in the banking sector of the Russian Federation as a whole, we consider the relevant data for the leading regional and federal banks (table 4) [3].

Table 3: Dynamics of indicators characterizing the optimality of the structure of income and expenses for individual banks for 2015-2018.

Indicators	Share in the amount of income / expenses, %			
	2015 г.	2016 г.	2017 г.	2018 г.
PAO Sberbank of Russia				
1. Interest income of all, including:	2,1	2,0	3,3	2,4
- on loans	2,0	1,8	3,0	2,2
2. Income from operations with foreign currency	90,3	90,1	91,8	91,5
3. Commission income	0,4	0,3	0,7	0,7
4. Expenses on operations with foreign currency	90,6	90,9	90,8	91,4
PAO VTB Bank				
1. Interest income of all, including:	3,8	5,2	7,2	5,4
- on loans	3,6	4,9	6,8	5,0
2. Income from operations with foreign currency	90,7	87,8	81,4	83,1
3. Commission income	0,1	0,1	0,1	0,3
4. Expenses on operations with foreign currency	90,8	87,9	82,6	83,4
PAO AKB CHUVASHCREDITPROMBANK				
1. Interest income of all, including:	23,3	23,5	28,3	26,9
- on loans	22,1	22,9	27,5	26,6
2. Income from operations with foreign currency	45,2	41,2	37,3	43,3
3. Commission income	3,6	4,5	6,1	6,9
4. Expenses on operations with foreign currency	43,9	40,3	32,5	38,5

The analysis of the structure of income / expenses for individual federal and regional banks allows us to state that if the volume and dynamics of the income and expenditure base for the largest, federal banks are determined by non-interest transactions, which are overwhelmingly represented by operations in the foreign exchange market, then the level and change of the final financial result is almost entirely dependent on the bank earned interest income; non-interest income plays the role of an additional element, the effective regulation of which is appropriate, significant for the bank, but not as productive as in relation to interest-bearing operations [2, p. 43].

In the activities of regional banks, the share of stable sources of income is high, close to the recommended rate; dependence on speculative financial markets is assessed as low, and the financial result is determined by the results of the traditional banking business.

Based on the results of the analysis, the following negative, destabilizing problems and factors determining the dynamics of revenues and profitability of PAO Sberbank of Russia and banks in the banking sector of the Russian Federation as a whole were identified:

1. The extremely low interest income in the income base (2-10% for federal banks against the norm of 40-50% for a bank operating in a stable economy);
2. The extremely low level of stable income in the revenue base (3-15% of the revenue base for federal banks and up to 35% for regional banks); however, according to the standards of banking financial management (according to a number of well-known authors and experts in banking), it is stable incomes that should form the basis of the bank's income, and their dynamics should play a

decisive role in the dynamics of the income base as a whole and the bank's profit, and ensure their stability and sustainability. values
3. The extremely high dependence of the volume and dynamics of the revenue base on unstable sources of income, namely income from operations in speculative financial markets (primarily in the foreign exchange market) (up to 90% of all revenues from federal banks and up to 50-60% of income bases for regional banks); the high level and determining value of these incomes negatively affects the stability of the financial result of the bank, determines the element of uncertainty in profit planning.

Conclusion

Thus, the proposed classification of income and expenses made it possible to identify significant centers of profit formation for the bank under study, which makes it possible to assess the quality of profit-generating elements (stable or unstable), determine regulatory measures, and assess the possibilities of forecasting the dynamics of its financial result for the future.

According to the results of the study, the following relevant areas of increasing the revenue base, increasing the level of its stable components, as well as limiting the costs of a modern Russian bank in order to maximize profits can be identified:

- minimization, maintenance of the optimal level of interbank credit, including from the Central Bank of the Russian Federation; a significant share of borrowings on the interbank credit market, including from the Central Bank of the Russian Federation, in the liabilities of the bank balance sheet, according to experts, indicates the presence of reserves to increase its profit and profitability; the formation of a balanced deposit portfolio (term deposits and demand deposits) leads to a decrease in the volume and level of interest expenses on attracted resources, implying a limitation of the share of paid deposits based on the calculation of indicators of the effectiveness of the use of deposit resources;
- measures to regulate credit risk were directed to limit the costs of creating reserves for possible losses on loans; in this case, the recovery from reserves will be balanced or higher than spending funds in reserves; both items occupy a significant share in the income and expenditure base of banks;
- the steady growth and significant place of commission net income in the formation of the financial result positively characterizes the financial management of the bank, testifies to the wide scale of the provision of commission services of settlement-cash, investment nature, the dynamic growth of the clientele.

The results of the study lead to the conclusion that the strategic direction of ensuring the rise in profits and profitability of the bank's activities is currently the outstripping growth of stable categories of income sources, in connection with which the most relevant and promising are commission operations of a settlement and investment-intermediary nature, which determines the need for their further expansion, improvement and promotion within the framework of effective banking marketing.

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Management of Innovation in the Agricultural Sector

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Abstract

Sustainable development of the agricultural sector of the country's economy is largely determined by the effectiveness of innovation in the industry. The development of innovations provides a systematic update of the organizational, economic, technological and technical base of agricultural production and the production of competitive products.

However, the current socio-economic situation in the agricultural sector of Russia suggests that, due to imperfect technologies based on knowledge of domestic and foreign literature, forms and methods of management in agriculture, the industry cannot compete with foreign exporters of products.

In addition, there is a tendency to increase the dependence of the country's agriculture on other states in relation to varieties, breeding livestock and poultry, and agricultural machinery. Breeding enterprises of the country with an unsatisfactory material and technical base cannot provide the domestic agricultural industry with the necessary amount of breeding material for stable operation.

In this regard, research is needed aimed at improving the innovation management system in the agricultural sector in order to increase the efficiency of investment in innovation, ensuring continuous growth in economic efficiency and expanded reproduction. Based on these provisions, it is possible to determine such tasks of scientific research as determining the main elements of the innovation process in the agricultural sector, identifying and analyzing the factors that determine the transition of the agricultural economy to innovative technologies.

Keywords: innovation, innovation management, innovative technologies, agro-industrial complex.

Introduction

In modern conditions, the development of the agro-industrial complex is closely connected with the introduction of an innovative component in the process of organization and management of an enterprise.

Investments in innovative projects provide an opportunity to develop the competitiveness of the enterprise, improve existing technologies, create new and better products that are in demand by the population.

The indicated problems of activation of innovative processes in the agricultural sector are reflected in the works of V.M. Bautin, K.V. Baldin, Yu.S. Vasyukova, A.A. Golubev, V.I. Nabokov, K.V. Nekrasov, S.A. Sharipov, G.A. Kharisov.

Theoretical and methodological aspects of the innovation management mechanism are reflected in the works of foreign and domestic scientists, such as Archibugi D. (1999), Howells J. (1999), Michie J. (1999), P. Drucker (2012), Koschantzky K. (2000), Sternberg R. (2000), C. Christensen (2014), M. Raynor (2014), S. Sandu (2009),Howell J. (1999) and others.

However the problems of innovative development in the agribusiness sectors are not well understood and require further consideration and resolution. Especially important for the development of the theory and practice of innovation management are issues such as the study and systematization of a combination of factors that determine the transition to an innovative type of development that helps to increase the investment attractiveness of enterprises and the effectiveness of investments in innovation.

It is obvious that the ongoing changes in the investment activity of the agro-industrial complex are closely related to innovations that ensure the necessary quality of investments and the competitiveness of agricultural products based on them.

Materials and Research Methods

The object of research is the process of technological entrepreneurship in the conditions of innovative development of the national economy and its most important investment and design aspects related to the construction of a business model.

The subject of the research is the processes of innovative transformations taking place at enterprises and in the national economy as a whole, causal relationships and consequences of this process, as well as objective and subjective factors contributing to its development.

The theoretical basis of the study was the scientific and methodological works of foreign and Russian researchers, which reveal the essence of innovation and innovation, conceptual approaches to the development of strategic integration of innovation and technological entrepreneurship.

The fundamental principles that reveal the essence of innovation were formulated by the Austrian scientist J. Schumpeter in his work on the theory of economic development, where he highlighted the typical changes characteristic of innovation.

Among modern foreign researchers covering the problems of innovative development in recent decades, it should be noted the works of S. Blanck, E. Ries, M. Johnson, K. Christensen, H. Kagermann, A. Osterwalder, I. Pigne, in which they analyze the scientific methodological approaches to testing innovative ideas and building business models that contribute to their implementation.

A significant contribution to the development of methodological support for innovative management and technological entrepreneurship was made by Russian scientists. Barykin, V.O. Ikryannikov proposed a functional-dynamic model of technological startup management and methodological approaches to business modeling in the management of innovative projects. M.V. Kovaleva, L.V. Silakova, V.V. Shirokovara developed a classification of technological startups by functional areas of activity and proposed managerial approaches to their creation and development. N.N. Ilysheva, S.I. Krylov developed a balanced scorecard for the strategic management of innovation. B.E. Tokarev has developed a startup model with a feedback loop, characteristic of innovative products.

The methodological basis of the study was the historical and logical, formal and substantive approaches, methods of analysis and economic modeling.

Research Results and Discussion

The problem of the transition of the agricultural sector of the economy to an innovative type of development takes on a specific character. The issue of innovative development is introduced into the legal field. The Ministry of Agriculture approved the Concept for the Development of Agricultural Science and Scientific Support for the Agro-Industrial Complex of the Russian Federation for the period until 2025. This Concept provides for the formation of a national innovation system that ensures the effective development of the Russian agricultural sector. A Strategy for the Innovative Development of the Agro-Industrial Complex of the Russian Federation has been developed, in which priority areas are identified.

However, the susceptibility of the agro-industrial complex to innovation is still weak, which determines the need for a transition to a qualitatively new innovative type of development of the agrarian economy.

Innovations are considered from different points of view: some scientists understand innovation as a process, others as a result.

The authors adhere to the understanding of innovation as the end result of research or discovery, implemented in any field of activity.

So, innovation is the result of innovative activity. It should be noted that many authors define innovative activity as the activity of bringing scientific and technical ideas, developments, inventions to results. In our opinion, this definition must be supplemented by a set of measures ensuring the development of innovations.

The development of the innovation process in the agricultural sector is determined by a combination of external and internal factors that directly affect the management of innovation in the industry. Moreover, one of the main external factors is the inclusion of the agri-food market of Russia in the global market system, which contributes to the modernization of the domestic agricultural sector. That is, agricultural enterprises that do not meet international quality standards cannot compete with foreign goods and thereby yield a certain part of the market for imported agricultural products.

Therefore, domestic producers must focus on increasing the competitiveness of the industry, expanding the range of products, creating favorable conditions for the penetration of agricultural products into the world market, which determines the introduction of innovative technologies in the agricultural sector.

Obviously, a qualitatively new approach to high technologies and achievements in the agrarian science of Russia, which are close to the world scientific levels, is necessary. The current government measures and incentives do not contribute to the full-scale implementation of innovations and the expansion of the participation of scientific developments and research in world markets.

Under these conditions, an appropriate state policy is needed to stimulate agricultural producers to switch to innovative technologies. The way out of this situation is primarily possible only through strengthening state support for the agricultural sector of the economy and expanding financial assistance to agricultural producers in technical re-equipment.
The problem of financing innovation in the agricultural sector needs attention. It is necessary to create favorable conditions in the financial and legal sphere for the formation of an effective innovation system.

It should be noted that the creation and implementation of innovations requires not only developed science and production capable of perceiving scientific achievements, but also incentives that encourage people to use these innovations.

For the development of innovative processes in agriculture, it is necessary to determine specific measures to improve the existing regulatory legal acts and the practice of state regulation of innovative activities of agricultural organizations.

The main factor determining the transition to innovative technologies is increased competition with foreign agricultural producers. Countries with large agricultural science potential make large investments in agriculture and strive to maintain their scientific position.

The experience of such developed countries as the USA, Great Britain, Germany, Japan shows that the best results in economic development are obtained by innovation-oriented enterprises.

At the same time, the economic strategy of corporations and firms of these states is not just innovative development, but the optimization of the role and magnitude of innovative investment, which ultimately forms a special attitude of society towards the creation of the country's scientific and technical potential and determines the innovative type of economic development.

At the same time, the world trend of expanding international cooperation in the field of fundamental and applied research and the participation of foreign scientists in national research projects is also obvious. The priority task of states in this case, in our opinion, should be to create favorable conditions for both innovative scientists and investors.

In many countries where agricultural production is low, large areas of agricultural land are not cultivated. These lands are acquired by foreign investors. Such a threat also exists for the Russian agricultural sector.

It is obvious that in the sectors of the agro-industrial complex, the innovation process is a continuous process of turning research and development into innovations: new technologies, improved varieties and breeds of cattle, new forms of organization and management. However, there are a number of features that predetermine the uniqueness of approaches and methods of managing the innovation process.

It should be noted that there is a growing trend in the dependence of Russian agriculture on other states in relation to varieties, pedigree cattle and poultry, and agricultural machinery. For example, in recent years, in Russia there has been a tendency to increase the proportion of poultry of foreign selection, which is most fully displayed in broiler production. The breeding enterprises of the country with an unsatisfactory material and technical base cannot provide domestic poultry farming with the necessary amount of breeding material for stable operation. It is quite obvious that it is necessary to update the country's breeding base using the modern achievements of agricultural science.

The acute problem is the technical equipment of agricultural enterprises. The state of the machine and tractor fleet is deteriorating. In addition, it should be noted that obsolete technological structures dominate in the domestic agricultural sector. The largest share is occupied by agricultural organizations belonging to the third and fourth technological paradigm, requiring modernization. The share of the fifth paradigm, characterized by the introduction of innovations in agricultural production, is minimal. Updating the technical base on a qualitatively innovative basis will increase the efficiency of its use.

The current level of development of the personnel potential of agriculture does not ensure the effective introduction of new methods and technologies in the country's agricultural production. New trends in the technological process on an innovative basis require an increase in the quality of personnel. At the same time, information technologies, being an innovation, make it possible to

achieve compliance of the professional competencies of personnel with the requirements of the innovative development of agricultural production.

Investments in the infrastructure of the company, that is, investments in information and communication technologies, in new work processes and management systems, according to the authors, determine the development of the creative potential of the personnel and the production management process as a whole.

Investing in solving innovative problems and carrying out R&D, as well as the costs of acquiring intellectual property such as patents, know-how, brands, are one of the most important factors ensuring the modernization of the economy.

Investments in building relationships with customers, the business reputation of the company, in the quality system, market forecasting contribute to raising the status of the company both regionally and internationally. These types of investments in client capital are important for building intellectual capital.

Low rates of growth in prices for agricultural products compared with prices for material and technical resources hinder the growth of production efficiency in the agricultural sector. Active development of modern areas of science and technology and their introduction into production will increase the efficiency of the use of labor, technical, energy, natural resources and thereby reduce the cost of agricultural products.

It follows that the introduction of innovative technologies and innovations in the agricultural sector provides an increase in the competitiveness of agricultural products and the economic efficiency of agricultural enterprises.

Conclusion

Thus, innovative activity in the field of agriculture is possible, first of all, if there is a system of external and internal factors that are necessary for its effective implementation, if there is an innovative potential of enterprises, including tools and methods for creating and implementing new technologies, knowledge, products and methods of agribusiness organizations.

Moreover, the totality of factors that determine the transition to innovative technologies in agriculture can be expressed in a systematic way (Fig.).

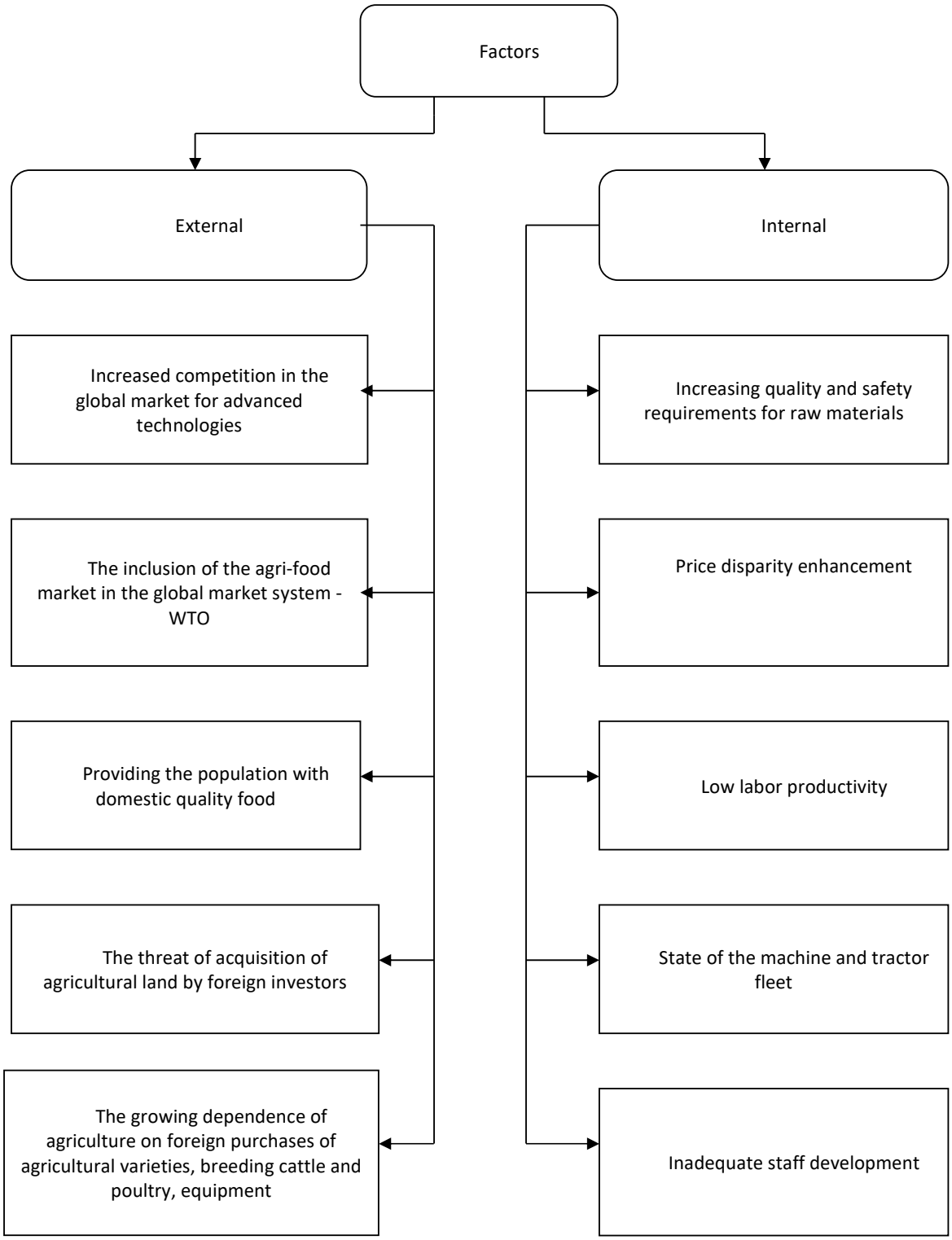

Fig. Factors determining the transition to innovative technologies in the agricultural sector

The analysis of the totality of factors influencing the innovation process in the agro-industrial complex shows that the successful implementation of innovative activity requires consideration of its features, which predetermine the uniqueness of approaches and methods of managing it. The innovative activity of the agro-industrial complex is represented by the results of the selection and genetic developments of the Russian Academy of Agricultural Sciences, innovations in crop and livestock production technologies, technical and technological modernization of agriculture, and new methods of organizing and managing modern agricultural production.

The above circumstances allow us to define the management of innovation activity as a targeted impact on innovation processes based on their planning, organization and coordination of innovation activity, motivation of its participants, monitoring the implementation of innovation projects in order to increase the return on investment in innovation and the value of the enterprise.

The specific nature of agricultural entrepreneurship, due to biological, soil, climatic and organizational factors, determines a certain discrepancy in the rates of economic growth of industry and agriculture, in the rate of return on investment in innovation, and thereby requires an improvement in the mechanism for managing innovation in the industry in modern economic conditions.

According to the authors, the following areas of improvement of the mechanism for managing innovation in the agricultural sector can be distinguished:

1. Transition to a qualitatively new approach to high technologies and achievements in agrarian science of Russia, which are close to world scientific levels.
2. Creating favorable conditions in the financial and legal sphere for the formation of an effective innovation system.
3. Updating the technical base of agricultural enterprises on a qualitatively innovative basis.
4. Making investments in information and communication technologies, in new work processes and management systems for the development of the creative potential of personnel and the production management process as a whole.
5. Investing in human resources to build intellectual capital.
6. State support for innovation, which may be available both for large enterprises and for small forms of management in the agricultural sector.

Thus, in modern conditions, the development of the agro-industrial complex is closely connected with innovative technologies, knowledge and innovations that contribute to increasing the competitiveness of agricultural products based on them. Despite the complexity of managing innovation in the Russian agricultural sector, there is enormous potential for competitive domestic products to enter the world market.

In a broad sense, the management of innovative activities allows us to solve the problems of increasing resource returns, transforming scientific, fundamental discoveries into practical solutions, and determines the competitive advantages of organizations and manufactured products.

The use of the proposed measures will contribute to the creation of a favorable macroeconomic environment for the development of agricultural enterprises that are actively mastering innovations, which, in turn, will contribute to their achievement of high financial and economic performance.

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Corruption Component of Labor Market Regulation

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Abstract

The need for labor market regulation has been the subject of debate since the turn of the century. As studies of this problem in Russia has shown labor market regulation results in numerous negative consequences. First of all, in high hidden unemployment, which affects labor productivity. However, Russian labor market has a number of distinctive features, one of them being high state participation in the economy. This leads to labor market being regulated by the state, not by the need for efficiency. However, this is not the only feature. In Russia the level of corruption is very high. Therefore, the issue of labor market regulation cannot be fully analyzed without this factor being taken into account. The paper analyzes labor corruption in sectors such as public administration, education and healthcare. It gives explanation to the extremely low productivity in these spheres. The paper shows that labor corruption significantly enhances negative impact of the existing labor market regulation in these sectors, especially in public administration.

Keywords: labor market regulation, unemployment, hidden unemployment, public sector, corruption, labor corruption

Introduction

In the previous work by Semenova A. et al (2019), the author examines the assumption of Besley and Burgess applied to the Russian labor market. It shows that in Russia existing restrictions on labor market result in negative consequences. First of all, in high hidden unemployment which affects such macroscopic indicator as labor productivity. In addition, this results in an increase in informal employment, in moving wages and salaries into the shadow economy sector and significant differences in wages. The paper considers mechanisms of this phenomenon and its causes, specific features of Russian legislation which give rise to these phenomena (peculiarities of wage formation, see (2001).

Thus, Russian economy is a good confirmation of Besley and Burgess`s thesis. One of the features of Russian labor market is the following: almost half of working people are employed in the state sector. This primarily applies to state-owned companies, state employees and officials. In addition, Russia is characterized by a very high level of corruption and this factor cannot be circumvented in the issue of labor market regulation.

The paper considers two sectors of economy that are most susceptible to corruption - the public sector and the public administration. It also analyzes the problems of labor market regulation in these sectors and an impact of corruption on this process.

Research Methods

Research sources for the study were the works by domestic and foreign scientists and economists on unemployment, the Federal State Statistics Service`s data, surveys` data and publications in scientific periodicals. The initial data for the analysis are taken from the reports of the Institute of Growth Economics named after Stolypin P.A. (2018) and Rosstat (the Federal State Statistics Service) for 2018-2019 (2019). The analysis of Russian labor market is based on the studies of Analytical Center under the Government of the Russian Federation (2001) as well as on the works by Siebert W.S. (2003).

Research results and discussion

In Russia there is a very high level of corruption. Corruption Perception Index (CPI) is used to assess the level of corruption. According to the international non-governmental organization Transparency International for 2019, Russia is 137 out of 180 in terms of prevalence of corruption in the state and economic sectors. Among countries with such a high level of corruption are Lebanon, Papua New Guinea, Paraguay and Uganda. Moreover, the number of points has not changed compared to 2018 and is 28 points out of 100. This is a very poor indicator.

Corruption naturally, one way or another, affects all areas of economic life including labor market. The analysis of labor market regulation will be incomplete if the effect of this factor is not considered. Therefore, it is imperative to take this factor into account in regulating labor market in Russia.

Directly related to labor market is a kind of corruption such as labor corruption. Note that the topic of labor corruption is currently not enough studied both in Russia and in other countries. However, for Russia this topic is quite relevant, Baitasov R.R. (2016).

In particular, the following are the most common among corruption violations of labor laws.

Protectionism (protection during employment), priority employment of some people at the expense of others (favoritism), promotion of workers on the grounds of kinship and fraternity (nepotism), personal loyalty, friendships, etc.).

Manipulations with wages (illegal deductions from wages, all kinds of offerings for one reason or another, incentive payments to one person at the expense of others, fictitious employment, use of official position for personal gain, etc.).

As shown in the works of Semenova A et al (2019) and (2001) in Russia a very significant part of wages is non-fixed payments and this leads to high hidden unemployment. However, this also creates the possibility of manipulating with wages which is the reason for labour corruption growth.

According to law enforcement reports, the most corrupt are the police, teachers and doctors. Therefore, we restrict ourselves to these sectors. According to statistics, officials and state employees make up a fairly significant part of all employees: 35.22 million people out of 70 million workers. According to the study (2018), sectors with the lowest level of value added generation per one workplace in 2017 were public administration (0.29 million rubles), education (0.37 million rubles) and healthcare (0.47 million rubles). Semenova A et al (2019), based on the analysis of value added generation per job during the crisis of 2014-2015 showed that a decrease in output did not lead to an increase in unemployment. This is due to the fact that enterprises have reduced wages of their

employees. However, the decrease in salaries in the above sectors was even more significant. Thus, hidden unemployment is even higher than in the manufacturing sector.

Let`s consider the public administration sector. According to Rosstat`s (Russian Statistical Agency) data, in Russia there are 1 million 107.3 thousand officials. In addition, according to estimates of the journal Voprosy Ekonomiki (Economy issues), there is one employee of technical personnel per official. So in general, we should talk about two millions involved in public administration. Note that in the US - only 17% officials. There are 2.1 million state employees in the United States. Thus, the number of state employees in the US equals the number of those in Russia, but the US population is 2 times more, so the concentration of officials is less there.

Note the following features of regulation of labor market of state employees.

Under Russian law a number of documents determine career planning. These include:

- qualification requirements;
- creation and effective use of personnel reserve;
- principle of compliance with the position.

In developed countries ethical standards of behavior are widely used. Typical examples are the USA and Singapore.

In connection with the decline in production in Russia the most attractive area in the labor market has become the public administration sector and the budget sector.

If in commercial organizations they find ways to circumvent legislation and free themselves from unnecessary workers, in state institutions there is neither an opportunity nor a motive to do this, because officials are not interested in improving labor efficiency. This explains such a noticeable drop in labor productivity in the public sector. Thus, the public sector is the best confirmation of the thesis of negative impact of state regulation of labor market.

It may sound strange but corruption brings some movement to this frozen picture, one might even say “market elements”. A weak personnel policy of the state allows personnel corruption and career opportunities regardless of the actual results of employees` work. Positions are partially determined by corruption schemes, bypassing labor market regulation laws. Thus, we come to the paradoxical conclusion - market mechanisms penetrate labor market through corruption. And this in a way compensates for the negative effect of law but in the wrong direction. Unfortunately, the result is also negative.

Two trends can be traced: an increase in the total number of officials and an increase in salaries against a lack of salary rise in the economy.

From 2000 to 2008 the number of officials grew 1.7 times. The growth was mainly due to regional employees - their number increased 2.25 times. Salaries are also growing rapidly. Here are indicative data for 2012 (see table).

Table. Salary growth for officials

Categories of officials	Number, thousand people.	Average salary, thousand roubles	Salary growth, %
Federal	38	60.6	13.1
Regional	733.4	30	5.3
Municipal	335.9	29.1	12.4

However, an increase in the number of state employees does not increase the efficiency of public administration. There is a simple expansion of the apparatus which reduces productivity in the public

administration sector. Thus, labor corruption significantly enhances the negative effect of labor market regulation.

Whereas in public administration labor market regulation leads to an increase in the number of officials, the situation in the budget sectors is somewhat different. The budget sphere is primarily education and healthcare.

Reduced funding of education and healthcare has led to fewer jobs in these sectors of labor market. This has led to a sharp increase in labor corruption in both education and healthcare.

Peculiarities of labor market regulation of education and healthcare are marked by the need for highly qualified specialists. The workers here are highly qualified specialists. Therefore, protectionism manifests itself to a lesser extent. In these sectors labor corruption manifests itself more vertically through creation of insignificant and ineffective jobs, as well as significant stratification of income.

Note, that there is no corruption in private healthcare. Corruption occurs in state and municipal healthcare.

According to law enforcement agencies, facts of a direct manifestation of labor corruption are known. In some large and prestigious hospitals managerial positions may be for sale. There are cases when posts are sold to people who are illiterate and simply do not have a medical education.

Doctors who want to work in a number of medical specialties must pay a lot of money for their appointment. By the way, this already gives rise to ordinary corruption, because this practice assumes the presence of shadow income, which allows them to compensate for the invested funds. It is necessary to take into account employment of doctors without proper qualifications, moreover, their admission and study at medical institutes was based on “kickbacks” to teachers.

If in the municipal healthcare sector labor corruption is restrained by medical responsibility, this is not the case with education. Therefore, labor corruption is quite widespread in education and in higher education. As it`s already mentioned, this translates into the creation of practically unnecessary jobs, as well as highly qualified specialists crowding out. All this explains low labor productivity in education. This is one of the reasons for the crisis of higher education in Russia.

The negative consequences of career corruption are very numerous, in general, they lead to a significant decrease in the efficiency of industries. First of all, this is an unreasonable staff increase and even creation of entire departments. Another very alarming result is a drop in professionalism, which is especially dangerous in healthcare.

Conclusions

The above analysis allows to draw the following conclusions. If the commercial sector somehow can circumvent the restrictions of labor market state regulation and reduces the number of workers to the required level, public sectors of economy (primarily public service, education, public healthcare) cannot and do not have any serious motivation for this.

Russia has an extremely high level of corruption. Corruption affects all spheres of society. Labor market regulation and labor corruption combined is the reason for the extremely low efficiency of state sectors of economy. The existing regulatory mechanism, in turn, gives rise to labor corruption.

According to estimates in Russian economy about 25 million workers (35%) are now redundant. First, it is hidden unemployment. Second, it is low labor productivity. Third, it is low salaries. Modern labor legislation is a serious obstacle to the restoration of market relations in the labor market. Note, that labor market regulation in Russia is clearly political in nature. Moreover, the society lacks an understanding of the need to restore market mechanisms in the labor market. Taking into account the widespread labor corruption, the task of labor market restoration is becoming a very

difficult task. Nevertheless, this is the only way to overcome the fall in incomes of working population. To improve the economy, it is necessary to change labor legislation and refer to the labor market model of countries such as the USA, Germany and the UK.

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Actual aspects of the state policy of the Russian Federation in the field of Economic Security

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Abstract

The article discusses the improvement of forecasting systems and strategic planning of threats to economic security and public administration. Creating the necessary conditions for sustainable growth of the real sector of the economy. Monitoring the development of the state financial system. Stimulating innovative development in the economy, creating favorable conditions for the development and implementation of advanced modern technologies, improving the regulatory framework in this area. Weighted and balanced development of Russia and the constituent entities of the Russian Federation, as well as the strengthening of a single economic space. Development of competitive advantages of export-oriented sectors of the economy, as well as an increase in their efficiency from foreign economic cooperation. Security безопасности economic activity in the country. Development of civic potential in the country.

Keywords: economic activity, economic security, financial system, public administration, strengthening a single economic space.

Introduction

An analysis of the economic security of the Russian Federation and a number of economically developed foreign countries shows that Russia is faced with a whole range of threats that are absent or insignificant for economically developed states.

The strategic national interests of the Russian Federation in the economic sphere are multifaceted and consist of several important areas:

- sustainable economic development of the country for the long term ahead of global average growth rates;
- increasing the competitiveness of the state economy, obtaining new places in the global commodity-financial market;
- the growth of the welfare and quality of life of Russian citizens, recognition of their role in the global public space.

The experience of various states indicates that threats to economic security for a long time may not appear in an open and acute form, but this does not mean that nothing threatens us or that any crisis can be easily overcome.

Important internal threats to Russia at present are the imperfection of the state's legislation and regulatory framework, poor coordination of the relationship between the real and financial sectors, limited insurance of various risks, poor state of the entire scientific and technical potential of the state, unemployment, and a decline in the well-being of citizens.

Methodological Framework

The research methodology is based on the principles and principles of economic theory, regional economics and optimal management. To solve the tasks in the thesis, methods of systemic, economic, comparative-analytical and statistical analysis were used. The method of expert assessments, as well as methods of linear and nonlinear programming were used. In addition, methods of economic and mathematical modeling were used, including simulation methods and methods of multi-criteria optimization.

Discussions

In the Russian Federation, more than 70 million citizens work in industry, in agriculture, in the service sector, conduct their small businesses, and more than 40 million Russians (state employees, military personnel, non-working pensioners) receive fixed incomes. Due to the fact that there is an increase in the price of goods in the country, it is necessary that their incomes grow no lower than the level of inflation.

Internal threats can also be attributed to the socio-demographic situation, which is associated with various processes of population reproduction, as well as providing citizens of the country with decent conditions for their lives. The main task of reproduction of the population, to which many social projects of the state are aimed today, has come to the fore because of the failure in the demographic sphere in the 90s of the past century and in the early 2000s. In general, according to this indicator, our citizens are in 49th place in the world from 189 countries. However, the average working ability of a Russian worker, as measured by the number of years of work, the loss of working time due to illness and accidents, activity at work, is two times lower than that of a worker in the United States.

A real threat to the economic security of the Russian Federation today is also a low level of production potential due to depreciation of fixed assets of enterprises, low competitiveness of products, export of capital abroad, and a fairly low standard of living of citizens. Potential threats that have a promising possibility of implementation are the country's scientific and technological lagging behind economically developed states, aggravation of various environmental problems that can take on a catastrophic nature of development, as well as corruption in the economy. Almost half of the cases (45 percent) brought against entrepreneurs are terminated before the court. As a result, one entrepreneur, whose business is falling apart in this situation, has an average of 130 employees who have lost their jobs, which is very bad for the development of Russia (Griewald Yu. 2018).

For the country's economy there are direct threats in the form of a decline in production, a low technical and technological level of production, a deterioration in innovative potential, a decline in the professional qualifications of workers, and irrational use of natural resource potential. The low competitiveness of products manufactured by enterprises, the predominance of raw materials in exports, the high level of dependence on foreign machinery and technologies, the low efficiency of the state's monetary and tax policy, insufficient credit and banking support for the entire real sector of the economy, and the export of capital also pose a threat to Russia's economic security abroad.

To date, an integrated system of institutions to ensure the economic security of the state is inextricably linked by the vertical of state power, the general leadership of which is exercised by the President of the Russian Federation. In the modern Economic Security Strategy of the Russian

Federation, internal and external threats to the economic security of the state are defined as a combination of different conditions and factors that create a danger to the various vital economic interests of the individual and society, as well as the state as a whole.

The technological part of economic security presupposes a state of scientific and technical potential of the state that allows, in a short time, to independently develop advanced technological solutions that can provide a breakthrough in the main branches of military and civilian production. The massive use of promising technologies in the economy will create conditions for the country's accelerated transition to an intensive development model, a significant improvement in the export-import structure, and the elimination of its economic dependence on foreign countries.

The main direction of scientific and technical development of industry is the reduction of energy and metal consumption in production. Developed countries have made great progress in this direction, gradually moving to a type of economic growth in which the satisfaction of the production and personal needs of people can occur with less resources allocated to production. The implementation of this direction in the future contributes to the sustainable development of the Russian economy (Ito K. 2017).

Currently, the Russian Federation is forming a huge demand for industrial and high-tech products. The conditions are being created for the qualitative development of Russian business, for machine building and machine tool building, microelectronics, the IT industry and for other industries. As part of the implementation of national projects, it is planned to procure medical and construction equipment, telecommunication devices and equipment, systems for housing and communal services, and transport in the amount of about 6 trillion rubles.

Industrialized countries today pay great attention to the development of information technology. The development of information networks and satellite communications makes it easy to transcend national borders and makes society more and more global.

Globalization is forcing the Russian state to gradually transition from energy and raw materials exports to a more balanced participation by integrating Russian scientific and technological potential into the global economy, exporting high technology products and services, and connecting to strategic associations (Kust G., Andreeva O., Lobkovskiy V., Telnova N. 2018).

An important component of the economic security system is food security, which implies the ability of the agricultural sector of the economy to provide the country's population with food, and industry - the necessary agricultural raw materials. Adverse economic conditions can create a real threat to the loss of food independence of the state if the executive authorities together with business entities do not take active and effective measures to overcome it.

In 2018 alone, the growth of Russian agriculture amounted to 19.4%, exports amounted to about 25.8 billion dollars, by 2024 in the state plans of Russia to increase it to 45 billion dollars. The Russian Federation is today one of the largest wheat exporters in the world, so in 2018 export volumes amounted to 44 million tons. Thanks to the development of Russian scientists, independence was ensured for wheat seeds.

The energy component plays a huge role in the economic security system, which consists in the uninterrupted supply of energy for the needs of the country's economy. In connection with the growth of production, energy consumption is also increasing, and the consumption of fuel is increasing. However, the fuel industry today is not able to significantly increase its output, and the price of fuel remains very high. We need a clear and clear government policy for all participants in the fuel and energy system, which allows us to prioritize the industry, ensuring the economic independence of the state (Thomas S. 2018).

The next component of economic security is information, which involves a procedure for the mutual exchange of military, scientific, technical, economic and social data within the national economic

complex and foreign partners, during which proper secrecy of doing business in the interests of the country, society and the economic entity will be guaranteed. Requirements for the implementation of the information component of economic security is determined on the basis of the need and sufficiency of the information provided to the consumer in accordance with his requests and needs.

In the last decade, the importance of ensuring information security in all areas of the economy, including the public, has increased. This is due to the rapid development of the capabilities of information technology and technology, the intensification of economic confrontation between countries, transnational organizations and corporations, the growing informational impact on the consciousness of various public groups of people.

Automation and informatization in the financial and economic sector creates both positive and negative impacts on its development. The negative effects on the consciousness and actions of our compatriots are shown by the facts of creating financial pyramids for fraud, which, through the promotion of television and radio, as well as via the Internet, allowed fraudsters to rob the money of millions of Russians, and unfair advertising promoted the sale of low-quality goods.

In today's world, the computer is becoming the most used tool in many economic crimes. After all, money in our time is stored in electronic accounts. As elsewhere in the world, Russia actively uses credit and debit electronic cards, which allow you not to carry paper money. Electronic card theft, computer fraud and theft have become critical in the country (Benedictow A., Fjærtoft D., Lofsnæs O. (2013).

Industrial espionage is also developing rapidly. Despite the fact that article 183 of the Criminal Code of the Russian Federation is applicable in our country, this does not stop criminals from stealing valuable information from organizations and enterprises, and therefore they incur enormous losses from their criminal activities. According to experts alone, over the past decade, hundreds of billions of dollars of important information about inventions, discoveries, scientific and technical developments have been exported from the Russian Federation. But nevertheless, in recent years, the level of sovereign debt continues to fall in Russia, the destruction of the industrial foundations of the state economy, the decline in scientific and technological potential, unemployment, the withdrawal of funds abroad, emergencies.

The main problem in the Russian economy is still a high dependence on exports of natural resources. In recent years, our country has done a lot for the development of branches of the processing industry, transport and services, however, the key role in the economy still belongs to the export of oil and gas, other raw materials and metals. As a result of the crisis in the economy, prices and demand decreased for almost all types of goods of Russian commodity exports. In recent years, there has been a significant drop in industrial production, an increase in the number of unemployed, a decrease in wages and inflation, and other negative processes in the economy. This was most noticeable in single-industry towns and regions where large city-forming enterprises are located. Nevertheless, state policy aimed at stabilizing the economic and social situation through the adoption of appropriate programs is bearing fruit in improving the situation in these cities and regions (Popova S., Karlova N., Ponomarenko A., Deryugina E. 2017).

Another problem for the state is the underdevelopment of the financial sector and banks. Many domestic organizations and enterprises, especially rapidly developing in recent years, entering foreign markets, could not count on financial assistance within Russia. Loans to our banking system were much more expensive, and loan terms were much shorter. In this connection, many companies were forced to borrow finances abroad. In recent years, as a result of the imposition of sanctions by foreign countries on Russian organizations, capital markets have become almost inaccessible to them. As a result of these actions, Russia now needs to find internal sources of growth for development.

Results

To overcome the difficulties in the economy, the state should clearly define the responsibilities of the federal executive bodies and authorities of the constituent entities of the Russian Federation to ensure the country's economic security, which must be performed at all stages of state activity, such as in determining the concept and main directions economic policy, transformation of the financial and banking system of the state, analysis of the course and forecast of socio-economic development, times abotke and approving the state budget, the adoption of basic legal acts and government decisions on economic issues, in the preparation and examination of laws.

A fundamental reform of state policy in the field of ensuring economic security is possible only if certain circumstances are met. It must be borne in mind that such a policy is not an independent unit. It is highly dependent on the state of the world economy. In order for the Russian Federation not to be one of the sources of raw materials and natural resources in relation to economically developed countries, it needs a clearly calibrated plan for effective inclusion in the international economy. It should be borne in mind that the effectiveness of public policy directly depends on the economic situation in the state (Galbraith J.K. 2011).

Today, a balanced and thought-out state policy is required to attract foreign investment, and in each specific situation it is necessary to find a balance, a balance between free trade and protectionism in the country. The resolution of this contradiction in the long-term perspective is considered as a search of an economic compromise that would create the basis for further development of accounting processes and compliance with the national and economic interests of the Russian Federation.

It should be noted that currently globalization in the world poses a twofold task for our state. On the one hand, globalization greatly contributes to rapid economic progress, but at the same time, on the other hand, it poses certain threats to its foreign economic security. In this connection, the Russian Federation should always approach gradual connection to world economic relations, taking into account all the features of the economy of our state, and in particular its raw material side.

Gradually, with increasing globalization highly developed countries will increase the competitiveness of their economies. In order not to lose its economic sovereignty, Russia now needs to have sustainable economic development, and this will require substantial investment in our domestic economy (Hellie R. 2011).

It can be noted that today significant investment is observed only for fuel and energy corporations in Russia. However, certain highly competitive organizations can also be formed in the sphere of the modern military-industrial complex (MIC). Today it is necessary to actively create and develop highly competitive enterprises, as well as develop information technologies that have huge advantages in the world market.

In this situation, Russia must implement a package of measures to diversify its economy, which will undoubtedly be a certain guarantee for the country's economic security.

It should be noted that an important condition for achieving the necessary requirements in the field of economic security is the system of projects, programs that have a promising character in innovative and scientific research.

The modern social policy of Russia should ensure a stable economic situation of all its peoples by increasing their standard of living. As for our state, today the wide gap between the poor and the rich in society continues to remain high. This destabilizing factor poses a great threat to the emergence of various social conflicts in the state (Zhao J., Tang J. 2018).

The implementation of modern state policy in the field of economy should always be accompanied by a uniform distribution of social burden between different sectors of the population. In this case, it is necessary to form a sufficiently effective mechanism aimed at constantly regulating the growth of

the population's income. The timely payment of wages as a incentive of productive labor plays a key role in real easing of social tension in the whole society.

It should be noted that in order to maintain the active development of the country's scientific and technical potential, which ensures the necessary strategic interests of Russia, it is necessary to set the priorities of the state scientific and technical policy, which will be consistent with the tasks of ensuring the country's economic security. It is necessary to develop and approve the necessary state programs in key areas basic research, to create the most favorable innovative climate in the state and economy, by using state forms of incentives for the active diffusion of advanced technologies, including the need for protection of Russian manufacturers of high-tech and highly competitive products, which very necessary for the state (Akindinova N., Kuzminov Ya., Yasin E. 2016).

Implementation of state policies to ensure Russia's economic security today will require substantial strengthening of state power, growth of public confidence in its various institutions, and the formation of modern economic policy. At the present time, the central position among the various factors determining the economic security of the Russian Federation is the stability of the entire state economy against internal and external threats caused by the process of globalization. During the economic crisis, the state economy is especially vulnerable to threats to economic security during the implementation of active reforms, the implementation of transformations in the economy and society. As world practice shows, in such periods the instability of the economy increases, its normal functioning is violated. This problem has arisen in our country, in order to resolve it, appropriate measures are needed.

Conclusion and Recommendations

In Russia today, to implement state policy in the field of ensuring economic security, it is necessary to fulfill:

1. Improving forecasting systems and strategic planning of threats to economic security and public administration. For this, Russia will need to take consistent and verified decisions of state policy in the field of ensuring economic security, improving strategic planning systems, improving the rules and standards for the use of innovative technologies and materials in production and economic activities, increasing the attractiveness of Russian jurisdiction for entrepreneurial activity and investment climate, the adoption of measures for the deoffshorization of the state economy, state control over foreign investments placed at enterprises and organizations of strategic importance to ensure the country's defense and security. It is also necessary to improve the mechanisms of budget planning, control in the field of procurement for state and municipal needs, increase the efficiency of budget expenditures and prevent cartel conspiracies, optimize the regulatory and tax burden on the business, taking into account the sustainable growth of the country's economy and modernize its production and technological basis, adoption of quality mechanisms in response to sanctions from foreign countries and international organizations in relation to Russian citizens us and legal entities, improving the quality of public administration in state-owned corporations and companies, as well as in organizations with state participation, improving the work of the control and oversight bodies, regulating labor migration flows in accordance with the needs of the state economy, legal securing the state border of an exclusive economic zones of the Russian Federation and the protection of the rights and interests of Russian organizations operating in this zone; a bitter struggle against misappropriation and theft of state property, corruption, the criminal and shadow economy.
2. Creating the necessary conditions for sustainable growth of the real sector of the economy. In particular, ensuring a safe and necessary level of technical and technological independence of the state economy, including strategically important industries, carrying out a comprehensive modernization of the production and technological basis of the sectors of the real economy taking into account modern environmental and industrial safety requirements, ensuring the stable development of the military-industrial complex, creation and active development of high-tech efficient and promising sectors of the economy, led chenie productivity and efficiency of production processes; state support for high-tech small and medium-sized businesses, the integrated development of transport infrastructure and the creation of modern transport logistics, the development and

production of the latest efficient vehicles, the integrated implementation of promising energy-efficient technologies with developed infrastructure, high-quality energy processing, the creation of strategic state material reserves and reserves to ensure full mobilization needs of the Russian Federation, active use e production and technological base and innovative potential in the military-industrial complex, as well as the production on their basis of products for civilian use.

3. Monitoring the development of the state financial system. It is achievable with a sufficient reduction in the critical dependence of the state monetary system on fluctuations in international commodity-financial markets, with the development of national sources of financial resources, while ensuring a sufficient accumulation rate for sustainable development of the country's economy, by reducing the use of foreign currency in the economic relations of the Russian jurisdictions, improving state support for lending to high-tech and high-tech industries in strategic important sectors of the economy, the development of the national payment system and payment cards, the infrastructure of the national financial market, the improvement of regulation of the activities of financial organizations, the quality of the fight against the shadow turnover of funds and the legalization of proceeds from criminal activities, ensuring the stability and balance of the state budget system Russian Federation, improvements in the management of state financial assets and debt obligations.

4. Stimulating innovative development in the economy, creating favorable conditions for the development and implementation of advanced modern technologies, improving the regulatory framework in this area. To fulfill these conditions, integration of education, science and production activities is needed in order to increase the competitiveness of the state's economy, expand public assistance in scientific, technical and innovative activities, create favorable conditions for attracting investments in this area, including using private state partnership, overcoming critical dependence on foreign supplies of equipment and instruments for scientific, experimental, test and production, components of microelectronics, selection and genetic materials, as well as hardware and software of computing technology. In particular, access to foreign technological solutions is needed to fulfill the tasks of the state economy, develop technologies that make it possible to strengthen the competitive position of the state in world markets with high value added products, stimulate the application of the results of intellectual activity in production, development of legal and administrative systems for the protection of intellectual property and the rights of Russian manufacturers to industrial property objects, improvement of legal regulation and development of markets for the latest high-tech products and the use of tools financing of innovative projects.

5. The balanced and balanced development of Russia and the constituent entities of the Russian Federation, as well as the strengthening of a single economic space. To carry out this development, it is necessary to improve the country's territorial planning system taking into account the challenges and threats to economic security, reduce the imbalance of interregional socio-economic development of the constituent entities of the Russian Federation, improve the nationwide population settlement system, create the necessary conditions for the active development of urban agglomerations, expand and strengthen ties between regions of the Russian Federation and the creation of inter-regional production and infrastructure clusters Active development sea routes, the modernization of the railway system.

6. Development of competitive advantages of export-oriented sectors of the economy, as well as an increase in their efficiency from foreign economic cooperation. To implement this direction, it is necessary to build profitable economic relations in the international legal system that meet the requirements of the national interests of Russia, expand partnerships and integration relations in international and interstate organizations, create and maintain regional and trans-regional integration associations in the interests of the Russian state, and help Russian organizations to introduce advanced technologies, increasing the range and number of exporters and non-primary products, the geography of the use of investment and foreign economic relations in the interests of Russia, support organizations in providing services to promote domestic products to foreign markets and their legal support in representing the legitimate interests of Russian exporters abroad and assistance in the development of Russian non-primary enterprises sectors of the economy, achieving and maintaining the level of global leaders of the global economy.

7. Safety безопасности economic activity in the country. To carry out this activity, it is necessary to increase the security and antiterrorist protection of critical and potentially dangerous facilities to an adequate level, to ensure the necessary counteraction to the activities of foreign special services and organizations, which is aimed at causing damage to the strategically important objects of

the state economy of the country - military-industrial, fuel and energy and transport complexes. It is also necessary to reduce the risks of doing business associated with the possibility of applying formal reasons for stopping them, as well as preventing selective application of legislation in relation to businessmen. We need to prevent and prevent crimes related to raider seizure of enterprises and organizations, state-owned companies and corporations, deliberate bankruptcy, in other criminal and unlawful actions in the economic and financial sector, in which, among other things, control and regulatory employees may be involved and law enforcement. Creation of the necessary conditions to eliminate the likelihood of a merging of interests of business structures with officials and representatives of state bodies, prevention and prevention of organization corruption schemes, their interaction with members of business of foreign countries.

8. Development of the country civic potential. To implement this development, it is necessary to improve the system of general and vocational education with the use of modern scientific and technological discoveries, the development of the state system of qualifications, requirements for employees and their professional orientation, the modernization of the entire system of ensuring environmental safety to preserve the environment. By assisting the population in effective employment and their labor mobility, it is possible to reduce the level of poverty in society and their inequality of property. The priorities of our state policy here are absolutely clear: this is building confidence, combating threats common to the whole society, expanding and developing cooperation in the economy, trade, education, culture, science, technology, removing barriers to communication between people.

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Public Relations Activations in a State Ministry of Education, Lagos, Nigeria

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Abstract

This study focused on what the PR practitioners think about the perception and awareness of the public regarding their activations in the Ministry of education and its agency Lagos State Universal Basic Education Board (SUBEB). An in-depth interview was conducted to find out what the activations are and how they affect the quality of education in Lagos State. The researcher adopted the SDG 4 (quality education) to support the statement of the problem, which is lack of quality education. Also, the researcher took the Excellent Theory of public relations, which is about embracing negotiation between the organization and its publics, and one that also fosters mutual understanding. The interest of both the organization and the public is of importance in this theory. The sample size was purposively selected. The head of the PR Unit and his Assistant in the Ministry of Education and SUBEB were interviewed. The telephone interview was applied for SUBEB due to the absentee of both Public Relations officers. In conclusion, the interview was analyzed and used to answer each of the research questions. The researcher also recommended that the public relations unit should engage more in PR activations by introducing technology to learning just like other advanced countries.

Keyword*:* Public perceptions, awareness, Public Relations, activations

Introduction

Public Relations (PR) is a profession that has existed for so many years. Public relations involve a two-way communication done to maintain the mutual relationship and good reputation of its organization (James *et al.,* 2020a; Ndubueze *et al.,* 2019; James *et al.,* 2020b; James *et al.*, 2020c; Ndubueze *et al.,* 2020; Nejo *et al.,* 2020a; Olabanjo *et al.,* 2019). The profession evolved in Nigeria during the first and the Second World War, where an office called Information Office was established for war information. After some time, the office was used for shaping a positive image for Nigeria. It continued to evolve, and that resulted in the spread of PR offices across the country with the primary aim of information dissemination to the public. In that sense, PR is not a new profession. PR engages in activations, which can also be called PR actions or activities. PR activations are the corporate social responsibility rendered by an organization through a public relations practitioner for public and corporate interests

(Nwosu *et al.*, 2020a; Nejo *et al.,* 2020b; Olabanjo *et al.,* 2020a; Omokiti *et al.,* 2020b; Salau *et al.,* 2020a; Salau *et al.,* 2020b; Nwosu *et al.,* 2020b).

However, the presence of PR in the government is not also new. It carries the responsibility of disseminating information to the citizen of a country to make them fully aware of the governments' activities (Aiyende *et al.*, 2020b; Fayemi *et al.,* 2020a; Fayemi *et al.,* 2020b; Fayemi *et al.,* 2020c; Fayemi *et al.,* 2020d; Olabanjo *et al.,* 2020b; Omokiti *et al.,* 2020a). The study seeks to examine the PR practices of both the Ministry of education and SUBEB; using in-depth interviews. The purpose is to know how much PR activations affect the quality of education in the State.

Statement of the Problem

Quality education creates opportunities, promotes timeless learning, and empowers an individual with knowledge and skills. This study focused on sustainable developmental goal 4, which is quality education. It examined the activations employed by the PR practitioners, how the public perceives it, and how it has impacted the education system. It was started by Malala Yousafzai that 'one child, one teacher, one book, one pen can change the world. The statement of the problem is the lack of quality education.

However, sustainable development is that which meets the needs of the present and the future without compromising everyone's access to sufficient resources (Musah & Bah, 2018). Therefore, to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all, the Ministry and agencies responsibilities are of importance to know if the set goal worked. The public relations activations are important in every organisation (Adelua, *et al.,* 2020a; Adelua, *et al.,* 2020b; James, *et al.*, 2020d; Nwosu, *et al.,* 2019; Adelua, *et al.,* 2020c; Adelua, *et al.,* 2020d; Aiyende, *et al.*, 2020a). In this case, the ministry of education and SUBEB stated how they used such activations to tackle lack of quality education.

Research Objectives

1. To find out if the public is aware of public relations activations
2. To examine the public relations tools used by the Ministry of Education and SUBEB in the provision of quality education.
3. To examine the impact of the Public Relations activations of quality education.

Research Questions

1. Is the public aware of public relations activations?
2. What are the public relations tools used by the ministry of education and SUBEB in the provision of quality education?
3. What are the impacts of public relations activations?

Literature Review

Government Public Relations Activities and The Tools Used

The government in every country needs effective communication to function. Public relations practitioners are intermediates between the government and the public (Salau *et al*., 2020). The government makes an effort to disseminate information in the media via PR, and the PR uses various tools to reach the target audience of the government. According to Fairbanks et al. (2007), a working democracy requires an informed public and a government that is transparent and accountable for every action taken.

More so, the government, through public relations, engages in media relations, public reporting and feedback to the citizens of the State (Lee, 2012). The communication strategies are employed either

directly or indirectly (Aiyende *et al*., 2020). When applied directly, it means the government informs the citizens about its activities through public relations activities. Some of the appropriate PR tools are press releases, press conferences and interviews (Goncalves & Santos, 2017).

Public Relations Tools/ Activations

Public relations activations create and maintain the image and reputation of the organization. Also, PR activations are employed to meet the needs or interest of the public (Nejo *et al*. 2020). These activations could, in turn, favour the people, the organization and its products (Odiboh *et al.*, 2020a; Odiboh *et al.,* 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019). What is more, public relations is powerful enough to influences the attitudes of an organization and its public. It also monitors and provides information about changes in the organization, informs the employees about the situation of the organization inclusive. One of the responsibilities of the public relations practitioner is to avoid a crisis. When it happens, they solve the problems and resolve such a crisis (Adelua *et al.*, 2020). Depending on what kind of situation public relations management deals with, there are numerous tools of communication and activations available to implement. Public relations activations include different aspects such as media relations, customer and community relations to internal communication with the organization's employees and essential and crisis management. (Karczewska & Bsoul, 2017).

More so, the power of the media to communicate to a different number of people makes it the best media to use by any organization. The media have persuasive attributes; the press can help to build or destroy an organization, by exposing its secrets to the public. In other words, every PR professional needs to develop a strong relationship with the media. The reason is that it has a significant influence on the reputation and image of an organization (Karczewska & Bsoul, 2017).

Some of the tools which public relations could use are press releases, press conferences, articles/features writing, interviews, websites, e-mailing and video releases. PR can also engage in community relations such as gifts in kind, direct involvement, sponsorship and donations (Karczewska &Bsoul, 2017).

Ministry of Education

The Ministry of education, which is under the government, is classified into the State ministry of education and the federal ministry of education (Nejo *et al*., 2020). The Lagos State Ministry of education is an arm of Lagos state civil service whose responsibility is the formulation, execution and the implementation policies (Fayemi et al., 2020). The ministry focuses on the educational goals and objectives of the State government (Kolapo & Pope, 2018). The Lagos State Ministry of education has different parastatals working together to provide better education in the State. Under the Ministry are agencies such as the State Universal Basic Education Board (SUBEB), Basic Education Services Department, Private Education and Special Programmes Department, Lagos State Vocational And Technical Education Board, Lagos State Educational Management Systems (LASEGMS), Teachers' Establishment and Pensions Office (TEPO), and others (https://education.lagosstate.gov.ng, 2020).

Therefore, the conduct of the people in power determines the commitment of the staff to work. That is because; the satisfaction or dissatisfaction of the workforce will positively or negatively affect the staff performances (Kolapo & Pope, 2018).

The University Basic Education Board Lagos State (SUBEB)

The Lagos State Universal Basic Education (LSUBEB) is an agency in Lagos State Ministry of education. The body birthed was set up to ensure the attainment of quality education (SDG 4) in every State in Nigeria. Some of the responsibilities of LSUBEB are as follows:

1. The body is responsible for the allocation of funds

2. They engage in projects under the approval of the State government. For instance: the building of more schools, and giving free books to pupils.
3. They offer free education with the help of the government, partners and stakeholders (investors).
4. The body is also responsible for the training of teachers and giving out certificates of service for both teaching and non-teaching staff.
5. Supervise the assessment and funding of salaries and allowances of teaching and non-teaching staff
6. They approve or disapprove Annual Vacation
7. SUBEB also supervise and collects annual reports from schools https://subeb.lg.gov.ng/company-overview/

Quality of education

According to Ololube (2016), Education involves values, ethics, norms and culture, which has been impacted by someone and then transferred to the next generation. A new or renewed idea adds to existing knowledge. That is called education. Education remains one of the tools for the transformation of an individual and society at large. It is one of the most powerful tools for change and nation-building.

Education is vital for people to be intellectually developed. The structure of the Nigerian educational system is in four categories, which are: the early childcare development, primary school, Post-basic education and tertiary education (Suleiman & Abubakar, 2020). Education is an instrument for:

1. Social change and nation-building (Salau *et al*., 2020).
2. Unity among the people.
3. Boosting skills and potentials.
4. Everyone has the right to education regardless of race, gender, religion, background (Suleiman & Abubakar, 2020).

Lack of Quality Education

Shortage of qualified teachers and inadequate remuneration package

Qualified teachers are limited because many people go into the profession due to lack of options. So many factors encourage so many persons who cannot teach to teach because of income (Suleiman & Abubakar, 2020). Therefore, not only are more teachers needed but qualifies teachers are required.

Corruption

The issue of corruption also tempers with the quality of education in Nigeria. When school supervisors, principals, head teachers, school teaching or non-teaching staff involves his/herself in dishonest conduct, it automatically affects the education system. Some of such acts are the embezzlement, mishandling of school funds and absentee teachers (Ololube, 2016). Also, there is the existence of ghost workers and absenteeism in schools aids lack of quality education (Suleiman & Abubakar, 2020). The results of such corrupt activities are schools without walls and roofs, classes without desks, chairs and books, empty laboratories, lack of teaching materials, incompetent graduates, underpaid or unpaid teachers, a decline in standards, overstaffing, exam malpractice and cultism. All these threaten the quality of education which affects the educational goals, deny people their right to access education, weaken social values and the development of the country (Jankur, Tafiya & Danbaba, 2019).

Concept of Quality Education

So many scholars defined quality education in various ways. Quality education comprises of how good academic performance is (Omokiti *et al*., 2020). For learning to take place, schools must have all the necessary materials needed (Jankur, Tafiya & Danbaba, 2019).

Looking at the various works of literature reviewed the gap which exists is the disconnection between public relations and the Ministry of Education and SUBEB. It showed the weak link between the PR activations of the Ministry and that of SUBEB. The profession is more of just an information disseminating body. This gap is what this study fills.

Theoretical Framework

Excellent Theory

Grunig James propounded this theory. The theory deals with the value of public relations to organizations and society. It is about satisfying the interest of both the public and their organization (Omokiti *et al*., 2020). This theory suggested that for an organization to be effective, it must solve the problems and satisfy the goals of the stakeholders. Therefore, both the Ministry and the Agency should act and make decisions that will also benefit their publics to reach the goal of quality education through PR activations (Grunig, 2002).

Research Design and Methodology

The researcher adopted a qualitative method of gathering data through the use of an interview guide. Here, the researcher asked a series of in-depth questions to PR practitioners in the Ministry of Education and SUBEB. In each of the selected units of study, the two highest-ranking public relations practitioners were selected and interviewed. Two of the Public Relations practitioners interviewed in SUBEB were unavailable in office; therefore, the telephone interview was conducted successfully. The sample size was selected purposively. A senior PR practitioner and an assistant PR practitioner from the Ministry and Agency participated as interviewees. The results of the interviews were analyzed and used to answer the research questions.

Results

The four participants interviewed agreed that the public is fully aware of their Public relations activations. The interviewees also stated that the PR department intermediates between the people and the government. The reason is that they are responsible for disseminating information to the public regarding the government's educational plans and programmes.

However, regarding the quality of education in Nigeria, two participants from the Ministry of education posit that “Is not hearsay to say it is not encouraging. There are so many reasons to adduce to that. One of such reasons is that government needs to brace up more in educational service delivery. There are more to provide in terms of infrastructure, teaching aids and curriculum review, which we are trying to do in Lagos State. The education we have now is not encouraging honestly. Rather people tend to see it as an avenue for making wealth in any way either legal or illegal' stated the other participant'.

On the other hand, two other participants form SUBEB (agency) saw no reason to regard the education system as not qualified enough. They only saw the need for the implementation of technology as a way forward. Also, new ideas are necessary for better services.

Furthermore, all the participants agreed that the PR uses the press release, Television, radio and social media platforms to disseminate information and to carry out responsibilities. The participants in the

Ministry of education mentioned the use of leaflets and booklets as a tool for disseminating information.

Participants form the agency has different media in addition to the general media used by all the participants. They employ the use of 'school online' to cover schools events and report online for people to be aware of the happenings.

However, based on the response from the participants', the agencies engage in more PR activations than the ministry. The Ministry of Education focused more on disseminating information through various media. The interviewee from the Ministry said 'From time to time, we distribute communication materials such as leaflets, booklets to acquaint the public with the importance of education. We also have these program called adult education for those who were not privileged to attend in their youths'. The participants from the agency stated that 'we engage in training, infrastructural development and project management. However, presently, we are working on scholarship because we want to do more, we want to give back to society, we want to encourage the pupils on education. We do not want them to relent. You know when you give back to society, wining a child is just like winning a nation, so we are trying to do that'.

The finding on the impact of the Public Relations activations of quality education indicated that students are highly benefiting. The first participant from the Ministry said "we measure the impact of our activities. We realised that pupils tend to read more because we activated the reading culture. There is a specific time to make them go and read. There are specific times that you tell them to do this... So when we monitor it, we realize that there are impacts as regard reading culture and personally and particularly I have paid attention to that. The reading culture is improving". All the participants agreed that the implementation of the use of technology in school would be of significant impact.

However, all the participants' saw themselves as mediators between the government and the public. Through their activations, the public would know the value of education, and they believed that their activations would make a difference in the education system. The Agency is closer to the public than the Ministry. Therefore, its impact on the students is more profound than that of the Ministry of Education.

Notably, the participants from the Agency avoided answering some of the questions in an official capacity. Instead, they stressed the word 'in my opinion' in answering the question. However, the other two participants were open and answered all the questions in full details.

Conclusion

This study shows that the connection between government agencies and the public vary. SUBEB public relations activations are more than the public actions of the Ministry. While the Ministry of Education does not have direct contact with its publics, SUBEB engages in a more direct relationship with teachers, investors, parents and pupils. Both the Ministry and agency use the electronic media, print media and social media to reach its target audience. Additionally, this study shows that the public relations unit in the Ministry of Education is more focused on disseminating of information through the media.

Recommendation

The study recommends that public relations practitioners in government employment should be technology-savvy in order to cope with modern trends in the industry.

The study also recommends that pupils should be motivated consistently with free meals. This way, the pupils would be open to receiving the PR messages of both the Ministry of Education and SUBEB.

The agency should also keep a closer relationship with the parents of the wards and investors to get more funding from organizations or wealthy individuals.

The public should also be motivated more often by providing infrastructure and enough computers that will make them familiar with the technology.

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Professional Public Relations Activations and Tools Used by a State Development and Property Corporation in Nigeria

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Abstract

This study seeks to determine the Public Relations activations and the tools used to convey these activations by the Lagos State Development and Property Corporation. The Responsible Advocacy Theory, developed by Fitzpatrick and Gauthier in 2001, was used as a theoretical framework for this study. Interviews were conducted from the public relations practitioners/personnel in this Corporation to draw the necessary conclusion on this subject. Findings show that there is a structured and well established public relations department/unit in both the Ministry and the Corporation. Meaning that there is formal public relations activation in the Corporation because they have to be able to professionally identify and defined clearly who the dominant target publics are. In conclusion, professional public relations activations and tools enhance housing development which can likely shape the local social and political environment, the reputation and actions of the developer, and Local expectations of the to represent public. Professionals in this sector who believe their housing plans are affordable or low-income may experience local opposition and may undertake an appraisal and community outreach.

Keywords: Public Relations, Activations, Tools, Lagos State, Development, Property, Corporation.

Introduction

The history of Public Relations (PR) in Nigeria is traceable to the colonial era when a Yoruba newspaper announced deaths, births and marriages. The British colonies seized the opportunity to use the newspaper for propaganda which was information about the evil deeds of the British. As at then, PR was used to gain trust from Nigerians. As note by Cutlip, Center and Broom (2006) that public relations is a feature of management that defines, develops and maintains mutually beneficial relationships between an entity and its audiences. However, the presence of PR carries the responsibility of disseminating information to the members of a country in order to make them fully aware of both governmental and non-governmental activities (James *et al.,* 2020a; Ndubueze *et al.,* 2019; James *et al.,* 2020b; James *et al.*, 2020c; Ndubueze *et al.,* 2020; Nejo *et al.,* 2020a; Olabanjo *et al.,* 2019). For example, in order for public relations professionals to work as administrators, they cannot merely insert the decisions taken by others within an organization. They will present themselves as leaders of what is generally referred to as the ruling party, those with the power to make decisions and set policies (Szmukler, 2017).

Public relations practitioners now involve the use of not only the traditional medium of communication but also the Internet, the Internet through social media platforms has many features like photo sharing, video sharing and communication, audio sharing, messages and content sharing amongst many others (Aiyende *et al.*, 2020b; Fayemi *et al.,* 2020a; Fayemi *et al.,* 2020b; Fayemi *et al.,* 2020c; Olabanjo *et al.,* 2020b; Omokiti *et al.,* 2020a). Nonetheless, public relations are the mechanism which ensures the kind of fairness and accountability in communication which promotes positive, long-term working relationships (Hong, 2014). It also plays a vital role in connecting

publics all over the world and enabling them to discuss mutual concerns and solutions (Omokiti *et al.,* 2020).

According to Miller (2005), public relations professionals often do a poor job of explaining how effective public relations can be measured and used effectively. When practitioners respond strategically rather than tactically to problems and challenges, they're far more likely to help organizations meet their challenges. They strive to fix or prevent protracted issues, and change important stakeholders' perceptions in mutually beneficial ways. They are people who work and they are experts in a particular field (Adelua *et al.,* 2020a; Adelua *et al.,* 2020b; James *et al.*, 2020d; Nwosu *et al.,* 2019; Adelua *et al.,* 2020c; Adelua *et al.,* 2020d; Aiyende *et al.*, 2020a). A practitioner that is unable to use the Internet to communicate with the online community cannot build the right relationship that will shape the image of an organization (Nwosu *et al.*, 2020a; Nejo *et al.,* 2020b; Olabanjo *et al.,* 2020a; Omokiti *et al.,* 2020b; Salau *et al.,* 2020a; Salau *et al.,* 2020b; Nwosu *et al.,* 2020b).

The creation of LSDPC in 1972 The inherited liabilities and properties of its three predecessors have been fully divested of all their powers of development regulation. They transferred those powers to the Ministry of Works and Planning of Lagos State (LSMWP), which became responsible for planning and control of development in the State. However, after much persuasion, the power to control development on its estates was transferred back to LSDPC in 1978. The current legal instrument governing the operations of the Corporation is the laws of Lagos State 2003 Cap L19 as amended by the Lagos State Development and Property Corporation (Amendment) Law 2006. The enabling edict of the Company set out its duties as providing accommodation for both residential and business / commercial purposes, and retaining the same. The publics of an organization are important in public relations; therefore, the execution of a planned action program must serve the interests of both the organization and its audiences (Nejo *et al.,* 2020).

According to Deji-Etiwe (2019), LSDPC is the commercial entity of the government to make profits and bring returns in a way that enhances the Economy growth. The corporation serves are consultants to the state government. They are like a middle man between the governments and the consumers/buyers. The creation of Lagos state, brought about LSDPC, which was the primary representative of the government when it comes to housing until in the late 1900s during the political era. They created the Ministry of housing to cater for the masses while LSDPC became the commercial entity. Government still owns the Corporation, but at the same time privatized. The Company has a fully commercialized role under the present structure with a managing director / chief executive at the helm of affairs. Among other features, the new LSDPC includes:

1) The creation of land or any estate or interest in land
2) To purchase, construct and retain homes, shopping centers, offices, industrial buildings necessary or suitable for the fulfillment of the Corporation's functions.
3) To acquire, establish, maintain or repair any work plant or equipment required or suitable for the supply of electrical, water or sanitary services or in connection with any building owned, built or constructed by the company;
4) To sell, let or lease any property established or currently operated by the Corporation under this law on terms and conditions as deemed necessary by the Corporation.

Organizational promotions are moving with technological advancement leading to electronic visibility of public relations actions (Omokiti, *et el*, 2020). However, organizations, firms, industries, ministries, agencies to mention a few engage public relations actions and tools to develop and represent themselves to the public in good light hence, the office of the public relations practitioner. Public relations experts are encumbered with the responsibility of the planning, building and maintaining the image and upholding the professional excellence and integrity of the organization (Nejo, *et el,* 2020).

Statement of the Problem

The sales rate of housing and properties is of interest to this study. An average individual wants to own a house or at least a property. However, the process of getting any of these things seems to dissatisfy the public. Getting original documents of any property and the troubles such individual faces in a building is quite discouraging. According to SDG 9, which encompasses industry, innovation and infrastructure, Lagos State Development and Property Corporation must be able to provide their operations/duties under these goals. One of the significant problems public relations faces has to do with assumptions. Therefore; this research seeks to investigate professional public relations activations and tools used by the Lagos State Development and Property Corporation.

Objectives

The study seeks to investigate the perceptions of the public about the activations of the Lagos state development and Property Corporation. Based on these objectives, this study will answer the following research questions:

1. What are public relations tools used by the Lagos State Development and Property Corporation?
2. What are the community relations activities being carried out by Lagos state council for Development and Property Corporation?
3. To what degree is the impact of these PR activations?

Theoretical Framework

This study stands on the Responsible Advocacy Theory developed by Fitzpatrick and Gauthier (2001). The theory focuses on public relations practiser's' duties. It follows some of the main concepts of ethics in public relations, such as regard for autonomy, welfare, non-malpractice and distributive justice. The principle of advocacy emerges from the social obligation of the press, and from Greek philosophy emerged persuasion. Public relation practitioners need to familiarize themselves with this ethical theory in their delivery of duty. The philosophy of activism allows for autonomous public decision-making. It provides an opportunity to bring about positive changes in their attitudes and behaviour. It also discusses ethical persuasion, which is acceptable and important for establishing the truth in a democratic society based on a culture of freedom of speech. Fitzpatrick and Gauthier (2001) It was explicitly mentioned that effective activism seeks to merge two distinct ethical positions of public relations professionals as advocates and social consciences.

Professionals in public relations should uphold responsibility to clients or organisations as advocates, and to the general public as a social conscience. Reber, Cropp and Cameron (2001), advocate activism, taking the gains from both sides into consideration. Motivation is for the benefit of the company of professionals and for public change. According to Martinson (1994, quoted in Fitzpatrick & Gauthier, 2001) basic principles should be the wellbeing of others, the maintenance of justice, self-dignity, serving others and the common good. The following principles for responsible advocacy theory were proposed by Fitzpatrick and Gauthier (2001): (i) the contrast of harms and benefits and (ii) Reverence for individuals.

Research Methodology

Analysis Methodology Research Methodology is the basic procedures or techniques used for defining, selecting, processing and analyzing topic information. The methodology portion, in a research paper, helps the reader to critically evaluate the overall validity and reliability of a study (LibGuides, 2019). This research aimed to find out the public relations tools and the activations used by LSDPC. Therefore, an in-depth interview which is one of the qualitative research methodology based on one on one engagement was used to draw out findings and conclusions on this research effectively. It involves two sections; Section A, this was with two public relations representatives in

the Ministry who answered ten questions each. Section B was with the public relations representative of LSDPC, who also answered ten questions in the guide.

Results

According to the findings, the Corporation has a robust public relations department and can professionally identify their target audiences. According to the interviewees, the audiences include those in the construction industry such as architects, engineers, quantity surveyors, cement producers, and sand/granite suppliers. These are part of our publics. They said "we have buyers of our houses and those who want to partner with us in constructions. All these people are part of our public because we also deal with joint ventures products while we provide the land and we get someone that will finance the project. We also have the off-takers in the sense of people who are looking for products to buy".

The LSDPC interviewees affirmed that their targets are the elites (i.e. middle class and the upper class). Thus, it has been easy overtime to decide on the most appropriate media platforms. So, the Corporations' public relations approach has been corporate promotions; TV adverts, Newspapers adverts, Corporate/Professionals bodies, Events; Professionals events like the annual general meetings, specialized trade fairs. They said "we do bulk emailing/bulk SMSing, and we have Social media platforms. We are on Twitter, Facebook, Instagram, LinkedIn; and then we have a website which is a major plus. If you search the Internet for the number one housing corporation in Nigeria, LSDPC will be between numbers one to five. Besides, we are reconstructing our website so that it can be more user-friendly and easily accessible. We also use flyers (If you have a budget or a certain limit we can be able to work with that)"

Another point to note is that they create room for feedback on the website, which provides a column for feedbacks. Then consumers send mails, once they have any issues, and this allows them to follow up both prospective and existing consumers. Besides, they have to be able to build their public over the years. The advantage they have over competitors is "documentation". The reason is that they have direct access to the government, and their clients are sure of reimbursement at any point in time compared to other private organizations.

Some of them said that their public relations activities are press conferences, social media, stakeholder engagement and town hall meetings. The tools which they use include broadcast jingles, fliers and billboards. However, majority of the respondents said the members of staffs are aware of all of these activities.

Other important information released by the interviewees is the structure of the public relations department. The structure houses a Director, Deputy Director, Principal Officers, Photographer, Cameraman and Admin Officer.

Conclusion

In conclusion, professional public relations activations and tools enhance housing development which could influence the economic, social and political climate, the developer's credibility and behavior and the economic expectations of the citizens to be served. Professionals in this area who feel their housing plans are likely to encounter local resistance may minimize the probability of opposition by undertaking an assessment and community outreach process. It is essential to create a meaningful two ways relationship which comes with a mutual understanding that helps the public's get all of the information of interest to them and vice versa (Fayemi, 2020). Professional public relations also encourages, promotes and attracts employees' involvements and volunteering at other nonprofits and corporate social responsibility in the community and at the same time, becoming well-informed about related issues. After the incorporation of Internet technologies into the messaging project, industry professionals need to determine how the immediate and direct contact influence the message (Salau *et al.,* 2020). Creating awareness and impacting personnel is a paramount function every Ministry should embrace in other to bring diaspora partnerships (Adelua *et al*., 2020)

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Public Awareness and Perception of Electronic Public Relations at the Lagos State Traffic Management Authority, Nigeria

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Abstract

This study is significant because the research will examine the effectiveness of the use of electronic media by LASTMA to propagate its policy. Therefore, detailed information will be made available on the prospect and performance of the agency in Lagos. This research will be useful for the state government to evaluate the performance of the agency. It will also be helpful for the general public to assess the effectiveness of LASTMA within the metropolis. The scope of this study will cover the public; which include some selected motorists, and commuters within and around Lagos.The study examined the effect of e-public relations on the activities of LASTMA. In the survey, Two-way symmetric Public Relations model of James E. Grunig was adopted with a random sampling method using survey design. We distributed two hundred and thirty copies of the questionnaires to the respondents. They returned 200 copies correctly fill. Also, the results were processed using the Statistical Package for the Social Sciences (SPSS) software. A significant finding is that LASTMA's public relations activities are not visible on the electronic media. This study recommends that the public relations department of the agency need to put in more work to propagate its policies.

Keyword: E-public Relations, LASTMA, Traffic management

Introduction

Traffic remains one of the biggest challenges of governance, commuting and living in the populated city of Lagos. With roughly 21 million inhabitants and growing dwellers and, the growing population as a result of the level of advancement and urbanization over the supplies and amenities, the state can provide. It is a highly diligent environment for indigenous and international dwellers.

The road transportation, which amounts to eighty-seven per cent of passengers plying the roads of Lagos and it continues to increase daily and as a result, is the primary cause of congestion on the streets. Before LASTMA came into existence, driving on the roads of Lagos was hectic and frustrating. It would take so much time before motorists can maneuver their way to their various destinations at a regular schedule. This situation worsened during the rains because traffic congestion will be twice times regular. There will be a high rate in a traffic jam which in most times lead to accident and conflict on the road. LASTMA was established as an agency under the Ministry of Transportation, charged with the responsibility of ensuring a free flow of traffic in Lagos. The agency was to help commuters to save time and improve the quality of the driving culture in the metropolis. Also, to make the environment safe and to ensure the reduction in road transportation hazards such as accidents leading to loss of lives and properties to the barest minimum. Delay and congestion will also reduce as the time spent on the roads will be less, therefore ensuring sustainable economic growth in the state.

Statement of The Problem

LASTMA's responsibility is the management of traffic situations in Lagos state. Thereby creating an avenue for more transport infrastructure, according to SDG 9, which evolves around enhancing and building resilient infrastructure and the administration of new models aimed at achieving the safety of lives and properties. Also, the adequate flow of traffic in Lagos State. This study aims to examine the activities of LASTMA and the level of awareness and perception of these activities. Furthermore, to review the process of applying these activities and the channels adopted to develop and innovate the transportation system in the State.

Research Objectives

This study gives insight into the perception and awareness of electronic public relations on the activities of LASTMA as an agency affiliated to the ministry of transportation. However, the following objectives aims:

1. To find out the public's perception about the activities of LASTMA
2. To examine the effect of the approach adopted for the sustainable transportation system for Socio-Economic benefits.

Research Questions

1. What is the Public's perception of the activities of LASTMA?
2. To what extent is the effect of the approach adopted for the sustainable transportation system for Socio-Economic benefits.

Literature Review

Electronic Public Relations

(Odiboh &Oladunioye, 2019) described public relations as the practice of knowing and understanding how to manage all information emanating from the organization and being able to use them for the positive good of the organization. Understand the logic behind getting along with the public is important for an organization, (L'Etang, 2009) describes public relations as the occupation with the responsibility of managing an organization's relationship and reps. (Adelua, *et al.,*2020a; Adelua, *et al.,* 2020b; James, *et al.*, 2020d; Nwosu, *et al.,* 2019; Adelua, *et al.,* 2020c; Adelua, *et al.,* 2020d; Aiyende, *et al.*, 2020a). Explains that public relations practitioners are burdened with the duty of planning, creating, building and maintaining a positive image and integrity of an organization. This practice entails public affairs, corporate communication, stakeholders' relations, issues management and corporate social responsibility. Public relations operate at different levels of the organization, both government and corporate. Public relations practitioners are individuals responsible for the running and success of an organization's reputation (Nwosu, *et al.*, 2020a; Nejo *et al.,* 2020b; Olabanjo *et al.,* 2020a; Omokiti *et al.,* 2020b; Salau *et al.,* 2020a; Salau *et al.,* 2020b; Nwosu *et al.,* 2020b).

Today, public relations practitioners adopt the use of new media tools to communicate. The Internet has changed the world, especially in communication. The research shows that people place so much importance on the use of the internet, and this suggests that public relations practitioners need to be involved in the trend. (Salau et al., 2020) describes public relations use of digital as an innovative concept that is computer-mediated. It consists of practising public relations in the cyberspace. A practitioner that cannot effectively use the online mediums to communicate with the online community cannot maintain the kind of relationship that will help shape the image of the organization. Fayemi et al., 2020) notes that when practitioners respond to an organizational problem strategically instead of tactically, it helps the reputation of the organization to be positively projected. The perception and

awareness level of the public regarding the public relations activities in the transport sector involves the public relations practitioner managing the website. It also involves other platforms to promote, relate with the local press and interact with the agency. All of these shows that public relations are a two-way communication (James *et al.,* 2020a; Ndubueze *et al.,* 2019; James *et al.,* 2020b; James *et al.*, 2020c; Ndubueze *et al.,* 2020; Nejo *et al.,* 2020a; Olabanjo *et al.,* 2019).

According to Philip and Young, public relations practitioners depend on the idea behind a communication to be able to follow up the public's desire for the media, which is fast becoming Internet-based. The Department of Trade and Industry and the Institute of Public Relations (2003) report that public relations previously involved a careful and tactical tool for influencing media coverage, the need to have an engaging relationship with the stakeholders, and demand for corporate transparency. Having a good relationship with media practitioners is an essential action that a public relations expert must be able to do. Keeping good working contact with the media controller such as radio presenters, journalists and bloggers (Nejo et al., 2020a). Public relations involve the manner at which top management of organizations employ the use of strategic ways to uphold the credibility of their brand, services to gain acknowledgement (Odiboh *et al.*, 2020a; Odiboh *et al.,* 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019).

In today's world, electronic public relations have become a necessity in representing communication in the community. (Salau et al., 2020) noted that sincere information seekers will always go to an organization's website to get relevant, trending information about the policies and activities of the organization. With this, they refer this platform to others who may need any information about the happenings within an organization. Relationship dimensions define an organization/public relationship, which acts as a predictor of public perception and choice behaviour. The effect of creating a mutual connection is to have a shared understanding with the public, which is an essential responsibility of a public relations practitioner, to ensure a positive perception of an organization (Fayemi et al., 2020).

Overview of Traffic Management in Lagos

Traffic Management

Traffic is commonly referred to as the movement of people, goods, and vehicles within an area, through road, air, or water route. Traffic management shown around the world have proved that drivers are much more careful when there are CCTV cameras, and speed limit monitors on the road. The use of these technologies will only improve the road attitude in the state. However, it will also enhance safety, reduce accidents, reduce the risk of theft. The use of CCTV's will help traffic control managers in the state watch traffic congestion and then work towards controlling it.

Traffic management involves the control of roadworks, that is, the action for improving safety on the road for all its users and also to ease congestion. In another context, it could mean the process of determining modern movement and quick economic delivery. It means tracking logistics in internal and external transportation. The technique for traffic management specializes in creating an environment suitable for customers, employees, and the general public and a safe working zone while ensuring a free flow of traffic. This objective is possible by combining good knowledge of experience with new technologies and approaches to the agency.

This initiative can help keep traffic moving steadily. When large vehicles are using the roads, they cause congestion. Thus, road management would mean preventing congestion effectively. Road traffic control involves guiding cars and pedestrian traffic around a construction area, therefore ensuring safety. Traffic control also allows the use of technological tools like the CCTV and other traffic monitoring devices. Traffic flow is free movement of all the vehicles moving on the road at a given time - statistically expressed as vehicle movement per hour. Traffic flow is the interactions between vehicles, infrastructure and drivers, intending to understand and develop road networks with efficient movement of traffic.

Lagos State Management Authority: LASTMA

LASTMA is established under the ministry of transportation to help manage road traffic. The agency is responsible for road traffic matters and a system of operation that makes it responsive to the demands of traffic, to ease congestion. LASTMA is an autonomous body responsible for improving the conditions and appearance of road movement (Aiyende et al., 2020). Its function is to redirect traffic for a better environment, improved access to commerce and industry, ease congestion, control and enforcement of traffic rules, public enlightenment, driving training and certification. A Chief Executive Officer (CEO) heads the agency. The principal administrative office consists of the public relations expert, the personal assistant, a clerk, secretary, administration and finance, education and training department, logistics departments (responsible for the procurement of auto spare parts and maintenance of agency's vehicles and also the allocation of cars to various zones within the metropolis).

The agency adopts the use of several techniques in actualizing their functions. These range from traffic patrol, vehicles inspection and public enlightenment, t towing of broken-down or accident vehicles good driving culture. All of these activities are through motor park rallies, use of flyers, handbills, posters, radio jingle, newspapers, public lectures, training programs/enlightenment activities, television e.t.c.

Theoretical Frameworks

Two-way symmetric model is an improvement of the two previous models established by professor Grunig as it involves an avenue to ensure feedback. The two-way asymmetric model wittingly employs scientific persuasion. It suggests that by learning more about the public or target audience, messages could be shaped or prepared to change their attitudes in favour of an organization's desired effect.

The practitioners strive to influence public attitude, but no mutual understanding arises from the shared communication. Two-way symmetric model is the most acceptable of all the models. In this case, both the communicator (the agency) and the receiver (the public) are mutually communicating. The messages take into account the needs, demands and interests of the people. This model is dependent on research in not only designing or packaging a letter but also in helping an organization to adjust concerning the needs of the public.

Two-way symmetrical model is described as a part of public relations practitioners daily because it involves the management of social media platforms. Grunig stated that proportional communication projects reality for practitioners regardless of whether or not they are trying to implement it. With digital communication, publics have much more control over their sources of information; and organizations have little choice other than to communicate with them symmetrically.

Research Design and Methodology

This study adopts the survey method. Survey research design has an unbiased representation of the population of interest and by gathering of the same information from each participant (Owens, 2002). In getting responses from the respondents, the researcher formulated a questionnaire out of the research questions. It is about the public consciousness of LASTMA's activities and policies and their effects on the traffic situation in the State.

The questionnaire consisted of open and close-ended questions whereby, the copies of the questionnaires were administered to the population by the researcher. After applying the questionnaires to the public, the data gathered was coded into the Statistical Package of the social science software and tabulated for easy understanding of data collected. The population was selected based on a random sampling technique. The random selection gave a chance for different categories of individuals to fit into the study. The sample size for the study is 230 respondents, but only 200 questionnaires returned from the field thoroughly and correctly filled.

Data Analysis

After the collection of data, it was analyzed through frequencies and percentages by the use of SPSS (Statistical Package of the Social Science) software. The tables interpret the findings.

Table 1: Gender

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Male	114	57.0	57.0	57.0
	Female	86	43.0	43.0	100.0
	Total	200	100.0	100.0	

Table 1 shows that 114 of the population (57.0%) are males, while 86 (43.0%) are females. These indicate that majority of the respondents are male.

Table 2: Age

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	18-25	127	63.5	63.5	63.5
	26-32	49	24.5	24.5	88.0
	33-40	18	9.0	9.0	97.0
	41-47	6	3.0	3.0	100.0
	Total	200	100.0	100.0	

This table indicates the age bracket of the respondents stating that 63.5% are between the ages of 18-25, 24.5% are between the ages of 26-32. Followed by individuals in the ages 33-40 (9.0%) with 41-47 (3.0%) respondents.

Table 3: Marital status

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Single	156	78.0	78.0	78.0
	married	43	21.5	21.5	99.5
	Others	1	.5	.5	100.0
	Total	200	100.0	100.0	

Table 3 indicates the different marital status of individuals that engaged in filling the questionnaire. The single has the highest respondents of 78%, followed by the married 21.5% with the least in the population are individuals under the category of others 5% of the people of 200 respondents.

Table 4: Educational level

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Secondary	9	4.5	4.5	4.5
	First degree/BSc /HND/and	87	43.5	43.5	48.0
	postgraduate/masters, MBA, PhD, others	100	50.0	50.0	98.0
	Others	3	1.5	1.5	99.5
	6.00	1	.5	.5	100.0
	Total	200	100.0	100.0	

This table indicates the educational level of the respondents. It shows that 4.5% fall under the second category and 43.5% are first degree/BSc/ and/ and holders, followed by 50% who fall under the category of postgraduate/ masters/ MBA/ PhD, the lowest which is 1.5% consist of individuals under others.

Table 5: Occupation

		Frequency	**Per cent**	**Valid Percent**	**Cumulative Percent**
Valid	employed	36	18.0	18.0	18.0
	self-employed	48	24.0	24.0	42.0
	unemployed	3	1.5	1.5	43.5
	student	102	51.0	51.0	94.5
	Retired	1	.5	.5	95.0
	Others	10	5.0	5.0	100.0
	Total	200	100.0	100.0	

Table 5 shows that 18.0% of respondents are employed, 24.0% are self-employed, 1.5% are unemployed, 51.0% are students, 5% fall under the category of retired and finally 5.0% others.

Table 6: Awareness of the agency called LASTMA

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	195	97.5	97.5	97.5
	No	5	2.5	2.5	100.0
	Total	200	100.0	100.0	

In this table, 195 respondents (97.5%) agreed that they are aware of the agency called LASTMA. The remaining five respondents (2.5%) are not mindful of the existence of LASTMA.

Table 7: Through which mass medium did you hear of LASTMA

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	TV	37	18.5	18.5	18.5
	Radio	34	17.0	17.0	35.5
	social media	32	16.0	16.0	51.5
	word of mouth	14	7.0	7.0	58.5
	TV, radio, social media, word of mouth	43	21.5	21.5	80.0
	Others	23	11.5	11.5	91.5
	None	17	8.5	8.5	100.0
	Total	200	100.0	100.0	

This Table shows that 37 respondents (18.5%) state that LASTMA is known/heard of through television viewing mass medium. Thirty-four (17%) respondents heard through the radio; and 32 respondents (16%) through word of mouth. However, a majority of 43 respondents (21.5%) said they heard of LASTMA through the combination of TV, radio, social media and word of mouth. Finally, 17 respondents (11.5%) said that they have no idea of the mass medium through which they heard of LASTMA. In contrast, 17 (8.5%) respondents failed to respond to the question.

Table 8: Are you aware of Lagos state traffic radio?

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	150	75.0	75.0	75.0
	No	48	24.0	24.0	99.0
	3.00	2	1.0	1.0	100.0
	Total	200	100.0	100.0	

In this table 150, respondents (75.0%) agreed that they are aware of Lagos State traffic radio. In comparison, the remaining 48 respondents (24.0%) are not aware of Lagos State traffic radio. Finally, the remaining two respondents 1.0% are neither aware or not.

Table 9: How effective has the radio program been on your day to day movement

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	very effective	45	22.5	22.5	22.5
	effective	76	38.0	38.0	60.5
	partially effective	26	13.0	13.0	73.5
	not effective	41	20.5	20.5	94.0
	5.00	12	6.0	6.0	100.0
	Total	200	100.0	100.0	

In this Table, the respondents answered the question of the effectiveness of the radio program on their daily commuting. Forty-five respondents (22.5%) agreed that Lagos State radio has been helpful. In comparison, 76 (38%) said it has been active, 26 (13%) said it has been partially effective, and 41 (20.5%) said it has not been effective. However, the remaining 12 respondents (6%) refused to respond.

Table 9: LASTMA since inception has improved infrastructural development

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	yes	77	38.5	38.5	38.5
	No	53	26.5	26.5	65.0
	undecided	70	35.0	35.0	100.0
	Total	200	100.0	100.0	

This table states out that 77 respondents (38.5%) agree that LASTMA has helped improve infrastructural development in the state; 53 respondents (26.5%) said no to the statement. In contrast, the remaining 70 (35.0%) were undecided.

Table 10: Is there sufficient information regarding activities

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	88	44.0	44.0	44.0
	No	61	30.5	30.5	74.5
	undecided	51	25.5	25.5	100.0
	Total	200	100.0	100.0	

This table indicates that 88 respondents who make up the highest number agree that there is sufficient information regarding activities of LASTMA in the metropolis. Sixty-one respondents (30.5%) are in disagreement with the statement, while the remaining 51 respondents (25.5%) were undecided.

Table 11: Are LASTMA current policies well understood

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	58	29.0	29.0	29.0
	No	86	43.0	43.0	72.0
	undecided	56	28.0	28.0	100.0
	Total	200	100.0	100.0	

This table reveals that 58 respondents (29.0%) are aware that LATMA's current policies are well understood; 86 respondents who made up 43.0% of the total respondents disagree with that statement. In contrast, the remaining 56 (28.0) respondents were undecided.

Table 12: Should the current policies be changed?

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	yes	70	35.0	35.0	35.0
	No	42	21.0	21.0	56.0
	undecided	88	44.0	44.0	100.0
	Total	200	100.0	100.0	

This Table summarises that LASTMA's current policies should be changed. Seventy (35%) respondents agree that LASTMA should replace its current policies. In comparison, 42 respondents (21.0%) said disagreed; while the remaining 88 (44%) respondents were undecided.

Table 13: Are you aware of the implementation processes of LASTMA policies?

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	50	25.0	25.0	25.0
	No	114	57.0	57.0	82.0
	Undecided	36	18.0	18.0	100.0
	Total	200	100.0	100.0	

According to this table, 114 respondents (57.0%) are not aware of the implementation processes of LASTMA policies. 50 respondents (25.0%) are aware while 36 respondents (18.0%) are undecided.

Table 14: If yes, through which medium did you hear of these policies

		Frequency	Per cent	Valid Percent	Cumulative Percent
	TV	37	18.5	18.5	18.5
	radio	34	17.0	17.0	35.5
	social media	32	16.0	16.0	51.5
	word of mouth	14	7.0	7.0	58.5
	TV, radio, social media, word of mouth	43	21.5	21.5	80.0
	others	23	11.5	11.5	91.5
	none	17	8.5	8.5	100.0
	Total	200	100.0	100.0	

This table shows that 43 respondents (21.5%) of the total respondents hear of LASTMA policies through television, radio, social platforms and word of mouth. While 37 respondents (18.5%) are aware through television medium, 34 respondents (17.0%) through radio program and 32 respondents (16.0%) through social media platforms. Twenty-three respondents (11.5%) did not categorically state the medium, and lastly, 17 respondents (8.5%) did not respond.

Table 15: LASTMA has had a positive effect on the effect on the driving culture in the state

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	agree	141	70.5	70.5	70.5
	disagree	27	13.5	13.5	84.0
	undecided	32	16.0	16.0	100.0
	Total	200	100.0	100.0	

This table reveals that LASTMA has a positive effect on the driving habit/culture of individuals in the state. One hundred forty-one respondents who make up the highest number and 70.5% of the total respondents agree to this, while 27 respondents (13.5%) disagree and lastly, 32 respondents (16.0) were undecided.

Table 16: Has the establishment of LASTMA affected traffic congestion?

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	agree	128	64.0	64.0	64.0
	No	25	12.5	12.5	76.5
	undecided	47	23.5	23.5	100.0
	Total	200	100.0	100.0	

The table above shows that 128 respondents (64.0%) agree that the establishment of LASTMA affects traffic congestion. 47 respondents (23.5%) were undecided, 25 respondents (12.5%) said no to the statement.

Discussion of Findings

Research question 1 what is the Public's perception of the activities of LASTMA
Table 11 shows that 70% of respondents agree that LASTMA has affected the driving culture, which is positive on the state. Also, 64% of respondents agree that the establishment of the agency has an impact on traffic congestion within the metropolis.

Research question 2 to what extent is the effect of the approach adopted by LASTMA for sustainable transportation system for Socio-Economic benefits
The last table shows that 128 respondents (64.0%) agree that the establishment of LASTMA affects traffic congestion. Thereby creating an avenue for more transport infrastructure, according to SDG 9, which evolves around enhancing and building resilient infrastructure and the administration of new models aimed at achieving the safety of lives and properties. And also, the sufficient flow of traffic in Lagos State.

Recommendation

The road network situation in Lagos needs to be expanded on with the construction of new roads. The condition of the streets should be improved upon by the ministry of government to avoid slow movement of vehicles, goods and individuals in the streets. Despite the presence of public relations in the agency, there is a need for more awareness. As revealed by the study, the public has little knowledge of the activities and policies of the agency.

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Public Awareness and Perception of Public Relations Activations At a Universal Education Board in Nigeria

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Abstract

The study focused on what the perception of the public is regarding the public relations (PR) activations of Lagos State Universal Basic Education Board (LSUBEB). Do they know if such department exist? Are the PR activations helping in curbing lack of quality education? These were the research questions. The respondents are employees of SUBEB. Their selection was based on their positioning to know if public relations operated in schools. The statement of the problem, which is lack of quality education hinges on the Sustainable Development Goal 4 (quality education). Also, the researcher adopted the Excellent Theory of public relations, which is about how the practitioners make the organisation useful, organised and well managed. The sample size was purposively selected. In SUBEB, the teachers (employees) were randomly selected from primary schools because they are under the management of the agency. The Scientific Package for the Social Science (SPSS) processed the data supplied by the questionnaire. Tabulations in percentages expressed the findings, further discussed based on the three research questions of the study. The researcher also recommended that PR activations should be more impactful so that the public can have a satisfactory perception of their duties.

Keyword*:* Public Perception, Awareness, Public Relations, Activations

Introduction

The history of Public Relations (PR) in Nigeria is traceable to the colonial era when a Yoruba newspaper was a medium for announcing deaths, births and marriages. The British colonies seized the opportunity to use the newspaper for propaganda to gain trust from Nigerians ((Ukonu, Anyadike & Okoro, 2018; James *et al.,* 2020a; Ndubueze *et al.,* 2019; James *et al.,* 2020b; James *et al.*, 2020c; Ndubueze *et al.,* 2020; Nejo *et al.,* 2020a; Olabanjo *et al.,* 2019). In 1894, the British established the first public relations department in Nigeria, headed by Mr. D.C Fletcher. The functions of the office were mainly to enlighten the public relating to government activities. Their publics were the Nigerian soldiers who participated in World War II with other selected publics. After Nigeria's independence in 1960, the department moved to the Federal Ministry of information. After the freedom, the first public relations professional body was founded in 1963 by Dr, Samuel Epelle. It was called the Public Relations Association of Nigeria, later changed to the Nigerian Institution of Public Relations, chartered in 1990 (Ukonu, Anyadike & Okoro, 2018). In this study, the PR activations in schools and the perception of the public are the main focus.

According to Ololube (2016) Education involves the imparting of values, ethics, norms and culture in an individual to enlighten and guide the person's behaviour and conduct in the society. Education moves from one generation to another; its continuity increases the development of a community. It is also the process of cultural renewal whereby the process of learning, unlearning and relearning takes place (Adelua, *et al.,* 2020a; Adelua *et al.,* 2020b; Nwosu *et al.,* 2019; Adelua *et al.,* 2020c; Adelua *et al.,* 2020d; Aiyende *et al.*, 2020a). Education remains one of the tools for change and advancement in society; recognised as one of the most powerful mechanisms for nation-building (Fayemi *et al*., 2020a).

Statement of the problem

A prosperous nation is that which has quality education because education determines the level of development. The problem the researcher seeks to solve is the lack of quality education. Because of the importance of education, the United Nations (UN) included quality education as the 4th sustainable development goal. An educated country is different from one who lacks knowledge. The advancement in technology, in health care sectors and every facet of life, is based on education (Omokiti *et al*., 2020a). This study focused on the perception and the awareness level of the publics' regarding PR activations of LSUBEB. Is the public awareness of the presence of PR in Lagos SUBEB? Is LSUBEB carrying out their activities to meet the goals set by the UN about quality education? The lack of quality education is a severe problem; this study tends to ascertain.

Research objectives

1. To find out if the public is aware of public relations activations
2. To find out the perception of the publics' regarding PR activations in SUBEB
3. To examine the impact of the public relations activations in SUBEB

Research questions

1. Is the public aware of public relations activations?
2. What are the perceptions of the publics' regarding PR activations in SUBEB?
3. What are the impacts of the public relations activations in SUBEB?

Literature Review

Perception and awareness of public relations

Society of America (PRSA) states that Public Relations is a "counselling management at all levels in the organisation concerning policy decisions, course of action, and communication, taking into account their public ramifications and the organisation's social or citizenship responsibilities" (Amodu *et al.*, 2019).

PR practice is broad with essential responsibilities which they are required to discharge effectively. PR establish and maintain a cordial relationship with other persons who they are effecting or effected by due to the activities they release. It engages a two-way communication process of disseminating information and getting feedback. PR maintains the communication and relationship of its organisation in other to preserve the right public image (Amodu *et al*., 2019).

PR is a management function which is needed in schools to foster good relations with its stakeholders (parents, students, investors and teachers). To maintain support and recognition from the stakeholders, the PR department needs to be efficient in discharging their duties. PR plays a role in decision making and also help an organisation to achieve its set goals (Omokiti *et al*., 2020). Also, an organisation needs to maintain effective communication with its publics to maintain a good business relationship (Aw, 2018). Public relations in the education sector tend to work towards placing the activities, accomplishments and efforts of the schools and its personnel in the most favourable light (Bartz, Rice & Karnes, 2018).

Also, the National Schools Public Relations Association defined PR in schools as a management function planned to aid the educational institutions to provide better services and have an improved relationship with their publics (Coruk, 2018).

The Schools' Principals agree that PR activations in the education sector involve the management of their institutions' website to promote the school. Other PR activations, according to the schools' chief administrators are organising meetings, conducting seminars, relating with the local press and interacting with parents (Coruk, 2018). All these showed that PR is a two-way communication process of which the principals are fully aware (Nejo *et al*., 2020a; Odiboh *et al.*, 2020a; Odiboh *et al.,* 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019). The employment of PR in schools promotes the vision and mission of the institutions.

The University Basic Education Board Lagos State (SUBEB)

The Lagos State Universal Basic Education (LSUBEB) is an agency under the Ministry of education in Lagos state. It exists in each Nigerian states according to law. The body functions to coordinate, manage, implement the programmes of the country according to the Federal Government of Nigeria's directives. Some of the duties and roles which LSUBEB plays are:

1. Work according to the national policies set by the federal and state government regarding education.
2. They Coordinate, supervise and train teachers and also monitor public primary schools and junior secondary schools in the state.
3. We are assessing the teachers within regular intervals.
4. Recruitment, appointment, promotion of teaching staff and non-teaching staff
5. They advise the State Government on funds and development (Fayemi *et al*., 2020).

Factors responsible for lack of quality education in Nigeria Insufficient budget allocation

It is one of the factors responsible for low standards in Nigerian schools. Even though the Nigerian government has continued to repeatedly state its commitment to the development of the education sector, Nigeria's education receives much lower than 26% of the national budget as recommended by the United Nations Educational Scientific and Cultural Organization (UNESCO). If only the budget allocation is enough, the education system will be more productive than it is. In other words, the insufficient fund is affecting the education system because funds are needed to run schools (Ololube, 2016).

Inadequate infrastructure

Inadequate infrastructure in schools is a severe setback, especially in primary schools. The majority (87%) of classrooms are overcrowded, 12% of pupils sit on the floor to learn, 77% lack textbooks and 38% have no ceilings in the classrooms. Also, schools lack laboratories, hostels, libraries and other facilities which is contradicting the goals of SUBEB and Universal basic UBE. All these are affecting the development of education in Nigeria, especially in the rural areas (Suleiman & Abubakar, 2020). Some students fail not because they are not intelligent, but because of the limited or lack of adequate educational facilities (Ogu, 2016).

Shortage of qualified teachers and inadequate remuneration package

The limited number of teachers in schools, especially secondary schools is a challenge. The total number of teachers available as of 2009 was 466,800, and as of 2015, the country required 688,200 teachers. The percentage of teachers needed should be 6.68% yearly (Suleiman & Abubakar, 2020). But that is not enough as some of the teachers are unqualified to teach.

Activations towards quality education

The training, recruitment, deployment, motivation, retention, as well as continuous training and retraining, are at the heart of education reforms for quality attainment (John, Egunsola & Bashir, 2019). Training is a crucial factor in promoting workers' efficiency in the workplace (Aiyende *et al.*, 2020b; Fayemi *et al.,* 2020a; Fayemi *et al.,* 2020b; Fayemi *et al.,* 2020c; Fayemi *et al.,* 2020d; Olabanjo *et al.,*

2020b; Omokiti *et al.,* 2020a). Training is a learning or teaching activity to help the employees of an organisation to acquire, develop and apply the knowledge, skills, abilities and attitude required by that organisation to achieve its mission. Also, capacity building is vital because it involves human and infrastructural facilities which enable an individual to realise his/her full potentials of existence, including the goals of an organisation (Anho, 2018).

Newly hired or employed employees (teacher) needs training, to keep them alert, fit and professional at their job. According to Anho (2018), training enables employees to work harder, which means every worker needs training once a while during their carrier phrase.

However, to manage human resources, teachers are to be continuously trained to upgrade their skills, knowledge, aptitude, attitude specified and general educational requirements, Anho (2017). When training is continuous, it increases advantage over others in economic development and increasing productivity. That is to say, that for primary schools to achieve its purposes of quality education, it needs adequately trained and competent teachers to participate in the policies formulation and implementation. Consequently, many teachers, despite their qualification, are teaching with no practice and no experience (Anho, 2018).

Training Steps

1. Diagnosis step: this is the problem identification step.
2. Prescription Step: this means providing a solution to the problem discovered.
3. Construction Step: this is when the instructor implements or execute the training.
4. Evaluation Step: this is when the given solutions are checked for effectiveness to know if the training solved the problem (Anho, 2018).

The quality education the citizens' disposal determines the rate of development of a country. The primary school is vital because when pupils don't have a good foundation, it will be difficult for them to be competent. High-quality education provides the needed human resources that will manage the different sections of a country effectively (Salau *et al*., 2020).

Besides, Daluba (2015) avers that for development to take place in a nation, there must be commitment and resources to provide education. It is in this light that UNESCO recommends that every country should commit 26% of its resources to the education sector to pursue quality education (Anho, 2018).

It is worth noting that the efficiency of quality education as a tool for development depends entirely on how students, parents, teachers, proprietors, policymakers, examination council, Ministry of education and the government collaboratively manage, execute and implement policy on education. In other words, quality education needs an enabling environment to thrive effectively. Development and technology are essentials for every society to advance (Salau *et al*., 2020).

Theoretical Framework

Excellence theory underpins this study. It is a public relations theory which deals with how organisations can conduct excellent public relations in practice. For PR to contribute to organisational effectiveness, the organisation must empower PR as part of the management function because they engage in the decision-making process (Nwosu, *et al.*, 2020a; Nejo *et al.,* 2020b; Olabanjo *et al.,* 2020a; Omokiti *et al.,* 2020b; Salau *et al.,* 2020a; Salau *et al.,* 2020b; Nwosu *et al.,* 2020b). The organisation, therefore, interact with the stakeholders in its environment both to accomplish its mission and to behave in a socially responsible manner (Adelua *et al*., 2020). In this case, they manage communication between management and publics to build relationships with the public that are most likely to affect the behaviour of the organisation or that are most affected by the behaviour of the organisation (Grunig, 2008).

The excellence theory was applied to the research topic because it is a public relations theory which deals with the interest of both organisations and the public. When the PR activations are in the interest of the people, it will enhance the image of LSUBEB in the eyes of the public. When such occurs, it will benefit both parties.

Research Design and Results

The researcher distributed 250 questionnaires to employees of SUBEB and only 197 copies of the questionnaire were retrieved. Lagos State was the location for the operation of the questionnaire, which consisted of open-ended and close-ended questions. Data from the retrieved questionnaire was processed with the Statistical Package for the social sciences (SPSS) was used for coding. Result presentation is in tables of frequency.

Frequency Table

Table: 1 Gender

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	**Male**	51	25.9	26.2	26.2
	Female	144	73.1	73.8	100.0
	Total	195	99.0	100.0	
	Empty	2	1.0		
Total		197	100.0		

Table 1 shows that majority of the respondents are females due to the percentage of 73.1 (144) while male respondents are 25.9% (51) of the sample size. Out of the 250 questionnaires, 195 (99.0%) respondents responded while 2 (1.0%) respondents failed the answer the question about gender.

Table:2 Age bracket

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	**21-25**	6	3.0	3.1	3.1
	26-30	17	8.6	8.9	12.0
	31-35	44	22.3	22.9	34.9
	36-40 above	125	63.5	65.1	100.0
	Total	192	97.5	100.0	
Missing	**System**	5	2.5		
Total		197	100.0		

This table 2 contains the age bracket of the respondents. As shown above, 3.0% (6) of the respondents are of ages 21-25, 8.6% (17) are 26-30 years old, 22.3% (44) are 31- 35 years old while 63.5% (125) are from ages 36- above. This result shows that the majority of the respondents are ages 36 and above (63.5%); while the lowest was the respondents between the ages of 21-25 (3.0%). Also, only 192 (97.5%) respondents responded, while 5 (2.5) respondents failed to answer this question.

Table 3: Religion

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	**Christianity**	132	67	72.1	72.1
	Islam	51	25.9	27.9	100.0
	Total	183	92.9	100.0	
Missing	**System**	14	7.1		
Total		197	100.0		

This table identified the religion of the respondents. It showed that Christians are the highest participants, with a percentage of 67% (132), while people who practice Islam are 25.9% (51). Only 183 respondents responded, while 14 respondents failed to respond.

Table:4 Public Relations Department in SUBEB

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	**Yes**	99	50.3	59.3	59.3
	No	68	34.5	40.7	100.0
	Total	167	84.8	100.0	
Missing	**System**	30	15.2		
Total		197	100.0		

Table 4 answered the question if the public is aware of the presence of the PR department in SUBEB. The table shows that 99 (50.3%) of the respondents are aware of the public relations department in SUBEB while 68 (34.5%) respondents said they are not aware of such department. The total of 167 persons responded while 30 respondents didn't select either 'yes or no'.

Table:5 Meaning of Public Relations

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Interactive relations with people	55	27.9	41.7	41.7
	Organising school competitions and disseminating information	24	12.2	18.2	59.8
	Assist community and support societal growth	19	9.6	14.4	74.2
	No idea	18	9.1	13.6	87.9
	Brand reputation and image building	16	8.1	12.1	100.0
	Total	132	67.0	100.0	
Missing	System	65	33.0		
Total		197	100.0		

Table 5 shows that majority (55) of the respondents (27%) defined public relations as 'interactive relations with people', while 24 respondents (12.2%) described it as 'organising school competitions and disseminating information'. However, 19 (9.6%) of the respondents defined PR as 'assisting the community and support societal growth', 18 (9.1%) respondents stated that they had no idea of what PR is. In comparison, 16 respondents (8.1%) said it is a 'Brand reputation and image building'. The total number of the respondents to this question are 132 (67.0%) with 65 respondents (33.0%) who failed to respond to the question.

Table 6: Activations of PR in SUBEB

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	**Infrastructures**	27	13.7	17.8	17.8
	Organising school competitions	63	32.0	41.4	59.2
	Scholarship	23	11.7	15.1	74.3
	Free books	19	9.6	12.5	86.8
	All of the above	20	10.2	13.2	100.0
	Total	152	77.2	100.0	
Missing	**System**	45	22.8		
Total		197	100.0		

The above table 6 showed the respondents response about PR activations as infrastructure 27 (13.7%), organising school competitions 63 (32.0%), scholarship 23 (11.7%), Free books19 (9.6%) while 20 (10.2%) mentioned all of the four options together. The highest number of PR activations listed is organising school competitions while the lowest is free books distribution to schools. Also, a total of 152 respondents provided answers, while 45 respondents (22.8%) didn't answer the question.

Table: 7 Public Awareness of PR Activations

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	**Yes**	113	57.4	66.9	66.9
	No	55	27.9	32.5	99.4
	4.00	1	.5	.6	100.0
	Total	169	85.8	100.0	
Missing	**System**	28	14.2		
Total		197	100.0		

Table 7 answered the question about if the public is aware of PR activations. Majority of the respondents 113 (57.4%) said they are aware of the activations carried out by PR in the academic sector while 55 (27.9%) respondents are unaware. 169 (85.8%) respondents attempted the question, while 28 (14.2%) didn't respond.

Table 8: Media for PR Activations

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	**Television**	29	14.7	19.2	19.2
	Social media	53	26.9	35.1	54.3
	Newspaper	13	6.6	8.6	62.9
	Radio	12	6.1	7.9	70.9
	Word-of-mouth	43	21.8	28.5	99.3
	All of the above	1	.5	.7	100.0
	Total	151	76.6	100.0	
Missing	**System**	46	23.4		
Total		197	100.0		

Concerning the medium through which the respondents knew about PR activations, 29 (14.7%) said through TV, 53 (26.9%) through social media, 13 (6.6%) through the newspaper, 12 (6.1%) through the Radio, 43 (21.8%) through word of mouth and only 1 (.5%) respondent chose all of the above. The highest media used is social media. 151 (76.6%) while 46 (23.4%) respondents didn't respond.

Table: 9 Rating quality of education

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Excellent	49	24.9	28.0	28.0
	Good	97	49.2	55.4	83.4
	Average	22	11.2	12.6	96.0
	Poor	7	3.6	4.0	100.0
	Total	175	88.8	100.0	
Missing	System	22	11.2		
Total		197	100.0		

This table rates the quality of education in Lagos state. 49 (24.9%) of the respondents said it is excellent, 97 (49.2%) respondents said it is good, 22 (11.2%) responded that it is average while few persons (3.6%) said it is poor. The total number of respondents is 175 (88.8%), while 22 (11.2%) respondents failed to respond. Therefore, most respondents believed that the education system in Lagos government schools is excellent.

Table: 10 Causes of lack of quality education

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Teachers lack training and overpopulated classrooms	42	21.3	29.8	29.8
	Lack of textbooks, infrastructure and lazy students	42	21.3	29.8	59.6
	Lack of teaching materials	27	13.7	19.1	78.7
	Lack of funds	30	15.2	21.3	100.0
	Total	141	71.6	100.0	
Missing	System	56	28.4		
Total		197	100.0		

Table 10 shows that 42 (21.3%) respondents said that teachers lack training and the classrooms crowded. Another set of 42 respondents (21.3%) said there are no textbooks, infrastructure and some pupils are lazy. Twenty-seven respondents (13.7%) which are the fewest stated that the cause for lack of quality education is lack of teaching materials while 30 respondents (15.2%) said lack of funds.

Table: 11 Perception of PR activations in SUBEB

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	**it is impactful**	52	26.4	31.9	31.9
	it is not helpful	45	22.8	27.6	59.5
	more is needed	66	33.5	40.5	100.0
	Total	163	82.7	100.0	
Missing	**System**	34	17.3		
Total		197	100.0		

This table 11 answered the question about the perception of the respondents towards activations of the public relations in SUBEB. According to 52 (26.4%) respondents, the activations of PR is impactful, 45 (22.8%) said it is not helpful. In contrast, the highest percentage of 33.5 (66 respondents) stated that the public more is needed from the PR in discharging the activations.

Table: 12 Challenges face

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Lack of qualified teachers	24	12.2	13.6	13.6
	Overpopulated classrooms	70	35.5	39.5	53.1
	Lack of funds	28	14.2	15.8	68.9
	Lack of infrastructure	42	21.3	23.7	92.7
	All of the above	13	6.6	7.3	100.0
	Total	177	89.8	100.0	
Missing	System	20	10.2		
Total		197	100.0		

This table shows that the challenges faced by education are lack of qualified teachers 12.2%, the highest number of respondents 70 (35.5%) said overpopulated classrooms, 28 (14.2%) respondents said lack of funds, 42 respondents (21.3%) said lack of infrastructure while 13 (6.6%) said all of the above. The total number of respondents who answered this question are 177 (89.8%) while 20 (10.2%) didn't respond.

Table: 13 PR activations witnessed by respondents

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Infrastructure	36	18.3	20.1	20.1
	Scholarships	32	16.2	17.9	38.0
	Organising competitions	56	28.4	31.3	69.3
	Giving free books	38	19.3	21.2	90.5
	All of the above	17	8.6	9.5	100.0
	Total	179	90.9	100.0	
Missing	System	18	9.1		
Total		197	100.0		

In this table 12, it showed that 36 (18.3%) of the respondents had witnessed the PR activations of infrastructure takes place in schools, 32 (16.2%) respondents said scholarships are provided, 56 (28.4%) respondents have observed competitions being organised in schools by PR, 38 (19.3%) said free books are donated. In comparison, 17 (8.6%) said all the above are PR activations in schools under SUBEB. The total of 179 (90.9%) respondents answered the question while 18 (9.1%) respondents didn't respond.

Table: 14 Impact of PR activations on education

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	More efforts from teachers	18	9.1	14.6	14.6
	Commitment from teachers	23	11.7	18.7	33.3
	Teachers are more motivated and aware of responsibilities	44	22.3	35.8	69.1
	No idea	12	6.1	9.8	78.9
	Scholarships provision, Infrastructures and improved learning process	26	13.2	21.1	100.0
	Total	123	62.4	100.0	
Missing	System	74	37.6		
Total		197	100.0		

The table above presented the impact of PR activations on the quality of teaching. Eighteen (9.1%) of the respondents stated that there is more effort from teachers; 23 (11.7%) respondents said teachers are more committed. Forty-four (22.3%) respondents said teachers are more motivated and are of their

responsibilities, 12 (6.1%) respondents said they have no idea of the impact of PR activations. In comparison, 26 respondents (13.2%) said scholarship provision, infrastructures and improved learning process is part of PR activations.

Table: 15 Satisfaction level of respondents

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	90	45.7	54.2	54.2
	No	76	38.6	45.8	100.0
	Total	166	84.3	100.0	
Missing	System	31	15.7		
Total		197	100.0		

The table showed the satisfaction rate of PR activations of SUBEB. 90 (45.7%) respondents stated that they are satisfied while 76 (38.6%) respondents said they are not satisfied. The total of 166 (84.3%) respondents answered the question while 31 (15.7%) didn't respond.

Table: 16 Suggestions

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Proper scheme of work and seminars and infrastructures	29	14.7	23.0	23.0
	Recruiting more teachers, provide teaching materials and welfare	45	22.8	35.7	58.7
	Training and motivating teachers	32	16.2	25.4	84.1
	Less crowded classrooms and parents involvement	7	3.6	5.6	89.7
	Provide internet facilities for learning	13	6.6	10.3	100.0
	Total	126	64.0	100.0	
Missing	System	71	36.0		
Total		197	100.0		

Table 16 presented the suggestions made by the respondents. 29 (14.7%) respondents suggested that the proper scheme of work, seminars and infrastructures are needed, 45 (22.8%) respondents said that recruiting more teachers, provide materials and welfare as well. 32 (16.2%) respondents suggested that training and motivating teachers are needed, 7 (3.6%) respondents suggested less crowded classrooms and parents involved in education and 13 (6.6%) indicated the provision of internet facilities for learning. The total of 126 (64.0%) gave suggestions while the remaining 71 (36.0%) failed to respond.

Discussion of findings

RESEARCH QUESTION 1: To find out if the public is aware of public relations activations

The results showed that majority of the respondents are first of all aware of what the term Public Relations means. This result is visible in the number of respondents who defined the word in their understanding. The respondents described PR as an interactive relation with people - an appropriate definition since PR deals with two-way communication and relationship building. It shows that the respondents understood what it means.

The respondents are aware of PR activations and the meaning of public relations. Majority of the respondents are aware of the activations carried out by PR in SUBEB, which they later stated in as provision of infrastructure, providing scholarships, organising competitions for schools and donating books to the students. This finding shows that even those that had no idea about the meaning of PR knew the activations.

RESEARCH QUESTION 2: To find out the perception of the publics' regarding PR activations in SUBEB

The respondents have the understanding that PR activations are needed more than discharged. This finding contradicted research question three, which is about the impact of PR activations. If PR activations are impactful, that means the respondents have a good perception of the responsibilities of PR. But these findings made it clear that the respondents didn't see it that way.

RESEARCH QUESTION 3: To find out the impact of public relations activations by SUBEB

According to the findings, the effect the PR activation is having on the public is massive because the teachers are more motivated and committed. This result shows that the training conducted by SUBEB for the teachers is profoundly impacting them and the students. The PR activations which causes such impacts are scholarship provision, infrastructures and improved learning process. These findings show that SUBEB is responsible for discharging its PR activities to promote a higher quality of education in Lagos State.

Conclusion

This study concludes that the respondents are fully aware of the activations of public relations and could relate it to the quality of education. Their activations are fully known, and they use the right mediums to reach their target audience. Usage of electronic, print and social media showed that both the agency and the Ministry are mixing the media (Aiyende *et al*., 2020). The new media which is used by many people, is a suitable and effective means of targeting the audience. It is noticeable that the publics expect more from the PR activations than what they have experienced.

Recommendation

The study recommends the application of the use of technology-assisted public relations in Nigeria's education system. Meaning that the government should make available computers to all schools so that the pupils will have a quality education.

Also, the government should invest more in the education sector so that there would be an impactful activation through the PR to schools to increase the level of quality education in the country.

The perceptions of the publics' regarding Public relations activations is that they need to do more. Therefore, the PR department should put more effort in discharging their activations so that it will have a positive effect on the quality of education.

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Managerialism- Leaders- Leadership in The Organization's Processes

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Abstract

The subject of managerialism- leaders and leadership is a key problem in the organization's processes. The aim of this paper is to present the concept of a manager and a leader in the aspect of leadership in organizations. The manager's and leader's activity was referred to the basic managerial functions in organizations. In their function's processes the phenomena of managerialism and leadership were pointed out in the context of achieving the organization's goals. The evaluation of leadership in the dimension of leadership based on the method presented by J. B. Kaplan and R. Kaiser was adopted as a particular area of consideration. The study was based on the analysis of the original data from a survey conducted among a group of managers at various levels based on the Leadership Versatility Test (LVI). The aim of the study was to assess leadership in four dimensions of leadership: forcing, activating, operational and strategic leadership. The study was divided into two phases involving analysis of the relationship between the skills of different types of leadership and estimating the level of balance between business and organizational skills. With this end in view statistical testing was used for qualitative data and an indicator for measuring leadership versatility. The received results allowed to identify various levels of versatile leadership skills depending on its dimensions and indicate the need to improve leadership skills in the area of strategic activities. The theoretical purpose was to analyze selected original views in the field of management sciences, emphasizing the evolutionary nature of managerialism and leadership.

Keywords: A Manager, A Leader, Leadership

Introduction

Theoretical and practical management problems concentrate on many different issues. The most important among them are managerialism, leaders and leadership. Because of the wide range of the issues, only selected processes' aspects of management about managerialism, leaders and leadership were analysed. Managerialism and a manager are the synonyms of phenomena and functions implemented in organizations in decision-making processes. At the same time, it is the widest approach of the problem of the management processes. Leader and leadership correspond to a narrower range of managerial processes and functions in the processes of management in relation to a manager. Leadership is a necessary attribute of a leader, to a lesser extent a manager. For a manager it is important to show some leadership qualities. Undertaking the subject of manager's activity justifies choosing the basis for consideration. In the consideration, most of all, the model approach which integrate organization's goals with the function of a manager was indicated. A manager is responsible for an organization in front of stakeholders who expect a return on invested capital. The manager is required to make the right decisions in the area of impact on employees appropriately motivated to achieve specific goals. The goals of the organization are achieved also by the leader who has a key role in the management processes. The leader is characterized by a particular trait which identifies him with the model worthy of conduct and indicated to follow. Other leaders' features are also important and they were presented by many authors. Particularly important was the indication of a measurable criterion for assessing the competence of a manager and leader with simultaneous indication of leadership. In research of leaders' and managers' activities the leadership was highlighted as: forcing, activating, operational and strategic. The thesis was accepted that there is a correlation in the sphere of forcing and activating leadership. The different types of leadership indicated the level of leadership versatility in the organization's process of operation.

Determinants of the functions of manager and leader in the context of leadership in organizations

Undertaking the issues of managerialism, leaders and leadership directly needs to take into account the place and position of key functions occurring in organizations. Functions in the aspect of the abovementioned issues concern managers and leaders. The group of managers and leaders is a basic human resources in the organization. In the management's activity there is a legitimacy to identify the functions of manager and leader, especially in the context of leadership. The manager is an employee who performs managerial functions. A manager can be called a catalyst who: (Buckingham, Coffman, 2004)

- makes a proper employee selection, who is talented, not only has experience and determination

- specifies expectations along with specific results

- motivates employees, affecting their strengths

- influences employee and organization development

L. Kowalczyk cites the results of the research led by Gallupa Institute and ascertains that in the manager's activity it is necessary to define the model of the workplace in relation to the hierarchy of needs of the organization. (Kowalczyk, 2014) There are then two levels in the models. One of them is the base level, which demonstrates demotivating character. The second, on the other hand, motivates employees, individually and collectively, enabling the organization to achieve its goals through management processes. The manager acts very actively on organizations and the increasing strategic resources cause a further increase of his business-oriented position. (Kościelniak, Skowron-Grabowska, Nowodziński, 2017) The dominant attitude in the work of a manager identified with leadership of employees enables the release of their creative potential to achieve the goals of the organization. (Zawada, Tomski, Kucęba, 2015)

In order to establish the manager's operational efficiency in management, a proper organizational structure of the enterprise is required. The basic condition which must be fulfilled by organizations is a well-defined business purpose along with a strategy adapted to market requirements. Then, managers concentrate on effective implementation of actions enabling achievement of the organisation's goal. What is more, for managers' tasks in the aspect of technical conditions (Baskiewicz, Łęgowik-Małolepsza, Bubel, Sałek, 2016) there are processes of designing which are the answer for constant challenges of a changing market. (Grondys, 2017) Managers are forced to high activity in the area of generating task and system structures and organizational projects that determine the vision and strategy of enterprises. (Łęgowik-Małolepsza, Łęgowik-Świącik 2015) Effectiveness of behavioral actions may then lead to achieve the company's competitive advantage (Bubel, 2017).

According to D. Jelonek, in the managers' operations, analyses with the use of new knowledge based on: data mining, web mining, knowledge maps, big data, the use of social media, visualization to create animations and dashboards for managers are of significant importance (Jelonek, 2018a).

M. Mach- Król (2018) underlines the high usability of maturity models based on Big Data analyses in decision-making processes. Managers who are aware of the potential of Big Data analysis implement other solutions in order to achieve set goals, especially gain a lasting competitive advantage in a strategic perspective (Nowicka-Skowron, Mazur, 2019). A particular challenge in this context is a sustainable development. Indication on a competitive advantage needs from managers integration of ongoing projects with strategic activities. In current activities, the role of a manager in the area of knowledge management should be underlined (Skowron-Grabowska, Jasińska K, 2019).

The function of Knowledge Manager identifies with an Executive Director who co-operate with Knowledge Management Director. Knowledge managers gain and share knowledge in a way that

provides employees with access to knowledge capital (Niedbał, Wrzalik, Sokołowski, 2018). Which, in turn, ensures the development of the organization.

In the time and development perspective, leadership is considered to be the most important element of the manager of the future. The variety of leadership is determined by different types and roles of managers resulting primarily from the creation of a vision creator, financial engineering analyst, creativity (Koźmiński, 2004). It is important to take into account the manager's risk. People performing managerial functions are obliged to constantly monitor the financial situation of the organization.

The outline of the issues of manager's functioning needs similar analysis in relation to the leader. In the opinion of the leader it is necessary to take into account the current and future actions of the organization. In order to explain the role of the leader A. Zerfass i M. Wiesenberg (2016) formulate many questions. It may be accepted that one of them has a key meaning because it concerns the most important attributes of a leader in the functioning of the organization and the professional communication system. The issues of the leader in this context are illustrated in a Fig 1.

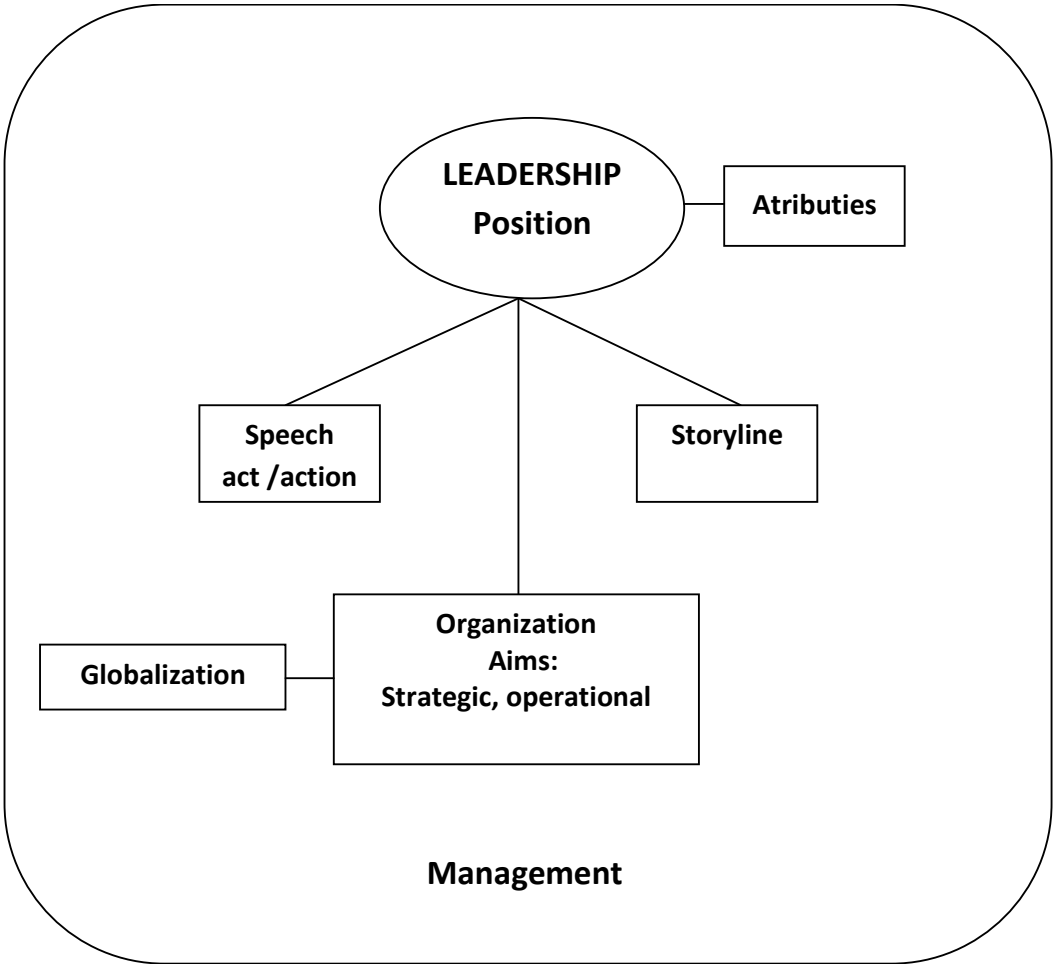

Fig. 1: The position of the leader in an organization

Source : Based on A. Zerfass i M. Wiesenberg (2016) Communicating the leadership status of organizations : A cross – national study In 10 European Countries [In:] The Management Game of

Communication, Edited by P.S. Bronn, S.Romenti, A. Zerfass, Emerald Group Publishing Limited, p.129, [p.12-142].

The leader's position influences the effectiveness of the organization's operations in the management processes. Leader's decision- making processes are limited by many different evidence. The basic evidence hindering the activity of leaders in enterprises should be recognized as (Krawczyk-Sokołowska, Korombel, Ziółkowska, 2016):

- inappropriate competences
- wrong incentive system
- inadequate control systems
- lack of effective methods of cooperation of the entire enterprise
- failure to recognize innovation and network potential.

In order to improve the effectiveness and efficiency of leaders, it is important to eliminate or reduce these negative premises. Thus, it is important to a leader to analyse conditions of the organization's activities, aimed at achieving goals including globalization (Kościelniak, Skowron-Grabowska, Grabara, 2017). Selected definitions from an interesting position are presented to determine the leadership position. These include the definitions:

A person is recognised as a leader when he has the capacity to be in charge and stay in the vanguard of efforts to be competitive with other group members. The term leader in relation to the employee holding a managerial post is not clearly identified since leadership is determined by context (Rutka. 2017, p.142).

A leader is someone open to raising awareness, someone who has a responsibility to create conditions for development, entrepreneurship and innovation, and who inspires people to do educational work. The leader must be to a certain degree a dreamer in order to be successful and capable of understanding the changing needs of people. He is supposed to be a role model who should secure good relations with stakeholders (Skrzypek, 2017, p.162).

As seen above, there are two widely differing approaches to identifying persons exercising control in organisations. One of them distinguishes the leader, the frontrunner and the manager implying that their roles and significance vary. The other concept attributes the aforementioned functions to one person (Smoląg, 2013, pp. 51-57)

A leader is a person who stands out in a contemporary organisation, task force or local community. The leader excels at skills and competences which demonstrate themselves in his emotional intelligence and a high level of morality. The leader is accepted by the organisation's members who knowingly and intentionally approve of his leadership and managerial qualities (Stachowicz, 2017, p.164).

The variety of presented definition of a leader is because of the fact of the complexity of characteristics, organizational behaviour and requirements posed to these employees in enterprises.

Presented generalized characteristics of a manager and a leader are the base for the relationship of management and leadership (Bucii, 2016). In the context of a leadership the key meaning has a process of maintaining a balance between management and leadership. Decision- making processes need strong position both of management and leadership. In the functioning of human resources, however, it is necessary to emphasize the special role of the leader who, with his authority, indicates the idea and direction of activities for the organization's employees. The leader is obliged to take on the challenges of the market. Promotional activities are especially a challenge.

For the leader of the 21st century, the particular challenge is an enterprise's functioning in a social media space. (Nowodziński, 2013). This activity needs verification of enterprise's goals in specific communities along with constant adaptation of current solutions to current conditions. The future creates a special challenge for the leader due to the dynamics of changes in the IT sphere. It is thus

necessary to systematize the approach in information addressing. As the first stage, developing and planning strategic solutions resulting from the media potential should be recognized. In the second stage it is important to identify and analyse current trends in social media. The third stage needs setting organizational procedures and standards which arrange planned processes. In the abovementioned context it may be stated that social media also fulfil a very important function of transferring information on corporate social responsibility (Barcik, 2019). The consequences of taking into account the issues of corporate social responsibility (Brzeziński, 2016) are reflected in the issues of managerialism, leaders and leadership. These problems indicate the legitimacy of conducting further research, especially in terms of leadership in the organization.

Key Decision Problems in Both Leaders and Managers Group

The starting point of discussion was the concept regarding the position of a strategic leader formulated by Romanowska. The role of this type of leader involves focusing on the environment of the company, seizing opportunities, and also examining potential risks while being able to make full use of knowledge in the horizontal perspectives and conditions. (Martin, Hauder, Matthes, 2016) When preparing a strategy, the leader must take into account conditions of uncertainty and risk which result in generating the atmosphere of anxiety and stress in the decision-making process. The decisions made in a changing environment necessitate constant analysis of the arrangements completed and the lines of action adopted as well as modifying the targets. A strategic leader's activity is largely determined by information resources. Their proper selection fosters the soundness and adequacy of decisions whereas any deficiencies in information or its contradictory nature leads to hindering decision-making of the strategic leader.(Romanowska, 2017, p. 56)

The author pursues her reflections on the role of leader by attempting to answer the question: "…what competences must a strategic leader be endowed with in order to meet the challenges?' The author makes a list of qualities that a strategic leader should display. They are: (Romanowska, 2017, p. 57)

- managerial expertise in respect of analysis, planning and control methods,
- intelligence, particularly creative thinking skills,
- capability to think and act unconventionally,
- ability to specify ideas, goals and priorities,
- charisma

courage that drives leader's success and, in terms of strategy, is a basis for decision-making in the event of incomplete information, (Jelonek, 2018b) social and business pressure or unconventional solutions. It is courage that lies at the root of decisions about abandoning the strategy in situations in which following it may cause losses.

Against this background, it is possible to refer to trends relating to strategy and the role of leader in literary studies. Based on the overview of research topics between 2014 and 2016 in 'Strategic Management Journal' by Dyduch and Bratnicki, the following conclusions may be drawn (Dyduch, Bratnicki, 2017):

- definition of the role of leader was provided only in relation to break-through innovations as a derivative of knowledge,
- prevailing terms are: leader and manager, notably as regards social values,
- as regards guiding and motivating a group of employees, two positions can be distinguished, namely: board president and director

The conclusions of the discussion about the issues that a leader must deal with are as follows: the problems connected with knowledge management, especially innovation as well as social values preferred by leaders, frontrunners and managers are very up-to-date. The tasks of those in leadership roles are linked to the strategic dimension of decision-making. (Rzemieniak, Knop, Jelonek, 2016)

The material for analysis came from the study of a test group of managers at various levels. A survey was used. The content of the survey was based on the Leadership Versatility Index (LVI). [1] A total of 264 evaluators (i.e. managers, co-workers and supervisors) participated in the study. They evaluated a total of 162 low-, medium- and high-level leaders. The aim of the study was to assess the effectiveness of leadership in four dimensions: forceful, enabling, operational and strategic. The skills of superiors were assessed on a "too little - too much" scale, where - 4 means "far too little", 0 means "the right amount " and 4 means "far too much". Single-person entities were excluded from the study. The first stage was to analyse the correlation between opposing skills in the four areas of leadership based on the category of the assessor (Table 1).

Table 1:The average value of correlations between pairs of leadership types

Category of assessor	Forceful - enabling leadership (I)		Strategic - operational leadership (II)	
	N	r	N	r
Managers	46	- 0.53	35	-0.21
Co-workers	32	- 0.56	25	-0.23
Supervisors	14	- 0.54	11	-0.27

Source: author's own calculations

Where N refers to the number of assessed managers, and r means the average value of correlations

It is assumed that leaders do not maintain a perfect balance between the social and interpersonal aspects (I), therefore a strong negative correlation is observed for this kind of skills, especially in the case of assessment by leaders of equivalent position. The strongest single correlations between variables in the area of forceful-enabling leadership were identified for:

• For r = -0.54, a negative correlation between controlling the situation (forceful leadership) and sharing one's skills (enabling leadership),

• For r = -0.57, a negative correlation between relying solely one's own opinion (forceful leadership) and listening to the opinions of others (enabling leadership),

• For r = -0.61, a negative correlation between exerting pressure on one's subordinates (forceful leadership) and supporting the activities of employees (enabling leadership),

• For r = -0.55, a negative correlation between making decisions alone (forceful leadership) and handing over initiative to others (enabling leadership),

• For r = -0.49, a negative correlation between pressure on achieving results (forceful leadership) and support for jointly achieved results (enabling leadership). (Kaplan, Kaiser, 2010).

On the other hand, business and organisational skills (II) are a lot less strongly correlated. The low average correlation indicator for strategic and operational leadership results from less frequent significant statistical relationships than in the case of the first dimension of leadership. Analysing individual relationships in this area, the following were identified:

• For r = -0.22, a negative correlation between focusing on a long-term strategy (strategic leadership) and centering on current results (operational leadership),

• For r = -0.28, a negative correlation between aiming at long-term development of the company (strategic leadership) and attention to the effectiveness of entity's operating (operational leadership),

• For r = -0.23, a negative correlation between bold decision-making (strategic leadership) and systematic pursuit of goals based on the principle of small steps (operational leadership),

• For r = -0.37, a negative correlation between unconventional solutions (strategic leadership) and using proven methods (operational leadership),

• For r = -0.22, a negative correlation between an aggressive pursuit of development (strategic leadership) and respecting existing restrictions (operational leadership),

• For r = -0.21, a negative correlation between a broad view of the results obtained (strategic leadership) and attention to detail (operational leadership).

The next step of the study was to estimate a versatility measure for each of the leadership pairs. It is understood as the 'right quantity' value which demonstrates the balance between forceful and enabling leadership as well as strategic and operational leadership. For each

leadership pair, grade values and their proximity to zero should be estimated. The value obtained indicates the extent to which a leader can strike a balance between the opposite qualities of balanced leadership. The graphical diagram for calculating the indicator is presented in Figure 1. According to the adopted assumptions, the indicator was calculated using the equation: (Kaplan, Kaiser, 2010, p. 202)

$$\text{Versatilityindicator} = \frac{\text{maximumdistance} - \text{actualdistance}}{\text{maximumdistance}}$$

Where:

actual distance: c2 = a2 +b2 and maximum distance: z2 = x2 + y2

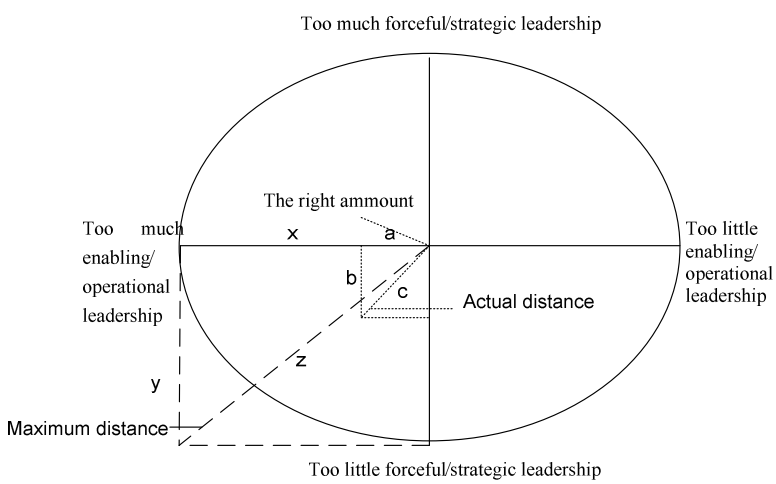

Figure 2: Graphic calculation of versatility indicator

Source: Own elaboration using the method described by Kaplan, J.B. Kaiser, R., (2010) Wszechstronny lider, Wolters Kluwer Business, Warszawa

For the maximum distance, the x and y values assume the maximum value on the scale, while in calculating the actual distance, the actual assessment values marked as a and b should be assumed. The indicator is in the range of 0-100%, where 0% to 20% means no versatility, 21 % to 40% - low

level of versatility, 41% to 60 - medium level of versatility, 61% to 80 - good level of versatility and 81% to 100% - very good level of leader versatility. For each leadership pair, the average leadership versatility index for the assessors was calculated (Table 2).

Table 2: The average index of versatility of the surveyed leaders by category of assessors

Category of assessor	Forceful - enabling leadership (I)	Strategic - operational leadership (II)
Managees	55%	46%
Co-workers	64%	52%
Supervisors	71%	61%
Total average	63.3%	53%

Source: Own elaboration using the method described by Kaplan, J.B. Kaiser, R., (2010) Wszechstronny lider, Wolters Kluwer Business, Warszawa, p.212.

The results obtained show a good level of versatility of the surveyed leaders as for forceful - enabling leadership. The average rate of 63% means that the leaders of the surveyed companies efficiently strive for balance between too limited and excessive use of their interpersonal and social skills. On the other hand, as far as strategic-operational leadership is concerned, the average indicator rating is 53%, which means a low level of versatility in this respect. The surveyed leaders have difficulty striking a balance between business and organisational skills. The leaders were rated the highest in terms of both leadership pairs by their superiors.

Summary

The issue of managerialism, leaders and leadership is the essence of an organization's operation. Employees who create: managerialism means managers, leadership means leaders. Their functions analysed are mainly about leadership in organizations. Managers and leader who have required features to perform those functions is an important condition for achieving the organisation's goals to ensure and increase its competitive position. The complexity of issues of the manager's and leader's functioning causes to its in-depth assessment, pilot empirical research in enterprises was conducted. Its essence was determined in a questionnaire based on the Leadership Versatility Test. This method was presented by J.B. Kaplan and R. Kaiser. Leaders were tested. The assessment was made by employees employed as subordinates and superiors as well as people having equivalent positions. The aim of the research was the assessment of the way of leadership in the following dimensions: forcing, activating, operational and strategic. In addition, a specific scale was adopted. The correlation between opposing skills in the presented dimensions of leadership was analysed.

According correlation analyses the following was found:

- leaders are characterized by a good level of versatility in a pair of forcing - activating leadership
- leaders show a low level of versatility in strategic and operational leadership.

The formulated conclusions indicate the need for leaders to improve their leadership skills in the decision-making area: strategic activity in relation to operational activity. At the same time, this application sets the direction for further research in the areas of managerialism, leaders and leadership.

The challenges considered particularly important are:

- necessity to adapt to dynamic changes in an organisation and the environment

- implementation and improvement of information systems along with appropriate cooperation with social media
- adaptation of multifaceted programmes in respect of corporate social responsibility.

These challenges require ongoing implementation. However, it is the strategic objectives of an organisation operating in a competitive surroundings that determine the importance of decision-making problems for leaders and managers.

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The Effect of Outward Foreign Direct Investments on China's Economy

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Abstract

The article analyses the influence of China's outbound foreign direct investments (FDI) on its national economy. The author focuses on the application of Chinese experience to the FDI theory. The paper finds that Chinese involvement in FDI has mainly positive effect on its economic growth. Based on the theoretical and empirical research analysis, it is established that several negative outcomes of Chinese foreign investment activity can be levelled for national economy due to the peculiarities of Chinese economic model. Based on the existing approach to FDI analysis the article describes the main impacts of China's FDI on its national economy. The author distinguishes and describes the main types of such effect, which include commercial and financial, as well as connected with transfers of tangible and intangible assets. The author points out that the positive impact of FDI on China's economic growth is connected mainly with the domestic use of tangible and non-tangible assets obtained abroad.

Keywords: foreign direct investments, FDI, China, economic effect, investment theory.

Introduction

Amid the steady rise and global expansion of China's economy, the volume of Chinese FDI surged from zero to over $100 billion in the past decade. According to Chinese Ministry of Commerce, by the end of 2017 China became the second largest investor in the world with total value of FDI of $1,8 trillion. The rise of China as one the main sources of direct investments globally requires special attention as FDI play important role not only for economic growth of recipient countries, but also for development of Chinese economy as one of the largest on a global scale. Thus, it is necessary to research economic effects of China's investment activity abroad on its national economy.

The topic of FDI impact on the economy of certain countries is widely publicized, however, researchers focus on the empirical analysis of their effect in recipient countries. At the same time, according to the author, theoretical aspects of direct investments effect on the economies of donor countries are under-researched in existing scientific publications. From the perspective of China, most of theoretical research is focused on FDI role in recipient countries, and very little attention is paid to China' FDI input to its economic growth at macro-level. The author implies that in spite of impressive amount of publications on the topic of Chinese FDI, modern scientific papers are mainly based on empirical analysis and pay little attention to influence of Chinese investments on the national economy in terms of investment theory.

The scientific novelty of the study lies in the author's analysis of theoretical model of foreign direct investments applicability for Chinese economic model and classification of China's foreign investments activity effects on the national economy.

The purpose of the article is to evaluate the economic impact of Chinese FDI on its national economy. For this purpose, the author researches the existing theoretical and empirical concepts to analyze foreign direct investments (FDI) impact on the donor's economy; defines and describes the main types of China's FDI economic impact on its national economy based on the conducted analysis. The object of the present study is China's FDI.

Main Points

Individual studies, based on the data from developing countries, point out a small positive influence of FDI on donor economies (Herzer, Klasen and Nowak-Lehmann D., 2008). For example, based on research of foreign investments conducted by USA, Herzer notes that FDI stimulates economic growth and increase in production in the home country. Studies, based on data from EU countries, indicate that outward FDI increase competitiveness and efficiency of companies in donor countries (Sunesen, Jespersen and Thelle, 2010) and positively influence their employment rate and industrial output (Hijzen, Jean and Mayer, 2011). Data from ASEAN indicate that increase of inward and outward FDI cumulatively stimulates investments within countries of the region (Goh and Wong, 2014).

In theory, FDI stimulate economic growth in donor country in two ways. Firstly, they spread technology from developed countries to home countries, what in turn increases efficiency of domestic investments. Secondly, companies investing abroad gain access to cheap raw materials, reduce production cost, increase volumes of output and become more competitive both on internal and external markets (Desai, Foley and Hines, 2005). As a result, development of value chains improves efficiency of the national economy in whole. In spite of this, various empirical studies have shown that foreign investments are undertaken at the cost of limited internal financial resources and displace investments in the home country, eventually reducing domestic productive capacity. However, the main drawback of these studies is that they are mostly concentrated on the effect of outward FDI on domestic investments and do not fully estimate economic impact of TNCs' foreign investment activity results.

Within the framework of this theory, China's case is rather peculiar. For example, there are two reasons for poor fungibility between foreign and domestic investments on China's market. Firstly, savings rate in China is one of the highest in the world (You and Solomon, 2015), which is a major spur to conduct both FDI and domestic investments. Secondly, significant part of Chinese foreign investments is financed from external sources and does not cause lack of capital in domestic market. Moreover, Chinese outward FDI contribute to introduction of foreign technologies to domestic production. That has a positive impact on investment performance and stimulates economic growth in China.

The effect of successful Chinese foreign projects significantly exceeds opportunity cost of using capital resources inside the country. In particular, taking into account the significant role of state regulation of investment development in China, negative impacts of outward FDI are minimized at the account of its strategic nature, while risks for national economy are mitigated by state. Empirical studies support this statement. Thus, based on statistical data analysis of China's foreign investments from 1982 to 2015, positive impacts of outward FDI on economic growth appear in the long term and outweigh negative impacts for Chinese capital market (Ali *et al.*, 2018).

In accordance with the approach of J.H. Dunning and S.M. Lundan, investments are divided into 4 types by their purpose (Dunning and Lundan, 2008):

1. access to natural resources and other strategic assets;

2. formation of new markets;

3. improvement of production efficiency;

4. access to strategic assets from abroad.

Each type of Chinese investments is aimed at providing certain advantages for national economy. However, the author notes that one type of investments in accordance with the above classification often leads to different impacts in China's economy, while different types of FDI may lead to the same impact. On the one hand, the fact of investing itself has effect on the financial state of China.

On the other hand, as a result of investment activity abroad, Chinese companies gain access to crucial material and immaterial resources for economic development.

Thus, taking into account peculiarities of Chinese economic model, the author offers to divide economic impacts of outward FDI on China's economy into several categories:

1. financial effects;
2. effects related to intangible assets acquisition;
3. effects related to tangible assets acquisition;
4. trade effects.

The author describes these effects below.

Financial Effects

At the present state of FDI development path Chinese companies lack certain types of specific advantages. That is why China pursues strategy of investment expansion as a way to obtain strategic assets abroad.

According to the balance of payments statistics, Chinese FDI generated $96.5 billion profits in 2018 with average return rate of about 6% (International Monetary Fund, 2019). Some part of the growing FDI revenues are reinvested to foreign subsidiaries, while their major part is returned to national market in the form of internal investments that stimulate economic growth. Even though the repatriated income is not a significant contribution to economy taking into account current Chinese financial capacity, its input to capital formation and development of different economic sectors is substantial. For example, even though the volume of immigrant remittances exceeded TNCs' financial FDI incomes during the early 2000s, most of it was consumed rather than reinvested. Moreover, incomes of Chinese companies' foreign subsidiaries were crucial during the first years of economic reforms, when China was in sharp need of foreign currency.

The financial aspect of FDI is also very important for export-oriented industries taking into account the fact that export volume increase plays important role in China's strategy to promote economic development and support current account surplus. FDI increase incomes of Chinese investors and exporters, as well as related suppliers of goods and services. Thus, financial advantages of FDI for Chinese economy depend directly on the volumes of profits earned and foreign currency inflow.

One more positive financial impact appears in granting access for Chinese companies to financing abroad (Wall, 1997; Deng, 2004). Overseas project demand foreign currency and large scale financing, that are hard to access in China by private firms. State-owned enterprises are major borrowers in China, while the most part of Chinese capital is managed by state banks and funds. These capital market imperfections make small and medium enterprises rely mostly on private loans and export revenues to finance and expand their activity. As a result, outward FDI create alternative funding sources for Chinese companies' business on the national market and abroad.

Effects Related to Acquisition of Intangible Assets

Another important effect of outward FDI for Chinese economy is gaining access to intangible assets that are in low supply in China. Investor companies implement the newly gained assets and thus accumulate specific competitive advantages. These intangible assets may include new technologies, know-hows, management and marketing skills, and so on. These resources flow into Chinese market by transferring from subsidiaries to parent company and assimilate by means of external effects. Through access to innovations, foreign investors and related companies become more effective and

labor productive. As a result, such process reduces the technological gap between China and developed countries.

The described effect is called "spillover effect" (Chen, Li and Shapiro, 2012). It arises mainly as a result of Chinese FDI to developed countries. Chinese foreign subsidiaries acquire technologies and other intangible assets by participating in value chains on recipient market. For example, companies receive new technologies and experience by using high-tech components for production of final goods abroad. Moreover, subsidiaries can hire foreign high-level experts or participate in research projects together with companies in the host country. The skills of Chinese labor force working in subsidiaries is also enhanced. Spillover effect in this case emerges due to the process of staff rotation between subsidiaries and parent companies (Knoerich, 2017). Transactions involving mergers and acquisitions open direct access to high technology for Chinese companies and integrate knowledge and managerial skills into TNCs' international structure.

In spite of significant progress of the past years, the majority of economy sectors in China do not reach technological and innovative level of development comparable to international leaders. Chinese companies are still limited by competitive and technological disadvantages on external and internal markets. China's economy has enormous potential for reducing the technology gap with developed countries; however, its innovation development is almost totally based on acquisition of foreign technologies.

Apparently, strategic intangible assets stimulate economic growth. However, in order to receive positive effect, Chinese companies have to successfully apply them on the domestic market. The two determinants of innovations that are acquired by undertaking FDI are the ability to transfer and implement them. Difficulties in transferring technology are often caused by internal factors, connected with TNCs deficiencies in strategic management, as well as by external factors, connected with cultural, legal and other differences between donor and recipient country. Moreover, in the context of rapid technological growth know-hows acquire new forms and become complicated, that makes them very difficult to implement in technologically underdeveloped countries. Nevertheless, successful examples of Chinese TNCs indicate high level of readiness to apply foreign technologies. For example, after acquisition of the IBM computer technology unit, Chinese company Lenovo acquired status of one of the world leaders in this sphere. Creation of Huawei and ZTE joint research project promoted implementation of 4G technology in China and extended influence of these companies both on internal and external markets. Empirical research also confirms positive correlation between outward FDI and quantity of Chinese patents. That illustrates successful implementation of foreign innovations on the domestic market (Qiang, 2001). Therefore, outward FDI is one of the major sources of the new knowledge for Chinese economy; however, the desired effect is not always achieved due to a number of internal market restrictions.

Impacts Related to Tangible Assets Acquisition

Another important effect of Chinese FDI on its economy is gaining access to tangible assets, including raw materials.

In spite of abundance of natural resources in China, their stocks calculated per capita are significantly below the world average. Fast economic growth in the last few decades, averaging to 10 per cent per year from 1978 to 2010 (National Bureau of Statistics of China, 2018), has further aggravated the shortage: Chinese natural resources are not enough to meet China's growing energy needs and supply Chinese industry. Electricity consumption is closely linked with economic growth in China, and its level has been increasing by about 10% per year between 1991 and 2007 (Liu, Zhang and Girardin, 2014). Moreover, the share of heavy industry, such as steel and cement production, has grown continuously in China's economy during the past decade (Yang, 2012). Thus, the amounts of consumed commodities and energy have increased significantly to meet the growing needs of Chinese and exporters and households.

Investments in search of natural resources, despite being cost demanding, accounted for about 50% of Chinese outward FDI stocks in 2017 (CSIS, 2018). Investment projects in this field are generally large-scale because of high related costs and foreign TNCs competition. Large-scale investments are undertaken mostly by big and state-owned companies and aim for resource-rich countries of Africa, North and South America, The Middle East and other regions. Their purpose is to gain access to foreign reserves of oil, gas, iron, copper, aluminum and other resources for Chinese manufacturing. This type of investment is implemented mainly by acquisition of equities of foreign producer companies, or by conclusion of agreements for share holdings and mutual development (Deng, 2004; Jiang and Sinton, 2011). China's large-scale investments became possible mostly at the account of state support and improving access to capital. Besides, Chinese companies acquire or lease agricultural lands all over the world, including countries of Africa, Latin America and EAEU for logging, to access to water resources or production of wide range of agricultural goods, including grain, palm oil, sugar, tea and meat (von Braun and Meinzen-Dick, 2009). Most of these resources are transferred back to China to be used in industrial and energy production.

FDI may not only contribute to direct access to raw materials for the national economy. Acquiring ownership rights and guarantees in recipient countries may also provide for stability of the flow of these resources to China. Moreover, FDI neutralize volatility impact on the world commodity markets by providing direct access to resources as part of the long-term investment contracts.

Foreign projects in resource extraction do not necessarily provide that all acquired commodities are supplied back to China. FDI of this type also play an important part in external trading strategy making companies able to sell products of the affiliated companies on international market in case it is economically justified or their transfer to the national market is temporarily complicated (Chen, Ge and Lai, 2011). In such cases, oversupply contributes to lower commodity prices, that decreases import costs for Chinese nationals. On the other hand, in case of crisis or resource shortages large Chinese companies, especially owned by state, tend to give preference to Chinese buyers and guaranty the desirable volume of supply for them (Ma and Andrews-Speed, 2006).

Thus, Chinese investments in the area of extraction, exploration and production of resources improve access of the national industry to commodities, agricultural and other intermediate goods. This process supports and expands China's productive capacity regardless of international environment.

Trade Effects

The FDI trade effect lies in the positive influence of Chinese FDI on the volumes of its industrial production and employment through enhanced involvement in foreign trade. Chinese FDI to advanced economies expands markets for lower costs goods produced in China. Moreover, some Chinese FDI in search for natural resources or strategic assets in Africa, South-East Asia and other developing countries often involve related domestic industries in production abroad.

Export-oriented FDI are strategic and find wide support from the Chinese Government. The first reason for that is the necessity to extend business activity outside China due to stiff internal competition, glut in the local markets and excessive manufacturing capacity. According to UNCTAD research, 40% of Chinese companies believe that increase of production capacity inside the country is one of the main reasons for foreign economic expansion, while 36% of respondents note that they undertake FDI as a means to bypass trade barriers in third-country markets (UNCTAD. Division on Investment, Technology and Enterprise Development, 2016).

Export-oriented strategy and economic expansion of China in any case provoke protectionist reaction in many countries of the world. In this case FDI is often used by Chinese companies as an effective means for overcoming such barriers and expanding foreign markets to FDI recipients as well as third countries. Prominent examples of such FDI are demonstrated by known Chinese manufacturers of household electrical goods and electronics like "Haier", "TCL" or "Huawei Technology".

Nevertheless, the described trade effect can be negative if Chinese companies extend foreign investment activity at the cost of production on the territory of China. Because of fast growth of production costs, some Chinese companies may transfer production facilities abroad to the countries with lower labor costs. However, the negative impacts are mitigated in the long term. Thus, new innovative firms outplace ineffective Chinese enterprises while national companies together with their foreign subsidiaries become more integrated into in global value chains.

Conclusion

Findings about the effect of FDI on the donor economy are rather contradictory in modern economic literature. Nevertheless, several scientists mention that with respect to China FDI has mainly positive impact on its national economy due to the peculiarities of Chinese economic model.

There are 4 main effects of Chinese FDI on its economy: trading, financial, related to acquisition of tangible and intangible assets. Financial effect appears in receiving additional currency incomes from abroad by Chinese companies and gaining access to financing from abroad. Trading effect occurs in stimulating foreign trade and overcoming trade barriers when exporting to foreign countries. Access to natural and other resources necessary for development forms the effect of tangible assets acquisition. The effect of intangible assets acquisition displays through application of foreign knowledge and technologies for modernization of the national economy.

The author implies that cumulative effect of outward FDI is generated mostly by utilizing the results of Chinese TNCs' foreign activities on the national market. Chinese companies acquire tangible and intangible assets available abroad but scarce on China's internal market by undertaking FDI. Direct or indirect transfer of these assets to China leads to financial gains, builds up manufacturing capacity and leads to positive macroeconomic effects. Accumulated advantages in turn contribute to China's economic development through their operation on the national market. FDI implemented in accordance with China's strategic needs and addressing specific internal market issues play paramount role in the described process.

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The Rationale for Building Up Stockpiles After The Coronavirus Threat in Poland

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Abstract

The paper presents the rationale for building up stockpiles after the coronavirus threat in Poland. It was divided into three main parts. First contains the concept of stockpiling and characteristics of dissemination and prevention of the risk of coronavirus. Second part is about consequences and problems of stockpiling after the declaration of an epidemiological emergency. Third part contains recommendations on the legitimacy of stockpiling.

Keywords: coronavirus, stockpiles, security.

Introduction

As of March 11, 2020, 31 cases of coronavirus were confirmed in Poland. While on the same day the World Health Organisation announced the outbreak of the pandemic, the Polish authorities decided to close down all educational establishments such as: nurseries, kindergartens, schools, universities for a period of two weeks (this period was extended). It was also decided to close down cinemas, museums and theatres. During the Prime Minister's press conference devoted to the announcement of information about the closure of these institutions, a question was asked by one of the reporters whether stockpiles should be collected in this situation and in what quantity? This is particularly important for those who are subject to a two-week quarantine period during which they cannot leave their homes. The Prime Minister's reply suggested that one should be sensible in the actions taken at that time and there is no need to make stockpiles (Prime Minister's press conference, 2020).

On the same day, the media reports that goods are disappearing from shop shelves. Especially those with a long shelf life, such as pasta, rice, groats, preserves. The shelves in some shops become empty. In the shops, on the other hand, crowds are gathering and long queues of people are queuing up to the cash registers. This article is dedicated to find an answer to the question: Is it reasonable to build up stockpiles in the event of an epidemic? This problem is related to the safety of the population and affects its survival. The prepared editorial has been mainly based on official government announcements and media reports. These data are often analysed in comparison with data from abroad, as well as against the data of international organisations. To assess the validity of stockpile collection, theoretical research methods such as: analytical-synthetic method, inference, comparison, abstraction were mainly used. The period from the 11th of March to the 1st of April was analysed, i.e. the time when people went to the shops most crowded to make supplies. In fact, at the end of this period, the situation with regard to overbooking was already settled.

Already after the first case of coronavirus infection in Poland, there were recommendations on some websites to build up a sufficient amount of stockpiles for 14 days. It was recommended to stock dry and easy to prepare products (rice, pasta, oatmeal, groats, canned food, chocolate, coffee, water), hygiene products (soap, hand disinfectants, toilet paper, wipes, pads, diapers, wet wipes), as well as in the case of people who take permanent stock of medicines (analgesics, antipyretics, for coughing, for stomach, electrolytes) (Coronavirus in Poland. What to buy for an epidemic in Poznań, 2020) (pol. Koronawirus w Polsce. Co kupić na wypadek epidemii w Poznaniu, 2020).

In practice, people went to the shops to make supplies. In Germany, for example, “the inhabitants buy paper towels, toilet paper, tinned food, pasta and flour in bulk (...). In many supermarkets these products are already gone on shelves. A similar trend can also be observed in Poland - antibacterial gels for

hands and masks, the price of which has increased dramatically in the last few days, have started to disappear from online shops at an exponential rate" (Krzymińska, 2020).

In this context, it should be stressed that the recommendation of Centers for Disease Control and Prevention did not include a recommendation on the need to build up stockpiles after the occurrence of coronavirus has been identified. Only for those who need additional precautions one of the recommendations is to stock up (Centers for Disease Control and Prevention, 2020). This means that people in full health are not recommended to stock up. They should be shopping as usual.

The concept of stockpiling and characteristics of dissemination and prevention of the risk of coronavirus

First of all, it should be noted that building up stockpiles has been defined as a technique to remain on standby (Keck, 2017, pp. 117-143) and as a security device (Amicelle A., Aradau C., Jeandesboz J., 2015, pp. 293-306). Stockpiling allows you to prepare for the future and contributes to minimizing the risk of insecurity in certain products and goods.

A brief overview of stockpiling can be presented as follows: "functions as a technology of preparedness because of its unique ontological features. By holding back resources, it freezes time, making it available for future use to bridge disruptions and buffer emergency situations. The temporality of the stockpile is not so much about the 'becoming' of matter that recent process philosophies stress. Rather, it is the effect of a particular moulding of matter that temporarily suspends this becoming in order to make a certain set of its potentialities available for the future. By arresting the processuality and eventfulness of matter, it harnesses the securing features of the stored materials. Stockpiling materializes anticipatory security politics since the stockpile is both an outcome of and a baseline for anticipations of potential threats. Its material persistence can stabilize or even enable expectations. Without ever being used in an actual emergency, it can have a securing effect" (Folkers, 2019, p. 505).

Nowadays, when we live in a changeable, complex and interdependent environment in the so-called global village, it is recommended to accumulate stocks in particular because of possible disturbances in their flows. „Multiple military and economic crises at the beginning of the 20th century challenged the liberal faith in the ability of dispersed private stores and the free circulation of goods to provide security of vital supplies. The liberal system of free-flowing circulations increasingly came to be regarded as a problem rather than a solution to the security and welfare of societies. The ever more intricate networks of progressively more global trade relations and the growing complexity of industrial societies created new bottlenecks in circulatory infrastructures and rendered disruptions of flows potentially disastrous" (Folkers, 2019, p. 498-499). When individual people stock up at home, a large proportion of the products will also be frozen, which means that an electrical energy-powered freezer is needed to maintain a negative temperature. Any interruption in the energy supply may therefore disrupt the stockpiling process and contribute to the spoilage of stored food that is unfit for consumption.

One of the reasons why people stockpile is because of other people's behaviour, and as a result, the thinking whether, if others buy it out, it will be enough of food for me later. This situation is perfectly illustrated by the statement of one of the clients: "I bought mostly meat. I'll freeze and pull out if necessary... I also took two packs of toilet paper, because I see there are only a few packs left" (Kasperska, Buczkowski, Szydłowski, 2020). If we observe in other people that they buy some specific kind of products, then we wonder whether we also should not buy this product. As a result, many consumers decide to buy something that they may not currently need.

The reasons for stockpiling in the face of coronavirus can also be identified as follows: „It can be for profit-seeking or loss avoidance purposes, and the goods may be meant for conventional consumption or unconventional use. Consumer stockpiling in the face of the COVID-19 pandemic can be viewed as unconventional inventory accumulation, mainly meant to minimize a perceived threat of loss or fear of going without" (Pan, Mantin, Dresner, 2020).

The spread of coronavirus is very easy and fast. „The human to the human spreading of the virus occurs due to close contact with an infected person, exposed to coughing, sneezing, respiratory droplets or aerosols. These aerosols can penetrate the human body (lungs) via inhalation through the nose or mouth" (Shereen M., Khan S., Kazmi A., Bashir N., Siddique R., 2020).

In the article by M. Nowak concerning the flattening of the disease curve, the author cites the results of A. Kucharski's research, according to which the spread of the virus consists of the following factors:

- "(duration) - that is how long a given person infects. Kucharski estimates that for coronavirus it is a week or two;
- (opportunities) - the number of contacts, during which the person who is infected could pass on the virus to other people;
- (transmission probability) - the chance that an infection will occur during such a contact (according to current data, the virus spreads up to 2 meters from the coughing person, on the surface - e.g. on a table, handle, etc. - can survive even a week);
- susceptibility - the likelihood that the person, who comes into contact with the ill patient, shall be infected and will start to infect other people" (Nowak, 2020).

People, by going to the shops en masse, particularly influenced the second factor, i.e. created opportunities to transmit the virus on to others.

Special precautions must be taken because the virus is spreading so easily. Selected recommendations for infection prevention include:

- „Frequently wash their hands with an alcohol-based hand rub or warm water and soap,
- Cover their mouth and nose with a flexed elbow or tissue when sneezing or coughing,
- Avoid close contact with anyone who has a fever or cough,
- Seek early medical help if they have a fever, cough and difficulty breathing, and share their travel history with healthcare providers,
- Avoid direct, unprotected contact with live animals and surfaces in contact with animals when visiting live markets in affected areas,
- Avoid eating raw or undercooked animal products and exercise care when handling raw meat, milk or animal organs to avoid cross-contamination with uncooked foods" (McCurry, 2020).

By referring these recommendations to the conditions under which you shop, one of the best ways to avoid infection is to keep an adequate distance and to cover your mouth and nose when someone coughs or sneezes. The first of these conditions cannot be met if the shops are overcrowded.

The World Health Organization has issued recommendations as to when to wear a protective mask:

- "If you are healthy, you only need to wear a mask if you are taking care of a person with suspected 2019-nCoV infection.
- Wear a mask if you are coughing or sneezing.
- Masks are effective only when used in combination with frequent hand-cleaning with alcohol-based hand rub or soap and water.
- If you wear a mask, then you must know how to use it and dispose of it properly" (World Health Organization, 2020).

It is pointed out that "there's no evidence that wearing masks on healthy people will protect them. They wear them incorrectly, and they can increase the risk of infection because they're touching their face more often" (Haelle, 2020). Exceptional circumstances are asymptomatic patients or people in the incubation period who do not yet have symptoms and who may infect other people. In such a situation, one way to reduce the risk of virus spread would be to wear a protective mask. However, given the large shortage of masks available on the market, a better way than to put on a mask, which is best left for people who really and surely need them, is to keep a social distance and to isolate as much as possible.

Consequences and problems of stockpiling after the declaration of an epidemiological emergency

Consideration should be given to the possible consequences for those who would fail to go to the store on 11 March and a few days after that date to make supplies. First of all, it should be noted that it is highly probable that most of the buyers had at least a minimum stockpile of food at home, which would most likely last several days. These people wouldn't be affected in any way. Other people who did not have enough food for a few days had to go shopping because they were threatened with a real lack of food. So they would not be able to secure their basic needs. However, if only these people would go to the shops at that time, there would be no excessive queues and crowds, so the risk of coronavirus infection would be much lower.

Secondly, consideration should be given to the situation where people who had a food supply for a few days did not go to the store to increase the amount of goods collected at home and then became ill (without hospitalisation) or quarantined. These people would not really have the opportunity to go shopping to make up for the shortfall. It was probably one of the reasons why people went shopping. Precisely because they were afraid that they might be sentenced to stay at home any moment. The argument of stockpiling in such a situation for fear of getting sick or being quarantined seems to be irrelevant. Those who did not have a chance to stockpile and were quarantined had the products necessary for survival delivered on an ongoing basis. This was most often courtesy of neighbours or close family members. Those who did not have the opportunity to benefit from their help could report the lack of specific products to the Municipal Social Welfare Centre (pol. MOPS Miejski Ośrodek Pomocy Społecznej).

Thirdly, it should be noted that people have been making stocks most likely for fear of being bought out by others and then not being available in shops for a long time. The Minister of Development Jadwiga Emilewicz reacted to the behaviour of the population during one of the press conferences: “She stressed that the government does not plan to close shops and retail outlets and cut off any large cities with a sanitary cordon. She pointed out that she had held talks with food producers and informed that the capacity is activated at the level of 80%. Food producers are ready to produce more if needed" (Press conference of ministers: Michał Dworczyk and Jadwiga Emilewicz of March 12, 2020). It is important to underline that the public's concerns in this respect have not proved to be true in terms of food and hygiene products. Some shops did indeed experience interruptions in the supply of this type of goods, but these were very short and did not disturb the normal functioning of the majority of the population. A major accessibility problem concerned medical products such as protective gloves and masks and disinfectants. These products were not available for several days in most stationary and online shops. On the other hand, the places where it was possible to buy them were much more expensive than the average. Which made it significantly more difficult for the average citizen to access these funds.

In this context, it should be stressed that no major problem has been identified at national level in terms of food stocks. But in terms of medical protection, yes. In various parts of the world there is a shortage of medical equipment, especially respirators. In Poland, for the time being, this problem has not been known about. However, we are only at the stage of development of the epidemic. Therefore, taking into account other countries, this problem may also occur in Poland. Admittedly, the authorities have taken steps to flatten the disease curve so that it is below the maximum level of health system capacity. Otherwise, there will be a significant reduction in places in Intensive Care Units (Nowak, 2020). However, more medical supplies should be built up for the future. The stockpiling system should not be based solely on accumulating large quantities of goods. The system should be rational. It can be presented as follows: “One lesson is that stockpiling is not just a matter of storing large quantities of supplies and equipment; it also requires considering the larger question of which dangers are most pressing to address” (Lakoff, 2020).

When assessing risks, people make the wrong decisions. The wrong actions resulting from an incorrect risk assessment are described by A. Bernstein. The author noted that people are usually not able to intuitively assess how dangerous a given situation is and, as a result, they take unreasonable actions

which increase the risk of spreading the threat. "Our focus on short-term risks has led to irrational decisions, like stockpiling of goods, that have nothing to do with stopping the spread of coronavirus, and can lead to shortages of necessary medical supplies, like face masks you don't actually need. We end up making decisions, both collectively and individually, that do not help "flatten the curve" but instead contribute to spreading the disease. A good example is hoarding toilet paper rather than practicing appropriate social distancing as recommended by public health officials" (Bernstein, 2020). The author indicates that one of the reasons for this state of affairs is the attention paid to a given event by the media. "Thanks to all that extra social media attention, the risks of coronavirus are at the forefront of our minds, creating a sense of urgency and panic that affects our ability to make rational decisions" (Bernstein, 2020).

A very large observed problem was the purchase of a large batch of goods by individual buyers. Such behaviour not only caused quarrels in the shop between consumers, but also had a real impact on making some products inaccessible to others. A very good example was the purchase of rice or pasta by several customers. It turned out that a few people had a stock for a very long time, and the rest could not do the basic shopping. A very similar situation also occurred with hand disinfectants. Buying these liquids by individuals caused that others had no chance to buy them. As a result, people who perhaps did not have an urgent need to use them, or simply did not need to use them in such large quantities had a stockpile, while others did not have this protection measure at all.

Protective masks and gloves have become in short supply and strongly desired by the population. They cannot be purchased either in stationary pharmacies or online shops. Around April, these goods began to be available again in some online shops, but in very limited quantities and at very high prices. For example, before the occurrence of coronavirus, the cost of a single protective mask was several dozen pennies. While at the moment you have to pay about 10 PLN for the same product.

Consumers should be aware and prepared for price increases in specific situations. "As retail stocks dwindle, prices rise for at least two reasons. Firstly, because lower-priced products are sold out, consumers must purchase higher-priced alternatives, also known as the product substitution effect. Secondly, sellers can capitalize on the imbalance of supply and demand and boost prices. Retailers may also hike prices because their suppliers have, thus driving up costs throughout the supply chain. Overall, under the stress from the coronavirus, scarcity of supply may induce consumers to pay higher prices" (Pan, Mantin, Dresner, 2020).

It should be borne in mind that, as stocks accumulate, there may also be problems related to rising storage fees and their overdue (Chen, 2017). Although this problem was outlined in the context of the establishment of a three-tier framework for the storage of personal protective equipment by the Taiwanese Centre for Disease Control, these problems can and should also be considered for ordinary citizens in Poland.

Large amounts of food are thrown away every day, so there is a high probability that tons of food will be bought this time too, and then will be in the basket. Although this risk is not high, due to the fact that the most frequently purchased stocks include dry and long shelf life products such as rice, groats, flour, canned food.

Nowadays, for many residents, especially in large cities, who have small flats there is a big problem of sleigh lack of storage space. This means that these people have limited opportunities to store food that they could use when needed.

A. Folkers proves, by citing data from the Federal Office of Civil Protection and Disaster Assistance in Germany, that the private sector is identifying a problem with supply chain disruptions and that reducing stockpiles is a threat to human safety. "Traditional distribution in food logistics operated via a multilevel distribution system with stores at each level down to the retailer. In recent years, this multilevel system has given way to a more centralized system, which 'causes the reduction of the amount of stored goods, since each warehouse obtained a security buffer to accommodate fluctuations in demand' (…). In addition, an increasing amount of stocks in the supply chains of contemporary food

logistics are frozen foods and therefore depend on functioning electricity supplies to ensure the integrity of the cold chain" (Folkers, 2019, s. 503).

Recommendations on the legitimacy of stockpiling

Recommendations for accumulating stockpiles have been issued by Federal Office of Civil Protection and Disaster Assistance in Germany. The Office has identified a list of necessary products that citizens should gather in order to survive for up to 10 days (Federal Office of Civil Protection and Disaster Assistance, 2020). These recommendations, on the other hand, were a response to the fact that the Germans went in large numbers to the shops to build up stockpiles. Anyway, recommendations of this type by this institution were not issued for the first time. A. Folkers wrote about it: "28 litres of water; 5.6 kg of grain, bread, potatoes, pasta and rice; 5.6 kg of vegetables and legumes; 3.6 kg of fruit and nuts; 3.7 kg of milk and dairy products; 2.1 kg of meat, fish and eggs; 0.5 kg of fats and oils. According to the emergency stockpile checklist issued by the German Federal Office of Civil Protection and Disaster Assistance (BBK, 2017b), this is the amount of food needed to survive a two-week food shortage" (Folkers, 2019, s. 493). In Poland, no recommendations have been made to accumulate stockpiles. The authorities ensured that the products were sufficient for all and called for rational and reasonable behaviour.

All citizens should have followed the calls for rational and reasonable behaviour. First of all, they should avoid crowds, and such were observed in shops. The problem that there is the lack of supply of food and medical and hygienic products for people who are ill or in quarantine can easily be resolved. Initially, people in quarantine had the opportunity to call the Municipal Social Welfare Centre to report shortages in food, hygiene and medical supplies. Around mid-March, an application called "Home Quarantine" was made available in Poland for people in quarantine, the purpose of which was to facilitate and streamline the implementation of the mandatory quarantine at home. Additionally, it has the feature to use the service to send a form with a request to the Municipal Social Welfare Centre. The reported demand may concern: a meal, groceries, psychological assistance and making a contact (Rules of application "Home Quarantine", 2020). Apart from the possibility to use the services of the Municipal Social Welfare Centre, it should also be emphasized that local communities are very much involved in helping their neighbours, especially the elderly, to make shopping. Initiatives from ordinary people have contributed to significantly reduce the problem of possible stockpile shortages. Therefore, the problem of a possible lack of access to articles necessary for survival should not be a concern and should not be an argument in favour of stockpiling when there is a high risk of being infected from other people. It should be recalled that at the beginning of March, the number of people confirmed to have COVID-19 was not high. As of 11 March, the number of confirmed cases of coronavirus infection was 31 people, the number of hospitalized people was 317, quarantined 1,193, and the number of people under epidemiological surveillance was 11,524 (Newsletter, 2020a). However, the number of people infected at that time may have been much higher. They could have been people who were in the incubation period. So all contacts with other people should have been limited at that time already.

On the 31st of March the Polish authorities imposed, among other things, restrictions on the number of people allowed to shop in shops, the minimum distance to be kept between people. Among other things, the following orders were imposed:

- the order to keep the limit of people staying in the shop - up to 3 people per 1 cash register. At marketplaces - 3 customers per 1 point of sale. In post offices - 2 people per 1 window,
- the order that shops and service outlets have to provide services from 10:00 a.m. to 12:00 p.m. to customers aged over 65 years only (during the remaining hours shops and service outlets are open to all customers, including seniors),
- the order to make shopping with disposable gloves,
- an order to maintain a distance of at least 2 metres between pedestrians. This order also applies to families and relatives (with the exception of children under 13 years of age and persons with disabilities or unable to move around on their own) (Regulation of the Council of Ministers of March 31, 2020 on establishing certain restrictions, orders and prohibitions in connection with the occurrence of a state of epidemic and Regulation of the Council of

Ministers of April 1, 2020 amending the Regulation on establishing certain restrictions, orders and prohibitions in connection with the occurrence of a state of epidemic).

These solutions should have been imposed on the 11th of March when educational institutions were closed, because then most people went to shops to do their shopping, i.e. at a time when they were very vulnerable to infection from other people, at a time when there were no orders to take safe behaviour.

Conclusion

If people felt co-responsible for others and did not look at different things from the perspective of securing their needs, there would be no problems associated with the lack of food products and medical and hygienic supplies. In a situation where a global pandemic has been declared and in Poland an epidemiological threat had to be avoided by not going to the shops and not making supplies. People, on the other hand, went to the shops in very large numbers and the effect was that they met in closed rooms in large quantities without keeping a safe distance. I assume that there will never be a situation in which people would act rationally, because the desire to satisfy their individual needs always prevails. Thus, on the 11th of March, when the educational establishments were closed, restrictions on the number of people allowed to enter the shop had to be introduced at the same time, and recommendations had to be made to keep an adequate distance from other people in public places, as decided by the government at the end of the month.

In response to the research problem posed in the editorial: Is it reasonable to build up stockpiles in the event of an epidemic? The answer is that such actions should not be considered as reasonable. It is therefore not recommended to build up stocks in an epidemiological emergency. It should be noted that the author does not identify with the statement that stockpiles should not be accumulated at all. Stockpiling is very prudent and allows you to prepare yourself, although to some extent, for the possibility of a possible threat. The above position is consistent with the position by A. Folkers The author wrote that “I will, however, argue that techniques of storing, retaining and accumulating things remain crucial security techniques not in spite of but because of the imperative to secure circulations” (Folkers, 2019, s. 493). The author takes the view that it was not wise to gather stocks in a situation when an epidemic emergency was declared and people went to the shops to shop to make stocks, without maintaining the principles of effective prevention of the spread of the virus. Shops were overcrowded, and people didn't keep the right distance. Which is likely to have contributed to the further development of the epidemic. As of the 31st of March, the number of confirmed SARS-CoV-2 cases was 2311, the same day the number of persons hospitalised was 1924, the number of persons quarantined was 171994 and the number of persons under epidemiological surveillance was 50804 (Newsletter, 2020b). In addition, most of the personal protective equipment was not available or was only available in limited quantities, as a result of which a large proportion of people were not wearing protective gloves.

It should be emphasized that by going to the shop in crowds after the 11th of March, people contributed to increasing the probability of coronavirus infection, which was the worst possible consequence.

Moreover, while gathering stocks, some people only took care of themselves by purchasing most of the goods, thus limiting or completely eliminating access to them for other people. Of course, some shops have taken preventive measures and have introduced limits on the purchase of individual products per customer.

Buying out products has also led to a significant increase in prices of those products which remained in shops or were available after replenishment. As a result, some goods had to be paid for several times more than usual.

The mass purchase of products such as protective masks has made them unavailable and sometimes difficult for those who actually had to buy them. As a result, a situation arose that the masks had people who did not need them, and access to them was lost to people who needed them, e.g. people with a cold.

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Organisation of Transport Process on The Example of An Enterprise

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Abstract

Nowadays, transport plays a very important role because it has a significant impact on the degree of communication of society, conditioning its development. The pace of development depends on the ability to move and communicate with other entities. The aim of the article is to present the basic issues related to the functioning of transport processes in the company. Analyse of selected transport areas in the enterprise and show how to make practical use of information on the existing transport processes in the company using selected research methods and tools that allows you to optimize the relevant processes.

Keywords: Transport, Transport Processes, Management of The Company

Introduction

Currently, transport and logistics are among the most important economic elements of the development of countries and regions, including enterprises. The market situation, as these developments in modern technologies contributed to the adoption of the concept, and the condition for profitability in the market is the undertaking of companies to take measures aimed at optimising and rationalizing all processes of their activities (Nowakowska-Grunt, Miciuła 2016). The way to achieve these goals is to implement logistics management, which improves the processes of product flow and storage, thus increasing their efficiency (Strzelczyk 2012). The importance of logistics is therefore reflected both in suppliers of goods and services and their buyers, which results in i.a. possibility to reduce the cost of supplying goods and services, increasing the speed of supply and increasing their quality (Zamkowska 2013).

With the onset of the industrial revolution, there was a radical change in the transport process, the era of mechanized transport began, then for the first time it was used for movement processes - machinery. Initially, they were steam-powered machines that over time turned into turbine-containing devices or a variety of internal combustion engines, electric, hybrid and other engines. New mechanisms appeared with the development of technology (Kabus, Strulak-Wójcikiewicz,Nurzyńska 2016). Thanks to this, humanity began to construct various devices to help transport. The most common and convenient means of transport have become cars, which have completely changed the way millions of people movement. The development of land transport has also had a significant impact on the routing of routes and transport routes. Today, transport is a very important aspect of the activities of various companies (Koch, Kdłubek 2015). Its main objective is the flow of goods necessary for the implementation of production plans, which affects many areas of functioning, i.e.. the quality of service and customer contact, the quality of products and services, as well as the time and level of costs incurred by the company.

The Essence of The Transport Process

Process is understood as following and causally related changes – actions (Twaróg 2016). The process is therefore a set of activities that convert the factors in the initial phase of the process into a result - baseline factors (Twaróg 2016). The transport process according to the literature is understood as a set of organizational, executive and administrative activities carried out in a certain order in connection with the movement of cargo by means of transport (Goździewska 2012). In the subject literature there

are also other definitions of the transport process, the meaning of which is the same as the definition set out above. One of them defines the transport process as a series of coordinated enforcement, organisational and commercial activities to bring cargo from one or more points of delivery to one or more pick-up points, as efficiently as possible by means of transport (Zguta 2015). Transport process can be defined as a string of specific tasks interrelated to each other, as a result of which a particular goods will be delivered to the designated consignee (Starkowski 2017).

Ms Kauf in the work Transport and Storage defined the transport process as a team of coordinated activities related to the temporary spatial transformation of products and information, in accordance with the terms of the contract between the carrier and the customer (Kauf 2016). The transport process consists of three stages – loading, proper transport and unloading, taking into account the complexity of the transport process, these stages may be extended by additional processes, which include: preparation of cargo for carriage, storage, acceptance of goods together with its transhipment also by other means of transport or forwarding services activities (Goździewska 2012). Organisational, executive and commercial activities are the three main activities that make up the transport process. Organizational activities consist in the development of an appropriate route of transport and preparation of the necessary transport documentation(Rydzkowski, Wojewódzki-Król 2010). Enforcement activities include the carriage of goods and additional processes related thereto such as loading and unloading. Each of these processes can be increased by a number of operations related to the type of load, the length of the route, etc.

Transport is a specific category of service activity consisting in the movement of persons and goods from point A to point B, it also provides additional logistics, forwarding, customs services requiring adequate means to form a transport system, which includes (Bujak, Topolska 2018):

- means of transport,
- transport infrastructure,
- human resources,
- rules and rules for the provision of transport services.

The management of transport processes is designed to meet the requirements of customers in the "9W" rule, which is distinguished by the following characteristics (Kubicki, Kuriata 2000):

- the right goods,
- the right quality,
- the correct quantity,
- appropriate packaging,
- the right way,
- the right place of delivery,
- the correct delivery time,
- the correct person (consignee), the correct cost (delivery).

Any company that would like to provide services at the highest possible quality level should take logistical action on behalf of the client during the planning process taking into account the above assumptions (Zamkowska 2013). The person responsible for the carriage must ensure that the cargo is properly prepared for shipment, select the appropriate means of transport, loading, carriage, unloading. That person must perform or assign a number of steps related to these processes. The transport process can be divided into the following stages (Starkowski 2017):

- planning a process related to the shipment of the goods,
- preparation of the cargo for transport,
- organising the process of moving the goods,
- physically moving the goods,
- legal and financial elements of the transport operation,
- analysis of the costs and quality of the transport process.

Proper planning of transport operations is the main element of the proper execution of the transport order by the transport undertaking.

Characteristics of Transport Processes in The Enterprise

The transport of the goods is related to a number of activities to be carried out so that the transport time and its quality are at the highest level. The transport of goods is carried out by the transport company, but in accordance with Article 43 of the Transport Law is the responsibility of the consignor or consignee and it is their responsibility to arrange the consignment in accordance with the applicable traffic regulations, in such a way as not to endanger safety and taking into account the permissible weight of the vehicle and axle pressure. The weight of the material transported shall be adapted to the maximum permissible loading weight of the vehicle used for this purpose (Dz.U. 2020.0.8 i.e.) . Most often, this part of the transport process is dealt with by the sender of the goods, but sometimes, as part of the order, this obligation falls on the carrier. This is most often true for paper transport or tires. Multi-sized loads prepare the payers themselves for the cargo.

In examining the enterprise, it was noted that the company decided to increase its scale of operation by carrying out more transport orders, which caused the number of orders served to increase by 20% per month. This state of affairs caused problems with the punctuality of cargo delivery, resulting in a 13% increase in complaints. It was decided to use quality management tools to determine the causes of the problem - 5 why analysis and fish diagram. 5 why analysis is a method that allows you to find the cause of the problem based on a series of questions that allow you to investigate the causal- effect alcompounds that relate to a particular problem. It consists of five stages. The first stage is the establishment of a working group. The second step is to identify and identify the problem. The third step is the location of the area where the causes may be located. The next step is to task and get an answer to the question "why?" (Kowalska, October 2015). The final step is the analysis and evaluation of the responses, below are the results obtained:

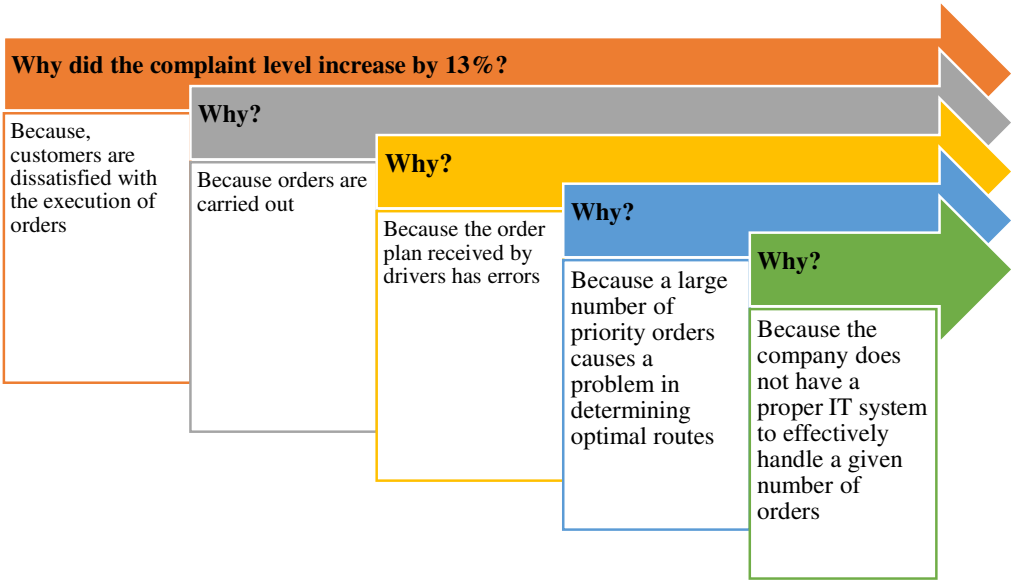

Figure 1: Analysis of the "5 why" of the problem being investigated.
(Own development based on company observations))

As the 5 why analysis shows the main reason for the increase in the level of complaints related to the increase in the scale of the organization is the lack of adaptation to a large number of orders supported. During the meeting, team members pointed out that this is a clear problem because the current order management takes place on the principle of keeping the worksheet in excel. A large number of data causes very often drivers to get an inefficient delivery route plan for executed orders over a given period of time, resulting in drivers often running to one area several times, thereby causing delays in delivery, and increase the organization's operating costs.

To present a wide range of problems that affect job execution delays, it was also decided to perform an analysis using the Ishikawa Diagram. Ishikawa Diagram is a cause-and-effect diagram, which is a tool for graphically illustrating the root causes of phenomena that generate a problem. This tool has allowed you to see a real picture of the problems that occur at different levels in your organization.

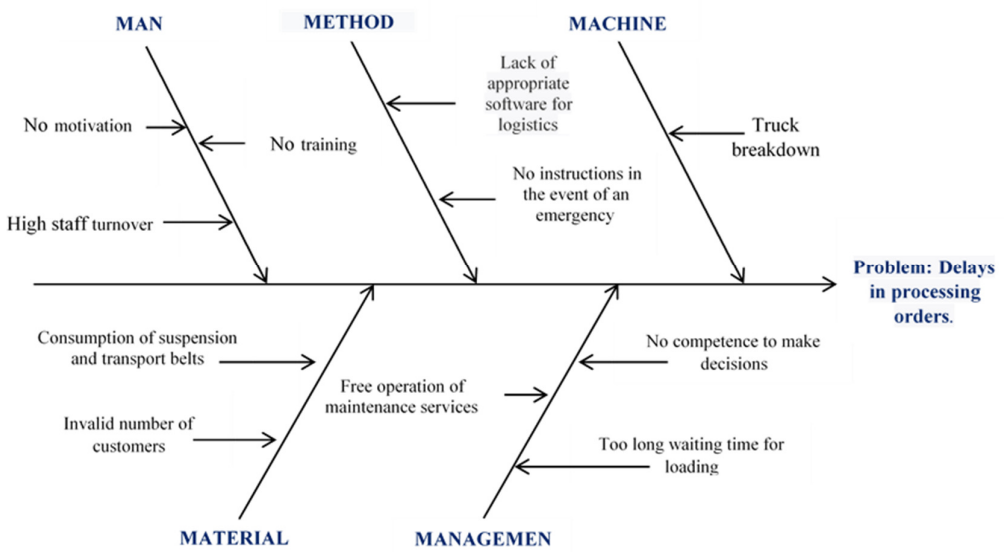

Figure 2: Ishikawa diagram showing analysis of the problem being investigated
(Own development based on company observations)

According to the above analysis, there are more problems in the company that affect the increased number of complaints. Team members identified a number of problems, such as a high staff turnover and, consequently, a lack or inefficient training of management. It has again been pointed out that the lack of a proper system for comprehensive order management is a big problem, which affects the supervision of the car fleet. Team members also pointed out that very often cars crash, and the waiting time for repair is quite significantly increased, which negatively affects the timeliness of deliveries. This study has allowed for the identification of areas to be analysed in depth and measures to be proposed to improve the implementation of the transport process

For a detailed analysis, it was decided to use the SMED method to parameterize the implementation of the transport process. SMED (Single Minute Exchange of Die)is a method that allows you to comprehensively shorten the retool times of machines and processes as it turned out also transport processes (Moreira,Pais 2011). It allows you to achieve results in a very fast time, without having to bear a heavy financial burden. It consists of three stages. The first step is to split the operation. The second stage is observation and analysis,trzecim stage is the implementation of changes (Shingo 1985). Time measurements were performed by logistics when handling 2 transport orders on different days. The following are the results of the measurements obtained:

Table 1: Measurement results obtained during the first transport order (Own development on the basis of internal materials ofthe company)

TIME MEASUREMENT SHEET				
Change	1	**Order number**	2345987	
Data	17.01.2019	**Order type**	Recursive	
Operation	Transport	**Driver number**	1298	
Work item name	**Starting point**	**End point**	**Value expressed in minutes**	**Additional notes (non-recurring operations)**
1. Preparatory steps	**06:00**	**10:30**	163	
Enter orders in the registry	06:00	07:13	73	
Setting a daily delivery schedule	07:13	08:10	57	10 min waiting for information from the trader (incomplete information on the order)
Forwarding the timetable to the implementation	08:10	08:25	15	
Preparation of transport kits	08:25	08:43	18	
2. Execution of a transport order	**08:43**	**11:30**	107	
Getting to the customer	08:43	09:20	37	13 min refueling of the car
Waiting for loading	09:20	09:35	15	
Loading	09:35	10:00	25	
Transport security	10:00	10:15	15	8 min problem with belt clamp (tool lock)
Waiting for documents to be issued	10:15	10:30	15	
Transport to target customer	10:30	11:30	60	25 min failure (overheated coolant)21 min traffic accident (waiting in traffic)
3. Completion of the transport order	**11:30**	**12:20**	50	
Waiting for unloading	11:30	11:43	13	
Unloading	11:43	12:05	22	
Waiting for documents to be issued	12:05	12:15	10	
Close an order	12:15	12:20	5	

Table 2: Sum of times and percentage of individual transport processes obtained during the first transport order (Own development on the basis of internal materials of the company)

Operations	Time [min]	Share [%]
Preparatory steps	163	51
Execution of a transport order	107	33
Completion of the transport order	50	16
Total order lead time	320	100

Table 3: Measurement results obtained during the second transport order(Self-development on the basis of internal materials of the company)

TIME MEASUREMENT SHEET				
Change	1	**Order number**	2346754	
Data	20.01.2019	**Order type**	Recursive	
Operation	Transport	**Driver number**	1298	
Work item name	**Starting point**	**End point**	**Value expressed in minutes**	**Additional notes (non-recurring operations)**
1. Preparatory steps	**06:00**	**10:30**	166	
Enter orders in the registry	06:00	07:18	78	
Setting a daily delivery schedule	07:18	08:15	53	
Forwarding the timetable to the implementation	08:15	08:31	16	
Preparation of transport kits	08:31	08:50	19	No belts and tensioners available (waiting for delivery from storage)
2. Execution of a transport order	**08:50**	**14:20**	330	
Getting to the customer	08:50	09:30	40	20 min refueling
Waiting for loading	09:30	09:40	10	
Loading	09:40	10:00	20	
Transport security	10:00	10:08	8	
Waiting for documents to be issued	10:08	10:30	22	
Transport to target customer	10:30	14:20	230	170 min failure (overheated coolant)
3. Completion of the transport order	**14:20**	**12:20**	85	
Waiting for unloading	14:20	15:00	40	30 min extra wait for late
Unloading	15:00	15:30	30	
Waiting for documents to be issued	15:30	15:40	10	
Close an order	15:40	15:45	5	

Table 4: Sum of times and percentage of individual transport processes obtained during the second transport order (Own development on the basis of internal materials of the company)

Operations	Time [min]	Share [%]
Preparatory steps	166	29
Execution of a transport order	330	57
Completion of the transport order	85	14
Total order lead time	581	100

In both cases, the preparatory work took a similar amount of time of about 160 minutes. It has been clearly observed that the lead time was radically different due to the occurrence of a failure during transport. In both cases, there was a failure, in the first it lasted 25 minutes. This also affected longer waiting times for unloading, and therefore the delay and waste of time has deepened. During the measurements, a number of irregularities were observed which significantly affect the efficiency of the execution of orders, i.e. :

- waiting for information from traders if the order is incomplete or inconsistent,
- refueling of the car ,
- car failure,
- waiting in line for unloading as a result of a significant delay.

In order to reduce the waiting time for orders to be entered into the system and waiting for the creation of a daily supply plan, it was decided to purchase a system for comprehensive management of the transport company. The software is to be comprehensive and be able to remotely enter orders into the system, automatically generate the daily delivery plan based on the most optimal routes. An additional but priority guideline is the possibility of comprehensive management of the fleet. The system is expected to contain information about drivers, running, vehicle condition, current order, combustion level, breakdowns, delays. It is very important that the system must have an advanced GPS system that will set effective routes on an ongoing basis and inform about delays. Completing these tasks will eliminate time waste and unnecessary operating costs. To avoid time losses associated with car failure, it is recommended to introduce prevention in SUR (Maintenance Service). Every day according to the schedule, mechanics are required to perform car fleet inspections and repairs. Such actions will minimize the loss of car failure that is on the road, which is very expensive and causes a lot of problems. Previous failure detection will allow you to respond faster. It has been diagnosed that there is no emergency response instruction in the organisation, when cars are missing as a result of accidents or accidents, resulting in delays in the execution of orders and, at worst, their resignations, adversely affecting the company's image. The created instruction will clearly and clearly inform who, what and when it must perform to maintain continuity of supply. In order to protect your organization from various random events, i.e. lack of available fleet in the event of accidents or accidents, it was decided in relation to point 7 to establish partnership cooperation with the transport company for the occasional execution of orders in the event of various random situations. Doing so will allow the continuity of the execution of orders, and at the same time will allow the company to succeed. Thanks to the rapid flow of information, the problem with transport delays has been minimized. This is evidenced by the fact that in February 2019 there was a decrease in complaints related to too long transport time by 8 percent, which makes it possible to conclude that the change carried out has had an effect.

To see how much the changes affected the execution of orders in March 2019, smed analysis was re-examined, below the results obtained.

Table 5: Measurement results obtained during the transport order after the changes (Own development on the basis of internal materials of the company)

TIME MEASUREMENT SHEET				
Change	1	**Order number**	2609584	
Data	02.03.2019	**Order type**	Recursive	
Operation	Transport	**Driver number**	1298	
Work item name	**Starting point**	**End point**	**Value expressed in minutes**	**Additional notes (non-recurring operations)**
1. Preparatory steps	**06:00**	**06:32**	42	
Enter orders in the registry	06:00	06:05	5	
Setting a daily delivery schedule	06:05	06:10	5	report automatically generated by the system
Forwarding the timetable to the implementation	06:10	06:12	2	report sent automatically by the system
Preparation of transport kits	06:12	06:32	30	
2. Execution of a transport order	**06:32**	**08:30**	118	
Getting to the customer	06:32	07:00	28	
Waiting for loading	07:00	07:10	10	
Loading	07:10	07:30	20	
Transport security	07:30	07:40	10	
Waiting for documents to be issued	07:40	07:50	10	
Transport to target customer	07:50	08:30	40	10 min accident (no alternative route - system alert)
3. Completion of the transport order	**08:30**	**09:16**	46	
Waiting for unloading	08:30	08:40	10	30 min extra wait for late
Unloading	08:40	09:00	20	
Waiting for documents to be issued	09:00	09:15	15	
Close an order	09:15	09:16	1	

Table 6: Sum of times and percentage of individual transport processes obtained during the transport order after the changes (Own development on the basis of internal materials of *the company)*

Operations	**Time [min]**	**Share [%]**
Preparatory steps	42	20
Execution of a transport order	118	57
Completion of the transport order	46	23
Total order lead time	206	100

According to the SMED analysis, after the implementation of the changes, the lead time of orders decreased by about 45% which is an excellent result for the company. The greatest time savings were achieved during preparatory activities where time decreased by 120 minutes thanks to the use of an IT system to manage an organisation which itself automatically based on the data entered schedule and selects the most efficient routes in real mode. The second very important process that, thanks to optimization, brought the greatest time savings was the operation of the execution of the transport order. Thanks to the introduction of fleet supervision through a special IT system and the implementation of daily Trucks TPM, there was a decrease of more than 80% as evidenced by faster delivery times by more than 200 minutes. This state of affairs allowed the research problem to be resolved, as the level of complaints decreased by 8 percent. Thanks to this, the company can develop in the market of transport services. Through the implemented changes, the company recorded significant revenue increases for executed orders. By eliminating losses, the cost of executing one transport order decreased by 30% (less fuel consumption, no penalties for delays, less operational effort of vehicles).

Summary

The transport process is an important link in the logistics chain, connecting customers of companies, suppliers and distribution channel entities. It is a chain of complex executive, organisational and commercial activities. Its purpose is to move the load or people from one or more points of delivery toone or more pick-up points, using the right means oftransport. There is no doubt that transport in a transport undertaking plays an important role in the performance of the basic objective. The formulation of the transport task well formulated is a condition for the undertaking to function smoothly and is the basis for the correct designation of the necessary number of transport measures carrying out the tasks of moving the goods of the undertaking. An important aspect of all activities related to the planning of transport processes in the enterprise is the correct identification of cargo streams, as well as information streams. This ensures that technical, technological and organisational solutions are properly integrated, which makes the implementation of transport processes at a high level.

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Analysis of The Implementation of Digital Technologies in The Enterprises of The Fuel and Energy Complex of The Russian Federation

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Abstract
The article substantiates the necessity of using digital technologies in industry. The directions of implementing the concept of the industrial revolution "Industry 4.0" are identified, where the main are Big Data, internet of things, robotics, digital twins, "smart" materials, 3D printing and a distributed registry (blockchain). Based on an analysis of the literature on digital transformation of business, trends in digital transformation in general for industrial enterprises and for enterprises of the fuel and energy complex of the Russian Federation are revealed. It has been established that the Internet of things is the most popular type of digital technology in the energy industry. This is primarily due to the fact that the energy system has traditionally been built around the technological principle of reliability and Smart Grid technologies, which are related to IoT elements and can significantly increase reliability. In addition to improving reliability, IoT technologies can reduce the number of network crashes by providing timely information about abnormal equipment operating conditions and timely preventive repairs. At the same time, the benefits from the digital transformation of the business will be received not only by the energy company itself, but also by other counterparties involved in the generation, distribution and consumption of electricity.

Keywords: Digital Transformation, Digital Technologies, Internet of Things, Fuel and Energy Complex of The Russian Federation, Energy Enterprises.

Introduction

At present everyone recognizes the enormous opportunities for business development through the introduction of digital technologies. Digital technologies contribute to the promotion of new business models, sustainable and efficient use of limited resources, and economical as well as environmentally friendly production of goods. The widespread use of digital technology in almost all areas of socio-economic processes is commonly called the "Industry 4.0".

If we look into history, the transition to mechanized production was carried out more than 200 years ago and radically changed the world forming new industries and ensuring the acceleration of technological development. Since then, four industrial revolutions have taken place in the world, including the designated Industry 4.0. The first revolution, Industry 1.0, is the transition from manual labor to machine labor, the emergence of factory production, and the spread of a steam engine.

"Industry 2.0" was marked by the creation of conveyor production and electrification. Industry 3.0 arose with the development of electronics, the advent of computers, and the success of automation.

The "Industry 4.0" concept was introduced after the international industrial exhibition in Hanover in 2011. Formally, the Fourth Industrial Revolution was one of the ten priority areas in the framework of the state high-tech strategy of Germany until 2020. "Industry 4.0" is a transition to a fully automated digital production controlled by intelligent systems in real time in constant interaction with the external environment, going beyond the boundaries of one enterprise, with the prospect of unification into a global the Industrial Internet of Things. If in the context of "Industry 3.0" we were talking about fragmented automation of individual stages or productions, in the case of the Fourth Revolution, in essence, an online-controlled enterprise is supposed. Some of the technologies that underlie Industry 4.0 began to develop and be introduced in the early 2000s. Today, digitalization is almost synonymous with competitiveness and opens up access to the markets of the future. Digitalization allows you to manage more complex production systems, contributing to the use and development of a wide range of new technologies.

The key technology areas of "Industry 4.0" in industry are:

1. Big data - tools and methods for organizing, storing, processing, working and performing calculations with huge data arrays. This includes areas such as machine learning and artificial intelligence.
2. Industrial Internet of Things (IoT) - a system of integrated computer networks and connected physical objects (things) with built-in sensors and software for collecting and exchanging data, with the possibility of remote monitoring and control in an automated mode.
3. Robotization (including unmanned aerial vehicles) that help automate processes, perform hazardous work, and conduct visual or "tactile" studies of hard-to-reach objects.
4. Digital twins (including visualization) - mathematical models of physical objects are not limited only to the collection of data obtained at the stage of product development or manufacturing, supplemented by data obtained throughout the entire product life cycle. The Digital Twin also significantly expands the capabilities of cloud-based analytics services used in the Industrial Internet of Things (IoT) concept of the fourth industrial revolution.
5. Smart materials (including nanocoatings and smart liquids) - a class of materials with different state of aggregation that retain or acquire specified physical and chemical characteristics when changing external conditions, up to extreme conditions.
6. 3D printing - a technology that allows you to create real, physical objects from a digital model.
7. Distributed registry (blockchain) - a decentralized application for general use, which allows you to keep records and provides a high level of system security.

Existing Literature

An analysis of the literature on the problems of digital transformation of industry in the Russian Federation led to the conclusion that most enterprises use the following digital technologies:

1. Widespread introduction of modern highly intelligent systems for the collection, processing and analysis of information on the state of technological processes (Industrial Internet of Things) (Levina, A.I., Dubgorn and A.S., Iliashenko, O.Y. (2018)).
2. Intensive implementation of robotic technologies - reducing the role of the human factor (Kose, T. and Sakata, I. (2018), Zaychenko, I., Smirnova, A. and Borremans, A.(2018)).
3. Implementation of cloud service technologies to ensure integration into global monitoring and control networks (Cloud services (Russian market)), (Ilin, I.V., Iliashenko, O.Yu., Borremans, (2018)).
4. Providing access to online information on the state of energy facilities in specialized organizations for the purpose of operational control and monitoring (Davidenko L.M. (2019), Lepekhin, A., Borremans, A. and Iliashenko, O. (2018)).

5. Implementation of technology for working with "Big data" for more accurate analysis and forecasting in the field of management and security (Ilin, I.V. et al. (2018), Klimin, A.I. et al (2018).
6. The transition from paper to digital media, updating technical and technological documentation, their archiving and backup, the introduction of digital signatures (Information security).
7. Transition to digital technologies in the development, design of energy complex facilities, the introduction of digital lifecycle management systems for energy complex facilities (Bauer V.P., Silvestrov S.N. and Baryshnikov P. Yu. (2019), Nekhorosheva L.N. (2019), Zharov, V.S., and Kozlov, A.V. (2018)).

A significant part of the theoretical and practical aspects of sustainable development of enterprises of the fuel and energy complex of the Russian Federation in the era of development of Industry 4.0 remains insufficiently studied. Despite the fact that as part of the development of the fuel and energy complex of the Russian Federation, a number of regulatory documents have been adopted (Decree of the Government of the Russian Federation of November 31, 2009 No. 1225 "On requirements for regional and municipal programs in the field of energy conservation and energy efficiency", Decree of the Government of the Russian Federation of December 01, 2009 No. 1830-p. "On approval of the action plan for energy conservation and energy efficiency in the Russian Federation", Decree of the Government of the Russian Federation of March 2, 2019 No. 234 "On the system for managing the implementation of the national program "Digital Economy of the Russian Federation", Decree of the President of the Russian Federation of 05.07.2018 No. 204 "On national goals and strategic objectives of the development of the Russian Federation for the period until 2024", Decree of the President of the Russian Federation of 05.09.2017 No. 203 "On the Strategy for the Formation of an Information Community in the Russian Federation for 2017-2030", Federal Law of November 23, 2009 N 261-ФЗ (as amended on July 26, 2019) "On Energy Saving and on Improving Energy Efficiency and on Amending Certain Legislative Acts of the Russian Federation", Federal State Statistics Service.), they are declarative in nature and do not provide the creation of a legal framework for the regulation and use of modern digital technologies at enterprises of the fuel and energy sector of the Russian Federation.

Only the qualitatively new fuel and energy complex of the country can meet the requirements of the new time which is both financially stable and cost-effective, as well as dynamically developing, meeting environmental standards and equipped with advanced technologies and highly qualified personnel.

In the era of digitalization of all socio-economic processes, energy companies are also actively introducing IT-technologies. This is evidenced by the analysis of the annual reports of the leading enterprises of the fuel and energy sector of the Russian Federation. The types of digital technologies used by energy are presented in table 1.

Table 1: Implementation of digital technologies by Russian energy companies

Business name	Digital technologies that have been introduced
PJSC "Rosneft Oil Com Company" (Consolidated financial statements of Rosneft)	• Cloud computing model. • "Intelligent field". • "Smart well".
PJSC "Gazprom" (GAZPROM PJSC Policy in the Field of Energy Efficiency and Energy Saving)	• Engineering centers (VNIIGaz, Tyumen NIPI Giprogaz, etc.). • "Intelligent field".
PJSC "Rosseti" (PJSC FGC UES (Rosseti FGC UES)	• Devices of intellectual metering. • "Smart networks". • Digital substations.
PJSC "LUKOIL" (Synergy of achievements and responsibility // report on activities in the field of	• Modeling based on Big Data. • Center for spatial visualization. • "Intelligent field". • "Smart well".

sustainable development of the Lukoil Group for 2018)	
PJSC "Gazprom Neft" (Energy Saving and Energy Efficiency // Gazprom Neft)	• Analysis of geological information Geomate. • "Digital double" refinery. • "Smart well". • Automated control center. • Introduction of industrial Internet.
PJSC "T Plus" (Energy Saving // T Plus Group)	• Software package for building energy modes.
PJSC "Tatneft" (Innovation // RITEK LLC)	• Engineering Center. • "Smart well".
"SUEK" JSC (Integrated Report 2018 // SUEK Group)	• "Intelligent quarry". • A set of intelligent systems to ensure work safety.
"RITEK" LLC (Innovation // RITEK LLC)	• Digital system for predicting the state of the equipment of gas power plants.

Based on the analysis of the data presented in table 1 we can conclude that the Internet of goods is the most popular type of digital technology in the energy industry. This is primarily due to the fact that the energy system has traditionally been built around the technological principle of reliability and Smart Grid technologies, which are related to IoT elements can significantly increase reliability.

In addition to improving reliability, IoT technologies can reduce the number of network crashes by providing timely information about abnormal equipment operating conditions and timely preventive repairs. For example, remote monitoring of the oil sensor in the transformer will allow you to notice a leak in a timely manner, prevent overheating and possible failure of the transformer and, probably, even a fire in the substation.

In the generation of the Internet of things, it will increase efficiency in the work of equipping the most important station nodes with diagnostic systems. It is worth noting that most of the modern equipment of the stations is already equipped with built-in telemetry systems and, of course, automation. And automated process control systems are also an integral part of the life support system of generating facilities.

However, a reasonable retrofit of generating facilities and the linking of "new" and "old" data in one system, for example, Supervisory Contro And Data Acquisition (SCADA), that is a software product designed to develop or provide real-time operation of collection, processing systems, displaying and archiving information about the object of monitoring or control.) – and that is what the leading companies in Russia are currently engaged into. Such systems are installed by JSC Inter RAO-Electric Power Plants, Unipro PJSC, Fortum PJSC, Rosenergoatom Concern JSC, Gazpromenergoholding LLC and others (JSC Concern Rosenergoatom, JSC Inter RAO-Electric Power Plants, LLC "Gazpromenergoholding" PJSC Unipro, PJSC Fortum).

At power plants, IoT systems also allow you to receive information about the operation of equipment in real time and make timely decisions on its repair. This technology helps optimize the shutdown times of generating equipment and minimize the risk of accidents. Taking into account the existing regulatory framework, the equipment will be repaired according to the regulations in the foreseeable future. However, at the same time, IoT in the electric power industry makes it possible to understand not the routine, but the real state of the equipment, the parameters of its operation after a scheduled repair.

When used correctly, IoT can help focus operational staff on key functions rather than routine work and, where possible, optimize the number of employees. Considering that more than 700 thousand people work in the electric power industry, their payroll is about 50 billion rubles (Federal State Statistics Service, The Ministry of Energy of the Russian Federation), we can talk about considerable reserves of productivity. The fact is that IoT covers not only "goods", but also employees. And «armed» with knowledge staff can do their job more efficiently.

In the generation, we can talk about simple systems in the form of personal tablets for shift workers in station workshops. However, even these devices can:

- free staff from unnecessary routine work on filling out paper forms;
- control the work of crawlers;
- minimize the influence of the human error factor due to the standardization of the process of filling out forms;
- give an instant hint to the staff about the condition of the devices by downloading retrospective data on the operation of the equipment, which the employee is currently taking readings with a forecast of the device's functioning in the future;
- transmit information in real time to the shift supervisor on the central control desk.

The economic factor is no less important than improving reliability. Due to the high cost of electricity services, in some cases the consumer is ready to reduce consumption himself in order to save. For power grid companies, cost reduction is also an extremely important task. On the one hand, the network component accounts for 67% of the price of electricity for households and about 40% for industry. On the other hand, regulators are increasingly demanding tariff reductions and the associated costs of network companies. Costs can be reduced by improving the observability of network objects.

Understanding the status of substations, power lines, insulators and other network elements will reduce the following cost components:

1. *Repair.* Currently, repairs are being carried out according to technical regulations. In particular, overhaul of lines should be carried out on average once every 12 years. The transition from routine repairs to repairs by state will save more than 8 billion rubles until 2030 (Concept Digital transformation 2030) by managing the sequence of repairs and extending the life of the equipment.
2. *Operation.* To take basic readings from network objects, it is necessary to make rounds and inspections of equipment. For example, to examine a transformer, you need a high-voltage laboratory, which checks the transformer every six months, and the oil used in it for cooling is handed over to the laboratory for examination. Inspections of lines and substations are also carried out by specialists personally. In addition, the manual method often searches for damage in the event of a line outage. Obtaining accurate data using IoT remotely and in a mode close to real will significantly save the time needed to analyze and fix problems, therefore, the associated costs.
3. *Losses*. The size of technological and commercial losses in the networks is quite high and amounts to an average of 9.22%, that is about 60 billion rubles annually (Central Dispatch Department of the fuel and energy complex). Only bringing the level of losses through improved network control will save up to 40 billion rubles a year. At the same time, the solution to the problem of reducing commercial losses may accelerate. So, from the middle of 2018 in Russia, in order to introduce Smart Metering technology, it is planned to legislatively ban territorial network organizations to upgrade old metering devices.

In addition, IoT will increase the resource and throughput (used capacity) of existing assets. This is due to the fact that in modern conditions the development of networks is limited not only by capital intensity, but also by geopolitical (in regions with a high population density there is nowhere to build new networks), climatic (in summer throughput is less given the greater sagging of wires), as well as the legal (according to existing regulations, loading lines and production systems is possible only at a certain level).

In generation, an analysis of optimal operating modes using IoT technologies reduces the amount of excessively burned fuel, which in some cases accounts for more than half of all plant operating expenses. In Russia, the electric power industry consumes about 115-120 million tons of coal and about 200 billion cubic meters of gas annually, which in monetary terms exceeds 1 trillion rubles (Central Dispatch Department of the fuel and energy complex). Even a small percentage of saving these costs

by generating companies in Russia can bring tens of billions of rubles a year to the industry and economy.

At the same time, reliable communication between the consumer and the manufacturer will allow the most efficient loading of production facilities. Today, according to industry representatives, trading in the wholesale market is «impersonal», and in a number of regions the most efficient stations operate half-heartedly while much less efficient capacities in the neighboring region are fully loaded.

At the moment, the most promising technology to solve this problem is the introduction of distributed energy technology. A wide range of technologies is ranked among the technologies of distributed energy (distributed energy resources (DER)) in the world practices, including:

- distributed generation;
- demand management (demand response);
- energy efficiency management;
- microgrids;
- distributed power storage systems;
- electric cars.

The basic property of all these technologies is its proximity to the energy consumer. Distributed generation is a set of power plants located close to the place of energy consumption and connected either directly to the consumer or to the distribution electric network (if there are several consumers). The type of source of primary energy used by the station (for example, renewable energy), as well as the affiliation of the station to the consumer, the generating or grid company, or to a third party. It is the implementation of the capabilities of IoT, Big Data and DER cloud services that will significantly increase both the efficiency of local distribution energy networks in terms of optimizing the producer-consumer path, and increase the environmental friendliness of energy-generating capacities by involving generation through renewable energy sources (solar, wind, geothermal and tidal energy).

Results

Thus, as a result of the study, it can be unequivocally stated that the active use of digital technologies by energy enterprises significantly increases the efficiency of their activities. As a result of the analysis of the use of digital technologies by leading enterprises of the fuel and energy complex of the Russian Federation, it was found that it is possible to maximize the efficiency of doing business in the digital economy within the energy industry using the Internet of goods. At the same time, the benefits of the digital transformation of the business will be received not only by the energy company itself, but also by other counterparties involved in the process of generation-distribution-consumption in the resource market (Figure 1).

It is important to understand that the digitalization processes of networks, generation and the consumer sector should go in parallel. A «smart network» without a «smart consumer» will not work.
Thus, the key areas in all components of the electric power system of the Russian Federation, which will be affected by the implementation of IoT, are:

- technologies, including their reliability;
- profitability, including cost reduction;
- the emergence of new markets, the creation of new properties and businesses.

The economic effect that the introduction of digital technologies in general, and the Internet of goods in particular, can bring about 532 billion rubles (Federal State Statistics Service).

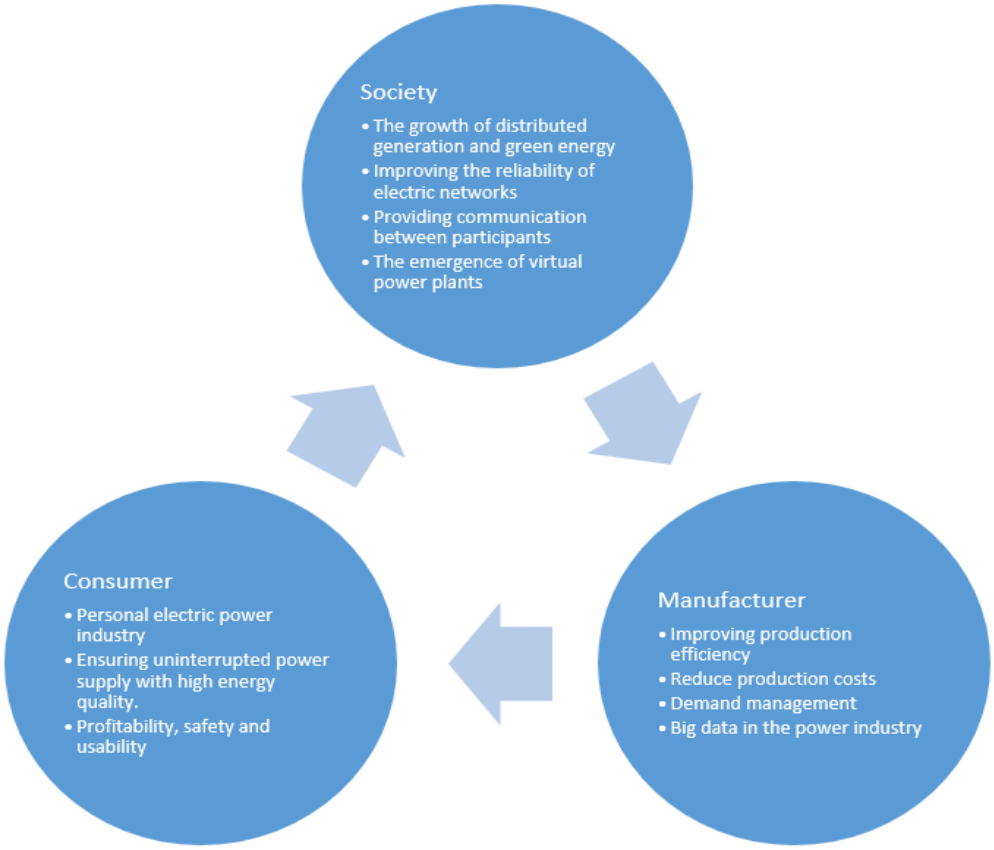

Fig. 1: Benefits from the implementation of the Internet of goods in the activities of enterprises of fuel and energy enterprises of the Russian Federation

Conclusion

In the course of this study, a number of annual reports of the leading energy enterprises of Russia were analyzed and it was concluded that in the future all three links of the electric power industry - generators, networks and consumers - should become «smart». The deep integration of all market participants, to which IoT technologies lead will make it possible to transform the electric power system of the Russian Federation and give it a modern look. The hierarchical system "production - transmission - sales" is being replaced, in which all procedures are strictly defined by regulations, coordination is achieved through state regulation, and participants learn about each other's actions from the news, a flexible system of productive interaction in real time will come. Each element of the system will "see" other elements, understand their capabilities and needs and use their potential to the maximum.

The introduction of digital technologies in the activities of the enterprises of the fuel and energy complex of the Russian Federation will allow reaching a fundamentally new level of reliability and efficiency in the operation of the entire energy system of the Russian Federation.

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Reference Digital Model of the IT-Architecture of A Medical Organization

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Abstract

At the present stage of modern technologies development, many companies are focusing on using end-to-end digital technologies (Internet of things, blockchain, big data, machine learning, etc.) to implement their IT strategy. Digitalization is changing the way business is conducted as part of the production of an end product or service based on the use of Internet of Things (IoT) technologies, intensive data exchange and analytical systems. However, the technological application of end-to-end digital technologies alone is not enough. To profit from digitalization, it is necessary to introduce innovative business models, for example, the transition to business models with advanced services. Medical organizations are no exception. The main problems in the digital transformation of medical organizations are the company's unpreparedness for organizational changes, as well as an insufficiently well-developed IT strategy and business model that should precede the start of the implementation of digital projects. Reforming the activities of medical organizations, caused by the need to introduce end-to-end digital technologies, requires analysis and reengineering of the business process system and the formation of the company's IT strategy. To solve these problems, it is necessary to form a reference model of the IT architecture of a medical organization. The methodological basis of the study is an analysis of the literature on the research problem, generalization and systematization of data, and an architectural approach. The result is the construction of a reference model of the IT architecture of a medical organization, taking into account modern digital technologies.

Keywords: IT-architecture, reference digital model, medical organization, digital transformation

Introduction

The digital economy is positioned as a "system of economic, social and cultural relations based on the use of digital information and communication technologies"[1]. Countries that are world economic

leaders are actively using digital technology to increase productivity and efficiency of the economy as a whole and individual enterprises. Digitalization is becoming an integral part of all processes of social life. The digital economy, being the basis of the fourth industrial revolution, determines a change in basic technologies and, as a result, a change in the technical and economic paradigm.

Gradually, digital technologies become a reality in the economies of countries, everyday life, in various spheres of economic activity, in international relations (examples are in the studies of the authors [2-5]). The widespread adoption of digital technologies (the Internet of things, the industrial Internet, big data, blockchain, cloud computing, machine learning, artificial intelligence, mobile communications, etc.) is one of the most important conditions for the development of national economies of all countries [6,7].

Studying the experience of the development of the digital economy in Europe, the USA, China and other countries is of great importance for the development of the digital economy in Russia
The federal project "Digital Technologies" of the state program "Digital Economy of the Russian Federation" (until 2024) [8], adopted in the Russian Federation, and the state program "Development of Health Care" (until 2020) [9] determine the development and process of digital transformation of priority sectors of the economy based on end-to-end digital technology stack. The base objectives of "Digital Technologies" project are:

- support of leading Russian high tech companies, which are develope products, services and platform solutions based on end-to-end digital technologies for digital transformation of priority economy sectors and social sphere mainly based on domestic developments;
- support for projects to scale technological solutions based on "end-to-end" digital technologies in a high degree of readiness in priority economy sectors and social sphere"

One of the way of improvement of health care system is implementation of modern management technologies based on end-to-end digital technologies (service-oriented architecture, process management, e-health) into practical healthcare.

Digital technologies have a significant impact on the quality and cost-effectiveness of medical care into sphere of healthcare. This premise, in particular, underlies in the base of the project in the Russian Federation for the development and implementation of a unified state information system in the field of healthcare in accordance with the Russian Federation government resolution No №555 by 05.05.2018. In modern world, where new technologies are dynamically developing, the focus of enterprises has shifted from the sphere of technologies for the implementation of core activities to the sphere of management technologies. For example, the more quickly and flexible management system responds to external challenges, the more effective the whole enterprise is. At the same time, the business model of the company, the value-oriented and functional models of the company, and the system of business processes are primarily affected by changes. The reengineering of a business process system based on the use of end-to-end digital technologies allows us to further formulate the IT architecture requirements and determine the program of development projects.

Methods

The methodological component of this article is based on the following approaches.

1. Analysis. The article analyzes the current interest of medical companies in the transition to an IT business strategy. Also, the article analyzed existing medical concepts taking into account the introduction of modern digital technologies, for example, IoT, BigData. Moreover, the influence of end-to-end technologies, which are of key importance in the implementation of digital transformation in the medical sector companies, was noted.
2. Architectural approach. The methodological basis of the study is the architectural approach to the design of reference digital model of the IT-architecture of a medical organization. This approach allows to make an alignment between the business and IT development strategies of medical companies. The use of this approach is relevant in connection with the

rapidly growing dependence of doing business with implemented IT support. The architectural approach allows us to reflect in detail various elements such as business processes, functional and organizational structure, the level of information services and applications, as well as the technological layer. At the present stage of development of approaches to designing enterprise architecture, four main approaches are distinguished: Federal Enterprise Architecture Framework [10], Gartner [11], Zashman Framework [12], TOGAF [13, 14]. After analyzing all the main advantages and disadvantages of each of the above incomes, the focus fell on the TOGAF method [15]. The choice of the method substantiated the possibility of its application to focus on the process of managing architectural changes in medical companies, taking into account the introduction of modern digital technologies. Moreover, this approach is flexible in relation to changes in the external and internal business environment. According to our study, we applied this approach to build a reference digital model of the It-architecture of a medical organization.

Results and Discussion

Digital technologies have infiltrated and changed the balance of power in most business areas, and the healthcare industry is no exception. Experts predict that soon the way we, the society, provide and consume medical services will change significantly [16,17]. Breakthrough technologies, such as Internet of Things (IoT), Artificial Intelligence (AI), Blockchain and Cloud Computing, have reached a certain level of maturity and are widely used in the world of healthcare. Today, the attention of investors and corporations is occupied by advances in medical technologies: inventions in the field of genomics, wearable devices for tracking health indicators and telemedicine, as well as inventions associated with various types of sensors. Researches in nanomedicine, robotics, and medical 3D printing is also not neglected and is aimed at helping medical organizations provide targeted, accurate and timely medical services.

Practices for using end-to-end digital technologies in medicine

Artificial intelligence, wearable devices, drones, robots are gradually becoming the usual health care tools. Modern technologies are used to diagnose diseases, treat, monitor, conduct operations, transport medicines and blood. Consider some of the possibilities of using artificial intelligence and the Internet of Things in healthcare. Let's consider examples of the introduction of end-to-end information technologies in various areas of medical activity [18].

Diagnostics

The most advanced diagnostic methods are the use of artificial intelligence. In December 2016, Don Woodlock, senior vice president of GE Healthcare, said that radiography would not require the use of films: images would be sent directly to radiologists via modern communication channels.

Making a diagnosis automatically using machine learning technologies will be the next step in medical transformation. Machine learning will not replace radiologists, but will make their work more efficient.

Also, artificial intelligence technologies will support the work of ophthalmologists. AI can detect eye damage in patients with diabetes. At present, a machine learning algorithm has been developed and passed its first tests, which is able to detect eye damage from photographs of the fundus.

To train the mechanism, it was necessary to use 130 thousand images of the retina. To participate in the project, images of both a perfectly healthy retina and images of diseases were used. Fifty experienced ophthalmologists previously evaluated the quality of the images, the presence and degree of retinopathy.

In September 2016, the Israeli company Beyond Verbal introduced a project of a system based on artificial intelligence. The task of the system is to diagnose diseases by voice. It is about recognizing intonation and other nuances that a person can't recognize by ear. To train the system, the developers proposed AI to analyze more than 2.5 million audio recordings with voices in 40 different languages.

In February 2017, experts at the American University of North Carolina developed a miniature wireless device. The device is able to remotely diagnose the physical condition of soldiers and athletes. A sensor made of elastic polymer material is attached to the wrist or chest. The device controls the electrical properties of the skin. These properties change depending on the level of perspiration of a person. The received data is sent to the tablet or smartphone of the owner. Scientists said that the sensor controls skin hydration, which means it will protect people working in hot conditions, improve the physical fitness of athletes, etc.
In May 2017, Perm scientists announced the creation of a system for the diagnosis of cardiovascular diseases based on a neural network and the method of mathematical freezing. For efficient operation and training of the system, a database was provided from the emergency cardiology department of the local hospital. The network is self-learning and successfully diagnoses. She uses data on previously transferred diseases of patients, medical history of relatives, data on pulse, pressure. The system takes into account 69 indicators.

In August 2017, an AI-based assistive system was presented in China for making a clinical diagnosis. To analyze 100 case histories, the system requires 4.8 seconds or 0.05 seconds for each history. The diagnoses of AI are 98% the same as those made by qualified medical staff. Millions of patient records have been used to create the system. The accuracy of the machine diagnosis is 20% higher than that set by the doctor.

Treatment

In December 2016, a prototype bracelet with an NFC chip was introduced in Israel, which will provide emergency assistance to soldiers wounded in battles. The device stores data on the patient's health, information about the treatment already carried out, photographs of the patient's wounds and GPS coordinates of the places where the soldier was injured. Developers are testing the bracelet to see if mass production is worth it.

Smart shoes are used to help travelers navigate and improve athletes' performance. In November 2016, ABI Research analysts reported that sensors embedded in the shoes themselves, in the insole or socks will be able to improve the condition of patients, and some can be literally put on their feet without the need for regular visits to doctors.

Monitoring

Wearable devices are already tracking physical activity indicators. For example, the Sensor Dot device developed by UCB and Byteflies will notify patients of an impending epileptic seizure. The sensor makes several different measurements to accurately predict the time of an impending attack.

Another device is a patch, a coin-sized one, presented in August 2017, released by Band-Aid. The wireless patch can be connected to the network and attached to the human body. First of all, patches will allow qualified doctors to obtain data on the health status of people in rural and mountainous areas, where, as a rule, medicine is poorly developed.

In May 2017, Apple CEO Tim Cook was spotted testing a device that looked like a blood glucose meter. Now, in order to measure the level of sugar in measles, people with diabetes need to pierce a finger. Wearable devices, if their error in determining blood sugar levels will be minimal, can also be used for monitoring, without having to take a blood sample.

Transportation of medicines and blood

Drones are indispensable for the delivery of medicines and donated blood to remote areas. For example, in Rwanda, Zipline (California) has been supplying blood and medicine with unmanned aerial vehicles since the fall of 2016.

Drivers of Medical Organizations Development

Various studies [19-22] identify three main drivers that push medical organizations to begin the process of digital transformation to increase the value and quality of provided medical services:

- increase of costs and chronic diseases of patients;
- high expectations of digital patients for the quality of medical services provided;
- emergence of digital technologies and modern medical equipment, sensors and wearable devices enabling expansion of the boundaries of decision support systems.

In order to meet these challenges and take advantage of the opportunities that digital transformation provides, healthcare providers must rethink their traditional value chain and consider the possibilities of joining or organizing a Digital Healthcare Network. The goal of such a network is to bring together patients, specialists and suppliers to provide the most efficient and patient-oriented medical service possible. The Digital Healthcare Network is the foundation of a new consumer-oriented healthcare system in which stakeholders are trying to solve common problems through ongoing and continuous collaboration. From an architectural point of view, such a network is an open integrated platform that provides tools for exchange of information within a single network, as well as tools for access management based on the pre-configured rights and roles of users (network participants).

The transition to digital healthcare offers many opportunities for both market leaders and niche companies. However, organizations must adhere to a number of rules and concepts when developing medical services:

- focus on meeting the needs of patients at the lowest possible cost;
- establishment of the maximum possible number of touchpoints between the client and the service as well as the personification of offers and user experience;
- collaboration within the medical network: collaborative research and clinical trials, etc.;
- balancing supply and demand through advanced real-time analysis technologies and predictive analytics.

Reference digital model of IT-architecture of medical organization

Medical organizations investing in digital technologies need an IT architecture that will support the implementation of key business processes and, at the same time, provide an opportunity for the development and integration of innovative scenarios, such as: digital diagnostics, digital boardroom, clinical decision support, patient involvement and many others.

Figure 1 shows a conceptual (reference) model of the IT architecture of a medical organization.

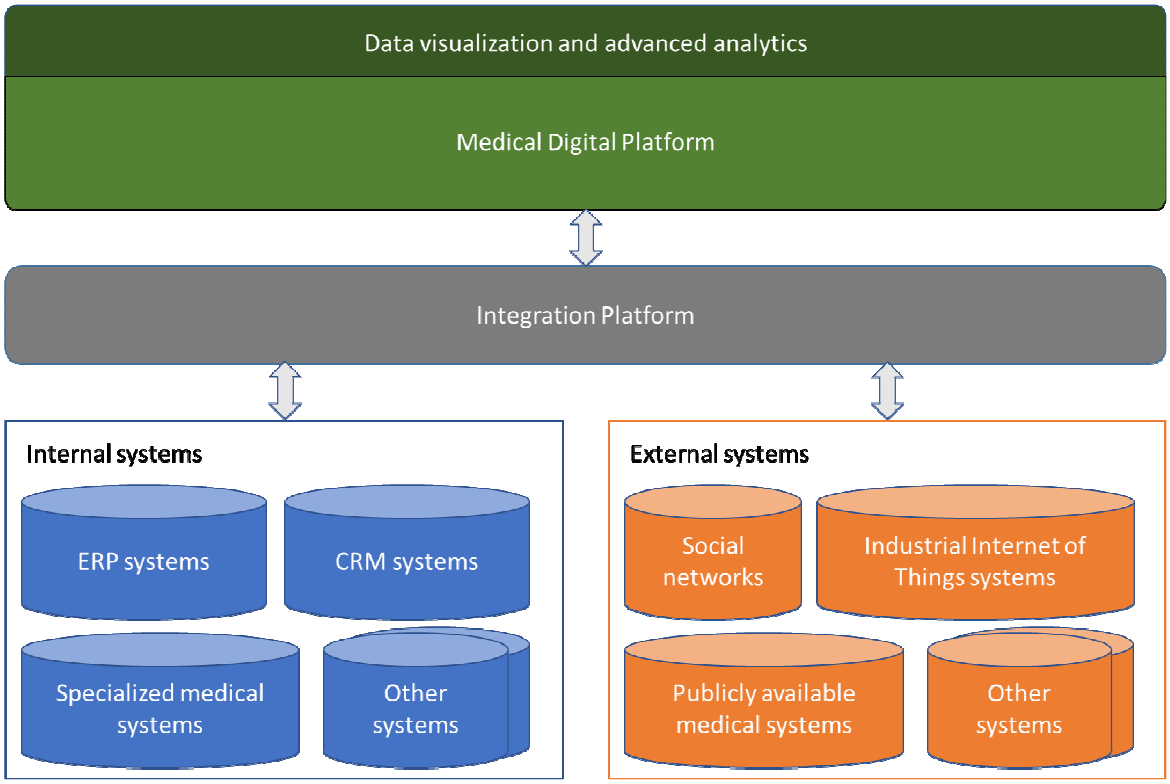

Figure 1 : Conceptual (reference) model of IT architecture of a medical organization

Let us consider in more detail each of the presented layers of the conceptual model of the IT architecture of a medical organization. Often in large medical organizations there is a "zoo" of IT systems of various classes. This is mainly due to the large number of specialized medical systems, but sometimes it is caused by the lack of a well-described IT strategy of the organization. In addition, with the growth of digitalization, medical organizations are forced to collect data from various external systems outside the enterprise's IT landscape: social networks, Industrial Internet of Things (IIoT) systems, various publicly available medical systems and catalogues, etc.

In this regard, in medical organizations the problem of integrating data from disparate sources is especially acute. The architectural solution (proposed within the framework of the reference model) is a comprehensive integration platform that would have functional and technical capabilities for setting up data exchange between all open integrated systems of the organization. Moreover, such an integration platform must be deployed in a cloud or hybrid environment in order to support the integration of cloud and on-premise systems.

The basis of this model is a Medical Digital Platform, which should provide functionality for aggregating heterogeneous data, as well as provide convenient and scalable services used by various applications located inside the platform. In addition, it is desirable that this system would support embedding (as an extension or add-in) of visualization dashboards (created by means of BI-systems), as well as libraries for Machine Learning and predictive and advanced analytics.

Figure 2 shows a conceptual (reference) model of the architecture of a Medical Digital Platform.

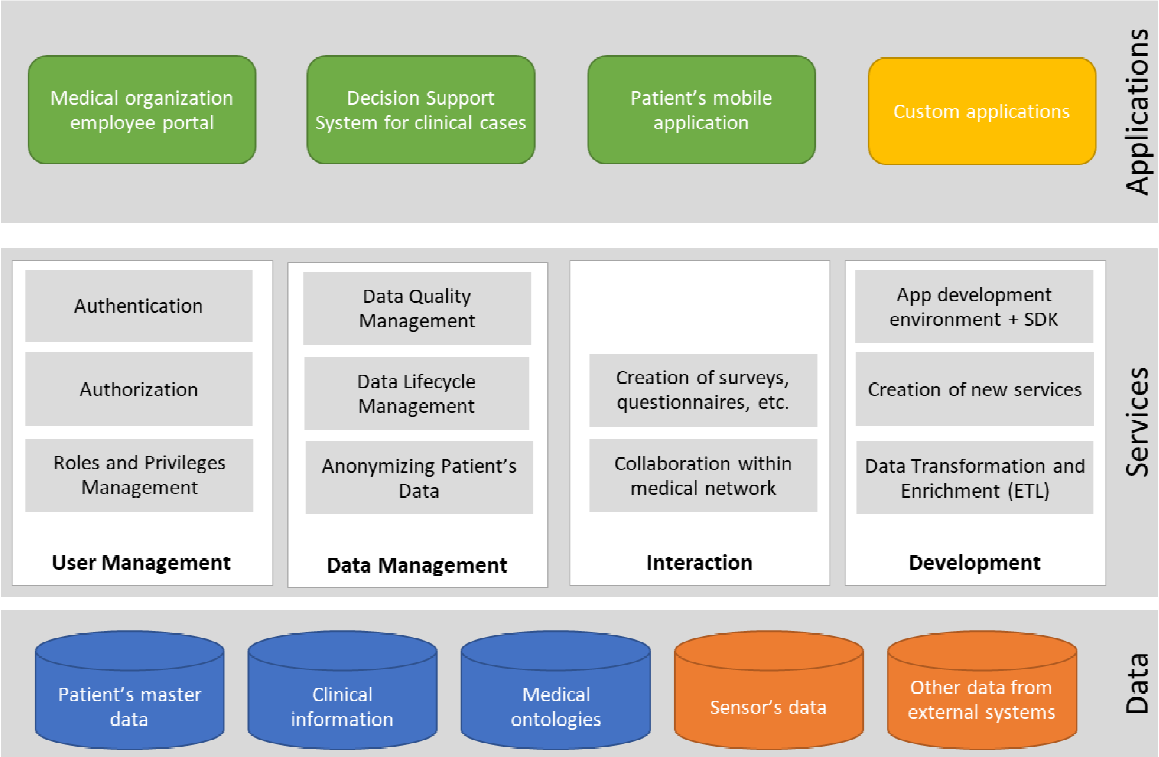

Figure 2 – Conceptual (reference) model of the architecture of a Medical Digital Platform

Digital Medical Platform should have technological capabilities for storing and processing large amounts of data. Patient's master data, data sets with clinical information and medical ontologies, data from medical devices and sensors, as well as other relevant data from external sources should be replicated to the medical platform to speed up the processing and visualization of this data.
Four key groups of services have been identified that, from our point of view, should be provided by a Medical Digital Platform:

- **User Management.** This group includes services for managing authentication, authorization, user's roles and privileges. When it comes to personal medical information of patients, it is extremely important to make sure that only attending physicians of patients themselves have access to it by providing protection against unauthorized access.
- **Data Management.** This group includes data quality and life cycle management services, as well as services for anonymizing patient data, which is a prerequisite for subsequent statistical analysis of such data arrays.
- **Interaction.** This group includes services responsible for interaction with the "external world": collaboration within the medical network, creation and automatic distribution of surveys, questionnaires, etc.
- **Development.** This group includes all services for custom development and refinement of the platform: tools for transforming and saturating data, tools for creating new unique client services (Platform SDK), and an integrated development environment for unique web and mobile applications (Mobile SDK).

Platform can be delivered with out-of-the-box boxed applications for solving various business problems. For example: a portal of an employee of a medical organization, a decision support system for clinical cases, a mobile application for a patient, etc.

Conclusions

1. Conceptual model of IT architecture of a medical organization, using IoT tehnologies, has been developed
2. Conceptual (reference) model of the architecture of a Medical Digital Platform has been developed.
3. Four key groups of services have been identified that, from our point of view, should be provided by a Medical Digital Platform.
4. The proposed reference model of IT architecture will allow in the future to formulate a program of projects for the development of IT architecture of medical organizations based on end-to-end digital technologies.

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Modelling and Development of Project Office for Resource Supply Organization

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Abstract

The active development of any organization determines the presence in the company of a large number of projects related to various industries. This necessitates the implementation of a corporate approach to project management as temporary structures established to achieve the required results. The discipline of project management allows you to organize structured management of the main constraints of any project - timelines, budgets, functional frameworks, while observing the quality requirements of the final project product. This article discusses the task of organizing a project office for a resource supply organization in order to create a centralized project management apparatus and implement strategic initiatives. As the standard of project management and the basis for creating a model of the project office, the PRINCE2 standard was chosen, while ArchiMate was chosen as a tool for modeling the organization's activities. The model obtained as a result of the study is the basis for creating an existing project office in the organization in question

Keywords: project office, project management, leadership, PRINCE2, ArchiMate.

Introduction

The leaders represent crucial points of communication inside a group. Communication is an important characteristic of groups, together with self-organization, conformity, unity, efficiency etc. The managers are people who “do what they have to do”, while the leaders are people who “do what they do, as they have to do”, that is efficiently. It is a big difference between the manager and the leader. The first faces complexity while the second one faces changes, grouping characteristic activities of management and leadership (Burke & Barron, 2007) (Ilin, Levina, & Lepekhin, n.d.), (Pirogova et al., 2019). Each action system implies taking the decision about what has to be done, creating relations between people, creating relations that can lead to the fulfilment of a common plan, and then the essay to assure that these people do what they have to do. Everyone fulfils these three tasks in a different manner.

This leadership concept is crucial for moving organization towards corporate development (Orlova, Ilin, & Shirokova, 2018), (Mandryka et al., 2019). In scopes of complex organizational structure and scale of the company, the role of corporate development cannot be assigned to one person, it can be performed by project office (Anantatmula, 2010).
This research paper addresses the models of project office for complex organization, which is acting on resource supply sector and has governmental interrelations. The core of the model is PRINCE2

methodology and ArchiMate modelling language (Lankhorst, Proper, & Jonkers, 2009). The results of this research paper are aiming to become a recommendation for the case-company in further realization of project office structure.

Literature Review

To date, a number of approaches to project management are applied around the world. Fundamental and more universal are the PMBOK and PRINCE2 approaches, the more flexible approaches are Agile (in particular, SCRUM), and the highly specialized ones are the NASA Project Management and Systems Engineering Competency Framework (Wideman, 2002). Nevertheless, PMBOK and PRINCE2 can be considered traditionally accepted approaches due to their very widespread use in many countries. It is worth noting that these approaches are considered international standards for project management. As you know, PMBOK is used on all continents in more than 185 countries. It is most popular in the USA, Canada, Mexico, Asian countries, including China and India. PRINCE2 also finds application on all continents in more than 150 states. This approach is most popular in the UK, in many countries of Europe, South Africa, Australia, New Zealand, the USA (in IT projects of oil companies) (Popova et al., 2019). PMBOK defines concepts "related to project management, contains a universally recognized standard and guidance for the project manager". PRINCE2 is "a structured project management method based on experience gained from thousands of projects." Table 1 presents a comparison of PMBOK and PRINCE2 (Siegelaub, 2004).

Table 1: PRINCE2 and PMBOK comparison

Criteria	PRINCE2	PMBoK
Definition	Structured methodology	Standard and Guide
Practical/Complex approach	Practical, focuses on critical areas	Complex approach
Themes/Knowledge areas	7 themes	10 knowledge areas
Processes and actions	7 processes and 35 actions	5 process groups and 47 processes
Principles	7	-
Interpersonal skills	-	+
Focus	Business case and product	Customer requirements
Project Board Role	Encourages the Project Board to provide oversight	Only offers the role that the sponsor should play

PMBOK presents 10 areas of knowledge (Integration, Content, Timing, Cost, Quality, Personnel, Stakeholders, Communications, Risks, Purchasing) and 5 process groups (Initiation, Planning, Execution, Monitoring and Control, Completion), for which they are described in detail 47 project management processes In the case of PRINCE2 there are 7 principles, 7 topics, 7 processes. The following topics are described in this methodology: Business Case, Organization, Quality, Plans, Risk, Change, and Progress. This standard governs the use of 26 management products, 8 roles and responsibilities, 2 methods (Product Based Planning and Quality Audit Technique) (Bentley, 2005, p. 2). It also provides recommendations for adaptation in case of a project in the program, customer / contractor relations, several project owners, use with other life cycle models and standards, and changes in the scale of the project.

Methodology

Project management is an integral component of enterprise architecture and plays a special role in project-oriented companies Project management standards are developed by professional associations or large companies. Any company has the right to develop and use its own corporate standard for project management. Choosing a project management standard, in addition to a well-developed general approach, many companies often seek guidance on specific actions to manage various aspects of the project. The PRINCE2 standard fully meets these requirements: the guidelines are detailed to

specific recommendations to project participants, the standard is scaled and adapted to any specific project.

The PRINCE2 standard was originally developed as a standard for managing IT projects. Currently, PRINCE2 is used in more than 150 countries to manage projects in more than 20,000 organizations. The PRINCE2 methodology is based on a process approach to project management, special attention is paid to the relationship between the Customer, the Supplier and the User (Commerce, 2002, p. 2).
PRINCE2 project management methodology has a number of features and advantages compared to other world standards in this area:

• Possibility of planning;

• Product orientation;

• Project management for individual controlled stages;

• Adaptability and flexibility in relation to projects of various sizes;

• A clearly regulated organizational structure of the project, which allows to increase the effectiveness of project management;

• The principle of deviation management during project management (the determination of the acceptable level of deviation of results at each stage of the project without escalating the problem to a higher level) (Hedeman, Van Heemst, & Fredriksz, 2012).
PRINCE2, due to its structure and key principles, allows to solve such complex projects as:

1. The length of the project

PRINCE2 makes project activities as result-oriented as possible thanks to the principle of "focusing on the project product": the entire project as a whole and each stage separately must end with the creation of a product that has value for the customer.

2. Schedule overruns

During the project, new tasks constantly arise that are built into the previously created plan, other tasks are shifted or completely excluded from the plan, often it takes a lot of time to determine the contractors. The PRINCE2 principle of "exception management" assumes that deviations from the plan are detected at an early stage, when they are only predicted, and corresponding analysis work is carried out with them, identifying and eliminating the causes, adjusting the plan (Ghosh, Forrest, DiNetta, Wolfe, & Lambert, 2012).

3. The inability to quickly identify those responsible for certain tasks

The inability to quickly identify the person in charge often manifests itself in the event of any problems due to inaccurate definition of roles and responsibilities in the project. At the same time, the project is significantly delayed, disagreements arise within the project team, and problems are not resolved promptly. PRINCE2 proclaims the principle of uniquely identifying roles and responsibilities in the project and describes in detail the main roles in the project management team. In particular, the duties of the project manager include daily monitoring of work and resolving disagreements within the project team (Barker, 2013, p. 2).

4. Ineffective communications between project team members

If the information exchange process is not established within the project team, the participants do not have access to critical information for them, this can lead to significant disruptions in the work on the project, a large number of errors, duplication of tasks, etc. PRINCE2 provides the "Communication Strategy" document, which contains all the interactions of the project executives, and also provides a

list of documents that require fixing in them all the information on the progress of the project (Samáková, Sujanová, & Koltnerová, 2013).

5. Inability to respond quickly to unforeseen situations

The problem of the lack of operational response is often associated with the absence of a permanent project manager in the project, who in such situations is the decision maker according to the PRINCE2 methodology. If there is insufficient authority to make a decision, the project manager should contact the senior manager in accordance with the communication management strategy.
The given examples of PRINCE2 tools for solving typical problems in projects determine the potential effectiveness of this standard for use as a corporate standard for project management and the creation of a project office on its basis.

Results

In addition to managing individual projects, it seems advisable to consider the organization of a structural unit that exists on an ongoing basis in the organizational structure of the company in question and is responsible for managing projects and project programs, while taking into account the wider context of the implementation of urban infrastructure development projects in the field of resource supply. Proposals were made on the following aspects:

• Management of individual projects in the company

• Project portfolio management in the company

• Project management (project programs) of urban infrastructure development in the field of resource supply

The management structure of an individual project is a temporary role-based organization. The proposed model of the role structure of managing individual projects proceeds from the assumption that traditional projects with the following properties predominate in the company's project portfolio: approved and conditionally stable cost, terms and volume of work on the project. Best practices for managing such projects recommend a three-level management structure (Fig. 1):

• The project curator is the sole body for managing the strategic interests of the project, responsible for making key decisions in the project (starting a project, providing resources for the project, completing and accepting project results), which should have sufficient authority in the project environment. Appointed from among representatives of the Government of the considered area of the company's functioning. The project's collegial advisory body is the Project Council, which, in addition to the Curator, includes a representative of the customer and the main project executor;

• Project manager - manages the current project work within the framework of his authority, coordinates the teams of performers of various types of work. Appointed from among the representatives of the resource supplying organization;

• Leader of the team of performers - since urban infrastructure development projects are a set of interconnected heterogeneous works (for example, engineering design, equipment supply and equipment, construction and installation works, commissioning), it is advisable to divide the management of various types of work between specialists in a particular area. The head of the team of performers of a certain type of work is responsible for the performance of work in this area and the transfer of the results of work under the guidance of the Project Manager to the performer of interrelated work.

The proposal on the role structure of project management in the company takes into account the requirements of the Methodological recommendations of the methodology.

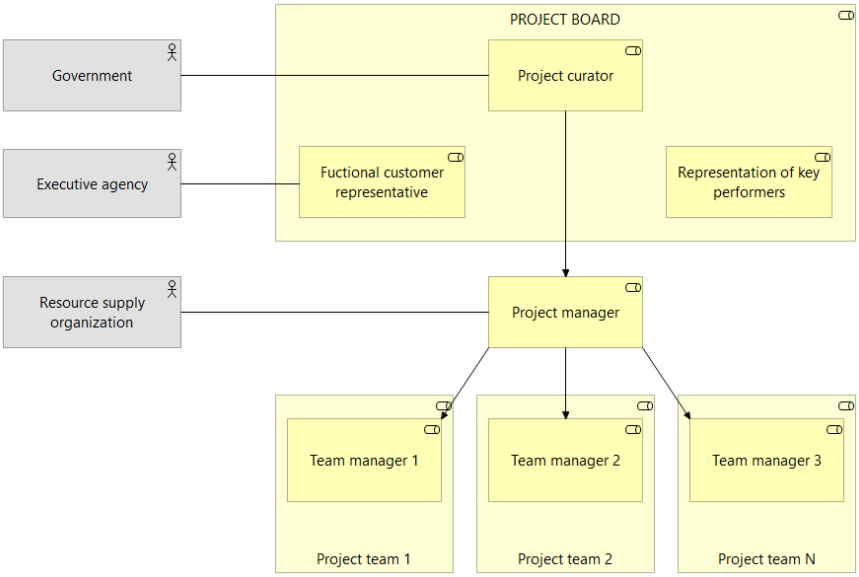

Figure 1: Role structure of individual project management

If the project is being implemented as part of a program of interrelated projects, then the program management structure can be implemented in the form - see Fig. 2. The program council is formed from among the representatives of the Government and is involved in protecting the interests of the program. The program director is personally responsible for making strategic decisions on managing the project program, and provides resources for the implementation of the program. The program manager, depending on the specifics of the project program, can be appointed: from representatives of the Government - in the case of projects that are heterogeneous in terms of specificity under the auspices of one program, from representatives of the Executive authority of the Region (profile committee) - in the case of a unidirectional project program.

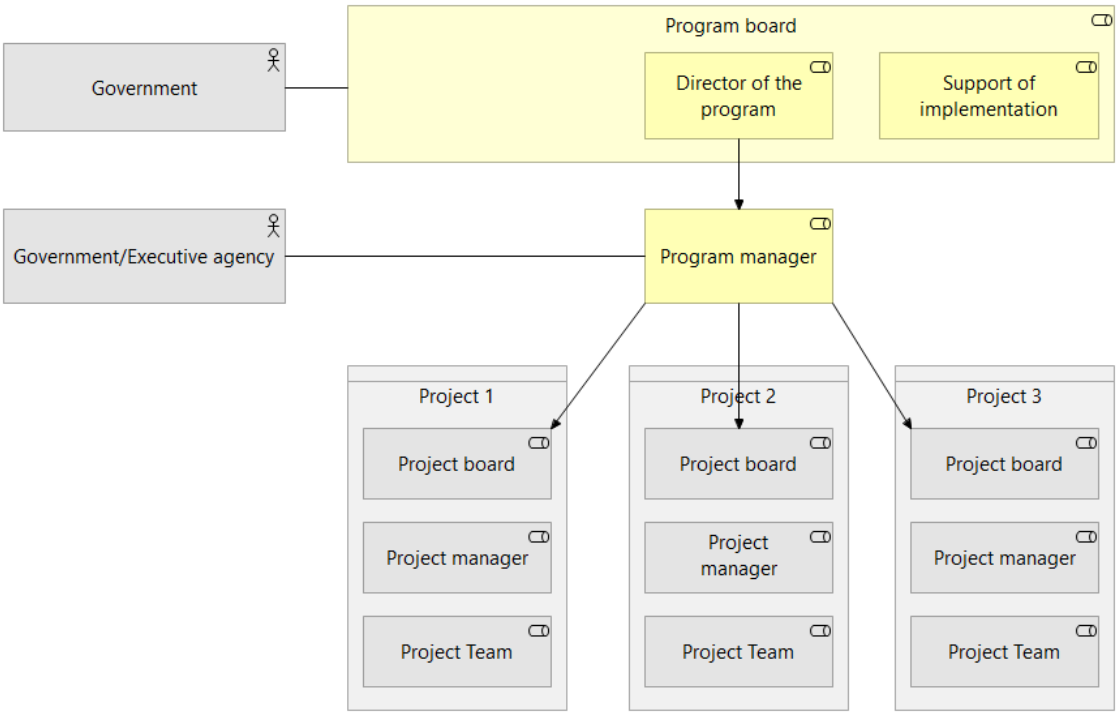

Figure 2 - Role structure of project program management

If in addition to current activities the company regularly implements development projects, it seems advisable to create a permanent unit in the organizational structure responsible for the implementation of project activities - the Project (Program) office. The goal of creating a Project (Program) office is to create a balanced portfolio of projects, manage the company's project portfolio and provide project expertise. To ensure and implement the activities of the Project (Program) office, the following functions should be implemented (Fig. 3):

• Curator of the Project (Program) Office - the person responsible for the allocation of resources for project activities; As a rule, the head of the company;

• Head of the Project (Program) office - a person managing the activities of the Project (Program) office in the interests of the company;

• Administration of project activities - document management of the Project (Program) office and specific projects (project programs);

• Management of project competencies - methodological support for project management and a center for project expertise;

• Portfolio planning and analysis - forming a balanced portfolio of projects, assessing the feasibility of project implementation, analysis of completed projects;

• Resource management - planning, distribution, monitoring, control and analysis of the use of resources of ongoing and potential projects (project programs), including financial (Bril, Kalinina, & Ilin, January).

The listed functions must be presented in the Project (Program) office. Depending on the volume of project activities in the company, the functions can be performed by individual specialists, combined in one position or departments can be formed for the implementation of functions within the Project (Program) office. Depending on the volume of projects of a certain direction, within the framework of the Project (Program) office, units can be created to manage projects of a certain type (for example, infrastructure projects, IT projects, regional projects, etc.).

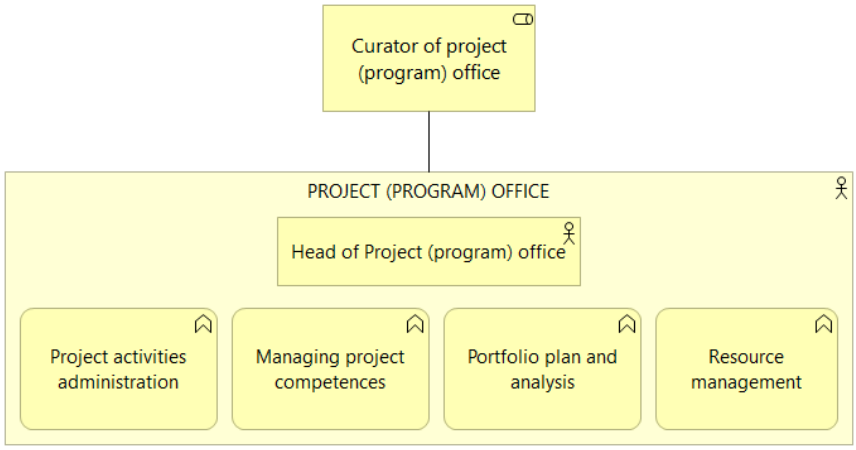

Figure 3 - Functional model of the Project (Program) office of the company

The team of executors of specific projects (including the Project Manager) is formed by the Project (Program) office from among the company employees (in agreement with their administrative leaders) or external specialists, depending on the competencies required for the project.

Project management (project programs) of urban infrastructure development in the field of resource supply Since infrastructure development and modernization projects implemented by the Organization are carried out, among other things, on the initiative and with the participation of the Government and the city's executive bodies (specialized committees), it is necessary to ensure the correlation of activities and the active interaction of the Project (Program) office of the company with the project units of the Government and authorities . Such interaction, in particular, is reflected in the management structure of individual projects (Fig. 1).

Conclusion

This article has developed 3 fundamental models of the project office for different levels of project management. A model for managing project departments as well as project programs was formed. With some adaptation, the proposed project management structure can be replicated to other resource supplying organizations of the considered geographical area in order to unify the activities of organizations of this type and facilitate communication of all interested parties to infrastructure projects. Further research in this direction may be associated with a more detailed study of individual tasks of project management - risk management, communications management, change management and others, as well as their industry adaptation.

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Improvement of The Process "Rendering the First Medical Aid" Based on The Use of The Hospital Information System Possibilities

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Abstract

Increasing competition in the medical services market necessitates improving the quality of services provided. The use of modern IT technologies and a process approach to management helps to increase the competitiveness of a medical organization through process automation. This study describes the results of improving the ambulance process through the use of the existing medical information system. To justify the effectiveness of the proposed "as it should be" model of the ambulance process, the simulation method and functional-cost analysis were used, which allowed us to assess the impact of the proposed changes on reducing the duration of ambulance waiting time.

Keywords: Business process reengineering, hospital information system, digital technologiesб increasing the effectiveness.

Introduction

Due to the constantly growing demands on quality, service, flexibility and low cost of medical services, improving the efficiency of enterprise management is very important for maintenance and growth of competitiveness of the organization. Process approach to business management according to which activity of the enterprise is considered as a set of processes can be used for these purposes [1–3]. Process approach is applicable to the enterprises of the medical industry as the medical organization can be considered as a production system because it provides according to the established rules the final product – medical services [4,5].

Using a process approach to medical management can lead to a sustainable increase in the efficiency of a medical organization, while the question remains which methodology to choose for improving the processes in a particular case [6–8].

Improvement of processes of the medical organization is inseparably linked with using of modern IT technologies [9]. For medicine, a comprehensive industry solution is the Hospital Information System (HIS). Hospital information systems are systems for the collection, processing, storage and transmission of information designed to automate the activities of medical institutions.

The main objective of introducing HIS in a medical organization is to automate the processes of core activity by reducing the time that doctors spend on filling out paper based patient records [10,11].

The use of HIS provides great potential for medical organizations, subject to the full use of the available functions [12]. Otherwise, the effect of HIS implementation, as in the case with any other information systems, may not meet the expectations of the customer[13,14].

When reengineering business processes, an important issue is which method to use for assessing the effectiveness of the new TO-BE model of process system compared to AS-IS model [15,16]. At the same time, a significant part of research related to business process reengineering in medical organizations focuses only on a qualitative assessment of the business process reengineering results, which makes it difficult to assess the actual effectiveness of the research results obtained by quantitative indicators [17,18].

The purpose of this study is to describe the “Rendering the first medical aid” process reengineering in a medical organization with a preliminary assessment of the effectiveness of the proposed TO-BE model. When providing ambulance services, it is vital to reduce the time between a call and its service. Therefore, the main goal of reengineering in this case is to reduce the average duration of an instance of the “Rendering the first medical aid” process.

Business process reengineering is associated with risks, therefore, before introducing a TO-BE model, it is necessary to assess whether it will really be more effective than the previous one [19].

The main goal of reengineering the “Rendering the first medical aid” process is to reduce the average duration of process instances while maintaining the quality level of the service provided, therefore, to assess the effect of reengineering in this case, the main indicator is the average duration of the ambulance service [20].

Methods

To improve the quality of the ambulance services, the process approach to the management of the medical organization was applied.

Researchers identify five main methods for achieving the goals of improving the business processes of organizations, listed below.

1. The technique of rapid decision analysis. When using this methodology, attention is focused on a specific process during a one- or two-day meeting of the process improvement group to determine ways to improve this process over the next 90 days. The decision of the group may be approved or rejected by the management of the organization.
2. Benchmarking. The method is based on a comparative analysis of the organization's business processes with the reference processes of organizations performing the same or similar processes, but better functioning. The purpose of benchmarking is to determine the reasons for the better functioning of the business processes of "reference" organizations and to prevent undesirable discrepancies with them in the organization that conducts the study.
3. Redesigning the process. This method focuses and efforts on improving the existing process. Redesigning is usually applied to those processes that are successfully working at the moment, but require correction due to changing requirements and the needs of the client or consumer.
4. Process Engineering. This method of designing business processes of newly created organizations or business processes of new types of business in existing organizations, taking into account best practices, is determined by the principle of optimality in process management.
5. Reengineering process. It is aimed at a radical change in the organization's internal business processes to achieve significant improvements in key performance indicators such as costs, quality, level of service and efficiency. It is used as a process management method in large companies, the main purpose of which is dynamic development based on the description of business processes [15].

To improve the process of "Rendering the first medical aid" is the most suitable method of reengineering. The main steps of company reengineering include:

- Choosing the strategic priorities of the company to formulate the goals of business reengineering and define the most important business processes of the company.
- Creating AS-IS model of company's business processes before the start of the changes.
- Analysis of AS-IS model and identification of bottlenecks in the company
- Development of a new structure of the company's business processes taking into account identified bottlenecks.
- The economic rationale for the transition to a new model of business processes.
- Development of supporting information systems. In this case, the required resources should be determined and, if necessary, a specialized information system is implemented.
- The transition of the company to new business processes, that is, the introduction of a new management system in practice [21, 22].

The strategic priority for the medical organization is to improve the quality of services provided. One of the most important indicators of the quality of a medical service is its timely delivery. Thus, the main goal of the "Rendering the first medical aid" process reengineering is to reduce the average duration of process instances while maintaining the quality level of the service.

To create a model of the "Rendering the first medical aid" process, it was decided to use the Cross-Functional Flowchart notation, since in this process it is important to display the process executors in order to visually assess their workload.

For the economic evaluation of the existing process, simulation modeling and functional-cost analysis of the AS-IS model was conducted.

To carry out the functional-cost analysis in the AS-IS model of the "Rendering the first medical aid" process, the following data was received from a medical organization: call frequency, time to complete each operation, and headcount. The simulation period was set to one week.

For the economic justification of process reengineering, simulation modeling and functional-cost analysis of TO-BE model with the same input data were also used.

Results and Discussion

The “First Aid” process consists of three stages: Reception of a call, Departure on a call, Execution of documentation.

The owner of the process is an Ambulance doctor.
Executors of the process are Paramedic on call reception, Ambulance paramedic, Ambulance doctor.

As a result of studying the “Reception of a call” stage, the following AS-IS model was constructed, shown in Figure 1.

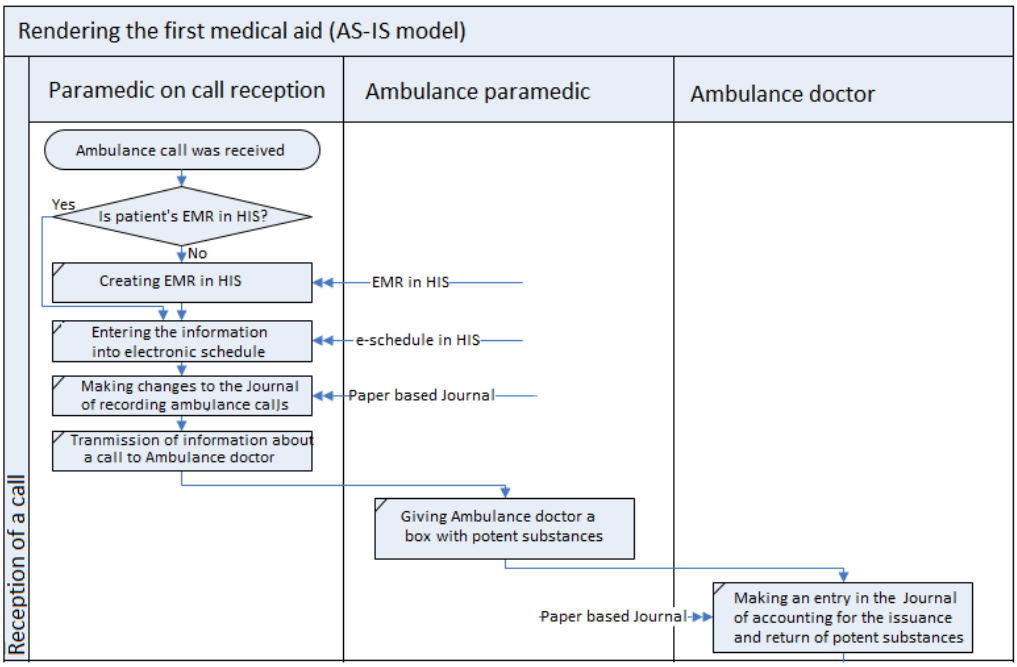

Figure 1 - Stage "Reception of a call " AS-IS

The Reception of a call phase begins with the receiving the patient call by Paramedic on call reception. Paramedic on call reception checks the patient for Electronic Medical Record (EMR) and starts it if there is no patient’s EMR in the HIS. Then the Paramedic on call reception enters the HIS information about the call into the electronic schedule and in the paper based Journal of recording ambulance calls, and also transmits information about the call to Ambulance doctor. Ambulance paramedic gives Ambulance doctor a stack with potent substances. An Ambulance doctor makes an entry in the paper based Journal of accounting for the issuance and return of potent substances.

The stage "Departure on a Call" following the stage "Reception of a Call" is presented on figure 2.

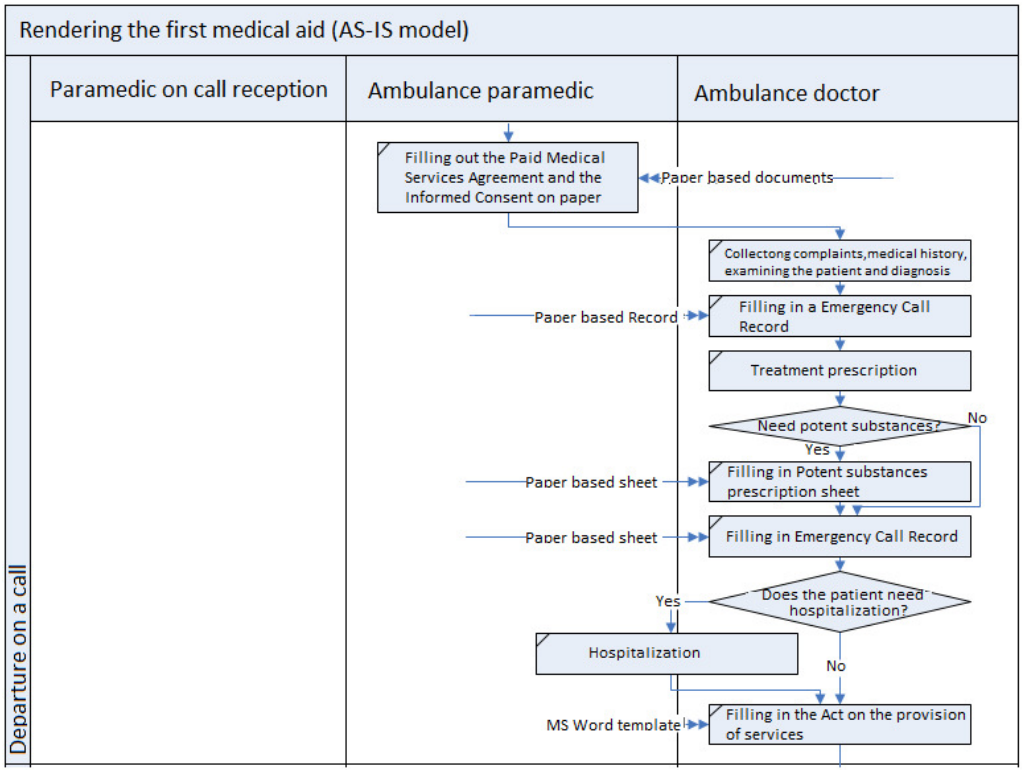

Figure 2 – Stage "Departure on a call" AS-IS

At the “Departure on call” stage, upon arrival at the address, the Ambulance paramedic fills out the Paid Medical Services Agreement and the Informed Consent on paper. Ambulance doctor collects complaints and medical history, examines the patient and makes a diagnosis. Next, he fills in a paper based Emergency Call Record and prescribes treatment. If it is necessary to prescribe potent substances, the ambulance doctor prescribes potent substances and fills in the Potent substances prescription sheet. The doctor enters the information about prescribed treatment on the paper based Emergency Call Record. Further, the Ambulance doctor decides whether hospitalization is necessary and, together with the Ambulance paramedic, performs the hospitalization of the patient. Next, the Doctor fills in the Act on the provision of services.

The “Execution of documentation” stage of the process is presented in Figure 3.

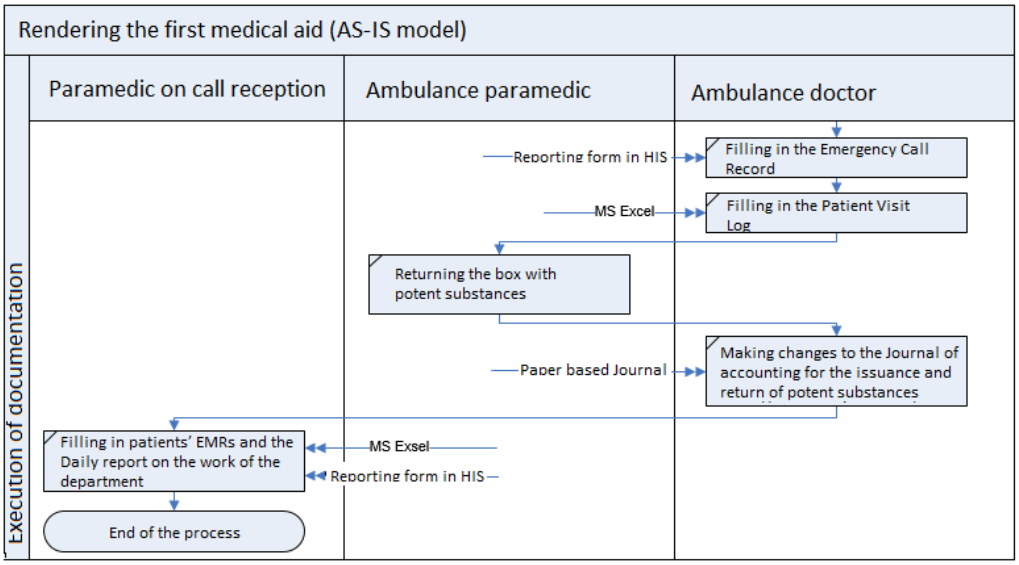

Figure 3 – Stage "Execution of Documentation" AS-IS

At the "Documentation" stage, upon arrival at the medical organization, Ambulance Doctor enters the data in the computer based Emergency Call Record and fills in the Patient Visit Log. Ambulance paramedic returns stack with potent substances, Ambulance doctor makes changes to the Journal of accounting for the issuance and return of potent substances. The Paramedic on receiving calls fills in patients' EMRs and the Daily report on the work of the department.

According to the results of the functional-cost analysis of the existing AS-IS model, it turned out that the average duration of one process instance is 2 hours (Figure 4).

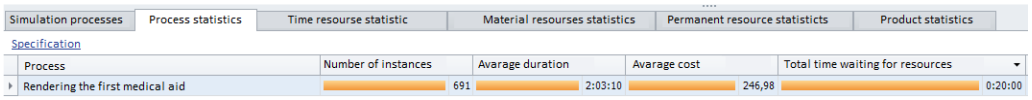

Process	Number of instances	Avarage duration	Avarage cost	Total time waiting for resources
Rendering the first medical aid	691	2:03:10	246,98	0:20:00

Figure 4 – Statistics on processes of the AS-IS model

Apparently from statistics on subprocesses, the existing model has subprocesses that cannot start on time, because they are waiting for resources, that is, employees do not manage to carry out tasks right after their receipt.

During the analysis of process "Rendering the first medical aid" the following problems connected with the underutilization of HIS are revealed:

1. Interaction of staff of the medical organization happens without the use of HIS that conducts to excess time expenditure;
2. Part of documentation is not maintained in HIS that leads to duplication of information.

Consider these problems in more detail and provide possible solutions.

The problem of reducing the time between receiving a call and receiving information about it by an ambulance doctor is especially relevant in this business process, since it can be vital for patients to get an ambulance as soon as possible. At the "Reception of call" stage, the Paramedic on call reception first enters information about receiving a call into the Electronic schedule, and then phones Ambulance doctor.

To reduce time between receipt of a patient call and the arrival, a solution is proposed to use the SMS notification function and the comment schedule that is already available in HIS but not used.

This will allow the Paramedic on call reception to enter the information received from the patient immediately into the electronic schedule. Then the Paramedic will not need to additionally transmit information to the Ambulance Doctor, as he will receive it immediately after Paramedic on call reception makes changes to the electronic schedule.

The next problem is that in addition to HIS, MS Word and MS Excel, as well as paper media, are also used for documenting in the medical organization. This leads to the fact that employees enter the same information in different reporting forms, that is, the medical organization irrationally uses the working time of employees.

For example, the Ambulance doctor fills out the paper based Emergency Call Record at the stage "Departure on a Call", and at the stage "Execution of Documentation" enters this information in MIS.

For the solution of this problem, it is offered to use a possibility of HIS to add and adjust the reporting forms. Transfer of documentation in HIS will allow to implement automatic filling of the documents created on the basis of other documents. It will significantly reduce the personnel time spent for maintaining documentation.

So, when transferring documents to MIS for most of the documents that are currently being maintained in MS Excel, MS Word or on paper, it will be possible to configure the automatic filling of fields from other documents that are also filled in this process.

Table 1 lists the documents filled in by the medical organization's employees in the "Rendering the first medical aid" process, indicating the original format of the document and the source documents for automatic completion.

Table 1. Documents used in the process

Name of the document	Document format	Source document for automatic completion.
Paid medical services agreement	Paper based	-
Informed consent	Paper based	-
Electronic schedule	HIS	-
Journal of recording ambulance calls	Paper based	Electronic schedule, Electronic medical record
Potent substances prescription sheet	Paper based	-
Journal of accounting for the issuance and return of potent substances	Paper based	Potent substances prescription sheet
Emergency call record	Paper based, HIS	Potent substances prescription sheet
Electronic medical record (EMR)	HIS	Emergency call record, Potent substances prescription sheet
Act on the provision of services	MS Word template	Emergency call record
Patient visit log	MS Excel table	Emergency call record
Daily report on the work of the department	MS Excel table	Patient visit log

Taking into account all offered changes TO-BE model of "Rendering the first medical aid" process is developed.

The chart of the stage "Reception of a Call" is presented to the TO-BE model on figure 5.

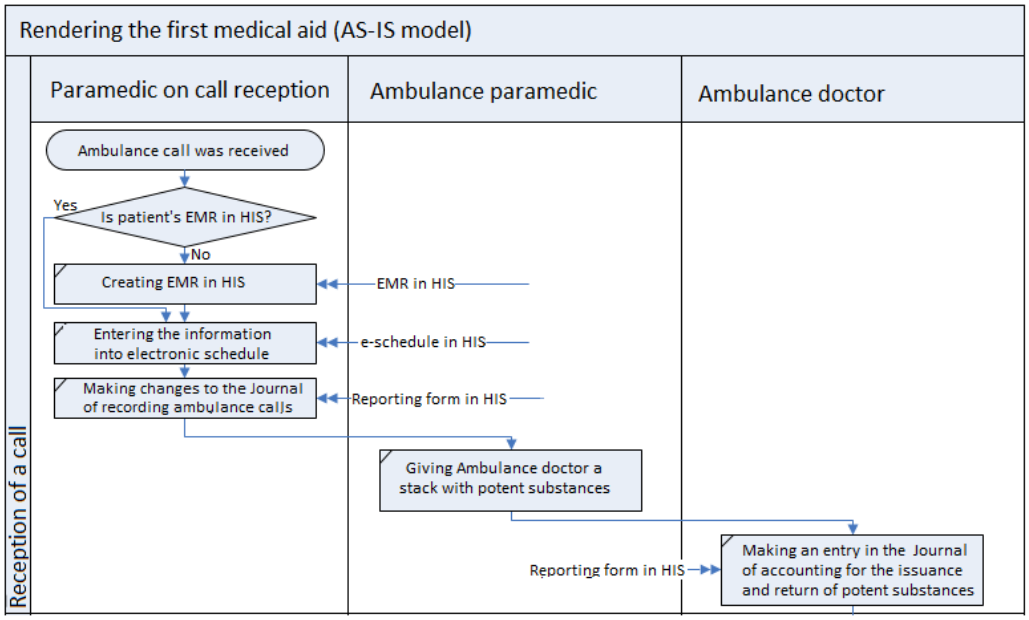

Figure 5 – Stage "Reception of a Call" TO-BE

The stage "Reception of a Call" begins with the receiving the patient call by Paramedic on call reception. Paramedic on call reception checks the patient for EMR and starts it if there is no patient's EMR in the HIS. Further the Paramedic call reception enters the HIS information about the call into the electronic schedule. The information from the electronic schedule is automatically entered in the Journal of recording ambulance calls. Paramedic on call reception checks and complements the Journal of recording ambulance calls with missing information. The Ambulance paramedic reports to Ambulance doctor stack with potent substances. . An Ambulance doctor makes an entry in the computer based Journal of accounting for the issuance and return of potent substances.

Differences from the AS-IS model: the operation "Transmission of information about the call to Ambulance doctor" is excluded from the model as in the offered TO-BE model Ambulance doctor obtains the information on the call through the notification in HIS right after the Paramedic puts it in the electronic schedule. All documents are stored and available for changing in HIS.

The chart of the stage "Departure on a Call" of TO-BE model is presented on figure 6.

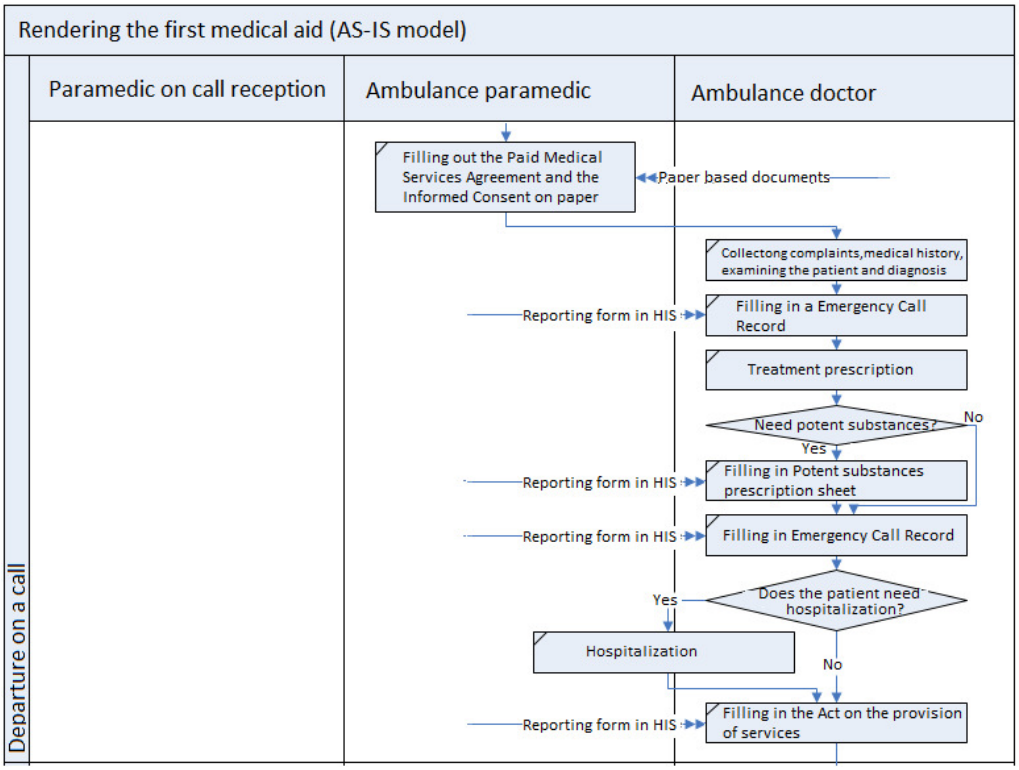

Figure 6 – the stage "Departure on a Call" TO-BE

At the stage "Departure on a Call" on arrival to the address Ambulance paramedic fills in the Paid Medical Services Agreement and the Informed consent on papers. Ambulance doctor makes collecting complaints and the anamnesis, survey of the patient and installation of the diagnosis. Further Ambulance doctor fills out the Emergency call record in HIS and appoints treatment. In need of prescribing of potent substances the he appoints strong substances and fills the Journal of accounting for the issuance and return of potent substances in HIS. The doctor enters information on the appointed treatment in the Emergency call record. Further Ambulance doctor defines whether patient needs hospitalization and together with the Ambulance paramedic performs hospitalization of the patient. Then Ambulance doctor checks whether the Act on the provision of services that is implemented as a reporting form in HIS was correctly filled.

Differences from AS-IS model: all documents that were on paper and in MS Word format are now implemented as linked forms in HIS, that is, when they are created, data such as patient information, call address, etc. is automatically filled. In this regard, the duration of the operations “Filling in the Emergency Call Record”, “Filling in the potent substances prescription sheet” decreased.

The “Documentation” stage of the TO-BE model is shown in Figure 7.

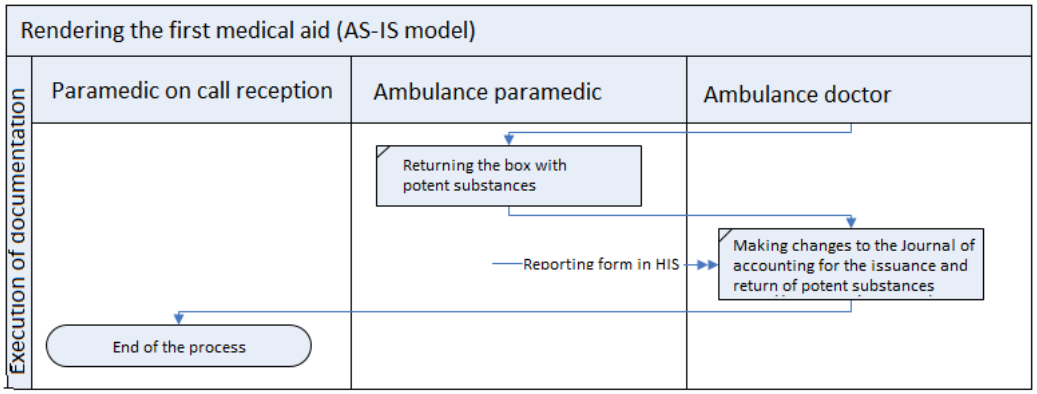

Figure 7 – Stage "Execution of documentation" TO-BE

At the “Execution of documentation” stage, upon arrival at the medical organization, the Ambulance paramedic returns the box with potent substances. Ambulance doctor makes changes to the Journal of the issuance and return of potent substances.

Differences from the AS-IS model: the Emergency call record in AS-IS model was first filled in on paper, then the data from there was transferred to HIS. Since in the proposed model at the “Departure on call” stage this document was filled immediately in HIS, the need for data duplication disappeared. The Patient visit log is implemented as a summary report in the HIS, that is, all data in this document is taken from other forms in HIS and is automatically filled out from the instances of the Emergency call record document.

According to the results of the functional-cost analysis of the existing TO-BE process, it turned out that the average duration of one process instance is 1 hour 40 minutes (Figure 8), subprocesses are not waiting for resources.

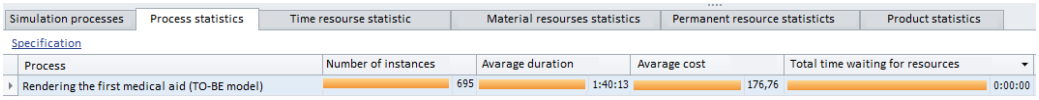

Figure 8 – Statistics on processes of TO-BE model

Thus, the average duration of the Ambulance Assistance process was reduced by 20 minutes, which led to the absence of subprocesses that were waiting for available resources.

Conclusions

1. AS-IS model of the “Rendering the first medical aid” process allowed us to identify optimization bottlenecks associated with the underutilization of the capabilities of the existing HIS.
2. The functional-cost analysis of AS-IS model showed that the existing model has subprocesses that cannot start on time because they are waiting for resources, that is, employees do not manage to carry out tasks right after their receipt.
3. TO-BE model of the “Rendering the first medical aid” process has been developed.
4. As a justification for the effectiveness of the proposed model, simulation modeling and functional-cost analysis were carried out. They showed that the problem of resource expectation was solved in TO-BE model, and the average duration of the process instance was reduced by 20 minutes.

Acknowledgement

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The Influence of Social media Tools on SMEs Performance: Case of United Arab Eremite

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Abstract

Social media is a phenomenon which has become an important aspect of the marketing mix and revolutionizes the way companies interact with their customers. It is a new field of research and literature quick scan revealed that not many studies exist on social media on SMEs in UAE. However, the few existing studies without scientific proof to SMEs in UAE data, have been rushing to conclude that the emergence of social media has led to the death benefits of social media for SMEs performance. Therefore, this research project is to clarify whether social media is more efficient in the perspective of SMEs performance in UAE. Quantitative methodology was employed in this research and 350 questionnaires were distributed to the target respondents, 263 questionnaires were received back from the respondents and 245 were used for the analysis in this research work. Smart-PLS were employed in data analysis and presentation in this research. The findings indicate that WhatsApp, email and twitter have positive effect SMEs performance while Facebook showed negative effect.

Keywords: Facebook, WhatsApp, Twitter, Email, SMEs' performance.

Introduction

Social media has developed different ways to communicate, collaborate and participate by involving users when creating information; this is making social media a daily part of our lives through the connection of people as stated by McCann and Barlow (2015). Scholars such as Tajudeen, Jaafar and Ainin (2017) have argued that the adoption of social media has helped companies understand the need of customers, therefore, social media has its advantages that contributions to positive impacts while organizations use technology. This phenomenon raised hot discussions and arguments on the influence of social media on SMEs by scholars and industries. Several studies recommend that SMEs should adopt social media tools to transform it to business growth (Culnan, McHugh, and Zubillaga, 2010; Kaplan and Haenlein, 2010).

Online social channels offer connectivity and transparency for SMEs to gain a competitive advantage. Among the 83% of marketers indicated that social media network is very important for their business (Michael, 2015). A report by Orient Planet Research (2016) found that social media channels such as Facebook, YouTube, WhatsApp and LinkedIn are increasingly being used by SMEs and have become major business enablers. The report also revealed that social media in UAE presents itself as an invaluable tool for SMEs due to the range of benefits that it has to offer and at a reasonable cost. Likewise, the report showed that SMEs represent 95 per cent of all local

establishments, accounting for 42 per cent of the workforce and contributing around 40 per cent to Dubai's economy (Orient Planet Research Report, 2016).

Moreover, Other scholars such as Tajudeen, Jaafar and Ainin (2017) have encouraged future research on how social media is used in different countries, the authors of this study decided to use UAE as their area of study since it has not been investigated on how advantageous social media can be to SMEs in UAE's setting, many scholars have conducted research in USA, New Zealand, Nairobi and other areas. Therefore, there is a need for this study since SMEs play a vital role in UAE's economic growth. Tajudeen, Jaafar and Ainin (2017) mentioned that it's important to know this view from other geographical backgrounds. Additionally, as we can see from above discussed articles, most of studies adopt common social media platforms, like Facebook, Twitter, but in this research, we used Facebook, Twitter, WhatsApp and Email, these tools have never been used by any researcher.

Today the penetration of social media network is huge in U.A.E. However, it is not being used for marketing purposes (The global information technology report WEF, 2016). Even though, the U.A.E is among the top countries in the world, with high percent smartphone penetration (78%) and more social media adoption even higher than the United States (Nielsen, 2014). This shows that UAE citizen does not make use full advantages of the social network especially with broad coverage more extensive penetration for the online user, persuade them to become online buyers.

It is evident that the presence of SMEs through social media network is facing big challenges due to several obstacles, whereby 2019, projections estimate that the Middle East “and Africa will have the world’s highest cloud traffic growth rate at 41% (Global Cloud Index forecast, 2016). Large corporations, as well as SMEs in UAE, often struggle to drive innovation from inside the company. Today, many companies have yet to tap into social media opportunities to innovate in business and expand (Muz and Puente, 2015). Hence, social media adaption by firms creates a great network among businesses, customers and suppliers. However, less attention has been paid to the social media marketing values for SMEs performance (Hajli, 2015; Wamba & Carter, 2016). Given that small and medium sized enterprises are economic engine of most of countries, previous studies mainly have focused on the adaption (Durkin, McGowan, & McKeown, 2013; Wamba & Carter, 2016) benefits and barriers (Michaelidou, Siamagka, & Christodoulides, 2011) of social media in SMEs context. SMEs in UAE do not fully make the best use of the potentials and opportunities offered by online marketing.

The application of mobile devices, and social media networks (SMNs) such as Facebook has revolutionised the e-commerce adoption process in SMEs. However, research into this area is still developing and there is a dearth of knowledge on how SMEs in UAE enact and apply this phenomenon. Nevertheless, how to use social media properly and make it useful still needs strategic planning for SMEs. Studies are lacking on how SMEs can implement social media to increase business growth. Culnan, McHugh, and Zubillaga (2010) illustrates on how large companies can obtain business value by identifying those aspects that affect and reward social media implementation, but there is not enough valuable study to show what those aspects are and how they contribute to implementation of social media on SMEs. As Jagongo and Kinyua (2013) states, SMEs can utilize social media to acquire an advantage but they are not properly exploited due to various limitations they are facing. Stockdale, Ahmed and Scheepers (2012) has also emphasized that there is lack of research in the benefits of adopting social media by Small and Medium Enterprises since most of them are known for their caution and views towards information technology.

There is a growing body of academic literature on the use of social media marketing among SME’s. However, most of the existing studies focus on larger enterprises that have a higher propensity for adopting new and innovative technologies. There have been modest studies on social media marketing in the context of SMEs explicitly (Ahmed et al. 2018). It is widely known that SMEs are often less likely to use emerging technologies due to their limited capabilities, lack of resources, absence of technical expertise, unstable organization structure, small number of employees and lack of capacity (e.g., Stockdale et al., 2012; Zeiller and Schauer, 2011; Kaplan and Haenlein, 2010). Additionally, Karjaluoto (2015) found out that SMEs look like not utilizing the social media and

online tools to maximum potential marketing, and therefore SMEs are not getting any benefits offers by these tools. This result is matched with a study conducted by AlaaEldeen, (2016) in U.A.E. They found that SMEs' average sales from online marketing are 32.2% and it is "somewhat very low" due to low attitude of customers to rely on social media ads of SME, he found a positive correlation between sales of SMEs and the efficiency of social media marketing.

Literature Review

Kaplan and Haenlein (2010) describe social media as "a group of Internet based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user-generated content." Web 2.0 technologies on the Social Web permit two-way conversations with consumers enabling brands to listen to consumers and respond (Fournier & Avery, 2011). On the other hand, social media can be described as series of internet-based applications that allow for the collaborative sharing of ideas, experiences and opinions through user generated content (Freeman & Avery, 2011, Ahlqvist, Halonen and Heinonen, 2008).

According to Evans (2008), Social Media relates to a self-generated, authentic conversation between people about a particular subject of mutual interest, built on the thoughts and experiences of the participants. Therefore, Social Media is definitely all about sharing and aiming at a collective vision, often intending to offer a more-appropriated or informed choice at the end. Furthermore, Social Media changes over time as it allows people to generate the content in a participative way whenever they want to add any additional piece of information. Social Media are also evolving constantly as they are part of internet high technologies, which are modified regularly with additional or replacing features (Evans, 2008).

Social Media covers a wide variety of "online and mobile, word-of-mouth forums including social networking websites, blogs, company sponsored discussion boards and chat rooms, consumer-to-consumer email, consumer product or service ratings websites and Celine ARCA Master of International Marketing forums, Internet discussion boards and forums, and sites containing digital audio, images, movies, or photographs, to name a few" (Hollensen, 2011). Social Networks, or Social Media Sites, which are the main actors in the Social Media medium, can be defined as online communities of people who typically share a common interest or activity, providing a variety of ways for users to interact and having the ability to facilitate communication.

Social Media is growing every day. Even if 90% of the 18-24 internet users use social network via any device at least once per month, social media affects every age group with much higher increase rates for the age groups over 35 (Karimi & Naghibi, 2015). Also, when looking at the average hours per week spent on online activities, we can definitely see that the world is becoming more social, with an average of 4.6 hours per week spend on Social Media Sites worldwide. Consumers and organizations alike are increasingly using the web to discuss, share, and collaborate (Jones, 2010). Social media offers an abundance of services on the Internet. This makes it complicated for companies to know which ones to use and how to use them. The types of social media include: social networks (Facebook, Myspace, and LinkedIn), micro- blogs (Twitter, Plurk, and Friend Feed), reviews and ratings (Yelp, Amazon, and Trip Advisor), video (YouTube and Vimeo), and more. Social media is very popular. Facebook has more than 800 million active users with over 50% of active users logging on every day (Facebook, 2011). According to Twitter"s CEO Dick Costolo, Twitter has 200 million registered users with 50 million active users logging in every day. The micro-blogging service hosts roughly 230 million tweets every day (Taylor, 2011). It comes as no surprise that businesses want to embrace the opportunities these services provide. Social media enables firms to engage consumers in a timely and direct manner at relatively low cost and higher levels of efficiency than with more traditional communication tools. This makes social media not only appropriate for large organizations, but for small and medium size companies as well (Kaplan & Haenlein, 2010).

SMEs' Performance

SMEs' performance can be understood from a quantitative perspective: efficiency, financial results, level of production, number of customers (Anggadwita & Mustafid, 2014), market share, profitability, productivity, dynamics of revenues, costs and liquidity (Gupta & Batra, 2016; Zimon, 2018), etc. and also from a qualitative perspective: goals achievement, leadership style, employee behaviour (Anggadwita & Mustafid, 2014), customer satisfaction (Alpkan, Yilmaz, & Kaya, 2007), product and process innovation, organisational and marketing innovation (Sheehan, 2013), etc. Gopang, Nebhwani, Khatri, and Marri (2017), in their work, considered a series of 14 indicators to describe SMEs performance: reputation, productivity, employee satisfaction, profits, sales, prompt order delivery, sufficient working capital, effectiveness in operations of production, product quality, achievement of targets, number of clients, easiness in supervision, reduction in product cost and product diversification.

Email

In the recent past, e-mail marketing quickly became the preferred method of contact for businesses looking to cut expenses, connect with buyers and increase profits. However, as the dynamic world of marketing has progressed, analysts are having encountered some disadvantages to e-mail marketing that have made other alternatives like direct marketing campaigns or text campaigns look more appealing (Hawi, & Samaha, 2017). Recent research shows that for every dollar invested in E-mail marketing, you can expect that according to the Direct Marketing Association, E-mail marketing in 2009, acquired for $ 43.52. So, E-mail Marketing has the highest return on investment than other marketing methods (Allcott, Gentzkow, & Yu, 2019). Email marketing messages can be customized for different customers and provide contents and promotions that are consistent with their profile. Customers acquire what they want and thus they obtain better view about what each section of current business will respond (Davis, 2018).

Facebook

Facebook was launched in 2004 and holds the most promise for retailers, in offering varieties of way to reach and attract new shoppers (Chugh, & Ruhi, 2018). As of 2011, this social networking site was reported to have 750 million active users and, as at second quarter of 2015, had 1.45 billion active users (Galati, Crescimanno, Tinervia, & Fagnani, 2017). It is ranked as the most used social network worldwide. Also, on a daily basis traffic to the network is on the rise (Bellucci, & Manetti, 2017). There is ability to create a Page which serves as an extension of their online shop that can be used to connect with customers, distribute content, promote products offers, services, and brands and attract online shoppers. Facebook can also be used to advertise products and provide a link to a blog post about the business or industry to online shoppers (Assimakopoulos, Antoniadis, Kayas, & Dvizac, 2017).

Twitter

Twitter was launched in 2006, and it gained a lot of popularity because it offered new options, such as micro blogging, and it was also used by some celebrities (Sinnenberg, Buttenheim, Padrez, Mancheno, Ungar, & Merchant, 2017). It had about 200 million users as of 2011 and, as of the third quarter of 2015, the microblogging service averaged at 307 million monthly active users (Chawinga, 2017). Twitter is normally used to lodge complaints about a company's product or services, generate new traffic by promoting product offers, advice, suggestions and new content to a company's followers (Enli, 2017). Twitter can be used to post multiple updates about company products and services, but its real power is its ability to break down the traditional barriers between the company and its customers, by providing insight into customer opinion and allowing the company to respond proactively to customer issues (Duncombe, 2017).

WhatsApp

WhatsApp has introduced WhatsApp Business app for small, medium and large-scale enterprises of all industries. This app enables enterprises to stay in touch with customers and expand their market base by effectively using the app and promoting the business irrespective of where the users reside (Dar, Ahmad, Ramzan, Khan, Ramzan, Ahmed, & Kamal, 2017). Enterprises can use WhatsApp Marketing Tool to promote their business, interact with users by sending and receiving text and media files using the rich interface by requesting early access to the platform (Stone, & Logan, 2018). This can be done by contacting the companies which provide the API integration with WhatsApp and offer their technical support to enterprises in managing the platform (Khatun, & Al-Dhlan, 2017).

Hypothesis of the study

Therefore, four hypotheses are developed;

H1: Facebook positively affects SMEs performance.

H2: WhatsApp positively affects SMEs performance.

H3: Twitter positively affects SMEs performance.

H4: Email positively affects SMEs performance.

Methodology

Methodology of a study is a strategy, plan of action, process or design for the choice and use of a particular method in order to achieve the mandated or stipulated objectives for the desired outcomes of the whole study (Gray, 2004). The study used quantitative method to achieve the objective of the study. Benz (2011) stated that the uses of quantitative approach provide a concrete manifestation of the findings on an actual setting. Thus, in this study items were selected from previously developed instruments and customized in accordance with the context of the present study. For the social media construct, this study adapted and customized items from the scale developed by Becherer, Helms, & McDonald (2012); Hoque et al (2019); Hoque & Awang (2019). Whereas, from the work of Santos & Brito (2012) this study adapted performance for measuring SME performance construct.

The questionnaire was distributed to the population of this study which included the CEOs, Managers and Supervisors. Thus, the population size is 3,623 service SMEs in Abu Dhabi, sample were generated purposefully, and the sample size was 350. Therefore, 35 questionnaires were distributed to 10 selected service-oriented SMEs in Abu Dhabi, the total number of questionnaires distributed was 350 and the number of questionnaires received from the respondents was 263, and the number of questionnaires used for analysis was 245. Thus, quantitative research based on the statistics was used to evaluate the influence of social media tools on the performance of SMEs in UAE. Structural equation modelling (PLS-SEM) software was employed to analyse the data collected from the respondents.

Results

Hair, et al (2014) defined convergent validity as the extent to which the indicators of a latent construct correlate. Hair, et al. (2011) recommended the use of indicator loading and AVE as criteria for judging convergent validity.

Table 1: Construct validity

Constructs	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Email	0.935	0.948	0.754
Facebook	0.837	0.877	0.593
SMEs' Performance	0.786	0.853	0.593
Twitter	0.918	0.935	0.743
WhatsApp	0.925	0.937	0.748

Table 1 shows the outer loading of the indicators, AVE and composite reliability of the measurement model. All the parameters meet the recommended thresholds for model's convergent validity. Specifically, the outer loadings range from .786 to .935 and they are all statistically significant. Similarly, the AVEs reported values within the acceptable threshold of .50. The composite reliability values also reported values within acceptable benchmark of .70. The CR values range from low of .853 to a high of .948; this indicate that construct validity is achieved.

Discriminant Validity

Discriminant validity is assessed using the Hetrotrait-Monotrait (HTMT) criterion. Henseler, et al. (2015) recommended it as the most conservative measure of discriminant validity. The criterion is to compare the calculated result with a value of .85 and .90 in such a way that any value in the table above the recommended threshold implies that discriminant validity is not achieved. Table 4.10 show the result of the HTMT test. The discriminant validity a result using Fornell and Larker criterion is presents in Table 2. The results shows that all pairwise combinations of all the latent constructs, the correlations are less than the square roots of their respective average variance extracted (AVE); therefore, the Discriminant validity is established.

Table 2: Discriminant validity using Fornell and Larker criterion

Constructs	Email	Facebook	Performance	Twitter	WhatsApp
Email	0.869				
Facebook	0.709	0.770			
SMEs' Performance	-0.093	-0.094	0.770		
Twitter	0.870	0.751	-0.083	0.862	
WhatsApp	0.775	0.783	-0.123	0.885	0.865

Furthermore, the Heterotrait Monotrait ratio criterion was also used to establish discriminant validity. Table 4.9 shows the HTMT ratios for the constructs. The highest HTMT ratio was between inspirational motivation and job performance with a value of 0.898. Discriminant validity is established since all the ratios were below the threshold values of $HTMT_{.90}$ as indicated by Kline (2015) and (Gold, Malhotra, & Segars, 2001) respectively.

Table 3: Heterotrait-Monotrait Ratio (HTMT)

Constructs	Email	Facebook	Performance	Twitter	WhatsApp
Email					
Facebook	0.837				
SMEs' Performance	0.102	0.116			
Twitter	0.946	0.887	0.097		
WhatsApp	0.853	0.927	0.111	0.760	

Also, Table 4.10 shows the results of HTMT inference. The lower and upper confidence intervals do not contain a value of 1 in any of the constructs, thus indicating that discriminant validity is established.

Table 4: Outer loading

	Email	Facebook	SMEs' Performance	Twitter	WhatsApp
em1	**0.797**	0.649	-0.048	0.770	0.654
em2	**0.849**	0.691	-0.103	0.833	0.735
em3	**0.894**	0.668	-0.064	0.764	0.735
em4	**0.903**	0.596	-0.069	0.719	0.641
em5	**0.854**	0.524	-0.088	0.706	0.632
em6	**0.909**	0.584	-0.086	0.739	0.639
fb1	0.621	**0.764**	-0.070	0.712	0.725
fb2	0.560	**0.547**	-0.017	0.644	0.604
fb3	0.572	**0.793**	-0.033	0.578	0.588
fb4	0.594	**0.875**	-0.098	0.625	0.659
fb5	0.515	**0.830**	-0.085	0.506	0.552
pro1	-0.117	-0.132	**0.828**	-0.095	-0.126
pro2	-0.049	-0.043	**0.710**	-0.034	-0.049
pro4	0.015	0.017	**0.784**	0.043	-0.001
pro5	-0.066	-0.056	**0.753**	-0.090	-0.123
tw1	0.789	0.672	-0.055	**0.874**	0.797
tw2	0.792	0.708	-0.078	**0.923**	0.857
tw3	0.706	0.691	-0.084	**0.873**	0.769
tw4	0.790	0.590	-0.079	**0.863**	0.722
tw5	0.724	0.547	-0.014	**0.772**	0.619
wa1	0.725	0.729	-0.049	0.771	**0.821**
wa2	0.659	0.702	-0.037	0.732	**0.779**
wa3	0.663	0.694	-0.164	0.792	**0.939**
wa4	0.750	0.726	-0.110	0.823	**0.933**
wa5	0.680	0.653	-0.048	0.804	**0.842**

Table 2 shows that all indicator loadings loaded highly on their own respective constructs (as indicated by bold text) compared to other constructs, indicating that there was no issue of high cross-loading between other constructs, therefore, discriminant validity is established.

Path Coefficient

The strength of each path leading to endogenous construct from the exogenous constructs is assessed using the path's coefficient. The paths represent the hypothesised relationships. The path coefficients range from -1 to +1 with values closer to 1 showing stronger relationship while values closer to 0 show weak relationships. The + values indicate positive relationships while –values shows negative relationships between models (Hair *et al.,* 2014). The significance of the path model is assessed using t-statistics through resampling procedures called bootstrapping (Wong, 2016).

Table 5: Path coefficients

Path	Std β	Std Error	*t* Statistic	*p-v*alue
Email -> SME's Performance	0.232	0.020	11.513	0.000
Facebook -> SME's Performance	-0.020	0.318	1.248	0.751
Twitter -> SME's Performance	0.232	0.029	7.934	0.000
WhatsApp -> SME's Performance	0.110	0.036	3.030	0.001

Table 5 shows that email; twitter and WhatsApp had a strong positive effect on the SMEs performance. As the t-values exceeding the t-critical value of 1.96 and p-values value less than 0.05. However, Facebook has negative effect on SMEs performance even though the effect is not statistically significant.

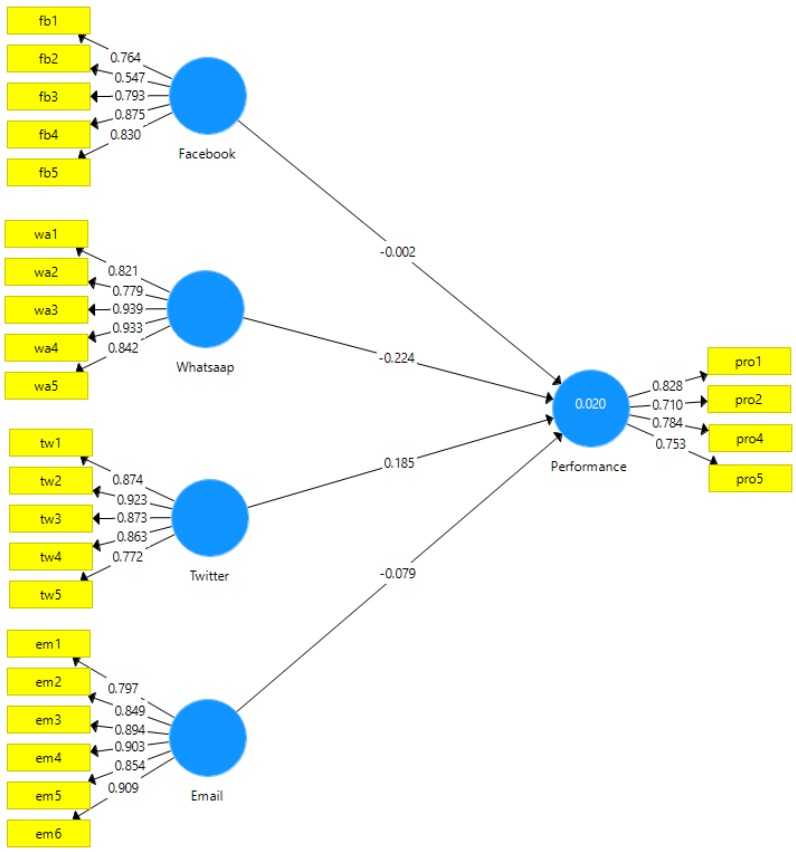

Figure 1: Measurement model of the study

Discussion

The findings of this research work show that email has a positive effect on the performance of SMEs in UAE with the path coefficient of 0.017. The findings of this research were buttressed by the research of Sousa and Bradley, (2009) in their work on the effects of export assistance and distributor

support on the performance of SMEs: The case of Portuguese export ventures. Likewise, this research found out that twitter has a positive effect on the SMEs performance with the path coefficient of 0.026, this was in line with the work of Scuotto, Del Giudice, and Carayannis, (2017) in which they investigate the effect of social networking sites and absorptive capacity on SMEs' innovation performance and the work of Ahmad, Bakar, and Ahmad, (2019) in which they conducted a research on social media adoption and its impact on firm performance: the case of the UAE. Also, WhatsApp has a positive effect on the performance of SMEs in UAE with the path coefficient of 0.193, this is in support of the work of Ebrahimi, Ahmadi, Gholampour, and Alipour, (2019) in their research on CRM performance and development of media entrepreneurship in digital, social media and mobile commerce. However, the findings of this research revealed that Facebook has a negative effect of the SMEs performance in UAE with the -0.065-path coefficient. This finding supported the findings of Ainin, Parveen, Moghavvemi, Jaafar, and Shuib, (2015) in their research on the factors influencing the use of social media by SMEs and its performance outcomes, and the work of Öztamur and Karakadılar, (2014) in their research on the exploring the role of social media for SMEs: as a new marketing strategy tool for the firm performance perspective.

Conclusion

The successful implementation of social media tools in general depends on its impact on the SMEs performance in UAE. Based on the survey data using discrete choice models, the researcher has concluded that social media tools have a significant effect on SMEs performance in UAE. This study has addressed a significant gap in the literature pertaining to the social media tools and performance of SMEs in UAE. Hence, the research hypotheses were then tested in the survey conducted. The results of this study indicated that social media tools have a significant effect on the performance of SMEs in UAE.

Directions for Future Research

Although this thesis has developed a model that shows effective social media tools for SMEs performance in UAE, several potential areas for future research remains. Thus, a longitudinal study would be desirable in investigating the causal status of the study variables observed in this research. This may be essential when designed with a panel study, to study the same set of samples over a period of time. This may give the opportunity to monitor the SMEs performance over time where behavioural patterns could easily be observed.

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Business Models of High-Growth Enterprises in the St. Gallen Business Model Navigator Conception

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Abstract

The study covers the theoretical-empirical research on the structure of business models of high-growth enterprises. The essence of functioning of those enterprises in the context of the role they play in the economic structure has been indicated. Then, the fundamental definitions of business models and basic approaches to the architecture thereof have been described. The ideas of the business models' structure were considered through the prism of the St. Gallen Business Model Navigator conception. The empirical analysis of the construction of business models of high-growth enterprises has been conducted on the grounds of the survey research piloted on a group of 150 Polish high-growth enterprises. On the basis of the research results, basic attributes of the components of business models distinguished on the grounds of the St. Gallen Business Model Navigator conception have been identified. The analysis results have proven that the studied high-growth enterprises entities are characterised with similar features of business models' elements.

Highlights

- The essence of functioning of high-growth enterprises (HGEs)
- Business model conceptions
- Basic types of business model's elements
- Construction of the St. Gallen Business Model Navigator
- Empirical analysis of the construction of business models of high-growth enterprises based on the Business Model Navigator conception

Introduction

The issue of business models is one of the leading aspects concerning contemporary business entities. Interest in this topic is manifested both in management theory and practice. Recently a lot of scientific publications, as well as scientific conferences and meetings have been devoted to this issue. Furthermore, business models constitute a crucial subject of considerations of the management, as well as management and supervisory bodies of enterprises. This focus on the essence and functioning of business models is related to the role assigned thereto. A model is a simplified reflection of reality. Therefore, it should roughly describe a certain aspect of this reality. In the case of enterprises, it is the aspect of business reality. Thus, business models contribute to the establishment of a schedule of conducting business activities. In consequence, they facilitate learning about the conception of conducted activity and, at the same time, illustrate methods of achieving set business objectives. Therefore, both from a theoretical and practical point of view, it is an interesting issue, an in-depth analysis of which provides knowledge on the logics of the conducted business.

Nevertheless, despite the quickly disseminated theoretical and practical considerations on business models, insufficiently studied research areas can be still indicated. One of such cognitive loopholes is business models of high-growth enterprises (HGEs). The essence of this issue to a great extent results from the significance of this type of enterprises for economic development. In the subject literature, it is indicated that high-growth enterprises are an important factor for well-prospering economy (Pereira, Temouri, 2018). Quoted authors referring to the international research indicate that both during a recession and economic boom, a small part of all enterprises, which can be classified as HGEs, play a disproportionately large role in the economy.

According to the OECD (Eurostat OECD, 2007): "All enterprises with average annualised growth greater than 20% per annum, over a three-year period should be considered as high-growth enterprises. Growth can be measured by the number of employees or by turnover." Therefore, a natural consequence of HGEs' functioning is creating new workplaces, as well as contributing to the increase in the competitiveness and innovativeness of economic entities. Thus, it should be assumed that the more of this type of enterprises in the economic structure, the more it is beneficial for the economic situation of a given country or region.

Due to their characteristics, high-growth enterprises for many years have become a subject of numerous scientific publications describing various aspects of functioning thereof. Among the issues discussed within the HGE-related topic, the following can be distinguished, in particular: human capital, strategy, innovation, Human Resources Management practices, capabilities, (Demiret et al. 2017; Senderovitz et al., 2016; Keen and Etemad, 2012; Ryzhkova 2015; Rindova et al. 2012; Coad et al. 2014; Ensley et al. 2007, Lee 2014, Muurlink et al. 2012, Lopez-Garcia and Puente 2012; Baum and Bird 2010). Considering the significance of the above issues for reliable cognition of drivers of high growth, it should be underlined that there are clear shortages in scientific publications concerning business models of high-growth enterprises. Therefore, this is an aspect which has not been studied in-depth and which is worth further scientific exploration.

A basic aim of the study is to discuss the architecture of business models of high-growth enterprises on the grounds of the Business Model Navigator conception. Achievement of the set aim imposes two significant requirements concerning the research procedure of the issue. In the first stream of research, it is necessary to provide a theoretical interpretation of the essence of a business model and its features, which will allow learning about conceptual assumptions of the construction of a business model and describing basic elements of architecture thereof. Whereas, the second stream will comprise conducting empirical research on the construction of business models of high-growth enterprises based on the Business Model Navigator conception. Furthermore, the research hypothesis assuming that high-growth enterprises are characterised with similar features of business models' elements, will be verified.

Literature Review

The business model, considered as the outline of business reality, is a multi-criteria issue which provokes dispute instantly at the stage of its conceptualisation. The subject literature includes extensive considerations referring to business models. The intensive development of scientific interest in the business models conception started in the 90s of the 20th century. At that time researchers started making numerous attempts to create a defined framework for the discussed concept. Precursors of scientific research on business models include Boulton Libert and Samek (1997), Timmers (1998), as well as Vankatraman and Henderson (1998). These researchers focused on their considerations primarily on discussing the essence of this issue. For example, Timmers (1998) indicated that a business model is an architecture of products, services and streams of information including a description of various business activities and roles thereof.

In the later research on business models, it was indicated that its basic idea is to combine key elements of the enterprise's activity. Such belief is presented in publications by Hamel (2000), Amit and Zott (2001), Mitchell and Coles (2003), as well as Chesbrough and Rosenbloom (2002). Hamel (2000) identifies business models as a multi-aspect conception comprising: relations with customers, compositions of key strategies, strategic resources and value networks. Amit and Zott (2001) assume that a business model presents the essence, structure and management of transactions in order to create value by using business opportunities. In the context of integrating basic aspects of the enterprise's activity, an interesting proposal of learning about the essence of business model was presented by Mitchell and Coles (2003), who stated that it covers combined descriptive elements: "who", "what", "when", "why", "where", "how" and "how long". These elements indicate factors participating in delivering products and services to customers and end- users. Whereas, Chesbrough and Rosenbloom (2002) saw in the business model the heuristic logic combining technical possibilities with the recovery of economic value. The opinion identifying the business model conception with the concept of prevailing logic was reflected in many scientific publications. Linder and Cantrell (2000) notice that it is the core logic of organisation on value creation. Whereas, Shafer, Smith and Linder (2005) believe that the business model is a representation of the core logic of the enterprise and its strategic choices used for creating and maintaining value.

In the subject literature it is underlined that in many definitions of a business model common parts characterising this issue can be identified (Wagner et al., 2015). One of the basic components of a definition of a business model comprises the value category. In this context, Wagner et al. (2005) notice that a business model should be understood as an abstract tool or manifestation of the real business world, which is targeted at creating value by the enterprises with a consideration of the role of stakeholders and external factors in those activities. It is quite a generalised approach. Researchers of the issue of business models (Teece, 2010; Osterwalder and Pigneur, 2010) differentiate the value category and divide it into three characteristic areas: value proposed to current and prospective customers, value created with the enterprise's resources and infrastructure, as well as value returning to the enterprise. The above considerations show that both, customers and the enterprise itself can be considered value beneficiaries.

It should be underlined that the development of the scientific discourse related to the essence of business models has been multi-aspect. The topic of a business model attracts various streams and approaches included in the management sciences. Authors of scientific works dealing with this issue have been considering in a broader understanding not only terminological issues but also attempted to conduct more in-depth analyses of this issue. For instance, studies on the possibility of introducing innovative solutions in a business model can be indicated. It is stressed that the use of these solutions has been to a large extent induced by the evolution of consumers' preferences, as well as changing the competitive environment (Saebi, Lien, Foss, 2017). Whereas, the newest streams include, among others, the research on business models of social enterprises (Joyce and Paquin, 2016). The essence of the issue considered in this case consists in reflecting in a business model not only the economic but also social and environmental platforms.

However, the architecture of business models remains one of the essential research areas thereof. Nonetheless, regarding this issue, the subject literature has not developed a uniform position yet. In the propositions presented by researchers, there are significant discrepancies regarding the specification of the business model structure. These discrepancies result from adopting different areas of business model optics and considering it through a generalised or detailed prism. However, among the vast collection of concepts of business model elements, ~~one~~ (researchers) can differentiate the ones that have received the highest recognition both in scientific works and practice. They include the Value-Based Business Model defined by three elements and developed by Richardson (2008), the Business Model Canvas outlined by ten elements and developed by Osterwalder and Pigneur (2010), the St. Gallen Business Model Navigator defined by four elements and proposed by Gassmann, Csik and Frankenberger (2013).

Taking into consideration the conception of the value-based business model, one can refer to the beliefs represented by Richardson (2008), who distinguished basic business model elements focused on: value proposition, value creation and delivery, as well as value capture. Osterwalder and Pigneur (2010) specified the following as fundamental elements of the Business Model Canvas: customers' segments, value proposition, channels, relations with customers, streams of revenues, key resources, key activities, key partners, and cost structure. Whereas, elements of the St. Gallen Business Model Navigator are based on four key questions: Who? (Who is your target customer?), What? (What do you offer to the customer?), How? (How is the value proposition created?) and Value? (How is revenue created?). While analysing the proposed conceptualisations of the business model structure, it should be underlined that despite terminology discrepancies regarding names of the elements and differing number thereof, there are certain clear logical correlations (Table 1).

Table 1: Correlations between elements of a business model according to the value-based conception, the Business Model Canvas and the St. Gallen Business Model Navigator

The conception of the value-based business model (Richardson, 2008)	Business Model Canvas (Osterwalder and Pigneur, 2010)	St. Gallen Business Model Navigator (Gassmann, Csik, Frankenberger, 2013)
value proposition	value proposition	What?
	customer segments	Who?
	customer relationship	
value creation and delivery	delivery channels	How?
	key partners	
	key resources	
	key activities	
value capture	revenue streams	Value?
	cost structure	

The value proposition usually concerns the offer of products and services of a given enterprise. Therefore, it is related to the answer to the question: *What the enterprise can offer to its customers?* Thus, a collection of products and services, which generate value for specific groups of customers, is specified (Richardson, 2008). Indication thereof is related not only to the specification of customers' needs and interests but also to developing systemic measures related to product delivery and exploitation. Whereas with the answer to the question: *Who is the target customer?* the enterprise indicates groups of people and organisations that it strives to reach and provide services to. In this case, the analysis or relations between the enterprise and representatives of a specific customers' segment is also crucial (Bocken et al. 2014; Davies, Chambers, 2018).

Value creation stipulates the manners and methods of creating value. The task of this business model is to answer the question: *How is the value created?* In this area is specified a combination of resources and capabilities at a disposal of the enterprise and necessary to generate value. Here, fundamental points of reference include partners, key resources and key measures that should be properly configured and mutually adjusted. Furthermore, after value creation, it is transferred via relevant channels of communication with customers and distribution channels (Amit and Zott, 2010). In the business model architecture, it is important to indicate the type of interaction of customers in order to transfer value to them.

Another characteristic area in a business model comprises value capture, which to a large extent is related to the specification of methods and manners of returning to the enterprise the value transferred to customers (Teece 2010). Thus, this business model element can be treated as feedback in value transfer between the customer and the enterprise. Therefore, it comes down to the answer to the question: *How profitable is a/the business model?* In the simplest understanding value transferred to customers returns to the enterprise in a form of sales revenues, yet, the profitability analysis should also include the structural assessment of the incurred costs. Thus, it should be indicated that during value capture both its inflow and outflow occur. It is reflected in the business model's effectiveness.

While referring to the correlations between business models' elements differentiated in compliance with the aforementioned conceptions, it can be stated that basically the architecture of these models differs with the degree of aggregating information included in particular elements. Thus, the basic difference between business model conceptions consists of a different perspective of the degree of specificity of considered elements. However, irrespectively of presented types of business models construction, integrally they are a reflection of identical issues and aspects.

Taking the above characteristics of the business model architecture into account as the basis of the assessment of elements of business models of high-growth enterprises, the St. Gallen Business Model Navigator's assumptions have been adopted in further empirical research. Their basic feature constitutes expressing the business model architecture by questions, which in their form are neither too aggregated, nor too detailed. The original idea of this model can be found in the publication by Mitchell and Coles (2003), who considered the essence of a business model by identification of key questions indicating the factors participating in the business activity. Margretta (2002) considered the business model concept in a similar understanding, as she indicated that a business model should answer the following questions: Who is the customer? What is the value for the customer? How do we make money in this business? What is the underlying economic logic that explains how we can deliver value to customers at an appropriate cost? Therefore, it can be stated that questions asked during the research process (in this case concerning the business model construction) have, due to their nature, a deeper cognitive dimension and serve for inquisitiveness and willingness to learn about a given aspect.

Methods

The empirical research on the structure of business models of high-growth enterprises was conducted on the basis of data obtained from the survey research piloted on a group of 150 HGEs in Poland. The researched entities included: 52 small-sized enterprises employing up to 50 employees, 61 medium-sized enterprises employing between 51 and 250 employees and 37 large enterprises employing over 250 employees. Age of the researched entities in the vast majority did not exceed 30 years. In 28 cases the activity started not earlier than 10 years ago, 84 enterprises have operated for between 11 and 20 years, and 35 entities – between 21 and 30 years. Whereas, 3 entities indicated over 30 years of market experience.

Entities were included in the group of high-growth enterprises according to the OECD nomenclature (Eurostat OECD, 2007), i.e. entities characterised with an increase in sales revenues or employment, on average, by at least 20% per year in the period of three years. In compliance with the above criteria, 141 enterprises indicating an increase in revenues (among which, 113 noted an increase only in revenues) and 37 of enterprises indicating an increase in employment (among which, 9 noted an increase only in employment) were identified. Whereas, 28 of studied entities declared both an increase in sales revenues and an increase in employment.

The assumptions of the business model construction proposed by Gassmann, Csik, Frankenberger (2013) were used for the formulation of survey questions. Four groups of questions corresponding to the St. Gallen Business Model Navigator were distinguished.

Within the element Who? (Who is your target customer?) the following were distinguished: targeting products at specific market industries (WHO1), having a key supplier of products and services (WHO2), having permanent/regular suppliers of products and services (WHO3), having a key customer/recipient (WHO4), having permanent/regular recipients of products and services (WHO5), factors in relations with the key supplier (WHO61 – timeliness of order execution, WHO62 – beneficial payment terms, WHO63 – quality of the product/service, WHO64 – availability of the product/service, WHO65 – quality of the order processing).

In the area of What? (What do you offer to the customer?) the following factors have been identified: activities performed for the customer (WHAT11 – counselling, WHAT12 – design of the product/service, WHAT13 – production of the product/performance of the service, WHAT14 – sales of the product/service, WHAT15 – implementation of the product/service, WHAT16 – training on the product/service, WHAT17 – product-related/service-related services), characteristics of main products/services (WHAT21 – constitute author's solution, WHAT22 – developed on the basis of a licence, WHAT23 – developed on the basis of a cooperation, WHAT24 – are performed according to the principal's plans/designs, WHAT25 – are related to the delivery logistics), features of the enterprise's activity (WHAT31 – systematic increase of the quantity of offered products/services, WHAT32 – offer of original products and services targeted at a specific group of customers, WHAT33 – entry into new industries and markets, WHAT34 – starting new types of activities, WHAT35 – cooperation with universities, research units).

For the business model element How? (How is the value proposition created?) the following have been indicated: resources obtained from key and/or permanent suppliers (HOW11 – knowledge and experience, HOW12 – raw materials, semi-products, components, goods, HOW13 – access to the infrastructure, real estate, HOW14 – licences, trademarks, copyrights, HOW15 – databases), resources relevant for producing key goods and services (HOW21 – technological resources, HOW22 – human resources (employees), HOW23 – other intangible resources (e.g. licences, databases), HOW24 – financial resources), groups of intangible resources (HOW31 – human capital, that is, employees' skills, employees' experience, employees' intellectual potential, employees' specialist knowledge, the management's managerial skills, HOW32 – organisational capital, that is, organisational structure, organisational culture, management methods, in-house relations, HOW33 – intellectual property, that is, patents, licences, trademarks, copyrights, contacts, databases, HOW34 – key competences, that is, know-how, knowledge, specialist knowledge, experience, abilities and capacities, HOW35 – relations that can take a form of formal or informal relations, relations with the environment, in-house relations, relations with customers or suppliers, HOW36 – employee's approaches and behaviours related to loyalty, availability, motivation and engagement in work, HOW37 – position resources, that is, trading brand, customers' loyalty, the company's goodwill and image, knowledge on the competition), forms of communication with customers generating economic benefits (HOW41 – website, HOW42 – social media, HOW43 – business meetings, conferences for customers, HOW44 – e-learning platforms for customers, HOW45 – traditional forms of advertising i.e.: radio, television, posters, leaflets, HOW46 – word-of-mouth marketing).

Whereas for the element Value? (How is revenue created?) the following were identified: diversification of revenues (VALUE1), depending on the origin of resources on the key customer (VALUE2), depending on the origin of resources on the key market industry (VALUE3), basic elements of the cost structure (VALUE41 – remunerations, VALUE42 – outsourcing, VALUE43 – costs of semi-products and raw materials), areas of savings in costs (VALUE51 – remunerations, VALUE52 – outsourcing, VALUE53 –

costs of semi-products and raw materials), stability of the financial result (VALUE61 – in the last 5 years, VALUE62 – in the last 3 years, VALUE63 – in the last year, VALUE64 – was not positive in the last 5 years).

Results and Discussion

The tables below include the characteristics of answers to survey questions referring to each element of the St. Gallen Business Model Navigator. The answers have been presented by categories: Who? – Who is your target customer? (Table 2), What? – What do you offer to the customer? (Table 3), How? – How is the value proposition created? (Table 4) and Value – How is revenue created? (Table 5). Data in particular tables presenting percentage amounts of given answers have been presented with reference to the total number of studied HGEs, enterprises indicating only an increase in revenues, enterprises indicating only an increase in employment and enterprises indicating both, an increase in revenues and employment.

Table 2: Characteristics of the business model element Who? – Who is your target customer? in high-growth enterprises

	high-growth enterprises			
	In total	**Indicating only an increase in revenues**	**Indicating only an increase in employment**	**Indicating an increase in revenues and employment**
WHO1	90,00%	90,27%	88,89%	89,29%
WHO2	48,00%	49,56%	55,56%	39,29%
WHO3	84,00%	86,73%	66,67%	78,57%
WHO4	78,00%	82,30%	44,44%	71,43%
WHO5	86,00%	89,38%	66,67%	78,57%
WHO61	24,67%	25,66%	22,22%	21,43%
WHO62	26,67%	25,66%	22,22%	32,14%
WHO63	21,33%	18,58%	44,44%	25,00%
WHO64	7,33%	6,19%	11,11%	10,71%
WHO65	4,00%	5,31%	0,00%	0,00%

Analysis of the data included in Table 2 allows indicating that 90% of high-growth enterprises target their products at specific market industries. All three distinguished subgroups of HGEs are characterised with high specialisation of production. Furthermore, it can be noticed that almost half of the studied entities have a key supplier of products and services. High-growth enterprises pay particular attention to stability in the supply chain. 84% of respondents have permanent and regular suppliers, and 78% of respondents have permanent and regular recipients. Whereas, at least ¼ of respondents included primarily the timeliness of orders' execution and beneficial payment terms as significant factors in relations with key suppliers.

Table 3: Characteristics of the business model element *What – What do you offer to the customer?* in high-growth enterprises

	high-growth enterprises			
	In total	**Indicating only an increase in revenues**	**Indicating only an increase in employment**	**Indicating an increase in revenues and employment**
WHAT11	40,00%	39,82%	33,33%	42,86%
WHAT12	56,00%	49,56%	88,89%	71,43%
WHAT13	98,67%	98,23%	100,00%	100,00%
WHAT14	94,67%	93,81%	100,00%	96,43%
WHAT15	51,33%	53,98%	55,56%	39,29%
WHAT16	26,00%	26,55%	22,22%	25,00%
WHAT17	54,67%	53,10%	77,78%	53,57%
WHAT21	63,33%	61,95%	77,78%	64,29%
WHAT22	22,67%	21,24%	44,44%	21,43%
WHAT23	62,67%	62,83%	66,67%	60,71%
WHAT24	60,00%	64,60%	44,44%	46,43%
WHAT25	23,33%	23,89%	11,11%	25,00%
WHAT31	83,33%	87,61%	55,56%	75,00%
WHAT32	56,67%	50,44%	100,00%	67,86%
WHAT33	60,67%	61,95%	22,22%	67,86%
WHAT34	25,33%	24,78%	0,00%	35,71%
WHAT35	28,00%	27,43%	22,22%	32,14%

Table 3 presents the characteristics of the business model element being the value proposition. The studied entities are primarily production-service enterprises. Such a declaration was made by over 90% of respondents. Nonetheless, the vast majority of them perform various activities included in the value chain. 56% of HGEs design products and services, over 51% of them implement products and services, and almost 55% of them provide follow-up services. While analysing the sources of offered products and services, three basic directions thereof can be indicated. Over 63% of respondents indicate that those are the author's solutions. 62.67% state that they were developed on the grounds of a cooperation, whereas 60% declare performance thereof on the grounds of the principal's plans and designs. While characterising the activity of HGEs, over 80% of respondents stated that they were systematically increasing the number of offered products and services. Furthermore, 60.67% of respondents indicate the expansion of new industries and markets.

Table 4: Characteristics of the business model element *How – How is the value proposition created?* in high-growth enterprises

	high-growth enterprises			
	In total	**Indicating only an increase in revenues**	**Indicating only an increase in employment**	**Indicating an increase in revenues and employment**
HOW11	70,00%	73,45%	55,56%	60,71%
HOW12	99,33%	100,00%	100,00%	96,43%
HOW13	10,00%	8,85%	22,22%	10,71%
HOW14	16,67%	14,16%	55,56%	14,29%
HOW15	11,33%	10,62%	11,11%	14,29%
HOW21	13,33%	13,27%	11,11%	14,29%
HOW22	8,67%	8,85%	11,11%	7,14%
HOW23	2,00%	2,65%	0,00%	0,00%
HOW24	0,00%	0,00%	0,00%	0,00%
HOW31	32,67%	33,63%	33,33%	28,57%
HOW32	22,00%	20,35%	44,44%	21,43%
HOW33	10,00%	9,73%	0,00%	14,29%
HOW34	3,33%	3,54%	0,00%	3,57%
HOW35	0,00%	1,77%	0,00%	0,00%
HOW36	0,00%	0,00%	0,00%	0,00%
HOW37	0,00%	0,00%	0,00%	0,00%
HOW41	2,67%	0,00%	22,22%	7,14%
HOW42	8,67%	7,08%	11,11%	14,29%
HOW43	9,33%	11,50%	0,00%	3,57%
HOW44	4,00%	2,65%	22,22%	3,57%
HOW45	0,00%	0,00%	0,00%	0,00%
HOW46	0,00%	0,00%	0,00%	0,00%

While analysing the manner of value creation by high-growth enterprises, it should be noticed that only 13.33% of respondents assigned to technological resources at least 50 points at a 100-point scale of significance for producing key goods and services. The second place in this classification was taken by human resources, since 50 or more points were assigned thereto by almost 9% of respondents. Verification of the significance of intangible resources' groups allows noticing that over 32% of HGEs indicated human capital as a basic group thereof. Whereas, organisational capital took next place. 22% of respondents indicated it as a priority. Also, important features of resources obtained from key and permanent suppliers were considered in this area. As many as 90% of respondents indicated that they expect from the key supplier only delivering raw materials, semi-products, components and goods, yet, at the same time 70% of high-growth enterprises declared acquiring from these suppliers' knowledge and

experience as well. Whereas, analysing the form of communication with customers, it can be noticed that the studied entities do not find sources of economic benefits in the forms of communication with customers. The most of respondents include business meetings and conferences for customers in such sources.

Table 5: Characteristics of the business model element *Value – How is revenue created?* in high-growth enterprises

	high-growth enterprises			
	In total	**Indicating only an increase in revenues**	**Indicating only an increase in employment**	**Indicating an increase in revenues and employment**
VALUE1	42,00%	43,36%	33,33%	39,29%
VALUE2	20,67%	16,81%	33,33%	32,14%
VALUE3	80,67%	79,65%	100,00%	78,57%
VALUE41	13,33%	13,27%	11,11%	14,29%
VALUE42	12,67%	12,39%	11,11%	14,29%
VALUE43	74,00%	74,34%	77,78%	71,43%
VALUE51	8,67%	9,73%	11,11%	3,57%
VALUE52	74,00%	75,22%	66,67%	71,43%
VALUE53	17,33%	15,04%	22,22%	25,00%
VALUE61	74,00%	78,76%	44,44%	64,29%
VALUE62	96,67%	98,23%	88,89%	92,86%
VALUE63	95,33%	97,35%	100,00%	85,71%
VALUE64	1,33%	0,00%	0,00%	7,14%

The last of the analysed business model's elements indicates the area of its profitability. While conducting research in this direction, it can be indicated that 42% of respondents diversify revenues. Only 20% of HGEs declare that they receive revenues from the key customer, yet, over 80% of them receive revenues from the key industry. The greatest significance in the cost structure is attributed to costs of materials, semi-products and raw materials. Whereas, outsourcing constitutes the biggest source of savings in costs. 74% of high-growth enterprises indicate that they search for savings in this area. While analysing the many years of profitability of the conducted activity, it can be noticed that only 1.33% of respondents indicated the lack of positive financial results in the last 5 years.

Conclusion

To sum up the considerations concerning elements of business models of high-growth enterprises considered in compliance with the St. Gallen Business Model Navigator conception, it can be indicated that characteristic features thereof, represented by the vast majority of studied entities, have been observed. In the case of the element *Who? – Who is your target customer?* it was targeting production at specific market industries and stability of the supply chain. Studied entities attributed a vast significance to the fact of having both regular suppliers and recipients. While analysing the characteristics of the

element *What? – What do you offer to the customer?* it can be stated that a large number of HGEs undertake sequential operations constituting the value chain elements. Nevertheless, production and sales are the most important links of this chain. Furthermore, value proposition characterises with a systemic increase in the offer of products and services, acquiring new industries and markets. Within the analysis of the element *How? – How is the value proposition created?* it should be noticed that studied entities did not significantly distinguish any of the proposed categories of resources. Therefore, it can be concluded that intangible resources are not the most significant in the process of creating value realised by high-growth enterprises. Whereas, while analysing the business model profitability represented by the element *Value – How is revenue created?* a lack of a decisive diversification of revenues is noticed. Studied HGEs do not depend on the key customer, but on the key industry. Furthermore, they show fairly good profitability of conducted activity.

To sum up the above considerations, it should be indicated that the research hypothesis, assuming that HGEs are characterised with similar features of business models' elements, has been verified positively. Confirmation of this hypothesis allows distinguishing basic attributes of business models of high-growth enterprises and thus, indicate the direction of constructing business models of these enterprises. However, it should be emphasized that the above features of the components of business models of HGE have been highlighted on the basis of the concept of St. Gallen Business Model Navigator. From a research point of view, a more detailed analysis of the business models architecture of HGE companies would also be interesting, e.g. based on the Business Model Canvas concept.

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Compliance Analysis of Economic Objectives and Activities in The Light of Sustainable Entrepreneurship Concept

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Abstract

Contemporary enterprises operating on the market not only affect the development of the national economy but also influence the formation of the nearest social and environmental environment. Although their primary purpose of the activity is economic goals, along with their simultaneous realization, enterprises undertake several numbers of actions focused on the social and ecological environment as well. These activities are part of an increasingly common trend, which is the concept of sustainable entrepreneurship, understood as a continuous commitment of the entrepreneur to ethical behaviour and contributing to economic development while improving the quality of life of employees, society and environmental protection. Thus the purpose of an article was examining whether there is a relationship between economic goals and such activities undertaken by Polish enterprises in the SME sector. Based on the results of the research, the conclusion is that longer the company operates on the market, the more actions it undertakes that fit into the concept of sustainable entrepreneurship.

Keywords: enterprise, sustainable entrepreneurship, c-Pearson coefficient, management

Introduction

Entrepreneurship is a factor conditioning not only economic development but also social and environmental. Striving for constant development, including by inventing new products and services and then taking actions to implement them is the essence of entrepreneurship. Since entrepreneurship manifests itself in almost all aspects of human life, it also makes a significant contribution to the implementation of the concept of sustainable development, which resulted in the appearance of the term "sustainable entrepreneurship". The "sustainable entrepreneurship" term essentially combines two terms' sustainable development' and 'entrepreneurship'. It characterizes some core business aspects that are less oriented on management systems and focus more on personal initiative and entrepreneur's skills in order not only to achieve market success but also to make (positive) changes in society and the natural environment. The appearance of sustainable entrepreneurship is, among others, the effect of actions aimed at taking into account the contribution of entrepreneurship to sustainable development in a more comprehensive manner. It is assuming that this contribution of entrepreneurship to sustainable development was caused by, among others a change in the attitudes of corporate stakeholders that go beyond narrow economic interests and increasingly take into account environmental and social aspects. Thus, they demand, for example, actions to improve the state of the natural environment or social improvements. However, these extended needs have also economic importance, as the actions as a result of the demands of this group can attract a larger group of recipients of products or services, which in turn will translate into measurable economic benefits. Therefore, the essence of this entrepreneurship is to conduct business not only bringing a sure economic profit but also enabling meeting environmental and social goals (Choi, Gray, 2008). Majid and Koe referred to as an entrepreneurial process that innovatively seeks to achieve economic profit

but also strives to achieve social justice, improve the quality of the environment and cultural heritage (2012).

According to S. Graham (2010), sustainable entrepreneurship is the process of maintaining a constant level of entrepreneurship development in order to change the business paradigm to one that assumes unchanged and unsurpassed GDP growth, jobs, capital investment, technological development and quality of life. By implementing such (often radical) actions, entrepreneurs also respond to the unmet needs of particular groups of stakeholders (Shaltegger, Wagner, 2011). The result of its operation is products, processes and services in order to achieve profits, both economic (pure financial profit) and non-economic (improvement of the company's image). A. Gerlach (2003) also emphasizes the role of innovation in sustainable entrepreneurship, because it is the innovative behaviour of private sector enterprises that perceive environmental and social issues as the primary goal and competitive advantage that determines that they operate in the spirit of sustainable entrepreneurship. Sustainable entrepreneurship is an innovative, market-oriented form of creating economic and social values. It is implemented by people and groundbreaking activities (innovations) that bring benefits in economic, social and environmental dimensions (Chodyński, 2014). From the definitions mentioned above, it follows that, in a narrow sense, sustainable entrepreneurship most often concerns an innovative enterprise that provides products and services friendly to the natural environment and society, which will allow achieving market success.

Sustainable entrepreneurship in an enterprise

Sustainable entrepreneurship can also be characterized by an enterprise with an established market position and conducting activities for many years, which, in addition to conducting activities aimed at achieving financial profits, initiates, e.g. social changes or undertakes actions aimed at improving the condition of the natural environment. This broad approach to sustainable entrepreneurship presents the definition given by E. Crals and L. Vereeck (2005). They claim that it is a continuous commitment of business to ethical behaviour and contributing to economic development, while improving the quality of life of employees, their families, local communities, society and, consequently, the whole world and its future generations. Entrepreneurs are not only profit-oriented but are also involved in activities aimed at achieving the goals of sustainable development in economic and environmental terms. Sustainable entrepreneurship is also an innovative, market-oriented and creativity-driven form of creating economic and social value through groundbreaking, environmentally or society-friendly products or services of breakthrough importance (implicitly - innovative) (Pinchot, 1988; Gapp, Fisher, 2007). Contemporary enterprises face a challenge in which they should strive for continuous development while accepting responsibility for actions that affect the immediate social and environmental environment in an increasingly globalized world. There is an assumption that the concept of sustainable entrepreneurship changed the business perspective and strategies of modern enterprises, which departed from the attitude focused on achieving economic and financial profit towards social and ecological order. Still, the financial results of the company are a definite success factor, but next to them it is social and ecological responsibility that has also become critical factors for further development (Santos, Rebelo, Barros, Pereira, 2012; Hubbard, 2009; Zairi, Peters, 2002). Contemporary companies operating on the market in the spirit of sustainable entrepreneurship, take several actions that are part of the concept of sustainable entrepreneurship, in the form of (Doherty, Haugh, Lyon, 2014; Paliwoda-Matiolańska, 2009; Zainon, Ahmad, Atan, Wah, Bakar, Sarman, 2014; Muhamad, Ebrahim, Hami, 2014; Burchell, 2008):

- defining and adopting social or ecological objectives,
- undertaking activities aimed at satisfying the social interest, creating an appropriate organizational culture,
- human resources management through responsible and innovative leadership,
- innovative and ecological management of production processes, through the use of modern, often pro-ecological technologies,
- research and development management
- responsible marketing management, in the form of ethical and social activities or reliable customer service,

- continuous improvement of working conditions of employees,
- involvement in charity
- striving for integration with the social and natural environment
- striving for positive perception and proper reputation,
- increasing the efficiency of employees' activities and work,
- looking for further solutions in the field of sustainable entrepreneurship based on own experience.

However, the organization's main economic goals are, among others making business profits, costs reductions, increased economic efficiency, higher predictability and cost stability, better cooperation with clients and partners, better company's image, increasing the number of customers, better business continuity, ability to run innovations faster and accelerating enterprise's development.
Thus, the conducted literature studies made it possible to formulate two research questions. RQ1: Is there a statistically significant correlation between the implementation of economic goals by organization and undertaking activities by the concept of sustainable entrepreneurship. RQ2: whether there were differences between the dependencies age of the enterprise (time of its functioning on the market)?
Based on the above, the research hypotheses assume that:

H1: There is a significant statistical relationship between the implementation of economic goals by Polish enterprises and undertaking activities by the concept of sustainable entrepreneurship.
H2: Due to the organization's length of operation, there are differences in relationships between the implementation of economic goals by Polish enterprises and undertaking activities in line with the concept of sustainable entrepreneurship.

The verification of accepted hypotheses included a statistical analysis of relationships using the c-Pearson correlation coefficient. Pearson's C contingency coefficient resists on the chi-square independence test. This measure determines the strength of the relationship between the two variables analyzed in the chi-square test. Because we use this test to analyze two qualitative variables, the contingency coefficient is determined by a measure of the relationship between qualitative, nominal and non-measurable variables. The C-Pearson contingency coefficient uses divisible tables with any number of levels of two variables. This coefficient takes values from 0 - which means the independence of two variables, no relationship between them to "almost" 1 - which means a stable relationship between them. Therefore, the coefficient values determine the strength of the relationship between two variables. The closer the value is to 1, the stronger the relationship. The significance of the c-Pearson contingency coefficient is the same significance that we determine for the chi-square test. In the conducted analyzes, the corrected form of the contingency coefficient was calculated in order to unify the maximum values for two coefficients (Kline, 2013).

Research Methodology

Structure of the Research Group

The research procedure assumed surveying randomly selected enterprises of the SME sector. For this article, we accepted the SME definition, provided by EU Recommendation: The category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR million, and/or an annual balance sheet total not exceeding EUR 43 million (OECD, 2003). This definition takes into account the following three criteria: staff headcount, annual turnover and annual balance sheet total (fig. 1).

Enterprise category	Headcount: annual work unit	Annual turnover	or	Annual balance sheet total
Medium-sized	< 250	<= EUR 50 mln		<= EUR 43 mln
Small	< 50	<= EUR 10 mln		<= EUR 10 mln
Micro	< 10	<= EUR 2 mln		<= EUR 2 mln

Fig. 1: SME's definition

The critical analysis of the literature made it possible to construct a research tool in the form of a questionnaire, which made it possible to conduct quantitative research. The analysis of the results obtained resists on the analysis of primary data obtained as a result of the completed survey. The questionnaire contained 20 questions divided into three main parts, which made it possible to obtain information on sustainable entrepreneurship in Polish enterprises. The nature of the answers to individual questions took the form of single, multiple choice answers and answers on the 6-point Likert scale. The scale used in the study consists of 6 categories of answers (6 - definitely yes, 5 - yes, 4 - rather yes, 3 - rather no, 2 - no, 1 - definitely no), which create the correct order (Chomeya, 2010). The analysis of measurement data using the Likert scale involves comparing and interpreting the points counted for individual items or individual respondents. Before conducting the main study, a pilot study included a group of 10 companies, the aim of which was to eliminate potential inaccuracies so that respondents had no doubts about the nature of the questions asked. Then, the primary survey among 400 enterprises, a representative sample of the survey, was conducted.

When choosing the study using the representative method, efforts made to minimize the sample size while maintaining the required certainty and accuracy of further inference. The minimum sample size when estimating the probability of success p in the general population calculated based on the sample size formula for a vast population:

$$N_{min} = \frac{N_p\ (\alpha^2 * f(1-f)}{N_p * e^2 + \alpha^2 * f(1-f)} = 384$$

where:

Nmin = minimum sample size,
Np = population size,
α2 = level of significance,
e2 = accepted level of the highest error,
f = the structure index

As the calculations show, the minimum sample size, with an acceptable confidence level of 1-2 = 0.90 and the maximum estimation error e = 5%, should be 384 questionnaires. Because 400 questionnaires were qualified for the research, we assumed that this condition had been met and the sample obtained meets one of the assumptions of the representative method. This value results from the relationship that determines the minimum sample size used when selecting the sample by individual sampling. The primary research was conducted in August 2018, using the CATI and CAWI methods.

The analysis of research results begins with the presentation of characteristics of the adopted research

sample based on its structure, which takes into account the size of enterprises (determined based on the number of employees as well as the profile of activity.

Table 1: The structure of the research sample

Profile	Frequency	Per cent	Valid per cent	Cum. Per cent
Administration	16	4%	4%	4%
Construction	45	11%	10%	14%
Professional, scientific and technical activities	31	8%	8%	22%
Education	6	2%	2%	24%
Trade	98	25%	24%	48%
Information and communication	14	4%	4%	52%
Entertainment and recreation	2	1%	1%	53%
Real estate	12	3%	3%	56%
Healthcare and social care	20	5%	5%	61%
Other services	8	2%	2%	63%
Industry	110	28%	27%	90%
Transport and warehousing	27	7%	7%	97%
Accommodation and gastronomy	11	3%	3%	100%

The answers received from all 400 questionnaires were primary data that we further developed. This study covered two stages: in the first stage, an Excel spreadsheet was used, which enabled the graphical representation of necessary information about the research sample. In the second stage, it was a tool for creating a database containing a set of variables, based on which statistical calculations were carried out at a later stage using selected statistical methods.

The descriptive and Reliability Analysis

Because the nature of the answers to individual questions took the form of single, multiple-choice answers and answers on the Likert 6-point scale, before starting the analysis of the obtained test results, an analysis of the reliability of the measuring scale we used Alpha Cronbach statistics. This statistics is the most often used to measure the internal consistency or reliability of a psychometric tool. It is a factor that tests the reliability of research questionnaires used, and in particular, the internal coherence of the tool used. Alpha Cronbach's statistics base on the correlation coefficients of all questionnaire questions with the overall score on this scale (Taber, 2018). Cronbach's alpha can assume values in the range of 0 to 1, with the assumption that the value of 0.6 is average and commonly accepted, although it is strived for the value of this coefficient to be 0.9.

Table 2: The reliability test of the economic goals items of the total 410 questionnaires

Variable	Mean	Variance	Std dev	Cronbach's alpha
Making business profits (V1)	4,924390	1,761995	1,327402	0,887014
Increased economic efficiency (V2)	3,873171	1,749156	1,322557	0,888089
Costs reductions (V3)	3,885366	1,720323	1,311611	0,886969
Higher predictability and cost stability (V4)	3,758537	1,582140	1,257831	0,885974
Investment risk reduction (V5)	3,587805	1,890804	1,375065	0,886740
The possibility of using technologically advanced IT resources (V6)	3,970732	2,326770	1,525375	0,893529
Better cooperation with clients and partners (V7)	4,756098	1,329119	1,152874	0,884702
Better company's image (V8)	4,819512	1,116489	1,056640	0,882756

Increasing the number of customers (V9)	4,714634	1,201986	1,096351	0,881817
Better cooperation between employees (V10)	4,358537	1,418814	1,191140	0,883250
Improving employees' efficiency (V11)	4,297561	1,490703	1,220944	0,880885
Better business continuity (V12)	4,346341	1,380977	1,175150	0,880408
The possibility to standardize and simplify procedures (V13)	4,204878	1,840563	1,356673	0,878564
The ability to run innovations more faster (V14)	3,934146	2,037217	1,427311	0,880442
Accelerating enterprise's development (V15)	3,965854	1,930372	1,389378	0,880959

As can be seen from the table below, it can be concluded that the scale used is a reliable measurement tool characterized by high consistency because, for all the studied issues, Cronbach's alpha values are above 0.8. Similar calculations we conducted for issues related to activities falling under the concept of sustainable entrepreneurship (table 3).

Table 3: The reliability test of the activities of sustainable entrepreneurship of the total 410 questionnaires

Variable	Mean	Variance	Std dev	Cronbach's alpha
Responsible use the available resources (X1)	4,646341	1,500537	1,224964	0,908345
Reducing the level of raw materials' consumption, semi-finished products and waste (X2)	4,739024	1,474512	1,214295	0,906188
Long-term goals are just as important as short-term goals (X3)	4,758537	1,308301	1,143810	0,905752
Operating according to the law of ethic and justice (X4)	5,117073	1,062055	1,030561	0,905195
While formulating new directions of activities, environmental, social and financial values are taken account (X5)	4,521951	1,262353	1,123545	0,906224
Ecological and social aspects are included in innovative activity (X6)	4,441463	1,694609	1,301772	0,906613
use the information power – acquisition, sharing and transforming (X7)	4,619512	1,248518	1,117371	0,908502
Caring for the well-being of employees and maintaining a balance between work and their private life (X8)	4,868293	1,312684	1,145724	0,903174
Striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (X9)	5,187805	1,037993	1,018819	0,907316
Paying attention to making services/products friendly to the natural environment and people (X10)	4,734146	1,320347	1,149064	0,902888
Implementation of procedures that result in the rational management of available resources (X11)	4,539024	1,378669	1,174167	0,901278
Using the "green technology" solutions (X12)	3,882927	2,240539	1,496843	0,914549

As can be seen from the table below, it can be concluded that the scale used is a reliable measurement tool characterized by high consistency because, for all the studied issues, Cronbach's alpha values are above 0.9.

Research Results

In order to verify the first research hypothesis, a statistical analysis of the significance of the c-Pearson correlation coefficient was carried out (table 4).

Table 4: The results of c-Pearson correlation coefficient analysis for the selected variables

Variables	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12
V1	0,34228	0,42728	0,34192	0,32604	0,33467	0,25528	0,35774	0,34595	0,40056	0,27461	0,29591	0,31719
V2	0,31092	0,3284	0,31413	0,31685	0,33807	0,29409	0,35808	0,24275	0,38085	0,31659	0,34524	0,35019
V3	0,27108	0,31583	0,34127	0,35186	0,35208	0,25146	0,29034	0,31123	0,29954	0,26146	0,30511	0,3563
V4	0,26819	0,29612	0,22835	0,31939	0,34283	0,30959	0,30936	0,29845	0,2928	0,27474	0,31439	0,27506
V5	0,25647	0,31238	0,23975	0,33011	0,34127	0,29595	0,29623	0,29177	0,26639	0,26827	0,31297	0,32171
V6	0,27295	0,28189	0,31046	0,29936	0,30982	0,3046	0,34568	0,26009	0,29635	0,26427	0,29867	0,29025
V7	0,37205	0,34985	0,4063	0,49973	0,4051	0,35936	0,40103	0,36753	0,47477	0,3194	0,33041	0,31141
V8	0,36129	0,31249	0,44214	0,51495	0,43283	0,37921	0,45275	0,34788	0,49377	0,39554	0,35168	0,35534
V9	0,35874	0,35642	0,4491	0,50774	0,42332	0,3656	0,44236	0,31444	0,45118	0,34448	0,3786	0,33638
V10	0,33642	0,32101	0,34807	0,45075	0,39879	0,36781	0,32505	0,38617	0,3756	0,35777	0,37768	0,29815
V11	0,33739	0,33352	0,33891	0,39831	0,375	0,34771	0,34555	0,35829	0,31881	0,26837	0,36083	0,33766
V12	0,32858	0,36507	0,31594	0,38004	0,4705	0,35315	0,36413	0,32422	0,36062	0,32175	0,33591	0,31413
V13	0,31966	0,3535	0,33942	0,36645	0,37198	0,38366	0,43878	0,30614	0,37024	0,34204	0,39665	0,34298
V14	0,29734	0,28367	0,30704	0,33271	0,39405	0,40672	0,41285	0,24829	0,30178	0,28795	0,30401	0,37753
V15	0,35045	0,32893	0,42077	0,34675	0,38653	0,40226	0,45113	0,30032	0,31209	0,32939	0,40003	0,44351

The obtained results made it possible to observe significant statistical correlations between the studied issues:

- enterprises which indicated the realization of the goal in the form of making business profits also often indicated taking actions in the form of: responsible use the available resources (Ccor = 0,34228, p < 0,05), reducing the level of raw materials' consumption, semi-finished products and waste (Ccor = 0,42728, p < 0,05), long-term goals are just as important as short-term goals (Ccor = 0,34192, p < 0,05), operating according to the law of ethic and justice (Ccor = 0,32604, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,33467, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,35774, p < 0,05), caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,34595 p < 0,05), and striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,40056, p < 0,05);
- enterprises which indicated the realization of the goal in the form of increased economic efficiency also often indicated taking actions in the form of: reducing the level of raw materials' consumption, semi-finished products and waste (Ccor = 0,3284, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,33807, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,35808, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,38085, p < 0,05), implementation of procedures that result in rational management of available resources (Ccor = 0,34524, p < 0,05), and using the „green technology" solutions (Ccor = 0,35019, p < 0,05);

- enterprises which indicated the realization of the goal in the form of costs reductions also often indicated taking actions in the form of: long-term goals are just as important as short-term goals (Ccor = 0,34127, p < 0,05), operating according to the law of ethic and justice (Ccor = 0,35186, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,35208 p < 0,05), and using the „green technology" (Ccor = 0,3563, p < 0,05);
- enterprises which indicated the realization of the goal in the form of higher predictability and cost stability also often indicated taking actions in the form of: operating according to the law of ethic and justice (Ccor = 0,31939 p < 0,05), and while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,34283 p < 0,05);
- enterprises which indicated the realization of the goal in the form of investment risk reduction also often indicated taking actions in the form of: operating according to the law of ethic and justice (Ccor = 0,33011, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,34127 p < 0,05), and using the „green technology" (Ccor = 0,32171 p < 0,05);
- enterprises which indicated the realization of the goal in the form of the possibility of using technologically advanced IT resources also often indicated taking actions in the form of: use the information power – acquisition, sharing and transforming (Ccor = 0,34568 p < 0,05);
- enterprises which indicated the realization of the goal in the form of better cooperation with clients and partners also often indicated taking actions in the form of: responsible use the available resources (Ccor = 0,37205, p < 0,05), reducing the level of raw materials' consumption, semi-finished products and waste (Ccor = 0,34985, p < 0,05), long-term goals are just as important as short-term goals (Ccor = 0,4063, operating according to the law of ethic and justice (Ccor = 0,49973, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,4051, p < 0,05), ecological and social aspects are included in innovative activity (Ccor = 0,35936, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,40103, p < 0,05), caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,36753, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,47477, p < 0,05), paying attention to making services/products friendly to the natural environment and people (Ccor = 0,3194 p < 0,05), and implementation of procedures that result in rational management of available resources (Ccor = 0,33041 p < 0,05);
- enterprises which indicated the realization of the goal in the form of better company's image also often indicated taking actions in the form of: responsible use the available resources (Ccor = 0,36129, p < 0,05), long-term goals are just as important as short-term goals (Ccor = 0,44214, p < 0,05), operating according to the law of ethic and justice (Ccor = 0,51495, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,43283, p < 0,05), ecological and social aspects are included in innovative activity (Ccor = 0,37921, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,45275, p < 0,05), caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,34788, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,49377, p < 0,05), paying attention to making services/products friendly to the natural environment and people (Ccor = 0,39554, p < 0,05), implementation of procedures that result in rational management of available resources (Ccor = 0,35168 p < 0,05), and using the „green technology" (Ccor = 0,35534 p < 0,05);
- enterprises which indicated the realization of the goal in the form of increasing the number of customers also often indicated taking actions in the form of: responsible use the available resources (Ccor = 0,35874, p < 0,05), reducing the level of raw materials' consumption, semi-finished products and waste (Ccor = 0,35642, p < 0,05), long-term goals are just as important as short-term goals (Ccor = 0,4491, p < 0,05), operating according to the law of ethic and justice (Ccor = 0,50774, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,42332, p < 0,05), ecological and social aspects are included in innovative activity (Ccor = 0,3656, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,44236, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,45118, p < 0,05), paying attention to making services/products friendly to the natural environment and people (Ccor = 0,34448, p < 0,05), implementation of

procedures that result in rational management of available resources (Ccor = 0,3786 p < 0,05), and using the „green technology" solutions (Ccor = 0,33638 p < 0,05);

- enterprises which indicated the realization of the goal in the form of better cooperation between employees also often indicated taking actions in the form of: responsible use the available resources (Ccor = 0,33642, p < 0,05), reducing the level of raw materials' consumption, semi-finished products and waste (Ccor = 0,32101, p < 0,05), long-term goals are just as important as short-term goals (Ccor = 0,34807, p < 0,05), operating according to the law of ethic and justice (Ccor = 0,45075, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,39879, p < 0,05), ecological and social aspects are included in innovative activity (Ccor = 0,36781, use the information power – acquisition, sharing and transforming (Ccor = 0,32505, p < 0,05), caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,38617, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,3756, p < 0,05), paying attention to making services/products friendly to the natural environment and people (Ccor = 0,35777 p < 0,05), and implementation of procedures that result in rational management of available resources (Ccor = 0,37768 p < 0,05);
- enterprises which indicated the realization of the goal in the form of improving employees' efficiency also often indicated taking actions in the form of: responsible use the available resources (Ccor = 0,33739, p < 0,05), reducing the level of raw materials' consumption, semi-finished products and waste (Ccor = 0,33352, p < 0,05), long-term goals are just as important as short-term goals (Ccor = 0,33891, p < 0,05), operating according to the law of ethic and justice (Ccor = 0,39831, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,375, p < 0,05), ecological and social aspects are included in innovative activity (Ccor = 0,34771, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,34555, p < 0,05), caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,35829, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,31881, p < 0,05), paying attention to making services/products friendly to the natural environment and people (Ccor = 0,36083 p < 0,05), and using the „green technology" solutions (Ccor = 0,33766 p < 0,05);
- enterprises which indicated the realization of the goal in the form of better business continuity also often indicated taking actions in the form of: responsible use the available resources (Ccor = 0,32858, p < 0,05), reducing the level of raw materials' consumption, semi-finished products and waste0,36507, operating according to the law of ethic and justice (Ccor = 0,38004, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,4705, p < 0,05), ecological and social aspects are included in innovative activity (Ccor = 0,35315, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,36413, p < 0,05), caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,32422, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,36062, p < 0,05), paying attention to making services/products friendly to the natural environment and people (Ccor = 0,32175 p < 0,05), and implementation of procedures that result in rational management of available resources (Ccor = 0,33591, p < 0,05);
- enterprises which indicated the realization of the goal in the form of possibility to standardize and simplify procedures also often indicated taking actions in the form of: responsible use the available resources (Ccor = 0,31966, p < 0,05), reducing the level of raw materials' consumption, semi-finished products and waste (Ccor = 0,3535, p < 0,05), long-term goals are just as important as short-term goals (Ccor = 0,33942, p < 0,05), operating according to the law of ethic and justice (Ccor = 0,36645, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,37198, p < 0,05), ecological and social aspects are included in innovative activity (Ccor = 0,38366, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,43878, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,37024, p < 0,05), paying attention to making services/products friendly to the natural environment and people (Ccor = 0,34204, p < 0,05), implementation of procedures that result in rational management of available resources (Ccor = 0,39665 p < 0,05), and using the „green technology" solutions (Ccor = 0,34298, p < 0,05);

- enterprises which indicated the realization of the goal in the form of the ability to run innovations more faster also often indicated taking actions in the form of: operating according to the law of ethic and justice (Ccor = 0,33271, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,39405, p < 0,05), ecological and social aspects are included in innovative activity (Ccor = 0,40672, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,41285 p < 0,05), and using the „green technology" solutions (Ccor = 0,37753, p < 0,05);
- enterprises which indicated the realization of the goal in the form of accelerating enterprise's development also often indicated taking actions in the form of: responsible use the available resources (Ccor = 0,35045, p < 0,05), reducing the level of raw materials' consumption, semi-finished products and waste (Ccor = 0,32893, p < 0,05), long-term goals are just as important as short-term goals (Ccor = 0,42077, p < 0,05), operating according to the law of ethic and justice (Ccor = 0,34675, while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,38653, p < 0,05), ecological and social aspects are included in innovative activity (Ccor = 0,40226, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,45113, p < 0,05), paying attention to making services/products friendly to the natural environment and people (Ccor = 0,32939, p < 0,05), implementation of procedures that result in rational management of available resources (Ccor = 0,40003 p < 0,05), and using the „green technology" solutions (Ccor = 0,44351 p < 0,05);

Based on the results, it can be concluded that the first research hypothesis has been positively verified because there were numerous significant statistical relationships between the implementation of economic goals by Polish enterprises and taking actions in accordance with the concept of sustainable entrepreneurship.

In order to verify the second research hypothesis assuming that due to the adopted age of the enterprise, there are differences in the relationships between the implementation of economic goals by Polish enterprises and taking actions in accordance with the concept of sustainable entrepreneurship, the surveyed enterprises were divided into three groups, depending on the number of years of operation on market (table 5).

Table 5: The age structure of enterprises

Group	Qty	%	Cum. %
Up to 10 years	163	41%	41%
10-20 years	207	52%	93%
More than 20 years	29	7%	100%

The first group of enterprises includes enterprises operating for no more than 10 years, in total they accounted for almost half (41%) of the surveyed enterprises. A statistical analysis of the significance of the c-Pearson correlation coefficient was also carried out for this group (table 6).

Table 6: The results of c-Pearson correlation coefficient analysis for the selected variables for the first group of enterprises

Variables	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12
V1	0,46423	0,49403	0,50961	0,43141	0,44229	0,37561	0,40272	0,40212	0,32991	0,39957	0,36337	0,43261
V2	0,46688	0,46013	0,46811	0,3313	0,4033	0,4404	0,45305	0,44472	0,48164	0,51629	0,46997	0,42248
V3	0,43729	0,46601	0,49751	0,44549	0,49304	0,48273	0,51798	0,42542	0,41791	0,53625	0,53894	0,48202
V4	0,36937	0,30885	0,42675	0,36577	0,44796	0,50327	0,46906	0,4553	0,35598	0,46163	0,44918	0,43108
V5	0,38372	0,42673	0,37276	0,33121	0,45637	0,44394	0,46508	0,4224	0,35764	0,39076	0,35351	0,44956
V6	0,39186	0,39678	0,41967	0,43883	0,41563	0,28982	0,4967	0,43132	0,41145	0,44245	0,40908	0,41259
V7	0,43578	0,44594	0,45408	0,56542	0,45024	0,38817	0,40907	0,44223	0,46975	0,41996	0,43407	0,38634
V8	0,42779	0,36872	0,40437	0,45429	0,4408	0,40145	0,5299	0,40538	0,39476	0,40837	0,34297	0,48315

V9	0,31716	0,38451	0,43272	0,41157	0,42944	0,40514	0,48929	0,31474	0,3912	0,40258	0,47175	0,4913
V10	0,45853	0,4884	0,40003	0,46142	0,46709	0,4631	0,38917	0,50314	0,45804	0,48294	0,48373	0,42792
V11	0,43855	0,44318	0,37049	0,4903	0,48402	0,40388	0,50938	0,51112	0,43138	0,38922	0,41126	0,40946
V12	0,46055	0,44621	0,456	0,52826	0,59285	0,45888	0,63947	0,46654	0,43354	0,42692	0,44738	0,49665
V13	0,43113	0,48591	0,34176	0,53172	0,54252	0,5037	0,60221	0,41178	0,44403	0,47293	0,53188	0,4506
V14	0,41964	0,45882	0,38004	0,40317	0,49062	0,46491	0,51279	0,37265	0,34266	0,45684	0,43372	0,37948
V15	0,44814	0,44224	0,46138	0,46309	0,48488	0,51236	0,52748	0,33915	0,3623	0,45606	0,48861	0,52132

The obtained results made it possible to observe significant statistical correlations between the studied issues:

- enterprises which indicated the realization of the goal in the form of making business profits also often indicated taking actions in the form of long-term goals are just as important as short-term goals (Ccor = 0,50961, p < 0,05);
- enterprises which indicated the realization of the goal in the form of increased economic efficiency also often indicated taking actions in the form of striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,48164, p < 0,05), and paying attention to making services/products friendly to the natural environment and people (Ccor = 0,51629, p < 0,05);
- enterprises which indicated the realization of the goal in the form of costs reductions also often indicated taking actions in the form of use the information power – acquisition, sharing and transforming (Ccor = 0,51798, p < 0,05), paying attention to making services/products friendly to the natural environment and people (Ccor = 0,53625 p < 0,05), and implementation of procedures that result in the rational management of available resources (Ccor = 0,53894, p < 0,05);
- enterprises which indicated the realization of the goal in the form of higher predictability and cost stability also often indicated taking actions in the form of ecological and social aspects included in innovative activity (Ccor = 0,50327, p < 0,05);
- enterprises which indicated the realization of the goal in the form of better cooperation with clients and partners also often indicated taking actions in the form of operating according to the law of ethic and justice (Ccor = 0,56542 p < 0,05), and striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,46975, p < 0,05);
- enterprises which indicated the realization of the goal in the form of better company's image also often indicated taking actions in the form of operating according to the law of ethic and justice (Ccor = 0,45429, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,5299 and using the "green technology" solutions (Ccor = 0,48315, p < 0,05);
- enterprises which indicated the realization of the goal in the form of increasing the number of customers also often indicated taking actions in the form of: use the information power – acquisition, sharing and transforming (Ccor = 0,48929, p < 0,05), implementation of procedures that result in rational management of available resources (Ccor = 0,47175 p < 0,05), and using the „green technology" solutions (Ccor = 0,4913, p < 0,05);
- enterprises which indicated the realization of the goal in the form of better cooperation between employees also often indicated taking actions in the form of caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,50314, p < 0,05);
- enterprises which indicated the realization of the goal in the form of improving employees' efficiency also often indicated taking actions in the form of operating according to with the law of ethic and justice (Ccor = 0,4903, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,50938 p < 0,05), and caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,51112, p < 0,05);
- enterprises which indicated the realization of the goal in the form of better business continuity also often indicated taking actions in the form of operating according to the law of ethic and justice (Ccor = 0,52826, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,59285 p < 0,05), and use the information power – acquisition, sharing and transforming (Ccor = 0,63947, p < 0,05);

- enterprises which indicated the realization of the goal in the form of possibility to standardize and simplify procedures also often indicated taking actions in the form of: operating according to the law of ethic and justice (Ccor = 0,53172, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,54252, p < 0,05), ecological and social aspects are included in innovative activity (Ccor = 0,5037, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,60221 p < 0,05), and implementation of procedures that result in rational management of available resources (Ccor = 0,53188, p < 0,05);
- enterprises which indicated the realization of the goal in the form of the ability to run innovations faster also often indicated taking actions in the form of use the information power – acquisition, sharing and transforming (Ccor = 0,51279, p < 0,05);
- enterprises which indicated the realization of the goal in the form of accelerating enterprise's development also often indicated taking actions in the form of: ecological and social aspects are included in innovative activity (Ccor = 0,51236, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,52748 p < 0,05), and using the „green technology" solutions (Ccor = 0,52132, p < 0,05);

The second group of enterprises includes organizations that operate for more than ten years but less than 20 years. Together they accounted for more than half (52%) of the surveyed enterprises. A statistical analysis of the significance of the c-Pearson correlation coefficient was also carried out for this group (table 7).

Table 7: The results of c-Pearson correlation coefficient analysis for the selected variables for the second group of enterprises

Variables	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12
V1	0,51924	0,43196	0,44875	0,54884	0,38369	0,42943	0,58585	0,53304	0,61704	0,54537	0,47795	0,46565
V2	0,46344	0,41837	0,44923	0,52612	0,44075	0,46628	0,5175	0,47884	0,51396	0,48698	0,51786	0,55244
V3	0,44935	0,3677	0,42053	0,50111	0,42494	0,52263	0,5302	0,54314	0,53113	0,41391	0,44441	0,46401
V4	0,50544	0,49757	0,42208	0,45281	0,45758	0,42045	0,45713	0,52087	0,53683	0,43735	0,45363	0,45116
V5	0,57826	0,4825	0,48024	0,45579	0,57081	0,539	0,45976	0,49602	0,53737	0,47991	0,5573	0,56518
V6	0,42577	0,41444	0,52037	0,55478	0,49323	0,47343	0,46596	0,50005	0,5278	0,50039	0,50037	0,54162
V7	0,59617	0,51956	0,47958	0,51333	0,54804	0,59897	0,57554	0,46456	0,61728	0,52524	0,53498	0,54397
V8	0,57961	0,54918	0,60491	0,70347	0,58515	0,5828	0,69299	0,63701	0,81031	0,55327	0,65689	0,49871
V9	0,62518	0,52224	0,62936	0,69549	0,47486	0,49395	0,69946	0,5379	0,80834	0,48806	0,64099	0,49176
V10	0,57933	0,50811	0,50011	0,53814	0,54065	0,54356	0,53259	0,57942	0,65183	0,53265	0,57005	0,55752
V11	0,59552	0,49619	0,5066	0,53653	0,50865	0,48378	0,53452	0,58165	0,62573	0,54248	0,60985	0,5772
V12	0,55942	0,52258	0,56371	0,56653	0,58171	0,54136	0,59426	0,59334	0,65553	0,63359	0,58931	0,55209
V13	0,52956	0,49426	0,4506	0,53089	0,46445	0,52955	0,56112	0,42075	0,58904	0,50788	0,61229	0,51696
V14	0,4862	0,42505	0,43871	0,47117	0,45449	0,56192	0,51335	0,43184	0,57938	0,47985	0,53228	0,60641
V15	0,52609	0,50445	0,48067	0,42204	0,51188	0,56452	0,48462	0,45642	0,50126	0,41581	0,48697	0,60488

The obtained results made it possible to observe significant statistical correlations between the studied issues:

- enterprises which indicated the realization of the goal in the form of making business profits also often indicated taking actions in the form of: operating according to the law of ethic and justice (Ccor = 0,54884, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,58585, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,61704 p < 0,05), and paying attention to making services/products friendly to the natural environment and people (Ccor = 0,54537, p < 0,05);
- enterprises which indicated the realization of the goal in the form of investment risk reduction also often indicated taking actions in the form of: responsible use the available resources (Ccor = 0,57826

p < 0,05), and while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,57081, p < 0,05);

- enterprises which indicated the realization of the goal in the form of better cooperation with clients and partners also often indicated taking actions in the form of: responsible use the available resources (Ccor = 0,59617, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,54804, p < 0,05), ecological and social aspects are included in innovative activity (Ccor = 0,59897, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,57554 p < 0,05), and striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,61728, p < 0,05);
- enterprises which indicated the realization of the goal in the form of better company's image also often indicated taking actions in the form of: responsible use the available resources (Ccor = 0,57961, p < 0,05), reducing the level of raw materials' consumption (Ccor = 0,54918, p < 0,05), semi-finished products and waste, long-term goals are just as important as short-term goals (Ccor = 0,60491, p < 0,05), operating according to the law of ethic and justice (Ccor = 0,70347, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,58515, p < 0,05), ecological and social aspects are included in innovative activity (Ccor = 0,5828, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,69299, p < 0,05), caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,63701, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,81031 p < 0,05), and implementation of procedures that result in rational management of available resources (Ccor = 0,65689, p < 0,05);
- enterprises which indicated the realization of the goal in the form of increasing the number of customers also often indicated taking actions in the form of: responsible use the available resources (Ccor = 0,62518, p < 0,05), long-term goals are just as important as short-term goals (Ccor = 0,62936, p < 0,05), operating according to the law of ethic and justice (Ccor = 0,69549, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,69946, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,80834 p < 0,05), and implementation of procedures that result in rational management of available resources (Ccor = 0,64099, p < 0,05);
- enterprises which indicated the realization of the goal in the form of better cooperation between employees also often indicated taking actions in the form of: responsible use the available resources (Ccor = 0,57933, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,54065, p < 0,05), caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,57942, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,65183 p < 0,05), and implementation of procedures that result in rational management of available resources (Ccor =0,57005, p < 0,05);
- enterprises which indicated the realization of the goal in the form of improving employees' efficiency also often indicated taking actions in the form of: responsible use the available resources (Ccor = 0,59552, p < 0,05), caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,58165, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,62573, p < 0,05), implementation of procedures that result in rational management of available resources (Ccor = 0,60985 p < 0,05), and using the „green technology" solutions (Ccor = 0,5772, p < 0,05);
- enterprises which indicated the realization of the goal in the form of better business continuity also often indicated taking actions in the form of: long-term goals are just as important as short-term goals (Ccor = 0,56371, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,58171, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,59426, p < 0,05), caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,59334, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,65553, p < 0,05), paying attention to making services/products friendly to the natural environment and people (Ccor = 0,63359 p < 0,05), and implementation of procedures that result in rational management of available resources (Ccor = 0,58931, p < 0,05);
- enterprises which indicated the realization of the goal in the form of possibility to standardize and simplify procedures also often indicated taking actions in the form of: striving to build lasting and

long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,58904 p < 0,05), and implementation of procedures that result in rational management of available resources (Ccor = 0,61229, p < 0,05);
- enterprises which indicated the realization of the goal in the form of the ability to run innovations more faster also often indicated taking actions in the form of: striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,57938 p < 0,05), and using the „green technology" solutions (Ccor = 0,60641, p < 0,05);
- enterprises which indicated the realization of the goal in the form of accelerating enterprise's development also often indicated taking actions in the form of: using the „green technology" solutions (Ccor = 0,60488, p < 0,05);
On the other hand, the third group were enterprises that have been operating on the market for more than 20 years, together they constituted 7% of all surveyed enterprises. A statistical analysis of the significance of the c-Pearson correlation coefficient was also carried out for this group (table 8).

Table 8: The results of c-Pearson correlation coefficient analysis for the selected variables for the third group of enterprises

Variables	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12
V1	0,68514	0,62153	0,43923	0,40106	0,54188	0,37946	0,48526	0,60588	0,61787	0,43774	0,55695	0,4284
V2	0,4217	0,45545	0,41689	0,43606	0,54407	0,41399	0,46993	0,36927	0,47174	0,39687	0,38966	0,51962
V3	0,4435	0,40178	0,5236	0,51682	0,50228	0,42652	0,4647	0,44511	0,38481	0,42792	0,4377	0,43753
V4	0,49765	0,49	0,49667	0,47572	0,45825	0,42177	0,55956	0,45737	0,4792	0,42786	0,45178	0,48413
V5	0,41773	0,45174	0,41246	0,46715	0,35714	0,29596	0,45201	0,43121	0,33476	0,40794	0,44884	0,42503
V6	0,5138	0,41619	0,44452	0,45212	0,54802	0,56027	0,48299	0,48561	0,47245	0,46728	0,51611	0,48356
V7	0,54277	0,48364	0,60888	0,57409	0,5317	0,50146	0,65213	0,53704	0,65964	0,49925	0,55442	0,45904
V8	0,54299	0,43061	0,59168	0,55902	0,53677	0,48356	0,54711	0,53557	0,64532	0,5469	0,50607	0,43079
V9	0,43458	0,47781	0,58254	0,48085	0,50283	0,45749	0,58969	0,47207	0,54702	0,46578	0,41534	0,49549
V10	0,40045	0,41317	0,50828	0,5657	0,50895	0,42941	0,44338	0,51066	0,51221	0,49508	0,53911	0,42094
V11	0,46348	0,45194	0,56919	0,48626	0,45152	0,42698	0,48214	0,49842	0,47337	0,45235	0,50073	0,42438
V12	0,39497	0,42634	0,41877	0,44852	0,53781	0,53968	0,46249	0,55538	0,432	0,46699	0,44351	0,42722
V13	0,44051	0,39454	0,50673	0,47012	0,49154	0,40269	0,52807	0,52597	0,53745	0,50325	0,52477	0,51462
V14	0,44422	0,39727	0,51984	0,46795	0,48389	0,47747	0,56052	0,38694	0,4894	0,42039	0,48931	0,51499
V15	0,44655	0,41596	0,53876	0,47105	0,43184	0,41778	0,55898	0,51552	0,51198	0,43992	0,5412	0,51138

The obtained results made it possible to observe significant statistical correlations between the studied issues:

- enterprises which indicated the realization of the goal in the form of making business profits also often indicated taking actions in the form of: responsible use the available resources (Ccor = 0,68514, p < 0,05), reducing the level of raw materials' consumption, semi-finished products and waste (Ccor = 0,62153, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,54188, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,48526, p < 0,05), caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,60588, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,61787 p < 0,05), and implementation of procedures that result in rational management of available resources (Ccor = 0,55695, p < 0,05);
- enterprises which indicated the realization of the goal in the form of increased economic efficiency also often indicated taking actions in the form of: while formulating new directions of activities,

environmental, social and financial values are taken account (Ccor = 0,54407 p < 0,05), and using the „green technology" solutions (Ccor = 0,51962, p < 0,05);
- enterprises which indicated the realization of the goal in the form of costs reductions also often indicated taking actions in the form of: long-term goals are just as important as short-term goals (Ccor = 0,5236, p < 0,05), operating according to the law of ethic and justice (Ccor = 0,51682 p < 0,05), and while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,50228, p < 0,05);
- enterprises which indicated the realization of the goal in the form of higher predictability and cost stability also often indicated taking actions in the form of: responsible use the available resources (Ccor = 0,49765, p < 0,05), reducing the level of raw materials' consumption, semi-finished products and waste (Ccor = 0,49, p < 0,05), long-term goals are just as important as short-term goals (Ccor = 0,49667, p < 0,05), operating according to the law of ethic and justice (Ccor = 0,47572, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,55956, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,4792 p < 0,05), and using the „green technology" solutions (Ccor = 0,48413, p < 0,05);
- enterprises which indicated the realization of the goal in the form of the possibility of using technologically advanced IT resources also often indicated taking actions in the form of: while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,54802, p < 0,05), ecological and social aspects are included in innovative activity (Ccor = 0,56027, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,48299, p < 0,05), caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,48561, p < 0,05), implementation of procedures that result in rational management of available resources (Ccor = 0,51611 p < 0,05), and using the „green technology" solutions (Ccor = 0,48356, p < 0,05);
- enterprises which indicated the realization of the goal in the form of better cooperation with clients and partners also often indicated taking actions in the form of: responsible use the available resources (Ccor = 0,54277, p < 0,05), reducing the level of raw materials' consumption, semi-finished products and waste (Ccor = 0,48364, p < 0,05), long-term goals are just as important as short-term goals (Ccor = 0,60888, p < 0,05), operating according to the law of ethic and justice (Ccor = 0,57409, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,5317, p < 0,05), ecological and social aspects are included in innovative activity (Ccor = 0,50146, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,65213, p < 0,05), caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,53704, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,65964, p < 0,05), paying attention to making services/products friendly to the natural environment and people (Ccor = 0,49925 p < 0,05), and implementation of procedures that result in rational management of available resources (Ccor = 0,55442, p < 0,05);
- enterprises which indicated the realization of the goal in the form of better company's image also often indicated taking actions in the form of: responsible use the available resources (Ccor = 0,54299, p < 0,05), long-term goals are just as important as short-term goals (Ccor = 0,59168, p < 0,05), operating according to the law of ethic and justice (Ccor = 0,55902, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,53677, p < 0,05), ecological and social aspects are included in innovative activity (Ccor = 0,48356, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,54711, p < 0,05), caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,53557, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,64532, p < 0,05), paying attention to making services/products friendly to the natural environment and people (Ccor = 0,5469 p < 0,05), and implementation of procedures that result in rational management of available resources (Ccor = 0,50607, p < 0,05);
- enterprises which indicated the realization of the goal in the form of increasing the number of customers also often indicated taking actions in the form of: reducing the level of raw materials' consumption, semi-finished products and waste (Ccor = 0,47781, p < 0,05), long-term goals are just as important as short-term goals (Ccor = 0,58254, p < 0,05), operating according to the law of ethic and justice (Ccor = 0,48085, p < 0,05), while formulating new directions of activities, environmental,

social and financial values are taken account (Ccor = 0,50283, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,58969, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,54702 p < 0,05), and using the „green technology" solutions (Ccor = 0,49549, p < 0,05);

- enterprises which indicated the realization of the goal in the form of better cooperation between employees also often indicated taking actions in the form of: long-term goals are just as important as short-term goals (Ccor = 0,50828, p < 0,05), operating according to the law of ethic and justice (Ccor = 0,5657, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,50895, p < 0,05), caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,51066, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,51221, p < 0,05), paying attention to making services/products friendly to the natural environment and people (Ccor = 0,49508 p < 0,05), and implementation of procedures that result in rational management of available resources (Ccor = 0,53911, p < 0,05);
- enterprises which indicated the realization of the goal in the form of improving employees' efficiency also often indicated taking actions in the form of: long-term goals are just as important as short-term goals (Ccor = 0,56919, p < 0,05), operating according to the law of ethic and justice (Ccor = 0,48626, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,48214, p < 0,05), caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,49842 p < 0,05), and implementation of procedures that result in rational management of available resources (Ccor = 0,50073, p < 0,05);
- enterprises which indicated the realization of the goal in the form of better business continuity also often indicated taking actions in the form of: while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,53781, p < 0,05), ecological and social aspects are included in innovative activity (Ccor = 0,53968 p < 0,05), and caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,55538, p < 0,05);
- enterprises which indicated the realization of the goal in the form of possibility to standardize and simplify procedures also often indicated taking actions in the form of: long-term goals are just as important as short-term goals (Ccor = 0,50673, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,49154, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,52807, p < 0,05), caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,52597, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,53745, p < 0,05), paying attention to making services/products friendly to the natural environment and people (Ccor = 0,50325, p < 0,05), implementation of procedures that result in rational management of available resources (Ccor = 0,52477 p < 0,05), and using the „green technology" solutions (Ccor = 0,51462, p < 0,05);
- enterprises which indicated the realization of the goal in the form of the ability to run innovations more faster also often indicated taking actions in the form of: long-term goals are just as important as short-term goals (Ccor = 0,51984, p < 0,05), while formulating new directions of activities, environmental, social and financial values are taken account (Ccor = 0,48389, p < 0,05), ecological and social aspects are included in innovative activity (Ccor = 0,47747, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,56052, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,4894, p < 0,05), implementation of procedures that result in rational management of available resources (Ccor = 0,48931 p < 0,05), and using the „green technology" solutions (Ccor = 0,51499, p < 0,05);
- enterprises which indicated the realization of the goal in the form of accelerating enterprise's development also often indicated taking actions in the form of: long-term goals are just as important as short-term goals (Ccor = 0,53876, p < 0,05), use the information power – acquisition, sharing and transforming (Ccor = 0,55898, p < 0,05), caring for the well-being of employees and maintaining a balance between work and their private life (Ccor = 0,51552, p < 0,05), striving to build lasting and long-term relationships with partners and clients in order to achieve its goals (Ccor = 0,51198, p < 0,05), implementation of procedures that result in rational management of available resources (Ccor = 0,5412 p < 0,05), and using the „green technology" solutions (Ccor = 0,51138, p < 0,05).

In each of the groups of enterprises examined, there are significant relationships between the economic objectives and the activities consistent with the concept of sustainable entrepreneurship. However, the analyzes carried out clearly showed that:
- in the first group of enterprises, these relationships were the least, as we observed only 31 significant relationships,
- in the second group of enterprises, these dependencies were more, as we observed 48 significant dependencies,
- in the third group of enterprises, we observed the most significant number of dependencies - as many as 88 of them.

It can, therefore, be assumed that the second research hypothesis, has been positively verified.

Conclusions

Sustainable entrepreneurship is a concept that is increasingly being implemented and used by Polish enterprises. The main goal of the functioning of every enterprise on the market is striving to achieve financial profits, gaining more and more customers or increasing its market share. However, in recent years, in addition to actions taken by enterprises aimed at achieving economic goals, actions in line with the concept of sustainable entrepreneurship are also being taken more often, e.g. in the form of rational use of resources, reduction of the amount of generated waste or production of environmentally friendly products. The above indicates an increasing environmental and social awareness of enterprises. The research results presented in the article, aimed at identifying statistically significant relationships between the economic goals and activities that fit into the concept of sustainable entrepreneurship undertaken by Polish organizations in the SME sector, demonstrated that along with the implementation of economic goals, activities consistent with the concept of sustainable entrepreneurship are implemented as well. However, differences are depending on the length of the company's operation on the market. Enterprises that have been operating on the market for less than ten years are much less likely to take actions in line with the concept of sustainable entrepreneurship than organizations with more extensive experience. Most of these actions were undertaken by enterprises that have been operating on the market for more than 20 years. It can be caused by the fact, that the so-called young entities, at the beginning of their activity, mainly focus on achieving the adopted economic goals, because only their achievement determines their survival and further development on the market. On the other hand, enterprises with more widespread practice, most often already have an established position on the market and have the appropriate resources enabling them to carry out activities by the concept of sustainable entrepreneurship.

The results obtained may be useful for the development of the policies for enterprises, especially aimed at the young ones, by the national or local authorities. What in turn, may translate not only into facilitating the operations of Polish enterprises, but also contribute to strengthening the concept of sustainable entrepreneurship.

However, the conducted analysis has several limitations, which determine the further directions of research. First of all, the research was limited to Polish enterprises; thus, it limits its generalizability. Moreover, a further direction of consideration may be conducting similar research on a sample of enterprises from other countries, which will allow conducting a comparative analysis on a larger scale.

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Regional Support for the Idea of Village Renewal in the Context of Stimulating Social Innovation in Rural Area

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Abstract

Rural renewal as a tool for influencing local development in the economic and social aspect is a response to the needs of the rural areas in the fields of economy, social life, culture, innovation and agriculture development. It constitutes a challenge for local government units, i.e. equalizing the level of socio-economic development in their area, the ability to diagnose social needs, solving problems with particular emphasis on increasing social activity based on informal potential social bonds. The article concerns the issue of regional support for the idea of village renewal in the context of stimulating social innovation in rural areas. The research focuses on the analysis of the effects of self-government contest "Activities Promoting the Idea of Village Renewal" implemented in Poland in Lower Silesia region in 2009-2018 under the program of the Marshal's Office of Lower Silesia. The program creates many opportunities for the local community development, offering alternative development paths requiring active community attitudes. The article presents bottom-up initiatives and activities, stimulating social innovations and featuring the role of public policy in supporting rural development through the potential of local community.

Keywords: village renewal program, regional development, rural area, social innovation.

Introduction

A wide spectrum of phenomena and social and economic processes included in the category of regional development makes the regional development a result of simultaneous activities undertaken by different entities of public authorities, companies, institutions, and local communities (Crescenz and Iammarino 2017). On the one hand, process identified as regional development is a result of behaviours functioning in the market economy of companies and investors; on the other hand, it results from a conscious and intentional operation of public entities shaping regional policy (Gibbs and O'Neill 2016). Conscious influence of public authorities on the regional development is defined as regional policy. It constitutes one of the policies of the contemporary economic policy which is carried out both, on the level of the European Union,

Member States, as well as regional and local governments (Fratesi and Perucca 2018). European politics has been conducting the development of rural areas for decades, with different results, though. Recently, social innovations have been introduced as a new remedy for the development and growth, guaranteeing at the same time social engagement and counteracting social inequalities (Neumeier 2017). Literature provides a wide selection of applications of social innovations - starting with developing new ideas, products, and services, to streamlining actions and processes, adopting new social practices, opening to creative spaces, innovative and renewed institutional arrangements, more democratic forms of participation, and not only - all strive for creating more fair, efficient, effective, and sustainable society. (Castro-Arce et al. 2019). In the light of the definition of social innovations, the concept of rural renewal is a tool for creating values serving the society (Wronka-Pośpiech 2015), becoming increasingly important against the backdrop of global phenomena and conditions and challenges of post-industrial societies such as aging of the society, changing the structure of households and development knowledge-based economy.

The main objective of this article is to identify the effects and directions of regional support programme promoting the idea of village renewal in the context of supporting social innovations on the foundation of the "Activities Promoting the Idea of Village Renewal" contest (PPIOW). An additional goal is to verify whether the value of PPIOW projects is correlated with personal incomes in the examined communes. In order to achieve the aims of the article the research methods including a review of domestic and international literature as well as analysis of the statistical data were used.

The specificity of the idea of village renewal

The latest approach towards the village renewal emphasises using the endogenous accumulation of local resources and wider internal capital of a village, e.g. social and cultural capital and all kinds of rural institutions. The endogenous concept of the village renewal is based on the bottom-up development - internal resources, especially on social and institutional capital. This model assumes that the bottom-up factors of development are supported by external intervention of public authorities, e.g. local government. (Damyanovic and Reinwald 2014).

"Village renewal" is both the developmental concept and an effective method of developing rural areas releasing communities and entities from demanding thinking and simultaneously shifting the responsibility for the future of rural community to the concept. In the process of village renewal one aspect seems to be intensely emphasised: the need to perform the significant change in the mentality of rural dwellers from the passive perception of processes controlled from the outside to creative attitude and actions including taking responsibility for their immediate surrounding, as well as for the future of their community and implementation of social innovations. Shaping of positive attitudes among rural dwellers generates the development of the bottom-up initiatives which, eventually, leads to general improvement of the quality of life, competitiveness of the Polish countryside, not only in the village - city comparison but also Polish village - European village (Wilczyński 2008). Conferences of the European rural environments - in Cork in 1996 and Salzburg in 2003 - highlighted the role of helpfulness principle in the development of a village and partner cooperation of all entities creating a given social space. The importance of communes in the development of rural areas increased when Poland joint the European Union. Thanks to accession of Poland to the EU, the village renewal could be implemented from the European level in the previous programming period under the "Rural Development Programme" (PROW 2007-2013) and in the current budget perspective (PROW 2014-2020). As Kaleta and Weber (1995) point out, the village renewal programmes are related to an attitude promoted by the European Council for the Village and Small Town (ECOVAST) which in 1991 formulated "The Strategy for the Rural Europe" and presented an integrated and sustainable development of the village. If

balanced development is understood as a concept taking into account social, environmental, and economic aspects (Derlukiewicz et al. 2020) and strengthening equal opportunities between areas of lesser and larger development potential (Minta et al. 2013), the initiatives related to the village renewal shall be regarded as favourable for implementing rules of sustainable development in rural areas (Orboi 2012). Moreover, such initiatives have positive impact on creating social innovations which are currently perceived as solution to various social problems. (Silvestre and Ţîrcă 2019).

On the basis of European experiences (Alesina et al. 2005), numerous initiatives have been undertaken in Poland, which require engagement of local authorities, including the Village Renewal Programme and LEADER Programme which assume that the social and economic development of a given area should be based on a wide social participation. The development policy based on local authority participation improves transparency of actions in relation to a wider group of recipients and influences the engagement of the interested parties (Bębenek 2014). According to Heffner and Gibas (2011) among many economic, social, spatial, and ecological factors determining the level of local development and its competitiveness, the endogenous factors constitute a significant element. Musiał (2009) points out that the reasons some areas operate resiliently and other become economically forgotten, are as follows: traditions of entrepreneurship, skills and knowledge, feeling of identity, being part of a community, and cooperation. Participation of the interested parties in forming and implementing the local development strategy in collaboration with players using three types of knowledge: scientific, managerial, and local guarantees sustainable development of rural areas (Adamski and Gorlach 2007). It is worth mentioning that according to Kłodziński (2007) appreciating the importance of local knowledge means appreciating rural communities themselves. Christopher Ray (2006) emphasises the strength of the local potential and the bottom-up character of the development; on the basis of his experiences related to the execution of LEADER Programme in the European Union, he claims that the key to undertake local initiatives is the role of human capital which combines cultural, social, and educational capital. Thanks to enhancing local potential and making use of the external forces towards the development of the local community it is possible to improve the quality of life in a village. For that reason it is worth creating mechanisms of different kinds of initiatives set to join local communities in the rural areas to come up with new projects and initiatives - social innovations (Mulgan et al. 2007). Both programmes of the local authorities and the EU tools for the policy of developing rural areas are perceived as catalysts of development for regions displaying the needs of the society in the context of culture, social contacts, keeping identity, and improving the quality of life. In order to execute the EU policy more effectively it is crucial that the undertaken actions, as part of the execution, were reinforcing one another (Kazak et al. 2014). There is the need for the implementation of innovative solutions which may contribute to an actual change in the everyday life of people in rural areas. This might be connected to the completion of such projects as: preventing digital exclusion, activating local communities towards rebuilding local structures, ensuring education to special groups (e.g. children from dysfunctional families, people with disabilities, elderly people, etc.), other actions towards building social coherence and civil society, and participation in preparing and implementing local policies. This is the way to common responsibility for the development based on endogenous resources, reinforced by the external support (Potok 2013).

Research Material and Methodology

The aim of this article is to identify the effects and directions of using a regional support programme promoting the idea of village renewal on the basis of “Activities Promoting the Idea of Village Renewal” contest (PPIOW) in the context of supporting social innovations. An additional goal is to verify whether the value of PPIOW projects is correlated with personal incomes in the

examined communes. Time frame of the research includes years 2009-2018. In terms of area, the research covers 102 rural and rural and urban communes located in Poland (the Lower Silesian Voivodship). The selection of the field of research results from the fact that the Lower Silesian Voivodship, as one of the first in Poland, officially accepted the renewal of countryside as a program carried out by the Voivodship Board.

In order to collect source materials documenting method and literature study were used. Empirical material adapted the form of information regarding village renewal projects subsidised from resources of a voivodship government (figures, tables, reports of using the financial resources and information from the Lower Silesian Voivodship Marshal Office). When processing the results descriptive and comparing methods as well as statistical methods: Pearson correlation coefficient and Spearman's rank correlation coefficient were used.

Results

In 2009 in the Lower Silesia region responsibility for execution of community development (activation and development of local communities) was taken over also by commune authorities and local government by launching the Lower Silesian Rural Renewal programme. (Wolski 2018). The Lower Silesian Voivodeship Marshal Office has come up with a contest for execution of promotional projects stimulating activity of dwellers called “Activities Promoting the Idea of Village Renewal (PPIOW)” (Mańkowska et al. 2019) which is thoroughly analysed in this article.

For the purposes of this article the local-based projects were analysed which are subsidised from the resources of the Lower Silesian Voivodship government, taking into account the existence of informal social bonds, self-organisation traditions, sense of solidarity which constitute a drive for social changes carried out as part of the PPIOW contests. The PPIOW contest offers enormous financial support for the execution of tasks which aim is to improve functioning of the village renewal group, boost activity of dwellers to work together for their town, and develop rural identity, keep cultural heritage and specificity of rural areas. As part of the contest, projects related to promotion are subsidies - i.e. executing, updating information boards located in a village describing the town, or so-called “welcomers” informing about the participation of the village administrative unit in the “Lower Silesian Rural Renewal” initiative; publishing materials promoting the village administrative unit; organising events promoting the “Lower Silesian Rural Renewal” initiative (fairs, competitions, contests, tournaments, tours, and bike excursions); holding workshops focusing on the main assumptions of the “Lower Silesian Rural Renewal” (regarding updating the Village Council Office Village Renewal Strategy, craft, pottery, artistic, regarding manufacturing the traditional and regional products); creating recreational places by locating architectural elements and including developing public space. Recipients of the contest are non-governmental organisations, associations, and groups of dwellers with a leader and a submitted project of a task may be carried out only in a town (village administrative units) officially entered and taking part in the “Lower Silesian Rural Renewal” initiative, which has the Village Administrative Unit Development Strategy (SSR) endorsed by the Village Meeting. The minimum value of the project amounts to PLN 3,000; however, the maximum amount of support for the execution of the project may not exceed PLN 5,000 per one village administrative unit, which should constitute not more than 90% of total costs of the project (own share in total costs of the project should be at least 10%). In years 2009-2018, as part of the above-mentioned contests, 757 local projects received support, out of 914 submitted requests (Table 1).

Table 1: Support means granted as part of the open competitive bid called "Activities Promoting the Idea of Village Renewal" in years 2009-2018 (data source: Lower Silesian Marshal Office)

Year (edition)	Number of requests on the ranking	Requested amount of subsidy	Number of offers which received subsidies	Granted amount of subsidy
2009 (1st edition)	39	PLN 144 943	39	PLN 144 943
2010 (2nd edtion)	101	PLN 412 664	101	PLN 412 664
2011 (2nd edtion)	77	PLN 339 430	77	PLN 339 430
2013 (2nd edtion)	152	PLN 704 729	104	PLN 483 339
2014 (2nd edtion)	159	PLN 733 475	129	PLN 597 360
2015 (2nd edtion)	88	PLN 415 910	88	PLN 415 910
2016 (2nd edtion)	127	PLN 596 996	84	PLN 398 510
2017 (2nd edtion)	64	PLN 304 853	51	PLN 245 086
2018 (2nd edtion)	54	PLN 255 110	42	PLN 196 232
2019 (2nd edtion)	53	PLN 253 880	42	PLN 200 000
Total	914	PLN 4 161 990	757	PLN 3 433 474

Despite the fact that the amount of subsidy per one project was low, beneficiaries jointly received PLN 3.4 million for 757 projects (Table 1). In terms of the number of projects executed in communes, significant differentiation should be emphasised.

The scope of subsidy value of actions related to the process of village renewal for individual communes in the Lower Silesia is significantly wide. The share of specific ranges of obtained amounts in the general amount of subsidy in from 2009 to 2018 is presented in Figure 1, and the spatial diversification of using the financial support for individual communes in the PPIOW contest is presented in Figure 2.

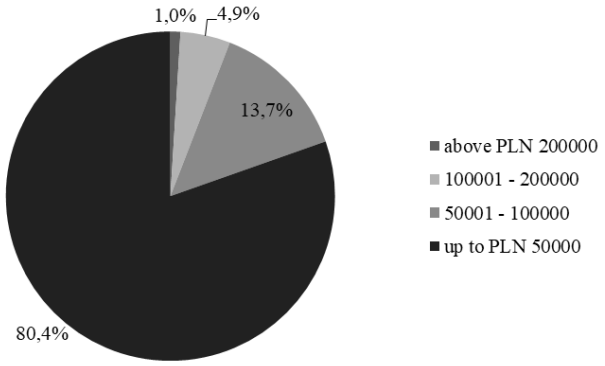

Fig. 1: Share of the used funds of the "Activities Promoting the Idea of Village Renewal" contest from 2009 to 2018 by specific ranges of subsidies

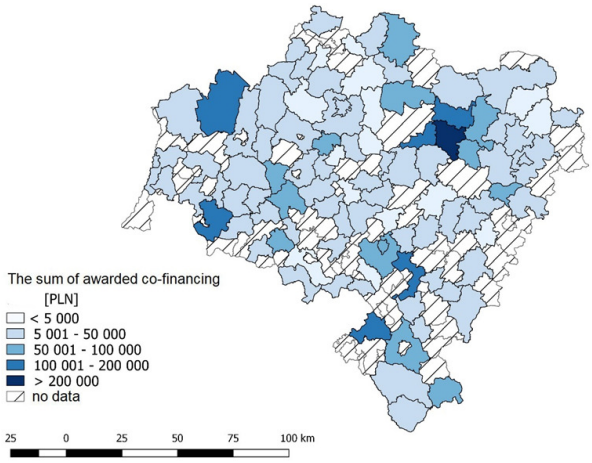

Fig. 2: Share of the used funds of the "Activities Promoting the Idea of Village Renewal" contest from 2009 to 2018 by specific ranges of subsidies

Oborniki Śląskie was the commune of the highest usage of the resources; within the analysed period, as the only commune, it obtained financial support in the amount exceeding PLN 200k using 1% of the amount for the region. 5 communes (Radków, Prusice, Osiecznica, Dzierżoniów, and Mirsk) were classified in the range from PLN 100,001 - 200,000 (4.9% of the amount for the entire region). The largest number of communes applied for means from the range up to PLN 50k (80.4% of the contest funds which were used by 82 communes). The remaining 13.7% of the contest funds were distributed among 14 communes which received subsidies in the range from PLN 50,001 to 100,000 per commune.

In order to define the types of projects subsidies as part of the contest, a detailed analysis was carried out of identified undertakings from the point of view of their subject range. The project quantitative structure is presented in Figure 3.

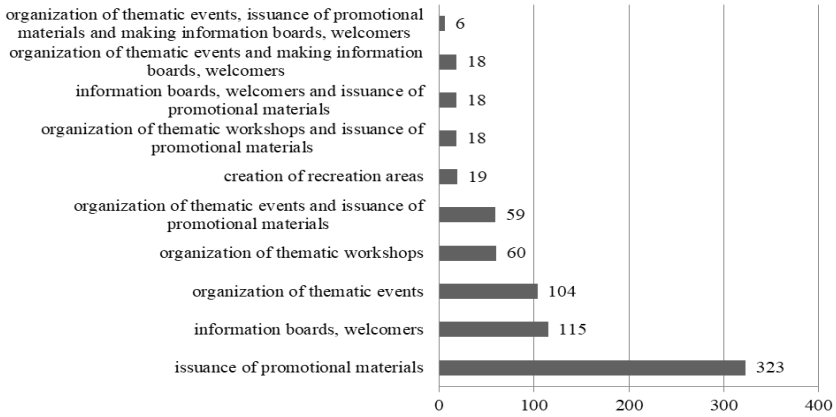

Fig. 3: The number of projects executed as part of the PPIOW contest from 2009 to 2018 by types of undertakings

According to Fig. 3 the majority of means were spent on publishing promotional materials (323 projects). Those actions included mainly publishing leaflets, calendars promoting the idea of village renewal, publishing of books, studies, brochures, or folders regarding history and tradition, as well as innovative undertakings of a given village administrative unit, and also creating local websites. Examples of such actions, mostly related to organising local events, are, among others, projects carried out in Pieszyce commune called "Promotion of the Idea of Village Renewal via Organising Family Fair, Day of Older Persons, and Preparing Promotional Materials", "Promotion of the Idea of Village Renewal via Organising Harvest Festival, Day of Older Persons, and Preparing Promotional Materials", "Promotion of the Idea of Village Renewal via Organising a Harvest Festival in the Village, Day of Older Persons, and Publishing a Folder entitled "Stoneware Now and Then". Other subject groups of large number included project regarding information boards located at an entry to a town or a commune, the so-called "welcomers" (115 projects) and organizing thematic events (104 projects) of incredibly diversified scope. The post popular events included sport events, presentations of local products and festive dishes during fairs, family and sport and recreation events, as well as events promoting rural culinary traditions (e.g. "Pierogi Fest in Paszowice as a culinary way to promote Village Renewal", "Baked Potato Festival in Podlesie", "Promotion of the Idea of Lower Silesian Rural Renewal in Nowa Wieś Wielka via organising an event called "6th Festival of Cep and Prunes"). 60 projects regarded organising thematic workshops, mainly trainings in the scope of developing Village Administrative Unit Village Renewal Strategy, setting up associations and village renewal groups, and obtaining resources or generating common ideas in order to motivate dwellers to take joint actions. Those types of actions constitute a great example of social innovation including common engagement of the dwellers in creating new local initiatives. Social undertakings carried out as part of the PPIOW contest are of social innovation character - they gather local community in the name of a greater idea, e.g. increasing the recognition of their town, boosting its attractiveness. It seems, that the micro grants, despite little financial stimulus, influence the entrepreneurship among the dwellers who feel that they share the responsibility for their place.

The final stage of research comprised an analysis of correlation between the value of obtained means from the PPIOW contest in comparison to own incomes of the analysed communes, calculated per capita from 2009 to 2018 presented in the form of graphical interpretation (wide range diagram). In order to examine the statistical significance between these features, Pearson correlation coefficient and Spearman's rank correlation coefficient were used. The results of those analysis are presented in Figure 4 and Table 2 and Table 3.

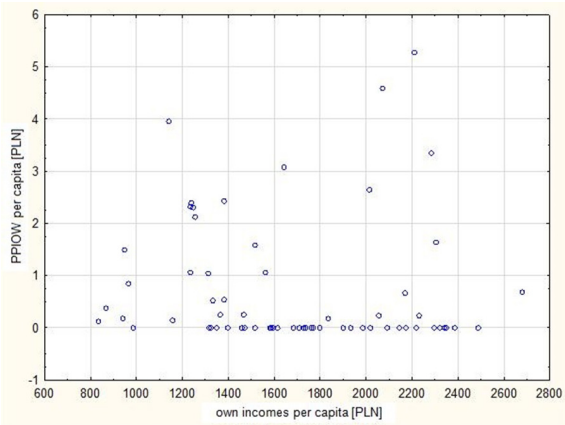

Fig. 4: The correlation diagram of wide range between the subsidy obtained in the PPIOW contest and own incomes in the analysed communes per capita from 2009 to 2018

The wide range diagram presents lack of correlation between data, i.g. connection between commune's own incomes and value of projects carried out as part of the PPIOW contest. On the basis of graphical interpretation of correlations one may claim that effective use of support funds by communes is not determined by the value of financial means in the budget.

The strength of correlation between two variables may be expressed with numbers using many parameters. The most popular parameter calculated for measurable variables is the Pearson correlation coefficient which result for two examined variables is presented in Table 2.

Table 2: Setting the value of Pearson correlation coefficient between the value of obtained means for PPIOW and commune's own incomes (per capita) from 2009 to 2018

	Correlation (Calculations for correlation) Marked coordinates of correlation are significant with p < .05000 (Lack of data deleted by cases)										
Var. X & Var. Y	Average	St. deviation	r(X,Y)	r2	t	p	Important	Constant zal: Y	Slope zal: Y	Constant zal: X	Slope zal: X
PPIOW per capita	0.717	1.2256									
PPIOW per capita	0.717	1.2256	1.000	1.000			66	0.000	1.000	0.000	1.000
PPIOW per capita	0.717	1.2256									
own income per capita	1680,990	454,6401	-0.031	0.001	-0.252	0.802	66	1689,349	-11.66	0.859	-0.0001
own income per capita	1680,990	454,6401									
PPIOW per capita	0.717	1.2256	-0.031	0.001	-0.252	0.802	66	0.859	-0.0001	1689,349	-11.66
own income per capita	1680,990	454,6401									
own income per capita	1680,990	454,6401	1.000	1.000			66	0.000	1.000	0.000	1.000

The Pearson correlation coefficient calculated in order to present the correlation between the commune's own incomes per capita and value of resources obtained as part of the PPIOW contest from 2009 to 2018 amounts to r=-0,03, which means lack of correlation and is statistically unimportant (p=0.8021).

A nonparametric equivalent of the Pearson correlation coefficient is the Spearman's rank correlation coefficient used for measuring non-linear correlation and is more adequate in case of analysing that type of qualitative variables. The application of rank correlation coefficient for two analysed variables is presented in Table 3.

Table 3: Setting the value of Spearman's rank correlation coefficient between the value of obtained means for PPIOW and commune's own incomes (per capita) from 2009 to 2018

	Correlation of Spearman's rank order (Calculation for correlation) BD deleted in pairs Marked correlation coordinates are important p <.05000	
Variable	own income per capita	PPIOW per capita
own income per capita	1.000000	-0.253241
PPIOW per capita	-0.253241	1.000000

The Spearman's rank correlation coefficient is statistically significant, it reaches -0.25 (significant with $p<0.05$) which means weak line correlation between the analysed variables. The negative value of correlation shows that increase of one feature is accompanied by decrease of a second feature. It may be assumed that the value of funds obtained as part of the PPIOW contest depends on own incomes of a commune. It seems that lower own incomes lead to greater determination in trying to get funds from PPIOW and also the other way round: the higher own incomes, the lower value of funds obtained as part of local government's programme.

Conclusions

Local resources of a given area are perceived as key elements for village development. Formal and informal citizen structures release human potential and constitute a trigger for active participation in social life and usage of other resources. Social innovations refer to fulfill social needs and carry out common desires and aspirations. (Castro-Arce et al. 2019). Social innovations concern actions, participation processes, and results which cause changes in social relations and lead to improve social system (Moulaert et al. 2013). Social innovations in a village help to solve social problems such as exclusion, mitigating the results of ageing of local communities, lack of access to fundamental services, including medical care, provision and access to internet, but also engagement of local communities in bottom-up initiatives.

One of the most interesting initiatives in the scope of social innovations in rural areas, undertaken in the recent years by EU, is the LEADER programme. Similar projects were completed also in Poland, e.g. in the Lower Silesian Voivodship. The Lower Silesian Rural Renewal programme brings actual benefits for the dwellers of rural areas in the region. Currently, 1200 village administrative units with 127 village and village and town communes participate in the program. What is interesting, over 1000 village administrative units have their own development strategies, which shows enormous engagement of the dwellers in satisfying needs of local communities. It can be also noticed that success in obtaining funds motivates local communities to further work. An important effect of the execution of the contest is establishing natural partnership between the representatives of the local authorities and the non-governmental organisations in the rural areas. The results of contests carried out as part of the village renewal programme in the Lower Silesian Voivodship indicate that the dwellers, thanks to small financial support, took the most important steps in the development process - they perceived the local resources not only through the perspective of its specificity but also through the way of using them for the development of their own area, including the increase of investment attractiveness level.

The range of projects presented in this study mentions numerous needs found in the rural areas. To conclude, relatively small financial support in the analysed promotional contest brings noticeable

results - including also an added value in the form of increased recognition from the dwellers of the analysed communes, emergence of active leaders and local animators, sense of their place, history, tradition, and the need to maintain its specificity. It is worth emphasising the engagement of local communities in creating new initiatives, thematic workshops, or joint ideas for new actions.

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Age Management In Polish Companies. Employees' Perspective

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Abstract

Demographic transformations towards depopulation and ongoing process of ageing of societies lean to search for solutions that can enable minimisation of negative results of these transformations. Consequences of these transformations can be felt also by enterprises and employees. The concept of age management can be a chance for improvement of the situation of companies as well as whole teams of employees, by building intergenerational labour teams. This can significantly improve the situation of older workers, whose professional situation becomes more difficult along with age. The article presents an attempt to determine whether in entities where respondents are hired use tools of age management and to which extent. For this aim, own studies among employees hired in companies located in Lubuskie voivodeship were conducted.

Keywords: Age Management, The Elderly, Demographic Changes, Company

Introduction

In the recent years, demography and economy emphatically indicate that dependences between them lead to very explicit social and economic effects. The scale and scope of the above mentioned effects are not decreasing as the demographic situation can not be changed day by day. The ongoing process of ageing, depopulation, as well as changes in the age structure are the most visible transformations. Results of such transformations can be especially harmful for the labour market due to a potential deficiency of people in their working age, as well as an increase of the percentage of older people included in the labour resources. Of course, the situation of older employees, even in the conditions of employee market, can be more difficult when compared to other groups of employees. The above results from numerous factors, which may include barriers at the side of employees as well as employers. A remedy for limitations at the side of employers related with hiring older people may be the concept of age management, assuming an approach to a team focused on effective use of age differentiated human resources, considering their needs and capabilities (Liwiński, Sztanderska, 2010a, p. 3).

The aim of this article is to explain the role of the concept of age management in attenuating negative results of demographic ageing of Polish society. The work concerns a study on employees of companies located in Lubuskie voivodeship, who were asked about the knowledge in the field of implementation of assumptions of age management in organisations they work. The accepted research thesis was that in the opinion of employees, there exist numerous advantages of age management but companies/institutions use tools of this scope in practice within a limited scope. The character of the work is theoretical and empirical. The theoretical part describes studies of literature in the field of age management, while in the empirical one, there was used the method of statistical analysis of results of own studies.

Idea of the concept of age management

Age management should be perceived as a balanced approach to management of human resources aimed at increasing work capabilities of employees from various age groups (Ilmarinen, 2001). This approach indicates the aspect of age management focused only on improving the efficiency of work of teams of employees.

Age management in a company leads to using the potential of human resources by enabling work conditions adjusted to age and capabilities of employees and facilitating cooperation between them regardless the age (Rembiasz, 2015, p. 156).

A. Walker (1997) understands age management as activities concerning "(...) various areas where human resources are managed within an organisation, having a focus on the issue of ageing of resources as well as general management over the process of ageing of employees through a state's policy or collective negotiations".

The essence of the concept of age management should be developing a work environment that is friendly for employees of various age groups, considering their needs and expectations. Age management is based on the mechanism of various activities concerning development and professional career of employees, maintaining their mental and physical condition and work efficiency, as well time of being hired, undertaken in a complex way by all interested entities, i.e. a state, companies, and employees, in order to rationally and efficiently use the human capital in companies. These activities should be implemented in all essential areas of human capital management (Adamska-Chudzińska, 2016, p. 337).

The discussed concept should respond to demographic changes by supporting, motivating, and appreciating employees, especially those from groups which situation on the labour market is special. One of such groups includes people who are approaching their retirement age. However, this is not contrary to approach that implemented solutions of age management concerned a whole team of employees, in order to create friendly work conditions regardless the age.

Age management in a company should be based on a new, adjusted to changes, culture of respect and appreciation of older employees, strengthening strong sides of this group of employees, at the same time eliminating and preventing from possible weaknesses. Age management can be focused on an employee and his/her capabilities as well as on his/her environment shaped by an employer, e.g. organisation of a work place, division of labour and responsibilities, creating the atmosphere (Cichorzewska et l., 2015, p. 43). The literature on economical conditions of hiring older employees indicates a series of advantages of such activities. Key of them include e.g. maintenance of the base of skills, regarding activities that are undertaken as necessary as proper, minimization of work costs related with age, reacting to transformation on the labour market, efficiency in struggling with bottlenecks on the labour market (Naegele, Walker 2006).

Age management in the perspective of a company

Regardless the scale of their activity, companies constantly function in turbulent conditions related with the market situation, the competition, and other threats, which are difficult to be foreseen. To a large extent, the above has an influence on possibilities of generating incomes by recognising and using market chances on various planes of the activity. A success of each company is not only customers and profits generated through sales but also engaged employees, who work in advantageous conditions, regardless potential limitations resulting from their age or other factors.

According to the European Code of Good Practice, developed by Eurolink Age in 2000, age management in a company should include seven areas (Good practice in age management and human resources management, especially considering employees aged 50+, 2013, p. 20):

1. recruitment,
2. education, training, development, professional advancement,
3. advancement and internal shifts between posts,
4. flexible forms of employment and modernisation of work,
5. designing work place and health prevention,
6. end of employment and retirement,
7. change of approach towards older employees.

The above fields indicate a complex approach to introduction of assumptions of the concept of age management by implementing them in the process of recruitment, during the period of employment and related activities, until the time of finishing professional career.

A similar classification was proposed by G. Naegele and A. Walker (2006) in their guide on good practice in age management, which includes seven groups:

1. recruitment,
2. learning, training, continuing education,
3. development of professional career,
4. flexible work time,
5. health protection and promotion, designing workplaces,
6. shifting between posts,
7. end of employment and retirement.

Companies have numerous approaches to the idea of age management. Some of them develop strategies of age management, while other use in practice only selected elements or use the assumptions but solely in respect to specific areas. Regardless the fact whether a company has a developed strategy or uses only selected aspects, advantages from its implementation are real for a company to such extent that it decides to bear expenditures and engage own resources.

As observed by K. Rembiasz (2015, p. 161), implementation of an age management strategy in a company brings measurable advantages for older as well as young employees. A good example can be activities related with protection and promotion of health, and work ergonomics. Following the rules of ergonomics can contribute to a longer life and a better health condition of all employees. Age management assumes enabling older employees, also those with the right to retirement benefits, continuation of employment and a full participation in the social life. Unfortunately, professional deactivation is most often related with lower incomes and a loss of a social status or a position in one's family.

Most often, age management is perceived at three levels (Jamka 2009, p. 42; Mendryk 2013, p. 103):

- Individual level – model of development of personal career,
- Organisational level – concerns all employees; adjusting aims and techniques of management according to age, with a special focus on older employees,
- Level of organisation environment – concerns interventional activities of a state, which the major aim is to improve the situation of older employees on the labour market.

Implementation of an age management strategy can bring a company several advantages, which include (Liwiński, Sztanderska 2010b, p. 75-76):

1. Greater flexibility in the field of age management,
2. Using numerous tools at the same time can increase the efficiency of each of them (synergy effect),
3. A comprehensive age management strategy can be easier implemented in a general strategy of HR management in a company in comparison to single activities,
4. Use of individual tools of age management is better accepted by the staff when they are elements of a comprehensive strategy.

Proper and complex age management increases the potential of employees, not only the older ones, and leads to its effective use (e.g. thanks to a cooperation of employees of various age, competences and be supplemented and exchanged). It also increases the motivation of older persons to maintain work and execute it in the most efficient way (Skibiński, Ławińska 2016, p. 425). In turn, the above determines other potential advantages, individual for employees, for an employer, but also for public finances.

Methodology of own studies

The aim of conducted research is to determine:

1. whether employees have knowledge about activities in the field of age management undertaken in their organisation,
2. why, according to employees, age management in a company is justified,
3. what advantages for a company resulting from implementing solutions related with age management are observed by employees,
4. what problems related with implementation of age management solutions are observed by employees,
5. whether companies have a special program of employment of persons aged 50+ and to what extent,
6. in what areas there are conducted activities aimed at supporting older employees.

The research was conducted among employees of companies and organisations located in Lubuskie voivodeship, whereas, a research sample included one employee representing a single company/institution. The research sample consisted of 63 respondents who were selected for the study using the targeted selection method. The study was conducted using the indirect measurement method, while the research tool was direct survey. The period of research was two months, January – February 2020. The results of the study have no representative features for the entire general population. Their purpose is only to describe the situation concerning the sample being tested.

The group included 48 women and 15 men; people aged below 26 were the most numerous in the sample (over 55%), while 35% were persons aged 24-45, and the remaining ones were those aged 46-60 (Tab. 1).

Table 1: Respondents participating in the survey by age and gender

Age	Gender					
	Female		Male		Sum	
	n	n [%]	n	n [%]	n	n [%]
up to 26 years old	25	52,1%	10	66,7%	35	55,6%
27 – 45 years old	18	37,5%	4	26,7%	22	34,9%
46 – 60 years old	5	10,4%	1	6,7%	6	9,5%
Sum	48	100,0%	15	100,0%	63	100,0%

Source: own research results.

Respondents represent various branches of economy. Employees of the services branch constituted the largest percentage (30%), next, there were public administration and public sector workers (27%), while persons working in the educational or cultural entities were the least numerous group (4,8%) (Tab. 2).

Table 2: Sector of economy in which the respondent works

Sector of economy	n	n [%]
Działalność usługowa	19	30,2%
Administracja rządowa, samorządowa, sfera budżetowa	17	27%
Działalność produkcyjna	11	17,4%
Handel	9	14,2%

Transport	4	6,4%
System oświaty lub kultury	3	4,8%
Sum	63	100,00%

Source: own research results.

Research Results

A key issue to be determined is the awareness of the existence of solutions in the field of age management at respondents' work places. 32 among 63 persons under this study state that there are no studies in age management conducted in their organisation, while only 15 declared such activities (Tab. 3).

Table 3: Knowledge of respondents in the area of existence of solutions in age management in their work places

Functioning of age management solutions in enterprises	n	n [%]
No	32	50,8%
I don't know	16	25,4%
Yes	15	23,8%
Sum	63	100,0%

Source: own research results.

Respondents were asked about reasons why, in their opinion, it is justified to use the concept of age management from the perspective of a company implementing such activities. The most often explanations concerned advantages of having an age diversified team of employees (40 responds), maintaining competences of employees at a proper level and a supremacy of older employees as far as experience and competences are concerned (24 responds each), as well as a reaction to changes on the labour market, e.g. ageing society (20) (Fig. 1).

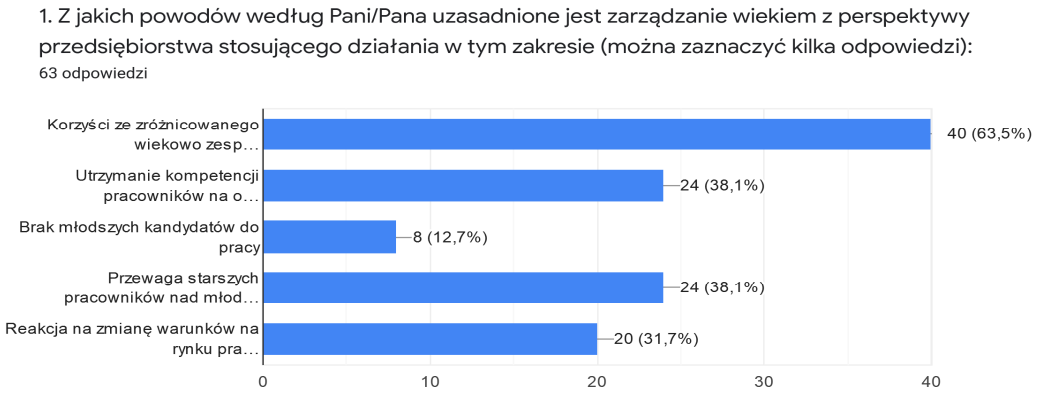

Figure 1: Reasons justifying age management in a company in the opinion of respondents

Source: own research results.

Advantages of implementing solutions in the field of age management observed by respondents most often included the possibility of sharing experience, skills, and knowledge within a team (56 answers), developing a stable team of employees thanks to age differentiation (27), and inter-generational cooperation in teams leading to development (21) (Fig. 2).

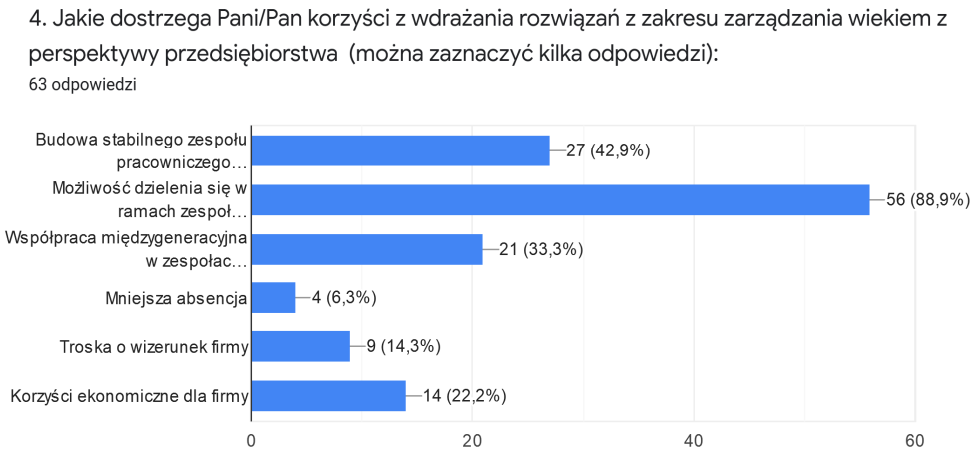

Figure 2: Advantages of implementing solutions in the field of age management in the opinion of respondents

Source: own research results.

The most often problems related with introduction of solutions for age management in the opinion of respondents included: concerns about changes (30 responds), lack of knowledge of management about potential advantages for a company (27), lack of competences of management in the field of implementing solutions (23) (Fig. 3).

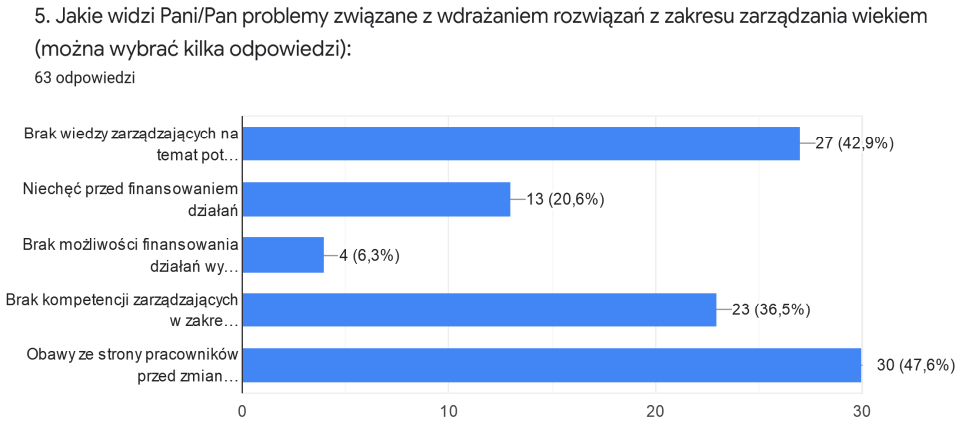

Figure 3: Problems related with implementing solutions in the field of age management in the opinion of respondents

Source: own research results.

55 of 63 respondents declared that their employers do not run any activities to have a special program of employing persons aged 50+, while in the entities where such program exists, it concerns cooperation with labour offices/employment agencies (4 responds) or participation in programs of professional activation of persons aged 50+ (4) (Fig. 4).

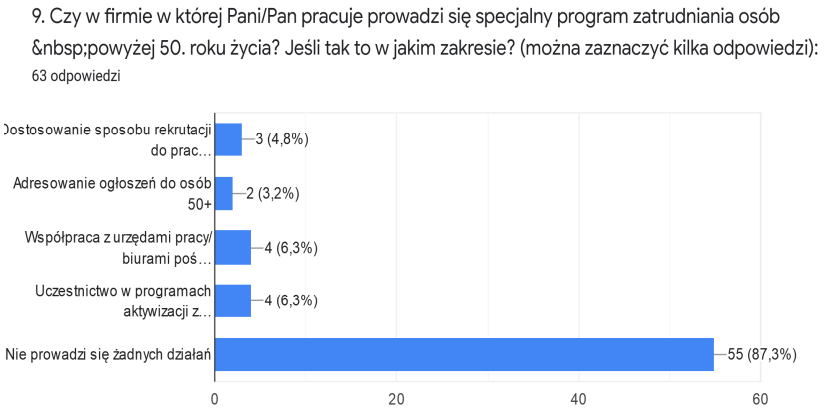

Figure 4: Functioning of an employment program addressed to persons 50+ in an organisation in the opinion of respondents

Source: own research results.

Persons under the survey were asked about potential fields of support for older employees at their companies/organisations. According to the answers, a half of them (31) do not have any knowledge in this subject. Other responds most often included: Flexible time and character of work (15 answers), possibility of changing a profession and changing a work post (12), education, training, and continuing education (10) (Fig. 5).

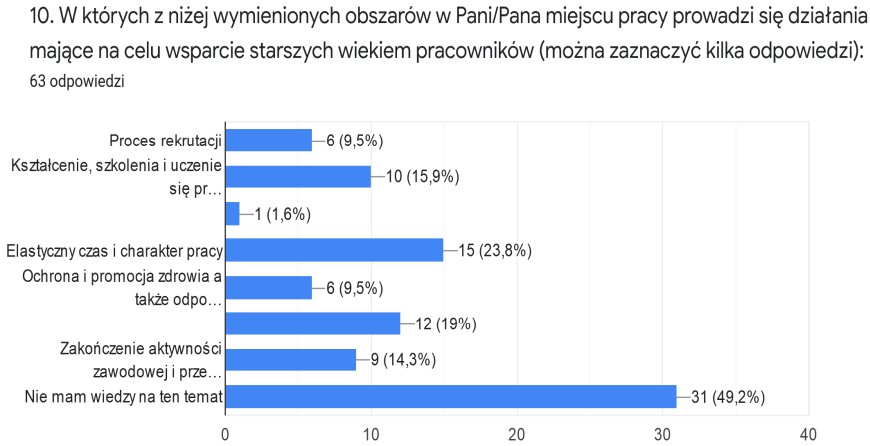

Figure 5. Declaration of respondents concerning fields of support for older employees in their companies/organisations

Source: own research results.

Conclusions

The research results indicate that the majority of entities where our respondents work, according to their knowledge, either do not run any activities in the area of age management (32 entities) or respondents do not have enough knowledge to state whether their employers conduct such activities (16). The above is confirmed by answers given to the question about an existence of an employment program addressed to persons aged 50+. As many as 55 respondents stated that their employers do not run such programs at all. On the one hand, this may indicate that despite the fact that the situation on the labour market is not favourable for employers due to existence of employee market and more often difficulties in finding employees because of demographic problems, employers still do not see the necessity to focus on activities which can support their efforts in acquiring valuable workers. On the other hand, it is also possible that it results from stereotypical perception of older employees and a lack of interest to keep them in a company. These observations are in a sense confirmed by M. Grzesiak (2012, p. 15) who stated that "in Poland, the awareness of the necessity of engagement in the problem of the society ageing, [……]. However, it must be stressed that an employer will decide to implement age management only when he/she is properly motivated, can properly determine what tools are best adjusted to needs of his/her company, and be able to implement them efficiently".

Persons taking part in the study observe the necessity to use age management tools and most often justify it by advantages of having an age diversified team of employees. Advantages of age management most often stated by respondents include the possibility of sharing experience, skills, and knowledge within a team (89% responds), while nearly a half of them stated that a problem in implementing tools for age management is employees' fear of changes.

Interesting conclusions in this scope can be drawn from studies conducted by K. Stankiewicz (2017, p. 335), according to which, employees from SMEs in Poland negatively evaluate activities of their employers as far as recognition of competences and skills of older workers is concerned.

To conclude, one can state that in the group of companies under this study, employees most often do not observe any policy of age management in their organisations or declare a lack of knowledge in this field. However, when asked about the reasons justifying, in their opinion, using age management tools and potential advantages, they most often emphasize a great value of an age diversified team of employees, what creates a chance of sharing experience, skills, and knowledge.

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Cultural Values in Online Advertising – Implications For E-Customer Experience Management

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Abstract

The intensification of international exchanges involves a growing need for intercultural communication. Advertising is now one of the areas of activity that most often need a cultural sensitivity. This study attempted to investigate how the society's culture is related with online advertising content. Literature review suggests that the differences between different cultures in terms of Hofstede's framework can be related to the differences in advertising appeals.
The purpose of this study is to examine the influence of Hofstede's culture dimensions on consumers' attitudes towards online advertisements. On example of Polish customer experiences the influence of cultural values connected with Hofstede's framework on online advertising perception and its acceptance level has been examined. The understanding of cultural implication for marketing communication is the main factor conditioning successful and effective international marketing activity.This study describes factors connected with cultural aspects of international marketing communication and emphasizes the significance of cultural differences and their influence on effective e-marketing communication on global market.

Keywords: online advertising, e-customer experience management, culture dimension, cross-cultural marketing.

Introduction

The online channel is especially important in the context of international advertising. When a company posts an advertising message online, the message becomes automatically available to a worldwide audience of Internet users, therefore companies are increasingly using this medium to reach their target audiences. This medium has facilitated the globalization of business and has reduced the time, cost, and effort required to reach consumers in other countries. Although the Internet is particularly suitable for international advertising, devising and implementing an effective international advertising strategy. Similar to traditional advertising, companies need to answer the questions of whether to standardize or localize their messages across geographic boundaries, how to manage the large number of consumers from different countries, and how to remain culturally sensitive and at the same time reach international consumers in a cost-effective way. Addressing these concerns, advertising researchers have been paying more and more attention to cross-cultural issues in online advertising.

When a product is marketed at an international audience the same domestic advertising campaign abroad will in most cases be ineffective, but cultural barriers may hinder effective transmission of the message and result in miscommunication (Kumar and Mittal, 2002). The cultural heritage, values and habits of a country influence perceptions of communication and reactions to different form of advertising. Each country has social habits or values that influence the expression of emotions, gestures, facial expressions, body language and even verbal communication (Dahl, 2000).

The globalization leads companies to communicate with consumers from different cultures. International marketing is the application of marketing principles to more than one country (Doole and Lowe, 2001). International advertising can also be viewed as a business activity through which

a firm attempts to inform target audiences in multiple countries. An important issue in determining international advertising strategy is whether or not to develop a global or regional advertising campaign, or rather tailor communication to differences in local markets (Peebles and Ryans, 2004). Marieke de Mooij (2004) argues that cultural differences are obstacles in standardized advertising, because the cultural background determines how a member from a particular culture interprets an advertisement. In cross-cultural marketing communication, advertising must be adapted to meet the cultural norms and values, as a message is interpreted differently depending on the recipient's cultural background. In addition, some products are sensitive to cultural values and can be connected with different associations in different cultures, which again emphasizes the necessity of adaptation (de Mooij, 2005). Communication is the primary key to international advertising. The essence of successful advertising is convincing people that a product is meant for them. By purchasing it, they will receive some benefit, whether it be lifestyle, status, convenience or financial. However, when an advertising campaign is taken abroad different values and perceptions as to what enhances status or gives convenience exist. These differences make the original advertising campaign defunct (Onkvist and Shaw, 2009).

The purpose of this study is to examine the influence of Hofstede's culture dimensions on consumers' attitudes towards online advertisements. On example of Polish customer experiences the influence of cultural values connected with Hofstede's framework on online advertising perception and its acceptance level has been examined.

The understanding of cultural implication for marketing communication is the main factor conditioning successful and effective international marketing activity.This study describes factors connected with cultural aspects of international marketing communication and emphasizes the significance of cultural differences and their influence on effective marketing communication on global market.

This study is structured as follows. After this introduction, the theoretical foundations and hypotheses that support the study have been described. Next section details the methodology of research. Than the results of research have been presented and discussed. Finally conclusion and suggestions for the continuation of the research have been presented.

Literature Review

Appropriate cross cultural communication aims to help minimize the negative impact of cross cultural differences through building common frameworks for customers from different cultures (Triandis, 1995). National differences are often cited as the source of intercultural communication conflicts and breakdowns. Geert Hofstede tends to focus on miscommunication or differences in intercultural communication (Hofstede, 2001).

Cultures can be described according to specific characteristics or categorized into value categories or dimensions of national culture. The anthropologist Edward Hall distinguished patterns of culture according to context, space, time and information flow. This concept relates to the balance between the verbal and the non-verbal communication. The concept of context is useful for understanding differences in communication across cultures because it explains the degree of directness of communication. Information in a low-context communication message is carried in the explicit code of the message. In a high context culture verbal communications tend not to carry a direct message. In a high-context communication message most of the information is either part of the context or internalized in the person. So with a high context culture hidden cultural meaning needs to be considered (Hall et al., 1990).

Low-context communication cultures are characterized by explicit verbal messages. Effective verbal communication is expected to be direct and unambiguous. Low-context communication cultures demonstrate positive attitudes towards words, argumentation and rhetoric, whereas high-context communication cultures can be characterized by symbolism or indirect verbal expression (de Mooij, 2004). High-context cultures are usually collectivistic cultures. As regards to advertising, high-

context cultures base their advertising on symbolism or indirect verbal expression. This means that these cultures are more visually oriented. Individualistic cultures are low-context cultures. Advertising in low- context cultures is then characterized by argumentation and rhetoric, because information is here found in the words rather than in the visuals (de Mooij, 2005).

Gert Hofstede developed a model of five dimensions of national culture that helps to explain basic value differences. This model distinguishes cultures according to four dimensions: Power Distance, Individualism-Collectivism, Masculinity-Femininity, and Uncertainty Avoidance. This dimensions can be used to explain differences in consumers' needs, behaviors, communication styles, metaphors and concepts used in advertising across different countries (Hofstede, 2001).

Marieke de Mooij (2005) points out that cultures with a small power distance often use humor in their advertisements. In low power distance cultures youth is seen as independent and individualistic which is why it is made an ideal. In addition, in large power distance cultures status symbols are often used in advertisements. Individualistic cultures often emphasize individuality in their advertisement by only showing one person and by the use of first person singular, because an individualistic motive is self-actualization through personal success and independence. However, in collectivistic cultures more people are shown together in advertisements to emphasize the community, family and harmony. Cultures dominated by masculine values make use of the hard sell approach. This approach is very informative and product-oriented, as it intends to sell the product by pointing out product advantages and characteristics. Feminine cultures, however, prefer the soft sell approach, where there is less focus on argumentation. Here, elements such as humor and word-play are highly used. Success, status or dominance is highly valued in masculine cultures, which is also frequently highlighted in their advertisements. However, feminine cultures favour quality of life, softness and caring. According to de Mooij (2005), strong uncertainty avoidance cultures have a need for explanations, structure, test reports, scientific proof and advice, and testimonials by experts, but also into high regard for technology and design, which is reflected in their advertisements. Cultures with strong uncertainty avoidance tend to include a lot of information in their advertisements, in particular technical details about a product and how it works. In addition, in weak uncertainty cultures the focus is on what the product or the service does, rather than what it can (Mooij M., 2005). The typical features of advertising in different cultures have been presented in table 1.

Table 1: Advertising features in different cultures

Culture dimension	Advertising features
High-context	- symbolism - indirect verbal expression - visual orientation
Low-context	- argumentation and rhetoric
Small power distance	- humor
Large power distance	- symbols of status
Individualism	- independence and individualism - personal success
Collectivism	- community, family and harmony
Masculinity	- informative character - product orientation (characteristic, advantages) - success, status and dominance
Femininity	- receiver orientation - argumentation - humor - mood and dreams of receiver - quality of life - softness and caring
Strong uncertainty avoidance	- explanations - test reports - scientific proof and advice - testimonials by experts,

	- a lot of information - technical details about a product
Weak uncertainty avoidance	- the focus is on what the product or the service does

Source: own elaboration on basis De Mooij, M. (2005) Global Marketing and Advertising: Understanding Cultural Paradoxes, Sage Publications Inc., London.

The advertisement is not only a means of economic activity, but also of cultural communication. The inter-cultural advertisements transmission is to communicate with the consumers from different regions, different nations, different countries and different societies.

The cultural context also impacts the effectiveness of communication. In high context cultures, such as the collectivist Asian cultures of Japan and China, the context in which information is embedded is as important as what is said. In low context cultures, which include most Western societies, the information is contained in the verbal messages. In these cultures, it is important to provide adequate information relating to the product or service in order to satisfy their need for content. Conversely, people in high context cultures are often more effectively reached by image or mood appeals, and rely on personal networks for information and content (Hall, 1976).

Each company wishing to enter and promote their products on foreign markets has to deal with the necessity of preparing an advertising campaign suited to the particular needs of the target receivers. Despite numerous voices claiming that cultural homogenization and standardization of markets and customers' needs enables using international advertising campaigns, it turns out that it is rarely possible to advertise a product worldwide without adaptation to the local socio-cultural and political conditions. Not adjusting the campaign to the local environment can result in a failure and have serious financial repercussions (Usunier and Lee, 2005).

International advertising can, therefore, be viewed as a communication process that takes place in multiple cultures that differ in terms of values, communication styles, and consumption patterns.

Research Methodology

The purpose of this study is to examine the influence of Hofstede's culture dimensions on consumers' attitudes towards online advertisements. On example of Polish customer experiences the influence of cultural values connected with Hofstede's framework on online advertising perception and its acceptance level has been examined.

Poland is considered to be a country with an individualistic culture (with a score of 60). At a score of 68, Poland is a hierarchical society with high power distance . A high score of masculinity (64) indicates that the society will be driven by competition, achievement and success. Poland scores 93 on uncertainly avoidance dimension and thus has a very high preference for avoiding uncertainty. Poland's low score of 38 in long term orientation dimension indicates that people prefer a short-term orientation focusing on personal stability (Hofstede, 2020).

Based on the literature review and the characteristic dimensions of Polish culture the following hypotheses for the causal relationship between the cultural values in online advertising and their influence on advertising messages acceptance have been proposed:

Hypothesis 1 **(H1)**. Online advertisements that emphasize individualistic values have positive influence on advertising message acceptance among Polish customers.

Hypothesis 2 **(H2)**. Online advertisements that emphasize high power have positive influence on advertising message acceptance among Polish customers.

Hypothesis 3 **(H3)**. Online advertisements that emphasize masculine values have positive influence on advertising message acceptance among Polish customers.

Hypothesis 4 (**H4**). Online advertisements that emphasize high uncertainly avoidance have positive influence on advertising message acceptance among Polish customers.

In order to test the hypotheses, a questionnaire survey will be carried out to collect empirical data.

The research was conducted on a group of Internet users in January 2020. The data was collected in the form of a survey carried out on the e-learning website. A questionnaire was developed and distributed to the 80 respondents among students, aged from 19 to 24. The questionnaire gathered information about the acceptance level of advertising message related to all independent variables: individualism, high power distance, masculinity and high uncertainty avoidance.

In questionnaire, respondents determine the acceptance level and their attitudes to the assessed advertising message with a five-point Likert scale. Each measurement variable varies from 1 to 5, among which 5 means very positive, 4 positive, 3 neutral, 2 negative, 1 very negative.

To ensure the participants have the same type of banner advertisements in their mind when answering the questions, a sample banner advertisement will be given at the top of the questionnaire. Additionally, the banner advertisements reflecting each of four culture dimensions will be mainly selected according to the banner text.

After viewing the banner advertisements, participants will complete a questionnaire containing several scales to indicate their responses. Since the objective of this study is to explore the role of cultural differences in effectiveness of online advertisements, the attitudes towards the advertisements will be measured by mentioned five-point scale. Regression analyze was used to estimate the unique effect of cultural values in online advertisements on consumers' attitudes to advertising messages.

The reliability test used was Cronbach's alpha. For all research variables values were higher than 0,8. Cronbach's alpha for individualism was 0,846, high power distance 0,837, masculinity 0,831, and high uncertainty avoidance 0,872. Cronbach's alpha showed high internal consistency, what implies that the measures are reliable and the evaluation instrument is appropriate for use in research.

Results and Discussion

Multiple regressions were used to identify the relationship between the independent variables (individualism, high power distance, masculinity and high uncertainty avoidance) and dependent variable – level of online advertising acceptance. The results of regression analysis have been shown in the table 2.

Table 2: The results of regression analysis

Independent variables	**Standardized coefficients**	**t**	**Significance level**
	Beta		
individualistic values	0,487	4,275	0,000
high power distance	0,327	4,261	0,000
masculine values	0,351	3,943	0,000
high uncertainly avoidance	0,569	4,358	0,000
Dependent variable: level of online advertising acceptance $\mathbf{R^2}$ = 0,816 **F** = 29,457			

Source: own elaboration.

The result shows that R-square was 0,816, which demonstrates that independent variables explain 81,6% of the variance in customers' acceptance of advertising messages. The linear relationship between all considered culture dimensions and customers' advertising acceptance is significant with an F-value of 29,457 at the 0,01 significance level. Therefore, the model is appropriate for this study.

In individualistic society, advertisements that reflect individualistic values can influence positive customers' attitudes. Thus, the hypothesis below:

H1. Online advertisements that emphasize individualistic values have positive influence on advertising message acceptance among Polish customers.

Since the significance level of dependence between individualistic values and advertising message acceptance was 0,000, which is less than 0,05. Therefore Hypothesis 1 is accepted. Individualistic values in online advertising have a significant positive influence on customers' acceptance level (beta = 0,487). The high level of advertising acceptance in case of individualistic values shows the specific expectations of surveyed customers, because they prefer, characteristic for Polish culture, individualistic values. The high acceptance of online advertisements that emphasize individualistic values is the consequence of customers' expectations, because they are created in cultural context.
Also advertisements, which emphasize high power distance values can influence positive attitudes and high acceptance level among surveyed consumers. Hence, the hypothesis below:

H2. Online advertisements that emphasize high power distance have positive influence on advertising message acceptance among Polish customers.

The significance level in case of high power distance values was 0,000, therefore, H2 is accepted.
The beta value for this variable was 0,327. Therefore, values connected with high power distance have a significant positive effect on customers' acceptance level. Advertisements that reflect such values can effective influence purchase behaviors of surveyed customers.
Also masculine values reflected in advertising messages can cause increasing acceptance level of online advertisements among surveyed customers. Thus, the hypothesis below:

H3. Online advertisements that emphasize masculine values have positive influence on advertising message acceptance among Polish customers.

Significance level in this case was 0,000, hence, H3 is accepted. The beta value for this variable was 0,351. Therefore, masculine values in advertisements have a significant positive effect on advertising acceptance and customers' attitudes.
The last considered culture dimension, which can influence customers' attitudes towards advertising is uncertainly avoidance. The surveyed customers represent culture with high uncertainly avoidance.
Thus the hypothesis below:

H4. Online advertisements that emphasize high uncertainly avoidance have positive influence on advertising message acceptance among Polish customers.

The significance level of dependence between high uncertainly avoidance and advertising message acceptance was 0,000, which is less than 0,05. Therefore Hypothesis 4 is accepted. The test also showed that high uncertainly avoidance had the highest coefficients (beta = 0,569) compared to others. In other words, this variable has the highest impact on increasing of online advertising acceptance level. Online advertising, which consists values connected with high uncertainly avoidance causes positive customers' attitudes and better advertising effectiveness.

According to conducted analysis, consideration of cultural values, which reflect culture dimensions typical for particular customers group have positive influence on customer experiences, online advertisements effectiveness and their acceptance level. The difference in acceptance level, customers' positive attitudes and advertisements effectiveness is especially considerable in case of uncertainly avoidance. Poland is country with very high level of uncertainly avoidance and this fact

has its manifestation in research results. The highest acceptance level among surveyed Polish customers have online advertisements that emphasize values connected with strong uncertainly avoidance.

Internet offers companies more ready access to the global market. With the Internet, even small companies can establish a website to sell directly to consumers in other countries. This favors a cost-effective standardization approach in online advertising. Secondly, the Internet also makes access to information much faster and easier for consumers in different countries. The globalization has homogenized consumer tastes, but international companies decide create a standardized campaign or make varied advertisements for select countries.

Though the above arguments suggest that online advertising may follow a more standardized approach, empirical research findings seem to suggest otherwise.

Comparison of websites and online banner ads across countries also reveals significant cross-cultural differences on at least some content and design elements. Furthermore, studies of online consumers show that Internet users in different countries exhibit diverse online behavior, and that their response to online advertising is dependent on elements of their home culture (Paek et al., 2009).

Localization of international advertising campaigns consists of adapting the company's communication to the specificities of the local environment of the hosting countries. While use of uniform advertising appeals offers a number of advantages, differences in customer perceptions and response patterns across countries and cultures are major barriers to use of a standardized advertising campaign.

Conclusions

This study investigated the impact of Hofstede's culture dimensions on consumers' attitude towards online advertising. On example of young Polish customer group the significant influence of cultural values connected with Hofstede's culture dimensions on online advertising perception has been confirmed.

Online advertising is still subject of cultural influences and consumers in different countries may still require communication messages that are targeted toward their specific culture. Localization of international advertising campaigns consists of adapting the company's communication to the specificities of the local environment. The consequences of not considering all the hidden meanings can be quite serious and lead, first of all, to the failure of the advertising campaign which does not fulfill its function and instead of attracting customers has a reverse effect.

Cross cultural communication solutions are also critical to effective cross cultural advertising. There will never be a common transfer code for all cultures. International marketing involves recognizing that customers all over the world have different needs, requirements and expectations.

The globalization also means that companies nowadays are addressing an incredibly varied target audience, with many different cultures. New technology development, increasing competition and consumer expectations have enforced substantial changes and new targets that can only be achieved through an adaptation approach. Consumers have also become very demanding, and new media, in particular the Internet, have become new communication channels but have also introduced new customers' requirements connected with online advertising and its cultural content.

There are some limitations in this study, connected with a limited study sample. Additionally, the empirical data were gathered only in Poland. A future study should try to validate and generalize the findings of this study by using a wider sample and taking into consideration customers' expectations from other countries.

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Determinants of Logistic Service Quality in Omni-Channel Retailing

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Abstract

Today's customers expect an integrated shopping experience where they can combine the different channels according to their preferences and omni-channel is a way for retailers to meet this need. Omni-channel retailing allows to connect the benefits of different retail channels integration. The paper describes the notion of omni-channel retailing and the concept of logistics service quality. Customer satisfaction is dependent on the difference between customers' expectations and the real service experience. Logistics service quality (LSQ) influence customer satisfaction and has a positive impact on fulfillment of customers requirements in omni-channel shopping The changes in consumer requirements and purchase behaviors in omni-channel shopping environment have been characterized. In this context the factors influencing consumer satisfaction level and determinants of logistic service quality have been indicated. This study aims to explore the concept of omni-channel retailing in the context of logistic service quality determinants. The study successfully verified the positive relationship between logistic service quality and customers' satisfaction in omni-channel retailing. Analysis of the collected data answered the study's hypotheses, contributing to the knowledge about dependency between customer satisfaction, and the considered dimensions of logistic service quality, related to product searching, order and product choice, product delivery, after sale service and shopping channel integration. Understanding the most influential elements for customers' decision-making is not only beneficial for future logistic development but also for increasing customer satisfaction in omni-channel retailing and successful improvement of quality management in retailing companies.

Keywords: logistics service quality (LSQ), retail logistics, consumer satisfaction, omni-channel retailing.

Introduction

Today's customers expect an integrated shopping experience where they can combine the different channels according to their preferences. Therefore many companies operate in numerous online and offline channels. This new form of retail is referred as omni-channel retailing (Rigby, 2011). The essence of this concept assumes that the retailer is able to reach and interact with its customers through combining all its established sales channels in an integrated manner (Frazer and Stiehler, 2014). In contrast to traditional retailing, omni-channel retailing has a major advantage in terms of product availability, customer service and the reduction of the company's management, operational and coordination efforts. Channel integration enable consumers to select the most advantageous distribution channel in terms of proximity, convenience, price, kindness of personnel, store ambience, products and information availability, delivery speed and channel transparency and accessibility (Moussaoui et al., 2016).

Customer can choose to use any of the available channels during any phase of their buying process depending on their needs. With increasingly complex ways to purchase, companies want to be present in as many channels as possible to give customers the ability to interact and purchase where and when they want.

The most important aspect of customer needs providing is fast delivery and high quality of service. Shopping channel integration has not only an important impact on consumers' ordering processes, requirements, expectation and shopping behaviors, but also creates new opportunities for companies. Customer satisfaction is dependent on the difference between customers' expectations and the real service experience (Zeithaml, 2003). Researchers suggest that logistics service quality (LSQ) can influence customer satisfaction and indicate that the quality of the logistics service can have a positive and significant impact on fulfillment of customers requirements in omni-channel shopping (Saura and Ruiz-Molina, 2011). Therefore, the exploration of this research problem is necessary in order to provide a suitable and measurable framework for evaluation of logistic service quality in omni-channel retailing.

This study aims to explore the concept of omni-channel retailing in the context of logistic service quality determinants.

Understanding the most influential elements for customers' decision-making is not only beneficial for future logistic development but also for increasing customer satisfaction in omni-channel retailing and successful improvement of quality management in retailing companies.

This study applies the following research methods: analysis of scientific literature, online survey, and statistical analysis of data (correlation analysis).

The study is structured as follows. After this introduction, the theoretical foundations and hypotheses that support the study have been described. Next section details the methodological procedures, followed by an analysis of data and defines the dimensions of the proposed framework and its indicators. Than the results of research have been presented and discussed. Finally conclusion and suggestions for the continuation of the research have been presented.

Literature Review

Omni-channel retailing has developed as an extension of multi-channel retailing. The difference between the concepts is the level of integration, where an omni-channel requires optimal and complete channel integration compared to a multi-channel where the level of integration varies from non-existing to high. Omni-channel retailing strategy can have a positive effect on retail, because a consumer's experience is properly enhanced through the simultaneous use of all available distribution channels (Chopra, 2016) as well as through social media, games, applications for portable devices which make the experience unique and encourage customers to buy (Verhoef et al., 2015). A major objective of retailers is to provide consumers with positive and unique experiences when they gather information for decision-making and look for the best ways to satisfy their needs and requirements (Gong and Janssen, 2015). Customers have high expectations for receiving great experiences across all of the channels they use. In an omni-channel context, the consumer expects to be able to buy desired products from a variety of channels, including websites, mobile devices and physical stores according to individual preferences. Omni-channel retailers can for example allow the customer to place an order online with the possibility of collecting the products in the physical store. They can also install online terminals in the physical stores and join the benefits of the online sales channel with the direct contact, help and assistance of salesperson. In addition to this, in order to make the website more omni-channel oriented the retailer can provide information on in-store product availability as well as store location as a way to connect the website with the physical stores (Kumar et al., 2012).

Logistics services are closely connected with customer's satisfaction in omni-channel environment and logistics processes management significantly influences customer satisfaction. The quality of logistics services is one of the most important elements that helps to satisfy completely the customers' needs in omni-channel retailing (Campos and Nobrega, 2009). Perception of logistics service quality is not only oriented towards the physical distribution, but is especially related to the after-sales service. It is determined by the following factors: customers' perception of the after-sales

services, quality and relevance of information provided by sales, order and delivery procedures (Rafiq and Jafar, 2007).

In order to deliver superior service quality, it is necessary to understand how consumers perceive and evaluate logistic service during all stages of purchase process (Marimon et al, 2010). Traditional service quality assessment is based on the well-known SERVQUAL model and proposes five dimensions of quality evaluation: Responsiveness, Assurance, Tangibles, Empathy, and Reliability (Pasuraman et al., 1988). But this service quality assessment model is focused on the traditional buyer-seller interaction. Therefore, this model should be extended by other dimensions, which are specific for omni-channel retailing. From customers' post-purchase evaluation, it can be seen how much customers value logistics service quality. Studies have shown that service quality is an important factor which influences customer satisfaction ((Rafiq and Jafar, 2007). Two core elements of omni-channel shopping are Logistics and Customer Service – ensuring that customers can receive the products ordered as soon as possible and that they can receive information and assistance during purchase process (Querin and Göbl, 2017).

The customers perception on logistic service quality is not only oriented towards the physical distribution, but is especially related to the after-sales process. Logistic service quality is determined by the following factors: customers' perception of the after-sales services, quality and relevance of information, order and delivery procedures, order release quantity, timeliness, order accuracy, order quality, error handling and staff communication (Mentzer et al., 2001). Another factors indicated as logistics service quality determinants are: customers' perception of the after-sales services, quality and relevance of information provided by sales and customer care representatives, order and delivery procedures (Bienstock et al. 2008). Customer concerns about several important elements with a close relationship to the customer value: time, dependability, communication and flexibility. Those elements indicate the requirements and expectations from customers, because they expect to gain the chosen products in easy and convenient way and as less time as possible (Rushton et al., 2010).

Research findings indicate that to increase the level of customer satisfaction companies should provide a high level of service quality (Meidutė-Kavaliauskienėa, 2013). With the rapid development of different shopping channels, customer demand for diversity and timeliness has also increased. Channel integration and implementation of omni-channel strategy lead higher requirement for logistics service (Wang, 2015). The quality of service is directly correlated to customer expectations. In today's competitive environment, satisfaction of customers' expectations regarding service quality affects business performance and encourages customer loyalty (Huang and Huang, 2012; Kilibarda et al. 2012).

According to studies conducted in retail companies, unified customer experience is a key factor for success in omni-channel strategy. On basis this studies the factors that influence customer experiences have been indicated: unified product information and pricing across different channels, flexibility of purchase systems, high quality logistics service, and customer communications. Unified pricing and product information across channels is a fundamental requirement for unified customer experience. If prices or information vary from one channel to another, it is very difficult to offer customer a unified and intuitive links between channels. Pricing and product information variation decrease the predictability for the customer, and might cause the customers to reconsider their purchase decision. Flexibility in systems and logistics is very important in omni-channel strategy development. E-commerce platform and traditional store integrated with logistics systems provide the flexibility in channel choice and high quality logistics customer service, where customer can freely choose and change their preferred delivery or pickup method from any service channel. The next important factor is unified communications to customers, which have a significant impact on omni-channel shopping experience. New channels and communications processes require the unity of marketing messages (Peltola et al., 2015).

Logistics services appear to deeply contribute to the general satisfaction for purchases. The availability of a product and its delivery times, the returns and warranty conditions are critical aspects of customer service quality. Increasing competition, turbulent business environment, changes in

consumers' behaviors, and new distribution channels cause that the ability of companies to understand their customers and ensure their satisfaction with high quality product and services is becoming more and more significant. The integration of shopping channels provides the retailer with more possibilities to satisfy the customer's requirements and expectations and customize its products and services according to each customer's needs. The increased interactions between different online, mobile and traditional shopping channels in all phases of customer buying process have forced the retail companies to change the management of their customer logistics services. A growing number of customers visit company's online channels before coming to the physical store, and a significant increase the use of mobile services during shopping. This omni-channel behavior becoming more common among customers.

Methodology of Research

The core element of online, mobile and physical channel integration is high logistics service quality on each phase of buying process, but customer satisfaction depends on various factors. This paper reviews the most recognized evaluation criteria of logistic service quality assessment in the context of omni-channel retailing. Based on the review of the collected literature, the following hypotheses have been developed for this study:

Hypothesis 1 (H1): Convenient conditions of product searching determinates e-logistic service quality assessment in omni-channel retailing.

Hypothesis 2 (H2): Suitable conditions of order and product choice determinates e-logistic service quality assessment in omni-channel retailing.

Hypothesis 3 (H3): Product delivery conditions determinates e-logistic service quality assessment in omni-channel retailing.

Hypothesis 4 (H4): After sale service determinates e-logistic service quality assessment in omni-channel retailing.

Hypothesis 5 (H5): Appropriate shopping channel integration determinates e-logistic service quality assessment in omni-channel retailing.

The empirical sample was the young customers, that make purchase with help of different shopping channels. The respondents were asked to indicate the dimensions which influence their evaluation of shopping quality and satisfaction in omni-channel environment. The study population was members of academic community. The data was collected in the form of an online survey. The online questionnaire applied in this study included two sections. The first section collected information about respondents, their shopping habits and behaviors. The second part collected the information required for running the main analyses. All survey participants were young people, aged under 25. Each participant of the study was asked to answer the survey questions. Among 92 respondents, that replied the online questionnaire, 3 of them indicated that they have little or no experience of omni-channel shopping, and 9 questionnaires were uncompleted. The remaining 80 questionnaires were the basis of the study and have been used in the analysis of data, by using correlation analyze. (V-Cramer's coefficient) analysis. Respondents included 35% males and 65 % females. All surveyed respondents, that have been taken into consideration, browse regularly e-commerce sites, have experience of online shopping and shopping in omni-channel environment. They confirm that they often join different shopping channel, for example make an order online, watch the product in physical store, use recommendation and suggestion of salespeople, and search for online opinion and recommendation of others consumers.

The reliability test used was Cronbach's alpha. For all research variables values were higher than 0,8. Cronbach's alpha for conditions of conditions of product searching was 0,847, conditions of order and product choice 0,829, product delivery conditions 0,856, after sale service 0,832, shopping channel

integration 0,841. Cronbach's alpha showed high internal consistency, what implies that the measures are reliable and the evaluation instrument is appropriate for use in research.

In questionnaire, each respondent determines the importance of every factor with a five-point Likert scale (very unimportant, unimportant, neutral, important, very important). Correlation analyze was used to estimate the unique effect of each factor typical for shopping in omni-channel environment on consumers' satisfaction levels.

The main limitation of this research is sampling. Therefore, results of the online questionnaire and all findings can be applicable only to the study sample.

Results and Discussion

Based on previous literature study, five logistic service quality attributes influencing customers' satisfaction in omni-channel shopping were selected and then subjected to examination (Table 1). The distribution of attributes related to: product searching, order and product choice, product delivery, after sale service and shopping channel integration was divided on the basis of consumers' gender.

Table 1: Arithmetic mean of the satisfaction level in omni-channel shopping

Arithmetic mean		**Conditions of product searching**	**Conditions of order and product choice**	**Product delivery conditions**	**After sale service**	**Shopping channel integration**
	women	4.75	4.91	4.87	4, 62	4,71
	men	3.79	4.78	4.42	3,87	4,29

Source: own elaboration.

In order to get a better look at which factors are related to each other, a data analysis was carried out, which determined the correlation between the level of satisfaction between selected factors with the division of groups with respect to gender. The analysis of the correlation of individual factors affecting the satisfaction level was carried out at the 0,05 level of significance. The results of the correlation matrix are presented in tables 2 and 3.

Table 2: Correlation matrix for men

Variables	**Correlations (men)** **Marked correlation coefficients are significant from p < 0.05**					
	Mean	Conditions of product searching	Conditions of order and product choice	Product delivery conditions	After sale service	Shopping channel integration
Conditions of product searching	4.75	1.000	0.624	0.612	0.625	0.347
Conditions of order and product choice	4.91	0.572	1.000	0.531	**0.947**	**0.761**

Product delivery conditions	4.87	0.617	0.543	1.000	0.423	0.534
After sale service	4, 62	0.541	**0.947**	0.463	1.000	0.000
Shopping channel integration	4,71	0.369	**0.761**	0.528	0.000	1.000

Source: own elaboration.

The factors considered as determinants of omni-channel retailing quality directly affects the level of customer satisfaction (table 1). The selected delivery factors have been chosen properly, which shows average satisfaction weights from 3,79 to 4,91 on a five-point scale. It should be noted that men and women declare different expectations and preferences. For both women (4,91) and men (4,78) the most important features, connected with omni-channel shopping are conditions of order and product choice. Very important factor for both gender is shopping channel integration. But women pay more attention to this factor (4,71) as men (4,29). Other considerable factor influencing customer satisfaction level in omni-channel shopping are product delivery conditions. They play an important role in creation of shopping experience for both women (4,87) and men (4,42). The significant factor of omni-channel shopping satisfaction is after-sale service. This factor has the higher value in case of women (4, 62) than in case of man (3,87). It exists the visible difference between men and women preferences in regard to quality of after-sale service. The differences are visible also in case of product searching conditions, were women pay more attention to this phase of buying process in omni-channel environment (4,75) as men (3,79).

The correlation analysis gave the possibility to explain some phenomena. In the case of male customers (table 2), the after sale service is strongly correlated with the conditions of order and product choice (0,947) and with shopping channel integration (0,761). In the case of female customers (table 3), the after-sale service is strongly correlated with the conditions of order and product choice (0,579).

Table 3: Correlation matrix for women

Variables	**Correlations (women)** **Marked correlation coefficients are significant from p < 0.05**					
	Mean	Conditions of product searching	Conditions of order and product choice	Product delivery conditions	After sale service	Shopping channel integration
Conditions of product searching	3.79	1.000	0.000	0.047	-0.147	-0.453
Conditions of order and product choice	4.78	0.000	1.000	0.287	**0.579**	0.189
Product delivery conditions	4.42	0.063	0.342	1.000	0.492	-0.241
After sale service	3,87	-0.172	**0.579**	0.454	1.000	-0.052
Shopping channel integration	4,29	-0.437	0.168	-0.263	-0.046	1.000

Source: own elaboration.

Shopping in omni-channel environment is connected with requirements of appropriate shopping channel integration, unified shopping conditions and easy switching of shopping channel according to present customer's requirements. Therefore customers are interested in unified information, price

and marketing communication across different shopping channels, information accessibility and relevance, effective communication with staff, customer support service and help by product choice. Omni- channel shopping can reduce risk connected with online transaction, but customers are interested in suitable after-sale service, the returns and warranty conditions, error handling and staff communication.

The significant role of all considered factors connected wit assessment of logistic service quality in omni-channel shopping has been discussed and empirically proven. This study confirms also the differences between gender in assessment of different dimensions e-logistic service quality in omni-channel environment. Men and women have different preferences related to product searching, order and product choice, product delivery, after sale service and shopping channel integration. Thus, all research hypotheses was supported. Furthermore, the findings of this study are beneficial from the practitioners' perspective, because they indicated considerable differences in omni-channel retailing quality assessment between male and female customers.

Conclusions

Omni-channel retailing allows to combine the benefits of different retail channels. Integrated logistics processes across particular channels provide various shopping possibilities, availability of diverse purchase and delivery options and different information sources. Suitable shopping channels integration enables flexibility and convenience connected with purchase process and creates unified purchase experience. The crucial determinant of this unique experiences and customers' satisfaction is high quality logistics service on each phase of purchase process across all accessible channels.

The study successfully verified the positive relationship between logistic service quality and customers' satisfaction in omni-channel retailing.

Analysis of the collected data answered the study's hypotheses, contributing to the knowledge about dependency between customer satisfaction, and the considered dimensions of logistic service quality, related to product searching, order and product choice, product delivery, after sale service and shopping channel integration. The conducted study enables the indication of the most important and visible differences between female and male customers in evaluation of particular quality dimensions. It can contribute significantly to the improvement of quality management in omni-channel retailing and increasing customers' satisfaction.

The relatively small size of the research sample does not allow generalization of results. Future research should be based on a larger sample and, in addition, increase the number of features describing the level of customer satisfaction in omni-channel retailing. In addition, other demographic variables, such as age, culture, education level, and income should be considered in future study. Possible future research should also take into consideration data, collected from customers, who have experiences not only with traditional, online and mobile channels, but also with social commerce. Future research would offer useful knowledge for retail companies and improvement of their omni-channel strategy.

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Educational Challenges for EU Member States in the Era of the Fourth Industrial Revolution

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Abstract

The purpose of the paper is to assess the impact of public expenditure on education as a percentage of GDP on educational effects, measured using indicators included in the Education and Training Program 2010 and 2020 in European Union member states in the years 2010-2018. There was also an attempt to determine the desired directions of educational indicators in the context of Industry 4.0, which is the novelty factor in the paper. Models for panel data (longitudinal data) were used in the research. The results of the research suggest that an increase in public spending on education does not improve the effects of education. What is more, educational indicators used in the European Union do not adequately measure the results of education desired from the perspective of the Fourth Industrial Revolution. The occurring socioeconomic and civilization changes impose the shaping of new competences, both cyber-technical, which allow work with artificial intelligence, and social. Therefore, there seems to be a necessity for a comprehensive redefinition of educational policy, both in terms of its subjects, goals and content of teaching and recipients, which cannot be equated with an increase in public spending on education.

Keywords: Education and Training Program 2010 and 2020, public expenditure on education, Industry 4.0, panel research.

Introduction

Education is one of the main issues being in the area of interest of the European Union (EU). Although the EU does not pursue a common educational policy, it is very significant for the community, which is reflected in the Europe Strategy 2020. Amongst five of its goals, one is directly related with education (decreasing the percentage of early school leavers to less than 10% and increasing the number of people with some form of higher education by at least 40%), and three more have an indirect link to education policy (reaching at least 75% employment rate for people aged 20 to 64, investing 3% of Gross Domestic Product (GDP) in research and development and reducing the number of people at risk of poverty or social exclusion by 20 million). Specific educational objectives of EU member states were determined in a strategic framework for European cooperation in Education and Training 2010 (ET 2010) and Education and Training 2020 (ET 2020) (Council of the European, Union 2009).

The occurring socioeconomic changes, and in particular the Fourth Industrial Revolution (Industry 4.0) and society's aging have put new challenges before educational policy. The Fourth Industrial Revolution is based upon smart technology. Its essence lies in transferring most decisions remaining with people to the competence of machines and obliterating the border between what is biological and what is digital. The main source of these changes is, among others, the Internet of Things, artificial intelligence, blockchain, autonomous vehicles, 3d printing and advanced robotization (Schwab, 2016). The aforementioned changes impose the realization of educational processes based on new educational models which will allow not only to raise foregoing skills and qualifications of employees, but to develop new ones as well. As the global economy arrives at the common use of artificial intelligence (AI), the demand for employees having limited skills required for the

implementation of new technology, and managing and working with it, decreases (Butler-Adam, 2018).

This means certain effects for educational institutions. Firstly, the aim of the work of, among other things, scientists, policymakers, educators should be striving for sustainable development so that everyone can benefit from sophisticated AI solutions. The second effect concerns the program for teaching and learning. To achieve success as an employee on the labor market in the era of the Fourth Industrial Revolution, literacy and numeracy skills are necessary, but also understanding how the world is functioning. In practice, this entails the necessity of a greater interdisciplinarity of curricula, in the context of including artificial intelligence, which will allow future employees to work effectively with new technology and with each other.

The Fourth Industrial Revolution requires the shaping of competences, which permit the separation of the work of humans to that of IT systems or artificial intelligence. These competences can be divided into three groups: digital and technical, cognitive as well as social (Śledziewska & Włoch, 2020). Social competences, including emotional intelligence, are associated with building the social capital necessary to work in a team and the ability to work in diverse cultural conditions (PwC, 2017). Cognitive competences (called thinking skills) include creativity, logical reasoning, and solving complex problems. These will be particularly important in the era of the Internet due to the torrent of information because they allow to assess their credibility. As part of this group of competences, also relevant is adaptability and flexibility, which are important due to the changing expectations of employers. Krzanowski and Trombik (2018) indicate that the Fourth Industrial Revolution may lead to the disappearance of not only professions requiring repetitive manual operations, but also such based on the use of advanced skills and long years of education. Hence the importance of readiness to participate in the learning process for the entire life, which will guarantee the possibility of adjusting to the upcoming changes. The third type of competence, i.e. digital and technical, includes not only programming skills, data analysis and machine operation, but also knowledge of cybersecurity and the ability to solve digital problems (Śledziewska & Włoch, 2020). The analysis of digital competences in the aspect of Industry 4.0 was conducted by Murawski and Bick (2017) and Sun et al. (2018).

Considering the above premises, a research problem was undertaken, which was formulated in the form of questions: Does the increase in expenditure on education result in improved efficiency and effectiveness in education? Are the currently used indicators adequate to measure the competences required in the era of the Fourth Industrial Revolution? On the basis of such a specific problem, a research hypothesis was made, according to which the increase in public spending on education improves efficiency and effectiveness in education.

Data sources and research methods

The study used figures from 2010-2018 for 28 EU countries from Eurostat databases. The indicators of the Education and Training Program 2010 and 2020 (Table 1) were analyzed, which were the explained variables in the models. In the estimated models, explanatory variables were public expenditure on education as a percentage of GDP ($\beta 1$), GDP per capita ($\beta 2$) and people at risk of poverty and social exclusion rate ($\beta 3$). The choice of such variables was dictated by the dominant in literature approach to the economic aspect of education research based on the analysis of costs and benefits. This approach is also used in the EU, where both effectiveness and efficiency are tested. The effectiveness of education and training systems refers to the output which they generate (e.g. the number of graduates, the level of skills mastered by them when leaving school). Hence, attention is drawn to long-term benefits of education and training both of the individual as well as the entire society. In contrast, efficiency of education and training systems is measured by comparing their effectiveness (learning outcomes and long-term benefits) to the monetary input made to generate these outcomes. Therefore, the impact of public expenditure on education on the level of indicators which are currently used in the EU to measure the degree of achievement of the objectives set by individual member states (European Commission 2012) was analyzed. Furthermore, the model

involves two variables related to the level of society's affluence, to see how changes in per capita GDP and the extent of poverty affect various aspects of education.

Table 1: Indicators of the Education and Training 2020

Indicator	Description	Target
Early childhood education – [Model 1]	The share of children aged 4 to the age of compulsory primary education who are participating in education	At least 95%
Tertiary educational attainment – [Model 2]	The share of 30 to 34-year-olds having successfully completed ISCED level 5-8[1]	At least 40%
Early leavers from education and training – [Model 3]	The share of 18 to 24-year-olds having attained ISCED level 0-2[2] and not receiving any formal or non-formal education or training in the four weeks preceding the survey	Less than 10%
Adult participation in learning (lifelong learning) – [Model 4]	The share of 25 to 64-year-olds who received formal or non-formal education or training in the four weeks preceding the survey	At least 15%
Employment rate of recent graduates – [Model 5]	The share of employed 20 to 34-year-olds having successfully completed ISCED 3-8 one to three years preceding the survey and who are no longer in education or training	At least 82%
Underachievement in (a) reading, (b) mathematics and (c) science – [Models 6a, 6b, 6c]	The share of 15-year-olds failing to reach level 2 in the OECD's PISA for reading, mathematics and science	Less than 15%

Source: Council of the European Union (2009)

Due to the nature of analyzed data (panel data with a balanced panel), models relevant to panel data were used. General notation of the panel model (Maddala and Lahiri, 2009):

$$y_{it} = \beta_0 + \boldsymbol{\beta}\mathbf{X}_{\mathbf{it}} + \alpha_i + v_t + u_{it}, \text{ i= 1,…, N, t=1,…, T}, \quad (1)$$

where: β_0 – absolute term; $\boldsymbol{\beta}$ – vector of structural parameters of the model; $\mathbf{X}_{\mathbf{it}}$ – matrix of values observed on explanatory variables; α_i – individual effects, part of the variability of *y* variable, typical of *i*-th unit (*N* effects); v_t – periodic effects, part of the variability of *y* variable, typical of *t* period (*T* effects); u_{it} – purely random distortion component.

Results of Research and Discussion

In the first step, parameters of a pooled model were estimated. The model assumes that all units in it are similar; therefore, they can be described with a simple total regression model. Next, diagnostic testing was performed to determine whether there were any significant effects that would suggest the choice of a fixed effects model (FE) or a random effects model (RE). Tables 2 and 3 present the results of pooled model estimation.

Table 2: Estimation results of parameters of pooled models for models 1-5

Specification	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	86.4758***	7.4750	7.6448***	−5.7928**	90.3078***
Public expenditure on education as a percentage of GDP (β_1)	0.1868	3.6169***	-0.3181	3.2071***	0.6723
GDP per capita (β_2)	0.1951***	0.3145***	-0.0070	0.2023***	0.0618
People at risk of poverty or social exclusion rate (β_3)	-0.0192	0.2055**	0.1848***	-0.2107***	-0.7533***
R^2	0.1932	0.3667	0.1019	0.6217	0.3599
p-value for Breusch-Pagan test	0.0000	0.0000	0.0000	0.0000	0.0000
p-value for Hausman test	0.0005	0.0000	0.0002	0.0026	0.0027

*Note: *p<0.1, **p<0.05, ***p<0.01.*
Source: prepared by the authors

Table 3: Estimation results of parameters of pooled models for models 6a, 6b and 6c

Specification	Model 6a	Model 6b	Model 6c
Constant	19.2477**	13.1697*	17.0233**
Public expenditure on education as a percentage of GDP (β_1)	-1.4537	-1.3422	−1.8314*
GDP per capita (β_2)	-0.0198	0.0085	0.0390
People at risk of poverty or social exclusion rate (β_3)	0.4307***	0.7017***	0.5222***
R^2	0.2447	0.4719	0.2875
p-value for Breusch-Pagan test	0.0000	0.0000	0.0000
p-value for Hausman test	0.0027	0.0012	0.0000

Note: *p<0.1, **p<0.05, ***p<0.01.
Source: prepared by the authors

In the case of all the models considered, residual variance test results as regards the significance of individual effects provided the basis for rejecting a null hypothesis that assumes correctness of the OLS panel model in favor of an alternative hypothesis that recommends the use of a fixed effects model. Verification of the assumption about the constancy in variation of the random component of objects by the Breusch-Pagan test allowed the researcher to reject the null hypothesis in accordance with which the OLS panel model is correct in favor of the alternative hypothesis which takes that the random effects model is more appropriate. In the end, in the case of each of the models, the Hausman test confirmed the correctness of the choice of the fixed effects model (Kufel, 2020). Estimation results of model parameters are presented in Tables 4 and 5.

Table 4: Estimation results of model parameters for panel data with fixed effects for models 1-5

Specification	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	133.8700***	74.9574***	-4.4903	3.4728	84.6786***
Public expenditure on education as a percentage of GDP (β_1)	-3.0700***	-4.9838***	2.9078***	0.3835	-0.5614
GDP per capita (β_2)	-0.5491***	-0.0422	0.0172	0.2270***	0.6262***
People at risk of poverty or social exclusion rate (β_3)	-0.5074***	-0.3807***	-0.0232	-0.0204	-0.8463***
AIC	1435.699	1297.264	961.7123	1054.684	1317.155
HIQ	1479.724	1341.290	1005.738	1098.709	1361.180

*Note: *p<0.1, **p<0.05, ***p<0.01.*
Source: prepared by the authors

Table 5: Estimation results of model parameters for panel data with fixed effects for models 6a, 6b, 6c

Specification	Model 6a	Model 6b	Model 6c
Constant	50.1875**	35.2929**	89.1214***
Public expenditure on education as a percentage of GDP (β_1)	-1.5566	-0.2842	-5.1413***
GDP per capita (β_2)	-0.1368	-0.2632	-0.4473
Percentage of people at risk of poverty or social exclusion (β_3)	−0.6780**	-0.1352	-1.2106***
AIC	419.4120	355.7452	410.0250
HIQ	449.7042	386.0374	440.3173

*Note: *p<0.1, **p<0.05, ***p<0.01.*
Source: prepared by the authors

The analysis of data included in Table 4 indicates a decrease in the indicator of the participation of children in pre-school education with an increase in the level of explanatory variables (Model 1). The lack of a positive correlation between spending on education, and the share of children participating in pre-school education points to the occurrence of other factors impacting the level of this indicator. Identification of those factors is significant, because organized programs for the care and education of young children prior to enrollment in the primary school system affect children's later success at school (Dobbelsteen et al., 1999; Currie, 2001). Magnuson et al. (2004), Loeb et al. (2005) and Wong et al. (2008) in their research indicated that children who attended a center or school-based pre-school program in the year before school entry perform better on assessments of reading and math skills. Anthony et al. (2005) believe that pre-school education supports children's preparation for school and later academic success. Berlinski et al. (2008) consider pre-school education as an effective and viable policy to prevent early school leaving. In turn, the European Commission (2014) stresses two important elements related to pre-school education. Firstly, education brings the greatest economic and social returns over the lifecycle and helps to avoid later, more expensive and often less effective remedial actions. Second of all, a good quality pre-school education is highly beneficial to educational achievements and limits the risk of early school leaving.

Factors determining participation in pre-school education include both systemic and cultural dimensions. As part of the first group, of particular relevance may be the manner of organizing pre-school education, and what follows the availability of places in centers. It should also be mentioned that the demographic processes occurring in the recent years, including the decrease in the number of births, means the increase of availability of this form of education with given inputs (Łobodzińska, 2011). On the other hand, as for cultural factors, of particular importance is the family model and the occupational activity of parents; the higher it is, the greater the interest of parents in institutionalized forms of childcare (Spieß, 1997). Furthermore, professional activity reduces the risk of poverty and social exclusion. This is evidenced by the outcomes of research which indicate that the increase in poverty results in a decrease in the participation rate of children in pre-school education. Inequalities in access to pre-school education have been studied, among others, by the UNICEF Office of Research (2018).

The analysis of panel data in the case of indicator of people aged 30-34 with higher education shows that with increasing public expenditure on education, the percentage of people with such education decreases (Model 2). Concurrently, the increase in the at risk of poverty and social exclusion rate is accompanied by a decrease in the share of people with higher education. That may be because in the case of most European Union countries, higher education is paid and involves the necessity to incur financial expenses from private funds. Of the 43 higher education systems examined, only in 9 countries (including 6 belonging to the EU) higher education is free and therefore fully financed from public funds , while in the remaining countries studies are paid or paid partially (European Commission/EACEA/Eurydice, 2018b). A natural consequence of this situation is the lower percentage of people with a higher education in countries in which the level of poverty and social exclusion is higher. Furthermore, in the case of countries where higher education is paid, the rise in public spending on education does not mean a possibility of engaging smaller private resources, and what follows does not translate directly into an increased share of people with higher education.

Research on economic, social and demographic factors determining the probability of youth participation in higher education was conducted by Türk (2019), Chakrabarti (2010) and Sá et al. (2004).

The above-mentioned rules for the financing of educational systems from public resources mean that, as in the case of the previously analyzed indicator, an increase in public spending on education results in an upshift in the rate of early leavers from education and training aged 18-24 (Model 3). Being over 18 years old, and sometimes even 16 years in some European Union member states, means the end of the period of compulsory and free education, which can be continued in the form of various types of courses, training and university studies (European Commission/EACEA/Eurydice, 2018a), which is tantamount to the need to finance further education from private funds. Certainly, this is only one of the reasons for which young people do not choose to continue education (Van Caudenberg et al., 2017, Nairz-Wirth 2014, Tomaszewska-Pękała et al. 2017). More on micro-, meso- and macro-factors influencing the decision to continue learning can be found in (Van Praag et al. 2018). Moreover, what is worth highlighting, early school leaving can pose a significant threat to human capital resources, especially in the face of the Fourth Industrial Revolution and new competences that will be required of employees.

As in the case of the above discussed indicator, the level of the rate of participation of people aged 25 to 64 in the process of lifelong learning is also important from the point of view of the challenges related to the Fourth Industrial Revolution. Karaman stated that the importance of lifelong learning has increased as a result of rapid change in the world (Kaplan 2016). Klug et al. (2014) described lifelong learning as a process that includes a rapid change through which individuals acquire competencies in different areas during their lives. In the case of the analyzed indicator, amongst the explanatory variables of significance is GDP per capita (Model 4). With the increase of this indicator upshifts the value of the analyzed rate. The level of affluence determines the possibility of financing additional education both from individual incomes and the scope of financial support provided by the private and public sectors. Similarly to pre-school education, also with the analysis of this indicator we should consider the occurring demographic changes, which in the coming years will affect the shape of formal, non-formal and informal education. Future labor resources in Europe will be recruited from a population significantly older than at present, while at the same time completely new competences will be expected of it (Schwab 2016). This will require a change of training systems, especially of adults, from which a significant part of employees will be recruited, and further socio-economic development will depend on the effects of their employment.

In turn, the estimated model for the employment rate of recent graduates indicates that the increase in GDP per capita causes an upshift in the employment rate among people aged 20-34. Concurrently, the growth of the at risk of poverty and social exclusion rate results in a decrease in the level of employment in the studied group (Model 5). As part of the ET 2020 program, an objective was established for EU member states in the scope of the share of employed graduates (aged 20-34 with at least upper secondary education attainment and having left education 1-3 years ago) at a level of at least 82%. According to OECD (2006) surveys, particularly younger people with low human capital and skills are more vulnerable to long-term unemployment, unstable and low-quality jobs and possibly social exclusion. In the light of the cited research, the increase of poverty among young people limits, as a result of too low financial resources, their possibility of raising professional qualifications and thus makes them less competitive on the labor market. These rationales provide clear evidence for the significance of education, but of relevance from the preceptive of the labor market is also professional experience. Caroleo and Pastore (2007) conducted research in this area; they pointed out that the "gap in experience" is a key factor explaining a higher unemployment rate among people entering the labor market, and thus a higher level of poverty, compared to people with longer seniority. Moreover, the "school to work transition" institutions are also of great importance when undertaking the first job (Ryan, 2001). More on this topic can be found in Brunello et al., (2007), the European Commission (2008), Perugini and Signorelli (2010a, b), Nunziata and Staffolani (2007), Kolev and Saget, (2005), Bassanini and Duval (2006) and OECD (2006). The literature also indicates difficulties associated with entering the labor market after graduation (Sciulli and Signorelli, 2011). The problem of youth unemployment was described in detail by Choudhry et al. (2012).

Interesting conclusions are provided by the analysis of the impact of explanatory variables on underachievement rates in reading, math and science (Models 6a, 6b and 6c). It goes without saying that the increase in spending on education causes a decrease in the percentage of fifteen-year-olds experiencing learning difficulties, nonetheless it is puzzling that the increase in the rate of poverty and social exclusion also causes a decrease in the percentage of underachieving students. Only the results of the naive analysis (pooled) (Table 3) indicating that the increase in poverty is accompanied by an upshift in the percentage of teenagers with school failure are as expected. This is confirmed by the research of Magnuson and Votruba-Drzal (2009), which demonstrates that poor children perform worse than those from wealthier families at the beginning of education, and poverty in early childhood shapes the results in children's learning. Reardon (2011) shows that the difference in performance between the wealthy (90th percentile of income) and the poor (10th percentile of income) increased over time. The upshift in inequality in performance is likely due to the fact that wealthier parents invest more resources in the development of their young children. Magnuson and Waldfogel (2016) elaborated on this subject more widely. However, it must be remembered that the mentioned research results refer to studies at the micro level (the statistical unit is the student).

With respect to the results of panel studies (Table 5), it should be noted that they are conducted at the level of countries. In the first place, it must be mentioned that in EU member states primary education is compulsory and financed by the state, and therefore the individual's level of poverty does not directly affect the availability of education (European Commission/EACEA/Eurydice, 2018a). Moreover, a thorough analysis of the results of Programme for International Student Assessment (PISA) 2015 indicated that students from socially and economically disadvantaged groups and those with a migrant background are over-represented in the low-performing group. In most countries, students with migrant background perform worse than students without it. For example, the probability of underachievement in science among migrant pupils is twice as high as for non-migrant ones (European Commission, 2019). At the same time, it should be remembered that countries with a high proportion of students with migration roots have low levels of the people at risk of poverty and social exclusion rate. Therefore, it is not the increase in poverty that causes the school failure rate to fall, but the demographic structure of society in individual countries, including the proportion of migrants.

Academic performance is also affected by the shape and mechanisms of functioning of education systems, including the curricula. EU member states have complete freedom in shaping both the school system and the teaching contents. The development of indicators related to underachievments also depends on other factors, e.g. parental involvement. Epstein (2011), Epstein et al. (2009), Rafiq et al. (2013) and Grace et al. (2013) demonstrated a positive relationship between children's involvement and academic success.

Summarizing the results of the conducted panel research, it can be noticed that not all the considered explanatory variables turned out to have statistically significant influence on indicators included in Education and Training 2020. Generally, with the ceteris paribus assumption, higher spending on education results in an increase in early leavers from education and training rate, a drop in early childhood education rate, a decrease in tertiary educational attainment rate and a decrease in underachievement in science rate. Therefore, we should reject the hypothesis that the increase in public spending on education improves efficiency and effectiveness in education.

Conclusion

The results of the research suggest that an increase in public spending on education does not improve the effects of education. Similar conclusions were reached by Noss (1991), Mingat and Tan (1998), Flug et al., (1998) and Hanushek (2020) indicating that there is currently no clear, systematic relationship between public expenditure for education and measures of education attainment. In turn, Gupta et al. (2002) showed that greater public spending has a positive impact on widely used measures of education attainment, but only in the case of spending on primary and secondary education.

The occurring civilization changes and the Fourth Industrial Revolution call for the need to search for new models of education, on the basis of which educational processes should be implemented and which will enable the acquisition of key competences for entities of the education system. According to the results of the Deloitte (2019) report, 55% of respondents noted a significant mismatch of the current scope of employees' competences to the requirements of the future, and 57% of respondents believe that the current education system is not sufficiently preparing young people to function in the conditions of the Fourth Industrial Revolution. The deficit in employee competence indicated in the report is not reflected in the level of indicators and the degree of achievement of ET 2020 objectives. This points to the inadequacy of educational indicators used for measurement of competences required in the era of the Fourth Industrial Revolution. Seeing this problem, and in particular the deficit of digital skills, the European Commission (2018) has adopted a Digital Education Action Plan which includes 11 actions to support technology use and the development of digital competences in education. It aims to make better use of digital technology for teaching and learning, developing digital competences and skills as well as improving education through better data analysis and foresight. However, the actions undertaken in this scope regard only digital competences, while omitting social and cognitive ones.

Therefore, there seems to be a necessity for a comprehensive redefinition of educational policy, both in terms of its subjects, goals and content of teaching and recipients, which cannot be equated with an increase in public spending on education. What is apparent from the conducted research, increased public expenditure on education does not translate into an increase in the participation of children in pre-school education, an increase in the percentage share of people with higher education, an increase in the percentage share of lifelong learners, or an increase in the employment rate of recent graduates. What is more, increasing public spending on education does not contribute to a decreased share of 15-year-olds failing to reach level 2 in the OECD's PISA for reading, mathematics or science. Considering the educational challenges stemming from the Fourth Industrial Revolution, in the light of investigations carried out, the main focus should be on development of non-compulsory education, improving the qualifications of people of working age, as well as financial support for training these people from the public budget. Taking these aspects into account will help improve the level of participation in lifelong learning rate and early leavers from education and training rate, which is particularly important from the point of view of the challenges of Industry 4.0. Modeling of education policy must also take into account demographic changes and be aimed at opening education systems to new audiences. With the change of elements of policy, the set of educational indicators should be extended so that they are also oriented towards measuring digital and technical, cognitive and social competences. The socioeconomic and civilization changes occurring in the era of the Fourth Industrial Revolution mean than both cyber-technical competences allowing to work with artificial intelligence as well as soft skills will soon be widely demanded from employees. Educational policy must be directed towards shaping these competences. If not, the next few years may bring an exclusion of a certain number of employees from the labor market due to a deficit of digital competences. This will result in a decrease in labor productivity, which will have an impact on the level of economic growth.

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Endnotes

[1]International Standard Classification of Education (ISCED) level 5 – Short-cycle tertiary education; level 6 – Bachelor's or equivalent level; level 7 – Master's or equivalent level; level 8 – Doctoral or equivalent level (UNESCO Institute for Statistics, 2012).
[2]ISCED level 0 – Early childhood education; ISCED level 1 – Primary education; ISCED level 2 – Lower secondary education (UNESCO Institute for Statistics, 2012).

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Application of Industry 4.0 Technologies to Support Lean Companies

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Abstract

The article presents results of empirical research regarding relationship between two leading management concepts: Lean Management and Industry 4.0. It investigates answers to two research questions: how do Industry 4.0 technologies support companies, which operate according to Lean Management principles and in what directions can application of such technologies develop? Conclusions of the paper provide detailed description of Industry 4.0 solutions application within Lean companies and explaining complementarity of their relationship.

Keywords: Lean Management, Lean Manufacturing, Industry 4.0.

Introduction

Lean Management is currently considered to be one of the leading management paradigms in the world. Gaining popularity from 1990s, the concept has proven to provide significant competitive advantages like quality improvement of products and processes, cost reduction through waste elimination, delivery time improvement, increase of customer satisfaction, productivity growth and many more. Thanks to so many potential benefits, Lean Management principles are nowadays applied in all kinds of companies, from small local factories to big global corporations, regardless of their profile and volume.

In parallel to the growth of Lean Management, a new management concept is becoming increasingly popular, starting from beginning of XXI century – Industry 4.0. Basing on dynamic development of new manufacturing technologies and increase applicability of automatization and digitalization, this new approach has found a lot of appeal in an industrial environment (Wilkesmann, 2018). Industry 4.0 can be defined as an attempt to use various types of new manufacturing and IT technologies in industrial environment, in a comprehensive manner, both inside and outside of an enterprise. It can be used for communication / integration of various solutions between supply chain stakeholders, providing a broad scale of efficiency and competitiveness improvements, while reducing the costs of using them (Balasingham, 2016).

Industry 4.0 and Lean Management, despite being two separate concepts, share similar principles and targets, as both aim at improving productivity and flexibility of processes (Gerbert, et al., 2015). Due to this fact, increasing number of companies have made attempts to apply both approaches, hoping to rise potential business benefits even further. As the practical application of Lean Management and Industry 4.0 has developed, also a lot of researchers and scholars started to gain interest in the relationship between both concepts. One of key questions in this field relates to how both approaches support each other and in what direction can their relationship develop. This paper seeks to investigate this subject and answer stated above questions.

Lean Management and Industry 4.0

Due to the fact, that "smart factories" seem to be an unavoidable future of manufacturing in 21st century, Industry 4.0 has become one of the most-discussed management concepts, both in industry and academia (Klingenberg, et al., 2017). However, its growing popularity creates not only new opportunities, but also a lot of challenges for the companies, which decide to implement its principles. One of the subjects, which is yet to be fully understood and explored, is the integration of Industry 4.0 with other well-established management concepts, as Lean Management.

Lean Management, originated from Toyota Production System, in its purest form is totally independent to any kind of Industry 4.0 technologies (Buer, et al., 2018) However, as the two approaches share the same common goal of increasing productivity and flexibility, over the years, many manufacturing companies tried to simultaneously implement solutions specific to both concepts. First such attempts have been evidenced in early 1990s and were named as "Lean Automation" (LA), as they focused mostly on simple automation of production and information processes within a company. With the recent emerge of Industry 4.0, the subject of integration Lean with Information and Communications Technologies has gained more momentum. Figure 1 shows number of articles related to Lean Management and Industry 4.0 within a period between years 2015 and 2018 (Bittencourt, et al., 2019).

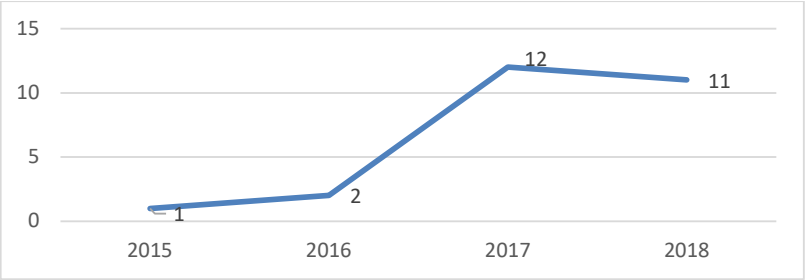

Fig. 1: Number of articles covering Lean Management and Industry 4.0 between years 2015 and 2018

Despite growing interest of this research area, there are still no conclusive findings regarding mutual interaction between both concepts. Some authors advocate, that Industry 4.0 conflicts with the ground principles of simplicity, continuous and small improvements typical to Lean Management and others claim that both approaches can be positively related (Rossini, et al., 2019).

One of more comprehensive theoretical studies, regarding the interaction between Lean Management and Industry 4.0 was performed by Sven-Vegard Buer from Norwegian University of Science, who analyzed 21 academic articles covering this subject. He identifies four theoretical lenses regarding the relationships between both concepts:

Industry 4.0 supports Lean Management

The first identified category, focuses on a question, how Industry 4.0 can support and further develop well-known Lean practices. It explores influence of new technologies on both implementation phase of Lean Management, as well as on already well-established Lean systems. According to Buer, this research area is covered in the most comprehensive way, with identified 18 academic papers. Majority of the studies focus on "hard" Lean practices, investigating, how the new technologies can improve existing Lean tools and methods. Findings of most of the papers confirm the statement, that Industry 4.0 does support companies in achieving the higher level of Lean Management. New information and communication technologies can reinforce effectiveness of such Lean tools and practices as Valve Stream Mapping, Poka-Yoke, Kanban, Heijunka, Andon, Total Productive Maintenance or Statistical Process Control. Despite these findings, the author points out, that a question regarding more detailed influence and optimal integration of both concepts seem to still be unanswered.

Lean Management supports Industry 4.0

The second identified perspective, focuses on Lean Management facilitation effect on Industry 4.0 implementations. This research category investigates, if already improved and waste-free processes can simplify introduction of new information and communication technologies. According to Wang (2016), a production process that already has implemented Lean is more likely to be modelled and controlled, which creates an easier foundation for building a "smart factory". Similar findings are also visible in other empirical studies. Research performed by Matteo Rossini, based on survey covering 108 European manufacturers, indicates, that EU manufacturers, which aim to adopt higher levels of Industry 4.0, should simultaneously implement Lean Management to support continuous improvement of organization (Rossini, et al., 2019). The study emphasizes, that companies which aim at achieving higher levels of Industry 4.0 must previously achieve a certain level of Lean maturity. This conclusion is also confirmed by survey on 179 industrial companies, which was conducted by Staufen AG (2016). It infers, that Lean Management seems to be an ideal foundation for companies shifting toward Industry 4.0 implementation.

1. Performance implications of an Industry 4.0 and Lean Management integration

The third research category investigates how integration of Industry 4.0 and Lean Management affects performance of the production system. In his article, Buer identifies eight studies covering this area. Their findings confirm, that integration of both concepts can have positive effects on cost, flexibility, productivity, quality inventory levels and reliability. It is stated however, that all of studies conducted so far, focused only on operational metrics of the companies, leaving a room for follow up researches.

2. The effect of environmental factors on an Industry 4.0 and Lean Management integration

The forth research perspective covers environmental factors, influencing the potential to integrate Industry 4.0 and Lean Management. No papers related to this subject has been identified. However, analysis of environments and sectors in which the integration of both concepts is the most beneficial and successful, remains very valuable and does require further exploration.

Apart from above mention categories, Victor Bittencourt, who conducted literature review of 26 different papers regarding Lean and Industry 4.0, identifies one more theoretical perspective, which is visible in existing studies (Bittencourt, et al., 2019). It is:

3. Barriers, constraints and difficulties in integrating Lean Management and Industry 4.0

As most authors confirm positive correlation between Lean and Industry 4.0, the last research perspective investigates potential barriers which may limit and impede their integration. The most important constrains, which are identified in the existing papers, include excessively complex manufacturing environment, lack of understanding of current architecture of production systems and mass customization of products.

To conclude, despite growing number of studies and papers related to Lean Management and Industry 4.0 integration, this research area still remains relatively immature and leaves plenty of room for further investigations. Some of the most commonly identified future research ideas are (Buer, et al., 2019; Cattaneo, et al, 2017; Mayr, et al. 2018):

- Investigating how to incorporate a human factor in Lean Management and Industry 4.0 integration model.
- Understanding the performance implications of an Industry 4.0 and Lean Management integration.
- Understanding environmental factors on the integration of Industry 4.0 and Lean Management.
- Creating holistic concept on Industry 4.0 and Lean Management integration.
- Defining the machine-human interaction and understanding how to integrate new professional functions such as data scientists in the current manufacturing environment.

- Understanding at what stage of the production process/ product lifecycle usage of Industry 4.0 is the most beneficial.
- Understanding interest conflict and trade-off of implementation of Lean Management and Industry 4.0.
- Understanding of pairwise relationships between specific Lean tools and Industry 4.0 technologies.

Research questions and research method

Considering areas stated above, there is a significant need to expand the current knowledge of Lean and Industry 4.0 integration. To address this need, research questions of this paper are as followed:

1) How do the Industry 4.0 technologies support companies, which operate according to Lean Management principles?
2) In what directions can application of Industry 4.0 technologies develop in companies, which operate according to Lean Management principles?

In order to answer such stated questions, a research method consisted of two steps was applied:

1) Literature review on existing Industry 4.0 technologies and their application to Lean companies.

The first step of the research was to analyze the existing literature related to Lean Management and Industry 4.0 technologies linkage. In order to do so, a systematic literature review was performed, using following criteria:

- Search on EBSCO, Emerald and Science Direct databases.
- Keywords used:
  "Lean Management" OR "Lean Manufacturing" OR "Lean Automation" AND
  "Industry 4.0" OR "Smart Factor*" OR "Digitalizat*".

As a result of such a search, 32 articles were identified. After further review based on abstracts, a final list of ten paper was selected for more in-depth analysis. Each article was then reviewed, focusing on answering the research questions. Based on the first research step, initial findings were developed.

2) Interviews with ten Lean and Industry 4.0 experts through the Delphi method.

The second step of the research method aimed at validation of initial findings through interviews with experts. The selection of experts was deliberate and included 20 Lean experts who are involved in the implementation or use of Industry 4.0 solutions in their enterprises.

As a first part of the interview, the experts were asked to answer specially designed questionnaires and describe how each of 14 defined Industry 4.0 technologies support Lean companies. As the second part of the questionnaire, the experts were asked to grade the influence of each technology with 0-5 scale (0 – no influence, 1 – very little influence, 2 – little influence, 3 – medium influence, 4 – strong influence, 5 – very strong influence).

The results of the study are presented in the next chapter of the article.

Research Results

Results of the carried out research, are summarized in the Table 1.

Table 1: Industry 4.0 technologies supporting Lean companies.

	Industry 4.0 technology	How does the technology support Lean companies?
1.	Cloud Computing	The technology closely supports Lean Management companies. Cloud computing provides "just-in-time" access to information, enabling employees to get the right information at the right time and the right place. Thanks to this, people can make faster and better decisions, which consequently increases their empowerment - key element of the Lean concept. The technology can also support real-time calculations for such important Lean metrics as WIP, OEE or productivity, enabling real-time problems resolution and eliminating waste in information flow.
2.	Big Data	Similarly as with the cloud computing, the big data supports better and faster decision making process within a company. It serves as an "engine", which processes complex and big-volume data enabling presenting them in condensed and more user-friendly form. This functionality goes hand-in-hand with fundamentals of Lean concept, which puts a lot of emphasis on real-time and visualization of results. The big data can also be used to improve problem solving processes, enabling using more data-oriented approach, which consequently supports more accurate root cause identification. Additionally, it is worth noting, that the importance of this technology will only increase, as the level of automatization within companies is growing bigger and bigger.
3.	Virtual Reality and digital simulations	Virtual reality is strongly connected with so called "Lean prototyping" approach, which supports faster and more efficient design of products or processes. Application of virtual reality enables visualization of future state concepts and performing functional tests in simulation of real-life conditions. Thanks to this, the design process can take less time and money - reinforcing Lean targets of cost and delivery reduction. Another application of virtual reality within Lean company is improvement of training process. The technology can improve both quality and time of new employee onboarding, by presenting real-life simulations and creating more visual training materials.
4.	Vertical and Horizontal Integration	Smooth information and material flow between suppliers and customers is one of key aspects of Lean Management, therefore horizontal integration technologies can constitute a significant support to Lean companies. By reinforcing better communication and real time status updates, they enable more accurate planning and real time problems resolution. Therefore, the technologies allow approaching to a Lean target state of just-in-time deliveries and shipments. On the other hand, vertical integration technologies support better information flow within company. They can be especially beneficial within escalation processes (Andon), visualization of results and quick problem solving.
5.	Augmented Reality	The technology can be really useful to such Lean tools as Training Within Industry (TWI), standardized work and Poka-Yoke. Regarding the first tool, Augmented Reality (AR) can accelerate training of new employees, by providing real-time instructions during actual performance of a work. Therefore, it supports also standardization, providing the best possible method of completing particular task in very user-friendly way. Additionally, the AR can have a strong quality significance. Right application of the technology prevents nonconformities from occurring (Poka-Yoke) or at least allows quick identification and correction of mistakes. Finally, the Augmented Reality is often used in warehousing processes, improving visualization of product location and speeding up pick-up times.
6.	Industrial Internet of Things	Application of this complex and powerful technology can be seen in two ways. On one hand, the IoT can strongly influence control of the whole production process within company. Applied in Lean organization, it can support better

		KPI control, maintenance of machines, faster problem identification and resolution. Collected real-time and big volume date, it can be used for further improvement of processes. On the other hand, some experts suggest, that Lean organizations, which traditionally focus on low cost and simple solutions, my find this technology excessively complex and too expensive to implement.
7.	Additive manufacturing technologies (for example 3D printing and rapid prototyping)	Additive manufacturing can have constitute a significant support to Lean companies. First, basic application can be 5S, where the technology is often used to create shadow boards and other visual supports. Second application can be seen as an emergency method of creating missing or broken units, to quickly fix machine breakdown. Nextly, additive manufacturing is important element to the Lean prototyping concept. It allows fast and cheap development of a prototype product, the perform visual checks or performance tests. Finally, the technology supports more customization of products, eliminating need for batch production and enabling better flexibility of a Lean company. It is worth noting, that according to surveyed experts, in order to apply these technologies on a industrial scale, it is necessary to decrease it manufacturing cost.
8.	Autonomous robots (for example cobots and AVG)	Based on surveyed experts, this technology has one of the biggest impacts on Lean companies. Autonomus robots can support elimination of wasteful activities, mainly within logistics and production processes. Automatic Guided Vehicles (AVGs) can optimize material flow by utilizing unmanned milk-runner cycles. The vehicles, which autonomously move on designated routes within defined hours, can support just-in-time deliveries of needed products. Additionally, the technology can used to apply one of key Lean principles, which is build-in quality. Machines with artificial intelligence can "draw conclusions" from previous mistakes and "learn" to prevent them from happening in the future. Autonomous robots can also be applied to eliminated un-ergonomic activities, improving employees safety and comfort of work.
9.	Cybersecurity	Most experts and Lean practitioners agree, that while cybersecurity is a necessity for modern organizations, it does not have a direct connection to Lean Management concept. Protecting stored and transferred data should be a must for every company, no matter if implementing Lean concept or not.
10.	Identification and sensor technologies (for example RFID and QR codes)	Due to relative simplicity, these technologies can be easily implemented to Lean companies. They can support organizations in multiple areas like warehousing, logistics, quality control, mistake proofing prevention, work standardization or visual management. Solutions such as RFID, provide excellent traceability of products by providing real-time data. This consequently enables better control of the process and faster reaction to problems, which is one of important Lean principle. Also, implementation of QR codes allow companies to eliminate wasteful processes and minimize manual mistakes.
11.	Mobile technologies (for example smartphones, tablets, etc.)	According to surveyed experts, mobile technologies can constitute one of the most relevant supports to Lean companies. Similar as for the previous solutions, these technologies are simple to introduce and are already quite available in the market. Being in line with Lean simplicity, supports like smartphones or tablets provide better access to information, enable better data collection and provide mistake proofing solutions. They can also significantly improve information and material flow within organization by introducing such tools as e-Kanban. Finally, mobile technologies strongly improve visual management, ensuring better tracking of metrics and enabling faster reaction to problems.
12.	Machine to machine (M2M) communication and Machine Learning	The M2M communication and Machine Learning technologies are directly connected to Jidoka pillar of Lean Management, which means "intelligent automation" or "humanized automation". According to this principle, Lean companies should aim a having automated processes, which are sufficiently "aware" of itself so that they will detect process malfunctions or product defects, stop itself and alert the operator. Machine Learning is therefore a perfect solution to achieve this target. Additional function of this technology can be

		also self-adjustment of parameters in case a machine detects any dangerous variations in a process.
13.	Artificial Intelligence	Artificial Intelligence can be considered as an integral part of Machine Learning technology, therefore its application in the Jidoka principle is also very significant. Compering to previously described technology, its application within Lean organization can be ever wider. Apart from Jidoka, the AI can also be used to ensure mistake proofing in all processes, both production and supporting like planning, purchasing or logistics. Additionally, it can be used during a design phase of product or process, by computing big-volume data and finding the optimal parameters or design. Interesting application of the AI can be also seen in call centers, to identify inicial problems of customers, however it is worth noting that traditional Lean companies should not allow leading customer service processes to robots.
14.	Blockchain	Most of the surveyed experts agree, that blockchain does not have much application within Lean companies. The reason for that may be still very little knowledge of this technology and not much practical application within production companies, The extend of blockchain application in Lean companies will be therefore proportional to its general application in industry.

Sources: (Buer, et al., 2018; Bittencourt, et al., 2019; Rossini, et al., 2019; Wang, 2016; Cattaneo, et al., 2017; Mayr, et al., 2018; Tortorella et al., 2018; Rüttimann, et al., 2016; Sanders, et al., 2016; Mrugalska, et al., 2017).

Based on opinions of the surveyed experts, it can be stated, that application of Industry 4.0 technologies within Lean companies will be steadily growing, as long as these technologies can support implementation of Lean Management principles within companies processes. The new information and communication solutions should therefore support increase of value added activities for products or services provided by company (e.g. increase in flexibility, innovation and quality of production), increase of customer service quality (including increased reliability and acceleration of information processing), reduction of processes duration time (including design, production and logistics), increase of work safety and contribute to reduction of costs by eliminating all kinds of waste in enterprises (muda). However, both authors and the surveyed experts agree, that as the Industry 4.0 technologies should promote rationalization of company's costs. It means, that in case where investment needed to apply them is too high, the implementation of such solutions should not be justifiable. Therefore, the difference of Industry 4.0 technologies usefulness between Lean and other companies, will be primarily based on the rationality of application based on the principles of Lean Management. This predictions, however, relate to a medium period of time (ten to twenty years), because of impossibility to predict directions in which humanity and technology will develop in a longer time frame.

As the second part of the questionnaire, the experts were asked to grade the influence of each Industry 4.0 technology to Lean companies with 0-5 scale (0 – no influence, 1 – very little influence, 2 – little influence, 3 – medium influence, 4 – strong influence, 5 – very strong influence). The summarized results of such an exercise are presented in Table 2.

Table 2: Industry 4.0 technologies based on their impact on Lean companies

Technologies	Average	Median	Standard deviation
Autonomous robots (for example co-bots and AVG)	4	4	1,05
Mobile technologies (for example smartphones, tablets, etc.)	4	4	1,05
Additive manufacturing technologies (for example 3D printing and rapid prototyping)	3,88	4	0,87
Identification and sensor technologies (for example RFID and QR codes)	3,77	4	1,39
Artificial Intelligence	3,77	4	0,92
Augmented Reality	3,55	4	1,57
Industrial Internet of Things	3,55	4	0,83
Virtual Reality and digital simulations	3,44	4	1,64
Vertical and Horizontal Integration	3,33	3,5	1,49
Cloud Computing	3,33	3	1,05
Machine to machine (M2M) communication and Machine Learning	3,12	3,5	1,36
Big Data	3,11	3	0,99
Cybersecurity	1,42	0	1,98
Blockchain	0,33	0	0,47

Analysis of above presented results was mainly conducted based on median, as in such a small sample size, the authors considered it to be the most reliable. It reveals, that nine out of 14 technologies have strong influence on companies, which are using Lean Management concept. The highest rated solutions, with average grade and median of 4, are autonomous robots and mobile technologies. Both of them were described as constituting the greatest support, due to two factors. First – they have very wide application within Lean company, enabling waste elimination and automation of many production and supporting processes. Second – both technologies are relatively simple to implement and already quite well established in production companies. Due to this fact, interviewed experts were able to give detailed examples of use to autonomous robots and mobile technologies supporting Lean principles.

Four out of 14 technologies were graded with median 3 or 3,5. These are Vertical and Horizontal integration, Big Data, Cloud Computing and Machine to Machine communication with Machine Learning. Within the surveyed experts there was quite a discrepancy in ratings, as each of these technologies got at least one grade of five and at least one grade of one or two. However, one thing in common for all four solutions is high level of complexity and time needed to introduce them in companies. Unlike the technologies rated the highest, those four are much more ambiguous in interpretation, being more general and high-level. This comprehensiveness does not go in line with general Lean rule of simplicity, hence the slightly lower grades.

Finally, two out of 14 technologies, which were rated the lowest are cybersecurity and blockchain. Both with different reasons. The first one, due to lack of clear relation to Lean Management concept, as the experts emphasized, that cybersecurity is a must have, no matter if company follow Lean rules or not. The second technology – blockchain, was assessed as the least influential, due to low practical applicability. It was stated, that this technology is yet to immature to have a significant impact on managing all production companies, not only the Lean ones.

Summary

As a result of conducted research, the authors obtained initial answers to previously formulated questions:

1) How do the Industry 4.0 technologies support companies, which operate according to Lean Management principles?
2) In what directions can application of Industry 4.0 technologies develop in companies, which operate according to Lean Management principles?

The research concludes, that technologies of Industry 4.0 do support companies, which operate according to Lean Management principles, however, the impact of each solution is varied. It can be stated, that both concepts can be complementary and support one another, as they share similar goals and objectives.

Detailed conclusions from the paper are:

1) There are two main conditions to successfully apply Industry 4.0 technologies in Lean companies: clear purpose of application and right financial justification. Following Lean principles, implementation of new information and communication solutions make sense only if they serve elimination of certain waste and their implementation is cost-efficient. If those conditions are not met, it is recommended to implement more traditional solutions.
2) Technologies, which constitute the biggest support to Lean companies are characterized by simplicity of use and easiness of implementation. Organizations, which operate according to Lean Management should always be economical, focusing on small and incremental improvements, rather than big and expensive. The preferred simplicity of Industry 4.0 solutions goes also along with flexibility principle, as less complex technologies tend to be more adjustable.
3) Preference should be given to eliminating waste within processes and only then automating them. Building on this observation, it can be stated, that the recommended order of implementation should be first Lean Management and then Industry 4.0, as the first concept lays foundations for easier implementation of the second one.
4) One of the main challenges of applying the Industry 4.0 concept in Lean companies will be maintaining the willingness of employees to solve problems and continuously improve their work. With a large share of automated processes, people can have perception of decreased autonomy and empowerment. Maintaining of people engagement should be therefore a critical task while implementing Industry 4.0 solutions.

With such presented findings, the paper contributed to current knowledge of Lean Management and Industry 4.0 relationship. It provided descriptive and comprehensive answers to how main Industry 4.0 technologies support companies operating according to Lean principles. The paper established also a list of most impactful information and communication solutions. For further studies, it is recommended to extend the empirical part of the research, by performing interviews with bigger number of experts and confirming the results through case studies.

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Urban Voids in The Context of Sustainable Development of Housing Estates

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Abstract

The basic objective of the study is to identify stages of implementation of sustainable development for the purposes of urban void management. Moreover, the article contains a proposal for land use indicators of sustainable development of housing estates in five different areas: settlement, social and cultural, economic, environmental, and functional and spatial.

Keywords: Sustainable Development, Spatial Order, Urban Void, Sustainable Development Indicator

Introduction

The characteristic and particularly undesired feature of contemporary urbanisation in the spatial aspect is its spontaneous and uncontrolled nature (Jedwab et al., 2017; Kowalewski et al., 2014). Dynamic and sudden changes in urban densification cause radical dwindling of empty spaces in cities, especially those of a high urbanisation level. Thereby, the significance of open, undeveloped space, defined by the author as urban void, increases. In the face of the challenges that contemporary cities are facing, it is therefore essential to find solutions that will compensate for the pace and intensity of urban transformations and dwindling of space.

With regard to the phenomenon of inability to multiply land as a rare good, but also a constitutional requirement of sustainable development, containing chaotic urbanisation process should be subject to more efficient land use control, and the size of investment areas should result from real needs and developmental abilities of cities. Therefore, the continuous control over the use of urban space, and, moreover, the monitoring of urbanisation processes, are necessary actions.

In this study a comprehensive review of the literature was used in order to establish the existing state of the studies on sustainable development at a local level, and to identify previous attempts to devise indicators of spatial development. The descriptive and interpretative approaches were applied with an emphasis placed particularly on the attempt to identify the stages of sustainable development implementation for the purposes of urban void management. Furthermore, on the basis of the conducted literature review and available databases, the land use indicators of sustainable development were suggested. Their structure was based on the level of spatial units as inherent elements of city structure. An optimal direction of development of urban voids should be considered in the context of the conditionings and needs of the surroundings. In the study housing estates were accepted as the surroundings. While formulating the criteria of sustainable development of housing estates, the following groups of criteria were regarded as significant from the perspective of the issues of the study and the assumed objective: settlement, social and cultural, economic, environmental, and functional and spatial.

It needs to be highlighted that while discussing the stages and indicators of sustainable development of housing estates, the starting assumption was made that the study will only present the most significant, in the opinion of the author, areas of their occurrence. It is a necessary condition if one takes into consideration the multitude of issues included in the analysis. The article with regard to space limitation does not exhaust the comprehensive and interdisciplinary subject of sustainable

development. However, it indicates the most significant determinants and barriers of sustainable development of urban voids.

Urban void as a subject of studies

Urban voids are an area that concerns both neglected, abandoned and forgotten areas in cities. These are the terrains which were created in contemporary cities as a result of urban processes. i.e. urban sprawl, decentralisation resulting from demographic changes, deindustrialisation, housing exclusion (Johnson et al., 2014). These are also areas abandoned due to internal migrations of the population, speculative investment practices, inappropriate municipal policy, lack of financial resources for their redevelopment, or lack of ideas for new development. Such areas negatively affect urban landscape while undergoing the process of degradation both in the sphere of space and function. In turn, this condition may become a reason that will make sustainable development of the whole urban centre impossible or to a large extent hindered.

In the era of current urbanisation tendencies, empty spaces are gaining more and more significance. However, only in few cases is the problem addressed in a comprehensive manner, analysing the importance of use of urban voids in city management, social life, and improvement of the quality of environment. With regard to insufficient awareness concerning potential use of void areas, they are frequently overlooked and not fully appreciated as a part of the urban landscape in spite of their potential social end ecological values (Kim et al., 2018). Furthermore, there is a dominating approach according to which the transformation of abandoned or void urban areas is concentrated on economic benefits in a narrow sense (Greenstein, Sungu-Eryilmaz, 2004). Long-term consequences of the conducted investments are also not taken into consideration.

The way of using urban voids has a direct influence on the changes in the functional and spatial structure of a housing estate. There are many possibilities for redevelopment of void areas with regard to their social and ecological value, therefore many designers, urban planners and scientists are interested in the potential offered by urban voids, in particular, however, within the scope of their planning and designing (Gunwoo, 2016; Johnson et al., 2014; Németh, Langhorst, 2014). In the studies (Gobster et al.,2020) it was empirically confirmed that the change of the intended use of abandoned and neglected urban voids in dense urban districts strengthens social cohesion and the sense of belonging to the place. Whereas (Anderson & Minor, 2017) suggest that successful implementation of the strategy of greenery establishment in urban voids helps to stabilise the population loss and improve social and ecological values.

The existing studies of literature show that the issue of use of urban voids is addressed mainly from the point of view of urbanisation and architecture, and it is regarded as a spatial element. In economic sciences, shortcomings in the approach towards urban voids can be noticed, among other things, insufficiency of studies, both of theoretical and empirical nature, regarding the impact of urban voids on socioeconomic development of contemporary cities. The available scientific works focus mainly on urban post-industrial areas (contaminated industrial areas), whereas relatively few studies or urban policies refer to an enormous unrealised potential of small vacant and abandoned plots that are most frequently located among the poorest urban districts (Goldstein et al., 2001). The loss of the potential described above is escalated by urban policies that are often concentrated on the establishment of new infrastructure, new development, instead of rehabilitation and redevelopment of the existing areas (Kim et al., 2018).

Sustainable development in local analyses

Sustainable development of the city

In the light of the Polish law, enforcement of sustainable development or principles of such development is a requirement that needs to be taken into consideration on socioeconomic planning and spatial development. On the one hand, it results from the provisions of the Constitution of the Republic of Poland, “The Republic of Poland […] ensures environmental protection guided by the principle of sustainable development”. On the other hand, sustainable development (beside spatial

order) is one of the main principles of planning of spatial development and management of cities, which directly results from the principles of the Spatial Planning and Land Development Act. The need to take into consideration the idea of sustainable development in creating urban policies may also be supported by, regardless of the above-mentioned legal regulation, the need for rationalisation of actions with reference to the existing suburbanisation processes (Parysek, 2013).

With reference to the definition of sustainable development that functions in the Polish legal system (Environmental Protection Law), it may be assumed that it is a process of socioeconomic development in which integration of political, economic and social actions takes place, with the preservation of natural equilibrium and persistence of basic natural processes, the objective of which is to guarantee the ability to satisfy basic current and future needs of the inhabitants. With reference to the city, the pursuit of equilibrium should concern one more significant subsystem, namely the urban area. The city is a specific spatial system composed of the social and tangible (anthropogenic) layers, as well as cross-systemic relationships between these elements and natural environment. It may be therefore assumed that sustainable development of a city, on the one hand, signifies a model of socioeconomic development, and, on the other hand, a spatial structure model (Parysek, 2013).

An important issue to discuss remains how the principle of sustainable development should be considered in the practice of planning and spatial development, and in a broader context: how planning and spatial development may contribute to more sustainable development (Mierzejewska, 2015).

Sustainable development of a city, following Parysek (2013), may be considered from the perspective of two categories of equilibrium: partitive and general. In the first one, equilibrium within the scope of each of the distinguished subsystems is pursued, that is the equilibrium in the following subsystems: (1) natural, the reflection of which are pro-environmental actions leading to the equilibrium in urban ecosystems and to healthy biophysical environment; (2) social, which should be related to civilizational and cultural development, social progress and cross-generational justice; (3) economic, which is indicated by the stability of economy and diversification of its components; as well as (4) spatial, which finds its reflection in spatial order. The general equilibrium is expressed by harmonisation or equilibration of the economic development with the social one, and with environmental conditions.

Determinants of spatial order

Following Zbierska, it is assumed that rational management of space and natural resources, through appropriate planning decisions, constitutes one of the cheapest and most effective ways that lead to the optimum use of space and increase of its value, and harmonious coexistence of the human and nature (Zbierska et al., 2015).

Preservation of the spatial order is one of the basic requirements that urban planners are faced with in the Spatial Planning and Land Development Act. According to the legal definition of the spatial order, it is such “lie of the land that creates a harmonious whole and takes into consideration in ordered relationships all and any conditionings and functional socioeconomic, cultural and compositional and aesthetic requirements” (Spatial Planning…). Spatial order is also one of the objectives of spatial development on all levels of planning (national, regional, local, and functional) included in the National Spatial Development Concept 2030. Furthermore, satisfying the collective needs within the scope of spatial order was mentioned in the Act on Municipal Government, as one of the first own tasks of a commune.

Therefore, spatial order may be regarded as a desired state of spatial development in which the arrangement of structures and services in space should correspond to the existing layout of the settlement network, social and natural conditionings, and serve the purpose of satisfying various present and future social needs. The main factors of preserving spatial order include optimal spatial arrangement of various functions, peaceful and most profitable proximity of functions arrangement (Zbierska et al., 2015) and harmonious topography of spatial elements and structures.

Indicators of sustainable development in spatial management

The instruments of implementation of sustainable development may be divided into the following ones: organisational and legal, financial, and information and educational. At a local level, land use studies and environmental impact assessments play the most significant role in space management (Zbierska et al., 2011). In Poland there are two systems of assessment of the quality of life and realisation of sustainable development that may be helpful in determining indicators to be applied in space management.

The first system operates within the framework of the European programme Urban Audit. It is a common initiative of the European Commission and Eurostat that is an answer to increasing information needs about cities. The main objective of the programme is the provision of objective and comparable statistical data concerning European cities, among other things, within the scope of demography, structure of households, housing industry, health care, crime, labour market, economic activity, income, social engagement, education, environmental protection, culture and tourism (Statistics Poland, https://stat.gov.pl/). At a city level, Urban Audit contains over 170 variables and more than 60 indicators. The indicators include 68 Polish cities. They come from the variables gathered by the European Statistical System (Eurostat, https://ec.europa.eu/eurostat/).

The second system of indicative monitoring is a Polish initiative called the Self-government Analysis System (SAS) initiated by the Association of Polish Cities. The module of indicators of sustainable development against the background of other systems of indicators stands out due to the possibility to calculate synthetic measures of sustainable development for particular orders (divided into the following groups: social 85, economic 68 and environmental and spatial 66) and fields. The module of this system amounts to 219 indicators altogether. The system of indicators is presented on the basis of the resources of the Local Data Bank of the Central Statistical Office, and the information is updated directly by the local government units that participate in the project.

The above-mentioned systems provide plenty of comparative data and they may be successfully applied also at a level of spatial units. However, it should be remembered that the above-mentioned indicators are used to compare communes between one another, and not for internal analyses. Therefore, for the purposes of space management they should be completed with analyses of spatial diversification within a particular city. Majority of features and criteria concerning urban development that the above-mentioned systems use, find their reflection also on a scale of a district or housing estate (Zaniewska et al., 2008).

Urban void in the context of sustainable development

The appropriate use of urban voids may become an important tool that supports the realisation of the assumptions of sustainable development of a city, as well as transformation of the hitherto applied urban practices. According to the author, it should be considered from the perspective of a spatial unit in which it is located (e.g. district, housing estate, urban unit or statistical region) so that a realistic assessment of development opportunities of urban voids can be made. The choice of spatial function should depend on the existing economic and natural conditionings, and it should serve the purpose of satisfying various social needs, including forecast changes within the above-mentioned scope.

Due to the complexity of factors of spatial order, an assumption was made that for local administration to manage void urban areas it is necessary to have a uniform and functional tool for spatial analyses within this scope (Zbierska et al., 2015). The author of the article suggests the following stages of implementation of sustainable development and development of indicators of sustainable development for the purposes of urban void management.

The first step in urban void management consistent with the principle of sustainable development should be the **identification of the resources of urban voids** in the area of a high level of urbanisation. The objective of the review of void urban areas is to identify undeveloped, unused, degraded areas and uninhabited buildings which do not have any precise intended use, or which remain unused for the purpose specified in the local zoning plans for a long time.

The second step should be the **inventory of urban voids**, that is the identification of the present state. The diagnosis of the area should be conducted in respect to its individual physical, biological, social and cultural, institutional and legal features (e.g. surface, present state, number and condition of trees, significance, function and value of the terrain). The purpose of inventory is to distinguish urban voids from the urban area where some limitations exist regarding the development opportunities that have an impact on the choice of function of the area. The limitations may result, among other things, from legal protection of nature or culture, property right, surface and landform of the terrain, unfavourable proximity of function (e.g. emission of pollution or noise). The diagnosis of the territory may be conducted through an indirect method (on the basis of the existing documentation) and through a direct method (inventory in the field).

In the next step the **valorisation of urban voids** should be conducted that consists in the assessment (in a point-like form) of usefulness of particular urban voids for specific functions of development or a way of use of the terrain. The final effect should be a map of valorisation of empty spaces. At this stage, it may be helpful to use Bajerowski's matrix method for optimum use of the terrain which consists in the choice of a physically possible and legally acceptable function of the terrain that causes the highest land value (Ogryzek, 2007).

An appropriate and reliable diagnosis of urban voids is of great significance due to practical actions that can be undertaken in the area as well as reasonable land use space management. The obtained results may contribute to the establishment of a local base of urban voids as an interactive tool for monitoring void areas. In the process of inventory and valorisation, GIS (Geographic Information System) programmes constitute a useful tool. They make it possible to conduct spatial analyses on maps and their presentation with the use of visualisation of results, and guarantee fast access to public data from many sources (presented as vectors, rasters and statistical data). Mapping such data may provide information about the location of void areas, their ownership structures, forecast period of lasting of an uninhabited building as well as plans for their use in the future. The aim of the presented base of void urban areas is to support the management of the urban area in a more reasonable and optimal manner, and to initiate and test the persistence of temporary urban solutions.

Another step should be a content-related **functional and spatial interpretation of terrain diversity** together with **quantitative establishment of the conditionings and development needs of a spatial unit.** The current situation of housing resources, labour market and spatial resources for the analysed housing estate should be collated with demographic and economic forecast, and with the projected needs. Then, on their basis, **land use indicators of sustainable development** should be determined (in the settlement, social and cultural, economic, environmental, functional and spatial areas) for particular spatial units where the studied urban voids exist. The indicators should take into consideration the developmental objectives included in the study of conditions and directions of spatial development of a commune. The above-mentioned measures can be concentrated both around the whole spatial unit and developed or completed with direct reference to the studied urban voids (e.g. measures of availability of the studied plot for urban public utility facilities). Following Śleszyński (2013), it is assumed that the number of indicators shall not exceed 30-40.

The source of baseline data could be the information available directly at the commune office or a subordinate unit, in public statistical databases (the level of local administrative units) as well as on the basis of the land and property register, maps and data from spatial information systems (e.g. topographic data, orthophotomaps), and on the basis of the information gathered during the inventory in the field.

In order to structure the above-mentioned land use indicators, the review and assessment of application possibilities of various indicators of spatial order were conducted at a local level, which constitute the result of the existing studies. The indicators suggested by, among others, T. Borys (2008), P. Śleszyński et al. (2013), A. Zbierska et al. (2015) as well as the Self-government Analysis System and Eurostat (Urban Audit) turned out to be particularly helpful. The above-mentioned indicators were analysed with respect to the possibility for their implementation at a level of a spatial unit and extended by the author's own list. In particular, the author focused the attention on the indicators that have spatial reference and result from the commune's own tasks.

The list presented below shows only a proposal for several land use indicators, which is a subject of discussion in scientific, expert and practical communities. The indicators may be specified for specialist needs in the context of space management.

Table 1: Proposal for land use indicators of sustainable development for an exemplary spatial unit (housing estate), with particular consideration of urban voids*

INDICATOR	FORMULA	
SETTLEMENT FACTORS		
(1) Population density of a housing estate [P_d]	$P_d = \frac{i}{s}$	i – total number of inhabitants of a housing estate s – total area of a housing estate [ha]
(2) Build-up density [B_d]	$B_d = \frac{b}{s}$	b – number of buildings in a housing estate (all or particular types of development) s – total area of a housing estate [ha]
(3) Urbanisation intensity [U_i]	$U_i = \frac{s_{ua}}{s}$	s_{ua} – total urbanised area s – total area of a housing estate [ha]
SOCIAL AND CULTURAL FACTORS		
(4) Pedestrian accessibility of the facility [P_a]	$P_a = \frac{i_i}{i}$ $P_a = \frac{i_e}{i}$	i_i; i_e – number of inhabitants of a housing estate in an isochrone[1] or equidistance[2] of pedestrian access to the facility (e.g. basic services, cultural services) above the specified time/distance limit from the facility (e.g. 10-minute walk to the public transportation stop) i – total number of inhabitants of a housing estate
(5) Availability of flats (F_{a_1} – average number of persons per 1 flat; F_{a_1} – average living area per person) [F_a]	$F_{a_1} = \frac{i}{f_1}$ $F_{a_2} = \frac{f_2}{i}$	f_1 – total number of flats f_2 – total area of flats i – total number of inhabitants of a housing estate
(6) Availability of cultural facilities [Cu_a]	$Cu_a = \frac{Cu}{i}$	Cu – number of cultural facilities i – total number of inhabitants of a housing estate
(7) Crime level [Cr_l]	$Cr_l = \frac{Cr}{i}$	Cr – average number of crimes per year i – total number of inhabitants
ECONOMIC FACTORS		
(8) Level of entrepreneurship (number of business entities per 100 inhabitants) [E_l]	$E_l = \frac{e}{i}*100$	e – number of business entities i – total number of inhabitants of a housing estate
(9) Unemployment level (the unemployed per 100 working-aged persons) [Ue_l]	$Ue_l = \frac{i_{ue}}{i_{wa}}*100$	i_{ue} – number of unemployed inhabitants of a housing estate i_{wa} – number of working-aged inhabitants of a housing estate
(10) Average price of land [L_p]	$L_p = \frac{p}{s_l}$	p – total value of purchase/sale transactions in a given period in PLN s_l – area of land in m^2 which the transactions concerned
(11) Investment conditionings [I]	$I_g = \frac{s_g}{s}100\%$	s_g – area of land (plots) where development is possible (gross)

[1] Isochrone – lines of equal availability of time.
[2] Equidistance – lines of equal availability of distance.

	$I_n = \frac{s_n}{s} 100\%$	s_n – net area, that is gross area less the area of land (plots) legally excluded from development (environmental protection, restoration protection, enclosed areas, protection zones etc.) s – total area of a housing estate
ENVIRONMENTAL FACTORS		
(12) Greenery availability [G_a]	$G_a = \frac{s_p}{i}$	s_p – area of parks designed for walking and leisure i – total number of inhabitants of a housing estate
(13) Share of greenery in the total area [G]	$G = \frac{s_g}{s} 100\%$	s_g – area of greenery in a housing estate, i.e. parks, lawns, garden squares, forests, allotment gardens s – total area of a housing estate
(14) Accepted level of pollution emission [Pe_l]	$Pe_l = \frac{p_e}{s}$	p_e – accepted level of pollution emission (e.g. gaseous, dust) s – total area of a housing estate
FUNCTIONAL AND SPATIAL FACTORS		
(15) Share of area of a given function in the total area [F_x]	$F_x = \frac{s_x}{s} 100\%$	s_x – area occupied by the x use function s – total area of a housing estate
(16) Share of urban voids in total area [V]	$V = \frac{s_v}{s} 100\%$	s_{uv} – area of urban voids (e.g. undeveloped, degraded areas, uninhabited buildings) s – total area of a housing estate
(17) Land use coverage (share of areas included in the valid local zoning plan) [L_u]	$L_u = \frac{s_{lu}}{s} 100\%$	s_{lu} – area of housing estate included in a valid local zoning plan, s – total area of housing estate

** Formulas in the table applies to a housing estate.*

Source: own study.

The discussed indicators concern various aspects of spatial development of a spatial unit. According to the assumed definitions, spatial order is a particular and desired state of this development. Therefore, after determining a content-related value and validity of the assumed indicators, the scope of this target framework should be established. It regards especially the adoption of appropriate limiting ranges (lower and upper ones) that position spatial order (Śleszyński, 2013).

However, it should be remembered that not all the issues can be measured with the use of the indicators. Attention should be paid so that they do not become a tool of "mechanisation" of urban void management, since they are based on the simplification and generalisation of phenomena and processes that cannot be always recorded mathematically (Zbierska et al., 2015).

The proposed indicators of spatial development and spatial order of spatial units should take into consideration the results of the diagnosis of urban voids. It should be emphasised that the optimal use of urban voids does not always need to be related to the transformation of the area towards anthropogenic functions. From the point of view of the principles of sustainable development, it may turn out to be more justified to apply ecological solutions, modernisation and rehabilitation actions or even temporary development for the purposes of space protection as a space reserve for the future.

Summary

The significance of spatial order as an inherent attribute of sustainable development causes the rationalisation of spatial processes to become nowadays one of the most important tasks for local governments.

In the conducted study urban voids were assumed as an area of the implementation of the assumptions of sustainable development. Adjustment of the directions of use of these areas to the natural conditionings as well as socioeconomic needs requires the development of a functional tool for spatial analyses. For this purpose, the author suggested a process of sustainable development implementation which consists of four stages: (1) identification of resources, (2) inventory and (3) valorisation of urban voids, and then, with reference to the surroundings, (4) functional and spatial interpretation of terrain diversity, and (5) quantitative establishment of the conditionings and developmental needs of a housing estate.

The implementation of the suggested procedure in future empirical studies will help to determine development potential of void areas, and, consequently, an optimum direction of their use in accordance with the principles of sustainable development. The presented tool, and the suggested indicators, may be helpful in verification of efficiency of the undertaken actions with regard to the intended results (e.g. increase of the economic value of a housing estate as a result of investment actions).

Due to the phenomenon of urban densification, the actions which to the largest extent guarantee the protection of open, undeveloped urban areas should be undertaken. These actions frequently require transformation of the existing urban practices and the engagement of decision-makers. The conducted analysis may contribute to the development of recommendations for the use of urban voids towards sustainable development and constitute an inspiration or a warning during developmental research on the effective management of limited spatial resources.

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Corporate Governance Mechanisms and Disclosure Compliance Practices in Emerging Economies: The Case of Listed Banks in Romania

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Abstract

The fallout from the financial crisis back in 2008 has placed a heavier focus on best practices for corporate governance principles, Boards of Directors feeling more pressure than ever before to be transparent and accountable. In the same background, given the current socio-economic context, due to the crisis generated by the new Coronavirus (CoVid-19) pandemic, banks may find themselves under similar levels of scrutiny, being subject to similar regulatory backlash. In this context, their behaviour should not once again fail to fulfil the expectations of policy makers in particular, and society in general. The Code of Corporate Governance issued by the Bucharest Stock Exchange (BSE) aims at creating an internationally attractive capital market in Romania, based on best practices, transparency and trust – pillars that encourage companies to build a strong relationship with their shareholders and other stakeholders, by an effective and transparent communication, as well as openness towards all potential investors. This paper aims to highlight the degree of compliances of bank listed on the BSE with the principles and provisions stipulated by the Code of Corporate Governance in force. In this context, we assessed bank corporate governance in Romania, by measuring the corporate governance quality and effectiveness in the main Romanian banks. Evaluating corporate governance eminence is constructed by using the score function method in regards to disclosure and transparency practices, as proposed (but not imposed!) by BSE. The sample consisting in the 4 Romanian banks currently listed on Bucharest Stock Exchange: Banca Transilvania, BRD, Erste Group and Patria Bank. In this respect, we performed an investigation of the mode in which the principles enforced by the BSE are respected in four top Romanian banks. We consider our goal important due to the current sensitive socio-economic environment, which, undoubtedly, makes the corporate governance in banking sector a controversial subject. In this framework, we reached valuable conclusions regarding a satisfactory compliance level with the Code of Corporate Governance issued by BSE regarding Romanian banks, the research emphasizing a high level of adoption of the best practice doctrines.

Keywords: corporate governance; Bucharest Stock Exchange; Code of Corporate Governance; disclosure; transparency; compliance; banks.

Introduction

Given the background of globalization and "the new economy", corporate governance's particularities within the bank system increase awareness of both practitioners and world organizations, concerned in advocating worldwide soundproof doctrines – whichever we talk about the **Organisation for Economic Co-operation and Development (O.E.C.D.)**, **Basel Committee's** or **the community law**. The first delineation of the concept dates back to the 1970s, when the **Securities and Exchange Commission (SEC)** brought the issue of corporate governance to the forefront when it was brought a stance on official corporate governance reform, the term appearing for the first time in 1976, in the Federal Register, the official journal of the Federal Government.

Corporate governance is defined by the **O.E.C.D.** as the set of relationships between a company's management and its stakeholders, respectively the "procedures and processes according to which an organisation is directed and controlled". The corporate governance structure specifies the distribution of rights and responsibilities among the different participants in the organisation – such as the Board, managers, shareholders and other stakeholders – and lays down the rules and procedures for decision-making.

Correspondingly, through the **M.E.N.A.-O.E.C.D. Initiative (2019)**, drafts some guidelines regarding the effectiveness of corporate governance structures in banks, depicting: "given the prevailing role of banking institutions as a source of finance for the corporate sector. Improved board structures, administrative procedures and disclosure requirements could result in better governed banks, which are more likely to allocate capital efficiently".

We see, therefore, that corporate governance incorporates managerial accountability, Board structure ad shareholder rights.

High standards in the governance of banks and companies are essential for emerging markets and economic growth, banks having a critical position in the progress of economies due to their major role in running the financial system.

Moreover, the banking industry is distinctive since it is concurrently consolidating and diversifying. Therefore, robust bank corporate governance is, indeed, an essential constituent for promoting a more resilient financial system (**Deliu, 2019a**).

Previous research highlights the consequences of banks' specific traits on their corporate governance framework, emphasising two foremost aspects: higher opaqueness and imperviousness and, of course, higher regulation.

Furthermore, unfortunately, over the last years, consequent to the 2007-2008 financial crisis, we observe that Boards have not thrived in actually comprehending specific risks in banks, so that there have been encountered not only several discontinuity gaps, but also a sturdy lack of authority in terms of decisional issues, the instantaneous result consisting in *the spawn of a substantial trust deficit in credit institutions in general*. This situation may repeat, as we speak, due to the turbulences, instability and volatility in the socio-economic environment, all spawned by the crisis generated by the current Coronavirus (CoVid-19) pandemic.

No one can accurately predict what will happen in the future, but we need to keep in mind some of the "changes that are probably waiting for us:

- ✓ *Corporate governance needs to be integrated into the business strategy of companies and not just as a mere compliance obligation;*
- ✓ *Effective corporate governance depends on management success;*
- ✓ *The fundamental objective of the management body must be built on sustained growth of the company;*
- ✓ *Shareholders must have a long-term responsibility and economic interest in making decisions dutifully and responsibly;*
- ✓ *Well-governed companies must ensure good transparency towards all stakeholders"* (**Deliu, 2019b**).

The way in which corporate governance systems will evolve in the future is hard to anticipate, however, the socio-economical revolutions in the business environment will make banks resort to changing processes, approaches, attitudes, as well as the stakeholder interaction models. The main scope of a corporate governance system is to ensure the sustainable growth in the current context of globalization. In this context, as **Fülöp and Pintea (2015)** observe, BSE should focus on one main priority: developing a Corporate Governance Index in order to efficiently assess the degree of applying and aligning with the Code's principles and provisions, as well as to measure the *corporate governance performance*. **Vintilă and Moscu (2014)** also deliberate that a respected legal framework of corporate governance regulation is necessary in Romania, considering that corporate governance principles should be implemented through the development of legally binding framework.
Through this study, we do not aim investigating exhaustive topics associated with corporate governance in banks during crisis, since previously tremendous researches already portrayed these – **Mehran et. al (2011)**, **Mehran and Mollineaux (2012)**, **de Haan and Vlahu (2013)** – but we rather aim to outline an *exploration of the capability of the Romanian bank system to stand by the corporate governance*

principles in the context of an imminent socio-economic crisis, that may be generated by the current CoVid-19 pandemic.

A critical feature of the Corporate Governance Codes is that they are implemented on the basis of the "comply-or-explain" norm which provides disclosures of clear, accurate, relevant and up-to-date information regarding the compliance of the listed economic entities with the corporate governance principles.

In other words, a qualitative corporate governance finds its correspondent in efficient rules, policies and procedures of business management, administration and control.

The primary sources of corporate governance legislation in Romania are the Companies Law, the Accounting Regulation, the Capital Markets Law, the Government Emergency Ordinance on Credit Institutions and Capital Adequacy, and the Government Emergency Ordinance 109/2011 on state owned enterprises (amended by Law 1112016).

In 2008, the **Bucharest Stock Exchange (BSE)** adopted a corporate governance code addressed to listed companies, to be implemented as "comply-or-explain", the *Code of Corporate Governance* being revised in 2015, whereas a new Code entered into force in January 2016. Along with the Code, BSE also published a *Compendium of Corporate Governance Practices* and a *Manual for Reporting Corporate Governance*, in order to assist companies to implement the Code. The BSE has committed to have a leading role in monitoring the Code's implementation, as the **European Bank for Reconstruction and Development** (hereafter, **EBRD)** observes (**ERBD, 2016**).

A corporate governance code comprises a set of principles and recommendations for economic entities whose shares are admitted to trading on the regulated market, hence, by emphasizing best practices and by based on transparency and trust, it aims at building an internationally attractive capital country in the region. Henceforth, it encourages companies to build a strong relationship both with their shareholders and stakeholders, through an effective and transparent communication and by showing openness towards all potential investors.

BSE has taken a significant step towards better, more qualitative corporate governance at Romania's listed economic entities, by adopting in 2015 a new corporate governance code, developed together with **EBRD**. This new Code replaced the original Code which was issued in 2001 and revised in 2008. The new corporate governance framework promotes higher standards of governance and transparency through a new system of compliance and enforcement **(BSE, 2015)**, aiming to "improve confidence in listed companies through promoting positive developments in the corporate governance of these companies", by:

- putting emphasis on the value of establishing a continuous relationship with investors,
- highlighting the quality of disclosure, respectively
- deploying new measures so as to lay down a solid base for the capital market in Romania.

This paper aims to measure the degree to which the banks listed on the Bucharest Stock Exchange (BSE) comply with the principles and provisions of the Code of Corporate Governance issued by the BSE regarding the:

A. *Responsibilities* of the Board (either the Board of Directors – in a one-tier system, either the Supervisory/Management Board – in a two-tier system) vs. the responsibilities of the executive management,
B. Reliability and efficiency of the *risk management system and internal control system*,
C. *Fair rewards and motivation* of the members of the Board; respectively the
D. *Added value created through the relationship with the current and potential investors*.

By means of the Corporate Governance Statement, included in the Annual Report in a separate section, the listed banks perform a self-assessment of how the provisions to comply with are respected and, subsequently, outline the measures taken to abide by with the aspects that are not yet fully met.

Bunea (2013) and Manea (2015) both conclude one some key features that are "pertinent for *analysing and testing the degree of enabling corporate governance principles in banks"*, these comprising: tasks and duties of both governance structures and control structures (with an emphasis on the Supervisory Board's responsibilities); monitoring structures' role (and possible contiguous conflicts of interest); minority shareholders' and interest owners' status; corporate governance risks and the amendments made to the internal control function (in order to prevent and detect these risks); role of internal audit; and importance of ethics.

We consider banking governance – and particularly the banks' non-executive directors – must recognize the clear and present danger to the sector, and use this crisis as an opportunity to transform banks into respected corporate citizens rather than the perennial corporate villain.

Research Methodology

This study seeks to explore the degree to which the key concepts, principles and techniques typical to corporate governance are spread and enabled, by taking the four banks that are currently listed on BSE as a reference. The research methodology used, the observation, was based mainly on *the analysis of the Annual Reports* and of the *"Comply-or-Explain" Statement* published by the banks analysed in 2018. The analysed sample is consisting of four banks that are currently listed on BSE: Banca Transilvania (TLV), BRD (BRD), Erste Group (EBS) and Patria Bank (PBK), included in the Monthly Bulletin drawn up by the BSE in December 2018.

Since this paper's purpose is to assess the degree of applying sound corporate governance principles by the significant players in the Romanian banking system, research methodology was fundamentally based on *non-participating observation*, respectively an analysis of the disclosed documents published on the websites of the analysed banks. Moreover, a *scoring method* was used (**Spătăcean and Ghiorghiţă, 2012**; **Manea, 2015**; **Deliu, 2020**), so as to assess the degree of smearing corporate governance principles and transparency disclosing elements, which permitted transforming assertive and qualitative data into numerical quantitative data.

Data collection finds its correspondence in developing methods of mediated information collection from examining the Code of Corporate Governance issued by the BSE, Corporate Governance Codes made public on the official websites of the analysed banks, as well as their published Annual Reports as at 31 December, 2018, respectively the "Comply-or-Explain" Statement. Therefore, the research required both a qualitative and a quantitative approach, on the basis of the empirical data collected out of the sample of the four banks that are currently listed on BSE.

The qualitative approach is enlightened by the fact that the research has prerequisite *interpretations, clarifications, explanations and deep understanding of the analysed phenomena*, while the quantitative method has concentrated on quantifying through numerical expressions by using the score system for each bank from the sample.

Data

According to **BSE (2015)**, the purpose of the Code of Corporate Governance Code is to create in Romania an internationally attractive capital market, based on best practices, transparency and trust, respectively to determine listed entities to comply to a great extent with all the principles and provisions.

As stated by the **BSE's Code of Corporate Governance**, the general principles and the provisions to comply with provisions and principles to be observed, applied and accounted for by the listed companies, are structured in four sections, as follows:

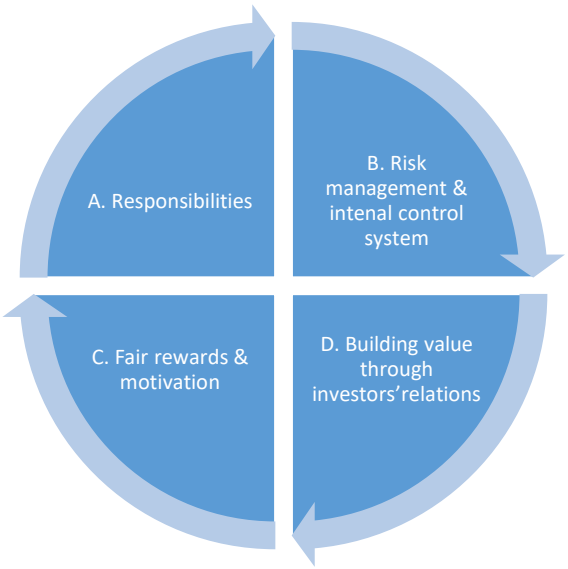

Fig. 1: Bucharest Stock Exchange Market's Code of Corporate Governance

Source: own projection, after B.S.E.'s Code of Corporate Governance (2015) (https://www.bvb.ro/info/Rapoarte/Diverse/ENG_Corporate%20Governance%20Code_WEB_revised.pdf)

On one hand, the *principles* postulated in BSE's Code of Corporate of Governance are the following:

Table 1: Corporate governance – general principles, as per BSE's Code of Corporate Governance (2015)

Section	General principles
Section A – Responsibilities	i. The role of the Board of Directors in a one-tier board system and the role of the Supervisory Board/Management Board in a two-tier board system should be clearly defined and documented in the company's articles of association, internal regulations and/ or other similar documents. The Board should ensure that company's articles of association, the resolutions of the general meeting of shareholders, and the internal regulations of the company include a clear distinction of powers and competencies between the general meeting of shareholders, the Board and the executive management. ii. The Board should be structured in such a way that allows it to diligently fulfill its duties. The Board should meet sufficiently regularly to discharge its duties effectively iii. The Board should ensure that a formal, rigorous and transparent procedure is put into place regarding the appointment of new members to the Board. iv. There should be a clear division of responsibilities between the Board and the executive management. v. The Board and its committees should have the appropriate balance of skills, experience, gender diversity, knowledge and independence to enable them to effectively perform their respective duties and responsibilities. It is recommended for the majority of non-executive members of the Board of Directors or Supervisory Board to be independent. All members of the Board should be able to allocate sufficient time to the company to discharge their responsibilities effectively. The Board should ensure that it is appropriately informed to enable it to discharge its duties. vi. Board members must strictly observe the secrecy of the proceedings, debates and decisions taken, unless otherwise decided by the Board or unless regulations in force require the appropriate disclosure.
Section B – Risk management & internal control system	i. The company should have in place an efficient risk management and internal control system. The Board should determine the principles of and approaches to the risk management and internal control system in the company. ii. The company should arrange for internal audits to independently evaluate, on a regular basis, the reliability and efficiency of the risk management and internal control system and the corporate governance practices. The Board of Directors or Supervisory Board, as the case may be, should set up an independent audit committee capable of ensuring the integrity of financial reporting and of the internal control system, including the internal and external audit processes. iii. The company will ensure that all related party transactions are considered on their merits in a manner that ensures independence and the protection of the interests of the company, compliant with the restrictions set out in related legislation and fairly disclosed to shareholders and potential investors. The definition of related parties follows that of International Accounting Standard 24.
Section C – Fair rewards & motivation	i. The level of remuneration should be sufficient to attract, retain and motivate skilful and experienced people as members of the Board and the management. The Board should ensure transparency related to remuneration matters. The shareholders should be provided with relevant information in order to understand the principles applied by the company regarding the remuneration policy, which is based on fair rewards and motivation for Board members, and for the CEO or Management Board. ii. A company should have a remuneration policy and rules defining that policy. It should determine the form, structure and level of remuneration of members of the Board, the CEO and when applicable, members of the Management Board.
Section D – Building value through investors' relations	i. The company should disseminate the most important information both in Romanian and English, to enable Romanian and foreign investors to have access to the same information at the same time. ii. A company should do its best to enable its shareholders to participate in general meetings, aiming at using electronic communication means through (a) live broadcast of general meetings and/or (b) live bilateral communication where shareholders may express themselves during a general meeting from a location other than that of the general meeting, as long as this is in line with legislation regarding data processing. iii. A company should aim to provide for an electronic voting system at general meetings, including remote electronic voting.

Source: B.S.E.'s Code of Corporate Governance (2015)
(https://www.bvb.ro/info/Rapoarte/Diverse/ENG_Corporate%20Governance%20Code_WEB_revised.pdf)

We observe the fact that, through enunciating these 14 general principles, BSE maintains a mechanism based on the "comply-or-explain" principle which gives the market clear, accurate and actual information about listed companies' compliance with corporate governance rules.

On the other hand, the *provisions* stipulated in BSE's Code of Corporate of Governance are, as follows:

Table 2: Corporate governance – provisions to comply with, as per BSE's Code of Corporate Governance (2015)

Section	General principles
Section A – Responsibilities	A.1. All companies should have internal regulation of the Board which includes terms of reference/responsibilities for Board and key management functions of the company, applying, among others, the General Principles of Section A. A.2. Provisions for the management of conflict of interest should be included in Board regulation. A.3. The Board of Directors or the Supervisory Board should have at least five members. A.4. The majority of the members of the Board of Directors should be non-executive. At least one member of the Board of Directors or Supervisory Board should be independent, in the case of Standard Tier companies. Not less than two nonexecutive members of the Board of Directors or Supervisory Board should be independent, in the case of Premium Tier Companies. A.5. A Board member's other relatively permanent professional commitments and engagements, including executive and non-executive Board positions in companies and not-for-profit institutions, should be disclosed to shareholders and to potential investors before appointment and during his/her mandate. A.6. Any member of the Board should submit to the Board, information on any relationship with a shareholder who holds directly or indirectly, shares representing more than 5% of all voting rights. This obligation concerns any kind of relationship which may affect the position of the member on issues decided by the Board. A.7. The company should appoint a Board secretary responsible for supporting the work of the Board. A.8. The corporate governance statement should inform on whether an evaluation of the Board has taken place under the leadership of the chairman or the nomination committee and, if it has, summarize key action points and changes resulting from it. The company should have a policy/guidance regarding the evaluation of the Board containing the purpose, criteria and frequency of the evaluation process. A.9. The corporate governance statement should contain information on the number of meetings of the Board and the committees during the past year, attendance by directors (in person and in absentia) and a report of the Board and committees on their activities. A.10. The corporate governance statement should contain information on the precise number of the independent members of the Board of Directors or of the Supervisory Board. A.11. The Board of Premium Tier companies should set up a nomination committee formed of non-executives, which will lead the process for Board appointments and make recommendations to the Board. The majority of the members of the nomination committee should be independent.
Section B – Risk management & internal control system	B.1. The Board should set up an audit committee, and at least one member should be an independent non-executive. The majority of members, including the chairman, should have proven an adequate qualification relevant to the functions and responsibilities of the committee. At least one member of the audit committee should have proven and adequate auditing or accounting experience. In the case of Premium Tier companies, the audit committee should be composed of at least three members and the majority of the audit committee should be independent. B.2. The audit committee should be chaired by an independent non-executive member. B.3. Among its responsibilities, the audit committee should undertake an annual assessment of the system of internal control. B.4. The assessment should consider the effectiveness and scope of the internal audit function, the adequacy of risk management and internal control reports to the audit committee of the Board, management's responsiveness and effectiveness in dealing with identified internal control failings or weaknesses and their submission of relevant reports to the Board. B.5. The audit committee should review conflicts of interests in transactions of the company and its subsidiaries with related parties. B.6. The audit committee should evaluate the efficiency of the internal control system and risk management system. B.7. The audit committee should monitor the application of statutory and generally accepted standards of internal auditing. The audit committee should receive and evaluate the reports of the internal audit team. B.8. Whenever the Code mentions reviews or analysis to be exercised by the Audit Committee, these should be followed by cyclical (at least annual), or ad-hoc reports to be submitted to the Board afterwards. B.9. No shareholder may be given undue preference over other shareholders with regard to transactions and agreements made by the company with shareholders and their related parties. B.10. The Board should adopt a policy ensuring that any transaction of the company with any of the companies with which it has close relations, that is equal to or more than 5% of the net assets of the company (as stated in the latest financial report), should be approved by the Board following an obligatory opinion of the Board's audit committee, and fairly disclosed to the shareholders and

	potential investors, to the extent that such transactions fall under the category of events subject to disclosure requirements. B.11. The internal audits should be carried out by a separate structural division (internal audit department) within the company or by retaining an independent third-party entity. B.12. To ensure the fulfilment of the core functions of the internal audit department, it should report functionally to the Board via the audit committee. For administrative purposes and in the scope related to the obligations of the management to monitor and mitigate risks, it should report directly to the chief executive officer.
Section C – Fair rewards & motivation	C.1 The company should publish a remuneration policy on its website and include in its annual report a remuneration statement on the implementation of this policy during the annual period under review.
Section D – Building value through investors' relations	D.1. The company should have an Investor Relations function – indicated, by person(s) responsible or an organizational unit, to the general public. In addition to information required by legal provisions, the company should include on its corporate website a dedicated Investor Relations section, both in Romanian and English, with all relevant information of interest for investors. D.2. A company should have an annual cash distribution or dividend policy, proposed by the CEO or the Management Board and adopted by the Board, as a set of directions the company intends to follow regarding the distribution of net profit. The annual cash distribution or dividend policy principles should be published on the corporate website. D.3. A company should have adopted a policy with respect to forecasts, whether they are distributed or not. Forecasts means the quantified conclusions of studies aimed at determining the total impact of a list of factors related to a future period (so called assumptions): by nature, such a task is based upon a high level of uncertainty, with results sometimes significantly differing from forecasts initially presented. The policy should provide for the frequency, period envisaged, and content of forecasts. Forecasts, if published, may only be part of annual, semi-annual or quarterly reports. The forecast policy should be published on the corporate website. D.4. The rules of general meetings of shareholders should not restrict the participation of shareholders in general meetings and the exercising of their rights. Amendments of the rules should take effect, at the earliest, as of the next general meeting of shareholders. D.5. The external auditors should attend the shareholders' meetings when their reports are presented there. D.6. The Board should present to the annual general meeting of shareholders a brief assessment of the internal controls and significant risk management system, as well as opinions on issues subject to resolution at the general meeting. D.7. Any professional, consultant, expert or financial analyst may participate in the shareholders' meeting upon prior invitation from the Chairman of the Board. Accredited journalists may also participate in the general meeting of shareholders, unless the Chairman of the Board decides otherwise. D.8. The quarterly and semi-annual financial reports should include information in both Romanian and English regarding the key drivers influencing the change in sales, operating profit, net profit and other relevant financial indicators, both on quarter-on-quarter and year-on-year terms. D.9. A company should organize at least two meetings/conference calls with analysts and investors each year. The information presented on these occasions should be published in the IR section of the company website at the time of the meetings/conference calls. D.10. If a company supports various forms of artistic and cultural expression, sport activities, educational or scientific activities, and considers the resulting impact on the innovativeness and competitiveness of the company part of its business mission and development strategy, it should publish the policy guiding its activity in this area.

Source: B.S.E.'s Code of Corporate Governance (2015)
(https://www.bvb.ro/info/Rapoarte/Diverse/ENG_Corporate%20Governance%20Code_WEB_revised.pdf)

We observe the fact that the new Code is much precise and more focused in what is required form listed companies, providing a clear list of functions that are expected from the corporate governance structures, therefore, complementing the law in force.

Method

The aim of the paper is to assess the degree of compliance of the Romanian banks that are listed on BSE with the Code of Governance issued by BSE. Hence, by using a scoring system, we succeeded in transforming the enounciative (and qualitative) data into numerical (and quantitative data), revealing,

henceforth, the extent to which they align with the principles and comply with the provisions presented above.

Taking into consideration the fact that in the "Comply-or-Explain" Statement the banks, by performing a self-assessment, have four options that reflect either full compliance, satisfactory compliance, unsatisfactory compliance or non-compliance, the following table presents the used scoring system, consistent with the response disclosed by the banks:

Table 3: Significance of the conformity score given to the collected and interpreted information

Conformity score	Compliance degree	Significance
0	Non-compliance	The analysed bank has not disclosed any relevant document or report concerning corporate governance (*The Statement Enforce or Explain*, *Annual Reports*, etc.).
1	Satisfactory	The analysed bank has disclosed ***satisfactory information*** (partial data, outdated information) which does not permit settling the cases regarding the soundness of corporate governance and/or making any recommendations.
2	Unsatisfactory compliance	The documents regarding corporate governance are publicly disclosed on the official websites in a proportion of ***70%***, the information available allow for settling the issues related to corporate governance at a medium level.
3	Full compliance	Information dissemination meets the maximum of ***100%***, by offering complete, accurate, transparent and exhaustive disclosed reports, in total accordance with the principles of an effective corporate governance.

Source: own projection, after Deliu (2020)

Considering this scoring system, as well as all 4 sections of the Code of Corporate Governance issued by BSE, comprising 11 provisions to comply with (in section A), 12 provisions (in section B), 1 provision (in section C) and 10 provisions (in section D) a bank can obtain:

- for section A – a maximum of 33 points,
- for section B – a maximum of 36 points,
- for section C – a maximum of 3 points, respectively
- for section D – a maximum of 30 points.

Hence, in total, a bank can sum up 102 points, which reflects absolute full compliance in all sections of the BSE's Code of Corporate Governance. Henceforth, for the studied banks, the maximum score that can be reached is 408 points.

Results and Discussion

By analysing the "Comply-or-Explain" Statement disclosed for each of the 4 banks and in accordance with the proposed scoring system, we calculated the level of conformity with the principles and provisions depicted in the Code of Governance issued by the BSE:

Table 4: Quantitative determinations regarding the level of conformity with the BSE's Code of Corporate Governance

Category / *Level of conformity*	**Maximum score** [pts]	**Compliance**	
		Obtained score [as at Dec, 31, 2018]	*Degree of compliance* [%]
TOTAL CGC.c score	408	357	87.50%
Section A score	132	130	98.48%
Section B score	144	118	81.94%
Section C score	12	10	83.33%
Section D score	120	99	82.50%

Source: own projection

From the analysis carried out it was revealed that the banks analysed in the sample comply to a great extent with the provisions of the Code of Corporate Governance.

However, the lowest result was obtained, unsurprisingly, in section B, which refers to risk management and internal control. Over the last years, subsequent to the 2007-2008 crisis, the bank practitioners seem not to actually understand risks and, therefore, banks do not periodically review and make amendments to the internal control function in accordance to the bank's risk profile.

Section D also acquired low result, due to the fact that banks should adopt a policy with respect to forecasts, whether they are distributed or not. Moreover, banks, even if they may have an Investor Relations function, they do not make the adequate disclosures and do not have a dedicated Investor Relations section on their website, both in Romanian and English, as advised by BSE.

Graphically, the scores obtained by the studied banks regarding the level of compliance with the provisions of sections A, B, C and D are reflected as follows:

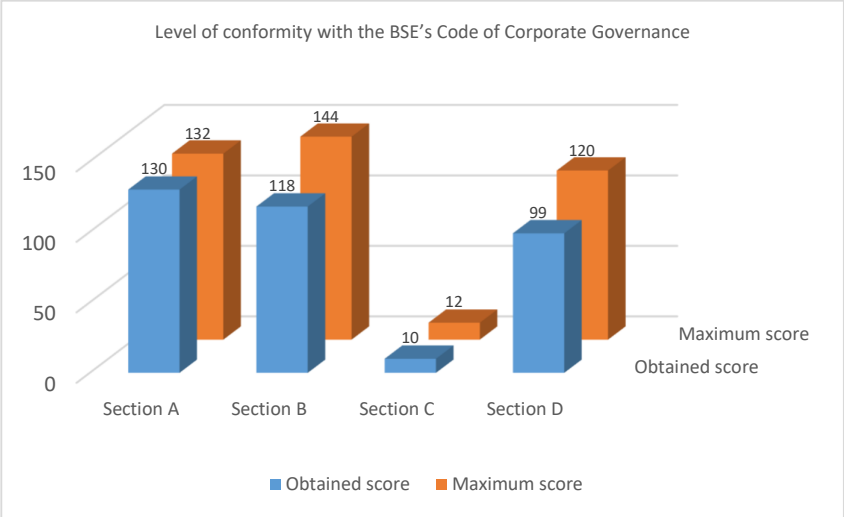

Fig. 2: Level of conformity with the BSE's Code if Corporate Governance
Source: own projection

The analysis of the level of compliance with the principles and provisions depicted in the Code of Governance issued by the BSE in each section is presented in the descriptive statistics below:

Table 5: Descriptive statistics

	Section A	Section B	Section C	Section D	Total CGC.c
Mean	32.5	29.5	2.5	24.75	92
Standard Error	0.2886	0.5	0.2887	0.25	0.4082
Median	32.5	29	2.5	25	92
Mode	32	29	3	25	92
Standard Deviation	0.5773	1	0.5774	0.5	0.8164
Sample Variance	0.3333	1	0.3333	0.25	0.6666
Kurtosis	-6	4	-6	4	1.5
Skewness	0	2	0	-2	0
Range	1	2	1	1	2
Minimum	32	29	2	24	91
Maximum	33	31	3	25	93
Sum	130	118	10	99	368
Count	4	4	4	4	4

Source: own projection

Section A's provisions seem to be the most banks comply with (98.48% compliance), especially in terms of:

- ⊕ internal regulation of the Board in regards to terms of reference and responsibilities for Board and key management functions of the banks;
- ⊕ managing conflicts of interest;
- ⊕ composition of the Boards;
- ⊕ policies regarding the evaluation of the Boards;
- ⊕ disclosed information regarding the number of meeting of the Board and of the committees;
- ⊕ appointing of a nomination committee (all banks being part of the Premium Tier entities).

However, some deficiencies are observed, most of them being related to:

- ⊗ insufficient information on the precise number of the independent members of the Boards.

The highest score and the maximum of the section (33) is obtained by 2 banks that fully comply with the provisions of the Code in terms of the responsibilities of the Boards. Within this section, the model's amplitude is 27 and it reflects the difference between the maximum and the minimum score obtained by the companies under study.

Conversely, *Section B*'s provisions seem to be the one banks do not comply with (only 81.94% compliance), especially when it comes to:

- ⊗ the audit committee's assessment regarding the effectiveness and scope of the internal audit function;
- ⊗ the adequacy of risk management and internal control reporting to the audit committee of the Board;
- ⊗ management's responsiveness and effectiveness in dealing with identified internal control failings or weaknesses and their submission of relevant reports to the Board;
- ⊗ lack of cyclical or ad-hoc reports.

The strong points refer to:

- ⊕ monitoring of the application of statutory and generally accepted standards of internal auditing;

- ⊕ existence of separate structural division (internal audit department) within the bank/ an independent third-party entity.

It is relevant to notice that within this section, the model's amplitude is the highest (2), reflecting the higher differences, respectively the variance between the maximum and the minimum score obtained by the banks under scrutiny.

In regards to *Section C*, there is only one provision that must be respected by the listed banks which refers to the fair reward and motivation regarding the remuneration policy of the members Boards. The lowest score obtained is 2, while the highest score is 3, this revealing that:

- ⊕ some banks fully comply with the provisions regarding the publication of the guidelines and arguments underlying the remuneration policy of the members of the Boards.

while some banks still do not provide a full disclosure of the aforementioned aspects. Thus, the obtained results indicate the above average compliance of the banks with the provisions of the Code (83.33%). *Section D* is another problematic section, with a total degree of compliance of 82.50%. The lowest score obtained is 24 points (out of maximum 30 points), which reveals that out of the 4 banks some do not comply with the provisions of the Code of Governance regarding building the value through relationships with investors, especially when it comes to:

- ⊗ having an Investor Relations function;
- ⊗ adopted a policy with respect to forecasts;
- ⊗ including specific information in the quarterly and semi-annual financial reports regarding the key drivers influencing operational revenues.

The strong points relate mainly to the external auditors, respectively to:

- ⊕ the presence of external auditors in the shareholders' meetings.

In conclusion, overall, from a global perspective, the level of compliance with the principles and provisions of the Code of the 4 studied banks is reasonably high (87.50%).
Weaknesses those charged with governance may have to address, in future, requiring efforts for revision, enhancing and improvement, may relate to:

- ⊗ lack of diversity in the composition of the Supervisory Board and Executive Board and a lack of a clear and concrete policy on gender balance, social and cultural origin, professional profile and education;
- ⊗ no real evaluation of the performances of the members of the two boards of management;
- ⊗ unsatisfactory supervision of risk management and risk exposure framework;
- ⊗ lack of authority from the risk management function, so that high risk activities can be stopped in time;
- ⊗ lack of diversification in risk management, often limiting only to those categories of risk which are considered as priority and, implicitly, the loss of sight of the overall picture, i.e. the totality of risks to which the credit institution exposes to;
- ⊗ unreasonable and disproportionate directors' remuneration, based on short-term value of bank's action, as being the only performing criteria (**Deliu, 2020**).

Conclusions

Corporate governance creates a "brave new world", in which entities have to either comply or explain. The "Comply-or-Explain" Statement reflects the extent to which the corporate governance guidelines are applied and enforced by the listed entities, through a self-assessment that reflects the either full compliance, satisfactory compliance, unsatisfactory compliance or non-compliance with the provisions of the Code.

The purpose of corporate governance is to facilitate effective, entrepreneurial and prudent management that can deliver long-term success for an entity activating in the banking sector
It's the system by which banks are directed and controlled, providing a measure for shareholders regarding the appropriateness of the governance structures.

Therefore, a cornerstone of the Code Corporate Governance issued by the BSE is the principle of "comply-or-explain", banks in Romania having to report each year how they have applied the principles of the Code, so that investors can evaluate the actions taken.

In this framework, we reached valuable conclusions regarding a satisfactory compliance level with corporate governance requirements in regards to Romanian banks that are listed on BSE. In this sense, the research emphasized, to some degree, a high level of adoption of the principles and provisions.

We emphasize the fact that it would be timely and beneficial that BSE would develop a Corporate Governance Index in order to efficiently assess the degree of applying and aligning with the Code's principles and provisions, as well as to measure the *corporate governance performance* of the entities listed on the BSE Market.

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The Impact of a Socio-Economic Crisis on Corporate Governance Effectiveness and Sustainable Development. Acumen: The Current New Coronavirus (Covid-19) Pandemic

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Abstract

The World is in a pandemic crisis at the moment, states, multilateral organizations and citizens being in urgent need for strategies to fight, cope with and ease the pandemic as well as to protect their societies and economies during and after this socio-economic crisis. The challenge (and struggle!) is global and huge – for many societies, the current crisis generating the largest turbulences in the environment since the Second World War. As we are all aware, as a result of the CoVid-19 pandemic, things are shifting and fluctuating quickly and the effect, enforceability and interpretation of laws may be affected by future events. As the practice of hindsight becomes emboldened, the "enterprise risk" preparedness of governance may be subjected to a more rigorous scrutiny that is less forgiving than what the law currently requires, boards being advised to anticipate this and take immediate measures. Boards may be considered "scape goats", therefore they must approach their enterprise risk evaluation. Risks such as business disruption, workforce turmoil and supply chain breakdown, but also risks that are existential in nature (e.g. global economic depression, national political upheaval, environmental/climate change disasters and public health catastrophes) must be taken into consideration. The issue of the quality and relevance of financial-accounting information in a sensitive socio-economic context such as that characterized (and influenced!) by an economic-financial crisis generated by certain turbulences in the socio-economic environment (such as the events generated by the CoVid-19 pandemic, events that are unfolding right now, under our eyes) is a topic of actuality and interest in the context in which the financial-accounting information largely bases the economic decisions of the users, and its quality is increasingly questioned in the context of an effective corporate governance imposed on companies around the world. Therefore, the emphasis on governance quality has expanded exponentially over the last two decades, corporate governance reform becoming a crucial global issue. Managing resources at the level of the economic entity and not only, including the resource represented by information, is extremely important in order to mitigate the effects of this global financial crisis; all the more so since the studies carried out on the causes that generated the global financial crisis in 2008, as well as the carried out research in the specialty literature that show how to manage the resources during the crisis period are current consequences of the economic life around the world. The recommendations set forth in this paper do not comprise an unequivocal statement of law, but instead represent the results of our exploratory and observation research, respectively our best interpretation of where things stand as of the date of publication.

Keywords: economic-financial crisis; turbulent socio-economic environment; Coronavirus; CoVid-19 pandemic; efficient corporate governance; sustainable development.

Introduction

Donald Rumsfeld, George W. Bush's secretary of defence, offered a declaration, statement that is revelatory – especially in these times of uncertainty, turbulences, insecurity, volatility, shakiness, unstableness, fluctuation, uncertainty, precariousness, imbalance, panic and disorientation: *"As we know, there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns—the ones we don't know we don't know"*.

According to **Investopedia**, *Enterprise Risk Management (ERM)* is a "plan-based business strategy that aims to identify, assess, and prepare for any dangers, hazards, and other potentials for disaster – both physical and figurative – that may interfere with an organization's operations and objectives".

As ambiguous as enterprise risks may be, the failure to acknowledge them may henceforward attract the sharpest finger pointing, most of the time those charged with governance (hereafter, TCWG) being considered the "scapegoats" of the entity's failure.

Boards' role in corporate governance, in general, is "to plan and strategize goals and objectives for the short- and long-term good of the entity and to put mechanisms in place in order to continuously monitor progress against the objectives", as **Price (2018)** depicts. In relation to this, Boards must understand, assess and debate the company's goals.

In this context, we have to assess *the manner in which the Boards are taking and will take into account*, in the most serious way, all these risks. *Did they manage to evaluate them? Did they prepare a plan to diminuate their effects?* To alleviate "blame game" apprehensions and to prepare for the next crisis, Boards may reflect on taking into consideration some measures.

Businesses are suffering an unprecedented disruption. Every corporation is consumed with issues arising out of the CoVid-19 pandemic, which has put their relationships with each of their stakeholders – employees, creditors, suppliers, regulators, shareholders – in stark relief. During this period of turbulence, stakeholders are looking to Boards of Directors to address the impacts of the coronavirus. How Boards *balance and prioritize those stakeholders* has to swing with shifting circumstances, just as Boards are forced to think about the *"long-term sustainability of their business"* (**Idowu et al., 2013**).

Considering the particularities of the current CoVid-19 pandemic, management – in general – and Boards of Directors – in particular, will need to answer many complex questions:

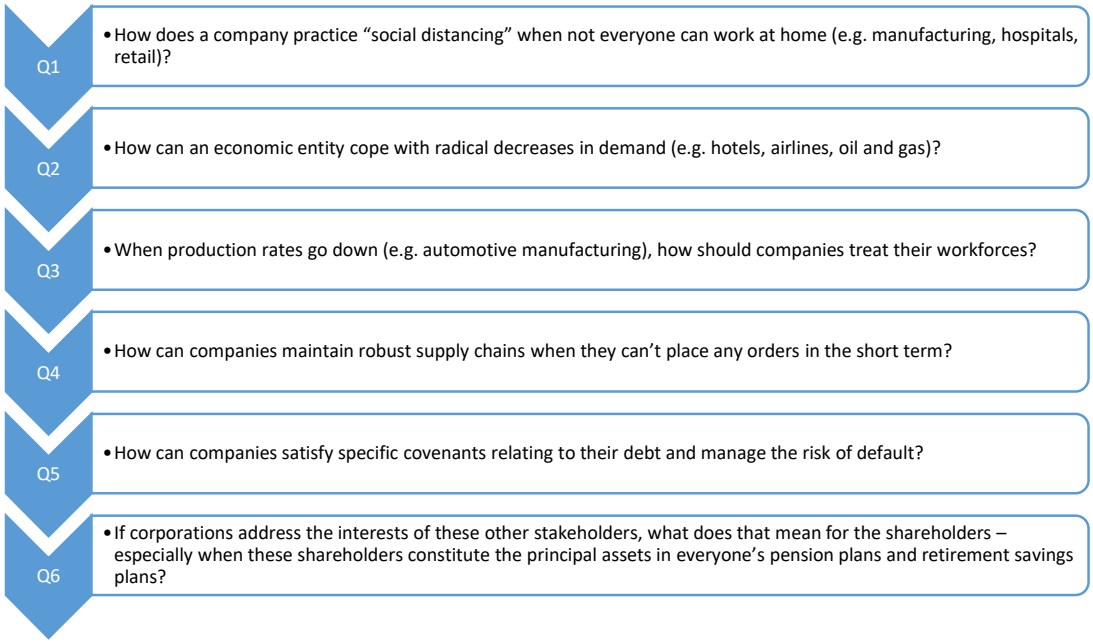

Fig. 1: Aspects the management and those charged with governance (TCWG) should consider during the CoVid-19 pandemic

Source: own projection

Without having the claim that the problems raised will be exhaustive, in the following we will try, through a *systematic approach*, to outline the aff*ected areas regarding corporate governance*, the *causes of these situations*, as well as the *sustainable directions of action*, likely to emerge from this general crisis.

Recent developments in crisis management increasingly demand that scientific rigor be useful and efficient in practice, through the form, background and considerations embraced by researching the extremely complex concept of effective corporate governance and sustainable development.

Research Methodology

This paper comprises a *fundamental research*, containing a number of debates and standpoints about the socio-economic crisis as a fundamental concept, respectively its impact on corporate governance practices, and also standpoints about the mission on the Boards in the context of the current new Coronavirus (CoVid-19) pandemic, in order to induce an effective, sustainable corporate governance. Being part of the *positivist research trend*, this paper encompasses broad *interpretative approaches*, intertwining harmoniously with a number of *critical elements* and *personal opinions*. In terms of generated information, this research focuses on a *qualitative research* (most investigated items being of qualitative nature). The research follows a *transverse direction* through the used *observation, comparison* and *conceptual analysis* techniques. Thus, the qualitative research valued specialty literature by processing it with various *methods specific to socio-human sciences*, such as *document analysis*, *non-participating observation* and *comparison*. The non-participating approach is due to the research field and the current state of knowledge in the field of interest, although comparisons made and opinions and conclusions expressed show certain participating aspects of the research, respectively the relevance of transmitted information. In our opinion, the dynamics of analysing scientific literature is extremely relevant in the analysis of the factors implying an effective, sustainable corporate governance, and consequently for increasing complexity of tasks and responsibilities attached to the Board of a company, the more that we talk about a sensitive, turbulent, socio-economic environment.

The CoVid-19 Pandemic as a Current Socio-Economic Crisis and its Impact on Practices in Corporate Governance

The pivotal concept that is found throughout the paper is the ***socio-economic crisis*** that captures the concerns of all societal actors (stakeholders), "calling for fundamental reconfigurations of economic philosophies and of the dominant action logic. Therefore, it needs *strategies* (to break out of economic weakness) and *tactics* (to control the effects of entrainment, immobilization, and contribute to restoring of stimuli)" (**Deliu, 2019**).

Obviously, this particular situation – this socio-economic crisis that captures the concerns of all societal actors – "calls for fundamental reconfigurations of economic philosophies and of the dominant action logic". Therefore, Boards need strategies – to break out of economic weakness, respectively tactics – to control the effects of entrainment, immobilization, and contribute to restoring of stimuli.

The crisis is analysed from many points of view, researchers insisting on: the multidimensional reverberations of the crisis processes, the reconfiguration of the elements of optimal nature, but also of the effectiveness under conditions of pronounced economic asymmetry, the new level of sustainability in the current economic development, imminent and long-term changes to the fundamentals of competitiveness.

At the moment, everyone is talking about crises and deficiencies, regardless of whether they are crises and deficiencies at the individual, family, economic entities, nations, regions, different currencies, financial systems or worldwide.

In this context, the global socio-economic crisis is a very complex, profound and topical process, which affects the fundamental elements of the economic system and to which the great economists of the world cannot find the antidote. Any socio-economic crisis usually has devastating effects on both the

highly industrialized and the least developed countries, whose economies are largely dependent on exports of raw materials. In times of economic recession, the volume of world trade is rapidly declining, as personal incomes, corporate profits and budgetary revenues also decline. The effects of economic crises are manifested in many forms, such as: decreasing the volume of trade, reducing consumption (and, implicitly, production), resounding bankruptcy, decreasing population incomes, increasing unemployment, depreciating national currencies, inflation, decreasing public budget revenues, diminishing public revenues, increasing budget deficits, etc. Although, overall, global economic crises affect all entities in a country, large units have more possibilities and greater strength to withstand its effects. In contrast, small and medium-sized enterprises are the most affected by the crisis, with most of them going bankrupt.

The generalized economic crisis manifested on a global scale brings into attention the *quality and credibility of financial-accounting information*, as well as the *efficiency of corporate governance* and, implicitly, the efficiency of the measures taken by the Board of Directors in this regard.

The paradox of the current crisis is that liquidity is generally plentiful, but is no longer in the right place. The crisis surprised all the participants by its size and the speed of penetration in the national economies, which was due in large part to the level of transformation determined by the securitization methods and especially due to the effects of globalization on some highly sensitive markets from the public trust point of view.

The problems of globalization of the world are also reflected in the *evolution of the concept of corporate governance*. The globalization of the world economy against the backdrop of a global socio-economic crisis generates *new circumstances* and raises *question marks* in everything pertaining to the economy of each country. These changes in the economic-social environment have been linked, most often unfairly, with TCWG. At present, Boards of Directors are the most exposed to the virulent criticisms of the users of information in the financial reports, being considered *"scapegoats"*, as guarantors of the quality and credibility of the data disseminated by the economic entities. Sometimes it goes even deeper and further, considering that they are the only ones accountable for the failures faced by the companies. In this context, the *role of Boards of Directors increases*, especially in the context of *efficient, sustainable corporate governance*, their value having to acquire *new valences* by "providing additional elements related to the transparency of operations, through the need for increased vigilance towards complex financial products and the need to better understand both individual and systemic risks" (**Deliu, 2018**).

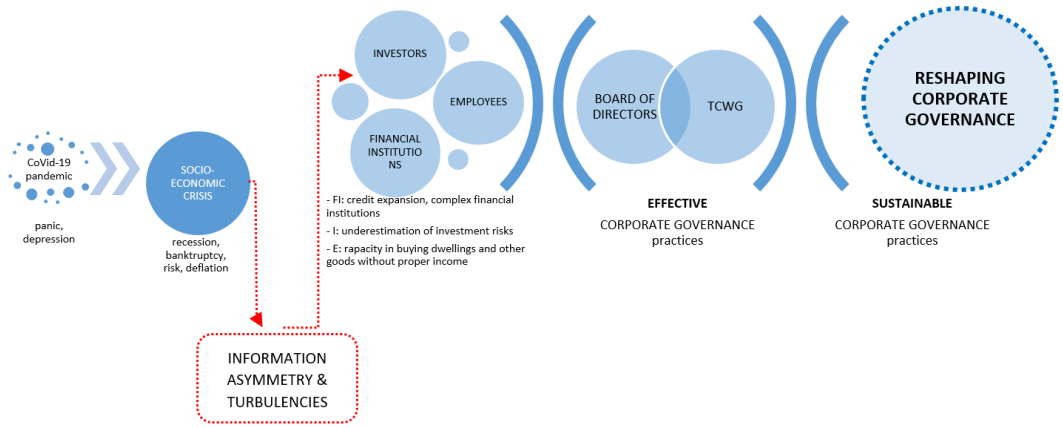

Fig. 2: Reshaping corporate governance – as a way of mitigating turbulences generated by the CoVid-19 pandemic and the socio-economic crisis phenomenon

Source: own projection

The financial crisis leads to important changes in the behaviour of the parties directly interested in the activity of a company. The reactions differ depending on the role of the participants in the life of the economic entity.

Hence, in order to avoid bankruptcy and conflicts of interest, managers must adopt a flexible attitude, adapt to the requirements of the stakeholders involved and, last but not least, they must ensure a permanent *communication* between the company and the stakeholders.

Henceforth, we see how most financial crises lead to rumours, perception distortions, confusion, stress, lack of control, panic, disorientation and even major imbalances across society. The affected ones (entities, owners, managers, other stakeholders) may have reactions of denial, avoidance of accountability, lack of guilt or justification. Ultimately, reactions must turn into positive feedback, acceptance, optimism, confidence, remedial and corrective action.

This means uncertainty, lack of security and major imbalances can only be controlled and removed when society's panic and disorientation are diminished. Therefore, in a crisis context, the liaison that makes the transition from a negative attitude to (at least!) a survival-oriented behaviour or even a more optimistic one, is the *communication* between the organisation and the stakeholders.

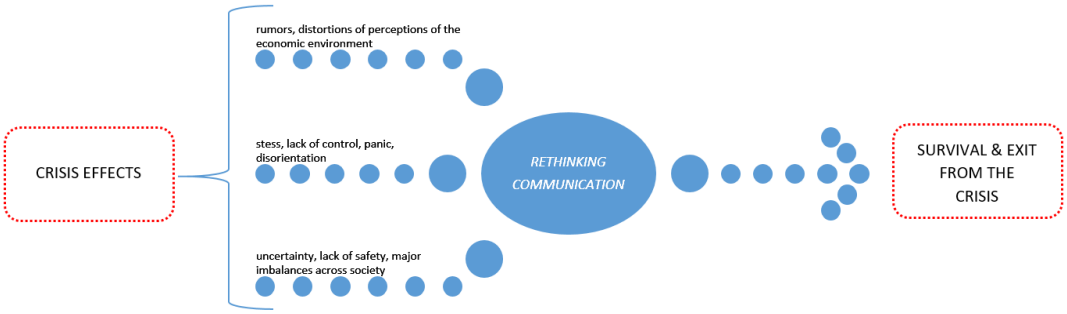

Fig. 3: Rethinking communication – as a way of survival and exit from the crisis
Source: own projection

On one hand, in order to avoid bankruptcy and conflicts of interest, managers, as prime movers for corporations, will need to cultivate survival strategies and prevailing risk management tackles. They need to adopt a malleable approach, must adapt to the stakeholders' requests, and last but not least, must ensure a permanent communication with them.

On the other hand, in this context, a company's managers *may intervene in applying accounting policies and methods* to benefit from the different interests of users of accounting information.

Corporate Governance Considerations During the CoVid-19 Pandemic

Lately, the concept of *governing an entity* or *corporate governance* has become more and more popular. Specifically, the concept was imposed in the early 90s, although it was used much earlier. Generally speaking, it refers to the process of managing an entity, the pursued objective being to establish rules of interaction between managers and shareholders so as to provide a framework for the protection of shareholders' rights.

As stated in the ***Principles of Corporate Governance*** issued by the **Organization for Economic Cooperation and Development (O.E.C.D.)**, corporate governance is defined as „the system (the totality of procedures and processes) by which a corporation is directed, managed and controlled". According to O.E.C.D., the "corporate governance structure specifies the distribution of rights and responsibilities among different participants in the corporation, such as, the board, managers, shareholders and other stakeholders, and spells out the rules and procedures for making decisions on

corporate affairs. By doing this, it also provides the structure through which the company objectives are set, and the means of attaining those objectives and monitoring performance".

Implicitly, corporate governance is *the set of links that arise between the management of a company and all stakeholders interested in its business*.

Worldwide, according to the "traditions" of each national economy, the "artisans" of corporate governance systems have identified three major models: American/traditional /"outsider" model (based on the extremely close link between shareholders and the company and defining best the model of European companies, a long-term orientation of the company's strategy and stability); the Continental-European/deterministic/German/"insider" model (implying a massive concentration of capital) and the Japanese extended/assumed risk model (bringing cohesion to the company and holding structures).

Therefore, the concept is understood somewhat differently in the two "accounting worlds": from the *Anglo-Saxon perspective*, the governance of the company takes into account the *primacy of the shareholders*, starting from the idea that the company belongs to the them and its purpose is to serve their best interests; while the *Continental-European perspective* is more generous in this direction, in the sense that the entity's governance takes into consideration the interest of *all parties involved* in the operation of the organization and not only of the shareholders.

The outbreak of the current crisis, followed by its global expansion, but – especially – the persistence of its effects, have led to broader debates on the *causes and optimal policies needed to overcome the difficulties*. Inevitably, these debates brought back to the discussion – a fact that has already become a cyclical phenomenon – *the role of the companies' management and of the corporate governance structures* both *in the credibility of the financial reports of the companies, as well as in the continuity of their activities*.

Thus, in view of the above, we consider the initiative useful that the *role and scope of the measures taken by TCWG be discussed and analysed in the general context of the financial market regulatory reform*. Corporate governance, together with external audit, should contribute to financial stability and reduce the risk of distortion, in order to reduce bankruptcy cases.

The question is *how should TCWG act*, *how will they go through the crisis* and *what will they learn from it*? The answer lies, in our opinion, in:

- caution in *evaluating the continuity of the company's activity*, respectively the *appropriateness of the use of the going concern basis of accounting*
- the *transition from effective corporate governance to sustainable corporate governance*.

A Sustainable Development Framework: From an Effective Corporate Governance to a Sustainable Corporate Governance

Acting in the interest of the corporation sounds simple, but it is far from simple. It requires a Board that is knowledgeable, diligent and willing to use its best efforts to treat all stakeholders fairly. Boards that use this challenge as an opportunity to drive innovation will create the greatest success for the companies they guide.

Therefore, currently, when only a few economies of the world remained unaffected from the global economic crisis that befell, corporate governance has become a vital solution for the economic growth and sustainable development to which every economy aspires.

It is renowned, in this framework, that management in general and qualitative, effective corporate governance in particular – are of critical significance for sustainable development.

The question that inexorably arises at this point is *how does effective corporate governance affect sustainable development?*

The answer may find its correspondent in the figure below:

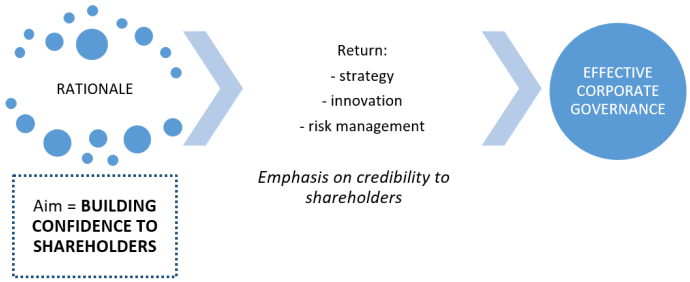

Fig. 4: Effective corporate governance
Source: own projection

At this point, it should also be emphasized what a "s*ustainable development framework"* embodies. In conjunction with global practices, it "covers three dimensions of economy, society and the environment, with corporate governance as an overarching principle" (**Jukka, 2020**):

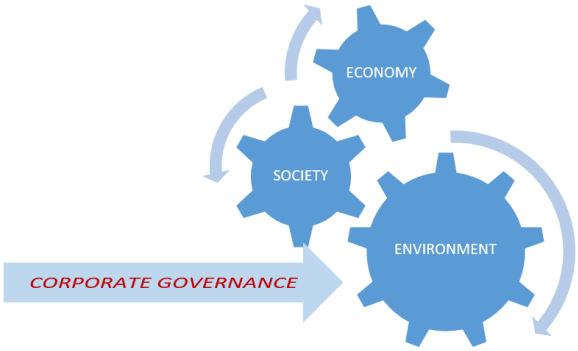

Fig. 5: Reshaping corporate governance by taking into consideration factors related to economy, society and environment
Source: own projection

With all these in mind and also taking into consideration today's sensitive socio-economic environment, Boards must understand that *economy* creates values not exclusively for profitability, but creates *mutual benefits for all stakeholders* through two directions: on one hand by contributing to national economic growth by means of value generated by company's operations, respectively, on the other hand, through income distribution between company's stakeholders.

Boards must also pay attention to *society* as a whole, therefore they should conduct business with integrity and concern for *Corporate Social Responsibility (CSR)*. Therefore, in what follows, as **Jukka (2020)** outlines, companies should redirect their attention to: "community investment and donation, labour practices and human rights, human resources and human capital development, health and safety, but also to stakeholder engagement".

Regarding the *environment*, companies should commit more than ever to preservation of the environment and natural resources, consuming all resources astutely and upholding ecological balances, and being alert to aspects such as: energy and climate change, biodiversity and ecosystems, environmentally friendly products and services, water and waste management, respectively logistics management.

Therefore, a not only *effective*, but also *sustainable corporate governance* – as an overarching principle – must supervise all activities in order to warrant transparency, fairness and accountability, uniformly with the business philosophy and mission, as well as business strategy, this implying:

- ✓ good, effective corporate governance practices;
- ✓ efficient risk management; respectively
- ✓ adequate disclosure and fairness in reporting.

Even though one cannot straightforwardly classify and disperse environmental, social and economic aspects, respectively and the relationship of corporate governance in regards to them, one can illustrate their conjoint associations, this being appropriate simply because they exist neither independently nor side by side. There is no perceived linear relationship, but a vertical relationship (relations of superiority and inferiority, i.e. we provide their hierarchy).
In this context, we provide the figure below:

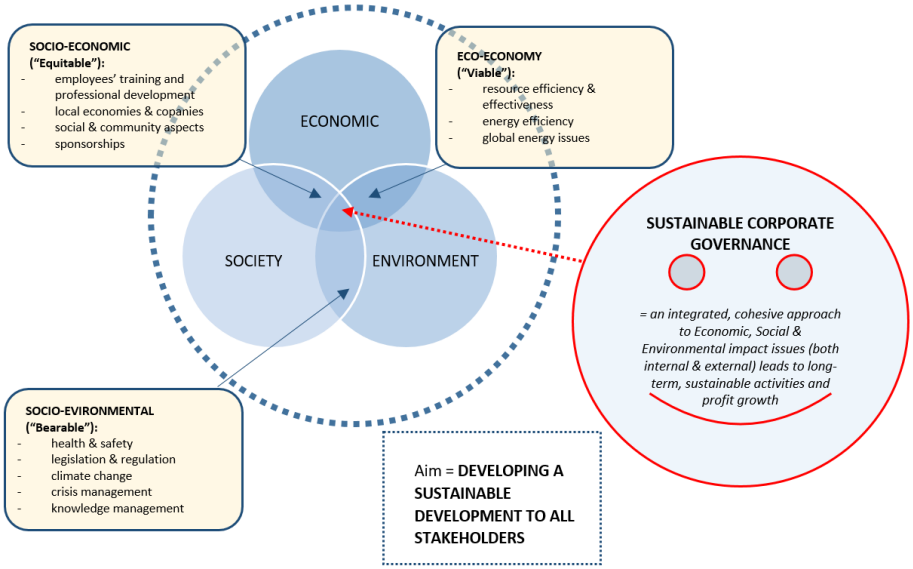

Fig. 6: Sustainable corporate governance – a framework
Source: own projection

As a result, only an effective, qualitative and sustainable corporate governance can contribute to sustainable economic development by improving company business results, increasing operational efficiency, facilitating and improving access to capital markets – especially in a sensitive socio-economic context, like the one generated by the current CovId-19 pandemic.
With the purpose of warranting a proactive approach to sustainable development, as noticed through the prism of effective sustainable corporate governance, it is necessary for the Boards of Directors to understand that their role and scope must expand.

Key Sustainable Corporate Governance Points for the Board of Directors Relating to the CoVid-19 Pandemic. Discussion

The current socio-economic crisis has rolled back the hard earned development gains of the past several years, since the last crisis in 2008.

In this context, **Heyzer (2009)** draws attention to the fact that sustainable development is "under threat with fewer resources available to deal with both development threats and challenges, the human costs of this crisis being incredibly high as millions lose their jobs and even more fall into poverty and income insecurity".

Thus, now, more than ever, corporate governance structures need to commit to inclusive and sustainable development.

Corporate governance in as many companies must now be built on *sustainable development principles*, involving:

- the recognition of corporate social responsibilities (CSR), and the
- stakeholders' legitimate interests in corporate activities.

CSR values should be integrated into corporate values, by also taking into consideration all four features of a company: moral, organizational, cultural and strategic (**Farcane and Deliu, 2019**).

Sustainability must be considered as a healthy dynamism and not as the spasmodic search for a single point of balance. In this framework, in order to achieve high levels of sustainability, "it is necessary for there to be a widespread sharing of values between those declared by the organization and those that guide the behaviours and attitudes of its employees, contributing to generating positive effects in the socio-economic environment" (**Farcane and Deliu, 2019**).

The following table comprises a *summary of key corporate governance points* that, in our opinion, *the Board of an economic entity should consider in connection with the ongoing COVID-19 pandemic*. We refer mainly to the manager or the Board of a limited liability company of privately held companies.

Table 1: Summary of key corporate governance points to be considered by the Board of a company

1. The Board's role in a crisis	As a general matter, the board is charged with overseeing the business and affairs of the company. This includes setting the goals, policies and objectives for the company and overseeing the management's execution of the company's business plan. During times of crisis, including a pandemic, the board may need to adjust its level of oversight over the company and its business to ensure that the board is properly monitoring the risks facing the company and to evaluate, on an ongoing basis, the effect the pandemic has on the company's business, its ability to continue as a going concern, and its strategic and business plans. To assist the board in monitoring the effect of the pandemic on the business or to assess or address one or more risks to the business posed by the pandemic, the board may form one or more committees of the board – composed of a subset of the members of the board – to oversee certain aspects of the pandemic. A committee composed of a select number of board members may be more efficient in evaluating, overseeing or addressing certain risks to the company caused by the pandemic. In discharging its responsibilities, the board must implement measures to ensure that it is reasonably informed of the business and operations of the company, including the risks facing the company and its business as a result of the pandemic. This requires that the board receive relevant information from the company's management and outside advisers on a timely basis. In times of heightened risk, the board should evaluate whether more frequent updates from the company's management and outside advisers are necessary, and whether the board should implement additional policies and procedures to ensure that the necessary information is reported to the board in a timely and complete manner.
2. Crisis response team and plan	If the company has a crisis response plan in place, the board, together with the company's management and outside advisers, should evaluate whether the plan is sufficient to address the risks posed by the pandemic and whether the plan or the crisis response team should be modified to address the specific risks to the business caused by the pandemic. If the company does not have a crisis response plan, the board should consider whether to implement a plan and whether a crisis response team – composed of members of the board, members of management and outside advisers – should be formed to assess and respond to the pandemic. The crisis response team should include individuals with diverse backgrounds and expertise to ensure that all aspects of the pandemic and its effect on the business are covered.
3. Evaluating the financial position of the company	The board should understand and evaluate the impact of the pandemic on the financial strength of the company. For instance, the board should monitor the company's cash flow and anticipated cash needs for (i) working capital, (ii) future debt payments, and (iii) maintenance of financial covenants in loan documents, and consider whether changes to the business or policies of the company are necessary in response to such anticipated cash needs. The board should consider whether it is appropriate to delay declaring a dividend or, if the dividend has already been declared, whether the payment of such dividend can be delayed under applicable law. It is important to note that if the company becomes insolvent or enters the "zone of insolvency," the obligations and duties of the members of the board may shift or broaden to include creditors and other constituents of the company.

4. Meetings of the Board of Directors	The board should consider whether it is advisable for it (or a duly constituted committee of the board), for the duration of the pandemic, to meet on a more frequent basis to ensure that the board is properly overseeing the business and affairs of the company. Due to social distancing and other measures imposed by many states and the federal government, it may not be possible for the board or a board committee to meet at a physical location. The corporate laws of many states expressly permit boards and board committees to meet telephonically or by other means of electronic transmission. Prior to holding a telephonic meeting or a meeting by other means of electronic transmission, the company must ensure that the laws of the company's state of formation and the organizational and governance documents of the company permit the board or board committee to meet telephonically or by electronic transmission. The board should also be mindful of notice and quorum requirements imposed on meetings of the board and board committees. The need for the board or committee to assemble quickly to address issues relating to the pandemic may come into conflict with notice requirements for board or committee meetings. In many instances, members of the board or board committee may waive notice requirements by attendance at the meeting or by signing a written waiver. However, it is generally not possible to waive a quorum requirement for board or board committee meetings.
5. Annual Meetings of Shareholders	Due to social distancing and other measures imposed by many states and the federal government, it may not be not possible for the company to hold its annual meeting of shareholders at a physical location. In response, a company may change its meeting date or, if the applicable law allows, hold a virtual meeting of shareholders. Prior to holding a virtual meeting of shareholders, the company must ensure that the laws of the company's state of formation and the organizational and governance documents of the company permit a shareholder meeting to be held virtually. Note that the corporate laws of many states have been amended in response to the pandemic to expressly permit companies to hold virtual shareholder meetings. If a company that desires to hold a meeting of shareholders virtually already has provided notice for an annual meeting of shareholders, careful consideration should be given to the notice and corporate laws of the company's state of formation to ensure that the virtual meeting is properly noticed, perhaps with a supplement to the original notice. However, in many instances, it will be necessary for the company to provide a new notice of the meeting. Instead of holding a virtual meeting, a company may elect to push out the meeting date. A change in meeting date may require a new notice obligation under applicable state law, or an adjournment process could be used. Instead of holding a shareholders meeting at all, most jurisdictions permit shareholders to act by written consent. However, some jurisdictions impose restrictions on the ability of shareholders to act by written consent in connection with the election of directors and/or impose a higher voting standard on actions taken by written consent of shareholders. Applicable state laws and governing documents of the company should be reviewed to ensure that shareholders are permitted to act by written consent and to determine the minimum voting requirements.

Source: own projection

In evaluating the appropriate actions to take in response to the pandemic, the Board should consider consulting with the company's management and outside financial and legal advisers, and other advisers (such as cybersecurity consultants). However, the Board should be mindful that it is the ultimate authority in connection with responding to the pandemic – the Board is the ultimate decision-making and goal-setting body of the company, charged with the protection of the interests of the
The rapidly evolving Coronavirus is triggering all kinds of risks impacting multiple aspects of an organization. Unfortunately, we are seeing first-hand how a single-root cause event can trigger interrelated consequences for almost all economic entities.

While strong risk management practices can't stop the spread of the coronavirus or prevent other pandemic risk events, enterprise risk management processes can help organizations anticipate the impact of these kinds of unforeseen, extraordinary events.

Conclusions

The current CoVid-19 pandemic may cause managers to rethink what an "effective sustainable corporate governance" might be.

Historically, the determination of whether a Board is discharging its duties responsibly has been assessed with reference to whether its actions would be consistent with general common practice. However, the current pandemic highlights that common practices, such as payment of extraordinary dividends or buying back shares that favour the shareholder, may have disadvantaged many other stakeholders in the past.

What does it mean to treat all stakeholders fairly and equitably? And how then does the corporation organize itself to respond to these unprecedented circumstances? We believe that companies should come up with a set of principles and practices to help them navigate these Especially at this moment of pandemic, we argue that main priority finds its correspondent in the sustainability of the corporation. However, at the extreme, the current crisis may cause some corporations that are overleveraged to "hit the wall." Even with the government supports being proposed, long-term sustainability may not be possible. Even here, the Board should give serious consideration to human issues, such as stability of employment for workers. Also, another recommendation would be that those charged with governance should create "social responsibility committees" – much like audit committees and compensation committees that are already in place, to dissect the relationship of their corporations to their stakeholder groups – research suggesting that companies with better performance on corporate social responsibility are also those that weather crises more successfully Also, Boards will likely have to engage directly with stakeholders to understand their needs and work collaboratively to generate resolutions to trade-offs. In the short term, these committees should enable corporations to be nimble and to move quickly to deal with the volatility generated by the pandemic. At a time of crisis, trust from stakeholders is primordial, being earned over time, since they may prove to be a better lifeline than any government crisis subsidy.

These principles and practices would enable boards to see this crisis as an opportunity to explore innovative solutions that might be better for everyone, or for many.

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Configuration Management As A System Tool To Support Product Quality For Safety And Business

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Abstract

The increase in demand for products from various product groups raises questions about their quality. Quality is understood as the degree, to which a set of inherent properties meets the requirements of the customer (ISO 9000 2015). Research shows that the product quality problem is perceived as a threat to safety and business. Meeting the quality requirements of products determines the level of safety of the military and civil market, in the global dimension. Customers on the global market are looking for products having the quality that comply with their requirements, while manufacturers, perceiving a quality problem, are looking for methods and tools to provide customers these quality requirements for products at a appropriate level. Can we find universal tools to support manufacturers in their pursuit to provide quality of products? The objective of the paper is to analyze and indicate one of such systemic tools supporting the quality and safety of products/services. It is configuration management, which plays a very important role in ensuring quality requirements for products/services, in providing full information about the compliance of the product/service with its requirements and about the achieved functional and physical properties of the product throughout its life cycle. Empirical research was carried out in 2016-2017 on a group of 120 Polish enterprises holding the ISO 9001 and AQAP 2110 certificates of quality management systems. The methods used have been adapted to the conducted research consisting of: analysis of normative documents, system documentation of the assessed enterprises, audit assessment by means of direct and indirect interviews with authorised specialists and experts, observation of processes and activities, conclusions and generalisations based on the collected data. The solutions contained in this paper may have a practical dimension for enterprises. Configuration management implemented in the design and production processes can help to ensure the quality requirements of products in relation to, among others: stages of realisation, formulation of requirements, methods of their confirmation and use of documents.

Keywords: Quality, Product, Configuration Management, Safety, Product Life Cycle,

Introduction

It is assumed in the literature that configuration management is used in the processes of realisation of products/services, mainly for national security and defence. Empirical research carried out in 120 companies shows that it can be successfully applied also in other sectors and industries, as one of the important elements of quality management for each type of product/service, e.g. in logistics. In order to ensure that processes, e.g. design, production and service processes are not ad hoc, partial, inconsistent with requirements, based only on technical documentation, solutions integrated with all stages of product/service implementation should be implemented, such as: definition of customer requirements, planning, development works, operation, service, purchases. This is of particular importance in global markets, in cooperative ventures carried out by many enterprises. Lack of implemented configuration management in accordance with specific reference documents may result in the delivery of a product/service not meeting the quality requirements. Can configuration management really affect the quality of the product/service? The research confirms the relationship between quality management and configuration management in various scopes of documentation in accordance with the ISO 9001 and AQAP 2110 requirements. Those organizations that implement a quality management system in accordance with the AQAP 2110 requirements should implement a

configuration management process. The effectiveness of configuration management is conditioned by the repeatability of realisation processes, ensuring the quality and safety level established in individual stages of the product/service life cycle. Configuration management is fundamental for organizations that offer products/services that affect safety, reliability, interoperability. First of all, it concerns organisations providing products and services, e.g. for the army. Configuration management becomes important for products/services with a high degree of technical and technological complexity. This does not mean that in case of other sectors or services, e.g. construction, medical, transportation, etc. we can exclude the application of configuration requirements. The adopted NATO quality policy clearly states that the basis for operation is an integrated systemic approach to achieve the quality of products/services in the full life cycle. This approach takes into account many factors from the area of organizational and technical-technological activities, including configuration management. It is understood as a continuous maintenance of the product's compliance with the requirements specified in the individual phases of realisation, i.e.: with customer requirements, concept, design, development, production or exploitation, including renovation, possible modernization and liquidation, the need to make and supervise changes. The lack of supervision over the changes made makes it difficult or even impossible to achieve certain functional and physical properties of the product/service. An important problem to ensure the quality requirements of a product/service is the assessment of configuration management. This problem requires effective methods based on modern techniques and scientific tools. In ensuring the quality requirements of the product/service there has been no uniform approach to configuration management so far. To this day, many Polish companies, having clearly formulated requirements, have not taken the trouble to implement them, risking that they fail to meet customers' requirements, subjecting themselves to non-compliance and complaints. The paper is addressed not only to enterprises planning to conclude contracts for products/services for security and defence purposes, but also to those organisations that want to have proof that their product meets certain quality requirements.

Configuration Management In Terms of The Analysis of Normative Documents

In the processes of realization of products/services, there is usually a need to make organizational, technological and technical changes. They result from customer requirements and unforeseen external and internal situations in an enterprise. If, in such situations, the lack of supervision over the implemented changes this makes it difficult to achieve the expected quality characteristics of products/services. This is a problem that requires the use of effective methods based on modern management tools, such as the configuration management.

Until the allied document on mutual acceptance of the Government Quality Assurance process was implemented and the allied AQAP quality assurance publications, STANAG 4107 was used, in the process of the assurance of quality requirements for products/services, no uniform approach to the configuration management had been applied under industrial conditions. The situation changed after the implementation of NATO standardization publications on AQAP quality assurance, which such publications implemented configuration management as the critical process managing product life cycle (Pokora 2016).

The basic document used in configuration management is the AQAP 2110 standardization publication on quality assurance (AQAP 2016). Configuration management as described in item 5.4.1.2 of this document is intended to implement planning, identification, supervision of changes, description of configuration status and configuration audits in accordance with the requirements of ACMP 2100 (ACMP 2017). Configuration management is one of NATO's requirements for quality management, which is why it was STANAG 4427, 3rd edition that introduced allied ACMP configuration management publications. Detailed requirements and guidelines for configuration management are the part of the ACMP publications and other additional clauses being the part of contracts or other equivalent national documents. One of them is the ISO 10007 quality management series standard, which contains configuration management guidelines (PN-EN 2018). It is referenced for use in the requirements of AQAP 2110:2016 (including ACMP 2100:2017). It should be noted that ACMP 2100 contains NATO's contractual requirements for configuration management in all stages of the product/service life cycle. When considering documents relevant to product/service

configuration management, we cannot omit ACMP 2000 and ACMP 2009 because of their detailed information on NATO policies and requirements relating to the scope of the subject matter. The information contained in ACMP 2009 (2017) is important for the development of the configuration management life cycle plan, i.e. for planning the provision of the required resources for ongoing contracts. This document is the adaptation of the requirements of ISO 10007 and additional directives and requirements specific to NATO. This publication helps to identify processes and define needs for configuration management. In addition, this paper supports the organization in planning configuration management activities throughout the full product life cycle. ACMP 2000, on the other hand, highlights the importance of NATO's Systems Life Cycle Management (SLCM) policy by making configuration management a mandatory management process for NATO programmes and systems over the full life cycle of a product/service, in order to achieve interoperability, risk reduction and effective use of NATO capabilities in joint operations. If these requirements were insufficient in relation to actual needs in all stages of the product life cycle, they may be further specified by means of an appropriate guide and added to the order. Documents indicate that the configuration management system should be established, documented, used, maintained, evaluated and improved. The publications have been developed to provide requirements for configuration management with regard to the quality of products/services in joint NATO international projects and national programmes. They provide detailed guidance on planning, configuration identification, control, status and audit, measuring and evaluating performance for executives and managers at different organizational levels. Although they have been developed with security quality requirements in mind, they should also be used by the civil sector due to the increasing quality requirements of its customers.

While reviewing normative documents in this subject matter area we cannot omit basic standards from the ISO family such as: ISO 9000, ISO 9001. AQAP standardization publications containing contractual requirements for the quality management system of suppliers of products/services use international standards from the ISO 9000 family, in terms of:

- terminology and definitions compliant with ISO 9000:2015,
- quality requirements compliant with ISO 9001:2015.

Based on ISO 9001, AQAP 2110 requirements have been developed to complement the basic requirements in quality management. This is particularly important for the design and development of a product/service and the need to establish configuration management procedures. In such processes there is generally a need for changes resulting from reviews, verification and validation (ISO 9000 2015). Then the lack of supervision over the introduced changes makes it difficult or even impossible to achieve certain functional and physical properties of the product/service. However, at the stage of production processes, configuration management is limited to the supervision over execution and to introducing deviations or changes not affecting the functional and physical properties of the devices.

Scope of application of configuration management with regard to safety and product quality

Configuration management requires a different view of the essence of management, especially with regard to product decomposition by degree of its complexity and innovation (Pokora, Świderski 2006). This is a concept that applies to comprehensive customer service in networks. Such networks can be formed by: product manufacturers, suppliers of components, spare parts, exploitation packages and training centres for operators of products on site. Such a way of customer service causes changes in the technical preparation of the product, which boil down to a different look at the product and documentation of knowledge than before (Pole 2007). In order to ensure proper identification and traceability of products or services, in accordance with the requirements of AQAP 2110, a configuration management procedure should be implemented in order to continuously maintain the compliance of the product/service with the requirements set out in the documentation created at individual phases of the implementation process. The conceptual meaning of the essence of configuration management is shown in Figure 1.

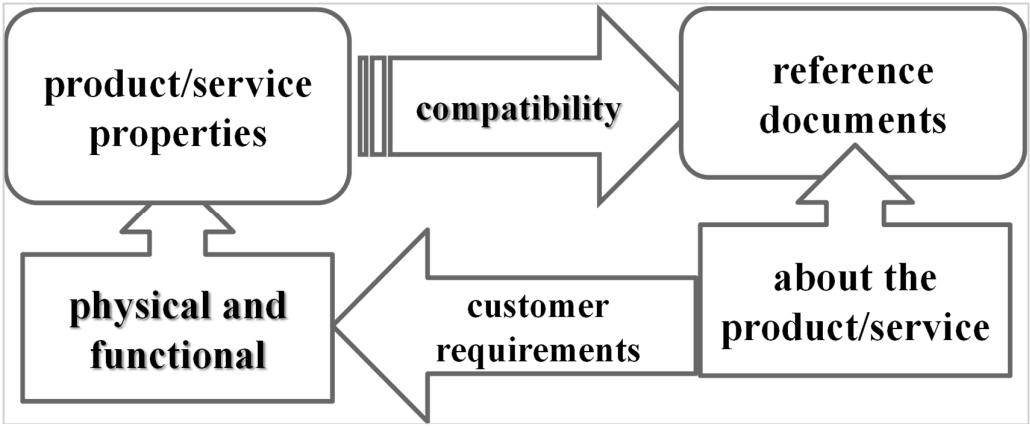

Fig. 1: The essence of configuration management (the in-house elaboration).

How can we read the essence of configuration management by using ACMP documents? Figure 1 shows a simple relationship which defines that, in classical terms, configuration is the functional and physical characteristics of a product/service as defined in the technical documents and obtained in the final product. On the other hand, product/service configuration management is understood as organisational, technical-technological and administrative activities consisting in supervising the compliance of functional and physical characteristics of manufactured products/services with the requirements specified in the documents. The observation and direct interview of the device/service configuration management organizations shows that the configuration defined in this way has its reference in the practice of manufacturing processes. Due to its nature, it is an instrument supporting quality management of products/services. In the quality management system they provide up-to-date information on the status of product realization at particular stages in relation to the quality requirements of the customer.

We must remember that configuration management applies at various stages of the product/service life cycle. This approach should be highlighted and promoted among organisations. Figure 2 indicates at which stages of the product/service life cycle we should refer to configuration management.

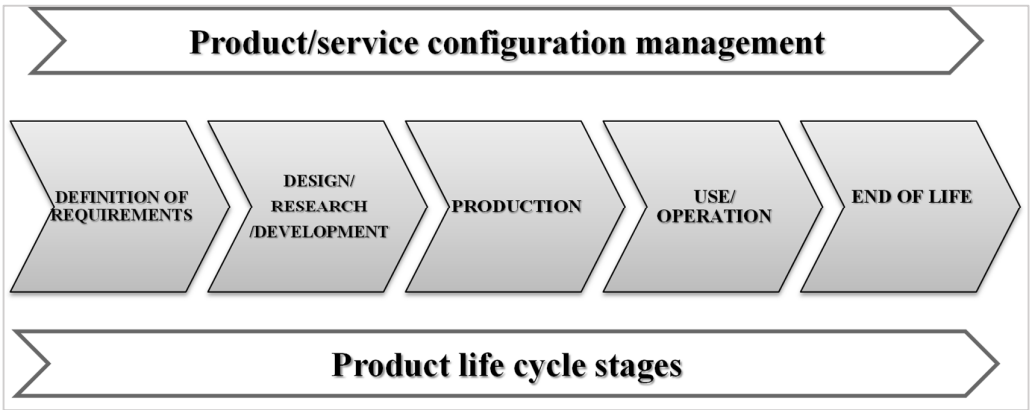

Fig. 2: Configuration management at individual stages of the product/service life cycle (own development).

An analysis of configuration management applications in organisations has shown that it should be implemented and cover such phases of the life cycle of a defence product as:

- definition and review of a product's requirements,
- design, research and development of a product,
- production of a product,
- use of a product,
- end of life.

Each of these stages is important in the configuration management process. From the point of view of determining the customer's requirements, failure to document quality requirements, their incompleteness or ambiguity may lead to many misunderstandings with the recipient and the internal customer at the stage of handing over the product/service to the next stage. On the basis of an unambiguously identified configuration resulting from the requirements review phase, the documentation of the design work (if applicable), in relation to the relevant physical and logistical functional characteristics, is essential. It is about determining the reference configuration and decomposition, i.e. extracting the objects of configuration from the structure of the designed product. It should be remembered that design is not necessarily part of every order. Orders for serial production or a finished product, e.g. on entrusted documentation, do not require configuration management in the design area. The next stage of research and development should involve the assessment of the design input data through the verification or validation of a model, prototype or first unit of a manufactured object of configuration or the entire product/service. The stage of execution (production) of a product/service in relation to configuration management is a consequence of design and development works. Includes production of the product on the basis of approved technical documentation. In the case of unit production, carried out as part of design and development work, proof of fulfilment of the quality and safety requirements shall be the specified reference configuration, including the results of configuration audits carried out, and in the case of series production, proof of fulfilment of the requirements shall be the relevant inspection and test records. Lack of configuration management at this stage may lead to uncontrolled deviations and changes to the previously approved reference configurations (Pokora 2006). The manufactured product/service, including all systems, assemblies and parts, has a built-in configuration. At this stage, a properly defined configuration should ensure that the product can be used, operated and repaired properly, including the distribution of necessary parts. The user relies on properly identified configuration in earlier phases of the product life cycle. A specific area that applies to all phases is a purchase. Configuration management is required in terms of ordered products as configuration objects, in the form of a finished product coming from the market or a product designed and manufactured by a co-operator (Pokora 2006). It follows that configuration management has a scope of application, determined by phases of the life cycle and the nature of application related to the specificity of the product or service. In accordance with the requirements of AQAP 2110, configuration management should function according to the principles, e.g. present in the form of a documented configuration management procedure. Although formally there is no requirement to implement a documented configuration management procedure, good practice observed in the organisations under investigation indicates such a need, even due to the rotation of personnel and many other factors influencing the disturbance of manufacturing processes, negative for the quality and safety of the device/service.

It is good if such a procedure describes actions concerning e.g:

- responsibility for configuration management, including parties involved in the organisation and beyond,
- identification of the configuration, i.e. description of the product/service taking into account functional and physical characteristics, applicable phases of the product/service life cycle, designation of the objects of configuration and reference configuration, introduction of the principle of numbering or marking, with reference to the necessary principles,
- configuration control with consideration of particular stages of execution,
- characterisation of the configuration status, which can be included in the description of configuration identification, control or audit,

- configuration auditing, including the rules of their execution,
- the configuration management planning.

Please note that this is not a closed list. In addition to the description of these basic areas of activity, its individual elements can be developed and clarified. It depends on the specificity of the organization and the degree of complexity of the product/service. Configuration management in the various phases of the product life cycle is designed to prevent incompatibility of functional and physical characteristics of the product/service only in the final phase of a product receipt or at the product usage phase. The costs of removing the causes and effects of customer complaints are disproportionate to the costs incurred in order to implement additional requirements in the quality management system securing the quality and safety of the product/service. The studies and analyses carried out (Szkoda 2002, Hordyniak 2007) support the thesis that changes should be implemented at the design stage, as the effects resulting from these changes are still disproportionate in relation to losses at the production stage or the use stage for a given product. It is estimated that the cost of error elimination is 1 : 10 : 100. The cost of error elimination in the analysis and design phase is one unit. The cost to eliminate the same error in the production phase is 10 units. If an error is identified in the course of use, e.g. of a machine, device or service, it can be expected that its removal will imply 100 times greater costs than repair after the error is detected in the initial production phases (Hordyniak 2007). These relationships are shown in Figure 3.

Surveys carried out in 2016-2017 on a sample of 120 audited companies indicate a similar relationship to that described in the cited works.

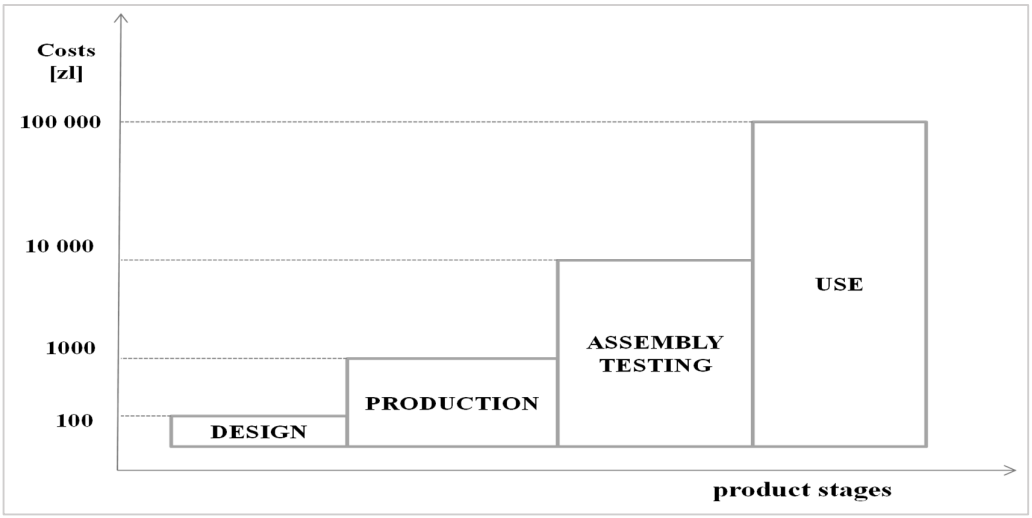

Fig. 3: Dependencies of the costs of error elimination in the product/service life cycle (Hordyniak 2007).

The analysis of incurred costs of non-compliant products/services was carried out on the basis of the organisation's complaint documentation, actions eliminating the causes of non-compliance, in order to avoid their recurrence and on the basis of reviews of the effectiveness of corrective and remedial actions taken. The results were collected and compiled in the auditor's reports. The effectiveness of the quality management system, including processes generating the highest costs, can be ensured in the process of quality planning and implementation monitoring in terms of compliance with the planned activities.

Systemic approach to configuration management affecting product/service quality and safety

Can we present configuration management in a system perspective? If the system is defined as a set of interrelated elements, tasks, activities functioning as a whole, for which borders, inputs and outputs and processing processes can be defined, then we definitely can present the configuration management in a system perspective. When identifying processes in the quality management system in accordance with the AQAP requirements (item 4.2), configuration management shall be included in the system documentation. Is this approach respected in organizations? Do you see the importance of this requirement in terms of product quality and safety of customers? Out of 120 surveyed organisations, which believe that they have a quality management system in place, 30% have not implemented configuration management in practice. There was only formal system documentation. It is not enough just to formally map the identified processes (example in Figure 4), define their sequence and interaction, establish criteria of the method to evaluate these processes, and even develop a configuration management procedure if this is not implemented in practice.

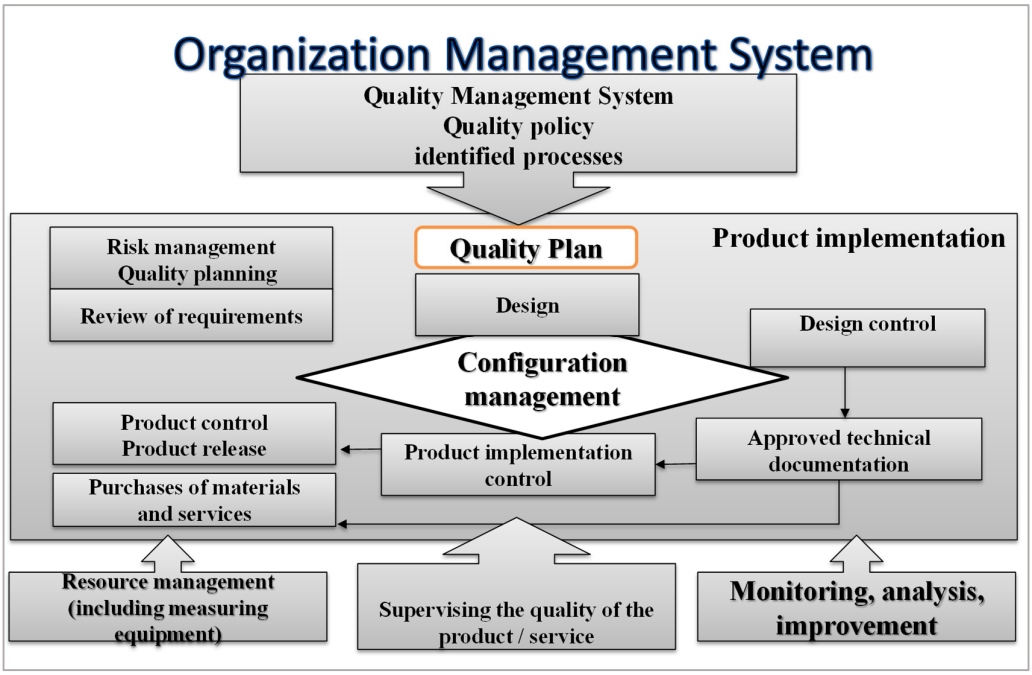

Fig. 4: Sample map of processes in the organization including configuration management (the in-house elaboration)

If the formal documentation is not followed by ensuring that the technical, technological, organisational and logistical characteristics of the products/services comply with the agreed technical documentation and by preventing unauthorized changes to this documentation, according to the implemented documented procedure, the configuration management process does not work, it is fictional.

An effective configuration management process ensures that the manufactured product/service conforms to requirements that are described in sufficient detail to allow interchangeability, safe use and maintenance, as well as modifications, repairs and upgrades during the product life cycle. What does that mean in practice? In practice, it means implementing the four basic elements of configuration management (ACMP 2100):

- identification of a configuration that includes a product as a configuration object and its subdivision into further configuration objects, against which activities related to the necessary tests and controls and the marking, documentation, review and approval are undertaken at specific stages,
- configuration control regarding the definition of a uniform system for monitoring changes to objects and descriptive documents,
- characterization of configuration status, which includes a system for informing and reporting the current status of configuration objects in the life cycle,
- configuration auditing, which concerns the formal assessment of the conformity of configuration objects with the requirements of the designed product before production.

Figure 5 illustrates, in an conceptual way, the elements of configuration management that should be included by an organization in its management system for the safety and quality of the product/service during its life cycle.

The basis for configuration management is to determine the necessary reference configurations, i.e. approved sets of documents that characterize a product or service at a given stage. What kind of documents are they? These are the ones that practically define the client's requirements when confronted with the organization's performance capabilities. The order/contract will not be properly executed if the configuration is not clearly documented at this stage. Important elements of configuration identification include the definition of product/service structure. Based on the proper structure of a product or service, it is possible to select the objects of configuration. It should be determined by decomposition taking into account the division into: product (systems, installations, assemblies, sub-assemblies, devices, aggregates, details, parts; service (implementation stages, methods used, equipment used). Making the right selection of objects allows for efficient configuration management. The configuration objects should be determined according to specific selection criteria.

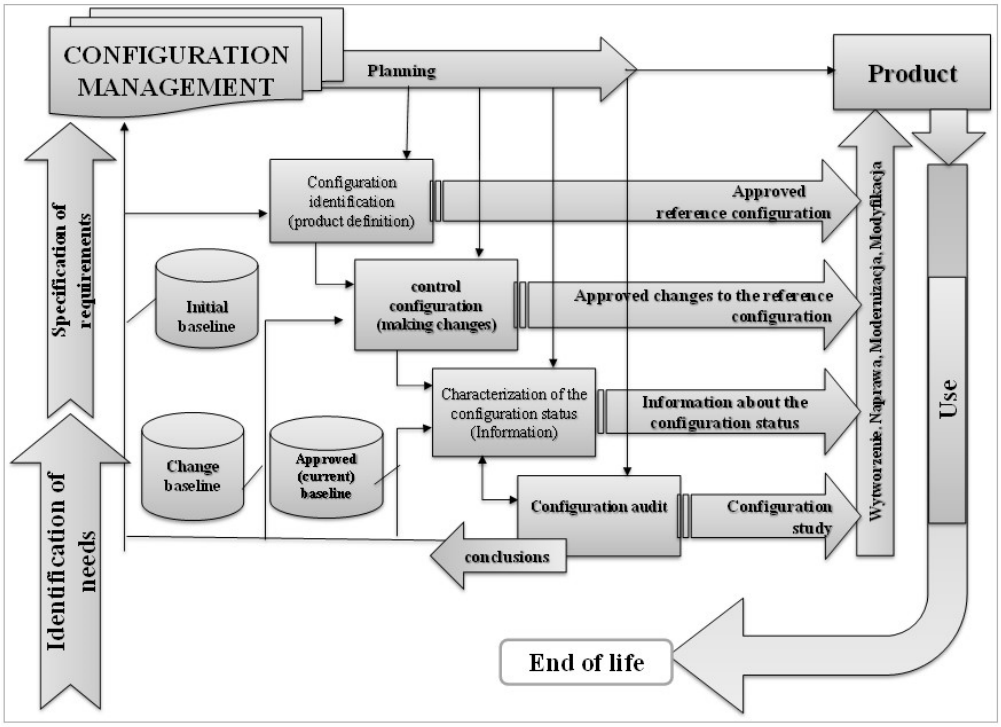

Fig. 5: Basic elements of configuration management for safety and quality of the product/service in the life cycle (the in-house elaboration).

The criteria for the selection of configuration objects are primarily defined in the contract but may also result from the application of the product. Criteria may concern e.g.: technology, safety of use, reliability (harmlessness, durability). Depending on the type of project being implemented, it is possible to select one configuration object or as many as necessary for efficient configuration management taking into account the adopted criteria. What is configuration control used for in practice? It serves to ensure that no unauthorised changes or deviations are made to the approved configuration (reference configuration) documentation. A distinction is made between pre-execution deviations, called authorisations, which may constitute an approved reference configuration or post-execution deviations applicable to a non-compliant product or service (Pokora 2016). Configuration control may concern configuration objects with regard to change proposals generated from three sources: from the customer, from the supplier, from the organization.

Another element of configuration management is the status characterization, i.e. formal registration and information about established documents, status of proposed changes and status of approved changes (ISO 10007). It should be determined at the product/service design stage what will be the form of records and registration of documents. Of course, it is important to agree this form with the customer or contractors of other configuration objects. Configuration management as a tool ensures full identification and traceability (Dutkiewicz 2016). This is especially important for an organization in case of a complaint, when we have the possibility to reconstruct the history of a product/service. Therefore, documents used in configuration management should include, among others: identification numbers, names, date of entry into force, release status, changes, change history, unambiguous designation of documents, part numbers, etc.

It is important for the security of the organization that, as part of the characterization of the configuration status, the following documents are kept, among others: lists of documents defining necessary reference configurations, lists of configuration objects and their decomposition, registers of changes, permissions and/or deviations, configuration audit reports and others. Arrangements to characterize the configuration status end with the approval of the documentation describing the product or service after their validation and positive results of configuration audits. Configuration audits are a formal verification of the product's compliance with the functional and/or physical characteristics of the products. Configuration audits should be planned as part of the project at the product or service design stage. They do not replace verifications, reviews, studies and controls, but concern the results of these activities.

If an organization has the ambition to build and implement a correct quality management system based on the AQAP requirements, it should obligatorily use all the basic configuration management elements described above (Figure 6). If it does not do so (30%), it potentially allows for unauthorized changes in the established product/service configuration and configuration documentation. This may affect the inefficiency of processes supporting the use of the product.

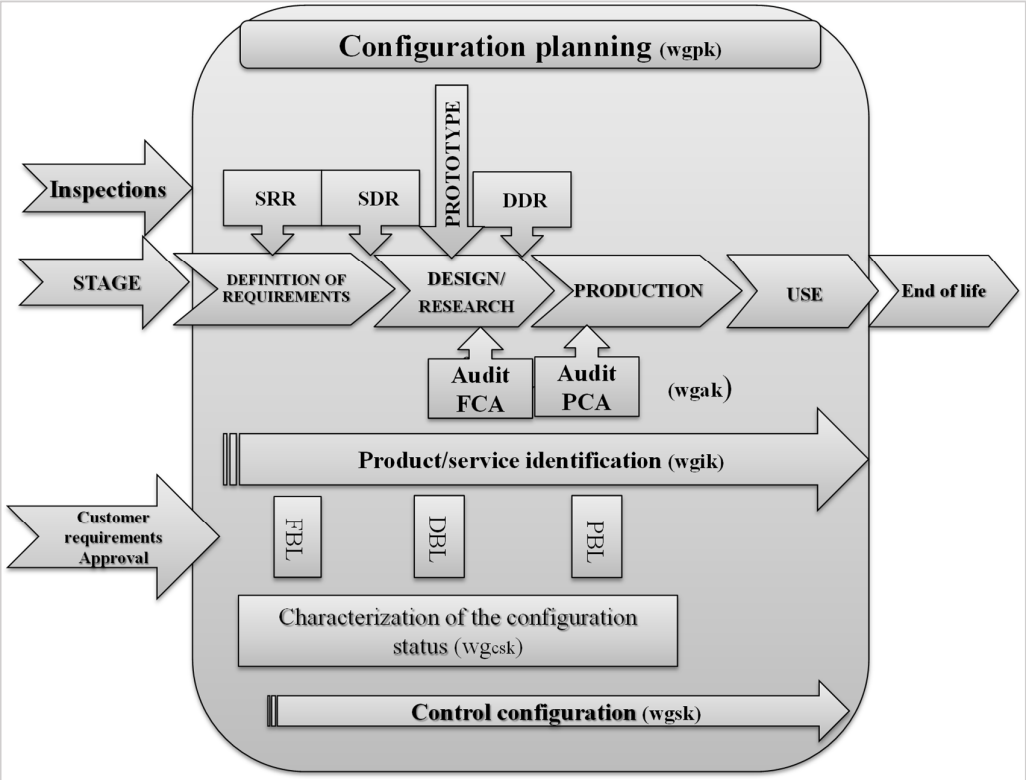

Definition key:

(Functional Baseline) FBL
(Development Baseline) DBL
(Product Baseline) PBL
(System Requirements Review) SRR
(System Design Review) SDR
(Detailed Design Review) DDR
(Functional Configuration Audit) FCA
(Physical Configuration Audit) PCA

Fig. 6: Structure of the configuration management model in relation to the product life cycle (own elaboration).

Lack of effectiveness may result in the delivery of products/services that do not meet the quality requirements, potentially affecting the process of use and user safety, i.e. customer complaints. The requirements oblige to implement such a system so that each identified process can be monitored and supervised (AQAP 2110). The quality management system according to AQAP allows for a comprehensive approach to the planning and execution of operational processes necessary for the execution of products and/or services and is an important business element in correlation with the needs and requirements of the customer.

Example methodology for assessing the effectiveness of product/service configuration management

Ensuring quality requirements in product/service implementation processes is achieved through effective configuration management. It should be assumed that where manufacturers of products/services cannot effectively manage the configuration, they cannot ensure that quality requirements are met. One of the very important scientific and practical problems is the knowledge and ability to assess the effectiveness of product/service configuration management as part of the

evaluation of processes in the organization. In systems, an important problem in ensuring the quality requirements of a product/service is the assessment of the effectiveness of configuration management (AQAP 2110). It is generally accepted that configuration management is effective if the final product is accepted by the contracting authority. This is too simplistic a qualitative method. According to analyses, about 70% of the surveyed organisations apply such simplification. And yet, if we refer systematically to the product/service configuration management model (Figure 7), the assessment problem is more complex. Each of the elements of the model contains a set of activities with different degrees of differentiation and suitability in relation to the requirements. Configuration management is one of many processes in organizations and should be subject to the same procedure for effectiveness assessment procedure based on the adopted model. Figure 6 illustrates the concept of a model for assessing the effectiveness of configuration management process, which such concept is used in audit research.

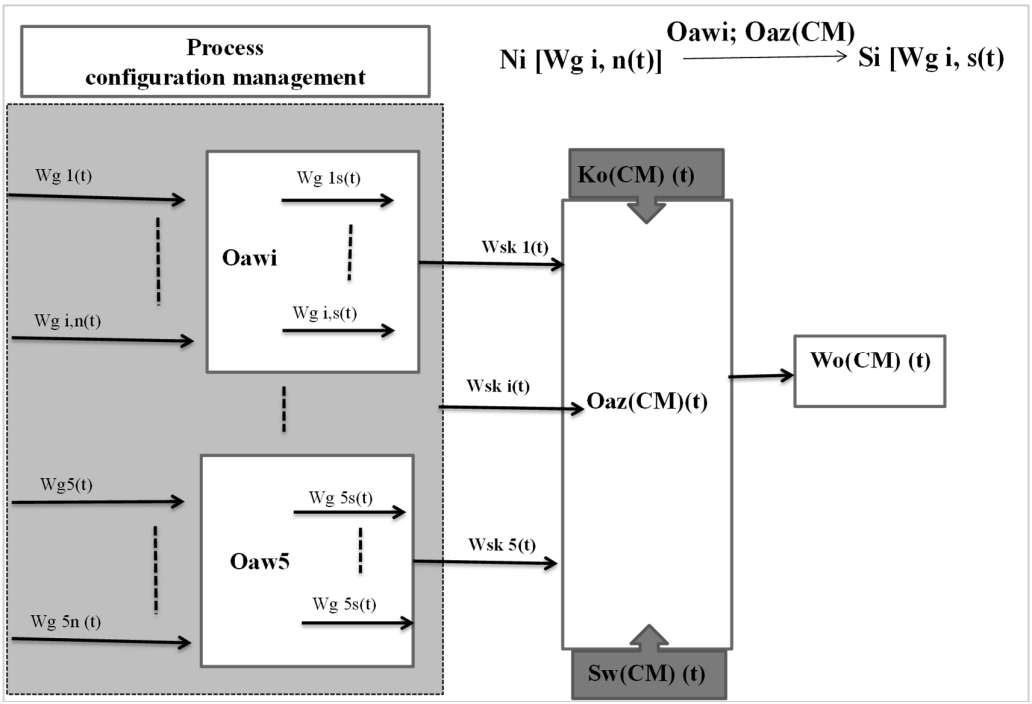

where: WG i,n(t) - i-th determined requirements of the nth process of CM
WG i,s(t) - s-th determined requirements of the nth process of CM
Oaw i - the indicator evaluating the fulfilment of the requirements of the i-th process of CM at organisation level
Wsk i(t) - the indicator of the degree of compliance of the i-th process of CM
Oaz(CM)(t) – external auditor to assess the level of compliance with CM
Sw(CM)(t) - Systemic indicator of compliance with CM
Ko(CM)(t) - criterion of performance of CM
Wo(CM)(t) - result of the effectiveness assessment of CM

Fig. 7: Model of evaluation of the effectiveness of the configuration management process (the in-house elaboration on the basis of: (Szkoda, Wojciechowski, Dębicka 2011).

In the assessment model of the configuration management process, the proper selection of assessment criteria and assessment indicators plays a special role as it clearly influences the effectiveness of the assessment. In addition, we can assume that the improvement actions taken will not have a positive impact on changes in configuration management if the assessment of effectiveness is not based on the substantive basis (requirements, knowledge, resources, procedures, methods and others).

To assess the configuration management process we can identify a set of requirements (WG) according to the product/service configuration management model (Figure 5).

WG={wgn} (1)
Where (wgn) - n^{th} subset of configuration management requirements.
The collection consists of the following requirements:
WG = {wgpk, wgik, wgsk, wgcsk, wgak} (2)
where:
wgpk - configuration management planning,
wgik - configuration identification (configuration object selection, information,
wgsk - configuration steering (supervising the changes),
wgcsk - characterizing the configuration status (description),
wgak - auditing the configuration.

The number of the set of established requirements (1), (2), concerning configuration management is determined on the basis of reference documents (ISO 9001, AQAP 2110, ACMP2100, other contract documents), while the quantity of the set of fulfilled requirements can be determined on the basis of an audit. The [Oawi] organisation and the external auditor [Oaz(CM)(t)] on the set of requirements [WG i,n(t)] at the time t, determine the quantity of the collection [WG i,s(t)] at the time t, according to a specific relationship (3).

$$Ni\,[Wg\ i,\ n(t)] \xrightarrow{Oawi;\ Oaz(CM)} Si\,[Wg\ i,\ s(t)] \qquad (3)$$

An example of an audit analysis to assess the effectiveness of the configuration management process is presented in Table 1.

Tab. 1. An example of an audit of the configuration management process in an organization

Quantity of the N collection	Wg configuration management requirements	Audit assessment Oawi, Oaz(CM)	Quantity of the S collection
1	The design and construction process should start with a decision of the Technical Director and the work should be carried out according to a permanent, plant-based phased design plan.	Requirement met	1
2	Stage I - of studies and analyses (configuration identification) should cover: conceptual and study issues; analysis of standards, requirements of the ordering party, of user, market requirements. The result of this work should be the product development (WZTT).	Requirement met	2
3	Stage II - As part of the preliminary design (model), the plan of the stage should be complemented by developing a schedule - arrangements which defines and secures the organizational and executive conditions of the model or the model batch.	Requirement met	3
4	Verification should be carried out during the execution and testing of the model batch, documented by the records in *the Book of Arrangements and Approvals* (F-PJ-04/02) signed	Requirements not met	-

	by the constructor and in the judgments, protocols and reports on the execution and testing of the model.		
5-29	. . .	**11 requirements not met**	4 . . 17
30	During the realisation of stage II, the identification of the configuration should be carried out, i.e.: – determination and separation of the objects of configuration (elements of the product) based on the analysis of the whole product, – documentation of physical (size, weight, shape, etc.) and functional features of the configuration objects (elements of a product).	Requirements not met	-
31	The input material for the implementation of Stage II plan should be: - the results obtained from the verification and validation of the previous stage, - construction documentation of the previous stage, and the output should be technical documentation for serial production.	Requirements not met	-
32	Design validation (configuration audit) should be carried out - validation by means of in-house testing, acceptance testing, type testing, periodic testing for compliance with the requirements of the ZTT.	Requirements not met	-

The analysis of the sample taken in the selected example shows that the company did not meet as many as 15 requirements out of 32 ones. Corrective or correcting actions are required in relation to the identified non-compliant areas. Assuming that the effectiveness of configuration management is the extent to which the achieved results of the configuration management process at time t correspond to certain evaluation criteria for the n^{th}requirements of the configuration management process at time t, we can determine the value of the effectiveness indicator by relationship (4):

$$Wo(CM) = Wsk\ i(t), Sw(CM)(t), [Oaw\ i\ (t), Oaz(CM)(t)] = Ni(Wg\ i,n(t)\ \text{result} \rightarrow Si(Wg\ i,s(t)/ \quad (4)$$

of 32 requirements 15 not met

A formally defined assessment of the effectiveness of configuration management, including an indicator (4), consists of a positive or negative statement based on the following principle:

If Wo(CM) is ≥ 1 then the configuration management process is effective

If Wo(CM) is < 1 then the configuration management process is ineffective

The assessment of configuration management efficiency is graphically interpreted in Figure 6.

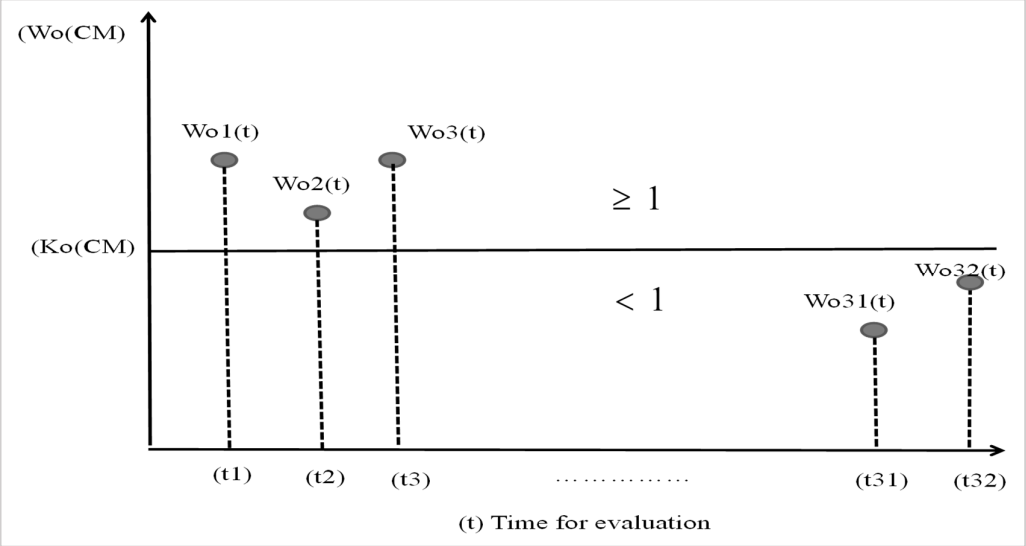

Fig. 6: Graphical interpretation of an example of the effectiveness of the configuration management process

The assessment of the effectiveness of the configuration management process is a prerequisite for the rational management of the entire quality management system, particularly in accordance with the AQAP requirements. The results of the effectiveness assessment are important information for managers as to whether the system works or needs to be improved. It is important that the assessment of effectiveness is carried out systematically and according to a plan.

Conclusion

The use of AQAP standardisation documents as part of the management system should be a basic quality requirement for products/services in which safety risks have been identified. All participants in the life cycle of a product, and especially organizations that manufacture products, e.g. for national security and defence, should be prepared to meet the AQAP requirements. They must adapt their quality management systems and have the necessary experience to ensure the expected quality. The quality management system standards compliant with ISO 9001 and AQAP have become the basic instrument for meeting the quality requirements of products/services and competitive-marketing activities of enterprises. Implementation of the quality management system requires the organisation to comply with the established requirements in accordance with the reference documents. The NATO requirements for quality assurance of products/services purchased e.g. for the military can be used by all organisations and industries. Fulfillment of the AQAP requirements is not conditioned by the size, legal status and ownership structure of the entity realising a given product. They can also be used to improve the quality management system for all organizations with implemented quality management systems. The AQAP document requires the establishment, documentation, implementation and improvement of a quality management system, including configuration management. Only the AQAP-compliant system in operation increases confidence in the organisation in terms of product/service quality.

The main objective in the NATO quality management is to obtain a product that is safe and meets the customer's requirements. Empirical research carried out in 120 companies shows that configuration management generally enables efficient execution of processes, ensures identification and traceability, access to accurate information, although not in all companies. 30% of them did not implement configuration management in practice, while 24% implemented ineffectively, e.g. did not identify the product, did not manage changes (controlling), etc.

Since configuration management problems are solved in different ways, not always satisfying customers, the proposed solutions aim to unify the approach to configuration management in the actions taken by product/service manufacturers. Organisations interested in providing quality and user safety requirements may use the test-verified assessment model to assess the effectiveness of configuration management.

The presented model proposal and methodology for assessing the effectiveness of product/service configuration management is not perfect, but may be used to correct or improve the process.

Attention should be paid to the practical aspect. The configuration management process is intended to increase the efficiency of the entire quality management system, not generate incompatibilities.

Configuration management is a new look at the product, its features, properties and development. Identification of the configuration is becoming particularly important today, as the products offered are characterized by increasing complexity. Customer service is changing and new decision-making centres are being set up: the supervision centre and the execution centres.

Generally, configuration management in the product/service life cycle allows for:

- process standardization,
- ensuring product/service repeatability,
- systematic supervision, monitoring and control,
- support of the usage process.

The article provides a basis for further research to solve practical problems of product/service configuration management. It recommends, in order to improve the efficiency of systems, that configuration management should be one of the basic requirements in a quality management system. A modern approach in quality management systems should be related to the design of validated configuration management models that would be the basis for ensuring the required level of safety and quality of products/services.

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Organización Comunitaria e Infraestructura Digital para el Desarrollo Rural

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Resumen

La implementación de infraestructuras digitales constituye una tarea central para que las sociedades logren conectarse a las redes de la sociedad de la información, en el entendido del acceso a internet como condición necesaria para avanzar hacia el desarrollo. En el caso de la ruralidad, la situación histórica de atraso respecto a los niveles de desarrollo urbano, evidencian disparidades en términos de acceso a los objetos digitales. Las políticas que apuntan a la masificación tecnológica no son suficientes para disminuir la brecha digital y el servicio prestado por el sector privado no garantiza una calidad suficiente para la conectividad de las poblaciones rurales. En este sentido, el papel de las comunidades adquiere relevancia como alternativa para paliar las dificultades que se presentan en términos de acceso a las redes técnicas y de conocimiento. El presente documento analiza estas circunstancias, argumentando que la organización comunitaria puede representar un factor clave para la democratización digital y el desarrollo local. El enfoque metodológico cualitativo se basa en una fase de revisión documental de política pública y en la indagación sobre la percepción de los pobladores del borde rural-urbano de Usme en Bogotá, respecto al acceso y la relevancia sobre las redes digitales.

Introducción

La presente reflexión hace parte del proyecto de investigación "La politica tecnológica como estrategia para la inclusión y el desarrollo de comunidades rurales", desde el cual se abordó el análisis de la política pública en materia de masificación tecnológica y su implementación en el sector del borde rural-urbano de Usme en Bogotá. El proceso metodológico presentó una fase de revisión documental sobre textos de política pública, lo cual permitió un seguimiento de las articulaciones entre masificación tecnológica y desarrollo rural, además, una fase de trabajo en campo, en la que se indagó a pobladores del sector -mediante la aplicación de instrumentos de entrevista semiestructurada- respecto a sus percepciones frente a las tecnologías digitales y sus experiencias en el marco de la sociedad informacional.

El punto de partida del análisis fue la consideración sobre la relativa importancia que han adquirido las tecnologías digitales en los discursos gubernamentales (Sourbati, 2011; Eckardt, 2014), aspecto que se evidencia en los textos de políticas públicas sobre el desarrollo regional y nacional. Desde allí se pretendió evidenciar el alcance de estas políticas en las zonas rurales ubicadas en sectores periféricos de la ciudad, caracterizados por un acceso limitado a los recursos digitales y la precariedad en la implementación de infraestructura digital (Salemink, Strijker & Bosworth, 2017).

A pesar de que las directrices globales sobre el desarrollo sostenible y la política pública sobre el desarrollo en Colombia consideran que la ampliación de la infraestructura digital es una tarea fundamental para el alcance de los beneficios sociales y económicos al total de la población, la brecha digital permanece en el sector rural, de manera que se evidencian profundas disparidades en el acceso a los objetos digitales, por tanto, en la democratización del conocimiento y la información (De Greiff, 2017). Vale destacar que, si bien las tecnologías digitales no son consideradas, por parte de la población del borde rural-urbano de Usme, como un factor determinante para su desarrollo, se reconoce -de manera creciente- que el uso de recursos tecnológicos facilita el acceso a la información necesaria para mejorar procesos educativos y productivos en la comunidad.

La relativa importancia que los pobladores del borde rural-urbano de usme le otorgan al uso de dispositivos y redes digitales se ve limitada por las dificultades de acceso. Ni el Estado ni los proveedores privados ofrecen la infraestructura requerida para garantizar la interconectividad a niveles aceptables de calidad. Como resultado del trabajo realizado en el contexto del proyecto surgen cuestiones sobre la necesidad de acciones alternativas que faciliten la democratización digital. En este sentido, la organización comunitaria puede promover iniciativas para mejorar la vinculación de la ruralidad de Bogotá a la sociedad de la información. Este documento invita a la reflexión sobre las relaciones entre la infraestructura tecnológica y el desarrollo de las comunidades rurales, planteando la posibilidad de organización comunitaria como estrategia para movilizar oportunidades de acceso a la infraestructura digital.

Infraestructura Digital para el Desarrollo

La infraestructura digital comprende un factor clave para la movilización de los objetos digitales (De Greiff, 2017), por tanto, el acceso al conocimiento por parte de los diferentes sectores sociales. La infraestructura no solo permite la movilidad de los objetos sino que también la restringe (Star, 1999) definiendo su distribución. De esta manera la planificación de la implementación de infraestructuras digitales comprende una posibilidad de acceso para algunos sectores y, a la vez, un proceso de exclusión para otros, determinando desventajas en el disfrute de los beneficios que se supone provee la información, dado que se afirma que la digitalización y la conectividad son fundamentales para la economía y la sociedad digital (Intenational Telecommunications Union, 2019).

Para el Banco Mundial (2019) internet promueve la inclusión, la eficiencia y la innovación, dado que facilita la generación de nuevas actividades económicas -caso del comercio electrónico- así como la disminución de costos en transacciones y otras operaciones mercantiles, además de la creación de una economía particular de los mercados de internet (Levin, 2011). Además, se afirma que las tecnologías informaciones aportan posibilidades para la inclusión educativa, tanto en términos de acceso como de calidad (Zappalá, 2013). Las tecnologías digitales son dotadas de capacidades para renovar y motivar cambios a nivel social (Pérez & Sarrate, 2011) y para movilizar la democratización de la información por vía del acceso a la infraestructura digital, de manera que el uso de tecnologías digitales promueve la reivindicación de la libertad de expresión (Ladrón, 2009) y los derechos ciudadanos.

Los aspectos mencionados hacen parte de un discurso que justifica la vinculación de tecnologías digitales como factores esenciales en la planificación del desarrollo. De tal modo se justifica la necesidad de masificación tecnológica como estrategia para la disminución de las brechas en materia de desigualdad, distribución del ingreso, acceso a beneficios y disparidades entre lo rural-urbano. Las infraestructura digital es entendida, por tanto, como mecanismo vinculante de las poblaciones periféricas al conocimiento, de manera que apunta la democratización de la sociedad de la información.

Experiencias Sobre Implementación Tecnológica En Contextos Rurales

La fase de revisión documental sobre política pública en materia tecnológica en Colombia permitió evidenciar la rápida adopción de las tecnologías digitales como mecanismo para movilizar el desarrollo. Las políticas en torno al desarrollo rural han incluido, entre sus principales líneas de atención, la ampliación de la infraestructura digital (MinTic, 2018), de manera que la conectividad rural se plantea como uno de los puntos principales de la agenda de Reforma Rural Integral y, por tanto, la política de desarrollo rural. Las acciones planeadas hacia la ruralidad, en el contexto de las políticas del desarrollo, se sostienen en los objetivos de disminución de las disparidades existentes entre lo rural-urbano y, de manera particular, en la atención a la brecha digital (Brunereau, Chuctaya & Vega, 2016), en este sentido, la dotación de infraestructura digital en los sectores rurales se establece como estrategia clave.

Las discusiones sobre la masificación del acceso a internet y la conexión de calidad para las poblaciones tradicionalmente periféricas adquieren una gran relevancia en el sector rural, dado el papel secundario que ha ocupado la ruralidad en las políticas tradicionales sobre el desarrollo (Pérez, 2001). Esto puede evidenciarse, particularmente, en el limitado acceso a las redes digitales por parte de las comunidades

del sector rural y el borde rural-urbano de grandes ciudades como Bogotá. Bajo estas condiciones es preciso reflexionar sobre diversas experiencias que muestran una tendencia hacia el mejoramiento de las capacidades de conexión por parte de las comunidades rurales, más allá de las políticas del Estado. En este sentido Mathur & Ambani (2005) afirman que la superación de la brecha digital, como oportunidad a las personas que viven en la ruralidad, plantea una revolución esperada.

Salemink *et al* (2017) establecen una conexión entre el desarrollo digital y el desarrollo rural en países desarrollados. Afirman que las políticas genéricas en materia de implementación tecnológica usualmente descuidan las necesidades locales, circunstancia ya tradicional en términos de las políticas que apuntan al desarrollo, en las cuales se ha hecho evidente la comprensión de la dicotomía rural-urbano, respecto a las disparidades y diferenciación existente entre ambos contextos. Los autores muestran que, dada la periferización de la ruralidad, estos lugares requieren mayor conectividad digital pero, paradójicamente, se encuentran menos conectados, dada su relativamente menor importancia en la forma en que se ha entenido el desarrollo.

Para Philip & Williams (2019) las posibilidades de acceso a redes de banda ancha pueden promover la inclusión de personas, familias y pequeñas empresas domésticas de las zonas rurales en la economía digital. La interacción con la infraestructura tecnológica puede representar oportunidades para movilizar pequeñas iniciativas relacionadas con las lógicas productivas y económicas de la ruralidad. Aunque en este caso se puede tratar de incrustar prácticas económicas exógenas en las comunidades, también puede promover la competitividad en actividades tradicionales relacionadas con el arraigo cultural de los sectores rurales. Esto puede ocurrir en el caso estudiado por los autores en Reino Unido pero tener sus propias particularidades en otros contextos locales por analizar, como en el caso de América Latina.

Ashmore, Farrington & Skerratt (2017) presentan el caso de las iniciativas de banda ancha lideradas por la comunidad en Reino Unido. Estas propuestas surgen como respuesta a la falta de acceso a la infraestructura digital, provista por el Estado, expresando una mirada local al desarrollo. Si bien pueden facilitar el acceso de comunidades rurales a las redes digitales, pueden promover un desarrollo rural desigual. Esta reflexión es clave si se consideran las particularidades de sectores rurales en Colombia -y América Latina- en los cuales las comunidades rurales, a pesar de su compromiso con el desarrollo local pueden tener pocas probabilidades de establecer propuestas autónomas para el acceso. Quizás las alianzas con el sector privado pueden ser alternativas para vincular el papel de la comunidad en los esfuerzos por articularse con la sociedad de la información.

Acceso Digital En El Borde Rural-Urbano De Usme

El trabajo realizado en la segunda fase de ejecución del proyecto "La política tecnológica como estrategia para la inclusión y el desarrollo de comunidades rurales" permitió el acercamiento a las comunidades del borde rural-urbano de Usme en Bogotá mediante la implementación de entrevistas semiestructuradas y la técnica de grupos focales. La observación del escenario ha puesto en evidencia la profunda brecha digital existente, expresada en la ausencia de una infraestructura que soporte el acceso a las redes digitales para las comunidades rurales y en el uso limitado a los recursos tecnológicos por parte de los pobladores. La precaria infraestructura es expresión de la implementación parcial -o nula- de las políticas de promoción de conectividad digital e implementación tecnológica.

Los pobladores del borde rural-urbano de Usme han expresado, de manera recurrente, su interés por las tecnologías digitales en tanto posibilidades para acceso a la educación o información relevante a sus prácticas productivas (Registro de Campo), sin embargo, la capacidad de ingreso económico de estas personas determina sus posibilidades de conectividad digital. El servicio de conexión a internet, en el sector, es ofrecido por empresas privadas a costos relativamente altos para las comunidades. Incluso, en la mayor parte de la región, la infraestructura móvil privada ofrece un servicio de baja calidad con velocidades de conexión lentas. La prestación de servicio de internet en el borde-rural de Usme constituye, en muchos casos, un bien de lujo determinado por la capacidad de pago. Esto reafirma que la desigualdad en términos de acceso a la infraestructura digital refleja, a la vez, las amplias disparidades en términos de desarrollo (Alva, 2015) en la ruralidad.

Un aspecto a resaltar en el sector rural de Usme es la organización comunitaria, movilizada en defensa del territorio y la identidad. Estas prácticas han enfatizado en aspectos como la resistencia frente a las políticas de urbanización de la ruralidad y la transformación de sus prácticas productivas tradicionales hacia actividades de explotación económica del recurso ambiental (Pereira-García & Ramírez, 2019). Sin embargo, a pesar de que el interés por las tecnologías digitales es un asunto menos urgente que las dinámicas del ordenamiento territorial, que pone en peligro la conservación del medio ambiente y los modos de vida tradicionales de las comunidades, los habitantes del borde rural-urbano de Usme tienen una percepción positiva sobre las TIC (Registro de Campo). Una proporción significativa de los pobladores considera relevante el uso de internet, como forma de acceder a la información, en tanto soporte de los procesos educativos de niños, niñas y adolescentes, así como en las relaciones con el Estado por vía del gobierno digital.

El interés secundario por las tecnologías tiene como una de sus explicaciones la ineficacia del Estado para proveer la infraestructura necesaria que permita conectar digitalmente las periferias del borde rural-urbano con los centros de la ciudad en donde el uso de internet se ha masificado. En el sector de Usme rural el uso de recursos digitales es limitado dada la baja disponibilidad de dispositivos tecnológicos (computadores y equipos móviles), además de las condiciones de la infraestructura de redes ya mencionada, no obstante, existe un uso generalizado -aunque no masivo- de aplicaciones como las redes sociales por parte de los habitantes (Registro de Campo). Las comunidades, pese a los problemas de acceso, ingresan de maneras periféricas a las dinámicas de la sociedad de la información, promovidas desde la política pública nacional durante varias décadas.

Las políticas sobre el desarrollo en Colombia han planteado, como parte de sus más relevantes directrices, ampliar el acceso a las TIC por parte de todos los sectores de la población. Una de las principales tareas proyectadas es la implementación de infraestructura digital en las zonas rurales (MinTic, 2018), al entenderse como regiones que históricamente han experimentado el atraso y la periferización en términos de desarrollo económico y social, respecto a los centros urbanos. A pesar de que se homogeniza la noción de ruralidad, existen realidades diferenciadas que se agrupan en dicha categoría (Matijasevic & Ruiz, 2013). Los sectores del borde rural-urbano de Usme se caracterizan por una naturaleza híbrida, dada la cercanía a la influencia de la ciudad y los intentos de urbanización propuestos por la planeación de la administración pública de la ciudad, sin embargo, conservan sus caracteres rurales en torno a las actividades productivas que realizan y a sus estilos de vida.

La provisión de Banda Ancha en el borde rural-urbano de Usme es bastante pobre. Aunque durante varios años las iniciativas propuestas por entidades gubernamentales como el Ministerio de las Tecnologías de la Información y la Comunicación y la Alta Consejería para las TIC en Bogotá han intentado acercar a la comunidad a la sociedad del conocimiento, las acciones reales no son suficientes para conectar a la población y disminuir la brecha digital. Los proyectos como Vive Digital y Computadores para Educar no han impactado el sector, aunque este aparece referido en los documentos proyectados para las iniciativas. Se hace referencia, en los informes públicos, que Bogotá logró la meta de remover las barreras de acceso a la tecnología (Impacto TIC, 2019), no se ha garantizado la provisión de infraestructura digital suficiente para asegurar el acceso por parte de la población.

Por otro lado, el Proyecto Nacional de Fibra Óptica plantea un plan de ampliación de la infraestructura de fibra óptica, como alternativa de provisión de conectividad de banda ancha para todas las regiones del país (MinTic, 2020). No obstante, el borde rural-urbano de Usme depende de las políticas distritales de conectividad, de manera que queda fuera de los planes nacionales. En el mismo sentido, el Plan Nacional de Conectividad Rural constituye uno de los planes para la Reforma Rural Integral, en el contexto del acuerdo de paz en Colombia. En este documento se proyecta la instalación de nodos de conexión de alta velocidad para todas las cabeceras municipales y los sectores priorizados, con el fin de promover la masificación digital. La reforma rural, no obstante, no ha sido ejecutada por el gobierno actual, por tanto, la posibilidad de acceso digital para las comunidades rurales se encuentra aplazada.

Reflexiones Finales: Organización Comunitaria e Infraestructura Digital

Si el acceso a la infraestructura digital es un factor clave para la democratización del conocimiento, esto debe constituirse en un factor clave para la política pública. Sin embargo, dicha tarea se ha propuesto como una responsabilidad particular del Estado, como proveedor de soluciones en términos de masificación tecnológica y ordenamiento del ámbito tecnológico. Las políticas públicas en materia de tecnologías digitales disponen de un discurso bienintencionado que pretende vincular a toda la población en el desarrollo económico y social. Sin embargo, la ejecución de las políticas públicas queda sometida a las proridades de los gobiernos y en muchos casos quedan como objetivos secundarios en la agenda política.

La dependencia de las poblaciones rurales a las políticas de Estado y las dificultades para el cumplimiento de las expectativas del alcance del desarrollo local, plantea reflexiones frente a la construcción de alternativas que faciliten la vinculación de la población rural en la sociedad del conocimiento. Algunas experiencias de organización comunitaria sobresalen por el papel que cumplen en el direccionamiento sobre la implementación de la infraestructura digital (Ashmore, et al, 2017), en el caso europeo algunas iniciativas locales que promueven el acceso a banda ancha en zonas rurales surge de la voluntad de las comunidades, como respuesta a la incapacidad gubernamental. No obstante, los arreglos comunitarios para influir en las políticas de implementación digital no son suficientemente efectivos en algunos sectores, a pesar de la larga tradición en materia de organización comunitaria.

La población del borde rural-urbano de Usme se destaca por una importante trayectoria de organización comunitaria en la defensa del territorio y los derechos ambientales y culturales de la comunidad , sin embargo, no se evidencia una consideración de relevancia suficiente, por parte de los pobladores rurales, sobre los derechos digitales, como parte de una estrategia para la disminución de las brechas en materia de desarrollo. La organización comunitaria puede constituirse en un factor clave para la democratización del conocimiento por vía de la implementación de infraestructura digital en el borde rural-urbano de Usme. Por otro lado, las iniciativas comunitarias pueden apostar a la articulación de sus intereses con el sector privado, como mecanismo para promover iniciativas que faciliten la conectividad y el desarrollo de alternativas económicas, como las empresas familiares (Philip & Williams, 2019). Como afirman Mathur & Ambani (2005), las instituciones privadas con fines de lucro pueden elaborar soluciones para captar mercados, hasta ahora no reconocidos, obtener beneficios y, al mismo tiempo, ayudar a las sociedades rurales a mejorar sus capacidades de articulación con la sociedad del conocimiento.

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Trust as the Determinant of Innovative Development of Economy on the Example of Poland, Czech Republic, Germany and Finland

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Abstract

The purpose of this paper is to analyse the impact of social trust on the creation of innovative economy. In order to achieve that purpose, countries of different level of innovation were selected. Then, different levels of trust in interpersonal relations were determined and correlation matrixes were calculated taking into account the SII and OECD II indicators. Based on these analyses, conclusions were drawn, which suggest strong correlations between the examined determinants. An attempt was made to identify the indicators that are the most affected by trust. The paper is analytical and it may be used in innovation-related modelling.

Keywords: Trust, Innovations, Economics Development

Introduction

The present times are characterised by rapid changes. The instability of the economic environment is conductive to various social and economic turbulences, which causes a sense of threat and uncertainty about the future. In order to better prepare for changes and competition, it is important to build durable trust in social and economic relationships. Trust is a vital factor of interpersonal relations, giving a sense of security and predictability (Turner, 2002). According to Fukuyama (1997), the prosperity of a country and its ability to compete are dependent on the level of the culture of trust in a given society. Also, he emphasises that growth in trust is accompanied by growth in economic efficiency – due to the fact that people are more willing to take risks and engage in productive social exchange. In innovation-oriented economies, trust produces a new dimension of social engagement in building and creating economic competitiveness both in the domestic and international dimensions. To quote Drucker (1999), in present times "organisations are not built on strength, but rather on trust", which should lead us to relevant conclusions. Trust creates opportunities for development, because it is founded on the rationality of evidence, without the need to verify or prove the evidence. A simultaneous combination of trust for an organisation, governance and social order and for fellow citizens is conductive to innovative economic development of a country. It should be noted, however, that trust is uncertain and volatile. Each manipulation may trigger a state of uncertainty and suspicion. Thus, trust should be carefully and consistently promoted and should not be influenced by trends and fashions associated with "creating" the reality.

The purpose of this paper is to examine how trust affects the innovation of economies on the example of Poland, Czech Republic, Germany and Finland. The research sample was selected taking into account the country's position in the ranking, the Summary Innovation Index (SII) used to evaluate the innovation of EU Member States and the OECD Innovation Indicators (OECD II) presented in the Oslo Manual. The following research questions were asked:

1. Does trust affect the level of country's innovation?
2. How large is the impact of interpersonal trust on economic innovation?
3. How does trust affect the creation of innovative enterprises?

Answering these questions will make it possible to evaluate the role of trust in building an atmosphere conductive to the innovative development of a country. The paper is of analytical nature and its results

will make it possible to take measures that will provide for the trust determinant in future pro-innovation activities.

Trust as social capital - review of the literature

Trust is an interdisciplinary concept that combines numerous areas of science. Trust is variously defined in terms of the benefits it provides (cooperation, political cohesion, reliability, social order, etc.), or the dispositions of those who give trust (affective, calculative, moral, pragmatic, etc.), or the character of the relationship between the trusting and the putatively trustworthy (contractual, dependent, exploitative, reciprocal, etc.). Indeed, the importance of trust to social relationships and exchanges, and therefore its wide application and appeal, means that experience of it will be varied and that not only in common usage but in a large and growing specialist literature there will be multiple understandings of the term (Barbalet, 2006). Sztompka (2006, 2007) believes that "trust and distrust are in a way bets about future, uncertain activities of other people... trust is conviction plus action based on that conviction". Others (Clarke and Payne, 1997; Kramer, 1999; Mayer, et al, 1995) think that it is a mental state that is of key importance for maintaining interpersonal relationships. Meanwhile, in relationships within an organisation (Colquitt, et al, 2007) and business (Zieliński, 2019) relations, trust is the key factor of success. Trust may be based either on affection or on experience (Wang et al) and it may be associated with expectations of other persons (Barbalet, 2006) or a form of building civic attitudes (Deluga, 1994).

Many authors have contributed to this literature. For example, Knack and Keefer (1997) find that a one-standard deviation increase in a survey-based measure of country-level trust increases economic growth by more than one-half of a standard deviation. LaPorta et al (1997) find that across countries, a one-standard deviation increase in the same measure of trust increases judicial efficiency by 0.7 of a standard deviation and reduces government corruption by 0.3 of a standard deviation.

Sztompka (2007) systematised knowledge about trust and identified the following types of trust: personal (in specific individuals), positional (in specific social roles, professions, positions), commercial (in products, brands, companies), technological (in various kinds of technological systems: transport, energy, information technology), institutional (in complex organisations that engage numerous, anonymous stakeholders, e.g. a bank, stock exchange or university), system (in the entire social system and its stakeholders – the political system, civilisation or economy). All the abovementioned objects may be reduced to human activities, which is why "in the end, we always have trust in such activities, and consequently, their effects and products". The above types of trust suggest that it is not only a personal attitude, but it concerns the entire contemporary society, becoming an element of its culture (Kort and Lewicka, 2016). According to Sztompka (2007), trust is the most precious type of social capital, while Putnam (1999) believes it to be an element of social capital that "relates to such features of the organisation of a society as ethics, norms and connections that may increase the efficiency of a society, making it easier to coordinate activities". Woolcock (2001) noted that "…'trust' is better understood not as social capital per se, but rather as a measure of it".

Trust as a factor determining human activities stimulates development. Both social trust and trust in a system make it possible to create a climate of innovation not only in an organisation but also in the cultural dimension. The subsequent part of the paper analyses the impact of trust on the innovation of the examined economies.

Methodology of the Research

The paper uses data collected by the European Innovation Scoreboard (2019), Oslo Manual 2018 (2019) and the European Social Survey (Round 9) (2018-2019). Such approach was considered reasonable, because it enabled objective attitude to information sources. The first part of the study used the Statistica programme to identify the states that would represent groups of different levels of the innovation of economy. Next, the SII indicator components were correlated with trust values in two groups, namely trust in interpersonal relationships and trust for employers. Interpersonal trust was

examined using the 11-point Likert scale, and the respondents from the respective countries answered the following questions:

1. In general, do you thing that most people can be trusted, or rather that you can never be too prudent in contacts with people? (P1)
2. Do you think that, if they had a chance, most people would try to take advantage of you, or rather that they would try to act honestly? (P2)
3. Do you think that people mostly try to help others, or rather they mainly look after their own business? (P3)

Since the responses differed depending on the level of education, they were analysed respectively for all the respondents (total) and for the respondents with higher education.

Interpersonal trust in Poland, the Czech Republic, Germany and Finland

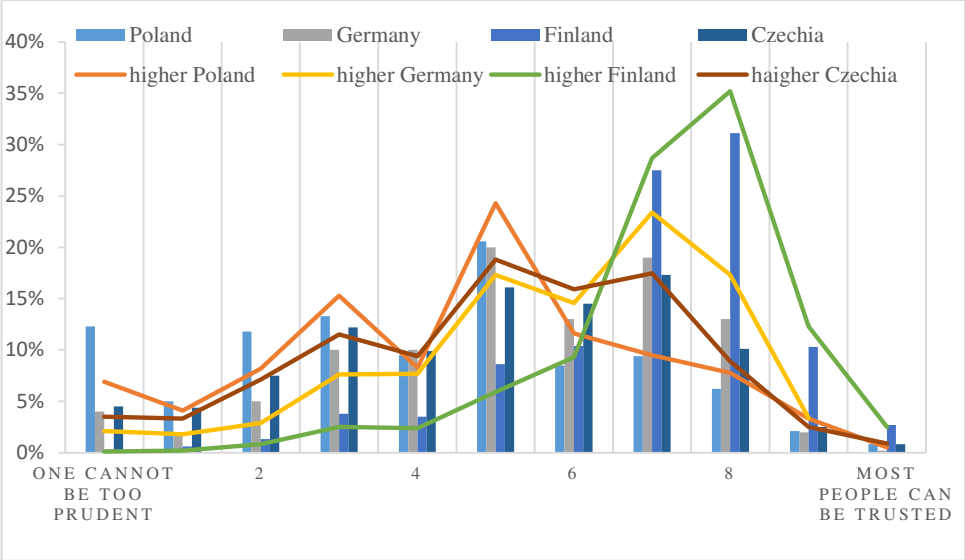

Trust in interpersonal relationships is a vital element of the social capital. The more people trust one another, the easier it is for them to unite around common ideas and to cooperate.

Fig. 1: Distribution of responses to question P1 in the respective countries.

When analysing the data presented in Figure 1, it is worth noting that persons with higher education are more trusting towards others. Another interesting fact is the significant difference between the examined countries. The most trusting are Finns and as many as 57% of them trust on another on the level of 7-8 points. The least trusting in interpersonal relationships are poles (as many as 12.3% declare that you can never be too prudent). Germans and Czechs have an average level of trust in interpersonal relationships (between 5 and 7 points). The next question concerned interpersonal trust concerning honest conduct (Fig. 2). Also in this case, Finns stated more frequently than most people would behave honestly (57% persons assessed this trust on the level of 7-8 points), while 47% of Czechs and 48% of Germans, respectively, assessed it on the level of 5-7 points. Poles thought that they should neither trust nor distrust and 28% of them assessed this trust on the level of 5 points.

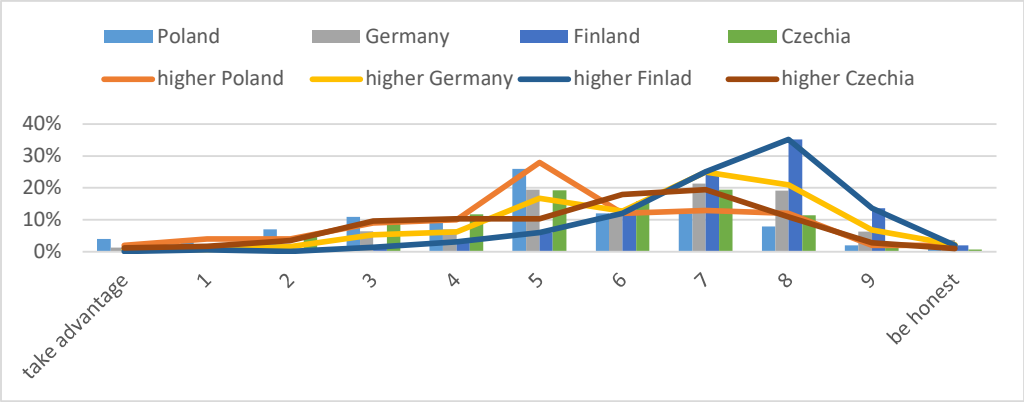

Fig. 2: Distribution of responses to question P2 in the respective countries

Research on trust should also take into consideration the intentions that guide individuals. Accordingly, the following question was asked: Do you think that people mostly try to help others, or rather they mainly look after their own business? (Fig. 3)

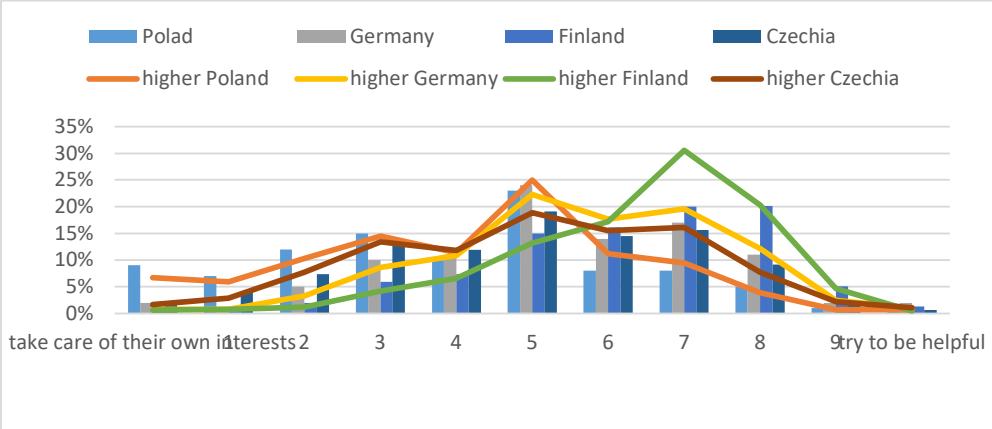

Fig. 3: Distribution of responses to question P3 in the respective countries.

Concerning he assessment of trust as regards the willingness to help another person, Finns were once again the most trusting and as many as 40% of them assessed it on the level of 7 or 8 points. In the other countries, the respondents assessed it on the level of 5 points. (23% of Poles, 24% of Germans and 17.2% of Czechs).

To sum up, the level of trust in interpersonal relationships differs between the examined countries. Persons with higher education are more trusting, but they keep a certain distance (the distribution of answers ranges between 4 and 7 points). The most trusting group are Finns with higher education and the least trusting are Poles. Czechs and Germans have a similar level of trust.

Trust vs the innovation of economies taking into account the SII and OECD II indicators.

A research on trust and its impact on the innovation of economies requires certain criteria to group countries depending on their level of innovation. This will be done using SII and OECD II indicators, and the groups will be based on an analysis of k-mean clustering. Such approach enables objective classification of countries taking into consideration latent variables.

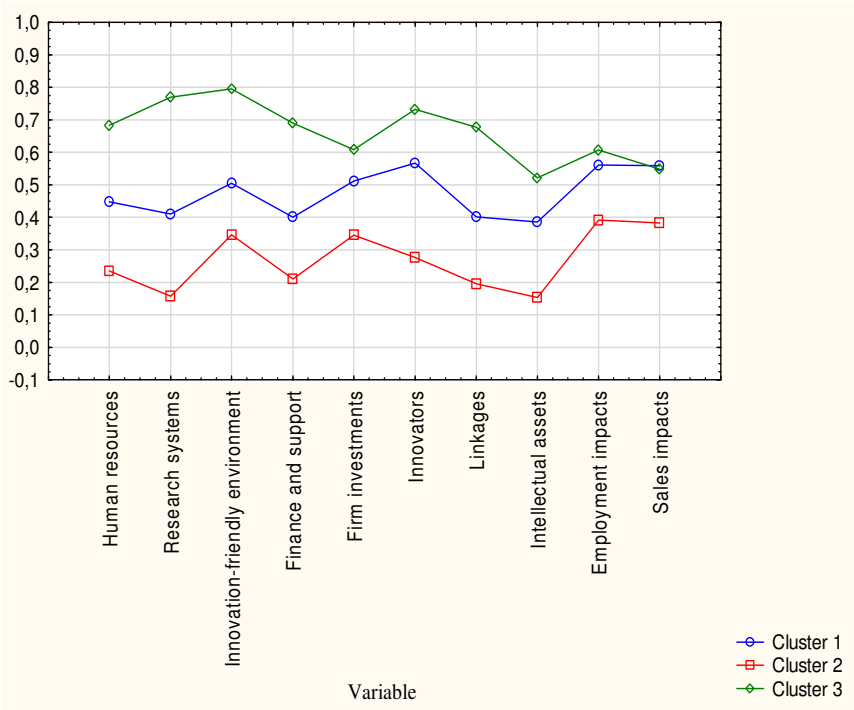

Fig.4. Diagram of k-means clustering of SII indicators.

When presenting models of the distribution of clustering according to the SII indicator (Fig. 4), major differences between the respective groups should be noted. The biggest difference is between the clustering groups 2 and 3, in the point of the Research Systems variable (values 0.16 and 0.79), i.e. the international competitiveness of the scientific base, focusing on scientific publications and quotations, and the number of international PhD students in those groups is on different levels. The countries clustered in groups 1 and 3 have the same level of the Sales Impacts variable. This indicator measures the export of medium and advanced technology products, exports of services requiring extensive knowledge and sales with respect to innovative activities.

Table 1: Clustering elements and distances from their centre for the countries regarding the SII

Elements of clustering 1	N=14	Elements of clustering 2	N=11	Elements of clustering 3	N=11
	Distance		Distance		Distance
Czechia	0.08452	Bulgaria	0.12495	Belgium	0.12565
Germany	0.17606	Croatia	0.11461	Denmark	0.12651
Estonia	0.11458	Latvia	0.14986	Luxembourg	0.16331
Ireland	0.18494	Hungary	0.12666	Netherlands	0.08625
Greece	0.16667	Poland	0.13970	Austria	0.16857
Spain	0.13376	Romania	0.14932	Finland	0.11740
France	0.14729	Slovakia	0.13895	Sweden	0.10081
Italy	0.12283	North Macedonia	0.14057	United Kingdom	0.15241
Cyprus	0.13547	Serbia	0.11348	Iceland	0.16979
Lithuania	0.16649	Turkey	0.20976	Norway	0.14662
Malta	0.24769	Ukraine	0.16689	Switzerland	0.18657
Portugal	0.16221				
Slovenia	0.11400				
Israel	0.22984				

Table 1 presents elements of each of the examined clustering. The purpose of this paper is to examine the impact of trust on the innovation of economies; the clustering analysis shows that each country is in a different group. Finland represents the most developed group 3 (the variables are between 0.58 and 0.8). Germany and the Czech Republic are in the 1st clustering group and Poland - in the 3rd, least innovative group. Such distribution of the groups suggests that trust influences the level of country's innovation (the distribution of trust measurements coincide with the clustering groups of the SII indicator).

Another approach to measuring the innovation of economies was proposed in the Oslo Manual (2019): the k-mean clustering analysis used the OECD II indicator measuring innovation-active firms in product, process or ongoing, abandoned or organisational and marketing. In this case, too, the k-mean clustering analysis was used (Fig. 5).

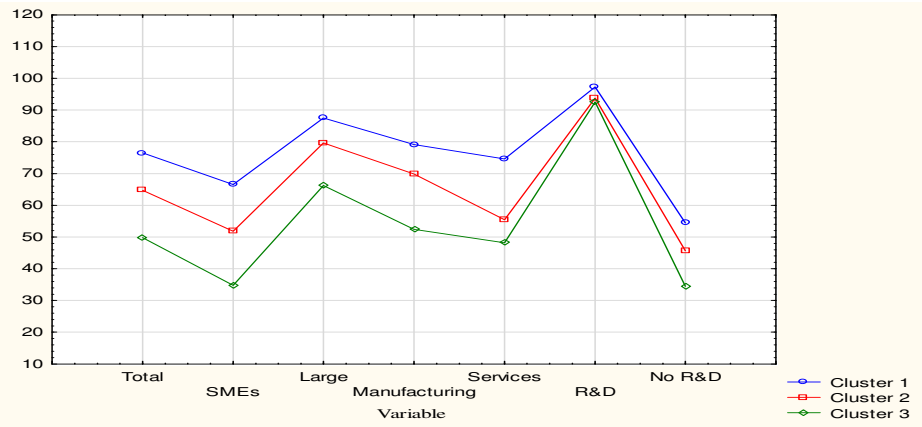

Fig. 5: Diagram of k-means clustering of OECD II.

In this clustering division, too, the groups differed significantly in terms of distribution levels. Clustering 1 has the most innovative operators, while clustering 3 - the fewest. Meanwhile, the trends in every clustering are the same (the differences concern only the values of the variables). Only the R&D variable, i.e. operators with a Research and Development department, is on a similar level for all the groups (between 92 and 98).

Table 2: Clustering elements and divergences from the centre.

Elements of clustering 1	**N=16**	**Elements of clustering 2**	**N=9**	**Elements of clustering 3**	**N=6**
	Distance		Distance		Distance
Austria	2.95903	Czechia	3.70332	Chile	10.59088
Belgium	2.90602	Denmark	5.15670	Hungary	2.39968
Canada	12.82882	Spain	5.17718	Korea. Republic of	6.38015
China	12.10455	Estonia	6.14854	Latvia	4.03756
Germany	6.24280	United Kingdom	13.80958	Poland	3.69576
Finland	6.79962	Japan	4.33870	Slovakia	4.19035
France	3.23125	New Zealand	10.27429		
Greece	4.05444	Slovenia	8.98013		
Iceland	8.31438	Turkey	6.79282		
Itally	5.18515				

Lithuania	6.51834				
Netherlands	7.07395				
Norway	3.04083				
Portugal	3.13790				
Sweden	5.97490				
USA	4.74311				

The clustering elements table (Table 2) confirms the right selection of representatives with different levels of economic innovation. Finland and Germany are in clustering 1, the Czech Republic in clustering 2 and Poland in clustering 3. The division into 3 clustering groups is sufficient considering the distance from the central point of the examined variables, since all the examined countries are on the peripheries of their respective groups. In this case, too, the variables characterising the level of innovation behave in the same way as the levels of trust in the examined countries, which confirms the thesis that the level of trust influences the innovation of their respective economies.

Knowledge of the determinant that influences the innovation of economy will also make it possible to examine the intensity of its impact. Subsequent analysis uses correlations between the levels of trust and selected SII and OECD II indicators. For this purpose, indicators examining the level of trust in the respective countries were identified and associated with appropriate weights - product of the level of point assessment and percentage of persons declaring such level.

Table 3: Correlation matrix for the trust indicator and SII indicator on significance level $p < 0.1$

Variable	P1 (Total)	P1 (higher education)	P2 (Total)	P2 (higher education)	P3 (Total)	P3 ((higher education)
Sales of new-to-market and new-to-firm innovations	0.47589	0.42520	0.56985	0.29060	0.76485	0.61809
Knowledge-intensive services exports	0.75044	0.82701	0.88309	0.90053	0.81603	0.85865
Medium & high-tech product exports	-0.30006	-0.34191	-0.17346	-0.40194	0.07167	-0.12424
Employment fast-growing firms innovative sectors	-0.85106	-0.92371	-0.87826	-0.98825	-0.70250	-0.83714
Employment in knowledge-intensive activities	0.94148	0.93873	0.98323	0.85815	0.99140	0.99175
Design applications	-0.35745	-0.22868	-0.12997	0.02062	-0.16425	-0.16902
Trademark applications	0.90543	0.96337	0.95761	0.99549	0.83981	0.93015
PCT patent applications	0.87150	0.93375	0.95385	0.97463	0.86009	0.92917
Private co-funding of public R&D expenditures	0.31192	0.38768	0.52258	0.48939	0.56099	0.51306
Public-private co-publications	0.91138	0.94236	0.98268	0.92385	0.94678	0.97550
Innovative SMEs collaborating with others	0.93364	0.86572	0.82878	0.67544	0.82916	0.85154
SMEs innovating in-house	0.95801	0.93312	0.96988	0.81264	0.99591	0.98683
SMEs with marketing or organisational innovations	0.82358	0.82044	0.90790	0.74591	0.96798	0.92444
SMEs with product or process innovations	0.96735	0.94973	0.98112	0.84166	0.99213	0.99386
Enterprises providing ICT training	0.94051	0.91999	0.96692	0.80801	0.99933	0.98377
Non-R&D innovation expenditure	-0.44072	-0.30220	-0.22735	-0.02788	-0.29527	-0.27498
R&D expenditure in the business sector	0.72957	0.77304	0.86560	0.78774	0.87881	0.86245
Venture capital investments	0.71871	0.82338	0.77859	0.95464	0.57067	0.72348

R&D expenditure in the public sector	0.84959	0.85619	0.93388	0.79737	0.97047	0.94432
Opportunity-driven entrepreneurship	0.70603	0.74793	0.62209	0.77408	0.40409	0.58022
Broadband penetration	0.69228	0.74352	0.61955	0.78710	0.39284	0.57389
Foreign doctorate students	0.88328	0.79136	0.79264	0.56050	0.86544	0.83299
Scientific publications among top 10% most cited	0.83926	0.90811	0.93636	0.96268	0.84478	0.91024
International scientific co-publications	0.99101	0.96021	0.93152	0.83048	0.89302	0.93924
Lifelong learning	0.95866	0.92909	0.86964	0.80579	0.79814	0.87129
Population completed tertiary education	-0.10653	-0.05964	-0.23008	0.04101	-0.46495	-0.28158
New doctorate graduates	0.82942	0.83656	0.92007	0.77993	0.96316	0.93133

Trust has major impact on the examined indicators associated with the innovation of economies. Trust in interpersonal relationships influences the most international scientific co-publications (0.99), SMEs with product or process innovations (0.97), SMEs innovating in-house (0.96), Lifelong learning (0,96), Enterprises providing ICT training (0.94), Innovative SMEs collaborating with others (0.93), Employment in knowledge-intensive activities (0.94), Public-private co-publications (0.91), Trademark applications (0.9). Meanwhile, trust associated with opportunities influences the most: employment in knowledge-intensive activities (0.98), SMEs with product or process innovations (0.98), Public-private co-publications (0.98), SMEs innovating in-house (0.97), Enterprises providing ICT training (0.97), Trademark applications (0.96), PCT patent applications (0.95), International scientific co-publications (0.93), Scientific publications among top 10% most cited (0.93), New doctorate graduates (0.92), SMEs with marketing or organisational innovations (0.91). Trust concerning the philanthropy of the respondents has the strongest impact on: enterprises providing ICT training (0.99) and it is the highest among the examined variables, SMEs with product or process innovations (0.99), SMEs innovating in-house (0.99), Employment in knowledge-intensive activities (0.99), SMEs with marketing or organisational innovations (0.97), R&D expenditure in the public sector (0.97), Public-private co-publications(0.95), New doctorate graduates (0.93).

There are also interesting dependencies between trust declared by persons with higher education and the SII indicators. Declared trust influences scientific publications among top 10% most cited (od 0.9 do 0.96), public-private co-publications (od 0.92 do 0.97), PCT patent applications (od 0.92 do 0.97), trademark applications (od 0.93 do 0.99) and employment in knowledge-intensive activities (od 0.93 do 0.99). These dependencies give grounds to the interpretation that activities that require cooperation must be founded on mutual trust, also thanks to the possibility of securing intellectual property (patent or/and trademark applications). The negative values in the correlation are also interesting (in two cases, this concerns the employment fast-growing firms innovative sectors indicator), which suggests that trust is lower in the case of growing employment in fast-growing companies. This suggests distrust to innovative operators, whose development might results from the fact that they take advantage of intellectual property, especially among persons with higher education.

The next step is to analyse of the impact of trust on the establishment of innovative operators. For this purpose, the correlation matrix of selected OECD II data will be used.

Table 4: The correlation matrix of trust and selected indicators concerning innovative solutions in companies on the significance level p< 0.1.

Indicators	Variable	P1 (Total)	P1 (higher education)	P 2 (Total)	P 2 (higher education)	P 3 (Total)	P3 (higher education)
Innovative firms (product/process or organisational/ marketing)	Total	0.85534	0.84936	0.92808	0.76784	0.98079	0.94428
	SMEs	0.86202	0.85656	0.93312	0.77558	0.98257	0.94869
	Large	0.72310	0.73165	0.84031	0.68435	0.91350	0.85557
	Manufacturing	0.86189	0.85077	0.92806	0.75975	0.98520	0.94629
	Services	0.85779	0.85933	0.93583	0.79103	0.97690	0.94829
	R&D	0.69220	0.56634	0.60611	0.28830	0.77011	0.66862
	No R&D	0.51979	0.55638	0.68928	0.57296	0.76366	0.69662
Product innovative firms (regardless of any other type of innovation)	Total	0.96436	0.94356	0.97680	0.83000	0.99380	0.99129
	SMEs	0.96436	0.94879	0.97908	0.83651	0.99172	0.99267
	Large	0.92174	0.90855	0.96412	0.81047	0.99774	0.97929
	Manufacturing	0.92223	0.90483	0.96036	0.79929	0.99903	0.97739
	Services	0.99043	0.97341	0.98410	0.86579	0.97112	0.99282
	R&D	0.56784	0.43227	0.49297	0.14560	0.69686	0.56366
	No R&D	0.64443	0.69698	0.80191	0.73360	0.82123	0.79702
Process innovative firms (regardless of any other type of innovation)	Total	0.97284	0.92520	0.93535	0.76496	0.95979	0.95757
	SMEs	0.97672	0.93024	0.93640	0.77198	0.95499	0.95739
	Large	0.89542	0.86056	0.92483	0.72582	0.99530	0.95121
	Manufacturing	0.96613	0.91300	0.92282	0.74363	0.95389	0.94743
	Services	0.98765	0.95803	0.96806	0.82843	0.96981	0.98225
	R&D	-0.00249	-0.11630	-0.23846	-0.30989	-0.23109	-0.20999
	No R&D	0.71507	0.72349	0.83380	0.67648	0.90929	0.84942
Organisation innovative firms (regardless of any other type of innovation	Total	0.87466	0.90932	0.96361	0.89934	0.93989	0.95735
	SMEs	0.87559	0.91142	0.96436	0.90352	0.93772	0.95733
	Large	0.89445	0.92508	0.97401	0.90678	0.94853	0.96856
	Manufacturing	0.88362	0.92118	0.96907	0.91600	0.93456	0.96036
	Services	0.86370	0.89494	0.95609	0.87939	0.94439	0.95260
Marketing innovative firms (regardless of any other type of innovation	Total	0.80470	0.77161	0.86421	0.64544	0.96704	0.89499
	SMEs	0.80578	0.77130	0.86340	0.64263	0.96733	0.89470
	Large	0.85779	0.85967	0.93608	0.79197	0.97666	0.94838
	Manufacturing	0.80105	0.76112	0.85334	0.62318	0.96425	0.88709
	Services	0.80779	0.78021	0.87270	0.66351	0.96858	0.90101

The correlation matrix (Table 4) presents the dependencies between the number of innovative (depending on the type of innovation) enterprises, broken down into size (large, small), industry (production, services), having the R&D department and the indicators of the level of trust in interpersonal relationships (the responses of persons with higher education are singled out). An analysis of the matrix shows that trust influences the number of innovative companies. The most influential is the philanthropy of approach (P3) in interpersonal relationships (from 0.76 to 0.98). The least influential (from 0.51 to 0.76) on the number of innovative enterprise is trust for another person (P1). The dependence between the level of trust and the number of enterprises that have, or do not have, the R&D department is low (from -0.3 to 0.85). This suggests that having a separate R&D unit causes

limited changes in the level of trust. Trust does not have a major impact on the size of innovative operators.

Meanwhile, the type of innovative activity is dependent on the level of trust. The trust factor is the most significant in establishing product innovative firms (od 0.83 do 0.99), where correlations with all the forms of trust are the highest. Future research should take this fact into consideration, as using instruments that stimulate the development of innovative products must be accompanied by increased trust in interpersonal relationships. There is also a significant dependence between trust and process and organisation innovative firms (od 0.96 do 0.72).

Innovative services (although to a limited extent) are more dependent on the level of trust than innovative manufacturing (the difference concerns marketing innovative firms).

When analysing the level of trust among persons with higher education, it it is worth noting that there are no significant correlations in question P2. This means neutral perception of trust in the category of the integrity of conduct with respect to the establishment of innovative operators.

The level of trust among persons with higher education is significant in the development of organisational innovation, especially in SMEs, large and manufacturing firms (from 0.9 to 0.97). The intangible nature of those innovations and their easy penetration means that trust is a key factor stimulating the development of those innovations.

Conclusion

The innovation of economies has a direct impact on sustainable growth and economic stability. Research concerning innovation and their impact of interpersonal relationships is, in the author's opinion, insufficient. The goal of this paper is to contribute to the knowledge of the impact of trust in interpersonal relationships on the innovation of economy. In order to achieve that goal, the following countries of different level of innovation, according to the SII and OECD II indicators were selected: the Czech Republic, Germany, Finland and Poland. An analysis of trust also revealed different levels of social trust in those countries, and the levels of trust corresponded to the degree of innovation of their respective economies. The correlation matrices between the level of trust and the SII and OECD II indicators revealed significant (from the perspective of statistical significance $p<0.1$) dependencies. The research results presented in this paper may be used to model the innovative development of a country, taking into account latent data, and trust in interpersonal relationships will determine the accuracy of such models. The author is aware that empirical data are limited to four cases only, but nonetheless, they may set the direction for future research concerning innovation climate on the level of regions and economies.

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Organic Production in Sustainable Rural Development: World Trends and Ukrainian Experience

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Abstract

The world tendencies of organic production development are revealed and their influence on the formation of the domestic market of organic products is determined. The basic tendencies of development of organic sector in Ukraine are characterized. The structure of agricultural lands certified in accordance with organic standards is given. Areas of organic crops are clarified, according to which Ukraine is the world leader. The place of Ukraine in Europe and the world is determined by the area of individual crops certified according to organic standards.

Keywords: Organic Production, Agriculture, State Support, Agricultural Crops, Organic Products Market.

Introduction

The agrarian sector of Ukraine's economy is intended to provide food security and food independence of the country. Recently, however, there has been a decrease in the quality of agricultural products, due to the deterioration of the ecological state of agricultural land and the decline of soil fertility- an indispensable source of life support for the country and the basis for the welfare of the population. The fertile soil layer is lost, the humus content is reduced, the area of acid and saline soils grows, 38% of the country's arable land is re-densified by soil erosion. Such processes negatively affect on the ecological quality and in some cases on the safety of agricultural products. A significant part of the produced agricultural products and foodstuffs do not meet the world standards.

At the same time, it is rapidly developing organic production aimed at improving public health through the production of high-quality food, raw materials and other products, the preservation of soil fertility and the environment in the EU and in the world as a whole. At the end of the last millennium, the global era of world agrarian strategies has begun and existed currently. The living agricultural model "more and cheaper" has been replaced by a new model "better and safer". Large areas of land are used under organic production in the world. Only in EU countries, the number of "organic" farms over the past 15 years has increased by more than 20 times.

Analysis of Research and Publications

Challenges of the formation and development of organic agriculture and its impact on economic, social and environmental components of agricultural production in Ukraine are highlighted in

scientific works of such national researchers as V. Articles [6], R. Bezus [7], E. Milovanov [14], O. Prutskaya [18], O. Skydan[15], M. Fedorov [21], O. Shkuratov [23] and so on.

However, due to various reasons, Ukraine has not fully realized yet the natural, economic and resource potential of the organic sector that necessitates a retrospective review of its development in national and world practice as well as the determination of global trends and developmental patterns.

Presentation of the Material

The term "organic farming" generally means a special system of agriculture, which has no chemically synthesized fertilizers and pesticides. However, this is just one of the hallmarks. Researchers of the US Department of Agriculture once suggested that organic production should be defined as a system of agricultural production that does not allow or substantially limits the use of chemically synthesized fertilizers, plant protection products (PPP), growth promoters and various synthetic fillers in fattening animals. The specified system is based as much as possible on the use of crop rotation, the use of plant remains, manure, compost, beans and legumes, siderates, organic waste products, mineral raw materials, mechanical and biological methods of combating weeds and pests and aimed at improving soil fertility, improving their structures with simultaneous provision of complete nutrition of plants [4].

In general, in the process of formation and development of world organic production different approaches to the definition of its essence have been formed. In particular, in 1995, the Board of National Standards of the United States proposed a proper interpretation of organic production. It is a "system of ecological management, aimed at preserving biodiversity, maintaining biological cycles, and improving the biological activity of soils. It is based on the minimal use of unnatural (artificial) raw materials and the widespread use of agrotechnical techniques that regenerate, support and improve ecological harmony ", according to this definition [2]. Due to this determination, the key principle of organic production is the use of such techniques, means and technological solutions that do not lead to a violation of the ecological balance in agroecosystems, and, on the contrary, provide an increase in their sustainability. At the same time, its main goal is to maintain the proper level of human health, optimize the productivity of soil fauna well as preservation of the plant and animal world.

The International Federation of Organic Movement proposes to consider "organic farming" as a set of diverse agricultural practices that provide ecologically safe, socially oriented and economically viable production of agricultural products and raw materials. The basis of such systems is the use of locally-specific soil fertility as a defining component of effective production. These agrification models are based on maximizing of the full use of the natural potential of plants and animals. Organic farming substantially reduces the use of third-party factors involved in the production process due to restrictions on the use of chemically synthesized fertilizers, pesticides and pharmaceuticals. Instead, agrotechnological measures and a variety of natural factors are used to increase crop yield and plant protection [3].

In Ukraine, under the production of organic products (raw materials), it is proposed to understand the "production activity of individuals or legal entities (including cultivation and processing), where during such production it is prohibited to use chemical fertilizers, pesticides, genetically modified organisms (GMOs), preservatives etc., and at all stages of production, the methods, principles and rules for obtaining natural (environmentally friendly) products, as well as the conservation and restoration of natural resources, are applied. "Such definition is determined by the Law of Ukraine "On the Production and Circulation of Organic Agricultural Products and Raw Materials " and identified the legal, organizational, economic bases of production and circulation of organic agricultural products and raw materials, measures of control and supervision of such activities, aims at ensuring fair competition and proper functioning of the organic products market, improvement of the main indicators of the state of health of the population, preservation of the natural environment, rational use of soils, sustainable use and restoration of natural resources as well as guarantee consumer confidence in products and raw materials labeled as organic. [12]

In general, organic production is based on the principles of local socioeconomic, climatic, historical and cultural peculiarities, among which it is rather difficult to identify the priority ones, since they are equally important and complementary.

Basic principles of Organic Production

Principles of organic production reflect ecologically directed perspectives that open up to humanity and outline ways of development of ecologically oriented agricultural production on a global scale.

The principles of organic agriculture developed by IFOAM should be considered as a whole. They regulate the process of developing programs and the development of standards for organic production as well as providing the following principles [1]:

- healing - organic farming should maintain and improve the state of the soil, plants, animals, humans and the planet as a single and indivisible whole;
- ecology - organic agriculture should be based on living ecological systems and cycles, working, co-existing and supporting them;
- justice - organic farming must be built on relationships that guarantee equity, taking into account the general state of the environment and its potential;
- care - the management of organic agriculture is aimed at a preventive and responsible nature to protect the health and well-being of present, future generations and the environment.

The principles of organic production at the macro-economic level include [9 , 22]:

- improvement and reproduction of the natural landscape and the agricultural ecosystem;
- prevention of processes of depletion and pollution of natural resources;
- minimizing the need for non-renewable energy and resources;
- production of high quality food, raw materials and other products in sufficient quantity to meet existing demand;
- restoration of a normal, safe and healthy environment;
- use of local knowledge and traditional agricultural systems.

The principles of organic production at the micro level include [19 , p. 11 , 21]:

- conservation and reproduction of soil fertility and biological activity through the widespread use of biological and mechanical methods characterized as nature conservation and energy saving;
- promotion of rational use and conservation of water resources with all their living organisms;
- preservation of agro-and biodiversity in farms and the environment by using a sustainable production and protection system of wildlife;
- provision of nitrogen demand by nitrogen-fixing plants cultivation;
- the introduction of biological methods for plant protection, aimed primarily at prevention, rather than treatment;
- expansion of plant varieties and animal breeds adapted to local conditions;
- livestock farming taking into account the physiological and biological needs of animals and creating the most favorable conditions for their maintenance;
- the prohibition of the use of chemically synthesized fertilizers, plant protection products, hormones and growth regulators;
- the prohibition of genetic engineering and its products;
- harmonization of the process of production with natural cycles and living systems of soil, flora and fauna;
- a significant impact on the system of organic production and processing of raw materials of social and environmental factors;
- use in the process of agricultural production and its processing, as far as possible, of domestic resources, prevention of their losses and pollution;

- stimulation of domestic production of organic products and promotion of it to consumers;
- satisfaction of livestock needs in ecologically safe forages;
- the use of packaging materials and containers to be re-biologically or decomposed;
- the focus on the formation of the social-oriented chain "production - processing - realization" on the basis of compliance with environmental standards;
- recognition of the importance and necessity of studying local experience and traditional forms of management [19 , p. 11] .

Subsequently, ukrainian researchers proposed another classification of principles for the production of organic products (general and special principles), which further laid the foundation for the formation of domestic "organic" legislation [8, c. 4; 13 , p. 415; 11 , p. 45]. Thus, the principles of the ukrainian legislative are the general principles of the production, storage, transportation and sale of organic products (raw materials) [12]:

voluntary

equality of rights of economic entities that produce, store, transport and sell organic products (raw materials);

rational use of natural resources, ensuring their proper use and reproduction;

refusal to use genetically modified organisms and products from them;

refusal to use chemically synthesized external resources, except in cases established by law;

long-term maintenance of soil fertility;

the use of living organisms and methods of mechanical production;

ensuring a high level of biological diversity;

use in the production of processes that do not harm the environment, health and well-being of people, plants and animals.

The special principles of the production, storage, transportation and sale of organic products (raw materials) are [12]:

ensuring the preservation and reproduction of soil fertility, soil stability and biological diversity by methods that optimize biological activity, ensure a balanced supply of nutrients for plants;

minimizing the use of non-renewable and external resources;

processing of waste and related products of plant and animal origin for further use in the production of products of plant and animal origin;

taking into account the local or regional ecological status of the territories when choosing the type of production for production;

plant protection through preventive measures such as the selection of appropriate species and varieties resistant to diseases and pests, crop rotation, mechanical and physical methods, and protection against natural pests;

animal health by promoting natural immune protection, selection of the breeds;

taking into account when selecting the breeds of the degree of adaptation of animals to local conditions, their viability and resistance to diseases;

adherence to a high level of animal maintenance that meets the needs inherent in each individual species;

obtaining organic livestock products from animals that have been grown in organic farms since birth throughout their lives;

feeding animals with organic fodder;

the exclusion of the use of artificially derived polyploid animals;

preservation of biological diversity of natural water ecological systems, continuous protection of the water environment and the quality of the surrounding water as well as surface ecological systems in the production of fishery products.

Now it's obvious that the material well-being of humanity, achieved at the expense of degradation of the natural environment the environment threatening existence man as a biological kind, its physical and mental health and, especially, the health of future generations. There is humanity civilized way out in this situation that is keeping up with the dynamic equilibrium between welfare and preserving friendly (supportive) living environment and thus get out on trajectory sustainable (balanced) development. Organic agriculture provides prospects for the development of economic systems because of significant environmental benefits over traditional.

The United Nations Food and Agriculture Organization (FAO) outlines following advantages of organic agriculture: a) long-term environmental sustainability; b) preservation and reproduction of soil fertility; c) rational use of water resources; d) conservation of biodiversity; e) refusal to use genetically modified organisms (GMOs); e) maintaining ecological balance in agroecosystem and its assimilation abilities [16].

Consider them in detail.

a) Long-term environmental sustainability. Numerous changes and processes occurring in the natural environment are of a long-term nature. Organic agriculture provides medium- and long-term positive ecological stabilizing effects on agroecosystems. It prevents depletion of soil fertility and the spread of diseases and pests due to the aim of producing ecologically safe food products. Organic farming is based on a philosophy that is understandable for society - it's cheaper to warn, to prevent anxieties than to eliminate them after they have already harmed.

b) Preservation and reproduction of fertility of soils. Such elements of agriculture as crop rotation, the use of intermediate crops, sideration, the use of organic fertilizers (compost, high-quality humus, by- products of plant growing and plant remains) and minimal soil cultivation are the most affordable methods of organic agriculture. They promote the development of soil flora and fauna, improve the composition and structure of the soil, promote the formation of more stable ecosystems, have an important role in combating water and wind erosion. The soil's ability to retain moisture and nutrients increases in aggregate interaction, which compensates for the refusal of the use of mineral fertilizers and ensures the preservation and reproduction of soil fertility.

c) Rational use of water resources. A serious environmental problem for rural areas is the pollution of groundwaters with nitrates and pesticides. Since their use in organic farming is prohibited, the risk of groundwater contamination by hazardous and harmful substances is significantly reduced. An important advantage of applying organic production technologies under irrigation is the widespread use of drip irrigation and micro-irrigation, which ensure the economical and rational use of water resources, prevent the formation of salt mints, reduce the cost of crop cultivation technologies, thereby increasing their competitiveness in the markets.

d) Preservation of biodiversity. Conservation of natural areas around the fields and the refusal to use agrochemicals creates the necessary conditions for the existence and development of wild flora and fauna and ecosystem-friendly organisms, such as pollinators and entomophages.

e) Refusal to use genetically modified organisms. Use in organic farming of GMOs is prohibited at all stages of the production, processing and circulation of organic food products. The presence of organic labeling on the product indicates that in the process of its production and processing, genetic engineering products were not used.

e) Maintaining ecological balance in agroecosystem and its assimilation abilities. Organic agriculture has a positive impact on the environment, contributes to maintaining ecological balance in agroecosystem and its assimilation abilities. It follows that the fundament of the technologies of organic agriculture includes two basic principles: the desire to maximize the use of natural biological processes and adapt to them the technology of agricultural production; do not to harm the environment (mainly due to the reduction of the use of chemically synthesized mineral fertilizers, chemical plant protection products and more rational use of natural resources).

Ukrainian researchers are proposing to determine the benefits of organic farming by environmental, economic and social characteristics (picture № 4.1).

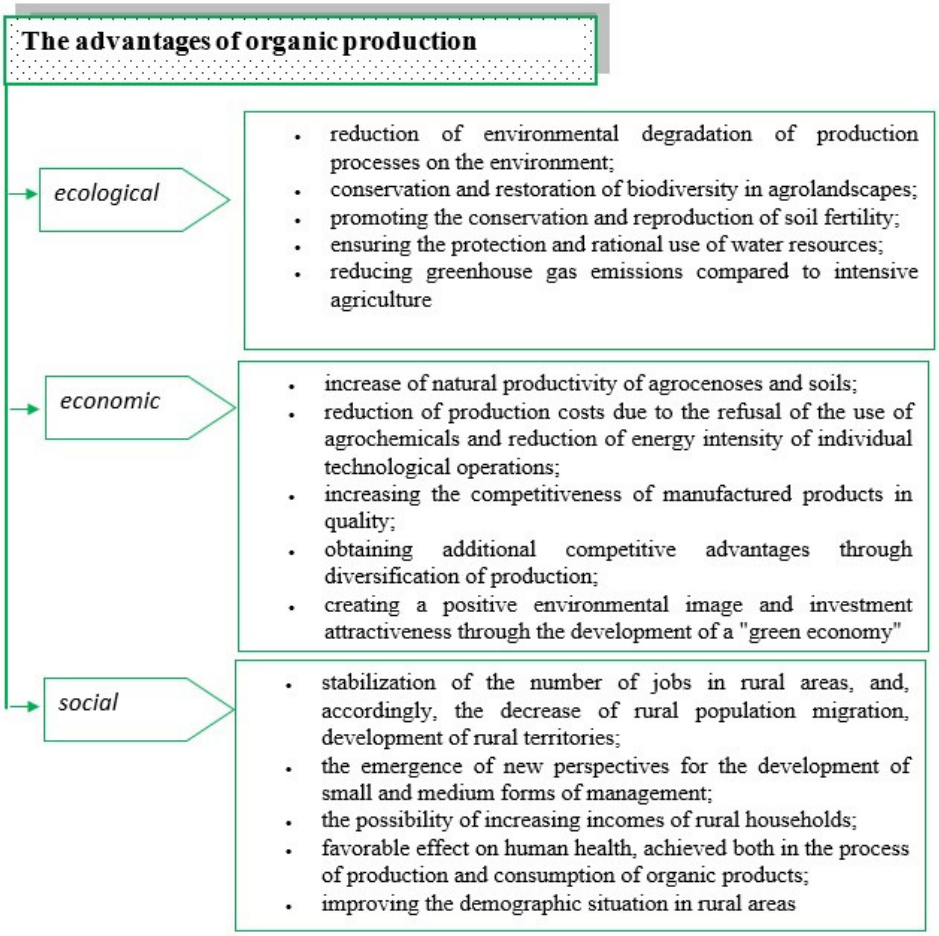

Picture № 4.1 The main advantages of organic production

Source: own research and summary based on scientific works .

World trends in the development of organic production

According to the International Organic Federation (IFOAM) and the Research Institute of Organic Agriculture (FiBL), the area of organic farming in the world is steadily increasing. For the past fifteen years, their size has increased by 4.6 times and by 2015 amounted to 50.9 million hectares. Statistical information on organic farming comes from 179 countries [5] . The organic sector is represented in almost all countries in Europe. (Table № 1)

Table № 1: Classification of countries with the organic sector by continents (2015)

Continent	Number of countries with organic farming	Number of countries on the continent	Share of countries with organic agriculture,%
Africa	41	56	73
Asia	41	49	84
Europe	48	49	98
South America	33	46	72
North America	3	5	60
Australia and Oceania	13	25	52
World in general	179	230	78

Source: FiBL, IFOAM and SOEL, 2017.

2.4 million organic producers are certified in the world, more than three quarters of which are in developing countries. Organic production accounts for 1.1% of the world's agricultural land area in 2015. Organic farming accounts for 6.2% of all agricultural land in the countries of the European Union.

Features of the Global Markets of Organic Products

Organic food markets function successfully in many countries. First of all, in the USA and the EU, where the necessary market infrastructure is formed [18] .

According to experts, the organic products market in the world is constantly growing. In particular, in 1999 he was valued at 15 billion $, in 2006 was about 30 billion $ and in 2015 it reached 81.6 billion $. Growth rates are 10-15% annually. Most of the organic products sold in highly industrialized countries. In particular, about 90% of its total consumption falls on the countries of Western Europe and North America. The most developed organic products markets are concentrated in the US, Germany and France. The leader in the sale of organic products is Germany among the countries in Europe (more than 8,6 billion Euros per year) [5] .

Switzerland is the world leader in organic food consumption per capita with average annual organic food costs per capita of 262 euros per year. The second position is Denmark - 191, Sweden is third - 177 euros per year.
The main reasons for the consumption of organic products: ecological safety of food; higher taste of organic produce; preservation of the natural environment in the process of production; the absence of genetically modified organisms.

Analyzing the peculiarities of foreign experience, we come to the conclusion about typical consumers of organic products. These are mainly urban residents with high purchasing power, who belong to the middle and upper social classes, take care of family health and focus on high-quality products [21] .

European Experience

The rapid growth areas of farmland occupied by organic production in Europe started in 1990 and lasted until 2002. Currently, this trend persists, but the growth rate has declined markedly.

Spain reached the first place (1.9 million hectares) in accordance to the area of land occupied by organic production in Europe, (Picture № 1), Turkey is the leader in the number of organic producers (70.0 thousand). Russia has the largest average organic farming area (4.7 thousand hectares), Malta has the smallest ones (2.7 hectares). The average area of organic farming in Europe is 36.4 hectares.

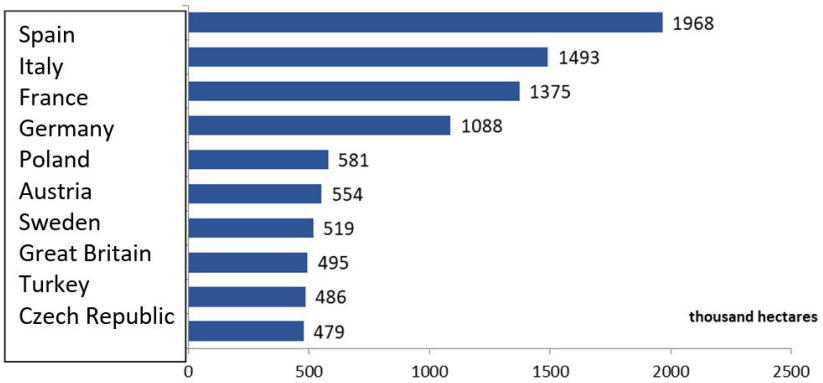

Picture № 1: The top ten countries in Europe for agricultural land occupied by organic production by 2015, thousand hectares

Source: FiBL & ZMP Survey 2017 .

Liechtenstein (30.2%) is in the first place, Austria (21.3 %) is in the second place in accordance to the share of land occupied by organic production in the total area of agricultural land.

45% is arable land, 42% are pasture lands and 11% are perennial plantations in accordance to the structure of agricultural lands of Europe (Picture № 2).

Cereals (39%) and crops on green fodder (36%) predominate in the structure of crops (Picture № 3). Among perennial plantations the largest share is occupied by olive (38%), vineyards - 21%, nuts - 16, fruits – 12% and citrus fruits - 3% (Picture № 4).

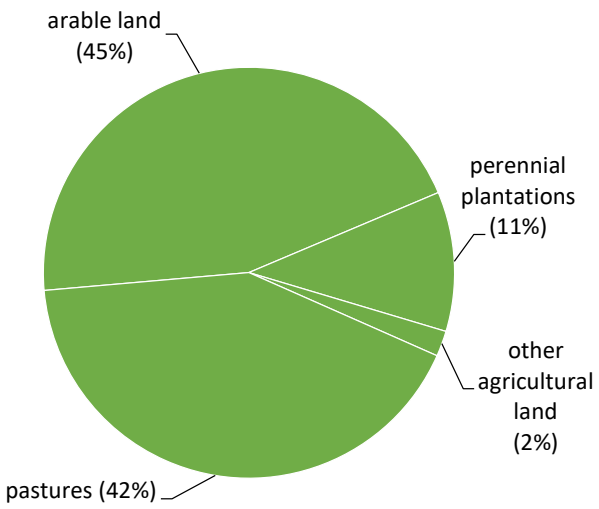

Picture № 2: The structure of agricultural land occupied by organic production in European countries,% (2015)

Source: FIBLE & ZMP Survey, 2017.

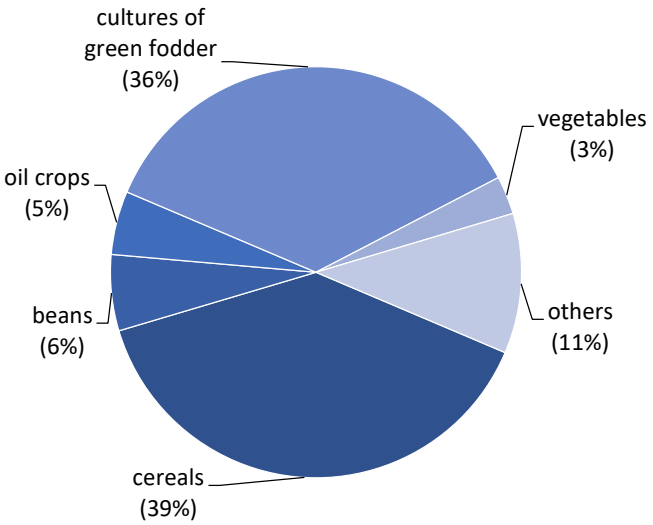

Picture № 3: The structure of the crop area under organic production in European countries,% (2015)

Source: FIBLE & ZMP Survey, 2017.

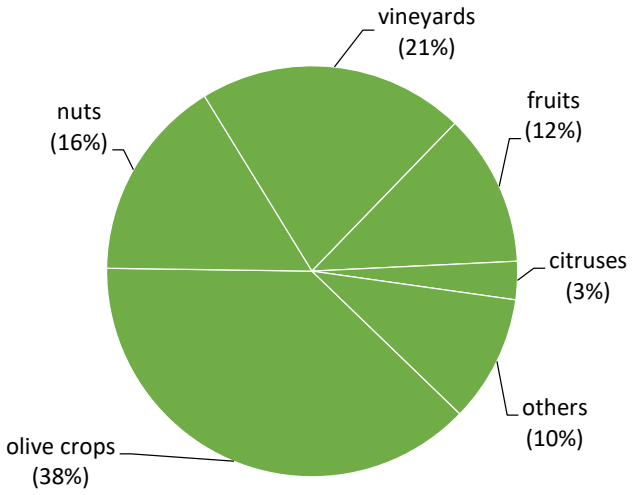

Picture № 4: Structure of perennial plantations certified as "organic" in European countries,% (2015)

The share of land occupied by organic agriculture has increased significantly in recent years. This was promoted by an active EU policy aimed at supporting farms moving from traditional to organic production. For example, during 2001 in Poland "organic" farms received subsidies of 108 $. per 100 hectares of arable land, 38 $ per hectare of pasture and about 150 $ per hectare of perennial plantations. In addition, the state also partially offset the cost of certification of farms according to organic standards. Subsidies per hectare of arable land in Poland increased to 202 euros per hectare, meadows and pastures - up to 66 euros per hectare, perennial plantations - up to 395 euros per hectare in 2013. The subsidies allocated to support organic agriculture during the transitional (conversion) period in some cases amount to 950 euros per hectare in Germany and France (Table 2) .

Table 2: Direct payments (subsidies) to organic producers in individual member states of the EU , EUR per hectare (2013)

Administration of agricultural land		Poland	Germany	France
Meadows, pastures	Transition	85	220	100
	Certified organic production	66	190	80-151
Arable land	Transition	215	220	200
	Certified organic production	202	180	100-151
Vegetable farming	Transition	397	575	350-900
	Certified organic production	333	350	150-160
Gardening and berry growing	Transition	461	950	100-900
	Certified organic production	395	750	590-900

Source: [22]

Ukraine's Experience on the Development of Organic Production

The development of organic production is becoming more widespread every year in Ukraine. This is primarily due to the active position of public institutions, associations, international projects, whose activities are aimed at popularizing this area of production.

The presence in Ukraine of a significant number of public organizations and producers-enthusiasts contributes to the development of the domestic organic sector. Thanks to them, Ukraine became one of the top 20 world leaders in the field of certified agricultural land and in dozens of countries in the world - in terms of harvesting wildlife. More than 420 producers of organic products have been certified in Ukraine till June 2017. 421.5 thousand hectares of land is under certified organic production and 550 thousand hectares of land are occupied under certified wildlife (herbs, berries and mushrooms).

Annual domestic consumption market reached 21-22 million. The export potential of the sector is estimated at 100 million euros at the same time.

The area of land occupied by organic production and the quantity of certified producers is gradually growing every year (Picture №5). 110 processing plants, 50 importers and 30 exporters of organic raw materials and food are certified in Ukraine also.

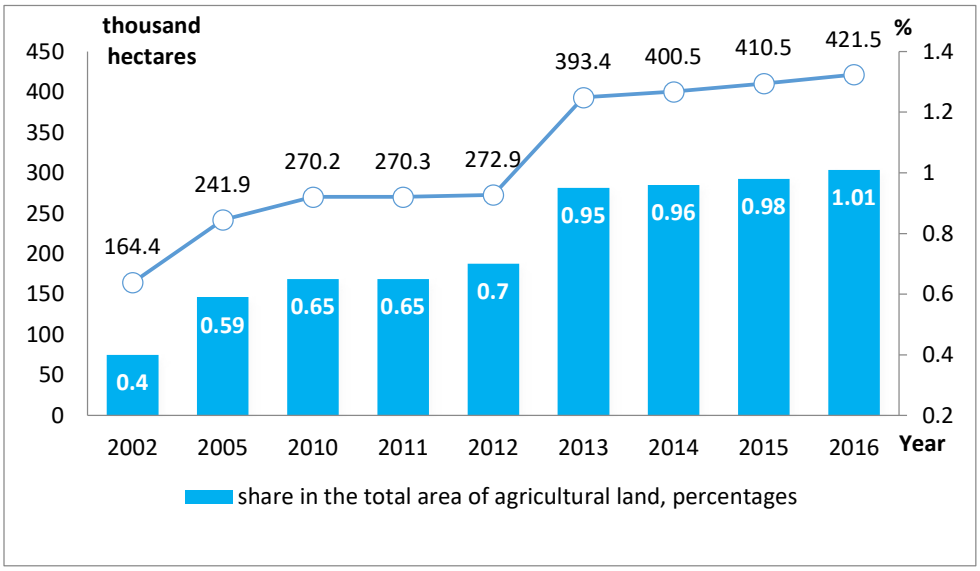

Picture 5: Agricultural land occupied by organic production in Ukraine

Source: according to the Federation of Organic Movement of Ukraine (2017).

Most of the farms engaged in the production of organic products are located in the Kyiv, Odesa and Kharkiv regions. In the structure of certified agricultural lands 82% falls on arable land. Pastures are about 12%. Perennial plantations are 2% (Picture №6).

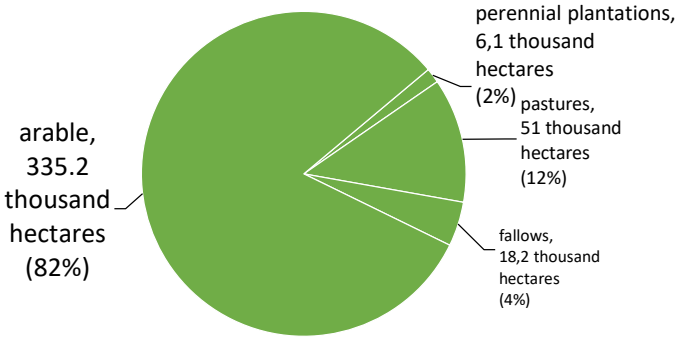

Picture №6: Structure of agricultural lands of Ukraine, certified by organic standards, % (2015)

Source: According to Institute Organic Agriculture FiBLE, Ackerstrasse (2017) [22] .

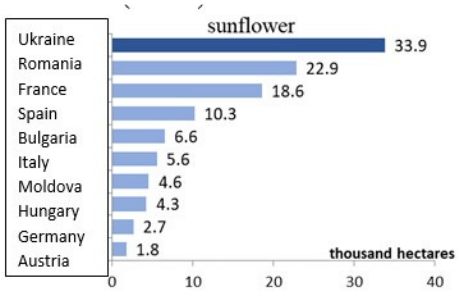

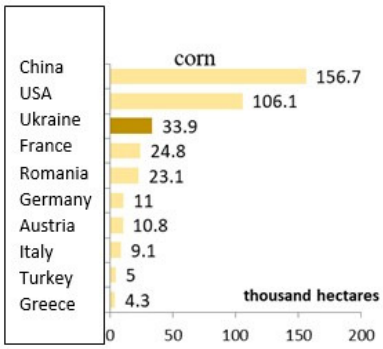

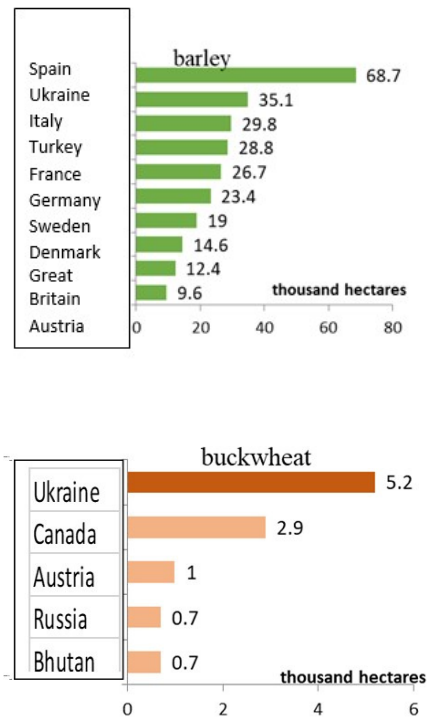

Picture № 7: Areas of organic crops where Ukraine is a world leader, thousand hectares (2015)

Source: NSC Research Institute of Agrarian Economics according to FiBLE (2017) [22] .

About 60% of the crops are occupied by wheat, barley, sunflower and corn. The rest of the cultivated area is appointed for peas, rape, buckwheat, soya, rye, oats, sorghum, millet, mustard, sugar beet, esparset and others. Consequently, the supply of ukrainian organic products for export is mainly represented by grain, oilseed and leguminous crops as well as berries, fruits and wild herbs. It should be noted that Ukraine ranks first place in the world due to the certified organic standards of sunflower and buckwheat. Ukraine is among the first ten world leaders in terms of organic grains (barley, corn, wheat) (Picture №7) as well as vegetables and legumes [22].

Despite the fact that organic production is a relatively new direction for Ukraine in separate groups of cultures, it has a leading position both in Europe and in the world as a whole. In particular, it owns 26% certified organic standards world space sunflower, 49 % of buckwheat, 43 % of millet, 11 % of spill, 9 % of barley, 8 % of corn, more than 5% of wheat and rye. Ukraine is turning into a very powerful producer of organic products and raw materials in Europe gradually. There are 75% of European organic buckwheat, 70 - millet, 28 - sunflower, 24 - corn, 11 - barley, 9% - wheat, etc. (Table 3).

Table 3: Ukraine's place in Europe and the world in the area of crops certified organic standards in 2015

Culture	Area of land certified by organic standards, thousand hectares			Ukraine's share,%	
	Ukraine	Europe	world	in Europe	in the world
Wheat	81.8	950.5	1516.9	8.6	5.4
Barley	35.1	325.6	391.1	10.8	9.0
Buckwheat	5.2	6.9	10.6	75.4	49.1
Corn	33.9	138.4	433.0	24.5	7.8
Millet	6.3	9.0	14.7	70.0	42.9
Rye	9.4	161.6	172.3	5.8	5.5
Spill	5.5	40.7	48.2	13.5	11.4
Sunflower	33.9	119.8	132.4	28.3	25.6
Soy	6.3	83.6	604.2	7.5	1.0
Vegetables	8.1	158.0	353.4	5.1	2.3
Oat	4.8	290.4	413.8	1.7	1.2
Berries	0.6	31.6	49.9	1.9	1.2

Source: NSC Research Institute of Agrarian Economics according to FiBLE (2017) [22] .

Organic production is recognized as one of the priority directions of development of the agrarian sector in Ukraine currently [10, 20]. However, the provisions of the current Law of Ukraine "On the production and circulation of organic agricultural products and raw materials" do not ensure the proper functioning of the organic products market. As a result, the counterfeit organic products takes place, the lack of effective tools for prosecuting violations of legislation in this area, which provokes unfair competition. In this regard, it is necessary to improve the regulatory framework for production and circulation of organic products, which led to the need to elaborate on the draft Law of Ukraine " On Basic Principles and Requirements for Organic Production, Circulation and Labeling of Organic Products " [17].

An important step was the introduction of economic incentives for organic producers, in particular, by providing on a turn-based basis financial support to farms in the amount of up to 500 thousand UAH. for the assessment of the conformity of production of organic products. In accordance with the Resolution of the Cabinet of Ministers of Ukraine "On Amendments to the Procedure for using the funds allocated from the State Budget to support farmers" No. 609 of September 8, 2016, on other equal terms farms have an advantage to other households that claim the financial assistance applying for conversion to organic production.

An important shift in stimulating the development of the organic sector is the introduction of specialized land auctions where commodity producers will be offered land for organic production at preferential rental rates. Thus, organizational and economic mechanism of supporting the organic sector is gradually being formed in Ukraine which will facilitate its development in the near future.

Conclusions and Perspectives of Further Research

1. Organic production is rapidly developing in the EU and in the world as a whole, aimed at improving the health of the population by producing high-quality food, raw materials and other products, preserving soil fertility and the environment. At the end of the last millennium, the global era of global agrarian strategies has begun and proceeded currently. The existing agricultural model "more and cheaper" has been replaced by a new model "better and safer". The large areas of land are used under organic production in the world.

2. The production of organic products is at the primary stage of development in Ukraine. The area of land under organic production is about 1% of the total area of agricultural land, there are over 420 "organic" farms. Gradually, the regulatory framework for organic production regulation is being developed, the national certification system, market infrastructure, and information support are developing.

About 60% of the crops are occupied by wheat, barley, sunflower and corn. The rest of the cultivated area is appointed for peas, rape, buckwheat, soya, rye, oats, sorghum, millet, mustard, sugar beet and espaces. Consequently, the supply of Ukrainian organic products supplied for export is represented mainly by grain and oilseeds crops. In addition, Ukraine is among the first ten world leaders in terms of organic vegetables and legumes.

3. It should be noted that the organizational and economic model of organic agriculture is constructed in such a way that it promotes the development of social infrastructure, supports the development of rural green and agro-tourism, aims at ensuring sustainable (balanced) development of rural areas. As the incomes of rural households increase, the level and quality of life in the village increases, self-employment, social infrastructure develops and the dependence of the budgets of territorial communities from the budgets of the state and regional levels decreases.

4. Implicitly eco-socio-economic benefits of organic agriculture is the simultaneous achievement of increased productivity of agriculture, improving the quality of ecosystem services and preserve the health of present and future generations that fully satisfies the concept of sustainable (balanced) development . At the same time, access to world agro-food markets is opening up. For Ukraine organic production means the ability to supply agricultural products to European markets, to create new, more perspective jobs, to open new businesses, to mitigate threats related to climate change, degradation of natural capital, which is the basis of sustainable growth.

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"The Category of Gender Seem from Significative Samples of Pictorial Art"

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Abstract

The main objectives of this work are the investigation and description of some characteristics of the category "gender" seen from the pictorial art. Some notions associated with this category find their expression in specific samples of universal painting and it is interesting to see how pictorial art has portrayed women throughout history and how in this reproduction has left visible samples of their conceptions of feminine nature. The gender category is not strange to this cultural process of the evolution of art and therefore, from some examples, the concept of women can be discussed with all the richness that this entails.

Keywords: gender, pictorial art, woman, history.

Introduction

The research project has allowed in its different advances to expand the spectrum of theoretical considerations. That is why, from the bibliographic inquiry and reflection on the concepts of gender and pictorial art, it has been possible to establish a significant relationship between the conceptions of women and the painting that has frequently portrayed in history. The idea resulting from this conviction is that pictorial art can say something about the gender category that can also be found in the cultural spaces of many peoples and nations. The question that could serve as the initial problem of the paper could be, according to the above, what relationship can exist between the gender category and some representative samples of pictorial art? And to resolve that question there are two specific goals: Identify some aspects of the gender category present in representative samples of universal pictorial art, and Describe some special elements of the genre category based on the analysis of some samples of universal pictorial art.

Methodology

The project development process assumes that some articles and papers can be created that constitute examples of themes that can be expanded to better support the synthesis of the thematic search and, in that order of ideas, approaches to the gender category can be generated. Expand your understanding. From the point of view of the methodology, it can be said that the process of construction of the paper started from the search matrix for articles on gender problems and sexual representations. Once this stage was completed, an analysis was made that favored the categorization of the phenomenon. After that, we proceeded with the investigation of the works of painting that dealt with the conception of women throughout history, in particular, the last century. With the testimonies on the subject, an interpretation work was carried out that yielded a vision on gender that can also be found in spaces such as culture and school. This product served in turn to initiate another bibliographic search that reinforced the theme of art and gender and from there the reflexive exercise that gave rise to the presentation was derived.

Results

The results of the project had to do with two great themes: the first of them is that the notions and perceptions of sex and gender are historical. Each era in culture and art posed an ideal and a reality

about women and about their sexual condition, as well as in men, and second: that the art of painting reflects these changes in an aesthetic and personal way.

Conclusions

1. There are samples of Western pictorial art that provide an image and a perception of sex and gender that may well be relevant and valuable in the process of understanding them in many cultural, social and academic contexts.

2. Regarding the conception, perception and evaluation of women and women, pictorial art is rich in examples and points of view that have their parallel account in many aspects of theories associated with gender.

3. From the samples of the pictorial art the interpretations of the artists in relation to the theorizations about gender and sexual diversity are noticed.

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The Evaluation of Teaching Factory Learning in Vocational High School in Bekasi

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Abstract

Learning Teaching Factory is a learning model of production/service-oriented Vocational High School that applies to principles and procedures that exist in the industry and are carried out in an environment like what happens in the industry. The introduction of Teaching Factory requires the total participation of the industry as a third party determining the standard of educational results in vocational high school. The research was conducted in 11 public vocational schools in Bekasi, held in May to July, with the number of respondents in this study being 23 people who were entrepreneurship subject teachers. A purposeful sampling method is the sampling technique. Interviews and questionnaires are used to collect data. Based on the analysis, TEFA was appropriately given to vocational high schools and this program is appropriate with an age requirement of 87 %. It was found that the most appropriate infrastructure facilities given to the school by the government are 80 %. And as for the teacher's competence is 62 %, and the TEFA program was able to permeate the market achieved 100 % strongly agree, but as for the school readiness aspects to incorporate the TEFA program is 64%.

Keywords: Teaching Factory, Enterpreneurship, and School Management

Introduction

The importance of providing skilled human resources realized by the government through the policy enhanced vocational education that gives attention to vocational high school. Vocational high school development is now moving from local labor market orientation to the ASEAN labor market welcoming the ASEAN Economic Community (AEC) and preparing the graduates with a decentering of entrepreneurial character. The application of the teaching factory in the vocational school is Directorate of Vocational School Development's effort to strengthen school cooperation or synergy between school and industry.

Learning with teaching factory aims to foster character and work ethic (discipline, responsibility, honesty, cooperation, leadership, etc.) needed by the business world/industrial world and improve the quality of learning outcomes from competency-based training to production-based training.

The cooperative relationship between vocational school and industries in teaching factory learning patterns will have a positive impact to build a systematic and planned partnership mechanism based on a win-win solution position. The application of the teaching factory affiliating vocational education world with the industrial world so the checks and balances on the educational process at the vocational school maintained and to maintain harmony (link and match) with the needs of the job

market. The government programs stated above also following 21st-century learning patterns that promote innovation and the realization of the creation of new ideas.

As stated in the previous posting, 21st-century learning has some characteristics known as 4Cs:

1. Communication
   In this character, students are required to understand, manage, and create effective communication in various forms and contents verbally, in writing, and with multimedia helps. Students are allowed to use their abilities to express their ideas, both when discussing with friends and when solving problems from the teacher.
2. Collaboration
   In this character, the students demonstrate their skills in group teamwork and leadership, adapting to different roles and responsibilities, working productively with others, putting empathy in place, honoring different perspectives. Students also accomplish their responsibility and personal flexibility, at the workplace and in community relations, setting and achieving high standards and goals for themselves and others, understanding confusion.
3. Critical thinking and problem-solving
   In this character, students strive to provide logical reasoning in understanding and making complex choices, understanding the interconnection between systems. Students also use their abilities to try to solve the problems they face independently and also can compile and express, analyze, and solve problems.
4. Creativity and innovation
   In this character, students can develop, implement, and convey new ideas to others, being open and responsive to new and different perspectives.

21st-century skills are skills needed to deal with life in a global society. Several organizations have defined and identified 21st-century skills. Although the classification of 21st-century skills is different from several different organizations, the essence is the same.

Literature Review

Education

Stated in Indonesian National Education System Law (*Undang-Undang No. 20/2003*), Education is a conscious and planned effort to create an atmosphere of learning and learning process so that students actively develop their potential to have spiritual strength, self-control, personality, intelligence, noble character, and the skills needed by themselves, society, nation, and the country.

Constitution of the Republic of Indonesia (Amendment version), Article 31, clause 3 also states, "The government organizes and implements a national education system, to be regulated by law, that aims at enhancing religious and pious feelings as well as moral excellence to upgrade national life." And article 31, clause 5 states, "The government advances science and technology along with holding religious values and national unity in high esteem to promote civilization as well as the well-being of humanity."

Learning Skills

The National Research Council (in Lai & Viering, 2012) has initiated the topics of learning and assessment of 21st-century skills. Types of 21st-Century Learning Skills (Student Competencies) required by students to have readiness in a career and attend education in college and career readiness are:

1) Cognitive skills which include critical thinking, non-routine problem solving, and systems thinking,
2) Interpersonal skills which include complex communication, social skills, teamwork, cultural sensitivity, and accepting differences,

3) Intrapersonal skills which include self-management, time management, self-development, self-regulation, adaptability, and executive functions.

The North Central Regional Education Laboratory (2003) identified 21st Century Learning Skills (Student Competencies) broader achievement of learning in the 21st century through digital literacy, inventive thinking, effective communication, and high productivity.

Program Evaluation

According to Suharsimi Arikunto (2012), "Program evaluation is a unit or unit of activity aimed at gathering information about the realization or implementation of a policy, taking place in a continuous process, and occurring in an organization involving a group of people for decision making". it means program evaluation is a series of activities carried out deliberately and carefully to determine the level of implementation or success of a program by knowing the effectiveness of each component, both for the current program and 7 that have passed.

There are many program evaluation models used by experts. One of them is the CIPP models (Context - input - process - product). This model was developed by Stufflebeam. (1971). The CIPP model looks at four dimensions: Context dimension, Input dimension, Process dimension, and Product dimension.

Teaching Factory

Learning Teaching Factory is a learning model in production/service based Vocational High School that refers to standards and procedures that apply in the industry and are carried out in an atmosphere like what happens in the industry. The implementation of Teaching Factory requires the absolute involvement of the industry as a relevant party assessing the quality of educational outcomes in Vocational High School. Implementation of Teaching Factory (TEFA) also must involve governments, local authorities, and other stakeholders in the regulatory, planning, implementation, and evaluation.

Teaching Factory implementation according to the Directorate of Vocational High School Development is divided into 4 models and can be used as a mapping tool for vocational high schools that have implemented TEFA. The model is as follows:

1) **The first model**, Dual Systems in the form of fieldwork practices is a pattern of vocational learning in the workplace known as experience-based training or enterprise-based training.
2) **The second model**, Competency-Based Training (CBT) is a learning approach that emphasizes the development and improvement of students' skills and knowledge by work needs. In this model, student assessment is designed to ensure that each student has achieved the skills and knowledge needed in each competency unit pursued.
3) **The third model**, Production Based Education, and Training (PBET) is a production-based learning approach. The competencies that students have possessed need to be strengthened and their skills ensured by providing knowledge of making real products needed by the world of work (industry and society).
4) **The fourth model**, Teaching Factory is an industry-based learning concept (products and services) through the synergy of schools and industries to produce graduates who are competent with market needs.

The harmonious goals of learning the teaching factory according to Alptekin et al. (2001) are as follows:

a) Prepare more professional graduates through the provision of modern manufacturing concepts so that they can effectively be competitive in the industry;
b) Improving the implementation of Vocational High School curriculum that focuses on the concept of modern manufacturing;
c) Showing feasible solutions to the technological dynamics of integrated business;

d) Receive the transfer of technology and information from the pair industry, especially on the activities of students and teachers while learning.

The learning stage teaching factory can use PBET / PBT syntax or can also use the syntax applied at Cal Poly - San Luis Obispo USA with steps adapted to competency expertise mentioned by Alptekin et al. (2001):

1) Designing products
   At this stage, students develop new products/recipe inventions or consumer goods products/ design contemporary shows by drawing/making script/designing on the computer or manual with data specifications.
2) Making prototypes
   Making new products /creations/testers as prototypes according to data specifications.
3) Validating and verifying prototypes
   Students validate and verify the dimensions of the specification data from the prototype/ new creation/tester that is made to get approval to be produced/staged.
4) Making mass products
   Students develop a schedule and number of products/performances by the specified time.

Based on the results of research conducted by Dadang Hidayat (2011), the learning steps of the Teaching Factory were developed as follows:

a) Receiving orders
   In this learning step students act as recipients of the order and communicate with the order giver relating to the order/service desired. Effective and polite communication takes place and records the wishes/complaints of the order giver for example: at the repair shop Smart Phone or hotel room reservation.
b) Analyzing orders
   Students act as technicians to analyze orders giving orders both related to product/service objects in connection with detailed drawings, specifications, materials, work time, and prices under the supervision of teachers who act as supervisors.
c) Stating Readiness Orders
   Students express their readiness to do work based on the results of the analysis and their competencies to foster motivation and responsibility.
d) Ordering
   Carry out work according to the demands of work specifications that have been generated from the order analysis process. Students as workers must obey prescribed work procedures. He must comply with work safety and work steps seriously to produce workpieces that conform to the specifications specified by the customer.
e) Evaluate the product
   Conduct an assessment of the workpiece/service by comparing the parameters of the workpiece/service produced with the data parameters on the order specifications or specifications in the service manual.
f) Submitting orders
   Students submit orders both workpieces/services after making sure all the requirements for order specifications have been fulfilled so that productive communication occurs with the customer. (extracted from the 2013 Vocational School Refreshing Material in 2017)

Public Policy And Education Policy

Policies made by the government of a country are public policies because they will have an impact on the lives of citizens in the country. Therefore a policy made by a government should not be detrimental to its citizens, meaning that every policy determined should be in favor of the citizens. But it cannot be denied that every policy made by the government is a result of a response to something that is influenced by various things such as pressure from a group of people who influence the government, can or indeed want from the ruling group in a government itself.

Research Method

Data Source

The study was conducted in 11 public vocational schools throughout Bekasi, held in May to July. Participant of this research is entrepreneurship subject teachers chosen with convenience sampling technique.

Data Collection Technique

Data collection will use the following techniques:

1. Interview: data collection will be done through in-depth interviews intended to obtain qualitative data as well as information from informants.
2. Questionnaire: to obtain valid or accurate data beyond observation, data collection will be done through questionnaires to understand opinions and gather information. The questionnaire was made based on the CIPP concept, The questionnaire explores in-depth information about the content, input, process, and product of implementation of the teaching factory.

Result And Discussion

The results of this research take precedence by describing the answers to the questionnaire as outlined in the form of pie charts for each item in question. Items asked include routine questions covering 4 important aspects in evaluating a program starting from Context - Input - Process - Product. The data we can describe empirical data obtained from the sample are entrepreneurship subject teachers in vocational highschool in Bekasi City totaling 11 schools. The data is following the TEFA 6 M (teaching factory) program evaluation indicators. We also conducted interviews with resource persons namely: headmaster, MGMP (*Musyawarah Guru Mata Pelajaran*) or entrepreneurship teacher working group chairman and several teachers who teach entrepreneurship subject about how teachers implement TEFA 6 M (teaching factory) at school, obstacles encountered, school readiness, supporting facilities provided by the government and solutions in implementing TEFA 6 M to develop the concept of entrepreneurship learning based on output or products, where it is hoped that in the future vocational graduates will not flock to find work but be able to open businesses and create their jobs. The result of the questionnaire analysis are explained below:

Table 1: Questionnaire Analysis Result

No.	Statement	Scale (in percent)				
		Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
The extent of the development of TEFA 6 M in its implementation						
1.	The government precisely deliver TEFA 6 M to Vocational High School	39	48	4	9	0
2.	The government has made the program TEFA 6 M with clear objectives appropriate age development	14	73	0	9	4
Facilities and infrastructure that support the implementation of TEFA 6M						
3.	The government has prepared competencies of teachers to be able to implement TEFA 6 M is well in school.	34	14	29	14	5
4.	The government has provided the budget needed to realize the TEFA 6 M program in schools	5	25	60	5	5

5.	The government has prepared all procedures well for the success of TEFA 6 M	5	55	25	10	5
6.	The government has provided a clear market for absorbing products from the TEFA 6 M	5	35	45	10	5
7.	The government has prepared schools to realize TEFA 6 M	9	41	36	5	9
Products that support the TEFA 6M program						
8.	Aspects within schools supporting the implementation of TEFA 6 M	9	55	27	4	5
9.	TEFA 6 M can be a good program to establish student entrepreneurial spirit	62	33	5	0	0
10.	TEFA 6 M program can be a solution for absorbing many unemployed graduates of vocational high school	55	45	0	0	0
11.	Students can carry out the TEFA 6 M program well	23	45	27	0	0
12.	The TEFA 6 M program is beneficial for Vocational high school students	64	36	0	0	0

From the data above it can be concluded that regarding the extent of the development of TEFA 6 M in its implementation, 48 percent of the teachers agree with the TEFA 6 M program provided by the government in vocational high schools, 39 percent strongly agree with this program because it helps vocational schools develop creativity and immediately feel entrepreneurial activities to the end so that it is felt the program is right to do in vocational high schools, 4 percent doubt, 9 percent 9 disagree.

14 percent of teachers strongly agreed that the government had made supporting facilities for the implementation of the 6 M TEFA in schools, 33 percent agreed, 38 percent were doubtful because there were still some schools that did not get supporting facilities by 10 percent disagreed and 5 percent strongly disagreed.

14 percent of teachers strongly agreed with the government to make infrastructure that supports TEFA 6M in schools, 29 percent agreed, 43 percent were doubtful because not all schools received supporting infrastructure, 9 percent disagreed and 5 percent strongly disagreed. From this, it follows that the supporting infrastructure provided by the government to support the implementation of TEFA 6 M has not been evenly distributed throughout the school.

From the data above, it was concluded that 9 percent of teachers strongly agreed that the government had made facilities that were in line with the needs for the implementation of the 6 M TEFA in schools, 27 percent agreed, 46 percent were hesitant because schools had not yet fully obtained the facilities following the 6 M TEFA implementation needs, 9 percent did not agree, and 9 percent strongly disagree. From the above statement, we conclude that indeed the infrastructure supporting the implementation of the 6FA TEFA program has not been fully provided by the government following the needs of the school.

5 percent of teachers strongly agree, 30 percent agree, 50 percent doubt because not every school has the infrastructure that meets the needs for the implementation of TEFA 6 M, 5 percent disagrees, and 10 percent strongly disagrees. Based on the results of the respondents' answers, we know that most of the facilities and infrastructure made by the government are not following the needs of schools to implement the program.

Also, regarding Facilities and infrastructure that support the implementation of TEFA 6M, it can be concluded that 38 percent of teachers strongly agree that the government has prepared teacher competencies to be able to implement TE 6 M well in schools, 14 percent agree, 29 percent doubt, 14 percent disagree and 5 percent strongly disagree. If we make a mapping based on the answers of the

respondents then we can conclude that the government has made preparations for the competence of teachers in vocational high schools related to the implementation of TEFA 6 M by 52 percent.

5 percent of teachers strongly agreed, 25 percent agreed, 60 percent of teachers were doubtful because they did not know about the government providing a budget for the need to realize the 6 M TEFA program, 5 percent disagreed, and 5 percent strongly disagreed. Regarding the budget, very few agreed and strongly agreed that the government had provided a special budget.

5 percent of teachers strongly agreed, 55 percent agreed with the government to prepare all procedures well for the success of TEFA 6 M, but cooperation with emotion had to be increased, 25 percent doubt, 10 percent disagree and 5 percent strongly disagree.

5 percent of teachers strongly agreed, 35 percent of teachers agreed that the market was available to absorb products from the TEFA 6M program, 45 percent of teachers were very doubtful because there were no facilities to accommodate products to the target market, 10 percent disagreed, and 5 percent strongly disagree. The conclusion from the evaluation above we can know that there are greater doubt and disagreement that the market can absorb the TEFA program made by the government.

9 percent of teachers strongly agreed, 41 percent of teachers agreed that the government had prepared schools to realize 6M TEFA, 36 percent of teachers were doubtful because only a part of the existing schools had been prepared to realize 6M tefas, 5 percent did not agree, 9 percent strongly disagree. There seems to be a balanced number of people who agree with and strongly agree that the government has made good preparations for schools to realize the TEFA program and half of them have doubts and disagreements.

Lastly, regarding products that support the TEFA 6M program, 9 percent of teachers strongly agree, 55 percent of teachers agree that all aspects of the school support the implementation of the 6FA TEFA, 27 percent of teachers hesitate because there are many aspects such as leadership, whooping, TU staff get the same understanding, 4 percent disagree, and 5 percent strongly disagree. From this, we can know that more people agree and agree strongly compared to those who are hesitant and disagreeing about schools that have prepared all aspects for the readiness to implement the TEFA program.

62 percent of teachers strongly agree with the existence of the 6FA TEFA program which can be a good program to shape the entrepreneurial spirit of students, 33 percent agree, and the remaining 5 percent of teachers doubt. If we refer to the answers above, we will find that the school, in this case, the teacher very significantly agrees that the TEFA (Teaching Factory) program is a program that can form a good entrepreneurial spirit in students in the school.

55 percent of teachers strongly agree that the TEFA 6M program can be a solution for absorbing many unemployed SMK graduates and the remaining 45 percent agree. All teachers stated strongly agree and agree if the TEFA (Teaching Factory) program can help be one way to alleviate unemployment.

23 percent of teachers strongly agreed, 45 percent of teachers agreed with this program students were able to carry out the TEFA 6M program well, 27 percent of teachers were doubtful because they needed to work hard to realize it, and the remaining 5 percent strongly disagreed. From the results of this questionnaire, we can know that the teacher's opinion is very significant about the ability of students to carry out the TEFA (teaching factory) program.

64 percent of teachers strongly agree that the TEFA 6M program is beneficial for vocational students and the remaining 36 percent agree. 100 percent of teachers agree that this TEFA (Teaching Factory) program is useful for students.

From the results of interviews that have been done before, we find that 95 percent of entrepreneurship teachers answer that there are many advantages gained from the TEFA 6 M program because they

can hone vocational students' abilities and are better prepared to go straight into the world of work, 5 percent say no because they do not know this.

95 percent of teachers answered that if the TEFA 6M program was realized well it would overcome unemployment for Vocational High School graduates because Vocational High School students would be better prepared with the provisions obtained at school through this program, 5 percent of teachers answered no because not all Vocational High School graduates had an entrepreneurial spirit.

Entrepreneurship teachers also answered that they had to involve more relevant agencies to improve the implementation of the 6FA TEFA program, there was socialization to all aspects of the school not only entrepreneurship teachers, then the school also had to support the facilities and infrastructure for the implementation of the 6FA TEFA program, the existence of financial assistance to implement the program.

The government prepares more budget for Entrepreneurship Subjects, more prepares things needed to support the needs of vocational students to be ready to work and entrepreneurship such as facilities and infrastructure, the existence of socialization to students to have an entrepreneurial spirit and deal with competitors.

Conclusion and Recommendation

If we refer to the context as the first rule that we value from the evaluation of the TEFA (teaching factory) program, we get significant results answered by respondents in the statement that TEFA (teaching Factory) has been appropriately given to vocational high schools and this program is appropriate with an age requirement of 87%.

In the second item, we examine the inputs there, we can find out that respondents thought the highest opinion regarding the most suitable infrastructure facilities given by the government to schools was 80%.

After we find out about the next input we look for data about the process, in the product questionnaire we find that the procedure given by the government regarding the implementation of TEFA (teaching Factory) is given the highest value which is 80% while for the lowest items given answers by respondents is about competence the teacher is only 62%.

The product was the last thing we evaluated in the TEFA (teaching factory) program where we got the highest answer for the statement that the TEFA (teaching factory) program was able to permeate the market which was declared 100% strongly agree and agreed by the teachers and the lowest was about aspects of school readiness to realize this TEFA program that is equal to 64%.

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Optimizing Control of the Production Process Through the Implementation of Scada System

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Abstract

Managing a company nowadays is a very complicated process. In order to have a complete picture of what is happening in the company, especially in production processes, monitoring systems such as SCADA are used. A system of this kind is an integral part of a complex IT system, which makes it possible to obtain valuable information about the production process. An optimizing of production process course has a fundamental meaning for proper enterprise functioning. The most practical and the most effective way of production process course controlling is a visualization of an actual process state. A visualization of production process gives a possibility for quick insight to a real state of production machines and allows controlling and steering of manufacturing process. Current article presents an optimizing of a production process course controlling in a chosen enterprise by implementation of a SCADA type system, moreover it points essential benefits caused by the SCADA system employment.

Keywords: Management, Optimization, Production Process, Company, Visualization, SCADA System

Introduction

This section should follow keywords. This section should provide background of the study and highlight research motivation A huge competition and dynamically changing market requirements, impose to enterprises application of more and more modern, safe and dependable systems of production process realization. Progressively wider application in automating of industrial processes, currently gain scattered steering and visualization processes which are labelled SCADA systems (Supervisory Control And Data Acquisition). It finds application on many fields of industry and infrastructure, ensuring a technological and production processes safety.

One of the most important feature of modern SCADA systems is theirs scalability, what means a possibility of theirs development. SCADA systems may process hundreds or even thousands of inputed variables, depending on complexity and on particular technology scope, together with development needs of a particular enterprise. The systems allow for cooperation with PLC drivers (Programmable Logic Controller) and another devices e.g. microprocessor regulators. Due to a scalability, SCADA systems can be used by small as well as by huge enterprises.

Today modern visualization and steering systems, allow for managing and controlling of all processes which take place in an enterprise, in real time. They allow also for steering of machines and devices work, for supervising of production processes and for managing of various technological

installations work. Currently SCADA systems are a basis of a modern industry and they pose a crucial solution for present enterprises.

The aim of this article is to present an optimizing of production process course controlling, in a chosen enterprise, through the implement of a SCADA system, with consideration of significant benefits resulted from SCADA system application.

Production Process Optimizing

Adjustment of enterprises to the variable market conditions is a supremely difficult and laborious task. Contemporary production processes, which employ modern technologies, becoming more and more complex. The main aim of production process optimizing is to achieve an efficiency increase, make a time of production shorter and to decrease its costs. The optimizing of production process is nowadays a necessity, because technological processes which take place at enterprises, need an effective managing. Complexity of production route steering systems, entails a necessity to assure a quick and simultaneously assured informations exchange, between machines and an operator, in real time, with possibly simple and understandable way for him.

The production process optimizing wield an essential influence for whole enterprise functioning and it determines achievement of a number of profits. Due to an optimizing of production processes, enterprises can increase their capability and decrease a cost effectiveness, which have crucial meaning on a competitive market.

SCADA System

SCADA systems are the automation systems that are used to monitoring of the course of technological process. SCADA system gathers information from individual machines and devices in real time, and then visualizes these informations. SCADA provides discreet control and supervision of production processes at a high level [Wu J., Cheng Y., Schulz N.N., 2006]. SCADA is widely used in large and medium-sized systems, so there are many types of SCADA software systems [Morsi I., El Deeb M., El Zawawi A., 2009]. Modern SCADA type software allows for full visualization of processes stage [Kaliczyńska M., 2016].

The most important elements, without which the SCADA system can't exist, are data sources and a technology of data acquisition. This operation can be done in several ways, beginning with the most popular, the fastest and the most confident data read-out from PLC drivers (Programmable Logic Controller) or directly from intelligent sensors (direct communication) and finishing with supplying to the SCADA system data, which were previously gathered e.g. in databases or even in individual files. The most often a direct read-out is used, with use of various types of media and data transfer protocols.

A number of SCADA systems offer a pool of communicative drivers which include the most popular protocols e.g. Modbus RTU, Modbus TCP, Profibus DP, MPI, Data Highway, SNP. It makes an opportunity to use the SCADA system practically to any automated technological process [http://systemy-sterowania.pl/informatyka-przemyslowa/].

The analysed enterprise and its functional problems

The analysed manufacturing and service company began in 1991, actually it employs 158 people. The company specializes in tools production, products, half-products and elements made of metal and it provide service of metal working. Production process in the analysing enterprise is running in a mechanized and automatized way. Modern machines and devices, as an integrated production lines, are a strong supply base of the company. Employees tasks are limited to the efficient service of machines and devices and to controlling of its working. Products offered by the company are

characterized as high quality and lasting products. The company continuously actualizes and extend its offer to face up to growing market requirements and it customizes to clients demands artfully. Due to a modern machines park the company readily cooperates also in range of details made of metal production. Confirmation of a high quality of fabricate articles is the ISO 9001:2015 quality certificate achieved.

In spite of long-standing presence on a market, the enterprise was facing with some problems in area of production process steering system in real time, which used PLC drivers. Next problem was a correct, upright and fast flow of the key informations from technological lines of production department, which was conducting directly by machines and devices. Next problem was assuming some difficulties with determining of a production process parameters and an efficiency of machines and devices exploitation, stoppages and failures history.

By analysing of an exemplary workplace, a big problem was a diagnostics of an arose failure, during automated welding process, which was supervising by a PLC driver. In the process, beginning of welding was following only after correct set up of required details and after locking of right actuators. Otherwise, a welding robot was not starting the welding. Because of specific conditions of a welding process, very often the presence sensors (so-called limiting switches) which are used for components presence detecting, were suffering damages. Due to this fact, a welding robot was not receiving an agreement for welding process beginning. Diagnostics of this kind of failures was only possible with use of a special computer (SIMATIC Field PG). The diagnostics could only led an automation specialist. Moreover, the company was employing only one automation specialist, thereby a process of failure removal or restoring of technical output of machines and devices was very time-absorbing. Exemplary picture of a welding table is shown on figure 1.

Fig 1. A welding table during an automatised welding process.

After an accomplishment of functional problem analysis of the company, an improvement of production process route controlling via implementation of a SCADA type system with accommodated diagnostic functions, has been proposed. The company has analysed this proposal and decided to introduce suggested system of SCADA class, adequate for company requirements.

Implementation of a SCADA system

The main challenge for the company was efficient and effective implementation of SCADA class system. After thorough analysis of potential suppliers of SCADA class software, the company

decided to implement the mySACADA system. The choice was imposed by the fact that mySCADA system distinguishes from competitive systems with wide scope of application possibilities.

Operation of the mySCADA system is very intuitive and close to WinCC operating. Furthermore the mySCADA system is much less expensive than WinCC, it has lesser hardware requirements and it is available for many operational systems as Linux, Windows, Android, Mac OS. The mySCADA system with connection through a WWW browser, represent a JAVA application, that is to say any calculations are performing form a client side – it makes a fundamental supremacy (in the mySCADA – with much weaker hardware server configuration much greater efficiency can be achieved. The mySCADA software allows to data exchange statistics preview in real mode, a graphical presentation of change of a variable value in time, visualization of current data and archival data (so-called trends), furthermore the system allows to identify critical values of monitored variables [Rut J., Bartoszuk M., 2016].

Implementation beginning of the mySCADA system to the analysing company took place in November 2015. The mySCADA system has been implemented to four workplaces, responsible for technological process supervising. A server of the mySCADA system has been realised on a computer of PC class, which was working under control of the Linux Debian operating system. This decision was made due to the fact that Linux operating system has a good stability and technical support. Moreover the system work in console mode to reach better server efficiency.

The mySCADA system is accessible through a WWW browser (from any PC class computer, tablet, smartphone or even TV of SMART TV type) after log in to the departmental WIFI network. Additionally there were client workstations applied which allows for interaction of user with the system, visualization of the process, process steering, incidents review, replies for alerts or tracing of reports. For realisation of this task, industrial console computers has been used, which were installed at each machine in production line. Client workstations display actual production data and allow for standpoint diagnostics.

Implementation of the mySCADA system encompassed inter alia:

- precise analysis performance of process data and determination of data displayed on screens,
- PLC drivers verification – compatibility with the mySCADA system,
- formation of a uniform LAN network – PLC drivers, which were not connected so far to the LAN network and which were using the Profibus bus, has been connected with use of Profibus adapters to Ethernet,
- verification of communication from PLC to computer and from computer to PLC,
- determination of variables which will be accessible to edition from mySCADA system level and determination of variables which should be archived,
- archiving of a process data and of steering commands which are transmitting to machines and devices,
- creation of graphical panel for diagnostics of particular standpoints,
- creation of graphical panel for particular standpoint work parameters monitoring,
- adjustment of the system (system actualization) – implementation of new functions and their integration with the actually existing,
- tests of system working – initial monitoring and production line work controlling and automatic informations generating,
- training of authorised employees in scope of appropriate (correct) using of system (machines operators, maintenance department employees, electricians, process engineers, managers).

It is necessary to make an appoint that in initial stage of mySCADA system implementation in the company, tests of particular unit modules had been made.

Process of the mySCADA system implemetation in the company lasted 5 months and it finished successfully in March 2016. Implementation of the mySCADA system transpired as a very complex

and complicated process, because obligatorily the system had to guarantee great reliability. Implementation of the mySCADA system dissolved appearing functional problems in the company, what made way for immediate information flow from technological lines, it enabled operational technical state controlling of machines and devices and it allowed for graphical visualization of production process steering in real time. Furthermore the mySCADA system largely contributed to increasing of production process realization degree through correct setting of production process parameters and its analysis and also through a complex gathering, archiving, processing and using of production data. Exemplary screenshots, showing graphical interface (HMI) of the implemented mySCADA system in the company are shown on figure 2 and figure 3.

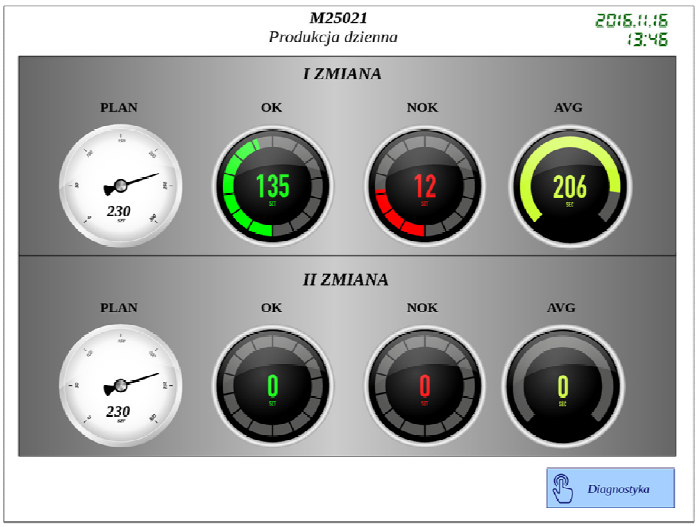

Fig. 2: System mySCADA – produkcji dzienna, w trybie zmianowym dziennym (daily production in daily shift mode (I Zmiana – I Shift, II Zmiana – II Shift, Plan, OK, NOK – Not OK, AVG – The average production time of one piece).

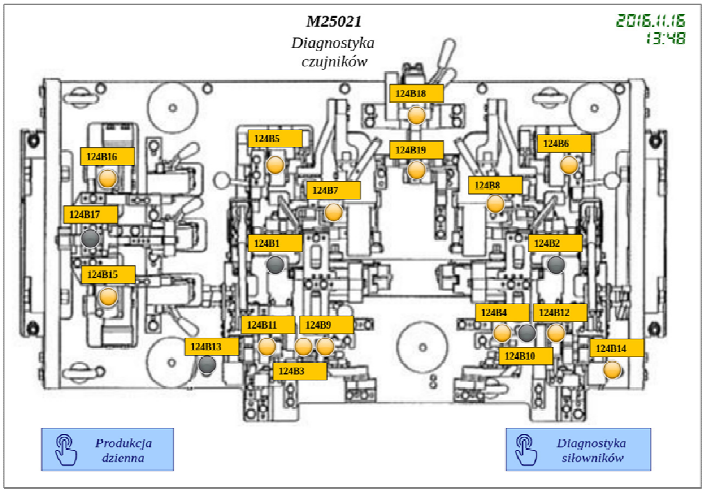

Fig. 3: The mySCADA system – sensor diagnostics in production process.

Due to the implemented mySCADA system, in the production enterprise, an efficiency of machines and devices exploitation had grown, through an elimination of loses connected with their working.

The mySCADA system has improved also a diagnostics through an easier failures and defects detecting and quick alerting and incidents registration.

Essential benefits emerging from SCADA system implementation in the analysed enterprise

By the analysis of acquired and rational benefits, emerging from the mySCADA system implementation to the analysed enterprise within 8 months (from April 2016 to November 2016), it has been noticed that in spite of an initial scepticism, the engineers very willingly use the mySCADA system as a tool for collecting of production process informations and for monitoring of status of particular production stages in real time and also as a tool for archival data obtaining. Furthermore, increase of an efficiency and production flexibility, increase of a devices and machines technical state controlling and increase of an efficacy of machines park use, had been noticed.

Implementation of the mySCADA system allowed for a running data and historical data (trends) presentation, allowed for reporting (daily and periodic), for generating of announcements (informational, warning and alerting), allowed for data exchanging with another applications (e.g. spreadsheets and data basis) and for reliable data archiving. Subsequent benefits are cyclical processing of process variables, possibility to quick decision making which are simultaneously more accurate in the context of arose incidents during production and an optimizing of production costs.

Applying of an expanded diagnostics functions and its visualization, caused significant easier a faster failures diagnostics, which can be now done by an electrician or even a brigadier (after previous training carried by a maintenance department). Due to this fact a time of standstills (waste time) had been decreased and an effectiveness of production line use had grown (OEE rate growth).

Summarize, application of the mySCADA system to the analysed enterprise introduced a lot of benefits, improving significantly working of all the company. Obtained in this way possibility of visualization of production process course, allowed for insight and controlling over a production process and gave an actual knowledge of its efficiency.

Conclusions

The aim of this report was to represent of optimizing of production process course controlling in a chosen enterprise through the implement of a SCADA type system, with consideration of significant benefits resulted from SCADA system application. Implementation of the SCADA system in the analysed enterprise, dissolved many of appearing functional problems and it allowed to obtain clear visualization of production process and of machines and devices state.

The implemented mySCADA system allowed for running controlling and for analysing of production process and it contributed to optimal using of production line capability through increasing of its efficiency. Furthermore the mySCADA system implementation largely contributed to improvement of a quality of generating documentation of production process course and to presentation of data from wide scope of steering devices (PLC, regulators, intelligent scanners). The mySCADA system transpired to be very helpful for tracing and recording of incidents (failures) and allowed for quick alerting of important process incidents in production line.

To sum up, after the analysis carried out of the implemented mySCADA system used in the analysed enterprise (during 8 months), it should be objectively stated that the mySCADA system transpired to be very relevant solution. Implementation of the mySCADA system contributed to obtain many significant benefits and to work out improvements in production operations area. Due to the system implementation the enterprise achieved an improvement with integration and exchanging of a data with another applications/devices and it achieved a possibility to analysing production process parameters comprehensively.

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Environmental Factors and Academic Performance in Selected Public Secondary Schools in Anambra State, Nigeria

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Abstract

Declining academic performance among students has remained a recurring irritant in Nigeria's educational system, in spite of all efforts of government and major stakeholders to change the narrative in the education sector. Since all teaching and learning activities take place within an environment, it is expected that the outcome of the education process correlates significantly with the teaching-learning environment. Following the method of survey design, this research identifies environmental factors that influence learning outcomes based on a sample of 622 respondents from public secondary schools in Anambra State. Multi-stage sampling technique is used in the sample selection, first to choose two senior secondary schools from each of three senatorial zones of the state. A second sample made up of 520 students and 102 academic instructors was drawn on proportionate basis from the previously selected sample of six senior secondary schools. The method of analysis is largely descriptive. The study presents robust evidence that students' family background, proximity of home to school, level of training/professionalism attained by teachers, as well as school structure greatly determine how students perform in these institutions and thereby concludes that environmental factors play significant roles in the promotion of high educational achievement among students at the senior secondary level.

Keywords: Environmental factors, Academic performance, Public school system, Senior secondary education

Introduction

Education is the process through which a society perpetuates itself. Education offers a platform for society to transmit its stock of knowledge, values and skills to future generations. It is a basic tool for development and empowerment. Basically, education aims at promoting understanding and judgement, and enabling action. It equips the individual for decisions that improve the quality of life (George, Okoye, Efobi and Modebe, 2017); it also promotes literacy and awareness, and confers responsibility to make decisions that guarantee better life for individuals in particular and the economy in general (Okoye, Omankhanlen, Okoye, Urhie, Okoh and Ezeji, 2019)

At the early days of education, the primary goal was to educate the child, no matter the environment (Wagner, 2017). This goal derives from the philosophy that something was better than nothing, which implies that any learning environment was better than no learning environment. As learning cannot take place in vacuum, any available environment was acceptable. However, with the growth in literacy rates across the globe over the years, there has been a paradigm shift by educational administrators to improvement in the quality of education, with great attention attached to the environment of education.

The environment is critical to the development of individuals in the society. In the school system, for instance, environment determines whether a child will be happy and ready to learn or become a deviant. The physical, social and psychological or emotional environments must be such that every aspect of human behaviour is warmly accommodated. Education is an important industry for social, political and economic development and it is affected by the environment within which it is conducted (Adediran, Ojomo & Adeyanju, 2015). The physical environment can determine the comfort of students and thereby their learning ability (Falsario, Muyong and Neuvaespana, 2014). When students are uncomfortable, they are easily distracted and are not likely to learn faster than their peers whose environments are quite comfortable.

Wagner (2017) posits that students' behaviour towards academic performance can be influenced through provision of an environment that balances and controls stimulants to the five human sensory organs: sight (what learners see), hearing (do they hear their teacher or noise from outside?), touch (is the temperature too hot or too cold?), smell (does the scent from deodorant or cleaning liquid support or disrupt learning?), and taste (there should be provision for food and drinks because hunger can disrupt learning). Wagner further alludes to substantial evidence that educational objectives like reading comprehension, multiplication and reading speed can be influenced by the study environment.

According to Olufemi, Adediran and Oyediran (2018), students' academic performance is affected by several factors which include students' learning skills, school environment, parental background, peer influence, teachers' quality, learning resources and infrastructure, among others. The school environment, for instance, supports the acquisition of academic knowledge. School environment refers to the quality and characteristics of school life, both social and physical aspects of the school, which can positively promote behaviour, school achievement, and the social and emotional development of students. Proximity, accessibility and the serene nature of the school environment of a school can encourage learning. Kenzo (2014) asserts that some researchers have studied the mechanisms by which school accessibility could affect test scores and found a positive correlation. UNESCO (2001) posits that the Nigerian child is a product of several environments, all of which contribute to his development and learning process. A child comes from a home, attends a school, lives in a community and belongs to a larger society (town, state, or a country).

Academic performance refers to the rate at which educational objectives are being achieved by those within the school system (Owan, 2012). This implies that students' academic performance measures the extent to which students' are achieving desired educational goals and objectives. According to Erum and Zahoor (2011), students' academic performance and graduation rates have been an area of concern, and investigation of factors relating to academic performance of secondary students has been a topic of much interest to scholars. This scenario may arise because since schools were established for the students, their performance can be used to judge the effectiveness of school system.

Statement of Problem

Poor academic performance has remained a recurring irritant in Nigeria's educational system, in spite of conscious efforts of governments at all levels to change the narrative in the education sector (Egunsola, 2014). There are many factors which may affect the educational performance of the learners. These can be categorized into teacher-related, school-related and home-related factors (Fajar, Hussain, Sarwar, Afzal and Gilani, 2019). There are also society-induced causations.

Poor sanitation and hygiene conditions can also be injurious to infants and children, particularly of school age, and thereby hamper performance. Bouya et al., (2010), for example, explain that illness caused by poor hygiene practices of students, such as failure to wash hands before eating, not washing oneself properly after using the toilet and not washing one's undies regularly may negatively affect students' cognition and performance at school.

Abdulmalik (2013) contends that inadequate attention to children's academic work by parents and guardians as well as having the dual activity of teaching and learning in poor school environments contribute to poor academic performance of students. Different scholars have investigated the sources of poor academic performance among students across different jurisdictions, but not many of the studies have been conducted in sub-Saharan African countries. It therefore remains unclear how the findings of these studies apply to sub-Saharan Africa. Based on a survey of selected public secondary schools in Anambra State, this study investigates how the academic performance of students at the senior secondary level is determined by environmental factors.

Research Statements

The study seeks to ascertain the validity of the following research statements:

i. Educational accomplishment of students in government-owned senior secondary schools is affected by the social and economic status of their parents (family background).
ii. Proximity of students of government-owned senior secondary schools to their school determines how they perform in their academics.
iii. Deployment of professionally qualified teachers to government-owned senior secondary schools promotes students' educational achievement.
iv. Academic performance of senior secondary students in government schools is strongly linked to quality and adequacy of school structure

Theoretical Foundation of the Study: Triarchic Theory of Intellectual Abilities

The triarchic theory of intellectual ability provides the necessary framework for this research. The theory which was postulated by Robert Sternberg in the 1980s (Sternberg, 1985) explains human intelligence in terms of distinct components: Analytical or Componential, Creative or Experiential and Practical or Contextual intelligence. Sternberg explains intelligence in the context of one's ability to succeed in life based on his personal standards. He contends that success is achieved when one is able to maximize his strength, while compensating for his weakness. Within the context of the theory, individuals achieve success when they are able to balance their analytical, creative and practical abilities in order to adapt to, shape, and select environments.

Review of Related Literature

Conceptual Review

Academic Achievement

Okoro and Ibebuike (2013) define academic achievement as the learning outcomes of the child. It refers to an outcome with common specifications, with students achieving results corresponding to previously determined success criteria, such as teaching aims. It is often discussed in relation to teaching aims (Kapsalis & Haniotakis, 2011). Academic performance measures the extent to which

educational goals is realized (Obeta, 2014). Common measures of academic performance include examinations or continuous assessment (Bossaert, Doumen, Bogse and Verschuereme, 2011). In Nigeria, such examinations include standardized (external) examinations like the West African Examinations Council (WAEC), National Examinations Council (NECO) and the Joint Admissions and Matriculation Board (JAMB) examinations. Academic performance can be affected by teacher-related, student-related, and/or school-related factors. It could also be influenced by instructional processes and socio-economic factors.

School Environment

The school offers an environment for formal education whereby learners learns and instructional materials and facilities to get socialized and equipped to confront societal challenges. It encompasses all conditions and controls in the school which determine educational achievement of students, like buildings, laboratory and library facilities, academic instructors, furniture, administrative staff, healthy teacher-pupil rapport and school location, among others (Ajayi, 2007). School policies are also important considerations. Ajayi and Ashaolu (2005) opined that improvements in physical facilities greatly affect students' academic achievement. The physical environment of a school creates an image which enables the public decide whether or not to associate with it (Mgbodile, 2004).

Family background/status

The family is the primary social unit of the society. It is the basic social environment of a child, and can define the character or personality of the child. Clifford (1998) asserts that family environment has immense potential to influence the intellectual capacity of the child. Anene (2005) describes home or family environment as the foundation from which children grow to become full and successful members of the society. The family offers love, security, encouragement, simulation and opportunities that prepare and enable children to realize their potentials in full. Learner-friendly home environment provides children with relevant social interaction, attention, and activities that enhance development of positive attributes and enables the acquisition of physical, emotional, social, intellectual, and language skills (Nanalee, 1977). As the immediate condition and the immediate socio-psychological surrounding in which an individual develops, the home environment also influences academic performance of the students (Enoh, Bamaja, and Onwuka, 2007).

Amadi and Segun (2018) situate family social standing as a major variable influencing the educational accomplishment of students in schools. Also, Hill (2004) posits that the socio-economic status of parents significantly contributes children's academic performance. Educational attainment of parents, motivation and income level are common measures of family social status.

Parents play considerable roles in shaping the lifestyle and behaviours of the younger generations by virtue of their privileged position at homes and from their vast experience in social issues, (Machebe and Ifelunmi, 2014). As the primary educators of children, parents provide them with physical, emotional and mental framework for learning (Ryan and Adams, 2000). By their actions, parents mold and shape moral character of their children and influence the career path of their children pursue in life (Li, Lerner and Lerner, 2010). They tend to modify the behavior, taste and preferences of their children.

Teacher's professionalism/quality

Evans (2006) defines teachers' professionalism as net growth in intellectual aptitude and skills as measured by the students' academic performance. Professionally qualified teachers manifest intellectual, social and emotional stability, display love for students, demonstrate ability to inspire students and show positive attitude towards the teaching profession. Poor academic performance among students often derives from a number of variables such as high teacher-student ratio, dearth of qualified and experienced teachers, low standard of leadership in educational institutions, unstable political environment, political influence on educational programmes, non-conducive teaching and learning environment and inadequate educational facilities (Evans, 2006; Ewetan, 2010).

Trained teachers engage a variety of instructional methods, experiences, assignments and materials to facilitate attainment of learning objectives. Qualified teachers are required to produce high quality

and productive students who can live fulfilled lives and contribute to societal development. These are teachers who have obtained relevant minimum level of training in education (Olaniyonu, 2008).

Empirical Review

Imeokparia (2018) examined how environmental factors correlate with academic performance in Edo State using a sample of 2,374 junior secondary (JS) Business Studies students and 65 teachers of the subject. The study did not show that location and school-type correlate strongly with academic performance. However, there is evidence of substantial connection between educational facilities and the performance of students. Gilavand (2016) investigated how the learning environment influences learning outcomes of students by analyzing data gathered from literature survey on the subject. Based on critical analysis of thirty-nine (39) published articles, selected on the advice of medical education experts, the result indicates that noise retards academic achievement while appropriate painting, lighting of educational environment, and open spaces in schools enhance learning outcomes.

Obeta (2014) examined how selected home environmental factors affect the educational performance of secondary school students in Abia Sate, Nigeria by conducting a survey of 200 respondents selected from a random sample of students at the junior and senior secondary levels, and their parents. The study reveals that lack of adequate educational materials at home and poor attitude of parents to the educational activities of their children, in addition to social and economic status of parents substantially affect the academic performance of students. The work of Joseph, Yeboah-Appiagyei and Fentim (2014) focused on identifying environmental factors that affect the performance of senior high financial accounting students in the Tamale metropolis of Northern Ghana. Based on data obtained from 260 students and 29 teachers drawn from 7 senior high schools, the authors observe that instructional materials and provision of residential facilities lead to improvement in students' academic performance.

Nwobodo and Agusiobo (2017) investigated the connection between academic adjustment of secondary school students in Enugu State and the environment of the school. Data obtained from the survey were analyzed using the method of means, standard deviation and Pearson Product Moment Correlation. The result shows strong association between the environment of the school and students' educational adjustment. It further indicates that location of the school is closely related to students' academic adjustment. However, it did not show significant relationship between gender and academic adjustment.

Kalagbor (2016) examined factors that enhance students' academic performance in public and private secondary schools in Rivers State-Nigeria. The data was analyzed using simple descriptive analytical methods: frequency counts, percentage and mean. The result indicates that academic performance in private secondary schools is better enhanced by most of the items analyzed in the study than in public secondary schools. These items include home background, teacher-student relationship, teacher's supervision, effective use of teaching time, and teacher-student ratio. However, academic performance in public secondary schools is better enhanced by the quality of teachers than in the private secondary schools.

Fajar, Hussain, Sarwar, Afzal and Gilani (2019) conducted a cross-sectional study of undergraduate nursing students to determine factors that determine their academic performance using convenient sampling technique. The authors observe negative correlation between gender of participants and academic performance. They also discover that teacher, school, home and student-related factors also affect students' academic performance.

Igbinoba, and Aigbedion (2015) analyzed the impact of classroom management techniques on students' academic performance in selected junior secondary schools in Abuja Municipal Area Council. Mean and percentages were used to analyze data obtained from a sample of 247 respondents. The finding shows significant positive correlation between classroom management techniques and academic performance in junior secondary schools in the Municipal Area Council.

Using a sample of 350 students selected through multi-stage sampling technique, Igbo and Ihejiene (2014) examined how parenting styles relate to students' abnormal behaviour and educational achievement based on a sample of students from selected secondary schools in Garoua, Northern

Cameroun. The outcome of the analysis of variance (ANOVA) test indicates that styles adopted by parents in the upbringing of children determine their behaviour and academic performance.

Farooq, Chaudhry, Shafiq and Berhanu (2011) investigated factors that affect academic performance using a sample of secondary school students from a metropolitan city of Pakistan. Standard t-test and ANOVA were used to analyze data obtained from the survey. The result indicates that the social and economic standing of parents and their educational attainment have significant effect on students' general educational achievement in addition to their performance in subjects like Mathematics and English. This implies that students from high and average socio-economic families perform better than those from lower class. They also observe that girls perform better than the male students.

Using descriptive and inferential statistics, Olufemi, Adediran and Oyediran (2018) examined the factors affecting students' academic performance in Colleges of Education in southwest, Nigeria. The result indicates that student-related factors, parental background, school factors, and teachers' factors greatly affect academic performance of students.

Umar and Samuel (2019) examined how school facilities and school-type impact students' academic performance using a sample of science students from senior secondary schools in Nasarawa State, Nigeria and discovered that school facilities significantly impact science students' academic performance in urban and rural schools from both the private and public school sector.

Ogoro, Nkwocha and Ogoro (2018) examined the correlation between proximity of students' homes to school and academic performance using a sample of students from selected schools in Obio/Akpor LGA of Rivers State. The finding indicates that pupils' distance to school does not correlate with their academic performance. However, they observe that lateness to school, family background, and family size could substantially determine their academic performance.

Ewetan and Ewetan (2015) investigated the effect of teachers' experience on students' academic performance in Mathematics and English Language based on a sample of public secondary school students in Ado-Odo/Ota and Ifo Local Government Areas of Ogun State. They observe that teachers' teaching experience significantly determine students' performance in Mathematics and English Language. The study specifically shows that schools with more teachers having above 10 years of experience in teaching achieved better results than schools with more teachers having 10 years and less of teaching experience. The authors used respondents' perception of students' performance in the Senior Secondary School Certificate examinations as proxy for academic performance.

Usaini, Abubakar and Bichi (2015) investigated how school environment influence the academic performance of secondary school students in Kuala Terengganu, Malaysia. Based on regression test of observations generated from respondents, the authors show that students with adequate facilities, good teachers and favourable environment perform better than their counterparts with inadequate learning facilities, untrained teachers and unfavourable learning environments.

Using proportionate random sampling method, Barkindo, Shehu and Aliyu (2018) conducted a study on how socio-economic background of parents and their involvement in their children's education correlate with children's performance at school based on a sample of 216 final year students of business education in Adamawa State, Nigeria. The research reveals that while social and economic standing of parents correlates strongly with students' educational achievement, parental involvement in children's educational activities did not substantially correlate with the academic performance of their children.

The above review shows strong correlation between environmental constituents and the educational achievement of students in secondary schools across different jurisdictions, including Nigeria. However, there is no evidence of such study in Anambra State in general and the selected local government areas in particular. In addition, available studies have not considered the nexus between closeness of students to school and their performance in school. This research takes account of the identified gaps.

Methodology

The survey design was used in this research because it offers researchers considerable latitude to administer research instrument (questionnaire) to a sample or to the entire population of people, and based on data generated describe the attitudes, opinions, behaviors, or characteristics of the population. The study covers six senior secondary schools across the three local government areas in Anambra State. Academic performance is proxied as the performance of students in the Senior Secondary School Certificate Examinations (SSCE) organizes by the West African Examination Council (WAEC). Multi-stage sampling technique was used in the sample selection, first to choose two senior secondary schools from each of the local governments. A second sample made up of 520 students and 102 academic instructors was further drawn on proportionate basis from the previously selected sample of six senior secondary schools. The Likert-type questionnaire was used to elicit responses from respondents because it takes account of degrees of opinion respondents hold on particular issues raised. The method of analysis is largely descriptive and evaluation of the research items was based on the method of means. By comparing the mean of data generated from the respondents with the likert mean of 3.00, research items that return of 3.00 and above qualify for acceptance, otherwise they are rejected.

Data Presentation and Analysis

The opinions of respondents harvested from the field survey were collated and presented in frequency tables while statistical analytical tools (mean and standard deviation) were used to analyze the observations and evaluate the research statements.

Table 1: Distribution and Return Rate of the Research Instrument

Questionnaire	Number	Percentage
Distributed	624	100.0%
Returned	578	92.6%
Not Returned	46	7.4%

***Source**: Field Survey (2019)*

From the result in table 1 above, out of 624 copies of questionnaire administered on the selected audience, 578 were correctly filled and returned for analysis. Forty-six (46) copies were either not correctly completed or not returned and were therefore excluded from the study. The return rate of 578, representing 89.1% of the total questionnaire was considered adequate for statistical analysis and generalized conclusion.

Table 2: Educational accomplishment of students in government-owned senior secondary schools is affected by the social and economic status of their parents (family background)

Question Items	SA (%)	A (%)	U (%)	D (%)	SD (%)	Statistics	
						Mean	Std.
Parents on high income are able to provide learner-friendly homes and also send their children to better schools	478 (82.7%)	76 (13.2%)	16 (2.8%)	6 (1.0%)	2 (0.3%)	4.77	0.791
Students from rich families perform better in their academics than their counterparts from poor homes	109 (18.9%)	141 (24.4%)	97 (16.8%)	119 (20.6%)	112 (19.4%)	3.03	0.042

Children of rich parents have higher career aspirations than those from parents with low economic standing	468 (81.0%)	82 (14.2%)	5 (0.9%)	1 (0.2%)	2 (0.3%)	4.65	0.738
Children of parents with high educational standing perform better academically than those from low educational status	346 (59.9%)	138 (23.9%)	76 (13.2%)	10 (1.8%)	8 (1.4%)	4.39	0.621
Children of parents with high social standing perform better in school than those from low social class	104 (18.0%)	128 (22.1%)	103 (17.8%)	117 (20.2%)	126 (21.8%)	2.94	0.027
Cluster Mean	**52.1%**	**19.6%**	**10.3%**	**8.8%**	**6.8%**	**3.95**	**0.444**

Source: Field Survey, 2019

The result presented in table 1 indicates that over 70 per cent of the respondents subscribe to the opinion that family background is an important influence on students' academic performance while 15.6 per cent hold a contrary opinion. On the other hand, 10.3 per cent are undecided on the subject.

From a statistical point of view, the table shows that four family-oriented research items present mean values of 3.00 and above while one presents a lower value. It is important to mention from the observation that social standing of parents may not affect children's academic performance. Overall statistical analysis of the feedback from respondents produced a cluster mean of 3.95 which is greater than the likert mean of 3.00. This result suggests that family background significantly affects the academic performance of students in public secondary schools in the selected areas.

Table 3: Proximity of students of government-owned senior secondary schools to their school determines how they perform in their academics

Question items	SA (%)	A (%)	U (%)	D (%)	SD (%)	Statistics	
						Mean	Std.
Students who live close to school perform better than those who live far from school	218 (37.7%)	126 (21.8%)	28 (4.8%)	101 (17.5 %)	105 (18.2%)	3.43	0.639
Students who live close to school know their teachers better and therefore are favoured during exams	307 (53.1%)	169 (29.2%)	27 (4.7%)	52 (9.0%)	33 (4.8%)	4.20	0.537
Students who live close to school come to school earlier than those living far from the school	452 (78.2%)	93 (16.1%)	18 (3.1%)	9 (1.6%)	6 (1.0%)	4.67	0.747
Students proximity to school amounts to less stress which in turn lead to better academic performance	382 (66.1%)	126 (21.8%)	28 (4.8%)	29 (5.0%)	13 (2.2%)	4.45	0.649

Students who live close to school are given more functions by the school authority which favours them in their academic performance	285 (49.3%)	158 (27.3%)	49 (8.5%)	41 (7.1%)	45 (7.8%)	4.03	0.460
Cluster Mean	**56.9%**	**23.2%**	**5.2%**	**8.0%**	**6.8%**	**4.16**	**0.606**

Source: Field Survey, 2019

Table 3 captures the feedback from respondents in relation to whether students who live close to their school perform better than those that live far away from school. The responses suggest a near total agreement that proximity to school determines academic performance. About 80 per cent of the respondents agree that closeness to the school affect students' performance. While 8 per cent do not have definite position on the issue, about 15 per cent did not agree that proximity to school affects academic performance.

In terms of statistics, the table shows that the mean response of the target audience to all the research statements is well above the likert mean value (3.00), an indication that all the items in the cluster agree to a relationship between proximity to school and academic performance. The cluster mean of 4.16 further validates the relationship.

Table 4: Deployment of professionally qualified teachers to government-owned senior secondary schools promotes students' educational achievement

Question items	SA	A	U	D	SD	Statistics	
						Mean	Std.
Teachers who teach what they studied can teach the subjects in ways that students understand better.	486 (84.1%)	74 (12.8%)	8 (1.4%)	4 (0.7%)	6 (1.0%)	4.78	0.796
Teachers are happy when they teach subjects from the area of their specialization, and this promotes positive interaction with their students.	478 (82.7%)	86 (14.9%)	6 (1.0%)	3 (0.5%)	5 (0.9%)	4.78	0.796
Professionally-experienced teachers use both theory and practical teaching methods, and students learn better under them	354 (61.2%)	172 (29.8%)	24 (4.2%)	12 (2.1%)	16 (2.8%)	4.45	0.649
Teachers' professionalism has significant positive impact on the educational achievement of students at the secondary level.	372 (64.4%)	168 (29.1%)	18 (3.1%)	11 (1.9%)	9 (1.6%)	4.51	0.675
Professionally trained teachers teach with high level of integrity and understanding.	428 (74.0%)	122 (21.1%)	14 (2.4%)	6 (1.0%)	8 (1.4%)	4.68	0.751
Cluster mean	**73.3**	**21.5**	**2.4**	**1.2**	**1.5**	**4.64**	**0.733**

Source: Field Survey, 2019

Table 4 presents overwhelming support that professionally qualified teachers contribute significantly to enhanced academic achievement of students in public secondary schools. This is attested to by over 94 per cent of respondents covered by the survey. Only about 5 per cent of the respondents either could not form an opinion or out-rightly disagreed with the statement. Quality of teachers in schools can derive from their professional status.

The mean value of all the items in the cluster of questions relating professional qualification to students' academic qualification exceed the Likert mean (3.00), which implies that, individually, they support that employment of professionally-qualified teachers can lead to improvement in the educational achievement of students. With a cluster mean of 4.64, the statement that students' educational achievement in senior government-owed schools can be enhanced through engagement of professionally qualified or good quality teachers is strongly validated.

Table 5: Academic performance of senior secondary students in government schools is strongly linked to quality and adequacy of school structure

Question items	SA	A	U	D	SD	Statistics	
						Mean	Std.
Procurement of educational facilities and degree of deployment has productive influence on students' educational accomplishment.	375 (64.9%)	108 (18.7%)	52 (9.0%)	20 (3.5%)	23 (4.0%)	4.37	0.612
Maintenance of healthy school atmosphere can promote academic performance.	397 (68.7%)	132 (22.8%)	27 (4.7%)	13 (2.3%)	9 (1.6%)	4.55	0.694
Prompt compliance to school teachers' welfare needs, including payment of salaries can enhance students' academic performance.	348 (60.2%)	164 (28.4%)	21 (3.6%)	19 (3.3%)	26 (4.5%)	4.37	0.612
Maintenance of approved teacher-student ratio leads to improvement in academic performance of students.	362 (62.6%)	177 (30.6%)	12 (2.1%)	21 (3.6%)	6 (1.0%)	4.50	0.671
Provision of recreational facilities in schools can influence students' academic performance.	398 (68.9%)	132 (22.8%)	24 (4.7%)	11 (2.9%)	13 (2.3%)	4.54	0.688
Cluster mean	**65.1**	**24.7**	**4.8**	**3.1**	**2.7**	**4.47**	**0.655**

Source: Field Survey, 2019

Table 5 shows the opinion of respondents in respect of the relationship between educational facilities and the educational achievement of government-owned senior secondary schools in Anambra State. The collated data shows over 89 per cent of the respondents agree that provision of school facilities can enhance the performance of students in these schools. On the other hand, while about 5 percent are undecided, the rest did not agree that school structure can influence academic performance.

The responses to the individual items in the cluster stands above the likert mean which indicates that they are in agreement that academic performance of students in public secondary schools is strongly linked to quality and adequacy of school structures. The cluster mean of 4.47 provides further validation to the above statement.

Discussion of Results

This research examines how environmental factors affect the academic performance of students in public senior secondary schools in Anambra State using six secondary schools across the three senatorial areas of the state. From the analysis of data generated from the respondents, it was observed that family background, in terms of social and economic standing of parents, determines the educational achievement of students. This result suggests that children of high profile parents perform better in school than their counterparts from poor background. This outcome aligns with the findings in Obeta (2014), Farooq, et al (2011), Ogoro, et al (2018), Igbo and Ihejiene, (2014), Barkindo, et al (2018), Olufemi, et al (2018) and Fajar, et al (2019).

The study also validates the statement that proximity of students to school contributes to their academic achievement. This implies that students living close to the school premises are likely to perform better in school than those that travel far distances to school. Though not many studies have been conducted in this area, the work of Ogoro, et al (2018) did not establish a connection between closeness to school and academic performance. However, the work of Joseph et al (2014), which reports that provision of residential facilities in schools leads to improvement in students' academic performance, suggests proximity to school can influence the performance of students in school.

Further evidence from the study indicates that employment of professionally-qualified teachers impacts the performance of students in public secondary schools in Anambra State. Experienced and well-trained teachers have the advantage of breadth and depth on the subjects they teach as well as the appropriate methods to use so as to achieve learning objectives. This result aligns with the works of Olufemi, et al (2018), Ewetan and Ewetan (2018), Usaini, et al (2015),and Fajar, et al (2019).

Finally, from our analysis, we observe that provision of the required quantity and quality of school facilities influences academic performance. This implies that students from schools that have adequate, functional and good quality structures often out-perform their counterparts from schools where these facilities are in short supply. This observation corroborates the research findings of Joseph, et al (2014), Imeokparia, (2018), Usaini, et al (2015), Olufemi, et al (2018), Umar and Samuel (2019) and Fajar, et al (2019).

Summary of Findings, Conclusion and Recommendations

Analysis of data obtained from respondents in respect of their opinions on how environmental factors affect academic performance in selected public senior secondary schools in Anambra State, Nigeria reveals that family socio-economic status, closeness of students to school, employment of professionally-qualified teachers, and provision of adequate and good quality school facilities contribute to students' academic performance.

Following from the results outlined above, this study concludes that academic performance of students in public senior secondary schools is affected by environmental factors like family social and economic status, distance students have to travel to and from school, professional status of teachers, and adequacy of facilities available to the students.

We therefore recommend that education managers, particularly in the public education sector, through the inspectorate unit of the Ministry of Education should ensure that learning-supportive school environments are in place. For instance, schools should be located in low noise areas and there should be adequate open spaces for students to operate, classroom temperature should not disrupt learning, paintings should be moderate, and scent from deodorants and or cleaning liquids should not be offence.

More schools should be established, particularly in the rural areas, to bring them closer to the people, and provision of residential facilities in schools should be encouraged to allow students more time to

concentrate on their studies. Students that reside in the school, for instance, have more time to plan their academic programme and stand a better chance of academic success. Also, teacher education should be emphasized. Teachers should be trained and re-trained to enhance the capacity of teachers to impart knowledge on their students. The on-going effort to professionalize and re-certify those qualified to teach in Nigeria is commendable.

Finally, there should be adequate infrastructural support to promote learning in public schools. Though ambience is relevant to academic accomplishment, teachers and students need facilities to achieve learning objectives. It is established that students easily remember what they see, so visual and practice should complement theory. To achieve this, instructional materials, adequacy of classrooms, information and communication and technology should be provided in the public school system.

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Physical modelling of the Industry 4.0 concept

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Abstract

This paper presents the possibilities of introducing and visualizing the Industry 4.0 trend concept to students of industrial engineering, or workers in technical fields using the STEM concept. The first part of the paper deals with an overview of technical aids with which it is possible to introduce the concept of Industry 4.0. The second part of the paper is devoted to a description of the Fischertechnik Training Factory Industry 4.0, how to operate it, the programming possibilities and a presentation of the possibilities for using it in education at technical universities, with industrial executives and other areas mainly related to industrial engineering.

Keywords: Industry, Industry 4.0, Industrial engineering, Engineering, Mechanical engineering, Education, STEM, Fischertechnik

Introduction

The education of both students and workers in complex fields such as industrial engineering is a relatively difficult task during the 4th Industrial Revolution. The previous need for knowledge and understanding of e.g. layout, production machines (including their possibilities and limitations), technological and production processes is extended by at least one other essential dimension – a communication layer between machines and people, or people and people, or also machines and machines, where people can be understood as service / employees of the company, so today in many cases this means suppliers, internal customers, or external customers. This puts new demands on the imagination and orientation of students / educated workers in new technologies, which is relatively difficult to pass on in such a way as to give a real idea of what Industry 4.0 is, what benefits and opportunities it brings and an idea of what is needed to introduce, change or improve if the organization wants to work as an Industry 4.0 company or wants to take it to the next level within the Industry 4.0 concept. In this case, it is advisable to use appropriate teaching and presentation aids for familiarization with the Industry 4.0 concept. In this way it is possible to switch from theoretical education to practical education, when a much higher level of interest and understanding of the issue can be expected, mentioned by Xudong Pan et al. (2011).

Industry 4.0 education

For practical training in Industry 4.0, it is appropriate to use physical models that promote interest, imagination, creativity as well as a level of understanding mentioned by Zokowski et al. (2016) or Rehman, Narejo and Zaidi (2012). This can also increase the range of students' knowledge without negative consequences on understanding the problem and success in the exam. So, there are 4 options for education in Industry 4.0:

1. Do not use physical models (educational aids)
2. Use own models (own building, e.g. using 3D printing)
3. Use building kits
4. Use purchased assembled models

Because we did not want to follow the path of not using educational aids and we already use the kits in the classroom - these are programmable kits based on the STEM concept Fishertechnik education - STEM Engineering, we had to choose between buying an assembled model or building it ourselves.

The advantage of such models is the possibility of demonstrating process thinking and production management methods such as Lean, Six Sigma or TOC and others in production practice mentioned by Koblasa, Šírová and Kralikova (2019).

Approaches to presenting Industry 4.0 on our own model

Platforms such as Arduino, RaspberryPi, or BBC micro:bit are the most common custom models illustrating the Industry 4.0 concept.

According to Votrubec and Koblasa (2019), it is possible to build a relatively complex model illustrating the Industry 4.0 concept on the Arduino development platform with Wi-Fi network communication and a stand-alone automatic guided vehicle (AGV), where problems such as guidance accuracy and fluidity of AGV can be solved by using a combination of physical modification and optimization of the algorithm for evaluating line tracking (or designing a new one).

In the case of the BBC micro:bit, the most common approach is the creation of separate devices (robotic arm, warehouse, conveyor, elevator, etc.) mentioned by Sanfilippo and Austreng (2018). If we want to create communicating devices it is possible to use Bluetooth (programming in graphical environment Microsoft MakeCode) or a radio signal (Python or programming in graphical environment Microsoft MakeCode) mentioned by 'Micro:Bit Educational Foundation | Micro:Bit' (2020).

In the case of RaspberryPi, there are often already deployed controllers, such as Industry 4.0 Embedded Systems Network mentioned by Andramuño, Vega and Parra (2019) (where there is a combination of RaspberryPi as a server and Arduino), or e.g. control units for a robotic arm mentioned by Garcia et al. (2018).

Variants of model acquisition and creation of own model

The advantage of acquiring an assembled model is the speed of delivery and the possibility of introducing it almost immediately into education. On the other hand, a bought solution has some disadvantages like the relatively high purchase price, the necessity of adapting it to the chosen model and in some cases it is a closed solution and this may be disadvantageous. Moreover, in such a case we will not encounter mistakes and dead ends related to the creation of our own model, which often have a significant influence on the transfer of knowledge and understanding of the issue.

Creating one's own model is from an educational point of view, i.e. understanding the issue, acquiring knowledge and engaging in the issue, probably the best way. Another significant advantage is that when creating your own model, many possibilities open up for bachelor's, master's or doctoral theses, which in addition can permeate across disciplines such as electrical engineering, construction, machining, cybernetics, informatics, industrial engineering, etc. Such models can be built on almost any platform such as Arduino (mentioned by 'Arduino - Home' (2019)), BBC Micro: Bit (mentioned by 'Micro:Bit Educational Foundation' (2019)), RaspberryPi (mentioned by 'Teach, Learn, and Make with Raspberry Pi – Raspberry Pi' (2020)) and others, or their combination. The cost of such a model is considerably lower than the acquisition of a finished model, and it is possible to extend the model almost infinitely in terms of both hardware and software. On the other hand, the disadvantage of this variant is that it is time consuming, and the model is not available for teaching in the near future and the creation of the final model can take several years.

In view of the above, the combination of both variants seems to be the best way. That is, to acquire an assembled model that is available almost immediately and it is possible to include it in the classroom and at the same time work on our own model using student work.

Industry 4.0 models on the market

There is not much choice on the market of ready-made models based on the Industry 4.0 principle, or models that could, after slight modifications, present the Industry 4.0 principles.

FESTO CP Factory

CP Factory is a versatile modular development and education platform in the Industry 4.0 area. It uses standard PLC systems, so there should be no problem connecting another system, including communication between them. All modules have a standardized size and the dimensions of most modules are around 1200 x 800 x 900 mm, stated by Festo Didactic SE (2020a).

FESTO CP LAB

These are pre-assembled sets of models from CP Factory and separate modules suitable for production, such as modules for drilling, bending, stamping, etc. An example is CP Lab 404-1, which consists of four application modules mentioned by Festo Didactic SE (2020b) of approx. 1800 x 1800 x 1800 mm:

- Magazine application module, which allows e.g. work with RFID, Process start
- Analogue measuring application module, which allows work with e.g. QS, SPC, Analytics
- Drilling application module, which allows work with CPS, Production parameters, Variants
- Output application module, which enables work with Parameter processing, Flexible handling, Logistics

Fischertechnik Training Factory Industry 4.0 - 9V

The model uses a 9V power supply, the control of the model is via the Fischertechnik cloud, which can be customized. The model contains 6 control units, a Wi-Fi router providing an internal Wi-Fi network and communication with the cloud via WAN. The model consists of a robotic swivel arm with vacuum system for gripping / dropping material and an NFC reader, automated warehouse, machine tool, conveyor, sorting device working on the principle of colour detection and a station of environment sensors with a remote-control camera cloud. The dimensions of the model are approximately 9720 x 7720 x 4020 mm mentioned by Fischertechnik GmbH (2020a).

Fischertechnik Factory Simulation – 9V or 24V

The model is largely similar to the Fischertechnik Training Factory Industry 4.0 and is available in 9V mentioned by 'Factory Simulation 9V - Simulation - Fischertechnik' (2020) or 24V versions mentioned by Fischertechnik GmbH 2020b. The 9V model needs to be equipped with control units that can control power elements running on 9V, e.g. the Fischertechnik TXT Controller, which is also equipped with the Fischertechnik Training Factory Industry 4.0 model. The model using 24V does not contain control units and needs to be additionally equipped with a PLC system through which it can be controlled. Another significant difference from the version of Fischertechnik Training Factory Industry 4.0 is the lack of material reception and delivery with the NFC reader, the connection to the Fischertechnik Cloud and the missing sensor station including the camera. All these things can be done by our own solution and driven via PLC. The variant running on 24V has the advantage of simple extension of any components from PLC technology, deployment and operation of our own PLC systems and connection to other models or devices e.g. for collection or transfer of information mentioned by Fischertechnik GmbH (2020b).

Merkur Toys – Programmable minilink with MG

Mercury Toys are not a complete, comprehensive solution. It seems appropriate to use the models of the Education series, specifically the programmable model "Programmable minilink with MG" which includes a robotic arm with six degrees of freedom and a conveyor with sensors. Some models of the Education series or Robotics series could be used to extend it. The model can then be expanded with other models from the Merkur Toys range, but the user must deploy some of their own, appropriate solutions for their connection and communication mentioned by Merkur Toys s.r.o. (2020).

Choice of solution

In our case, the Fischertechnik Training Factory Industry 4.0 9V was chosen. The main reason is the use of the Fishertechnik education - STEM Engineering kit in teaching the basics of robotics and algorithmization and thus a relatively simple possibility of extending the model with its own parts, the connection to the Cloud and data collection to the Cloud, including the control of the model, and last but not least, knowledge of the system and programming options thanks to the experience with the kit.

Model Fischertechnik Training Factory Industry 4.0

The model is controlled by six Fischertechnik TXT Controllers, whose basic technical data are: ARM Cortex A8 500MHz+Cortex M3, 128MB DDR3 RAM, 64 MB Flash, Micro SD Slot, 2.4" colour touch screen (320x240 Px), BT 2.1 EDR+ 4.0, WLAN 802.11 b/g/n, infra port, USB 2.0 client, 10 pin connector, I2C interface, integrated loudspeaker, Linux, power supply 9V DC, 8 universal inputs which can be used as 4 counter inputs or 4 outputs for motors or 8 individual outputs. Communication between the controllers and the cloud model is via a small TP Link Wireless Nano router TL-WR802N, which connects to the WAN by cable and creates a local Wi-Fi network to connect the controllers to each other and the main controllers with the cloud application via MQTT (Message Queuing Telemetry Transport, open message protocol) mentioned in 'TXT Controller - Fischertechnik' (2020).

In addition to control units and building blocks, the model contains a relatively large number of power elements. The most important are the NFC reader, optical colour sensor, light gates, solenoid valves, compressors, electric motors, stepper motors, calibration modules, webcam, air quality sensor, humidity quality sensor, light control sensor, thermal sensor, LEDs and buttons.

The mechanical parts are mainly gear mechanisms of various types and designs and pneumatic cylinders.

The model consists of a total of five elements: Sorting Line with Colour Detection, Multi Working Station with Oven, Automated High Bay Warehouse, Vacuum Gripper Robot and Sensor station.

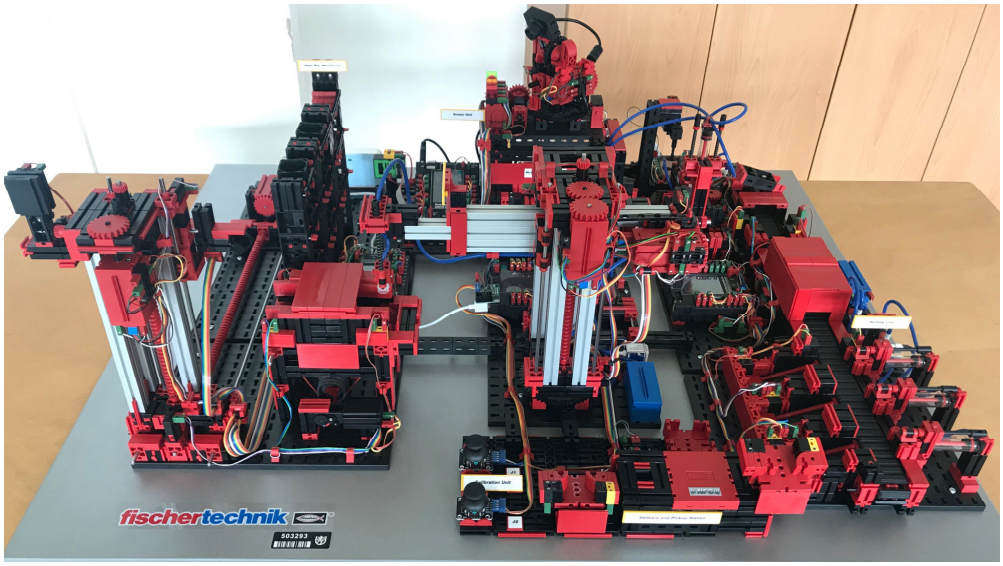

Fig. 1: Fischertechnik Training Factory Industry 4.0

Description of Model Processes

Because the model consists of several separate devices that are able to communicate with each other, it is important to get an idea of the basic processes that can be encountered when using the model.

Material Storage

A colour puck containing an NFC chip is inserted (there are blue, red and white pucks, which represent material at the beginning and later a product). Using the light gate, the Vacuum Gripper Robot is informed that it has material to store. If it has no other job, it takes the material, reads the NFC code using an NFC reader, the colour using an optical colour sensor, and passes the material to the Automated High Bay Warehouse input, which puts it into a free warehouse location. Information about the colour and NFC code of the stored material is written to the Cloud and it is possible to order the product with this colour via the e-shop.

Production

After ordering the product, the material is removed from the warehouse and the material is transferred using the Vacuum Gripper Robot to the Multi Working Station with Oven, where heating in a furnace is simulated (inserting the material into the furnace, LED simulating the heating and withdrawal of the material). The Multi Working Station with Oven has a small vacuum gripper that transfers the material to the milling machine, where the machining is simulated and transferred to the Sorting Line with Colour Detection when the machining is complete. The current status of the material and the use of individual parts of the model, including the reporting of possible errors, is constantly displayed in the cloud interface.

Transportation to pick-up place

As soon as the workpiece reaches the Sorting Line with Colour Detection, the conveyor is lowered, the product passes through the paint shop, and the product is sorted by colour at the end of the conveyor to the dispenser. The current status of the material and the use of individual parts of the model, including the reporting of possible errors, is constantly displayed in the cloud interface.

Product picking

When the product is delivered to the warehouse, the Vacuum Gripper Robot takes over again, checks the NFC code and colour of the product, and issues it to the customer. In the graphical interface of the cloud application there is information that the customer should take the material. The removal of the material by the customer is monitored by a light gate.

Watch / Check Factory

The entire factory can be viewed from the graphical interface of the cloud application using a webcam, which can be remotely recorded as needed. It is also possible to create photographs. A sensor station monitors the model environment, namely temperature, air quality, lighting and pressure. All this information is graphically depicted in the cloud application's graphical interface.

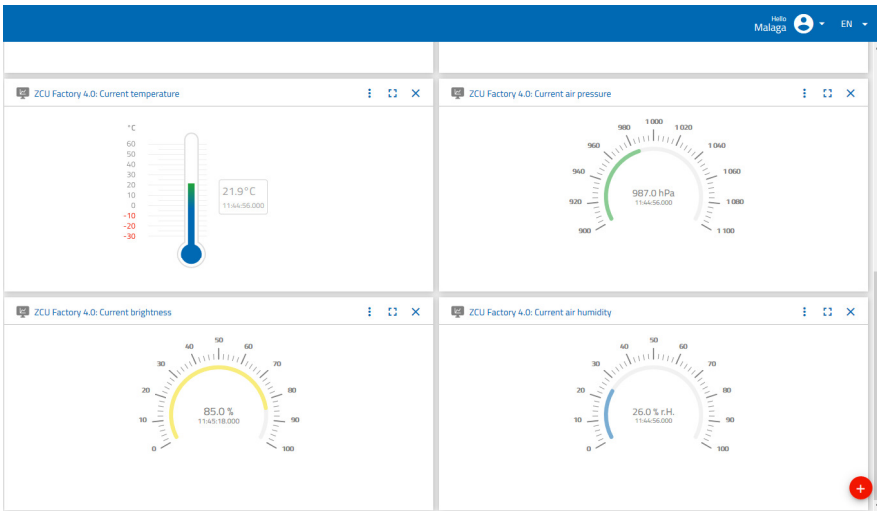

Fig 2. Fischertechnik Cloud – sensor information

Demo program of the model

The demo program of the Fischertechnik Training Factory Industry 4.0 is fully available on the Git hub mentioned by 'TxtSmartFactoryLib: Main Page' (2019), including the source code, which means it can be modified. Control programs can be written in C / C++ mentioned by 'TxtSmartFactoryLib: Main Page' (2019), Python mentioned by 'Fischertechnik TXT Community Firmware' (2019), RoboPro (graphical programming environment, where the program is created by composing graphical elements and setting their properties) and now also in Scratch mentioned by 'Fischertechnik/FT-TXT' (2020).

Cloud - Dashboard

The production model and simulation can be viewed from the cloud application's graphical interface from 3 different views:

- Customer View - The customer can see what products can be ordered (depending on the stored material) and place an order. When the product is finished, the customer is informed and can take it from the dispensing point.
- Supplier View - The supplier sees what material is stored in the factory and what material is missing. Accordingly, it can supply the missing material and the factory will store it.
- Manufacturing View - The manufacturer can see the stock status, current production, the status of all parts of the model (whether they are working / standing or reporting any error),

the statistics of the ordered products and the factory environment (temperature, humidity, pressure, lighting)).

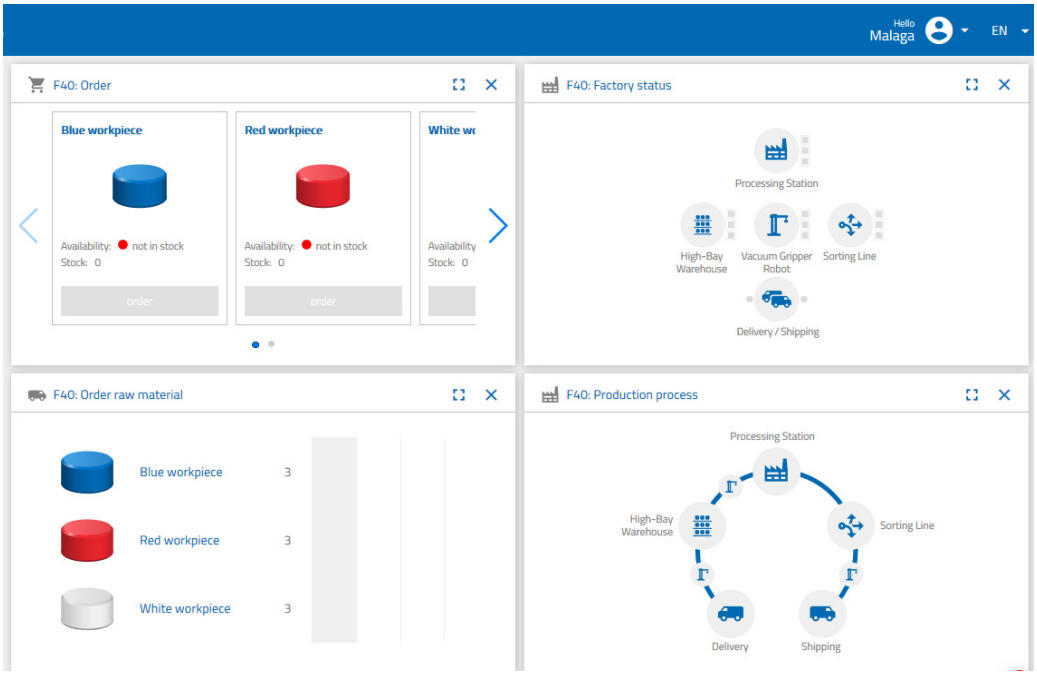

Fig. 3: Dashboard of Training Factory Industry 4.0 from Fischertechnik Cloud system

Model Extension Options

The behaviour of the model can be changed by either modifying the demo version of the control program or creating one's own control program. The extension of the model can be done either by the added part communicating with the model elements via Wi-Fi, or by only reading data from e.g. light gates. Such an extension is easy, quick to implement and there is no danger of brick modelling. In this way it is also possible to solve separate elements of the AGV type, which would bring the material for storage or take away the finished products. In the case of reading only values from light gates, it seems easy to use other models built on a platform other than Fischertechnik, such as Arduino, BBC micro:bit, or RaspberryPi.

Industry 4.0 concept in the model

The principle of Industry 4.0 in this model is based on several points.

The first important point is the concept of collaboration between the individual elements of the Fischertechnik Training Factory Industry 4.0. The model is composed of five separate devices controlled by their own control units, namely Sorting Line with Colour Detection, Multi Workstation with Oven, Automated High Bay Warehouse, Vacuum Gripper Robot and Sensor Station. These independently controllable models communicate with each other by connecting to a common Wi-Fi network, and in some cases using shared features such as light gates. In addition, one of these controllers provides communication with the cloud application. If necessary, you can program or modify the demo program for selected devices only.

The second important point is online access to the model from anywhere and via any device (phone, tablet, PC, laptop, etc.). The only condition is internet access and a web browser. Using the cloud

application, the model is completely managed and the state of the warehouse, production, etc. and the state of the environment in the factory - temperature, humidity, lighting, or air quality are monitored.

The third important point is the ability to access the model as a material supplier, a customer ordering a product, or a manufacturer, with the ability to monitor the current state of the warehouse, product, manufacturing features and current production process or processes at any time.

Possibilities of using the Fischertechnik Industry 4.0 model

The Fischertechnik Industry 4.0 model seems to be a quick (or instant) opportunity to show students or engineering professionals the principles of the Industry 4.0 concept in such a way that they can understand it and can imagine at least approximately the impact of the concept on production, management, communication both within the company and with its surroundings. Last but not least, we can show the way of thinking of all who work or cooperate with an enterprise at least partly based on the Industry 4.0 principle.

In addition to the Industry 4.0 principle, this model (and similar models) can also be used to familiarize students with in-house and outsourced logistics (using other, proprietary models), fundamentals of algorithmization, programming, data collection and visualization simulation. Creation of digital twins should be understandable and if students are familiar with the model, then the validation and verification should be relatively simple. As reported, for example, mentioned by Vachálek et al. (2017), which used the digital twin model Festo.

Conclusion

The paper describes the basic idea of the approach to modelling the Industry 4.0 concept, including a brief overview of some models based on this principle and a closer look at the possibilities of the Fischertechnik Industry 4.0 model in teaching and its practical use for industrial engineers or workers in any technical sector. An approach where the problem is shown on a suitable model is a way to enable students to see the tangible results of their work on a physical model that behaves according to student-programmed rules, but mainly it teaches students to think in the necessary context, systemically and with regard to the surroundings of the designed and running system. The industrial engineer can then use these models not only for simulation, but also for the creation of initial system designs or problem solving designs of real systems in certain cases. It should be possible to use such models in practice as part / complement of large systems, e.g. for data collection, behaviour evaluation, planning or management of certain processes.

Acknowledgements

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Job Stress and Its Predictors Among Malaysian Teachers

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Abstract

The success and competency of an education system depend on the main driver of the system. They are the teachers. Teaching is not the only profession associated with a high-stress level job. Instead, almost all other professions are. High-stress level imposed an occupational threat to the mental and physical state of a person. Stress is a state of mental or emotional strain which results from adverse or demanding circumstances. It provides both physical and emotional effects leading to positive and negative feelings among teachers. Over the years, researchers examined issues about the stress level in the teaching profession. Researchers contended that teaching preparatory work mainly causes teachers to have a high-stress level. However, there is little evidence from the Malaysian literature concerning the stress level among school teachers. Hence, it is obligatory to explore the factors affecting stress level among teachers in Malaysia. This study may help the researchers to diminish the gap. This study attempts to examine the relationship between variables that affect stress among school teachers in Selangor. This study adopted the quantitative method. Researchers distributed the Questionnaires among 15 secondary schools in Selangor, particularly in Petaling Utama district which totals up to 2259 teachers. The findings reveal that the independent variables are highly significant and positively associated with the dependent variable. Hence, all the hypotheses were accepted. The findings further reveal the teachers' stress awareness. Steps to be taken to keep stress under control were proposed using various stress management techniques. The measures proposed in this study include widespread stress handling program development for teachers.

Keywords: Stress; depersonalizations; workload; interpersonal relationship; working environment

Introduction

According to Maphalala (2014), pressure is an organizational problem, which can disturb individuals in a somewhat public atmosphere, whether workplace, home or religious. Like everybody else in their group, teachers

are unprotected to tension due to their working profession (Maphalala, 2014). The causes of stress can be internal or external to the individual. (Maphalala, 2014). A study by the National Union of the Teaching Profession *Malaysia* (NUTP) found that 70 percent of 9,000 teachers across the country were depressed not only because of the burden of duties but also had to face headaches, clerks, parents and students (Nor Kasiman, 2009). Raja Ali (2011) in his written report stated time constraint factor was the highest mean score (2.66), followed by the task load factor (2.58), the reward factor (2.50) and the lowest mean score was the student's incapacity factor (2.10).

Stress-related issues are acceptable complaints in most workplaces, this is associated with some negative personal and professional effects (Karasek & Thorell, 1990; Roeser et al., 2013; Shirom, Oliver, & Stein, 2009). Teachers 'pressure not only affects teachers' health and negatively on job satisfaction, but also increases in teacher pressure across the country (McCarthy, Lambert, & Reiser, 2014).

In Malaysia, there are a few researchers who do research related stress among teachers but this is not done at all levels and areas in large scale (Rahman Budi, 2013). There is a need for some future researchers to continue studying about stress among teachers in Malaysia especially at Selangor and Kuala Lumpur (Zahid Munir, 2010). The highest levels of stress among teachers were caused by the introduction of the new curriculum (Maphalala, 2012). The largest direct effect on teacher stress in this category resulted from planning and assessment workload (Maphalala, 2012). Among the factors that cause teacher stress are depersonalisation, self-success, emotional depletion, overwork, interpersonal relationships and work environment. This depersonalisation refers to a teacher's emotional state such as how to treat a student and how a teacher overcame his student's problems. Self-success refers to the way a teacher achieves success in seeing his students achieve good results in the lesson. Emotional deprivation also refers to a strong sense of teacher in carrying out tasks without feeling angry, sad and sentimental. The working environment also affects teachers in their daily tasks including classroom environment conditions, teaching aids facilities and other tools to facilitate teacher and student relationships.

Besides good interpersonal relationships it is also necessary for teachers to share their problems with colleagues, co-workers are always cooperating and always getting encouragement from administrators or principals. Teachers are also charged with various administrative tasks that have become routine of their work, such as filling in forms, collecting fees, updating student arrivals, preparing performance reports, preparing test and exam questions, giving guidance and more to advance their students. Kyriacou (1987) also emphasizes that long-term stress can undermine mental and physical well-being as well as to significantly undermine the teacher's career and student performance as stress affects teaching quality and commitment of teachers. This study can help to inform the level of stress experienced by teachers in Selangor especially in Petaling Utama district. The effectiveness of an education depends on the main driver of the system, namely teachers. Teachers' performance and commitment are important for a teacher to help the nation in achieving success.

Stress Among Teachers

The issue of stress among teachers has gained considerable attention and began to be studied as early as the 1970s to this day (for example: Kyriacou & Sutcliffe, 1978; Chaplain, 1995; McCormick, 1997; Lau, 2002; Lemaire,2009; Abdullah Ismail, 2010;Ages, 2011). Among them are the study by Van Dick and Wagner (2001) who find that the load factor work is a major contributor to teacher stress. Their study also shows that the stress experienced by teachers will have a negative impact not only in terms of physiology such as high blood pressure, but also it also affects the behaviour of teachers. It also found by Tang and Yeung (1999) and Lau (2002) in Hong Kong's high school studies also found that the burden of duty has caused teachers to invite stress. This phenomenon is also supported in Kokkinos (2007) and Kumarakulasingam (2002).

Montgomery and Rupp (2005) conducted a meta-analysis on 65 studies related to teacher stress from 1998 to 2003 to identify the various causes that cause teachers to become stressed. The findings show that three external stress factors moderately influence stress among teachers. These factors are student behaviour, workload or job demands, and support from colleagues. Kyriacou and Chien (2004) are also in their study of primary school teachers in Taiwan found that 48 percent of respondents were at moderate stress levels. Similar findings were obtained from the study of Klassen and Chiu (2010) on primary and secondary school teachers in Canada. The factors of workload and poor attitude were also found to be the dominant factors affecting teachers' stress. Compared to the Chaplain study, Klassen and Chiu reported with detail that the level of stress of a female teacher

is much higher than that of a man but it is only for the factors of workload and the ability of the student alone. Based on the literature emphasized above, it is pure that there are numerous reasons that cause teachers to feel stressed. Among them are workload factors, student abilities and relationships with colleagues. As teachers are an important asset needed by the state, the teachers need to be addressed especially in the face of stress. With the stress among teachers, it will have an impact on teachers in making commitments in carrying out their duties and responsibilities at school.

The Relationship of Depersonalization and Stress Among Teachers

Concept of depersonalisation emphasises on the individual that remains comparatively fine after facing high quantities of traumatic lifecycle events. Individuals who contribute a high mark of stress without falling ill have a character structure differentiating them from individuals who become sick under stress (Kobasa, 1979). This character change is greatest characterized by the term "personalize". Personalized reflects the individual's response to life events both for myself and for money (Kobasa, 1979). Depersonalisation is a particular type of dissociation involving a disrupted integration of self-perceptions with the sense of self, so that individuals experiencing depersonalisation are in a subjective state of feeling estranged, detached or disconnected from their own being (Daphne Simeon, 2004). Some teachers may lead to avoid some work because they think it was not under the job scope of teacher as an example key in marks into an online system and it makes them feel unhappy (Kusyairi, 2010).Commitment imitates an assurance to oneself and to one's effort. Control is the degree to which a distinct stimuli lifecycle actions to warrant a precise conclusion. Challenge refers to lifetime actions and one's comeback to a person's events. Persons who are strong survive with several stressors, both for example life cycle, family and specialized for instance work-related roles and associations, are better than those people who are not hardy (Simoni and Paterson, 1997). Therefore, it can be hypothesized that,

H1: There is a positive relationship between depersonalisation and stress among teachers.

The Relationship of workload and Stress Among Teachers

Occupational Stress (OS) is the employee's response when facing work stresses and burdens not matched to their resources, needs, skills and information, and overwhelmed their capability to succeed (Desouky and Allam, 2017). Committed teachers' always want to finish the syllabus prior to the schedule organized by school and sometimes they do not have enough time (Norhayati, 2012). Teachers also tend to get headaches with several organizational responsibilities that have become repetitive of their work, such as filling in forms, collecting fees, bringing up-to-date student entrances, preparing performance reports, preparing quiz and exam questions, providing direction and more to advance their students (Kelly, 2011).

Kyriacou (1987) also emphasizes that long-term stress can undermine mental and physical well-being as well as to significantly undermine the teacher's career and student performance as stress affects teaching quality and commitment of teachers. The current research discloses that accountability for pupils to be successful in examinations and able to act like standard students were the chief workload that underwrote teachers' stress. This is shadowed by managerial work, presence training, managing stock and catalogue, and too much task in one time (Mohd Ghani, 2014). Therefore, it can be hypothesized that,

H2: There is a positive relationship between workload and stress level among teachers.

The Relationship of Interpersonal Relationship Between Colleagues and Stress Among Teachers

Investigation of this research exposes that the greatest important stress influence for interpersonal relationships is "getting blurred instruction and orders from the managerial", shadowed by observation by education officers and absence of colleagues' collaboration in accompanying an action specifically from a regular education instructor (Mohd Ghani, 2014). There are, however, insufficient studies have been presented on pressure interferences and their efficiency among teachers (Wiley and Sons, 2006). Work stress among colleagues is common but will be

problematic in the future and may occur episodes of depression in two groups on management and administration (Lewinsohn, Rohde, Klein, & Seeley, 2010; Pine, Cohen, Gurley, Brook, & Ma, 2010; Rao, Hammen, & Daley, 1999; Weissman et al., 2011). Among the causes of conflict is the misunderstanding, personal problems such as spousal relationships or problems that are happening at home and taken to the office and do not recognize colleagues despite long working groups in an organization (Cramer, 2011). Therefore, it can be hypothesized that,

H3: There is a negative relationship between interpersonal relationship between colleagues and stress level among teachers.

The Relationship of Working Environment and Stress Among Teachers

One of the sources of labour pressure is by the unhealthy and safe working conditions (Toscanor & Weber, 2009). This factor is due to incomplete work instructions and unspoken safety instructions, unregulated regulations, inherent hazards are not well controlled, lack of interaction between management and unprotected protection devices (Bulatao & VandenBos, 2011). Working in locked and unfriendly organizational environment takings about undesirable reactions and moods on the part of the teachers and students, these including disappointment, psychosomatic burden, shirking, insignificance, and finally job alienation leading to occupational stress which can be named the catastrophe of the contemporary era (Ahghar, 2008). Stress that is bright to decrease teacher's motivation can have harmful effects such as alienation from the school, absenteeism, and attrition. In fact, when superior education teachers are harshly harassed by the uncontrollability of their job, they are more likely to leave the special education classroom (Miller, Brownell, & Smith, 2013). Therefore, it can be hypothesized that,

H4 There is a negative relationship between workload and stress level among teachers.

Methodology

The research strategy of this research is adopted survey research where the instrument used for this research would be a questionnaire. By distributing the questionnaire, the data gained is less time consuming rather than using other methods. Other than that, this method would give the researcher accurate data from the respondent. The process of distributing the questionnaire is done within 10 days. First of all, the researcher will contact the administration for each of the chosen schools. The questionnaire will be given to administration at each school and they will give it to teachers in that particular school to answer the questionnaire. They are given 14 days to complete the questionnaire without any pressure from the researcher. If the total of questionnaires that the researcher received back from the representative of the class is not tallyed for the first time, the researchers will give another set of questionnaires and collect them back within 3 days. The researcher also uses a simple word to make it easy for the respondent to answer all the questions.The content of the questionnaire is also not subjective to a specific respondent as the topic and items of the questionnaire is understandable by all respondents. The researcher would use a personal administered questionnaire through drop and collect method. For this research, the variables proposed to measure are adopted from the past research that has been conducted by the past researchers. The independent variable that is being measured is depersonalization, workload, interpersonal relationship among colleagues and working environment adopted from (Azizi Yahaya and Mazeni Ismail, 2014).

Findings and Discussion

Based on the findings of this study, in terms of demographic profile, the respondents are mostly female (85.9%) equivalent to 305 of them. And the rest of the respondents are male (14.1%) equivalent to 50 of them. Most of the respondents have been working up to 3-4 years (45.4%) equivalent to 161 of them. The second highest are up to 1-2 years of work (45.4%) equivalent to 159 of them. Lastly followed by who are more than 4 years of work (9.9%) equivalent to 35 of them.The respondents' salary are less than or equal to RM 4000.00 (65.6%) equivalent to 233 of them. The second highest salary is less than or equal to RM 3000.00 (24.5%) equivalent to 87 of them. Lastly followed by whose salary are more than RM 4 000.00 (9.9%) equivalent to 35 of them. The majority of the respondents are teaching elective subjects (55.2%) equivalent to 196 of them. And the rest of the respondents are teaching core subjects (44.8%) equivalent to 159 of them.

Correlation

Table below showed that there is a significant positive high correlation between workloads and stress (r=0.755, p=0.00, p<0.05). Therefore, it illustrates that the higher the workloads the higher the stress. Table above that there is a significant positive high correlation between relationships between colleagues and stress (r=0.812, p=0.00, p<0.05). Therefore, it illustrates that the higher relationship between colleagues the higher the stress. Table above shows that there is a significant negative almost negligible correlation between the relationship between the working environment and stress (r=-0.195, p=0.00, p<0.05). Therefore, it illustrates that the higher working environment the lower the stress.

Table 1: Correlation and Cronbach Alpha Table

Variables Workload Depersonalization Relationship Work environment Stress

Depersonalization 0.362** (0.618)

Relationship 0.694** 0.646** (0.660)

Work Environment -0.175** -0.174 (0.035) (0.638)

Workload (0.669)

Stress 0.755** 0.786** 0.812** -0.195 (o.636)

Note: ** Correlation is significant at the 0.01 level (2-tailed); Entries in parenthesis indicate Conbrach Alpha values.

The alpha coefficient for the 15 items for depersonalisation independent variables have questionable correlation. It shows the value of Cronbach's Alpha is 0.618 (62%). It indicates that the items for depersonalisation's questionnaire can be used for the future research for different samples. The alpha coefficient for the 11 items for workloads independent variable have questionable correlation. It shows the value of Cronbach's Alpha is questionable 0.569 (57%). It indicates that

The items for workloads questionnaire can be used for future research for different samples. The alpha coefficient for the 9 items for interpersonal relationship between colleagues independent variables have questionable correlation. It shows the value of Cronbach's Alpha is questionable 0.660 (66%). It indicates that the items for interpersonal relationship between colleagues questionnaire can be used for the future research for different samples. The alpha coefficient for the 17 items for working environment independent variables have unacceptable correlation. It shows the value of Cronbach's Alpha is questionable 0.038 (4%). It indicates that the items for the working environment questionnaire can't be used for the future research.

All the four independent variables (Depersonalisation, Workloads, Relationship Between Colleagues and Working Environment) together explain 88% (R^2=0.883) of the variance Stress. It is highly significant, as indicated by F-value of 658.745 (f>1) as shown in the table.it indicates that the remaining 12% was influenced by other variables.

Table 2: Multiple Regression Analysis

Model Unstandardized Coefficients Standardized Coefficients t Sig.

B Std. Error Beta

1

(Constant) -41.388 3.985 -10.386 .000 Total Workloads .637 .040 .437 16.002 .000 Total Depersonalisation 1.215 .062 .501 19.545 .000 Total Relationship Between Colleagues .588 .106 .187 5.544 .000 Total Working Environment -.159 .084 -.038 -1.894 .059

a. Dependent Variable: Total Stress

Based on the coefficients table, depersonalisation is proven to be the highest variable that influences stress (β=1.125, p=0.000, p<0.05) where 50% of depersonalisation influences stress. This indicates the higher the depersonalisation, the higher the stress. This is followed by workloads (β=0.637, p=0.000, p<0.05) where 44% of workloads influence stress. This indicates the higher the higher the workloads, the higher the intention to stress. Next followed by relationships between colleagues (β=0.588, p=0.000, p<0.05) where 19% of relationships between colleagues influence stress. However, the working environment was found not significant as the 4% (β=-0.159, p=0.059, p>0.05). This indicates the higher the working environment, the lower intention to stress.
Collin (2012) stated that there is a positive relationship between depersonalisation and stress which means the higher the depersonalisation the higher the stress. People who are facing depersonalisation need to be more energetic, try to be involved in sport and get more new friends (Billy, 2013). It tends to make them feel more relaxed and peaceful (Gabriel, 2003).Therefore hypothesis 1 is supported.
Hypothesis 2 : There is a positive relationship between workloads and stress . This is supported by Munir, (2010). The higher the workloads the higher the stress among Teachers. Teahers often are burdened with administration work such as to collect fee bills, registration student names and conduct orientation day for students (Kelly, 2013).
Hui Ling Ling (2011) stated that there is a positive relationship between interpersonal relationships between colleague and stress. The higher the interpersonal relationship between colleagues the higher the stress. Hypothesis 3 is supported.
For hypothesis 4, Rubbin (2007) stated that the higher the working environment the higher the stress. It happened, as an example for those who work in teaching profession including lecturer and nursery and kindergarten, even though the environment is clean and peaceful but they need to work on Saturday and sometime may lead to half day on weekend (Rubbin, 2007). However, according to Kelly (2009), the relationship sometimes can be positive and negative, it depends on who your respondents are.

Conclusion

Based on the objectives of the research which is to determine the relationship between depersonalisation, workloads, relationship between colleagues, working environment, four hypotheses were developed in order to determine the relationship between independent and dependent variables. To conclude the finding, all the hypotheses accepted.
Overall, the results of this study have achieved its objective of responding to the study questions based on the variables studied. The findings show that teachers from 15 secondary schools in Petaling Utama District experience stress even at moderate levels. The findings show that the factors that cause stress among secondary school teachers in Petaling Utama are depersonalisation, workloads, relationship between colleagues and working environment. The importance of paying attention to these factors is seen in terms of their impact on students, teachers, and schools. Improving the positive relationship between teachers and parents is not only beneficial for both parties, but also for the excellence of the school. It is also important for appreciation and support factors, especially from the administration that can be further enhanced to create a harmonious atmosphere in the school.

School administrators should play a key role in reducing the stress of teachers. School administrators should also play a key role in reducing the stress of teachers. Principals, professors or administrators need to first establish a healthy and harmonious school environment by ensuring a good relationship between the administration and the teachers without any conflicts. The management style of headmasters and school principals also greatly influences the relationship with their subordinates, especially teachers. Headmasters should not only use one management style, such as collaborative or collaborative management styles but can diversify them according to the appropriate situation. The other way to treat depersonalisation is that counsellor at school may conduct one day for teachers to do stress tests, teach them how to handle stress, how to measure stress and knowing in depth the causal effect of stress. Teachers who have a depersonalisation effect also can do some vacation or get outdoors activities such as jogging, joining music class and try to involve in corporate social responsibility events. They also need to talk, try to be an extroverted person, join any indoor or outdoor club and be a president for any society or do something that doesn’t make them feel lonely.

As for the future research, it is recommended that longitudinal study be used along with observations of the same subject over a period of time. Therefore, the objectives can be reached within the time. Although it would take more time and effort and cost more rather than doing cross-sectional studies, however, a well-planned longitudinal study will help researchers to identify causes and effect relationships for studies. As to measure the effect of the stress, researchers can detect developments or change in the characteristics of the target population at both the group and individual levels.

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Health Security Survey of the Population of Warsaw Using the Logistic Regression Model

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Abstract

Health is the priority value for all people and a prerequisite of their sense of safety. Fast economic and industrial growth has heightened the risk of threat to human health security. This is attributable to the constantly growing emissions of harmful substances into the environment, which causes air pollution, including smog. Consequently, it is essential to monitor and survey the types of emitted substances and their underlying factors through analysis. Such an analysis is discussed in this article. It employs the logistic regression model. Based on survey data collected in the years 2016-2018, a preliminary analysis of the conditions of smog formation was carried out. The estimated parameters of the model and calculated odds ratios allowed the assessment of impact of selected factors on the risk of exceeding the concentration limits of harmful substances in the air. Assessment of the model was carried out based on cross-validation, and its quality was validated against a significance analysis of parameters and by testing goodness of fit using the Receiver Operating Characteristic Curve (ROC) and the Area Under ROC curve (AUC). Obtained results can be useful in shaping the development of the comprehensive environmental strategy for the area of the capital city of Warsaw.

Keywords: Smog, Logistic Regression, Health Security

Introduction

Health security is defined as a process implemented by government, self-government, specialized and non-specialized bodies and units aimed to maintain or improve the health status of citizens as well as enhancing the operation of health care system (Kięczkowska, 2020; Aldis, 2008). The fast growth of industry and the transport sector, let alone globalization, has some negative effects on the environment, in particular generating air pollution. Such effects can pose a threat to the health security of society as well as directly contributing to the emergence of respiratory, cardiovascular, and cancer diseases in humans. Therefore, it is of key importance to monitor and study the types of emitted pollutants and factors that deepen the negative impact on the environment. It is also no less important to develop forecasting models that support the decision-making in environmental matters.

The population of Warsaw is growing steadily reaching 1.77 million in 2019. The number of registered motor vehicles is on the rise as well (up to 727 vehicles per 1,000 residents). This means traffic congestion and an increase in emissions affecting the environment. These facts have urged a research which aims to identify factors and areas in which corrective action can be taken to improve the worsening condition of the environment.

The research focuses on air pollution which leads to the formation of smog in the city of Warsaw. It employs the logistic regression model. Based on data spanning the years 2016-2018 and covering the concentration of specific harmful particles in the air (e.g. PM-2.5 or PM.10), a preliminary analysis of smog formation was conducted. Then, explanatory variables were identified that may be involved in the occurrence of the phenomenon. Quantitative variables were also selected related to weather conditions and traffic volume plus qualitative variables attached to the calendar date. Based on the above input, model parameters were estimated, and the existing relationships were assessed. Assessment of the model was carried out based on cross-validation, and its quality was validated against a significance analysis of parameters and by testing goodness of fit using the Receiver Operating Characteristic Curve (ROC) and the Area Under ROC curve (AUC).

Literature Analysis: Problem Status

The price for the dynamic economic and industrial development, coupled with the growing demand for carriage services, is more and more harmful compounds released into the atmosphere. The result is air pollution which takes the form of smog. Reduced air purity produces many negative effects, including on human health status, primarily seen in the growing number of respiratory, circulatory, and cancer diseases. It also worsens the mental state of people who are concerned with their health. The World Health Organization estimates that the stressors associated with the environment and its pollution account for 15 to 20% of all deaths in European countries. In addition, according to the Organization for Economic Co-operation and Development (OECD), by 2050 the level of air pollution in cities is forecast to become the main environmental cause of mortality in the world (Treder, 2017).

Air pollution is understood as the presence of a specific volume of liquid and gaseous substances in one of the strata of the atmosphere that causes a nuisance to humans and has a negative impact on their health. The main sources of pollution are natural and are attributed to environmental processes, i.e. forest fires or volcanic eruptions, but they can also be anthropogenic, i.e. related to human activity, e.g. emissions caused by the use of motor vehicles or the heating of homes. The visible effect of exceeded air pollution limits is referred to as smog (Gangwar, 2019).

Smog refers to a non-natural atmospheric phenomenon that is caused by two main factors: human activity and specific atmospheric conditions (Łabij-Redtuta et al., 2019). Based on the available literature on the subject, two main types of smog can be distinguished: the London-type and the Los Angeles-type smog. The London-type smog is mainly caused by air pollution due to the burning of coal and sulfur dioxide emissions. Its chemical structure is: nitrogen oxides, soot, and dust suspended in the air. Such contamination combined with fog causes the formation of sulfuric acid droplets in the air (Read, Parton, 2019; Wielgosiński, Czerwińska, 2020). On the other hand, the Los Angeles-type smog, also known as photochemical smog or tropospheric ozone, consists of carbon oxides, nitrogen oxides, and hydrocarbons. These compounds undergo photochemical reactions and lead to the formation of peroxyacetyl nitrate (PAN), aldehydes and ozone (Czerwińska et al., 2019; Hidy, 2018).

A closer look at the literature on the subject shows an extensive research interest in the phenomenon of smog. Among the available studies, some focus on the mechanisms of smog formation and its chemical composition together with its effects on society. Still, others attempt to design mathematical models that capture the most significant factors behind the occurrence of smog as well as producing forecasts for its development (Łabij-Redtuta et al., 2019). Among the smog forecast models available in the literature, there are statistical and deterministic models. The former cover research mainly based on the analysis of ARIMA (or ARMAX) time series (Ni, Huang, Du, 2017), neural network models (Ravi, 2019) or data mining models (Pusporani et al., 2019). The latter include a diffusion box model, Gaussian diffusion models or chemical transport diffusion models (Bang, 2019; Levi, 2019; Wang, 2020).

The review of the available literature revealed a comparatively small number of studies on the use of the logistic regression model to study the risk of exceeding the nominal limits of concentration of air pollutants leading to the formation of smog. However, in the author's view, it seems reasonable to determine a satisfactory level of air purity and take measures only when the established limits are violated. This approach can help identify significant relationships between the identified factors and high air pollution by pinpointing the source and causes of such a state of affairs and enabling corrective measures to be taken to alleviate negative effects on the environment.

Logistic Regression Model

The study of threats to health security in the capital city of Warsaw was performed using the logistic regression model. It permits a mathematical demonstration of the influence of several variables $X_1, X_2, \ldots, X_n$ on the dichotomous variable Y, which adopt value 1 in the case of high values of air pollution indicators (smog) and value 0 when high air quality and purity is reported. The binding function of the model is the logistic function which takes the form of (1):

$$f(x) = \frac{e^x}{1+e^x} = \frac{1}{1+e^{-x}} \tag{1}$$

where:
e - Euler's number,
x - value of explanatory variable *X*.
The logistic regression model is embodied in the equation:

$$P(Y=1|x_1, x_2, \dots, x_k) = \frac{e^{\beta_0 + \sum_{i=1}^{k} \beta_i \cdot x_i}}{1 + e^{\beta_0 + \sum_{i=1}^{k} \beta_i \cdot x_i}} \tag{2}$$

where:
β_i $i=0,\dots,k$ – regression coefficient,
$x_1, x_2, \dots, x_k$ – independent variables that can be measurable or qualitative.

The logistic regression model is based on the method of expressing probability through odds, i.e. a ratio of probability of occurrence of an event and probability of its non-occurrence. For event A, the above definition takes the form of:

$$(\text{Odds})\text{S(A)} = \frac{P(A)}{P(notA)} = \frac{P(A)}{1-P(A)} \tag{3}$$

The most commonly used measure of association is the odds ratio (OR). For the two compared groups A and B, it is defined as the ratio of likelihood of A v. likelihood of B. The odds ratio is recorded as:

$$\text{OR}_{AxB} = \frac{S(A)}{S(B)} = \frac{P(A)}{1-P(A)} : \frac{P(B)}{1-P(B)} \tag{4}$$

Regression coefficients β_i where $i = 0, \dots, k$ are estimated based on the maximum likelihood estimation (MLE) which maximizes the likelihood function or its squared value. The likelihood function takes the form of (Borucka, Grzelak, 2019):

$$\text{L}(x_1, x_2, \dots, x_n; \theta_1, \theta_2, \dots, \theta_k) = \prod_{i=1}^{n} p(x_1; \theta_1, \theta_2, \dots, \theta_k) \text{ for discrete variables} \tag{5}$$

$$\text{L}(x_1, x_2, \dots, x_n; \theta_1, \theta_2, \dots, \theta_k) = \prod_{i=1}^{n} f(x_1; \theta_1, \theta_2, \dots, \theta_k) \text{ for continuous variables} \tag{6}$$

where:
$\theta_1, \theta_2, \dots, \theta_k$ - unknown distribution parameters,
$x_1, x_2, \dots, x_n$ - observed in the random sample of the value of variable X,
p(x) - distribution determined by the likelihood function,
f(x) - distribution determined by the density function,
L - likelihood function.

Assuming that all observations are independent of each other, the likelihood of observing the entire data set (with established model parameters) is equal to the product of the likelihoods (likelihood function) of individual samples. The results of estimated parameters are values with the highest likelihood (the higher likelihood, the better model to data matching).

Model and prediction quality assessment is carried out by:

- taking advantage of the statistics used in the assessment of diagnostic tests, i.e. accuracy (ACC), sensitivity (SE) and specificity (SP),
- conducting a Hosmer-Lemeshow test,
- plotting the ROC and analysing the AUC.

The use of statistics employed in the assessment of diagnostic tests requires a value known as cut-off point. This is the value of the studied variable that optimally divides a group into two parts: one in which a phenomenon occurs and the other in which it does not. The cut-off point is therefore a fixed value π_0 from the range [0,1] for which:

$$\hat{P}(Y=1|x) > \pi_0 \tag{7}$$

To assess the quality of the classification, two values are most often used simultaneously: sensitivity and specificity (within the meaning of difference: 1 - SP). In order to perform assessment, the received

value pairs 1 - SP and SE are marked on a plane where the horizontal axis represents values 1 - SP and the vertical axis represents values SE. The connection of the two points creates the so-called Receiver Operating Characteristics Curve (ROC) that allows an overall assessment of the predictive quality of the model. It shows all possible cut-off points and related statistics. Moreover, it does not depend on the adopted scale and allows easy reading of sensitivity and specificity values.

If there is a continuous independent variable in the logistic regression model, many different cut-off points can be tested that help distinguish occurrences from non-occurrences, depending on predicted likelihood. It is important to find such a point that reveals high values of both sensitivity and specificity. This will be the optimal cut-off point determined using the Youden index (J). It adopts the following form:

$$J = sensitivity + specificity - 1 \quad (8)$$

The optimal cut-off point corresponds to a case in which value *J* reaches the maximum.

The study of health security threats in the capital city of Warsaw using the logistic regression model

The subject of the study is air quality in the capital city of Warsaw. The analysis covered the values of concentration of individual particles registered in the years 2016-2018, including PM 2.5 [μg/m^3], PM 10 [μg/m^3], ozone O_3 [μg/m^3], carbon monoxide CO [mg/m^3], benzene C_6H_6 [μg/m^3], sulphur dioxide SO_2 [μg/m^3] and nitrogen dioxide NO_2 [μg/m^3]. Regular monitoring is carried out by the Chief Inspectorate for Environmental Protection. It underlies the estimation of air quality index. Exceeding the nominal concentration limits for individual particles in the air causes the formation of smog. An air quality index with a binomial distribution was used as a dependent variable for which *1* means exceeded nominal concentration limits of the above particles, i.e. smog. For the purposes of the study, it was assumed that smog occurs when at least one of the nominal concentration limits for individual particles in the air is exceeded, these limits being: for PM 2.5 - 35.1 [μg/m^3], PM 10 - 50.1 [μg/m^3], ozone O_3 - 120.1 [μg/m^3], carbon monoxide CO - 7.1 [mg/m^3], benzene C_6H_6 - 11.1 [μg/m^3], sulphur dioxide SO_2 - 100.1 [μg/m^3] and nitrogen dioxide NO_2 - 100.1 [μg/m^3].

The building of the model begun with selecting factors that may affect the explanatory variable. Primary selection covered variables related to the calendar date, weather conditions (air temperature, wind speed, air humidity, cloudiness, total precipitation, air pressure and insolation), as well as traffic volume.

In the first step, the impact of the above variables on the dependent variable was analysed. As regards the group of qualitative variables, the analysis was carried out based on contingency tables and testing the relationship strength using independence test χ^2 (Table 1).

Table 1: Independence test results χ2 (Pearson's test)

Variable	Test statistics value	df	p-value
day of week	45.30	6	0.00
month	57.40	11	0.00

The analysis revealed that both the day of the week and the month have a significantly influence on air quality and smog formation. It was confirmed by the results of independence test α^2. These results show that the null hypothesis should be rejected in favour of the alternative one saying that the value of concentration of individual particles in the air depends on qualitative variables linked to the calendar date.
The analysis of the impact of quantitative variables on air quality in the capital city of Warsaw was based on non-parametric Levene's homogeneity of variance test. (Table 2).

Table 2: Results of Levene's homogeneity of variance test

Variable	Test statistics value	p-value
air temperature	3.85	0.00
wind speed	38.71	0.00
total precipitation	9.26	0.00
air humidity	4.85	0.00
cloudiness	4.21	0.00
atmospheric pressure	4.98	0.00
insolation	45.30	0.00
traffic volume	4.15	0.00

The results of the test indicate the need to reject the null hypothesis in favour of the alternative one saying that the variances in individual groups are not homogeneous, which means that the above variables have an appreciable effect on the modelled phenomenon. In addition, a single-factor analysis was performed of quantitative variables along with the corresponding result of the LR (Likelihood Ratio) test, looking at whether the single-factor model containing a given variable is significantly better than the model with only an absolute term (Table 3) (Kozlowski, et. al. 2020).

Table 3: LR test results

Variable	Test statistics value	p-value
air temperature	9.72	0.00
wind speed	79.71	0.00
total precipitation	29.01	0.00
air humidity	13.78	0.00
cloudiness	12.74	0.00
atmospheric pressure	18.35	0.00
insolation	13.32	0.00
traffic volume	11.03	0.00

To ensure the effectiveness of using the logistic regression model requires that the assumption of linearity of independent and quantitative variables be met. Uncritical adoption of the assumption of predictor linearity has an adverse effect on the process of inference about the impact of the variables and may ensue in encumbered values of estimators of regression parameters. Therefore, a graphical assessment of its scatter plots was carried out along with the odds logarithm corresponding to its value. In addition, a linearity test was performed to check whether the quality of the model is statistically significantly affected by the addition of the square of the predictor value (Table 4) (Borucka, Grzelak, 2019).

Table 4: Results of linearity of quantitative variables test

Variable	p-value
air temperature	0.15
wind speed	0.20
total precipitation	0.00
air humidity	0.55
cloudiness	0.68
atmospheric pressure	0.89

Variable	p-value
insolation	0.00
traffic volume	0.89

Calculated *p* value indicates that for the variables *air temperature, wind speed, air humidity, cloudiness, air pressure* and *traffic volume*, there are no grounds for rejecting the null hypothesis indicating the linear impact of the tested variable on the analysed phenomenon.

In the next stage, a multifactor model was built using the backward stepwise method in which statistically significant variables will not be rejected and will not be included in the model's design. The variables used were those whose impact on mortality due to traffic accidents was significant and linear. For qualitative variables, parametrization was carried out with the adopted benchmark (January was used for the variable *month* and Saturday for the variable *day of the week*). Cross-validation was selected as a method of model assessment. Estimated values of logistic regression parameters are shown in Table 5.

Table 5: Estimated parameters of the logistic regression model

Effect	Modelled likelihood: poor air quality Distribution: binomial, binding function: LOGIT				
	Effect level	Parameter	Standard estimation error	Wald test statistics	p-value
month (m)	February	-0.38	0.46	0.69	0.01
month (m)	March	-1.13	0.48	5.60	0.02
month (m)	April	-2.87	0.56	26.20	0.00
month (m)	May	-5.82	0.69	70.88	0.00
month (m)	June	-5.16	0.70	54.84	0.00
month (m)	July	-5.39	0.72	56.02	0.00
month (m)	August	-5.27	0.71	54.36	0.00
month (m)	September	-4.26	0.63	45.46	0.00
month (m)	October	-2.63	0.51	26.28	0.00
month (m)	November	-1.58	0.45	12.19	0.00
month (m)	December	-1.17	0.43	7.46	0.01
day (d)	Sunday	-0.98	0.33	8.71	0.00
day (d)	Monday	-2.05	0.35	34.50	0.00
day (d)	Tuesday	-1.14	0.33	11.87	0.00
day (d)	Wednesday	-0.19	0.34	0.32	0.01
day (d)	Thursday	-0.74	0.34	4.79	0.03
day (d)	Friday	-1.02	0.33	9.53	0.00
air temperature		0.10	0.02	18.72	0.00
air humidity		-0.04	0.01	22.10	0.00
wind speed		-0.90	0.10	85.84	0.00
cloudiness		-0.15	0.05	10.41	0.00
pressure		0.01	0.00	101.93	0.00

All estimated model parameters proved to be statistically significant. For all variables, the Wald test statistical value and the corresponding *p* value are below the adopted significance level α=0.05. On this

basis, it can be concluded that the factors named above have a significant impact on the risk of exceeding the nominal values of concentration limits of harmful particles in the air. The logistic regression model equations is (9):

$$P(dead = 1|X) = \frac{e^a}{1 + e^a} \tag{9}$$

where: $a = -0.38 \cdot February - 1.13 \cdot March - 2.87 \cdot April - 5.82 \cdot May - 5.16 \cdot June - 5.39 \cdot July - 5.27 \cdot August - 4.26 \cdot September - 2.63 \cdot October - 1.58 \cdot November - 1.17 \cdot December - 0.98\, Sunday - 2.05 \cdot Monday - 1.14 \cdot Tuesday - 0.19 \cdot Wednesday - 0.74 \cdot Thursday - 1.02 \cdot Friday + 0.10 \cdot air\ temperature - 0.04 \cdot air\ humidity - 0.90 \cdot wind\ speed - 0.15 \cdot cloudiness + 0.01 \cdot atm.pressure$ (10)

The equation given above can take the equivalent form of odds (11):

$$P\frac{P(dead = 1|X)}{1 - P(dead = 1|X)} = e^a \tag{11}$$

where: $a = -0.38 \cdot February - 1.13 \cdot March - 2.87 \cdot April - 5.82 \cdot May - 5.16 \cdot June - 5.39 \cdot July - 5.27 \cdot August - 4.26 \cdot September - 2.63 \cdot October - 1.58 \cdot November - 1.17 \cdot December - 0.98\, Sunday - 2.05 \cdot Monday - 1.14 \cdot Tuesday - 0.19 \cdot Wednesday - 0.74 \cdot Thursday - 1.02 \cdot Friday + 0.10 \cdot air\ temperature - 0.04 \cdot air\ humidity - 0.90 \cdot wind\ speed - 0.15 \cdot cloudiness + 0.01 \cdot atm.pressure$ (12)

Then, the model's goodness of fit was examined based on a comparison of predicted and observed values. For this purpose, the Hosmer-Lemeshow (HS) test was used. It compares the frequency of occurrence of the modelled class with its actual materialization. The null hypothesis for the above test assumes that the observed and expected frequencies do not differ from each other. The calculated p-value of the HS test is 0.45. It does not give grounds for rejecting the null hypothesis showing that the model matches the data well.

The next step was to calculate the odds ratio of exceeding the nominal values of concentration limits of harmful particles in the air, provided that some of the individual factors occurred. The sign next to the calculated parameter values indicates whether the analysed factor is a stimulant or destimulant of the odds of occurrence of the studied phenomenon (Table 6).

Table 6: Estimated odds ratios

Effect	Modelled likelihood: death as a result of a road accident Distribution: binomial, binding function: LOGIT				
	Effect level	**Odds ratio**	**95.00% Cl**	**-95.00% Cl**	**p-value**
month (m)	February	0.68	0.28	1.68	0.01
month (m)	March	0.32	0.13	0.82	0.02
month (m)	April	0.06	0.02	0.17	0.00
month (m)	May	0.01	0.00	0.01	0.00
month (m)	June	0.01	0.00	0.02	0.00
month (m)	July	0.01	0.00	0.02	0.00
month (m)	August	0.01	0.00	0.02	0.00

month (m)	September	0.01	0.00	0.05	0.00
month (m)	October	0.07	0.03	0.20	0.00
month (m)	November	0.21	0.08	0.50	0.00
month (m)	December	0.31	0.13	0.72	0.01
day (d)	Sunday	0.38	0.20	0.72	0.00
day (d)	Monday	0.13	0.07	0.26	0.00
day (d)	Tuesday	0.32	0.17	0.61	0.00
day (d)	Wednesday	0.82	0.42	1.61	0.01
day (d)	Thursday	0.48	0.25	0.93	0.03
day (d)	Friday	0.36	0.19	0.69	0.00
air temperature		1.11	1.06	1.16	0.00
air humidity		0.96	0.94	0.98	0.00
wind speed		0.41	0.34	0.49	0.00
cloudiness		0.86	0.78	0.94	0.00
pressure		1.01	1.01	1.01	0.00

The calculated odds ratio values (Table 6) indicate that each of the model parameters has a significant effect on the risk of exceeding the nominal values of concentration limits of harmful particles in the air. Speaking of air temperature, the odds ratio indicates that an increase by one degree raises the risk of air pollution by 11%. In the case of air humidity, an increase in the parameter by 1% reduces the risk of worse air quality by 4%. An increase in cloudiness by one octane reduces the risk by 14%, while an increase in atmospheric pressure by 1 hPa increases the risk by 1%. The analysis of the odds ratio for the month variable indicates that in January the risk of exceeding the concentration limits of harmful particles in the air is lower in the other months: 0.01 times in May, June, July, August and September, 0.68 times in February, 0.32 times in March, 0.06 times in April, 0.07 times in October, 0.21 times in November and 0.31 times in December, respectively. Considering the day of the week, it should be noted that for Saturday the risk of exceeding the air purity limits is lower: 0.38 times on Sunday, 0.13 times on Monday, 0.32 times on Tuesday, 0.82 times on Wednesday, 0.48 times on Thursday and 0.36 times on Friday, respectively.

The above model can also be used to predict the risk of exceeding the nominal values of concentration limits of harmful particles in the air, so the next step was to assess the quality of prediction. The ROC was plotted. Its key assessment parameter is AUC, i.e. the area under the ROC. It adopts values from 0 to 1. The larger the area under the curve (AUC), the greater model discrimination. For its assessment, Kleinbaum and Klein proposed the following classification (Table 7) (Borucka, Grzelak, 2019):

Table 7: AUC classification

AUC value	Grading
0.9<AUC<1.0	Excellent discrimination
0.8<AUC<0.9	Good discrimination
0.7<AUC<0.8	Fair discrimination
0.6<AUC<0.7	Poor discrimination
0.5<AUC<0.6	Failed discrimination

The model was assessed using cross-validation: the sample was divided into 10 subgroups containing the training and test sets. The study was then conducted in accordance with the LOO (leave one out) strategy. It provides that all observations are used to estimate the model except one that will be used to calculate prediction error. The overall prediction assessment is an average of errors from individual

sets (Borucka, Grzelak, 2019). Due to the use of cross-validation for model assessment, ROCs were plotted separately for the training and test sets; next, the AUC fields were calculated (Figs 1 and 2). Determined were also the cut-off point and the matrix of classification of actual observations and those indicated by the model (Tables 8 and 9).

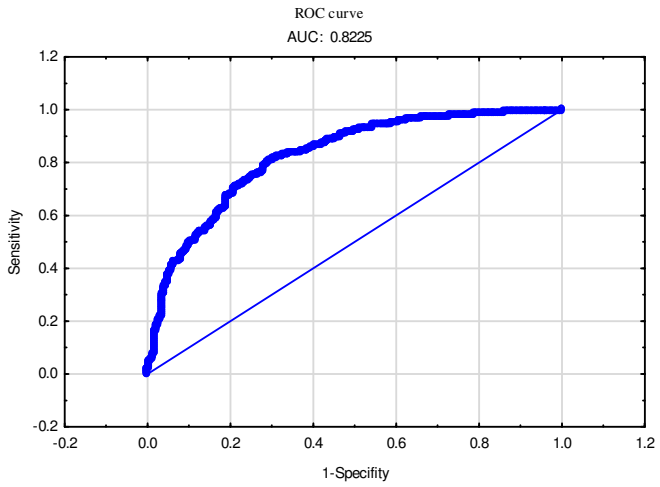

Fig. 1: ROC curve for training set

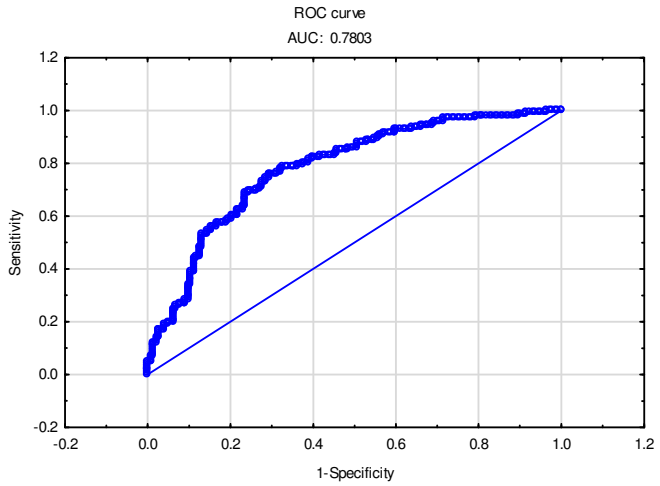

Fig. 2: ROC curve for test set

Table 8: Classification matrix: actual state and model indication

	Predicted: 1	Predicted: 0	Percentage of correct
Observed: 1	480	117	80.40
Observed: 0	157	342	68.54

Table 9: Cut-off point for tested model

Observation no.	Cut-off point	True positive	True negative	False positive	False negative	SE	1-SP
624	0.51	476	351	148	121	0.79	0.29

The calculated AUC values for individual sets are 0.8225 for the training set and 0.7803 for the test set, respectively, which (according to the classification by Kleinbaum and Klein) permits a conclusion that they exhibit sufficient discrimination. This testifies to good data fit and to the sufficient quality of the model in the event of emergence of new data. In addition, the calculated AUC values are similar (the difference between them is not greater than 0.05), which means that the model can be considered correct.

For the proposed cut-off point, sensitivity is at 0.79, while 1 - specificity at 0.29. There are 827 correctly classified cases (476 positive positive and 351 positive negative) and 269 badly classified ones (148 false positive and 121 false negative). For this adopted cut-off point, the value of accuracy indicator, which determines prediction effectiveness, is 75.45%, which allows the model to be considered satisfactory and proves its good predictive properties.

Summary

Air quality in the capital city of Warsaw has a direct impact on the residents' health security. A high level of air pollution affects the mental state of the residents and can also be an underlying cause a number of diseases, including respiratory, circulatory, and oncological conditions. The economic and industrial development and the accompanying population growth in Warsaw provided a stimulus for an analysis aimed to identify factors that significantly contribute to air pollution.

The study discussed in the article was conducted on data on the concentration of harmful particles in the air registered between 2016 and 2018 in the capital city of Warsaw. The objective was to develop a model for estimating the risk of exceeding permissible air pollution limits, which manifests itself in the form of smog. Based on the developed model, it was demonstrated that air temperature has a significant role in smog formation, and a temperature growth one degree increases the risk of smog by 11%. In the case of air humidity, an increase in the parameter by 1% reduces the risk of worse air quality by 4%. An increase in cloudiness by one octane reduces the risk by 14%, while an increase in atmospheric pressure by 1 hPa increases the risk by 1%.

The assessment of quality of the developed model demonstrates its good predictive characteristics. The model can be used as a tool supporting decision-making processes in environmental protection management in the city of Warsaw.

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Methodology for Organization Social Effectiveness Assessment based on Labor Indicators

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Abstract

Organization social effectiveness assessment has been studied for many decades by leading experts in the field of economics and management. However, at present, unified approaches to the problem of quantitative and qualitative measurement of social efficiency have not yet been determined. What makes it even more difficult is that this category is directly related to the working activity of personnel, and human behavior is subject to special laws and has a direct impact on the economic and social results of the organization. The study of scientific approaches and concepts allows us to identify three methodological approaches to assessing the social effectiveness of an organization. Proponents of the first approach believe that the main criteria for social effectiveness are the final results of work for a certain period of time. Proponents of the second scientific trend are of the opinion that indicators reflecting social efficiency should take into account labor productivity, as well as its quality and complexity. The third approach puts social efficiency directly dependent on the forms and methods of working with staff. This study showed that it is impossible to assess the social effectiveness of an organization using just one indicator. To do this, a system of indicators should be used, which collectively will indicate social efficiency. This point contributed to the development of methods for assessing the social effectiveness of an organization based on labor indicators.

Keywords: Social Efficiency, Personnel Management, Performance Indicators

Introduction

Long-term success of the organization is impossible without effective personnel management, since it is investment in a person that contributes to the development and socio-economic growth of the organization and the economy as a whole. However, the problem is exacerbated by a conflict of interest between staff and employers. In an effort to maximize economic benefits, the employer often pushes into the background the needs and interests of workers. A high level of economic efficiency can be achieved only when social efficiency is achieved. Therefore, the problems of assessing social effectiveness are important for scientific research.

Certain aspects of the study of social efficiency from the standpoint of economics and management were considered in the works of well-known domestic and foreign scientists, such as G.V. Atamanchuk (2002), L.P. Vladimirova (2006), B.M. Genkin (2019), I.N. Gerchikova (2017), R.L. Daft) (2015), P.F. Drucker (1998), A.P. Egorshin (2015), A.A. Litvinyuk (2015), I.I. Mazur (2003), M.H. Mescon (1988), M.G. Mankew (2014), Yu.G. Odegov (2011), K.A. Raitsky (2003), S.D. Reznik (2018), S.P. Robbins (2018), H.A. Simon (1995), E.A. Utkin (2000), V.M. Shepel (1999), I.O. Shkaratan (1982), K. Eklund (1991) among others.

General approaches to social efficiency were studied, however, the assessment of social efficiency based on labor indicators is not found in the works of domestic and foreign researchers.

Materials and Methods

The scientific problem was investigated on the basis of the Department of Economics and Management of the Cheboksary Cooperative Institute (branch) of the Russian University of Cooperation using information resources that are available, including electronic library systems, official websites of existing Russian organizations. The object of the study is organization of Russian business entities, their structural units (training and development of personnel, personnel administration, staff recruitment groups, remuneration management departments), as well as mechanisms for participation in ensuring the organization's social effectiveness.

In the course of work, general scientific methods of dialectics, system analysis, expert assessments, opinion polls, and the theory of social efficiency were used.

Research Results and Discussion

The success of the economy of the organization is determined by the ability to increase the volume of activity, and of the social component - by the growth of the real level of remuneration, increase of the social security of staff, improvement of the quality of working standards, as well as the comprehensive development of a person.

In our opinion, social efficiency comes to the foreground as the economy becomes more socially oriented. We propose to consider this category as workers' satisfaction with the level oftheir salary, labor intensity, social security, and career and professional growth prospects. Based on the works of well-known Russian scientists G.V. Atamanchuk, B.M. Genkin, A.P. Egorshin, E.A. Utkin, it was proposed to group the factors and criteria of the organization's social effectiveness based on labor indicators (Fig. 1).

The studied category is very specific, which leads to difficulties in choosing the criteria for its evaluation. The following are the leading quantitative and qualitative factors of social efficiency: social (qualitative) structure of personnel, salary, degree of satisfaction of the staff with their work. Indicators of labor are the criteria for social effectiveness of the organization.

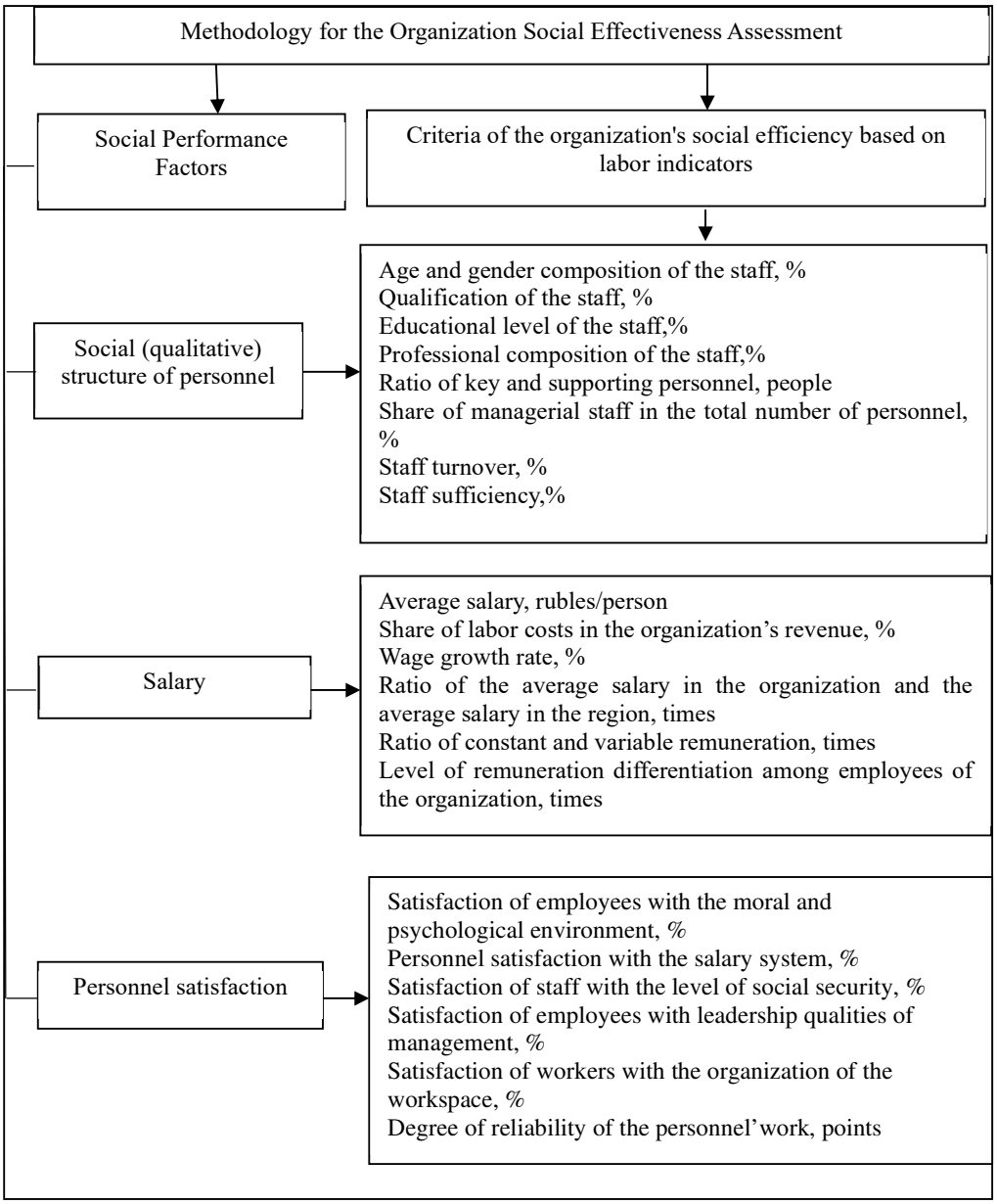

Fig. 1 : Factors and criteria that are taken into account when assessing the organization's social performance based on labor indicators

All researchers who studied the problem of social efficiency assessing agree that it is much more difficult to measure social efficiency than economic performance. A number of researchers argue that social effectiveness of an organization is largely determined by the system of motivation and stimulation of labor, organizing work with personnel and an established organizational culture. A more typical methodology for assessing social effectiveness is proposed by Russian scientists and economists Yu.G. Odegov and T.V. Nikandrova They believe that attention should primarily be focused on the prevention of negative aspects (damage to the physical and psychological health of the employee) and implementation of benefits (ensuring a decent standard of living, social contact, recognition of merit, individual development).

After a thorough and detailed analysis of the scientific and methodological literature, we propose a grouping of parameters for assessing the organization's social effectiveness based on labor indicators and their generalization according to the object and content of the analytical work (Fig. 2).

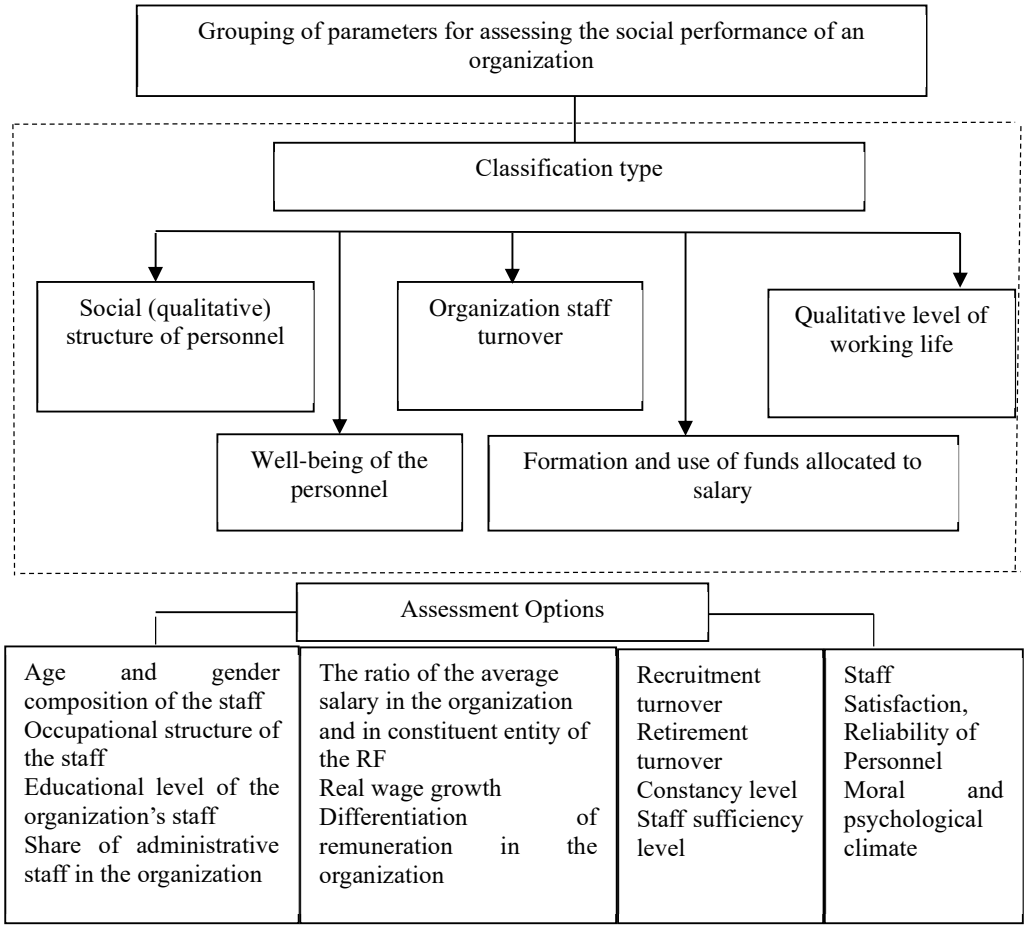

Fig. 2 : Scheme of grouping parameters for assessing the social effectiveness of the organization

Based on the proposed criteria parameters, we propose the following groups of indicators reflecting the social effectiveness of the organization (table 1).

Table 1: groups of indicators showing the social effectiveness of the organization

Indicator groups	Essential Content
Salary level	Guaranteed permanent part of renumeration (salary), remuneration for certain achievements in work, annual and quarterly bonuses, surcharges
State social guarantees (according to Labor Code of the Russian Federation)	Annual paid leave, payment of state-guaranteed benefits, payment of sick leave
Social guarantees provided by the organization	Payment of material assistance, gifts for significant dates within the framework of corporate policy, compensation payments

	(corporate communications, food, travel, additional medical insurance)
Environment in the workplace	Socio-psychological climate, management styles in the organization, stress prevention, positive motivation
Relations with senior management in the organization	Respect for employee rights, relations with the organization's management, degree of respect and trust towards managerial staff, competent personnel policy in the context of digitalization of the economy
Career management	Staff turnover, regular internships and staff development, promotion solely on merit and performance, lack of apathy and stagnation
Organization of workspace and time	Security of the workplace with everything necessary, presence of a parking lot for personal vehicles, provision of company's vehicles, application of time management tools, sense of personal safety

Thus, regardless of what changes are observed in the economic and social development of the country, the main trends in ensuring the proper level of social efficiency of the organization are:

1) wage system as a key motivational incentive;

2) state guarantees in the field of labor relations, ensuring the implementation of basic rights and interests of workers;

3) social guarantees to employees by the organization in the form of non-state benefits;

4) belonging to a certain social group within the framework of labor relations, which will serve as a source of social satisfaction or vice versa;

5) relations developing along between the administration and the employee;

6) possibility of changing status as a result of career growth, leading to the development of self-motivation and self-expression of the staff, and, therefore, has an impact on the social effectiveness of the organization.

A study of approaches to assessing social effectiveness shows to the specificity of this category and causes problems in the selection of criteria for its assessmnent. Nevertheless, it is undeniable that social efficiency is directly related to the organization's personnel and its labor activity, which means that our proposed methodology for assessing social efficiency based on labor indicators is justified.

Table 2 presents the indicators recommended for assessing the social effectiveness of the organization.

Table 2: parameters for assessing the social effectiveness of the organization based on labor indicators

Indicators	Calculation Method	Note
Average salary per employee, rubles/person.	The ratio of labor costs to the average number of employees	the indicator reflects the level of salary and trends to its change
Share of labor costs in revenue, %	The ratio of labor costs to revenue, multiplied by 100%	allows to show economic feasibility of labor costs in the cost structure
Staff turnover rate	The ratio of the number of those who left the organization to the average number of employees	characterizes the level of staff stability

Socio-psychological climate, points	Determined on the basis of studies involving independent experts in this field	allows you to identify leaders, motivation, efficiency of organizational and corporate culture
Qualitative level of staff work, points or %	I) The ratio of the proportion of complaints to the average number of employees II) Expert assessment of quality according to a scale	allows you to evaluate the quality of staff with an external quality assessment by consumers and customers
Quality of organization management, points	Determined by an independent panel of experts according to a selected scale	increases the brand capital of the organization (image)
Ratio of key and supporting personnel, person	The ratio of key personnel to supporting personnel	allows you to judge the ratio of the two main categories of personnel
Average qualification level of staff	The sum of the products of the number of employees of a particular category and the category as a whole	reflects the skill level of the organization's personnel
Educational level of the organization's staff, %	The ratio of the number of employees with higher and secondary vocational education to the average number of employees	allows you to judge the level of education of staff
Ratio of the average salary in the organization and the average salary in the constituent entity	The ratio of the average salary in the organization to the average salary in the constituent entity	reflects the correspondence of the size of the average salary in the organization with the average value in the region
Actual salary, rubles	Ratio of nominal wages and price index	reflects the amount of material benefits that an employee can receive in the amount of nominal earnings
The level of differentiation of wages	The ratio of the maximum and minimum wages	reflects differences in the level of remuneration between employees of the organization
The degree of satisfaction of staff: - relations in the team - remuneration - social security - career growth - organization of the workspace	It is determined on the basis of sociological and psychological studies (primarily questionnaires) with the involvement of independent experts and specialists of consulting firms	allows you to understand how satisfied the employees of the organization with their work, the atmosphere in the team, working conditions
The degree of staff cohesion	Determined based on specialized tests (e.g. Seashore)	serves as an indicator of the organizational culture of the organization

The proposed methodology for assessing social efficiency based on labor indicators is quite universal and can be used to conduct a comprehensive analysis of social efficiency both at the organization level and in the macroeconomic aspect.

Conclusion

Based on the study, the authors come to the following conclusions. Efficiency should be considered both from the economic and social points of view, with priority being given to social efficiency. Considering that social efficiency is achieved, first of all, through the realization of the interests of personnel, it is proposed to evaluate it on the basis of labor indicators, which can be integrated into the following groups:

1) social (quality) staff structure;

2) remuneration;

3) employee satisfaction with work.

Summarizing, it should be noted that the use of labor indicators for assessing social efficiency was not chosen accidentally, since the success of any business mainly depends on effective, self-developing, loyal to the organization personnel.

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Public Relations Activities of a State Parks and Gardens Agency in Promoting Environmental Sustainability in Nigeria

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Abstract

In Public Relations, the Publics of an organisation are essential; therefore, implementation of a planned programme of action must serve the interest of both the organisation and its publics. Public relations is a management function, and its activities and tool are indispensable to every organisation for building and sustaining their image in public, especially to their audience. This study seeks to find out the awareness of public relations actions carried out by the ministry and agency and the impact of their activities on the citizens. The study focused on the Lagos state ministry of environment and one of its agencies, Lagos State Parks and Gardens, which were selected purposively. The population was selected purposively due to accessibility and availability of respondents also; every citizen has an equal chance of being selected both male and female. The sample size for the study was 250 questionnaires, but 200 questionnaires were retrieved successfully from the field. The study discovered an information gap and the need for more awareness of organised public relations activations. However, the study recommends that the government's public relations actions should help the citizens to imbibe the appropriate cultures and lifestyles that would grow organisations. Also, other researchers are to find out the awareness and the impact of this initiative, LASPARK on the populace in Lagos covering other local governments and zones.

Keyword*:* Awareness, Publics, Public Relations, Healthy Living, Environment, Impact

Introduction

The British Institute of Public Relations defined Public Relations as a deliberate, planned and sustained effort to establish and maintain mutual understanding between the organisation and its public. According to the Mexican Statement (1978), public relations is the art and social science of trend analysis, management counselling and implementation of planned programmes.

The sustainability and development of the environment become a focus to tackle. Hence, the Lagos State Ministry of the Environment came to existence and saddled with the responsibility of ensuring a clean, healthy and sustainable environment for the wellness of the citizens. The wellness and totality of the citizens are imperative to the government in order to achieve a sustained environment. The Lagos State Parks and Gardens Agency was established with its mandate to make Lagos greener and healthier through the creation and maintenance of operational parks and gardens and planting and maintenance of trees.

Statement of The Problem

The Lagos State Ministry of the Environment focuses on the clean, healthy and sustainable environment for the wellness of the public. Lagos State Parks and Garden Agency is one of the agencies with a mandate to make Lagos greener and healthier through maintenance of trees in conjunction with the Sustainable Development Goals 15- emphasis on Life on Land. Despite the existence of LASPARK, there are issues surrounding tree felling, planting of trees, parks

development, and gardens tending. Trees maintenance has become necessary for combating the adverse effects of climate change and the safety of lives on land. Therefore, this study seeks to find out the awareness of public relations actions carried out by the ministry and agency and the impact of their activities on the citizens.

Research Objectives

The objectives of this study are to find out the Public Relations activities carried out by the Ministry and Agency, how informed are the citizens about it and its impact on them.

1. To find out the extent of awareness of the ministry and agency PR activities on the public.
2. To find out the impact of the PR tools on the public.

Research Questions

1. What is the extent of awareness of the ministry and agency PR activities on the public?
2. What is the impact of the PR tools on the public?

Theoretical Framework

Excellence theory supports the objectives of this study. It is a public relations theory that stipulates that the effectiveness of an organisation depends on the engagement of public relations practice. Public relations determine an organisation's structure, relationship management and public worth (J. E. Grunig 1992; Dozier et al. 1995; L. A. Grunig et al. 2002).

The theory's emphases on the relevance of public relations in an organisation and society, following the social role of the top management, their decisions impact on the public. The theory indicates that proffering effective solution to stakeholders' problems must be a primary goal of an organisation. If not achieved, the stakeholders might force the organisation to be flexible or oppose it in ways that add cost and risk to corporate progress.

Research Design and Methodology

In this study, the researcher adopted the survey research design. Survey research design has an unbiased representation of the population of interest and by gathering of the same information from each participant (Owens, 2002). The use of a questionnaire instrument was engaged to get answers to the research questions from respondents. The questionnaires were administered on the field to the selected respondents with the aid of research assistants. The research adopted the purposive and simple random sampling technique. The researchers administered the questionnaire based on random selection as every individual had an equal opportunity to participate. The sample size for the study was 250 questionnaires, but 200 questionnaires were retrieved successfully from the field.

Literature Review

Public Relations, as viewed by Grunig and Hunt (1984, p.6) is 'the management of communication that exist amid an organisation and its publics'. Besides, PR is the management function that deals with creating and maintaining understanding relationships that are valuable to both an organisation and its publics to boost its success (Cutlip et al., 2000 p.6).

Victoria Ajala (2001) source the definition of public relations as created by Harlow as the unique function that helps the management to build and maintain mutual lines of communication, approval, for cooperation between the companies and their publics. It further involves managing organisational problems and helping to inform management on issues that are of the public's interest (Salau et al., 2020). Furthermore, these help shape the decisions that would be taken by the management, which will not only benefit its publics but help actualise their goal. (Aiyende, *et al.*, 2020b; Fayemi, *et al.,* 2020a; Fayemi, *et al.,* 2020b; Fayemi, *et al.,* 2020c; Fayemi, *et al.,* 2020d; Olabanjo, *et al.,* 2020b;

Omokiti, *et al.,* 2020a).

Organisations employ these tactics to establish, maintain and to sustain a favourable image and to obtain adequate publicity. These plans are documented, signed and tied to an organisation's goal, which conveys a clear message that focuses on the values and interests of the public. The plans aim to achieve the specified objectives (Adelua *et al.,* 2020a; Adelua *et al.,* 2020b; James *et al.*, 2020d; Nwosu *et al.,* 2019; Adelua *et al.,* 2020c; Adelua *et al.,* 2020d; Aiyende *et al.*, 2020a).

Public relations practitioners engage different platforms to reach their publics online and offline; through the media, town hall meetings, public announcements, to mention a few. These are tools used to disseminate their information and intentions to the people (Nwosu *et al.*, 2020a; Olabanjo *et al.,* 2020a; Omokiti *et al.,* 2020b; Salau *et al.,* 2020a; Salau *et al.,* 2020b; Nwosu *et al.,* 2020b).

The practice of PR has become a need for an organisation to its publics. Hence, the need for PR expert in an organisation to predict consequences, counsel top leader and implement a planned program of action according to the Mexican statement of 1978. PR has become an integral part of an organisation's function. The functionality of an organisation is dependent on its level of exposure to PR activities and what it entails (Udomisor, 2013).

Furthermore, PR upholds corporate credibility which rubs off on products, services and even employees (James *et al.,* 2020a; Ndubueze *et al.,* 2019; James *et al.,* 2020b; James *et al.*, 2020c; Ndubueze *et al.,* 2020; Nejo *et al.,* 2020; Olabanjo *et al.,* 2019). Relationship management is the essence of public relations tied to organisational performance and overall success (Odiboh *et al.*, 2020a; Odiboh *et al.,* 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019).

Environmental Sustainability

Environmental sustainability implies that sustaining the environment involves a system that must be kept in check while maintaining the natural resources as used by humans at when due to replenish themselves. Though climate change is a global phenomenon, other environmental problems such as erosion, deforestation, and scarcity of drinkable add up to harm the poor, especially the developing countries. It is the collective role of both the public and private sectors to tackle these issues because environmental degradation has a considerable imprint on national economic growth. The issues as identified are insufficient government commitment, weak institutional capacity to deal with them and insufficient attention to sustainable development goals (World Bank, 2008).

The World Economic and Social Survey (2015) discussed that the international community must harmonise the climate change imbalance between the developed and developing countries. Cooperation is necessary to reduce carbon dioxide emission globally. Also, the effort to safeguard forest with sustainable production and consumption pattern, deforestation is seen to be caused by factors beyond the forest sector's control. The role of forests as viewed in the life and maintenance of the indigenous people should receive much attention. Likewise, availability of potable drinking water and sanitation depends on public ingenuity, supported by public relations efforts of government and business organisations (James *et al.,* 2020a; Ndubueze *et al.,* 2019; James *et al.,* 2020b; James *et al.*, 2020c; Ndubueze *et al.,* 2020; Nejo *et al.,* 2020; Olabanjo *et al.,* 2019).

Sustainable Development Goals 15 - Life on Land - focuses on restoring, protecting and promoting and ensure the effective use of terrestrial ecosystems. It includes managing the forests, combating desertification, encouraging biodiversity and reversing land abuse. Human activities had caused severe damage to the ecosystem through deforestation, loss of natural habitats and land degradation. The target is that by 2030 according to the SDGs 15, deforestation would end. Forest restoration and conservation of land ecosystem would take place.

Ugochukwu (2008) opined that to ensure environmental sustainability in Nigeria, the government should increase the budgetary allocations to the environmental sector. More expenditures should go to capacity building and reorientation of the ministries and agencies. Also, the government should come up with strategies to ensure that environmental laws are adhered to by the citizens and

companies. The Nigerian environment is still under assault from various challenges; the different efforts from the government to curb such challenges are yet to stem the tide adequately. Existing policies and laws are mostly ineffective (Leke & Leke, 2019).

According to Oyefara 2013, he discovered that the Lagos state leaders need to possess essential characteristics of good governance which is also relevant to the future needs of the society. He found that the state government dedicates to improving the environment and its serenity.

Data Analysis

After the collection of data, it was analysed through frequencies and percentages by the use of SPSS (Statistical Package of the Social Science) software. The tables interpret the findings.

Table 1: Gender

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	female	127	63.5	63.5	63.5
	male	73	36.5	36.5	100.0
	Total	200	100.0	100.0	

Table 1 indicates that 73 of the population (36.5%) are males, while 127 (63.5%) are females. These show that the mainstream of the respondents are females.

Table 2: Age Bracket

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Under 18-25	53	26.5	26.5	26.5
	26-35	91	45.5	45.5	72.0
	36-45	41	20.5	20.5	92.5
	46 and above	15	7.5	7.5	100.0
	Total	200	100.0	100.0	

This table shows the age bracket of the respondents stating that 45.5% are between the ages of 26-35, 26.5% are between the ages of 18-25, ages 36-45 has a percentage of 20.5% while the lowest which is 7.5% consist of ages 46 and above. Therefore, the highest age bracket which engaged in this exercise are ages 26-35 (45.5%).

Table 3: Marital Status

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Single	90	45.0	49.2	49.2
	Married	93	46.5	50.8	100.0
	Total	183	91.5	100.0	
Missing	System	17	8.5		
Total		200	100.0		

Table 3 indicates that the married has the highest percentage with 93(46.5%) while the single has 90 (45.0%).

Table 4: Educational Qualification

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	SSCE	37	18.5	19.5	19.5
	OND/NCE	57	28.5	30.0	49.5
	HND/BSC	90	45.0	47.4	96.8
	Specify	6	3.0	3.2	100.0
	Total	190	95.0	100.0	
Missing	System	10	5.0		
Total		200	100.0		

The table states that 90(45.0%) are HND/BSC Holders, 57(28.5%) are OND/NCE holders while 37(18.5%) are SSCE holders and 10(5.0%) were unanswered. The lowest 6(3.0%) specified that they were either postgraduate students or PhD holders.

Table 5: Length of residence in Lagos

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	1-5 years	50	25.0	25.0	25.0
	6-10 years	7	3.5	3.5	28.5
	11-15 years	67	33.5	33.5	62.0
	others	76	38.0	38.0	100.0
	Total	200	100.0	100.0	

Table 5 shows that 76 (38.0%) have lived in Lagos above 15 years. 67 (33.5%) have resided in Lagos for 11-15 years, 50 (25.0%) have resided for 1-5 years while 7 (3.5%) resided in 6-10 years.

Table 6: View about Lagos and its Environ?

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Very good	12	6.0	6.0	6.0
	Good	132	66.0	66.0	72.0
	Not good	56	28.0	28.0	100.0
	Total	200	100.0	100.0	

This table indicates that 132 (66.0%) viewed Lagos and its environs to be Good, 56 (28.0%) viewed it to be Not Good while 12(6.0%) viewed Lagos and its environs to be Very Good.

Table 7: Is there any Difference from the Lagos of 2010 and the Lagos of 2019?

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	132	66.0	66.0	66.0
	No	68	34.0	34.0	100.0
	Total	200	100.0	100.0	

This table states that there is a massive difference from the Lagos of 2010 and the Lagos of 2019 with a highest agreed percentage of 132(66.0%) while 68(34.0%) states No.

Table 8: Awareness of LASPARK

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	79	39.5	39.5	39.5
	No	121	60.5	60.5	100.0
	Total	200	100.0	100.0	

According to the table, 121 respondents (60.5%) are not aware of LASPARK while 79(39.5%) are aware of the agency, LASPARK.

Table 9: existence and function worth it?

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	72	36.0	36.0	36.0
	No	128	64.0	64.0	100.0
	Total	200	100.0	100.0	

Table 9 shows that 128 (64.0%) find the existence of LASPARK not worth it while 72(36.0%) agrees that its existence and function are worth it.

Table 10: Awareness of LASPARK's Public relations activities

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	94	47.0	47.0	47.0
	No	106	53.0	53.0	100.0
	Total	200	100.0	100.0	

As viewed from table 10, it indicates that 130(65.0%) are not aware of the public relations activities carried out by LASPARK. In comparison, 70(35.0%) are aware of the activities, which shows a gap in information.

Table 11: Kindly mention them

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Mentioned	101	50.5	100.0	100.0
Missing	System	99	49.5		
Total		200	100.0		

According to table 11, 101 respondents with 50.5% mentioned the activities they aware of being carried out by LASPARK. In contrast, 99 persons with 49.5% failed to mention the public relations activities they are exposed to or aware of carried out by the agency, LASPARK.

Table 12: Is the Environment conducive enough for Healthy Living?

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	76	38.0	45.0	45.0
	No	93	46.5	55.0	100.0
	Total	169	84.5	100.0	
Missing	System	31	15.5		
Total		200	100.0		

As shown above, 93 respondents, with 46.5% disagree that the environment is not conducive enough for healthy living; 76 respondents with 38.0% agree that the environment is conducive for healthy living. In comparison, 31 respondents with 15.5% failed to respond to the question. This result shows that the environment is not conducive enough for healthy living.

Table 13: Impact of the PR activities

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Mentioned	98	49.0	100.0	100.0
Missing	System	102	51.0		
Total		200	100.0		

Table 13 indicates that 102 (51.0%) did not respond to the impact of Public relations activities on them. In comparison, 98 (49.0%) mentioned its impact on them.

Table 14: Usefulness of the beautification of street, gardens, parks and lawns useful?

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	94	47.0	47.0	47.0
	No	106	53.0	53.0	100.0
	Total	200	100.0	100.0	

According to table 14, it shows that 106 respondents with 53.0% do not find the beautification of street, gardens, parks and lawns useful. In contrast, 94 with 47.0% find such an initiative to be useful.

Discussion of Findings Based on Research Questions

1. What is the extent of awareness of the ministry and agency PR activities on the public?

As seen in table 10, it indicates that 130 respondents are not aware of the public relations activities carried out by LASPARK. In comparison, 70 respondents are aware of the activities which show a gap in information. To some extents, the Public Relations activities carried out by the ministry and agency in view, LASPARK is known as the public but not to a large extent. This finding shows that much effort is necessary to create awareness for the activities. The functionality of an organisation is reliant on its level of exposure to PR activities and what it entails (Udomisor, 2013).

2. What is the impact of the PR tools on the public?

From findings, the PR tools have a slight influence on the habit patterns. Many of the respondents are still oblivious about the PR tools engaged by the ministry and the agency to disseminate their

information. The assumption is that there is an influence on the public, but findings show the discrepancy.

Some respondents claimed that the PR tools have added to their knowledge base, helped them to engage in public sanitation, and enabled their environmental consciousness. Some say the public relations actions have enlightened them on waste disposal and volunteer opportunities.

Public Relations, as viewed by Grunig and Hunt (1984, p.6) is 'the management of communication that exist amid an organisation and its publics'. Besides, PR is the management function that deals with creating and maintaining understanding relationships that are valuable to both an organisation and its publics to boost its success (Cutlip et al., 2000 p.6).

From findings, several respondents agreed that there is much difference between the Lagos of the early 20s and the Lagos of late 20s (see Table 7). Also, 79 respondents claimed to be aware of LASPARK. In comparison, 121 respondents seem to be unaware; thereby indicating many gaps in the awareness of the existence of the agency responsible for the beautification of lawn, garden, trees and ensuring sustainability in conjunction with the Lagos State Ministry of the Environment.

Some respondents are also aware of the executed public relations activities such as media relations, stakeholders' meeting, fliers distribution, news conference, and public enlightenment campaigns. There were other initiatives to deal with the dirty environment and tree felling.

According to Table 9, one hundred and twenty-eight (128) respondents did not find the existence of the agency worth it; thus, showing that despite the substantial PR activities being out by the agencies via several platforms, there remains an information deficiency.

A fair representation of the respondents agrees that Lagos is conducive for healthy living. In contrast, 93 respondents disagree with this statement. They asserted that Lagos is over-crowded, dirty and everybody wants to live in Lagos at the same time, which has contributed to the inability of Lagos to be conducive enough.

Beyond beautifying the lawns, gardens and trees, it is necessary to sensitise the public about the benefits and importance of ensuring a sustainable environment for every citizen to live in (see table 14).

One of the functions of Public relations is Feedback. Feedback helps the organisation to make proactive decisions and to ascertain that the public duly understands their messages and activities.

Conclusion

Findings show that the Public relations activities carried out by the ministry and its agency LASPARK are oblivious to the public. The PR activities as claimed to be recognised by the public are mere assumption. There is need for educating the citizens more often on the need of the gardens, parks, lawns and other activities and amenities put in place for their benefit in order to maintain a sustainable environment conducive for their total well-being in conjunction to the SDGs 15- Life on Land.

Recommendation

The study recommends the reengineering of the Lagos State Ministry of the Environment and LASPARK officials to be able to develop policies of global standards in alignment with the SDG 15. Public sensitization on climate change and advocacy on appropriate lifestyle living should increase forthwith.

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Community Observations of the Public Relations Activations of a State Ministry of Housing in Nigeria

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Abstract

This paper is to investigate and find out the public perceptions on the activations of the Ministry of Housing using the Lagos State Development and Property Corporation (LSDPC) as a case study. Public relations plays important roles in organisations because of the level of competitions and trust from both existing and prospective patrons (Fayemi, 2019). Two hundred (200) copies of questionnaires were distributed to the members of the public to examine the level and impacts of these PR activations. The Excellence Theory by James Grunig formed the theoretical framework for this study. This study concluded that more still needs to be done when it comes to informing and creating awareness about the activities and practices of the corporation. Many respondents are not aware of the corporation's activations. Moreover, public perception of the image and activations of LSDPC is not encouraging. Based on these results, this study recommends an intentional creation of public awareness through impactful activations involving the public.

Keywords: Public, Perceptions, Activations, Ministry for Housing, Lagos state, Development, Property, Corporation.

Introduction

Public relations activities range from program planning which means analysing problems and opportunities, defining goals and planning activities. It measures results, for the progress of the organisation (Aiyende *et al.*, 2020b; Fayemi *et al.*, 2020b; Fayemi *et al.,* 2020c, Fayemi *et al.,* 2020d; Olabanjo *et al.,* 2020b; Omokiti *et al.,* 2020a). This way, Public relations activations plays a vital role in connecting publics all over the world and enabling them to discuss mutual concerns and solutions (Omokiti *et al.*, 2020a). However, James *et al.* (2020b) opine that the presence of PR in the government is not new; it carries the responsibility of disseminating information to the citizen of a country to make them fully aware of the governments' activities. Public relations activations and tools enhance housing development which can likely shape the common environment, reputation, developer's actions, and perceptions of the local population to be served (James *et al.,* 2020a; Ndubueze *et al.,* 2020b, James *et al.,* 2020b; James *et al.,* 2020c; Ndubueze *et al.,* 2020; Nejo *et al.*, 2020a; Olabanjo *et al.,* 2019)

Access to suitable, affordable housing and property is a fundamental human right, which is "essential to the well-being of individuals, families and communities" (ACOSS 2008 in Select Committee 2008, p29). The provision of modern housing schemes and the transformation of slums and ghettos in Lagos dates back to 1928 with the inauguration of the Lagos Executive Development Board (LEDB); among other things, the LEDB was chiefly charged with the task of getting rid of the filth and unhealthy living conditions that existed in Lagos at that time. The Board also intended to transform the slum areas and ghettos into a planned and habitable setting. Though the Board was the sole planning and development authority in central Lagos and its surroundings; the Lagos City Council was responsible for maintaining its highways, drains and open spaces. Also shared with the City Council was the approval of construction plans, an uncomfortable process that always resulted in the

delay in approving building plans. The attendant frustration of private developers often led to developers breaching planning regulations. However, subsequent urban expansion required the involvement of the Ikeja Area Planning Authority (IAPA) in controlling the development and supply of public housing outside the city.

On the one hand, the (IAPA) had full powers to monitor building plans and private development in its area of jurisdiction, but such plans had to be forwarded to the appropriate local health authorisation council. With the establishment of Lagos State in 1967, the need to curb the lack of proper coordination between the existing planning authorities involved and the unnecessary dissipation of energy without meaningful results necessitated the formation of a central body to be charged with the responsibilities of the various bodies. Consequently, the Lagos Executive Development Board (LEDB), the Ikeja Area Planning Authority (IAPA) and the Epe Town Planning Authority (ETPA) metamorphosed into what is now known as the Lagos State Development and Property Corporation (LSDPC). The LSDPC granted this metamorphosis legality. Edict No. 1 of 1972.

The way housing is perceived and consumed influences a range of factors. A major constraint on housing choices is the availability and supply of new homes, which, despite some recent efforts, lags significantly behind housing demand (NHPAU, 2009). There are also cultural influences that make the way people live or view their identity and belonging a home important (Savage et al., 2006). There are also strong demographic pressures on demand, as increased longevity and solitary living patterns mean household growth rates are higher than population growth rates (NHPAU, 2009). Residential property is now primarily seen as an investment rather than good use and is now contributing to financial planning for a household (Smith & Searle, 2006). Every investment is dependent on land, in some way or another. The land is the key component of the private sector, national and local investment, far-reaching land-related projects, tax collection, land re-adjustment, expropriation, and other similar socio-economic applications (Candas & Yomralioglu, 2016).

Though land value is one of the most important data required for all these investments and applications, the "true value" is typically difficult to predict. Assessing the value of land by assessing many factors related to real estate, e.g. location, climate, topography, and conditions of use are called valuation of real estate, which is a key factor in land management. Planning process land use can influence the supply and range of housing produced in both new development and redevelopment areas. With the rapid population growth that resulted in illegally building homes, buildings vulnerable to disasters, utilities and transportation, one needs to consider the local housing and property values (Prasetyo, & Putri, 2018)

Statement of the Problem

The rate at which housing and properties are being sold is of interest to this studies because an average individual wants to own a house or at least a property but the process of getting any of these things to dissatisfy the members of the public; when it comes to the matter of getting original documents of any property and the troubles such individual faces in a building is quite discouraging. According to SDG 9, which encompasses industry, innovation and infrastructure, Lagos State Development and Property Corporation must be able to provide their operations/duties following these goals. One of the major problems public relations faces as to do with assumptions, therefore; this research seeks to investigate Public Perceptions on the activations of the Ministry for Housing: A focus on Lagos state development and property Corporation

Objectives of the Study

The research aims to examine public expectations regarding the Lagos state construction and property corporation's activations. The following research questions will be answered based on those goals:

1. What are public relations practices in the Lagos state development and Property Corporation?
2. To what degree is the impact of these PR activations?

Literature Review

According to Grawe (2012), practitioners operating as service providers are commonly limited to advocating organisational viewpoints. This role prevents them from helping the company develop and sustain long-term partnerships that guarantee long-term organisational performance, requiring some adjustment to public expectations and needs. In establishing and maintaining organisational legitimacy, a company or organisation that has a sound public relations philosophy works unceasingly to build and maintain a good reputation on which present and future operations depend. Companies that have survived for decades, or even centuries, have built a good image-based mainly on their 'bonding' with their various publics which public relations is all about (Metzler 2001, p. 321) Public relations have achieved a secure place in the corporate structure. Significant expenditure for public relations programs is essential.

However, Ledingham (2018) noted that the relational viewpoint holds that "public relations combine the needs of organisations and the public through organisational-public relations management. The idea of managing relationships has several advantages. As Ledingham puts it, "It offers a mechanism to evaluate how public relations programs relate to organisational objectives." Such goals often go beyond profitability to encompass social and even political objectives. Ledingham claims, among others, convincingly that the relational viewpoint is a reasonable unit assessment of the influence of public relations in the organisation-public relationship. Ratio dimensions can define an organisation-public relationship which, in turn, can act as a predictor of public perception and choice behaviour and, most importantly, the result of effective relationship management is mutual understanding and benefit. The point here is that an organisation that manages its relationship with the public has a high chance of positive perception, which often leads to higher patronage of the company's product and ultimately, higher profitability.

As previously noted, Relationship management is the core of public relations in every modern sense, in particular, where organisational success is involved. Several researchers argue that "relationship should be constructed to ensure the corporate bottom line's effectiveness" (Jo, 2006, p. 227). Although many admit that public relations is useful within an organisational framework, they also observed that the contributions of public relations are difficult to measure. The seeming difficulty in measuring public relations contributions to organisational effectiveness and performance is often exaggerated because of obsession with quantification as life depends entirely on figures and statistics. In real-life situations, everything is not reduced to figures alone. In this case, the use of digital public's relations practices also helps in enhancing the existing relationship with the publics (Salau *et al.,* 2020)

Housing Affordability

Affordable housing is the supply of houses for less than market value for sale or rent. These include a housing with voucher assistance systems depending on the location and the tenant; housing built with low-income tax credits for rent; and affordable housing. 'Affordable housing' was used as an alternative to words like 'public' housing, 'private' housing or 'low cost' (Gabriel et al. 2005, p6). Practical interpretations of what constitutes affordable housing are typically unique to the context of the normal policies and services. However, they typically have common features such as a notion of what is affordable, and a reference to the target group(s) for which they are intended (Milligan et al. 2007, p26). Creating awareness and impacting personnel is a paramount function every ministry should embrace in other to bring diaspora partnerships (Adelua *et al.,* 2020a; Adelua *et al.,* 2020b; James *et al.,* 2020d; Nwosu *et al.,* 2019; Adelua *et al.,* 2020c; Adelua *et al.,* 2020d; Aiyende *et al.,* 2020a).

The complexity surrounding affordability means that there is no single measure to assess the nature and degree of affordable housing issues. Therefore, the challenge is to identify the policy needs around the issues and to develop measures relevant to the policy requirements for identifying the scale and shape of the problem; assessing consumer patterns in housing, informing policy-making or

offering business feedback (Gabriel et al. 2005, p37). Quantitative tests may show that there is a problem with affordability but do not propose solutions (Gabriel et al. 2005, p37).

Additionally, the affordability of households can be experienced in a variety of ways; that is, through employment, transportation, health and other consumption by individuals, single parents and couples with children who adapt their circumstances to high housing costs and low incomes (Gabriel et al. 2005, p37). Hence Stone (2006, p459 in Paris 2007, p2) firmly argues in favour of an affordability approach to residual income because 'housing costs continue to be inflexible and make the first claim on after-tax income for most households.' The disadvantage of this approach, though, is that it relies on subjective household spending assumptions. Burke *et al.* (2004, p2 in Gabriel *et al*., 2005, p27) have commented that, while several studies that review low-income housing issues recognise the utility of residual housing costs measures (e.g. HNZC 2004; Bramley 1990; NHS 1991, pix), the preference for most researchers has been to deploy a ratio measure because of the perceived difficulties of defining measurement criteria. Ministers of Planning accept that the design and provision of affordable housing using planning frameworks is a major contributor to sustainable communities based on the three-pronged approach to sustainability through cultural, environmental and social improvements (HPLGM 2005, p5 in Gurran et al. 2007, p1)

How Affordable Housing Affect Surrounding Property Values

According to Furman 2008, the key to understanding this problem is to identify those particular housing, neighbourhood or regional economic conditions that may depress, or, in many cases, even stabilise and strengthen the values of neighbouring properties. A clearer delineation and comprehension of these requirements helps developers, builders and public representatives to make better-informed decisions which can lead to better outcomes. The factors identified most consistently through a series of rigorous research studies include:

Replacement: affordable housing projects that replace vacant, distressed areas, abandoned buildings or other blighted areas are likely to have more beneficial effects on surrounding property than those built inside vacant communities (Furman, 2008)

Degree of Concentration of Affordable Housing Units: Larger, affordable housing developments (whether new construction or rehabilitation) have, to some extent, resulted in positive prize impacts for nearby homes (Furman, 2008).

Host Neighborhood Context: affordable housing appears less likely to hurt property value when embedded in higher value, low poverty, stable neighbourhoods and when affordable housing is well managed (Furman, 2008).

Management: Good management makes a difference, and good management of assets correlates with those built by non-profit community development companies, less so with those created and operated by for-profit developers or public housing authorities (Furman, 2008).

Theoretical Framework

The Excellent Theory by James Grunig in 1985, explains the value of public relations when organisations apply the process in the system, thus contributing to good relations with strategic audiences, helping an organisation to develop and achieve desired goals, reduce negative advertising, and increase revenue by providing stakeholder-needed products and services. As defined in this theory, to a balance of expectations, property development organisations must optimise the value of public relations. Nonetheless, internal and external contact and partnership should be based on the principle of excellence.

Research Methodology

This aspect deals with the tools used to collect data from the area of study. The questionnaire is the instrument used to collect data; it consists of a series of questions. A survey research design with 200 respondents from selected publics in Alausa Ikeja, Lagos State, Nigeria, was drawn using stratified random sampling. The two hundred copies of an open and closed-ended questionnaire. It contains two sections, section A and section B. The first section is about the respondent's perceptions on the activations of the ministry for housing, while the second section consists of the demographic questions. The series of questions is aimed at eliciting information and getting answers to the research questions.

Data Analysis and Presentations

Table 1: Respondents' awareness of LSDPC

	Frequency	Per cent
Yes	131	65.5
No	69	34.5
Total	200	100.0

Table 1 illustrates that 131 (65.5%) respondents know about LSDPC, while 69 (34.5%) respondents do not know at all.

Table 2: Respondents awareness of any LSDPC's community relations activities

		Frequency	Per cent
	Yes	79	39.5
	No	67	33.5
	not sure	54	27.0
	Total	200	100.0

The above Table indicates that 79 (39.5%) respondents know about community relations activities being carried out by LSDPC**,** 67 (33.5%) respondents do not know while 54 (27.0%) respondents are not sure if community relations activities are being carried out by LSDPC

Table 3: Corporate updating of the public

		Frequency	Per cent
	Yes	84	42.0
	No	71	35.5
	Not sure	45	22.5
	Total	200	100.0

According to Table 3, 84 (42.0%) respondents said the corporation keeps up to date with new policies, activities and general information about their programmes, 71 (35.5%) respondents said they don't while 45 (22.5%) were not sure if they do.

Table 4: LSDPC activities that respondents are aware of

		Frequency	Per cent
	Press release	15	7.5
	Corporate promotions	18	9.0
	TV adverts	29	14.5
	Newspaper adverts	35	17.5
	Annual general meetings	8	4.0
	Specialised trade fairs	7	3.5
	Non	78	39.0
	Others	10	5.0
	Total	200	100.0

Table 4 shows the type of activities respondents are aware of, 15 (7.5%) respondents know Press release, 18 (9.0%) respondents knows corporate promotions, 29 (14.5%) respondents know TV adverts, 35 (17.5%) respondents knows Newspaper adverts, 8 (4.0%) respondents knows Annual general meetings, 7 (3.5%) respondents knows Specialised trade fairs, 78 (39.0%) respondents knows None of these activities, while 10 (5.0%) respondents stated "Others" as sources of awareness.

Table 5: Sources of respondents' awareness of these activities

		Frequency	Per cent
	Social media	29	14.5
	Radio	5	2.5
	Television	18	9.0
	newspaper	35	17.5
	Magazine	18	9.0
	Billboards	15	7.5
	Fliers	3	1.5
	Word of mouth	38	19.0
	Non	39	19.5
	Total	200	100.0

Talking about how respondents became aware of those activities, Table 4 shows 29 (14.5%) respondents said through Social media, 5 (2.5%) respondents said through Radio, 18 (9.0%) respondents said Television, 35 (17.5%) said Newspaper, 18 (9.0%) respondents said Magazine, 15 (7.5%) respondents said Billboards, 3 (1.5%) respondents said fliers, 38 (19.0%) said through Word of Mouth, and 39 (19.5%) respondents said non.

Table 6: Impact of these activities on respondents

	Frequency	Per cent
Increase your level of awareness	62	31.0
Encourages you to own a property/house	34	17.0
changed your perceptions about them	15	7.5
convinces you to refer a friend	4	2.0
Non	79	39.5
Total	200	100.0

Table 6 stated the impact of these activities on respondents. 62 (31.0%) respondents said it Increased their level of awareness, 34 (17.0%) respondents said it encourages them to own a property/house, 15 (7.5%) respondents said it changed their perceptions about the corporation, 4 (2.0%) said it convinced them to the point of referring a friend, while 79 (39.5%) respondent said non

Table 7: Respondents' satisfaction with these activities

	Frequency	Per cent
Yes	93	46.5
No	84	42.0
Indifferent	23	11.5
Total	200	100.0

Table 7 shows that 93 (46.5%) respondents are satisfied with these activities 84 (42.0%) respondents are not you satisfied meanwhile 23 (11.5%) respondents are just indifferent about the whole thing.

Table 8: Respondents' perceptions of respondents about the PR practices of LSDPC?

	Frequency	Per cent
Excellent	19	9.5
Above average	28	14.0
Average	57	28.5
Below average	38	19.0
Very poor	46	23.0
Don't know	12	6.0
Total	200	100.0

According to how respondents rated the frequency about the practices of LSDPC in Table 7, 19 (9.5%) said Excellent, 28 (14.0%) said Above average, 57 (28.5%) said Average, 38 (19.0%) said Below Average, 46 (23.0%) said Very poor while 12 (6.0%) don't know.

Table 9: Respondents' suggestions on LSDPC's public relations actions

	Frequency	Per cent
Create more awareness and publicity	82	41.0
Improve and do more	21	10.5
Engage more on social media platforms	17	8.5
Use modern technology for advert	34	17.0
Housing scheme	46	23.0
Total	200	100.0

The following are what the respondents think in Table 9, 82 (41.0%) said they should create more awareness and publicity, 21 (10.5%) said they should improve and do more, 17 (8.5%) said they should try and engage more on social media platforms, 34 (17.0%) respondents said they should use modern technology for the advert, while 46 (23.0%) respondents said housing scheme.

Table 10: Respondents' Gender Distribution

	Frequency	Per cent
Male	99	49.5
Female	101	50.5
Total	200	100.0

Table 10 shows that 99 (49.5%) Males and 101 (50.5%) Females responded. Meaning that more women were interested in the study than men.

Table 11: Age range

	Frequency	Per cent
18-25	55	27.5
26-31	64	32.0
32-35	47	23.5
36-41	26	13.0
42-and above	8	4.0
Total	200	100.0

Table 11 shows the ages respondent's falls into; 55 (27.5%) are between 18-25, 64 (32.0%) are between 26-31, 47 (23.5%) are between 32-45, 26 (13.0%) are between 36-41, and then 8 (13.0%) are between 42 and above.

Table 12: Marital status

	Frequency	Per cent
Married	87	43.5
Single	112	56.0
Divorced	1	.5
Total	200	100.0

According to Table 12, 87 (43.5%) respondents are married, 112 (56.0%) respondents are single, and 1 (.5%) respondent divorced.

Table 13: Occupation

	Frequency	Per cent
Students	52	26.0
Employee	96	48.0
Employer	15	7.5
Self-employed	31	15.5
Retired	6	3.0
Total	200	100.0

Table 13 shows that 52 (26.0%) respondents are Students, 96 (48.0%) respondents are employee, 15 (7.5%) respondents are employers, and 31 (15.5%) respondents are self-employed while 6 (3.0%) respondents are retired.

Discussion of Findings

According to the outcome of the analysis obtained, majority of the respondents in Table 1 knows about the corporation, but less to these percentages of respondents in Table 2 are not aware of the community relations activities being carried out by LSDPC**.** Meanwhile, in Table 3, a minority of the respondents said the corporation keeps up to date with new policies, activities and general information about their programs.

According to Table 4, the larger number of respondents which respondents know none of the corporation's activities, however, few could identify Newspaper adverts (which are the traditional media) to be the type of activities of their awareness. As a result of this, these activities have no impact on the majority of the respondents when the larger number/percentages of respondents said none of these activities has any form of impact on them

From Table 7, the number plus percentages of respondents are not satisfied while some of the respondents are just indifferent about the whole thing. More so, based on the perceptions of the public about the practices of LSDPC in Table 8, the respondents rated the performances of the corporation "Average."

Finally, in Table 9, respondents stated ways the corporation can improve its information dissemination and other public relations functions; higher number of the respondents in numbers/percentages said they should "create more awareness and publicity" while some others suggested they should "engage more on social media platforms".

Conclusion

Based on the results of this report, it is clear that it has been learned that more needs to be done when it comes to educating and increasing awareness of the company's activities and procedures because not everyone who cares about the organisation is aware of their activations that they participate in or introduce. Also, the public's view of the Lagos State Development and Property Corporation's image is not entirely positive, because the public thinks that everything they do is either bad or good, so that is why, Intentional steps must be taken by the corporation not only to let the public know what they are doing, but also to let them know how all their activities, as they may affect the public, are carried out and, at the same time, to carry the public through these different activities.

It is imperative to create a meaningful two ways relationship which comes with the mutual understanding that helps the public's get all of the information of interest to them and vice versa. It is important to note that the confiscation or modification of the property must be straightforward, fair and acceptable to all stakeholders involved in the projects (Pievatolo, 2016). Moreover, those demands have grown as changing media and increased access to information-on-demand puts greater pressure on organisations to be accessible, sensitive and transparent. (Odiboh, Olonode, Adesina, and Yartey, 2018)

Recommendations

The study recommends the improvement of the public relations office because the corporation already has an established public relations departments and experts in the field that works directly with the members of the public, but still, the corporations need to get their public relations tools right and properly engage their publics in communicating their activations because the public's of an organisation is it most important stakeholders with whom relationships need to be developed. Therefore, Lagos State Development and Property Corporation need to do more in building substantial relationships with the public by communicating their healthy activations, facilities and

expertise always. Public relations in any organisations are the messages communicated and the relationships established with the publics.

As LSDPC practice public relations, they will improve their company's brand, connect with the community, and boost their marketing efforts. Consistent, strategic messaging with the end goal of building and nurturing public relations is key to the success of any organisation. In other words, good public relations are the key to LSDPC 's success, and they need to do a better job in keeping their audiences aware of the things they do every day. Besides, public relations initiatives conducted by the ministry and agency should be stepped up with greater public knowledge before it becomes a lifestyle (Nwosu *et al.* 2020a; Nejo *et al.,* 2020b; Olabanjo et al., 2020a; Omokiti et al., 2020b; Salau *et al.,* 2020a; Salau *et al.,* 2020b; Nwosu *et al.,* 2020b*).*

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Farmers on Digital Media Usage and Agricultural Information in Lagos, Nigeria

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Abstract

This preliminary study focuses on farmers' business and their perception of digital public relations and agricultural information dissemination. As an experimental study, collaborations are invited to harvest an ultimate global inquiry on new media influences on providing food security in the world. Specifically, this study presents the viewpoints of 341 representatives of 3,406 farmers in Lagos, Nigeria. Selected farmers cut across the spectra of agricultural business. Results of this pilot study indicate that majority of farmers in Lagos have digital devices on which they spend up to three hours daily mainly for Facebook social networking. Interim conclusion is that perceived high cost and diversion of use render digital media unproductive for agricultural information dissemination among Lagos farmers. The study recommends that relevant government ministries and agencies should take advantage of farmers' ownership of digital media to refocus attention on productive agricultural information dissemination.

Keywords: Digital Media, Public Relations, Farmers, Agricultural Information.

Introduction

Subject area	Business Information Media
More specific subject areas	Agricultural Communication, Public Relations, Marketing Communication
Study execution	A survey using a questionnaire instrument.
Study format	Quantitative methodology
Experimental factors	As an experimental study, 341 farmers representing 3406 members of the Lagos branch of All Farmers' Association of Nigeria. Study objectives include examining farmers' knowledge of digital new media; accessibility of agricultural information; and investigating the frequency and prominence of agrarian information in creating awareness on poverty alleviation in Lagos, Nigeria. Charts and tables indicate the initial results.
Experimental features	Data on farmers' perception, ownership and usage of digital media for public relations, marketing and communication in the course agricultural activities appear in this maiden study.

Preliminary study location	Lagos, Nigeria
Data accessibility	Original data is available to compare with similar investigations anywhere in the world

Value of Study

1. This study supports the United Nations Sustainable Development Goals (SGD) one (no poverty and two (zero hunger). It provides the template for similar studies in different parts of the world, especially the developing countries.
2. Preliminary results of this study are potential background data for future researches on farmers use of digital media for their business communication.
3. The multidimensional focus of this study consists of the following:

    a. Agricultural and Digital Media Information. Sample in Adeyeye et al., (2018); Grunig, J. (2001); Kaplan and Haenlein (2010); Kaur (2015); Alzahrin and Alias. (2018); Bach and Kim (2012); Baer (2017); Baruah (2012); Bernama (2018); Chinnasamy (2018); Comscore Inc. (2017); Einwiller and Steilen (2015); Farzana *et al.,* (2015).
    b. Public Relations and Information Management. Sample in DiStaso, Mccorkindale, and Wright (2011, 2012); Coombs and Holladay (2012); Diga and Kelleher (2009); Eyrich, Padman and Sweetser (2008); Fitch (2009); Gabriel and Koh (2016); Garding and Bruns (2015; Grunig and Grunig (1992); Grunig and Hunt (1984); Hadina (2010); James (2007); Ji *et al.,* (2017); Kent and & Taylor (1998, 2014); MacNamara (2010); McLennan and Howell (2011; Moreno *et al*., (2015; Mukhtar and Syed (2017); *News Straits Times.* (2017); Robson and James (2013); Shahizan and Sobihantun, (2015); Statcounter Global Stats (2018); Stříteský and Stránská (2015); Tench and Jones (2015); Valentini (2015); Wright and Hinson (2008, 2009, 2015); Zheng, Liu and (2018).
    c. Public relations in marketing communication. Sample in Odiboh and Oladunjoye (2019), Odiboh, *et al.* (2020a), Odiboh and Ajayi (2019), Odiboh, Ezenagu, and Okuobeya (2019), Adelua, *et al.* (2020a), Adelua, *et al.* (2020b), Adelua, *et al.* (2020c), Adelua, *et al.* (2020d), Aiyende, *et al.* (2020a), Aiyende, *et al.* (2020b), Fayemi, *et al.* (2020a), Fayemi, *et al.* (2020b), Fayemi, *et al.* (2020c), Fayemi, *et al.* (2020d), James, *et al.* (2020a), James, *et al.* (2020b, James, *et al.* (2020c), James, *et al.* (2020d), Ndubueze, *et al.* (2020), Ndubueze, *et al* (2019), Nejo, *et al.* (2020a), Nejo, *et al.* (2020b), Nwosu, *et al.* (2020a), Nwosu, *et al.* (2019), Nwosu, *et al.* (2020b), Olabanjo, *et al.* (2020a), Olabanjo, *et al.* (2020b), Olabanjo, *et al.* (2019), Omokiti, *et al.* (2020a), Omokiti, *et al.* (2020b), Salau, *et al.* (2020a), Salau, *et al.* (2020b).

Experimental Design, Materials and Methods

This short survey method generated the data for all time use. Three hundred and forty-one farmers drawn from 3,406 members of the Lagos branch of All Nigeria Farmers Association. The farmers were selected through a random sampling technique. Tables below indicate part of the initial results of the research.

Preliminary Study Results

This study adopted descriptive statistics to indicate mean scores in the data presentation. Frequency distribution tables show the position of each item in the questionnaire. The study used Statistical Package for Social Sciences (SPSS/PASW) software, version 25.

Table 1: Descriptive on social networking sites among farmers

Social networking sites	Frequency	Per cent (%)
Facebook	78	30.9
Twitter	52	20.6
Instagram	36	14.3
You tube	24	9.5
Pinterest	20	7.9
WeChat	18	7.1
Telegram	14	5.6
Others	10	4.0
Total	252	100%

Lagos farmers' favourite social networking sites are Facebook (30.9 per cent), Twitter (20.6 per cent) and Instagram (14.3 per cent). Whereas, WeChat (7.1 per cent), Telegram (5.6 per cent), and others (4 per cent) were relatively low in usage.

Table 2: Descriptive on the main limitations of using/adopted digital media by selected farmers

Items	Options	Frequency	Percentage	Rank
What would you describe as the main limitation of using digital media for agricultural business information dissemination?	It is very slow	85	33.7	2
	The websites do not look good on my device	24	9.5	4
	It is expensive	86	34.1	1
	It is only suitable for limited use	57	22.6	3

Table 2 labeled farmers' main limitations of using digital media. Majority (34.1%) said that using digital media is expensive. Whereas, 33.7% said it is slow, 22.6% said it is only suitable for limited use. Only 9.5% acclaimed that agriculture business websites do not look good on their devices.

Conclusion

It is clear that the potential value of farmers' digital media consumption for agriculture business is limited. Farmers' vast ownership of digital tools and awareness of social media networking are two public relations factors for deepening SDG 1 and 2 of the United Nations, locally. These findings are also useful to agriculture Ministries and Agencies for coordinating farmers for productive yields and food security in the country.

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Health Information and Social Media: Patients' Perception of Selected Primary Health Care Centers, Yaba, Nigeria

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Abstract

The role of the Internet has significantly changed the channel of health information. As a result, it becomes essential to understand the behavioural pattern of people seeking health-related information on the websites and highlight improvements. This study executed a cross-sectional examination using 221 patients of selected primary health care centres at Yaba, Lagos state. The data covered between December 2019 and January 2020 using an adapted structured questionnaire. The 25 research items were validated to answer the questions raised. The questionnaire items captured the adoption of social media for health awareness, perception of health information on social media, benefits of the use of social media for seeking health-related information, knowledge of health information on social media and usage of social media for health information. The study findings showed that the advent of social media platforms had transformed people's health information-seeking behaviour. Majority of the respondents (patients) claimed that they adopt digital media because it saves time, convenient to access, fosters immediate, up-to-date information and less cost of accessing compared to other sources. The findings of this study revealed that online health seeker had modified the way they take care of their health after having internet searches and their health-related decision making (Omokiti et al., 2020). Our findings suggest that most participants used social media platforms to find information about their health conditions, while around one-third received direct online medical consultations. There is a need for public awareness on the use of reputable sources for health information. The study findings will also become a significant contribution to health policymakers and health-related website content regulators.

Introduction

Social media has become a convenient source for obtaining educational materials and information. Social media refers to the applications of networking sites to create and exchange information through blogs and microblogs (i.e. twitter), content communities (YouTube), and social networking (i.e. Facebook and LinkedIn). Social media and online resources have affected most aspects of our lives, and many are now using it to guide their healthcare decisions. With the emergence of the Internet, the world, especially in the perspective of communication, has advanced. (Aiyende, et al., 2020) Over the past years, social media enabled and unrestricted sharing of information and knowledge distribution, including medical and healthcare information that can be quickly discovered by patients (Tan & Goonawardene, 2017).

The use of social media is unlimited; some people use the mentioned platforms to receive medical consultations, while others use it to find information related to their conditions. Several studies are stressing how technology has empowered individuals and changed the way they seek out health-related information on the Internet. (Salau, et al., 2020) Social media provides informal channels for disease reporting. It also plays a vital role in connecting patients all over the world with others that have the same health conditions, enabling them to discuss mutual concerns and solutions. Health professionals are generally individuals who work and are experts in a particular field (Adelua et al., 2020). Patients take into consideration the comments of strangers when making medical decisions.

Today, many patients are seeking online advice from physicians they have never met. The advantage of an online medical consultation is that there are no geographic boundaries, as the patient can gain access to reputed physicians that are not usually available. Another advantage is the cost; the consultations provided online are lower in price (Shepherd, Sanders, Doyle, Shaw, 2015; Albalawi & Sixsmith, 2014). However, this will not be suitable for many cases, where a physical examination is needed. While social media facilitates patient care and education, it could also create impending risks for patients and healthcare professionals alike. (James, et al., 2020)

The distribution of poor-quality information can cause harm to patients and damage the professional image. Even though many as an influential factor in improving health and reducing costs saw patient engagement in social media, there is a considerably high risk of patients encountering misleading information (Tyrawski & DeAndrea, 2015).

Extant literature has shown that health care practitioners have reduced the potential harm caused by untrustworthy information retrieved from social media by sharing accurate knowledge and educating patients to reputable sites. (Fayemi, et al., 2020) Another risk is the inappropriate exchange of online information or advice for in-person visits to a healthcare provider. Thus, the use of social media among patients is changing the traditional information-seeking behaviours. This study aims to assess the use of social media platforms for obtaining health information and describing their perceptions, attitudes, and practices. (Nejo, et al., 2020)

Statement of the Research Problem

Since the global target of Health for All as declared in 1978, primary health care (PHC) has been universally adopted and embraced as the path to achieving Millennium / sustainable development goals. The primary health care program is a grass-root approach designed to address critical community health challenges by offering preventive, restorative, and rehabilitative services (Gofin, 2005, Hao & Gao 2017). Primary-health care values underline the approach's great importance. These principles, which include essential health care, community involvement, equity, inter-sectoral collaboration and the use of appropriate technology, are the driving force behind the efficiency of primary health-care as the hope of achieving universal health coverage.

By implications, this means that primary health care aims to provide services to most people based on needs without geographical, social or financial barriers through their involvement in health program planning, implementation and evaluation. The World Health Organization (1991) agreed that health information should be made available to the public in the mass channels they already learn and use, which means that the mass media can make a useful contribution to the dissemination of health messages to the general public. This situation raises the salient question on the benefits and use of social media platforms by health-seeking patients. They should focus more on areas public benefits such as more empowerment programs, educational programs and better community relations (Adelua et al., 2020a; Adelua et al., 2020b; James et al., 2020d; Nwosu et al., 2019; Adelua et al., 2020c; Adelua et al., 2020d; Aiyende et al., 2020a; Aiyende et al., 2020b; Fayemi et al., 2020a; Fayemi et al., 2020b; Fayemi et al., 2020c; Fayemi et al., 2020d; Olabanjo et al., 2020b; Omokiti et al., 2020a).

Research Objectives

i. To examine the benefits of social media usage for seeking health-related information; and
ii. To evaluate social media awareness, adoption and usage on Health seeking information by primary health care patients

Research Questions

i. What are the significant benefits of social media usage for seeking health-related information?

ii. To evaluate social media awareness, the adoption and usage of Health seeking information by primary health care patients are critical.

Literature Review

Social Media

Social media is part of our society, which influences social norms and ideology (Abdulaziz, 2014; Antheunis, Tates & Nieboer, 2013). The sharing of information and content is now a common desire (Albalawi & Sixsmith, 2015). It has changed how many people interact, communicate and socialize. This scenario implies that the social media platform has become gradually more popular as the central platform for small businesses worldwide. Adelua et al., (2020a) proposed that the impact of social media platform as an electronic market place for business has become a critical issue in the industry and the literature of entrepreneurship (Odiboh *et al.*, 2020a; Odiboh *et al.,* 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019).

According to Fernández-Luque and Teresa (2015), social media is used as an alternative business tool so that small and medium enterprises (SMEs) can gain advantages such as engaging in a marketplace which is situated far from their geographical area without necessitating physical presence. Nowadays, social media have been pervasive for businesses as a tool for interacting directly with consumers, even reaching potential customers (Hao & Gao, 2017; Househ, Borycki & Kushniruk, 2014; Greaves, Pape & King, 2012).

Health Information

Health information-seeking behaviour is now gradually gaining attention among the public worldwide including Nigeria (James *et al.,* 2020a; Ndubueze *et al.,* 2019; James *et al.,* 2020b; James *et al.*, 2020c; Ndubueze *et al.,* 2020; Nejo *et al.,* 2020a; Olabanjo *et al.,* 2019). Health information-seeking behaviour also differs between each individual depending on the health issues ones face. Health information-seeking behaviour is "finding and receiving messages or information to minimize the health status-related confusion and build trust in the health context. Health information pursuing action is, according to (Fayemi et al., 2020b) a pursuit that involves obtaining information about medical treatments, alternative medicine, diet and physical activities.

A systematic review study revealed that studies investigating health information seeking in Nigeria are still low. The study of health information-seeking is relevant in the context of Nigerian society. Awareness of health information-seeking behaviour is not only imperative to public health (Nwosu *et al.*, 2020a; Nejo *et al.,* 2020b; Olabanjo *et al.,* 2020a; Omokiti *et al.,* 2020b; Salau *et al.,* 2020a; Salau *et al.,* 2020b; Nwosu *et al.,* 2020b). But more importantly, it will have an impact on people's ability to self–manage their health. (James, et al., 2020a). A recent study found that the Internet has become necessary to those who are health conscious and prefer to be more empowered in managing personal health through seeking health information using the Internet (Nejo et al., 2020b).

Social Media and Health Information

The adoption of the Internet has significantly changed the way health information considered. It is essential to understand the behavioural pattern of seeking health-related information on the websites to identify their needs better. These highlight improvements are possible in the landscape of Internet health information quality and availability (Aiyende et al., 2020a).

Methodology

This study is a cross-sectional investigation conducted between December 2019 and January 2020 at Yaba, Lagos State, Nigeria. The ethical approval for this study was obtained from the Ethical Review

Board at Covenant University and conducted according to the underlying principles. The inclusion criteria consisted of patients in the waiting rooms of the outpatient clinics and their perceptions of health-seeking information via social media. The participants were literate (could read and write) and use the internet regularly (daily). Those who did not meet the inclusion criteria did not participate. A self-administered 4-section questionnaire was adopted from the literature to assess the use of social media by patients seeking health information.

Two hundred and sixty respondents filled a questionnaire based on the online sample size calculator Raosoft, and a 95 per cent confidence interval, which is an assumed 50 per cent prevalence of patients using social media for medical information. The self-administered questionnaire was developed in English and modified by the researcher(s) to fulfil this study's purpose and assure validity. 2 experts reviewed the items in the questionnaire: a social media expert and the supervisor. For the reliability of the instrument, Cronbach's alpha of the survey for sections B (perception) was 0.811, section C (awareness) was 0.792, and section D (usage) was 0.758.

The questionnaire consisted of 4 sections with a total of 20 questions measured by "yes", "no", and, "don't know" choices. Four questions were used in the third section to assess their awareness of health information through social media. Likert scales (4- and 5-point) were the perceptions and usage questions. Participants answered the question about seeking medical consultation via the Internet; response choices were yes or no.

The questionnaire consisted of two parts: 1. The first part was concerned with demographic data including age, gender and education. 2. The second part of the questionnaire included the following items: a. They were using internet/social media in general health-related reasons. b. Public sources to get oral health information. c. Use of social media to collect or share data about health. d. benefits of using social media to access health information as the primary source. e. Perception of using social media to obtain information on health. f. Most topics the respondents searched/viewed through social media those are related to oral health and how often they are doing it g. Awareness towards the importance of the references to the given information through social media. And social media effects in changing oral health behaviours. For the data analysis, frequency distribution shows the demographic characteristics of the participants.

Data Analysis and Presentation

Only 221 subjects completed the questionnaire. Out of the total sample, 29% were males, and 71% were females. Ages of respondents ranged from 18 to 50 years with a mean age of 30.5 (33.5) years filled in the questionnaires. Approximately 81 (37.6%) of the respondents were single, while 125 (56%) were married and only 15 (7%) were others such as a widow, divorced, separated, etc. Nearly 42% of the respondents had completed at least a university education (see Table 1). Regarding their profession/employment status, 114 (52%) respondents reported that they are employed; 82 (37%) were self-employed, and only 25 (11%) were employed. The demographic information summary of the participants is in **Table 1**.

Table 1: Demographic Characteristics of Respondents (n = 221)

		Frequency	Per cent (%)	Cum. Freq
Gender	Male	64	29	29
	Female	157	71	100
	Total	221	100%	
Age	18-25 yrs	47	21	21
	26-35 yrs	86	39	60
	36-45 yrs	62	28	88
	46yrs and above	26	12	100

	Total	221	100%	
Marital	Single	81	37	37
	Married	125	56	93
	Others	15	7	100
	Total	221	100%	
Educational Level	SSCE	47	21	21
	Diploma/NCE	82	37	58
	Bachelor's Degree	61	28	86
	Master's Degree	31	14	100
	Total	221	100%	
Harvey Road Health Centre, Yaba		75	34	34
Ayetoro Primary Health Centre, Yaba		81	37	71
Ebute-meta primary health centre, Yaba		65	29	100
	Total	221	100%	
Profession	Unemployed	25	11	11
	Employed	114	52	63
	Self-Employed	82	37	100
	Total	221	100%	

Table 2: Adoption of Social Media for Health Awareness (n = 221)

		Frequency	**Per cent**	**Cumulative Frequency**
Do you have any social media account? (N= 260)	Yes	221	85	85
	No	39	15	100
Total		260	100%	
How many social media accounts do you have/operate? (N= 221)	Only One	67	30	30
	Only Two	109	49	79
	Only Three	28	13	92
	Above Four	17	8	100
Total		221	100%	
Most used applications for getting oral health information (N= 221)	Facebook	62	28	28
	Twitter	48	22	50
	Instagram	42	19	69
	WhatsApp	31	14	83
	YouTube	18	8	91
	Snapchat	17	8	99
	Others	3	1	100
Total		221	100%	
Frequency of social media platforms for health-seeking information (N= 221)	Daily	45	20	20
	Weekly	91	41	61
	Bi-Weekly	33	15	76
	Monthly	22	10	86
	Quarterly	19	9	95
	Yearly	11	5	100
Total		221	100%	
How many sources of medical web pages (Ada, Webteb, Medscape, WebMD, WHO, Ministry of Health, Food and Drug Administration, Daily Medical	None	5	2	2
	One	65	29	31
	2-4	119	54	85
	Five and above	32	15	100

Info, and Others) are you familiar with?				
Total		221	100%	
Topics that respondents have searched/viewed through social media those are related to oral health (N= 221)	Common cold (Flu)	51	23	23
	Surgeries	15	7	30
	Diabetes & Obese	24	11	41
	Implants (Bleeding)	34	15	56
	Tiredness/ Hypertension	40	18	74
	Infertility	22	10	84
	Communicable diseases	28	13	97
	Others	7	3	100
Total		221	100%	

Source: Field survey 2020

Out of the total 260 respondents for this study, only 221 (85%) participants reported that they have social media account(s). Among the 221 participants, 154 (70%) used at least one type of social media for health-seeking information. The primary reason for seeking consultations on social media may probably be as a result of time constraints to visit the physician's office. Facebook usage was predominant (28%), followed by Twitter (22%), Instagram (19%), and WhatsApp (14%). Approximately 28% (62/221) of respondents used Facebook; among all social media platforms, Snapshot was the least utilized, implying that the respondents got health-related updates on Facebook and Twitter more often than other social media platforms.

Considering the frequency of social media for health-seeking information, 45 (20%)respondents claimed that they search to get oral health information on social media platform(s) daily, followed by Weekly and BI-weekly 124 (56%), Monthly 22 (10%), Quarterly 19 (9%), and Yearly 11 (5%).

From a list of sources of medical web pages provided in our questionnaire (Ada, Webteb, Medscape, WebMD, WHO, Ministry of Health, Food and Drug Administration, Daily Medical Info, and Others), 216 respondents (98%) were familiar with at least one of them. Lastly, the table indicates the health-related topics that respondents have searched/viewed through social media.

The result shows that the predominant (23%) health-related issue is common flu (cold, catarrh, fever, headache, congested nose and respiratory tract infection). Others are tiredness/hypertension (18%), infertility (10%), infectious diseases such as missiles, chickenpox, Lassa fever, etc. (13%), implants (bleeding during pregnancy (15%), diabetes and obese (11%), surgeries (7%), and others constitute 3%.

Table 3: Perception of Health Information on Social Media (n = 221)

		Frequency	Per cent	Cumulative Frequency
I like to seek medical information using search engines/social media platforms	Yes	153	69	69
	No	52	24	93
	Don’t know	16	7	100
Total		221	100%	
Information on social media has improved my health status	Yes	158	71	71
	No	50	23	94
	Don’t know	13	6	100

Total		221	100%	
The use of social media has made me have a specific reference for doctor/hospital	Yes	149	67	67
	No	58	27	94
	Don't know	14	6	100
Total		221	100%	
I have strong reliability on social media engines for health information	Yes	149	67	67
	No	47	21	88
	Don't know	25	12	100
Total		221	100%	
My beliefs of social media health information have enhanced my awareness	Yes	155	70	70
	No	48	22	92
	Don't know	18	8	100
Total		221	100%	

Source: Field survey 2020

The participants' perception of health information via social media shows in **Table 3**. Out of 221 participants, 153 (69%) respondents like to seek medical information using search engines/social media platforms. 71% of the participants' believed that Information on social media had improved their health status. More so, 67% of the participants indicated that the use of social media has made them have a specific reference for doctors/hospitals. Approximately 67% reported that they have strong reliability on social media engines for health information. Lastly, 74% claimed that their beliefs about social media for health information had enhanced their awareness. By implications, participants often use social media for medical consultations and more importantly, the online information provided by physicians is useful.

Table 4: Benefits of the Use of Social Media for Seeking Health-Related Information

		Frequency	**Per cent**	**Cumulative frequency**
Quick accessibility of health information	Yes	164	74	74
	No	43	20	94
	Don't know	14	6	100
Total		221	100%	
Reach of a wide audience	Yes	142	64	64
	No	63	29	93
	Don't know	16	7	100
Total		221	100%	
Cost-effective option	Yes	146	66	66
	No	56	25	91
	Don't know	19	9	100
Total		221	100%	
Professionals interaction	Yes	158	71	71
	No	46	21	92
	Don't know	17	8	8
Total		221	100%	

Table 4 provides a clear illustration of the advantages of using social media as a leading source for getting health-related information. The majority of the respondents (74%) stated that quick accessibility and easiness of getting information is the crucial reason for the success of social media. Among 221 respondents, 64% expressed their interest in using social media to communicate and reach a wider audience. 66% of respondents also affirmed that social media is a cost-effective option

for patients. While 71% of respondents also believed that social media could allow health-related professionals to interact with people and share information effortlessly. In conclusion, the level of online fitness-related information was satisfactory.

Table 5: Awareness of Health Information on Social Media

		Frequency	Per cent	Cumulative frequency
Information on social media increases my desire to communicate with a physician	Yes	153	69	69
	No	49	22	91
	Don't know	19	9	100
Total		221	100%	
Health-related messages are receivable can be received via any social media platforms (Facebook, WhatsApp, YouTube, etc.)	Yes	150	68	68
	No	51	23	91
	Don't know	20	9	1000
Total		221	100%	
There is a high risk of misinformation from social media platforms on Health-related messages	Yes	144	65	65
	No	55	25	90
	Don't know	22	10	100
Total		221	100%	
I prefer to share their medical conditions with the public through the social media platform(s)	Yes	142	64	64
	No	60	27	91
	Don't know	19	9	100
Total		221	100%	

The level of awareness and attitude of participants regarding social media usage shows in **Table 5**. Among 221 respondents, 69% expressed that information on social media increases their desire to communicate with a physician, and 38% of the participants indicated that health-related messages are receivable via any social media platforms (Facebook, WhatsApp, YouTube, and others. However, 65% of the respondents affirmed that there is a high risk of misinformation from social media platforms on health-related messages; while

64% prefer to share their medical conditions with the public through the internet.

Table 6: Usage of Social Media for Health Information

		Frequency	Per cent	Cumulative Frequency
Have you ever started medication/treatment on social media as advised/advertised, without asking your doctor?	Yes	152	69	69
	No	51	23	92
	Don't know	18	8	100
Total		221	100%	
Do you check with a doctor or other health care professional the credibility of social media health information?	Yes	120	54	54
	No	65	30	84
	Don't know	36	16	100
Total		221	100%	
Do messages on social media platforms ever affect your decisions regarding yourself or the health care of your family?	Yes	128	58	58
	No	63	28	86
	Don't know	30	14	100
Total		221	100%	
Do check the credibility of health-related	Yes	126	57	57

information received online before sharing it with other people?	No	67	30	87
	Don't know	28	13	100
Total		221	100%	

Table 6 The participants' usage of social media usage is presented in Table 6. 69% of the participants' expressed that they start medications/treatment as advised/advertised on social media without asking your doctor. This result bolsters the danger of seeking unverified information on health-related issues via social media. Approximately 54 per cent believe that they verify the credibility of health information on social media with a doctor or other health care professionals. In contrast, only 58 per cent claim that social media platform messages ever influence their decisions about them or the health care of their family. Ultimately, 57 per cent of respondents also indicated that before sharing it with other people, they would check the integrity of health information. The number of respondents who check the authenticity of health-related information obtained via social media is, by definition, slightly above average. This finding raises considerable concern.

Summary of Findings and Discussion

This study shows that health information obtained from social media influences the health status of the majority of the participants. Participants of this study believe that the health information available on social media has enhanced their awareness regarding their health conditions. This finding highlights a significant concern regarding the health misinformation and alarming for the urgent need for an official healthcare social media channels. The results revealed an important fact on the reliability of health information sought by social media users. The safety of information exceeded half of the total number of participants. This striking figure guarantees that healthcare practitioners and policymakers, in addition to the social media owners, can help reduce the potential harm of misleading or wrong information transmitted through social media by guiding patients to reputable sites.

It can be concluded based on the information above that social media holds considerable significant value because it allows new ways of accessing information and sharing it. In the current study, more than three-quarter of the participants stated that accessibility and easiness of getting information is the critical reason for the success of social media. This conclusion agrees with research conducted by Elof et al. (2014) which found that participants believed that online social network could allow health promotion campaigns to share information more easily. Moreover, about half of participants found communication with oral health professionals as one of the main advantages of using the social network for gaining oral health information. Many researchers, such as Bacigalupe (2011) and Chou et al. (2009) affirmed that social media encourages social support, cooperation and participation of the stakeholders concerned and increases the interaction of individuals and allow users to participate directly. Also, the majority of respondents in the current study found communication difficulty as the main barrier for using social media for getting oral health information followed by credibility and trustfulness which was the second most common barrier to the participants.

Health care professionals and policymakers raised concerns regarding the reliability of health-related information found on the internet and how to make it practical for the public. There is a high risk of misinformation; as healthcare providers are unable to control the content in circulation. However, our finding in term of searching related health information shows that patients are more willing than other users to get their news from social media and search engine. The study findings showed that respondents (patients) seek online health information because of time-saving, convenient to access, fosters immediate, up-to-date information and less cost of obtaining compared to other sources. It confirms that respondents seek online health information because of the high credibility of the information sources.

Moreover, health information seekers found health information on social media platforms because they would like to look for information and learning about a sensitive health topic that is difficult to talk about. In addition to that, there are several health-related information or medical issues that have

been sought by individuals. The searched health, or medical issues/topics were specific diseases or medical problems. Seeking health-related information from social media have some benefits, but at the same time result in challenges. Patients report both positive and negative effects. It is essential to identify these effects for health care authorities because the ratio of patients using social media for health-related purposes is evolving, so health professionals will have to follow on the advantages and disadvantages effects of this use.

Conclusion

In conclusion, this study shows that social media usage is widespread among patients in Lagos state. The majority used social media platforms to seek health information. The study participants are more likely to search for health information on behalf of family members while a minority received one-to-one medical consultations. Awareness campaigns on the practical use of social media are needed to enhance the knowledge of patients in evaluating the quality of health information, together with proper guidance and education for practitioners. Developing clear policies and guidelines in addition to addressing information accuracy and reliability, perhaps via new technologies by respective governments, might reduce the risk of misleading information.

The results also conclude that social media platform was useful in helping to make decisions relating to health, while only a few felt otherwise. Most findings from this study were also consistent with previous research work. The advent of social media platforms has transformed people's health information-seeking behaviour. It is the hope that this study's findings will help researchers in terms of understanding factors that might influence people's health-related decision making, particularly in Nigeria. The study findings will also become a significant contribution to health policymakers and health-related website content regulators. It is consistent with prior research, which discovered that online health information seekers had rated themselves as good or very good in terms of general personal health. However, the frequency of social media use for health-related purposes was every week. This study concluded that health issues/topics sought may vary according to an individual's preferences. The findings of the previous research revealed that online health seeker had modified the way they take care of their health after having Internet searches and their health-related decision-making.

Recommendation

The results of this study will help guide healthcare practitioners on how to use social media to provide consultations and will also help in developing clear policies and guidelines to reduce misleading information risk. This study shows the need for having active healthcare givers who have the right skills to interact and educate the public using social media.

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Community Relations Activities of Tourism, Arts and Culture in Nigeria

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Abstract

This study examines Community Relations activities in government agencies. The purpose is to investigate public awareness and perception about the community relations activities in ministry services. The research method employed for the aim of this paper is the survey design technique, using the questionnaires to gather the opinion of respondents. This paper reveals that the public generally are not aware of the activities being executed by the ministry and as such, have not impacted their lives since its existence. The paper adopts the theory of social relation. The paper concludes that the Ministry needs a stronger relationship with the public and the media to overcome the current negative perception and low awareness of its activities. They should as well focus more on areas that will benefit the public such as more empowerment programs, more educational programs and better community relations. Its recommends that the council should restructure its public relations team, set aside people who will mobilize people in each local government in Lagos. Let the community benefit from the government. Create a long-lasting relationship with Lagosians, and they will never forget the organisation.

Keywords: Community relations, Lagos state, Tourism, Culture, Ministry, Council

Introduction

In the world today, people go to places for leisure purpose, research and whatnot. Not to undermine culture and art, which is a way of life. Creating awareness and impacting personnel is a paramount function every ministry should embrace in other to bring diaspora partnerships (Fayemi, Odiboh, James and Olabanjo, 2020a).

Tourism is an aspect of the Nigerian economy that is not functioning soundly. It needs renewed attention. Tourism is now a crucial component of the economy as well as the fourth biggest industry across the world. It is bringing more gains to people, firms and government (Honey and Gilpin, 2009:1; UNWTO, 2008). Despite the numerous tourism potentialities and abundant cultural legacies within Nigeria, very few of these have been exploited and optimised into the global tourism industry. Tylor (1871) says that culture is about knowledge, beliefs, art, morals, law, custom and any other social capabilities and habits. For Oke (1984, p. 20), culture is "the distinctive way of life of a group of people, their complete design for living". Therefore, culture entails transferred perceptions, customs, principles and anticipations of a specific collection of individuals. It has diverse practical uses in people's lifestyles, informs social relationships, with material antiques constituting the foundation for developing the tourism industry. It is in languages; music, arts, governance, folklore, dance and literature in addition to the nature of the environment inhabited and passed on across generations. (Odiboh, Adelua and Fayemi, 2020a). As communities strive towards cultural conservations, previous customs in modern forms could readily be examined and utilised to redevelop the past. (James, Odiboh, Aiyende and Salau, 2020b).

Geographically, Lagos is physically an enormous State in Nigeria with 1,381 sq.km landmasses, 3,577km overall coastline with over 17,552,940 inhabitants as estimated by LASG in 2012. Lagos is one of the most culturally and socially endowed states in Nigeria with more than 250 ethnicities

existing in Lagos, inclusive of Fulani, Igbo and Hausa. This city is principally known for its transformational changes in the last two decades. Lagos was once considered fatal and hard for the government to coordinate. Today it is a new international destination with a bustling tourism industry that is attracting Nigerians in the diaspora.

Lagos is a fusion point of several ethnic customs. The state is characterised by exciting growing artistic landscapes which is just as apparent on the roadsides as it is in exclusive festivities of formalised contexts. The city's formal cultural infrastructure presently comprises 20 libraries, 51 art galleries, 14 theatres, 68 bookshops, 54 cinema screens and 12 museums.

Tourism entails operations which willingly and momentarily carries individuals out of their natural habitat to indulge their desires for thrills, enjoyment, recreation and adventure (Falade, 2000). These activities are advantageous in many ways to societies which engage in tourist endeavours. One, it brings prosperity to impoverished places. Two, it endows the local peoples' culture and ways of life to yield them revenue. Moreover, such tourism ventures are likely to boost the construction of infrastructural varieties which are gainful to the anchoring cities.

Tourism in Nigeria focuses mostly on events and celebrations. Owing to the nation's tremendous diversity of ethnic groups; nonetheless, it is inclusive of natural attractions such as waterfalls, savannah and rain forests amongst others. However, the industry's challenges include the country's deplorable conditions of quality water, roads and electricity (James, Odiboh, Adelua and Fayemi, 2020a; Ndubueze, Odiboh, Nwosu and Olabanjo, 2019; James, Odiboh, Aiyende and Salau, 2020b; James, Odiboh, Nwosu and Fayemi, 2020c; Ndubueze, Odiboh, Adelua and Fayemi, 2020; Nejo, Odiboh, James and Fayemi, 2020a; Olabanjo, Odiboh, Nwosu and Ndubueze, 2019).

Lagos is now a key venue for 'black' and 'African' indigenous identity. Numerous events take place in Lagos; where payment for these occasions differ yearly and could occur intermittently every month. Some of these festivals include annual Festac Food Fair, Lagos Jazz Series, Eko International Film Festival, Eyo Festival, Lagos Seafood Festival, Lagos Photo Festival, Lagos Carnival and Lagos Black Heritage Carnival. Each provides a distinct franchise for live music that covers all genres.

Despite being a prominent place for African and black cultural identity, the Lagos state tourism, art and culture still faces several problems among which include low awareness, misappropriation, mismanagement, and misguidance (Onyeocha, 2016). This paper focuses on and analyses the public awareness and impact of the community relations activities of the Lagos State Council for Art and Culture.

Statement of the Problem

The issue of low awareness to bring about a partnership that seeks to achieve the goal of the Ministry and Council for Art and Culture is paramount. According to the United Nations' Sustainable Development Goal 17, which revolves around creating partnerships for goals, awareness and community relations is very important. The key question in this regard is: who would bring partnerships to a seemingly lowly art and culture? (Adelua, Odiboh, Aiyende and Omokiti, 2020a; Adelua, Odiboh, Nejo and Fayemi, 2020b; James, Odiboh, Olabanjo and Adelua, 2020d; Nwosu, Ndubueze and Olabanjo, 2019; Adelua, Odiboh, Olabanjo and Ndubueze, 2020c; Aiyende, Odiboh, James and Salau, 2020a).

Significant shortcomings of the tourism sector in Lagos state include insufficient amenities at certified tourist locations, the low magnitude of international recognition of tourist activities within Nigeria, poorly built tourist infrastructures, inadequate security, low investment levels; and disparaging demeanour of Nigerians to relaxation and holiday breaks (IMF, 2005:73).

The information and level of awareness regarding diverse communities appear in news reports that are accessible to the general public, and these affect the viewpoint of people towards the narrative

and individuals concerned in such stories. Therefore, the mass media subtly paints a mental picture of persons and situations, which eventually determines the mannerism of interrelation with real-life scenarios that envelop the events (Asakitikpi, 2009). However, low awareness of the community relations activities of the council creates problems.

Research Objectives

This research aims at determining the public relations tools used by the Lagos State Ministry for Tourism and Council for Art and Culture to create public awareness of their activities. It also sets to investigate the public awareness and impact of these activities. Given these objectives, the research questions outlined for answers are below:

Research Questions

1. What are the PR tools the ministry/council adopts?
2. What are the awareness level and the PR activities of the ministry/council?
3. What is the view of the public about community relations activities in the ministry/council and the areas of improvement?

Literature Review

An overview of the Lagos State Ministry of Tourism Art and Culture

The Ministry's vision includes making Lagos State the favourite destination for recreation, business and tourism in Africa. Its mission involves attaining sustainable tourism development via a facilitating ambience which is satisfactory for both foreign and indigenous tourists.

The Ministry's several responsibilities include: initiating, formulating, executing, monitoring and evaluating policies relating to Tourism, Arts and Culture. Another is promoting investment in hotels and development of tourism projects, tourism advancement and information dissemination, supervision of the council for Arts and Culture, management of tourism assets, such as beaches, Supervision of Lagos State Film and Video Censors Board, Organization of all State tourism activities in conjunction with other relevant Agencies, Establishment of a mini-exhibition centre to project the image of the State, Promotion of entertainment & arts-related matters, Establishment and Management of project THESE – (Tourism, Hospitality, Entertainment, Arts and Sports for Excellence), Promotion of social arts and community cohesiveness.

Tourism in Lagos State was first fashioned in 1995 by the Military Administration of Captain Mike Akhigbe as a department under the Ministry of Home Affairs. In 1991, the government of Chief Michael Otedola removed the Tourism Department from the Ministry of Home Affairs. It merged it with the Ministry of Information and Culture. Thus creating the Bureau of Information, Culture & Tourism headed by a Permanent Secretary.

In 1994, the Tourism Department was again detached from Bureau of Information, Culture and Tourism and merged with the Ministry of Commerce, Industry and Tourism (MCIT), headed by a Commissioner. During that period, the Lagos State Tourism Board was created out of the Tourism Department. The functions of the Board were strictly tourism promotion and marketing.; while on the other hand, the Tourism Department was in charge of policy matters (Odiboh, Amodu and Ekanem, 2020a; Odiboh, Fasanya, Adegoke, Afolabi and Ofor, 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019). In 1998, the Tourism Department and the Lagos State Tourism Board emerged a full Corporation named as 'Lagos State Waterfront and Tourism Development Corporation (LSWTDC)'presided by a Managing Director. In 2007, LSWTDC was segmented into 2 (two) separate arms: Ministry of Tourism and Intergovernmental Relations and Ministry of Waterfront Infrastructure Development.

Lagos State Council for Art and Culture

The Lagos State Council for Arts and Culture is a Social Service Parastatals established by Edict No. 12 of 1963 and amended in 1974. The Council has the responsibility of advising Government on the technical aspects of the National Cultural Policy and initiating principles for the Development of Institutional Infrastructure for meeting the Institutional needs. It implements International and Governmental Cultural agreements through adequate measures of coherence on all cultural activities. It is a channel between the Arts Agencies of the Culture Sector and the Ministry of Tourism, Arts and Culture on Professional matters relating to Culture and the enactment of the National Cultural Policy.

It is the overall policy organ of the Lagos State Government in the administration of Arts and Culture. The Council serves as advisers to Government on Arts and Cultural matters. It renders consultancy services to private and public Cultural Institutions. The Council also functions as Commissioned Agency for Artistes and similar performers.

The Lagos state council for art and culture is an arm under the Lagos state ministry of tourism, art and culture. Its vision includes making Lagos State Council for Arts and Culture the Heart Beat of Nigerian traditions by positively articulating and implementing the overall Nigerian Cultural Policy. Its mission includes providing gainfully related services in terms of propagating, encouraging, demonstrating and preserving the abundant cultural norms of persons within Lagos State and entire Nigeria.

Community Relations Activities of Lagos State Council for Art and Culture

The Lagos State Council for Art and Culture community relations activities include planning and showcasing the abundant culture and tradition of Lagos. Other activities are cultural education training programmes, recreating cultural facilities, providing assistance to art practitioners, and disseminating cultural Information on Lagos. The Council also implements bilateral cultural agreements between Nigeria and friendly countries, collaborates with international, governmental and non-governmental partners. It provides cultural entertainment and educative Programmes for the moral upliftment of the youths. Lastly, it preserves and maintains historical sites and monuments.

Others include propagating the state's culture and art policy and programmes. It functions as an adviser to the State Government on culture, as well as consults for private and publicly-owned Cultural Organisations. It serves as the Commission’s Agency for Artistes and other similar entertainers, and plays supporting duty on aesthetics aesthetic arts of general Nigeria and specifically in the city, Design Arts Division.

Sustainable Development Goal 17

In relations to SDG goal 17, which is to revitalize the global partnership for sustainable development, the Sustainable Development Goals (SDGs) of Lagos council for art and culture is achievable with a vivid dedication to worldwide cooperation and partnerships. (Omokiti, Odiboh, Aiyende and James, 2020b).

The globe currently has greater interlinkages than past times. Enhancing accessibility to knowledge and technology are crucial avenues to disburse ideologies and spur innovative actions. Harmonising policies to aid developing economies to handle their debt correctly, and fostering investment for less developed nations is necessary to accomplish sustained progress. Getting partnerships with bodies can also help the council impact successfully on its audience.

Theoretical Framework

The social relationship theory is the anchor of this study. This theory presumes that the grouping of persons depends on their common interests and predilections. It insists that individuals who belong to the same group would choose similar information materials and respond to it in an equitable approach (Bowen 1972). The theory additionally posits that demographic variable such as residential location, education, age, sex. Occupation, income and race can aggregately bring out communication saliency for collective people. So, a city that has various elements involving communal leaderships, student group, cultural associations, industrialists, domestic traders and women group, which are very important in informing the disposition, judgement and ideological belief towards the company (Aiyende, Odiboh, Adelua and Omokiti, 2020b; Fayemi, Odiboh, James and Olabanjo, 2020a; Fayemi, Odiboh, James and Aiyende, 2020b; Fayemi, Odiboh, Nejo and Salau, 2020c; Fayemi, Odiboh, Oyesomi, Nwosu and Olabanjo, 2020d; Olabanjo, Odiboh, Nwosu and James, 2020b; Omokiti, Odiboh, Salau and Nejo, 2020a).

Thus, a cultural organisation must be knowledgeable about the divergent socio-cultural groups in anchoring cities. The organisation must comprehend cultural components, goals and existential targets in order to work towards establishing reciprocal relations. This theory is relevant to the study as it explains the component that determines people's perception and opinion towards an organisation. The Lagos State Ministry of Art and Culture through its community relations activities, determines how the public sees and perceive cultural and tourist activities of the establishment.

Research Design and Methodology

Given the research objectives, the study adopted the survey research technique for collecting data. The survey entails obtaining information from a sample of people using their answers to questions (Check and Schutt, 2012, p. 160).

This type of research allows different approaches to reenlist respondents, gather data and adopt diverse information styles. E.g. survey research can make use of quantitative (via questionnaires with numerically ranked elements), qualitative (through open-ended questions) research strategies or using both strategies.

The data collection method implemented under the survey method is a questionnaire, which was self-administered to the respondents by the researchers.
The questionnaire obtained public responses on the enlightenment level of the Council's community actions. Notably, the survey instrument used close, and open-ended questions on applied community relations tools that utilised in creating conscious recognition by the Ministry. Questionnaire copies were self-distributed to the respondents based in Lagos State.

The sample size for this work is 200. The participants were selected from communities domiciling tourist attractions in Lagos state. Thus the purposive sampling method produced respondents from coastal Badagry where many beaches and historical centres attract tourists.

Purposive sampling used encompasses a collection of diverse non-probability sampling methods. This technique is similarly referred to as subjective, selective or judgmental sampling as it depends on the researcher’s perceptions in terms of choosing the units of investigation (Shobowale, 1981; Wimmer and Dominick, 2011; Odiboh and Ajayi, 2019).

Results

Through percentages and frequencies, aggregated data was analysed and shown in a tabular form via Statistical Package of the Social Science (SPSS) software. These tables reflect the participant's consciousness of community relations activities of the ministry and council, the corresponding

magnitude of contentment (with those activities) and suggested ideas for better actions. Out of 220 copies of the distributed questionnaire, 209 returned filled without any flaw. The low mortality of 11 copies of the questionnaire implies that the research scored an excellent and acceptable response rate. Respondents' knowledge of the ministry and council was the first poser of the questionnaire. The following tables depict the outcomes using questionnaires.

Table 1: Knowledge about the Lagos state ministry of tourism, art and culture's existence

	Frequency	Per cent	Valid per cent	Cumulative per cent
Yes	155	74.2	74.2	74.2
No	54	25.8	25.8	100.0
Total	209	100.0	100.0	

Out of 209 respondents, 155 respondents which represent 74.2% said to know the ministry exists while 54, which represents 25.8% said they do not. Table 1 shows that a lot of the respondents know the ministry exists.

Table 2: Respondent's awareness about the Ministry/Council's community relations

	Frequency	Percentage	Valid percentage	Cumulative percentage
Yes	44	21.1	21.1	100.0
No	165	78.9	78.9	78.9

Table 2 shows that 165 respondents which represent 78.9% are not aware of any community relations activity of the Ministry/Council. In comparison, 44 respondents which represent 21.1% are aware of the Council's community programs. This result shows that many participants are not aware of related community relations projects of the Council.

Table 3: Council activities that are known to the respondents

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	None	23	11.0	41.8	41.8
	social event	15	7.2	27.3	69.1
	Scholarship programs	6	2.9	10.9	80.0
	Sponsorship	8	3.8	14.5	94.5

	Education support and empowerment programs	3	1.4	5.5	100.0
	Festivals	37			
	Total	92	26.3	100.0	
Missing	System	117	73.7		
Total		209	100.0		

Table 3 reveals the community relations activities the respondents are aware of. A majority (37%) of the respondents said they are aware of the Council's festival activities. Fifteen (7.2%) of the respondents chose social events as the only community relations activity in their awareness. Six respondents (2.9%) are aware of scholarship programs, and eight respondents (3.8%) said they are aware of sponsorships. Meanwhile, three respondents (1.4%) noted that they are aware of the educational support and empowerment programmes. This result reveals that although people do not know some of these activities, the dominant community relations activity is the festival. However, 56.0% of the respondents ignored this question.

Table 4: The impact of the activities on respondents

		Frequency	**Per cent**	**Valid Percent**	**Cumulative Percent**
Valid	no impact	66	31.6	32.4	32.4
	Knowing about the culture	65	31.1	31.9	64.2
	Positive	53	25.4	26.0	90.2
	Negative	20	9.6	9.8	100.0
	Total	204	97.6	100.0	
Missing	System	5	2.4		
Total		209	100.0		

Table 4 shows that 66 respondents which represent 31.6% have not gained any impact from the ministry/council. In comparison, 65 respondents which represent 31.1% has learnt more their culture from the ministry while 53 respondents which represent 25.4% said the impact is positive. In contrast, 20 respondents (9.6%) said the impact has been negative. This result indicates a thin line between those impacted and others un-impacted by the community relations activities of the Ministry/Council. Noticeably, 2.4% of the respondents ignored this question.

Table 5: Tools used by the ministry that respondents are aware of

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Social Media	44	21.1	21.1	21.1
	Radio	40	19.1	19.1	40.2
	Television	39	18.7	18.7	58.9
	Newspaper	34	16.3	16.3	75.1
	Magazine	11	5.3	5.3	80.4
	Billboards	17	8.1	8.1	88.5
	Fliers	8	3.8	3.8	92.3
	None	16	7.7	7.7	100.0
	Total	209	100.0	100.0	

Table 5 reveals that 44 respondents (21.1%) are aware of social media as the community relations tool adopted by the Ministry/Council. Forty respondents (19.1%) on the other hand, says radio is the tool known to them. Thirty-nine respondents (18.7%) said that the newspaper is the tool they know. In comparison, 12 respondents (5.3%) said magazines are the primary tools Ministry and Council adopted for community relations. Seventeen respondents (8.1%) said that billboards are Ministry/Council tools they know. Meanwhile, eight (3.8%) said fliers are the tool they know, and 16 respondents (7.7%) said none of the listed options. This finding shows that a large per cent of the respondent is aware of social media as the primary PR tool the ministry/council uses.

Table 6: Perception of the respondents about the ministry/council

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Good	55	26.3	26.3	26.3
	Fair	29	13.9	13.9	40.2
	Poor	52	24.9	24.9	65.1
	Unsatisfactory	73	34.9	34.9	100.0
	Total	209	100.0	100.0	

Table 6 reveals the perception of the respondent about the practice of Lagos state ministry of tourism council for art and culture. Fifty-five respondents (26.3%) said the practice is good. Twenty-nine (13.9%) said the practice is fair, 52 respondents which represent 24.9% said the practice of the ministry is poor. In contrast, 73 respondents which represent 34.9% said the practice of the council is unsatisfactory. This response shows that the majority are unsatisfied with the practice of the ministry/council.

Table 7: Respondents' satisfaction with their practices and activities

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	57	27.3	27.3	27.3
	No	152	72.7	72.7	100.0
	Total	209	100.0	100.0	

Table 7 shows that 152 respondents which represent 72.7% are not satisfied with the practice and activities of the ministry/council. In contrast, 57 respondents which represent 27.3% said they are satisfied, and this shows that a more substantial part of the respondents is not satisfied with the ministry's activities.

Table 8: Areas the respondents want them to improve on

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Yes	139	66.5	66.5	66.5
	No	70	33.5	33.5	100.0
	Total	209	100.0	100.0	

Table 8 reveals that despite not being satisfied with the council's practice and activities, a more substantial part of the respondent want them to improve on their activities. 66.5% of the respondent said some areas need improvement while 70 respondents which represent 33.5% said there is no need for improvement.

Table 9: Areas to improve on

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	No need	18	8.6	12.2	12.2
	Publicity	22	10.5	15.0	27.2
	Everything	24	11.5	16.3	43.5
	Awareness	29	13.9	19.7	63.3
	International Partnerships	39	18.7	26.5	89.8
	More Information	15	7.2	10.2	100.0
	Total	147	70.3	100.0	
Missing	System	62	29.7		
Total		209	100.0		

Table 9 reveals different areas the respondents want the Ministry and Council to improve on. Results show that 18 (8.6%) of the respondents said there is no need for improvement, 22 (10.5%) said the publicity of their activities should be improved upon, 29 (13.9%) said there is need to improve on how they create awareness; 15(7.2%) said there should be more information. Sixty-two (29.7%) of the respondents ignored this question. While the majority of the respondents see areas needing improvement, others request that there should be an overall improvement on all services.

Discussion of Findings

The tables above show the findings from the respondents. This section discusses the responses to the research questions guiding this study. All the questions are treated to ascertain the respondent's opinions on essential ramifications of the community relations activities the Lagos State Ministry of Tourism and the Council for Art and Culture.

Research Question 1: What are the PR tools the ministry/council adopts?

This research question was structured to unearth the media tools adopted by the Ministry/Council in their Community Relations efforts. Findings to this respect are in Table 5. The data on Table 5 reveal that the most popular channel of community relations is social media. This tool is ahead of radio, television, newspapers, magazines and others. Physical activities rather than social media conversation would typically have more communicative impact on community relations relative to tourism. Social media would have played a supplemental or secondary role. The prominence of social media in this result suggests that the Ministry and Council are physically inactive as much as they are online.

Research Question 2: What are the awareness level and the community relations activities of the Ministry/Council?

This research question helps to determine the public awareness of community relations activities executed by the organisations. Data generated from the questionnaires indicate that the level of the public's awareness varies.

Findings in this respect can be found from tables 2 and 3, respectively. This result reveals that a large proportion of participants are not aware of the community relations activities of the Ministry/Council. This result indirectly reflects the earlier observation that social media, instead of physical activities, are the primary source of awareness of the Ministry/Council as community-related organisations.

However, out of all the purported activities of the Ministry/Council cultural festivals are the primary

community relations activities executed by the Ministry/Council. The gap between cultural activities and other actions is indicative of the disproportion of the organisations' community relations actions. The emphasis on cultural activities may indicate such events attract tourists and therefore generate income for the government. However, overemphasis on cultural activities at the expense of other income-earning activations shows that the tourism potential of the State is still untapped.

Research Question 3: What is the view of the public about community relations activities in the ministry/council and the areas to improve on?

This research question seeks to show the public's perception about the community relations activities in the ministry and council as well as areas the public will want the ministry to improve on. It was observed based on the findings on table 6 that majority of the respondents hold that the Ministry/Council are not doing enough. It means that the public is generally unsatisfied with their activities.

The overriding perception is that the Ministry/Council are weak organisations; although a handful says that they are doing well. The point is made more explicit in Table 7, where the respondents declared dissatisfaction pointedly. Table 8 goes further to show clearly that the Ministry and Council need to do better. There is room for improvement, especially in the area of service delivery and involvement of international partners, according to Table. Respondents mention of international partnership alludes to the need for foreign direct investment in tourism in the case the organisations lack the needed funds to expand tourism-expanding community relations activities,

Conclusion

From the findings above, this study

1. Concludes that the Lagos State Ministry of Tourism and the Council of Arts and Culture have not created appreciable public awareness for their activities.
2. In other words, low public awareness about what they stand for is a sign of public relations failure.
3. The Badagry community surrounding tourist attraction affirmed their dissatisfaction with the community relations activities of the Ministry/Council. According to the people, the Ministry and Council are not doing enough to relate to the community. Again, this is a sign of community relations failure of the two related organisations.
4. The concentration of efforts on cultural festivals is both positive and negative. Positive because the people could see that the Ministry and Council are active. The peoples' acknowledgement of the cultural festivals is an existential attestation for both the Ministry and Council However, and it is negative in the sense of a limitation. Where there are many tourism activities, pursuing only one indicates that the two organisations' activities are one-sided. There is a lack of strategic thinking for multiple tactical actions.
5. Lack of public relations initiative and poor community relations by the Ministry and Council indicates that the two organisations have lost touch with their key stakeholders (Nwosu, Odiboh, Olabanjo and Fayemi, 2020a; Nejo, Odiboh, Omokiti and Adelua, 2020b; Olabanjo, Odiboh, Adelua and Fayemi, 2020a; Omokiti, Odiboh, Aiyende and James, 2020b; Salau, Odiboh, Adelua and Fayemi, 2020a; Salau, Odiboh, Omokiti and Nejo 2020b; Nwosu, Odiboh, Oyedepo, James and Adelua, 2020b).

This study concludes that the ministry needs to focus more on community relations at the local level and create a high-level awareness among the people. Moreover, ensure that they build a relationship between the public and the organisation to overcome the issue of negative perception. They should as well focus more on areas that will benefit the public, such as more empowerment programs. More educational programs, better community relations activities

Recommendations

It is not enough for staffs of Lagos state ministry of tourism art and culture to sit down in one spot. The public does not know what the Ministry and Council stand for. They should try as much as possible to have a good working relationship with the media which would help to further project their activities at the community level. Additionally, the two organisations should restructure their public relations apparatuses, engage and train tourism mobilizers in each local government in Lagos. Let the community benefit from the tourism plan of the government through a long-lasting relationship that would stand the test of time.

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Public Relations Practitioners, Poverty Alleviation Programmes for Farmers and State Agricultural Development Authority: A Qualitative Study

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Abstract

This study investigates the awareness and understanding of the usage and challenges of the digital public relation to the farmers in Lagos state. In-depth interview was adopted to elicit information from a cross-section of four PR practitioners. They were purposively selected to provide necessary information on the adoption of Digital Public Relations in farming. The Two-Symmetrical public relations model by James Grunig was adopted to explain the issues raised. The findings of the study call for the use of other channels of communication such as the new (digital) media, also known as digital public relations, to increase the dissemination and sharing of agricultural information to farmers. Findings suggest that the use of Facebook, email and text messages are valuable assets to the communication strategy.

Keywords: Digital Public Relations, Awareness, Poverty Alleviation, Farmers.

Introduction

Agriculture is an essential sector of Nigeria economy. The backbone of the economy. It provides jobs for over 70% of the citizen. Providing food for consumption, marketing purposes and exporting purposes which generate income and revenue for the government enhancing the growth and development of the country (Odiboh *et al.*, 2020a; Odiboh *et al.,* 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019). However, agricultural productivity in Nigeria has many limiting factors. Such factors include poor fertiliser input, over-dependence on rainfall, and reduced physical infrastructures. Others include poor roads network and outdated harvesting methods, lack of technological advancements, weak market prices, and ineffective agricultural policies (Adeyeye et al., 2019; Adellua et al., 2020). Studies (Sharma, 2011; Sife, 2014) have shown that farmers are prone to inadequate accessibility to agricultural information.

Mtega and Benard (2013) noted that Nigeria's rural information availability and access are restricted by poor and unreliable communication, among others. Eradicating poverty, in its entirety, continues to be one of humanity's significant challenges (Aiyende et al., 2020). Worldwide, more than 800 million people are poor. The SDGs are an audacious commitment to ending poverty in all respects by 2030. To achieve the SDGs, a program is necessary to aid people living in vulnerable situations. Expansion of access to essential resources, services and information are necessary (Coombs & Holladay, 2012; Alzahrin, 2018).

Information and knowledge are significant components of poverty alleviation strategies. Digital public relations offer easy and fast access to large quantities of information that are useful for farmers. Financial challenges limit agricultural access to poverty reduction information for farmers, insufficient facilities and insufficient information (James *et al.,* 2020a; Ndubueze *et al.,* 2019; James *et al.,* 2020b; James *et al.*, 2020c; Ndubueze *et al.,* 2020; Nejo *et al.,* 2020a; Olabanjo *et al.,* 2019). The traditional approach to the distribution of farm knowledge by extension programs has also been lacking in many developing countries.

Thus, the use of other communication channels, such as digital new media, also known as digital public relations, to promote agricultural information dissemination and sharing to farmers (Adelua *et al.,* 2020a; Adelua *et al.,* 2020b; James *et al.*, 2020d; Nwosu *et al.,* 2019; Adelua *et al.,* 2020c; Adelua *et al.,* 2020d; Aiyende *et al.*, 2020a). Digital Public Relations are communication channels that can disseminate information in a short time to a broad audience. As such, the new media is a place for farmers to raise awareness of specific issues, particularly the poverty alleviation scheme so that they can be informed quickly. The new digital public relations is better than the scope of the standard extension services, according to Oladele and Boago (2011).

Statement of the Research Problem

ICT has brought many revolutionary changes to various sectors, including agriculture. The system has changed from traditional media to computerised systems, which is a more convenient and efficient method to save financial resources and time. Scientists widely analyse this phenomenon (Disney et al., 2018; Ghazizadeh et al., 2012; Martens et al., 2017; Roy et al., 2018; Skackauskiene et al., 2016; Yang et al., 2015), but attention to the developing countries and their acceptance of Digital Public Relations is missing.

As a result of these concerns of both positive and negative influences of digital public relations, numerous studies were executed by scholars, organisations, practitioners and stakeholders. Nevertheless, none of the studies captured the influence of digital public relations practice on farming in developing countries (James et al. 2020). This knowledge gap calls for new studies to understand the influence of digital public relations on the awareness of poverty alleviation programs for farmers in Lagos State, Nigeria.

Objectives of the Study

This study established the relationship between digital public relations adoption and awareness of poverty alleviation programmes for farmers in Lagos state.

However, the specific objectives were to:

i. Identify the significant digital PR channels adopted by PR practitioners in Lagos State Agricultural Development Authority (LSADA)
ii. examine the influence of social media (*Facebook*, *Twitters*, *Instagram*, *WhatsApp*) in promoting awareness of poverty alleviation programmes for farmers in Lagos state;

Research Question

i. What are the digital PR media adopted by public relations practitioners in Lagos State Agricultural Development Authority (LSADA)?
ii. What are the influence of social media (*Facebook*, *Twitters*, *Instagram*, *WhatsApp*) in promoting awareness of poverty alleviation programmes?

Literature Review

Yekini et al. (2012:13) defined poverty as being the opposite of wellbeing. Poverty goes beyond income shortages in this section of the literature review. It includes poor access to land, credit, and essential services. Poverty is not limited to material deprivation. There are other intangible aspects, such as poor

access to quality schooling, health care and social support (Yekini et al., 2012:13). Poverty in the broader sense means the lack of necessities, including food; shelter and general consideration of medical care and safety (Bradshaw, 2016). Poverty has low income and expense, high mortality, and morbidity, poor nutritional status, poor educational achievement, vulnerability to external shocks (such as drought, plagues, disease and flood), and exclusion from economic, social and political processes (Moyegun 2006).

Omoyibo (2013) described poverty in two terms–subsistence often referred to as extreme/absolute poverty and relative poverty. Absolute poverty describes a situation where people barely survive, where the next meal is unsure. This situation defines an inadequacy of fundamental human needs such as food, clothes, accommodation, clean water and health services. He, on the other hand, describes relative poverty as a process of deprivation, which allows people to slip away almost imperceptibly from the social life-system, with no stereotype pauper. Similarly, Adawo (2017:14) says that absolute poverty is misery linked to insufficient resources, income shortages, smaller margins, high risk of failure, hunger, and disease. In contrast, relative poverty is about deviant results and irrelevant comparisons between the material position itself and others, mainly from expectations.

Poverty alleviation is a set of reasonable measures to lift people out of poverty permanently. It is a public-spirited action for economic growth and social happiness (Aiyende *et al.*, 2020b; Fayemi *et al.,* 2020a; Fayemi *et al.,* 2020b; Fayemi *et al.,* 2020c; Fayemi *et al.,* 2020d; Olabanjo *et al.,* 2020b; Omokiti *et al.,* 2020a). Poverty alleviation in public relations uses institutions to empower the poor with knowledge and skills-based activities. It creates opportunities to develop and boost public livelihood in terms of income, spending, increase in revenue, provision of food and health services.

Digital Public Relations

The Internet has created the most prominent international village. The world is completely changing the delivery of information to the earth, enabling people to access data at all times and keeping them updated minutes at a time (Hiebert, 2004). Even as distribution outlets previously dominated by newspapers and television, the Internet gives equal access today to all those who contribute to information dissemination. The Web promotes real democracy with equal access and a free flow of information as opposed to any other platform.

Robert (2005) claimed that cell phones and the Internet were used by people around the world to mobilise rallies and protests. It is particularly useful for public relations professionals due to the global presence of online media. "Internet is a great tool that should be used effectively and rationally by PR professionals for effective public relations (Broom. 2009). (James, et am 2020) added that this changes the way professionals perform their work as public relations practitioners accept the power of the Internet. The emergence of the Web and electronic communications has changed public relations and the way it is practised (Nwosu, *et al.*, 2020a; Nejo *et al.,* 2020b; Olabanjo *et al.,* 2020a; Omokiti *et al.,* 2020b; Salau *et al.,* 2020a; Salau *et al.,* 2020b; Nwosu *et al.,* 2020b).

Social Media

Social media is an essential means of communication from social networking websites and forums and microblogs (Aiyende et al., 2020). Demand for more creativity, efficiency, speed and public impact in public relations turns the attention of practitioners to the application of social media as a tool of activations. Data on social media are plentiful. Publics use social media to gather, connect, and disseminate information to friends, families, colleagues and their global networks. In this regard, public relations practitioners can use social media to achieve and engage their target audience (Nejo para al 2020).

Social Networking Web sites

Another innovative digital tool is social networking websites. Websites like Twitter, Myspace and LinkedIn are a popular way of keeping people linked. One-third of the top 15 sites in 2007 are websites for social networking (Johnson, 2008). Websites were, like Dwyer, Hiltz and Passerini observed, "the

core inspiration in interaction and relationship-keeping" (2007, p. 1). As the task of maintaining partnerships is public relations, social networking networks are an ideal way to manage multiple relationships at once. Dwyer, Hiltz and Passerini (2007).

Perceptions of Public Relations and Social Media

From the history of Public relations till date, people have a biased conception about the image, practice and Its function within organisations, as well as the role in society, is often discussed by professionals and academics alike. Rampton, Stauber (1995), Miller and Dinan (2008) directed attention to the detrimental public relations practice. They accused PR associations and big corporations of information manipulation and other unethical practices. These, from a theoretical perspective, are further revisited, in Grunig and Grunigs's (2008) excellence theory, Kent and Taylor's (2002) dialogical critique of public relations or Zerfass' (2008) and Odiboh's (2020) integrated communication.

Lagos Stage Ministry of Agriculture

Lagos State Ministry of Agriculture exists for the sole purpose of achieving agricultural development. Its vision is to be a significant contributor to sustainable economic growth and the social well-being of the general public. Its mission is to promote sustainable healthy, effective and efficient food production in a healthy environment.

Lagos State Agricultural Development Authority (LSADA)

The Lagos State Agricultural Development Authority (LSADA), in earlier times known as the Lagos State Agricultural Development Project (LSADP), was well-known in 1987 and became a state government parastatal schedule with effect from 1 April 1995. The Authority is a service-oriented agency providing farmers/fisher folks in the state with technical agricultural services. The Ministry is responsible for the coordination and monitoring of the Authority's activities. Public relations and LSADA are responsible for disseminating validated technologies on improved management practices in agriculture-related to crops, livestock, fisheries, agro-processing, farm mechanisation and women. The sub-component has 64 extension agents who visit farmers with new tested technology on a fortnightly basis, as well as providing solutions to farm and field problems. The agent-to-farmer extension ratio is 1:6204, and is valued at 600,000 farms.

Theoretical Framework

This study adopts the two ways public relations model. Grunig & hunt (2000) propounded this theory. It focused on the free flow of information, visual understanding between an organisation & its publics (Grunig 2000). The opinions and attitudes of the public have always been important in public relations practice as it shapes the interaction that can take place between the organisation & its publics. Hence, the adoption of digital public relations will facilitate reporting to the public in the ministry & agency activities, actions as a way of contributing to an informed public, disseminating. Agricultural information to create awareness, on rustic scheme and programmes as a prelude to farmers' participation in Ministry &its agency decision making and listening to public opinion through their feedback

Research Methodology

This study obtained data from 4 public relations practitioners in Lagos state. Specifically, data came from public relations practitioners working with Lagos State Ministry of Agriculture and Lagos State Agricultural Development Authority (LSADA) through a purposive sampling technique. This sample size was adequate for exploring and answering the objectives of this study. The data was collected using a semi-structured interview guide which contained items adapted from previous studies. Each piece had statements about which respondents were asked to express their opinion freely. These

statements were mainly on the adoption of digital public relations in creating awareness of poverty alleviation programmes for farmers. Specific responses across various questions were clustered and analysed.

Qualitative Findings

These are the findings from the in-depth interview conducted among four public relations practitioners from both the Ministry of agriculture and Lagos State Agricultural Development Authority. Findings reveal that farmers seek information concerning market prices, input supply, credit facilities, especially information about their lively hood "poverty alleviation programs. According to the practitioners, such data are readily available to the farmers through the digital public relations.

Two interviewees claimed that in addition to information being readily available to farmers, there is a feedback mechanism by the Ministry and its agency. The interviewees said that the Ministry and the Authority believe in two-way communication between them and the farmers.
As a professional in the field of communication all the interviewee affirmed that information dissemination and awareness creation is essential, hence the adoption of the digital platform of communication to disseminate quick reliable and credible agricultural information to the farmers

The interviewee claimed that Facebook, mail and text message are most prominent and vital digital communication platform that is valuable to the day to day practice of their profession. When asked for the benefit of digital public relation, a practitioner said

> *"To the best of my knowledge, digital means of communication is a good public relations strategy in the sense that, farmers can obtain credible, timely and up to date information on infrastructure, inputs, financial institution and government policies, programs and actions".*

In many developing countries, too, the traditional approach of disseminating agricultural information through extension services has many shortcomings. This situation necessitates the use of other channels of communication. These are the new (digital) media, also known as digital public relations, to increase the dissemination and sharing of agricultural information to farmers (Salau et al., 2020).

In determining the challenges faced by the PR practitioners in the selected Ministry and agency, one of the interviewees acclaimed:

> *I believe that the lack of credible data to ascertain some information is a significant hindrance to farmers on getting accurate information about poverty alleviation programme.*

While another PR professional has this to say:

> *The challenges they face is non-availability and accessibility of digital devices and some that do have, do not often make use of it.*

Another ascertain that:

> *Digital public relations involved the use of the English language to disseminate information. We discovered that some of these farmers are semi-illiterate. Consequently, lack local language, and relevant local information is significant obstacles to the usage of digital public relations.*

The study also revealed that public relations practitioners in the Ministry and agency agreed that Facebook, email and text messages are the most prominent and valuable assets to their daily practices. Facebook enables practitioners to communicate with specific communities of farmers on a micro-target basis and opens a one-on-one communication line with other members. Interviewee acknowledged that new digital media provides a new medium for target audiences (farmers) to connect.

In response to this, a Public Relations officer revealed that:

> *Facebook allows explicitly the ability to react and encourage updates." A PR practitioner confirmed that "Facebook should be part of any communication campaign which aims to interact with the farmer in a specific, unique, and genuine way; somehow in support of Sharma (2011) and Sife (2014).*

The interviewee adduced that farmers might be exposed to inadequate accessibility to agricultural information due to a whole number of factors. According to Mtega and Benard (2013), access to agricultural information in the rural areas of Nigeria faces inadequate and unreliable communication infrastructure, high levels of poverty, lack of electricity and high digital device costs.

Conclusion

In conclusion. The presence of digital media in our everyday life establish ways in which we come to communicate, express our identity representations, routine undertaking and experiences. Digital media has made it possible to reach a whole lot of people that were simply difficult to meet before. The findings of this study indicate that the adoption of digital social networking platforms allow public relations practitioners to target farmers and get the necessary governmental agricultural information to them. Respondents acknowledged that social media and websites offer a new method of micro-targeting that is not provided by other existing tools. The interviewees agree that text messages via Facebook are not the only social media device that allows public relations professionals to access their farmers. However, through social media, one-on-one interaction is achievable. The ability to communicate with farmers immediately and often get a quick response offers a new way of communicating to farmers on various poverty alleviation programs of the public relations units.

Recommendations

Based on this study's findings, the following its recommendations

i. First, the Ministry and its agencies have to discover that the farmers need enlightenment on the importance and benefits of new media of communication. The farmers need information and training on how to use digital handheld phones in accessing the information on the programmes, policies and schemes of the Ministry and its agency.
ii. Second, government agencies can lease out mobile phones to farmers to facilitate quick access to information. It would also lead to effective communication with empowered farmers, thereby making them information literate.
iii. Third, the government-owned computer network should be deployed for agricultural public relations. It would make the government and its agency easily accessible to farmers who will serve as an avenue to get immediate information on government schemes and programs about farmers.

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Awareness and Impact of the Public Relations Activities on a State Ministry of the Environment in Nigeria

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Abstract

Public relations is a management function, and its activities and tools are indispensable to every organization for building and sustaining image. Lagos state is one of the most populous states in West Africa yet small in size. The Lagos state ministry of the environment with one of its agencies Lagos State Parks and Gardens is committed to building a cleaner, greener and sustained Lagos despite the challenge of overcrowding. This study seeks to discover public relations actions and its approaches to the Ministry and its Agency. It would identify the tools used in carrying out their public relations actions, and examine the effect of climate change while ensuring life on land. The study focused on the Lagos state ministry of environment and one of its agencies, Lagos State Parks and Gardens, which were selected purposively. The population was selected purposively due to accessibility of the ministry and agency. The study found that public relations actions are ongoing in the Ministry and its Agency. Proactive measures are in place to combat climate change and ensure secured life on land. Moreover, the right tools are engaged to execute and disseminate their public relations actions and messages which have a massive impact on the environment and the public. However, the study recommends that the public relations actions executed by the ministry and agency should be more intensified with massive awareness to the public until it becomes a lifestyle.

Keywords: Public Relations, Environment, Public Relations Activities, Sustainability

Introduction

The Mexican statement (1978) defines Public Relations as an art and social science of analyzing trends, predicting its consequences and counselling top organizational management on how to relate to the public. Another definition of PR is that it is deliberate, planned and sustained effort towards institution-public cooperation. That is why it is a general assertion that Public Relations interfaces between an organization and its publics.

The environment, on the other hand, can be defined as everything around us, the activities that take place within and around a business setting. The sustainability and development of the environment become a focus to tackle with. Hence, the Lagos State Ministry of the Environment came to existence with the responsibility of ensuring a clean, healthy and sustainable environment for the wellness of the citizens. The wellness and totality of the citizens are imperative to the government in order to achieve a sustained environment. For this purpose, the Lagos State Parks and Gardens Agency was established with its mandate to make Lagos greener and healthier through the creation and maintenance of operational parks and gardens and planting and maintenance of the tree.

Therefore, this study seeks to find out how the Ministry and its Agency engage the Public Relations actions to drive home their awareness of tree planting, beautification, maintenance of public lawns, gardens and parks in accordance to the Sustainable Development Goal 15 - Life on Land. A vital aspect of this goal is the need to plant a tree in order to protect the environment.

Statement of The Problem

The Lagos State Ministry of the Environment focuses on the clean, healthy and sustainable environment for the wellness of the public. Lagos State Parks and Garden Agency (LASPARK) is one of the agencies with a mandate to make Lagos greener and healthier through maintenance of trees. Despite the existence of LASPARK, there are issues surrounding tree-felling, tree-planting, and respect for trees. Other issues are management of parks, railings, lawns and gardens. The presence of trees and its maintenance has become necessary for combating the adverse effects of climate change and the safety of lives on land. Therefore, this study seeks to find out the awareness of the public relations actions executed by the ministry and agency, the approach used in disseminating PR actions to the public. The activities executed to ensure life on land.

Research Objectives

The objectives of this study are to find out the Public Relations activities executed by the Ministry and Agency, how informed are the citizens about it and its impact on them.

1. To discover and compare the PR actions of the ministry and agency and its approaches.
2. To identify the tools employed by the ministry and agency in carrying out PR activities.
3. To discover the effects of climate change while ensuring life on land.

Research Questions

1. What are the PR actions and approaches used to project your works?
2. Which public relations tools do you use?
3. What are the effects of climate change while ensuring life on land?

Limitation of Study

The constraint encountered during the interview with the agency LASPARK was that reshuffling took place not too long across the ministries and agencies. As a result, the Head of Enforcement was the only available person to grant the interview; hence, caused a limitation to the study.

Theoretical Framework

The two-way symmetrical model of public relations developed by James Grunig and Todd Hunt in their 1984 book 'Managing Public Relations' was adopted in this study. The theory focused on ensuring that resolutions made by the organization are mutually beneficial between itself and its publics. It provides an organization with the tools and path needed to create a strong company reputation built upon stable, long-lasting relationship and also maintains both the organization's and its audiences' best interests as the forefront in the fair and balanced way. Through these, the organization and its publics can collaborate to grow and strengthen the organization leading to greater success (Excellence theory 2013).

Therefore, the Lagos State Ministry of the Environment and its focus study agency, LASPARK should implement decisions, policies and projects that are in the interest of the public wellbeing. Their actions would ensure the environmental sustainability of the State, as indicated in their official mandate.

Literature Review

Broom (2009) defines Public relations as the management function that establishes and maintains mutually beneficial relationships between an organization and the publics on whom its success or failure depends. Public relations is the practice of knowing how to manage all information emanating from your organization and being able to positively influence such opinions from time to time from your base (Odiboh & Oladunjoye, 2019). It is the promotion of good rapport and goodwill between an organization and other persons (Abodunrin 2015). Likewise, PR assists top management leaders of

organizations to uphold the credibility of corporate image, products and services (James *et al.,* 2020a; Ndubueze *et al.,* 2019; James *et al.,* 2020b; James *et al.*, 2020c; Ndubueze *et al.,* 2020; Nejo *et al.,* 2020; Olabanjo *et al.,* 2019).

Newsom et al. (2010:2) wrote that public relations involve responsibility and responsiveness in policy and information to the best interests of the organization and its publics. It entails anticipating the analysis of new and emerging issues that may affect an organization. PR is also the occupation responsible for the running and success of organizational relationships and reputation (Nwosu et al., 2020a; Olabanjo et al., 2020a; Omokiti et al., 2020b; Salau et al., 2020a; Salau et al., 2020b; Nwosu et al., 2020b).

It involves the communication and exchange of ideas either in response to or facilitates change. Intrinsically, it connects to policy initiatives, their promotion and responses to the organizational actors and their representative. Public relations exist in all sectors of different levels (L'Etang, 2009).

Public Relations Activities: Aid for Ensuring Sustainability

Public relations is a crucial tool for informing, building a mutually beneficial relationship with a focus on the public. These activations are employed to create and maintain the identity and what the organization stands for (James et al., 2020). Therefore, as human life develops and improves, daily, there is a need for smooth communication which expands the level of the people's knowledge base. Public relations helps organizations' management teams in achieving institutional or corporate goals. It brings into the affairs of companies' transparency, accountability, respect for citizens' rights, and programmes evaluation (Gilaninia & Taleghani 2013). They further posited that public relations help to promote mutual understanding, confidence and strong reasoning meanwhile safeguarding the interest of the organization and its public. (Gilaninia & Taleghani 2013).

Organisations, firms, industries, ministries, agencies to mention a few engage public relations actions and tools to develop and represent themselves to the public in good light hence, the office of the public relations practitioner. Public relations experts have the responsibility of the planning, building and maintaining institutional image and upholding the professional excellence at the same time (Adelua *et al.,* 2020a; Adelua *et al.,* 2020b; James *et al.*, 2020d; Nwosu *et al.,* 2019; Adelua *et al.,* 2020c; Adelua *et al.,* 2020d; Aiyende *et al.*, 2020a).

The public relations activities range from programme planning-which means analyzing problems and opportunities, defining goals and planning activities in order to measure results, which involves the management and clients (Fayemi et al., 2020). Writing and editing involve preparing news releases, annual reports, article and features, booklets, shareholders' reports to mention a few (Aiyende *et al.*, 2020b; Fayemi *et al.,* 2020a; Fayemi *et al.,* 2020b; Fayemi *et al.,* 2020c; Fayemi *et al.,* 2020d; Olabanjo *et al.,* 2020b; Omokiti *et al.,* 2020a). Media relations which is one of the crucial PR actions is about maintaining excellent working contact with the media operators and professionals. These media include radio, television, cinema newsreel, social media platforms and the press. The public relations professional works with the media to place stories about the products, companies and company spokespeople (Onabajo, 2013). Here, the organization supplies information and provides facilities to the media. At the same time, the media publishes these to the public as concerned. Additionally, the success of a kind media relation is subject to the public relations professional having an understanding of the functions of the media in society. The relationship is central to the practice of public relations (Onabajo, 2003).

Furthermore, products such as brochures, report ad multi-media programmes are essential to communication (Odiboh *et al.*, 2020a; Odiboh *et al.,* 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019). Special events organization helps to gain the attention of specific groups such as news conferences, exhibitions, award programmes and facility celebrations. Research and evaluation is one crucial activity of a public relations practitioner. It entails the gathering of fact, analysis, and evaluating the continuing process and success or failure in order to decide future strategy (Chartered Institute of Public Relations n.d.).

Environmental Sustainability

As discussed by the Office of Sustainability, University of Alberta (2013), Sustainability can be viewed as meeting the needs of the present without compromising the ability of future generations to meet their own needs. Sustainability is all-encompassing with a holistic approach that put ecological, social and economic dimensions into consideration in order to find lasting prosperity. It is also about working within limited available resources that allow the living system to thrive.

Environmental sustainability implies that all earth's environmental system is in balance. At the same time, natural resources are used by humans at when due to replenish themselves. Though climate change is everywhere, other environmental problems are more severe. They are erosion, deforestation, land degradation and potable water scarcity, which harms the poor, especially the developing countries. It is the collective role of both the public and private sectors to tackle these issues because environmental degradation has a considerable imprint on national economic growth. The issues as identified are insufficient government commitment, weak institutional capacity to deal with them and insufficient attention to sustainable development goals (World Bank, 2008).

The World Economic and Social Survey (2015) reports that the international community must ensure that the United Nations Framework Convention on climate change. Furthermore, it should produce cooperation between the developed and developing countries in order to meet carbon-dioxide emission reduction targets. Also, an effort to protect the forest with sustainable production and consumption pattern, deforestation is seen to be caused by factors beyond the forest sector's control. The role of forests in the life and livelihood of the indigenous people deserves much more attention. Adequate drinking water and sanitation infrastructure can be best built through public initiatives across all levels and access to clean water should be expanded (Nejo et al., 2020).

Sustainable Development Goals 15 (Life on Land) focuses on restoring, protecting and promoting sustainable use of terrestrial ecosystems. It also includes the need to manage forests, combat desertification, halt biodiversity and reverse land degradation in a more densely populated and resource-taxed world. There is no doubt that human activities had caused severe damage to the ecosystem through deforestation, loss of natural habitats and land degradation (Salau et al., 2020). The target is that by 2020 according to the SDG 15, an end comes to deforestation and restoration of degraded forests. Also, conservation and restoration of terrestrial and freshwater ecosystems must ensure the conservation of mountain ecosystems, restoration of degraded land, protection of natural habitats and biodiversity. There must also be access to genetic resources and integrate ecosystem and biodiversity in governmental planning.

Ugochukwu (2008), in his findings, discussed the need to ensure environmental sustainability in Nigeria. According to him, the government should increase the budgetary allocations to environmental matters. Ministries and Agencies of the environment should, in turn, invest in capacity building, training and acquisition of laboratories. Also, the government should ensure strict compliance with the environmental laws by citizens and companies operating in the country. Another discovery is that the Nigerian environment is lacking the coordinated management approach it deserves. It is still under assault from various challenges; the different efforts from the government to curb such challenges are not in the direction of stemming the tide. The policies and laws are mostly ineffective (Leke & Leke, 2019).

According to Oyefara 2013, he discovered that the Lagos State leaders needed essential characteristics of good governance responsive to the present and future needs of society. He found that the current administration is committed to good governance, which is visible in the areas of environmental sustainability are yielding positive.

Research Design and Methodology

The researcher adopted a qualitative method of gathering data through the use of an interview guide. An in-depth interview was adopted to get the opinions of the people in charge of public relations

affairs at the ministry and agency. After transcribing the interviews, a discourse analysis followed based on the research questions of the interview guide.

Results

From the results of the interview conducted, all the ministries have detailed approaches used to protect their works. The participants affirmed that the public relations actions used are door-to-door sensitization, public enlightenment, press releases, stakeholders meetings, and packaged mini-documentaries. Others are media relations, media appearances and interviews, location tours, press conference, media advocacy, sponsorship and community relations. Others still are partnerships, special reports and feature article and enforcement of government policies while ensuring compliance through monitoring of the activities. One of the participants elaborated further on how they go about stakeholders meetings. He said, "we do a lot of stakeholders meeting. We visit the traditional rulers in local government areas to discuss issues such as refuse dumping, biodiversity, wetland preservation, drainage blocking, street trading and others. During the stakeholders meeting, we get those people we think can reach out to the people at the grassroots level, then we educate them. We package mini-documentaries in diverse languages such as English, Yoruba, Igbo, Pidgin, etc. So that the people can understand the messages we are disseminating in order to stimulate them to act positively".

The LASPARK interviewees also agreed with the above-stated findings. However, they added that they carryout public announcements on obedience and enforcement of environmental laws. They harp on those trampling on the open spaces; those involved in soil degradation. Some officers are responsible for issuing notices and warning the public on tree felling.

These actions get to public knowledge via media vehicles such as radio jingles, television announcements, fliers, web pages, newspapers, and public address systems. Other outlets are stakeholders' meetings, individuals who walk into the office for clarifications and questions about the workings of the department of public affairs as one of the participants stated.

However, all the participants agreed on the need to tackle the challenge of climate change adequately. Since Lagos is an overcrowded city and also one of the most populous states in Nigeria, advocacy worked well. On tree planting to protect the environment, one of the participants said "my son had an assignment which talked about everyone who should plant a tree. After much research, I found out that as we drive, your exhaust from the car affects the climate. Therefore, we are to plant a tree." This statement is intriguing as much as it shows the interviewee's understanding of the relationship between climate change and environmental tree planting. Furthermore, limit burning to avoid the ozone layer being depleted and do not dispose of your waste indiscriminately to avoid flood when the rain comes.

All the participants ascertained that it is an offence which is punishable when caught to default the policies identified. Two of the participants opined that "We have a stiff penalty to unauthorized tree felling. If you want to cut a tree in Lagos, you must seek permission from the agency otherwise; a heavy penalty will be slammed on you". The reason given by the interviewees is that the Lagos State Government has executed several steps to combat climate change issues in order to protect lives on the land according to SDGs 15. The government continues to sign treaties with international bodies.

Conclusion

From the results of the qualitative in-depth interview research, it is clear that there are efforts in ensuring that Lagos State is habitable despite the rapidly increasing population. Government's emphasis is on greening, advocacy on a clean environment, sensitization and public enlightenment to ensure no defaulters. They were proactive in tackling climate issues this year, compared to previous years through Zero tolerance for refuse dumping and distillations of drainages to minimize the flow of flood and its impact on lives.

As the ozone layer depletes, the tree planting initiative and beautification of medians helps to protect the environment and makes it safe and conducive for living. Therefore, individuals on land have an

immense role to play in ensuring a sustained environment. Climate change is a part of life, and a natural cause that comes and its effect has found are flood, destruction of homes, properties and loss of lives.

Nigeria and Lagos state by extension is a signatory to treaties like Conference of parties which gear towards one goal that is, reducing the effect of climate change.

Recommendation

The researcher recommends that the public relations actions executed by the ministry and agency should be more intensified with massive awareness to the public until it becomes a lifestyle. Finally, aside from the stakeholders' meetings, more training is necessary for the officials assigned to areas on the Sustainable Development Goal 15. They need updates on how to inform the public about what the SDG entails.

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Abstract

This study focused on e-Public Relations as a tool for effective healthcare management, using the Lagos State Ministry of Health. The Lagos State Primary Health Care Board, Nigeria, as a study, to discover if the outpatients are aware of the use of social media as an ex-public relations tool. The advent of the Internet has significantly changed the way health information considered (Omokiti *et al.,* 2020). Relevant to this study is the Sustainable Development Goal (SDG) 3., which is good health and well-being. Also, the theoretical foundation of the study is the Excellence Theory, which involves creating value and functional relationship between an organisation (hospital) and it is public (outpatients). Thus, In-depth interviews were conducted in the public relations departments of both the Ministry of Health and Lagos State University Teaching Hospital (LASUTH), its sister agency. An interview guide applied to elicit answers to each of the research questions., which recommended that the public relation department at hospitals try to execute the functions of maintaining a mutual relationship or an understanding between the hospital, and its outpatients. The study recommends the introduction of online communication consultants that will help guide healthcare practitioners on how to use social media to create a smoother patient-hospital relationship.

Keywords: Public Relations, Outpatients, and e-Public relations tool

Introduction

The usage of social media should be an essential factor for an outpatient's health. Arguably, information dissemination about health care, such as immunisation and medication. This social media, which is a site and an application, which empowers customers to make and share the content of what, they see. Social media such as the Facebook, Twitter, Instagram and so on acts as e-Public relations tool in health communication (Adelua *et al.,* 2020a; Adelua *et al.,* 2020b; James *et al.*, 2020d; Nwosu *et al.,* 2019; Adelua *et al.,* 2020c; Adelua *et al.,* 2020d; Aiyende *et al.*, 2020a; Adelua *et al.,* 2020a; Adelua *et al.,* 2020b; James *et al.*, 2020d; Nwosu, *et al.,* 2019; Adelua *et al.,* 2020c; Adelua *et al.,* 2020d; Aiyende *et al.*, 2020a).

Public relations experts at the Ministry of Health and hospitals or Health centres should engage the outpatients (publics) more on the information on healthcare and about the healthcare institutions., especially with social media, because it is a standard tool that is being used or is operated by most people in our society today. The public relations department can disseminate health activities and information with different e-public relations tools, like social media and still the traditional media such as television and radio. Increasing access to social media by individual preferences is noticeable worldwide. Some prefer Facebook to Instagram and vice versa. Others prefer LinkedIn to Twitter or the other way round. Individual social media preferences can be a challenge for the public relations experts in any organisation (Aiyende *et al.*, 2020b; Fayemi *et al.,* 2020a; Fayemi *et al.,* 2020b; Fayemi *et al.,* 2020c; Fayemi *et al.,* 2020d; Olabanjo *et al.,* 2020b; Omokiti *et al.,* 2020a).

Statement of the Problem

Social media are popular outlets for all sorts of promotions (Odiboh *et al.*, 2020a; Odiboh *et al.,* 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019). Organisational promotions are moving with technological advancement leading to electronic visibility of public relations actions. Using social media platforms to communicate these actions is a trend that many countries have adopted. Specifically, Facebook, Instagram, Twitter, and others are online tools for fast-tracking public relations communications with various publics (James *et al.,* 2020a; Ndubueze *et al.,* 2019; James *et al.,* 2020b; James *et al.*, 2020c; Ndubueze *et al.,* 2020; Nejo *et al.,* 2020a; Olabanjo *et al.,* 2019).

Fast-tracking public understanding Sustainable Development Goal (3) and aligning organisations with their publics are two things that e-PR would do. However, public awareness and corporate usage of this tool are not clear. In this haze, public expectation of good health and well-being. It is against this background that this research seeks to investigate the use of social media as electronic public relations tools in the Ministry of Health and Lagos State Primary Healthcare Board. The aim is to ascertain how practical its uses are and the level of awareness, to the well-being of identified publics (Nwosu *et al.*, 2020a; Nejo *et al.,* 2020b; Olabanjo *et al.,* 2020a; Omokiti *et al.,* 2020b; Salau *et al.,* 2020a; Salau *et al.,* 2020b; Nwosu *et al.,* 2020b).

The objectives of the study

The general objective of this study is to examine the usage of social media and the awareness as e-public relations tool for achieving effective healthcare management of the public is towards their satisfaction in the hospital. However, the specific objectives of the study are:

I. To ascertain outpatients' level of awareness of social media usage by Lagos State Primary Health Care Board and the Ministry of Health
II. To find out what social media tools the hospital and Ministry of health deploy communicating their public relations activities
III. To find out outpatients' usage of social media to access information about e-P. R activities of the Ministry and LAGPHCB.
IV. Another objective is to investigate the challenges of useful application of social media between MoH, LAGPHCB and the outpatients.

Research Questions

I. What is the outpatient's level of awareness of the usage of social media by the officials of Lagos State Primary Health Care Board and the Ministry of Health?
II. What are the social media tools the hospital and MoH deploy in communicating their public relations activities?
III. How does the outpatient use social media to access information about P.R. activities of the MoH and LAGPHCB?
IV. What are the challenges of the practical application of the outpatients' using social media to access information about P.R. activities in the MoH AND LAGPHCB?

Literature Review

Social Media

Social media is one of the essential tools to be employed by any organisation. It is a website where people connect, make friends and also get information, e.g. Instagram and Face book. Kaplan and Haenlein (2010) define social media as internet-based applications built on the ideological and technological foundations of Websites.

The social media can be accessed with our digital devices such as mobile phones, laptops and other electronic gadgets. With the era we are in social media is the fastest way for information to be shared. Today, social media is part of public and private life to the extent that individuals only pay attention to the apps in building and sustaining relationships. Everybody is via web-based networking media from the youth, old, rich and poor. Indeed, even organisations presently are extremely dynamic Internet, posting refreshes and noting inquiries. (Adelua, et al., 2020)

The development of new media (web or advanced advances) changes how individuals speak with one another (Balaban-Sali, 2012), access and offer data. Not at all like in the days where individuals depended on conventional media or relational correspondence. Currently, individuals have the chance to look for, read, view. They offer the data they like, anyplace, whenever, and on any theme (Papoola, 2014).

With social media, health organisations can improve in carrying out their information to the outpatients (public), so they can be aware of the activities of the organisations. Also, social media is viewable anywhere, which gives easy access to fast pace information. (Salau, et al., 2020)

Public Relations and E-Public Relations Tool

Public relations have many definitions, which range from simple to complex (Salau et al., 2020) As indicated by L'Etang. In essence, public relations "are the occupation liable for the administration of hierarchical connections and occupation. It includes issues the executives, open undertakings, corporate correspondences, partner relations, risk communication and corporate social duty. Public relations work in the interest of various kinds of association both at the administrative and corporate level, to a private company and intentional areas (James *et al*., 2020). Public relations emerge at purposes of cultural change and opposition" (2009, p.13). Objectives of public relations are to advance common comprehension with the crowds (publics), which might be inside and outside (Aiyende et al., 2020)

The Mexican creed of public relations surmises that the profession is about trend analysis, prediction of consequences and programme implementation on behalf of an institution (Nejo *et al.,* 2020). Public relations also involve an organisation having a mutual understanding with the public (outpatients) for both their interest. The public relations tools include; media relations, press release, employee relations, social media usage and corporate social responsibility.

E-public Relations

The Internet has today changed the world, including acts of correspondence. The Internet is an essential instrument for communication, and the exploration shows that the Internet is exceptionally crucial to everybody. The public relations professional ought to be engaged with online public relations because the Internet is imperative to individuals. Public relations expert that does not discuss viably with the online open cannot effectively or productively keep up the favoured clear picture.

Everybody is associated carefully in this day and age, and P.R. encourages associations to make a vigorous online nearness that is very obvious to their intended interest group. Public relations online provide organisational backing and direction on the web, while being on standby in case of a fiasco occurrence (Fayemi et al., 2020).

E- Public Relations with Health Care

Since health care services and administration include all the people, hospitals have a unique significance among open administration organisations. Hospitals attempt massive missions in verifying physical and mental prosperity of the general public, in short ensuring the well-being of the public, which are the outpatients (Aiyende et al., 2020). Public relations is a series of continuing activities evaluating the attitudes of a target community, and creating relationships dependent on

collective participation and acknowledgement. It exchanges regards, love and compassion with hospital outpatients while giving them a positive picture of recovery back to life (Fayemi et al., 2020)

Public Relations Institute of South Africa (PRISA) looks at the administration of actions of the profession through correspondence. Accordingly, public relations is about discernments and connections between a going-concern and its inner and outer partners (Nejo et al., 2020). Accordingly, it is significant for associations and even people to pay attention impression they make of themselves (James et al., 2020).

Lagos State Ministry of Health

The Lagos State Ministry of Health is the state government supported organisation, accused of the obligation to plan, devise and complete the state courses of action on prosperity. Lagos State showed up through a Federal Decree on May 27, 1967, and Health was one of the Ministries with which it took off. The Ministry was once in the past blamed for commitment concerning both prosperity and social welfare. The political and official organisation of the Ministry resides in the Honorable Commissioner for Health and the Special Adviser to the Governor on Primary Health Care. Through them, healthcare matters affecting the citizens in the State go to the State Executive Council and the Governor. The Lagos State Ministry of Health has distinctive parastatals in the State. (https://health.lagosstate.gov.ng).

Lagos State Primary Health Care Board

Lagos State Primary Healthcare Board was formed to meet the desires of the citizens' health and well-being. One of the methods for accomplishing this objective is the bridging medicinal services and human needs through the 200 and eighty-eight Primary Health Care Centers in the State. The focal point of the Primary Health care is in this manner on preventive human services, and the Board is initiating its acknowledgement all through the niches and corners of the State. https://lagphcb.lg.gov.ng/company-overview/

Sustainable Development Goal (3)

Good health and well-being are one of the most critical tools in our lives. Guaranteeing healthy lives and advancing the prosperity at all ages is fundamental to available advancement. Efforts are needed to thoroughly remove a wide range of diseases/ sicknesses and address many different emerging health issues.

Theoretical Framework

The two-way symmetrical model of public relations is the theoretical foundation of this study. Grunig propounded it and the theory centres principally around the enthusiasm of an organisation (Lagos State Ministry of Health and Lagos State Primary Health Care Board) towards its publics. An organisation decides, which will profit both the organisation its crowds (Grunig, 2001). This theory grasps arrangement between the organisation (well-being division) and its publics, and one that likewise cultivates shared understanding (Severin, 1997). Along these lines, organisations are relied upon to settle on choices that will intrigue the public and not just themselves. At the point what the organisations need is intrigue-free public fulfilment.

Research Design and Methodology

The researcher adopted a qualitative method of gathering data through the use of an interview guide. Here, the interviewee answered the questions posed by the interviewer. The institutions under the study are the Lagos State Ministry of Health and Lagos State Primary Healthcare Board. In each of the purposively organisations, two public relations practitioners were selected and interviewed. The sample size was selected purposively; a senior P.R. practitioner and a junior or assistant P.R.

practitioner were interviewed for each sample size. The results of the interviews were examined and used to answer the research questions.

Results

In this section is the presentation of the interviewees' responses to the in-depth interview questions. All four participants agreed that the public is aware of social media usage by the public relations department. They affirmed that they follow the track of the United Nations' Sustainable Development Goal (SDG) 3. The goal is good health and well-being. The public relations officers said that they regularly disseminate information about diseases like polio, immunisation, meningitis and others to the public to create awareness for the outpatients or the public.

The four participants indicated that they work directly with the government in other for the public relations department to disseminates information to the public (outpatients) concerning the organisation. The participants stated that they all use social media for official purpose. All the staff of their public affairs units encourage and enlighten the members of staff to use the social media platforms effectively, and it helps to coordinate them. The participants also indicated that they all have different social media accounts in other to reach out to the public (outpatients) and also get feedback from the public. The participants also indicated that there are social media handles, that all staff are members. Some of the staff in the public relations departments manage the social media pages daily.

The social media platforms used by the participants in disseminating information to the public are Facebook, Twitter, Instagram, Telegram and WhatsApp. They are emailing telegram and the websites, which contain the phone numbers of their agencies and ministries. Two of the participants implied that Instagram and Twitter are mostly used in distributing information. Two of the interviewees indicated that weekly activations social media platforms. The other two interviewees said that their social media activities are daily.

However, the four participants also agreed that there are challenges for the outpatients or publics in accessing social media. However, one participant stated that "it depends on outpatients' desire for healthcare updates. I do not think it is challenging to access our public relations activities, especially LAGPHCB (Lagos State Primary Health Care Board). The challenges are subjective and individual.

The two interviewees from LAGPHCB stated that their e-PR challenges are the lack of uninterrupted Internet connectivity. Another challenge is that some outpatients are stuck with some unknown social media app. At the same time, some do not have digital media devices for using social media. Another challenge could be that some of the information is sometimes false, and various media articulates negative thing about the governments.

Furthermore, the four participants agreed that there are impacts of public relations activities on the public, which are numerous. If there were no Public Relations department, there is no way the public would know what the government is doing. So, the Public relations department is the tool in which the government disseminates information to the public. The public relations also react to public issues based on available information. They get feedback from the public.

This study, therefore, shows that the outpatients are aware of the social media usage and the four participants employ the right tools in disseminating the information. According to the interviewees, healthcare outpatients also access social media to get more information about the public relations activities of both the Ministry of Health and the Lagos State Primary Health Care Board. Though the access extent may vary; the impact of the healthcare institutions' public relations activities are numerous, and there are many challenges.

Conclusion

This study consists of in-depth interviews with two Public Relations Officers, each of the Ministry of Health and the Lagos State Primary Health Care Board. The study revealed that more information on the awareness and usage of social media as an e-Public relations tool is required. Based on the responses from the four Public Relations Officers, different factors and services affect the outpatients 'and that of the public's choices. To improve the system on hospitals in line with the Sustainable Development Goal (3), public relations officers need to be more proactive in the usage of social media platforms. Coordinated content sharing with both inpatients and outpatients should be institutionalised. Moreover, they inform the outpatients about their P.R. activities by sharing their social media contents and web updates.

Recommendation

This study endorses remodeling of the healthcare superstructure to create public relations units in all the healthcare agencies. That way, there should be a P.R. department, or they should hire the services of a P.R. agency, in other to disseminate information to the public or outpatients.

The study recommends the creation of clear public relations policies and guidelines inclusive of active healthcare givers with the skillset to interact with and educate the public using social media apps.

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Public Relations Professionals' Works at A State Ministry of Tourism Arts and Culture: A Layout of Viewpoints

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Abstract

This study examines community relations practices by professionals in the Ministry of tourism, council for art and culture. It also examines areas the public want the Ministry and council to improve on. The research method employed for this study is the In-depth interview method; the interview was also conducted with the public relations professionals in the Ministry and agency to get their insights. Professionals generally do not execute enough community activities to ensure the public see ministries in a positive light. It is not possible to do a successful activity without Public Relations. This paper reveals that despite the professional's claim in ensuring there is a mutually beneficial relationship between the community and the Ministry, a lot still need to be done. The paper concludes that the Ministry and council need to focus more on public relations with those at the local level and overcome the issue of negative perception. They should as well focus more on areas that will benefit the public, such as more empowerment programs. More educational programs, better community relations activities also need more attention. Its recommends that the Ministry of Tourism, council for art and culture must get involved with international partnerships as that is a significant area they are lacking. Also, they must endeavour to create keen awareness about their activities; they should exploit more activities across the different local governments in the State.

Keywords: Ministry, Public Relations, Professionals, Lagos state Ministry of Tourism, Lagos Council for Arts and culture, community relations.

Introduction

Professionals are like people who work as experts in specific fields. The problematic nature of the business world at large coupled with social and environmental inequalities have raised the issues of community relations and corporate image. In recent times, organisations generally have tried in one way or the other to be identified by the domiciling community they are operating. Thus, the need for identity and communication led to the development of public relations which community relations is part and parcel of (Nwosu, Odiboh, Olabanjo and Fayemi, 2020a; Nejo, Odiboh, Omokiti and Adelua, 2020b; Olabanjo, Odiboh, Adelua and Fayemi, 2020a; Omokiti, Odiboh, Aiyende and James, 2020b; Salau, Odiboh, Adelua and Fayemi, 2020a; Salau, Odiboh, Omokiti and Nejo 2020b; Nwosu, Odiboh, Oyedepo, James and Adelua, 2020b).

Community relations, as explained, constitute an essential tool in building good relations between an organisation and its various publics.

The primary goal of practising public relations in regards to community relations is to create two-way communication and sustain mutual relationship and understanding between the organisation and the host community (Adelua, Odiboh, Aiyende and Omokiti, 2020a; Adelua, Odiboh, Nejo and Fayemi, 2020b; James, Odiboh, Olabanjo and Adelua, 2020d; Nwosu, Ndubueze and Olabanjo, 2019; Adelua, Odiboh, Olabanjo and Ndubueze, 2020c; Aiyende, Odiboh, James and Salau, 2020a). Communities are the central part of a business plan that helps in promoting the sustainable development of business activities of corporate organisations through profitable future partnerships.

The Lagos State Council for Art and Culture has had several activities over the years. However, to what end has these activities impacted its surrounding community? Not to undermine the importance of partnership as recorded in the Sustainable Development Goal 17 of the United Nations Organisation (UNO).

This paper seeks to get professionals' perspectives of community relations. It would examine what they have done so far; and how they execute their activities and most especially, how they get partnerships.

Statement of the Problem

There is a general misconception that individual professionals in ministries have become figureheads who would rather sit all day than do an actual job. There is the issue of non-challant attitudes of professionals in ministries to work. The image of an organisation lies solely on the attitude of its workers. The misconceptions about the ministries were avoidable if things were straight from the outset (Fayemi, Odiboh, James and Olabanjo, 2020a). This paper, therefore, looks at the activities being executed by the professionals, tools used, how they create awareness of their programmes, and how they get partnerships.

Research Objectives

This research examines the community relations activities of the Ministry and Council and the P.R. tools applied.

Research Questions

Based on these objectives, the following research questions suffice:

1. What are the media outlets used by the Ministry of Tourism and Lagos State Council for Art and Culture to create awareness of their activities?
2. What are the community relations activities being executed by Lagos state council for art and culture?
3. How does the ministry/council get partnerships?

Literature Review

Concept of Community Relations

The idea of community relations is to establish a cordial and mutual relationship between an organisation and the host community (James, Odiboh, Adelua and Fayemi, 2020a; Ndubueze, Odiboh, Nwosu, and Olabanjo, 2019; James, Odiboh, Aiyende and Salau, 2020b; James, Odiboh, Nwosu and Fayemi, 2020c; Ndubueze, Odiboh, Adelua and Fayemi, 2020; Nejo, Odiboh, James and Fayemi, 2020a; Olabanjo, Odiboh, Nwosu and Ndubueze, 2019). Such a mutual relationship and rapport helps to entrench peace which in turn enables the organisation to operate effectively without hostile interference from the host community. In order to understand community relations very well, it is imperative to know the meaning and what constitutes a community of an organisation.

Community is a place of interactive institutions. It may be social, political, economic, and religious. All of them produce interdependence; co-operation, collaboration, and unification (Nnaemeka, 1993; Odiboh, Amodu and Ekanem, 2020a; Odiboh, Fasanya, Adegoke, Afolabi and Ofor, 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019).). A community is a combination of social units and system which perform the primary functions having locality relevance (Waren, 1963). By locality relevance, Akpan (1987) holds that it concerns the condition in which human beings find themselves integrated into a web of meaningful relationship with fellowmen in their style. Such interacting social structure of the community believed to have been possible through what Cutlip and Centre call "... attitude and practice of interdependence, co-

operation, collaboration and unification" (1982, p. 311). A community is also one of the underlying subsystems of human existence that opens the way to man's realisation of their need.

According to Nwokedi, (1988, p.3), community relations is the social responsibility which organisations owe to the people in that area of operation. Canfield (1968) sees community relations by what it does and the reason for doing so – much co-existence between the company and the community in which it operates. He sees good community relations as making an organisation a corporate citizen of the community. Their organisation must do everything to enable society to be well-governed and provide socio-economic activities to support the community.

Nweke (2001) sees community relations as the deliberate effort and planned programme embarked upon by an organisation to maintain a smooth relationship with the host community. The success of this mutual relationship thus depends on proper understanding and adequate knowledge of each other, easily facilitated by functional communication services, knowledge of the community, its pressing needs, social status structure, channels of communication, social agent, opinion leader, among other issues (Nweke 2001).

The essential ingredients of community relations translate practically into social responsibility on the part of the organisation. Meaning that by operating within the community, the organisation should not only identify within the community but should discharge some fundamental social responsibilities to the community. Benson-Eluwa (1999) holds that many organisations in Nigeria do not have plans for issues and crisis management. They operate as if they have everything at their disposal. What they do in times of crisis is to take ad hoc measures. Instead of giving support to public relations expert to manage the issues, they do the wrong things until it is too late to avert crises.

Explicitly, Kogan (1977, p. 8) holds that community relations are "the management functions that evaluate community concerning an organisation within the community, the peoples' interests and executes a programme of action to earn community understanding and acceptance". In Kogan's viewpoints, community relations is no less a severe part of public relations practice. In respect to that, communication becomes the primary useful tool required in maintaining and sustaining a mutual relationship, understanding, goodwill and acceptance in the community where the organisation exists.

Therefore, to achieve a mutual relationship with the members of the community, the organisation should adopt the principles of community relations. These include: (i) the fundamental principles of operation; (ii) the need to define community relations objective; (iii) the importance of community relations, public complaints and expectations.

Community Relations Development

Community relations is way beyond being helpful to people around, and it involves commercial participation in research, vision, evaluation and dissemination (Salau, Odiboh, Adelua and Fayemi, 2020a). With this, it is essential to examine the community relations activities executed accordingly. However, evaluating community relations programmes can be challenging to measure in terms of quantifiable data—performance indicators such as publicity, employee feedback, money value, innovations. Compatibility, perceptions from public opinions, appreciation messages, internal and external communication audit results could measure the community programmes achievements.

There are also vital factors to consider knowing the success of community involvement programmes. Among which is the acceptance of the strategies done by Board of directors and senior management, their endorsement is necessary to avoid unnecessary scrutiny later on. (Nejo, Odiboh, Omokiti and Adelua, 2020).

Key Factors to the Success of Community Involvement Programmes

Several crucial factors determine the success of a programme, the key one of which is the acceptance of the strategy by board directors and senior management. Without their endorsement, the programme and individual initiatives will differ from unnecessary scrutiny beyond the necessary status

measurement criteria. Certain things that may influence these programmes may include partnerships with community organisations, monitoring and evaluations, top management support, successful internal and external communication.

Theoretical Framework

This study adopts the Two-way Symmetrical Model. In this model, both the communicator (the organisation) and the receiver (the public) are mutually communicating. The messages take into account the needs, demands and interests of the public. This model is dependent on research in not only designing or packaging a message but also in helping an organisation to adjust concerning the needs of the public. According to the two-way symmetrical model the public relations practitioner should serve as a liaison between the organisation and critical publics, rather than as a persuader (Odiboh and Ajayi, 2019). Here, practitioners negotiate using communication to ensure that all involved parties benefit from the situation. The term "symmetrical" denotes used attempts to create a mutually-beneficial situation. The two-way symmetrical model is the most ethical, one that professionals should aspire to use in their everyday tactics and strategies (Simpson, 2014).

This theory is relevant to this study because it clearly states how messages relayed by the professionals are considered. Here the professionals are made to serve as an intermediary between the company and critical audience, which in turn sharpens how the public views them. For this research, the qualitative method of research was adopted, using the in-depth interview method of data collection.

Results

Findings from the in-depth interviews conducted among three interviewees revealed that they create awareness about their activities. Moreover, they make people know the customs and traditions of different divisions in Lagos. "When we say that we are propagating and presenting the rich culture of Lagos State, it means that we have a relationship with the people at the grass-roots and communities, for instance, we attend festivals like the Zagbeto Festival in Badagry, Coconut Festival in Badagry, and through the attendance of such festivals, we create awareness."

Two of the interviewees agreed that they use more social media as their primary tool to pass information and create awareness. At the same time, one noted that the Ministry uses the State-owned radio and television stations more. Also, two of the interviewees said they get more of sponsorships and consultants rather than partnerships. In contrast, the other said they get partnerships. "We partner with different newspapers, and they come to cover the event. We send out stories to them, and then they make use of our stories and pictures as well" One also noted they create an enabling environment for the creative arts.

However, one of the interviewees said they use festivals to drive tourism devoid of tradition to avoid Juju and harms on the people. "We normally devoid the tradition from the festival so that at the end of the day, the Juju or whatever they want to do will not be part of the show. It is not as if they do not do the traditional aspect of that festival. However, we try to let them emphasise on the entertainment aspect of that festival so that we can drive tourism". The Ministry and Council have the same structures, the interviewees said. Concerning measures to build relationships between themselves and the community, an interviewee stated that they do so by creating awareness. Another interviewee highlighted that they build a relationship by organising events on creative arts, and more celebrated Lagos festivities. However, the other said they educate the public on traditions and culture, and by that, they build an everlasting relationship.

From the interviews conducted with the Ministry and Council officials, it is clear that the significant activity consistently highlighted is Zangbeto festivities in Badagry. The other two are Egbe and Greater Lagos festivals which happens in few areas of the State. There is little effort to activate its more activities. They stated some of the ways they activate their activities include creating

awareness, strategic meetings, sharing of banners. They agreed that there is usually room for improvement in the way they pass messages to their publics.

Notably, they get sponsorships from reputable brands like GAC, Pepsi, Guinness amongst others. They also have an in-house magazine where pictures of several activities are displayed. To this end, it will be essential for the Ministry and agency to focus more on managing the public misperception and the issue of not creating awareness, activities, and partnerships by improving on their tools and manner of activating their community relations activities.

Conclusion

Community relations, as outlined, ensures confidence-building. It preaches the key messages and organisation's aims at passing across to its publics; in other words, the Ministry's messages must from time to time be consistent and luring enough. (Odiboh O, Olonode A, Adesina E and Yartey D, 2018).

As often said, there is a better method of pitching visibility as a brand, building a customer base and enlightening the public than through community relations activities. It often allows the organisation to execute its crafted messages to target publics professionally and credibly. A primary essential objective in any community relations activities is the ability to differentiate the client's brand from the competition.

However worthy of note that community relations help to make or mar an organisation. A good relationship with the community in which an organisation operates will help build a good reputation. It is essential to embrace as many activities as possible and create necessary awareness as much as possible.

To this end, this study concludes that the Ministry of tourism must embrace more tools in reaching out to its publics not just rely on the traditional media. At the same time, the council for arts and culture must endeavour to get international partnerships to display the cultural heritage of Lagos to the world at large, not just local consultants.

Recommendations

Ministry of tourism must get involved with international partnerships as that is a significant area they are lacking. Also, they must endeavour to create keen awareness about their activities. Furthermore, they should exploit more activities across the different local governments in the State, not just in some areas. Everyone should be able to benefit from the Ministry.

Council for arts and culture must also get involved with partnerships to showcase the rich culture of Lagos worldwide and internationally. It will benefit the State. Above all, Organisations generally should contribute to the development of society and better the lives of its community by providing excellent and maximum service.

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Practitioners' Usage of Electronic Public Relations at a State Transport Ministry in Nigeria

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Abstract

The use of electronic public relations constitutes and forms a standardized way of promoting an organization's products, services, and therefore making an impact on its general public. The purpose of this research is to examine the usage of electronic media by the public affairs Practitioners in the transport sector of Lagos state. The use of an electronic medium in public relations has excellent potential as a communication tool because the profession generally is and always will be about human relationships. The use of ecology theory and its assumptions form the basis of this study, and it focuses on how the media and communication processes influence human perception, understanding, feelings and values. The researcher adopts a qualitative method of gathering data through the use of an in-depth interview. The study population include the Ministry of transport and its agency LASTMA. The result shows that the transport sector adopts electronic media communication and have effectively used it in ensuring a relationship between the agency and the public. Thereby creating an impact which is positive on the economic growth on the State. Thus, this study recommends that LASTMA needs to intensify effort in the use of the media to instill the habit of obeying traffic rules and regulations on vehicle drivers. Celebrities and social icons should be engaged to influence road users, regardless of whatever challenges they may encounter in their day to day discharge of duty.

Keywords: Public Relations, Traffic Management, Electronic Public Relations

Introduction

Traffic management involves the diverse practice of coordinating, controlling, arranging, and directing existing traffic system. Traffic management provides an environment that is conducive enough for motorists plying the roads. Over the years, the situation of vehicular traffic in Lagos is increasingly critical. A chaotic situation and neglect by the government were significant characteristics. Therefore, leading to a loss of lives and properties. This situation now led to the establishment of an agency under the control of the Ministry of transportation, called LASTMA (Lagos State Traffic Management Authority). The agency was established in the year 2000, under the authority of the State Governor to control and manage the traffic situation in Lagos, which will to a great extent help in saving productive time from been wasted on the highway thereby ensuring sustainable economic growth in the State.

Traffic infrastructure is one of the most relevant elements of development today. Transport infrastructure facilitated the growth of connections between regions within a geographical environment. It also supports the formation of mutual economic, social, cultural relations.

Electronic public relations play a significant role in facilitating two-way communication. Today, this medium has allowed practitioners to implement more effective communication through electronic channels with the public.

Statement of The Problem

Lagos roads before the establishment of LASTMA was full of high traffic congestion, high rate of road accidents, the poor driving culture of commuters and motorists on the roads, high rate of a log jam. There was little or no observation of road rules and regulations, no usage of pedestrian bridges, no complaints to traffic lights and control amongst many others. All of these problems led to a high result in several accidents and significant loss of lives and properties on the roads—theft on the road and precious human hours in traffic. Also, there is severe damage to vehicles plying the roads. These problems, therefore, had an effect on the business costs and efficiency, which also injured and slowed down the social, economic development of the State and county at large.

All of this form the brain behind the establishment of an agency which can help curb all these problems. In 1999, LASTMA came to existence to ensure and create an avenue for the free flow of vehicular traffic, and to help prevent the waste of productive time on the road and to improve the quality of living in the metropolis. The Ministry of Transportation at large is responsible for implementing the State's policies on the transport system. Part of these policies creates an avenue for transportation infrastructural development according to the Sustainable Development Goal (SDG 9). This Goal evolves around enhancing and building resilient infrastructure and the administration of new city models aimed at achieving the safety of lives and properties. And also, the sufficient flow of traffic in Lagos State. This study examines LASTMA activities concerning the motoring public. The study also aims to review the application of procedures in traffic management in the State. It considers the public relations channels adopted to develop and innovate the transport system in the State.

Research Objectives

The objective of this study is finding out the usage of electronic public relations on the activities executed by the Ministry of transportation.

1. To find out how public relations activities contribute to the vision of LASTMA through electronic mediums.
2. To examine the usage of an electronic medium to create awareness in ensuring a free flow of traffic.

Research Questions

1. How do the activities of public relations contribute to the vision of LASTMA through electronic media?
2. How does the usage of the electronic medium create awareness in ensuring the free flow of traffic?

Literature Review

Public Relations

Human life continues to advance relative to global changes. Therefore, there has been an increased need for information and communication; everyone craves for accurate and up to date information to be knowledgeable about happenings in the world. (Fayemi et al., 2020) notes that when practitioners respond to an organizational problem strategically instead of tactically, it helps the reputation of the organization to be positively projected. Public relations is the promotion of goodwill relationship between an organization and it publics. Information brings about success and aids development. Public relations is the practice of knowing how to manage all information emanating from an organization and being able to positively influence such opinions from time to time from its base (Odiboh &Oladunjoye, 2019).

The role of public relations in any organization in terms of work quality is to achieve organizational goals. The objective of public relations is to promote mutual understanding with the audiences(public) which may be internal and external. Public relations practice is the way, and manner top management uphold the credibility of their brand, services, products, staff members to gain acknowledgement (James et al., 2020a; Ndubueze et al., 2019; James et al., 2020b; James et al., 2020c; Ndubueze et al., 2020; Nejo et al., 2020a; Olabanjo et al., 2019). Public relations experts adopt the use of different media platforms in reaching out to both their online and offline audiences. Some of these tools include one on one meetings, public announcement, to mention a few (Odiboh et al., 2020a; Odiboh et al., 2020b; Odiboh and Oladunjoye, 2019; Odiboh and Ajayi, 2019; Odiboh, Ezenagu and Okuobeya, 2019).

Public relations is a profession that is responsible for the success and growth of organizational relationships and reputation. The effect of creating a mutual relationship is to have a mutual understanding with the public, which is an essential responsibility of a public relations practitioner, to ensure a positive perception of the organization (Fayemi et al., 2020). The practitioners' primary duty is establishing and maintaining convivial relationships for their organizations. Part of that duty is safeguarding the interests of the organization. Public relations practitioners are involved planning, creating, building and maintaining a positive image and integrity of an organization (Adelua et al.,2020a; Adelua et al., 2020b; James et al., 2020d; Nwosu et al., 2019; Adelua et al., 2020c; Adelua et al., 2020d; Aiyende et al., 2020a). The survival and growth of an organization depend on having a reciprocal relationship between the internal and external publics. Therefore, the need to provide up to date useful information is essential to keep the public informed of happenings within the organization. Public relations involve the manner at which the top management of organizations employ the use of strategic ways to uphold the credibility of their brand, services to gain acknowledgement (James et al., 2020).

The British Institute of Public Relations explains that the activities of public relations as a profession are deliberate, planned and sustained. It is an effort to establish and maintain excellent and mutual understanding between an organization and all its publics. Three variables are central to this definition of public relations. First, it is a planned activity. Second, the activity must be sustained. Third, the principal aim of the activity is to ensure mutual understanding. Thus, an excellent public relations department must operate with clearly stated goals and objectives. Concerning establishing mutual relations, the public relations practitioner must be both a good listener as well as a good speaker. Public relations practitioners are individuals responsible for the running and success of an organization's reputation (Nwosu, et al., 2020a; Nejo et al., 2020b; Olabanjo et al., 2020a; Omokiti et al., 2020b; Salau et al., 2020a; Salau et al., 2020b; Nwosu et al., 2020b).

Another definition by the International PublicRelations Association describes public Relations as a management function with which an organization or institutions works for the support and understanding of those who make up the public opinion about them. Public relations is the art and social science that analyses situations around the organization. Having a good relationship with media practitioners is a critical action that a public relations expert must be able to do. They are keeping good working contact with the media such as radio presenters, journalists, and bloggers (Nejo et al., 2020).

Electronic Public Relations

Public relations is an occupation responsible for managing an organization's reputation and relationships between the management, stakeholders, customers, government, employees, and all other publics associated with the growth and development of the organization. Public relations practitioners are charged with the responsibility of the planning, building and maintaining the image and upholding the professional excellence and integrity of the organization. As a whole, the body of public relations involves two sub-sectors, one half is responsible for building a good relationship with the internal public of the organization. In contrast, the other half is responsible for creating an excellent mutual relationship with the external public. These sub-sectors work hand in hand to the progress of the organization as a whole. In carrying out these responsibilities, practitioners must adopt the use of a mass medium for proper communication. Some of the media mediums include both traditional

mediums and the new mediums. Salau et al., 2020) noted that sincere information seekers will always go to an organization's website to get relevant, trending information about the policies and activities of the organization. With this, they refer this platform to others who may need any information about the happenings within an organization.

With the emergence of the Internet, the world, especially in the aspect of communication, has advanced. The Internet is now of utmost importance as it affects quick and effective communication both far and near. Public relations activities range from program planning-which means analyzing problems and opportunities, defining goals and planning activities in order to measure results, for the progress of the organization. Due to this, public relations practitioners now involves the use of not only the traditional medium of communication but also the Internet, especially social media platforms. Online activities include photo sharing, video sharing and communication, audio sharing, messages and content sharing amongst many others. It is now very essential for practitioners to adopt these new mediums in order to be able to effectively shape and maintain the desired public image of their organization. (Salau et al., 2020) describes public relations use of digital as an innovative concept that is computer-mediated. It involves practicing public relations in the cyberspace.

The observation regarding the application and use of the online with the electronic public relations is that practitioners tend to apply the online tools in a similar way to traditional media tools such as the print and broadcast (newspaper, radio, T.V., magazines (Aiyende, et al., 2020b; Fayemi et al., 2020a; Fayemi et al.,2020b; Fayemi et al., 2020c; Fayemi et al., 2020d; Olabanjo et al., 2020b; Omokiti et al., 2020a). While there are several advantages to the use of the Internet, it also has some challenges. For example, cases of crisis control, the traditional media rather than the Internet perform better. Therefore, practitioners much are conversant with the effectiveness of these mediums to the benefit of the organization.

Public relations practitioners all over the world, including Nigeria, must master the principles, rules, tricks and applications of digital public relations in order to be relevant to organizations of the future. Noticeably, human activities had caused a severe change to the communication system through the enormous growth in the adoption of internet features. The first step is to be vast in the use of the Internet and digital equipment because being digital involves the use of computers. Also, practitioners in this profession must understand the difference between analogue and digital because they both have their implications for executions. Digital can transmit information quickly without considering proximity as a factor. However, it is always difficult to keep records while the analogue is like an archive for data and information. Today, electronic public relations have become an essential and necessary style for communication because it is open to more extensive opportunities. The public can now interact with one another about an organization in a public way through the Internet.

Road Traffic Management

Managing road traffic involves applying control measures for road users to improve road safety and ease road congestion. These measures could also be the process of controlling and determining the timely movement of vehicles on the road. Traffic management is a technique that ensures a sufficient flow of traffic through the adoption of strategic methods. These are achievable by combining many years of experience with fresh techno approaches to provide a free traffic controlled environment. Managing traffic helps to control large vehicles, tricycles, road users (including pedestrians) to prevent jam and congestions on the road, with a minimum level of convenience.

Road traffic management and control involve the activities of directing vehicles and pedestrian traffic within and around an environment, construction area, accident zone and other kinds of disruption, therefore ensuring the safety of lives and properties of the general public. This activity may include the use of some technologically advanced equipment like the CCTV and monitoring tools. Also, advice can be given by local roadside authorities to commuters and motorists all to ensure a road free of traffic congestion. Besides, traffic management ensures the achievement of dynamic balance between the needs of individuals plying the road and network capacity. It also includes having in mind that users of the different means of transportation share limited infrastructural space. The requirement for traffic

management involves the monitoring of traffic. This activity is not one-sided, support like sharing of information to users, emergency management, and support for commercial means of transportation amongst many others.

Urban community traffic management is a telematics system of road traffic control because this kind of advanced community can quickly reveal the cause of a problem. Through the web of traffic, information solutions are more accessible to come about. The use of advanced tools such as television circuits, information transmitter and road detectors, traffic management
is now part of social governance.

Generally, traffic involves the movement of people and goods from one point of location to another. This movement occurs along a particular pathway which may also be a guideway. The cause of traffic congestion is a condition in which the number of road users increases with little available space to accommodate them adequately. The slow speed characterizes this situation in the movement, longer time spent on the road, and increased long queues. Congestions like this create frustrated drivers engaging in road rage and violation of traffic rules and regulations, which frequently result in accidents, loss of lives, loss of properties and damage of the roads.

Research Design and Methodology

The researcher adopted a qualitative method of gathering data through the use of an interview guide. Here, the respondents give their opinions and comments directly to the researcher. An in-depth interview was adopted, and the population were selected purposively. The study population include the Ministry of Transportation and its agency LASTMA.

Theoretical Framework

Media Ecology Theory assumptions are best suitable to emphasis the idea of the study. This theory aims to understand the social impact of technology and communication (McLuhan, 1964). The theory claims that the media act directly to shape and organize culture within a society. Media ecology is the study of how media and communication processes influence human perception, feelings, values, understanding.

McLuhan notes the influence of technologies including radios, clocks, television, movies and games on its viewers. He focused on defining the relationship between technology and members of a specific culture. He also noted that electronic media had revolutionized the society, and the society is quickly becoming reliant on these communication technologies. No society is unaffected by the impact of the various electronic media used by communication.

Results

The result from the interview conducted at the Lagos ministry of transportation and it agency LASTMA reveals that the public relations department adopt the use of an electronic medium of communication to create and maintain a mutual relationship with their public. The Participants explains that the public affairs unit mediates between the Ministry and it publics, and every aspect of transportation is a susceptible sector as it affects every single person. The department's responsibility is disseminating information through different media channels to reach people and share information on the activities of the Ministry. The participants mentioned that in addition to the traditional media, they use new media. The reason is that because the world has transformed to digital where the Internet plays a vital role, especially the social media platforms, handled by the social media unit. YouTube, Twitter, Facebook, Instagram, email and other platforms.

Each participant explains extensively on the use and effectiveness of the Traffic radio 96.1FM, created for communicating the control and navigation of vehicular movements within Lagos. Road traffic officials on the road help transmit what is happening on the road from time to time, into the

department's WhatsApp group chat. This information, in turn, is transmitted to the control room who then transmits it to Traffic Radio an arm of the Lagos state government ministry of information and strategy. Traffic Radio disseminates information to the motoring public concerning road situations, so they can plan their journey accordingly and help them spend less time on the road.

This platform allows the public to call into traffic radio to find out the situation of a particular road and the traffic situation on that particular road. Traffic radio also gets across especially to the zonal commanders and zonal heads who are in charge of the zones. Besides, participants also added that there are many challenges with maintaining traffic-free roads in Lagos State. One of these challenges is the peoples' poor maintenance culture. People do not maintain their vehicles. So, along the line, this may lead to a breakdown. Once this happens on the road, it results in massive traffic congestion. Motorists are so impatient to get to their various destinations, and therefore, leading to violation of traffic rules and regulations which even compounds the traffic congestion. Another challenge is the ability to instill a safe driving culture in the State. It is not that the people are not aware of the traffic rules and regulations, but they just chose not to adhere. Motorists violate traffic rules, and when apprehended, unfortunately, the members of the public then turn against the traffic officers to insult them while carrying out their duties. One of the participants mentioned that the Ministry is coming up with some strategies to help instill professionalism in the LATMA officers through retraining and the use of technology to execute most of the duty.

Lagos is an overcrowded city and also one of the most populated State. Also, there has been more damage to roads due to the constant and continuous rain pour. Therefore, advocacy for more infrastructures is highly needed. The government's massive construction and reconstruction of roads in Lagos state have added to traffic gridlocks because some parts of the roads need to be blocked. In situations like this, motorists are to be patient to follow the instructions of the traffic officers. The Officers are on the road because of the road users to ensure safety and to help navigate easily within the minimum possible time.

Discussion of Findings

Based on the results from the interview, all the three public relations officers expatiate that the use of the electronic medium of communication has been beneficial. Based on the interviews conducted, it is clear that the public relations department use the radio, television, and the Internet is relating to the public. The study shows that the state government has a specific radio station that was established purposely for monitoring the traffic situation in the State. The Lagos Traffic Radio 96.1FM works hand in hand with the Lagos State Traffic Management Authority (LASTMA) to alert people and inform the people of on-ground traffic situations.

Conclusion

This study is an in-depth interview with three public relations practitioners from both the Ministry of Transportation and its agency LASTMA. They explained their policies and strategies through the adoption and use of electronic media in reaching out to their public. Most notably, the use of Lagos Traffic radio and the internet platforms have been beneficial to the State's progress. It is ensuring the free flow of traffic on the road to enable economic development.

Recommendation

Electronic public relations goes beyond using the State-owned radio station to disseminate traffic-related information. The absence of digital media and social media applications in the traffic management mix in the State suggests that the Ministry of Transportation and LASMA still need to do a lot. Thus, an internet application that would attract public participation in transportation relations is recommended going forward. LASTMA needs to intensify effort in persuasive public relations actions to instill the habit of obeying traffic rules and regulations on road users. This action is regardless of whatever challenges they may encounter in their day to day discharge of duty.

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Common Goods Theory: Identification and Review of Research Areas

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Abstract

Although the concept of common goods, or commons, has been used by scholars since the Middle Ages, its meaning keeps evolving and it has not been consistently defined so far. The increasingly complex reality and the challenges of today have been inspiring researchers to look for new applications of the common good theory. Traditionally, two research areas have been distinguished: the analysis of common goods, understood as natural resources, and the analysis of their users and the institutions they create. These areas have been quite thoroughly researched and the ensuing knowledge is relatively well structured, although many gaps still exist. However, new types of goods and services emerge in the literature, alongside new institutions, relationships and social processes that can be analyzed using the common good theory. In these areas, few theoretical works have been written and knowledge is poorly structured. Therefore, this paper aims at identifying and reviewing those research areas where the common good theory is or could be applied.

This paper is directly inspired by the issue of effective municipal waste management in the context of circular economy. While the theory of public goods seemed more appropriate at first, it turned out that many elements of this system could be seen as common goods. Waste itself could be perceived as both a common good and a demerit good. Although some works have been written on this, they are merely case studies or do not derive from the common good theory.

The paper sets out to identify and possibly expand the areas researched by the common good theory by determining the attributes of common goods and their environment that can be analyzed. The historical development of the common good theory will serve as a starting point.

Keywords: common goods, common pool resources, new common goods

Introduction

The notion of common goods is already present in the works of Aristotle and Cicero, who understood them as goods produced collectively, but shared individually (Dupre L., 1993). Also Thomas Aquinas and Machiavelli in the Renaissance looked at those issues. Both of them analyzed the relationships between the common interests (the state) and the individual interests of citizens (Mrozek M., 2013; Słup P., 2017; Izdebski H., 2017). The concept of the common good is also present in Catholic social teaching, introduced there by John XXIII. Also political sciences and law have contributed greatly (Łaczkowski W., 2003). In economics, the issue was first addressed together with the voluntary exchange theory and the analysis of public expenditure policies. Among other things, public and common goods were studied in this context, including their financing, or their presence in the public sector. These issues were researched by such authors as Musgrave R.A.(1959). Somewhat later, common goods were analyzed by Samuelson, who in 1954 concluded that such goods did not meet the optimization condition (the marginal social cost of producing a good must be equal to the aggregated marginal rates of substitution of all consumers of that good). Therefore, in Samuelson's opinion, such goods should be produced by public entities as public goods. He used the term "collective consumption goods" to describe the subject matter of his research (Samuelson P. A., 1954).

The interest in common goods flourished after publication of G. Hardin's "Tragedy of the commons" (Hardin G.,1968). Hardin formulated a social dilemma, still known as the "tragedy of the commons", claiming that the discrepancy between the self-interest of an individual and the common good of all users of renewable resources, eventually leading to its depletion. The individual self-interest aims at maximizing the benefits by increasingly intensive use of the resource. In contrast, reduced use is in the common interest, to ensure sustainable use. If individuals fail to take into account the replacement rate of the resource, irreversible destruction occurs. The underlying reason is that individual benefits are instant and therefore desirable. In their turn, collective benefits are postponed and hence much less obvious for individuals (Prandecki K., 2016).

Despite the growing popularity of the common good theory, despite even the Nobel Prize for E.Ostrom, no consistent definition of the concept of commons has become generally accepted. To quote Schumpeter (1995; as quoted in: Grabowska, Szawiel 2003: 75) *there is no such thing* as a uniquely determined *common* good, that all people could agree on or be made to agree on by the force of *rational arguments*. Piechowiak (2012: 433) understands common good as the sum of the *social life conditions that enable and facilitate comprehensive development of all members of a political union and the communities it forms.* Broadly speaking, common good are those of material or non-material value for a certain community (Prandecki K., 2016:56). Based on these statements, it can be assumed that common goods combine an economic category, related to goods and their value, and a social category that determines that value. Many definitions of commons emphasize that their use is reserved for members of a particular group, thus excluding others (Barnes P., 2006). L. Balcerowicz (2013) finds that common goods are somewhere between easily excludable and non-excludable goods and may be rivalrous or non-rivalrous.

These properties have become a basis for searching for definitions of common goods by differentiating them from private and public goods, introducing increasingly elaborate sets of distribution criteria (Weimer D. L. Vining A. R., 1999; Cooper T., Hart K., Baldock D., 2009). The initial works on common goods aimed at seeking their physical characteristics. Researchers focused on the unique features of commons (usually natural resources) used by a particular community. Apart from comparisons to public and private goods, the distinguishing criteria included (Choe J., 1992, as quoted in: Hess C., 2000):

- origin: natural and anthropogenic,

- intended use: for profit or for consumption,

- renewal rate: renewable and non-renewable.

Importantly, these divisions may evolve over time or denote different categories for different users.

Another research area was proposed by E. Ostrom, who defined commons by reference to their users and the institutions they created. Today, the term common pool resources (CPR) is used to describe common goods perceived in this way (Ostrom E., 1990). These two research areas are still being explored today, both in the traditional sense and in attempts to use the existing knowledge for new applications. Therefore, many terms denoting common goods have appeared in the literature. They do not always mean the same thing and the differences are not clearly defined. New possibilities of applying or modifying the common good theory regularly emerge, mostly owing to technological and information progress, which generates completely new goods and services. Also contemporary environmental problems, including those of a global nature, together with the related externalities, are increasingly being studied in the context of common goods. However, in these new research areas, there are few works that propose a systematic framework for the existing knowledge. Hence, significant research gaps exist in this area.

Common Goods as Common Resources

This area of research on common goods is based on Harding's works. Initially, attempts were made to identify physical characteristics of common goods that would distinguish them from clearly defined

private and public goods. Analyses focused on renewable natural resources, which were particularly vulnerable to the 'tragedy' if exploited beyond the sustainability rate by private users seeking to maximize their profits.

To mitigate these negative effects, it has been proposed to award property rights, whether to private or public entities (Ostrom e., 1990). Introduction of fees or tradable permissions is another way to limit access (Tietenberg T.,2002). These proposals have sparked an array of research papers on market failures, such as the free rider effect, the prisoner's dilemma, or the agency theory. As research progressed, it was found that Harding's solution was only seemingly more efficient. The essence of the problem was that a particular type of goods were analyzed (i.e. goods commonly used but not managed in any way). Today, such goods are referred to as open access goods. Everyone can freely use such goods, and at the same time everyone suffers the consequences of the free use by other users, without being entitled to make any claims. Thus, an indeterminate set of users without specific rights enjoy a given resource. A few economists have tried to distinguish between common goods and open access goods (Bromley, 1982; Runge 1981).

Some researchers considered top-down regulations (for instance introducing property rights or fees) as a way to avoid the 'tragedy'(Goldman M.,2013, Dasgupta P.S., Heal G.M.,1980). An analysis of their works shows a number of features of common goods, today referred to as common pool resources (CPR). These are as follows:

- common pool resources are renewable,
- users have similar resources and skills and do not consult their decisions with other users
- the analyzed situation is predictable and stable over time.

In these models, as long as the price that buyers are willing to pay exceeds the cost of private production, the number of resource users will grow, over-capitalization (i.e. excessive investment in technical solutions used to exploit the resources more intensively) will continue, and – as a consequence – the economic rent will be increasingly fragmented. Traditionally, such an approach has been applied to describe commonly used renewable natural resources such as forests, pastures or fisheries. However, it can also be applied to certain man-made (anthropogenic) resources, such as the Sahel famine in the 1970s (Picardi and Seiferet, 1977, as quoted in: Hess C., 2000).

Institutions established by resource users

As research progressed, it became evident that ownership supervision proposed by Harding did not mitigate the 'tragedy'. Whether the owner is private or public, there is no certainty that the benefits owed to ownership will be clearly greater than the cost of supervision. This conclusion inspired a search for rules ensuring effective use of commons in the long term. It was recognized that the essence of such goods was not so much in their physical characteristics as in their users and the institutions they create. The leading researcher in this area is Elinor Ostrom, who, together with her team, was the first author who approached commons in this way. In her opinion, what distinguishes common goods from other goods, is above all the manner of social supervision, which determines the long-term viability of these goods (Ostrom E., 1990). In her works, she analyzed a number of detailed issues related to the goods themselves and the communities who use them. She created a methodology for studying common goods (The Institutional Analysis and Development – IAD) in the classical meaning of the term (natural renewable resources) (e.g. Ostrom E., Hess C., 2007). In her research she proved that depletion of common resources largely depends on the behavior of the community that uses them – the division of roles and property rights, the community's characteristics, the type of institutions created, the exchange of information, the co-organization of activities or the adjustment of rules and principles of using the common resources. The stability and functioning of the institutions are crucial in ensuring sustainable use of the resources (Ostrom E., 1990).

Communities that successfully manage their natural commons often operate under changing natural conditions and are characterized by longevity (similar experiences, continued cohabitation, shared plans and values) and by assigning importance to the individual's reputation as a prerequisite for achieving a certain social status. Examples include communities and the institutions they set up to use

common forests, contemporary farming communities (Marelli B.,2020), and institutions managing natural resources in Africa (Bollig M., Lesorogol, C., 2016). Ostrom identified the following characteristics of such communities that are essential for long-term success in the management of common goods:

- individuals or households that use the resources are clearly defined, as are the boundaries of these resources,
- the rules governing the use of the resources are adapted to local needs and conditions and are flexible,
- most participants subject to the rules are entitled to modify them, and decisions are made collectively,
- the right of community members to set their own rules and apply them in practice is respected by higher-level authorities,
- community members organize a system for monitoring members' behavior,
- a system of graduated sanctions is used to penalize those who violate the rules,
- community members have access to affordable dispute resolution mechanisms (Ostrom E., Hess C., 2007a:7)

Ostrom, introduced the concept of group ownership. With reference to the use of commons, she did not define the concept, but proposed it as an alternative to public and private ownership. As in the case of private ownership, group ownership confers ownership rights on individuals who are also users of the common goods in question. Thus, the goods are used individually, but the benefits are common for all users. Balcerowicz (2013) is of the opinion that this type of ownership is becoming similar to private capitalist ownership. Many of the group ownership cases described by Ostrom have been built bottom-up, sometimes even centuries ago, and still exist today. This shows the strength of bottom-up institutions. Bottom-up group ownership formation processes may also be promoted or managed by state institutions, such as courts, which can intervene in case of disputes among commons users (Ostrom E., 1990).

Objects: new common pool resources

The development of the goods and services market, technologies and information has led to the emergence of completely new common pool resources and has changed the characteristics of the existing ones. For example, easier and more affordable copying makes consumption less likely to be rivalrous, while the introduction of usage fees facilitates exclusion from consumption. Although new common pool resources share certain features of traditional common pool resources, they are different in many ways. New common pool resources are most often man-made and based on technology, hence the term 'object' (although it is reasonable to include here the use of the environment to meet new, artificially created needs) (Hess C., 2000). While a great body of literature has been devoted to these issues, they are not deeply rooted in the common good theory, even though the authors highlight problems that are analogous to those of common pool resources: the free rider effect, congestion, or exclusion from consumption. The new common pool resources include:

- road infrastructure and transportation systems (e.g. highways) (Waller P.F.1986),
- landscape and cultural heritage (Gerber J.D., Hess G.,2017; González A.P.,2015).
- municipal and urban infrastructure – e.g. sewerage systems (Svderberg, 1997)), urban infrastructure (Little R.G., 2005) community centers (Foster S.R., Iaione C.,2016; Frischmann B.,2012)
- shared goods (e.g. city bikes, social gardens, community fridges or cars (Nettle C.,2016).
- services of the environment (e.g. waves for surfers and other environmental functions used for sports, e.g. mountains for skiers (Rider R., 1998; Nazer D.,2004),
- public radio (Steemers J.,2004).

A community using common pool resources benefits from a certain system of objects (Oakerson R.J., 1986) (a function, good or service provided by that system) which are large enough to make the exclusion of potential users and beneficiaries costly (albeit not impossible). A system of objects generates object units, such as the annual number of bridge crossings. For an object to exist in the long term and maintain its productivity, its normal wear and tear cannot outpace the investments in maintenance, repair and improvement. Objects are accessible to all, whether or not they have

contributed to these investments. Access reserved only for contributors (i.e. exclusion of all others) involves a high cost of use and may be unfeasible. Consequently, this leads to overuse.

Global Commons

In the age of globalization and global problems, global commons have been identified as a subtype of common pool resources. These include both natural and anthropogenic goods and services, including in particular:

- goods and services related to information technology (e.g. the internet and information resources) (Bailey R., Tierney B.,2002; De Filippi P., Tréguer F.,2015),
- climate and rainforests (Sirén A.H.,2006; Carattini S., Tavoni A., 2019)
- world cultural heritage, gene pool, radio space and outer space (Hess, 2000).

They are analyzed in the same way as common pool resources or objects. Some research problems are the same, and a few new ones exist, such as those related to intellectual property or the assessment of environmental policy effectiveness.

Colletive action as commoning

The factors determining the transformation of a good into a common good are another research area in the common good theory. Such factors may be exogenous and endogenous. Studies on endogenous factors and how they contribute to 'commoning' of public goods can be found in literature. One of those factors is the possibility (actual rather than potential) to exclude users from consumption, caused by physical conditions and the socio-cultural environment. Therefore, 'commoning' depends on the specific circumstances, actions and decisions of the community of users of a given good (Helfrich 2012: 65), which can vary over time. Hence, the same good may and may not be common in various periods.

According to Euler (2015), it is collective actions that make common goods common, and the individual who uses them becomes an element of the system, not just an external controller. Some authors (Bennhold-Thomsen, 2012) indicate that common goods should be treated as social relationships. Thus, they will depend on the relationships and type of interactions among individuals and between individuals and goods. Euler (2015) notes that commoning depends on the universality of collective actions. Endogenous and exogenous changes may lead to changes in the existing rules, which may cause commoning (or uncommoning) of goods. Among the social behaviors that may cause commoning, Euler mentions: (re)production, satisfaction of needs through volunteering, self-organization of community members, as well as inclusion and mediation. Co-production means that the user of the common good is both the producer and the user, which results in commoning.

Common actions are meant to satisfy everyday needs. They are often performed free of charge, especially those of a social nature, such as care and nursing work. This means that such work has a high added value derived from the pleasure of doing it or from a sense of purpose. It may also be a way of maintaining relations or building a sense of importance. Thus, volunteering may cause commoning, in a process that is separate from commoning through market transactions. The third cause for commoning is self-organization of the community. The basis of self-organized free cooperation is the recognition of all members of the community as equal and committed partners establishing common, individual, loose relationships of individuals cooperating with one another regardless of market cues or managers' orders (Benkler, 2006). Thus, the rules of common action can only be established in peer-to-peer relationships, rather than in superior-subordinate relationships.

Inclusion serves the purpose of better meeting the needs of the community, and consists of inviting users with different skills and competences, but also with different needs. Members join the community voluntarily and offer their skills to better serve the community's needs. In some situations, inclusion-related changes in existing relationships in the community are profound enough to cause

uncommoning. Inclusion of a governmental partner may be an example of such a destructive factor. In its turn, mediation always leads to communing (Euler J., 2015).

Exogenous factors leading to commoning or uncommoning include primarily those related to the activity of an external regulator, such as the state, and to a permanent change in governance conditions. The role of the state as a promoter or inhibitor of commoning may result from legislative changes which:

- affect the value of a given resource (e.g. waste treated as a resource in circular economy becomes a social value),
- govern the functioning of community members (e.g. resettlement or eviction orders)
- allow state institutions to join the community.

Another example of commoning factors are environmental changes in governance conditions. For example, as a result of climate change, the resource used so far by a particular community may no longer satisfy its needs, whether due to its changing quantity or quality, or to the availability of alternative ways of satisfying those needs. It seems that the importance of these factors will grow in line with the increasing severity of environmental problems, especially those of a global nature.

Demerit goods as a common

The common good theory may be extended to include demerit goods, also referred to as economics bads. These are goods which are socially undesirable and sometimes generated and/or consumed as a side effect of the consumption of traditional goods. Being a considerable social nuisance, economic bads are the opposite of economic goods and represent a negative value for the consumer or a negative market price. This means that goods and payments flow in the same direction. The adverse effects of the consumption of demerit goods are often unknown or underestimated by the consumer, mainly because they affect the society as a whole. This ignorance may be due to a lack of information or incorrect decision making. In contrast, private benefits are often overestimated. This leads to over-consumption or over-production of economic bads, as long as production and/or consumption decisions are made on the free market. Therefore, the government intervenes in certain ways to reduce or eliminate demerit goods, e.g. through taxation, takeover or administrative orders and prohibitions. As no-one can usually be excluded from government intervention, the free rider effect typically occurs, thus limiting the effect of the introduced intervention (Mendoza, 2011). The consumption or presence of this kind of demerit goods reduces consumers' wealth. Alternatively, consumption or presence of certain kinds of demerit goods reduces consumers' usefulness. Examples of demerit goods include modern-day slavery, disease, environmental emissions, waste, various forms of discrimination in the labor market, internet viruses, or high rates of global income and wealth inequality.

Demerit goods can be analyzed as common goods on a local, regional or global scale and in several dimensions. Continuing with the example of waste, let us assume that demerit goods are a common renewable resource. We can then proceed to analyze waste in exactly the same way we analyze common pool resources, but the relationships will take the opposite direction. It seems however, that environmental emissions, such as air pollution, are not in the same category of demerit goods as waste. Environmental pollution can be analyzed as an increase in the supply of demerit goods, or as a decrease in the supply of goods in the form of reduced assimilation capacity of a given environmental component. In the case of waste there is no such possibility – waste (especially with long decomposition time) can only be analyzed as a demerit good. The second dimension of the analysis will be related to commoning resulting from collective actions. If waste is a common demerit good, are there internal or external factors that will make it a common good? In the case of municipal waste, the circular economy policy, which turned waste into a raw material, has become such a factor. The mere fact that there exist factors that 'turn' demerit goods into goods (or vice versa) is not tantamount to commoning. Finally, the third dimension of the analysis is related to institutions built by the users' community. Examples of such institutions include addiction treatment centers or waste processing plants. In the literature dealing common goods the notion of demerit goods has not yet been addressed.

Concluding Remarks

The most intensively developing literature on new common resources deals with the internet and information resources, urban collectives, communication and transportation. However, research on new common goods may also concern completely new areas, such as dynamic development of new institutions created as a result of endogenous and exogenous changes, as well as constant technological development. New research areas dealing with new common goods also highlight new problems, such as the analysis of the effectiveness of applied instruments from the perspective of the common good theory, issues observed in adaptation systems, in intellectual property or in environmental protection. The problem of demerit goods as common resources has not been addressed in the literature so far.

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The Essentials of Pedagogical Approach to Entrepreneurship Education in Nigeria

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Abstract

The zeal to constantly advance the educational practise of students has been rising progressively around the world and entrepreneurship education in Nigeria cannot be left out. Entrepreneurship education in Nigeria has been proceeding on two distinctive directions – general entrepreneurship education at tertiary institutions and skill acquisition programme by government and non-governmental agencies. However, these programmes have fallen short of expectations in terms of curbing unemployment in Nigeria. One reason often adduced is the weakness of the current structure of imparting entrepreneurship knowledge. As a result, the pedagogical approach to entrepreneurship education is often seen as a way out. Hence the paper examines the current challenges of entrepreneurship education and the need to adopt pedagogical approach to entrepreneurship education in Nigeria. Various literature on entrepreneurship education and pedagogical approaches were reviewed, theories that support this study reviewed and theoretical framework developed. The importance of pedagogical approach to entrepreneurship education discussed. Based on the necessities, appropriate pedagogical approach is recommended in entrepreneurship education in Nigeria.

Keywords*:* entrepreneurship, entrepreneurship education, Nigeria, pedagogical approach.

Introduction

In Nigeria, entrepreneurship education has been going on in two main directions which are, entrepreneurship education in higher institutions and skill acquisition programme by government and non-governmental organisations. To reduce the high rate of unemployment and poverty condition, government and non-governmental agencies introduced several Poverty Reduction Policies (PRPs) (Taiwo & Agwu , 2016). Due to the failure of PRPs to address the purpose and as a result of flaws in the nation's development policies, the Nigerian government made entrepreneurship education compulsory in all educational system starting from the 2007/2008 academic period (Gabadeen & Raimi, 2012). Before the take-off, in 2006 Yahya emphasized the main objective for setting up entrepreneurship education as to nurture entrepreneurship value and culture among students and faculty. Likewise, maintaining sustainable businesses and not restricted to their research finding.

Furthermore, the team estimated that after three years (2010), 10,000 graduates out of about 50,000 graduate students will be self-employed and reliant (Rufa'i, 2011).

Globally, United Nations Sustainable Development Goals (UNSDG), under education and economic growth included the advancement of entrepreneurship in the education system due to its significance (Greence, Brush, Eisenman, Neck, & Perkins, 2015). In the opinion of Aja-Okorie & Adali (2013), the main objective of entrepreneurial education is to impart on students the correct appraoaches, acquaintance, talent, abilities and expertise to perform in business thereby making it possible for them to succeed in the highly uncertain economic environment. In addition, it is also essential to developing an entrepreneurial culture. Although entrepreneurshiop education has been included in educational system, graduates still find it very challenging and unrealistic to establish their feet on ground as professional business owners even when they have undergone skill training (Adebayo & Kolawale, 2013).

Hence, these programmes have fallen short of expectations in terms of curbing unemployment, poverty alleviation and rapid economic development in Nigeria. Bruton, Ahlstrom, and Oblog (2008) opined that scholars in entrepreneurship have more concerned with who, why and how of entrepreneurship instead of the impart of entrepreneurship on development and on developing countries. Audretsch and Thurik (2007) as cited in Naudé (2013) described it as intellectual disconnect. Some of the challenges that weakened the current structure of imparting entrepreneurship knowledge are inappropriate and inconclusive skill training at the universities and other training centres among others. Similarly, Olokundun, Moses, Iyiola, Ibidunni, Ogbari, Peter and Borishade (2018) attributed one of sure challenges to traditional teaching approaches of entrepreneurship in the universities that involves theoretical methods and are less operative to motivate entrepreneurship career. The methods make students to cultivate a dormant outlook instead of participating actively. As a result, the pedagogical approach to entrepreneurship education is often seen as a way out.

Pedagogy by definition is having skill and science of teaching. It involves the abilities to transfer understanding and assistances in ways that students can relate with, comprehend, recollect and put into practices. Its abilities can be classified into classroom management skills and content-related skills. Having good pedagogical expertise is essential use for classroom and behaviour management. Operational pedagogy incorporates a collection of instruction approaches that back academic commitment, linkage to the extensive domain, supportive classroom environments, and acknowledgement of variance. The application is necessary in all major education and aspects of the course. It forms the action of the teacher by recognising learning theories, upbringing and training of the students, their needs and interest.

As noted in the Nigerian educational policy, education is the greatest essential mechanism for driving transformation, because no vital development will take place in any economy unless the minds are influenced through educational revolt (Federal Government of Nigeria, 1998). Generally, the advantage of entrepreneurship in developing economic growth is implicit. Over time, some countries have achieved substantial poverty reduction, stimulating employment through entrepreneurship (Naudé, 2013; Akhuemonkhan, Raimi, & Sofoluwe, 2013). Individual can view problem from different perspectives with the help of creativity. Therefore, Olokundun et al (2018) suggested that experiential entrepreneurship teaching methods in universities with practical activities and active involvement can be considered significant to students' advancement of entrepreneurial interest in business start-up possibilities. Hence the paper examines the essential of pedagogical approach to entrepreneurship education in Nigeria.

Literature Review

Entrepreneurship Concept

Entrepreneurship has been in existence for quite a long time. France-based Irish economist Richard Cantillon 1732 first used entrepreneurship to mean any practice of quick buy and sell with the purpose of making gain that consists of risk connected with a fresh business. Overtime, the interpretation of

entrepreneurship phenomenon is in accordance with the social scientist disciplines and views. Entrepreneurship has been defined by numerous theorists, but there is yet no widely acceptable definition. Previous definitions tended to be based on the areas of specialisation of the author. Economist defines entrepreneurship from economics view point, same with sociology and psychology. Similarly others look at it from the viewpoint of management or social outlook. Hence Bula (2012) referred to entrepreneurship as a multidimensional concept. For example, an entrepreneur from the point of view of an economist could be regarded as a bearer of uncertainty (making difference between risk which calculated or not), a resource allocator or an innovator. According to Schumpeter an economist, the abilities of transforming, bring together new equipment, increasing competence and output, or creating new products or services, are specific potentials of entrepreneurs (Friis, Paulsson, & Karlsson, 2002).

Anayadike, Emeh and Ukah (2012) defined entrepreneurship as a process through which people recognise prospects, assign means and make value. The value is created through recognition of opportunities for transformation of needs. An entrepreneur transforms innovations into economic values, as challeges are seen as opportunities that needs transformation to make the environment better. One important aspect of entrepreneurship is the acquisition of the skills and knowledge necessary to understand entrepreneurship.

Entrepreneurship Education

Entrepreneurship education is a learning (formal or informal) that instils in students the capability toward observation, recognition and take hold of accessible prospects in the surroundings with acquired skill (Akhuemonkhan, Raimi, & Sofoluwe, 2013). Also, entrepreneurship education can be described as a developmental teaching that inculcates in the students' qualities with abilities of squad player, headship, self-tracking, challenge resolving, cooperation expertise, and self-controlling, different from the traditional education that places little consideration to talents and useful requirements of the domain of work (Soskice, 1993; Sofoluwe, 2007; Gabadeen and Raimi, 2012). Entrepreneurship education as a facet of education, prepares and build an individual's mind-set to carry out the risk of going into something new through the application of acquired knowledge and skills from school (Atakpa, 2011). The general objective of entrepreneurship education is to improve skills as individual and to have varieties of abilities establishing and obtaining entrepreneurial mind-sets, expertise and traits. Since these attributes can be adept, improved and learned; it is essential that all students should be exposed to entrepreneurship education (Ojeifo, 2012).

In the opinion of Brush (2014) entrepreneurship education entails a set of activities that encompass curriculum- formal and informal, co-curricular activities and investigation efforts. The aim is to add values to opportunities discovered. In addition emphasis is on the necessity to inculcate in young people the entrepreneurial behaviours with improved expertise in an innovative way. As entrepreneurship education has transformed, so also has our understanding of what is required to learn and practice entrepreneurship. It is worth to note that entrepreneurship education varies with the different audiences and countries. For example entrepreneurship programme (education) for primary and secondary school will be different from tertiary institutions which will focus on developing competencies among others thing. In the same way the entrepreneurship education for community/local areas will centre on how to start-up a small business and self-employed.

Despite the increase in research concerning the effectiveness of entrepreneurship education, there are inquiries about the general effect on the real number of increase of business undertakings. The emerging findings from Rauch and Hulsink, (2015); Singer, Amoros and Moska (2015) indicate an optimistic link between entrepreneurship education and entrepreneurial mind-sets. However, Olokundun, et al (2018) submitted that for students to develop entrepreneurial competences in school, universities recognition of the essence of experiential teaching approaches, its influence on students' entrepreneurial curiosity and starting ups a business is desired, which are far reaching implications for all the stakeholders.

According Greene, Brush, Eisenman, Neck, & Perkins (2015), the United States has an extensive history in entrepreneurship education and China denotes an evolving centre of education and commerce. Finland has been recognised for long time in its advancement in all stages of education. Also Qatar symbolises a region controlled by the oil industry but considering diversification in its economic activities through entrepreneurship. However, these countries are at various diverse levels of their entrepreneurial initiatives. Across the countries, their emphases are different, subject to the background, circumstances and industrial policy. Meaning that entrepreneurship education depends on the purposes and targets of the country. United States entrepreneurship education is directed toward the improvement of fast growth and technology-based businesses. While Europe entrepreneurship education is more associated with the small and medium enterprise (SME) community, as the emphasis of China is mostly on start-ups. Greene et al (2015) stated that the decision of entrepreneurship education comprises of learning objectives, topics covered, materials choice (cases, training and ideas); pedagogy and delivery mechanism. These decisions comes from intention of the entrepreneurship, the role of concept and magnitude of assimilation across classes, programmes (Neck, Greene, & Brush, 2014). Neck, Brush and Greene (2014) opined that entrepreneurship education is the known of generating, discovery and working on avenue to add value that can be used in the same way in other domains. Ebele (2008) opined that any teaching of knowledge and expertise that aids students to plan, establish and manage their own businesses is called entrepreneurship education.

Entrepreneurship Education in Nigeria

Entrepreneurship education would be formal or informal, the informal structural learning has been an age long programme in Nigeria. This informal learning modified with their natural skills to develop traditional businesses and crafts have sustained the country for more than fifty years (Osalor, 2010). In addition, several programmes and policies have been adopted by government and non-government agencies to enables youths acquire skills to put a stop to the rising unemployment and prevalence poverty that will make them self-employed and economically empowered (Ojeifo, 2012, Taiwo & Agwu, 2016). Due to flaws in the nation's development policies and programmes, the Nigerian government through Federal Ministry of Education introduced entrepreneurship education into higher education syllabus that started from the 2007/2008 school period (Gabadeen & Raimi, 2012). Yahya (2006) gave reasons for making entrepreneurship education compulsory in the educational system. To improve the repositioning of more new business start-up by graduated students. Unemployment To reduce unemployment and put the country on the track to join other countries that have alleviated poverty by means of consolidating on setting up of small businesses.

That notwithstanding, the traditional entrepreneurship training method still exist alongside with the formal entrepreneurship training. The traditional entrepreneurship education is an age long training that existed before the inclusion of formal entrepreneurship education into Nigerian tertiary institutions. The traditional entrepreneurship education are in two forms – Igbaboi and the Omoshe. The concept of Igba boi which means trade apprenticeship is a culture practiced by the Igbos in the eastern part of Nigeria and is also being referred to as mentorship. Though it is an age long practice, their terms of engagement are archaic and should be reformed. This method of training involves an agreement between the parent of the student and the trainer (oga) whereby the student will live with and serve the Oga for a number of years, get trained and the Oga will establish business for him at the end of the training. Another traditional method of entrepreneurship education is called Omoshe mostly practiced in the western part of Nigeria. This type of training, the student go for training from his/her parent's house and at the end of training, his/her parents establish for him/her. With this method, certain amount is paid to the trainer for the training. In both methods, the number of years of training depends on the agreement and the nature of the business. Before now, the two form were referred to as apprenticeship but today, it is called mentorship, where the trainer is referred to as the Mentor and the student (apprentice) as the Mentee.

However, a number of issues have been identified as responsible for the rather slow adoption of entrepreneurship education. The issues as identified by Moses, Ezema, Ezema and Omolade (2017) with entrepreneurial education in Nigeria include curriculum content, availability of qualified and adequate staff, funding, facilities, faulty foundation and weak university-industry linkage. Also

students are restricted to available skill acquisition rather than being able to select something close to their area of disciplines. When Entrepreneurship education is successfully and proficiently taught there is the possibility that it will lead to self-employment among students and increasing viable growth and improvement. With entrepreneurial educational facilities for improving human capital against traditional method of teaching that is predominant in developing world Nigeria inclusive, will lead to better results.

Problems with Current Entrepreneurship Education in Nigeria

Different tertiary institutions ascribed different meaning and method to entrepreneurship education in Nigeria. Most of entrepreneurship education programmes are done in form of vocational and technical education instead of evolving the spirit of entrepreneurship and performance in various disciplines. Some major problems of entrepreneurship education are inappropriate learning environment, lack of updated teacher's schedule, lack of understanding of student's interest, lack of access to modern equipment for vocational and skills. Ojeifo (2013) however stated the following as the challenges of entrepreneurship education in Nigeria:

a. Lack of data to run entrepreneurship education resulting to inadequate curriculum scheme for entrepreneurship education.

b. Inadequate administration and trade hurdle that restrain capacity building and hinder access to technical support.

c. Absence of a pro-active regulatory measures, an environment that encourages innovative enterprise development at the grassroots level.

d. Most vocational skill centres are not accessible to everybody – development training for rural and urban youths involved in the informal economy not easy to get to.

e. Inadequate funds for teaching the practical terms for entrepreneurship education, starting up and expanding venture.

Pedagogy/pedagogical approaches

Pedagogy updates teacher's schedules, judgements and approaches considering theories of learning, understanding and knowing what students need, also the situations and interests of individual students. As an encompassing term is apprehensive of the things teacher does to encourage learning in others. According to Collins English Dictionary, Pedagogy is a field that deals with the theory and practice of teaching and the influences it has on student training. It includes the interaction of teacher and students, the social and intellectual environment the teacher strives to create.

Pedagogical approaches*:* Pedagogical approach is defined as how the teachers educate their students. Every teacher advances his/her own technique of teaching, he or she uses a peculiar pedagogy. No single learning approach is enough, hence a combination of different approaches is required for effective results. Effective teachers use a group of teaching approaches as there is no particular, general method that fits all conditions. Different schemes with different amalgamations with different gatherings of students to develop their learning results. Moses, Olokundun, Akinbode and Agboola (2016) submitted that teachers' creative abilities in teaching motivate creativity in learners, because entrepreneurship teaching is creative work as well as an expression of creativity.

Bhowmik, Banerjee and Banerjee (2013) observed that pedagogical analysis irrespective of the subject, the purpose of the content will aim at analysing the course material either in part or sub-part, subject matter or as a whole, the concept of the subject being taught involves gradually implementing the succeeding four tasks in a handy collaborative style.

i. ***Content analysis***: It has to do with the teacher's topic and concept as he teach the subject.

ii. ***The objective formulation*:** Teaching background and instructional purposes of the content material of the topic on ground by documenting them in detailed behavioural expressions.

ii. ***Selection of the teaching technique and material***: Proposing procedures, skills, teaching learning actions, supports and tools supportive for the teaching learning of the topic on ground is reasonably in harmony with the understanding of the agreed instructional objectives.

iv. ***Selection of the evaluation devices*:** Advising suitable assessment strategies in an oral form, documented or pro-active undertakings and test inquiries for appraising the results of the teaching learning method used with respect to the teaching of the topic on ground. The four components mentioned above are in relationship and interdependent of the pedagogical analysis and the operations are accurately explained through Figure 1 diagram.

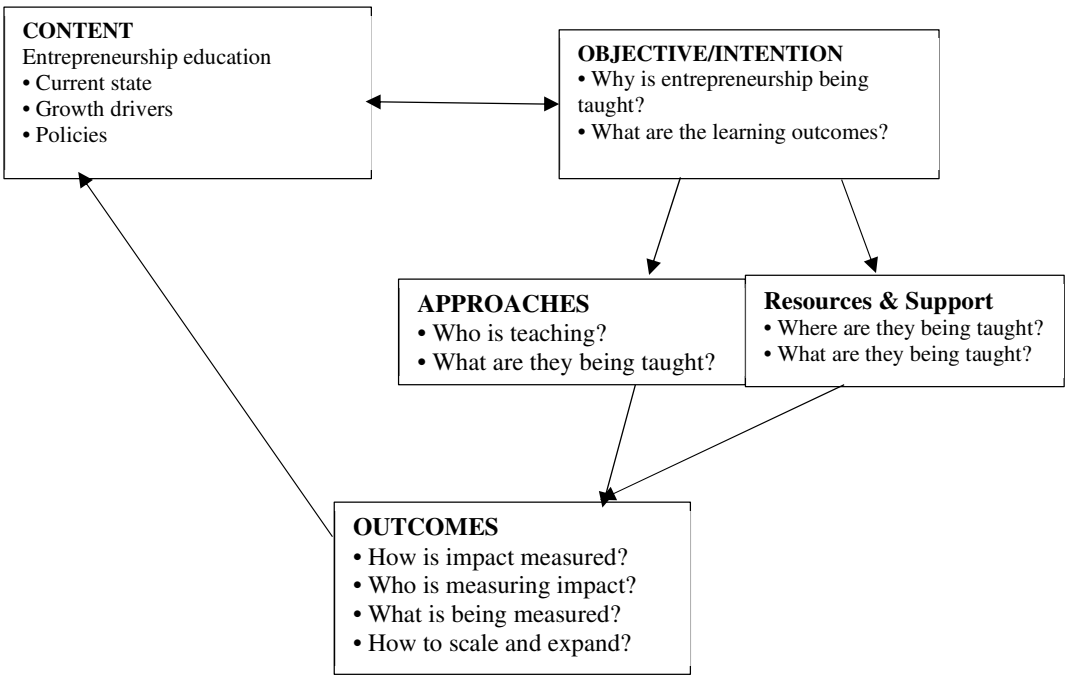

Fig 1 Effective Processes of Pedagogical Approach to Entrepreneurship Education
Source: *Adapted from Greence, Brush, Eisenman, Neck, & Perkins, (2015)* https://www.wise-qatar.org/2015-wise-research-entrepreneurship-education/

From the diagram fig. 1 above, a teacher will need to accomplish pedagogical investigation of the substances of the topic he is going to teach in the class, by completing the series of the above four stated mechanisms.

Theoretical Framework

Before now, there is a general believe that starting point of a business is the idea, opportunity or business plan, but that has shifted to developing a mind-set of acting, doing and creating, hence pedagogical approach to entrepreneurship education. There are various methods/techniques to teaching especially if you have taught for a long time. This can also mean that there are no specific ways to teach

a student. You can also have a specific preferences methods and different ways to reach students or you have used to reach students. As your teaching style continue to be and it becomes part of you to form changes in your style of teach. The right way to know how to change your teaching depend on how student learn. There is no particular learning theory that can capture the requirements of every teaching event. Amalgamation of viewpoints is the most likely and effective approach. However, you can build on the various pedagogical theories and approaches that underpin this paper which are the Socio-Cultural theories of learning and teaching, Need for Achievement Theory (NAT) and the three principles of ARM approach. Below are the theoretical frameworks and their corresponding teaching approaches.

Socio-cultural theory

was created by Lev Vygotsky (1896-1934) a Russian psychologist but his work was unfamiliar not until the publication by West in 1962. Vygotsky's theory is one of the foundations for constructivism as an answer to behaviourism. The theory states that the interaction of people with one another and their culture shape their mental abilities, meaning that social interaction plays an essential role in the cognisance improvement. Hence this study is built on critical socio-cultural theories of learning and teaching. Modern-day socio-cultural theories of learning, and outgrowths such as cultural historical activity theory, advance that social and cultural perspectives of learning atmosphere, composite and changing nature of human activity structures at a point in time shape the teaching and learning. Before thinking about how to teach, there is need to consider how people learn. Moses, et al (2016) stated that school culture of creative methods teaching entrepreneurship is dependent on the values, norms, beliefs and perceptions of teachers and stakeholders. Since different schools have their own understanding of culture of entrepreneurship education, school culture of entrepreneurship teachings are usually established unintentionally, but centred on the values of the managers, founders and stakeholders of different institutions.

Need for Achievement Theory (NAT)

NAT is a psychological theory of David McClelland (1965), this theory indicates a positive connection among the need for achievement (n-Achievement), economic development and entrepreneurial undertakings. The theory advocate McClelland (1956) clarifies that when the average level of need to achieve is comparatively great, there would be a relatively larger aggregate of entrepreneurial undertakings in the society. The theory brings to bear that when students are adequately inspired to acquire high need for achievement in life through entrepreneurship education, there is larger inclination for them to establish their own businesses after graduation. NAT -Fast-tracking entrepreneurship education.

The principles of Action-Reflection-Model (ARM) approach

This model has been developing since 1980s with Handel (1983) and Lauvas (1990) as the originators. The model talks about the importance of active participation and active learning on the part of the student; the significance of reflective learning and reflection for both student teachers and learners; and modelling by staff to student teachers and by student teachers to learners in school. In the book, 'the Reflective Practitioner' by Donald Schon (1983) made known about the ideas of reflection-on-action and reflection-in-action. Reflective practice is the ability to reflect on one's actions so as to take part in a practice of constant learning. Reflection is also a vital way to combine theory and practice, through reflection one is able to see and tag systems of thought and theory around the work frame. The focus on the teacher's capacity to reflect over actions is yet another inspiration for the model. One of the authors that also inspired Handel and Lauvas was Ole B. Thomsen. Thomsen argues that student teachers should be joint participants in developing the criteria for good teaching. Therefore, the teachers should reflect on their teaching methods and the impact on the students, in the same way students should reflect on what they have been taught. Teachers think analytically about their practice and learn from their experience (through reflection practicing).

The Importance of Pedagogical Approach to Entrepreneurship Education

The conducts and techniques a teacher adducts in passing his/her instruction is an essential part of teaching, predominantly the way he/she decides to interact with learners, structure the classroom and deliver the content. The different strategies used in different combinations with different groups of students to improve their learning outcomes are very significant. Thus, importance of pedagogical approach to entrepreneurship education cannot be over emphasized and they are:

i. The pedagogical entrepreneurship education is to fulfil specific expected student learning outcomes.

ii. With pedagogical approach to entrepreneurship education, it brings out a better solution proposed to teachers that helps to modify their approaches of teaching in harmony with their students learning styles. Some teachers emphasise strongly the importance of differentiating lesson plans to meet the needs of all types of minds. They write comprehensively about concrete ways to continue to be relevant in the classroom by teaching to students with diverse abilities and cultural backgrounds.

iii. Pedagogical approach boost confidence of the students and teachers and also adds to their reason of presence at school. Teachers take the recognisance of the student that is they give attention to the intellectual, sentimental, collective, and physical dimension when drafting an instructional programme.

iv. The interest of the teachers, students and school community is motivated through pedagogical practice.

v. Through pedagogical syllabus, learning is built upon reflection on experience. This process enhance previous knowledge with cultural and social experiences valued.

vi. Active engagement and interaction facilitate student learning.

vii. Students have their areas of interests with strength which can be used to improve student learning. Good teachers will create an instructional situation that can attract on the strengths.

viii. Students learn best in an optimistic and developed environment recognised by teachers who believe in the abilities of their students to learn.

Recommendations

The following recommendations are made for entrepreneurship education policies maker especially in Nigeria.

i. Detailed syllabus that clearly outlines all expectations and course logistics

ii. Factors affecting the growth come from the entrepreneurial decision to insightful educational entrepreneurship. Entrepreneurship education should be designed to boost student interest and self-efficacy.

iii. A well-organized course website and make the components known.

iv. The advancement of entrepreneurship education has made known of what is needed to learn and practice entrepreneurship. Responsiveness should be on educating the students' entrepreneurial mind-sets and deeds.

v. The policies and programmes of countries should be consistent and proactive in restructuring the capacity of education system to provide entrepreneurial competences and expertise for their citizenries.

vi. There should be increase in fund for entrepreneurship education and advancement and support innovative machineries to leverage partnerships with companies, Non-Government Organisations, international institutions and foundations, as well as with personalities.

vii. From time to time outcomes should be measured to know the current state and the effectiveness of the impact. This will also help to know when some of the policies should be modify if not meeting the target and to increase the growth drive.

viii. Face-lift instructional values and classroom models to stimulate team-based, action-oriented education in areas targeted to improve teamwork and imagination that embrace actual world collaborations with entrepreneurship experts and with purpose markets for new products and services.

ix. For a suceessful achievement, institutions must strengthen the incorporation of pedagogical approaches to entrepreneurship education in Nigeria system.

Conclusion

Interest in entrepreneurship is not inborn as it can grow and develop in accordance with the factors that influence it. A pedagogical approach to entrepreneurship education is able to build confidence and capabilities in learners thereby making it an essential capital in starting a business. The built capabilities is the self-efficacy that reflects on an individual's understanding of his abilities based on previous practice and attribute of the performance and attention to work. It is worthy to note that entrepreneurial thinking patterns are basically changing and the approach to entrepreneurship education should change. Aside from idea, opportunity or business plan, attention should shift to developing mind-sets for acting, doing and creating. This is to achieve an optimistic connection between entrepreneurship education and new business formation. The pedagogical approach will help to achieve the objectives of entrepreneurship education.

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Catastrophes as A Managerial Challenge for Modern Air Carriers

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Abstract

The aim of this paper is to identify the scale and type of changes in the global passenger air transport sector that occurred as a result of catastrophes. According to the definition by Marcinkowski (2019) catastrophes can be divided into two main categories – natural disasters and technological catastrophes. These include plane crashes, volcanic activity and epidemics. All of these catastrophes have an influence on entities in the airline sector. In their research, the authors reviewed the literature, carried out desk research and conducted an analysis of public-access documents of selected companies from the passenger air transport sector. The review of the literature shows a variety of relationship life-cycle models with many similarities and differences among them. Studied models seems to be insufficient to examine relationship development in project-based organizations, and the revised model with two loops and six phases was developed and presented. The paper develops a framework for strategic analysis and the operational implications of natural disasters and technological catastrophes. It indicates those implications that have already been and one-sided to give impetus to the prognosis of such catastrophe implications. Research is an introduction to the broader research implications in the management in global passenger air transport sector that occurred as a result of catastrophes. The findings might constitute a basis for further research on the SARS-Cov-2 outbreak and its impact on the passenger air transport sector.

Keywords: Management of Change, Catastrophes, Strategic Management

Introduction

Changes in the management of organizations are caused by various factors. Much research has been conducted, and many monographs written, concerning this management issue. The authors agree that even though changes may result from a single factor, they are usually influenced by a combination of simultaneous factors which may be of different nature, process, and may determine efficiency in various ways.

Special factors influencing change include natural disasters directly or indirectly connected with an existing sector. This paper analyses changes which occur in enterprises functioning in the passenger air transport sector as a result of selected natural disasters. The choice of this particular sector resulted predominantly from the authors' own interest, but also its specific character.

After World War II, it was observed that the development of civil aviation could contribute to the spread of democratic values and peace, as reflected in the preamble to the 1944 Chicago Convention by ICAO. As Van Vleck (2013) writes, the process of building a policy of open skies in line with Adolf Berle's vision, which began then, aspired to create a world in which national and imperial boundaries no longer constrained the free movement of people, planes, and products [Van Vleck, 2013].

Later on, thanks to a process of sector deregulation launched in the 1970s, aircraft have become widely available means of transport, both for long-distance, continental and domestic journeys, often in direct

competition with railways. As Bailey (2010) notes, the reform issue was framed as both providing the consumer of air travel with lower fares and freeing business from the "dead hand of regulation." One of the main examples that the deregulation has become successful has been Southwest Airlines – a carrier that has provided impetus for lower consumer prices, and even now is considered a model of a low-cost carrier.

In this sector, the diffusion of management changes resulting from a natural disaster occurs exceptionally fast. It is connected with its global nature, unique information flow, especially relating to flight safety, special economies of scale, particular intensity of supplier power and competition, as well as exceptional role of the carrier's prestige and reputation as instruments of creating competitive advantage. Another characteristic feature of this sector is the presence of network relationships in the form of strategic and operational alliances. All those characteristics make the sector an exemplary subject for an analysis of effects of external influences on strategic and operational management.

Marcinkowski [2019] defines a catastrophe as a sudden event disrupting the functioning of a given community, contributing to the occurrence of suffering and social, material, economic and institutional damage. It determines the need for external assistance as a result of overstretching the capacity to cope with its effects. Catastrophes can be divided into two main categories: natural disasters and technological catastrophes. The former category, natural disasters, includes among others volcanic activity and epidemics. The latter, technological catastrophes, include among others catastrophes in air transport, for instance plane crashes. A similar approach is followed by Zeckhauser (1996), who points out that catastrophes are "by definition extreme events". Additionally, he observes that most of them are caused jointly by nature and humans. An example he gives is an epidemic, in which nature creates a virus, but it is transmitted mainly by human behavior. The widespread availability of air transport

Table 1: Classification of natural disasters and technological catastrophes

Category	Subcategory	Main type of disaster / catastrophe
Natural disasters	Geophysical	Volcanic activity
	Meteorological	Fog
	Hydrological	Flood
	Climatological	Drought
	Biological	Epidemic
	Extraterrestrial	Meteorite impact
Technological catastrophes	Industrial catastrophes	Fire
		Building collapse
		Fuel leak
	Catastrophe in transport	Air transport
		Road transport
		Rail transport
		Water transport
	Other	Other typse

SOURCE: Marcinkowski, J. M. (2019), Humanitarny łańcuch dostaw w sytuacji wystąpienia katastrof naturalnych na przykładzie ugrupowania regionalnego ASEAN. Wyd. Uniwersytet Ekonomiczny we Wrocławiu

undoubtedly contributes to an increase in the geographical coverage of infectious diseases, especially those transmissible by droplets.

Natural disasters and technological catastrophes are important factors that induce changes in the passenger air transport sector. According to the International Air Transport Association (IATA), the airline segment consists of more than 290 air carriers in the world, representing 82% of the world's air traffic, which means more than 4.3 billion passengers carried in 2018. Taking that into consideration, the passenger air transport sector is one of the most globalized branches of the world's economy. It is exposed to diverse factors which may potentially cause serious disruption, or force managerial changes

in organizations, including the international route network, global sales systems, supply chain, air traffic control and dependence on foreign aircraft producers.

In the past 20 years, several natural disasters and technological catastrophes have affected the world, with a serious impact on the operations of air carriers. The aim of this article is to identify the scale and type of changes in the global passenger air transport sector which have occurred in the past 20 years as a result of natural disasters and technological catastrophes. The paper is based on desk research, literature and market data analysis.

Changes in the management field of the passenger air transport sector may refer to strategic, but also operational processes. In terms of strategy, those may be decisions referring to the scale and range of airlines' membership in a network of alliances, scale and range of services offered (the choice of markets), acceptable level of infrastructure safety, scale and type of purchase decisions (aircraft, fuel, other cost factors). On a tactical and operational scale, they especially include events influencing the RASM (Revenue per Available Seat Mile) and CASM (Cost per Available Seat Mile), i.e. those indirectly or directly connected with the processes of passenger or transport service.

Clearly, catastrophes have a direct impact on changes in managing passenger air transport, but they also influence it indirectly, resulting in new regulations in air carriage. The authors claim that natural disasters and technological catastrophes have been responsible for strategic and operational changes in the sector over the last two decades, and that catastrophes have increased the degree of state regulation in this field, thus indirectly influencing changes in management.

Selected Natural Disasters and Technological Catastrophes That Impacted the Passenger Air Transport Sector Between 2000 And 2019

The 11 September 2001 attacks

On 11 September 2001, a terrorist group later identified as al-Qaeda, hijacked four airplanes. Two Boeing 767 airplanes (American Airlines Flight 11 and United Airlines Flight 175) crashed into both towers of the World Trade Center in Manhattan, New York City. The third airplane, Boeing 757 (American Airlines Flight 77) hit the Pentagon building in Washington, DC. The fourth airplane (Boeing 757, United Airlines Flight 93) crashed into a field 15 minutes of flight from Washington, DC. 2,973 passengers were killed in the four crashes, excluding 19 hijackers and 26 persons reported missing.

The direct consequence of that terrorist attack was the grounding of commercial air fleet for three consecutive days in the USA. Clark, McGibany and Myers (2009) wrote that it "resulted in a 31.6% reduction in travel volume in September of 2001 compared to that same month in 2000 and generated massive industry losses". The use of aircraft as a weapon in the hands of terrorists increased the fear of flying and also led to increased insurance costs for aircraft and carriers. As a consequence of the 9/11 terrorist attacks, security requirements were tightened among US carriers and airports, and subsequently extended to the entire world. It increased the costs of air travel financially, but also in terms of time.

Ten years later, in one of its analyses, IATA indicated that the 9/11 events probably cost the airline industry three years of growth. Between 2001 and 2002, airlines lost USD22bn globally. The global air traffic and its revenues returned to the 2000 level three years later – in 2004, and the profitability of the branch (1.1% margin) – in 2006. It was also identified that the shock after the attacks led some financially fragile airlines, such as Swissair and the Belgian national carrier Sabena, to bankruptcy.

Scheraga (2004) states that the financial crisis followings the events of 11 September 2001 precipitated the "low-cost revolution" in the airline sector, of which the flagship example is the aforementioned Southwest Airlines. National carriers looked to "no-frills" low-cost airlines for operational solutions that could be emulated into their business models. Scheraga concludes that this caused large carriers to reassess the appropriate nature of customer service.

SARS outbreak 2002-2003

Severe Acute Respiratory Syndrome (SARS) is a viral respiratory disease caused by coronavirus SARS-CoV-1. Its outbreak in the years 2002-2003 started in Guangdong Province in China. The first cases were reported in November 2002. The epidemic reached the public spotlight in February 2003, after SARS symptoms had appeared in a patient travelling from China to Singapore. The plane was forced to make an emergency landing in Hanoi, Vietnam, where the patient subsequently died and the medical workers who were taking care of him also developed the same disease. The World Health Organization (2020) announced the end of the global outbreak in July 2003. Overall, the SARS epidemic affected 26 countries (with China, Hong Kong and USA affected most) and resulted in more than 8,000 cases in 2003 and 775 deaths world-wide.

IATA estimated that the SARS outbreak had caused a loss of 51.8bn in international passenger traffic (measured in revenue passenger kilometers, RPKs) and USD7bn in revenues in Asia-

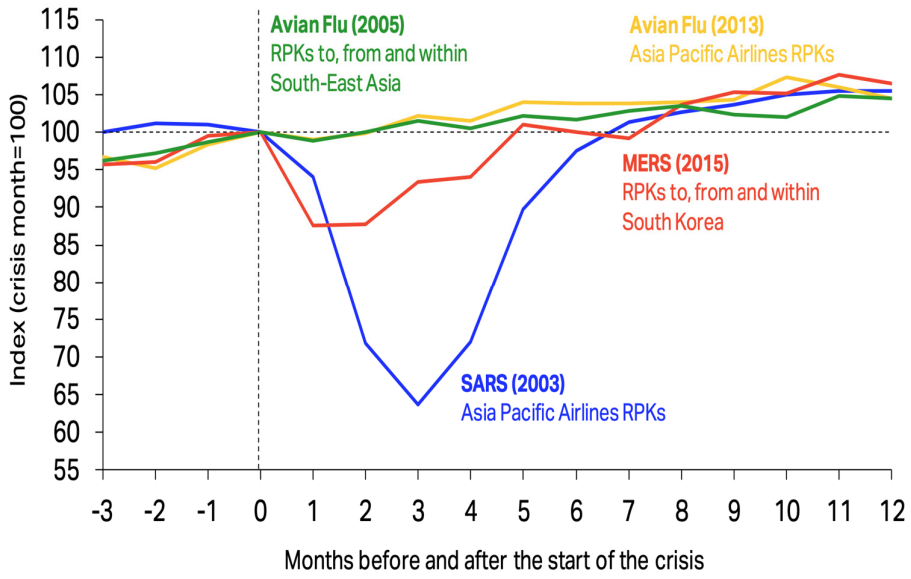

FIG. 1: Impact of past outbreaks on civil aviation

SOURCE: IATA . [DOWNLOADED 2020-04-22], www.iata.org/en/iata-repository/publications/economic-reports/what-can-we-learn-from-past-pandemic-episodes/

Pacific and North American carriers [IATA. Economic Briefing. Avian Flu]. For the Asia-Pacific airlines, it meant 8% of annual traffic loss caused by SARS.

Eyjafjallajökull volcanic eruption 2010

On 14 April 2010, Eyjafjallajökull, an active volcano in Iceland erupted. The eruption followed a series of unusual seismic activities recorded since the end of February 2010 including, among others, three thousand earthquakes detected near the volcano, and its first eruption on 20 March. The major explosive eruption was followed by 800 people being evacuated, but no fatalities were reported. It threw volcanic ashes several kilometers up in the atmosphere, which led to air travel disruption in northwest Europe between 15 and 21 April 2010. What is important, the major air corridors connecting Europe and North America run through the airspace of Iceland.

IATA assessed that over the three-day period between 17 and 19 April, when the disruptions in air travel were the most severe, lost revenues reached USD400m per day. Throughout the six-day period, revenues lost by airlines reached over USD1.7bn, the crisis impacted 29% of global aviation and affected 1.2m passengers per day [IATA. Volcano Crisis Cost Airlines…]. According to IATA, the scale of the crisis exceeded 9/11. The Eyjafjallajökull crisis impacted mostly European carriers (70% of available seat kilometers affected), Asia-Pacific airlines (11% ASKs) and North American carriers (10% ASKs) [9. IATA. Economic Briefing. The Impact of Eyjafjallajökul…].

Boeing 737 MAX 8 crashes

Boeing 737 MAX was introduced into service in 2017 as the fourth generation of the single-aisle passenger jet. On 29 October 2018, the Boeing 737 MAX 8 Flight 610, operated by Lion Air crashed into the Java Sea 13 minutes after takeoff, killing all 189 people onboard. Less than half a year later, on 10 March 2019, the Boeing 737 MAX 8 Flight 302 operated by Ethiopian Airlines crashed 6 minutes after takeoff, killing all 157 people onboard. As a result of these two crashes, global safety concern was raised, resulting in the grounding of this type of aircraft by national aviation authorities. It caused a sudden shortage of more than 300 aircraft around the world, delays in production and deliveries, and a decreasing number of new orders. While presenting the financial results of Q4 2019, the Boeing Company announced that costs associated with grounding the B737 MAX would likely surpass USD18bn, including at least 8.3bn in compensations for the affected airlines [Gelles, 2020]. The grounding has remained in effect for over a year now, and the date of returning the Boeing 737 MAX to service remains unknown.

Impact of natural disasters and technological catastrophes in the passenger air transport sector

In this part, the subject of analysis includes changes connected with the scale and range of membership of an airline in a network of alliances, scale and range of services offered (choice of markets), scale and type of purchase decisions (aircraft, fuel, other cost factors) and acceptable level of safety infrastructure. On a tactical and operational scale, they include changes influencing the RASM (Revenue per Available Seat Mile) and CASM (Cost per Available Seat Mile), i.e. those indirectly or directly connected with the processes of passenger or transport service.

Clearly, catastrophes have a direct impact on changes in the management of passenger air transport, but they also influence it indirectly, resulting in new regulations in air transport. The authors claim that natural disasters and technological catastrophes have been responsible for strategic and operational changes in the sector over the last two decades, and that catastrophes have increased the degree of state regulation in this field, thus indirectly influencing changes in management.

Natural disasters and technological catastrophes influence the passenger air transport sector in different ways. By having a look at the graph below, it can be inferred that between 2000 and 2011, when the three events described above took place, terrorist attacks hit the sector in the most visible way – the decrease in passenger air traffic was -2.7%. Apart from the disruptions caused by the SARS outbreak of 2002-2003 and the volcanic eruption of 2010, there was no significant impact on its general level. The 2020 COVID pandemic will most likely cause a significant decrease in passenger numbers as well.

In terms of strategic decisions, it may be concluded that carriers which are members of alliances are coping considerably better. Currently, three strategic alliances dominate: Star Alliance (27 airlines), oneworld (14 airlines) and Sky Team (20 airlines). Membership in such alliances allows airlines to react to changes in a flexible way. However, it may also lead to disruption if vertical relationships exist among the members. In such cases, one network's disruption may influence the operation of other airlines, e.g. when airlines are concentrated on international routes and airlines servicing domestic hubs connected with them.

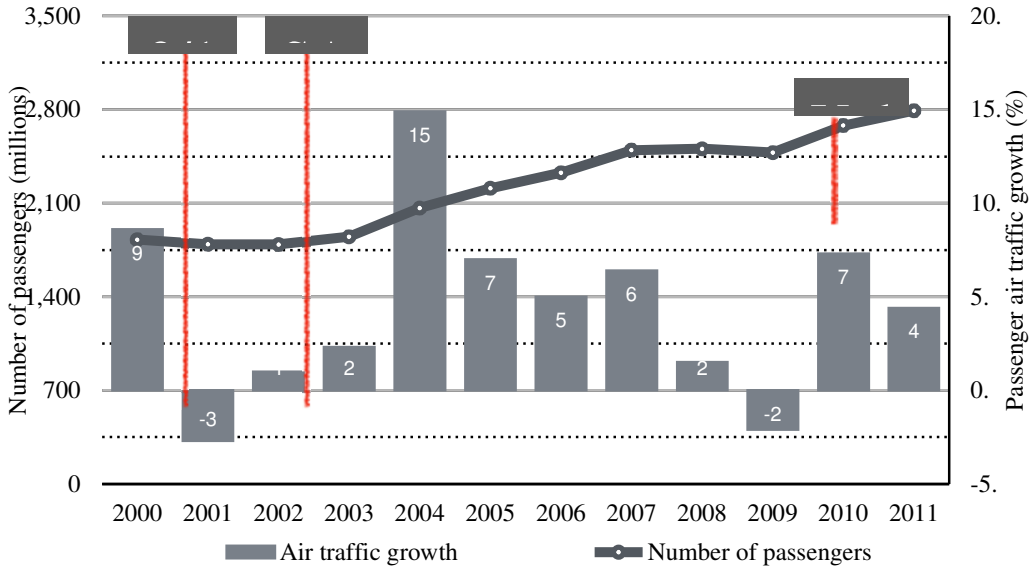

Fig. 1: Change in number of passengers (millions) and air traffic growth (%) in 2000-2011. Occurence of catastrophes marked.

Source: own work based on 6. [IATA Statistic, 2011]

Modern air carriers are globalized entities, operating in multiple foreign markets, with extensive route networks and dense flight schedules to maximize their profits generated by aircraft. Natural disasters and technological catastrophes require sudden and immediate reactions in various ways on the part of the affected entities in the passenger air transport sector.

Aircraft purchase is among the strategic decisions. Leasing planes is the current operating model, a change obviously influenced by the Boeing 737 MAX crashes. The terminated contracts, altered financing models and damage to Boeing's reputation have already brought about purchasing changes. A drastic reduction in the number of orders is at the same time accompanied by growing demand for lease and charter of planes.

An event such as an air crash first of all means the loss of a valuable asset, in this case an aircraft. For example, the list price of a narrow-bodied Boeing 737 MAX 8 is more than USD120m. It is not a common practice for airlines to maintain a sufficient reserve fleet of aircraft in case of an emergency need to replace an out-of-service airplane, regardless of the reason. Taking into consideration that the aircraft may be taken out of service anywhere in the world, and that airlines have a limited number of their bases, smooth replacement of an immobile machine with another one is operationally difficult.

There is a number of leasing or chartering companies offering aircraft that are often older but still operational and safe, even in emergency cases. The worldwide grounding of the Boeing 737 MAX 8 has shown that, in a serious crisis, demand exceeds supply in the so-called second-hand aircrafts market. The 2020 pandemic will probably force more changes in purchasing patterns, but it will also influence changes in aircraft manufacturing. It is bound to cause an increase in prices on the market.

Passenger safety is another important issue. Each of the above-mentioned catastrophes changed external regulations concerning the scale of the carrier's responsibility for the aftermath of such incidents.

Disruptions in flight schedules cause an obligation on the part of the carrier to compensate passengers affected by cancelled or significantly delayed flights. In the European Union, it is sanctioned by Regulation (EC) No 261/2004 of the European Parliament [13. Regulation (EC) No 261/2004…] and

of the Council, which states, among others, that "passengers whose flights are cancelled should be able either to obtain reimbursement of their tickets or to obtain re-routing under satisfactory conditions, and should be adequately cared for while awaiting a later flight". Operating carriers may avoid their obligation to pay additional compensation if the delay or cancellation is caused by extraordinary circumstances, which include, in particular "political instability, meteorological conditions incompatible with the operation of the flight concerned, security risks, unexpected flight safety shortcomings and strikes" [13. Regulation (EC) No 261/2004…].

The carrier is responsible for damages in case of death or bodily injury if the accident that caused it occurred in-flight or during embarking/disembarking, according to The Montreal Convention 1999 (MC99) 3. [Convention for the unification of certain rules…]. Up to the compensation amounting to 113,100 SDRs (Special Drawing Rights, 1 SDR = approx. 1.25 EUR on 22 April 2020), the carrier may exclude its liability for death or loss of health only if the damage was caused by the passenger himself or herself. Above the limit of 113,100 SDRs, the carrier may exclude its liability by proving that the death or injury did not result from negligence or a wrongful act of the carrier or (similar to Regulation EU261/2004), it was a result of negligence or a wrongful act of a third party.

The 11 September terrorist attacks affected the airline sector also by increasing the costs of security (including the requirement of reinforcing doors to the flight deck on airplanes) and insurance. The total aviation insurance market amounted to around USD2,830m in 2000, and was expected to reach 6,950 m in 2002 [Harding, Maddocks, Moss, Pyrde, 2004]. After 11 September, aviation insurance was perceived as more risky, which in turn led to increased insurance costs for carriers and aircraft operators (e.g. lessors).

It means that carriers incur significant costs to minimize and mitigate the risk of impact of a catastrophe on its operational and financial situation when facing the payment of compensation for losses in the event of their occurrence. If they are excessive, it may lead the airline to a liquidity crisis, which may result in suspension of the operations and filing for bankruptcy. For example, the Lockerbie disaster, caused by a bomb, is listed among the main causes of PanAm's (Pan American World Airways) bankruptcy in 1991. Clearly, the increase in spending caused by the necessity to improve security, as well as growth in insurance-related expenditure, directly affect both the RASM and CASM.

Factors which directly influenced a decrease in revenue included e.g. the volcanic eruption in Iceland and the current suspension of air traffic due to the pandemic. If the situation continues, bankruptcies will be inevitable. The suspension may also lead to strategic changes, including a shift to cargo transport or limiting services to domestic flights.

Natural catastrophes, such as volcanic eruptions or even heavy fog at the hub airport, may paralyze traffic in the airspace. As previously mentioned, in April 2010 the Eyjafjallajökull crisis impacted 1.2m passengers per day during its most severe, three-day phase. Such a situation leads to other consequences connected with delayed or cancelled flights, like the costs of taking care of affected passengers, even if the carrier manages to bypass liability and avoid paying additional compensation. According to Eurocontrol, in 2018 the total costs of delayed and cancelled flights rose by 28%, to EUR17.6b [Walków, 2019c]. Only for one carrier, Ryanair, these costs amounted to EUR699.7m, as compared to EasyJet paying EUR455.3m, and Lufthansa 391.9m.

Outbreaks of diseases have an impact not only on direct traffic and financial condition of airlines, but require additional public health safety measures. Droplet-transmitted infections, like SARS, pushed the Asian-Pacific air carrier sector to establish or comply with new regulations. "During SARS everything had to be invented. It was the first time we were dealing with such a disease, such an international threat", as Isabelle Nuttal, WHO Director for the Global Capacities Alert and Response Department, said in an interview for CNN ten years after the outbreak [Inocencio, 2013]. Several airlines, especially in the Asia-Pacific region, introduced procedures for aircraft disinfection and dealing with passengers displaying certain symptoms. Airports in that region started to measure the body temperature of in-bound and out-bound passengers (manually or by using thermal imaging cameras). Another

consequence was the higher level of attention resulting from advanced onboard air-purification systems installed in Boeing 787 Dreamliners, newer Boeing 777s, Airbus A350s and Airbus A320neos.

Catastrophes can lead to financial instability, but also loss of reputation and passengers' fear of flying. Two months after the second crash of the Boeing 737 MAX 8, only 3% of respondents surveyed by Ipsos stated that the brand and model of the plane was important for them when choosing an air ticket [2019a]. In July 2019, the media revealed pictures of yet undelivered Boeing 737 MAX airplanes in Ryanair's livery, in which the model's name had been changed from 737 MAX to 737-8200. Ryanair is expecting the delivery of 135 aircraft of this type. Also, the British airline group IAG, when announcing an order of 200 aircraft of this type, described them as Boeing 737-8, and its bigger version – as Boeing 737-10. Even US president Donald Trump recommended in April 2010 that the name Boeing 737 MAX should be changed. Also, new market research by Barclays, carried out among 1.8 thousand European and North American passengers revealed that only 19% of them would feel comfortable when boarding a Boeing 737 MAX airplane after they return to service, whereas a similar percentage claims the opposite [2019b].

Such catastrophes also influence changes in the field of operational management in passenger air transport. The most common ones include:

- changes in check-in and boarding passenger service (increased airport fees due to additional health checks, supply of disinfectants, more restrictive control of checked-in baggage and carry-on luggage),
- increased risk of delays (legal requirement to unload the luggage of a passenger who did not show up at the gate for boarding)
- changes in onboard passenger service (safety infrastructure costs, other costs, e.g. installing bullet-proof cockpit doors resistant to potential forced entry)
- increased fleet service costs because of additional safety requirements, technical inspections and recommended remedying of defects found during accident investigations
- accelerated changes as a result of the "low-cost revolution" by adapting the offer of traditional air carriers (limited catering, additional paid services) in order to improve the financial condition of airlines.

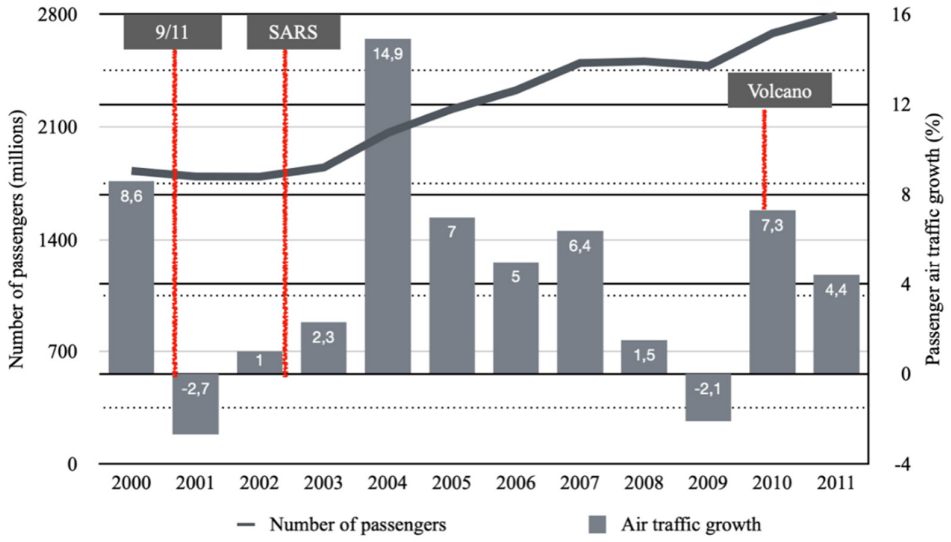

FIG. 2. CHANGE IN NUMBER OF PASSENGERS (MILLIONS) AND AIR TRAFFIC GROWTH (%) IN 2000-2011. OCCURENCE OF CATASTROPHES MARKED. SOURCE: OWN WORK BASED ON IATA STATISTICS, 2011

Discussion and Conclusions

Natural disasters and technological catastrophes are a serious challenge for the passenger air transport sector on many levels. They can impact directly the financial situation of an entity, causing the risk of a liquidity crisis, potentially resulting in bankruptcy. Especially in the case of technological catastrophes – including air crashes – they may also undermine trust in the company, which can lead to similar consequences. The article has identified the influence of catastrophes, especially in terms of strategic decisions, on:

- decisions concerning the scale and range of an airline's membership in alliances, scale and range of services provided (selection of serviced markets)
- decisions concerning the acceptable level of infrastructure safety
- decisions concerning the scale and type of purchasing decisions (aircraft, fuel, other cost factors); tactically and operationally, such decisions influence the RASM (Revenue per Available Seat Mile) and CASM (Cost per Available Seat Mile), and are usually connected with the processes of passenger or transport service.

The examples of catastrophes listed in the paper are important in that at least some of them were not within a planning scenario in the passenger air transport sector. Their incidence changed the conditions of the competitive and co-operative environment. They require higher costs to be incurred, without any knowledge of expected usability. Globalization is playing an interesting role here. On the one hand, it is a buffer of the negative impact of single events. On the other, it acts as an accelerator increasing the overall negative influence of a single event on other subjects of the global market.

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Personal TERIS-Code of The Entrepreneur

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Abstract

Entrepreneurial activity varies in time and space. The nature of entrepreneurial activity is influenced by many external factors. All of them transform into one form or another, depending on the character and psychological type of the entrepreneur. Researchers have long tried to define the concept of the entrepreneur and identify its main characteristics. However, they faced significant difficulties. Recently, scientists are increasingly turning their attention to the study of the types of entrepreneurs and entrepreneurial activities. However, the theory of entrepreneurship does not offer any comprehensive approach to this study. Therefore, the article proposes a novel method of the identification of the type of entrepreneur using five key properties, which, measured in the aggregate, comprise the entrepreneur code.

Keywords: Psychological Type, Entrepreneurship, Properties, Entrepreneur, Code, Trader, Engineer, Raider, Inventor, Schemer

Introduction

Entrepreneurship appeared with the start of the first commodity exchange between settlements, cities and countries. It was the first entrepreneurs who carried out this exchange of goods. This was a new type of business, carried out at their own risk. At that time one of the most fundamental characteristics of any entrepreneurial activity was the ability to protect one's life, the life of subordinates as well as the property from external threats. The ancient entrepreneur was, in the first place, a warrior, and his other fundamental properties and characteristics were not so obvious to ordinary people.

Entrepreneurial activity in other forms, not related to trade, was poorly developed since the entrepreneur did not have easy access to capital and free or cheap labour. At the same time, the attitude towards entrepreneurs engaged in trade was condescending. For example, the great thinker and philosopher of Antiquity, Plato wrote about entrepreneurs in his famous "Dialogues":

"Suppose now that a husbandman, or possibly an artisan, brings some production to market, and he comes at a time when there is no one to exchange with him, - is he to leave his work and sit idle in the market-place?

Not at all; he will find people there who, seeing this want, take upon themselves the duty of sale. In well-ordered states they are commonly those who are the weakest in bodily strength, and therefore unable to do anything else; for all they have to do is to be in the market, and take money of those who desire to buy goods, and in exchange for goods or give money to those who desire to sell" (*Dialogues, Plato, 2010, p. 194*).

According to Plato, it means that only residents who were no longer capable of anything else were engaged in trade.

Over time, the attitude towards entrepreneurs changed. Several centuries after Plato, the prominent figure of ancient Rome Cicero, Marcus Tullius, said that trade should be considered a dirty business, but only if the volume of it is insignificant. However, when trade is extensive and profitable, when many goods are brought from other countries and many people are supplied with them without deception, then it deserves respect (*Cicero, 2018*).

Entrepreneurial activity, commerce and trade facilitated the formation of economics as a separate discipline already in the Middle Ages. It is not accidental that the first economic research paradigm is associated with the phenomenon of mercantilism. According to supporters of this doctrine, the main function of trade is to enrich peoples. In this context, the entrepreneur played a key role, and it was within the framework that the notion of "entrepreneur" came to replace the notion of "trader".

The study of entrepreneurship began with the publication of Cantillon Richard, a London merchant and a banker. In his "Essays on the Nature of Commerce in General", published in 1755, for the first time, an attempt was made to determine the key characteristics (properties) of the entrepreneur (*Cantillon, 2009*).

Since then, economists have made significant efforts to identify the properties, which can distinguish the entrepreneur from other participants of economic activity. This was done mainly by listing the properties of the entrepreneur, which was definitely not the best way to define the entrepreneur.

Literature Review

Sombart, W., who claimed that the entrepreneur possesses a special entrepreneurial spirit, made the most prominent contribution to the solution of the problem. Under the entrepreneurial spirit, he understood a certain set of spiritual qualities that are necessary for the successful implementation of an entrepreneurial project (*Sombart, 2018*). The economist reoriented research from the external manifestations of entrepreneurship, such as the propensity to take risks, the desire for independent work, etc., to the study of the internal characteristics of entrepreneurs. Sombart, W. wrote that if the entrepreneur wants to achieve success, he should be a conqueror, an organizer or a merchant. This idea of Sombart about a special entrepreneurial spirit has inspired many scientists to conduct research in this field and brought about many recent research works.

Today, the phenomenon of the entrepreneur and the peculiarities of entrepreneurial activity are studied not only by economists, but also by psychologists and sociologists, who have made a significant contribution to the theory of entrepreneurship.

Troeltsch, Ernst wrote that capitalism was born in the depth of the organizational forms of church (*Nix, 2010*). These forms determine the moral and ethical principles of the social and economic life of society, and therefore, shape an attitude towards business and entrepreneurship. Becoming aware of the involvement in the life of society and the responsibility for what is happening, the individual finds the strength and develops the necessary properties to be engaged in entrepreneurial activities.

Freud, Sigmund, who laid the foundations for psychoanalysis, explored the behaviour of people through their sexuality and childhood experiences. He argued that only those people who can and want to control themselves and their surroundings become entrepreneurs (*Freud, 2012*). In his critical evaluation of the teachings of Freud, Fromm, Erich wrote that the basic human needs remain the same over time, but it is the social system that determines the way to satisfy them. The social type of the individual's character is formed as a result of the interaction between the biological self of the individual and the norms and values of society. Then this social type is continuously reproduced. Naturally, any social transformation meets resistance and cannot occur quickly. Only after a certain period of time, when a new social type of personality is formed, changes in society begin to accelerate. The personality of the entrepreneur reflects the social character of their era and the society they live in. Entrepreneurs possess a set of characteristics (properties), which varies depending on time and locality (*Fromm, 2013*).

Vries, Manfred agrees with Freud that the main features of the entrepreneur's psyche are formed in their childhood (*Vries, 2010*). Future entrepreneurs tend to be under stricter control from their parents, which is often coupled with a certain degree of rejection, especially from their father. These two factors determine the psychological type of the entrepreneur. The entrepreneur seeks to control the surrounding environment by organising it in the form of an enterprise. In addition, entrepreneurs reject authority and strive for establishing norms for society. This is a compensation for stringent control and rejection in their childhood.

One of the recent examples of the influence of Sombart's idea of the existence of a certain *entrepreneurial spirit* and the impact of this idea on the economic thought is the work of Adizes, Ichak, in which the *entrepreneurial spirit* is considered to be an integral part of the manager's psychological type.

It should be noted that in the modern theory of management there are three styles of leadership: authoritarian, liberal and democratic. Adizes shows how each of these styles can be formed by combining the four main managerial functions (according to the style of work organization) (*Adizes, 2004*):

1) producer (P),
2) administrator (A),
3) entrepreneur I,
4) integrator (I).

He believes that each manager has his own type of the PAEI code. For someone, (P) focuses on the result whereas another person is more concentrated on administration (A). However, Adizes's analysis of management styles can only indirectly help us solve the problem in question. He interprets the function of the entrepreneur as follows: the entrepreneur is by nature capable of pre-emptive actions in the environment of constant change ... the entrepreneur is creative and ready to take risks. It is clear, however, that this is not enough to define what the entrepreneur is and what properties he possesses. "Being enterprising" and "being entrepreneurial" are two completely different things.

Adizes did not study the entrepreneur as such. The object of his research was management and the manager. He did a thorough analysis of management styles and their peculiarities. However, he developed a very important tool, which we will use in our research as demonstrated below.

Methodology

ADIZES does not consider different types of managers as a set of rigid personality traits, but rather as a set of properties, each of which can be expressed in varying degrees. Some of these properties are strongly pronounced in a particular manager whereas in others they are barely noticeable. Various combinations of the four main properties - focusing on the result, focusing on administration, enterprise and the desire to integrate - lead to the formation of characteristic traits of the manager.

The entrepreneur also has a very different set of characteristics. Any successful entrepreneur has to complete the arduous journey from an emerging businessperson to a capitalist who does not engage in entrepreneurship anymore.

In the course of this evolution, significant changes occur in the worldviews of entrepreneurs and their styles of conducting business. Nor do attitudes to competitors and employees stay the same (Ponomarev, 2018). But the main properties of the entrepreneur remain unchanged in time.

Over many years, different researchers of entrepreneurship have identified the following properties inherent in the entrepreneur:

1) the focus on profit and being able to put everything at stake to get it;

2) the ability to conduct business in the conditions of risks and uncertainty; entrepreneurial profit is a genuine risk;
3) the ability to introduce innovations to get profit;
4) a creative approach to business;
5) specific knowledge of the market, people, market conditions, allowing the entrepreneur to conduct entrepreneurial activity;
6) the desire for continuous accumulation of capital;
7) money is the most important value for the entrepreneur, which makes it possible to compare the capital available with the capital of others as well as to objectify the world as a whole, make it more rational, predictable and subjected to assessment;
8) successful entrepreneurs are the individuals who are not burdened with social and cultural ties and relationships. It allows them to initiate super-profitable and sometimes unethical and immoral business projects;
9) the behaviour of entrepreneurs is often not rational; they do not even strive for being rational since the cognitive abilities of a person (perception, memory, decision making, etc.) are limited;
10) the behaviour of entrepreneurs is not rational due to the irrational nature of the surrounding world (*Odiorne*, 1990);

There are other properties, which can be derived from the list above. It can be noted that some of the ten basic properties of the entrepreneur can be combined into certain groups. We hold that there are several types of the entrepreneur:

1) T - Trader (businessman, merchant, dealer);
2) E - Engineer (engineer, financier);
3) R - Raider (conqueror, security guard, warrior);
4) I - Inventor (inventor, innovator);
5) S - Schemer (combinational player, communicator, organizer, lobbyist).
The properties of each type are inherent in every entrepreneur. However, in each individual, they are expressed to various degrees. Consequently, entrepreneurial styles also differ.

Let us analyse in more detail each of the five groups of entrepreneurs.

Historically, *Trader* is the first type of the entrepreneur. This is a merchant, a shopkeeper and a money lender. Before the era of industrialization, merchants and barterers represented this type. The famous Venetian and Hanseatic leagues were the main economic driving force of Western Europe in the first half of the second millennium. These people built up modern civilization, ensuring the exchange of goods and technology. They created the path “From the Varangians to the Greeks”, which served as the foundation for the development of Russian statehood in Europe. In general terms, the trader is a person having a special intuition, a special sense of trade. It is important to note that such people derive great joy from the very act of concluding a deal. This entrepreneurial quality is usually innate and manifests itself quite early in life. The main quality of the entrepreneur is the ability to make a DEAL. Each entrepreneur has this talent but, again, in varying degrees.

Engineer is a technically minded person, a builder, a farmer, a financier or a capitalist. These are business creators who built up the modern economy - from the first factories to modern industrial giants. These are modern Atlantes: Rand, Ford, Rockefeller, Dupont, the people who developed the industrial potential of the United States. These are the great Russian industrialists: the Demidovs, the Morozovs, the Ryabushinskys, the Stroganovs and the Nobels. These are the great Germans, Japanese, Koreans, Chinese, who created the most famous world brands. Without Benz, Daimler, Porsche, Mitsubishi, Toyota, the world would have been different. They are in construction, transport, banking, agriculture and food industry because at the core of their business is CRAFT. Craft is always a business. An entrepreneur having pronounced engineering skills is capable of organizing a perfect process of running a business.

Raider is a warrior, a security guard or a power entrepreneur. Even at the dawn of civilization, merchants organized long-distance armed raids to get spices or sable fur. As a result of these armed

expeditions, Europe conquered the American continent, and Russia expanded as far as Siberia and the Far East. The recent world economic crisis was a reminder that capitalism can both create and destroy. There are numerous entrepreneurs seeking to establish control over different types of assets at any cost. For them, the most important thing is 'nutritional value' - liquidity value of the asset being acquired. In the economic history of modern Russia, there have been as least two types of such power entrepreneurs – those of the 1990s (former criminals and athletes) and the entrepreneurs of the 2000s (former law enforcement officers). Naturally, the main thing for them is POWER. Any entrepreneur belonging to this type must have this quality otherwise, his business is short-lived.

Another type, *Inventor*, is a creator and an innovator. In this context, I cannot but quote Steve Jobs, who famously said, "Praise to the madmen, to the rioters and troublemakers. To those who are always inopportune and out of place. To those who see the world differently. They do not follow the rules. They do not respect the status quo. You can quote them, argue with them, glorify or curse them. But it is impossible to ignore them. Because they bring change. They push humanity forward. And let someone see them as madmen, we see geniuses. Because only madmen believe that they can change the world. And so they change it". This type of entrepreneur lives by DISCOVERY. In the modern theory of entrepreneurship, the postulate that the entrepreneur is an innovator is axiomatic. Yet, in each entrepreneur, the ability to innovate is expressed in various degrees. In addition, the desire to become a "troublemaker" decreases with time and acquires a more civilized and 'quiet' form.

Schemer is an organizer, a lobbyist and a rentier. All Russian businessmen were brought up with the image of the great schemer, Ostap Bender, a character from the famous book "Twelve chairs". This fictional character created by the Soviet writers Ilf and Petrov in the 1920s, the time of the New Economic Policy, is the epitome of an irrepressible organizer, a specialist in communications and a creator of different schemes. Beyond fiction, we cannot fail to notice that the economic situation, formed in the 1990s as a result of the privatization of the largest Russian enterprises, was formed partly by talented entrepreneurs, who used their connections, lobbying capabilities as well as contacts abroad. This type of the entrepreneur is a good manager of entrepreneurial assets (time, people, technology, finance). The main ability of these entrepreneurs is to connect the non-connected, i.e. the ability of networking. It is this type of entrepreneurs that is notoriously known as organizers of different pyramids. As entrepreneurs of this type mature and withdraw from active business and the management of capital, they tend to create legal and secure business schemes and often become rentiers. They manage PEOPLE.

Since each entrepreneur combines all five components of the *entrepreneurial substance*, every entrepreneurial type is characterized by the corresponding code consisting of a combination of all five types. Pronounced properties of the entrepreneur will be written in capital letters, for instance, TERIS. If some properties are poorly expressed, they will be written in lower case letters: teris. Since we are exploring the code of the entrepreneur, it will be logical to refer to the identified qualities as genes.

Results

In practice, pure types of entrepreneurs that possess a single code with only one dominant gene are a rare occurrence. Entrepreneurs belonging to one type only, i.e. having one dominant gene, are vulnerable and limited in their decisions. The lack of business-generating genes T, E, the organizational S, or I inevitably leads to the inability to effectively use the acquired asset.

If there is the T gene, the raider is able to effectively monetize the asset. If he possesses the I gene, the entrepreneur is a visionary and can foresee future developments of his business. The S gene ensures a deeper understanding of one's own weaknesses and turns them into strengths either by using the third-party business substance, by forming partnerships or by the development of internal entrepreneurship in the company.

The internal code of the entrepreneur is manifested externally. Having identified the five main qualities that are inherent in each entrepreneur and are present in varying degrees, we can now resort to the Adizes methodology to research different styles of entrepreneurship.

Proceeding from the objective of this research, it was important to show the functioning of the TERIS-code in practice. To this end, the author conducted a written survey of more than 450 Russian businessmen. This survey showed that there are at least 10 possible variations of the TERIS code. Our research showed the most frequent variations of the TERIS code are the following: IS (15%), RS (13%), TS (12%) and ES (12%).

It is necessary to note that these variations of the code were identified by Russian entrepreneurs during their self-evaluation. This fact allows us to put forward a hypothesis about the prevailing type of the entrepreneur in Russia – the Schemer. Further research into the entrepreneur code is the TERIS analysis and digitization of entrepreneurial groups and trends in the historical perspective. It is also necessary to further analyse the combinations of two dominant genes.

The newest economic history began with the legalization of entrepreneurship in the USSR in 1985. After the demise of the USSR, there were two groups of cooperatives that proved to be particularly efficient - trade and marketing cooperatives owned by entrepreneurs with the IT code and production cooperatives of the ET code entrepreneurs.

The emergence of cooperative banks and state-owned enterprises required a new type of entrepreneurs capable of transforming state capital into private capital - the TS code entrepreneurs.
The severe crisis of the early nineties led to the emergence of criminality in business - the RR code entrepreneurs, who later evolutionised into the SR type. Privatization means connections and schemes: how to redeem an asset at his own expense is the task the ST entrepreneur can easily solve.
Acquisition of an industrial enterprise means turning it into a profitable and developing asset, and here the skills of an entrepreneur with the TE code are required.

The consumer revolution of the 2000s made it possible for the TI code merchants to realize their potential. The time required the ability able to recognize the needs of the consumer and offer him products having definite competitive advantages.

Entrepreneurs of the construction boom of the early 2000s have the ET code: they are good civil engineers and salesmen.

The era of digitalization has opened the doors to innovators. Today, it is impossible to succeed in the digital economy without a deep knowledge of information technologies and the IE code entrepreneurs are good at their application.

The identified dominant combinations of the two genes of each type of entrepreneurs, working in modern Russia and beyond are complemented by the remaining three genes manifested in varying degrees.

Conclusion

The proposed approach to the identification of the types of entrepreneurs requires further development. It can be used to describe the most typical types of entrepreneurial activity and also to identify and assess the personal code of an entrepreneur. The personal code of the entrepreneur can be graphically expressed in many ways, for example, TeRis or teRIS depending on the type of the entrepreneur. The assessment of each component of the code of the entrepreneur is essentially binary: it can be more or less pronounced.

For simpler research, such a binary estimation is quite sufficient. However, a more complex and comprehensive research into the entrepreneur typology requires a wider assessment scale. For instance, the intensity of each property can be assessed on a scale from 0 to 10, where 0 is the

complete absence of the property, and 10 is the maximum possible score. In this case, a more accurate identification of the entrepreneurial code will be done.

The one of authors of this article, being an entrepreneur, evaluates his own TERIS code as T (10) E (5) R (5) I (8) S (6). Since the engineering component of this entrepreneurial code is not as pronounced it should, the author decided to develop his engineering competence through research activities.

Summing up, it should be noted that the scope of application of the TERIS code of the entrepreneur is much wider than just a simple analysis of entrepreneurial techniques, psychotypes or groups of entrepreneurs. It is obvious that the TERIS code of the entrepreneur is the most important part of the intellectual capital of his company.

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Self-Assessment Of Civil Servants In Public Organisations – Research Results

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Abstract

The self-assessment of civil servants is one of the elements of the open form of assessing public organisation's employees. This is a process of formulating assessments toward oneself with regard to the skills, knowledge and experience. The management decides on the criteria of this assessment that will be used for further decisions taken in the scope of managing human resources of a given organisation. The awareness of the potential of a civil servant on a given position is very important. The analysis of weaknesses should encourage civil servants to reflect on whether they want to improve them and if yes, what effort do they want to make and how much time do they want to spend on improving them, what influence does it have on themselves and on the environment in the professional work. The aim of the article is to discuss the role and significance of the value of civil servants in public organisations, indicate organisational areas that might be helpful in self-improvement of staff and to present research results related to the self-assessment of civil servants of selected public organisations.

Keywords: civil servants, self-assessment, public organisations, management, the management.

Introduction

The management's skills in the strategic, personal and interpersonal areas are of key significance. The maximum use of all possible resources, including the human capital, allows development and implementation of planned intentions and aims of public organisations. The role of local government institutions is to satisfy the needs and expectations of a broadly understood environment, i.e. public services' beneficiaries. In order to increase the civil servants' satisfaction, various measures are taken in the scope of human resources management in the area of motivating, developing attitudes based on full trust and engagement, which favours relations within the organisation's structure. The management of public organisations should create conditions favourable also to the staff. The aim of the article is to discuss the role and significance of the value of civil servants in public organisations, indicate organisational areas that might be helpful in self-improvement of the staff and to present research results related to the self-assessment of civil servants of selected public organisations.

The role and significance of the value of civil servants in public organisations

The organisation's resources comprise all that is available at the organisation and may be helpful in achieving aims, mission, vision and tasks adopted by that organisation. The organisation's resources usually include: financial resources, capital assets, human resources, equipment, raw materials, machines and devices (Dictionary, 2007). Civil servants making the human resources in organisations have their own places therein (job positions), perform specific roles and tasks, are held liable, are included and engaged in the achievement of the organisation's aims. They also have rights and obligations regulated by the Labour Code (Padzik, 2020).

Human resources in public organisations are at a disposal of specific value (they can be measured), they are renewable and continuously increased (certain measures of an investment character can be undertaken in the area thereof), they are also a source of future income (an organisation can expect a

return on investment) (Łukaszewicz, 2009). Work components of civil servants in organisations include (Juchnowicz, 20014):

- competences, that is, knowledge, skills, talents, styles of operation, personality, values, features, which, used and developed at professional work, lead to the results compliant with the assumptions of the whole organisation;
- interpersonal contacts (interpersonal relations, organisational communication and information system);
- organisational culture (models of thinking and behaviour);
- organisational climate (atmosphere at the organisation).

"The strength of the organisation's human capital is proven not only the obtained general and professional knowledge, as well as skills developed during the hitherto work, but also the possibilities of proving oneself in the professions, abilities not yet disclosed, aspirations, own deep motivation to work and learn, creativity, readiness to take risk and personal sense of responsibility for success of the organisation. Thus, human capital comprises people who are able to cooperate with each other - people permanently related to the organisation and its mission", as stressed by M. Rybak (Rybak, 2003). The concept of human capital is related to the superior concept of the intellectual capital, which is created by the organisational knowledge. The intellectual capital as non-material resource and material resources (funds and fixed assets) constitute the market or total value of the organisation (Armstron, 2011). The role of the management also comprises behaving in a manner recognising employees' values, their expectations, needs, way of thinking and acting. With their behaviour, the management should give good example in the scope of introducing changes, executing cultural transformations or norms. Proper leadership, motivational system and communication processes also play a significant role. Without effective motivation, employees will not strive for sharing knowledge or effective performance of tasks. The potential of the staff's knowledge and competences is the most important (Walczak, 2009). Human resources meet both, their own needs and expectations and the needs and expectations of the aim and task-oriented organisation. Whereas, the organisation creates conditions favouring human resources, applying to this end planning, organising, coordinating activities and controlling. Furthermore, the organisation's task is to recognise employees' attitudes and behaviours. The human capital is defined as "the knowledge, competences, abilities, skills, know - how, culture, values, relations, motivation, attitudes, mental agility, leadership" (Szopik-Depczyńska, Korzeniewicz, 2011), therefore, human resources must be treated as social capital which can be developed and their participation in decision-taking has its value. Moreover, H. Król believes that the concept "human resources" (Król, 2006):

- appears as a synonym to the following terms: workforce, staff, workers, employees; it is related to the new approach to employees treated subjectively and not objectively, it is connected with the word "management";
- has evaluative character, i.e. defines basic significance among other resources in the organisation, such as: material, financial, information, decides on using them by the human factor;
- is related to the most important values, i.e. abilities, knowledge, skills, attitudes, which should be properly used in the management process;
- can have a negative effect due to the comparison thereof with raw materials and machines, devices, all depends on the manner of treating employees - a person as a living being, who cannot be compared with other resources;
- other terms should not be adopted as synonyms of the subject matter.

Civil servants are the driving force of each public organisation focused on development due to the motivational possibilities of the staff (Dziędziora, 2006).

Organisational areas helpful in the self-development of civil servants

Human resources development comprises obtaining skills necessary for the performance of duties on particular job positions. In the literature there are various terms referring to the employees' development, among others: education, training, apprenticeship, supplementary education, professional improvement, learning, professional development (Trochimiuk, 2013). Therefore, the

conception of performing personal function focused on employees' development at the organisation can be adopted, which is enabled by the following assumptions (Morawski, Mikuła, 2011):

- focus on competition in the scope of knowledge and proper quality thereof;
- the most important competences of the organisation are developed by the best employees;
- professionalism and creativity of employees as the basis of each organisation;
- focus on migration of staff between labour markets, applying new human resources programmes due to the changing needs and expectations thereof;
- high costs of soliciting employees;
- maintaining proper relations with customers taking into consideration effective, efficient and reliable services also provided to new groups of customers and markets.

In the civil servants' supplementary education processes self-education or supplementary education is extremely important, which influences the properly performed work, which is directly related to the following learning attributes (Boydell, Leary, 2001):
- applying rules, i.e. learning proper performance of the easiest activities by strictly following the rules of performance thereof and adopted procedures; such method of work is necessary, especially with regard to safety and health;
- adaptation occurs when there is a need for adjusting rules and procedures in order to enable performance of more efficient work than in the case when an employee follows strict rules;
- discovering interrelations consists in realising why a specific form of performing work is effective and compliant with the procedures.

The need for training is an area of employee's competences, which must be subject to evolution in order to enable effective performance of duties. They can have the following character: ongoing (occur at the moment of a sudden issue requiring employees' training), adaptation (occur when a training enables employees to perform additional tasks) and development (conducted with a view of future consequences of employees in terms of human resources) (Jasiński, 2005). Employee trainings aimed at improvement of their knowledge and skills have a diverse dimension and the selection thereof is determined by the needs of both, the employed and the management and has the following forms (Andrzejczak, 2005):

- traditional, i.e. trainings focused on the needs of job positions, selection of the topic and preferred traditional methods of education;
- development, i.e. trainings have a long-term character targeted at innovativeness of activities and changes in the environment with a preservation of traditional methods of education;
- non-formal, i.e. conducting trainings in the form of apprenticeship by adjusting employees' competences to the requirements of particular job positions;
- innovative, i.e. conducting trainings so that they contribute to creative activities of employees targeted at creating new values.

In the improvement process employees identify their own educational-professional aims with the development policy of the organisation. Despite high expectations from employers, employees very often follow changes and wish not only to meet expectations, but also to be competitive on the market thanks to their attitude. The sense of physical and psychological wellbeing in the work environment and high self-control of employees in the aspect of self-development generates expected results (Różański, 2014). The management have to take decisions concerning selection of proper tools in the development process of employees taking into account the organisational culture based on mutual understanding and trust and supporting decisions taken by employees in this area (Michna, 2016).

Research results in the context of self-assessment of civil servants of selected public organisations

The research covered 10 randomly selected institutions of the Silesian Voivodeship local government, in Poland, and 50 civil servants of those institutions. In order to conduct the research, the survey questionnaire was selected from among many other measurement instruments from the

classification of direct survey methods of collecting data from primary sources to direct survey method. While formulating questions for analysed studies, factors determining human resources management in local government units were taken into account, with a consideration of, among others (on the grounds of in-depth, extensive analyses of literature, factors determining human resources management in local government organisations in Poland have been enumerated[)]:

- predispositions, abilities and skills, talents of civil servants;
- innovative, creative, entrepreneurship approaches, social responsibility of civil servants;
- motivation systems of public organisations toward the civil servants;
- improving human resources in local government units;
- improving human resources, delegating tasks, controlling and assessing civil servants;
- strategy, mission and vision of local government units;
- culture of public organisations;
- diversity of tasks performed by the administrative staff;
- IT shared on job positions of civil servants;
- effectiveness and efficiency of work of civil servants.

In question 1 (histogram 1) concerning the aspects that generate the most difficulties on the position of a civil servant, respondents could choose more than one answer. It turned out that civil servants encounter the most difficulties with knowledge of administrative provisions which are constantly changing. Employees complain that due to the large number of tasks they do not have the time to continuously analyse often small, yet, significant amendments to the administrative law. According to the respondents, knowledge on the functioning of the whole local government administration is another factor causing difficulties in performance of duties. It may result from the multiple aspects in particular organisational units of public administration. Another difficulty in performing duties on job positions comprises the manner of approaching performed tasks and effects thereof. It results from the lack of unambiguity in methods of implementing resolutions and acts introduced by the government, as well as interpretation thereof. Knowledge of foreign languages and provisions concerning the performance of entrusted tasks are the least difficult for civil servants.

(Knowledge of foreign languages, Knowledge of administrative provisions, Knowledge of provisions concerning performance of entrusted tasks, Knowledge in the scope of functioning of the whole local government administration, Manner of approaching performed tasks and effects)

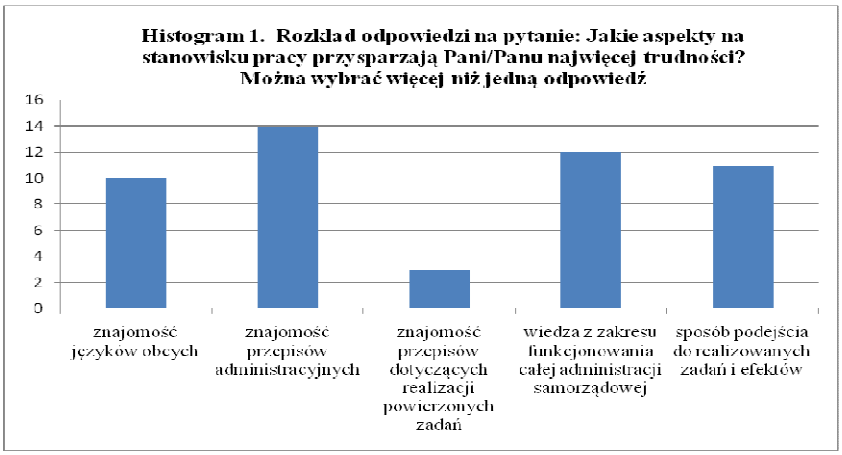

Histogram 1: Distribution of answers to the question: What aspects of the job position generate the most difficulties for you? You can choose more than one answer

Source: own study on the grounds of survey research

In question 2 (histogram 2) respondents from Poland while answering took into consideration the significance of factors influencing job satisfaction. It turned out that they considered the most important the following factors: sense of employment security, possibility to improve qualifications, good atmosphere in the team, good interpersonal relations and appreciative superiors. The result shows that non-financial motivators are more significant for administrative employees in Poland. Awards for team members can have various forms: non-cash awards, promotion, praise in the presence of the whole team, appreciation or additional days off. The possibility of improving qualifications provides the employees with a number of opportunities, such as: changing the job position, promotion, specialist knowledge, new skills, combining theory with practice, broadening horizons and self-development. Good interpersonal relations in the team allow achieving satisfaction at work, trigger drive and initiative, favour proper atmosphere of work and have a positive impact. An integrated team, where responsible and loyal persons willing to cooperate work, is harmonious and strong and thus, it generates very good results, often exceeding the planned targets. Appreciative superiors notice the potential of the team and are able to use it effectively for the organisation's purposes. The team's potential can manifest itself in various employee skills, i.e. adjusting to working conditions, the ability to analyse various situations occurring in the organisation, organisational and decision-taking skills. Well-selected team members that are driven by mutual values, function better in the organisation and achieve set objectives faster.

(Prestige of the office, Sense of employment security, Ability to improve qualifications, Work at a place of residence, Character of the performed work, Good atmosphere in the team, Facility and equipment conditions, Good interpersonal relations, Appreciative superiors)

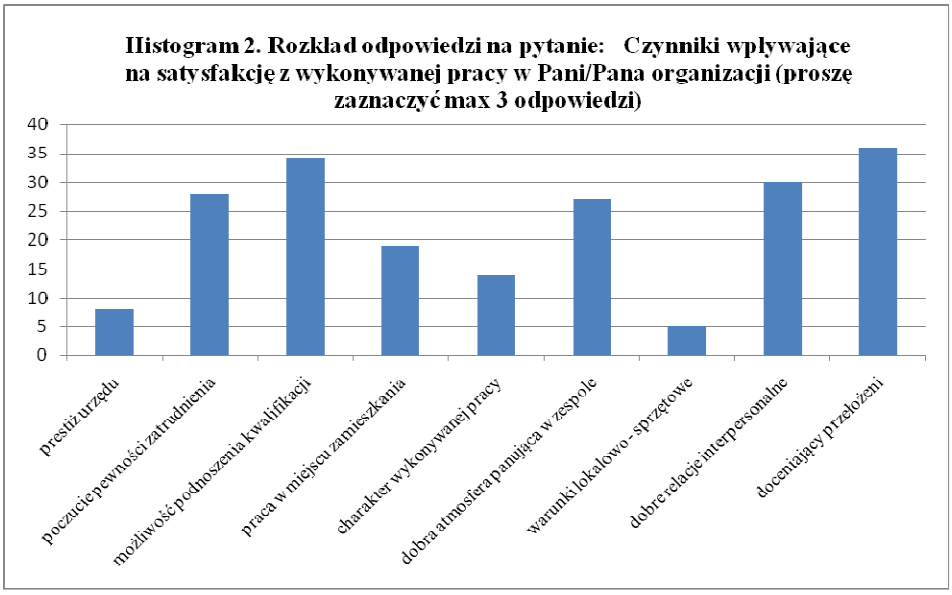

Histogram 2: Distribution of answers to the question: Factors influencing your job satisfaction at the organisation (please select not more than 3 answers)

Source: own study on the grounds of survey research

Answers to the question "Which skills do you use on your job position?" (histogram 3) imply that, according to the respondents, the most frequently used skills include: communicating, learning and developing, organising activities and formulating clear objectives. Communication plays a significant role both, in the private and professional life of every person. Work of a civil servant to a large extent

consists in communication with other people. This process is especially visible in administration, where the flow of information constitutes a basic element of the official activity. Functioning thereof consists in managing information in the communication process aimed at exchanging thoughts, sharing knowledge, information and ideas. A significant issue proves to be formulating clear objectives, as well as adjusting the manner of communication to situations and persons with whom civil servants interact. In the respondents' opinion, organising activities is a skill frequently used, since it is related to dividing tasks with the use of the potential of human resources both, in team and individual work. Local government officials' work becomes more and more interdisciplinary and requires continuous learning, obtaining information and practical use thereof. Learning and development of employees is related to the modification of previously adopted manners of behaviour, analysis and improvement of existing procedures, readiness to properly react in exceptional and unpredictable situations. Due to the development of their own skills, employees influence continuous improvement of local government institutions' functioning. Creating new visions, solutions, setting mutual objectives, using mental abilities of all members have a very favourable impact on the public organisations' functioning.

(Creative thinking, Formulating clear objectives, Organising activities, Full engagement, Learning and development, Planning, Motivating oneself and others, Taking decisions, Communicating, Introducing changes, Moving from thinking to acting quickly, Analysing failures and drawing)

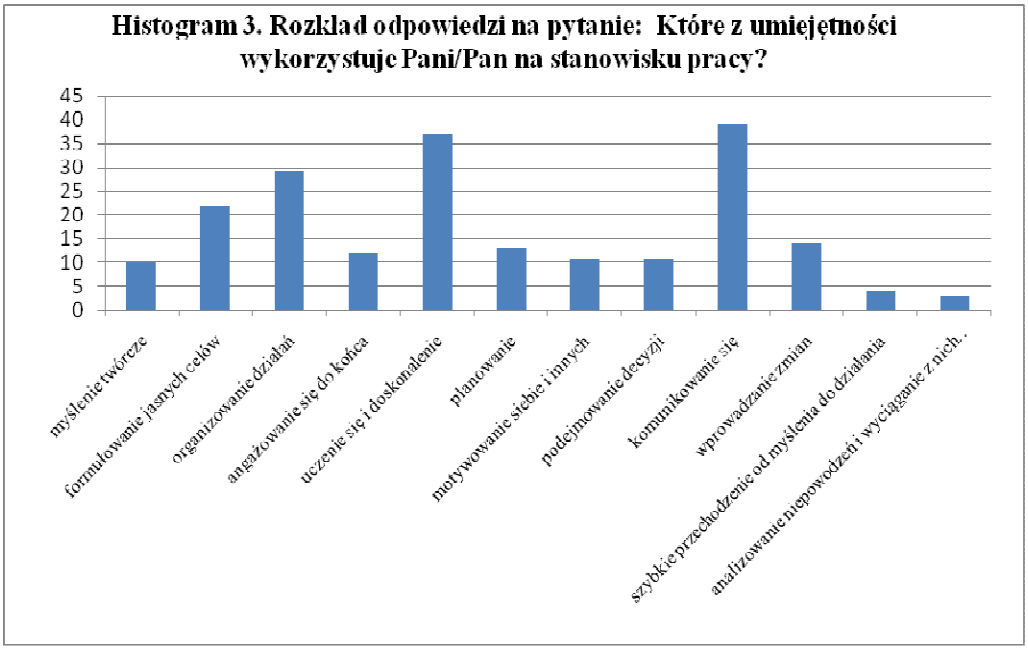

Histogram 3: Distribution of answers to the question: Which skills do you use on your job position?

Source: own study on the grounds of survey research

Due to the specialist skills of civil servants, public organisations strive to gain customers' trust and are highly assessed by the external environment.

Conclusion

Public organisations, wishing to remain on the highly competitive market, ensure versatile development of civil servants. It has a positive impact on their external image and constitutes a

promotional element. Improvement of competences of both, the management and employees, updating knowledge, developing new and necessary skills, focus on innovativeness, entrepreneurship, aiming at implementation of newly developing trends, conceptions, assumptions - those are some of the factors determining strategies of contemporary organisations. Only effective human resources management in these areas provides the possibility of development of the whole organisation. Also the environment to a large extent forces new attitudes of employees in organisations and causes continuous necessity of their self-development necessary not only to achieve a high position in the professional work, but also full cooperation with superiors.

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The Role of Civil Servants in The Process of Effective Functioning Of Public Organisations – Research Results

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Abstract

Motivating staff to implement the organisation's strategy, including the staff in the decision-making processes targeted at activities related to creativity, innovation and entrepreneurship aims at developing a fully engaged public organisation with shaped organisational culture. The management of public organisations should create conditions favourable also to the staff. In order to increase the civil servants' satisfaction, various measures are taken in the scope of human resources management in the area of motivating, developing attitudes based on full trust and engagement, which favours relations within the organisation's structure. The aim of the article is to present the role and significance of the staff in the context of developing effective management of public organisations and to discuss the research results related to the assessment of functioning of public organisations by civil servants employed therein.

Keywords: management, civil servants, effective management, public organisation, resources

Introduction

The organisation's resources comprise all that is available at the organisation and may be helpful in achieving aims, mission, vision and tasks adopted by that organisation. The organisation's resources usually include: financial resources, capital assets, human resources, equipment, raw materials, machines and devices (Dictionary, 2007). Employees making the human resources in organisations have their own places therein (job positions), perform specific roles and tasks, are held liable, are included and engaged in the achievement of the organisation's aims. They also have rights and obligations regulated by the Labour Code (Padzik, 2020). Conducting an effective human resources policy in organisations has many positive aspects. The management supervises and supports the processes of tasks performed by employees, which, due to the implemented organisational culture, enables effective functioning thereof in the organisation. The aims, mission and vision of a public organisation are effectively achieved. Appreciated employees strive to fully use their knowledge, skills and experience and employers meet their requirements and needs. Such positive relations contribute to the organisation's successes and becoming more competitive for the environment.

The aim of the article is to present the role and significance of the staff in the context of developing effective management of public organisations and to discuss the research results related to the assessment of functioning of public organisations by civil servants employed therein.

Civil servants in Public Organisations' Functioning Processes

Civil servants are also indicators of competitiveness on the market where an idea, charisma and courage in taking action are valued (Szydzińska, 2000). Civil servants' capabilities must be subjected to ongoing improvement, which is also reflected in the organisation's integrated development model. Success in improving human resources depends on the purposefulness, planning, the manner of implementation and methods of measuring development opportunities of employees (Morawski,

Mikuła, 2009).
Processes of managing civil servants of public organisations are distinguished with, among others:

- organisation of the workplace in order to benefit from useful knowledge, innovativeness and creativity, stipulation of duties and tasks for particular employees;
- teamwork and interpersonal relations;
- assimilation of knowledge, skills and experience of team members;
- shaping development of particular team members;
- employee motivation generating expected results;
- full engagement of civil servants in the process of developing knowledge and sharing it with other members;
- assessment of work results, settlement of entrusted tasks and duties;
- laying out a path for professional promotion or demotion in the case of a lack of effective performance of employee tasks.

According to U. Sanak and B. Buchelt, the human resources policy constitutes one of the most important factors influencing employees' decisions on staying or leaving the organisation (Snanak, Buchelt, 2008).

While applying the human resources policy at the organisation, one should take into consideration the fact that employees create the value of a given organisational unit and constitute the element of its strategy and the basis of competitiveness. In the context of value, the human resources virtues include, among others: mobility and availability, identification with the organisation, engagement, productivity, diligence, willingness to work in a team, positive attitude to the organisation's value hierarchy (Sajkiewicz, 2007). Implementation of the human resources policy by managing human resources covers complex measures in shaping, development, results-orientation and motivation of employee groups. In this context, the human resources policy is understood as an instrument in striving for implementation of necessary assumptions and key strategies of the organisation. An important element of this process constitutes, among others: "(…) participation of employees in management, the sense of impact on the enterprise's results, the extended scope of autonomy, equal and just treatment of employees, the possibility of promotions and transfers according to interests and capabilities." (Listwan, 2008)

The management, whose role also includes self-development and liability for performed tasks, participates in the process of improving public organisations. Moreover, the management tasks include self-organisation consisting in effective delegation of tasks, self-evolution (searching for new forms of providing services) and self-recognition (any activities that do not generate expected values for petitioners within the provided public service). Civil servants must be aware of the necessity of professional self-improvement manifested in, among others, continuity of self-improvement, increase in activity, focus on learning and self-education. Process orientation in public organisations should be aimed at the development of managerial skills of the management and developing relations, as well as monitoring the activity of servants in the scope of the performance of tasks. In this area, the following might be helpful, e.g.: measurement of servants' competences or broad use of the newest achievements of science and technology. The management must be aware of the essence of human resources and their development necessary in building the organisational strategy. Costs or resources should be analysed in-depth, profitability of investment in the human resources should be identified and knowledge management systems should be introduce (Sitko-Lutek, 2006). Human resources management in public organisations is developed by many factors, so-called human resources management conditions. They include: external and internal conditions (micro and macro environment factors). Micro environment factors include: local community, competition, petitioners, organisations of employees and employers. Whereas, macro environment factors include the following conditions: demographic, market, political, economic, cultural, social, legal, technological progress and international conditions. Internal conditions of public organisations may include: organisational strategy, organisational culture, organisational structure, employment rate, competences of civil servants, the object of activity, the level of technology, activity of trade unions (Pawlak, 2003). In compliance with the adopted assumption, the human resources management in public organisations is one of the management conceptions focused on performed personal functions

in the organisation, where staff constitute the basic component of the organisation's assets and the source of competitiveness. This conception also includes: employment, development, remuneration, cooperation, shaping proper attitudes in scope of the superior – subordinate relations, but also among employees (Armstrong, 2011). The roles of the management in the scope of human resources' development in public organisations include (Bergenhenegouwen, Mooijman, 2012):

- initiating and carrying out discussions regarding human resources management systems aimed at competences' management;
- developing tools and techniques aimed at identification and description of key organisational and individual competences;
- coordination and establishment of relations between aims, business strategy, structure, procedures related to key competences of the organisation and particular employees;
- cooperation with the staff in the areas of developing and drawing up personal development plans;
- managing processes related to organisational changes;
- developing and implementing methods of recruitment and selection, assessment, training and building career development paths, the basic component of which constitutes competences.

Therefore, the following seem to be very important (Małysz, 2003): skilful use of the potential of servants, planning and control of employment, motivation and assessment of productivity, providing feedback to employees on the results of their work, managing the remuneration system and the motivation system, developing organisational culture, ensuring good interpersonal relations, implementation of the idea of social responsibility of business, improvement in the system of communication with the environment, measuring results of managers' work, connecting economic effectiveness with aims and values of public organisations, establishing proper relations between the legal – organisational and social sphere and the public management sphere, developing and implementing the principles of public management in the context of its social conditions.

Selected aspects of public organisations' functioning in the opinion of civil servants

The research covered 10 randomly selected institutions of the Silesian Voivodeship local government, in Poland, and 50 civil servants of those institutions. In order to conduct the research, the survey questionnaire was selected from among many other measurement instruments from the classification of direct survey methods of collecting data from primary sources to direct survey method. It is worth noticing that survey research in management sciences are aimed at recognising opinions, judgements and assessment of the reality, facts by respondents with regard to socio-economic phenomena occurring in state and private organisations.

In the question regarding the significance of work components in a public organisation (histogram 1), while choosing answers, civil servants took into consideration the significance of work elements by indicating the most important ones: taking initiative at work, permanence of employment, satisfactory remuneration, promotion and appreciation by the boss. Other answers had lower shares. In the civil servants' opinion, taking initiative at work is related to resourcefulness, creativity, specialist knowledge, which generates measurable benefits to the public organisation in the scope of performing tasks. The permanence of employment is a strongly motivating factor ensuring life stability and the sense of security, which have a positive impact on the mental sphere of employees. Satisfactory remuneration is one of the strongest motivational factors, which decides on the level of employees' engagement. Promotions and appreciation by superiors constitute a consummation of servants' efforts. In awarding it is important to recognise employees' motivation and adjust awarded prizes so that they satisfy their needs to the greatest extent. At the same time, it should be remembered that better results are obtained with the use of a positive motivation method. However, a negative motivation method, which can be defined as disciplining employees who continuously repeat the same mistakes, cannot be completely eliminated. Leaving such behaviour without reaction can result in the intensification of negative motivation methods.

(Taking initiative at work, Working on good quality equipment, Participation in trainings , Good interpersonal relations, Effective flow of information, Permanence of employment, Satisfactory remuneration, Promotion ,
Appreciation by the boss)

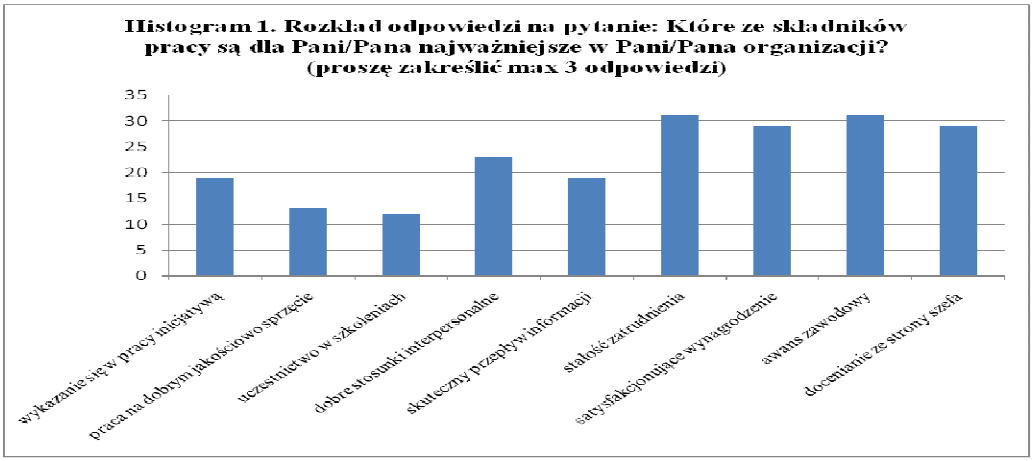

Histogram 1: Distribution of answers to the question: Which of the work components are the most important for you at your organisation? (please choose not more than 3 answers)
Source: own study on the grounds of survey research

(Work structuring, Planning succession, Developing individual plans of professional development, Trainings , Promotions, Horizontal transfer of servants)

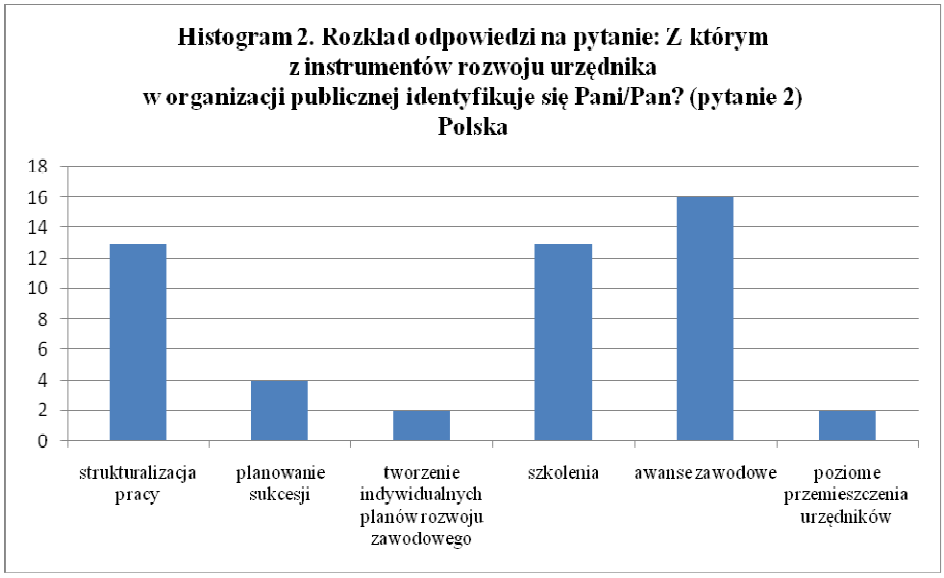

Histogram 2: Distribution of answers to the question: Which of the tools of development of a civil servant at the public organisation do you identify with? (question 2)

Source: Self-Created Source based on Pilot Research

While analysing answers given by respondents to question 2, it is stated that the most important for the staff in the area of their development are: promotions, trainings and work structuring.

Work structuring is related to shaping the contents and conditions of work at the level of a given job position of a civil servant. Servant's activities vary depending on the type of office and held position. However, in general, they are multi-functional and require relatively broad general knowledge and specialist background. The basic tasks of a public administration official include practical implementation of assumptions and postulates of the state's policy in spheres directly related to the society's life in the system of territorial division units and single towns/cities. Furthermore, these tasks include: conducting activities related to meeting local communities' needs, taking care of following the law, initiating socio-economic ventures and influencing the awareness of particular groups and individuals in the scope of developing local ties and regional identity.

Employee trainings are one of the tools of developing the organisational culture. They have an actual impact when the obtained knowledge has practical application during performance of everyday duties. Employees should improve their qualifications and develop professional competences, in particular, in the scope of the issues regarding professional work.

Promotions constitute a significant instrument of civil servants' development due to the fact that they act as motivating factors and contribute to further progress in improvement.

I often have an impression that at my organisation..
At my organisation, employees believe that..
Civil servants do not have any impact on changing the conditions..
My organisation ruthlessly gets rid of..
My organisation does not research the needs and expectations..
Continuous improvement of employees is not a matter..
Rules of the management's treatment of employees..
I do not trust my co-workers..
I negatively assess the level of culture and behaviour..
At my organisation civil servants are not able to balance..
Communication manners between employees, methods..
Employees often do not keep up with duties, it is..
My organisation does not treat individually..

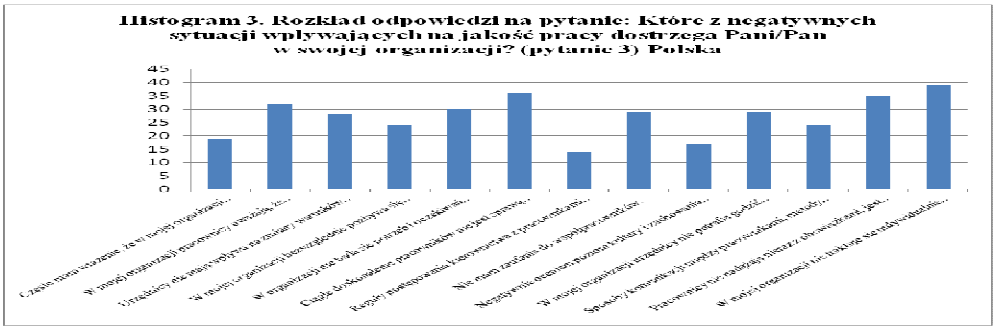

Histogram 3: Distribution of answers to the question: Which of the negative situations influencing the quality of work do you notice at your organisation? (question 3) Poland

Source: own study on the grounds of survey research.

In the respondents' opinion, the most important, negative situations influencing the quality of work in local government institutions include: a lack of individual approach to every servant, overload with duties, a lack of continuous development of employees. Individual approach to every employee at the

organisation consists in, above all, indication of an individual path of their development. An appreciated and noticed employee is more loyal and performs entrusted tasks with more engagement. Still noticeable bureaucracy in local government institutions is related to the significant overload with duties of civil servants, who clearly indicate this fact in the research. The employers' role is to delegate tasks so as not to discourage servants from work. The insufficient time of performing often monotonous and complex tasks, as well as related timelines result in the unnecessary frustration of the staff. While analysing civil servants' answers, it can be stated that they show willingness to attract the interest of the management regarding systematic improvement of employees. According to respondents, measures aimed at the improvement of the staff are undertaken decidedly too rarely and irregularly. The aim of the education and development of the staff is to achieve desirable changes in the scope of personal competences, skills and virtues of public administration employees, which is demonstrated in the social and professional role of civil servants.

Histogram 3 implies that the majority of servants are satisfied with their professional work and cooperation with superiors.

Histogram 3 implies that 25 persons out of 50 respondents stated that the professional work gives them satisfaction, 10 persons did not have an opinion in this matter, whereas, 15 persons stated that the professional work at local government organisations is not gratifying.

Conclusion

A civil servant's task is not only to professionally and reliably provide services to petitioners so that their work is assessed at the highest level, but also assessed as very good in terms of quality. Furthermore, a civil servant has to understand and support the aims of the public organisation, feel proud from the fact of belonging to the organisation and undertake additional tasks, if required by the management. Predispositions to perform this profession are extremely important. A position of a civil servant can be held by a person with high professional qualifications, with relevant skills, with reliable, professional expertise at a relevant level. Furthermore, it has to be a well-mannered, emphatic, communicative person ready to take challenges, changes, and development-oriented. Flexibility, morality, amicability, creativity and entrepreneurship are other features of a model civil servant. Petitioners like civil servants who solve their problems, are able to provide advice and the management appreciates those who perform duties entrusted to them. In public administration, the management underlines competences of their employees. They are expected to continuously improve their qualifications, undergo trainings, be knowledge-oriented. In present times, an employee of any industry, not only a civil servant, has to follow the changes; a different attitude annihilates the opportunities for further development and weakens the organisation's position. Furthermore, public administration does not like stagnation. Advancing technological changes, economic conditions and competition in a way force the staff to progress in their professional activity.

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Management of Assessment Information (Following The Polish Act On Higher Education And Science of 2018) on Websites of Libraries of Selected Technical Universities

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Abstract

Changes in education, including the assessment process, are a sign of contemporary times and are reflected on websites of university libraries. As a response to diverse information needs of users, the same information is being ever more frequently presented within various offer ranges and at diverse locations on library websites. The objective of the article is an attempt at description of the form of information by libraries of selected technical universities concerning sources related to assessment after the introduction of the Polish Act on Higher Education and Science of 2018. Taken into account were sources published by the Polish Ministry of Science and Higher Education following the period from introduction of the Polish Act on Higher Education and Science of 2018 until September 1st, 2019, available in their full text directly on the library websites, without necessity of searching through computer catalogues, databases or portals. Due to the breadth of the issue, the study is limited to selected aspects. The article contains an introductory chapter dealing with issues of information on library websites.

Keywords: acts of law, assessment of education, information, websites, university libraries

Introduction

Issues related to changes in Polish education in the second decade of the 21st century have entered an advanced phase and encompass various aspects of creative activity (Feret, 2018). All these have become the object of many new acts of law aimed at the improvement of competitive capacity of education and of universities on the global scale. The introduced Polish Act on Higher Education and Science of 2018, also referred to in Polish as the Constitution for Education, the *Ustawa* 2.0 (English: the Act 2.0) (referred to in the text as the New Education Act) was the first to fuse aspects of science and higher education into one concise system. Changes in education pursuant to the act govern, among others, issues concerning future assessment of the quality of scientific activity (referred to in the text as Assessment).

The new assessment procedures assumed in the act and in the subsequent regulations and communications of the Polish Ministry of Science and Higher Education (referred to as the MNiSW) differ significantly from those in force earlier – they take into account new scientific disciplines, new titles of ranked journals, new rules of ranking of scientific work and employee assessment, etc. The regulations provide support to Polish journals to strengthen their position in science and in the assessment process.

For this reason, scientists and publishing communities face the need to follow current information. Acts of the ministry, regulations, messages and other information resources related to the New Education Act published as generally available on the website of the MNiSW, the Polish Constitution for

Education website, the Polish Journal of laws, are being increasingly frequently recommended on library websites. The librarian community is making efforts for information on future assessment to contain full texts of ministerial sources offered broadly across library websites.

The objective of the article is an attempt at the presentation of the information on sources related to Assessment according to the New Education Act on library websites of selected technical universities. Browsing library websites was chosen as the research method. In the period between June 1st and September 17th, 2019, websites were browsed of the following technical universities: from Białystok, Częstochowa, Gdański, Koszalin, Kraków, Lublin, Łódź, Opole, Poznań, Rzeszów, Gliwice (Silesian University of Technology), Kielce, Warsaw, Wrocław and Kraków (the AGH University of Technology), further the University of Bielsko-Biała (ATH), the University of Technology and Humanities of Radom (UTH), the Bydgoszcz University of Science and Technology (UTP), the University of Zielona Góra (UZ), the West Pomeranian University of Technology in Szczecin (ZUT). The basic criterion of selection of libraries to study was the continuation of availability of sources related to registration of work on their websites (Knop, 2014; Knop, Cichoń, 2018). The article begins with a chapter introducing issues of information on library websites.

Information on library websites

Musings about information on library websites should best begin with a precise definition of the concept of information itself, as these abound depending on the scientific field and context in which this concept emerges. With respect to the carrier that is a library website it may mean notification about or communication of something (Szymczak (ed.), 1978, p. 788) as well as „… the volume of a certain factor reducing entropy[1]" (Materska, 2007, p. 23).

The proper transmission of information via a website entails such transmission of information so that it ensures the achievement of the expected result by the sender, i. e. the library. In other words, the user, to whom the information is sent, should notice the information on the website, be able to easily reach and be able to read it at any time they would choose. What turns out to be important is the „significance of information as a measurable value; [this] stems from the need of a quantitative analysis of the properties of necessary information for the purpose of assessment of the communication process. After all, situations and contexts may emerge, in which the conveyed information contains too little or too much information" (Materska, 2007, p. 25), in which the information requires more detail, a reference to a source, comment or simplification. Too little information may lead to destructive actions by the recipient as a result of incomplete knowledge, while too much information may discourage them from reading the message. In the pragmatic view, information is considered as useful information for the recipient – the information user.

To communicate anything via a library website „[also] identifies with the entirety of activity related to the creation and transfer to the market of the ideas about a company and its offer, and opening up people to these ideas: potential, present customers, interested parties and the broad general public" (Szymoniuk, 2006, p. 12). Research about websites of libraries, understood as the "Library 2.0", which is „user-focused, offers a multimedia experience, creates social capital and is socially innovative" (Wałek, 2014, p. 114) have shown that references to on-line resources are, after e-mail and tags, the tools the users expect the most (Wontorowska, 2009, p. 130-131).

Information on Assessment on library websites

The subject of the study of the present article shall be an attempt at a response to the question about information on websites of libraries of technical universities: of Białystok, Częstochowa, Gdańsk, Koszalin, Kraków, Lublin, Łódź, Opole, Poznań, Rzeszów, Gliwice, Kielce, Warsaw, Wrocław, and

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[1] Entropy is the volume of information in a single message from a source. In other words, it is the weighted average of the volume of information carried by a single message, in which the weights are the probabilities of transmission of indivirual information (Entropy. Polish Wikipedia…, 2019).

the universities AGH, ATH, UTH, UTP, UZ, ZUT, on Assessment, in line with the New Education Act. Considered are sources published by the MNiSW between the entry into force of the New Education Act and September 1st, 2019, available as full text (linked) directly on library websites so that users need not search for them in computer catalogues, databases, portals. The results of the analysis of these websites also found linked general individual sources as recommended by the analysed libraries (table 1). These are acts of law, guides, projects, rank points of scientific journals published on the Polish Constitution for Education website, and presentations. Information about individual linked ministry sources are provided on the websites of 90% of the studied libraries.

Table 1: Individual ministerial linked sources of Assessment following the New Education Act available on websites of libraries of selected technical universities

Source name
Acts of law, regulations, messages
Polish act of July 20th, 2018, on Higher Education and Science (Polish Journal of laws, item no. 1668)
Polish act of July 3rd, 2018, auxiliary provisions to the act – Polish act on Higher Education and Science (Polish Journal of laws, item no. 1669)
Regulation of the MNiSW of September 20th, 2018, on fields of science, scientific disciplines and art disciplines (Polish Journal of laws, item no. 1818)
Regulation of the MNiSW of September 20th, 2018, on de minimis aid as part of the programme of support for scientific journals (Polish Journal of laws, item no. 1832)
Regulation of the MNiSW of November 7th, 2018, on the development of lists of publishers of scientific monographs and journals and peer-reviewed international conference materials (Polish Journal of laws, item no. 2152)
Regulation of the MNiSW of November 20th, 2018, amending the regulation de minimis aid as part of the programme of support for scientific journals (Polish Journal of laws, item no. 2198)
Message on the mode of determination of the list of scientific publishers and the main assumptions concerning its development, of 11.12.2018
List of publishers of peer-reviewed scientific monographs (attachment to message of the MNiSW of January 18th, 2019)
Draft regulation of the MNiSW on drawing up of lists of publishers of scientific monographs and scientific journals and peer-reviewed materials from international conferences
Ordinance of the MNiSW of January 25th, 2019, on the establishment of advisory committees concerning lists of scientific journals and peer-reviewed international conference materials (Polish Journal of laws, item no. 12)
Regulation of the MNiSW of February 22nd, 2019, on the assessment of quality of scientific activity (Polish Journal of laws, item no. 392)
Regulation of the MNiSW of March 6th, 2019, on data processed in the POL-on Polish Integrated System of Information on Science and Higher Education (Polish Journal of laws, item no. 496)
Message of the MNiSW of July 31st [2019], on the list of ranked journals and peer-reviewed international conference materials along with the assigned point rank
List of ranked journals and peer-reviewed international conference materials along with the assigned point rank, PDF file (attachment to message of the MNiSW of July 31st, 2019)
List of ranked journals by discipline, MS Excel file
Content of the message of the MNiSW of July 31st, 2019.
Message of the MNiSW of August 1st, 2019, amending the message on the list of ranked journals and peer-reviewed international conference materials along with the assigned point rank
Books - guides
Polish Constitution for Education – guide to the education system and science. Part 1
Assessment of quality of scientific activity – guide
Others

List of journals from the Scopus and Web of Science databases along with their assigned scientific disciplines (suggestion of the MNiSW – October 2018)
List of projects qualified for financing as part of the programme of support for scientific journals
Point ranks of scientific publications
Presentations – training materials
Assessments
Assessment – slots – additional slides
Statements
Support for journals
Lists of journals
Issues concerning education and doctoral issues
Operation of IT systems of the MNiSW (including POL-on)
Organisation of a higher education facility, its financing and oversight

As can be seen, libraries provide many diverse sources concerning the process of assessment in relation to the publication the New Education Act. However, information about sources listed in table no. 1 on the websites of the studied libraries is varied. This variability stems primarily from the number of sources made available. The most libraries felt the need to publish information as links to source materials, in the following order: list of publications of peer-reviewed scientific monographs - 85% of libraries; list of scientific journals and peer-reviewed international conference materials along with assigned point ranks (in the text as: list of ranked journals) – 85% of libraries; list of ranked journals by discipline (in the text as: list of journals by discipline) – 75% of libraries; message of the MNiSW of July 31st list of scientific journals and peer-reviewed international conference materials along with assigned point ranks (in the text as: message on the list of journals) – 70% of libraries; content of the message of the MNiSW of July 31st, 2019 – 70% of libraries; message of the MNiSW of August 1st, 2019, amending the message on the list of ranked journals and peer-reviewed international conference materials along with the assigned point rank (in the text as: amending message) – 70% of libraries; regulation of the MNiSW of February 22nd, 2019, on the quality assessment of scientific work (in the text as: Regulation of the MNiSW of February 22nd, 2019, on assessment) - 60% of libraries; „Quality assessment in scientific work – a guide" - 55% of libraries; the Polish act of July 20th, 2018, act on higher education and science - 45% of libraries; the Polish act of July 3rd, 2018, auxiliary provisions to the act – Act on higher education and science - 40% of libraries; Regulation of the MNiSW of September 20th, 2018, on fields of science, scientific disciplines and art disciplines - 40% of libraries; list of projects qualified for financing part of the programme of support for scientific journals - 35% of libraries; Regulation of the MNiSW of September 20th, 2018, on de minimis aid part of the programme of support for scientific journals - 30% of libraries; Regulation of the MNiSW of November 7th, 2018, on on the development of lists of publishers of scientific monographs and journals and peer-reviewed international conference materials - 30% of libraries; „Polish Constitution for Education – guide to the education system and science" - 25% of libraries; regulation of the MNiSW of January 25th, 2019, on the establishment of advisory committees concerning lists of scientific journals and peer-reviewed international conference materials - 20% of libraries; list of journals from the Scopus and Web of Science databases along with their assigned scientific disciplines - 20% of libraries; Regulation of the MNiSW of March 6th, 2019, on data processed in the POL-on Polish Integrated System of Information on Science and Higher Education - 20% of libraries; Draft regulation of the MNiSW on drawing up of lists of publishers of scientific monographs and scientific journals and peer-reviewed materials from international conferences – 10 % of libraries; point ranking of scientific journals - 10% of libraries; Regulation of the MNiSW of November 20th, 2018, amending the regulation de minimis aid as part of the programme of support for scientific journals - 5% of libraries; message on the mode of determination of the list of scientific publishers and the main assumptions concerning its development, of 11.12.2018 – 5% of libraries; presentations on the following topics: assessment - 25% of libraries, assessment – slots, or how to calculate participation in scientific publications - 20% of libraries. The remaining presentations listed in table 1 may be viewed in the offer of 15% of libraries. It is noted that in the offer of websites, the presentations constitute an auxiliary, abridged form of provision of detailed information on changes stemming from the new acts of law and regulations of the MNiSW, whereby guides facilitate the understanding of changes requiring the knowledge of, among others, several acts

of law (see MNiSW, 2019a; MNiSW, 2019b). It must be stressed that in the initial period of analysis of library websites, grade information for scientific publications offered by the Polish Constitution for Education website was provided by 40% of the analysed libraries, however after the list of ranked journals was published, the link to this source was maintained by websites of only 20% of libraries; two libraries removed the information and drew up an information on ranking rules of publications using links to acts of law in the text – as will be discussed in the further part of the work.

None of the analysed libraries limits the information solely to presentations, guides as well as sources published in different forms than acts of law, as opposed to acts of law, regulations, messages that are the subject of news and information elsewhere on the library websites.

All the linked sources are recommended in different offers, depending on the relevant library, in locations foreseen for affairs concerning science, employees, local references concerning publications of employees/ the knowledge base, assessment, on special pages created and marked with links referring to the new act ow law, e. g. „Assessment in the New Education Act", among links at the library of the Wrocław University of Science and Technology; in the tab „University 2.0" at the library of the Poznań University of Technology and „Interesting links" under „Polish Constitution for Education" at the library of the Kielce University of Technology. Selected sources may also be viewed at the publishing house of the Łódź University of Technology that constitutes a part of the library of this university.

The specific location of information about new acts of law is the home page visible for everyone visiting the library virtually. Graphical design components particularly emphasized on a home page are indicated as typical for a modern website (see Kołodziejczyk, 2012), in particular within the context of the dynamic pace of information volume growth. Suitable visual representation aids in distinguishing specific information among all that is available at a specific location on a website. Visual representation is defined as a graphical method of development and transmission of information in a simple manner, yet with the use of artistic tools, often requiring creativity of those designing the information (Visual representation. Polish Wikipedia…, 2019); it facilitates emphasizing a topic and attracting the user's attention to selected information via specific senses. The possibility of using graphics to attract an individual's attention to sources concerning issues of Assessment was noticed by the studied libraries, which used:

- the MNiSW logo and a text link to the list of ranked journals[2] - latest news on the home page of the library of the Silesian University of Technology;
- the MNiSW logo as a link and a text link to a subpage with extensive information on the content of the list of ranked journals, with links leading to the list content, the list and to other components of the message – in current news – at the library of the Gdańsk University of Technology;
- moving graphical and text link to the specific topical sections „Quality assessment in scientific activity" with links: „ABC of Assessment", „List of journals and publishers of the MNiSW", „Polish Constitution for Education", „Useful links", „DONA scientific work database in assessment" - home page of the Library of the Wrocław University of Science and Technology.

The initial stage of the analysis already shows that access to one source is available from more than one location on the library website. This thesis is confirmed by the offer of the library of the Rzeszow University of Technology being different than others, in which the list of ranked journals and list of journals by discipline found on the page „Lists of ranked journals and publications" can also be found via the link „Lists of the MNISW" in the "Assessment" tab.

The information provided as a link to the full text of the act of law, regulation or list may contain information provided exclusively as the link and textual information with in-line links, also referred to as context links. The placement of a link in the text is considered to be more encouraging to view the

[2] In the discussed design, the library of the Silesian University of Technology included one more link to resources from the Internet that are not the subject of this paper's analysis, hence it was not listed here.

full text, as „[this] encourages close to 70% of readers to follow that link – thanks to which a site's usefulness also improves" (Gontarek, 2015).

The text information with in-line links analysed in this paper refer to the following sources:

a) list of ranked journals – at articles published in 2019-2020, according to which these articles will be ranked, differing from publications from 2017-2018 – in the message on the rules of scoring of scientific publications depending on publication year – in libraries of the Silesian University of Technology and the Wrocław University of Science and Technology; and in that same message by scientific articles published in reviewed materials from international scientific conferences included in the list of publications and conference materials – at the library of the Silesian University of Technology; in the information on the publication of a new list of ranked journals, containing detailed data on the rank number of scientific journals, conference materials included in this list – in the latest news at the library of the Gdańsk University of Technology; in the information on the addition of scores at the local publication database of employees to articles published in the years 2019-2020 at „DONA scientific work database in assessment" at the home page of the Library of the Wrocław University of Science and Technology;
b) list of publications of peer-reviewed scientific monographs – at the monograph, chapter and review, published in the years 2017-2020 in the information on the rules of scoring at „ABC of Assessment" – at the home page of the Library of the Wrocław University of Science and Technology; - in the information on the publication of the link with content of the list – in the latest news at the library of the Kielce University of Technology; in the information about the amendment of data to include the publisher's rank in descriptions in the local literature references of employee publications at „DONA scientific work database in assessment" at the home page of the Library of the Wrocław University of Science and Technology;
c) Regulation of the MNiSW of February 22nd, 2019, on assessment – in the information about a publication from outside the list receiving five points at the local database of employee publications, in latest news and at „DONA scientific work database in assessment" at the home page of the Library of the Wrocław University of Science and Technology.

The practice of attachment of the full text in the message is related to the repetition of the link leading to a single source in many different pieces of information on a single library website. The most frequently repeated source is the list of ranked journals offered e. g. seven times by the library of the Kielce University of Technology and six times by the home page of the Library of the Wrocław University of Science and Technology. The repetition of the source in a single information stems, as noted above, also from the presence of two links referring to different points in the source text. Further analysis shows that the former of these phenomena may be the result of the system of presentation of links in an information about one source used by the library as a PDF icon and relevant link given in the full name of the act of law, as is the case of the library of the Kraków University of Technology. The PDF file opens to show the content of the message with the list of journals publishing peer-reviewed scientific monographs within the library resources, with the second link leading to the PDF file in the public information bulletin of the MNiSW. The bulletin website allows the user access to more detailed information on the construction and content of the list. The most common information on assessment is the full name of the source included in the link, without additional data on this source, e. g. at the libraries of the Koszalin University of Technology, Lublin University of Technology, Poznań University of Technology, or the full name of the source with the link underneath, e. g.: prawo.sejm.gov.pl – at the library of the Wrocław University of Science and Technology, presented in particular as a list of various sources.

Summary

The musings in the present article certainly do not exhaust the topic at hand. The development of presentation of information and providing links to sources on Assessment is stressed in various ways

on library websites. The user's attention to selected sources is attracted by graphical components as well as various links to the same source. This means that the same information is provided in various ways from various locations. Information is provided in a shorter and more simple form or in an extended form, enriched with links to full texts. The libraries implement new tools of information design at various paces.

The information provided on library websites covers the two most important acts of law and legal acts significant in future of assessment. The most libraries provide the list of publications of peer-reviewed scientific monographs - 85%, the list of ranked journals - 85%, the list of journals by discipline - 75%. Linking of acts of law varies. Some open e. g. within library resources, some on an external body's website. Free sources related to the registration of work at local websites, placed directly on library websites, provide on the one hand access to information without the necessity of having to search for it in computer catalogues, databases or portals, yet on the other hand leading to reliable sources of the MNiSW, including e. g. new book publications (conf. Hudzik, 2018, p. 152). Users may also browse two guides and presentations.

The information offer evolves towards provision of resources that are generally available on-line, useful in education. Texts are published exclusively on-line, aiding the communication of something exclusively via the web page. The acquisition and usage of the opportunity offered by the Internet allows one to look differently upon the development of information on websites of university libraries and recruit users (conf. Sidorczuk, Gogiel-Kuźmicka, 2012). It is known that the Internet has become the medium of daily use in social communication, and good management of information on a library website may bring in more site traffic and retain the user for longer.

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System Analysis of Risk of Human Errors in Enterprise Management From The Resilience Engineering Perspective

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Abstract

Employees are a source of innovation, but employee is at the same time a critical "element" of the organization and the medium of greatest risk. Many experts judge current methods of HRA (Human Reliability Analysis) as not detailed enough and too simplistic in relation to the concept of human error. Conducting HRA, despite simulation modeling, is obviously difficult (Piesik et al., 2014). Nevertheless, such analyzes should be performed in the operational environment of the company, with a particular emphasis on the dynamic nature of the phenomenon. As a result, it is about creating forecasts and algorithms for possible behavior / events involving employees. The purpose of this work is to present a proposal for system analysis of human error risk as a management tool.
Design/methodology: The model presented in this paper was tested in a polish critical infrastructure enterprise for a period of 18 months. Research data were collected automatically from tablets, which monitored the tasks carried out by employees using a special application.
Findings: In this study the system based on automatic measurement of human error risk is presented. Human participation in processes related to the analysis and management of human error risk has been kept to a minimum. The tested system received implementation recommendations.
Originality/value – This article presents a new approach to developing a model that can be used as a tool for predicting potential human errors and managing personnel risk. Presented solution may support the management in measuring and analyzing human errors and managing the enterprise's activity.

Keywords: human risk, Human Reliability Analysis (HRA), work safety, resilience engineering.

In the literature on the subject there is almost unanimous agreement that the critical (weak) links of organizational systems are associated with the human factor, i.e. their users (Fragopoulos et al. ,2013). This is due to the fact that users are people with individual characteristics that cannot be completely classified. Sources of limitations of human nature are: senses (vision, hearing, touch, smell, taste), cognitive skills (perception, concentration, information processing), memory, motivation, situational awareness (the ability to understand what we see, draw conclusions and predict the consequences of action)(Cloninger et al., 1993). The psychophysical condition of a person, ones individual permanent characteristics (temperament, personality, routine) and states (fatigue, stress, attitude, monotony, stress) are also important (Kim and Hamann, 2007). Human and environmental factors also influence human behavior. As a consequence, forecasting causes of human errors is very difficult and complex, as it covers many dimensions and perspectives (psychological, technical, sociological, organizational and cultural) (Riuz-Moreno and Trujillo, 2012). Probably for this reason, there is no clear, universal definition of error. Fröderberg(2014) described human error as any unintentional human action which exceeds the limits of acceptability. Human error is also defined as the most critical factor in information security management (Werlinger et al., 2009; Asai and Hakizabera, 2010; Frangopoulos et al., 2014, Hadlington et al.,2019, Evans et al., 2019).

According to many practitioners, employee behavior is the primary risk carrier and not procedures, machines or systems (Navare, 2003). The literature on the subject uses an analogy - human errors as adequate to machine / device failures. In many control systems, including machine-human interactions, human errors prove to be one of the main causes of failure in areas such as industry, transport, technical

diagnostics, medicine, and the military, as demonstrated in a number of statistics (Chiodo et al., 2004). Human errors are inevitable (Kuchta, 2017)and constitute 30-90% to all economic failures(Asai and Hakizabera, 2010, Komatsu et al., 2013; Pintelon et al., 2016;, Alavi et al., 2016; Stewart and Jürjens, 2017; Evans et al., 2019).

When transferring risk categories to the personal area, they are defined as "involvement in conditions of uncertainty in personell activities that may fail" (Lipka, 2012). Personal risk is most often related to individual components of the personal function, e.g. the risk of planning personal needs, division of roles and tasks, motivational, etc.), or is considered from the perspective of the organization's human capital (risk of competence gaps, information security risk, risk of "human error, etc.) (Kierner, 2008). Occupational risk and behavioral risk are also closely related to personal risk. Behavioral risk (related to employee behavior) is seen as important, but managing it is much more difficult.

The more so that the employee's behavior in critical moments is the result of not only what he has learned so far, but also of professed values, fears, etc., which results in a set or sets of behaviors (Navare, 2003). A classic approach to the risk associated with the human factor in the enterprise (personal risk, occupational risk), when applied and analysed fragmentary, does not provide the opportunity to grasp the specificity of this risk, its variability and complexity. In turn, the risk of human errors is apprached in the literature mainly from the perspective of managing work safety, which means that it is very often narrowed down to the issues of safe work and ergonomics of the workplace. Is this representation of the problem sufficient?

The fact is that personal risk (including the risk of human errors) belongs to the least recognized in both theory and practice of management. Methodological proposals regarding the practical application of theoretical concepts are not following the development of the theory fast enough. As a consequence, there is a lack of tools for diagnosing and improving the state of the organization. The issue of the human factor, due to its complexity, is neglected even in the analyzes regarding the resilience of organizational systems to emergency events (Choi et al., 2018, Eveans et al., 2019). Many existing techniques developed for the quantitative assessment of human reliability share the same weakness, which is the use of expert assessments as a basis (Kirwan, 1992).

With the rapid development of information technology, future research should focus on the automatic identification and registration of research factors and combining them with models to develop an automated system of dynamic risk assessment (Zhangming et al., 2019). Therefore, it becomes expedient to analyze the causes and conditions of human error, as well as to develop principles and tools for their elimination

Man in control systems - review of selected concepts and risk testing models

The issues of occupational safety management are considered in most publications from two perspectives: American and European. In Europe, safe work is usually understood as a job that does not pose a threat to workers or anyone in the workplace. In the US, safe work means not only the safety of employees and other people in the workplace, but also the protection of the company’s property and of the company itself, it is a safe production or safe provision of services, it is a safe product. This difference influences, to a great extent, the effectiveness of the management and the profitability of a company. For this approach, an established view is that the more comprehensive the risk analysis and assessment are, the greater the chance of building an effective management system.

Potential human errors increase the level of risk associated with operating systems. In order to assess the risk resulting from potential human errors, a set of methods called Human Reliability Analysis (HRA) is used (Merkisz at al., 2014; Olpiński, 2016; Pniewski and Kornaszewski, 2017). With the help of HRA, the impact of people on the functioning of individual technical systems is analyzed, which in turn leads to both the minimization of technical damage as well as the reduction of the number of accidents. The purpose of conducting human error analysis is to design a technical system resistant to human errors. HRA (Human Reliability Analysis) is based on a systematic analysis of factors affecting human behavior in an ergonomic system (Obora, 2014).

Selected specific concepts and risk testing models that are best known and used in practice were selected and shown below:

1) **A Technique for Human Error Analysis (ATHEANA)** - HRA method developed by the American Commission for Nuclear Energy in 2000. The purpose of the method is to identify probable situations related to human errors and potential contexts forcing these errors - EFC (Error-Forcing Context) and to estimate the probability of HEP (Human Error Probabilities) in risk assessments. The ATHEANA methodology consists of the following stages (Thompson, 1997).
2) Cognitive Reliability and Error Analysis Method (CREAM). The CREAM method was developed by Erik Hollnagel in 1998. This method can be used to analyze human errors, as well as to estimate the probability of making a mistake (Bedford, 2013). It consists of nine phenotypes (e.g. time, duration, strength, distance, speed, direction, wrong object, sequence, quality / level) and three categories of genotypes (human factors, technical / environmental factors, organizational factors). The is based on the selection of subsequent phenotypes characteristic of incorrect human activity, and then the selection of the genotype that best suits the given phenotype. This method specifies four control modes appropriate for the level of control performed by the operator (Marseguerra and Librizzi, 2006).
4) MORT (Management Oversight Risk Tree) - the first comprehensive risk management system based on risk assessment (1980). This was the first time the concepts of: formal risk acceptance by company's management, level of acceptable risk, which determined the cause of accident as a consequence of the assumed risk level, were adopted. The system, initially introduced in the US power industry, contributed greatly to the importance of a risk management approach based on risk assessment. For the first time, OHS (occupational health and safety) specialists have begun to differentiate hazard from risk (Johnson, 1980).
5) LMRA (Last Minute Risk Analysis) - the LMRA rules come down to employees checking the workplace, to ensure that all hazards are identified and adequate protection measures are taken. This approach is based on the assumption that hazardous work can only be commenced if all necessary protection measures have been applied (Karczewski, 2012).
6) TRA (Task Risk Analysis) – is based on dividing the task into successive steps, taking into consideration the occurrence of threats at selected stages. This is justified, since the managers are required to discuss the hazard of each commencing step with employees and not rely only on previous training presentations, inclusion of the hazards in the occupational risk assessment, or discussions from few days ago. In TRA perspective, every step of the hazard is analyzed and it is known, at every step exactly, what are the risks and what protection measures need to be applied. Such information cannot be conveyed through the risk assessment card (Karczewski and Karczewska, 2013).
7) The concept of RE (resilience engineering) in critical infrastructure management is a security management paradigm. A distinctive feature of RE is the emphasis on understanding how to create safety and predictability in a work environment that abounds in hazards / risks(Hollnagel and Woods, 2006). The basic premise of RE is that human error is inevitable, so the workflow system must be flexible, assuming that the management of variability is as important as reducing diversity (Rasmussen et al., 1994). Wreathall (2006), in turn, connects RE with the ability of the organization to maintain a stable status or its fast recovery, which is a condition of the efficient execution of all processes and operations during major system interruptions as well as after their occurrence. In this context, the ability of an organization to function smoothly, under conditions of permanent instability in the environment is also important.

Management processes absolutely play a key role in ensuring safe and ergonomic working conditions (Tabor, 2013). However, the risk of human factor in operational terms, reduced to the assessment of occupational risk or task risk does not meet the needs of enterprises, despite the fact that its assessment and analysis is carried out using various models and management systems. Even the TRA concept captures the problem of human factor risk fragmentarily, focusing only on elements related to human work. The problem of human risk should be seen much more broadly. It is also a fact that any employee behavior may be correct, but only in a specific situation. The problem is also that some of the side effects that arise can only adversely affect certain parts of the system (Borkowski et al., 2013). It is clear, however, that human availability is an uncertain state and therefore the risk is to be expected.

Systemic approach to risk

Current risk management methods are based on static identification and risk assessment. So many organizations do not see financial benefits of human risk management, although they put a lot of effort into its analysis and selection of protection measures, considering these activities mainly as a formal requirement. The fact is that applied risk management methods are of little use to a large number of executives, who, in order to manage efficiently, want to have readable, quantitative indicators. It is also worth mentioning here that the traditional approach to risk is categorized according to the probability of occurrence and the reduction of risk is limited to reaching the acceptable level. In this concept, risk types with little or no probability of occurrence are omitted, although (as demonstrated by practical examples) often cause large losses. The effectiveness and efficiency of risk management depends on the extent to which all existing threats related to the organization can be identified. The step of identifying the risk is crucial, so if it is carried out incorrectly or incompletely, subsequent steps are burdened with increasing systemic errors. Practice proves that the hazards identification is very often carried out in a superficial and formal way - to please the superiors. Also, the practice of artificial stretching the number of included hazards (just in case) in the risk assessment cards, does not lead to an effective risk assessment. Taking into account all the possible sources of danger causes a monstrous expansion of the workplace's risk assessment card, which makes it completely impractical. Inclusion of everything into the documentation, just in case, causes records to grow and to become of little use and difficult to understand for the employee. There is no doubt that the division of risk into categories facilitates its description in a cause-effect relationship, and coded risk effects (by constant and repetitive elements) allow them to concentrate on finding the causes for the analyzed risk. But is this practice sufficient for management purposes?

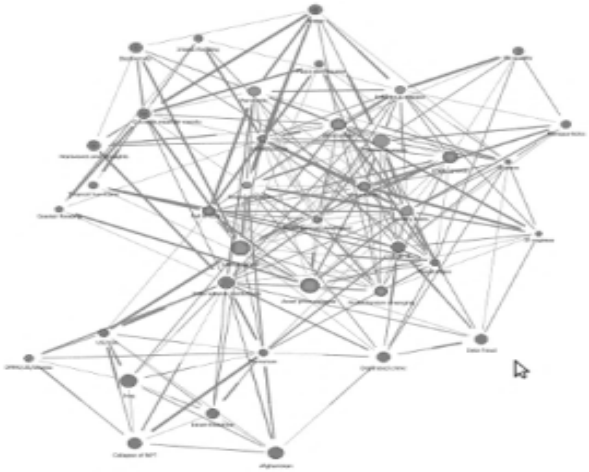

Figure 1: Risk map

In the diagram above the individual points are the following categories: strategic risk, business risk, human error risk and others.

As real-life scenarios suggest, knowing the whole structure / tree of cause-effect relationships (scheme 1.) is required. On this basis the choice of one critical link can be made. So it seems that the aim is not to identify or find as many risk types as possible. The goal is to uncover so far unknown types and correlations between them.

In analyzing this problem, cybernetics seems to come to fruition as a science of system control. Cybernetics assumes that numbers are a sufficient medium to distinguish the interdependence between different phenomena and also to describe the actions of individuals. It provides a new knowledge about how to anticipate, control and influence employee behavior at work, which can be useful for the effective risk management of human error. In cybernetics, behaviors of employees are described by elastic properties that can be influenced to a great extent and rigid properties that are not a subject to

any influence. A set of rigid properties determines the nature of the indyvidual. Therefore the compliance of the flexible characteristics of any worker and his professional situation may be achieved in two ways: by adjusting the emloyee to the situation or by adjusting the situation to the employee. On the other hand, there is only one possibility in relation to the rigid qualities of man: the adaptation of the situation to man. In managing the risk of human error, it is useful to identify the nature of employees, in order to improve the management of staff (more accurate prediction of the undesirable behavior of employees, without trying to "tamper" with their character, since such attempts fail). Thus, from the cybernetic point of view, there are six basic character traits (three informative and three energetic).
The information (intellectual) properties are:

• information capacity (intelligence);
• recordability (determining capacity);
• preference (specifying talent).
In turn, the energy properties consist of:
• dynamism (defining attitudes);
• tolerance (defining free acceptance of stimuli);
• susceptibility (defining stimulus acceptance).
There are six cases of non-compliance with the character level when:
• an intelligent employee is prevented from processing a lot of information,
• a non-intelligent employee is forced to process a lot of information,
• a worker with high capacity is prevented from processing information quickly,
• an employee with low capacity is forced to process information quickly,
• a talented employee is prevented from processing information about his talent,
• a non-talented employee is forced to process information in a particular area (Mazur, 1999).
Another question that needs to be addressed is the extent to which workers' behavior can be influenced by the environment, and in particular by the impact of others. Given that stimuli may be attractive or aversive (it is assumed that the person is seeking to maintain the independence of his or her behavior) for an employee, and that his or her reactions may be attractive or aversive to his or her contractor (a person striving to influence that behavior), the following situations are possible:

Conflict-free situations

- mutual encouragement - attractive stimuli cause reactions that are attractive to both the employee and the contractor,
- mutual avoidance - aversive stimuli cause responses that are aversive to both parties.

Conflict situations

- stimuli attractive to the employee trigger aversive reaction of the contractor (the employee seeks attractive stimuli but the contractor hinders his/her efforts),
- stimuli aversive to the employee cause reactions which trigger attractive stimuli to the contractor (the employee avoids such situations, but the contractor tries to force them).

Other type of situations characterized by the presence of inert stimuli are these where conflict does not occur. Such situations base on links, where the reactivity of one system or both is equal to 1(Mazur, 1999).

The behavior of the employee determines information, which lead to the decision. In this context, the employee's initial influences are composed of his reactions. The type of these reactions is determined by the influence of the correlation power K. The intensity is determined by the disposition power P_d. Among mentioned factors are the following compounds:

$$\boldsymbol{K = [V_r + V_h]G}$$
$$\boldsymbol{P = P_0 + P_d}$$
$$\boldsymbol{P_d = P_r + P_s}$$

Explanation:

information factors, constituting correlating components of power "K"

Vr - current stimuli (expressed as receptor potentials),
Vh - self-interest (expressed by the homeostatic potential),
G - state of memory (expressed by the distribution of correlational conductivity)
energy factors, constituting the components of physiological power "P":
P_0 - needs of the body (expressed by sterility power)
Pr - situation in the environment (expressed by working power)
Ps - influence on the environment (expressed by free power)(Mazur,1999).

In situations where the influence of a contractor on an employee is limited to information factors, only current stimuli (Vr) may be influenced. By providing additional stimuli, attractions over the aversions (encouragement) or the aversions over the attractions (discouraging) may be achieved, leading to the replacement of the approval with disapproval or vice versa. This is the case of stopping a conflict as a result of persuasion.. Nevertheless, it is mportant to note that an employee may want different things, but in different situations. In a specific situation, employee's desires are a result of his current structure (Mazur, 1999).

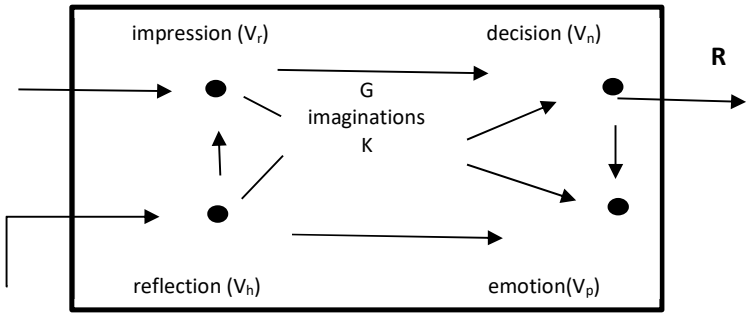

Figure 2: General correlation scheme
Source: Mazur M., (1999), Cybernetyka i charakter, Wydawnictwo: Wyższa Szkoła Zarządzania i Przedsiębiorczości, Warszawa.

Intelligent System Resistant To Human Errors

When analyzing the literature on the subject, unfortunately it should be stated unequivocally that there is a lack of systemic risk solutions in dynamic terms and in connection with the risk assessment of processes operated and implemented by employees, as well as taking into account the correlation between individual types of risk. This is due to different reasons. One of them is the fact that systems omit correlation analyzes of various types of risks with various probabilities of occurrence. Only the assessment which captures this context can provide the basis for more adequate projections in the area of enterprise risk management.

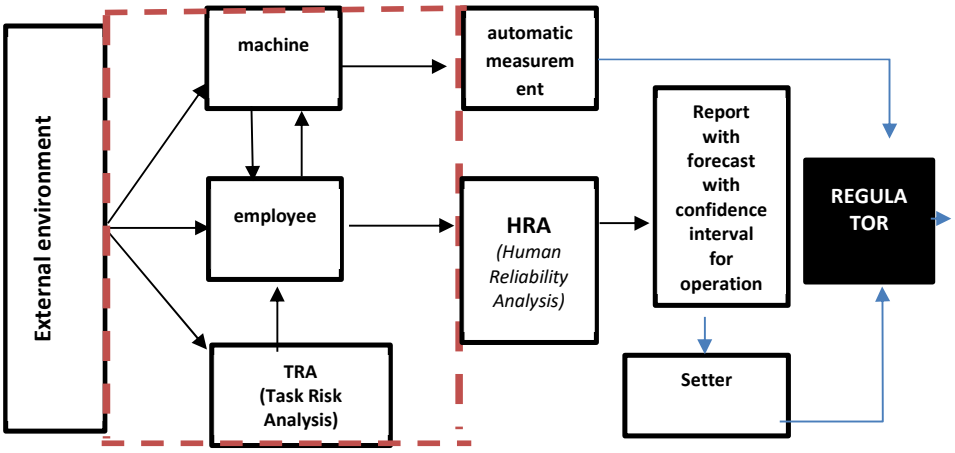

The integration area of the worker with the operational process

Figure 3: Model of employee integration with the operational process

The model presented above was used to design the risk prediction system at the critical infrastructure enterprise in Częstochowa. The test measurement was carried out over a period of 18 months. The essence of the system was the ongoing and automatic collection of data from all participants of operational processes. The system monitored activities and even employee behavior at each shift and generated forecasts with confidence intervals for operational risk. This information was systematically conveyed to the management and the maintenance department. Technological service employees were equipped with tablets on which, after logging in to a specific object / machine, a checklist was displayed. The checklist contained all parameters of technological devices and machines on the critical path of this enterprise and appeared on a tablet after each login.

Every day, in accordance with the adopted procedure for assessing the condition of machinery and equipment, the information was processed automatically to assess the risk of human errors (including quality errors and omission errors, according to Reason's classification). This information was forwarded in the form of a report to the dispatcher. The dispatcher, based on the received data which contained confidence intervals for operational risk, provided relevant information to the maintenance department and the technology department in order to ensure work continuity and maintain proper technical and operational parameters. The first stage of testing the system allowed us to positively verify the architecture of the model and demonstrated its usefulness for the purposes of assessing and managing the risk of human error.

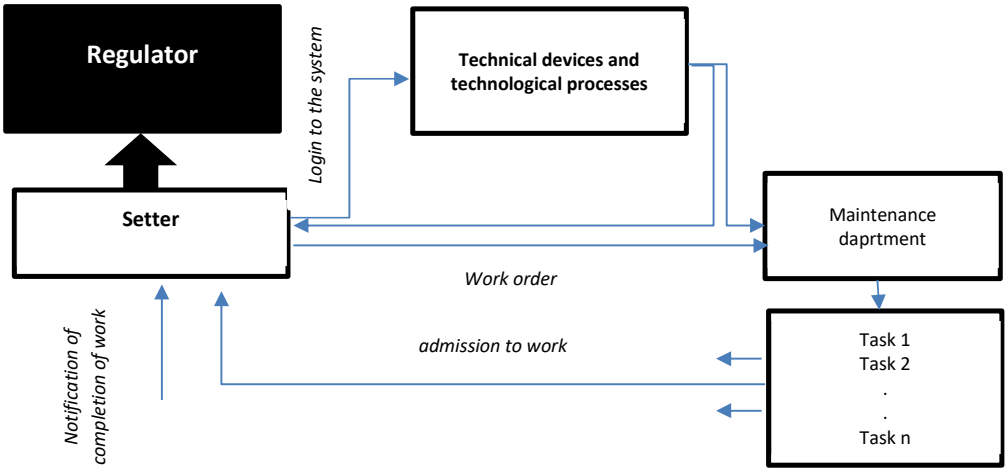

Figure 4: Employee movement path in the examined plant

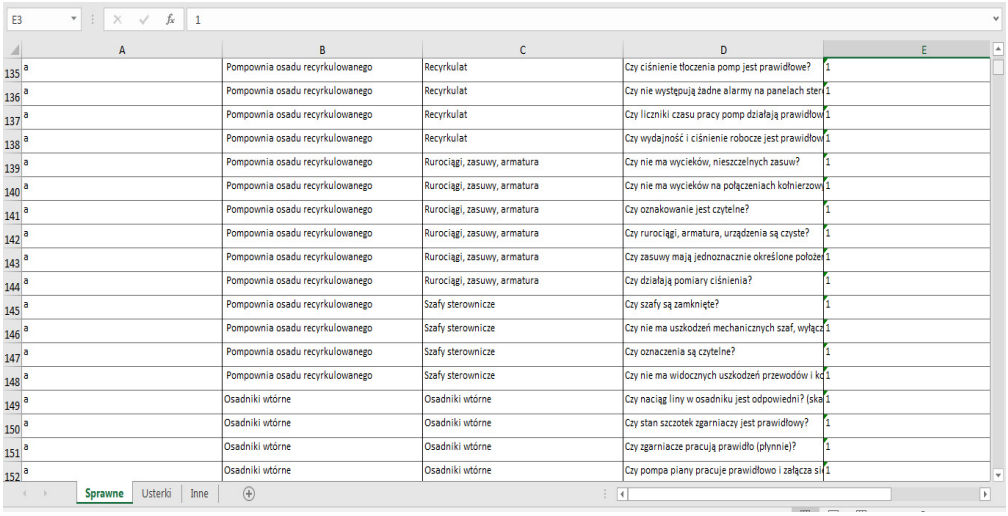

	A	B	C	D	E
135	a	Pompownia osadu recyrkulowanego	Recyrkulat	Czy ciśnienie tłoczenia pomp jest prawidłowe?	1
136	a	Pompownia osadu recyrkulowanego	Recyrkulat	Czy nie występują żadne alarmy na panelach ster	1
137	a	Pompownia osadu recyrkulowanego	Recyrkulat	Czy liczniki czasu pracy pomp działają prawidłow	1
138	a	Pompownia osadu recyrkulowanego	Recyrkulat	Czy wydajność i ciśnienie robocze jest prawidłow	1
139	a	Pompownia osadu recyrkulowanego	Rurociągi, zasuwy, armatura	Czy nie ma wycieków, nieszczelnych zasuw?	1
140	a	Pompownia osadu recyrkulowanego	Rurociągi, zasuwy, armatura	Czy nie ma wycieków na połączeniach kołnierzow	1
141	a	Pompownia osadu recyrkulowanego	Rurociągi, zasuwy, armatura	Czy oznakowanie jest czytelne?	1
142	a	Pompownia osadu recyrkulowanego	Rurociągi, zasuwy, armatura	Czy rurociągi, armatura, urządzenia są czyste?	1
143	a	Pompownia osadu recyrkulowanego	Rurociągi, zasuwy, armatura	Czy zasuwy mają jednoznacznie określone położe	1
144	a	Pompownia osadu recyrkulowanego	Rurociągi, zasuwy, armatura	Czy działają pomiary ciśnienia?	1
145	a	Pompownia osadu recyrkulowanego	Szafy sterownicze	Czy szafy są zamknięte?	1
146	a	Pompownia osadu recyrkulowanego	Szafy sterownicze	Czy nie ma uszkodzeń mechanicznych szaf, wyłącz	1
147	a	Pompownia osadu recyrkulowanego	Szafy sterownicze	Czy oznaczenia są czytelne?	1
148	a	Pompownia osadu recyrkulowanego	Szafy sterownicze	Czy nie ma widocznych uszkodzeń przewodów i ko	1
149	a	Osadniki wtórne	Osadniki wtórne	Czy naciąg liny w osadniku jest odpowiedni? (ska	1
150	a	Osadniki wtórne	Osadniki wtórne	Czy stan szczotek zgarniaczy jest prawidłowy?	1
151	a	Osadniki wtórne	Osadniki wtórne	Czy zgarniacze pracują prawidło (płynnie)?	1
152	a	Osadniki wtórne	Osadniki wtórne	Czy pompa piany pracuje prawidłowo i załącza si	1

Sprawne | Usterki | Inne

Figure 5: Fragment of the system report

Conclusion

Today, no one should have illusions that the ongoing automation of processes in organizations, will cause a decrease of the direct involvement of workers (for diagnostic work). This implies significant risks to operational efficiency. Employees who are at risk of losing their jobs can intentionally introduce errors to the systems, hoping that the employer will mistake it for an equipment filure, so they can keep their jobs. However, technological change is inevitable. This risk closely implies another: the risk of inadequate configuration (selection) of employees (crucial factor in case of personell, manning sites with critical infrastructure, where in the event of a failure, teams must demonstrate maximum efficiency, which may have a direct impact on the effectiveness of remedial actions). Systemic identification of potential critical areas, related to the participation of employees in operational processes (as an integrated part of the organizational environment) in the context of risk identification and management, is an area of great research potential.

In order to attain a dynamic adaptation to the environment and achieve goals of the system, it is not enough to monitor only the quality of processes. Their dynamic and flexible adaptability is also important. It is imperative that the security of the entire operating system, not just work safety, is strictly managed to ensure high performance of such organizations. Models of systemic identification of human

errors can be an important support for managers in managing organizational processes in a cost-optimal way.

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Dynamic Business Model-Electronic Payments Market. Practical Perspective

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Abstract

The authors presented the concept of the business model as a review of other studies related to the institution of the payment card processor, i.e. the company which provides services in the area of electronic payment. The concept of the business model seems to be cognitively interesting on account of the fact that it combines a few unique structures. Polish market of electronic payments is steadily increasing. It is determined by the development of electronic and mobile banking. The approach of clients is changing. Although cash payments still constitute a high percentage of all payments, the number of transactions conducted with the help of payment cards or through websites and mobile applications is constantly increasing.

Keywords: Business Model, Electronic Payments Market, Business Model

Introduction. The perspective of the business model

Technology has become increasingly important to the evolution of payment ecosystems and the development of new electronic products. The ability to deliver new advanced technology products reliably has become a central theme in the strategies of a growing number of ecosystems members. Most institutions see introducing new products and services as a necessary step for retaining highly valued customers, and for positioning themselves strategically for the future. As this trend continues, the nature and magnitude of risks posed by technology will continue to change. The purpose of this paper is to review the extant literature on empirical research related to payment card processor institution. It provides a comprehensive assessment of research methodology of empirical research describing the functioning of the market of electronic payment in Poland 1998-2019. The final part of the paper describes the conceptual model of delivering value in the contemporary business model of the cashless payment operator (payment card processor). The perspective of the business model of the company emphasizes and concentrates the attention on the role of a client and the concept of value which is provided to them. The characteristics of the business model describe the general concept of creating value in the company [Ueda, Takenaka et al, 2008; Haile, Altmann 2016]. It should also specify the dependencies and interactions between different groups of stakeholders. In this context, the importance is appointed to the relationship with clients in creating the appropriate business model of the company. Changes in product portfolio, strategic alliances, takeovers, coopetition, diversification, company takeover strategies along the entire value chain – all of these activities lead to the creation of a specific ecosystem, i.e. the developed business model in which the client may easily use a wide range of values offered by the company, inside which they do not deal with the offers of the competitors.

Ever since the Internet boom [Centner, 2008], firms have been experimenting with new ways of doing business and achieving their goals, which has led to increase in popularity and number of editions of the scholarly literature on business models [Massa et al., 2017].

The concept of business models is useful also in the analysis of the relationships with clients in small and medium companies. Considering the varied role of clients, the companies become complex and dynamic systems, including the components entering friendly and antagonistic interactions with other systems [Doligalski, 2013; Girella et al., 2019].

The issue of creating value is the subject of interest of both theoreticians and practitioners of management. On account of its interdisciplinary nature, this issue combines the theory and practice of management and finance. The appropriate configuration of the fundamental elements of the business model (both in the financial and non-financial categories), allows for creating competitive advantage which is favorable for creating value by the enterprise [Kindström, 2010; Anwar, 2018; Bashir, Verma, 2017]. The business environment of enterprises has very significant impact on the opportunities which appear due to the understanding and implementation of the appropriate business model. The increasing globalization and fast technological progress are changing them radically. The relationships between the producer (the offer supplier) and the client (the offer recipient) are changing. Consumers are assessing offers available on the market much faster and more accurately. The information asymmetry is decreasing. Companies must be increasingly client-oriented, regularly verifying value propositions provided to them. The value appropriation approach is changing - the essence of creating competitive advantage is building such a business model which will provide the creation of value and its maintenance, but also the adoption of value created by other entities – by the possibility of possessing or controlling resources and the capabilities corresponding to generating value. It is common across the industries [Malara, 2003; Kollmann, Hensellek, 2016; Hall, Roelich, 2016; di Trana et al, 2019; Yang, 2017; Valdez-Juárez et al, 2019; Nitsenko, 2016].

These factors bring about the necessity to verify and redefine if needed the business models applied by the companies so far. The competences of this type should be included, in the current economic reality, in the key competences favorable for building the enterprise value. In turn, the system of cause and effect links and ties between individual components of the business model should allow for the implementation of the assumed goals of the enterprise [Rudny, 2013; Niemimaa, et al., 2019].

The main purpose of the paper is to design and characterize the concept of the business model for the institution of the payment card processor, i.e. the company which provides services in the area of electronic payment in retail and service outlets. In order to achieve the goal of the paper – there should be the cashless payments across the market explained and the Polish market of cashless payments, as well.

The functioning of the market of electronic payment

Cashless payments, particularly using payment cards, are developing very fast. Both the number of cards and the amount of transactions conducted with them is globally increasing. In 2012 the number of the issued payment cards in the world went up by 12% and reached 10 billion. There were generated 182 billion cashless transactions using payment cards. The forecasts indicate that by 2018, the number of transactions will have been growing faster than the number of the issued cards – respectively 8% and 5% per year. In 2018 there will be nearly 14 billion cards. An increase in the number of transactions will be caused by the popularization of proximity cards, mobile payments and e-commerce.

In Poland, there are two types of payment card systems: three- and four-party payment card systems. However, the key role is played by four-party systems (e.g. represented by Visa and MasterCard payment organizations). During implementation of retail payment in a retail outlet – the charge is imposed on a sales or service outlet (MSC - merchant service charge). The charge is collected by the payment card processor (the company which provides services in the field of card payment in a specific retail outlet). The listed charge consists of the margin of the payment card processor, charges for the benefit of the

payment organization and the charge for the bank (interchange fee), which issued the card for the client [Heikkinen, Tómasson, 2016; Fung et al, 2018; De Groen, 2020].

The suppliers of payment services are responsible for providing payment system, access to appropriate suppliers of financial services (e.g. acquirers and banks) and they establish the payment transaction process between consumers and merchants in the point of sale. Their role is reduced to supplying the appropriate software and hardware to the parties of the transaction. The supplier of payment services can be an operator, or an organization appointed jointly by the banks and also the independent entity. In turn, network providers supply telecommunications infrastructure which allows to conduct transactions with the help of payment terminals, mobile phones, starting with initiating the payment and ending with verifying the users. Also, the sellers and providers of services and consumers always take part in transactions. The parties having direct impact on the process of mobile payments are legislators and market regulators, establishing legal frameworks and technical requirements [Hsiao, 2019; Tan et al, 2019].

In the system of retail payment, the participation of the central institution is not required, therefore, the role of non-banking institutions intermediating in the processing of electronic payment is increasing. It is also the result of the development of technologies and electronic forms of payment. Modern payment systems are treated as platforms joining payers and payees [Iwańczuk-Kaliska, 2013]. Therefore, the activity of the organization performing the function of the payment card processor may be based on the concept of two-way market (platform/network).

This type of two-way platforms creates "two groups of users with related interests. Two-way markets are characterized by direct network effects, therefore, the demand for the service provided depends jointly on both groups. An example of such a market is the card payment systems, in which the demand for the payment service is reported by the card merchants and holders (consumers). Merchants accept card payments whereas consumers buy merchants' goods with the help of them. Multiplying network effect occurs when the acceptance network is growing in the form of points equipped in payment terminals and, at the same time, their number and the card payment value is increasing [Górka, 2013; Krivosheya, Korolev, 2018; Bounie et al, 2017].

In this sense, a new participant of the system (this can be both a client and seller), who joins the "network", understood in this way, provides an increase in the system value for all its participants. This brings about that the greater the subjective "value" of the payment card for the holder the larger the network of entities accepting it. On the other hand, the bigger the number of clients using these cards is the greater benefits are brought about by entering the system by merchants [Maciejewski, 2012; Ramya et al, 2017; Tee, Ong, 2016].

Polish market of cashless payment

The Polish e-commerce market is showing remarkable growth, which is unsurprising considering the overall performance of the economy. Gross domestic product growth was 5.1% in 2018. The main driver has been private consumption and strong consumer confidence, driven by high wage growth. Due to such conditions, it is no surprise that due to forecast Poland is able to have double-digit growth for e-commerce up to 2021, making it one of the most dynamic European markets. Polish market of electronic payment, compared to other European countries, is exceptional and there can be observed some dualism. On the one hand, in Poland, proximity payments are developing the most rapidly and there are carried out a lot of projects connected with mobile payments. On the other, a significant part of the society prefers cash payments and there is recorded one of the lowest rates of a number of cards per one citizen (about 0.86).

A decade ago, at the beginning of the 2010, Poland has one of the lowest degrees of banking across the whole population in the European Union, amounting to 77% of Polish adults, every third Pole does not have a payment card. About 1/3 of cash transactions were performed by people possessing payment cards but in places not accepting such a form of settlement. This, among others, results from the fact that, according to estimates, only about 16% of Polish entrepreneurs offer their clients cashless settlement. Then, there occur significant technological and legislative changes, which influence an increase in the dynamics of development of the popularity of electronic payment. In 2013 there were taken the decisions on the introduction of the statutory reduction of interchange to the level of 0.5%. At the end of 2014, there were 35.5 million of payment cards on the Polish market [NBP, 2014]. (Fig. 1).

At present, bank transfers are Poland's most-used payment method, taking a 50 percent share of all e-commerce transactions and €5 billion in yearly sales. Major banks tend to offer their own, branded e-commerce bank transfer solutions or e-commerce bank transfer platform. This method is expected to grow at a compound annual growth rate of eight percent to 2021, but the rapid rise of cards as a payment option will dent the overall share of transactions carried out by bank transfers. Indeed, cards are forecasted to grow at a compound annual growth rate of 25 percent up until 2021 and will take almost 30%of the payment market. Card usage is growing quickly in the country as people turn away from cash payments, and Mastercard and Visa are already well established. Digital wallets are also growing in popularity. At the moment, they account for only 15% of online sales, but this is set to expand at a compound annual growth rate of 33% out to 2021, when they are predicted to take a 23% market share. The rise of digital wallet facilities is being supported by Poland's high uptake of mobile banking and an overall willingness to adopt new payment technologies. Poland was one of the first European countries to embrace contactless technology, for example: the rapid success of BLIK highlights the readiness of the Polish consumer to migrate to digital-only payment options [Morgan, 2019].

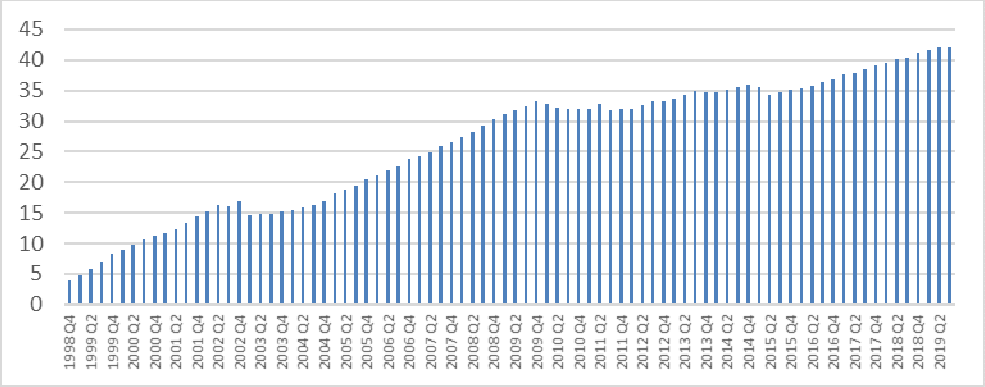

Fig. 1: Number of payment cards in Poland in subsequent quarters [millions] since 1998.

Source: Narodowy Bank Polski, Informacja o kartach płatniczych III kwartał 2019, Departament Systemu Płatniczego, Warszawa 2019.

With the arrival of new payment tools (proximity cards, mobile applications and payment technologies), the awareness of consumers and entrepreneurs concerning the advantages of cashless settlement is growing. The introduction of new technologies and simplifying payment procedures brings about that more and more people consider electronic payment practical and safe. In turn, new legal regulations may be an incentive for entrepreneurs to offer their clients electronic settlement. The domestic market of electronic payments is comparable to other markets with reference to the available payment solutions, however, it is lagging behind with respect to the popularity of cashless transactions and the number of

payment terminals (per 1 million of citizens, Poland occupies the second-to-last position in the European Union. In 2012, the EU average amounted to 17 500, whereas the average in Poland – 7000). This state indicates some significant opportunities for development. Greater availability of payment terminals on the market will affect an increase in the number and popularity of cashless transactions carried out on the Polish market. According to the data by the banks, in the fourth quarter of 2014, there were conducted 690 million of transactions using payment cards and, compared to the previous quarter, there was recorded an increase in the number of transactions by 46.8 million, which amounts to an increase by 7.3%. Over the last year, there was recorded an increase in the number of transactions by 19%, and over the last two years –36% [NBP, 2014] (Fig. 2).

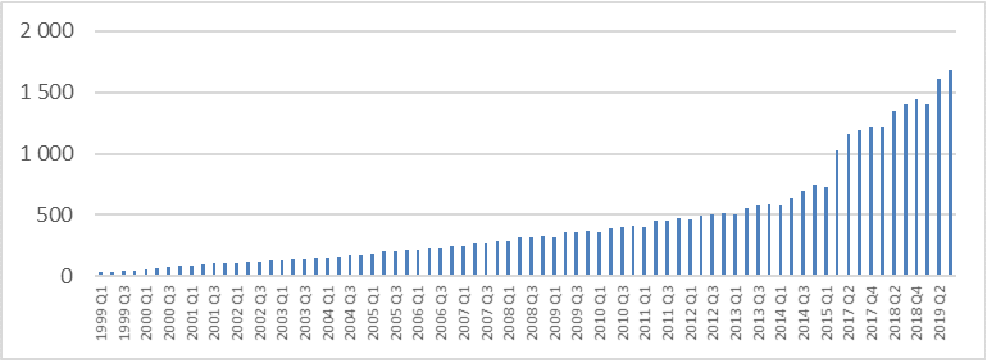

Fig. 2: Number of payment card transactions in subsequent quarters [million].

Source: Narodowy Bank Polski, Informacja o kartach płatniczych III kwartał 2019, Departament Systemu Płatniczego, Warszawa 2019.

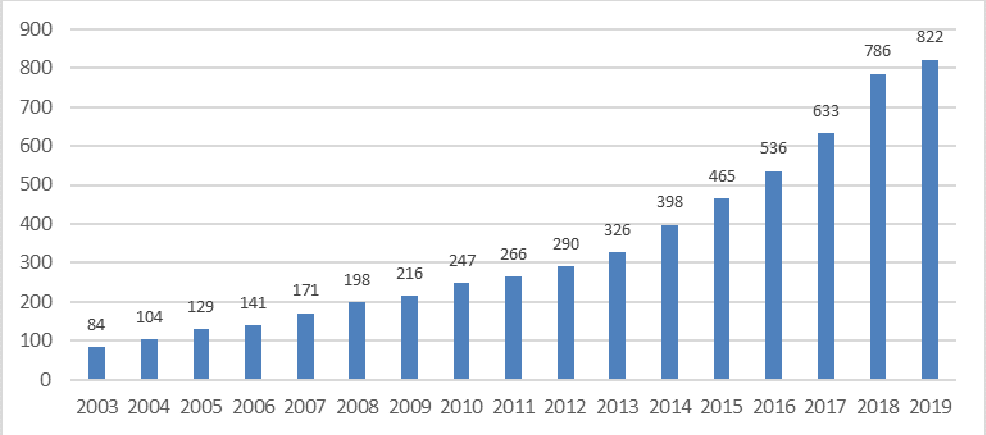

Fig. 3: Number of EFT POS terminals accepting card payments [thousand].

Source: Narodowy Bank Polski.

As many as 65% of them are in centers below 100,000 residents, thanks to which people living in villages and smaller towns gain greater freedom in choosing the means of payment. the Cashless Poland Program is developing so rapidly and is also reaching those regions of Poland that need the most civilizational change brought by cashless payments. This has a positive effect on the development of local enterprises and retail and service outlets, which, especially in smaller towns, play the role of a center of local activity. Regions with the highest percentage of terminals installed include the following voivodships:

Mazowieckie (15.19%), Śląskie (11.55%), Greater Poland (9.49%) and Lesser Poland (9.32%) , while those with the lowest number include the Świętokrzyskie (2.86%), Podlasie (2.84%), Opolskie (2.76%) and Lubuskie (2.48%) voivodships. So far, terminals installed as part of the Cashless Poland Program have completed over 187.5 million transactions, for a total of nearly PLN 10 billion. According to the latest statistics presented by the National Bank of Poland at the end of December 2019, the number of POS terminals in Poland in the third quarter of last year was already over 867 thousand and is constantly growing. In addition, since March 2019, virtually all installed terminals allow contactless payments.

The research [PBS, 2013] indicates that Poles, the most frequently, use cashless payment in stores and at gas stations (56%). However, 66.9% of the respondents stated that such a form of settlement guarantees security. Only 6.9% of the respondents indicated that they consider card payment dangerous. More than 33% of the respondents admitted that they do not have a payment card, either debit or credit card, whereas 9.7% of the respondents claimed that admittedly, they do have a card, but they usually pay cash. In turn, with reference to the availability of payment terminals in Poland, the respondents confirmed a general tendency to an increase in the number of points accepting this form of payment. More than 70% of the participants of the research believe that the availability of terminals in Poland is considerable.

The research results indicate that Poles are increasingly into electronic payment tools and they are more willing to settle payments with cards, expecting such a possibility even in small shops or service points. The basic conclusions from the research are the following:

— card payments are becoming increasingly popular,
— card payments are safe (Polish awareness and, consequently, trust in the security of this type of transactions is growing),
— consumers indicate the rapidity and comfort of transactions conducted with cards.

A positive attitude towards payment cards and recognizing the advantages of such a form of payment – comfort, security and rapidity, is a good signal for new projects connected with the popularization of electronic payments in Poland. However, there is still the need to increase access to entrepreneurs who run commercial and service premises in smaller cities and towns to show them the value of the payment terminal installation for their business. In conversations with representatives of various industries who have decided on such a step, there is clearly satisfaction that thanks to their openness to cashless payments, their clients can choose whether they prefer to pay by card or cash.

The concept of business model of the cashless payment operator (payment card processor)

According to A. Osterwalder and Y. Pigneur, the business model consists of nine basic elements which determine four areas of business activity (clients, offer, infrastructure, financial position). According to the cited authors – in a sense, the business model is an outline of the strategy which is to be implemented in the framework of structures, processes and systems of an organization [Osterwalder, Pigneur, 2012] (Fig. 4).

<table>
<tr><td rowspan="2">Key partners [KP]</td><td>Key activities [KD]</td><td rowspan="2" colspan="2">Value proposition [PW]</td><td>Relationships with clients [RK]</td><td rowspan="2">Client segments [SK]</td></tr>
<tr><td>Key resources [KZ]</td><td>Channels
[K]</td></tr>
<tr><td colspan="3">Cost structure
[KS]</td><td colspan="3">Revenue streams
[SP]</td></tr>
</table>

Fig. 4: Business model template by A. Osterwalder and Y. Pigneur

Source: A. Osterwalder, Y. Pigneur, Tworzenie modeli biznesowych. Podręcznik wizjonera, OnePress, Gliwice 2012, p. 48.

The payment card processor (whose business model has been presented in Fig. 3) – provides services of completing and conducting payment transactions using payment cards or similar payment tools. A payment card is an instrument authorizing the payment of cash or allowing the submission of the payment order, in this case, via the payment card processor, accepted by the merchant in order to receive due funds. The listed service is dedicated to payment card processors. It consists in allowing the execution of payment transactions, initiated by or via the merchant, with the payer's payment instrument, particularly, by authorization service, sending a payment card to the issuer or payment systems of payment orders of the payer or merchant, aiming at the transfer of funds owed to the merchant, excluding the activities consisting in its clearance and settlement in the framework of the payment system.

<table>
<tr><td rowspan="2">- mobile network operators,
- banks,
- payment centers,
- hardware suppliers,
- software suppliers,
- suppliers of new services and innovation</td><td>- management of transaction platform,
- network maintenance,
- development of terminal applications,
- service positioning,
- marketing.</td><td rowspan="2">- a wide range of terminal services,
- financial products,
- management of POS transactions,
- management of the relationships of partners and consumers</td><td>- attracting and maintaining clients,
- management of relationships with key clients,</td><td rowspan="2">- wholesale clients,
- individual clients,
- retailers,
- institutional clients</td></tr>
<tr><td>- transaction platform,
- intellectual property,
- customer database,
-relationships with clients.</td><td>- own sales group,
- personal contacts,
- sales platform</td></tr>
</table>

- client acquisition and maintenance costs, - expenditure on marketing, - costs of the headquarters, - costs of development of new service (R&D)	- service charges, - transaction charges, - subscriber charges, - advertising charges

Fig. 5: Business model of the payment card processor

Source: Authors' own study

The presented model uses the functioning of the multilateral platform. Multilateral platforms associate two individuals but mutually related groups of clients. Such a platform has a value for one group if there is a possibility of establishing the relationship with the other group. The platform generates the value, creating the conditions for interaction for the representatives of different groups. An increase in the platform value consists in attracting new users (network effect). In case of the payment card processor, the larger the number of merchants the transaction platform possesses the larger value generated for the consumers using payment cards. On the other hand, the larger the number of consumers (payment card users) conducting transactions the greater the value of the transaction platform. The activity of this type has become popular with the occurrence of information technology. Such a model generates value as a result of acting as an intermediary. To generate value, the platform must attract and provide services to the representatives of all interested groups at the same time. The value of the platform for a specific user considerably depends on the number of users on the other side. An essential challenge to this outline is attracting a segment of clients (and their sufficient number), therefore, the operators of the multilateral platform often apply the donation (formulating not expensive or free value proposition) to a particular segment of clients. Such activities are to arouse interest in the offer by the other party. The key resource essential for the functioning of this business model is the platform – key activities consist in management of the platform, providing services and promotion of the platform. The value proposition in this model includes attracting a specific number of users, associating segments, reducing costs by using the platform for transactional purposes.

The next step to achieve better performance on the market is strategy related to payment gateway solutions. A payment gateway is a merchant service provided by an e-commerce application service provider that authorizes credit card or direct payments processing for e-businesses, online retailers, and so on. The payment gateway may be provided by a bank to its customers but can be provided by a specialized financial service provider as a separate service, such as a payment service provider. A payment gateway facilitates a payment transaction by the transfer of information between a payment portal (such as a website, mobile phone or interactive voice response service) and the front-end processor or acquiring bank. Payment Gateway could work as an innovative platform, created to facilitate activities for entities involved in the process of adopting to non-cash payments, such as: financial institutions, acquirers, Added Value Service providers, and banks. The unique quality of this system is the possibility of integration between paying devices of different class, and systems of the billing agent. For the Payment Gateway, support is foreseen for devices from Ingenico, Verifone and Bluebird and more. Payment Gateway is a flexible solution, providing differentiated services developed with the increase in activities such as: transaction authorization between multiple acquirers, loyalty programs, recurring payments, and electronic top-ups.

Conclusions

Polish market of electronic payments is steadily increasing. It is determined by the development of electronic and mobile banking. The approach of clients is changing. Although cash payments still constitute a high percentage of all payments, the number of transactions conducted with the help of payment cards or through websites and mobile applications is constantly increasing. Banks are into the development of technologies and the direction of changes is often subjected to the demand from the market. With the development of technologies, mobile banking will become the central element of each purchase made both traditionally and online [Campos, 2014]. With the development of e-commerce there is forecasted the early arrival of the age of domination of electronic payments, including the ones implemented with the use of mobile devices [Burak, 2013]. The presented business model of the payment card processor institution partially uses the ideas of multilateral markets to make mangers focus on managing the transactional platform and management of the relationships of business partners with consumers.

The holistic business model framework can serve both as a cognitive instrument and a planning tool to get the most out of value chain design, which is an inherent part of the design system.

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Transformation of The Funding Sources in Banking Activity in Poland In 2016-2019

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Abstract

The study aimed to assess the degree of the development of the Polish banking system and to analyze its funding sources as related to the lending activity. The analyses revealed that the Polish banking system still retains the classical model of financial intermediation, i.e. lending activity is financed entirely by non-financial sector deposits. Sources of financing are mainly composed of deposits from the non-financial sector. At the same time, such a structure causes a deep term mismatch between the lending activity and funding sources (long-term foreign sources account for 5% of total liabilities). The new supervisory requirements introduced mainly in terms of liquidity standards (NSFR) and resolution (MREL) may, therefore, pose a significant challenge to the Polish banking sector.

Keywords: bank, founding sources, deposit

Introduction

The experience of the financial crisis has led to the introduction of new supervisory requirements to reduce the materialization of systemic risk on the one hand and the public cost of a massive bailout oriented to the banking sector on the other. These regulations focus on capital requirements and supervisory standards for bank liquidity. The need to regulate the banking system results in particular from its functions in terms of the transformation of measures, terms, and risk. A deep mismatch in the maturity structure of assets and liabilities remains the main source of risk in such banking systems as in Poland.

Transformation of funding sources in the light of supervisory banking standards

The activity of banks has a significant effect on the functioning of the economy as a whole. Banks transform small savings into much larger investments, thanks to which they implement significant investment projects with key importance to the economy. Banks act as financial intermediaries and undertake a specific estimated level of risk with the expectation of generating sufficiently high profits. Banks use their accumulated capital to grant not only loans in the broadest sense of the word, but also to make investments in the capital markets. These are transactions with a reasonably long time horizon (Prokopowicz 2008, Krawczyk-Sokołowska 2011, Wielgórka 2018).

Commercial banks operate in a high-risk environment. The classic functions of financial intermediation make banks vulnerable to mismatch of maturity, resources, and risks. The specific financial structure based on almost 90% foreign capital results in banks being exposed to a strong materialization of risk which, due to the links and dependencies between entities, may even lead to systemic risk. The negative effects of the financial crisis forced supervisors to introduce new legal regulations aimed at strengthening the existing regulations for the banking sector and creating a safer and transparent financial system (Łukomska-Szarek and Wójcik-Mazur 2010, Łukomska-Szarek 2010).

The essential prerequisites for the legal regulation of banking activities are to ensure the stability and security of the financial system and to protect depositors. The regulations concerning the sector security guarantees are an essential element in limiting the systemic risk of a crisis because problems of one bank can lead to a serious crisis of the entire banking sector, and consequently to disturbances in economic stability. Undoubtedly, the failure of one bank can increase the risk of contagion and it would be highly questionable to recognize that the bankruptcy of one institution can produce benefits to competitors13. This results from the specific characteristics of the bank, which include Szczepańska et al. (2015):

1. the structure of the balance sheet, which consists in that banks' funding sources are scattered, short-term and can be payable on demand (e.g. deposits), whereas assets are generally long-term and are not always eligible for quick sale (e.g. loans) or fire-sale
2. low equity to assets ratio (high leverage), which allows for a rapid erosion of capital in the event of increased deposit withdrawals and sale of assets at an undervalued price.

These features make the stability of banks largely dependent on the trust of their creditors. The loss of this confidence exposes banks to the phenomenon of bank run, i.e. mass withdrawals of deposits and other forms of financing caused by negative information. This is due to the belief that those who postpone the withdrawal of funds may face bank insolvency and consequently incur losses.

Therefore, the essential prerequisites for the legal regulation of banking activities are to ensure the stability and security of the financial system and to protect depositors. The regulations concerning the sector security guarantees are an essential element in limiting the systemic risk of a crisis because problems of one bank can lead to a serious crisis of the entire banking sector, and consequently to disturbances in economic stability. Furthermore, another element enforcing the need to introduce banking regulations is the protection of consumers in the banking market (i.e. depositors and consumers).

The current legal framework, concerning specifically existing prudential standards at both macro and micro levels, is the CRD IV/CRRR package (Brzozowski 2014, Olszak 2016). The macro-prudential tools in the CRD IV directive include instruments that have the nature of capital buffers, i.e. systemic risk buffer, countercyclical buffer, risk of a global institution with systemic relevance, the risk of another institution with systemic relevance.

Furthermore, for macro-prudential policy purposes (relating to systemic risk), they were defined in the CRR Regulation (Fedorowicz 2014, Mikita 2013). These instruments include:

- the level of own funds,
- requirements for making information available to the public,
- liquidity requirements,
- large exposure requirements,
- exposures within the financial sector,
- the level of security buffer,
- risk weights related to economic bubbles in the real estate market.

To improve banks' short-term resilience to international market shocks, the Basel Committee on Banking Supervision (BCBS) introduced reforms under Basel III.

The CRR Regulation indicates the need for banks to maintain at an appropriate level the liquid coverage ratio (LCR), known as the short-term liquidity ratio, and the net stable funding ratio (NSFR),

a structural (long-term) liquidity standard, to effectively match the terms of bank assets and liabilities (Meskova et al. 2019).

The CRR Regulation concerning the LCR levels indicates that credit institutions were required to maintain this indicator at the level of 70% by 1 January 2016, 80% by 01 January 2017 and 100% by 1 January 2018.

LCR aims to provide banks with sufficient reserves of high-quality liquid assets to enable them to withstand a period of significant liquidity risk of 30 calendar days.

Part IV of the CRR Regulation on liquidity risk sets out the requirements that banks must meet to ensure:

- liquidity coverage: maintaining an adequate level of liquid assets, the total value of which is covered by the decreasing liquidity less its flow in extreme circumstances in order to ensure that the bank maintains an adequate level of collateral over a 30-day period.
- stable funding - ensuring the coverage of long-term liabilities through the use of a variety of instruments to provide stable funding in normal and extreme conditions.[84]

Liquid coverage ratio is expressed by the formula:

$$LCR = \frac{HQLA}{NCO}$$

where HQLA is high-quality liquid assets

and NCO denotes net cash outflows over a 30-day time period.

Based on HQLA calculations, individual asset types are assigned weights and they are larger for more liquid asset categories while the NCO means the weight of a stable liability position (Niedziółka 2015).

A bank characterized by a satisfactory level of LCR possesses unencumbered liquid assets with low credit risk of a value adequate to cover the forecasted (net) outflow of funds within 30-days period of market stress. The main purpose of such construction of the measure is to encourage banks to reconstruct the balance sheet in a way that in period of market stress allows limiting excessive burden for the central bank related to the necessity to compensate liquidity shortages (Niedziólka 2015, Meshkova 2019).

The structural liquidity standard is determined by the formula:

$$NSFR = \frac{AASF}{RASF}$$

where AASF is the amount available for stable sources of funding,

while RASF is the total of the items that need to be covered by stable sources of funding.

The objective behind the introduction of the NSFR standard was to change the structure of financing of banking activities based mainly on short-term and renewable deposits based on medium and long-term sources. The NSRF is an important measure of liquidity risk at a time when markets are reporting the need to finance the purchase of securities and decreasing liquidity of the sector (Meshkova 2019).

One of the legal acts which may have a very significant impact on the transformation of the banking sector, including the sector in Poland in particular, is the BRR Directive. As a result of post-crisis modifications of the rules governing banks' activities, they were subject to new requirements for own funds and eligible liabilities. It was introduced to provide sources of financing of the bank's losses in the event of bankruptcy (Kozińska 2018).

The RDI directive and SRMR regulation set the following objectives for restructuring and orderly liquidation of banks:

- ensuring the continuity of critical functions, defined as 'activities, services or operations that are necessary for the real economy or for financial stability duet to the size, market share, external and internal relationships, complexity or cross-border activity of the institution or group ,
- avoiding serious implications for financial stability,
- protecting public finances by minimizing public support,
- protecting depositors covered by the Deposit Guarantee Schemes Directive (DGSD) and investors covered by the Investor Compensation Schemes Directive (ICSD);
- protection of clients' funds and assets.

The BRR directive introduced a new requirement for banks in the European Union referred to as the Minimum Requirement for Own Funds and Eligible Liabilities MREL). Its purpose is to ensure reliable sources of funding for banks, whereas its design (making its level dependent on the level of risk-weighted assets and balance sheet total) is similar to capital adequacy requirements. However, the need to meet the MREL requirements will result in changes to the business model (e.g. restructuring of operations to reduce the balance sheet total or the value of risk-weighted assets) or issuing new securities which will affect the banks operating costs (Kozińska 2018).

Analysis of the degree of development of the banking sector in Poland against the background of selected countries.

When assessing the level of development of the banking sector, the degree of financial intermediation should also be assessed. Its level determines the stability of the banking sector and allows for the identification of the banking system model. The banking system, together with insurance institutions, investment funds, pension funds, and leasing, factoring, loan and brokerage companies, form a financial system. Its development is evidenced by a basic indicator measuring the total assets of the financial system in relation to GDP. Table 1 shows the level of this ratio in the countries of Central and Eastern Europe against the background of the eurozone. These data indicate that Eastern European countries are characterized by a much lower level of development than in the eurozone. However, significant differences can also be observed among the countries of Eastern Europe. Undoubtedly, the most developed financial system is observed in the Czech Republic, whereas in other countries of the region, the differences are not that significant. On the positive side, the assets of the financial system are increasing steadily in all countries, but compared to developed countries, this level remains low. The analysis of the development of the banking system indicates similar relationships. Furthermore, it should be stressed that an excessive ratio of financial assets to GDP may result in an increase in systemic risk and materialization in times of economic downturn. However, the development of financial systems, especially in Hungary and the Czech Republic, is still low.

Table 1 : Assets of the financial system in relation to GDP in selected countries and eurozone.

	2015	2016	2017	2018
Poland	128.6	133	132.1	128.7
Czech Republic	153.7	161.7	168	171.8
Slovakia	120.3	124.3	126.8	125.8
Hungary	131.4	130.9	128.4	132.2
Eurozone	482.7	487.2	478.2	466

Source: Authors own elaboration based on: Raport o sytuacji banków, Urząd Komisji Nadzoru Finansowego Warszawa, 2019

The eurozone has a much higher level of development than the banking systems of Central and Eastern European countries. In 2016-2018, the level of assets of the banking system in relation to GDP in the eurozone ranged from 290% to 260% (table 2). Against this background, the banking systems of Poland, the Czech Republic and Hungary are much less developed. It should be stressed that the assets of the Czech banking system reached the level of almost 138% in 2018 whereas in the Polish system, this value was ca. 90%. Therefore, the Czech banking system (and the financial system) is relatively better developed than in countries such as Poland or Hungary. Substantial differences are observed in the lending activity of the Czech and Hungarian banking systems. In the Czech Republic, the ratio of total loans and GDP is about 63% in 2016-2018 whereas in Hungary this was only 32%. In Poland, on the other hand, the level of this ratio was ca. 50%. Similarly, the level of deposits to GDP ratio was the highest (outside the eurozone) in the Czech Republic and lowest in Hungary. Furthermore, it can be noted that in Poland, the Czech Republic and Hungary, the level of deposits acquired exceeds the lending activity observed in these countries. Therefore, all these countries are characterized by classic financial intermediation focused on deposit and lending activities. In the eurozone, the level of deposits acquired significantly exceeds the lending activity, which means that banks are forced to provide wholesale financing.

Table 2: Total assets of banking system, loans and deposits to GDP in selected countries.

	Total assets to GDP			Loans to GDP			Deposits to GDP		
	2016	2017	2018	2016	2017	2018	2016	2017	2018
Poland	91.7	89.4	89.2	51.2	49.4	49.6	54.9	53.4	53.6
Czech Republic	124.9	138.7	137	63.4	62.9	63.8	76.4	79.4	80.2
Hungary	97.3	95.3	100	33.2	32.1	32.4	39.4	40.1	43.1
Eurozone	288.3	271.9	266.5	90.4	88.8	87.6	84.6	84.8	85.1

Source: Authors own elaboration based on: Rozwój systemu finansowego w Polsce w 2018 r, Warszawa NBP 2019

Analysis of funding sources in the Polish banking system

An analysis of the funding sources of the banking system should take into account the relations between the level of lending activity and the funding sources. One of the basic indicators reflecting the stability of funding sources is the relation between the level of loans granted to the non-financial sector and the level of deposits acquired also from this sector. From the point of view of the security of the banking system, it is more advantageous for the lending activity to be fully financed by non-financial sector deposits. However, deposits from the non-financial sector are acquired for short terms, which requires their continuous rollover and does not increase the stability of the banking

system. Such a situation, especially in times of crisis, can be significant and may undermine the stability of the banking system. The option preferred especially by supervisors is a higher proportion of long-term funding sources, which include debt securities issues. However, issuing debt securities involves a much higher financing cost than deposits from the non-financial sector. Therefore, deposits from the non-financial sector remain a natural funding source for banks. Figure 1 presents the relations between the value of loans granted by the Polish banking system and the funding sources: deposits of the non-financial sector.

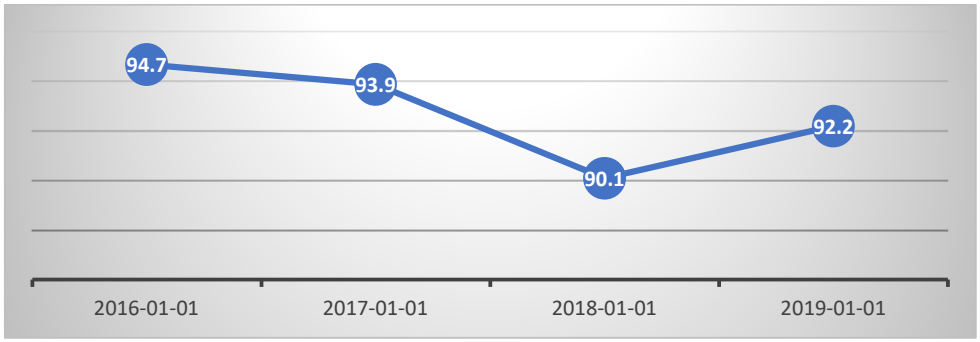

Fig. 1: Relation between the amount of loans to the non-financial sector and deposits in polish banking sector.

Source: Authors own elaboration based on: Raport o sytuacji banków, Urząd Komisji Nadzoru Finansowego Warszawa, 2018

Between 2016 and 2019, the level of this index remained well below 1. This seems to be an advantageous tendency since the banking sector, on the one hand, is not forced to raise more expensive capital from the wholesale market but, on the other hand, such a situation increases the risk of the term mismatch. Furthermore, this means that the Polish banking sector still has significant potential to increase lending activity. Against the background of aggregated data for the banking sector, the level of this indicator for the 3 largest banks in Poland was also analyzed. These data are presented in Figure 2. The analysis of the figure reveals that in the case of the largest Polish commercial banks, the scope of the gap is already much smaller, but it remains below 100%. Therefore, even the biggest banks in Poland such as PKO BP SA, PKO SA and Santander Bank Polska SA do not use their credit potential.

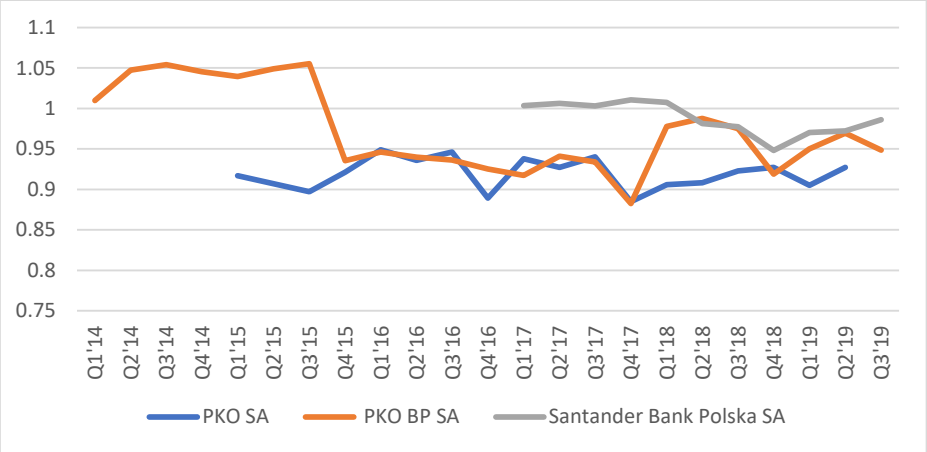

Fig. 2: Relation between the amount of loans to the non-financial sector and deposits in PKO BP SA, PKO SA and Santander Bank Polska SA.

Source: Authors own elaboration based on: Consolidated financial statements of the PKO Bank Polski SA Group, Bank Pekao S.A. Group and Annual report of Santander Bank Polska for 2019

One of the key determinants of the high degree of risk in banking activity is a strong mismatch between the structure of loans and the corresponding sources of financing. As mentioned above, lending activity is mainly financed by non-financial sector deposits and their stability is determined by maturity. The analysis of the structure of the mismatch between lending activities and their sources of financing shows the level of risk and potential directions for policy change. Table 3 shows the term structure of assets and liabilities of the Polish banking sector. Data contained in the table indicate that almost 58% of the value of assets is financed by liabilities with a term not exceeding 1 month and 75% finance liabilities up to 1 year. On the other hand, loan maturities over 1 year represent as much as 64% of total assets, which means that they require long-term funding sources. As shown in Table 3, long-term liabilities account for approximately 15% of the value of liabilities (of which 10% are equities). For this reason, even long-term loans are financed by deposits with much shorter terms. This phenomenon seems to be safe because, according to the deposit settlement rule, savings accounts (which are not assigned a maturity date) can be treated as a long-term source of financing but only until the macroeconomic situation is stable. In a crisis, a massive withdrawal of deposits may destabilize the banking sector.

Table 3: The term structure of assets and liabilities Polish banking sector (30 June 2019)

	No stated maturity	Own capital	=< 1 month	> 1 month =< 3 months	> 3 months =< 1 year	> 1 year =< 5 years	> 5 years
liabilities	37.1%	10.9%	20.1%	7.9%	10.1%	8.2%	5.8%
assets	13.4%		2.7%	10.3%	31.9%	28.3%	35.1%

Source: Authors own elaboration based on: Raport o stabilności systemu finansowego, Departament Stabilności Finansowej NBP, Warszawa, grudzień 2019

The type and the term structure of the bank's liabilities is important for the stability of both the individual institution and the banking sector as a whole. The source of risk is not only the term mismatch but also the lack of long-term sources of financing for the bank (which is compensated by savings and settlement accounts). These elements can affect primarily the level of liquidity of the bank, the contagion risk, the systemic risk, and, consequently, the failure of the banking system or its essential part. The experience of the recent crisis has demonstrated that the problem of securing banks' liquidity requires institutional solutions that focus on the requirements of the LCR and NSFR indices. It is the NSFR measure that requires changes in the structure of liabilities since it forces banks to match the risk of assets with the stability of their funding sources. Furthermore, the budgets of countries, mainly those highly developed after the financial crisis, have experienced the necessity of a bailout for the banking sector on an almost massive scale. For this reason, the bank supervisors introduced a remedy to cover possible losses due to bankruptcy by the banks themselves. This mainly concerns the MREL requirements, which aim to issue debt considered in this case as long-term funding sources. Nevertheless, the cost of introducing these capital requirements remains a major problem, which may result in an excessive burden on the banking system. The low level of development of the financial system in Poland, including the debt securities market, may significantly hinder the issue of qualified liabilities whereas the potential directing of issues to global markets will increase the cost of financing. The issue of debt securities that may be annulled will also require higher costs to encourage potential investors.

Conclusions

The experience of the crisis has shown that the materialization of systemic risk is a real threat. To prevent it, regulations that focus on the appropriate relationship between the sources of finance (including capital requirements) and the lending activity are introduced. In countries such as Poland, where the banking system performs traditional financial intermediation functions, lending activity is fully financed by non-financial sector deposits and the financial system is not highly developed, the burden of changes in the structure of funding sources may be excessive. However, maintaining a

structure of liabilities with long-term sources that account for ca. 5% requires changes in the financial policies of banks.

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Information and Communication Technologies in Public Administration in Poland

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Abstract

The development of information and telecommunications technologies is extremely fast. Public institutions are adapting to the growing level of computerization of society and management in order to increase the efficiency of operations and improve the quality of services rendered. Electronic administration is part of the information society. Enabling access to public administration services contributes to its development as a whole. The purpose of the article is to present the implementation of the state computerization plan in the years 2016–2020, which is a response to the significant increase in social computerization and expectations of public administration. Presented results of research carried out by the Central Statistical Office on social informatization, transport and administration. The applications discussed are the implemented innovations in public e-services and human resource management.

Keywords: e-governance, ICT, innovations in public administration.

Computerization of society, economy and the State

The rapid development of information and telecommunications technologies is accompanied by an equally rapid increase in the IT competences of the society and the widespread use of ICT (from Information and Communication Technologies, a concept covering a wide range of all technologies enabling manipulation and sending information).

The definition of ICT is contained in the glossary of transport development strategies by the Ministry of Transport, Construction and Maritime Economy until 2020, and reads as follows: "ICT Technology An abbreviation of Information and Communication Technologies. The concept of ICT covers a wide range of all technologies that enable information to be manipulated and transmitted. The conceptual scope of ICT includes all communication media (Internet, wireless networks, bluetooth networks, landline, cellular and satellite telephones, sound and image communication technologies, radio, television, etc.) and media enabling the recording of information (portable memory, hard drives, CD / DVD discs, tapes, etc.) as well as equipment enabling information processing (personal computers, servers, clusters, computer networks, etc.).

Poland is getting closer to the results of other European Union countries when it comes to access and use of the Internet, although it still ranks in the last five. The survey conducted by the Central Statistical Office shows that in 2019, at least one computer at home was owned by 83.1% of households with at least one person aged 16-74. This ratio is steadily increasing year by year, but at a slower pace; compared to the previous year, it increased by 0.4 pp (in 2015 it was 77.9%).

In recent years, the share of households with an internet connection has also been growing. In 2015, 75% of households had access to the Internet at home, and in 2019 86.7% of households (2.5 percentage points more than in 2018), including as much as 83% having a broadband connection.

The concept of using e-government services includes, among others use of websites regarding civic obligations (e.g. tax returns, change of residence), rights (e.g. social assistance), official documents (e.g. ID cards, birth certificates), public educational services (e.g. public libraries, information and recruitment to public schools or universities), public health services (e.g. public services, hospitals); excluding handwritten emails. In 2019, people using public administration services over the internet in the last 12 months constituted over 40% of the population of people aged 16-74. Every year in recent years, the group of people who use the option to download forms and return completed ones has been growing. In 2019, the percentage of people downloading forms is 24.6% and increased by 2.5 pp annually, and those sending 31.4%, an increase of 6.8 pp (GUS). The percentage of people seeking information on public administration websites is 24.9%.

The Ministry of Digitization has commissioned a report on the opinions of people using the Internet about the quality of electronic services. 4,800 Internet users were surveyed, divided into 3 types, in terms of e-government services and services. Extracted users using - using these services provided and confidently (25%), as well as unconvinced users who have already gained experience in this topic, but are not always available, must be included in the required effect (29%), they are supported 54 %. A large proportion of the respondents, to the inexperienced handled - prefer personal contact, are not subject to e-government experience, but opportunities for using these services in the future are often rejected (46%).

The knowledge of services provided by e-administration is growing from year to year, 60% of respondents know ePUAP platform, 48% trusted profile, and citizen.gov.pl 47%. The biznes.gov.pl and danepubliczne.gov.pl websites are known for fewer international transactions - 40% and 25%, respectively. The ZUS electronic services platform is known by 66% of respondents, and the Electronic Land and Mortgage Register - 45%.

The most frequently visited websites of offices is obtaining address and contact data as well as information about additional devices of the institution. In recent years, the percentage of people meeting data and reports has increased. Among the public services of public administration, the analysis of main interests enjoys searching information on public administration websites.

The most important matters that respondents use to settle over the internet are issued / exchanged documents, and also include health-related issues. In recent years, the entire steady increase in the number of documents that have an impact on the operation of the e-Declarations service.

The use of information and communication technologies in enterprises necessarily associated with equipping enterprises with computers. Their widespread use means that the indicator showing the use of computers in companies has been used at a similar and consistent high level for several years. In 2019, the percentage of enterprises using computers was 96.8% (in 2015 it was 94%). Already in the years 2011–2015 100% of large companies employing 250 and more people used computers. The dynamic increase in the use of the Internet in business includes its important feature, such as: no bureaucratic restrictions, cooperation opportunities for specialists, global reach and widespread use. Thanks to this, the internet has become a business tool. Increasing interested service companies enjoy cloud computing. Cloud computing is understood to mean that you use scalable ICT services via the Internet. Services may include access to software, use of computing power, and data storage. The following services: - are provided with the services of suppliers' servers; - they can be scalable up or down (you can scale, for example, users, or the amount of data stored); - they can be changed or adapted for On-demand self-service, i.e. without the intervention of service providers; - they may be subject to payment methods, such as a subscription or a flexible payment adapted to the quantity and options of services purchased (Ministry of Digitization, 2016). The biggest benefits of using clouds are:

• saving financial resources,
• smaller needs for office space
• limiting the number of people involved in IT support in the company.

In 2019, 17.5% of enterprises used paid cloud services, i.e. by 6.0 pp. more than in 2018. Among the services offered in the cloud computing function, popularity of e-mail services (e-mail) - 12.9% of enterprises (by 5.2 percentage points. More than a year ago). Enterprises using paid cloud services by various services (in% of all enterprises).

The use of electronic sales is increasing. In 2018, 15.7% of enterprises received orders for products electronically, with 11.3% comparing sales via a website or mobile application, 6.4% - via an external online trading platform, 4.3% - via EDI messages. Enterprises also covered with open public data - data of institutions and offices made available to interested parties for use and application for any purpose. In 2018, 16.9% of companies used open public data, with data on the list of data on business and business activity most frequently searched for (15.1%). In order to protect the ICT infrastructure, the availability of available services is implemented with various measures and methods that eliminate various threats appearing on the network. In 2019, 87.2% of enterprises used ICT security measures. The most-used security services and software updates, and strong password authentication (80.8% and 76.4%, respectively). Among the problems that occurred in connection with the occurrence of ICT security safety incidents, the availability of indications available for impossible use with ICT resources, e.g. due to DoS attacks, ransomware, as well as destruction or damage of data, e.g. due to taking into account malicious activity.

There is also a growing use of robots in various operations. In 2019, 7.5% of enterprises used robots in their operations, including industrial robots - 5.7%, and service works - 2.9%. The highest percentage of enterprises using robots was recorded among the most-used - 28.4%. The interest of these companies focused mainly on industrial robots (25.3%) and less often on service works (8.1%).

Another symptom of advanced ICT in the economy is being used with social media as business tools. Over 20% of enterprises in Poland used in 2015 available on one of the social media. Include classic sizes, preferably large companies (49.4%), taken into account the type of business - companies from the information and communication section (61.3%). Social networking sites were the most popular tools, they are divided into size classes and operate their business.

Entrepreneurs are eager to use e-government services. The option of completing and sending documents online saves time, and information on public administration websites is available to track changes in regulations. The percentage of users using the Internet in relations with public administration successively used - 90% in 2012, 92% in 2015, 95% in 2020 (source CSO).

E - governance

Innovation is purposeful and benefits from changes in public services offered by the administration. It may concern a new service, modified services or new solutions used for the first time in a given institution. Innovation in the public announcement of Mikołajczyk, implementation of a new product, service, process, new strategy or changes in organization or relations with the environment (Mikołajczyk 2013, p. 96). The goal of innovation is to improve public administration and / or increase services related to activities for the benefit of applicants and activities (Krawczyk-Sokołowska I., 2013). E-services are key to the quality assessment, availability and functions of public services. Development of administration services in Poland at three levels: in the register of administrative offices, in the scope of cooperation of offices and enterprises, and between offices and citizens (Kobylińska 2015, p. 148).

E-governance for IT applications in public administration, in the scope of improving the quality of services rendered for administration and management. It is "a continuous process of improving the quality of governance and service services through integrated external and external relations with portable internet and communication devices. External relations to the office-citizen, office-business entity and office-service provider relationships include various relationships between outstanding office-office and office-staff. The purpose of creating e-administration is the effective operation of public administration in the field of services. E-administration is to simplify the handling of official matters and the available downloading of information about them. The adopted form allows for

gathering in one place extensive to various public administration units and making their procedures available on the Internet " (Wikipedia). E-governance is the application of information and communication technology (ICT) for delivering government services, exchange of information, communication transactions, integration of various stand-alone systems between government to citizen (G2C), government-to-business (G2B), government-to-government (G2G), government-to-employees (G2E) as well as back-office processes and interactions within the entire government framework.(Saugata, B., Masud, R.R. 2007). Implementing E-Governance Using OECD Model(Modified) and Gartner Model (Modified) Upon Agriculture of Bangladesh. IEEE. 1-4244-1551-9/07. Through e-governance, government services are made available to citizens in a convenient, efficient, and transparent manner. The three main target groups that can be distinguished in governance concepts are government, citizens, and businesses/interest groups. In e-governance, there are no distinct boundaries (Garson, D.G. 2006).

In Europe, for the first time, e-government began to be talked about in 1994 after the publication of the Europe and public global information by the publication page. Recommendations to the Council of Europe, in which the directions of development of the information society in Europe were signaled. The beginning of e-administration in Poland is the year 2000, when the Scientific Research Committee published the Society of global information in the general conditions of Poland to the European Union. In the same year, the Sejm of the Republic of Poland adopted a resolution on the construction of a basic information forum, and in 2001 adopted bills that were friendly to partners in the implementation of this project: the act on access to public information and the act on electronic signature. In the same year, a document entitled: ePoland was prepared. Action plan for the development of the information society in Poland for 2001-2006, which outlines an action plan for the development of the information society in Poland. On its basis, he created the "Polish Gateway" project - a central IT system, available, available to citizens and business entities related to the formalities for using electronic devices. The project has not yet been fully implemented. In 2008, the government adopted the strategy for the development of the information society in Poland until 2013, which is associated with the strategic document creating the framework for the development of the information society in Poland, including e-administration. According to Eugeniusz Bojanowski, e-administration is "public administration using information and telecommunications technologies in the operation of public services, aimed at improving the quality of services provided by administration.

The use of information and communication technologies in public administration is still a challenge, despite the fact that the level of development of public e-administration in Poland is successively subject to. Research offered by the EU offer for the growing distance between the spread of broadband internet and users of administration services in Poland. Broadband units with global computer support is a mandatory condition for the existence of e-government. Widely available universal access to the network is connected to the Internet using mobile technologies. In Poland, in 2016-2017 the most commonly used Internet access connections among public administration units are available through connections with DSL technology (76.4% and 75.3% of the number of these units, respectively), and the least often - service via a mobile narrowband connection (11.3% and 11.9%) (GUS, 2018).

Despite the dynamic development of mobile technologies, the scale of disseminating Internet access in public administration is unattainable for its maximum capabilities. This is due to the function of inhibiting the development of this method of connecting with results. Half of the surveyed public administration units not reporting problems limiting or managing access to mobile Internet access (49.6% in 2016 and 50.9% in 2017).

Currently, many e-services are available for public administration connections, including citizenship, the labor market, health insurance, the judiciary, education and culture. The most important for society and management include:

- free Trusted Profile, available confirming the identity of customers in electronic contacts with the administration;
- access to the National Court Register (KRS) throughout the country;
- access to information from the Court and Economic Monitor;
- access to Land and Mortgage Registers;

- services for the unemployed - searching the central database of job offers in Poland and abroad (www.psz.praca.gov.pl, www.eures.praca.gov.pl); online registration of the unemployed;
- health care services; eWUŚ - electronic verification of the entitlements of beneficiaries; ZIP - Integrated Patient's Guide (access to information on healthcare services provided and the amount of expenditure spent on financing those covered);
- access to e-services for organizations through garden services and the ePUAP platform (eg, adding to the voter list, submitting an application for an ID card, etc.);
- e-Declarations - submitting tax declarations for income tax, tax on services and services, inheritance and donation tax and tax on civil law operations;
- customs service - including Possible access to transactions and settlements with electronic handling of transactions with foreign trade in goods, in transit and trade in excise goods;
- e-services for people running a business (CEIDG); handling identification reports (for issuing NIP) or update reports referred to in the Act on the principles of recording and identifying taxpayers and payers; servicing reports submitted to the official REGON register, including the assignment of a REGON number; handling reports submitted to heads of tax offices submitted in the scope of registration or changes to registration data in the use of CRP KEP.
- electronic checking of the status of implementation of a passport submitted by citizenship; access to spatial data - geoportal.gov.pl, access to administration (including rescue services), services and services for spatial data using e-services and mobile devices;
- shared results regarding statistical information - CSO Information Portal (PI GUS);
- handling calls to the emergency number 112 (including the location of the places to report);
- • access to databases on the socio-economic, demographic, social situation and the state of the environment for voivodships, poviats and communes;
- • access to cultural heritage resources (www.nina.gov.pl, http://www.nac.gov.pl).

For several years, special emphasis has been put on the operation of operations that will improve the efficiency of public administration due to the widespread implementation of the electronic device management service. This way is faster and cheaper than traditional, extending the clerk's work efficiency and the number of full-time jobs enables customer service. The increasingly widespread access to the network makes this tool very popular when using spread functions by business functions and activities. Banks which offer services of accessing our services via the network have been noticed as the first advantages of the Internet. The same thing awaits public administration, a sphere more resistant to changes. Increased costs, as well as reducing the efficiency of traditional administration, that you are looking for new, cheaper and more efficient tools for carrying out tasks. (Zalewska-Bochenko, 2017).

The greatest benefits resulting from the use of e-administration services indicated by the offices are shortening the time of providing services, increasing the number of services provided by electronic devices, eliminating the use of services by clients data that are already in official resources, as well as removing customer service procedures. The largest selection of benefits, which was an increase in customer satisfaction with service, a statement based on research carried out by the office or on its behalf (4.5%) (Rozkuta D., 2012).

Over 40% of the surveyed officials used the electronic document management system, almost three quarters of unfavorable plans planned in the next 12 months to implement such a system. Electronic documentation management systems do not replace a uniform paper size, often just publish it. In addition, 37% of government administration offices and only 4% of local government administration offices declare that electronic documentation management is supported for them. The main problem in effective communication with the office by electronic means is the lack of a common application identification system.
The ePUAP Trusted Profile performs this role only to a broader extent, but encourage it to use a successive application. It is also worth considering large important forms of authentication, available in the form of an electronic signature of tax returns (Kozioł G., 2014). The popularity and reliability of this solution are associated with the use of usage and security relationships. In order to meet the goals set at the service level, Poland defined the development plans in the field of administration. The basic goal of the strategy is developed by the state thanks to the skills and intensive use of information and

communication technologies for the development of the country. One of the strategic ones is the preparation of Digital Poland. Its goal in the 2020 perspective, detailed in the National Development Strategy 2020 (SRK2020), as an objective indicating social and institutional activities that require support for faster and sustainable development of the country and improvement of the life of the population.

The Ministry of Digitization based on analyzes of the performance of tasks under the financial perspectives 2007–2013 (7. Priority Axis Innovative Economy) in the field of e-administration, identified many problems regarding the impact on the design processes and effects of IT systems by the administration. The greatest beauty was poorly prepared by the administration to implement projects, to take over activities related to the substantive and organizational implementation of projects and the lack of a coherent concept of the application and maintenance of created systems. There was no comprehensive, strategic management of administration development, cooperation and construction of systems not cooperating with each other and duplication of activities undertaken under various projects.

Based on the identified problems developed, the integrated state information program, which aims to increase Polish policy by developing electronic service services and improving business conditions. The integrated state computerization program is an executive document for the development strategy, i.e. the Efficient State 2020 strategy. A document that takes into account the important role in planning activities co-financed by the European Union in the business perspective for 2014-2020. The program is included in the area prepared by the Ministry of Digitization, the strategic document Paper Policy on the development of Poland's development by 2020 and the Digital Poland Operational Program. The priorities of the Minister of Digitization should be rationalized from the point of view of finance and centralization of the ICT systems created by the administration, assuming that the citizen is covered by the use of various administrative activities (MoD 2016).

The basic criteria and development directions specified in the operational strategy are concentrated in five basic principles:

- the state is to be servant to the citizens - thanks to digital technology and combine distributed functions and transform complicated procedures into coherent and simple services;
- access to networks and public services must be secure for data and transactions involving the comparison of data types on the network;
- acceleration of the development of modern telecommunications infrastructure for the implementation of e-administration, social and activities;
- current, available access to data collected by public services;
- a list of compatible administration services, effective use of the benefits of digitization and competing in the global market.

The goal of the program is to increase the use of application and communication technologies in the economy, improve business operations and increase customer satisfaction and services in the field of quality and speed of operation with administration. The program of integrated creation of a coherent, logical and extensive state IT system, providing e-services at the level of coverage and services in an effective manner in terms of quality and cost. It is to take into account cooperation and new ICT systems of public administration and eliminate duplicate restrictions. The Ministry regularly monitors the percentage of citizens and users using public administration e-services and the level of user satisfaction. In the program covering four directions of intervention in which systematic actions are undertaken. Belong to them:

- open government; convey to civil society (development of information society and knowledge-based transport);
- effective and secure e-administration (designated recommendations, integration of active registers, uniform information system, consistent authentication system, electronic document management in administration);
- public e-services (citizenship, labor market, health care; justice, business and other);

- computerization of offices (management of IT services - operating standards, use of ICT, raising the competences of officials).

Successful achievement of the Program in designated directions requires the implementation of actions. They were specified in the Action Plan of the Minister of Digitization, constituting an attachment to the PZIP, which contains a schedule for the implementation of projects supporting the set goals and directions. The Ministry created the concept of the Chief National Computer Science - a set of general regulations for the computerization process. The role of the National Chief Information Technology is to centralize the ICT infrastructure and to integrate the state's ICT resources and systems. The goal is to reduce production costs and maintain IT systems. The solutions that the implementation of the integrated computerization program of the State brings with it are mutual. Expanding and facilitating access to public information, services and the quality of electronic services as well as their services for the needs of services, as well as accelerating the implementation of operations as part of proceedings involving saving time required for personal services in the office and financial finance. It should also be indicated what are available from the improvement of communication between offices, from the burdens associated with the transmission of this information, increased administrative transparency, and thus increased trust Electronic administration offering the possibility of using information, officials includes saving time, the clerk facilitates work - from charging in terms of information (Kapler M., Piersiala L., 2014).

Innovations in management of human resources in public administration

The public service is characterized by a large number of intangible assets and two-way, simultaneous involvement in factors, i.e. officials and petitioners. Account should also be taken of the significant external and human impact as well as the resulting heterogeneity in the process of providing services. One of the main activities of a public organization is the effective management of human resources in the context of covered activities. Development of tax officials offered by a pro-innovative human resource management system. Building conditions for assessing the quality of services requires the support of human resources through an incentive system targeted at those particularly involved and predisposed to professional activity in public services. Effective Leadership in public administration it consists in acquiring talented and talented employees, motivated to achieve the assumed aims and results, creative and willing to take on new challenges, engaged in self-education and updating knowledge, the needs and expectations of applicants and open to cooperation.

The potential of the managerial staff in innovation management processes is also extremely important (Skowron S, Skowron Ł., 2015). It is noted that the role of officials in innovation-oriented public organizations requires a solution to reflection in policy and practice of managing tchem (Bielski I., 2007). That is why it is so important (Małysz-Bujak E., 2009): the ability to use employee services, employment planning and control, motivating and assessing work efficiency, providing feedback to employees about the results of their work, managing the remuneration system and incentive system, creating an organizational culture, using concentrated services, implementing the idea of function general business, improving the communication system with the environment, measuring the results of managers' work, linking economic efficiency with the goals and values of a public organization, extended relations between the legal and organizational sphere and social and the sphere of public management, shaping and implementing public management principles in the context of its social conditions.

Manage in public organizations, wanting to apply innovative action to change your attitude with managing the present, to create an action plan for balancing the balance between different modes of management. Experience shows that emotionality and intuition are unfortunately too rarely recognized as an important element for decision in public. Creative thinking, creativity means the ability to formulate new ideas or combine them, at the core of which used existing solutions. To process, as part of what we are dealing with accumulation of facts, model creation and analysis, maturing ideas, creating solutions and critical ideas. (Stępień J., 2001)

Impacts affecting the level of processing in public administration include:

- environment - the number of competing organizations that can be a benchmark for the success of successes or failures, public service applicants;
- organization culture;
- organization climate;
- cosideration of organization;
- competitive strategies;
- measures to improve work efficiency;
- work planning;
- different options;
- Human Resources management;
- research and development.

It is noted that the above factors must interact with innovation in public administration it proceeded in a planned, organized way and without agreeing on complications.

Conclusion

The digitization of services related to the service is necessary in the context of the social computerization and activities that have been growing in recent years, and in view of the expectations of public administration. It is necessary to constantly improve and introduce changes in the computerization of the state to create a coherent and effective state information system, which is the basic basic efficiency of e-administration. Flexibility and constant access to resources to one of the basic solutions of the modern economy, also posed for public administration. Changes in mentality and competence preparation of officials are also necessary. The simplification of procedures and transformation includes an integrated system based on paper information processing into electronic will be a significant facilitation for companies and operators, responding to their expectations towards e-administration. The strategic goal is to increase Polish development thanks to the development of electronic services, to improve the conditions for business operations and to improve services. There is also an urgent need to address potential undesirable effects of data collection, including the need to ensure data protection and privacy for all individuals in the evolution of big data and new technologies.

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Can Digital Solutions be Applied Effectively in the Travel Industry, During Pandemic?

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Abstract

In times of crisis, the whole world changes at a large scale. Consumption behaviors are swapping as well and the most normal activities become lavishness. The key to break through is the ability to adapt in an ecosystem where social distancing is imposed and economy is collapsing. Technology plays an important role in the adapting strategy and persisting unpreceded times. But how effective are the digital solutions in an industry where human interaction and mobility is mandatory and emotions play an essential part in creating the demand? The current article aims to study the extent to which digitalization can be applied and where it can be applied. Therefore, this study cannot be complete without acknowledging technological limitations and means of improvement. In any case, the new pandemic has caught the world off guard and is putting technology through a very difficult test.

Keywords: Neuromarketing, Marketing Communication, Tourism Digitalization, Covid-19,

Introduction

On the 11th of March 2020, the World Health Organization "made the assessment that Covid-19 can be characterized as a pandemic. Pandemic is not a word to use lightly or carelessly. It is a word that, if misused, can cause unreasonable fear, or unjustified acceptance that the fight is over, leading to unnecessary suffering and death". (WHO, 2020)

Once this declaration was made, the whole world has changed. In his book entitled "Thinking Fast and Slow", Daniel Kahneman (a Nobel Prize-winning psychologist) stated that our brains rely on a dual-core system to process information and make choices. He describes the first system as automatic (emotional) and the second as controlled (cognitive). These two processes can be roughly distinguished by where they occur in the brain, and together they form the backbone of our decision-making. If we understand how each system works, we can use this knowledge to make better decisions and influence the people around us.

According to Kahneman, "System 1 (thinking fast) is intuitive, automatic and generally operates below the level of our conscious awareness. It is in this subconscious setting that we undergo different affective (emotional) states, many of which motivate impulse reactions and feelings such as hunger, fear, sexual desire and pain" (Nahai, 2017).

Therefore, as a first reaction, people from everywhere around the world, regardless of culture or social status, started to shift their attention from products and services considered in a normal economic course, such as shopping and specialty goods or services, to basic products, such as non-perishable food and sanitary products.

As a result, a significant number of industries sectors have faced a negative impact. The figure below (Figure 1) shows how manufacturing and travel and transportation industries are the most affected sectors on all four dimensions: personnel, operations, supply chain and revenue.

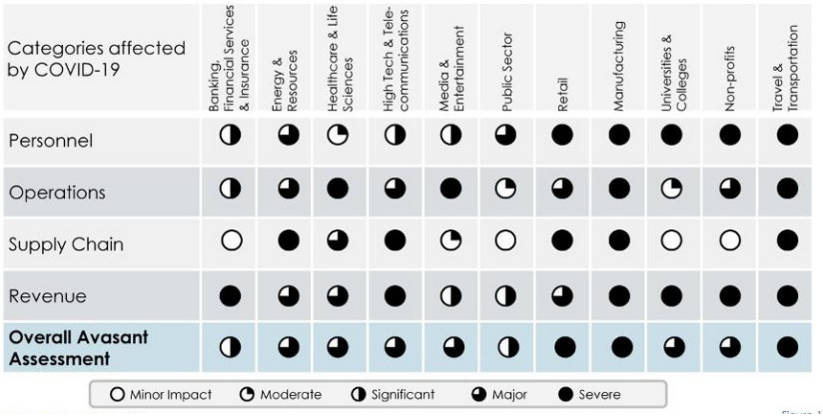

Fig. 1: Most affected industries by covid-19

Source: business2community.com

How the pandemic affected tourism

Almost in real time, after WHO declared the pandemic, people's appetite for travel decreased dramatically. According to comscore.com (Figure 2), after the 11th of March 2020, weekly visits to travel categories registered -38% for airlines, -43% for hotels and home rentals and -53% for online travel agents.

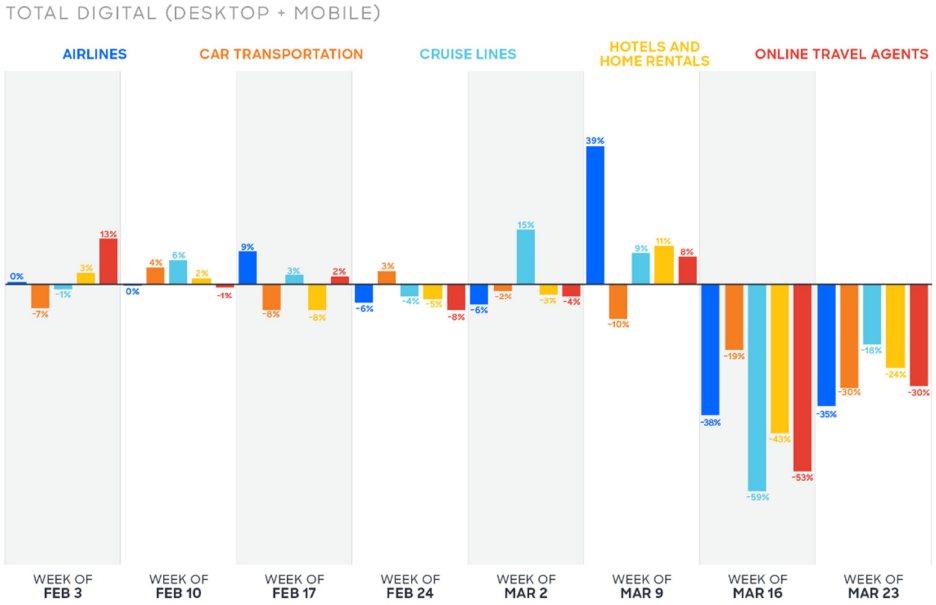

Fig. 2: Weekly visits to travel categories

Source: comscore.com

No industry has been more affected by coronavirus than the industry of making memories: tourism. As they are usually the first to feel the impact of any global crisis, tourism companies around the world have made urgent requests for help from governments.

Once the Covid-19 disease generated by the coronavirus debuted and spread, almost the whole world had to impose quarantine. In turn, quarantine greatly affected the economy, as too few companies from even fewer domains of activity could respond in time and digitalize their activity or were able to reduce the personnel to only a handful of people. As stated in Chakraborty and Maity's (1 August 2020) article, the economy of many countries is now facing the threat of high inflation and unemployment as a result of the lack of productivity brought forth by Covid-19. According to data gathered by the OECD Interim Economic Assessment (2 March 2020, cited in Chakraborty, 1 August 2020), the annual GDP growth loss will be approximately 2% for each month spent in this situation, the tourism sector will be hit among the hardest, with an output decrease of 50% or even up to 70%.

"Based on travel restrictions and an expected global recession, IATA estimates that global air transport industry revenues could fall $252 billion, 44 percent below 2019's numbers".

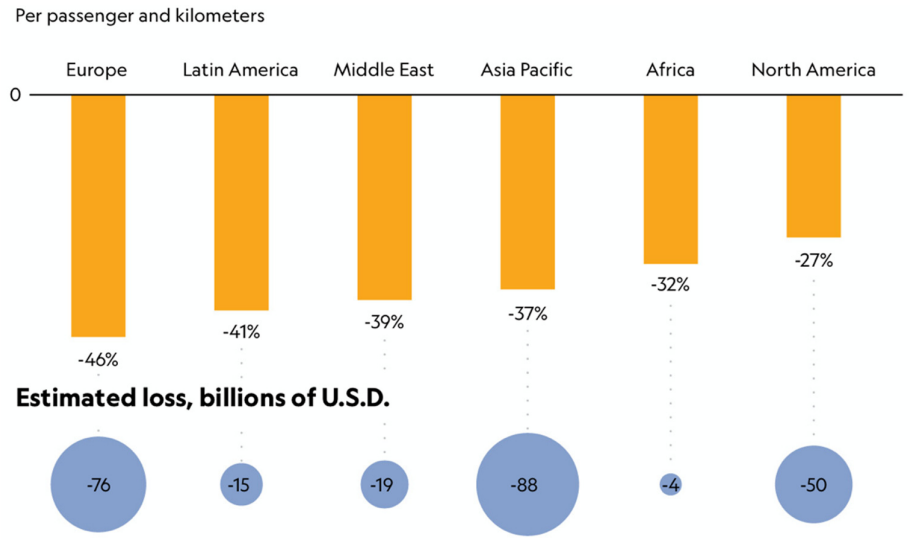

Fig. 3: Percentage change in revenue from 2019 to 2020

Source: nationalgeografic.com

As a component part of the market, the demand represents the desire for a certain product, doubled by the possibility and the decision to buy it. Tourist consumption represents services with tourist motivation. Thus, the result of the interaction between supply and demand. Tourist consumption has a larger scope than demand, because in the field of tourism we can also talk about self-consumption when holidays are spent in second homes or with relatives or friends (Minciu, 2004).

Faced with the exceptional circumstances, the tourism industry has reached a point of interruption of normal activity never seen before, as more and more borders are closed and more and more travel restrictions are imposed. The way the activity will be carried out throughout the rest of the year is impossible to anticipate. What we can do is look at how tourists feel about the current crisis, what the long-term impact of Covid-19 will be on them, and what new tactics will have to be applied to refresh the market.

Even in the aftermath of the pandemic, people will be skeptical of other people, and the market segment will be segmented into two more categories, those that wish to take a vacation as soon as possible, and those that would rather wait a few months for things to settle down once again. This can also be noted in Barbhuiya and Chatterjee's article (1 January 2020), in which they state that exogenous shocks can lead to stagnation and decline of the touristic destination, depending on the targeted market resilience. The study itself has concepts regarding specific events that took place in specific countries, thus making that place more inclined to be visited by a niche segment and less so by those concerned by their safety. Since Covid-19 is affecting the whole world, we can assume that the majority of people will not want to travel due to this perceived risk to their health.

Marketing strategies to revive tourism

We can assume that the best type of strategy regarding this pandemic will be adaptation, since the market change could not have been forecasted due to the unknown that is part of the human behavior regarding a pandemic, otherwise some companies might have been able to use an active strategy. The product life cycle should also be analyzed since all the products that are not considered essential will most likely reach a decline stage, regardless of the previous stage they were on before the pandemic.

Regarding the tourism sector during and after the pandemic, we can assume that it is most likely in the decline stage. A product modification strategy with reduced prices could prove useful, offering a more for less value proposition. After the quarantine ends, most people will not have enough money as they could not work, thus, at least the very first months they will keep saving money and only afterwards they might be inclined to get a vacation. But they are likely to wish to spend less money, while still being able to enjoy themselves.

Going back to the two above-mentioned segments, the more health concerned segment will most likely want a later appointment towards their preferred destination, while the other segment, which comprises of people less concerned of their health, is more prone to visit certain destinations sooner rather than later. Those two segments can be offered totally different offers, but in the same mindset of more for less, the first segment can be offered an almost VIP experience for the standard price, while the second segment can be offered additional services to the standard package, like a hot meal under x monetary units at a specific restaurant or one free spa, those services can be personalized depending on the original segmentation, due to demographics and other aspects.

The reasoning behind these offers is that those booking a later appointment may be inclined to take those offers and they will have the money for it since it will not be on the immediate term, the second segment will get the standard package at a reduced price with extra services, but in order for the short-term customers to be incentivized to visit a certain destination now rather than later, it all depends on the extra services that need to be carefully selected to get their attention.

Decrease strategy – "**Customer churn** is calculated by the number of customers who leave your company during a given time period. In a more down-to-earth sense, churn rate shows how your business is doing with keeping customers by your side" (Plaksij, 2015). In order to prevent churn tourism, agencies should give their customers reasons to stay by showing them the benefit of using their services (Plaksij, 2015).

Adaptive strategy – in order not to lose their clients or the money they already paid, the tourism agencies should adapt to the new situation and use the following ideas:

- extend the validity of holiday vouchers
- offer the same services but at another time of the year
- send offers for the areas not affected by Covid-19

Digital solutions

Taking into consideration the restrictions imposed by the quarantine, many businesses have tried to adapt and shifted to the digital environment. Schools have moved the teaching to e-learning platforms, fitness studios started training via video calls and restaurants, which were not considering home delivery before, now partnered with delivery services suppliers and take orders online. In tourism, there are suppliers that play in different industries sub-sectors: travel, leisure, entertainment, arts and culture, and hospitality.

Therefore, the touristic sector cannot be fully digitalized, and even so it would take great investment in order to do so. Some investments can be made in Virtual Reality (VR) equipment, but this will also

require the management of an application through which the consumer will be able to "visit" a specific destination.

The application itself will have various destinations through which the consumer can choose and live the experience without actually being there. Now, in order for this to work, either the application would charge a specific amount per destination, or the equipment would be used at the tourism company's headquarters for a certain amount of time, or even loaned, on the condition that it is disinfected after each use.

The application could be charging a respective amount per destination visited or even as a subscription, this way consumers who do have a Virtual Reality (VR) equipment do not have to actually visit the headquarters or subsidiaries in order to use it.

The end result is similar to the "Virtual Reality in Tourism" videos, but of higher quality, in order to immerse the customer into the touristic experience.

Two examples of this kind are VR Cities application and Google Arts & Culture application.
VR Cities uses a very similar concept to Microsoft Encarta or Google Earth, the pioneers of VR travel. This application comes with a list of most wanted cities in the world to be visited; Berlin, Hong Kong, Chicago being just a few of them. The user taps on the city he would like to virtually visit and another list of the touristic landmarks or main attractions in the chosen city will appear. The user only has to "walk through" and let himself immersed in the beauty of the landscape (Figure 4).

However, the "walk" through the city is quite limited, since the location is brought in the applications by professional cameras, the user cannot get lost among the streets or enter any shop for souvenirs.

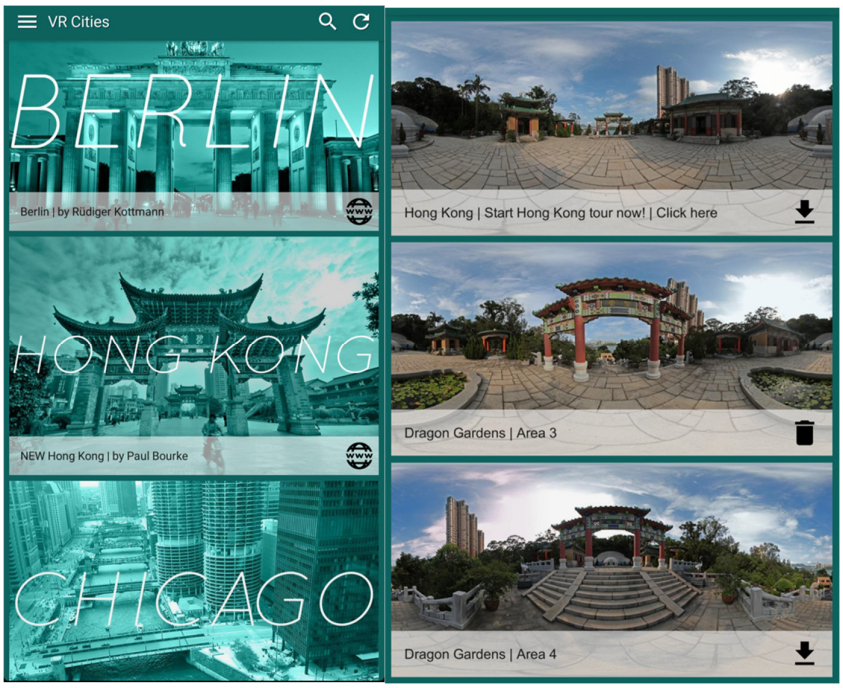

Fig. 4: List of virtual cities and places

Source: VR Cities application

The lack of access to museums, generated by pandemic, can be fulfilled by the fast response the most famous museums had. The partnership between Google and MoMa, Van Gogh Museum, Louvre, Sorolla Museum or Musee d'Orsay. Google Arts & Culture, fulfills effectively the desire for cultural

activities (Figure 5). The masterpieces are pictured in high quality and they can be visualized for free, while at a visit to a museum there is usually an entrance fee.

Definitely the art enthusiasts will argue that the experience of living the emotion of admiring a Van Gogh, a Vermeer or a Michelangelo in reality is not the same and the smallest details cannot be seen via the app.

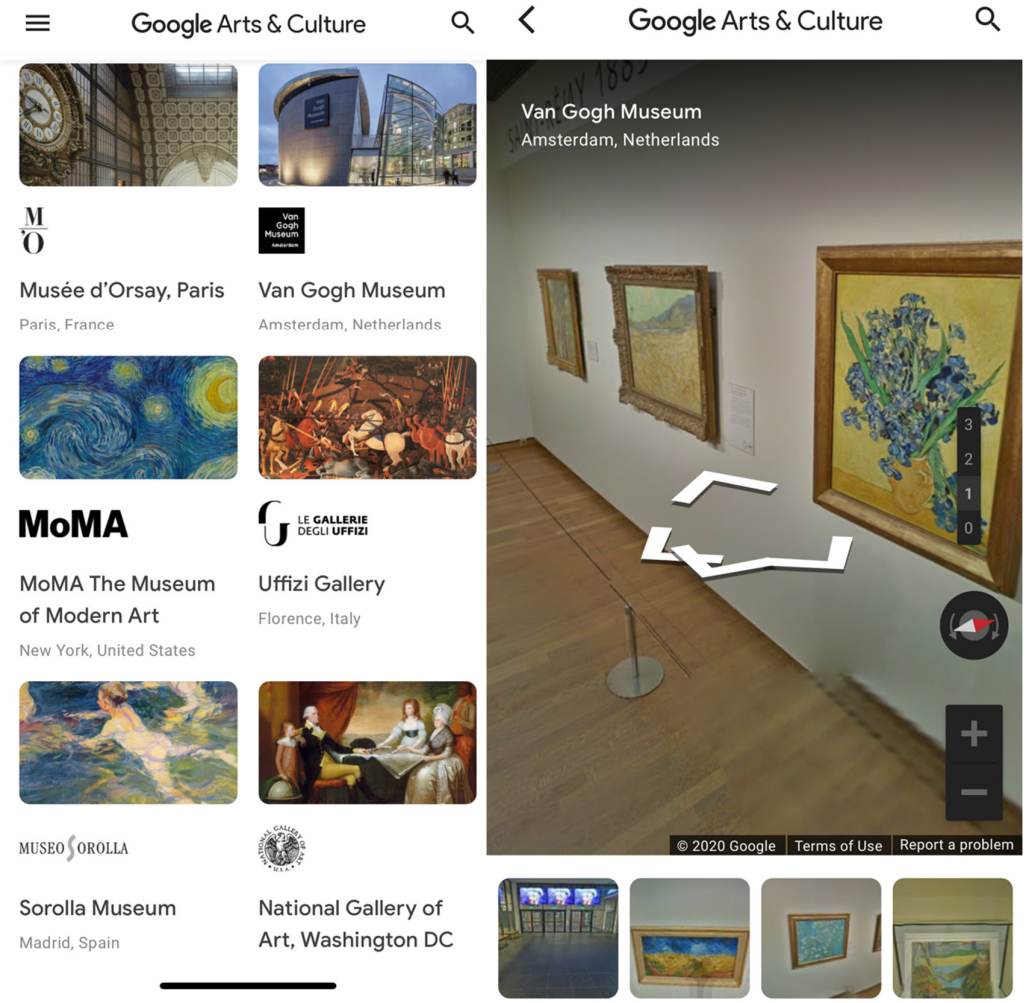

Fig. 6: Virtual Museums Tours and Van Gogh Museum, Netherlands

Source: Google Arts& Culture application

"People, businesses, and agencies are continuing to move to using virtual reality worlds because they are tired of traveling, have less money to spend on travel, and are realizing the power associated in these worlds. My motto is, "Essentially everything that can be done in person can be done over the Web using various technologies" (Epstein et al., 2013)".

"Digital transformation of companies involves fundamental changes in business process, including digitalizing everything that can be digitalized (Basly and Hammouda, 2020)".

Longstanding business models are affected by the digital transformation, that is why new businesses face new opportunities. Digital transformation means the use of digital technologies, which will aid in changing the business model and creating new approaches and opportunities for the creation of new added value. Despite the growth of online distribution of tourism packages and tourism offers, there is

still a significant part of untapped potential for websites and resorts. For example, AirBnb became the biggest hotel in the world without ever having to place a single brick. That is a key example of the change in the environment (Zahariev, 2019).

A responsive state should proactively develop resilience of vulnerable subjects in order to better monitor potential exploiters and equip them with more tools to avoid or resist exploitation (Fineman et al., 2017).

Digital transformation implies intelligent management of human resources, creative and innovative models for good management, creative mobile applications, an Internet of everything connected to the travel industry, big data, open data, artificial intelligence, hotel software, booking software, developed following a new principle, a new type of digital travel marketing and management and new tendencies in the communications over powerful social media platforms (Zahariev, 2019).

Conclusions and limitations

Even though technology is aiming to help the most affected industries survive during the pandemic and the financial crisis, there are limitations that cannot be ignored. While digital transformation can support the tourism sector in improving safety and security or automating processes, when it comes to experience, VR can only provide a hint, a trial of what the place looks like.

We can talk about VR as an instrument of keeping tourism customers engaged with the "product" until the pandemic passes and maybe use it in the future as a "sample" before purchasing a vacation.
"Still, there is a big gap between using virtual reality to "try before you buy" and treating virtual reality like the destination itself" (National Geographic b., 2020).

"Limited sensations are another hurdle. The videos focus on sounds and sights but cannot do much with smell, touch, or taste, and VR experiences tend to only be a few minutes long—hardly the equivalent of a two-week vacation in Spain" (National Geographic b. 2020).

Despite the fast-evolving technology trend, the experiences, the emotions and the places where the memories are born, cannot be replaced by technology.

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Market Efficiency in the Nigerian and Ghanaian Stock Markets

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Abstract

In literature, there has not been a known comparative study published on Nigeria and Ghana stock markets. The study is considerably important to enable a fair comparison of the level of improvement on the Ghanaian and Nigerian Stock-Exchanges. We observed market responsiveness to information. We engaged Partial Autocorrelation in testing the independence of prices. We used One-sample Kolmogorov Smirnov to investigate recognizable trends in movement of prices. Price movements were found independent in these two markets. Results of the Partial Auto Correlation's test show independent movements of prices. However, Runs and Distribution patterns display prices movement, which is not completely random. Study shows that the two markets are similar in every respect as they both exhibit independence in stock movements, show non-randomness as well as the presence of observable trends within the period under study. We conclude that no one could really draw a line of difference between the two markets.

Keywords: efficient market; stock exchange; price movement; information-efficient

Introduction

Efficient market hypothesis holds that no investor is able to sustain reaping of abnormal profits when all investors are well informed of the existence of an accruable abnormal profit at a particular segment of the market. They would all rush into such investment to reap of the profit; thereby, they increase the demand for such an investment; and thereby force out the abnormal yield.

Even though the strong form efficient market holds to the believe that no investor can earn any excess returns, the hypothesis holds that efficiency can be at its strong, semi-strong, or its weak form. It is at its strong form when no one earns any excess profit no matter the form of analysis employed, but at its weak form when some fundamental analyses enable excess returns; even if on a very short term. This implies therefore that the hypothesis asserts that excess returns can be earned on the capital market when strategies based on historical share prices are used. It implies that the hypothesis does not subscribe to the fact that technical analysis techniques will be able to consistently produce excess returns. It avers that there are no patterns to assets' prices. That is, future price movements are random; they are determined by unexpected information.

Thus, it can be said that stock market efficiency basically concerns the nexus between prices of shares and information. In the words of Markowitz, as Akinsulire (2003) puts it, the efficiency of the market can be discussed or measured in categories. In the categories are the strong-form of efficiency, the semi-strong form, and the weak-form of efficiency as Fama (1970) defines it. At the weak form, prices are random. No historical price pattern could be studied and utilized to enable abnormal profits. Daily prices are independent of one another. Future earnings cannot be predicted accurately. There is no pre-assumption of potential price rallying. Hence, one could say that market efficiency is uncertain.

Study objectives

The central aim of the study is to find out degree of proficiency that exists in the Nigeria and Ghana stock markets. The specific objective is to investigate the extent to which the movement of stock prices in the two markets depends on previous stocks' prices movements; and compare the two. Equally, study set out to examine whether successive stocks' price movements in the two markets are random. That is, it set out to determine the extent to which there are observable patterns in the movements of prices in the two stock markets.

Research hypothesis

$H0_{1:}$ Movement of prices in the two markets are not independent.
$H0_{2:}$ Movement of in both markets are not random.

Empirical Evidence

Ignited by Fama (1965)'s study of the American stock market, series of researchers have examined the efficiency of different markets, but with diverse results. For instance, Vitali and Mollah (2010) studied the random walk hypothesis on Egypt, Morocco, Kenya, Mauritius, South Africa, Tunisia and Nigeria from 1999 to 2009. Results obtained rejected the hypothesis. Only South Africa bourse proved market efficient; even at weak-form. The results suggest that prices of stocks do not fully reflect all historical info. Aga and Kocaman (2008) examined the efficiency of Istanbul stock market, with index-20, for a period of 20 years: 1986 – 2005. The analysis confirmed the existence of weak-form efficieny. That is a departure from Vitali and Mollah (2010).

Bhattacharya and Murherjee (2002) investigated the causal link between stock prices and financial market aggregates in India, using Granger causality tests. They found no causal link between stock prices and money supply, national income, nor interest rates. Moreover, they found a two-way causation between share prices and inflation. The study perceived Indian market tended towards efficiency.
Dragota et al (2009) appraised Romanian capital market. They used daily and weekly returns of 18 quoted firms. In addition, Dragota et al (2009) equally assessed daily and weekly market returns, using multiple variables ratio, and found that most of the stock prices were information efficient.

Vosvorda et al (1998) and Nwosa and Oseni (2011) could not find stock prices reflect random walk on Prague and Nigeria stock markets rerspectively. These are in tandem with the finding of Macskai and

Molnar (1996). Macskai and Molnar (1996) utilised Ljung-Box Q Statistics to test the degree of efficiency on the Budapest stock exchange, and found traders making excessively high returns.
Afego (2012) studied the Nigerian stock market, testing for random walk, using monthly index returns over 25 years (1984 - 2009). He conducted non-parametric runs. He found the market inefficient; even in the weak-form. This is contrary to the report of Ajao and Osayuwu (2012). Ajao and Osayuwu (2012) analysed efficiency of the market using all securities being traded on the stock exchange, and the month-end All Share Index of ten years (2001 - 2010). Serial Correlation technique was utilized to observe independence of price movements, the distributive pattern, and runs test for randomness. The duo found Nigeria stock market efficient; though it was at weak-form.

Olowe (1999) too analysed monthly data obtained from 59 randomly selected securities from 1981 to 1992 on the Nigerian stock exchange. Olowe (1999) found the market conformed with the weak-form efficiency. Nevertheless, Olowe doubted if the market could pass more stringent statistical tests. Apart from Olowe (1999), some other studies on the efficiency of the Nigerian stock market, Ekechi (2002), Inegbedion (2009), Aguebor et al (2010) and Rapuluchukwu (2010), averred that the Nigerian stock market is efficient in the weak-form.
Ekechi (2002), Aguebor (2010), and Inegbedion (2009) show that the Nigerian bourse was not efficient even in the weak-form. A cursory look on the reports show that all studies reporting that the Nigerian stock market is efficient in the weak-form used All Share index, while those reporting inefficiency used just samples of selected securities (Ajao and Osayuwu, 2012)

Research design

The data analysed for study were mostly sourced from internet. The publications of the Nigerian stock market, newspapers, publications of the Central Bank of Nigeria, the monthly All Share Index used were sourced from the CBNs Statistical Bulletins. The Ghana stock exchange composite index was sourced from Ghanaian stock exchange. The population of this study comprised the Nigerian and Ghanaian markets. Samples include monthly published all shares' indexes and the Ghana composite index. The NSE All-Shares Index and the Ghanaian Stock Exchange Composite Index depict the behaviours of ordinary shares that are quoted on the Exchanges. These provide a complete representation of the market. The market index indicate direction of the markets and capitulates the scope of their movements.

The Nigerian Stock Exchange's All-Shares' Index and the Ghana Stock Exchange's Composite Index are used as performance indicators for study. Two are the aggregations of shares' price gains and losses on trading. They constitute appropriate measures of stock price changes; required to determine market efficiency.

Model specification

$$ri=\frac{n\sum xy-\sum x\sum y}{\sqrt{[n\sum xi^2-(\sum xi)^2][n\sum yi^2-(\sum yi)^2]}}$$

$$Q = n\sum ri^2$$

Where:

Q	=	Box-pierce statistic
ri	=	serial correlation coefficient (the ith lag)
n	=	sample size (financial security)

The Box-pierce statistics follow chi-square distribution with 'm' degree of freedom; 'm' is the number of lags.

Test for randomness of prices

$$Z=\frac{R+0.5+R;}{SR}$$

Where:

R = number of runs (stock price changes)
R = (2N1N2/N1+N2) **+ 1 = me**an number of price changes
SR = 2N1N1 (2N1N2 - N1 – N2) / (N1+N2) 2(N1+N2 - 1)

Where:

N1 = number of positive price changes
N2 = number of negative price changes
SR = standard deviation of the distribution (number of price changes)

Data analysis

We examined the unit root of data and obtained the following result. We used Augmented Dickey Fuller for the examination. We adjusted data for stationarity by integrating once, due to failure of Augmented Dickey Fuller stationarity test. It was after the adjustment that we conducted the analysis.

Table A. All Share Index (Nigeria). Month ends (2004-2014)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
2004	22,712.9	24,797.40	22,896.40	25,793.00	27,730.80	28,887.40	27,061.10	23,774.30	22,739.70	23,354.80	23,270.50	23,844.50
2005	23,078.3	21,953.50	20,682	21,961.70	21,482.10	21,564.80	21,911.00	22,935.40	24,635.90	25,873.80	24,355.90	24,085.80
2006	23,679.4	23,843.00	23,336.60	23,301.20	24,745.70	26,316.10	27,880.50	33,096.40	32,554.60	32,643.70	32,632.50	33,189.30
2007	36,784.5	40,730.70	43,456.10	47,124.00	49,930.20	51,330.50	53,021.70	50,291.10	50,229.00	50,201.80	54,189.90	57,990.20
2008	54,189.92	65,652.38	63,016.56	59,440.91	58,929.02	55,949.00	53,110.91	47,789.20	46,216.13	36,325.86	33,025.75	31,450.78
2009	21,813.76	23,377.14	19,851.89	21,491.11	29,700.24	26,861.55	25,286.61	23,009.10	22,065.00	21,804.69	21,010.29	20,827.17
2010	22,594.90	22,985.00	25,966.25	26,435.20	26,183.21	25,384.14	25,844.20	24,268.20	23,050.60	25,042.20	24,764.70	24,770.52

2011	26,830.70	26,016.80	24,621.20	25,041.70	25,866.60	24,980.20	23,827.00	21,497.60	20,373.00	20,935.00	20,003.40	20,730.60
2012	20,875.80	20,123.50	20,562.50	22,045.70	22,066.40	21,599.60	23,061.40	23,750.80	26,011.60	26,430.90	26,494.40	28,078.80
2013	31853.18	33,075.14	33,536.25	38,485.56	41,474.40	42,482.48	42,097.49	41,532.31	36,585.08	37,622.74	38,920.85	41,329.19
2014	40,571.62	39,558.89	38,748.01	38,485.56	41,474.40	42,482.48	42,097.49	41,532.31	41,210.10	37,550.24	34,543.05	34,657.15

Source: CBN Statistical Bulletin 2014

Unit root test

Table B. Result of the unit root test

Augmented Dickey Fuller (ADF)					
Variables		Test Statistic	Probability	Status	Remark
ASI	1st Difference	-4.180128	0.0010	1(*1*)	Stationary
GSE-CI	1st Difference	-9.842816	0.0000	1(*1*)	Stationary

On the table above, the ADF test shows that both the ASI and GSE-CI are stationary at first difference. Thus, the 1st difference of the variables are used to perform the analysis to obtain normal results.

Test of hypotheses

We used Partial Autocorrelation to test for individuality of prices in the market. Equally, we used Ljung-Box and the Box-Pierce to test for the significance of autocorrelation coefficients. Based on the outcomes of the series of tests conducted we arrive at the following conclusions.

Hypothesis 1**:** The movement of prices in the market is not independent.

Test Statistics: (i) Partial Autocorrelation test (PACF)
(ii) Autocorrelation test (ACF).

Table C: Result of Partial Autocorrelations

Lag	Partial Autocorrelation	Std. error
1	.153	.087
2	.194	.087
3	.204	.087
4	-.173	.087
5	.086	.087
6	-.040	.087
7	.123	.087
8	-.136	.087
9	.132	.087
10	.051	.087
11	-.107	.087
12	-.029	.087

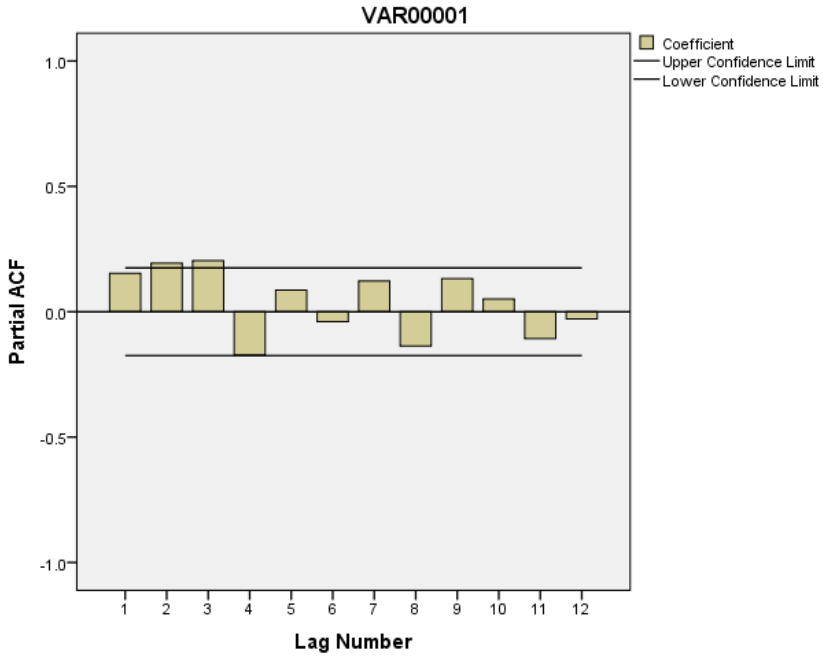

Fig. 1: Partial Autocorrelation 2 Standard Error Test

As seen in Fig.1, lags 2 and 3 of these 12 lags violate the two standard error limits; lag 4 is only just within. All the remaining 9 lags fall inside the range. Thus, a significant percentage of the 12 lags (above 75%) are within the two standard errors limit. Hence, we accept the null hypothesis. We conclude at 95% confidence level that movement of prices in the stock market is independent.

Table D. Autocorrelations

Lag	Autocorrelation	Std. error[a]	Box-Ljung Statistic			
			Value	Df	Sig.[b]	Remark
1	.153	.086	3.154	1	.0.76	Not significant
2	.213	.086	9.255	2	.0.10	Significant
3	.248	.086	17.623	3	.001	Significant
4	-.086	.085	18.254	4	.001	Significant
5	.136	.085	20.819	5	.001	Significant
6	-.004	.085	20.821	6	.002	Significant
7	.084	.084	21.821	7	.003	Significant
8	-.035	.084	21.999	8	.005	Significant
9	.079	.084	22.893	9	.006	Significant
10	112	.083	24.709	10	.006	Significant
11	-.108	.083	26.416	11	.006	Significant
12	.064	.083	27.018	12	.008	Significant

The Box-Ljung statistics as contained in the Autocorrelation test show that only the 1st lag is not significant. Results of the Box-Pierce Q statistics show that the overall significance of the test is poor; the tabulated value of the Box-pierce Q is higher than the calculated value. Hence, we accept null hypothesis. Therefore, it is reasonable to conclude that at 95% confidence level, the changes in prices of stocks traded on the floor of the Stock Exchange are independent. This result is consistent with that of the partial autocorrelation test.

$Q = n\sum r_i^2$ where n is the sample size

What informs the use of this statistics is that high sample autocorrelations lead to large values of Q. If the calculated value of Q exceeds the appropriate value in a χ^2 table, we reject the null hypothesis. This implies the acceptance of the alternative hypothesis; that at the minimum, one autocorrelation is not zero.

Table E: Box-pierce statistics

0.153^2	0.023409
0.213^2	0.045369
0.248^2	0.061504
-0.086^2	-0.007396
0.136^2	0.018496
-0.004^2	-0.000016
0.084^2	0.007056
-0.035^2	-0.001225
0.079^2	0.006241
0.112^2	0.012544
-0.108^2	-0.011664
0.064^2	0.004096
	$^{\Sigma}$=0.158414

Q = 0.158414 × 132
Q = 20.911
Box-pierce statistic$\sim\chi^2_{\propto,\,m}$
$\propto$ = 0.05
Bp$\sim\chi^2_{0.05}$, 12 = 21.026
Bp > $\chi^2_{\propto}$, m
Hence, we admit null hypothesis; since Q > Bp
This implies that changes in prices of stocks are dependent. Hence, investors can predict future price movement from past stock prices. Hence, the Nigerian stock market lacks efficiency; even at the weak-form.

Test for randomness

Hypothesis 2**:** The movement of prices not random.

Table F : Runs test

	VAR00001
Test value	31568.9164
Cases< Test value	80
Cases>= Test value	52
Total Cases	132

Number of runs	4
Z	-10.988
Asymp.Sig.(2-tailed)	.000

As shown in Table F the calculated value of the Z-statistic is -10.988 with an associated asymptotic significance (2-tailed probability of 0.000). Therefore, the null hypothesis is accepted at 1% level. Thus, at 99% confidence level, we conclude that the stock price movement in the stock market is not random.

Although the results from this study contradict few previous studies already done on the Nigerian Stock Exchange, which have employed the Runs test, they are consistent with many others like Appiah-Kusi and Menyah (2003), Smith (2008), Emenike (2008), and Mollah and Vitali (2011). Given that African Stock Markets, including the Nigerian stock exchange, are bothered by problems of thin trading, lack of market transparency and poor regulatory standards (Mlambo and Biekpe, 2005). Therefore, the results reported in this study are not inconsistent with expectations.

Distribution patterns

The normal curve in Fig. 2 shows that the distribution Patterns is asymmetrical, since the shape of the curve to the left of the line of symmetry is conspicuously different from the shape to the right of the line of symmetry. The implication is that the distribution pattern of the Stock price movement is not Random. This is consistent with the result of the Runs test earlier carried out.

Test for observable trend

Hypothesis 3: There is no observable trend in the movement of stock prices in the Nigerian stock market. This test was carried out using the one-sample Kolmogorov smirnov test.

.

Table G. Result of the One-Sample Kolmogorov Smirnov test

N		132
Normal Parameters[a],[b]	Mean	31568.9164
	Std. Deviation	11177.58123
Most Extreme Differences	Absolute	.217
	Positive	.217
	Negative	-.147
Kolmogorov-smirnov Z		2.497
Asymp.Sig.(2-tailed)		.000

One-sample Kolmogorov-Smirnov test

As shown in Table G, Kolmogorov-Smirnov calculated value of the Kolmogorov-Smirnov Z is 2.496 with an associated asymptotic significance (2-tailed probability of 0.000). as a result of this, the null

hypothesis is rejected. The implication is that we conclude at the 99% confidence level that there is an observable trend in the pattern of price movement in the market.

Discussion of findings relative to Nigerian Stock Exchange

The results of the autocorrelation and partial autocorrelation tests indicate that the movement of stock prices in the Nigerian stock market is independent. This implies it is impossible for investors to use previous stock price movements to predict potential prices or use today's stock price movement to predict future prices. Contrarily, the results of the runs test and distribution patterns of price changes show that price movement is not random; thus signalling that the Nigerian stock market is not efficient, even in the weak form. In other words, it is possible for investors to beat the market; that is, make gains on the basis of privileged information. Although this result is inconsistent with those of Olowe (1999) and Rapuluchukwu (2010); it is consistent with the findings of Ekechi (2002) and Inegbedion (2009).

Test of hypotheses for the Ghana stock market

The same tests that was carried out for the Nigerian bourse was also carried out for the Ghana Stock Market. The aim is to promote fair comparison of the two markets.

Table H. Data presentation [Ghanaian Composite Index (GSE-CI)] Months end (2004-2014)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
2004	3,798.06	4,633.14	4,633.14	6,543.95	6,853.00	7,045.40	7,125.05	7,316.31	6,997.79	6,932.90	6,747.41	6,798.60
2005	6,889.44	6,737.21	6,453.84	6,108.19	6,050.03	5,862.74	5,019.66	4,836.56	4,880.06	4,903.68	4,801.89	4,778.07
2006	4,702.60	4,739.60	4,773.28	4,791.74	4,855.26	4,851.32	4,903.19	4,932.18	4,963.00	4,993.93	5,013.71	5,026.80
2007	5,032.95	5,065.75	5,113.15	5,162.19	5,247.18	5,318.29	5,368.71	5,587.94	5,675.91	5,837.58	6,381.27	6,595.63
2008	6,718.48	7,011.03	7,851.54	9,344.69	9,812.26	10,349.68	10,655.21	10,812.91	10,921.46	10,781.02	10,573.43	10,431.64
2009	10,220.99	9,836.84	9,247.17	8,822.91	7,496.02	5,423.03	5,230.49	5,900.41	6,292.14	5,378.72	5,386.48	5,572.34
2010	5,625.42	5,541.15	6,014.34	6,518.88	7,172.08	6,591.10	6,394.02	6,821.80	6,835.71	6,886.31	7,101.23	7,369.21

2011	**1,057.14**	**1,051.83**	**1,071.50**	**1,100.38**	**1,162.78**	**1,188.91**	**1,170.85**	**1,145.12**	**1,098.38**	**1,007.86**	**987.26**	**969.03**
2012	**974.53**	**1,016.47**	**1,046.88**	**1,056.10**	**1,022.95**	**1,045.48**	**1,027.78**	**1,025.90**	**1,047.72**	**1,116.27**	**1,133.47**	**1,199.72**
2013	**1,270.72**	**1,482.26**	**1,733.47**	**1,800.66**	**1,884.26**	**1,880.26**	**1,936.29**	**1,989.55**	**2,030.96**	**2,099.88**	**2,123.75**	**2,145.20**
2014	**2,255.52**	**2,420.91**	**2,386.34**	**2,255.27**	**2,319.12**	**2,373.38**	**2,300.35**	**2,200.18**	**2,239.68**	**2,249.33**	**2,266.92**	**2,261.02**

Source: Annual Reports Ghana

Table I. Results of the partial Autocorrelation

Lag	Partial Autocorrelation	Std. error
1	.145	.087
2	.012	.087
3	.042	.087
4	.073	.087
5	-.024	.087
6	.022	.087
7	.062	.087
8	-.068	.087
9	-.062	.087
10	-.117	.087
11	-.051	.087
12	-.032	.087

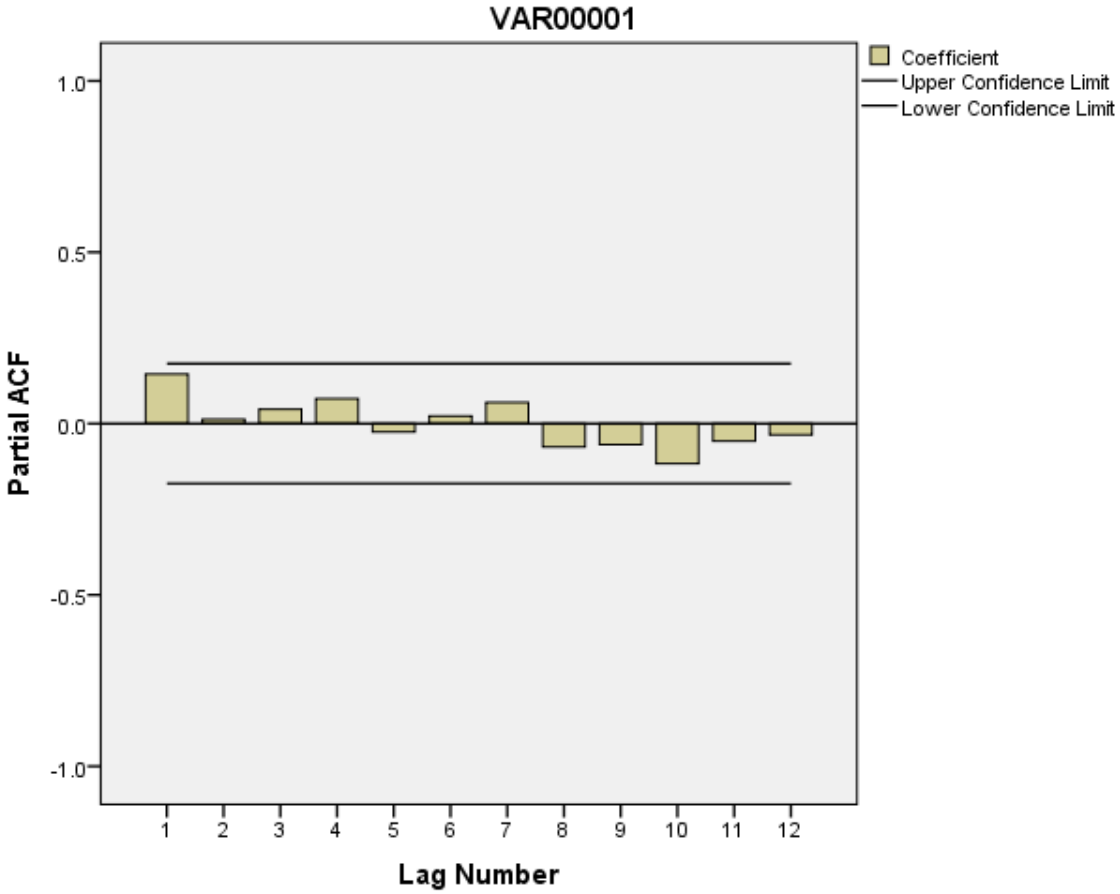

Fig 3: Partial Autocorrelation 2 Standard Error Test

Result in Fig 3 shows that out of the 12lags, none of them violate the two standard error limits, but are all within the range. The implication of this is that the degree of independence of the stock price movement is maximal. Hence, we accept null hypothesis. We therefore conclude that at the 95% confidence level the movement of prices in the Ghana Stock Exchange is independent.

Table J. Result of the Auto correlation test

Lag	Autocorrelation	Std. Error[a]	Box-Ljung statistic			
			Value	Df	Sig.[b]	Remark
1	.145	.086	2.804	1	.094	Not significant
2	-.033	.086	2.951	2	.224	Not significant
3	.048	.086	3.261	3	.353	Not significant
4	.084	.085	4.234	4	.375	Not significant
5	.000	.085	4.234	5	.516	Not significant
6	.022	.085	4.303	6	.636	Not significant
7	.072	.084	5.026	7	.657	Not significant

8	-.042	.084	5.270	8	.728	Not significant
9	-.073	.084	6.038	9	.736	Not significant
10	-.125	.083	8.295	10	.600	Not significant
11	-.077	.083	9.147	11	.608	Not significant
12	-.065	.083	9.774	12	.636	Not significant

Table K. Box-Pierce statistic

0.145^2	0.021025
-0.033^2	-0.001089
0.048^2	0.002304
s0.084^2	0.007056
0.000^2	0
0.022^2	0.000484
0.072^2	0.005184
-0.042^2	-0.001764
-0.073^2	-0.005329
-0.125^2	-0.015625
-0.077^2	-0.005929
-0.065^2	-0.004225
	$\sum$ =0.002092

Q=0.002092× 132
Q=0.2761
Box-pierce statistic~$\chi^2_{\propto,\,m}$
$\propto$= 0.05
Bp~$\chi^2_{0.05}$, 12=21.026
Bp> $\chi^2_{\propto}$, m

The Box-Ljung statistics from the Autocorrelation test shows that all the lags are not significant. Results of the Box-Pierce Q statistic shows that the overall significance of the Autocorrelation test is poor since the calculated value of the Box-pierce Q is less than the tabulated value. Hence, we reject the null hypothesis. In other words, it is reasonable to conclude that at 95% confidence level, the changes in prices of stocks traded in Ghanaian Stock market are independent.

Table L. Runs test

	VAR00001
Test value	4721.8402
Cases< Test value	51
Cases>= Test value	81
Total Cases	132
Number of runs	5
Z	-10.801
Asymp.Sig.(2-tailed)	.000

Table 4.12 shows the calculated value of the Z-statistic is -10.801 with an associated asymptotic significance (2-tailed probability of 0.000). Consequently, the null hypothesis that the stock price changes are random is rejected at the 1% level. Thus, at the 99% confidence level, the stock price movement in the Ghanaian market is not random. This result is consistent with Magnusson and Wydick (2002). They made use of Partial Autocorrelation and runs test for randomness for a number of African markets. They find evidence of significant correlations in stock returns for Ghana, Nigeria and Zimbabwe, thus suggesting that these markets are not efficient, even at weak form.

DISTRIBUION PATTERNS

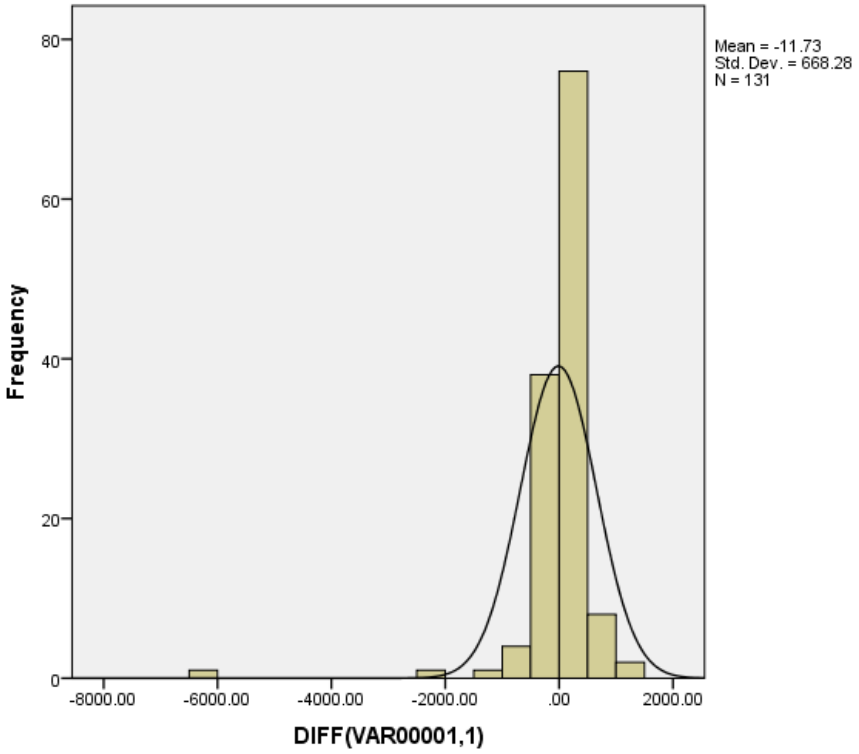

Fig

4: Distribution pattern

The normal curve in the above shows the distribution pattern is asymmetrical. This implies that the distribution pattern of the stock price movement is not random. This is consistent with the result of the Runs test earlier conducted.

Table M. Result of the One-sample Kolmogorov Smirnov test

N		132
Normal Parameters[a],[b]	Mean	4721.8402
	Std. Deviation	2801.68066
Most Extreme Differences	Absolute	.158
	Positive	.158
	Negative	-.118
Kolmogorov-smirnov Z		1.814
Asymp.Sig.(2-tailed)		.003

One-sample Kolmogorov-Smirnov test

The table above shows the calculated value of the Kolmogorov-Smirnov Z is 1.814; with an associated asymptotic significant (2-tailed probability of 0.003). Therefore, we reject the null hypothesis that there exists no observable consistent trend in the pattern of price movement. This implies, at the 99% confidence level, that there is an observable consistent trend in the Ghanaian market.

Discussion of findings for the Ghana stock market

The Ghanaian market just like the Nigerian bourse shows that the movements of prices are not independent. This means that it is possible for investors to use previous stock price movements to predict subsequent day's stock prices or use today's stock price movements to predict future prices. Furthermore, the results of the runs test and distribution patterns of the stock price changes show that the price movements are not random. This suggests that the Ghana stock market is not efficient in the weak form. That is, new information is not always diffused promptly. Therefore, it is possible for investors to make gains on the basis of privileged information. This result is consistent with Magnusson and Wydick (2002), Frimpong et al (2008), Ayentimi et al (2013) and Osei (2002).

Lastly, the one sample Kolmogorov Smirnov test for availability of trend in the pattern of stock price changes in the Ghana stock market revealed that there is a trend in the pattern of stock price movements. This means that there are short durations of bullish runs and short durations of price movements. However, even within these periods, the investors were not in a vantage position to predict stock prices with absolute certainty since the changes in the stock prices are independent. The results obtained from both the Nigerian and the Ghanaian stock markets show that they are the same in every respect as they both exhibit independence in price movements, exhibited non-randomness as well as the presence of observable trends in the movement of prices within the period under study. This shows that one could not really draw a line of difference between the two markets.

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Organizational Commitment of Public Sector Employees: Loyalty and Neglect as an Alternative Model of Response to Organizational Cultures

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Abstract

This paper proposes the model of *Exit, Voice, Loyalty*, and *Neglect* (EVLN) as a manifestation of Employees' Organizational Commitment (EOC) in responding to organizational cultures within the Indonesian public university setting. Structural equation modelling is used to fit the data provided by 150 lecturers. The best predictions are proposed for loyalty and neglect. Loyalty is expected to be found in organizations that value the organizational culture dimensions of *teamwork, respect for people, stability, attention to details* and *outcome orientation*. The proposition is expected to have important implications for practitioners attempting to improve the level of EOC of their employees which in turns to enhance the level of loyalty contributing to improvements in productivity and growth in the Indonesian public university environment.

Keywords: loyalty, neglect, employee organizational commitment (EOC), organizational culture, public sector management

Introduction

Research on organizational commitment conducted in separate Asian national cultures has shown that the meaning of commitment and predictors of commitment differ. For example, in a study of Malaysian librarian, Karim & Noor (2017) noted that 'harmony, non-aggressiveness, and a strong preference for a relationship-based orientation' were key to Malaysian values and that these values predicted AC. Similarly, in a sample of Korean workers, a warm, supportive climate positively predicted (affective) commitment (Choi *et al*., 2018). Chaudhuri & Oba (2016) found that freedom positively correlated with a commitment for Americans, but not Japanese. For Japanese, seniority positively related to commitment. This indicates that idiocentric values, such as freedom and achievement might be significant predictors of commitment in individualistic societies, whereas allocentric values, such as respect, tradition, and seniority might be important predictors of commitment in communal societies *i.e.* emphasizing relationships with others. In another psychoanalytical study on organizational commitment among Japanese employees, entitled '*Spurious Loyalty of Japanese Workers'*, Naotaka Watanabe and Kohoku-ku Takahashi (2002) show that the Japanese style of management actively promotes the employees' continuance commitment, rather than an affective commitment. Under such a system, it is very costly for workers to quit the organization they have worked for since they have almost no alternative organization to employ them in better, or at least the same, conditions. So they must remain in the company even if they no longer have any emotional attachment to it.

Cross-cultural studies of organizational commitment have been conducted consistently in many countries such as Canada, Great Britain, Belgium, Australia, Russia, South Korea, Japan, Singapore, Indonesia (e.g., Ko, Price, & Mueller, 1997; Lee, Allen, Meyer, & Rhee, 2001; Vandenberghe, 2003; Sue et al., 2009; Rajiani, 2010). With increasing globalization and awareness of cultural issues that bear on social, cognitive, and attitudinal issues in the workplace (Hofstede et al., 2010), extending research on organizational commitment to the public sector is essential. Public organizations in Indonesia are structured and run differently from their U.S. counterparts, in terms of recruitment, promotion, work environment, and political expectations (Abbas et al., 2018). As such, public university lecturers in Indonesia may have different views and motivations toward their job. Besides, the cultural orientations of the two countries are entirely dissimilar. Given these differences, it is possible that the factors that influence the organizational commitment of employees would be different in Indonesia.

Since the crucial test of commitment should be the readiness to stay as long as possible and contribute as energetically as possible , the approach derived from *Hirschman* **-exit, voice, loyalty, and neglect (EVLN)-** is a useful conceptual framework for analyzing the relationships among responses to organizational commitment (Bar-Haim, 2007). Hirschman's model, which was developed to explain varieties of consumer (customer) behavior, has broad appeal to a variety of disciplines, including marketing and political science (Lee & Varon, 2020). The theory of exit, voice, and loyalty suggests at least three possible option as responses to dissatisfaction.

Given the importance of Employees' Organizational Commitment, the overall objective of this study is to provide practitioners with an insight on how they can enhance the level of EOC within their organization. The study aims at achieving this objective by extending the literature examining the contextual factors influencing EOC. This way, the study's overall objective is to examine the association between cultural factors and level of EOC among Indonesian employees working in Lambung Mangkurat Universities Banjarmasin reflected in *Loyalty* and *Neglect* behaviour. Specifically, the study will explore the association between EOC with the six dimensions of culture attributed to Chatman and O'Reilly's (2016) Organizational Culture Profile (OCP) measure: *team work; respect for people; outcome orientation; innovation; stability and attention to details*.

Employees Organizational Commitment (EOC)

There are many definitions of commitment, such as : *an attitude that reflects feelings such as attachment, identification or loyalty to the object of the commitment* (Viccovic & Morrow, 2019). Porter, Steers, Mowday (2013), clarify organizational commitment represents an employee's (a) *firm belief in and acceptance of the organization's goal and values*; (b) *a willingness to exert considerable effort on behalf of the organization;* and (c) *a strong desire to maintain membership.* Although more recent researchers have refined this definition (e.g., Al-Jabari & Ghazzawi, 2019), its basic concepts of the employee's identification with and attachment to the organization's values and practices have been accepted by most researchers.

Meyer et al., (1993) identified three dimensions of organizational commitment which allow researchers and practitioners to examine why employees form more significant commitment towards their organizations. These dimensions are "*affective commitment*" (i.e., commitment as an affective attachment to the organization), "*continuance commitment*" (i.e., commitment as a perceived cost associated with leaving the organization), and "*normative commitment*" (i.e., commitment as an obligation to remain in the organization). Since continuance and normative commitment is beyond the control of management (Su , et al. , 2009), this study assesses the level of affective commitment. Besides, Karim & Noor (2017) consider normative commitment as an extension of affective commitment as these two types of commitment statistically in high correlation and a lack of discriminating validity.

Exit, Voice, Loyalty, and Neglect (EVLN) Responses

Hirschman (1970) proposed the fundamental theory of exit, voice, and loyalty to outline how people respond to decline in firms, organizations, and nation-states. Since then, the theory has been used in

various disciplines including public management (John, 2017) and education (Carter et al., 2019). *Hirschman* initially described **exit** as 'some customers stop buying the firm's products or some members leave the organization: this is the exit option' (1970). A conceptual broadening of the exit option was suggested by Rusbult et al. (1988), who conceived of the exit option not only as actually quitting the job or leaving the organization voluntarily, but also as searching for a different job and thinking about quitting.

Hirschman defined voice as 'any attempt at all to change an objectionable state of affairs, not only by petitioning to management or higher authorities, but also through protests including the mobilization of the public opinion' (However, when the model is employed to describe the employment relationship, voice necessarily takes on a different meaning, defined by Rusbult *et al.* (1988) as 'actively and constructively trying to improve conditions', a form of voice also referred to as pro-social voice (Van Dyne *et al.,* 2003). In the present study, voice is operationalized as pro-social voice.

As Hirschman set out to develop a theory of loyalty, he first somewhat loosely referred to it as '. . . that special attachment to an organization known as loyalty'. In the organizational literature, loyalty was defined by Rusbult and colleagues as passively but optimistically waiting for conditions to improve, by giving public and private support to the organization, waiting and hoping for improvement, or practicing good citizenship (Rusbult et al., 1988).

As organizations and employees had already been conceived of as partners in exchange relationships long before the work of Rusbult, the assumption that neglect behavior would also occur in the work environment appeared to be a logical step. Here, neglect was described as lax and disregardful behavior, exemplified by lateness, absenteeism, error rates and using company time for personal business (Farrell, 1983; Rusbult et al., 1988). According to Rusbult et al. (1988), exit is active and destructive, whereas voice is active and constructive; neglect is passive and destructive, and loyalty is passive and constructive.

While Rusbult et al. (1988) demonstrated that different behavioral responses to the imbalance in the exchange relationship could be predicted based on exchange variables such as job satisfaction and quality of job alternatives, they did not consider the societal or cultural context in which the exchange was embedded (Thomas & Au, 2002). Exit is an active response and, as such, might also be favored by individualists. For individualists, the alternative active behavior of voice is a more acceptable option than it is for collectivists. Therefore, an exit script is not likely to be a more dominant active response option for collectivists. Within the Indonesian setting, organizations often interpret speaking up as unfavourable because it can threaten cohesiveness. This is because the social behavior of collectivists Indonesian is highly influenced by norms, perceived duties or obligations that they are less likely to exhibit non-conforming behaviour (Rajiani & Pyplacz, 2018). Loyalty has been conceptualized as both an attitude that deters exit and promotes voice and as a distinct behavioral response. As a passive and non-confrontational response, it is consistent with the vertical collectivist cultural orientation described above. Maintenance of harmony and conflict avoidance norms associated with this cultural orientation is indicative of a dominant loyalty script. Neglect, like loyalty is a passive response. Therefore, it seems inconsistent with the active pursuit of conflict resolution characteristic of horizontal individualists like Indonesian (Passakonjaras et al., 2019). Neglect and loyalty, are vague as to the target of behavior, and thus are more subtle means of responding to a dissatisfying situation that avoids confrontation with organization members. These subtle responses allow higher status members in the exchange relationship to maintain face while still satisfying the lower status individual's need to respond. Both loyalty and neglect will be more prevalent scripts for vertical collectivists than for horizontal individualists (Akhmad et al.,2020). Consequently , being vertical collectivist Indonesian employees will engage in passive exchange behavior; ***neglect*** and ***loyalty*** which is consistent with the conflict avoidance norm observed in Indonesian values ; *tepa-selira* (or tolerance), a characteristic of many Indonesian relationships practiced in part to minimize risk among individuals (Rajiani & Pyplacz, 2018).

Organizational Cultures

Organizational culture refers to 'a system of shared values and norms that define appropriate attitudes and behaviours for organizational members' (Chatman & O'Reilly, 2016) and it is one of the fundamental factors in developing and maintaining a high level of organizational commitment among employees. However, few studies have investigated the effect of organizational culture on the level of EOC (Su et al. , 2009).

Chatman & O'Reilly, (2016) Organizational Culture Profile (OCP) instrument is used as the measure of organizational culture in the present study. This measure consists of 26 items and has been used extensively (Ru et al., 2019) with similar findings regarding the dimensions of culture: teamwork; respect for people; outcome orientation; innovation; stability; and attention to detail.

Teamwork refers to the extent to which employees within a firm cooperate and work in unison towards overall organizational goals. The importance of teams has been emphasized in the modern economy as they can increase employees' flexibility and productivity which are both essential components for organizational success (Bishop, Scott and Burroughs 2000). Gil, Alcover and Peiro (2005) suggested that teams empower greater responsibility to team members, thereby increasing their involvement and commitment to work. Hayat et al. (2019) found a positive association between team work and the level of EOC and hence, the level of EOC is expected to be higher in organizations where teamwork is more prevalent.

Respect for people refers to the extent to which business units focus on fairness, respect for the rights of the individual, and tolerance (Wiedner & Mantere, 2019). Being respected by the organization can increase employees' commitment to their organization (Zappala et al., 2019). Specifically, employees who are treated with genuine respect and fairness are more likely to behave with loyalty and hard work. Du et al. (2019) found a positive association between respect for people and the level of EOC in a Taiwan organization. It is expected that a similar result will be found in Indonesia as the importance of value and respect is universal (Beauchamp, 2020).

Outcome orientation refers to the extent to which business units emphasize action and results, have high expectations for performance, and are competitive (Chatman & O'Reilly, 2016). Kumar (2019) argued that employees feel more committed in organizations that focus on pragmatic values where results are more important than processes. Hofstede et al., (2010) also suggested that employees in organizations with a process-oriented culture perceive themselves as risk-averse and only exert the minimum amount of effort on their work, while in outcome-oriented organizations; employees perceive that every day can bring new challenges and exert maximum effort into their work. McKinnon *et al.* (2003) treated the link between outcome orientation and the level of EOC as an empirical question with the results demonstrating a positive relationship. Similar findings are expected in the current study. Innovation represents a business unit's receptivity and adaptability to change, and its willingness to experiment. Further, innovative organizations are more likely to experiment with new practices and their employees are more likely to respond positively to new techniques (Rajiani & Norain, 2019).

Drucker (1998) argues that innovation requires focused and hard work every day rather than just genius, and therefore employees in innovative organizations will exhibit higher levels of EOC. A strong positive relationship between the culture dimension 'innovation' and the level of EOC was found in McKinnon et al. (2003). However, the organization in Indonesia is in paternalistic environment. The well-defined hierarchy, with its specific roles for each member inhibits creativity and innovation (Abbas et al., 2019). Further, face—a measure of social value—is an essential concept to the Indonesian. The potential loss of face from failure may discourage innovativeness. Therefore, in a culture where innovativeness is not encouraged, it becomes a differentiating cue that discriminates more from innovative and less innovative organizational culture. As such in this research , innovation is not expected to relate to EOC, making this variable is excluded from the research model.

Stability refers to the security of employment. It represents the extent to which an organization provides stable employment for employees and employees' perceptions that the employment will continue as long as they exert the appropriate effort in their job (Cairo & Cajner, 2018). In terms of Chitre's (2019) study, employees' attitudes toward job security are contingent on the behaviour of the labour market. Su et al., (2009) prove that in Australian manufacturing industry, two cultural factors (outcome orientation and stability) were found to be significantly associated with the level of EOC. Hence, given the study is conducted where economic conditions in Indonesia is growing making job security is not expected to be related to the level of EOC.

Attention to detail is defined as strict compliance with detailed rules and procedures in terms of precision and accuracy (Chatman & O'Reilly, 2016). McLarty et al. (2019) found that the extent of

specific information given by supervisors has no direct impact on employees' commitment to their organization. As a result, attention to detail is not expected to be associated with the level of EOC.

The above discussion leads to the development of the following theoretical model:

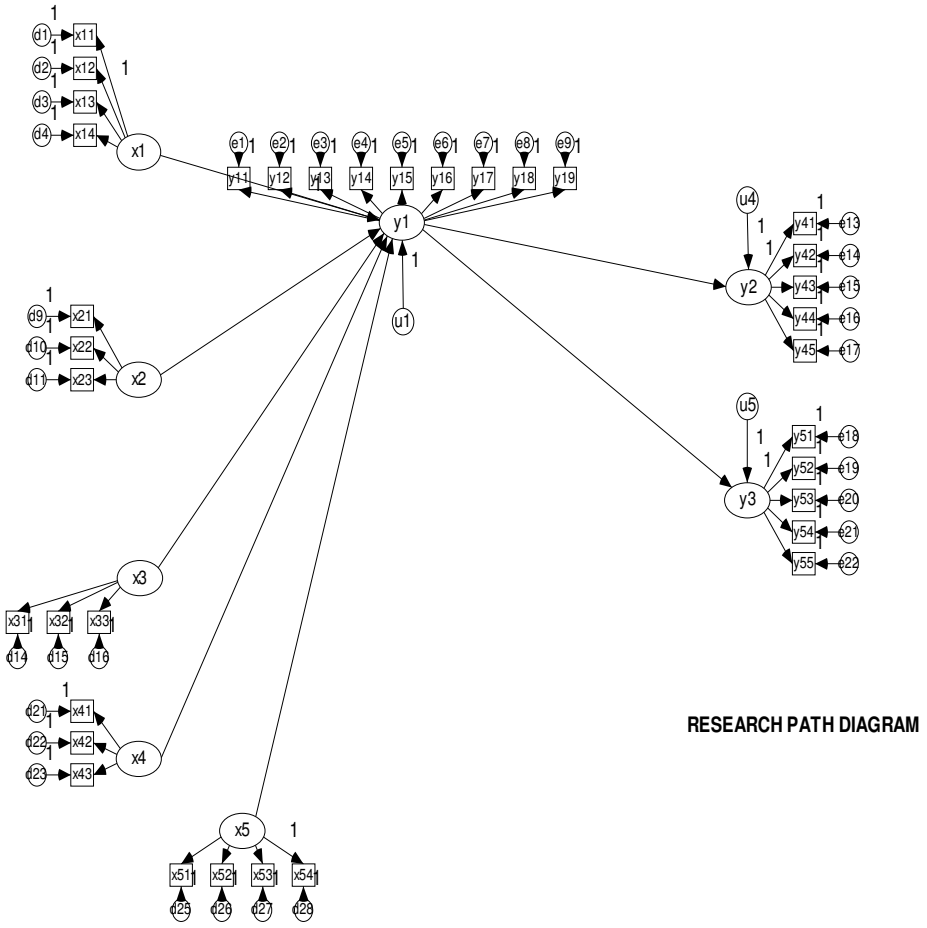

X1 = Team Work

X2 = Respect for people

X3 = Stability

X4 = Attention to Details

X5 = 0utcome Orientation

Y1 = Employee Organizational Commitment

Y2 = Loyalty

Y3 = Neglect

Given these mixed findings, the preposition concerning the relationship between organizational culture and the level of EOC is stated in the following propositions :

PROPOSITION 1: *Organizations that value the organizational culture dimensions of teamwork, respect for people, stability, and attention to details and outcome orientation to a greater extent are more likely to exhibit higher levels of EOC reflected in loyalty behaviour.*

PROPOSITION 2: *Organizations that less value the organizational culture dimensions of team work, respect for people, stability, attention to details and outcome orientation to a greater extent are more likely to exhibit lower levels of EOC reflected in neglect behaviour.*

Method

A survey questionnaire was administered to lecturers from a non-random sample of 150 Indonesian working in public universities. Using Structural Equation Model (SEM), the general rule outlined by Hair et al (2006) is that the minimum sample is to have at least five times as many observations. As there were 28 indicators to be tested, a sample of 150 falls within an acceptable sample range. This study applies Cook and Wall's (1980) nine-item scale to measure the level of EOC. It has been shown to be a reliable measure of EOC in prior studies conducted in Asian setting (Sufan et al., 2017; Lee, 2018; Choy et al., 2018; Koiv et al., 2019). The scale consists of three components (organizational identification, organizational involvement, and organizational loyalty) with respondents required to indicate the extent to which they agree with each of the statements using a five-point scale with anchors of 'strongly disagree' and 'strongly agree'. The level of EOC was measured as them combined score for the nine items (ranging from 9 to 45), with a higher (lower) scores representing a more significant (lower) level of EOC. Reverse scoring was applied for the three items that were negatively stated.

There are two main perspectives to the measurement of organizational culture, the quantitative and qualitative approaches. The quantitative approach maintains that 'culture can be objectively determined and measured' (Schmiedel et al., 2019). The qualitative approach assesses organizational culture through observation thereby facilitating a more detailed insight into the prevailing culture. Hence, given the objective of the study was to determine how differences in culture may affect the level of EOC, a quantitative approach was considered appropriate. Accordingly, organizational culture was measured using Chatman & O'Reilly's (2016) Organizational Culture Profile (OCP) instrument. This instrument was chosen as it has been widely used in many prior studies including in the education setting (Rosenthal et al., 2017).

The OCP measure required respondents to indicate the extent to which each item was valued within their organization on a seven-point Likert scale with anchors of 'not at all' and 'to a great extent'. Scores for each of these dimensions were calculated as the sum of the cultural value items which loaded on those dimensions with higher (lower) scores indicating that the cultural dimension was valued to a higher (lesser) extent.

Items used to measure neglect and loyalty use questionnaires developed by Naus and Iterson (2007). Items measuring neglect consists of reporting sick because do not feel like working, coming in late because do not feel like working, putting less effort into work than may be expected , not putting enough effort into work and missing out on meetings because do not feel like attending them.

Items measuring loyalty consists of trusting the decision-making process of the organization ,trusting the organization to solve the problem , remaining confident that the situation will be taken care, assuming that in the end everything will work out fine and optimistically waiting for better times.

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A Descriptive Approach on Motivating Factors Influencing Labour Retention among Teachers

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Abstract

Education is important as it aids the development of every society. Teachers play a crucial role in promoting this development and are responsible for training students to be informed and contributory members of the society. Dissatisfaction among teachers often leads to turnover. This research investigated the factors that motivates and influence retention among. It solely relied on the use of survey method. 100 copies of questionnaire were administered to teachers in Iganmode secondary school in Ota, Ogun state Nigeria using the simple random sampling technique. Only 80 copies of questionnaire were retrieved. Data retrieved was analyzed using the statistical package for social sciences representing the result in frequency tables and percentage. The study revealed that factors such as promotion, trainings and salary increment when due is crucial in motivating and retaining teachers. When motivating factors are not in place, it leads to extra cost of hiring and training new teachers. The study recommends that administrators in school should put appropriate measures in place such as incentives and benefits so as to make teachers satisfied and retained. There is a need to ensure also the good working condition in the school that is conductive for teaching and learning as this will motivate teachers and improve their performance.

Keywords: Retention, Satisfaction, School, Teachers, Turnover

Introduction

Education is vital in developing man power which is crucial for the social and economic development of a nation Rebore (2007). Retaining teachers have become a major issue faced by most schools globally (Msuya, 2016).. Herbert and Ramsay (2004) stated that in developing countries, teachers' turnover rate is high. These turnover rates of teachers often affect the schools and students negatively (Obineli, 2013). Also, turnover cost affects an organization in term of recruiting and training newly employed staff. It has also been noted overtime that teachers turnover have detrimental effect on the productivity of the school and academic curriculum (Frincke, 2006; Hammond and Luczak, 2005). According to Ingersoll (2011), 25% of teachers often leave the school in a span of five years in search of another school with better remunerations. Motivation is a tool that aid teachers productivity, loyalty and satisfaction Nadim, Chaudhry, Kalyar, and Riaz 2012). Schools are dependent on the commitment and intellectual abilities of teachers which make it important to ensure teachers are retained.

Literature Review

Retention is vital as it helps in ensuring continuity and reduction of turnover rates among teachers (Chiboiwa, Samuel and Chipunza 2010). Retention can be regarded as an employer voluntary move to ensure employees remain in the organization for a long period of time (Michael, 2008). Retention can be seen as steps taken by an organization to ensure employee's turnover is reduced. Retention is a process of ensuring that high performing employees remain committed in an organization (Michael, 2008). The aim of every organization is to ensure productivity and maximize profit so it is vital that employers ensure their employees are retained.

Teacher retention focuses on ensuring teachers do not move to different schools, or leave the profession before retirement (Musaazi, (2005). Teachers' retention is of utmost important to school managements because of the cost of recruiting new teachers. Amutuhaire (2010) stated that teachers can be retained by attractive remuneration. Kipkebut (2010) asserts that teachers will be retained if they are satisfied with the working conditons and welfare policies in the school.

Motivating factors that retains teachers in schools

Salary: a good salary package is crucial in the retention of teachers as they are able to meet their financial needs (Shoaib, Noor, Tirmizi and Bashir, 2009). Salary could be a factor that helps to encourages a teacher intention to leave or remain on the job or career path (Adebayo, Imhonopi and Iruonagbe, 2019). Barton (2002) suggested that financial reward such as salary can strongly influence the job satisfactions of teachers. Cowin's (2002) stated that salary helps to motivate teachers. The performance of teachers is often increased if the salary they get is commensurate with the job they do. Robbins (2001) stated in line with the Herzberg theory of motivation that salary as a hygiene factor helps to reduce job dissatisfaction among employees. According to the Expectancy theory, employees work and expect to be rewarded in turn. The form of rewards includes promotion, money etc. Employees expect that if they work well in their workplace then their performance will increase and automatically their pay will increase (Udume, Imhonopi, and Iruonagbe, 2019) Man sees money as economically important as it is used more to satisfy needs, in terms of purchasing food, shelter, and clothing. When employees are well paid, it reduced turnover intentions (Samuel and Chipunza, 2009). Employees are often in search of organizations with better pay, bonuses and higher wages (Kinicki and Kreitner, 2003). Employees who are well paid have reduced turnover intentions (Nelson and Quick, 2005). Therefore, for organization to achieve productivity, their employees must be adequately rewarded, and the rewards must be attractive and enticing (Burgess and Ratto, 2003)

Good working conditions: providing a good working condition is of great benefits to organizations, It reduces absenteeism and also improve performance and productivity among teachers. A difficult working condition can influence employees' performances negatively. A safety working environments is important as it reduces danger to life or health. It helps employees avoid accidents, injuries at work. Employees should be trained and oriented on how to the handle equipment's in the organization to reduce the rate of accidents. Good working condition leads to job satisfaction and commitment among employees (Adeniji, Osibanjo, Iruonagbe, Ibidunni, Olokundun, 2019).

Trainings: organizing training for teachers has a positive relation with retention (Ilunor 2010). Training increase chances for advancement. Training can also help to improve the current performance an employee in an organization (Miller, 2006). Training involves offering a new or improved learning experience (Paul and Anantharaman, (2003) Training helps increases job satisfaction among employees. Southwest Wisconsin Workforce Development Board (2008), states that job training is often provided by an employer in an organization to an employee. Buckley and Caple (2005) assert that training can lead to intrinsic or extrinsic job satisfaction among employees in an organization. Inadequate training in organizations could lead to absenteeism as teachers may not know what to do on the job and so loose in interest in coming to work (Adewunmi, 2011).

Promotion: promoting teachers when due have a positive impact on their job satisfaction (Demaki, 2012). Promotion is the upward mobility where an employee changes position from a lower one to another with greater responsibility. It sometimes comes with greater pay and other benefits (Ilunor, 2010). In most cases, promotion serves as feedback from an employer to an employee for a job well done. Promoting a teacher when due, enhances retention and productivity (Ikenyiri and Ihua-Maduenyi 2011). Teachers who have stayed long in a current position are often demotivated and this often triggers job dissatisfaction which can lead to turnover. Promoting teacher also helps to build their social status and boost their morale (Demaki, 2012).

Methodology

This study employed the use of survey research design. The study population consist of 126 teachers in the selected school. The sample size consists of 100 teachers. 100 copies of questionnaire were administered using the simple random sampling method to teachers in Iganmode Secondary school in Ota, Ogun State. Only 80 copies of questionnaire were adjudged usable for this research. Statistical package for social sciences was used to analyse the data. The results are presented using frequency tables and percentage.

Data analyses and results

Table 1: Socio demographic characteristics of respondents

Sex	Frequency	Percent
Male	36	45.0
Female	4	55.0
Total	80	100.0
Age		
25-34	25	31.3
35-44	34	42.5
45-44	21	26.3
Total	80	100
Marital status		
Single	20	25.0
Married	60	75.0
Total	80	100
Academic qualification		
M.Sc/Mba	13	16.3
B.Sc /Ba	62	77.5
Hnd	4	5.0
Ond	1	1.3
Total	80	100.0
Years of teaching		
1-5years	19	23.8
6-10	33	41.3
11-15	21	26.3
21-25	4	5.0
26-30	3	3.8
Total	80	100.0

Source, field work

From the table above, 45% of the respondents' are males while 55% are females. Majority of the respondent are between the ages of 35-44 with 42.5%. 25% of the respondents' are single and 75% are married. 16.3% have an MSc/MBa, majority has a BSc/Ba with 77%, 5% has an Hnd and only 1.3% has an Ond. 41.3% which constitute majority of the respondents has taught between 6-10 years while only a few 3.8% has taught between 26-30 years.

Table 2: Sources of motivation in retaining teachers

Variables	Frequency	Percent
Salary increment/welfare packages	12	15.0
Better working conditions/ better classrooms and laboratories	47	58.8
Trainings	13	16.3
More teachers needed	1	1.3
Promotion	1	1.3
Allocation of funds to the educational sector	6	7.5
Total	80	100.0

Source, field work

From the table above 15% of the respondents' state that salary increase helps to retain and motivate them, 16.3% stated that trainings serves as a form of motivation to them, 1.3% stated the need to recruit more teachers, 1.3% state that promotion is vital I retaining them, 7.5% stated that the allocation of more money to the educational sector motivates and retains them while 58.8% of the respondent which is the majority stated that the provision of better working conditions, better classrooms and laboratories helps in motivating and retaining them to remain in the school.

Conclusion and Recommendations

This study revealed that the variables such as promotion, salary, working condition and training is crucial in motivating and retaining teachers to remain on the job and in their current school of employment. The absence of these variables can have detrimental effects on the school as teachers may be dissatisfied. Job dissatisfaction among teachers can affect their teaching output. Hiring new teachers after turnover may result in incoherence in the teaching curriculum, high cost of hiring and training newly employed teachers. Thus, the study recommends that. School management should ensure teachers are promoted as at when due. Also prompt payment of teachers' salaries is important as it increases commitment among teachers. Training is vital as it aids career development and advancement among teachers. Furthermore, good working condition is necessary it motivate them

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Towards Achieving Organizational Goals Through an Improved Administrative Communication

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Abstract

Administrative communication is a very important tool towards attaining organizational objectives. The study adopts descriptive method and relies on secondary source of data collection. The data collected were analyzed descriptively. Administrative communication is an instrument for social interaction, a tool for understanding others, and a means of keeping in touch with people. The paper argues that effective administrative communication is a sine qua non for the attainment of organizational goals, while ineffective administrative communication often leads to industrial conflict and low morale. The paper further highlights the relevance of effective administrative communication towards achieving organizational goals, and the study found out that administrative communication is hindered by time constraints, hierarchy, culture, filtering, status differences among others. It therefore recommends clarity of communication, feedback mechanism, listening, consistency, completeness of the message as ways of improving administrative communication in organization.

Keywords*:* Organizational goals, administrative communication, attainment, feedback.

Introduction

Organizations are set up to achieve definite objectives (Oden 2011). These objectives need to be communicated to every employee at different levels. One of the problems that organization faces is the inability to deliver a clear message and makes the receiver have an understanding of the information (Keyton cited in Lunenburg 2010). However, effective administrative communication is one way of attaining organization objectives (Razak, Athmar, Durani, Salleh and Hamdan 2019). Effective administrative communication allows the sender to understand the emotion and intention of sending the information to the receiver (Razak et al 2019). According to Chiang, Jang, Canter and Prince (2008: 327-351), employers and employees must be consistent, clear, complete and accurate when communicating with each other. Good communication is therefore fundamental to the existence of human organization (Oden 2011). Lack of good communication in an organization tends to create conflicts between individuals and within an organization, and can cause a good plan to fail (Oden 2011; Osabiya 2015).

Karen (2004) defines administrative communication as a means by which administrative level of organization communicates with each other and also with lower employees. It involves writing business correspondence such as memos, notices, reports and letters, speaking in meetings and presentations and listening to all levels of employees, co-workers and superiors in order to be productive (Karen 2004)..

N'yel (2006) indicates that administrative communication is an instrument for social interaction, a tool for understanding others, and a means of keeping in touch with people. It also assists in establishing, extending and maintaining relationships, by giving orientation to staff and spelling out the goals of an organization. N'yel (2006) maintains that communication is the lubricant that keeps the machinery of an organization going, and the means through which roles are identified and assigned.

Since no organization can survive without effective communication, this paper therefore examines the relevance of administrative communication in the attainment of organizational objectives. It also

discusses factors that hinder effective administrative communication, and suggest ways of achieving organizational objectives through an improved administrative communication.

Conceptual Framework

The two basic concepts that are central to this study are administration and communication.

Administration

Administration is derived from two Latin words "Minor " and "Ministrare" meaning to "serve" and to "govern." It is a universal phenomenon and it is essential in every human endeavor for the accomplishment of set objectives. Administration is said to commence immediately two people agree to co-operate to undertake a task which cannot be completed by a single person (Simon, Smitburg and Thompson 1950). Thus, the bedrock of administration is co-operation. Fayol (1984) stressed that we are involved in administrative behaviour when we co-operate with other people to accomplish such objectives as erecting a community town hall, constructing and managing schools, churches, hospitals, vehicles, assembly plants etc. The modern systems of administration have emerged in one way or the other form the old practices and experiences of the ancient Egyptians, Chinese the Greeks and Romans, and much later from the Christian Church, and the German Cameralists of the middle ages (Onuoha 1999).

Communication

The word "communication" is derived from a Latin word "communis" which means common. There is no acceptable definition of communication. However, communication has been described along the dimensions of content, source, channel, destination, and purpose (Wikipedia 2007: 48). Communication refers to the process of passing information and understanding from one person to another. Communication is an act by which one person known as sender gives information to someone else known as receiver based on person's needs, desires, knowledge, opinions, and perceptions (Razak, Athmar, Durani, Salleh and Hamdan 2019). It involves an exchange of facts, ideas, opinions or emotions by two or more individuals (Rao and Rao 1996).

According to Allen (1958) communication is the sum of all the things one person does when he wants to create understanding in the mind of another. Terry and Franklin (2003) define communication as the art of developing and attaining understanding between people. It is the process of exchanging information and feelings between two or more people, and it is essential to effective management. Keyton's study (as cited in Lunenburg 2010) observe that the stimulation and motivation of employees could be achieved through administrative communication. Clamitt (1993) observes that the stimulation and motivation of employees could be achieved through administrative communication.

Administrative communication involves writing business correspondence such as memos, notices, reports and letters, speaking in meetings and presentations and listening to all levels of employees, co-workers and superiors to be productive and effective in your position (Karen, 2004). Communication which could be verbal or non-verbal could ensure the success of every organization. Non-verbal communication involves the expression of feelings and emotions at workplace (Burgoon, Guerrero and Manuson 2011). Non-verbal communication could be expressed through positive and facial expression (Burgoon, Guerrero and Manuson 2011).

The above analysis is an indication that communication has some characteristics. These are (a) It involves two or more people (b) It is a process ©It has a channel (d)It has a sender and receiver(e)There must be an understanding of the message (f) It occurs at different level, and (g) there must be feedback.

Process of Administrative Communication

Sharma, Sadana and Kaur (2011) observe that administrative communication starts with the sender who initiates the communication. The sender has an idea or information, a thought or need which he wants to transmit to some other person or persons in the group or organization. The encoding process that follows is when the sender translates his ideas into common language or symbols. The language or symbols must be specific to the purpose of the communicator's message.

The message which can be verbal or non-verbal is communicated by the sender depending on the purpose of communication. The message is communicated through a channel. Communication channel is the carrier of the message sent by the communicator, and is the link that connects the sender and the receiver. The channel can be formal like letter, memorandum, telephone, telex, computer, group meetings, policy statements, production schedules, etc. or informal like facial expression, tone of voice, body gestures (Sharma, Sadana and Kaur 2011)

Decoding process allows the receiver to translate the message into the terms that he understands. It is affected by the receiver's past experience, education, perception, expectations and common understanding with the sender. The rate at which the sender understands the message, the greater the possibility of success of the communication. The sender must take into account the socio-cultural background of the receiver, his decoding abilities, and his capacity to understand the message being transmitted (Sharma, Sadana and Kaur 2011).

The feedback loop provides a channel for the receiver response which enables the sender to determine whether the message received is exactly the same as the message sent. Feedback provides a kind of check to see how successfully the message is transferred and interpreted by the receiver (Sharma, Sadana and Kaur 2011).

Channels of Administrative Communication

Channel of communication is a path through which messages are transmitted from the sender to the receiver. Communication channels are the various means by which people at work transmit messages (Badau 2018). Channels of communication are used to accomplish various tasks in an organization (Badau 2018). Channels of organization can be categorized into formal and informal. Formal channel is established by the management and specified in the organization charts. In this channel, commands, instructions and orders travel downward, reports regarding performance, grievances and suggestions travel upward; and coordination travels horizontally. Formal channel of communication follows a formal chain of command and it includes circulars, unit meetings, board meetings which are held to ensure the enforcement of rules and regulations (Greenberg and Baron 2010). The formal communication is orderly, systematic and supports the authority of superiors. This channel of communication is very slow as it travels long distances in the organizational set up and distortions are likely to occur.

The formal channel of communication has four distinct directions: downward communication, upward communication, horizontal communication, and diagonal (Lunenburg 2008).

Downward communication travels from the superior to the subordinates and may take the form of instructions, face -to-face conversation, use of public address systems, company newspapers and bulletin boards. Badau (2018) observes that downward communication transmits information from higher to lower levels of organization. Canary (2011) identified five general purposes of downward communication: implementation of goals; strategies and objectives; job instructions and rationale; procedures and practices; performance feedback, and socialization. Distortions in communication are likely to occur if the number of levels through which the communication is to travel is large. To overcome this problem, managers must strive to forge the shortest link between themselves and the person who will carry out the order.

Upward communication travels from subordinate to superior**.** This consists of ideas**,** suggestions for improvement, requests for help or information, and expression of attitudes or feelings affecting performance on the job. It provides feedback to the management on how well things are going. It provides opportunity to the employees to contribute valuable ideas for improving efficiency and profitability of the organization. Rao and Rao (1996) suggested the following methods to improve upward communication: social gatherings, union publications, scheduled meetings, performance appraisal meetings, grievance procedures, formal suggestion system and open door policy.

Horizontal communication involves the lateral flow of information from colleague to colleague and department to department. Canary (2011) defined it as a kind of communication that takes place across the lines of the formal chain of command. It can be in form of intradepartmental problem-solving, interdepartmental coordination, staff advice to the departments, in brief horizontal communication (Canary 2011). It can also be with persons outside the organization like customers, suppliers, other organizations, etc. It is very useful when coordinated activity is necessary in order to achieve common organizational goals. Horizontal communication fosters social interaction and group cohesiveness. The methods used include memoranda, letters, and the personal face to face contacts, telephonic contacts etc.

Diagonal communication occurs when the source of a message cannot effectively reach the receiver through other existing channels. This can save time. For example, if a salesman writes directly to a client to know his requirements instead of routing the letter through his manager.

Informal channel of communication takes place outside the formal structure of an organization (Greenberg and Baron 2010). It is spontaneous and is not deliberately created by the management but it co-exists with formal communication system. Informal channels include facebook, videos, cartoons, and talks (Greenberg and Baron 2010). Employees resort to informal communication when there are barriers in the formal channels. Managers also use informal communication when they find it difficult to collect information from the workers. The best known type of informal communication is known as the "grapevine".

Grapevine or the rumour mill is the inevitable part of the organizational life. The term seems to have its origin in the American Civil War when the telegraph lines, to carry military intelligence, were garbled or interfered with, and so all unofficial messages came to be known as carried "by the grapevine" (Rao 1996)..

The communication chains formed by friendship cliques or casual associations, which carry daily gossip and news of work, are the more frequently used forms of the grapevine. It is the people at the lower levels of the organization who are likely to be important actors in the grapevine. They carry juicy pieces of information from place to place. The grapevine can carry incorrect messages as well as accurate ones. One important limitation of grapevine is that it tends to spread rumours and half-truths thereby rapidly tarnishing the image and reputation of people (Rao and Rao 1996).

Rumour is un-official information without evidence to confirm. It is based on speculation, wishes or imagination. It can be correct but most often it is not. Rumour also is the grapevine information, but it is without any authentic evidence. It is therefore, an untrue part of a grapevine.

Rumour tends to change as it passes from one person to another. Its general theme may remain the same, but details get changed sometimes beyond recognition.

Methods of Administrative Communication

There are two methods of Administrative communication. These are verbal and non-verbal. Verbal communication is used in daily activities with no record (Badau 2018). It can take place either face to face or through mechanical devices. The most natural way of transmitting messages is face to face conversation. Face to face talk eliminates the possibility of misunderstandings, because through it one can convey the message both by words and gestures.

Oral communication is used for instructing, lecturing, counseling, receiving suggestions of the workers etc. It promotes personal interaction and, therefore, is very useful in promoting relations between the management and the employees. It is used in communicating with the trade union leaders. It is useful for receiving grievances of employees and feedback from them.

Written communication is not difficult to understand if expressed in unambiguous terms. It is generally formal and verifiable. It can be in for of circulars, bulletins, manuals, handbooks, notes, orders, instructions, etc. Written communication serves as a permanent reference for future. It is found useful by the executives when the assignment is important and it is necessary to fix responsibility. Workers and trade unions communicate with the management through written communication and they prefer to receive response from the latter through this medium. But compared to oral communication, it is very slow. If the language of the letter is ambiguous or faulty, the written communication can lead to confusion, disputes or other such problems. Written communication may be blocked through bureaucratic procedures or red tapism. Poorly drafted written communication can give rise to queries for clarification and elaboration which may lead to further loss of time and money.

Non-verbal communication is a kind of communication through gestures or postures and it is used as a means to supplement verbal communication. Non-verbal communication gives an impression of people to others without saying or writing anything. It also reinforces what is being said or written. The main components of this communication are: appearance, manner, expression, eye contact, body movement, position, listening (Badau 2018).

Relevance of Administrative Communication in Organization

In any organization, communication is a very essential tool towards achieving the set objectives. The general public must be provided with adequate information to help them make better decisions and identify opportunities that could improve their quality of life. It is true that the decisions made by the administrators are greatly affected by the way they communicate. That is why it should be practiced properly when in office and even outside appointments (Karen, 2004).

Chabra and Suri (2000), highlight the importance of communication in organization to include:(i) It helps the management in making the employees understand the objectives, plans and policies of the organization. (ii)It develops understanding between the superiors and the subordinates. Therefore, it leads to better human relations in the organization. (iii) It helps in controlling the performances of different individuals and departments of the organization. (iv) It facilitates decision- making by providing necessary information in time. (v) It provides unity of direction to various activities of the organization. (vi) It is an effective device for achieving participation by the workers. (vii) It facilitates change on the part of employees by modifying their behaviour.

Factors that Hinder Effective Administrative Communication

Robbins (1980) believes that there are three types of barriers to communication. These are physical, individual and semantic. According to him, since organizations are formal structures, they cannot help but create barriers to effective communication. The existence of excessive hierarchy creates physical distance between people. The reliance upon the unity-of-command concept requires that formal communications follow prescribed channels through the organization

Also, instead of listening in a rational, or objective manner to what is being said, people occasionally become emotionally involved. People inject their value systems into what they hear or read. Robbins explains the semantic barrier by saying that things mean different things to different people. The meanings of words are not in the words but they are in us. Cushyway and Lodge 1999 cited in Osabiya 2015: 84 identified the barriers to effective communication like unwillingness of the sender to communicate the necessary message very clearly, or with the receiver who may be unable to understand the message being sent, or there may be environmental factors affecting the conditions under which the message is conveyed, such as noise.

Apart from the distortion in communication process, Huneryager and Heckman (1972) identify the following barriers to effective communication:

Many people in organizations cannot communicate effectively because they cannot use words and their personality effectively. They ask for one thing and mean another. It is this which creates misunderstanding in the mind of the receiver of the message.

Also, Managers and supervisors lack writing, oral, reading and listening skills which prevent them to express themselves clearly.

Another barrier to effective communication is the perception of different people about the information received. People give different interpretation to messages depending on their perceptions. This depends on the past experience of a person, his educational background, emotions, values, beliefs, etc.

Filtering constitutes a barrier to effective communication. This is an attempt to alter and colour information to present a more favourable or unfavourable impression. Subordinates try to filter information as it progresses up the chain of command. They tell the boss what he wants to hear.

Differences in status created by the organizations through titles, offices and amount of support resources distributed serve as hinderance to communication. For example, the person who has a car parking space, personal fax and an office suite puts up barriers to communication with the more junior staff.

Similarly, time constitutes a barrier to effective communication in an organization. Cheney (2011) observes that time lags between communication and the action can inhibit communication. Managers work under time pressures. They must make decisions without delay and meet deadlines. To expedite matters, they often short-circuit formal channels, leaving some people in the dark; and when the messages that are transmitted are incomplete or ambiguous to the receiver, effective communication is hindered.

The hierarchical structure of an organization is a setback to communication. The more hierarchical an organization, the more the communication problems it creates. At each stage of communication process, messages may be either lost or added through transmission.

Furthermore, organizational culture which consists of practices, beliefs, values and feelings constitutes a barrier to effective communication. Some organizations spread the feeling that orders are not be questioned or show no interest in the feedback or do not encourage two-way communication. In this, case communication goes underground when the climate is threatening.

Finally, problem arises when the rules and regulations are written in language that is not simple and direct, and where standards vary between different managers, supervisors, departments, divisions and functions.

Ways of improving administrative communication in organization

Administrative communication can be enhanced through the feedback mechanism that allows the sender to have ideas whether the information sent has been received as originally intended. The use of feedback improves the communication process and reduces the chance of major disparities between the information received and the one intended. Similarly, repeating of messages using various media can improve communication. For example, Airport controllers use this technique so that information relayed between the tower and arriving and departing aircraft is as distortion-free as possible.

Administrative communication can be improved through good listening skills of an administrator. This important quality of an administrator helps him to give objective judgment to issues. In this case, the speaker expresses his points of view fully before you react. It requires separating objective from subjective data.

Also, the message being sent must be as clear as possible. There should be no ambiguity in the message. The language should be clear and simple so that the receiver is able to understand the message without any difficulty. In addition, the message being sent should be complete in itself and adequate so that there is no misunderstanding in the mind of the receiver. Inadequate information delays actions, spoils good relations and affects the efficiency of the parties to the communication.

There is the need to bridge communication gap in an organization. Communication gap occurs where the workers have not been properly informed about several things concerning them like what their jobs are, what is expected of them, how important their work is, how is their performance, when their promotions are expected and what would be required to get promotions.

Finally, timely passage of information to the stakeholders will improve administrative communication. The management should make it a practice of passing along the information promptly to everyone concerned so that action, where required, is not delayed.

Conclusion

Administrative communication is a sine qua non of a successful organization. Since administration is the sum total or the whole complex of activities that are undertaken to realize the objectives in view. It therefore requires the efforts of all the employees to learn how to communicate effectively. It demands that each employee must know his roles as an administrator. Administrative communicators should be able to translate their ideas into simple and understandable language. The communication channel chosen must be appropriate to the information they want to pass.

Also, administrative communicators should know that words can destroy therefore, they should take cognisance of their environment when communicating. In addition, they should not allow their subjective judgement affect their communication. Superiors at different levels should have listening abilities so as to allow their subordinates to express their opinion. An open door policy that allows interpersonal relationships between the superior and the subordinates should be encouraged.

Finally, administrative communicators should try to avoid grapevine information in form of rumour because it can destroy the image and reputation of people.

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Investigating the Impact of information Technology on learning service delivery: A Case Study of Gaborone Technical College (GTC)

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Abstract

The purpose of this study was to investigate the impact of information technology (IT) in service delivery: a case of Gaborone Technical College. The study investigated the impact of IT in improving service delivery. The study adopted a case study research strategy were both qualitative and quantitative data was collected using questionnaires. Subjects in this study comprised of students and lecturers of the Gaborone Technical College. Convenience sampling was used to select the respondents who were selected based on their availability, accessibility to the researcher and their willingness to take part. The findings of the study revealed that IT has a positive impact on service delivery at Gaborone Technical College.

Keywords: Information Technology, IT, Service Delivery, Gaborone, Strategic management

1. Introduction

It is evident from global industries that the use of information and communication technology seems to be the solution to information management problems in most organisations. Therefore learning institutions as organisations are no exception to the rule. Information technology is a wide and varied sector, and is represented in some form in almost all the industries. Information technology impacts on business operations, the achievement of organisational goals and service delivery (Swap and Srivastava, 2011). A review of literature indicates that the use of IT for improving customer service and customer satisfaction has attracted much recent attention (Cummings & Worley, 2008)). Swap and Srivastava, (2011) argued that IT is increasingly being adopted by community and hospital-based providers of health care services, because IT is now available not only to improve the communication of patients' clinical data but also to expedite communication of myriad other information across health care organisations.

Information technology have significant effects on the structure, management and functioning of most organisations. Cummings and Worley (2008) point out that "IT is redefining the traditional business model by changing how work is performed, how knowledge is used, and how the cost of doing business is calculated". Research studies have addressed information technology's impact from a variety of perspectives (Brynjolfsson & Hitt, 2000). Increasingly, the relevant question about information technology's impact relates to the nature of the impact and how it occurs. Impact through use is one area of investigation suggested (Torkazdeh & Doll, 1999). Although it is quite obvious that IT system use would lead to some impact, the unanswered question is how? Some authors proposed job-learning as one possible mechanism in this regard (Torkzadea et al, 2009).

As individuals interact with the system applications, they learn about their job, and as a result, become more productive. Information technology plays an important role in job-learning and individual productivity. Because of this, information technology plays a critical role in the expansion of knowledge and learning becomes a new form of labour. Learning is no longer a separate activity that occurs either before one enters the place or in a remote classroom setting. Learning is the heart of productive activity. For the individual, information technology holds promise in terms of job enhancement and the outcome of labour. Information technology impacts on how a job is performed and what the outcome might be. Thus, there is a need for better understanding of the nature and outcome of the interaction between people and technology in an organisational context (Torkzadea et al, 2009).

According to Sarmento (2005) computer systems play a prime role in the support and delivery of services. For many systems their main role is in enabling service encounters between customers and providers. ATMs, self-service airline ticket dispensers and Internet shopping sites represent services entirely delivered by the computer. Here the service encounter is purely between the computer and customer (Sarmento, 2005). Today, it is essential for all organisations to adapt to their rapidly changing environment. To remain competitive, organisations must continuously scan their environment and look for better ways of conducting business.

1.2. Background of the Study

Gaborone Technical College (GTC) falls under Vocational Education Training (VET) in Botswana. The idea of Training in Vocational Education Training (TVET) in Botswana was conceived around the country's independence in 1966. As noted by Van Rensburg (2002), it started with setting up the Botswana Training Centre (BTC). According to the same author Van Rensburg (2002), the establishment of BTC then led to the setting up of the Botswana Institute of Administration and Commerce (BIAC) and Botswana Polytechnic. Around the same time as observed by Ankoojee, Gower & McGrath (2002) the Brigades were also established. Finally, six technical colleges among them Gaborone Technical College, were set up in 1987.

Looking at the Southern African region, there are limited studies with regard to VET (Ankoojee, 2003). In fact as noted by McGrath (2002), there are only a few international journal articles, which is a call for concern because VET plays an important role in supporting a country's social and economic development goals. The importance of the role played by VET in an economy can therefore not be ignored. Vocational Education Centers (VET) if well utilised could play a significant role in a country's social and economic development. As noted by Ankoojee et al (2005:18), such institutions are established with an aim of empowering the citizens, especially the youth, with technical skills and competencies that promote the spirit of entrepreneurship and in the process, employment and sustainability. The focus now narrows to GTC. The Institution as mentioned earlier was established alongside six other such institutions in 1987 (Ankoojee et al, 2005).

The main objective of this study is to determine the impact of IT in the service delivery, with particular reference to the educational sectors. The main research question is: **What is the impact of Information technology on service delivery at Gaborone Technical College?** Technology remains one of the primary drivers of change in the ways that people work, seek information, communicate and entertain themselves (Marimuthu & Paraman, 2011). This paper is organised as follows: The next section presents a brief literature review. Section 3 presents the methodology used to conduct the study. Section 4 presents the results from the study. Finally, section 5 presents the discussion and conclusion of the study.

2. Brief Literature Review

There are numerous research efforts on IT investments on service delivery. However, understanding IT investments' contribution to business value and service delivery has been challenging and perhaps more challenging in developing countries due to generally less predictable changes in social, political, and

economics infrastructure (Roztocki and Weistroffer, 2004). Prasad (2008) conducted a study of the intangible benefits of IT investments in Fiji. The findings indicated that for businesses in developing countries, their IT investments provide intangible benefits, especially at the process level that contributes to business value. In a similar research effort, Roztocki and Weistroffer (2004) presented a framework for evaluating IT investments by integrating the value chain model with activity-based costing in emerging economies, where the primary motivation of the many investments is an improvement of cost structure.

Furthermore, in the work of Roztocki and Weistroffer (2004), a value chain analysis framework was presented for evaluating investments for services. They argued that in order to achieve reliable cost estimation, the framework employs a costing system, which integrates activity-based costing with an economic value-added performance measure. Oliver (2002) emphasised the impact of ICTs on educational practice in higher education, as a tool with the capacity to transform education from a teacher directed enterprise to more student-centred models. He also argued that the use of ICT in higher education settings could enhance knowledge creation through increased use of ICT among students. McGrath (2002) also discussed the use of ICT tools as a means of fostering interaction and knowledge creation among students through the use of online discussion forums.

2.2 The impact of Information Technology in Education Sector

The challenges faced by countries in increasing access to post-primary education, improving quality of education and addressing threats to education systems from pandemics, natural disasters and civil conflicts, need participation of all parties which include higher education institutions. It is true that institutions of higher education should not differ from other businesses in the manner in which they adapt to environmental changes; however, the environmental factors that affect them should not be compared to those of other businesses. Information technology is one of the leading environmental factors that affects all industries and have played a significant role in transforming the higher education industry.

Countries need to strengthen the management of education systems, provide better teaching materials and increase expenditure for training, hiring and management of teachers. For example, an estimated 4.5 million teachers needed in Africa to achieve the MDGs by 2015 (MDGs 2008) is a challenge to try to achieve within time left. The contribution of ICTs in achieving these goals and the participation of higher learning institutions in particular cannot be over emphasised as a number of ICT projects are carried out by these institutions. The significance of ICTs is realised in many aspects such as improved access to learning by all, creation of a conducive learning environment by gender, quality of knowledge delivery expanded secondary and post-secondary education, reduction of expenditure on training and many others (Kaino, 2005). This is to the advances in information technology (IT) that have changed ways of communication in education and delivery of knowledge to society. Some new delivery technologies using for example electronic learning (e-learning) in virtual programs, Internet courses' delivery strategies, audio and video communications have changed and challenged ways of knowledge delivery in the education sector.

In education, the delivery of knowledge using ICTs has influenced the design of various curricula programmes globally. The technology allows learners' interaction with the computer screen rather than the teacher. Through the computer network, learners are able to communicate with the instructor on the material and could discuss assignments involved. In this process, learners are able to attend lectures "online". Current technologies in e-learning such as AulaNet, tend to provide groupware for creation, participation and maintenance of Web-based courses emphasising group learning where individuals shared ideas online (McGrath, 2002). It has been argued that ICT is a way to move from elite to mass education through digital media where more learners could get access to education for both campus and distance-learning students (Kennedy, 2005). ICT is seen as a way to promote educational change, improve the skills of learners and prepare them for the global economy and information society (Kozma & Wagner, 2005). ICT is used to improve delivery of and access to education. ICT as focus of learning tends to improve the understanding of the learner, increase quality of education and thereby increase the impact of education on the economy.

While basically ICT based innovations can occur in classrooms, their linkage to national policies is essential to achieve intended social and economic outcomes.

2.3 ICT Policy Framework

While the benefits of these technologies have been acknowledged there have been some constraints of adoption especially in developing countries. The constraints are many and include access to computers (email and Internet), affordability of computers and connectivity, telephone and electricity infrastructure, computer literacy, expertise (Oliver, 2002). While such problems have been acknowledged, the main reasons behind the slow pace of adoption have been identified as lack of effective policies on ICTs (Kaino, 2005). Many countries have outlined the significance of these technologies and much of these policies have remained on paper without committing enough resources to policies. The issue of utilising a fraction of the capacity of existing ICT facilities in developing countries has been noted in past studies (Cawthera, 2010).

One of the main obstacles to adoption of ICTs in developing countries in particular, has been identified as ineffective policies in Government departments (Kaino, 2005). While many efforts have been made to stipulate ICT policies, not much have been done on the implementation side and especially on the structures and processes in place. To realise the full impact of ICTs, educational policies and programs need to be coordinated with those in other ministries, such as economic development, human resource development, telecommunications, agriculture and rural and urban development. Policy leadership is key to any successful development strategy, particularly if these efforts are to contribute to economic and social transformation. The contribution of ICTs policies to education, social and economic development are premised on ICT policy framework structure. ICTs should be used to address social and economic inequalities by extending the ICT infrastructure to rural areas and establish community technology centres.

2.4 Theoretical Framework

Cheung & Huang (2005) proposed a framework for assessing Internet usage in university education in Figure 1. The framework investigates the impact Internet has on learning and job prospects considering organisational and individual factors, perception, attitude and Internet usage. The research framework takes into account organisational factors and IT usage as a factor influencing IT investment on service delivery such as management support, institutional goal, power supply, improved funding and security. The first construct of the framework takes into account the organisational context. Previous research demonstrates that organisational support, IT support and IT skills are important factors that influence internet usage (Cheung & Huang, 2005). The second construct describes various aspects of Internet usage by the university personnel including the frequency and intensity of Internet use (Cheung & Huang, 2005). The third construct examines the impact of the use of IT on service delivery and interaction with students. In summary, the relationship between the factors specified in the framework was supported. The Internet usage for teaching, registration, examination processing and submission of assignments, had a positive impact on service delivery by the staff. Findings also revealed that there is efficient service delivery and availability of Internet in the Institution to foster online interaction among staff and students.

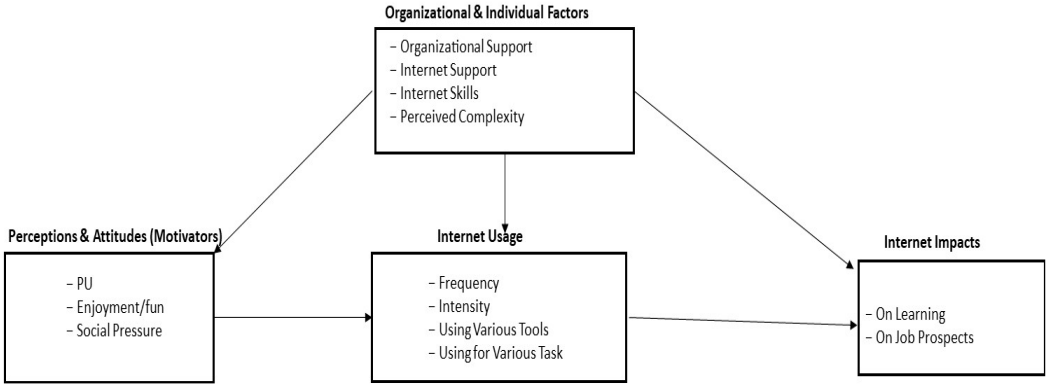

Fig 1. The Research Framework

A review of literature indicates that the use of IT for improving customer service and customer satisfaction has attracted much recent attention. Information technology plays an important role in job learning and individual productivity. Because of this information technology plays a critical role in the expansion of knowledge and learning becomes a new form of labour. To remain competitive, organisations must continuously scan their environment and investigate better ways of conducting business. The next section discusses the research methodology used to conduct the study.

3. Research Methodology

Research methodology is a collective term for the structured process of conducting research. This section describes the researcher's basic research plan. It explains how the research problem was investigated and why particular methods and techniques were used. It also gives a detailed account of the data collection processes employed to obtain data.

3.1 Research Design

Research design is the detailed outline of how an investigation will take place. The study used a case study research design which allows both qualitative and quantitative data in a single study. The questionnaire that was used contained both open and closed ended questions to allow some components of data to be measured numerically and elaborate on those through qualitative ones. Yin (2009) defines the case study research as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used". The case study design help provides an understanding of a complex issue or object and can extend experience or add strength to what is already known through previous research and detailed contextual analysis of a limited number of events or conditions and their relationships. Case studies are important in decision making and for policy makers.

3.2 Sampling Procedure

The target population for this study was 596 respondents - both the students and personnel of Gaborone Technical College in Gaborone. However, the researcher managed to interview only 296. Polit and Beck (2010) defined sampling as "the process of selecting elements which are the basic unit from which data and information will be collected to represent the entire population". The sample for this study was 296 comprising of 200 students and 96 lecturers. This study used convenience sampling which is a non-probability sampling method to select the respondents. The personnel of Gaborone Technical College who

were available and willing to participate during the period of data collection were given the questionnaires to complete. The questionnaire was administered to determine a variety of aspects from respondents which included beliefs, thoughts and knowledge about impacts of technology on service delivery at Gaborone Technical Collage.

3.3 Research Instruments

A questionnaire was used in the study which consisted of both closed and open ended questions, developed based on the constructs from literature in order answers the research question. The questionnaire was developed to solicit information from the respondents of Gaborone Technical College. A questionnaire was chosen because it allows participants to give their views anonymously reducing bias. Polit and Beck (2010) explained that the importance of administering a questionnaire as that it makes it easy to test validity and reliability, it is flexible and may be applied to many different populations within a short time and the same questions are repeated to get valid and reliable answers with minimal resources. Depending on the type of questions, data capturing may be quick if most of the questions are fully structured. However, even though questionnaires were used, the researcher was aware of its limitations. Questionnaires are sharply limited by the fact that respondents must be able to read the questions and respond to them. Thus for some demographic groups conducting a survey by a questionnaire may not be practical. A total of 280 questionnaires were prepared and distributed. For students, 200 questionnaires were administered and 80 for lecturers. Pilot testing was also done to estimate the time needed for the actual survey and refine some questions.

3.4 Reliability and validity

In this research, quantitative and qualitative designs were chosen to deduce impacts of information technology in the Institution. In this study, content validity was ensured by doing a thorough related literature search on which contents of questionnaire and interview guides are based. The pilot testing conduct helped to improve the quality of the questionnaire and validity. In this research, data analysis was done using both quantitative and qualitative analysis tools such as descriptive statistics and Statistical Package for Social Science version 19 and a statistician was engaged to help with analysis of data. This research external validity was influenced by the sampling method used, namely convenience sampling, therefore findings cannot be generalised to other settings.

3.5 Data Analysis

When the questionnaires arrived from the field, they were checked for completeness and only the questionnaires which were 75% answered were considered and captured into Microsoft Excel while qualitative data obtained from open ended questions were analysed using content analysis whereby only responses that are relevant to the questions were considered and the rest were discarded. The qualitative data was then reported qualitatively in the report while the quantitative data was exported to the Statistical Package for Social Sciences version 19 for analysis.

3.6 Ethical Considerations

All research designs should consider ethics of participants - that is how sensitive the issue might be to the respondents. In carrying out a research, it is the responsibility of the researcher to protect the respondents from harm and provide them with adequate information on the importance of research and enable them to withdraw whenever they want to. The main aim is to assess the impact of information technology on service delivery at Gaborone Technical College therefore written permission to conduct the study will be sought and obtained from the Principal. Copies of consent forms providing information on the nature, purpose and research process, assuring respondents confidentiality of data and information provided, was prepared and

issued to sampled respondents prior to commencing the study. Respondents were given an option to fill in the questionnaire or decline, and extra time was given so as not to rush the subjects. Interviewees were also given options to write down their answers and allocated more time as a way of encouraging them to express themselves freely.

In this research, all subjects were informed verbally and through consent forms about the benefits of the study. In this study, respondents were encouraged to participate so as to make contributions and suggestions to ensure effective use of technology in providing good service to the customers. The researcher indicated clearly and stressed verbally on first meeting to the respondents that they are not supposed to write their names in order to maintain anonymity and confidentiality of their information. The participants were told that participating in the study is voluntary, hence they could decide to quit at any stage. However, taking part in the study was emphasised. Participants were informed that at the end of the study, the results would be shared with them as a way of appreciation as well as giving them feedback about the results. This section discussed methodology employed in the data collection process on the research. The next section presents the results of the study.

4. Research Results

This section presents statistical results of the data obtained by a questionnaire from students and lecturers in Gaborone Technical College in Botswana.

4.1 Demographic Data

The distribution of the subjects who participated in the study was that, about 70.5% were lecturers while 29.5% were students amongst which 63.7% were females and 36.3% males.

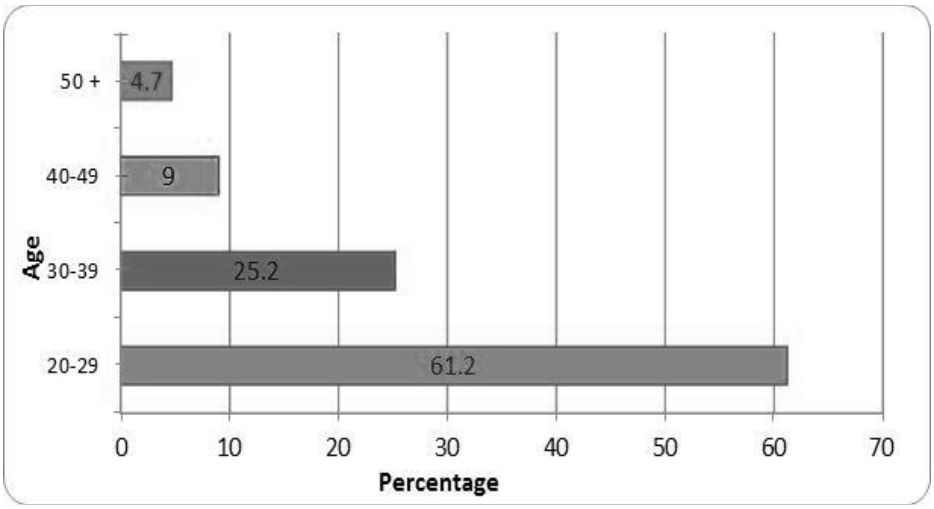

Fig 2. Respondents' age

Figure 2 above shows that the majority (61.2%) of the respondents who participated in the study were of the age 20-29 years of which the most were the students while the other 38.8% may come from other mature students and lecturers. Looking at the age of the participants, those participants of the age 20-29 should consider the use of technology most useful in delivering services. One can expect them to use different

modes of technology such as the use of Internet for research, the use of intranet to communicate with their lecturers, the use of e-learning strategies, for example the mode for access of course materials.

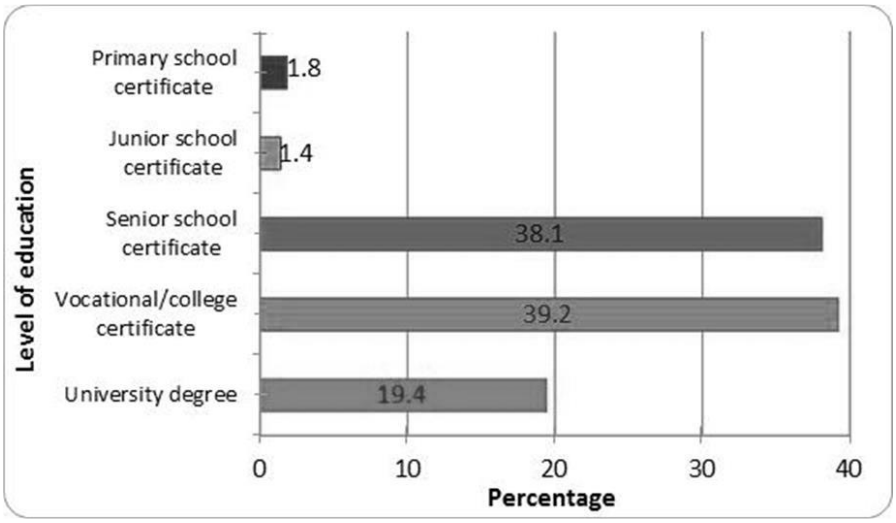

Fig 3. Education level

With regard to educational attainment, most of respondents (77.3%) have obtained either a vocational/college certificate or a senior school certificate. About 3.2% have obtained either a junior or a primary certificate. These are probably those students who have not yet completed their studies. The other 19.4% came from those participants who have a University degree and would be the lecturers. Regarding the level of education of the respondents, this reveals why the use of technology may not be considered as the most effective method of communication within the Institution in delivering services, especially between the lecturers and the students. When asked about the length of time they have been in GTC, about 50.4% indicated that they have been in the Institution only for at most 6 months, 19.1% for 12 months while 30.6% have been in the Institution for more than 12 months.

4.2 Lecturer section

4.2.1 Level of proficiency in IT

This section seeks to determine the lecturers' level of proficiency in IT. Lecturers were asked to indicate the extent to which they are proficient in the hardware and software categories selected and the following responses were gathered.

Table 1: Level of proficiency in IT

Category	Strongly Disagree	Disagree	Neutral	Strongly Agree	Agree
Basic hardware	4.8	7.2	14.5	19.3	54.2
Microsoft Word	1.2	1.2	9.6	28.9	59.0
Microsoft Excel	1.2	1.2	9.6	28.9	59.0
Microsoft PowerPoint	7.2	7.2	7.2	18.1	60.2
Use of Internet	2.4	1.2	8.4	25.3	62.7

The results in Table 1 indicated that the majority (60%) of the respondents across all the categories agreed and strongly agreed that they were proficient in the use of software. This is Microsoft Word, Excel and PowerPoint. However, there are some who indicated that they are not proficient with these soft- and hardware as indicated by those who disagreed and strongly disagreed. It is indeed a concern to discover that at a college level, there are some lecturers who are not capable of using some of these soft- and hardware effectively. This may negatively affect service delivery to students in a convenient way. Due to this incompetency, this may lead to under-utilisation of information technology in service delivery within the Institution. At college level, students should be able to receive the notes, assignments, announcements and any other important messages through such modes of communication. This is supported by Oliver (2002) who emphasised the impact of ICTs on educational practice in higher education, as a tool with the capacity to transform education from a teacher directed enterprise to more of student-centred models. He also argued that the use of ICT in higher education settings could enhance knowledge creation through increased use of ICT among students.

4.2.2 Teaching aids

Table 2: Teaching aids

Questions	Strongly Disagree	Disagree	Neutral	Strongly Agree	Agree
Do you use a computer/laptop to conduct class?	12.0	9.6	18.1	14.5	45.8
Do you use PowerPoint to illustrate to learners?	12.0	9.6	15.7	14.5	48.2
Do you use a projector to conduct class?	9.6	13.3	14.5	16.9	45.8
Do you use a white board to illustrate to learners?	2.4	0	8.4	38.6	50.6
Do you use pointing devices to illustrate to learners?	12.0	15.7	19.3	14.5	38.6

Regarding the use of a computer or laptop to conduct classes, more than 50% across all the questions indicated that they use computers/laptops to conduct classes, PowerPoint to illustrate to learners, projectors, white board as well as pointing devices. Above all, white board markers seem to be the most common to the majority of the lecturers as indicated in Table 2 above. However, there are also some lecturers who indicated that they do not make use of the mentioned teaching aids. At tertiary level, most of the mentioned teaching aids need to be employed in order to allow various teaching strategies. If the instructors at tertiary level can encourage the use of technology to the students, this may also reduce their workload as most of the information could be uploaded onto the Web and students could access it at their own time. Cheung and Huang (2005) proposed a framework for assessing Internet usage in university education. The framework investigates the impact of Internet on learning and job prospect considering organisations as well as the individual factor - perception, attitude and Internet usage. Results showed that students preferred to do their school work and hear about any school activities through the Web/email. Students also indicated that they preferred to receive assignments that involve them in research, since this encourages independent learning.

4.2.3 The role of information technology on service delivery

Table 3: The role of information technology on service delivery

Statement	Strongly Disagree	Disagree	Neutral	Strongly Agree	Agree
Electronic tools help my students to learn the course.	0	3.6	8.4	43.4	44.6
In planning a course I consider electronic tools to help students achieve course educational goals.	1.2	2.4	7.2	45.8	43.4
If the college were to commit more resources to support information technology for teaching, it could improve the effectiveness of my teaching.	0	0	6.0	50.6	43.4
Computers help me to keep learner records.	0	2.4	2.4	55.4	39.8
I use a computer to prepare lesson plans.	1.2	0	2.4	56.6	39.8
I use a computer to prepare learner progress reports.	1.2	1.2	3.6	54.2	39.8
I use a computer to receive correspondence from other departments.	4.8	3.6	9.6	39.8	42.2
I use a computer to communicate with regional office.	8.4	10.8	12.0	30.1	38.6
I use a computer to keep teaching and work information.	0	2.4	9.6	42.2	45.8

When asked on the role or effect of IT on service delivery, most of the respondents across all the statements were of the view that indeed IT plays a major role in delivery of services. Results in Table 3 above also revealed that even though respondents believe that IT plays a major role in the delivery of services, it is unfortunate to them because of limited resources, as not all of them seem to be able to use computers for several activities including correspondence with other departments or with regional offices. Yang (2008) examined the impact of Information Communication Technology (ICT) on higher education among tertiary teachers and students. The study also explored the issues that emerged from the implementation of ICT in higher education information as an essential commodity in well-managed organisations. The report revealed that it is evident from global industries that the use of information and communication technology seems to be the solution to information management problems in most organisations and therefore learning Institutions as organisations are no exception to the rule. Comparing the information from other researchers and the results from this study, it can be concluded that IT indeed plays a major role in the delivery of services. It is now evident that at GTC this affect there is a gap that needs to be closed. There is a limited utilisation of IT within the Institution.

4.2.4 Level of satisfaction by the users on information technology

Table 4: Level of satisfaction by the users on information technology

Statement	Strongly Disagree	Disagree	Neutral	Strongly Agree	Agree
I am happy with IT usage in the College	14.5	19.3	19.3	20.5	26.5
I am competent in using IT tools.	9.6	18.1	19.3	21.7	31.3
IT tools makes my teaching easy.	3.6	4.8	10.8	43.4	37.3
IT improves my service delivery	1.2	2.4	12.0	45.8	38.6

When asked about their level of satisfaction in information technology at Gaborone Technical College, some respondents indicated that they were satisfied while others were not. The respondents who indicated that they were satisfied could be those who find it not necessary to be innovative and they may be used to their communication level, hence not concerned about change, whereas those who are not satisfied are those respondents who believes that service delivery can be improved by improving and encouraging the use of technology at Gaborone Technical College. Generally looking at the results in Table 4, the level of satisfaction with information technology in the Institution is not satisfying hence a need to improve it so that both the lecturers and students can realise the importance of subscribing to technology in the Institution.

4.2.5 The successes of the information technology on service delivery

Table 5: The successes of the information technology on service delivery

Statement	Strongly Disagree	Disagree	Neutral	Strongly Agree	Agree
Use of IT simplifies my work	1.2	1.2	7.2	53.0	37.3
Use of IT professionalise my work (presentations, neatness, organised)	0	2.4	2.4	54.2	41.0
A computer assists me in drawing a timetable for classes and assessments.	2.4	2.4	2.4	2.4	2.4
A computer helps to simplify management of the college (Records and assets)	0	6.0	7.2	45.8	41.0
Computers improve my learners understanding.	0	1.2	4.8	44.6	49.4
I use a computer to prepare scheme of work.	0	3.6	3.6	49.4	43.4
I use a computer to receive work from students electronically.	9.6	10.8	7.2	32.5	39.8
I use a computer to communicate with other lecturers from other colleges.	6.0	3.6	9.6	38.6	42.2

From Table 5 we can deduce that most of the lecturers indicated that they use computers in most of their day to day activities and they agreed that it helps them a great deal. This clearly indicates that given enough resources, the level of satisfaction with IT services will improve since Gaborone Technical College community is willing to subscribe to technology and this may improve the situation at the college.

4.2.6 Problems associated with the use of information technology on service delivery

Table 6: Problems associated with the use of information technology on service delivery

Statement	Strongly Disagree	Disagree	Neutral	Strongly Agree	Agree
Non availability of electricity affects the use of IT in college.	2.4	4.8	8.4	57.8	26.5
Limited IT resources affect service delivery in the college.	4.8	6.0	3.6	60.2	25.3
Lack of IT skills affects service delivery.	4.8	1.2	3.6	65.1	25.3
Network failure interrupts service delivery.	6.0	1.2	1.2	67.5	24.1

The results of the sample revealed the problems faced by the lecturers at GTC regarding information technology and delivering services to the students. Across all the statements, most of the lecturers agreed with the statements revealing how limited IT resources, lack of IT skills and network failures contribute to the problem at the Institution. Some researchers indicated that the usage of information technology for the completion of tasks in any organisation, speeds up the processing and information mobility, and also improves the reliability and integrity of information (Swapnil & Srivastava, 2011). Lecturers were also asked to share their opinion on problems they experienced regarding information technology in the Institution and the following were the common suggestions: Provide lecturers with access to wireless connection, install backup system for use in times of blackout, IT systems should be kept up to date, offer training on IT to lecturers, the college should buy their personnel laptops to use during lessons.

4.3 Section C: Students

4.3.1 Availability and accessibility of IT to students at the college

Table 7: Availability and accessibility of IT to students at the college

Questions	Strongly Disagree	Disagree	Neutral	Strongly Agree	Agree
Do you have computer laboratories in your college?	1.5	1.0	3.1	28.1	66.3
Are computer laboratories in your college sufficient for use by all learners?	21.4	26.5	20.9	8.7	22.4
Are computer laboratories in your college equipped with computers?	5.6	12.8	13.3	21.4	46.9
Are most computers in your college in a working condition?	9.7	25.0	26.0	9.2	30.1
Is the number of computers enough for the whole class to use at once?	15.3	19.9	8.7	19.4	36.7
Are learners allowed to use computers when they need information on the Internet?	10.7	14.3	17.3	16.3	41.3

The result shows that there are computer laboratories at Gaborone Technical College but there are not sufficient for use by all learners. Furthermore respondents reported that laboratories are equipped with computers but they are not in a good working condition. Respondents were also asked if the numbers of computers were enough to be used by the whole class at once. These results indicate that the use of technology at the Institution is very limited as both students and lecturers have indicated on various aspects and this has affected delivery of services negatively for both the students and the lecturers as there is no

smooth communication thorough email or the Web. Therefore this does not only affect the students and lecturers but also the Institution at large in terms of delivery of services and effective communication within the Institution.

4.3.2 The benefits of IT to students at the college

Table 8: The benefits of IT to students at the college

Questions	Strongly Disagree	Disagree	Neutral	Strongly Agree	Agree
Do you usually need Internet to do your challenging school work?	2.1	1.0	1.0	62.1	33.8
Do you prefer Internet to text books for doing school work?	4.1	4.6	24.6	39.5	27.2
Does Internet help you improve your performance at school?	1.5	0	6.7	47.2	44.6
Do you use Internet to find other methods of solving a subject content problem?	1.0	1.0	11.8	40.0	46.2
Do you use a computer to receive notes and tasks from your lecturers?	20.0	30.8	15.4	9.7	24.1
Do you use computers to communicate with other students in the college?	36.4	28.2	16.4	4.6	14.4
Is your learning better facilitated using PowerPoint?	8.7	17.4	33.3	21.0	19.5
Does a computer make your learning easy?	1.5	.5	8.2	47.2	42.6

It is evident from the results in Table 8 that the respondents find it necessary to make use of information technology. Across all the questions asked, most of the respondents indicated that they really need to use IT services to communicate as it makes life easier. This indicates that there is indeed a problem with the use of IT within the Institution that is mostly associated with the insufficient number of computers and lack of Internet connectivity. This may leave both students and lecturers with no available resources to use hence compromise the quality of learning. Students and lecturers indicated that this problem affect effective communication amongst them and even with other Institutions. Students also indicated that their academic performance could be improved if resources were made available and wireless network provided, as this may result in enough computers. This section provided the results of the study. The results were analysed objectively in that questions from the same objective were put together. The next section presents the discussion and conclusion of the study.

5. Discussion and Conclusion

Results from the study revealed that IT forms indeed an integral part in delivering of services. The overall responses from the respondents indicated that IT is needed and is also useful in any organisation for better services to the clients. Therefore the situation at the GTC needs to be improved as indicated by the results, namely that most of the areas need to be improved especially those that affect student learning directly as the core primary role of the Institution is to produce competent products that will lift up the country in different areas. Provision of adequate resources may help both lecturers and student to better their performance and thus uplift the name of the Institution. Overall, respondents were not satisfied with the impact of IT in delivering services.

The results show that information technology has a positive impact on service delivery and that limited IT resources and lack of skills affect services delivery negatively at Gaborone Technical College. It is evident

from the results that there is a lot that need to be done in the Institution in terms of providing enough resources to execute various tasks. Results from the study revealed that there are limited resources in the Institution therefore this affects both the students and the lecturers negatively and hence affect learning. Provision of adequate resources may help both lecturers and students to better their performance. Overall, respondents were not satisfied with impact of IT in delivering services. A review of literature shows that more research on the impact of IT-based services on customer perceived service quality is needed. An opportunity to go beyond the current state of knowledge presents itself in developing and testing the conceptual framework which links the attributes of IT based services, the variables affecting customers' evaluation of such services and the dimension of service quality.

In conclusion, the proposition that limited use of information technology is the major contributing factor to the poor service delivery at Gaborone Technical College has been supported by the results of the study. The findings shows that information technology has a positive impact on service delivery and that limited IT resources and lack of skills affect service delivery negatively at Gaborone Technical College. The results also revealed that efficient service delivery and availability of Internet in the Institution fosters online interaction among personnel and students. Based on evidence emanated from this study, it can be concluded that the impact of IT investment in GTC is significant to the service delivery in the Institution. However, for further studies the opinion of administrative and academics could be analysed separately since the usage and access of IT might not be the same for the two groups. It is important to note that while many expect IT to make a positive contribution to improve service, it should be remembered that IT is a tool people use, not a strategy. People are emotional and select the logic they want to apply based on their feelings. However, technology alone does not guarantee success.

This study has its limitations, firstly the study only concentrated on one Technical College in Botswana, while future research could examine multiple Technical Colleges across Botswana. Secondly this study was limited to the views and opinions of lectures and students of Gaborone Technical College, excluding non-teaching and support staff. The study was limited to the impact of technology on service delivery at Gaborone Technical College. For future studies, it is therefore recommended that service quality and customer satisfaction be explored to determine the effectiveness of information technology on them. Despite these limitations, the study results can provide valuable lessons to other vocational colleges.

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Sources of Financing for Innovative Activities of Enterprises in The Industry 4.0

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Abstract

The aim of the study was to identify possible sources of financing for innovative activity of enterprises. The very concept of innovation is understood ambiguously. It is usually defined as a radical change, invention or novelty, especially in the context of a product, technology or business management methods. If enterprises will have the possibility to use a wide portfolio of sources of financing innovations, it will influence their development and active participation in the fourth industrial revolution - the concept of Industry 4.0. The study presents an attempt to systematize the definition of Industry 4.0, discusses the main elements of necessary changes in an enterprise. Optimal sources of financing for innovative activity of enterprises will allow for full implementation of the concept of Industry 4.0, which may allow to achieve an unprecedented level of operational efficiency and accelerate productivity growth, which should be taken as a great advantage. New types of advanced production and industrial processes, integration and cooperation of machinery and equipment for human work will allow full flexibility of the company's production systems.

Keywords: Innovation, Industry 4.0, Sources Of Financing Innovation

The concept of innovative activity of enterprises

In the literature, the concept of innovation is not unambiguous, there are many definitions of innovation (Weryński, Dolińska - Weryńska, Tokar 2014, pp. 13). The word innovation comes from the Latin language. Innovation, innovatis, innovatio, means renewal, introducing something new. Innovation is perceived as products and phenomena or processes of technical, organisational, social or psychological nature. Different approach to innovation results from short research time on innovation and also from different theoretical approaches. The genesis of this concept makes it possible to distinguish two main areas of perception of innovation. Innovation understood as less radical, i.e. renewing a certain area of reality, and more radical, meaning introducing new qualities. These are currently used explanations of the understanding of innovation. Innovations can be interpreted in two ways, narrow and broad. In the narrow sense, innovation in the strict sense is a change in a product or production method that is based on new, previously unused knowledge. In a broad sense - the largo sense - it should be understood as any change consisting in assimilating the knowledge obtained (Pichlak 2012, pp. 24). Thus, it will be every good change implemented for use, which is perceived as a novelty from the point of view of the entity introducing it. These changes will concern functional areas of the enterprise, which may result in product or organizational innovation (Kalinowski 2010, pp. 18). In a narrow sense, an innovation is only a change with a positive effect of implementation (Szamrowski 2010, pp. 20). It should be stressed that not every invention is immediately an innovation. It becomes only when it can be copied on an industrial scale, at an acceptable cost level. For a company to achieve market success, it must have the ability and speed of adapting to the current technical progress. The best known and classic definition of innovation was introduced by J. Schumpeter, who considered it an innovation (Schumpeter 2017, pp. 102):

- the introduction of new products or the improvement of existing products,
- introduction of new or improved manufacturing methods,
- creating a new market,
- the use of a new form of sale or purchase,
- use of new raw materials or semi-finished products,

- introducing new process organization.

Currently, the development of the business management concept has led to the creation and modification of new definitions of the term innovation. Many of them have their roots in Schumpeter's view, however, they have a different view on the degree of novelty, the area of change implementation or the effect on the company and the market. Most definitions of innovation can be grouped in some way, emphasizing some of their characteristics. The first group of innovations is based primarily on the use of an idea. An innovation is a process that includes all activities that are related to the creation of an idea, invention and implementation of a new or improved product, process or service (Pomykalski 2001, pp. 17). A. Farazmand also refers to innovation in terms of ideas, methods, approaches, structures or processes, behaviours, attitudes and cultures, as well as technology. The author also treats knowledge used to create a new product or service, to govern and administer communities and manage various types of organizations as an innovation (Farazmand 2004, pp. 8). Innovation is also defined by D.A. DeCenzo and S.P. Robbins as the process of transforming a creative idea into a useful product or service or way of acting (DeCenzo, Robbins 2002, pp. 345). One of the latest definitions of innovation was presented by M.C. Schippers, M.A. West, J.F. Dawson. According to these authors, an innovation is the deliberate presentation and application in a work, work team or organisation of ideas, processes, products or procedures which are new to that work, work team or organisation and which are designed, to benefit the work, the working team or the organisation. Innovation includes creativity and the application of its products. (Schippers, West, Dawson 2012, pp. 3). For J. Tidd and J. Bessant, on the other hand, innovation is the process by which the perceived opportunity begins to be a new idea, and this one is widely used in practice (Tidd, Bessant 2009, pp. 16). The second group are the definitions of innovation, in which the authors focused not only on an idea, but on the whole idea, i.e. a guiding thought that gives direction to scientific activity and creativity. Innovation is every idea, action or thing that is new because it is qualitatively different from the current state. These are products, services and activities that aim to bring them to their buyers and convince them of their utility. E. refers to ideas. M. Rogers, for whom innovation is an idea or object perceived as new by persons or other recipient entities (Rogers 2003, pp. 12), as well as J. Brilman , considering innovation to be an application of some creative idea (Brilman 2002, pp. 162), as well as P. Kotler and G. Armstrong, claiming that innovation is an idea, product or element of technology developed and offered to customers who consider it new or innovative (Kotler, Armstrong, Saunders, Wong 2002, pp. 662). D. Smith writes that innovation is a new idea, practice or object (Smith 2006, pp. 6). L. Soete describes innovation as creating value from ideas and ideas by bringing them to the market in the form of a new product or service, through better design, better production or better distribution of the product (Soete 2006, pp. 198). Innovation is any new idea or approach that is applied in a fundamentally different way to create value for an organization and for customers, suppliers, partner organizations, communities, governments and the general good of humanity. Innovation is directly related to value creation (Lee, Olson, Trimi 2012, pp. 818). From the entrepreneur's point of view, innovation is a process that allows to transform entrepreneurial opportunities into attractive ideas (Kuratko, Hodgetts 2001, pp. 120), or it can be treated as creativity, i.e. creation of new ideas, as well as implementation of these ideas, i.e. their application in practice (Von Stamm 2008, pp. 2). Every idea, action or thing is an innovation because it is qualitatively different from the current state of affairs. Another group of definitions of innovation is also connected with knowledge, as some authors rightly said. P. Hildreth and C. Kimble believe that innovation is the result of the exchange of knowledge from many areas and then it is integrated in a new and different way, from which a new material product or service or process is created (Hildreth, Kimble 2004, pp. 81). Innovation is the economically successful exploitation of new ideas, a continuum of technical and organisational change that includes simple modifications of an existing product or process or practice, up to fundamentally new products or processes, technological improvements or better methods, as well as the way a particular thing is done (Porter 1990, pp. 45). J. Fagerberg considers innovations to be new and better solutions than those used so far by people, which have an impact on socio-economic living conditions (Fagerberg 2005, pp. 155). The Organisation for Economic Cooperation and Development defines innovation as the implementation of a new or significantly improved product or process, a new marketing method or a new organisational method into company practice (Oslo Manual 2005, pp. 31). Nowadays, innovations are also identified with an idea or an innovative idea, as well as an effect, but also with a

cause-and-effect process, which aims at preparing and implementing innovative solutions. Innovation is treated as something new or significantly improved in some area (Yusuf 2009, pp. 1). Currently, innovation is also defined as the process of creative use and transformation of knowledge, belonging to the organization or obtained from outside, as a new product, service or process (Cavagnoli 2011, pp. 112). In characterising innovation, reference should also be made to the concept of innovation, as it is linked to each other. Innovation is the ability to continuously generate and implement innovations that are appreciated by consumers for their high level of modernity and competitiveness on a global scale. In companies, innovation becomes an interesting tool that can provide competitive advantage, enables development and gives independence, which can result in the expected success and financial benefits (Wielgórka, Trzepizur 2015, pp. 45).

Concept Industry 4.0 - Innovative challenges for enterprises

In today's environment, companies face the challenge of coping with large amounts of data, speed of making the right decisions or flexibility of production processes. The flexibility of production is an important element here, because nowadays, the nature of production is shaped by paradigm shifts from mass production to on-demand production, directed to the customer's needs (Schwab 2015, pp. 18-26). The development of the technological process results in an increase in the complexity of the company's business areas. This results in increased demand for innovations in new materials and technologies, innovative production processes as well as new business models. In order to introduce innovations, optimal sources of their financing are necessary. Taking into account these additional aspects: processing a large amount of data and decision making, the company faces a huge challenge and technological leap forward. The challenge is to provide innovative platforms and tools for the mutual cooperation of all areas of a company's activities. It turns out that many of the companies' production systems are not prepared to manage large amounts of data due to the lack of intelligent analytical tools.

In order to meet the expected complexity of modern production systems, a new concept based on knowledge, technology and tools, simulation, optimization and monitoring of existing production systems was created. The phenomenon of the next phase of socio-economic development, which is referred to in the literature as the "Fourth Industrial Revolution", is related to three phenomena:

- universal digitization and ensuring constant communication between people, between people and devices and between devices,
- increasingly often implemented disruptive innovations, which allow for a jumping increase in the efficiency and effectiveness of the social and economic system,
- achieving such a development of machines that they gain the ability to behave autonomously through the use of "artificial intelligence" in their control process.

The concept of "Industry 4.0" has an important place in the vision of a world that will reach a level of development defined as the "Fourth Industrial Revolution". The concept of Industry 4.0 appeared for the first time in 2011 in Germany (Lee 2013, pp. 9). It was then stated that in the area of Industry 4.0 (Alexa L., Alam 2019) the company's production system will consist of an information system and numerically controlled machines that will operate autonomously and display elements of artificial intelligence. The concept of Industry 4.0 should be considered on a case-by-case basis, depending on the needs of the company concerned. The nomenclature of the new concept is also changing, as evidenced by various scientific studies, in which we can find terminology related to Industry 4.0, such as Industrial Internet or Digital Factory (Lasi, Fettke, Kemper, Feld, Hoffmann 2013, pp. 240-242). The term Industry 4.0 means the fourth industrial revolution, which assumes that this is the vision of intelligent factories built with intelligent information systems. The implementation of this idea allows for the development of intelligent production systems which, in addition to this autonomy, have the properties of self-configuration, self-control or repair. The concept of Industry 4.0 covers areas with numerous technologies and related paradigms. The main elements that are closely linked to the idea of Industry 4.0 are therefore: cloud-based production, the industrial internet of things or intelligent factories (Hermann., Pentek, Otto 2015, pp. 4-8).

The concept of Cloud Computing (CC) or cloud computing was first used in 1997. The most commonly used definition of CC is which: "Cloud computing is defined as a model allowing access through the network to computing resources that can be delivered and based on the use of services provided by an internal or external service provider". (Grance, Mell 2019). Kevin Ashton first defined the term "Internet of things" in 1999 (Ashton 2009). The author proposed the use of data transmission over the Internet using RFID for supply chain control at Procter & Gamble. The area of Industrial Internet of Things also includes Industrial Control Systems (ICS). Industrial control systems already make use of advanced web-based communication technologies to some extent, so they can be quickly integrated into the company's information systems. Integration activities are currently being carried out in many industries, which provides an excellent basis for launching future intelligent production systems in the idea of Industry 4.0. The highest form of development is "Smart Factory" as the main component of the Industry 4.0 concept. It is defined as a factory that deliberately supports human resources and machines in performing their tasks based on elements of the cyber-physical system of the Internet of Things. This means that the factory 'will be aware and intelligent enough' to control the production process or keep machines and equipment in good condition. Innovation will be the source of the development of the "smart factory". The construction of an optimal portfolio of financing sources of the company's innovative activity will have an important role in building a competitive advantage.

Sources of financing for innovative activities of enterprises

Implementation of innovative undertakings in the era of Industry 4.0 requires adequate capital. Therefore, there is a need to obtain external sources of financing for innovative activity. Innovative projects are burdened with high risk and are characterized by a long period of return on invested money, as well as uncertainty about future profits. This makes it difficult to raise money for their implementation. Depending on the type of financing source for the company's activity, one can distinguish between own and external financing. The source of equity may be external and internal. The internal sources of equity include obtained net profit, depreciation, release of capital by accelerating the rotation of current assets. The external sources of equity capital include partner surcharges, venture capital funds, searching for new partners, and over-the-counter issues. Foreign capital includes bank loans (Wójcik-Mazur 2012, pp. 6-22), leasing, loans, grants, bonds, franchising, factoring and funds from European Union funds. Hybrid financing can also be distinguished, including other sources of capital creation which are not classified as already mentioned (Janasz 2010, pp. 136-145). Own financing is a form that is suitable for financing any investment regardless of its type. Equity can be used to finance new investments, and to modernise or expand existing ones. Equity capital can also be increased from proceeds from the sale of redundant assets or from making assets available to other entities for use against payment. Equity capital also includes depreciation charges. Depreciation is a cost without expenditure and does not result in a decrease in cash, so depreciation can also be used to finance innovation. The sale of redundant assets is also one of the solutions, as internal financing of innovative activities. The release of capital reserves is also possible by accelerating the rotation of current assets, i.e. the sale of warehouse stocks, an appropriate policy for the settlement of receivables, in order to minimize transport and storage costs. The company obtains profit which can be used to finance innovation. Such activities strengthen economic and credit independence. The company becomes more reliable and easier to obtain financial resources from external sources. Venture capital is another source of financing for innovative activity, commonly called venture capital. Venture capital is an important source of financing the development of small and medium-sized enterprises, including those that would not have a chance to obtain capital from other sources. Venture capital funds raise funds from large investors interested in high returns and willing to take on higher risks. The investors are mainly financial institutions, but also large companies. The funds can operate on their own, as well as be organised by specialised companies managing such funds. Such enterprises are responsible, among other things, for choosing the industry or market on which the acquired funds will be invested and take various decisions related to potential and current investments. Running an innovative activity requires large financial outlays and a long period of return on invested funds. Therefore, financing from own sources is often insufficient. This causes companies to look for other sources of financing innovation. The most common, foreign source of financing is bank loans. However, innovative undertakings usually

require a long implementation period. They are not always successful. Banks require a certain amount of credit security from enterprises, which makes small and medium-sized enterprises unable to take advantage of the bank loan offer because they do not have sufficient fixed assets to provide security. Moreover, innovation requires considerable financial resources, and the risk incurred is so great that the bank has to set a high interest rate on the loan, which is not conducive to innovation by companies. Banks are also reluctant to engage in capital freezing for a longer period of time in exchange for possible future profits. A loan, on the other hand, is similar to a bank loan, except that it may be granted by other economic entities or other (non-bank) financial institutions for innovative activities, and it does not have to involve the payment of interest. Another form of capital raising is leasing, a long-term source of financing for various undertakings. It consists in obtaining various types of investment goods on the basis of a long-term contract, in which the donor undertakes to place certain goods at the disposal of the recipient in exchange for fixed fees. In practice, the most important forms of leasing are: returnable, operational and financial. The first type consists in selling the manufactured capital goods to a leasing company, at the same time concluding a lease agreement to use the goods. An operating lease consists of putting a specific good into use for a specific period of time, usually shorter than the period of full depreciation of the value of the good. In financial leasing, an agreement of this type is of a long-term nature and its duration is similar to the period of full depreciation of the value of the leased asset. It concerns capital goods of higher value than in the case of an operating lease. Foreign capital may also include non-returnable funds, which include subsidies from the state budget, as well as funds from the European Union funds. Franchising is another way of financing innovation. It is a method of economic cooperation through the creation of a network of units, assuming independence in terms of ownership, but also permanent control of the network owner on the basis of a coordination agreement. Another way of financing is factoring, which is a short-term financing of activities without increasing the company's liabilities. It is therefore an effective instrument for improving liquidity and speeding up the rotation of cash by converting the frozen capital provided in the form of services or products of the recipient into cash. It is a transfer of receivables resulting from the conclusion of a contract with a contractor to a factor who collects receivables from the debtor, finances the creditor and takes over the risk, and for his service charges an appropriate remuneration. The company in the period of innovation development bears costs which it is not able to cover the income, so venture capital financing can be used here. One of the attractive possibilities of financing innovative activities are subsidies from the European Union. These are various types of funds granted within the framework of the competition. Structural funds are funds that come from the European Union budget. Their basic aim is to support restructuring and modernization of regions and sectors of the economy of the member states, which have problems with meeting the average economic level in the European Union. In the years 2007-2013, in financing innovation, these were: Innovative Economy Operational Programme and Regional Operational Programmes (ROP). Z European funds can also be used for the period 2014-2020, where the programmes also include funding for innovative activities for businesses. Innovation vouchers can also be used to purchase services. There are many sources of funding for innovation activities, but there is no single optimal choice. The choice of the appropriate method of financing is an individual matter, which results from the specific conditions of a particular enterprise. What is important here is a detailed analysis and assessment of availability and effectiveness of particular sources of financing. The choice also depends on the characteristics of the implemented innovative project, the current financial condition and previous experience, or management staff, etc. In innovative activity, various sources of financing innovation are used at various stages. It is often used to divide the sources of financing of innovative activity taking into account the stage of the process of innovative projects. In order to facilitate this procedure, it is necessary to adopt three phases of an innovative project, conducting research and development, implementing and marketing and sales. At each stage of the process it is possible to show the expenses and revenues connected with conducting innovative activity. Sources of financing can also be assigned to each phase. NewConnect (NC) is a stock exchange platform for young and dynamic companies that are interested in a stock exchange debut but do not meet the stringent criteria for entering the stock exchange's core market. Companies can raise capital from the issue of new shares and sell them in an issue intended for external investors. The shares are traded on the NC market. The type of source of financing can also be attributed to the development stage of the company. Loan funds are local institutions operating in a specific area. Their product and service offer is tailored to the needs of entities operating in a given

area, focuses primarily on micro, small and medium-sized enterprises and applies simplified rules and principles of creditworthiness assessment. These institutions operate in various legal forms, most often it is a foundation, association or company. Moreover, they deal with training, advisory and information activities, they also run business incubators and guarantee funds. Credit guarantee funds are non-profit parabank units that provide financial assistance in the form of guarantees, mainly for small enterprises that have problems with completing the required collateral within the credit procedure. The term business angels refers to individuals who provide equity capital directly to new, innovative enterprises with growth potential, with which they have only an economic interest. They are venture capitalists, using their personal financial resources for this purpose. Such investors include current entrepreneurs and those who have already been successful and thus have sufficient capital to invest in new companies. Technology parks provide comprehensive support and offer entrepreneurs also advisory services in the field of development, technology transfer and transformation of scientific research results and development works into technological innovations. The mission of technology parks is to support enterprises in the process of technology development and implementation. They are naturally pregnant with the scientific environment. Most of them, even if there is no "scientific" part in the name, "are involved in the implementation of the mission of science parks, which consists of organizing research work, in order to implement their results in the company, as well as supporting the process of creation and development of spin-off, spin-out' companies. Entrepreneurship incubators act as a tool to support entrepreneurs who start running their own business. The operation of the incubators is part of the policy of supporting entrepreneurship, at national, as well as regional and local level. They have a significant impact on the level of local communities. This allows for the development and use of proven business creation patterns. Within a properly prepared offer of business incubators, one can distinguish basic services that reduce the costs of running a business on a current basis, as well as a number of additional services that provide entrepreneurs with an advantage over companies that operate on the market without similar support.

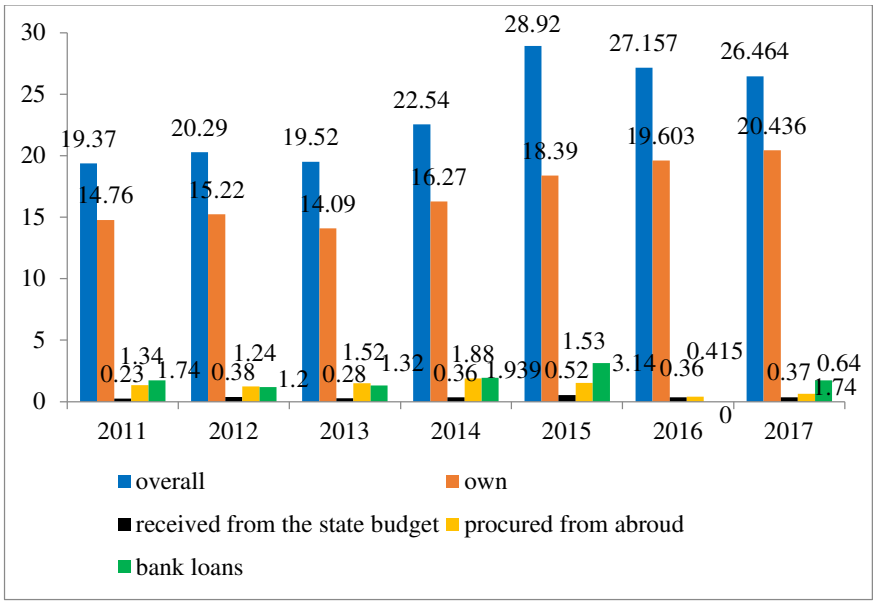

Fig. 1: Outlays on innovative activity due to the source of financing in production companies (billion PLN).

Source: Own elaboration based on GUS 2019.

In Poland, another type of financing of innovative activity is state aid in the form of technological credit, as well as reliefs and tax exemptions. The technology credit is a source of financing aimed at providing financial resources for the implementation of modern technology. It is available for the SME sector. The amount of the technology credit may not exceed the equivalent of EUR 2 million, and the subject of financing by the credit may be solutions developed on their own or solutions that come from outside. The necessary condition is a high level of novelty of the acquired technology.

Various innovation and business centres can also be used to support companies or potential entrepreneurs in the form of financial or material equipment and various services such as information, advice or training. In recent years, such a form of raising capital for innovations as Crowdfunding has been gaining in popularity. It is a kind of collection and transfer of accumulated funds by the society through the Internet. The innovative potential should be increased, both in the sphere of financing and introducing new solutions. Financing the innovative activity of enterprises in the Industrial 4.0 era is one of the most serious management problems. Capital is the basis for the development of innovative enterprises. There are many different sources of financing innovation, from the company's own resources to bank credits, loans, as well as various types of funds such as: venture capital or funding from the European Union. An appropriate source of financing should be chosen according to the stage of the implemented undertaking. Research has been carried out which illustrates the expenditure on innovative activity of enterprises operating in Poland. Expenditures on innovative activity can also be considered due to the source of financing of these expenditures.

The data presented in Figure 1 shows that the main source of financing of outlays on innovative activity in the examined period 2011-2017 was the companies' own funds. In 2015, they constituted as much as 63% of all outlays and increased by 13.03% in relation to the previous year. The lowest expenditures were recorded from the state budget. Throughout the entire period under examination, they remained at a similar level of about 0.5%. In 2015, however, bank loans as funds obtained for innovative activities increased by 80.46% compared to 2010. The increase in bank loans as a source of financing for innovative activities results, among other things, from the fact that the interest rate in Poland has decreased, loans have become cheaper. The reduction of interest rates was from 3.5% in 2011 to 1.5% in 2015, which partially resulted in an increase in bank loans. Also noteworthy is the low share of resources from the structural funds on average 1.42%.

Conclusions

In today's economy, innovation is a key factor in social and economic development. Only those enterprises that implement innovative projects, introduce innovative products and services, solutions, technologies will be able to match the competition and meet the requirements of the dynamically changing market in the era of the Industry 4.0 concept. More and more entrepreneurs are aware of the necessity of implementing innovative projects and benefits resulting from them. Increase of profits, increase of market shares, increase of competitive advantage, use of new market opportunities are only some of the advantages of implementing innovations in an enterprise. Not without significance is also the implementation of customer needs, personalization and variety of products, processes, services or increase in customer loyalty. All this makes entrepreneurs want to implement and implement innovations to ensure the company's survival and development. The available sources of financing include debt financing, interest-free foreign capital, as well as own capital, which is used to start up and develop innovative activities. Therefore, financing is available at every stage of the company's development. The funds come from both public and private sources. Available sources of financing for innovative projects in Poland include:

- EU funds (operational and framework programmes),
- Funds from the National Centre for Research and Development,
- Innovation Support Loan Fund (PARP),
- Venture Capital and Business Angeles funds,
- Crowdfunding.

Research has shown that equity is the most popular in financing innovation. Polish companies have great potential to create and develop innovative solutions known all over the world and actively implement solutions of the Industry 4.0 concept. The criteria for applying for structural funds may be relaxed. There are many sources of financing innovative activity at each stage of the enterprise's development. A tax relief for research and development may also be an incentive to undertake innovative activity.

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Effect of Financial Development on Macro-Economic Variables in Nigeria

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Abstract

There has been an increasing build-up of studies that focus on suspected relationship between developments in Finance and economic development variables. While some studies sought to establish the causation between the two variables, some others focus on the aspect or extent of development in Finance, or exact variables in Finance that could ignite growth in the economic sector. Yet some others examine those macro-economic variables, which financial growth could ignite their performance. Undoubtedly, the quest to proffer logical answer to the fundamental economic development question on why countries grow at different rates has undoubtedly digressed researchers to further investigate the causal factors of influence among growth variables in finance and the real economy. Moreover, dearth of studies on correlation that exists amidst real and financial growth variables in Nigeria necessitated this study. The paper aims at investigating the impact and trend of developments in the finance and real sectors of the Nigerian economy. The study examines the long-run effects and two potential causal variables of influence on economic development; using Vector Error Correction Model. It finds that growth effect of finance is bias to choice of macro-economic variables regressed. The results suggest that the influence of growth in finance on macro-economic variables depends on measures used to proxy for financial growth.

Keywords: Economic Development Variables, Financial Growth, National Income, Market Capitalisation, Gross Domestic Products

Introduction

It is considerably wise for resource managers to have at least a good analyses conducted on their individual business units; even if they lack the requisite expertise of business portfolio matrix. In like manner, it is equally wise of public functionaries to periodically identify and conduct periodic assessments tailored at improving the various variables that aid the performance of the economy that they govern. In other words, it is pertinent to identify and further develop such variables that could play pivotal roles in aid of performance of cogent macro-economic variables.

This study chose the Gross Domestic Product and the National Income to proxy macro-economic development on one side; and loans to the private sector and capitalization of stock mart as proxy to developments in finance. Macro-economic variables are economic aggregates via which economic development and performances are measured. These are aggregates like total output of an economy, general price level in an economy, inflation rate, rates of interest, national income and exchange rate. National outputs are measured by the GDP, which represents the value of all final products in the mart produced at a particular time. That is, national income connotes earnings of producers and suppliers of productive resources. It is the net national income at factor cost, which excludes transfer earnings (Ajayi & Ojo, 1980).

Meanwhile, according to Falaye (2014), the following indicators enunciated by Khan and Senhadji (2000) are good measures of developments in finance. The sum of loans and advances to private sector as a percentage of Gross Domestic Products; the sum of domestic credits lent to the private sector as a percentage of the GDP plus the stock mart capitalization as a share of the GDP; the sum of domestic credits lent to the private sector as a share of GDP plus the stock mart capitalization as a share of GDP, and non-public and public bond marts capitalization as a share of GDP; and the stock mart capitalization. Out of the four, the most exhaustive is the sum of domestic loans lent to non-public segment of the economy relative to domestic products plus the stock mart capitalization as a percentage of GDP, and the bonds mart's capitalization as a percentage of gross domestic products. Where the capital mart is still emerging however, the ratio of private credits to the GDP could be used to measure financial depth. In sum, financial growth is easily noticeable via increased change in financial structures over periods of time. Hence, the rate at which financial structure increases can be deduced by comparisons at different points in time. Some other measures of financial growth that may prove useful in less developed economies include liquid liabilities of banks and non-bank institutions as a percentage of GDP, the ratio of banks' credit to the sum of banks and central bank's credit, the ratio of private credits to domestic credits, the measure of financial assets in the economy, and commercial banks deposits as a ratio of GDP.

Related works

Moreover, it is not out of place to further probe Schumpeter's view on the constructive effect of financial growth on economic development. This is in consonance with the articulate models of King and Levine (1993a), (1993b), Shaw (1973) and McKinnon (1973). In sum, the correlation between pecuniary development and economic growth variables must be established to enable fair comparison among countries in investigating the reasons nations grow at diverse degrees.

Shaw (1973) and McKinnon (1973) built on the work of Schumpeter (1883-1950) and propounded the financial liberation thesis of 1973 that higher degree of financial growth that results from financial liberalization would accelerate growth in outputs. They further maintained that financial sector could raise not only the volume of savings, but also the quality and quantity of investments. In support of their view, growth and endogenous financial growth models emerged in 1990s. These models clearly indicate that financial growth occasions long run growth; and that financial distribution lessens economic development rate.

In the words of Goodhart (2004), progress causation between real and financial growth variables runs in either of the two directions. This is equally the report of Demetriades and Hussein (1996). Goodhart however submits that a more domineering research finding is that financial growth promotes economic development. According to him, the most functional financial marts are found mostly in very successful economies. More importantly, his submission implies the existence of a linear relationship between the two.

As Das (2005) puts it, 'a well-developed financial sector plays an important role in the overall economic development.' In his words, literature has exposed some ways via which the financial sector supports macro-economic development. Das submits that the financial sector does not only mobilise and channel funds into investments, but also optimizes resources allocation. Yet, a well-functioning finance sector lowers costs of financial intermediation and reduces the risks inherent in financial transactions. His submission is in tandem with King and Levine (1993) that a well-functioning finance system quickens economic development via successful brilliant innovations. Some other studies that report financial growths positive impact on economic development include Claessens and Feijen (2006), Uddin et al (2013), Durusu-Ciftci et al (2017), Assefa et al (2015), Bayar (2014), Ben-Jedidia et al (2014), Bijlsma et al. (2018) and Yang (2019) among many others.

Nevertheless, some researchers hold the opinion that even though there exists a fundamental connexion between growth in finance and economic development, the rapport is negatively linear. They maintain that financial growth impacts negatively on economic development. Studies in support of the report that financial growth has negative impact on economic development include D -Gregorio and Guidotti (1995), Ductor and Grechyna (2015) and Samargandi et al (2014). Conclusively, while some other studies like Hassan et al (2011), Ang and McKibbin (2007) and Ibrahim (2007) report that it is even economic development that influences financial growths; some like Adu et al (2013) even report that variations in those reports base on variables used to proxy financial growth.

Goldsmith (1969) presents data from 35 nations for a period of 103 years (1860 to 1963), applying the OLS and graphical exploration. The study establishes distinct association between finance growth and developments in the economy. King and Levine (1993a) use a sample of 77 countries for 29 years (1960 to 1989). They conclude that finance is crucial for economic development. In the same vein, Atje and Jovanovic (1993) investigate the impact of stock marts and banks on economic development, based on 94 countries for a period of 25 years (1960 to 1985). They find that stock markets have non-negative and growth impact on economic activities. Equally, Levine and Zervous (1996) obtain data for a period of 29 years (1960 to 1989), apply OLS estimation technique to a sample of 49 countries. The study finds stock mart liquidity positively and significantly correlated with economic development.

Objectives of study

1. To investigate if there is an underlying relationship between the finance growth and developments in Nigeria's economy.
2. To find the trend of the fundamental association between the two variables; if there exists any in Nigeria.

Methods

Model specification

$$GDP, Y = f(M_C, C_P, i + ecm)$$

Where:

GDP	=	Gross Domestic Product
NI	=	National Income
MC	=	Market Capitalization
CP	=	Credit to the private Sector
i	=	Prime interest rate
ecm	=	error correction term

Hypotheses of study

H0$_1$: There exists no significant connection between finance growth and developments in Nigeria's economy.

H0$_2$: The relationship between National Income and Financial Performance is not significant.

Scope of study

The study based its data usage on the Nigerian economy only. It's a collection of a period of 35 years; starting from 1984 to 2018. We decided to analyse two independent and two dependent variables for study.

Table 1: Unit Root Augmented Dickey-Fuller test

Variables	ADF@ levels	ADF@1st diff and Intercept	Order of Integration
National Income(NI)	-0.429414* ** ***		I(0)
Market Capitalization(MC)	-1.841954* ** ***		I(0)
Credit to private Sector (CP)	-1.549822 * ** ***		I(0)
Gross Domestic Product (GDP)	-2.834029* **		I(0)

Evidence from our unit root test shows that all the data variables in our study are stationery at first difference. This implies that the data variables are efficient for further analysis; hence, we proceed to regression analysis**.**

Test of hypotheses

H0$_1$: There is no substantial connexion between financial performance and economic advancement in Nigeria.

Table 2: Regression results showing the effect of financial performance on economic growth in Nigeria.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.497706	0.049865	30.03546	0.0000
MC	0.196856	0.060995	3.227432	0.0029
CP	0.631695	0.068543	9.215990	0.0000
R-squared	0.991550	Mean dependent var		3.883827
Adjusted R-squared	0.991005	S.D. dependent var		0.919947
S.E. of regression	0.087252	Akaike info criterion		-1.955945
Sum squared resid	0.235998	Schwarz criterion		-1.821266
Log likelihood	36.25106	Hannan-Quinn criter.		-1.910015
F-statistic	1818.770			
Prob(F-statistic)	0.000000			

From Table 2, mart capitalization (MC) indicates a coefficient of regression value of 0.196856. This means that MC is confident and substantial determinant of economic advance in Nigeria as measured by Gross Domestic Product (GDP). It also means that a unit variation in MC will bring about equal change in economic growth in Nigeria. As seen in the table, credit to private sector (CP) has a coefficient of regression value of 0.631695. This indicates that CP is positive and significant; hence, a function of GDP in Nigeria.

$H0_2$: The relationship between National Income and Financial Performance is not significant.

Table 3: Regressions results showing relationship between National income and Economic growth in Nigeria

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.519932	0.113386	4.585513	0.0001
MC	-0.048661	0.138694	-0.350852	0.7281
CP	0.513235	0.155859	3.292943	0.0025
R-squared	0.943146	Mean dependent var		139.7684
Adjusted R-squared	0.939225	S.D. dependent var		170.3217
S.E. of regression	41.98880	Akaike info criterion		10.40174
Sum squared resid	51128.72	Schwarz criterion		10.53916
Log likelihood	-163.4279	Hannan-Quinn criter.		10.44729
F-statistic	240.5380			
Prob(F-statistic)	0.000000			

Evidence from Table 3 indicates that market capitalization has a regression value of -0.048661. This value is seen to be negative and insignificant at a 0.5% level, implying that national income is not a function of mart capitalization in Nigeria. Again, the Table 3 also shows that credit to private sector (CP) has a coefficient of regression value 0.513235. Permit to say that this value is positive and significant at a 5% level. It indicates that CP is a determinant of economic growth as measured by national income in Nigeria.

$H0_1$: There is no significant influence between financial performance and economic growth in Nigeria.

Table 4: ***Regression result showing the influence of financial performance on economic growth in Nigeria***

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-933.2059	410.9096	-2.271074	0.0305
EG	0.392053	0.010108	38.78518	0.0000
R-squared	0.980447	Mean dependent var		8991.254
Adjusted R-squared	0.979795	S.D. dependent var		12795.19
S.E. of regression	1818.753	Akaike info criterion		17.91015
Sum squared resid	99235880	Schwarz criterion		18.00176
Log likelihood	-284.5624	Hannan-Quinn criter.		17.94052
F-statistic	1504.290			
Prob(F-statistic)	0.000000			

Statistical evidence from Table 4 shows that economic growth in Nigeria is a function of financial performance. This assertion is validated by a coefficient of regression value of 0.392053, which is momentous at a 5% level. It means that pecuniary performance effects economic growth in Nigeria.

Results

As seen in Table 2, mart capitalization is indicated to have a coefficient of regression value of 1.369411. This means that mart capitalization is positive and significant determinant of economic development in Nigeria as proxied by GDP. Thus, a unit change in mart capitalization will bring about equal change in economic development in Nigeria. Equally, the Table 2 shows that credit to private sector has a coefficient of regression value of 3.590826. This is an indication that credit to private sector is confident and substantial; hence, a determinant of economic development in Nigeria.

In Table 3, it is evident that mart capitalization has a regression value of 0.011911. This value is seen to be positive and significant at a 0.5% level; implying that national income is a function of mart capitalization in Nigeria. Equally shown in the Table 3 is the fact that credit to private sector has a coefficient of regression value fo0.013927. Permit to say that this value is confident and substantial at a 5% level. It indicates that credit to private sector is a determinant of economic development as proxied by national income in Nigeria.

Summarily, the statistical evidence from Table 4 shows that economic development in Nigeria is a function of financial performance. This assertion is validated by a coefficient of regression worth of 0.392053 that is significant at a 5% level. This means financial growth stimulates economic development in Nigeria. Hence, there exists substantial correlation of influence amid financial performance and economic development in Nigeria. Hence, we equally discard the third null proposition.

Discussion and conclusion

Specifically, that result in Table 2 is akin to Ben-Jedidia et al. (2014), which reports that domestic loans to the private sector has positive effect on the economic development of Tunisia. The result is tenable because money lent to operators in private sector of Nigeria are seen to be competed for among various applicants and won over by the most lucrative and most prudently managed business proposals. After being awarded such credit facilities, loan officers still monitor the beneficiaries' engagement of such opportunities to avoid the incidences of bad loans. Hence, the productivity of credits lent to the non-public sector is sacrosanct to increased domestic products; and even the GNP. Ben-Jididia et al. surmised that notwithstanding the fragility at the short-run, financial growth positively affects economic development in the long-run.

Generally, results of the study are in tandem with the bulk of empirical literature, which submits that good functioning financial system plays a vital and causal role in augmenting long-run economic development (Demirguc-Kunt, 2012. This is an indication that the Nigeria financial system is fast developing, influencing innovations in the tangible sector of the economy (King and Levine, 1993). It is a fast departure from Ojo (1990) as cited by Falaye (2014), and therefore a good an indicant of improved efficiency in financial contracts enforcement; and strong legal right of foreign investors. Moreover, we acknowledge the finance approved for publishing this article, which Landmark University, Nigeria supplied. It is our hope that tertiary institutions in and around Nigeria will emulate and adopt the laudable gesture.

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Appendix

Table 5:

S/No	Year	GDP (Billion)	MC (Billion)	CP (Billion)	NI (Billion)
1	1984	170.38	5.50	12.46	27.72
2	1985	192.27	6.60	13.07	27.85
3	1986	202.44	6.80	15.25	19.29
4	1987	249.44	8.20	21.08	21.69
5	1988	320.33	10.00	27.33	22.76
6	1989	419.20	12.80	30.40	22.15
7	1990	499.68	16.30	33.55	27.87
8	1991	596.04	23.10	41.36	24.94
9	1992	909.80	31.20	58.12	26.35
10	1993	1,259.07	47.50	127.12	13.44
11	1994	1,762.81	66.30	143.42	15.73
12	1995	2,895.20	180.40	180.00	26.33
13	1996	3,779.13	285.80	238.60	32.76
14	1997	4,111.64	281.90	316.21	33.59
15	1998	4,588.99	262.60	351.96	29.18
16	1999	5,307.36	300.00	431.17	34.39
17	2000	6,897.48	472.30	630.37	40.24
18	2001	8,134.14	662.50	764.96	40.04
19	2002	11,332.25	764.90	930.49	53.02
20	2003	13,301.56	1359.30	1,096.54	59.99
21	2004	17,321.30	2112.50	1,421.66	77.99
22	2005	22,269.98	2900.10	1,838.39	98.88
23	2006	28,662.47	5120.90	2,290.62	140.79
24	2007	32,995.38	13181.70	3,680.09	154.61

25	2008	39,157.88	9563.00	6,941.38	192.91
26	2009	44,285.56	7030.80	9,147.42	154.92
27	2010	54,612.26	9918.20	10,157.02	349.55
28	2011	62,980.40	10275.30	10,660.07	389.09
29	2012	71,713.94	14800.90	14,649.28	438.87
30	2013	80,092.56	19077.40	15,751.84	489.45
31	2014	89,043.62	16875.10	17,131.45	549.53
32	2015	94,144.96	17003.40	18,675.47	468.41
33	2016	101,489.49	16185.70	21,082.72	395.95
34	2017	**113,711.63**	21128.90	22,092.04	364.28
35	2018	**127,762.55**	21904.04	22,521.93	378.95

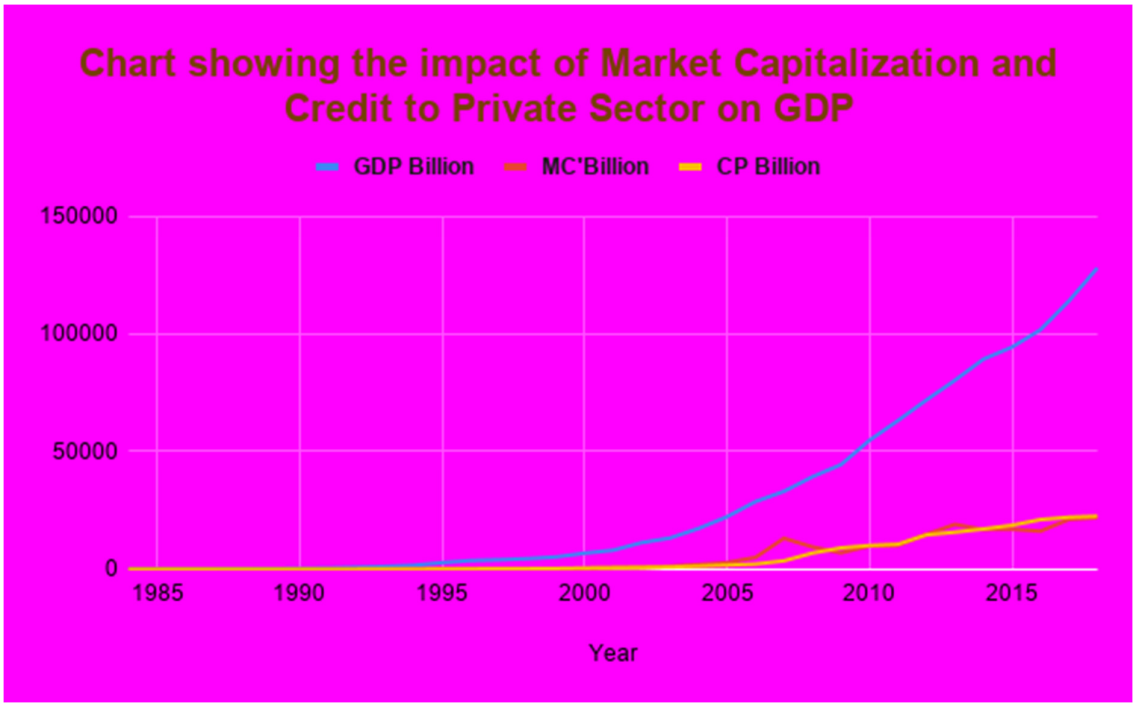

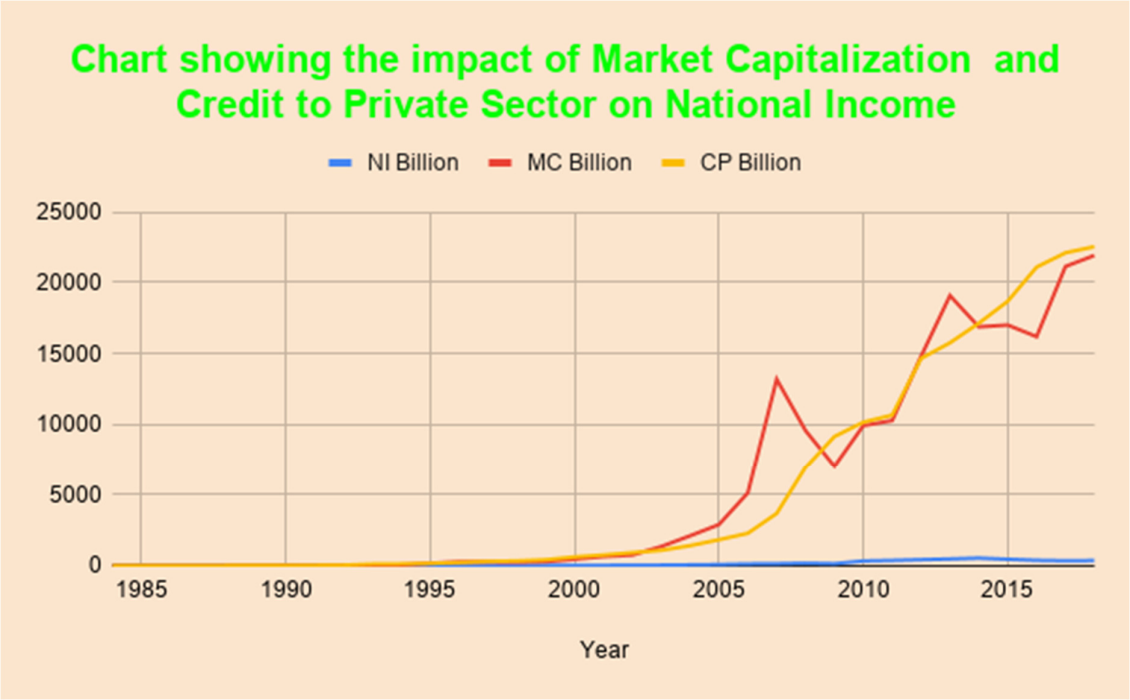
Chart showing the impact of Market Capitalization and Credit to Private Sector on National Income
NI Billion
MC Billion
CP Billion
25000
20000
15000
10000
5000
0
1985
1990
1995
2000
2005
2010
2015
Year

Information and Communication Technology (ICT) Adoption and Financial Depth in Africa: A Positional Argument

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Abstract

Evidence abound that the levels of Information and Communication Technology (ICT) adoption as well as financial depth differ across Africa's sub-regions is relatively poor. Thus, this study comparatively examines the trend of ICT adoption and financial depth, hence, presenting statistical facts within Africa and Africa's sub regions (Central, East, North, Southern, and West Africa) to develop a positional argument on the state of affairs together with its implications. The data for the analysis is sourced from the World Development Indicators of the World Bank and utilises statistical packages for the collation and characterisation of the data. The outcome of this study will contribute to knowledge information on Africa's financial depth and ICT adoption, hence, spurring the need for the development of both the financial and the ICT sector by different stakeholders.

Introduction

Technology and innovation have been at the very core of human progress thus impacting on the quality of lives of people across the nations of the world through the improvement of educational and health care facilities, accessibility and efficiency (Ejemeyovwi, Osabuohien, Johnson & Bowale, 2019; Ejemeyovwi and Osabuohien, 2020). The rate of adoption of internet and Information and Communication Technologies (ICTs) has proven to be instrumental in driving inclusive growth, connecting people in remote locations to market, improving access to education, enabling access to information, promoting innovation, improving citizens participation in the democratic process and enabling the rise of small and medium scale enterprises (Guerriero, 2015). Financial development is not left out as a result of the fast adoption rate of ICTs.

Well-functioning financial institutions improve overall economic efficiency, create and increase liquidity, mobilise savings, promote capital accumulation, transfer resources across sectors and encourage entrepreneurs (Darrat & Al-Sowaldi, 2010). Okafor, Onwumere and Chijindu (2016) referred to financial deepening as a condition of sufficient liquidity and smooth financial intermediation, hence, the increase in assets and provision of needed financial services to the economy. World Bank (2018) referred to financial deepening (broad money supply to GDP ratio) as the summation of currency outside banks, demand deposits other than those of the central government, the time, savings, and foreign currency deposits of resident sectors other than the central government; bank and travellers checks; and commercial paper. Financial development theoretically

could be achieved through ICT adoption (Ejemeyovwi & Osabuohien, 2018; Karakara & Osabuohien) but however, the question of whether this hypothesis has been the trend in Africa is an unexplored aspect.

The study's objective is to utilise descriptive statistics to explore and argue about the level of ICT adoption and financial depth in Africa through stylised facts. The study commences section one with the introduction about the subject matter; section two itemises the materials and methods which extracts the stylised facts from the data as stated in the objectives using descriptive statistics tools; section three entails the results presentation and discussion section while section four consist of the conclusion on the positional argument.

Materials and Methods

The study utilises descriptive tools to analyse and present the trend of information and communication technology adoption and financial development for Africa as a whole, West Africa, North Africa, East Africa, and Southern Africa. The tools to be utilised include the graphs, tables, charts and descriptions of the trend from 2000 to 2018.

Results and Discussion

In Africa, financial depth has been increasing with few slight downward fluctuations on the average but within the same range. The African average values for the study period range within 27% as at 1999 and 40% as at 2015 and 2016 (Figure 1). Of the countries within the case study, outstanding performances in terms of the most and least financially developed (broad money supply to GDP ratio) African countries include: Morocco and Chad. Morocco is characterised by impressive financial development values among all the countries in Africa which maintained a consistently increasing trend with 66.1% as at 1999, 84.3% as at 2004, 113.3% as at 2013, 118.3% as at 2016, and 120.3% as at 2017. These trend shows that lessons on financial development may be learnt from Morocco by other African countries. Chad, on the other hand, performed poorly at the initial time period but improved overtime in Africa. The statistics further show that Chad had 10.8 as at 1999, 12.36% as at 2004, 13.3% as at 2013, and 15.6% as at 2017. In sum, statistics show that 97% of African countries had values below 50% within the study period.

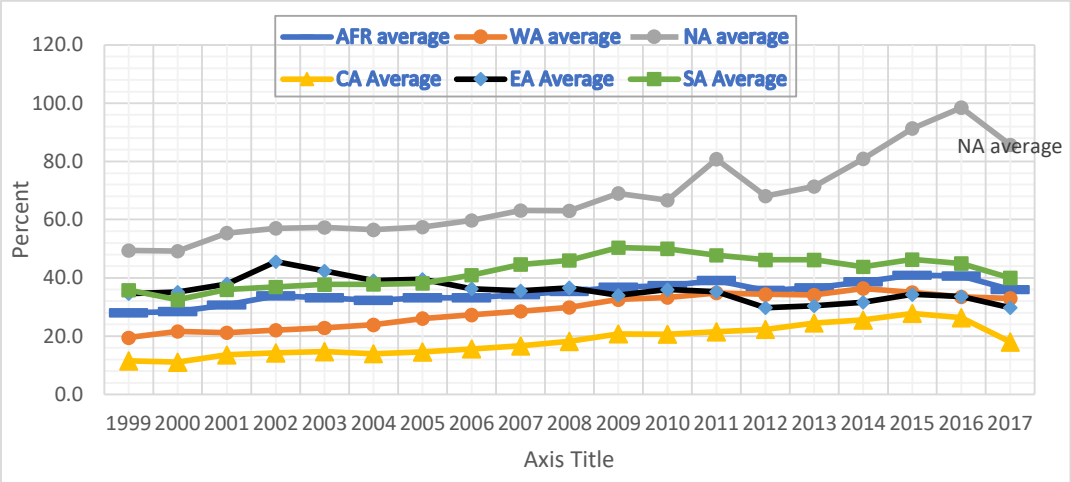

**Note: AFR = Africa; CA = Central Africa; NA = North Africa; WA = West Africa; SA = Southern Africa; EA = East Africa.*

Figure 1: Average Broad Money Supply to GDP Ratio for Africa and Regions

Source: Authors Computation using data from World Bank (2018)

In West Africa, financial depth has been increasing on the average but the increase has been poor and slow**.** The West African average values for the study period range within 19.49% as at 1999 and 36.35% as at 2014 which was then followed by a certain reduction to 33.5% and 33.03% as at 2016 and 2017, respectively (Figure 1). Of the countries within the case study, Cape Verde impressively had broad money supply to GDP ratio of 59.95% as at 1999 followed by Guinea Bissau with 29.50% while Togo, Senegal and Benin came next with 22%. For the most recent time period of the data set as at 2017, Cape Verde experienced 105.49%, Guinea Bissau (32.71%) while Togo, Senegal and Benin had 56.03%, 49.59% and 39.68%.

Outstanding performances in terms of the most and least financially developed (broad money supply to GDP ratio) West African countries include: Cape Verde and Niger. Cape Verde is characterised by impressive financial development values among all the countries in West Africa which maintained a consistently increasing trend with 59.96% as at 1999, 76.17% as at 2004, 89.44% as at 2013, 104.08% as at 2016, and 105.49% as at 2017. This trend shows that lessons on financial development may be learnt from Cape Verde by other West African countries. Niger, on the other hand, performed poorly at the initial stage but improved overtime in West Africa. Statistics show that Niger has 7.45 as at 1999, 12.36% as at 2004, 22.50% as at 2013, and 27.16% as at 2017. However, as at 2017, the least financially developed economy is Mali having 23.91% as at 2017 as can be seen in Table 1.

Further observation of the broad money supply to GDP ratio show that within 1999 to 2017, (i) West African countries individually performed above their yearly average 99 times (34%) while they performed below the yearly average 127 times (44%) throughout the study period. This implies that most countries individually performed below the yearly average of the broad money supply to GDP ratio. (ii) West African countries individually performed above 50% (average on a scale of 1 - 100) only 28 times (9.7%) while they performed below 50% (average on a scale of 1 - 100) 258 times (90.2%). This further signifies the relatively low financial development in West Africa.

Table 1: The Average of the Broad Money Supply to GDP in West Africa

Country Name	1999	2001	2003	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Benin	23.00	24.60	22.94	21.31	25.57	28.61	32.10	33.06	35.29	36.08	34.34	37.03	41.35	43.00	41.59	39.68
Burkina Faso	19.68	18.45	25.52	20.27	21.18	21.43	23.56	27.52	28.94	29.08	29.83	31.95	34.20	40.56	41.10	44.61
Cote d'Ivoire	21.99	20.98	18.16	19.27	21.64	27.17	25.88	29.67	32.87	37.57	34.17	34.01	34.35	36.17	36.50	36.25
Cape Verde	59.96	65.70	71.10	83.99	87.74	77.57	75.56	77.50	80.10	78.48	82.08	89.44	95.65	98.88	104.08	105.49
Ghana	24.09	31.45	31.05	32.11	23.26	25.72	27.46	28.25	29.62	30.55	30.36	29.25	33.10	34.40	34.48	32.53
Guinea		12.50	16.07	18.69	17.90	12.93	14.73	17.37	26.44	27.16	21.75	22.87	24.14	27.02	25.11	
Gambia	15.84	21.95	32.90	33.91	41.66	41.16	45.09	46.24	49.05	54.94	53.43	55.31	56.04			56.79
Guinea-Bissau	29.51	19.74	10.94	16.48	17.19	20.20	22.58	24.02	26.66	31.47	30.55	31.35	46.26	49.47	47.95	32.71
Liberia	11.51	11.23	13.22	20.31	24.49	26.98	32.43	31.69	34.81	39.92	34.91	37.26	34.00	35.71		
Mali	17.14	19.36	27.48	24.57	24.64	22.48	17.48	22.56	23.86	23.27	25.91	27.21	26.48	26.84	27.67	23.91
Mauritania				26.52	21.78	24.37	25.06	28.94	25.80	25.86	26.75					
Niger	7.45	10.88	11.53	11.62	12.23	16.58	15.41	17.66	19.48	19.50	21.91	22.50	26.16	25.96	26.82	27.16
Nigeria	21.13	26.67	20.20	17.73	19.04	28.06	37.77	43.27	21.02	20.68	21.89	21.51	20.19	19.69	20.38	
Senegal	22.51	20.19	25.85	28.16	29.67	30.31	29.93	33.66	35.35	35.87	35.59	38.11	41.15	45.97	48.43	49.59
Sierra Leone	16.08	13.18	13.82	14.86	15.44	15.67	17.10	20.69	20.81	21.62	20.43	17.52	20.40	24.15	26.37	23.62
Togo	22.02	22.96	25.40	27.16	32.55	37.50	36.52	39.67	43.28	45.03	44.58	51.13	48.21	53.31	55.67	56.03
Total	311.9	339.84	366.19	416.95	435.99	456.75	478.68	521.76	533.39	557.07	548.48	546.43	581.68	561.13	536.17	528.36
W. A Average	19.49	21.24	22.89	26.06	27.25	28.55	29.92	32.61	33.34	34.82	34.28	34.15	36.36	35.07	33.51	33.02

Source: Authors Computation using data from World Bank (2018)

In North Africa, financial depth has been increasing on the average but the rate of increase has been poor and slow**.** The North African average values for the study period range within 50% as at 1999 to about 91.4% as at 2016 which was then followed by a certain reduction to 85.7% as at 2017 (Figure 1). Of the countries within North Africa, outstanding performances in terms of the most and least financially developed (broad money supply to GDP ratio) include: Morocco and Sudan. Morocco is characterised by impressive financial development values among all the countries in North Africa which maintained a consistently increasing trend with 66.1% as at 1999, 84.3% as at 2004, 113.3% as at 2013, 118.3% as at 2016, and 120.3% as at 2017. This trend shows that lessons on financial development may be learnt from Morocco by other North African countries. Niger, on the other hand, performed poorly at the initial stage but improved overtime in North Africa. Statistics reported in Table 2 show that Sudan had 9.4% as at 1999, 17.0% as at 2004, 19.4% as at 2013, and 20.3% as at 2016. In terms performance of North African countries' money supply to GDP ratio, 27.43% of the countries performed below 50% and 73% of their countries performed above 50% which is impressive compared to other regions.

Table 2: The Average of the Broad Money Supply to GDP in North Africa

Year	1999	2000	2003	2004	2005	2006	2008	2009	2010	2011	2013	2014	2015	2016	2017
Algeria	42.2	37.8	62.8	59.3	53.8	57.3	63.0	73.2	69.1	68.1	71.7	79.3	82.1	79.4	79.1
Egypt	76.0	76.7	96.7	96.7	97.1	97.4	88.4	83.2	80.7	75.8	74.6	75.4	78.0	98.1	92.3
Libya	55.3	48.5	33.3	29.6	26.6	26.0	36.3	57.4	47.6	131.7	80.4	127.5	185.7	204.5	149.5
Morocco	66.1	70.9	82.6	84.3	92.0	99.5	111.6	114.4	113.7	115.8	113.9	117.6	116.9	118.3	120.3
Sudan	9.4	11.0	15.7	17.0	20.8	22.9	20.1	23.2	23.7	23.5	19.4	16.5	16.1	20.3	
Tunisia	47.5	50.1	53.3	52.5	54.1	55.3	58.9	62.6	65.1	69.7	68.7	69.0	69.4	70.3	73.0
NA Average	49.4	49.2	57.4	56.6	57.4	59.7	63.0	69.0	66.6	80.8	71.5	80.9	91.4	98.5	85.7

Source: Authors Computation using data from World Bank (2018)

In Central Africa, financial depth has also been increasing on the average but the rate of increase has been relatively constant than other regions for the same period. The Central African average values for the study period range within 11.5% as at 1999 to about 27% as at 2015 which was then followed by a reduction to 18.0% in 2017 (Figure 1). Of the countries within Central Africa, outstanding performances in terms of the most and least financially developed (broad money supply to GDP ratio) countries include Sao Tome & Principe and Chad. Sao Tome and Principe is characterised by relatively high financial development values among all the countries in Central Africa which maintained a consistently increasing trend with 28.0% as at 2004, 37.7% as at 2013, 34.5% as at 2016 and 34.5% as at 2017. This trend shows that lessons on financial development may be learnt from Sao Tome and Principe by other Central African countries. Chad, on the other hand, performed poorly, improved overtime but the improvement was not significant. Statistics in Table 1.3 show that Chad had 10.8% as at 1999, 8.2% as at 2004, 13.3% as at 2013, and 15% as at 2016. In terms performance of Central African countries' money supply to GDP ratio, 100% of the countries performed below 50% and 0% of their countries performed above 50% which is not impressive compared to other regions within Africa.

Table 3: The Average of the Broad Money Supply to GDP in Central Africa

Country Name	1999	2000	2003	2004	2005	2006	2008	2009	2010	2013	2014	2015	2016	2017
Angola	22.8	17.3	17.0	16.3	17.4	20.4	33.2	42.5	35.3	36.5	41.0	46.4	41.8	31.6
Central African Republic	17.6	17.0	14.4	16.1	18.1	15.9	15.2	16.1	17.8	28.5	29.1	27.8	26.2	26.5
Cameroon	12.8	14.0	14.9	14.7	15.1	15.3	17.1	17.8	19.3	19.1	20.0	20.6	20.7	20.6
Congo, Dem. Rep.		3.4	3.2	5.1	4.5	5.9	8.5	9.7	10.1	11.4	11.9	12.3	14.0	
Congo, Rep.	14.5	14.6	12.9	12.8	13.1	15.3	18.1	22.3	22.4	32.0	36.1	44.1	41.0	
Equatorial Guinea	9.2	6.4	10.5	8.7	6.4	5.9	6.5	10.5	12.3	16.7	14.5	17.8	17.4	16.1
Gabon	15.5	14.6	15.0	15.1	16.3	17.4	16.1	20.3	19.7	24.9	23.5	24.9	24.5	19.7
Sao Tome and Principe			33.1	28.8	32.8	34.3	37.9	37.2	37.6	37.7	38.5	40.7	34.5	31.6
Chad	10.8	12.3	11.6	8.2	7.2	9.8	10.9	11.1	11.5	13.3	15.7	15.8	17.0	15.6
Total	103.3	99.7	132.4	125.6	131.0	140.3	163.5	187.5	185.9	220.2	230.3	250.5	237.0	161.8
Average	11.5	11.1	14.7	14.0	14.6	15.6	18.2	20.8	20.7	24.5	25.6	27.8	26.3	18.0

Source: Authors Computation using data from World Bank (2018)

In East Africa, financial depth on the average been relatively downward trending. The East African average values for the study period range within 13% as at 2013 to about 42% as at 2005 for which a reduction began in 2002: 45.6% and descended to 42.3% and 39.1% as at 2003 and 2004, respectively which trended downwards till 2017, having a value of 29.8% as highlighted in Figure 1. From Table 4 outstanding performances in terms of the most and least financially developed (in terms of broad money supply to GDP ratio) countries in East Africa, include Eritrea and Malawi (with exception of Somalia and South Sudan having missing records).

Eritrea is characterised by relatively high financial development values among all the countries in East Africa which maintained a consistently increasing trend with 128.9% as at 2004, 123.2% as at 2010 while the 2012 – 2017 records were not reported. Statistics further show that Malawi had 16.2% as at (1999, 12.3% as at 2004, 26.0% as at 2013, and 23% as at 2016. In terms performance of East African countries' money supply to GDP ratio, 73.57% of the countries performed below 50% and 26.5% of their countries performed above 50% which is not that impressive but is better compared to the central African region.

Table 4: The Average of the Broad Money Supply to GDP in East Af

Year	1999	2000	2003	2004	2005	2006	2008	2009	2010	2011	2013	2014	2015	2016	2017
Burundi	20.5	17.2	24.0	22.3	23.2	26.3	25.3	26.4	28.2	25.3	23.3	23.0	22.8	23.7	24.7
Comoros	18.2	19.7	25.7	23.7	24.6	26.1	28.9	31.0	34.9	36.3	39.2	40.4	45.3	45.7	45.1
Djibouti	54.6	53.7	69.7	74.1	77.6	79.8	80.5	89.7	93.5	81.4	93.6	90.8	96.2	96.9	113.0
Eritrea	145.7	141.1	146.1	128.9	129.2	123.9	141.3	121.5	123.2	114.6					
Ethiopia	35.5	34.6	44.9	45.4	43.8	42.5	34.0								
Kenya	35.8	35.2	39.0	39.3	38.9	34.6	36.1	36.5	40.3	40.9	42.3	43.2	42.4	38.4	38.9
Madagascar	19.9	20.8	23.4	24.4	20.1	22.5	22.4	23.8	23.8	25.3	24.2	24.3	25.5	27.2	28.5
Mozambique	19.1	23.5	24.5	22.4	24.6	25.6	28.9	35.7	38.7	37.7	44.9	49.7	56.4	53.3	49.0
Mauritius	80.9	79.4	95.6	101.2	102.2	93.1	96.5	96.3	97.5	96.6	98.2	101.4	106.9	109.9	113.5
Malawi	16.2	17.8	11.5	12.3	12.5	11.6	18.7	19.9	22.1	25.1	26.0	24.0	24.5	23.0	
Rwanda	16.3	16.9	16.2	15.7	15.6	16.4	16.7	15.1	16.5	18.4	18.8	19.7	21.4	20.8	
Somalia															
South Sudan										9.5	14.7	17.7	38.3	28.9	
Seychelles	92.6	91.8	110.8	104.2	96.8	89.8	64.9	55.5	62.2	57.6	58.3	69.1	66.4	71.8	78.3
Tanzania	16.9	17.1	23.0	22.6	22.2	22.2	22.8	23.3	25.1	24.7	22.7	23.3	24.3	22.2	
Uganda	15.6	16.1	19.6	17.2	19.3	19.9	23.6	19.4	22.9	22.5	20.8	22.1	22.3	22.9	23.4
Zambia	17.2	21.7	18.2	18.8	15.5	18.1	19.1	17.8	18.4	19.1	20.5	20.9	25.8	20.6	22.0
Zimbabwe	17.9	26.7	70.2	31.4	45.4										
Total	622.9	633.3	762.2	703.8	711.6	652.3	659.6	611.8	647.4	634.9	547.4	569.8	618.5	605.3	0.0
Average	34.6	35.2	42.3	39.1	39.5	36.2	36.6	34.0	36.0	35.3	30.4	31.7	34.4	33.6	0.0

Source: Authors Computation using data from World Bank (2018)

In Southern Africa, financial depth on the average was upward trending till 2010 which was then followed by a relatively downward trend. The South African average values for the study period range within 13% as at 2013 to about 32.5% as at 2000, had an increase resulting to 50% by 2010 for which a reduction began in 2011: 47.7% and descended to 42.3% and 39.1% as at 2003 and 2004, respectively which trended downwards till 2017, having a value of 40% (Figure 1). Of the countries within Southern Africa, outstanding performances in terms of the most and least financially developed (in terms of broad money supply to GDP ratio) include South Africa and Swaziland.

South Africa is characterised by relatively high financial development values among all the countries in South Africa which maintained a consistently increasing trend with 61.6% as at 2004, 75.8% as at 2010, and 72.2% as at 2017. Statistics in Table 5 show that Swaziland had 23.5% as at 1999, 17.4% as at 2004, 25.4% as at 2013, and 30.5% as at 2016. In terms performance of Southern African countries' money supply to GDP ratio, 68.08% of the countries performed below 50% and 32% of their countries performed above 50%.

Table 5: The Average of the Broad Money Supply to GDP in Southern Africa

Year	1999	2000	2001	2002	2003	2004	2008	2009	2010	2011	2012	2013	2015	2016	2017
Botswana	28.5	24.8	39.4	45.2	47.9	46.9	52.5	52.7	49.3	41.7	44.0	42.7	45.8	41.4	40.2
Lesotho	30.1	27.6	28.0	26.5	26.2	24.3	31.6	33.3	36.9	33.0	32.5	35.5	31.7	28.6	34.4
Namibia	41.1	40.0	37.7	37.5	36.4	38.9	42.5	63.2	62.6	64.0	57.2	56.7	54.6	51.7	53.4
Swaziland	23.5	17.2	17.2	17.1	17.8	17.7	22.4	25.4	25.6	25.1	24.4	25.4	25.8	30.5	
South Africa	55.7	52.7	57.3	58.3	60.6	61.6	80.8	77.7	75.8	74.6	72.9	71.0	73.4	72.6	72.2
Average	35.8	32.5	35.9	36.9	37.8	37.9	46.0	50.5	50.0	47.7	46.2	46.3	46.3	44.9	40.0

Source: Authors Computation using data from World Bank (2018)

Internet Adoption Trend in Africa

In Africa, internet adoption rate maintained a consistently increasing trend with a temporary change on the constantly increasing growth path as at 2009. The African average values of internet adoption rate for the study period ranged within 0.5% of the total population as at 1999 to about 23% of the total population as at 2016. The slight alterations to the steady increasing state occurred in 2008 and 2009 with the internet adoption rate maintaining the same value of 6% for the two tome periods (Figure 2). This implies that something significant happened that caused the non-increase or non-decrease in the level of internet adoption. Outstanding performances in terms of the most and least countries with regards to the internet adoption rate are Morocco, Mauritius, Sierra Leone and Somalia. Mauritius had the most impressive figures at the beginning of the time period 4.7 – 15.2% of the total population (1999 - 2005) while Morocco had the most impressive figures from 19.8% to 58.3% of the total population (1999 and 2016 respectively). On the other hand, Sierra Leone and Somalia performed poorly, but Sierra Leone performed better from 1999 – 2003 but Somalia improved slowly overtime, leaving Sierra Leone as the least performing country between 2003 - 2016.

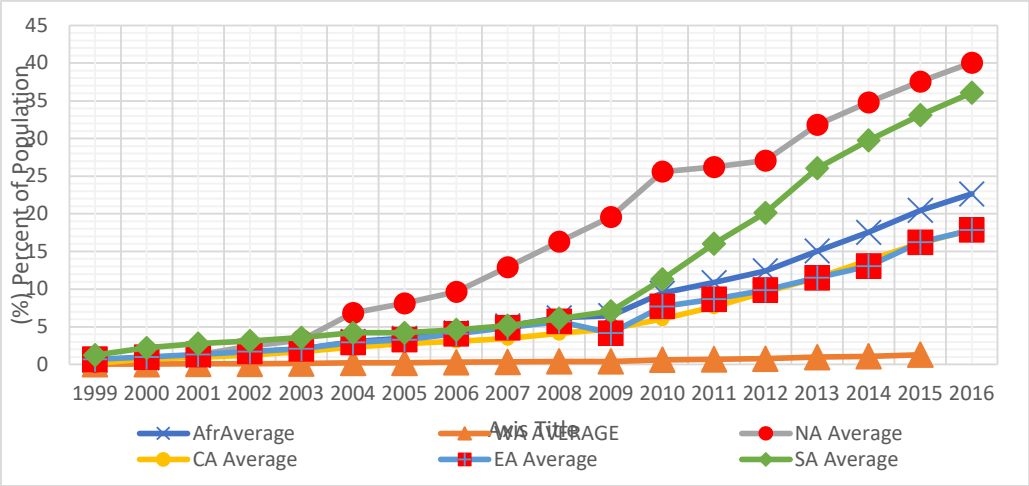

*Note: AFR = Africa; CA = Central Africa; NA = North Africa; WA = West Africa; SA = Southern Africa; EA = East Africa.

Figure 2: Internet Adoption Average in Africa and Regions

Source: Authors Computation using data from World Bank (2018)

For West Africa average, the level of internet adoption has been increasing overtime with notable temporary alterations to the steady increase but however, has ranged within 0.3% of the population (2000) and 17.1% of the population (2016). Further observation indicates that the slight alterations to the initial steady growth path for West Africa average values of internet adoption rate occurred between 5.6% of the population (2010) and 9.5% of the population (2013). The average internet adoption rate in West Africa as shown in Table 6 report 0.5% as at 2001), 2.2% as at 2006, 6.4% as at 2011, 14.7% as at 2015 and 17.1% as at 2016. Exceptional individual performances were attained by Gambia, Liberia, and Niger at the initial study time period - 2000 while Guinea Bissau and Cape Verde were exceptional towards the end of the study period - 2016. Liberia and Niger attained the countries with the least internet adoption rate having about 0.0% as at 2000 while Gambia attained country with the highest internet adoption rate having about 0.9% of the population as at 2000. In terms of other outstanding performances, Cape Verde attained the country with the highest internet adoption rate having about 50.3% of total population as at 2016 while Guinea-Bissau attained country with the poorest internet adoption rate having about 3.8% of the total population as at 2016 which was amazingly the highest percentage all-through its country's history

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Table 6: Internet Adoption Average in West Africa

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Benin	0.2	0.4	0.7	1.0	1.2	1.3	1.5	1.8	1.9	2.2	3.1	4.1	4.5	4.9	6.0	11.3	12.0
Burkina Faso	0.1	0.2	0.2	0.4	0.4	0.5	0.6	0.8	0.9	1.1	2.4	3.0	3.7	9.1	9.4	11.4	14.0
Cote d'Ivoire	0.2	0.4	0.5	0.8	0.8	1.0	1.5	1.8	1.9	2.0	2.7	2.9	5.0	12.0	19.3	21.9	26.5
Cabo Verde	1.8	2.7	3.5	4.3	5.3	6.1	6.8	8.3	14.0	21.0	30.0	32.0	34.7	37.5	40.3	48.0	50.3
Ghana	0.2	0.2	0.8	1.2	1.7	1.8	2.7	3.9	4.3	5.4	7.8	9.0	10.6	15.0	25.5	31.4	34.7
Guinea	0.1	0.2	0.4	0.5	0.5	0.5	0.6	0.8	0.9	0.9	1.0	2.0	3.1	4.5	6.4	8.2	9.8
Gambia, The	0.9	1.3	1.8	2.4	3.3	3.8	5.2	6.2	6.9	7.6	9.2	10.9	12.4	14.0	15.6	16.5	18.5
Guinea-Bissau	0.2	0.3	1.0	1.4	1.8	1.9	2.1	2.2	2.4	2.3	2.5	2.7	2.9	3.1	3.3	3.5	3.8
Liberia	0.0	0.0	0.0	0.0	0.0			0.6	0.5	2.0	2.3	2.5	2.6	3.2	5.4	5.9	7.3
Mauritania	0.2	0.3	0.4	0.4	0.5	0.7	1.0	1.4	1.9	2.3	4.0	4.5	5.0	6.2	10.7	15.2	18.0
Niger	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.4	0.7	0.8	0.8	1.3	1.4	1.7	2.0	2.5	4.3
Nigeria	0.1	0.1	0.3	0.6	1.3	3.5	5.5	6.8	8.0	9.3	11.5	13.8	16.1	19.1	21.0	24.5	25.7
Senegal	0.4	1.0	1.0	2.1	4.4	4.8	5.6	6.9	7.1	7.5	8.0	9.8	10.8	13.1	17.7	21.7	25.7
Sierra Leone	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.6	0.9	2.5	4.0	6.1	6.3	11.8
Togo	0.8	0.9	1.0	1.2	1.5	1.8	2.0	2.2	2.4	2.6	3.0	3.5	4.0	4.5	5.7	7.1	11.3
Total	5.4	8.1	12.0	16.5	23.2	28.2	35.8	44.1	54.0	67.4	88.9	102.9	119.4	151.9	194.2	235.4	273.6
Average	0.3	0.5	0.7	1.0	1.4	1.8	2.2	2.8	3.4	4.2	5.6	6.4	7.5	9.5	12.1	14.7	17.1

Source: Authors Computation using data from World Bank (2018)

In North Africa, internet adoption average steadily increased overtime with slight and temporary alterations (2004, 2010 and 2012) but however, has ranged within 0.4% as at 1999 to 40.1% as at 2016. The North African average values of the rate of internet adoption within the study period range within 0.4% as at 2003 and 40.1% as at 2016. Also, the slight alterations occurred in 2004, 2010 and 2012. (Figure 2). Of the countries within North Africa, outstanding performances in terms of the most and least internet adopting countries include: Tunisia and Sudan. Tunisia exhibited values among all the countries in North Africa which had the highest values and maintained a consistently increasing trend with 1.6% as at 1999, 6.5% as at 2003, 8.5% as at 2004, 43.8% as at 2013, and 49.6% as at 2016. Sudan on the other hand, performed poorly at the initial study time period having 0.6% as at 1999, 0.5% as at 2003, 0.8% as at 2004, but from 2010, Libya became the country with the smallest internet adoption rate having 14.0% as at 2010, 16.5% as at 2013 and 20.3% as at 2016. The statistics is shown in Table 7.

Table 7: Internet Adoption Average in North Africa

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Algeria	0.2	0.5	0.6	1.6	2.2	4.6	5.8	7.4	9.5	10.2	11.2	12.5	14.9	18.2	22.5	29.5	38.2	42.9
Egypt, Arab Rep.	0.3	0.6	0.8	2.7	4.0	11.9	12.8	13.7	16.0	18.0	20.0	21.6	25.6	26.4	29.4	33.9	37.8	41.2
Libya	0.1	0.2	0.4	2.2	2.8	3.5	3.9	4.3	4.7	9.0	10.8	14.0	14.0		16.5	17.8	19.0	20.3
Morocco	0.2	0.7	1.4	2.4	3.4	11.6	15.1	19.8	21.5	33.1	41.3	52.0	46.1	55.4	56.0	56.8	57.1	58.3
Sudan	0.0	0.0	0.1	0.4	0.5	0.8	1.3		8.7			16.7	17.5	21.0	22.7	24.6	26.6	28.0
Tunisia	1.6	2.8	4.3	5.3	6.5	8.5	9.7	13.0	17.1	27.5	34.1	36.8	39.1	41.4	43.8	46.2	46.5	49.6
Total	2.4	4.8	7.7	14.6	19.4	41.0	48.5	58.1	77.5	97.8	117.4	153.6	157.2	162.5	190.9	208.8	225.2	240.3
Average	0.4	0.8	1.3	2.4	3.2	6.8	8.1	9.7	12.9	16.3	19.6	25.6	26.2	27.1	31.8	34.8	37.5	40.1

Source: Computed by the Researcher using data from World Bank (2018)

In Central Africa, internet adoption began in 1999 and has experienced an exponential increase overtime which significantly kicked off in 2009 and remained consistent till the end of the study period. The Central African internet adoption rate per 100 persons within the study period range within 0.1% as at 1999 to about 17.9% as at 2016. The average pattern picked up a significant upward trend at 2009 with 4.7% (Figure 2). Of the countries within Central Africa shown in Table 8, outstanding performances in terms of the most and least internet adopting countries include: Sao

Tome and Principe, Democratic Republic of Congo and Chad. Sao Tome and Principe exhibited the highest values among all the countries in Central Africa by maintaining a consistently increasing trend with 0.4% as at 1999, 10.2% as at 2003, 13.3% as at 2004, 23.0% as at 2013, and 28.0% as at 2016. Chad on the other hand, performed poorly at the initial study time period having 0.0% as at 1999, 0.0% as at 2001, but from 2002, Democratic Republic of Congo became the country with the smallest internet adoption rate having 0.1% as at 2003, 0.4% as at 2007 and 5.0% as at 2016.

Table 8: Internet Adoption Average in Central Africa

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Angola	0.1	0.1	0.1	0.3	0.4	0.5	1.1	1.5	1.7	1.9	2.3	2.8	3.1	6.5	8.9	10.2	12.4	13.0
Central African Republic	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.4	1.0	1.8	2.0	2.2	3.0	3.4	3.6	3.8	4.0
Cameroon	0.1	0.3	0.3	0.4	0.6	1.0	1.4	2.0	2.9	3.4	3.8	4.3	5.0	7.5	10.0	16.2	20.7	25.0
Congo, Dem.	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.6	0.7	1.2	1.7	2.2	3.0	3.8	6.2
Congo, Rep.	0.0	0.0	0.0	0.2	0.5	1.1	1.5	2.0	2.8	4.3	4.5	5.0	5.6	6.1	6.6	7.1	7.6	8.1
Gabon	0.2	1.2	1.3	1.9	2.7	3.0	4.9	5.5	5.8	7.5	9.5	13.0	18.0	24.0	30.5	38.1	45.8	48.1
Equatorial Guinea	0.1	0.1	0.2	0.3	0.5	0.8	1.1	1.3	1.6	1.8	2.1	6.0	11.5	13.9	16.4	18.9	21.3	23.8
Sao Tome and Principe	0.4	4.6	6.3	7.6	10.2	13.3	13.8	14.2	14.6	15.5	16.4	18.8	20.2	21.6	23.0	24.4	25.8	28.0
Chad	0.0	0.0	0.0	0.2	0.3	0.4	0.4	0.6	0.8	1.2	1.5	1.7	1.9	2.1	2.5	2.9	3.5	5.0
Total	1.0	6.5	8.4	11.0	15.4	20.4	24.7	27.7	30.9	37.0	42.5	54.3	68.7	86.4	103.5	124.4	144.7	161.2
Average	0.1	0.7	0.9	1.2	1.7	2.3	2.7	3.1	3.4	4.1	4.7	6.0	7.6	9.6	11.5	13.8	16.1	17.9

Source: Computed by the Researcher using data from World Bank (2018)

In East Africa, internet adoption rate on the average has maintained a consistently increasing trend with slight alteration to the steady increase at 2009. The average values of the rate of internet adoption within the study period range within 0.7% as at 2003 and 17.9% as at 2016. Also, the slight alteration occurred in 2009. (Figure 2). Of the countries within East Africa shown in Table 9, outstanding performances in terms of the most and least internet adopting countries include: Seychelles and Somalia. Tunisia exhibited values among all the countries in East Africa which were the highest values and maintained a consistently increasing trend with 6.2% as at 1999, 14.6% as at 2003, 24.3% as at 2004, 50.4% as at 2013, and 56.5% as at 2016. Sudan on the other hand, performed poorly at the initial study time period having 0.0% as at 1999, 0.4% as at 2003, 1.1% as at 2004, 1.3% as at 2011, 1.5% as at 2013 and 1.9% as at 2016.

Table 9: Internet Adoption Average in East Africa

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Burundi	0.0	0.1	0.1	0.1	0.2	0.3	0.5	0.7	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	4.9	5.2
Comoros	0.1	0.3	0.4	0.6	0.8	1.3	2.0	2.2	2.5	3.0	3.5	5.1	5.5	6.0	6.5	7.0	7.5	7.9
Djibouti	0.1	0.2	0.3	0.5	0.6	0.8	1.0	1.3	1.6	2.3	4.0	6.5	7.0	8.3	9.5	10.7	11.9	13.1
Eritrea	0.0	0.1	0.2	0.2					0.4	0.5	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2
Ethiopia	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.8	1.1	2.9	4.6	7.7	13.9	15.4
Kenya	0.1	0.3	0.6	1.2	2.9	3.0	3.1	3.6	4.4	5.2	6.1	7.2	8.8	10.5	13.0	16.5	21.0	26.0
Madagascar	0.2	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.7	1.7	1.6	1.7	1.9	2.3	3.0	3.7	4.2	4.7
Mozambique	0.1	0.1	0.2	0.3	0.4	0.7	0.9	0.8	0.9	1.6	2.7	4.2	4.3	6.0	7.3	9.2	16.9	17.5
Mauritius	4.7	7.3	8.8	10.3	12.2	13.7	15.2	16.7	20.2	21.8	22.5	28.3	35.0	35.4	40.1	44.8	50.1	52.2
Malawi	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	1.0	0.7	1.1	2.3	3.3	4.4	5.1	5.8	9.3	9.6
Rwanda	0.1	0.1	0.2	0.3	0.4	0.4	0.6		2.1	4.5	7.7	8.0	7.0	8.0	9.0	10.6	18.0	20.0
Somalia	0.0	0.0	0.1	0.1	0.4	1.1	1.1	1.1	1.1	1.1	1.2		1.3	1.4	1.5	1.6	1.8	1.9
South Sudan															3.8	4.5	5.5	6.7
Seychelles	6.2	7.4	11.0	14.3	14.6	24.3	25.4	35.0	38.4	40.4		41.0	43.2	47.1	50.4	51.3	54.3	56.5
Tanzania	0.1	0.1	0.2	0.2	0.7	0.9	1.1	1.3	1.6	1.9	2.4	2.9	3.2	4.0	4.4	7.0	10.0	13.0
Uganda	0.1	0.2	0.2	0.4	0.5	0.7	1.7	2.5	3.7	7.9	9.8	12.5	13.0	14.1	15.5	16.9	17.8	21.9
Zambia	0.1	0.2	0.2	0.5	1.0	2.0	2.9	4.2	4.9	5.6	6.3	10.0	11.5	13.5	15.4	19.0	21.0	25.5
Zimbabwe	0.2	0.4	0.8	1.1	1.8	2.1	2.4	2.4	3.0	3.5	4.0	6.4	8.4	12.0	15.5	16.4	22.7	23.1
Total	12.2	17.1	23.8	30.6	37.3	52.3	58.9	73.1	87.5	102.8	74.8	138.4	156.2	177.7	206.8	235.1	291.8	321.4
Average	0.7	0.9	1.3	1.7	2.1	2.9	3.3	4.1	4.9	5.7	4.2	7.7	8.7	9.9	11.5	13.1	16.2	17.9

Source: Computed by the Researcher using data from World Bank (2018)

In Southern African region, internet adoption began in 1999 and also experienced an exponential increase overtime which significantly kicked off in 2010 and remained consistent till the end of the study period. The trend is similar to that of Central Africa. Southern African internet adoption within the study period range within 1.2% as at 1999 to about 36.1% as at 2016. The average pattern picked up a significant upward trend at 2010 with 11.3% (Figure 2). Of the countries within Southern Africa shown in Table 10, outstanding performances in terms of the most and least internet adopting countries include: South Africa and Lesotho. South Africa exhibited the highest values among all the countries in Southern Africa region by maintaining a consistently increasing trend with 4.1% as at 1999, 7.0% as at 2003, 8.4% as at 2004, 46.5% as at 2013, and 54.0% as at 2016. Lesotho on the other hand, performed poorly as the country with the smallest internet adoption rate within the study time period having 0.1% as at 1999, 0.3% as at 2001, 1.5% as at 2003, 3.4% as at 2007 and 27.4% as at 2016.

Table 10: Internet Adoption Average in Southern Africa Region

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Botswana	1.1	2.9	3.4	3.4	3.3	3.3	3.3	4.3	5.3	6.3	6.2	6	9	16	30	36.7	37.3	39.4
Lesotho	0.1	0.2	0.3	1.1	1.5	2.2	2.6	3	3.4	3.6	3.7	3.9	7	10	15	22	25	27.4
Namibia	0.3	1.6	2.4	2.6	3.4	3.8	4	4.4	4.8	5.3	6.5	11.6	12	12.9	13.9	14.8	25.7	31
Swaziland	0.5	0.9	1.3	1.8	2.4	3.2	3.7	3.7	4.1	6.9	8.9	11	18.1	20.8	24.7	26.2	25.6	28.6
South Africa	4.1	5.3	6.3	6.7	7	8.4	7.5	7.6	8.1	8.4	10	24	34	41	46.5	49	51.9	54
Total	6.1	11	13.7	15.6	17.7	20.9	21	23	25.7	30.4	35.3	56.5	80.1	100.7	130.1	148.8	165.6	180.3
Average	1.2	2.2	2.7	3.1	3.5	4.2	4.2	4.6	5.1	6.1	7.1	11.3	16	20.1	26	29.8	33.1	36.1

Source: Computed by the Researcher using data from World Bank (2018)

Conclusion

Judging from the review of statistics on information and communication technology adoption, the average amount of individuals using the internet in Africa ranged from 0% to 23% of the total population, which seemed to be relatively low. With regards to the regions shown in figure 2, North

Africa seemed to be the highest (ranging from 0.4% – 40.1%) which was followed by Southern Africa (ranging from 1.2% – 50.5%) then followed by East Africa (ranging from 0.7% – 17.9%). Central Africa followed ranging within 0.1% – 17.9% and then lastly West Africa (ranging from 0.02% – 1.3%). Internet technology's importance was emphasised by studies (Ejemeyovwi, Osabuohien, & Osabuohien, 2018) for which the technology serves as a platform for new technology adoption such as Bigdata technology (Alalade, Ejemeyovwi, Ekong & Adeyemo. 2019; Ekong, Adiat, Ejemeyovwi, & Alalade, Harnessing 2019) inclusive economic development (Ejemeyovwi, Adiat, & Ekong, 2019;. Ejemeyovwi, Osabuohien, Bowale,. Abuh, & Adedoyin.2019).

Africa's performance on the broad money supply to GDP ratio (financial deepening), has also been relatively poor. The African region was seen to be below 45% at all the time periods (specifically ranging between 28% and 40.9%) and only few countries have few time periods above the average values of Africa, which is relatively poor. With regards to the regions, North Africa seemed to be the highest (ranging from 49% – 98.5%) which was followed by Southern Africa (ranging from 32% – 50.5%) then followed by East Africa (ranging from 29.8% – 39.1%). West Africa followed ranging within 19.5% – 36.4% and then lastly Central Africa (ranging from 11.1% – 27.8%). This is shown in figure 3.1. Also, in terms of the percentage of countries that performed below 50% (benchmark for this study), 97% of countries within Africa performed below 50%: 90.2% of countries within West Africa performed below 50%; 27.43% of countries within North Africa performed below 50%; 100% of countries within Central Africa performed below 50%; 73.5% of countries within East Africa performed below 50%; 68.08% of countries within Southern Africa performed below 50%. This reinforces the fact that financial development is relatively low in Africa

The implications of this poor performance of financial development in Africa include: the reduced capital availability, reduced attractiveness for investors, reduced production possibilities, inefficient financial intermediation and the tendency for a slow pace and possibly non-achievement of the sustainable development (Anh, 2017; Sanogo & Mousaa, 2017). This suggests that improving financial development will lead to increase in investment thereby leading to increase in liquidity, solvency and profitability; stimulation of capital reserves, improvement of investment opportunities, and achievement of Sustainable Development Goal (SDG) nine (9) of industry, innovation and infrastructure development in 2030.

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Organizational Justice and Performance Among Academic Staff

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Abstract

Job performance is one of the most critical topics in literature. Additionally, both managers and researchers paid more attention to this topic due to a crucial role in the success of organizations. There is a limited study conducted in developing countries. Likewise, most of the previous studies focused on organizations and limited studies conducted in the education field. This paper develops a conceptual model for organizational Justice and job performance to fill this gap. The potential participants of this study were academic staff at Iraqi public universities selected depending on stratified sample technic from 9 universities located in Baghdad. Based on the finding of previous studies, the results suggest that organizational justice dimensions are one of the most important factors that influence organizational performance.

Keywords: Job performance, organizational Justice, academic staff, university Rank, Higher education.

Introduction

Job performance (JP) consider one of the most crucial topics in the literature. It is primary interest to both managers and researchers, Due to its vital role in the success of organizations. Therefore, necessary to understand the mechanisms that affect job performance, particularly among academic staff. Besides, university performance is primarily determined by academic staff activities such as publications, conferences, patents and community service. This study attempts to add to the literature by offering a more detailed understanding of how organizational justice (OJ) influences job performance. Many factors affecting the performance of an employee are studied, while limited studies have examined the effect of OJ on JP among academic staff. Meanwhile, organizational Justice, a neglecting topic in higher education institutions. Most of the previous studies paid more attention to find the impact on performance appraisal (Byrne *et al.*, 2012; Tinuke, 2015; Onuselogu and Adaobi P., 2017) and limited studies have been conducted to find the impact of OJ on JP in the educational field (Arab and Atan, 2018). Meanwhile, the procedural Justice has been selected as the primary indicator of job performance in most of the studies (J. A.Colquitt, 2001; Zapata-Phelan *et al.*, 2009; Chien, Lawler and Uen, 2010; Suliman and Kathairi, 2013), While there are other two dimensions of OJ which neglected by the most of previous studies, particularly in the higher education context.

Iraqi universities suffering from low ranking among regional universities (Webometric, 2020) Furthermore, university ranking highly depend on academic staff performance in term of Research productivity (Mousa, Jameel and Ahmad, 2019; Jameel and Ahmad, 2020). The number of publications

for Iraqi universities in a reliable database is only 28091 (SJR, 2020) this number placed the Iraqi universities in low rank.

Purpose of this study is to propose the conceptual framework that may examine in higher education institutes, particularly in Iraqi universities in future studies.

Literature Review

Academic Performance

The term of academic is usually used about the school, university, or any higher-learning institution. This involves human academic activities in a structured educational environment. While, Performance is an activity, implementation and production. Performance refers to as what is accomplished under current circumstances which subsume the mechanism of obtaining and using knowledge skills structure and a host of successful, motivational and stylistic factors influencing the ultimate responses (Karem *et al.*, 2019; Jameel and Ahmad, 2020). (Armstrong 2010) Defined Performance as achievement, implementation, success, the efficiency of anything done, and contributing to outputs/outcomes (accomplishment). (Jameel and Ahmad, 2019a) and (Karem *et al.*, 2019) Indicate that performance is the execution of specific tasks calculated against specified reliability, completeness, cost and requirements. (Jameel and Ahmad, 2020) and (Jameel and Ahmad, 2020) emphasize were that education, research/publication and community service positions were essential for the growth of any nation internationally since these roles specifically promote social welfare, financial literacy, safety and reduced crime in communities. Research is one of the reasons why universities were founded, leading to new information development, the production of technology, enhanced service quality and increased educational prestige and economic value. The performance of universities mostly measures by the efforts of academic and non-academic staff. Academic staff at university comprise people who carry out educational work at the university, including teaching, research, and, in some instances, administrations. However, Educational achievements are the primary criteria used to assess university academic performance (Jameel and Ahmad, 2019a, 2019b). According to Tinuke (2015); Abba and Mugizi (2018) the criteria which could measure the academic performance such as staff skills, material resources, teaching, publication, research and community service.

Organizational Justice

Throughout recent years, social justice study has attracted significant interest. Studying Justice in psychology began with Adams ' monograph on equity theory (Adams, 1963) stressing assumed fairness in performance. Nevertheless, considering the importance researchers assign to justice existence, reproducing and expanding this research area was unavoidable. Organizational Justice may clarify a wide range of workplace attitudes, highlighting the importance of equality and equity values as a prerequisite for organizations to function effectively. However, (Greenberg, 2004) believe that OJ can decrease job stress. However, According to Lee *et al.*, (2015); Karem, Jameel and Ahmad (2019) Justice is a vital element in the development and maintenance of a sustainable labour environment defined as a Member's sense of the moral property of the way they are treated. OJ is the understanding of the equity with which an entity handles workers (Greenberg, 2004). OJ can be defined as a quality of mutual interest, affecting both interactions with others and consequences that influence the physical, psychological and social health of others (Cropanzano *et al.*, 2001; Jameel, Mahmood and Jwmaa, 2020). OJ often has three components: Distributive Justice (DJ), Procedural Justice (PJ) and Interactional Justice (IJ) (Leventhal, 1980; Bies and Moag, 1986).

Distributive Justice

DJ includes the allocation of incentives for work related to outputs. It is based on the theory of equity, in which expectations of unequal distribution of job incentives compared to work contributions could create tension among the employees. Likewise, Distributive fairness is the degree to which the

institutions' individuals view the distribution of resources (Greenberg, 1990; Jameel, Mahmood and Jwmaa, 2020). DJ relates to the Justice of particular results relative to that obtained by others (Farndale, Hope-Hailey and Kelliher, 2011; Karem, Jameel and Ahmad, 2019). DJ primarily applies to the organization's performance.

Procedural Justice

The degree to which uniformity occurs in the decision-making process of an institutions' and to what extent the views of representatives are expressed in the decision-making process is known as PJ (Greenberg, 1990). PJ applies to whether decision-making procedures maintain continuity and whether beneficiaries of these judgments can affect the system (Byrne *et al.*, 2012). The procedural Justice refers to facets of corporate transition processes. Furthermore, PJ represents the formal expectations and performance of the communication partnerships in the decision-making process; PJ is distinct from IJ as it illustrates the informal connections between the decision-making unit and the approving institution (Karem, Jameel and Ahmad, 2019; Yu *et al.*, 2019).

Interactional Justice

IJ characterized as the degree of treatment obtained by institution participants like provide details to them, especially when the making decision (Yu *et al.*, 2019) and (Karem, Jameel and Ahmad, 2019). Interactional Justice addresses the association between workers and the institution and the treatment of individuals (Jameel, Mahmood and Jwmaa, 2020). However, Interactional Justice, often perceived an element of PJ, refers to how one is handled during the execution of a system or policy (e.g. with respect and dignity) and stresses the interaction and social process dimensions (Bies and Moag, 1986).

Proposed Model and Propositions

Based on the literature, this study proposes that organizational Justice will affect positively on job performance among academic staff. Figure 1 illustrates the conceptual framework

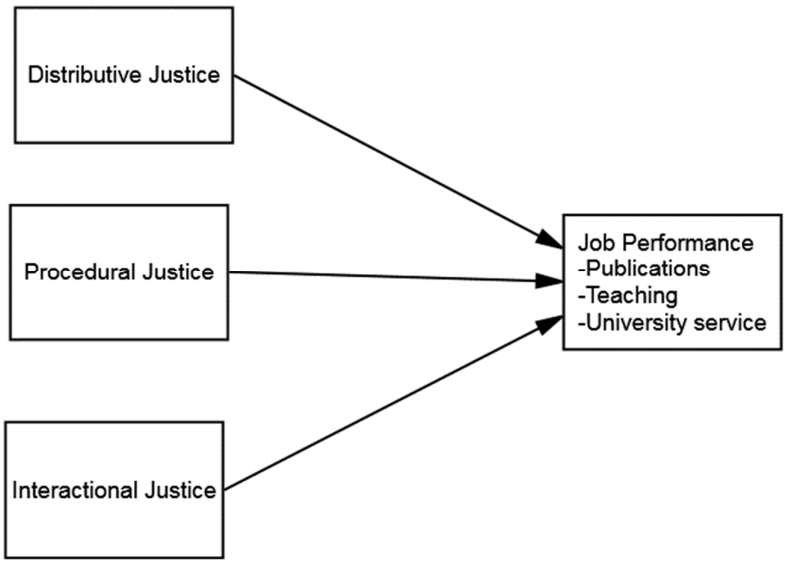

Figure 1 : conceptual framework

Hypotheses development

Organizational Justice and Job Performance

The universities are the only organizations centred on dual-core functions of information development and dissemination through research, teaching and community engagement processes (Jameel and Ahmad, 2020). Although university academic staff do intricate work in an increasingly tricky setting, both in the area of teaching and research. Several researchers indicated that performance and engagement at work were two significant findings related to the sense of Justice (J. A.Colquitt, 2001; Cropanzano, Bowen and Gilliland, 2007; Zapata-Phelan *et al.*, 2009).

When individuals agree social and mental requirements such as speech, respect and dignity (dimensions of PJ and IJ) are fairly treated, they will generally Respond to higher performance and feel stronger. If organizations develop high-quality communication agreements with their workers by handling them equally and allowing them to make decisions about their results (fair processes), employees are more fulfilled and more likely to work to achieve a better standard of JP. Individuals are expected to show enough work performance and feel dissatisfied if they assume, they are low exchange relation. Empirical studies have demonstrated usually that DJ significantly predicted to Job performance (J. A.Colquitt, 2001; Shan, Ishaq and Shaheen, 2006; Cropanzano, Bowen and Gilliland, 2007). However, many findings have shown that PJ leads actively and substantially impact on JP (J. A.Colquitt, 2001; Shan, Ishaq and Shaheen, 2006; Zapata-Phelan *et al.*, 2009; Chien, Lawler and Uen, 2010; Suliman and Kathairi, 2013). However, IJ relation to JP remains unclear, and correlation experiments between these two factors produced mixed results, Some studies reported the IJ was not related and does not impact on job performance (Colquitt *et al.*, 2006; Zapata-Phelan *et al.*, 2009). While some other studies found a significant positive relationship (Shan, Ishaq and Shaheen, 2006; Suliman and Kathairi, 2013). According to the above mentioned, the study proposes the following hypotheses.

Proposition 1: Distributive Justice has a significant and positive effect on Job Performance among academic staff. Proposition 2: Procedural Justice has a significant and positive effect on Job Performance among academic staff. Proposition 3: Interactional Justice has a significant and positive effect on Job Performance among academic staff.

Research Methodology

In general, several conceptual frameworks on organizational Justice and job quality are available.

Measurement

This describes the four variables briefly to be used in the models. First, the distributive justice measures were drawn from a previous study that assessed the employee's perception of equality and equity, Items propose to adapted from (Leventhal, 1980) to assess academics staff perceiving distributive Justice. Second Procedural Justice shall be specified as necessary in the assignment process, such as coherence, lack of bias, reliability, equality of the applicants, correction and ethics of the organizational procedures Items propose to adapted from (Leventhal, 1980). The third factor incorporates the Items propose to adapted from (Bies and Moag, 1986), which analyzed the appropriateness of care workers to interactional Justice obtained from an individual of authority. Fourth Job performance Items propose to adapted from (Shan, Ishaq and Shaheen, 2006; Musah *et al.*, 2016; Abba and Mugizi, 2018) to measure the academic staff performance in term of publications, Teaching and university services.

Unit of Analysis

The potential participants were academic staff at Iraqi public universities selected depending on stratified sample technic from 9 universities located in Baghdad.

Statistical Data Analysis

To achieve the study aims, the Structural Equation Model (SEM), particularly, an analysis of a moment structures (AMOS) appropriate because the techniques allow multiple equations to be simultaneously calculated and conduct a variable analysis, including path analysis in one stage (Hair *et al.*, 2014). The study should be carried out in two phases. First, based on the confirmatory factor analysis, the measurement framework is estimated. Second, researchers examine the conceptual model and measure the path coefficients (Hair *et al.*, 2014).

Expected Findings

The researchers expect to find there is a strong impact of Organizational Justice dimensions on Job performance among the academic staff. It is also likely that the study will reveal that a favourable situation with regards to the Organizational Justice dimensions mentioned will also lead to a more positive Job performance. These findings are in accordance with other studies completed in the past, such as that of (J. A.Colquitt, 2001; Shan, Ishaq and Shaheen, 2006; Cropanzano, Bowen and Gilliland, 2007), which have all found the positive prediction of organizational Justice on job performance.

Conclusion

This paper proposed that Organizational Justice could be the most critical factor to predict job performance. Furthermore, academic staff performance plays a vital role in enhancing the universities ranking, community services and teaching quality. In this context, we proposed in this study the conceptual framework to determinants organizational justice and academic performance. Research in developing countries are still behind the developed countries, and the grading and quality of education in the universities of developing countries need to be improved. This study was designed specifically for testing in a developing country. The authors will, in future empirically examine the proposed model by deploying an academic population at both private and\or public universities. Stratified samples or random sample data may be collected through a questionnaire.

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Causes of Contemporary Migrations

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Abstract

Migrations, permanently inscribed in the history of human development, have been and are determined by a number of factors. This paper, the aim of which is to demonstrate current causes of migrations, sets out to settle the formulated research questions concerning the main contemporary factors of movement of people and to point to conditions which may affect these processes occurring in the future. It analyses social and economic factors (including the issues of development disproportions between countries, food problems, debt issues), technological, demographic, political as well as those associated with the occurring changes in man's natural environment. A hypothesis has been formulated in accordance with which we are increasingly dealing with the fact that individual factors determining the movement of people permeate, which affects the impossibility of clear indication of its specific cause. The hypothesis was verified positively.

Keywords: migrations, international migrations, causes of migrations, determinants of migrations, climate migrants, SARS-CoV-2 pandemic.

Migrations, falling under multidimensional phenomena of various character (demographic, economic, social, political, cultural) and as such a subject of research of many scholarly disciplines (e.g. demography, sociology, legal studies, economy) have existed for thousands of years and are permanently associated with human history [Keeley writes about migration processes in the past (Keeley, 2019, p. 21ff)]. They have been and are determined by numerous factors, though as pointed out by A. Maryański "migrations are by nature a vigorous element dependent of many incalculable factors" (Maryański, 1984, p. 10). One can conclude that they are a resultant of numerous social and economic circumstances (Szajnowska-Wysocka 2000, p. 28). In the historical development migrations have changed their character and intensity multiple times.

This paper, the aim of which is to demonstrate current causes of migrations, sets out to settle the formulated research questions concerning main contemporary factors of movement of people and to point to conditions which may affect these processes occurring in the future. This analysis is done with the assumption that this study addresses international migrations with their broad understanding, thus undertaken as movement of people from one country to another for a temporary or permanent stay, freely or under coercion (Cziomer, 1999, p. 77). The causes of the described phenomenon which we dealt with in distant past will stay outside the scope of this study. It seems obvious that since the dawn of time people have moved in response to a demographic growth, climatic changes or expansion of production and trade (Castles, Miller, 2011, p. 107). Contemporary migrations and their causes are a certain consequence of various factors which occurred in the 20th century, a century called "the age of migrations" by S. Castles and M. J. Miller (Castles, Miller, 1998). It needs to be borne in mind that intensification of processes associated with movement of people in the 20th century entailed unprecedented development of infrastructure, means of transport and media as well as an economic upturn. It was also associated with the result of activity of two totalitarian regimes and two world wars which caused mass flights or displacement and deportation of people of unparalleled volumes. The migration waves in the second half of the 20th century did not weaken and in certain periods even intensified. It was caused by new international circumstances which contributed to the migration wave, i.e. decolonization, post-war economic development, demand for cheap labour, armed conflicts, political and religious persecutions. It was noted that more often than before migrations gained a multiple character - migrants change their countries of residence multiple times during their lifetime (Wójcik-Żołądek, 2014, p. 10).

Social and economic factors are undoubtedly essential causes of contemporary migrations. Particular attention needs to be paid in this regard to the severe disproportions between the level of economic development of individual countries and their groups. It is pointed out that the consequence of the development asymmetries involves great differences in standards and quality of life between different countries and regions (Sulmicka, 2001). To illustrate the "development gap" with regard to economic and social and civilisation development in the West-South relations, one needs to point out that in 1990 the West, which accounts for 15.7% of the population, produced 71.7% of the gross world product, post-communist countries which accounted for 7% of the population - 12.3% of the GWP, and the South, representing 77.3% of the world population produced only 16.1% of the gross world product. One needs to point out that this "development gap" has not narrowed significantly despite world scale efforts (since the 1960s the so-called UN development decades have been undertaken in this scope). The 1999 United Nations Development Programme – UNDP entitled "Human Development Report 1999" pointed out that differences in incomes between the 20% of the population who live in developed countries and the 20% living in the least developed countries were 30:1 in 1960, 60:1 in 1990 and in 1997 it reached 74:1. 86% of the gross world product fell for those 20% of the richest populations, while a mere 1% for the poorest. The Report demonstrated that the OECD countries with 19% of the global population had 71% of global trade in goods and services, 58% of global foreign direct investment and 91% of all Internet users (UNDP, 1999).

The UNDP created (as is highlighted) a more comprehensive though subjective so-called human development index – HDI, with the scale from 0 to 1, which takes into account, apart from the economic aspect (real purchasing power of the obtained income per capita), also certain social and civilisation aspects of this development (such as life expectancy, literacy index) (Tabor, 2000, p. 276). Based on this index, the UNDP published in 1990 the first ranking of 130 countries with the population at least 1 million, in which the top places were occupied by the so-called countries of the West (Japan in the first place - 0.996), whereas the last positions were taken by African countries (last place - Niger 0.116) (Tabor, 2000, p. 276). In the last ranking published by the UNDP, enumerating 189 countries, the first twenty places are taken by: Norway (0.954), Switzerland (0.946), Ireland (0.942), Germany (0.939), Hong Kong [China] (0.939), Australia (0.938), Iceland (0.938), Sweden (0.937), Singapore (0.935), Netherlands (0.933), Denmark (0.930), Finland (0.925), Canada (0.922), New Zealand (0.921), United Kingdom (0.920), United States (0.920), Belgium (0.919), Liechtenstein (0.917), Japan (0.915) and Austria (0.914). Whereas the following countries are at the bottom of the list (starting from the end): Niger (0.377), Central African Republic (0.381), Chad (0.401), South Sudan (0.413), Burundi (0.423), Mali (0.427), Eritrea (0.434), Burkina Faso (0.434), Sierra Leone (0.438), Mozambique (0.446), Congo (Democratic Republic of the) (0.459), Guinea-Bissau (0.461), Yemen (0.463), Liberia (0.465), Guinea (0.466), Gambia (0.466), Ethiopia (0.470), Malawi (0.485), Djibouti (0.495) and Afghanistan (0.496) (UNDP, 2019). This data shows that the situation stays unchanged, the so-called Western countries still occupy the top spots and African countries take the lasts places.

The subject matter of development disproportions also covers raw materials-energy questions, food problems and international debt issues (Tabor, 1994, p. 144). There is no doubt that raw materials and energy determine economic development, which is why the possibilities of using raw materials which are key to the economic and civilisation development and the energy derived from them are treated as a key factor of long-term growth. The existing disproportion between "resources" and "needs" is also the reason for interdependence of countries and sometimes may lead to crises and disputes, or even international conflicts (Stadtmüller, 2000, pp. 21 4-219).

Food problems are also marked with a great imbalance between individual countries and regions. Some countries have a problem to manage food surpluses, while others do not have enough food to cover basic social needs. Food production is mainly determined by resources and natural functions, by the area of arable land, adequate resources of fresh water and well-functioning ecosystems. The 2019 report "The State of Food Security and Nutrition in the World (Safeguarding Against Economic Slowdowns and Downturns)" shows that more than 820 million people in the world suffer starvation. It was also pointed out that after many years of a decline, the number of undernourished people began to rise again in 2015 and compared with this in 2017 the number of people suffering from starvation

rose by over 11 million. It seems that the goal specified in the 2030 UN Agenda for Sustainable Development (United Nations General Assembly, 2015, p. 14) involving total elimination of severe poverty in any form throughout the world seems too ambitious and difficult to implement.

It needs to be borne in mind that in the areas where there is a food deficit social distress often occurs, and when this problem increases it may pose a risk of armed conflicts for access to fertile soils and water (Stadtmüller, 2000, p. 213).

Examining debt issues, one may agree with the view that it is not a problem until debtors, for various reasons, are not able to settle obligations towards their creditors on time. However, the problem grows the more countries-debtors stray away from the so-called safety boundary, that is when the annual service of foreign debt exceeds 25% of the value of annual export and the amount of payment of annual interest exceeds 10% of this export (Tabor, 1994, p. 154). This has been pointed out since the beginning of the 1970s. The level of foreign debt of developing countries has been constantly on the rise (Górniewicz, 2010, p. 69ff). It needs to be noted that the growth of debt in the world may lead to a financial crisis or even chaos. Despite the various actions taken in order to lower debt in the world the chances of eliminating all related threats are limited (Tabor, 1994, pp. 153-156).

Taking into consideration social and economic contexts one cannot leave out the psychological factor in perceiving objective differences in the level of development of societies. The perception of the economic situation and of the perspectives of the development of one's country, the assessment of capabilities and opportunities for individual progression and professional career, hope for personal success or the sense of security, faith (or its lack) in stabilisation and a "better tomorrow" are also essential (Kozanecka, 1997, p. 201). It is pointed out that in a situation where pessimism prevails, migration pressure rises for obvious reasons (Anioł, 1992, p. 23).

Technological factors also play a crucial role among determinants of contemporary migrations. Modern means of transport and developed communications network allow easy, quick and relatively inexpensive movement of vast masses of people from one country or continent to another. It is one of the key factors of the observed migrations accelerations. One may agree with the view that without modern means of transport and well-developed communications network the great "migration of peoples" observed in recent decades would have been practically impossible (Anioł, 1992, p. 23).

Demographic factors are now an important group of determinants which affect mass migrations. The speed of population growth in each country causes various consequences, both when it is low and when it is high. When analysing demographic data, a number of worrying phenomena was observed, that is a population growth observable since 1950s, where the pace of growth of the population of under-developed countries is much higher than that of developed countries. It was assumed that should current trends be maintained, in 2050 world population will exceed 10 billion, where 95% of this growth will fall for today's countries of the South (Tabor, 2000, p. 265 and Cesarz, 2000, pp.163-167). One needs to take into account that the changes in the distribution of the world population are also associated with a vigorous influx to cities (Cesarz, 2000, p. 167-168). A rapid growth in populations of large cities such as Mexico City, Shanghai or Mumbai is also concerning (Mojsiewicz, 1997, p. 211).

It is also worth noting that demographers point to an unfavourable structure of the age of the population (Mojsiewicz, 1997, p. 211). The average age at the moment is as follows: in Europe – 42.4; in North America – 39.7; in Oceania – 35.8; in Asia – 33,8; in South America – 33. 2, and in Africa – 24,1 (World Population, 2020). This data clearly shows that developed countries located in Europe or North America belong to "the aging societies" compared to under-developed countries in Africa, Asia or South America. One may agree with the belief that geography of demographic asymmetries overlaps with the geography of developmental disproportions (Tabor, 2000, p. 265). The ageing societies of developed countries and often a low or negative birth rate also cause demand for labour. Thus, these countries often conduct a well-thought out migration policy in his regard the aim of which is to manage migration processes and use them in the development of a given country. In

these countries the supply of labour often depends on the inflow of immigrants (Matkowska, 2013, p. 77).

At the moment it is not known either what impact the pandemic caused by the SARS-CoV-2 virus will have on demography. It may significantly affect the demographic situation of many countries, but without a doubt it will influence the economic situation in the world.

Political factors still take a significant place among the factors of contemporary migrations - political upheavals, political instability of certain countries established after WWII, armed conflicts. Causes of emigration also include discrimination and persecution of national minorities, for political and religious reasons and due to sexual orientation and others. The causes for a decision to change one's place of residence also include reasons associated with limitation of fundamental human rights.

The data from the United Nations High Commissioner for Refugees demonstrates that in 2018 more than 70 million people were forced to leave their place of residence and in 2009 this number was over 43 million (UNHCR, 2018, p. 4).

It also needs to be noted that the choice of a place of residence may be done after personal experience with the migrant's lack of acceptance of the political system.

When presenting determinants of contemporary migrations one cannot omit the factor associated with negative changes in the natural environment. Vast numbers of people leave their places of residence due to degradation of the natural environment and a change in its conditions or climate. Many world regions due to i.a. lack of water, water pollution, desert terrains or degradation of farmlands due to excessive exploitation or deforestation are not fit for human habitation. It is assumed that if a given country has less than 1,000 cubic meters of water per person throughout the year it suffers water shortages, which severely hampers economic development and negatively affects human health (Przyszłość, 1999, p. 53). In 1990 20 countries were is such a position, whereas in 2025 they are to reach 30 (Przyszłość, 1999, p. 53).

It is worth noting that the concept of "climate migrants" was first used in the 1980s in reference to people forced to leave their natural place of residence due to such changes to the natural environment which led to a threat to their life and health (Groszkowska, 2019, p. 241-242).

The issues concerning the impact of climate changes on the phenomenon of migrations were subject of interest of the Intergovernmental Panel on Climate Change (IPCC) under the United Nations, which in 2007 published a report (IPCC, 2007) where it was pointed out that climate changes will proceed ever more quickly and in consequence the number of people exposed to extreme weather phenomena, rising sea and ocean levels and other climatic threats will rise, which in turn will bring about a growth in migration (Groszkowska, 2019, p. 242).

In the 2004 IPCC report (IPCC, 2014) a distinction was made between two types migrations associated with climate change, namely: 1. caused by extreme weather events (their frequency will increase with the occurring climate changes) and 2. caused by long-term changes in the natural environment, such as rising sea levels which will flood little island states and will force residents to resettle. The report from the UN High Commissioner for Human Rights (HRC, 2018) also refers to this division, where it classifies events into sudden onset events (hurricanes, storms, and flooding) and slow onset events (sea level rise, increasing temperatures, ocean acidification, glacial retreat, salinization, land and forest degradation, loss of biodiversity, and desertification). This division was also upheld in a 2019 document adopted by way of intergovernmental negotiations drawn up under the auspices of the UN entitled Global Compact for Safe, Orderly and Regular Migration (United Nations General Assembly, 2019).

These events were explained in the document Slow onset events – Technical paper (FCCC, 2012). The first ones ("rapid onset events") include single, discrete events that occur in a matter of days or

even hours. Whereas the other ones ("slow onset events") evolve gradually from incremental changes occurring over many years or from an increased frequency or intensity of recurring events.

One also needs to take into consideration that the impact of environmental factors on people's mobility is undoubtedly a complex phenomenon and often occurs in relation to social, economic or political factors (Groszkowska, 2019, p. 242).

To sum up, one can conclude that contemporary migrations are determined by numerous political, cultural, social, economic factors and those associated with the degradation of man's natural environment. Individual reasons for migrations permeate increasingly, especially that they are strictly interrelated, which is why it is often difficult to classify unequivocally a specific reason for a given movement of people. Without a doubt, the most severe effects causing migrations will still be brought about by the rising disproportion in the social and economic development of the world's countries and emerging conflicts in the world or by the factors of man's natural environment, which in the long run may lead to the disappearance from the world map of some island states. At the moment it is impossible to fully understand the conditions and changes occurring in individual countries and regions without reference to the global context. The existing interrelations of the impact of participants of the global system of international relations are a consequence of the common occurrence of processes of internationalization of various spheres of social life. Today it is also impossible to predict the impact of the pandemic caused by the SARS-CoV-2 virus. It will gravely influence the social and economic situation of countries and may bring about an increased demand of developed countries for highly-qualified labour force, which in turn may contribute to the ample one-way migration flow of highly-qualified staff and to the "draining" of poorer countries of the most valuable factor of development that is human resources, especially highly-qualified staff.

In the course of research, the assumed hypothesis was verified positively concluding that we are increasingly dealing with the fact that individual factors determining the movement of people permeate, which affects the impossibility of clear indication of its specific cause.

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Improving Planning Industrial Corporation Personnel Training With Game Models Usage

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Abstract

Amid radical changes in the management systems of industrial corporate entities over the past 15 to 20 years, personnel management has undergone significant modernization. Human resources management is being transformed into human resources management. This transformation of personnel management has found expression in the following main trends: over the past few years, there has been a relative and absolute increase in the number of personnel management personnel (in the departments: personnel, development, training and certification of personnel, labor and wages, social development) and advanced training of others categories of employees. In this regard, in order to increase the effectiveness of the personnel management system, a classification of labor management strategies for industrial enterprises in relation to their production program is proposed, the implementation of which, taking into account the influence of external and internal factors, can significantly reduce the cost of implementing the production program due to its balance with labor resources enterprises. A game model has been developed to determine the optimal number of personnel aimed at continuing education, in which the minimization of losses associated with the fact that the level of qualification of specialists does not increase and the cost of training specialists with appropriate restrictions is the objective function. The problem in the proposed formulation is the problem of resource allocation and can be solved by applying game models. The practical significance of this model from the point of view of improving the level of quality of planning for improving the qualifications of industrial enterprises employees is confirmed by the results of its implementation at the St. Petersburg enterprise of the fuel and energy complex of the Russian Federation. In this regard, the article devoted to the improvement of professional development of industrial corporate education personnel, as applied to the strategy of structural and factor support of the company through the use of game models to determine the number of personnel allocated for further training, is relevant and timely.

Keywords: Industrial Corporation; Personnel Management; Game Model; Strategy.

Introduction

Personnel management is considered as interrelated organizationally-economic and social measures system on conditions creation for normal functioning, developing and effective using firm personnel potential. Most important personnel management system elements are personnel policy and personnel strategies. Personnel policy Personnel policy is the system of aims, principles and determined by them forms and methods, rules, norms and criteria of work with personnel, set in firm and corresponding to business strategy. Personnel policy aim is providing optimal needed personnel quantify & qualify content renewal, keep and development processes balance according to business needs. Personnel strategy is the set of basic principles, rules and aims of work with personnel taking into account business strategy, organizational structure, personnel potential and personnel policy. Personnel strategy or personnel management strategy is based on personnel policy and firm development strategy and is long-term.

Personnel management strategy elaboration consists in determining basic acts destinations, resources, time parameters, measures complex on chosen firm aim realization. In set assumption, effective firm HRM in its base must be executed on some principles, elaborated by science and tested with practice, main of which are: setting link of current and perspective planning for making future labor potential condition the result of aimed development, coordinated with changes in technic production basis; achieving maximal fitting labor force characteristics to requirements of production and market.

Rising corporative activity effectiveness requires personnel management strategies classification, interlinked with its production program (Figure 1).

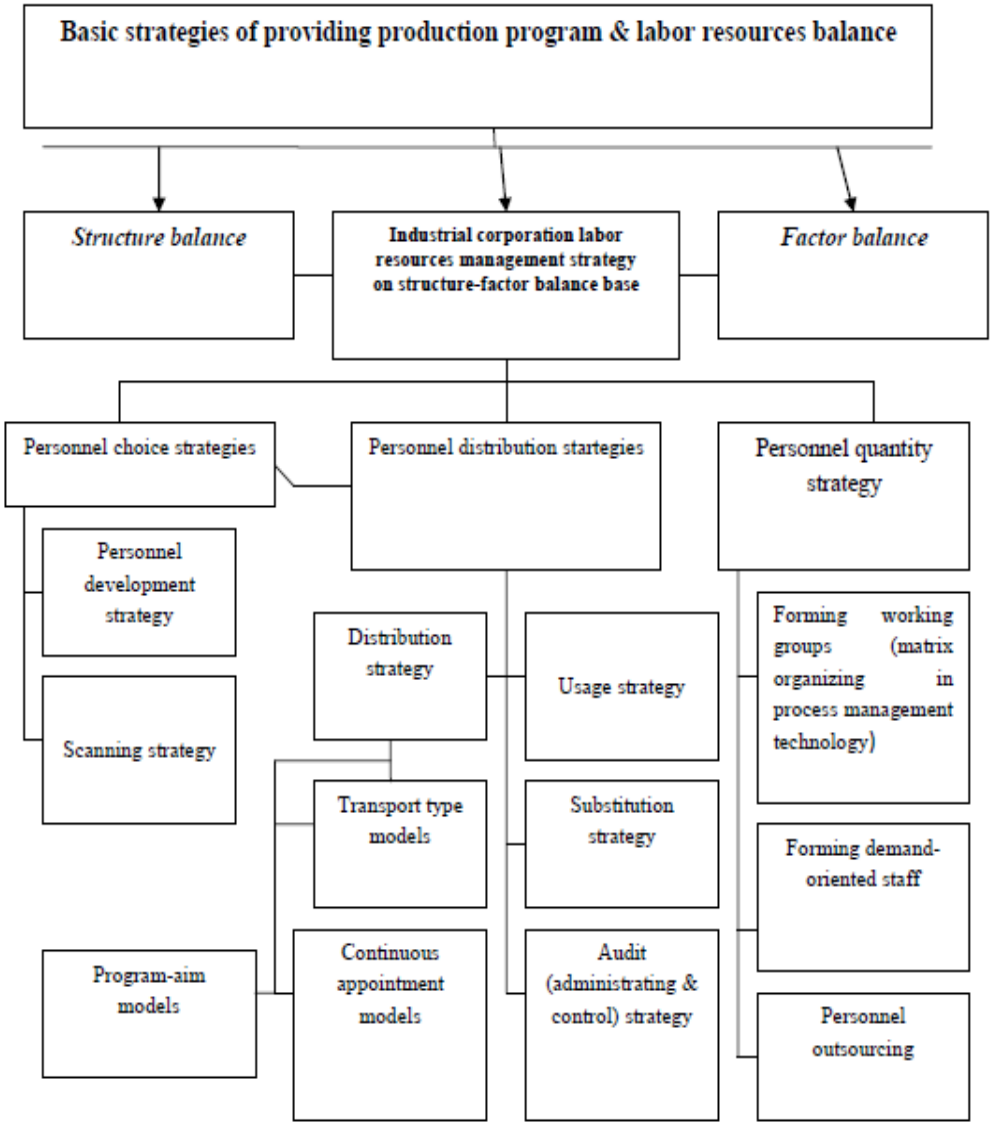

Figure 1: Labor resources strategies classification, interlinked with production program

The article considers improving planning industrial corporation personnel qualification improvement for basic strategy – structure-factor providing with game models for determining optimal personnel number for qualification improvement.

Literature Review

In modern economic conditions, the selection and implementation of an organizational strategy for structural changes in corporate entities, on which the development of a strategy for managing personnel in corporate education is based, involves assessing the existing type of organizational structure. There are various types of organizational structures. In modern management theory, there are two types of organization management - bureaucratic and organic.

Currently, in conditions of ever-increasing dynamism of the external environment, fierce competition, customer orientation, the transition to flexible organic structures, the method of which is reengineering of business processes, is relevant (Morgunov (2000); Ivanov (2000); Dobrokhotova and Kukushkin. (2000)). The issues of business process reengineering are the subject of works (Ilin et al (2017), Ilin and Shirokova (2018)). These works examine in detail not only new terms of the process management of the holding, but also developed various technologies for reengineering business processes, evaluating the effectiveness of process management. A large area of research is the development of business process management reengineering software, which makes it easier to apply the mechanism of business process reengineering (Ilin et al (2017); Ilin and Shirokova (2018); Ilin et al (2019); Ilin et al (2019); Sokolitsyn et al (2017)).

According to O. Cheremnykh, the transition to a process management structure, in which the organizational structure of the company consists of a set of business processes and sub-processes that "produce" clearly defined "internal products" for specific internal and external consumers, is accompanied by optimization (reengineering) of key business processes, is the most important component of a qualitative increase in the efficiency of business management (Cheremnykh (2019)).

The structure of business processes at different enterprises may vary. It is advisable to create an enlarged diagram of business processes for enterprises of one industry, however, an accurate list of business processes, and especially subprocesses, can be formulated only at a particular enterprise. The list of business processes should be approved and documented in each organization (Ilin et al (2017); Ilin and Shirokova (2018); Ilin et al (2019); Ilin et al (2019); Sokolitsyn et al (2017), Klochkova et al (2017), Trostinskaia et al (2017), Shirokova and Naidenysheva (2017), Zemlinskaya and Fersman (2017).

In domestic and foreign literature, the approach to personnel management as a business process is extremely rare, the consideration ends with the wording of this process. So, Orlova et al (2019) by staff reengineering refers to the restructuring of management. In a number of articles on business process reengineering, human resources management is reflected in some business processes (Oksana et al (2019); Ilin et al (2019)).

Process-oriented personnel management is fuller considered only in a few works. So, the International Benchmarking Chamber has proposed a list of 13 business processes of the organization, one of which is "Human Resource Management".

The consultants of the Tengry Group consulting group (The Tengry group (2019)) identify the business process of preparing, training and certification of personnel as auxiliary, but exclude it for organizations of less than 300-400 people. However, there are personnel management at such enterprises, even if the personnel processes are not carried out by personnel management personnel, but by direct managers.

D. Khlebnikov identifies the business process "Reproduction of competencies" - all types of activities related to providing the business system with the necessary competencies (knowledge, experience, skills) and their carriers (personnel). The main result of the process is personnel with the necessary level of competencies (Khlebnikov (2017)). In our opinion, the result of the personnel management business process is correctly defined, but clients, the input of the business process are not considered, and the content is considered very superficially.

The content (subprocesses and functions) of the business process "Staffing" offers (Velieva and Dudyashova (2014)) as one of the subprocesses of the business process "Development of production capabilities", namely:

- development and management of strategies in the field of human resources (determination of costs, determination of personnel requirements, analysis and development of functions, determination of results and indicators, determination of areas of responsibility);

- management of staff reception (planning and forecasting staff requirements, career planning, search, selection and hiring, team building, reorganization, reduction, dismissal of staff);

-development and training (qualification management, development of training programs, career guidance, development of areas of responsibility of management teams);

- productivity management, moral and material incentives (determination of performance indicators, development of a constant and variable part of wages, management of material and moral incentive programs);

- ensuring the health and satisfaction of staff (development of support systems for work and family, ensuring staff satisfaction).

But, despite the full list of functions for working with personnel, the activities of the personnel service are considered solely from the point of view of the full transition of the organization to process management.

The concept of personnel processes is most accurately given in (Anisimova et al (2014). It groups all personnel management functions into 4 main subprocesses: 1. personnel selection; 2. staff career management; 3. monetary staff career management; 4. personal career management of staff In our opinion, this author has further advanced in building a personnel management system based on a process approach, the design feature of which is "... the allocation of a single management function is previously fragmented manpower flows and management processes, integration of individual units Personnel Management Service and functional subdivisions of businesses into a single enterprise management system''. Further, in this paper we propose specific methodologies for the implementation of HR processes.

However, in our opinion, this approach should be finalized in terms of focusing the HR process on the client (or clients), as well as more clearly reflect the relationship of the HR strategy, on the basis of which HR processes are carried out, with the organization's business strategy. The list of personnel processes should also be supplemented by adding processes aimed at transforming the organization itself (working conditions). Thanks to this, they optimize personnel management activities (personnel management services or the process team for staffing), since emphasis is placed on the relevance at the moment for the current organization of personnel processes. Molchanov (2016) considers personnel procedures as a mandatory process element of personnel management and breaks down personnel management into several groups of business processes: 1. business processes for hiring personnel (selection and hiring processes, actually hiring, information support for hiring, that is, relevant checks and professional tests); 2. business processes of adaptation and consolidation of personnel (including processes of personnel motivation, conflict management); 3. business processes of internal movement of personnel (including advanced training); 4. business processes for the release of personnel.

A literature sources range considers effective personnel preparation as one of leading factors of successful contract system functioning. Thus they forms integral model of teaching purchase personnel (contract managers) taking into account such characteristics as professional experience and others. These articles analyze contract managers preparation methodic system specialties. This theme articles study results can be used as base for organizing personnel professional teaching and re-preparation, existing professional development programs optimization and innovative projects retaliation in these spheres. (Averina et al (2018)).

An articles range presents Russian education system potential researches results and ways to improve it for raising personnel preparation quality for digital economy. These researches authors answer such questions, as: 1) what qualification requirements are usable for labor resources; 2) which is Russian education system potential in personnel preparation for digital economy; 3) what are risks in Russian education system in learning digital economics. These articles conclusions backgrounds actuality of personnel preparation for digital economy (Mitrofanova et al (2018); Peshkova and Samarina (2018), Necheukhina et al (2017), Vinogradova et al (2017)), Iliashenko et al (2017)).

A researches range is devoted to need in teaching high schools employees to digital technologies for universities academic programs transfer on distant teaching. Authors use method of modeling for providing regional economic digitalization of Russian and foreign universities high education programs (Bolgova et al (2020), Rao et al (2018)), Goncharova and Bezdenezhnykh (2018), Andreyeva et al (2018), Konnikov et al (2018), Kuladzhi et al (2017)).

Some literary sources deal with continuing education courses for studying accounting information systems. So, the articles (Kogut et al (2020), Diaz-Fernandez et al (2017), Vinogradova et al (2017)) address the issues of accounting for human capital in the digital economy. In the accounting community, company personnel are recognized as an object of personnel records, but are not recognized as an object of accounting, cost accounting. In these works, it was concluded that the main areas of transformation, from the point of view of improving the theory of accounting and reporting in the digital economy, are the following areas of the economy: manufacturing, financial services, education, healthcare and the media.

In many cases, the application of analytical methods to solve the task of managing labor resources is impossible due to the need to take into account the complex interactions of many variables that affect the final result. In such situations, it seems appropriate to use mathematical modeling models. So, for example, considerable attention was paid to the study of the problems of the distribution of work among performers in the scientific literature, and especially in the framework of the economically-mathematical field. There are various approaches to the implementation of these tasks, we will combine them in three areas: transport-type models; game theory models, sequential models, and simulation models (Sokolitsyn et al (2016); Sokolitsyn et al (2017); Sokolitsyn et al (2016), Ilin et al (2018), Valebnikova et al (2018), Glukhov and Vasetskaya (2017)).

Research Methodology

A recent study of the personnel experience of a number of industrial corporate entities in St. Petersburg has shown that one of the unresolved issues of improving the training and professional development of specialists and managers is planning the number of employees to be trained at corporate entities.

Currently, staff development planning is carried out as follows. Industrial corporate entities conduct research to determine the number of specialists and managers to be trained. The following main types of continuing education courses are carried out in them: training of managers, advanced training of specialists and managers. The number of students for each year is determined on the basis of the need for each employee to undergo advanced training in accordance with the requirements established by the leadership of the corporate company and the influence of the external environment, that is, an approximate percentage of the total number of middle and senior level employees.

With the current planning procedure, there are a number of disadvantages. Firstly, there is a situation where the implementation of the plan is often ensured by training employees who has no especial value for the corporate firm, while others do not upgrade their skills at all.

Secondly, the requirement to undergo advanced training by an appropriate employee, as practice shows, is not always feasible, for several reasons. So, for example, it is inappropriate to send specialists who retire after 1 - 2 years. In addition, employees subject to training in the planning period may quit or become ill by the time they receive training. All this leads to emergency situations when a candidate is urgently selected for referral to the appropriate training center.

The elimination of these shortcomings can be facilitated by the introduction of a coefficient when planning advanced training for employees at a company, which provides for the establishment of a certain percentage of employees in the total number of corporate education personnel.

To determine such a coefficient, it is necessary to calculate the optimal number of specialists and managers to be trained, based on the criterion of economic feasibility in conditions of uncertainty. Uncertainty means the possibility or impossibility (due to the above reasons) of sending an employee to training.

The indicated problem for a specific corporate structure boils down to solving the problem of determining the optimal number of workers in certain categories sent for training from corporate education units.

It is proposed to build an economic and mathematical model for solving the problem as a result of the existing strategic uncertainty as a model game for the designer against "nature", where "nature" is understood as a certain time fund (person × h) intended for advanced training.

As a criterion for the optimality of the solution of the problem, the minimum cost sum S, rub.

$$S = S_1 + S_2, \tag{1}$$

where S_1 - losses associated with the fact that the level of qualification of specialists does not increase, rub .; S_2 - the cost of training specialists, rub.

$$S_1 = \sum_{j=1}^{m}\sum_{k=1}^{n} C_k \max(y_{jk} - x_{jk} a_k ; 0), \tag{2}$$

where m is the number of units whose specialists are sent for training (j = 1, 2 ... m); n is the number of types of training (k = 1.2 ... n); a_k - the duration of the k-th type of training, h; C_k – average losses caused by the employee's refusal to train, rub.

The strategy of the second player (designer) is the choice of x_{jk} - the number of personnel from the j-th unit sent to the k-th type of training, determined under the restrictions:

$$x_{jk} \quad - \quad \text{whole numbers;} \tag{3}$$

$$\sum_{k=1}^{n} x_{jk} \le \mathrm{P_j}\,\mathrm{N_j} \qquad (\mathrm{j}=1,2,...,\mathrm{m}), \tag{4}$$

where Nj is the number of people in the j - th unit, P_j is the maximum possible value of the coefficient for determining the number of employees requiring advanced training, from the number of personnel in the j th unit of corporate structure.

The strategies of "nature" (I player) is the choice of the possible number of man-hours for training specialists from the j-th unit on the k-th type of training with restrictions

$$d_k \le \sum_{j=1}^{m} y_{jk} \le \mathrm{r_k}, \tag{5}$$

$$\sum_{j=1}^{m}\sum_{k=1}^{n} C_k \le \mathrm{T}, \tag{6}$$

here T is the time fund intended for training specialists, person / h; d_k - the minimum necessary time, person / h, provided for the training of specialists in the k-th form; r_k - the maximum allowable time provided for training specialists in the k- th form

$$S_2 = \sum_{j=1}^{m}\sum_{k=1}^{n} C'_k \, x_{jk} \, . \, a_k \, , \tag{7}$$

where C'_k – average costs associated with training of the k-th form, rub./h

Formula (1) can be rewritten in this form

$$S = \sum_{j=1}^{m}\sum_{k=1}^{n} C_k \max(y_{jk} - x_{jk} a_k \, ; 0) + C'_k x_{jk} a_k \, , \tag{8}$$

The task of determining the optimal number of workers in certain categories sent to training from specific departments is the task of allocating resources and can be solved by the method of distributing resources of several types between several sections, that is, by applying game models.

Practical Results

The calculated optimal number of personnel aimed at continuing education through the use of game models to increase the effectiveness of the implementation of the structural factor factor strategy for a number of St. Petersburg enterprises that are part of industrial corporate entities. So, for example, a calculation was made for a medium-sized enterprise LLC Gazstroymashina, which is currently one of the leaders in the development and manufacture of various equipment for enterprises of the fuel and energy complex of the Russian Federation. Its main partners are such well-known enterprises as Gazprom, Mosenergo, Stroytrangaz and others.

Unfortunately, all the calculation results for the proposed model for this enterprise cannot be presented. Therefore, the article presents only the basic calculations.

So in 2018, according to the results of calculations based on the developed model, nine employees were sent instead of the previously planned twelve employees from various departments of the enterprise. In addition, training costs decreased by 38 thousand rubles this year, and according to expert estimates of employees of the enterprise as a result of advanced training of these nine employees, revenue growth in 2019 will be approximately 1.2%.

In addition, the presented model for personnel development can be applied in the practice of personnel management of firms in various sectors of the national economy.

Limitation

Currently, in conditions of a high level of uncertainty in the development of the Russian economy, it is quite difficult for firms based on demand for their products to form a portfolio of orders on a long-term and medium-term basis, which makes it difficult to determine the needs of personnel capable of ensuring the implementation of the production program, balanced with minimal losses.

In addition, a certain deficit for some categories of personnel leads to an increase in the cost of its use with a rather low solvency of many firms.

Significance of research

Ensuring a balanced production program and labor resources has at least two goals. The first is to achieve structural balance.

It involves optimizing the number and structure of the main production staff (categories of professions and their qualifications) in relation to a given (fixed), annual production program.

The second goal is to ensure factor balance. It involves the optimization of the production program for a given (fixed) number of key production personnel.

Thus, as a recommendation, it is necessary to more detally and thoroughly refine the set of strategies that form the strategy of structural-factor balance of the development of the company, the implementation of which will reduce the cost of the production program and will increase the competitiveness and financial stability of industrial corporate entities.

Results

The article presents a classification of basic strategies to ensure the balance of the production program and labor resources. A game model is proposed for determining the optimal number of personnel aimed at continuing education, the implementation of which can significantly improve the quality of staff development planning at an industrial enterprise by improving the balance of enterprise personnel with the implementation of its development strategy, which is confirmed by the results of the implementation of this model at St. Petersburg an enterprise of the fuel and energy complex of the Russian Federation.

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Developing Methodic Aspects of Forming and Developing Industrial Corporations Strategic Sustainability

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Abstract

Industry development on integration concept base is closely concerned with enterprises dissatisfactory condition and low activity resultatives in modern Russian economy. Such condition causes include two basic ones: misbalance of the majority of internal enterprises structures and disharmony of their relations with external counteragents. But sufficient specific of functioning industrial corporations in their integration development concept framework and with need in continuous adaptation to market environment conjuncture is coordinating principally several on destination and affect power market subject's interests. Particularly, government institutions are interested in sustainable functioning and developing big industrial enterprises, which ensures high economic growth, employment, regular inflows to budget. Sociologic services interests are in sphere of public progress from industrial enterprises activity, which must take into account each public member interests, while ecologists suggest entrepreneurs save resources and minimize damage to environment. The article inquires base corporation sustainable development strategy components taking into account specific Russian market relations conditions and suggests methodic aspects on their sustainable development level climb. The inquiry practice sufficiency consists in possibility to use considered methodic aspects on Russian corporation development sustainability rise not only in industry, but also in other national economy spheres. Thus, article on problems of forming and developing industrial corporations' strategic sustainability considers methodic aspects, concerned with efforts concentration on basic strategic sustainability components, which realization will allow rising their strategic sustainability level with more effective presenting resources usage in market economy uncertainty.

Keywords: Strategic Sustainability; Components; Industrial Corporation; Development; Inquiry; Management.

Introduction

Industry is developed countries economy base; its effective functioning makes key impact on their socially-economic development. Hardly predictable Russian economy market conditions and enough hard world economy condition more and more sharpen industrial enterprises strategic development issues. In order to ensure and keep sustainability of functioning, contradict crisis situations, get more adaptively and maneuverability, industrial enterprises use integration and cooperation instruments. CEOs more and more prefer collaboration in market segments entry and control, joint cumulated knowledges and resources usage, forming corporations, which, concentrating sufficient gross national product part in their assets can economically control not only singular industries and sectors, but also all national economy, which makes them economic power centers. In Russia industrial corporations, with aimed governmental support, also can become most effective form of organizing production, which will ensure organic financial and industrial capital relationship, helping progressive changes in Russian economy and oriented on export growth.

Such wide problems ring, concerned with industrial economy sector enterprises corporatization, ensuring and supporting their sustainability in strategic perspective, determines this inquiry actuality.

Problems actuality and not enough study in inquired sphere their high sufficiency for Russian industrial enterprises determine this inquiry theme choice.

Literature Review

In modern household conditions sustainability problems are first for many real economy sector household subjects. Big industrial enterprises and their integrated unions have sufficiently more opportunities to adopt unfavorable environment changes with both internal resources and borrowing loan sources.

Let's consider several "sustainability" economic category traction variants. Enterprise sustainability, according to Diaz-Fernandez et al (2017); Ilin et al (2017); Ilin et al (2018); Ilin et al (2019); . there is enterprise financial condition, when household activity ensure in normal conditions executing all liabilities to employees, other organizations, government, due to enough incomes and their fit to outcomes. According to Kogut et al. (2020); Orlova et al. (2018); Peshkova et al. (2018); economic sustainability is complex household subject characteristic for some time period, reflecting ability to support key financial, marketing, production and personnel figures with high probability at normatively set level with external and internal affects.

There are three sustainability kinds (Rao et al. (2018); Sokolitsyn et al. (2013); Sokolitsyn et al. (2016)) external (achieved with external management, i. e. governance and objective environment factors (market, geographic etc.) impact); internal – determined with in-time and economic reacting environment affects and adaptation to new conditions; heritage – based on forming, keeping and developing internal enterprise opportunities and resources, which usage allows keeping sustainable condition. "Sustainability is whole system characteristic, not reduced to its single elements. Some systems can form stable super-system with one link kind and unstable with another, despite stable or unstable behavior of its particular parts" (Sokolitsyn et al. (2016); Sokolitsyn et al. (2017)); Glukhov et al. (2018); Ilyinsky et al. (2019); Orlova et al. (2018); Kozlov et al. (2018); Borremans et al. (2017); Zaychenko et al. (2017); Lisitsa et al. (2019)).

However in some cases sustainability is unfavorable sequence of system inert and sufficiently restricts its management possibilities (Sokolitsyn et al. (2017); Rudskaia and Rodionov (2019); Turan et al. (2020); Zhilenkova et al. (2019)). Because, from one hand, sustainable system condition is base for its parameters and processes prediction on perspective, which is favorable factor for development strategy elaboration, from other hand – for manageability, sustainability (constancy) makes some processes and phenomena low manageable (Camocho et al (2019); Borkovskaya et al (2020), Ilin et al (2019); Bagaeva et al (2019); Ilin et al (2018)).

Thus, sustainability, and especially strategic in economic literature is perceived ambivalently, because issues of sustainable functioning and developing household subjects are interdisciplinary, i. e. considered by a range of sciences.

Research Methodology

Industrial corporations, compare to middle and small business, have advantage of sufficiently higher production-household activity effectiveness because of production scales and activity diversification. It impacts sale market, making complex R&D, entering innovations, high-qualified personnel invitation. Thus, big integrated industrial unions have sufficiently more opportunities to adopt unfavorable environment changes with both internal resources (for example, goods, works, services diversification; widening market links; assets structure optimization) and borrowing loan sources. But such system development prediction, especially in long-term perspective, becomes harder. Also more sufficient task for integrated industrial firms is achieving and keeping all system sustainability. It is caused by that corporative forms development as stochastic process can depend on each external environment factor that called "butterfly effect", which result can be both positive and negative. And

big industrial corporations sufficiently harder do strategic changes. But with effective their internal resources adaptation and functional links transfer, industrial corporations can develop ability to continuous auto-renewal and keep sustainable position. And in modern market conditions for these organizations problem of achieving and keeping strategic sustainability gets especial sufficiency, because complexing their organizing, interlinks and interdependence causes actuality of ensuring all integrated system sustainability.

Industrial organizations strategic sustainability and development requires keeping organization and its interlinks with internal conditions of functioning and factors, determining external environment changes. Corporative industrial firm strategic sustainability support requires continuous monitoring and analyzing internal and external impacts on all production-household system effectiveness, and also in-time reacting affects, including with adaptation to household conditions.

Industrial corporations' strategic sustainability term in long-term aspect includes strategic dynamic organization development, achieved in strategic management process for the following sustainable development components:

- financial-investment sustainability;
- product competitiveness;
- organization activity diversification;
- development complexity;
- organizationally-production flexibility;
- innovation activity.

In managerial decisions elaboration and realization in forming strategic sustainability one of main tasks is creating strategic competitive advantages, i. e. new opportunities, and also risks distribution between particular business-units for strengthening positions in competitive fight both these business-units and whole integrated organization.

The article inquires base corporation sustainable development strategy components taking into account specific Russian market relations conditions and suggests methodic aspects on their sustainable development level climb.

Thus effective managerial decisions elaboration in forming industrial corporation strategic sustainability and its level rise (figure 1) requires efforts concentration on the following three basic strategic sustainability components:

- ensuring at set branch-average level or at rivals level basic figures, assessing organization strategic sustainability level, i. e. economic sustainability level rise;
- social and ecologic responsibility level rise;
- rising relationship level and effectiveness of governmental and municipal bodies with business.

The considered main types of corporate education activities are interconnected and interdependent, the level of development of each type of activity has its effect on the overall economic sustainability of education, especially in the long term.

The increase in the level of sustainability of the financial and investment type of corporate education activity and its efficiency is characterized by an improvement in the state of financial resources so that education, through their effective use, can provide the specified process for production and sales of products, as well as effectively invest them in projects aimed at diversifying the activities of education.

An increase in the level of sustainability of commercial activity and its effectiveness is characterized by an improvement in the state of business activity, the reliability of economic relations and market share for its products.

Improving the sustainability of marketing and its effectiveness is characterized by an improvement in the market for manufactured products and the use of the market potential of corporate education.
The increase in the level of sustainability of production activities and its effectiveness is characterized by the stability of the production cycle, the smoothness of its resource and technological support.

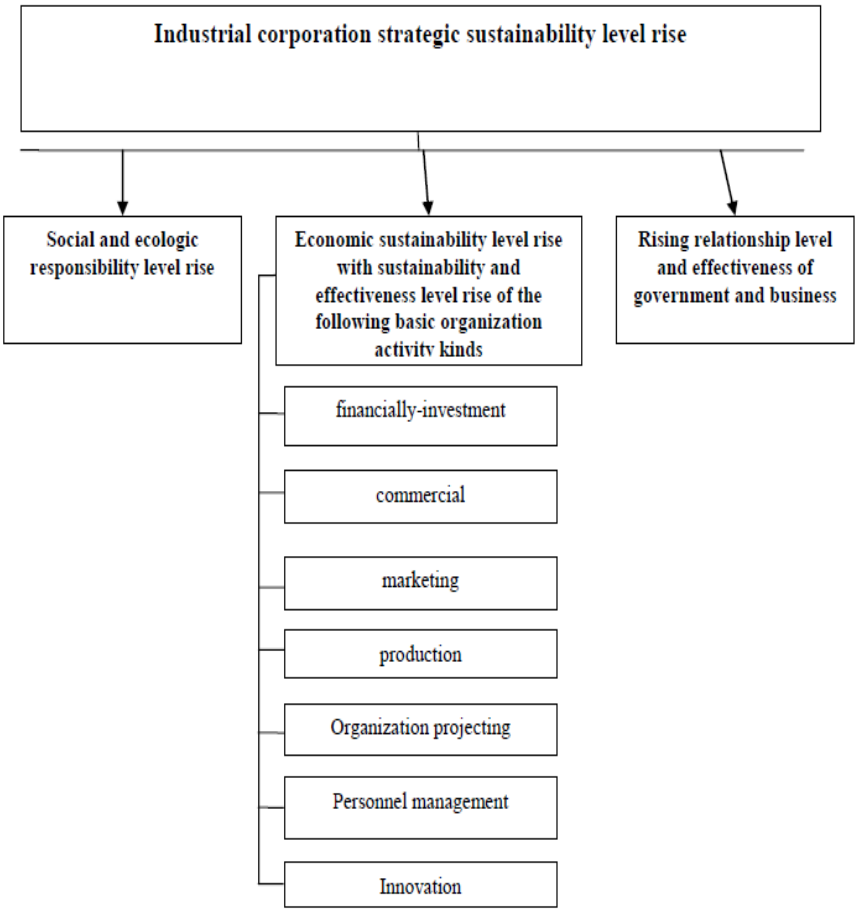

Figure 1: Basic components of forming and developing industrial corporation strategic sustainability

Improving the sustainability of organizational design and its effectiveness is characterized by an improvement in the management structure, a higher degree of coordination and adaptability of relations between different departments of corporate education, taking into account the impact of the external environment.

An increase in the level of sustainability of personnel management and its effectiveness is characterized by an improvement in the provision of production by qualified personnel and its involvement in social processes.

Improving the sustainability of investment activity and its effectiveness is characterized by a greater ability of corporate education to introduce new technologies and methods of organizing production and management.

Thus, the formation and development of strategic sustainability of industrial corporate education occurs by managing the main activities taking into account the interests of society and the state. Their

optimal, balanced combination, in turn, is converted into economic potential, that is, the ability to ensure their long-term functioning through the achievement of strategic goals and the implementation of the strategy, which is the key to the strategic sustainability of industrial corporate education with dynamic development.

Practical Results

The main scientific and practical provisions relating to the formation and development of strategic sustainability of industrial corporate education can be used in the production and economic activities of both enterprises included in corporate education, and for it as a whole, as well as further research in this area.

The inquiry practice sufficiency consists in possibility to use considered methodic aspects on Russian corporation development sustainability rise not only in industry, but also in other national economy spheres.

Limitation

Despite numerous publications on the topic of sustainable development and the development of socio-economic systems, there is still no consensus on what a “sustainable corporation” should be.

One reason for this situation is the comprehensiveness of the concept. Most scientists look at sustainability issues from various perspectives: economists emphasize maintaining high economic growth and employment; sociologists focus on social progress, which would take into account the needs of each member of society, while ecologists are trying to reduce the damage to the environment of the planet.

Thus, one of the biggest difficulties in the formation and development of strategic sustainability of industrial corporate education is its comprehensiveness.

Significance of Research

As a result of the study, it was shown that the implementation of the strategic sustainability of an industrial corporation allows balancing the state of material and financial resources of the corporation, the optimal combination and rational use of which ensures its ability to develop, maintain and maintain the necessary conditions for development, combined with the interests of society and state institutions, strategic goals and long-term competitive advantage.

Conclusions and Recommendation

As a result of the research carried out in the article, it was found that the adaptation of industrial corporate enterprises to modern business conditions is the basis of its strategic stability and consists in preventing and eliminating the destabilizing effects of environmental and internal factors, which makes it impossible to achieve a given level of system economic efficiency. It is also important to note that for an industrial enterprise of a corporate form, when forming a set of factors of strategic sustainability, the influence of such global factors as social responsibility and environmental safety of activities increases. Therefore, when developing scenarios for the development of the external environment, it is mandatory to take into account environmental and social risks, which have become part of the system of managerial risks along with commercial and investment ones.

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Configuration of Selected Competencies of International Managers in Knowledge Transfer

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Abstract

The purpose of the article is to identify the configuration of competencies and acquisition of HRM qualifications by the management / HR managers and a way to transfer knowledge in the field of HR management between the headquarters and the local unit. This purpose was achieved by means of empirical research through correlation analysis. Verification of hypotheses led to the conclusion that the method of acquiring competences of the managerial staff and the method of acquiring qualifications is conducive to the level of knowledge transfer in the field of HRM between the headquarters and the local unit

Keywords: Competencies, Human Resource Management, Knowledge Transfer

Introduction

The subject of the article are the competencies of the managerial staff and the method of acquiring qualifications in the field of human resources management (HRM). The research studies their impact on the method of knowledge transfer in international organizations[1]. This problem seems extremely interesting in the light of the growing interest in knowledge transfer, knowledge sharing or knowledge exchange, but it is not considered in the area of human resource management and in relation to international companies. Knowledge transfer in international companies is more complicated due to the location of units in different countries (see Stor, 2018). In this context, the primary purpose of the article is to identify the configurations of key competencies and acquisition of HR qualifications by the management / HR managers and a method of transferring knowledge in the field of human resource management between the headquarters and the local unit. Therefore, at the beginning of this article the author explains the subject of interest and the purpose of the work. Then, the main theoretical and terminological assumptions are presented. Further on, the methodology used in these studies and the results of research are discussed. Finally, summary and conclusions are formulated.

Competencies of the managerial staff in the area of HR Management

The constantly evolving role of the human factor in organization management requires continuous development and strict assignment of functions to managerial positions (Quinn, Faerman and Thompson, 2007). The HR function is also the most dynamic function of the company, which has been evident in recent decades (Wiernek, 2006). Recognizing the role and importance of managerial staff in human resource management, which is supposed to support organizations in achieving goals, strategies and tasks, and thus, in achieving success and competitive market position (Stor and Suchodoslki, 2016), allows to assume that an effective supervisor anticipates problems and manages risk properly (Juchnowicz and Kinowska, 2018). The biggest challenge for companies is to recruit people with great potential who have the chance to become valuable employees with high level of performance(Sulich, 2015). Therefore, top management representatives, as well as other key people

[1] For stylistic reasons, the term international company is used interchangeably with the concepts of corporation and international organization, and is understood as an entity that owns and controls assets in at least two countries. It consists of the headquarters of the parent corporation / corporate headquarters and foreign subsidiaries [Stor M. 2011, p. 42; Schroeder 2000, p. 13; Purgal-Popiela J. 2017, p. 47]

for the organization, have a decisive influence on the formation of dominant adaptive behaviors throughout the organization (Barabasz and Bełz, 2017). This role is certainly more difficult in the case of international companies, in which, in addition to knowledge of various HR tools and processes, one must also demonstrate knowledge of the country's culture, market environment and employee mindset (Raczek, 2016). As numerous studies show, the elements that compose managerial qualifications can be strongly influenced by national culture and, therefore, their assessment may be different in each country (Stor, 2008). Therefore, a modern employee of the HR department should have extensive knowledge and competencies, enabling them to perform an advisory and supportive role for management boards in making strategic decisions affecting the global functioning of the company (Raczek, 2016). Managerial staff in order to support key processes of creating, sharing and disseminating knowledge should have appropriate managerial competencies. M. Stor points out that the success of modern international managers depends on their own qualifications[2], which must be constantly developed, and the competences that they get in recognition of these qualifications (Stor, 2010). Therefore, the competency structure consists of psychological features, knowledge and skills (Stor, 2008). The article adopts the definition proposed by M. Stor, who believes that competencies are: skill, knowledge, personal characteristics and behaviors needed to effectively play the role/perform work in a given organization, and support the enterprise in achieving its strategic goals (Kupczyk and Stor, 2017)

The importance of knowledge transfer in international companies

Today, knowledge is shared between geographically dispersed individuals and organizations, and across cultural and national borders. Therefore, understanding how knowledge can be transferred from one entity to another is extremely important. Effective completion of knowledge transfer, which is one of the most important stages of knowledge management, is considered laborious and time-consuming (Duan, Nie and Coakes, 2010). The concept of knowledge transfer has not been clearly defined, without going into deeper discussion the article adopts the definition of knowledge transfer proposed by J. Purgał-Popiela. According to this definition, knowledge transfer concerns dynamic processes in which there is a flow of knowledge between parties involved in the transfer (transmission) and acceptance (absorption) of knowledge and which lead to changes in the original state of knowledge of the participants of these interactions (Purgal-Popiela, 2017). Managers must adapt traditional human resource management practices to accelerate and create knowledge within the company (Kianto, Sáenz and Arambura, 2017). Human resource management (HRM) contributes to innovation by increasing the organization's knowledge base and stimulating knowledge creation(Duan, Nie and Coakes, 2010). The transfer of knowledge in international companies is associated with using existing resources and capabilities in the new location or with the intention to acquire valuable knowledge available there, which in both cases depends on their successful transfer (Purgal-Popiela, 2017). M. Kuzel, based on the results of the conducted research, expressed the fear that especially systems of reverse transfer of knowledge and skills may be ineffective (Kuzel, 2013), there is no knowledge about the way in which organizations learn from their environment (Sharma and Lenka, 2019). While the transfer of knowledge encounters certain obstacles, international organizations face additional challenges due to cultural, political, economic and geographical differences (language, climate) (see, among others, Schlegelmilch and Chini, 2002; Duan, Nie and Coakes, 2010). A foreign subsidiary must comply with local laws, local culture and other environmental conditions that affect people and organization management, which becomes a challenge for multinational corporations that for their part would like to manage a subsidiary in the host country based on human resource management policies and practices in the country of origin (Oppong, 2018).

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[2] In the literature, the terms competencies and qualifications are often used interchangeably (see, among others, T. Oleksy, 2006; Jabłoński M., 2011). To clarify: *competency is a potential ability to function in a given situation or under certain conditions and is associated rather with formal documentation of knowledge, skills, experience or certain psychological features (Stor M, Kupczyk T p. 21).*

Table 1 Correlation between the key competencies of the managerial staff and the method of acquiring qualifications in HRM, and the method of knowledge transfer in the field of HRM between the headquarters and the local unit

Spearman's rank-order correlation **BD removed in pairs** **Marked correlations with p <, 05000**		**method of transferring knowledge in the field of HRM between the headquarters and the local unit**				
	VARIABLES	**from headquarters to the local unit**	**from the local unit to the headquarters**	**between local units**	**inside the HR Department of the local unit.**	**between HR Departments and a local unit**
key competencies	Business knowledge	0.22	0.22	0.12	0.07	0.25
	Strategic management	0.39*	0.42*	0.25	0.29*	0.24
	Responsibility, reliability, credibility	0.09	0.26	0.24	0.19	0.27
	HRM skills	0.16	0.19	0.42*	0.24	0.29*
	Using the HR information system	0.23	0.14	0.47*	0.28*	0.19
	Knowledge of foreign languages	0.30*	0.22	0.14	-0.09	0.06
way of acquiring qualifications	Informal learning in the HR department of the local unit under study	0.09	-0.04	0.04	0.35*	0.27
	Informal learning in the HR department of another local unit	0.30*	0.22	0.19	0.09	0.11
	Informal learning in the HR department of the Corporate Headquarters	0.57*	0.69*	0.48*	0.11	0.24
	Participation in HRM qualification programs organized by a local unit	0.43*	0.33*	0.23	0.20	0.11
	Participation in HRM qualification programs organized by the Corporate Headquarters	0.55*	0.68*	0.28	-0.04	-0.01
	Participation in HRM qualification development programs organized by other local units	0.35*	0.48*	0.27	0.12	0.19

Source: results of own empirical research

Methodology of conducted empirical research and obtained results of empirical research.

This article presents the results of surveys carried out in 2019. 50 international companies with at least one unit in Poland constituted the population of the examined organizations. As a result of the study, the country of origin / seat of the parent corporation (Corporate Headquarters) was determined: Austria - 2, Belgium - 1, Czech Republic - 1, Finland - 1, France - 5, Spain - 2, India - 1, South Korea - 2, Germany - 15, Switzerland - 1, Sweden - 3, USA - 11, Great Britain - 4, Italy - 1. The research tool was a survey questionnaire. The questionnaire was addressed to the managerial staff / HR managers of the organizations surveyed. The main goal of the study was to determine the relationship between the key competencies of the managerial staff and the method of acquiring qualifications in the field of human resource management (HRM), and the method of knowledge transfer in the field of HRM between the headquarters and the local unit.

The article tries to to determine whether there is correlation between the key competencies of the managerial staff and the method of acquiring qualifications in HRM, and the method of knowledge transfer in the field of HRM between the headquarters and the local unit. Thus presented research goal allowed to formulate two research hypotheses:

H1: key competencies of HR managers influence the method of knowledge transfer in the field of HRM between the headquarters and the local unit

H2: the method of acquiring qualifications in the field of HR Management affects the method of knowledge transfer in the field of HRM between the headquarters and the local unit.

A nonparametric Spearman rank-order correlation was used for the analysis. The study of Spearman rank-order correlation was justified by the use of ranks (1-4) which are features of the Likert scale in the questions.

The results are collected in Table 1. and the commentary is narrowed to statistically significant correlations. Assuming that the relationship between variables is statistically significant at $p < 0.05$, it can be said that the greater the weight of knowledge transfer in the field of HRM:

- from the local unit (branch) to the Corporate Headquarters (parent unit), the greater the assessment of such a way of acquiring knowledge as informal learning in the HR department at the Corporate Headquarters ($r = 0.69$) and participation in HRM qualification programs organized by the Headquarters Corporations ($r = 0.68$), but the lower informal learning in the HR department of the examined local unit ($r = -0.04$);
- from the headquarters to the local unit, the greater the assessment of such a way of acquiring knowledge as informal learning in the HR department at the Corporate Headquarters ($r = 0.57$);
- inside the HR Department of the local unit, the greater the assessment of such a way of acquiring knowledge as informal learning in the HR department at the Corporate Headquarters ($r = 0.48$); and of competencies: using SIP ($r = 0.47$);
- between HR Department and the local unit, the greater the assessment of skills in the field of HRM ($r = 0.29$).

Conclusion

In the light of the research findings, it should be considered that the purpose of the article has been achieved. It was possible to determine the configuration of competencies of the managerial staff / HR managers due to the method of transferring knowledge in the field of HRM between the headquarters and the local unit. It was also possible to determine how important the method of acquiring qualifications in the field of HRM is due to the method of transferring knowledge in the field of HRM. The analysis of the results partly allows to determine that:

H1: key competencies of HR managers influence the method of knowledge transfer in the field of HRM between the headquarters and the local unit = hypothesis is rejected (no influence evidenced)

H2: the method of acquiring qualifications in the field of HR Management affects the way of knowledge transfer in the field of HRM between the headquarters and the local unit = hypothesis is confirmed (positive influence evidenced).

The verification of research hypotheses made it possible to formulate a general conclusion that the method of acquiring qualifications of managerial staff in the field of HRM in various ways can affect the method of transferring knowledge in the field of HRM.

However, the weak point of the research is the selection of a research sample. It is unknown what the results would be if the sample included, e.g. more Asian countries, so the research cannot be generalized to the entire population. Therefore, it is unknown whether the patterns sought would be ultimately extended by additional applications. Despite these limitations, the conducted research has a cognitive value and allows filling a certain research gap, especially in connection with the relations that appeared between the competencies of HR managers and the method of acquiring qualifications in the area of HRM and the transfer of knowledge in the field of HRM between the headquarters and the local unit

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Managerial Competencies Management - A Practical Approach

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Abstract

Employees are a key component of modern enterprises and the level of tasks performed depends on the state of their competence, which is measurably reflected in achieving the objectives set by the organization. The main goal of this article was to find an answer to the question concerning the possibility of achieving the company's objectives by means of effective and efficient management of employees' competencies. The result of theoretical research work is to adopt the following thesis: identification of employee competencies, and consequently reaching the competence gaps of the organization, causes that activities related to competence management may, in a measurable way, be reflected in the results and success of the company.
The thesis formulated in this way, in turn, contributed to the clarification of the empirical problem, namely: *What is the state of the managerial staff's competencies, crucial for the organization in terms of achieving the objectives?* The empirical research made use of the analysis of the available organizational documentation and questionnaires filled in by the management staff. This article focuses on the results of the empirical studies carried out, as well as an analytical review of the collected research data and conclusions and recommendations for the surveyed organization.

Keywords: competencies, competencies management

Introduction

The strategic links between competences and human resources management and business management are the foundation of competence management in an organization. The importance of competencies is evidenced by the fact that they shape the profile of the employee and enable him/her to perform the entrusted work effectively.

The interest in issues related to the competence of employees comes from the continuous growth of the importance of human resources in organizations. Employees are a key component of modern enterprises and the level of tasks performed depends on the state of their competence, which is measurably reflected in achieving the objectives set by the organization.

The main **goal** of the author of this article was to find an answer to the question concerning the possibility of **achieving the company's objectives** by means of **effective and efficient management of employees' competencies**.

The result of theoretical research work is to adopt the following **thesis**: identification of employee competencies, and consequently reaching the competence gaps of the organization, causes that activities related to competence management may, in a measurable way, be reflected in the results and success of the company.

The thesis formulated in this way, in turn, contributed to the clarification of the empirical problem, namely: *What is the state of the managerial staff's competencies, crucial for the organization in terms of achieving the objectives?*

In order to answer this question, it was necessary to take appropriate methodological actions related to empirical research. First of all, it was established that **the subject of the research** would be the diagnosis of the competence status of the management staff, in terms of key competencies. Next,

efforts were made to find an appropriate **research object**. As a result of the search, a local leader from the passenger transport industry was selected, who recently undertook actions aimed at improving the effectiveness and efficiency of the human resources management system.

The empirical research made use of the **analysis** of the available **organizational documentation** and **questionnaires** filled in by the management staff. This article focuses on the results of the empirical studies carried out, as well as an analytical review of the collected research data and conclusions and recommendations for the surveyed organization.

The terminological and conceptual assumptions adopted for competence management.

When conducting theoretical considerations on the employees' competencies management, it is difficult to find commonly accepted definitions of competence and competence management in the literature. A review of the literature on human resources management shows the vastness of definitions of competences, their diversity results from the scientific perspective adopted by a given researcher. Therefore, due to the practical orientation of this article, the terminological assumptions adopted will be presented below.

For the purpose of this work, it is understood that competencies are the skills, knowledge, personal qualities and behaviors required for the effective performance of the work assigned, inextricably linked to acting in a specific situation. Qualifications, on the other hand, are the potential ability to function under given conditions. Thus, qualifications make the employee capable of performing the tasks entrusted to him or her, and competencies determine that these tasks have been performed as expected. This means that before an employee has the expected competencies at the required level, he or she must first have a certain type and level of qualifications. Definition by M. Stor (2014).

Another theoretical issue to be addressed is the key competencies, meaning those which, due to the defined reasons, are most important for the organization, the job position or the employee himself. P. Drucker defines the key competencies of an organization in a precise and concise way as what a given company can do best. In relation to an employee, the term refers to the most important and distinctive personal qualities. It is also worth noting, that a very high level of key competencies and a lower level of other competencies of secondary importance is more beneficial for the organization than the average level of all expected competencies.

T. Oleksyn (2010) mentioned, that due to the importance of employees competencies for the organization, this issue will be further discussed in the next section. Employees are undoubtedly one of the key components of the organization and their competencies can be invaluable, this is also expressed in his statement by K. Obłój (2000), who claims that each company is ultimately the accumulated knowledge of past and present employees.

In both the literature and business practice of companies, competencies are discussed in connection with management. Bearing in mind, that competence in an organization is used for a specific purpose, it is important to understand what we mean when we compare the concepts of competences and management. T. Oleksyn (2010) reduces competence management to the basic functions of management, i.e. planning, organizing, directing (leadership) and controlling. However, he emphasizes, that management always has a practical dimension and should be goal-oriented, respecting the principles of rationality, economy, effort and ethics.

This short discussion about competencies, their importance and management, leads to the conclusion, that, depending on the specific needs of a company, its personnel management system and people themselves, competence management has many different applications. Objectives can be general or specific, they can be more business- or human capital-oriented, and they can be organizational or individual in nature. However, the main objective of competence management is to support and enable the company to succeed, achieve and maintain a competitive advantage and prepare the organization for changes and functioning in a turbulent environment.

Practice of Managing the Competences of Management Staff - Empirical Research

The literature studies carried out led to the general conclusion, that issues of employees' competencies relate to the strategy and functioning of the company as a whole. As a result, it was assumed, that the use of the term 'competencies management' is considered appropriate. Based on the theoretical research **a thesis** was also put forward, that the identification of employees' competencies, and consequently reaching the organization's competence gaps, causes that activities related to competence management may, in a measurable way, be reflected in the results and success of an enterprise.

Previous theoretical research has contributed to the formulation of the following **empirical problem**: *What is the state of the managerial staff's key competencies for the organization in terms of achieving the objectives.* **The subject of the empirical research** is a diagnosis of the current state of competence of the management staff in the area of key competences.

A Polish company, which is a leader among commercial carriers in the Lower Silesian Province, was selected as the **research object**. The audited company is a company that has been on the market for over 60 years, providing regular bus services throughout the country, as well as providing coach rental services in the country and abroad. The company declares that it transports around 3 million passengers during a year, covering over 9 million kilometers. It has 130 buses, coaches and tourist coaches in its rolling stock. The company declares its overall strategy as follows: strengthening its competitive position on the market and increasing its development potential. The cited policy shows that the company strives to improve its capabilities; this is also reflected in the company's activities.

The selection of the organization was intentional, because the activities of the new management board of the company, aimed at improving the effectiveness and efficiency of the human resources management system, made it possible to conduct empirical research in the organization. The following **research techniques** were used: analysis of available organizational documentation and questionnaires filled in by the management. The analysis of the documentation was used for the general characterization of the company together with the competence management system functioning within it, and allowed to identify the key competencies that the management staff should have. The questionnaire asked for self-assessment of particular competences. From the methodological point of view for a person performing self-assessment the level of his or her own competences is compared with that of other people. Such cross-referencing was to help in formulating final conclusions. The point is to determine, in the most adequate way possible, the current competence status of the employees of the surveyed company.

Based on the documentation and the analysis carried out, a list of key competencies was identified for the managerial staff. Then each of the listed competencies was defined in accordance with the needs articulated by the organization and taking into account activities of a strategic nature. In this way, **10 key competencies** were identified: 1) communicativeness, 2) leadership, 3) decision making, 4) identification with the company and loyalty, 5) ability to predict, 6) delegation of tasks, 7) flexibility of behavior, 8) organizing own work, 9) building organizational culture, 10) resistance to stress.

For the assessment of competencies, a four-stage measuring scale was used, in which the following markings were used: 1 - I lack a given competence, 2 - I rather have a given competence, 3 - I have such a competence, but it needs to be improved, 4 - I fully have such competence.

The return of the questionnaire was very high, as it was completed by 7 out of 9 managers (return level 77%).In case where the respondents did not indicate answers for certain competencies, it was decided to calculate average values for missing choices. The averages were calculated based on the values marked by the respondents for the remaining competencies. Statistica 12 was used to supplement the missing data. Statistical analyses were carried out on the basis of choices made by the respondents in terms of self-assessment of their competencies. Table 1 presents the average

values obtained by each of the surveyed competencies.

Table 1: Average values obtained in the self-assessment of competencies among management staff

MANAGEMENT STAFF											
COMPETENCE	Communicativeness	Leadership	Decision making	Identity with the company and loyalty	Ability to predict	Delegation of tasks	Behavioural flexibility	Organization of work	Building an organizational culture	Stress resistance	**TOTAL**
MEAN	3.43	3.29	3.43	3.43	3.43	2.86	3.43	3.57	3.43	3.14	**3.34**

Source: empirical studies

Bearing in mind, that the highest possible value on the measuring scale is 4, it is worth noting that the competence of 'organizing own work' reached the highest mean. It obtained a score of 3.57, thus indicating only a slight need for improvement. The second place was taken by a set of 6 competencies with a slightly lower average than the one discussed above, i.e. 3.43, which includes: building an organizational culture, flexibility of behaviour, ability to predict, identification with the company and loyalty, decision making and communication skills. The next place is taken by the competence defined as leadership, whose average score was 3.29, so the need to improve this competence is clearer. Another competence, resistance to stress, is ranked fourth with a score of 3.14. The last, fifth, place is occupied by a competence that has an average score of 2.86, and therefore the identifying persons directly express the need to improve it. This competence is the delegation of tasks.

Conclusions of the study

The diagnosis of the state of competence of the management staff allows to identify competence gaps. The surveyed company indicated, that the desired value of each of the key competencies is value 4, i.e. a fully possessed competence. Therefore, the competence gap was determined from this value.

The competence gap in the organization is the difference between the structure and level of competencies held by the employees and the desired competencies. This gap is a deficiency or lack of specific knowledge, features, skills and attitudes of employees that prevent or reduce the level of performing the work on a given position in the expected manner. The reference point for identifying the competence gap are job descriptions and expected behaviors of the employees, which should include qualification requirements for employees and managers (making them capable of performing their duties at a given position), as well as competences (stating that work at a given position is performed expectedly), contributing to achieve strategic objectives of the company.

As a result of surveys conducted among the management staff, it was determined in which area of competencies and how big the competence gap between the desired and current level is. The largest competence gap resulting from the self-assessment of managers concerned the delegation of tasks. Chart 1 presents a graphical list of competencies required and diagnosed as a result of the survey.

Chart 1: Competences required and diagnosed in the managerial staff profile

Source: empirical studies

The competence mismatch of managers concerns, to a large extent, the ability to manage teams of employees, and particular competence gaps have been shown in a delegation of tasks and leadership. These competencies are among skills that are achievable, capable of being shaped and acquired through increased professional experience in the management position. Diagnostic tools (questionnaires) used in this article made it possible to collect data based on which various analyses were carried out to identify the development needs of the **management staff**.

Preliminary analyses indicated, that there are gaps in each competence area, which means that the level of knowledge, skills, attitudes, behaviours and personality traits of the surveyed managers does not correspond to the level expected in the created competence profiles.

Recommendations for organizations

As a result of the empirical research carried out and with reference to the company's strategy (which is: Strengthening the competitive position on the market and development potential), the following recommendations for actions aimed at the development of human resources management in the context of competence management can be formulated.

Competence management, as a subfunction of human resources management, has been defined as a set of activities performed in the organization and aimed at identifying, acquiring, developing and retaining in the organization such employees' competencies that enable the realization of strategic objectives of the company. In view of the research carried out it can be said, that such competencies have been identified in the company, and therefore further actions should be directed at acquiring, developing and retaining in the organization employees who demonstrate such competences. In this respect, the proposed solutions and actions of human resources management should enable the achievement of objectives related to the competence management.

Therefore, it is reasonable to develop and implement a system solution in which competencies are treated as a common base for all activities aimed at people in the organization, i.e. those that make up human resources management.

With regard to the analysis of the survey results among employees in managerial positions, priority should be given to the development of the following competencies: delegation of tasks, leadership and resistance to stress.

To sum up, the development of management staff competence should take place in two ways. On the one hand, appropriate actions and programs should be implemented in the scope of various sub-functions of human resources management, such as selection of personnel (including, in particular, job descriptions and introduction to work), improvement and control of relations with internal and external customers, evaluation of employees, their remuneration, intangible motivation, integration, communication, shaping the organizational culture, employees leaving the organization and competence management. On the other hand, it is also necessary to develop and carry out appropriate training courses and trainings dedicated especially to management staff.

Summary

The subject of consideration and research in this master's degree dissertation was the competence management. The main objective was focused on finding an answer to the question of how to achieve the company's objectives by means of effective and efficient management of employees competencies.

In the theoretical part, based on the literature review, the concept, essence and objectives of competence management are presented and the key role of the managerial staff is demonstrated. Attention is also paid to the methodology of activities involving competence management. The considerations undertaken probably did not exhaust a broad set of views expressed about employees competencies, however, in the author's opinion, the issues of competence management have been discussed in a manner allowing to continue the practical considerations described in the following parts.

To achieve the goal, research techniques were used, including the analysis of available organizational documentation and questionnaires filled in by the management staff. On the basis of the conducted research, competence gaps were defined for the management staff of the surveyed company. Based on the performed analyses, it became possible to determine recommendations and directions for further actions.

The author of this study indicates, that the development of competencies that should be followed by the surveyed organization should take place in two ways. On the one hand, actions and programs should be taken to improve the subfunctions of human resources management, focused on competences, especially on the selection, evaluation and improvement of employees. On the other hand, training courses and trainings should be prepared and conducted to strengthen the competences of the management for which the largest gaps have been identified.

In conclusion, it can be stated, that in the context of the findings made, the purpose of the article can be considered to have been achieved. The research carried out in the course of the study made it possible to determine actions aimed at competence management and, as a consequence, at improving the effectiveness and efficiency of the objectives and strategies implemented by the organization.

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Democratic Schools in Poland As Educational Innovation: A Qualitative Study

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Abstract

The paper explores educational ideas and practical issues within democratic schools in Poland. A recent development that started in 2013, democratic schools are set up by parents dissatisfied with the country's mainstream education system, as an alternative learning environment free from the perceived shortcomings of public schooling. The major question addressed is: How are these schools innovative? The notion of educational innovation is analyzed in terms of educational ideology and of practice, including organization and pedagogy. The authors argue that while the founders and the staff of democratic schools are driven by and preoccupied with the fundamental problems of learning, upbringing, and child development, they are more dedicated to rethinking or redefining them and less engrossed by devising pedagogical solutions or didactic techniques. Central aspects of democratic schools' ideology of education are identified, such as taking children's interests as the starting point in designing educational processes and prioritizing children's well-being and the development of their social competences over academic skills. Practical innovations include approaching education as a matter of debate and experimentation, organizational modifications of everyday practice, in particular involving children in decision-making processes on school matters, and respectful, equality-based child-adult relationships. The article concludes with an account of controversies around the sustainability and the potential impact of democratic schools.

Keywords: alternative education, democratic schools, educational innovation, ideology of education

This place is different. I will stand up for it, despite its shortcomings. I will defend it with all means possible, because it is something exceptional that has to be created and nurtured, and developed.
(A democratic school educator)

Introduction

This paper explores educational ideas and practical issues within democratic schools in Poland. Representing a recent educational development, democratic schools are set up by parents who are dissatisfied with the country's mainstream education system and seek to provide their children with an alternative learning environment free from the perceived shortcomings of "systemic education," in particular of public schooling. Educational philosophies underpinning democratic schools revolve around a comprehensive transformation of the school as a community, rather than focusing on efficiency-oriented improvements in instruction methods or tools. The major question addressed below is: How are Polish

democratic schools innovative, and what makes their founders innovators and their ideas and practices the vehicles of innovation? The first section outlines the contemporary democratic school movement in Poland and the position of democratic schools vis-à-vis the national schooling system. Subsequently, the notion of educational innovation is introduced against the background of modern efforts aimed at providing alternative schooling. We argue that while the founders and the staff of democratic schools are driven by and preoccupied with the fundamental problems of learning, upbringing, and child development, they are more dedicated to rethinking or redefining them and less engrossed by devising pedagogical solutions or didactic techniques. We use Meighan and Harber's (2007) notion of the ideology of education as a set of "theories" concerning respective dimensions of schooling. As the main part of our argument, we offer a qualitative analysis of interviews and the observational material collected in several democratic schools in Poland. In conclusion, we return to the question of the democratic schools' potential for initiating change in Poland's culture of schooling and in the understanding of the purposes of education.

Democratic schools in Poland: Development and selected characteristics

The democratic school movement is a small, yet dynamically growing, educational phenomenon in Poland. First four democratic schools opened in Poland in 2013, and, as of 2020, there are approximately thirty of them across the country. They considerably differ from typical educational facilities of Poland's schooling system, where schools are state-managed institutions working within a framework determined by the Ministry of Education and accountable to it for the implementation of the standardized curriculum and the fulfillment of centrally mandated objectives. Typically not accredited as schools[1] (unlike their counterparts in the U.K. [Garry et al., 2018] and Israel [Hecht, 2012]) and operated by non-governmental organizations or small companies offering educational and care services, democratic schools can be said to be positioned on the fringes of the education system. Their students are formally registered as receiving out-of-school education, which is recognized as a viable form of compulsory education (called "the school duty" in Poland). They have to be enrolled at a regular school and take annual examinations to prove they have achieved the learning outcomes stipulated by the national curriculum. At the same time, democratic schools do not receive any state funding and, not being subject to legal regulations for educational institutions, they enjoy the liberty to determine their priorities the way they see fit.

Rarely encountered in mainstream schooling, the pivots of the educational ideology embraced by democratic schools include the unschooling tradition (Holt, 2004; Stern, 2013), radical free schooling in Western Europe and the U.S., such as Summerhill or Sudbury Valley schools (Hope, 2019), and modern parenting approaches (Kohn, 2006). They are inspired by child-centered approaches to education and the understanding of child-adult relationships as based on respect and nonviolent communication (Juul, 2011; Rosenberg, 2003). Some of these schools belong to the European Democratic Education Community, and endorse its central values and principles of equality, shared responsibility, respect, self-directed learning, and collective decision making.[2] However, partly due to the legal context, and partly in response to the confusing nature of the term, schools of this kind may refrain from labeling themselves as "democratic." Instead, they rely on a range of telltale monikers, e.g., flexible, friendly, or free, with the latter also indicating their deliberate dissociation from the formal education system. Nevertheless, since the term "democratic schools" tends to serve as a common identifier, we use it throughout this paper.

Democratic schools and the progressive educational tradition

From an anthropological perspective, innovation is an initial stage in cultural change (the introduction and adoption of an idea or a practice), and, as such, it requires widespread learning and collective acceptance of the new element to be integrated with the shared patterns. Murdock (1960) distinguishes four variants of innovation: variation, invention, tentation, and cultural borrowing. What defines innovation is therefore not an absolute but a contextual, or relative, novelty of an element at a given place

(or society) and time. Also, innovation does not necessarily entail a break with the past, as it may either draw on an existing tradition and/or institution or reintroduce an idea and/or practice to be retested under new circumstances.

In contemporary educational contexts, innovations tend to be understood as novel didactic techniques, services, and/or technological tools, and the very term has become somewhat of a fetish in the marketized educational realities (Crosscombe, 2018). However, what passes as innovation may actually fail to further real problem-solving (Yordanova, 2019), to integrate pedagogy and technology for more effective learning (Pisanu, 2014), and to effect a more complex change in the educational culture(s) of schools and beyond. The comprehensive view, however, seems relevant when educational innovation is not equated with improvements within the entrenched systems of standardized rules and roles, but denotes efforts at seeking alternatives, therein redefining central concepts and practices. In the modern context, such comprehensively innovative approaches were promoted and tested across the world throughout the 20th century by experimental or laboratory schools and other establishments based on progressivist philosophies, the "new education" principles, and critical pedagogies. Such practices were encouraged and implemented by a long list of visionaries, reformers, and proponents of "active school," "experiential learning," "child-centered pedagogy," collective upbringing and peer cooperation, etc. (Bowers, 1967; Darling and Nordenbo, 2003; Gribble, 1998). Intrinsic to them all, their variety notwithstanding, was a criticism of the traditional pedagogies prevalent in mass schooling. As the principle of free and universal access was widely accepted, the notion of quality education based on the child's dignity and agency was increasingly highlighted (Piaget, 1974; UNICEF, 2007). Democratic schools in Poland are embedded in this tradition, dating back to the interwar period (Gawlicz and Starnawski, 2018) and revived through experiments inspired by Alexander Neill's Summerhill school in the 1990s (Neill, 1995; Brzezińska and Brzeziński, 2012).

The Methodological Framework

This paper draws on the material collected in a project exploring the origins, rise, and current daily life of democratic schools in Poland. The fieldwork spanned four years and took place in eight schools, selected with regard to their geographical location, size, the declared pedagogical approach, and willingness to participate in the project. The objective was to capture both the variety of approaches to the organization of democratic schools and their development in time. The research methods used in each research site included interviews, observations conducted during a total of approximately 200 visits, and the analysis of school documents, websites, and social media accounts. In order to obtain a multifaceted perspective on the schools, the interviews were carried out with different stakeholders: parents, staff members, and students, and addressed issues related to the genesis of the school, the process of joining it, everyday school routines, and the understanding of democratic schooling and its role in the broader education system. A total of ninety interviews were administered. This research design resulted in the collection of abundant data which helped us both to produce a detailed description of the observed settings and practices, and to identify meanings ascribed to them by school members (Flick, 2007). However, the results neither reflect the multiplicity of ways in which democratic education is practiced beyond the studied schools nor provide substantial insights into the effectiveness of this model of schooling.

Addressing the question of innovation, our analysis below focuses on the passages in the interview transcripts[3] in which the respondents pointed to the features that rendered their schools novel and distinct from mainstream educational institutions. Based on these passages, we developed analytical categories, and then identified corresponding excerpts in our fieldnotes with a view to grasping the discourse-practice interplay and thus demonstrating the complexities of the approach adopted the schools. The analysis is divided into a depiction of the selected components of the typical ideology of education explicitly or implicitly shared by leaders, educators, and parents, and a discussion of the major dimensions of practice, that is, the organization of school life and the implemented pedagogies. We draw on the definition of the ideology of education as an ensemble of theories concerning various dimensions of schooling, where

"theories" are colloquially conceived as "ideas and beliefs held by a group of people about the formal arrangements for education, specifically schooling, and often, by extension or by implication, also about informal aspects of education, e.g. learning at home" (Meighan and Harber, 2007, p. 218). In our view, the practice dimension is only analytically distinguishable from the ideology dimension, as the two actually make up one whole that comprehensively determines the experience and a collective identity of democratic school-based communities.

Ideology of Education

In this section, we identify and depict the ideology espoused by parents and staff members in democratic schools. This ideology initially arises in opposition to what they perceived as typical of mainstream schooling (or, to use their parlance, *the system*). When describing their approach to education, democratic-school parents and educators highlight the aspects that make it distinct from what they view as the dominant schooling model.

Children's interests as the starting point

In terms of *learning and teaching*, the democratic-school parents and staff follow constructivist approaches and emphasize that education should be individualized and based on a child's interests, rather than on an external, standardized, and ready-made curriculum. In this understanding, they draw (without necessarily acknowledging it) on progressivism with its central tenets of readiness, choice, needs, play, and discovery (Burman, 2017, p. 252), and envision the child as competent, naturally developing, trustworthy, and inherently capable of learning (Pomianowska and Stańczyk, 2017). Efficient learning, in their view, cannot be forced on children, as it is triggered by learners' intrinsic motivation: their sense of necessity ("I believe that if she needs something, she will learn it" [S5_P6]) and/or passion ("Children develop faster when they are happy and learn what they want to and what they are interested in" [S7_E5]). This is linked to the idea of the teacher as a companion in the learning process, rather than as a transmitter of predetermined knowledge.

Such a notion of learning and teaching makes some proponents of democratic schooling endorse unschooling, even though it is formally impossible in Poland, given the compulsory national core curriculum and mandatory exams for children in out-of-school education (Pomianowska and Stańczyk, 2017, p. 327). Democratic schools downplay the significance of the curriculum, framing it as a requirement that has to be dealt with instrumentally, rather than as a valid ground rule for educational activity. It has to be covered in conformity with the law, but it is not where the essence of learning lies. This ties in with other components of the educational ideology upheld by democratic schools, i.e., their *theories of assessment, of resources and locations appropriate for learning* (Meighan and Harber, 2007). First, democratic schools reject the idea of external assessment expressed in grades as causing stress and leading to the categorization of students into good, average, and poor. Instead, they favor self-assessment or formative feedback. In their argumentation, they draw on the theories of motivation that underscore the detrimental effects of grading on children's interest in learning, their responses to failure, their willingness to challenge themselves, and the quality of their learning (Kohn, 2000). Second, democratic schools perceive learning as happening continuously, in any situation, and through any means, whereby precedence is granted to free play (Gray, 2013), experimentation, hands-on activities, and participation in natural situations, e.g., tending to animals, "trampolining, going out for French fries […], rolling in the mud, or running around the forest all day, or lying in the hammock" (S1_P2).

Well-being and socio-emotional competence over academic skills

In terms of *theories of knowledge* and *of aims, objectives, and outcomes* (Meighan and Harber, 2007), democratic schools share an understanding that preeminence should be given to personal and social

competences, rather than to academic knowledge. While this does not mean that they belittle the latter (parents' and educators' interviews abound in passages where they marvel at the pace and efficiency with which children acquire academic knowledge, and at the depth and quality thereof, frequently extending far beyond the curriculum), it is not treated as centrally important ("Knowledge is something one can always gain," as one educator said [S5_E6]). Such a hierarchy of priorities stems from an often emphasized belief that the future is unpredictable, and, thus, that it is impossible to determine what specific content knowledge children may need. Given this, well-developed personal and social competences are potentially more desirable.

In the discourse of democratic schools, the development of socio-emotional skills is predicated on attentiveness to the well-being of children, who are considered "human beings with the same rights as those an adult has" (S5_E8). Respecting children, listening to them, and treating them seriously contribute to creating settings that "do children good" (S3_P2) and where they "are simply happy" (S4_E4). This in itself sets these spaces apart from typical schools, which are rarely deemed enjoyable, and fosters conditions for children to achieve self-insight and self-knowledge: how they feel, what they like and dislike, what they want, and what interests them – also academically – which is deemed a prerequisite for effective learning (Hecht, 2012). Supported in their choices, children develop self-esteem, confidence, and resourcefulness: "She listens to herself and reacts in line with her needs. […] When she has an idea, she just shares it" (S4_P3). Eventually, they become capable of taking control of their own lives. This is associated with developing social skills, such as the capacity to appreciate a variety of opinions, to argue for one's views, to collaborate with others, and to solve conflicts respectfully, which is seen as instrumental in preparing children for active social involvement and participation. Such a perception of the aims and outcomes of education causes the advocates of democratic schools to consider them, quite against the prevailing view, a "school of life" rather than a "bubble." Accordingly, they think of regular schools as an adult-managed "artificial world" (S1_P2), and insist that in democratic settings children directly experience that "real life doesn't look the way they'd want it to look, and that they have to come to terms with others and find a solution" (S7_E5/P).

Educational ideology in practice: Organization and pedagogy

Education as a matter of debate and experimentation

Two aspects are often emphasized by individuals involved with democratic schools: that it is expedient to forge a school vision through debating and experimenting, and that it is urgent to take an active stance and create a new educational setting if the current one harms children and a viable alternative cannot be found. Debate is integral in/to the development of democratic schools, from meetings before the opening of a facility, to constant discussions in different fora (of children, parents, and the staff) once it becomes operational. Resources used to generate the school vision and procedures include the literature on democratic education in other countries, study visits at schools in Poland and abroad, and the exchange of ideas at conferences or summer camps. In the spirit of experimentation, various solutions are put to the test.

While the attitude of openness to new ideas enables democratic schools to constantly develop in response to the changing needs and circumstances, some problematic aspects arise, beginning with the ownership of the vision. The schools stress the equality of voices, but some voices may and do sound louder than others. Most typically, school founders and leaders play a dominant role in defining the school's educational philosophy. Among parents, visions promoted by the strongest-minded individuals gain prominence. Children are usually not included at the early stages of the school formation, and while there are mechanisms in place to involve them in decision-making processes, their position is visibly weaker compared with adults'. Besides, to operate on the educational market, the schools need to attract a sufficient number of fee-paying families, which poses a challenge of retaining the coherence of their vision while accommodating parental expectations. Finally, since education is a political and ethical

endeavor involving "different understandings, values, and interests" (Moss and Urban, 2010, p. 31), reaching a shared vision of a democratic school proves challenging. While the dynamic that results from a variety of perspectives contributes to a school's vitality, it may threaten its stability. Differences in vision are known to have led some start-up groups and schools to split and form separate facilities, a process which helps create a place where members feel at home, but also aggravates the financial strain. The observation that "the only constant here is that everything changes" (S5_L5) reveals a feature of democratic schools that is simultaneously highly valuable and troublesome.

Organizational aspects of day-to-day practice

Resulting from value-laden choices, such as freedom vs. structure and individual vs. community, the organization of everyday life in democratic schools needs to be considered as linked to their pedagogies. They distinguish democratic schools both from mainstream educational institutions, and – due to the adoption of different values – from each other. These pedagogies also change in time as a result of reinterpreting the principles of educational ideologies and the core values championed by the schools. Below, we will discuss two dimensions of organization: time management and housekeeping duties.

The schools in our sample took various approaches to planning and time management, from developing fairly stable schedules to prioritizing spontaneity. Educational activities themselves were organized differently, ranging from day schedules with lessons planned at fixed hours and participation required or optional, to the adults inviting children to join them for an activity, to no activities on offer unless the children asked for them. If offered, activities were either divided into subjects or arranged as integrated project work. Typically, a range of extracurricular activities would be offered, including yoga, knitting, and astronomy. School schedules also included school meetings, which served as collective decision-making fora. Most of the settings did not divide the children into age groups, and promoted learning in varied locations outside the school building, such as museums, workshop venues, and outdoor spaces (e.g., forests) (see Kłosińska, 2019). Given the value put on children's free play (Gray, 2013) and dedication to fostering responsibility through decision-making, ample time was left at the children's disposal. Since educational ideologies of the schools foregrounded autonomous learning based on intrinsic motivation, the dominant model was to transfer the responsibility for education on the students, while providing them with abundant resources and forms of support.

Involving the children in school maintenance tied in with approaches to the freedom-responsibility balance and perceptions of children and adults. The settings that drew on, for example, Korczak's (Wolins, 1967) vision of "children's homes"[4] touted school as a shared responsibility or a home-like space and, accordingly, tended to systematically engage the children in cleaning or helping with meals. The establishments that focused more on individual rights tended to leave it up to the children to decide whether they would tidy up or not. This would open up pedagogical discussions on responsibility for taking care of the shared space, appropriate responses to the children's refusal to do so, and child-adult relations.

The ways of balancing freedom and structure give rise to several concerns. Ensuring children's involvement in decision making represents a much desired departure from practices of limiting students' participation, which are typical of Polish educational institutions (Napiontek, 2013). Additionally, research has shown that learning is efficient and rewarding if students take control of their learning (Gray and Chanoff, 1986; Gray, 2013; Hecht, 2012). Yet, some interviewees observed that excessive freedom could be detrimental to children as it deprived them of the sense of security and failed to teach them to take responsibility for their actions. In particular, younger children were said to be "not ready yet" for "too much choice" (S4_P4) and "incapable of imagining that if they don't study, they will fail [an exam]" (S4_P2). The chaos resulting from loose schedules and frequent changes was considered harmful to children with special educational needs, which led some schools to restrict access for such students, especially if their funding was insufficient to provide professional assistance. Finally, the principle of

autonomous learning as the organizational cornerstone of a school is not without its problems. Specifically, autonomous learning hinges on the competences that are vastly dependent on a child's social and cultural capital and on support from a stimulating environment. While it can be successfully carried out in schools attended by students from families with considerable cultural and economic capital, and enjoying access to high-quality resources, it proves challenging in settings where those are missing or insufficient. Moreover, as some staff members observed, the enhanced focus on intrinsic motivation and students' readiness to learn may lead to overlooking children's developmental problems that obstruct their engagement in learning. As these observations suggest, launching novel, otherwise beneficial, educational approaches requires careful attention to their complex consequences and to the circumstances in which they are implemented.

Child-Adult Relationships

As their distinctive feature, democratic schools promote child-adult relationships embedded in the democratic type of discipline, wherein power is shared and order is derived from collectively deliberated and agreed-on rules (Meighan and Harber, 2007, p. 226). Close, trusting, and acceptance-based relationships between children and adults are considered prerequisite to learning, as expressed in an often-repeated phrase "There is no education without relations." Such relationships are underpinned by the perception of the child "as a human being with the same rights as an adult has" (S5_E8), the cultivation of equality and respect as fundamental values, and the rejection of a typical image of the teacher. Democratic schools are not bound by regulations on staff qualifications, and they frequently employ educators without teaching diplomas, prioritizing personal qualities and passions instead. The label "teacher" is replaced with an array of terms, such as "tutor," "mentor," or simply "adult." Against the cultural norm, children are on first-name terms with adults, and engage in close bodily contact with them. Children are also involved in various decision-making processes wherein conditions are created for them to discuss and disagree with adults.

However, such respectful, equality-based relationships are neither easy nor unproblematic to establish. Socialized in a culture where hierarchical relations are a norm, adults need to learn new positions, which entails confronting their own preconceptions and habits. This includes issues ranging from simple everyday routines, such as queuing for lunch, to complex mindsets and attitudes, such as overcoming the feeling of incompetence when children refuse to attend a lesson, or refraining from using one's legal responsibility for children to exert power over them. This process is of utmost importance since, to quote a staff member, "nobody can give children more freedom than they have themselves," and adults create school space depending on "who [they] are, how they deal with their different experiences, with conflicts, with resistance, anger" (S3_L2). Another risk involved is swinging to the other extreme. A parent shared her concern with "adults [becoming] a lower caste ... [having to] serve," worrying "what [this situation] teaches the children" (S5_P7). Striking a balance can be challenging, and the adults who find themselves unable to do so are expected to engage in a personal development process that would help them recognize their needs and set their own boundaries, while still respecting children. Otherwise, they are bound to leave the school sooner or later.

Conclusion

Democratic schools in Poland not only exemplify planned and implemented local educational innovation, but since that they form a network of mutually inspiring communities and other agents, they can also be regarded as an educational ecosystem (Abdul-Jabbar and Kurshan, 2015) with a potential to set an example of changes in the country's educational culture, at least in an experimental mode and on a micro scale. Democratic schools embody not only the borrowing pattern (from the earlier generations of progressivists and contemporary educational "radicals" elsewhere) but also other variants of innovation conceptualized anthropologically by Murdock (1960): *variance*, that is, modification of certain aspects of schooling; *invention*, i.e., using concepts developed primarily in other fields (such as nonviolent

communication); and *tentation*, or "trial-and-error learning" of how to develop and maintain the new learning environment. By stressing respect for children as agents of their own learning and full-fledged "citizens" of their school, by building their pedagogies around students' curiosity, interests, and creativity, and by attempting to structure adult-child relations in a relatively non-hierarchical way, democratic schools demonstrate that "another education is possible" if only there is a will to experiment with it.

A number of critical and potentially contentious points must be acknowledged. Whether and how the effectiveness of this innovation can be measured and verified is one question to ponder for practitioners and further researchers. Another problematic aspect is the precarious status of democratic schools (fringe positioning in relation to the schooling system and the lack of steady – public – funding for an adequate infrastructure and stable employment contracts for professional staff), which threatens their long-term sustainability. Even though the parent-paid fees are sometimes differentiated according to families' financial capacity, tuition-based financing is certainly part of the problem, rather than part of the solution, as these schools certainly do not aspire to provide education exclusively to the wealthy. Further, given the recent conservative turn in Poland, fears have been voiced over possible curbs on out-of-school education, including democratic schooling. The latest regulations[5] introduced by the Ministry of Education have been interpreted as a warning sign thereof. Last but not least, while democratic schools may indeed bring about change at a micro level by creating emancipatory experience for the students and adults involved, they do not seem at this point to be a feasible systemic solution. Even though democratic schools avoid educational elitism, they largely rely on families' economic resources and, importantly, tend to cater to parents with higher cultural capital (knowledge and appreciation of alternative education) who are well-networked socially and have time to engage in school community-building. This is not the case for the majority of parents in public schools. Therefore, if the proponents of democratic schools want to see their innovations as harbingers of a wider transformation in educational culture, one of the major challenges in the upcoming years may be policy development to ensure that the democratic education ideals translate into what Fielding and Moss (2011) advocate when they describe the democratic common school as "a public institution and a public space, a forum or place of encounter and connection, interaction and dialogue open to all citizens, young and old" (p. 108).

Endnotes

1. Given this, some researchers label them as quasi-schools (Uryga and Wiatr, 2015).
2. https://eudec.org/democratic-education/what-is-democratic-education (retrieved July 9, 2020).
3. All participants are quoted anonymously. Symbols attached to quotations indicate leaders (L), educators (E), and parents (P), with interview numbers within a given school community. "S" with a number indicates a school.
4. However, unlike Korczak's orphanages and boarding schools such as Summerhill, contemporary democratic schools in Poland mostly operate as day settings, or organize away-activities periodically.
5. The regulations included reducing the governmental subsidies for out-of-school students, setting stricter conditions of enrollment at the base school (now it must be a school situated in the student's zoning district), and restricting the acceptability of assessments issued by Psychological and Counseling Centers (while assessments provided by public centers are recognized, those issued by private facilities are not).

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Effective Leadership in The Organization – A Current Challenge in The Military Service

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Abstract

Leading people is not an easy task. This is perfectly captured by Plato's remark: "The most important thing is that nobody is ever left without leadership, a man or a woman, that they don't get used to serious matters or games and act in their own way." Designing an activity and convincing others to do it is a real art. Many military commanders, politicians and managers have found this quite painfully. To encourage others to follow you, you need both the right knowledge and many skills, which, however ... can be learned! The authors of this article in the years 2007 - 2018 cooperated jointly in building and implementing command and leadership programs at the General Tadeusz Kościuszko Military Academy of Land Forces in Wroclaw. These were the first courses in this dimension in the Polish Armed Forces. Military leadership seems to be something natural and "traditionally" constantly present in the armies of the whole world. The educational practice encountered by the authors at a military university was quite complex. Authors of presented project (work in progress) willing to analyze and discuss the role of leadership and its' meaning in the organization . The main thesis of the project is that leadership in the military sector is not just a process that involves influencing other people, without having to use coercion, to shape goals and motivate others to achieve them. Leadership in an army is also a property or a set of attributes of a leader, i.e. an individual whose role has been accepted by others.

Keywords: The Leadership, The Military Academy, Improvement.

Introduction

Many people are "born" to become leaders and often become them. But what do those who do not feel the mission to lead people and do not even try to encourage others to work together in a new direction? Nothing lost. In the light of the latest research, and this is also demonstrated by business practice, we have many types of leadership and under certain conditions everyone can become a leader. The only problem here is ... being ready to play this role. The first step in this direction is to know yourself, your weaknesses and the best sides of character. It gives you confidence and allows you to feel internally consistent. It also becomes a premise for opening up to the world and others, as well as being free to undertake new experiences without fear and prejudice.

Leading people is not an easy task. This is perfectly captured by Plato's remark in the book by Popper K (1993): "The most important thing is that nobody is ever left without leadership, a man or a woman, that they don't get used to serious matters or games and act in their own way." Designing an activity

and convincing others to do it is a real art. Many military commanders, politicians and managers have found this quite painfully. To encourage others to follow you, you need both the right knowledge and many skills, which, however ... can be learned! Improvement also requires personal predisposition to lead and lead others. Even Leonidas and Aristotle, teachers of the Alexander the Great (356–323 B.C.), were convinced of this.

In this context, attention is usually paid to charisma, as a special, even unique gift that has only a few and makes it easier to influence others, as well as to build the authority. Referring to military service -cadets were aware of the "need" to be a leader, but they are often unable to put it into practice in military service. The traditional autocratic command of a non-tolerant opposition and the use of the order for "immediate execution" are not methods of building the authority of an effective commander. The cadets were often surprised that in order to become a leader, they had to be "named" as leaders by followers (Kaluzny R., Pietrakowski P.,2020). This was emphasized already in the first issue of The Practice of Management in the fifties of 20th century by P.F. Drucker (1954), who claimed that "The only proper definition of a leader is that which says that it is a person who has followers (...) without followers, not subordinates, there is no question of leaders". The difference between the commander and the leader was then determined for the first time (Kacała J., Michaluk A., 2014).

Contemporary organizations often have problems maintaining the desired pace of development, stagnation and even regression. Among the many reasons for this, there is usually a visible leadership deficit. So there is no leader here who would show a new direction - the goal that the organization should follow. It is also important that through various actions and exerting influence, this person would be able to arouse enthusiasm, "breathe new spirit" into the organization's community in order to effectively achieve these new goals.

The authors of this article in the years 2007 - 2018 cooperated jointly in building and implementing command and leadership programs at the General Tadeusz Kościuszko Military Academy of Land Forces in Wroclaw. These were the first courses in this dimension in the Polish Armed Forces. Military leadership seems to be something natural and "traditionally" constantly present in the armies of the whole world. The educational practice encountered by the authors at a military university was quite complex.

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Literature Review

Leadership is a kind of power where one person has the ability to influence or change the values, beliefs, behavior and attitudes of another person.

Ganta, V. C. and Manukonda, J. K. (2014) mentioned the leaders must be skilled at the process of creating a shared vision and to do so in such a way that other can visualize it. "A vision is something that you can see." In Peter Senge's (1990), classic book, *The Fifth Discipline*, he discusses the importance of creating a vision that is *shared* by others and provides useful perspectives on how this can be accomplished. In a research study by Baker, Edward L. MD (2014)Leaders must also lead the process for identifying and communicating the broader strategies ("the how" and "the why") needed to bring the vision ("the what") into reality.

Visionary leaders who create a culture of engagement maintain employee trust, drive optimal levels of productivity, increase overall satisfaction and retention, and are able to position the company for success. A critical element in building confidence, motivating performance, and increasing employee

engagement is having people at the top who inspire belief in the organization's future. When done effectively, organizations experience better business success and stronger bottom-line business performance (Wiley J.W. 2010)

It is important that organizations embark on leadership development programs that will enhance leadership effectiveness. Leadership development should be comprehensive and systematically integrated into the organizational culture in order to produce leaders who can deal adequately with organizational challenges. Organizations and leadership developers should use a systemic approach in order to address the current leadership crisis (Amagoh, F., 2009).

When times are good, honest communication from those at the helm creates loyalty and organizational pride, ensuring companies retain top performers. Wiley, J. W. (2010)mentioned the leadership effectiveness can be defined by five characteristics: (1) the ability to give employees a clear picture of the direction the company is headed; (2) the ability to handle the organization's challenges; (3) a genuine commitment to providing high-quality products and services; (4) a demonstrated belief that employees are important to company success; and (5) the ability to inspire confidence in employees.

Even though considerable attention is often given to formal team leaders, it is important to recognize that the functional view of team leadership is deliberately inclusive when it comes to who satisfies these team needs. Because multiple individuals are often capable of satisfying team needs, it has been suggested that we "devote attention to the study of leadership rather than leaders," in part because of the "observation that many every-day groups have different leaders in different situations". The leadership is therefore conceptualized as the process of team need satisfaction in the service of enhancing team effectiveness (Baron I.S., Agustina H., 2017). Leadership management training should be supported by the abilities and skills of participant in following the training with various techniques used by trainers and facilitators.

Intelligent leaders also have the responsibility to use their skills and knowledge to effectively and efficiently guide their business forward in the face of an uncertain future and also to decrease the feelings of insecurity in their employees caused by that uncertainty. In the paper by Hao M. J., Yazdanifard R. (2015) a leader has the power to influence the success of the organization, due to his full power to control the direction of the organization, as well as through the influence they exert on their employees that motivates them to bring the company to greater heights.

Leaders are able to inculcate an environment of teamwork and to delegate the job to the qualified team members. Leaders do not create followers, rather they create more leaders. An effective leader acknowledges the team members for a job well done, regardless of whether the team was able to completely reach the set goals, or not. A leader is capable of developing the best out of his team members; leadership is regarding "we" and not "me" (Khoshhal K. I., Guraya S. Y., 2016).

Project research problem and research method

Building curricula for officer cadets of the Polish Army, the authors took extensive experience from J. Adair's [1] publications, which in this regard began to be gradually published in Poland after 1990. In the content and structure of the curriculum in the Management field of study, devoted a lot of attention to including courses that build the profile of the future commander through the superposition of content and exercises of "military" and "civilian" nature. The officer cadets simultaneously studied content in the field of command for a specific type of the army (infantry, reconnaissance, artillery, etc.) as well as content in the field of organization management similarly to the students of the Wroclaw University

[1] J. Adair was a senior lecturer at the Royal Military Academy, Sandhurst from 1961 to 1967 who carried out some observation work on young officer cadets handling leadership tasks

of Economics and Business, where many civilian academic teachers came from(Kopertyńska M.W., Pietrakowski P. 2019, MichalukA., Kacała J., 2014, Martusewicz J., 2019)

Advanced leadership studies and scientific research undertaken by the authors of this publication at the military university meant that these experiments would be gradually adopted in the civilian sector, where various leadership courses and workshops were increasingly carried out. Interestingly, they all primarily referred to examples of outstanding military commanders. In the military academy; the 5-year Master's Degree in Management was just a cooperation of military and civil content useful in modern command. Command is of course a basic trend of military studies and in this respect the improvement of leadership competences has become a real challenge.

The observation of young officers of Management graduates in the years 2008-2018 provided a lot of evidence that the new concept of "civil-military" education is starting to work in a fairly traditional and resistant to change military environment. These experiences prompted the authors to extend their research and implementation in a managerial environment.

In the military academic programme the majority of classes are carried out in the form of exercises and trainings preparing to fulfill the role of a leader in an organizational environment. Subjects implemented in the form of lectures are only used to present the latest knowledge in the field of leadership and human capital management of an organization. They constitute the theoretical basis for exercises and practical trainings. They mainly serve to improve the leadership competences of course participants. The classes put great emphasis on the individual learning of their competences by the participants. This is knowledge that serves to further improve the desired leadership competences. During classes, participants solve many tasks and tests both individually and in small teams. Active teaching methods and techniques are used that prepare for the role of a leader in a modern organization. Practical forms fill a minimum of 60% of study time during studies. Practical scenarios envisage playing roles in stressful situations, time deficit and threats, aimed at familiarizing participants with the presence of various threats and limitations typical of managerial work. Therefore, we decided that the group of students of the military academy (Management specialization) will be our study group.

Based on the literature review and authors' observation the research questions have been formulated:

- Does the personal characteristic of the cadet changes during the course?
- Does the cade discover his/hers natural leadership predispositions and ways to improve them during the study?
- Does the cadet apply principles and techniques to effectively motivate other members of the group during the study?
- Does the study made the cadet (after graduate) to more effectively assess the competences of subordinates and shape their professional development ?
- Does the study made the cadet (after graduate) able to design changes in the organization more flexibly and effectively?
- Does the cadet (after graduate) communicate with members of the organization in a way that enables better understanding, empathy and acceptance of the organization's adopted goals?
- design tasks for teams, appoint them and ensure their effective functioning,
- Does the cadet (after graduate) recognizes and resolve conflicts in the organization, including those that result from the impact of the environment and internal and external threats?
- Does the cadet (after graduate) deals with stress and danger situations, showing support to his/hers subordinates?
- Does the cadet (after graduate) builds an organizational culture in which job satisfaction and awareness of the community are the primary directive for the development of the organization?.

The goal of the project (work in progress) is to carry out, based on the systematic review of the literature, qualitative and quantitative research. In the first period we plan to execute Individual In-depth Interviews (IDI), with representatives of the course (twice- during the course, and 1 year after graduating, N=25). The qualitative study will help to formulate the hypothesis and the model of the effective leadership in the military organization. Next step of the project will be the quantitative research carried out with representatives of the military force (management officers) (N = 300). The collected data will be subjected to computer processing and quantitative analysis using descriptive statistics and the use of the SEM / PLS (structural modeling).

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The Effects of Ethics Institutionalization, Organizational Commitment, and Psychological Empowerment on Organizational Citizenship Behavior

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Abstract

Many of organization implement code of conduct as an explicit guidance to help employees knowing the standard of ethics from management's viewpoints, with the aim to gain productivity achieving organization's goal. The purpose of this paper is to examine the influence of ethics institutionalization on organizational citizenship behavior and to analyze the role of organizational commitment in mediating the impact of ethics institutionalization on organizational citizenship behavior with psychological empowerment as a moderator in one of Social Security Agency in Indonesia. This research employed a quantitative approach with online survey method to 784 respondents which were determined by purposive sampling method. Respondents come from employees of the social security institution who already work at the institution for minimum three years. The results show that both explicit and implisit ethic institutionalization has a positive effect on organizational citizenship behavior, whereas organizational commitment act as a mediator, and psychological empowerment may moderate their positive linkages.

Keyword: Ethics Institutionalization, Organizational Commitment, Psychological Empowerment, Organizational Citizenship Behavior

Introduction

The social security institution, as one of public institutions engaged in the sector of social security, has prepared various arrangements to regulate its organization in supporting the fulfillment of services provided to the public. One of the guidelines produced is the institution's code of ethics which provides guidance for all employees and management to be professional and responsible of their tasks. On implementation, explicit codes of ethics clearly understood by institution members and can drive ethical behaviour implicitly by each individual. This was considered with reduction of violations rate during 2014-2017. Data of public complaints against institutions has also increased along with technological developments that can facilitate the delivery of information. Therefore, to improve excellent service to the community, management needs to direct its employees to be involved in organizational citizenship behavior.

Moreover, organizational citizenship behavior reflects those actions performed by employees that surpass the minimum role requirements expected by the organisation and that promote the welfare of co-workers, work groups, and/or the greater organisation (Jehad, Quoquad, Farzana, and Mohmad, 2011). Although there is no direct relationship between institutionalizational of ethics and organizational citizenship behavior, but with the increase in ethics behaviour as shown on the reduced rate of violation, can support the enhancement of organizational citizenship behavior through organizational commitment as mediator variable and accelerated by psychological empowerment as a moderator variable.

Literature Review

Organizational Citizenship Behavior

Term Organizational Citizenship Behavior (OCB) was first created by Bateman and Organ (1983), came from from Katz's research (1964), that studies innovative and spontaneous extra-role behaviors and distinguishes high or low performance of employees. According to Katz and Kahn (1978), OCB is an extra-role behavior concept which states that an effective organization must evoke innovative behavior. Podsakoff and MacKenzie (1994) explain that OCB is discretionary work-related behavior, it is not related to formal organizational reward systems, and promotes the effective function of organizations. Therefore OCB refers to individual behavior that benefits the organization but is not formally determined or valued by the organization. (Organ, Podsakoff, and MacKenzie, 2006). Bateman and Organ (1983) explains OCB has several dimensions, that is: Sportmanship means the desire of employees to tolerate discomfort in the work environment without complaining; Civic Virtue is the behavior of employees who have the responsibility to participate in the activity of surviving the company; and Helping is a combination of several other types of OCB such as Altruism, Courtesy, Peacekeeping, and Cheerleading which is the behavior of helping a coworker to solve a problem or to avoid a problem.

Institutionalization of Ethics

Organizational practice in engaging ethics in decision making process is called "institutionalization of ethics" (Singhapakdi and Vitell 2007). Organizations can increase the formalization of ethics in the form of a company code of ethics and ethical guidelines as a guidelines for employees, and can also make changes to the organizational structure by creating special positions for ethical management (Vitell and Singhapakdi 2008). Furthermore, Singhapakdi (2010) explains that Explicit Ethics Institutionalization (EE) refers to the codification of ethical behavior in terms of ethical codes, policy guidelines, orientation programs, and ethics committees. Whereas Implicit Ethics Institutionalization (IE) refers to a work climate in which ethical behavior is understood by employees as important in the formation and function of the company (Lee, Yu, Sirgy, Singhapakdi, and Lucianetti, 2018). According to previous research, EE has a significant effect on IE and not in reverse. There are several reasons, that is EE can provide clear understanding for employees about what is ethical and not in organizational environment and EE can also increase ethical sensitivity among employees to create an ethical climate as a form of IE (Lee, Yu, Sirgy, Singhapakdi, and Lucianetti, 2018).

Organizational Commitment

Jaworski and Kohli (1993) define Organizational Commitment (OC) as the behavior to know bounding of employee and organization also willingness to make personal sacrifices for the organization. According to Robbins (2003), an employee with OC will identify the goals of the organization, and wishes to maintain membership in the organization. OC is seen as employee loyalty to their organization (Muchinsky, 2007). Meyer and Allen (1991) state that OC is formed when employees and organizations foster greater interest in maintaining their work relationships. Commitment can be increased and utilized to support organizational goals if employees are allowed to participate in decision making (Salancik, 1977). Luthans (1995) explains that OC is defined as a strong desire for someone to become a member of an organization; the willingness to exert every effort for the organization; and trust and acceptance of the organization's values and goals. In other words, OC is an attitude that shows the "loyalty" of employees and the ongoing process of how members of the organization express their sympathy for organizational failure and success.

Psychological Empowerment

Psychological empowerment (PE) increases motivation of work that are manifested in four cognitions that reflect an individual's orientation to his work role, that is: Meaning, Competence, Self Determination, and Impact (Spreitzer, 1995). The concept of PE is rooted in theory Rappaport (1987)

which explains the mechanism for promoting employee contributions in an organization in order to meet their needs and defend their rights (Lee, 2001). The first dimension of PE, meaningfulness, refers to the value of an objective in relation to the standards of individuals who are intrinsically concerned about the tasks given (Thomas and Velthouse, 1990). Competence (or self-efficacy) is the extent to which a person can complete a task skillfully (Thomas and Velthouse, 1990). Self Determination connotes individual independence in initiating and continuing tasks (Spreitzer, 1995). The fourth dimension, Impact, refers to the influence individuals feel over important strategic, administrative, or operational outcomes (Liao, Toya, Lepaj, and Hong, 2009).

Research Model and Hypothesis Development

Effect of Explicit Ethics Institutionalization on Implicit Ethics Institutionalization

Institutionalization of ethics is considered capable of resolving ethical issues in an organizational environment (Gellerman, 1986; Murphy, 1989; Stevens, 1994) both explicitly and implicitly to assist management in decision making. Based on research conducted by Singhapakdi, Sirgy, Lee and Vitell, (2010) Explicit Ethics Institutionalization has a significant positive effect on Implicit Ethics Institutionalization, not the other way around.

H1: Explicit Ethics Institutionalization (EE) has a positive effect on Implicit Ethics Institutionalization (IE)

Effect of Explicit and Implicit Ethics Institutionalization on Organizational Commitment

Ethical elements such as fairness in the workplace, attention and concern for employees, trust in employees, and organizational reputation are factors in work that have the greatest influence on employee commitment to the organization (Ferrell, Fraedrich and L. Ferrel, 2002). Furthermore, according to Valentine and Barnett (2003) shows that someone in an organization who has strong ethical values can improve Organizational Commitment. Based on previous research conducted by Vitell and Singhapakdi (2008) and Lee, Yu, Sirgy, Singhapakdi, and Lucianetti (2018) stated that Explicit and Implicit Ethics Institutionalization had a positive relationship with Organizational Commitment.

H2: Explicit Ethics Institutionalization (EE) has a positive influence on Organizational Commitment (OC)

H3: Implicit Ethics Institutionalization (IE) has a positive influence on Organizational Commitment (OC)

Organizational Commitment on Organizational Citizenship Behavior

Organizational Commitment is related to employee motivation. Evidence reveals that employee involvement is observed by their extraordinary actions or behavior in the organization, such as their agreement to work after working hours (Caldwell, Chatman, and O'Reilly, 1990). Haigh and Pfau (2006) in their research found a significant positive relationship between Organizational Commitment and Organizational Citizenship. Consequently, the positive relationship between affective Organizational Commitment and Organizational Citizenship Behavior is a sensible relationship (Moorman, Niehoff and Organ, 1993; Organ and Ryan, 1995).

H4: Organizational Commitment (OC) has a positive influence on Organizational Citizenship Behavior (OCB)

Mediation of Organizational Commitment

There is no direct effect between institutionalization of ethics on organizational citizenship behavior. However, Maignan, Ferrel, and Hult (1999) found that proactive citizenship behavior where ethics for their responsibilities as part of an organization can increase the level of employee commitment to the company. And found a positive relationship between explicit ethics institutionalization and implicit ethics institutionalization with Organizational Commitment (Lee, Yu, Sirgy, Singhapakdi, and Lucianetti, 2018) and a positive relationship between Organizational Commitment and organizational citizenship behavior in Obedgiu and Bagire research (2017).

H5: Organizational Commitment (OC) mediates the positive influence of Explicit Ethics Institutionalization (EE) on Organizational Citizenship Behavior (OCB)

H6: Organizational Commitment (OC) mediates the positive influence of Implicit Ethics Institutionalization (IE) on Organizational Citizenship Behavior (OCB)

Moderation of Psychological Empowerment

Employees who are committed to the company will have organizational values that have been internalized in themselves, a sense of belonging, and are willing to invest their personal efforts for the organization, while Psychological Empowerment facilitates the realization of this willingness (Farzaneh, Farashah, and Kazemi, 2014). Empowered people are aware of the factors that affect the welfare of individuals and their organizations (interactional components), perceive a higher capacity of self, and are willing to exercise control over organizational problems. Psychological Empowerment strengthens employees who are committed to the organization to help others overcome their problems (behavioral component) (Zimmerman, 2000). Therefore, Psychological Empowerment is able to be the right construction to increase employee motivation in showing organizational citizenship behavior. Also, an individual with a greater level of Psychological Empowerment will be better suited to show a higher Organizational Commitment and will eventually be involved in organizational citizenship behavior (Farzaneh, Farashah, and Kazemi, 2014).

H7: Psychological Empowerment (PE) moderates the relationship between Organizational Commitment (OC) and Organizational Citizenship Behavior (OCB), where the higher the PE the relationship will be stronger and conversely the lower the PE the relationship will be weaker

Based on seven hypotheses above, the research model can be depicted as follows (see figure 1).

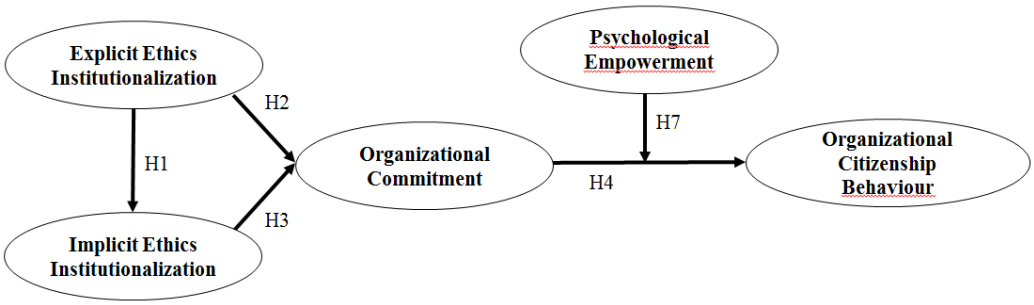

Figure 1: Research Model

Research Methodology

Procedure and Sample

The research sample come from employees of a Social Security Agency, who have already worked at the institution for a minimum three years tenure. Respondents were then given a questionnaire containing items about general information (gender, marital status, age groups, educational level, years of service, and job position) and observed variables.

Total of 784 questionnaire was successfully collected. This number has met Krejcie & Morgan requirements (1970), minimum samples 357 for Structural Equation Modeling (SEM). Related to SEM, data then analyzed using Confirmatory Factor Analysis (CFA) from Lisrel 8.7 program.

Measurement and Scales

This study uses a measuring instrument from previous literature that has been translated into Indonesian. All items in the questionnaire use 1-7 Likert scale (1 = strongly disagree; 7 = strongly agree). OCB was measured by three dimension (Helping, Civic Virtue, and Sportmanship) with 14 questions from Podsakoff and Mackenzie (1994). EE as an independent variable was measured by seven questions from Singhapakdi dan Vitell (2007). IE was measured by nine questions from Singhapakdi dan Vitell (2007). OC as a mediating variables was measured using seven questions from Jaworski dan Kohli (1993), while PE as a moderating variables was measured by four dimension (Meaning, Competence, Self Determination, and Impact) with 12 questions from Spreitzer (1995). In this study, the reliability test of each variable was measured using Cronbach's alpha. The minimum value of Cronbach Alpha (α) for each variable must be minimal 0.6 (Hair, Black, Babin and Anderson, 2014). Every variable has reached it, OCB (Helping dimension $\alpha = 0.936$; Civic Virtue dimension $\alpha = 0.830$; Sportsmanship dimension $\alpha = 0.818$), EE ($\alpha = 0.847$), IE ($\alpha = 0.856$), OC ($\alpha = 0.894$), and PE (Meaning dimension $\alpha = 0.873$; Competence dimension $\alpha = 0.971$; Self Determination dimension $\alpha = 0.881$; Impact dimension $\alpha = 0.763$).

Result and Discussion

Table 1 shows the demographic data of respondents in this study. Majority of employee return were male (59,1%), while the others were female (40,9%). Based on the marital status, most of them are married (76,8%) , 76,8% are single, and ever been married 2,0. Most of these employee returns were at age range 21-30 years (48,7%), while 22,8% were 31-40 years old, 21,0% were 41 to 50 years old, 7,3% were above 50 years old, and only 0,1% of them are 20 years and under. Based on the level of education, most of them are college graduates (77,9%) , 13,3% are magister graduates, 7,3% of them only diploma graduates and the senior high school graduates just 1,5%. Most of these employee returns were at years of service range 3-5 years (44,6%), then above 15 years of service (26,8%), while 20,8% were at range 6-10 years, and 7,8% were 11 tot 15 years. Based on the job position, most of them are staff (77.8%) , 13.3% are middle manager, 8.4% of them as a first manager and top manager just 0,5%.

Table 1: Demographic Data

Demography	Category	Summary	Percentage (%)
Gender	Men	463	59,1%
	Women	321	40,9%
Marital Status	Single	166	76,8%
	Married	602	76,8%
	Ever Been Married	16	2,0%
Age Groups	≤ 20	1	0,1%
	21-30	382	48,7%
	31-40	179	22,8%
	41-50	165	21,0%
	≥ 51	57	7,3%
Educational Level	Senior High School	12	1,5%
	Diploma	57	7,3%
	College	611	77,9%
	Magister	104	13,3%
Years of Service	3-5 years	350	44,6%
	6-10 years	163	20,8%
	11-15 years	61	7,8%
	≥ 16 years	210	26,8%
Job Position	Staff	610	77.8%
	First Manager	104	13.3%
	Middle Manager	66	8.4%
	Top Manager	4	0.5%

The research model should be analyzed by its Goodness of Fit Index (GOFI) to see a match between selected variables and data (Schermelleh-Engel, Moosburger, and Muller, 2008). We can see the criteria at table 2. Most of the criteria indicate that the research model is good fit, particularly for the RMSEA, which happens to meet the criteria. Therefore, the research model is assumed to be valid.

Table 2: Goodness of Fit Index

Criteria	Provision	Actual Value	Conclusion
RMSEA	≤ 0.08	0,069	Good Fit
GFI	≥ 0.90	0,89	Marginal Fit
NFI	≥ 0.90	0,97	Good Fit
NNFI	≥ 0.90	0,97	Good Fit
CFI	≥ 0.90	0,97	Good Fit
IFI	≥ 0.90	0,97	Good Fit

The following step was to check results of regression analysis, to examine the relation and significance between variables. Figure 2 shows the regression coefficient (β) and t-value between variables.

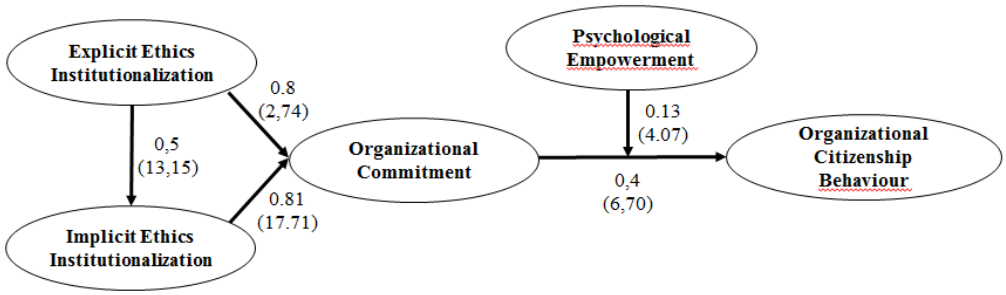

Figure 2: Regression Estimates of Model (with t-value)

The results of the analysis show that EE has a positive and significant effect on IE (β = 0.5, t-value = 13.15). So the first hypothesis (H1) is supported. This research also show that Institutionalization of Ethics both EE (β = 0.8, t-value = 2.74) and IE (β = 0.81, t-value = 17.71) has a positive and significant effect on OC. So the second hypothesis (H2) and third hypothesis (H3) are supported. Then OC has a positive and significant effect on OCB (β = 0.4, t-value = 6.7), accordingly fourth hypothesis (H4) is supported. Look at the mediating effects of OC between EE and OCB, direct effect (β = 0.08, t-value = 2.74) and indirect effect (β = 0.19, t-value = 5.86), so OC mediates the positive influence between variables, and H5 is accepted. Therefore, mediating effects of OC between IE and OCB, direct effect (β = 0.81, t-value = 17.71) and indirect effect (β = 0.32, t-value = 6.60), so OC mediates the positive influence between variables, and H6 is also accepted. And for the last hypothesis show that PE can moderates positive effect OC on OCB (β = 0.13, t-value = 4.07). So the seventh hypothesis (H7) is supported.

From the results of the statistical tests above, several things could be figured out. It can be concluded that the greater the ethical behavior formally expressed by the company will increase employee perceptions of ethical behavior that is implied and understood as very important. This is in accordance with Singhapakdi's research (2010) that explicit ethics institutionalization has a significant effect on implicit ethics institutionalization and not vice versa. In addition, the greater the ethical behavior formally expressed by the company will increase employees' perceptions of their attachment to the company and are willing to make personal sacrifices for the company. These results are in accordance with the research of Vitell and Singhapakdi (2008) where explicit ethics institutionalization has a positive effect on organizational commitment. Also the greater the ethical behavior that is implied and understood as very important by employees, will also increase the perception of employees' ties with the company so that employees are willing to make personal sacrifices for the company.

Likewise with the research of Lee, Yu, Sirgy, Singhapakdi, and Lucianetti (2018) who explained that implicit ethics institutionalization has a positive relationship with organizational commitment of employees in the company. The greater the ties of employees with companies where employees are willing to make personal sacrifices for the company will increase employee perceptions of relationships with discretionary work, that is not related to rewards given by the organization but do it voluntarily.

These results are in accordance with the study of Farzaneh, Farashah, and Kazemi (2014) who explained that organizational commitment positively influences organizational citizenship behavior. The magnitude of the influence of ethical behavior formally expressed by the company will increase employees' perceptions of their engagement with the company which then triggers employees to engage in discretionary behaviors. Likewise with the magnitude of the influence of ethical behavior that is implied and understood as very important by employees will increase employee perceptions of engagement with the company which then triggers employees to engage in discretionary behaviors.

Then the greater the increase in motivation for his work will increase employee perceptions of engagement with the company while triggering employees to engage in discretionary behaviors.

Conclusion and Recommendation

This study continues previous research on the institutionalization of ethics both explicitly and implicitly which has a positive effect on organizational commitment. But differently in this study is examining the effect of ethical institutionalization indirectly on organizational citizenship behavior. Issue of excellent service in organization is being intensified by business practitioners as well as at state institutions, for this reason development of organizational citizenship behavior is needed. This is caused the role of organizational citizenship behavior that is able to encourage employee productivity to be focus on increasing effectiveness and efficiency of the company. In this study, organizational commitment is proven to mediate the relationship between institutionalization of ethics and organizational citizenship behavior. Psychological empowerment has also been proven to accelerate the relationship between organizational commitment and citizenship behavior. This shows that employees of a state institution that has higher motivation for their work have stronger organizational citizenship behavior than those who are not motivated enough.

This study also has limitations that need to be developed in future studies. The first limitation is found several indicators on invalid variables. For this reason, a wider sample is needed to believe indicators for the variables used in previous studies are valid and reliable. Second, this research has been carried out in state-owned institutions with the results of all the hypotheses being fulfilled. So future research may conduct similar model of this research but in other sectors to find out whether the same hypothesis is also acceptable. Third, refer to the second point, cultural and organizational characteristics of the sample in the state institution can influence the study's findings. Future research should formally incorporate these variables as variables to control their effects. Finally, it is hoped that more research will be conducted in the future to replicate and build on this program of research.

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Entrepreneurial Intention And Usage Of Remittance In Influencing Entrepreneurial Behavior Among Indonesian Return Migrant

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Abstract

Indonesian Migrant Worker has created significant economic contributions to the country. They have potential role in creating entrepreneurship. This study would explore about how the entrepreneurial intention of the Indonesian Return Migrant were formed when they build a business. Moreover, the study wants to find how the entrepreneurial purpose and usage of remittance can influence the entrepreneurship behavior of Indonesian Return Migrant. Based on interview and focus group The study involved 34 Indonesian Return Migrants from three provinces that become the main sources of Indonesian Migrant Worker, namely East Java, Central Java, and West Java. We have found some relevant entrepreneurial intention factors, namely attitudes, subjective norms, perceived behavioral control, and educational factors. The remittance benefits earned by the Indonesian Return Migrant were used for investment, asset, saving, helping families, and making business. Moreover, it was found that entrepreneurship intention and remittance beneficial have a contribution in supporting entrepreneurship behavior of the Indonesian Return Migrant.

Keywords: entrepreneurship, entrepreneurial intention, remittance, return migrant

Introduction

The number of Indonesia's workforce (economically active) with an age range of more than 15 years and already employed, totaling 131,005,641 inhabitants (Badan Pusat Statistik, 2019). The population included in the Indonesian workforce is not only in the Republic of Indonesia territory but also in other countries. Those who work in other countries are called Indonesian Migrant Worker. According to data from The World Bank (2017), the total population of Indonesia abroad is around 4,247,814 people. The National Agency for the Protection and Placement of Indonesian Migrant Worker (BNP2TKI, 2019a), it is mentioned that Malaysia, Hong Kong, and Taiwan are the most popular destinations for sending Indonesian workers. The Indonesian Migrant Worker generally came from provinces on the island of Java, namely East Java, West Java, and Central Java.

The Indonesian Return Migrants are those who have returned from working abroad and settled in their home country. BNP2TKI stated that Indonesian Return Migrant has entrepreneurial potential. Therefore, BNP2TKI provided a development program for entrepreneurial development. BNP2TKI also encourages the Indonesian Return Migrant to improve the welfare of their families when they return to their home regions by doing creative business. Creative business results are also supported to be exported so that they can penetrate foreign markets with the provision of a network owned by return migrant workers. The export proceeds indirectly help the national economy (BNP2TKI, 2019b).

Entrepreneurship behavior is the process of creating value or adding value to something. This process involves a variety of unique resources that exist by bringing together various resources that are owned to be utilized. Utilization can be used in various business opportunities (Omisakin, Nakhid, Littrell, &

Verbitsky, 2016). Most Indonesian Return Migrants returned to their countries do not want to become workers again after returning. The returning also becomes the driving force for them to be entrepreneurs.

Indonesian Return Migrant has the experience, networking, and provision of abilities (skills). Marchetta (2012) stated that those who have worked as migrants have more experience to be able to open their jobs (become entrepreneurs). In theory, entrepreneurial intentions can influence a person in deciding whether to carry out an entrepreneurial activity or not. The entrepreneurial intention is defined as a conscious thought before taking action to start a new business. The role of entrepreneurial intentions is significant in encouraging someone to start a business (Moriano, Gorgievski, Laguna, Stephan, & Zarafshani, 2011). Stephens & Partridge (2011) stated that entrepreneurship and economic growth in disadvantaged areas carried out by residents of an area have positive implications for employment growth.

The amount of remittance beneficial between countries originating from Indonesian Return Migrant reaches hundreds of trillions every year. Bank Indonesia noted, during 2018, the number of remittance funds originating from Indonesian Return Migrant was around US$10.8 billion or around Rp151 trillion (CNN Indonesia, 2019). Almost 75% of the average use of Indonesian Migrant Worker's salaries is to be sent to their hometowns in Indonesia. Furthermore, as much as 15% of the average total of Indonesian Migrant Worker expenditure allocated to accommodate their daily needs while working. Meanwhile, only 10% of the total salary is used for personal savings (BNP2TKI, 2016).

Yuniarto (2018) mentioned that Indonesian Return Migrants tend to actively carry out entrepreneurial activities when they return to their hometown. Return migrants tended to become entrepreneurs after returning home than those who do not work as immigrants. The causal factor is that immigrants usually work in developed countries whose economic level is higher than the origin country (Démurger & Xu, 2011). Murphy (2000) added that the return migrant's role is very dynamic when they return because they bring new information to the local community and the enthusiasm to build new entrepreneurs. Furthermore, they also encourage broader development for their regions, not only in terms of the environment and infrastructure but also in building rural and urban industries for their regions.

The study attempts to analyze the use of remittance generated by Indonesian Return Migrants. Besides, the authors also explored related to the factors forming the entrepreneurial intentions of Indonesian Return Migrants when they were doing business in the home country. Furthermore, this study also wants to find out how entrepreneurial intentions and the use of remittance can encourage the growth of Indonesian Return Migrant entrepreneurial behavior. Indonesian Return Migrant respondents who were involved as data sources come from three provinces on Java; East Java, Central Java, and West Java. Based on data collected by BNP2TKI (2019c), the following provinces are the three provinces that send the most Indonesia migrant in the period of 2014 to 2018.

Literature Review

Return Migrant

The phenomenon of migrant workers is now something interesting to discuss. The state government considered these migrant workers to be potential investors. The investment was because the amount of remittance received by the state comes from migrant workers. The remittance was believed to be a more effective instrument for income redistribution, poverty reduction, and economic growth of the country compared to regional development programs carried out by the government (De Haas, 2010).

Indonesian Return Migrants are considered to have a positive influence on the development of the home country. Recent literature shows that migrant workers returning to their origin have a high preference for becoming entrepreneurs. Equipped with work experiences abroad, migrant workers returned to their home country with a series of results in the form of experienced human capital and financial capital for them to open a business. In China, return migrants had invested twice as much in

productive agriculture as those who are not migrants. The potential of return migrants also directed work mobility towards non-agriculture with an increase in post-migration skills and abilities. Those who return have a higher human social capacity to mobilize capital that leads to the opening of entrepreneurs (Démurger & Xu, 2011).

The return migrant workers had created many positive aspects of the economy. They have the role of promoting local economic growth. They also became one of the sources of business preservation in the home country. However, the return migrant workers also had a negative impact, including fostering an environment of fierce economic competition that led to social distrust, a high level of exclusivity of post-employment networks, and socio-economic inequality (Anwar & Chan, 2016).

Entrepreneurship

Entrepreneurship is the process of creating value by having together a variety of owned unique resources to take advantage of various business opportunities. In several studies, it had been proven that entrepreneurial strategies contribute significantly to entrepreneurial performance. Entrepreneurship is an essential factor for the company's strategic interests (Omisakin, Nakhid, Littrell, & Verbitsky, 2016). Entrepreneurship is the work of an organization. Entrepreneurs had the opportunity to organize something. Entrepreneurship encompasses the nature of an entrepreneur with a particular set of characteristics and traits (Gartner, 1988). Entrepreneurship is a positive term related to the company's business success. For example, entrepreneurship is related to innovation, proactive action, and risk-taking (Wiklund, 1999).

Entrepreneurial intentions are known as conscious thoughts that precede action and direct all attention in starting a new business. The process of forming intentions in creating a business is the first step that must be done. One model that is very influential in the process of building intentions is the theory of planned behavior (TPB) model. The TPB approach is a model that offers a coherent and generally applicable theoretical framework. This model predicts entrepreneurial intentions by calculating social factors, not just personal factors (Moriano, Gorgievski, Laguna, Stephan, dan Zarafshani, 2011). Intention can be derived from aspects of attitudes towards behavior, subjective norms, and perceived behavioral control. Attitudes toward behavior refer to the extent to which a person has an evaluation or assessment, which states that the behavior is good (beneficial) or not good (unprofitable) when implemented. Furthermore, subjective norms, which are considered as social factors, are related to perceived social pressure when doing or not doing a behavior. Then perceived behavioral control is associated with the ease or difficulty felt by someone in carrying out an action whose assumption reflects the past-experience and the obstacles that need to be anticipated when implemented (Ajzen, 1991). Besides, the role of education is an effective means of promoting and developing entrepreneurial intentions and entrepreneurial activities (Liñán, Rodríguez-Cohard, & Rueda-Cantuche, 2010). Another statement about entrepreneurship said that culture is closely related to entrepreneurial intentions. The culture here is linked with gender as a moderation between subjective norms and entrepreneurial intentions (Díaz-García dan Jiménez-Moreno, 2009).

Entrepreneurship has an essential role in job creation and economic development. Entrepreneurship education is correctly regarded as one of the principal instruments for fostering entrepreneurial behavior (Liñán, Rodríguez-Cohard, & Rueda-Cantuche, 2010). Entrepreneurship, in some literature, has an essential role in community development. The contribution of entrepreneurship to the community has an impact on the development of the economic sector (Omisakin, Nakhid, Littrell, & Verbitsky, 2016). Besides, another positive effect of increasing new entrepreneurs is the emergence of economic growth. Entrepreneurs are considered able to provide new jobs so that indirectly helps reduce the number of unemployed (Stephens & Partridge, 2011).

Remittances

Remittance has a role in the development of the home country. Leon-Ledesma & Piracha (2004) found that the short-term migration of residents of Eastern European countries to Western European countries affected the significance of the establishment of business ventures in the origin country. These funds, along with the funds brought by migrants after returning to their home countries, positively increase

the average production in the home country. Also, remittances have a substantial effect on increasing investment in the origin country. The use of remittance can be one source that can reduce poverty, equitable consumption, and household expenditure. Remittance can also reduce spending on education funds and health services. Remittance is commonly used for savings and investment (Naudé, Siegel, & Marchand, 2017). Remittance may be needed to build (or buy) a house in the origin country. Besides, remittance is also allocated to maintain assets (Carling, 2008). Some forms of remittance beneficial and investments made are to buy greenhouses, rototiller machines, walnut gardens, etc. (Piras, Vittuari, Möllers, and Herzfeld, 2018). In China, per capita income increases with remittances sent to the country by migrant workers. The use of funds specifically for entrepreneurial activities which primarily can increase income in the village (Démurger & Xu, 2011). The remittances are a source of opportunities for entrepreneurs with small and medium enterprises (Anwar & Chan, 2016).

Remittance is a significant source of opening a micro business in the home country. Remittances have a positive effect on the emergence of a business in the household sector. International remittances have significantly and positively contributed and been associated with business ownership. The flow of remittance to the origin country is one of the emergences of new companies, such as start-up firms (Naudé, Siegel, & Marchand, 2017). There is a significant effect on entrepreneurship opportunities for migrant workers returning to their home countries. This effect arises from overseas savings sent to the home country (remittance), which avoids liquidity funds and the length of service abroad. The existence of funds sent to the origin country by migrants was also found to be a factor influencing the high capital to open a business or new venture (McCormick & Wahba, 2001). In line with those statements, Ma (2002) found the positive impact of remittance on investment savings, which was one of the reasons for the economic empowerment of the home country. Remittances also flow to the level of entrepreneurship in the origin country. Entrepreneurial behaviors are becoming wide open with an increasingly significant flow of remittance to their home countries. Remittances also have an impact on capital mobilization, which is an essential aspect of regional entrepreneurial potential.

Methodology

The research design used in this study is qualitative. The research begins with assumptions, general views, and the use of a conceptual framework. This research also studies problems related to individuals or groups that are considered as social problems. This research method is also commonly used because researchers want to find something complicated, detailed understanding, and require exploration of a problem or issue deeply (Creswell, 2007).

This research chooses to use a case study approach in answering the problems. Case studies are empirical research that looks at complex contemporary phenomena in-depth and in real-life contexts (Yin, 2009). Stake (1995) said that there were several stages of analytical methods commonly used in case study research. First, categorical aggregation, namely the stages of grouping various data into categories and classes to find an understanding. In the second stage, direct interpretation is when researchers see data and directly provide an explanation from one perspective, without seeing other data. The interpretation is used to sort the data one by one, and later it will be put back together. The third stage is establishing a pattern and examining relationships between data in several categories. The purpose is to help researchers to see the differences and similarities of the cases studied. The last stage, researchers make a naturalistic generalization of the analyzed data, so that the case studies conducted can be concluded in the application of other cases (Creswell, 2007).

In this research, the respondents are the Indonesian Return Migrant, who has returned to their home country. These respondents came from 3 districts located in 3 provinces, namely Karawang district of West Java province, Kendal district of Central Java province, and Blitar district of East Java province. In each area, FGDs were carried out in each group of respondents with the composition of Karawang regency 12 respondents, Kendal regency nine respondents, and Blitar district 13 respondents. The total number of respondents involved in this study were 34 people, consist of 9 males and 25 females of Indonesian Return Migrant.

Most of the Indonesian Return Migrant respondents have already run their businesses. Before returning to Indonesia, all of the respondents used to work in different countries abroad. The origin countries abroad of respondents were South Korea, Saudi Arabia, Taiwan, Singapore, Hong Kong, Malaysia, Qatar, and Oman. The professions carried out by the Indonesian Return Migrant also varied. Most of them worked as domestic workers. Some worked as caretakers for children and the elderly, whereas the others are factory workers, ship and fisheries laborers, farming workers, and stone factories.

FGD data collection was conducted from March 26 to September 14, 2019. The guiding questions in conducting interviews and the FGD process in this study used the form of semi-standardized interview questions or what is called semi-structured interviews. Tod (2006) explained that the semi-structured interview process still uses guiding the discussion with predetermined topics. However, it is still possible to provide responses and unexpected problems by giving open questions to the interviewees (Ryan, Coughlan, & Cronin, 2009).

Several questions were asked in the FGD guidelines and interviews. The guiding points are accompanied by a description of what needs to be deepened at each point. In the FGD question, there are eight guideline points, including the reasons, activities, and experience of becoming an Indonesian Return Migrant; the use of remittance funds; entrepreneurial support; individual quality, and suggestion for return migrants. In the interview questions, there are six points raised, namely the reasons for becoming Indonesian Return Migrant, the use of remittance funds, goals, experience support and obstacles in starting a business, and suggestion for Indonesian Return Migrant.

Results and Discussion

The use of remittances beneficial

From the analysis conducted, the purpose of remittance at the Indonesian Return Migrant is very diverse. In general, the use of remittance is used to purchase assets, invest, be saved, help families, and support entrepreneurial activities. First, Indonesian Return Migrant uses remittance to buy assets. Assets become one of the priorities for Return migrant workers in using remittance. Land and houses are the options from most Return migrant workers to buy. For those who previously owned land, the remittance is used to repair the home. Other than that, for Return migrant workers who already had a house before they leave, the funds they got are used to improve the house. Furthermore, other assets that are targeted to be purchased by Return migrant workers are vehicles such as motorbikes and pick-up cars. These assets purchased is aimed to keep the remittance did not just run out. Carling (2008) explained that the house is the most common asset owned by migrant workers in their home country. Remittance may be needed to build (or buy) a house at their origin, and it is also used for further maintenance. Parinduri & Thangavelu (2008) showed that shipping money allows for an increasing income and value of assets. Assets purchased by migrant workers tend to be in the form of houses and jewelry.

> *I also buy a land and a house only, just a house and land. I buy a land first ... after the land, next, build a house.* (A12, Karawang, Female, 16 June 2019)
>
> *Yes, built a house* (B8, Blitar, Female, 20 July 2019)
>
> *Yes, I save the money right away, send it, use it to repair the house, and buy a vehicle* (B Together, Blitar, Male and Female, 20 July 2019)

The second use of remittance owned by the Indonesian Return Migrant is to invest. The investment made by Indonesian Return Migrant is based on the results of the previous analysis, which is to buy rice-fields to work on. Besides, when they do not have enough costs to buy, they tend to rent rice fields. In investment, the rice fields, Indonesian Return Migrant, also usually chose investments in livestock. Investment in cattle is the easiest and most common method of investment by Return migrant workers in the origin area. In line with Piras, Vittuari, Möllers, and Herzfeld's research (2018), which stated that

there are several choices for migrant workers to invest in the agricultural sector. Some options that become a trend are buying dairy cows, agricultural machinery, and agricultural land.

> *But I'm afraid if I lend it, the money will not return. Later, after the debt increases, he moved to another shop to borrow again. Nah, I'm afraid it will be like that, so the capital is useless. I better buy a rice field. If I buy a rice field, my enemy is only 'planthopper,' rat, but my rice-field is still there. Only the rice field income is reduced.* (B8, Blitar, Female, 20 July 2019)

> *Yes, if I have a job, then I'll do it. If I don't have it, I just have a goat in cattle so that my money will be growing, hehehe. If the goat has a lamb and it's already big, it can be sold so that it will make income for me* (A8, Karawang, Female, 16 June 2019)

Furthermore, some Return migrant workers use remittance to keep and saved. Some store it conventionally, but some of them keep it in the bank. The funds deposited are related to the long-term needs that will be used by Return migrant workers when they return to their home countries. Naudé, Siegel, & Marchand (2017) explained that remittance could be used for savings and investment. In many developing countries, the existence of remittance can be a solution to the shortage of venture capital and is invested through small and medium businesses. When the development of the financial sector is weak, the existence of remittance can be mean to strengthen a region's economic growth.

> *Some of it, I use to help my parents, the other I save myself. I have savings. Here at the bank, sir. The money was sent here sir..* (C4, Kendal, Male, 14 September 2019)

> *Yes, I have money saved. Yes of course* (A2, Karawang, Female, 16 June 2019)

The Indonesian Return Migrant also used the remittance to help families in their home countries. This factor is a motivation for them to send remittances. For them who are single when they work abroad, the funds tend to be used to help their extended families; including parents, siblings, and others. Démurger & Xu (2011) explained that remittance helps reduce the problem of rural poverty. People's income in the area increased because of remittance sent by one of the family members. Next, Naudé, Siegel, & Marchand (2017) explained that the remittance could be the source in reducing poverty, equaling the distribution of consumption and household expenditure in the origin area.

> *It is to help my parents because our economy is not as good as others, Sir. So I use it to help my parents. And others to fix the house. For the house, ya, and then helping my parents. After that, the main one is helping my sister in school.* (C2, Kendal, Female, 14 September 2019)

> *Sometimes I like to lend my money to others first* (A2, Karawang, Female, 16 June 2019)

> *For my son. Nothing for others. The money is mostly for children* (C5, Kendal, Female, 14 September 2019)

Finally, the remittances have contributed to support entrepreneurial behavior. Many Return migrant workers returned abroad and decided to open their businesses. The typical business to make is opening a shop or store. The other efforts they do after returning relate to the skills they got. Some Return migrant workers who have expertise on farms, tend to open businesses in the field. The other is creating a cake shop or mini restaurant relating to cooking skills. Ma (2002) found that remittances have an impact on capital mobilization, which is vital to strengthen regional entrepreneurial potential. Naudé, Siegel, & Marchand (2017) also explained that the flow of remittance to the origin country became one of the supports for the emergence of new companies and businesses. They mentioned that the international remittance has significantly and positively contributed and is associated with new business owners.

> *Sell vegetables.., sell vegetables..., selling vegetables from house to house. Well, instead of going to the rice fields, it's good to go to the market. Every day, walking around before dawn,*

> *I already departed. then I arrived home at nine in the morning.* (B8, Blitar, Female, 20 July 2019)

> *I am selling cakes, from house to house. I trade cakes from house to house.* (A2, Karawang, Female, 16 June 2019)

> *No, when I go home, I find out what business opportunities from my friends. There are many opportunities to raise quail. I finally joined, raising quails. Then I only sell the eggs. Just sell the eggs*. (B7, Blitar, Male, 20 July 2019)

> *That's all. after I am home, I got the idea. No, it's not an idea from my parents but mine. I buy a tool to climb the mountain. I rented these tools to my friends.* (C10, Kendal, Male, 14 September 2019)

The Establishment of the Entrepreneurial Intention

Based on the results, it is mentioned that Attitude, Subjective Norms, Perceived Behavioral Control, and Education played a role in the formation of Entrepreneurial Intention to the Indonesian Return Migrant. The findings of Attitude, Subjective Norms, and Perceived Behavioral Control in building entrepreneurial intentions have been discussed in many kinds of literature. Ajzen (1991) provided a general explanation related to the theory of planned behavior (TPB). He said that entrepreneurial intention influenced by Attitude, Subjective Norms, and Perceived Behavioral Control. Besides, Moriano, Gorgievski, Laguna, Stephan, and Zarafshani (2011) in their research stated that the formation of entrepreneurial intentions could be predicted by referring to the theory of planned behavior (TPB). Díaz-García and Jiménez-Moreno (2009) also mentioned in their research that attitudes towards entrepreneurship, subjective norms, and self-affirmation in entrepreneurship (entrepreneurial self-efficacy / perceived behavioral control) have a significant relationship to entrepreneurial intentions.

> *Yes, if I have a job, then I do it, if I don't have it, I just have a goat in cattle so that my money will be growing, hehehe... If the goat has a lamb and if it's already big, it can be sold, so it's income for me ...* (A8, Karawang, Female, 16 June 2019)

> *When I was there, I had work. So, if I'm home and there's no work, it doesn't feel right, I'm used to working. If I work, there will be income. If I am just at home, there will be no income, so I'm confused. *laugh*. If there is no income, it makes me feel hard.* (B8, Blitar, Female, 20 July 2019)

> *My neighbor. He said that I have good sales talent. It means, my neighbor gave me support to become an entrepreneur* (C2, Kendal, Female, 14 September 2019)

> *Because my deceased sister has a shop.* (A2, Karawang, Female, 16 June 2019)

> *I followed my husband. Then, it turns out that being in business is fun. Now I enjoy my work.* (C2, Kendal, Female, 14 September 2019)

> *Well, instead of going to the rice fields, it's better for the market*. (B8, Blitar, Female, 20 July 2019)

Education plays a role in the formation of entrepreneurial intentions. The intended education is in the form of specific skills training for Return migrant workers. From the analysis, when return migrant workers trained themselves with particular skills, they will build self-desire to do business (entrepreneurial intentions). The training can be accessed during migrants abroad or the skills they train when returning to Indonesia. Rodríguez-Cohard and Rueda-Cantuche (in Liñán's, 2010) have explained the factors that influence the level of entrepreneurial intentions, and one of the elements is

entrepreneurship education. This study showed that the role of education is an effective means of promoting and developing entrepreneurial intentions and entrepreneurial behavior.

> *From friends. I learned from friends, and then I continued to study in Indonesia. I am not yet skilled, but I am desperate ... Yes ... until finally there is a friend who invites. Let's learn to make kebabs ..* (C3, Kendal, Male, 14 September 2019)

> *There is a business idea. Catering business. When I was in Taiwan, there was often cooking training* (C11, Kendal, Female, 14 September 2019)

Entrepreneurial Intention and Remittance Beneficial that Supports the Entrepreneurship Behavior

In this discussion, it can be concluded that the entrepreneurial intentions of Indonesian Return Migrant and the use of remittance contribute to support entrepreneurial behavior after returning. It was explained that entrepreneurial intentions were a strong predictor of the entrepreneurial behavior of Indonesian Return Migrant. Moreover, the use of remittance also promotes entrepreneurship behavior carried out by Return migrant workers in the origin area.

Entrepreneurial intentions play a role in supporting the formation of entrepreneurial behavior of Return migrant workers. Entrepreneurial intention possessed by Indonesian Return Migrant can be seen from the business planning, entrepreneurial commitment, and the enthusiasm before starting a business. This entrepreneurial intention has an essential part in shaping the entrepreneurial behavior of Return migrant workers. These findings are supported by Moriano, Gorgievski, Laguna, Stephan, and Zarafshani (2011), who declared that entrepreneurial intentions are conscious thoughts that occur before a behavior and these thoughts direct someone to start a new business. The process of forming intentions (entrepreneurial intentions) in making an entrepreneurial activity is the first step that must be done. Referring to the theory of planned behavior (TPB), Ajzen (1991) stated that an intention is the only best predictor of behavior. The statement is in line with the entrepreneurial intention, which is considered as one of the most appropriate indicators in predicting entrepreneurial behavior. Krueger and Carsrud (1993), in their research, tried to apply the theory of planned behavior (TPB) in entrepreneurship. One of the findings in the study conducted is that entrepreneurial intentions can be used in measuring and predicting entrepreneurial behavior.

> *Yes, I thought about it. I have planned it before. I am already planning by myself. There is no influence from friends. I just want to have a business. I want to be an entrepreneur .. If it doesn't exist ..., initially his wife didn't want to. Finally, I have done it myself. I do my own business.* (C1, Kendal, Male, 14 September 2019)

> *Yes, before I left, there was a sewing job. The intention was to go abroad, opening convection, and it arrived there. I don't know. I already have money, why do you want to open a shop. Gitu. then I am not skilled in sewing. *laugh*. Heeh, Before going to work abroad, I already thought of finding capital for business. Well, so my parents used to be a trading company. I went along with parents, maybe it fits there. If I sew, it's just one or two jobs.* (B8, Blitar, Female, 20 July 2019)

> *I have do want to do business, but I don't know what kind of business ... It's like this ... yes, but one house sells kebabs. I learned from friends, and then I continued to study in Indonesia. I am not yet very skilled, but I am desperate. That's not it ... No, no. I study by myself. But there is no idea yet .. yes there is an intention ..* (C3, Kendal, Male, 14 September 2019)

The next results used to answer the research questions about the remittance of Return migrant workers in contributing the entrepreneurial behavior. Ma (2002) settled that remittance will have an impact on capital mobilization as an essential aspect of regional entrepreneurial potential. Démurger and Xu (2011) said that income per capita in China increased with remittances sent to the country by migrant workers. The usage of funds significantly escalates the entrepreneurial activities that cause income in the origin village. Leon-Ledesma & Piracha (2004) found that the short-term planning of Eastern European countries to Western European countries affected the establishment of business ventures in the origin country.

> *Because of my husband. My husband has five years of experience working at a cellphone counter. Yes, I used to work at a cellphone counter ... if my husband has the soul of a businessman. So, if he has some capital want to open a business, it will suit him. So, I ... Hehehe. So, I followed my husband. Oh, I just found out that entrepreneur people are fun.* (C2, Kendal, Female, 14 September 2019)

> *I use the funds to sell fried meals ... yeah ...* (A3, Karawang, Female, 16 June 2019)

> *Here it is. This is a big shop. Selling mobile credit too, I bought it there. He also opens a mini shop.* (B8, Blitar, Female, 20 July 2019)

Conclusion

The Indonesian Migrant Worker had economic potential with remittance while working abroad. With the remittance, Indonesian Return Migrant has the potential to open new businesses. The creation of new businesses was also a factor that encouraged the growth of the Indonesian economy.

In this study, Indonesian Return Migrants received remittance when they work abroad. The remittance was used for various needs by migrant workers. First, remittances are used to buy their assets in their hometowns, such as land, houses, and vehicles. Then, the remittances are used for investment by migrant workers. Forms of investment carried out, such as buying rice fields and livestock. This investment is typical for community investment in rural areas. Next, the remittance obtained is also used to help families in their hometowns. The family can be parents, siblings, spouses, and even children who are left behind when they work. Furthermore, the remittance is partly deposited by Indonesian Migrant Workers in the form of savings. These savings are used for their future needs. The remittance is also used by Indonesian Migrant Worker when they return to their hometown to open a new business.

This study also discusses the formation of entrepreneurial intentions in Indonesian Migrant Worker. The intention is formed from several factors, which are in line with the Theory of Planned Behavior by Ajzen (1991). The elements of entrepreneurial intentions that fit the theory are attitudes towards behavior, subjective norms, and perceived behavioral control. The other findings from this study are the education or training that found to be a factor building entrepreneurial intentions in Indonesian Return Migrant.

The final result of this study is that remittance and entrepreneurial intentions contribute to the formation of entrepreneurial behavior. The remittances gained by Indonesian Return Migrants are utilized as venture capital to open a business when returning to their origin country. The factor of entrepreneurial intentions is also a factor driving the formation of entrepreneurial behavior. In choosing a business, there are various businesses built by Indonesian Return Migrants, such as opening a shop, opening a food stall, opening a farming business, and selling food.

Based on the results of the study, it can be seen that there are several recommendations for BNP2TKI, who are responsible as Indonesian Migrant Worker processors. First, many factors can be the reason for the use of remittance funds among Indonesian Migrant Workers, either to improve their welfare, to

help families in general, or to seek capital (financial or experience) in building a business. Therefore, it is essential for Indonesian Return Migrant, Indonesian Migrant Worker, or prospective migrant workers who will go abroad to be equipped with financial management skills for them. BNP2TKI has a role in providing these provisions and abilities before the Indonesian Migrant Worker departs for overseas migration.

Furthermore, it is known that one of the factors forming entrepreneurial intentions is training related to specific skills acquired by Indonesian Return Migrant. In developing entrepreneurship, the Indonesian Return Migrant, the government, specifically BNP2TKI, needs to make a severe effort of providing skills training for Indonesian Migrant Workers and Indonesian Return Migrants. The training provided is not only for Indonesian Return Migrant but also for Indonesian Migrant Worker families who will go abroad. It is related to the remittance funds that will be received by Indonesian Migrant Worker families in the origin country so that the funds received can be used as business capital later. A series of training for both Indonesian Return Migrant and Indonesian Migrant Worker families also aims to enable entrepreneurial intentions to emerge, which in turn will encourage entrepreneurial behavior.

The final impact of the results of this study is that there are contributions from remittance funds in the formation of entrepreneurial behavior. In this context, financial capital owned by Indonesian Return Migrants can be a driver for forming new businesses when they are home. The government, in this case, BNP2TKI, can provide a variety of tangible support for entrepreneurial activities carried out by Indonesian Return Migrant. The support provided can be in the form of convenience in providing entrepreneurship training, the creation of business groups for Indonesian Return Migrant, explaining the potential for business development in the origin country of Indonesian Return Migrant, and also assistance in terms of additional business capital. These supports are very influential for Indonesian Return Migrants, whose purpose is to develop the business they have built.

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The Role of Social Remittance in Supporting Entrepreneurship of Indonesian Return Migrant Workers

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Abstract

Indonesian return migrant workers are expected to have a great potential to be developed as entrepreneur. Their social remittance can be leveraged in entrepreneurship activities when returning home to stimulate economic growth. The purpose of this study is to examine how the Indonesian return migrant workers use the social remittances gained during migrating abroad to develop their entrepreneurship activities after returning to their hometown. The study was conducted using a qualitative approach and applying interviews and focus group discussion (FGD) methods for the Indonesian return migrant workers in Blitar (East Java), Kendal (Central Java), and Karawang (West Java) regions, which were major sources of the Indonesian migrant workers. The results show that the social remittances brought by migrant workers to their home region have played a role in encouraging the entrepreneurship of Indonesian return migrant workers. The results of the study can be used as alternative consideration to policy makers in making development policy and programs for Indonesian migrant workers, especially those who have returned to Indonesia.

Keywords: Entrepreneurship, Social Remittance, Return Migrant Worker

Introduction

The sending of workers abroad is one of the strategies undertaken by the Indonesian government to overcome the problem of unemployment and limited domestic job opportunities. The number of Indonesian migrant workers and the amount of remittances always show a trend of rising incomes every year (BNP2TKI, 2019). The large number also shows how significant the role of Indonesian migration workers as a substantial contributor to increasing foreign exchange for the country. In addition to the large number of Indonesians who migrate abroad to work; on the other hand, many Indonesian migrant workers have completed their work contracts abroad and returned to their home regions. Researches explain that remittances from abroad are one of the important factors that help economic growth and have a significant effect on poverty alleviation in a country (Azam, Haseeb and Samsudin, 2016). The combination of financial and social remittance of migrant workers is a valuable asset for economic reintegration of the return migrants (Yuniarto, 2018). Indonesian migrant workers mostly come from rural areas which concentrated in several regions. Based on data from BNP2TKI (2019), the majority of Indonesian migrant workers come from the provinces of East Java, Central Java, and West Java.

Return migrant workers have great potential to be developed (Adams, Richard H. and Cuecuecha, 2010; World Bank, 2017; Pauli and Osowska, 2018). Migrant workers provide financial remittances which can be invested in economic activities when returning to their home regions to stimulate economic growth through their entrepreneurial activities (Spitzer, 2016). In addition to financial remittances, return migrant workers also bring home additional knowledge, skills, experiences, norms and values, and social capital gained while working abroad (Grabowska, Garaphic, Jazwinska, & Radziwinowiczowna, 2017; Levitt & Lamba-nieves, 2011; Peth & Sakdapolrak, 2019). These non-

financial transfers were defined by Levitt (1998) as social remittances or the diffusion of ideas, norms, values, practices, and social capital to the origin country. Benefitting from the financial remittances and social remittance while they work abroad, return migrant workers are expected to be self-employed or to enter the field of entrepreneurship after returned to their home region.

Researches on the entrepreneurial potential of migrant workers still evolve. Most studies for Indonesian migrant workers relating to entrepreneurship discuss about the allocation and management of remittances and the role of financial remittances in the economic perspective(Adams, Richard H. and Cuecuecha, 2010; Anwar, 2013; Primawati, 2017; Mas'udah, 2019). While there are still little discussions on how social remittances affect the entrepreneurship of migrant workers or about experiences gained by migrant workers that are useful to be applied in Indonesia. Therefore, we conduct this research to answer this gap. In addition, the results of previous studies are still inconclusive, so further research is needed to explore how the forms of social remittances obtained by migrant workers and their effects on entrepreneurship. This research will present descriptive data on how social remittance (such as ideas, values, skills, knowledge, or experience) can support the entrepreneurship of Indonesian migrant workers.

Literature Review

Entrepreneurship

Entrepreneurship is firstly mentioned in the early 18th century by a French theorist. Richard Cantillon (1755, in Bjuggren, Johansson and Stenkula, 2012) defined entrepreneurship as self-employment of any sort, referring to a risk-taking person who bought goods for a certain price and sold them for an uncertain price in the future for an expected profit. Since Cantillon, several economists tried to develop a theory about entrepreneurship. The most popular view of the entrepreneur in economics has been developed by Joseph A. Schumpeter in the 20th century. According to Schumpeter, an entrepreneur does not always mean a trader or manager but also a unique person who has the courage to take risks and introduce innovative products and new technology into the economy (Suryana, 2013). For Schumpeter, the entrepreneur is the individual carrying out new combinations, introducing new products or processes, identifying new export markets or sources of supply, even creating new types of organization (Olim, Mota and Silva, 2015). In accordance with its development, the concept of entrepreneurship has special characteristics, such as having the ability to create something new and different (creativity and innovation), organizing, taking risks, results-oriented, always creating opportunities, personal satisfaction, and independent.

Another definition by Hisrich, Peters and Shepherd (2017), entrepreneurship is the dynamic process of creating additional wealth by individuals who dare to take major risks with the conditions of reasonableness, time, and career commitment or the provision of added value for goods and services. These products and services do not have to be new or unique, but they must, however, be established by entrepreneurs by accepting and putting skills and resource needs (Hisrich, Peters and Shepherd, 2017).

In empirical research the rate of entrepreneurship is commonly estimated using the self-employment rate or other measures of small business activity (Henrekson and Sanandaji, 2013). However, many of the self-employed are not entrepreneurial in the Schumpeterian sense, especially when they do not bring a new innovation to the market and do not plan to grow their business. Piracha & Vadean (2010) try to distinguished self-employment as either own account workers and entrepreneurs and compare their differences in Albanian migrant workers. This difference is important because self-account workers tend to have a weaker direct effect on employment (and hence growth) compared to entrepreneurship. If this also applies to migrant workers returning to their home regions, then their economic impact on the household economy will be weaker than expected (Piracha & Vadean, 2010). Despite decades of academic research, Schumpeterian entrepreneurship remains a subtle concept, difficult to define exactly and harder yet to measure (Henrekson and Sanandaji, 2013).

Migrant Workers Entrepreneurship

Some previous studies related to the relationship between migrant workers returning to their countries of origin and entrepreneurship gave several results that tended to be the opposite. An argument that supports migrant worker entrepreneurship is the opinion of Neville, Orser, Riding, and Jung (2014) who believe that a migrant worker will tend to be less risk-averse, or not refuse to take risks, this is illustrated by the actions of those who dare to go abroad alone to try their luck as migrant workers. Migrants are also seen to be able to see business opportunities as they have previously been able to see opportunities to work abroad (Hart and Acs, 2011)

Pauli and Osowska (2018) point to the important role of migration in the decision to start a business because almost half of the respondents surveyed formulated business ideas during migration. Capital gains that influence the development of entrepreneurial potential are mostly observed in terms of financial and human capital, with relational capital only applied to business ideas. Human capital is important because it is the assets that individuals acquired through their investment in schooling, on the job, and in other kinds of experiences (Rauch and Rijsdijk 2013). Migrant workers learn new things while abroad, in addition to collecting savings and building foreign relations, which can also make it easier to start a new business after returning to their home country (Marchetta, 2012).

On the other hand, other studies explain that a migrant worker should not be seen as a super-entrepreneur because not all migrants tend to be more entrepreneurial than non-migrants (Naudé, Siegel, & Marchand, 2017). When leaving abroad, most of migrant workers are low-skilled, low-educated, and they generally departed to become a migrant worker only to meet the needs of domestic workers or other work in the destination country (Busro, 2017). Return migration leads to self-employment not because of financial and human capital acquired abroad but because of barriers in the local labor market, which might limit return migrants' access to salaried employment (Levy, 2008). This can explain why migrant workers are not interested in entrepreneurship after returned. There are two conditions needed to maximize entrepreneurship and resource opportunities of migrant workers returning to their home countries to be successful, including: (1) conditions relating to how a former migrant worker can obtain and apply the knowledge that they gained during the migration process and learn to apply it when returning to their country of origin, (2) a return migrant worker needs to develop capabilities and adaptation strategies to maintain his economy after returning to their village or region of origin (Yuniarto, 2018).

Recent entrepreneurial research on Indonesian migrant workers discusses the relationship between return migrant worker and their economic reintegrating strategy. Most recent research discusses how the financial remittances sent by migrant workers significantly affect the lifestyle of their families in the area (Mas'udah, 2019). Yuniarto (2018), in his research, concluded that the combination of financial support and knowledge into entrepreneurship is a valuable asset in the economic reintegration efforts of return migrant workers in their home villages.

Social Remittance

Levitt (2001) introduced the concept of social remittances, which is defined as the ideas, behaviors, identities and social capital that flow from receiving to sending-country communities. Previous research also explained social remittances as a term for non-financial assets that obtained as a result of overseas migration and then transferred back to others in the area of origin (Levitt, 1998). This because migrant workers can interact more with the people in the destination country and learn more quickly and effectively and are better able to reflect on their application than those who merely observe. Within the scope of migration theory, de Haas (2010) explains that social remittance is a feedback process in migration system theory. In the same study, it mentions that social remittances are contextual and commonly referred to as forms of cultural change that are driven by migration. Migration through confrontation with other norms and habits can influence the formation of identities, norms, values, and behavior in the area of origin of migrant workers, mainly when migration is associated with social and material success (de Haas, 2010).

Levitt & Lamba-nieves (2011) emphasize how migrant workers' experience before going abroad, and the ideas and practices they bring will affect the type of remittance they send back. Social remittance is cultural and social, which circulates continuously and repeatedly, rather than moving in one direction. Besides, the study also shows how social remittances from previously influential in the household sphere, but it can also extend to regional and national and impact on other habits. Levitt (1998) categorised them into three domains: (1) normative structures (ideas, values, beliefs that include norms of behaviour, the notion of family responsibility, principles of neighbourliness, community participation, aspiration for social mobility); (2) systems of practices (actions shaped by normative structures such as organisational practices: recruiting and socialising new members, goal setting and strategising, establishing leadership roles, and forming interagency ties; including how individuals delegate household tasks and how much they participate in political, religious and civic groups (acts, actions, rituals); (3) social capital based on values and norms which form the resource for collective actions and facilitates the circulations of norms and values.

The mechanism for transmitting social remittances differs from the type of spread of global culture in several ways (Levitt, 1998). Grabowska, Garaphic, Jazwinska, & Radziwinowiczowna (2017) once tried to explain the concept of stages and models of the social remittance transfer process by identifying the main stages of the social remittance transfer process (i.e., acquisition, transfer, and impact) and other related modalities (such as resistance, imitation, and innovation). Furthermore, Peth & Sakdapolrak (2019) try to improve by distinguishing social remittances into intangible social remittances and integrated social remittances (incorporated social remittances). First, intangible social remittances which include information, the reflection of norms and values, differences in perspective, ways of doing things, and generally new ideas. Second, there are more tangible and incorporated social remittances, such as new skills and knowledge to be transferred and used when migrants return to their home regions or migrate again to a place where they can practice their skills and knowledge. The process of acquisition and transfer of social remittances is closely related to migration activities Peth & Sakdapolrak (2019). In the process of transferring social remittances, there are particular prerequisites or conditions (for example, social closeness during migration) that apply and obstacles to overcome.

In the context of Indonesian migrant workers and entrepreneurship, several studies have discussed entrepreneurship among Indonesian migrant workers who have returned to their home regions. However, most studies are focused more on the management side of migrant workers' financial remittances and the role of these remittances from the perspective of economic development (Mas'udah, 2019; Spitzer, 2016). Another study found that workers from Java who migrated to South Korea had several positive effects on their attitudes, such as discipline, diligent, and hardworking. These social remittances are useful for various purposes, including production, consumption, and economic investment (Anwar, 2013). Other studies use the term knowledge remittance as a more specific form of Levitt's (1998) approach to social remittance, and try to see its effect on self-employment career choices in migrant workers in Indonesia (Supriyanto, 2017).

Methodology

Qualitative approach is conducted to give a better understanding of how social remittances play a role in supporting Indonesian return migrant workers' entrepreneurship. Qualitative research is designed to tell researchers how (process) and why (meaning) things can occur (Cooper and Schindler, 2014). The qualitative method in this study was to obtain an overview and information of data in more depth with a thematic approach. A thematic approach is a method for identifying, analyzing, and reporting themes that are patterned in a phenomenon (Boyatzis, 1998). This method can provide a detailed description of the research theme. The thematic approach is one of the methods used in processing qualitative information.

Data collection methods used were group discussion forums (FGD) and interviews. FGD respondents in this study were migrant workers who had returned to their home regions, namely Karawang, Kendal, and Blitar. The three regions are located in top three provinces in Indonesia (East Java, Central Java,

and West Java) which contribute highest number of Indonesian migrant workers. In the process of selecting respondents, we used a purposive sampling technique. Purposive sampling is one of the most common sampling strategies for selecting groups of participants according to previously selected criteria that are relevant to particular research questions (Wahyuni, 2015). Respondents' backgrounds are return migrant workers who both have a business and who do not have a business. In each FGD group, there were 9 to 13 respondent participants who were female and male. The respondents have worked in different countries for at least two years. Moreover, to gain a deeper understanding related to the entrepreneurship of migrant workers, this study conducted interviews with three expert respondents in the field of entrepreneurship. The three respondents comprised Head of the Center of Small and Medium Enterprises (SME) of the University of Indonesia, a lecturer of the Faculty of Economics and Business (FEB UI) who teaches entrepreneur class, and a marketing expert who earned a doctorate degree in marketing.

This research uses one software program to assist in sorting and organizing data. QDAS (Qualitative Data Analysis Software) is a software or computer program to help the process of qualitative research analysis. The software can enable researchers to work efficiently with complex coding schemes and large amounts of text, facilitating depth and sophistication of analysis (King, 2004). According to Creswell & Poth (2018), computer programs are most helpful in research with extensive data - such as more than 500 pages - although it can also provide more value with less data. The data in this study were in the form of transcripts from 3 FGD groups, with a total of 154 pages and seven interview transcripts with a total of 192 pages. Although it does not reach 500 pages, the use of a computer program is sufficient to be used and can provide additional findings which not found through manual analysis. Data processing techniques in this research used NVIVO 10 software. The analysis technique in this study is based on the results of the reduction (coding) and data presentation, which is carried out both manually and the results of data processing using NVIVO 10 software. NVIVO 10 provides a unique advantage for creating a data category indexing system called a "node." We use NVIVO 10 software to make it easy to analyze the results of interviews, FGDs, and literature studies in sections or sub-sections related to analyse the entrepreneurial potential of migrant workers.

Validity and Reliability

Several studies have tried to establish methods for the validity and reliability of qualitative studies. Researchers can choose a validation technique that is preferred but uses several, or at least two validation strategies (Creswell & Poth, 2018). Validity in qualitative is an attempt to examine the accuracy of research results by applying particular procedures (Creswell, 2016). In this study, there are several strategies to validate the research process. The first is triangulation, which is a process that involves corroborating evidence from various sources to explain a theme or perspective (Creswell & Poth, 2018). This research involved several researchers in the process of data collection and FGD (researcher triangulation) collected from three different districts namely Blitar, Kendal, and Karawang (location triangulation), as well as two data collection methods, namely Focus Group Discussion and interviews with return migrant workers (triangulation method). The researchers have also interviewed four respondents from return migrant workers as a form of triangulation of methods. We interviewed respondents with some open questions to produce in-depth answers interspersed with closed questions to get specific and precise information. Another strategy to support the validity of qualitative research results is to make detailed and concise descriptions (Cresswell, 2016).

Reliability refers to how far the results of this study can be replicated (Merriam and Tisdell, 2016), in terms of how the results of the study will be consistent based on data collected in the study. According to Merriam and Tisdell (2016), to ensure reliability, researchers must describe in detail how the research was conducted and how the data was analyzed. In this study, the authors describe in detail systematic research and data analysis methods in the research methodology chapter. Creswell (2014) states that qualitative researchers need to document case study procedures and as many steps as possible in those procedures. Therefore, Wahyuni (2015) advises researchers to make study protocols, or guidelines, as a tool to ensure that there is consistent treatment throughout data collection and analysis. This study developed an FGD protocol to guide the research team. The researchers has also compiled a simple codebook that contained explanations of the categories in the study to help coding in this thematic

analysis remain consistent throughout the analysis process. Codebooks are useful for maximizing coherence between codes or categorization in research (Cresswell, 2016).

Results and Discussion

Based on interview with three expert respondents in the field of entrepreneurship, data analysis was carried out, including the use of NVivo 10 for coding. The process has created several nodes classified into internal factors and external factors that support entrepreneurship. The internal factors consist of effectiveness, risk profile, cognitive adaptability, affordable loss, risk profile, proactive personality, learning from failure, self-efficacy, innovative and creative, structural thinking, opportunity oriented, capital, growth-minded, and complacent nature. As external factors comprised access to information and communication and crisis effect (see figure 1).

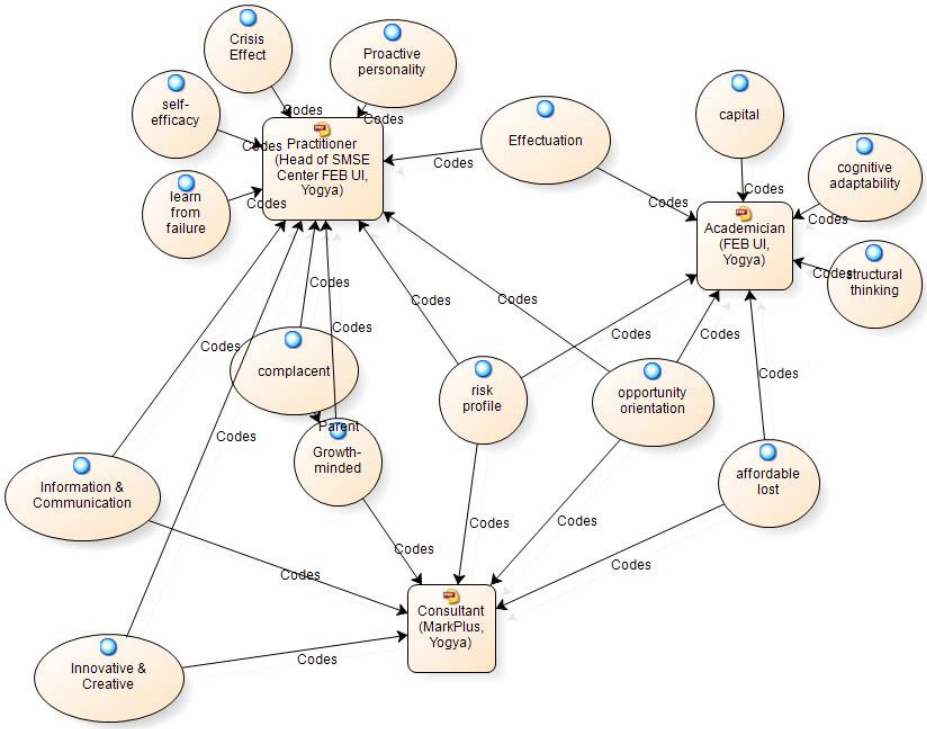

Fig. 1 : Node Mapping Determinant Factors of Entrepreneurship

Of the three respondents interviewed, all of them have provided similar opinions that risk profile and opportunity orientation have a role in supporting entrepreneurship. Entrepreneurial activity involves, by definition, taking risks of some type (Fernandes *et al.*, 2018). According to Kuratko (2016), a successful entrepreneurs are a very calculated risk taking. Opportunity orientation is the nature of someone who is always observant in seeing opportunities that exist. This also supports the opinion of Stoner (1997, in Rusdiana, 2018), which states that an entrepreneur is aware of opportunities that are not seen or ignored by other business executives. Opportunity orientation is a constant awareness of the opportunities that exist in everyday life, where a successful entrepreneur starts from an opportunity and lets their understanding lead to other important issues (Kuratko, 2016).

Neville, Orser, Riding, and Jung (2014) argue that a migrant worker may be less risk-averse, as is evident in their decision to migrate which is also a risky activity. Also, Hart and Acs (2011) argue that migrants can see business opportunities as they have previously been able to see opportunities for migration. However, based on the results of the FGD, it shows that not all return migrant workers have

a preference or a tendency to take risks and be keen to see opportunities. Some migrant workers have succeeded in developing their business by borrowing money, or they have succeeded in seeing opportunities in their area. However, there were return migrant workers who were hesitant to open a business and decide to become a farmer, as it has lower risk.

From FGD we found that one of the reasons for return migrant workers to set up a business is economic pressure (crisis effect). This is also in accordance with the findings of the interview by one expert that the crisis effect is also one of the drivers for entrepreneurship. However, the results of the interview also found that the criteria for entrepreneurial success can be seen from how their business developed and how they funded the business, whether from investment or own capital. We found that most return migrant entails the creation of microenterprise and are closer to self-employment with necessity entrepreneurship (individuals who choose to pursue entrepreneurial careers given lack of other employment opportunities) instead of based entrepreneurship (defined as entrepreneurial activities involving a pursuit of a perceived business opportunity even when other employment options are present) (Zheng and Musteen, 2018). Respondents have lower affordable lost and hesitate to take the risk of borrowing money from bank or saving and loan cooperatives to develop their businesses. In addition, the crisis effect prevented the respondents to develop because they feel satisfied as long as their business survives.

> *I am afraid of being in debt. Uh huh (in debt). Yes, I prefer to start a small business as long as it is from my own money. If we take it in the saving and loan cooperative, we will be at risk. We should leave guarantees. Also we are still new to this business. It's good if we are optimist that we can. If not, then I don't know how we should pay the saving and loan cooperative later.* (Respondent E, Return migrant worker, FGD in Kendal, September 14, 2019)

> *As long as we can finance our daily needs, that's enough. The important thing is to eat for every day. Although it is difficult to collect a lot of money, but thank God we can still survive. That is it.* (Respondent K, Return migrant worker, FGD in Kendal, September 14, 2019)

Nevertheless, there are also return migrant workers who have successfully expanded their businesses. This return migrant workers were also previously had several other businesses before developing his current business, but was unsuccessful because the product was less attractive to consumers. These return migrant worker learned from previous failures and sees other opportunities by utilizing existing resources.

> *Previously I tried selling seaweed crackers, that time I got coached by the government, the office of fisheries and marine, which was in Depok. But in the past the demand was limited and it is not successful.... So I now have changed to sell lemon syrup. Thanks God, it worked. From the first time selling seaweed, I've borrowed money from a financial institution. For seaweed crackers I have borrowed 5 million rupiahs. The second time, I have borrowed 15 million rupiahs. Just yesterday I borrowed 100 million rupiahs for lemon syrup business ... because I'm considering its developments too.* (Respondent S, Return migrant worker, Interview, Jakarta, May 24, 2019)

Some reasons for respondents to open a business are because of crisis effect, influenced by the surrounding environment, and seeing opportunities in the home region. The influence of the surrounding environment is in the form of influence because of seeing the example of a neighbor who has successfully opened a business, or because of growing from a family environment that is also an entrepreneur. This crisis effect arises because of their economic pressures to survive. This characteristic of entrepreneurial activities are also called as necessity entrepreneurs where individuals tend to start new business because of lack of other employment opportunities and as "last resort" of individuals to make a living (Zheng and Musteen, 2018).

> *Because I don't know what else to do. The money was used to build a house but then it turned out that I was cheated by my husband and everything just disappeared. I ran out of money,*

> *finally my house was sold to be used as capital to open a business.* (Respondent G, Return migrant worker, FGD in Blitar, July 20, 2019*)*

> *I was interested in selling groceries.. In my village it was very rare, there were only three groceries stores in one village.* (Respondent G, Return migrant worker, FGD in Kendal, September 14, 2019)

Besides, some migrant workers choose to become own-account workers or ordinary housewives instead of opening a business. The types of own-account workers (Piracha and Vadean, 2010) found here are farming or freelance. From FGD, we also found several reasons why the return migrant worker was reluctant to open a business. Also, some migrant workers have previously tried to open a business but were unsuccessful. The lack of capital is one of the factors that makes migrant workers not willing to open businesses. In spite of relatively big amount of salary when working abroad, usually the money is used up to finance the daily needs of the family, repair the house, or buy land, rather than to buy productive assets. Besides, the problem of competition is also the reason why respondents do not open businesses. Respondents assured that before leaving for migrant workers abroad, they saw the possibility to open a business in their area, but when they returned home, the area was entirely developed, so they did not know what business they wanted. This can happen because they cannot see other opportunities to open a business, so they doubt if they can succeed in setting up a business.

In addition to financial capital problems and fear of competition, the inability to manage finances is also an obstacle faced by respondents. The inability of migrant workers to manage their finances after arriving in Indonesia also causes the money to run out quickly. This is influenced by the bad habits in their home regions (usually people in rural area) to defer the payment. Some have even tried to open a business but eventually went bankrupt because they were unable to manage finances because many neighbors set back the payment. Then this story becomes an example for other return migrant workers, so there is a fear and anxiety of not being able to manage finances when opening a business.

Social remittances brought back to home countries can take the form of ideas, behavior, identity, or social capital, such as skills, knowledge, experience, and innovation (Levitt, 1998; Peth & Sakdapolrak, 2019). Some forms of social remittances found in respondents of Indonesian return migrant workers is explained (see figure 2).

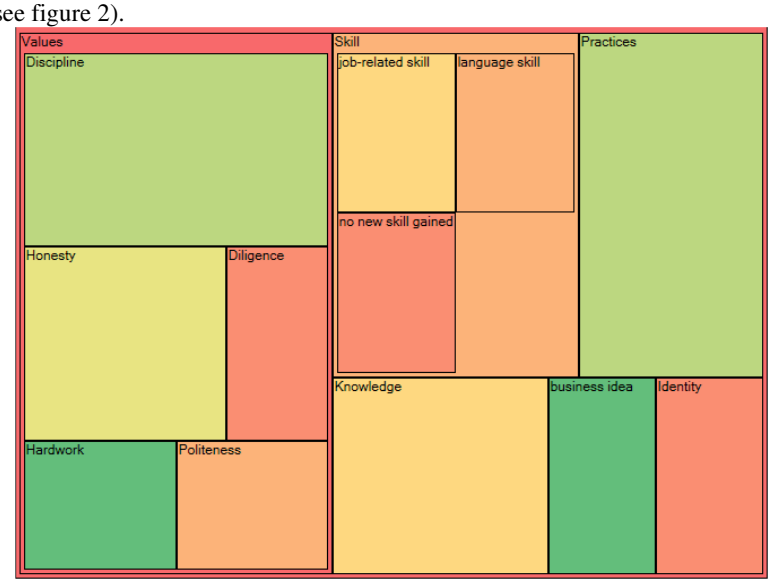

Fig. 2: Tree Map of Respondents' Social Remittance

Based on the data obtained, the return migrant workers gain the ability to interact with others while working abroad. Migrant workers learn how to communicate in place with new cultural settings. At

least from working abroad, migrant workers acquire language skills by learning a new language. Some of these migrant workers have also been provided with language courses before migration, although some have not. However, when working in other countries, even though they do not yet master the language in the country, migrant workers are forced to learn and understand the language used in that country so that they can interact and communicate in doing their work.

> *I can speak Mandarin ... because I worked there I think I can automatically speak the language ... I came back from abroad last 2014, right. But because I think it's been quite a long time there so I'm used to Mandarin or Cantonese now. Sometimes during Eid and there are family gatherings, I unconsciously speak in Mandarin with my sister who was a migrant worker also.* (Respondent Y, Return migrant worker, Interview, Banyumas, June 4, 2019)

In addition, the experience of migrating can also help migrant workers to be more flexible in adapting to environmental changes. New skills can be obtained by changing employers, because it can familiarize someone with changes in style and way of work desired by the employer. Job changes during migration abroad can also introduce migrant workers to a new and different management style or work culture.

> *I think I tried everything. Five years working abroad. I have worked in building construction, then three years in a factory, then one year and a half in fishing.* (Respondent L, Return migrant worker, Interview, Kendal, September 14, 2019)

At the time of data collection, we asked respondents of return migrant workers to explain their experience or things that they think valuable in building business. Then return migrant workers discuss about some of the values or attributes that are most remembered. They considered that honesty, discipline, and hard-work are most useful to be re-applied after returning to Indonesia. Even though these characteristics are common and can be found everywhere, return migrant workers practice these attributes in their daily lives while working abroad because they are valued more and become a high value in their workplace environment.

> *I think it is honesty. Because in the country where I used to work, honesty is very important. Looks like honesty is a priority there. In my experience, when I first started working there, the employer tested me. For example. When washing clothes, in his pocket I found some money. Starting from a few coins, then the next day I found more money slipped in his pocket. I thought he has put it deliberately to asses my honesty. Besides that, how hard-working we are at work was also highly considered by my employer.* (Respondent I, FGD in Blitar, July 20, 2019)

In addition, migrant workers consider the nature of discipline and hard work in building a business. According to them, this trait they learned from the destination country, namely Korea and useful to be applied when they returned. These attributes that they brought and applied in home region are what they think they learned the most while working abroad. This values are transferred by migrant workers to their home region by implementing this values in daily lives and showing it as example in the neighborhood. According to Grabowska, Garaphic, Jazwinska, and Radziwinowiczowna (2017), social transfers also happen by sharing observations and opinions, by discussing issues, by encouraging others to do something “in this or that way”, by persuading (soft per- suasion is most effective), by doing things together with a migrant, and when a migrant acts as a “social example” for people to imitate his/her practices(Grabowska *et al.*, 2017).

> *Maybe after returning from Korea, the most useful thing was not the financial capital, but it was the discipline. The hard work. From the first time I worked there, I had to be disciplined every time. That's why people in the village here consider me the most rigid person. That's what I learned. So even now, if I teach, before students arrive, I already stand by here. It's always like that. If anything happens, I will still come to work.* (Respondent L, Return migrant worker, Interview, Kendal, September 14, 2019)

> *What I learned while working abroad is about hard work. In Korea, you can say, we live only for work. What I learned from the Korean, you could say you are lazy if you only work 8 hours. If you are mediocre, you will work 12 hours. If you are diligent, you will work above 16 hours. So I learned that, the hard work.* (Respondent D, Return migrant worker, FGD in Kendal, September 14, 2019)

Furthermore, according to Peth and Sakdapolrak (2019) there are more tangible and incorporated social remittances, such as new skills and knowledge to be transferred and used when migrant workers return to their home regions, or migrate again to a place where they can practice skills and their knowledge. The change of occupation has a greater potential for social remittances, as new skills and knowledge can be generated and transferred during and after the migration process (Peth and Sakdapolrak, 2019). While migrating abroad, migrant workers have the opportunity to gain new skills, both from job scopes that are still new to them and from outside activities organized by the government or migrant worker communities in their respective countries.

> *At my workplace (a nursing home for elderly), the equipment or everything is complete. When we should inject the medicine, even all directions in the form of images are available so that we can understand easily. We just need to follow a predetermined schedule which describe when we should do it,, to whom, and where. As caretakers, we are also trained to inject. Because I worked as a caretaker of a decrepit grandmother, when the grandmother was sick and hospitalized, the nurse also gave me training. When I worked, the new thing I learned was all that. When the grandmother is sick and has to get through a surgery, sometimes we also have to be good at regulating her blood sugar, we were also trained for that. (*Respondent C, Return migrant worker, FGD in Blitar, July 20, 2019*)*

> *When I was in Taiwan, I took part in training to make Taiwanese special drinks. Here we call it bubble tea drink ... Training is given from the Taiwanese government for Indonesian migrant workers there. I used to make it right when I was there. At home, at least I can teach others to make it.* (Respondent G, Return migrant worker, Interview, Kendal, September 14, 2019)

> *In the host country, there were many other activities for fellow Indonesian migrant workers besides working, there were Moslem forum (Quran recitation) and courses, such as sewing courses, bag crafting courses, and many more… There were also equivalence education programs such as junior secondary (package B) and upper secondary education (package C). These all are specifically for Indonesian migrant workers. And that was officially from the Consulate General of the Republic of Indonesia.* (Respondent E, Return migrant worker, FGD in Kendal, September 14, 2019)

In addition they also have the opportunity to acquire skills or skills in organization because there is also an organization or community forum for migrant workers to jointly organize an activity. In Taiwan, there are also migrant workers active in an organization for Indonesian citizens.

> *I joined an organization while in Taiwan. I became one of the branch administrators of Nahdlatul Ulama. Yes, it is the branch of Nahdlatul Ulama in Indonesia ... They also held a regular meeting.* (Respondent N, Return migrant worker, FGD in Kendal, September 14, 2019)

Migration experience can be an advantage for migrant workers when they learn and eventually master a new skills, knowledges, and ideas to be used in the future. Nonetheless, there are several conditions where these social remittances are not fully obtained by migrant workers. A person is unable to learn new things (non-learning) because he feels there is no change or disjuncture (Jarvis, 2007). This could have happened because they did not find a significant difference between new work conditions and working conditions in the country of origin. From the findings, some respondents who worked in the Middle East did not have the tendency to open a business even though the duration of working abroad exceeded five years. Respondents are more likely to choose to become own account workers such as farmer, animals breeder, or freelancer. This can be explained because the type of work they take there on average is domestic work, so it does not add skills or new knowledge for migrant workers. In

addition, there are strict restrictions for migrant workers to leave the house or make direct contact with outsiders while working in the Middle East.

> *I am a helper when I worked in Arab. There was rarely other activity besides working for me because my employer wouldn't let me go out. He said it's haram (forbidden). However, the communication with family via telephone or mobile phone is allowed, I'm just not allowed to go out, I must always at the house for 24 hours.* (Respondent A2, Return migrant worker, FGD in Karawang, June 16, 2019)

While migrating abroad, migrant workers has also gained new skills and knowledge from their work environment or from other activities they do during work breaks. For some respondents in countries such as Taiwan and Korea, there were other activities besides work carried out either by the local government or the community of fellow migrant workers in the destination country. Some of the new skills gained were through training, such as thin sewing and making bags. There were also study activities or organizational activities for migrant workers. Also, the change in social identity in the community as a migrant worker after returning to Indonesia after return migrant workers had the opportunity to be able to develop their potential for entrepreneurship further. Some of the efforts and training and training programs carried out by the service, local government, and the ministry can also be an additional accumulation of human capital and social capital owned by migrant workers. Not only coaching or training but sometimes there is also a production machine assistance program for the development of productive businesses for return migrant workers that can be utilized.

Conclusion

During migration, Indonesian migrant workers learned some new skills, knowledge, values, and social skill. These forms of social remittances are expected to become a social capital that can be leveraged to open a business when they return to Indonesia. Some values or attributes that are considered beneficial to be re-applied after returning to Indonesia are honesty, diligence, self-discipline, and hard work. Rusdiana (2018) explains that one of the ethical principles in business or entrepreneurship is honesty, trustfulness, earnestness, and integrity. A similar study also found that Javanese workers who migrated to South Korea gained some positive effects from working abroad that influenced their attitudes in their communities of origin, such as discipline, diligence, and hard work (Anwar and Chan, 2016). Although these characteristics are common and can be found anywhere, migrant workers practice these attributes in their daily lives while working abroad because they are valued more in their work environment. Migration provides opportunities and context to form, validate, and develop social skills both explicitly and implicitly, which help practice reflexivity both to others and to migrant worker by gaining social awareness from the world around and by mastering new social instructions on how to apply in a unfamiliar environment (Grabowska, 2018).

Grabowska (2018) shows that the social skills of migrant workers can be part of social remittances (Levitt, 1998) obtained and transferred in the work environment. This was also evident in this study that return migrant workers also had the opportunity to gain more skills and experience while working abroad. In addition, their identity as Indonesian migrant workers also allows them to have more entrepreneurship education or training provided by the government when abroad or after returning to their home regions.

Despite the potential gain from financial and social remittances that return migrants have from being a migrant workers, it was found that not all respondents have an intention to set up a new business after returned. Some respondents also claimed to go abroad when still young, so they did not really think of doing business after their return. The gain of human capital and social capital formed through migration are usually not directly transferred to the country of origin but are collected and stored from time to time to be used when required (Grabowska, 2018). Peth and Sakdapolrak (2019) shows that social remittances also require that migrants have the structural and personal ability to make use of them.

The finding shows that most of the businesses run by return migrant workers tend to be micro or small businesses. Most respondents who open a business use small capital from remaining of personal saving instead of borrowing from banks or saving & loan cooperatives. This can be explained because the migrant workers tend to spend their financial remittances on raising their status and status of the family rather than investing in productive assets (Mas'udah, 2019). A similar study by Anwar (2013) also showed financial remittance utilization within return migrant workers in Indonesia are for savings to buy a house or to renovate house, to pay off debts, and also to buy a vehicle, farmland, or livestock. Our suggestions for policy makers to provide alternative funding solutions in addition to remittances to help develop the business of Indonesian return migrant workers. If the government also wants to increase opportunity-based entrepreneurial activities (Zheng and Musteen, 2018) among of Indonesian return migrant workers employees, it is important to be able to identify which individuals have an entrepreneurial interest and spirit to further develop and provide education that is not only about entrepreneurial strategies but also about access to institutions that can help provide financial loans to fund their businesses.

For further research regarding the role of social remittance, a quantitative approaches can be conducted to compare whether the findings of the results of this study had also applied to wider respondents. Further research can also try to utilize variables such as the period of migration, education, or the employment sector when working abroad to see its role in the quality of social remittances brought to the home region to be utilized in entrepreneurship. In addition, further research can also use a larger sample to involve migrant workers in addition to Java with a more balanced sample composition so that the results of the study can better represent the population of migrant workers in Indonesia.

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The Relationships of Workplace Fun, Inspirational Leadership, and Participative Decision Making towards Employees Happiness at Work: Case of IT Workers in Jabodetabek Area

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Abstract

This research aims to examine the relationship between workplace fun and inspirational leadership towards employees' happiness at work when its mediated by the variable of participative decision making. The sample of this research is programmers as the knowledge intensive workers in 24 – 40 years old in Jabodetabek area. The method to process the data was with the Structural Equation Modeling (SEM). The result of this research shows that workplace fun and inspirational leadership directly have positive relationship towards employees' happiness at work. As for the mediating effect of participative decision making was not proved to had an effect towards those relationships.

Keywords: happiness at work, workplace fun, inspirational leadership, participative decision making

Introduction

Indonesia has notable growth in information, communication, and technology industry indicated by the exponential growth in several digital services such as e-commerce, fin-tech market and digital content (Frost and Sullivan, 2018). The growth was indicated by the contribution of the IT industry in Indonesia GDP which accounted for 7.2% in 2016 and the industry grew 9.5% per year between 2014 and 2017, the fastest growth compares to other industries in Indonesia (ILO, 2019). As the industry and production process becoming more complex and specialized, the more communicative effort from the higher-level manager is required to manage the creation process within the organization. Thus, the demand for well-informed or knowledge labour with high-level of educational background and specialized skills are expected to be capable in handling, synthesizing, and creating new knowledge to address new problems in this continuous emerging market and industry environment (Pyoria, 2005).

Along with the development of digitalization in every industry, programmers or software/IT developers as one of the examples of knowledge workers that are becoming one of the most wanted workers (World Economic Forum, 2018). Another emerging roles and expertise that are predicted to have a significant increase in demand up to 2022 are individuals who able to do data analysis, digital sales and marketing, computer and mathematical experts.

Knowledge workers have constant needs to familiarize themselves with new and updated findings and information in their related fields of work, in order to stay up-to-date on the recent problems which required innovative problem solving, therefore knowledge sharing among knowledge workers is one of the ways to make knowledge workers stay engage and feel fulfilled with their jobs (Erren, 2010).

Happiness at work (HAW) is a construct that proposed by Fisher (2010). For many years and after tons of research done by the scholars, numbers of constructs might have an overlapping concept one to another that could lead to one main idea as employees' happiness at work. These constructs more or less have some the similarities that reflect the happiness and positive attitudes towards the job. Fisher also grouping these happiness-related constructs in the workplace into the transient level, person level,

and unit level. In this research, we will focus on the person level happiness-related construct which includes job satisfaction, engagement, and affective organizational commitment because the transient level tends to represent short-lived emotion and mood meanwhile unit level happiness which focused on teams and organization which the aggregate of individuals.

According to a survey of employees' job happiness index conducted by Seek Asia (2017), among ASEAN countries, employees in Indonesia and Vietnam are the happiest employee in the region. There are three main kinds of drivers of happiness that have been taken into account in this survey which are workstyle, rewards, and leadership style from supervisor. Focusing in Indonesia's case, the survey revealed that even though Indonesian employees are the happiest employee in ASEAN, the unhappiest employees in Indonesia are generally coming from the younger and less experienced workers, and are represented by the worker who work in IT, general trading, and media industries (Seek Asia, 2017).

Unfortunately, the amount of potential and professional IT workers available in Indonesia is not as much as the demand needed by the companies. High cost of capital and the lack of skilled workers in the technology sector are still the two main factors that hinder the companies in Indonesia to improve their technological development (ILO, 2017). It indicates that skilled IT-related workers are scarce and become the most wanted human resource among competitor companies within the same industry who also desire to hire skilled IT workers. Therefore, it is one of basic necessity for the organization to maintain IT workers happiness as their role is very crucial to brings the digitalization to the organization so organization can always keep up with the recent technological development.

Literature Review

Happiness at Work

Fisher (2010) divided "happiness"-related construct in organizational perspective into three levels which are transient level, person level, and unit level. The majority of organizational behaviour research concern about the second level which is the person level as the most happiness construct in organizational perspective is conceptualized based on the variance that occurs at an individual level (employee). Example research constructs that are categorized as person level, for instance, job satisfaction, engagement, and affective organizational commitment which will be discussed further in this research. Another construct that categorized in this level is such as job involvement, dispositional affect and affective well-being at work. Salas-Vallina and Fernandez (2017) were concerned on the person level as the person level perceived to be have the more stable attributes that could differentiate each person rather that the transient level and unit level.

Fisher also indicates that group-level constructs are sometimes can be fluctuate and usually studied in a shorter time frame. Thus, Fisher suggest that person-level construct provide more stable and minimum variation throughout the time. Furthermore, Fisher suggested the measurement of happiness at work construct to be targeting these three targets: (1) the work itself; (2) the job's context and features; and (3) the organizational as a whole. These three foci or targets are represent by engagement which represent employees' involvement and enjoyment towards the work itself, job satisfaction which represent the cognitive judgment about the work including work environment (e.g. pay, co-worker's behavior, supervisor, work environment), and affective organizational commitment which represent the employees' feeling about organization such as sense of belonging and attachment.

Job satisfaction can be defined as a pleasurable or positive emotional state of employee that resulting from an appraisal of one task (Locke, 1976). Job satisfaction and job dissatisfaction can be influenced by several factors such as manager's concern for employee, job design, working conditions, social relationships with colleagues, and level of aspiration (Rue and Byars, 2003). Employee engagement described as emotional bonds to the organization or the amount of the employee feel belongs, attached, and willing to invest and put extra effort into their job and organization (Kahn, 1990). Allen and Meyer (1990) described affective organizational commitment as an affective or personal emotional bond between the employees to the organization in a form of strong emotional commitment as the employee feels involved, and enjoys their membership in the organization.

According to Salas-Vallina (2017), engagement, job satisfaction, and affective organizational commitment are shared common core as these three dimensions capture a broad and accurate attitude of happiness while considering different sides and scope of happiness. Therefore, happiness at work can be determined as the higher construct of these three dimensions.

Workplace Fun

Fun in the workplace has been an interest of several scholars in recent decades as nowadays there is more and more modern workplace that has promotes a more fun work environment through more play and humor. For instance, big companies such as Google and IBM have implemented the fun elements into their organizational culture and this implementation has followed by great success (Karl, Peluchette, Hall, and Harland, 2005). According to Tews, Michel, and Allen (2014), there is three dimensions of workplace fun which are fun activities, coworker socializing, and manager support for fun. Fun activities can be in a form of social interaction and group activities which encourage the implementation of fun element in the workplace. Coworking socializing emphasize on the friendly communication among peers in the workplace (Tews, Michel, and Allen, 2014). Meanwhile, manager support for fun refer to the what extent manager or supervisor encourage the existence of fun element in the workplace and support the subordinates to having fun while they're working (Tews, Michel, and Allen, 2014). Furthermore, Tews also described how these three dimensions are related one to another.

As positive emotions as joy and interest could be some of the trigger of creativity and the urge to exploring new ideas, creating a fun environment in the workplace could be a good method for the managers to provide and facilitate sharing knowledge between the workers. Meanwhile, a positive emotion such having a close and warm relationship with colleagues and co-workers could be one of the sources of happiness for the workers. In the history of organizational behaviour studies, it can be assumed that the dominant causes of the employees' happiness or unhappiness were to be found in the attributes related to the organization, the job itself, the supervisor or manager, and other aspect related to the work environment (Fisher, 2010).

Inspirational Leadership

According to Stogdill (1950), leadership can be defined as an act of one individual who influencing the action of a group of people that have certain shared-objectives and goals. Etzioni (1965) suggests that the core of the leadership is how the leader could influence the sub-ordinates including change the preferences or even perspectives. Leaders with a strong people-oriented would like to listen to employee ideas, suggestions, and perspectives, do personal favors for employees, support their interests, and treat employees as equals (McShane and Glinow, 2009). This research will focus on people-oriented or perspective which focus on employees' happiness and well-being.

In the organizational context, inspiration is the extent to the leader stimulates enthusiasm among subordinates for the group-based work through continuously says some motivation words to boost their confidence in order to successfully achieve their goals (Yukl and Van Fleet, 1982). Moreover, Yukl and Van Fleet (1982) also provide some examples of leader's behaviour that considered as inspirational for the subordinates such as instills pride in individuals, giving personal encouragement and compliment to build their morale and boost confidence, set his own behaviour as an example. However, the distinction between transformational leadership and inspirational leadership might be ambiguous and it was unclear how to distinguish these two approaches. Lee (2014), pointed out the differences between transformational and inspirational leadership based on several characteristics such as impression, philosophy, social distance, power distance, process, openness, and when this type of leadership is appropriate to be applied.

Inspirational leaders give impression to the followers that they are an imperfect leaders which might be doing wrong things, has a relatively close but not very close social distance to their followers, egalitarian power distance, how they perform the change in the organization is in the stressful process but in attentive, interesting, and provocative way to boost the change within the followers, in terms of degree of openness inspirational leader tend to reveal the weakness selectively, and inspirational

leadership is appropriate to be applied at a matured institution which requires gradual transition and tends to maintain their status quo (Mei Lee, 2014; Bass, 1999; Goffee & Jones, 2006).

Participative Decision Making

According to Morrison (2011), employees' voice is an employee's way to communicate the concerns, ideas, or opinions regarding work-related issues that they faced in the workplace with the good intention to improve the organization or the work units. While employees voicing their voice is the expected and favourable condition in order to maintain good communication within the organization, employee silence is the contradictive condition where employee consciously holding and keep their ideas, questions, opinions, suggestions, and all the information they know and choose to not express it to who might be had the responsibilities to take an action to address the problem (Brinsfield, Edwards, and Greenberg, 2009). The typical cause of employee chooses to not share any kind of valuable information they have is because of fear or concerns about the negative effect for their career when they choose to speak up (Milliken, Morrison, and Hewlin, 2003). Thus, the exact cause of why employees choose to share or to not share information becomes a significant issue to be discussed.

Morrison (2011), based on his literature study, proposed three main predictors of voice which are organizational contextual factors, supervisor behavior, and employees' attitudes and dispositions. An organization that is less bureaucratic with supportive conditions is giving cues to the employee that they are actually able to express their opinion and suggestion and those inputs could actually make a difference and will not harm their career (Morrison and Milliken, 2000). Meanwhile, when the organization had full of fear and intimidation environment, those kind environments will discourage individuals from breaking the silence (Pinder and Harlos, 2001). The supervisor's behavior that reflecting high-trust relationship between subordinate and the leader, approachability, and possessed openness could also drive the decision whether they would or would not voice (Ashford, Sutcliffe, and Christianson, 2009).

Reinhardt et al. (2011) concluded that knowledge workers are considered as the investor of knowledge which this knowledge become the energy and potential resource for the organization. Hence, knowledge workers by its nature are willing to engage and participate if they have the right motivation to do so. Therefore, managers as the part of the organization which directly interact with the employees could take the role as the catalyst to induce and establish a proper working conditions that stimulate employees to actively engage and participate in the knowledge sharing process and also able to state their opinions and determine their attitude towards managerial decision (Kelloway and Barling, 2000).

Research Method

Structural Equation Modeling (SEM) method will be used because the researcher wants to test whether the model in this study, which is a modification of the previous research (Salas-Vallina and Fernandez, 2017) model is fit or not. Researcher used LISREL to processed the model fit in SEM, meanwhile the reliability and validity test of the questionnaire items were processed using SPSS. Non-probability sampling is used in this research. Before conducting the main test, the pretest will be conducted to 40 respondents in order to test the reliability and validity of each item of the questionnaire. Later on, the main test conducted to test the model fit and the hypotheses of the relationships between variables.

In this study, the relationship between two independent variables which are Workplace Fun and Inspirational Leadership towards the Happiness at Work as the dependent variable will be examined. The mediating effect of the Participative Decision Making as the mediating variables towards to both independent and dependent variables will also examine in this research. This study will discuss about what are the underlying factors of IT workers' happiness at work in Indonesia.

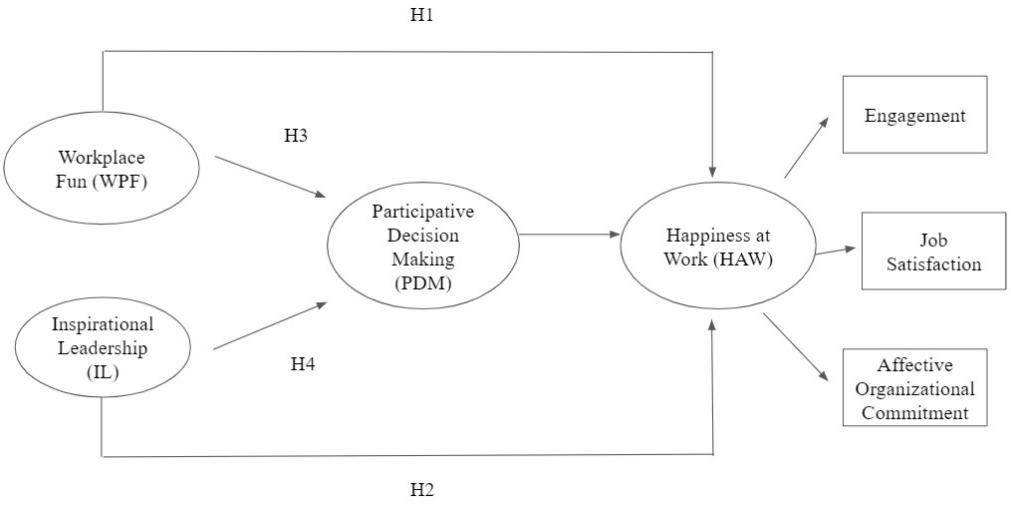

Figure 1 : Research Model

Research Hypothesis:

There are four hypotheses examined in this research:

H1: Workplace fun positively affects employees' happiness at work
H2: Inspirational leadership positively affects employees' happiness at work
H3: Participative decision making mediates the relationship between workplace fun towards employees' happiness at work
H4: Participative decision making mediates the relationship between inspirational leadership towards employees' happiness at work

Measurement

This study uses questionnaire to measure the data in order to assess the hypothesis. The questionnaire are measured using 5 items of workplace fun from Karl and Peluchette (2006), 3 items of inspirational leadership from Rafferty and Griffin (2004), 5 items of participative decision making from Steel and Mento (1987), 3 items of engagement from Schaufeli et al. (2002) as the dimension of employees' happiness at work, 3 items of job satisfaction from Schriesheim and Tsui (1980) as the dimension of employees' happiness at work, 3 items of affective organizational commitment from Rhoades, Eisenberger and Armeli (2001) as the dimension of employees' happiness at work.

Research Result

Table 1 shows the demographic data of respondents in this research. Majority of the respondents were males, who made up more than half of the sample (66.67%). Approximately 70% respondent has bachelor degree, 13.58% were high school graduates, and 11.11% of respondents were diploma. 21-30 years old age group is very dominant with 88.27% while the rest is 31-40 years old (6.17%), less than 20 years old (4.94%), and 41-50 years old (0.62%).

Table 1: Respondent's Demographic

Demography	Category	Percentage (%)
Gender	Men	66.67
	Women	33.33
Educational Background	High School	13.58
	Diploma	11.11
	Bachelor Degree	70.37
	Master Degree	4.94
	Doctor/PhD	0
Age Groups	<20 years old	4.94
	21-30 years old	88.27
	31-40 years old	6.17
	41-50 years old	0.62
	> 50 years old	0

Before testing the relationship between variables, all items included and overall model fit should be examined their validities and reliabilities. It was found that item WPF5 and JS2 were invalid items. Therefore, these two items were deleted from the model. The model's goodness-of-fit was examined and it was found that the value of RMSEA is 0.099 which indicated the model has marginal fit. In order to achieve the good fit, researcher then modified the error covariance of the items.

After the modification of error covariances, the absolute fit measures show that the research model has relatively good fit indicated by RMSEA value which below 0.08 (0.072) and in incremental fit measures NFI showed model has good. Meanwhile AIC from the parsimonious measures also showed the model's good fit. The summarize of the goodness-of-fit result of structural model can be found on Table 2.

Table 2: The Result of Goodness-of-fit Structural Model Analysis

GOF Measurement	Result	Interpretation
RMSEA	0.072	*Good Fit*
NFI	0.91	*Good Fit*
AIC • *Model* • *Saturated* • *Independent*	 226.62 240.00 1730.08	*Good Fit*

There are four proposed hypotheses in this research. All hypothesis in this research are processed and tested in LISREL 8.51 in accordance to structural model t-values. Meanwhile for examining the mediation effect of the participative decision-making variable as the mediation variable, the researcher multiplies the SLF of independent variables towards the mediation variable and the SLF of mediation variable towards the dependent variable. Hence, to calculate the total effect between these variables, the sum of direct effect and indirect effect are needed (Wijanto, 2008). Table 3 below summarizes the hypothesis testing in this study:

Table 3: Research Hypothesis Testing

Hypothesis	T-Value	Interpretation
H1: Workplace fun positively affects happiness at work	3.48	Hypothesis was accepted, the data supporting the hypothesis
H2: Inspirational leadership positively affects happiness at work	6.26	Hypothesis was accepted, the data supporting the hypothesis

H3: Participative decision making mediates the relationship between workplace fun towards happiness at work	0.87 → 1.52	Hypothesis was rejected, the data not supporting the hypothesis
H4: Participative decision making mediates the relationship between inspirational leadership towards happiness at work	6.28 → 1.52	Hypothesis was rejected, the data not supporting the hypothesis

Based on the result of T-values, Hypothesis 3 and 4 was rejected since the T-values shows insignificant relationship between the variables. Therefore, participative decision making cannot mediate the relationship between workplace fun towards happiness at work and not mediates the relationship between inspirational leadership and happiness at work.

Hypothesis 1 and 2 which are the direct effect between the variables are supported in this research, in line with previous study which stated that experiencing fun ambiance at the workplace (Bolton and Houlihan, 2009) and leadership style could improve employees happiness as it could positively affect employees engagement, job satisfaction, and organizational commitment (Salas-Vallina and Fernandez, 2017)). It implies that having a pleasant working ambiance that allow employees to having fun and release their stress are needed in order to make IT workers feel happy and contented about their work (Tews, Michelle, and Allen, 2014), as it creates a positive emotion that becomes the fuels for the employee to tackle stress and reduce the tension or pressure in the work condition which likely to happen to the IT workers that always working in a fast-changing and high pressure working condition in order to have a better well-being (Frederickson, 2000). Moreover, this pleasant working condition also should be imposed or implemented by the manager or supervisor as the leader of the working unit as leadership style could affect to the employees' positive attitudes towards their work (Joshi, Lazarova and Liao, 2009) through set a proper example for the workers and building trust to the employee.

This research found that items WPF1 ("this is a fun place to work") and WPF3 ("managers encourage employees to having fun at work") have the highest loading factor which implies that these items highly represent the workplace fun variable. Therefore, employees can feel the excitement and fun environment in the working place if the workplace itself give them pleasant circumstances. This kind of pleasant circumstance can be supported by a flexible workplace that enables employees working in a place that is comfortable for them and creating fun and playful activities once in a while with the team and colleagues to reduce boredom. Moreover, encouragement from managers also has an important role in terms of reminding employees to not forget to take rest and have fun so they can enjoy their task. Manager's encouragement can be in a form of an invitation to eat or getting out together with the team after work hours as the refreshment. In this research, workplace fun has no relationships towards employees' participation in decision-making process. Employees might have a different perspective about fun and different acceptance towards having fun and playful environment in the workplace (Clouse and Spurgeon, 1995). One person might totally enjoy it and performed better in a playful circumstance meanwhile the other person might perceive it as disturbing their concentration which reducing their creative thinking process and impact on they cannot come up with new ideas and suggestions. These might be the reason why workplace fun had insignificant relationships with employee participation in decision making.

For example, in a real case of the implementation of workplace fun in PT. T is focused on how they build a pleasant and comfortable atmosphere in the workplace through creating a homey workplace, set the lighting not too bright but not too dim, set the layout of the room so employees can move easily, and provide some snack or refreshment on the workplace (Karl and Peluchette, 2006). Another example was done by PT. S which emphasize that they have a regular (most likely monthly) occasion like seminar or sharing session which designed and organized by the younger workers so the younger workers can have more time to interact with the same-age colleagues. Celebrating a special moment together such as celebrating someone's birthday or promotion also could give employee' pleasant feelings towards their colleagues. These kinds of occasion could reduce employees' boredom and give them positive moods (Karl and Peluchette, 2006).

Furthermore, this research also found that items IL1 ("managers says things that make employees proud to be a part of this organization") and IL2 ("managers says positive things about work unit") have the highest loading factor. Inspirational motivation performed by the managers could affects employees' happiness and well-being. When managers say good things about how well the organization is or appreciate the work units, it will make the employees proud and satisfied with themselves and happy to become a part of the organization. Inspirational leadership also provides greater opportunities for employees to express their opinions as its stimulates employees creativity and build employee trust, so they able to express their opinions or suggestion freely as the leader sets the example of being outspoken about their thoughts even though they might make some error, which error can be considered as source of employees learning process (Barile, Saviano, and Simone, 2014).

The findings in this research were not supported the hypothesis regarding the role of participative decision making as the mediator of workplace fun and inspirational leadership towards happiness at work even though there is a positive relationship between inspirational leadership and participative decision making. This finding indicates that in order to employees are able to feel happy and contented about their work, it was not enough to have the feelings of they are allowed to express their opinion and suggestion or contributes to decision-making process. From theoretical perspective, both workplace fun and inspirational leadership are variables that we could see the impact directly and immediately towards the employees' well-being and do not really need the role of mediator variable to enhance these relationships. Participative decision-making variable itself still needs any other factor to support its implementation. For instance, according to Vroom (1964) the employee will be considered to take action to speak up when they feel that there is a high probability of the voice to be heard effectively. Otherwise, they feel that speaking up and give opinions and suggestions as a pointless action.

According to Morrison (2011), organizational support in a form of supervisor and top-level management provide cues to the employee that their opinions was heard, will be accepted and make a difference to the company. This kind of organizational support is likely to happen in an organization that has a good suggestion system, grievance procedures to the top-level management and has a low bureaucracy. Based on that concept, it was not enough for the supervisor to allow the workers to give their suggestion, the supervisor also needs to show that the worker's suggestion would actually be implemented in the company so the employee feels assured that their voice was actually heard by the higher-level management.

Conclusion and Recommendation

When workers experiencing fun at their workplace, it will positively affect the improvement of employees' happiness and well-being. Creating a fun environment could reduce employees stress' factor especially in IT workers which always work in high-pressure working conditions since they are enforced to always innovate. Fun at work was perceived as the generator of positive emotion within the workplace that gives the employee a sense of contentment about their work and improve their well beings.

Leaders that implementing inspirational motivation and supportive working condition would enhance employees' happiness as a whole. Inspirational leadership also could improve employees' satisfaction and commitment through implementing a sense of pride and belonging to the companies through inspirational motivation as the leader could visualize and communicate organization's vision clearly to the followers.

While the direct relationship between workplace fun and employees' happiness at work could be defined as a positive relationship, mediating variable participative decision making still needs the role of other variables to support employees' well-being. In general, IT workers' have been contented and happy only by having a fun working environment and supportive leadership who uses inspirational motivation and IT workers happiness does not heavily rely on the amount of opportunity given to them to participate in decision-making process.

Even though that in this research participative decision making could not mediate the relationship between leadership style to the employees happiness at work just like the previous research by Salas-Vallina and Fernandez (2017) did, still there is positive relationship between inspirational leadership and participative decision making as it could build employee trust that their supervisor is willing to listen to their opinion and suggestion regarding their work and encourage them to speak up and voice their opinion about problems that could occur in completing task. Although, participative decision making was proved that has no relationship towards the employees' well-being , in this case, as IT workers are working on the innovative climate that is expected the workers continuously innovate and create new ways of thinking and learning, sharing knowledge is important thus, this research proved that inspirational leadership style already facilitate employees to speak up and proposed their opinion.

In conducting this research, there are several limitations. The mediation effect was not found in this research because of involving employees in the decision-making process does not directly make the employee feel satisfied and happy but requires the actual realization of the employees' ideas and suggestion in order to achieve employees' satisfaction and happiness as a whole. Future research might consider to involve different dimensions or measures to examine these relationships.

While maintaining fun at the workplace to improve employee's happiness, the manager should also focus on how to create a conducive atmosphere in the workplace which allows employees to effectively share their knowledge and exchange constructive ideas. Some employee could perceive fun at the workplace as "too much fun" which could reduce their concentration and impede their creative thinking process which hinders them to actively participate in proposing new ideas and contributes in decision-making process.

Some fun elements that already implemented in respondent's workplace is such as have a regular event like seminar or sharing session which designed and organized by the younger workers and celebrating a special moment together such as celebrating someone's birthday or promotion also could improve employees' feelings. A tidy and comfortable layout which facilitate employee positive interaction can also help to create a fun atmosphere in the workplace. Managers have to show that they willing to listen to the employees' suggestion and discuss it together with the team in the regular group meeting so employee feel that their suggestion is an important matter to be discussed together and their voices are actually heard by the board. Shorten the flow of employee suggestions through having regular meetings in the working units where employees can sit together with the higher-level management could improve employees' satisfaction as they would feel as soon as they proposing new ideas, the ideas will be heard and taking into higher manager's considerations. Decision-making process that requires less formal and low bureaucracy also could improve employees' participation in decision-making process because it makes the process shorter and faster which supporting IT workers working conditions.

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Analyzing the Effect of Job Satisfaction, Work-Life Enrichment, and Trust towards Employee Turnover Intention

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Abstract

The purpose of this research is to analyze the impact of turnover intention phenomenon in a metal manufacturing company. It examines the interrelation of job satisfaction, work-life enrichment and trust to management toward employee turnover intention. A survey involving 293 operators was conducted to test the proposed conceptual model in this study. By employing Structural Equation Modelling (SEM) the finding of this study shows that the job satisfaction, supported by the work-life enrichment and the employee trust toward management affect the employee's turnover intention. The investigation on turnover intention is relevant with the company's condition at that time. All analyzed factors are generated based on discussion with human resource department. Last but not least, the managerial implication for improvement, and suggestions for further study are also discussed.

Keywords: Automotive, Manufacturing, Job Satisfaction, Work-Life Enrichment, Trust, Turnover Intention, Production, Casting, Machining, Finishing

Introduction

Manufacturing sectors have become a significant concern for the Indonesian government as they grow slowly to Indonesia's Growth Domestic Product (GDP) in the last two decades (Hartomo, 2019). One of the reasons is due to the trade war between United States (US) and China since 2018, which weakens the global economy supply chain (Adharsyah, 2019) and affects workforce lay-off in automotive manufacturing sectors globally (Aninda, 2019). Regarding this phenomenon, it must be noted that one of the most significant contributing sectors to manufacturing GDP's growth in Indonesia is the automotive industry ("Industri Manufaktur", 2017). Most of these automotive manufacturers apply assembly-system in their production process. Each of the corresponding suppliers supports the materials needed by them. These materials needed may vary across the component; it depends on the production plan and the requirement of automotive manufacturers. Therefore, establishing a proper supply chain strategy may be required. On the other hand, the fact that these "trade war problems" will affect Indonesia in the future, the government may need to think about the strategy to support and develop manufacturing industries, especially automotive sectors.

Moreover, both government and company's owners should also put more concern in potential lay-off threat as the number of unemployment or jobless labor in Indonesia is around 7.05 million as per data in August 2019 (Indonesia, 2019). However, it would not be easy to implement the development as it would require a very complicated process and would take quite a long time to finish. Thereby, specifically for the company, enhancing workforce quality and retain potential talent will play a significant role. Upon this fact, however, it is an unavoidable challenge for this manufacturing sector to retain the potential workforces, especially on skilled labor. Economic and Social expert has also identified the negative impacts of turnover. The cost which is associated with turnover is included but not limited to the recruitment process, replacement fit in the right candidate, and personnel training for adaptation (Hom, Lee, Shaw, and Hausknecht, 2017). Besides, the cost associated with production costs & volumes, as well as administrative costs, will also be included. Based on the reference example data of Dessler (2013), in educational service, around 12% occurs voluntary turnover.

It is common for such companies, especially the manufacturing industry, to face problems in managing temporary workers. It has become a permanent challenge in the human resource management field (Feldman, Doerpinghaus, and Turnley, 1994). In Indonesia, approximately around 40 % to 50 % of employees in the manufacturing industry have less than 36 months of job tenure in February and August period according to BPS Sakernas Jakarta data in 2015. As maintaining workforce turnover is very important, there is one manufacturing company in Indonesia that face the current situation challenge. The company's name is called as PT Excel Metal Industry. They just recently try to implement the concept of lean manufacture to promote effectiveness and efficiency. By that means, it includes maintaining the rate of defective products and enhancing number workforce of efficiency.

There are a variety of reasons to analyze the cause and indication of employee's turnover. However, at PT Excel Metal Industry, the research focused on finding the effect of three contributing factors toward turnover intentions of the employee. These factors are job satisfaction, work-life enrichment, and trust. These factors have a significant influence on turnover intentions. Likewise, they also have a substantial impact from one variable to another. One point that must be noted is that this research emphasizes on the turnover by the decision of employees themselves. Over the decades, many scholars have been trying to figure out how to examine and investigate the outcome regarding this workforce turnover. One of the research examples is the effect of workplace violence and job satisfaction on turnover intentions (Li, Zhang, Xiao, Chen, and Lu, 2019). According to their study, it was found that job satisfaction plays a mediator role between workplace violence and turnover intention among nurses. It was suggested that among nurses who suffer workplace violence should be encouraged to resort to problem-focused.

Meanwhile, work-life enrichment's concept is derived from Greenhaus and Powell (2006). They describe as the extent to which experiences in one role improve the quality of life in the other role. It is aimed to enhance the quality of life through experiencing work activity. Consider the example such as communication skill training provided to the employee may also benefit them for their real-life activity. According to Carlson's, Kacmar's, Wayne's, and Grzywacz's (2006) research in public relations, work-life enrichment is taken into three dimensions in which are development, affect, and capital. The development stands for instrumental resources that can benefit an employee's personal life (capabilities, skills, and knowledge).

On the other hand, the final factor that will be the main focus of this research is trust between the employer (management) and employee of PT Excel Metal Industry. Several existing studies relate trust to a particular variable in their analysis. One example is, according to Fungá˘cová, Hasan, and Weill (2019), the analysis of trust relative in banks. Their finding concludes that trust at a bank based on a factor such as sociodemographic, religious, political, and economic value form trust at the individual level. Their study was conducted in a world survey covering up to 52 countries from 2010 until 2014. Furthermore, their study also finds that women trust banks more than men. In general, the scope of this research is limited only to the three main factors (job satisfaction, work-life Enrichment, and trust), especially in terms of its impact on voluntary employee turnover. Therefore, the main context that differentiate this study between other similar research is in the variable of work-life enrichment. As the variable is unique, the number of research on this variable is still limited, especially in manufacturing sectors.

Literature Review

Turnover Intention

Turnover, as the main topic of this research, has become an interesting issue in the corporation. Many scholars have analyzed turnover in many forms of definition. According to Cascio (1995), turnover is defined as any permanent departure or leave beyond organizational boundaries. In a simple word, turnover means a condition when the employee leaves the company permanently for any reason (Aksu, 1996). There are two different types of turnover, according to Dessler (2013). The first one is voluntary Turnover. It is an intentional leave decision caused by motivation from the employee. It can be

reflected by their behavior, such as when an employee starts to look for a new job (Ito & Brotheridge, 2005). Meanwhile, the second is involuntary Turnover. It is defined as a type of turnover that is caused by reasons out of employee decision (unintentional). A proper management strategy is needed to control these turnover condition as it matters when recruiting, selecting, hiring, and training is costly and expensive (Cho & Lewis, 2012).In comparison, it can be concluded that the definition context between turnover intention and actual turnover is different. Actual Turnover discuss about actual activity, the occurrence of permanent departure, while turnover intention describes reason why a person want to leave his/her job.

Job Satisfaction

Job satisfaction is defined as a person's effective, emotional response, the general attitude toward various jobs, or work (Kreitner and Kinicki, 2010). This definition implies that job satisfaction is relatively different among each individual. It may be considered that it is not uniformed. The stimulant of job satisfaction occurrence may also vary from one company compared to other as several universities in the world have conducted and developed the study of this job satisfaction. Similarly, Spector (1997) defines the theory as to how people feel about their jobs that is include any kinds of aspects of their jobs. Spector (1997) divide his job satisfaction concept into nine different dimensions. On the other hand, Kreitner and Kinicki (2010), describe job satisfaction into five dimensions models. Interestingly, Dugguh & Ayaga (2014) also have different theory regarding to job satisfaction. They in fact divide job satisfaction into three dimensions. According to these finding, most study related to job satisfaction discuss its definition different type of dimension factors. The measurement of satisfaction is rather complex and differ from one person to another. Therefore, it is suggested for researcher to identify the cause of job satisfaction based on a proper dimension used.

Work-life Enrichment

The concept of work-life enrichment is derived from the concept of work-family enrichment in theory. Firstly, it must be understood that the meaning of work-family enrichment, according to Greenhaus and Powell (2006) is the one that experiences a role or function improves the quality of other role or function. The role itself refers to the variable of work (1st role) and life (2nd role). Enrichment is applied when both roles attain certain aspects, which include but not limited to psychological, flexibility, physical, materials, social capital, perspectives, and skills, improving performance in the other role (Vargas, Gómez, and Ortíza, 2015). It must be noted that between work and life, both are having separate meanings in terms of its conceptualization. According to Jiang & Men (2017), as cited in Kossek & Lambert (2004), work is conceptualized as a condition when the employer pays the employee, while everything or every context outside of work is called life. Employee's best interests can be fulfilled through a healthy and balanced lifestyle, which refreshes their life and enhances their morale (Haar, 2013). As described in the previous chapter, the concept of work-family enrichment is later adapted by Carlson, Kacmar, Wayne, and Grzywacz (2006). Having parallel meaning with work-life balance, work-life enrichment's research is still limited in most academic journal. Therefore, this research help to expand the knowledge of this variable.

Trust

Many basic concepts define the basis of trust as a theory. Trust can be conceptualized as existing when one party has confidence in an exchange partner's reliability and integrity (Morgan & Hunt 1994). Meanwhile, according to Grunig & Hon (1999), trust is defined as the degree of confidence and willingness of one party to be open to other parties. Thereby, it would be clear based on the three definitions that the concept of trust itself can be stated as the confidence in exchange from one to another. In most research, this variable is used following to different kinds of subject's prespective. Similar to job satisfaction concept, one definition of trust may not fit with all research subject since it must follow the proper dimension explanation.

Research Model and Hypothesis Development

Effect of Job Satisfaction

Job satisfaction is negatively correlated to turnover intention according to Carmeli's & Weisberg's (2006). Their research prove that the more the employee experience higher satisfaction on job, the lower their intention to leave the company permanently. On the other hand, job satisfaction may seem to show positive effect on both work-life enrichment & trust toward management's decision. According to Jaga's & Bagraim's (2011) study in national retail-chain, job satisfaction was a significant output of work-family enrichment compared to career satisfaction. Meanwhile, according to Rich's (1997) study in ten different U.S. companies, job satisfaction has a reliable connection in enhancing the trust of sales-manager. Therefore, the hypothesis can be developed as follow:

H1: Job satisfaction negatively affects the employee voluntary turnover intention.
H4: Job satisfaction positively affects the employee's trust toward management
H6: Job satisfaction positively affects the work-life enrichment

Effect of Work-life Enrichment

Wayne, Randel, and Stevens (2006), in their research, have found that work-life enrichment is negatively affect the turnover intentions. It means, if workers are able to experience the positive impact of work to their life, their intention to leave woul surely be reduced. Furthermore, work-life enrichment not only reduces turnover intention, but also enhances a person's trust (Jiang's & Shen's, 2018). Based on these finding, these are the hypothesis that can be derived:

H2: Work-life enrichment negatively affects the employee voluntary turnover intention.
H5: Work-life enrichment positively affects the employee's trust toward management.

Effect of Trust

According to Cho's & Song's (2017) study on 242 social workers in South Korea, they found that trust in an organization is more impactful to affect turnover intention rather than surface acting or emotional labor. In other words, the higher trust would reduce the intention to quit on the social worker. Applying the similar concept of Cho's & Song's (2017) finding in manufacturing industry, the suggested hypothesis for this research would be as given below:

H3: Trust toward management negatively affects the employee voluntary turnover intention.

Research Methodology

Procedure and Sample

The data collection method is purposive sampling, non-probability distribution method. It took around three months for the author to collect all respondent's data. The questionnaire was distributed to production department (casting, machining, and finishing) at operator-level, in coordination with human resource department as the informant. The data was collected at a sequential period, without any manipulation and interference on occurred settings such as environment and respondent activities. Following to Slovin's formula (Tejada & Punzalan, 2012), the assumption on margin of error in this research would be five percent, while the total population that is considered to be involved is 778 employees. Therfore, the calculated sample size (n) would be at the very minimum is 264 respondents.

Measurement and Scales

This study uses a measuring instrument from previous literature that has been translated into Indonesian. The design of the questionnaire applies a quantitative methodology using Likert-Scale. All of the scale option is formulated from the range level of 1 (strongly disagree) to level 6 (Strongly agree) (Cooper, Schindler, & Sun, 2014), since the Likert scale of 6-point provides higher reliability value, and it is fit for research that has only several variables (Chomeya, 2010). In addition to it, Chang's (1994) finding also suggests that the scale of 6-point Likert would increase the opportunity for response sets the value to raise, which affects internal consistency reliability compare to lesser value 4-point In this study, the reliability test of each variable was measured using Cronbach's alpha. Finally, the reliability test of each variable was measured using Cronbach's alpha. The minimum value of Cronbach Alpha (α) for each variable must be minimal 0.6 (Hair, Black, Babin, and Anderson, 2013).

Result and Discussion

In order to fully construct the complete analysis, validity and reliability test in the complete model must be calculated. In order to define the result, Table 1 shows calculation on Construct Reliability (CR) Value, and Variance Extracted (VE) Value. Most of dimensions shows Job Satisfaction dimension, Turnover Intentions, Job Satisfaction, and Work-Life Enrichment fulfill the requirement to be considered as valid and reliable.

However, only the QTR1 in the variable of trust was found to be invalid. Since QTR1 value does not seem to fulfill validity and reliability criteria, it is then removed from the analysis (Rothwell & Arnold, 2007). Since QTR1 value does not seem to fulfill validity and reliability criteria, it is then removed from the analysis (Rothwell & Arnold, 2007). Continuing the new modification result, Table 3. shows the value of CR and VE, which shows the remark to be valid & reliable.

Table 1: Calculation on Construct Reliability (CR) and Variance Extracted (VE)

Variable/Dimension	Indicator	Standardize Factor Loading	Results	CR (≥0.5)	VE (≥0.5)	Results
PAY	QJS1	0.69	Valid	0.803	0.50	Reliable
	QJS10	0.75	Valid			
	QJS19	0.72	Valid			
	QJS28	0.68	Valid			
PROM (Promotion)	QJS2	0.76	Valid	0.840	0.57	Reliable
	QJS11	0.78	Valid			
	QJS20	0.73	Valid			
	QJS33	0.74	Valid			
SPV (Supervision)	QJS3	0.72	Valid	0.841	0.57	Reliable
	QJS12	0.75	Valid			
	QJS21	0.82	Valid			
	QJS30	0.73	Valid			
BNFT (Fringe Benefits)	QJS4	0.76	Valid	0.835	0.56	Reliable
	QJS13	0.71	Valid			
	QJS22	0.77	Valid			
	QJS29	0.75	Valid			
RWRD (Contingent Rewards)	QJS5	0.76	Valid	0.827	0.54	Reliable
	QJS14	0.74	Valid			
	QJS23	0.75	Valid			
	QJS32	0.7	Valid			
OPRT	QJS6	0.79	Valid	0.817	0.53	Reliable

(Operating Conditions)	QJS15	0.65	Valid			
	QJS24	0.75	Valid			
	QJS31	0.71	Valid			
COWRK (Coworkers)	QJS7	0.61	Valid	0.807	0.51	Reliable
	QJS16	0.76	Valid			
	QJS25	0.72	Valid			
	QJS34	0.77	Valid			
NATR (Nature of Work)	QJS8	0.73	Valid	0.819	0.50	Reliable
	QJS17	0.68	Valid			
	QJS27	0.68	Valid			
	QJS35	0.72	Valid			
COMM (Communication)	QJS9	0.78	Valid	0.790	0.50	Reliable
	QJS18	0.81	Valid			
	QJS26	0.75	Valid			
	QJS36	0.74	Valid			

Table 2: Calculation on Construct Reliability (CR) and Variance Extracted (VE) (continued)

Variable/Dimension	Indicator	Standardize Factor Loading	Results	CR (≥0.5)	VE (≥0.5)	Results
TI (Turnover Intentions)	QTI1	0.83	Valid	0.793	0.50	Reliable
	QTI2	0.53	Valid			
	QTI3	0.67	Valid			
	QTI4	0.75	Valid			
JS (Job Satisfaction)	PAY	0.81	Valid	0.912	0.54	Reliable
	PROM	0.68	Valid			
	SPV	0.80	Valid			
	BNFT	0.75	Valid			
	RWRD	0.69	Valid			
	OPRT	0.66	Valid			
	COWRK	0.63	Valid			
	NATR	0.82	Valid			
	COMM	0.74	Valid			
WLE (Work-Life Enrichment)	QWE1	0.71	Valid	0.886	0.53	Reliable
	QWE2	0.75	Valid			
	QWE3	0.64	Valid			
	QWE4	0.71	Valid			
	QWE5	0.83	Valid			
	QWE6	0.73	Valid			
	QWE7	0.69	Valid			
TR (Trust)	QTR2	0.68	Valid	0.821	0.53	Reliable
	QTR3	0.76	Valid			
	QTR4	0.76	Valid			
	QTR5	0.72	Valid			

Through the analysis of Structural Equation Modeling (SEM), the Goodness of Fit (GOF) test overall is required to be conducted (Wijanto, 2008). The aim of this test is to whether the collected samples can represent the population. Figure 1. shows the initial model of GOF analysis. It can be seen that the RMSEA is considerably very high, with the value of RMSEA equals to 0.273. It indicates that the model is not a good fit since RMSEA should have a value of at least ≤ 0.08 or < 0.05 for a close fit.

Table 3: Demographic profile

Variable	Category	Frequency	(%)
Marital Status	Single	140	0.478
	Married	151	0.515
	Formerly Married	2	0.007
Age	18 - 25	128	0.437
	26 – 33	115	0.392
	34 – 41	41	0.140
	42 - 49	6	0.020
	≥ 50	3	0.010
Education	SMK	290	0.990
	D3	3	0.010
Working Contract	< 1 Years	72	0.246
	1 – 2 Years	107	0.365
	3 – 5 Years	35	0.119
	6 – 10 Years	48	0.164
	11 – 15 Years	24	0.082
	≥ 15 Years	7	0.024
Working Status	Temporary	226	0.771
	Permanent	67	0.229
Department	Casting	135	0.461
	Machining	87	0.297
	Finishing	71	0.242

The respondents taken are 100% male-operator as the scope of the industry is automotive manufacturing. As can be seen in table 3., the total size, according to the complete questionnaire distribution, was in total 293. All worker position level is considered to be hard-skill labor. They are all mostly come from a nearby area of Cibitung recruitment, and they have a lower education level under a bachelor's degree. Most of their working contract is less than 1 – 2 year, and their working statuses are temporary in dominant. Meanwhile, respective department are at most taken in Casting division since according to past record, casting was shown as the highest turnover rate

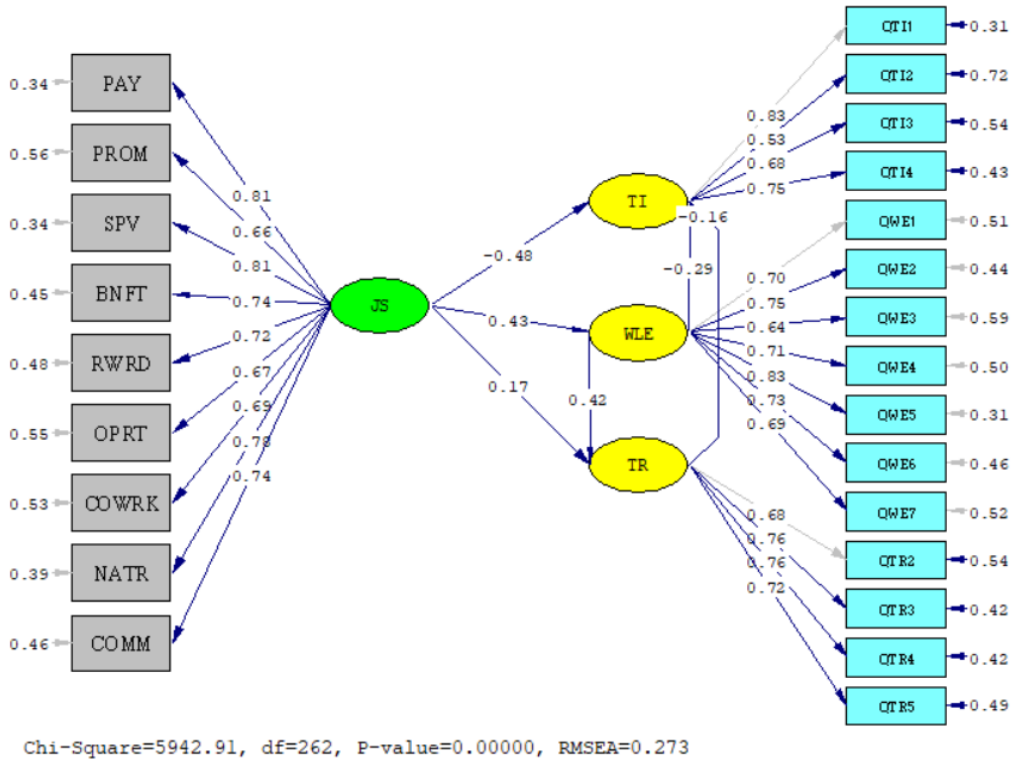

Figure 1:Model Fit Test

In light of this, the author of this research conducts re-specification on the syntax to create a model that Goodness fit. The result of the GOF test can be seen in Table 4. shows that each goodness fit indices show that the model overall is fulfilling a good fit requirement.

Table 4: Goodness of Fit Index

Goodness fit Indices	Fit Measures	Standard Required	Results	Remarks
Absolute fit Indices	RMSEA	≤ 0.05 or 0.05 ≤ RMSEA ≤ 0.08	0.000	Close Fit
	Chi Square (P -Value)	≥ 0.05 & Chi-square lower is better	1.000 & 0.00	Good Fit
	NCP	The lower the better	0.000	Good fit
	GFI	≥ 0.90 or 0.8 ≤ GFI ≤ 0.9	0.92	Good fit
Incremental Fit Indices	NFI	≥ 0.90	1.00	Good fit
	NNFI	≥ 0.90	1.05	Good fit
	IFI	≥ 0.90	1.05	Good fit
	RFI	≥ 0.90	1.00	Good fit
	CFI	≥ 0.90	1.00	Good fit

Figure 2 shows the regression coefficient (β) and t-value between variables to examine the relation and significance between variables.

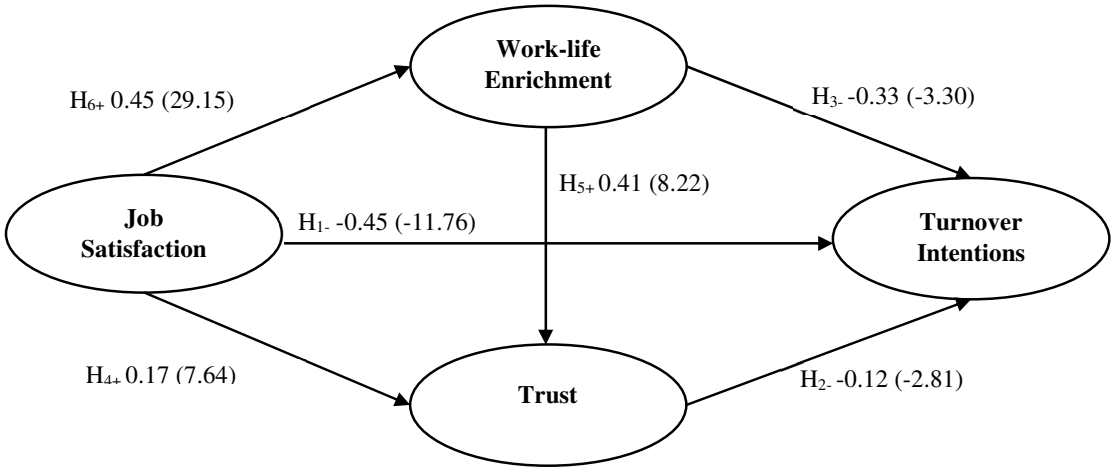

Figure 2:Research Model Testing (with t-value)

In the first hypothesis, the effect of job satisfaction toward employee turnover intentions shows a significant result. The T-value is -11.76, which the value is less than -1.96. Therefore, the first hypothesis can be accepted as job satisfaction affect negatively to turnover intentions. This finding is actually linear and consistent with Carmeli's & Weisberg's (2006) research, as they found in their study that job satisfaction is inversely correlated to turnover intention.

The test of the second hypothesis shows that the T-values between work-life enrichment and employee voluntary turnover intention is -3.30. It is considered to be significant since it is less than -1.96. The T-value clearly shows that the relationship is inverse or in negative pattern/form. When work-life enrichment is high to have an impact on the employee, intention for the worker to leave their job will be low. The hypothesis tested upon this research follows the same result in McNall, Masuda, & Nicklin (2010) and Jiang & Shen (2018) research.

Trust in management and employee voluntary turnover intentions, according to figure 2 shows the T-value of -2.81, which was significant as it is less than -1.96. Similar to the previous hypothesis, the effect of trust in turnover intention is in the form of an inverse or negative direction. It means that a higher level of trust of the employee toward management, the lower employee intention to leave their current job. program itself may encourage the employee to trust their management. Thus, the hypothesis derived from this research is linear and consistent with Ertürk (2014), Cho &´Song (2017), and Jiang & Shen (2018) research.

Table 5: Direct effect of each hypothesis

Hypotheses	Path	T-values	SLF	Results
H_1	Job Satisfaction → Turnover intention	-11.76	-0.45	Supported
H_2	Work-life Enrichment → Turnover Intention	-2.81	-0.12	Supported
H_3	Trust → Turnover Intention	-3.30	-0.33	Supported
H_4	Job Satisfaction → Trust	7.64	0.17	Supported
H_5	Work-life enrichment → Trust	8.22	0.41	Supported
H_6	Job Satisfaction → Work-life enrichment	29.15	0.45	Supported

According to the result of path analysis at Table 5, the T-value between job satisfaction and trust is 7.64, which indicates the variable effect is significant, and the fourth hypothesis is drawn in a positive

direction. In light of this, it can be stated that the higher job satisfaction the employee feels, the higher also employee trust toward management. Therefore, it can be concluded that increasing employee satisfaction in the dimension of increasing amount pay, deliver good supervision, and enhance the proper nature of work may encourage employee trust in management decisions, especially those that affect employee immediately in the personal context. The hypothesis testing in this research supports the previous research result to prove the positive effect of job satisfaction to trust (Rich, 1997; Khany and´Tazik, 2017).

The T-values of the fifth between work-life enrichment and trust are 8.22, in which the value is considered to be very significant (> 1.96), and the direct effect is positive. In other words, the more impact of work-life enrichment to the employee, the higher their trust toward management would be. In work-life enrichment, Currently, the supporting journal available that relates work-life enrichment to trust is still limited. The closest concept that can be derived is from Jiang & Shen´(2018) research, which their model is used as the primary reference in this research.

Finally, the last hypothesis analyzed the correlation between job satisfaction and work-life enrichment. The T-values for both variables is 29.15, which becomes the highest significance value compare to all other hypotheses. As the value is significant, the hypothesis for the corresponding variable is accepted. In other words, job satisfaction affects work-life enrichment positively. As job satisfaction increased, work-life enrichment impact on the employee will be increased as well. The hypothesis is synergy with the conceptual theory of satisfaction derived by Carlson, Hunter, Ferguson, and Whitten (2014).

Based on the analysis result, the effort for PT Excel Metal Industry to control turnover rate should be supported by top management decisions. Thus, other variables such as job satisfaction, work-life enrichment, and trust must be included to develop strategic planning. As can be seen in figure 2, this research constructed a model that shows the overall results that each variable has a significant effect from one to another. To simplify, when operators of PT Excel Metal Industry is satisfied with the job they are currently doing, especially with the job nature they can enjoy, their intention to leave the company permanently will be reduced. By enhancing the opportunity for operators to spend more time with family and encourage trust in management decision that affects personal preference would also support reducing employee intention to leave.

Conclusion and Recommendation

Based on this research related to analyzing the effect of job satisfaction, work-life enrichment, trust as factors toward employee voluntary turnover intentions, it can be concluded into several issues. First, job Satisfaction negatively and significantly affects employee voluntary turnover intentions. The greater value of job satisfaction perceived by the employee will reduce the employee turnover intentions in PT Excel Metal Industry.

Second, work-Life Enrichment negatively and significantly affects employee voluntary turnover intentions. When work-life enrichment perceived by the employee is high, employee intentions to leave PT Excel Metal Industry permanently will be reduced. Third, trust in management negatively and significantly affect employee voluntary turnover intentions. The higher employee trust toward management's decision, the lower employee intentions to leave PT Excel Metal Industry permanently.

Fourth, job satisfaction positively and significantly affects employee trust toward management's decision. Job satisfaction perceived by the employee will increase their trust in management's decision of PT Excel Metal Industry. Fifth, work-life enrichment positively and significantly affects employee trust toward management's decision. When aspects of work can enrich family life of PT Excel Metal Industry employee, it will increase employee sense of trust toward management's decision. Sixth, job satisfaction positively and significantly affects work-life enrichment. A condition when job satisfaction is fulfilled, work-life enrichment will also be perceived. In PT Excel Metal Industry, the employee tends to value their job more if it can enrich their family life.

Based statistical finding, there are several recommendation for the practical implication in PT Excel Metal Industry. This research divide the implications into three categories. First for job satisfaction, the company needs to conduct workload analysis (WLA) & measure Employee Stress Index first to verify and review the working field conditions. The purpose of workload analysis is to measure the difficulties of one job position to be performed, analyze the potential risk of safety, and create an atmosphere that the worker may be able to enjoy, especially in the Casting area where the condition is very hot & the task performed is difficult.

Second, for work-life enrichment, the company is to provide information related to overtime weekly schedule in the information board so that the employee may know when they should plan to spend quality time with family, especially on the weekend. The company may need to consider in developing a better plan of PPIC in order to reduce the sudden change in production schedule (which includes overtime).

Third, for variable of trust, management should encourage transparency on what decision they want to take during management speech. Things such as potential risk and any adverse condition that may occur in the company must be socialized. If possible, it would be better for the company to state clearly about the bonus regulation, which includes calculation formula in PKB

Due to the limitation of time, this study may not be able to continue further to analyze the implemented action for reducing the actual turnover. However, the finding of this study can be used as suggestion for the company to create several programs for employee in deciding the action taken to reduce the actual turnover. In terms of the academic benefit, this study provides interesting information for other researcher that can be used as reference in analyzing turnover intention cause. Moreover, this study opens the opportunity for the next research topic.

To continue the further research, there are several suggestions that can be offered. First, turnover intentions in this research only measure the operator-level (hard skills). Therefore, the next research may continue to staff and upper level. Second, Other factors may affect the turnover intentions; the author suggests to analyze job search behavior and work environment in the future as proposed by Phillips (2003). Third, further study should analyze the effect of turnover intentions directly to organizational performance. Finally, Further study might also consider in comparing the gap between actual turnover occurred with turnover intentions. Therefore, a longitudinal study is strongly recommended.

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The Influence of Work Autonomy on Innovative Work Behavior with Work-Life Balance and Psychological Flow as Mediator on Workers in Application and Game Developer Companies

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Abstract

Innovative work behavior is a critical factor that determines successful work performance in organizations, particularly in digital creative industries as application and game developers. According to early research, innovative work behavior can be influenced by several factors. The primary objective of this study is to investigate the mediating effect of work-life balance and psychological flow on the relationship between work autonomy and innovation work behavior. The research adopts a quantitative approach to address the research objectives. The participants in this study were employees (n=263) at the application and *game* development sectors of creative industry in Indonesia. LISREL 8.8 was used to analyze the quantitave data. The findings revealed that work autonomy provides significant impact to the innovative work behavior of the workers in application and game development sector, particularly if they perceive that they experienced work life balance and psychological flow. Both work-life balanced and psychological flow have mediated the relationship between work autonomy and innovative work behavior. The results of this study highlight the requirement for the application and game developer companies to give and improve a policy for employees to control their own work because innovative work behavior is strongly influenced by work autonomy, especially by criteria autonomy. This study provides contribution in examining the mediation mechanism, particularly the psychological flow, which is a key variable but has little research.

Keywords: Innovative Work Behavior, Psychological Flow, Work Autonomy, Work-Life Balance

Introduction

Creative economy is a newly formed economy that relies on the creativity of Human Resource as its main factor of production in the economic activity, and is regulated by the Ministry of Tourism and Creative Economy, also known as *Kemenparekraf* (Thomas, 2019). The creative industry is considered as the future of industry of Indonesia (Hamdani, 2019). The significance of this contribution given by creative economy has made Indonesia to have prospects to become the country with the fifth highest income in the world by 2030 (Harefa & Nuky, 2018). This immense contribution in the sub-sector is also brought about by the substantial growth of businesses in the field of application and game development. Based on data in the year 2016, there are 12.441 businesses in this sub-sector within the period of two years (Sabdarini, 2018). There are a lot of start-up companies in this sector today. The immense growth of this sub-sector has made competitions to be more intense, therefore entailing the workers in the application and game development industry to improve their product quality to be able to compete, both domestically and internationally.

The abundance of creativity, ideas, and concepts are required to improve product quality. Innovation too is required for companies in this sector. Innovative work behavior is important in allowing creativity of employees to contribute in product innovation and therefore in the company. Innovative

work behavior is defined as every action oriented to bring about changes within the organization, both as form of products or processes (Krause, 2004). Several divisions are naturally in charge of continually creating new formations and innovations, thus this work behavior to be able to bring about creativity and innovation is incredibly needed. These divisions may involve software or IT development, designer, product producers, product development, and so forth. The need to innovate is also seen in the area of marketing as it is thought to be a dynamic area, where the job has to go along with the trends and growing information to market products that are acceptable to the consumers.

As for the employees of application development, their responsibilities are based on projects with unexpected work load, requiring consistent project delivery within the agreed timeline without any critical bugs (Mathew, 2007). Based on the employees of game development companies spread out in several countries, 51% of them mentioned that they work overtime due to the presence of critical time to finish products within the deadline (crunch time). During this crunch time, 37% work 50-59 hours per week, 29% work 60-69 hours per week, and the rest 14% work more than 70% per week (International Game Developers Association, 2018). The application and game developer sub-sector in Indonesia have excessive work time. The application and game developer sector was once the highest sub-sector in the creative industry which had excess working hours with a percentage of 86.40% (Sabdarini, 2016). Time pressure is considered as the destructive factor and negatively impact the innovative work behavior. When this negative factor arises, other factors are then required to support the innovative work behavior. These factors may both be external or internal. Common ways that applied by several companies in the creative industry, especially in the application sector and game developers is giving work flexibility to their employees.

According to a research earlier, one of the external factors affecting the innovative work behavior is work autonomy, or the freedom to control work. Spiegelaere, Gyes, Witte, Niesen, Hootegem (2014) explained that the freedom in working, whether of methods, schedules, and work evaluation criteria, influences the innovative work behavior of employees. Nielsen & Cleal (2010) revealed that employee autonomy can increase motivation in the workplace. Although motivation is a broader domain, psychological flow itself is seen by involving aspects of intrinsic motivation (Bakker, Golub, & Majdarijavec, 2017). Demerouti (2006) who researched on the job characteristics one of which being work autonomy, found that this is related to the psychological flow in working, or also the experience requiring absorption, enjoyment, and intrinsic motivation. Psychological flow drives positive results to individuals such as productivity, satisfaction with life, positive mood and emotions and others (Mihelič & Aleksić, 2017). Psychological flow affects individuals who need creativity task in carrying out their daily work so that the optimal experienced has an important role in stimulating innovative behavior.

Research done on work-life balance in gaming industry in Finland concluded that the employees feel the work-life balance between their job and personal lives (Nahkamäki, 2015). James (2013) has found that work-life balance improves the learning capabilities of employees, allowing them to concentrate, innovate, be involved in their job, have the capability to lay new ideas, therefore initiating the innovative work behavior amongst IT developers. This is brought about by participating in many activities, and interacting socially will give various points of view that will expand into new ideas (Mihelič & Aleksić, 2017). If individuals can manage and carry out their personal lives without conflict with work, the quality of an individual's private life will be positive, and provide satisfaction.

This satisfaction in personal lives outside their job can increase their positive feeling towards their jobs and also increase the individual’s ability in creating new things (Tang, Huang & Wang, 2017). Mihelič & Aleksić (2017) stated that individual’s satisfaction on work-life balance can reduce fatigue so that the individual may have several roles and do not have any difficulties in overcoming various requests needed. This satisfaction triggers positive affection as the individual is involved in meaningful life events to the individual, which leads to high probabilities for the individual to experience psychological flow during activities. Psychological flow is defined as an action experienced by the individual in which the individual takes control and is in harmony in carrying out activities, resulting in a condition of complete and optimum involvement within the activity (Maeran & Cangiano, 2013). This optimum condition is the condition where the individual is highly concentrated and focused on the job, so much so that he gets carried away by time.

Innovative work behavior had been researched by many countries in diverse company. A research study in Malaysia by Hilmi, Pawanchik, Mustapha and Mahmud (2012) shows that Malaysian employees does have a high level of innovative work behavior. Saether (2019) mentions that R&D employees in high-tech companies in Norwegia expected to have high levels of innovative work behavior as contribution to their firms' innovations. Innovative work behavior had been conducted in diverse industries in Indonesia but with small number of studies for examples, study in hospitality industry (Noerchoidah, Eliyana & Christiananta, 2020). Owing to explanation above, researches about innovative work behavior that focus on creative industry is still rare in developed countries.

Based on the earliest research, the researchers wanted to analyse the factors that may influence the innovative work behavior by investigating the effects of policy in giving the freedom at work (work autonomy), positive feeling based on balanced work and personal life (work-life balance), optimum condition, and the individual involvement on one's work (psychological flow). For this reason, the researchers are interested in deepen their knowledge of the impact of work autonomy towards innovative work behavior at work, mediated by work-life balance and psychological flow of employees in application and game development sector in Indonesia.

Literature Review

Innovative Work Behavior

Krause (2004) defined innovative work behavior as every action oriented to bring about changes within the organization, both as form of products or processes. This concept emphasizes on a situation requiring problem solving or requiring change. An individual who tries to find solutions by giving a new idea and tries to implement it is said to have behaved innovatively. Innovative work behavior has two dimensions in its implementation, exploring ideas and solutions, and then implementation of those ideas (Krause, 2004).

Generation ideas is every process involving the behavior of analysing and formulating problems, finding new ideas, whether developed anew or combination of existing ideas, in order to propose an idea. Generation idea process is related to implementation. The second dimension is implementation: the process at which the new idea is being used and distributed. Implementation of this innovation gives new knowledge, making this stage of the process a repeating one. This concept emphasizes on the fact that implementation and generation ideas are inter-related to each other (Krause, 2004).

Work Autonomy

The theory of work autonomy by Breaugh (1985) is oriented to Hackman & Oldham (1975), however executing the work independence aspect, therefore work autonomy is then categorized into three. First is work method autonomy, explaining the level of freedom and choices owned by an individual regarding to procedures and methods they are to use in going about their work. Second is work scheduling autonomy. The definition of this is the level of sense of belonging owned by an individual in controlling their own schedules to carry out their job. Third is work criteria autonomy, explaining the level of ability of an individual in modifying or developing the criteria to be used in evaluating work performance.

Work-Life Balance

In his research, Fisher (2001) emphasizes on work-life balance being a perception of each individual whether they have the resources (time, behavior/achievement of goal, energy and effort) both in personal life and at work, thus showing the presence of balance of both roles. Fisher, Bulger, & Smith (2009) stated that someone has work-life balance when there is time, behavior (achievement of goal), energy and effort in both areas of life. Work-life balance can be seen from four aspects (2009), first is Work Interference with Personal Life (WIPL), that views whether work life intervenes the personal life

of an individual, for instance, the high work load and working hours interrupts oneself to take care of personal life.

Second aspect is Personal Life Interference with Work (PLIW), viewing how far the personal life of an individual intervenes work life, so as to interrupting the performance of work. Third aspect is Personal Life Enhancement of Work (PLEW). This aspect views the positive impact in the work-life relationship. The positive impact of personal life of an individual to the work life can be seen from this aspect. How the personal life impacts positively the work performance of an individual is also shown, for instance the improvement of work performance due to the content psychology of an individual. The last aspect is Work Enhancement of Personal Life (WEPL). In contrast to PLEW, WEPL views how far the work life of an individual positively impacts the personal life, for instance the ability obtained from work has helped an individual in behaving adaptively in one's personal life.

Psychological Flow

Psychological flow is also known as Optimal Experience, which is achieved by optimum work performance followed by positive mental condition and positive thoughts (Csikszentmihalyi, 1990). Bakker (2008) defined psychological flow from three aspects, absorption, enjoyment and intrinsic motivation. Bakker (2008) defined absorption as the level of complete concentration that occurs in an individual when one is completely deep in the work. Second aspect is work enjoyment, defined as a form of cognitive and affective evaluation of psychological flow experience, making an individual feel the sense of contentment and enjoyment during work. Third aspect, intrinsic motivation, is defined as the push in an individual to do the related work for the purpose of achieving the contentment and satisfaction that are adhered to the activity or work (Bakker, 2008).

Research Model and Hypothesis Development

The factors affecting innovative work behavior have been greatly found before through several researches. External factors that may build innovative work behavior at work is by implementing work autonomy policy. Giving high control to employees in doing their job, especially the freedom in using methods to complete their tasks, has effectively encourage them to develop new and innovative ideas (Spiegelaere, Gyes, Hootegem, 2016).

The research done by Sia & Appu (2015) explained that by giving autonomy, the minds of employees will be more relaxed hence they are capable of creating new ideas, initiating the emergence of innovative work behavior. The research done by Kono, Sekiguchi, Suzuki and Takaishi (2018) on interaction of method autonomy, schedule autonomy and criteria autonomy towards innovative work behavior proved that these three kinds of autonomy impact the innovative work behavior.

In the scope of this research, employees working in application and game developer experience higher pressure and work demand as seen from the average working hours exceeding 48 hours a week. Work autonomy is one of the many ways given by the management to the employees to let them have control over their own responsibilities of giving qualified productivity, seen from their abilities in creating ideas and in implementing the existing innovation. The effectivity of work autonomy towards innovative work behavior has been proven by earlier researches. Based on this, the first hypothesis of this research is therefore:

H1. There is a positive relationship between work autonomy and innovative work behavior

Moving over to a more intrinsic factor, the internal factors, it is known that positive evaluation towards the quality of personal life and its impact to positive evaluation of work also significantly influence the initial aspect in innovative work behavior (Tang, Huang & Wang, 2017). When personal life and work life experiences bring about positive qualities, the individual will have positive value of oneself, therefore pushing the emergence of innovative behavior at work (Mishra, Bhatnagar, Gupta, Wadsworth, 2017).

Reviewed from the other researches, work autonomy also impacts aspects other than innovative work behavior. According to Russel (2009), an individual who has the freedom to control his job has better balance between work and personal. Chung (2017) stated that work autonomy impacts both personal life and job, as work autonomy reduces conflicts that might occur between work and personal life. Wheatley (2012) also acknowledged that with the freedom of control and flexibility at work, the individual can reduce conflicts within work life and personal life, decrease work stress, and avoid pressing situation. These discoveries and statements led to the hypothesis as follows:

H2. There is a positive relationship between work autonomy and work life balance

Maeran and Cangiano (2013) had done a research that analysed the relationship between job characteristic and psychological flow where autonomy was one aspect of the job characteristic. The results implied that autonomy impacted significantly and positively the psychological flow. Likewise, Bakker (2005) did a research on the relationship of social support, supervisory coaching, autonomy and feedback towards psychological flow. The result also indicated that there was an impact created by autonomy to psychological flow. The research done by Demerouti (2006) was also consistent with the previous research, stating that impact of autonomy was one of motivational potential score to see the relationship of psychological flow at the workplace. Looking at the earlier researches, autonomy increases the occurrences of psychological flow or work optimization in employees. If employees often experience psychological flow or optimum working experience, then it is expected that they would give quality result. Thus, based on this, the researcher came up with the hypothesis as follows:

H3. There is a positive relationship between work autonomy and psychological flow

The research done by Mishra, Bhatnagar, Gupta, Wadsworth, (2017) proved that when personal and work life mutually give positive qualities, the individual will value themselves positively, this therefore enforces the emergence of innovative behavior at work. James (2013) also stated that positive values to work-life balance contributes to innovative behavior. Other supportive researches revealed that mutual relationship between work life and family has the potential to improve innovative behavior (Fletcher & Bailyn, 2005). Mihelič & Aleksić (2017) explained that work-life balance can increase the individual's ability in creating new ideas, which is one of the aspects of innovative behavior. This is because the interaction with surroundings will enrich the individual's ideas and knowledge. Participating and being involved in various activities, together with interacting socially, will give wide perspectives that will enhance the individual's ability in creating and innovating. Jaussi, Randel & Dionne (2007) mentioned that the experience obtained outside of work will give positive impact to the individual's ability in developing new ideas while at work, and this is one part of innovative behavior.

H4. There is a positive relationship between work-life balance and innovative work behavior

According to the research done by Tang, Huang & Wang (2017), when an individual is content with their personal life outside of work, the individual is able to channel positive feelings towards their job. Positive feeling makes the individual works optimally. This can also increase the ability in innovating new ideas, which is one aspect of innovative work behavior at workplace. Mihelič and Aleksić (2017) explained the underlying process of this is because work-life balance can decrease individual's fatigue, enabling them to overcome the demands of different needs and roles.
Positive value to work-life balance triggers positive affection situation as the individual involved in life considered to them as meaningful. The research done by Kuhnle (2012) aligned with the other researches stating that there was positive correlation between work-life balance and psychological flow.

H5: There is a positive relationship between work-life balance and psychological flow

One factors that can encourage the formation of innovative work behavior is psychological flow (Maqbool, Černe, and Bortoluzzi, 2019). Psychological flow give rise to an individual fully involving oneself with his work. This full involvement includes cognitive, affective, and motivation, brings positive impacts to organizational activities, such as problem solving, strategy formulations, making approaches which are also a form of creative organization behavior (Zubair and Kamal, 2015).

H6. There is a positive relationship between psychological flow and innovative work behavior

The research done by Abstein and Spieth (2014) that saw the role of work-life conflict as an antithesis of work-life balance in mediating human resource management policies, one of them being autonomy, towards innovative work behavior concluded that work-life conflict had negative correlation to innovative behavior, and autonomy as an approach in giving freedom to the employee too had negative correlation with work-life conflict, therefore increasing innovative work behavior. This also explained that there was a mediating role of work-life conflict. The previous explanations on various researches concluded that work-life balance impacts innovative work behavior positively (Mishra, Bhatnagar, Gupta, Wadsworth, 2017; Mihelič & Aleksić, 2017) and work autonomy impacts work-life balance positively (Russel, 2009; Chung, 2017; Wheatley, 2012). All of the three constructs have preceding interconnected researches and are supported by research, therefore to that reason, the researcher constructed the following hypothesis:

H7: work life balance has a mediating effect on the relationship between work autonomy and innovative work behavior

The research done by Zhou (1998) stated that autonomy improved one construct of psychological flow, intrinsic motivation that in turn encouraged the emergence of new ideas, which is part of innovative behavior (Zhou, 1998). Other research also stated that work autonomy can affect innovative work behavior through the role of work engagement, where the construct is related to psychological flow, absorption (Spiegelaere, Gyes & Nielsen 2014; Spiegelaere, Gyes & Hootegem, 2016). Based on this, psychological flow is then expected to have its role in mediating the impacts between work autonomy and innovative work behavior. Therefore the researcher constructed the following hypothesis:

H8: Psychological flow has a mediating effect on the relationship between work autonomy and innovative work behavior

Based on the conceptual model, the following hypotheses were developed for testing:

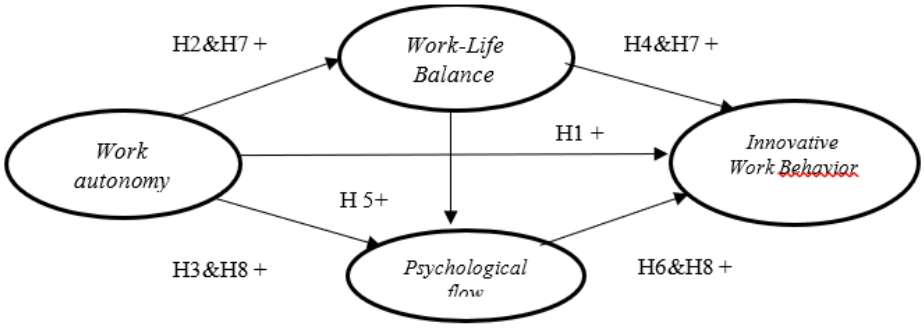

Figure 1: Research Model

Research Methodology

Procedure and Sample

The approach used in this research was quantitative approach based on the research that was to be done. Respondents in this research comprising 263 respondents from several companies in Indonesia that develop applications or games. Respondents gave several answers about their job sectors, because of this, researchers divide into five type sectors of application and game developer sectors (game developer, e-commerce, financial technology, information technology developer, and internet of things). Majority of respondents work at e-commerce sector with a total 90 respondents. In addition, there are 70 respondents which work at game developer sector, 60 respondents work at information technology developer, and the rest with a total 24 respondents work at internet of things sector.

Snowball sampling was used in this study by asking for help from existing population members. Questionnaires were distributed using social media. Participation was entirely voluntary. Respondents were assured that their responses to the online survey are confidential. The research data was collected from the end of August to December 2019. The research process from the preparation stage to the data processing was carried out from January to December 2019. In processing the data, the researchers used LISREL 8.8 as the software that can process Structural Equation Modeling (SEM) to analyze the data obtained, and SPSS was used to analyze the statistical description.

Measurement and Scales

Researchers took primary data using questionnaires about perceptions of work autonomy, (Breaugh, 1985) work-life balance (Fisher, 2001), psychological flow (Bakker, 2008) and innovative work behavior (Krause, 2004). The questionnaires were self-reported, reflecting assessments of environment and personal life. The primary data obtained were composed of: respondent demographic data in the form of gender, age, marital status, company of work, and department of work. Likert scale was used as the measurement scale in this research, with the range of 1 (fully disagree) to 5 (fully agree). The questionnaires were adapted by translation from English to Bahasa Indonesia to accommodate the understanding of the respondents.

The results of pre-tests done on 36 respondents resulted to reliability values of each of the four variables with Cronbach's alpha of ≥ 0.7, therefore concluded that the measurement tools of work autonomy, work-life balance, psychological flow and innovative work behavior were reliable (Maholtra, 2010). Of validity of pre-test results, it was known that the value of component matrix in work-life balance variable WIPL1 item was $0.141 < 0.5$, which according to Malhotra (2010), a measurement tool is stated valid if the value of component matrix is greater than or equal to 0.5, therefore the item was demoted by the researchers and was not used in the real test. In the validity test using the overall data of 263 respondents, based on the analysis process using LISREL 8.8, it was known that three items have factor loading values of < 0.05. The researchers decided to reduce those three items in the data process in order to improve the reliability and validity of the measurement tools.

Results and Analysis

Before analysing the model, goodness of fit test was conducted. The goodness of fit test can be decided by comparing the calculated Goodness of Fit (GOF) value to the predetermined standard value. The result of GOF is shown in Table 1. The result showed that the overall value of Goodness of Fit was said to be highly suitable with the model.

Table 1. Goodness of Fit Index

Criteria	Provision	Actual Value	Conclusion
RMSEA	≤ 0.08	0.065	Good fit
GFI	≥ 0.90	0.95	Good fit
NNFI	≥ 0.90	0.97	Good fit
CFI	≥ 0.90	0.98	Good fit
RFI	≥ 0.90	0.95	Good fit

Proceeding to the hypothetical analysis, it was known that the research hypothesis was acceptable if the t-value was greater than or equal to 1.65 in one-tailed hypothesis. Figure 2 shows that there was only one correlation t-value under 1.65. This showed that there was one objected hypothesis. Thus, concluded that H1-H4 as well as H6 were accepted, showing that there are significant positive impacts between the research variables. On the other hand, H5 was objected, showing that there is no significant impact between work-life balance and innovative work behavior.

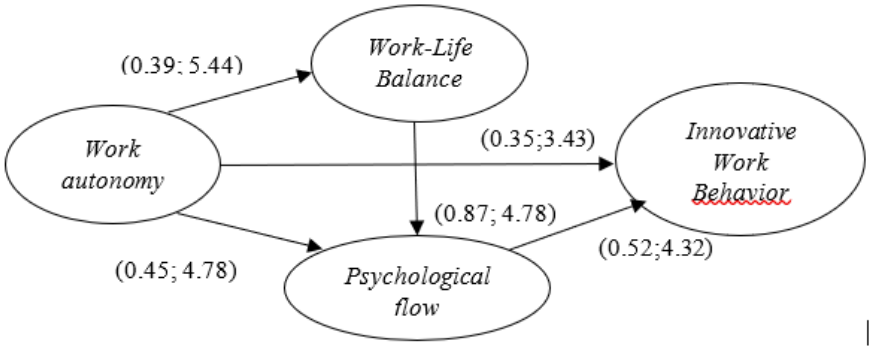

Figure 2: Hypothetical Test Result Model

From the result of mediation calculation on Table 3, it is shown that work-life balance as a mediator did not fulfil the third requirement of Baron and Kenny (1986) because it does not have direct impact (direct-only-non-mediation) to innovative work behavior. On H8 hypothesis, it was known that psychological flow mediates the relationship between work autonomy to innovative work behavior by *partial mediation* according to Baron and Kenny (1986).

Table 3: Mediation Impact Test Result

Construct	Model 1	Model 2
work-life balance as mediator	4.68	3.43
psychological flow as mediator	4.42	3.43

Based on the result of the research done, it is found that the high work autonomy, especially in giving enough control in deciding the goal of work to application and game development employees is in fact pushing them to behave innovatively. This is shown from the values on work autonomy variable ((β = 0.35, t-value = 3.43). When there is high level of delegation in the work autonomy, there is improvement in innovative work behavior. This high control shows that the employees have the freedom in choosing or changing methods, procedures, schedules, and working criteria. Spiegelaere, Witte, Gyes, Niesen (2014) states that work autonomy, be it in methods, scheduling, or work evaluation criteria, has significant impact in improving innovative work behavior. Sia & Appu (2013) explains that work autonomy influences individuals, therefore encouraging them to develop new ideas, which is also included in the generation ideas aspect of innovative work behavior.

The balance of personal and work-life felt by the employees also enhances the birth of innovative behavior by influencing psychological flow (β = 0.87, t-value = 4.78). This shows when the interaction between personal and work life is more positive, the more often they will feel optimum experience in carrying out their job. Also, the innovative behavior is enhanced by psychological flow (β = 0.52, t-value = 4.32). Psychological flow promotes the birth of new ideas and innovative behavior such as experimentations, taking risks, and innovating (Mihelič & Aleksić, 2017).

Work autonomy is also known to influence psychological flow that impacts on the improvement of innovative work behavior (β = 0.45, t-value = 4.78). When employees are given freedom and flexibility to adjust when and how the work should be done according to the wants from within oneself, they will work positively and will be absorbed into their work. The freedom in choosing which method and order the task are to be done, will activate the intrinsic motivation to carry out the work. (Theurer, Tumasjan, Welpe, 2016).

Table 4. Standard Loading Factor of work autonomy indicators

Construct	SLF
Method autonomy	0.69
Schedule autonomy	0.75
Criteria autonomy	0.76

The results from table 4 shown that the highest SLF value on autonomy work dimension is criteria autonomy with 0.76. Schedule autonomy has an SLF value of 0.75 where this value nearly close with the criteria autonomy value, and method autonomy has an SLF value of 0.69. This shows that the criteria autonomy has the biggest role in the work autonomy at this study.

Discussion

Based on the results, the work autonomy given to the application and game developer employees would lead to the improvement to their innovative work behavior, particularly if they perceived that they experienced work life balance and psychological flow. The work autonomy is in fact plays a major role in improving innovative work behavior, especially the control over determining objectives. These objectives are related to tasks needed to be done in a certain period of time. Companies in application and game development sector applies Objectives and Key Results (OKR). OKR is determined from the scope of organization to the individual himself. When given autonomy in the form of enough control, employees are then able to negotiate and propose alternative options of work targets. When given enough control to determine and evaluate objectives, employees will then become more critical. This will train them to solve problems and form plans to innovate new ideas as one form of effective and efficient solutions. As a developer, these abilities are very much needed to develop better application updates, and they need to be done quickly. Aside from that, giving enough freedom in determining objectives enables employees evaluate themselves and their results. Once they were aware of what needs to be reviewed and improved based on their own results, they will strive to improve their work quality by cultivating new and innovative ideas that can be implemented at work.

The presence of psychological flow experience, particularly contentment of work, is able to strengthen innovative work behavior of employees working as application and game developers. Freedom at work relieves the burden and pressure of work targets to employees that in turn enables them to be focused and to enjoy working. This also gives them positive values when working. They will then not slumber and are spirited at work even when they get tired.

Giving work autonomy is one policy among others that can create positive feeling at work. The policy that enables employees to maintain their work-life balance that they can value their life positively is in fact affecting their optimum work, which in turn improves innovative behavior. This is because work autonomy gives room for employees to improve their balance between personal life and work life. Positive affect brought about personal life impacts workers in such a way that they will become more relaxed and are able to focus on their job. This shows that they are enabled to work optimally or experience psychological flow.

Conclusion

Based on the explanation on the result of research analysis, the conclusion that can be made is that work autonomy gives positive and significant impact to the innovative work behavior of the workers in application and game development sector. This means, the higher the work autonomy owned by the workers, the higher the innovative behavior. Other factors influencing innovative work behavior is psychological flow that has been found to give positive and significant impact towards innovative work behavior. This means that the more often the workers are absorbed and optimally work, the more they behave innovatively. Work-life balance is known to have no significant impact towards innovative work behavior. Other than direct impact, work autonomy has indirect positive and significant impact towards innovative work behavior through psychological flow, while work-life balance does not have

any role in mediating the effect of work autonomy towards innovative work behavior. Stating that the higher the work autonomy, the higher the chance of occurrence of psychological flow, thus the higher the innovative work behavior.

Managerial implication, limitation and future research

Other than the results obtained, researchers also give suggestions for managerial implication. Suggestions that can be given to the company managements in the field of application and game development sector to improve innovative work behavior among employees are, first, to implement a policy for them to control their own work criteria and goals because criteria autonomy has not been implemented equally in companies. This can be supported by applying suitable goal setting framework, such as Objectives and Key results, therefore providing an open discussion and meeting space to discuss together of the goals to be achieved. Another method that can be done to give rise of innovative work behavior is by improving the abilities of employees to work optimally (psychological flow).

Another solution that can be implied in establishing innovative behavior is by expanding their abilities to work optimally (psychological flow). Based on this, the company needs to focus on developing intrinsic motivation, one aspect of psychological flow, and on continuously improving positive affect of employees at work. One way that can be done to improve this motivation is using the role of manager to give explanation about the meaning of the job they do, so they are aware that their roles have significant contribution within the organization or company, and enabling them to use their time efficiently to work even when they have spare time.

Despite its contributions, several shortcomings of this study should be noted. The first limitation is about self-reported nature of the gathered data and it could impact the result because of the possibility of bias. To reduce this concern, future research can use different methodological approaches, including expert ratings from supervisor for innovative work behavior questioner. Another limitation of this research is the unavailability of data on the population, as only 263 participants were involved in the present study, the sample size may have caused the not significant results. So, one of the recommendations is to increase the sample size of participants, including employees from diverse sub-sectors in creative digital industries. This would enhance the generalization of research findings to the entire population. Suggestion for future studies if done with similar research design with similar contexts, the researchers recommend the following to be noted down. The next research should use other methods such as longitudinal method. This recommendation may encourage more future researches to do sustainable researches over long period of time, hence the analysis of cause-consequences of innovative behavior may be explained more profoundly. Other suggestion for future research is to enrich the research field by adding new antecedents, whether as independent variable, moderator, or mediator because there is still little research that addresses about innovative work behavior and the factors which could influence it.

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The Influence of Time Budget Pressure, Self-Efficacy, Resilience, and Burnout on Reduced Audit Quality Practices in a Public Auditor Institution

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Abstract

Quality audits have a crucial role in the effectiveness of government administration. Previous studies showed that audit quality can be altered by several variables, therefore the purpose of this study is to be able to find out whether time budget pressure, self-efficacy, resilience, and burnout affect the reduced audit quality practices (RAQP) resulting in lowering the audit quality, on auditors in the public sector. Data were collected by distributing on-line questionnaires to 385 public auditors and Structural Equation Modeling was used for data processing. The results showed that time budget pressure had a significant positive effect on burnout and RAQP, whereas self-efficacy and resilience had a significant negative effect on burnout and RAQP while burnout showed a significantly positive value on RAPQ

Keywords: Time Budget Pressure, Self-Efficacy, Resilience, Burnout, Reduced Audit Quality Practices, Public Auditor

Introduction

Based on the data quoted from Trading-Economic (2019), the Indonesia's Corruption Perception Index (CPI) was 38 from 100 in 2018. Corruption Perception Index ranks the countries based on the corruption perception done by its public sector. Zero-point mean very corrupt and 100 points mean very clean. Thus Indonesia's CPI can be considered very low.

The government audit report on the country's potential loss from the year 2017 until 2019 is shown in figure 1. Lee, Su, Tsai, Lu, and Dong (2016) stated that ensure the audit quality was an important approach to increase the resource also to stimulate economic growth. Audit quality holds a crucial role in government administration's effectiveness.

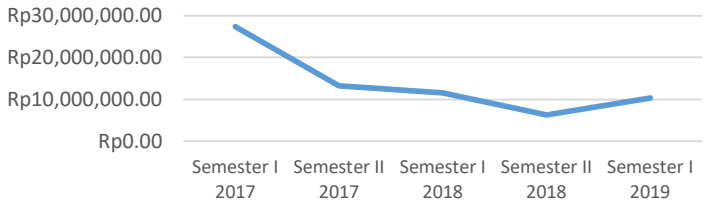

Figure 1: Total Government Loss (in million Rupiahs)

Source: (BPK-RI, 2017a, 2017b); BPK-RI (2018a); (BPK-RI, 2018b, 2019)

From the earlier study, it is known that audit quality can be influenced by several variables. Time budget pressure (TBP) aroused when allocated time for audit is less than the actual time needed to finish the audit, therefore the auditors using their personal time to be able to finish the audit on time (Sayed Hussin, Iskandar, Saleh, and Jaffar, 2017). Ettredge, Sun, Lee, and Anandarajan (2008) states that from the conclusions of the results of several studies show that time budget pressure (TBP) does exist in the audit sector, and the auditor must constantly trade-off between the time dedicated to carrying out the financial statement audit work and the quality of the results of his work with the cost to do his work. Gundry, and Liyanarachchi (2007) stated that audit quality (AQ) was negatively affected by higher TBP compared to optimal TBP. Therefore auditors feel the pressure because they have to carry out the tasks within the specified timeframe to complete the audit.

On the other hand, the ability and technical knowledge related to auditing and the ability to solve problems become important determinants of judgment task performance. Traits possessed by an auditor such as self-efficacy and goal orientation may be able to distinguish the level of audit judgment. The effect of self-efficacy on social and cognitive aspects of the judgment in various work conditions has been recognized, but the research examining the effect of auditor self-efficacy on audit performance judgment is still very limited (Sanusi, Iskandar, Monroe, and Saleh, 2018). If it said that AQ is easily affected by the auditor's ability, effort, and persistence than if there is an effort to upgrade the level of self-efficacy (by changing belief, information, and knowledge), it can lead to improvement of auditor's work result. (Lee, Su, Tsai, Lu, and Dong, 2016).

Smith, and Emerson (2017) found that the higher the auditor's level of resilience in dealing with stressful situations, the less likely that the auditor would take action to reduce AQ. The auditor plays an important role as the front line institution that maintains the process of preparing financial statements, as well as plays an important role in the effectiveness of capital market turnover. As a result, everything that has the potential to reduce AQ is an important concern for management, investors, regulators, and all stakeholders who may be affected by the financial statements.

Burnout is a common occurrence among auditors. Audit offices are well known for their busy work patterns and this industry has historically been associated with high turnover rates (Cannon and Herda, 2016). Previous studies found that high workload contributed to burnout, increased turnover and decreased performance. Over time, audit offices are increasingly aware of this problem and are increasing efforts to monitor and manage workloads. Despite the efforts made, there are still concerns that the high workload could negatively impact AQ (Persellin, Schmidt, and Wilkins, 2018).

Literature Review

Reduced Audit Quality Practice (RAP)

Audit Quality (QA) is a crucial concept in auditing. Colbert, and Murray (1999) suggested that it is hard for the management to be able to measure AQ because AQ cannot be observed. It has to be assessed from planning and the audit scope and the auditors have to be assessed periodically. Audit quality also often discussed as reduced AQ, which is lower audit quality and much more specific which behavior that caused the reduced AQ. Broberg, Tagesson, Argento, Gyllengahm, and Mårtensson (2016) defined reduced AQ as an action that intentionally and not supposed to reduce the efforts to collect the audit data. Behaviors that associated with reduced AQ are a concern for the audit profession because it tends to be a systemic action. Previous research indicates that more than half of auditors admit to doing at least one deviant behavior. Apart from reduced AQ actions carried out both individually and collectively, it does not always result in an impaired audit opinion, but such behavior has the potential to lowering the validity of the audit (Smith, Emerson, and Boster, 2018).

Time budget pressure (TBP)

Time budget pressure (TBP) is a time constraint that arises or may arise due to limited resources (time) allocated to carry out audit tasks (DeZoort and Lord, 1997). Andreas (2016) states that TBP is a condition in which auditors have to face limited time allocation to implement the audit program. A tight time budget is perceived as a time pressure in carrying out audit procedures that trigger an imbalance between the time available and needed to complete the audit task, furthermore, this can trigger the dysfunctional behavior of the auditor. Several studies have been conducted to determine the relationship between TBP and AQ and underreporting time. Umar, Sitorus, Surya, Shauki, and Diyanti (2017) refer to Utary (2014) argued that if the time budget is difficult to be met, then dysfunctional audit behavior will increase. However, if the auditor shows dysfunctional behavior, then it will have an impact on the declining quality of the audit, both directly and indirectly (McNamara and Liyanarachchi, 2008). Examples of dysfunctional behavior performed by auditors are reducing or replacing some procedures and collecting ineffective audit evidence (López and Peters, 2012).

Self-efficacy (GES)

Self-efficacy is a construct that represents one of the key aspects of social-cognitive theory (Bandura, 1994). In his theory of behavior change, Bandura stated that self-efficacy determines whether the behavioral action will be initiated, how much effort will be made, and how long it can last for obstacles and failures. According to several theories and research, self-efficacy makes a difference in how an individual thinks, feels and reacts. In terms of feelings, low levels of self-efficacy are associated with depression, anxiety, and feelings of hopelessness. Someone with a low level of self-efficacy will also have a low level of self-esteem and will have a pessimistic feeling about their achievements and development. In terms of cognitive, the feeling of having certain strong competencies can facilitate cognitive processes and performance in a variety of circumstances, including in terms of producing decisions that determine the quality (Schwarzer and Hallum, 2008). Refer to (Chen, Gully, and Eden, 2001), Zhang (2018) states that self-efficacy is generally defined by certain tasks that one thinks of, but can also refer to various achievement situations.

One consequence of high self-efficacy levels on auditors is tending to make it difficult for the auditor to make soft decisions on material audit issues compared to auditors who have lower self-efficacy levels (Svanberg, Öhman, and Neidermeyer, 2019). Sanusi, Iskandar, Monroe, and Saleh (2018) also stated, in the context of the audit, the auditor's confidence in their ability to carry out the task requires the belief that they have cognitive abilities to carry out their duties. This trust in cognitive abilities is known as self-efficacy. Self-efficacy is a motivational construct that influences individual activity choices, levels of achievement, persistence, and performance in certain contexts. Self-efficacy represents an individual factor that, according to social cognitive theory, affects judgment performance (Stajkovic and Luthans, 1998).

Resilience (RES)

Resilience is not easy to define, in general, the approach to defining resilience is grouped into three things: some researchers think that resilience is in a person (trait), other researchers argue that resilience is a result of behavior, and several other researchers consider resilience to emerge as a process (Gras, Font-Mayolas, Baltasar, Patiño, Sullman, dan Planes, 2019). Connor, dan Davidson (2003) define resilience as a personal quality that enables a person to develop in dealing with various problems.

Burnout (BOT)

Burnout is conceptualized as a negative psychological response to work demands and / or interpersonal stressor (Almer and Kaplan, 2002); (Cordes and Dougherty, 1993) and is thought to manifest through repeated or extended exposure to stressors. Smith, Emerson, and Boster (2018) states that burnout is a negative psychological response that arises as a result of work pressure and/or interpersonal conflict and arises as a result of repeated stresses over a long period. Cordes dan Dougherty (1993) defines emotional exhaustion as a feeling of lack of energy and decreased emotional resources of a person, and

depersonalization as a tendency to treat others separately, and do not care. Reduced personal accomplishment is characterized by a feeling of low self-esteem, low motivation, and an inability to work satisfactorily, for example, a tendency to evaluate someone negatively.

Research Model and Hypothesis Development

Effect of Time Budget Pressure, Self-Efficacy, Resilience and Burnout on Reduced Audit Quality Practices

Auditors are routinely preoccupied with a variety of audit clients, must follow strict task scheduling, conduct mentoring, must meet job demands, as well as participate in various types of training in one work year. During busy periods, the auditor can work extra for more or less 5 hours than usual working hours (Persellin, Schmidt, and Wilkins, 2018). The high demands of the auditor's work will be increasingly challenging and consuming time during the auditor's busy period. The auditor will be burdened with high time pressure and overtime hours and risky decision making (Lopez dan Peters, 2012). Smith, and Emerson (2017) suggested that the higher the level of auditor's resilience can reduce the level of burnout and also minimized the RAQP.

H1a: Time Budget Pressure has a positive effect on Reduced Audit Quality Practices
H2a: Self-efficacy has a negative effect on Reduced Audit Quality Practices
H3a: Resilience has a negative effect on Reduced Audit Quality Practices
H4: Burnout has a positive effect on Reduced Audit Quality Practices

Effect of Time Budget Pressure, Self-Efficacy, and Resilience on Burnout

The research conducted by Treglown, Palaiou, Zarola, and Furnham (2016); Kutluturkan, Sozeri, Uysal, and Bay (2016) dan Hao, Hong, Xu, Zhou, and Xie (2015) suggested that the higher the level of auditor's resilience it can reduce the level of burnout. Earlier studies also found that burnout associated with absenteeism, poor job performance, reduced citizenship behavior, and increasing turnover intention. Smith dan Emerson (2017) states that, if stress is an immediate response to an environmental stressor, burnout represents the consequences arising from prolonged and repeated exposure to the same stressor. The duration of exposure to this stressor can defeat a person's coping abilities. Smith dan Emerson (2017) also found evidence of a relationship between stress and the individual components of burnout as well as the relationship between the dimensions of burnout with the emergence of job satisfaction, turnover intentions, and job performance. Burnout can lead to decreased effectiveness and productivity, reduced commitment to work, has a negative effect on domestic life and has a negative effect on health. (Guenette and Smith, 2018). :

H1b: Time Budget Pressure has a positive effect on Burnout
H2b: Self-efficacy has a negative effect on Burnout
H3b: Resilience has a negative effect on Burnout.

Based on the hypotheses above, the research model can be depicted as figure 2.

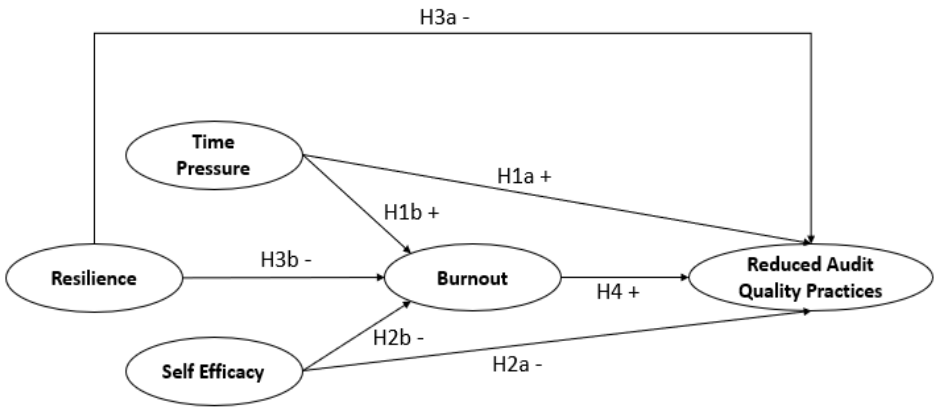

Figure 2. Research Model

Research Methodology

Procedure and Sample

The population in this research is the public auditors in Indonesia. A total of 385 questionnaires was successfully collected from August until September 2019. This number already met the minimum criteria for using the Structural Equation Modeling (SEM) as suggested by Leohlin (2004) that the minimum sample used for SEM are 200 or as suggested by Wolf, Harrington, Clark, and Miller (2013) that the minimum criteria for using SEM are (1) 100-200 minimum sample; (2) 5-10 observation for each parameter; (3) 10 samples for each variable. The data collected then will be analyzed for its Confirmatory Factor Analysis (CFA) using Lisrel 8.8 program.

Measurement and Scales

This study uses primary data obtained through questionnaires given to respondents. The question used in this questionnaire is: (a) six-item for time budget pressure adopted from Sayed Hussin, Iskandar, Saleh, and Jaffar (2017), (b). ten-item for self-efficacy adopted from General Self-Efficacy Scales (GSE) by Schwarzer, and Jerusalem (1995); (c) ten-item for resilience adopted from The Connor-Davidson Resilience Scale (CD-RISC) by Campbell-Sills, and Stein (2007); (d) nine-item for burnout adopted from Smith, Emerson, and Boster (2018); (e) five-item for reduced audit quality practices adopted from Smith, and Emerson (2017).

This research questionnaire using a Likert scale with a range of 1 to 7 because it can increase the value of reliability and validity, and the use of a wider range of scales provides a wider range of answer choices for respondents so able to improve the distribution (Dawes, 2007). Emerson (2017) states that many researchers use a 7 or 9 Likert scale because the scale can work more robustly. Leung (2011) also suggested in his research that the presence of neutral points in the Likert scale used, did not show differences in the normality of the data, his research showed that the wider the scale used, the better normality of the data would result.

The research hypothesis testing was carried out after it was confirmed that the SEM model had met the good fit requirements and the indicator variables were valid and reliable in reflecting latent variables. Testing is done by looking at the path coefficient and t-value and then compared with t-table. The results of the test show how the direction and significance of the influence or relationship between variables. With a significance level of 0.05, the hypothesis is accepted if t-value ≥ 1.65 (Hair, Black, Babin, and Anderson, 2014). The mediation measurement will be referring to mediation measurement by Leohlin (2004).

Result and Discussion

The demographic data from the respondent are described in table 1. Therefore, the majority characteristics of the respondents were male, married, age of 31-40 years old, had a background education as undergraduate degree, and had possessed quite extensive working experiences of 6-15 years at the positions of young auditor.

Table 1. Respondent Demographic Data

Demographic Data	Respondent Count	Percentage
Sex		
Male	244	63.38%
Female	141	36.62%
Marital Status		
Married	323	83.90%
Single	56	14.55%
Widow/widower	6	1.55%
Age		
21-30 years old	45	11.69%
31-40 years old	268	69.61%
41-50 years old	65	16.88%
Up to 50 years old	7	1.82%
Education		
Bachelor	258	67.01%
Master	125	32.47%
Doctor	2	0.52%
Years of services		
1-2 years	16	4.42%
3-5 years	24	6.23%
6-10 years	148	38.44%
11-15 years	143	37.14%
Up to 15 years	53	13.77%
Working Position		
Junior Auditor	131	34.03%
Young Auditor	220	57.14%
Senior Auditor	34	8.83%

The variables reliability measures by Construct Reliability (CR) and Average Variance Extracted (AVE) and the result is each variable fulfills the reliability criteria. The complete measurement for AVE and CR from each variables are shown in the table 2.

Table 2. AVE and CR for each variables

Variables	Average Variance Extracted (AVE)	Composite Reliability (CR)
TBP	0.55	0.71
GES	0.52	0.88
RES	0.52	0.92
BOT	0.52	0.70
RAP	0.50	0.80

The measurement for goodness of fit of the research model is shown in table 3. The goodness of fit test can be decided by comparing the calculated Goodness of Fit (GOF) value to the predetermined standard value. The result showed that the overall value of Goodness of Fit was said to be highly suitable with

the model, since at least one measure for each type of fit measures indicated good fit (Hair, Black, Babin, & Anderson, 2014).

The results of hypothesis testing show that all hypotheses are acceptable because they show a significance value of t-value ≥ 1.65, as shown in figure 3, which describes the regression coefficient (β) and t-value between variables. The mediation measurement result shows that burnout mediates time budget pressure, self-efficacy, and resilience on reduced audit quality practices by complementary (partial) mediation.

Table 3. The Research Model Goodness of Fit

Fit Measures	Good Fit Criteria	Data Measurement	Notes
Absolute-Fit Measures			
Chi-square (X^2)		1767.61	Poor fit
ρ Value	≥ 0.05	1.00	
GFI	≥ 0.90 or 0.8 ≤ GFI ≤ 0.9	0.73	Marginal fit
RMR	≤ 0.05	0.20	Marginal fit
RMSEA	≤ 0.05 or 0.05 ≤ RMSEA ≤ 0.08	0.000	Good fit
SRMR	≤ 0.05 or 0.05 ≤ SRMR ≤ 0.1	0.23	Marginal fit
Incremental-Fit Measures			
AGFI	≥ 0.90 or 0.8 ≤ AGFI ≤ 0.9	0.69	Marginal fit
NNFI	≥ 0.90 or 0.8≤NNFI≤0.9	1.02	Good fit
NFI	≥ 0.90 or 0.8≤NFI≤0.9	1.00	Good fit
RFI	≥ 0.90 or 0.8≤NFI≤0.9	1.00	Good fit
IFI	≥ 0.90 or 0.8≤NFI≤0.9	1.02	Good fit
CFI	≥ 0.90 or 0.8≤NFI≤0.9	1.00	Good fit

The path diagram at figure 3 displays that the relationship between the time budget pressure and the practices of reduced audit quality variables shows a t-value of 8.28. Therefore, the hypothesis 1a can be accepted. This implies that the higher the time budget variable pressure felt by the examining staff at BPK-RI, then practices of reduced audit quality too will more and more increased. This is in line with research conducted by Gundry, and Liyanarachchi (2007); Otley, and Pierce (1996); Coram, Ng, and Woodliff (2004); and Broberg, Tagesson, Argento, Gyllengahm, and Mårtensson (2016), who stated that there is a positive significant relationship between time budget pressure with reduced audit quality practices. This is because with time pressure in completing audit tasks enlarge the possibility for auditors to take the appropriate actions reduce audit quality.

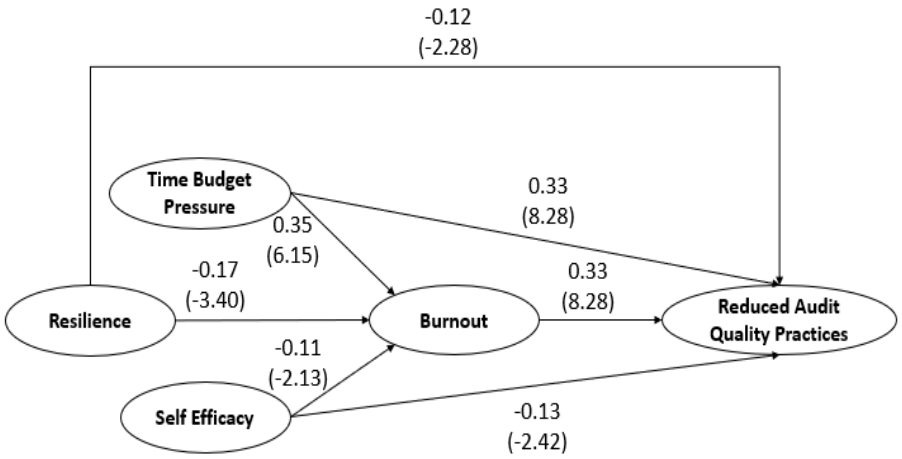

Figure 3. Regression Estimates of Model (with t-value)

The path diagram for the relationship between the time budget pressure variable with the burnout variable shows a t-value of 6.15. Therefore, the hypothesis 1b was accepted. This shows that the higher the time budget pressure felt by the BPK auditors, the higher the burnout they feel. Shbail, Salleh, and Nor (2018); Darawad, Nawafleh, Maharmeh, Hamdan Mansour, and Azzeghaiby (2015); (King'ori, 2016); Teng, Shyu, Chiou, Fan, and Lam (2010), found that there was pressure caused by time constraints show a significant and positive relationship to burnout. This is caused by the pressure caused by the limited time of inspection will trigger the emergence of burnout.

The relationship between the self-efficacy variable with the reduced audit quality practices shows a t-value of -2.42. Therefore, the hypothesis 2a was accepted. This shows that the resilience has an influence and negative effect on the reduced audit quality practices. As with research on self-efficacy and burnout, research conducted to find the relationship between resilience and reduced audit quality practices is also still very limited. In his research, Smith, and Emerson (2017) stated that one of the internal factors of individuals that can be used to overcome stressors arising from organizations is resilience so that the higher the level of resilience that is owned by individuals, it can reduce the negative impact caused by various stressors. One of them is to reduce reduced audit quality practices.

The path diagram for the relationship between the self-efficacy variable with the burnout variable shows a t-value of -2.13. Therefore, the hypothesis 2b was accepted. This shows that the the greater the level of resilience at the BPK RI agencies, the burnout level experienced by the inspector staff will decrease. Smith, and Emerson (2017) stated in their research that resilience has a significant and negative influence on burnout, so that steps to increase resilience levels such as providing related training can improve the ability of auditors to overcome the pressure arising from burnout. This is in line with the research of Smith, and Emerson (2017), research conducted by Treglown, Palaiou, Zarola, and Furnham (2016); Sozeri, Uysal, and Bay (2016) and Hao, Hong, Xu, Zhou, and Xie (2015) quoted that by increasing the level of resilience that an individual has, it can reduce the level of burnout felt by that individual.

The path diagram for the relationship between the resilience with the reduced audit quality practices variable shows a t-value of -2.28. Therefore, the hypothesis 3a was accepted. This means that the resilience variable has a negative effect on the reduced audit quality practices variable. In his research, Smith, and Emerson (2017) stated that one of the internal factors of individuals that can be used to overcome stressors arising from organizations is resilience so that the higher the level of resilience that is owned by individuals, it can reduce the negative impact caused by various stressors, such as the reduced audit quality practices.

The hypothesis 3b was accepted since the path diagram for the relationship between the resilience with the burnout variable shows a t-value of -3.40. Therefore, the higher the resilience shown by the auditors can reduce the level of burnout felt by that individual. Smith, and Emerson (2017) stated in their research that resilience has a significant and negative effect on burnout, so steps to increase resilience levels such as providing related training can improve the auditor's ability to cope with pressure or overcome the negative impacts arising from burnout. This result is in accordance with the research conducted by Treglown, Palaiou, Zarola, and Furnham (2016); I quote, Sozeri, Uysal, and Bay (2016) and Hao, Hong, Xu, Zhou, and Xie (2015).

The t-value calculation of the H4 hypothesis shows a significance value of 8.28, which means that the burnout variable has a positive influence on the reduced audit quality practices variable. The acceptance of this hypothesis shows that the higher the level of burnout felt by the auditor, the higher the possibility of reducing audit quality practices. Some studies that support this hypothesis are research conducted by Smith, and Emerson (2017), Smith, Emerson, and Boster (2018), and Fogarty, Singh, Rhoads, and Moore (2000) who find that with an increased level of burnout that is felt by the auditor has a positive influence on the emergence of reduced audit quality practices.

Overall, the results of this study indicate that if the auditor has confidence in conducting audits (self-efficacy) and able to improve their self when facing difficulties (resilience), therefore, when the auditor faces limited time of work (time budget pressure), the auditor can overcome the emergence of fatigue due to work pressure (burnout), which in turn can reduce the occurrence of actions that can reduce audit quality (reduced audit quality practices). Self-efficacy is shown by the ability to think of various alternative solutions when faced with a problem and resilience is shown by the ability to achieve its goals even though faced with various obstacles, it will be able to reduce the pressure arising from the tight time allocation of audit (time budget pressure) so that feelings burnout that arises in the auditor, that is the feeling of not caring (depersonalization) with the main form of feeling hard-hearted to the supervisor can be reduced to moderate levels.

As a result of the high self-efficacy through the ability of auditors to think of various alternative solutions when faced with a problem and a high level of resilience that is shown by the ability to be able to achieve its goals even though faced with various obstacles, can reduce the occurrence of reduced audit quality practices with the main components reducing the audit work below the standard.

Conclusion and Recommendation

From this study, it can be concluded that time budget pressure can significantly and positively influence burnout and reduced audit quality practices. Where the higher level of time budget pressure felt by the auditor will be able to trigger the emergence of burnout and increase reduced audit quality practices that can affect the decline in audit quality. Self-efficacy and resilience are proven to have a significant and negative effect on burnout and reduced audit quality practices. This means that the higher level of self-efficacy and resilience possessed by the auditor, can reduce the perceived burnout and reduce the occurrence of reduced audit quality practices that can have a positive impact on improving audit quality. Burnout is known to have a significant and positive effect on reduced audit quality practices.

This research faced with several limitations where researchers have not been able to research things that can affect the level of self-efficacy such as problem-solving skills, perceived ability, and confidence, or even on other variables that can also affect reduced audit quality practices such as professional development, auditor experience, professional skepticism, auditor independence, and auditor integrity, so it is expected that in the future these variables can be used as further research material.

Another limitation is the reduction of three out of a total of six indicators of time budget pressure variable, which can affect the construct of time budget pressure variable. It is expected that future research can be carried out with more adequate data collection times and sample sizes, therefore, the

data obtained can be a better represent indicators of time budget pressure variable and other variables in this study.

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Effects of Internal Communication to Employer Branding and Employee Retention mediated by Employee Engagement

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Abstract

Organization must rethink the relationship with its employees in order to compete in this rapidly changing business world. As market demands for innovation, this rapid change require employees to be involved in various ways with their work and company, communication is needed between the management and employees. Internal communication is one of the channel to influence employee engagement, improve employer branding and increase employee retention as attracting and retaining highly talented employees. The purpose of this study was to understand the effect of internal communication on employer branding and employee retention through employee engagement. Structural equation modeling (SEM) was served to analyze collected questionnaires at building industry. The results showed that the internal communication and engagement would be effective to retain the employees only if the employees felt safe in working for reputable companies. The results were expected to consider internal communication as strategic management tools.

Keywords: internal communication; employer branding; employee retention; employee engagement

Introduction

In order to compete in this rapidly changing business world, an organization must rethink the relationship with its employees. As market demands for innovation, this rapid change requires employees to be involved in various ways with their work and company. As organizations develop, the role of public relations includes the internal scope to establish harmonious relationship between the organization and employees as internal audiences in it. Harmonious internal relationship leads to a sense of mutual understanding and trust, a comfortable work atmosphere, encourage good cooperation and avoid conflict. Internal communication is one of the discussions that often arises in strategic management and plays an important role related to employee engagement in the industrial nowadays as it offers two-way communication between employees and management.

Internal communication is defined by Men and Bowen (2017) as “a process co-created by the organization and its employees”. Welch and Jackson (2007) further explained that strategic interactions and relationships between parties within organizations include “internal line manager communication, internal team peer communication, internal project peer communication, and internal corporate communication”. Effective internal communication can increase employee awareness of opportunities and threats, and develop employee understanding of changes in organizational priorities (Bakker, Albrecht, and Leiter, 2011; Bindl and Parker, 2010). In measuring internal communication satisfaction, communication satisfaction is important to determine the level of employee satisfaction with the communication process within the company thus involves all areas of social interactions, keeps people together, and helps to perfect organizational communication. Communication satisfaction is the level of individual satisfaction with various types of communication in an organizational environment (Jalalkamali, Iranmanesh, Nikbin, and Hyun, 2018). Karanges, Johnston, Beatson, and Lings (2015)

revealed that there is a significant positive relationship between internal communication and employee engagement. Results suggest that internal communication facilitates the interaction between the organizations, supervisors and employees which create workplace relationships, and through this optimizes employee engagement. Verčič and Vokić (2017) study also confirmed that internal communication satisfaction has a significant role in high employee engagement.

Schaufeli, Shimazu, Hakanen, Salanova and De Witte (2019) defined employee engagement as a positive and satisfying state of well-being, which is characterized by high pleasure and arousal that will increase productivity. Although it is important to understand the relationship between internal communication and employee engagement, there is still few empirical researchs address the association of these two (Welch, 2011). Employee engagement is very important towards the company's branding strategy. It is best to build strong brands internally by increasing engagement. Burawat (2015) found that there was a positive relationship between company brand and employee engagement. Hashim and Nor (2018) also revealed that employees most likely felt safe working at well-known companies, especially international brands. In addition, Neill (2016) provided new insights on how internal communicators promote ethics and values among new and existing employees under the umbrella of corporate branding.

Employer branding covers development benefits, as well as economic benefits, and psychological benefits (Berthon, Ewing, and Hah, 2005). Employer branding is a contemporary approach that is continuously expanding and it can keep up the firms' reputation in attracting and retaining employees (Ahmad and Daud, 2016). Organizations are concerned with what their employees think about them as an employer. According to Sokro (2012), an organization makes use of its employer branding strategy to attract employees in their business that can stay with the company and influence the choice of employees to stay or leave the organization. Hadi and Ahmed (2018) also stated that employer branding enabled the employer to build an image in people's mind that the firm is a great place to work. Eemployer branding has the ability to retain the best people by providing an environment that allows employees to live the brand through various aspects (Fernon, 2008). This increases their satisfaction and is likely to remain within the organization (Jain and Bhatt, 2015).

Gaddam (2008) identified that commitment, retention, performance, satisfaction, interests, interests and loyalty can all be positively linked. Allen, Bryant and Vardaman (2010) also recognized that brand increased employee morale and satisfaction, which in turn increased retention. Singh and Rokade (2014) suggested that brand are important for employees to stay in the organization and that it developed a strong appeal to get the opportunity to work with good brand. In addition, Ashfaq, Ur Rehman, Safwan, Afzal and Humayoun (2012) examined how effective communication played an important role in retention and motivation stated that overall work atmosphere, rewards and skills acquired by employees are important but are not useful if supervision and communication are not comfortable enough which means that communication is very important for employees.

Increasing engagement by improving non-financial drivers such as communication, recognition, supervisor support, work engagement, teamwork, and role clarity could increase retention (Balakhrisnan, 2015). It is a positive message that even without financial expenditure, the engagement of employees and retention can be increased. Biswas and Suar (2016) argue that costs associated with employee replacement today are high and employer branding can be used to improve employee relations and ultimately reduce turnover (Berthon, Ewing, and Hah, 2005). Bussin and Mouton (2019) found that employees with high overall employer branding scores were more satisfied, less likely to actively seek to move and less likely to consider to leave.

Employee retention is the company's efforts to retain its employees in the organization that aims to help achieve maximum organizational targets. The term retention is related to turnover, which means the process of employees leaving the company (Mathis and Jackson, 2006). Turnover intentions are used to measure employee retention rates. Turnover intention according to Babalola, Stouten and Euwema (2016) is the tendency or intention of employees to stop working from work voluntarily or move from one work place to another according to their own choice.

In Indonesia, all industries need to attract talent and retain potential employees, include the brick-and-mortar industries. One of the company is BuidingCo. In 2019, the company conducted employee surveys. The company was also registered as the Top Employer Certification for 2020 where the company would complete a detailed assessment of its human resource management practices through the HR Best Practices Survey. The expectation of the certification was that company could become employer of choice, in which company succeeded in maintain its certification for two consecutive years. However, feedback from both surveys related to the points of the extent to which the new recruitment impressions of the company's brand are fulfilled by their experience after joining, how to measure engagement in the organization each year by using a comprehensive engagement study, whether the survey results are communicated quickly and how to systematically measure the company's reputation as an employer. Based on these feedback points, a lot of attention was paid to employee engagement and employer branding in the company which it prioritized internal communication. This research was expected to be able to contribute to the concept of internal communication in the management sphere as a management strategy related to employee engagement, employer branding and employee retention. The paper proceeded then by the literature review, followed by the research methodology and the results explained finished by conclusion.

Literature Review

Internal Communication

Internal communication is defined in many different ways and interchangeably referred to as internal public relations, employee communications, business communications, employee relations, internal relations, internal marketing, intra-organizational communication, and staff communication (Men and Bowen, 2017; Verčič, Verčič, and Sriramesh, 2012; Welch and Jackson, 2007). Men and Bowen (2017) specifically defined internal communication as “a process co-created by the organization and its employees,” and defined internal relations as “the strategic management of internal communication in managing interdependence and building mutually beneficial relationships between the organization and its employees.” In comparison, Welch and Jackson (2007) took a stakeholder perspective focusing on internal stakeholder segmentation. They defined internal communication as “the strategic management of interactions and relationships between stakeholders within organizations across numerous interrelated dimensions, including internal line manager communication, internal team peer communication, internal project peer communication, and internal corporate communication”.

In measuring internal communication, communication satisfaction is the most suitable construct. Communication satisfaction is the level of individual satisfaction with various aspects of communication in organizations (Downs and Hazen, 1977). This understanding put forward about communication satisfaction defining as individual satisfaction with various kinds of communication in the organizational environment. Communication satisfaction is defined as satisfaction with communication related to the position of employees in the organization (Mount and Back 1999). Downs and Hazen (1977) developed the Communication Satisfaction Questionnaire (CSQ) to discuss the relationship between communication satisfaction and job satisfaction. CSQ is the most widely used business communication satisfaction questionnaire, which provides leaders with the knowledge and tools to build positive attitudes and performance (Mount and Back, 1999). According to the Downs and Hazen study (1977), it was revealed that CSQ construction includes organizational and management communication from requesting corporate communications. In short, basically, both CSQ construction and internal communication are agreed on at the same time in corporate communications. Downs and Hazen (1977) identified eight dimensions of communication satisfaction in organizations consisted of communication climate, supervisory communications, organizational integration, media quality, horizontal informal communication, general organizational perspective, subordinate communication, and personal feedback.

Employee Engagement

Conceptualizations of engagement build from Kahn's (1990) influential work about three constructs help explain how engagement develops: meaningfulness, safety, and availability. According to Kahn (1990), engagement implies physiological as well as physical presence in performing an organizational role. Another important definition of engagement comes from Schaufeli, Shimazu, Hakanen, Salanova, and De Witte (2019) as they defined it as a positive, work related state of mind that is characterized by vigor, dedication and absorption. The dimensions or aspects of the employee engagement are vigor aspect characterized by high levels of strength and mental resilience in work and persistent in facing difficulties. The second dimension is the aspect of dedication characterized by a feeling that is full of meaning, enthusiasm, inspiration, pride and challenging at work. The third dimension is the aspect of absorption which is marked by concentration and deep interest, immersed in work, time seems to pass so quickly and individuals find it difficult to break away from work so that and forget everything around them. (Schaufeli and Bakker, 2004). Saks (2006) stipulated that employee engagement includes two important aspects, job engagement and organization engagement.

Employer Branding

Ambler and Barrow (1996) describe the employer brand as the package of functional, economic and psychological benefits provided by employment, and identified with the employing company. Backhaus and Tikoo (2004) additionally stated that the employment brand highlights the unique aspects of the firm and how they differentiate from its competitors by attracting, motivating, and retaining the firm's current and potential employees. The added value of favorable employee response to employer knowledge is generally expressed as employer brand equity. An outcome of employer brand equity is 'organizational attractiveness' (Lievens and Highhouse, 2003) which it was used to measure employer branding as company need to know their degree of attractiveness. Employer attractiveness is the profit that is coveted by employees when they work in an organization (Berthon, Ewing, and Hah, 2005). Employer branding measurement tool called Employer Attractiveness Scale was developed by Berthon, Ewing, and Hah (2005) consisting of five dimensions with 25 questions to infer how the level of interest in each dimension of employer branding. The values including the value of interest related to innovation and interest in products and services generated by the company, social values related to the conditions of the work environment and relationships between other employees, economic values related to the benefits derived by employees from the economic side, the value of development related to the possibility of employment opportunities and promotion in the future, and the value of the application related to the possible application of something that has been learned and an indication of how far the organization is oriented towards consumers.

Employee Retention

Employee retention is an effort of the company to keep its employees in the organization that aims to help achieve the maximum organizational targets. The purpose is to retain potential employees who are valuable assets. It also defined as "a technique adopted by businesses to maintain an effective workforce and meet operational requirements" (Mehta et al. 2014). Das and Baruah (2013) explained the concept as "a process in which the employees are encouraged to remain with the organization for the maximum period or until the completion of the project". The term retention is related to the term turnover, which means the process of employees leaving the company (Mathis and Jackson, 2006). Turnover intention was used to measure employee retention rate. According to Porter and Steers (1973), turnover intention is a withdrawal behavior when employees feel dissatisfied. Mobley also defined that the turnover intention is the psychological tendency of employees who are dissatisfied with certain aspects of the organization and want to leave the organization after comparing external work opportunities with current work. Moreover, Mobley, Horner and Hollingsworth (1978) further suggested that turnover intention is a combination of job dissatisfaction, plans to quit, and the tendency and likelihood of finding other jobs at their own choice.

Methodology

Hypothesis Development

Effect of Internal Communication on Employer Branding

Neill (2016) had provided new insights that how internal communicators promote ethics and values among new employees and those that already exist under the umbrella of corporate branding. However, this research focused more on public relations.

H1: There is a positive influence of Internal Communication (IC) and Employer Branding (EB)

Effect of Internal Communication on Employee Retention

Ashfaq, Ur Rehman, Safwan, Afzal Humayoun (2012) found how effective communication played an important role in employee retention and motivation. It showed that employee morale was relatively high, which it illustrated that relationships in their work are important for job satisfaction. This reflects that the overall working atmosphere, rewards and skills acquired by employees are important but are not useful if supervision and communication are not comfortable enough to work. This research concluded and gave recommendation that communication is very important for employees.

H2: There is a positive influence of Internal Communication (IC) and Employee Retention (ER)

Effect of Internal Communication on Employee Engagement

Karanges, Johnston, Beatson and Lings (2015) stated that internal communication is important in the organization as it facilitated interaction between organizations, supervisors, and employees which create relationships at work based on meaning and value. Verčič & Vokić (2017) study also confirmed that internal communication satisfaction had an important role in high engagement.

H3: There is a positive influence of Internal Communication (IC) and Employee Engagement (EE)

Effect of Employee Engagement on Employer Branding

Burawat (2015) reported that there was a positive relationship between company brands and employee engagement and further reported that development and application were the most important dimensions. Hashim and Nor (2018) also revealed that employees most likely feel safe in working for well-known companies, especially if they carry international brands. Therefore, for employees to survive, they believe that they must be more engaged with their work.

H4: There is a positive influence of Employee Engagement (EE) and Employer Branding (EB)

Effect of Employee Engagement on Employer Retention

Balakrishnan, Masthan, and Chandra (2013) stated that retention can be increased by increasing the level of employee engagement by overcoming non-financial drivers of engagement such as communication, recognition, supervisor support (work), work engagement, teamwork, and role clarity. Therefore it has given a very positive message that even without financial expenditure, the engagement of employees and retention can be increased.

H5: There is a positive influence of Employee Engagement (EE) and Employee Retention (ER)

Effect of Employer Branding on Employee Retention

Gaddam (2008) stated that commitment, retention, performance, satisfaction, interests, interests and loyalty identifies can all be positively linked. Allen, Bryant and Vardaman (2010) also recognized that brand increased employee's morale and satisfaction, which in turn increased retention. Hadi and Ahmed (2018) also stated that branding created possibility in building image "a great place to work". If done properly, it had the ability to retain the best people by providing an environment that allows employees to live in the brands through various aspects (Fernon, 2008). This increased their satisfaction and would likely to remain in the organization (Jain & Bhatt, 2015).

H6: There is a positive influence of Employer Branding (EB) and Employee Retention (ER)

Based on the hypotheses above, the research model can be depicted at figure 1.

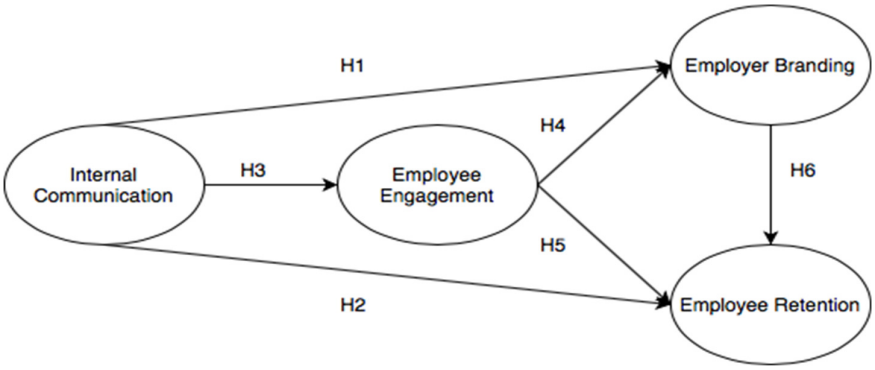

Figure 1: Research Model

Research Method

Procedure and Sample

This study was a cross-sectional study, where data was collected only at one time (Cooper and Schindler, 2014). This research was conducted through quantitative method by collecting primary data. To quantify the relationships between internal communication, employer branding, employee retention and employee engagement, data were collected via an online survey to involve employees at BuildingCo using convenience sampling. The respondents we also asked about general information such as gender, age, work location, service year, and educational level. Hypothesis testing was done using structural equation modeling with PLS-SEM.

Measurement and Scales

All items within the online survey were measured using 7-point Likert-scales (strongly disagree to strongly agree). One stage of pre-testing were implemented to resolve any fundamental problems in the online survey and to test for content validity. The questionnaires were modified from Downs and Hazen (1977) of Communication Satisfaction Questionnaire (CSQ), Berthon (2005) of Employer Attractiveness Scale, Mobley (1978) of Turnover Intention Questionnaire, and Schaufeli and Bakker (2004) of Utrecht Work Engagement Scale (UWES) with a total of 52 questions. In this study, the reliability test of each variable was measured using Cronbach's alpha. The minimum value of Cronbach Alpha (α) for each variable must be minimal 0.6 (Malhotra, 2010). Every variable were reliable as it resulted IC (α = 0.878), EE (α = 0.91), EB (α = 0.925), as well as ER (α = 0.847).

Results and Discussion

In this study, demographic data was collected from 100 workers. Majority of respondents were male with total 66% due to the nature of the industry in building material manufacturing. The majority of the respondents (66%) possessed bachelor degree, whereas 44% of respondents worked at Jakarta, and the rests were scattered in several plants and sites. Most of them (21%) have had service year between 1 to 3 years in the company.

The measurement model was evaluated through convergent validity consists of reliability items (validity of each indicator) and average variance extracted (AVE) (see table 1). Testing of item reliability (indicator validity) can be seen from the value of the loading factor (standardized loading). A re-estimation was made on the model after being reduced to produce a valid indicator. The results of the second structural model have indicated that the values of the Standardized loading factor for each

indicator are greater than 0.7. This means that the indicators in the model are valid as a measurement tool for latent variables so that they can be used for modeling. The reliability test was performed using Average Variance Extracted (AVE) and Composite Reliability (CR). This study has shown that the AVE values of all variables were greater than 0.5. This means that the latent variable already has a good convergent validity where the latent variable can explain an average of more than half the variance of the indicators. The CR values of all latent variables are more than 0.7, mentioning that all latent variables are reliable, or all the indicators have consistency in measuring their respective latent variables.

Table 1: AVE and CR for each variables

Dimension	Variables	Average Variance Extracted (AVE)	Composite Reliability (CR)
Employer Branding	Application	0.876	0.701
	Development	0.873	0.633
	Economy	0.826	0.704
	Interest	0.854	0.661
	Social	0.903	0.652
Employee Engagement	Absorption	0.882	0.714
	Dedication	0.910	0.771
	Vigor	0.919	0.792
Employee Retention	ER	0.909	0.770
Internal Communication	Communication Climate	0.919	0.695
	Personal Feedback	0.857	0.601
	Supervisory Communication	0.887	0.613

Figure 2 showed the results of the hypothesis testing. Based on direct effect coefficient structural model, it can be concluded that internal communication had significant effect on employer branding at 0,624. Therefore, H1 was supported and this support Neill (2016) research that internal communicator could promote employer branding to employees. In contrary, H2 was not supported since internal communication did not significantly affect employee retention at 0.055 even though Ashfaq, Ur Rehman, Safwan, Afzal Humayoun (2012) research mentioned that effective communication might have important role in retention.

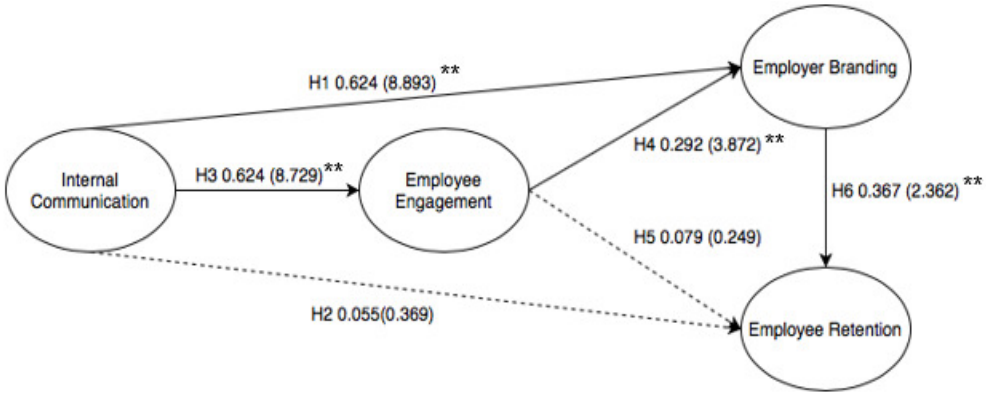

Figure 2: Hypothesis Testing

*Note: **: Significant at 5%*

In regards to employee engagement, the internal communication had a significant effect to employee engagement at 0,624, whereas in turn, employee engagement also had a significant effect to employer

branding at 0,292 (see table 2). Thus H3 and H4 were supported. These findings was in line with Karanges, Johnston, Beatson and Lings (2015) research that internal communication had significant role in organization to facilitate interaction between organization and employees thus increased employee engagement also Verčič & Vokić (2017) study that internal communication satisfaction had an important role in high engagement. It also supported Burawat (2015) and Hashim and Nor (2018) that engagement and employer branding had positive relationship that employee preferably feel safe if they worked at well-known company. This research has proven again that internal communication significantly and positively influenced engagement and employer branding which implied that the better the process of internal communication in the company, the more employees feel involved and engaged thus make the company a great place to work. This also support Hadi and Ahmed (2018) research that branding created possibility in building image "a great place to work". This research mentioned that employees agreed that they received information about how they are valued, receive recognition of their efforts, receive information about how problems at work can be overcome, interesting company publications, and how communication in the company motivates and encourages their enthusiasm to achieve company goals and make them identify themselves or feel an important part of the company.

However in contrary, H5 was not supported since employee engagement did not significantly affect employee retention at 0.079 even though Balakhrisnan, Masthan and Chandra (2013) research mentioned that retention could be increased through increasing engagement. In the end, employer branding, however, had a significant effect on employee retention at 0,367. Thus H6 was supported and this supported Gaddam (2008) also Allen, Bryant, and Vardaman (2010) research mentioned that given employer brand could increase moral and satisfaction of employees thus increased retention. If done properly, it had the ability to retain the best people by providing an environment that allows employees to live in the brands through various aspects (Fernon, 2008). This increased their satisfaction and would likely to remain in the organization (Jain & Bhatt, 2015). Moreover, to win the "war of talent", Gilani and Cunningham (2017) indicates that employer branding is integrated into the organization and holds value for employees and contributes to them staying employed.

Table 2: Direct Effects of the Structural Model Pathway Coefficients

Hypo-theses	Path	Path Coeff.	t-value	p-value	VIF	Results
H1	Internal Communication → Employer Branding	0.624	8.893	0.000**	1.636	Supported
H2	Internal Communication → Employee Retention	0.055	0.369	0.356	2.937	Not Supported
H3	Internal Communication → Employee Engagement	0.624	8.729	0.000**	1	Supported
H4	Employee Engagement → Employer Branding	0.292	3.872	0.000**	1.636	Supported
H5	Employee Engagement → Employee Retention	0.079	0.678	0.249	1.921	Not Supported
H6	Employer Branding → Employee Retention	0.367	2.362	0.009**	3.344	Supported

*Note: **: Significant at 5%, *: Significant at 10%*

The research showed that employee engagement is also considered to significantly affect employer branding, which in turn employer branding significantly affects employee retention. This means that the more employees are involved with their work, the more attractive the company will be, which then increases employee retention. This is supported by data showing that employees feel they have the opportunity to be able to teach others about what they know, feel themselves accepted and have a sense of ownership of the company, feel the company is a good company so that it can be used as a stepping stone for future work. This result is also supported by employees feeling that the company is innovative because of work practices, and produces quality products. This certainly increases the company's reputation as well as increasing the attractiveness of the company, which in turn affects retention.

As this study also measure the role of employee engagement as mediator, based on indirect effect coefficient structural model, it also can be concluded that employee engagement significantly mediates internal communication with employer branding with estimated coefficient 0.182, but employee engagement did not significantly mediates internal communication and employee retention at estimated coefficient 0.049 (see table 3). Since there were few researchs about employee engagement mediating between internal communication to employer branding and employee retention, this research could provide insight into how engagement played the mediator role which mostly engagement played as mediator linked to job characteristics, organizational commitment, job satisfaction, psychological capital and role of perceived organizational support.

Table 3: Results of the Indirect Effect of Structural Model Pathways Coefficients

Variables	Path Coefficient	t-value	p-value
Employee Engagement mediates the relationship between Internal Communication and Employer Branding	0.182	3.325	0.000**
Employee Engagement mediates the relationship between Internal Communication and Employee Retention	0.049	0.640	0.261

*Note: **: Significant at 5% level, *: Significant at 10% level*

Table 2 shows that all VIF values were close to 3 and lower, mentioning that no indicative of probable collinearity issues among the predictor constructs to prevent bias the regression results. Therefore, we may examine the structural model of PLS SEM results (see table 4), including coefficient of determination (R^2) assessing explanatory power of the endogenous variables and Q^2 values that indicates predictive accuracy (Hair, Risher, Sarstedt, and Ringle, 2019). Table 4 explains that the model could explain substantial variance of employer branding, as for the other two constructs, namely employee engagement and employee retention, the model provided limited limited explanation of their variances. The results also in line with the Q^2 values, which the model have provided medium predictive accuracy for employer branding and employee engagement, and small predictive accuracy for the employee retention.

Table 3: Results of the Indirect Effect of Structural Model Pathways Coefficients

Variables	R^2	Q^2
Employer Branding	0.701	0.325
Employee Engagement	0.389	0.222
Employee Retention	0.221	0.156

The comprehensive findings show that at BuildingCo, the synergy between internal communication and engagement was not enough to improve the employee retention. This result is in line with findings of Alias, Noor, & Hassan (2014) in Malaysian companies. The benefits of internal communication and engagement would be effective in influencing the decision of employees to stay at the organization only if the employees felt safe in working for reputable companies. The evidence that BuildingCo itself was certified as the Top Employer in 2020 has explained why the employees considered to stay remain at the company. However, companies need to rethink on how take internal communication activities and tactics seriously, or otherwise, they would easily move to the other competitors in the building industry.

Conclusion

This study had open new insights on how internal communication mostly discussed on public relation topics can be used in management topics as strategic management tools related to employee engagement, employer branding, and employee retention. The importance on how company need to attract talent and retain employees remains top priority for them to maintain their competitive advantages. This study had proven again that the implication of internal communication was boosted if the company could keep its prestige as one of the leader in the industry. Most results related to the insignificant effect of employee retention may be because turnover intention was used to measure the employee retention. Also, since the study relies on employees' self-reports, which raises concern about self-serving bias when employees report their own behavior (Gruman and Saks, 2011) and concern about common method bias. However, all constructs were measured with established scales, which mitigate measurement error and decrease common method bias (Spector, 1987).

Based on the research results, the company needs to pay attention to aspects that employees feel are still lacking. Among other things related to the receipt of information about the comparison of work with others. This can be overcome by clarity in the job description for each position. Then another point of concern is that employees feel that top management does not know and understand employees' problems, as well as listen to and pay attention to employees. This can be overcome by employee dialogue to intensify meetings between management and employees. On the other hand, employees feel the company should be more often involved in social activities. As for other findings related to relationships between coworkers, support and enthusiasm from coworkers, and gaining direct experience from other departments that were felt to be lacking which in the end felt the work environment did not make them happy. Advice can be given related to relationships with colleagues, this is a task for managers to pay more attention to the relationship between team members with other members both from the same division or different divisions. This can occur due to the possibility of miscommunication or other divisions' work performance that is uncomfortable.

Finally, this research does have sampling limitations that reduce the generalizability of our findings to the wider population – the sample is small in absolute numbers and self-selected, and the study is limited to a single organization source. The first limitation was that this research had only been carried out on 100 employees of staff and lower level of management in a company. In the future, self-selection and one-organization issues could be diminished and a broader scope of research was expected to obtain broader and comprehensive overview of internal communication from employees working at brick-and-mortar industries in Indonesia or broader in various organizational and industrial settings. Moreover, there were still a need for exploration of other factors and testing some models that involve different variables. Balakrishnan, Masthan, and Chandra (2013) suggested the use of details of drivers of employee engagement that influenced the employee retention. Since internal communication was a new construct discussed in management scope, it might have different perspective than discussed in public relations scope.

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The Growing Role of Marketing Communication and Visual Identification in The Company's Development

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Abstract

The main purpose of the paper is an attempt to present the role that visual identification should play in the process of preparing a marketing strategy for a modern enterprise. The offer of the company is addressed to a specific segment of recipients (target group). The case study of the Tiens Corporation is presented.

Keywords: Marketing Communication, Visual Identification

Introduction

The purpose of the paper is to indicate the marketing communication as an important element in the process of building a strategy to reach a selected target group. Marketing communication in the context of this work is defined as a set of information (signals) that the company emanates from various sources towards not only to its clients but also to other entities of the marketing environment. Marketing communication is also defined as the information that reaches decision-makers in the form of megatrends, identified needs, buyer preferences, and macro-developmental tendencies [Mruk, 2004; Schultz, Schultz, 1998; Finne, Grönroos, 2009; Stuart, Kerr, 1999; Naeem, Bilal, et al. 2013; Finne, Grönroos, 2017].

The article presents one of the elements of marketing communication - visual identification on the example of the concept of the TIENS Group Co. Ltd.

Success of the strategy in today's competitive reality is conditioned by the proper identification of the target group, which implies the appropriate development of graphic elements related to marketing communication, which affects the functioning of the company. The visual context is of great importance, especially since more than eighty percent of the reading devices have a visual form, the eye is a well-developed sensory sensor, better supported by the brain than all other senses [Sydenham, Dudziewicz, 1990; Feenstra, Borgstein, 2019; Ramos, Sampaio, et al. 2020; Rathee, Rajain, 2017].

In today's market reality, appropriated by the dominant customer - the creator of the organization's market attitudes - Searching for the main determinant of the strategy of business organizations has no obvious solution. Intuitively, it seems that it should be a customer, but in management practice, the basic criterion by which the company's management is accounted for is economic profit. Nevertheless, it is the customer, or rather the degree of satisfaction of his needs, that predominantly determines the amount of profit achieved. Over the past thirty years in management and strategic management, the place and role of the client has often changed. In this historical context of the analysis, we find periods of disregard for this stakeholder, but also periods when the client becomes the sole determinant of business strategy [Niemczyk, Stańczyk-Hugiet, 2012; Barutcu, Yaldir, et al. 2017; Rubera, Kirca, 2017].

Turning to the universal model, it becomes important to create a positive image of the organization that will be an emanation of its internal strength. Every company consciously or unconsciously creates a certain image - more or less favorable. Understanding its strengths and weaknesses allows

you to take action to maintain positive characteristics, eliminate negative or completely change the image. A positive image allows, among others on: diversifying products, brands and enterprises, creating relationships with clients, building trust in the company [Tkaczyk, Rachwalska, 2016; Vid 2016; Goetschalckx, Moors, et al., 2019].

Visual Identity System

Visual identification should be one of the elements of the organization's identity. The study of corporate identities includes directions related to corporate identity, organizational identity and visual identity [Balmer, 2001; Skaggs, 2019; Bravo, Matute, et al. 2017]. Visual identification is the basic tool that is used to create (positive) brand image of a company on the market. It defines all symbols and behaviors used in the company to obtain clear and consistent market identification and distinguish it from competing brands. A consistent visual system is the most important element of overall identification [Eriksson, Fundin, 2018]. For example: [...] the visual identification of scientific institutions on their websites is based on the consistent use of colors, company symbols and lettering. As in the real world, child units should be included in the parent institution's visual identity system by visually linking to its website's design while maintaining individual visual identity [Jaskowska, 2007]. The only area of company identity that can be fully controlled by the company is visual identity (visual identity system). The visual identification system is part of the company's communication, which through specific symbolism tries to send an appropriate message about its identity, making it known and recognizable. Symbols used by enterprises as part of the visual identity system can be divided into five main categories: organization name, slogan, its symbol (sign and logo), colors and typography [Lis, 2013, Trynchuk, 2017; Raposo, Neves, et al. 2017]. One of the key concepts for building an organization's identity is the visual identity system. It is a set of rules and consistently designed patterns, which in total are to build positive perceptions about the organization or product and consolidate the desired opinions among employees, partners and clients, creating a consistently visual identity. Visual identification - this is the whole symbolism used by the company, that is, all that you can recognize from the outside that it is our company; it is the color, logo, logotype etc. These are other elements through which relationships with the environment are built [Gawroński, 2009; Su, Swanson, et al. 2016]. A properly constructed visual identification system should consist primarily of such elements as: [Budzyński, 2002; Dejnaka, 2006; Melewar, Jenkins, 2002; Riel, Balmer, 1997; Abratt, Mingione, 2017; Wiedmann, 2004] graphic sign (logo), company colors, company prints (business cards, letterhead, envelopes, commercial documents), advertising materials (information boards, guidebooks, brochures, leaflets), vehicle marking, external and internal decoration of buildings, company flags and banners, unit and collective packaging of products.

The visual identification system enables the organization (enterprise, institution) or product (service) to be distinguished from competing market participants who try to present offers more attractive than competitors. Visual and non-visual identification does not only apply to consumer goods producers, it is also effectively implemented in non-commercial marketing concepts (political marketing [Nieć, 2013; Wring, 1997; Henneberg, 2002; Lees-Marshment, 2001; Lees-Marshment, 2019], religious marketing [Partycki, 2007, Stolz, Usunier, 2019; Pinelli, Einstein, 2019; Wiesenberg, 2019], marketing of public local government units, territorial marketing [Szromnik, 2006; Eidelman, Fakhrutdinova, et al. 2016; Frolov, Sarkisyan, et al. 2017; Kuttubaeva, Ishchuk, et al. 2017]. A good example are city coats of arms and hymns, already developed in the Middle Ages [Dacka, 2004; Shaw, 2016; Fox, 2019], document and correspondence markings were the prototype of modern professional identification systems [Macalik, 2013; Veldman, Willmott, 2017]. In modern understanding, the visual identity system is the whole symbolism used by the organization, means of communication with the environment, an element of broadly understood identity. It is thanks to the visual identification system - the organization is recognizable and gains credibility. A logo, i.e. a graphic representation of a brand representation, forming a trademark - combines symbols, shapes and colors into a specific whole. It performs important marketing and information functions: it distinguishes the brand from the competition and also shapes the relationship with the consumer [Gawroński, 2009; Reyes, Nieto, et al. 2018; Barnes, 2017; Jiang, Gorn, et al. 2016; Van Grinsven, Das 2016].

We can distinguish a number of fundamental determinants that are important in creating the image of the product and having significant marketing significance. Nowadays, an increasing role is being paid to the considerable role of human senses [Pabian, 2011; Dąbrowska-Leszczyńska, 2014; Krishna, Lee, et al. 2017; Krishna, Cian, et al. 2016; Géci, Nagyová, et al. 2017]. Early marketing achievements did not pay much attention to the fact that human senses can play a very important role in the selection of goods - often greater than other values (utility features, price / quality relations, etc.). Sensory features of the product received through the senses can also prove to be an important factor in building competitive advantage [Śmiechowska, Dmowski, 2014; Yoganathan, Osburg, et al. 2019; Farhadi, Slambolchi, et al. 2017; Wiedmann, Haase, et al. 2018].

As already mentioned, a company logo and corporate identity is now a basic tool for building a company's image, brand and prestige, but also the basis for positioning a company on a competitive market. [...] A well-designed logo should contain a maximum of content, while maintaining a minimum form. [...] You can specify the basic criteria that a good logo should meet, the American designer J.S.B. Morse formulated them in the form of four principles: it must meet the basic principles of design, it must be functional, it must represent the company well, it must be unique [Włoszczyński, 2015; Van Grinsven, Das, 2016; Séraphin, Ambaye, et al. 2016; Wang, Duff, et al. 2018]. The characteristic and individual graphic trademark is another seemingly banal element of marketing. Its primary purpose is to help the customer differentiate your brand from the market. Large global corporations consciously use this tool, for which immediate visual identification in visual contact with the product is a priority [Dutko, 2013, Chen, Nguyen, et al. 2017].

The company's corporate identity (visual identity, visualization, corporate identity, CI) is a collection of various elements (graphic, musical, typographic and other) with directives regarding their use, which are included in the book of identity. Thanks to the above system, all marketing messages sent by the company are consistent, interact with each other, strengthening each other, which gives a synergy effect - the sum of joint action is greater than the sum of actions of each individual. Corporate identity, apart from the attitude of the organization, behavior and communication with the environment, is one of the important pillars of the institution's identity [Mruk, 2004; Naumovska, Blazeska, 2016; Sharif, Butt, 2017]. Based on this, together with the other elements, the company's image is created. Often, when the message relates to the intangible sphere - visual identity is a kind of packaging eg for services. The visual identification system is designed to manage graphical marketing messages to eliminate: inconsistent messages, disturbances in brand communication processes, disinformation, loss of trust among customer groups. Due to the fact that the modern environment is extremely saturated visually, it is important that each solution stands out and be original - it should be simple, bold, memorable and reflect the essence of the company's personality, and be able to operate on many platforms media and perform well in various applications. Visual identity is an important tool supporting brand awareness by evoking emotions and associations associated with it. Thanks to repeated duplication, and thus exposure, symbols are remembered and recognized. Designers use knowledge about the sequentiality of human visual perception to create the most relevant solutions. The human brain, as the first always recognizes the shape - the image is received and remembered directly, the second is the color that liberates emotions, while the word itself must first be subjected to the process of decoding to read them - this processing process takes the mind the most time. Due to the consistency of the visual message, the system based on clearly defined standards raises trust in the recipient, which carries the feeling that the client is dealing with a company with a high degree of credibility, guaranteeing the safety and quality of services offered [Wrona, 2015; Dixon, Perry, 2017; Zhao, Calantone, et al. 2018; Bolhuis, de Jong, et al. 2018].

Logotype concept. TIENS case study

Each enterprise using its products or services aims to appear on a competitive market, and then build a lasting advantage over other entities. The brand is one of the most important marketing instruments allowing for effective competition and successive acquisition of the market. The strong position of the brand plays a significant role in product shaping, price, distribution and promotion, and appropriate activities within the brand management process have a significant impact on the brand's

existence in the minds of customers. The brand, being the result of a thoughtful management process, should affect the clients' awareness, encourage them to buy, and as a result increase the level of sales and contribute to building the company's competitive advantage [Szymankowska, 2013; Kim, Jeon, et al., 2011; Yu, Cable, 2012; Vukasovič, 2012; Reyes, Nieto, et al. 2018].

Therefore, the corporate identity of the company must be adequately adapted to the target group, which according to analyzes will be the recipient of the marketing activities of the loyalty program creator. Communication activities, including a properly tailored visual identification system, should be directed to a predetermined target group. The visual identification system must result from an appropriate marketing strategy built for a target group. The target segment of consumers can be described, for example, by the segmentation tool Censydiam and by technical conditions (disposing of tools that can be carriers of program elements) and demographic variables [Maison, Poraj-Weder, 2015; Callebaut, Hendrickx, et al. 2002; Garant, Korycka, 2015]. Marketing activities include the end users of the company's products. It is a group that requires the greatest communication effort and is the basis for building relationships with other groups. The Censydiam model helps to develop positioning of products and brands in such a way as to create an emotional relationship with the target group (helps to design effective marketing activities based on the feelings and desires of consumers, not just their declared beliefs and opinions). The fundamental foundation of the model is the assumption that all consumer behavior is controlled by the desire to meet basic needs that have their source in the subconscious. To meet these basic needs, consumers use different strategies (called incentive strategies) and, as a result, choose different products and brands (to meet their needs). This model enables deep exploration of motivation - thus it is the optimal solution in the case of analyzing motivation, feelings and desires to determine the optimal product / service portfolio or positioning for each product / brand so as to design a coherent and effective communication strategy for the entire portfolio, such as and individual products and brands. Defining the target segment thus determines future visual identification.

TIENS Group Co. Ltd. (TIENS Group) was founded in 1995 by Li Jinyuan in Tianjin (Tianjin) in China. Is an international, multinational corporation, operating in various industries, such as the food industry, education, tourism, finance, international trade, and e-business. The TIENS Group (TIANSHI) entered the international market in 1998. Currently, with operations in over 190 countries, the TIENS Group has branches in 110 countries.

TIENS is derived from the Chinese word Tianshi , which is a cluster of the word Tian which means sky, which is associated with the will of the heavens, favorable geographical location and universal support, and Shi meaning lion.

Fig. 1: The original TIENS logotype

Source: http://witajwtiens.blogspot.com/p/filozofia-tiens.html

For centuries, the city of Cangzhou was famous for its antique lion sculpture, made of iron, which became the symbol of the city, called the Lion City . The founder of Li Jinyuan, and now its president wanted to commemorate the iron lion of his hometown and chose the word lion . In 1993, Li Jinyuan came to Tianjin to found a company there. That is why the company was named Tianshi (Heavenly Lion). The lion is a commemoration of the memories of the founder associated with his hometown, while the wings are to symbolize the growing aspirations and dynamics of the company. The logotype design is based on a dynamic arc that symbolizes advanced technology, carries a message of unlimited possibilities thanks to its interactive structure and symbolizes inexhaustible energy and continuous development [see Fig. 1].

Fig. 2. The current TIENS logotype

Source: http://witajwtiens.blogspot.com/p/filozofia-tiens.html

In turn, the three-leaf branch resembling an unfolded map of the world reflects the strategy of international development of TIENS. Individual leaves are the image of a product that is characterized by 'naturalness and health', yellow color symbolizes 'sunshine' and 'wealth', while green is the natural color of 'green Earth' [see Fig. 2].

Fig. 3. Genesis of the TIENS logotype

Source: http://witajwtiens.blogspot.com/p/filozofia-tiens.html

A pattern of three human silhouettes joined by hands surrounds the leaves in a natural way, indicating that the TIENS concept is people-oriented and TIENS participants around the world are closely connected. As a whole, the logo is intended to illustrate the continuous development of the brand. The new logo was developed based on the original colors. It embodies the brand's priority values. The whole symbol is an illustration of the key features of the brand under study - it is the concept of A shared world. One family, connects to the long-term brand strategy, expressed by the slogan "Together We Share". According to the managers, the new project is the beginning of the new TIENS road, which begins the development of the global brand.

Conclusions

The growing number of available marketing communication channels due to the development of technology should give companies the opportunity to have a flexible approach to the communication process related to the choice that ensures effective and efficient communication results. The criterion of effectiveness and efficiency should be the basis for planning the communication process with the market, because these measures influence the assessment of the final market effect obtained by companies. In the process of managing a modern enterprise (especially in the era of marketing management), you can use rich marketing instruments, however, the strongest and most positioned brand in the consumer's consciousness is considered to be the most important and strongest. The use of brands is one of the most effective ways to gain and consolidate a company's competitive advantage. A well-perceived brand is not a product, but a set of associations thanks to which a product or service bearing a trademark is bought more often and can be offered at a higher price than competing products. This is, among other things, because the brand allows you to identify and distinguish it from other products offered on the market. However, before you can take advantage of all the opportunities and privileges it brings, you must undergo a difficult process of creation and then brand management.

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Intelligent Personalization – The Result of The Evolution of Web Solutions

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Abstract

Motivation. Offer profiling for customers is one of the most effective methods of achieving customer satisfaction. The realization of the offer profiling process requires an individual approach, which isn't always possible especially for large scale activities.
Purpose. The aim of the article is to propose a model for the selection of web technology solutions depending on the specificity of the business as well as the way of individual customer service.
Design. The goal will be achieved by answering the following questions: a) are there web solutions that enable automation of the selection of offer parameters? b) is it possible to create tools supporting automation in order to achieve intelligent personalization?
Methodology. The research methods used to answer the research questions were critical analysis of literature and IT solutions. In research were used: questionnaire interviews, participatory observations, analysis of IT solutions implemented in research entities and direct participation in processes.
Findings. 1) Web solutions have evolved from passive solutions - of informational nature, through actively enabling two-way communication between the client and the enterprise, to solutions using full automation enabling the implementation of intelligent personalization; 2) Enterprises conducting service activities have a very individualized customer service process as well as the process of creating offers; 3) automation enables intelligent personalisation of offers, which is also possible in enterprises providing knowledge services.
Implications. Recognition of the possibilities of implementing solutions enabling automation of the offering process as well as provision of basic knowledge services can significantly increase the competitiveness of these enterprises.

Keywords: intelligent personalization, web solutions, social networks, semantic networks, sensory networks

Introduction

The development of technologies supporting remote communication and the collection and transmission of large collections of information has significantly changed the conditions and ways of functioning of the organization (Wallis 2015, p. 102-110; Olszak 2016, p. 84-85; Andoh-Baidoo 2016, p. 193-204; Bernat, Cieśliński 2016, p. 31-32). Subsequent stages of evolution of technologies enabling remote communication and data transmission between entities entering into business relations revolutionized the ways of doing business and, above all, the ways of communicating with the environment. In the literature very often the problems of implementation of web solutions as the main determinant of the organization's development are discussed. Nevertheless, issues related to the impact of the development of intelligent technologies on the processes of personalization of value creation for the customer are rarely discussed. Subsequent versions of web solutions, defined 1.0 to 5.0 respectively, evolved from solutions enabling remote communication with unlimited groups of recipients in a passive way, through solutions enabling increasingly interactive ways of communication, to solutions using artificial intelligence.

The transition from passive communication to solutions which, using Artificial Intelligence tools, are able to customize messages according to the value of the characteristics of the information recipient is becoming increasingly sought after by entrepreneurs. Such a spectacular progress in the development of technology makes them not only a tool used to support business, but they have become a determinant of creating completely new solutions in the area of customer service processes. The result of this direction of ICT development has been personalization, which is in complete contrast to the economies of scale that were possible as a result of the development of social networks that describe solutions from the Web 2.0 stage (Stanton 2001, p. 199-201).

The aim of the article is to indicate how the developing web technologies influence the creation of mechanisms of personalization of offers constructed for customers. The key attribute of the personalization process is the intelligent adjustment of offer parameters to current customer needs.

Therefore, the first part of the article will present a short analysis of theoretical considerations of approaches to the concept of "personalization" in order to define and place the considerations contained in the article in the development of management and quality sciences.

Against the background of considerations about the directions and mechanisms of personalization, the next phases of Web 1.0 to 5.0 solutions development will be discussed and their relation to the adoption of trends in the personalization of activities, especially in the area of marketing and communication will be indicated.

The last part of the article contains a presentation of a synthetic analysis of the results of research carried out in a group of several knowledge organizations[1]. The aim of the research was to identify and assess the scope of application and impact of web technologies on the development of personalization processes.

Technological conditions for smart personalization solutions

The development of technologies using the Internet has changed not only the channels of communication between enterprises and their environment, but the whole philosophy of conducting business activity. The depreciation of geographical barriers, the possibility of reaching unlimited groups of customers with a product offer, allowed for the evolution of the organization's activity and shifted the focus from material value chains to intangibles (Benito-Osorio, Peris-Ortiz, Armengot, Colino 2013).

The literature most often indicates that the dynamic development of remote communication was initiated by Tim Berners-Lee's (1999) research on improving the exchange of information between researchers, which resulted in 1993 in CERN making its World Wide Web software available in the public domain (Król 2019).

This event triggered a spectacular development of communication technologies (Chomiak-Orsa 2020). In the literature we can find classifications or characteristics of the next more and more advanced versions of technological solutions defined as solutions and web applications (Khanzode, Sarde 2016; Kambil 2008). And so it is most often said about:

- Web 0.0 - Desktop-Era - was dominated by desktops, a small group of users, had the ability to transfer information between them. This stage of technology development contributed primarily to the opening of communication channels enabling access for users on a previously unknown scale.

[1] Knowledge organizations that have been audited are tax advisory offices and accountancy offices. The survey had a qualitative character, so 17 respondents were subjected to the survey - each respondent was a representative of a different business entity. The research was conducted in November 2019.

- Web 1.0 - the early Web (The Basic Publishing and Transaction Medium) - there has been a significant development of technologies enabling the transfer of mainly text files between computers on the network, such as e-mail, GaduGadu instant messaging, Irc. There was a slow dissemination of access to the network through fixed telecommunication links. This laid the foundations for the creation of an information society, which was characterized by the free flow of information. At this stage of network development, communication on a large scale was of the greatest importance, with personalization processes not yet of great importance, and it was important to reach large groups of customers.
- Web 2.0 - The Social and Co-created Web - is a spectacular development of the Web as a result of "co-creation" mechanisms. The Web is developed as a result of the development of Open Source software. Users drawing information from the web can simultaneously shape its content. At this stage, we can talk about the first significant manifestations of personalization, because the creators of Open Source solutions shaped the IT solutions, adapting them primarily to their identified needs. In addition, the analysis of content and expectations published in social networks significantly raised awareness of the needs and interests reported by users. During this period of development of web solutions, there was a slow focus on solutions personalization.
- Web 3.0 - The Semantic and Intelligent Web - content availability is increased by combining multiple information sources. The use of neural networks and genetic algorithms contributes to increase the computing and analytical capabilities for large data sets collected, among others, in social media. This spectacular increase in analytical capabilities contributes to the launch of activities aimed at a more accurate analysis of customer segments and identification of their common features or significant differences indicating the need for more precise definition of the proposed values.
- Web 4.0 - The Mobile, Machine and Object Web - as a result of the development of artificial intelligence methods and machine learning, the Web becomes not only interactive but also seeks symbiosis with users by personalizing the information made available to users. The web "alone" seeks to select "right" information for specific users as a result of artificial intelligence solutions. This stage of evolution of web solutions was a spectacular turn in the perception of the possibility of personalizing messages, information, offers that were created and directed in a dedicated way (Choudhury 2014, p 8096-8100).
- Web 5.0 - The Sensory-Emotive Web - seeks to implement sensory solutions in the field of neurotechnologies that will be able to record and analyze user emotions. This stage of web development assumes that not only historical information can contribute to the personalization of business processes, but also takes into account current, identified in real time customer preferences.

Each of the above mentioned generation of web solutions is a tool used in business practice (Chomiak-Orsa, Hauke 2020). On the other hand, individual stages of technology development have contributed to an ever "deeper" application of these solutions in organizations. Therefore, Table 1 presents the relations between individual generations of web solutions, the functionalities they make available and the possibilities in the area of personalization.

Tab. 1. Correlation between the Web evolution and the scope of personalization of selected areas of the organization's functioning

Web version	Functionality available	Scope of personalization
The Basic Publishing and Transaction Medium	Static passive websites (Bernes-Lee, Cailliau, Luotonen, Nielsen 1994) allowing only a small number of authors to publish content for a narrow audience with access to the Internet (Król 2019).	Creating passive communication solutions of informational nature. First attempts to personalize but only in the area of graphic design of a passive Internet site
The Social	A platform that integrates all	Creating solutions enabling

and Co-created Web	devices connected to it (O'Reilly 2005). All users can not only read but also publish information, which gives the possibility of mutual communication. Web 2.0 platform gives the possibility to use information resources from different sources (mushup) (Cormode, Krishnamurthy 2008). There is a significant development of websites and social networks.	two-way communication. Creating mutual communication processes. The content of the message was the responsibility of the person who also constructed the message being sent.
The Semantic and Intelligent Web	The transformation of the network into a database which, by collecting large data sets, enables the use of artificial intelligence (Fuchs, Hofkirchner, Schafranek, Raffl, Sandoval, Bichler 2010) in semantic analysis (Morzy 2009, p. 31; Berners-Lee 2014; Berners-Lee, Hendler, Lassila 2001, p. 34-43) of user-generated data.	The tools enable characterization of customer segments, analysis of business partners, creation of business solutions resulting from possessed IT resources as well as employees' knowledge. This contributes to the creation of algorithms facilitating the selection of an appropriate offer for the customer
The Mobile, Machine and Object Web	Mobile solutions integrating all elements of the network in real time, enabling geo-location, user identification and personalization of the transmitted information in real time, systems for managing data collected from thousands of sensors (Sarowski 2017, p. 32-39; Brachman 2013) and processing these sets in real time. Creation of chatbots automating simple operational activities with a high level of duplication. Using multimedia systems combined with virtual reality solutions for remote training or distance learning (Burdea, Coiffet 2005).	Value proposition for customers in a completely new innovative dimension, introducing co-creation into manufacturing processes, more accurate and detailed analysis of customer segments, application of personalization mechanisms and customer experience in value creation processes, automation of communication processes, characterization of customer segments, analysis of business partners, creation of business solutions resulting from possessed IT resources as well as employees' knowledge, improvement of relational capital through building bonds resulting from the use of virtual reality technology
The Sensory-Emotive Web	Attempts to use neurotechnology to interpret selected user biometric indicators by web applications (Patel 2013, p. 410-417) will adapt the scope and type of messages not only to the user's historical interpretations but to his current mood. The use of	IT solutions enable immediate identification of stimuli, analysis of changes in the environment and automatic adaptation to the diagnosed needs of the analysed fragment of reality.

	advanced analysis and inference mechanisms to process large datasets of data to simulate inference and identify relationships between variables (Fleerackers, Meyvis 2018) .	

Source: Own elaboration based on: (Berners-Lee, R., Cailliau, R., Luotonen, A., Nielsen, H.F., Secret, A. (1994); Patel, K. (2013); Burdea G., Coiffet P.(2005); Sarowski Ł. (2017); Morzy M., (2009); Berners-Lee T. (2014); Cormode, G., Krishnamurthy, B. (2008); Król, K. (2019).; O'Reilly, T. (2005).

Intelligent personalization - the customer is the central element of the process

Personalization and co-creation processes are currently the main directions in the improvement of marketing activities. Using artificial intelligence in these processes is one of the main trends in e-commerce development (www.wiadomoscihandlowe.pl; www.payu.pl 2018; www.payu.pl 2019; www.praktycznymarketing.pl; https://achmielewska.com). The notion of "personalization" appears in reference and is most often defined in the area of marketing activity (Szymanski 2010, p. 119-128) as innovative communication processes allowing for skillful adaptation of the company's activities to the needs, likes and behaviors of the customer during contact (Porębska-Miąc 2006, p. 200-215; Firgolska 2017, p. 130-139; Shen, Ball 2009, p. 79-91). Personalization is a trend that is the result of the development of technologies such as artificial intelligence, which is why more and more often there is talk about personalization, which concerns both product solutions in the field of IT (Jelonek 2014, p. 267-278; Yijuan, Nicu, Ross, Oi 2011, p. 247-277) and the possibilities offered by its implementation (Iskierka, Wężgowiec 2018, p. 32-39; Wójcik 2013, p. 112-121). In relation to ICT solutions that should support business processes enabling personalization is defined in correlation with such terms as product customization (Nordin, Kindström, Kowalkowski, Rehme 2011, p. 390-408), presumption (Radziszewska 2010, p. 249-256) or co-creation (Janiszewski, Szmal 2018).

Despite the multitude of definitions as well as indications concerning the directions of implementation of personalization processes it can be noticed that each of the above mentioned considerations indicates the same key attributes and objectives of personalization (Manczak, Sanak-Kosmowska 2018, p. 29-35; Stępniak 2018, p. 190-194; Pukas 2012, p. 83-86; Jabłońska 2018; Jelonek 2014, p. 267-278).

The most important goal is to place the customer as the central point of the sales process. Special emphasis is placed on individual approach in sales processes. This means that it is necessary to collect information about the customer or groups of customers so that profiling is possible - in other words, personalization.

In personalization processes it is also important that the practical implementation of personalization should be beneficial not only for customers but also for the organization.

From a customer's perspective, personalisation should enable customers to achieve greater satisfaction and to meet their reported consumer needs more fully. What is more, it allows the customer to get an impression of its "uniqueness" for the company. This is relatively easy to achieve when dealing with services traditionally provided to individual customers. However, entering digital markets and selling goods and services on a mass scale becomes difficult to "beautify" and "individualise" the customer.

On the other hand, personalisation using mechanisms of co-creation and prosumption can and should contribute to the product development of an enterprise. Personalisation occurring as a result of better identification of customers' expectations or even resulting from their indications and expectations as to improved versions of products and services minimises the risk of producing products that will not enjoy interest on the market. As a result of more precise processes of identifying customer needs,

the company can better define target customer groups, build a customer knowledge base, create personalized relationship policies, increase the effectiveness of building customer loyalty to the competition (Drab-Kurowska 2011, p. 674-681).

With the development of information technologies and the globalisation of market processes, access to large groups of customers was multiplied, while the appropriate adaptation of the offer for selected customers was a growing problem. Both the globalization mechanisms and the resulting generalization and the tendency to personalize offers became possible thanks to successive stages of web technology development.

The above mentioned aspects of personalization and application of ICT solutions are beginning to play a significant role in the area of creating relations with customers. This is of particular importance in relation to:

- defining customer segments through groups of recipients functioning and communicating primarily on the Internet. Personalisation is possible through the use of ICT tools, which not only enable the collection of large information collections but also provide unlimited analytical possibilities.
- creating a value proposition dedicated to properly identified and segmented customers, where as a result of virtual chains, as well as analysis of customer preferences, it will be possible to personalize a value proposition correlated with needs. In the case of virtual customers, it is also important that the customer often treats the possibility of remote contact as the primary value and is primarily interested in intangible value chains or remote implementation of material value chains. Therefore, the use of web tools and personalization mechanisms will enable the realization of these needs remotely.
- creating a relationship policy that, through personalisation and the use of co-creation and prospective mechanisms, can better influence the feeling of customers that they are contributing to the development of an enterprise that responds to their needs.

Adopting the perspective of defining the functioning of an organization that uses personalization in the processes of creating offers and customer service may significantly contribute to the development of the organization, which at the same time will respond in a more flexible way to the evolving needs of customers and environment.

The approach discussed above, which aims at constructing organizational solutions, is focused on personalization thanks to a wide and spectacular development of Internet technologies.

Motivation and presentation of the test method

A critical analysis of the literature made it possible to indicate the directions as well as the available IT solutions supporting intelligent personalization. In order to verify the literature considerations, qualitative research was conducted in 17 organizations. The research methods included questionnaire interviews, participatory observations, analysis of IT solutions implemented in research entities and direct participation in processes.

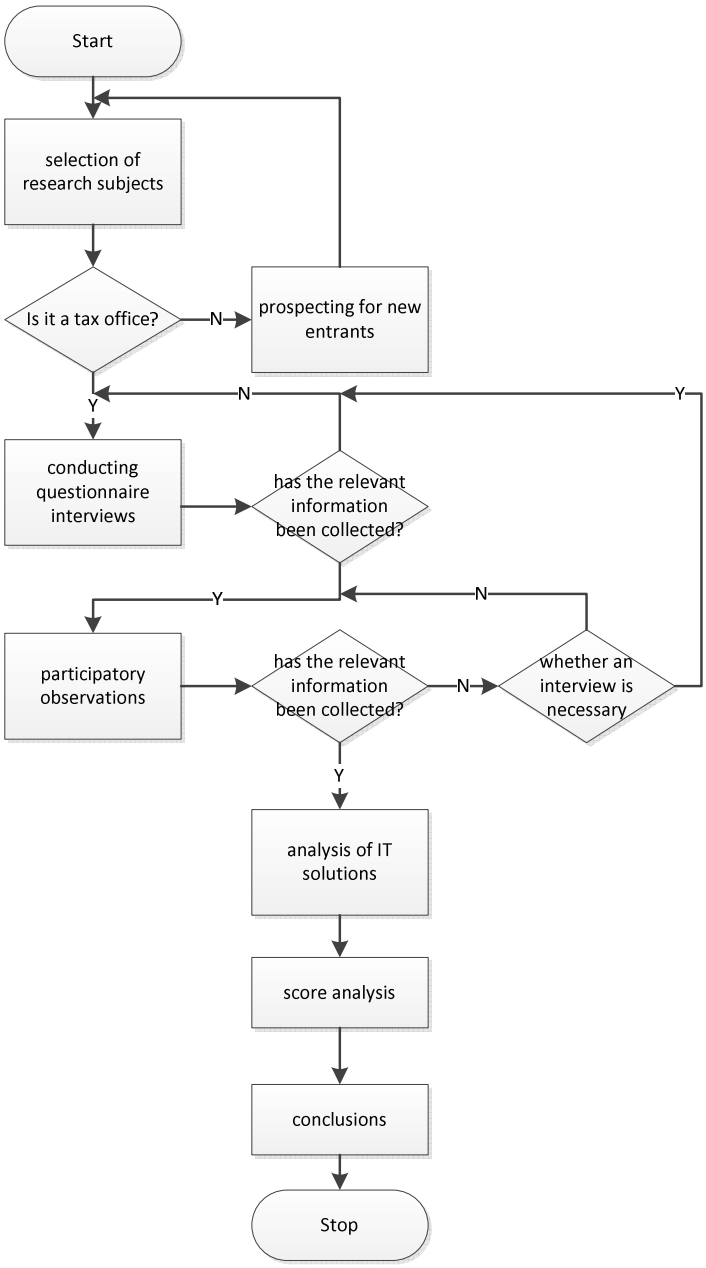

Fig. 1: Research procedure

Source: own study

Knowledge organisations have been studied. The group of entities was homogeneous in terms of industry, as the surveyed entities included only tax advisory offices and accounting offices. As the survey was a qualitative one, the questionnaire interviews were conducted with 17 respondents - each respondent was a representative of a different business entity. The research was conducted in November 2019 during seminars and industry conferences for tax advisors.

The summary presented in the article is synthetic in nature. This means that the responses of the respondents were assigned to categories reflecting successive generations of Web solutions, respectively

Use of Web technology in personalization – a synthetic of case studies

The researcher defined the range of technological solutions for each web generation and as a result of the answers given for the applied solutions, assigned the respondent to a specific generation of solutions (Chomiak-Orsa, Hauke 2020).

Synthetic compilation of respondents' answers is presented in Table 2.

Tab. 2: Examples of smart personalization solutions

Mechanism to be applied	Number of respondents
Intelligent searching	3
Smart sheets	7
Intelligent message initiating contact	6
Personalised starter offer	2
Predictive customer analysis	5
Intelligent range of services	5
Intelligent communication process	3
Personalised offer	5
Intelligent handling process	4
Use of blockchain solutions	1
Intelligent liability calculation process	10

Source: own study

A summary of the size of the indications of individual respondents is presented in Table 2 and shown in Figure 2

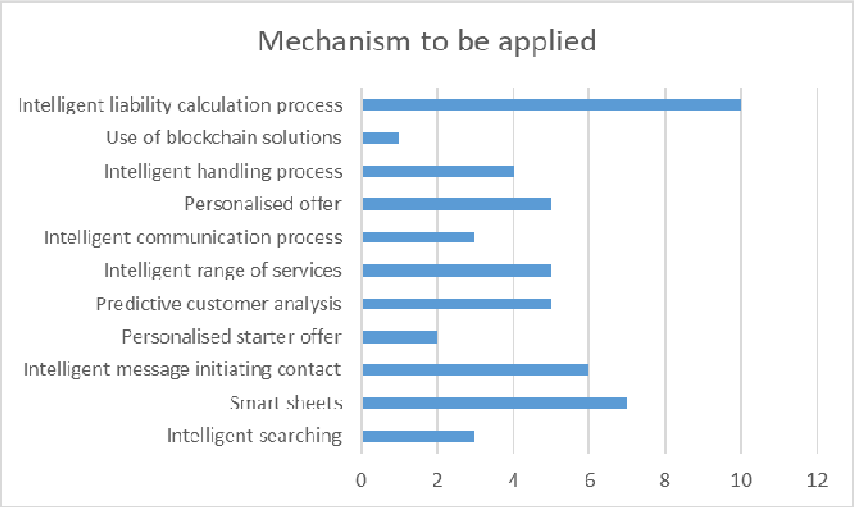

Fig. 2: List of applied intelligent solutions in the surveyed entities

Source: own study

Analyzing the respondents' indications, it is clear that each of the surveyed companies uses modern web technologies that enable the creation of intelligent, personalized processes of acquisition as well as customer service. Nevertheless, the use of such advanced technologies as semantic networks or predictive algorithms is not yet widely used. It can be concluded that companies providing individualised services by carrying out face-to-face processes with customers have very high barriers for introducing automatic solutions. On the other hand, high costs of making investments in the implementation of advanced technologies are a barrier.

Despite the high technological awareness of the respondents, the implementation of this type of technology is still a big novelty for organisations such as tax consulting offices.

Conclusions

The aim of the article was to discuss the possibility of using Web tools in creating intelligent personalization solutions. The analysis of the literature as well as an in-depth analysis of the functional capabilities of modern ICT solutions indicates a very wide spectrum of possibilities to create intelligent personalized offers as well as customer service processes.

The author also sought an answer to the question: are the solutions enabling smart personalization of offers and customer service also possible to implement knowledge in organizations such as tax consulting offices. As a result of the research, the degree of use of web technologies by organizations was identified and diagnosed in order to personalize selected business processes. The article presents pilot studies carried out on a group of 17 entities which are knowledge organisations from one industry, i.e. providing services in the field of tax consulting and management accounting. As the research has shown - all entities are evolving towards personalization using more and more advanced IT tools for this purpose. This means that even running such an individualized and personalized business requires the implementation of web-based solutions. However, as the research shows, a small group of these entities currently uses such solutions.

The results of the research indicate that the implementation of such solutions will most probably constitute the next stage of development of a tax consultancy firm.

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Global Citizenship

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Abstract

Global society is a type of society with certain characteristic and repetitive forms of social life that occur one after the other, e.g. in specific states or nations. A characteristic feature of the global economy is the emergence of international corporations and economic integration occurring between countries around the world. The purpose of the article is a detailed analysis of social globalization in the world. The social globalization dimension includes personal contact, information flows and cultural globalization. The aim of the study is to classify states belonging to the European continent into clusters, including countries characterized by similar development of social globalization. As part of the study, three separate groups of clusters will be constructed, differentiated due to oscillations around the 2-year, 4-year and 8-year trend. Trend analysis and long-term non-linear ordering. A discrete wavelet was used for wavelet analysis of the time series studied. In the process of discrete wavelet transformation, the approximation is called in approximation and detail.

Keywords: Globalization, Global Citizenship, Global Society, Integration, Social Globalization, Wavelets.

Introduction

Globalization is such a qualitative change that transforms current development conditions so much that it fundamentally changes the basic factors affecting the well-being of people, enterprises and countries. The term globalization is commonly used as a term, very complex, ambiguous and multifaceted. Goes beyond the sphere of economics and finance, it covers the area of politics, demography, technology, information, ecology, health, internal and international security, as well as culture and religion. Most often, however, thinking about globalization comes to mind quite advanced form of economic activity, which is carried out on the international level and on the level of markets, sectors and enterprises, which is also characterized by the growth of various kinds of connections between various entities of international life. The definitions of globalization that can be found in the literature draw attention to various aspects of this process and depending on the field in which the author specializes, emphasize other areas of globalization. As every process, globalization is developing (see fig. 1).

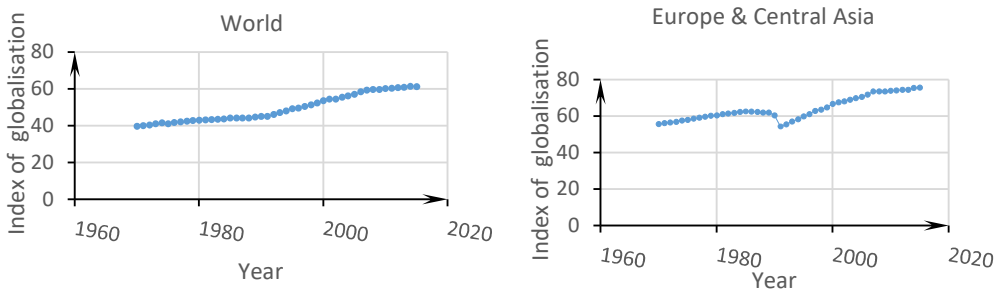

Fig 1: Index of globalisation.

As for globalization, there are different variations of this process. One of the varieties is social globalization, which will be devoted to the rest of this article. Social globalization, expressed as the spread of ideas, information, images and people. Social globalization is subdivided into interpersonal, information and cultural globalization. Social globalization consists of interpersonal, informational and cultural globalization, each of them contributing the third to the social globalization index.

Globalization has its pros and cons in all spheres it affects. However, it is impossible to stop this process, so it is necessary to control its course in such a way that as many countries as possible benefit from participation in it. Therefore, globalization cannot be a spontaneous process, countries must learn to shape it properly. One should get to know the mechanisms of globalization well and consciously use them. Active participation in this process is conducive to rapid reduction of areas of poverty, rapid development of education, and above all, rapid growth and economic development.

Global Citizenship

Globalization is a process that has already affected almost all spheres of life - political, social, economic, culture, communication and private life. So social ideas and movements are also globalizing, which make up what we might call a global society.

The creator of the concept and concept of "global society" was Herbert Marshall McLuhan (Canadian sociologist). McLuhan coined the expression "the medium is the message" and the term global village, and predicted the World Wide Web almost 30 years before it was invented. He regarded the printed book as an institution fated to disappear.

Global society means the existence of the same structures around the world ("global village"), a high degree of civilization development, blurring borders between countries, the activities of large corporations worldwide.

In general usage, the term “global citizenship” may have much the same meaning as "world citizen" or cosmopolitan, but it also has additional, specialized meanings in differing contexts. Various organizations, such as the World Service Authority, have advocated global citizenship.

However, the question arises as to what the definition of global society really is. Paul van Seters, who brings the Charles Taylor distinction between three different definitions of global civil society to a global level, believes that (see Haratyk, 2011):

- According to the minimum definition, global civil society exists when there are independent international non-governmental organizations (GSOIs).
- According to a stronger definition, global civil society exists when society creates an internal structure and coordinates its activities through international non-governmental organizations (GSOII).
- According to the third definition, global civil society exists when international NGOs exert significant influence on global or international policy (GSOIII).

The process of creating a global society is called globalization. The origins of this type of society should be sought at a very fast rate of information flow, mass media access and telecommunications development. Obviously there are different approaches in this context, e.g. according to Clark: "The fall of the Berlin Wall ended the rivalry of superpowers, which defined politics for most of the 20th century, but a different system of three superpowers emerged in its place. The first is the US government and military complex and its allies. The second is the power of a global corporation. The third is the power of public opinion and civil society " (Clark, 2008). According to Roland Robertson, in reference to Ferdinand Tönnies's division of human communities into communities (Gemeinschaft) and associations, organized communities (Gesellschaft) the following typology of global communities is possible (Robertson, 1919):

- "Global Community I" - the world is a mosaic of closed, mutually separated communities, or unique and egalitarian, higher and lower in cultural development, but mutually isolated and

not aspiring to subordination different from each other. Compliant with the ideology of anti-globalization and fundamentalist religious orientations.

- "Global Community II" - a universal consensus around certain common values and ideals. A world consistent with the Christian idea of God's kingdom on earth, the concept of the universal Church and ecumenical tendencies. These are also aspirations of the peace movement or the environmental movement and the human rights movement.
- "Global community I" - a mosaic of sovereign, independent nation-states connected by strong, mutual cooperative bonds in the field of economics, politics and culture.
- "Global community II" - predicts the disappearance of nation states and regional unification, followed by global unification under the aegis of a joint political organization or supranational world government.

Social Globalization - Detailed Empirical Analysis

Globalization measures can be divided into those of an economic nature and those that estimate social progress. The impact of the globalization process on the social sphere is enormous. This is evident at every step of human life, both in the spiritual sphere (values, ideas, culture, religion), the sphere related to personal and family life, as well as everyday life - education, work. This impact is bi-directional, both positive and negative. Therefore, one should strive for the positive effects of the globalization process to affect the social sphere over negative ones.

Globalization has its pros and cons in all spheres it affects. However, it is impossible to stop this process, so it is necessary to control its course in such a way that as many countries as possible benefit from participation in it. Therefore, globalization cannot be a spontaneous process, countries must learn to shape it properly. One should get to know the mechanisms of globalization well and consciously use them. Active participation in this process is conducive to the rapid reduction of areas of poverty, the rapid development of education, and above all, rapid growth and economic development.

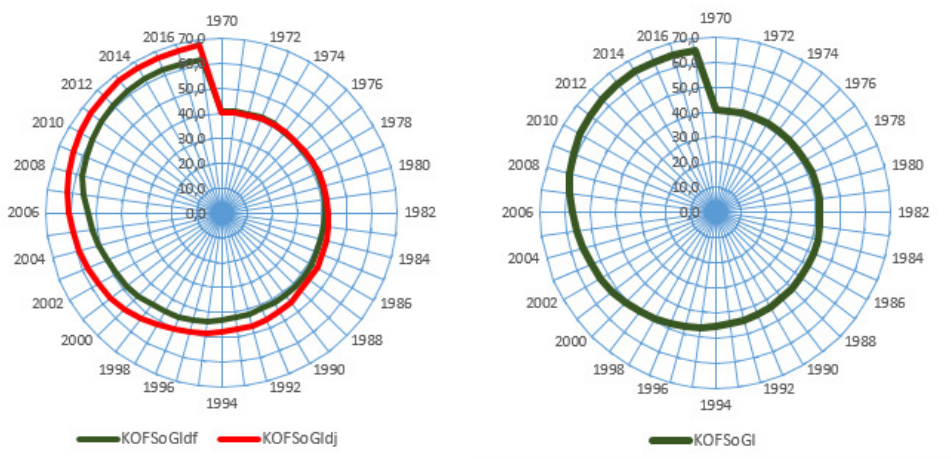

Fig 2. Social globalization index in World

Source: Own calculations based on data from Swiss Economic Institute.

The social globalisation dimension includes personal contact, information flows and cultural globalisation. "For each of these in turn a distinction is made between de facto (KOFSoGIdf) and de jure globalisation (KOFSoGIdj).

De facto personal contact is measured in terms of international telephone connections, tourism flows and migration, while de jure personal contact is quantified on the basis on telephone line rentals, international airports and visa restrictions. De facto information flows are determined based on

international patent applications, international students and trade in high-tech goods. De jure information flows consist of access to television and the internet, press freedom and international internet connections.

De facto cultural globalisation comprises trade in cultural goods, international trademark registrations and the number of McDonald's restaurants and IKEA stores. De jure cultural globalisation is measured in terms of civil rights, gender equality and educational standards" (Swiss Economic Institute, 2020).

Social globalisation has hardly advanced at all in recent years either. The figures below show the evolution of the social globalization index since 1970.

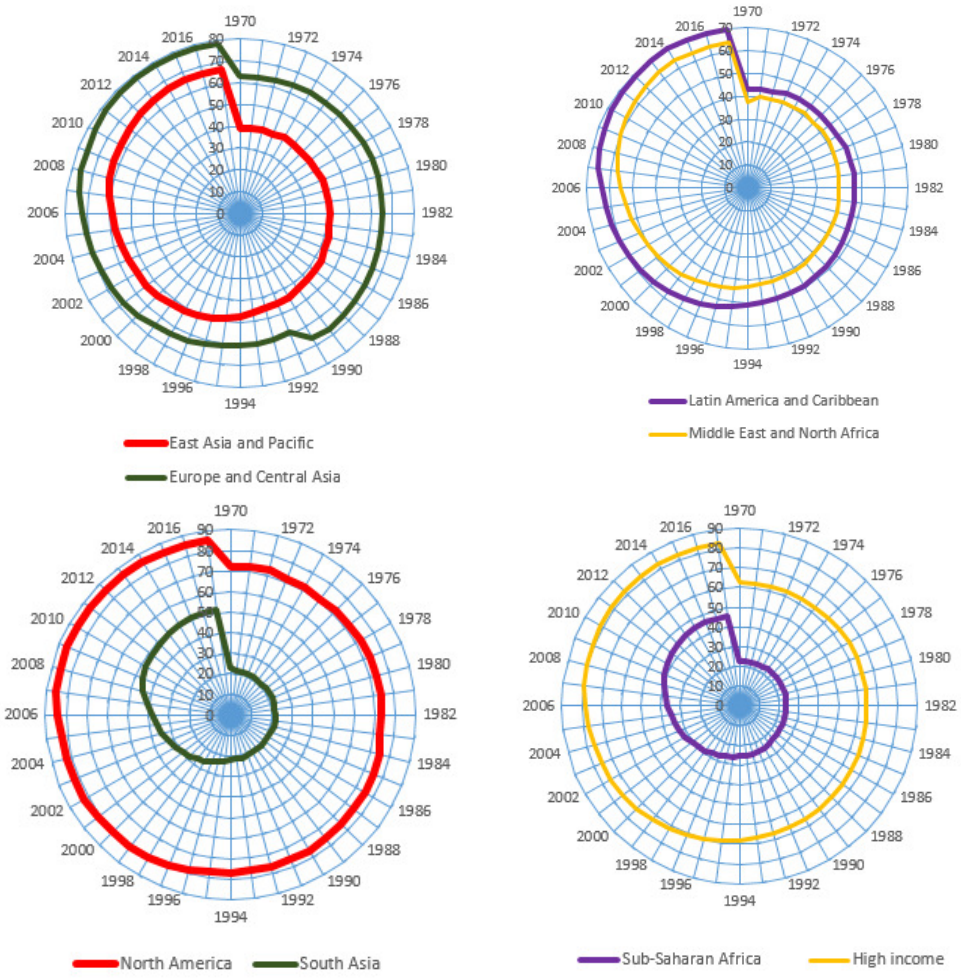

Fig 3. Social globalization index in World

Source: Own calculations based on data from Swiss Economic Institute.

The analyzes show that the index of social globalization in the period 1970-2018 grew the fastest on average in Low Income annually, while in the years 1990-2018 and 2000-2018 in South Asia. In the period 1970-2018, the poorest social globalization index grew in North America, in 1990-2018 the slower pace of change was High income, and in 2000-2018 in North America (see Table 1).

Table 1: Average annual rate of changes in the social globalization index.

	Period		
	1970-2018	**1990-2018**	**2000-2018**
World	0,50%	0,73%	0,71%
East Asia and Pacific	0,56%	0,76%	0,64%
Europe and Central Asia	0,24%	0,32%	0,50%
Latin America and Caribbean	0,51%	0,65%	0,55%
Middle East and North Africa	0,56%	0,80%	0,82%
North America	**0,18%**	0,22%	**0,18%**
South Asia	0,87%	**1,67%**	**1,76%**
Sub-Saharan Africa	0,74%	1,13%	1,32%
High income	0,30%	**0,41%**	0,34%
Low income	**0,90%**	1,39%	1,64%
Lower middle income	0,83%	1,23%	1,22%
Upper middle income	0,56%	0,79%	0,75%

Source: Own calculations.

Analyzing the changes in the development of social globalization in the world, according to the above division, it should be noted that the largest change in this index compared to the previous year took place in Low income countries. In 2008, the index represented 106.7% of the 2007 index. In other regions, the maximum increases were:

- World - maximum increase by 3.11% compared to the previous year.
- East Asia and Pacific- maximum increase by 3,49% compared to the previous year.
- Europe and Central Asia - maximum increase by 2,99% compared to the previous year.
- Latin America and Caribbean - maximum increase by 3,13% compared to the previous year.
- Middle East and North Africa - maximum increase by 5,72% compared to the previous year.
- North America - maximum increase by 2,06% compared to the previous year.
- South Asia - maximum increase by 8,03% compared to the previous year.
- Sub-Saharan Africa- maximum increase by 5,36% compared to the previous year.
- High income- maximum increase by 2,09% compared to the previous year.
- Low income- maximum increase by 6,67% compared to the previous year.
- Lower middle income - maximum increase by 6,05% compared to the previous year.
- Upper middle income- maximum increase by 3,80% compared to the previous year.

Details are shown in the figure below.

Analyzing the data, it can be seen that the largest decrease compared to the previous year was Europe and Central Asia. The decrease was by as much as 10.35% (a decrease from 1990 to 1991). In other regions of the world, the maximum decreases were as follows:

- World- 1,06%
- East Asia and Pacific-1,31%
- Europe and Central Asia - 10,35%
- Latin America and Caribbean - 0,84%
- Middle East and North Africa - 1,56%
- North America-2,24%
- South Asia-4,06%
- Sub-Saharan Africa-1,47%
- High income-0,71%
- Low income-1,07%
- Lower middle income-1,27%
- Upper middle income-0,92%.

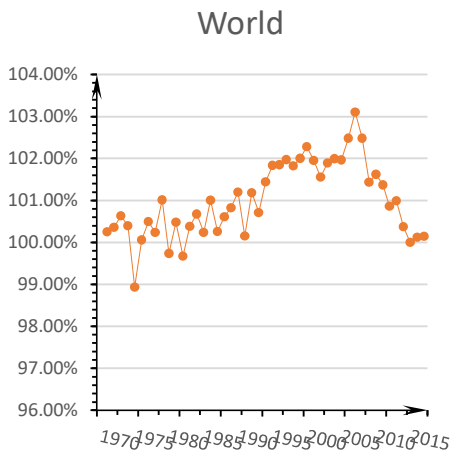

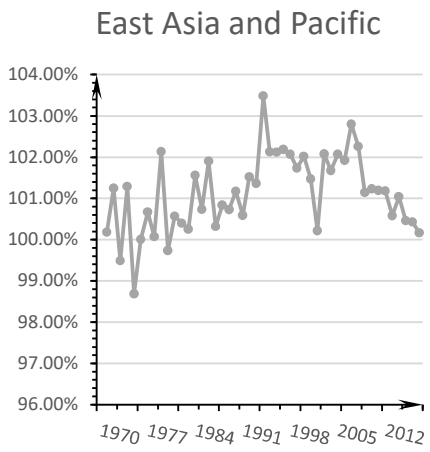

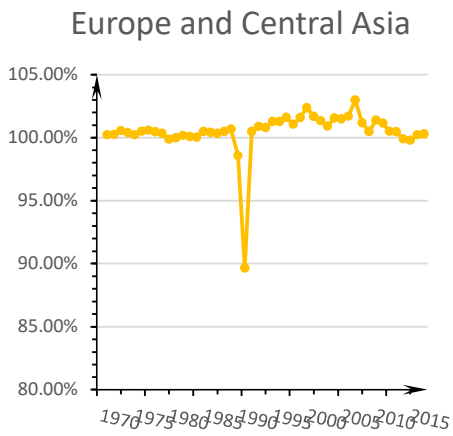
Europe and Central Asia
105.00%
100.00%
95.00%
90.00%
85.00%
80.00%
1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

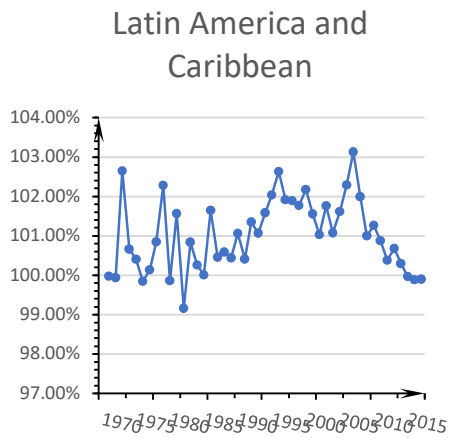
Latin America and Caribbean
104.00%
103.00%
102.00%
101.00%
100.00%
99.00%
98.00%
97.00%
1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

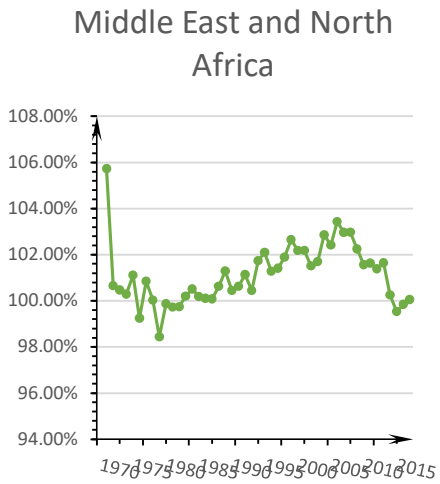
Middle East and North Africa
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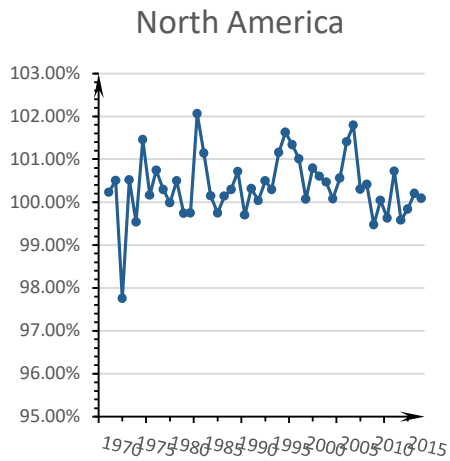
North America
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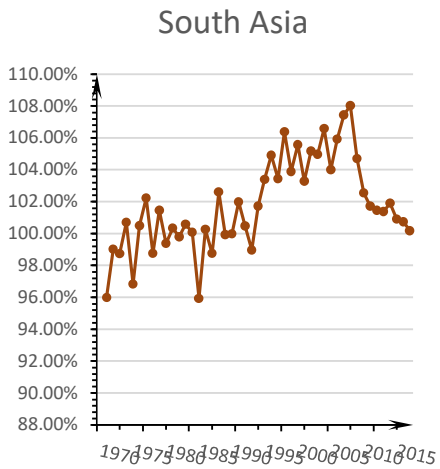
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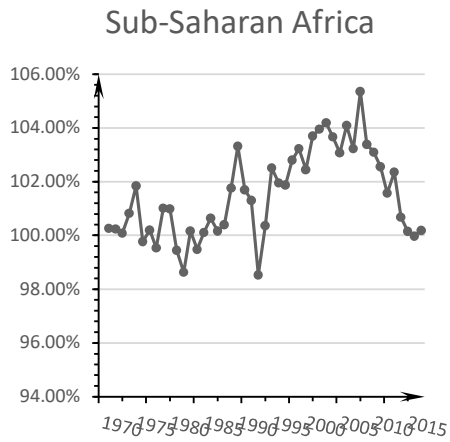
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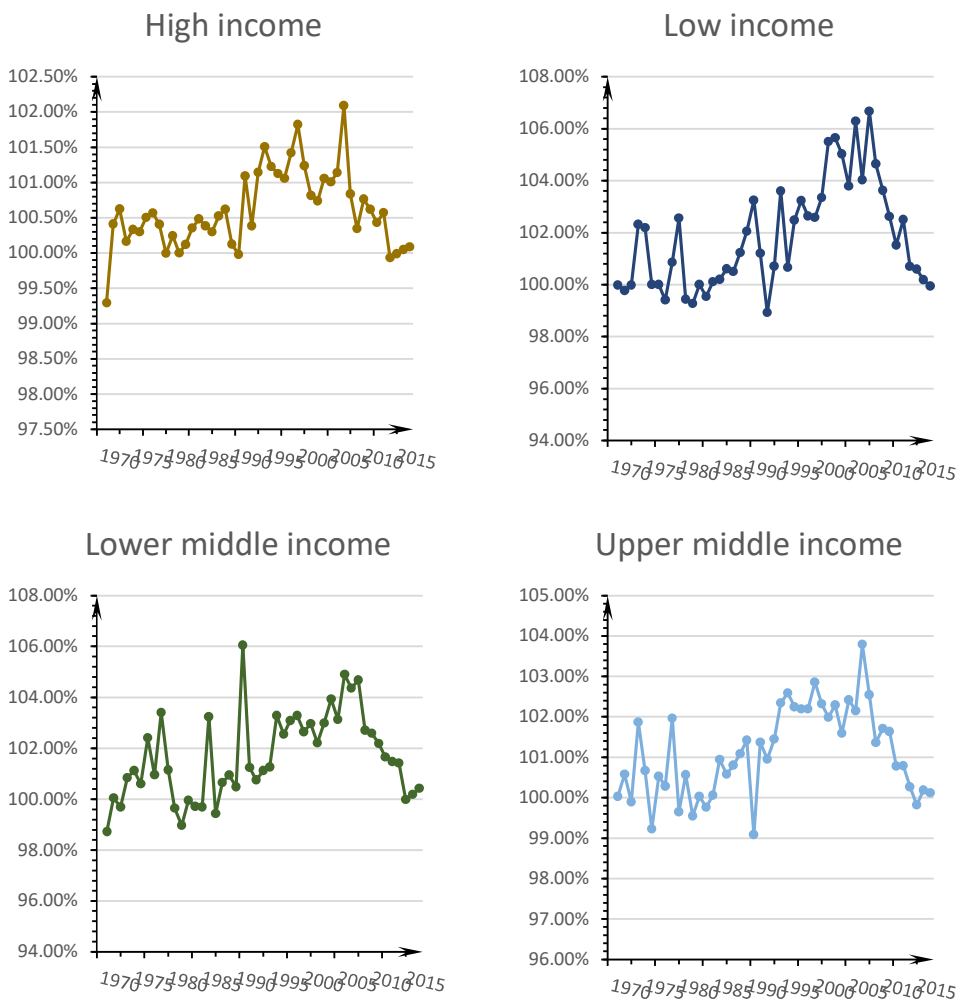

Fig 4. Dynamics of changes in the social globalization index. Change in the index of social globalization compared to the previous year.

Source: Own calculations.

Analyzing the dynamics of the social globalization index compared to 2000, we obtain that the largest increases compared to 2000 were as follows:

- World- increast by 27,33% (the value of the index in 2016 constituted 127.33% of the index from 2000);
- East Asia and Pacific- increast by 24,32%;
- Europe and Central Asia - increast by 18,55%;
- Latin America and Caribbean - increast by 20,63%;
- Middle East and North Africa - increast by 32,86%;
- North America - increast by 6,59%;
- South Asia- increast by 81,19%;
- Sub-Saharan Africa - increast by 55,93%;
- High income- increast by 12,37%;
- Low income- increast by 74,08%;
- Lower middle income- increast by 50,90%;

- Upper middle income- increast by 29,06%.

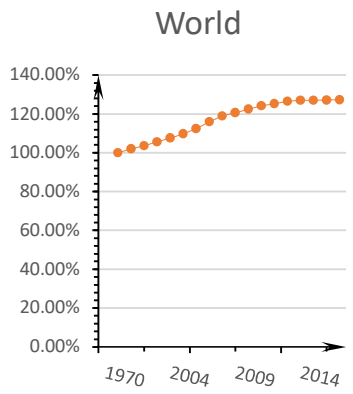

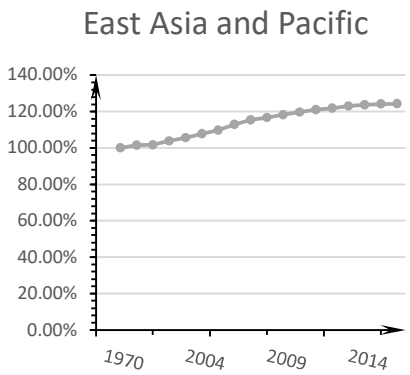

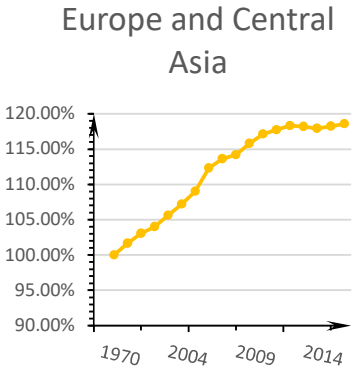

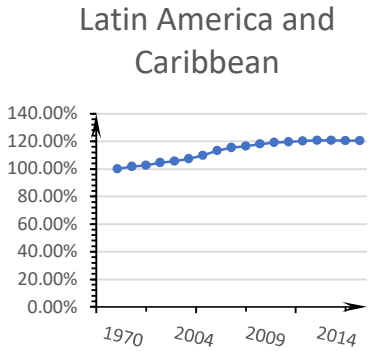

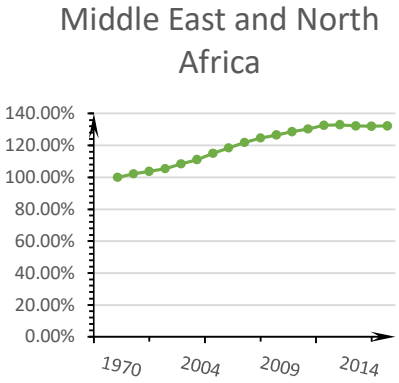

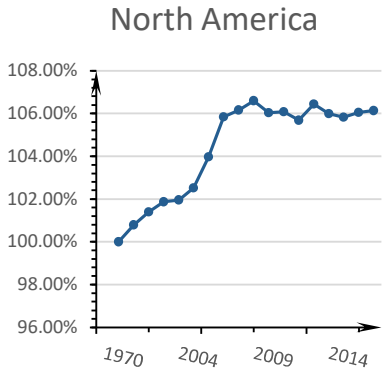

Fig 5. Dynamics of changes in the social globalization index. Change compared to 2000.
Source: Own calculations.

Empirical Analysis European Continent

The aim of the study is to classify states belonging to the European continent into clusters, including countries characterized by similar development of social globalization. As part of the study, three separate groups of clusters will be constructed, differentiated due to oscillations around the 2-year, 4-year and 8-year trend. The study was based on 36 countries belonging to Europe. Due to the lack of relevant data, countries such as Kosovo, Macedonia, Slovakia and Vatican are not included. Data from the 1970s.

The research analysis based on a wavelet analysis with a discrete wavelet (see, among others, Hadaś-Dyduch 2015a, 2015b, 2016a, 2016b, 2016c, 2017, 2019, 2019a) and non-linear ordering (Dezin, 2017; Jajuga, 1993). Wavelet analysis and nonlinear ordering were used for the study. The key steps of the algorithm used in the study are summarized below.

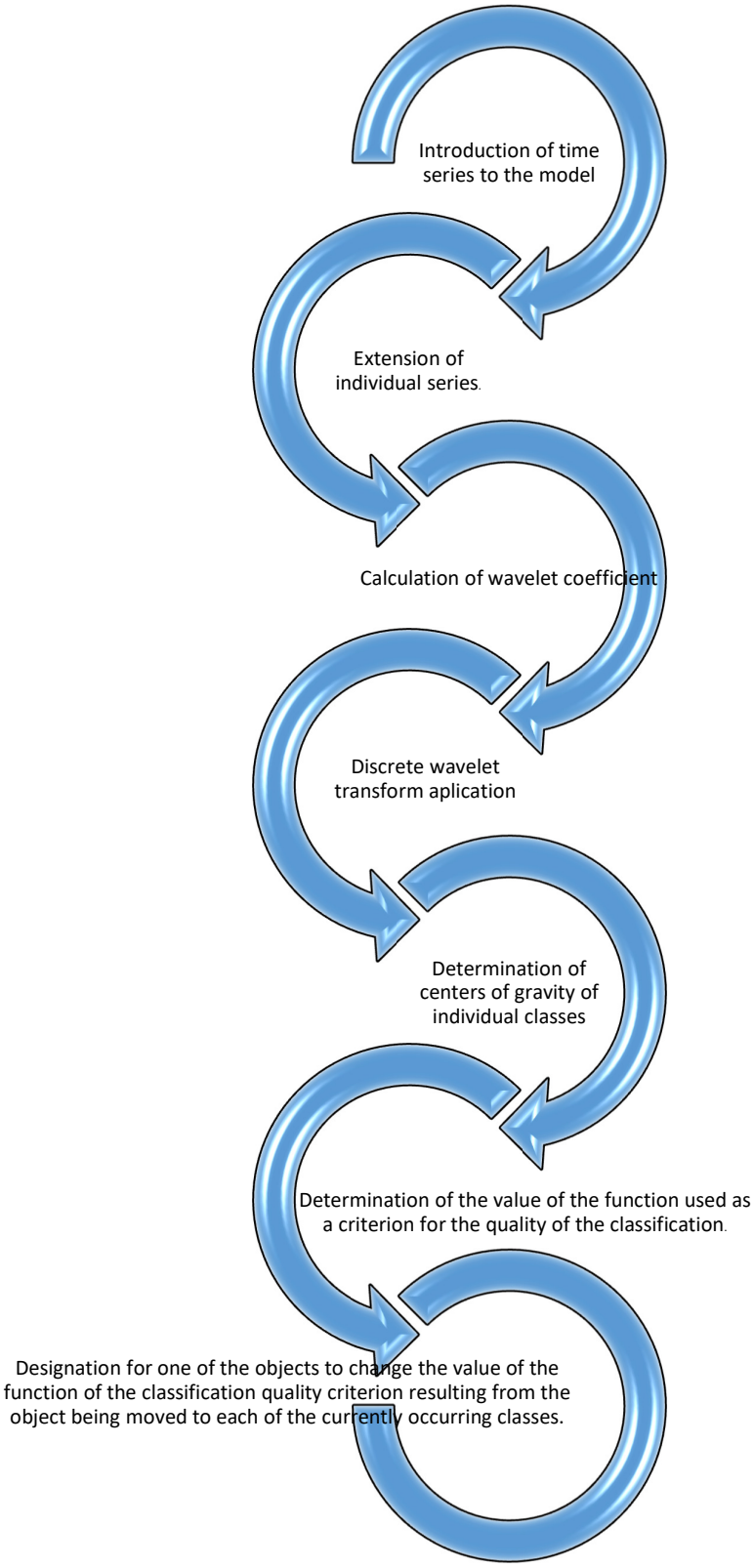
Introduction of time series to the model
Extension of individual series.
Calculation of wavelet coefficient
Discrete wavelet transform aplication
Determination of centers of gravity of individual classes
Determination of the value of the function used as a criterion for the quality of the classification.
Designation for one of the objects to change the value of the function of the classification quality criterion resulting from the object being moved to each of the currently occurring classes.

The Research Results

The algorithm application described in chapter 3 allows for the construction of clusters containing groups of similar countries in a given time trend and also for the following conclusions.

The index of social globalization in the world since 1970, increases on average by 0.97% annually. However, since 2008, the global social globalization index has been increasing on average by 0.61% annually.

Currently, the highest value of the social globalization index is in the following countries: Albania 64.33; Ukraine 65.40; Belarus 65.70; Russia 65.81; Andorra 66.88; Moldavia 68.06; Bosnia and Hercegovina 68.25; Liechtenstein, 68.47; Romania 70.05; Serbia 72.08 (see figure 4, 5). The lowest value of the social globalization index is in Sweden 85.68; Cyprus 85.81; Finland 85.85; Belgium 86.29; Austria 86.75; United Kingdom 88.05; Italy 88,12; Denmark 88.30; Luxembourg 89.89; Norway 90.43.

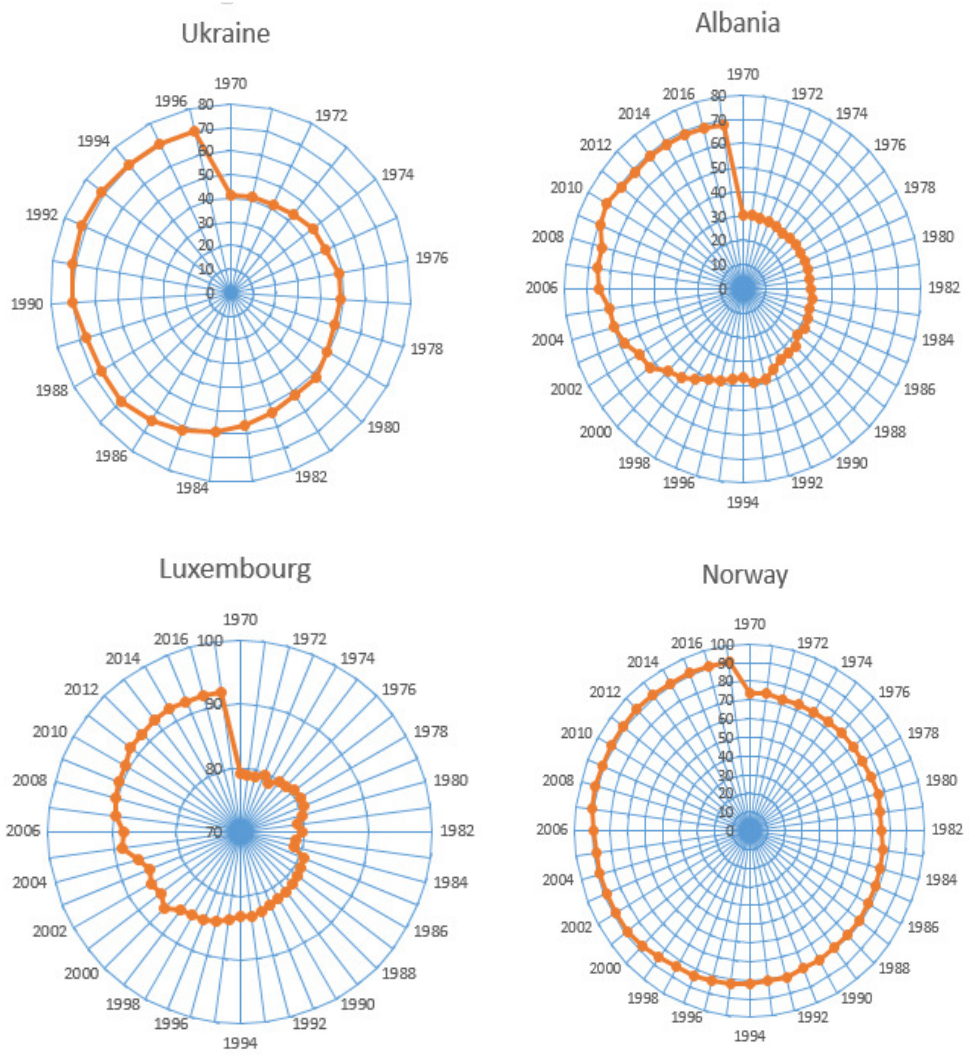

Fig 6. Index of social globalization in Albania and Ukraine, Luxembourg and Norway
Source: Own elaboration

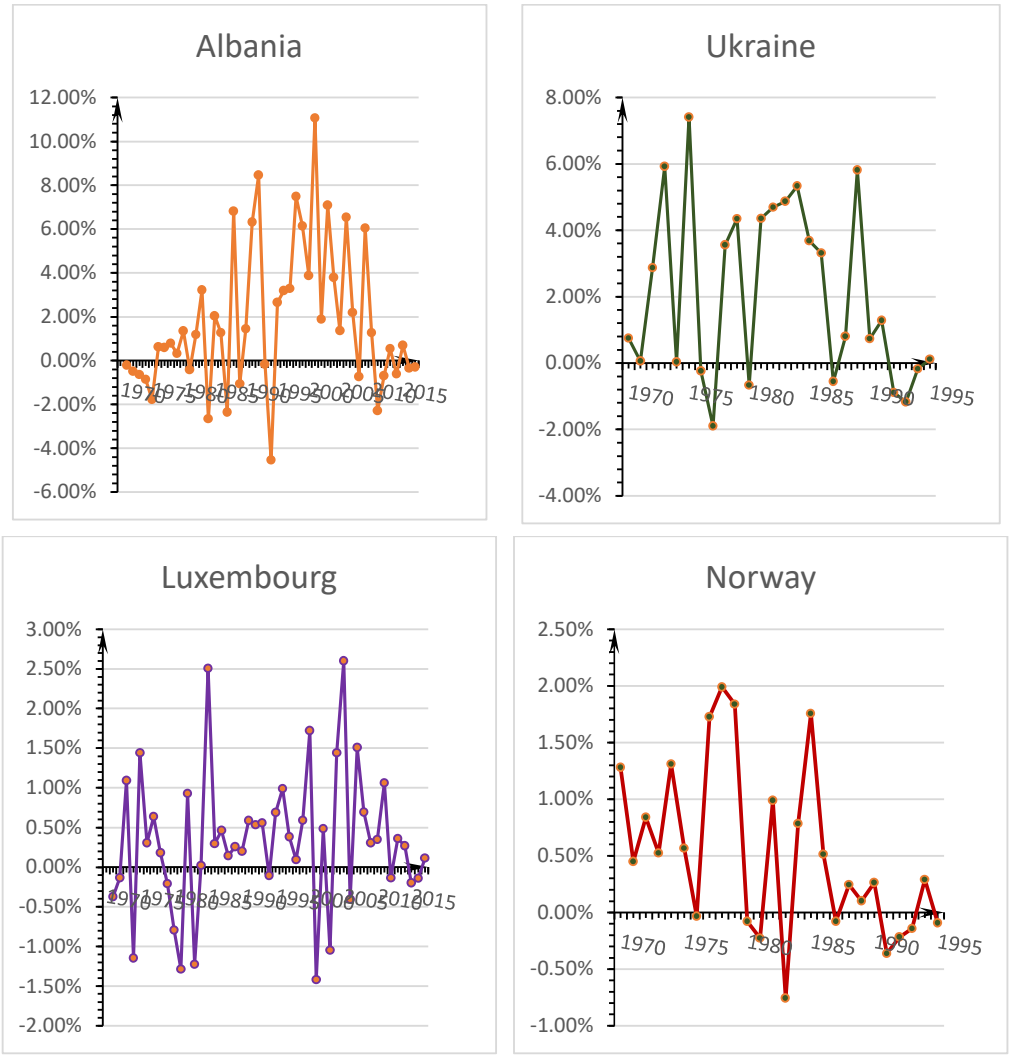

Fig 7. Dynamics of changes in the social globalization index. in Albania and Ukraine, Luxembourg and Norway

Source: Own elaboration

The top ten countries with the highest growth rate of the social globalization index are: Estonia 1.43%, Russia 1.57%, Belarus 1.68%, Ukraine 1.77%, Moldavia 1.90%, Bulgaria 2.03%, Albania 2.09%, Lithuania 2.18%, Romania 2.20%, Bosnia and Hercegovina 2.41%. However, the countries with the lowest growth rate of the social globalization index are: Liechtenstein -0.10%, Andorra 0.04%, Sweden 0.29%, Denmark 0.41%, Ireland 0.44%, Austria 0.46%, Norway 0.49%, Iceland 0.49%, Portugal 0.55%, Finland 0.57%.

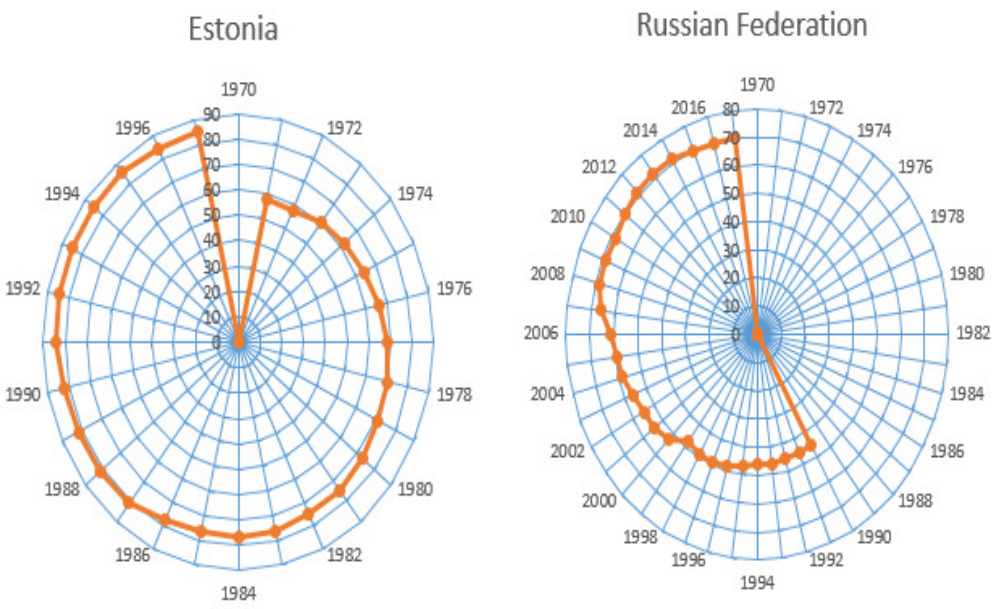

Fig. 1 Index of social globalization in Luxembourg and Norway

Source: Own

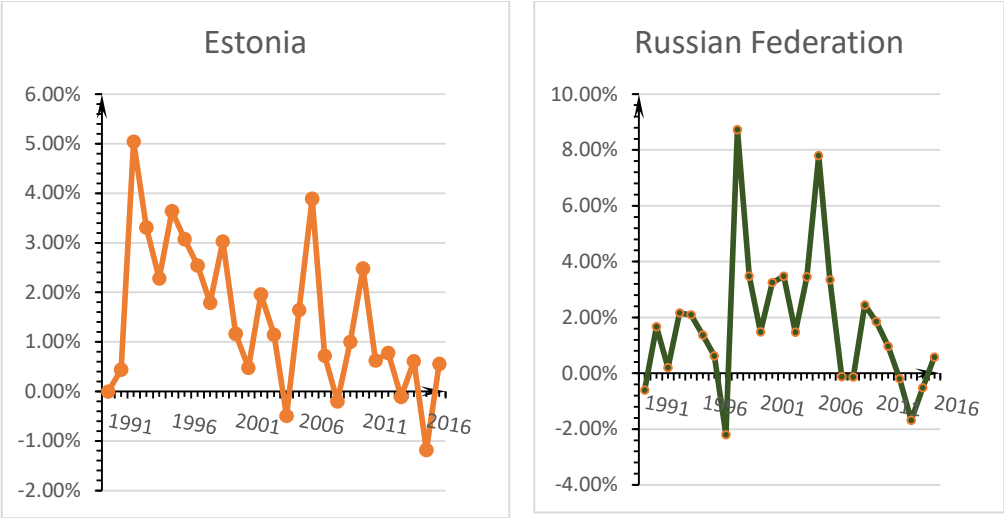

Fig 9. Dynamics of changes in the social globalization index in Albania and Ukraine, Luxembourg and Norway

Source: Own elaboration

The calculations and simulations carried out show that by analyzing the social globalization index in the 2-year tendency, 11 clusters can be created. Countries with a similar development trend of social globalization in the two-year trend are (see Figure 9): klaster1: Bosnia and Hercegovina, Czech Republic; cluster 2: Denmark, Iceland, Ireland, Latvia, Ukraine; cluster 3: Germany, Luxembourg, United Kingdom. Cluster 4: Belgium, Finland, Portugal; cluster 5: Malta, Netherlands, Sweden; cluster 6: Andorra, Croatia, Liechtenstein, Montenegro, Serbia, Slovenia; cluster 7: Belarus, Bulgaria,

Lithuania; cluster 8: Austria, Cyprus, Italy, Spain; cluster 9: Estonia, Greece, Hungary, Romania; cluster 10: Albania, Norway, Poland; cluster 11: France. The following countries were not included in the study: Kosovo, Macedonia, Moldavia, Russia, Slovakia, Switzerland, Vatican.

The development of the social globalization index in France in the two-year trend is not similar to the development trend of any of the countries of the European continent (countries such as Kosovo, Macedonia, Moldavia, Russia, Slovakia, Switzerland, Vatican were not taken into account. However, already in the 4-year tendency it is the closest to the trend in Austria and in the 8-year tendency to Finland and Spain.

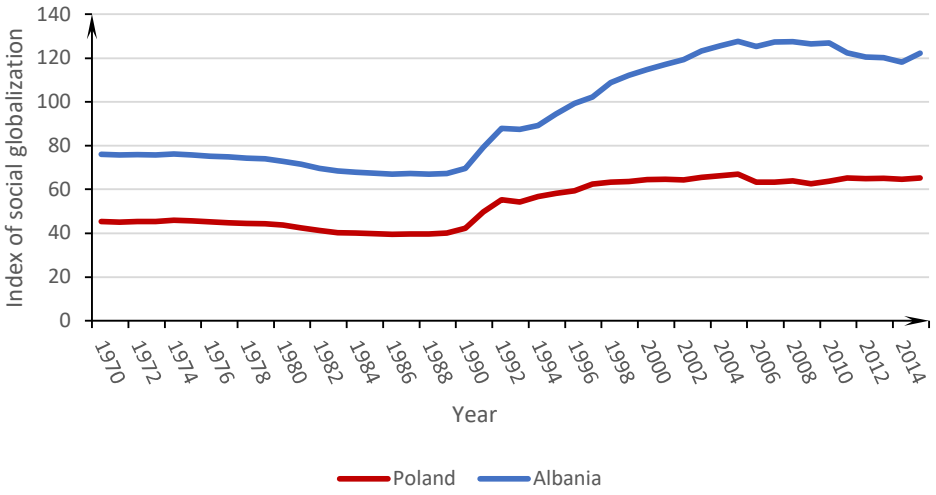

Fig 10. Index of social globalization in Poland and Albania

Source: Own

The volatility of the social globalization index in the 4-year tendency allowed the division of countries belonging to the European continent into 12 clusters. By grouping, the following countries are not included: Kosovo, Macedonia, Moldavia, Russia, Slovakia, Switzerland, Vatican. Cluster 1: Croatia, Iceland, Slovenia, United Kingdom, Estonia; cluster 2: Latvia, Romania, Ukraine; cluster 3: Germany, Spain; cluster 4: Bulgaria, Lithuania; cluster 5: Ireland; cluster 6: Belarus; cluster 7: Belgium, Cyprus, Finland, Malta, Norway, Sweden; cluster 8: Austria, France; cluster 9: Liechtenstein, Luxembourg; cluster 10: Denmark, Netherlands, cluster 11: Andorra, Montenegro, Serbia; cluster 12: Greece, Hungary, Bosnia and Hercegovina, Italy, Poland, Albania; cluster 13: Czech Republic, Portugal.

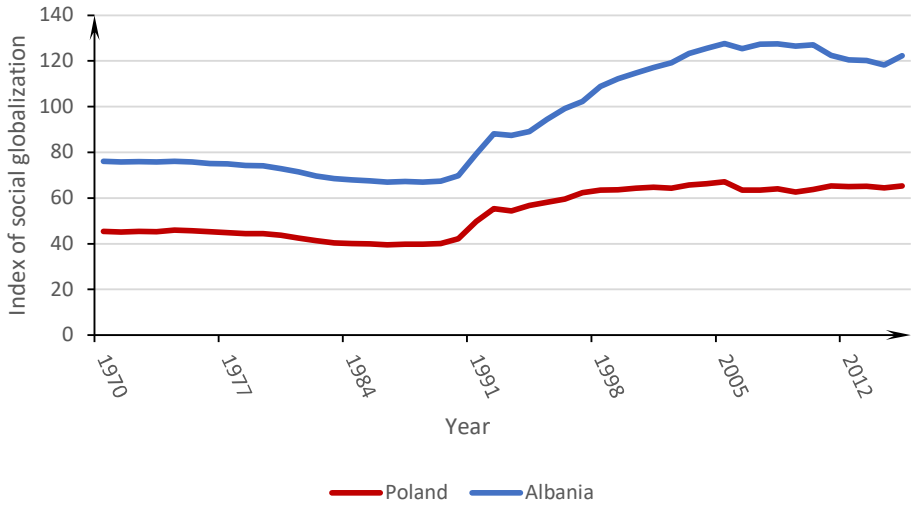

Fig 11. Index of social globalization in Poland and Portugal

Source: Own

Conclusion

Globalization has its pros and cons in all spheres it affects. However, it is impossible to stop this process, so it is necessary to control its course in such a way that as many countries as possible benefit from participation in it. Therefore, globalization cannot be a spontaneous process, countries must learn to shape it properly. One should get to know the mechanisms of globalization well and consciously use them. Active participation in this process is conducive to rapid reduction of areas of poverty, rapid development of education, and above all rapid growth and economic development. According to (Zdanowski, 2000) when globalization is said to be a phenomenon of crossing borders, economic activity and labor flow are most often meant. Meanwhile, globalization means a global flow of primarily intangible assets - social norms and behavior, cultural and political norms, and its result is the continuous formation of new and as yet unknown cultural ties that differ from those previously formed by nations and ethnic groups. Interesting multifaceted analyzes of Europe are also described in (Czech & Krakowiak-Drzewiecka, 2019; Pietrzak, 2020; Grybaitė & Stankevičienė 2018; Staníčková, 2020).

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The Study of Terrorism Financing in Indonesia

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Abstract

Terrorism activity need funding supports in its survival. The practices of conventional methods, such as physical robberies, sending cash via couriers, and charitable donations have now moved towards the use of technology, particularly the use of internet-supported technology. This paper aims to describe the methods of financing terrorism implemented in Indonesia, covering both the use of traditional methods and internet based technology methods, and the recommendation to countering the financing of terrorism by the misuse of the internet. This research was conducted using qualitative method, combining discussions with experts from various government agencies, as well as journal literature reviews and reports. This paper shows that the existence of the internet indirectly expands the financing of terrorism with a wider, faster, anonymous, and greater amount.

Keywords: Internet, Terrorism Financing, Indonesia

Introduction

Like most organizations, terrorists need funds to meet their needs (Reda, 2014). According to some experts, funds are seen as a 'source of life' and a driving force of a terrorist organization. Without funding, terrorists will not be able to carry out their operation, attack, or even exist as an organization (Freeman, 2011). The funds, both in the form of income and assets, are the most important part in the survival of terror organizations. Without funds, terrorism will not occur.

Santoso and Laksmi (2016) explained some examples. Al Qaeda in 2000 needed funds of around USD 9,000 to USD 500,000. In the attack on the London Underground on July 7, 2005, Al Qaeda was estimated to cost around USD 9,700. While the terrorist attack on the Madrid Railway on March 11, 2004, funds were needed around USD 110,000. For terrorist attacks in Southeast Asia, such as the bombing at the Marriott Hotel, the al-Jama'ah al-Islamiyah terrorist group costs around USD 30,000 and for the 2002 Bali bombings it requires USD 50,000. The terrorist attack said to be the deadliest so far, the attack on the Twin Towers of New York on September 11, costs around USD 400,000 to USD 500,000. Therefore, funds are very crucial in the act of terrorism.

The terrorism funding methods have developed throughout the time. In early 2000, the majority of their funding sources came from the infaq and zakat of members and sympathizers, whereas cash were smuggled in from abroad, charities, aid from Al Qaeda, bank robberies, narcotics trafficking, and through *hawala*, which is an informal money transfer based on trust between brokers at the sending and receiving locations. (Abuza, 2003).

However, the method of financing terrorism has undergone various changes. Purwawidada (2014) explains that the use of the conventional methods, such as physical robberies, sending cash via couriers, charitable donations and alms, to foreign aid, terrorists have now moved where the 'robberies' are carried out digitally through illegal financial technology (FinTech) as done by Rizky Gunawan. During 2010 to 2012, Marwan and Rizky Gunawan managed to obtain accumulated funds of Rp 6

billion from the illegal hacking of a financial technology company, which offered by an investment company named Speedline.com. The funds were partly used for training in Poso area in South Sulawesi, amounting to Rp 500 million, and bombing in the Kepunton church in Solo in 2011.

The illegal use of FinTech to obtain funds shows that terrorists are always following technological developments. Terrorists do this to adapt to government regulations, especially in the financial sector and to avoid surveillance and tracking by the authorities. This method has several advantages such as fast, effective, efficient transfer of funds, without the need for physical face-to-face. These advantages were then used by terrorists as a loophole to become a medium for terrorism funding. (PPATK, 2015). In addition, the use of technology in terrorist operations is also in line with the will given by Imam Samudera in 2004 before being executed, where his successor jihadists were encouraged to study and practice hacking in terror (Purwawidada, 2014).

This paper aims to examine various methods that have been used in Indonesia throughout the time. It is divided into three sections: section one provides a brief historical review of terrorism financing; section two considers the nature and operation of technology in terrorism financing; and section three discusses the method of the financing of terrorism in Indonesia.

Conceptual Frameworks and Methods

The funding sources used by the terrorist groups vary, from legal sources to illegal, directly or indirectly, such as using intermediaries, and from local to global. However, funding for terrorism is not only limited to money. Those who encourage, plan, and get involved in the process of their action can also be categorized as terrorism funding. Because terrorism financing activities are becoming increasingly visible in the formal financial sector and law enforcement agencies, terrorists must find an alternative method to sustain their activities, one of which is through the internet.

The first part of the paper will discuss the evolution of terrorism funding according to Vittori (2011), followed by the use of technology in terrorism financing, and the dynamics of terrorism financing in Indonesia. The discussion of internet-based methods for the financing by terrorist follows the typologies offered by the United Nations Office on Drugs and Crime (UNODC) (Conway, 2005).

The paper will use results of discussions with institutions related to various agencies relating to terrorist countering in Indonesia, such as Detachment 88 (Densus 88) of the Indonesia Police Agency, Indonesian Financial Transaction Reports and Analysis Center (PPATK), and digital forensic experts. Whereas, the secondary data was obtained through Financial Action Task Force (FATF) and PPATK reports, as well as literature studies that discuss funding of terrorism.

Periods of Terrorism and Financing Methods

Vittori (2011) analyzed the evolution of financing of terrorism based on the thoughts of David Rapoport, namely four waves of terrorism consisting of 1) Anarchist Waves; 2) Anti-Colonial Waves; 3) New Left Movements; and 4) Waves of Religion. In his analysis, Vittori (2011) states that each wave of terrorism has a certain funding method. Therefore, the method of financing terrorism has evolved from time to time, where the methods used have become increasingly complex, varied, and adapted to the current conditions.

First wave: Anarchists (Ages 19-1914)

It was explained that the Anarchist wave arose because of the technology that began to advance in the century. Communication and transportation patterns such as telegraphs, daily newspapers, railway lines, have eliminated time and space restrictions. This is the era of the first global war on terrorism. Countries in Europe and North America fight what is considered a global anarchist conspiracy. Initially, these revolutionary groups operated with only limited funds. They rely on confiscation or takeover actions, which were usually in the form of a bank robbery.

In this period, lone wolf activities also appeared. At that time, there were no organizations with clear commands. All individuals are anarchist and free to protest in various forms when they feel there is a compatibility of thought. They become individuals who act as ideologists who act individually or in small groups, to issue propaganda that aims to inflame the spirit of radical change in society.

Second Wave: Anti-Colonialism (Early Twentieth Century - 1960s)

The second wave emerged at the end of the 19th century, and reached its peak at the end of World War I when the empire was destroyed and the idea of determining the fate of each country began to emerge. At this time, what is called state sponsored terrorism or the state as a supporter of terrorism emerged. In this wave, robberies still occur even though not as common as the first wave. On the contrary, diaspora funding emerged. For example, the Irish Republican Army (IRA), and its splinter, the Provisional Irish Republican Army (PIRA) received a lot of money, weapons, and volunteers from people of Irish descents living in the United States. They have not only provided money, but also lent a bank account for PIRA funds, even stole weapons to be sent to PIRA cells.

Third Wave: New Left Movements (1968-1989)

This third wave began with protests against the involvement of the United States in the Vietnam War, especially the mass demonstrations in 1968. At this time, there was a tendency to combine left radicalism with nationalism, because self-determination always had a greater constituency. In addition, this period is the beginning of modern international terrorism, where extremists can easily attack in unrelated places, because of modern communication such as television coverage.

In terms of funding, bank robbery is still the choice for these leftist radical groups to fulfill their resources. In addition, kidnappings to request ransom are also widely carried out, and perfected into more professional practices. During this time, a nexus began between terrorists and transnational crime groups. One example of the first collaboration undertaken to overthrow the government is Camorra and the Red Brigades. In addition, they also commit narcoterrorism which is seen as far more profitable than bank robberies. Another source of funding is state sponsorship, which is one of the proxy war strategies. The peak of the state sponsorship was in 1978, when the Arab League promised to support the Palestinian Liberation Organization (PLO) with $ 250 million annually.

However, the most important innovation in this era is the creation of business-oriented organizations. The PLO Fatah faction under Yasser Arafat was the first group to realize that a strong financial base is essential for the organization to continue to grow, so that the accumulation of capital and wealth becomes an organizational priority. They must make Palestinians recognize the PLO as a humanitarian organization and must maintain personal control over military aspects.

Fourth Wave: Religion Related Activism (1989-now)

When the third wave began to recede in the early 1980s, waves of religion began to emerge and by 1990, most terrorist attacks were motivated by religion. In the religious tide, terrorists try to take control of the government to impose a religious order on the state. In this fourth wave, many state sponsors supported terrorists, especially to encourage religious agendas.

One innovation that characterizes this wave is the widespread use of charities to fund and facilitate terrorist groups. Support through charity, whether intentional or not, has become the main vehicle for channeling diaspora funds to terrorist organizations in various countries. In addition to charity, various criminal acts remain the choice of terror groups. Medicines are used as the primary and most common means of fulfilling resources, not only for groups in Latin America but also for religious groups, such as the Islamic Movement for Uzbekistan in connection with the Beka'a Valley Agriculture that produces heroin. Criminal acts committed in this era are also increasingly sophisticated. They commit forgery, credit card fraud, to identity theft.

Another progress on this wave is the emergence of franchise groups (Vittori, 2011). Hezbollah and Hamas are said to be one of the franchises, with most of their resources coming from Iran and Syria. However, they also maintain a substantial source of internal funding, so that they are still able to maintain substantial autonomy from their sponsoring countries. In this regard, Al Qaeda is the first terrorist organization capable of sponsoring other terrorist organizations. They are known specifically for giving "seed money" to promising terrorist cells, to carry out operations on behalf of the larger Al Qaeda movement. Not only to smaller terrorist cells, Al Qaeda is also able to sponsor a terrorist state. It is known that they have funded Sudan. As a reward, they received a place of protection for operations, a training base, and conducted research on weapons of mass destruction.

Technology and Terrorism Funding

Cyber Terrorism

Ballard (2002) divides the relationship between technology with terrorists into four types, namely: information attacks and infrastructure attacks, where technology is targeted, and technology-based facilities and fundraising and promotion, where technology is used to prepare for terrorist acts. The whole attack and use is then called a cyber incident.

According to Ballard (2002), the most commonly known form of cyber terrorism is information attacks, which are defined as attacks aimed at destroying or changing the contents of electronic documents, computer systems, and various other materials. Many researchers and counter-terrorism experts have focused on this attack, because this attack was the most occurred and reported. Other forms of this attack include online harassment, identity theft, threats, the use of computer viruses, and so on. The second form of cyber terrorism is attacks aimed at destroying or damaging physical infrastructure. This includes attacks on hardware, operating platforms, or programs in a computer system. The effect here is the destruction of data, computerized systems and controls.

The third category of cyber terrorism is not in the form of attacks, but rather the use of technology to facilitate terrorist attacks, both traditional and cyber attacks. These uses include message encryption technology, the use of steganography to conceal plans to carry out attacks, disseminate information, and use internet sites to find ways of making bombs and so on. The final category in cyber incident typologies is the use of technology to raise funds as well as to promote their ideology or propaganda. Although this activity does not directly represent cyber terrorism, it does represent the planning and gathering stages of their support (Ballard, 2002).

Financial Technology and Terrorism Funding

The term "FinTech" is an abbreviation of the word "financial technology". The Financial Stability Board (FSB), an international institution whose job is to maintain global financial stability, defines FinTech as a technology that enables financial innovation and produce new services, including business models, applications, processes, or products, that can have an impact on the market, financial institutions, and financial service providers (Lukonga, 2018).

At first, FinTech was part of Citicorp's research in the early 1990s, which aimed to bring their reach closer to the market. However, the term FinTech is increasingly developing and becoming an 'umbrella' for terms that include innovative financial solutions through the application of information technology (Puschmann, 2017).

The use of technology in financial services is actually not new. Over the years, banks have experienced a revolution in their services using technologies such as e-banking, international transfers, credit cards, and cash machines (Auto Teller Machines / ATMs) that are designed to support banking operations. Lukonga (2018) considers that the existence of FinTech has caused a paradigm shift in the financial system. FinTech sometimes replaces the role of conventional financial institutions, such as banks, insurance firms, and asset management companies, with the process that is still traditional, giving rise to a new business model.

The existence of FinTech is driven by changes in consumer demand, especially from millennials who have grown and developed in a digitally connected world. For other consumers who tend to be more conservative and continue to use banks, they put pressure on banks to adopt similar technology to enable banks to improve their services. Financial services that are the focus of FinTech include payment systems, deposits, capital and loan, insurance, to financial management

As said by Choo (2009), the advances in information and communication technology have and will continue to influence the financial and banking systems in operation. With these advancements, making payment, investment and money transfer activities easier because it can be done online which is now popular in the community. However, people's dependence on electronic payment systems and facilities to move large sums of money quickly and across different jurisdictions presents its own risks such as the threat of money laundering, fraud, and financing of terrorism.

Another FinTech method that has a high risk of being used as a means of financing terrorism is virtual currency. Whyte (2018) says that the technology offers a relatively safe and reliable method for sending money, has the opportunity to be a source of income, and is not too difficult to understand and use. Virtual currency also offers opportunities for money laundering by avoiding regulations in the formal financial system.

Methods of Financing Terrorism in Indonesia

Conventional Methods

Abdullah Sonata, through the Committee's Organization Crisis Response Measures (KOMPAK) has raised funds under the guise of humanitarian assistance for natural disaster victims and the poor, both from domestic and abroad, such as Saudi Arabia, Kuwait, Australia, Britain, Spain and funds from international organizations. An amount of eight billion rupiah was obtained between 1998 and 2001. KOMPAK was involved in purchasing illegal firearms from Philippines to be supplied to conflict areas in Poso, Sulawesi (Celebes) and Ambon, Maluku (Molucca) (Golose, 2015).

The Ambon and Poso conflicts were categorized into acts of terrorism because, in this conflict, there were some parties who took advantage of the situation for the interests and existence of their terror groups in Indonesia. For example, the the al-Jamaah al-Islamiyah (JI) group entered Ambon in 1999, followed by JI from countries such as Malaysia and the Southern Philippines to join the Ambon and Poso conflicts under the command of Hambali and Mustofa alias Abu Tholut (Karnavian, 2008).

In early 2000, Hambali succeeded in raising funds of US $ 200,000 or around two billion rupiah, which is acquired from contributions, such as infaq and sadaqah, of Muslims in Malaysia. The amount of funds donated by the JI members could be such a big amount, since some JI members worked as professionals. The funds were used to buy weapons, military training, recruit and finance the activities of perpetrators violence in Poso and Ambon (BNPT, 2013).

In the 2002 Bali Bombing case, sources of funds originated from Al-Qaeda that were brought in cash by Wan Min Wan Mat and sent to Ali Gufron (Mukhlas), Noordin M. Top, and Azmi Rahim to prepare the attack (Golose, 2015). Similar to the Bali Bombing I, in the 2003 Marriott Hotel bomb case, funds were also distributed in cash. The original funds were obtained by Gun Gun Rusman Gunawan, then sent to Hambali through several of their couriers (Tempo.co, 2014).

JI considers that carrying cash as the most effective method for channeling funding. According to Safrudin (2018), JI prefers to take informal routes through underground when going across the border area to enter Indonesian territory. In addition, the length of the border line between Indonesia and neighboring countries makes the border region vulnerable to being used as a path for smuggling goods and money to support acts of terror in Indonesia.

Indonesian terror groups also often do bank robberies and jewelry stores or what they usually call fa'i to meet their funding needs. JI group has robbed 2.5 kilograms of gold at *Elita Indah* gold shop in Serang on August 22, 2002, and the robbery of 3 kilograms of gold at *Gunung Agung* gold shop in Palu, February 2006. The robbery in Serang was related to the Bali Bombing I in 2002, whereas the robbery in Palu was related to terrorism in Poso (Safrudin, 2018). In 2003, Fadli Sadama along with his members conducted bank robbery of the Lippo Bank in Medan and managed to get IDR 113 million. Other groups that frequently conducted robberies were the Abu Roban group, who had robbed the BRI Batang office in 2013 and gained IDR 790 million, BRI Grobokan in 2013 and gained IDR 630 million, and *Terus Jaya* gold shop in Jakarta in 2013 and brought 1.5 kg of gold. worth IDR 500 million (Purwawidada, 2014).

Financial Technology Use for Terrorism Financing

As mentioned previously by Choo (2009) and Whyte (2018), the electronic payment system, new paymet methods, and payment via the internet offer several advantages such as fast, effective, efficient transfer of funds, without the need for physical face-to-face and money. These advantages are then used by terrorists as a loophole, causing the risk of using them to become a medium for terrorism funding. (PPATK, 2015). Not only that, the internet seems to provide a 'virtual bridge' that can cross the national borders, so it enables terrorists to get a wider scope with a greater profit potential (Carroll & Windle, 2018)

Conway (2005) explains the framework offered by the United Nations Office on Drugs and Crime (UNODC) on classifying terrorism funding on the internet into four methods, namely direct solicitations, new payment methods and e-commerce, exploitations of online payment tools, and charitable organization.the use of the internet for the financing by terrorist, which are: a) direct solicitiation via terrorist website; b) exploitation of e-commerce tools and entities; c) exploitations of online payment tools and new payment methods, such as virtual currencies and hacking at FinTech; and d) exploitation of charities and fronts, which is used as a front to promote the ideology of their organization or to provide for their material needs.

Direct Solicitation

Direct solicitation refers to the use of sites, chat rooms, emails, and others to solicit and collect donations directly from their supporters. Since the September 11 tragedy, terrorists have increasingly used social media in terms of funding their actions. Through social media, terrorists can reach a greater number of audience through peer-to-peer communication, which is done through chats and forums, social networks like Facebook, Twitter and Instagram, mobile applications for personal communication, such as Whatsapp and Telegram, or safer communication networks like Surespot and VoIP (FATF, 2015). In Indonesia, requests for donation and fund can be in the form of explicit statements, such as those made by Mujahideen of East Indonesia (MIT) on social media. However, urgent requests are usually done by asking for donations directly to their supporters as in the case of Rio Adiputra (Conway, 2005).

Although the MIT fundraising process was carried out directly, MIT still used an intermediary account, the Abu Ahmad Foundation (AAF), a fundraising foundation from Indonesia that collected money to buy food, weapons, clothing and other materials for jihadists, as well as to open a new Telegram channel (memri.org). Whereas in Rio Adiputra case, ordered by Imron, he requested funds directly from the 'brothers' in Bima to be given to the 'Umahat' or the terrorists wife left by their husband because their husbands were shot by the police, imprisoned, or escaped, or the 'ikhwan' which incorporated in the Santoso group. He then received funds of IDR 1.5 million from Hafid, Fadli, Lahmudin, to buy tickets to Poso, buy explosives in the form of fertilizers, and rent vehicles (District Court of East Jakarta verdict No. 776/Pid/Sus/2015/PN.Jkt.Team).

The vulnerability to social media abuse is compounded by the fact that Indonesia does not have a data center for social media, so it needs to do mirroring to neighboring countries. This will certainly hinder

the investigation process if there is any misuse done by the terrorists or other crimes that have the potential to cause many victims.

E-Commerce

E-commerce sites provide customer-to-customer buying and selling service are now very popular. The increase in e-commerce users is because the customers can easily access the sites anywhere, the sites are open to the public, the registration is very easy and fast, there is no face-to-face transaction, there is no procedure to verify and identify the customers, the customers can use anonymous email addresses, it has a fast transaction process, it enables users to register more than one user, and it facilitates various transactions across national borders. With all of these advantages, online trading sites or e-commerce are prone to be misused by criminals and terrorists (FATF, 2008).

In Indonesia, the case of terrorism involving the use of e-commerce is the Surabaya bombing happened on May 2018. Dita Oeprianto, along with his three children and his wife, blew themselves up in three different churches. The bomb he assembled was a Triacetone Triperoxide (TATP) type or often called 'the mother of satan' by terrorists. According to the National Police Public Relations Head Setwo Wasisto, this type of bomb is a bomb that is easy to assemble, but has a high explosive power (Nathaniel, 2018). Based on the information from PPATK, Densus 88, and the National Police Forensic Laboratory Center (Puslabfor Polri), the explosive materials were purchased several times through e-commerce, such as fertilizer, acetone, ball bearings, lighters, and so on, which are basically known as daily necessities, but were vulnerable to misuse. The easiness of getting these materials shows the lack of the monitoring processes and the awareness of the seller.

Internet Based Payments

Internet-based payment method is part of the New Payment Methods (NPMs) that has developed in response to the market needs as an alternative to traditional payment. In some cases, this development has been driven by a demand for a safer and more convenient way to pay online. Whereas in other cases, the development is based on the desire to provide any access to financial services for those who are 'excluded' from the traditional financial services, such as individuals with poor credit records, minors, and residents from distant areas to access the bank (FATF, 2010).

One of the internet-based payment service providers that has been abused by terrorists is PayPal. Wahyudi (2019) explained that PayPal is used to transfer funds of USD 1,000 to Indonesia from Bahrun Naim who is located in Syria. The funds were sent to Munir Kartono, which then channeled to Dwi Atmoko as the bomb maker, Nur Rohman as a suicide bomb martyr in Mapolresta Surakarta in 2016, and his wife for living expenses and compensation for the death of her husband. Densus 88 mentioned that Munir Kartono, Nur Rohman, and Dwi Atmoko did not know each other. They only received orders directly from Bahrun Naim. When Dwi Atmoko handed the bomb to Nur Rohman, it was only marked by the code that Bahrun Naim had prepared beforehand. This makes it difficult for the authorities to track them. Not only that, that the amount of money sent is insignificant, so it will not cause the redflag for the financial service providers.

Virtual Currency

Virtual currencies are digital objects that have economic value, and function the same as fiat currencies (government-issued). This technology allows people to transfer their funds internationally and anonymously. If previously, currency purchases can be easily seen, identified, and traced through a formal banking system, all virtual currency transfers are very difficult to detect. Moreover, virtual currency has characteristics that give two advantages for terrorists, namely: can be exchanged for fiat money, and high anonymity in its application.

In Indonesia, terrorism funding through virtual currency is used by Bahrun Naim network. According to Gunaratna (2018), Bahrun Naim was a terrorist from Southeast Asia who first used the virtual currency Bitcoin. In December 2016, Bahrun Naim ordered Dian Yulia Novi to carry out a suicide bombing that was planned to be carried out at the State Palace as the main target, the Guards for DKI Jakarta Governor Basuki Tjahjapurnama, and the Brimob Mosque in Kelapa Dua. According to Densus 88 members, the funding of this project was sent by Bahrun Naim in Syria to Indonesia using Bitcoin. However, during the investigation, Dian admitted that she did not know the sender and the source of the incoming money and who the bomb maker is. She was only explained by her husband, Solikin, that the funds were sent by Bahrun Naim (Densus 88). Until now, the Police and PPATK are still trying to trace the flow of funds from Bahrun Naim (Sohuturon, 2018).

Charitable Organization

Terrorist organizations often exploit charities as the intermediaries to raise funds in disguise. This method is very popular, especially among Islamic terrorist groups because they feel they have an obligation as Muslims to donate charity and zakat regularly. Tasnima Salsabila, a Hong Kong migrant worker who was affiliated with Bahrun Naim network, used her personal money to “donate charity” in the way of Allah because she believed that everyone who used part of their wealth to help the warring Mujahideen would receive the same rewards as the mujahidin who carried out amaliyah (Putusan PT Jakarta 189/PID.SUS/2018/PT.DKI). Thus, charity becomes a fertile field for the terrorists to exploit because people think funding the terrorist acts is part of their worship. In some cases, terrorist organizations even set up a charity with humanitarian purposes, such as helping victims of disaster, illness, poverty, etc., despite the fact that their funds can be used to fund the acts of terrorism or help the terrorist families (FATF, 2015).

In Indonesia, Azzam Dakwah Center (ADC) was a charity based on social institution, charities, and da’wah formed by Jamaah Ansharut Daulah (JAD) and used as a front for the supporters of the Daulah Islamiyah. The da'wah center was run under the leadership of Azzam who was affiliated with ISIS. The funds were collected through the infusions of six Qoriyah (regions), namely Karanganyar, Klaten, North Solo, East Solo, Sukoharjo and Solo Raya.

ADC was also often used to prepare for several acts of terrorism, such as making Molotov cocktails and canned bombs. The bomb was made by Suyanto to attack the Alfamart Surakarta shophouse conducted by Wahyudi, Candi Resto by Wawan Prasetiawan, and the private house of Candi Resto by Suyanto in November 2016. The three attacks were carried out based on the instruction from Nor Solikin, inspired by the chaos that occurred in Jakarta during Aksi Bela Islam, and a retaliation for the action of tearing the Quran that was allegedly committed by the owner of the Candi Resto restaurant (High Court of Jakarta verdict No. 189/PID.SUS/2018/PT.DKI).

Conclusion

Criminals and terrorists have shown their adaptability and opportunistic nature in finding a chance to launder illegal money and fund the acts of terrorism. It is undeniable that the information technology development, such as the internet are increasingly expanding the access, opportunities, and reach of terrorist activities, including funding. When the internet has become a global phenomenon, where everyone is easy to access, and commercial websites and payment systems via the internet have become more advanced, the potential and risk of abuse by criminal and terrorist organizations is also increasing.

Terrorists are no longer dependent on the conventional method of funding, such as cash couriers, robberies, and through formal financial institutions. They take advantage of the development of technology and the internet, which they are able to collect large, fast, and anonymous funds through social media, e-commerce, internet-based payment services, and charities. All these conveniences, on the one hand, actually become the vulnerabilities and weaknesses to the system and application on the

Internet. Therefore, it is necessary to strengthen the security system on the internet and increase public awareness as the internet service users.

The security system can be improved from the initial stage of service on the internet, such as an adequate verification process to prevent the use of fake identities. According to Laksmi (2017), a strong regulation related to the internet-based payment services need to be established in Indonesia. This regulation must cover customer identification and verification process, and include a control and reporting system to be useful to identify suspicious transactions and report them to the Financial Intelligence Unit, and developing the centralized services to enable companies to monitor cross border transactions and assist the monitoring and evaluation process of the regulator.

In addition, an initiative are needed for the service providers to actively monitor and report the content that are deviated and suspected. The service providers on the internet, such as social media, online payment systems, e-commerce, and online charity should store all user data and transactions – including the information on parties involved, addresses, public keys, and date of transactions – to facilitate the process of investigation and monitoring if there is an abuse (Salami, 2018).

In the wake of increasing number of online-based charitable institutions, such as Aksi Cepat Tanggap, Kita Bisa, and so on, which can raise funds quickly and reach the wider community, the government needs to educate the public through campaigns in proactive media in order to increase the awareness and caution about the danger of terrorism financing and money laundering through charitable institutions. It is also necessary to conduct an audit by the authorities as well as transparency regarding the structures, beneficiary owners, place the charities into high-risk institutions, and make detailed financial reports.

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Interest Rate Macrostructure and Financial System Development: Does World Interest Rate Matter for Nigeria?

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Abstract

This paper tests the endogenous theory that in open economies, domestic interest rate may elude the capacity of developing economies to fathom. The study applies the fully modified ordinary least square technique to examine the rational expectation theorem on Nigeria's long-term interest rate sensitivity to the Fed fund rate, while trade openness, exchange rate, inflation expectation, public debt ratio, and bank competitiveness are introduced as control variables, from 1970 to 2017. The result reveals that domestic interest rate has negative short-run and long-run sensitivity to the US Fed fund rate and trade openness, while it is significantly sensitive to inflation, exchange rate and public debt ratio. Policy recommendations are provided.

Keywords: Financial system, Interest rate macrostructure, Sub-Sahara economies

JEL Code: G20, F41, O55

Introduction

In the modern financial market, the interest rate mechanism serves as risk ingredient for credit availability. The mechanism connects the economic system and the financial system for functional savings, investments and productivity. Should the financial system be ineffectual, interest rate may be maladapted to function as architect of scarce resource mobilization, allocation and utilization (Ojo, 2010). In contemporary times, developing economies have huge finance gap challenge due largely to maladapted financial system, with high rate of financial mis-match, and financial stress that exacerbates credit defaults (World Bank, 2001). Prevalence of credit defaults often result in financial instability. On instability, literature argues that bank-based financial structure, of which sub-Sahara countries are examples, by nature are less structured for stability (Knoop, 2013), which may be worse in a maladapted financial environment. The yield curve, where it exists may be directionless; often not meaningful or tie with the economic cycle.

In Nigeria, despite ranking as one of top largest economies in sub-Sahara Africa (SSA), its financial system has unfortunately been biased against the real sector, with very low inclusivity (Ojo, 2010). The financial system is bank-based, with very low bank branch per capita (World Bank, 2018). The bank intermediated financing system consequently does not largely support the agriculture and small

scale industries, the main source of employment and GDP. The mechanism to obtaining required long-tenured capital funds is usually quite problematic (WEF, 2015; Ojo, 2010). In general, Knoop (2013) opines that the financial system in the SSA region is perceived as failing. A failed financial system is characterized by very high interest rate, high interest spread, high credit default rate, and low financial inclusivity; an environment where willing entrepreneur are being alienated from the formal finance system into the informal arrangement, like the pervasive rotatory savings and credit associations (ROSCAS), where credit assistance is often inadequate. Dahou *et al.* (2009) highlights failings of African financial markets, characterized by highly concentrated banking sector, poor banking intermediation, poor remuneration of deposits; high interest rate spread; illiquid and narrow capital market; and lack of innovative financial instruments.

Keynes argues that interest rate mechanism sets the limit to the level of employment in the economy, such that, the interest rate sets the standard upon which the marginal efficiency of a capital could be newly productive (Williams, 1999). Low financial inclusiveness and high interest rate regimes in sub-Sahara Africa may have contributed significantly to her poverty dilemma, as cost of funds that could aid micro, small and medium enterprises (MSME)'s productivity and entrepreneurial capacities in general are usually within the second to third degree (Eke, Adetiloye, Adegbite, and Okoye, 2017). Contemporaneously, real savings-deposit rate is abysmally low, with adverse consequences on the financial development process.

Being capital scarce developing countries, sub-Sahara Africa have often relied on the external fund sources for much needed development capital, through capital purchase by borrowing and through foreign direct and portfolio investments. Indirectly too, the increasing global economic integration and openness to trade constitute fundamental source of capital sourcing. Hechscher-Ohlin theorem encourages, that mutual benefits exist from trade (Leamer, 1995). Given the relative weak levels of market efficiency, foreign borrowing and other capital flows are however, often determined by world interest rates *(wir)* dynamics, which may transmit more risks to the domestic financial system, (Grossman and Stiglitz, 1980; World Bank, 2001). In modern economies, interest rate determination has microeconomic foundation, but broad macroeconomic impact (Lucas and Sargent, 1978). It is conceptually a macrostructure; a price with far-reaching impacts (Eke, 2018). For instance, in line with rational expectation, and due to economic distortions from abroad, the US may raise her domestic interest rates, commonly known as normalization.

Interest rate determination is potent to the much needed international capital inflow in capital scarce developing countries, as it is to domestic capital mobilization and efficient resource allocation. Indeed, due to increasing global embrace of capital liberalization for international capital flows, interest rate misalignment may produce severe economic shock, leading to significant contractions in productive capacity and per capita income. Intense information flow is a global prerequisite for efficient financial system; notably in financial risk sharing, which many capital scarce developing countries may be guilty of (Ojo, 2010). Secondly, in the event of unintended risks, increased reliance on foreign capital flow may expose the sub-Sahara countries to risk of major financial disturbances, just as the experiences of Asian and Latin American economies in the 1990s (Daniels and VanHoose, 2011).

The extent of openness to factor flows and global trade have been noted in the literature to have conflicting impacts on growth paths, as debates still rage as to whether more open developing economies indeed experience faster growth and development than otherwise (Daniels and VanHoose, 2011). Nevertheless, irrespective of the balance of the argument on economic openness and protectionism, the cost of capital determination, and hence the financial system stability, may be more influenced by the extent of developing countries openness to trade and factor flows. This is the crux of this study, that is, whether, the cost of capital, that occupies huge role in domestic capital resources allocation is more open to external determination than domestic monetary authority can fathom. Stiglitz and Greenwald (2003) posits that interest rate compares conventionally with commodity prices, given the quality of its information content, its impact on borrowers' behavior, and its local and structural effects on the global economy.

Conceptual Framework

Trade and finance are the link of an economy to the global economy (Dornbusch, Fisher, and Startz, 2011). The open finance mechanism operates through the international credit channel of monetary policy rate *(MPR)*, (Morais, Jose-Luis and Claudia, 2015). The authors suggest that increasing 'risk taking channels of monetary policy' may reveal to a large extent how external monetary policy rate *(MPR)* and quantitative easing (*QE*) decisions could influence credit risk taking behavior of domestic banks in developing economies, with broader impact on economic variables, as depicted below:

$$wir \downarrow \Rightarrow capital \inf low \uparrow \Rightarrow ir \downarrow \Rightarrow I \uparrow \Rightarrow Y \uparrow$$

(1)

Where: *Wir* is world interest rate, *ir* is domestic interest rate, *I* is investment, *Y* is output.

From the context of investment multiplier, domestic deposit money banks may benefit from relatively low foreign interest rate (wir) could improve their borrowing from abroad, hence capital inflows, and thus expand domestic economic activities, leading to income growth. The reverse order holds when wir rises, as was it occurred following the 2008 global crises in less advanced economies.

These transmissions and thoughts may have been justified in the literature. Although, both the International monetary fund (IMF) and the World Bank were established to lend money to poor countries that would face economic crises and assist to attain development convergence respectively (Pressman, 2006), however, these global bodies' market ideologies and policy prescriptions often push for high interest rate to borrowing developing countries. The experience has usually exacerbate domestic interest rates, leading to financial and economic crises, as noted in many economies crises such as the Asian currency crises of the late 1990s, Argentina financial crises of late 1990s to early 2000s, the sub-Saharan African economies from late 1980s to mid-2000s (Stiglitz, 2002; Pressman, 2006). These unwholesome relations may have caused what the IMF regards as enormous reputational risk (IMF, 2003), of which the institution was expected to obtain 'learning culture' thereof (IMF, 2004). Furthermore, the literature is replete with risks of original sin and currency mix-match (Eichengreen, Hausmann, and Panizza, 2007), which may be linked to behavior of the wir .

Facts on Nigeria's interest rate

A major characteristic of Nigeria financial system is high interest rate (such that, on average lending cost is between 30-35%), paucity of long-tenured savings and high interest rate spread (Ojo, 2010), perhaps due to prevalence of high inflation rates, and hence negative real savings rate (Table 1). Other major features of the financial system are very low bank branch per capita, and poor financial intermediation ratio (Ojo, 2010). The structure of Nigeria's interest rate relative to peers in the World Bank rated lower middle income (LMI) group reveals that while interest spread (difference between commercial banks' average lending rate and deposit rate) in LMI countries consistently declined from 9.583% in 2000 to 6.083 in 2017, the Nigeria's spread rose from 2.25% in 1985, through 16.26% in 2000, dropped marginally to 15.66% in 2005 and rose steadily to 26.55% in 2017. The huge gap may further unveil the huge profit take and hence the limited financial depth and uncompetitive bank-based financial system in Nigeria. On the other hand, high inflation rate regime in Nigeria is fueled by inflationary pressure (Okoye, Olokoyo, Ezeji, Okoh and Evbuomwan, 2019) which has also lowered the quality of life of citizens, retarded economic and fiscal performance (Okoye, Omankhanlen, Okorie, Okoh and Ahmed, 2019).

Table 1: Nigeria's interest rates macrostructure relative to peers (selected years)

Interest rates	1980	1985	1990	1995	2000	2005	2010	2014	2015	2016	2017
MPR %	6.0	10.0	18.5	13.5	13.5	13.0	6.08	12.15	13.0	14.0	14.0
T. Bill %	5.0	8.5	17.5	12.5	12.0	7.0	3.84	10.5	9.40	10.11	15.72
Savings rate	6.0	9.5	18.8	12.61	5.29	10.82	5.67	9.16	8.68	6.22	10.88
MLR	10.0	11.75	27.70	20.79	21.55	19.49	22.62	25.74	26.71	27.29	30.68
IRS	4.0	2.25	8.90	8.18	16.26	15.55	20.41	22.36	23.13	23.15	26.55
IRS-LMIE	n.a	n.a	n.a	n.a	9.583	7.063	8.068	6.71	6.659	6.508	6.083
RDR	-3.9	4.0	11.3	-50.19	-0.61	-7.08	-6.13	1.16	-0.32	-9.58	-5.62

Sources: *Central Bank of Nigeria statistical bulletins (2007-2017). MPR is monetary policy rate. T. Bill is Treasury bill rate; MLR is maximum lending rate; Interest rate spread (IRS) is computed as difference between maximum lending and deposit rates. LMIE interest spread is for Lower-middle income economies, obtained from the World Bank, the World Development Indicator: data.worldbank.org. RDR is real deposit rate.*

Destroches and Francis (2007) argue that in an increasingly integrated global capital market, the real interest rates on savings and investment is somewhat determined by global forces in the global market. Potently, this research work reasons that, the financial system that facilitates the platform for saving and lending, borrowing and investing, are all tied together significantly by the rate of interest (Rose, 2003). Thus, relying on the above foundation and conceptual framework, this paper deduces from the rational expectation theorem by arguing the following research questions. First, why would the world interest rate *(wir)* be related to domestic interest rate structure? Secondly, to what extent does the world interest rate *(wir)* impact the domestic financial system? The study therefore makes the proposition, in the Nigerian case that, there is no significant relationship between the domestic interest rate and the world interest rate in Nigeria; secondly, the world interest rate does not significantly impact the Nigerian financial system in the long term.

Literature Review

Financial literature on developing economies has considerable theoretical backing of the impact of capital accumulation and allocation on financial system development, and that it facilitates the finance and economic growth nexus. However, despite the capital liberalization revolution initiated by McKinnon (1973) and Shaw (1973), which has gained substantial global currency (Destroches and Francis, 2007) finance in sub-Sahara Africa has underperformed of its expected role (Dahou *et al*, 2009; Ojo, 2010). The World Bank opines that finance in the channel of investment to growth. In many developing economies however, the linkage is relatively weak, as the financial sector may require pressing reforms (Ojo, 2010; World Bank, 1989). In Nigeria's case, perhaps due to its imperfections, the financial system have developed and functioned in a maladapted form in terms of aiding fund mobilization, poor liquidity of financial instruments and investment options (Ojo, 2010).

Structurally, interest rate through its future value mechanism has the potency to influence the economy's future pricing system. The same follows in the global perspective at the international financial system, as *wir* avails borrowers, lenders, savers, and investors with sensitive price signals and hence a requisite risk control measures. Studies at the global level claim that nominal interest rate is made of world interest rate, real exchange rate and local inflation; and that dynamics in international business cycle indicates trend in *wir*, a proxy for international required rate of return (Dillen, 1995).

Moreover, for developing economies, the increasing financial globalization may impact more on domestic interest rate dynamics, as real interest rate responds to huge debt servicing challenges (Eke,

2018). Interest rate functionalities have macroeconomic management influences, an instrument that restores equilibrium, as a countercyclical policy instrument for regulatory authorities.

Following expanding capital market integration, Bosworth (2014) exposed the link between real interest rate and external systematic risks, and submits that fiscal policy may serve as antidote to the adverse impacts. Spratt (2009) suggests that lack of effective use of fiscal policy may be have aggravated the rising interest rate spread overtime, as the CBN (2010) reveals that nominal interest rate transmits multiple impulses and directional pathway

In summary, aside internal variables, domestic financial system is potentially linked to elements of global openness such as trade, capital flows, remittances, official and non-official transfers.

Empirical Literature

Iacoviello and Navarro (2018) employed heterogeneous Panel in 50 developed and emerging economies from 1965 to 2016 to examine new empirical evidence on foreign spillover effects of higher US interest rates. Gross domestic product (GDP) in both advanced and emerging markets were found to respond to US monetary shocks; with emerging economies having higher impact. The study however did not consider Nigeria's case. Bahadir and Lastrapes (2015) applied dynamic factor model using yields of emerging and industrialized countries beyond US Treasury bill rate to examine whether in integrated capital market, domestic interest rate in emerging markets account for world interest rate impact. The outcome is consistent with capital market integration in emerging market, particularly for long-term US dollar denominated bonds. Desroches and Francis (2007) studied the relative importance of determinants of long-term world interest rates. Key variables studied affect the behavior of world interest rate overtime: the variables are labour force growth; age structure of global economy; state of financial development. The study however ignored sub-Sahara Africa from the sample. Pigka-Balanika (2013) examined the impact of openness on growth among 71 different economies from different regional blocks using panel fixed and two-way fixed effect regression from 1990 to 2005. Trade liberalization has positive and significant impact on growth, except for sub-Sahara region.

Negro, Giannone, Giannoni, and Tambalotti (2018) applied vector auto-regression with common trend from 1870 to 2016 to examine the role of global factors in relative low real interest rates in seven industrialized economies. The outcome reveals the following: no more specific country trend since the 1970s; lower rate is driven by increased premium demand from international investors; and lower global economic growth is driving the decline.

A striking observation from the reviews above notes gap in the scope and methods employed, this study therefore employs different method, that is, autoregressive distributed lag (ARDL) method for Nigeria.

Theoretical Framework and Methodology

Theoretical framework

The interest rate framework adopted is the international Fisher's theory. In the open interest rate framework (Omolehinwa, 1998), Fisher reveals that difference in identical bond instrument may be the linked to differences in market forecast of expected exchange rates, an indication that the law of one-price operates through the real interest rate *(rir)* system. The microeconomic foundation of market interest rate is linked with the consumer's utility mechanism, as the consumer decision to postpone present consumption earns savings time preference, otherwise referred to as the consumer's opportunity cost (Jones, 2010). On average the instrument may stand for the economy's real risk-free rate (*Rrr)* of interest. Algebraically, the treasury rate (Rf) then consists of real risk-free rate (Rrr), adjustment for expected inflation $E(\pi)$ as follows:

$$Rf = Rrr + E(\pi) \quad (2)$$

Equation 2 is the domestic Fisher model. It reveals that the nominal short-term interest rate rises along with expected inflation, to maintain real interest rate constant. The framework is as follows:

$$(1+i) = (1+\rho)(1+E(\pi)) \quad (3)$$

i is the nominal short-term rate, ρ is expected real interest rate, and $E(\pi)$ is expected inflation. Dornbush *et al.* (2011) posit that transaction cost increase, on account of inflation, may generate differing economic influences on account of whether inflation is anticipated or not. Where it is anticipated, the economics of rational expectation mechanism would prevail on business contracts, such that inflation generates no real costs. In the first instance, currency holding cost rises with inflation rate, and hence hurts if not substituted for interest bearing assets. Moreover, individuals and households have to allocate more resources, for possible increased price. Under unexpected situation, a higher risk level may be assumed depending on whether the economic unit is a creditor or a debtor (Dornbush *et al.,* 2011).

Data

The data sources and descriptions of variables employed are presented in the table below. The theoretical literature justification and *a priori* are stated. The Nigerian interest rate is the maximum interest rate as published by the Central Bank statistical bulletin. The fed fund rate is proxy for the world interest rate, as evidenced is studies such as Bahadir and Lastrapes (2015), Iacoviello and Navarro (2018). It is sourced from Federal Reserve Bank of St. Louis (Table 2).

Table 2: Data: description, sources, measurement and justification

Variable description	Source/Measurement/Proxies	Literature justification
Irt= interest rate	Central Bank of Nigeria	Bosworth (2014)
Wir= world interest rate	The US Fed fund rate**	Iacoviello and Navarro (2018). Bahadir and Lastrapes (2015).
Inf= inflation rate	National Bureau of Statistics	Soludo (2005)
Bc= bank competitiveness	World Bank*/ Bank branch per 100,000 adults/proxy for financial depth	Ojo (2010)
Open= trade openness	World Bank*/ Trade % of GDP	Pigka-Balanika (2013)
Exr= exchange rate	Central Bank of Nigeria/ Naira direct quote to US dollar	Ojo (2010)
Pdr=public debt ratio	World Bank	Bhatia (2008)

*Source: compiled by the authors; *World Bank data base, data.worldbank.org; **https://fred.stlouisfed.org/series/FEDFUNDS*

The study adopted the fully-modified ordinary least square in an autoregressive distributive lag system. The short-run dynamics adjustment term was established, along with the FMOLS co-integrating analysis

Model Specification

The functional model that may link nominal interest rate to suggested explanatory variables of world interest rate, trade openness, inflation expectation, exchange rate, bank competition and public debt ratio is implicitly presented as follows:

IRT= f(Wir, Open, Inf, Exr, Bc, Pdr)
(4)

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Stated underneath are the expected regression signs. The explicitly structured log form of the autoregressive distributive lag (ARDL) model is as follows:

$$InIRT = \alpha_i + \beta_1 \sum_{i=1}^{p} Inirt_{t-i} + \beta_2 \sum_{i=1}^{p} Inwir_{t-i} + \beta_3 \sum_{i=1}^{p} Inopen_{t-i} + \beta_4 \sum_{i=1}^{p} In\inf_{t-i} + \beta_5 \sum_{i=1}^{p} Inexr_{t-i} + \beta_6 \sum_{i=1}^{p} Inbc_{t-i} + \beta_7 \sum_{i=1}^{p} Inpdr_{t-i} + \varepsilon_t$$

(5) where: *p* stand for the optimal lag

Results and Findings

Unit root analysis

The study applied Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) techniques to carry out the unit root test statistics. One variable, the inflation rate *(Linf)* appear to be stationary at level, while the rest six variables namely interest rate (*Lrt),* Fed rate *(Lfed),* exchange rate *(Lexrt),* bank competitiveness *(Lbc),* openness *(Lopen),* and public debt ratio *(Pdr)* are first differenced stationary. The non-uniform stationary properties suggest the use of ARDL methodology for co-integration analysis, as use of ordinary least square may produce spurious outcome (Granger and Newbold, 1984).

Table 3: Unit root tests

Methods	Augmented Dickey-Fuller Test			Phillips-Perron Test			
Variables	[1]Test statistics	Prob. value	Stationary@	[1]Test statistics	Prob. value	Stationary @	Remark
Linrt	-9.6776	0.0000***	I(1)	-10.4024	0.0000***	I(1)	Differenced
Lfed	-5.5286	0.0002***	I(1)	-7.0897	0.0000***	I(1)	Differenced
Linf	-4.1183	0.0113**	I(0)	-3.8791	0.0208**	I(0)	Stationary
Lexr	-5.9557	0.0001***	I(1)	-6.0958	0.0000***	I(1)	Differenced
Lbc	-6.0294	0.0000***	I(1)	-5.9898	0.0000***	I(1)	Differenced
Lopen	-8.9145	0.0000***	I(1)	-8.145	0.0000***	I(1)	Differenced
Lpdr	-5.5265	0.0002***	I(1)	-5.5042	0.0002***	I(1)	differenced

*Source: By the authors. *,**,*** stand for 0.1, 0.05, and 0.01 significance level respectively. [1]Test is for constant and trend model.*

Summary statistics

A significant item in the summary statistics presented in Table 4 is the Jarque-Bera test which reveals that the study fails to reject the null hypotheses that five **(5)** variables- interest rate *(Inr)*, Fed rate *(Fed),* trade openness *(Open)*, Public debt ratio *(Pdr)*, and Bank competitiveness *(Bc)* are normally distributed, while it rejects normality for two variables series- inflation rate *(Infr)* and exchange rate *(Exrt)*. The result agrees with the model's Jarque-Bera diagnostic test result in Table 10**.**

Table 4: Summary statistics

Statistics	Inrt	Infr	Exr	Fed	Open	Pdr	Bc
Mean	18.8854	18.3671	68.3467	4.9129	46.5432	0.1918	3.4386
Median	20.7950	13.2000	22.2654	5.0000	45.9875	0.1645	3.4275
Max.	36.0900	72.8000	305.0000	12.1000	81.8130	0.4311	6.5610
Mini.	6.0000	3.2000	0.5464	0.5000	19.5240	0.0669	0.8800
St. Dev.	7.4251	15.1882	77.5136	3.1535	17.0213	0.1070	1.6505
Jarque- Bera	1.6948	45.9700	7.3478	1.3791	1.8832	5.7647	2..0655
Prob. value	0.4285	0.0000	0.0253	0.5018	0.3900	0.0560	0.3560
Observations	48	48	48	48	48	48	48

Source: Computed by the authors

Correlation Matrix

The correlation statistics produce negative association between Nigeria's interest rate and the Fed rate which suggest that the Nigeria interest rate regime may not be sensitive to global forces as represented by the US Fed rate; while in line with *a priori* reasoning it is positively sensitive to endogenous forces such as inflation rate, public debt ratio and exchange rate. Furthermore, against *a priori* thoughts, trade openness and bank competitiveness share positive association with domestic interest rate. On trade openness, the positive link may suggest the pressure of high imports and the nature of imported goods relative to primary commodity exports which Nigeria has been noted (UNCTAD, 2014; UNCTAD, 2016; Eke, 2018; Eke and Alege, forthcoming). On bank competitiveness, it suggests that policy on increased bank branching may not be an antidote to managing cost of funds downwards since the measure may not increase the limited depth of financial markets, level of inflation, risks and uncertainty (Soludo, 2005), rather technology, such digital finance model may serve the purpose.

Table 5: Correlation matrix

	LINR	LINF	LFED	LOPEN	LPDR	LBC	LEXR
LINR	1.0000						
LINF	0.1426	1.0000					
LFED	-0.5816	0.0801	1.0000				
LOPEN	0.3361	0.1434	-0.0423	1.0000			
LPDR	0.0155	0.2538	0.4938	-0.0322	1.0000		
LBC	0.8371	0.0483	-0.6820	0.2586	-0.1427	1.0000	
LEXR	0.8554	-0.0152	-0.7252	0.3562	-0.3194	0.8655	1.0000

Source: Computed by the authors

Lag length order

The optimal lag length of the variables is established to moderate the time dynamics that was fitted for the model. While three techniques- All information criterion (AIC), Final prediction error (FPE), and the LR criterion limits the lag length to two (2), Schwarz information criterion (SIC) and Hannan-Quinn information criterion (HQ) chose lag one (1) as lag length as optimal. The study therefore adopts lag length two (2) as optimum, as presented in Table 6 below:

Table 6: Optimal lag length

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-221.47	NA	4.86e-05	9.9335	10.2118	10.0378
1	40.2127	432.34	4.80e-09	0.6864	2.9125*	1.5203*
2	97.9534	77.8244*	3.81e-09*	0.3063*	4.4804	1.8700

Source: Computed by the authors

Granger causality result

The Granger-causality statistics is presented in table 7 below. Established in the vector autoregressive (VAR) framework, it provides preliminary investigation on the short-run relationships among the variables, and could assist to establish basis for variables' inclusion in the model. By *a priori*, inflation rate, the fed rate, bank competitiveness and exchange rate significantly granger-causes interest rate in Nigeria. Bi-directional causal relations exist among exchange rate and interest rate. Similarly, in line with expectation, while public debt ratio is sensitive to exchange rate, bank competitiveness also granger-causes exchange rate.

Table 7: Pairwise Granger-causality tests @ optimal lag 2

Null hypothesis	Obser.	F. statistics	P. value
Linf does not Granger-cause Linr	46	4.3431**	0.0195
Linr does not Granger-cause Linf	46	1.7127	0.1930
Lfed does not Granger-cause Linr	46	2.9457*	0.0638
Linr does not Granger-cause Lfed	46	2.0114	0.1468
Lbc does not Granger-cause Linr	46	2.6221*	0.0848
Linr does not Granger-cause Lbc	46	0.7481	0.4796
Lexr does not Granger-cause Linr	46	4.4872**	0.0129
Linr does not Granger-cause Lexr	46	8.4798***	0.0008
Lopen does not Granger-cause Lfed	46	1.0165	0.3708
Lfed does not Granger-cause Lopen	46	2.9402*	0.0636
Lbc does not Granger-cause Lfed	46	3.0676*	0.0573
Lfed does not Granger-cause Lbc	46	1.4258	0.2520
Lexr does not Granger-cause Lfed	46	5.0331**	0.0111
Lfed does not Granger-cause Lexr	46	0.3406	0.7134
Lexr does not Granger-cause Lpdr	46	0.9141	0.4089
Lpdr does not Granger-cause Lexr	46	7.7785***	0.0014
Lexr does not Granger-cause Lbc	46	0.0822	0.9211
Lbc does not Granger-cause Lexr	46	4.6198**	0.0155

*Source: Computed by the authors. *,**,*** indicates significant @ 0.1, 0.05 and 0.01 respectively.*

Diagnostic Tests

Model serial correlation LM Test

The serial independence LM test presented below in Table 8 provide evidence which indicates that the study fails to reject the hypothesis that there is no serial correlation among the series, as the F-stat. value of 0.1060 produces a probability value of 74%. The result thus concludes that the residuals do not contain serial correlation.

Table 8: Breusch-Godfrey serial correlation LM test

.	*LM test*	*DF*	*Probability*
F. Stat.	0.1060	1,38	0.7465
Obs*R-squared	0.1307	1	0.7176

Source: Computed by the authors using E-view 7

Heteroscedasticity Test

The heteroscedasticity test statistics whose probability values are above 5% for each of the test result presented below provide evidence which suggests that the homoscedastic assumption of the residual is upheld.

Table 9 Breush-Pagan-Godfrey heteroscedasticity test

.	Test	*DF*	*Probability*
F. Stat.	2.1786	7,39	0.0576
Obs.*R-squared	13.2122	7	0.0671
Scaled Explained SS	11.2379	7	0.1286

Source: Computed by the authors

Model normality Test

The result of Jacque-Bera test statistics in Table 10 of 0.45340, whose probability value is above 5%. The study thus fails to reject the null hypothesis that the model series are normally distributed. It implies that the models' inference statistics may be valid (Asteriou and Hall, 2011).

Table 10: Jacque-Bera residual test

Obser.	*Test statistics*	*Probability*
47	0.45340	0.7972

Source: *Computed by the authors*

Co-integration Test

The tau-statistic and z-statistic results in both Phillips-Ouliaris and Engle-Granger methods are presented in Tables 11 and 12 below. The results suggest existence of long-run co-integration, as their probability values are below 5%. The study therefore rejects the hypothesis that the series are not co-integrated.

Table 11: Co-integration test: Phillips-Ouliaris test

tau-statistic	*Probability value**	z-statistic	*Probability value**
-6.4966	0.0107	-46.7621	0.0045

*Source: computed by authors; * MacKinnon (1996) P-value.*

Table 12: Co-integration test: Engle-Granger test

tau-statistic	*Probability value**	z-statistic	*Probability value**
-6.47980	0.0111	-44.7803	0.0087

*Source: computed by authors; * MacKinnon (1996) P-value.*

Short-run adjustment results

The short–run dynamic adjustment result is presented in Table 13. The error correction (adjustment) mechanism of 56 per cent is significant at 5 percent, and of the right negative sign, which suggest that the interest rate model's disequilibrium is adjusted to equilibrium annually.

Table 13: Short-run results

Dependent Variable: *Linrt*				
Explanatory variables	Coefficients	Std. error	T. stat.	P. value
ECM	-0.5632*	0.2113	-2.6658	0.0112
Linrt(-1)	0.9227**	0.1351	6.8279	0.0000
Lfed(-1)	-0.0380	0.0545	-0.6976	0.9504
Linf(-1)	0.0028	0.0453	0.0626	0.4896
Lopen(-1)	0.0805	0.0895	0.8995	0.3741
Lpdr(-1)	0.0373	0.0594	0.6285	0.5334
Lexr(-1)	-0.0233	0.0281	-0.8287	0.4124
Lbc(-1)	0.0939	0.1296	0.7245	0.4731
Diagnostics: R^2 = Adj. R^2 = S.E of reg.	0.816 0.783 0.198	SSR:1.487 Log likelihood: 13.654		

Source: *By the authors; * and ** denotes 0.05 and 0.01 significance levels respectively.*

Long-run results and analysis

Given the significance of the diagnostic results above, it suggests that the inferences and the significant coefficients of the long-run regression results presented in table 14 below may be valid. The R^2 of 83.7% suggests that the model is fitted, as the joint influence statistics is significant. The moderate fitted-test score suggests that the coefficients might be free of multicollinearity bias. Moreover the all-variables Wald's F-stat. and X^2 tests are significant, which suggests that the model may be reliable. On specifics, the fed rate has negative long-run relationship with interest rate, same as the short-run result and correlation statistics earlier analysed. It reveals that one per cent rise in the fed fund rate may result in 0.63 per cent reduction in Nigeria interest rate. Against the conceptual thought presented above (see equation **1**), it suggests, *ceteris paribus,* that the Nigeria's interest rate regime may not be positively sensitive to the US monetary rate changes, such as normalization policies suggests.

The result suggests that contrary to *a priori* of normalization policy, an increase in the US fed rate, may not lead to capital outflow from Nigeria, that may result in interest rate surge. On the other hand, a decrease in the fed rate, may not lead to capital flight to Nigeria, given the workings of international interest rate parity, which may then decrease interest rates in Nigeria; perhaps for reasons of other macroeconomic risk factors. In other-words the fund transfer mechanism is not automatic, such that reduction in fed rate, would lead to capital outflow or attract much needed global capital, necessary to reduce domestic interest rate. It may imply that the interest rate policy rule in Nigeria would largely be determined by workings of endogenous production forces, or the workings of the domestic economy. The adverse effect of US normalization that has been of primary concern in monetary policy rate determination of developing economies does not seem to arise. Rather this paper's

outcome suggests that such fears should be directed at high debt service burden, political risks, and corruption issues, as affecting interest rate.

Other results reveal that, in line with domestic Fisher hypothesis, inflation rate positively drives interest cost, while in line with the international Fisher effect, exchange rate is technically linked with interest rate rise, as it seems to drive it in Nigeria. The result also suggests that the interest rate parity may hold, as the spot and forward exchange rates are positively linked with interest rate.

Moreover, public debt ratio positively drives interest rate. A one per cent increase in public debt could result in corresponding 19 percent increase in interest rate in the long term. In the short-term regression, the coefficient is 3.8 per cent. It indicates that the high rate of public debt consumption, that is now common in developing economies may be producing high price in interest rate for the Nigerian financial system than what policy makers envisage.

Overall, bearing the state of information asymmetry, the results of positive elasticity of interest rate subject to a per cent increases in inflation, exchange rate, and public debt ratio may affirm the rational expectation hypothesis for interest rate determination in Nigeria. This outcome may require effectiveness in policy articulation and formulation, and may not be of random-walked nature, as attributed to Robert Lucas (Pressman, 2006; Grossman, 1981).

In line with *a priori,* trade-openness has negative long run effects on interest rate, which suggest that a one percent increase in trade ratio *ceteris paribus* results in 0.2 percent reduction in interest rate. It indicates that, perhaps, given commitment to trade liberalization interest rate reduction could be effectively achieved in Nigeria.

Table 14: FMOLS-ARDL Long-run equation results

Regressed variable: *Linrt*				
Regressors	**Coefficients**	**Std. error**	**M .Wald test (p lag order)** χ^2 **-Stat.(p.value)**	**F-Stat.(p.value)**
Lfed(-1)	-0.0631***	0.0380	13.2311(0.0013)	6.6155(0.0034)
Linf(-1)	0.0213***	0.0305	10.0027(0.0067)	5.0013(0.0118)
Lopen(-1)	-0.0175**	0.0639	8.5376(0.0140)	4.2688(0.0213)
Lpdr(-1)	0.1901***	0.0553	43.748(0.0000)	21.8741(0.0000)
Lexr(-1)	0.0764***	0.0262	42.2559(0.0000)	21.1279(0.0000)
Lbc(-1)	0.0986***	0.0862	10.9018(0.0043)	5.4509(0.0008)
Linrt(-1)	0.3416***	0.1170	n.a	n.a
C	2.0356***	0.4159	125.079(0.0000)	62.5398(0.0000)
Diagnostics: R^2 = Adj. R^2 = S.E of reg. All Wald test: $\chi 2$ statistics F. statistics	0.837 0.807 0.1862 21605.99 2700.749	 p. value p. value	 0.0000*** 0.0000***	

Source: *By the authors; ** and *** denotes 0.05 and 0.01 levels of significance respectively. n.a indicates not applicable.*

Policy implication of findings

The policy implications of the findings suggest as follows: first, domestic interest rate negative and significant sensitivity to world interest rate (wir) in both the short and long-term suggests that, against the rational expectations doctrine, Nigeria's monetary policy mechanism and its functional interest rates is not exogenously link to the US fed fund rate system. It may appear that there is no monetary policy spillover effect on Nigeria monetary system, as advocated by global financial regulator, the Bank for International Settlement (BIS). This may suggest the workings of the rule-based Central Banking System that had been promoted in the 1980s and early 1990s (Volker, 2014; Taylor, 2014; Obsfeld and Rogoff, 2002). The result suggests that recent US fed rate normalization programmes couldn't have impacted the Nigerian monetary and credit system adversely.

Taylor (2014) observes that the rule-based monetary system by global Central Banks could advance international finance stability. The paper reveals that under economic openness, developing economies could obtain spill-over benefits, in low long-run price and output stability, from rule-based system of monetary policies in advanced economies. To this effect, accelerated global financial liberalization may have encouraged leading international banks in sub-Sahara Africa (SSA) to obtaining cheap credits from significantly advanced credit market environments, which *a priori* should result in low interest rates for high investments and output (Taylor, 2014). This result supports the empirical findings that sub-Sahara Africa is characterized by weak transmission of monetary policy mechanism (Mistra, Montiel and Spilimbergo, 2011; Berg and Rafael, 2018).

However, financial institutions in emerging markets often leverage on advanced economies' low interest-rate regimes, even at zero per cent in climes such as Japan, Germany. The negative result suggests that local banks in financial institutions in Nigeria may not explicitly be transmitting arbitraged spread yields, hence do not impact the country's interest rate, nor drive investments. This may also be unrelated to the relative smallness of Nigeria's financial system and the limited openness to the global economic order. Unique feature of small financial systems economies is low competition, due to few financial institutions, and higher finance operating costs (Bossone, Honohan and Long, 2002). Iacoviello and Navarro (2018) found in a multi-regional study that GDP in emerging markets declined in response to the US normalization policy as it did to the US economy.

It suffices to reveal that the unstructured nature of the interest rate to global interest rate, may explain why the economy is dominated by large informal sector, as formal finance-system have eluded genuine entrepreneurial venture. High interest rate continues to emasculate real sector firm, such that they are closing shop, and relocating to neighboring countries. Today, only oil extraction and firms in the service industry are well placed to attract finance from the credit market, as private credit to GDP keep falling year on year, on account of interest related cost of finance.

Secondly, in line with extant growth literatures, other controls in the model: inflation rate, exchange rate and public debt positively drives interest cost. The plausible implication is that in high interest rate environment, the financial intermediation industry may find it difficult to flourish, giving way for high risk taking attitude for any interested entrepreneur (Knoop, 2013; Eke, 2018). The implications of high lending cost on investment and growth may just be unimaginable. The economy is largely dominated by the informal sector, which has relied on rotating savings and credit associations (ROSCAs) for their micro and small-scale entrepreneurial capital at cheaper cost than the formal bank finance (Knoop, 2013).

It may also imply that appropriate policies may not have been adopted at structural reforms to manage inflation, encourage industrialization and boost productivity. Critical sectors that low interest rate could moderate for greater investments needs are agriculture, road and rail infrastructure, and small and medium scale enterprises (SMEs), home mortgage sector where currently the housing deficit is in excess of seventeen million (CBN, 2013). Inflation driven high interest cost could exacerbate the financially excluded population, and hence deepen poverty. For instance report from the National Bureau of Statistics claim that despite the importance of agriculture to the GDP, in excess of 40%, agricultural loan is less than 3 per cent of total credit in 2017 and 4 per cent in 2018 financial years (CBN, 2018). The structure of Nigerian economy does not help matter, as it is import

dependent, hinged largely on mono-product primary commodity export, which is subject to global price vagaries, and weak manufacturing sector. Moreover, rising public debt, over the 2005 Paris club debt forgiveness, may be crowding-out the credit system, hence high interest cost, particularly when the debt are not infrastructure-linked borrowing. Made worse is the very low per capita income, hence low consumption power, that may be discouraging industrial investments.

Trade openness has negative long-run impact on interest rate. This result sheds light on immense benefit from trade openness on Nigeria's financial system, as current restrictive trade policy and openness to trade has revealed to the contrary. It suggests that the economy needs to be more open to trade, as perhaps the governments was yet to appraise among other from trade competitiveness, the financial system implication of her opposition to greater trade openness, provided appropriate remedies are instituted against unfair trade practices on the economy.

Conclusion and Recommendations

This paper tests the basic rational expectation hypothesis that in open economies, domestic interest rate may be sensitive to global information, such as the fed fund rate. This study relied on the fully modified ordinary least square, in an autoregressive distribution system to conclude that Nigeria's interest rates structure is not sensitive to world interest rate, proxied by the US fed fund rate. Therefore, the rational expectation theorem of monetary policy rate determination on global information does not seem to hold in the Nigerian case.

From the findings above the study recommends as follows. First, since the study suggest that Nigeria interest rate regimes does not seem to be sensitive to global interest rate risk, Nigeria policy rates should be set independent of the Fed rate; but be guided by the dynamics of endogenous macroeconomic variables. Central Banks globally usually pursue two goals for its policies: to keep interest rates low and to increase the amount of money available for lending, so as to maintain employment on the rise. Nigeria shouldn't be an exemption.

Secondly, a relatively lower US fed rate regime should *ceteris paribus* attract capital to capital-scarce safe heavens. This exercise may deepen the financial market and lower interest costs. Nigeria can attract foreign capital by ensuring low-risk macroeconomic environment, such as growth-inspired inflation rate, freer exchange rate regime, provision of basic physical infrastructure, like constant electricity, that would enable lower cost production cost. Government has the responsibility to inspire business friendly environment that could moderate unemployment and inflation. Institutions that influence economic, social and political outcomes should be efficient and effective, as their actions or inactions affects business conducts, to make Nigeria a safe haven for investments.

Thirdly, the regression outcome of positive and significant impact of inflation rate, exchange rate and debt ratio on domestic interest rate reveals the high risk macroeconomic environment. Hence high interest rate reflects appropriate level of risk that could attract requisite foreign capital. Governments need to improve production infrastructure to reduce cost push inflation such as modern transport and energy facilities. It suffices to stress that Nigeria still suffer from poor energy supply for her bourgeoning micro, small and medium enterprises (MSME) often relied on towards easing unemployment challenges. Furthermore, the foreign exchange market need to be completely liberalized and the dual exchange structure removed for foreign exchange market competitiveness. Public debt policy as instrument of public budget may need to be handled with caution. Debt contract in form of revenue bonds should to be tied to specific income generating infrastructural investments.

Fourthly, the combined adverse long-run effects of inflation risk, exchange rate risk, and public debt risk on interest rate can be addressed by improving the level of productivity of the people in all sectors. Government should ensure systems of quality institutions that promote competitiveness and productivity. The adverse effect of fed rates may have contributed to the relatively high interest rate and hence, unhelpfulness of the financial system in general, since the informal finance services the credit system more. Government should encourage the informal finance by human capital training and organization to enhance their services

Finally, greater trade openness reduces interest rate, which requires government policies to encourage openness to trade. Government should put up institutional and legal safeguards on fairness to trade to maximize broad range of returns, such as reduction in interest rate. Governments should encourage technology transformation in agriculture and manufacturing exports to reduce the level of extroversion.

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Product Information as A Tool to Ensure the Right of Citizens to Quality and Safe Food

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Abstract

The article is devoted to the study of one of the issues of ensuring the quality and safety of food products in Russia - the need to provide complete and reliable information about the product delivered to the consumer. The authors consider this legal obligation of the food producer as one of the most important guarantees for the realization of the right of Russian citizens to purchase high-quality and safe products.

The need for compulsory labeling or information provided by law or state standard is indicated. The authors insist on expanding the list of mandatory information on certain groups of goods that should be established by state bodies. In their opinion, this will contribute to stricter compliance with the requirements for the quality and safety of food products in the Russian Federation, which, in turn, will ensure the national security interests of the Russian state in the food sector.

Keywords: quality and safety of food products, product information, quality of food products, law, national security, consumers, consumer market.

Introduction

High-quality and safe food is a prerequisite for the full existence and development of any society. The state of public health and other indicators affecting the quality of the human potential of a nation depend on the qualitative characteristics of food products (Vorontsov A.L., Vorontsova E.V., 2016). Because of this, the factor of quality and safety of food products acquires the value of the factor of national security of the state, ignoring which deprives society of the prospects for normal reproduction, and, accordingly, in general any prospects.

Awareness of the above circumstance has forced many states to pay increased attention to the problem of quality and safety of food products, which has found expression in the development and institutionalization of mechanisms to ensure their quality and safety. The Russian Federation is one of such states, especially since the qualitative characteristics of the products consumed by the population did not always meet the demands of consumers and the requirements of authorized state bodies. Moreover, the low quality of food products has long been a traditional problem of the Russian consumer market, which could not but cause an aggravated reaction of society (Vorontsona E.V., Vorontsov A.L., 2018).

Changes in the socio-economic situation in the country made it possible to create the necessary conditions for improving the quality of food products entering the market. However, the increase in the volume and assortment of manufactured and supplied products, as well as the increase in the purchasing power of Russian citizens, did not, and could not; solve the problems of quality and safety of food products. A significant role in this case was played by an insufficiently perfect legal mechanism designed to fulfill the role of a regulator of quality and safety issues at all stages of the food product life cycle - from its production to receipt by the consumer. And if at the stages of

production, storage and transportation of food products, the current legal mechanism laid the main burden of responsibility for compliance with the requirements for its quality and safety on the producer, seller and, in part, on the state regulatory authorities (as an official guarantor), then at the stage of product acquisition the consumer was guided by his own opinion based on the information available to him, firstly with information contained on the product.

Results and Discussion

The consumption of food products with low consumer properties, as noted in the Strategy for improving the quality of food products in the Russian Federation until 2030, is the reason for reducing the quality of life and the development of a number of diseases of the population, including due to unreasonably high calorie content of food products, reduced nutritional value, excess consumption of saturated fats, micronutrient deficiencies and dietary fiber, in connection with which they are of particular relevance, the issues of ensuring consumers' right to reliable product information (Order of the Government of the Russian Federation of 29.06.2016).

For many years, the problem of the Russian consumer market was the poor quality of goods coming from the countries of the near and far abroad. There were objective reasons for this: the need to saturate food shelves in combination with the low purchasing power of the Russians was facilitated by the import of relatively cheap goods in the purchase, the quality of which. As a rule, it could not be high.

The measures taken by the state, and most importantly - the increase in the purchasing power of our citizens and the development of consumer culture, led to the fact that the quality of goods imported from abroad significantly improved (in proportion to the increase in prices for them). And if not all citizens due to their financial situation could afford to buy really high-quality goods (products), then, in any case, there was a situation in which the buyer had the opportunity to choose.

The situation has changed dramatically with the introduction of economic sanctions against our country. Previously functioning channels for the receipt of marketable products were blocked. This caused the need for import substitution and, from an economic point of view, created the prerequisites for the development of domestic production (especially in the field of food production. It seems that this can only rejoice. Poor-quality goods ceased to come to us from abroad, the Russian manufacturer began to actively enter the consumer market, which, it seems, is much easier to control at all technological stages of production. However, the quality problem has not gone away. Moreover, the lack of foreign competitors creates a temptation for the Russian manufacturer to neglect the quality requirements and mislead the buyer regarding the latter. Thus, there is a very real threat of violation of the right of consumers to receive goods of good quality.

We remind the reader that the quality of a product is a combination of its useful properties that can satisfy certain human needs under normal conditions of use. It should be noted that the Law of the Russian Federation “On the Protection of Consumer Rights” does not provide a legal definition of the quality of goods; it only defines the safety of goods. The Federal Law "On Quality and Food Safety" enshrines the concept of quality and safety. So, according to Article 1 of the Federal Law “On the Quality and Safety of Food Products”, the quality of food products is the totality of the characteristics of safe food products that meet the requirements established in accordance with the legislation of the Russian Federation, the terms of the contract, sample, standardization documents, and technical documentation that determine consumer properties, nutritional value, authenticity, grading (caliber, category and others), and satisfying the physiological needs of a person (Federal law dated 02.01.2000). In the Strategy for improving the quality of food products in the Russian Federation until 2030, the quality of food products is understood as the totality of the characteristics of food products that meet the stated requirements and include its safety, consumer properties, energy and nutritional value, authenticity, the ability to satisfy human needs for food under ordinary conditions use to ensure the preservation of human health.

The consumer often evaluates the quality of the goods by their appearance, taste, smell, color and other external characteristics. As a rule, the consumer does not have special knowledge in the field of quality assessment of goods purchased by him. An important role is played by the information about him received from the seller.

Speaking about the quality of goods, we mean their compliance with standards, specifications, samples, etc. And we don't think about the fact that a product that meets the requirements of standards, specifications, samples can still be recognized as poor quality.

Yes, this is possible if there is no mandatory labeling or information on this product, provided for by law or state standard.

Product information must meet the requirements of Art. 9 - 10 of the Law on the Protection of Consumer Rights.

The Law "On Protection of Consumer Rights" enshrines the right of consumers to information about the manufacturer, seller and goods. But he does not disclose the content of the concept of "necessary information". The manufacturer, seller himself determines the necessary amount of this information, realizing his responsibility for its incompleteness. For certain types of goods, the list of information and methods for communicating it to the consumer are established by decisions of the Government of the Russian Federation, which are binding on the entire territory of the Russian Federation. Since the Law contains a list of mandatory information about the product, the information established by the Government of the Russian Federation, as well as the manufacturer, seller, is additional or reflects the specifics of the product. Such information must be complete and accurate.

Information on goods must contain:

- the name of the technical regulation or other established by the legislation of the Russian Federation on technical regulation and indicating the mandatory confirmation of conformity of the goods designation;

- information on the basic consumer properties of the goods, in relation to food products, information on the composition (including the name of food additives, biologically active additives used in the manufacturing process of food products, information on the presence in the food products of components obtained using genetically modified organisms, if the content of these organisms in such a component is more than nine tenths of a percent), nutritional value, purpose, conditions of use and storage of products such as are for food, about how to make ready meals, weight (volume), the date and place of manufacture and packaging (packaging) of food products, as well as information on contraindications to their use in certain diseases. The list of goods, the information on which should contain contraindications for their use in certain diseases, is approved by the Government of the Russian Federation [5];

- the price in rubles and the conditions for the acquisition of goods, including when paying for goods after a certain time after their transfer to the consumer, the full amount payable by the consumer, and a schedule for paying off this amount;

- warranty period, if installed;

- terms and conditions for the efficient and safe use of goods;

- information on the energy efficiency of goods in respect of which the requirement for such information is determined in accordance with legislation on energy conservation and on improving energy efficiency;

- the service life or shelf life of the goods, established in accordance with this Law, as well as information on the necessary actions of the consumer after the specified periods and possible

consequences if such actions are not performed, if the goods after the specified periods pose a danger to the life, health and property of the consumer or become unsuitable for intended use;

- address (location), company name (name) of the manufacturer (contractor, seller), authorized organization or authorized individual entrepreneur, importer;

- information on the mandatory confirmation of the conformity of the goods referred to in paragraph 4 of Article 7 of the Law of the Russian Federation "On the Protection of Consumer Rights" (that is, if mandatory requirements are established for goods by law or in the manner prescribed by them that ensure their safety for life, health of the consumer, and the environment and the prevention of harm to consumer property, the conformity of goods to the specified requirements is subject to mandatory confirmation in the manner prescribed by law and other legal acts. The number of imported goods, without information on the mandatory confirmation of their compliance with the requirements specified in paragraph 1 of Article 7 of the Law of the Russian Federation "On Protection of Consumer Rights" (the consumer has the right to have the goods under normal conditions of use, storage, transportation and disposal was safe for life, health of the consumer, the environment, and also did not harm the property of the consumer. prevention of damage to consumer property is mandatory and is established by law or in the manner prescribed by it));

- information on the rules for the sale of goods.

If the product purchased by the consumer was in use or the deficiency(s) was eliminated in it, the consumer should be provided with information about this (The law of the Russian Federation of 07.02.1992).

The technical regulation of the Customs Union "Food products in terms of their labeling" in Art.4, establishes labeling requirements for food products. In particular, the marking of packaged food products provided for by this document and inscribed in the form of inscriptions shall be applied in Russian and in the state(s) language(s) of the state - a member of the Customs Union, subject to the relevant requirements in the legislation(s) of the state(s)-member(s) of the Customs Union, with the exception of the cases specified in this document, or rather information about the name and location of the manufacturer of food products supplied from third countries, it is allowed to indicate the letters latin alphabet and Arabic numerals or in the state(s) language(s) of the country of location of the food manufacturer on condition that the name of the country in Russian (Decision of the Commission of the Customs Union dated 09.12.2011).

Information on imported goods should contain the following information in Russian: name of the country of manufacture, manufacturer, their legal address; purpose, basic properties and characteristics; terms and conditions of use; other information on goods provided for in accordance with the legislation of the Russian Federation. It should be placed on the packaging or label of the product, on the insert sheet or in the form of an annotation to be displayed together with the samples.

This situation enables consumers to protect their rights regarding the quality of foreign-made goods. However, there are no real levers of consumer influence on manufacturers located outside the Russian Federation. The reference to the application in international situations of the norms of international treaties (Article 2 of the Law on the Protection of Consumer Rights) also does not solve the problem.

GOST R 51074-2003 “National Standard of the Russian Federation.Food Products.Information for the consumer. General requirements” establishes not only general requirements for the content of information for the consumer, but a list of information on food groups (GOST R 51074-2003). Information for the consumer in accordance with GOST R 51074-2003 must be unambiguously understood, complete and reliable, so that the consumer cannot be deceived or misled about the composition, properties, nutritional value, nature, origin, method of manufacture and use, as well as other information, characterizing directly or indirectly the quality and safety of a food product, and

could not mistake this product for another one that is close to it in appearance or other organoleptic characteristics.

The information is brought to the attention of consumers in the technical documentation attached to the goods, on the labels, markings or in any other way accepted for certain types of goods. Information on the mandatory confirmation of the conformity of goods to established requirements is presented in the form of marking of goods in the prescribed manner with a conformity mark and (or) in another way established by laws, other legal acts or usually presented requirements, and includes information on the number of the document confirming compliance with the term his actions and the organization that issued him. The consumer can additionally receive information on products of interest to him also on Internet sites, in commercials and catalogs.

Thus, product information is an effective means of ensuring its quality. Both Russian producers and Russian consumers should always remember this. The absence of certain types of foreign goods and, accordingly, the availability of their analogues produced in Russia (in connection with the sanctions imposed on our country), does not at all preclude the possibility of non-compliance with the quality requirements of these goods. Widespread in Russia the slogan “we will support the domestic producer”, addressed to consumers should correlate with the obligation of the manufacturer of the products to strictly observe the requirements for its quality, and reliable information about the product should become an axiom of relations in the consumer market. It seems that the development of the situation in this direction will contribute to a more complete realization of the right of Russian citizens to purchase safe food of good quality.

Conclusion

Our brief study allowed us to draw a number of conclusions:

- in the system of legal measures ensuring the realization of the rights of Russian citizens to high-quality and safe food products, the right to reliable information about a product occupies an important place, since it is it that allows the consumer to make his own choice of a food product, guided by his preferences regarding it nutritional value and taste;
- the obligation of the manufacturer, established by Russian law, to indicate the necessary and reliable information about the product, as well as sanctions for not providing or distorting it, serve as an instrument of legal support for the quality and safety of food products, forcing the manufacturer to bring their goods in accordance with the specified characteristics (usually high in view of marketing needs and maintaining the image of the manufacturer);
- further refinement of the lists of information on certain groups of goods established by the state, as well as improving the consumer culture of citizens will, but in our opinion, contribute to a more complete and strict observance of the requirements for the quality and safety of food products in the Russian Federation, which, in turn, will ensure the interests of national security of the Russian state in the food sector.

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Ensuring the Quality and Safety of Food Products in The Context of Ensuring National Security of The State: The Experience of Legislative Regulation in The Russian Federation

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Abstract

The article is devoted to the analysis of the practice of legislative regulation of issues of quality and safety of food products in the Russian Federation. The authors note that the problem of ensuring the quality and safety of food products is an urgent task of any state, given the enormous importance of the qualitative characteristics of the food consumed by the population in order to maintain the national gene pool and the stable development of society. Only healthy nation is able to withstand internal and external challenges, ensuring its progress and prosperity. Therefore, the problem of ensuring the quality and safety of food products should be considered as an important part of the problem of ensuring national security. This approach will allow us to concentrate organizational and legal efforts on solving the problem of creating a mechanism for ensuring the quality and safety of food products. The authors analyze the legislation of the Russian Federation aimed at regulating the issues of quality and safety of products, including program strategic documents designed to improve the existing legal mechanism in this area. Noting the positive trends in the legal regulation of issues of quality and safety of food products, the authors of the article draw attention to the fact that the Russian state has not yet been able to equalize the legislative "bias" existing in this area: the norms of Russian law are still mainly aimed at ensuring food safety requirements, not quality. All this creates potential threats to the health of Russian citizens, and therefore - threats to the national security of the country.

Keywords: quality and safety of food products, food, legal support of quality and safety, ensuring quality and safety, legislative regulation, legal mechanism, national security, food security, technical regulations, mandatory requirements, health protection, public health.

Introduction

The problem of ensuring the quality and safety of food products is an urgent task for any state, given the enormous importance of the qualitative characteristics of the food consumed by the population to maintain the national gene pool and the stable development of society. For states whose consumer market, for one reason or another, is experiencing a shortage of food products of its own production and (or) is excessively dependent on food supplies from abroad, this task is especially acute, since in this situation conditions arise to fill their food market with poor quality and counterfeit products that can cause significant harm to public health. It is obvious that in this case the interests of the national security of the country will be jeopardized, since only a healthy nation is able to withstand internal and external challenges, ensuring its progress and prosperity.

For Russia, the problem of food quality and safety was especially acute in the 90's XX century, when in conditions of total food shortages, the flow of food products with low consumer properties and unsafe for health poured into the Russian market. The collapse of the national food industry, the

inconsistency of the previous legal framework with new market relations - all this was an ideal environment for ignoring the requirements for the quality and safety of food products. As a result, the Russian consumer purchased food products whose expiration date had long expired (most often this happened when delivering products from abroad), or products whose consumer properties did not meet the standards of the country of origin.

Inside Russia, counterfeit (usually artisanal) production flourished that did not meet elementary technological requirements. For the population, this turned into massive food poisoning and outbreaks of salmonella, botulism and other diseases.

Quite a lot of time has passed since then, and the measures taken by the Russian state - toughening regulatory requirements for food safety, increasing domestic food production - played a role. The quality and safety of food products in circulation has increased. At the same time, the Russian food market is still subject to threats associated with low consumer properties and the safety of food products and raw materials for their production. To a large extent, this is a consequence of the imperfection of the existing legal mechanisms for ensuring the quality and safety of food products, which in turn was caused by a wrong look at the problem itself - for a long time the issues of quality and safety of food products were considered, as a rule, in the context of the implementation of civil law claims of citizens. This narrowed the essence of the indicated problem and downplayed its significance for society as a whole. At the same time, the understanding of the quality and safety of food products as one of the most important aspects of ensuring national security has significantly intensified the organizational and legal activities of the state in this area.

The aim of our study is to analyze the legislative regulation of the quality and safety of food products in the context of ensuring the national security of the Russian Federation. The study of the problem of legal ensuring the quality and safety of food in this context is, in our opinion, a promising area of scientific activity, and in addition it allows bringing the legislative regulation of this sphere to a higher legal level (taking into account the (huge) importance that is attached in the Russian Federation national security.

Materials and Methods

The empirical material for the study undertaken by the authors was the legal acts of the Russian Federation aimed at regulating relations in the field of ensuring the quality and safety of food products, as well as ensuring the national security of the country. Basically, these were program strategic documents that made it possible to determine the principled position of the Russian state with respect to the main directions and ways of ensuring the quality and safety of food products, achieving food security, the role and place of these tasks in an integrated system of ensuring national security of the Russian Federation.

The study was built on the basis of the general principles of scientificness, objectivity, and the adequacy of the methods used for research tasks. The direct research methods were: the method of formal logic, scientific assumptions (hypotheses), the formal legal method, the method of generalization.

Results and Discussion

The national security of the state depends on many factors, each of which can be crucial for the life support of society. In this case, it all depends on the situation in which the state finds itself under the influence of certain circumstances: social instability, military threat, economic crisis, natural disasters, etc.

Among all the factors that are essential for ensuring national security, the factor of public health should be highlighted. This is explained by the fundamental role of public health for the functioning

of all spheres of public life, without exception. The coronavirus pandemic resulted in global changes in the system of public relations both within countries and internationally, is a clear example of this. Thus, the "cross-cutting" nature of the factor of public health and its importance for the normal functioning of society is becoming increasingly apparent.

For the national security of the Russian Federation, the state of public health is of particular relevance due to the low reproduction of the population, a decrease in the age limit for the occurrence of chronic diseases, and the prevalence of diseases caused by lifestyle. These circumstances may call into question the possibility of realizing the ambitious tasks that Russia has set for itself to ensure its sustainable development. The intensification of modern production, its transfer to hard-to-reach areas with an unfavorable climate and other features of modern labor activity require a healthy workforce. The needs of the Armed Forces of the Russian Federation also require good health, the importance of which has grown significantly in the face of geopolitical pressure exerted on us. All this makes us pay close attention to the state of public health, as well as to factors that directly affect it.

The food consumed by the population is perhaps the main factor determining the state of health of the population. This is due to the fact that the bulk of the substances necessary for a person get to him from food. At the same time, it is with food and water that the human body gets more than 85% of all toxic substances. Food products in the scientific community have long been considered only as the "fundamental prerequisites" of health (Tobes B., 2001). They appear in the same quality in a number of international acts.

The Russian legislator did not stand aside from this trend. The Federal Law (2011) "On the Basics of Protecting the Health of Citizens in the Russian Federation" provides that health protection is ensured, including by the production and sale of food products of appropriate quality (Article 18). In turn, the adoption of such legislative acts as the Law of the Russian Federation (dated 07.02.1992) №2300-1 “On Protection of Consumer Rights”, Federal Law (of 05.07.1996) №86-FZ “On State Regulation” was aimed at ensuring the quality and safety of food products. in the field of genetic engineering”, Federal Law (of 02.01.2000) №29-FZ“On Quality and Food Safety”, Federal Law (27.12.2002) №184-FZ“ On Technical Regulation”, Federal Law (of 29.06.2015) №162-FZ “On Standardization in the Russian Federation” and others. Particular attention was paid to improving control and supervisory mechanisms and limiting the turnover of products obtained using genetically modified organisms. In this regard, the adoption of Federal Law (dated 03.07.2016) №358-FZ “On Amending Certain Legislative Acts of the Russian Federation with Regard to Improving State Regulation in the Field of Genetic Engineering”, which banned the production and import into the Russian Federation of products containing genetically modified organisms. Despite this, the Russian food market is not at all insured against the receipt of low-quality and dangerous samples, which is confirmed by experts of the Federal Service for Supervision of Consumer Rights Protection and Human Welfare, who note that the consumed food products, as well as water, are one of the main causes of most diseases (State report, 2012). This calls into question the provision of public health, and, accordingly, national security in the food sector.

It should be noted that in the Russian Federation the problem of ensuring the quality and safety of food products has long been perceived very one-sidedly. It was believed that only food safety indicators in the indicated context are less important for ensuring national security interests in the food sector, and therefore do not need detailed legal regulation. At the legislative level, this has found expression in the loss of the quality of its mandatory value and the reorientation of the legislator to regulate issues related exclusively to ensuring the safety of food products. At present, it is safety indicators that have the nature of mandatory requirements according to the Federal Law (of 27.12.2002) №184-FZ “On Technical Regulation”.

At the same time, objective reality shows us that many public health problems are caused precisely by the qualitative characteristics of the food consumed. We are talking about the excess in food products of reasonable (acceptable from the point of view of medicine) indicators of fat content, calorie content, sugar, carbohydrates and other things, and, conversely, about the lack of

micronutrients, coarse fibers, etc. necessary for the body in these products. The constant use of these products (despite their safety) can lead to delayed negative health effects (obesity, diabetes, etc.), creating a threat of a national scale. Thus, the task of ensuring the quality of food products also falls into the category of tasks related to ensuring the national security of the Russian state. Apparently, it was the recognition of this circumstance that prompted the leadership of our country to reconsider its approaches to legislative regulation of issues of ensuring the quality and safety of food products and to pay attention to the need to create legal mechanisms to guarantee proper quality indicators of food products. In 2016, an Order of the Government of the Russian Federation (date of 29.06.2016) was issued, which approved the Strategy for improving the quality of food products in the Russian Federation until 2030 (hereinafter referred to as the Strategy), contains program provisions that reflect the conceptual approach of the Russian state to solving the problem of providing its population with a full-fledged (that is, relevant WHO recommendations and other international organizations), which allows to prevent certain diseases, contributing to the improvement of quality and increase the duration of human life) nutrition through improving the quality characteristics of food products.

The Strategy (2016) indicated to us was the basis for the formation in the Russian Federation of a national system for managing the quality of food supplied to the consumer market. The goals of the Strategy were to ensure the quality of food products, stimulate increasing demand and supply for increasingly high-quality food products, and ensure that consumers have the right to adequate food quality.

The Strategy (2016) contains a detailed list of tasks, the implementation of which, according to the creators of this document, will achieve the above goals. Among them: ensuring the monitoring of the quality of food products; improving state regulation in the field of food product quality, including in terms of ensuring state control (supervision) and applying administrative responsibility for non-compliance by the manufacturer (contractor, seller, person acting as a foreign manufacturer) of food product quality requirements; creation of a unified food product traceability information system; development and implementation of a food product quality management system.

It is easy to notice that these tasks involve the creation of new organizational, legal and managerial institutions that have not previously been used in the mechanism for ensuring the quality and safety of food products. Their implementation will require tremendous work of all interested departments, as well as the legislator, which does not allow us to hope for a quick resolution of these problems. Nevertheless, the fundamental position of the Russian state is obvious, consisting in the harmonization of legislative approaches regarding the consolidation of mandatory product requirements. Initially, this is manifested already in the very definitions of the fundamental concepts used in the Strategy. Thus, the concept of food product quality is defined as a set of characteristics of food products that meet the stated requirements and include its safety, consumer properties, energy and nutritional value, authenticity, and the ability to satisfy human food needs under normal conditions of use in order to ensure the preservation of human health. As you can see, in this definition, food safety is an integral characteristic (component) of its quality, i.e. actually presumed. At the same time, according to the logic of the legislator, the presence of a food safety condition is not enough to recognize its quality. In this case, the legislator returns to the practice of regulating the issues of quality and safety of food products (in terms of their relationship to each other) used in the Soviet period and, as we think, there is nothing wrong with such a return, since it is such a combination of quality and food safety that meets the interests of preserving the health of citizens, and accordingly the interests of the national security of the country.

At the same time, it should be noted that at present, the real legal mechanism for ensuring the quality of food products is in its infancy: the quality indicators of food products have not yet been included in technical regulations, and they are absent in most current standards and technical conditions. In general, the establishment of mandatory requirements for food quality by the Russian legislator is only planned. Their early establishment is hampered by the lack of a modern methodology for assessing potential risks to the health of citizens of certain food contaminants, the lack of the necessary scientific justification for the maximum permissible content of these contaminants in food, etc.

Thus, it can be stated that the legal mechanism currently in force in Russia to ensure the quality and safety of food products is still focused mainly on ensuring product safety requirements, ignoring the regulation of its quality. At the same time, the perception of this mechanism as one of the tools for ensuring national security allows us to hope that what we noted the imbalance of legal regulation of issues of food quality and safety will nevertheless be eliminated.

In the Russian Federation, the formation of a holistic mechanism for ensuring the quality and safety of food products occurs within the framework of ensuring the food security of the country, which in turn is one of the main directions of ensuring Russia's national security for the long term (Vorontsov, A.L., Vorontsova, E.V.,2019; Vorontsova E.V., Vorontsov A.L, 2019). It is in this capacity that the Food Security Doctrine of the Russian Federation (dated of 21.01.2020) considers food security - a strategic planning document that develops the provisions of the National Security Strategy of the Russian Federation (Decree of the President of the Russian Federation of 31.12.2015) related to food security. In the Doctrine (dated of 21.01.2020), providing the population with high-quality and safe food products is declared the national interest of the Russian Federation in the field of food security, which puts the solution of this problem to the list of the priorities of the Russian state.

The fact that the problem of ensuring the quality and safety of food products is considered in Russia in the context of ensuring its national security is also evidenced by the fact that a number of program provisions of the Doctrine actually duplicate the provisions of the National Security Strategy. This applies to requirements for improving technical regulation, sanitary and epidemiological, veterinary and phytosanitary surveillance, monitoring food safety for human health, and preventing the uncontrolled import and circulation of food products obtained using genetically modified organisms (moreover, the Doctrine contains the task of preventing the import into the territory of the Russian Federation of genetically modified organisms for the purpose of sowing, growing and breeding them, as well as a ban on breeding animals whose genetic program has been changed using transgenic technologies) and some others.

The enormous importance attached to the Russian Federation by the task of improving the quality indicators of food products, as well as indicators of its safety, is also evidenced by the fact that providing the population with safe and high-quality agricultural products is proclaimed a strategic goal of ensuring the country's food security. The Food Security Doctrine of the Russian Federation indicated by us contains a list of areas of state activity, the implementation of which will ensure the quality and safety of food products. Among them: monitoring the compliance of these products with the mandatory requirements of technical regulations of the Eurasian Economic Union; creation of a modern technical and methodological base, allowing to improve control over the quality and safety of food; harmonization of international requirements and their quality and safety parameters; encouraging manufacturers to produce environmentally friendly food products that comply with sanitary-epidemiological, veterinary and other requirements; strengthening the legal liability of manufacturers for violation of mandatory requirements for food products, etc.

It should be noted that in the programmatic strategic documents of the Russian state, ensuring the quality and safety of food products, as well as food safety in general, is linked to the formation of a healthy type of food, which indicates a comprehensive perception of this problem and an understanding of the fact that its solution does not lie only in the field of normative regulation of indicators of food quality and safety, but also in the field of the structure of food consumption, as well as the food traditions of the population.

Conclusion

The study allowed us to draw a number of conclusions:

- taking into account the decisive importance of the qualitative characteristics of food products for public health, the factor of quality and food safety plays an important role in ensuring the national security of the state;

- for the Russian Federation, the need to take effective measures aimed at ensuring the quality and safety of food products is exacerbated by the presence of negative trends in public health, the reason for which is the quality of food consumed by the population;

- the existing legal mechanisms to ensure the quality and safety of food products do not guarantee the citizens of the Russian Federation the exercise of their right to purchase food of the proper quality necessary for an active and healthy lifestyle. The legal regulation of this sphere is still focused mainly on ensuring the safety requirements of food products, while the issues of its quality remain outside the zone of legal regulation. At the same time, it is the qualitative characteristics of food products on the Russian food market that raise concerns in terms of potential threats to the health of Russians.

The problem identified by us significantly affects the national security of the Russian Federation. Due to this, the Russian government outlined drastic measures, which are reflected in the program strategic documents;

- the state's reaction to the need to ensure quality indicators of food products was the adoption of the Strategy for improving the quality of food products in the Russian Federation until 2030, which was the basis for the formation of a national food quality management system. In general, the Strategy is focused on providing good nutrition and disease prevention andincreasing the length and quality of life of the inhabitants of Russia. It seems to us that the implementation of the program provisions of this document in terms of legislative regulation of product quality issues will make the general mechanism for ensuring the quality and safety of food products more harmonious, since it will allow introducing into the regulatory framework not only requirements related to food safety, but also requirements related to its quality;

- taking into account the great importance of high-quality and safe food products to ensure the national security of the country, the solution of this problem is carried out in the framework of ensuring food security. The food safety doctrine of the Russian Federation contains a specific list of areas of state activity, the implementation of which is designed to ensure the quality and safety of food products.

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Nigeria Stock Exchange's Performance and Sustainable Evolution: Causality Test

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Abstract

Study aims at finding out if the stock mart in Nigeria already advanced to the extent of being able to impact positively on the country's economic evolution sustainably. Observed studies on the rapport that exists amid financial advance and economic development in emerging economies mostly underscore the importance of the banking sub-sector. Those studies ignore the strategic role of the stock mart in these countries relative to evolution of the economies. Few others that consider the influence of the bourse did using mart capitalization generally to proxy stock mart development. The study becomes so imperative given the spate of globalization and foreign investments via the bourse. Moreover, this study concentrates on the impact of the stock exchange proxied by mart capitalization (debt). Johansen co-integration and Augumented-Dikey Fuller stationarity tests are used to assess the influence that the stock mart development in Nigeria has on sustainable evolution. It is done to see if mart capitalization, as a measure of mart development, could impact on sustainable evolution of the nation. Empirically, we find that the stock exchange in Nigeria enacts positive but no significant influence on sustainable increase of the economy.

Keywords: Sustainable Evolution, Gross Domestic Products, Market Capitalization, Financial Growth
JEL classification: G12

Introduction

One could define the stock exchange as the totality of buyers and sellers of equity and loan stocks, their instruments of trade and the enabling frameworks. According to Familoni (2001), the bourse is established an apex financial mart for the sales as well as purchase of financial securities and all allied activities that go along with the trading. It is purely a forum for financial dealings that is made up of stocks of equity and debt instruments. The equity mart is for already existing shares and the debt mart is for fixed-income securities. In the words of Olowe (2011) as Azubike (2017) quotes it, the apparatus of stock mart came exist to facilitate investments, which hitherto were intrinsically illiquid to be made liquid. This occurs via divestments, given the discretion of the investors devoid of disrupting the operation of the borrower. In the words of Petros (2007), very vibrant stock marts could ease investing in better returns yielding projects; thereby enhancing efficient redistribution of capital and engendering the projections for evolution, even in the long run.

Undoubtedly, the stock exchange as a long term borrowing sustenance platform enhances corporate evolution. It implies then that the more the stock mart develops in enabling the exchange of stocks, the more the economy grows. Indeed, evolution is a good measure of success. The longer the term of evolution, the merrier the success story is told of any economy. To grow means to naturally increase by addition either through assimilation or accretion (Herman, 1993). Thus, evolution is quantitative; and therefore measurable. In the words of Chandra et al (2017), evolution is still one crucial factor in while considering valuation, accessing credt, attracting top skilled professionals, as well as in increasing shareholders' returns. In the words of Adebanjo (2014), evolution becomes sustainable when resources used and the extent of such evolution does not become hazardous to future generations. Hence, sustainable economic evolution could define as such progressive increases induced by concerted actions that enhance standards of living in a given region. In other words, sustainable evolution could be defined as sequential increases of material wealth of which production components are not detrimental to the wellbeing of the concerned economy.

Evolution becomes sustainable when its rate can be continued with, without causing economic problems. Toni (2016) perceives sustainable evolution as having to do with corporate efficiency and long term stability. It is about maximizing resources. In her words, it entails the ability to continually earn more than the outlay at a good margin, militating unprecedented risks, while continuing to invest. It requires immense agility and dynamism. Agility here implies being able to optimize sourcing of funds that are adding value, while putting an eye on the look for better and more efficient ways of accomplishing tasks. Toni (2016)

concludes that being agile equally helps to mitigate risks by being able to shift, change and pivot ahead of, or in response to, mart forces.

At the corporate level, sustainable evolution could be defined as such increment that could be maintained without having to jeopardise ownership. Hence, Pandey (2010: 637) defines sustainable evolution in term of yearly financial developments that are in conformity with organisation's financial policies; assuming no issue of new shares. That is, sustainable evolution of a single product firm is such evolution that the firm attains while maintaining its annual operational efficiency; without raising external equity. It implies that new issues could contributory jeopardise firm control of organisations; hence, sustainable evolution if not well managed. Howitt (2006) submits that sustained economic evolution should be a continuing process that should never end.

Meanwhile, the gap that ignited this research is well captured in Brown and Nyeche (2016). Brown and Nyeche (2016) state that observations on the rapports that exist amid finance developments and evolution of emerging economies focus more on prominence of banking. Those studies ignore the strategic role of the stock marts in these countries, relative to economic evolution. Brown and Nyeche (2016) identify the roles of the marts among others to include savings mobilization and creation of credits. Other roles identified by them include diversification of risks, enhanced corporate control, and efficient allocation of funds. They conclude that efficient and effective delivery of these functions could foster economic evolution rate. Nigeria is one of such emerging economies. The extent to which the Nigerian stock exchange impacts its level of efficiency to grow the nation's economy sustainably is the subject of concern to this study.

Moreover, study set to examine if connection exists amid the stock-exchange and sustainable evolution. In addition to this are the set sub objectives of study, which include finding out if the Exchange has any influence on sustainable evolution in Nigeria. The second goal is to establish the nature of impact, if there is, that the stock exchange has on sustainable evolution in Nigeria. Therefore, the two null hypotheses of study are that stock exchange has no impact on sustainable evolution in Nigeria; and that there exists no causal connexion amid the stock exchange and evolution in Nigeria.

Theoretical framework

The pecking order theory base on the assertion that managers have richer knowledge of firms than investors. Hence, managers will issue out debt instruments when optimistic about firms' future prospects. This implies that equities are issued by prudent managers when they are sceptical about firms' prospects. In other words, the issuance of debt instruments is an indicant that the firm is sure of steady cash inflows that would repay the sum borrowed and its attached costs. This means that informed finance managers would only favour the issuance of equities whenever the ruling price of shares is over-valued. Summarily, the pecking order theory asserts that the issuance of new equities is often the last resort of managers. Hence, the managers prefer financing projects with retained earnings when available and adequate. When not adequate, managers prefer to borrow, using the retained earnings as leverage. One could therefore state that debt is considered cheaper than the cost of equity capital. Payable interests on debt are deductible before tax.

Moreover, internal equity is cheaper than external equity capital. This is so because there are no costs of issuance attached. Therefore, managers avoid issuing new equities so that wrong signals would not be relayed to the investing public about their firms. Hence, they mostly avoid raising capital via the stock exchange publicly. This explains why some finance managers would choose to raise funds privately; but with some of the structures of the stock exchange. In the words of Pandey (2010), managers always prefer to use internal finance. In the absence of internal finance, managers would issue secured debt instruments. If not sufficient, managers would issue unsecured debt or better still a hybrid of debt instruments. Thus, informed managers only issue new equities as a last resort to finance projects.

Meanwhile, there is the endogenous evolution theory, which sought to explain the need to focus inward in a bid to advance evolution. The endogenous evolution theory is of the view that long-run evolution rate in any nation could be influenced by concrete measures. Good policies aid savings and optimal allocation of resources. This suggests that policies which embrace change, competition, openness, and innovations should enhance evolution. On the other hand, policies that restrict change by protecting some particular firms are likely to retard evolution. In clear terms, endogenous evolution theory states that evolution is a fundamental function of endogenous factors.

Efficient Mart Hypothesis

This mart premise posits that when stockholders are faced with novel info they could over react while some others could under react. This means that shareholders' responses are at random. Their reactions chart normal distribution. In the words of Jensen (1978), mart is 'efficient' relative to information. In an efficient mart, it is impossible to generate excess returns base on mere available information. This is due to the fact that prices automatically adjust instantly unbiased to new information; thereby leaving no chance for investors to reap excessive gains. This, in addition, means that all current information about a stock and its expected future cash-flows is included in its mart price.

The hypothesis therefore posits that it is simply not possible for any stockholder to outwit the mart. This is due to the fact that share prices already integrated and reveal all relevant information. It is however assumed that all stockholders adequately perceive available info in the same way. Efficient capital mart implies a well-informed mart. In the words of Pandey (2010; pp.: 46), efficiency of any stock exchange could translate to mean the propensity of the quoted financial securities to reflect and integrate in their prices every pertinent information; with speed.

Therefore, the proficiency of quoted securities' prices depends on the promptness with which the prices adjust to all relevant accessible info. The faster the adjustments speed, the more reflective the securities' prices. Moreover, Fama (1970:383) categorised the sub-capital mart's efficiency into strong, semi-strong and weak forms. The weak-form is the lowest status, which defines the mart when current prices of a shares completely mirror all past prices. Thus, this status implies that past prices cannot be solely used to predict future prices for abnormal gains.

The semi-strong status of efficiency posits that the present stock prices reflect all publicly accessible info. These include information on the quantity of money in circulation, rates of exchange, rates of interest, and stock splits among others. Thus, if the available information incorporates private info, it is therefore not likely that a stockholder earns abnormal gains. In this wise, the mart is said to be strong form efficient. Under the strong form status, mart prices reflect all pertinent information, including public and private info. The strong form status implies that private info reflects in the stocks' prices. Private information may be tough to obtain even though it could prove useful in making abnormal profits.

Empirical Evidence

Over the years, the involvement of the stock exchange in economic evolution and development is increasingly being a key subject of discourse in literature. Many authors argue in favour of its contributions to increasing productivity and economic development, while others argue against its being a causal factor. Still, some others do argue that the relevance of stock exchanges to economic development depends more on some additional factors. For instance, Boubakari and Jin (2010) claims that there exists a prosperous link between the stock marts and economic evolution in some countries whose stock marts are liquid and pro-active. However, this is not so in countries where the stock marts are small and less liquid. In their own words, arguing in favour of stock exchange led evolution, stock mart development has a significant and positive long-run impact on economic evolution. Azubike (2017) puts it that the stock mart is a pivot upon

which economies revolve because it creates, mobilizes and rations long-term funds tailored toward increasing productivity of concerned economies.

Today, the stock marts remain in focus due to their perceived benefits by policy makers. They are often cited as haven emerged indicators of business direction (Petros, 2007). Notably, in the list economic benefits of stock marts are mupping up of savings and provision of liquid capital, with which firms are established and grown. Petros (2007) asserts that efficient delivery of these functions can augment the rate at which economies grow. The stock marts provide the avenue for corporations to raise finance at comparatively low costs. Hence, corporations in nations with already developed markets are less reliant on banks' credit. According to Petros (2007), the stock marts are expected to inspire savings by being innovative in creating novel financial instruments that could better meet investors' risk preferences and credit needs. However, the slow rate at which the Nigerian market develops could be partially due to the unwillingness of the local firms to go public as explained by Meyrs' pecking order theory. Petros (2007) concludes that developed stock marts are able to positively influence savings among individuals and provide avenues for firms' finance. This explains the positive connexion that many authors report, which exists amid developed stock marts and the real economy of host countries. Hence, the efficiency of the stock exchange is often perceived as a barometer for gauging the level of host countries' economic evolution. It further explains the reason why most of the existing literature emphasize the need for government policy framework in enhancing the stock marts' development as Brown and Nyeche (2016) observe. Moreover, Ngare et al (2014) reports that nations with stock marts are more productive when compared to countries without stock mart; and concludes that market's availability and development has positive effect on domestic productivity.

Singh, as seen in Petros (2007), posits that stock marts are expected to enhance gross domestic productivity by boosting savings and at the same time increasing investments. In actual fact, the stock marts provide the much needed avenue for growing corporations to raise credits at comparatively lower costs. In line with this, Petros (2007) is of the opinion that stock marts are truly able to engender productivity by encouraging savings and providing same to finance the industries. To corroborate this view, Chris (2012), quoting Azubike (2017), posits that these stock marts constitute a catalyst to grow and develop economies. Petros (2007) applies autoregressive distributed lag model to find if there is any long-run connexion amid stock mart performance and domestic productivity in Zimbabwe. The study concludes that productivity is positively and significantly related to the performance of stock marts in Zimbabwe. One should note that earlier in the study Petros highlights the works of Levine and Zervos (1998) as well as Nyong (1997) on the co-integration amid stock marts and productivity. As perceived by Petros. Nyong collated an aggregate index of capital mart performance; and used it to examine its connexion with long run productivity in Nigeria. The study use time series data collated from 1970 through 1994, and includes a measure of financial depth as control. Nyong (1997) finds that capital mart performance negatively and significantly correlates with long run productivity in Nigeria.

Levine and Zervos (1998), as Petros (2007) reports, examine if strong connexion exists amid market performance and long-run productivity. The study use pooled cross-country time-series regression of 41 countries from 1976 through 1993; to assess the connexion. The study conglomerates the bourse sizes, liquidity, and integration with world markets into stock mart development index. The productivity rate per capita is then regressed on a variety of variables that are designed to control for initial conditions, and then include the index of stock mart development. The study finds a strong correlation amid overall stock mart performance and long run economic productivity.

Moreover, in a similar study, Owusu (2016) use the ARDL and Unrestricted Error Correction Model (UECM). He uses combined stock mart development index. Study finds stock mart performance has negative effect on sustainable domestic productivity in Nigeria. In the words of Owusu, this might have been due to the not so liquid nature of the Nigerian bourse, as well as its size relative to the magnitude of the nation's economy. This view is partially corroborated by Ovat (2012); as cited by Owusu (2016). Ovat

examines the impact of the markets in driving economic productivity, with evidence from the Nigeria. Ovat (2012) disintegrates market performance into market size and liquidity. The study tests for data stationary, co-integration, and causality. It finds two-way causation between markets liquidity and domestic productivity. The forte of the causation emanates from market liquidity, while the size of the mart proves to have zero or near zero effect on increasing local productivity. Further in the empirical evidence of Owusu (2016) is a similar study that Owusu and Odhiambo (2014) reports on the Ghanaian stock mart's development vis-a-vis economic productivity. The study finds that stock mart performance has no positive influence on domestic productivity, whatsoever. Werema and Nikupala (2016) reports that Biyan (2012) finds both market capitalization and value of shares traded slightly contribute to domestic production. This is in their literature review studying the impact of the stock exchange on the ddomestic productivity of Tanzania. Same is the report of a similar study conducted on Kenyan Stock mart by Ikikii and Nzomi (2013). The same results are found in Mauritius (Nowbutsing, 2009) and in South Africa (Odhiambo, 2009), as Werema and Nikupala (2016) reports.

In their own study, Werema and Nikupala (2016) reports that the stock mart capitalization has a weak significance and a negative effect on economic productivity in Tanzania. The volume of shares traded is reported to have yield positive result on the economy's productivity. These effects are contrary to priory expectation that the stock mart capitalization and volumes traded should weigh positively on economies' productivity. In the words of Werema and Nikupala (2016), these results could be because of the small nature of the stock market capitalized in the country. This infers that the Tanzanian market is in its nursling stage and has not spurred the nation's productivity (Werema and Nikupala, 2016). In consonance with this view is the literature review of Azubuike (2017) on studies conducted on the Nigerian and German stock marts' impact on economic productivity of these countries. Azubike reviews Adamu and Sanni (2005), Obamiro (2005), Abu (2009), Ewah et al (2009) and Autonios (2010). These studies all find positive correlation amid stock marts development and economic productivity. Not only that, some authors argue that its even economic productivity that exerts influences on stock marts. For instance, Vazakidis and Adamopoulos (2009) submits that domestic productivity improves stock markets' performance in France. Vazakidis and Adamopoulos investigate the causal relationship between market performance and domestic productivity in France for the period 1965-2007, using Vector Error Correction Model (VECM). Study examines the causal connexion amid the variables, using Granger causality test; base on VECM. To achieve this goal, stationary (unit root) tests are carried out for all-time series data in their levels at first difference. Johansen co-integration analysis is applied, to observe if the variables are co-integrated of the same order; taking into account the maximum eigen values and trace statistics tests. VECM is selected to examine the long-run connexion amid stock mart development and economic productivity. Finally, Granger causality test is used to find the causality direction amid the examined variables of the estimated model. Study unveils that a shock increase in economic productivity of 1% leads to an increase of stock mart index of 0.24%, while interest rate increase of 1% leads to a decrease of stock mart index of 0.64% in France.

Research Design

Study focus on effectively capturing the impact of that aspect of the Nigerian Stock Exchange that mostly pertains to sustainable productivity. Ordinary least square method with Augmented Dickey Fuller test are adopted for stationarity. Study uses a framework that emphasises the debt aspect of mart capitalisation (MpD). This has never been used in any empirical study prior to this. It is novel.

$$GDP_r = f(M_s, V_t, M_pD, M_pE, C_rP, i, v, ecm)$$

Where:

GDPR	=	log of GDP
Ms	=	Broad money supply
M_pD	=	Mart capitalization (Debt)
M_pE	=	Mart capitalization (Equity)

C_rP	=	Credit to private sector
V_t	=	Volume of stock traded
i	=	Prime interest rate
ecm	=	error correction term

Economic A Priori Expectation

In line with empirical reasoning, financial deepening, mart capitalization, credit to private sector, and money supply have positive relation with GDP; while interest rate has inverse relation with GDP. If the estimates negate what is stated in the model, then there ought to be some strong reasons to enable the acceptance of the stated estimates.

Data Analysis

The used secondary data are sourced from various issues of CBN's Annual Reports and Statistical Bulletins, and the Nigerian market's fact sheets. The unit root tests conducted for all the variables, as shown in Annexure-1, except for the value of stock traded (V_t) and the interest rates (i) are stationary at first difference. This implies that only the value of stock traded (V_t) and the interest rates (i) are stationary at 1% level of significance.

Unit Root and Co-integration Test

It has been established from literature that most time series' variables usually have unit toot. Since this study adopts time series data for its empirical analysis, the test for the presence of unit root or otherwise in the variables becomes imperative. The Augumented-Dikey Fuller (ADF) test is used to achieve this. The result shows that; only prime interest rate variable is found to be stationary at level. Other variables in the study are stationary at first difference.

Table 1: Result of Unit Root Tests

(Kindly see annexure 1 for the results of unit root tests)

Variable	ADF	Integration Order
LRGDP	-4.947660	I(1)***
LC_rP	-4.238626	I(1)***
LM_PD	-2.834313	I(1)*
LRM_S	-3.333425	I(1)**
M_PE	-4.426028	I(1)***
LV_t	-4.605980	I(1)***
i	-4.73989	I(0)***

****Statistical significance at 1 %*
*** Statistical significance at 5 %*
** Statistical significance at 10 %*
Source: Authors' computation, 2018

There is the need to conduct co-integration test among variables. This is necessary because the presence of unit root in almost all the variables reveals that there is short run disequilibrium among them. Johansen co-integration test is therefore adopted which reveals that there is long run connexion among the variables.

Co-Integration Result

Date: 02/27/18 Time: 13:47
Sample (adjusted): 1987 2015
Included observations: 29 after adjustments
Trend assumption: Linear deterministic trend
Series: GDP MPD MPE VT CRP I MS
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.999400	572.1401	125.6154	0.0001
At most 1 *	0.987918	356.9996	95.75366	0.0000
At most 2 *	0.967831	228.9350	69.81889	0.0000
At most 3 *	0.887476	129.2696	47.85613	0.0000
At most 4 *	0.688008	65.91656	29.79707	0.0000
At most 5 *	0.535661	32.13797	15.49471	0.0001
At most 6 *	0.288988	9.890900	3.841466	0.0017

Trace test indicates 7 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.999400	215.1405	46.23142	0.0000
At most 1 *	0.987918	128.0645	40.07757	0.0000
At most 2 *	0.967831	99.66545	33.87687	0.0000
At most 3 *	0.887476	63.35301	27.58434	0.0000
At most 4 *	0.688008	33.77859	21.13162	0.0005
At most 5 *	0.535661	22.24707	14.26460	0.0022
At most 6 *	0.288988	9.890900	3.841466	0.0017

Max-eigenvalue test indicates 7 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Since almost all the variables in the model are not stationary at level, adopting ordinary least square method (OLS) would not be suitable. Thus, Error Correction Model (ECM) is adopted instead of ordinary least square estimator. The variable, prime interest rate (*i*), is eliminated from the Error Correction Model because it is found to be stationary at level. The formulation of Error Correction Model requires that all variables under consideration must be stationary at level. The Error Correction Model is given as below.

$\Delta LRGDP_t = \beta 0 + \beta 1 LC_rP_t + \beta 2 LM_PD_t + \beta 3 LRM_{St} + \beta 4 M_PE_t + \beta 5 LV_{tt} + \beta 6 \Delta LRGP_{t-1} + \beta 7 LC_rP_{t-1} + \beta 8 LRM_{St-1} + \beta 9 M_PE_{t-1} + \beta 10 LV_{tt-1} + \beta 11 ECT_{t-1} + \mu$

Regression result of the error correction model (ECM)

Variable	Coefficient	t-Statistics	Prob. Value
C	1.493603	1.758278	0.1292
LC_rP	-0.516365	-1.457802	0.1952
LM_PD	0.140595	2.023851	0.0894
LRM_S	0.916766	10.85051	0.0000
M_PE	1.72E-05	0.882847	0.4113
LVT	-0.036373	-0.541048	0.6080
D(LRGDP(-1))	-0.036368	-0.481118	0.6475
$LC_rP(-1)$	0.485492	2.321631	0.0593
$LRM_S(-1)$	-1.191058	-7.082569	0.0004
$M_PE(-1)$	2.82E-05	1.164956	0.2883
$LV_t(-1)$	-0.077254	-0.856585	0.4246
ECT(-1)	-0.860222	-2.398117	0.0534
R-squared	0.987619		
Adjusted R-squared	0.964920		
F-statistic	43.51016		
Prob(F-statistic)	0.000081		

Interpretation of Results

The co-efficient of the error correction term (ectt-1) is -0.860222 and it is statistically significant at 10 percent level of significance. The negativity and statistical significance of the variable satisfies the condition of reliability of the error correction model. It implies that about 86 percent of the error is corrected annually. Hence, the speed of adjustment amid short run disequilibrium and long run equilibrium among the variables is very high. Given the R2 of 0.987619, it indicates that about 98 percent of the variable factors causing the change in log of real gross domestic product are captured in the model. The overall model is statistically significant as the value of F-statistics reveals.

The result of analysis shows that out of all the variables analysed, LMPD, LRMS, LCrPt-1, and LRMSt-1 are statistically significant. From the result, although the lag impact of broad money supply on economic productivity is negative. However, the impact of real broad money supply of the current period on the economic productivity is positive and very high. In the same vein, it has also been established from the result that there is huge impact of the volume of credit to private sector in the previous year on the economic productivity of the current year when other variables are held constant. Most important is the fact that the magnitude of mart capitalization (debt), which has direct and concomitant impact on economic productivity of Nigeria. This is an empirical proof that the Nigerian stock exchange has impacted on sustainable productivity of the nation's economy. It is in line with the theoretical postulations of Pandey (2010: 637).

Conclusion

The stationarity of the variables at 1st difference, given 1% level of significance implies the reliability of data. Equally from the normalized co-integration equation, the focal sustainable productivity debt aspect of mart capitalization (MpD) has no positive long-run connexion with economic productivity (GDPR). It is however mind bulging that the causality tests unveil that neither mart capitalization (debt), mart capitalization (equity) nor volume of stocks traded on the Nigeria stock exchange has any Granger causal effect on the productivity of the economy. This implies an under-developed state of the nation's bourse. It calls for the need to further develop the nation's stock mart.

Recommendations

The authorities of the Nigeria Security and Exchange Commission should be commended if one considers the feat attained by the Nigerian Stock Exchange, relative to its contemporaries on African continent. However, one feels obliged to admonish them to sustain the tempo; given the global expectation of Nigeria to emerge more pronounced in the committee of advanced nations. In line with this, additional impetus should be accorded the creation of more assorted plush debt instruments on the stock exchange. Quants could be directly employed by the SEC to increasingly execute the task. In institutions of higher learning, SEC could encourage studying stock-trading as a professional course of study like Accounting, Banking, Finance, Marting and so on, in a bid to produce more quants.

Besides, more branches of stock broking and commodity exchange platforms could be created in all the states of the federation; linked up by electronic trading and telecommunication systems. In addition, more awareness campaign could be engendered towards facilitating increased listing of firms; towards boosting activities on the Stock Exchange. In addition, the local government councils could be more liberalized to enable their ability to raise infrastructural development funds via the Stock Exchange.

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Annexure 1

Variable	ADF T-Statistics	Order of Stationarity
I	-4.073989	I (0)***
LCrP	-4.238626	I (1)***
LMpD	-2.834313	I (1)*
LMpE	-4.426028	I (1)***
LMs	-3.333425	I (1)**
LRGDP	-4.94766	I (1)***
LVt	-4.60598	I (1)***

*** = 1% Significance

** = 5% Significance

* = 10% Significance

Annexure 2

Co-integration result

Date: 02/27/18 Time: 13:47
Sample (adjusted): 1987 2015
Included observations: 29 after adjustments
Trend assumption: Linear deterministic trend
Series: GDP MPD MPE VT CRP I MS
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.999400	572.1401	125.6154	0.0001
At most 1 *	0.987918	356.9996	95.75366	0.0000
At most 2 *	0.967831	228.9350	69.81889	0.0000
At most 3 *	0.887476	129.2696	47.85613	0.0000
At most 4 *	0.688008	65.91656	29.79707	0.0000
At most 5 *	0.535661	32.13797	15.49471	0.0001

At most 6 *	0.288988	9.890900	3.841466	0.0017

Trace test indicates 7 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.999400	215.1405	46.23142	0.0000
At most 1 *	0.987918	128.0645	40.07757	0.0000
At most 2 *	0.967831	99.66545	33.87687	0.0000
At most 3 *	0.887476	63.35301	27.58434	0.0000
At most 4 *	0.688008	33.77859	21.13162	0.0005
At most 5 *	0.535661	22.24707	14.26460	0.0022
At most 6 *	0.288988	9.890900	3.841466	0.0017

Max-eigenvalue test indicates 7 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Normalised co-integration

Normalized cointegrating coefficients (standard error in parentheses)

GDP	MPD	MPE	VT	CRP	I	MS
1.000000	0.000000	-14.71740	65.36689	3.295437	2.736587	-5.862457
		(0.37589)	(1.81892)	(0.33445)	(15.0248)	(0.39096)

Annexure 3

Granger Causality Tests

Pairwise Granger Causality Tests
Date: 02/27/18 Time: 13:55
Sample: 1985 2015
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
MPD does not Granger Cause GDP	29	1.17930	0.3247
GDP does not Granger Cause MPD		18.8950	1.E-05
MPE does not Granger Cause GDP	29	0.17045	0.8443
GDP does not Granger Cause MPE		9.52257	0.0009
VT does not Granger Cause GDP	29	0.06634	0.9360
GDP does not Granger Cause VT		7.87661	0.0023
CRP does not Granger Cause GDP	29	1.18278	0.3237
GDP does not Granger Cause CRP		12.0995	0.0002

I does not Granger Cause GDP	29	0.00657	0.9935
GDP does not Granger Cause I		2.82980	0.0788
MS does not Granger Cause GDP	29	0.14486	0.8659
GDP does not Granger Cause MS		7.18975	0.0036
MPE does not Granger Cause MPD	29	2.05695	0.1498
MPD does not Granger Cause MPE		2.81240	0.0799
VT does not Granger Cause MPD	29	3.05609	0.0657
MPD does not Granger Cause VT		33.3344	1.E-07
CRP does not Granger Cause MPD	29	14.5057	7.E-05
MPD does not Granger Cause CRP		7.00772	0.0040
I does not Granger Cause MPD	29	0.12240	0.8853
MPD does not Granger Cause I		1.59402	0.2239
MS does not Granger Cause MPD	29	16.5618	3.E-05
MPD does not Granger Cause MS		4.18516	0.0276
VT does not Granger Cause MPE	29	2.52775	0.1009
MPE does not Granger Cause VT		19.7656	8.E-06
CRP does not Granger Cause MPE	29	3.19107	0.0590
MPE does not Granger Cause CRP		10.6735	0.0005
I does not Granger Cause MPE	29	0.05246	0.9490
MPE does not Granger Cause I		2.40840	0.1114
MS does not Granger Cause MPE	29	5.05216	0.0148
MPE does not Granger Cause MS		20.4209	7.E-06
CRP does not Granger Cause VT	29	12.7541	0.0002
VT does not Granger Cause CRP		1.80807	0.1856
I does not Granger Cause VT	29	0.16990	0.8448
VT does not Granger Cause I		1.27051	0.2989
MS does not Granger Cause VT	29	8.12591	0.0020
VT does not Granger Cause MS		4.97145	0.0156
I does not Granger Cause CRP	29	0.39304	0.6793
CRP does not Granger Cause I		1.37888	0.2711
MS does not Granger Cause CRP	29	18.7523	1.E-05
CRP does not Granger Cause MS		4.51151	0.0217
MS does not Granger Cause I	29	1.62421	0.2180
I does not Granger Cause MS		0.10580	0.9000

Cybersecurity Challenges in The Digital Economy

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Abstract

Fraud in the field of digital technologies is becoming more sophisticated and widespread. Monitoring of fraudulent schemes for cybercrime allowed identifying criminal acts based on these types of fraud and preventing them at an early stage.

Keywords: Digital Technologies, Financial Services, Digital Fraudsters, Phishing, Skimming, Sniffering.

Introduction

The term "digital economy" was first used in 1995 by the American computer scientist Nicholas Negro-Ponte. Since then, it has been used all over the world. There are quite a few definitions of this concept, but they all boil down to the fact that the digital economy is an economy based on the use of digital technologies in production [1].

The Fintech revolution continues to unfold, with digital financial services significantly expanding the ways in which people make transactions that go beyond traditional banking. They are also changing the way existing banks conduct banking, as they themselves are increasingly digitizing traditional channels.

Digital financial services make everyday life easier, help families and businesses plan for everything from long-term goals to unexpected emergencies, and contribute to their prosperity and sustainability.

Financial security is the protection of financial interests at all levels of financial relations [4, p. 19]. Authors such as A. S. Linnikov and O. V. Maslennikov identify the following financial security risks associated with the use of modern electronic technologies and affecting the financial system: cyber attacks; risks of fraud in the IT sphere; risks of software errors; strategic risks associated with the rapid development of information technologies and changes in financial business conditions; risks of state regulation of financial innovations; the risk of increasing the scale of the shadow economy due to the growth of economic activity in cyberspace; the risk of disrupting the functioning of complex

information systems; the risk of reducing employment as a result of automation of business processes; the risk of forming alternative decentralized currency systems, and others [13, p. 12].

The huge amount of advertising placed on the Internet is a fertile ground for criminals who play a game with numbers, waiting for unsuspecting victims.

There are the following forms of fraud in the digital environment.

Prepaid fraud is the most common fraud on the Internet. As the name suggests, this scheme works by requesting a prepayment.

The fraudster sends some goods and services that he sells or offers, usually at an attractive price. Then it requires payment of a small advance, i.e. this money is intended for processing the order. To avoid becoming a victim, you should never deal with an unfamiliar online company without some form of insurance. In this case, the best type of insurance is the escrow service. Thus, the seller will receive money only if he fulfills his transaction.

Phishing is the most dangerous form of cyber attacks faced by customers and corporations in the modern world, because it is aimed at using human factors, not systems. Phishing is the fraudulent use of electronic means to deceive and exploit users. Phishing attacks attempt to get sensitive information – usernames, passwords, credit card details, network credentials, and more. By posing as a legitimate representative of an organization over the phone or email, cyber attackers use social engineering to manipulate victims by performing certain actions, such as clicking on a malicious link or attachment - or deliberately divulging confidential information.

Almost any kind of personal or organizational data can be valuable. In addition, some phishing scams may target organizational data to support espionage or espionage against state-backed opposition groups.

Email phishing consists of sending fake emails in which fraudsters fraudulently try to force the recipient to disclose information. This information may include: passwords; credit card numbers; login credentials; and corporate secrets.

The form that the message takes can help identify phishing: attackers disguise themselves as a trusted person (company), often real or plausible, with which the victim can deal. This is one of the oldest types of cyber attacks, Dating back to the 1990s, and still one of the most common and harmful, which is becoming more sophisticated.

Phishing attempts most often start with an email trying to get sensitive information through some kind of interaction with the user, for example, by clicking on a malicious link or attachment.

Using hidden redirection, attackers redirect users to a phishing website that is a copy of a legitimate website. Phishing scams can use a fake website by using JavaScript commands to make the website URL legitimate.

By manipulating links, an email may contain minor typos or use of subdomains. The presence of phishing kits allows cybercriminals, even with minimal technical skills, to launch phishing campaigns. The phishing Suite combines the resources and tools of a phishing site that need to be installed on the server. After installation, the attacker only needs to send emails to potential victims.

Analysis of phishing tools allows security services to track who is using them. By tracking email addresses, you can associate participants with specific campaigns. You can not only track where credentials are sent, but also see where they are approved from.

Phishing scams can also use phone calls, text messages, and social media tools to trick victims into providing sensitive information.

Some specific types of phishing attacks use more targeted methods to attack individuals or organizations.

In phishing with deception, the hacker sends out an email designed to deceive the recipient, based on trust. These types of phishing attacks are widespread and are sent to tens of thousands of people at once. They rely on volume rather than specifically targeting their recipients.

In "harpoon" phishing, email messages do not look as random as in General phishing with deception. Attackers collect information about their targets to fill emails with a more authentic context. Some attackers even intercept business email and create messages with individual settings.

"Whaling" phishing is specifically designed for high-level and senior managers in the organization. Fraudsters spend a lot of time to study the target victim, choose the time and means to steal data.

Harpoon and whaling attacks are extremely complex. As employees become more aware of threats and fraud, cheating becomes more difficult for the hacker. But this has not slowed the growth of corporate data breaches year after year. On the contrary, this trend continues to grow. From 2016 to 2017, data loss increased by 6%, along with a whopping 21% increase in hacked accounts and malware. Registered increases occur only from phishing attacks. When combined with other forms of vulnerability, it becomes clear that organizations are subject to a well-planned and well-thought-out attack.

Organizations should train employees to prevent phishing attacks by recognizing suspicious emails, links, and attachments. Cyber attackers always improve their methods, so continuing education is a prerequisite.

The main signs of phishing are: poor spelling and grammar; suspicious sender; threats to close the account; links, especially if the target URL is different from the ONE displayed in the email content; unexpected attachments, especially files with an extension .exe.

Additional technical security measures may include:

- two-factor authentication (includes two methods of identity verification);
- email filters that use machine learning;
- extended password logins using images, identification hints, etc.

Also, you should not publish personal data on social networks (for example, date of birth, vacation plans, address or phone number).

Skimming is an uncontrolled fraud because the theft of cash occurs before it is entered into the accounting system, so it is never reported in the company's accounting reports. Individuals are also vulnerable and may encounter the use of ATMs, debit and credit cards.

Among other types of crime, skimming is the simplest form of fraud. However, skimming is the most difficult to detect because it does not have control logs that can reveal the source of the theft. Often skimming is detected by accident. However, in some cases, businesses may suspect potential fraud by detecting revenue below expected.

Skimming in the business area can take several forms:

- Direct theft. A fraudster hides money from an employer, business partner, or shareholders.
- Tax evasion. Skimming is a popular tax evasion scheme. A business owner can get cash without recording it in the accounting system. In this case, funds are transferred from the client directly to the business owner. Thus, the owner can avoid paying income tax or personal income tax.

– Bribery and other crimes. Sometimes skimming involves other crimes, such as bribery or protection racketeering. The business owner can use skimming to allocate funds for bribes or as payment to racketeers.

Skimming for individuals can take different forms:

– ATM. Using ATM skimming, fraudsters can get a person's debit card number by installing an illegal card reader on the ATM. In addition to this, thieves use a camera to record a person's personal PIN code.

– Credit card. The intensive development of modern information technologies in the field of electronic payment systems eliminates the need for citizens to carry cash. However, along with the convenience of non-cash payments, the risk of becoming a victim of fraud using payment cards increases. Thus, according to the Ministry of internal Affairs of Russia for the period from 2017 to 2018, fraud, including under article 159.3 of the criminal code "Fraud using payment cards" increased by 4.7% (in 2017, 24916 were detected, and in 2018 - 25738) [15]. When using a credit card, thieves charge a small fee that may go unnoticed by the cardholder.

Credit card skimming is a type of credit card theft where fraudsters use a small device to steal information in another legitimate credit or debit card transaction. When the card passes through the skimmer, the device captures and stores all data stored on the card's magnetic stripe. The bar contains the credit card number and expiration date, as well as the full name of the owner. Thieves use the stolen data to make fraudulent payments online, or using a fake credit card.

Credit card collection devices are designed to be easily combined with the machine on which they are installed. There are several ways to detect a credit card withdrawal device:

– A credit card reader that "sticks out" far beyond the panel. Skimmers are designed to match an existing credit card reader.

– Parts of the credit card reader are loosened or move when swaying. The credit card reader must be securely attached. Moving parts are an indication that the reader has been tampered with or that a skimming device is attached to an existing reader.

– A Pinpad that is thicker than usual. In addition to a skimming device, scammers can place a fake keyboard on top of a real one to capture keystrokes. This way they can get a pin or zip code in addition to their credit or debit card details. If the keys are difficult to press, you should remove the card and use another ATM.

Once the victim's credit card information is stolen, scammers create a cloned credit card to make purchases in the store, use the account to make purchases online, or sell the information online. Victims of credit card skimming are often unaware of the theft until they notice unauthorized withdrawals from their account.

Many banks and credit card issuers are getting better at detecting fraudulent transactions and may not process suspicious payments until the customer confirms that they initiated the transaction.

To catch fraudulent payments related to a skimming incident, you must periodically review your accounts, monitor checks and credit card accounts online, and immediately report any suspicious activity to your Bank or credit card Issuer.

To avoid credit card skimming, you must check ATMs before using them. In ATMs, skimmers often place the camera in the keyboard's field of view to steal the PIN code. These cameras are often very small in size, so they are difficult to detect.

If you suspect the presence of skimmers, you should contact your Bank or credit card Issuer, even if no fraudulent payments have been detected. The earlier the suspicion is reported, the faster the protection from liability for unauthorized use will be provided. You must provide as much information as possible about the possible location of the skimmer, which can help the Bank prevent future losses.

Sniffering (data interception) - fraudsters practice data interception in crowded places (in restaurants, cafes, train stations, etc.) using a network traffic analyzer (sniffer, from the English word tosniff - "sniff") - a special computer program for intercepting packet data, decoding and analyzing it. A free and public Wi-Fi network is just the place where you can become a victim of an attacker. Fraudsters can intercept any data, including passwords from payment accounts and payment details of the card, if, for example, the owner pays using it in an online store, and the connection was not properly protected [17].

A sniffer (or packet analyzer) is a type of computer software or hardware used to intercept and register traffic passing through a computer network. It can be described as a "listening" device that allows you to intercept network traffic. Packet analyzers are used for network management and network security, but can be used by unauthorized users to steal information from the network.

Packet sniffers are used for both legal and illegal activities. A legal packet analyzer is a commercial device used to help manage and maintain a network, as well as to ensure network security. It is used as a diagnostic tool for network backup systems and for checking the network system for security violations.

An illegal packet interceptor is used by a hacker to gain unauthorized access to confidential information and data on the network. Criminals use sniffing to steal Bank card data, customer data, passwords, and codes. Credit card information is collected as payments are transferred over the network during authorization, and then retrieved. An illegal packet analyzer is installed without the knowledge of the it administrator and is hidden in different areas of the network for the purpose of spying and stealing information packets that pass through the network. The use of sniffers is fairly easy because they are very difficult to detect and can be installed in virtually any location in the network.

There are the following ways to ensure security from sniffing:

- periodically updating passwords.
- do not disclose your credit card number to third parties;
- save receipts and receipts;
- report any suspicious expenses to the card Issuer;
- use a credit card instead of a debit card. Credit cards offer better protection against fraud and identity theft;
- use data encryption;
- use special programs to scan the network for possible spies.

Online quiz and Scam games - this form of online fraud is quite simple. The hacker sends a message containing a link to a quiz or game. This game or quiz may be harmless in itself. The problem starts when they require some verification before being allowed to play. Sometimes a website may require you to enter sensitive data when registering.

Internet fraud, including surveys, works as a fraud e-mail attachments. The victim receives a link asking them to participate in the survey. Some of these surveys promise some form of reward after completion. As soon as the victim clicks on the link, dangerous malware is installed on the PC, which steals and sends its information to the fraudster.

Another type of fraud is so-called asset recovery firms that target people who have lost money as a result of another type of fraud - often a fictitious work-from-home scheme. After cheating, the victim's name is likely to be included in the list that will be passed from one Scam to another. Victims can even be contacted by the same scammers who took the money the first time, now presenting themselves as the company that will return it. It should be borne in mind that the phone requests from companies on asset recovery are almost always the work of Scam artists. If someone calls and offers a refund service for a fee, you should never pay for it.

Since the beginning of 2018, OLX, an online ad platform that connects people to buy, sell, or exchange goods and services, has removed more than 250,000 "suspicious users" from its platform. A total of 1.3 million ads were removed. This is primarily due to the combination of human and automatic detection. Most of these ads are flagged using automatic detection.

OLX uses contextual messaging, where it notifies users in chat messages in certain situations when suspicious behavior is detected. In addition, OLX uses online user device identification to monitor their presence on the Internet for suspicious patterns, as well as registration captchas to authenticate users logging in from unidentified devices.

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Transformation of Human Capital in The Digital Economy

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Abstract

The digital economy contributes to fundamental transformations of all spheres of human activity, defining a new quality of human capital of the territories. One of the key factors of this kind of transformation is the level of digital literacy of the population, formed by knowledge, skills in the field of digital consumption, digital competencies and digital security. The study of the distribution of ranks, "Index digital literacy" is considered the rating of Federal districts of the Russian Federation and the main trends of territorial differentiation of the integrated administrative-territorial units of the country. Along with the change in the quality of human capital in terms of the development of digital competencies, the demand for it from the labor market is changing. The article considers the key digital competencies, which are an integral part of the professional competencies of modern workforce. Examples of necessary digital skills of certain professions are given.

It is established that robotics has a special influence on the formation and development of human capital. This fact is confirmed, including the emergence of new opportunities to overcome the existing biological limitations. However, the active introduction of robots is associated with significant risks. As examples of such risks, the article identifies threats of violation of human rights and freedoms due to hacker attacks, risks of potential unemployment, rising inequality and exclusion of certain categories of citizens from the economy.

In the article the perspective directions of the solution of problems of transformation of human potential and social adaptation of the population to challenges of digitalization and robotization of economy among which the active policy in the labor market, support of the income, continuous training and more flexible educational systems are formulated.

Keywords: Human Capital, Digital Economy, Digital Competence, Digital Literacy, Robotics

Introduction

The digitalization of the economy and the fourth industrial revolution are accompanied by the blurring of the boundaries between physical, digital, and biological technologies. Proposed in 2011 at the Hanover fair, the term industry 4.0 characterizes the process of radical transformation of global value chains. The ultimate goal of this process is a flexible interaction of virtual and physical

production systems that ensure full adaptation of products and the formation of new operating models. In this context, one of the key tasks is to create fundamentally new jobs and develop human capital as a key competitive advantage of countries undergoing such economic transformations.

The requirements for qualification in production also vary significantly depending on the degree of digitalization and the level of technology. The introduction of any new technology means that employees, one way or another, will face certain challenges that form additional requirements for their skills and competencies.

At the same time, the digital transformation of socio-economic systems not only acts as a driver for the development of new industries, but also contributes to fundamental transformations in all spheres of human life. With its help, a fundamentally new approach is possible in ensuring the achievement of sustainable development goals and solving key problems of modern society of a social and climatic nature [16]. Under the influence of advanced science and technology, regional health systems, education, and the labor market are being transformed, and as a result, the quality of the human capital of the territories is changing [7].

Digital literacy of the population as one of the key factors in changing the quality of the region's human capital

Traditionally, human capital is considered in three aspects: health, education, and culture [2]. In turn, each of these structural elements includes a set of functional parameters. In the period of digital transformations of economic systems at different levels, the competence approach to determining the quality of human capital is particularly relevant, according to which the level of education should be determined by the ability and readiness of a person to perform effective and productive activities in various socially significant situations based on the use of key competencies. Therefore, the main result of the educational process is not just increasing the volume of knowledge, but the acquisition of diverse experience [13]. In the digital economy, digital competencies are the most important ones, which are a system of knowledge, skills and attitudes necessary for living in a digital society. Such a system generates digital literacy of the population, including knowledge, skills and abilities in the field of digital consumption, digital competencies and digital security (figure 1).

Digital consumption	Digital competencies	Digital security
• Fixed Internet • mobile Internet • Digital device • Internet media • News • Social network • Public services • Telemedicine • Cloud technologies	• Retrieval • The use of digital devices • The use of social network functionality. • Financial operation • Online purchases • Critical perception of information • Production of multimedia content • Syncing devices	• Personal data protection • A strong password • Legal content • Culture of behaviour • Reputation • Ethics • Information storage • Creating backups

Fig. 1 Parameters of digital literacy of the population

Since 2015, the non-profit organization ROCIT, with the support of the HSE, has been implementing the research project "digital literacy Index". Its calculation is based on the measurement of key parameters of digital literacy, which are quantified by a system of three sub-indices. According to the value of the resulting indicator, each Federal district is assigned a rank (table 1).

Table 1: Distribution of ranks "digital literacy Index" by Federal districts of the Russian Federation, 2018

Region	Digital consumption	Digital competence	Digital security
Northwestern Federal District	1	1	2
Far Eastern Federal District	3	2	1
Central Federal District	2	3	4
Ural Federal District	4	6	3
Siberian Federal District	5	5	5
Southern Federal District	7	4	7
Volga Federal District	6	7	8
North Caucasian Federal District	8	8	6
Crimean Federal District	9	9	9

The highest index value was recorded in the North-Western Federal district. In the second position is the Central Federal district, which is due to the resulting indicators of Moscow and the Moscow region, where the level of digital literacy is quite high compared to other regions of the Russian Federation. In third place is the far Eastern Federal district, the most remote from the European part of the country, which determines the special importance of digital communications for its residents. The Ural Federal district is in the fourth position. The fifth position belongs to the southern Federal district. The North Caucasus Federal district is in sixth place, and the Siberian Federal district is in seventh place. The Volga Federal district occupies the penultimate, eighth place in terms of the integral value of the PPI and for each of the three sub-indices separately. The Crimean Federal district completes the list [1].

Main trends in demand for human capital from the labor market

Along with changes in the competencies of human capital, the demand from the labor market also changes. The digitalization of the economy and the robotization of production have a mixed effect on it, generating on the one hand job cuts, stagnant wages and growing wage inequality, and on the other creating fundamentally new popular and highly paid professions.

According to forecast calculations, new production technologies and widespread robotics will deprive 5.1 million people of work. The most significant reductions will affect office and administrative employees, as well as production personnel in certain industries. At the same time, it is expected to compensate for these losses due to the two-million growth in engineering, financial and computer specialties.

It should be emphasized that the reduction in the share of human labor against the background of the introduction of widespread robotics will be most evident in developing countries that lack breakthrough technologies, compensated by the available labor force. Eventually, many large-scale production will be returned to the US and the EU, and developing countries will lose an important industrial resource.

In this regard, digital skills are becoming an integral part of professional skills in both education and science and industry [15]. The implementation of breakthrough technological projects in the digital

economy creates a demand for specialists who possess a set of rigid, flexible and special digital competencies (figure 2).

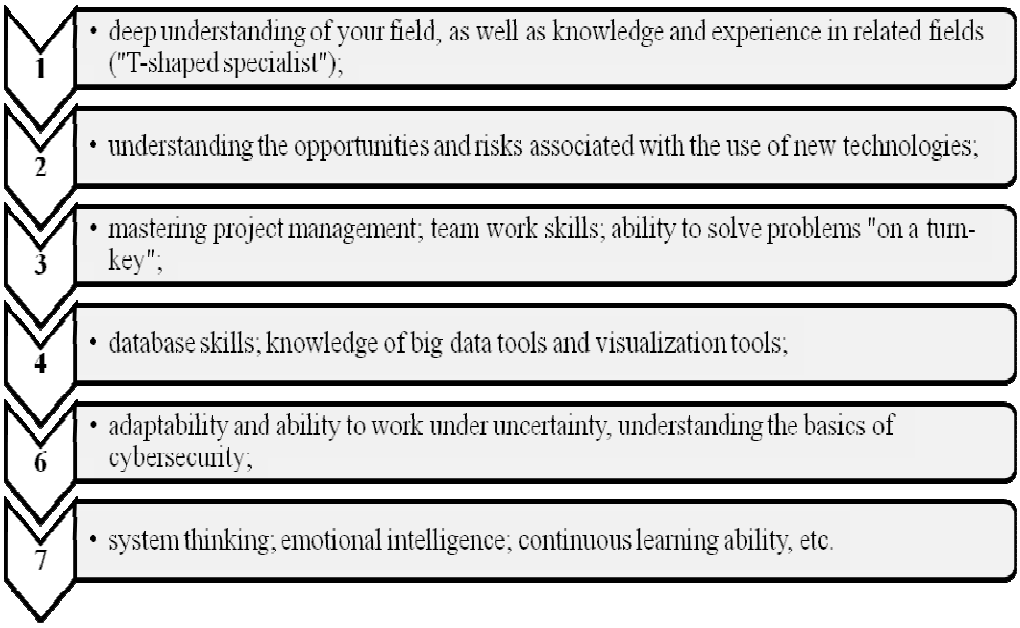

Fig. 2 Key digital competencies

In the context of the digital transformation of the economy, the possession of key digital competencies becomes relevant for the vast majority of professions. In particular, in order to optimize ad management and predict the emotional response to it, digital competencies are necessary for marketers. In law, digital skills will allow you to automate the analysis of materials, as well as simplify the preparation for the trial. For modern engineers, professional digital competencies are already an integral part of the employer's required skill set. In addition, the demand for data specialists is expected to grow rapidly in most industries, which will facilitate the acquisition of this profession of an intersectoral nature.

Changes in the number and structure of jobs are not the only significant consequences of the digital transformation of the economy. The development of technology will trigger a gap between income from labor and capital, which will lead to an increase in inequality among workers. Owners of intellectual and physical capital (developers, shareholders, and investors) will get the maximum benefit from the upcoming changes. Workers with a low level of education and skills will eventually become ineligible, due to the replacement of this kind of work with robotic resources.
In this context, it is obvious that the state authorities already need to take actions to restructure the education system and train specialists, modernize the infrastructure, and create new jobs. Changes are also needed in the legal framework for the development and implementation of new progressive tax legislation [12].

The impact of robotics on the formation and development of human capital

In the foreseeable future, new technologies will help overcome the current biological limitations:

– devices on the human body that are part of the Internet of things will transmit context-sensitive information that relates directly to our emotions, increasing their manageability;
- exoskeletons and prosthetics, coupled with the brain, will increase the physical strength and endurance of a person, as well as return mobility to the elderly and people with disabilities;

- sensors and computers embedded in contact lenses and permanent implants will allow you to hear whispers behind walls, give you natural night vision and allow you to immerse yourself in virtual and augmented reality;
- nootropic drugs will expand a person's cognitive abilities and transform work and education [15].

Robotics, which is getting deeper and deeper into human life, will expand the horizons of its application in the near future and will be integrated into new industries and activities. Robots will be involved in the organization of patient care, delivery of purchases, harvesting, maintaining the infrastructure of society and providing a host of other services, which will be facilitated by the spread of the Internet of things with the connection of third-generation robotic systems with artificial intelligence. Using terabytes of information received from the network, such robots can be responsible for automating business processes, education, service and service delivery.

The problem for society is the difficulty of increasing a person's competitiveness in an augmented economy, as well as preserving their rights and freedoms. Given the high cost of augmented technologies, not everyone can afford such a transformation, while losing their competitive advantages in particular in the labor market. It is also likely that network add-ons can be a target for hacker attacks aimed at controlling a person's mind and body.

To date, we can identify the following main areas in which the strengthening of the role of robotics is less likely:

- creativity, research and new creation, entrepreneurship;
- development of robots and software;
- social interaction, which implies personal contact, the ability to feel, empathize (social workers, teachers);
- work in adaptive conditions (doctors, emergency services);
- responsibility and management related to the need to bear financial, legal or other responsibility (top management and relatives by profession);
- mentoring-the transfer of implicit knowledge and the ability to persuade (academic leaders, clergy, sports coaches) [17].

The risks of actively introducing robots are obvious. They are related to potential unemployment, rising inequality, and the exclusion of certain categories of citizens from the economy. Another negative consequence is the increased polarization of the regional population in terms of education, competence, age, and gender. Older people of working age do not react so flexibly to changes in the external environment and are less likely to learn new technologies. As for the gender polarization of society, this trend is explained by the excess of the share of men over the share of women employed in potentially less robotic industries. Differences in the degree of adaptation to the robotic circular reproduction of regions will contribute to the formation of zones of social tension, increase in interregional migration flows, and reduce the stability of the budget system of individual territories [7].

Conclusions and Recommendations

Thus, the development of the digital economy will solve a number of socio-economic problems:

- create new opportunities for entrepreneurship and employment;
- improve the quality of social services provided;
- improve the system of education and professional competencies;
- create new opportunities for socially significant scientific research;
- strengthen communication between the state, business and society;
- encourage the participation of business and civil society in the formation of the country's economic well-being and a favorable environmental background [15].

On the other hand, the problems of transformation of human potential and social adaptation of the population to the challenges of digitalization and robotization of the economy, related to the need to improve the level of skills and development of digital competence, remain unresolved. In this regard, active labour market policies, income support, continuing education and more flexible educational systems are essential. The identified features should be taken into account and subjected to additional scientific research in order to overcome possible threats and minimize the risks associated with digitalization and robotization of key sectors of the economy.

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Assessing the Citizens' Adoption of e-Government Platforms in the North-West Province Local Governments, South Africa

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Abstract

Local governments in South Africa are responsible for the provision of basic services. There are countless benefits that come with e-Government platforms if they are properly implemented to help local governments deliver these basic services to citizens. This study investigates factors influencing the adoption and use of e-Government platforms by citizens in the North-West Province, South. The study is set against a background of significant change in South Africa where government services are electronically delivered. The outcome of the study revealed that: 1) local governments are starting to benefit from higher levels of adoption of e-Government platforms by citizens; 2) user-friendliness, access to information and 24-hour availability of e-Government platforms are some of the factors that motivates citizens to use and adopt e-Government platforms; 3) the municipalities have room on their e-Government platforms for dialogue on how best to improve service delivery; 4) the use of only English as the preferred language, lack of adequate ICT infrastructure and training have an impact on the use and adoption of e-Government platforms; 5) e-Government platforms are seen by many citizens as convenient means to promote access to information and public participation in local government.

Keywords: e-Government, e-Government platforms, user acceptance, local government.

Introduction

The use of websites by the public sector has gained significant attention in recent years among practitioners and academics in the fields of public policy, public affairs, and communication. Websites have become one of the most important tools for citizens to get information about municipalities (Murray & Klobby, 2013). South Africa has one of the most progressive constitutions in the world and public participation is one of the fundamental principles cherished in virtually all aspects of it (Naidu, 2008). It would be a tragedy for our democracy if this principle were to remain nothing more than words on paper and does not translate into concrete and tangible participation that affects policy at all levels, starting in the communities where people live and what is at stake is their everyday lives and livelihoods (Naidu, 2008).

Government agencies do not, as a rule, engage citizens in the development of their e-Government services and resources, many applications are internally driven to meet cost savings and other government mandates regarding efficiency (Bertot, Jaeger, & McClure, 2008). The objects of local government were clearly entrenched in Section 152 of the Constitution (Thornhill, 2008). These include, inter alia, that the involvement of communities and community organizations be encouraged in all matters concerning local government (Thornhill, 2008). Lack of inclusion of citizens in an ongoing and regular basis can lead to a range of barriers for users of e-Government services – and that users are seeking help from alternate sources such as public libraries (Bertot, Jaeger, & McClure, 2008).

As governments break new ground with social networking tools, there is a dual challenge of not only harnessing this new technology to deliver the benefits of better citizen interaction, but also accurately evaluating the effectiveness of government websites (Murray D. , 2010). Effective matching of virtual representation to citizen and stakeholder preferences should be grounded in feasibility assessments along with several dimensions (Baker, Fairchild, Pater, & Seavey, 2010). There has been a growing need for research on factors influencing the adoption and diffusion of e-Government services (Abdel-Kader Abdel-Fattah, 2014).

Literature Review

A.*e-Government overview*

South Africa has three vertical governance levels that are at national, provincial and municipal (local) level. At each level people, have just realized the benefits that can be gained by using e-Governance systems (Mavetera & Lemme, 2006). Local government is accepted as a sphere of government in its own right. Thus, local government is no longer viewed as subordinate to provincial and national government (Malherbe, 2008). Mahole, Moroke, & Mavetera (2014) defines local government as a branch of government and administration that is most intimately concerned with the lives of ordinary people and with those matters that are closest to them in their daily experience and basic needs.

B.Factors that contribute to technology adoption and use of e-Government platforms by citizens

e-Government has been identified and adopted as one of the most efficient vehicles for appropriate, transparent and inclusive / participatory decision making (Bwalya, 2009). In the past decade, most countries have embraced new technologies to improve the way they offer public services to citizens (Shareef, 2013). The rapid rate at which internet adoption is growing in Africa has revolutionized not only the way people communicate with each other but has also resulted in rapid growth in number of businesses using the internet to connect with their customers (Mpinganjira, 2012). There seems to be an almost universal adoption of Information and Communications Technologies by governments at all levels, local and national (Keefe & Crowther, 2015).

C.*Implementation of e-Government platforms*

The vital initiatives for implementing e-Government should be followed and given due attention to enhance the delivery and use of e-Government services. One of these initiatives is the active launch of official government websites as the main portals for delivering online services to all the different categories of e-Government, including G2C, G2B, and G2G (Alfarraj, Drew, & AlGhamdi, 2011). Jayashree and Marthandan (2010) articulate that e-Government cannot be thought of as a one-step process or implemented as a single project. It is evolutionary in nature, involving multiple stages or phases of development. Alhomod and Shafi (2012) point out that there are four stages of e-Government which in most cases follow each other. e-Governments all around the world have different objectives and follow different models for e-Government development. The advantage of having a phased approach is that the success of each e government initiative can be calculated and the possible errors and pitfalls of the initiative can be rectified. Generally speaking, there are four stages of e government which in most cases follow each other:

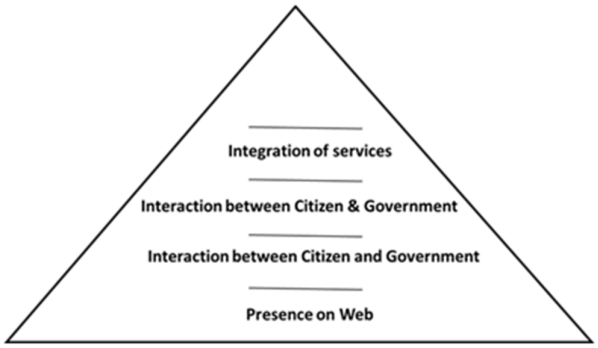

Fig. 1 : Stages of e-Governance

D. Information and Communications Technology (ICT)

Information and Communications Technology (ICT) is an overarching term that includes all technologies for the manipulation and communication of information (Liem, Swierenga, & Gheerawo, 2010). "The term IT, or Information Technology began to be used to describe computers and these various peripheral devices. Then the internet arrived together with computer networks, the World Wide Web, email and search engines. A new term entered the language ICT. ICT embraces the many technologies that enable us to receive information and communicate or exchange information with others" (Orinda, 2015). ICT provides communication i.e. faster and accurate, and further provides adequate storage with the use of computer, electronics devices and software application (Dhindsa, Narang, & Choudhary, 2013).

E. ICT Accessibility and Usability

Accessibility and usability are closely related; their goals, approaches, and guidelines overlap significantly. It is most effective to address them together in many situations, such as when developing websites Accessibility is about ensuring an equivalent user experience for people with disabilities, including people with age-related impairments. For the Web, accessibility means that people with disabilities can perceive, understand, navigate, and interact with websites and tools, and that they can contribute equally without barriers. Usability is about designing products to be effective, efficient, and satisfying (Abou-Zahra & Henry, 2012).

F. Community participation

South Africa: Currently, one of the main concerns in environmental governance is to be able to build real partnerships between public authorities, private industry and citizens. From this perspective, citizens' involvement is becoming increasingly important (Reiter, Gronier, & Valoggia, 2014). Recent literature has emphasised Gov 2.0 as a possibility for greater communication, participation, and collaboration with citizens (Aladalah, Cheung, & Lee, 2015). e-Government and electronic participation have received increased attention as tools that 21st Century governments utilize to interface with citizens in the conduct of the public's business (Smith, 2015). However, citizens' participation levels in Gov 2.0 have not met to the hype (Aladalah, Cheung, & Lee, 2015).

The government of the Republic of South Africa (RSA) consists of a central government, nine regional governments (provinces) and a total of 262 local governments (municipalities). (Mahole, Moroke, & Mavetera, 2014). Since 1994, there has been a widely-observed commitment in South Africa to participatory governance within both government and civil society (Smith T. , 2008). The involvement of citizens and communities in local government is a statutory requirement of the legislative framework in South Africa (Ngamlana & Poswayo, 2013). Apathy towards political participation is of concern for many countries throughout the world, and for many people political participation means no more than voting in an election (Van Belle & Cupido, 2012). The South African Constitution makes several provisions for public participation. Empowered participatory governance approaches have worked elsewhere in the world under less favorable conditions than we have here in South Africa (Narsiah, 2010)

Global trends: In keeping pace with the rapid developments in information and communication technology, the Saudi government has invested heavily, in recent years, in the development of e-participation services in e-Government websites with the aim of enhancing citizens' interaction with the government and thereby making the latter more responsive and accountable to citizens' needs. However, despite its significant efforts, a low level of use of the online opportunities by the citizens for interacting with the government is an endemic problem faced by the Saudi government (Alharbi & Kang, 2014).

Italian e-Government projects since 2000 have been functional to implementing at the national level

the objectives set out in the Lisbon Agenda, eEurope 2002, eEurope 2004, i2010, and the European Digital Agenda. Innovation in the Italian public sector is not merely the sum of all smart technological factors but is rather achieved by integrating organizational processes and traditional best practices. Several municipalities (such as Ravenna) are pursuing the objective of computerizing and automating their services with a view to implementing e-Government services, and in a scenario where not all the administrative government agencies are at the same level of innovation, traditional and paper services need to be managed in combination with paperless e-services (Martoni & Palmirani, 2013).

Methodology

Based on literature review there is evidence that e-Government initiatives are depended on both the government support and citizens' adoption of e-Government platforms. To gain a deeper understanding of what motivates citizens to visit government websites and actively participate in decision-making, a more detailed study was conducted using a self-administered structured questionnaire as a tool for data collection. The study was undertaken in the North-West Province municipalities in South African. Quantitative research was used. A survey strategy was the chosen strategy for this research.

The population for this study comprised of students and the working class because the two groups are amongst the adult population for whom the Internet has become part of their daily lives. There are 19 municipalities in the North-West Province, 15 municipalities have functional websites and 4 municipalities don't have websites. Random sampling method was used targeting 20 respondents from each municipality to make up 300 respondents from 15 municipalities with functional e-Government platforms Out of the questionnaires sent to 300 potential participants 169 responded, giving us 56% response rate. The sample size for this study was therefore 169.

There are important ethical issues that must be carefully thought through when undertaking research (Young & Barrett, 2010). The protection of individuals who volunteer to participate in research is essential to the ethical conduct of human research (Federman, Hanna, & Rodriguez, 2003).

The questionnaire for this study was designed such that it respected the participants' rights to confidentiality, anonymity and privacy and to withdraw from the study at any time. Anonymity was assured because participants were not asked to disclose their names. The participants will be informed of the research results if they so wish. The survey had two paragraphs that explained what the research was about and participants' rights to confidentiality, anonymity, privacy and the right to withdraw from the survey.

How to collect appropriate data is a crucial issue in pragmatic research because the data collection instrument will determine whether the data gathered are reliable and fairly accurate to represent the authentic performance of linguistic action (Nurani, 2009).

For this study, online self-administered questionnaire was used to collect primary data from students and the working class. The questionnaire was upload onto an online system with specific instructions as to how the questionnaire should be filled. The respondents were first asked for their consent and informed about the purpose of the study, which was for academic purpose only. A degree of anonymity was achieved by not asking the respondents to identify themselves.

The overall data collection was to acquire better idea of students' and workers' opinions towards the use and the adoption of municipal e-Government platforms. The data collection was conducted in three phases. Data from the three phases were collapsed and analyzed as single unit. This was done to avoid repetition.

A. *Phase 1 Pilot study – Staff (North West University and Students*

During the pilot phase, questionnaires were distributed to randomly chosen staff members and students from different faculties of the University of the North West. The researcher explained to

individual staff members and students the objectives of the study. The respondents were asked to identify questions they felt were difficult to answer or understand. They were also asked to identify any leading questions. All the staff members approached completed the survey. The same applies to the students approached, all of them completed the survey. Most respondents felt that one of the questions was vague. The question was rephrased.

B. *Phase 2 – Student*

The proposed study was conducted with students from the North-West University – Mafikeng Campus, North Province, South Africa. The researcher had no difficulty obtaining permission to conduct the study using students. Permission was obtained from the lecturers. The researcher visited two classes from two different faculties after receiving approval to do a five minutes' presentation from individual lecturers. The five minutes' presentation was used to explain what the survey was all about and to gain informed and voluntary consent from the students. Only students from the North-West Province, South Africa were encouraged to participate in the survey. Thereafter the lecturer of the particular class was sent the URL to the survey to post on the online learning system for students to access.

C. *Phase 3 - Working class*

The researcher contacted municipalities, clarified the purpose of the survey and requested a list of citizens' email addresses. Some municipalities did not have the list. The research access was not easy with this group. For instance, 15 municipalities were approached, but only the nine municipalities responded positively. The rest of the municipalities did not have a list of citizens' contact details. From a list of approximately 300 emails a sample of 100 was selected. The URL to the survey together with ethical clearance was emailed to the potential participants.

Data analysis

Data analysis can be thought of as the process of collecting, transforming, summarizing, and modelling data, usually with the goal of producing useful information that facilitates drawing logical conclusions or making decisions. Virtually any field that conducts experiments or makes observations is involved in data analysis (Greenwald & Thomley, 2015).

There are many mathematical data analysis methods, including statistics, data mining, data presentation architecture, fuzzy logic, genetic algorithms, and Fourier analysis, named for mathematician Joseph Fourier (Greenwald & Thomley, 2015).

In this research study, the extent of adoption of e-Government platforms by citizens was examined. Data collected by the questionnaire was coded by the researcher. Firstly, the data was recorded in an MS Excel program and later transferred to Statistical Package for the Social Sciences (SPSS). Descriptive and inferential statistical analyses such as mean, standard deviation, frequency, percent, and correlation were implemented using SPSS. Frequency tables were drawn and from these tables the data was presented in pie diagrams and bar graphs.

Descriptive statistics (frequency, graphical presentation and tables) and chi-square test for independence of association was computed using SPSS. Wegner (2016) postulated that descriptive

statistics summarises large sums of data into smaller measures while chi-square test measures the difference between the observed frequencies and the expected frequencies.

Findings

A.*To measure the level of user friendliness of the e-Government platforms*

The majority of the respondents agreed that the municipality has conducted workshops to make them aware of the available technology to use to access its online services; the respondents indicated that the website can be accessed on the mobile devices like cell phones & tablets; the respondents agreed that they can report any damage on the municipality infrastructure anytime using the website /e-Government platforms; the respondents agreed that the website /e-Government platform is easy to learn and maneuver; the respondents agreed that the use of website /e-Government platform saves them time in requesting services from the municipality; the respondents agreed that the municipality updates their website /e-Government platform regularly; the respondents agreed that to access the website /e-Government platform requires some skills in ICT; and lastly the respondents agreed the website /e-Government platform requires no special software to be able to use it. e-Government platforms are perceived by citizens as being friendly to the users. The users found all the statements relating to the level of friendliness to e-Government platforms as positive

B. To identify factors that motivates citizens to participate actively in government decision-making

Majority of respondents are in favor and supportive to all the six statements under this objective. The following are the statements that the majority of the respondents were in favor of: the municipality is accessible to them all the time; the municipality is open to constructive criticism on their online platform; the municipality has room for dialogue on how best to improve service delivery; decisions on the development of e-Government platforms are made based on a series of consultative forums; the municipality is making means and ways to empower them to be part of the collective and lastly e-Government provides room for online discussion.

Citizen participation is considered as one of the core elements of transparency of Governments with regard to their citizens. (Boudjelida, Mellouli, & Lee, 2016). Citizens have new expectations based on involvement, collaboration and participation in urban governments' life and administration: therefore, the improvement of citizens' empowerment should be one of the main objective of any structured web presence of municipalities. (Buccoliero & Bellio, 2016).

Agbabiaka (2016) states that the primary goal of eGovernment is to create public value. Against this backdrop, governments all over the world continue to invest huge capital on eGovernment with a view to improving internal efficiency and providing better and quality services to the citizenry (Agbabiaka, 2016).

C. To determine the effectiveness of the e-Government platforms

Majority of respondents are in favor and supportive to all the eight statements. The following are the statements that the majority of the respondents were in favor: they can report corruption activities using the E-Government platform; e-Government empowers citizens to perform transactions online; e-Government platforms provide easy access to municipal services; e-Government platform promotes the use of ICT; e-Government platform increases transparencies for decision making; the e-Government system will enable them to accomplish tasks more quickly; learning to operate the e-Government system is easy for them and lastly there is faster access to documents and forms through e-Government platforms.

There is ample opportunity for government agencies to build greater trust with citizens through increased social-media based "collaboration" and "participatory" decision, policy making and service delivery (Chouikh, Ojo, & Driss, 2016). Noticeable government efforts are ongoing for utilizing social media platforms in both pushing information to citizens (one-way interaction) and obtaining timely citizen feedbacks and opinions on government actions (Rezk & El Khayat, 2016). While social media platforms have been largely used by government entities for communicating with and obtaining feedbacks on programs and services from citizens; traditional websites remain the primary interaction channel (Chouikh, Ojo, & Driss, 2016). However, the success of eGovernment is best measured by the perceptions of citizens who use the services (Agbabiaka, 2016).

D. To determine the major challenges of using e-Government platforms

Majority of respondents are in favor and supportive to seven statements and are opposed to two.

The following are the statements that the majority of the respondents were in favor: they use the internet on regular basis; they are not familiar with e-Government platform; they do not have access to ICT facilities/Internet; the language used in e-Government platforms is understandable; they have access to a computer; they find it difficult to use the e-Government platform due to lack of information and lastly they find it difficult to use the e-Government platform due to lack of awareness campaigns.

The following are the statements that the majority of the respondents were not in favor: uncertain about safe use of e-Government platforms; and uncertain about safety of using e-Government to transfer personal information and sharing information with public agencies online or electronically.

The utilization of new technologies by the public sector differs from the one by private companies and individuals (Parycek, Schöllhammer, & Schossböck, 2016). It is widely acknowledge that many of e-Participation initiatives often attract wider audience and face serious limited citizens' involvement (Alabariyat & Sá Soares, 2016). The use of social media has been seen as a hope to remedy such limitation, however, despite the recently adoption of social media the lack of citizens' involvement in e-Participation initiatives still remains (Alabariyat & Sá Soares, 2016).

Conclusion

Citizens have begun to envisage the importance of e-Government platforms usage in relation to access to information and public participation in local government decision making. Local governments on the other hand, are starting to benefit from higher levels of adoption of e-Government platforms by citizens. It is clear that local governments need to invest more on making sure that e-Government platforms are user-friendly and accessible by citizens.

User-friendliness, access to information and 24-hour availability of e-Government platforms are some of the factors that motivates citizens to use and adopt e-Government platforms. Being able to engage with local government officials and getting feedback encourages citizens to visit and use e-Government platforms again.

e-Government platforms are seen by many citizens as convenient means to promote access to information and public participation in local government. Citizens are happy that they can perform some transaction through e-Government platforms. There is also an effort by local government through e-Government platforms to improve service delivery which is well received by citizens and seen as the right direction taken by local government to deliver better services to citizens.

The implementation of e-Government platforms has changed the way governments interact with citizens. This study revealed that lack of adequate ICT infrastructure and training contribute to the low use and adoption of e-government platforms. The use of only English also has an impact on the use and adoption of e-Government platforms.

Recommendations

The following recommendations, based upon the results of the study are:

Strengthen awareness and ensure accessibility of the internet and usage of the e-Government platforms by local governments. The awareness of the existence, benefits and user-friendliness of e-Government platforms is not enough hence the low usage and adoption of the platforms. Evidence have shown that citizens are willing to use and adopt e-Government platforms. Therefore, there is a need for more workshops and roadshows to make citizens aware of the existence, benefits and user-friendliness of e-Government platforms.

Some of the statements are dependent on some of the demographic factors such as age, gender and current qualifiction. It is a clear demonstration that technology use is most depended on age factor. The growing younger citizens demands of online services indicates that e-Government platforms will most likely be supported by the younger age groups. There is a need for a campaign by the local governments that conveys the benefits of using e-Government platforms across all ages. Challenges that can affect and prevent the usage of e-Government platforms should be investigated and removed to allow and encourage all citizens irrespective of age and qualifications to use and adopt the e-Government platforms.

The uncertainty and the perceived safety of the usage of e-Governance must be investigated further and the myths around the usage be nullified/confirmed with research. There is a need to explore public awareness of, attitudes towards, beliefs about and safety of the e-Government platforms. It is important that citizens trust local governments with their personal information when using e-Government platforms.

A follow-up study to test the actual effectiveness of the e-Governance in the municipalities is recommended. The potential for e-Government platforms to positively contribute to good governance and citizen participation has been known for a long time, but very little concrete empirical evidence of the effects of e-Government platforms on governance, and how these effects should be evaluated, exist.

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Mediating Effect of Employee Value Proposition on Innovative Work Behaviour and Organisational Growth: A Conceptual View

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Abstract

Globally, organisations in developed countries are faced with a highly competitive labour market. Therefore, leading to the emergent of locating enthusiastic employees who will be creative and innovative enough to differentiate and drive an organisation to achieve new feats. The rise for innovation in organisations has demanded the need for creative work-force. Organizations with employees that exhibit innovative work behaviour as they get things done can achieve cutting edge growth and performance. For employees to effectively generate ideas, promote an idea and implement it, an organization must have had a value proposition in place. This value proposition is a flexible benefits policy that encourages organisations to fabricate employees reward to their needs and priorities. The purpose of this study was to conceptually; (a) find a match between innovative work behaviour and organisational growth; (b) evaluate the mediating effects of employee value proposition on both innovative work behaviour and organisational growth. Various articles were reviewed from the areas of marketing, organisational behaviour and business management on the subject matter. This study was premised on three major theories namely: Penrose theory, Interactionist Theory and Porter's Generic Value Chain Model. The study discovered that employee value proposition can induce innovative or disruptive work behaviour, with myriads of effects on organisational growth. It is therefore suggested that Human Resource Professionals and Managers must evaluate, manage and monitor Employee Value Proposition (EVP) in a goal-oriented manner to stimulate innovative work behaviour to achieve growth and competitive positioning. Empirical enquiries can be made to further this study.

Keywords: Employee value proposition, innovative work behaviour, recruitment, retention and growth.

Introduction

The rise in technological applications and borderless trade zone of products and services, organisations must innovate to gain a competitive positioning. Messmann (2012) posited that innovation is an effect of societal and economic developments, technological developments, revolutions of organisational structures and tasks, and as well become a major feature of today's world of work. Therefore, the search for a talented workforce has become imperative. Presently, within the Nigeria manufacturing industries, Orga and Ogbo (2012) recognized that organisations are confronted with employees' related challenges. These challenges include poor job fit, poor customer service, poor employment engagement, poor values of the workforce and the complexity of the organisation and its technology to mention but a few. Beyond recruitment, selection and retention of a talented workforce there arise a need to manage employees' creative ability. These abilities include; being able to identify work-related problems, generate ideas to resolve them and intentionally striving to realize such ideas as matching organisational goals. Aligning and mapping innovative work behaviour towards achieving growth is a challenging and difficult process to handle. This is due to the several discrepancies and fragmented nature of innovative work behaviour to translate into organisational growth. However, the role of innovative work behaviour to drive profitability, employee performance and market expansion is yet to be explored.

According to Al-Azzam (2015) companies have been forced to find their employee's needs and wants by understanding the valuable work behaviour that makes them attracted to a prospective employer. Managements clue to employees' needs and value will help induce innovative work behaviour, earn more revenue and make organisation survive in highly competitive situations. Studies recognized both employee value proposition (EVP) and Innovative Work Behaviour (IWB) as needed factors in human resource (HR) strategic practices to achieve competitive advantages. The employee value proposition is a flexible benefits policy that encourages organisations to fabricate employees reward to their needs and priorities. This value proposition becomes a stimulus to which employees react which could be productive or destructive. Innovative work behaviour is one of the productive outcomes which could be linked to organisational growth.

Innovative work behaviour (IWB) on the other hand can be referred to as attitude that "encompasses all work activities that are required from employees to accomplish the prerequisite innovation tasks (Messmann, 2012). Behind each of the expected innovations by an organisation, innovative work behaviour is stimulated by HR strategic practices. Yuan and Woodman (2010) recognized that such work behaviour is edge-to-edge processes to reach organisational aim goals effectively. Scholars such as Åkesson, Skålén, Edvardsson & Stålhammar (2016); Bos-Nehles & Veenendaal (2017); Veenendaal & Bondarouk, (2015) have been able to identify that employee value proposition systems are ways of initiating new behaviour in employees. The need for a logical view to ensuring that when employee's physiological and emotional needs or nature are taken care of, problem identification, innovative idea generation, and idea realization could be prompted using value propositions to employees. This is with the aim that such propositions are expected to facilitate employees' performance, profitability and market expansion which indicates 'organisational growth. The crucial business perception of exploring employee's value proposition and promises with the reality of fulfilling it has called for a new inquiry. This study is, therefore, aimed at finding how value proposition motivates employees to put up innovative work behaviour that will enhance significant growth.

Literature Review

Conceptual Clarifications of Innovative Work Behaviour and Employees' Value Proposition

As employers in present-day seek a bigger market share, they as well, needed to be equipped and have what it takes to ensure a quality workforce that can keep the organisation relevant. Laszlo and Zhexembayeva (2017)stipulated that every organisation has to strategize to embed sustainability, business value and achieve competitive positioning.

Work behaviour is anticipated to be innovative to attain set objectives. Studies (Scott & Bruce (1994); Newman, Herman, Schwarz & Nielsen, (2018) posited that innovative work behaviour is employees' ability to create and implement new and valuable ideas at work. Innovations play a vital role in firm long-term sustainability, growth and survival and have been long embraced by firms that want to be visible, viable, effective and competitive in the dynamic business world (Akhigbe and Bibiebi, 2017). Meanwhile, Afsar, Badir and Khan (2015) posited that intense rivalry and unceasing threat to earn worthy market share has pushed organisations to differentiate and continuously allow innovation from inspiring employees who can achieve organisational objectives. Extant literature in psychology established the fact that behaviour takes place as a response to a stimulus, hence for employees to be innovative in their work behaviour value proposition has to be strong. Randel, Galvin, Shore, Ehrhart, Chung, Dean and Kedharnath (2018) recognized inclusive leadership, belongingness (social interactions) and value proposition for uniqueness as a factor that induces creative work behaviour.

Scholars (Salau, Osibanjo, Adeniji, Ojebola, Oludayo, Falola and Atolagbe 2018) reported that employees' value proposition as a motivational strategy and flexible benefits allowed for rewarding unique skill, abilities and talented employees. It is one of the human resources (HR) strategic practices. It is an employer brand strategy that is unique, relevant, compelling, designed to attract, engage and retain a talented workforce (Minchington, 2006). EVP is an established link and exchange of value between employee's expertise, competencies and experiences and organisational provisions for meeting employee's expectations. The study revealed that it is more gainful for organisations to put in place suitable strategies such as good organisation's image or reputation, regular salary package, and humane treatment of employees as strategies for growth and performance (Gberevbie, 2010).EVP is a total reward strategy that is highly diversified. It brings five different areas which include social management, work-life balance, organisational brand, opportunity development and compensation management under a single umbrella. It can be used as employees resourcing and retention strategy.

Career development is an encouraging phase of any effective EVP and it is ideal on helping employees to get their work done easily. Bhattacharyya (2011) reflected on the importance of using career development as a form of the value proposition which includes: offering promotional avenues, enhances the morale of employees, internally manage promotional vacancies and guarantees better use of employees' abilities. Mouzelis, (2017) identified that organisational growth life cycle is akin to the biological life cycle. According to Demir, Wennberg and McKelvie (2017), the issue with growth is so fragmented that it will take five drivers to achieve high growth: human capital, strategy, human resource management, innovation, and capabilities. To have growth in any organisation there must be a unique offer with peculiarities. Such peculiarities must have such feat that can consistently resolve management challenges that are not seen with other growing firms(Delmar, Davidsson and Gartner, 2003).

Theoretical Framework

Based on the literature review on the employee value proposition, innovative work behaviour and organizational growth three grounded theories were found relevant. The theories are Penrose theory; Interactionist theory; and Porter's Generic Value Chain Model.

(i) Penrose Theory

Edith Penrose (1914-1966) was one of the most celebrated women economist, who wrote the momentous book- Theory of the growth of the firm in 1959, and which led to the birth of Resource-Based View a central paradigm in current strategic management research. The trio field of management, human resource and strategy borrowed from her insight of organisational growth. Penrose in her study identified two resources which are physical and human resources. They are potential bundles of achieving both growth and competitive advantage in an organisation. This theory posited that these two resources can be induced to expand the limit and growth rate of an organisation by an enterprising manager. The theory recognized the facilitation of knowledge within, interrelatedness, and encouragement of productive opportunities as seen by the manager. The theory discovered that growth gets limited if intuition, imaginations and idea does not precede economic decisions. By implication, the need to meet with uncertainty and organizational complexities is to encourage knowledge and changes. Ensuring the ability to use the knowledge which is dependent on interactions, career development and competency is well facilitated and imperative to sustain an organization.

(ii) Interactionist Theory

Interactionist theory is a perspective of organisational creativity developed by Woodman, Sawyer and Griffin (1993). It was focused on how individuals shape and organisation and are shaped by the organisation through meaning that arises through interactions. The interactions induce contextual influence that can facilitate innovative work behaviour. Such contextual influences are social reward, motivation, social influences, physical environment, self-esteem, knowledge, style and preferences. It also stresses that creativity is a complex interaction between the individual and their work situation at different levels (individual, group and organisation) of the organisation.

At the group level, innovation is a result of individual creative behaviour, the interaction between the group members (e.g., team composition), team features (e.g., norms, size), team practices, and contextual impacts (e.g., organisational culture, remuneration systems). Innovation is an outcome of individual and group resourcefulness at the organizational level (Woodman, Sawyer and Griffin, 1993). Several studies revealed a major conceptual framework most commonly used to accentuate the connection between contextual and individual variables that could improve or inhibit workplace innovation (González-Sánchez, Suárez-González &Gonzalez-Benito (2018); Yuan & Woodman (2010); Zhang & Bartol (2010).

(iii) Porter's Generic Value Chain Model

Michael Porter (1985) identified two organisational activities; primary and support activities that can drive organisational competitive advantage. From Porter's postulation, González-Sánchez, Suárez-González, and Gonzalez-Benito (2018) asserted that HR functions stand as the core of a value chain in any organisation. The latest variant of value chain concept proposed by KramerandPorter (2011) namely creating shared value. It is a generic value chain thinking located in the entire value chain as strategic analysis, based on consideration of the competitive advantage (Simatupang, Piboonrungroj and Williams, 2017). Innovative work behaviour is a form of shared value. Holloway (2017) recognized that shared values are built on relationships that required, support decision-making and action. These influencing the value system and can be a 'grand plan', in a dynamic competitive environment. The implication of this theory is that; HR functions with employee value proposition inclusive can contribute to a firm's relative cost and create a basis for differentiation both to attract and retain a talented workforce. Growth, competitive advantage, firm's value chain and the way it performs are reflections of Individual's behaviour and the organized effort.

Research Methodology

This research study adopted the qualitative research approach to examine the mediating effect of employee value propositions on innovative work behaviour and organizational growth. To conceptually enrich this research, secondary data was retrieved from the internet. About 60 articles with a focus on keyword variables from Google, Jstor, EBSCO, Science direct, Sage, Elsevier and Scopus journal outlets were reviewed. Most of the articles were from the area of marketing, organisational behaviour (OB) and business management.

Result and Discussion

The Match between Innovative Work Behaviour and Organisational Growth

Scholars' knowledge of the factors behind organisational growth remains fragmented. Therefore, the potential to generate high impact ideas that would ascertain long-term economic returns to shareholders dwindles (Senderovitz, Klyver and Steffens, 2016). However, studying growth factors is fraught with challenges as they are difficult to sample and follow (Daunfeldt, Elert and Johansson, 2014).Scholars (Nicholls-Nixon, (2005); Powell & Sandholtz, (2012) posited that rapidly evolving organisational structures is also making organisational growth difficult to study. Quinn (2018)posited that organisational growth and expansion are always definitive and iterative and discovered it is always frustrated by barriers and government policies. Several studies argued that manager's ability to issues in the organisation should be from micro perspective especially when attention is drawn to crucial employee's attitudinal and behavioural reactions(Baluch, Salge & Piening, 2013; Katou & Budhwar, 2012).

The obvious mismatch between innovative work behaviour and organisational growth after a considerable time is shocking. The time frame to identify employees' needs and intentions when time is scarce (Wisniewska & Wisniewski, 2018). It also includes the loss of the valuable idea that could have emerged as innovative to enhance organisational growth when there is a breach in a business life cycle that exists due to the company's failure. Innovative, novel and creative work behaviour is what keeps organisations evolve and revolve at each stage of the spin of a business lifecycle. Dodgson, (2018) and Cefis and Marsili (2018) shared a similar view that there comes a need for a certain measure of innovative work behaviour especially; when the expected goal is to stimulate product rebrand, increase sale, increase market share and ensure organisational economic revival. Anderson, Faulk and Stewart (2014) posited that the capacity needed in the early idea and start-up stages is different from the capacities needed by the organisation at the mature stages. Work processes are iteratively linked by feedback loops which include the advancement of an idea that may promote the exploration of further opportunities or ideas. The nature of successful strategies and the mixed feeling of frustrations and achievement that arise while driving organisational growth is inevitable (Baluch, Salge & Piening, 2013). Having this understanding innovative work behaviour became a base on which organisational innovation and competitive advantage are sustained (Montani, Courcy and Vandenberghe, (2017); Ramamoorthy, Flood, Slattery and Sardessai, (2005).

The Role of Innovative Work Behaviour in Achieving Organisational growth

Innovative work behaviour has both an employer and an employee perspective. As the employer thinks of branding its organisation to attract a talented workforce, increase market share and make a profit; the employee is thinking of need satisfaction, image, reputation and equity. Innovative work behaviour (IWB) is not a competency that works with one aspect of the organisation than another. They are initiated abilities, knowledge and skills that rebrands the value of the products, services, practices and processes of an organisation. Renders (2015) recognized that employees with innovative work behaviours have special ability to be dedicated, work and increasingly perform in both current and future task. In most cases, innovative work behaviour is ignited when employees are avail with work-related opportunity, training and career development. Aslam, Aslam, Ismail and Cheema (2017) posited that when training and development are in place innovative work behaviour

of employee will be enhanced, shapes the culture and improve product/services patronage of the organisation. The result of effective innovative work behaviour is innovation.

Employee Value Proposition as a Mediator between Innovative Work Behaviour and Organisational Growth

According to Nijenhuis (2015) building on Scott and Bruce (1994) model posited that factors like communication, supervisor's role, workgroup, perceived image gain, personal characteristics, role clarity, training and development are all stimulants to innovative work behaviour. Three innovative behaviour were identified in this study which are idea generation, idea promotion and idea realization. Innovative work behaviour is all-inclusive, so it entails social interactions from the stage of problem identification, idea generation to the stage of realization. According to Anderson, Potočnik and Zhou, (2014), innovative behaviour in organisations is a state-of-the-science and can be facilitated at three different levels; individual, group or organisational depending on the value communicated to the labour stakeholders.

Social interaction is an information-sharing moment among employees. It is a strong platform for generating veritable ideas. It is an opportunity for individual employees to express their feelings, identify and discuss issues, recognized an impending problem and create an alternative solution. Social interaction among employees has both functional and social value. Such values have to be promoted to have a competitive advantage". Value propositions which include information sharing and supportive supervision to employees prove positively related (Bos-Nehles & Veenendaal, 2017). Nonetheless, Ramamoorthy, Flood, Slattery and Sardessai (2005) argued that remuneration has direct effects on innovative work behaviour. Yuan and Woodman (2010) examined employees' innovative behaviour and job performance and discovered that there are apparent supports for innovation. These supports are myriads of value propositions that were made to employees to stimulate their innovative work behaviour and enhance growth.

Awasthi and Sharma (2016) recognized a significant relationship between employee career development and organisational growth. An employee value proposition is a resourcing and retention strategy that is useful both in the early idea start-up and mature stage of any organisation. These forms of strategies are fundamental to the survival and sustainable development of any organisation in the face of an increasingly competitive business (Falola, 2017). The proposition to encourage employee's career growth and development is useful in problem identification and exhibited in solving problems. This reality could help boost employee's performance on the job and increase market shares. Intentional realization of goals becomes possible, especially when the manager's discretionary skill makes value proposed to employees serves as a tool that will drive organisational growth.

Apart from employees' career development is reward flexibility. Though reward flexibility is flawed in Nigeria as a country it is still useful in retaining a talented workforce and ensures organisational span of life. Reward flexibility is an extension and sustainability strategy organisations use to achieve their goals(Connell, Agarwal & Dhir, 2018). Reward flexibility is a way of presenting sustainable ingenuities without any challenge to entrench employees who operate within company practice and maintain client relationships.

Thus, the mediating effect of employee value proposition on innovative work behaviour and organisational growth is therefore proposed by the researcher as depicted in Fig. 1. Below

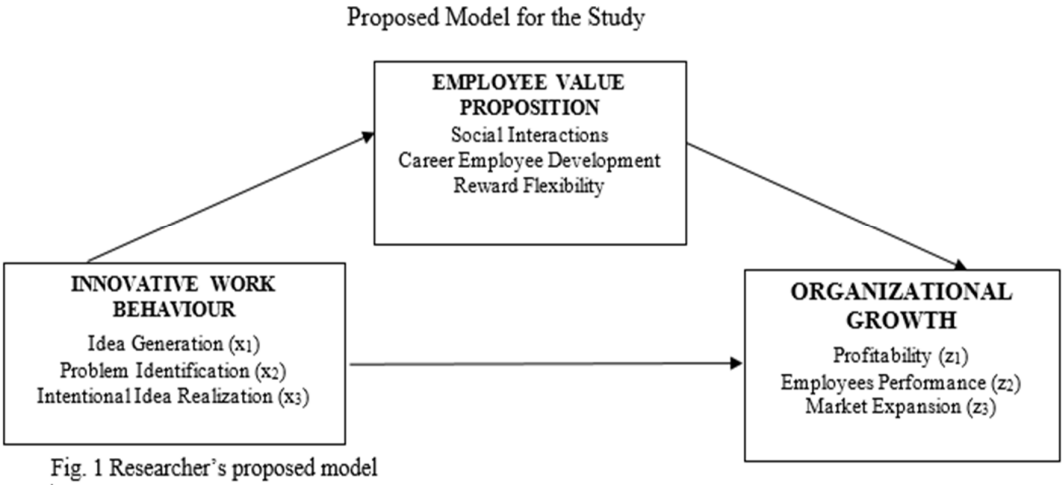

Fig. 1 Researcher's proposed model

Conclusion

Matching available core competencies with opportunities is a smart move any manager would use to attain a competitive edge. The need to value chain activities, identify and understand the gap between innovative work behaviour and organisational growth becomes imperative. EVP is model around people, work situations, organisational culture, opportunities and reward package. Therefore, managers with transactional and inclusive leadership style should craft organisational growth around it.

EVP promotes value chain activities and a strong strategy to initiate innovative work behaviour in employees. Manager's skill and ability to attend to; employees attitudinal and behavioural needs, recognize the right EVP to initiate innovative work behaviour and understand EVP strategic mix that is important to drive organisational growth. When an organisation create an opportunity for interpersonal relationships and social interactions idea are easily generate. Members of the same organisation seek common goals to achieve better values, life quality and fairness as they strive to achieve organisational goal. It is discovered that when innovative work behaviour is encouraged and well monitored the organisation's economic reward will be robust, and the entire business stakeholder will be assured of having a profit on their various investment.

Manager's skill and entrepreneurial ability to initiate professional or task-related training and development programs and encourage career development path for employees is a tool to have new insight into contemporary workplace issues. This becomes a way of providing employees' psychological instrument to identify job-related issues easily and resolve it before it sabotages planned goals. Ability to also carve flexible and equitable reward system can facilitate the intentional realization of innovative idea that would bring about a rare branded product and facilitate quality services to customers. Knowledge and idea shared through creative thinking during social interactions will help employee's smooth job performance and boost ethical and professional practices. The reflection of employees' cutting edge services to clients and customers of the organisation will create a branded image that is worth of patronage thereby leading to gaining market share and improved profitability. To ensure a value system and embed sustainability in a business life-cycle, HR managers should draw employee value proposition grand plan, to operate in a dynamic competitive environment.

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Conceptualising Well-Being Initiatives and Employees' Behavioural Outcomes: An Archival Review

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Abstract

The purpose of this work was to conceptually; (a) validate the relationship between physical wellbeing initiatives and presenteeism situations, (b) establish the significant role of psychological wellbeing initiative on employees' turnover intention among others. This conceptual paper is an archival review of the Nigeria Pharmaceutical firms. Secondary data was retrieved from online journals using the keywords of the subject matter. About 60 articles with both local and global view from Google, Jstor, EBSCO, Science direct, Sage, Elsevier and Scopus journal outlets were reviewed. These are articles from the area of human resources management, organisational behaviour (OB) and business management. The underlying theories adopted for this study are Six-factor Theory and Subjective Wellbeing Homeostasis Theory. This study was able to draw policy and managerial implications, that wellbeing initiative as workplace policies; can help achieve workplace diversity, work/life balance and sustainability goals in the pharmacology field. It is therefore suggested that; (a) Organizations can draw policies such as dietary awareness and physical exercise to curb behavioural outcomes especially the issue of presenteeism. (b)Homeostasis buffer, in the form of work-life balance policies that will help stabilize employees' emotional and mental wellbeing, should be targeted towards reducing employees' intention to leave the organisation. (c)HR professional in both Pharmaceutical and non- pharmaceutical companies should develop healthy policies concerning employees' job type (physical work) and enhance work climate that can foster employees' loyalty to encourage sustainable organization. Empirical enquiries can be made to further this study.

Keywords: Well-being initiative, behavioural outcomes, presenteeism, performance.

Introduction

Efforts by organizations in taking advantage of globalization, policies, trends and high efficiency of technology, require managers to pay vital attention to employees' intrinsic motives and behavioural responses. These Intrinsic motives are physiological and psychological drivers that contribute to employees' health, happiness and focus on functioning well. Employees have been recognised as both valuable assets and key success factor to any organisation. Employees' wellbeing has become a management mantra in recent times. Scholars such as(Ajayi & Olatunji, 2019; Balogun &Olowodunoye, 2012)have shown that employees' reactions to an organizational situation affect many sectors in Nigeria including companies within the pharmaceutical industry.

According to Obukohwo Olele and Buzugbe (2018), the Nigerian pharmaceutical sector has the potential to be a leader in the production and distribution of pharmaceuticals within sub-Saharan Africa. But the sector was poorly rated (World Health Organisation, 2018). In the manufacturing sector, pharmaceutical scientists are involved in the processes of converting chemical and biological materials into pharmaceutical products and therapies. These professionals use the latest equipment, processes, and software solutions to ensure the products produced are profitable, safe, and regulatory compliant. Although Nigeria has a large human population (having approximately 200 million people) and vast natural resources, the country has few skilled personnel within the pharmaceutical industry causing reliant on high importation of foreign drugs. Such few available employees' may be susceptible to occupational stress-causing mistakes in product outcomes due to intense daily activity(Faremi, Olatubi, Adeniyi & Salau, 2019).

Having this understanding, that human factor is a core consideration in work processes minor mistake or variation without safe and regulatory compliance can be a disaster to the health of products final consumers (Cox, Kate, James Black, Grand-Clement & Hall. 2016). As such, only a few of the pharmaceutical firms in Nigeria can participate in the supply of anti-malaria, anti-TB medicines, anti-retroviral and other pharmaceuticals in international tenders (Lead Capital Ltd., October (2008).Organisations to achieve sustainable performance are expected to be creative, innovative and smart by taking into considerations employees' behavioural responses. Afidegnon (2019) opined that achieving sustainable goals seems unreachable except employees' behavioural outcomes are well tackled focusing on their state of well-being (such as employees' emotional and mental health, social connectivity, financial education and sense of fulfilment).

Literature Review

Wellbeing: A Conceptual Clarification

Wellbeing is not just a state of being without illness or diseases. It is "typically changes through time, depending on employees' ability in handling physiological, psychological and social being (Lohaus & Habermann, 2019). The state of employees' wellbeing is a persistent concern that needs to be dealt with urgently to resolve employees' behaviours (Al Mamun and Hasan, 2017). Driving a business to achieve competitive advantage and sustainable performance does not only rely on the manager's ability to make provisions for adequate resources but also to ensure that the workforce is in good health. The CIPD's UK Working Lives survey report (2016) recognises health and well-being as a distinct and vital aspect of work quality considering significant outcomes, emphasizing that 'being well is working well'.Bapna, Langer, Mehra, Gopal and Gupta (2013) posited that a gratified and encouraged employee has a greater chance of making important contributions to the organization.

Halleröd and Seldén (2013) identify the complexity involved in defining well-being. The authors specified that; it exists when employees know that their potential is powerful in coping with the normal strains of life.It is a fluid way of being and needs nurturing throughout life. Wellbeing is a word that has been interpreted as health, achievement and happiness. The research of Dodge, Daly, Huyton and Sanders (2012) affirm the multi-dimensional and intangible nature of this word "well-being". The authors were able to identify two approaches that emerged in the process of defining wellbeing. The approaches are: (i) Hedonic approach (ii) Eudaimonic approach

The hedonic approach is the standard and level of living of an employee. Hanc, McAndrew and Ucci (2019)recognized it as a subjective state of wellbeing that reflects happiness, pain, anger and standard of living. Psychologists described it as a state of seeking pleasure and avoidance of pain (Lengieza, Hunt & Swim, 2019). According to The World Health Organisation (WHO, 2018) standard of living is the worth of occupation and working conditions, the standard of housing, sanitation, nutrition, level of provision of health, educational achievement, social security, access to recreational and other services that can be used to measure individual socioeconomic status.

The eudaimonic approach highlights positive psychological functioning and human development. It can be defined "as the orientation, behaviour, experience, or functioning that allow human flourishing and fulfillment of basic, intrinsic motives (Huta & Waterman, 2014). It reflects the objective nature of a total well-being of employees' quality of life as perceived by such employees.Wellbeing wholly is abalance point between an individual's resource pool and the challenges face (Dodge, Daly, Huyton & Sanders, 2012). While hedonic wellbeing emphasizes feeling good, eudaimonic wellbeingfocuses on functioning well or doing good (Oades, 2019). The goal of measuring workplace well-being is to complement Occupational Safety and Health measures to make sure employees are safe, healthy, fulfilled and engaged at work.

Wellbeing initiatives and Employee Behavioural Outcome

Well-being initiatives are referred to as intervention which describes policy, process or structure designed by employers' targets to improve health and wellbeing of employees' at work (Fenton, PinillaRoncancio, Sing, Sadhra & Carmichael, 2014). Well-being initiatives are the thoughtful and determined programs put together by insightful managers for attaining desirable employee behaviour towards the achievement of both current and future organisational objectives. Promoting employees' wellbeing is seeking employees' satisfaction, fulfilment and health.

According to Osibanjo, Abiodun, Salau, Adeniji, Falola and Alimi (2018) to manage human resources strategically employees' behavioural outcomes has to be in focus. The authors described behavioural outcomes as employees' reaction to job situations especially the way a job is designed. Stephen (2014)identified employees' behavioural outcomes is referred to as manifestations of employees' physical, psychological or behavioural responses (which include turnover intention, loyalty, unfriendliness, absenteeism, low engagement) to occupational situations. It is described as employees' perception and attitudinal changes concern with the support top management give to them (Oludayo, Falola, Obianuju & Demilade, 2018).

It is challenging to comprehend with assurance what impact workplace wellbeing initiatives are making. Several studies have explored the different types of wellbeing initiatives. Carmichael, Fenton, Pinilla, Roncancio, Sadhra, and Sing (2016) identified initiatives such as mental health initiatives, health promotion initiatives, muscular-skeletal disorder initiatives and safety at work initiatives either in seclusion or in combination and their impact on both employees and employers. Spence (2015) also recognized other programs such as career wellbeing, financial wellbeing, social wellbeing and environmental wellbeing as initiatives that contribute to employees' wellness and behavioural outcome that directly or indirectly affect organizational stake.

Studies (Faremi, Olatubi, Adeniyi and Salau 2019; Al Mamun and Hassan 2017)identified that factors affecting employee turnover, sound retention strategies and other behavioural outcomes in a business organization are as a result of wellbeing issues. Such issues include job stress, emotional labour and emotional intelligence which are related to employees' state of well-being(Ogungbamila, Balogun, Ogungbamila & Oladele, 2014).In this context, the study explores workplace wellbeing initiatives in four different areas. They are; (i) Physical wellbeing initiatives (ii) Psychological wellbeing initiatives (iii) work climate initiatives; and (iv)Social wellbeing initiatives. Each initiative dependent on each other is chosen as the main foci of this research activity.

Theoretical Review

(i) The Six-factor Theory

The Six-factor Model of Psychological Well-being was the work of Carol Ryff, 1989. It described six factors that promote employees' psychological well-being, contentment, and happiness. The theory

assumes that organisational success depends on six psychological well-being elements. The elements are (a) positive relationships with others (b) personal mastery (c) autonomy, (d) a feeling of purpose and meaning in life, (e) personal growth, and (f) personal development. The implication of this theory is that attaining a state of balance between affected challenging and fulfilling life events is very crucial, and to do so should aid the attainment of psychological well-being. Employer's creative intuition and leadership style to take into consideration these six factors will help regulate employees' behavioural outcomes enhance prompt achievements and encourage organizational sustainability. With different viable initiatives around these six factors, detrimental employees' behavioural outcomes can be curbed.

(ii) Subjective Wellbeing Homeostasis (SWB) Theory

The theory was proposed by Cummins in the year 2010, in a comparable sense to the maintenance of body temperature. The main crux of this theory is that, automatic neurological processes to maintain personal well-being that is mildly positive and initiated control of the level of SWB. Barrington-Leigh (2018) recognized that achieving stability in well-being is due to different factors which include economic and political stability of a country. Nonetheless, Cummins, Lau and Davern (2012) proposed that the real cause for stability was genetic. Therefore, they proposed what is called 'Homeostasis buffers' which are defence mechanisms in three levels namely; (i) defensive behaviour (ii) external resources and (iii) internal resources

Defensive behaviour: employees are skilful at avoiding unpleasant emotional encounters through established life routines, these make daily experiences foreseeable and convenient. However, tough and unexpected issues will cause SWB to be out of place and ranges from time to time. Elevated SWB is connected with features like pleasure, open-handedness and enhanced friendliness while the downside includes pain, sadness and illness.

External Resource: it is discovered money and intimate relationships are the two most powerful second-level defence mechanisms. The role of both as a flexible resource contributes to the quality of life an employee has.

Internal resources: These are both conscious and unconscious devices help to minimize threat against balanced subjective wellbeing.

This theory implies that basic control and positive reappraisal can be provided by basic organizational programs and policies. Abell (2019) states that policies focused around work climate can deflect core negative views which help employees achieve a homeostasis state of wellbeing. It is important to note that employees' wellbeing initiatives such as getting along with colleagues, self-esteem, fairness, personal healthy watch, and taking safety precautions while handling machines can help balance contributes to employees state of wellbeing.

Methodology

This research adopted the qualitative research approach to conceptualize and examine the effect of well-being initiatives and employees' behavioural outcomes. It is an archival review of the Nigeria Pharmaceutical firms using secondary data retrieved from online journals. The reason for focusing this study in the pharmaceutical industry is because of the; (a)global poor ratings of the industry, (b) likely hidden and untraceable detrimental effect of human error in that field can be harmful to the Nigerian populace. About 60 articles with are both local and global view from Google, Jstor, EBSCO, Science direct, Sage, Elsevier and Scopus journal outlets were reviewed. These are articles from the area of human resources management, organizational behaviour (OB) and business management on the subject matter.

Findings and Discussion

Background review on Well-being Initiatives and Employees Behavioural Outcomes

The focus of most studies was more on employees work activities with little or no mentioning of specific wellbeing initiatives that can drive positive employees' behavioural outcomes. Gilbreath and Karimi (2012)posited that behavioural outcomes (including presenteeism, turnover intention, employees' loyalty and engagement) to organisational situations could frustrate the effort of achieving competitive positioning. Studies affirm that employees' state of wellbeing contributes to improved performance(Bogetic, Đorđevic, Ćockalo & Vorkapic, 2018). The need to explore the effect of wellbeing initiatives becomes a concern that surrounds Nigeria's pharmaceutical companies' limitation of not being a main player in the global terrain. This study, therefore, is bringing the wellbeing initiative construct and employees behavioural outcomes together under a single focus.

Physical wellbeing initiatives and Presenteeism

Scholars such as (Ganster, Rosen and Fisher, 2018; Kim, Kim, Newman, Ferris and Perrewe, 2019) identified that employees behavioural issues that are related to physical wellbeing include absenteeism, presenteeism, and commitment. Presenteeism ensues when employees are physically present, but mentally absent (Hemp, 2004). It is when employees attend work even if they are not feeling healthy. Employees' target to reduce and prevent organizational punitive measures related to absenteeism has metamorphosize into presenteeism. Studies revealed that type of work (physical), low social support from family and friends can lead to job dissatisfaction and low engagement (Spanos & Strigas, 2018). Therefore, the state of employees' physical wellbeing will justify the rate of presenteeism in an organization. According to the American Association of Nurse Anesthetists (2019), physical wellbeing is lifestyle behaviour and choices to ensure health to avoid preventable diseases and conditions. Physical initiatives are organizational policies which include health promotion through physical activity, nutritional awareness, safety and health talks, and programs aimed at reducing exposure to or intake of dangerous substances and smoking prevalence. Aldana, Barlow, Smith, Yanowitz, Adams, Loveday and Merrill (2006) recognized that physical activities, dietary changes and group support programs can be used to reverse or prevent life-threatening diseases such as metabolic syndrome, cardiovascular diseases, cancers, overweight and obesity. Faremi et al., (2019); Vuorio, Suominen, Kautiainen and Korhonen 2019; Zerbeș, Cioca and Neamu (2019) stated that when employees are strained, stress and make to work for longer hours than necessary organizations will be at risk of presenteeism. *Based on the above arguments, the second proposition is that;*

P1: ***Physical wellbeing initiatives help to curb presenteeism situations.***

Significant Role of Psychological Wellbeing (initiatives) on Employees Turnover Intention

Turnover intention can be referred to as employees' wilfulness to separate from his or her current job. It is a ˝conscious and thoughtful wilfulness to leave the organization (Emiroğlu, Akova & Tanrıverdi, 2015). Studies affirm employees' intention to leave an organization is as a result of certain factors such as job stress, emotional labour and emotional intelligence which are core aspects psychological wellbeing (Ogungbamila, Balogun, Ogungbamila & Oladele, 2014). Psychological well-being is an engagement with existential challenges of life (Keyes, Shmotkin Ryff, (2002). It denotes the extent to which employees experience enthusiasm and moods of happiness. This feature of psychological wellbeing is also recognised as subjective wellbeing (Ng, W. and Diener, 2019). Scholars such as Skevington and Böhnke 2019; Corazon, Nyed, Sidenius, Poulsenand Stigsdotter 2018; and Gawke, Gorgievski and Bakker 2018)discovered that psychological initiative could be formal or informal to both individual and organisation. Psychological wellbeing initiatives are interventions and programs that tackle issues of employees' emotional and mental health. According to Robertson and Cooper 2011; Coetzee and Van Dyk, (2018)employees who maintain psychological balance and mental

wellbeing, function properly in an organization. Friedman, Ruini, Foy, Jaros, Love and Ryff (2019) posited that when employees do not enjoy autonomy, environmental mastery, achieve a positive relationship with others and a stable lifestyle it may spur employees' intention to leave the organization. *Based on the above arguments, the second proposition is that;*

> *P2: Psychological wellbeing (initiatives) play a significant role in employees' turnover intention.*

Work Climate (Initiatives) and Employees' Loyalty

Scholars such as(Viitala, Tanskanen and Santti, 2015; Wu and Li, 2018 and Willis, Reynolds and Lee 2019) state work climate as an organizational initiative to promote employees state of wellbeing. Work climate initiatives are programs organization can put in place to achieve employees' loyalty. Employees' loyalty is mostly induced when the work climate in the organization is tolerable. Work climates are a set of shared opinions concerning the processes, practices and policies that an organization supports, expects and rewards(Thakre & Shroff, 2016). According to Chung, Liao, Jackson, Subramony, Colakoglu and Jiang (2015), a supportive work climate in an organization is an aspect of wellbeing that can make employees' loyalty strong. Work climate encourages community spirit in employees, a shared vision and a positive outlook which can improve organizational business lifespan. The literature revealed that work climate initiatives aid and regulate job stress, performance, recruitment, morale, organizational learning, teamwork, turnover and employees' well-being.Employee's innovativeness and risk-taking behaviour contributes to employees' spirit of loyalty and organisational intrapreneurial engagement. *Based on the above argument, the third proposition is that;*

> ***P3:*** *Work climate does have an impact on employees' loyalty.*

Effects of Social Wellbeing (Initiatives) on Employee Engagement

Social wellbeing is one of the dimensions of wellbeing. Teghe, Daniel and Rendell (2005) viewed wellbeing as a social thing. Social wellbeing can be referred to as the degree to which employees feel a sense of belonging and social inclusion. Social wellbeing initiatives are the programs put in place for employees to enjoy social support both within and outside work schedules. Some of the initiatives may include incentive-based team trips, team-based incentives, creating opportunities for cultural inclusions and encouraging interpersonal relationships for idea cross-fertilizations.Pfeffer (2018) in his book 'Dying for a Payback' identified two critical contributors to employee engagement one of which is social support. Literature (MacLeod, D. and Clarke, 2014)affirm positive employee engagement is linked to factors such as employees' capability to contribute to workplace decisions and a sense of achievement. When employees are connected in the organization, they feel supported. *Based on the above argument, the fourth proposition is that;*

> ***P4:*** *Employee social wellbeing (initiatives) do have effect on employees' engagement*

Based on these findings from the literature the researcher hereby proposed the following model in fig.1 below

Proposed Schematic Model of the Study

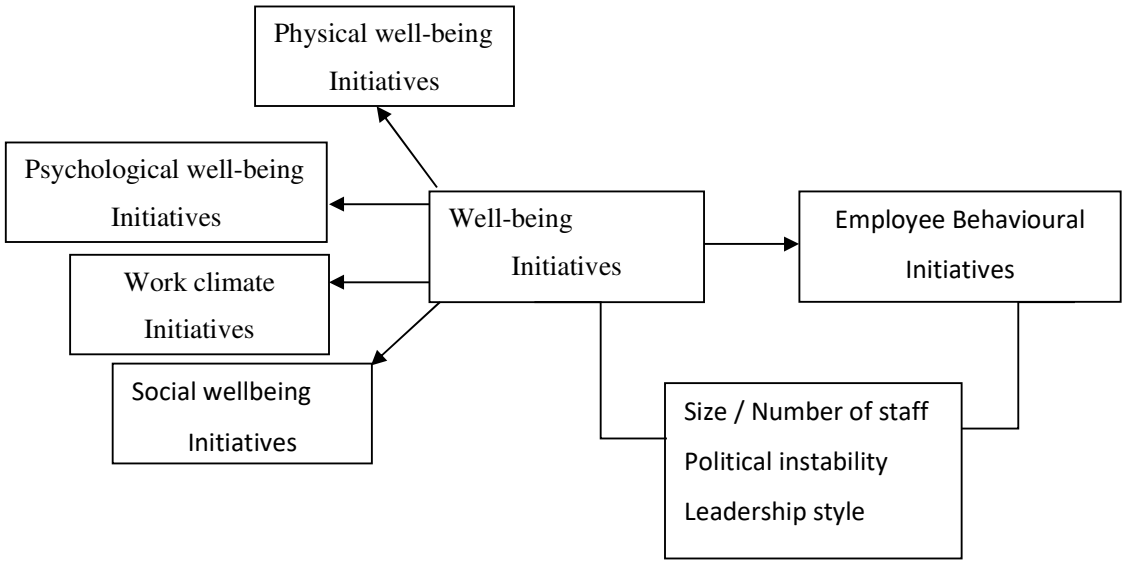

Fig. 1 Researcher's proposed model

Conclusion

This research paper aims to conceptualize the concept of well-being initiatives and employees' behavioural outcomes in Nigeria's pharmaceutical companies. Literature was reviewed to examine the concept of well-being initiatives and employees' behavioural outcomes. Different authors were able to identify the relationship between well-being initiatives and employee behavioural outcomes (i.e. presenteeism, turnover intention, employees' loyalty and engagement) which affect the sustainable performance of a business. Wellbeing initiative can help achieve workplace diversity, work/life balance and goals are more easily reached. Considering the intuitive ability of employers, HR professionals, managers and legislative body to initiate programs such as dietary awareness, organisational support and physical exercise will enhance a stable state of employees' wellbeing. Work-life balance policies, training and development programs will help stabilize employees' emotional and mental wellbeing thereby reducing employees' intention to leave the organisation.

HR professional in both Pharmaceutical and non- pharmaceutical companies could develop healthy policies concerning job type (physical) and work climate, that can foster employees' loyalty in the organization. Management should draw policies to encourage employees' engagement by creating opportunities for teamwork and social support from family and friends. Further empirical studies can be carried out to test the relationship between the variables of well-being initiatives and employees' behavioural performance. However, this study is limited, other areas of interest to researchers may be explored Comparative studies could also be carried out on wellbeing initiatives between developed and developing economy.

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Perceived Implications of Casualisation on Organizational Growth: A Study of Covenant University Cafeteria, Ogun state, Nigeria

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Abstract

The objective of this study is to explore the crucial business perception of Casualisation and its implications on organisational growth. Casualisation in Nigeria has witnessed a lot of criticism. It has been viewed as a degrading form of engaging workers in labour engagement. Major decline in the labour market, especially within the public sector, where employment has been exchanged with massive privatisation of government agencies which heightened the misuse of Casualisation as a working arrangement. A model and a theory are the two underpinning focus for this work which includes: Atkinson model on the flexible firm and equity theory. Two hundred fifty questionnaires were used as a survey instrument to collect quantitative data, while 15 interviews were carried out involving four managers' and 11 supervisors. Proportionate stratified sampling method was used for the study representativeness. In presenting a frequency distribution of the data, descriptive statistics were implored using simple linear and regression analysis tool of Statistical Package for Social Sciences (SPSS) version 24 software in testing the formulated hypotheses. The study revealed that Casualisation of a job as a form of sub-standard job, without any curb, can grow fast into modern-day' slavery'. The study recommends that Casualisation can be used as a form of recruitment pool and help manage the rate of employability within an organisation. Manager's ability to recognise referent leader among casual workers could serve as a mechanism to establish a social relationship and sound organisational culture. To further this study, more enquiries can be focused on the agricultural sector or in a different geographical part of the country.

Keywords: Business perception, Casualisation, inequity, Atkinson Model and growth.

Introduction

Man being an 'Economic man' seek better condition to earn his livelihood and balance it with other activities that make him fulfilling; therefore, rationally opting for a flexible working system 'casualising'. Studies (Anyim, Ufodiama&Ideh, 2017) posited that the centric desire of employers to

exploit employees and myopically exclude the work-life-balance benefit. Casualization in Nigeria has witnessed a lot of criticism. Fapounda (2012) viewed it as a degrading form of engaging workers in labour engagement. Major decline in the labour market especially the public sector employment has been exchanged with massive privatisation of Government agencies and heightened the misuse of Casualisation as a working arrangement by not applying decent terms and conditions of employment (International Labour Organization, 2014).

According to Danesi (2011), casual work has always existed for particular jobs; but it is the structure that it has taken in the last two decades that is diverse and challenging. Meanwhile, exploring the employers and employees business perception is the general objective of this study; the fast-changing nature, trends in employment and innovative services has given rise to Casualisation as the modern strategy in today's workplace. According to Salau, Falola, Ibidunni& Igbinoba, (2016) strategies have to be in place to ensure employees role in organisational success, one of which Casualisation can be considered.

Perception of Casualization and Organizational Growth

Scholars now infiltrate elements like workers with no respectable job and wage, a secure future, social protection, and access to rights into defining Casualisation (ILO, 2017). The term casualisation does not indicate an indecent work arrangement but a work arrangement that is temporal without an arrangement for tenor benefits. The USA Bureau of Labour Statistics (2019) posits casual work as "any job in which employees do not clearly understand contract for long-term employment or one in which the minimum working hour can fluctuate(Connelly & Gallagher, 2004). It can be described as "the process whereby employees in an organisation are casual or part-time employees with no lawful provisions (Solaja, 2015). The tradition of engaging casual workers in Nigeria for provisional positions comes in casualisation form(Kalejaiye, 2014).

Generally, 'casual employment is not permanent; requires formal or informal critical skill for job performance and provide for payment hourly, daily or at the end of the contract period. Although recent scholars (Walker, 2011) identified Casualisation as the process of engaging workers on contract recognised has non-standard of labour arrangement which has disadvantages to workers. Casual work has awkwardly empowered employers to misuse employees' knowledge, skills and abilities and as well as to abridge the working conditions that are to be of standard relating to opportunities. Employees are now being subjected to sub-standard or informal forms of work arrangement which are bore by nepotism, favouritism, God-fatherism and tribalism, especially in an economy that is sectioned to different tribes like Nigeria. This is because it not only the employers' that like to engage employees on a casual basis only but also the employee who desire job engagement opportunities on a casual basis.

Business is an activity, which provides people with needed goods and services at a profit (Timms, 2011). Every business has its participants who are; the employers, and the customers who they both depend on to achieve their goals (Galotti, 2017). Perception could be defined as the process by which individuals select, organise and interpret situations around them using their five senses to reason. Business perception is the awareness of both employer and employee about the possible profit they will make from engaging together in a working relationship. This awareness could be informed by the goals of the business or the need of each participant in the job contract. Growth means 'increase'. Senarath-Jayasinghe and Fernado (2017) recognised the going concern and growth of the organisation becomes the first and the major concern of every business owners as they start to engage in business activity. Achieving key organisational growth indicators (profitability, growing customer base, customer satisfaction employees' satisfaction and employers' satisfaction) is made robust by the consistent availability of needed employees that could achieve sustainable growth. There will always remain a huge difference between organisation growth and organisation, providing the platform for an employee to consistently drive change to enrich proper achievement of growth.

The Inequity of Casualization in Nigeria Work Place

Scholars such as (Rasak, Oye, Oyeyipo&Ganiyu, 2019) argued Casualisation had presented a discrepancy connecting the fluctuating nature of work arrangements, compared to the existing legislation and policy framework built around the philosophy of standard employment. The total differences in the benefits of an employee with full-time employment and employee with part-time job engagement are so astounding in the Nigeria workplace. According to Bamidele (2010)report by the Campaign for Democratic and Workers Rights in Nigeria, showed 45 per cent, casual workers, in Nigeria. This can only indicate the vast utilisation of Casualisation in major sectors of the country. The unfair and different ways of using Casualisation by different organisations of even the same sector has called for standard with which employees be engaged. Okafor (2011) emphasised that Casualisation surges inequality within and among organisations, and as well threatens employment and living standards. Nonetheless, the more the usage of Casualisation to engage employee is not just determined by the employers only but also the decision of the employees themselves to achieve certain goals.

Employers'Perception of Casualization

Exploring the business perception of Casualisation is more of viewing the possible positive aspects of this mode of employing workers. According to Horwitz, Allan, Brosnan and Walsh, (2000), organisations have to embrace employment flexibility to achieve high productivity, lower costs and competitive agility. Unaligned leadership with an initiative to manage talent can induce the sensibility to employ people casually to make the job position transitional.

Small business owners demand the local labour market to enrich, measure success factor and engage in labour activities that are not costly. Bamidele (2010) identifies the following as causes and reasons casualisation thrive in organisations especially manufacturing industries which include;

a. Recruitment strategies; which is acquiring and retaining high-quality talent' becomes critical to an organisation's success (Richardson, 2013). Casualization, therefore, becomes a viable means of recruiting, selecting and retaining needed employees into the organisation.
b. Labour regulation; due to active union activities and sensitive labour market regulation, it becomes challenging for employers to operate businesses considering labour cost, therefore, resulting in engaging in more flexible recruitment practice.
c. Labour cost; there is a glaring discrepancy in the direct cost incurred considering the compensation and benefits of a permanent worker to that of a casual. But few studies are yet to evaluate the extent to which indirect cost is incurred to maintain a regular workforce in the process of achieving organisational goals.
d. Labour flexibility; Casualisation has added flexibility on both the demand and supply sides of the market (Richardson, 2013). Both the employer and employee enjoy the proportional value of money and time involve in the bargaining conclusion of Casualisation as a means of labour engagement in the face of variability, diversity and contingency situations.
e. Labour control; employment practices have been structured due to rising differences between the labour market and the employers of Labour. With Casualisation, employers become more in-charge to determine conditions with which employees are engaged in the organisation while employee considers labour dynamics making Casualisation become a routine filtering device to monitor employers' exploitation and encourage a quality life.
f. Labour market restructuring; the quality of Labour in the local labour market would endear the heart of employers towards Casualisation, especially when the work process involves creativity, innovation and sustainable economy local, un-schooled but talented individuals are therefore engaged to get the job done. The aspect of engaging female folks in almost every sphere of careers has held in high esteem a fair consideration for casual working arrangement.

Employees'Perception of Casualisation

The world becoming a global village is turning every aspect of labour engagement into competitions with this in mind offering employment casually becomes a key to

i. Personal satisfaction and achievement: students who are self - sponsored would prefer casual work to meet up with their other academic responsibilities. Women who play different roles as a wife, mother and student would also desire casual working opportunity with the probability that such job engagement will be modified as soon as they are ready to fulfil the conditions of a full-term work
ii. Career path development: studies show that artisans who are interested to work in a formal environment can decide to work in a company of a related field to develop more interest to build a career in their area of competency. Employees' career growth opportunity is an adequate retention strategy to help gain insights and experience from the organisation practically and as well overcome the alarming rate of employees' turnover (Ohunakin, Adeniji & Oludayo, 2018).
iii. Employees with core competencies that want to explore the large market can also decide to be on contract terms without being tied down by conditions to a single or few employers. This would also mean economic progress and having access to different clients or customers.
iv. Skilled and age of the employee: certain abilities come with experience; therefore retired individual may opt for casual work arrangement to support the organisations with their experience.
v. There are also several other reasons like health issues, succour to unemployment that could inform the decision of employees who prefer to work base on casual terms.

Rasak, Ake, Asamu and Ganiyu, (2019) proposed some decent "guidelines or principles that form the bedrock of business ethics concerning human resource management in Nigeria. The principles include; the principle of respect, the principle of beneficence, the principle of justice and principle of social responsibility

Theoretical Underpinnings

(i) Atkinson Model (1984) on Flexible Firm

Senarath-Jayasinghe and Fernado (2017) recognised Atkinson, 1984 found major situations underpinning employment practice which he identified has followed; market stagnation, uncertainty, and technological change. Therefore, it is opined that organisations being under pressure should fix adaptive ways to take account of consistent market realities. He suggested flexibility can be of three kinds which are, functional, numerical and financial flexibility. Functional flexibility is required within the work process and progress along with the terms of achievable goals of the organisation. Employees can be reassigned swiftly and easily between activities and tasks. An organisation may obtain functional flexibility through processes such as job- rotation, widely designed jobs, and cross-functional teams (Pantic-Dragisic&Söderlund, 2020)

Numerical flexibility seeks that the number of labour demand by employers is closely in a match with the available number of employees need. This is the reason most organisations create a pool of employees to make ready a good number of them that have basic and rare skills, knowledge and abilities which can promote the innovative competency of the organisation. Financial flexibility: Employees with core competencies are sometimes casualised because retaining them on full employment could be expensive for employers. Having to meet up with market competitions and expansions, a reasonable manager would want to have such employees engaged with less compensation and benefit attached just within the period of the employment relationship. Pay flexibility is of greater importance in any organisation. It is a shift to new pay and remuneration system that facilitate either numerical or functional flexibility, such as assessment-based pay systems in place of rate-for- the-job systems.

(ii) Equity Theory

Equity theory is based on the idea that individuals are motivated by fairness, and if they identify inequities in the input or output ratios of themselves and their referent group, they will seek to adjust their input to reach their perceived equity. If employees perception does not agree with the goals of the organisation, such employee may reduce his performance, hoard his idea (either about new marketing strategy or new market horizon,) thus impeding growth in the organisation.

Methodology

This research adopts a combination of both quantitative and qualitative research design (mixed method) to acquire comprehensive information to help the research to validate a business case on Casualisation and explore its implications on organisational growth. Retrieving information from the internet, use of journals and textbook relevant to the research topic forms the basis for the development of the various concepts, construct and variables of this study. 250 questionnaires is used as a survey instrument to collect quantitative data, while 4 managers' and 11 supervisors responses to the interview questions were used to gather qualitative data. Proportionate stratified sampling method was used for the study because representativeness concerning variables used as the basis of classifying categories increased chances of being able to make comparisons between strata which include the managers (who represent the employer), the tenor staff and the casual staff. The analysis was made to present the data collected for this study, descriptive statistics were also used in presenting a frequency distribution of the data and simple linear regression analysis using Statistical Package for Social Sciences (SPSS) Amos.16 software was used in testing the formulated hypotheses. To confirm the reliability of the research instrument Cronbach's alpha, Likert scale on the questionnaire, and responses generated from the interview to corroborate the responses from the questionnaire method were use in this study. The alpha value for the construct indicated that the items formed had reasonable internal consistency reliability of 0.772.

Findings and Discussion

Background information of respondents

The gender of respondents shows 14.6 % male, most of who work at snack and drink stand, as drivers and ticketers, while 75.4% were female. The age of the respondents reveals that respondents between 21-25 years represent 21.2%, respondents between 26-30 were 28%, 31-40 years representing 43.6% and 41-45 years represents 7.2% of the total sample. It can be deduced from this table that majority of the respondents were relatively adults. The marital status of respondents who are single represents 34.8%, married representing 56% while divorced represents 9,2% of the total sample. This indicates that majority of the respondents were married. The academic qualification of respondents reveals that 33.2% were OND/NCE holders, 44.8% were BSc/HND holders while 22% were PGD/MSc/MBA holders. This indicates that majority of the respondents were BSc/HND holders. Findings also revealed that 27.6% had been working from 0-2 years, 39.2% of respondents have served between 3-5 years, and 33.2% have served for 5 years and above. The distributions of respondents' status in the organisation 8.9% of respondents were tenor staff who hold strategic positions of the cafeteria unit. It includes the managers, accountant and some supervisor who monitors the order of each cafeteria from the central kitchen. 91.1% of respondents were the casual staff. This indicates that majority of the respondents were casual staff including the drivers, cooks, ticketer, delivery boys and girls.

Analysis of Data on Employees' perception of Casualisation

The analysis shows 75.6 % of the respondents agreed and strongly agreed that they need casual work to sponsor themselves in school. 65.2% takes on casual work to balance up their dual role as a mother and wife, 9.2% of which are widows. 78. 0% of the respondents agreed and strongly agreed that casualisations contribute to their work experience and 20.4% of the respondents agreed and strongly agreed that they need income from a casual job to support their business. Managers' responses to the interviewed questions revealed that casual work arrangements form a major part of the recruitment

pool for the organisation. Most cases, information about vacant positions in the unit is first disseminated to both casual and tenor workers in the organisation.

Analysis of Data on Employee's career growth

Analysis indicates that 86.4% of the respondents agreed and strongly agreed that workers gained a lot of experiences while working. 97.6% of the respondents agreed and strongly agreed that workers are trained on the specification of food crafted and sold to avoid waste and 14.9% of the respondents agreed and strongly agreed that workers are paired especially in the technical aspect of the catering job to avoid unnecessary accidents. Respondents' responses from the analysis also show that 8.9% of the respondents agreed and strongly agreed that they paired supervisors with managers to acquit them with managerial issues before they were made supervisors. The interviewed carried out amidst the casual workers revealed that the unit transit casual staff to tenor staff, if the staff is seen as been hard working. With the aid of observation, one could easily identify the whole sense of belonging that the workers' display and the workers also revealed that the unit allows for creativity especially when it comes to pastries and snack making.

Percentage distribution of responses to Employees Performance and Labour cost

Analysis indicates that 86.4% of the respondents agreed and strongly agreed that workers prefer casual work to unemployment. 97.6% of the respondents agreed and strongly agreed that they seek casual work arrangement as an opportunity for economic empowerment and 73.9% of the respondents agreed and strongly agreed that if time is well structured, they will be glad to do overtime. Respondents' responses from the analysis also show that 98.4% of the respondents agreed and strongly agreed that good pay will keep their performance high. Responses from the managers and supervisors interviewed indicate that casual work arrangements save the unit from labour cost, especially since the catering services has been operating a central kitchen from which all the connected cafeteria access and order food.

Percentage distribution of responses to the reward system and organisational market expansion

Analysis indicates that 87.6% of the respondents agreed and strongly agreed that their wages commensurate with their effort. 96.2% of the respondents agreed and strongly agreed that organisation does not give casual workers bonus for extra performance and 96.8% of the respondents agreed and strongly agreed that familiarity is the basis for the hiring of casual workers. 91.6% of the respondents agreed and strongly agreed that co-workers left working because they were not well remunerated especially having to do overtime when there is a special order. These findings indicate that sampled respondents believe that organisational reward system influences market expansion.

Hypotheses Testing

Four hypotheses were raised in a null form and tested in the course of this study. The significant level of 0.05 or 95% confidence level was set to determine if the findings were significant or not. The findings were presented below:

Hypothesis One

H_{01}: There is no significant relationship between employees' business perception of Casualisation and recruitment pool.

Table 4.4.1: Correlations			
		Casual employees' perception	Recruitment pool
Employee's Perception	Pearson Correlation	1	.530**
	Sig. (2-tailed)		.000
	N	250	250
Recruitment Pool	Pearson Correlation	.530**	1
	Sig. (2-tailed)	.000	
	N	250	250
**. Correlation is significant at the 0.01 level (2-tailed). Source: Researchers Survey Compilation (2020)			

From the table above, correlation analysis was conducted to determine the relationship between casual employees' perception and recruitment pool. There is a strong positive correlation between casual employees' perception and recruitment pool (r= .530**, N= 250, p value= .000). The result is statistically significant with a p-value of .000 which is less than the level of significance of 0.01. Therefore, improved casual employees' perception will enhance employee involvement

Decision: Reject the null hypothesis and accept the alternate hypothesis. Hence, there is a relationship between casual employees' perception and recruitment pool.

Hypothesis Two

H_{02}: Employees' career growth does not elicit job transition

Table 4.4.2a: Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.530a	.280	.278	.456
a. Predictors: (Constant), Employees' career growth				

Table 4.4.2b: ANOVA						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	20.084	1	20.084	96.682	.000a
	Residual	51.516	248	.208		
	Total	71.600	249			
a. Predictors: (Constant), Employees' career growth						
b. Dependent Variable: Innovation						

Table 4.4.2c: Coefficients						
		Unstandardized Coefficients		Standardised Coefficients	T	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	2.090	.253		8.268	.000
	Employees' career growth	.536	.055	.530	9.833	.000

Table 4.4.2c: Coefficients						
Model		Unstandardized Coefficients		Standardised Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.090	.253		8.268	.000
	Employees' career growth	.536	.055	.530	9.833	.000
a. Dependent Variable: Innovation Source: Researchers Survey Compilation (2020)						

From the tables above, simple linear regression was conducted to determine whether employees' career growth brings about job transit in an organisation. The model summary shows a variation of 28% in job transit can be explained by an influence of employees' career growth. The result is statistically significant at a p-value of .000 which is less than the level of significance of 0.05. This indicates that employees' career growth positively predicts job transit in organisations. Besides, a beta coefficient of 0.530 indicates that employees' career growth is a significant predictor of innovation.
Decision: Reject the null hypothesis as p-value is less than 0.05. Therefore, employees' career growth brings about job transit in an organisation.

Hypothesis Three

H_{03}: Labour cost does not influence employees' performance to a significant extent

Table 4.4.3a: Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.370a	.137	.133	.757
a. Predictors: (Constant), Labour cost				

Table 4.4.3b: ANOVA						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	22.500	1	22.500	39.296	.000a
	Residual	142.000	248	.573		
	Total	164.500	249			
a. Predictors: (Constant), Labour cost						
b. Dependent Variable: Employee's performance						

Table 4.4.3c: Co-efficients						
Model		Unstandardized Coefficients		Standardised Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.476	.263		9.400	.000
	Labour cost	.397	.063	.370	6.269	.000
a. Dependent Variable: Employee's performance Source: Researchers Survey Compilation (2020)						

From the tables above, simple linear regression was conducted to determine whether Labour cost influence employee's performance. The variation of 13.7% in employee's performance implies the

labour cost of the organisation. The result is statistically significant at a p-value of .000 which is less than level of significance of 0.05. This indicates that Labour cost positively predict employee's performance. Also, a beta coefficient of 0.370 indicates that performance norm is a significant predictor of employee's performance.

Decision: Reject the null hypothesis as p-value is less than 0.05. Therefore, Labour cost influence employee's performance.

Hypothesis Four

H_{04}: Organisational reward system of casual workers does not have a significant impact on market expansion

Table 4.4.3a: Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.573a	.328	.325	.505
a. Predictors: (Constant) Organisational reward system				

Table 4.4.3b: ANOVA						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	30.827	1	30.827	121.018	.000a
	Residual	63.173	248	.255		
	Total	94.000	249			
a. Predictors: (Constant), Organisational reward system						
b. Dependent Variable: Market expansion						

Table 4.4.3c: Coefficients						
		Unstandardized Coefficients		Standardised Coefficients	T	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	1.650	.270		6.112	.000
	Organizational reward system	.640	.058	.573	11.001	.000
a. Dependent Variable: Market expansion						

Source: Researchers Survey Compilation (2020)

From the tables above, simple linear regression was conducted to determine whether Organisational reward system has a significant impact on the market expansion. From the model summary, a variation of 32.8% in market expansion can be explained as an influence of organisational reward system. The result is statistically significant at a p-value of .000 which is less than the level of significance of 0.05. This indicates that Organisational reward system positively predicts market expansion. Also, a beta coefficient of 0.573 indicates that financial reward system is a significant predictor of market expansion.

Decision: Reject the null hypothesis as p-value is less than 0.05. Therefore, Organisational reward system has a significant impact on the market expansion.

Conclusion and Recommendations

The perception of both the employers and the employees, as well as, the intervention of the government body hereby becomes imperative to manage Casualisation in this era of globalisation. In this study, the following recommendations are made.

i. Human resources managers should identify and ensures that casual employees' activities are in line with standard achievements of goals.

ii. Employees' training, research and development on useful ideas discovered can foster career growth and bring about job transit. Therefore employees should be given the freedom to open discussions with supervisors and top managers during tea and lunch breaks to promote work initiatives.

iii. Identifying referent leader among casual workers who could serve as a mechanism of to better management of organisations can be used to establish a sound organisational culture, manage and resolve conflicts arising from diversity, work process, interpersonal and social relationship.

iv. To reduce the inhumane way of exploiting employees and justify the perception with which the employer engages his workers. The mediating factors of change in institutional and external attributes of a growing organisation have called for a well define legislated business policies for any form of work engagement.

v. Every employer should aim at facilitating a transitions compensation system that would harmonise the fair treatment of both the employees on Casualisation or full-time employment.

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The Assessment of Reindustrialization Capacity of Arctic Regions of Russia

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Abstract

The paper is investigated reindustrialization capacity of Arctic regions of Russia. The international experience of the implementation of the reindustrialization strategy was analysed; the methodological foundations for assessing the readiness of regions for reindustrialization were studied. New assessment approach for reindustrialization capacity was suggested using the fuzzy-logic.
The developed approach was used out for assessing the level of readiness of the Arctic regions of the Russian Federation for reindustrialization and recommendations for improving the reindustrialization strategy were formed for each Arctic region.

Keywords: Fuzzy logic; Reindustrialization, Arctic region, Russia

Introduction

Today, the strategic views of not only Russia, but also other states have turned to the Arctic. Despite strong interest, the development of the Arctic poses many challenges due to high logistics costs, poor infrastructure, difficult climate conditions, advanced technology needs, low population density and not developed reference points for further development.

In the previous period of historical development, the economic structure and labor market of the Arctic regions of the Russian Federation were oriented towards the single investor - the State (Skhvediani & Kudryavtseva, 2018).

A sectoral and regional economy, a system of material incentives, transport and energy infrastructure have been developed to meet its needs.

From this period, the Arctic inherited:

- Irrational structure and poor diversification of the mono- or oligo-genic resource economy;
- Insufficient communication and broadcasting systems;
- High moral and physical depreciation of fixed assets, infrastructure and life support systems;
- Inadequate demographic structure and resettlement system;
- Lack of a flexible mechanism for state regulation of environmental management;
- The imbalance between federal, regional, local and corporate interests;
- The high dependence of the traditional indigenous economy on direct State participation.

After the break-up of the USSR, in the 1990s of the 20th century, economic activity in the Arctic was carried out under conditions of savings in practically all positions.

Savings were realized by:

- wages, which deprived the population of a resource of economic stability and mobility due to accumulations;
- development of the housing and communal environment and the social security sector, which in the context of the reforms led to the rapid degradation of the housing resources and crisis of public utilities systems;
- improvement and updating of technologies, which brought a significant part of production assets and transport systems to the point of complete wear and tear;
- environmental safety of economic and defense activities, which led to the pollution of large territories and water areas in the Russian Arctic (Shestopalov, 2008).

These factors had an inertial negative impact on the socio-economic sphere of the Arctic zone of the Russian Federation and formed a region-specific set of constraining factors:

- increasing disparities between regions of the Arctic and other regions of the Russian Federation in terms of their level of social and economic development;
- high and ultra-high production costs associated with remoteness of sales markets, limited transport accessibility and extreme climatic conditions;
- progressive pollution and degradation of environmental components under the conditions of increasing anthropogenic pressure, accumulation of wastes and contaminants from transboundary transport;
- the need to use special technologies, equipment and materials;
- the need for significant capital investment in the capital-intensive basic commodity sectors of the Arctic;
- high depreciation of fixed assets;
- the sub-optimal demographic structure and settlement system;
- lack of human resources of specialists with experience and high cost of attracting labor resources.

The industrialization of the Arctic zone of the Russian Federation began in the mid-thirties of the twentieth century and peaked in the sixties - seventies. In the 1980s, the process of industrial development in the Arctic (still ongoing) entered an inertial phase. The 1990s were dominated by a decline in inertia and an increase in the processes of degradation of technological potential, depreciation and retirement of production assets, and elements of infrastructure.

The long stagnation of the process of industrialization of all spheres of life and economic activity of the Arctic zone of the Russian Federation, which led to a general decline in the competitiveness of the economy of the Arctic regions and a deep crisis in the social sphere, determined the insufficient resources of the economies of the Arctic regions to carry out the necessary technological breakthrough. The Arctic regions are unable to flexibly respond to new emerging economic and technical problems. The Arctic zone of the Russian Federation needs reindustrialization based on the latest technological advances.

If the Arctic regions do not carry out reindustrialization, this will lead to their complete degradation due to the deterioration of the production and infrastructure base, as well as systemic macroeconomic problems (Melamed & Pavlenko, 2014)

The first industrialization of the Arctic has been largely detached from the task of improving living standards. As a result, a considerable amount of «deferred» social obligations has been formed. The second industrialization of the Arctic should be based on the need to realistically form social commitments and achieve an economically determined high social standard in enterprises, industrial complexes and the public sector. At the same time, there is an undesirable imbalance in the way the State and the private sector redirect their efforts mainly towards solving social problems. While the

social aspects of development are important, concentration in these directions should not lead to «devouring» of the economic potential of the second industrialization of the Russian Arctic. At the same time, it is clear that the implementation of reindustrialization projects will obviously make it possible to significantly improve the standard of living of the people of the region.

The first industrialization of the Arctic did not take sufficiently into account the environmental impact and destruction of the traditional habitat and economic activities of the indigenous peoples of the North. This has led to the fact that today, the potential for economic development of the Arctic through investment by private Russian companies is being constrained by the need to undertake a considerable amount of obligations to eliminate the consequences of ecologically ill-conceived economic activities, from the 1950s to the 1980s.

The new industrialization of the Arctic must take into account the interests of environmental conservation carried out on the basis of energy-saving and environmentally friendly technologies (Dmitrieva & Burii, 2019). Projects for the reindustrialization of the Arctic should be based on appropriate institutional changes that will improve the investment climate and give a green light to capital inflows into important infrastructure and production projects. The following approaches are under active discussion:

- application of direct or indirect investment incentives for significant projects in the Arctic zone. The characteristic of the Arctic economy is that large projects implemented in an integrated manner are more likely to be commercially successful. However, the payback period for such projects will be long enough to require a preferential tax regime;
- tax incentives for small and medium-sized businesses, e.g. created by vertical diversification of large companies. The creation by large companies of additional jobs in the service and ancillary industries, even if they are not part of the core business, requires the encouragement of direct tax incentives. Only the direct encouragement by the State of the outflow of labour into small and medium-sized businesses will help large companies operating in socialist enterprises to increase productivity by ensuring their global competitiveness;
- changing the principle of the contribution for environmental damage to increase the business opportunities to use the funds for the introduction of environmentally friendly technologies in production. Companies should be able to reduce environmental taxes through corporate environmental programs. Otherwise, while maintaining the existing system of compensation for environmental damage, there will be hidden double taxation of the business, in which he will be forced to spend money both on improving the environmental parameters of production and on current compensation for environmental damage;
- creation, on the basis of tax revenues from enterprises registered in the region, of a special fund for contributions to the development of the Arctic zone (on the principle of «funds of future generations») with the formation of special financial instruments. For this, however, it will be necessary to create specialized financial instruments and infrastructure, in particular, such as the «Arctic Bank for Reconstruction and Development», which could receive part of the fiscal fees from enterprises in the region;
- creating a stimulating tax and investment environment for the development of traditional nature management, which would stimulate large businesses to make targeted investments in the development of small traditional forms of management. However, such productions should not be charitable, but commercially oriented.

Literature Review

The problems of industrial policy are more relevant today than ever, because today is a new industrial revolution period. At the moment we are at the stage of transition to the sixth technological order, the creation of our own new Russian production. It is important to understand that this transition is not possible without solving several basic problems; therefore, it is important to determine the current level of readiness of the regions for reindustrialization.

In Russian and international practice and science, there is currently no holistic, generally accepted, universal methodology for assessing the level of preparedness of regions for re-industrialization of the economy (Miller et al, 1984; Heymann & Vetter, 2013; Euler Hermes Economic Outlook, Special Report, 2013; Prisecaru, 2014; Amitai, 1983; Samuel, Peter & William, 2009; Pasholikov & Dudakov, 2019; Kulagina, Mikheenko & Rodionov, 2019; Kotynkova, 2017; Skripnuk, 2019).

Since the manufacturing sector plays a leading role in reindustrialization, the majority of authors assess the readiness of the regions by determining the production potential (Tarasov, 2018; Buzmakova, 2017; Bodrunov, 2015; Barashkova, 2015; Granberg, 2006; Greenberg, 2017).

An analysis of the literature and practical recommendations was carried out by the author, which identified a number of basic methods for the assessment of productive capacities: (Erokhina, 2015; Korsuntseva, 2013; Andriychuk, 1981; Karsuntseva, 2014; Tarasov &Vahromov, 2009; Aglyamov, 2015; Rudskaya & Rodionov, 2018; Chernogorskiy, Shvetsov & Parkhomenko, 2018; Zdolnikova & Babkin, 2018).

1) By resource assessment. The author of this method states that the analysis and assessment of the region's productive capacity should be carried out through a system of indicators. The main one is a general indicator, which helps to compare the actual output of enterprises with the potentially possible output that enterprises are able to provide with the most efficient use of production capacities, intellectual, labor, material, energy, natural and other resources play a central role in this system (Erokhina, 2015). In this case, it is necessary to pay attention to the presence of subjectivity in the choice of resources.

2) Index analysis. An index analysis of the assessment of production potential is often used by enterprises, but can also be used on a regional scale. The essence of the method is that each element of productive capacity is compared with the average value of the same element, but over the total number of enterprises (regions) studied. The result (index) describes the relative efficiency of productive capacity. This method is based on the use of a multifactor correlation model, but its difference from the similar ones lies in the way of estimating and applying the parameters of the statistical model (Korsuntseva, 2013) It should be noted that there are some limitations in the indices used to measure the impact of individual inputs on the output of an enterprise's productive capacity.

3) Method of linear optimization models. In the practice of assessing production potential, the method of linear optimization models has also found application, based on determining the value of the potential volume of production for all types of products, taking into account the optimal mode of resource supply. The production potential, in this case, is expressed in terms of value and is found by simple arithmetic summation of the found production volumes (Andriychuk, 1981). Using linear forms of modeling can lead to a significant error of the method, due to the fact that most potential-forming factors in the dynamics have tendencies of nonlinear development. Therefore, while the linear optimization method is attractive, it needs to be refined for the non-linearity of some connections, as well as the addition of validation criteria for the linear forms used (Karsuntseva, 2014).

4) Correlation and regression methods. Multi-factor correlation and regression analysis allows the identification of the most important factors determining the efficiency of production and the quantification of their impact on the result, both individually and collectively. This method examines the relative capabilities of territories (regions) by comparing the normative output of products corresponding to a given resource supply with an average level of resource use. This method was used to assess the production potential of the Kamyzyaksky district of the Astrakhan region. (Tarasov & Vahromov, 2009; Aglyamov, 2015; Rudskaya & Rodionov, 2018)

5) Basic production functions. The simplest type of production function is static production functions, which reflect the dependence of output on the expended resources (capital and labor). The main disadvantage of the model reflecting this dependence lies in its static nature: it does not take into

account the time factor as a dynamic variable. While the enterprise's production process is influenced by many factors of the internal and external environment, such as the level of employee qualifications, the degree of development of the enterprise's infrastructure and information technology, competition, relationships with suppliers and consumers, relationships with competitors and investors, with authorities and etc. The addition of the variable t allows us to take into account the impact on the production process not only of capital and labor, but also of other factors of production (Chernogorskiy, Shvetsov & Parkhomenko, 2018; Zdolnikova & Babkin, 2018)

An analysis of approaches to assessing production potential based on the above methods allows us to conclude that it is impossible to obtain on their basis the complete information necessary for an accurate assessment of the region's readiness for reindustrialization, and requires their refinement in the direction of eliminating the shortcomings presented.

6) During the study, the author discovered a fuzzy logic method developed by S.A. Poltavsky to determine the level of economic development of the regions of the Russian Federation. In contrast to the previously described approaches, with this method, variables can take on linguistic meaning. In this method, there is a low degree of subjectivity, minimal intervention of experts in the study (only at the initial stage when selecting a set of features), and possibility of operations with large amounts of data. Moreover, on the basis of fuzzy classification of regions, a clear classification can be obtained, while obtaining a fuzzy classification from a clear one is impossible (Poltava, 2008).

This method will provide a reasonable classification of regions according to the level of readiness for re-industrialization of the regional economy, which was not possible using the methods 1-5 described earlier.

Methodology

Thus, the authors develop a method for assessing the readiness of regions for reindustrialization using the fuzzy logic method.

To implement the approach, it is necessary to build the equation (Formula 1):

$Y=\{x, T, D\}$, (1)

Y - is the level of readiness of the region for reindustrialization;
X - actors, which determine variable Y value;
T – X-range: "low level of the region's readiness for reindustrialization," "the region's readiness for reindustrialization is below average", "average region's readiness for reindustrialization," "region's readiness for reindustrialization is above average," "high level of region's readiness for reindustrialization";
D - domain of definition in interval [0;1].
The following is a scale of fuzzy variable Y (Table 1).

Table 1: Recommended fuzzy-scale for Y-variable

Set of values	Title	Description
0-0,333	«low level of readiness of the region for re-industrialization»	The region is poorly prepared for reindustrialization of the economy, with a large number of problems, such as the scientific and technological backwardness, lack of resources, poor productive capacity and poor environmental situation
0,167-0,5	«level of readiness of the region for re-industrialization below average»	The region has its own conditions for re-industrialization, but there are lag in a number of significant factors

0,333-0,667	«average level of readiness of the region for re-industrialization»	Regions where factors are at an acceptable level to attempt re-industrialization, but additional investments are needed to increase the chances of success
0,5-0,833	«level of readiness of the region for re-industrialization above average»	A region with good characteristics, lagging behind in insignificant components and not requiring large resources to change the situation in the region
0,667-1	«high level of readiness of the region for re-industrialization»	Regions with better conditions for transition to re-industrialization compared to other regions

The next step is to identify the factors for the modelling (Djamilia, Kuzaeva & Glushkova, 2019). The assessment of the level of readiness of the regions for reindustrialization of the economy will include five main areas: 1) Industrial capacity; 2) Innovative capacity; 3) Investment capacity; 4) Human capacity; 5) Environmental capacity (Table 2).

Table 2 - Factors of re-industrialization of the economy [32]

Area	**№**	**Title**
Industrial capacity	X1	Gross Regional Product (GRP)
	X2	Industrial Production Index (IPI)
	X3	Labor Productivity Index (LPI)
	X4	Consumption of fixed capital (CFC)
	X10	GRP energy intensity
Innovative capacity	X5	Volume of innovative goods, works, technology services
	X6	Technology Innovation Costs
	X13	Innovative activity of organizations
	X14	Internal research and development costs
Investment capacity	X9	Investments in fixed assets
	X12	Solid public road density
Human capacity	X7	Number of higher education institutions and scientific organizations
	X8	Per capita income
	X15	Annual average number of employees
	X16	Number of researchers with an academic degree
Environmental capacity	X11	Environmental rating (composite index)

The next step is to collect statistics. The initial statistics for the calculation were taken from Rosstat. (Official website of Rosstat, 2019) The linguistic scale for each of the input variables is encoded by conversion to a metric on the interval [-1; +1] according to Formula 2:

$$x = \frac{X_i - X}{\overline{X}} \quad (2).$$

Each factor X_i can be given a level of significance for the analysis of (r_i).

If all indicators have equal value (equally preferred or no preference system), then use Formula 3.

$$r_i = \frac{1}{N} \quad (3)$$

The next step is to present matrixes of factor values for each region based on the classification table (Table 3).

Table 3 - Classification of the level of factors

Range of values, X		Membership function
-1≤x≤ -0,667	X1 (Low)	1
-0,667<x<-0,333	X1	$\gamma_1 = \frac{-0,333 - x}{0,667}$
	X2 (Below the average)	$1 - \gamma_1 = \gamma_2$
-0,333≤x<0	X2	$\gamma_2 = \frac{0 - x}{0,667}$
	X3 (Average)	$1 - \gamma_2 = \gamma_3$
0≤x<0,333	X3	$\gamma_3 = \frac{0,333 - x}{0,667}$
	X4 (Above average)	$1 - \gamma_3 = \gamma_4$
0,333≤x<0,667	X4	$\gamma_4 = \frac{0,667 - x}{0,667}$
	X5 (High)	$1 - \gamma_4 - \gamma_5$
0,667≤x≤1	X5	1

The last step is to determine the value of the final factor according to Formula 4:

$$y = \sum_{j=1}^{5} y_l \sum_{i=1}^{N} r_i \lambda_{ij} \quad (4)$$

$$y_j = 0,833 - 0,167 * (j - 1)$$

y_j – nodal points of triangular numbers,

r_i – weight of i-th factor,

λ_{ij} – the value of the membership function of the j-th quality level relative to the current value of the i-th factor,

5 – the number of classifier levels.

Findings and Results

Following this analysis, the Arctic regions of the Russian Federation were rated according to their level of readiness for reindustrialization (Table 4).

Table 4 - Rating of the Arctic regions of the Russian Federation in terms of readiness for reindustrialization

Position	Region	The level of readiness to re-industrialization	
15	Krasnoyarsk krai	0,65981	Above average
38	The Republic of Sakha (Yakutia)	0,557452	Average
47	Yamal-Nenets Autonomous Okrug	0,507706	Average
48	Arhangelsk region	0,507206	Average

53	Murmansk region	0,488998	Below the average
58	Komi Republic	0,471167	Below the average
66	Nenets Autonomous Okrug	0,43259	Below the average
78	Chukotka Autonomous Okrug	0,408385	Below the average
82	Republic of Karelia	0,38654	Below the average

The following conclusions emerged from the analysis:

1. Krasnoyarsk krai

According to the analysis, the Krasnoyarsk krai takes a high position - 15th place, but if we look at the value of 0.659, then we can see that it is only slightly above the average level in Russia and it has something to work on. To illustrate this, diagram have been constructed on the selected factors (Figure 1), which illustrate where the region has succeeded and where it needs to strengthen its activities in order to make a successful transition to re-industrialization.

The potential of Krasnoyarsk Krai is generally assessed positively, with the exception of the environmental sector. The most positive level region has in investment capacity, but the human capacity demonstrates a poor situation. Environmental capacity is negative.

In a detailed examination of the influencing factors in Figure 1, it is noticeable that the region needs to increase such indicators as the number of educational institutions of higher education and scientific organizations (X7), income per capita (X8), the place in the ecological rating of regions (X11), as well as the innovative activity of organizations (X13) and the number of researchers with academic degrees (X16).

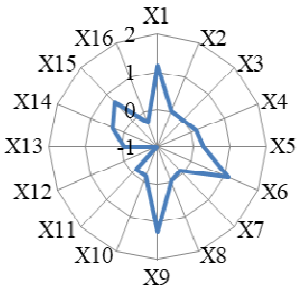

Fig. 1 : Factors forming the Krasnoyarsk Krai reindustrialization capacity

2. The Republic of Sakha (Yakutia)

The Republic of Sakha (Yakutia) takes 38th place out of 85 regions with an average level of readiness for reindustrialization. The leading area of the region is an industry, and the weakest is the innovation sphere. There are three areas with negative level: innovative, human and environmental.

Figure 2 shows that the region should pay attention to the volume of innovative goods, works, technology services (X5), the costs of technological innovations (X6), internal research and development costs (X14), the annual average number of employees (X15) and number of researchers with academic degrees (X16).

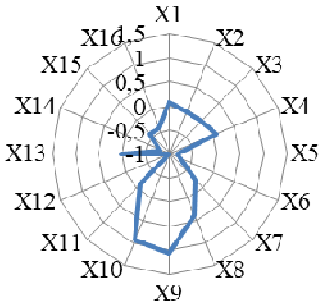

Fig. 2 : Factors forming the Republic of Sakha (Yakutia) reindustrialization capacity

3. Yamal-Nenets Autonomous Okrug

The Yamalo-Nenets Autonomous Okrug takes 47th place in terms of readiness for reindustrialization, its leading area is the investment sphere. The weakest area of the region is innovation, but human capacity and environmental capacity are also poor. The highest capacity region has in investment field.

The region's lowest indicators are observed for such factors as the volume of innovative goods, works, technology services (X5), the costs of technological innovations (X6), internal research and development costs (X14), annual average number of employees (X15), and the number of researchers with academic degrees (X16) (Figure 3).

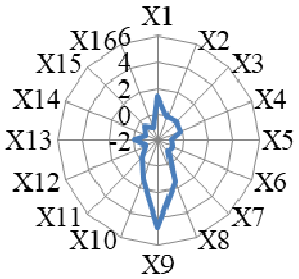

Fig 3 : Factors forming the Yamal-Nenets Autonomous Okrug reindustrialization capacity

4. Arkhangelsk region

Arkhangelsk region takes 48th place in terms of readiness for reindustrialization. The most developed areas of the region are environmental and industrial capacity, and the weakest are investment capacity.

The region has low technological innovation costs (X6), small investments in fixed assets (X9), low solid public road density (X12) and a small number of researchers with academic degrees (X16) (Figure 4).

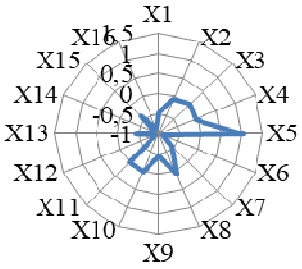

Fig. 8 : Factors forming the Arkhangelsk region reindustrialization capacity

5. Murmansk region

Murmansk region is 53rd in terms of readiness for reindustrialization. The leading areas of the region are ecology and industry, while innovation and investment are very poorly developed.

Analyzing Figure 5, it can be noted that the lowest factors are the volume of innovative goods, works, technology services (X5), the costs of technological innovations (X6), the density of public roads with hard surface (X12), the internal costs of research and development (X14).

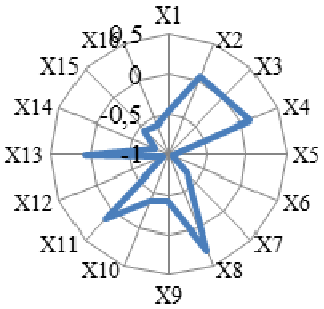

Fig. 5 : Factors forming the Murmansk region reindustrialization capacity

6. The Republic of Komi

The Komi Republic is 58th in terms of readiness for reindustrialization. The leading areas of the region are ecology and industry, and the weakest are innovations.

The region lags behind on the following factors: internal costs of research and development (X14), the volume of innovative goods, works, technology services (X5), the cost of technological innovation (X6), the density of public roads with hard surface (X12) (Figure 12)

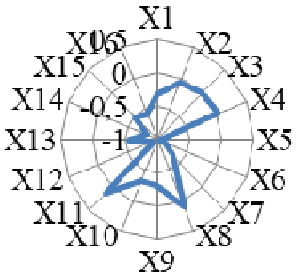

Fig. 6 : Factors forming the Komi Republic reindustrialization capacity

7. Nenets Autonomous Okrug

The Nenets Autonomous Okrug ranks 66th in terms of readiness for reindustrialization. The leading directions of the region are ecology and industry and lagging – innovation.

Figure 7 shows a significant lag in internal spending on research and development (X14), the annual average number of employees (X15), and the number of researchers with academic degrees (X16).

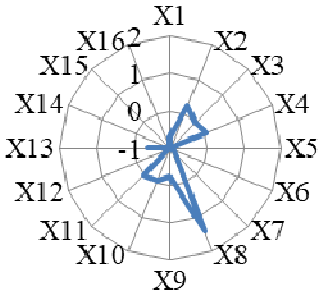

Fig. 7 : Factors forming the Nenets Autonomous Okrug reindustrialization capacity

8. Chukotka Autonomous Okrug

In terms of readiness for reindustrialization, the Chukotka Autonomous Okrug takes 78th place. The leading areas are ecology and industry, and the weakest are investments.

It is important for the region to focus on the following factors: investment in fixed assets (X9), the density of public roads with hard surface (X12), internal research and development costs (X14).

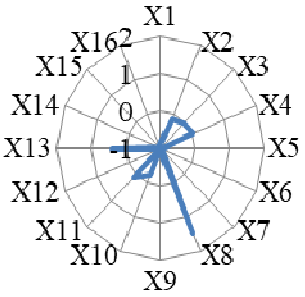

Fig. 8 : Factors forming the Chukotka Autonomous Okrug reindustrialization capacity

9. Republic of Karelia

The Republic of Karelia is 82nd in terms of readiness for reindustrialization. The leading areas are ecology and industry, and the weakest are investments.

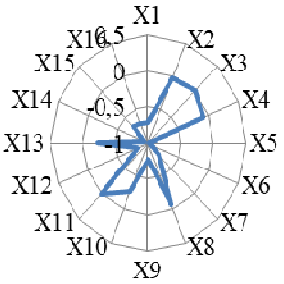

Fig. 9: Factors forming the Republic of Karelireindustrialization capacity

The region lags behind on the following factors: the volume of innovative goods, works, technology services (the X5), the cost of technological innovation (the X6), internal spending on research and development (X14) (Figure 9).

Limitation

The possibilities of fuzzy sets for the valuing of aggregated economic indicators are limited by the lack of expert and statistical database (information necessary for conducting) the research.

Conclusion

After analyzing all regions of the Arctic region, the authors found a trend in the weak innovative activity. The basis of reindustrialization is innovation based on the development, production, and mass distribution of basic innovations in all sectors of the region's economy, so it is very important to develop this area in the regions.

In order to stabilize and revitalize the innovations of regions, it is important to:

- to intensify innovative activities in order to create new competitive products and improve the quality of products to world-class level and expand due to this external and internal market for industrial enterprises of the region, etc.;

- maximize the use of scientific advances in the restructuring of the economic sectors of the region;
- form regional science, technology and innovation programs and projects;
- open an innovation center for consulting enterprises when creating new investment projects or promoting existing ones;
- introduce a regional contract system in the field of scientific and technological development;
- increasing the focus of the regional order on scientific, technical and innovative products to solve important regional problems;
- attracting investments from the federal budget and extrabudgetary sources for the implementation of scientific, technical and innovative programs and projects of regional significance;
- stimulation of inventive activity, increasing the level of patent protection of products and technologies; protecting the patent market of the region from the influx of foreign patents;
- assistance in protecting national priority on the results of scientific research carried out at the expense of budgets of all levels and protecting the interests of authors and patent holders of industrial property;
- development of business-innovation planning;
- organization of technology parks, grants, subsidies (Shestak, Shcheka & Klochkov, 2019).

A cluster approach to the implementation of innovation policies can be considered as one way of activating and improving the innovation environment in the region. Clusters create optimal conditions for innovative development (Gromova, 2018).

Partner enterprises gain rapid access to the latest developments of each other and are in a state of organizational, financial and technological interaction. Thus, the cluster organization of production creates a synergistic effect and ensures continuous progressive development. The process of creating innovative clusters should take into account the specifics of the regions: levels of regional innovative potentials, financial security of regional budgets, innovative activity of enterprises in the region, levels of their industrial development.

Acknowledgment

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Quality of Agrifood Products in the Republic of Moldova. Legislative and Organizational Issues

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Abstract

Insuring the quality of the agri-food products represents a primary concern at an international, regional and national level. Governmental policies in Republic of Moldova to ensure the food safety is based of the modern principle "from the pitchfork to the fork", that includes monitoring the quality at all the stages of the food chain. The study proposes an analysis of the main regulations and public institutions with attributions in the area of the quality at national level. The sources of documentations were represented mainly by the national legislation in this area, completed with scientific articles and publications from specialized magazines. The research highlighted the attempts of modernization of the national system of quality, with an eye to harmonize it with regulations in the European system. There is a developed legislative framework that it's permanently adapted to the international norms. The National Agency for Food Safety is the main public institution with attributions in the area of the food quality, supported in their actions by the ministries responsible for health, agriculture, economy, financial and intern fields. Although the HACCP system is obligatory, to apply for it isn't generalized at national level. The national standardization system is harmonized to the international norms. Ensuring the quality of grocery products in Republic of Moldova is an extensive process that requires efforts from public institutions, but also from the consumers. Even though there are certain progressed registered the last few years, lack of the staff, insufficient funds or difficulties in applying the legislation specific for food products there are problems the quality system faces in Republic of Moldova. The done research is preliminary and sets the basis to certain complex analysis that are going to be developed during the doctoral training program.

Keywords: Quality, Security, Food/Groceries, Control

Introduction

The transition to the market economy - process started in the '90s in Republic of Moldova, applying reform measures in agriculture, the appearance of the private propriety on the farm land fund and also on animals and products of animal origin and coming considerably closer of the economic relations with the European Community led to the necessity of harmonizing national legislation in the area of norms of organizing formal controls specific concerning the food for human consumption. Ensuring the food quality involves an ensemble of measures applied on the whole food chain, starting with the agricultural production, continuing with the processing and placing it on the market for the final consumer and it represents a prerogative of the national policies in the area of the food security and population health. Reorientation of the food export, traditionally destined for the Commonwealth of Independent States until 1992 for the European Union market or for the countries of the Middle East or South-East Asia, with a request of increasing, led to the necessity of modernizing the ways of production and applying certain efficient systems of the quality management, including the control performed by official institutions.

Literature Review

According to writers Enciu and Meleșco (2012), consumers have the right for the consumed food to be without any dangers for health and the personal consumption. In order to align to European norms, Republic of Moldova has developed and recently approved a series of normative acts in the governmental official control in the agri-food industry. Munteanu Pila and Stanciu (2019), proposed a comparative presentation and analysis of Romania and the Republic of Moldova from food security perspective. Although there are important differences between the two countries in providing food for the population, there are also common issues specific to food security. both countries are confronted with the dependence of the import national food market, and the lack of coherent strategies dedicated to food agriculture and food security, the rapid changes in the agricultural sector, as well as in globalization and trade liberalization, lead to rapid changes in the consumers' needs and demands on the food's quality and safety, food security, nutrition, legislation and control.

The first stage in adapting the system of official control to European regulations the Law 590/1995 was adopted, concerning the standardization to national level, followed by regulations concerning the plant area (1996-2016), the consumer's security (Law 105/2003), aspects concerning the food (Law 78/2004), ecological production (Law 115/2005) or the animal production sector (Law 231/2006) (National Agency for Food Security ANSA, 2020). The activity of the sanitary-veterinary sector is regulated by Law 221/2007. The normative act above-mentioned has put the foundation for official controls in the sanitary-veterinary sector and also regulating the authorization in the sanitary-veterinary of the activity of the units of economical profile. The initial legislation was completed with a series of legislative regulations, so that at the moment on the agency's web site are present about 25 laws specific to the area (ANSA, 2020).

To ensure the food security it's necessary to consider all the aspects connected to the chain of growth, production and even placing the food on the market as a whole continuous process, due to the fact that these elements separately among themselves can influence the quality of the food production (Brădățan and Enciu, 2007. In the actual conditions the legal and methodical support, of the institutional structures, of the human potential and the necessary material, general evaluation of the food security in the food chain proves that the weak links are the final ones: companies of public and trade food enterprises (Opopol, 2014). The recent increase in fraud in the food sector, but also a better organized activity of official controls in the field was presented by Munteanu Pila and Stanciu (2018). Proper management of natural resources can allow the sustainable use of agri-food products in Moldova, being required a number of monitoring and control measures at the national level.

Materials and Methods

In the conducted research were used statistic information from the reports of the National Agency for Food Security from Republic of Moldova concerning the multi-annual national plans of control between 2016-2018. For the bibliographic research were used specialized publications selected from the data basis Google Academic, Clarivate Analytics or Scopus. The statistical data were analysed and the obtained results were interpreted based on the national legislation to highlight the efficiency of the authority of control and appreciation of the degree of conformity from the food area of Republic of Moldova with legislative regulations in force.

The Food Quality System in Republic of Moldova

Ensuring the quality of the agri-food products has become a necessity in Republic of Moldova, in the technological conditions (that allows producing certain products with superior physicochemical and sensory properties), of the globalization and dynamic properties of the quality (Agrobisznes, 2020).
According to the National Strategy in the area of the food security, the responsibility for regulating the policy concerning the food security lays on the Agriculture, Regional Development and Environment Ministry, being partially shared with the Health, Labor and Social Protection Ministry or other institutions (Government of Republic of Moldova, 2019).

The consolidation of the quality infrastructure in Republic of Moldova was started in 2006, at the same time with the Quality Infrastructure Conception that rationalizes the modernization of the legal framework, is based on the standardization norms, on the evaluation of the product conformity and on a national program to elaborate technical regulations, the already existent legislation, but without consistency support within a clear conception of development of the quality infrastructure at national level.

Subsequently, the institutional aspect of the food security being approved in 2011, the National Strategy in the food security area in the period between 2011-2015, a document that was going to stabilize, based on certain reference models of certain European States, a personal approach of organizing the food security and of execution of the institutional structure responsible for this area.

The main directions concerning the modernization of the quality system in Republic of Moldova included:

- **National Standardization System**

The standardization of products and services in Republic of Moldova is based of Law 590/1995. Executing the national policies is the attribution of the Standardization Institute of Moldova (ISM), public institution subordinated to the Ministry of Economy that carries its activity in accordance with the provisions of the Law 20/2016 concerning the national standardization. SIM (ISM) organizing and functioning are regulated through the government's decision No. 996/2012. The standardization of the food in Republic of Moldova is voluntary, being marked with the "SM" logo. The standardization becomes mandatory, if adopting a certain technical regulation makes reference to a specific standard. At the moment about 27,000 standards (of them about 6,000 related to the European ones) are adopted in Republic of Moldova. The Standardization Institute of Moldova is responsible for the adoption of the European standards (EN) and international (ISO) in the food area, for e.g.: test methods, national sampling methods etc. For the agri-food export, necessity of national standards is established in the delivery contract (Source ISM, 2020).

- **Technical regulations in the agri-food area**

Technical regulations represent the basis determining the minimal requests for quality and security that the agri-food products must have. The system is founded by the Government's Decision 873/2004 "Concerning the approval of the National Program for the elaboration of technical regulations", completed by Law 420/2006. National technical regulations usually are elaborated based on international standards, but if there are national standards elaborated according to the international ones of relevant regional ones, then they'll become the basis of those technical regulations. In Moldova there are over 100 technical regulations adopted at the moment and the level of the agri-food chain (where about 40% regulations are concentrated), governmental decisions include technical regulations for each product category placed on the market (Source Agrobisznes, 2015).

- **Assessing the compliance of products with legal requirements**

The agri-food conformity evaluation is correlated to the National Standardization System and the ensemble of technical regulations in the agri-food area. The evaluation activity of the conformity if regulated by the Law 235/2011. When commercializing the food products, the trader has to have a certificate of conformity (issued by the certified organ), a tests report (issued by an accredited laboratory) or a hygienic notification, as it is established in regulations. For products intended for export, the existence of the conformity certificate isn't mandatory, if in the export contracts it isn't indicated the obligation of this certificate or if this conformity certificate isn't a necessity for the importing country (Agrobisznes, 2015).

- **Quality Systems Management (ISO, HACCP)**

In Republic of Moldova, the norms of the Hazard Analysis and Critical Control Point System HACCP become mandatory starting with 2010, according to the Government's Decisions 412/2010 and 435/2010 concerning the hygiene rules and food products. The HACCP system started being implemented in our country starting with 1998 in the units of producing preserves, due to the external partner's requests. The HACCP didn't get a generalized spread at the national level, although it is mandatory for processor categories. According to Agrobisznes, in 2015 the exact number of factories that implemented the HACCP system in Republic of Moldova isn't known (Agrobisznes, 2015).

National Institutions with attributions in food quality assurance in Republic of Moldova.

The strategy of Republic of Moldova of agricultural and rural development for 2014-2020 (approved by the Government's Decision No. 409/2014), and the Strategy concerning the food security for 2018-2022 (approved through the Government's Decision No. 1150/2017) have the main objective of ensuring a fair living standard for farmers, stable supply with food secure for consumption for affordable prices for consumers.

According to official regulations, the competent authorities with responsibilities in the food security area are:

- Ministry of Agriculture, Regional and Environment Development,
- Ministry of Health, Labour and Social Protection via The National Agency for Public Health,
- Ministry of Intern Affairs,
- Ministry of Defence,
- Ministry of Finances, via the Customs Service
- National Agency for Food Security, that is supposed to coordinate the authorities in the food security area.

National Agency for Food Security ANSA

ANSA is the administrative authority with national activity responsible for implementing the government's policies in the area of regulating and controlling the security of the food and in the sanitary veterinary area, zootechnical, of plant protection and the phytosanitary quarantine, seed control for food security, quality of primary products, food products and food for animals. Having in its structure the Direction for the control of quality and quality systems, ANSA has become the main factor in ensuring the agri-food quality during the whole production chain, according to the concept "from pitchfork to fork".

The Agency was created in 2013 by the Government Decision Nr. 51/2013, by reorganizing some central national institutions with control functions and surveillance in the sanitary-veterinary area, phytosanitary surveillance, public health surveillance (Sanitary-Veterinary Agency and for the Food Security of Animal Origin - responsible for implementing and monitoring the policies and strategies in the sanitary-veterinary area and the security of the Food of Animal Origin; The General Inspectorate for Phytosanitary Surveillance and Seed Control - responsible for implementing the government's policies in the phytosanitary quarantine area, protections of plants, seed control, and also cereals' quality and the derived products, producing and trading tobacco and tobacco products). (ANSA, 2016). ANSA activates based on Law Nr. 113/2012 concerning the principles of stability and general requests of the law regarding the food security No. 221-XVI/2007 regarding the sanitary-veterinary activity, on Law 228/2010 regarding the protection of plants and the phytosanitary quarantine, and also a Government's Decision No. 600/2018 regarding the organization and functioning of National Agency for Food Security.

The procedure and the method of performing official controls in the sanitary-veterinary and phytosanitary areas are regulated at national level via specific legislation, available on the agency's web site (ANSA, 2020). A specific element, that differentiates the agency's activity compared to other authorities of control in Republic of Moldova, is that the planned controls aren't announced beforehand, as with other official institutions. This element increases the degree of objectivity in evaluating the unit submitted to verification, ensuring an identification of the potential risk factors in that exploitation.

The Multi-Annual National Plan of Control in Republic of Moldova in supervising the food products, of animals' health and plants' health is a strategic document that stipulates the governmental functions delegated to the National Agency for Food Security. The document provides the measures that are going to be taken in the period between 2016-2020 during the official control in the mentioned areas and offers oriented, including for the stipulations of the plans for yearly controls (ANSA, 2016). Organizational structure of the agency includes 23 territorial entities and 7 inspection posts at the border. The agency's selected staff comprises 1330 jobs, and 223 of them are in the central structure, 150 inspection posts at the border and 957 in the territorial subdivisions. Actually, in the ANSA, in 2019 there were 1,144 employees and their distribution if represented in Figure 1.

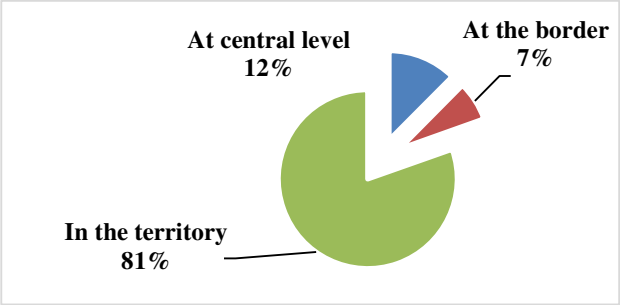

Figure 1: Distribution of the ANSA employees on divisions (2018)
Source, The Author, based on ANSA (2019).

The biggest staff deficit in 2019 is seen at the central level, there were 88 jobs aren't covered (Figure 2). Because of the staff shortage, the agency registered a decrease of the number of official controls done in the area of animals well-being and protection, doing activities of official control reported to the number of objectives that must be verified being effected (ANSA, 2019).

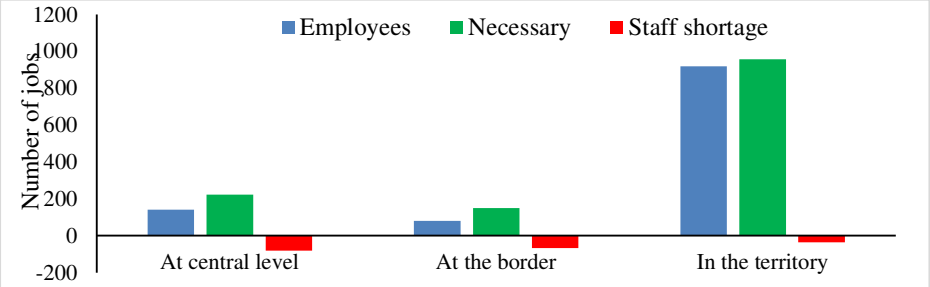

Figure 2: Covering the necessary staff for ANSA (2018)
Source. Author, based on ANSA (2019).

ANSA exerts the quality of founder in certain public institutions that have administrative and technical control on these institutions.

- The Republican Centre for Veterinary Diagnosis is a national reference laboratory in the veterinary area, food security and food for animals, areas of competence of the centre being the following ones (Government of Republic of Moldova, 2018):

- Laboratory investigations concerning the animal's health;
- Laboratory investigations in the area of security and quality food of animal origin and food for animals;
- Laboratory investigations in the area of verifying the quality and the harmlessness of medications of veterinary use;
- Evaluating the risk and scientific research in the area of activity;

- The public institution "Central laboratory of testing the alcoholic and non-alcoholic beverages and preserved products" IP "LCTBANPC", the Center's areas of competence being the following ones (IP "LCTBANPC", 2018):

  - Providing analysis services regarding the security and quality of the food, of the raw materials and alcoholic products;
  - Organizing the lab and sensory analysis for alcoholic products and food products;
  - Providing evaluation services of alcoholic products conformity and food products;
  - In other areas, through legislation, including the founder's documents, in the laboratory's competence;
  - Testing the quality and harmlessness of the alcoholic products, collected by the organs performing control and surveillance of the alcohol products;
  - Doing the arbitration tests regarding the quality and harmlessness of the alcoholic products;
  - Providing the methodological help regarding the done control on the quality and implementing new methods of testing the quality and harmlessness of alcoholic products;
  - Elaboration, revision and execution the technical-normative documents;
  - Implementing methods of control of the quality and harmlessness of alcoholic products according to European and international practices;
- The Central Phytosanitary Laboratory performs their functions of control, supervising and monitoring of the National Governmental Programs in the phytosanitary area, as it follows (Ministry of Justice, 2020):

  - Verification and identification of the phytosanitary situation, plants protection and nutrition, soil fertility;
  - Verification of the quality of products of phytosanitary utility, pesticides residues in plants and vegetal products;
  - Verification of the seed and seedling material quality, the agri-food products quality and of the products involved in the ecological agriculture;
  - Providing testing services regarding the harmlessness of products of phytosanitary utilization.

Control points at the border are responsible for the sanitary-veterinary and phytosanitary at the border of living animals, food and plants, animal feeds, medications, pesticides in order to protect the animals and plants health, public health, preventing the introduction of epizootic diseases on our country's territory. The rehabilitation the Check Points at the Border, done with the financial support of the World Bank Group is integrated in the concept of implementation of the unitary system of official control. During this activity, the reconstruction and re-utilization of five check point at the borders with the European Union and Ukraine: PCF (Check Point at the Border - CPB) Leușeni, PCF (CPB) Giurgiulești, PCF (CPB) Palanca, PCF (CPB) Criva and PCF (CPB) Tudora.

The way of performing official controls and supervising the products of animal and non-animal origin, of units of retail and public food, of pharmaceutical products for veterinary use, of animal food are provided in the National Multi-Annual Plan of Control of ANSA. The yearly plans for monitoring residues concerning red meat, products of meat, eggs, natural honey and fish are also elaborated.

Execution of governmental official controls takes place in two situations:

- Control actions performed according to the yearly plan, done according to the planned control

- Unforeseen official control, if there is a complaint made by a consumer, another third person or when possessing truthful and probative information that in that controlled unit there are risks related to food security (Figure 3).
-

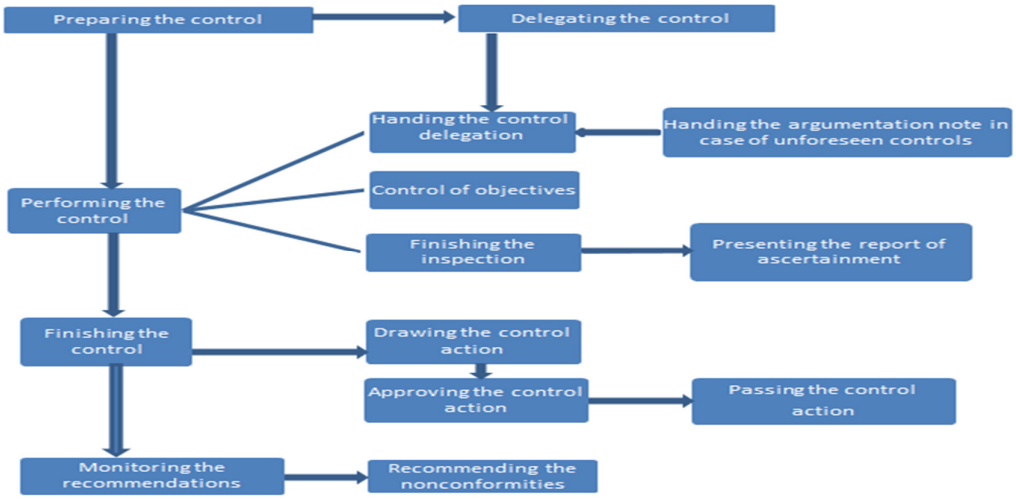

Figure 3. The structure of governmental official controls concerning the food security
Source: Authors, by using Law No. 131/2012.

The unforeseen control is compulsorily accompanied by the control delegation and by the informative argumentative note, respectively of motivation regarding the initial unforeseen control from the office. Harmonizing the legislation in the sanitary-veterinary area under the control and accomplishing it by the veterinary doctors of free practice.

Ministry of Agriculture, Regional and Environmental Development

According to the Government's Decision 695/2017, the Ministry of Agriculture, Regional and Environmental Development elaborates documents of policies, of projects of legislation in the food security area and executes the function of founder of the National Centre of Verification and Certification of the Vegetal Products and of the Soil, and also of the Agricultural Informational Centre, responsible for implementing the e-Agriculture strategy, of informational automatized systems of administration and of management of business processes in the agro-industrial area, including the functional improvement of the Agency's activities.

Ministry of Health, Labour and Social Protection

Via the National Agency for Public Health ensuring the identification, evaluation of the management and communication of risks in the area of the harmlessness of food products for public health, of the population's health and nutrition; preventing disease caused by food products; epidemiological research and registration of disease outbursts caused by food; supervising the health situation and the level of knowledge of the staff regarding the hygiene norms in the units that produce, store, transport and trade food products or provide services of public catering; authorizing and supervising on the market of the new food, of the food supplements, fortified food products, mineral waters, drinking water from the system, of the nutrition and health mentions inscribed on the food products, of the materials that come in contact with food products, food additives, food for infants and toddlers, of the food for special nutritional destination; warning and supervising the nutritional labels of the food.

The Ministries of Internal Affairs and of Defence have attributions in the area of the food quality established, especially in situations in crisis.

Ministry of Internal Affairs MIA

The attributions of the Ministry of Internal Affairs in the food area mainly refer to supporting ANSA's actions, if needed and if there are specific crisis situations / food crisis. In emergency situations, MIA ensures via the Material Reserve Agency, from the State Reserve, the products and the goods strictly necessary for operational interventions for the protection of the population, economy and national security, according to the established procedures.

Ministry of Defence

In crisis situations, the Ministry of Defence coordinates and organizes the activity of sanitary-veterinary inspection and for the food security in the structures of the Ministry of Defence, they coordinate the elaboration of regulations specific for the inspection sanitary-veterinary and for the food security in the military units, it controls and monitors the operators from the food business who carry their activity in the spaces that belong to military institutions; they find and report the contraventions from the sanitary-veterinary legislation and for food security; they elaborate periodical reports regarding the activity of public and sanitary-veterinary health in the area of food security.

Ministry of Finances (MF), via the Customs Services collaborates with the staff with control attributions within the Agency to eliminate the risk of introduction in Republic of Moldova of goods that don't meet the sanitary-veterinary requirements established in the legislation in this field. Furthermore, the MF exercises the function of point of contact within the SRAAF and they take part to information exchange within the system, accordingly to their competences.

The National Agency for the Consumer Protection

The agency in an administrative authority subordinated to the Ministry of Economy and Infrastructure, responsible for implementing policies in the consumer protection area and for executing the governmental control regarding the product compliance and/or of services placed on the market to the requirements required or declared and respecting the provisions of the normative acts in the area of the legal metrology, of norms and rules for carrying out trade activities (Ministry of Economy and Infrastructure, 2020).

The National Agency for Public Health

The supervision of the public health, occupational safety, circulation of medications and para-pharmaceutical products, controls of medical devices, including their radiology and nuclear safety, of the provided medical services, the pharmaceutical activity, the activity regarding the transplant area. Consumer protection in the medical, pharmaceutical and para-pharmaceutical products area, of the provided services by the pharmaceutical and medical institutions, and also in the area of other products and services made available for the consumer by the pharmaceutical and medical enterprises and institutions (Ministry of Economy and Infrastructure, 2019). According to the last legislative harmonization, ANSA took other the competence of control on the entire production chain and food circuit. Starting with 2018, after legislative modifications, the agency holds the whole control without interrupting or initiating the delegation of certain decisions by other control authorities regarding the applying sanctions or restrictions about food or managing certain crisis situations, as it was until 2018 when the authority had to delegate certain situations to the National Agency for the Consumer Protection or the National Agency for Public Health.

Conclusions

Confronted with many internal and external challenges, the infrastructure of the agri-food quality in Republic of Moldova enforces the modernization measures in the legislative framework and of the agri-food succession flow. Founding the National Agency for Food Security - ANSA, simplified in a certain measure the activity of the profile public institutions, that were concentrated in one single authority.

Reforming the national system of regulations in the area of quality and its harmonizing to the European requirements represents a lengthy process imposing efforts from the side of both national and local authorities and also traders with food profile.

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Web Accessibility Assessment and Universal Access

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Abstract

The advancement and diffusion of Web technology forced the availability of information with quality and easily accessible. Such requirements have actively engaged Human-Computer Interaction (HCI) research community to ensure that IT interfaces can be used on an equal basis by users with disabilities and older users. It is therefore essential that the interface is easy to use and that it meets the expectations and needs of all users.

The advancement and diffusion of technology, particularly the Internet, requires providing quality and easily accessible information. These requirements confirm the relevance of the role of the interface as the main element of user interaction with information systems.

The development of interfaces that satisfy users with different needs, use their motor and perceptual, cultural and social skills is not a simple task. According to several experts and pioneers in HCI, interfaces must be built respecting the principles of user-centric design, using a high level of use and in compliance with the guidelines of basic accessibility so that all the aspects of a user's experience (UX) in such environments are considered and covered.
We realize that interfaces are still an important research, worth exploring for its potential to create accessible personalized interfaces. That's the aim of this work when proposing a methodology for assessing dynamic websites accessibility which can be applied throughout or in the end of the development phase. This evaluation is based on an open document made available by the World Wide Web Consortium (W3C) regarding accessibility guidelines, a standard to ensure the long-term growth of the Web through the Web Accessibility Initiative (WAI).

Keywords: Universal Web Access; Web Accessibility Assessment; Human-Computer Interaction; Interfaces.

Introduction

Accessibility and Universal Access are not new concepts. However, in view of the population that is aging and of the constantly increasing technological complexity, they become not only timely, but also pivotal for the prosperity of future societies (Stephanidis, C. et al., 2019). In this sense, accessibility standards were established in national legislation. In September of 1999, Portugal regulated the adoption of rules for accessibility to information made available on the Internet by the Public Administration.

Afterwards in June 2000 the European Commission's – eEurope 2002 An Information Society for All – action plan[1] was approved, which included among other measures, the commitment to adopt guidelines on accessibility, Web Content Guidelines Accessibility (WCGA), from the World Wide

Web Consortium (W3C), made available by Web Accessibility Initiative (WAI), on public Websites until the end of 2001.

The accessibility standards defined by the accessibility guidelines for Web content, WCGA2.1 (latest version), allows to meet the needs of different groups and situations through three levels of compliances, namely: A, AA or AAA. Level A is the minimum required for a Website to be accessible by a group of users with a low degree of disability (WAI, 2018).

It is also to be employed by international standardization organizations, which signifies that on a political level it is not only of importance for people with disabilities, but anyone can also benefit from universal access approaches, as it is now clear that one's abilities are constantly changing (Persson et al., 2015).

In Portugal we had to put hands-on work after the publication of a resolution of the Council of Ministers (no. 155/2007) made with the purpose to establish guidelines regarding the accessibility of Government Websites and services and public institutions of the Central Administration on the Internet to citizens with special needs. This resolution recognizes that the 97/99 resolution had no practical effects. With this new legislation, it has been defined that only informative Websites must comply with WCAG 1.0 level A, within three months from the date of its publication, while Websites with transactional services must comply with level AA, within six months.

A task-force has been established with advisory functions, consisting of representatives of the Administrative Modernization Agency, responsible for its coordination, of UMIC - Knowledge Society Agency of the National Rehabilitation Institute - and the Government Network Management Centre – which shall work in articulation with the General-Secretariat of the Presidency of the Council of Ministers, and shall contribute towards the proper identification of technical requirements for accessibility, namely those related to conformance level "A" and "double-A", and provide further cooperation as far as technical advice is concerned. This time we could see the results and real effects mainly on public administration Websites accessibility.

The WCGA guidelines, not being mandatory for non-public Websites, have come to guide and encourage Webmasters to reach a certain level of accessibility in the Websites they manage, certified by posting one of the W3C logos in the homepage.

Brief Literature Review

When the accessibility issues arise, several authors, such as Sloan, D. et al. (2000), Nielsen, J. (2000), Brajnik, G. et al. (2006,2008), Rutter, R. et al. (2007), Foley, A. (2011), Stephanidis, C. (2011,2014), within many others, started to systematize and study the assessment of accessibility (and usability), establishing different methods and variables for practical application. Several studies and methodologies have recently appeared, combining objective and subjective measures, using manual or automated tools. We have selected a few representative publications between 2015 and 2020; it is well known, within the IT community that five years is a long time due to its rapid transformation and evolution.

Aizpurua (Aizpurua, A., et al., 2015) published an article in *the Computers in Human Behavior* journal about what extent the expectations and confidence influence experienced accessibility on the Web. Coming to the conclusion that the evidence suggests that compliance with accessibility standards does not always guarantee a satisfying user experience on the Web. So, to fill this gap and in order to meet the literature indications, its decisive address the expectations users have about online content and functionalities. To do so, 11 blind participants were involved and enquired through interviews and questionnaires about 12 tasks they completed in four Websites. They found that "Identifying the nature of expectations is key (i) to formalize more exhaustive user testing protocols and (ii) to complement and complete existing accessibility guidelines."

Crespo et al. (2016) developed an automated tool to analyse Websites to detect accessibility problems automatically; after this, a guided assistant is used to offer adequate solutions to each detected problem. This approach can be useful to improve the level of accessibility of many Websites for people, besides experts.

Later, Schmutz, S., et al. (2016) questioned if the Implementation of the recommendations from Web Accessibility Guidelines would also provide benefits to nondisabled users, assured that contrary to some concerns in the literature and among practitioners, high conformance with Web accessibility guidelines may provide benefits to users without disabilities. Recognizing that the user's evolvement became fundamental at some stage of the Website development.

A year later, we found an interesting investigation from Aline Silva (Silva, A. B. P. D, 2017) about the ccontinuous assessment of accessibility to support the evolution of Websites. A study was carried out, supported by an automatic accessibility assessment a tool and a questionnaire adapted to support developers on finding and fixing the accessibility faults. A direct contact was used too, to alert the Website managers about the faults founded. Due to the lower adhesion and realizing that if these faults, if not validated again by experts or with the support of the tools, will cause a regression in the quality of the Website. This work had as main objective "to test the hypothesis that the adoption of a continuous process of validation of accessibility of Websites allows to keep them accessible, despite maintenance and modifications made throughout its existence" (Silva, A. B. P. D, 2017).

Still in 2017, Abduganiev, S. G. (2017) made a comparative study towards automated Web accessibility evaluation published in The International Journal of Information Technology and Computer Science. The purpose of this empirical research was to assess and compare eight popular and free online automated Web accessibility evaluation tools (AWAETs).

The main motivation was the necessity to "emphasize that one should not forget that the disabled are also human beings and they are in large numbers" once they consider the average accessibility level of sites to be very low.

The conclusions were compiled on a final report where they reported nineteen pros and fourteen cons of AWAEMs, fifteen recommendations for the AWAEM's quality improvements. Since then, it was possible to fix the cons founded and choose the AWAET more appropriate to each case and "consequently contribute to rational use of AWAEMs in evaluating and enhancing Web accessibility".

Few months later, Abascal, et al. (2018) published a study *in the Web Accessibility. Human–Computer Interaction Series*, about the same subject: Tools for Web accessibility evaluation. More tools came up to perform diverse types of automatic accessibility evaluations and on-site and remote evaluations with users can also be supported by specific tools. Even manual evaluations may be supported by crowdsourcing-based tools. It was necessary to investigate the importance of these innovations in the advancement of Web accessibility. This study concluded about the need for tools-based Web accessibility field and made a review about the main characteristics of those tools used in this area, providing insights about their effectiveness.
Acosta-Vargas, P., et al. (2018) presented a paper, in the *International Conference on Information Theoretic Security,* where they propose a combined method for evaluation of Web accessibility grounded in several studies that recommend combining some methods with each other to achieve better results. In this study they applied the Web Site Accessibility Assessment Methodology (WCAG-EM) considered in the Web Content Accessibility Guidelines 2.0 (WCAG 2.0). From the results, we conclude that most tested Websites can achieve an acceptable level of compliance and as future work they will focus on optimizing this combined approach originating a guide to help develop more inclusive Websites.

A very recent study published in *Interacting with Computers* journal, from the seniors researchers, Brajnik & Vigo (2019) took a step forward as they realize "the fact that several Web accessibility metrics exist may be evidence of a lack of a comparison framework that highlights how well they work and for what purposes they are appropriate." So, it wasn't a matter of guidelines compliance, yet criteria

that can be used to assess the quality of existing metrics and to analyse some of the automatic ones. The they propose and demonstrate a feasible framework that comprises validity, reliability, sensitivity, adequacy and complexity of metrics in the context of four scenarios where the metrics can be used. The insights obtained lead to "focus more on quality aspects of accessibility metrics with the long--range goal of improving the effectiveness of accessibility engineering practices."

Most part of the studies presented referred that the results obtained, after applying WCGA or any metrics (automated or not), were very accurate, but only useful to confirm the formal aspects of the Website. In other words, it wasn't possible to conclude whether it is, in fact, fully usable by users with disabilities. The accessibility of the Website cannot be summarized using a single, quantitative accessibility score, only observing real users interacting with the interface, can be conclusive about the real degree of accessibility of the Website.

Pereira, L. S., et al., (2015), "in order to ensure the access of the visually impaired to all information provided online it is necessary to remove existing barriers on the Websites through several existent approaches, from recommendations to Web development to validations of existing Websites" developed a methodology for a preliminary Web accessibility evaluation method through the identification of critical items with the participation of visually impaired users. Only during the user's navigation through the Website would be possible to detect interaction issues. So, "in this scenery, this study uses previous researches on the subject and Web accessibility rates in order to identify those barriers commonly founded by these users with total visual impairment, as well as to come up with a list of recommendations in order to optimize the evaluation process." This research contributed with a methodology to conduct evaluations with insights from the real users and the visually impaired users.

With regard to user's participation, Borsci, S., et al. (2015) presented a paper, on a scale of satisfaction assessment involving disabled users in the usability testing of Websites, in the International Conference on Human-Computer Interaction. They implemented a usability test with blind and sighted users to observe the differences between the two evaluation. As they say, "the insight of disabled users could be a key factor to improve the usability of those interfaces which aim to serve a large population, such as Websites of public administration and services. If the Website is usable it must be accessible, once usability encompasses accessibility Yesilada, Y., et al. (2015)

To sum up this brief review, although the few studies with real users, the recommendations from the literature indicate that not to stick with assessing compliance with WCGA or other standards for Web accessibility but, complement the study, whenever possible, with real users.

Now and in what regards to the assessment methodology itself, we could observe a wide range of automated tools mentioned above. While doing this, an obvious question arises: should we use only automation tools, manual tools or a combination of both?

As the literature says, trough the more influential authors in the last 30 year like Nielsen, J., Loranger, H. (2006), Rutter, R., et al. 2007), Brajnik, G. (2008), Foley, A. (2011). Stephanidis, C., & Antona, M., 2014), Shawar, B. A. (2015), (Crespo, R. G., et al., (2016), Silva, A. B. P. D. (2017), Gonçalves, et. Al. (2018), (Abascal, et al., 2018), (Acosta-Vargas, P., et al., 2018), Stephanidis, C., et al., 2019), the automated tools are very useful, providing significant insights to the evaluator, specifically in what regards to formal Website's structure. On the other hand, manual tools can become impractical in medium or large Websites.

Recently, Mucha, J. M. (2018) conducted a study with a combination of automatic and manual testing for Web accessibility where his "research confirmed the hypothesis that outcomes from manual and automated Web accessibility evaluation can be combined on the grounds of implemented guidelines. The study has shown that there is no need to choose either manual or automated method of accessibility testing. Both methods can be deployed in a synergistic way and complement each other." The integration of manual and automated evaluation (WTKollen testing tools), can cover up to 57.9% of the criteria of WCAG 2.0 on Level AA. Previously, the maximal coverage for testing, using only one method (either automatic or manual) was equal to 42.1% and 28.9%, respectively.

An integrated methodology to assess Web accessibility, combined with manual and automated methods, can become a very useful tool to uncover different type of inconsistencies. In the next section a proposal is depicted, which can be used, simultaneously by the experts as well as the non-experts.

Methodology: Methods, techniques, and tools

This section is proposed as a methodology grounded on the review of the literature and on the information analysis provided by the WAI form the W3C to assess the level of compliance of a dynamic Website along the standards defined by the accessibility guidelines for Web content, WCGA 2.1 [5]. The main guidelines are grouped into four principles: Perceptible, Operable, Navigable and Robust.

We believe that the first step in assessing the accessibility of a Website is to conduct a preliminary study, to detect the most evident accessibility problems with the Easy Checks – A First Review of Web Accessibility, a document provided by WAI (Easy Checks – A First Review of Web Accessibility). This can be performed by free automated Tools (WebDev Toolbar, which is an extension added to the browser).

This first review covers just basic accessibility issues; we can confront this result with a more robust assessment to evaluate accessibility widely in order to fix the main issues.

According to the specifications found in the WAI, also supported by the literature, one of the most effective strategies to test the accessibility of a dynamic Website would be:

1. **Define the scope of the evaluation**
2. **Use tools for automatic assessment of accessibility on the Web**
3. **Manually evaluate examples of representative pages**
4. **Summarize and present the results**

The action plan must consider specifically the compliance with the requirements displayed on table 1.

Table 1. Action Plan

ACTIONS	REQUIREMENTS
Action 1. Define the scope of the assessment. the scope must be stated in order to define boundaries of the study.	A1.1. Specify the level of compliance (A, AA or AAA) with WCGA 2.1; A1.2. Select a sample of representative pages of the Website for manual evaluation according to certain criteria and; A1.3. Select a URL (uniform resource locator) for the Website or an expanded selection, for automatic and semi-automatic evaluation.
Action 2. ***Use tools for automatic assessment of Web accessibility.*** It is recommended the use of at least two tools as it helps to eliminate potential errors in the identification of accessibility problems.	A 2.1. It is advisable to use at least two tools in the sample of selected pages, e.g. Wave [12], Taw [13], and to run at least one tool throughout the site (or in the selection of expanded pages); A 2.1. In this way, the validation of mark-ups is obtained, including the syntax and style of the pages;
Action 3. Manually evaluate examples of representative pages.	A 3.1. Examine the pages using at least three graphic browsers, in different versions and platforms.

Manual assessment is somewhat less objective than automatic, with the exception of the directives defined by the WCGA, which are carried out directly, with little room for subjectivity. But it will not be entirely preventable due to the high number of situations that are not likely to be integrated into automatic tools.	A3.2. Examine the pages using specialized text browsers, e.g. Lynx [14], Opera [15] and specialized voice browsers, e.g. the Home Page Reader [16], Jaws [17]. A 3.3. Read and evaluate the content of the pages, checking that the text is clear and simple in its entire length, in a manner appropriate to the purpose of the Website.
Action 4. Summarize & present the results. Refer to the problems and best practices identified on each type of page; the representative URL, as well as the method by which it was identified. Recommend particular attention to the aspects described below.	A 4.1. Correct the accessibility barriers identified through the conformity assessment process; A 4.2. Expand the positive aspects of the Website; A 4.3. Ensure continuous maintenance, as well as Website monitoring.

This preview review, in addition to enabling the identification of significant accessibility barriers, to be eliminated before carrying out the evaluation with users, also helps to define the key points to be tested posteriorly with users.

User's Involvement in Assessing Accessibility

Although checking compliance with accessibility standards remains mandatory, the participation of the users, as we mentioned earlier, helps to understand how the Website really works. The test using disabled users or elderly users permits identify problems that will not be detected using only conformity guidelines assessment.

One of the first studies carried out in the United Kingdom in the early 2004, it's an evaluation report of the commission on the rights of people with disabilities, in which presents great differences between the results obtained in the evaluation according to the standards or according to the users. Means that standards compliance and users tests are not mutually exclusive; on contrary: should be used simultaneously, combined in a proper way naturally.

User involvement bring many advantages, but it is not enough to determine whether a Website is accessible or not, and must be jointed with the assessment of compliance, with the rules to ensure the accessibility of the Website to users with different degrees of disability.

Years later, Aizpurua, et al., (2016) explored the relationship between Web accessibility and user experience (Norman, D. Nielsen, J., 2016) and concluded that understanding the interplay between the user experience (UX) and Web accessibility is key to design Web sites that beyond access, could provide a better UX for people with disabilities.

According to the WAI (2020) disabled or elderly users can be included in a wide variety of assessment activities, from brief consultations to large-scale usability studies, specifically:

> **1.** ***Informal assessment*** of a specific issue, e.g., someone using a screen reader (speech synthesizer) or a special browser that allows you to use only the keyboard and not the mouse.
>
> **2.** ***Testing the formal usability*** of a Website according to a specific protocol to obtain quantitative and qualitative data from specific tasks performed by users. These usability tests can be optimized and address specific accessibility issues.

Last but not the least, according to a WAI document, (*involving users in Web Accessibility Evaluation,* 2020), conducting informal assessments throughout development is more effective than usability testing at the end of the project. The inclusion of users at the beginning of the project helps to understand accessibility issues in the real world, such as people with disabilities or the elderly who use

the Web with adaptive strategies, (e.g., increasing the font size in a common browser) and assisted technologies (e.g. screen readers, screen magnifiers, speech recognition software, selection buttons instead of the mouse and keyboard). Resulting in better end products for users and ensuring a more efficient Website development.

Conclusion and Future Work

Trough out this work was described a methodology, grounded by the literature, for assessing the accessibility of a Website, combining automatic, semi-automatic and manual tests. Compliance with the WCGA 2.1 guidelines was the starting point of the assessment, and once verified, guarantees the accessibility of the Website to a group of users with certain physical disabilities.

As near future work we foresee to apply this methodology to a Website of a digital secretariat of a higher education institution, in order to obtain compliance with accessibility level A: the minimum necessary to guarantee access to the Website by a group of users with low disabilities, such low or lack of vision, or deafness, which allows them to attend or work in an institution not directed to cases of serious disabilities. The evaluation will focus primarily on technical aspects. Thereafter will carry on usability tests with users with physical disabilities, once their experience (UX) helps to ensure the effective application of the technical solutions found WAI (2020).

Results will be published into a user-friendly report format, with recommendations, and made available to the webmaster of the institution, in order to certificate the website as accessible and in compliance with level A WCGA 2.1. Hopefully, soon a logo from W3C will be posted in the homepage.

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Ensuring Food Safety in Republic of Moldova. Controls, Results and Conclusions for 2016-2018

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Abstract

In the current global context, the need for safe food is growing and food security is taking on new dimensions**.** This paper has a double objective. First, it provides a review of food safety system legislation in Moldova. Secondly, an analysis is made of the controls performed in the field of food safety. Moldova has exceptional natural resources, favourable to agricultural production and consistent exports. The Moldovan food safety system has registered some gaps compared to the European food regulations, due to the orientation of exports to the Russian market, until a few years ago. Currently, Moldova has signed partnership agreements with the European Union, allowing food exports to the EU market. The paper assessed the food quality control and monitoring system in Moldova, according to the Annual Reports of the National Agency for Food Safety. In the period 2016-2018, official controls focused mainly on food of animal origin. Planned inspections have steadily increased, while unannounced inspections peaked in 2017. After the checks, specific measures were recommendations, but about 200 food production units were closed for critical non-compliance. The study is an initial stage of doctoral research, which proposes a complex analysis of the agrifood system in the Republic of Moldova and of the measures necessary for compliance with Community regulations,

Key-words: quality, security, food, official control.

Introduction

Moldova has exceptional natural resources, favourable for agricultural production. Fertile soil is ideal for growing corn, fruits and vegetables. Due to its geographical location, the country enjoys a moderately continental climate with short and relatively warm winters and long warm amounts, so that early crops can be grown, giving producers a strong competitive advantage.

The strategic purpose of the internal and external policies of Republic of Moldova is integration in the European Union EU. The association agreement with EU was initialled in 2013 and came into force in 2014. Through this agreement, Moldova made a series of commitments. The document contains 395 instructions and regulations, once applied, will make national legislation to be correlated with the EU acquis. The Free Trade Agreement between Republic of Moldova and EU proposes to ensures the economic integration of Republic of Moldova in the community's market and the gradual liberalization of the good and services trade, reduction of customs duties, of technical and non-tariff barriers. Within the policies of the community states according to the basic principle regarding the food security consists in an integrated approach "from farm to consumer", concerning all the section of the food chain, but it also defines the authority's attributions and functions to remove any superposition of the competence areas. The development of commercial relations outlined between Republic of Moldova and the community states has imposed the application of European principles and practices of official control in the European food security area at national level. Harmonization with food safety control practices in the European market opens up new opportunities for local food producers to access the demands of European countries and creates a competitive environment for Moldovan food producers.

Literature Review

In the context of EU integration, national food security policies have proposed a series of actions to harmonize internal regulations with European ones: Law no. 131/2012 on government control over entrepreneurial activity, Law no. 221/2007 for the sanitary-veterinary activity, Law no. 228/2010 on plant protection and Law no. 306/2018 on food security. Last period, the governmental policies were especially focused on the official control system, methodical and logistics support being ensured and harmonized to the European partnership. Food security policy is based on the efforts of those involved in the food chain: producers, processors, carriers and consumers. Food security must become a common responsibility for those involved in the food market. According to the National Food Safety Agency ANSA, procedures and control mechanisms are needed to ensure food safety for consumers (ANSA, 2016). To ensure food safety, legal regulations must be considered as a continuous process, because if they are considered as separate, the quality of food production could be severely affected (Brădățan and Enciu, 2007).

Materials and Methods

The research used statistical information provided by the Multiannual National Control Plan for the period 2016-2018, presented in the ANSA Reports. For documentation were used specialized publications selected from the Google Academic, Clarivate Analytics data base. The statistical information was analysed, and the results were interpreted according to the national legislation, to identify the efficiency of the official controls and to appreciate the non-conformity degree tracked by the control authority in the agri-food area.

Food safety control system in Moldova

In Moldova, the national authority empowered to conduct official control of foodstuffs is the National Agency for Food Security (ANSA). Moldova's food safety agency was established in 2013 as a single food safety control authority for the entire food chain. Along with the Ministry of Agriculture, the main policy maker, this young institution was the FAO project's main beneficiary (FAO, 2018). A national food safety emergency response plan, and regulations to strengthen the food recall system, were drawn up as part of the FAO project. Risk analysis and risk-based inspections, foresight and intelligence in the food chain, and early reaction to food safety threats are essential capacities for a national food safety system. Food safety risk is reduced by applying good practices and the principles of HACCP (Hazard Analysis and Critical Control Points) all along the food chain – from farm to consumer.

ANSA has responsibilities in terms of ensuring veterinary control and animal welfare: seed control; plant protection and health; phytosanitary quarantine; security of biological, chemical, physical food of animal and non-animal origin; animal health; control of contagious diseases in animals, zoonoses and epizootic agents; supervises and monitors the production, import, marketing, use and storage of plant protection products; veterinary medicines and fertilizers; the supervision and control of residues of pesticides, fertilizers, other contaminants or the supervision of the quality of raw materials, food and feed, as well as other areas related to food safety, animal and plant health. ANSA controls on food safety are based on national legislation, harmonized with European regulations. The research made by Munteanu Pila and Stanciu (2019), showed common issues on food security for Romania and Republic of Moldova: dependence on food import, lack of coherent strategies dedicated to food agriculture and food security, rapid changes in food chain, changes in the consumers' behaviour and high requirements on the food's safety, nutrition and control.

In the action plan for the implementation of the Association Agreement between the Republic of Moldova - European Union EU (2017-2019) the list of sanitary and phytosanitary measures included approximately 241 regulations on the agri-food sector, necessary to be harmonized. Law 306/2018 on food security mentions the basic principles on food security: risk analysis, precaution, protection of consumer, transparency of normative acts and specific procedures for the food field. Parts of the current food safety assurance system are in the early stages of transition to Hazard Analysis Critical Control

Point (HACCP) programs. An important element of Law 306/2018 on food safety is the application of the principles of the HACCP in official controls of the food chain. The application of the HACCP principles in the food sector is not a substitute for official controls by competent authorities (Vieru,2017). Food chain operators must cooperate with authorities in accordance with Community or national legislation.

The food safety system includes producers, processors, shippers, retailers, food preparers, and, ultimately, consumers.

Despite the hardships the food security system encounters, the consumers have the right to get food without any dangers for their health and the personal consumption (Enciu and Melești, 2012).

In Republic of Moldova the official controls in the food security area are performed according to the Multi-Annual Control Plan PNMAC 2016-2020 elaborated and approved, considering the principles and requirements, the law regarding the governmental control on the entrepreneurial activity 131/2012, Law No. 221/2007 regarding the sanitary-veterinary activity, Law No. 228/2010 regarding the plants protection, the Regulation of the European Parliament (CE) No. 882/2004 regarding the guidelines for assisting the member states in elaborating the unique national multi-annual integrated plan of control and of the Commission's Decision 2007/363/EC concerning the guidelines to elaborate PNMAC.

Basic principles of the official control must be: prevention; control based on the evaluation of risks; presumption of innocence; legality and respect the competence; the proportionality of the control and it opportunity, legality and respect the competence. The control will be applied only when absolutely necessary and only when other methods of verifying compliance with the law have been exhausted. The proportionality and timeliness of the control implies the exercise of control as soon as possible, in accordance with the stated reason; proof of control actions and acts; non-compliance with the patrimonial interest of the control by removing the direct breakdown in the budget of the control body, respectively of the financial resources coming from the pecuniary sanctions (ANSA, 2016).

Proportionality and opportunity concerning the length of the control - exercising the control as soon as possible, according to the reason stated by the organ of control; the evidence of all the actions and acts of control; not allowing the patrimonial interest of the control by removing the direct breakdown in the budget of the organ of control respectively of the financial resources coming from the pecuniary sanctions. (ANSA, 2016).

Based on an analysis by Vieru (2017), it can be deduced that the main aspects of compliance with food safety rules include actions to verify the requirements of the national veterinary authority, general hygiene issues and compliance with the production process, monitoring programs and quality documents.

The main objective of the controls executed by ANSA is the inspection of the territorial centres, the analysis of the roads of access, complementary spaces, hygiene maintenance. The inspection of production units requires the evaluation of the hygiene of spaces, equipment and tools, sanitary filters, analysis of technological flow, reception and manage of raw materials. During the inspection, ANSA officials verify the standards of food processing, implementation of Food Safety Management Systems, respectively Good Manufacturing Practice (GMP), Good Hygiene Practice (GHP) and others quality requirements (ANSA, 2018).

Munteanu Pila and Stanciu (2018) analysed food fraud in Moldovan fishery sector, and official controls made by ANSA on fisheries products. The judicious management of natural resources allows the sustainable use of agri-food products, requiring monitoring and control measures at national level.

Official controls performed by ANSA between 2016 -2018

Although the Regulation's provisions (CE) No. 882/2004 doesn't apply to controls concerning the health of plants, official controls of the products of protection of plants for marketing and use. The

Regulation and the Commission's Decision 2007/363/EC concerning the guidelines in elaborating the PNMAC requires to be included in the national plan of control measures referring to these subjects. So the multi-annual plan and the reports concerning the implementation of the Multi-Annual Plan of Control for 2016-2020 reflects the activity on all the components of ANSA's activity. Analysing the data represented in Figure 1 it can see a considerable growth of official controls in 2017 compared to 2016. The planned controls registered a growth of 119,06%, but for spot controls the relative growth (143,13% in 2017 compared to 2016). In 2018 the planned controls registered a growth of 15,52%, and spot controls have decreased of 32,92% compared to 2016.

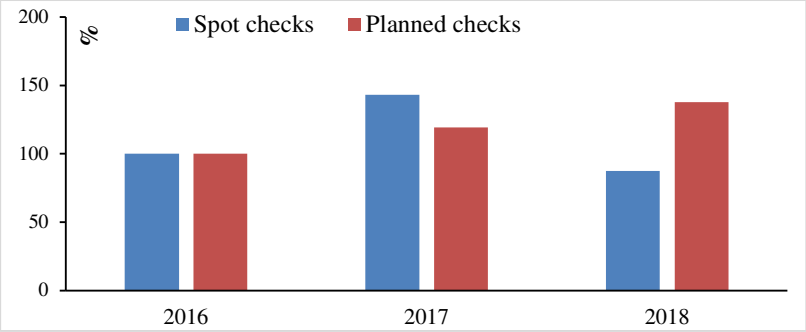

Figure 1: Governmental official controls (2016-2018)
Source: Elaborated by the author based on ANSA Reports (2016-2018)

In order to establish the degree of the risk of the non-conformities tracked after the official controls, the results of the official controls were analysed. The data is systematized in table 1.

Table 1. ANSA actions within the official controls

	Measures ordered	2016	2017	2018
1	Recommendations	3,184	10,828	11,407
2	Contravention fines	571	1634	2,752
3	Suspension of activity	-	76	146
Total		**3,755**	**12,538**	**14,305**

Source: Elaborated by the author based on the yearly ANSA Reports (2016-2018).

Applying the Law 231/2012 regarding the governmental control on food production, three forms of nonconformities established by the national legislation can be identified. So, the actions of the organ of control and the applied measures during the control are reported at three levels of violation of the legislation: minor, major and critical:

- Minor nonconformities - characterized through the possibility of the removal that can take place so that the current activity of the person isn't affected and doesn't create an imminent danger for the environment, life, health and people's property.
- Major nonconformities are characterized through the impossibility of removal during the control being necessary and the possible allocating a time for actions of removal and that creates an imminent, but not immediate, danger for environment, life, health and the property of the controlled person or their employees or it creates an imminent danger, but not immediate, for the society, that isn't removed in the indicated term, it's going to become immediate.
- Critical nonconformities - the removal isn't possible during the control, but these kind of actions have to be undertaken immediately, and it creates an imminent danger and immediate for the environment, life, health and the control of the person's property and /or their employees or it creates an imminent danger and immediate for the society.

For the minor nonconformities, it's recommended ways of removing it. For major, beside the recommendations of removal and offering the term of remedy, sanctions can be applied, but restrictive measures can't be applied. In case of critical situations, removal is indicated, and sanctions and restrictive measures are applied, respectively, suspending the activity of the economic entity. Analysing ANSA data, in 2016 were 15,659 minor nonconformities on food security, and 3,755 major. In 2017 there were 32,190 minor nonconformities, 12,462 major and 76 critical. In 2018 there were registered 30,254 minor; 11,159 major and 146 critical unconformities. Considering global ANSA controls on the food sector, starting from raw material, continuing to food industry and market, it could be considering 3 categories of control *(table 2).*

Table 2. Type of controls made by ANSA

Stage of food chain	Controls (on areas)
Producing the raw material	animal: health; identification and și traceability; well-being; zootechnical supervision; products medicinal veterinary; animal feeds; vegetal: plants health, phytosanitary and fertilizers
Processing	Processing the products of animal origin; processing the products of vegetal origin;
Marketing	Food market, public alimentation and restaurants

Source: Elaborated by the author based on ANSA Reports, (2016-2018)

According to Figure 2, official controls performed in the food sector are focussed on raw materials (57%), followed by processing sector (34%), food trade, consumer protection and public alimentation and public catering occupying the last position (9%).

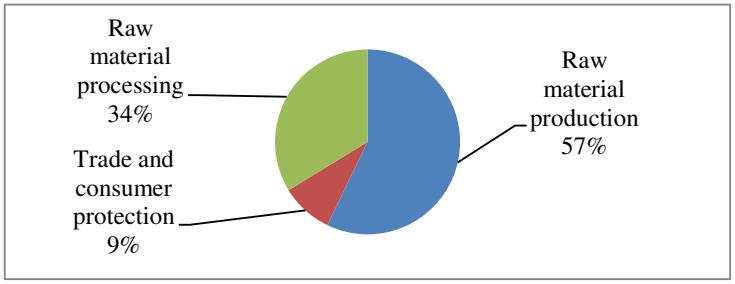

Figure 2: Categories of control, on stages of circulating the product
Source: Elaborated by the author based on the yearly ANSA report (2016-2018)

In table 3, the abbreviation P represents planned controls, and I unexpected (checks) controls, in %.

Table 3: Official controls weight, in the area of producing the raw materials (%).

Official control on agriculture, by the fields:	**2016**		**2017**		**2018**	
	P	**I**	**P**	**I**	**P**	**I**
Animals health	6	49	13	53	23	50
Animals identifying and traceability	2	24	1	5	-	-
Animals well-being	7	25	4	16	-	-
Zootechnical supervision	40	-	67	11	61	20
Medical veterinary produces	3	-	5	1	3	-
Animal feed and nutrition	2	-	3	-	3	-
Plants health, phytosanitary, and fertilizers	40	2	7	14	10	30
Total	100%	100%	100%	100%	100%	100%

Source: Authors, based on ANSA Reports (2016-2018)

According to figure 2, in 2016 the majority of planned controls were made in the zoo technical sector, at it could mention that the areas of animals' health, well-being, intensification and traceability constitutes 15% in total controls made by ANSA. Check controls on the segment of animal's health represents 49%, of total control on the raw materials sector.

In conclusion, it can notice that the official controls in sanitary-veterinary areas regarding the living animals aren't planned applying an incorporated system that would include doubling the planned controls from the same institution of control in one year of economic administration, and also in this system of control prevail a small weight of planned controls compared to the unforeseen ones so as to we can say that the authority mostly applies the form of the unforeseen control, in the absence of conclusions from the previous evaluations on the checked objects that would allow identifying the risk and justifying the beginning of official controls. Figure 3 showed that controls in the food marketing, consumer protection and public catering for 2017 increased with 68,14% compared to 2016 and 6% in 2018. The controls on areas of processing the products of vegetal origin registered a growth of 55,2% in 2017, compared to 2016, and an increasing with 27,3% in 2018.

Official controls in products of animal origin registered a growth of 0,16 % in 2017, compared to the previous year and decrease of -3,7% in 2018, being the segment within the control registered a decrease in 2018, being influenced by a smaller number of performing check official controls.

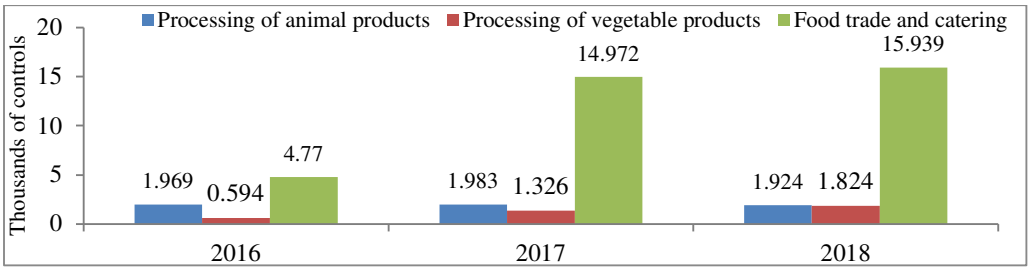

Figure 3: Official controls performed in the process and marketing area.

Source: Elaborated by the author based on the ANSA's reports concerning the official controls (2016-2018)

Analysing the information presented in Table 4 it can notice that in the sector of food products of animal origin, the minor nonconformities registered an increase of 21% in 2017 compared to 2016, but the major registered a decrease of 22%. 53 critical nonconformities were registered in 2017, representing about 3% of the total controls made in 2017 in food processing sector. In 2018 it's registered a decrease of major nonconformities in sector of food products of animal origin compared to 2017 (-13%). On food commerce sector major nonconformities registered an increase of 77% in 2017 compared to 2016, but in 2018 the major nonconformities registered an increase of 24% compared to 2017. In table 1 the nonconformities found were classified as minor (m), major (M) or critical (C).

Table 4: Categories of registered nonconformities

Nonconformities / Controls in food processing	2016		2017			2018		
	m	Ms	m	M	C	m	M	C
Food of animal origin	805	1,164	1,026	904	53	1,110	781	33
Food of vegetal origin	594		967	359		1163	661	75
Food Market	3,612	1158	9,762	5210		9,000	6,907	32

Source: Elaborated by the author based on the ANSA reports regarding the official controls (2016- 2018).

According to Opopol (2014), food control represents a complex system. The purpose of the control is to apply food regulations, in order to protect the consumer from contaminated and fraudulent food consumption. The planning of the annual control plan must take into account the proportionality of the control and the possibility to carry out the control only when absolutely necessary (ANSA, 2016). Based on table 4, it can be observed a significant increase in the number of checks. The national

authority must justify the reasons and the planning of the controls, based on the risk criteria, of the analysis of the results of the previous controls.

Conclusions

Legislation and control are the two components of risk management. The national legislation on food safety transfer the regulatory powers to The National Food Safety Agency ANSA. ANSA must meet the fundamental principles of independence, excellence and transparency to be successful in its mission. The research showed that the planning and performance of controls on food quality was not correlated with the level of risk of the sectors. Authority controls were directed mainly to the marketing of products where fraud can be easily performed. This aspect can also be explained by the dependence of the national food market on imports, mostly from Ukraine. The sector of animal food product, more susceptible to risks and non-conformities, had several controls. The study represents a preparing stage in the doctoral research that sets the basis of extensive evaluations of the food quality system in Republic of Moldova of the necessary measures to align it to the community's regulations. The research has highlighted the national measures for modernizing the food sector through monitoring and control activities, harmonizing the national legislation to the European requirements, the results and progresses made by national authorities.

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Aspects of Increasing the Level of Financial Support of Agricultural Enterprises

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Abstract

The problems of financial support of agricultural enterprises in the context of current conditions are considered. The necessity of the development of the mechanism of state support of agrarian industry in the conditions of economic instability has been substantiated. The main sources of financial support of agricultural enterprises have been investigated and the main ways of their activation have been determined. Specific measures to improve financial and credit support of agricultural enterprises, both at the micro and macro levels, have been proposed.
Keywords*:* investments, financial support, credit relations, state support, mortgage mechanism, credit management systems.

Introduction

Systematic economic transformations of the agrarian sector of the economy in conditions of instability and uncertainty necessitate the adaptation of agricultural enterprises to the market environment. The problem of resourcing enterprises, especially financial, is one of the most acute ones. Unfavorable external financing conditions, reduced budget allocations, and lack of own resources encourage economic entities to improve the use of financial resources. The development of an effective economic mechanism for financial support of agricultural enterprises implies the priority of their own financial resources (attraction, growth, effective distribution, etc.) and creation of necessary conditions for selective state support.

Effective management of the processes of formation, distribution and use of financial resources provides an opportunity for timely financing of operational activities of enterprises, compliance with the terms of their obligations, capital insurance, economic and social development and growth of their business activity.

Analysis of recent research and publications

Important contribution to the development of the theory and methodology of formation and use of financial resources was made by Ukrainian scientists O. Hudz, M. Demianenko, V. Zinovchuk, V. Oparin, P. Stetsiuk, O. Tereshchenko, S. Yurii, Yu. Tsal-Tsalko and others. Scientific studies of V. Aleksiichuk, V. Andriichuk, P. Haidutskyi, P. Kaninskyi, P. Laiko, M. Malik, L. Maslovska, V. Mesel-Veseliak, H. Pidlisetskyi, P. Sabluk, A. Chupis and others are dedicated to issues of development of financial relations of resource-forming and resource-consuming nature in the globalized market environment.

Objectives statement

Within the conditions of economic instability, the range of problems in financing, crediting and government support of agricultural enterprises has increased significantly. This necessitates their assessment, identification of the causes of underfunding and further research aimed at finding the best ways to solve the above problems.

Presentation of basic material of the research

Agriculture, regardless of the level of development of forms of ownership, methods of its organization, has its specific, peculiar to it features that significantly differentiate it from all other sectors of the economy. These peculiarities manifest themselves in the conditions of a market economy under the domination of free competition, where the state does not objectively interfere with the activities of agrarian sector, without being able to effectively participate in inter-industry competition. In most countries of the world, one of the priority areas of economic policy is state regulation of agriculture, within which specific legislative acts are adopted, on the basis of which effective programs are developed that ensure the sustainable development not only of agriculture, but also of all spheres of agriculture as well as the development of rural areas.

The world's realities and extensive historical experience make it possible to conclude that state intervention (balanced, complex and purposeful) is more an objective necessity than a temporary anti-crisis measure. Adam Smith also supported participation of the state in the fate of low-profit and strategically important for the welfare of the society spheres. In the conditions of competitive market relations, banks cannot be "forced" to lend to agro-industrial complex, but it is quite acceptable, with the assistance of the state, to make necessary adjustments to their credit policy, in particular, by developing a motivational component – at the level accepted at the same time for the farmer and his investor. The national priority in the sphere of agro-industrial complex is largely intended to serve as the corrective factor that determines the business and investment climate of the industry in the future.

In today's context, there is a wide range of tools to influence agricultural situation. The range of priorities, as well as the mechanisms of influence, is heterogeneous and conditional, which sometimes causes difficulties in the correct choice and assessment of economic course.

At the same time, we emphasize that stimulating investments in the agricultural sector is an important part of the state's agricultural policy, a central element in the national forecasting system. At least, this does not contradict the realization of the concept of effective demand by J. M. Keynes, the "father" of a scientifically grounded system of state regulation of economy. Increasing food capacity, improving social sphere of rural territories, protecting domestic agricultural producers in domestic and foreign markets are closely and almost directly dependent on the investment block of priorities in the system of state regulation. Only by providing methodological and financial incentives for the implementation and conditions for expanded reproduction in business – activity of objects of agricultural policy (agricultural producers), the government have the right to raise the issue of the effectiveness of political decisions initiated today. The credit should be returnable, but affordable, the system of state leasing should fill the needs of farms adequately and expediently (in terms of minimizing the natural factors for the reproduction of the purchased livestock), and the customs tariff

system sufficiently to protect the producer, as is the case in most countries of Central and Eastern Europe.

In addition, for a system of mechanisms to enhance the investment attractiveness of the agricultural sector to function effectively, potential investors need effective legal protection. Creation of a positive investment climate, development and structuring of its economic and socio-legal content in the form of a complex of the state law on agricultural development, an adequate financial target program of support to the village for the medium term, resolutions of the Government of Ukraine which give the right, while maintaining competitive principles, to take advantage of privileges, subsidies, tax breaks, trade preferences.

The main factors that cause decline in agricultural production, decrease in its efficiency, deterioration of social development of the village and the need to improve financial support of agricultural sector in modern conditions are:

1. Misguided agricultural policy in setting priorities – reforming property relations was preceded by the development of new models and forms of management.
2. The agrarian sector of the economy performs the state's inherent social function of providing population with cheap food and acts as a creditor for other sectors as a whole.
3. Significant discrepancy between prices for agricultural products and material and technical resources (technical means, fuel – lubricants, electricity, mineral fertilizers, plant protection products, cost of services, etc.).
4. The imperfection and almost complete absence of an effective system of financial and credit support of agro-industrial complex.
5. Low level of credit market development for agricultural sector.
6. Agrarian credit subsystem is not formed.
7. A long-term strategy for the development of agricultural sector, taking into account the current conditions, and its social significance has not been worked out.

Overcoming these deficiencies is an important nation-wide problem, the solution of which must be united by agrarian, banking capital – providing active state stimulation.

Research on financial support of agricultural enterprises indicates that these enterprises operate at the expense of their own resources, which today are significant in persentage but not sufficient for self-financing. This leads to the development of both banking and partner forms of lending. Bank lending does not play a significant role in the development of agricultural sector, although there are currently positive trends in the growth of lending by domestic commercial banks, including in terms of preferential lending (Table 1).

Table 1: Amounts of budget allocations and crediting of agricultural enterprises in 2008-2018, billions of UAH. [1]

Year	Budget allocations	Credits granted, total	Including preferential
2008	9,7	10,4	7,6
2009	8,3	12,8	7,0
2010	11,6	14,6	7,8
2011	5,8	20,1	15,1
2012	3,3	5,8	2,6
2013	4,6	9,7	6,2

2014	4,3	12,5	6,5
2015	7,0	13,5	1,4
2016	7,5	21,4	0
2017	9,2	14,6	0
2018	2,7	11,8	3,2

The current state of development of credit relations is characterized by the process of finding new forms of credit support of agrarian vector of the economy in relation to new economic conditions. Changing the conditions of economic environment causes a change in credit relations in agricultural sector of economy (Fig. 1).

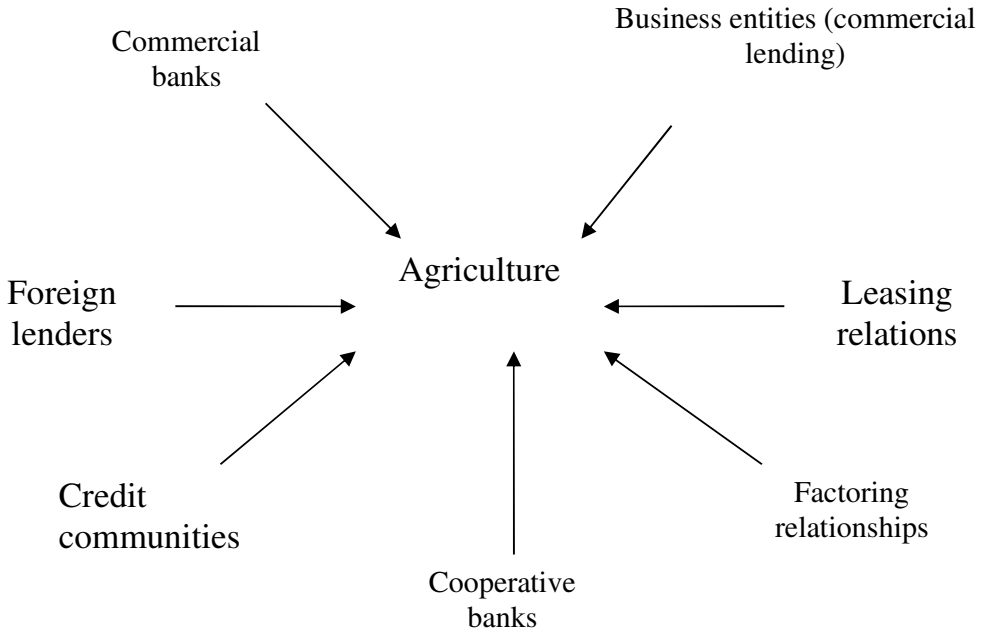

Fig. 1: Potential creditors of agricultural producers*

** Summarized by the authors*

The data in Table 1 show that crediting of agricultural enterprises does not have a stable dynamic, which confirms the absence of a long-term credit support program for the industry.

Economic history of different countries shows that significant credit growth can increase the risks to the economic stability of a country's development. That is why it is believed that the so-called Asian financial crisis of 1997-1998 pp. was triggered by non-repayment of loans by large national corporations. Today, some experts believe that a similar crisis could happen in Ukraine, in particular, the director of European department of International Monetary Fund Michael Doppler. It is believed that a significant economic growth observed in the United States during the 1990s was caused by speculative fever, conditioned by a significant expansion of bank loans among other things [2].
Considering the theory of everyday problem, it should be noted that it has a long history. One of the

first to pay attention to it was J. Mill. "... For almost half a century, there has been no commercial crisis against which the Bank would not be gravely accused of having caused it or strengthened" [3].

Many borrowers and farmers in order to implement their business plans and production schedules are forced to attract up to 2 - 3 loans from different banks within a year. Often, plans are at odds with reality. This alone is a significant factor for the lender of the increased risk of the transaction. In addition, the risk of livestock disease, non-productive crop losses and almost the norm in unstable meteorological conditions, with even a single short-term delay means the extension of more stringent conditions for future credit agreements.

Some concerns among economists, including representatives of agribusiness, cause Ukraine's accession to the WTO on US financial terms. Acceptance of these conditions promises aggravation of competition for the insurer and systemic risk of being financially disadvantaged (in terms of portfolio structure), which will indirectly affect the advantages of the domestic clientele. Expanding the insurance space is not likely to reduce the tariff burden. Insurance premiums will be raised by domestic insurers in order to hold existing programs with Western products accountable (this is primarily about property insurance).

Summarizing the difficulties on the way of agrarian sector, we note that these are essentially the manifestation of the following risks, which can be divided into two groups:

1. Socio-political and structural-economic – incompleteness of the legal framework, cautious anti-inflationary agrarian policy, relatively small amounts of state investments in the sphere of agro-industrial complex; imperfection of the mechanism of state regulation of the industry; low payment discipline in relations between business entities; undercapitalization of banking system and insufficient level of protection of creditors' rights, for example, in the part of "blurring" in the legislation of the terms of the recovery of the debtor's property.
2. Risks of a sectoral nature – weak justification and low budgetary and - economic efficiency of the majority of investment projects in the field of agro-industrial complex, shortage of energy raw materials and skilled labor, high level of competition from foreign producers, significant (more than 60%) degree of "dependence" sector from the opportunities and resources of personal farms.
3. Risks of financial and credit nature – low level of development of the financial market, imperfect infrastructure of the credit system serving agrarian industry, no defined strategy for the development of credit security of production entities.

These negative factors are virtually interrelated. It is believed that strategic planning for the development of agro-industrial sector, implemented by the vector "state - banking sector - agricultural producers" is in conjunction with risk and motivational components of the policy / business of each participant in the agribusiness support system.

The main provisions and measures to stabilize agricultural sector in the current economy and change the motivational component of investment activity of banks in this market segment require the following activities:

- to ensure the quality of economic growth of all strategic sectors (and agriculture refers to them) on the income side of basic economic parameters. To continue positive innovation in determining national priorities in the development of the State Budget of the country;
- to develop and ensure support of the profitability of agricultural sector at the appropriate level. Proceeding from this, the development and implementation of a weighted system of insurance of incomes of agricultural producers are believed to be promising;
- to determine in tax legislation the rules that give the right to receive benefits to economic entities that invest a certain amount of their profits in agricultural sector of the economy;
- to strengthen customs control on the import of foreign raw materials.
- to assess the probability of benefits from the reduction (minimization or differentiation of rates) of the income tax of banks – from the income directed to lending of the enterprises of agricultural sector of the economy;
- to provide practical opportunity to set so-called "usury limits" (widely used in the United

States of America) at the Government level to prevent undue overestimation of bids by commercial banks;

- to develop the structure of a specialized agricultural bank on the basis of the universal credit institute (in the mould of widespread in Western practice) development bank;

a) crediting the purchase of mineral fertilizers; feed, the purchase of fuel, veterinary drugs, to cover the costs of insurance for future harvests - up to 12-15 months in the form of overdraft, single issue or within the credit line;

b) medium-term lending (for up to 5 years) of the needs of agricultural machinery, freight transport, production equipment, with the aim of modernization of fixed assets, creation of production facilities for processing agricultural products;

c) credits for the purchase of breeding young animals on his pledge, for carrying out works of new construction, for creation of production capacities of agricultural enterprises (in particular, for the construction of livestock complexes) on terms of long-term financing (up to 8 years).

The development of mortgage relations in agriculture in modern conditions is of great importance due to the need to attract additional investments in agro-industrial complex in order to revive agricultural enterprises of different forms of ownership. Poor mortgage quality limits agricultural businesses' access to credit and increases banks' credit risks. In this regard, the formation of the land market is, in our view, a high-priority task, the solution of which will allow to launch a mechanism of mortgage lending in agriculture, where agricultural lands will be as a mortgage, which will help to attract investment loans.

The use of mortgage mechanisms allows business entities to:

- get a loan for the purchase of land and start your own business using it;
- expand the existing economy by purchasing new real estate, including new land, buildings and structures;
- renew working capital.

The current state credit relations development is characterized by the process of finding new forms of credit support for agricultural sector of the economy in relation to new economic conditions. Changing conditions of economic environment causes a change in credit relations in agricultural sector of the economy.

The crediting process for agricultural producers in Ukraine has not gained stability and is cyclical. Credit institutions of the country need to work out a single criterion for determining the volume of lending to agricultural industry. In most of the world, 70% of agricultural credit goes to bank loans. Under these conditions, the volume of bank credit support for agrarian sector of Ukraine should be in the range of UAH 10-12 billion [4].

However, there is no consensus as to the optimum amount of credit resources to the gross agricultural output.

To do this, it is necessary to define a minimum (though not significant enough) and a maximum credit limit, which directly affects the creditworthiness of enterprises. In our opinion, the amount of credits attracted by agricultural enterprises should not exceed 40% of the volume of gross agricultural production. Exceeding this limit may disrupt the playback cycle [5].

The insufficient level of development of the credit market and the imperfect mechanism of state support of agrarian industry are evidenced by data at the regional level (Table 2).

Table 2: Indicators of economic activity of agricultural enterprises of Cherkasy region

Indicators	2014	2015	2016	2017	2018	2018 to 2014, %
Gross output of agricultural enterprises at constant prices in 2010, mln	10577,1	11335,6	11102,8	10985,5	11372,8	107,5
Profit (loss) from all activities of agricultural enterprises, mln	1434,3	1798,3	761,2	6054,2	5553,0	387,1
Level of profitability (loss) of all activities,%	27,1	24,7	10,5	49,4	42,3	156
State support for agricultural enterprises, total (including VAT), UAH million	332,2	314,3	643,3	356,8	101,4	30,5
Sources of financing current assets of agricultural enterprises, (including VAT), UAH million	7648,5	10598,5	8675,13	9259,1	8715,4	113,5
Owner's sources, their share%	4703,8 61,5	4716,3 44,5	5231,1 60,3	5101,8 55,1	5055,2 58,0	107,4 -2,5п.
Bank loans, their share%	535,4 7,0	455,7 4,3	338,3 3,9	333,3 3,6	208,4 2,4	38,9 -4,6п.
Payable accounts %, their share	2409,3 31,5	5426,5 51,2	3105,7 35,8	3824,0 41,3	3451,8 39,6	125,7 81 п.

** Calculated according to the data of the Main Statistics Department of Cherkasy region*

Data of Table 2 shows that most agricultural enterprises in Cherkasy region are not fully covered by their own working capital (55.88% on average). This indicates that it would be advisable to attract loans from banking institutions, but the provision of credit resources tends to decrease. This situation causes agricultural enterprises to seek their own reserves to finance current assets (profitability is confirmed by the effectiveness of these searches).

However, most agricultural enterprises in the region are working under the conditions of a crisis of

payments. Thus, the accounts payable of agricultural enterprises in the structure of sources of circulating assets for 2017 amounted to 39.6% or 30.3% of the gross output. The payment crisis has a direct impact on the financial situation of the enterprises of the industry and makes it necessary to work out a strategy of financial development of the region taking into account the starting economic opportunities of each entity. This is in the context of reduced state support programs for agricultural enterprises in modern conditions (compared to 2014 in 2018, the amount of state support was only 30%).

In today's context, the issue of efficient use of land resources and preservation of soil fertility is particularly acute. Today, Ukraine's farmland is losing about 600 million tons of soil and 16 billion m^3 of surface water annually, which would be enough to form 16 million tons of grain. The area of degraded soils increases by 80 thousand hectares every year. Almost every third hectare (30.7%) is eroded. Lands that have been destroyed by water and wind in Luhansk, Donetsk, Kirovohrad and Chernivtsi regions make up 50-65% of arable land. In the steppe zone, two thirds of the land have reduced fertility. One in four hectares is acidic, and almost every second of the Forest-Steppe and Polissia zones (49.7 - 47.4%). Particularly large areas (52.1 - 65.0%) of acid soils are in Vinnytsia, Cherkasy, Ternopil and Khmelnitskyi regions.

In recent years, Ukrainian land has been used with complete disregard for physical law of the return of nutrients, which has led to instability in agriculture, reduced agricultural efficiency, especially in years when natural disasters are increasingly occurring. The yield loss on poorly washed-off soils is 20%, averagely washed-off – 40%, heavily washed-off – 60%. The annual total losses of the state amount to UAH 12.76 billion, and loss of net profit – UAH 7.4 billion. [6].

The state regulatory documents should provide for the provision of credit privileges for the rational use of land. Improving the effectiveness of the use of land resources of the country is the basis of its food security and the basis of a favorable competitive environment after Ukraine's accession to the WTO. However, the legislation does not provide for economic incentives for the rational use and protection of land with credit privileges.

By reducing the fertility of land resources, its value as capital and as value of collateral is reduced, which reduces the effectiveness of credit mechanism of agricultural sector as a whole.

Thus, there are no real influential mechanisms for using economic incentive procedures through granting credit privileges in Ukraine, while in other countries of the world these incentives are the main and most effective ones.

The production of organic and environmentally friendly agricultural products is still relevant.

The production of organic and environmentally friendly agricultural products also remains relevant.

According to the Ministry of Agriculture, in the last five years the land occupied by organic production has increased by 54% and today makes up 421 500 hectares. Of these, organic cereals are grown at 48.1% of cornfields (7th place among the countries producing the relevant products), over 16% - oilseeds (5th place), and 4.6% - legumes (7th place), vegetables - 2% (10th place), fruits - 0,6%. In addition, according to the 2018 report of commercial service of the US Embassy in Ukraine, the average return on investment in domestic organic farming can reach 300%, making it one of the most attractive destinations for foreign investors. Skillful management guarantees considerable profits, because products grown without "chemistry" are now gaining more popularity and cost more than "ordinary".

Measures for soil protection and production of organic products require improvement of the mechanism of crediting of agricultural enterprises as part of the strategy of agricultural sector development.

The main elements of the system of state support measures and state regulation should be:

• maintaining the profitability of agricultural sector of economics at the level of the average rate of return on the Ukrainian economy through the implementation of an effective antimonopoly policy of regulating prices for natural monopolies goods and regulating the proportions of internal and inter-branch exchange;

• active stimulation of integration processes, pooling and cooperation of capital, preferential attraction of funds for investment of the basic industry;

• introduction of mechanisms of minimum guaranteed prices, government interventions and mortgage transactions, price grants and compensations;

• co-operation of capitals, preferential attraction of funds for investment of the basic industry;

• increasing purchasing power of agricultural producers on the basis of development and improvement of equipment leasing and commodity credit;

• increasing the effective demand of the population, especially the disadvantaged, by providing assistance;

• assisting manufacturers in adapting to market conditions and facilitating market infrastructure development;

• sound protectionist policies to protect domestic producers from unequal competition for imported goods in the domestic market;

• providing the village with affordable loans, taking into account its specific features.

Under such conditions, the profit in agriculture will reach about UAH 7.5-10 billion on average per year which will become the main source of financial resources and real investments in the industry.

In order to develop credit relations in agrarian sector of the economy, to solve financial, economic, environmental and social problems of the region, it is necessary to develop an appropriate policy of solving problems regarding ensuring the creditworthiness of borrowers and transition to new forms of management and development of financial and credit mechanisms by intensifying the interaction of state and regional authorities and economic entities [7, p. 107].

Thus, the system of credit management of agricultural sector of the economy is a set of financial and credit relations and should implement the basic management functions arising from the creation of certain conditions for finding, attracting and efficient use of financial resources of economic entities in agricultural sector of the country's economy and its individual regions.

The main components of credit management system of agricultural sector of the economy are shown in Fig. 2.

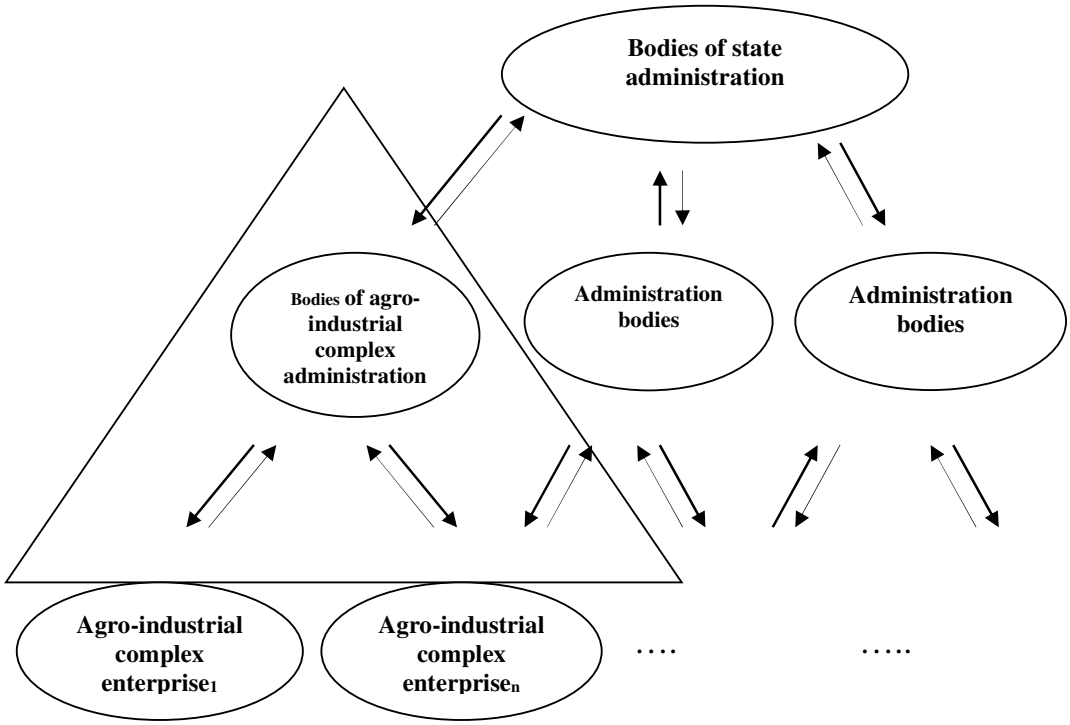

Fig. 2: Three-level system of credit management of agricultural sector of the economy

Presented in Fig. 2, the credit management system of agricultural sector of the economy is considered as a set of bodies of state, regional administration and agrarian enterprises that interact with each other, where each element of the system (state, region, enterprise) is guided by its own goals during the formation and decision making and voluntarily interacts with other participants only in case of obvious benefit to itself.

Thus, state, region and agrarian enterprises can be considered as elements of a three-level system of management: agrarian enterprises – the object of management, regional bodies – the subject of management of the first level, state – the subject of management of the highest level of members of the system [8, p. 135].

Thus, the improvement of crediting in agricultural sector in Ukraine implies performing the following tasks:

- stimulating the development of various forms of economic management, increasing the role of internal (own) accumulations of enterprises for financing projects;
- improvement of legal framework and forms of state support for priority projects and programs for the development of agricultural sector of the economy;
- creation of a favorable investment climate for expanding extra-budgetary sources of financing capital investments and attraction of domestic and foreign private investments;
- expanding the practice of joint public-commercial financing;
- management of bank credit risk by setting limits and diversifying the terms of loans, introducing a reliable system for diagnosing the financial condition of the borrower;
- expanding the practice of insurance and guaranteeing state support for agrarian programs.

Therefore, economic effect of improving credit management and support system for agricultural sector is reflected in the growth of both resource potential and performance of agro-industrial complex.

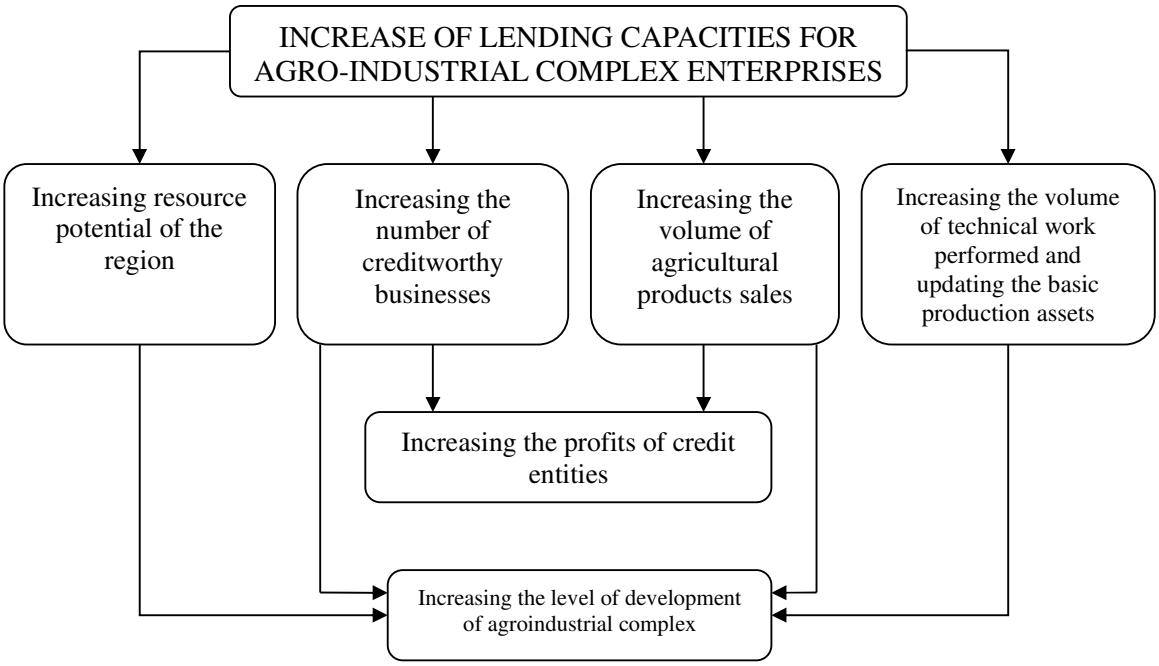

Fig. 3: Impact of crediting on performance of activities of agro-industrial complex [9, p. 50]

Conclusions

Thus, the proposed ways of improving crediting of economic entities in the agrarian sector of the economy, which combine interaction between the three levels of the hierarchy of management - macro-, meso- and microlevels (state – region – agrarian enterprises), aimed at improving financial and credit system of supporting agrarian sector and determining management scenarios according to the priority directions of development of agricultural sector of the economy taking into account targeting and consistency of the results of overall efficiency.

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Factors Affecting the Production Cost Function of Assembly Lines in Relation to the Level of Automation in Context of Industry 4.0

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Abstract

The paper discusses how the level of assembly line automation affects the production cost function. The paper introduces to the issue of Industry 4.0 that is associated with topic of automation. Afterwards three levels of automation are described (that the paper is concentrated on) - manual (no automation), semi-automated (partial automation) and complete automation. In the main part, the paper analyses the components of production cost function and for each component identifies the factors that need to be taken into account and which can influence the calculation of the production cost function, this is the original part of research. Not only the factors but also their influence to the components of production cost function is described in the paper. The target of the paper is to show that evaluating of the investment in automation by calculating the production costs is more accurate and convenient than simple conventional ROI calculation. By simplified ROI calculation a lot of important factors and influences can be overlooked.

Keywords: Costs, Automation, Assembly line, Industry 4.0

Introduction

In this paper we will discuss the factors that influence the cost function for different levels of automation in a assembly process in order to determine, what level of automation is optimal solution for a company. It is important to realize, that deciding upon the level of automation can´t be based on simple ROI calculation, which considers only 4 or 5 factors, because many more factors need to be considered.

This could help companies to choose the “right” level of automation due to their production, requirements and demands. This gives great benefits when it comes to time and cost savings in the planning and implementation phase.

Industry 4.0

Industry 4.0 (the fourth industrial revolution) is a designation for the current trend of digitization, its associated automation of production and the labour market changes it will bring. The four industrial revolutions are briefly described by Basl (2017) in the figure 1.

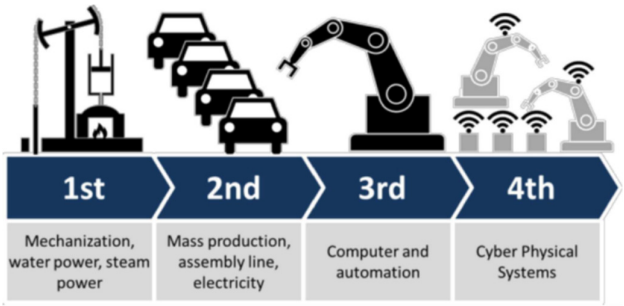

Fig 1. Four industrial revolutions – Basl (2017)

Poor et al (2019) mentioned that the basic visions of the so-called Fourth Industrial Revolution emerged in 2011. According to this idea, “smart factories” will emerge using cyber-physical systems. They will assume the repetitive and simple activities that have been performed by humans until then.

This will be accompanied by a change in the labour market, which could jeopardize the employment of people on which computers with new control / decision-making systems or robotic systems controlled by these systems could replace human power (for example diagnostic medical systems, will replace workers with lower qualifications). New jobs should be created which, however, will require higher qualifications of staff. It was mentioned by Poor and Basl (2018).

Raska and Ulrych (2017) mentioned that Industry 4.0 will be implemented using methods of machine perception, self-configuration and self-diagnostics and with computer connection of machines and parts.

Poor et al (2019) mentioned that both products and machines receive chips to control and operate over the Internet. In addition, cloud storage, 3D printing, data centres, automated problem reporting, and "smart warehouses" will be used to keep track of low supplies.

Industry 4.0 methods and tools should save time and money and increase business flexibility. The main risks include hacker attacks and data abuse. It was mentioned by Horanek and Basl (2018).

Industry 4.0 brings hope to improve the quality of human life by increasing labour productivity and the disappearance of monotonous and physically demanding professions. Automation, system integration and greater efficiency through more sophisticated logistics are also hope for reducing industry-related negative human impacts and for implementing sustainable development. Bures et al (2019) mentioned it.

As it was mentioned Industry 4.0 (the fourth industrial revolution) is associated automation of production. The next part of the article is concentrated on description of automation, mechanization and manual work.

Levels of Automation

Levels of Automation can be defined as splitting tasks between people and technology from completely manual to fully automatic. Therefore, automation can be understood as providing support to a worker, for example in the form of tools, to fulfil his task . Such support can be considered as a certain step of automation leading to full automation. It was mentioned by Simon and Broum (2018). As an illustration, we’re supposed to attach a nut. The nut can be attached manually, but if support is provided in the form of a pneumatic tightener, it is a certain level of automation. If we replace this support with a machine or robot, the level of automation is higher to achieve complete. Otherwise, manual work can be understood as actions performed by human employees with the help of tools. Here, other levels of automation are understood as an admission of an automated solution in which an act is performed without human assistance. Frohm et al (2008) and Srajer et at (2011) mentioned it.

Manual

Bures and Cadkova (2020) mentioned that manual work can be understood in different ways. One way is to understand the concept of manual work as an operation performed by a worker using basic hand tools. A second way is a person performing the work without any support in the form of tools. This way looks at manual work so that it is completely performed only by a person based on his abilities, and no human function is replaced.

Semi-automated

Bures and Cadkova (2020) also mentioned that most production combines human work and automation. Therefore, tasks are divided between manual work and automatic work. Semi-automatic production can, therefore, be considered as a production where at least one of the functions of the person performing the work is replaced by another source. In essence, mechanized or computer tasks are considered to be a higher level of automation. When implementing automation, it is necessary to find the optimal part of the value flow that should be automated. Also, it is necessary to determine the amount of automation and consider human resources, information, and technology.

Automated

Fully automated production is where the work of man is completely replaced. A typical example is remote-controlled machines and robotics (collaborative robot, industrial robot etc.). It was mentioned by Granell et al (2006). In this case, the machine completely and itself solves all the problems that occur. With full automation, the machine is tasked with refinement, accelerating and facilitating human work. Such production reduces the need for a person in the workplace to carry out a particular activity. It was mentioned by Broum and Simon (2019).

Calculation

We use the minimization principle to calculate a certain volume of production at minimal cost. The volume will be constant.

Benes (2014) mentioned when doing business, the basic goal is to keep costs below the selling price of the product. This can be achieved primarily by reducing production costs, from the pre-production stages that determine future production costs. In this paper we will focus on reducing specific costs incurred in production.

Own production costs can be considered as a decisive criterion for assessing the economy of production and one of the most important factors for ensuring economically optimal production. The essence of management lies in the analysis of processes, whether in terms of quality, cost or time. It is the suitability of the production process to ensure the corresponding output is reflected in the cost of production. Poor et al (2016) mentioned it.

The optimum production process for a given performance can be considered to have the lowest production costs for a given product, while maintaining the required quality and delivery deadlines. Broum et al (2012) and also Cechura et al (2012) mentioned it.

Own production costs can be defined as the targeted consumption of production factors to generate a certain output in production

Production costs function

To determine our own costs of production, we will use the calculation based on full costs, because we need to capture all the costs incurred in production. Production costs are calculated on the basis of the

calculation of the direct material, direct wages and production overhead, which is then divided into individual components. The production costs are related either to a certain period of time or to a precisely defined calculation unit. It was mentioned by Ehrlenspiel (2007) and also by Broum and Kleinova (2018). Expression of own costs of production and its individual components (costs of technological operations and costs of non-technological operations) are based on the relation by Olfert (2006):

$$PC = DMa + DWa + IMa + MC + TC + C\ ntech \quad (1)$$

PC Production costs [EUR]
DMa Direct material [EUR]
DWa Direct wages [EUR]
IMa Indirect material costs [EUR]
MC Machinery costs [EUR]
TC Tool costs [EUR]
$Cntech$ Non- technological costs [EUR]

Precisely defined performance is then called a calculation unit in terms of costing. In production, the calculation unit is considered to be a product, batch or order. Let's take a look at the individual components of the costing formula and what factors can affect them in automation. The definition of the factors is original part of research. In this work we will consider that the default state to be manual work.

Costs components

Direct material costs

Direct material represents the consumption of material (basic material, raw materials, semi-finished products, subcontracts, etc.) for the production of a given calculation unit (part, product, batch, order, etc.) expressed in monetary units. It is determined on the basis of material consumption standards. It was mentioned by Zahalka and Raz (2019).

For a component or simple product of one type of material, the following shall be determined:

$$DMa = \text{MCS} * \text{MUP} \quad (2)$$

DMa Direct material [EUR]
MCS Material consumption standard [unit (Kg/m/...)]
MUP Material unite price [EUR/unit (Kg/m/...)]

These costs are directly related to production, they are given by production processes, production technology, used production machines and their parameters.

Factors that may affect direct material are mentioned in table 1.

Table 1: Factors that may affect direct material

Factor	Manual	Semi automated	Automated
Level of accurancy	x	Machine works more accuratly, it saves material (↓ MCS)	Machine works more accuratly, it saves material (↓ MCS)

Direct wages

Direct wages represent labor consumption per unit of calculation, ie. basic wages of production workers. They are determined on the basis of the production process and time standards.

$$DWa = \sum_{i=1}^{n}(WTSO * WaT) \quad (3)$$

DWa Direct Wages [EUR]
WTSO Work time standard of operation [Hour]
WaT Wage tariff [EUR/hour]
n Number of operations

Factors that may affect direct wages are mentioned in table 2.

Table 2: Factors that may affect direct wages

Factor	Manual	Semi automated	Automated
Number of workers	x	Partial reduction of workers at the assembly line (↓n)	Partial or total reduction of workers at the assembly line (↓n)
Qualification	x	Decrease of necessary knowledge of the manual worker for the operation, thus decrease of wage tariff. (-WaT)	Decrease of necessary knowledge of the manual worker for the operation, thus decrease of wage tariff. (-WaT)
Speed of robots and its influence on operations	x	Decrease/Increase of Work time standard of operations (↓/↑ WTSO) due to speed of robot	Decrease/Increase of Work time standard of operations (↓/↑ WTSO) due to speed of robot
Range of operations done by the robot	x	Decrease/Increase of Work time standard of operations (↓/↑ n) due to the range of operations that the robot can do	Decrease/Increase of Work time standard of operations (↓/↑ n) due to the range of operations that the robot can do

Cost of overhead material

The cost of overhead material, which includes e.g. lubricating and cutting fluids, manufacturing aids, auxiliary material, office supplies, etc., is usually determined on a costing unit using a surcharge calculation with a percentage overhead, where the schedule base is made up of direct material. It was mentioned by Kurkin et al (2011).

$$IM = OMS*Dma \quad (4)$$

IM Indirect material [EUR]
OMS Overhead surcharge,(estimated from the previous period consumption) [%]
Dma Direct material (according to the above defined calculation) [EUR]

Factors that can affect the overhead material are mentioned in table 3.

Table 3: Factors that may affect overhead material

Factor	Manual	Semi automated	Automated
Level of accuracy	x	Machine works more accurately, it saves direct material (↓-DMa) It also may save auxiliary material (↓OMS)	Machine works more accurately, it saves direct material (↓-DMa) It also may save auxiliary material (↓OMS)
Type, number and suitability of the machine	x	Decrease of number of the production aids (↓OMS) Saves auxiliary material (↓OMS)	Decrease of number of the production aids (↓OMS) Saves auxiliary material (↓OMS)
Maintenance material	x	Increase of lubricating and cutting fluids (↑OMS)	Increase of lubricating and cutting fluids (↑OMS)

Machine costs

Machine costs represent costs relating to individual machines and equipment in a production unit for a given period of time. The cost of production per calculation unit is calculated using machine hourly rates mentioned by Kral (2002).

$$MC = \sum_{i=1}^{n}(WTSO * MHC) \quad (5)$$

MC Machinery costs [EUR]
WTSO Work time standard of operation [Hour]
MHC Machinery hour cost [EUR]
n Number of operations

Factors that can affect the machinery costs are mentioned in table 4.

Table 4: Factors that may affect machinery costs

Factor	Manual	Semi automated	Automated
Type, number, size, and suitability of the machinery	x	Cost of the machine + depreciation + interest + space (premises) costs + energy costs + maintenance costs + maintenance stuff increase + deployment costs + programming/ setting/ adjusting costs (↑MHC)	Significant increase of the machine cost + depreciation + interest + space (premises) costs + energy costs + maintenance costs + maintenance stuff increase + deployment costs + programming/ setting/ adjusting costs (↑MHC)
Speed of the machinery	x	Increase/decrease of the machinery operation standard due to different	Increase/decrease of the machinery operation standard due to different

		speed (↓/↑ WTSO)	speed (↓/↑ WTSO)
Range of operations done by the robot	x	Increase or decrease of number of operations (↓/↑ n)	Increase or decrease of number of operations (↓/↑ n)

Tool costs

Tool costs represents the cost of tool consumption on individual machines in a production unit for a given period of time. The cost of production is calculated using hourly cost rates.

$$\mathrm{TC} = \sum_{i=1}^{n}(WTSO * THC) \quad (6)$$

TC Tool costs [EUR]
WTSO Work time standard of operation [Hour]
THC Tool hour cost [EUR]
n Number of operations

Factors that can affect the tool costs are mentioned in table 5.

Table 5: Factors that may affect tool costs

Factor	**Manual**	**Semi automated**	**Automated**
New tools for the machines might be needed	x	Cost of the machine + depreciation + interest + maintenance costs + maintenance stuff increase + deployment costs (↑MHC)	Cost of the machine + depreciation + interest + maintenance costs + maintenance stuff increase + deployment costs (↑MHC)
Speed of the machinery	x	Increase/decrease of the machinery operation standard due to different speed (↓/↑ WTSO)	Increase/decrease of the machinery operation standard due to different speed (↓/↑ WTSO)
Tools usage	x	Due to optimal programs to tools last for longer (↓/↑ THC)	Due to optimal programs to tools last for longer (↓/↑ THC)
Range of operations done by a new tool	x	Increase or decrease of number of operations (↓/↑ n)	Increase or decrease of number of operations (↓/↑ n)

Non-technological costs

Non-technological costs are costs related to non-technological operations, such as handling, manufacturing and inspection costs. This division of non-technological costs was mentioned by Gorner and Simon (2015) The calculation is then performed by adding the following costs.

$$C\ ntech = Cman + Cprem + C\mathrm{inc} \quad (7)$$

$Cman$ Manipulation costs [EUR]
$Cprem$ Premises costs [EUR]
Cinc Inspection costs [EUR]

We can also take these costs into account when deciding on partial or complete mechanization, but only if they affect us the space(premise) occupied by the workplace, the related handling or the product inspection process. Polasek and Simon (2018) mentioned that. Alternatively, instead of non-technical costs, change-induced undesirable costs could be chosen, which would include other, poorly classifiable costs.

Table 6: Factors that may affect non-technological costs

Factor	Manual	Semi automated	Automated
Premise	x	Increase/decrease of space needed (↓/↑ Cprem)	Increase/decrease of space needed (↓/↑ Cprem)
Manipulation	x	Increase/decrease of manipulation needed (↓/↑ Cman)	Increase/decrease of manipulation needed (↓/↑ Cman)
Inspection	x	Way of quality check may decrease control costs (↓/↑Cinc)	Way of quality check may decrease control costs (↓/↑Cinc)

Criterial function

The criterion function (K) was derived from the calculation of production costs. Novikov and Kleinova (2018) were mentioning that while maintaining the functionality and quality of the product and keeping the deadline for delivery under given production conditions, it should apply to the most economical form of mechanization.

$$Min(K) = Min(PC) \tag{8}$$

$$Min(K) = Min(DMa + DWa + IMa + MC + TC + Cman + Cprem + Cinc) \tag{9}$$

DMa Direct material [EUR]
DWa Direct wages [EUR]
IMa Indirect material [EUR]
MC Machinery costs [EUR]
TC Tool costs [EUR]
$Cman$ Manipulation costs [EUR]
$Cprem$ Premises costs [EUR]
$Cinc$ Inspection costs [EUR]

Conclusion

The paper was concentrated on analyses the individual components of production cost function. Each component was analysed separately and the relevant factors were analysed. Factors that need to be taken into account and which can influence the calculation of the production cost function.

The paper managed to influence altogether 18 factors that need to be considered when thinking about automation. As shows in the figure 2 bellow, 5 of these actors will most likely decrease the outcome of the criterial function of production cost, 3 were identified as factors that could increase the calculation result and finally 10 factors that can either increase or decrease the outcome.

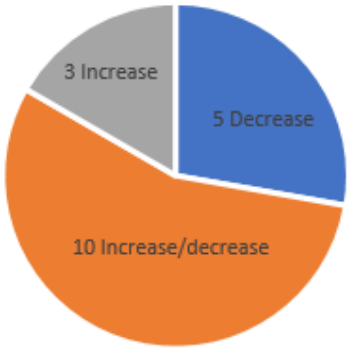

Fig 2. Influence of factors on production cost

The main purpose of the paper is to show that evaluating the investment in automation by calculating the production costs is more accurate and convenient than commonly offered methods of calculation, which are based on ROI calculation with only few factors, such as number of shifts, number of operators removed and annual labor cost per operator. The fewer factors we consider, the lesser the calculation will be accurate.

The next step is to analysed the individual factors in detail with specification of values (and their range) linked to each of the factor. Then the comparison of calculations by simplified ROI and product cost functions will be created.

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Analysis of The Importance of Factors Describing the Mission of Enterprises According to Toyota And the BOST Method

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Abstract

The article reviews the concept of the mission of enterprises, the structure of research surveys, including the BOST survey. The place and factors describing the mission at the Toyota House and in the mentioned survey were determined. Surveys, involving respondents determining the importance of factors: quality, costs, work safety, implementation time, crew morale (they describe the mission in the TPS system). The BOST survey was carried out in two companies: a manufacturer of bread and pastry, a manufacturer of lighting equipment. It was shown that regardless of the type of production, the first three places were occupied by factors: quality, costs, and work safety. Analysis of the relationship between factor importance assessments using preferences revealed details of built series. An assessment of the significance of diversity of average scores for the obtained sets of scores was also carried out. The aim of the analysis is to present which factors are the most important by building the significance sequences of obtained results. The information obtained confirmed previous relationships between the factors. The content of the mission for the surveyed enterprises was formulated. The results obtained for the type of small and medium-sized enterprises overlap with the results of tests verified in other enterprises.

Keywords: mission, toyotarity, BOST method, preference, similarity.

Introduction

Mission is a precise word Stochowski (1994) expressed in a language understandable to employees and the organizational environment outlining its far-reaching goals and aspirations. Mission is the statement of vision employed by organization for strategic purposes. Vision Stabryła (2000), Porter and Kramer (2011) on the other hand, is the image of the future that organizations want to create. The word "vision" comes from the Latin word *videre,* meaning "vision". Obłój (2014) mentioned that according to the most natural definition vision is the concept of the company's future, the most fundamental aspiration that in order to be effective should be shared by both the management and other employees Campbell and Nash (1992), Dwojnicki (1995).

Company mission acquires strategic significance when it satisfies three requirements:

1. Defines the direction and concerns the future Mackiewicz H. (2009),
2. Expresses dreams and challenges in which employees participate Lisiecki (2001), Cardona and Ray (2009), Cady, Wheeler, DeWolf and Brodke M (2011),
3. Its implementation process is credible Campbell and Nash (1992), Canals (2010).

1. If the mission of the company is to clearly communicate the direction, it must refer to a time that has not even started, that is, to the future. To deal with the present, it is based on short-term goals, while mission is forward-looking. The future can be defined precisely, as was the mission formulated in 1961 by the American President J. F. Kennedy: "This nation should commit itself to achieving the goal, before the decade is out, of landing a man on the moon and returning him safely to the earth ". It is also possible to formulate a timeless company mission, as Yashinari Kawai, the president of the Japanese company producing poor quality bulldozers and Komatsu excavators did expressing the company's mission in two words: "Muru-Cat" ("beat Caterpillar"). In those days Caterpillar was the world's leading manufacturer of heavy equipment, and the entire sector consisted of strong companies (Ford,

International Harvester, Case, Fiat). Indeed, dreaming about beating the world leader by a weak Japanese company meant looking far into the future. In the research study by Obłój (2014), Komatsu has almost fulfilled its vision, and the way it has been done is a wonderful illustration of the importance of mission for an effective organization.

2. In Komatsu, subsequent successes boosted motivation and gave hope that an "impossible mission" is achievable, even if the victory is far away. Good mission triggers employees' zeal and enthusiasm, and allows them to treat the vision of the company as their own. Peter Senge writes: "Visions are liberating. They create a spark of excitement, which puts an organization above everyday life. In a normal organization, the mission that employees accept will change into their relationship with the company. It ceases to be "their company" and becomes "our company". The very word "dreams" causes anxiety in some managers. They claim that "dreams" are childish, and managing a business should be realistic. The majority of employees do not dare to dream but struggle with the realities of everyday life. If they are professional and competent their actions are effective and they manage to solve the problems of yesterday on the current basis. Dreams remain only a fantasy if the entrepreneur or manager is not able or does not want to infect others with his/her enthusiasm and convince employees of his vision of the future of the company. In a typical company there are three groups of employees: mercenaries, loyalists and guards. Mercenaries are obedient and indifferent. In return for fair pay and working conditions, they "sell" the company a certain amount of their time and skills. If someone offers them better working conditions they will move to a new company without much hesitation. Loyalists are committed to the company for various reasons: they may have been working in the company for years, they like what they do, they are proud of their workplace, or they believe that the balance of contributions and benefits is positive. For loyalists to change the job means high psychological costs and uncertainty which they do not tolerate. Loyalty to a company can, therefore, be mainly instrumental ("it pays") or evaluative resulting from the acceptance of the mission, that is, company's future. Guards are involved in the company for good; most often because they are its founders, have emotional ties with the company leader, or simply identify themselves fully with company's mission and values. It seems clear that there are just few guards in the company. The loyalists are a minority, and the mercenaries (and malcontents) dominate. It is a true art to convince some mercenaries and loyalists that a given mission is important, makes sense and can also become their dream and aspiration. The prerequisite for achieving this is the credibility of the management and the company as a whole in the context of the company's mission.

3. It is amazing how many companies after taking a lot of trouble and spending so much time and money to state their missions, in the face of tough businesses realities almost immediately have shown their employees that it is just an empty phrase not worth the paper on which it was written by Cardana and Ray (2009). In 1988 General Motors executives launched a huge campaign under the slogan "GM employees are the most important for us." Three years later, GM announced the intention of closing 21 factories and dismissing 8% of the staff. The results of research into the usefulness of missions are not particularly optimistic. Extensive British studies show that answering the question whether the statements of company mission and goodwill are just slogans, 6% of respondents said "absolutely yes", and 53% "partly". If there were a conflict between company values and short-term gains, only 23% thought that values would have priority. And this constitutes the major problem for the management. Once formulated the company's mission, can become either extremely helpful or harmful.

Mission in the structure of Toyotarity

TOYOTARITY is a concept invented by the author of the chapter and is a proprietary name Borkowski (2012).

Toyotarity is defined as a scientific study of human-machine and human-human interactions with regard to process-based approach and Japanese culture, especially that of Toyota, aimed at continuous improvement with the use of knowledge.

The basic model of TOYOTARITY is shown in Figure 1.

The choice of flat figures is intentional:

• The circle as a symbol of human being in the dipole human-machine emphasizes the importance of people both in the organizational structure and operation of manufacturing and service companies, etc. This element of TOYOTARITY must treat all components of the organization equally and know exactly what is going on around the organization (how the market and competitors behave). The concept "human" is a mental shortcut used by initiators of business activities, investors, top executives, tactical managers and company owners. It includes the elements of COMPANY MISSION STATEMENT.

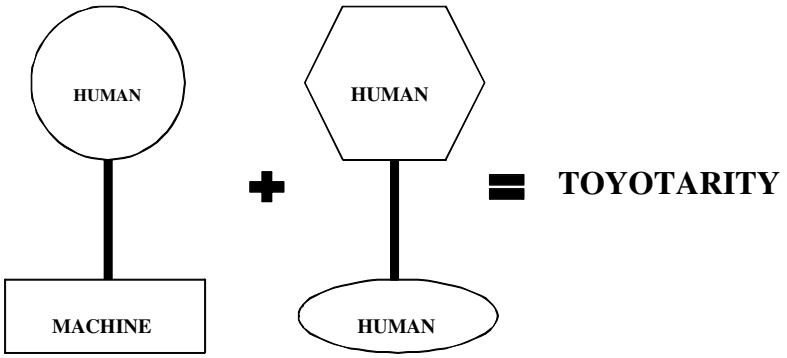

Fig. 1. The basic model of TOYOTARITY

Borkowski (2012) mentioned in the BOST method Toyota management principles are described by specific factors. The number of factors depends upon the scope of principle and fluctuates between 4 and 10. The set of factors is called areas. Some principles are divided into two or three areas. Toyota's management principles are divided into four sections, while the BOST survey has two versions: one for an employee and the other for a supervisor. The version for an employee contains a set of factors describing principles: 1; 2; 3; 4; 6; 7; 14 and the elements of the roof of Toyota house (quality, costs lead time, occupational safety, staff morale). The version for supervisor contains a set of factors that describe all Toyota's management principles and the elements of the roof of Toyota house. The survey rating scale is a rank scale. Respondents evaluate the validity of the factor inserting one of the numbers within the scale into an appropriate box.

The BOST method defines relations between material resources and human resources and between human resources and human resources and is named Toyotarity. The BOST method describes Toyota's management principles with its characteristic factors. The set of factors is called an area. Each of these principles is described with an appropriate set of factors. Apart from Toyota's principles described with applied factors and respondents' features the set of research problems also contains elements of the roof of Toyota's house, which describe the mission of enterprises.

The Toyota Production System is based on the assumption that all individual elements work for the cause of a whole. In the research study by Liker (2005), Ohno (2008). Its goal is also to support and encourage employees to continually strive for improvement in every sphere of company's activity. In literature, several models of Toyota production system are described.

Mission in the BOST questionnaire

Borkowski (2012, 2016a) mentioned that the survey is universal and can be used both in manufacturing and service-providing enterprises (e.g., banks, hospitals, schools and shops). The survey for manufacturing enterprises (one version for employees and the other for supervisors) consists of 12 sets of factors (areas). The version for the employees includes a set of factors describing the elements of

the Toyota house roof and principles 1; 2; 3; 4; 6; 7 and 14, whereas the version for the supervisors includes a set of factors describing all the principles of management in Toyota and the elements of the Toyota house roof. The survey contains a rank scale and the respondents use it to evaluate the importance of each factor. Respondents may assess the significance of a given factor by placing one of the numbers within the range of scale in an appropriate box.

In the author's publications (2016b) the elements of mission, the roof of Toyota House, are presented as follows:

Area E1. What is most important in your enterprise? Arrange the factors in the priority order inserting 1; 2; 3; 4; or 5 (5 is the most important factor) into the box:

JA		Quality
KO		Costs
CR		Lead time
BP		Occupational safety
MZ		Staff morale

The owners of the following enterprises agreed to have a survey conducted:

The manufacturer of bread and cakes (T). During production, traditional bread and cake making technologies are used. As for the cakes, the enterprise takes orders from individual customers to provide sweet delights to all kinds of occasions including; weddings, anniversaries, eighteen birthdays, religious ceremonies and post funeral receptions. The enterprise has a network of shops within 50 km of its headquarters.

The manufacturer of lighting equipment (T1). He manufactures chandeliers, lighting fixtures and wall lamps basing upon its own designs. In the production process semi-finished steel, non-ferrous metal alloys, wood, marble, plastics, leather and textiles are used. The enterprise purchases semi-finished products in bulk. Then they are divided into smaller parts and profiled according to the design. The enterprise owns two shops. Most of its products are sold in supermarkets.
A preliminary condition for classification of the companies to BOST study was confirmed information about implementation of Toyota management principles in the workstations in analyzed company. In selected enterprises the population of respondents was chosen, which consisted from production workers of the examined enterprise, having a contact with manufacturing process in the workplace. The BOST questionnaire form was filled out in both companies by 30 respondents i.e. nearly half of production workers. Such a large research group of directly production workers will allow to precisely identify the most important factors in the surveyed enterprises. This article presents an analysis of the answers given to the question contained in the BOST questionnaire, referring to the roof of Toyota's house.

The use of Thrustone scale and the scale of range to analyze the series of factors arranged by the degree of importance

Thurstone's *comparative judgement method* introduced in Sagan (2009) and (2012) is used (Fig. 2) to develop a one-dimensional metric scale of factor preferences that allows us to compare the rating of each factor with those of all other factors. The results of comparisons provide the basis for the development of the scale of preferences are introduced in the research study by Borkowski and Knop (2014).

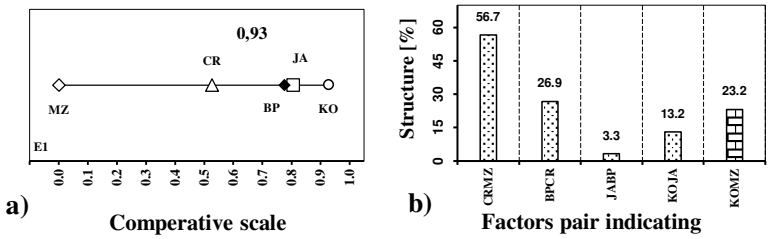

Fig. 2. Characteristics of comparative evaluations' scale for importance factors in E1 area: a) distribution of factors on the scale, b) scale structure (%). Example

The scale of preferences is based on the ratings assigned by respondents to each factor. The ratings are used to compare pairs of factors. The result of Thurstone method is the distribution of the factors along one-dimensional scale which provides information on similarities and differences between the factors and allows us to indicate the groups of factors with a similar rating (on the basis of the distance between factors on one-dimensional rating scale).

The distribution of factors on the scale includes four groups:

- *costs* factor (KO) is unlike other factors most preferred,
- *quality* factor (JA) and *work safety* factor (BP) are similar to each other, and highly preferred,
- *lead time* factor (CR) is unlike other factors, its preference being mid-level,
- *staff morale* factor (MZ) is unlike other factors least preferred.

The inspiration for the search for a different scale that would allow to obtain the information on the degree of similarity or difference between the factors and to identify the group of factors with similar ratings was the fact that *Thurstone comparative judgment method* requires the same number of responses, which poses a problem for the BOST method.

The results are obtained by the questionnaire method; the respondents are employees of the operational level of enterprises. Their number is limited and the number of questionnaires accepted varies widely (usually from 15 to 60). We can either select companies which have obtained the same number of questionnaires or reduce the number of questionnaires to the smallest number obtained in the selected group. The second method involves the loss of hard-earned data. Thus it is reasonable to present a replacement for a comparative scale. While analyzing the stages of the comparative scale development, we note that in the final phase, the smallest number must be subtracted from the existing numbers, so that the scale can start with zero.

To develop series of ratings, the average ratings of individual factors are used. We determine a range and subtract the lowest average rating from each rating. Then we order the results from the smallest to the highest value. This procedure is not provided by the Thurstone method, but it is necessary to calculate both the distance between factors and scale structure. The length of comparative scale is replaced by the scale of range. Further steps are the same as in the Thurstone method. The distribution of factors on the scale of range is presented is described as follows:

- c*osts* factor (KO) is unlike other factors most preferred,
- *quality* factor (JA) and *work safety* factor (BP) are similar to each other and highly preferred,
- *lead time* factor (CR) is unlike other factors, its preference being mid-level,
- *staff morale* factor (MZ) is unlike other factors least preferred.

It represents the largest share of the pairs of factors on the analyzed scales. This induced the author to conclude that:

There exists a research tool equivalent to one-dimensional Thrustone comparative scale and this is a range scale.

In the Borkowski (2016a) publication the lack of the criterion for the division of the comparative scale is pointed out. Hence the following division of the comparative scale is presented: 0% least preferred, 0 - 20% weakly preferred, 20 - 40% moderately preferred, 40 - 60% rather preferred, 60 - 80% strongly preferred, 60 - 100% very strongly preferred, 100% most strongly preferred.

The structure of ratings assigned to factors

During the presentation and preliminary analysis of the significance of the aforesaid factors a positional measure of distribution (Fig. 3) Pułaska-Turyna (2008). From Figure 3, presenting T company, it appears that a clearly marked mode occurs for the following sets of factors: costs (KO) - the maximum rating "5", lead time (CR) - rating "4", staff morale (MZ) - the lowest rating "1". For the quality factor (JA) the number of "4" and "5" ratings is the same and differs only by 1 from the next number that received "2" rating. A set of ratings with a similar feature exists for the occupational safety factor (BP), where "4" has the maximum number of occurrences.

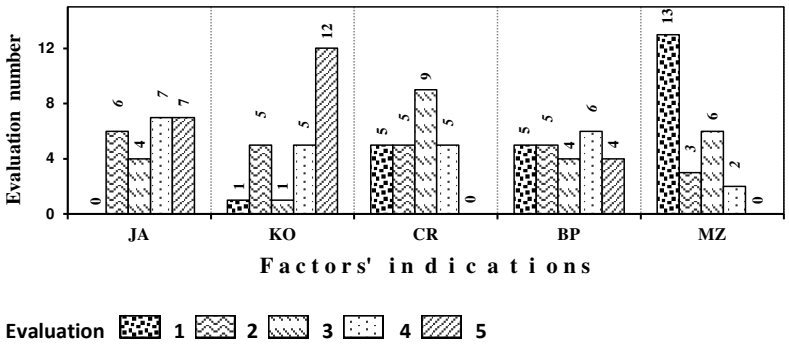

Fig. 3: Roof of the Toyota house. Distribution analysis of evaluations E1 area factors. It concerns T

The evaluation of the significance of factors in the company manufacturing lightning equipment (T1) can be summarized as follows (Fig. 4): the sets of ratings for *quality* (JA) and *staff morale* (MZ) do not contain the lowest and the highest score, respectively. The set of ratings of *costs* factor (KO) contains only two numbers: 5 refer to extreme ratings of ”1” and ”5”, 4 refer to three other ratings. *Lead time* factor (CR) has two modes: for the lowest rating ”1” and for ”4”.

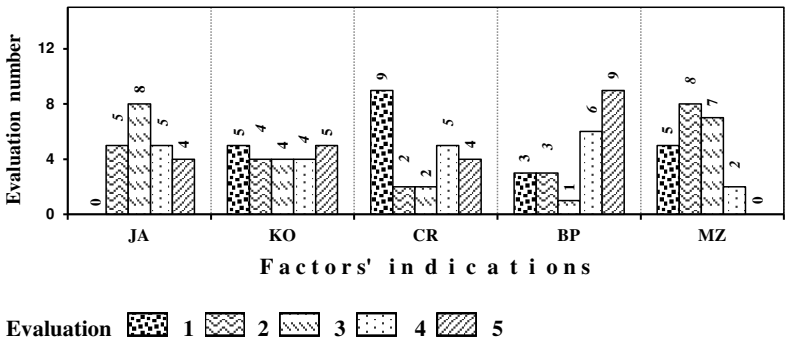

Fig. 4: Roof of the Toyota house. Distribution analysis of evaluations E1 area factors. It concerns T1

Development of the series of factors arranged by the degree of importance (The Roof of Toyota House)

One of the aims of the BOST survey is to examine the relationships between ratings obtained for the factors. For that purpose, the series of factors (describing the Toyota mission) arranged by the degree of importance, the preferences for each factor and the differentiation of average ratings are presented. To develop the series of factors by the degree of importance, the rating scale is used. It is calculated on the basis of the average rating. For a five-point scale it is five. The extent to which the scale is used is expressed as the average rating divided by the maximum rating (resulting from the scale) multiplied by a hundred (expressed as a percentage). Fig. 5 shows the application of the ranking scale in two enterprises.Based on the data the following series of factors (describing the Roof of Toyota House) arranged by the degree of importance were obtained:

Enterprise T
KO > JA > BP > CR > MZ **(1)**

Enterprise T1
BP > JA > KO > CR > MZ **(2)**

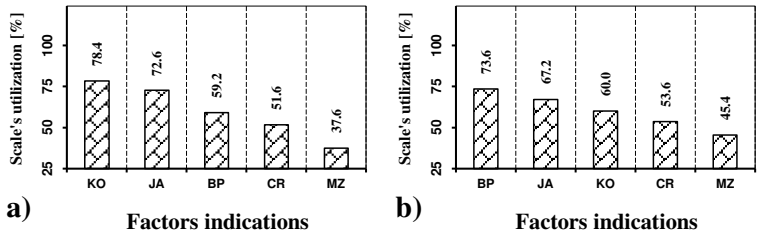

Fig. 5: The usage of measurement scale for evaluations the importance of factors which describe the mission in companies: a) T, b) T1

In general, the series can be described as follows:

- *quality* factor (JA) takes the first place three times, *costs* (KO) and o*ccupational safety* (BP) take it once,
- the second place is taken twice by *quality* factor (JA) and *costs f*actor (KO); it is taken once by *lead time* factor (CR),
- two factors take the third place: *occupational safety* (BP) which appears three times and *lead time* (CR) which appears twice,
- *lead time* factor (CR) takes the fourth place four times and *occupational safety* just once,
- *staff morale* factor (MZ) takes the fifth place in all series of importance

According to the employees of bakery and pastry enterprise (T), the most important factor in the mission is *costs* (KO) while *quality* (JA) takes the second place. The enterprise T has implemented a HACCP system which guarantees food safety, in other words, quality. The bakery is a family run enterprise with a long tradition. However, it is not enough to become a leader on the competitive market. The respondents consider costs to be the most important. They are 100% right. Low costs of bread production influence its price. The shops practically do not send unsold bread back to the bakery. So, the costs determine the mission of food business.

The analysis of the series of factors (2) describing the Toyota mission in the enterprise producing lightning systems (T1) indicates that o*ccupational safety* (BP) is the most important factor. Chandeliers, night lamps, standing lamps are everyday products that we use in our apartments, so it seems natural to look at them and think what their production looks like. We will certainly notice that a large part of the production involves manual work, mainly related to electrical installation. The employees use screwdrivers, and ticks for eight hours that may cause smaller or bigger cuts even though protective gloves are worn. Every injury means the exclusion of the employee from the production process so, to put it simply, it is a loss for the company. *Quality* factor (JA) takes the second place. Since electrical goods have safety label their quality is guaranteed by the regulations in force.

Interpretation of series of importance

The interpretation of series of importance describing Toyota mission will be conducted on the basis of preferences expressed by the respondents while ranking the significance of factors. Two scales will be used to compare preferences: Thurstone scale and the scale of range developed by the author. The purpose of using two scales is to demonstrate their equivalence. The figures include: the comparative scale and the scale of range: (a) showing the factors studied, (b) illustrating the distance between adjacent factors, (c) showing the distance (%) between adjacent pairs of factors on a selected scale.

Fig. 6 and Fig. 7 present the sets of the preferences for the factors describing Toyota mission in bakery and pastry enterprise (T). The diagrams refer to the series of importance defined by the relationship.

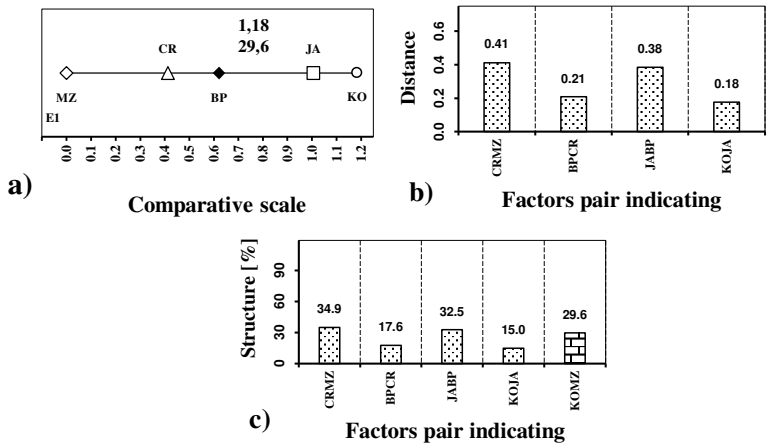

Fig. 6. Characteristics of comparative evaluations' scale for importance factors in E1 area: a) distribution of factors on the scale, b) distance between pairs of factors, c) scale structure (%). It concerns T

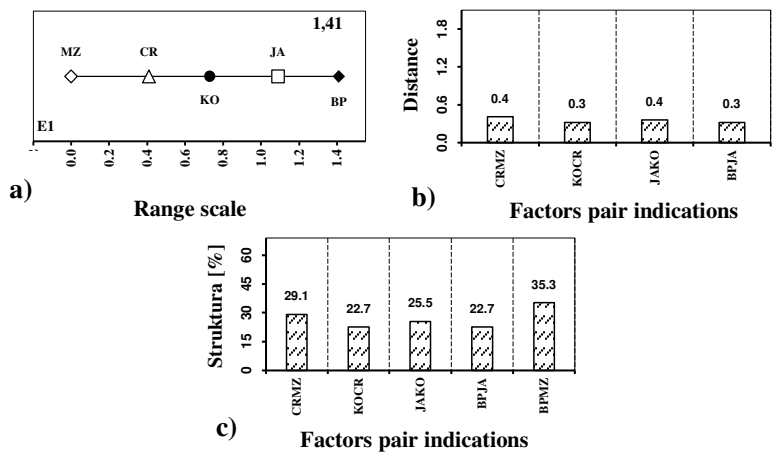

Fig. 7. Characteristics of range' scale for average importance evaluations' for the factors in E1 area: a) distribution of factors on the scale, b) distances between pairs of factors, c) structure (%) of scale. It concerns T1

It should be noted that the factors in series are arranged by decreasing values while on the scales they are arranged by rising values. Therefore, we will start the analysis of diagrams from the factor located at the end of the relevant scale. We will begin the interpretation of the series of importance checking if the order of factors on the scale is the same as their position in a series. Analyzing the distribution of factors on the comparative scale (Fig. 6a) we notice the following order: KO, JA, BP, CR, MZ. In Figure 7a (the scale of range) the order is as follows: KO, JA, BP, CR, MZ. We can conclude that the order of factors on a comparative scale and on the scale of range is the same and corresponds to their positions in the series of importance (1; 2). This implies that the series of importance can be represented graphically using either comparative scale or the scale of range.

Differentiation of average ratings of factors describing the enterprise mission

This part presents the interpretation of series of factors arranged by the degree of importance. In this section a statistical analysis of the significance of differentiation of average ratings for three α levels (0.05, 0.1, 0.2) is conducted. Table 1 presents the results concerning the significance of differentiating the average ratings that contributed to the construction of relation.

Table 1. Roof of the Toyota house. The results of importance difference analysis average evaluations factors for E1 area

Indications		KO	CR	BP	MZ
JA	test	*0,78*	*3,16*	*1,73*	*5,27*
	α = 0,05	*no*	*yes*	*no*	*yes*
	α = 0,1	*no*	*yes*	*yes*	*yes*
	α = 0,2	*no*	*yes*	*yes*	*yes*
KO	test	*E1*	*3,73*	*2,34*	*5,68*
	α = 0,05	*2,0129*	*yes*	*yes*	*yes*

	α = 0,1	*1,6787*	*yes*	*yes*	*yes*
	α = 0,2	*1,3002*	*yes*	*yes*	*yes*
CR	test	*yes - significant diversification*		*1,01*	*2,25*
	α = 0,05			*no*	*yes*
	α = 0,1			*no*	*yes*
	α = 0,2			*no*	*yes*
BP	test	*no - insignificant diversification*			*2,90*
	α = 0,05				*yes*
	α = 0,1				*yes*
	α = 0,2				*yes*

Since there are five factors in the E1 area, we will analyze four pairs of relationships. As given in the research methodology, the analysis starts with the first top row and then we go to the first column and make an appropriate change from vertical to horizontal orientation. There is no significant difference between the average ratings of the pairs of factors JA: KO at any of the assumed α levels. This can be written as (0; 0; 0), which means that, in a given case, the average rating does not show difference at the α level of 0,05 (the first digit in brackets), 0,1 (the second digit in brackets) and 0,2 (the third digit in brackets). If the differentiation exists, the digit 1 appears. The differentiation of average ratings of pairs of factors JA: CR is written as (1; 1: 1), which means that a statistically significant differentiation between the average ratings of the two factors exists. Applying the proposed notation to a pair of average ratings of JA: BP we obtain (0; 1; 1). The average ratings of *quality* (JA) and *occupational safety* (BP) are statistically significant at α = 0.1 and α = 0.2 (the second and third digit in the notation). There is no differentiation between the average ratings at α = 0.05 (the first digit in brackets). The average ratings of pairs of factors KO: JA are (0; 0; 0) and they equal those for JA:KO. The implication is that there is no significant differentiation between average ratings. KO column does not contain any more interesting data. The orientation of KO is horizontal and there are three missing factors there. The average ratings of pairs of factors: KO: CR, KO: BP, KO:MZ are written as (1; 1; 1). They show a significant differentiation at all three α levels. For the data in CR column the *lead time* factor (CR) forms the pairs: CR: JA and CR: KO. Their average ratings are written as (1; 1; 1) but for the CR row and the pairs CR: PB and CR: MZ the ratings for the first pair of factors are (0; 0; 0) and (1; 1: 1) for the second. The average ratings for the pairs of factors in which *lead time* (CR) is present do not differ if they appear in a pair with *occupational safety* (BP) factor. However, the average ratings are differentiated at all α levels for *lead time* (CR) in pairs with *quality* (JA), *costs* (KO) and *staff morale* (MZ) factors. *Occupational safety* factor (BP) is present in the following pairs: BP:JA, BP:KO, BP:CR, BP:MZ. The average ratings for these factors are written as (0; 1; 1), (1; 1; 1), (0; 0; 0), (1; 1; 1), respectively. The average ratings of BP: KO and BP: MZ are significantly differentiated at all three α levels. The average ratings of BP: JA are different at α = 0.1 and α = 0.2, but there is no difference at α = 0.05 (zero is the first item in the notation). The average ratings of BP:CR are not differentiated at the assumed α levels as expressed by (0; 0; 0). The average ratings of MZ: JA, MZ:KO, MZ:CR, MZ:BP are differentiated in all cases and for all α levels which is expressed by (1; 1; 1). The adjacent factors presented in (1) form the following pairs: KO: JA, JA: BP, BP: CR, CR: MZ.

It was revealed that in a number of factors important for the first of these companies, the factors: quality and safety at work showed similarity to each other (criterion of similarity of 10% of the scale). The distance between these factors is 3.3% of the scale, the distance between factors: cost and quality 13.2% of the scale, while the total length is 0.93 units. In the case of the second of the mentioned companies, there was no case of similarity of factors in terms of preferences. Respondents in a company manufacturing lighting equipment believe that their enterprise is important to safety at work, followed by quality and costs in the third place.

In the researched company a quality of products, as well as safety in the workplace are important in production process and in the entire enterprise. Significance sequences of factors describing roof of

the Toyota's house is an interesting element. They contain a logical order conditioned by organization of production in the company. The practical use of BOST surveys gives the opportunity to benefit from the practical knowledge of employees at the company's production level. This may contribute to the identification of key areas for the functioning of the enterprise.

Conclusion

The publication highlights the existence of many definitions of the term mission of enterprises in specialist literature. Attention was paid to the significance of this term in the Eastern approach to management, especially management in the Toyota production system (TPS). Elements of this management are presented in the form of Toyota Houses, which have different: constructions. "The common part of these houses is the roof, the elements which define the mission of TPS are: quality, costs, work safety, time of implementation, crew morale". Toyota management principles are the basis for the term TOYOTARITY, whose research tool is the BOST survey and also the method of analyzing the results of copyright surveys under the same name. The BOST method is one of the qualitatively quantitative research methods, because respondents are asked to rank the factors: describing the roof of the Toyota House and the rules of Toyota management, the set of factors is called the area. The methodology uses the results of a survey carried out at the manufacturer of hubcaps and metal decorations for cars as well as the manufacturer of bread and cakes. Using the results of the survey, a series of importance of factors describing the mission were built (arithmetic means were used), similarity or lack of it was determined in terms of preferences of the analyzed factors (Thrustone and author scale - range was used), significance of differentiation of average marks was assessed. Based on these three elements, information was obtained authorizing the definition of the mission of the surveyed enterprises:

- producer of hubcaps and metal decorations for cars. The mission of our company is to produce hubcaps and metal decorations for cars of a quality higher than required by applicable legal regulations and standards, treat employees' safety at work as well as quality. The management puts a special attention to minimizing production costs, thanks to which our products are also competitively priced,
- producer of bread and cakes: The mission of our company is to produce, at the lowest possible cost, high quality and healthy food for everyday consumption, especially bread and cakes and pastries for various celebrations, which exceeds the requirements of the HACCP system. Employees have appropriate safety conditions at work,
- manufacturer of lighting equipment: The mission of our company is to manufacture lighting equipment with the CE mark in conditions safe for employees of quality exceeding legal provisions and standards requirements, paying great attention to production costs.

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Application of The Kanban Methodology In Research Projects Management

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Abstract

The goal of the paper is to analyze if Kanban methodology can be used in managing research projects. Researches were conducted based on the data collected during realization of research projects implemented at Wroclaw University of Science and Technology. Thanks to interviews with project teams and project managers the most important elements of the Kanban methodology were identified which should be implemented in the management of research projects. The most important result of the analyzes was the design of the Kanban electronic board project and its verification for the selected research project. The board was programmed in VBA (Visual Basic for Applications) implemented in MS Excel.

Keywords: Project Management, Kanban, Research Projects.

Introduction

In the 1950s, a production management system called Kanban was developed in Japan. The word was created from a combination of two Japanese words: Kan - visible and Ban - a piece of paper. Kanban is the Japanese term for "sign" or "signboard" (Sugimori et al. (1977) and Anderson (2016)). Initially, Kanban was used to manage production in industries such as automotive (Liker (2004)), aeronautics (Venables (2005)), healthcare (Rocha et al. (2018)), education (Fitriawati and Lestari (2019)), retail clothing (Tokatli (2008)). Over time, it gained popularity in software development as one of agile approaches in project management (e.g. Al-Baik and Miller (2015), Lei et al. (2017) or Kirovska and Koceski (2015)). A review of the literature on the use of the Kanban methodology in IT project management can be found in Ahmad et al. (2017). Brechner (2015) states that the adoption rate of Kanban methodology is increasing. In this paper, we would like to consider whether it is possible and reasonable to apply selected Kanban methodology practices in research project management.

The Kanban methodology can be described as "start with what you know". The application of this methodology reduces resistance to changes in the organization, because it is a catalyst for a fast and focused change in line with the company's goals. As part of the Kanban methodology, the project team works together to create a typically immaterial work product. Even if the product is physical, its value is not in itself, but in its informational content. The basic activities of managers who manage in accordance with the Kanban methodology can be defined by six general practices (Anderson (2016)):

1. Visualize. The project workflow should be displayed on a Kanban board (this board is described in more detail in Chapter 2.5). This makes it possible to limit work in progress at each stage of project work. It is also important to specify commitment and delivery points. These steps distinguish the Kanban methodology from the usual flow system. There are various improvements in the use of the Kanban board, for example color-coded task labels and visualizing the owner of each task (Nakazawa and Tanaka, (2016)). The popular visualization technique used in Kanban methodology is also known as cumulative flow diagram (Alaidaros et al. (2018)). The cumulative flow diagram presents the cumulative distribution of tasks over time (Karunanithi (2016)).

2. Limit work in progress. According to this practice, imperceptible knowledge must be made visible and the service must be guaranteed to work with the right amount of work. This quantity should not be

too large or too small. For this, work in progress limits, called WiP (Work in Progress) limits, are set. By setting WiP limits and then following them, the "push" system (work is "pushed" into the system) changes into the "pull" system (work is "pulled" into the system at the right time). In the new system, work is "pulled in" only after the current work completion (after the current tasks are completed). It is not "pushed" into the system immediately when it appears. Therefore, the goal of setting work in progress limits is to prevent too little or too much work in the system. Thanks to this practice, the members of the project team do not feel overloaded with work. In addition, this action improves the flow of value to the customer.

3. Manage flow. Care should be taken to maximize the value delivered, while the realization time should be minimized. The flow of work itself should be as smooth as possible.

4. Make the rules public. The basic practice in Kanban is to clearly define the rules, as well as the mechanism for questioning them when these rules do not work.

5. Implement feedback loops. Loops are an essential part of controlled processes. They are very important for changes resulting from the evolution of the organization.

6. Improve cooperation. Kanban methodology is often referred to as improvement / adjustment methodology. Improvements never end because in this case the concept of "perfection" is not achievable. To improve communication within the project team, it is recommended to organize daily Kanban meetings. These are short meetings of the project team (usually up to 15 minutes) in which team members describe their work progress. The purpose of these types of meetings is to improve daily coordination and work organization. Shamshurin and Saltz (2019) propose a method to improve team performance for teams that use Kanban.

Methods

The goal of the paper is to analyze if Kanban methodology can be used in managing research projects. To achieve the goal of the article, the following research methods were used: interviews with members of project teams in research projects (including research project managers) implemented at Wroclaw University of Science and Technology, analysis of project documentation and own observations collected during the implementation of such projects.

Results

Based on Kanban definitions presented in Kniberg and Skarinm (2010) where Kanban methodology is considered in three aspects: visualize the workflow, limit WiP (Work In Progress) and measure the lead time, we analyzed the use of these practices in managing research projects.

Visualize the workflow

One of the basic practices in Kanaban methodology is workflow visualization. One of the tools recommended here is a Kanban board. Primarly, the Kanban board is used to visualize work in progress and improve flow. Thanks to it, members of the project team can clearly see how many tasks they started, which allows them to avoid work overload because they do not undertake to realize too many tasks in a given time range. The use of Kanban boards reduces the amount of work in progress and enables more efficient management of project tasks realization (Anderson (2016)). Boards can be constructed in physical (e.g. paper board, wearing board) or electronic form. Most often, physical Kanban boards are created on large sheets of white paper. Colored sticky notes with the name of the task, its description and date are placed on them. The color of the sticky note depends on the criteria established by the team. Colors can symbolize the type of task, its urgency or importance. In addition, task sticky notes are marked with the avatar of the person who is responsible for the task. An avatar can be a person's initials, name or signature.

The authors of this work designed a table to be implemented in research projects. Since research projects usually lack funds for the implementation of additional tasks (in addition to the research tasks anticipated in the research plan), it seems necessary for this type of board to be available free of charge.

Therefore, the authors of this work decided to choose the MS Excel tool due to the very good knowledge of this program by all members of the project team and free access to the software by every university employee. An important advantage of this software is also the ability to create calculations of necessary measures and metrics, as well as their graphic presentation without having to import data to another program. If someone is interested in the application, she/he should contact the authors of this paper.

The developed Kanban board is organized in five MS Excel sheets: *Tasks*, *Board, Measures*, *Throughput Chart, Cumulative Flow Diagram* which will be described in the following subsections. The *Tasks* sheet stores information about the tasks performed during the realization of the research project. Each task has a unique ID number assigned, which is used to identify the task on the board. This number appears automatically when the user enters the task description. This option has been implemented using the *IF()* function, which can be used to check whether a given string in the cell assigned to the *Description* column contains a string. If the string is entered, the function takes the numerical value from the row above and adds one to it. The first ID number is already entered because it can be assumed that the project will have at least one task. Another attribute of each task is its status, selected from the drop-down list of five options: *ordered task* - task that appears in the project and awaits project manager approval, *pending task* - task approved and pending implementation, *realization* - task in progress, *internal review* - task being verified and *completed* - task completed and accepted by the project team. Each of the tasks is also described with an attribute such as its execution mode, selected from four options: *expedite*, *fixed date of implementation*, *standard*, *tangible*. Usually, tasks are carried out in the *standard* mode, which means no specific requirements are foreseen. However, they can also be performed in other modes, such as: *expedite* (this mode is selected when the task should be completed as soon as possible), *fixed date* (with a specific date of execution), *tangible* (tasks are carried out in this mode when they need to be performed up to specific date). It is also important for the team to have a commitment point, which is the boundary between the ordered status of the task (*ordered*) and the status of waiting for the task to be completed (*requested*). This point is important because after reaching it, the task must be carried out by one of the researchers within a specified period. In addition, the project tasks are grouped into categories that can also be selected from a drop-down list from four possible options: *research area*, *publication*, *lecture*, *others*. Each category is assigned the appropriate color that represents the group on the board. The *research area* is marked in green, the *publication* - pink, lecture - *blue*, and others - *yellow*. The next attribute of each task is a description in which the user can save any information relevant to him. After completing the described attributes of tasks implemented in the project, the user completes the dates of appearance of each task in individual areas of the board. For each of the five areas, a column has been assigned in which the relevant date should be given. On this basis, the number of days the task has spent in a given area is calculated. To perform these operations, the function *DATEDIF()* was used. An interesting fact is that this function is somewhat hidden in a spreadsheet and the user will not find it in the function browser or in MS Excel help. Thus, the only possibility to use this function is when the user is already aware of its existence and enters it manually. The *DATEDIF()* function has been combined with the *IF()* function, so that if the appropriate cells are not filled with the date (this happens when work on the task is not yet advanced), the error message about missing data will not appear. The last attribute of the task is its duration in the analyzed project, expressed in weeks. To calculate this value, the *DATEDIF()* function was used, which is used to calculate the number of days between the appearance of a task on the board and its completion. In the next step the result is divided by seven to express the number of days in weeks unit. A function *ROUNDUP()* was also used to round the calculated number of weeks to whole weeks. This rounding is intentional, because at a later stage this value will be used to illustrate the number of tasks completed in a given week. These functions are combined with the *IF()* function so that if the task is not completed the error message does not appear. The task attributes listed above are the table column headers, while the rows contain individual tasks. The tasks table can contain information on up to fifty tasks. The tasks table has been constructed so that when scrolling tasks down, the column titles are always visible. Above the tasks table, in the upper right corner, there are buttons redirecting the user to the Kanban board, calculated measures or charts. The button referring to the board also automatically updates the board. Any changes made to the tasks table (such as adding or removing a task, changing the status of a task, changing the mode or category) will be updated in the board. To ensure greater transparency of the worksheet, grid lines, formula bar and headers have been disabled.

The *Board* sheet contains a developed Kanban board. An example of such a board is shown in Figure 1. Above the board, in the upper right corner, there are buttons that redirect the user to other sheets.

	Ordered tasks				Pending tasks				Realization				Internal Review				Completed			
Expedite																				
Fixed date of implementation																				
Standard										2	3	9						1	4	5
									10								6	7	8	11
																	12			
Tangible																				

Fig. 1. Sample Kanban board

Figure 1 shows a Kanban board filled in with tasks. Based on the board, one can immediately determine to which category the task belongs and at what stage of work it is. To get more detailed information about a task, the user must go to the *Tasks* sheet and search for a specific task based on the ID number.

The basic sequence of actions that had to be automated thanks to VBA was the process of moving subsequent tasks to the right places on the Kanban board. For this purpose, the Tasks procedure was written. This procedure first limits the tasks table area, then checks the status of the task and the mode of its execution, and places it in the right place. The task ID appears in the selected cell. The next step is to fill the cell to which the task was assigned with the correct color. Project tasks can appear in any of the twenty areas, starting from the second cell. Subsequent tasks appear on the right. The described procedure handles a situation in which there will be more tasks than anticipated places in each area. In this situation, an appropriate message is displayed and if accepted, the tasks are overwritten with the previous ones.

Measure the Lead Time

The *Measures* sheet has four navigation buttons. Under the buttons there is a table containing the task ID and the measures calculated for the given task. To ensure greater transparency of the worksheet, grid lines, formula bar and headers have been disabled. The head of the analyzed research project monitors two basic measures: *Lead Time* and *Cycle Time*. *Cycle Time* is the time that elapses from the beginning of the task realization to its completion. This time can be expressed in days, weeks, months or any other unit of time selected according to the size of the project. In turn, the *Delivery Time* is the total time that elapses from the moment the task appears on the board in the order area until the task is completed. This time can also be expressed in any time units. However, one must ensure that the unit is identical to the cycle time unit in the project. Table 1 presents sample calculations of measures for individual tasks.

Table 1: Sample calculation of measures for individual tasks in the selected project

ID	LEAD TIME	CYCLE TIME
1	60	59
2	-	-
3	-	-
4	43	42
5	50	41
6	41	38
7	74	62
8	49	45
9	-	-
10	-	-
11	41	35
12	33	29

In order to calculate the cycle time, the time spent on the task in the work phase and the internal review phase time were added up. In case the task has not been finished yet, thanks to the *IF()* function, no error message is displayed. What is more, to calculate the delivery time, the times that the task spends in each phase - from the moment it appears on the board as the ordered task until its completion are added.

The second option to monitor the velocity of delivering tasks is the ability to create a throughput chart in the developed tool. Throughput is a quantitative measure that shows how many tasks have been completed in a given unit of time. This time can be expressed in any unit of time, which should be chosen according to the size of the project. This measure is easiest to be visualized on a bar chart. The *Throughput Chart* sheet has four navigation buttons. To make the spreadsheet more transparent, it has disabled gridlines, the formula bar and headers. In addition, the spreadsheet includes a table used to calculate the throughput chart. The table shows the project weeks and the number of tasks completed in a given week. Based on the data in this pivot table, a throughput graph is automatically created that shows the number of tasks completed in a given week. An example of the capacity graph is shown in Figure 2.

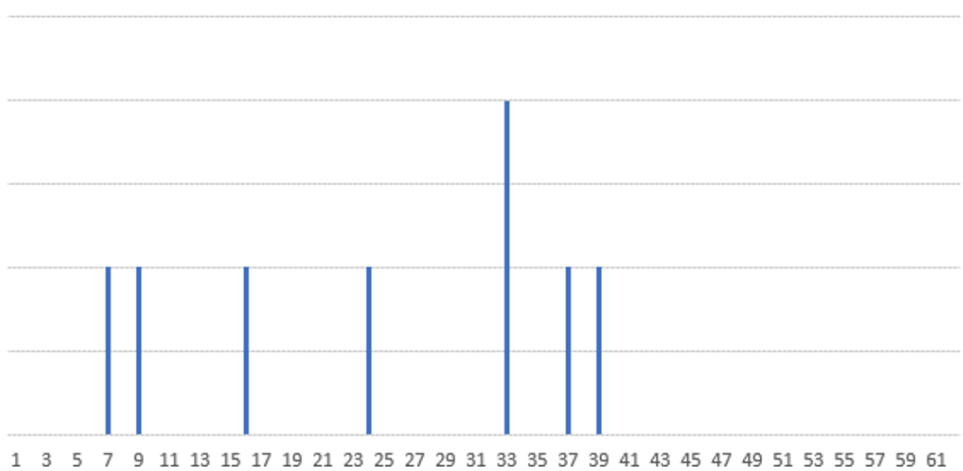

Fig. 2. Sample throughput graph in the sample project being analyzed

Limit Work in Progress

Limit Work in Progress is also an important practice of the Kanban methodology to be used for research projects, because scientists tend to start research tasks without completing them and start realizing more interesting tasks. Therefore, the developed tool offers the possibility of generating a cumulative flow diagram, which facilitates monitoring Work in Progress (WiP) and allows to set a WiP limits. The *Cumulative Flow Diagram* sheet also has navigation buttons at the very top. A table was built under the buttons, which shows how many tasks in a given week are in each of the implementation phases. Based on this table, a layered chart called a cumulative flow diagram is generated. Figure 3 shows an example of a cumulative flow diagram.

The cumulative flow diagram indicates what work looks like each week. The delivery time, cycle times and total work in progress can be determined from the chart. Information from the chart can be the basis for suggesting process improvements.

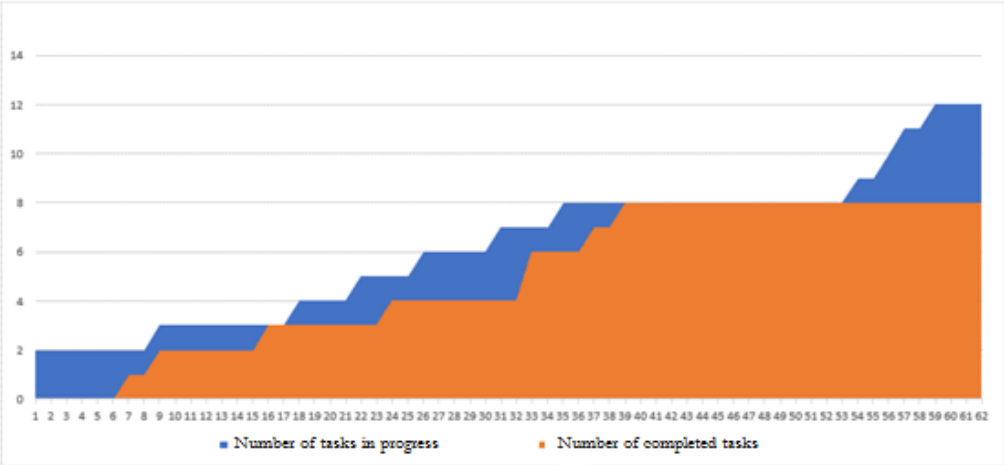

Fig. 3. Sample Cumulative Flow Diagram in the selected research project

Discussion

The conducted research shows that the Kanban methodology, developed for production processes and successfully applied for IT projects, can also be used in research projects (at least some of their parts). To our knowledge, based on the existing literature studies, such an application has not been researched or measured so far and this article proves that Kanban usage is fully justified also for research projects. In the article we presented analysis of using the main practices of Kanban methodology in research projects. The main result of the work was the design of the Kanban board for the research project in the MS Excel environment and its verification based on the projects implemented at the Wroclaw University of Technology. Thanks to the electronic version of the Kanban board, the research project manager can easily and quickly access basic measures of project progress. The motivation of the project team members to carry out tasks in a timely manner, as well as the motivation to update the percentage of tasks realization in the table on a regular basis, have increased. The project manager is most satisfied with the ability to track the measures and metrics he is interested in, because on their basis he can make necessary changes in the deadlines for tasks and in the project plan. The electronic board is intuitive to use. Any user, even the one who is not advanced in MS Excel, will be able to use it. The implementation of the board in the selected research projects went smoothly and effectively. In addition, the benefit of implementing the designed board expected by the project manager (as shown by the interview) is to increase the motivation of the project team members to perform their tasks. The manager hopes that the project tasks will be carried out within deadlines and there will be no delays in implementation. Because in the designed Kanban board it is possible to monitor the time of task delivery and cycle time

by the project manager and the research team. Project team members accepted the new method of monitoring work progress and committed to regularly updating the board.

The proposed research and methods used have their limitations. Primarily, the suggested elements of the Kanban methodology have been implemented in only one research project. This methodology has been rated positively, but the effects of implementation need to be analyzed also on other research projects. As a future work we see a need to develop a quantitative method for measuring how much the implementation of the Kanban methodology helps project teams and managers in implementing research projects and to identify the crucial areas of improvements.

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Organizational Justice and Organizational Commitment. Relations and Interdependence of Phenomena

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Abstract

The article presents the problem of dependency between perceived of organizational justice and organizational commitment. In this article, factors supporting organizational commitment related to criteria of organizational justice proposed by J. Colquitt and R. Moorman where analyzed.

Authors have reviewed literature in the field of employees' organizational commitment and perceived organizational justice especially concerning on relations between particular aspects of both organizational phenomena. Based on this research authors find that there is no published research of testing R. Moorman and J. Colquitt scales in area of relation between particular aspects of organizational justice proposed by these authors and organizational commitment. In this case the aim of presented article was to examine the relation between organizational commitment (and its dimensions) and perceived organizational justice (and its dimensions).

The findings of this study show which measurement reflects more conveniently the level of perceived justice.

The research was held at Wrocław University of Business and Economics in Poland on the group of 170 working students of full-time and part-time studies.

Keywords: organizational justice, organizational commitment, Moorman's scale, Colquitt's scale.

Introduction

Organizational commitment is a state reflecting employees' identification with their firm's goals, values and norms (Mowday, Steers, Porter, 1979). The aspect of organizational commitment has been widely discussed in the source literature for many years. Many authors have deeply discussed both the drivers as well as the consequences of organizational commitment. R. Mowday *et al.* (1982) claimed organizational commitment to be characterized by at least three crucial conditions: *a) a strong belief in and acceptance of the organization's goals and values; b) a willingness to exert considerable effort on behalf of the organization; and c) a strong desire to maintain membership in the organization*. J. Meyer and N. Allen (1991; 1996) also discussed a multifold nature of organizational commitment as a psychological state and separated three natures of organizational commitment. They differentiated a

desire (affective commitment), a need (continuance commitment), and an obligation (normative commitment).

There are only few negative consequences of organizational commitment listed in the literature. Special engagement in one's company issues may lead to their career stagnation or even decrease in one's innovativeness and creativity (Mathieu, Zajac, 1990). It may also strain one's self-development (Randall, 1987). Organizational commitment constitutes a remarkable aspect in many companies. It may be especially significant in health services or educational services. In service sector, lack of alternatives is driven by continuance commitment. Such a state of matter may cause a dilemma (Raju, 2017).

Indeed, organizational commitment generates many advantages for an organization. High employee commitment is supposed to be a driver of a lower employee turnover and attrition rate, as well as the lateness and absence. Workers committed to their organization usually tend to be decently motivated and to maintain high morale (Fako, Nkhukhu-Orlando, Wilson, 2018). They also use more eagerly their potential and capabilities at work. Organizational commitment constitutes a source of organizational performance and employees' spontaneous contributions towards one's organization or an individual (Dixit, Bhati, 2012). Moreover, it is crucial in encouraging the employees to engage in organizational citizenship behaviors (OCB). Organizational commitment enhances extra role performance, accountability, job satisfaction and work motivation (Fornes, Rocco, 2004; Mathieu, Zajac, 1990).

Employees do not need to look for a job if they are satisfied. The organizational climate should be convenient for its workers, providing them stable conditions to participate actively in their firm's daily life. Organizational commitment is perceived to be a useful feature, because it is a driver of firms' success (Mathieu and Zajac, 1990). That's why it is necessary to determine how this feature is shaped and enhanced.

The literature review showed that employees' commitment is strictly related to the reciprocal relationships between employees and supervisors. This statement is clearly supported by social exchange theory (Blau, 1964; Wayne, Shore, Bommer, Tetrick, 2002).

Pursuant to A. Bandura's social learning theory (1977), people learn by observing the behavior and analyzing its consequences (Mushtaq, Ellahi, Bashir Khan, 2020). No wonder people reciprocate a favorable demeanor when they are treated decently. J.S. Adams' equity theory (1965) suggests that an entity calculates the possible output that might be obtained, providing given input. Obviously, the input/output ratio must be clearly profitable for an employee to act such a behavior. *Quid pro quo* agreement reflects significance of organizational fairness. When the considered dependence is not equal beneficially for both parties, the relationship may be hampered or inhibited (Deutsch, 1975).

The problem of justice is important in social, political and economic areas of our lives. J. Rawls (2004) escribed fairness as the first virtue of social institutions. The issue has been broadly raised in many critical materials (Greenberg, 1990; Colquitt, Wesson, *et al.*, 2001; Tyler, 2010). At the beginning, researchers named two divergent terms of justice: distributive one and procedural one. The most common type of justice –distributive justice – refers to outcomes allocation (Deutsch, 1975; Hart and Deutsch, 1986). It was the first type of justice, that was recognized. *The concept of distributive justice is concerned with the distribution of the conditions and goods which affect individual well-being* (the distribution concerns both benefits and costs). According to Deutsch (1975), equity, equality and human needs touch the aspect of distributive justice. Then, researchers started to scrutinize the principles of outcomes' distribution.

In turn, procedural justice is strictly associated with the decision-making processes, i.e. process control (Colquitt, Noe, Jackson, 2002; Leventhal, 1980). Although several authors previously concentrated only on two dimensions of organizational justice, R. Bies and J. Moag (1986) introduced the *human* approach of fairness perception. Such a dimension was named interactional justice (Colquitt, Wesson, *et al.*, 2001).

Further, it was categorized into: interpersonal and informational justice (Colquitt, Wesson, *et al.*, 2001). Interpersonal justice may be perceived by how employees are treated by their supervisors (Ambrose and Schminke, 2009) in the context of outcomes distribution (Greenberg, 1993a). Meanwhile, informational justice focuses on informing employees about the procedures and regulations applied in decision-making processes (Bakhshi, Kumar and Rani, 2009) and refers to the way how fairly the distribution procedures are explained and communicated by decision makers (Greenberg, 1993b; Li and Cropanzano, 2009).

Many researchers have discussed the issue of organizational justice in the context of organizational commitment and other factors (Organ, Moorman and Niehoff, 1993; Tyler, 2010). In order to point out the significance of organizational justice, the authors systematized the relations between organizational justice and organizational commitment in a table below.

Table 1: Relations between organizational justice and the organizational commitment – literature review

References	Respondents	Examined factors	Main findings	Scales used
(Organ, Moorman and Niehoff, 1993)	870 employees of public TV, United States	effects of job satisfaction (JS), organizational commitment (OC), and procedural justice (PJ), organizational citizenship behavior (OCB)	-PJ is significantly related to OC, -PJ is related to OCB	(Organ, Moorman and Niehoff, 1993)(Lind, 1988)(Organ, Moorman and Niehoff, 1993)
(Masterson *et al.*, 2000)	651 university employees, United States	PJ, interactional justice, OC, leader-member exchange (LMX), JS, OCB, perceived organizational support (POS)	-LMX fully mediated the relationships between interactional justice perceptions and both JS and supervisor-directed OCB, -POS fully mediated the relationships between PJ and both JS and intentions to quit and partially mediated PJ's relationships with both OC and organization-directed OCB.	(Folger and Bies, 1989; Tyler, 1989)(Folger and Bies, 1989)

(Bakhshi, Kumar and Rani, 2009)	128 employees working in medical college in North India	Organizational justice (OJ), job satisfaction, organizational commitment	PJ and DJ are significantly and positively related to organizational commitment	(Aldrich, Price and Mueller, 1988; Organ, Moorman and Niehoff, 1993)(Porter *et al.*, 1974)
(Ravangard, Ansarizade and Sajjadnia, 2013)	120 employees, public university in Persia	OC, OJ, affective (AC) and normative commitment (NC), continuance commitment (CC)	-AC, NC and total OC have significant positive correlations with total OJ and its three components: PJ, DJ and interactional justice; -CC had only a significant positive correlation with PJ and interactional justice	(Organ, Moorman and Niehoff, 1993)(Meyer and Allen, 1991)
(Suliman and Kathairi, 2013)	500 full-time government employees in UAE	OJ, OC, job performance (JP) in state-owned organizations	-significant relationship between OJ and all forms of OC; -OJ (procedural, interactional) is positively and significantly correlated with AC, CC and JP; -moderating effect of AC and CC of high JP.	Based on (Colquitt, 2001)(Moorman, 1991)
(Jiang, Gollan and Brooks, 2017)	706 university employees across China, South Korea and Australia	Distributive (DJ) and PJ, OC, organizational trust, OT	-PJ and AC are significantly related, -OT fully mediates the PJ and AC relationship. -in China and South Korea, both DJ and PJ were significantly related to AC	(Colquitt, 2001)
(Ari and Çağlayan, 2017)	524 academicians from the school of physical education (professors, assistants, researchers etc.) in Turkey	OC, AC, NC, OJ	-the highest perception regarding OC was in the AC dimension, it was followed by NC dimensions, -there are moderate and low-level positive relationships between the OJ dimensions and OC dimensions	(Moorman, 1991)(Meyer and Allen, 1991)

(Osei, Osei-Kwame and Osei Amaniampong, 2017)	201 nurses across six hospitals in Ghana	OT, ethics, OJ, OC	-OC significantly and positively predicts work self-efficacy of nurses, -the work environment characterized by OT, ethics, and OJ will affect work self-efficacy directly and also through the OC that it generates in the workers -OJ has a significant and positive effect on OC	(Meyer and Allen, 1991)(Rego and Souto, 2004)
(Mushtaq, Ellahi and Bashir Khan, 2020)	12 firms: Pakistan Airlines, banks, and a Fast Food Services in Pakistan.	OJ, supervisor support, group cohesiveness on OC: mediated role of ethical behavior	-OJ, supervisor support, and group cohesiveness depicted significant association with OC.	Organizational Commitment (Meyer and Allen, 1991)Ethical Behavior Hunt, (Hunt, Chonko and Wilcox, 1984) Distributive Justice (Aldrich, Price and Mueller, 1988), Procedural Justice (Moorman, 1991)

Source: own elaboration

As signalized in the table above, the researchers used many various scales to examine the level of perceived organizational justice. A number of studies have examined the relation between organizational justice and employees' commitment. In many papers, there was found a significant positive relation between these aspects (Organ, Moorman and Niehoff, 1993; Colquitt, Wesson, *et al.*, 2001; Mushtaq, Ellahi and Bashir Khan, 2020). According to the table 1, the most often are used: four-dimensional J. Colquitt's scale (2001) and three-dimensional R. Moorman's scale (1991).

R. Moorman's (1991) scale reflects three various aspects of organizational justice: procedural, distributive and interactional. Conversely, J. Colquitt's (2001) split interactional justice into two different sections: informational and interpersonal. The most common type of justice – distributive justice – refers to outcomes allocation (Deutsch, 1975; Hart and Deutsch, 1986). It was the first type of justice, that was considered. Then, researchers started to scrutinize the principles of outcomes' distribution. Procedural justice, introduced by Thibaut and Walker (1975, 1978), analyzes the processes that lead to those outcomes' allocation. R. Bies and J. Moag (1986) noticed the significance of personal interactions that assists goods' and rewards' distribution. Their analyzes introduced the concept of interactional justice. As social interactions importance was signalized in research area, the exploration in the field of interactional justice enhanced. Interactional justice split into interpersonal and informational. Interpersonal justice refers to how people are treated by their supervisors in the context of outcomes distribution (Greenberg, 1993a). Conversely, informational justice refers to the way how fairly the distribution procedures are explained and communicated by decision makers (Greenberg, 1993b; Li and Cropanzano, 2009).

Taken together, the findings from table 1 would seem to suggest the remarkable relation between perceived organizational justice and organizational commitment. The findings demonstrate the importance of each specific dimension of organizational justice and their influence on each kind of organizational commitment. The literature review shed light on the aspect of organizational commitment among the employees of university, medical services, government institutions, public and private enterprises. Analyzed papers (Organ, Moorman and Niehoff, 1993; Masterson *et al.*, 2000; Bakhshi, Kumar and Rani, 2009; Ravangard, Ansarizade and Sajjadnia, 2013; Suliman and Kathairi, 2013; Ari and Çağlayan, 2017; Jiang, Gollan and Brooks, 2017; Osei, Osei-Kwame and Osei Amaniampong, 2017; Mushtaq, Ellahi and Bashir Khan, 2020) indicate the interdependence between perceived organizational justice and employees' attitude towards organization (i.e. organizational commitment, organizational citizenship behavior, job performance).

The aim of this paper is to examine the relation between organizational commitment (and its dimensions) and perceived organizational justice (and its dimensions). The authors measured the level of perceived organizational justice applying two popular scales: J. Colquitt's (2001) and R. Moorman's (1991), commonly used in literature (as well as in analyzed papers). In turn, organizational commitment was measured using the scale developed by N. Allen and J. Meyer (1991).

Methods

The empirical studies were conducted on a group of 170 working students (bachelor, master and postgraduate studies). The aim of the research was to determine how perceived organizational justice dimensions proposed by J. Colquitt and R. Moorman affect the organizational commitment (both as a whole and as its individual components). The results of our pilot study have shown some trends and complement existing literature findings. Our pilot study will be continued by the authors in order to reduce the statistical error.

The survey consisted of 87 questions and was based on the original J. Colquitt's (2001) and R. Moorman's (1991) scales (in case of organizational justice). To examine the relations between organizational justice and organizational commitment, the authors used scale proposed by J. Meyer and N. Allen (1991). In all cases the original research scales proposed by listed authors were used.

Secondly, an appropriate statistical analysis was performed. The authors used methods such as: regression analysis, multiple regression analysis and structural equation modelling.

First multiple regression analysis was performed, where the dimensions of organizational justice were taken into account as independent variables (in two cases, i.e. both models according to R. Moorman (1991) and J. Colquitt (2001)). An organizational commitment was adopted as the dependent variable (as the average of results in each dimension proposed by N. Allen (1991)).

Multiple regressions analysis using this method did not give results at a statistically satisfactory level. For this reason, series of single analyse were conducted, using the regression analysis of each independent variable (which are particular dimensions of organizational justice). In each case organizational commitment according to N. Allen was adopted as the dependent variable.

A regression analysis was also conducted in relation to the variable which is the average value of organizational commitment calculated as the average of the results from individual dimensions (affective, continuance, normative). The results obtained are summarized in Table 2.

Additionally, in order to determine the relationship between organizational justice according to R. Moorman's (1991) and J. Colquitt's (2001) approach and an organizational commitment, a path model was proposed and analysis using structural equation modelling was performed.

These analyses were conducted for a simplified model in which the impact of variables such as distributive and procedural justice (both in R. Moorman (1991) and J. Colquitt's (2001) proposal) on the organizational commitment was assumed. In this model, the variables related to interactional, interpersonal and information justice were tested as mediating variables (see Fig. 1). In case of J. Colquitt's (2001) proposals, the average value of variables which was interpersonal justice and information justice was also tested as a mediating variable.

Results

An important problem addressed in this article is to demonstrate the relationship between a sense of organizational justice and commitment to work. The results obtained for the models of justice developed by R. Moorman and J. Colquitt were compared in the context of their organizational commitment - according to the scale developed by J. Meyer and N. Allen. The research results presented below indicate a moderate or weak impact of the sense of organizational reliability (by type) in relation to commitment to work (by type). They also show that R. Moorman's scale is better suited to study the impact of a sense of justice on employee commitment in this specific research sample. The results are presented in Table 2.

Table 2. Linear regression between a sense of organizational justice and organizational commitment (N = 170)

Organization justice		Commitment		
		Affective	Continuance	Normative
Total	Moorman	**0.443****	0.121	**0.264****
	Colquitt	**0.401****	0.115	**0.260****
Distributive	Moorman	**0.334****	0.070	**0.183***
	Colquitt	**0.287****	0.117	0.090
Procedural	Moorman	**0.417****	0.045	**0.252****
	Colquitt	**0.308****	0.091	**0.193***
Interactional interpersonal /	Moorman	**0.325****	**0.162***	**0.204****
	Colquitt	**0.301****	0.149	**0.190***
Informational	Colquitt	**0.319****	0.019	**0.295****

** p<0,05, ** p<0,01 Bold values indicate the statistical significance of the parameter.*

Source: own elaboration

The table above shows that the use of the R. Moorman's scale is a better suited model to examine the correlation between sense of organizational justice and commitment. The value of the sense of justice in general in R. Moorman was higher and equal to 0.443, while in J. Colquitt it is 0.401, In particular types of justice the R. Moorman model also has higher values than J. Colquitt (i.e. in procedural justice this value is 0.417 compared to 0.308). The most susceptible to the impact of a sense of organizational justice is affective commitment - the values of the sense of each justice were statistically significant, i.e. showed a significant impact. Studies have shown that the sense of organizational justice does not significantly affect continuance commitment. In this case, none of the types of organizational justice was statistically significant (except for R. Moorman's interactional justice - the value of the statistics was 0.162 for p <0.05). In contrast, normative attachment was significantly affected by most types of organizational justice (except for distributive J. Colquitt - 0.09 for p> 0.05). Values describing the correlation of attachment to the company in the context of the sense of individual types of organizational justice gave average values and ranged from 0.287 to 0.443 for affective commitment,

statistically insignificant values for continuance commitment and 0.183 to 0.295 for normative commitment.

For the purpose of achieving the set goal, the method of data path analysis was also used to show the directional impact of the analysed variables and their interrelationships. Path analysis is a technique that uses multivariate regression analysis. The starting model for this method is proposed in Fig. 1.1. relationship diagram.

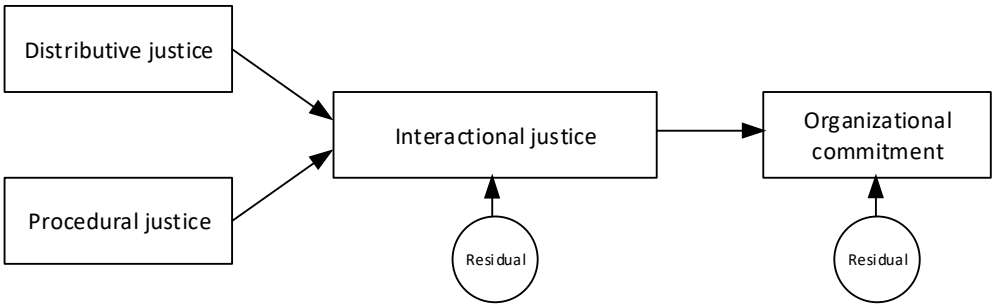

Fig. 1: Path diagram for the research model

Source: own elaboration.

For the purposes of the analysis, the authors assumed the existence of a direct correlation between the interactional / interpersonal / informational type of organizational justice and organizational commitment. The analysis confirmed the validity of the hypothesis about the proposed shape of the diagram.

The diagram has been tested for the R. Moorman and J. Colquitt scales. For the analysis, the basic parameters used in the path analyses that reflect its results (p, RMS, GFI and AGFI by Joreskog) were used. In table 3. presents values that were obtained on individual path diagrams.

Table 3: Basic statistics values for path analysis

Path diagram	p	RMS	GFI	AGFI
R. Moorman's path diagram (direct variable is interactional justice)	0,933	0,005	1	0,998
J. Colquitt's path diagram - I (direct variable is the average value of interpersonal and informational justice)	0,117	0,052	0,987	0,935
J. Colquitt's path diagram - II (direct variable is interpersonal justice)	0,031	0,069	0,979	0,896
J. Colquitt's path diagram - III (direct variable is informational justice)	0,043	0,065	0,981	0,905

Source: own elaboration

The results obtained indicate a high fit of the model to real data. GFI indicators oscillate between 0.979 and 1.00, while AGFI 0.896 - 0.998. The desired value also includes RMS values (all below 0.1). The best fit of the model can be seen in the case of Moorman - the parameters indicate the best fit (path diagram shown in Fig. 2.).

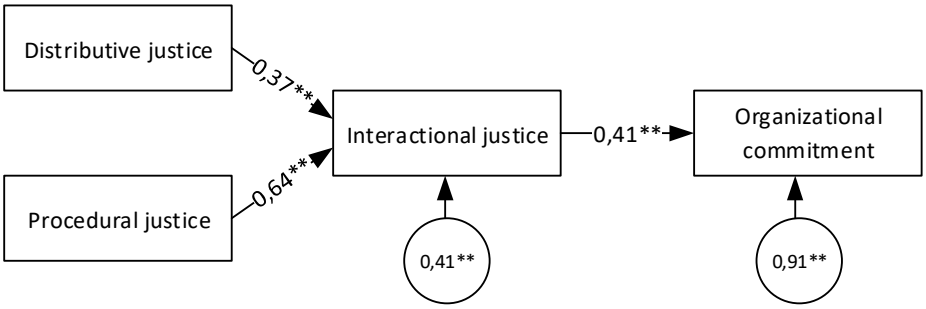

Fig. 2: Path diagram - model based on the analysis of R. Moorman's organizational justice scale with marked path coefficients and residual

Source: own elaboration

The obtained parameter values allowed the interpretation of direct and indirect causal effects. interactional justice moderately strongly affects organizational commitment, while its value is strongly influenced by procedural justice 0.64.

In the figures below there are 3 different paths based on the J. Colquitt model. Three versions of the model were presented with different variables, which directly affect organizational commitment. In Fig. 2. direct value refers to the average value of information and interpersonal types of justice, along the path presented in Fig. 4. direct variable is interpersonal type justice, while in Fig. 5. informational type. On each diagram of paths taking into account the concept of J. Colquitt's organizational justice scale one can observe a much stronger impact of procedural justice on information / interpersonal - in two diagrams the values are not statistically significant (variant with the mean value from informational/interpersonal and interactional values as directly affecting organizational attachment). Distributive justice affects organizational affiliation with a strength of 0.15 (0.37 x 0.41) through the mediating variable 'interactional justice', while procedural justice with a strength of 0.26 (0.64 x 0.41).

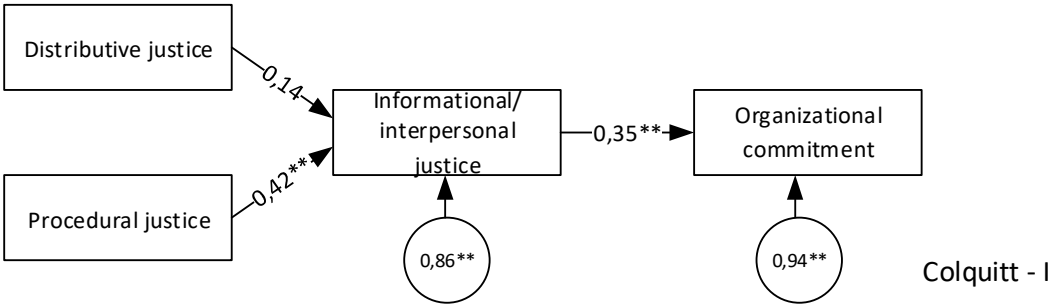

Fig. 3. Path diagram - a model based on an analysis of Colquitt's organizational justice scale with marked path coefficients and residual.

Source: own elaboration

In the first version of the path analysis of the model based on the J. Colquitt organizational justice scale, the mean value of informational and interpersonal variables was used as a counterpart of R. Moorman's interactional justice. Similar to the analysis of the model based on the Moorman scale, procedural justice has a stronger impact on informational / interpersonal justice (0.42), while distributive justice is not statistically significant. When examining the impact of distributive justice on organizational commitment through the mediating variable (average value of informational and interpersonal justice), one statistically significant result was obtained - procedural justice affecting with a strength of 0.15.

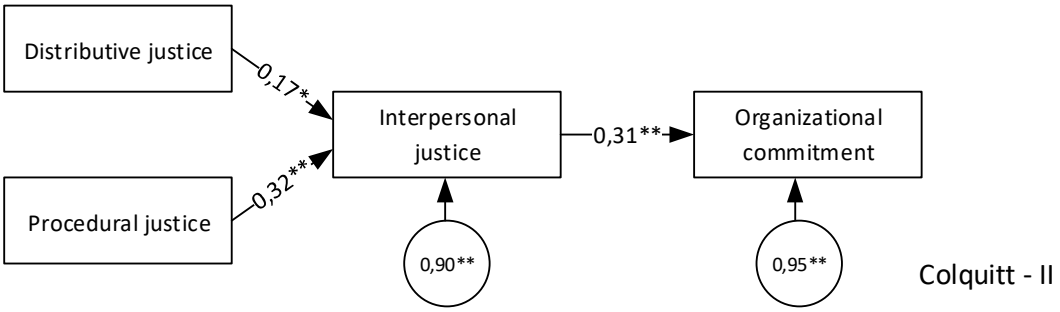

Fig. 4. Path diagram - a model based on an analysis of J. Colquitt's organizational justice scale with marked path coefficients and residual.

Source: own elaboration

In the second variant of path analysis of the created model based on the J. Colquitt scale, interpersonal justice was adopted as the mediating value. Distributive justice and procedural justice are both statistically significant. The mediating variable is more strongly influenced by procedural justice (0.32), whereas distributive by 0.17. In examining the impact of direct distributive and procedural justice on organizational commitment, we obtained the results 0.05 (0.17 x 0.31) and 0.1 (0.32 x 0.31) as follows. Alike to previous analyses, it should be stated that procedural justice strongly influences organizational commitment.

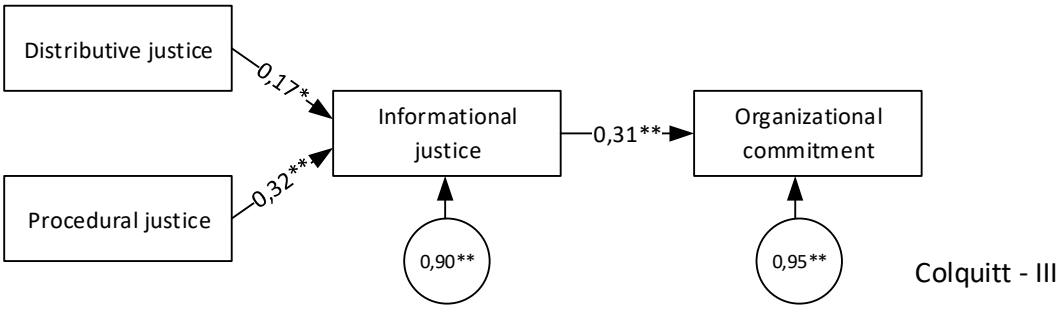

Fig. 5. Path diagram - a model based on an analysis of J. Colquitt's organizational justice scale with marked path coefficients and residual.

Source: own elaboration

As in option II of the path analysis of the value of the impact of individual types of organizational justice on the informational justice (mediating variable) and their indirect impact on organizational commitment were the same. Summing up the analysis of paths for the model based on the scale of organizational justice according to J. Colquitt, one can conclude that variant I, which takes the mediation average value from informational and interpersonal justice gives higher values than when analysing the interpersonal and informational mediation variables separately.

Discussion

The analysis of models based on the scale of justice according to R. Moorman and J. Colquitt leads to the formulation of several important conclusions. First of all, it should be noted that the use of the R. Moorman organizational justice scale in path analysis for the developed model shows stronger links with organizational justice than J. Colquitt's scale, which can be described as a better fit to the empirical

data model. In addition, the strongest organizational justice affects affective commitment, but it does not affect continuance commitment. Distributive justice affects mediation variables and organizational attachment much less than procedural justice. The results obtained in the study are consistent with the results obtained in the 90s by R. Moorman or D. Organ. The results of the research open the possibility of conducting further analyses, which take into account the significant cause-effect relationships occurring in organizations, at which the scales of R. Moorman and J. Colquitt can be used. The research emphasised the significance of organizational commitment in the context of organizational justice.

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Innovations in The Construction Industry. Diffusion of Innovations

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Abstract

Types of innovations in the construction industry are discussed in this article. Particular attention is paid to nanotechnology and nanomaterials which are currently being actively developed at the level of basic research but are not widely used in real production. This is the main problem of the development and spread of innovation. The model for assessing the diffusion of innovations in an economic setting is proposed in this article. This allows assessing the possibility of using innovative technologies in the production process. The model is built on the basis of the physical task of determining the diffusion flow. The model is adapted to solve economic problems. The concept of innovative risks is defined as an anti-environmental effect.

Keywords: Diffusion of Innovation, Nanotechnology, Risks of Innovation, Model of Diffusion of Innovations

Introduction

We have been using the terms "nanotechnology" and "nanomaterials" for a long time in our lives. These are the chemical industry, mechanical engineering and instrument making, the defense industry, aeronautics and space technologies, nuclear energy, electronics and microelectronics, robotics, computer technology, medicine, the pharmaceutical industry, biotechnology, cosmetics and many other areas of the modern industry. And, of course, we must not forget about one of the most important sectors of activity - construction.

The use of these unique materials and technologies is widely distributed in all of these areas of human activity. The construction industry lags behind other industrial fields in the industry-wide conception.

The nanotechnology industry in Russia is only at the beginning of a fundamental process of its development. Despite the lack of approbation and operational experience, many industries accept these unique developments quite actively. Thus, the nanotechnology industry is most actively developing in the energy sector, defense and space industries, medicine and pharmaceuticals, the textile industry, which has applied nanotechnology and nanomaterials among the first.

Problem Statement

Despite the fact that the construction industry is provided with unique developments by the nanotechnology industry, so many nanocoatings, nanofilms, nanostructures and nanomaterials have

been developed by the nanotechnology industry. At the same time, the construction industry is at an easy pace to introduce it into large-scale production.

First of all, we will consider those technologies and materials that have already been provided to Russian builders. These are nanomaterials and nanoconstructions:

- nanostructured concrete;
- glass fiber-reinforced composite;
- high strength steel;
- nanocomposite pipes;
- nanocoatings and nanofilms;
- nanostructured ceramics;
- innovative film;
- structural composites;
- self-cleaning coatings, etc.

These categories of materials include many different types. The variety of which is difficult to fit into the framework of one research. It has to be said that each individual type is a completely new material that carries certain functions and has its own unique characteristics adapted to solve specific problems in the field of construction operations and construction technologies.

Besides the nanotechnology in the construction industry, there are many unique developments that are innovative and creative. These developments can bring the industry to a whole new level.

3D printing is one of the unique technologies. The first development of 3D printing has started in the eighties of the last century. Today 3D printers are actively used in construction, especially for non-standard architectural forms. Typical objects are also suitable for construction based on this technology. The construction time of the building is significantly reduced relative to a similar object constructed using standard methods.

At the same time, this new technology has its disadvantages:

- the unavailability of using vibro concrete because the concrete with a high setting speed should be used;
- there is no specific methodology for structural reinforcement;
- the 3D printer works only in conditions of positive temperatures and dry weather;
- possible formation of voids because the vibrocompression is not used with this technology.

Especially, the builders did not like the last point. It is known that voids and cracks in concrete can lead to very negative consequences during building operations.

But this problem can be completely resolved. There is another unique technology that should be considered - self-healing concrete. It is hard to imagine that a collapsing wall is being rebuilt independently without any external influences. However, this is already a reality. Microbiologists have helped to solve the problem of concrete restoration. It is known that over time, concrete gains strength and the liquid fills the appeared microcracks. As a result, we get a set of negative effects: corrosion of reinforcing elements, violation of the structural characteristics of concrete, structural continuity, etc.

Microbiology has given builders a very creative solution: to use the ability of some microorganisms to produce limestone using a nutrient medium in the course of its vital functions. There is not enough nutrient medium in concrete. So, the calcium lactate which is consumed by microorganisms is using to create it. The limestone which fills the cracks in concrete structures is formed as a result of a chemical reaction.

Literature Review

For the first time, the concept of diffusion of innovations was described in the works of E. Rogers. E. Rogers has applied the concept which justifies the mechanism for introducing innovations into the real sector of the economy by political and economic factors. The provisions which have been developed by E. Rogers give an explanation of the diffusion of innovation in the economic and political aspects of the country's development. He identifies exogenous environmental factors and defines it as catalysts for the spread of innovation or as resistance factors.

The terms "innovation transfer" and "innovation spillover" can be found in some foreign literary sources. Both terms are related to innovation distribution channels. The first category includes leasing (buying and selling licenses) and franchising.

The term “innovations spillover” is more complicated in its interpretation. This term came from chemistry, and initially, it sounded like “spillover effect”. In an economic interpretation, this term defines the diffusion of innovation from the point of view of the spread and transfer of intellectual property through the “flow” of intellectual human capital.

T.F. Gareev gives more economic concept in his works. He defines the commercial and non-commercial nature of technology transfer. Economists think that such concepts are more acceptable but marketing specialists have been argued that such concepts are not entirely successful.

In our opinion, the diffusion of innovations as a conceptual apparatus includes a larger complex of aspects and represents a systemic concept that covers all stages of the development of the innovation process from the idea of creation to its implementation.

Perhaps it makes sense to give a more detailed idea of the phenomenon of diffusion of innovations as an economic and, therefore, commercial process. But in this work, we have tried to find the answer to the question of how to accelerate the process of diffusion of innovations and determine the catalyst for this process. First of all, we have to define the innovations as a complex process of transforming the idea into a final innovative product which includes at least four stages: the idea of creation with the consideration of motivation - development (creation) - testing - implementation.

Based on the definition of diffusion as a physical process (diffusion, dispersion), the process of diffusion of innovations can be represented in the form of the stepwise model of diffusion. It means that distribution can occur at each of the stages considered starting from the innovative ideas and ending with final products which are ready for use in a real production process.

Findings

The question arises: why does the construction industry implement high performance technologies and materials so slowly? For example, the pace of innovative development in China is higher than the pace in Russia and also in United States of America. What is the problem of the innovative development of Russian industries and construction?

The main problem of the active spread of innovative solutions in large-scale building production is the lack of a wide range of investors who allow the use of new technologies and materials due to its lack of testing in the market. In other words, due to the high risks of innovative projects. Not every investor is ready to invest in new technologies. If we talk about construction products, the new technologies can be very costly.

A risk assessment tool must be developed to create an active environment for the diffusion of innovations. According to this tool, it will be possible to assess the potential negative exogenous impacts. It is also necessary to create a model of diffusion of innovations to assess the rate of the introduction of innovations in the production process.

The term "diffusion" is mainly used in the natural sciences. It has come to the economy relatively recently. Today, the term “diffusion of innovations” sounds more and more often. This term means the rate of distribution of innovative solutions and its use in the production process.

In the physical process, the less the resistance of the medium, the more the diffusion activity. For example, the diffusion will be more active with the increased temperature.

The problem in the economic statement is presented as follows. Let's consider the risks as environmental resistance. The risks are presented as negative factors that impede the spread of innovations and reduce the effectiveness of implementation in the economic space.

Economic diffusion will be more active if the temperature is “increased” in the diffusion medium. Such a “warm-up” from an economic point of view can be interpreted, such as increasing the activity of marketing initiatives, risk analysis and measures to reduce it, etc.

According to Fick's first law of diffusion, the flux density of the substance will be equal to:

$$J = -D\frac{\partial c}{\partial x}, \quad (1)$$

where D - diffusion coefficient.

Diffusion coefficient is a quantitative characteristic of the diffusion rate equal to the amount of substance (in mass units) passing per unit time through a unit area (for example, 1 m²) with a concentration gradient equal to one (corresponding to a change of 1 mol / l → 0 mol / l per unit of length). The diffusion coefficient is determined by the properties of the medium and the type of diffusing particles.

The diffusion D is numerically equal to the mass flux density with a density gradient equal to one, i.e.

$$D = \frac{1}{3}\overline{V} \cdot \overline{l}, \quad (2)$$

where $\overline{V}$ — average velocity of thermal motion of molecules, $\overline{l}$ — mean free path

Thus, the risk of introducing innovations is reflected precisely in the diffusion coefficient if we draw an analogy between the physical task of determining the diffusion flow and its economic interpretation.

Since the diffusion coefficient is determined by the "properties of the medium", therefore, the more active the resistance of the medium, the lower will be the density of the diffusion flux, i.e. diffusion coefficient will also be less.

In the economic model, the diffusion of innovations is presented:

$$J_d = -R\left(\frac{\partial g}{\partial q} + \frac{\partial g}{\partial r} + \frac{\partial g}{\partial s}\right), \quad (3)$$

where R - diffusion coefficient of innovation.

The task is to calculate the resistance of the medium or its anti-action. The anti-action of the medium can be defined as the “pressure” of risks.

Expression (2) in the economic interpretation will sound like this: the diffusion coefficient is 1/3 of the product of the number of innovations introduced per unit time N (for example, a year) by the size of the economic sector S.

To predict the economic diffusion process, it is necessary to know what the expected dynamics of the diffusion coefficient of innovation is. For this, it is necessary to adjust the diffusion coefficient by the value of the external resistance, i.e. the magnitude of the risks with the consideration of its occurrence and the range of variation.

Thus, the diffusion coefficient of innovations will take the final form:

$$R = \frac{1}{3} N \cdot S \cdot (1 - P), \quad (4)$$

where N – speed of adoption of innovation; S – the sectoral distribution which can be expressed as the ratio of the number of enterprises using certain innovations to the total number of industry enterprises in a given region; P – probability of occurrence of risks, i.e. those adverse factors of the external economic environment that impede the introduction of innovations in real production.

Based on empirical data (information on the implementation of various innovations in the industry over the past period), the diffusion coefficient of innovations can be calculated.

Risks are defined as incompatible events. The sum of several events is an event consisting in the occurrence of at least one of these events. If A and B are incompatible events, then its sum A + B means the occurrence of event A or event B. The probability of occurrence of one of two incompatible events is equal to the sum of the probabilities of these events. Therefore, the sum of the probabilities of incompatible events A_1 - A_n which are forming the complete group, is equal to one.

All that is left to do is to determine the risks of innovation and the likelihood of its occurrence. This can be done based on expert assessments or using various risk assessment models.

Conclusion

The obtained model allows assessing the rate of innovation spread at various stages of creating innovative products and identifying the environmental anti-action which is defined as innovation risks in the generally accepted economic concept. The stages of development of the innovation process make it possible to determine the so-called reference point. In consideration of the foregoing, the need to assess the level of diffusion of innovations with the consideration of the risks arising at each individual stage. The model can be adapted to solve various industry problems.

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Sustainable Development of the BSEC Member States for the Effective Integration into Green Economy

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Abstract

The article analyzes processes of formation of green economy within the framework of sustainable development between the countries of the Black Sea region. The role of green economy aimed at reducing the negative impact on the environment is revealed. The subject of the study is the main directions of green economy emerging in the Organization of the Black Sea Economic Cooperation (BSEC). The BSEC member States play an important role in the sustainable development of the black sea region. The article presents an analysis of CO2 emissions by sectors of the economy in the BSEC, which indicates the relevance of the transition to green economy in the region. In the process of studying the normative documents of the organization, the author's vision of the key directions of green economy is proposed. The research conducted in the article on the use of renewable energy sources in the world and in the BSEC countries is aimed at identifying the stage of formation of one of the directions of green economy in the BSEC countries on the way to sustainable development. A forecast is made of the use of renewable energy sources (RES) sources and conventional energy sources in five countries of the BSEC, which revealed the largest amount of installed capacity of renewable energy sources. The existing problems in the BSEC require special attention, as well as analysis, which will show the main solutions and opportunities to reduce environmental costs.

Keywords: BSEC, sustainable development, green economy, RES.

Introduction

The last decade has seen the largest increase in energy consumption in history. And at the same time, the world community began to worry about climate change, environmental problems and energy security problems. Also, existing and projected climate problems increase with population growth, urbanization and migration. Thus, many countries have set a course for a low-carbon economy, sustainable development and a green economy. Renewable energy has regained an important role, especially in the area of electricity generation.

The Organization of the Black Sea Economic Cooperation (BSEC) is a unique platform that was established as a unified regional economic organization in June 1992. The key priorities concerning the BSEC activities in the field of sustainable development are defined by Goals of the “BSEC Economic Agenda: towards an Enhanced BSEC Partnership”, adopted in 2012 (BSEC, 2012). Sustainable development is way of conceiving the global interaction between economy, society and environment.

Research is devoted to Sustainable development of the BSEC Member States for the effective integration into the green economy. Green economy is the economy that provides social welfare and justice, but at the same time environmental risks and ecological deficit is minimized (Babenko et al, 2018, p. 36). This economy is inclusive with efficient use of resources and minimal use of

hydrocarbons. Green energy strategy, environmental protection in the Member States, produce green products and services and others are important elements of the green economy in the Black Sea region (BSEC, 2012). A range of environmental and economic possibilities are available for realization green economy.

The main objective of the article is the implementation of the concept of green economy in the BSEC Member States. The main goals are to identify the main directions of green economy in the BSEC region and to highlight the main role of RES. This paper contributes to existing studies focusing on how countries can develop the directions of green economy in the long term.

The paper consists of the following parts. First, the theoretical review disclosures the features of green economy and the importance of this study for the BSEC region. Second, the paper identifies peculiarities of development of RES applied by BSEC. Third, this study aims at determining the overall ecological and economic tools associated with global sustainable development trends in the Black Sea region.

In that way, perspective the development of the BSEC within green economy will help to better understand future policy decisions by addressing complex environmental impacts as the new baseline to design sustainable development.

Theoretical base and features of green economy

The term “green economy” was firstly mentioned in 1989 in the title of Blueprint of Green Economy. Later in June of 1992 this term was underpinned by the Conference on Environment and Development in Rio de Janeiro. However, green economy did not get wide dissemination before the world crisis of 2007-2008, which helped push it swiftly to the top of political discussion. The financial crisis drove many countries into recession and into higher level of debt while also causing high numbers of job losses and widespread business failure. At the same time it entailed food and goods lacks in developing countries because of high prices on fuel and products. These events coincided with increasing concern about the potential impact of climate change caused by human activities. The green economy’s conceptual foundation recognizes that the separation of economic development and environmental policies is artificial (Georgeson et al., 2017). It was a critical moment for scholars and politicians to revise people’s production and consumption behavior and change it accordingly green economy concepts. Current situation and further steps to “green” future were discussed during Rio + 20 Global Summit (Rio de Janeiro, Brasil). Summit resulted into setting 17 Sustainable Development Goals (SDG), where 7 of them is devoted to ecological improvement.

Green economy belongs to sustainability sciences, which is defined as is “…an emerging field of research dealing with the interactions between natural and social systems, and with how those interactions affect the challenge of sustainability: meeting the needs of present and future generations while substantially reducing poverty and conserving the planet's life support systems” by Proceedings of the National Academy of Science of the United States of America (National Academy of Scienc, 2011). As the a part of this group, green economy possess the sustainability science characteristics (Kates, 2010):

- it is use-inspired; in other words, it is defined by the problems that is addresses rather than by approach employed. In this, it contrasts with curiosity driven or “blue skies” research. It is applied in nature, designed to meet human need;
- it focuses on coupled human-environmental system. Integration is therefore a core theme. It is also strongly interdisciplinary, including both social and environmental sciences as well as other fields;
- sustainability science is rooted in values. Many proposed solutions relating to the development of the green economy depend on the values of different people. The subject therefore includes the science of identifying and analyzing values and attitudes as well as action.

Green economy aims at improving a human well-being and committed to social equality, thus, contributing to reducing environmental risks and ecological deficit-reduction resources (Canfin and

Lambertini, 2018). The findings of the literature review highlight the fact that there is no agreed definition of green economy. Examples of interpretation follow:

- UNEP has defined the green economy as «one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. It is low carbon, resource efficient, and socially inclusive» (UNEP, 2011). This definition has been cited in a number of more recent reports, including by the UNEMG and the OECD.
- Another definition for green economy offered by the Green Economy Coalition (a group of NGOs, trade union groups and others doing grassroots work on a green economy) succinctly defines green economy as «a resilient economy that provides a better quality of life for all within the ecological limits of the planet» (Georgeson, 2017).
- The International Chamber of Commerce defines the green economy from business perspective as "an economy in which economic growth and environmental responsibility work together in a mutual reinforcing fashion while supporting progress in social development".
- Lund University explains green economy as "…one that generates increasing prosperity while at the same time reducing our environmental impact."

The mutual meaning that all of four definitions shares is interconnection of economic, social and ecological aspects of economies development. They all agree that we countries can succeed only if all of three spheres will work together.

More broadly the green economy meaning explained by International Human Dimensions Programme on Global Environmental Change (International Human Dimensions, 2012). In its opinion green economy is "One that focuses on enabling people around the world to pursue and achieve lives that are meaningful to them, while minimizing humanity's negative impact on the environment. It is an economy that is measured against the yardsticks of human well-being and its productive base. It is the economy that is anchored by a passion for equity and celebration of ingenuity."

Professor of city and regional planning in Berkley (Chapple, 2008) defines the green economy as: "the clean energy economy, consisting primarily of four sectors: renewable energy (eg. solar, wind, geothermal); green building and energy efficiency technology; energy-efficient infrastructure and transportation; and recycling and waste-to-energy. The green economy is not just about the ability to produce clean energies, but also technologies that allow cleaner production process, as well as growing market for products which consume less energy. Thus, it might include products, processes and services that reduce environmental impact or improve natural resources use".

The Danish 92 Group defines the green economy as: "…not a state but a process of transformation and constant dynamic progression. The green economy does away with a systemic distortion and dysfinctionalities of the current mainstream economy and results in human well-being and equitable access to opportunity for all people while safeguarding environmental and economic integrity in order to remain within the planet's finite carrying capacity" (Danish 92 Group, 2012).

Green economy indicators written by Andrea M. Bassi et al and UNEP staff in 2014 (Andrea and Bassi, 2014). According to this guidance green economy indicators have 4 successive purpose (Fig. 1):

- Issue Identification: instruments that help decision makers identify and priorities problems that might undermine the path towards sustainable development.
- Policy Formulation: help to design solutions.
- Policy Assessment: expected economic, social and environmental effects of different policy options need to be measured with the help of impact indicators.
- Policy monitoring and evaluation: support the assessment of the performance of the intervention implemented, and allow decision makers to design timely corrective measures, when needed.

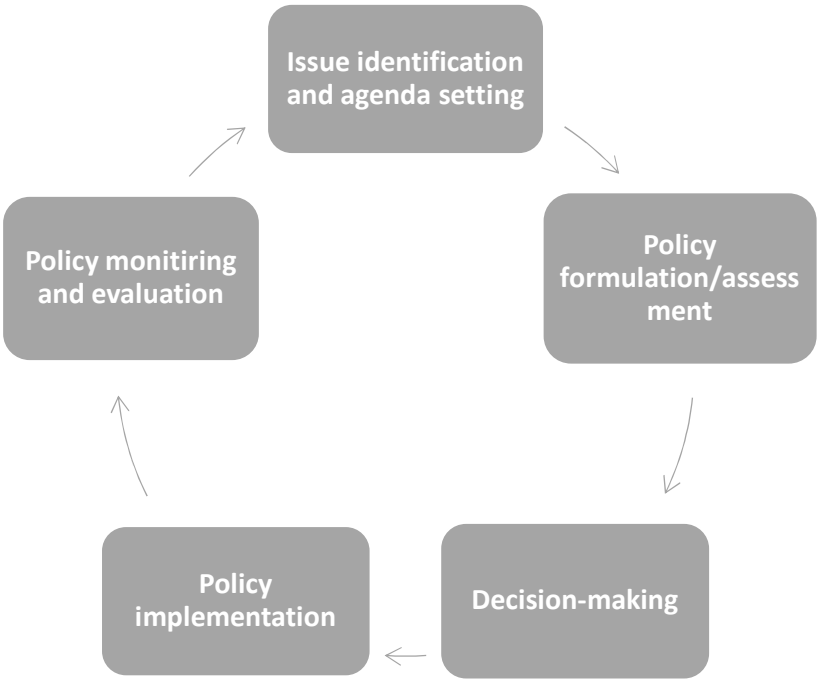

Fig. 1: Green Figure economy policy circle

Source: authors' calculations

Traditional industries are gradually being replaced by more environmentally friendly ones, thereby replacing the raw material economy based on the extraction of natural resources. Green economy is manifested in the growth of investments, new jobs, improvement of the environment, prevention of reduction of biological diversity in the Black Sea region and etc.

The historic Paris Agreement, the 2030 Agenda for Sustainable Development and 17 Sustainable Development Goals provides a chance for countries to improve and to support climate action to reduce emissions and build resilience to climate change. The SDGs can promote global changes by providing a growing vision of sustainable society. Extensive efforts are needed to raise public awareness about the essential need for economic and political reform. Today, sustainability specialists must make the cases for the concept sustainable development to encourage companies to reduce negative impacts. So, businesses must begin to apply the same responsibility standards that individuals currently apply (Dixon, 2019).

Currently, renewable energy sources compete with traditional resources (oil, gas and coal) in the energy sector, which is evidenced by the refusal of many countries from polluting technologies in favor of green innovation in order to achieve 100% of renewable energy production. The renewables, with its huge volume of investment and amount of state initiatives, are an opportunity to move the world into a green future and help countries transition to low-carbon, clean energy with new green infrastructure.

This trend is gaining momentum as the topic of climate change becomes a promising direction for business in the coming years. The number of companies that implement the principles of sustainable development in their business models is constantly growing.

In the context of limited resources and the concept of circular economy has been developed, which is applied in various industries with environmental, economic and social benefits. Circular economy increases resource efficiency and renewable resources and reduces the amount of waste in the environment (Pakhomova and Richter, 2017). Circular economy practices can help achieve of the

SDGs' targets, such as SDG 6 (Clean Water and Sanitation), SDG 7 (Affordable and Clean Energy), SDG 8 (Decent Work and Economic Growth), SDG 12 (Responsible Consumption and Production), and SDG 15 (Life on Land) (Schroeder et al., 2019).

Every year the number of supporters of greening and climate risk reduction represented by international organizations and intergovernmental associations increases. Climate risks and their impact on all spheres (environment, economy and society) are assessed. Despite the fact that the consequences of risks may be noticeable only in the long term, we need to act now.

Overall, green economy has been researched and defined in different research reports with various terms rather well known today. However, this concept being in some sense a more complex, as well as a more day-to-day subject, is not clear, the amount of research on it is insufficient.

Methodology

Econometric models are made to reveal causal relationships between variables (GDP, renewable energy sources (RES) and primary energy (PE)). The aim of the researcher in solving this problem is not only to find the correlation dependence between two variables, but also to obtain a predictive estimate of the effect of one property on another.

Logic of mathematics instrument:

- to calculate of a correlation coefficient;
- to build a multiple linear regression;
- to make a forecast of renewables, primary energy, GDP;
- to make explanations.

Correlation analysis is a method of statistical data processing, which consists in studying the relationship between variables. Correlation analysis allows to answer whether in general there is any connection between variables and in case there is some how close it is.

The sample correlation coefficient:

$$r = \frac{SS_{XY}}{\sqrt{\mathrm{SS_X}\,\mathrm{SS}_Y}} \quad (1)$$

Where

$\mathrm{SS_X}, \mathrm{SS_Y}, SS_{XY}$ – *sums of squares and cross products.*

The plus sign before the coefficient indicates that the relationship between the phenomena or the indicators is direct. The more one indicator, the greater the other. Such a correlation is called direct, or positive. If the coefficient is greater than 0.70, the relationship between the indicators is strong; from 0.30 to 0.70 - communication is moderate; less than 0.30 - weak communication.

If the coefficient has a minus sign, then the correlation is inverse, or negative. In this case, the higher one indicator, the lower the other.

Regression refers to the statistical technique of modeling the relationship between X and Y. The simple linear regression is the model of the relationship between two variables: a dependent variable and an independent variable.

When we model the relationship between the dependent variable and a set of several independent variables, we use a technique called multiple regression.

$$Y = b_0 + b_1X_1 + b_2X_2 + \varepsilon \qquad (2)$$

Where

Y – is the dependent variable;
X – is the independent variable;
ε – is the error term;
b0 – is the intercept of the systematic component of the regression relationship;
b1,2 – is the slope of the systematic component.

The process of finding the least-squares prediction equation, testing the adequacy of the model and estimating the values of model parameters is called a multiple regression analysis.

Renewable energy forecasting results provide information about the expected changes in the energy to be generated in the near future in the world and the BSEC Member States.

Environmental risks in Black Sea region

One of the main causes of climate change is greenhouse gas emissions from industry, transport, agriculture and other important sectors of the economy. Traditional fuels are the largest source of carbon dioxide.

The global CO2 emissions trend has increased since the beginning of the 21st century. The dataset shows that global anthropogenic fossil CO2 emissions increased by 1.2% in 2017 compared to 2016 reaching 37.1 Gt CO2 (Muntean et al., 2018, p.5).

In 2017 BSEC's fossil CO2 emissions increased by 2% to about 2 Gt compared to 2016 (Fig. 2).

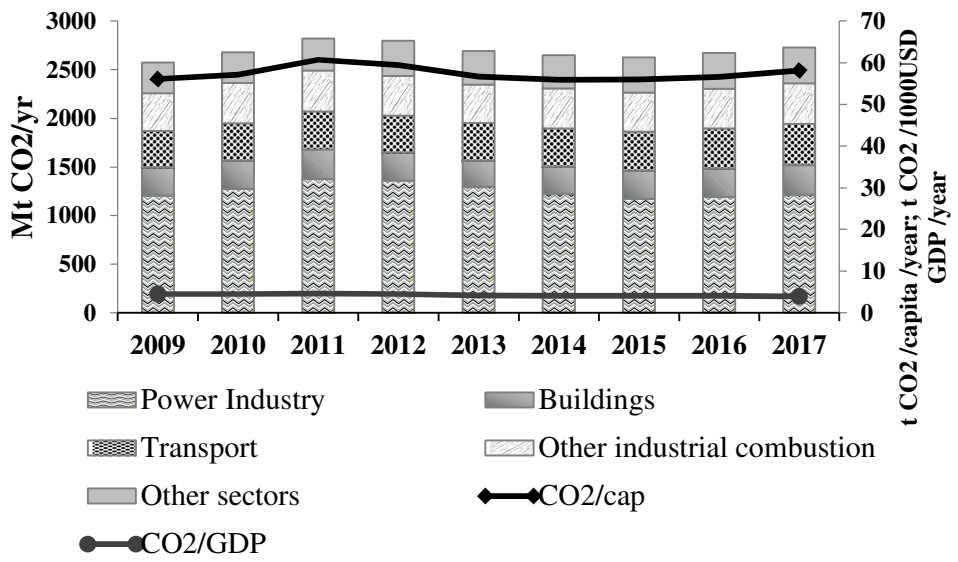

Fig. 2: Fossil CO2 emissions for the BSEC by sector, 2009-2017 (Mt CO2/yr, t CO2 /capita /year; t CO2 /1000USD GDP /year)
Source: authors' calculations based on the data from (Muntean et al., 2018).

BSEC per capita emissions of 58 tonnes CO2/cap/yr are higher than in 2016. Russia is the fifth largest emitter of global CO2 emissions (1.8 Gt CO2), due to an increase in the consumption of coal, natural gas and oil consumption. Also the largest fossil CO2 emissions were in Turkey and Ukraine in 2017. The largest increases of fossil CO2 emissions were in power industry (power and heat generation plants) and transport (road & rail & ship & aviation).

Pollution of the environment, and especially of the marine environment, has become so widespread that urgent action is required by the BSEC governments. The marine ecosystems are under threat, due to of the heavy load on the ecology of the sea coast (Tsiaras, 2010, p.15).

All the declarations of the BSEC summit confirm the priority of environmental issues for the organization. For example, the Declaration of the Black sea Economic Cooperation Summit (Istanbul, 1992) requires States to take part in new regional initiatives through "appropriate steps to protect the environment, especially to preserve and improve the ecology of the Black sea, as well as to conserve, exploit and develop its potential». After the transformation of the international structure in 1999, environmental protection became one of the priority areas of cooperation within the organization, which was presented in the Charter of the BSEC.

The climate changes will be influenced the natural resources, the economic activities and will be had an aftermath of societal of the region. It is likely that vulnerable components of ecosystems of Black Sea region will be impacted the most.

Cooperation among the member states to adopt green economy

The main activities, concerning the promotion of cooperation in the field of green economy, are carried out by the BSEC Working Groups on different areas, such as environmental protection and energy. The Working Group developed the “BSEC Climate Change Adaptation Strategy for the Black Sea” on 15 December 2017, which is contained a tasks to Goal 5 of the “BSEC Economic Agenda” for mitigation measures to address the impact of environmental risks (BSEC Climate Change, 2017).

When exploring the potential implications of green economy perspectives for sustainable development, it is important to stress the incredible diversity of the countries encompassed in Black Sea region.

BSEC is supported activities in the BSEC region in the field of environmental protection taking into account the provisions of the BSEC Charter and the other BSEC documents. After the signing of the Bucharest Convention, which provided an international legal framework, environmental programmes were developed in the BSEC Working Group on environmental protection in cooperation with the European Commission, UN Agencies (UN development Programme and UN Environmental programme), the World Bank and etc. (Dogru, 2013, p.17). The BSEC working group on environmental protection aims at cooperation of the member States in the field of environmental protection and seeks to strengthen cooperation in key areas: control of air, water and land pollution, elimination of environmental consequences, nature protection; development of ecological tourism in the black sea region.

The author's visions of the main directions of the green economy of the BSEC are presented in figure 3. Thus, all priority directions of green economy are discussed and monitored to ensure energy and food security, the implementation of waste management, health care and etc.

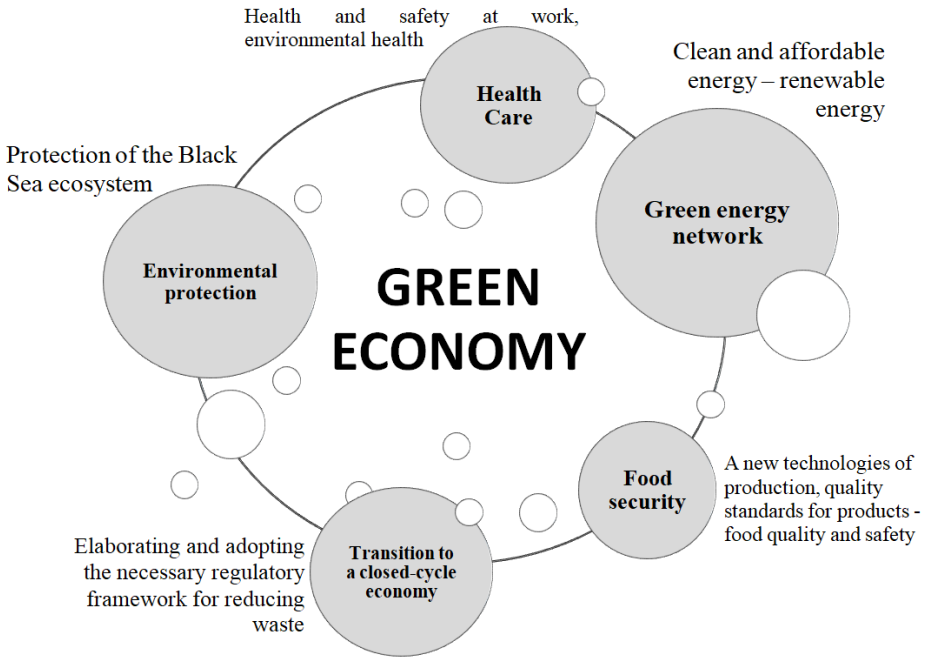

Fig. 3: The main directions of the concept of green economy in the BSEC
Source: authors' calculations

Governments should pay special attention to climate change as an issue of security and sustainable development and address it together. Solutions to climate change must involve a wide range of actors and stakeholders, including local governments, civil society organizations, academia and the business community.

Renewable energy in the Black Sea energy market

Cooperation among the Member States is strategically task with the view to promoting renewable energy sources and energy efficiency. So, the countries are trying to promote renewable energy through energy efficiency and economic growth. In 2018 BSEC's renewable energy installed capacity increased by 4% to about 139 Gt compared to 2017 (Fig. 4).

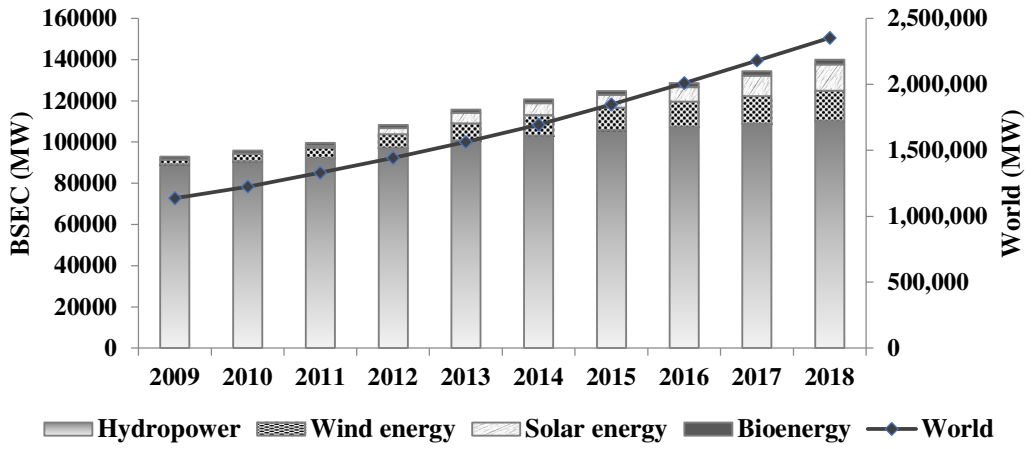

Fig. 4: Total renewable energy installed capacity in the world and in the BSEC by sector, 2009-2018 (MW)

Source: authors' calculations based on the data from (IRENA, 2019).

The renewables are expected to have an increase of their use, but the use of it is expected to account for the smallest percentage. The share of Russian renewable energy installed capacity in the BSEC was equal to 38% in 2018 (fig. 5). Thus, Russia, Turkey, Romania, Greece and Ukraine play dominant role in renewable energy installed capacity in the BSEC.

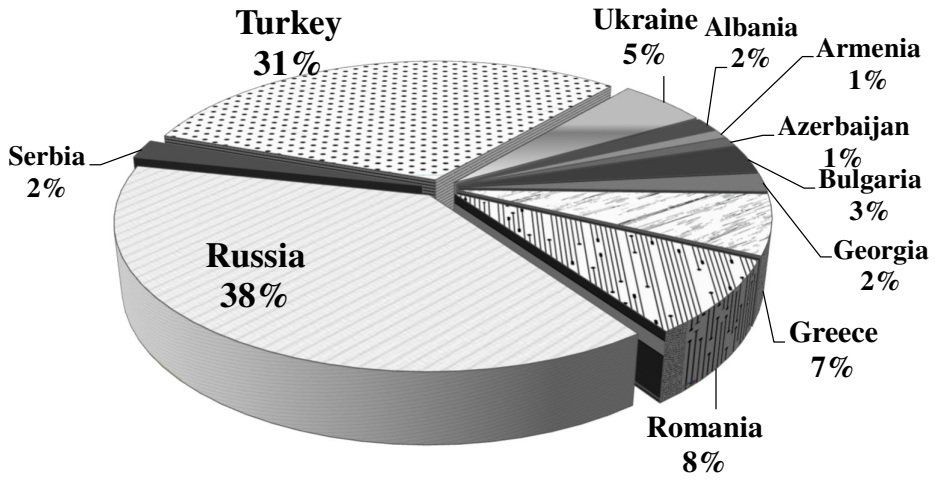

Fig. 5: Renewable energy installed capacity in the BSEC countries in 2018 (%)

Source: authors' calculations based on the data from (IRENA, 2019).

For the BSEC countries it's important to develop the innovative, environmentally friendly and resource saving technologies.

The BSEC is facilitating its members' integration into the global green economy and advancing sustainable cooperation capacities within the region.

The dependency relationship between RES and GDP growth has been less studied in different scientific works because the issue of production and renewable energy consumption has been researched only recently as a fundamental objective for sustainable development. In this field, the authors, who has studied the relationship between renewable energy and GDP, estimated for G7

economies, the Organization for Economic Co-operation Development (OECD) economies and the EU member states, there was statistically significant and insignificant relationship between GDP and renewable energy (Marinaș et al., 2018).

We try to find an answer to the question of what is the relationship between renewable energy consumption and GDP, and, accordingly, to understand how the development of renewable energy will affect the economy in the world and the top-5 BSEC countries. Figure 6 shows the correlation field and the empirical regression line of the relationship between RES and GDP.

The world: the higher RES, the higher GDP. The relationship between the indicators is strong (r = 0,9).

Greece: a strong negative association (r = -0,9) implies a relatively positive linear relationship between RES and GDP. But the relationship between the indicators is negative.
Romania: a correlation of r = 0,6 implies a relatively strong positive relationship between GDP and population
Russia: in the example of RES and GDP, we got r = -0,4, which means that the more RES, the lower level of GDP.

Turkey: a correlation of r = 0,1 implies a weaker association between RES and GDP.
Ukraine: a correlation of r = -0,3 suggest a weak, negative association. A correlation close to zero suggests no linear association between two variables.

The results obtained for the world and the top-5 BSEC countries, are, for the world and countries, such as Greece, Romania and Russia, consistent with the conclusions revealed in other researches, given the empirical estimation of the relationship between the consumption of renewable energy and GDP. The ecological trends had led to a significant increase in renewable energy consumption in the BSEC Member States, which validate the directional relationship from GDP to renewable energy consumption. The absence of the causality relation in Turkey and Ukraine may be suggested to the difficulties of identifying and insignificances these variables in managing the policies of renewable energy sources.

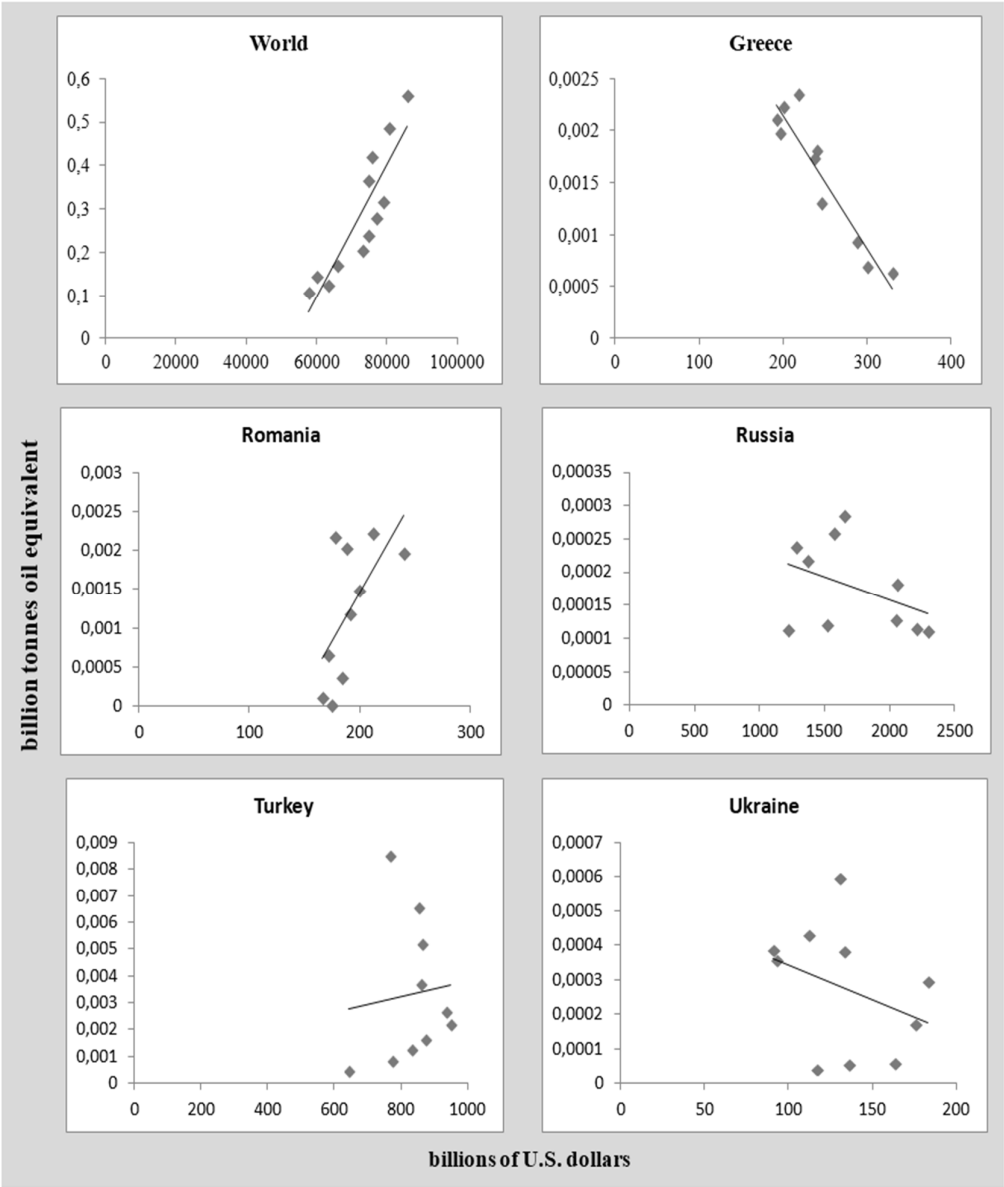

Fig. 6: Correlation field based on renewables from GDP (billion tones oil equivalent, billion of U.S. dollars)

Source: authors' calculations based on the data from (BP, 2019).

The search for answers to the following questions becomes more and more meaningful: what will be the share of RES in the world and the top-5 BSEC countries' energy consumption over time; what is the economic and non-economic expediency of its increase.

The global demand for RES is constantly growing (see Fig. 7). According to the forecast, RES will grow slowly against the background of growing energy consumption; despite this traditional sources will be in demand for a long time.

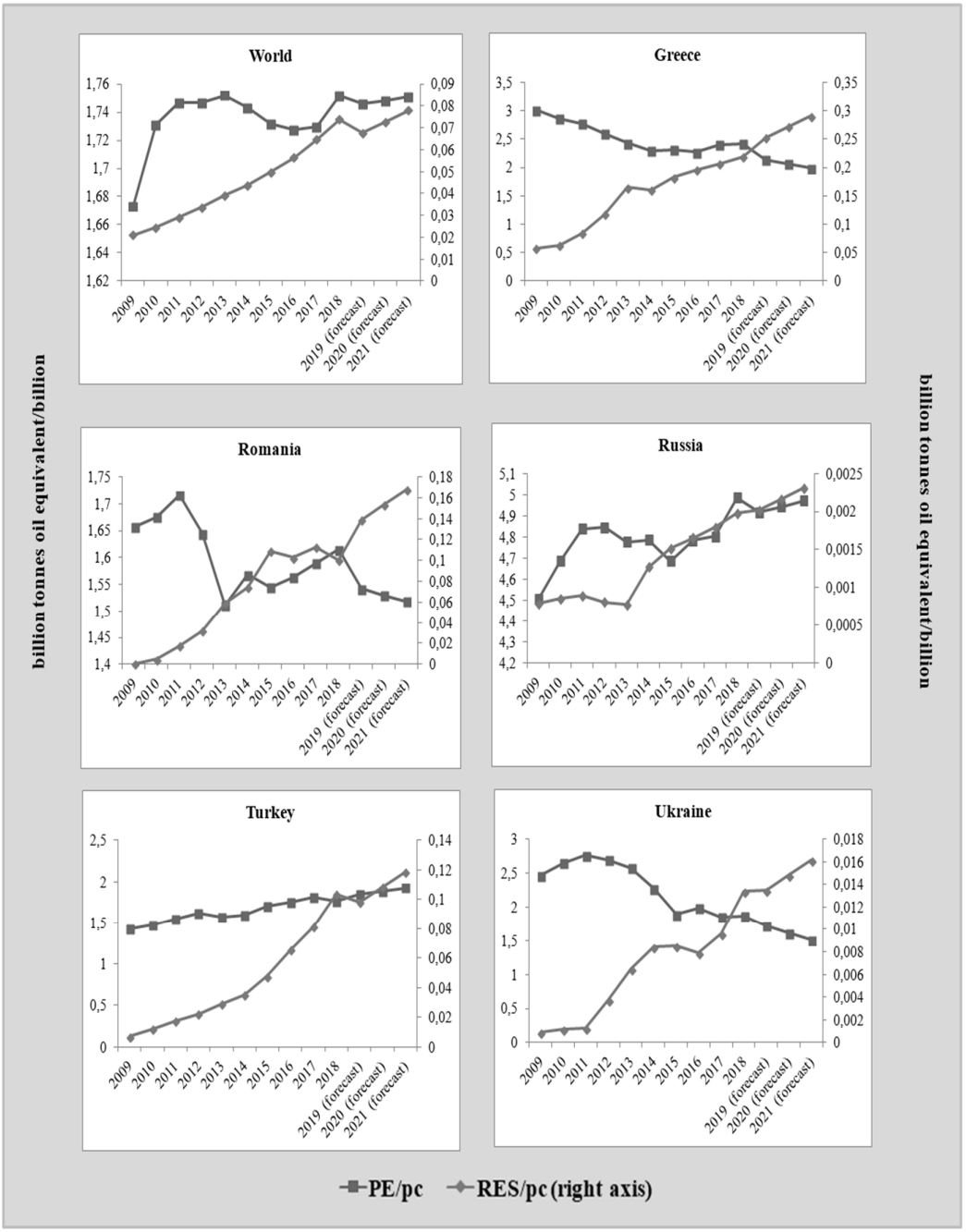

Fig. 7: Forecast consumption of RES and PE in the world and the top-5 BSEC countries by 2021(billion tones oil equivalent/ billion)

Source: authors' calculations based on the data from (BP, 2019).

In the foreseeable future, the trajectory of RES and PE consumption curves in the world do not intersect, indicating the development of these two sources of energy in parallel within its technological stage.

It is assumed that structural changes in the traditional energy sector will not be carried out in the analysis of this forecast in Russia and Turkey. RES will not have a significant impact on the economy. However, the volume of renewable energy will slowly increase every year in energy consumption. Renewable energy use in Greece, Romania and Ukraine is still increasing, although a slowdown in overall development has continued. Also, the forecast show a decline for consumption of traditional resources between 2015 and 2018, and this decline will continue.

As this analysis makes clear, current and planned policies offer a comparatively slow trajectory whereby the world would exhaust its energy-related “carbon budget” in under 20 years. As a result, the energy system requires rapid, immediate and sustained change. The deployment of renewables must increase at least ten-fold.

In contrast to fossil and nuclear fuels, which have finite reserves expected to last for tens to hundreds of years, RES will be available from year to year for a very long time. Furthermore, RES have lower greenhouse gas emissions than fossil fuels, and are therefore expected to play an important role in achieving global climate goals.

The results and implementation of tools related to green economy

The strategies for BSEC to support climate change adaptation in the Black Sea region recognize the problems of climate change and the need for common solutions for seeking common sustainable initiatives. The BSEC need to facilitate the exchange of information related to the environmental situation in the Black Sea region and to use of economic and ecological tools in the field of the environmental protection in order to develop for mutual projects.

The main aim of green economy is to design of better, demand-driven and output-oriented green programmes and projects in the region, targeting more effective use of existing funds.The politics of many countries focused on reducing energy consumption and on enhancing the deployment of renewable energy within the energy sector.

"Green Black Sea" is perspective direction that includes the ecological culture, also economic and social prosperity of population. It makes the concept of sustainable development driving force, because the environmental dimension runs through all of actions and aims of the BSEC.

National governments in the BSEC have already moved towards identification of key possibilities for building sustainable development in the future. In many BSEC countries, taking into account the green objectives of economic indicators, there is a wide application of economic levers (fines for pollution and others). Particularly interesting the "Polluter pays principle" is applied where the manufacturer must at its own expense to cover any costs representing the opportunity to lead the adverse environmental impact and restore damage to the environment.

Productive cooperation in order to preserve and protect the natural resources of the region and to maintain stable environmental conditions is the duty of each the BSEC member state.

Thus, the next goals to need achieved as part of green economy in the BSEC:

1. Improve global safety, combating climate change and environmental degradation.
2. Increase the competitiveness and job potential of green industries by boosting investments in the green economy.
3. Strengthen the BSEC’s international position and work towards its strategic independence by setting and implementing ambitious sustainable goals.
4. Improve governance in the BSEC to support the sustainable transition to a safer and more competitive economy.

Today, the countries have a responsibility to coordinate their work and boost their cooperation to decrease ecological risks in the Black Sea region. It is necessary to predict long-term environmental

consequences as a result of economic decisions. Furthermore, regional and international organizations need to involve civil society in regional dialogue and cooperation in fields of green economy.

Conclusion

The Black Sea region is special place, where countries of this region are positioned strategically at the crossroads of East and West and they have a high potential of growth with their unique and complementary markets. Unfortunately, there are many issues that the Black Sea is facing, for example: differences of the size of economy of the BSEC countries, lack of communications between countries, difference in legal systems and best practices and est.

As a global actor, BSEC need to play a crucial role in ensuring conditions for peace, stability and sustainable development throughout the whole region, including its immediate neighborhood with other countries and promoting of the regional cooperation initiatives and programs in the field of environment.

The concept of green economy is defined as one that is low-carbon, efficient and clean in production, based on sharing, circularity, collaboration, solidarity, resilience, opportunity and interdependence in Black Sea region. The scientific research aims to offer a comprehensive framework for analyzing green economy issues. The green economy contributes to the accelerated transition to a low-carbon economic model through which new directions/ industries are emerging in the BSEC countries. According to the flows, the share of the green economy in the market is steadily growing, and the fossil fuel sector is in a state of decline.

In accordance with the goal set by the author, the following tasks were formulated and solved: the author's approach to the interpretation of the main directions of the green economy in BSEC was proposed; the analysis of the dependence of GDP and RES in the five countries of the organization was carried out, the forecast of RES development was determined; the key tools and results in ensuring the transition to a green economy in the black sea region were shown.

Although this paper provided an overview on the relationship between RES and GDP, additional research will be required to further explore and analyze in depth the correlation and opportunities between RES practices for SDG targets in the BSEC member states.

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Assessment of Project Maturity Using the OPM3 Model

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Abstract

The aim of the paper is to present the way of using OPM3 to asses project maturity in organizations. To achieve the goal, a review of the literature in the field of project maturity models was carried out and qualitative research -"single holistic case study" connected with project maturity assessment of a selected company from manufacturing industry was presented.

Keywords: Project Maturity, OPM3, Qualitative research, Case study, Manufacturing industry.

Introduction

The project maturity is considered to be one of the key factors determining the effectiveness of projects and project portfolios management in enterprises. The most important elements defining maturity in this aspect include: processes, structure, people and systems [Weidemann 2017]. There are many definitions of the organization's project maturity, including "*the ability, readiness of the organization to effectively select a project portfolio supporting the strategy and goals of the organization as well as the use of professional techniques and tools, project management methodologies that are leading to the successful completion of the project and translate this success into further projects*" [Juchniewicz 2013]. Another definition of the organization's project maturity is "*the ability of the organization or/and its processes to improve and thus to bringing better results*" [De Bruin and Rosemann 2005]. According to the first definition, the organization's project maturity refers to the strategic management and emphasizes the importance of choosing the right projects to implement. Both of them accent the fact that the higher the maturity in project management, the greater the chance of project success.

Many models assessing project maturity can be found. According to [Spalek 2013] several dozen models are used worldwide, [Steyn et al 2012] source counts there are about thirty of them. Almost every reputable organization that sets project management standards has created its own project maturity model. The most known models were shown in Table 1.

Table 1: Selected models of the organization's project maturity

Model short name	Full name of the model	An organization that creates standards in project management
OPM3	Organizational Project Management Maturity Model	Project Management Institute (PMI)
CMM/CMMI	Capability Maturity Model Integrated	Software Engineering Institute of Carnegie Mellon University
K-PMMM	Kerzner Project Management Maturity Model	Harold Kerzner
P3M3	Program and Project Management Maturity Model	Office of Government Commerce (OGC), department within the UK Government

Each model distinguishes about five levels of maturity, which requires certain conditions to be met by the organization or the project. The first level is characterized by some chaos, lack of stability, which is then gradually mastered by acquiring experience and learning about processes, structures, people and systems. Thanks to this it is possible to move to higher and higher level. At the highest - fifth level, continuous improvement is possible to achieve ever better results.

Conducted literature review (chapter 2 of the paper) shows that there are not many publications describing in real cases how a given project maturity model can be used. In manufacturing industry few case studies about how to assess the organization's project maturity were found (OPM3 – [Silva et al 2019] and purposely developed model – [Guimaraes et al 2018]). There was even found one case study directly connected with automotive industry – [Kerzner 2019], but it was focused more to specify questions related to project maturity in the company rather than show how the project maturity model (K-PMMM) can be used in it. Therefore, authors decided to choose one - well known model (OPM3) and after describing the basic assumptions of it (chapter 3), present its use for selected organization from the manufacturing industry (chapter 5).

The contribution of this article to the current state of knowledge is to illustrate how qualitative research can be used in assessing the maturity of organization and supplementing information about the level of project maturity in companies from the manufacturing (to be more specific - automotive) industry.

Literature Review – Project Maturity Models

Type of literature review used in the article is *scoping review,* which aim to provide an assessment of the size of available literature, defining the scope of conducted research [Orlowska et al 2017] on [Booth et al 2012]. The characteristics of this type of literature review are presented in the Table 2.

Table 2 : The characteristics of *scoping review*

Search	Appraisal	Synthesis	Analysis
'As far as time allows', it may also include unpublished works and research	None	Narrative, tables	Quantity and quality assessment of available literature

The main criterion of the literature review was the qualitative research used to measure the organization's project maturity. Because empirical research was planned to be carried out in the form of a case study, the literature review was conducted for such a research strategy. The process of literature review began with the selection of keywords that are related to the research subject. Two axes were used, the first one with the keyword regarding the project maturity models, and the second one with qualitative research in type "case study". The selected keywords with the combinations are shown in Table 3.

These words were used to search for articles in selected scientific databases – *Science Direct* and in *Primo* search engine (available to employees and students of Wroclaw University of Science and Technology in Poland). The *Primo* search engine searches many scientific databases, including those valued by scientists, for example: Taylor & Francis Online – Journals, Directory of Open Access Journals (DOAJ), Emerald Insight, Wiley Online Library, Wiley (CrossRef), Elsevier (CrossRef), SpringerLink Books, Knovel E-Books, ProQuest Research Library, ProQuest Dissertations and Theses Full Text. Thanks to this, it became possible to analyze the texts articles (including main PM journals), conference materials, e-books, as well as doctoral dissertations.

Table 3: Combinations of selected keywords for literature review

Keywords			***Science Direct* Results**	***Primo* Results**
I	II	III	IV	V
Axis 1	Boolean Operator	Axis 2		
project maturity model	-	-	57 121	150
project maturity model	and	case study	6	5

The search results are shown in columns IV and V. For the combination of "project maturity model" and "case study" axes in *Science Direct* only 6 papers were found, which is a huge variation between using only one ax - "project maturity model" (57 121). Besides, after analyzing the content of the articles, only 3 out of 6 actually relate to project maturity models. Whereas in *Primo* – only 5 papers were found (considering two axes). The titles of papers and project maturity models used for assessing real organizations are given in the Table 4.

Table 4: Case studies - use of project maturity models

No.	Title	Project maturity model
Science Direct https://www.sciencedirect.com/		
1	Project Management Maturity Models – A Critical Review: A Case Study within Swedish Engineering and Construction Organizations [Backlund et al 2014]	P3M3
2	Dimensions of Project Orientation. Case-Study in Polish Local Government [Strojny 2015]	Author's Model Project in Administration Excellence Model (PAEM)
3	Discrete-event simulation software selection for manufacturing based on the maturity model [Guimaraes et al 2018]	Model developed by the authors No Name
Primo http://biblioteka.pwr.edu.pl/e-zasoby/wyszukiwarka-primo		
4	Three-Dimensional Complex Construction Project Management Maturity Model: Case Study of 2010 Shanghai Expo [Hu et al 2012]	Three-dimensional complex construction management maturity model (3D-CCPM3), based on OPM3
5	Utilizing a capability maturity model to optimize project based learning – case study [Al Mughrabi and Jaeger 2017]	Project Based Learning Capability Maturity Model (PBLCMM)

6	Project Management Maturity: Case study analysis using OPM3® model in manufacturing industry [Silva et al 2019]	OPM3
7	Using the Project Management Maturity Model, Chapter 14: Case Studies [Kerzner 2019]	K-PMMM
8	Organizational Project Management Maturity Model (OPM3®) – Third Edition, Appendix X4: Case Studies [PMI 2013]	OPM3

After making the decision to use the OPM3 model, prestigious journal related to project management was additionally examined - *International Journal of Project Management* - for finding research using this model, especially in the context of manufacturing industry. No articles were found directly dealing with the use of the OPM3 model in measuring project maturity or articles regarding project maturity in the manufacturing industry. There were cross-sectional articles related to maturity models [Milosevic and Patanakul 2005], [Kwak et al 2015], [Williams 2004], [Ahlemann et al 2009], [Gorog 2016] and articles about project maturity assessment in other sectors [Jia et al 2011], [Cooke-Davies and Arzymanow 2003].

OPM3 – Model for Assessing Project Maturity

Model OPM3 (Organizational Project Management Maturity Model) was developed by the PMI (Project Management Institute). The main purpose of this model is to evaluate project management according to the PMI concept in terms of its maturity, based on experiences of other companies and good practices. OPM3 is built from components include: Domains, Process Improvement Stages, Best Practices, Capabilities and Outcomes [PMI 2013] (see in Figure 1). The basis for assigning an organization to one of the levels of maturity is the percentage of Best Practices implemented in three main domains: project, program and portfolio.

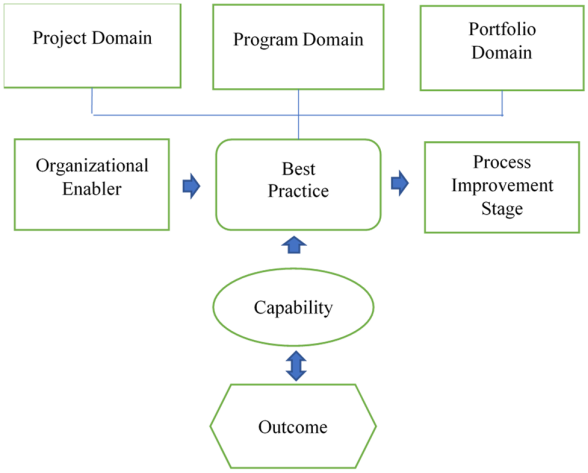

Fig. 1. OPM3 Standard – Components

The OPM3 model cataloged and described 586 Best Practices. Best Practices refer to the methods, currently recognized within a given industry or discipline, to achieve a stated goal or objective [PMI 2013]. Best Practice can be understood as "*the optimal way of achieving the assumed goal*" [Trocki and Buklaha 2016]. The application of the described practices results in an increase of the organization efficiency and effectiveness. To be able to state that a given good practice is being applied in an organization, the organization must have specific Capabilities.

At least two Capabilities are assigned to each Best Practice. Capability is part of Best Practice, it is a competence that an organization must possess in order to apply Best Practice. 2109 Capabilities were

defined in the described model. Capabilities can be interrelated. This imposes on the organization the need for continuous long-term process improvement.

Best Practices and Capabilities have been grouped into individual domains: project management, program management and portfolio management (Project, Program, Portfolio - PPP).

The OPM3 model details the Process Improvement Stages: Standardize, Measure, Control, Improvement - SMCI. In Table 5 is an example of assigning Best Practices to these stages [PMI 2013].

Table 5: Assignment of exemplary Best Practices to each of the Process Improvement Stages

Best Practice ID	Best Practice Name
1005	Standardize Develop Project Charter Process
1700	Measure Develop Project Charter Process
2240	Control Develop Project Charter Process
2630	Improve Develop Project Charter Process

Best Practices and Capabilities relate to the environmental and cultural aspects of the organization in accordance with the Enablers which are [PMI 2013]: Benchmarking, Competency Management, Governance, Individual Performance Appraisals, Knowledge Management and PMIS, Management Systems, Organizational Project Management Communities, Organizational Project Management Methodology, Organizational Project Management Policy And Vision, Organizational Project Management Practices, Organizational Project Management Techniques, Organizational Structures, Project Management Metrics, Project Management Training, Project Success Criteria, Resource Allocation, Sponsorship, Strategic Alignment .

The assessment according to the OPM3 model is carried out on the basis of three elements: Acquire Knowledge, Perform Assessment and Manage Improvement. In their scope can be specified 5 activities forming a cycle: Prepare for Assessment, Perform Assessment, Plan for Improvements, Implement Improvements, Repeat a Process.

The assessment is made on the basis of a specific score: 1) binary scoring - 1 for a fully existing Outcome and 0 for an Outcome that does not fully exist, or 2) assessment of a variable measures - based on how often the Outcome exists. See in the Table 6.

Table 6: Variable Measures Scoring

3	Fully implemented, consistently for Outcomes of Best Practice
2	Fully implemented, not consistently for Outcomes of Best Practice
1	Partially implemented for Outcomes of Best Practice
0	Not implemented for Outcomes of Best Practice

Qualitative research in type single case study

Qualitative research was based on a wave of criticism of quantitative research, which intensified in the 1960s and 1970s. Qualitative research is becoming not only alternative or complementary research for quantitative research, but also equal research [Juszczyk 2013]. Qualitative research is used when a researcher is interested in deepened knowledge about a topic, understanding the essence of a given phenomenon, and quantitative research when it is necessary to verify a research hypothesis. According to U. Flick, qualitative research aims to look at the outside world, as well as to describe, interpret and explain phenomena from an internal perspective [Flick 2010]. As part of qualitative research, frequently used strategies are [Creswell 2013], [Czakon et al 2011]: ethnography, grounded theory, case studies, phenomenological research and narrative research.

For the aim of the paper, a qualitative research strategy was applied - case study. W. Czakon points to three purposes of using case studies: the theorygenic goal (cases are examined to develop the existing

theory, provide explanations of unrecognized phenomena and to help understand the course of processes), the purpose of testing the theory (the case is to prove the genuineness of the theory) and the application purpose (when a case study has a clear practical orientation) [Czakon et al 2011]. In this context, the adopted research strategy is of the formative and partly application nature, taking into account the possibility of using research results by people managing projects.

In [Yin 2015] four models of case study can be found: single holistic case study, single embedded case study, multiply holistic case study, multiple embedded case study. A single case study is a case study organized around one case. In a single case study units of analysis do not have to be on one analysis level. When, within the limits of a single case study (e.g. organization), we separate sub-unit or sub-units of analysis (e.g. projects implemented in the organization), we deal with the embedded case study. When the case study deals only with the global character (e.g. organization), we deal with a holistic case study. When a case study involves more than one case, we are dealing with a multiple case study. For the multiple case study, two types can also be distinguished: "holistic" and "embedded", in other words, multiple case studies can include many single holistic cases or many single embedded cases [Yin 2015].

For the purposes of this article, a single holistic case study model was chosen. “Holistic”, because case study it is related to assessment of whole organization (regarding to its project maturity). According to R.K Yin, the use of a single case study is the right solution when the case is decisive (meaning it will be decisive for the theory or theoretical assumptions), unusual (i.e. illustrating deviation from theoretical norms), common (meaning to grasp the circumstances of some everyday situation, in order to give information about processes related to the theoretical interests of the researcher), revealing (when the researcher has the opportunity to observe and analyze a phenomenon previously inaccessible to social sciences) or requiring research in the long-term, so-called longitudinal (when the theory assigned to it should show how the conditions change and the processes relevant to them over time) [Yin 2005]. In this article the justification for undertaking a single case study is a common case. On the basis of single case study, an opportunity was created to learn how the assessment of the project maturity of a selected organization can be carried out using a specific OPM3 model and how the results of this type of assessment can be used.

Assessing project maturity in chosen company from manufacturing industry

Selected company - basic information

The company that will be assessed is a production company specializing in mass production of a wide range of elements made of sheet metal, strips in the field of extrusion, punching and bending on presses. In addition to the production of metal parts for the automotive and household appliances industry, the company has CNC tool shops and specializes in building new and overhauling currently used for the production of press tool components for its customers. Two production plants located in Poland employ approximately 350 employees. The main goal of the company is to achieve the highest quality of production, ensuring effective customer service. The company has a Quality Management System confirmed by the ISO/TS 16949 - certificate required for all automotive industry suppliers. Projects implemented are: primarily the launch of new products for mass production and related investments, such as: production of a new tool, purchase of a tool, purchase of new machines or transfer/modernization of existing production lines. During one year about 40 new projects/launches are carried out.

The organization's plans for the coming years assume major development in automotive services (currently around 30% of the company's revenues are from automotive industry, plan for 2020/2021 is reach 50%) and expanding the range of the product (new production hall put into use in 2020). The achievement of these objectives of the organization is therefore directly related to the implementation of a large number of new projects in a relatively short period of time. And thus the key factor will be the way in which projects are implemented in the organization. It was important for the company to check what level of project maturity it is in, so that it can check what to improve in the context of achieving its objectives.

The company is representative for the automotive and household appliances sectors in terms of the size and resource base. It was chosen mainly because of its size, and thus certainty as to the implementation of projects in it. The methods of data collection were mainly in-depth interviews (semi-structured through the use of OPM3 Self-Assessment Method) and documentation analysis (documentation such as internal regulations, statutes, procedures). In large enterprises there is a greater possibility of conducting a significant number of interviews, moreover, one of the authors of the article is employed in the company (he is the head of the project management department), thus the participant observation was used. Interviews were conducted with employees who are responsible for managing, executing projects - representatives of project management, quality, sales, purchasing, industrialization, production, tooling, maintenance and HR departments. When answering, respondents took into account all types of projects implemented in the enterprise (small, large, along and with cooperation, rather short-term which results from the specifics of the industry).

Assessing project maturity with use of OPM3

The assessment of the current state of the project's project maturity in the company was carried out on the basis of questions which are included in OPM3 Self-Assessment Method (SAM) Questions in Appendix X3 and a list of Best Practices in Annex X1 from [PMI 2013]. Due to the extensiveness and level of detail of the topic, in this paper only issues related to project domain will be addressed, and those related to the portfolio and program will be omitted.
The rest of the text presents the results of the project maturity analysis of the current state of a selected company. The results were divided according to indicated in chapter 3 stages of processes improvement: Standardize, Measure, Control, Improvement – SMCI.

Standardize

Standardization means the harmonization of certain services, objects, tools in such a way that regardless of the place of their performance/use, the quality and quantity is the same or as close as possible to each user. Schemes for their performance should be created, which in subsequent processes translates into their control and evaluation. The assessment of the process must be documented and communicated.

In the studied company, the number of points gained in this domain is 88 out of 135 possible. The lowest rated questions were about the WBS (*Work Breakdown Structure*) document and the standardized communication plan in the project - Best Practices: 1075, 1115, 1160, 1260, 1300, 1380, 1195, 7530, 2035, 7540.

Measure

This stage is related to a set of activities performed to determine a measure of a given physical or contractual quantity. Measure is about determining what to measure, as well as collecting the measures that measure it. It aims to help understand if the process is operating within acceptable limits. In the studied company, the number of points gained in this domain is 87 out of 135 possible.

The biggest problems noted during the assessment of “Measure” are: no standardized communication plan in the project, no document regarding changes in the project, no WBS document – Best Practices: 2000, 1085, 1940, 1850, 1650, 1990, 2070, 2005, 7580, 2045, 7590.

Control

Control is the activity of checking the status of the actual condition and comparison with the required (designated) state. It is: comparison of actual performance with planned performance, deviation analysis, evaluation of trends to improve the process, evaluation of possible alternatives and recommending appropriate corrective actions. In the studied company, the number of points gained in this domain is 81 out of 135 possible.

The worst rated questions are about the WBS document, a document regarding project changes and cost control – Best Practices: 2540, 1095, 2330, 2580, 2380, 2390, 2490, 2530, 2610, 2015, 7630, 2055, 7640.

Improve

All elements that make up the organization should be improved. System operation, procedures, process design, and employee qualifications must be monitored to find opportunities for more efficient operation. Continuous improvement is the process of creating something better, developing new qualities and skills. In the studied company, the number of points gained in this domain is 55 out of 135 possible.

The biggest problems related to continuous improvement are related to Best Practices: 2850, 1065, 2930, 1105, 2770, 2880, 2920, 3000, 2025, 7680, 2065, 7690.

In order to confirm the organization's good practices connected with four Process Improvement Stages - SMCI in Table 7 were listed documents used in the assessed company when projects are conducting.

Table 7: List of documents supporting project management in the assessed company

No.	Document in PM in the assessed company
1	Kick off document_project_diam257
2	Standard project plan (MS Project)
3	Weekly works status (MS Excel)
4	Standardized project folder template
5	Tool requirement project approval_ tool approval_rev.1
6	Hi plan machine resources
7	Hi plan die shop new project timing
8	Project plan - status control MS Project
9	Kick-off presentation
10	Budget Control after closure of the project - calculated automatically by the ERP system
11	KPI (quarterly controlled)
12	Trial report Process approval
13	Training plan
14	New projects status review
15	Analysis of potential defects and effects of FMEA

Summary of results and improvement actions

The organization received 311 points out of 540 - which gives 58%, it shows that some project management areas need improvement. Most points awarded in the field of standardization, which proves that the company has standardized project management methods, which is partly due to the fact that the organization operates in the automotive industry. Requirements for launching new components for mass production and therefore also project management in this industry set standards such as:

• APQP (*Advanced Product Quality Planning*) is a set of guidelines created jointly by the Big Three of the automotive industry Chrysler, General Motors and Ford. These guidelines were addressed to their suppliers and sub-suppliers. The main goal of creating APQP was to show how to develop products so that their quality was satisfactory for the organization. Therefore, APQP can be defined as a

description of the communication methods and processes that occur between a company and its subcontractor during product development.

• PPAP (*Production Part Approval Process*), is the process of approving parts for production. This process confirms the compliance of each individual component with customer requirements. PPAP is made on the basis of 18 strictly defined documents, which include DFMEA, PFMEA, Control plan, Process Flow Diagram, R&R (MSA) or analysis of measurement results compared to documentation.

• VDA (*Verband Der Automobilindustrie*), MLA (*Maturity Level Assurance*), this standard is mandatory processes for suppliers of car parts to German production vehicles, such as Volkswagen or BMW.

• ISO/TS 16949 specifies the requirements for the quality system for products in the field of design or development, production, installation and servicing in the automotive industry.

The lack of some of the documents or Best Practices described in the PMI may be due to the fact that they were not included in the above-mentioned standards. The most important differences, in stages of "Measure" and "Control", include the lack of a WBS document, a communication plan and a document tracking changes in the project. Cost control in the project also needs to be improved. The lowest rated range covering "Improve" stage, which is confirmed in practice. Some of the processes in the organization are not measured and controlled (real time spent on the project/ task, number/ time of delayed tasks, component costs in budgets, quality of communication in the projects, project scope) and only individual actions are analyzed, not project management in general. This does not allow drawing appropriate conclusions and introducing corrective actions into subsequent projects (*lessons learned*). Projects are tracked and monitored to some extent, but they are not completely analyzed.

The most important actions that should be taken are the introduction of the WBS document, communication plan, document tracking changes in the project and creating a document that will allow the analysis of the project and drawing conclusions that will be used in subsequent projects.

Conclusions

Assessment of project maturity allows the organization to diagnose the state of project management, recognize project management processes, define the good and weak points of the organization, and clearly define its level of maturity in relation to the competition and its partners. In project maturity models in addition to the diagnostic ability, a large part is to support the development of the organization. The OPM3 model presented in the paper precisely defined the state of project management of organizations and make easier to do specification of actions that should be taken to achieve a higher level of maturity. An examination of an organization's project maturity can also lead to an improvement in the competitive position and prestige of an organization - a high level of maturity is a confirmation that the organization uses a unified, professional language, professionally uses techniques, tools and methodologies for project management.

Although in the literature on the subject there are voices that models in project management are 'useful fictions', in the assesed company people who 'commissioned' examining project maturity were of the opinion that it is necessary to objectively indicate where the organization in term of project maturity is, what are its strengths and weaknesses, what can be improved. This is due to the fact that the company is expanding and restricting, because of the higher and higher needs and expectations of the automotive industry market.

The OPM3 model is to serve improvement activities for the company that will use it. The creators of the model emphasize that there is practically no such possibility for the company to achieve all best practices at all stages and in all domains. However, it should systematically improves its results/ achievements. The results should therefore be compared in the context of subsequent maturity assessments. There is also a justification for comparing (on a benchmarking basis) to other enterprises, but companies rarely publish the results of their evaluation. What can be read from the literature however is that different industries implement projects at different levels of maturity [Cooke-Davies and Arzymanow 2003], degree of maturity depends on many factors [Gorog 2016] and for manufacturing industry are proposed various project maturity models [Schumacher et al 2016]. The evaluated company meets more than 50% of best practices in the domain of project management, but in general it is

hard to deduce, whether it is good or bad. Authors did not identify in the scientific literature the positions in which the project maturity of manufacturing companies is determined.

According to the purpose of the article - it was shown in a real example - how to use the OPM3 model to assess the project maturity in an organization. The description of the case study completes the list of publications in Table 3 that may be useful for project management practitioners. The presented works meet the legitimacy of using a single case study as a research method.

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Forming the Data Integration Dimension for The Preparation of Integrated Reporting

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Abstract

At the moment, active research in the field of integrated reporting is being conducted in Russia and internationally. However, until now many issues in this area remain poorly researched and are of a debatable nature.
In particular, Russian scientists practically do not raise the question of how and by what means the necessary degree of information connectivity and mutual consistency of the elements of integrated reporting is achieved, in what ratio should information be presented in it, or how, these elements unite and form a single information field .
The article justifies the conclusion that there are three different approaches to defining the boundaries or perimeter of integrated reporting, within which the perimeter of integration is defined, the main elements of the integrated are structured and linked: the «weak» union, the «strong» connection and, finally, the connection in the «narrow» sense.
On the basis of the conducted research on 10 major Russian organizations, the degree of coherence of the presented integrated financial statements for 2016 was evaluated. Specifics of ensuring transparency and coherence of the integrated reporting of Rosatom State Corporation were studied in detail. The conclusion is substantiated that the «weak» connection used in it is directed more toward revealing common strategic guidelines for the near future. However, it does not provide a proper clear understanding of all the key components of creating economic added value. A possible solution to this problem may be a revision of the approach to the formation of the perimeter of integration towards the «strong» connection.
Keywords: integrated reports, users, information, connection.

Introduction

Complex, diverse, multidirectional institutional processes that take place around the world led to a fundamental change of ideas about the ways, the amounts and methodological platforms for information disclosure concerning some reporting entity activities for its stakeholders. In many respects, this is determined by the fact that nowadays the traditional concept of capital has undergone a serious transformation. The capital involved in added value creation, considered by investors as the main guarantee of a positive return and return on investment, has acquired a comprehensive and integrated character and cannot be reduced only to financial or material flows.

Accordingly, the return on investment, the growth of business value and development prospects are estimated not so much through financing scale and the real availability of material values, but also by the consideration of intangible components, such as business connections, network interactions, the

use of modern communication technologies, market segmentation, an active use intellectual property, green business solutions, etc.

Under these conditions, accounting (financial) statements, remaining the most important basis for investment and financial decisions, cease to be the only information source about a business property and financial position and are not able to satisfy the increased diversity of information requests from various users. Therefore, other forms and types of corporate reporting, such as, for example, social, environmental one, the reporting in the field of sustainable development, etc. are demanded more and more often.

The theoretical basis of the study. The issues of financial and non-financial reporting theory and practice in Russia and abroad were studied by the following Russian and foreign scholars: D. Berstein, D.Ya. Solomatin, A.N. Kochetkov, T.Ya. Prokudin, Ya.V. Sokolov, L.A. Tchaikovskaya, M.I. Kuter, N.A. Kamordzhanova, M.M. Gurskoy, S.N. Polenova, V.I. Petrova, L.B. Trofimova, N.N. Khakhanova, E.V. Sevastyanova, S.A. Stukov, M.R. Matthews, M.Kh. Perer, A.N. Sushkevich, Chan Ngok Chang, J. Richard, and V.V. Pankova.

The studies on the issue of corporate social responsibility, environmental orientation and sustainable business development, including the issue of non-financial information disclosure, were conducted by the following researchers: Yu.P. Anisimova, Yu.M. Belyaeva, T.L. Bezrukova, I.P. Bogomolova, S.V. Ivchenko, G.A. Lobanova, I.P. Soboleva, K. Carter, S. Matos, D. Rogers and J. Hall.

The issues of business relationship effectiveness enhancement with various stakeholder groups for sustainable development and necessary information provision are reflected in the works by R. Freeman, K. Fussler, T. Holmes and D. Ecklington.

Due to the fact that the problems of non-financial reporting in general, and integrated reporting, in particular, are of high practical importance, an important role is played by international research and developments conducted under the auspices of various international organizations, such as the Association of Certified Chartered Accountants (ACCA), World Business Council for Sustainable Development (WBCSD), International Federation of Accountants (IFAC), International Integrated Reporting Committee (IIRC), International Institute on Sustainable Development (IISD), etc.

Study: Main Part

One of the most widely and actively promoted solutions aimed at financial statement information content expansion is the formation of the so-called integrated reporting, the main purpose of which is to provide a comprehensive presentation of all types and forms of resources (capital) used by the business. The high importance of non-financial reporting in the current economic environment is recognized in the concept of public non-financial reporting development and the plan of measures for its implementation in May 2017. Such reporting ensures that various "organizations provide meaningful, complete, timely, accurate, balanced, comparable reliable and objective information about their activities on economic, environmental, social aspects and management systems to meet the information requirements and interested party demands" (The concept of public non-financial reporting development and the plan of measures for its implementation, approved by the Order of Russian Federation Government No. 876-p).

The International Integrated Reporting Council presents it as a "comprehensive compact message to all interested parties about the ways an organization strategy, its management, its activities, and future plans, taking into account the external environment, lead to short-term, medium-term and long-term additional value creation" (International Integrated Reporting Council ("the IIRC"), 2013). It is considered as a modern, actively used channel of information interaction, implemented for the widest range of interested parties, including employers, customers, suppliers, business partners, local communities, regulatory bodies, and authorities.

Research Methodology

One of the key elements of the integrated reporting concept is the active use of the "integration" category in relation to business goals and objectives, considered in the context of the so-called integrative thinking. The main essential characteristic of this methodical approach is to combine separate elements (individual reports) into a single whole, which ensures the appearance of an additional and a very important feature - emergence - which enhances and supplements the existing information and communication characteristics of the reporting elements.

The roots of this approach in Western business and political culture can be traced back to G. Hegel's philosophy, who, considering the process of human cognition, drew attention to its internal dialectical nature and complex cultural dynamics. At that, the dialectical process of ascent from the abstract to the specific one is characterized by internal integrity, manifested primarily through the union of the constituent parts.

In the modern business environment, integration is considered in a more down-to-earth style, primarily as the element of organizational effectiveness and identity. The usefulness and the importance of integration are directly indicated, for example, in the documents by the Institute of Chartered Accountants of England and Wales (ICAEW) (The Institute of Chartered Accountants in England and Wales, 2009) and the Organization for Economic Cooperation and Development (OECD) (Organization for Economic Co-operation and Development, 2015). "Integrity stimulates trust and is vital for the reputation of individuals and organizations, the economic development of nations and information and reporting reliability" (The Institute of Chartered Accountants in England and Wales, 2009).

However, this is a complex and ambiguous concept. The diversity and the ambiguity of its application areas show that one can talk about such concepts as political, social, industrial, economic, financial, cultural, scientific and educational integration, etc. (Sorokina, 2008). Each of these concepts reflects some of the elements, some properties of the surrounding reality. And it is possible that this ambiguity, even multiplicity, largely determines the wide distribution of integrated reporting throughout the world. This is also true for Russia.

Study Procedure

Recently, in Western academic and applied research more and more attention is paid to the combination ways of various information types, accounting and non-accounting one, into a single whole, forming a single document - integrated reporting.

The need for an effective and broad combination of heterogeneous information elements is indicated in the works of the famous Western scholar, one of the main ideologists of integrated reporting, R.J. Eccles, who was among the first ones noting the importance of financial data proper combination and integration with a wide range of non-financial indicators that contain the information about intangible assets, key performance indicators, corporate management, etc. (Eccles, Krzus, 2010).

The informational diversity of data provided in integrated reporting can be clearly seen from the p. 3.10 and 3.11 of the conceptual framework for corporate integrated reporting, which include the following items:

- substantive elements: organization activity and external environment overview, top management, opportunities and risks, strategy and resource allocation, business model, operation results and future prospects;
- time: past, present, and future;
- capital: financial, industrial, intellectual, social, relational, human and natural;
- financial and non-financial information;

- qualitative and quantitative information;
- internal management information, the information for the boards of directors, the information for external reports;
- other internal information, additional external information.

However, such information diversity does not create a single whole, well understood by interested users. Therefore, one of the most important principles for the preparation of integrated reporting is the internal connectivity requirement, which allows you to implement fully the previously considered integration principle. They assume that the practical implementation of such a requirement is able to provide the necessary complex semantic and meaningful combination of various types of information on a single methodological basis, which determines the general format of their internal representation and external perception integrity.

Therefore, the unity of integrated reporting image should be considered, among other things, not only as of the way of information disclosure about the internal integration achieved by some organization, which includes five key aspects (The Institute of Chartered Accountants in England and Wales, 2009):

- the moral values that the organization supports;
- the driving motives of organizational activity;
- the obligations assumed by the organization and public responsibility for their implementation;
- the qualities demonstrated and encouraged by the organization;
- the organization high achievements, including role models.

For the purposes of this article, a separate element of integrated reporting with a relatively independent value and a certain semantic load will be called an internal element (a part) of integrated reporting. In essence, such an element should disclose the information on the use of one or another type of capital, or be an autonomously perceived component of a general report (a final report), which reflects information on an internally homogeneous range of issues.

In the documents dedicated to integrated corporate reporting, such an element with a certain autonomy is a private or a separate report. If they consider an integrated report as a document that reveals comprehensive information about the process of added value created by an organization, then each such element (a part) of it can be viewed as the description of activity key areas in which this process is implemented, as the methods for its implementation.

The conceptual framework for integrated reporting preparation determines that any significant business components associated with a particular capital can be distinguished in order to disclose necessary information. Such components can be considered both independently, acting as original information sources, and in combination, when their presentation occurs from the standpoint of a holistic and integrated view of the business.

Organizations generate a wide variety of information during their activities, including those presented in various reports, either as required by law (for example, accounting (financial) or tax reporting), or formed voluntarily, in order to communicate better with interested parties to meet the information needs of the latter (e.g. a sustainable development report). If such additional reporting is generated in parallel with integrated corporate reporting, it is advisable to include the references to relevant reporting forms in the latter (International Integrated Reporting Council ("the IIRC"), 2013).

In practice, it can be seen that integrated reporting and individual reports perform various functions. Initially, the most objective informing of interested parties about the organization ability to create

value was considered as the main goal of integrated reporting preparation. However, nowadays this goal is viewed more broadly - like the need to demonstrate the "value creation story"[10] consistently and clearly and disclose specific information about individual types of capital.

In this regard, the task of high-quality, reliable and correctly composed integrated reporting development acquires a fundamentally important methodological significance. An effective solution of this task is largely determined by the correct choice of a central reporting unit and, accordingly, the integration perimeter, within which the final report configuration will be determined. Therefore, the completeness, the clarity and the depth of disclosure in the final accounts will be determined by connection degree between various parts of the final report.

The degree of information coherence and mutual consistency of integrated reporting is largely determined by the methodological basis, which determines the way of a final report structuring, the proportion of information presentation, and the combination way of its various elements. But this aspect of integrated reporting remains unstudied by domestic scholars.

According to the developers of the integrated reporting concept, the boundaries of the integrated report, as well as the elements included in it, should be configured according to standard financial statements (International Integrated Reporting Council ("the IIRC"), 2013). The limitations of the latter are obvious. While integrated reporting should also cover so-called external impact zones, reflecting certain economic, environmental, and social outcomes of its activities and their consequences, the information about them does not stay often within the limits of standard financial reporting (International Integrated Reporting Council ("the IIRC"), 2011). This is due to stricter requirements for capital, asset, and liability element recognition in the latter. Since the zones of influence are not clearly defined often, and the information about them is poorly structured, they are difficult to identify in standard financial statements.

Besides, integrated reporting should allow the tracking of all links of the economic added value chain in the short, medium and long term. And this is also impossible within the financial statements.

The study of domestic and foreign materials shows that you can use at least three different approaches to determine integrated reporting boundaries or perimeter. Each of them defines specifically the way of boundary development, the integration framework structuring and the grounds final reporting drawing up.

According to the performed analysis, the following approaches can be distinguished: "weak" association, "strong" connection, and finally, the connection in a "narrow" sense. The presence of three approaches is determined by the fact that a different type of element connection into a whole allows us to reflect and reveal the peculiarities of the existing business practice in different ways, taking into account industrial and national specifics.

Let's describe the main characteristics of each of them.

A "weak" connection assumes that integrated reporting is based on the most significant, key part, which is considered to be "essential", while the remaining parts only reinforce the information contained in it. The latter are considered as secondary and are auxiliary ones in general reporting structure.

There are two possibilities here. The first is that the leading part is the accounting (financial) component, the information content of which is increased through the inclusion of social or environmental components.

In the second case, integrated reporting is designed as a clear alternative to accounting (financial) statements. Accordingly, social or environmental reports play a leading role, and financial data is attached to them as a supplement only.

In fact, a final report arising on the basis of such a connection, cannot be considered as full-fledged integrated reporting for various reasons, primarily due to the incompleteness and insufficient

coherence of the parts included in it. The main focus of such reporting is biased towards the information presented in the main part. There is only a mechanical connection of the constituent elements in it, without a sufficient internal and logical interconnection, while there is no real integration, leading to the value increase of the disclosed data.

When a financial component is taken as the main part, such a report is generally reduced to extended accounting (financial) statements. This approach also occurs in Russian practice, where integrated reporting is the way of additional self-representation, rather than a full-fledged communication channel for relationship development with interested parties.

A "strong" connection implies that the parts of the integrated reporting are located in it "proportionally", and each of them is considered as a full-fledged report of independent value. The details of different parts complement each other. Unlike the previous approach, the main, "leading" part, to which additional information is attached, is not highlighted here. Instead, a relatively complete presentation is formed across all lines of accountability. Accordingly, each of the parts of the integrated report characterizes a specific area and has an independent value now.

At the same time, the aggregation takes place mechanically, mainly due to the fact that the information contained in certain parts is repeatedly intersected within a final report or is actively used in other parts. This implies the development of close reciprocal informational links, which in some cases turn out to be redundant. The final integrated corporate reporting, in this case, turns out to be quite informative, but it does not provide a comprehensive synthesis. Each of the parts characterizes a specific area without the loss of independent value. It is included in the general report through internal links and cross-references, due to which it can be considered as a single report element. But these parts are not so much lined up in some coherent unity, due to which a holistic picture emerges, as they are located side by side, complementing each other. A final report, in this case, is a document containing a vast array of information without the necessary connectivity. And therefore, it does not provide adequate disclosure about the ways the various elements involved in business capital generate the process of added value creation.

A final report turns out to be more aggregated than in the previous case, but its main disadvantage is its lack of information. Collected from separate parts, it does not add additional information besides the data which they contain.

The connection in the "narrow" sense is the approach that provides the best of all the interconnectedness of the information presented in an integrated report. The individual parts of the report act here as related to other parts of the information element. Taken together, they can be interpreted in a wider context than separately.

Accordingly, in this case, the elements of corporate integrated reporting are not included in it as independent reports and therefore cannot initially contain all the information included in a final report. An overall report is based on the balance principle between detailing and analyticity. It contains only the necessary, relevant information selected according to the principle of materiality and significance and describing the way the process of business added value creation takes place. At that, it is advisable to avoid the overloading with details and the inclusion of information not related to added value creation in a final report. In other words, a report must meet the criterion of brevity (International Integrated Reporting Council ("the IIRC"), 2013).

Summarizing the above mentioned, several comments should be made regarding the correlation of corporate integrated reporting and other types of reporting.

There is always a certain information area overlap between the different types of reports. So, you can see the connection between social and intellectual capital reports, between the Board of Directors and the Management Reports, etc. Many elements of non-financial information are used more and more in accounting (financial) statements. This overlay contributes to the appearance of excessive, redundant information that makes corporate integrated reporting overloaded with details, background information, and repetitive data. The brevity criterion assumes that the information contained in

separate reports that are prepared separately and have independent significance should be included in the corporate integrated reporting selectively, without a direct link to an original source (International Integrated Reporting Council ("the IIRC"), 2013). In this case, integrated corporate reporting and other types of reporting can be generated autonomously based on organization goals. Accordingly, their functions will be different, the information will be added without intersection, and thus their information value will be increased.

From the foregoing, it is clear that a separate presentation integrated due to other types of reporting has different objectives. While corporate integrated reporting provides a generalized, holistic assessment of the value creation process by business, the rest of the reporting reflects detailed information on the various activities and used capital types. The information contained in them turns out to be more specific and is aimed at the "narrowed" informing of interested users about various business areas.

It should be recognized that nowadays the relationship issue between the information field of integrated reporting and other types of reporting remains controversial. They started the studies in this field relatively recently.

In 2016, they conducted the studies on non-financial reporting of 10 large domestic organizations, which in terms of their composition and disclosure nature met the requirements of the International Rules for integrated reporting preparation. Despite the fact that the study was limited, the conclusions made in it allowed, among other things, to assess the degree of coherence between the presented integrated reports.

In particular, they performed a detailed analysis of reporting transparency and coherence degree in relation to the State Corporation "Rosatom". Since 2009, Rosatom has been actively developing the area of corporate reporting related to the presentation of non-financial information. At that, the developments aimed at integrated reporting, "Rosatom openness and transparency increase, image, business reputation, and competitiveness strengthening, information support for the promotion of products and services in Russian Federation and abroad" were initially adopted as the basis (State Atomic Energy Corporation "Rosatom").

Based on leading international developments, taking into account the advanced domestic and foreign experience, "Rosatom" developed its own system document "Rosatom Policy in the field of public reporting" and prepared the corresponding "Standard on public reporting", applied by "Rosatom" and its related structures.16

The reporting for 2016 prepared by "Rosatom" includes the following elements (see Table 1):

Table 1. “ROSATOM” INTEGRATED REPORTING CONTENT

Disclosure area	Main content
Chapter 1. Rosatom today	About Corporation Key results of 2016 Main events of 2016 Appeal by the Chairman of the Supervisory Board Director's appeal Appeal from the representative of interested parties Financial and economic results

Disclosure area	Main content
Chapter 2. Business Strategy	2.1. Activity Strategy until 2030 2.2. Value creation and business model
Chapter 3. Contribution to strategy implementation: international activity results	3.1. Presence Markets 3.2. International Business 3.3. International cooperation
Chapter 4. Contribution to strategy implementation: the results of division and complex activities	4.1. Mining Division 4.2. Fuel Division 4.3. Machine engineering division 4.4. Engineering Division 4.5. Electricity Division 4.6. Nuclear weapons complex 4.7. Nuclear icebreaker fleet
Chapter 5. Contribution to strategy implementation: innovations and new products	5.1. Science and Innovation 5.2. Business diversification
Chapter 6. Contribution to strategy implementation: corporate process effective management	6.1 Corporate management 6.2. Risk management 6.3. Performance of state functions 6.4. Financial and Investment Management 6.5. Optimization of production and business processes and cost reduction 6.6. Procurement Management 6.7. Internal control system 6.8. The measures against corruption and other offenses
Chapter 7. Unified "Rosatom" team	7.1. The work with staff 7.2. Contribution to the development of presence territories 7.3. The activities of "ROSATOM" Public Council 7.4. Interaction with interested parties
Chapter 8. Safe Operation Guarantee	8.1. Provision of nuclear and radiation safety 8.2. RAW, SNF management and nuclear and radiation

Disclosure area	Main content
	hazardous facility decommissioning activities 8.3. Environmental Safety
Chapter 9. The system of public reporting and the interaction with interested parties during report preparation	9.1. Public reporting system 9.2. Dialogues with interested parties during report preparation 9.3. Accounting for stakeholder proposals 9.4. Public Assurance Conclusion
Annexes	
Contact information and useful links	

Study Results

Logical and textual analysis of "Rosatom" integrated reporting for 2016 allows us to conclude that it uses a "weak" connection aimed at common strategic guideline disclosure for the near future. The dominant, "center" idea of the reporting is a general picture development about business, the description of the management structure and strategic goals outlined without proper balance in respect of the main structural element description. Despite the fact that the latter are presented as required by the relevant international and internal documents, a clear and precise idea about the creation of added economic value has been not formed still.

Result Analysis

A possible solution to this problem may be the revision of the approach to the integration perimeter development in the direction of a "strong" combination of reporting elements.

Conclusion. The preparation of integrated reporting is an important step towards major changes, both in the reporting organizations and in their business environment. These are the changes that affect significant issues strategically, in particular, to the issue of an effective and efficient way of corporate goal implementation and the way of added economic value chain development. And one of the most important factors that allow for more complete, deep and correct disclosure of information on each element of non-financial reporting is the correct choice of integration perimeter.

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The Administration of EU's Good Practices In the Light of Human Rights

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Abstract

The right to good administration is one of the aspects of the civil right to good governance. Its practical dimension is manifested in the continuously improved protection of civil rights and liberties in relations with the national administrative entities and the institutions and bodies of the European Union. This paper is composed of three main parts. Part one is devoted to the general issues of the individual's right to good governance. Therein, the Authors analyse the formation of the individual's right to a fair and equitable administrative procedure in contacts with state authorities. Part two presents the major issues related to the standards of the European Union in respect of the operation of public administration bodies. Part three discusses the selected matters connected with good administrative practice, as illustrated by the example of Poland. In concluding remarks, the Authors present their conclusions, also indicating the need for further activities to raise the social awareness of the civil right to good administrative practice.

Keywords: European Union law, human rights law, fundamental rights, civil rights and liberties

Introduction

In modern states, administration forms part of the structure of public authorities, which is responsible for the practical implementation of the functions of the state. The manner in which the administration bodies are organised influences the quality of the tasks they perform, promotes or inhibits civilizational and cultural progress, and also translates into the image of the state as perceived by the citizens. Nowadays, the administration carries out many highly diversified tasks aimed at satisfying the growing social needs. This approach to administration is compatible with a concept proposed by

Jacques Ferrier, for whom public administration forms an essential link between design and implementation, between politics and technology (Ferrier, 1974, p. 35).

Administration is not a self-contained entity. It is rather a collection of instruments through which the state fulfils its obligations towards society (citizens) and performs its tasks resulting from its functioning in the transnational and global structures of power. This means that administration, understood as an implementation mechanism for the tasks of the state, must be subject to modernisation and change. The direction of those changes was described by B. Guy Peters, pointing in his research to the four main models of administration transformation: the market, participatory, flexible, and deregulatory models (Peters, 1999, p. 404-405). The aim of the reforms was, and still is, to eliminate those solutions which hinder or make it impossible for administration to solve the fundamental social problems and needs. In accordance with the Latin *administrare*, administration bodies should be helpful and effective when solving problems and should serve society (Lipska-Sondecka , 2019, p. 10). In a world of megachange, the issue of the place and role of administration in modern states is of exceptional importance. Individuals, social groups, and large communities expect public authorities to ensure security, stability of living and development conditions, a sense of respect for human dignity, and respect for their fundamental rights and liberties. Good administration practices are invaluable in making these expectations reality.

The selected problems of the right to good governance

The end of the 20th century and the first half of the 21st century were characterised by profound, intensive, and complex changes taking place at all levels of social structures. Exogenous factors such as globalisation, regional integration, economic and financial crises, and armed conflicts in different parts of the world have contributed to a new view on the problems of good governance in a changing world. The number and diversity of entities involved in this process resulted in the need for redesigning the functions to be performed by administration under new conditions referred to as a "network" (Lipska-Sondecka, 2019, p. 257). At the national and trans-national levels there appeared a greater need for organisational, administrative and protective activities when it came to solving problems and issues affecting the public and individual people (Oniszczuk, 2008, p. 59). The right to good governance and the right to good administration, which falls within the framework of the former, have set the course for changes in all subjects of social relations. In Human Rights Resolution 2005/68 of 20 April 2005 entitled 'The role of good governance in the promotion and protection of human rights' the UN Commission on Human Rights states that: 'transparent, responsible, accountable and participatory government, responsive to the needs and aspirations of the people, including members of vulnerable and marginalized groups, is the foundation on which good governance rests and that such a foundation is a sine qua non condition for the full realization of human rights, including the right to development' (Izdebski, 2012, p. 378). Therefore, one can conclude that the fundamental rights of the individual include the right to good administration, which means the prevention of the use of violence by the administration (Oniszczuk, 2008, p. 59). There appeared a space for the formation of administrative law understood as an ordered collection of legal standards, whose objective is the direct realization of values distinguished by virtue of the common good by administrative bodies (Oniszczuk, 2008, p. 59). The contemporary catalogue of values referred to as *bonum communis* (the common good) also includes the right of the individual to good administration. This right derives from the concept of protecting the individual against the omnipotence of the state and the arbitrariness of decisions taken by state authorities. It is rooted in the European Convention for the Protection of Human Rights and Fundamental Freedoms, where the sections related to the right to a fair trial, the right to property, and the right to information affect the shape and nature of the administrative systems of many modern European countries (Jackiewicz, 2008, p. 103). In Finland, the right to good administration is reflected in the Constitution and normal legislation. In Sweden, it constitutes a fundamental principle of the operation of all administrative bodies. In Denmark, the provisions of the Code of Administrative Procedure are developed based on the practice of the Parliamentary Ombudsman. There is more to the right to good administration than just the legal standards determining the behaviour of public entities. It also covers actions conducive to the maintenance and enhancement of those freedoms and human rights which condition the standard of living of individuals (Oniszczuk, 2008, p. 63). Good administration operates under law and within its boundaries for the common good, and safeguards order and security for individuals,

social groups, and large communities. The right to good administration in the context of respect for human rights was noted at the international level by the Council of Europe in the 1970s. The Council took action to define the general principles of relations between individuals and administrative bodies which would be consistent with respect for civil rights and freedoms[1]. The Convention for the Protection of Human Rights and Fundamental Freedoms of 4 November 1950 played an important part in determining the standards of the right to good administration by the Council of Europe. This document specifies the fundamental rights and freedoms of a human being and requires states to guarantee those rights and freedoms to any person under their jurisdiction. The Convention also establishes an international system for their protection. The most important rights and freedoms guaranteed to each and every individual by the Convention include: the right to life, the right to protection against torture and inhuman treatment, the right to liberty and security, the right to respect for private and family life, home and correspondence, freedom of expression, freedom of thought, conscience and religion, the right to freedom of peaceful assembly and to freedom of association, and the right to a fair trial. The Council of Europe draws particular attention to the protection of ideals and principles constituting the common heritage of a free and democratic Europe. Human rights, regarded as inalienable, universal, and vested in every individual since birth, occupy a special place among the values promoted by this organisation. The concept of human rights as fundamental rights is reflected in many constitutional provisions of modern states, thereby influencing the determination of obligations of public authorities towards individuals. It should be understood as the right of every individual to sound and effective operation of public institutions (Izdebski, 2012, p. 377).

The main objective of the activities carried out by the Council of Europe as regards good administrative practice is to introduce uniform standards of administrative procedures, which should guarantee every individual the fair implementation of the specific provisions of substantive law. According to Jerzy Łętowski, the 'European nature of the state and its bodies is proven first and foremost by the standard of regulation of procedures binding on administrative authorities' (Łętowski, 1992). Good administration is a collection of well-thought-out and well-designed instruments enabling all entitles involved in the government process to operate effectively and to safeguard freedom, liberties and human rights. It still, however, is a vague term, since it appears impossible to list all the elements comprising the concept of good administration. The structure of public administration in modern European states is formed based on the political system traditions in the given state, the history of administrative thought, and administrative culture. The models of administration differ from one another. It is, therefore, extremely difficult to devise a universal definition of the right to good administration. Despite the differences resulting from states' acting within national models, a certain common denominator can be indicated, indisputably referring to the concept of good administration. It is the rule of a democratic state governed by the rule of law, which takes into consideration and respects in its political system such values as: freedom, sovereignty, pluralism, equality before the law, constitutionalism, the separation and balance of powers, the authorities acting within the limits of the law and, finally, respect for the rights of the individual. The problems of good administration and the right to it have been recognised not only by the Council of Europe but also by the European Union.

The right to good administration as a fundamental right of the European Union

Already in the 1960s, the case-law of the Court of Justice of the European Communities included the issues of fundamental rights understood as the general Community law principles protected by the judicial authorities of the European Communities. As European integration improved, the role and significance of fundamental rights, including human rights, grew to such an extent that the assurance of upholding those rights was included in the preamble to the Single European Act of 1986. The commitment of the member states to respect human rights and fundamental freedoms was also included in the provisions of the Maastricht Treaty of 1992. Nevertheless, the right too good administration could be regarded as a fundamental right in European Union only after the Treaty of Lisbon and Charter of Fundamental Rights, an integral part of this Treaty, were signed in December 2007. The right to good administration (Article 41) systematises and streamlines the system for the protection of fundamental rights in the European Union and guarantees respect for and protection of human and citizen rights in the European Community. The provisions of Article 41 of the Charter not only provide for the lawful activities of administration, but also impartial and objective behaviour of

officials. The right to good administration includes the following: the right of every person to present his or her case in person before any measure which would affect him or her adversely is taken, the right of every person to have access to his or her file, while taking into account the rules of confidentiality and of professional and business secrecy, the obligation of administrative authorities to present reasons for their decisions, the right to seek compensation from the Community for any damage caused by the EU institutions and their officials, and the right to write to the institutions of the European Union in one of the languages of the Treaties and obtain an answer in that language (Ura, 2007, p. 231-232). In the light of Article 41 of the Charter of Fundamental Rights, the right to good administration is first and foremost the obligation for the entities and bodies of administration to observe procedures for fair administrative procedure. Administrative procedures are a recognised part of administrative law in most Member States of the European Union, including Poland. Good administrative practice also includes the right to be compensated for damage caused by EU institutions and their officials connected with the performance of their duties. This aspect of the right to good administration has its roots in mediaeval Europe, where the construction of the rule of law was adopted quite commonly, for example in England and Sweden (Izdebski, 2012, p. 383). Here, one should underline that the subjective scope of the Charter is limited in terms of the right to good administration. Grzegorz Krawiec explicitly stated that: 'its provisions are addressed to the institutions, bodies, offices and agencies of the Union with due regard for the principle of subsidiarity and to the Member States only when they are implementing Union law. ... This provision indicates that the Charter of Fundamental Rights (and thereby the right to good administration under Article 41) should apply to EU officials, institutions, offices and agencies only when the authorities of those states deal in matters with Community elements' (Krawiec, 2009, p. 21). Despite their limited character, the provisions of Article 41 of the Charter clearly highlight the role of administration and its officials to serve citizens, in accordance with Latin *administrare* (to serve, to be of use).

The right to good administration included in Article 41 of the Charter is confirmed in the European Code of Good Administrative Behaviour. This document was compiled by the first European Ombudsman, Jacob Söderman, and adopted in the form of a resolution by the European Parliament on 6 September 2001. In spite of the non-binding nature of the Code, its adoption indicates that the European Union and its bodies strive to systematically bring into effect the concept of the right to good administration. This document forms part of the legal acts of the Union regarded as *soft law*, i.e. non-binding secondary legislation. Despite its "soft" nature, the Code is regarded by virtually all EU institutions as instructions on how their staff should act in relations with the public. In the light of the Code, the officials shall act according to law, shall be impartial and independent, and shall fairly and reasonably resolve difficult matters. Jerzy Świątkiewicz highlights that 'the Code of Good Administrative Behaviour can be treated as a selection of standards which are useful also outside the Union to assess the functioning of the administration. There are no grounds which would speak against regarding the standards of the Code as useful in determining the obligations of Polish administration and in interpreting substantive law and procedural law. This is of significance for the adjustment of everyday relations between the public and the authorities to the requirements imposed within the European Union' (Świątkiewicz, 2007, p. 22). The administration of good practices goes beyond the legal standards determining the correct procedures for public authorities and their staff. It is also a model for modernisation efforts made by modern states in terms of implementing the civil right to good governance.

The implementation of the right to good administrative practice, as illustrated by the example of Poland

The preamble to the Constitution of the Republic of Poland of 2 April 1997 states that Poland has the duty to 'guarantee the rights of the citizens for all time, and to ensure diligence and efficiency in the work of public bodies'[2]. Poland's membership in the Council of Europe (1991) and later in the European Union (2004) obliged the state to apply models covered by transnational and international standards in the national legal system. This means that a given model being reflected in a state's legal system influences not only the legislator but also the bodies applying the law, implying the necessity to reference its content on a case-by-case basis (Jackiewicz, 2008, p. 166). In the light of the provisions of the Constitution of Poland, the right to good administration is referenced as early as in

Article 2 which states: 'The Republic of Poland shall be a democratic state ruled by law and implementing the principles of social justice', while Article 7 provides for the obligation of authorities to act on the basis and within the limits of law. In Article 9 the Polish legislator provides for the will for Poland to respect binding international law. These articles clearly indicate that the legal system of Poland is structured based on the rule of law, and, as a democratic state, the Republic of Poland shall observe all obligations resulting from its membership in transnational and international structures. The right to good administration is also reflected in Article 153 of the Constitution, stating that 'A corps of civil servants shall operate in the organs of government administration in order to ensure a professional, diligent, impartial and politically neutral discharge of the State's obligations'. Therefore, the corps of civil servants are under a constitutional duty to substantively, expertly, reliably, and trustworthily fulfil their professional obligations, which, undeniably, constitutes a fundamental part of good practice in the activities of public administration. In terms of normal legislation, the right to good administration translates into the regulations covered by the Code of Administrative Procedure[3]. Although the provisions were adopted in the 1960s, owing to a number of amendments, they take into account the principles of good administrative practice, which is in line with the democratic character of the rule of law, as well as those stemming from Article 41 of the Charter of Fundamental Rights of the European Union. Jerzy Łętowski underlines that most rights of the individual included in the Code, resulting from the right to good administration, form, at the same time, part of the equitable administrative procedure, i.e. allowing citizens to participate in the resolution of their cases, openness of proceedings and access to file, impartiality of the determining authority, fair nature of the proceedings, obligation to justify its decisions, the right to appeal against decisions, ensuring judicial review of the legality of decisions (Łętowski, 1995, p. 172). The principle of equitable administrative is complemented by the principle of effectiveness of procedure. Lawyers who deal in administrative law also pay attention to another principle related to the right of the individual to good administration. This is the right to a fair trial, which as a rule – in a substantive sense – characterises any democratic state (Adamiak, Borkowski, 2002, pp. 87-89). The provisions of the Code rather exhaustively determine the actions of the target parties to the procedure. Rule of law, legality, efficiency, objectivity, transparency, openness, professionalism, and loyalty are the main characteristics stemming from the document in question. Administrative courts, which supervise the activities of public authorities, guarantee that the provisions of the Code of Administrative Procedure, based on the principles referenced above, are observed. Jan Zimmermann indicates that administrative courts pursue two objectives: the first (direct) one concerns controlling the activities of public administration and determining whether those activities are in line with the adopted and acceptable models; the other (indirect) is related to protecting the adopted catalogue of values (Zimmermann, 2018, p. 476). Administrative courts in Poland can exercise two types of control, i.e. direct control by challenging activities of an administrative authority in court or indirect control by bringing action against a decision (Warzecha, 2006, p. 231). Hence, administrative law is a system of specific standards of conduct for administrative bodies which are obliged to act in accordance with the rules in force. Those principles should not be regarded as merely legal standards but should be considered as ethical standards (Woodhouse, 1997). In order to makes this possible, educational activities are necessary to raise awareness of the civil right to professional, reliable, fair and friendly administration. Already in 1993 the Supreme Court, in its judgment stated that: 'The individual has the right for their claims and applications to be examined within a procedure provided for by law and forms defined by law. ... It is against constitutional principles for administrative bodies to act in a way where citizens' applications are handled outside the procedure and in forms not provided for – this generates legal uncertainty and restricts citizens' rights to protect their rights before public authorities and courts'[4]. The wording of this judgment confirms that knowledge of good administrative practice can contribute to better and more effective enforcement of one's constitutional, fundamental rights. This can also translate into the improved activity of administrative authorities, including enhanced protection of civil rights and freedoms which are regarded as an integral part of human rights.

Final remarks

Good administration is a well-thought-out and well-designed executive mechanism for the tasks of the state. The structure of such an apparatus requires that the actual conditions of the constantly changing reality be taken into consideration. The administrative system has the duty to realise public

expectations towards authorities, and the extent to which they are met indicates the level of modernity of the state's and its authorities. On the one hand, good administrative practice means specific legal solutions while, on the other hand, it is a system of values grounded in civil rights and freedoms. These form a fundamental part of human rights and freedoms. The law and its standards determine only certain desirable *patterns* of organisational behaviour, principles, and scope of action for public entities (Lipska-Sondecka, 2014, p. 113). They form a basis for the executive mechanism allowing the state to fulfil its functions, carry out tasks, and meet the needs and expectations of the citizens. Nowadays, in a world of megachange, good administrative practice gains exceptional importance. The right to good administration is an integral part of the right to good governance as 'the condition for the full realisation of human rights' ((Izdebski, 2012, p. 378).

The administrative apparatus of the state must serve the society, and its activities should be characterised by sensitivity to, understanding of, and kindness towards human problems and concerns. Those principles not only stem from transnational and international standards but also comprise the rules of social coexistence. The most important responsibility of all moderators of public life not only in Poland but also in Europe, is to raise public awareness of the right to good administrative practice. Meeting these expectations is crucial if we want modern countries to be able to bring about change appropriate for the 21st century.

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[3] The Act of 14 June 1960 – the Code of Administrative Procedure (Journal of Laws of 1960, No. 30, item 168, as amended).

[4] Judgment of the Supreme Court of 18 November 1993, III ARN 49/93, OSNCP 1994, No. 9, item 181.

Analysis of Socio-Economic Sustainability Of Local Coastal Municipalities of Murmansk District of The Russian Federation

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Introduction

By Russian and international experience, a multi-level stability assessment system should be taken into account in order to assess the socio-economic stability and development prospects of coastal territorial objects. And for totality of such objects in the form of coastal ecosystems and coastal infrastructure, in which a person is present in all kinds of their life activity (residence, work, rest, etc.), as applied to the tasks of territorial planning, it's needed to use the system approach [1, 4, 5, 7, 9, 14].

Using the methodology for assessment and analyzing the components of the sustainability and socio-economic development of the coastal eco-socio-economic system for different spatial levels it can allow [1, 2, 6, 7, 11, 12, 13, 14]:

- to obtain reliable data on the state of the coastal eco-socio-economic system at various spatial levels;
- to provide information for decision-makers, which necessary to assess the development and variability in the living conditions of the population and the effectiveness of the maritime economic enterpriser activities;
- to develop plans for territorial development for the coastal eco-socio-economic system;

– to develop forecasts of the interaction of society and nature, reducing anthropogenic and natural risks and the vulnerability of coastal objects and in general, the forecast of the state of the coastal eco-socio-economic system, depending on the development scenario.

Applicability of the indicator method of analyzing of the socio-economic stability of territories for coastal local municipalities

The level of regional municipalities considered in [3, 10-12, 13, 15] and gives a picture of the coastal eco-socio-economic system on a large scale, which is insufficient for assessing the operational development of the local territories. So the more detailed consideration of the territorial object is required.

The use of indicator method of a comprehensive assessment of stability of local coastal municipalities as complex systems allows to assess their condition, giving the ability to show hierarchy and to predict the trends of vulnerability and variability [1-5, 8, 10-12, 13, 15]. In this case, the indicator approach can also be used to evaluate each of the stability factors separately.

Applying this method to the local spatial level, it will include the coastal local municipalities within their administrative borders. This is due to the fact that these territorial entities have open official data on direct and indirect impact factors, such as anthropogenic and economic activity, population density, areas of protected areas, and other data.

For developing the system and methods of indicator calculation the following assumptions were made for all indicators [3, 11, 12, 13]:

– the indicator value must be dimensionless and take values in the range from -1 to +1;
– it is necessary to avoid using weight functions in calculation of integral indicators, as this will lead to ambiguity and contradictions in the assessment of the importance of each indicator and described element.

Based on this, each factor of sustainability as a set of indicators and comprehensive integrated indicator of stability are estimated as the average value of a set of indicators and their values also ranges from -1 (extremely negative influence of factor or sustainability assessment) to +1 (extremely positive impact of factor or sustainability assessment).

For the local spatial level, unlike the spatial level of regional municipalities, only a medium-term nature of changes is present, and the political and strategic components are absented. So only two sustainability factors must be considered as components in order to account.

– economic;
– social.

The economic factor of sustainability and development is determined based on such parameters as:

– indicator of the value of the local budget;
– indicator of investment in basic capital;
– indicator of regional transport infrastructure development;
– indicator of tourist potential, based on the number of places to accommodate visitors;
– indicator of the amount of subsidy of the local municipality budget from the budgets of the Subject of the Russian Federation.

The social factor of sustainability and development is determined based on such parameters as:

– indicator of the population growth, with separate accounting for the values of birth rate and mortality;
– indicator of the population's availability of housing and living conditions;
– indicator of the population's provision with social infrastructure facilities, based on the number of schools and medical organizations;
– indicator of the migration balance of the population;

- indicator of the square environmental protected areas located on the territory of the local municipality;
- indicator of volume of removed solid municipal waste from the territory of the local municipality.

A comprehensive integrated indicator for assessing the sustainability of a coastal local municipality is calculated separately for each local municipality, and shows the situation and condition for this territorial object. At the same time, taking into account parameters and factors listed above makes it possible to obtain a current comprehensive assessment of the stability of the coastal local municipality as a coastal eco-socio-economic system, which includes not only an integral indicator, but also complex multifactorial assessment of stability.

Assessment of socio-economic sustainability of coastal local municipalities of the Murmansk district of the Russian Federation

The above system was probated for coastal local municipalities of the Murmansk region. Total of 11 coastal local municipalities were analyzed:

- City of Murmansk;
- Kandalaksha urban settlement;
- Lovozero rural settlement;
- Mezhdurechye rural settlement;
- Pechenga urban settlement;
- Teriberka rural settlement;
- Tuloma rural settlement;
- Umba urban settlement;
- Ura-Guba rural settlement;
- Varzuga rural settlement;
- Zelenoborsky urban settlement.

Statistical information from the Federal state statistics service of the Russian Federation and its territorial authority for the Murmansk region for 2013 and 2017 was used as input data. This allowed to assess not only the current situation, but the trends of variability and development of coastal local municipalities as coastal eco-socio-economic systems.

Economic factor of sustainability

Analysis of the economic sustainability of the coastal local municipalities of the Murmansk district for 2017 showed that in general all municipalities have a low level of economic development and mainly negative values of the integrated indicator of economic sustainability. Exceptions are the City of Murmansk, the Kandalaksha urban settlement and Varzuga rural settlement (Fig. 1), whose values of integrated indicator of economic sustainability are 0.42; 0.27 and 0.03, respectively. The limits of negative values of one range from -0.80 (for the Ura-Guba rural settlement) to -0.03 (for the Mezhdurechye rural settlement).

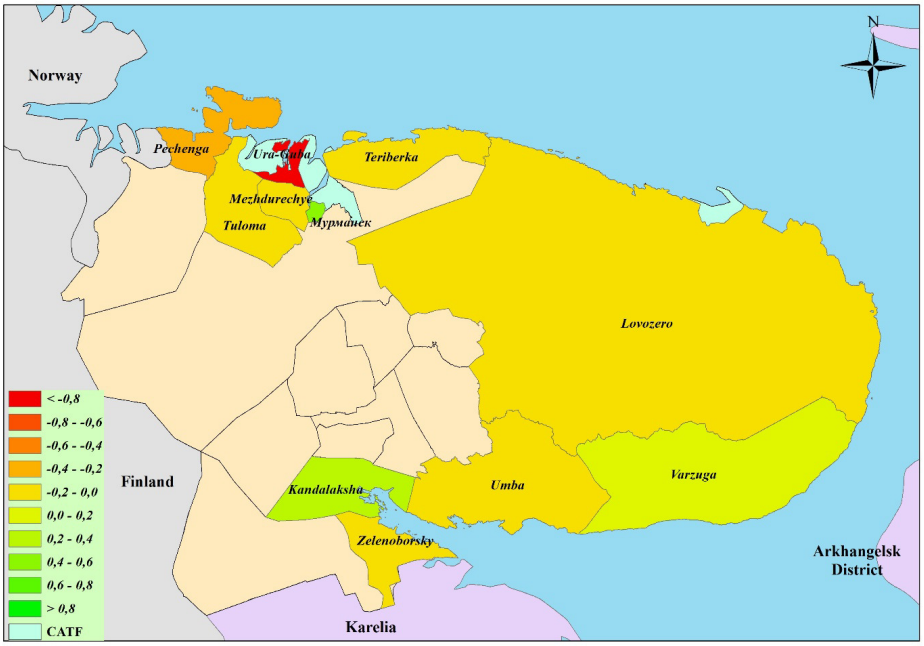

Fig. 1: Values of integrated indicator of economic sustainability for coastal local municipalities of the Murmansk district, 2017

(CATF – closed administrative-territorial formations)

The main negative features of the level of economic development (by the decrease of negative impact on the economic factor of sustainability) are:

– indicator of regional transport infrastructure development. A positive value equal to 1 was recorded for the City of Murmansk only. For other coastal local municipalities of the Murmansk district, the indicator values vary from -1 (Lovozero rural settlement) to -0.60 (Kandalaksha urban settlement).

– indicator of investment in basic capital. Three local municipalities have a positive value: the City of Murmansk and the Mezhdurechye rural settlement with indicator values equal to 1, as well as the Varzuga rural settlement with an indicator value of 0.15. Other coastal local municipalities of the Murmansk district have negative values of this indicator, from -0.97 (Pechenga urban settlement) to -0.40 (Tuloma rural settlement).

– indicator of the value of the local budget. By consider of this indicator, it is necessary to note the presence of 5 positive values. For the Lovozero and Varzuga rural settlements, as well as the Umba and Kandalaksha urban settlements, the indicator values are close to 1, and for the Zelenoborsky urban settlement the indicator value is 0.29. Other coastal local municipalities of the Murmansk district have negative indicator values that range from -0.89 (Teriberka rural settlement) to -0.08 (Mezhdurechye rural settlement).

The indicator of tourist potential for the most territories has positive values ranging from 0.05 (Zelenoborsky urban settlement) to 1 (Teriberka, Tuloma, Lovozero, Varzuga and Umba settlements). Accordingly, this one has less impact on the integral economic factor of sustainability. Negative values of this indicator range from -1 (Ura-Guba and Mezhdurechye rural settlements) to -0.37 (the City of Murmansk). The indicator of the amount of subsidy of the coastal local municipalities of the Murmansk district also has more positive values, except for the Ura-Guba, Lovozero, Varzuga settlements (the indicator value is -1) and the Umba urban settlement (the indicator value is -0.91). For other territories the indicator values varies from 0.52 for the Tuloma rural settlement to 1 for the City of Murmansk.

In comparison with 2013, there was a relative improvement in the economic situation for the Mezhdurechye rural settlement and the Zelenoborsky urban settlement, the values of the integral indicator of the economic factor of sustainability increased by 0.26 and 0.25 units, respectively (Fig. 2). For Mezhdurechye rural settlement it is associated with a significant increase in investment, and for the Zelenoborskiy urban settlements – with the growth of tourism attractiveness of the municipality and some reduction in subsidy. For other municipalities the situation is reversed compared to 2013. For the Teriberka rural settlement the integral indicator of the economic factor of sustainability decreased from 0.44 to -0.17, which is the maximum in comparison with other local municipalities. This is mainly due to a significant decrease in the amount of investment basic capital and a decrease of value of the local budget.

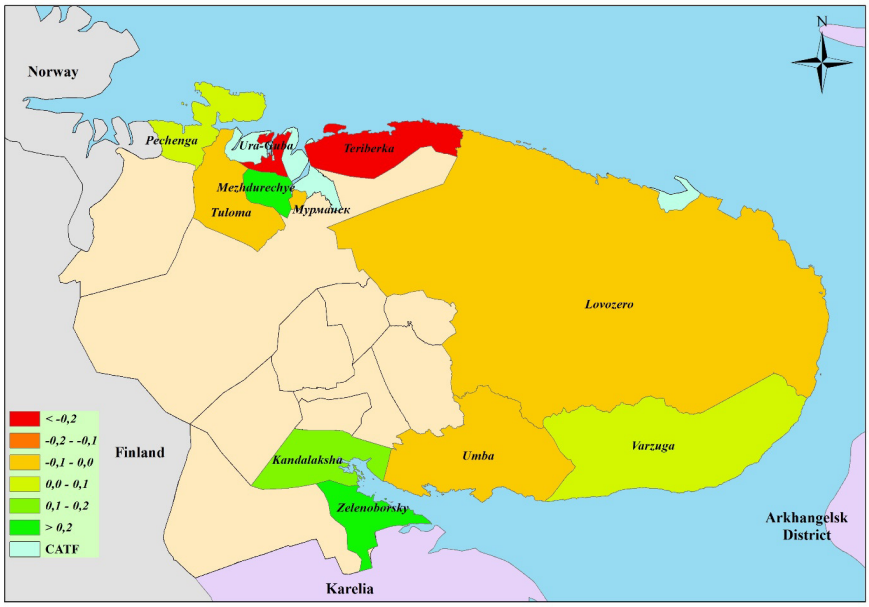

Fig. 2: Difference in assessment of the values of integral indicator of the economic factor of sustainability for the coastal local municipalities of the Murmansk district, 2013 and 2017
(CATF – closed administrative-territorial formations)

Social Factor of Sustainability

The social sustainability factor is positive in half of the coastal local municipalities of the Murmansk district (Fig. 3). The lowest value of the integral indicator of the social sustainability factor is -0.35, and it was registered for the Zelenoborsky urban settlement, and the maximum value 0.4 - for the Pechenga urban settlement and the Lovozero rural settlement.

Fig. 3: Values of integrated indicator of social sustainability for coastal local municipalities of the Murmansk district, 2017

(CATF – closed administrative-territorial formations)

The most positive contribution to this condition is made:

– indicator of the population's provision with social infrastructure facilities, whose values for the coastal local municipalities range from 0.15 (Zelenoborsky urban settlement) to 1 (Ura-Guba, Mezhdurechye, Varzuga rural settlements and Umba and Kandalaksha urban settlements). The exception is the Teriberka rural settlement with a negative indicator value of -0.44.

– indicator of the population's availability of housing and living conditions, whose values are less than 1 only for the Zelenoborsky urban settlement (-1) and the Varzuga, Tuloma and Mezhdurechye rural settlements (-0.83; -0.49 and -0.11, respectively). For other local municipalities the positive indicator values prevail, which range from 0.02 (The City of Murmansk) to 1 (Kandalaksha urban settlement).

– indicator of volume of removed solid municipal waste, which has a less positive impact on the situation due to half of the negative values of the indicator for municipalities, with range from -1 in the Varzuga rural settlement to 0.71 in the Lovozero rural settlement.

Indicators of the square environmental protected areas, migration balance and population growth are mostly negative, which does not have the best effect on the social stability of coastal local municipalities. However, the presence of positive indicators indicates the beginning of solving the existing problem with the outflow of the population, decrease in the birth rate and the creation of new protected areas. Indicators of the square environmental protected areas are above zero for the Pechenga urban settlement (the indicator value is 1) and Umba urban settlement (the indicator value here is 0.14), as well as for the Lovozero rural settlement (the indicator value is 0.24). Negative values of this indicator for other territories vary from -1 to -0.09. Indicator of migration balance in the following coastal local municipalities have positive values: 0.90 for the Varzuga rural settlement, 0.83 for the Pechenga urban settlement, and 0.02 for the Tuloma rural settlement. Values less than zero for other territorial entities range from -1 to -0.18. The indicator of population growth varies widely from -0.97 (Umba urban settlement) to 0.72 (Pechenga urban settlement). This indicator has only two positive values: in addition to Pechenga urban settlement, in the Tuloma rural settlement, the indicator value is 0.15.

The integral indicator of the social factor of sustainability for the coastal local municipalities of the Murmansk district showed significant dynamics of variability over the period from 2013 to 2017 (Fig. 4).

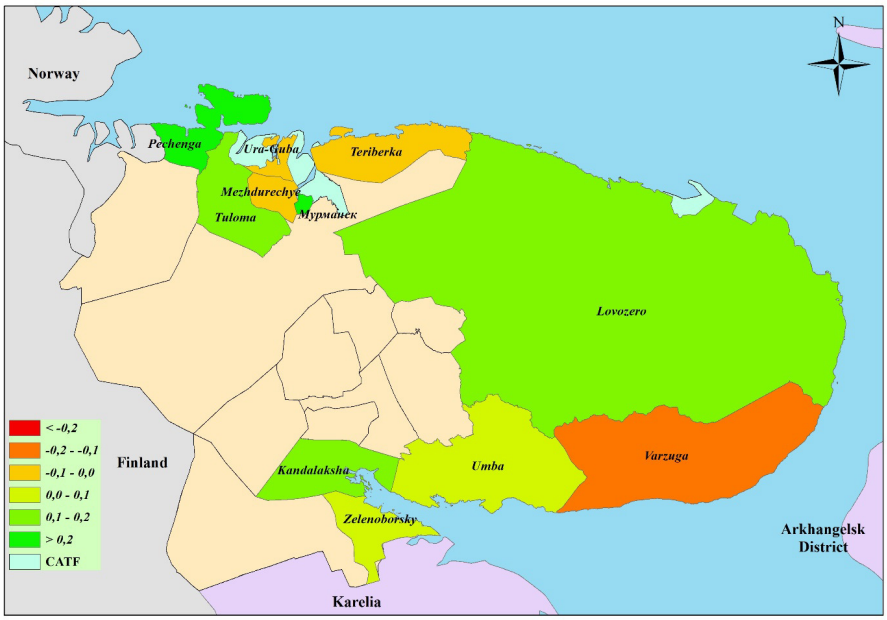

Fig. 4: Difference in assessment of the values of integral indicator of the social factor of sustainability for the coastal local municipalities of the Murmansk district, 2013 and 2017
(CATF – closed administrative-territorial formations)

It is worth noting that, despite the presence of negative values of the integrated indicator of social factor of sustainability in half of the coastal local municipalities, the overall change shows a trend towards improving the situation. In comparison with 2013, the picture has changed for the better, and the differences in the values of this integrated indicators in the majority have positive values from 0.06 (Zelenoborsky urban settlement) to 0.46 (Pechenga urban settlement). This was due to an increase in the population's provision with social infrastructure facilities, improved housing and living conditions and the development of a positive policy in the waste removal sphere. However, for the Varzuga, Ura-Guba, Mezhdurechye and Teriberka rural settlements, the situation worsens by about 0.1 units, which is associated with the deterioration of housing and living conditions and the outflow of population from the territories.

Comprehensive integrated indicator of sustainability

According to the values of the comprehensive integrated indicator of sustainability for assessing the stability of coastal eco-socio-economic systems, it is possible to recognise the Kandalaksha urban settlement as the most stable coastal local municipality of the Murmansk district, with a value of the comprehensive integrated indicator more than 0.1 (Fig. 5). The least stable coastal eco-socio-economic systems are the Zelenoborsky urban settlement, the Teriberka and Ura-Guba rural settlements, with values of the indicator of sustainability less than -0.2.

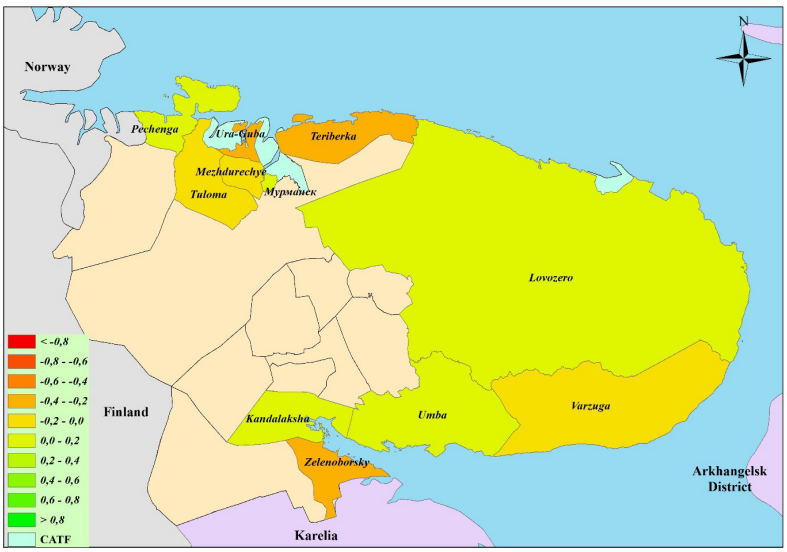

Fig. 5: Values of the comprehensive integrated indicator of sustainability for the coastal local municipalities of the Murmansk district, 2017

(CATF – closed administrative-territorial formations)

In comparison with 2013, the Pechenga urban settlement shows relatively significant positive dynamics, the values of the comprehensive integrated indicator of sustainability for which have changed from -0.23 to 0.05 (Fig. 6).

The decrease in stability is observed for the Teriberka and Ura-Guba rural settlements. For the first of the coastal eco-socio-economic system this is due to a serious deterioration of the population's provision with social infrastructure facilities and a sharp decline in investment in basic capital. And for the second one this connects with a decrease of the local budget and outflow of population.

In general it should be noted that the overall comprehensive integrated situation in the Murmansk district is relatively stable, with a sufficient degree of homogeneity in the coastal local municipalities.

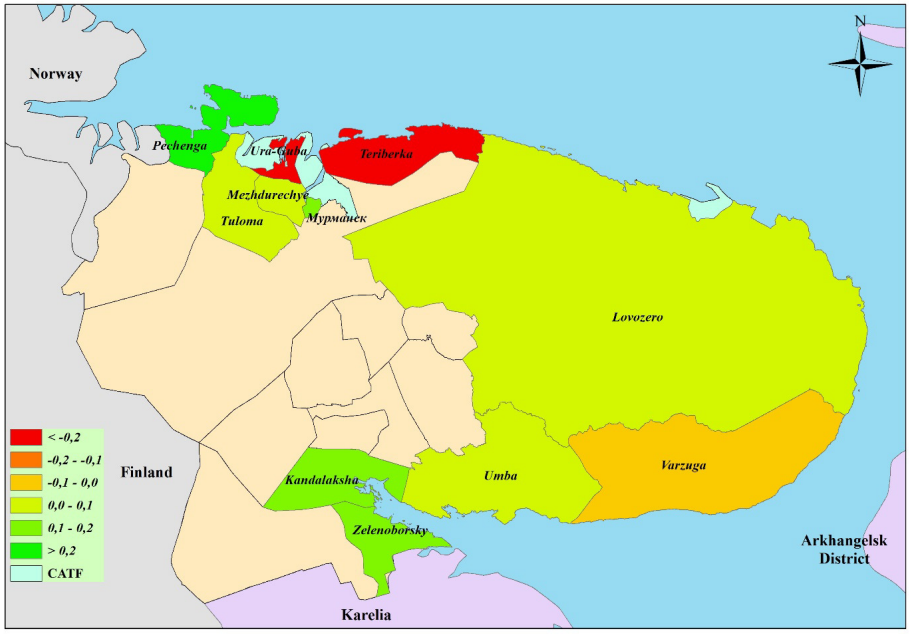

Fig. 6: Difference in assessment of the values of comprehensive integrated indicator of sustainability for the coastal local municipalities of the Murmansk district, 2013 and 2017
(CATF – closed administrative-territorial formations)

Conclusions

Thus, the result of the analysis and assessment possibilities of the accounting of medium-term socio-economic changes in the coastal local municipalities as coastal eco-socio-economic systems, was developed a conceptual model for integrated assessment of sustainability of coastal eco-socio-economic systems and development planning for local municipalities.

Testing the model on the coastal local municipalities of the Murmansk district has shown its applicability both for assessing the current condition of coastal eco-socio-economic systems, and for tracking the dynamics and forecasting the variability of their stability: by the comprehensive integrated indicator and by separate factors of sustainability. Also, due to the local level of consideration of coastal eco-socio-economic systems, it is possible to determine the point of negative and positive impact on the system and further adjustment in the positive direction. This will improve the state of the coastal eco-socio-economic system at a higher spatial level: the coastal regional municipalities and the Murmansk district as a coastal Subject of the Russian Federation.

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Span of Control of Registrars Services and The Growth of Unclaimed Dividends in Nigeria: Evidence from The Nigerian Stock Market

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Abstract

The incidence of unclaimed dividends has been one of the major issues in the Nigerian economy till date this research examined the impact of registrar's span of control services by the active nineteen (19) registrar companies in the Nigerian stock market and the effect on the growth of unclaimed dividends in Nigeria. Regression model and stochastic dominance were used to examine the relationship between the span of control of company registrars and the incidence of companies' default and registrars` defaults in the determination of the growth of unclaimed dividends. The study revealed that there is a positive and significant relationship between the span of control of company registrars and aggregate amount of unclaimed dividends with the quoted firms in Nigeria. The study revealed that there is first and second order stochastic dominance of unclaimed dividends with the companies over the unclaimed dividend with the registrars. The study also revealed that there is skewness in the distribution of the number of the companies each registrar serviced in the Nigerian stock market. The study therefore concludes that the increasing amount of unclaimed dividends with the companies that pay dividends than the registrars that are expected to manage the process of dividend payment for fifteen months beginning from the date of dividend payments in Nigeria. The study therefore recommends that the Federal Government and supervisory authorities should intensify the enforcement of the policy on the maximum number of companies each registrar companies should service. And to check the possible collusion between the registrars and the quoted companies that pay dividends in Nigeria. This will ensure that there is equity and even distribution of services among the registrars, and also to reduce the rising trends of unclaimed dividends in Nigeria. A situation where some registrars serviced up to forty and some serviced only one or two, in the face of poor staffing by the registrars calls for urgent review.

Keywords: Shareholders, Unclaimed Dividends, Company Registrars, Nigerian Stock Exchange, Span of Control

Introduction

The incidence of unclaimed dividend in Nigeria remains one of the major issues that have continued till date. The major concern is that many shareholders especially the small investors are not getting their dividends as and when due from their investments. This is happening despite the fact that the Securities and Exchange Commission (SEC) had introduced the Electronic-Dividend Mandate Management System (E-DMMS) in collaboration with the Central Bank of Nigeria (CBN), Nigerian Interbank Settlement System (NIBSS), with other stakeholders. Olowokeere (2018) sated that shareholders Association of Nigeria has argued that both quoted companies and the Registrars have deliberately slowed down the process of the e-dividend system. According to the shareholders, Registrars employ tactics of selective payments and distribution of electronic dividend (e -dividend) while exploring loopholes in the rules and enforcement by SEC. They argued that among other requirements, the Registrars ask for a bank account, official identity card, signatures, and utility bills, in filling the Know Your Customer (KYC) form. They further explained that the argument was the differing ways Registrars and shareholders embraced e-dividend initiative which is a major concern to investors. The information demanded by Registrars are already contained in investors Bank Verification Number (BVN) which are already with the stockbrokers, where they bought their shares and who are custodians of the information. They wondered why an investor is tossed from one end to another when it comes to dividend payment (Olowokeere, 2018).

One of the requirements for smooth running of the stock market is that shareholders must receive their dividends when declared according to their shareholdings and so the possibility of unclaimed dividends would be minimal. However, this has not been the case in Nigeria. From 1986 to 1996, the figure of unclaimed dividends stood at N4 billion, from 1996 to 2006 it increased to N40 billion (Owolabi & Obida, 2013). From 2006 to 2016 it rose to about N80 billion, and as at December, 2018, it stood at N130 billion (Olowokeere, 2018). This, in the past, led to a proposal by the National Assembly to set up a committee to manage the unclaimed dividends but the move was rejected by the Shareholders` Association of Nigeria.

The few researches that have been done in this area identified reasons for the rising unclaimed dividends. They adduced that the rising pattern of unclaimed dividends in Nigeria was, among others, due to ineffectiveness of the postal services in Nigeria, issues of multiple applications for shares, and uninformed investors. Other reasons adduced are the lack of postal services in some communities, investors changing their addresses without notifying the Registrars, and the Indigenization decree of 1972, when some investors used fictitious names to buy shares which later could not claim their dividends.

Many analysts have adduced many reasons responsible for unclaimed dividends in Nigeria. Kighir (2006) analyzed dividend payout and unclaimed dividends in Nigeria and attributed unclaimed dividends to some factors which include: the shareholders, the quoted companies, companies Registrars, and the regulatory authorities themselves. The Companies and Allied Matters Act (CAMA, 2004), Section 382 subsection (1), and Corporate governance code (2018) states that the decision to pay dividend rests on the board of directors of companies, and the legal position of unclaimed dividend is that after 15 months, dividends not paid are expected to be returned to the company from which investors or beneficiaries will make claim not later than twelve years afterward. It would appear that this clause is being exploited by the companies and the registrars themselves. It is against this background that the paper examined the span of control of registrar's services in Nigeria.

The registrar's span of control services refers to the number of companies each registrar serviced or have control to pay its declared dividends. The actions of the Securities and Exchange Commission in tackling the rising unclaimed dividends is that there can be lapses in part of Registrars operational activities that could contribute to or trigger increase in unclaimed dividends in Nigeria. Registrars are institutions responsible for keeping the records of shareholders of quoted companies in the first instance.. The size or number of firms each registrar controls, or the span of control of companies the

registrars are servicing could be a source of the rising unclaimed dividends in Nigeria. In addition, some companies in Nigeria vary in sizes and structure, so also are the registrars.. Some Registrars service some large number of blue chip quoted companies, in addition to other middle sized companies. Some registrar's service up to about forty companies, while some service few companies, as low as two or one. However, this research adds to the existing knowledge by examining the span of control of company registrars and the incidence of unclaimed dividend in Nigeria. The rest of the paper has been divided into literature review, methodology, data analysis, discussion of findings and conclusion.

Considering the effect of unclaimed dividend in Nigeria, Studies like Opara and Emenike(2014) investigated on the implication of unclaimed dividend on the economic development of Nigeria. The study employed the use of desk research method. The study revealed that the problem of unclaimed dividend can be attributed to shareholder and the trends has a negative impact on investors' confidence. The study concluded that the adoption of the electronic dividend payment must be inclusive and Nigerians should adopt a model where there a dematerialization of share certificates in other to resolve the problems of unclaimed dividend permanently. Jalloh (2017) also examined the impact of dividend policy on shareholders in the agricultural industry in Nigeria. The study used ex-post facto research design and the multiple regression analysis. The result revealed a positive relationship between the variables on dividend payout and the market price share (mps). The changes on the independent variables (mps) are as a result of the changes with the independent variables. The study recommends that firms especially in industries should have a robust dividend payout in other to attract investors. Ezeudu and orikara (2017) examined unclaimed dividend and the implication on the economic growth of Nigeria from 2005 to 2015. The study employed the ordinary least square multiple regression model to investigate the relationship among the variables. The study revealed that there is appositive and significant relationship between earnings per share (uses as control variable) and the real gross domestic product in Nigeria. The study recommends a mobilization of all unclaimed dividend by firms in Nigeria and the creation of a pool of those funds to channel infrastructural development in other to enhance economic growth.

Literature Review and Hypotheses Development

Concept of unclaimed dividend

According to Olowe (1997) dividend is a taxable income of payment declared by the board of directors to shareholders, and the payment could be quarterly or yearly, depending on the type of company. Payment of dividend maximizes shareholders wealth, and dividend not claimed by shareholders or investors give rise to the issue of unclaimed dividends. Dividend declarations are made by companies and dividends are paid by the Registrars of the respective companies to the respective shareholders.

Osaze & Anao, (1999) stated that the issue of unclaimed dividend cannot be over emphasised and so, improper payment of dividend by company registrars to lack of transparency by the company registrars, can result to the issue of unclaimed dividends. The financial statement of a company is the reflection of the company's shares. When there is improvement or update on a company's bank account, it can help in adjusting unclaimed dividend, because it will also reflect in the financial position of the company concerned (Unegbue, 2002). This does not only benefit the stockbrokers but also the people in the environment because the number of shares a company owes is the reflection of the company's own worth or value.

The issue of unclaimed dividends is not peculiar to Nigeria alone. Some countries have made adequate provisions for the appropriation of unclaimed dividends. An example of such a country is Kenya. Where unclaimed dividend assets amounted to 9.2 billion Kenya Shillings, and 573 billion Shillings, between 2009 and 2011 respectively.. A parliament was established by the government of Kenya to set up an Appropriation Bill which was called unclaimed financial assets set up Authority Board to carry out unclaimed financial assets. The bill was passed and sent to the president but the parliament that deals with this bill abandoned the property.

According to Ekanem (2002), the issue of unclaimed dividend has been prevalent in the Nigerian stock market. The investors, shareholders are interested with the issue despite the effort made by regulatory agencies. He concluded that integrity seems to be the prevailing question in the management of unclaimed dividend in Nigeria in the midst of consistent increase in s the unclaimed dividends.

Review of prior studies on unclaimed dividends

In this section, literature which relate to the subject matter is briefly reviewed in order to portray the gap in knowledge. Few authors have conducted researches of company registrars as it relates to unclaimed dividends in Nigeria. The rising unclaimed dividends have been a major concern to shareholders, investors, and the potential investors alike.

Suleyman (2005) examined the phenomenon of unclaimed dividends in Nigeria. With the use of secondary data and trends and chi-square statistical analysis, it was observed that the increase in the number of Registrars does not benefit the registrars. As more Registrars are set up, the more disadvantaged existing ones would be. The study concluded that companies and registrars do not manage the unclaimed dividends. The study found that there was insincerity on the payment and declaration of unclaimed dividends on the part of the companies. The study recommends that a trust fund be set up in order to take up the management of unclaimed dividends, and that all companies should adopt the e-dividend policies. Despite this recommendations, the unclaimed dividends amount was still on the increase.

Ogbodo. (2017) analysed the effect of unclaimed dividends on the financial statement of some commercial banks in Nigeria. The study addressed dividend policy on corporate performance of some banks.. It employed the use of primary and secondary data, and the annual reports of two commercial banks were used from 2008-2012. The z test statistical tool was used to test the results. The study showed that unclaimed dividend affects the financial position of the firm and in such firms, investors are more concerned. The study, therefore, recommends that cash and short-term funds should be made available by companies in case a fund is being transferred to a separate account as it will help management in presenting a true and fair financial statement. This did not however address the increasing unclaimed dividends which was not restricted to the banking sectors alone.

Owolabi and Obida (2013) examined rising issues of unclaimed dividends. The authors analysed the value of dividend unclaimed over the years giving various reasons attributable to the increase. A descriptive statistic was used to analyse the data of First Bank Nigeria (FBN) for a period of ten (10) years. The study suggests that there should be a readjustment in section 382 of CAMA 1990 and interest should be given when beneficiaries come for dividend due to the death of their benefactor, and the use of electronic dividend payments. He also suggested that the lost and expired dividends must be replaced. The study only used one bank to make conclusion and recommendation.

Recent issues surrounding unclaimed dividends are the impact of operational mechanism of the registrars in areas of span of control, and the fact that there are unclaimed dividends with companies within the six months and less than fifteen months that dividends were to stay with the registrars. This paper has focussed on the examination of this area.

A notable gap in the literature is that prior studies failed to examine the operational mechanisms of registrars especially the size of control of registrars in respect of the number of companies each registrar serviced in the Nigerian stock market. They failed to examine companies default and registrar's defaults in terms of the amount of unclaimed dividends in the custody of the two institutions.

Development of hypotheses

Based on the gap in literature, this study attempts to provide answers to the hypotheses stated below in the null form.

$H0_1$ There is no significant relationship between the span of control of registrars and the increasing amount of unclaimed dividends in Nigeria

$H0_2$: There is no significant difference between Registrars default and companies default in the determination of unclaimed dividends in Nigeria.

Research Method

The study used the cross-sectional research design. The cross-sectional design involves the use of cross-sectional data to gain knowledge about some phenomenon among variables over a short period of time, not less than five years, from 2012- 2018. Causal research design was also used, where data are collected to quantitatively identify the causal relationship between the dependent variable and independent variable(s), using statistical inferences or diagnostic tests to arrive at the conclusion of the study. In addition, the population of the study consist of 364 companies listed as at December, 2018. However, the sample size consist of 264 out of the 364 companies quoted. The sample size consists of only public limited companies that have ordinary shares or in which the 19 active company registrars serviced.

Model specification

Model 1.

The study used analytical model of the ordinary least square regression. The Regression model is stated below...

. The model can be expressed explicitly in the equation below.

$$TUCD = \alpha + \beta SOC + \beta 3COD + \beta 4RED + e \qquad \ldots(1)$$

Where,
TUCD = Total unclaimed dividends
SOC = span of control of firms by the registrars (the number of companies each registrars services) in the determination of unclaimed dividends in the Nigerian Stock Market
COD = companies` default (the total amount of unclaimed dividends with companies in the determination of unclaimed dividends management in the Nigerian Stock Market.
RED = registrars` default (total amount of unclaimed dividends with registrars in the determination of unclaimed dividends management in the Nigerian Stock Market.
e = error term.

Stochastic Dominance

Model 2.

This model is to test the cumulative distribution functions of unclaimed dividends with the registrars and the quoted companies by using the Vose Dominance functions to run and test hypothesis two stated in this paper. We assume that distribution A represents the distribution of unclaimed dividends with the registrars, and B is the distribution of unclaimed dividends with the quoted companies. If B is to the right of the two, then, B is said to dominate A, and is first order dominance over A.

First Order Stochastic Dominance

Consider options A, B, that have the cumulative distribution functions $F_A(x)$ and $F_B(x)$,

Where it is desirable to maximize the value of x.

If:

$$F_A(x) \leq F_B(x) \text{ for all } x \qquad (2)$$

Then option A dominates option B. That amounts to saying that the cumulative density function (cdf) of option A is to the right of that of option B in an ascending plot.in an ascending plot as in fig 1.

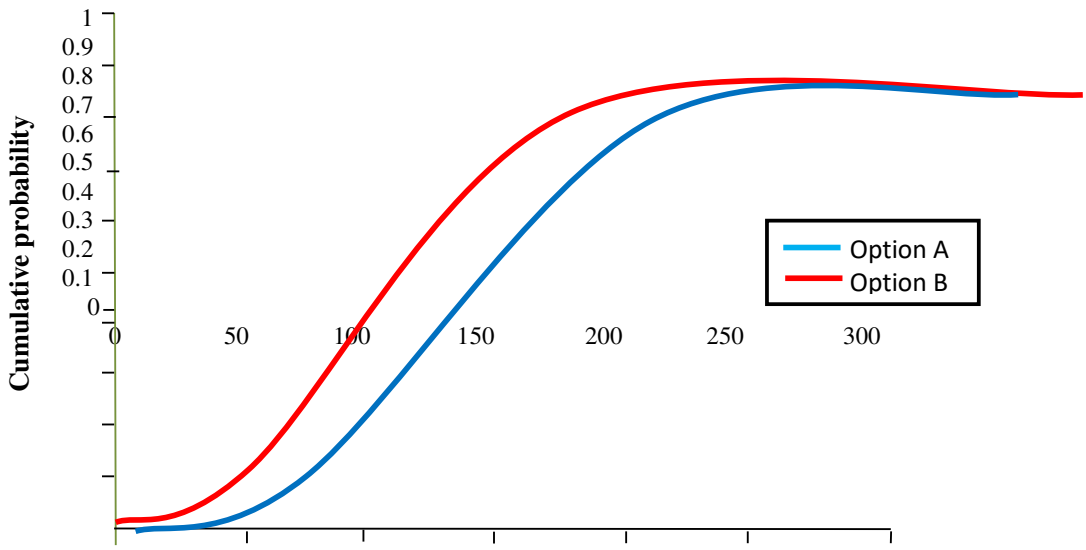

Fig. 1: Options A and B cumulative density functions.

Data Analysis and discussion of findings

Table 1: Total Number of companies each registrar serviced (POPN) and the SAMPLE (Equity portion out of the total quoted securities in the population) of the 19 active registrars.

	TABLE 1: SAMPLE SIZE OF THE COMPANIES USED			
SN	Registrars	POPN	SAMPLE	%of Popn
1	AFRICA PRUDENTAL	47	38	0.808510638
2	ALL CROWN	2	2	1
3	APEL	6	4	0.666666667
4	AXA	1	1	1
5	CARDINAL STONE	76	53	0.697368421
6	CENTURION	4	4	1
7	CITADEL (CITL REGISTRARS)	8	8	1
8	DATA MAZ REGISTRARS	3	3	1
9	EDC REGISTRARS	7	7	1
10	FIRST REGISTRARS	71	37	0.521126761
11	GTL REGISTRARS	24	20	0.833333333
12	HIGHT HOUSE REGISTRARS	1	1	1
13	MAINSTREET REGISTRARS	11	9	0.818181818
14	MERISTERM REGISTRARS	46	27	0.586956522
15	PAL REGISTRARS	30	11	0.366666667
16	STERLING REGISTRARS	9	7	0.777777778
17	UNITED SECURITIES	7	6	0.857142857
18	UNITY REGISTRARS	4	3	0.75
19	VERITAS REGISTRARS	5	5	1
	TOTAL	364	246	0.675824176
	246/364 =	0.675824176	APPX 68%	
	source Nigerian Stock Exhange WEBSITE , DEC, 2018			

From table 1, the total number of companies serviced by each of the active 19 company registrars are presented. This includes funds, state government trust funds and many other securities. But this study is concerned with equities only. From table 1, Africa Prudential, serviced 48 securities out of which 38 are equity firms. We considered only the equities or ordinary shares this study. However, some registrars serviced only equity firms, like ALL CROWN registrars that serviced only two equity firms. Out of the 364 securities, 246 were equities, making 68 percent of the population.

Table 2: TOTAL UNCLAIMED DIVIDENDS (UDTOT), THE SPAN OF CONTROL (SPANC1) and UNCLAIMED DIVIDENDS WITH COMPANIES (UDVDCO)

SPANC	UDTOT	SPANC1	UDVDCO	UDUSM	UDWREG	UDLFM
47	65999408231	38	9410461144	40186288566	25813119665	54278772352
2	84398160778	2	8404770675	18362509943	66035650835	67865451557
6	61023734335	4	9039942888	2829222063	58194512272	66386571376
1	77275912701	1	10119950236	835102504.7	76440810197	64667720984
76	74791342051	53	10874888241	1.24305E+11	-4.9514E+10	72765823814
4	73707663871	4	13511935642	12502310229	61205353643	79840166518
8	82885774049	8	23012116644	5008413963	77877360086	76549220505
3	90715054759	3	30076730000	33576820000	57138234759	75676335146
7	90061156147	7	67694068594	14050595409	8478113679	68757230000
71	98688451791	37	71252624325	19528999032	7655281456	25799573577
24	98834050000	20	78154086583	13453217373	8887566138	19050543572
1	1.01957E+11	1	80674976053	2966579243	8890242045	11904414951
11	97790151816	9	81200778615	18551899769	11877987439	18897931678
46	98144727988	27	86392405236	20703458745	9934862940	16467876938
30	1.08583E+11	11	85983267284	9057603850	13711582331	6770320756
9	1.09787E+11	7	89146245192	8177933992	11215363076	17389731156
7	1.03104E+11	6	90384660026	23096874998	15379624378	20986344718
4	1.17152E+11	3	94509757042	27239071993	10297796053	20823760537
5	1.21398E+11	5	99340879360	7604428270	15004969753	8606643639

SOURCES: (i) SEC WEBSITE, NEWSLETTER, (2018)

(ii) AUTHOR`S COMPILATION (2019)

Where,

SPANC1 =	ACTUAL SAMPLE OF SPAN OF CONTROL USED
UDTOT =	TOTAL UNCLAIMED DIVIDENDS.
UDLFM =	UDVD LESS THAN FIFTEEN MONTHS
UDVDCO =	UNCLAIMED DIVIDENDS WITH COMPANIES
UDUSM =	UNCLAIMED DIVIDENDS UNDER SIX MONTHS
UDWREG =	UNCLAIMED DIVIDENDS WITH REGISTRARS

Table 2, presents all the data used for the study, and this include the actual sample of span of control used, the total unclaimed dividends amount, unclaimed dividends that are less than fifteen months, unclaimed dividends with companies, unclaimed dividends under six months, and unclaimed dividends with registrars.

Table 3: CORRELATION MATRIX

		CORRELATION MATRIX				
	SPANC	SPANC1	UDLFM	UDUSM	UDVDCO	UDWREG
SPANC	1	0.967678611	-0.07501	0.649324	-0.05609132	-0.60192769
SPANC1	0.967679	1	0.018746	0.7355463	-0.14438458	-0.60778189
UDLFM	-0.07501	0.018745875	1	0.265208798	-0.89444974	0.498278975
UDUSM	0.649324	0.7355463	0.265209	1	-0.27685345	-0.59459643
UDVDCO	-0.05609	-0.144384585	-0.89445	-0.276853445	1	-0.51454085
UDWREG	-0.60193	-0.607781889	0.498279	-0.594596432	-0.51454085	1

Table 3 is the correlation matrix of all the variables used in the study. It can be observed that there is a high correlation between unclaimed dividends with companies (UDVDCO) and unclaimed dividends less than fifteen months (UDLFM). Companies are expected to hand over their dividend payments to registrars to administer within this period. The purpose of correlation is to identify variables that correlate so as to avoid autocorrelation in our regression analysis. The study is more concerned with the span of control and the unclaimed dividends with companies. We present the regression results in table 4 below.

Table 4. TOTAL UNCLAIMED DIVIDENDS WITH UDLFM, UDUSM, USVDCO, and UDWREG.					
	Dependent Variable: UDTOT				
	Method: Least Squares				
	Date: 11/04/19 Time: 06:50				
	Sample (adjusted): 1 19				
	Included observations: 19 after adjustments				
	Variable	Coefficient	Std. Error	t-Statistic	Prob.
	SPANC1	-1.86E+08	1.67E+08	-1.115678	0.2848
	UDLFM	-0.116397	0.12366	-0.941267	0.3637
	UDUSM	0.36072	0.126711	2.846794	0.0137
	UDVDCO	0.538367	0.116565	4.618612	0.0005
	UDWREG	0.291197	0.132254	2.201803	0.0463
	C	5.51E+10	1.41E+10	3.901877	0.0018
	R-squared	0.910375	n dependent var		9.24E+10
	Adjusted R-squared	0.875903	. dependent var		1.68E+10
	S.E. of regression	5.93E+09	ike info criterion		48.09626
	Sum squared resid	4.57E+20	hwarz criterion		48.3945
	Log likelihood	-450.9144	han-Quinn criter.		48.14673
	F-statistic	26.40964	bin-Watson stat		2.302272
	Prob(F-statistic)	0.000002			

From table 4, total unclaimed dividends are positively related to other variables, except Span of control (SPANC1) and unclaimed dividends less than fifteen months (UDLFM). These two variables are not statistically significant considering their t -statistic values. However, unclaimed dividends with the companies (ADVDCO) has a t – statistic value of 4.6186, and therefore significant at the 5

percent level. The results shows that the unclaimed dividends with the companies drives or is a major determinant of total unclaimed dividends (UDTOT.) Unclaimed dividends with the registrars is significant at 5 percent level, with a t-statistic value of 2.2018, and the unclaimed dividends under six months also is significant in determining total unclaimed dividends with a t-statistical value of 2.8468 at 5 level of significance. The study revealed that total unclaimed dividends is negatively related to span of control and that span of control is not significantly related to total unclaimed dividends. We therefore cannot reject the null hypothesis that there is no significant relationship.

The R-squared value is 91 percent, showing that all the independent variables are able to explain 91 percent of what determines total unclaimed dividends during this period. The adjusted R-squared which is a diagnostic control of R-squared is 87.6 percent and not too far away from the value of R-squared. The Durbin Watson statistic value is 2.302 which shows that there is no autocorrelation in the result. The F-statistic which indicates whether our equation and the variables are right in determining total unclaimed dividend has a value of 26.40964 and this passes the 5 percent level of significance.

Since the unclaimed dividends with both companies and registrars are significant, there is need to probe the relationship between the two and span of control. Table 5 provides the results.

Table 5: REGRESSION OF UNCLAIMED DIVIDENDS WITH COMPANIES AND SPAN OF CONTROL SAMPLE

Dependent Variable: UDVDCO				
Method: Least Squares				
Date: 10/29/19 Time: 23:20				
Sample: 1 19				
Included observations: 19				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
SPANC1	-7.13E+08	3.32E+08	-2.146535	0.0498
UDLFM	-0.655362	0.222958	-2.939396	0.0108
UDUSM	-0.395732	0.27059	-1.462479	0.1657
UDWREG	-0.70483	0.237625	-2.96614	0.0102
C	1.18E+11	7.19E+09	16.40698	0
R-squared	0.891675	Mean dependent var		5.47E+10
Adjusted R-squared	0.860725	S.D. dependent var		3.64E+10
S.E. of regression	1.36E+10	Akaike info criterion		49.72466
Sum squared resid	2.59E+21	Schwarz criterion		49.9732
Log likelihood	-467.3843	Hannan-Quinn criter.		49.76672
F-statistic	28.81006	Durbin-Watson stat		0.929743
Prob(F-statistic)	0.000001			

From table 5, using the coefficients, there is a negative relationship between unclaimed dividends with companies (UDVDCO), which is the dependent variable, with all the independent variables: the span of control (SPANC1), unclaimed dividends less than fifteen months (UDULFM), unclaimed dividends under six months (UDUSM) and unclaimed significant in determining the unclaimed dividend with companies. And unclaimed dividends less than fifteen months is also significant. The R-squared value is 89 percent. That means that span of control, unclaimed dividends less than fifteen and six months, and unclaimed dividends with registrars are determinants of unclaimed dividends with the companies. And of these variables, span of control is a driver of the unclaimed dividends with companies. Thus, the null hypothesis that states that there is no significant relationship between the span of control of registrars and the increasing amount of unclaimed dividends in Nigeria is rejected. The alternative hypothesis is accepted. The F-statistic value is 28.8 and this is significant at five percent level of significant.

Table 6: REGRESSION OF UNCLAIMED DIVIDENDS WITH REGISTRARS AND SPAN OF CONTROL

	Dependent Variable: UDWREG			
	Method: Least Squares			
	Date: 10/29/19 Time: 23:22			
	Sample: 1 19			
	Included observations: 19			
	Variable	Coefficient	Std. Error	t-Statistic	Prob.
	UDVDCO	-0.547523	0.184591	-2.96614	0.0102
	SPANC1	-5.32E+08	3.06E+08	-1.736738	0.1044
	UDLFM	0.12107	0.247791	0.488597	0.6327
	UDUSM	-0.720052	0.168917	-4.262761	0.0008
	C	7.30E+10	2.08E+10	3.514309	0.0034
	R-squared	0.890307	Mean dependent var		2.60E+10
	Adjusted R-squared	0.858967	S.D. dependent var		3.19E+10
	S.E. of regression	1.20E+10	Akaike info criterion		49.47211
	Sum squared resid	2.01E+21	Schwarz criterion		49.72065
	Log likelihood	-464.985	Hannan-Quinn criter.		49.51417
	F-statistic	28.40734	Durbin-Watson stat		2.212939
	Prob(F-statistic)	0.000001			

From table 6, the R-squared value is 0.890397, showing that 89 percent of the unclaimed dividends with registrars have been explained by the independent variables. Unclaimed dividends under six months is a driver of the amount with the registrars, followed by those with the companies. However, at 10 percent level, span of control is important a value of 1.7367. Durbin Watson statistic(DW), and the F-statistic pass the 5 percent level of significance.

TABLE 7 DATA FOR STOCHASTIC DOMINANCE REGISTRARS AND COMPANIES.

UDVDCO	UDWREG	CUMDVCO	CUMREG	
9410461144	25813119665	9410461144	25813119665	
8404770675	66035650835	8404770675	66035650835	
9039942888	58194512272	9039942888	58194512272	
10119950236	76440810197	10119950236	76440810197	
10874888241	-49513735441	10874888241	-49513735441	
13511935642	61205353643	13511935642	61205353643	
23012116644	77877360086	23012116644	77877360086	
30076730000	57138234759	30076730000	57138234759	
67694068594	8478113679	67694068594	8478113679	
71252624325	7655281456	71252624325	7655281456	
78154086583	8887566138	78154086583	8887566138	
80674976053	8890242045	80674976053	8890242045	
81200778615	11877987439	81200778615	11877987439	
86392405236	9934862940	86392405236	9934862940	
85983267284	13711582331	85983267284	13711582331	
89146245192	11215363076	89146245192	11215363076	
90384660026	15379624378	90384660026	15379624378	
94509757042	10297796053	94509757042	10297796053	
99340879360	15004969753	99340879360	15004969753	
1.03918E+12	4.94525E+11			

TABLE 8					
RESULT OF THE STOCHASTIC DOMINANCE OF CUMMULATIVE UNCLAIMED DIVIDENDS WITH COMPANIES AND REGISTRARS.					
CUMDVCO is 1d over CUMREG	CUMDVCO is 1d over CUMREG	CUMDVCO is 1d over CUMREG			
CUMDVCO is 1d over CUMREG	CUMDVCO is 1d over CUMREG	CUMDVCO is 1d over CUMREG			
CUMDVCO is 1d over CUMREG	CUMDVCO is 1d over CUMREG	CUMDVCO is 1d over CUMREG			

From tables 7 and 8, the unclaimed dividends with the companies is first order dominance over the unclaimed dividends with the registrars. The study reveals that companies have more control of unclaimed dividends in Nigeria than the registrars. Thus we reject the null hypothesis that states that there is no significant difference between companies defaults and registrars defaults.

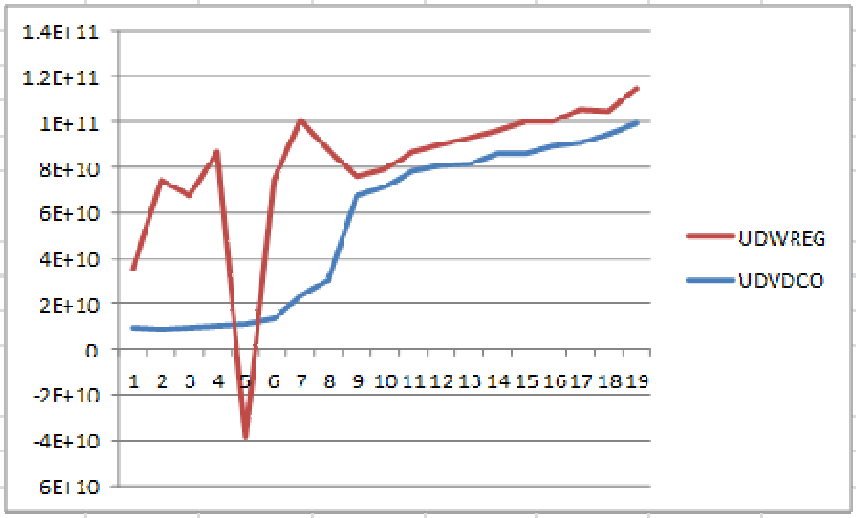

FIG 1. CHART OF UNCLAIMED DIVIDENDS WITH COMPANIES AND REGISTRARS

Fig 1, shows the graph of dividends with registrars and the unclaimed dividends with companies. Unclaimed. Arising from the graph, it could be seen that the UDVDCO is to the right of the UDWREG. This indicates that UDVDCO is far away from the Y-axis than UDWREG. The distance between the two is large towards the right. That suggests that UDVDCO is first and second order determinant over UDWREG. The study revealed that the companies have more unclaimed dividends than the registrars that are responsible for paying dividends declared by companies. This reinforces the results of the stochastic Dominance run above. Thus confirming the rejection of the second null hypothesis that there is no significant difference between Registrars default and companies default in the determination of unclaimed dividends in Nigeria. The study revealed that there is a significant difference between companies` default and registrars` default.

Recommendations

From the above analysis, the study recommends that an enforcement policy of fixing a maximum number of quoted companies a registrar should service should be introduced by the supervising authorities. The study implicates both the companies and the registrars in terms of handling the dividend payment processes in Nigeria. There should therefore be a close documented process and monitoring of the process of dividend payment channels between the quoted companies and the registrars to ensure transparency in the process of dividend pay-out in Nigeria.

Conclusion

The study examined the relationship between the span of control of company registrars and the incidence of unclaimed dividend in Nigeria. The study employed a cross sectional research design with a population that comprises 364 of all listed equity and non-equity companies. A sample size of 264 made up of only equities were selected from the population, and all the active 19 company registrars were used from 2012-2018. The study as part of its findings observed that the span of control by company registrars has a significant but positive relationship with unclaimed dividend with companies there is a significant difference between the unclaimed dividends with companies and with registrars.

Limitation/ Future Research

The study is limited to that fact that it only examines the span of control of company registrars and the incidence of unclaimed dividend in Nigeria. However, future researcher could focus on other aspects or mechanisms of company registrars. More so, based on the number of years required in the study, future research in this area could extend the number of years required in this study.

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Interaction of Earnings Management and Economic Value Added

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Abstract

Every business can evaluate its performance through many indicators. Every indicator has its advantages, but also disadvantages. Traditional financial analysis uses information from the past. Because of it they are not often sufficient to business performance measurement. One of modern tools of business performance evaluation, which has been in very interesting during period of recent year, is the economic value added – EVA. The reported profits of each business have a very strong impact on a variety of business activities and decisions that the company management has to do. The aim of earnings management is to report profit at the amount required by corporate management. Earnings management uses some techniques of creative accounting. The main aim of the article is to examine theoretical background of EVA and some motives of earnings management. Based on this information there could be find some relationship between earnings management and the economic value added indicator. There is also mentioned the effect of earnings management and EVA on the company and individual investors of the company. The contribution of the article is to summarize of knowledge about economic value added and earnings management, their assessment and determination of their impact on the company.

Keywords: Earnings Management, Economic Value Added, Earnings, Business Performance

Introduction

The term Economic Value Added (EVA) has been used in recent years, it has been increasingly promoted in economic theory and economic practice of companies in countries with developed market economy, for example the USA, the UK, Germany, countries of the Visegrad Group (Marik, Marikova 2005).

Indicator EVA was created at the turn of the 1980s and 1990s in the US as a concept of a management tool valuation of Stern Stewart & Co. It was defined as operating profit without the cost of capital which are used to generate that profit. Authors of model EVA are representatives of Stern Stewart & Co. - G. Bennett Stewart III and Joel M. Stern. According to Stewart, EVA is a financial indicator of performance of the company, which captures the economic profit of the company that the company achieves. This profit company achieves also when current costs and capital costs are paid (Horvathova, Mokrisova, Vravec 2015).

EVA is one of the modern methods of financial analysis that is based on economic evaluation on the financial statements of the company (Holeckova, 2008).

Development of economic value added indicates whether the enterprise creates value for the owner or not. If the net profit do not cover the cost of capital that the owner has invested in the business, then despite the fact that the company as a whole shows a profit, it is a loss for owner (Zavarska 2012). The cost of capital determines the amount of funds that a company can acquire through the issuance of shares, loans or a combination thereof (Rebetak, Karpac, Bartosova, 2019).

Economic value added is a method that has been increasingly common in recent time. It is a way of managing the business based on the value created for the owner, respectively business owners. The central idea of economic added value is that investments create value for investors when the return on investment is expected higher than its capital cost. This means that the EVA indicator measures how the company contributed to the increase or decrease by its own activities during the period values for their owners (Zavarska, 2012).

The basic principle of economic added value is that it measures economic profit. And therefore, if the enterprise shows positive accounting profit, it also shows economic profit when its accounting profit is higher than the cost of invested equity (Kiselakova, Jencova, Čverhova 2012).

Earnings management is not directly a creative accounting technique, but is a concept that is inextricably linked to it. Earnings management is practice that business use, and in some cases may even contribute to a more realistic picture because it includes risks (Mulford, 2002). Earnings management is goal-intervention in external financial reposting with intent to obtain some gain (Bagnoli, Watts, 2000). Earnings management is acceleration or deferral of expenses with the objective to produce consistent growth in earnings. These earnings may not reflect the economy of the enterprise during the time period (McGregor, 2011).

Earnings management combines the requirements of top management in the area of profit and it manipulates financial statements and accounting processes themselves to make them requirements satisfied. Earnings management is an integral part of creative accounting. In a company where earnings management is practiced, accountants usually automatically expect to use creative techniques bookkeeping. Earnings management can use all the techniques which are involved with adjusting the economic result. Some author divide two perspectives of earnings management: earnings smoothing and management of earnings to achieve positive target of this possibility to influence profit of company (Hoang, Joseph, 2019).

The most common methods of adjusting profits are income smoothing and big bath. The income smoothing method holds the same level of the profit so that it does not fall, ideally profit has slightly growing trend. Revenue from successful years is used during worse business era and it eliminates losses. The big bath method is mainly used when the enterprise shows a loss now but it expects profit in the future. In this case, the company does not want to reduce its loss, but on the contrary it tries to deep loss and then artificially increases its profit in the next period (Mulford, Comickey, 2002).

Methodology

The aim of the article is to evaluate profit management and EVA as two ways of measuring corporate profitability and efficiency. The article also evaluates the positives and negatives of the EVA indicator and the motives that lead to the application of earnings management. The method of analysis was used in the writing, we started from a general evaluation of the problem to reach concrete results. Based on theoretical knowledge we reach the conclusion. Scientific information from the Web of Science Core Collection, conference articles, articles from economic journals of the Slovak Republic, books of domestic and foreign literature were used. The reason for choosing the topic is the authors' interest in the issue. The authors are interested in investment, profit and earnings management. The contribution of the article is based on a summary of knowledge about selected EVA and earnings management and evaluation of their interaction.

Results

As already mentioned, the EVA indicator prefers economic profit, ie. profit formed by the difference between capital returns and economic costs. It included in addition to accounting costs also so-called opportunity (alternative) costs. They represent the return that the owner (investor) would receive if he invested his resources in others shares (activities). Indicator EVA can be calculated:

$$\mathbf{EVA=NOPA-WACC \times Capital}$$

NOPAT - profit / loss from operating activities after taxation,
WACC - weighted average cost of capital,

Capital - total invested capital,
NOA - net operating assets.

There is some practical example how to calculate EVA. Earnings before interest and taxes amounted to $5,130 million. Applicable tax rate is 35%. 60% of the company's assets are financed by debt which has an after tax cost of 3.8%, while 40% is financed by equity with a cost of 9.8%. Average total capital employed over the period amounted to $50,420 million.

NOPAT = EBIT × (1 − Tax Rate) = $5,130 million × (1 − 35%) = $3,334 million

WACC = 0.6 × 3.8% + 0.4 × 9.8% = 6.2%

Economic Value Added = $3,334 million − 6.2% × $50,420 = $208 million

This tells us that company added a total of $208 million to its value.

The EVA value obtained may have the following values:
EVA ≥ 0 - return on invested capital in the business is higher than costs investment in this capital, which means that business is more profitable than all less risky ways of capital appreciation and therefore the company creates value for the owner.
EVA <0 - the cost of invested capital is higher than the return on that capital, implying that business is disadvantageous because wealth is lost business owners, i.e. j. the enterprise does not create value for the owner (Horvathova, Mokrisova, Vravec, 2015).

Advantages and disadvantages of the EVA indicator

Benefits of EVA include:

- EVA is close to the net present value category,
- It fits the theory that increasing the value of a business is possible if the managers adopt projects with a positive net present value,
- Indicator is a simpler performance indicator than other value-added ones indicators and is understandable.
- Eliminates the effects of the application of different accounting rules and therefore it is an important complement to traditional performance indicators in financial analysis for managers.
- EVA can use one methodology in several areas of business actions and it focuses only on the core business of the enterprise. Profits of individual companies in the countries are strongly influenced by the economic development of the country, as they have an impact on unemployment, remuneration of employees (Behun, Gavurova, Tkacova, Kotaskova, 2018).
- EVA is the simplest value indicator (Pavelkova, Knapkova, 2005).

The disadvantages of EVA include:

- It is based on information of financial statement, quantification of input profit data and invested capital.
- The calculation of the cost of equity is complicated and does not provide unambiguous the result.
- If the growth of the EVA is accompanied by an increase in the cost of capital, it may decrease the value of the company even with a simultaneous increase in EVA.
- EVA takes into account the revenues and costs achieved in the given period, does not include expected benefits in future periods, not even in the form of estimates future flows.
- It is not adjusted for the effect of inflation.
- The problem is the calculation of costs, in particular equity and this indicator does not include expected revenue in the future
- EVA cannot be used as a basis for assessing strategic development company (Pavelkova, Knapkova, 2005).

In our opinion, the EVA indicator is very important for companies. The basic principle of EVA is that it measures economic profit. Economic profit is achieved when not only current costs but also capital costs are paid. For businesses, EVA is an important tool for measuring performance. The

indicator is also an important for measuring the company's valuation, which is important to shareholders. EVA also serves as an important tool of motivation for employees. Regular calculation of the indicator is therefore important for companies.

Motives of Earnings Management

Earnings management is not a technique, but it is often associated with creative accounting. There are a lot of different models and processes how to measure and predict earnings management. Models of identifying and predicting earnings management in companies are usually based on the dependence between total assets of companies and various profit measures (Svabova, Valaskova, Durana, Kliestik, 2020). Earnings management is one of the forms of creative accounting. It can be positively or negatively influenced by tax aggressiveness, leverage or institutional ownership (Susanto, Pirzada, Adrianne, 2019). Between leverage and earnings management there is very positive relationship. Also companies with high leverage prefer real earnings management more than accrual-based earnings management (Khanh, Thu, 2019). It is a deliberate intervention of management to the process of determining profit when they want to achieve their own goals. In addition to earnings management, an important part of each company's internal process is risk management, which affects the company's future development (Olah, Kovacs, Virglerova, Lakner, Kovacova, Popp, 2019). It is significant for every business to investigate risk and risk management (Valaskova, Kramarova, Kollar, 2015). Earnings management tries to prepare financial statements by usage information about the amount of profit demanded by investors and other creditors. Reputation is very important for every company because it can influence earnings and quality of financial performance. These are than important for investors (Huynh, 2019). We know some motives of earnings management:

- It avoids a significant fall in share prices due to market expectations

Because of the negative market reaction to unexpected changes in profits, managers are motivated to hedge investors' expectations by taking certain measures affecting the amount of profit. Companies often exert pressure to meet market expectations. In practice, businesses try to provide investors and analysts with information about the expected development of profit. Nowadays, companies in the field of artificial intelligence for enterprise applications reach a very high level of revenues (Tuffnell, Kral, Durana, Krulicky, 2019). Several companies such as Coca-Cola, Intel Corp. and Gillette Co., use the opposite approach and they do not provide analysts with quarterly and annual estimates. The reason is to focus on meeting long-term strategies.

- Smoothing fluctuations in profit against the long-term sustainable trend

This way of reporting profit (smoothing) is also related to the effort to meet investors' expectations in future periods. Investments in artificial intelligence and Internet technologies are expected to increase in the future, bringing many benefits in terms of revenue growth (Whittle, Gregova, Podhorska, Rowland, 2019). Management of company may be concerned about the fact that increasing margins in current period raises increased market expectations in the coming periods. When business managers do not believe that this level of profit would be sustainable in the long term, they are motivated to manage profit in the direction down at present. For this reason, the smoothing of profits is sometimes seen as an effort of managers to bring analysts internal information connected with future development of the company's profit (Ortega, Grant, 2002).

- Maximizing the proceeds of the public offering (IPO) and secondary issues (SPO)

In general, the management of a stock issuing company aims to increase profits, share prices and investor interest. Practical experience shows that the earnings management becomes particularly popular during the period of the first public offer of shares (IPOs) when companies try to show themselves in the best light. In fact, earnings management in the IPO occurs so often that investors are aware of this practice and because of it they know the possibility in their assessments earnings management. Earnings management is also used to raise the issue price when company want go public and sold shares (Sosnowski, 2018). Some studies show that the market does not know if shares are overstated due to earnings management.

- Usage of earnings management avoids breaching credit agreement conditions and minimizing transaction costs.

The loan agreement represents an agreement between the enterprise and its creditor in which the company undertakes to maintain selected financial indicators set by the lender at the required level. Between these indicators usually include profit´s criteria such as return on assets, profitability of equity, coefficient of interest coverage, etc. It is considered very risky when a company is unable to meet a given conditions and in this case the lender can either apply for immediate repayment of the loan or interest rate increase.

Relationship between Economic value added and Earnings Management

Economic Value Added is an indicator that allows evaluate the performance of an enterprise and the economic efficiency of its business. It helps to top management, controllers and owners to evaluate the performance of the company and the trend of its development, to find out how the business activity influences the shareholder's business investment, evaluate the effectiveness of investment projects, and increase the material involvement of workers to the results of business activities. Earnings management is a process of changing the financial statement. It tries to conceal real economic conditions. Every business can be characterized by a large amount of financial and nonfinancial numbers. Financial statement, balance sheet, profit and loss account make image of companies processes and operations (Siekelova, Kovalova, Ciurlau, 2019). On the other hand earnings management tries to attain private gains out of contractual outcomes. Through earnings management the company can increase the reported profit or reduce the reported loss, manipulate indicators of financial analysis. Company uses this technique to eliminate financial risk, delaying shareholder control requirements, strengthen the position of management, and increase the enterprise's ability to raise funds. Profit is important for every investor. Investors are also focused on information about a possibility and risk of bankruptcy in every business and country (Kovacova, Kliestik, Valaskova, Durana and Juhaszova, 2019).

Earnings management and Economic value added can be used by the company to determine its economic efficiency and profit. Through this indicator and method, companies are able to influence shareholders, investors and the total investment of the company.

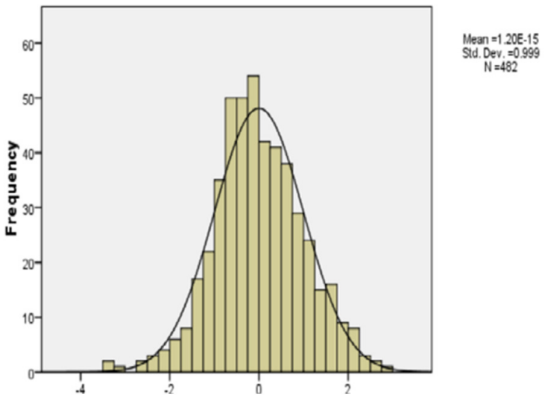

Fig. 1 : Interaction between earnings management and EVA
Source: Jahani, A. M., Zalghadr-Nasab, M. R. and Soofi, F. (2013)

Authors Jahani, Zalghadr-Nasab and Soofi (2013) have made an research of the relationship between economic value added and earnings management. Between earnings management and EVA is important relationship. Increasing of earnings management in a company is probable connected with increasing of EVA and also decreasing ot method is connected with decreasing of indicator.

Conclusion

Economic value added is a term that currently marks a very important value measure of a company's performance. The basic idea of the indicator is that invested capital must have a greater benefit than the cost of that capital. The EVA indicator is based on the microeconomic concept of the company's goal - maximizing profit, where profit is understood here as economic. It expresses the interest of owners and investors. Earnings management is technique which is used to produce financial statements that present an overly positive view of a company's business activities and financial position. Earnings management applies rules and creates financial statements that inflate or "smooth" earnings. It is used by company to create higher profit and then to influence investor.

The main aim of the article is to summarize the basic theory of economic value added, describes the basic definitions, calculation procedures and the main advantages and disadvantages of this indicator. Companies use this indicator to determine the performance of the company, assesses the profits of the company for the period. The article further describes the basic motives that lead companies to use creative accounting, respectively. One of the techniques of creative accounting - earnings management. It is again used by businesses to misrepresent their financial statements and thereby seek to build a positive image, increase the value of their securities and positively influence the investors themselves.

The contribution of the article lies in the assessment of economic value added and earnings management. It describes the basic selected theoretical procedures and characteristics of both indicators. The article shows the interconnection of indicators. Finally, the relationship of indicators is also supported by a graphical representation. The reason for choosing the topic is its timeliness and interest of authors in the given area. The reason for choosing these two indicators is that they are indicators evaluating the performance and profitability of the company. In the future, we would like to focus more closely on the interaction between economic value added and earnings management, but also among other selected performance indicators and earnings management.

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Cost-Based Pricing Options in The Manufacturing Company

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Abstract

The importance of price to the company is undeniable, while for the buyer price is the most important factor in buying a product or service. For the seller is important price, which should bring to the company funds for further activities and also bring profit for the effort. This implies that pricing is an essential part of the functioning of businesses in addition to marketing strategies or business planning. The main objective of this work is to analyze cost-based pricing in a manufacturing company. The aim was to describe the possibilities of cost-based pricing through examples. The thesis used the methodology of deduction and analysis of pricing based on costs in the manufacturing company. After the analysis, we have proposed specific cases where companies based on certain assumptions choose one of the pricing options. We have also outlined the procedures for calculating the sales price of a product in a manufacturing company for each cost-based pricing method. Based on these procedures, different production companies can, under non-identical conditions, determine the selling price of the product to be introduced.

Keywords: cost-based pricing, cost-based pricing methods, manufacturing company, pricing

Introduction

The prices of goods and services are paid by the seller and the buyer and therefore pricing is an essential part of businesses. This process is constantly changing and influenced by various factors. It is influenced by competition, the nature of demand and the market, inflation, the company's goal, costs, product life-cycle, marketing mix strategy and many other factors. On this basis, we can argue that pricing is a constantly changing and dynamic process that needs to be adjusted and monitored very carefully.

We agree with the claims made by Kufelova (2017) that the prices of products and services are subject to a correlation between the required amount of profit, the size of production and costs. According to the author, in the current market economy, most businesses are founded with the aim of making a profit that largely testifies to the company's success and prosperity. The amount of profit is influenced mainly by factors such as volume of production and realization, price and also costs. There is a clear relationship between costs and production volumes. As sales volume increases, total costs and price decrease, what is caused by fixed costs.

In general, we can characterize a manufacturing company as a company that produces something. Its activity is focused on production of tangible goods of industrial or consumer character. Through the production activity, the production inputs are transformed into production outputs. From this, there is a clear relationship between the volume of production and the cost of this production volume. The purpose of each manufacturing company is not only the production of products, but also the sale of manufactured products. By selling, these enterprises raise funds to cover the costs of production and also raise funds for further development and investment. The sale also ensures that a reasonable profit is generated for the company. Manufacturing companies can often be family firms. According to

Suprianto, Rahmawati, Setiawan and Aryani (2019), manufacturing companies as family firms can be considered a traditional market sample where different influences influence family earnings management. Family businesses have a stable market position, but their failure as a result of management by generations is a common phenomenon.

According to Gajanova, Nadanyiova and Moravcikova (2019), for the existence and profitability of the production company are important customers and above all they are loyal customers. Acquiring new customers is very important for manufacturing businesses, but loyal customers are often the key to market success in the face of increasing competition. Manufacturing companies must therefore monitor all factors and meet all the needs of loyal customers and constantly communicate with them. (Chetthamrongchai, Saengchai, 2019) However, it should be added that marketing communications must be direct, bilateral and clear. (Nadanyiova, Gajanova, 2019) In order to communicate with customers, manufacturing companies should also be adequately informed through the authorities, with the State itself drawing information not only from within the country, but also from surrounding countries and an overview of the whole market. (Valaskova, Kramarova 2015)

A manufacturing company can be considered to be competitive if it fulfills all customer requirements in terms of quality, price and communication, while customers are satisfied and trusted. According to Podhorska, Gajanova, Kliestikova and Popescu (2019) in this way, a manufacturing company builds a reputation in the customer community, and this is often the decisive factor for competition. The goodwill thus acquired and built can be considered as the key to market leadership.

For a manufacturing company, its products and assortment are at the heart of its existence and must adapt them to customer requirements. It must focus on the assortment demanded by all customer groups. It should avoid that the appropriate assortment consists exclusively of goods that are designed for one sex. Therefore, the choice of assortment should also be made by a group of people to avoid gender bias. Every age and gender group should be satisfied with the assortment. (Mihaila, Kovacova, Kliestikova, Kliestik, Kubala, 2018) The choice of product range of the manufacturing company is also crucial for its customers, who often prefer the private brands of products. (Valaskova, Kliestikova, Krizanova, 2018) However, manufacturing companies must focus not only on products, but also on the services they provide and integrated solutions. The introduction of 'intelligent services' as an integrated system would allow for the exchange of information between customers and manufacturing companies, thereby ensuring that higher customer requirements are met. (Kanovska, 2018)

Manufacturing companies, especially nowadays, have to focus on an environmentally minded customer. Therefore, manufacturing companies must also take environmental risk and associated costs into account and constantly reduce the negative impact on the environment. (Eriandani, Narsa, Irwanto, 2019) Intelligent technologies could help both production enterprises and environmental sustainability. (Zhuravleva, Nica, Durana, 2019) According to Fielden, Michalkova, Vrbka and Lyakina (2019), sustainable manufacturing is currently very important, covering areas such as marketing or customer relations.

Rajnak et al. (2007) argue that pricing is the essence of pricing and is a complicated process. A properly designed price is the quickest way for a business to maximize its profits. An appropriately priced price can even increase profits faster than increasing turnover. Of all management decisions, price decisions are the most visible and have a significant impact on the overall profitability of the business.

Literature Review

Pricing is a constantly evolving process that adapts to the current situation and market requirements. There has always been a way or a pricing method in the world, and historically it is not possible to determine exactly when the first pricing methods were introduced. However, the understanding of pricing once and for now is very different, so only literature from the late 20th and 21st centuries can be used for today's pricing in businesses.

One of the first authors to deal with pricing in the form we know it today was Olah and Janicek (1978), who laid the foundations of pricing based on cost calculations in their publications. They considered cost calculations as the basis of price formation, consisting of the cost of production and the associated profit component included in the price. A similar pioneer in this field of modern pricing was the author Zeelenberg (1986), who in his publication Industrial Price Formation dealt with pricing in industry.

The importance of the pricing strategy and the difficulty of pricing levels have been described by Janok (1996), where he considers pricing to be essential in introducing new products, changing market conditions, changing costs and competing. The cost and costing of pricing has been discussed in the publications of Kupkovic (1996, 1999, 2002), Chromajakova, Skoda (2005), Kostkova and Lajos (2011) and many others.

Pricing is also known for price flexibility, which is essential in adapting prices to different market conditions. Flexibility and pricing principles were addressed by Hanna and Dodge (1997), who also discussed pricing practices. Price decision-making and pricing methods were dealt with by Rajňák (1999, 2007), who also dealt in detail with cost-based pricing and its methods and calculation procedures.

The prize and pricing was given by the author Lipianska (2002), while later she collaborated on other publications and created a price-oriented authorial team of Lipianska, Hasprova (2007, 2009, 2011, 2016). The authors focus on a wide range of prices, pricing and pricing, also in terms of marketing and marketing strategy. Kufelova (2015, 2017), who deals with pricing in various market conditions for various entities, whether profitable or non-profit, also has a significant contribution to pricing.

Methodology

Not only manufacturing companies can choose one of the general pricing methods for pricing. The main components of pricing include cost, competition and demand. These three elements are very important in determining the appropriate price level to be targeted by the producer, since the most appropriate price is between the competitive price of the product and the price created at cost level. Based on competition, price and demand, we distinguish the following approaches:

- cost-oriented pricing,
- demand-oriented pricing,
- competitive pricing. (Lipianska, Hasprova, 2011)

Kupkovic (2002) argues that **cost-oriented pricing** is one of easy and quick pricing. The price is created by the means spent on a unit of output, that is, a product or service, plus an individual amount of profit, which depends on the type of calculation, whether it is absorbing or variable. This pricing is a success in companies producing a large number of product ranges. In this approach, the price should cover the costs of production and sales and also take care of the profit.

Demand-based pricing reverses the process because the company determines the target end price based on the customer's perception of the value of the product. Pricing thus begins with an analysis of the customer's needs and perceived value, and the company determines the price of the product accordingly. This approach is based on the customer's preferences and opinions and therefore companies try to adjust prices as much as possible to their customers. They obtain this information from various sources such as polls, questionnaires and the like. (Kotler, Armstrong, 2004)

According to Lipianska and Hasprova (2011), in **competitive oriented pricing**, demand and costs are not an essential element, but competitors' prices. In this approach, the company does not develop its pricing strategies, but sets the price from the price of similar products of competing producers. Companies using this strategy can choose a price that is either below the competitive price, above the competitive price, or at the same level as the competitive price.

In pricing, effective pricing control is required for all methods based on relevant standards and regulations. On the basis of this inspection, it is possible to identify certain deficiencies or errors in the pricing process and to contribute immediately to their correction. (Svadlenka, Chlan, 2009)

Cost-Based Pricing

Cost-based pricing is mainly used because it requires little information and is relatively easy to do. It is a pricing method that companies use to maximize their profits but does not take demand into account, and demand information is not often available and expensive, so this method is often considered the most rational approach to maximize profits. Minimizing costs and maximizing profits are, according to Brabenec (2010), the main objectives of manufacturing companies, while the costs produced by affiliates are often used for tax optimization.

Given that this pricing method does not take into account demand, competition or the market environment, it can be seen that the individual who is willing and able to pay for the product is not related to the cost of production. Rational customers do not have to choose a higher price, especially if they have cheaper substitutes, they can choose a higher price based on a higher quality or luxury brand. This implies that the characteristics of a product and the level of customer satisfaction are a determinant of its market value, but consumers themselves do not know and are not interested in the cost of production.

For cost-based pricing, cost calculations may be made on the basis of total own or incomplete direct or variable costs, with profit being recorded as a profit margins, a price margin or the required return on investment. This means we know the following cost-based pricing options that we classify as cost-oriented pricing:

- using profit margin,
- using a price margin,
- using return on investment. (Rajnak, 2007)

Cost pricing using a **profit margin** generally involves the calculation of the cost of the product, followed by the addition of a percentage mark-up for pricing. The procedure for calculating the selling price is such that the enterprise first calculates the cost of manufacturing this product, the necessary net profit and gross profit for that product, then determining the profit for that product and finally calculating the price of that product. In doing so, the price of the product is determined as the sum of the costs and the profit margin per product or as a multiple of the product price and the profit margin coefficient plus one unit.

There are three types of profit margin known: maximum, average and minimum. The maximum profit margin can only be used if it is a monopoly or if the requirements for return on capital are too high, and this profit margin is only used by companies whose main objective is profit maximization. The average profit margin is capable of generating sufficient funds for the company's basic development needs, loan repayments and easy reproduction, and also generates profits sufficient for the venturers or business owners. The minimum profit margin ensures an economic survival of the company by means of a minimum profit, which usually represents the amount of all outstanding loans. This profit margin only allows companies to make a basic recovery. (Kufelova, 2017)

Rajnak (2007) calls cost-based pricing using a **price margin** as well as pricing at the desired return on sales. Generally, it is a uniform pricing or price deviation, ie return prices, through which an enterprise achieves its target return. With this method, during the price reduction process, there is a risk that the owner miscalculated the price margin and then the profitability coefficient of sales needs to be changed. The method requires much more practical experience and knowledge, especially when it comes to a product where sales and demand are changing rapidly. Therefore, this method of pricing is not recommended for start-ups as they do not have information on past years' sales and also have insufficient experience in estimating all the necessary quantities.

The return on sales factor can also be characterized as the amount of profit per unit of sales. The overall nature of the calculation must therefore be based on the required return on sales by establishing a price margin. Several steps are known to calculate a price by using a price margin. Based on the financial goals of the company it is necessary to calculate gross profit, then it is necessary to calculate the price margin as a ratio of gross profit and sales and finally it is necessary to calculate the price of the product using the price margin. (Sedlak et al., 2007)

According to Kufelova (2017), cost-oriented pricing using **return on investment** is generally valued on the basis of target return on capital. A correct estimate of the total costs and sales volume of the whole production is needed. This approach is based on the idea of translating the target role of the company as a whole into the prices of individual products. The target role of the company is measured through the ROI indicator, which can be calculated as the ratio of profit to used capital.

The return on investment variable is linked to the investment of capital in various technologies or projects. Projects are often about optimizing project management, ie investing in a project portfolio. (Kral, Valjaskova, Janoskova, 2019) The size and nature of the investment of the production manufacturing depends on various factors. Often, account is taken of the size, method of management or performance of the organization in which part or project the manufacturing undertaking wishes to invest. (Nguyen Luu, 2019) When investing in complex technology systems, according to Ciszewski and Nowakowski (2018), it should be taken into account that the cost of ownership of such systems is often much higher than the cost of acquiring such systems.

Results

Based on a theoretical definition of cost-based pricing, different situations may arise in a manufacturing undertaking where one of the cost pricing methods is better than the other two methods. In this part of the paper we will define certain pricing cases with the choice of a specific method and also with a description of the procedure for manufacturing companies X, Y and Z.

Manufacturing company X is a legal entity which pays income tax. The company also pays a certain percentage to the reserve fund from net profit. To put the products into production, the company must take out a loan with a certain annual repayment of principal. The company must know the amount of its fixed costs related to the realization of production and also knows the variable costs per product. Likewise, the company must be able to estimate the production volume of the product as well as the standard calculation items that are reflected in the product, such as direct material, direct wages and production overheads. The basic financial objective of the company is to repay the loan, so it is clear that it **will use the profit margin for pricing.** The business process can be divided into several steps:

- the enterprise must determine the allocation base for fixed costs, which is usually direct wages. Direct wages per piece are multiplied by the number of products and the amount is divided by fixed costs and thus gets a fixed cost coefficient. An enterprise achieves fixed cost per product by multiplying direct wages per product by a fixed cost coefficient.
- the next step is to determine the net profit containing the levy on the reserve fund by a simple formula where the net profit is divided by the difference (1 - reserve coefficient). As the enterprise is a taxable person, gross profit is calculated by the enterprise as a proportion of the net profit including the levy on the reserve fund and the difference (1 - income tax coefficient).
- it is necessary to quantify the total costs of the enterprise by adding together the variable costs of the total production volume and the fixed costs of the total production volume.
- the profit margin is calculated by the enterprise as a ratio of gross profit to total costs.
- gross profit per product is earned by the company as a multiple of total costs and profit margin.
- the last step is to calculate the selling price by adding the total cost of the product and the gross profit of that product.

Manufacturing company Y has invested a certain amount of money in new technologies and expects to return this invested capital over a period of time, ie a return on the invested capital will be a percentage. The company knows the volume of product sales and also estimates its own costs per product. On the basis that the company expects to return the invested capital, **pricing using return on investment** will be used to determine the selling price. The business should take the following steps:

- the percentage of return on investment must be multiplied by the amount of the investment.
- the next step is to divide this multiple by the planned sales volume and, to obtain the selling price of the product, the company adds the estimated total cost of the product. The requirement of return will be met if an undertaking sells products at the desired sales volume for this sale price.

Manufacturing company Z achieved a certain amount of sales and total production costs last year. The company wants to produce a new product, while applying production overhead and administrative overhead at a certain amount. Direct costs such as material, wages and other per product are known to the enterprise. To determine the selling price of a new product that must meet the return on sales criteria, an enterprise uses **pricing using a price margin** as follows:

- the enterprise first calculates the total cost of the product by adding the direct costs, production overhead and administrative overhead. Subsequently, the company calculated gross profit as the difference between total sales and total costs.
- the company will calculate the price margin as a ratio of gross profit to revenues.
- finally, the enterprise calculates the selling price of the product at which the product should be sold in order to meet the return on sales criteria, as a proportion of total costs and difference (1 - price margin).

From these cases, the procedure and the criteria which must be known to the undertaking for determining the market price of the product are evident. In practice, a large number of other cases may arise, but the essence of choosing the appropriate cost-based pricing method remains the same.

Conclusion

Price decision-making, pricing strategy and pricing processes are time-consuming, costly, and labor-intensive and require some experience in this area. The constantly changing market environment and the pressure of competition are factors that constantly increase the importance and substance of pricing. Also, the fact that price is mostly a decisive factor, whether for the buyer or the seller in the exchange process, is an important incentive for businesses to pay enough attention to pricing.

Several general pricing methods are known, and one of them is cost-based. Costs are an integral part of all manufacturing companies and their minimization is a matter of course for them. Cost-based pricing in the manufacturing company can be done using a profit margin, a price margin or a return on investment. Based on the results of this work, it can be argued that a manufacturing company must be well informed about its objectives, market conditions and often its previous output so that it can be sure of the right choice of pricing method.

The results of this work show that the manufacturing company will use cost-based pricing using a profit margin if it knows the full amount of its costs, can estimate the future production volume of the product being introduced and has the financial objective of covering new product into production. Cost-based pricing using a price margin will be used by the manufacturing company when it knows the costs and revenues of the previous period and can determine variable costs and overheads per unit of production of the new product. A manufacturing company will use cost pricing using a return on investment if it wants to return its invested capital over time and knows the total cost of the previous period and can determine the variable cost per unit of production of the product being introduced.

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The Principles of Forming the Architecture of The Digital Space of Russian Business

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Abstract

Successful digital business transformation requires the right approach to building business architecture. The article describes an approach in which, based on the identification of the main stakeholders and drivers of the digital transformation of Russian business, a model of motivational expansion is built. This, in turn, allows developing a methodology for the formation of digital architecture from the level of enterprises to the state level. As a methodological basis of the research, a combination of an architectural and service-oriented approach at various levels is applied. The article provides examples of digital architecture at the enterprise level and its distribution to the level of industries and regions as an architecture of the digital business space.

Keywords: Digital Transformation, Enterprise Architecture, Digital Space Architecture, Motivational Expansion

Introduction

Digital transformation is a process that businesses around the world need to adapt to the new conditions and preferences of the digital economy society. The main driver of changes is the consumer. Digital transformation is a process of business change that provides a set of transformations through the introduction of an innovative culture in the company, adaptation of business models, widespread use of data, customer-centricity and value management (Gimpel and Röglinger, 2015). Customer-centricity, partnership, data use, search and implementation of innovations can be considered as the key directions of digital transformation (De la Boutetière et al., 2018). Business needs all the tools and the ability to adapt to the rapidly changing culture of consumption and communications. The product now is a complete process of interaction with the client, in connection with which it is necessary to study, analyze and manage customer experience in order to use it as a platform for the growth and creation of new products and services. Digital transformation is based on the principle of developing infrastructure as a platform or an entire ecosystem of a company. An important component in this concept is the principle of an open API and flexible integration. Digital partnership is becoming one of the important factors of scaling. The key to successful business transformation is the correct formation of the company's structure, the selection of personnel with the necessary qualifications and motivation, the selection of the right

approach to conducting business and management methodology. Accordingly, it is required to build a digital architecture relevant to the tasks.

A set of social and socio-technical arrangements, activities for the organization and management of digital processes, technological environment (including digital infrastructure, digital platforms), digital processes, digital data, etc. forms a digital space (De Smet et al., 2018). The pace of change in different spheres of life directly depends on the quality of digital transformation, including the degree of use of data flows (digital processes). The density of connections and relationships in the social world has significantly increased due to the use of technology and information and communication technologies, and will continue to grow to new structural changes that are being shaped in socio-technical systems: digital infrastructures, digital platforms, data warehouses (information or digital data), virtual worlds, etc. The formation of digital space must begin at the enterprise level and extend further to the level of the industry, region, etc. for inclusion in large-scale global digital transformation processes. At the same time, regional and industry strategies should be consistent with transformation strategies in the breakthrough sphere.

One of the main principles of digital modernization is the use of an architectural approach to the description of processes, the introduction of a digital architecture management system from strategic planning and risk planning to project planning, maintenance of project management at all levels with personalization of responsibility in all areas (Bharadwaj et al., 2013).

In order to develop the architecture of the digital space of Russian business, a study was conducted, during which the main drivers of the digital transformation of Russian business were identified. On this basis, the model of motivational expansion is constructed (Fig.1).

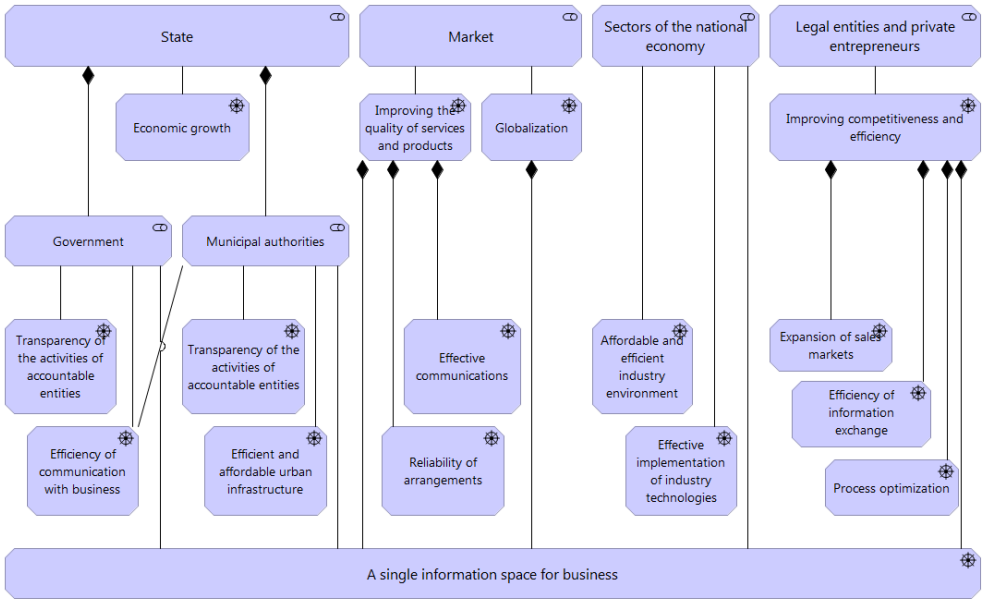

Fig.1: A model of motivational expansion of the Russian business system in the transition to a digital economy.

Further research is devoted to the development of a methodology for the formation of digital architecture from the level of enterprises to the level of industries and regions.

Methodology

The methodological base of research includes:

1. Enterprise architecture as an integrated approach to integrating heterogeneous elements (business processes, functional structure, organizational structure, information systems and technologies, digital technologies, manufacturing technologies, assets) into an effective business system (Ilin et al., 2017; Lankhorst, 2004).
2. Service-oriented approach as a means of harmonizing (aligning) the requirements and capabilities of business and IT elements of a single system (Papazoglou and Van Den Heuvel, 2007).

The research methodology for the purpose of constructing a digital transformation methodology should be considered by levels:

1. Level of enterprise
   1.1 Formation of business process models and architecture of IT support for enterprises.
   1.2 Identification of digital technology capabilities and the formation of digital services architecture.
   1.3 Formation of approaches to the implementation of digital technologies (based on the concept of ERP3).
   1.4 The introduction of digital technology in enterprises.
2. Industry level
   2.1. Development of reference (replicated) industry models of digital architecture.
   2.2. Identify end-to-end digital technologies for industries.
   2.3. The formation of the architecture of the industrial digital environment.
3. Region level
   3.1. Integration of regional and corporate technologies.
   3.2. The formation of the architecture of the regional digital environment.

Principles of the formation of digital space architecture:

1. interaction of subjects at the selected levels;
2. a single information space.

Results

The study showed that the main stakeholders of digital transformation in Russia are the state, the market as an institutional environment, sectors of the economy, legal entities and private entrepreneurs. These stakeholders are interested in the stable growth of the national economy, in the general improvement of the quality of services and manufactured products, in the competitiveness of national products and services in the global market, in the formation of a single information space accessible to all participants in the business environment (Ilin and Grigoreva, 2017, Lukyanov et al., 2019). The main drivers for using digitalization technologies are economic changes, cost reduction while increasing profits, and establishing a stable business.

On this basis, a methodology for the formation of digital architecture from the level of enterprises to the level of industries and regions (up to the state level) has been developed. At each level, the key interests of key participants are taken into account.

For instance, for the health care organization, the organization's management, line ministry, suppliers of medical equipment and medicines, insurance companies are identified as the main stakeholders of digitalization. The main drivers of digitalization for healthcare organizations are an aging population and changes in the nature of morbidity (with a tendency for chronic diseases to prevail), the increasing cost of providing medical services, and the use of new technologies. This analysis shows that a change in the architecture of the medical organization is required to increase the efficiency of

its work with a constant increase in the quality of medical care. The solution is the Smart Hospital model, implemented on the basis of the Health 4.0 concept combined with the medical principles of P4 (Hood, 2013).

This model enables predictive, preventive, personalized and participatory delivery of health services. Also, the implementation of the model requires the expansion of the competencies of medical and administrative personnel. Implementation of Smart Hospital architecture allows to automate activities, move to client-centric criteria for effectiveness, and strengthen the organization's market position. Thus, at the enterprise level, models of architecture and IT architecture of a medical organization that implements the concept of Smart Hospital were developed and the procedure for transforming the architecture of a medical organization during the transition to the concept of Smart Health was determined. Based on this, a reference model of the business processes of a medical organization has been developed at the industry level. At the regional level:

- a reference model of the business processes of a geographically distributed medical organization has been developed;
- requirements for digital technology services to support the management of geographically distributed medical organizations have been defined;
- an architecture for telemedicine services based on the Internet of Things technology has been developed.

For the field of maritime logistics at the enterprise level:

- a business model of the global shipping container line in the context of digital transformation has been developed;
- a method for analyzing the impact of digital transformation on key resources and key capabilities of the global shipping container line has been adapted;
- a strategic architectural alignment method has been adapted to harmonize business and IT architecture global shipping container line;
- a method of forming a balanced scorecard to evaluate the effectiveness of the digital transformation of the global shipping container line, taking into account the specifics of the industry, was developed.

Important in this business model are the use of paperless electronic document management, Internet of things technology (Golosovskaya et al., 2019, Maydanova and Ilin, 2018, Popova et al., 2019). Based on this, a reference model of the digital architecture of the global shipping container line has been developed at the industry level.

For the housing and communal sector and urban infrastructure at the enterprise level:

- the requirements of resource-supplying organizations and consumers of resource-supplying organizations for a monitoring, control and management system for the distribution and consumption of energy resources were analyzed,
- software and hardware complexes for monitoring and managing housing and communal services objects were introduced and integrated.

For example, for the purposes of managing the urban transport system, the city authorities, the population, the business community, emergency services, and law enforcement agencies are defined as stakeholders. The main objectives of the management are information, efficient and safe use of road infrastructure, fast and high-quality feedback. Data collection is carried out from cameras, detectors, GPS / GLONASS devices. Data transfer to the intelligent system is also carried out using mobile phones, TV/radio, information screens. Intelligent transport system processes the data and transfers the results to the control center of the urban transport system. In this architecture, the Internet of things technology, service-oriented architecture (SOA) is widely used. Business models in the housing and communal sector are focused on the use of energy efficiency principles. For example, a business model was developed using piezoelectric materials to illuminate urban spaces.

The stakeholders in this business model are municipal authorities, transport companies, population, and production enterprises (Kalyazina and Lepekhin, 2018). Similar business models can be used for other alternative renewable energy sources. There are projects of an automated resource accounting system in homes; on the development of infrastructure for electric vehicles; on the implementation of a hardware-software complex for monitoring and managing resource supply, which allows for weather regulation of the supply of thermal energy, monitoring of overflows / underflows, prompt reporting of operational failures in resource supply networks; on equipping streetlights with radio-controlled relays to save energy when street lighting (Kalyazina et al., 2018). In general, such solutions are focused on the application of the Smart City concept, the main stakeholders of which are the population, government, and business. Based on this, at the industry level:

- a business model for the interaction of housing and communal services market participants has been developed;
- the possibilities of development and implementation of housing and communal services solutions using digital technologies (the Internet of things, machine learning and predictive analytics, big data processing, cloud computing) were identified;
- the architecture of digital services in the field of monitoring, control, and management of distribution and consumption of energy resources using the concept of the Digital Twin has been developed and approaches to its implementation in enterprises have been identified;
- a typical industry solution (software and hardware complex) for monitoring and management of housing and communal services has been developed;
- a promotion plan and an approach to integrating the developed solution into the existing IT architecture of enterprises has been developed.

Conclusion

Identification of stakeholder expectations from digital transformation and the main drivers of the development of Russian business enterprises allows formulating an approach to the formation of digital architecture of enterprises, which allows extending the digital architecture to the level of the industry, region, up to the state level. Such a single directed approach allows shaping the architecture of the digital space of Russian business according to predefined principles, methodology, taking into account the interests of all stakeholders. As a result, an effective digital transformation will provide a timely and adequate response to the challenges of the economy and consumers.

Acknowledgement

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Development of A Top-Level Business Processes Reference Model as A Basis for Building the Architecture of Hospitality Industry Enterprises

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Abstract

The article considers the methodology of developing a top-level business processes reference model for the construction of architectural solutions in hospitality industry. In this paper, the authors identify basic stages in the development of business architecture for hospitality enterprises and define the main differences between business functions and business processes. Classification of basic, managing and supporting business processes is also given. As a result of the research, the reference business processes model of top level digitalization is developed. Development of a top-level business processes reference model allows to construct an optimal architectural solution that will create new opportunities for hospitality industry enterprises in the era of digitalization, when the increase of manageability, monitoring of performance indicators and security control will allow to move to predictive models and proactive (program-target) management of accommodation facilities.

Keywords: Top-Level Business Processes, Basic Business Processes, Supporting Business Processes, Managing Business Processes, Reference Model, Business Architecture, Architectural Solution, Business Process Modeling, Accommodation, Hospitality Industry, Hotel Business, Hotel Chains.

Introduction

Currently, the process of digital transformation has a significant impact on almost all sectors of the economy, but the hospitality industry in the Russian Federation has been undergoing dramatic changes since 2014. The main catalyst for the support of hotel business in Russia remains the placement of rooms in the cross-country areas. According to official data, almost 70 percent of industry is taken over by hotels in two Federal cities - Moscow and St. Petersburg.

Enterprises of the hospitality industry in the Russian Federation continue to be in a rather difficult situation. According to official data, Russia continues to lag behind its European partners in terms of overall number of rooms per capita. However, most managers of the hospitality industry also noted the low level of customer demand. The result of low consumption is a sharp reduction in costs for hotels and, as a consequence, the deterioration of the services quality.

Competition in the hospitality market remains very high. External growth reserves are almost exhausted, special attention is paid to the optimization of companies own resources. In addition, the cost of hotel product continues to be an important factor for end users.

In these conditions, successful companies are the most effective in their business processes, in accordance with which, the main emphasis of the companies development is digitalization and even greater focus on consumers.

Methodology

Effective management of business processes is impossible without the construction of process architecture, which is associated with construction of business architecture for the company as a whole. The main stages of business architecture development within hospitality industry are shown in figure 1.

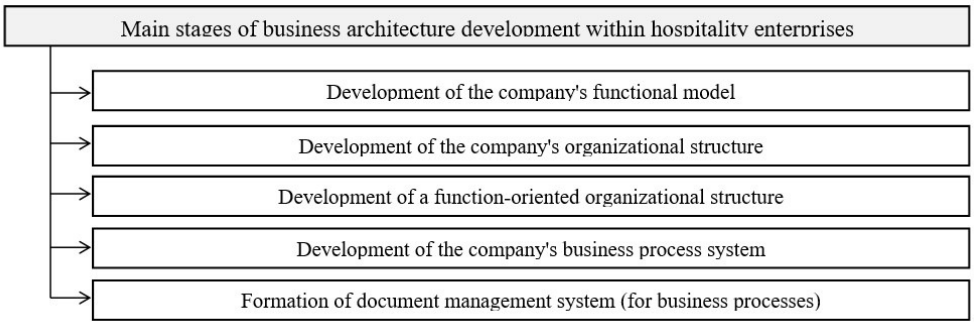

Figure 1: Main stages of business architecture development within hospitality industry enterprises

The consumer value chain of each major hospitality company is implemented through the performance of its functions by individual structural units. Building a function-oriented model of the organizational structure is a fundamental element for designing the business architecture of the company . At the same time, according to figure 1, the next important step in the business architecture development is to build a model of business processes.

At the initial stage of building a reference model, it is necessary to present the definition of business processes. Since the construction of a business process model is the stage following the development of a functional model, it is advisable to focus on identifying the differences between business functions and business processes.

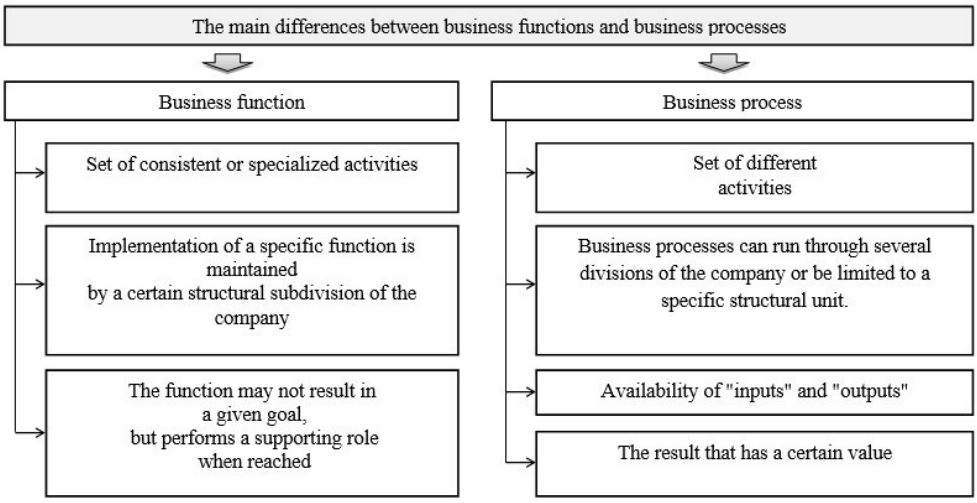

Figure 2: Main differences between business functions and business processes

Business process is the cumulative sequence of actions to convert the resources received at the input into the final product that has value for the consumer at the output.

The consumer can be both external and internal in relation to the company. At the same time, external consumer is not part of the network company, and the internal consumer is inside the company [6]. In addition, it is important to know the consumer of the business process because it is he, who explicitly or implicitly sets the requirements for the process and, therefore, can have an impact even on the very existence of a particular process.

When considering business processes, it is necessary to take into account the levels of detalization. Thus, at the initial construction stage it is essential to select top-level business processes.

Top-level business processes should be understood as key or most important business processes for the organization, which perform the target functions of the company and determine their structure [4].

Building a top-level model is a tool for analyzing the company's activities used to form a system of processes. The top level business processes model is necessary, first of all, for reasonable formation of structure of process categories and groups in system of processes at the hospitality enterprises.

There are different classifications of business processes. Classification of business processes helps to determine how to distinguish a particular process from their total mass.

As a rule, the basic processes are based on the result that is valuable for the consumers. Supporting processes are allocated by the resource that they supply to the company, and control processes - by the object over which the control action is carried out.

While studying business processes of hospitality enterprises, the authors define a key feature that determines the belonging of specific business processes to a certain type, as which the directed action of each business process in creating consumer value is taken. At the same time, the flow of consumer value creation should be understood as a set of all actions to transform resources and information into an end product for the consumer. It should be noted that the value stream is better represented graphically — in the form of business processes map.

According to this, basic business processes are the processes that directly create customer value, constitute the core business of the company and create the main revenue stream.

Managing business processes include processes that increase customer value, which cover the entire range of management functions at the level of each business process and the business system as a whole.

Supporting business processes are designed to provide basic and managing business processes and are focused on supporting their universal features.

Let us consider each separate type of business processes of the top-level hospitality enterprises in more detail.

The basic top-level processes of the hospitality enterprises are presented in figure 3.

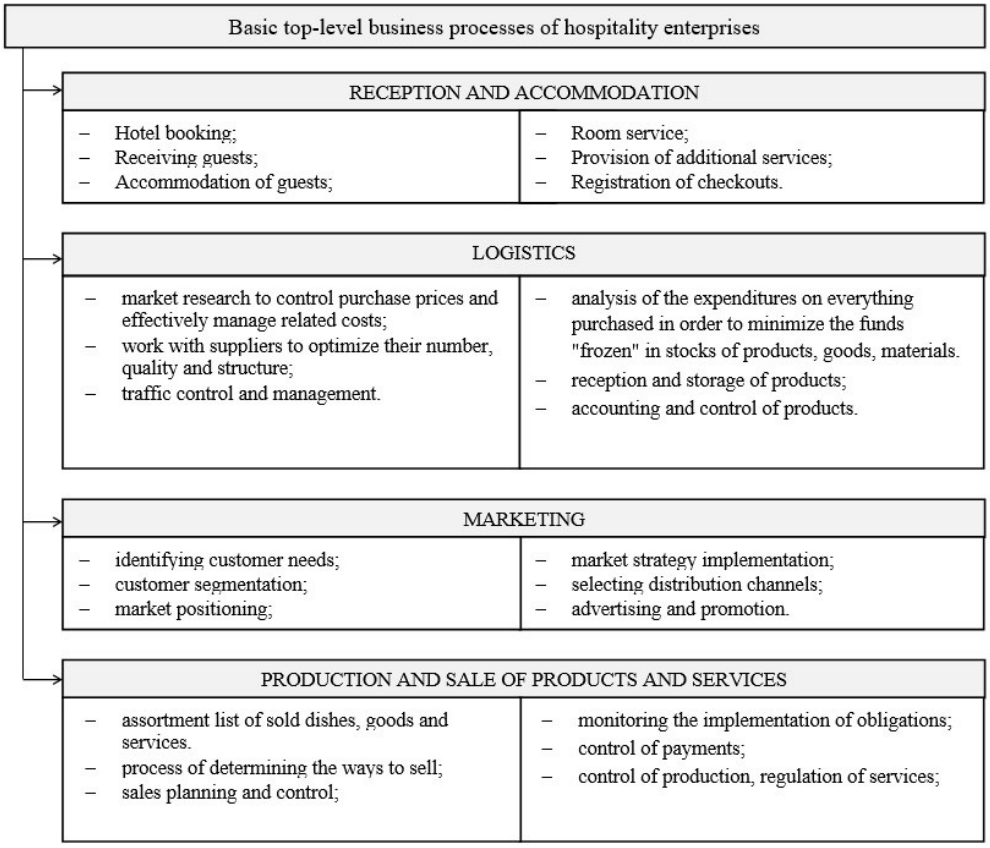

Figure 3: Basic top-level processes of hospitality industry enterprises

The processes presented in figure 3 are referred to as the basicones, since they create the consumer value of the hospitality industry enterprises. Let us consider them in more detail.

Reception and accommodation. The technological cycle of service implies a process that covers the period of time from the moment when a potential consumer contacts the hotel by phone or otherwise, to the payment bill and the checkout. The process of guest service in hotels of all categories has the following stages:

- Preliminary hotel booking (reservation);
- Reception, check-in and accommodation;
- Providing accommodation and food services;
- Providing additional services to residents;
- Final payment and check-out.

One of the most important services in the hotel is to book a room, as it allows you to guarantee the accomodation in advance and stay in a particular hotel. When booking a room, the first impression of staff and the hotel as a whole is shaped. As an example, let us consider the "Booking" business process in more detail.

Elements of "Booking" include:

- "input" - booking request, customer data, date of arrival, length of stay, availability, additional data, means of payment;

- "output" - mark in the booking log, booked room, confirmation letter to the client, booking report, payment for the room or a refusal to book;
- "control" - journal of booking, booking manual;
- "mechanism" - staff, office equipment (computer, telephone, MFP), software and Internet.

Business processes modeling of hotel reservation allows to:

- determine what enters the service at the "input", which is important for a detailed understanding of the process;
- what functions and in what order one's are performed within the department responsible for this process or sub-process;
- what is the executor guided by when performing each process;
- identify the resources that are required to implement certain operations and analyze their availability and quantity;
- what is the result of the service (output).

In accordance with the established rules of hotel services, hotels must provide round-the-clock check-ins and check-outs. To make the stay comfortable for a client, hotels, in addition to offering rooms, must provide a certain amount of additional services according to its category, specialization, size, etc. Regardless of the functional characteristics, any hotel should set a main goal which is to bring the living conditions of the client to home ones during the entire stay of guests, to create conditions for effective work, recreation, entertainment. High level hotels require a business center, service bureau, spa-center, car hire, etc. Additional services are also important in ensuring the income of hotels. The share of income from the offer of additional services can reach 30%.

Logistics. Logistics or the organization of supply of the enterprise with products and expendables for production of dishes, goods for resale (alcohol, drinks, etc.), expendables for rendering services to guests and ensuring economic activity is the most important business process. This is explained by its costly nature. Therefore, the strictest formalization and control are extremely necessary in the process of managing this unit. When purchasing food, the hotels follow the laws of the country regulating this sphere of activity, internal rules and methods (for example, contracts concluded with suppliers, production technology used in this enterprise, service methods, etc.), norms of ethics, aesthetics and psychology, which are of particular importance in the subsequent stages, current orders and orders of the management (hotels and catering services).

Studies show that a 3% reduction in logistics costs results in a 1-2% increase in return on sales. This is achieved by a clear organization of a single process of raw materials movement from the supplier to the end user (guest), the purpose of which is to minimize costs for the purchase, transportation, storage of products and accelerate the turnover of capital by minimizing stored reserves. This solves the following problems:

- development and implementation of a common procurement policy and strategy;
- development and implementation of search methods, selection methods and evaluation methods of supplier, methods of contractual work;
- creation and strict observance of the uniform cycle of the organization of deliveries and movement of production in the enterprise on points of production and sales;
- formation of reports on logistics processes, including the balanced scorecard;
- control of movement, safety and correct consumption of products within the enterprise at the points of production and sales.

Since the specifics of hospitality enterprises is that suppliers usually deliver products by their own vehicles, it is not advisable to consider the transport part of logistics in the main business processes. In any case, the management company performs delivery for individual restaurants in a chain, so it would be more correct to consider only two areas of logistics. The first is purchasing, the second is storage and movement of the purchased goods within the enterprise.

Marketing. Marketing in the hotel business is often identified with the sale and advertising of hotel services. In fact, sales and advertising are the only components of "marketing mix", and often are not

the most important. Advertising and sales are part of the policy of promoting goods and services to the market. There are other elements of marketing — the product itself, its price and distribution. Marketing also includes comprehensive research, information systems, planning and strategies. Development involves designing innovations that can provide new opportunities for sales. Such innovations should meet the needs and preferences of potential customers.

Monitoring involves the analysis of the results of activities to promote services to the market and checking whether these results reflect a truly full and successful use of existing opportunities in the tourism sector.

However, marketing expands its functions, placing special emphasis on relationships with consumers. Long-term relationships with customers are much cheaper than the marketing costs required to increase the interest of the new consumer to the hotel services.

Production and sales of products and services. Food service in hotels is an important structural subdivision in the formation of the main product of hospitality - the provision of food services and a number of additional services, which are determined by the functional type of catering establishments. The enterprises of restaurant economy in structure of hotel complexes public, however are obliged to serve first of all clients of hotel. In specialized accommodation facilities - boarding houses, hotels, clubs, hotels with treatment and other - services are provided only to guests of the institution. In the structure of hotel complexes the functional organization of food services is solved taking into account the category of accommodation.

In modern conditions, the management of the hotel company must be simple and flexible to be competitive. It should have the following characteristics:

- a small number of control levels;
- small units staffed by qualified personnel;
- production and organization of work based on the principles of effective communication.

Strategic management of the hospitality industry includes the following:

- development of a strategy consistent with marketing strategies and analysis of the tourism market;
- identification of economic factors affecting the efficiency and completeness of the hotel management implementation;
- preparation of the budget plan and pricing policy; long-term and short-term planning of the structural units of the hotel;
- assessment of risks associated with the hotel business;
- planning of loading the number of rooms, seats at catering establishments, animation and health centers and vehicles.

Top-level management processes of the hospitality industry are shown in figure 4.

Figure 4: Top-level management processes of hospitality enterprises

Supporting technological processes provide the conditions necessary for the implementation of the main processes: staffing, financial and accounting, security, control of technological and aesthetic condition of equipment and premises, their maintenance and repair. Supporting processes of top-level enterprises of the hospitality industry are shown in figure 5.

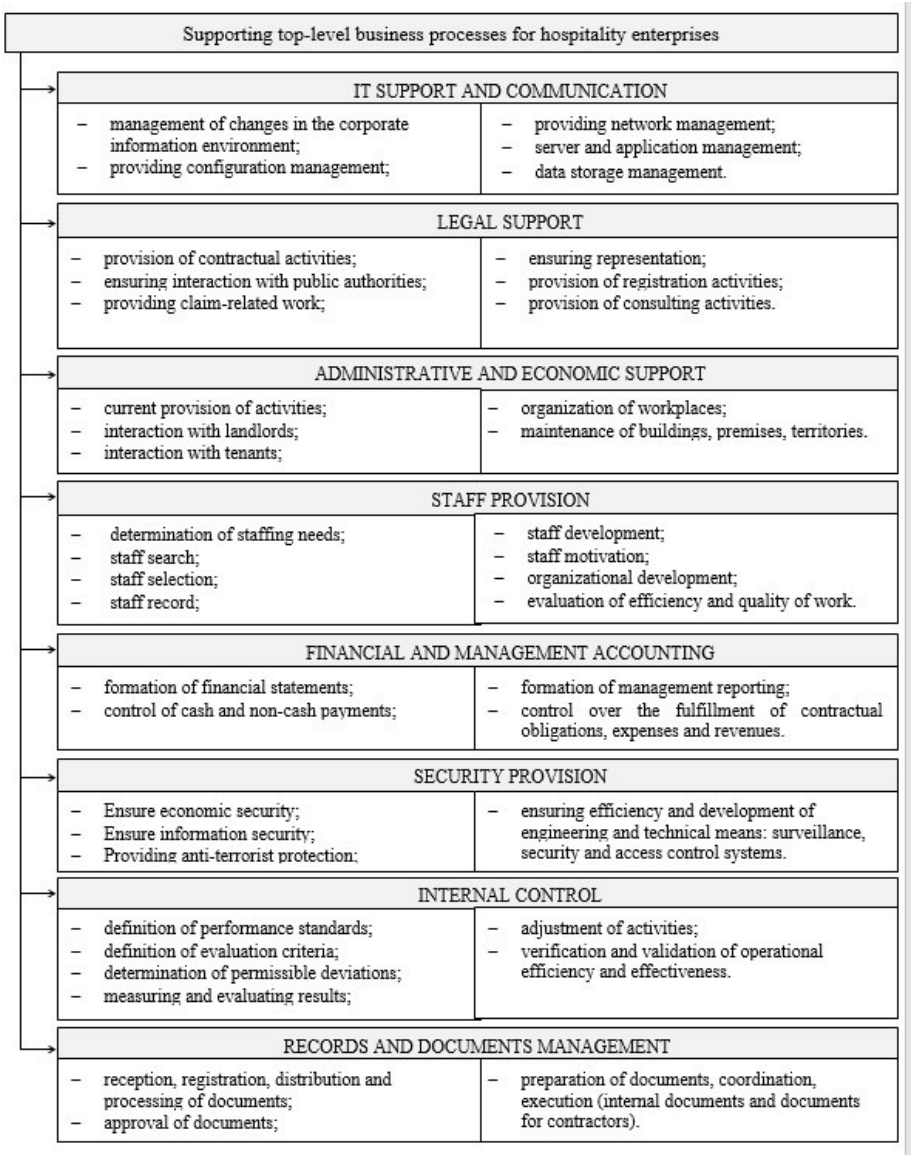

Figure 5: Supporting top-level processes of hospitality industry enterprises

Supporting processes are associated with the operation of equipment and premises (cleaning, cleaning), storage and movement of raw materials, semi-finished products, finished products. They are held in the hotel warehouse, transport, engineering and technical services. Service processes also include social services provided to employees in the enterprise.

Supporting and servicing technological processes can be performed by other specialized enterprises, for which these processes are the main ones. Specialization leads to better service. The organization of such technology is beneficial for small businesses. However, the hotel supporting and servicing processes are provided by their own services (own Laundry, maid service, catering service, tourist information Agency, etc.).

Results

Consistent consideration of basic, managing and supporting business processes, as well as the identification of their relationships, allowed to build a reference model of top-level business processes, presented in figure 6, which is a necessary condition for the development of architectural solutions for the hospitality industry.

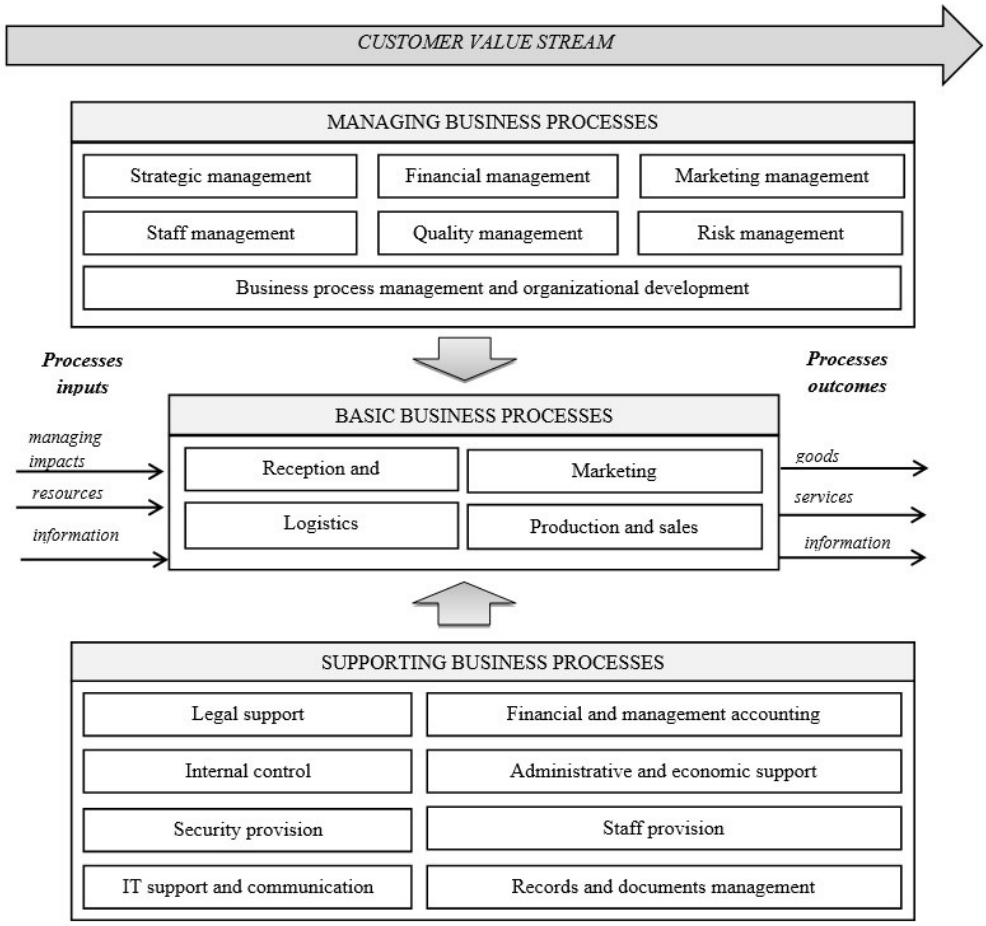

Figure 6: Reference model of top-level business processes of the hospitality enterprises

The developed reference model of top-level business processes will allow to develop an optimal architectural solution that will create new opportunities for the hospitality industry enterprises in the era of digitalization, when the increase of manageability, monitoring of performance indicators and safety control will allow to move to predictive models and proactive (program-target) management of accommodation facilities.

Conclusion

Further modeling of basic, managing, and supporting business processes of enterprises of the hospitality industry on the basis of a reference business model, the upper level will allow optimizing the information with respect to the data describing the current or future (forecast) state of business processes and analysis and presentation of data in the form required to solve strategic and tactical challenges facing the hospitality industry. Underestimating business processes, hotels lose not only

the opportunity to improve the quality of service, but also the ability to respond to customer criticisms. By noticing only individual "details" indicated by the guests and focusing on them, it is not possible to see the full picture until the entire business process associated with this detail has been carefully worked out and modeled.

The described processes are examined for the presence of empty points (when the staff does not know how to act with guests), critical points (when conflicts with guests occur most often) and points of inactivity (when the process begins to move in a vicious circle). After these points are identified, the processes are improved and put into practice (internal trainings, work standards).

The conducted research will provide an opportunity to gain a competitive advantage, reduce financial and commercial risks of business activity, to determine the attitude of customers to the provided service, to assess strategic and tactical activities of the hotel, improve the effectiveness of communication markets, to determine the optimal segment positioning processes and the nature of their life cycle.

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Development of Data Architecture of the Interface for Interaction with Suppliers Based on Document Management System at Chain Trading Companies

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Abstract

This article considers the methodology for development of data architecture of the interface for interaction with suppliers on the basis of DMS modeling at chain trading companies. The study identifies basic business processes of chain retailing companies, examines the typical structure of business processes within the interface of interaction with suppliers at chain trading companies, and classifies the main documents. Based on the analysis of sub-processes, the authors consider the main stages of data architecture development, classification of the main documents used in the "Purchase" business process, as well as entities and tools for data architecture formation. The conducted research allowed the authors to model the top-level document management system that reflects an external, internal, and supporting document flow at chain companies, and also serves as a basis for development of data architecture of interface for interaction between chain trading companies and suppliers.

Keywords: Document Management, Electronic Data Interchange, Data Architecture, Data Modeling, Entity-Relationship, Business Process, Model Of Document Management, Document Management System, Purchase, Retail, FMCG Segment, Retailing Trade.

Introduction

In the present day conditions with the intensive development of chain retailing trade, the retailers who keep on working effectively are those, whose assortment relies on maximum demand satisfaction through complementary products and partner services. Nevertheless, even in the conditions of relative economic stability in the retail market, external reserves for growth of chain companies within FMCG segment are gradually working themselves out. In this situation, the management of chain companies begins to pay special attention to the search of internal growth reserves. In the conditions of retailing trade digitalization, document management optimization at chain companies within FMCG-segment should be observed as one of those reserves [1].

Particularly important is the improvement of document management system in terms of business processes optimization, since even minor changes in business processes (basic, managing and/or supporting) entail an inevitable change in the company's document flow. In its turn, this creates new requirements for data architecture of a chain company in FMCG segment. Thus, it is advisable to carry out the development of data architecture based on the modeling of basic business processes.

Methodology

As a rule, there are four basic business processes identified in FMCG chain retailing companies [3]:

- A1 Purchase;
- A2 Logistics;
- A3 Marketing;
- A4 Sales.

The interface for interaction with suppliers of chain trading companies includes the "Purchase" business process.

The typical structure of the "Purchase" business process at chain FMCG companies is shown in figure 1.

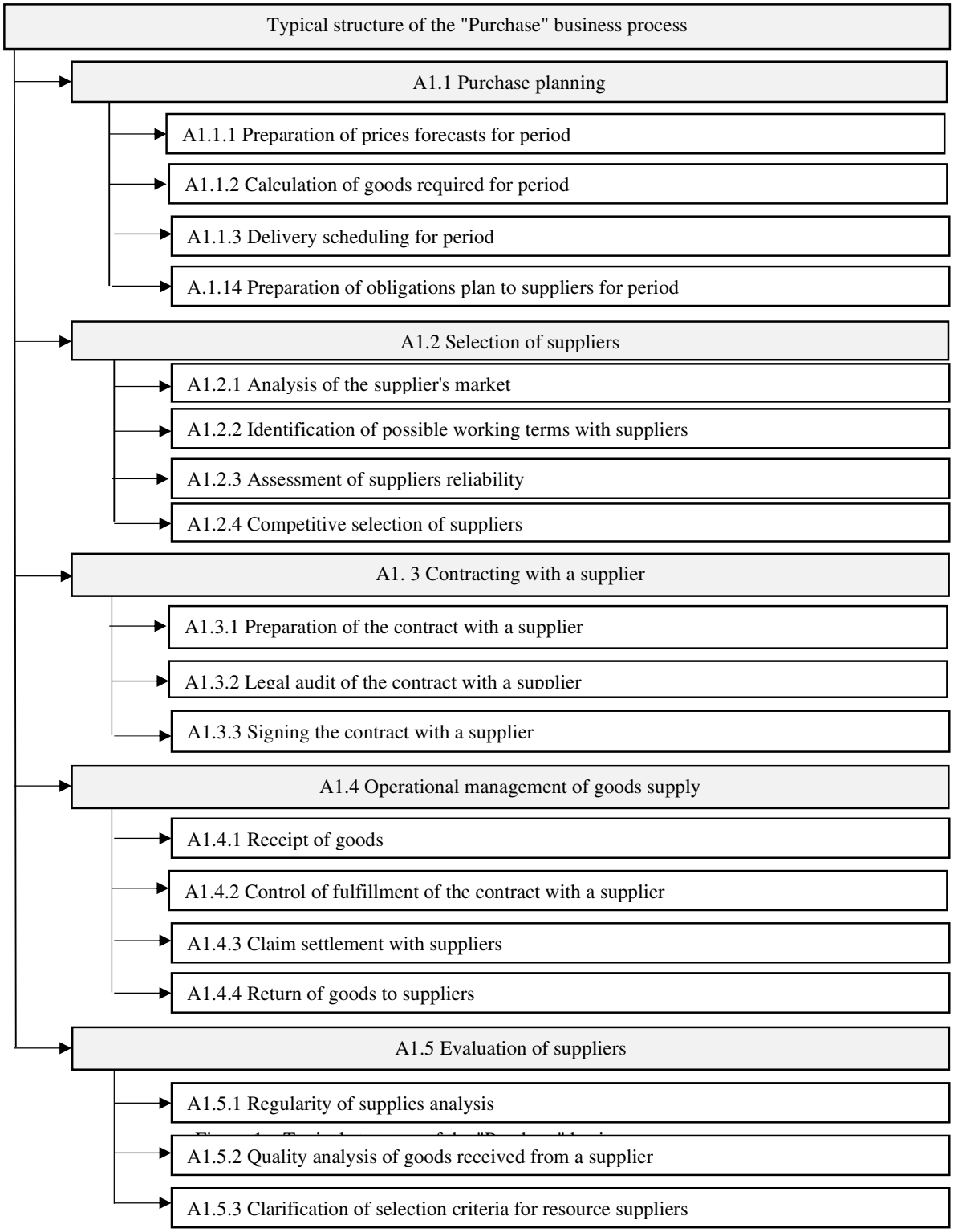

Figure 1: Typical structure of the "Purchase" business process in the interface of interaction between chain companies and suppliers

Document flow between suppliers and chain companies is one of the areas of external document flow. Cooperation between the parties concerned begins with the conclusion of a contract. At this stage, in the transition from paper to electronic form of interaction, there is a significant reduction in time, and as a consequence, financial costs of network companies [2]. It is worth mentioning that the introduction of electronic document management solves such typical problems of chain trading companies, as technical errors in multiple data entry, time spent on approval, loss of documents when signing the paper version of the document, etc.

At the first stage of the "Purchase" business process price forecasts for the period are prepared. In order to be efficient, it is necessary to analyze prices at all channels of distribution - direct producers, distributors, competitors, etc., due to the fact that only after understanding the producer's pricing, it is possible to estimate objectivity of prices and to define strategy of negotiations with potential suppliers [5].

In order to organize the purchase process effectively, it is necessary to develop and agree on a delivery schedule with regular suppliers. Delivery schedules require compliance with the supply discipline, allow to minimize inventory and, as a result, reduce the cost of procurement logistics.

At the second stage of the "Purchase" business process, the selection of potential FMCG suppliers is carried out. The right choice of supplier is vitally important not only for the price, but also for the stability of supply, provision of guarantees of delivery in accordance with the order, service, promotion and other aspects. Interaction with suppliers normally begins on the portals of chain companies [7]. In order to participate in the selection, the manufacturer must register in the information system of the chain on the website, get a link to one's personal account, enter the data concerning all manufactured goods and, then place a commercial offer. The commercial offer is verified, the goods get into the tender table and are ranked by the system. The top lines of the table go for those goods that have the best indicators for sales forecast, marginality, compliance with quality criteria (based on data provided by Roskachestvo), etc. The tender table is constantly updated [4]. In case of successful participation of potential suppliers in the competitive selection, the conclusion of the contract becomes a next stage of the "Purchase" business process.

Conditions of cooperation, assortment and promotion programs are thoroughly worked out with each supplier and/or manufacturer during the negotiation campaign. One of the most important contract sections is the terms of payment, including prepayment, partial prepayment, deferred payment, and goods delivery for sale. Together with suppliers, a balanced assortment structure is built. The data on sales in different regions of a chain company are taken as a basis, and consequently the assortment is fine-tuned for each network depending on the region, format, positioning and consumer needs.

The next important stage of the "Purchase" business process is the operational management of supplies, which are carried out, as a rule, in the distribution centers of a chain, directly supplying goods to retail outlets. At the same stage, claim settlement and return of goods are carried out [8]. Contract is a matter of great importance because the company will be able to recover claims for non-performance of the contract only if it is officially recognized as a legally competent one.

In the digital transformation context, implementation of the "Purchase" business process becomes impossible without modern information technologies. Electronic data interchange is wide spread in terms of interaction between network companies and suppliers of goods. Currently, most of the FMCG chain retailing companies are already actively operating with the electronic data interchange system (EDI), and in the recent years the number of their partners connected to this system is steadily increasing. Connection of partners, systems integration, transformation and transmission of messages between partners is carried out by specialized companies - EDI providers.

The final stage of the "Purchase" business process is the evaluation of suppliers, including the analysis of supply regularity, quality assessment, and, as a result, clarification of the criteria for the selection of FMCG suppliers [9]. In order to expand the base of potential suppliers and increase

competition between them, it is necessary to conduct regular market research of manufacturers and distributors.

It is worth mentioning that these studies are based on the analysis of big data, omnichannel characteristics, digitalization of internal processes and building a supply chain in order to meet customer needs as quickly as possible.

Classification of basic documents used in the "Purchase" business process is shown in figure 2.

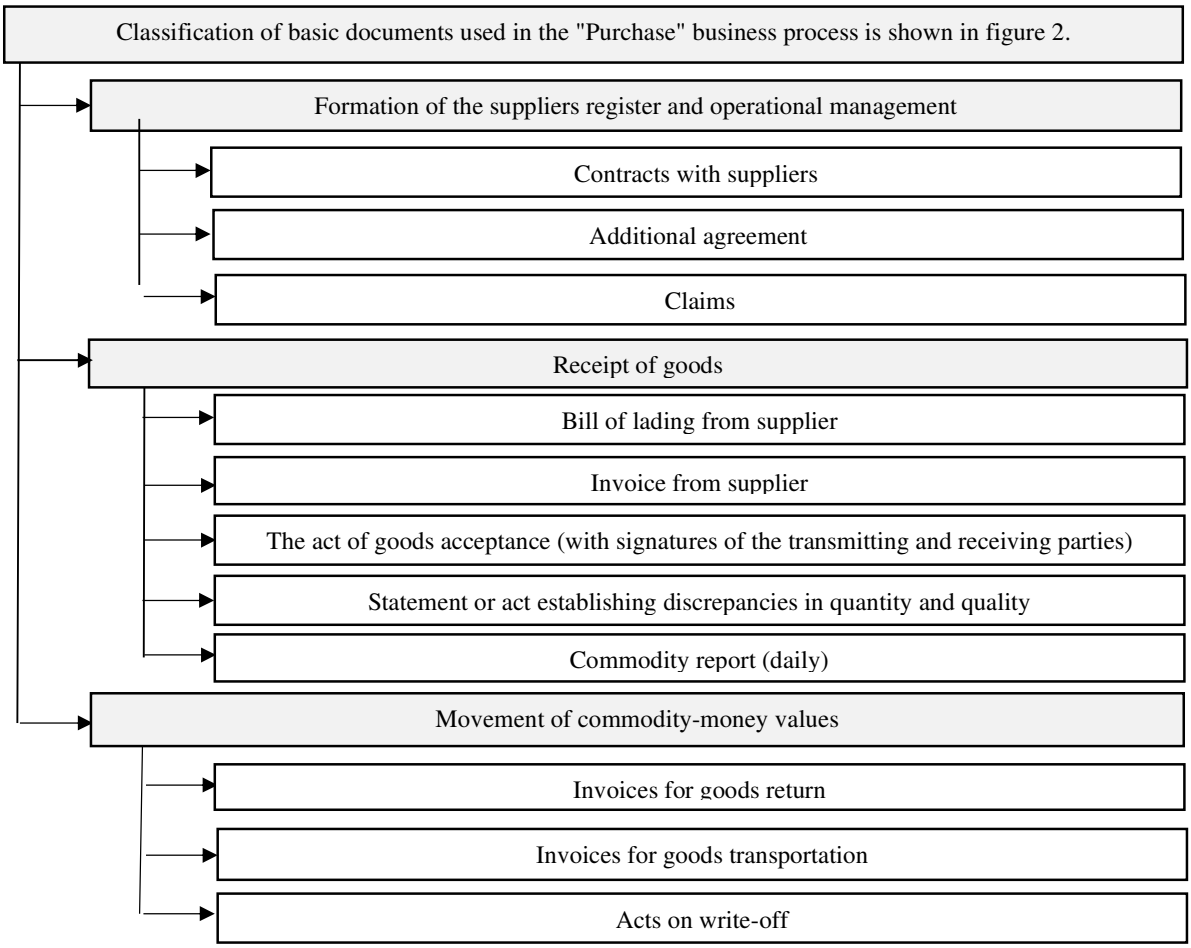

Figure 2 - Classification of basic documents used within the interface for interaction between chain trading companies and suppliers

It should be noted that the DMS of network trading companies within the "Purchase" business process depends on the location of distribution centers that handle incoming goods and their redistribution for shipment to individual retail outlets in the structure of chain trading companies [6].

At present day the following options are available for distribution centers:

- Distribution center may be the part of the organizational structure of a chain trading company along with the retail outlets.
- Distribution center can be the part of a holding company or a large retailing chain that unites several legal entities. That is, on the one hand, it serves only participants of one holding, but on

the other - the center and the retail points of sales served by it (supermarkets and stores, etc.) are interconnected, but separate legal entities. Therefore, the movement of goods between them actually implies not an internal movement, but the transfer of ownership from one organization to another.

- Distribution center may be owned by a third-party company, most often a logistics company. In this case, we can talk about 3PL (Third Party Logistics) services, that is, the provision of a specialized logistics company to various trade organizations of a certain set of logistics services: order management, delivery of goods from a supplier to a distribution center of the logistics company, cargo handling, storage and shipment to customers.

Depending on the affiliation of the chain company's distribution centers, the list of documents and the direction of their flow in the general document management system can vary significantly.

Thus, the combined influence of all external and internal factors that have a significant impact on the document management system, leads to the need for the formation of data architecture of the chain FMCG company [10].

Let us consider the main stages of data architecture development for the interface of interaction with suppliers. Based on the analysis of the sub-processes of the "Purchase" process, it is possible to create data architecture that reflects the model of information interchange in accordance with the implemented business processes.

Before proceeding to the formation of data architecture, it is necessary to find out what requirements and limitations are imposed on the data that provides information support for the business process in question, ans what is the source of data that supports this process. To identify the requirements, it is necessary to conduct structured interviews with the owners of the process and with the employees directly involved in the process implementation [3].

A detailed analysis of sub-processes showed that data accompanying the process can be divided into three categories:

- data obtained from transactional system (e.g. supplier data, product data, etc.);
- data generated on the basis of transaction, for example, data on the purchase - the volume of purchase, the price at which the purchase of goods was carried out, etc.
- data obtained from external sources: from social networks or from external databases, for example, supplier data for supplier market analysis.

The first and second types of selected data are formed as a result of the transactional system operation. On the basis of these data, the functionality of transactional system allows to generate the required reporting, which is the documents support of sub-processes. Table 1 shows an example of the interconnection between reporting documents and data types.

Table 1: Interconnection between reporting documents and data types.

Reporting	Type of data		
	Suppliers data	Product data	Purchase data
Report on the results of suppliers market analysis	+		
Product card		+	
Consignment note	+	+	+
Commercial invoice	+	+	+
Contract between organization and supplier	+	+	+
Goods delivery schedule for period	+	+	+
Plan of obligations to suppliers for period	+	+	+

In the presented list there are stages of almost all subprocesses of the "Purchase" process: planning of purchases; choice of suppliers; conclusion of a contract with supplier; operational management of goods deliveries.

The second and third types of data are used for loading into BI app in order to form various analytics, including: calculation of goods requirement for period; scheduling deliveries of goods to the company; market analysis of suppliers; analysis of supply regularity by a supplier [4].

Therefore, the data supporting all subprocesses must be accumulated in a single transactional system. In case of using different transactional systems, data integration between these systems is required. Another important aspect is the ability to load data from transactional systems and external sources into a BI app.

Based on the information above, we can formulate the following general requirements for data architecture:

- possibility of automatic information processing accompanying all subprocesses;
- the need to take into account situations where one purchase from the supplier is followed by another purchases of goods in accordance with a certain nomenclature, i.e., more than one type of goods
- a single data format used to implement all subprocesses;
- data integrity, data consistency;
- ability to generate reports, for example, delivery schedule for period, contract with supplier of goods, etc.
- possibility of integration with BI app that allows to carry out analytics on various aspects (analysis of the suppliers market, analysis of deliveries regularity by the supplier, ability to download data from external sources).

Figure 3 shows the top level FMCG data architecture of the "Purchase" business process.

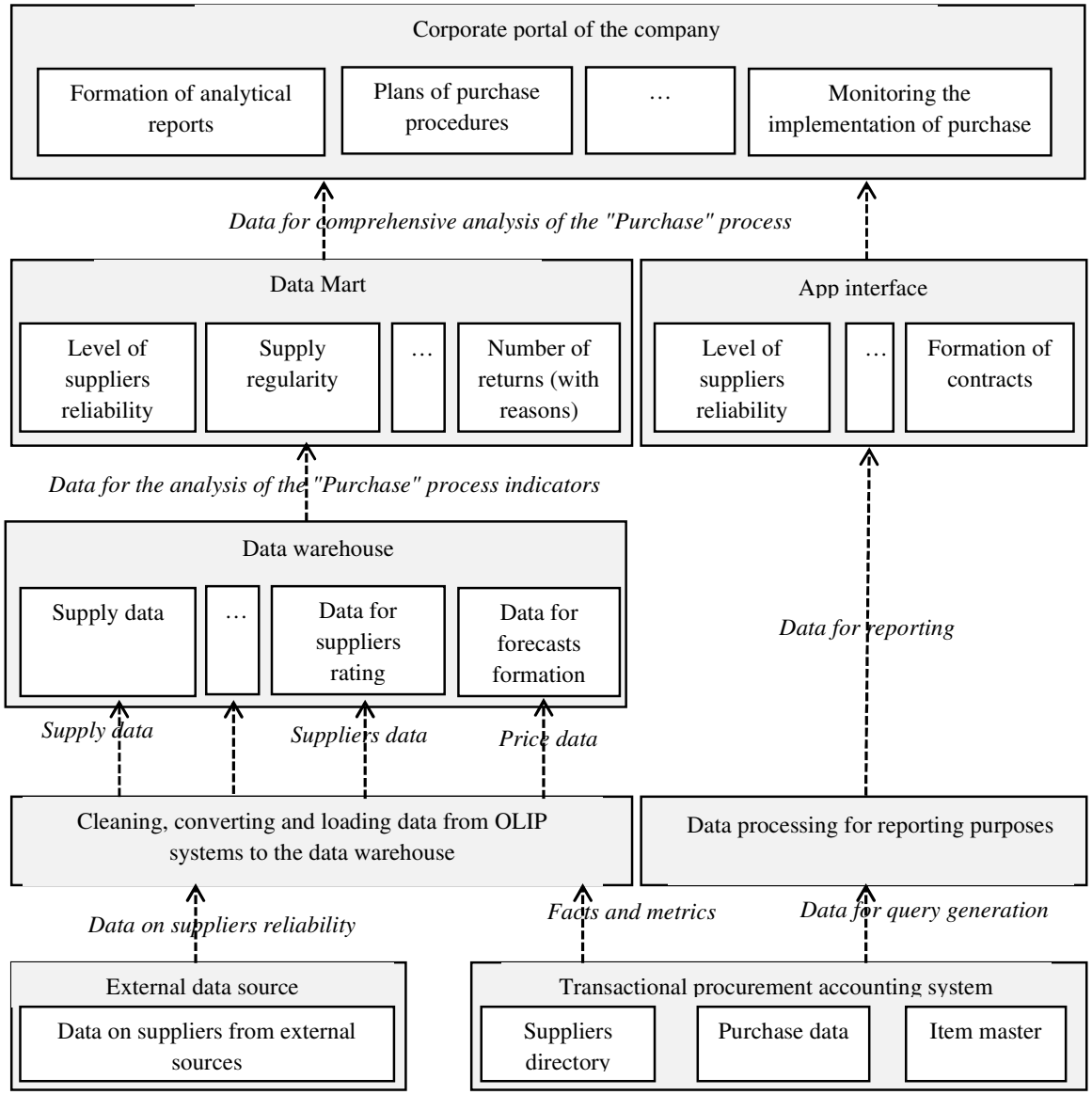

Figure 3- Data architecture of the interface for interaction with suppliers (information systems).

Let us consider in more detail data architecture of the transactional accounting system for purchases/returns of goods. Detailing the architecture at the next level involves creating a data model for the transactional system.

To design data models of a transactional system, the most commonly used method is entity-relationship modeling (ER-modeling) with such concepts as: entities, their relationships and attributes to describe the properties of entities and their interconnections [6].

During the analysis of the subject area, as well as the formulated requirements and limitations, the following entities were identified: product; supplier; manager; business region.

The following connection is defined between the entities:

- Chain company initiates a trade operation (purchase or return of goods). The Company can make many purchases or returns, but each purchase/return can only be initiated by the Company. The Company has many suppliers who provide it with goods in accordance with the contract. "One-to-many" connection.
- The fact of trade operation (purchase/return) contains the item. One item can be reflected in multiple trade transactions, and a single trade transaction that is reflected in a transaction system can contain many items. "Many-to-many" connection.
- Purchase or return is carried out from the warehouse or to the warehouse. One warehouse can ship goods for many trade operations, but each trade operation accounts for one warehouse in the system. "Many-to-one" connection.
- Supplier operates in a specific business region, but a single business region can be the place for many suppliers. "Many-to-one" connection.
- The supplier is serviced only by the manager who is attached to one. At the same time, one manager may work with more than one Supplier. "Many-to-one" connection.
- The Manager works only in one department of the Company, while many managers work in one Department of the Company. "Many-to-one" connection.

  As an example, table 2 provides a list of primary entities and their attributes.

Table 2: Entities and attributes of the interface for interaction with suppliers

Entity	Description	Attribute	Attribute name in the model
Goods	Item that is ordered from the Supplier or returned to the Supplier's warehouse	Product_ID	Product_ID
		NameDepartment	NameProduct
		VendorCode	VendorCode
		NameClass	NameClass
		NameCountry	NameCountry
Supplier	Partner of the organization supplying the goods	ID_SP	ID_SP
		NameDepartment	NameSP
		NameSP	NameSP
		Address	Address
		Phone	Phone
		MobilePhone	MobilePhone
		INN	INN
		BankAccount	BankAccount
		SupplierReliability	SupplierReliability
		AdditionalInformation	AdditionalInformation
NameSP	Business region in which the supplier operates	Business region_ID (PK)	Region_ID (PK)
		Name of region	Name_Region
Manager	Manager of the company that serves the partner and works in the organization	Code of manager_ID (PK)	Manager_ID (PK)
		Surname of manager	SurnameManager
		First name of manager	FirstnameManager
		Last name of manager	LastnameManager
		Department (FK)	Department_ID
Department_ID	Department in which the purchase is carried out and managers work	Department_ID	Department_ID
		Name of department	NameDepartment
Trading operation	The fact of purchase (return) of goods,	ID_Fact	ID_Fact
		Product code	Product_ID

Entity	Description	Attribute	Attribute name in the model
	characterized by quantitative indicators of trading activity of a chain company	ID_SP	ID_SP
		Arrival	Arrival
		Date of first contract	DateContractFirst
		Contract life completion date	DateContractEnd
		Manager_ID	Manager_ID
		Quantity of contract	QuantityContract
		Price	Price
		Quantity	Quantity
		Date of fact	DateFact

If you include the trade entity as shown in table 2 in the logical data model, one of the data integrity rules is violated: there will be problems with adding, deleting, and editing data. This is explained by the fact that the entity "Trading operation" (purchase/return) is not reduced to the second standard form. In this situation, you want to decompose the entity into two entities, for example "Purchases" and "Fact".

The "Product" entity is characterized by such attributes as "Classifier" and "Country". In order to avoid problems with adding and deleting data, it is proposed to allocate two additional entities (guides) in the logical data model - "Classifier" and "Country" guides.

Results

Currently, large FMCG chain retailing companies are actively implementing new information technology solutions and automating business processes in order to reduce costs and increase sales. In these conditions, the transition to electronic document management can be considered as one of the stages of digitization in chain trade.

Document management system in retail is extremely extensive, due to the large size of trading companies. Thus, its optimization is an extremely important component of the cost reduction process [11]. The system of general document flow at FMCG chain retailing companies can be represented in the form of three subsystems - external, internal and supporting document management [7].

The top-level document management model of FMCG chain retailing companies is shown in the figure.

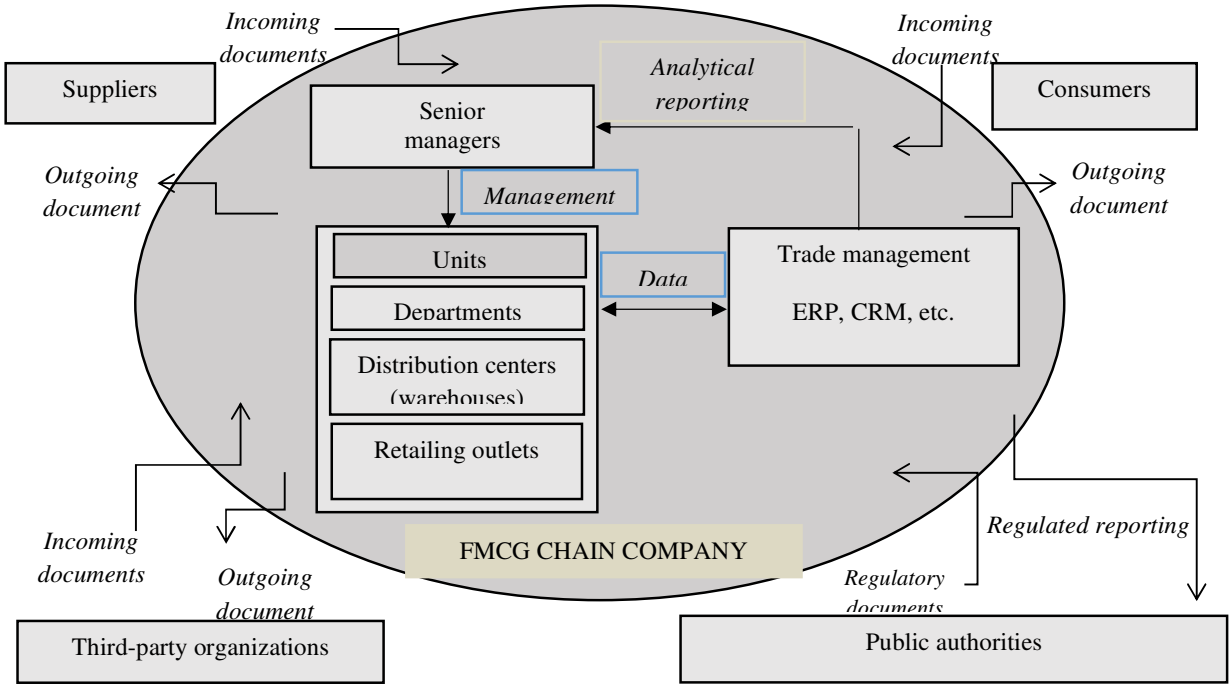

Figure 4 - Top-level document management model of FMCG chain retailing companies.

In terms of the analysis of problems concerning construction of complex electronic DMS, the aspect of creation and functioning of data architecture is especially interesting.

The figure shows a conceptual model of data architecture for FMCG retail. The model is made in UML notation, which allows to reflect the key classes and relationships, as well as to analyze the presence of connections that require simplification ("many-to-many").

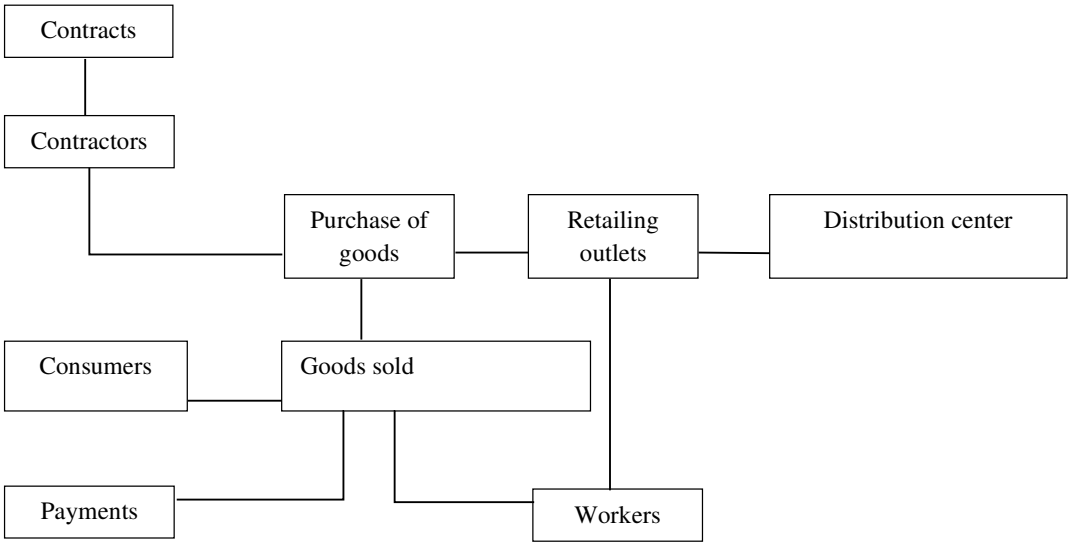

Figure 5 - Conceptual model of data architecture at FMCG chain retailing companies

As a result of the model formation, top-level data architecture can be supplemented by including a layer of IT-infrastructure. This will help to form a comprehensive model of data architecture, starting with the database that is the basis of the transaction system and up to completing the IC top-level – level of corporate portal of the company represented in the figure.

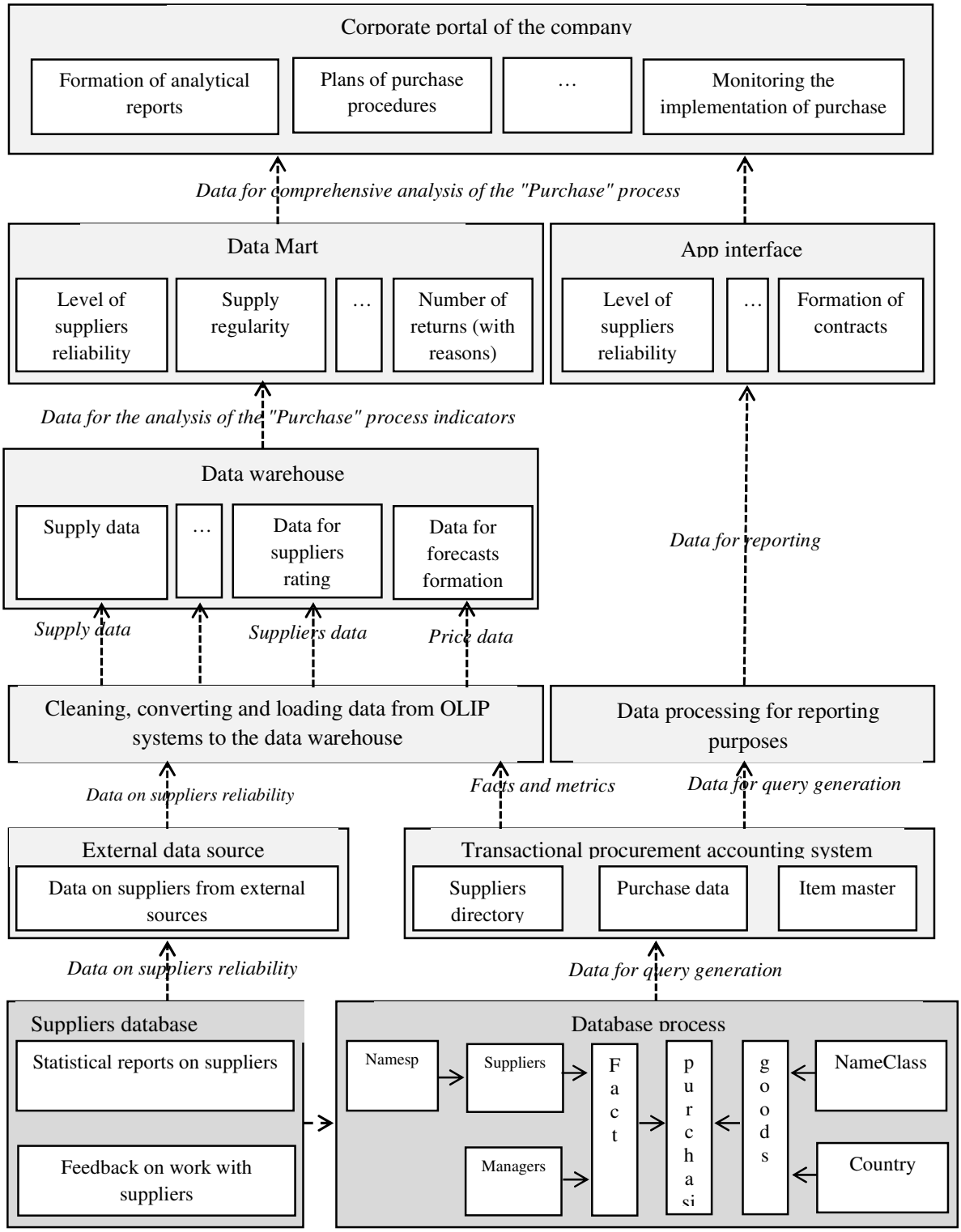

Figure 6 - Data architecture of the interface for interaction between chain trading companies and suppliers.

Data warehouse architecture should be flexible enough to grow and change together with the needs of business, as the requirements of the FMCG chain retailing segment change quite quickly under the influence of the market. Today, random efforts to normalize the architecture of corporate data warehouses are not enough. Furthermore, inconsistency of modeling methods inevitably leads to rather tense implementation of solutions.

Conclusion

For FMCG-retail companies, the task of determining data architecture based on DMS is a matter of the highest priority.

The generated DMS model allowed to identify the following key entities in the data model of FMCG retail:

- purchase of goods – fast moving consumer goods sold at points-of-sale;
- turnover – goods sold;
- points of sale – retailing points of sale;
- warehouses – distribution centers;
- workers – staff;
- consumers – customers who purchase goods of the company.
- counterparties – a person or company that assumes an obligation under the contract;
- contracts – agreements with partners on mutual obligations;
- payments – settlement.

The study identifies basic business processes of chain retailing companies. The typical structure of the "Purchase" business process is considered. The classification of basic documents within the analyzed business process is presented. On the basis of the analysis of sub-processes included in the "Purchase" process, the main stages of data architecture development, interrelation of reporting documents and data types, architecture of data (a layer of information systems) are considered in the paper.

As a result of the study, a top-level data architecture was formed, reflecting the model of information interchange in accordance with the basic business processes of FMCG chain retailing companies. The resulting data model can be considered universal for FMCG-retail companies, as it allows to organize data management in such a way as to ensure further development and effective functioning of the chain companies architecture.

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Designing The IT-Architecture of Mining Enterprises in View of Digital Transformation

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Abstract

A modern manufacturing enterprise is hardly imaginable without process automation – both core and management processes. The efficiency of an enterprise largely depends on the high-quality data processing within the single information space of the enterprise. The introduction of an integrated automated system for an industrial enterprise, coordinated with the business model, will create an effective enterprise management system and reduce future costs for the modernization and development. Actual trends in the digital transformation of industry reinforce the requirements for a complex model of a business management system, including the integrated information management system model as an integral part of it. The paper is aimed to create a model of the manufacturing enterprises architecture, including a comprehensive vision of business and technological processes, their IT support, information and production infrastructure of manufacturing enterprises. The model was developed based on the analysis of experience and the current practice of automating large industrial enterprises in Russia in such sectors as construction, mining, and engineering.

Keywords: enterprise architecture, IT architecture, technological architecture, technological processes

Introduction

Digital transformation is a major challenge for today's businesses. Opportunities of modern digital technologies, such as the Internet of Things, big data, predictive analytics, blockchain, machine learning, inter-machine interaction, cyber-physical systems, etc., are able to meet the requirements of the business on a qualitatively new level, allow to significantly increase the efficiency of enterprises and make the processes that were impossible before possible for enterprises to implement. The well-known concept of Industry 4.0, which declares the transition to a new format of industrial enterprises, at the same time opens up new opportunities for industry, but at the same

time poses challenges to industrial enterprises to effectively transition to a digital model of activity. [1-3] It is obvious that the successful implementation of digital transformation projects requires a systematic approach to the formation of the target business model and the development of a transition plan to it.

Today, industrial enterprises should take into account the following actual trends when designing a business management system:

•Active growth of IoT practices and marketplace [4,5]. Thanks to the ability to transmit data using 5G networks and advances in sensor technology, in the coming years, the industry will be able to make even greater use of devices within the framework of the Industrial Internet of Things (IIoT) concept to increase productivity, product quality and reduce costs;

•As IIoT and intelligent systems become more widely used, there will be a dramatic increase in the amount of data generated by production processes - the ability to analyse this data must be ensured;

•As information technology evolves, so do the skills of cybercriminals. Recognition of the urgency of the problem of information security for certain industries in the modern world was the adoption of a number of legislative acts in 2017-2018, tightening the requirements in this area [6-8].

The need to consider the enterprise management system as a single complex of implemented business and technological processes, information flows and data flows, information systems and technologies determines the role of the architectural approach in the formation and reform of management systems to improve the efficiency of business due to its internal structure. As a similar complex approach to the formation of a balanced and effective management system in the professional community of business analysts and implementers of IT solutions is a concept of enterprise architecture, which offers to consider the model of the enterprise as a unity of heterogeneous elements (business processes, organizational structure, functional structure, information systems and applications, data, document management, business and IT services, etc.) in their interconnection and interdependence. Nowadays, when management and realization of business are impossible without IT-support, the model of enterprise architecture gives the necessary complex vision of all aspects of management system and allows to connect business and IT-components of management into a single system. [9] However, the existing approaches and models of enterprise architecture do not pay due attention to production technologies, which determine the special structure of technological processes and technological infrastructure.

The purpose of this work is to form an extended model of the enterprise architecture, which includes as an integral element of the core technology and related technological infrastructure. Development of such an extended model is especially relevant in the context of the ongoing digital transformation of business, because the introduction of digital technologies in industrial enterprises will affect both the elements of business and IT-architecture, and elements related to production technologies. This section should follow keywords. This section should provide background of the study and highlight research motivation.

Methodology

The methodological foundations of the work are: business analysis, an architectural approach (including the concept of a service-oriented architecture) and a technological approach. The paper introduces the concept of infrastructure-intensive enterprises, proposes an extended model of the

architecture of such enterprises and a method of its development that takes into account the specific features of the architecture of such enterprises and, in particular, the peculiarities of the IT architecture design. As a result of adapting existing approaches to modeling and developing the manufacturing enterprises architecture, the extended model and approach to the development of enterprise architecture were supplemented with aspects related to production technologies, the joint influence of business and technological processes on the formation of enterprise IT architecture was described, the example of the IT-architecture functional structure of the mining business was described.

Results

Features of IT-architecture design of infrastructure-intensive enterprises.

The object of consideration of the present article are the enterprises, the technologies of realization of the main activity of which determine the specific infrastructure, structure of assets, resources used and require significant investments in the physical infrastructure. This category of enterprises primarily includes industrial enterprises, but also enterprises of other industries - construction, transport, medical, etc. - i.e. all those branches of industry where the technologies for the implementation of core activities require specialized and capital-intensive infrastructure. With regard to such enterprises, the term "infrastructure-intensive enterprises" is introduced [10] (a broader term - infrastructure-intensive industries - can be introduced).

In the traditionally adopted, established by various international standards (TOGAF, FEAF, DODAF, Zahman model) [13,14] and deservedly recognized by the international scientific and professional community interpretation of the architecture of the enterprise, the business management system as a system includes such groups of elements (so-called layers) as [15]: business architecture, architecture of information systems and applications (IT-architecture) and technological architecture (Fig.1). Business architecture includes such elements as functional structure, business process system, organizational structure; in the architecture of information systems and applications - information systems and applications that support the implementation of business processes, as well as data architecture; technological architecture - infrastructure that provides the capacity for deployment and operation of information systems and applications (servers, networks, databases, etc.). [6] Layers of enterprise architecture interact with each other through services - units of functionality provided by elements of different layers to each other. Thus, business architecture in response to customers' requirements provides them with business services. In turn, the architecture of information systems and applications in response to the requirements of business architecture provide IT services to support business processes. Similarly, the technological architecture provides the possibility of functioning of information systems and applications by providing services in strict accordance with the requirements of IT-architecture. Such service orientation allows to form a balanced management system where all requirements of architecture elements to each other are realized and there is a possibility of flexible and operative introduction of new functionality of the system due to transparent model of interaction of elements.

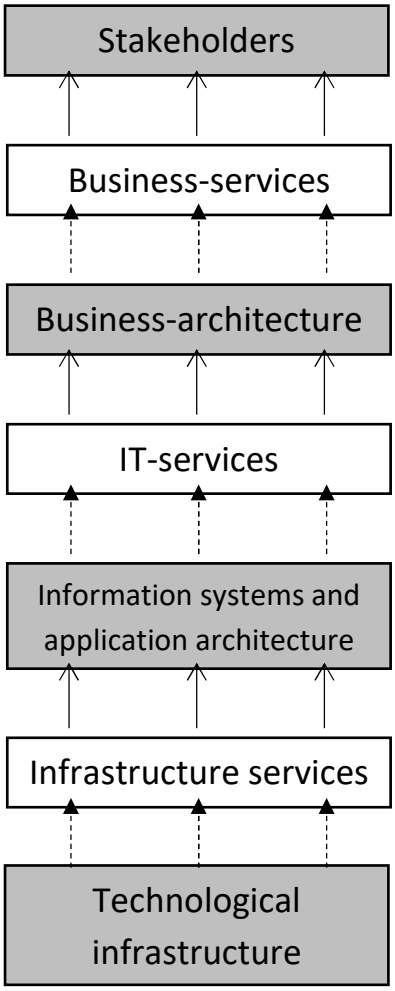

Fig 1. The traditional model of service-oriented enterprise architecture

Currently, automation of industrial enterprises is moving to a new level: it is not only the introduction of production control systems (class MES) and process control systems (class APCS), but also the introduction of digital technologies in the technological process, as well as in the architecture of information systems and applications. Thus, a number of technologies within the framework of the concept of Industry 4.0 is aimed at the introduction of production technologies or their information services into the sphere of implementation [17]. For example, cyber-physical systems (Cyber-Physical Systems, CPS) are designed to replace human labor in the performance of routine operations of technological processes or operations that are difficult to perform by humans (in harsh climatic conditions, etc.); technology of industrial Internet of Things (Industrial Internet of Things, IIoT) [2,3,11] allows you to collect in real time the indicators of the implementation of technological processes, while partially replacing the existing systems of instrumentation and automation (instrumentation and automation) by functionality; Big data processing technologies allow to process large amounts of data on the progress of technological processes collected in real time, and to carry out the analysis of such data; technologies of inter-

machine interaction (machine-to-machine, M2M) allow to transfer the control of the next stage of the technological process between the components of technological equipment without human intervention, etc.

The introduction of such technologies requires a clear understanding:

•The place of such technologies in the enterprise management system;

•Requirements to digital technologies from business and technological processes and possible requirements to change the processes themselves;

•Mutual requirements of digital technologies and elements of IT and technological architecture;

•A way of integrating digital technologies with other elements of the management system. [4]

At the initiative of public and private institutions in Germany, a reference model of RAMI4.0 architecture was developed to provide a unique vocabulary and structure that everyone can understand when describing the components of intelligent production or Industry 4.0, which was officially adopted in March 2017 as a publicly available specification for intelligent production. 18] Undoubtedly, the future is beyond such models of production enterprises, however, the time horizon for the widespread introduction of such architectures seems quite distant. At the moment, the development of the architecture of infrastructure-intensive enterprises on the basis of universally recognized models (e.g. TOGAF), with the introduction of missing elements into it, seems relevant.

It is expedient to include in the contour of consideration of the enterprise architecture a separate layer, which includes technological processes and related infrastructure and resources: buildings, structures, technological equipment, transport, material and material resources, etc. Thus, the layer of architecture, including as a key element of the technological process and related infrastructure in the proposed concept is called "technological architecture", while the infrastructure that provides the deployment and implementation of functions of information systems and applications (technological architecture in the adopted TOGAF terminology) - "IT infrastructure" (Fig. 2).

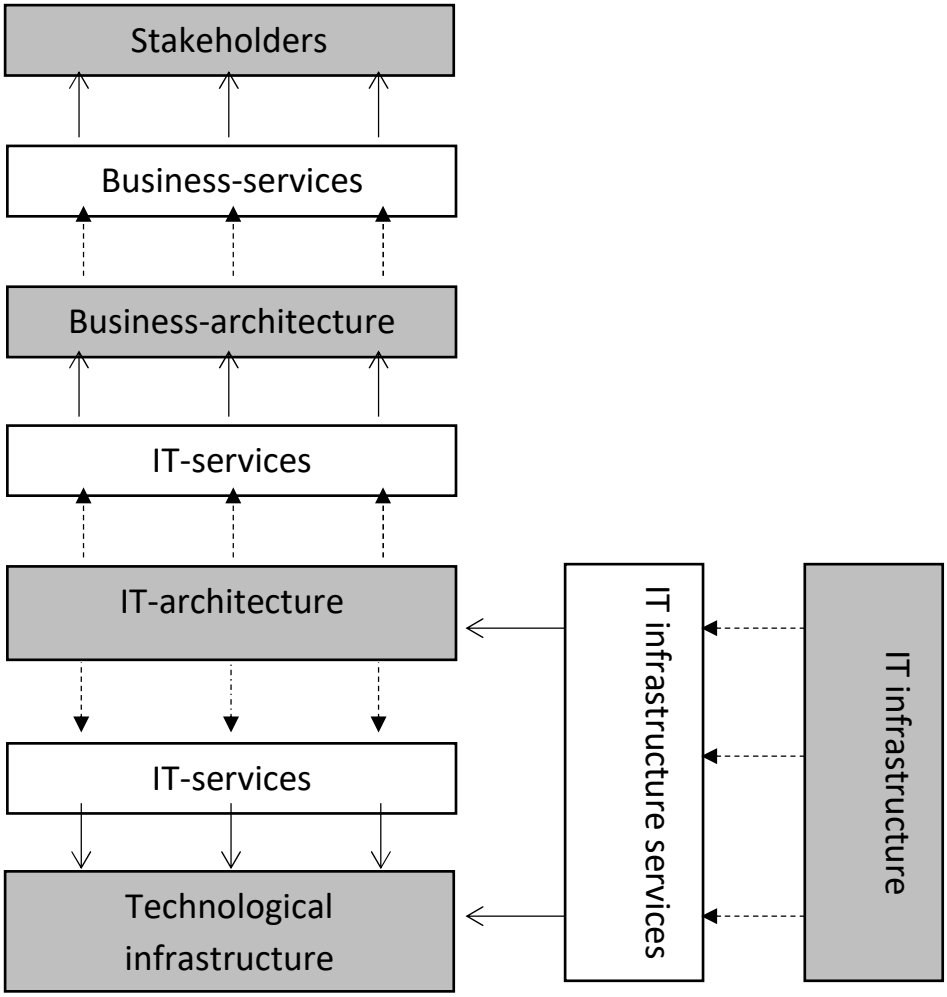

Fig 2. Extended model of service-oriented enterprise architecture

Allocation within the framework of the enterprise architecture of the layer of elements connected with production technologies, will allow to identify and take into account the impact on the architecture of information systems and applications of the enterprise as a system of business processes, and technological processes. Among IT-specialists the model of hierarchy of information systems is known for a long time and is used [19, 20], actual first of all for the industrial enterprises (Fig.3). The following levels of information systems corresponding to management levels are singled out: Automated Process Control System (APCS) - management of technological processes, MES - production management, ERP - enterprise management, BI - analytics and support of making strategic decisions. Systems of class BI sometimes carry out beyond the limits of a pyramid of information systems, but the hierarchy of interaction of the presented classes of systems from it does not change - it is in many respects a question of representation.

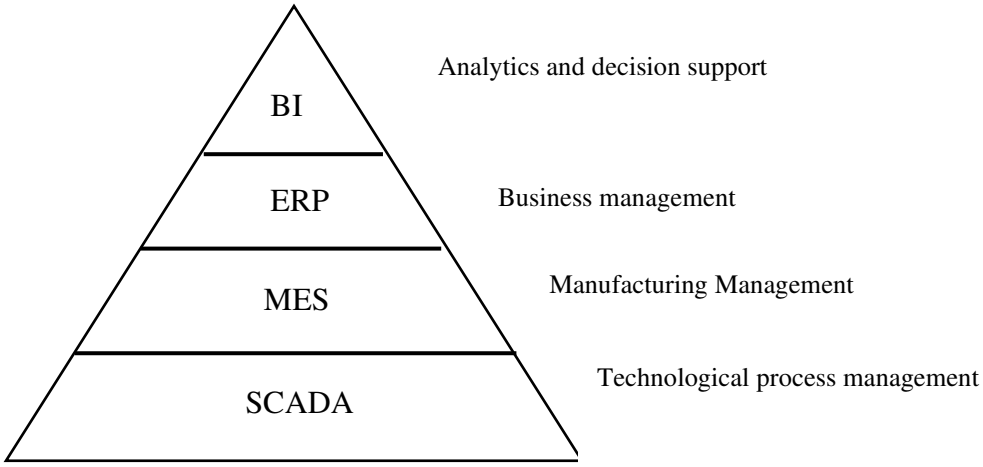

Fig 3. Hierarchy of enterprise information system

The MES concept is being actively developed and implemented, and nowadays it attracts great interest from practitioners as a link in the pyramid of information systems of the enterprise with its own functionality. The layer of information systems of MES class is a characteristic feature of industrial enterprises, as it focuses on the so-called production processes.

Landscape design of functional systems of IT-architecture of mining enterprise. The proposed approach to the design of the IT-architecture of the enterprise, taking into account the requirements of both business and technological processes and production processes, was applied in the project of development of IT-architecture of the mining enterprise. Digital technologies are changing the mining industry, changing the operating models of mining companies and allowing them to remotely manage more and more processes. The key requirement for an effective digital transformation of any enterprise is comprehensive business automation, which implies the integration of information systems and data within a single information space. To ensure such complex automation of business it is important to design a complex information space based on the analysis of all business, production and technological processes.

On the basis of the analysis of business, industrial and technological processes of the concrete enterprises of a mining industry of Russia (on the basis of interview with experts and the analysis of the data of Internet sites of the organisations designing the mining enterprises and their automated systems [12-17, 25]), and also on the basis of studying of reference models [26-27], the following list of functions of the mining enterprise has been developed (Table 1). It should be noted that Table 1 lists the functions not only of the production mining enterprise, but the functions of the mining business as a whole. Thus, the functions № 1-6 may not be implemented directly at the operating mining plant, and are carried out by various design organizations and other participants in a single process.

Table 1: The functional structure of the mining enterprise

№	Mining function	Information system management layer supporting function
1.	Object Definition	-
2.	Intelligence service	MES (incl. BIM, GIS)
3.	Rights management	ERP
4.	Scientific research work	MES (incl. BIM)
5.	Design of a mine (mine) (PIR - design and survey work)	MES (incl. BIM)
6.	Engineering	MES
7.	Production planning	MES
8.	Streamline Operations	MES
9.	Ore mining	MES - operational production management Automated process control systems - real-time control of technological processes
10.	Ore transportation of ore	MES - operational production management Automated process control systems - real-time control of technological processes
11.	Ore sorting and mixing	MES - operational production management Automated process control systems - real-time control of technological processes
12.	Ore processing (beneficiation)	MES - operational production management Automated process control systems - real-time control of technological processes
13.	Melting	MES - operational production management Automated process control systems - real-time control of technological processes
14.	Refining	MES - operational production management Automated process control systems - real-time control of technological processes
15.	Product processing	MES - operational production management Automated process control systems - real-time control of technological processes
16.	Waste management	MES - operational production management Automated process control systems - real-time control of technological processes
17.	Infrastructure production support	MES - operational production management Automated process control systems - real-time control of technological processes
18.	Asset Management	ERP MES
19.	Production Management	MES - operational production management Automated process control systems - real-time control of technological processes
20.	Logistics (transport and storage)	MES - operational production management Automated process control systems - real-time control of technological processes
21.	Accounting and reconciliation	ERP – strategic planning and management MES - operational production management Automated process control systems - real-time control of technological processes

22.	Customer relationship management	ERP
23.	Marketing and sales	ERP
24.	Financial management	ERP
25.	Personnel Management	ERP
26.	IT Management	ERP
27.	Product Lifecycle Management	ERP MES
28.	Land management	ERP
29.	Strategic management	BI ERP

Comparison of the key functions of mining companies and the levels of information systems, the tasks of which include IT support for these functions, is given in Table 1:

- forms the requirements of business and technological architecture to the functional structure of the IT-architecture of the enterprise;
- forms a landscape of functional structure of IT-architecture of the enterprise at all levels of management;
- is the basis for further design of individual subsystems of IT-architecture of the mining enterprise;
- is the basis for the formation of requirements for horizontal and vertical integration of information systems;
- creates prerequisites for the effective implementation of digital technologies.

Such a representation can serve as a kind of reference model of requirements to the functional composition of information systems. Each functional block is not necessarily realized by separate information system, rather on the contrary: suppliers both ERP, and branch MES-decisions group a number of functional blocks within the limits of the uniform decision. Use of similar reference models at a stage of designing of IT-architecture is the important precondition of complex automation.

Conclusion

The paper proposes an extended model of enterprise architecture that meets the needs of enterprises, the various aspects of which (structure of assets, infrastructure, location, etc.) are largely determined by the peculiarities of technologies for the implementation of core activities - primarily industrial enterprises. Such a model of the enterprise architecture links into a single complex such elements of business as: functional structure, business processes, organizational structure, cash flows, document flow, information systems, applications and data, technological processes and related infrastructure, IT infrastructure. The account of interrelation and interdependence of the listed elements at a stage of designing of business will allow to create transparent control system of the enterprise, and also will provide a basis for operative introduction and effective introduction of organizational changes of the enterprise according to requirements of a business environment. In the work the example of application of the offered approach to landscape designing of functional subsystems of IT-architecture of the mining enterprise is described. With a certain adaptation the proposed extended model and method of development of architecture of the infrastructure-intensive enterprises can be used as universal and applied not only for industrial, but also for the enterprises of other branches, the technologies of implementation of which have a significant winding on the infrastructure and IT-architecture of the enterprise (for example, medicine, transport, construction, etc.).

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Digital Architecture's Requirements of Russian Business to Technologies, Providing Its Implementation

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Abstract

Nowadays, thanks to the advent and development of such modern information technologies as IoT, Big Data, Blockchain and many others, digitalization affects more and more areas of Russian business. Such changes are inevitably reflected in enterprise architecture. This research discusses the need to adapt the standard enterprise architecture framework, TOGAF, to present the latest technologies in it. Moreover, a list of digital architecture's requirements of the Russian business for the technologies ensuring its implementation has been compiled.

Keywords: Digital Architecture, Enterprise Architecture, IT Requirements, Enterprise Architecture Framework

Introduction

Digitalization is a business transformation. This is the use of information technologies (IT) for the implementation of business processes and the digitization of all types of information that can benefit the business (Legner et al., 2017). Digitalization is changing not only business, but the whole society, creating electronic services, products, changing the usual approach to production, work, training. For example, the creation of a single digital infrastructure for public services, advanced online banking, electronic medical records, online universities and the robotics of some professions, all this is just an incomplete list of innovations that came with the advent of digitalization (Dubgorn, Zaychenko, & Grashhenko, 2018).

This change in business became possible only thanks to the active development and popularization of the latest technologies. According to the «Hype Cycle for Emerging Technologies» popularity chart, technologies such as Blockchain, Digital Twins, Virtual Assistants, the Internet of Things and Deep Learning are now at the peak of high expectations, which means that they are in the active phase of implementation and use in various fields (Figure 1)(Panetta, 2018).

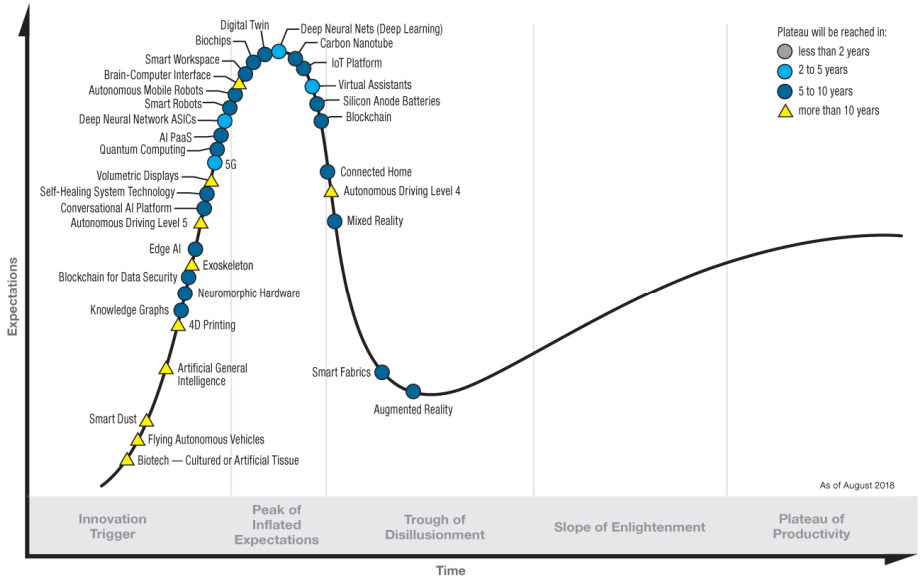

Fig 1. Hype Cycle for Emerging Technologies, 2018

Consider examples of the implementation of these technologies in Russian business. For example, Blockchain technology has become the basis of a project for registering participatory construction contracts. This project will allow to have more transparent transactions, both for equity holders and for the state (Kolobov, Filatova, Borshcheniuk, Semerianova, & Bayanov, 2019). Moreover, the project of the first information system in Russia for antitumor clinical research based on the Blockchain implemented by one of the oncology research center can be highlighted. Such a system will make it possible not only to register research volunteers, but also to secure their personal information (I. Ilin, Levina, Lepekhin, & Kalyazina, 2018). Digital twin technologies are actively used in one of gas and oil companies to create unified control centers for oil refineries and oil producers. This allows to diagnose objects, manage them, predict and optimize their work remotely (Zaychenko, Smirnova, & Kriukova, 2018). Speaking about virtual assistants, it is worth mentioning first of all voice assistant from Russian IT company, whose monthly audience is 35 million unique users. This assistant can not only answer questions and order a taxi, but also be the basis of a Smart Home system, coordinating all Internet things on the network. Speaking about the Internet of Things, which is the basis of many modern technologies, should be mentioned that production and transport are leaders in investing in the Internet of things in Russia. Moreover, the Internet of Things is actively used in the field of housing and communal services, this is ensured by smart meters that transmit and analyze data (Zaychenko, Borremans, & Gutman, 2018). Deep Learning, in turn, is a field of machine learning research and an area of artificial intelligence (AI) research. According to studies, virtual assistants, machine learning and predictive analysis are the most used AI technologies in Russian business (Figure 2) (Wright & Schultz, 2018).

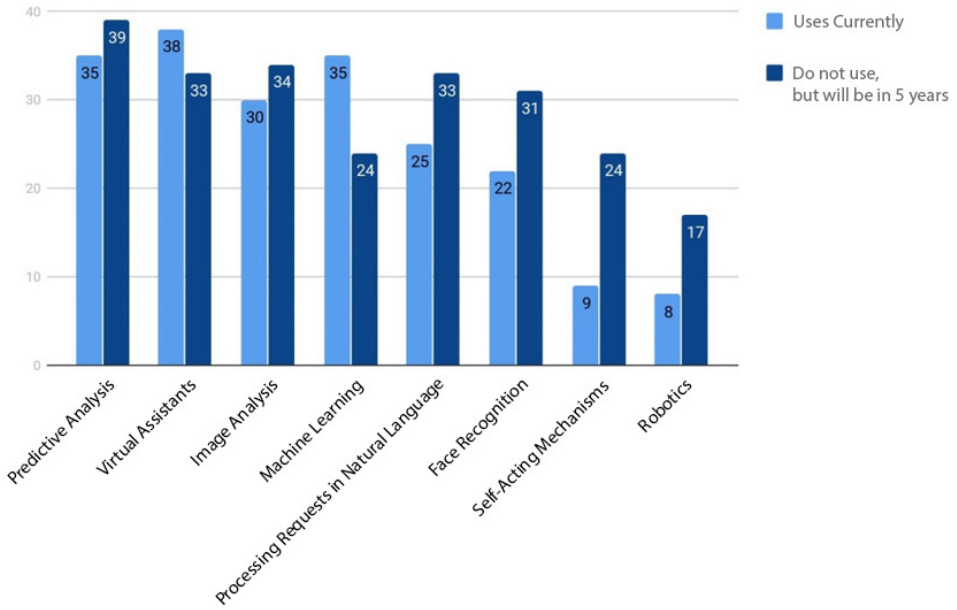

Fig 2. AI technologies in Russian companies, %

Since many of these technologies have recently begun to be applied on real projects, it is now too early to judge the success and effectiveness of these technologies in the long term, but nevertheless, active business changes are already noticeable. Moreover, a changing business dictates requirements for changing the architecture of the enterprise.

Today, the most famous and used enterprise architecture description framework is TOGAF. It is based on the ADM method, which step by step describes the development of architecture. Three TOGAF enterprise architecture domains, which can be called three layers of architecture, are distinguished: a Business layer, an Application layer, and a Technology layer (Figure 3) (Levina, Borremans, & Burmistrov, 2018).

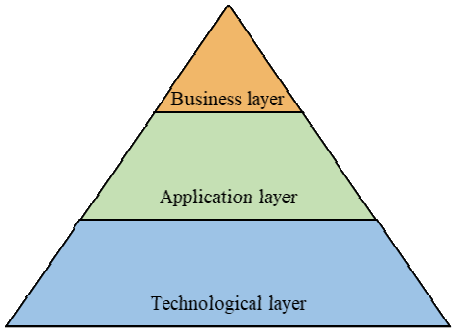

Fig 3. TOGAF domains

TOGAF itself is a comprehensive framework that can be adapted to the development of a specific corporate architecture. However, from the point of view of modern IT, this framework cannot be considered universal.

Despite the fact that TOGAF mentions and describes business services on the Business layer, application services on the Applications layer, platform services on the Technology layer, and there is also a special notation "Mobile IT Category" and the API is mentioned in the Applications layer and the Technology layer, there are no cloud elements in this framework (Masuda, Shirasaka, Yamamoto, & Hardjono, 2018).

The purpose of this article is to formulate a list of requirements for information technology for the subsequent description of the new digital business architecture framework for Russian business.

Literature Review

Information technology requirements imply a description of the properties and qualities of information systems, software and hardware. Speaking about IT requirements in general, there are two types of requirements: functional and non-functional in nature. The first type describes the requirements for the behavior of the system, the second - shows the requirements for the nature of the behavior of the system (Becker, Tebes, Peppino, & Olsina, 2019). The subtypes of requirements and their case examples in more details are presented in the Table 1. The examples are made on the basis of Russian transport industry (I. V. Ilin, Iliashenko, Klimin, & Makov, 2018).

Table 1: IT requirements

Type of requirements nature	Subtype of requirements	Characteristic and example of requirements
1. Functional	1.1 Business requirements	Description of the high-level goals of the enterprise that will be achieved by implementing IT. Example: Intelligent Transport Infrastructure, within the framework of the Smart City concept, should automatically inform the traffic participants with up-to-date information using digital information boards (DIB) (Bolobonov, Ilin, Korolev, & Frolov, 2019).
	1.2 User requirements	Description of how the product is used by the end user. Example: User Stories describing the driver, who changed the route, having learned the latest information from the DIB.
	1.3 Functional requirements	Description of the functionality that can be implemented in this system. Example: The digital information boards should display the optimal speed, calculated taking into account weather conditions and congestion routes.
2. Non-functional	2.1 Business rules	A characteristic defining or restricting certain aspects of a business. Example: Placement of the DIB should be in accordance with the standard.
	2.2 System requirements	Description of a specific method for implementing product functionality. Example: a system for analyzing the current situation on the road should be located on a cloud platform where unstructured big data will be processed.
	2.3 Documentation Requirements	Description of the content of documents required for implementation. Example: documentation for the development of an information system must comply with an international standard IEEE Std 1016-1998 «IEEE Recommended Practice for Software Design Descriptions».

	2.4 Design and usability requirements	Description of graphic, visual and navigational aspects of the developed IT. Example: The font used in the DIB should be read when visibility is poor.
	2.5 Security and Reliability Requirements	Description of the created security levels, access levels, identification process and information flows. Example: Only leading programmers can access changes to the system algorithm.
	2.6 Function metric requirements	Description of performance indicators, fault tolerance, etc. Example: a system can be updated only at night.
	2.7 Operation and Personnel Requirements	Description of the required level of staff skills and requirements for working with IT. Example: After each major update of the information system, staff training is required.
	2.8 Other requirements and restrictions	Description of the possibility of integration, mobility, autonomy. Example: a system must be integrated with all Smart City systems (Chourabi et al., 2012).

It can be noted that all the requirements listed above relate to different layers of the enterprise architecture: from the goals and initiatives of the business (1.1, 2.1, 2.3, 2.7, 2.8) and specific applications (1.2, 1.3, 2.4,), ending with the requirements for networks and IT infrastructure (2.2, 2.5, 2.6).

Results

The enterprise architecture represents a comprehensive vision of the organization. That is why the framework on which it is built should reflect all aspects of the business, including new information technologies. To create this new framework for building a digital architecture, it is necessary to take into account not only existing standards and contain not only the basic requirements for IT, but also include a number of additional organizational requirements (Masuda & Viswanathan, 2019). The list of such requirements includes:

1. Standardization of the main business processes of the selected industry.

One of these requirements is the standardization of the main business processes of a particular industry and the creation of flexible data management platforms. Such standardization will allow the development of more “box version” IT solutions, which will accelerate the pace of digitalization of area. Moreover, this will allow the creation of adapted versions of reference models of enterprise architecture for specific industries.

2. Creation and incorporation of an Architecture Board into organization.

The next requirement is the mandatory inclusion of Architecture Board in the organization, which would allow to create high-quality and flexible models, as well as understand the necessary level of IT implementation in a particular case.

3. Analysis of demand for IT.

This analysis and subsequent management in a specific area should also become the basis for building the architecture of a digital enterprise. This will not only reduce the cost of introducing new IT in the industry, but also make it possible to predict the risks associated with their implementation.

4. Assessment of the enterprise maturity regarding the application of IT.

Another important aspect may be the level of the enterprise maturity for the implementation of modern technologies. The created assessment model will allow building models for implementing various IT for specific cases.

The requirements described above should be the core of the enterprises development along with functional and non-functional requirements. It is a combination of organizational, functional and non-functional requirements that will allow to build an ecosystem of enterprise architecture for the subsequent creation of reference models and a new framework.

Conclusions and Discussions

The digitalization and development of modern enterprises is inextricably linked with a change in the enterprise architecture. The new digital architecture puts new demands on information technology. Now these requirements should be not only functional in nature, for example, a description of the strategy and technical means of its implementation based on user requirements. Also, requirements of a non-functional nature should be taken into account, for instance, requirements for documentation, interface, standardization, personnel, etc. Moreover, the organizational requirements describing the approach to IT implementation become the most important requirement of the digital space architecture.

In the further studies, the issue of forming a reference model of the digital Russian business based on the described IT requirements can be considered. Moreover, the question of formalizing organizational requirements, for example, by creating a model for assessing the enterprise maturity and their readiness to implement modern IT, can be raised.

Acknowledgments

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Marketing Strategy of Successful Brand

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Abstract

In the article, we elaborated the issue concerning the marketing strategy of a successful brand, which should lead to the effective application of the overall corporate strategy with regard to the global environment. The global Starbucks brand, which is of irreplaceable importance on the current market, is subject to analysis. In order to properly define the company's marketing strategy, the analytical part of the article describes the basic 4P marketing mix of the brand, and the defined segmentation structure of the Starbucks brand with regard to current perceived global trends. In addition to marketing, these areas also fulfill the company's brand strategy. Based on the data obtained on all the mentioned areas, the discussion part of the article approaches the definition of the company's goals and a description of the resulting marketing strategy, which also includes the company's brand strategy. Both strategies can significantly affect the overall competitive performance of the company in the global environment in question. The discussion part also includes the direction of the company to the future, based on a defined marketing and brand strategy, which are generalized in the final part. Achieving the goals of the resulting marketing strategy should lead to strengthening the competitive position, brand promotion and better marketing performance of the company in the global environment. The resulting strategy is defined depending on international marketing trends, and the development of an environment to which the company must respond quickly and adapt effectively, depending on the changes that the time horizon brings. The final part of the article defines recommendations with regard to current global developments based on the analyzes that were part of the analytical part of the article.

Keywords: Marketing strategy, Brand, Starbucks, Marketing, Customers

Introduction

As already mentioned in the abstract page, the subject of the definition of marketing strategy will be the Starbucks brand. In order for a brand to be successful in the current market environment, it must constantly adapt to the development of the environment and the trends that are dominant in the given period. When creating a marketing strategy, it is necessary to take into account the overall strategy of the company and the defined marketing philosophy. Gavurova et. al (2018, pp. 72 - 84) argues that part of effectively achieving the goals of the company's marketing strategy should be a brand strategy, which is irreplaceable in building the overall image of the company and customer loyalty. Krizanova et. Agrees with this opinion. al (2013, pp. 105 - 112). Building relationships with customers, building their loyalty and properly satisfying all needs and requirements is the first step to achieving brand success in an international environment. The authors Hallowel et. al (2019, pp. 13 - 18). Valaskova et. al (2018)also agrees with this statement. al, who further argue that in building loyalty and the right brand strategy of the company, other factors that can influence purchasing behavior must be taken into account. Basic factors include, for example, demographic, behavioral or geographical. (2018, pp. 149 - 163). Kliestikova et. al. (2019) Is also attached to the important importance of behavioral factors. al, who argue that transposition into subjectively perceived sources of brand value is important in perceiving consumer loyalty. (2019, p. 190 - 203) This can subsequently be reflected in the overall marketing performance of the company in connection with the limited achievement of the objectives

of the defined marketing strategy of the company. Based on the individual statements of the authors, it is necessary to take into account the fact that the marketing strategy is influenced by a number of factors that must be taken into account by all brands operating not only in the national but especially in the global market environment. These factors must also be taken into account by the Starbucks brand, which operates intensively in this environment.

Starbucks

As mentioned in the introduction to the article, various factors such as customer loyalty, satisfaction of needs, behavioral aspects, environmental impact, trends or brand image are of irreplaceable importance in creating and achieving the goals of a marketing strategy. The individual factors need to be taken into account and taken into account as they can significantly affect the market performance of the company. The author Zeman and Bognad (2019, pp. 1 - 9) also agree with this opinion. According to the authors Tuan et. al, it is important to perceive the brand image as it can influence the competitive position in the market environment (2018, pp. 270 - 281). Starbucks must also take this into account.

Starbucks Corporation was founded on March 30, 1971 in Seattle, Washington. The company's mission is to constantly advance and become a world leader among suppliers of first-class coffee and to maintain the growth of uncompromising principles. The following six principles help assess the adequacy of decisions:

- ensure an excellent working environment and treat others with seriousness and respect,
- understand diversity as a necessary part of the way society does business,
- comply with the highest quality standards when purchasing, and delivering fresh coffee,
- constantly strive to ensure customer satisfaction,
- make a positive contribution to the life of the community and its surroundings,
- realize that the basis of future success is profitability.

Based on these principles, it can be argued that Starbucsk is determined to play a leading role in protecting the environment in all aspects of its business. Krizanova, Gajanova and Nadanyiova also agree with this opinion (2019, p. 17) The business of the company is based on the ownership of the parent company. Heniman and Wanikawa state that between 2000 and 2007, Starbusk had up to 64% of its licensed subsidiaries. Of the total number, only 36% of them were directly owned. They came from the USA. (2008, p. 25) Currently, Starbucks is following a similar trend, showing a higher percentage of licensed affiliates. Starbucks currently has four operating segments in various market environments in the United States, Canada, Latin America, Europe, China and developing countries. Unreported operating segments include Teavana, Seattle's Best Coffee, Evolution Fresh and Digital Ventures' own ventures, which are combined and presented as other segments.[1]

Revenues from reported segments and other segments as a percentage of total net income for 2014 were as follows: US (74%) EMEA (8%), Emerging (7%), Development Channel (9%) and others (3%). The segments include our own but also licensed cafe operations. The US market segment is most important for Starbucks. It is an important measure of a company's business. The EMEA and CAP markets are still in the early stages of development and require extensive support from the organization, given their current level of revenue and operating income compared to the US market. In some EMEA and CAP markets, acquisition and operating costs are higher than in the US market, due to higher rents for significant historic premises or country-specific regulatory cost requirements.[2]

[1] Starbucks Company Profile:
http://globalassets.starbucks.com/assets/4286be0614af48b6bf2e17ffcede5ab7.pdf
[2] UNITED STATES SECURITIES AND EXCHANGE COMMISSION:
http://secfilings.nasdaq.com/edgar_conv_html%2f2014%2f11%2f14%2f0000829224-14-000041.html#FIS_BUSINESS

Emerging market segments include roasted ground and wholemeal coffee, premium Tazo ® teas, Starbucks and Tazo brand products, various beverages such as Frappuccino ® Starbucks Doubleshot ® espresso beverages, Starbucks Refreshers ® beverages and other branded products sold worldwide through channels, such as grocery stores, club warehouses, specialist shops, supermarkets and also fast food outlets.

Operations owned and managed by the company accounted for 79% of total net income. Starbucks' retail goal is to be the leading retailer of branded coffee and tea in each of its target markets by selling the highest quality coffee, tea and related products, as well as through the customer experience. Licensed operations accounted for 10% of total revenues Licensed operations generally have a higher operating margin than company-owned and managed operations. Under the licensed model, Starbucks receives a reduced share of total revenue, but this is more than offset by a reduction in its share of costs because these are primarily generated by the license.

The licensed stores use the expertise of local Starbucks partners who share the operation and delivery of the experience. Licensee is sometimes the only way to gain access to the desired premises. These are mostly retailers with market knowledge. Starbucks obtains royalties and license fees from the sale of coffee, tea and related products. The company also sells certain equipment, such as coffee machines and things needed to prepare products. Employees who work in licensed stores are required to follow operating, work procedures, training and courses. Traditional franchising is used for Teavana ® and Seattle Best Coffee ®, as well as for Starbucks ® stores in some markets.

Marketing processes

In applying the tools of the basic marketing mix, Starbucks makes intensive use of all the frameworks in which it strives to fulfill the basic marketing strategy and satisfy the needs and wishes of the targeted segment. As part of the analysis of the marketing mix, we will discuss the product, pricing, distribution and communication policy of Starbucks. Based on the data obtained from individual tools, we will proceed in the discussion part to define the marketing and brand strategy of the company.

Product policy

The company's product range is very wide. The company is primarily committed to selling coffee beverages and the best coffee beans. In order to properly ensure compliance with strict standards, employees constantly check the purchase of coffee, roasting, packaging, global distribution and the like. The company offers more than 30 blends of coffee in its portfolio, including original premium coffees. The company even produces its hand drinks in the form of freshly brewed coffee, hot and iced espresso drinks, Frappuccino coffee and decaffeinated drinks, Starbucks fresheners and many more. The consumer goods category includes coffee and tea products such as Starbucks coffee, Ready Brew, K-Cup, Teavanna, Verisimo, Tazo and others. In addition to coffee and tea, the consumer goods category also includes Ready-to-Drink (RTD), which includes: bottled ice juice, tea, bottled Frappuccino, chilled cup of coffee, Starbucks Iced Coffee, Starbucks Refreshers, energy coffee drink and more.3

An interesting feature of the company is how it adjusts its product portfolio. A typical example is the Chinese market, which is known mainly for drinking tea and tea drinks. Based on this factor, the company decided to offer a wide range of teas in this market in addition to coffee. In this regard, the company also cooperates intensively with local partners. Based on the above, it can be argued that in strengthening the brand and marketing strategy, the company intensively takes into account the factory of cultural differences. [4]

[3]Starbucks Company Profile:
http://globalassets.starbucks.com/assets/4286be0614af48b6bf2e17ffcede5ab7.pdf
[4] Starbucks to cut up 6,700 jobs, close more stores as profit falls:
http://usatoday30.usatoday.com/money/industries/food/2009-01-28-starbucks_N.htm

Price policy

The best-selling commodity on the market is Arabica coffee. Its price depends on various factors such as the supply of demand at the time of purchase. Supplies and prices can be influenced by many factors in its countries of production, including weather, natural disasters, crop diseases, generally rising agricultural costs, stock levels, as well as political and economic conditions. The price is also affected by trading activities in the Arabica coffee market, including hedge funds and index commodity funds. In addition, green coffee prices have been affected in the past and may be affected in the future by actions by some organizations and associations that have in the past tried to influence green coffee prices through export quota agreements or restrictions on coffee supply.

Starbucks purchases coffee at a "fixed-price" and "price-to-be-fixed purchase commitement", depending on market conditions and factors, to ensure a sufficient supply of quality green coffee.[5]

Despite the fact that coffee drinks and their various variations represent a global product, the company implements local adjustment mainly in the area of pricing strategy. It can also significantly affect the overall marketing strategy of the company and its operation in the industry. To operate in the industry according to Hollowell et. al are influenced by various factories that the company should take into account when carrying out its business. (2019, p. 9 - 15) A typical example can be the product "Grand Latte", the price of which varies considerably in selected economies. According to The Wall Street Journal, Grand Latte is the most expensive in Oslo, where the price of the drink is $ 9.82, in Moscow $ 7.40, in Paris $ 5.18, in Toronto $ 4.08 and in Hong Kong 3.87 $. As can be seen in different global economies, the price of this product varies.[6] This is influenced by a number of factors. The factor that most intensively affects the price of the marketed product is the monetary policy in individual regions. This means that in countries where there is a strong currency, Grand Latte coffee is higher than in countries with a currency that has less purchasing power, which is a typical example of India. This policy also has a strong impact on the overall marketing strategy, which must be tailored to individual regions within the global market environment.

Communication Policy

The most intensive tool by which complaints can be associated with the possible risk of the customer is his marketing communication, it may happen that it is not possible to satisfy the needs and wishes of customers. It also tries to intensively strengthen brands that use methods of communication.

Unlike other businesses in the food industry, Starbucks has invested only $ 10 million in 2009 since 1996. The company advocated low investment for the following reasons: Starbucks presented itself with its highly acclaimed logo, its ubiquitous presence and corporate image. He focused on customer loyalty based on a sense of connection. Satisfied customers did the company's largest advertising, for which they did not have to pay, and therefore the company focused primarily on the customer. Marketing communication of a company is related to its development. This means that as the brand has developed in individual years, so has their marketing communication focused on satisfying customer needs.

As part of its communication policy, Starbucks uses the most intensive sales support. It uses the My Starbucks Rewards loyalty program, which the company evaluates as an effective tool for connecting with customers. Registered customers can collect stars and earn rewards each time they visit the point of sale. The most common rewards include a free drink, a free piece of cake in customers' birthday with any other handmade drink, free customization of the drink, and the like. The company has been using this tool extensively in the US and Canadian markets since 2016. Another sales support tool that Starbucks uses extensively is free gifts. It uses "Buy One Get One Free" for it, which is for customers every Friday. In addition, free gifts are provided for specific occasions, such as the Spice Latte

[5] UNITED STATES SECURITIES AND EXCHANGE COMMISSION: http://secfilings.nasdaq.com/edgar_conv_html%2f2014%2f11%2f14%2f0000829224-14-000041.html#FIS_BUSINESS

[6] Oslo: The town with the most expensive coffee: http://www.news.com.au/travel/world-travel/oslo-the-town-with-the-most-expensive-coffee/story-e6frfqai-1226584690823

pumpkin's thirteenth birthday celebration in October 2016. During this period, Starbucks supplied free coffee to the first 1,300 customers.[7]

In addition to sales support, the company also makes intensive use of offline advertising tools such as television advertising, advertising in newspapers, magazines, posters and the like. However, it also focuses intensively on seasonal sales, especially during the Christmas holidays or Star Holiday, Red Holiday Cup and the like. The mentioned tools, which the company uses for the purpose of its promotion, intensively contribute to the effectiveness of the implementation of the marketing strategy. At the same time, it can be argued that promotion contributes to strengthening the brand in a global market environment.

Distribution Policy

In the case of Starbucks' marketing analysis, the distribution policy is crucial. As there is a presumption that most coffee customers buy in stores and drink at home, the company tries to take advantage of such demand in the form of penetration into supermarkets. The company's distribution strategy consists of direct delivery to retail networks. However, despite this strategy, the company entered into a new brand agreement with the global corporation Kraft. Based on it, the company roasts and packs its coffee, and Kraft will ensure the marketing and distribution of this coffee, in which we can see the elements of cooperation management. We have shown the fact that the Starbucks distribution strategy is crucial for the company's marketing strategy, as the company not only secures the distribution itself, but also strives to create cooperative partnerships. The advantage of this partnership is that in a single night, 25,000 supermarkets can reach Starbucks products and receive 3,500 Kraft dealers. Kraft thus competes with its range and, through the most popular brand, gains immediate entry into the fast-growing segment of exclusive coffee.

In addition to supermarkets, Starbucks uses other ways to get its brand to market. As an example, Marriott provides Starbucks at more than 60 airports and also serves this coffee to its airline passengers. The Westin and Sheration offer packages of such coffee in the hotel rooms. Starbucks has also contracted cafes at Watersones Libraries.

Segmentation structure

In addition to the tools of the marketing mix, the segmentation structure is also important for Starbucks. Starbucks decided to modify this in 2008. As the price of the product range increased this year, the company decided to provide its products to customers who have more money and are willing to pay more for Starbucks products. Among other things, the company began to focus on image, as many young people visit stores only because of prestige, even though their financial situation is not favorable. The author Purgat claims that image is one of the main factors that influence shopping behavior. (2018, pp. 123 - 142) Such customers are satisfied with the feeling that they are seen by others when they enter and leave the store. In this way, the company also tried to influence the behavioral aspects of the primary segment. In connection with current trends, we can define the basic characteristics of customers as follows:

- people who like to drink coffee, whether alone or in society,
- they like the different types of coffee that Starbucks makes,
- aged 18-60,
- live in or around cities,
- work as professional, managerial and managerial positions,
- socially - responsible people who care about the environment,

[7] Starbucks marketing communication mix: https://research-methodology.net/starbucks-marketing-communication-mix/

- expect the company's service to be at a good level.[8]

Based on the defined characteristics, we can define the primary and secondary segment. The primary segment for the company are men and women aged 25 to 40, who represent up to 49% of the company's total sales. Starbucks strives to reach this group of customers through modern design that is consistent with advertising and decoration, striving to make Starbucks products a symbol of social status. The customers of this group are mostly residents of cities with relatively high incomes, opportunities for professional career growth and focus on society as a whole. The growth of this target group is 3% per year. The secondary segment is young people aged 18 - 24, who account for 40% of the company's total sales. This group can include university students who use cafes as a space where they can study and socialize with other friends. Based on this factor, Starbucks in the US began to adapt the interior of the stores.[9]

Discussion

Based on the data and information from the previous chapter, we will proceed to the definition of marketing and brand strategy of the company. Prior to 2008, the company's strategy was primarily to expand into new markets. This strategy was primary because the company wanted to expand its business into the global environment and want to reach "every household". The implementation of the strategy was characterized by elements of quantity rather than quality. After 2010, the company's strategy changed again and began to focus on the quality of products and individual stores.

Later, the company's strategy focused on an active promotional policy on social networks such as Facebook, Instagram, Twitter. Through social networks, the company spread its good name in an undemanding way among fans who intensively shared their photos with green and white cups and happy smiles. A key element of the strategy of this period was also a change in business. Starbucks was interested in making customers feel comfortable, so he adapted the cafes individually. There were not the same two cafes, all tried to adapt to local customs and traditions. Light wood dominated, the emphasis was on lighting and a place with storage space. It was challenging, but the success did not take long. In 2020, Starbucks had nearly 36 million fans on the social network Facebook and 11.2 million fans on Twitter. 18.4 million followers on the Instagram.[10]

At present, the company's marketing strategy is focused on providing first-class products, maintaining the brand image and the ideal of social responsibility. It follows from the above that the strategy is also focused on customer loyalty. According to Gajanová, Nadanyiová and Moravciková, this is an important aspect for building a brand strategy (2019, pp. 65 - 84). Properly implemented, it can lead to a good reputation for business. Podhorska et al. (2019, pp. 271 - 285).

Starbucks is a global company with a diverse customer base and ever-changing workforce. Diversity and inclusion is not only a business priority but also a necessity. A key element of Starbucks' long-term growth strategy is to create a workforce that reflects the company's community that operates globally. To achieve this goal, Starbucks seeks to create opportunities, attract, develop, retain and engage the future workforce. It focuses on how to continue the strategy of diversity and inclusion in tackling the challenges of increasingly global business. Starbucks needs partners who will be actively involved in Starbucks' efforts. Starbucks sees its greatest potential for working with farmers, partners, customers and like-minded organizations to move the industry forward. Looking to the future, where Starbucks wants to move in five years, it can continue to change the baseline model towards greater sustainability, find new ways to minimize the environmental footprint and create opportunities for young people, thus creating a new workforce for the future.[11]

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[8] Starbucks case study: http://www.slideshare.net/sharvan316/starbucks-case-study-2675777

[9] Who Is Starbucks' Target Audience?: http://smallbusiness.chron.com/starbucks-target-audience-10553.html

[10] *Starbucks legend delivers recovery by thinking smaller:* http://www.theguardian.com/business/2010/jan/21/starbucks-howard-schultz

[11] *Global responsibility report 2014:* http://globalassets.starbucks.com/assets/ea2441eb7cf647bb8ce8bb40f75e267e.pdf

Based on the above information, it can be argued that the overall strategy of the company consists of various factors. These may include a cooperation partnership with a global company, satisfying the needs and wishes of customers, modification of the segmentation structure, monetary stability and the like. All of these factors, according to Olah et. al important for the financial management of the company and can in a positive and negative sense affect the total revenues of the company (2019 pp. 20 - 39). All these factors help to properly fulfill and satisfy the marketing and brand strategy of the Starbucks brand. Based on the findings, it can be argued that Starbucks' brand strategy is currently strong. Which also reflects the fact that customers go to the company only to spend some time there and not to buy the product. Flisikowski and Kucharska claim that brands are considered the company's most valuable asset. (2018, p. 251 - 264) Unlike the authors, Krawczyk adds that the brand is an important competitive advantage in a market environment. (2019, pp. 181 - 191) Nwachukwu and Olatunji argue that taking a competitive advantage can also strengthen the overall optimization of the company. (2018, pp. 15 - 25). But that's a priority for Starbucks. This proves that Starbucks has a strong strategy in place that it can pursue in a global market environment. Mihăilă et al. Shares this view. al (2018, pp. 158 - 164)

Conclusion

Today, the global market is very diverse and companies must adapt to it by applying various forms of communication tools. Starbucks strives to develop a comprehensive approach that contributes to the areas in which it operates while supporting young people who represent future employees for the business. An essential factor on which the entire strategy of the company is based is the focus on the quality of products and customer satisfaction. By meeting the needs and desires of customers, Starbucks believes it will be a leader in the coffee business.

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Earnings Management and Accruals Process

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Abstract

The main aim of this paper is to approach the theoretical background of earnings management in connection with the detection of accruals. Earnings management is legal management of profit within the legal framework, but it should be noted that earnings management involves creative accounting techniques, the use of which may call into question the true and fair view of the financial performance of the business. In practice, there may be opportunities to influence accounting information through the use of different methods and techniques, as a result of which the financial statements lose their function and thus misrepresent the accounting data. Because accruals are used as a key indicator that shows the performance of a business, it can be used to make the business performance look different from the actual position of managers. If there is a discrepancy between the timing of cash flows and accounting recognition of the transaction, accruals are increased. In this paper we specify the theoretical background of earnings management in connection with the detection of accruals, where we use the method of description and classification of scientific terms. We illustrate the accruals in connection with earnings management through an example focused on revenues recognition and total accurate balance.

Keywords: Earnings Management, Earnings, Accruals, Revenues, Total Accrued Balance.

Introduction

When it comes to rapid changes in the global business environment, more and more companies are realizing the impact of revenue management on global business (Hudakova et al., 2018). Every company has economic and moral responsibility to external entities for good financial results (Durica et al., 2019). Relevant information is essential for effective and efficient corporate governance (Rybicka and Rybicki, 2018). Due to the manipulation of financial information, the actual financial situation and operating results of companies cannot be reflected in users of financial information (Certin and Ugur, 2015). A disadvantage that the manipulation of accounting information can cause is the division of financial resources into areas that are not able to allocate them efficiently, which results in additional costs in the economy (Küçükkocaoğlu and Küçüksözen, 2005). In general, global leaders and accountants should carefully consider their decision-making process when analyzing earnings performance (Kovacova et al., 2019a) and also consider the vicious link between revenue management and financial performance and with reference to the reputation of the organization (Huynh, 2019). According to the concept of profit manipulation, most entities imagine how companies are trying to influence revenues and expenditures due to lower tax payments. Many businesses manipulate profits to maximize business value. And revenue management is one of the methods companies use to manage profits on an accrual basis. It is this that reflects the motive for writing this article on accruals related to earnings management, which is used as a key indicator of the company's performance and which can be used to make the company's performance look different from the company's actual performance. In this paper, we specify the theoretical basis of earnings

management in connection with the determination of accruals, where we use the method of description and classification of scientific terms. We illustrate the accruals in connection with revenue management with an example focused on revenue reporting and the overall exact balance.

Theoretical Background

Earnings

Earnings are the most important item in the financial statements (Svabova et al., 2020) which plays an important role in attracting investors and therefore the management of the company strives to maximize the results of the financial statements (Susanto et al., 2019). For this reason, managers constantly monitor earnings for each period (Valaskova et al., 2015) and subject it to different calculations or future forecasts. Managers and corporate analysts use a wide range of tools, algorithms, and methods, while the goal of these entities is the same: to predict the future development of corporate financial health (Kovacova et al., 2019b). The reported profit values are then compared with analysts' forecasts, which also affects stock prices. Any investor wishing to buy shares must be adequately informed and have an overview of the financial situation of the individual companies operating on the market since investing in the purchase of securities presents a high risk from the investor's perspective. Therefore, individual investors invest their funds in companies that show potential profitability. If the reported profit coincides with the analysts 'estimates, then the market share price will rise, and conversely, if the reported profit values differ from the analysts' estimates, then the market share prices will fall. In addition to stock prices, profit also affects the remuneration of the managers of the business. Managers strive to keep their profits between their minimum and maximum levels, resulting in their ability to increase their bonuses by overestimating their reported profits. If the reported profit reaches the maximum possible bonus value, managers' motivation will consist of accumulating reported profit for further use by taking specific steps to reduce the reported profit (Healy, 1985).

Earnings management in connection with the detection of accruals

According to McKee (2005), earnings management is purposeful and legal management of decision-making and reporting to achieve stable and predictable financial results. It is legal management of profit within the legal framework, but it should be noted that earnings management involves creative accounting techniques, the use of which may call into question the true and fair view of the financial performance of the business. In practice, there may be opportunities to influence accounting information through the use of different methods and techniques, as a result of which the financial statements lose their function and thus misrepresent the accounting data. Earnings management reduces transparency in financial reporting and that is why managerial restriction induced by a lack of privacy can damage the interest of external subjects (Arya et al., 2013). One author explains that reducing financial limitations of enterprise can be the goal of the earnings management, because of obtaining higher external capital (Sosnowski, 2018). Earnings management measures are derived from an accrual approach (Suprianto et al., 2019). The essence of accruals is to present the true performance of a particular business by recording revenue and expenses in the period in which they were incurred. Accruals in the accounting language can be understood as the timely recording of a financial event on the account, taking into account the principle of periodicity, without taking account of cash inflows or outflows. Accrued charges are recorded to the relevant account the effect of transactions and other events when the transactions and events are carried out and reported in the financial reports for the period and not when they are withdrawn or paid with cash or cash equivalents (Örten et al., 2011). In other words, it can be pointed out that, on an accrual basis, the resulting financial transactions and events in the enterprise are reflected in the financial statements without having to wait for the transactions to be converted into cash. Richardson, Sloan, Soliman and Tuna (2005) state that the cash account will be the only asset or liability item to be presented in the balance sheet because of the more comprehensive description of accruals, in the absence of accruals-based accounting. The reason why this is so is that other assets and liabilities are the result of accrual-based accounting. In other words, all assets except cash are included in the decision-making process

using accruals. Accruals are therefore a means of assessing and measuring performance by accounting revenue (Balsari et al., 2010). Because accruals are used as a key indicator that shows the performance of a business, it can be used to make the business performance look different from the actual position of managers. Subramanyam (1996) asked the question: Why do managers decide to use manipulation concerning accounting accruals. There are at least two aspects from which this issue is important. The first consideration is the interest of users of financial statements in how to interpret discretionary accruals and how to increase these numbers and how to reduce the reported earnings. The second aspect is the tendency of standards makers to take measures to limit the ability of managers to exercise discretion in the reporting process. This decision is based on the assumption that the exercise of their accounting discretion is carried out by managers for their benefit. The total accrual is divided into discretionary and non-discretionary accruals. Discretionary accruals are the accruals that emerge depending on the discretional power or unexpectedly, and they are also called abnormal accruals or unexpected accruals. Nondiscretionary accrual is also named as normal accruals, and they are the accruals that are related to routine operations of the enterprise. Discretionary accrual is generally used as a measure and an indicator of accounting policy choices of managers, and the degree of discretionary accruals is estimated (Certin and Ugur, 2005). The overall increment is the starting point that is important in measuring and estimating discretionary accrual. Several studies report that models that can measure accounting quality and thus earnings management divide the total accrual into a discretionary and non-discretionary accrual (Teoh et al., 1998). In some studies, as a result of this distinction, the discretionary accrual amounts are indexed to the total assets or the sales revenue amount, and the tendency that comes into view in this index by years is accepted to be the indicator of financial information manipulation devoted to various purposes. The discretionary accrual is indexed according to the total assets or the sales revenue amount, and the tendency that occurs in view in this index by given years is accepted to be the indicator of earnings manipulation (Tekin and Kabadayı, 2011).

Accrual Studies

There is a large extent of research examining the effects of characteristics of enterprises on earnings management practice, in which accrual plays a significant role (Khanh and Thu, 2019).

Table 1: The accrual-based earnings management models

Models	Year
The Ronen and Sadan model	1981
The Healy model	1985
The DeAngelo model	1986
The Jones model	1991
The Modified Jones model	1995
The Jeter and Shivakumar model	1996
The Beneish model	1997
The Teoh, Welch and Wong model	1998
The Margin model	2000
The McNichols model	2002
The Hribar and Collins model	2002
The Dechow and Dichev model	2002
The Larcker and Richardson model	2004
The Kothari model	2005
The Pae model	2005
The Stubben model	2010

The present review of the scientific literature in this area points to diversity (Novak Sedlackova et al., 2019) because each of the models uses the different intensity of measurement of earnings management (Hollowell et al., 2019). Ronen and Sadan (1981) created a model that first stimulated

the accrual modeling stimulus. It is based on the modeling of costs classified according to the profit and loss statement and also the analysis of long-term trends in the area of earnings development through a two-level regression model. The purpose of this model is to reduce earnings variability by generating a balanced figure that is close to the long-term average earnings, the so-called trend of income. In the following figure, we can see the process of balancing earnings showing two situations. The first situation is an overestimation of reported earnings when true earnings are below the trend line, which means that the enterprise does not get above the long-term trend. The second situation is the opposite, and therefore, true earnings above the trend line represent an underestimation of earnings for the enterprise.

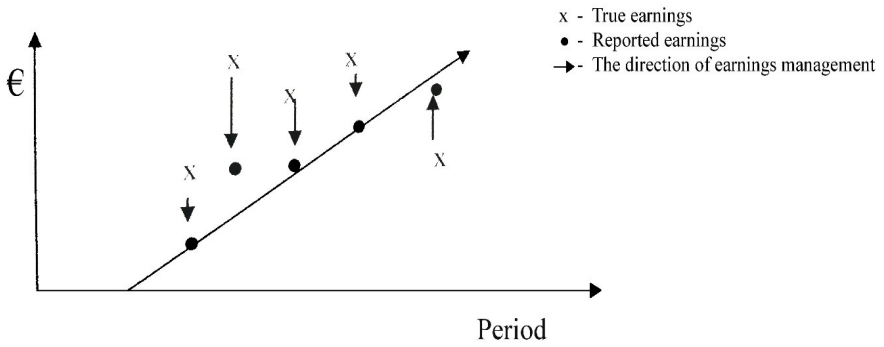

Fig. 1: Smoothing around Trend Income

As part of the process of smoothing earnings, the individual items in the profit and loss account are timed as the enterprise is required to report total actual earnings. When estimating trend earnings, the reported earnings may also deviate from the trend. The deviation can move in both positive and negative directions. In case of a positive deviation of the reported earnings from the trend, the company can manage the earnings downwards and in case of a negative deviation again up (Ronnen and Yaari, 2008). The essence of the Healy model (1985) is the total accrual consisting of a non-discretionary accrual where the author assumes that its value is not always zero and a discretionary accrual different from the long-term average of the total accrual. The average overall accrual is perceived by the author as a differential variable, based on which it classifies the sample of the enterprises into three groups. The first group contains companies with the assumption of legal manipulation of earnings by increasing it. The other two groups of companies are focused on manipulating earnings by reducing them. The author concludes that the total average accrual in the first group of enterprises is evaluated using a pairwise comparison of the average total accrual in the two remaining groups of enterprises. When we subtract the non-discretionary accrual from the total average accrual, we get discretionary accrual. An increase or decrease in the accrual is accompanied by an increase or decrease in the enterprise's revenue, resulting in a deviation in the non-discretionary accruals estimate (Hoglund, 2012). A prerequisite for the DeAngelo model (1986) is the equality of the non-discretionary accruals and the overall accrual of the immediately preceding period, which results from the 'random walk' process to which the accrual meets. This model is a special case of the Healy model, where the non-discretionary accrual estimation period is limited concerning the immediately preceding period. For both models, the total accrual is used to estimate the expected non-discretionary accrual. The DeAngelo model and the Healy model can measure non-discretionary accrual flawlessly if the non-sparking accrual is steady and the mean discretionary accrual is zero. Which model is more appropriate to use is determined by the nature of the time series exhibiting the non-sparking accrual. Rather, the DeAngelo model is used to estimate a non-discretionary accrual that is consistent with the “random walk” process, while the Healy model estimation refers to the “white noise around average” process. The Industry Model relaxes the assumption that nondiscretionary accruals are constant over time. Instead of attempting to model the determinants of nondiscretionary accruals directly, the Industry Model assumes that the variation in the determinants of nondiscretionary accruals is common across enterprises in the same industry The power of this model to decrease the measuring error in discretionary accruals depends on two factors. The first factor is the fact that the Industry model meets only the change in the nondiscretionary accruals that

are common for the enterprises in the equal sector. If the changes in nondiscretionary accruals to a great extent reflect the changes special to the conditions of the enterprise then this model will not be able to exclude the discretionary accrual indicators from nondiscretionary accruals. The second factor is the fact that this model presents the discretionary accruals that are interrelated among enterprises in the equal sector. This situation can cause a problem with the existence of earnings management. The greatness of this problem depends on how related is the motive of earnings management among the enterprises in the equal sector (Yurt and Ergun, 2015). The Jones model (1991) takes into account the impact of changes in the economic situation in a business relative to the non-discretionary accrual, using independent variables, which are tangible fixed assets and sales, expressing their linear regression. According to this model, the profit series of individual enterprises are divided into two subperiods. The estimation period represents the first stage when the discretionary accrual value is zero. Jones's model expresses the relationship between the short-term accrual, the so-called. working capital accrual and change in sales, or the relationship between depreciation and long-term assets. With the help of regression, it is possible to estimate the necessary coefficients α0´, α1´, α2´. Consequently, estimates of these factors can be implemented in the second stage formula, which is the "event period" when the discretionary accrual value is not zero, which implies the existence of earnings management. Jones points out several assumptions of the model. The first assumption is that within the “estimation period” individual enterprises do not implement earnings management because this assumption points to its biased measurement. The second assumption considers that the coefficients do not change over time, which may have an impact on the selection of the set of individual enterprises (Hoglund, 2012). The third assumption is based on non-discretionary revenue and says that in the case of discretionary revenue management, some of the earnings may be removed from the discretionary accrual estimate. Jones's model contains the error I and II. type. A type of I error assumes the detection of earnings management, although it does not occur, by a type of II error is not revealing earnings management in case of its occurrence (Bernard and Skinner, 1996). Dechow, Sloan and Sweeney (1995), to improve the specification of the original Jones model, suggested adjusting the change in sales by a change in receivables. The modification aimed to reduce the error in the measurement of discretionary accrual if it was created using revenue. In the case of time series analysis, the first stage of non-discretionary accrual estimation is taken from the original model. The modified model assumes that any changes in sales revenue from the provided credit are the result of earnings management. It is questionable whether the proposed modification improves the original model. Another of the authors, Jeter and Shivakumar (1999), modified the original Jones model in which they defined cash flow from operating activities as a non-discretionary part of earnings management, trying to improve Jones's model to measure earnings management in companies with extremely reported cash flow. McNichols (2002) continued to modify the original Jones model by adding CF of the previous, present, and future periods. Teoh, Welch, and Wong (1998) adjusted the Jones model using the short-term accrual, which they expressed as the difference between the change in non-cash short-term assets and the change in short-term operating liabilities, thus identifying the non-discretionary part of the short-term accrual through business growth. Kothari et al. (2005) presented a modification of the original Jones model, also known as "performance matching", offering two approaches. The first is the matching of similar businesses, which alleviates the need to estimate the discretionary accrual by the least-squares method. The second, linear approach, involves taking into account the return on assets to regulate the performance of the organization. Author Beneish (2001) created a model focused on identifying earnings management from organizations dealing with significant financial performance, and examines actual earnings management occurrences, comparing the performance of the model to that of the aggregate accrual approaches, particularly the modified Jones by Dechow et al. (1995). The method establishes a distinction between GAAP violators and aggressive accruals. Peasnell et al. (2000) introduced an alternative model for accrual estimation, known as the so-called "Margin model". They used cross-sectional data to mitigate the weaknesses of the Jones model. They took a two-step approach from the original Jones model but used the working capital accrual as an estimate for the overall accrual and different explanatory variables - sales and customer cash. The authors argue that the Margin model generates relatively better specific accrual estimates when cash flow levels are extreme. They consider the original Jones model to be stronger in the case of manipulation through sales and bad debts. They consider the Margin model stronger in the case of cost manipulation detection. Hribar and Collins (2002) point out that calculating the accrual using balance sheet data can cause different

errors and that is why they detect earnings management using the total accrual (discretionary and non-discretionary accrual) calculated using the net operating cash flow reported in the cash flow statement. Dechow and Dichev's model (2002) focuses on working capital accrual and operating cash flow. The authors consider working capital and operating cash flow as short-term characteristics and therefore expect their changes during the year. Lacker and Richardson (2004) have added an accounting market ratio and cash flow from economic activity to the Modified Jones model to mitigate measurement errors associated with the discretionary accrual. The discretionary accrual represents the difference between the total accrual and the estimated non-discretionary accrual. The Pae model (2005) was created to estimate the discretionary accrual. Its goal is to increase the predictive power of the Jones model and the modified Jones model in the form of an expansion containing variables that capture operating cash flow. The Stubben model (2010) focuses on discretionary revenue, with the use of revenue to estimate discretion eliminates error measurements, thereby reducing data distortion. This model is more specific compared to other accrual models for three reasons. First, it assumes that discretionary revenue reflects the accrual of claims and that accrual of claims is more directly related to revenue than the working capital accrual. Second, the model takes account of reported revenue rather than cash receipts. Third, it examines the accrual of claims separately in the fourth quarter, as they are less likely to be recorded before the end of the year. The result of this model is to avoid excessive discretion when revenue for the fourth quarter is relatively high or to understand discretion when revenue is relatively low.

Revenues recognition and total accrued balances

Empirical research contributions have explained earnings management in connection with the detection of accruals. If there is a discrepancy between the timing of cash flows and accounting recognition of the transaction, accruals are increased. A substantial example of this is revenue recognition. The following table shows the accrual process by the medium of recognition of revenues after customer advance cash and before total collection.

Table 2: The accruals process and revenues recognition

Period	Event	Cash flow	Accounting recognition of revenues	Accrual
1	Advance from a customer	Inflow of advance	-	Increase in unearned revenues
2	Shipment of merchandise to the customer	-	Recording of revenues	Increase in accounts receivable
3	Customer settles his account	Inflow of the final payment	-	The decrease in accounts receivable

From the table, we can see that advance from customer causes a liability called unearned revenues. In the next period, the goods are delivered to the customer, which results in a decrease in unearned revenues, and at the same time, there is an increase in accounts receivable. The final payment from the customer decreases the assets called accounts receivables. Revenues reported by an enterprise must equal total cash inflows and total accrual must equal zero. The result of this equality is the accrued balance of assets and liabilities reverse and thus in our case after the customer receives the delivery of goods the unearned revenues liability is reduced to zero and after the customer settles his account the accounts receivable assets are reduced to zero.

Total accrued balances of an enterprise in a given period can be expressed by the equation:

$$EBTA_{it} = DA_{it} + NA_{it} + Reversal_{it} + EBTA_{i,t-1} \quad (1)$$

where:

$EBTA_{it}$ ending accrued balances of an enterprise in period t

DA_{it} discretionary accrual of enterprise resulting from transaction and events occurring in period t

NA_{it} non-discretionary accruals of enterprise resulting from transaction and events occurring in period t

$Reversal_{it}$ The reversal in period t of balances accrued by the enterprise in the previous period t-1

$EBTA_{i,t-1}$ accrued balances of an enterprise in period t-1

Based on the above equation for calculating total accrued balances, we suppose that an enterprise makes 800€ sale and a normal credit period is 30 days. Sale can not be made without deallocation of credit policy and that is why an enterprise boosts its earnings by agreeing to 50% in 30 days and the remaining 50% payment in 60 days. The following table shows the decomposition of account balances and accruals.

Table 3: The Total accrued balances of an enterprise

Indicator	Period in months			
	1	2	3	Total
EBTAi,t-1	0			
EBTAit	+800	400	0	
DAit	+400			+400
NAit	+400			+400
Reversal		-400	-400	-800
Total				0

Based on this table we can see that in the first month both non-discretionary accrued balance and discretionary accrued balance increase by 400€. In the following month, the non-discretionary accrued balance is reduced by 400€. In the third month, discretionary accrued balance is reduced by 400€. The payments of 400€ in the second and third months represent reversals which make safe that changes in accrued balances are equal to zero.

The ability to manage earnings is narrowed by the reversals of accrued balances. We focus on revenues in the current period, which is increased by delivering unsolicited goods to the customer. Based on the unsolicited delivery of goods, the claim and return of goods from the customer are expected in the following accounting period. This is the so-called channel stuffing whose goal is restructuring of transactions when customers are offered excessive discounts to make early purchases to support sales. The revenues in the following accounting year are thus reduced by sales returns and accounts receivable accrued balance thus reverses. We suppose that in the following period unmanaged earnings and expected reported earnings will be equal. That is why the enterprise has to redouble managed earnings for compensation of the negative impact of the reversal of earnings management from the previous period. Reversals are important but the most empirical research ignores them because they are undetectable. The most empirical research contributions compare total accrual with a divergence between ending and beginning accrued balance. It can cause an error in the measurement of accruals. The following figure gives an example.

CASH			ACCOUNTS RECEIVABLE			SALES	
BB	50		BB	80			
	1800		NDA	200			2000
			DA	50			50
	80				80 (Reversal)		
EB	**1930**		**EB**	**250**			**2050 EB**

Fig 2. The Difference between the beginning and ending accrued balances

The beginning balance (BB) of cash is 50€ and the beginning balance of accounts receivable is 80€. Beginning accrued balance of accounts receivable is paid in the current year. Enterprise realizes two sale transactions. The first transaction represents the normal sale of 2000€. This sale causes an increase in non-discretionary accruals (NDA) by 200€. The second sale represents channel stuffing that causes an increase in sales and discretionary accruals (DA) by 50€. The change that occurred in balances of accruals is 170€ which was calculated as 250€ minus 80€. It is equally as differences between earnings and cash flow which was calculated as 2050€ minus 1880€ but we can see that total accrual consisting from non-discretionary accrual and discretionary accrual is 250€ which was calculated as 200€ + 50€. A reversed beginning balance of 80€ caused this difference. If the beginning balance was not paid in the current year, the difference between beginning balance and ending balance reflects total accrual consisting of non-discretionary and discretionary accruals as would difference between revenue and cash flow. Based on the example we can see that many empiricists ignore reversals and they implicit correct for the omission by relating their measured accruals to the difference in sales rather than to sales. Measurement of accruals which is done by ignoring reversals is defeated in all that managers purposefully accrue during the current year.

Conclusion

As noted above, most of researched studies has identified earnings management with the detection of accruals. Accruals arise when there is a discrepancy between the timing of cash flows and the accounting recognition of the transaction what we illustrated through an example focused on revenues recognition and total accurate balance. We found that advance from customer causes a liability called unearned revenues. The final payment from the customer decreased the assets called accounts receivables. Revenues reported by an enterprise had to be equal total cash inflows and total accrual had to be equal zero. The result of this equality was the accrued balance of assets and liabilities reverse and thus in our case after the customer received the delivery of goods the unearned revenues liability was reduced to zero and after the customer settled his account the accounts receivable assets was reduced to zero. Then we explained example relation to reversals where we pointed out the difference between the beginning and ending accrued balances and we found that if the beginning balance was not paid in the current year, the difference between beginning balance and ending balance reflects total accrual consisting from non-discretionary and discretionary accruals as would difference between revenue and cash flow. Based on the example we could see that many empiricists ignore reversals and they implicit correct for the omission by relating their measured accruals to the difference in sales rather than to sales. Accrual measurement, which is done by ignoring reversals, is defeated in everything that managers intentionally gain during the current year, which can lead to the use of earnings management.

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Strategic Management and Its Specifics in Conditions of Non-Profit Organizations

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Abstract

Strategic management in the environment of non-profit organizations is a frequently discussed topic. Strategic management in the conditions of non-profit organizations is based on the concepts that are applied in the conditions of companies. The comparison of strategic management in the commercial and non-profit sector brings some differences. The most important difference is that the non-profit organization bases its management on its mission, which is superior to all partial processes, decisions and tasks that take place in the non-profit organization. The article focuses on strategic management in the conditions of these organizations and its aim is to identify a suitable method that would be universal and could be applied to the management of non-profit organizations, regardless of the subject of activity. As there are no specific management concepts that would be created exclusively for the non-profit sector, we decided to deal with two selected concepts - the classical and BSC method. We used the comparison methods that were used to assess the suitability of the classical control concept and the BSC control method, and based on the comparison, we chose the appropriate method, which we subsequently modified. The hypothesis was chosen on the basis of specific elements of non-profit organizations, namely that it will be necessary to modify the selected concept of management in non-profit organizations so that strategic management corresponds as much as possible to the needs of non-profit organizations.

Keywords: Non-Profit Organization, Strategy, Strategic Management, BSC Model

Introduction

Compared to the business sector, the non-profit sector is specific with certain features. When we look at the non-profit sector as a separate area of the national economy, the primary difference that distinguishes it from the commercial sphere is that its primary goal is not to make a profit. It consists of non-profit organizations whose goal is to provide public services (Drucker, 2016). These services are provided in various areas of the country's economy - e.g. in the fields of health, education, science and research, culture, child and youth work, protection of human rights, etc. Anheier and Salamon specified 5 basic aspects that are characteristic of non-profit organizations:

1. non-profit organizations have a formal structure; that means they are to a certain extent formalized, respectively. institutionalized,
2. are of a private nature, which means that they are to a certain extent separate from the government;
3. they do not make a profit, so they are unprofitable. Thus, they do not have a primary goal of making a profit. Although non-profit organizations can make a profit, it is never distributed to the owners, but is

returned to the non-profit organization's budget and is used to cover the activities of the non-profit organization.
4. they are self-governing, which means they are not dependent on being run by the state.
5. they are voluntary, so their activity, as mentioned above, is based on the work of volunteer workers (Anheier and Salamon, 2000).

In the current economic environment, great emphasis is placed on the management system in non-profit organizations (Borisova, et al., 2019). As there is no separate concept governing the management system for non-profit organizations, we must rely on the concepts used in the business environment. Any management of organizations, companies or people is currently based mainly on business area (Crotty and Ljubownikow, 2020). The comparison of a non-profit organization and a business entity brings several differences, even in the field of management.

Unlike commercially oriented companies, non-profit organizations work with a more complex system of organizational goals (Drucker, 2016).

Another difference is that personnel management is more complex for non-profit organizations than for companies, because many people with volunteer status can work within a non-profit organization. In the case of non-profit organizations, great emphasis is placed on the financial aspect, because the main source of funding is contributions from donors, which are obtained mainly from the external environment. In some cases, a non-profit organization may make a profit and it automatically becomes part of the funding source and cannot be distributed among the owners of the organization. Even in the case of non-profit organizations, the monitoring of financial results allows the prediction of financial stability in future periods (Bartosova and Kral, 2017).

Financial management undoubtedly belongs not only to the business sector, but also to non-profit organizations. These organizations must constantly seek sources of funding and
and decide how to combine them so that they can fund all their activities. Valaskova et al. considers financial behavioral aspects of decision-making itself to be key in financial decision-making, as they can be used to explain why some market areas appear ineffective for organizations (Valaskova, et al., 2019). In financial management, the author Brabenec recommends to use modern methods of financial management in the conditions of current markets (Brabenec, 2010).

It is important that the non-profit has a developed area of management, on which the success of the non-profit organization in the target market depends. According to Blazek, the term management means the process within which the control object, ie. the individual or group sets goals and, depending on the behavior of the managed entity, then selects appropriate tools, techniques or procedures, through which the effective achievement of the set goals will be ensured (Blazek, 2014). Another definition looks at management as a process of coordinating the activities of a group of workers, which is carried out by an individual or a group of people in order to achieve given results that cannot be achieved by individual work alone (Donelly, et al., 1997).

The concept of strategy is also closely connected with the management system. We can understand the strategy as a direction that must be followed in order to achieve the set goals. Even in the conditions of non-profit organizations should be determine strategies that will enable them to achieve and also maintain a competitive advantage (Chijioke, et al., 2019). This is the overall process of steps that we need to take to meet the objectives set. As part of strategic management, non-profit organizations try to reconcile the internal environment of the organization with the external environment, which takes place at a professional level (Bryce, 2017). The result of this process is a strategy that determines the development and direction of the non-profit organization, specifying the way in which the set goal will be realized. Author Drucker considers strategy to be an essential tool through which an organization can translate intent into the end result (Drucker, 2016). By Nica, et al. considers it advantageous to use artificial

intelligence to evaluate the success of strategic decisions that have been made in the organization. (Nica, et al., 2019).

Authors Donnelly, Gibson and Ivancevich define strategic management as a process that consists of examining market conditions, customer needs and expectations, a process that specifies strengths and weaknesses, as well as a summary of the effects of the internal and external environment. These aspects can bring interesting market opportunities for non-profit organizations, but on the other hand, the organization learns about possible threats in the market. (Donelly, et al., 1997). It is very important to deal with market risks, because they are an important factor in influencing the competitiveness of organizations operating in the market (Hudakova, et al., 2018). The author of Cera is of the opinion that younger non-profit organizations may be more vulnerable in terms of their strategic management compared to organizations that operate on the market for longer (Cera, et al., 2019). The strategic levels that are part of strategic management are shown in Figure 1.

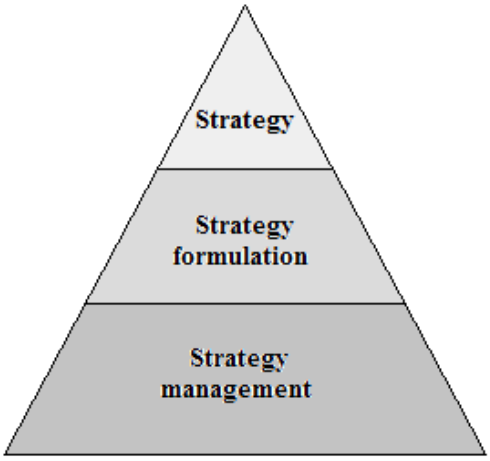

Figure 1: The parts of strategic management

Source: own processing

Alani, et al. states in its publication that strategic orientation is considered a principle through which organizations are able to innovate (Alani, et al., 2019).

Author Hagoort, in turn, distinguishes three dimensions of strategic management, among which he included: context, content and process. The first dimension is the context, which includes internal and external aspects. The subject of the internal context is the internal organization of the organization, organizational structure and also strategic performance. The content of the external aspect of the context is represented by competitiveness and other factors that have an immediate influence on strategic decision-making (Hagoort, 2001). By Olah, et al. considers trust in organizations to be a crucial element in building an organization's competitiveness (Olah, et al., 2017). Strategic decision-making belongs to another, second, dimension, namely content. The content focuses on the emergence of the mission and value systems. The last dimension, the process, already brings concrete solutions, which consists in the selection of a specific strategy that can best achieve the set goal and also determines how the organization will implement it in practice (Hagoort, 2001).

Methods

In this part of the article we deal with the comparison of two models of concepts that can be used in the environment of non-profit organizations in connection with their strategic management.

The first model is based on the classical approach to strategic management and the second model is based on the BSC method, which can also be applied not only in the commercial sector but also in non-profit organizations.

Classic concept of strategic management

The basic premise of an effective strategy is the creation of a certain structure or framework. The strategic framework of the basic concept is applicable in the for-profit, commercial sector as well as in the non-profit sector in the conditions of non-profit organizations. The output of strategic management is the compilation of a strategic plan. In the context of non-profit organizations, the strategic framework would include the following aspects: the most important is the mission, which is superior to the management in the organization. Another important aspect is to perform the analysis, both in the context of the company's internal environment as well as in the external environment. Based on this analysis, the non-profit organization is able to specify the opportunities in the market, or market gaps that it can use to its advantage and, on the other hand, can identify threats that may pose a disadvantage for its market operations. The strategic framework within the classical concept is shown in Figure 2.

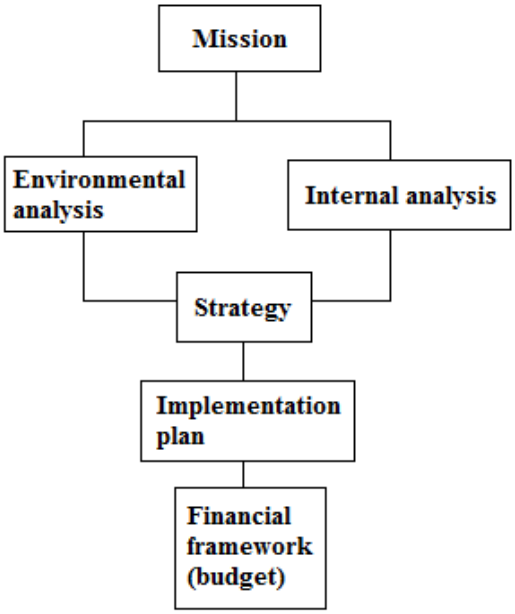

Figure 2: Strategic planning framework in non-profit organization

Source: own processing

Mission

The starting point of any strategic planning is the mission itself, which gives us information about what are the intentions and reasons for the existence of the organization and also its goals. The mission describes the direction of the organization in the long run. Its essence is therefore the setting of long-term goals and the related determination of an appropriate strategy, thanks to which these goals will be achieved. The mission of a non-profit organization should meet the following conditions: it should be clear, concise, concretely formulated so that the mission is understood by all members of the organization and they do everything possible to ensure that the mission is fulfilled.

Environmental Analysis

This analysis is aimed at examining the environment in which the organization operates. For a non-profit organization, the external environment represents a set of factors of a wide environment, which create a certain framework, certain conditions within which it carries out its activities. We could mention factors such as political, cultural, environmental, social, technological, political and legislative conditions in their specific form over the time horizon under consideration in terms of strategy-making. The immediate surroundings of a non-profit organization are persons to whom public benefit services are intended, this also includes other non-profit organizations that pursue the same or similar purpose as the considered non-profit organization and also donors, the public, financial institutions, etc. The analysis of the environment provides the non-profit organization with information about possible threats and opportunities in the market.

Internal Analysis

The internal analysis focuses on identifying the strengths and weaknesses of the organization itself. The most effective way to examine the internal environment is to conduct an audit of the organization, through which it is possible to identify key problems of the organization. The data obtained then help to identify priority problems and their solutions. The basic issues that should be addressed in the internal analysis are the following:

• What is the nature of the programs that the organization provides?
• Who are these programs for?
• What is the level of success of each program?
• How does society perceive the programs?
• What score do we achieve compared to a similarly focused non-profit organization?
• How can we improve individual programs?
• What are the costs of each program?
• Who runs a non-profit organization?
• At what level is the remuneration of the organization's employees?

In strategic management, we must therefore take into account the following elements: At the top of the entire management is the mission of the organization. Based on the mission of the organization, we can perform an analysis of the external environment and an analysis of the internal environment. After performing the analyzes, the strategy itself comes into play. The strategy needs to be planned and must also include a financial framework, ie. a budget must also be planned for the strategy, when the organization must set aside a certain amount of money that it will invest in implementing the strategy in practice.

S*trategic Management According to the BSC Method*

The BSC method is used to measure the performance of organization or enterprise. This method connects the individual goals of the organization and serves as a means to sustain the goals and strategies of the non-profit organization. It presents four perspectives that allow to achieve an optimal, balanced state between short-term and long-term goals, as well as between outputs and processes, while the basic intention is to achieve the so-called. integrated strategy. In the basic context, the objectives of the strategies are divided into four areas, which are as follows:

A) Financial perspective: this is an essential area, as it points to improvement, resp. deterioration the financial performance of an organization when we implement a specific strategy. For non-profit

organizations, it is necessary to consider the relationship to public administration and whether certain financial success can be achieved.

B) Customer Perspective: This focuses primarily on the customer, respectively user of the service provided and evaluates the level of satisfaction of the needs of the target subject.

C) Internal Processes: these are all processes that take place within an organization and must be effectively applied to meet customer needs. Any non-profit organization should endeavour to ensure that, in an area in which it excelled and to meet the expectations of donors who have provided it with the funding to ensure its mission and activities.

D) Learning and Growth: This aspect is directed towards the inside of the organization and pursues the improvement of abilities of the staff working for the non-profit organization. In this case, the question is whether we can improve services even further and whether we are able to make changes.

The basic principles of the BSC method are as follows:

• clarification and updating of the strategy, through which we can focus on future periods;
• the strategy is analysed within the organization and thoroughly discussed;
• the sub-objectives of the individual departments are linked to the overall strategy;
• obtaining feedback on the performance of individual processes;
• we can specify the threats and risks that exist in the market.

The prerequisite for any strategy is the specification of long-term goals and related sub-goals. The BSC method is used to measure the performance of a given organization. This method connects the individual goals of the organization and serves as a means to sustain the goals and strategies of the non-profit organization. It presents four perspectives that allow to achieve an optimal, balanced state between short-term and long-term goals, as well as between outputs and processes, while the basic intention is to achieve the so-called. integrated strategy. In the basic context, the objectives of the strategies are divided into four areas, which are as follows:

The aim of the article is to compare selected concepts for strategic management in the environment of non-profit organizations and to select a suitable variant that would be more effective in terms of management of these organizations. Part of the goal is also to determine whether the selected concept can be applicable to non-profit organizations without modification, inasmuch as the strategic management is based on concepts that are primarily intended for enterprises. We work with the hypothesis that a concept that is applicable in the business environment will require some modifications for use in non-profit organizations.

Results

Based on the analysis, in which we assessed selected conceptual approaches to strategic management in non-profit organizations, we would recommend the use of the BSC method. We consider the BSC method to be a more suitable method precisely because it is possible to link the set goals of the organization to the final context of the overall strategy. The essence in this case is to maintain a balance within the organization and its organizational structure, with great emphasis on internal communication. Although the BCS method is applied in practice mainly in the conditions of enterprises and measuring their performance, in our opinion, it would bring beneficial effects in the environment of non-profit organizations. We have created a universal framework for solving strategic management in non-profit organizations to streamline the results of their activities in the future.

In the basic sense, the BSC strategy is implemented on the basis of four key areas, which include the area of customers, finance, growth and internal processes. In the conditions of non-profit organizations, we would recommend modifying these areas into the following units: the financial area, the public, the internal processes of the organization and cultivation. According to the modified areas, the strategic framework of the BSC method would look like this:

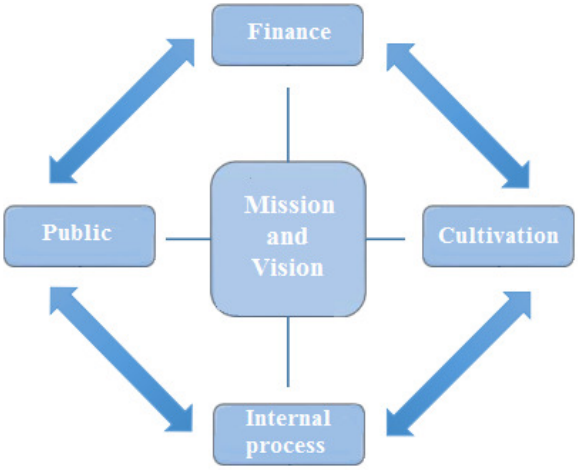

Figure 3: Modified framework according to the BSC concept for use in the environment of non-profit organizations

Source: own processing

As for the area of finance, it is very specific in the case of non-profit organizations. Since non-profit organizations are not created for profit, we cannot count on profit as a source of funding. In the conditions of non-profit organizations, funding is dependent on contributions from donors, from which they cover their activities. It is from this point of view that we propose that non-profit organizations address the following issues when applying strategic management within the modified form of the MSC method:

• How do we ensure the financial stability of a non-profit organization?
• How correctly will we present our position to potential donors?
• How do we want to maintain stable relationships with our existing partners?
• How do we intend to establish new relationships?
• How will we allocate resources with respect to the organization's mission?
• At what level are we able to transform the mission into a fundraising system?

The second area after the modification of the BSC method is presented by the public as another key area for non-profit organizations. In this case, we recommend non-profit organizations to place great emphasis on communication with the public, based on which the non-profit organization can assess at what level the services are provided to target entities, or which service would be welcome for specific target entities, etc. The basic issues that should be addressed in relation to the public are the following:

• What services do we include in our program?
• What is the interest in the provided program?
• What is our target segment?
• What can we do to increase the target group's interest in our services?
• What communication channels do we choose?
• What resources are we able to allocate for communication and marketing purposes?

Internal processes should be understood as the arrangement and structure of goals within the organization. We would highlight this area the most, mainly due to the fact that the balance in the fulfillment and balancing of goals at the next levels of the strategy depends to a large extent on internal processes. The initial definition of internal processes and the subsequent formulation and control of partial goals can achieve a balance within the non-profit organization, and it is thanks to this that goals that are outward-facing, towards people, can be effectively fulfilled. In this area, we emphasize the following questions that every non-profit organization should ask itself:

- What is the formal structure of our organization?
- What are the informal relationships in the internal environment of the organization?
- Who has the specific tasks and why?
- Is our work structure sufficient within the current needs of the organization?
- Can we respond flexibly to change?
- Does our non-profit organization enable the provision of retraining and training for its employees?
- What is our remuneration system and how is it set up? Should changes be considered?

As for cultivation, it should proceed through all levels of the strategy, because cultivation is directly linked to the mission of the non-profit organization. Through it, there are partial penetrations with the area, which focuses on the target market segment and undoubtedly also with the area of internal processes. To some extent, the area of cultivation should focus on linking and then balancing the mission and internal processes. In this case, we are talking about inward cultivation of a non-profit organization, ie. applies to members, volunteers and all staff. In the case of outward cultivation, we would be talking about cultivating a specific segment of the market, that is, the people we are targeting. Within this section, non-profit organizations should address their own revitalization program, training of employees in specific key activities, e.g. this could be capacity building for executives related to the leadership and management of a non-profit organization.

Regarding the individual proposed areas of strategic management applied through the BSC method and the connection with the objectives for the given area, we propose the following matrix, which it can be understood as a universal matrix of strategic management. This matrix would serve as a model for strategic management solutions for non-profit organizations, and each organization could tailor specific goals to its subjective needs. The figure 4 shows the proposed matrix for application in the conditions of non-profit organizations.

	Program	Realization	Public Administration	Private sector
Finance	Sufficient amount of resources for a quality program, redistribution of funding sources.	Search of donors, sustainability of existing relationships with donors, partial self-sufficiency.	Financing through multiple sources, balanced budget.	Financing through multiple sources, balanced budget.
Public	Knowledge of the target group, knowledge of quality requirements and an overview of the interest in the service provided.	Appropriate marketing strategy targeted at a selected segment.	Communication, awareness, support.	Support of public events, public interests and support of communities.
Internal Processes	Openness, creative environment, perfect knowledge of the internal environment and relationships in the organization.	Professionalism, organizational structure, formal relations, quality of processes.	Financial management, management plan, compliance with the established plan, marketing strategy connected with fundraising.	Financial management, management plan, compliance with the established plan, marketing strategy connected with fundraising.
Cultivation	Education, enlightenment, personal development, communication.	Education, training, employee innovation, personal development, growth.	Public impact, awareness.	Public impact, awareness.

Figure 4: The matrix of universal solution for strategic management in the environment of non-profit organizations according to the BSC method

Source: own processing

In order to balance all levels of the strategy, it is necessary to understand the following matrix from both a horizontal and a vertical point of view. The vertical axis is represented by four modified areas of the BSC method, and the horizontal axis shows four key areas that are part of the existence of each non-profit organization: its own program, method of implementation, public and private sector. The areas of the horizontal axis form the internal and external environment of the organization. The internal environment includes the program and method of implementation, and the external environment is represented by the private and public sectors. The inside of the matrix consists of basic goals that correspond to the intersection of the individual elements of the horizontal and vertical axis of the matrix and to which non-profit organizations should pay attention.

Discussion

Regarding strategic management in the conditions of non-profit organizations, we recommend non-profit organizations to deal intensively with this aspect, because the external environment is constantly changing and needs to adapt to it. Certainly, even in cases where organizations feel the need for change, they should not be afraid of change, and we would recommend them not to be afraid to start a possible restructuring. They can use the concept of strategic management and our proposed modified model on this issue, based on which it is possible to achieve better performance of the organization. (Dobrovic, et al., 2019) The models of strategic management in the environment of non-profit organizations are also recommended to be used by the author Dobrovic, et al.

In particular, the condition in the market is that the ever-changing environment places ever-increasing demands on these organizations and, if they are to survive and continue to function in the market, they must withstand all threats in the market. We see as a possible solution the constant evaluation of the market, market conditions and finally the approach to restructuring through the concept of strategic management. By Caryl, et al. considers process monitoring in today's economic environment to be necessary (Caryl, et al., 2019). Carvalho, in turn, considers it important that non-profit organizations place increasing emphasis on their responsibility within their mission (Carvalho, et al., 2019). In the concept of strategic management in the conditions of non-profit organizations, it is important to address the question of whether organizations are interested in strategic management and also how they perceive the need for strategic management. It is important to specify the reason why the non-profit organization wants to implement the selected strategy in practice. According to Kral et al. In creating a strategic framework, the criteria that managers of non-profit organizations consider to be the most important should be carefully identified (Kral, et al., 2019).

The hypothesis we worked with - the concepts for strategic management applied in the conditions of commercial enterprises will require certain modifications has been verified. The chosen BSC model as a more suitable variant for strategic management in the environment of non-profit organizations was changed for use in these organizations.

Conclusion

Strategic management is an important element in the environment of non-profit organizations and it is through the quality of strategic management that the organization can gain a competitive advantage. It is very difficult to assess at what level non-profit organizations have strategic management, but we consider it important that they deal with this issue carefully. Strategic management is reflected in the quality of market research, on the basis of which a non-profit organization can identify the market environment in which it operates and adapt the concept of strategic management to it.

In this paper, we recommended the use of a modified BSC method for strategic management, in which a matrix was designed with the basic elements and corresponding objectives that every non-profit organization should address with an emphasis on improving its competitiveness and performance. Only if the non-profit organization cares about the quality of strategic management and has perfectly answered questions in terms of its existence, then it can be assumed that there will be a positive effect in the form of increasing its competitiveness.

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Occupational Health and Safety Management in Public Health Care Institutions Based on The Behavioral-Based Safety Concept

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Abstract

The purpose of the paper is to analyze and evaluate health and safety at Primary Health Care (POZ) facilities. In the paper, the results of research conducted among medical and support staff have been presented. In the research, the behavioral safety improvement methods dedicated to the medical industry and a questionnaire, which is a tool assessing the effectiveness of the methods have been used. The obtained results confirmed the need to implement the behavioral-based safety concept (BBS) based on behavioral observation, thematic training and supporting materials in Primary Health Care facilities. It has been noticed, that knowledge about safe behavior and awareness of occupational hazards as well as their effects are not in the same level among all POZ employees. In practice, work safety is not treated by all employees as the supreme value. Therefore, there is a great need to shape safe and accident-free behavior of Primary Health Care facilities employees using selected methods of the BBS concept.

Keywords: behavioral-based safety, occupational hazards, Occupational Health and Safety, OHS, safety management, healthcare institution.

Introduction

This section should follow keywords. This section should provide background of the study and highlight research motivation. Medicine and management are scientific disciplines that operate on very different theoretical levels and use various activities in practice (Bukowska-Piestrzyńska, 2011). At a time when medical service providers are very prosperous enterprises, more and more attention is paid not only to the type and amount of services provided, but also to aspects related to the management of such a specific organization. The specificity of facilities providing medical services includes, next to the basic elements (employee, customer, service, product), there are factors of high occupational risk. This high risk for loss of health (and even life) results from exposure to factors occurring in the work environment. Both employees of institutions who are so-called internal clients are exposed to them, as well as external clients, i.e. patients. These threats are related to hazardous (accident) factors, but also onerous or harmful factors, which in turn include physical, biological, chemical and psychophysical factors (Ulewicz i inni, 2015). In the light of the data, the European Agency for Safety and Health at Work (EU-OSHA), over 10% of European Union employees is employed in the health and social care sector. This sector belongs to the largest employing sector in Europe and includes a large group of various professions, including doctors, nurses and so-called auxiliary medical staff (support staff). This is a feminized sector, with 77% of the workforce being women. In addition, in the health sector the incidence of accidents at work is 34% higher than the average for the entire European Union, and the sector itself is in second place, right after construction, in terms of the incidence of work-related

musculoskeletal disorders (European Agency for Safety and Health at Work, 2019). The main risk factors in the health sector of the European Union and related health problems are primarily the abovementioned musculoskeletal loads resulting from faulty body postures while performing work and incorrect lifting and carrying of weights (Niciejewska & Klimecka-Tatar, 2016). In addition, the European Agency for Safety and Health at Work (EU-OSHA) draws attention to biological factors - microorganisms, contaminated blood, viruses, e.g. HIV or hepatitis B, as well as accidents at work, which are in the form of micro-injuries, cuts, punctures, etc. Also chemical agents present in the work environment of health care are a group of risk factors indicated as the main ones. These include especially disinfectants, anesthetic gases, and antibiotics. These compounds may be harmful to the skin or respiratory system, and may also be carcinogenic. More important risk factors in health care also include shift work hazards, especially at night, which are associated with many undesirable phenomena and behaviors - fatigue, a decrease in the level of physical and mental fitness, mistakes resulting from reduced attention and concentration, etc. Increasingly, in the European Union countries, attention is being drawn to threats that are difficult to identify. These are threats belonging to the psychosocial group, including aggression of patients and their family members, which is not rarely in the form of physical and psychological violence against a healthcare professional (European Foundation for the Improvement of Living and Working Conditions, 2016). Research on working conditions as well as occupational hazards in healthcare, conducted by EU-OSHA, is reliable and well documented. In Poland, there is still a lack of reliable research on working conditions and the identification of hazards in health care, especially when it comes to the professional group of primary care physicians who work in Primary Health Care Facilities (POZ). This is a professional group that is on the so-called "First line" of patient relationships. Therefore, it is most exposed to threats, which in literature are called "new and emerging", often difficult to identify, analyze and evaluate. It is also the most numerous among all others group of medical specialists (general practitioner or internal diseases). According to the Supreme Medical Chamber, as at 31 December 2018, the number of doctors specializing in "internal diseases" (professionally active) is almost 29,000. The given number of all practitioners (professionally active) and belonging to the regional medical chamber (hold a professional title) as at 31 December 2018 was almost 138,000, the aforementioned group of doctors constitutes almost 21% of the total Supreme Medical Chamber - based on on the Numerical Statement by field and level of specialization, (www.nil.org.pl of February 5, 2019).

The medical profession treated for years as a special calling, today it is subjected to a test determined primarily by social phenomena, i.e. a decrease in respect for the medical profession, claiming patients, aggressive family members of patients, media campaigns, numerous processes related to errors made by doctors. The medical profession has a very long educational path. It is estimated that a doctor achieves professional capacity at the age of 27, and full professional development at the age of 34-35. Due to the economic situation, this period is not rarely extended to 39-44 years of age. The upper age limit for the exercise of the medical profession is not restricted by age. The limitations are psychophysical fitness and the possibility of medical practice (Irzyniec & Konodyba-Szymański, 2010). Therefore, the professional career of a doctor can be divided into two main periods - the period of acquiring knowledge and full activity and professional fitness (on average up to 42 years of age), and the period of subsequent work, which sometimes lasts over 30 years (Lewandowski, Niciejewska & Marjański, 2019). The work of a doctor is associated with a number of occupational hazards with which their have contact almost every day. Exposure to these factors is also significant. Despite the legal basis on medical activity, which specifies the working time of doctors employed in a medical entity not exceeding 7 hours and 35 minutes a day and an average of 37 hours and 55 minutes a week in an average five-day working week, there are cases of non-compliance with these guidelines (Polish Act of 15 April 2011 on medical activities, Journal of Laws of 2018 0.2190). It can only be assumed that the consequence of non-compliance with the rules of occupational hygiene, i.e. breaks and rest after work, may couse medical errors, accident occurrences, illness and even death. Literature and

available scientific papers on the subject discussed also indicate a failure to comply with the doctor's working time as a threat which in turn carries a high risk of health loss and even life, both for the doctors themselves and their patients (Irzyniec, Konodyba-Szymański & Szczerba, 2010).

Previous studies on occupational health and safety in the environment of healthcare professionals, including doctors, clearly indicate the occurrence of many and very diverse threats. The available literature indicates above all biological hazards that result from the specifics of the work. It includes many activities that can lead to, among others for blood-borne infections (Gołofit-Szymczak & Górny, 2019). According to the World Health Organization (WHO), out of 35 million medical workers globally, up to 8-10% are exposed to pathogens and the possibility of infection. It is estimated that as many as 2 million can be infected with HBV, less than 1 million with HCV, and about 170 thousand with HIV. In Poland, HCV infection is a significant clinical, epidemiological, economic and social problem. It is a serious health threat for medical workers employed in health care entities, including doctors (Sierpińska, 2017). Microorganisms that are transferred in the bioaerosol fraction are another threat in the doctor's work. The transmission of viruses that cause SARS and influenza (e.g. avian influenza viruses, also known as ”bird flu”, swine influenza virus (SIV) known as ”swine flu”) is also very dangerous. Among the "new" biological threats should be mentioned those that did not exist until the 70s of the last century. These are allergic hazards caused by latex that creates medical gloves. The problem of "dangerous gloves" mainly concerns surgical specialties. Chemicals, in turn, that may pose a threat to doctors are disinfectant drugs and preparations. Chemical compounds used in oncological and antiviral treatment are among the most dangerous. Anesthesia gases are also a group of dangerous compounds for the health and even life of doctors (Żółtańska & Bujnowska, 2010). In turn, the so-called "old-classic" physical factors of occupational risk for physicians include, first of all, noise, vibrations, microclimate, lighting, dustiness etc. Ionizing radiation from X-ray machines or electromagnetic radiation of physical therapy apparatus is particularly serious. There are still old devices in Polish branches that are still in operation and pose a threat to the health and life of employees who operate them (Makowiec-Dąbrowska i inni, 2010). Some of the more recent physical hazards include those associated with laser techniques. Emission of harmful fumes and dust originating, among others from damaged tissues are chemical (toxic compounds) and biological (bioaerosols and viruses) (Dutkiewicz & Górny, 2002).

In the literature on the subject relatively little space is devoted to psychophysical threats, especially psychosocial ones. These threats are difficult to identify and thoroughly analyze and evaluate. For many years, this type of occupational hazard was neglected and even underestimated. Recently, the topic of psychosocial risks occurring in the work of doctors is more often addressed by specialists and scientists. And all this as a result of special programs and campaigns promoting health and safety in healthcare facilities. The European Agency for Safety and Health at Work conducts research on the risks of 'new and emerging', also in the work of medical doctors (European Agency for Safety and Health at Work, 2019). When considering the topic of conditions of medicals work, it should not be ignored the topic related to work-life balance. Shift work, especially at night, causes a large psychophysical burden on work, especially doctors, who often practice their profession in several facilities, stretching the day to the maximum. Thus, they do not maintain the principle of balance between work and leisure. Health effects in the form of initial symptoms - musculoskeletal disorders, food disorders, circulatory disorders - are the beginning of many diseases, occupational diseases and even accidents at work (Zużewicz, 2017).

Generally, one may be tempted to state that there is a lack of reliable identification of threats in the group of doctors (medicals), especially in the largest group due to the type of specialization - "first contact" doctors working in POZ facilities. There is a lack of effective methods for shaping safe

and accident-free behavior among medical staff and support medical staff. In many organizations, including health care facilities, building awareness in the field of occupational health and safety (OHS) is limited to compulsory training. In everyday work, shaping this awareness often takes the form of superiors' orders and prohibitions. This approach to broadly understood work safety does not give measurable effects in the form of even a reduction in the number of accidents at work. There are still a large number of accidents in Poland (although in 2018 there was a 4.6% decrease in incidents compared to 2017) at work, the main reason for which is the human factor, especially the inappropriate behavior of employees when performing tasks on position (GUS 2018, PIP 2019). In addition, the fatal accident rate places Poland in fourth place from the end in Europe (Eurostat 2019), and expenditure on benefits from the accident fund in Poland is rising (PIP 2019). There are many methods and tools by which employers try to shape the awareness of safe work among their employees. Increasingly, medium and large enterprises observe, for example, employee involvement in matters related to the safety of employee tasks - identification of occupational hazards, assessment of occupational risk and all preventive measures as well as promoting safe behavior at work (Niciejewska & Klimecka-Tatar 2017, Niciejewska & Klimecka-Tatar 2018, Ulewicz et al. 2015; Wolniak, 2019). One of the concepts that affects the elimination of undesirable behaviors in the work process is Behavioral-Based Safety (BBS). This is safety based on behavioral observation. It was developed by behaviorists who assumed that people learn from the effects of their behavior, with a tendency to repeat behaviors that brought them pleasure, and to refrain from those that brought harm (Niciejewska & Obrecht, 2020; Skowron-Grabowska & Sobociński, 2018). According to Geller's principle: "a change in behavior leads to a change in mindset and attitude" (Taylor, Alvero 2012).

According to this concept, the use of behavioral methods for a long time in relation to employees should shape a safe attitude, which will result in safe behaviors (Szczygielska, 2014, Boczkowska, Zawodiecka-Sikora 2014). At the very beginning, the concept of BBS in the enterprise should be carried out by the supervisor. Similarly to the concept of improvement (kaizen or Lean), all actions improving behavior begin at the top in the organization hierarchy. But when the tools used are firmly inscribed in the company's safety culture that it is worth extending the BBS concept program by introducing behavioral linear observations - "an employee observes an employee" (Jasiulewicz-Kaczmarek et al. 2015).

The results of numerous studies carried out in Europe and around the world confirm the effectiveness of the BBS concept. The use of behavioral methods to reduce dangerous behaviors effectively eliminates such behaviors, reducing, among others the number of accidents at work. Dangerous behavior modification programs have been promoted in the United States and Canada for many years (McAfee, Winn 1989). The results of various experiments carried out by foreign companies regarding the impact of BBS on the modification of hazardous behavior have shown a positive impact on employees' awareness of occupational health and safety (Snyder 2012, Tuncel et al. 2006). Dangerous behavior modification programs have proven to be an effective accident prevention tool. Hazardous behavior modification programs based on BBS work well in many industries - construction, cement production, urban road construction projects, transport, etc. (Li,Xie i inni 2018, Fang i inni 2020, Nunu i inni 2018, Zhang i inni 2019, Guo i inni 2018, Wang i inni 2018). The BBS concept is a big challenge for business entities with a service profile. In such enterprises it should be taken into account that the participants of the process are, apart from employees, also customers. Changing the behavior of processess participants is not possible without the commitment of management in the field of health and safety department. Willingness to invest in safe and ergonomic working conditions and the flexibility of employers in making positive changes in organizational factors is the basis in shaping pro-safe behavior among employees (Zawodiecka-Sikora et al. 2010).

Polish enterprises also implement programs to modify dangerous behavior based on BBS. Despite the fact that the approach to the issue of safety based on safe behavior is nothing new (the approach to the issue of safety based on safe behavior appeared already in the 40s of the last century), in Poland there is an increase in the number of consulting companies that provide services in the field of behavioral audits. Based on the work of H. W. Heinrich, it could be stated that only 10% of accidents at work and occupational diseases are the result of improper working conditions, and more than 88% - dangerous behavior of employees. Polish enterprises that underwent an experiment on the modification of dangerous behavior based on BBS, noted in the first phase (i.e. immediately after the implementation of the program) a sharp decline in the number of registered dangerous behaviors, and in the next phase (after a long time since the implementation of the program) stabilization and gradual reduction of the number registered risk behavior (Pęcilło 2010, Pęcilło 2011). Hazardous behavior modification programs based on BBS are effective and bring measurable results (Szczygielska, 2015).

It is obvious that the effectiveness of actions according to the BBS concept is closely related to the size of employment (number of employees) as well as the type of business (service / production or industry branch). The medical industry is probably such a specific industry. Medical industry is characterized primarily by exposure to biological factors, but also psychophysical and psychosocial factors, as hazardous and accident factors. Aggression of patients, their families, work overload, stress related to fear of infectious diseases - all this can lead to dangerous, potentially accidental behaviors. This paper is an attempt to answer the question whether behavioral safety methods work and effectively improve safety in a Primary Health Care Institution (POZ).

Methodology

The research results presented in the paper based on the principles of the BBS (Behavioral-Based Safety) concept. The research consisted of two stages.

- Stage 1: selection of behavioral methods aimed at improving the level of occupational health and safety in chosen Primary Health Care (POZ) facilities.
- Stage 2: assesment the effectiveness of behavioral safety methods used.

In the first stage, selected behavioral methods have been planned. All methods have been discussed according to the level of occupational health and safety improvement - method selection taking into account the POZ facilities work organization (Table 1).

Table 1: A set of behavioral safety methods used in selected Primary Health Care Facilities to increase the level of occupational health and safety

Activity type	Name and activity characteristics	A group of employees to whom the activity was dedicated
Behavior observations	Reward system - promoting safe behavior in the workplace - activities to support positive attitudes of employees in the field of health and safety - observation by the management	Doctors, nurses
	Penalty system - suppressing negative, dangerous behaviors threatening the health and life of employees in the workplace - observation by the management	Doctors, nurses
	"Here and now" - mutual ("I watch you - You watch me") active response in real mode to dangerous behavior of employees	All POZ employees

	Calls postponed - mutual ("I you - you me") later reaction to the employee's dangerous behavior	All POZ employees
	Anonymous mailbox (policy of safe behavior without blaming) - a place to inform about dangerous or undesirable behavior of other employees (anonymity)	All POZ employees
	Non-anonymous mailbox - a place to inform about dangerous, accidental behavior of other employees (given name and surname of the reporting person as well as the reporting one)	All POZ employees
	Self-observation - controlling, observing your own behavior - writing down dangerous behavior and reporting to management	All POZ employees
Training	Collective training on identifying and analyzing employees' hazardous behaviors (their own and others behaviors)	All POZ employees
Supporting materials	An information board regarding accident occurrences, threats and preventive actions	All POZ employees
	Brochures and leaflets on preventive measures	All POZ employees

The second stage of the research was based on surveys. The total number of respondents was 48 employees. Among them were 32 medical employees (general practitioners, nurses) and 16 auxiliary staff (receptionists, assistants, administrative and office employees). The survey by means of a questionnaire was conducted on a voluntary and anonymous basis. All employees participating in the survey answered a number of questions. The questions contained in the form were developed based on the content of behavioral safety methods implemented in the first stage of research (BBS concept). Respondents rated the effectiveness of individual behavioral safety methods used in their workplace on a scale of 0 to 4, where 0 meant that the method "has no effect" on safety improvement, 1 - "has a little impact", 2 - "has a medium impact", 3 - "has a high impact", 4 - "has a very high impact".
The survey has been conducted after a period of implementation of the proposed behavioral safety methods (table 1) and all employees of designated POZ entities took part in the study.

Results and discussion

The study consisting of two stages was conducted in four Primary Health Care Facilities (POZ). The BBS concept implementation process took three months. After this time, the second stage (assesment) of the study took place - a questionnaire survey has been conducted among POZ employees to assess the effectiveness of the behavioral safety methods used. Table 2 presents the results of research carried out at POZ facilities, a summary of respondents' opinions on the BBS concept tools used.

Table 2. Survey questionnaire regarding the assessment of the effectiveness of implemented behavioral safety methods in the examined Primary Health Care Facilities

No.	Type of behavioral safety method (actions)	Impact of the method (action) on work safety in the opinion of employees				
		0 – "has no effect"	1 – "has a little impact"	2 – "has a medium impact"	3 – "has a high impact"	4 – "has a very high impact".
1.	Reward system - promoting safe behavior in the workplace - activities to support positive attitudes of employees in the field of health and safety - observation by the management				19 medical staff 10 support staff	13 medical staff 6 support staff
2..	Penalty system - suppressing negative, dangerous behaviors threatening the health and life of employees in the workplace - observation by the management			30 medical staff 5 support staff	2 medical staff 11 support staff	
3.	"Here and now" - mutual ("I watch you - You watch me") active response in real mode to dangerous behavior of employees			7 medical staff 10 support staff	25 medical staff 6 support staff	
4.	Calls postponed - mutual ("I you - you me") later reaction to the employee's dangerous behavior		17 medical staff 12 support staff	15 medical staff 4 support staff		
5.	Anonymous mailbox (policy of safe behavior without blaming) - a place to inform about dangerous or undesirable behavior of other employees				30 medical staff 14 support staff	2 medical staff 2 support staff

	(anonymity)					
6.	Non-anonymous mailbox - a place to inform about dangerous, accidental behavior of other employees (given name and surname of the reporting person as well as the reporting one)		6 support staff	10 medical staff 10 support staff	22 medical staff	
7.	Self-observation - controlling, observing your own behavior - writing down dangerous behavior and reporting to management		32 medical staff 12 support staff	4 support staff		
8.	Collective training on identifying and analyzing employees' hazardous behaviors (their own and others behaviors)				32 medical staff 16 support staff	
9.	An information board regarding accident occurrences, threats and preventive actions				32 medical staff 16 support staff	
10.	Brochures and leaflets on preventive measures				32 medical staff 16 support staff	

In the light of the obtained results, it can be stated that among the respondents, the most effective action under the BBS concept is "reward system - promoting safe behavior in the workplace", i.e. actions supporting positive attitudes of employees in the field of health and safety by the management who is the observer. According to medical workers, this type of activity has a "high impact" (59% of medical staff) and a "very high impact" (41% of medical staff). Support staff have assessed in the same way. Almost 63% of support staff indicated this activity as having a "high impact" and 37% of support staff as having a "very high impact" on safe behavior in the

workplace. Less enthusiastically, but equally positively, the respondents assessed activities related to the penalty system, i.e. the suppression of negative, dangerous behaviors threatening the health and life of employees in the workplace - observations by the management. Almost all medical staff (94%) considered such activities to have a "medium impact" on safety, while most support staff (69%) assessed this type of activity under the BBS concept as „high impact". Similarly, "Here and now" - mutual ("I watch you - You watch me") active response in real mode to dangerous behavior of employees, were assessed.

The respondents very positively assessed activities related to the "anonymous mailbox", which is based on a policy of safe behavior without blaming. All respondents rated its impact as "high" (94% of medical staff and 88% of support staff) and "very high" (6% of medical staff and 12% of support staff). As activities having a "very high" impact on safety in the workplace, shaping safe behavior, all respondents indicated:

- collective training on identifying and analyzing employees' hazardous behaviors (their own and others behaviors),
- an information board regarding accident occurrences, threats and preventive actions,
- brochures and leaflets on preventive measures.

In turn, for the least important activities - having a "medium impact" or "a little impact" on shaping safe behavior among employees, the respondents indicated:

- Non-anonymous mailbox - a place to inform about dangerous, accidental behavior of other employees (given name and surname of the reporting person as well as the reporting one)
- Self-observation - controlling, observing your own behavior - writing down dangerous behavior and reporting to management

Analyzing the above results, it can be stated that the concept of BBS in examined Primary Health Care Facilities is not yet fully understood and the majority of respondents do not identify with its premises. Respondents do not trust the BBS concept, especially in the aspect of line audit, consisting in mutual attention to mistakes or potentially accidental behavior. There is a conviction in the respondents that every attention, especially not anonymous, can be perceived as something unethical, denunciation. Still, the most "safe", because they have no signs of denunciation or complaints, are considered activities that do not carry the need for direct interference with the individual and confrontation with it. These are collective trainings, leaflets, information boards. Employees have identified those activities that have the greatest impact on shaping safe behavior. However, one may be tempted to state that the indication of these activities as the best was chosen only because of the lack of an alternative to which the respondents would be 100% convinced. There is therefore a great need to change employees' attitudes to the BBS concept. Employees do not trust actions that interfere so much in mutual relations. Paying attention, pointing out erroneous behaviors, they still consider to be unethical acts of denunciation.

Conclusions

Employees at Primary Health Care Facilities are exposed to many factors that threaten their health and even life. The specificity of their work imposes many restrictions on safe behavior. Unfortunately, man as the most unpredictable link in the work process chain, through their dangerous behavior can put other people at risk - internal clients of the organization (i.e. other employees) as well as external clients, i.e. patients. There are many methods that can be used to shape safe behavior in the workplace. Among them are behavioral methods that are widely recognized by employees - the BBS concept. It is recognized as a very effective method that increases the safety in the enterprise if it is properly understood. The BBS concept, through its activities, shapes awareness of safe behavior among employees, which is paramount. The results of the activities BBS concept evaluation have showen that respondents feel some concerns and do

not trust some of the BBS concept activities. The biggest problem for them are actions that involve interference in the behavior of another employee, especially not anonymous. In Poland, this concept - although not new - is not popular among employees. In the mentality of many employees, activities under this concept constitute a significant barrier. This concept will have no effect if employees perceive its actions as unethical, with the signs of denunciation or complaint.

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Industry 4.0: Overview of Business Models in Additive Manufacturing

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Abstract

The article presents an overview of business models for the area of additive manufacturing in Industry 4.0. The authors present the additive manufacturing business model. The classification of business models is presented in three categories: startup direction companies, mass production, value proposition delivered by the business model. Value proposition delivery business model is a proposal classification prepared by authors to show connection between Industry 4.0 technology, proposal of value and Scalability 4.0 concepts. Authors present example of use value proposition delivery business model on the example of additive manufacturing.

Keywords: Business Model, Additive Manufacturing, Industry 4.0, Scalability 4.0

Introduction

The fourth industrial revolution, also called Industry 4.0, is – like the previous ones – characterized by the ability to transform economies, jobs and societies through the introduction of new technologies and processes. Digitization, automatisation, artificial intelligence, IoT and machine learning are increasingly infiltrating the world and business.[1] Additive manufacturing (AM) technologies are among the dynamically developing fields of Industry 4.0. They are no longer a fledgling technology – 3D printing has matured and is entering a new era, which has serious implications for the business models that companies can use. Over the past few years, the growing possibilities of AM, together with the expansion of available materials and the ecosystem of suppliers, have enabled cheap manufacturing of a much wider range of products, from simple models of game figurines to parts of cars or aircraft. AM provides an unprecedented opportunity to customize products and respond quickly to changes in market demand. As a result, it is moving from limited applications, such as prototyping and manufacturing of conventional tools, to a central role in production for an increasing number of industries. Examples of areas related to the use of AM and possible business models will be discussed below.

Definition of additive manufacturing (AM) and business model (BM)

In the changing world of Industry 4.0, what should be considered is the developmental potential of business models taking into consideration prototyping with the participation of additive manufacturing. The concept allows us to think about changing enterprise activity, building prototypes of technological

[1] Przemysł 4.0 w Polsce – rewolucja czy ewolucja? Pierwsza edycja badania Deloitte o skali i poziomie Przemysłu 4.0 w Polsce, access on: 27.04.2020 https://www2.deloitte.com/pl/pl/pages/technology/articles/raport-przemysl-4-0-rewolucja-czy-ewolucja.html

solutions and implementing digital business models, resulting in the emergence of the Industry 4.0 business model.

A business model describes the rationale of how an organization creates, delivers, and captures value[2]. Moreover, a business model is an abstraction of how a business functions. (…) What the business model will do is provide a simplified view of the business structure that will act as the basis for communication, improvements or innovations, and define requirements for the information system necessary to support the business. It is not necessary for a business model to capture an absolute picture of the business or to describe every business detail. (…) The evolving models also help the developers structure and focus their thinking. Working with the models increases their understanding of the business and, hopefully, their awareness of new opportunities for improving business[3]. It is also worth adding that the digital business model is "a transaction handled using digital technologies. It can be described based on six core elements: a transaction, an offering digital system, a demanding digital system, a (digital) performance, an appropriate counter performance (monetary or non-monetary) and the repeatability of this transaction".[4] This formulation of a business model may be particularly important in the application field of such new technologies as additive manufacturing.

The first additive process was invented in the 1980s. Since that time, additive manufacturing technologies have been established in several industry branches and still show a significant market growth.[5] Additive manufacturing, according to the ISO/ASTM standard, is defined as the "process of joining materials to make parts from 3D model data, usually layer upon layer, as opposed to subtractive manufacturing and formative manufacturing methodologies".[6] It is also known as rapid manufacturing or rapid prototyping.[7] It allows to build three-dimensional structures from digital data (3D model) by adding material in a layer-by-layer manner. This technological process is also called three-dimensional (3D) printing.[8] In order to produce physical 3D objects in AM technology, it is necessary to use CAD 3D software or scanner – e.g. computerized tomography (CT), micro-CT, magnetic resonance imaging (MRI) – and then create a digital design file in the CAD file.[9] Using additive manufacturing, a design in the form of a computerized 3D solid model can be directly transformed to a finished product without the use of additional fixtures or cutting tools.[10]

In contrast to conventional manufacturing technologies, the advantages of additive manufacturing are easy to acknowledge. Technological progress in this area has allowed to eliminate several limitations in manufacturing and enabled to obtain products more precisely, with controlled dimensions and more complex geometry, without using traditional tools, with low manufacturing costs, in a shorter time and

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[2] Osterwalder, A. and Pigneur, Y. (2010), Business model generation, p.14.

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[4] Härting, RC., Reichstein, C. and Schad, M. (2018), 'Potentials of Digital Business Models–Empirical investigation of data driven impacts in industry', *Procedia Computer Science*, 126, 2018, pp. 1495-1506.

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[6] ISO/ASTM 52900(en), *Additive manufacturing — General principles — Terminology*.

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[8] Szymczyk-Ziółkowska P., Łabowska, MB., Detyna, J., Michalak, I. and Gruber, P., (2020), 'A review of fabrication polymer scaffolds for biomedical applications using additive manufacturing techniques', *Biocybernetics and Biomedical Engineering*, Volume 40, Issue 2 April–June, p. 624-638.

[9] Mazgajczyk, E. (2013), 'Technologie generatywne na przykładzie bioplottowania', *Nowe trendy w naukach inżynieryjnych*, 4. T. 1, Kraków: Creativetime, p. 54-62.

[10] Huang, SH., Liu, P. and Mokasdar, A. (2013), 'Additive manufacturing and its societal impact: a literature review', *Int J Adv Manuf Technol 67*, p. 1191–1203.

with minimum human intervention.[11] The application of additive technologies allows a full control over the target geometry of a structure and guarantees high repeat accuracy of the manufacturing process.[12] Recent technologies in additive manufacturing have the potential to eliminate traditional manufacturing limitations and to impact, among other things, the sustainability of the production processes.[13] That is why over the last thirty years these technologies have been widely used for the manufacture of very different and unusual parts.[14] It has been increasingly applied in the aeronautical and aerospace industries, automotive, biomedical and other fields, e.g. architecture. The use of AM in such a variety of manufacturing fields is possible mainly thanks to the processing of various materials, ranging from metals, ceramics and polymers to composites. Whereas the first applications were only for prototyping purposes based on polymer processes, today high-quality metal-based products can also be made additively, mostly using the Laser-based Powder Bed Fusion process (LPBF).[15]

It should be pointed out here that over a dozen approaches to additive manufacturing may be listed in the group of advanced technologies. In the ISO/ASTM 52900 norm, seven groups are distinguished, as presented in Fig. 1 together with examples of technologies.

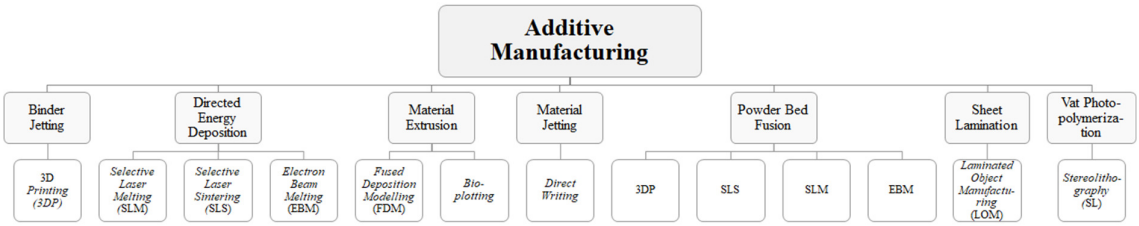

Fig. 1. Additive Manufacturing processes

Sources: Own, prepared according to ISO/ASTM 52900 Additive manufacturing — General principles — Terminology.

Nowadays, additive manufacturing is commonly referred to as 3D printing, however it must be noted that it is a "term often used in a non-technical context synonymously with additive manufacturing; until present times this term has in particular been associated with machines that are low-end in price and/or overall capability."[16]

Example of additive manufacturing business models

Specialist literature extensively describes and proposes various business models containing detailed accounts of elements of the model as well as descriptions of the influence of additive technologies on

[11] Szymczyk-Ziółkowska P., Łabowska, MB., Detyna, J., Michalak, I. and Gruber, P. (2020), 'A review of fabrication polymer scaffolds for biomedical applications using additive manufacturing techniques', *Biocybernetics and Biomedical Engineering*, Volume 40, Issue 2 April–June, p. 624-638.
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[14] Suzic, N., Suzic S. and Cipriano, F. (2017), In Business of Additive Manufacturing.
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[16] ISO/ASTM 52900

elements of the business model[17]. Other broadly discussed issues include those of additive printing technologies and a new paradigm resulting from the use of those technologies in business[18].

In the analysis of changing technologies and expansion of AM, three development directions of business models may be distinguished. The first, startup direction comprises a group of models based on prototyping, close co-operation with the client or preparing dedicated customer solutions, as well as models based on core competencies. The models are characterized by focusing on co-operation with the client and meeting customer expectations. The second direction — is a group of models based on mass manufacturing or activities aiming to deliver technological solutions, products or projects on a large scale.

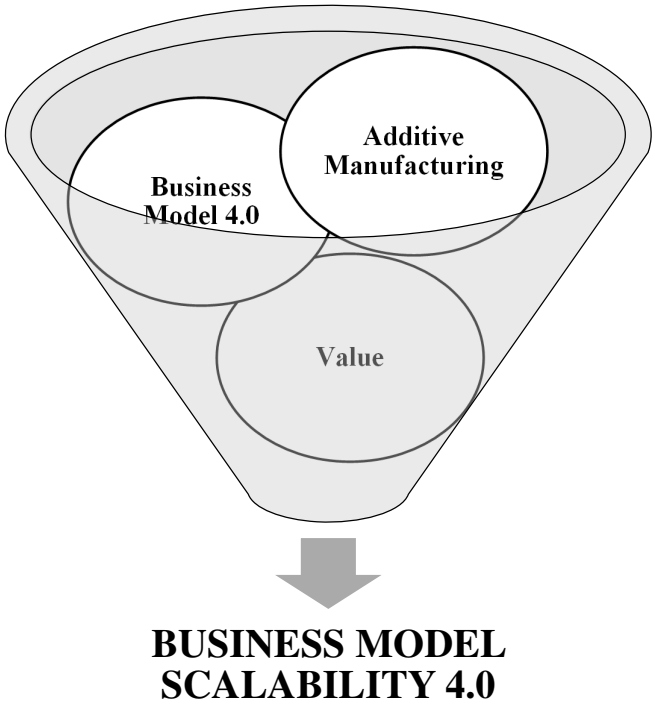

Fig. 2: Components of business model Scalability 4.0

Sources: Own.

The third direction is based on the value proposition delivered by the business model – it is a proposition of a solution allowing to establish what the business model offers from the perspective of its scalability. The authors of the concept suggest combining the Industry 4.0 technology of additive manufacturing, elements of business models and value proposition, and elements bringing the Scalability 4.0 effect, in order to build the most effective business model for an enterprise (Fig. 2).

[17] Öberg, Ch., Shams, T. and Asnafi, N. (2018), 'Additive Manufacturing and Business Models: Current Knowledge and Missing Perspectives', *Technology Innovation Management Review*, 8, p. 15-33.

[18] Savolainen, J. and Collan, M. (2020), 'How Additive Manufacturing Technology Changes Business Models? – Review of Literature', *Additive Manufacturing*, Volume 32, 101070, ISSN: 2214-8604.

Startup additive manufacturing business models

In Poland, many companies using 3D printing have been established in the last ten years. It should be noted, however, that these are mostly units that do not have advanced devices in their resources, working mainly with the FDM technology.[19] Their models are often of low quality, with poor mechanical strength. Due to the aforementioned restrictions, such products cannot be used e.g. as spare parts for cars or orthopedic prostheses. Therefore, microenterprises often focus on offering custom-made services. Their business model is based on the possibility of making simple accessories or spare parts for which there is a unit demand (e.g. replacement of an exhausted part with a specific geometry).[20] To implement this business model, very often all you need is an online store, basic spatial design skills and a simple 3D printer on which you can quickly, easily and relatively cheaply make such an element. The development of the company in this business model is not easy due to considerable competition and low-level innovation. These companies often expand their activities by selling consumables or spare parts only for this type of equipment.

Another area of business activity is the production and/or sale of consumables for low-budget 3D printers, i.e. the well-known filaments. An interesting business model is establishing close co-operation with a company specializing in the production or processing of plastics, from which you can order a finished product. Then pack it in your own boxes and sell it under your own brand. Such a company focuses only on developing the right mix (which can also be outsourced), sales, order processing and marketing. There are also numerous websites of sales representatives offering sales of 3D printers.

When analyzing the market in terms of the use of AM in various industries, one should also consider very advanced 3D printers. They allow manufacturing products with very complex geometry or even designed mechanical properties.[21] These are machines that process materials such as e.g. metal, polymer and ceramic powders (e.g. SLS, SLM, EBM, 3DP) or liquid materials, e.g. resins (e.g. SLA). These types of printers are successfully used in the automotive, aviation and medicine industries.[22]

An important issue to consider in the context of this technology is the skill of advanced design for AM (DfAM).[23] In this area, two directions of building business models can be identified: offering design services and conducting training for engineers who will be educated as specialists in this field. In the first case, the Printelize platform can be a good example. Printelize Marketplace is a trading platform that allows you to automate and optimize the search of 3D printing suppliers, the valuation of the printing service and its sale.[24] It is a place where commissioners of 3D printing meet with order takers. This tool simplifies the processes of offering, sales and communication, making access to 3D printing even easier. Designing for 3D printing is currently the most desirable skill on the service market. It is not about simple modeling of details, but the ability to create spatial models, taking into account engineering knowledge in the field of material processing. Specialists are needed who are able, for example, to design a detail taking into account material shrinkage during the 3D printing process,

[19] Badanie rynku druku 3D w Polsce, raport został przeprowadzony przez Fundację Centrum Innowacji FIRE na zlecenie Printelize, https://printelize.com/pl/T/BadanieRynkuDruku3DwPolsce, access on 27.04.2020.

[20] The future of spare parts is 3D: A look at the challenges and opportunities of 3D printing, raport strategy& 2017, access on 24.04.2020, https://www.strategyand.pwc.com/gx/en/insights/2017/the-future-spare-parts-3d/the-future-of-spare-parts-is-3d.pdf

[21] Davin, PJ. (2020), Additive and Subtractive Manufacturing: Emergent Technologies, p. 45.

[22] Tofail, SAM., Koumoulos EP., Bandyopadhyay, A., Bose, S., O'Donoghue, L. and Charitidis, C. (2018), 'Additive manufacturing: scientific and technological challenges market uptake and opportunities', *Materials Today*, Volume 21, Issue 1, January–February, p. 22-37.

[23] Rosen, D. (2014), 'What are Principles for Design for Additive Manufacturing?', 1st International Conference on Progress in Additive Manufacturing, p. 85-90.

[24] https://printelize.com/pl/T/AboutPrintelizeMarketplace, access on 27.04.2020.

optimize the geometry in terms of printing, or prepare it in a way to eliminate problems associated with postprocessing.[25]

Understanding the idea of Industry 4.0, which AM is part of, will allow to introduce changes in business models that increase the share of these technologies in mass production. The continuous development of the industry is associated with changes on production lines, where conventional production methods are replaced by AM. Their flexibility gives producers the certainty of optimal return on costs incurred and the possibility of personalizing the product. Small batches improve quality, simplify planning and encourage continuous improvement. In addition, 3D printing allows you to combine materials with different properties during one printing process and embedding structural elements inside the project structure.[26] This allows manufacturers to limit the number of parts produced, which reduces assembly time, for example.[27] Attention should also be paid to the need to have smaller storage resources (e.g. damaged items can be produced immediately without having to store them). In addition, factories can use optimization software to customize production and/or improve their products at a low cost, without the need for interruptions during the expansion of assembly lines or the change of tooling and tools used in the conventional production model.

Changing the business model is also possible in the medical or pharmaceutical industry. An example is the FabRx machine[28], which allows the additive manufacturing of tablets with a personalized dose of a drug substance (called printlets). In addition, this 3D printing system allows the inclusion of several medicinal substances in a single tablet, with a view to creating drugs for patients who must take several pills at once (children or the elderly).[29] This type of system can be used where mass production is unprofitable, e.g. due to low demand or high storage costs. Hospitals, pharmacies and also pharmaceutical companies can take advantage of this.

Thanks to personalization, product optimization and production efficiency (also production tools) and new business models, AM enables unbelievably fast innovations – the two-year period from the idea to launching the product on the market is shortened to a maximum of two months.[30]

Mass additive manufacturing business models

New production technologies are reasons for the generation of new business models. They are very often modifications of existing business models or inspire the emergence of new models. The chart below lists suggested business models compatible with additive manufacturing solutions, as well as models resulting from the appearance of the idea of additive manufacturing.

[25] Dodziuk, H. (2020), 'Perspektywy rozwoju druku 3D', *Mechanik 01/2020*, access on 24.04.2020; http://www.mechanik.media.pl/artykuly/perspektywy-rozwoju-druku-3d1.html.
[26] Yakout, M. and Elbestawi, M., (2017), 'Additive Manufacturing of Composite Materials: An Overview', 6th International Conference on Virtual Machining Process Technology (VMPT) at: Montréal, Canada.
[27] Kurzynowski, T., Pawlak, A. and Smolina, I. (2020), 'The potential of SLM technology for processing magnesium alloys in aerospace industry', *Archiv.Civ.Mech.Eng 20*, 23.
[28] Trenfield, S. and Goyanes A. (2014), 'Shaping the Future, Innovations in Pharmaceutical Technology' , *at FabRx*, April, p. 12-14, https://www.fabrx.co.uk/wp-content/uploads/Promote.pdf.
[29] Jamróz, W., Szafraniec, J. and Kurek, M. (2018), '3D Printing in Pharmaceutical and Medical Applications – Recent Achievements and Challenges', *Pharm Res 35*, 176 (2018), pp.2-22.
[30] Dodziuk H., (2020), 'Perspektywy rozwoju druku 3D', *Mechanik 01/2020*, access on 24.04.2020; http://www.mechanik.media.pl/artykuly/perspektywy-rozwoju-druku-3d1.html.

Type of business model	Advantages	Type of industry	Example of product
Mass customization	- it takes product variation to the extreme, - it entails creating one-off products that are precisely adjusted to the needs or whims of individual buyers - thanks to the efficiency and precision of digital technology - cost less than conventionally manufactured items and fit individuals' specifications more exactly.	- medical, - automotive, - home decoration, - architecture - personal accessories	- hearing aids, - orthodontic braces, - prostheses, - sunglasses, - car and motor-cycle accessories, - Christmas tree decorations.
Mass variety	- it targets customers who have strong and varying preferences, - customers do not need products adjusted to their personal specifications, - manufacturers can skip the process of collecting personal information, - manufacturers can offer a wide variety of options at affordable prices, - units are one-offs.	- jewelry - architecture - fashion	- jewellery - home accessories - shoes
Mass segmentation	- it greatly limits variety, offering only a few dozen versions of a product, - it works well for highly segmented markets, such as components designed specifically for popular B2B products, - each version serves a single segment and differs from the others enough that conventional manufacturers would need costly new machine tools to make all of them, - thus additive companies can make them at a lower cost, - production is in batches rather than one-off, - it is also suitable for seasonal, cyclical, or short-term fad markets.	- automotive, - cyclist, - architecture - personal accessories	- spare parts, - accessories for cyclists (handlebar mounts, durable, lightweight part)
Mass modularization	- rather than offering customers different versions of a product, this model involves selling a 3D-printed body with interchangeable modules for insertion, - manufacturers design the base units, - reduces assembly costs, increases opportunities for miniaturization, and creates space for additional electronic components to be integrated into the product in ways that conventional modular	- automotive, - telecommunica-tions, - personal accessories	- smartphones

Type of business model	Advantages	Type of industry	Example of product
	production methods cannot manage.		
Mass complexity	- exploits the ability to make products with intricate designs that conventional manufacturing cannot achieve and to produce unusual shapes and embed sensors and other elements, - that ability reduces production costs while improving the product's reliability, - with new design software emerging, AM can now restructure materials at the micro level to improve properties such as porosity, strength, durability, elasticity, and rigidity	- automotive, - aerospace, - personal accessories - fashion	- honeycomb-shaped supports for airplane fuselages, - nozzles for commercial mixers - strong, supple, lightweight lattice structures for the midsoles of running shoes
Mass standardization	- as 3D printers grow ever more efficient, they may become competitive for making standardized products even when they do not save on direct costs, - AM reduces: an extended and risky supply chain, expensive capital equipment, the elaborate assembly of parts, and high inventory or transportation costs, - proves that high-volume standard products can be churned out at a low cost in certain circumstances.	- high-tech products, - automotive, - aerospace - electrochemical energy systems[31]	- video screens - spare parts - membrane electrode assemblies

Fig. 1. Types of business models in mass additive manufacturing

Source: https://hbr.org/2018/07/the-3-d-printing-playbook, access on 26.04.2020

Business model based on the theory of value proposition

One of the main objectives of a good business model is supplying the customer with a value proposition. Value is defined in a number of ways in business model theory. Osterwalder and Pigneur propose a description of fields of building value in a business model on the basis of five areas of value: Value Proposition, Value Creation, Value Delivery, Value Capture, Value Communication. Value Proposition is a key element in every business model. It would be also interesting to consider how to connect the particular areas of building value with Industry 4.0 technologies, including AM and others. The Scalability 4.0 concept might be an element combining in the long term the classic business model and Industry 4.0 technology. The Scalability concept will be able to generate the effects of mass production, mass trade and the mass provision of customised services. What was impossible in the past due to limitations in production technologies, transport technologies and sales technologies due to, among others, the costs of technology change, transport costs, and the cost of customising individual

[31] Hashemi, MH., Babic, U., Hadikhani, P. and Psaltis, D. (2020), 'The potentials of additive manufacturing for mass production of electrochemical energy systems', *Current Opinion in Electrochemistry*, Volume 20, April, pp. 54-59.

offers, is now possible. According to the authors, Scalability 4.0 takes the following form: the economies of scale and experience curve, network effect obtained within the network of suppliers, producers and customers, long-tail effect, Big Data effect (advantage in data processing and analysis)[32]. After combining the three elements:

- Industry 4.0 technologies – Autonomous Robots, Simulation, System Integration, IoT, Cybersecurity, Cloud Computing, Additive Manufacturing, Augmented Reality, Big Data, Other;
- Classic value proposition offered by the business model – Value Proposition, Value Creation, Value Delivery, Value Capture, Value Communication, Other;
- and the Scalability 4.0 concept – effects of mass production, mass trade and the mass provision of customised services;

new opportunities for building value in Industry 4.0 conditions may be observed. New technologies allow the development of elements of the business model. Thanks to that, there is a possibility of strengthening the selected area of building value. In the next step, it may influence business scalability and bring benefits. Fig. 3 presents a combination of the concepts. Generating added value should begin from selecting the Industry 4.0 technology. This influences the given elements of the business model, and consequently the area of building value. The Scalability 4.0 concept is the final result.

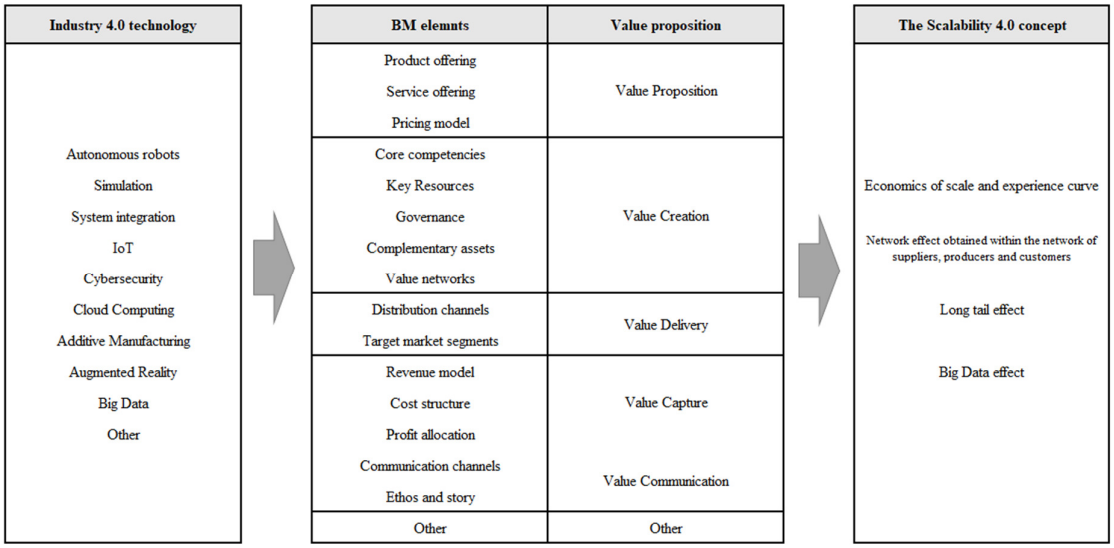

Fig. 3. Concept of combining technology, value proposition and Scalability 4.0
Sources: Own prepared by Rafał Trzaska using Osterwalder model, Scalability 4.0 concept and Industry 4.0.

In order to understand the relationships, let us use additive manufacturing technology. We assume that the analysed enterprise uses 3D printers and has performed a strategic analysis of key competencies of the organization. The analysis results in a certainty that the enterprise has the key competencies necessary in AM and in implementing solutions connected with this technology. According to the business model, key competencies are defined as ways of offering value to the client. It may therefore be stated that the enterprise in question has the key competencies, on the basis of which it may create competitive advantage. Moreover, it may consider how to multiply the competencies in other areas of development. Competencies are rare resources which are difficult to copy, so the choice of a path of their multiplication may be arduous, capital-intensive and time-consuming, as well as difficult to scale.

[32] Niemczyk, J., Trzaska, R., Borowski, K. and Karolczak, P. (2019), 'Scalability 4.0 as economic rent in Industry 4.0', *Transformations in Business & Economics*, 18(2B (47B)), pp. 824–838.

However, thanks to the use of appropriate technology, it may turn out that the competencies we have are sufficient to ensure the development of the organization without any additional expenditures. The crucial activities here include the network effect and long-tail effect, capable of bringing a strategic advantage.

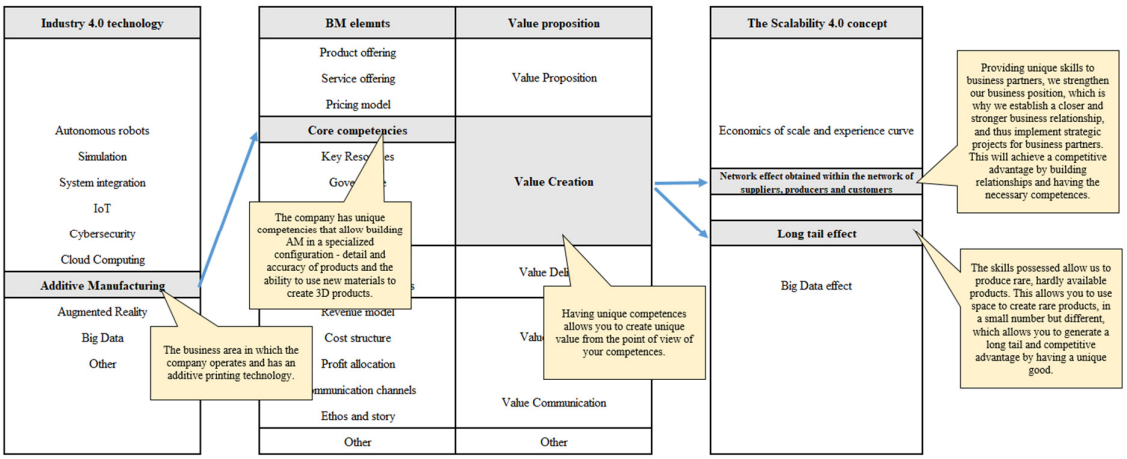

Fig. 4: Example of a business model based on the value proposition of an enterprise using AM
Sources: Own prepared by Rafał Trzaska using Osterwalder model, Scalability 4.0 concept and Industry 4.0.

The example of an AM-technology business model based on the value proposition is one possibility. In another, the cause-and-effect chain may also be reversed. Ways of generating value may be considered then, as well as types of technologies used in order to gain an advantage. These constructions may lead to generating new business models and strategies of operation.

Conclusion

The current global digitization progress causes changes in the field known as Industry 4.0. The term comprises a number of advanced digital technologies, including additive manufacturing. According to a report prepared by Wohlers Associates[33], one of the largest consulting companies in the field of additive manufacturing, the value of the AM industry will increase from $15.8bn in 2020 to $23.9bn in 2022 and $35.6bn in 2024. It proves that the AM market is intensively and continually growing. It also refers to the implementation of advanced manufacturing technologies. The changes also result in adjustments in human resources and organisational management[34], which in turn means changes in business models.

This paper is a review of business models implemented in sectors based on additive manufacturing. The authors have distinguished three approaches to business models: the startup approach (company offering to market), mass production (market needs to company) and value proposition (company and market co-operation). The three approaches show that there are many ways of creating business models when an enterprise applies new technologies. New sales opportunities follow in such cases, as well as possibilities to offer various kinds of services. Each of the approaches is characterized by both common and distinguishing features.

[33] Wohlers Report 2019, ISBN 978-0-9913332-5-7.
[34] Krot, K., Mazgajczyk E., Rusińska, M. and Woźna, A. (2019), 'Strategy of improving skills of innovation managers in the area of advanced manufacturing technologies'=, Intelligent systems in production engineering and maintenance', *Advances in Intelligent Systems and Computing*, Springer, vol. 835, pp. 296-305, ISSN 2194-5357.

The common elements of the business models include:

- responding to market needs, and particularly – customer needs
- possibilities of applying Industry 4.0 technologies in various business areas of the enterprise
- seeking a competitive advantage of the enterprise on the market
  The differentiating elements include:
- business models other than the ones used so far: the start-up approach (company offering to market), mass production (market needs to company) and value proposition (company and market cooperation).

It must also be stressed that these considerations are only a fragment of a larger study that can be continued and elaborated, for instance concentrating on extending the range of materials used, thus broadening the offer. Another interesting direction might be an analysis of the evolution of business models in various sectors from the perspective of additive manufacturing.

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The Impact of Time Thieves on The Efficiency of Management of Non - Profit Organizations

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Abstract

A non-profit organization is a legal entity that provides services of general interest under pre-determined conditions and for all users on equal terms, and whose profits may not be used for the benefit of founders, members of bodies or its employees, but must be used in full to provide services of general interest. The effective functioning of non-profit organizations is primarily driven by the organizational skills of managers. The basis of self-government is the ability to organize and manage your own time. The management of an individual's time generally depends on his ability to respond adequately to stressors and disturbances that have a negative impact on his work performance. In work activities, self-government is closely linked to the systematic nature of work. The manager who maintains the system and the sequence of tasks prevents them from accumulating. The principle of optimal organization of time in managerial practice also lies in managerial skills. Throughout the working day, managers are confronted with situations that are time consuming. They are surrounded by people, situations and consequences that cause a waste of time. These "time thieves" of managers focus on efficiency, focus and performance. They can get rid of them only by self-discipline. Time is alienated by factors that put them in a stressful situation, stressors and factors that we call work breaks. The task of self-government and time management is the time manager to categorize as effectively as possible the individual management functions and tasks of time thieves who are in their workplace. These thieves can be eliminated by early detection, implementation of effective methods and control of the effectiveness of established measures to ensure productivity and time spent effectively not only for managers but also for individual employees of non-profit organizations.

Keywords: Non-profit organizations, Efficiency, Stressors, Disturbance.

JEL Classification: L30, L31

Introduction

Creative managerial thinking in a market economy becomes a guarantee of survival and a condition for entrepreneurial success. The management of the manager, inspired by such thinking, is then highly creative and at the same time proportionate to the business environment. It accepts risks and uncertainties, helps to heal an inefficient corporate and extra-corporate economy. One of the core tasks of the manager is the task of performing their work efficiently and arrange everything to do what is necessary for the job to be successful. The basic prerequisites for doing this work are the good results of the work achieved by performing effective activities using their intelligence, imagination and knowledge. Its action will only become effective once certain conditions have been met. The main condition is determined by the needs of the process and can be expressed by the imperative of "mind".

The manager is supposed to produce ideas, ideas, information, and turn them into useful values through his subordinates or associates. The work of managers is classified by management activities, which we also call core management functions. These managerial functions are different from the perspective of many authors. Each manager holds a certain managerial position and therefore shows that he is required to perform the main functions of managers with regard to the overall efficiency of the business. Effective manager is expected to plan, organize, manage human resources, manage, communicate, control, and make decisions. To what extent is this work effective, depends on the external and internal conditions of its work.

Stressors

Internal factors concern the manager's own relationship to work and the circumstances that arise from the content of his work and put him in a stressful situation. We call these factors stressors. Stress at work has become a major health and safety issue. One of the things that creates stress in managers is the failure to discharge obligations, which in most cases is caused by their postponement to later. Procrastination is not only a thief of time but also of life. By postponing things they can avoid being prepared thoroughly, working on smaller parts and gathering all the necessary materials so that they do not risk having to break the work by getting up from the desk (Kushlev, et al. 2016).

The second stressor, who lurks at the managers and takes time for them, is "fire extinguishment", that is, unexpected events "that can take them away from the current work up to several hours. In situations where the crisis occurs first or second, it is very difficult to find the right solution, it requires a high level of intelligence and a lot of experience. However, if the occurrence is much higher and we can not find a suitable way to prevent it, the best solution is to create a set of measures that it can use (Morlock, et al. 2017).

Denial is a feature that keeps managers at work and exposes them to stress. The longer they decide, the less time they have left to work. Through long thinking, they are offered more and more opportunities, but this may not be good. Managers often take care of projects that carry a lot of responsibility. Responsibility is another thing that causes them a sense of stress, because only one error can negatively affect their career or, cooperation with the client the project may relate to (Smith, et al. 2018).

Managers often have too much work and are unable to do anything right. They find themselves in a stressful situation that causes overloading with a lot of work. Then they are in the gap between many broken work activities. This confuses them and gradually loses sight of them. Finally, stress is coming, and they are no longer able to concentrate on one project because they are immediately thinking about waiting for another. Managers should be able to guess where their borders are. If they do not know, they can help them learn from previous experiences. Sometimes it is good to try out the extreme burden to discover the difference between meaningful extraction and congestion (Tziner, et al. 2015).

Lack of time is another factor of stress. At present, increasingly frequent prolonged and irregular working hours are due to lack of time. Its reason may be various interruptions and their own working style. The stress caused by this is that managers can not accurately determine priorities and divide the working day. Managers come into contact with other people every day, whether within or outside of the organization. Human relationships can also be considered a source of stress if these relationships do not move in the right direction. It can be very stressful for the manager to work with the feeling that he does not have good relationships with some people or has unresolved conflicts with them (Valera, et al. 2016).

Unclear powers also cause stress because managers have no clear definition of their duties and job assignments. Because of this, they get into a slump because it can happen that they know the information is too late and it is difficult to get them into a project or other task. The manager should always make sure that he has all the necessary information to prevent the time losses that arise from the lack of clarification (Alani, et al. 2019).

Every manager needs to concentrate on his work. Therefore, if they have limited work space, he can stress it and is unable to concentrate. The managers should have their own space adapted to their duties and requirements so that they does not feel confined Graessley, et al. (2019). Resolving crisis situations and problems can bring them to a state of long-term tension that can negatively affect their sleep. Permanent inadequate sleep is associated with adverse outcomes in working life. In order to effectively manage the organization and achieve positive work outcomes, managers should try to avoid stressful situations and respond to persistent stress (Janoskova, & Kral, 2019)

Disturbance

Another factor influencing the quality of work not only managers but also subordinates are disturbances. Often, managers are faced with situations that they can not resolve important tasks because they are constantly interfering with them Nagy, et al. (2018). It is therefore important to be aware of these interruptions properly and not allow them to be an obstacle to fulfilling their job responsibilities. This section contains various types of interruptions with recommendations to prevent them (Kmecova, 2018).

The most common interruptions include phone, SMS, and email interference. At present, technology is increasingly penetrating everyday life, causing more and more interruptions with various warnings. In the end, these warnings cause inattention (Musova, et al. 2018).

Managers' time also misses unexpected visits. They stop at the office, often talk about insignificant issues, and keep managers away from work. Chat conversations - whether live or through social networking managers, take time. It's a big waste of time. It is estimated that it is up to 75% of working time. For social activities, managers should reserve time for coffee breaks, lunch breaks, and after work. The greatest value is the time they spend talking about the problems and obstacles their business faces (Carvalho, et al. 2019).

Another thing that is wasting time for managers and subordinates is meeting. These can be planned or unplanned. They take away the participants up to 40% to 50% of the working time. Unless they are carefully planned, they are just a waste of time. They are, however, an indispensable part of every business and should therefore be carried out as efficiently as possible. Remembering a thief of time disturbs the managers' work day, and often because of them they do not have enough time to do business (Pisar, & Bilkova, 2019).

Methodology

The purpose of the article is to identify disruptions in the work of managers in non-profit organizations. The survey contains a total of 42 questions about managers' time management. 4 questions are devoted to stress and distractions. The sample of the survey consists of 210 managers from non-profit organizations from the Slovak Republic. The survey involved 80 women and 130 men.

Results

The first question in the monitoring of factors influencing the quality of work performance, we found out whether the managers of individual non-profit organizations work under stress, which was answered positively by up to 78 managers. However, occasional stress at work is perceived by up to 116 managers. Thus, we can say that up to 194 managers face stress in the workplace and only 16 managers stated that they do not work under stress at all, so we can say that internal manifestations in the form of stressors affect managers as we see in Chart 1. In the second question we asked whether managers can complete their work without interruption. Graph 1 shows that disturbances are not as significant a factor as stressors, which is definitely a consequence of the organization of work and good conditions in the workplace. In this case, only 15 managers stated that they would not complete the activity without interruption, 84 managers said that sometimes they were disturbed at work and as many as 111 managers stated that they completed the work without interruption.

Table 1: Monitoring the presence of stressors and disturbances

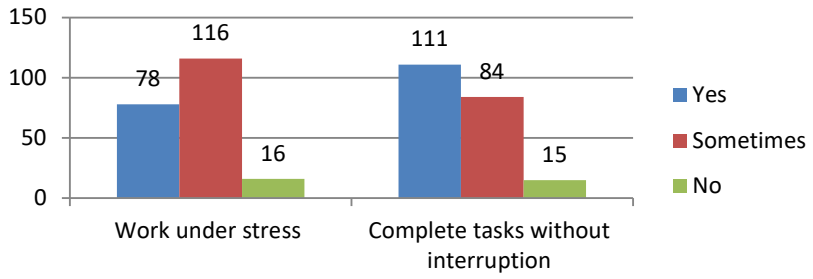

Source: Authors

In the third question, we asked about the most common stressors that affect managers in the performance of their work. Most respondents cite centralization as a transition to a new system. Most of the respondents came from small non-profit organizations, where the transition to centralization is ruled out. The second biggest stressor was seen by managers in their superiors. Respondents considered lack of time, social problems, multitasking, inadequate information, a sense of responsibility, failure of technical equipment, unclear goals at all levels or poor planning as other factors in table 2.

Table 2 : The most common stressors

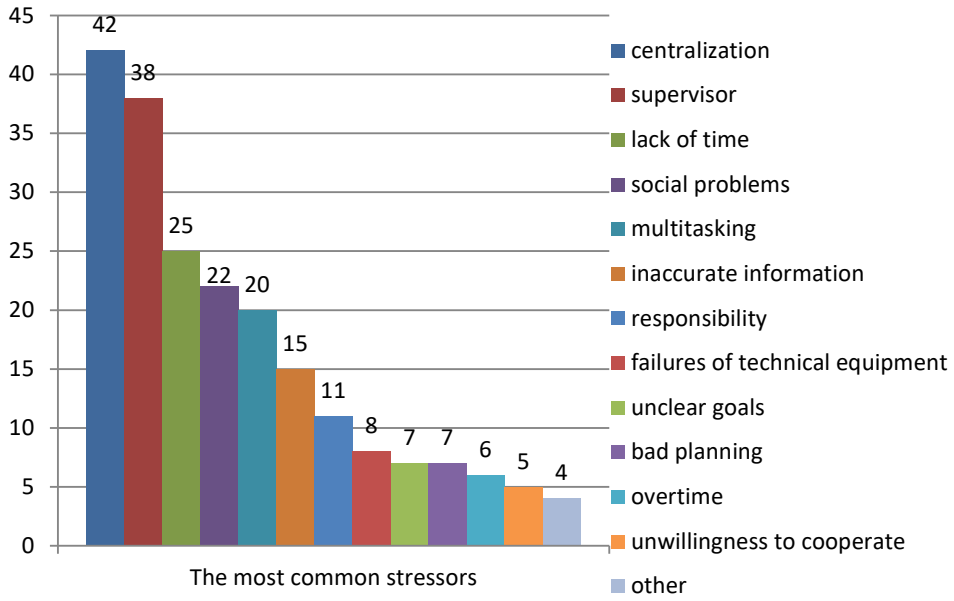

Source: Authors

In the last question devoted to the influence of external and internal factors, we focused on naming the most common stressors. Although most managers have indicated that they will complete their work without interruption, all managers report the most common interruptions see in table 3.

Table 3 : The most common interuptions

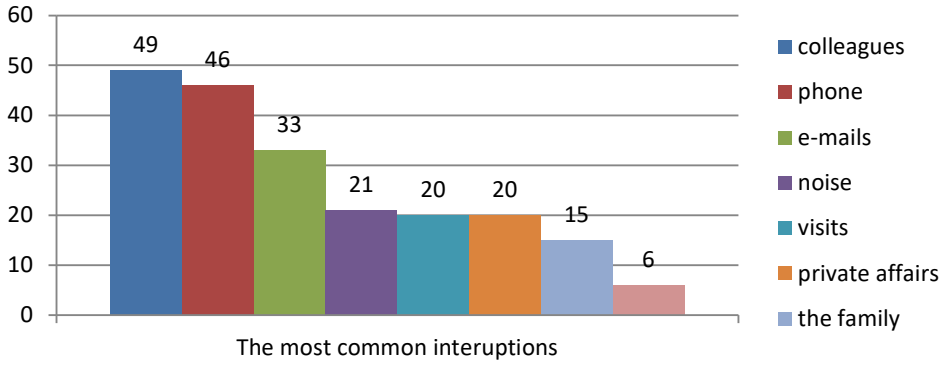

Source: Authors

The most common interruptions are considered by managers to be the following colleagues, phone calls, mailbox congestion, noise, handling of private affairs and family.

Discussion

Efficiency means doing the right thing. Managers must have the necessary knowledge, experience and ability to distinguish what is right for the business. Efficiency is the most economical use of resources. An efficient manager therefore knows how to use the resources he has at his disposal. The efficiency of the managers' work depends on their time management, and the ability to implement defined plans by managing available resources. Participation in work-related stress reduces its effectiveness, it can lead to negative emotions, and in the worst case also leads to illness (Meyers, et al. 2019).

The sources of stressors at work are situations with demands that managers perceive over their strengths and abilities. A major problem in the inappropriate organization of time lies in the present strategy of organizations, which is directly related to the aforementioned time compression, i. pressure to manage multiple activities in a shorter time horizon. For this reason, long-term planning is lost in organizations, retreats to short-term goals, but they put higher demands on human potential. The human potential associated with organizational goals is primarily the capabilities and skills of the manager. Negative consequences of inappropriate time organization, or time burglars, represent a misconduct that manages time. These consequences result in the inability to determine the priorities for solving the problems, the inability to distinguish the importance and the urgency, the effort to handle everything that is coming or the implementation of the wrong things (Andjarwati, et al. 2019).

Another mistake is the preference of short-term goals over the medium or long term, the loss of a review of priorities and goals, the absence of a real time planning system, intuitive action, and the inability to reject a new role, or delegate tasks, an effort to do it all alone. The lack of self-discipline, disorder in the papers and failure to respect the physiological curve of performance and distraction together with neglect of rest even leads to a deterioration of the state of health (Salaga, et al. 2015).

Disturbances are stimuli that arise from the activity of an enterprise, employees or business surroundings. Efficient policies for emails or telephones are also effective for telecommunication devices. Managers should only provide the necessary phone calls and emails. When dealing with important tasks, they should disable all interference devices and should have regular time when they will handle all phone calls and emails and get to know other colleagues or the public. In the event that an unwelcome visitor is approaching, managers should quickly get up as if they were leaving and get to know that they have a lot of work to do (Trettin, et al. 2019).

If the meeting lasts, do not hesitate to close the discussion, for example, by saying: "Before you go, one more thing." Managers should give unexpected visitors the idea that you do not always have time for them by specifying the date when you are available. Even meetings can be made more effective. The meeting is to be organized if it is really necessary and it is important to ensure that only those people who are needed are involved Valaskova, et al. (2018). It is necessary to draw up a clear agenda and establish the meaning of the meeting. However, there are many other stressors and disturbances for which a clear elimination procedure needs to be developed. These stressors and disturbances may also vary in relation to the type of management and managerial tasks that managers encounter in individual work projects.

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An Overview of Non-Profit Financing in Slovakia

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Abstract

Non-profit organizations fulfil a major role in an economy and society – they provide services in domains where these are not provided by neither government, nor market, i.e. the profit focused businesses. The core principle of their working is them being non-profit. It means the operations they conduct don't bring financial benefits to their founders or owners, but all revenue proceeds must be reinvested in the pursuit of the mission of the organization for which it was founded. And for these operations, all non-profit organizations need some source of financing, whether internal or external. Financing of non-profit organizations is a complex issue, maybe even a more complex one than the financing of for-profit businesses, because they have to usually rely on generosity of its donors to get the funding needed for their calls. Their financing is an important part of their life and usually decides whether they can fulfil their stated mission or not. Therefore, in this article, we aim to provide an overview of the current aspects of non-profit financing in Slovakia with focus on the different sources of funding available for non-profit organizations.

Keywords: non-profit organizations, financing of non-profit organizations, non-profit funding sources

Introduction

Non-profit organizations fulfil a major role in an economy – they provide services in domains where these are not provided by neither government, nor market – i.e. the profit focused businesses. The core principle of their working is them being non-profit. It means the operations they conduct don't bring financial benefits to their founders or owners, but all revenue proceeds must be reinvested in the pursuit of the mission of the organization for which it was founded. And for these operations, all non-profit organizations need some source of financing, whether internal or external. Financing of non-profit organizations is a complex issue, maybe even a more complex one than the financing of for-profit businesses, because they have to usually rely on generosity of its donors to get the funding needed for their calls.

Non-profit organizations are getting more and more important in the current socio-economic context. (Carvalho et al., 2019) Their financing is an important part of their life and usually decides whether they can fulfil their stated mission or not. Therefore, in this article, we aim to provide an overview of the current aspects of non-profit financing in Slovakia with focus on the different sources of funding available for non-profit organizations

The article is divided into three parts. In the first part, we deal with the current state of research into non-profit organizations and their financing. In the second part, we focus on non-profit financing in Slovakia in general, in its theoretical aspects and with an emphasis on possible diverse funding sources for non-profit organizations in Slovakia. In the third part, we conclude with some overview on the current state of non-profit financing in Slovakia.

Current research on non-profit organizations and their financing

Non-profit organizations have been studied by many authors. One of the most used definitions of non-profit sector is the one by Salamon and Anheier (1992) in which they formulated 5 criteria that characterize as organizations possessing formal structure, having private (non-state) character, having non-profit goal, being independent and self-governed and being voluntary. Usually these 5 criteria are joined by another two which are being non-religious and non-political.

As for the financing of non-profits, this topic is also researched extensively. Eppich and Grinda (2019) looked into financial management of cultural heritage sites who lack resources and identified a need for identification of more funding resources. Kisileva and Dubrova (2019) studied Russian corporate non-profit organizations. Rudnik and Kushtanina (2016) studied normative financing of non-profit performing arts organizations in Russia. Margarian (2017) studied financing strategies for non-profit organizations with aim to establish how the effectiveness of public support systems depends on recipients general financing strategies. Doyle et al. (2016) looked at resource dependence and survival of a hospital through different stages on its history depending on changes to its funding. Mikolajczak (2018) studied the impact of revenue diversification of a non-profit organization on the probability of its commercialization – i.e. organizations begin self-financing through sale of a product or service. Leshanych et al. (2018) focused on financing of higher education institutions in different countries.

Moreno et al. (2017) studied crowdfunding as possible new funding source for non-profit organizations. Yang et al. (2016) and Pitschner et al. (2014) also studied crowdfunding and found that non-profit projects are significatntly more likely to get funding trough crowdfunding. Social media is also important. (Ashander et al., 2019)

Hladka and Hyanek (2018) studied non-profit financing in Czech Republic, more precisely the crowding-out effect of public money. They found that indeed, public money has a crowding-out effect on private donations, however not for other types of financing sources, such as self-financing. Dvorakova and Mackova (2016) studied non-profit financing in terms of management of the non-governmental non-profit organization. Radic and Barbaca (2018) focused on financing of non-profit organizations in Croatia through European funding sources. Vasicek et al. (2017) also focused on Croatian non-profit organizations to assess their financing needs. On the other hand, Ceptereanu et al. (2017) studied Romanian non-profit organizations and their financial sustainability.

Financial stability of non-profit organization is also very important and is closely linked with availability and diversification of sources of financing. Many models for prediction of financial vulnerability of non-profit organizations (i.e. how vulnerable are they to financial shocks) use concentration of revenues as one of predicting variables. (Tuckman, Chang, 1991); (Trussel, 2002); Greenlee and Trussel (2000) Mazanec and Bartosova (2019) also proposed a model to assess financial vulnerability of non-profit organizations particularly for Slovakia, however, they did not use the revenue diversification as a variable due to the unavailability of data. Some authors are using cart-based models for prediction of financial distress. (Durica et al., 2019) The existence of a large number of models is caused by the fact that there is no universal application in various sectors and economic conditions. (Kral et al., 2018) Various financial indicators, mostly financial ratios, are usually used to predict the financial distress. (Svabova, Durica, 2019), (Valaskova et al., 2015). Financial analysis results cannot be taken as useful and acceptable without their objectification on the basis of chosen reference rates, values. (Bartosova, Kral, 2016)

Trust is also important in obtaining finances from different sources. Olah et al. (2019a) studied relationship between trust and financial performance. Other researchers study decision-making in selecting and managing employees. (Meyers et al., 2019) Valaskova et al. (2019) looked at financial

decision-making and its behavioral aspects. Olah et al. (2019b) also researched financial risks, so did Hudakova et al. (2018). Brabanec (2010) studied cost contributions.

Moniz (2017) researched the use of tax assignation for financing churches and religious organizations. Hladka and Hyanek (2016) studied the usefulness of tax assignation in Czech Republic as it is the only country of the Visegrad group that does not have a tax assignation scheme. This topic was also previousle researched by Otavova et al. (2014). Marianna (2017) also researched tax assignation systems in central European region.

Non-profit financing in Slovakia – theoretical aspects

Principles of Financing in Non-Profit Organizations

Marcek (2004) defined following basic principles of NGO financing: multi-source financing, co-financing, self-financing, fundraising, management of external resources, efficiency, demonstrable use of funds, reimbursement of costs related to fulfilling the mission of the organization, focus on projects, budgeting, earmarking of funds. The principal preconditions for effective financing are, above all, the credibility and good name of the organization and the transparency of its operation.

Kuvikova et al. (2014) redefined the principles and came with 4 principles: non-profit nature of the organization, multiple sources of financing, self-financing and fundraising, tax exemption.

Non-profit nature of the organization is the basic principle in the financial management of a non-profit organization. All money (in any form – revenues, grant, donation) obtained must be used in the organization to fulfill its stated goals and objectives and cannot be redistributed or taken out of the organization.

Principle of multiple sources of financing means getting financial resources from different sources. With multiple sources of funding, organizations can diminish their reliance on one source of money. Moreover, another good reason to seek multiple sources of financing is that some donors are not willing or not able to cover all costs of the organization or costs of a given project realized by the non-profit organization.

Self-financing and fundraising is another basic principle of non-profit financing. It is a way of acquiring or obtaining financial or non-financial resources for the activities of an organization. If a non-profit organization is able to generate income from its own activities, we speak of self-financing. Self-financing is important for achieving the stability of the organization and its independence in terms of financing. In most cases, however, the organization is dependent on financial resources from the external environment. In that case, we can talk about fundraising, i.e. an activity that can be characterized as an active activity of non-profit organizations aimed at obtaining external financial and non-financial resources. (Kuvikova, 2004)

Tax exemption is a generally accepted principle in developed countries. With the tax exemption, we can talk about three basic tax regimes for the flow of funds to and from a non-profit organization:

1. tax exemption - it is an exemption of income from the main activity of a non-profit organization from corporate income tax, but the exemption can also be from value added tax, customs duties and various other property taxes;

2. tax relief for non-profit organizations, the so-called tax credit - the organization pays taxes without exemption, but has the opportunity to claim various reliefs from the calculated tax liability;

3. tax relief for contributors, the so-called tax benefit - this is the support of private persons who provide funds to non-profit organizations, these contributors have the opportunity to claim the gift as a non-taxable part of the tax base or deduct the amount of the gift from the tax base

Sources of financing for non-profit organizations

There exist many classifications of sources and forms of non-profit financing. Following are some of the most used classifications and sources of financing we identified after a research on this topic. For a better understanding they are listed in the following table and are elaborated upon in more detail below the table.

Table 1: Sources of financing for non-profits

Internal	Self-financing		• Equity introduced by the founders • Membership charges • Sales of products or services • Advertising, sale or renting of property
External	Domestic or foreign	Public sector direct financing	• Grants and subsidies from government, local governments, cities, foreign countries, EU funds or other bilateral and multilateral funds • Payments for services provided by non-profits
		Public sector indirect financing	• Customs and tax exemptions • Assignation of the percentage share of income taxes of legal entities and individuals
		Private	• Individual and corporate gifts, donations and sponsorships, • Assignation of the percentage share of taxes of legal entities • Grants from foundations

Source: author's compilation

Internal sources of financing represent an important piece in the puzzle of non-profit financing sources. It is called self-financing. Self-financing is a process in which a non-profit organization uses its capacities (human, material, financial, know-how, etc.) to create and obtain resources (especially, but not exclusively, financial) while fulfilling its mission. At the same time, the fulfillment of a public or mutually beneficial mission of the organization is a key element that distinguishes it from a business entity. Although making a profit may seem inappropriate to a non-profit at first glance, the opposite is true. Even a non-profit, as well as a business entity, can generate a positive economic result from its activities. The difference, however, is that in the first case, this profit is intended for the fulfillment of non-profit goals within the mission of the organization and not for the enrichment of owners, as in the case of entrepreneurs. (Marcek,2004) There are different sources of self-financing. It can either come from its founders in form of the initial or ongoing funding, its members in the form of a membership fee or it can be from its commercial activity, like sales of products and

services or using its assets – sale or renting of property, advertising income, etc. If a non-profit organization is doing business activities, it has to divide their revenues and costs between the main and the business activity and the revenue from these activities is taxable and has to be used to fund the primary goals for which the non-profit organization was founded. (Rebetak et al., 2019) In some cases, it can even be investment income on its asset, however it is rare in Slovak conditions. Self-financing presents an important pillar of stability for non-profit organizations, because it decreases their dependence on external funding.

External sources of financing represent all the money that comes to the organization from the outside. External financing comes from some of the other economic entities from all the sectors of the economy, whether public or private. When it comes to external sources of financing for non-profit organizations, one of classification is judged important by many authors and it is the location of the source. The sources of funding can be either domestic or foreign, i.e. based in a different country or from an international organization.

Public sector direct financing sources of non-profit financing are the many grants and subsidies that the public sector entities give to the non-profit sector or payments for services that the non-profit organizations provide for the public sector. These financing sources can come from any part of the public sector. The government usually operates its grant schemes from its ministries and agencies, each ministry and agency giving grants for organizations working in its dedicated area, like Slovak Aid for the humanitarian aid. Local governments and municipalities also have their own grant schemes and provide a source of financing for local non-profit organizations. These grants usually come usually earmarked for a specific use in some beneficial activity for the public – art, sports, education, healthcare, social care or humanitarian aid, etc. Non-profit organizations also provide services for the public entities and receive payments for them. Among the public sector direct financing sources, a special mention goes to the EU structural funds and other bilateral and multilateral foreign funds like Norway grants, that provide great source of financing albeit with a greater deal of bureaucracy and administrative difficulty. (Gregorova-Brozmanova et al., 2009)

Public indirect financing is through two means: customs and tax exemptions and tax assignation. Customs and tax exemptions are another source of funding, or more precisely of an advantage given to non-profit organization by the government or municipalities. State forgoes a part of its revenues it may get on taxes to support non-profit organizations. They are exempt from the income tax on their activities tied to the main goals of the organization and can be also exempt from some other taxes and custom duties, like for example property tax. Tax assignation is a support mechanism for the non-profit organizations that lets taxpayers assign a fixed percentage share of their paid income taxes is another source of financing which is largely specific to central Europe. (Hladka, Hyanek,2016) In Slovakia, uniquely in the world, not only individuals but also corporations can divert a portion of their income tax to non-profit organizations. Individuals who paid taxes can direct 2% or 3% of the tax to the non-profit sector. 3% can be assigned by persons who have volunteered for at least 40 hours per year. Legal entities may assign a tax of 2% or 1%. An entity that donated funds of at least 0.5% of the tax paid may assign 2% share of their income tax. (Rebetak et al., 2019) Creation of this tax assignation for corporate income taxpayers led to a rise in the number of a special type of foundations in Slovakia - corporate foundations. Since 2004, the year of the change, many larger corporations have established foundations that bear the name of the founding company and its logo and work on publicly beneficial causes. Most of them then funnel their corporate income tax assignation to their foundations and fund their charitable donations with these funds. In 2011 there were 85 corporate foundations in Slovakia. (Strecansky, 2012). Tax assignation is on one hand a way for the government to support non-profit organizations, but it also provides a possibility for private individuals or businesses to fund their preferred non-profit organizations.

This leads us to private sources of funding for non-profit organizations. The tax assignation is one of the ways that private individuals or businesses can donate to their non-profit organization of choice. Non-profit organizations have to be eligible however the bar to pass is low, so most non-profit

organizations strive to benefit from this possibility and ask individuals or companies for their tax assignation. Gifts, donations, sponsorships, grants, loans and public collections are other private sources of financing that non-profit organizations strive to obtain. Gifts can be also of non-financial nature, such as physical objects, volunteering or sharing of information or know-how. Gifts and donations from individuals and companies usually mean a big number of small donors who support the financial stability of the organization. However, attaining a sufficient number of such small individual donors can be challenging for a non-profit organization. Activity of soliciting such gifts and donations is called fundraising and is an important part of life for a non-profit organization. Grants from private entities such as corporations or foundations present an opportunity to cover costs associated with specified projects for which the grants have been given. Private sources of non-profit financing wouldn't be complete without a mention of foreign private funding, either directly from individuals and corporations or through foundations. Many foreign foundations create their own branches in Slovakia or choose a Slovak partner – some well-respected foundation. Some of these foundations function as grant-givers, i.e. not having their own operations focused on some publicly beneficial purpose but redistributing or giving grants to other non-profit organizations for diverse projects.

Non-Profit Financing in Slovakia In Numbers

As for the current state of financing of non-profit organizations, on the following figure, we can see the amounts of money received by non-profit organizations in Slovakia in the period 2008-2018, with 2018 being the last year of available data at the time of writing this article. These are donations to all non-profit organizations in their general sense, not only private non-governmental entities, they however represent most of the organizations and also in share of donations. We can see an overall growing trend in donations to these entities with a strong growth from 2012 till 2015 and a bit of a slump in the following period, however, we can see an uptick in 2018.

The increase in period 2012-2015 was mainly due to individual donations starting in 2012 with a biggest increase of 75% in 2013 when comparing to 2012 for an amount of almost 96 million € and further growing in following years to a high of 136 million € in individual donations in 2015. Individual donors from Slovakia are the biggest donors for non-profit organizations.

Corporate donations have been mainly consistent throughout the years without big variations except for year 2014 where they jumped 37% y-o-y. Their share as a percentage of all donations has been around 30% since 2013. Foreign donations also grew in 2012-2015 period with a peak of almost 99 million € in 2015.

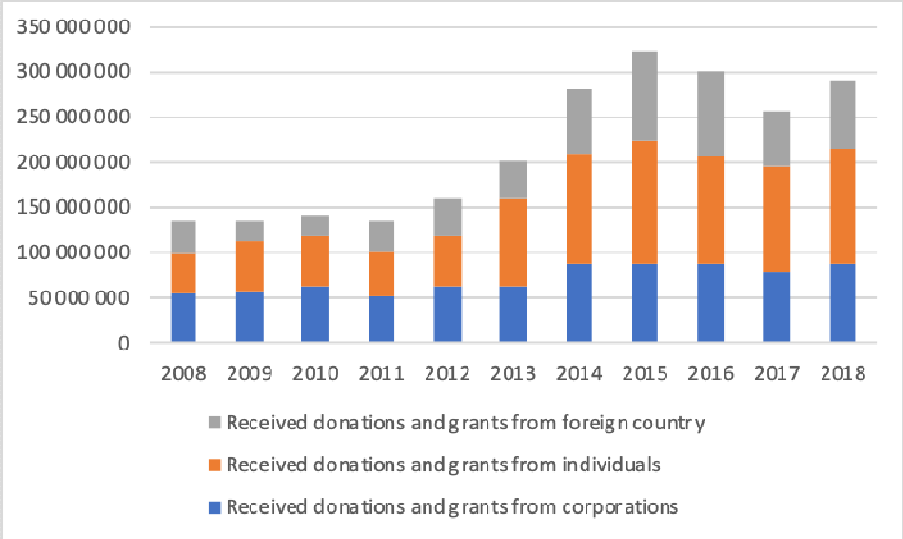

Figure 1: Amount of received donation and grants to Slovak non-profit organizations per origin of the donation for 2008-2018 in €

Source: Slovak Statistics Bureau.
http://datacube.statistics.sk/#!/view/sk/VBD_SLOVSTAT/ns2002rs/v_ns2002rs_00_00_00_sk

Another source of funding that we mentioned in the previous chapter is the tax assignation – i.e. assignation of a percentage of the paid income tax by individuals and corporation to be redistributed to their chosen non-profit organization. The figure 2. presents an evolution of the amount given through tax assignation to non-profit organizations by companies and individuals. We can this source of financing as growing and the trend is projected to continue in following years. In 2019, tax assignation represented 73 million € in funding for non-profit organizations.

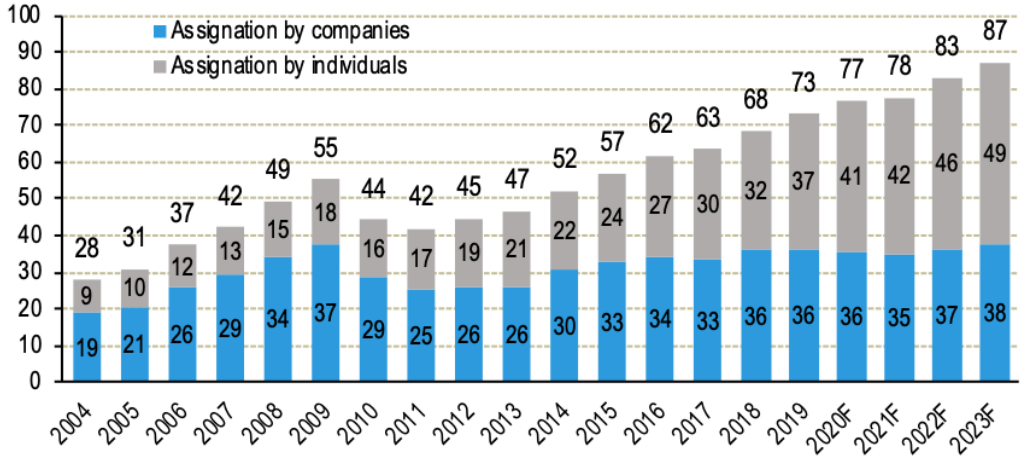

Figure 2: Amount of tax assignation in Slovakia per year in mil. €

Source: Institute of Financial Policy at the Ministry of Finance of Slovak Republic
https://finance.gov.sk/sk/financie/institut-financnej-politiky/ekonomicke-statistiky/asignacia-dane/

As for the research done in Slovakia on non-profit financing, usually it was done through a method of a structured questionnaire. Kuvikova and Vacekova (2009) studied sources of financing for governmental and non-governmental non-profit organizations. They found for non-governmental non-profit organizations to following diversification of sources of financing:

- 39,69 % coming from individual and private sources,
- 21,29 % comes from self-financing activities,
- 20,19 % comes from government,
- 16,79 % comes from foreign donors,
- 2,04 % comes from other sources

Svidronova and Vacekova (2012) also studied the financing of non-profit organizations and that 85% of organizations have more than one source of financing. i.e. they diversify their funding sources. She also found the tax assignation to be the most used funding source (91,6% of non-profit organizations used it) followed by private individual or corporate funding (60%), grants (45%), public sources such as subsidies from state or municipality (42%).

Conclusion

This article aimed at providing an overview of different financing opportunities for non-profit organizations in Slovakia. Non-profit organizations are an important part of Slovak society society and they play an important role in providing generally beneficial services that neither market nor state provides. They need funding for their operations as any other organizations for-profit or government organization, however they are usually reliant on generosity of their donors to fund their financing needs. We focused on many different sources of financing available for non-profit organizations in Slovakia. In conclusion, we can state that there are many sources of financing available for non-profit organizations and the amount of money given to non-profit organizations has a growing tendency. However, we can observe a lack of current research into this topic based on sound data. The unavailability of more data pertaining to the use of different sources of financing non-profit organizations, with current studies done on a small number of non-profit organizations, might therefore limit their applicability. The theoretical research lacks behind the well-established practitioners in the non-profit sector and the unavailability of ample statistic data is limiting the researchers. Nevertheless, we can observe some interesting findings for financing non-profits in Slovakia. Tax assignation is a big source of funding and its projected to get even bigger and was already observed to present an important source of funding. This might be inapplicable to other countries where the institute of tax assignation is not established. Other sources of non-profit financing enumerated in this article are also applicable elsewhere around the world, obviously with some adjustment to the local condition but the framework is sound.

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Marketing communication and its importance in the success of product sales

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Abstract

Nowadays, it is increasingly difficult for companies to stay in the market, compete with organizations with similar services or products, and thus continue to move forward and become more successful. One of the basic goals of every business is to achieve success and prosperity. From this goal, the overall corporate policy, decisions and specific activities of the company are derived. The development and success of the company are among the basic goals of business. Due to the constantly changing and advancing market conditions, it is not easy to clearly identify the factors that affect the development of the company. Already in the past, the model of the marketing mix, which consists of tactical marketing tools of product, price, distribution and communication policy, was decisive for the success of the company. The paper focuses on marketing communication, which is an integral part of the activities and the overall activity and position of the company. Communication is one of the tools of the marketing mix, which has an important position in increasing competitiveness and achieving success in selling products as well as the success of the company. It is also an important tool for building corporate identity and corporate image. The aim of the article is to point out the importance of marketing communication in connection with the successful sale of the product as well as to achieve success and increase the competitiveness of the company as a whole and to clarify the individual tools of marketing communication.

Keywords: communication, marketing, product, sale

Introduction

At a time when there is competition between customers, it is very important for a company to differentiate itself from the competition, create a certain position in the market and become known to potential customers. A competitive environment creates an environment for companies that need new innovative products and services to succeed in the market (Durana et al, 2020). Not only the company is undergoing changes, but also the people themselves, which include both employees and customers. We see these changes mainly in higher expectations, demands or changing needs. People are becoming more demanding, which must be considered by entrepreneurs who decide to enter the market or who are already at the centre of events. Companies must continually strive to improve or at least maintain its market performance (Parobek, 2016). As there is currently a lot of competition in the market and we can say that supply has long exceeded demand in many sectors, a competitive advantage becomes relevant for the company, as a result of which it can gain a large number of customers and thus strengthen its market position. Vafaei et al. (2019) perceives customer satisfaction with the company's products or services as a key factor in the company's success and long-term competitiveness. The success of the company is helped by the correct determination of

specific marketing goals that the company wants to achieve, defining the target group of customers and adapting the individual tools of the marketing mix. All these activities related to the purchase and sale of the product to the final consumer can be called a collective name - marketing. Today's successful company provides 4P as a matter of course. However, they must be accompanied by other factors that determine the future performance and competitiveness of a modern enterprise. Mainly factors such as product innovation and the quality of service provision. These must be innovations of this type that generate new demand. As Rosalie et al. (2019) state innovation is an integral part of business. According to Janoskova and Kral (2019) for the successful innovative development of the economy in each country, it is necessary to set certain preconditions that should ensure positive results. Mira et al. (2018) state that in new economies driven by creativity, knowledge and technological development, innovation is the success key to achieve competitiveness. Businesses must also monitor market factors such as changes in demand and competitive behaviour (Buc et al. 2013). Related to this is the ability to respond quickly to changing customer requirements. Some customers consider the speed of response and the quality of service to be the most important features in which they choose their suppliers. A company that wants to be successful must carefully and constantly monitor the indicators characterizing the satisfaction of each customer. For example, according to Bartosik-Purgat (2018) the country of origin and the brand image are among the main factors influencing consumers' purchasing decisions. The success of companies is influenced by a set of factors of tangible and intangible nature, the so-called development potential. These include factors such as the level of innovation, the level of customer satisfaction, the level of employee motivation and the protection of the environment. These factors also include, for example, sustainable production (Terry, 2019). Olah et al. (2017) point out the relationship between the key success factors and the company's performance. The success of the company in making products or services offered by companies in some way different from the competition. In the context of this, it is important to state the findings of Mikolas (2005), who emphasizes that competitiveness is created by other attributes, in addition to the basic four attributes, human, technological, financial and business potential of the company. Kadar and Kadarova (2010) point out that if companies want to be able to compete or to compete in the market, they need to constantly improve individual business processes as well as adapt to customer requirements. However, business also brings risks. Poliak et al. (2014) point out to systematic risk, such as political, international and economic risks and unsystematic risk that is directly linked to society, for example managerial skills. Business risk is also pointed out by Valaskova, et al. (2019). In connection with corporate communication, Dedina and Odchazel (2007) emphasize that they clearly and directly affect the performance of the entire organization and it is essential that the company pays enough attention to them, because managing them can give the company a competitive advantage. To the importance of effective communication in building and maintaining performance success also point out Nwabueze and Mileski (2018).

Theoretical Background

The current business environment is affected by technological changes, new information technologies and new business practices. In order to meet customer expectations and meet their needs, it is necessary to create a strategy of competitive advantage (Mohammadi, 2018). Zeman and Bogdan (2019) also points to the importance of marketing strategy. According to Kotler and Keller (2013) marketing is a social process through which individuals and groups obtain what they need and want by creating, offering and freely exchanging products and services with others. In the company's success is important consumer satisfaction and education in environmental and social issues related to the business of the company, which can gain a competitive advantage, image, attract new customers and thus increase profits, through the application of the principles of corporate social responsibility (Nadanyiova and Durana, 2019). In the context of marketing, the company is an integral part of the marketing mix. It is a set of marketing tools that a company uses to achieve marketing goals in the target market. The company uses these tools to stimulate

customer activities. With a well knowledge of customer needs and expectations, the company can use the individual elements of the marketing mix to guide customer behaviour according to the company's needs. Customer relationship management includes employees, business processes and technologies to maximize customer loyalty and business profitability (Krizanova, et al. 2018). A company will only have a successful product if it has all the tools of the marketing mix harmonized (Marusic, 2019).

Product

A product in the broadest marketing sense is everything that serves to meet the needs of target or relationship groups. In this sense, products are understood as the essence of the existence of a company, without which other elements could not be effective (Vysekalova and Mikes, 2009). Janeckova and Vastikova (2001) characterize a product as anything that can be offered for purchase, use or consumption that is able to satisfy the needs, desires or requirements of customers. Birnerova and Krizanova (2013) define a product as the most important tool of the marketing mix. In relation to a product, it is important to point out two types, namely the tangible and the intangible product, which are otherwise called the terms product and service. Kotler (2007) defines products as something of a material nature that are the means of providing services. On the other hand, services are intangible products, which are activities for sale that do not bring ownership. Every customer has certain ideas and expectations regarding the properties and quality of products and services that the company should try to satisfy. Birnerova and Krzanova (2013) in the context of the product point to the importance of product policy, the essence of which is the goal and culmination of creating an offer. Depending on whether it is a manufacturing enterprise or a service enterprise, the term product policy can be replaced by the term product policy for manufacturing companies or performance policy for service enterprises. They also list the main tasks of product policy, which include demand-driven supply creation, demand-driven supply change and competition-driven supply change. It is recommended to make these changes after performing analyses that are suitable for determining the position of the assortment, such as product life cycle analysis, assortment structure analysis by age, by customers, by share of sales and by profitability. Svoboda (2009) states that the offer of products and services is the essence of the company's existence in corporate identity, and therefore it is impossible for corporate identity to be based only on corporate design, communication and culture. The correlation between an organization's product and its corporate identity is very close. One of the basic requirements for marketing is a clearly identifiable product, originating from a clearly identifiable manufacturer. The product expands its impact on the company's image and gives it an additional dimension of cohesion. For building and influencing corporate identity, such emotional properties of the product are important as: overall enjoyment of owning and using the product, personal identification with the product, satisfaction of individual taste through aesthetic properties of the product, product impact on prestige and self-satisfaction, product as a symbol enabling self-expression (Vysekalova and Mikes, 2009).

Marketing communication

According to Cihovska (2001) communication is the life-giving force of any relationship, and therefore also a commercial one, because every organization communicates. Swiatkiewicz (2018) focuses on market communication at the organizational and marketing level. Nagy (2012) points out that communication is one of the most important components of an individual's daily life, which can be described as a process of exchanging information either orally or in writing, which takes place between at least two participants. Kosiciarova (2017) sees the importance of communication mainly in the fact that it allows to influence individuals as well as groups, modify their behaviour, achieve effective changes and subsequently the relevant goals. In the

communication process, everyone expresses their ideas in a certain way and gives them a certain form. Communication is influenced by many factors based on the physical, social and cultural environment (Dedina and Odchazel, 2007). Corporate communication can be defined as the process that ensures that the corporate identity is transferred to the corporate image of the company through controlled and planned communication with key target or interest groups (Cihovska, 2001). Corporate communication represents all means of communication, a complex of all forms of behaviour by which a company shares something about itself, whether with an external or internal environment. In the context of communication in the company Dedina and Odchazel (2007) state that communication clearly directly affects the performance of the entire organization, and therefore it is necessary to pay enough attention to it. Managing communication can give a company a competitive advantage and its underestimation is likely to lead to major problems. Therefore, it is necessary to pay attention not only to classical communication, but also to communication influenced by technological changes. In the process of globalization, these are the internet, discussion groups and other new forms of communication between individuals and between organizations and the individual. The goal of marketing communication is to adequately address individual target groups so that positive attitudes to the company are created, so that marketing communication becomes an important and inseparable part of corporate identity, because without appropriate communication and presentation of strategy and company values it is not possible to create the desired image (Vysekalova a Mikes, 2009). Kosiciarova (2017) considers the main goals of marketing communication to be strengthening corporate image, providing information, stimulating and creating an offer, differentiating the product, emphasizing the value and benefit of the product and stabilizing turnover. Traditional approaches to marketing communication are based on rational consumer behaviour (Nadanyiova, 2017). The overall marketing communication program is also called the communication mix and consists of a combination of four main communication tools, including advertising, sales promotion, personal sales and public relations (Cihovska, 2001). There are several ways to classify a communication, resulting in several types of communication. First, it is possible to divide communication into two basic categories. The first is internal communication, the aim of which is to strengthen the internal integrity of the company's social system and to create a sense of responsibility of employees towards the company. The second category is external communication, which aims to inform about products, economic results, current position, future intentions and activities of the company. In connection with this division, it is important that the entire corporate communication, both internal and external, is uniform in its content (Cihovska, 2001). Balmer (2000) states that corporate communication is a system process consisting of three spheres, namely z primary, secondary and tertiary. In many societies, all three are balanced. Primary communication should present a positive image of the company and set the stage for a strong reputation. Secondary communication should be designed to support and strengthen primary communication. Tertiary communication should be positive and should result in an excellent reputation. If corporate communication is properly designed, executives who implement corporate communication can get the company to a competitive advantage. Corporate communication is particularly important in that it creates a connection between the corporate identity of the organization and the set strategic goal, and it is possible to achieve a favourable reputation of the company through it. Horakova et al. (2008) define corporate communication as a process that translates corporate identity into corporate image, through managed and planned communication with key target and interest groups. Communication is essential for all interest groups - employees, customers, shareholders and others to understand the identity of the organization, its values and strategy. Marketing communication based on a well-chosen communication mix leads to increased consumer loyalty to products and their better placement in the market. For this reason, it is also important to create and build a long-term relationship with customers through communication. Marketing communication is a term that includes all the ways in which an organization communicates with its environment and various stakeholders (Melewar and Karaosmanoglu, 2006). Communication can be divided according to the degree of formality. From this point of view, there is formal and

informal communication. While formal communication flows through officially established communication channels, informal communication takes place through informal communication channels. Petrikova (2007) points out that formal communication is based on the organizational structure of the company and determines powers and responsibilities. Communication outside the company, which in many cases is formal and official, can offer many forms, such as published company missions, logos and press releases about the company. Through formal communication, companies try to acquaint stakeholders with their strategy, goals and operational results. Informal communication is more spontaneous and does not consider formally established channels. In the context of communication Dedina and Odchazel (2007) point out the importance of electronic communication, which, despite its many forms, due to the rapid development of information technologies, it is possible to expect the emergence of its other forms. Businesses use the Internet as a global network for electronic communication and their own intranets. The Internet contains a huge amount of information about various products, companies, technologies and options, so the employee, rather than finding the problem, solves how to choose what is necessary and up to date.

Tools of marketing communication

Personal selling is included among the personal form of communication, because it takes place directly between the seller and the buyer. It is basically a presentation of a specific product or service in the presence of both parties, but it is not necessarily a physical contact. The goal of personal sales is not only to sell the product, but also to strengthen relationships with the customer and get feedback from him. (Prkrylova et al., 2019). Examples of personal sales can be sales presentation, telemarketing, face-to-face meetings, various programs, samples, etc. (Kincl et al., 2004)

Research question: What marketing communication tools do companies use?

Based on literature review, there are many tools of marketing communication. We have selected 7 tools, which we describe in more detail in the next part of the article. These selected include advertising, sales support, direct marketing, PR (Public Relations), trade fairs and exhibitions, guerilla marketing, product placement (PP)

Advertising - The task of advertising is to reach the target group of people, potential customers, either through various media or non-profit organizations and groups. Advertising is paid for and we classify it as an impersonal form of communication, because it does not take place directly between the producer and the consumer. The mission of advertising is to evoke a certain impulse in a possible future customer to buy a given product or service. (Prikrylova et al., 2019) The following are used to promote advertising: various print and broadcast advertisements, packaging design, catalogues, films, brochures, magazines, various billboards, etc. (Kincl et al., 2004).

Sales Support - In most cases, sales promotion is added to a different type of ad. The point is that existing advertising gives the customer an incentive to buy a given product or service, and sales promotion is the reason why they end up buying it. It follows from the above that it is only a kind of short-term incentive to increase the volume of sales of a product or service, which may be for example in the form of any game, competition, coupons, rebates or exhibitions (Prikrylova et al., 2019).

Direct marketing - Once direct marketing was considered a direct communication between producer and consumer, but the market and technology have evolved over time and today we can imagine direct marketing, for example, through online shopping or e-shop. This method of purchase differs from catalogue sales in that the transaction proceeds much faster, and thus the trade or bank transfer (Prikrylova et al., 2019).

PR (Public Relations) – it means relations with the public. Under this phraseology we can imagine various articles in the press, annual reports, publications or speeches (Kincl et al., 2004). PR contributes to the improvement of relationships, both inside the company (internal relations) and outside (external relations). In internal relations with the public we can include customers, suppliers, employees, in short, everyone who has a certain relationship with the company. External represent media, government bodies, teachers or high schools or universities. An important concept in PR is the so-called publicity. In this case, it is impersonal advertising, where the message, television, social network, or other form of communication refers to a product, service or person. Today, the Internet is the fastest growing medium found almost everywhere. For companies, the Internet is attractive mainly from the point of view of marketing communication, thanks to which it can quickly and easily reach potential consumers (Gajanova and Kramarova, 2016). The advantage of online marketing communication is a large impact on a wide audience, which perceives the promotion as a form of advertising (Krizanova et al., 2019). On the contrary, the disadvantage is that while the traditional consumer proves loyalty to the company for the services provided, the digital customer has several options to choose from, where the decisive factor is the purchase of time, delivery costs, product price or references (Chivu et al., 2018).

Trade fairs and exhibitions - Trade fairs and exhibitions represent a combination of personal and impersonal forms of communication, which we had the opportunity to see in previous forms of advertising (Prikrylova et al., 2019).

Guerilla marketing - A moment of surprise, this is the best way to capture the essence of guerrilla marketing. It most often uses humorous or absurd processing, which is supposed to cause a shock in people, at the same time the company tries to remind its brand at minimal cost (Wojciechowski, 2016).

Product placement (PP) - This form of advertising is essentially the placement of a specific branded product in an audio-visual work. The products themselves are not of an advertising nature unless they agree to them in clearly defined conditions. The advantage of this advertisement is that it does not act violently, the viewer perceives it as part of watching e.g. your favourite movie, where the viewer may even have a desire or need to own the product (Prikrylova et al., 2019).

In connection with technical progress and modern technologies, the necessary tools of marketing communication are the website and communication via social networks. The company's website can be the company's main means of communication with the public on the Internet. Ecommerce users' websites have very important components in gaining trust and influencing buyers when buying goods (Princes, 2019). It should contain all the important and necessary information for customers. Another tool that is in most cases essentially a necessary tool for communication are social networks, especially Facebook and Instagram. Instagram is currently the most used and, so

to speak, the latest social network. Above all, various images or series of images are shared via Instagram. In addition, however, it also offers other options: broadcast live videos, give current pictures, the so-called stories that are only visible for 24 hours, live interviews, etc. Instagram is an ideal place to promote products, and importantly - in a freeway.

Conclusion

Marketing communication is an important element, thanks to which both the customer and the company obtain the necessary information. Customer about the product and company about the customer. A serious problem is the use of the right kind of promotion of the product. Evaluate what type of promotion is most appropriate for promoting the product. Incorrectly determining the type of ad used can have a significant impact on gaining potential customers. Even though traditional methods of advertising are still used by many people today, it is important to consider technological progress. Today, the Internet is popular with many people, as it is the most dynamically developing medium. For companies, the use of communication through modern technology is a matter of course. Marketing communication is an important tool, thanks to which, when properly applied and implemented, the company can ensure effective and successful sales of the product, as well as the success of the entire company.

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Innovation activity and innovation barriers in the Slovak companies

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Abstract

Innovation and education in particular are becoming key factors for the growth of competitiveness, as well as the ability to apply the results of science, research and development in business practice. In this paper, we focus on three main areas. As the Slovak Republic is a member state of the European Union, one subchapter focuses on the level of innovation activity across the European Union and emphasizes the position of Slovakia in the ranking of all member states. However, we focused more on the innovative activity of companies operating in the Slovak Republic and the aim of this paper was to emphasize the main barriers that prevent companies from innovating. When processing the paper, we mainly used the meta-analysis to review studies by foreign authors, documents issued by the Statistical Office of the Slovak Republic and the European Union.

Keywords: innovation, innovation activity, innovating enterprises, innovation barriers.

Introduction

The natural development of the business environment of the Slovak Republic has created a great deal of pressure on the growth of the competitiveness of companies and regions. Firms' innovation activities play an important role in fostering firms' competitiveness and enhancing economic growth of regions and countries, as well as the ability to apply the results of science, research and development in business practice (Zygmunt, 2019). International competition and a competitive market environment have made it important for companies to successfully manage innovation-enhancing activities. Continuous development in areas such as education, the Internet, fast communication, contributes to the continuous improvement of companies and their growing offer of more complex and differentiated products and services.

It is the fact, that innovation is positively linked to business performance and it acts as an intermediary between organizational variables and financial performance measured by earnings achieved (Durana et al., 2020).

The level and intensity of innovation activity in individual companies does not only depend on the willingness or ability of the company to engage in innovation, but is also influenced by external factors. Identification of factors determining the innovative activity of enterprises is one of the basic directions of research on growth and economic development (Jakimowicz & Rzeczkowski, 2019). This task is extremely complex, because it is conditioned not only by the singular internal

properties of enterprises, but also by the aspects regarding the socio-economic environment (Wziątek-Kubiak et al., 2013). The impact of innovation barriers on the innovative activity of enterprises and their goals is confirmed by numerous studies (Lewandowska, 2014; Madeira Silva et al., 2017; Segarra-Blasco et al., 2008; Talegeta, 2014; Zabolotniaia et al., 2019).

In this paper, we will focus mainly on the innovative activity of companies in the Slovak Republic and on the barriers that affect their innovative activity.

Literature review

The current economic situation on the market underlines the importance of business competitiveness. An important and necessary feature of companies is a flexible response to the changing business environment and customer requirements. Efforts to meet such variable requirements create pressure for innovation (Zizlavsky, 2016). Innovation is considered a key factor for success (Akman & Yilmaz, 2008) and at the same time it is the basis for increasing economic performance and productivity. Boston Consulting Group (BCG) points out that up to 66% of executives consider innovation to be one of the top three strategic priorities (James et al., 2008). Through innovation, companies gain the ability to dictate and modify "rules of the game", allowing them to enter new markets and challenge established market leaders.

When companies wanted to increase their market competitiveness in the past, they focused on cost, time efficiency and quality improvement. At present, quality is a necessary criterion of competitiveness, but it is not enough for a company to survive and be successful (Rejeb et al. 2008; Assink, 2006; Romijn and Albaladejo, 2002). Companies should not take an emphasis only on product quality, but also quality of customer relationship is important (Krizanova et al., 2018). Businesses are therefore forced by the pressure of the market environment to constantly innovate, develop new processes and supply new products to achieve and maintain a competitive advantage (Rejeb et al. 2008).

The economic crisis that businesses will continue to face should not be a barrier to a company's ability to innovate. Simply reducing the workforce and suspending or relocating R&D to other countries will not solve the problems caused by the economic crisis. One possible solution for businesses to survive in times of economic crisis is to remain innovative. The right strategies can benefit companies and build competitive advantages. An example of the correctness of such an action is Craig Barrett, a former chairman of Intel, who was able to understand and benefit from the circumstances. He argues the following: “You cannot save on your way out of recession; but you have to invest in it,, (Little, 2009).

Carlos Moedas, European Commissioner for Research, Science and Innovation, said (2019): “Innovation is synonymous with job creation and growth. However, if the EU and its Member States are to compete globally, they must continue to invest and develop appropriate policies to further develop innovation. "

There is no denying the fact that innovation is the basis of sustainable growth in the company. On the other hand, there is no guarantee that investing in innovation will be spent effectively. Therefore, it is essential to innovate wisely and with focus. For this reason, the company should continuously evaluate current ongoing innovation projects and decide on the basis of this information whether it will continue these activities.

Unfortunately, a large number of companies are not involved in measuring the performance of innovations, despite their enormous importance in business development (Skarzynski & Gibson, 2008). Experience and research confirm that the necessary steps by top management must be: to show long-term commitment and allocate resources for innovation in order to create a lasting organizational capacity for innovation (Davila et al., 2013).

Understanding of innovation

As the Slovak Republic is part of the European Union, we will look at the definition of innovation from the perspective of the European Commission, which understands innovation as the renewal and expansion of products and services and related markets, the creation of new methods, technologies and methods of production, supply and distribution, the introduction of changes in management and organization of work, in improving working conditions and increasing the qualifications of workers.

This definition points to a comprehensive understanding of innovation, including different application procedures in the field of innovation. The European Commission does not limit the understanding of innovation to those of a technical nature; on the contrary, it increasingly emphasizes the importance of innovation in the organization and management of production processes, business quality models in production and, of course, sales promotion. It considers science, research and development to be the main source of innovation, which is naturally related to the ability to apply them in business practice and thus also to the invention, creativity and qualification of entrepreneurs and their employees.

A business that does not innovate ages and declines. At present, in a period of extreme changes, the decline is rapid. "Innovate or die," is a well-known statement by Tom Peters. The importance of innovation in business survival requires that the company's structure, organization, technologies and practices constantly meet market needs (Castellacci et al., 2005). In order for a business to continue and survive in a changing environment, it must adapt (Eisenhardt & Martin, 2000).

Innovation is important, because for many businesses it is a set of tools for generating entrepreneurial and profitable growth that will improve its performance and competitiveness (Potters, 2009). Sustainable and profitable growth in the company requires sustainable innovation activities (Michalkova et al., 2019). Before a current product or service reaches a level of maturity or technological obsolescence, companies must come up with a new business opportunity, improved product line or service to sustain growth and maintain a competitive position. Innovation helps to bring new products or services to market, retain existing customers, create new markets and promote the global competitiveness of nations (Dobrodolac et al., 2018; Elvira et al. 2019). History has shown that only companies that innovate will survive, and companies that do not innovate, are more likely to leave the market because they cannot focus on a rapidly changing market, so it is essential to drive innovation (Valaskova et al., 2018).

Many researchers are currently discussing innovation models. The research by Alani et al., 2019 provides a better understanding on the product innovation within the organizational context and the authors create a model of the relationship between strategic orientation and product innovation under the mediating effect of customer knowledge management. Innovation models have also been discussed by Oliinyk et al., 2018, where authors deal with the process of distribution of an innovative product using the Bass model. With issue of business models for sustainable innovation in Industry 4.0 dealt authors Ludbrook et al. 2019.

Companies have a strategic choice in a time of radical technological changes. Several researchers have addressed this choice in technology management, organizational education, and economics (Lee et al. 2003). The company must decide whether to use its current technology to ensure short-term survival, or it will decide to use new technologies and hope that they will have better opportunities in the long run.

Also important is the country's policy, which can support innovation in the country by allocating funds to support research and development carried out by resident companies, research institutes, universities.

Methodology

This chapter is devoted to the description of the scientific methods that the authors used to create the paper. The authors used the following scientific methods: meta-analysis and synthesis.

Meta-analysis is a scientific method that summarizes data from several sub-independent studies. The aim is to identify and quantify the prevailing trends or to identify the causes of the different conclusions of the work.

We used the scientific method of synthesis to find out the links between these earmarked elements, contradictions, their interconnections, and then we could reproduce the phenomenon under investigation with its essential features and relationships. The synthesis of knowledge consisted of joining individual parts into wholes - we combined them into individual subchapters: *Innovation activity in European Union* and *Innovation activity of Slovak companies and barriers of innovation activity*.

The literature was collected by using various sources, the main part was created by research papers from scientific databases Web of Science and Scopus. We identified such papers using the keywords “innovation”, “innovation activity”, "innovating enterprises" and “innovation barriers”. We also used documents issued by the Statistical Office of the Slovak Republic and the European Union to find out the current situation of innovation activities of Slovak companies.

Innovation activity in European Union

The European Commission has made recommendations to guide the economic policies of individual Member States. For the Slovak Republic, one of the recommendations for 2019 and 2020 is directly related to innovation: to focus investment-related economic policy on healthcare, research and innovation, transport, notably on its sustainability, digital infrastructure, energy efficiency, competitiveness of small and medium-sized enterprises, and social housing, taking into account regional disparities.

In June 2018 and March 2019, the European Council stated in its call that if Europe wants to compete on world markets, maintain and improve the European way of life, it needs to increase its innovative capacity. That is why the Juncker Commission has set more ambitious targets for the EU and its Member States and regions, and has proposed a European horizon, which is the most ambitious program in the field of research and innovation yet. These steps are intended to help keep the EU at the forefront of global research and innovation.

The 2019 European Innovation Scoreboard and the 2019 Regional Innovation Scoreboard, published by the Commission, show that the EU's innovation performance has been improving for

four consecutive years. For the first time in history, Europe has performed better than the United States in terms of innovation. However, the EU continues to lag behind Japan and South Korea, and China is fast catching up.

Regular evaluation of the level of innovation in individual EU member states is also carried out using the European Innovation Scoreboard (EIS), which provides a comparative assessment of research and innovation results across the EU. Such data can be used by Member States, regions and the EU as a whole to assess the relative strengths and weaknesses of national research and innovation systems. It also reveals areas where Member States are doing well, as well as areas where Member States need to focus their efforts to increase their innovation performance. The similar research done authors Kral and Janoskova (2019), which aim was to identify possible strengths and weaknesses of the national innovation systems of countries V4 and, thus to identify the impact of these strengths and weaknesses on the innovative position of these countries.

Based on the number of points (score) in this evaluation, EU countries are divided into four performance groups: innovation leaders, strong innovators, moderate innovators and modest innovators. We present the results of the latest evaluation for the year 2018, published in 2019. According to the division of countries into individual groups, we can see their innovative performance, as well as the classification of the Slovak Republic:

- Innovation Leaders – Denmark, Finland, the Netherlands, and Sweden perform 20% or more above the EU average;
- Strong Innovators – Austria, Belgium, Estonia, France, Germany, Ireland, Luxembourg, and the United Kingdom perform above or close to the EU average;
- Moderate Innovators – Croatia, Cyprus, Czech Republic, Greece, Hungary, Italy, Latvia, Lithuania, Malta, Poland, Portugal, Slovakia, Slovenia, and Spain show an innovation performance below the EU average;
- Modest Innovators – Bulgaria and Romania perform well below 50% of the EU average.

As we can see, Slovakia belongs to the group of moderate innovators. The following figure shows the ranking of countries according to the European Innovation Scoreboard, as well as the classification of individual countries into the four groups. The colored bars show the innovation performance in 2018, the horizontal linkers show the performance for 2017 and the gray bars the performance in 2011, all data compared to the EU average in 2011.

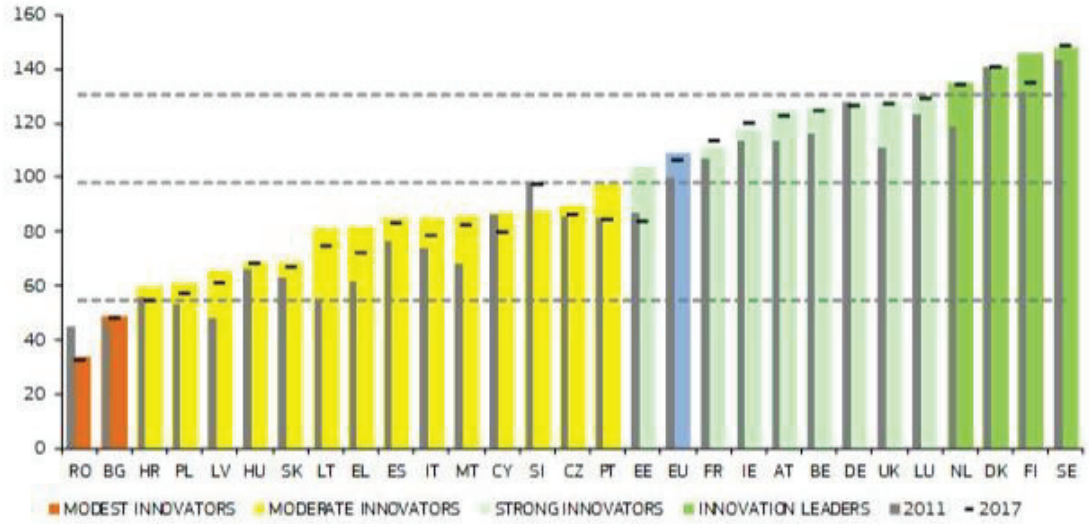

Figure 1. 2019 Innovation Scoreboards

Source: 2019 Innovation Scoreboards: The innovation performance of the EU and its regions is increasing

Innovation activity of Slovak companies and barriers of innovation activity

Enterprises with innovation activity are those that have launched new or significantly improved products or introduced new or significantly improved processes within the company, or have introduced organizational or marketing innovations. Also included are those enterprises that have had incomplete or suspended innovation activities. In the years 2014-2016, 28.7 % of enterprises in the Slovak Republic were innovatively active. In industry and selected services together (excluding construction), there were 30.7 % of them. Businesses in industry (32.7 %) had a higher innovation capacity than in services (28.4 %) (Statistical office of the Slovak Republic, 2018).

As in the previous period, the innovative activity of companies was directly proportional to their size. Compared to the period 2012-2014, innovation activity in industry increased in medium and large enterprises. In services, the increase in innovative activities compared to the previous survey was also in the group of medium-sized and large enterprises, while the most intensive increase was in the group of large enterprises. The decrease in innovation activities compared to the period 2012-2014 was in industry and services in the group of small enterprises (Statistical office of the Slovak Republic, 2018).

The low share of innovative companies in the Slovak Republic is a consequence of the action of innovation barriers preventing innovation activities in both innovative and non-innovative companies. Innovation barriers in Slovak companies are mainly cost, market and knowledge factors.

According to the results of the survey of the Statistical Office of the Slovak Republic, in the period 2014-2016, 30.7% of enterprises in industry and selected services were innovatively active. However, these companies also faced problems that prevented them from engaging in further innovation. Cost factors are considered by innovating companies to be the main factors limiting innovation activities. *Lack of internal finance for innovation* is considered to be the biggest innovation barrier by 29 % of innovating companies, *too high innovation costs* by 25.9 % and *lack*

of credit or private equity by 10.2 % of companies. Other highly important factors limiting innovation were market factors. *Difficulties in obtaining government grants or subsidies for innovation* were reported by 22.1 % of innovating companies, *too much competition in the market* by 19.5 % and *uncertain market for ideas for innovations* by 12.9 % of innovating enterprises. From the group of knowledge factors, a high degree of importance have these factors: *lack of skilled employees within enterprise* - 15 % of enterprises and *lack of collaboration partners* - 5.9 % of companies (Statistical office of the Slovak Republic, 2018). The following table provides an overview of the most important areas of factors limiting innovation activities by companies.

Table 1. The main factors limiting innovation activity in Slovak companies

Area of factors	**Type of barrier**	**Percentage of innovative enterprises indicating high importance of selected factor**
Cost factors	Lack of internal finance for innovation	29 %
	Innovation costs too high	25,9 %
	Lack of credit or private equity	10,2 %
Market factors	Difficulties in obtaining government grants or subsidies for innovation	22,1 %
	Too much competition in your market	19,5 %
	Uncertain market demand for your ideas for innovations	12,9 %
Knowledge factors	Lack of skilled employees within your enterprise	15 %
	Lack of collaboration partners	5,9 %

Source: own processing by author by Innovation activity of enterprises in the Slovak Republic 2014 - 2016

The following table shows the number of individual companies in indicating the importance of specific factors. We must point out that these results only concern innovative companies.

Table 2. Innovation barriers of innovative companies in the Slovak Republic by number of employees in 2014-2016

Type of barrier	Number of innovative enterprises indicating high importance of selected factor Sizeclass (by number of employees)			
	between 10 and 49	between 50 and 249	250 or more	total
Lack of internal finance for innovation	464	201	56	**721**
Lack of credit or private equity	191	68	12	**271**
Innovation costs too high	439	156	53	**648**
Lack of skilled employees within your enterprise	248	88	37	**373**
Lack of collaboration partners	106	23	17	**146**
Difficulties in obtaining government grants or subsidies for innovation	363	145	49	**557**
Uncertain market demand for your ideas for innovations	226	78	29	**333**
Too much competition in your market	344	110	33	**487**

Source: own processing by author by Innovation activity of enterprises in the Slovak Republic 2014 - 2016

Tab. 2 provides an overview of innovation barriers and their impact on companies by number of employees. The data in the table show that innovation barriers are most felt by small and medium-sized enterprises, relatively less by large enterprises, which is related to the fact that the number of small and medium-sized enterprises in the economy is absolutely greater than the number of large enterprises. However, this also implies the need for greater support for innovative activities of small and medium-sized enterprises by the state. In developed economies, small and medium-sized enterprises in particular are the implementers of innovative development. To improve the innovation performance of companies and the economy as a whole, it is important to identify innovation barriers. However, this is only the first step - they must be removed. Some of the barriers can be removed at the enterprise level, through innovative management, but most of them require a society-wide solution at the state level.

Conclusion

According to the latest measurements of the European Union from 2018, the Slovak Republic belongs to the group of moderate innovators - shows an innovation performance below the EU average. The low share of innovatively active companies in the Slovak Republic (28.7 %) is also reflected in the low innovation performance of the Slovak Republic in comparison with other countries of the European Union. This result is, among other things, a consequence of the action of innovation barriers that hinder the development of innovation activities in Slovak companies. For the most important barriers limiting them innovation activities, Slovak companies consider cost factors, namely: lack of internal finance for innovation; innovation costs too high and lack of credit or private equity. However, the successful implementation of innovations is also limited by market and knowledge factors. These barriers limit innovation activities small and medium-sized enterprises in particular, therefore state support should focus in particular on these enterprises. The state must create the necessary preconditions for the successful innovative development of a certain country. This means that it should not only provide sufficient financial, human and material resources, but also create a suitable innovative business environment, enabling companies

to become more involved in innovation processes and thus contribute to increasing the innovative performance of the economy.

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The Pandemic_Covid-19 and The Online Selling Process in Small and Medium-Sized Enterprises (SMEs): A Preliminary Perspective

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Abstract

The global pandemic scenario, marked by the new coronavirus (covid-19), makes evident the need for companies to react in their strategy (communication, distribution and sales). In this sense, this study aims to understand the value proposition by investing in the quality of the online sales process in the food sector based on the dimensions of service quality, identifying attributes that customers recognize value. It is intended to apply a questionnaire using the WEBQUAL model to understand the perceptions of customers on the company's website. In the end, we intend to understand the importance of the quality of the digital commerce process in companies in Portugal as a blue ocean strategy. In particular, the contribution of the quality of the digital commerce process (quality of processes) in the segment of food companies in Portugal. The research methodology is exploratory. The method used is descriptive, quantitative and based on the administration of an online questionnaire that applies the WEBQUAL model. In an interdisciplinary perspective, this study presents inputs for marketing, strategy and the quality of services. At the end, lines of future research will be presented.

Keywords: Covid-19, market orientation, Blue ocean strategy, WEBQUAL.

Introduction

The COVID-19 pandemic turned out to be a huge public health problem with an impact on companies and consumers at the national and international levels. Measures were implemented in Portugal in response to COVID-19: limitations on travel rights, closure of commercial establishments, and prohibition on holding events. Teleworking was also encouraged and distance learning was promoted. Consumers and companies had to adjust their behaviour, the mode of purchase and the place of purchase were changed. The companies took steps to continue the business because there is no knowledge of the end of the pandemic by Covid-19. They were forced to rethink strategies and processes to ensure that they have the necessary tools to remain open after the pandemic. The experience in the digital commerce process by some companies has proved to be a sustainable competitive advantage. Sustainable competitive advantage must preserve what is distinctive in a company. Digital commerce assumes itself as

an important vehicle for communication and product distribution, which is fundamental for companies today. Companies must control what they achieve, namely the portfolio of products and services to the customer. Strategy is the way to achieve the goals. Companies must follow blue ocean strategies, market space where industries that do not exist at the moment are found or blue oceans are created from innovations in red oceans with opportunities for profit and growth. There is a concern for the blue ocean strategy for technological advances and globalization. Lower barriers between commercials, product information and prices become instantly available and monopoly markets tend to disappear (Kim & Mauborgne, 2005). Strategic options are limited by the environment and the development of a corporate strategy begins with an analysis of the conditions of the industry in which it operates. To choose the strategic vision, one must consider: the structural conditions in which organizations operate, the resources and competencies and the strategic mind-set (Kim & Mauborgne, 2014). The adoption of quality (Quality Management System) is a strategic decision by an organization that can help improve global performance and provide sustainable development (NP EN ISO 9001: 2015). An organization that is focused on quality promotes a culture with processes, behaviors and attitudes that provide value in meeting the needs and expectations of relevant customers and stakeholders (NP EN ISO 9000: 2015). It is relevant to understand the quality perceived by customers to make continuous improvements and readjust strategic and operational decisions. According to Kumar, Singh and Kaur (2012), the analysis of the quality of the websites is an essential tool for the improvement of the websites and future decisions of the commercial department. Therefore, this preliminary study aims to understand the corporate strategy of companies by investing in value for quality of service in the food industry segment in Portugal, identifying attributes that customers recognize value, through the application of the WEBQUAL model.

Strategy and markets

The market consists of two spaces: the red ocean and the blue ocean (Kim & Mauborgne, 2005, 2008). Red oceans have the following characteristics: existing industries in which industry boundaries are defined and accepted; competitive rules are known; companies try to outperform their competitors; they get crowded and the profit and growth prospects are reduced. In the blue oceans are found all the industries that do not exist at the moment; untapped market space, creation and growth opportunity, highly profitable. The authors argue that some blue oceans are created beyond the existing limits of the industry, most are created from the red oceans, extending the limits of the industry to an untapped market space. Thus, the red ocean represents all the industries that exist and high competition prevails, the blue ocean considers all industries that do not yet exist, represents the unexploited market and where there are opportunities for high growth and profitability. They add that in the blue oceans there are new opportunities for profit and growth. A study was carried out on 108 companies (which started their activity) and found that the majority of businesses are located in red oceans (86% of businesses representing 62% of revenues and 39% of profits). The blue oceans represent (14% of businesses that obtain 38% of revenues and 61% of profits). The performance benefits of creating blue oceans were evident (Kim & Mauborgne, 2005).

The competitive strategy is the creation of a unique and valuable position, involving a set of different activities (Porter, 1996). It means choosing a different set of activities to provide a unique mix of value. There are three fundamental principles underlying the strategy: strategy is the creation of a unique and valuable position, involving a set of different activities; the strategy requires trade-offs* in competition to choose what not to do, the strategy involves creating an adjustment between the company's activities (Porter, 1996). Michael Porter (1996) presents three generic strategies: cost leadership, differentiation and focus.
Kim and Mauborgne (2005) argue that the “blue ocean” strategy focuses on making competition irrelevant, creating a new market space where there are no competitors. The solution to face the competition is to bet on the creation of blue oceans where innovation with value predominates (creating value for the company and buyers, making the competition obsolete) is not to compete in the red ocean environment. The authors concluded that the creation of blue oceans can be

created from the company's core business. The blue ocean strategy is achieved only when the company's entire system of utility, price and cost activities is correctly aligned. It is this system-wide approach that makes creating blue oceans a sustainable strategy. The blue ocean strategy is part of the company's range of functional and operational activities. It is a strategy that covers the entire system of activities of the company. The strategic objective, Blue Ocean, is to create new rules, to reject trade-off based on differentiation and low cost and to change strategic thinking, changing from a structuralist vision (strategic thinking based on a defensive position against the competition) to a reconstructionist that increases the value for the company and buyers (space where competition is irrelevant) (Kim & Mauborgne, 2004, 2005). The success of a strategy depends on the development and alignment of value, profit and people. The researchers also defend the concept of the blue ocean strategy strongly related to leadership in order to increase the productivity of employees: focus on the activities that leaders need to be to stimulate motivation and obtain results; keep an eye on the market and distribute leadership across all levels of management. They add the following steps to achieve blue ocean leadership: observe current leadership; develop alternative leadership profiles; select future leadership profiles; institutionalize new leadership practices. In the relationship between the leader and the led, trust and cooperation are essential (Kim and Mauborgne, 2014).

To design a blue ocean strategy, three tools are mentioned: the strategy screen, a table of the four possible actions and the relationship to eliminate, reduce, elevate and create. The strategy screen, is a diagnosis and action that aims to identify alternatives in the industry (understand what the competition is doing and identify factors to compete) and in non-customers; the framework of the four possible actions allows to redesign the strategic profile and create new value. Through identification: elimination, identifying factors in the industry that must be eliminated because they do not compete; reduction, determining the factors that must be reduced, companies can over-serve their customers and increase costs; elevation, determining the factors that they must add value according to the industry standard; and creation, identify the factors to create that the industry does not yet offer.

In elimination and reduction, companies obtain information on how to reduce costs in relation to the competition and the other two questions provide information on how to increase the value for buyers and achieve new demand (Kim, & Mauborgne, 2005). When a company applies the framework of the four possible actions to a given industry, it gets a new look at what is actually perceived. The third tool using the eliminate-reduce-increase and create ratio is a complement to the analysis of the structure of four actions that allows companies to not only ask the four questions but also to act to create a new value curve. With the application of this combination (eliminate, reduce, increase and create) it allows to obtain four immediate benefits: to look for differentiation and low costs seeking to eliminate value / cost trade-off; identify companies that are only focused on increasing and creating by raising their cost structure and designing more products and services.

The researchers applied the practical application to the wine sector in the United States and the results allowed to identify that the characteristics for a good strategy are the focus, the divergence and the slogan. The focus does not spread efforts on all factors of competition; the divergence is related to a new value curve different from that of competitors; the slogan of the strategic profile must be clear and attractive (Kim & Mauborgne, 2005). They also applied the structure of the four actions (eliminate, elevate, reduce and create) to a communication technology company in the logistics area, to the company CJ-GLS (develops an electronic logistics business model), in order to analyze how the company achieved a competitive advantage through innovative information technology that allowed to create a space in the electronic business logistics market. The rapid growth was due to the implementation of a blue ocean strategy (3PL market) and not to the attraction of competitive customers. In order to carry out this study, interviews were conducted with the directors: executive, IT, research in logistics, responsible for information and several collaborators. Success factors and problems in the implementation of the blue ocean strategy were identified. The success factors for implementing

a blue ocean strategy were mentioned: the highly motivated information systems team, strong leadership from top managers and the availability for innovation (Kim et al., 2008).

Online trends and WEBQUAL

The digital world has come to challenge companies, approaching everyone everywhere (Malheiro et al., 2019). Challenges that extend to all levels, not only economic, but also at a relational level, since the relationships themselves, and the way in which people relate and behave, have also undergone modifications. Its indefinite nature, among the news about the various unlawfulnesses that have occurred in the digital medium, make the online consumer develop a certain prudence in the use of this medium, especially in regard to their trust in it. Thus, it is clear the need for companies operating in this medium, in addition to addressing new business models and take advantage of the great benefits offered by this new digital era, including in their strategies the needs and expectations of their customers, achieving what build a reliable image (Vilas Boas et al., 2019). In the current context, strongly marked by the coronavirus pandemic, online services assume a recognized importance (as an attempt to react and respond to the health crisis, economic and social crisis). Thus, this section aims to address the importance of online services (trends and developments in the Portuguese market) and also the WebQual model as a tool for managing and improving the service provided. According to the General Directorate of Health (DGS) in Portugal, the new coronavirus, designated SARS-CoV-2, was first identified in December 2019 in China, in the city of Wuhan. This new agent has never been identified in humans before. The source of the infection is still unknown. The route of transmission is still under investigation. Person-to-person transmission has been confirmed and infection already exists in several countries and in people who had not visited the Wuhan market.

The evolution of online commerce

The most common form of trade is one that is based on the existence of a physical store, a supplier/seller, a customer and all the dynamics that derive from the interaction between the three, the so-called "brick-and-mortar" (Barnes et al., 2004). In this type of channel (traditional/offline) it is possible to expose the product, touch, smell, test, change or even return, which allows the consumer to enjoy a complete shopping experience, although limited by the operating hours and location (Vilas Boas et al., 2019). It was for many years the main form of transaction and sale of goods of the society but that quickly was transformed, not only by the evolution of the technology, but also by the needs and demands that the consumers and the own economy came to present (Koufaris, 2002). According Vilas Boas et al. (2019), online commerce brings countless advantages for consumers, such as, for example, getting alternatives at any time, compare products and compare prices (Pallant et al., 2017). 65% of respondents admitted using the Internet to compare prices in other stores, 61% to search for information about products or services and 49% to see reviews. In the first place of research by products, where 52% of consumers cited at least one channel without connection and 59% an online channel, which shows that, despite the growth of online commerce, both types of commerce still have a significant weight in the consumer purchase process (KPMG International, 2017). In the event that there is a change in the quality of the information, it should be taken into account that the use of information technology, allow stores to be able to attract and retain more consumers.

In specific Portuguese context, and according to the e-commerce barometer in Portugal, in 2014, 66% of the sites in the study said they had increased their sales volume compared to the previous year, and 24% said that this volume was over of 1 million euros (ACEPI, 2015). According to ACEPI's annual study, e-commerce and online purchases are growing in Portugal and at the end of 2016, some 873.000 Internet domains were recognized in .pt. In 2017, online purchases in Portugal amounted to 4.6 million euros, only in the B2C market, and the expectation for 2018 is for growth. Indicators for the development of the digital economy in Portugal revealed that in 2025 the percentage of the population that uses the Internet will be moved to 91, and 59 the

percentage of consumers who use the Internet to make online purchases. The fashion and clothing sector and the technology sector have the highest online sales rate, although the study also foresees a significant increase in the food and supermarket sector (ACEPI, 2018). With this change in online commerce, consumer behavior has also changed. The digital age brought with it a new profile, the online consumer profile. According to the results published recently by Statistic National Institute (INE) on the use of information and communication technologies (Vilas Boas et al., 2019), presented in Figure 1, in 2018, 79% of Portuguese families had Internet access at home (INE, 2018).

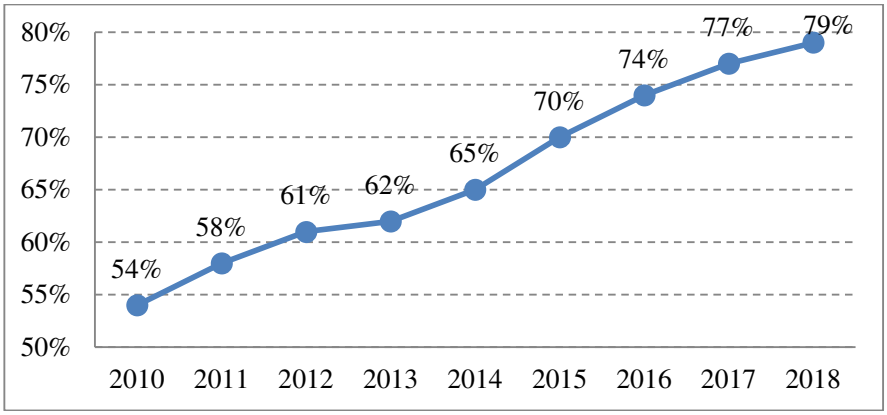

Figure 1: Proportion of households with Internet connection, Portugal (2010-2018).
Source: Vilas Boas et al. (2019).

However, and with the reality of the new coronavirus strongly felt in Europe, particularly in Portugal, online commerce is increasingly important in the first months of 2020. The results mainly in an attempt by companies, and consumers, to minimize the economic impact of the pandemic and, at the same time, have greater access to essential products and services (e.g. food and beverages, pharmacy or clothing).

WEBQUAL

Quality is a central element in corporate strategy. Companies compete for quality, customers look for quality and markets are transformed by quality (Golder et al., 2012). According to the standard (NP EN ISO 9000: 2015) the quality of an organization's products and services is determined by its ability to satisfy customers and the impact on relevant stakeholders. The quality of services is considered a determining factor for the success of companies and assumes importance due to the increase in the offer (Igreja & Sousa, 2020), the experience of the companies, the cost and the demand of customers (Parasuraman et al., 1985). Companies to be able to match or even exceed customer expectations need to understand the dimensions they value, in order to improve the services provided (Zeithaml, 1988). The technical and functional dimension constitutes Service quality. The technical dimension is related to what the customer actually receives from a service (result). The functional or process dimension concerns the way the service is delivered, the customer's perception of the interaction during the service provision (Grönroos, 1982). Technical quality affects customers' perceptions of service quality (Grönroos, 1982, 1990; Rust & Oliver, 1994). In some services, technical quality may be difficult to assess. If this dimension of quality is not possible to estimate customers, they depend on functional quality, namely on empathy and the trust transmitted by the service provider (Kang, 2006).

The WebQual model is considered a method of assessing the quality of websites that is based on the perceptions of consumers' quality on the websites. This model has been applied in several

areas of online commerce: bookstores, online auctions and small businesses (Stuart J. Barnes & Richard T. Vidgen, 2001). The researchers Loiacono et al. (2007) reached an instrument with 36 items, organized into four constructs (utility, ease of use, entertainment, complementary relationship) and 12 dimensions (Loiacono et al, 2007).

The utility construct is composed of the dimensions: adequacy of information to the task, interactivity, degree of reliability and response time. The dimension adequacy of the information to the task is related to the personalization of the information according to the objectives of the users (clear and easy to understand information). The interactivity dimension characterizes the resources available on the website in order to facilitate the user to obtain information appropriate to specific needs.

The reliability dimension is related to the respect for the privacy of users' information, technical reliability on websites and the provision of updated content in a secure environment. The response time dimension is the time to obtain a response after requesting with the website, the user must quickly access and perform any operation from his environment (Loiacono et al., 2007). The ease of use construct is made up of dimensions: ease of understanding and intuitive operations. The ease of understanding dimension is related to the pages displayed on the site being easy to read and the sections easy to understand. The intuitive operations dimension is related to the ease of use of the website.

The entertainment construct is made up of the following dimensions: visual attractiveness, degree of innovation and emotional appeal. The visual attractiveness dimension is related to the stimuli that can lead to a pleasant browsing experience and innovative character of the website. The degree of innovation, is related to the creativity and innovative design of the website, and the emotional appeal, is related with the emotional effect of using the website and with the intensity of involvement (the user feels satisfied, excited and sociable) (Loiacono et al., 2007). The complementary relationship construct consists of the following dimensions: consistent image, online integration and comparison with other sites. The consistent image dimension is related to the website providing an image consistent with the company's image. The online integration, the website must allow the user to be able to complete his online transaction. The dimension comparing with other channels, is related to the user comparing the service provided through the website with the same service provided through alternative channels (namely the fax or telephone) and the website should allow the same tasks to be performed through the Web in the best way (Loiacono et al., 2007).

Methodology and preliminary results

This study will follow, in methodological part, a stage of primary data collection and systematization in the Portuguese context (in the first half of 2020). In particular, we intend to observe the performance and responsiveness of some food companies in Portuguese (i.e. dairy products). It is intended to understand the reactive strategies of organizations in the context of the pandemic (i.e. coronavirus) and the extent to which market strategies are adopted in these unpredictable scenarios. Thus, the WebQual model will allow researchers to assess the quality of websites that is based on the perceptions of consumers' quality on the websites. In this sense, it will also be intended to develop an analysis of social networks, in order to capture good practices for responding to the covid-19 crisis (communication and response strategies with online service). See, for example, the case of the '*Lacticínios das Marinhas'*, that sells dairy products, (figure 2) that published a new home delivery service on social networks (using electronic commerce and online shopping).

On the social network, a company located in the north of Portugal (in Esposende) put the following message "During this difficult period, we don't want anything missing! Now you can receive the best Marine products in your home at no extra cost. By private message and Order now!". At the same time, check if the public organization has several posts with the message

'everything will be fine', in an attempt to create hope, empathy and positive thinking with Portuguese consumers.

Figure 2: Reaction strategy of the company '*Lacticínios das Marinhas*'' (Portugal).
Source: Facebook.

Since this strategy is relatively recent (30 days), it is too early to evaluate the results of this initiative. However, a qualitative analysis of social networks shows a high acceptance by the public, particularly with regard to the number and type of reactions and sharing with the community (viral marketing). The pandemic situation led to a greater use of the Portuguese company's digital channels, using technological means and avoiding proximity and physical contact. In particular, and due to the pandemic situation, Lacticínios das Marinhas decided to reinforce the measures of the contingency plan implemented and ensure the protection and health of employees, while maintaining the provision of services. The measures in question, came into force as of 16.03.2020 and are broadly reflected in the following:

- Lacticínios das Marinhas did not receive any supplier at its facilities until further notice.
- Elimination of sales to final consumers on the premises.
- Customers (Wholesalers and Retailers) who pick up orders at the premises should place orders via phone or e-mail and call the office as soon as they arrive and should remain in the vehicles until pickup is authorized.
- Drivers must also avoid contact with employees.
- Only accept payments for orders via MBWay, ATM or bank transfer. Cash payments were not accepted. The reactions that were manifested on social networks were positive and consumers showed a strong sense of social responsibility and a greater acceptance of the digital solutions presented by the Portuguese company. Future studies will allow us to monitor and analyze the evolution of this initiative and, consequently, measure the positive impact on sales and customer loyalty.

Conclusions and future research

The global pandemic scenario, marked by the new coronavirus (covid-19), makes evident the need for companies to react in their strategy (communication, distribution and sales). In this sense, this study aims to understand the value proposition by investing in the quality of the online sales process in the food sector based on the dimensions of service quality, identifying attributes that customers recognize value. Technological evolution is the great cause for most of the changes that have occurred, from cultural, social, political, economic, personal and even psychological changes, all of them on a global scale. The environment and the relationships that are built in it stopped happening only in physical space, happening also in a space without defined location: the virtual space. The development of technology has brought with it innumerable positive aspects: the global communication that today is fundamental; the democratization of knowledge throughout the world, made possible through the connections that information systems have acquired; the medicine that attended to great evolutions; the very world that has become a small town where everyone is connected, and endless other advantages.

The inclusion of trust and perceived risk was due to the fact that online commerce, due to its technological nature, operates in an environment of doubt and uncertainty. However, the needs and expectations of the consumer have undergone changes with these technological advances, so that companies in this sector had to reinvent themselves and, inevitably, evolve themselves as well. The improvement of behavior models originated the development of new business models, which in turn originated new forms of communication between companies and consumers, and vice versa. In specific, the WebQual model is considered a method of assessing the quality of websites that is based on the perceptions of consumers' quality on the websites. This model has been applied in several areas of online commerce: bookstores, online auctions and small businesses.

Thus, the WebQual model will allow researchers to assess the quality of websites that is based on the perceptions of consumers' quality on the websites. In this sense, it will also be intended to develop an analysis of social networks, in order to capture good practices for responding to the covid-19 crisis (communication and response strategies with online service). See, for example, the case of the '*Lacticínios das Marinhas'* that published a new home delivery service on social networks (using electronic commerce and online shopping). Since this strategy is relatively recent, it is too early to evaluate the results of this initiative. However, a qualitative analysis of social networks shows a high acceptance by the public, particularly with regard to the number and type of reactions and sharing with the community (buzz marketing). Future studies will allow us to monitor and analyze the evolution of this initiative and, consequently, measure the positive impact on sales and customer loyalty. In an interdisciplinary perspective, this study presents inputs for marketing, strategy and the quality of services. However, this study has some limitations, namely because it was developed during a coronavirus mitigation phase in Portugal. Temporary limitations prevent, for now, this manuscript from presenting more conclusive data. In view of this Public Health threat, response phases have been defined that include three levels and six sub-levels, according to the risk assessment for COVID-19 and its impact for Portugal. Currently, Portugal is in the Mitigation phase, in which there is local transmission in a closed environment, as well as community transmission. On March 19, 2020, a state of emergency was declared as a consequence of the evolution of the pandemic in Portugal. The risk assessment is constantly updated. The World Health Organization does not recommend travel, trade or product restrictions to countries with a COVID-19 outbreak. Travel bans to affected areas or denied entry to passengers from affected areas are generally not effective in preventing the importation of cases. Therefore, the approach centered on the study of online commerce is very relevant in this scientific investigation. However, it is a preliminary contribution to the management and quality of services (online) in the Portuguese context.

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Encouraging Innovation and Relational Trends in Thermal Tourism: A Peninsular Northwest Perspective

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Abstract

The innovation process, and its application to tourism, has been gradually gaining ground in the academic community as a field of study. Similarly, in recent decades, tourism has received greater attention from researchers in several sciences. The present manuscript intends to gather and sistematize the main aspects related to innovation process in specific tourism context, in particular the case of thermal tourism in Peninsular Northwest. In specific, in this region, thermal tourism still constitutes a vector of sustainable development, serving as leverage for complementary activities like healthcare and thermal tourism. The study has as purpose to provide a better understanding regarding the essence of innovation process and entrepreneurship: theoretical and practical implications. With a theoretical perspective, the manuscript aims to bring together the major components of entrepreneurship and its implications tourist perspective and relationship marketing (i.e. consumer perspective). In the end, we intend to explore the relationship with thermal tourism consumers, suggesting a conceptual model (to be tested empirically) that relates relational marketing and the result of innovation in tourism (favoring trust, commitment, quality of service, satisfaction and loyalty). A future study should include emotional factors. The new vogue of thermal tourism forces us to challenge and re-visit the power relationships that exist within contemporary tourism and the host-guest relationship.

Keywords: Innovation, Process creation, Thermal tourism.

Introduction

Tourism is an economic and social phenomenon due to its ability to create regional and cross-border development. According to Ratten et al. (2019), there has been increasing recognition of the way tourism can be innovative, particularly through creative means (e.g. thermal tourism). This is evident in new services developed that integrate technology and sustainability practices. The subject of interest for many years, the role of innovation in tourism is growing in significance. There are two main reasons for the dramatic growth. Firstly, the tourism industry has been the launchpad for new technological innovations that have created new markets and segments (e.g. thermal tourism), and secondly, the tourism industry has a large number of small-sized enterprises include tourism providers such as hotels, travel agencies or educational providers (Ratten et al., 2019). Therefore, and according to Ma and Tan (2006, p.705), "there has been an increasingly popular trend of cross-fertilization among strategic management

research and entrepreneurship research, two fields deeply concerned with wealth creation and heavily influenced by Schumpeter's seminal work on innovation and creative destruction". With regard to its proximity to the concept of innovation, Schumpeter (1934) argues that innovation can be seen as a phenomenon, including technical, non-technical aspects as well as innovations in product and process innovations (e.g. tourism industry). The creation process contributes to business success and increased competitive advantage, which is a theme that has clearly captured the attention of researchers in the field of management. The dynamic nature of this process, coupled with the constant need to invest in a highly distinctive and differentiating offering new studies have provided in order to score market position and achieve consumer satisfaction, including the level of emerging realities confirmed by new trends and desires (Costa, 2001; Buhalis & Costa, 2006). Innovation is the adoption of a change that results in something new to the organization and relevance to the environment, and the creative idea and its development is the seed germinated by innovative, effective for the market economy (Sousa & Alves, 2019). There is a large body of knowledge about innovation management but less is known from a specific thermal perspective. This is unusual as thermal management has an abundance of innovation due to its emphasis on technology and change. In this sense, innovation has attracted the attention of several scholars and entrepreneurs together with this research topic (Ratten, 2016). The present manuscript intends to contribute theoretically to the management of innovation in specific tourism contexts (i.e. thermal tourism) in Peninsular Northwest. In the end, we intend to explore the relationship with thermal tourism consumers, suggesting a conceptual model (to be tested empirically) that relates relational marketing and the result of innovation in tourism (favoring trust, commitment, quality of service, satisfaction and loyalty). The model should be tested empirically in the Peninsular Northwest. This makes it possible to open new doors and open new markets, enabling greater efficiency in business, economic growth and new ways of targeting an increasingly competitive market, in specific the case of thermal tourism contexts in Peninsular Northwest.

Innovation and relational trends

Innovation can be seen as a specific tool of entrepreneurs, the means with which exploit change as an opportunity for a different business or service, being able to be understood and, as such, to be practiced, leading to a common distinction between invention and innovation (Drucker, 1993). Almost all the innovations reflect existing knowledge, combined with new uses, suffering the concept of innovation as a shift towards emphasis on the interaction between institutions, focus on interactive for the creation, dissemination and sharing of knowledge and relevance of the role of government processes as an important actor in an innovative environment (Sousa, 2015). It is important to clarify the difference between two concepts that, for different times, tend to be confused: Process Innovation and the Innovation Process. Innovation Process is essentially related to the set of steps that tend to incorporate both the market and technology. Companies have the ability to go seizing, building your knowledge base and thus make the continuous improvement of process management (Tidd, Bessant & Pavitt, 2003). Monitor the internal and external environment and analyze the relevant signals will be the starting point. After this, we have the decision about how to respond. Finally, we will implement the project with the development of technology and the domestic and foreign market (Sousa, 2015). The Process Innovation, by the way, combines the adoption of a process view of the organization's business with the application of innovation to key processes. This is the big difference, compared with the Innovation Process, but it allows us to understand its complexity. Process Innovation encompasses the prediction of new work strategies, the actual process activity and the implementation of change in their complex human, technological and organizational dimensions (Davenport, 1993). According to Davenport (1993), in practice, companies need to combine the two concepts in a continuous quality program. Ideally, the organization will seek to stabilize the process and start continuous improvement, to later create the ambition to go on the innovation processes. The differences between these two concepts can hinder your combination, so one of the possibilities to minimize this problem may be the assignment of different roles to different managers, with high levels of cooperation. The company must be aware that the risk of innovation processes is at least proportional to the

rewards for that in reduced competitiveness continuous improvements environments may be the preferred choice. Highly competitive environments (e.g. greater balance between enterprises, reduced rate of market growth, high barriers to exit) may encourage the bet on a change with the greatest impact (process innovation). Access to information (e.g. technological innovations) and the challenge of the information revolution is also the base of the reach of competitive advantage, in order to maximize innovation in the process and, consequently, greater differentiation from competitors (Ratten, 2015).

The dynamic nature of triggering and entrepreneurial process

Entrepreneurial activity is seen as a process: includes a set of steps, is subject to tourism management, continuous and applicable in many contexts (Stevenson & Jarillo 1990). This process becomes a source of competitive advantage on a global scale. This entrepreneurial process is, as a rule, inextricably linked to certain factors that allow initial "take the leap" (circumstances, triggering events). Shindehutte et al. (2000) present a conceptual model that summarizes the dynamic nature of the triggering process in an attempt to summarize the various contributions on this topic.

The entrepreneurial process is conceptualized as a response to the awakening of the event. However, the nature of the trigger, relevance and impact depends on the dynamic interaction between the characteristics of managers/employees (e.g. personal life), firm characteristics (e.g. size, culture) and external developments of the environment (e.g. competitiveness). The different types of entrepreneurial activities are probably the result of different types of triggers.

Shindehutte et al. (2000) present a summary that reflect the main differences between conventional marketing and entrepreneurial marketing. The entrepreneurial process results in corporate contexts, rather than individual traits of an increasingly conscious need to provide the organization with innovative behavior and can, according to Sharma and Chrisman (1999), take many forms. The prospect of Schollhammer (1982) is the most cited and identifies five types of corporate entrepreneurship: administrative, opportunistic, acquisitive; incubative; imitative. Traditionally, innovation management and entrepreneurship tend to be excluded from the domain of conventional marketing department (Shindehutte et al, 2000).

The creation process in termal Tourism context

Tourism is a phenomenon that moves millions of people around the world, taking as a major driver of the global economy. Every year, much due to the frequent changes in the tourism environment, fosters competition between and within tourist destinations (Bigné & Andreu, 2004; Sousa & Rocha, 2019; Sousa, Silva & Malheiro, 2020). Moreover, tourism is a sector of great importance to the economy, responsible for creating a large number of jobs. For instance, female entrepreneurship in the tourism sector has been rather neglected as a field of study and women's employment opportunities and the segregation of occupations are the major focus of research on women's situation in the tourism context (Tajeddini, Ratten & Denisa, 2017). As a psychological phenomenon, a tourist trip is preceded by a specific need that generates a reason to travel and sets a goal for the trip, which follows the search for information (Gursoy & McCleary, 2004; Sousa & Alves, 2019). Like other emerging sectors in a modern economy, tourism is a dynamic and ever-changing industry (e.g. Wellness and thermal tourism). As such, comes an increasing need to understand the consumer behavior of thermal destinations contexts. According to Lordkipanidze et al (2005), the growth of the tourism sector and increasing demand with regard to new types of tourism, makes it even more visible and required its connection with the emerging trends in entrepreneurship (e.g. Termalism, Thalassotherapy, Spas and quality of life, Senior Thermalism). Since tourism is composed of many of small firms, they are constantly called upon to respond quickly to new trends and market demands (assuming as a source of innovation). The role of each actor in the distribution channel, within the operational management of tourism, will be critical to appreciate the range and nature of the emerging changes. The use of technology has profound implications to satisfy tourist demand

as it enables the interconnection between consumers, intermediaries and producers, providing at the same time, tools for strategic marketing development (Buhalis, 2003; Kim, Lee & Hiemstra, 2004).

According Costa, Quintela and Mendes (2015) Wellness and thermal tourism has become an emerging market segment directed not only for those who pursue solely thermal treatments but also for those seeking illness prevention, physical improvement and spiritual balance or even for those eager of cultural and relaxation programs. In this sense, this specific niche tourism has become more complex and creative, demanding high quality equipment and infrastructures, providing a wide range of products and services related not only with the diversity of spa treatments but also with complementary recreational activities regarding the connection to nature and to cultural patrimony as well as to other regional resources, creating effective links to the territory and becoming a significant force that will shape the regional development, by creating a positive pressure on local economic bases with spillover effects on the territory. For instance, and according Araujo, Paiva, Ribeiro & Coutinho (2015), thermal spa treatment is a touristic product that is highly recognized for its potential in the exploration of endogenous regional resources. Consequently, the development of new and competitive thermal tourism products can play an important role in the development of the inland regions, contributing effectively to addressing the economic asymmetries of the region. Particularly in the Galicia Northern Portugal Euroregion this activity still constitutes a vector of sustainable development, serving as leverage for complementary activities like accommodation, restaurants and transports (Ladeiras, Mota, & Pardo, 2015).

On top of this, the researchers Fleus, Azara & Michopoulou (2018), citing Bushell & Sheldon (2009, p.56) highlight the potential identified by governments and the tourism industry itself of wellness tourism – and thermal spa tourism in particular – to serve as a tool for empowering individuals and societies to adopt wellness. In a similar manner, according to Ladeiras et al. (2015), thermalism benefits the cultural industry as it helps boosting the demand for cultural products, promoting local identity and consolidating the feeling of belonging by transforming natural endogenous resources into differentiation elements for the destination and, consequently, improving the local communities' quality of life. In fact, Roget, Dominguez & Brea (2018) identify SPAs businesses as a framework of a company committed with sustainable development because these companies make use of resources without compromising their future, create jobs and generate wealth, settle populations and satisfy needs by improving people's quality of life. As thermalism goes, this activity underwent significant changes throughout the last centuries. It is referred by Del Río-Rama et al. (2014) that thermalism has moved from a tradition that focus solely on the curative purposes for a variety of health conditions – such as respiratory, gastric or rheumatic, among others – to a wider approach that highlights the properties of thermal waters and its benefits for the contemporary society. The changes underwent by thermal tourism and the subsequent diversification of its offer echoed in the type of consumer of this industry. Del Río-Rama et al. (2014) also refers to the objectives of this type of tourism: the improvement of the tourist's health status; rest, quite and relaxation; contact with nature; aesthetics and beauty. In turn, the consumer is gradually turning away from companies that focus their offer exclusively on health benefits and is now more inclined towards companies that will help him/her occupy his/her leisure time in their facilities but obtaining greater satisfaction through value proposals (Rama, et al., 2014). This shift in the tourist's positioning forces the companies that provide thermal tourism services to give him/her special attention beyond technical quality, as is stated by Rodriguez (2005), since this tourist is not seen as a patient but as a consumer (Del Río-Rama et al., 2014). According to Del Río-Rama et al. (2014), this tourist seeks treatment for his/her physical and mental diseases while, at the same time, searching for a good level of service, adequate accommodation facilities, leisure programs, cultural and sports activities and pleasant natural surroundings.

The development of dermocosmetics based on thermal water carried in nanobiotechnological systems is proposed for its contribution to the differentiation amongst local, unique and genuine products, especially relevant in the case of products with high economic impact in tourism

markets (Araujo et al., 2015). According to Portuguese Thermal Association data, „demand for wellness packages in 2005 registered a growth of 37.1% in relation to 2004, while, in the same period, classical therapeutic thermalism showed negative growth, with a 6% loss in clients. The same trend occurred in the following year, with a fall in the number of classical thermalism users, from 80,309 users in 2005 to 76,999 users in 2006, and growth in the number of wellness thermalism users, to a total of 22,049 users compared to the 17,730 seen in 2005. In 2008, there were 38 active hot springs, 19 of which were located in the centre of Portugal (50% of the total), 16 in the North (42%) and 3 in the South (8%). Wellness has become an important topic of research, as well as a rapidly increasing business. There is demonstrable growth in health and wellness tourism across Europe, as the result of a number of social circumstances" (Quintela, Correia & Antunes, 2010, p.2). Similarly, Loutraki has a long history in Spa & Thermalism. The water derived from the Loutraki natural thermal springs was characterized as "The Water of Life" since antiquity.

The geothermal springs derive from many faults of the coastal area in a 750 -m-wide zone. The natural spring hot waters, at the bottom of Mount Geraneia, are discharged from a great mineral depth. Nowadays, visitors enjoy balneology, spa treatments & wellness sessions in a luxurious environment in the modern Loutraki Thermal Spa. Similarly, wellness tourism is promoted through various services that are practiced in order to relax and rejuvenate. Hot springs have been one such effective method that has tremendously added to the dimensions of the wellness tourism. Naturally occurring hot springs and the use of their water is highly important in various wellness therapies as well as the procedures that are required to provide rejuvenating experience to the guest (Sousa & Alves, 2019). Geothermal energies and hot spring waters are the basis of the wellness therapies like balnoetherapy, thermalism etc. The water of these naturally occurring hot springs usually possesses a very high quantity of mineral content that is used extensively for clinical purposes. Spas and other wellness centers run on the mercy of these waters for these waters are the basis for nearly all the wellness therapies (Jagyasi, 2010). Also in thermal tourism context, the process of creation and innovation have been increasingly used to describe business behavior, the destinations, the tourism sector as well as all their planning (Dredge, 2009). However, tourism is going through significant changes, facing new challenges that require new perspectives and implementing ideas (Stamboulis & Skayannis, 2003).

A Peninsular Northwest perspective

Particularly, in terms of natural resources and thermalism, the Peninsular Northwest (Spain and Portugal) is one of the most important in the Iberian Peninsula, with a large number of quality springs and the richest medicinal mineral waters (Amboage, Fernández, Boga, & Fernéndez, 2019). However, because this territory is composed by two regions of two different countries, it is easily understandable that in political terms, these two regions live different realities. Cross-border regions may vary, for example, depending on the degree of cooperation (high or low intensity) or geographic extent (low or high). In particular, Euroregions tend to define themselves as micro cross-border regions, with a reduced geographical extension between contiguous spaces. In view of the above, it was intended to carry out fieldwork in the Euro-region North of Portugal and Galicia (as an integral part of the study of cross-border tourist regions), not only for the local convenience but, above all, for the contribution that will be given to it. This Euroregion belongs to two different states: In one of them an autonomous administrative level (Galicia) is created, while in the other (Northern Portugal) an administrative region with no legislative capacity is maintained (Commission for the Coordination and Development of the Region) do Norte). According to Sousa (2014), it is a Euro-region with more than 6,000,000 inhabitants, based on a space of strong social, economic and cultural interaction. The Euro-region North of Portugal and Galicia shares a significant cultural and natural heritage, with enormous tourist potential. With the opening of national borders between Member States of the European Union, regional exchange registered a clear increase, both in economic and social terms, creating highly compensatory regional synergies. This region is formed by twelve NUTS III (common nomenclature of statistical territorial units) of which five

constitute the basic border area (Pontevedra and Ourense in Galicia, Cávado, Minho-Lima and Alto Trás-os-Montes in Northern Portugal). In a study on banding and strategy in the Peninsular Northwest, Oliveira (2015) pointed out that as an autonomous region, Galicia has its own regional government with legislative and executive powers in such fields as infrastructure, environment and regional planning, while, in contrast, the Northern Portugal region lacks this autonomy and is ruled by the central government and this limits the region's decision-making capabilities. In terms of thermalism, Galicia stands out as being Europe's second largest thermal region and the city of Orense is only surpassed by Budapest in number of water reserves (Roget, Dominguez, & Brea, 2018).

According to Roget et al. (2018), Galicia possesses up to 300 water catchments and the largest part of the 116 spas in Spain. It is underlined by Roget et al. (2018) that in Galicia thermal tourism presents itself as a tourism alternative that comprises health, wellbeing and leisure. These researchers point out that a large number of Galician SPAs are located in the inlands, in rural areas characterized by a low-income population and an economic landscape where the primary sector is dominant (Roget et al., 2018). Roget et al. (2018) add that the Galician SPA play an important role of socioeconomic promoters of the municipalities where they are established. Roger et al. (2018) state that these SPAs are generally small sized, family-owned companies of Galician origins. In the beginning of this century, Nóvoa (2010) found that one fifth of all of Spanish SPAs are located in Galicia, with these SPAs generating approximately 126 million euros in wealth and being responsible for directly employing 2700 professionals in the the year of 2009, which served 140 thousand tourists in the same year (Gândara, Brea, & Manosso, 2013). The work of Solla (2012) shows us that by the beginning of the twenty first century, Galician SPAs had a rate of occupancy around 80%. This researcher argues that although a large number of SPAs' customers benefit from public subvention programs, the popularity of SPAs and the services provided in SPAs has significantly increased throughout the years (Solla, 2012). This increase in popularity of SPAs translates into a growth of this market. Roget et al. (2018), referrencing DBK (2016) show that in Spain thermalism is a 230 million euro market, with a growth trajectory. Roget et al. (2018) noticed a change in the thermal tourist's demographic profile which is becoming younger. These researchers state that the most proeeminent age interval of the thermal tourist is between the age of 46 and 60 years old which contains 46% of these consumers (Roget, Dominguez, & Brea, 2018). Roget et al. (2018) add that the contemporary themal tourist shows a greater interest for his/her health and wellbeing than before.

Over on the Portuguese side, Gustavo (2010) describes the country as a case-study for thermalism due to it abundance of hot springs and the popularity of thermalism. The work of this researchers shows that in the first decade of the twenty first century there were approximately 40 active hot springs in Portugal, most of them located in Northern Portugal and specialized in the therapeutic component of thermalism (Gustavo, 2010). Gustavo (2010) adds that, in recent years Portugal has witnessed an increase in the number of modern SPAs, mostly located in urban areas and often integrated in hotel units. In an important article on Thermal Tourism, the researchers Quintela, Correia, and Antunes (2011) demonstrated that, in 2005, the total number of visitors of Portuguese themal units was approximately 98.000, increasing to approximately 99.000 visitors in the following year. Quintela et al. (2011) also noted that Spanish tourists accounted for a little over half of foreign visitors to Portuguese traditional themal units. These researchers noted that, if on the one hand, the demand for wellness packages increased dignificantely between 2004 and 2005; on the other hand, the demand for classic thermalism in the same period shortened 6% (Quintela et al., 2011). This trend continued in the following years, as is showned by Quintela et al. (2011), however, since the increase wellness tourism was insuficient to offset the decrease in the demand for classical thermalism, portuguese thermal units suffered a decrease in business of 4,3% in that period.

Nevertheless, innovation in thermal tourism and its offer in Peninsular Northwest continued to thrive in the following in years as is shown in the works of researchers such as Roget et al. (2018). These researchers state that, in Galicia, innovative products are being introduced in the

market, integrated in a strategy combined of the public and private sector to promote the thermal sector as an innovative tourism destination for wellbeing and thermalims seekers (Roget et al., 2018). The city of Ourense and its product 'TrenBalnearios' is an example of innovation provided by Roget et al. (2018). This product comprises the mobility of tourists through seven of the province's SPAs (Roget et al., 2018). Another example provided in this article is the CERLAC – the rowing training centre of Laias, Arnoia and Castrelo de Miño – which is a 2014 inniciative of Grupo Caldaria and INORDE – Ourense's Economic Development Institute – that combines indoor nautic sports and Laia's SPA infrastructure and services (Roget et al., 2018).

Proposed conceptual model

Preliminary research was conducted in order to develop the research instrument. Details of the preliminary research are given below. After the collection of the preliminary data, empirical data would be collected through fieldwork. This study discusses the increasing phenomena of thermal tourism and the relationship marketing perspective associated to innovation. Based in the literature review, we propose a model that connects the relationship marketing dimensions (i.e. commitment, trust and cooperation) with the consequent satisfaction with thermal tourist and the behavioural intention of repeating the experience or reinforcing the experience with a euroregion marketing and niche tourism perspective. Several studies in marketing and tourism contexts have discussed the association relationship marketing to the site and consumer purchasing behaviour, including the study of satisfaction, loyalty or quality of service (Heung, Kucukusta & Song; 2010). An extensive review of the current literature reveals that no integrated theoretical framework for the holistic study of the innovation and thermal tourism industry exists. The proposed research model not only has implications for future research, but also provides useful information for practitioners in the thermalism. Several studies have shown that more brand commitment and brand trust leads to more positive satisfaction behavior (e.g. Belaid & Temessek Behi, 2011; Sousa & Alves, 2019). The theoretical framework highlights that satisfaction tends to favour the development of behavioural loyalty. These results are particularly evident in tourism contexts, as the example of the importance of satisfaction in revisiting or recommendation family or friends (Bigné et al., 2005; Prayag, 2008; Sousa & Rocha, 2019). Based on this discussion, we propose that, in a context of healthcare and thermal tourism, the increase in trust, cooperation and commitment facilitates the development of behavioural satisfaction and loyalty. The proposed model intended to contribute theoretically to the management of innovation in specific tourism contexts (i.e. thermal tourism) in cross-border tourist destinations (Portugal and Spain, specifically the Peninsular Northwest. The relationship with consumers of thermal tourism was explored, suggesting a conceptual model (to be tested empirically) that relates relational marketing and the result of innovation in tourism (favoring trust, commitment, quality of service, satisfaction and loyalty). The model should be tested empirically in the cross-border tourist area of Peninsular Northwest. Hence we propose that: P1: cooperation has a positive effect on satisfaction of healthcare and thermal tourism; P2: commitment has a positive effect on satisfaction of healthcare and thermal tourism; P3: trust has a positive effect on satisfaction of healthcare and thermal tourism; P4: Satisfaction has a positive effect on the healthcare and thermal tourism.

This study should to reveal the potentials of individual destination attributes to cause satisfaction and/or dissatisfaction, and it shed light on the most determinant and critical attributes in explaining the overall tourist experience, in specific the case of thermal tourism contexts. It is well established in the literature that the tourist's assessment of different destination attributes influences his or her overall satisfaction and, subsequently, intentions to revisit a cross-border destination. Studies typically apply linear modelling techniques in analyzing these influences, such as multiple regression analysis or structural equations modelling and focus group analysis.

Final considerations

In an increasingly global world, which tends to predominate competitiveness and change, the difference is, so often, the ability to create discontinuities in the external environment. Many times the success is the ultimate goal, which focuses on searching for new products, new markets, new organizational forms and new sources of customer value. In this field it inevitably highlights the thermal tourism as some of the examples mentioned in this paper, as vehicles of innovation, and that may prove suitable choices of context for the operationalization of the proposed study. For instance, the creation process associated with for Wellness and SPA reservation systems, mechanisms and information sharing as a form of competitive advantage over other tourist destinations (social networks), the marketing of thermal and heatlh tourism products and services as well as other related activities that can leverage the increased business synergies. It should be noted generators entrepreneurship factors that may trigger an entrepreneurial activity (particularly in thermal tourism contexts); and whose origin may be associated with internal, external factors and characteristics of the organization. The external factors are more difficult to control: political, economic, social, technological, environmental factors or legal issues. However, the combination of those factors with the intrinsic nature will form the basis of an innovative event, along with the organizational characteristics (e.g. culture, values and business traditions). Finally, and this manuscript is primarily theoretical and reflection, is expected to arise in the future some work of a practical nature that bring greater robustness to support and perspectives presented. In terms of thermalism, Peninsular Northwest stands out as being Europe's second largest thermal region and the city of Orense is only surpassed by Budapest in number of water reserves. Galicia possesses up to 300 water catchments and the largest part of the 116 spas in Spain.Iin recent years Portugal has witnessed an increase in the number of modern SPAs, mostly located in urban areas and often integrated in hotel units. The present manuscript intended to contribute theoretically to the management of innovation in specific tourism contexts (i.e. thermal tourism) in cross-border tourist destinations (Portugal and Spain, specifically the Peninsular Northwest). In the end, the relationship with consumers of thermal tourism was explored, suggesting a conceptual model that relates relational marketing and the result of innovation in tourism (favoring trust, commitment, quality of service, satisfaction and loyalty). The model should be tested empirically in the cross-border tourist area of Peninsular Northwest. We intent to show shows how these valid questions can be answered by introducing causal modelling and discussing one approach to it, structural equation modelling (SEM), which is a rigorous technique for building and testing such models. An advanced statistical methodology delivers models and results that are easy to understand and employ. We intent to confirm that a causal relationship exists (i.e. measurement over time should confirm that change in one variable precedes change in the other; a controlled experiment is required that changes a single variable; the direction of causality must be correctly specified; the relationship must not disappear when common causes of both are removed and the causal effect 'makes sense' in domain knowledge), (Elliott, 2003). This study has already identified that the global movement of tourism is seemingly showing an increased focus on the thermal tourism (niche product or niche service). In this case, the question seems to be whether the further growth in demand for healthcare management and thermal tourism. A future study should include emotional factors. The new vogue of thermal tourism forces us to challenge and re-visit the power relationships that exist within contemporary tourism and the host–guest relationship.

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Rural Tourism Destination Competitiveness in Portugal

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Abstract

This research presents a study aimed to evaluate the performance and competitiveness of tourist destinations in Portugal and Belarus within regions. The evaluation was performed under an analytical tool, Market Share Analysis proposed by Faulkner (1997). In addition, it was used some descriptive statistics. The conducted analysis concluded, with respect to the evolution of the destinations tourism that *Açores* Island is the most prosperous market for the majority of countries, because most countries staid in the zone of Performing market. North, Lisbon and Algarve regions are maturity markets for the most countries, because they stay in Stagnant markets zone. Centre and *Alentejo* regions could be attributed Emerging markets for the majority of countries once are developing markets. The major market share is occupied by Portugal practically for all regions, except islands.

Keywords*:* Rural Tourism, Competitiveness, Agritourism.

Introduction

Tourism is one of the largest economic sectors in most countries, and it also has a very competitive sector. In rural tourism, an escalating niche in the tourism market, numerous elements of environmental constructs, such as natural resources, cultural heritage, infrastructure, environmental quality and environmental preservation, fulfil a key role in promoting the sustainability and competitiveness of rural tourism destinations. Moreover, the regards of regional fellowships toward tourism extension impact its prosperity or flop.

Therefore, this research regarded rural tourism destination competitiveness in Portugal regions. The conclusions of this research also give useful data to tourism intermediaries and policy planners about the significance of environmental attributes and community maintenance in direction of the extension of tourism destination competitiveness, especially in the scope of rural tourism. The evaluation was performed under an analytical tool, Market Share Analysis (MSA), proposed by Faulkner. For the calculation of the MSA, it was used varying the overnight stays in the Portuguese rural areas, empowered by the National Institute of Statistics, for the period from 2013 to 2014.

The sections of this research are organized in the following order. Section 1 represents the general information about tourism in a whole and rural tourism in particular, as well as description of peculiarities of rural tourism in Portugal. Section 2 reviews research methodology and objective of the study, as well as description of data collection and data analysis from rural tourism context. Section 3 demonstrates the data analyses and obtained results. After that Conclusions, limitations and implications of this study as well as suggestions for future research are presented.

Background

Day by day tourism becomes more and more popular global leisure activity and has been emerged as one of the most dynamic and fastest growing industries all over the world, which represents around 6% of international trade both in goods and service and contains 30% of the world's export of commercial services (Daniloska & Hadzi Naumova-Mihalovska, 2015). In both developed and developing countries, tourism is supposed to be a vital mean of growth in economic, social and cultural activity and regions development (Hall, 1994). It is also a highly competitive environment, which forces tourism players to provide better services for customers in order to stay competitive.

Nowadays World Tourism Organization (UNWTO) gives the following general definition to this term: "Tourism is the activities of persons identified as visitors", (UNWTO, 2014). The main reason for such generalization of the term lays in huge differentiation of tourism division recently.

For example, modern society marked out around 80 different types of Tourism. Here are some of them: Adventure travel, Curative tourism, Cultural tourism, Ecotourism, Geotourism, Heritage tourism, Medical tourism, Music tourism, Rural tourism, Wine tourism, etc. (Sucheta, 2013).

Principal contextual feature of rural tourism is that it meets the needs of people, who live in cities for open area and let them fresh knowledge of nature and rural lifestyle, and therefore is in contradiction with urban area. Rural tourism is accomplished on the space that is originally used as a living and labouring area of rural population and agricultural producers that is space vestured with tillable, fallowed and populated area outside the cities. It composes of the conventional village and rural architecture, along with whole rural landscape where traditional culture, distinct cognition and capabilities, lodging, clothing, nourishment, national dances, songs and legends are cultivated and created. The unity of all these elements performs the distinguishing and essential part of the tourist importance that have to be integrated into rural tourism sentence.

Several rural villages may alleviate tourism because many countrymen are hospitable and eager to welcome (and from time to time even host) tourists. Partially it occurs because agriculture is becoming notably mechanized and consequently, needs less handheld labour. At the same time, this trend is generating economic tension on some countrymen, which in its turn produces young people to shift to urban locations. There is howsoever, a part of the urban population that is concerned in visiting the rural locations and conception of the lifestyle (Daniloska & Hadzi Naumova-Mihalovska, 2015). Rural tourism is a multi-faced performance, which takes place in an environment out of strongly urbanized locations. It is an industry segment characterized by small scope tourism business, established in locations where land use dominated by agricultural occupations, forestry or natural locations (Lane, 1994).

Consequently, in an attempt to aggregate all previously mentioned definition, rural tourism has to have following features (Roberts & Hall, 2001):

- Located in rural areas;
- Functionally rural-built on the rural world's particular characteristics of small and medium size enterprise, uncovered area, connection with nature and the natural world, inheritance, 'conventional' communities and 'conventional' practice;
- Rural in scale (e.g. either in terms of houses and locations and, consequently, usually small-scope);
- Conventional in nature, escalating deliberately and organically, and linked with regional households. It is usually very substantially managed regionally and developed for the long term of the location;
- Of many various types, representing the multipurpose pattern of rural environment, economy, history and location.

The rise of rural tourism reflects as common enlargement of all kinds of tourism as a variety of tourist experiences, tightly connected with the growth of a lifestyle-led and leisure-oriented society at the same time, and with the prevalent mobilization of tourism as a strategy for rural elaboration and recovery (Walmsley, 2003).

According to the European Union, a quarter of the EU population travels to a rural area within their holidays. Moreover, while focusing on natural and cultural resources, rural tourism provides visitors with an alternative to 'sun and sand tourism'. Recently instead of three S (sun, sea, sand) - come three L (landscape, lore, leisure). If considered in a wider environment of a destination's frame this orientation gives tourism providers the possibility to vary and supplement their offers whilst spreading the advantages of tourism more extensively (Sharpley, 2002).

From the other point of view, rural tourism should be seen as a continuum of various types of tourism subject to the region/location where it occurs. That is, the inquiry for rural tourism is immediately connected with the distinct feature of rural locations. It looks like rural regions not far from urban locations are very likely to present several urban tendencies, whereas circumferential rural locations whereas attracting lower levels of tourists can propose more possibilities for more rural-specific tourism activities. For example, farm tourism is characteristically rural, whilst cultural tourism is usually a more urban type of tourism. In contrast, wellness tourism located in the middle of these two forms of tourism (Pollermann & Neumeier, 2014).

Situated in the Western part of the Iberian Peninsula, Portugal is a country with one of the most antique and sustainable territorial frontiers of Europe (Silva & Leal, 2015). Until the end of the XXth century tourism based on the 'sun and beach' has been the main commodity of the Iberian Peninsula (Loureiro, González & Javier, 2009). The conception is determined as a paid set of activities and services provided in rural regions, in foundations with family nature aiming at sentence of a complete and varied tourism commodity in rural locations (Agapito, Mendes & Pinto, 2012).

In these latter days, western and particularly Portuguese remote rural locations are increasingly considered as multifunctional areas, where efficient activities, such as agriculture or forestry, are occasionally as prominent as the (growing) consumption-oriented activities as leisure and tourism (Figueiredo & Raschi, 2012). Besides leisure and tourism, new functions of the countryside contain environmental protection and the conservation of both customs and memories and of the built patrimony and inheritance (Silva, 2012). Those locations are nowadays 'beyond agriculture'. However, around 50% of Portuguese area may be measured as brittle and declining rural locations (Oliveira-Baptista, 2006).

In Portugal, tourism is a strategic sector in the country economy. Indeed, with a view to enhance the destination's attraction for tourism, the National Strategic Plan for Tourism (Ministério da Economia e da Inovação, 2007) pinpointed nature-based tourism as one of the ten national strategic products.

The regional fellowship also plays an active role in establishing the rural tourism experience, supporting visitors to detect and relish a keener experience of these places. Residents can share their cognition of a region's history, culture and nature inheritance, or suggest possibilities of closer binding with their way of life or with regional products (Sáez, Fuentes & Lloréns-Montes, 2007).
Nowadays in Portugal prevails several forms of rural lodging units, such as: *Turismo de habitação* - manor houses or residential houses of admitted architectural value, of adequate measuring, with character furniture and decoration; *Turismo Rural* - rustic houses having the features of the rural environment in which they are situated; *Agroturismo* - houses and the outhouses on the farm, visitors being able to participate in the work of the farm or in supplementary types of entertainment, *Turismo de Aldeia* - Villagetourism; and *Casa de Campo* - Country Cottages (Ribeiro & Marques, 2002).

Methodology

The objective of the study is comparison of situation on rural markets of Portugal and to observe the competitiveness of rural markets. The research focuses on forms of rural tourism and it is driving forces, its advantages and what makes rural tourism successful. It provides some examples of rural

tourism in Portugal. The work gives data about various geographic regions and stages of tourism development. The study also highlights some points for further research and extension of rural tourism.

To answer the main objective of the study it was fixed the follow research hypothesis (RH): There are tourism rural competitiveness between each region of Portugal.

Data was collected from web site of National Institute of Statistics of Portugal. On the base of obtained information, for Portugal in a whole and its each region in particular for the 2013-2014 period, the Top 5 countries which visitors spent the most number of nights in rural tourism areas were chosen. Eventually the whole data set included 7 countries (Portugal, Germany, France, Spain, Netherlands, United Kingdom and Belgium), because of the difference in Top 5 for each region (North, Centre, Lisbon, *Alentejo, Algarve, Açores, Madeira*).

In these research was used the following variables: Market bias index, Change index, average rate, grows rate and/market share rate.

During the data analysis of Portuguese rural tourism competitiveness, Faulkner, (1997) Market Share Model was implemented, because this type of analysis provides valuable background for verification of particular target markets and provides valuable diagnostic information for strategic planning. The base of this method is an index that repulses the movements of the marketplace and variations in the destination's performance with respect to this market, while at the same time permitting for the givens that place extensive limits on the destination's general competitiveness. This method was widely used in 1960 to compare the economic development of regions.

During the research, it was used the following dimensions of the analysis (Faulkner, 1997; Águas, Grade & Sousa, 2003; Fernandes, 2005; Fernandes & González, 2007; Fernandes et al., 2008):

- An index of market share with respect to each major market or, in other words, market bias index (B); in examined case this index means the degree to which the market share of Portuguese regions with respect to a Portugal as a whole deflects from its share of spending nights of tourists generally. This index is calculated as fallowing:

$$B_{ik} = \frac{\left(X_{ijk} \Big/ \sum_{i=1}^{n} X_{ijk} \right) - 1}{\left(\sum_{j=1}^{n} X_{ij_{(k)n}} \Big/ \sum_{i=j}^{n} \sum_{j=i}^{n} X_{ij_{(k)n}} \right)} \quad [1]$$

  Where,

  B_{ik} , Market bias index for destination *i* in year *k*;

  X_{ijk} , Tourists numbers to destination *i* from market *j* in year *k*;

  n , Number of markets (origins) and destinations.

- An index of change (C) in the tourists received from each market relative to the change in that market generally.

$$C_{0-k} = \left[\left(X_{ijk} \Big/ X_{ij1} \right) - 1 \right] - \left[\left(X_{jk} \Big/ X_{j1} \right) - 1 \right] \quad [2]$$

  Where,

  C_{0-k} , index of change of market share between moment 0 and the moment *k*;

X_{jk} , total foreign tourists from market *j* in year *k*;

X_{ijk} , tourist's quantity to destination *i* from market *j* in year *k*;

$1 \ldots k$, between year *1* until year *k*.

For analysing the competitiveness of Portugal in the sphere of rural tourism, the data was united in Tables according to year (2013 and 2014), countries (Portugal, Germany, France, Spain, Netherlands, United Kingdom and Belgium) under analysis and region (North, Centre, Lisbon, *Alentejo, Algarve, Açores, Madeira*).

The most important reason for choosing that method was a possibility to present the value of these two indices in the evaluation within graphs, where Market Bias Index (B) is on the vertical axis and the Change Index (C) is on the horizontal axis (Figure 1).

Follow it will be described the strategies for each Quadrant (Faulkner, 1997; Águas, Grade & Sousa, 2003; Fernandes, 2005; Fernandes & González, 2007; Fernandes et al., 2008): Quadrant I (B>0; C>0) - Performing Markets: origins, where the destination already had a share above average and where market continues to gain market share; Quadrant II (B>0; C<0) - Stagnant Markets: backgrounds, where the target has a quota market above average but begins to decrease; Quadrant III (B<0; C<0) - Declining Markets: backgrounds, where the target has a quota of below the market average and reducing continuous; Quadrant IV (B<0; C>0) - Emerging Markets: origins, where the destination part of a market share is below average, but that is beginning to gain market share.

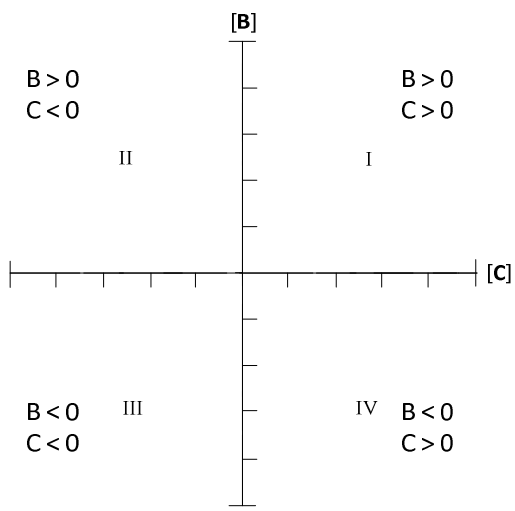

Note: Market Bias Index [B]. Change Index [C].

Figure 1. Market Share Typology.

Source: Adapted from de Faulkner (1997, p. 29).

Results

It could be easily seen (Table 1), that in one year the number of visitors, who participated in rural tourism grew as for Portugal as a whole as for the North region in particular, except Netherlands towards Portugal and North region, and United Kingdom and Portugal with respect to North region. The main difference between these 2 years lays in changes in Top 5 of visiting countries; Spain reached 1 level and obtained the forth place, while Netherlands lost 1 level and lowered to the fifth place in 2014.

Table 1: Overnights spent by foreign tourists in rural areas of Portugal within North region.

2013 (10^3)		Countries	2014 (10^3)		Annual Growth Rate (%)	
Portugal	**North**		**Portugal**	**North**	**Portugal**	**North**
400,407	132,847	Portugal	443,52	131,91	10,77	-0,71
78,46	9,681	Germany	93,61	11,49	19,31	18,69
46,28	17,971	France	58,12	20,61	25,58	14,68
35,79	13,841	Spain	47,89	20,85	33,81	50,64
45,71	8,557	Netherlands	40,77	8,16	-10,81	-4,64
34,142	11,948	United Kingdom	36,45	11,02	6,76	-7,77
29,043	8,292	Belgium	34,07	8,92	17,31	7,57
670	**203**	**Total**	**754**	**213**	**12,54**	**4,93**
745	**226**	**Total of Portugal**	**856**	**240**	**14,90**	**6,19**

As it could be seen from the Table 2, that in one year the number of foreign tourists grew as for Portugal as a whole as for the Centre region in particular almost for all countries, except Netherlands.

Table 2: Overnights spent by foreign tourists in rural areas of Portugal within Centre region.

2013 (10^3)		Countries	2014 (10^3)		Annual Growth Rate (%)	
Portugal	**Centre**		**Portugal**	**Centre**	**Portugal**	**Centre**
400,407	80,105	Portugal	443,52	92,56	10,77	15,5
78,46	4,608	Germany	93,61	5,609	19,31	21,7
46,28	6,617	France	58,12	10,21	25,58	54,3
35,79	5,304	Spain	47,89	6,64	33,81	25,2
45,71	5,91	Netherlands	40,77	6,41	-10,81	8,5
34,142	3,315	United Kingdom	36,45	3,37	6,76	1,7
29,043	3,587	Belgium	34,07	5,15	17,31	43,6
670	**109**	**Total**	**754**	**130**	**12,54**	**18,7**
745	**122**	**Total of Portugal**	**856**	**146**	**14,90**	**19,7**

As it could be seen from the Table 3, that in one year the number of foreign tourists fall for the Lisbon region almost for all countries, except Portugal, France and Spain.

Table 3: Overnights spent by foreign tourists in rural areas of Portugal within Lisbon region.

2013 (10^3)		Countries	2014 (10^3)		Annual Growth Rate (%)	
Portugal	**Lisbon**		**Portugal**	**Lisbon**	**Portugal**	**Lisbon**
400,407	13,427	Portugal	443,52	15,09	10,77	12,4
78,46	2,935	Germany	93,61	2,58	19,31	-12,1
46,28	2,659	France	58,12	3,21	25,58	20,7
35,79	3,098	Spain	47,89	3,79	33,81	22,3
45,71	2,567	Netherlands	40,77	2,1	-10,81	-18,2
34,142	3,108	United Kingdom	36,45	2,34	6,76	-24,7
29,043	1,186	Belgium	34,07	0,91	17,31	-23,3
670	**29**	**Total**	**754**	**30**	**12,54**	**3,6**
745	**35**	**Total of Portugal**	**856**	**37**	**14,90**	**5,7**

As it could be seen from the Table 4, that in one year the number of foreign tourists grew for the *Alentejo* region for all countries, except Netherlands.

Table 4: Overnights spent by foreign tourists in rural areas of Portugal within *Alentejo* region.

2013 (10^3)		Countries	2014 (10^3)		Annual Growth Rate (%)	
Portugal	***Alentejo***		**Portugal**	***Alentejo***	**Portugal**	***Alentejo***
400,407	132,695	Portugal	443,52	162,45	10,77	22,4
78,46	13,722	Germany	93,61	14,64	19,31	6,7
46,28	4,77	France	58,12	6,86	25,58	43,8
35,79	7,291	Spain	47,89	9,52	33,81	30,6
45,71	8,313	Netherlands	40,77	7,19	-10,81	-13,5
34,142	5,031	United Kingdom	36,45	6,53	6,76	29,8
29,043	3,213	Belgium	34,07	4,16	17,31	29,5
670	**175**	**Total**	**754**	**211**	**12,54**	**20,7**
745	**186**	**Total of Portugal**	**856**	**234**	**14,90**	**25,8**

As it could be seen from the Table 5, that in one year the number of foreign tourists grew for the Algarve region for all countries, except Netherlands.

Table 5: Overnights spent by foreign tourists in rural areas of Portugal within *Algarve* region.

2013 (10^3)		Countries	2014 (10^3)		Annual Growth Rate (%)	
Portugal	***Algarve***		**Portugal**	***Algarve***	**Portugal**	***Algarve***
400,407	25,518	Portugal	443,52	26,642	10,77	4,4
78,46	7,379	Germany	93,61	9,38	19,31	27,1
46,28	2,606	France	58,12	3,42	25,58	31,2
35,79	3,973	Spain	47,89	4,51	33,81	13,5
45,71	7,177	Netherlands	40,77	6,09	-10,81	-15,1
34,142	6,226	United Kingdom	36,45	7,57	6,76	21,6
29,043	9,189	Belgium	34,07	9,68	17,31	5,3
670	**62**	**Total**	**754**	**67**	**12,54**	**8,4**
745	**67**	**Total of Portugal**	**856**	**74**	**14,90**	**10,4**

As it could be seen from the Table 6, that in one year the number of foreign tourists grew for the *Açores* region for all countries, except Portugal.

Table 6: Overnights spent by foreign tourists in rural areas of Portugal within *Açores* region.

2013 (10^3)		Countries	2014 (10^3)		Annual Growth Rate (%)	
Portugal	***Açores***		**Portugal**	***Açores***	**Portugal**	***Açores***
400,407	12,031	Portugal	443,52	11,34	10,77	-5,7
78,46	12,929	Germany	93,61	17,37	19,31	34,3
46,28	3,784	France	58,12	4,35	25,58	15,0
35,79	1,391	Spain	47,89	1,47	33,81	5,7
45,71	3,546	Netherlands	40,77	3,83	-10,81	8,0
34,142	2,343	United Kingdom	36,45	2,38	6,76	1,6
29,043	2,192	Belgium	34,07	3,38	17,31	54,2
670	**38**	**Total**	**754**	**44**	**12,54**	**15,4**
745	**49**	**Total of Portugal**	**856**	**57**	**14,90**	**16,3**

As it could be seen from the Table 7, that in one year the number of foreign tourists grew for the *Madeira* region almost for all countries, except Portugal and Netherlands.

Table 7: Overnights spent by foreign tourists in rural areas of Portugal within *Madeira* region.

2013 (10^3)		Countries	2014 (10^3)		Annual Growth Rate (%)	
Portugal	***Madeira***		**Portugal**	***Madeira***	**Portugal**	***Madeira***
400,407	3,784	Portugal	443,52	3,53	10,77	-6,7
78,46	27,205	Germany	93,61	32,56	19,31	19,7
46,28	7,874	France	58,12	9,44	25,58	19,9
35,79	0,895	Spain	47,89	1,12	33,81	25,1
45,71	9,644	Netherlands	40,77	6,98	-10,81	-27,6
34,142	2,171	United Kingdom	36,45	3,23	6,76	48,8
29,043	1,384	Belgium	34,07	1,88	17,31	35,8
670	**53**	**Total**	**754**	**59**	**12,54**	**10,9**
745	***60***	***Total of Portugal***	***856***	***68***	***14,90***	***13,3***

The results obtained in calculating the Market Bias index, and Change in Market Share index, are presented in Tables 8 and 9. These values represent the coordinates for the origins/destinations represented in the following Figure 2. The analysis of the following graphs shows the evolution of the main origins destinations.

Table 8: Market Bias index [B], for 2014.

Country	North	Centre	Lisbon	*Alentejo*	*Algarve*	*Açores*	*Madeira*
Portugal [PT]	6,1	22,4	-21,3	34,0	-30,5	-61,6	-90,0
Germany [DE]	-56,2	-64,9	-36,2	-42,8	15,9	178,7	337,9
France [FR]	26,5	3,0	27,8	-56,8	-31,9	12,4	104,5
Spain [ES]	55,3	-18,7	83,1	-27,3	8,9	-53,9	-70,6
Netherlands [NL]	-28,6	-7,8	19,2	-35,5	72,8	41,1	115,5
United Kingdom [UK]	7,8	-45,8	48,5	-34,5	140,2	-1,9	11,6
Belgium [BE]	-6,6	-11,4	-38,2	-55,3	228,7	49,0	-30,5

Table 9: Change index [C].

2013/2014	North	Centre	Lisbon	Alentejo	Algarve	Açores	Madeira
Portugal [PT]	-11,47	4,78	1,62	11,66	-6,36	-16,51	-17,48
Germany [DE]	-0,62	2,41	-31,40	-12,62	7,81	15,04	0,37
France [FR]	-10,90	28,72	-4,86	18,23	5,65	-10,63	-5,70
Spain [ES]	16,83	-8,62	-11,47	-3,24	-20,29	-28,13	-8,67
Netherlands [NL]	6,17	19,27	-7,39	-2,70	-4,34	18,82	-16,82
United Kingdom [UK]	-14,53	-5,10	-31,47	23,04	14,83	-5,18	42,02
Belgium [BE]	-9,74	26,27	-40,58	12,17	-11,97	36,89	18,53
Total Portugal	**-8,67**	**4,71**	**-9,25**	**10,84**	**-4,52**	**1,36**	**-1,63**

In the plot, presented below the bubbles formed by countries represent the Market Share, occupied by countries. It could be seen that the biggest share in North region is taken by Portugal, the smallest by Netherlands. The graph shows that only Spain is located in the zone of Performing market, while the majority of countries (France, United Kingdom and Portugal) are situated in the zone of Stagnant market or so called zone of uncertainty. Concerning Germany and Belgium, these countries laid in the zone of Declining market or failure, and Netherlands belongs to Emerging market.

The graph shows (Figure 2): that for Centre region most countries are located in the third and fourth quarter; Lisbon region all countries are located in the third and second quarter, e.g. between Stagnant (the majority of countries: Spain, France, Portugal, Netherlands and United Kingdom) and Declining (Germany, Belgium) markets; *Alentejo* region all countries, except Portugal, which is located in the Performing Market, are located in the third and fourth quarter; *Algarve* region most countries, on the contrary with *Alentejo* region, are located in the first and second quarters, except Portugal, which is located in the Declining Market, and France, which occupies Emerging market; *Açores* region the main Market Share is taken by Germany, and the smallest by Spain. Such countries as Germany, Belgium and Netherlands represent Performing Market (staying in the first quarter), while France occupy Stagnant market (second quarter); *Madeira* region the main Market Share is again, as in a case with another island region *Açores*, taken by Germany, and the smallest by Spain. Only Germany and UK were situated in the first quarter, or zone of Performing market. Such countries as France and Netherlands are located in the zone of Stagnant Market, Portugal and Spain represent Declining Market for *Madeira* region, and the Emerging Market is occupied only by Belgium.

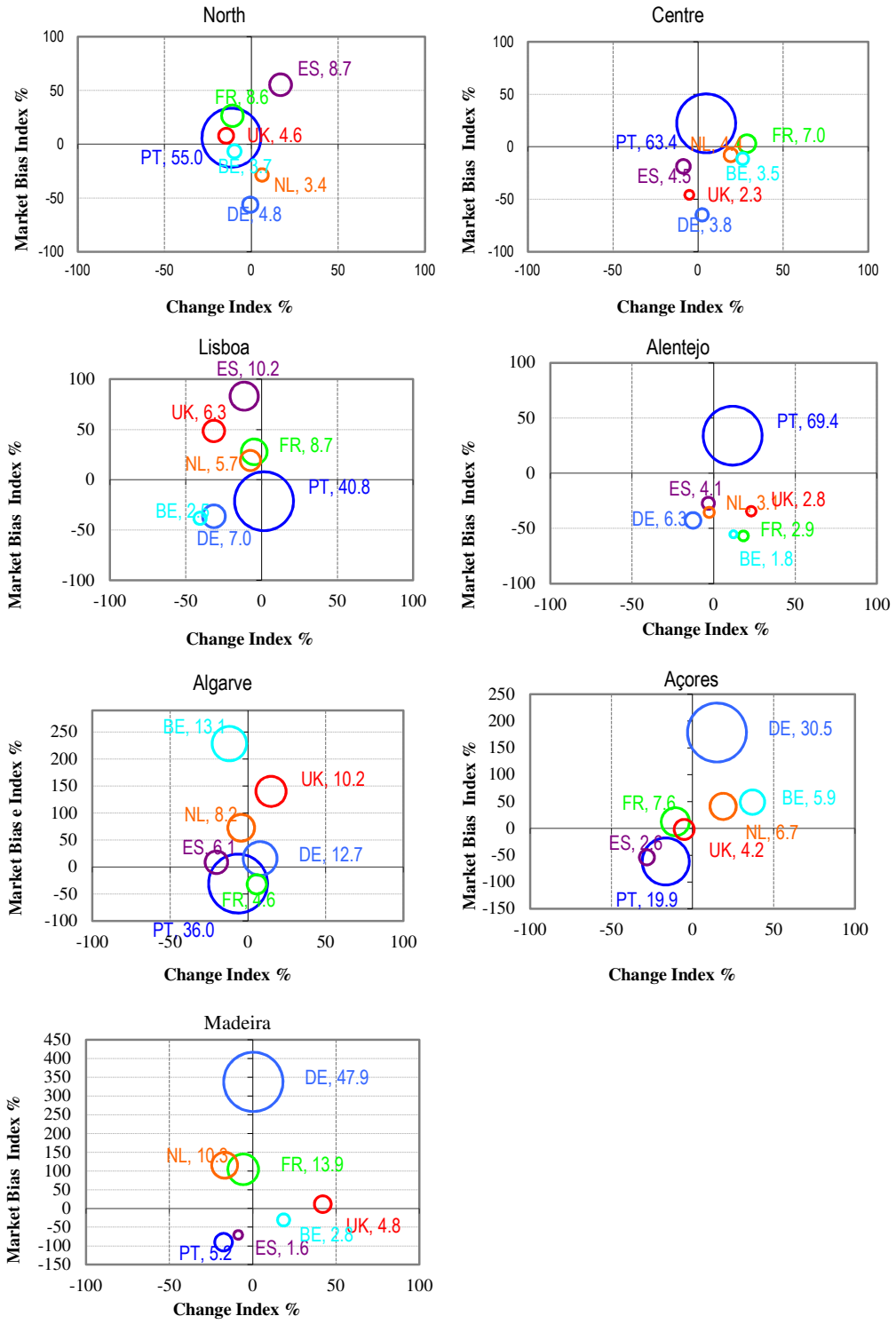

Figure 2. Analysis of Origins in the Destination North, Centre, Lisbon, *Alentejo*, *Algarve*, *Açores* and *Madeira*.

To answer the specific objective 1, "*SO1: There are tourism rural competitiveness between each region of Portugal*", the analysis produced above showed that for each region of Portugal the rural tourism is competitive but for different countries (in connection with the quadrant in which these countries are situated).

Conclusion and Limitations

This research regarded rural tourism destination competitiveness of Portugal regions. To answer this question an analytical tool was applied, as well as Market Share Analysis, proposed by Faulkner.

During the analysis it was found that *Açores* are the most prosperous market for the majority of countries, because most countries (Germany, Belgium and Netherlands) stay in the zone of Performing market, what means that they are located in the area where shares of these countries are above average and where market continues to gain market share.

North (France, United Kingdom and Portugal), Lisbon (Spain, France, Portugal, Netherlands and United Kingdom) and *Algarve* (Spain, Netherlands and Belgium) regions could be attributed to Stagnant markets for the majority of countries located in the second quadrant. It means that the target of these countries have a quota market above average but begins to decrease.

Centre (Germany, Belgium and Netherlands) and *Alentejo* (France, Belgium and United Kingdom) regions are supposed to be developing markets for the most countries, because they stay in Emerging markets zone. Stagnant Markets are origins, where the destination part of a market share is below average, but that is beginning to gain market share.

Madeira region occupies several markets at the same time: Performing market (Germany and UK), Stagnant Market (France and Netherlands) Portugal and Spain represent Declining Market.

It was concluded that "There is tourism rural competitiveness between each region of Portugal", answering in this way to the specific objective.

It is also necessary to underline, as limitation, that the research was made only within two years (2013 and 2014), because of the lack of necessary information in previous years in INE web site.

As future lines of research is intended to monitor these indicators to see the behaviour of each one and to give this information to municipal and national decision-makers for maintain foreigners and create sustainable rural tourism.

Acknowledgment

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Alternative earnings management techniques and the relationship between earnings and cash flow

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Abstract

Earnings Management is about the use of accounting techniques in the process of financial statements creation. Financial statements are a structured presentation of the business activities and financial situation of companies. Earnings Management is thus used for the way in which accounting rules are applied and generates financial statements according to the management's wishes. Earnings management is becoming an increasingly popular topic and therefore is the subject of this paper. The objective of presented paper is to clarify alternative techniques of earnings management. It also contains presentation of the relationship between earnings and cash flow. The presented paper consists of five parts. The first part of the paper is devoted to the theoretical aspect of earnings management. It also contains, clarification of the creative nature of the earnings management. The paper deals with the options of application earnings management as well. The second part of the paper is aimed at clarifying alternative earnings management techniques. Within the issue of earnings management, increased attention is devoted to techniques like „Cookie Jar Reserve“, „Big Bath“, “Big bet on the Future”, “Flushing”, “Throw out a problem child”, “Change accounting”, “Operating versus non-operating income”. The third part of the paper focuses on analysing the relationship between earnings and cash flow. The analysis was carried out on the Slovak company. The fourth part of the paper is focused on discussion. The discussion deals with specific cases of the use of individual techniques, which have been defined parts before. A descriptive method, analysis, mathematical-statistical methods, graphic methods, comparison and synthesis were used in the processing of the submitted paper creation. The result of this paper is a comprehensive overview of the possibilities in the process of alternative earnings management techniques usage.

Keywords: earnings management techniques, cash flow, earnings, creative accounting,

Introduction

Earnings is generally an item that is part of the accounting statements. It is usually most often subjected to different calculations, forecasts or planning. It tells about the profitability of the company. The earnings values for monthly, quarterly, or annual statements are subject to comparations with an earnings-development prediction. (Svabova, Kramarova, Durica, 2018) The actual earnings values are compared with the estimated values. If the development of earnings is different to the estimated development, the price of the shares will be directed towards the decline. It is therefore evident that earnings determine the price of shares. It also gives information about whether the company will be profitable and successful in the long run. Earnings management is therefore defined as the purpose and legal management of decision-making and reporting in order to achieve stable and predictable financial results. (Eysenck, Kovalova, Machova, Konecny, 2019)

This definition is an important ingredient "legal". It emphasises the legality of this activity, in contrast to illegal accounting procedures, created for the purpose of manipulating financial statements. Illegal creative accounting practices are also referred to as “cooking the book”. Earnings Management is thus moving within the scope of the legal framework. However, it is not possible to deny the fact that Earnings Management contains creative accounting techniques. (Remenaric, Kenfelja, Mijoc, 2018) In essence, it is a creative accountant that shows the financial situation and performance of the company according to management. As a result of creative earnings management, it is possible to doubt the true and fair image of the accounting as well as the image of economic reality. (Huynh, 2019)

The creative character of earnings management is also reflected in terms such as creative accounting, the earnings game, accounting magic and window dressing. Creative accounting can be characterised as a process of manipulation with accounting data. (Susanto, Adrianne, Pirzada, 2019) The aim is to transform the accounts of the financial accounts into a form that should have a fair view of the facts. Creative accounting includes the execution of such transactions, the purpose of which is to present the desired financial position, performance or cash flows of the enterprise. (Hoang, Joseph, 2019) The earnings game concerns the wishes of companies and the steps that are taken in order to meet their quarterly forecasts of earnings. Used to describe the way companies play the game. Players in the game include companies, their accountants, analysts, etc. The essence of the game lies in the fact that companies meet the assumptions of analysts for example for one share. The reason for which this goal is referred to as "the game" is, that it is not always achieved as linear as your management may think. The magic accounting uses the term as fraud. In accounting, accountants are involved in cheating on economic realities. What they believe is really real and vice versa. (Gray-Hawkins, Michalkova, Suler, Zhuravleva 2019) The facts induced by accounting alone are physical artefacts that have an official certificate. Window dressing is a strategy used by mutual funds and other management portfolios. This is mostly the end of the year or quarter, which contribute to improving the performance of the Fund in front of its investors. Thus, window dressing are the actions that were taken before the release of the financial statements in order to improve its appearance. Based on these definitions, it is therefore difficult to establish an imaginary boundary when accounting and managerial creativity are within the limits of the law and when they no longer among its boarders. However, fraud in these contexts generally refers to the creation of transactions that have not been related. (Kliestik, Kovacova, Podhorska, Kliestikova, 2018) Alternatively, the deliberate use of unauthorized accounting practices. The goal is to deceive users of financial statements. (Craig, Smieliauskas, Amernic, 2014), (Hudakova, Masar, Luskova, Patak 2018), (McKeen, 2005)

Methods

Earnings management is thus the management of earnings through the manipulation of accounting in the company. The reason is to make the company's earnings looks better. There are a number of earnings management techniques that are not generally illegal. Primarily, because they are complying with accounting rules. But they can violate the spirit of these rules by assuming something other than an honest, objective picture of the company's finances.

„Cookie Jar Reserve“ technique

This technique results from the flexibility of the accounting framework. The essence of this technique is to 'store' the various amounts as long until it is time to increase or decrease the earnings. Mostly according to the current situation and needs of the company. If we use GAAP, IFRS and other national laws, it is necessary to estimate the role of managers and record the costs incurred from the event of the current year. Although they will become due in the future. It is the estimation of the amount of costs that brings room for profit management. If the manager chooses

the highest possible amount that can be reasonably justified, he will report higher costs than he would in the case with a lower estimate. With this decision, the manager created a "cookie jar reserve", which will be used later. Especially when it is necessary to report lower costs and possible higher earnings. However, if in the future it turns out that spending is actually in the upper range of the cookie estimate, spring reserve will be empty. Then there will be no revenue increase. Withal, if future expenditure actually appears in the middle or lower range of the estimate range, the excess in the previous period may be taken into account as earnings.

„Big bath“ technique

This technique will report all possible revenue-related expenses in the current year. This is a technique that is often used, when management change. New managers can shift responsibility for huge losses to their predecessors. The Big bath technique is used in the belief, that if it has to report bad news to management, that is the loss caused by substantial restructuring, it is better to report it at once. Given the fact that many such fees are based on estimates, it is better to estimate the parties now. The reason is to avoid any surprises. In essence, this technique practically means that if a company expects a poor profit, it will show an additional loss for even worse financial results. On the other hand, this avoids a later loss. With this technique, the time of cost recognition is affected.

“Big bet on the Future” technique

In this technique, it is about ensuring earnings growth by the fact that management literally buys the profit through acquisition. This technique is basically a combination of business earnings management methods that we have defined above. A separate acquisition is a consequence of the investment decision made by the management. The related acquisition costs may be subject for creative accounting. In practice, it works like having a company acquired by another company make a big bet on the future.

“Flushing” the investment portfolio

This technology is understood as reducing the number of securities. It mainly on the purpose of earnings/loss, depending on what needs to be achieved. In essence, this is an earnings management technique that is very good feasible in terms of time. However, this technique is not an example of creative accounting. It is part of an investment decision leading to the sale of securities that lose economic sense. One of the purposes of sales is to influence earnings. Companies often buy shares in other companies to invest excess funds. Alternatively, they have achieved some kind of strategic alliance. These investments usually are classified into one of two portfolio categories. Each of them has different accounting procedures.

“Throw out” a problem child

This technique is worthwhile, if it appears that the slowdown in profit due to the branch will increase in the near future. This technique follows from existing alternatives. Management decides on the method of disposing of the branch according to the accounting impact. If earnings are driven down by an underperforming subsidiary, the burden is expected to increase in future periods. The subsidiary company “problem child” can be a “throw out” to get rid of the pulling down. Stopping the downward pull can be done using one of the techniques including the accounting entity. The first technique is the sale of the company. Upon the sale of a subsidiary, the earnings/loss is recognized in earnings or loss statement in the current period. If reporting a large loss on sale is undesirable, a distribution should be considered. The second technique is to create a special purpose entity for financial assets. One of the available technical alternatives is the transfer

of financial assets to a qualified special purpose entity. Such assets are treated as sold and are excluded from the balance sheet. The company's management records an earnings/loss on the sale of assets. A qualified special purpose entity is not consolidated with the financial statements of the entity. The third technique is to spin off the subsidiarity. As part of this activity, the shares of the subsidiary are distributed or exchanged with the current shareholders. On the separation normally no earnings/losses are recognized and any negative effects of the subsidiary are eliminated from all financial statements.

Change accounting

If a company chooses an accounting policy, which it will use, little when they change over time. Companies that are changing they must also ensure that the stock market does not regard this change as a deterioration in the quality of returns. The reason may be, for example, that the company underestimated the share price. However, in the following circumstances, accounting policies may change without adversely affecting the share price. The first circumstance is volunteering for a new accounting standard. There is usually a period of two to three years for the adoption of a new accounting standard, which companies can accept at any time. Because voluntary early adoption can be an opportunity to manage earnings. The second circumstance is the improved revenue recognition rules. Many industries have several alternative revenue recognition rules. Some of them are better perceived as economic reality. Early adoption of a better revenue recognition rule provides an opportunity to manage earnings. The third circumstance is an improved expenditure reporting rule. For companies that record certain cash-based expenditures, a timely change of the rule may provide an opportunity to manage earnings. This change may coincide with a change in the Company's policy on the item.

Operating versus non-operating income

Comparison between operating and non-operating profit may seem like a straightforward task. However, there are items whose categorization is ambiguous. On this basis, a decision must be made as to which type of earnings these items belong to. Operating profit is characterized by regularity and is expected to be generated in the future. Although non-operating earnings are volatile and earnings is one-off. Operating profit is the starting point for determining the value of the company's shares. It is also an important accounting item for the financial statements and its components must be correctly identified. Consciously try to prevent purposeful shifting of individual types of earnings precisely in order to create a misleadingly negative picture of the financial situation of the company. The choice between posting a transaction to operating or non-operating profit is a profit management technique. It is available again due to some accounting flexibility. As a cessation of operations, extraordinary earnings/party, or the cumulative effect of a change in accounting policy.

Earnings and operating cash flow can also be used as a measure of quality earnings. We can divide it into two groups. The first measure can be:

$$QE1 = \frac{earnings\ distribution\ before\ extraordinary\ items}{operating\ cash\ flow\ dispersion} \tag{1}$$

If it is assumed that all revenues and expenses will be translated into cash flow in a given period, then earnings and cash flow will be equally variable. This means that QE1 will be exactly 1. The variance is the mean of the squares of the deviations from the arithmetic mean of the set. If the ratio is less than 1, then the variance in operating cash flow is greater than the variance in earnings. This reflects the poor quality of the earnings. If the ratio is greater than 1, the operating

cash flow deviation is less than the earnings deviation. However, this cannot be evaluated as a result of earnings management.

The relationship between earnings and operating cash flow is also expressed:

$$QE2 = correlation\ (earnings - operating\ cash\ flow) \tag{2}$$

The correlation coefficient indicates the statistical dependence of two characters. Its values are in a closed interval <-1.1>. This interval indicates how strong the two variables are linked to each other. A correlation coefficient of 1 means excellent positive and direct proportionality. And under unchanged conditions, an increase/decrease in operating cash flow leads to a decrease/increase in earnings. The correlation coefficient -1 means indirect proportionality. The operating cash flow is calculated as net income plus non-cash expenses minus the increase in working capital. The lower the correlation coefficient is, the more profit manipulations have been made.

The mentioned measures of earnings management will be applied and analysed for a specific Slovak company. The aim is to demonstrate whether academic tools for detecting manipulation of profits have real explanatory power. Whether they actually provide a claim that there have been creative interventions in accounting or not. Also finding interdependence between operating cash flow and earnings. Whether the tax model is statistically significant.

Advantages and disadvantages of using these techniques

Of course, each of the above techniques has both its advantages and disadvantages. The utility of these alternative earnings management techniques can now be combined with their benefits. The following paragraph lists some of the benefits of using the technique in earnings management. Also, the disadvantages of using these techniques in earnings management.

The advantages of using the above techniques by managers are, for example:
- manipulation of income information so that the company's managers achieve the set goal, possibility to charge financial bonuses, increase the value of society to achieve earnings, improve and adapt information on reported earnings, etc.

The disadvantages of using the above techniques by managers are, for example:
- decrease in operating performance, lower return on assets as well as equity, lower cash flows, lower earnings per share, lower price to wage ratio, etc.

Entities can use these techniques: manufacturing companies and companies with larger net operating assets, publicly traded companies, companies getting ready for major debt financing or for an IPO (Initial Public Offering), automobile industry sector mechanical engineering and electrical engineering private domestic companies, private international companies, private foreign companies, etc.

In accounting, earnings management is a method of manipulating financial records to improve the appearance of the company's financial position. In general, we can say that earnings management techniques can be used by almost all companies. Companies use earnings management to present the appearance of consistent profits and to smooth earnings' fluctuations.

Examples of entities that have used these alternative earnings management techniques and faced legal action is Cendant. Cendant announced misstated financial statements at its CUC International unit, the announcement resulted in a loss of $14 billion in market capitalization within one day of trading. It had produced a tremendous record of growth in revenues and

earnings. The second examples is Manhattan Bagel. From its initial public offering in 1994 to June 1996, the stock price of Manhattan Bagel rose from $5 per share to $29. The company grew to be the third largest bagel franchise in the United States with ambitious plans for substantial expansion. Sales and earnings were growing. The company began to expand through acquisition. The free-fall in its stock price continued and with the negative publicity and shareholder lawsuits that followed, the company was unable to sell franchises at anywhere near their previous pace. Eventually, the company was forced to seek bankruptcy protection. sell franchises at anywhere near their previous pace. Eventually, the company was forced to seek bankruptcy protection. The third example is Sunbeam. Sunbeam, a maker of small consumer appliances such as Mr.Coffee, has drawn much attention in recent years for its disappointing financial results. In mid-November 2000, the SEC concluded its investigation into accounting practices at Sunbeam. This activity was prior to the dismissal of Sunbeam's infamous CEO, who was terminated in 1998. Although not discussed in the SEC ruling, it would not be surprising if the stress of the environment contributed to the aggressive revenue recognition.

Results

In order to analyse the quality of earnings calculations, we had to obtain data directly from the company's financial statements. For better informative value, we have followed the development of earnings and operating cash flow in the last 5 years. In table 1 contains the values of earnings development and operating cash flow from 2014 to 2019. And also, the results of two earnings management quality indicators.

Table 1: Values of profit development and operating cash flow and results of indicators for measuring the quality of earnings management

	Earnings	**Operating cash flow**
2014	130929	172455
2015	7849	19149
2016	688	11892
2017	-151995	-140431
2018	377	18064
2019	462	7347
Variance	8056908553,47	9809063212,00
QE1	**0,821373905**	X
QE2	**0,995852034**	X

Source: own processing

The first measure of quality earnings (QE1) reached the value of 0.8214. This value indicates that the company was clearly managing earnings in the period. A value lower than 1 indicates from the table that the deviation of operating cash flow is greater than the deviation of earnings. Thus, we can note that in the analysed company, the possible presence of earnings management is pointed out.

The second measure of quality earnings (QE2) points to the relationship between operating cash flow and earnings. The Slovak Republic strives to detect as many frauds as possible within the framework of creative accounting and earnings manipulation. Therefore, we decided to perform a regression analysis of earnings factors and operating cash flow. As first, we set the null hypothesis that earnings and operating cash flow are linearly independent. Subsequently, an alternative hypothesis was established that earnings and operating cash flow are linearly dependent. Then it is

important to choose the level of significance α, which in our case was 0.05. The next step was to determine the relationship between earnings and operating cash flow. A Scatter / Dot-Simple Scatter graph was chosen to express the dependence. The graphical dependence of the variables is in graph 1.

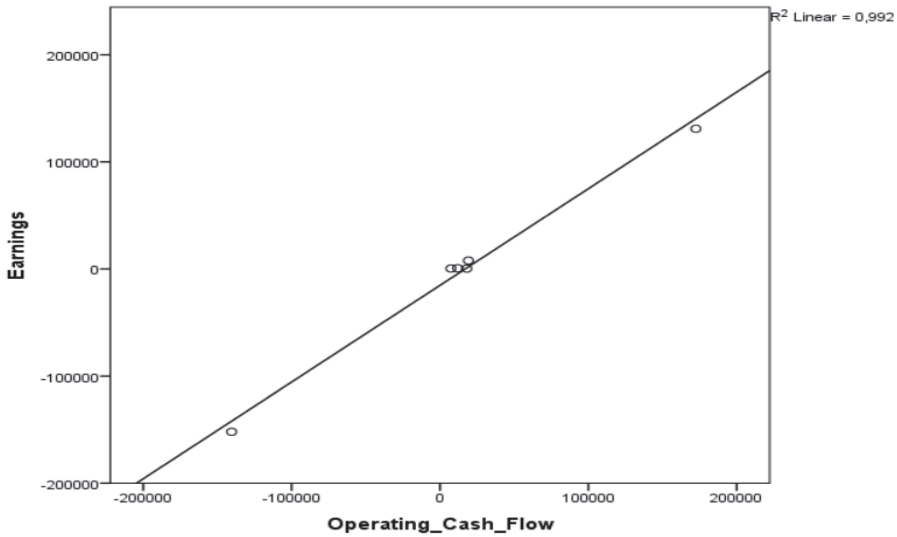

Fig 1. Graphical dependence of the variables

The value of R^2 is the coefficient of determination. Determines the quality of the regression model. Thus, how many% of the variability of the dependent variable is captured by this straight line. The closer R^2 is to 1, the better the linear model captures the data. The coefficient of determination is the square of the correlation coefficient r. Thus, in our case r = 0.996. Subsequently, the correlation coefficient was calculated in the SPSS statistical program and its statistical significance was tested. The test result is shown in table 2.

Table 2: Calculation of the correlation coefficient of its statistical significance.

		Operating_Cash_Flow	**Earnings**
Operating_Cash_Flow	Pearson Correlation	1	0,996
	Sig.(2-tailed)		0,000
	N	6	11
Earnings	Pearson Correlation	0,996	1
	Sig.(2-tailed)	0,000	
	N	6	6

Source: own processing

Table 2 is an important line where it is earnings. It depends on the number of operating cash flow. Therefore, we will take into account the second cookware table. Pearson Correlation is the value of the correlation coefficient, which represents 0.996. Sig.(2-tailed) is a test of the relay significance of the correlation coefficient. If p value is < α, then the hypothesis H0 rejected and vice versa. In our case, we reject the hypothesis of zero. Correlation is statistically significant and variables are linear dependent. And thus, under unchanged conditions, it leads to an increase in operating cash flow to reduce profits. In our case, the company achieves the value of 0.996 and the less manipulations of profits have been made. If the value was lower, it would be possible to talk about greater handling of profits in society.

Discussion

In addition to the aforementioned gauges and techniques, that have been defined and analysed above, there are still several options where the Cookie techniques Jar Reserve, Big Bath, Flushing defined in methods can be used.

The authors of the paper recommend to use the technique Cookie Jar Reserve for the following reasons. The first option technique is to return goods and discounts. Claims must be accounted for in net realisable value. Thus, the value at which they are expected to be collected eventually. Therefore, all possible factors which affect the collection must be taken into account. (Caylor, Chambers, 2015) The typical ones are sales price, returns and discounts. Managers are expected to return or modify the sales price. The second option is the depreciation of inventories. The historical value, cost or cost of production must be reduced to a net realisable value. If there is a significant fall in their usefulness due to oblong, reduced and price changes. The implementation of the cost factor is also important for these methods. For example, one possibility is therefore the depreciation of the inventory into the cost. Subsequently, the possibility of applying advertising stocks.

The most common circumstances, in which a Big Bath technique can be applied, are the operational restructuring and the impairment of assets. (Valaskova, Kliestik, Kovacova, 2018) The cost of operating restructuring is the costs incurred by the company in order to reorganise its activities. The reason for this, is to increase revenue or reduce productivity. These costs are due to the temporary dismissal of employees. The posting of depreciation of assets consists in the comparations of the book value and expected future cash flows from their use and possible removal. (Svabova, Valaskova, Durana, Kliestik, 2020) If the expected cash flows are lower than the carrying amount, the asset will be a detailed deterioration. However, the loss of deterioration shall be the amount of the difference between the carrying amount of the asset and its market value. (Novak Sedlackova, Svecova, Tomova, 2019)

The Big Bet on the Future technique includes two areas, within specific usage cases. The first is to write down the ongoing costs of research and development for the company acquired. For example, this technique allows companies to depreciate a substantial portion of the purchase price against the actual profit in the acquisition year. This is because it protects future profits from these charges. In practice, this means that future earnings will be higher than they would be otherwise. The second is the incorporation of the earnings of the acquired company into the consolidated earnings of the company. (Vochozka, Rowland, Zrbka, 2016)

With Flushing technology, investment requirements that offer the opportunity to manage revenue are broken down into several techniques. (Hadaway, 2006) The first technique is the timing of sales of securities that have earned value. If additional revenues are needed, companies may sell portfolio security that has unrealised earnings. The earnings will be recognised in the operating income. The second technique is the timing of the sale of securities that have lost value. If it seems more useful to report lower income, companies sell a security that has an unrealized loss. (Svabova, Durica, 2019) The loss will be recognized in operating income. The third technique is to change the intent to holding. The company's management may decide to change its intention in relation to the security. It may reclassify from a trading securities portfolio to an available-for-sale portfolio and vice versa. The effect would be to transfer any unrealized earnings/losses to or from the income statement. (Khanh, Thu, 2019)

Conclusion

The main goal of submitted paper was to clarify the accounting techniques used in earnings management, which may lead to manipulations of earnings. Earnings management can be achieved essentially in two ways. The first is a company management decision to do some transaction with an impact on earnings. The reason is its influence. The second option is to use earnings management through the bending of accounts for the purpose of the desired result. This requires sufficient orientation in accounting. The formulation of accounting standards, principles or standards offers a fairly wide scope for earnings management. This facilitates the execution of creative accounting ideas.

In conclusion, it can be said in general that the implementation of the time factor is also an important factor in these techniques. Earnings manipulation is an important accounting and economic issue. This issue cannot be avoided due to the involvement of the human factor. Because from time to time, personal interests are subject to the detriment of the public. The elimination of this problem can be sought in the wording of the accounting-legal framework, which will not offer such flexibility to the units of account. The question remains, however, whether such a requirement could sometimes be fulfilled.

The output of the presented paper is a tool that will enable the non-recognition of earnings management techniques and the debugging of the use of these techniques in society. The paper is part of a wider project, the main output of which will be an innovative solution.

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The EFQM Radar-Based Assessment Of Industry 4.0 Solutions – The Plan of Research

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Abstract

Assessment of the organization's functioning using the EFQM Excellence Model is usually implemented as a comprehensive project to which the entire organization is a subject. This article presents the idea of using the RADAR tool, which is part of the EFQM Excellence Model, to examine the level of implementation and evaluation of a selected organizational solution related to the concept of Industry 4.0.

Keywords: The EFQM Model, business excellence, assessment, RADAR, Industry 4.0

Introduction

The concept of Industry 4.0 has become one of the main drivers of change in organizations in the world in recent years. The digitization associated with it enters the lives of almost every organization, causing changes in processes and ongoing operations. The question arises how to evaluate both the change process itself and its results. This article presents the idea of using the tool from the EFQM Excellence Model, i.e. the RADAR tool to evaluate an organizational solution in a selected factory in the automotive industry. In the following parts one can find a description of the evaluation tool and plan of research related to the evaluation of the implemented and functioning solution in the area of internal logistics of a large factory located in Poland. The purpose of this research procedure is to check if and how the RADAR tool can be used to evaluate individual organizational solutions.

1. Digital transformation

Digital transformation is a tool of industry 4.0 (the fourth industrial revolution) as well as a vision of the future for most enterprises. It is a concept of connecting the world of production machines with the world of the Internet, information technology and people. The flow of information between all these elements should be automated and connected within the digital ecosystem.

Companies of all sizes can take advantage of innovative digital solutions and transform their enterprise into a 'smart factory' - the intelligent factory of the future. Processes are carried out

automatically, production is optimized, and all areas of activity intertwine smoothly and work together to ensure maximum profit for the company. The key to this approach is, according to CG. Machado et al. [Machado et al., 2020,] is to understand the network of connections that must occur in the organization between new technologies, products, value chain and the business model of the organization. The key role is played by a broader view on processes within the organization and its structure, i.e.

- transformation of the product and service offer,
- vertical and horizontal integration of the value chain,
- optimization of customer relations,
- building a new business model

[A. Wagire et al. 2020; PWC, 2017; Deloitte, 2016; HBRP, 2019; Zielinski, 2016].

Research on the level of automation of Polish production plants prove that for the managers of Polish factories the challenges of the third industrial revolution related to microelectronic technologies remain largely valid. Only 15% of Polish factories are fully automated, [Zieliński, 2016] and 76% of respondents point to partial automation. Only a small part of factories, i.e. 6%, use IT systems for operational management and production control (Manufacturing Execution System MES class).

While analyzing the data from the reports, it can be concluded that Polish industry still has a problem with finding its place in the third industrial revolution involving the automation of individual machines and processes. This Polish delay compared to the most industrialized countries is the result of:

- lack of adequate capital,
- late opening to modern technologies,
- lack of specialized management and engineering staff,
- focus on marketing and sales in order to build market position.

If organizations want to prepare themselves to take advantage of the opportunities associated with the current, fourth industrial revolution, first of all they need full access to the technology from the previous stage, i.e. building a strong infrastructure that allows automation and computerization of production.

On the other hand, the key to the development of Polish enterprises is effective building of the value chain. The key stages of this process are: R&D, design, branding, production, distribution, promotion and maintenance services. This means that companies that focus only on production will be under pressure to lower prices. If they do not automate or build new value added in the short term, e.g. in the form of R&D and design processes, they will be eliminated from the supply chain.

It is obvious that when implementing new, breakthrough organizational solutions, it is also highly desirable to specify how the implemented solutions will be assessed. The assessment of compliance with the implementation schedule and budget seems obvious, but from the point of view of assessing the relative value generated by a given solution, this approach seems to be insufficient. A usage of an assessment tool which is a part of EFQM Business Excellence Model can fill this gap.

2. The EFQM model as a framework for assessing implemented Industry 4.0 solutions

The EFQM model is one of the methods supporting the holistic preparation of an organization for Industry 4.0. The Model of Excellence helps modern organizations measure, anticipate, monitor the needs and requirements of interested parties, and track the achievements of other organizations. The results achieved are the basis for the implementation of improvement activities in the organization. [EFQM 2013]

The evolution of the path to excellence was shown in the work by P. Hermel and J. Ramis-Puyol [Hermel and Ramis-Puyol 2003], where they anticipated the concept of integrated improvement - the so-called "Excellence 5.0". This concept is based on the integrated improvement of the organization, based on a systematic view on management, taking into account all its dimensions. [Stańczyk-Hugiet, 2014]

There are now many models that are designed to help achieving business excellence. They can be classified in three areas: global / national models; academic models, company models. Overall, Tickle et al [Tickle, 2016] identified 94 models of excellence that are used in 83 countries around the world. The basis of most is the EFQM Model.

Values and goals of the model according to Carvalho A. et al. [Carvalho et al., 2019] focus mainly on improving the competitiveness of companies on the domestic and global market, as well as emphasize the importance of flexibility, creativity and an innovative approach to management. Key areas of improvement are: leadership, employees, clients, strategy orientation, process management, etc. Strong aspects of the stakeholders, the environment and long-term orientation of the company's success are also important aspects. The organization’s performance is a key element. Socio-cultural conditions are of fundamental importance when creating the principles of excellence models. According to B. Talwar [Talwar, 2013] it is important to properly include the culture and customs of a given country in the organizational culture being built. Western countries focus mainly on individual devel-opment, developing freedom, creative thinking or entrepreneurship, while in Asian countries they focus on group development and "Eastern philosophy."

Literature analysis [Bou-Llusar et al., 2005, 2009; Boulter, Bendell, Abas, Dahlgaarh et al., 2005; George et al., 2003; Jackson & Bircher, 2002; Sanchez et al., 2006; Martusewicz, Wierzbic , 2018] indicates that the use of models of excellence facilitates the improvement of the organization by obtaining an overview of the entire organization, identifying the strengths of the organization and areas for improvement, the ability to check the effectiveness of actions taken, the ability to compare with other organizations, help in identifying and sharing best practices within the organization, increasing employee involvement in continuous improvement or improvement of internal communication and integration of various initiatives in the organization.

Thanks to self-assessment, the organization receives a picture of where it is and what is the basis for determining the path to its continuous improvement. The proposed self-assessment of enterprises based on models of excellence, compared to other assessment systems, takes into account the richer range of issues that comprehensively relate to various activities for quality and excellence.

3. The EFQM RADAR as assessment tool

In the EFQM Excellence Model 2013, the RADAR tool works in conjunction with the criteria for Enablers and Results [EFQM 2013]. The set of elements and attributes against which the assessment is made is different in relation to the two types of criteria mentioned above. In the latest version of the EFQM Model, there are three groups of criteria: Direction, Execution, Results, and the RADAR tool, similarly to the 2013 version of the Model, is adapted to each of the three groups of criteria mentioned above [EFQM, 2019]. For the purposes of this study, the tool described in the EFQM Model 2013 will be used. This choice is dictated by the fact that this version of the model is known to managers in the researched organization, as well as the fact that the organization has experience in using the Polish Quality Award model, which is very similar to EFQM Model 2013.

The RADAR tool, contrary to many popular beliefs, is not directly related to a radar chart, often used to present three or more quantitative variables on axes meeting at the starting point and stretched in the figure resulting from the number of axes, i.e. the number of presented variables. RADAR is an abbreviation of the words Results, Approach, Deployment, Assess, Refine. RADAR logic predicts that at the beginning the **results** that one want to achieve should be defined. Next, one need to design an **approach** that aims to achieve results. The next step is to **deploy**, implement the approach in reality. After that one should **assess**, evaluate both the approach itself and its implementation. The last step is to **refine**, improve the approach and its implementation. There are common points between RADAR and PDCA, but it seems that the creators of RADAR have intentionally highlighted the results to be achieved.

The figure 1 shows the flowchart of the RADAR tool.

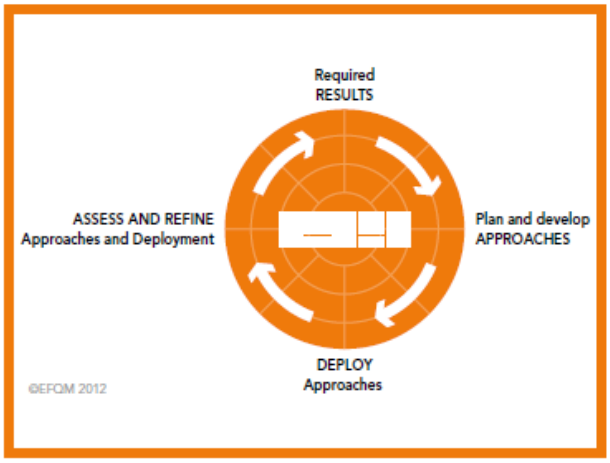

Fig 1. RADAR, source: EFQM Model 2013

As mentioned above, the EFQM 2013 model is built based on two groups of Enablers and Results criteria, and in both groups the RADAR tool has different elements and attributes. On Figure 2 one can see the RADAR for Enablers.

Analysis of Enablers

Elements	Attributes	Guidance
Approaches	Sound	The approaches have a clear rationale, based on the relevant stakeholder needs, and are process based.
	Integrated	The approaches support strategy and are linked to other relevant approaches.
Deployment	Implemented	The approaches are implemented in relevant areas, in a timely manner.
	Structured	The execution is structured and enables flexibility and organisational agility.
Assessment & Refinement	Measurement	The effectiveness and efficiency of the approaches and their deployment are appropriately measured.
	Learning & Creativity	Learning & creativity is used to generate opportunities for improvement or innovation.
	Improvement & Innovation	Outputs from measurement, learning & creativity are used to evaluate, prioritise and implement improvements & innovations.

Fig. 2. Analysis of Enablers, source: EFQM Model 2013.

As it can be seen on fig. 2, the RADAR for Enablers is directed to four elements, i.e. _ADAR (approaches, deployment, assessment & refinement) and in the area of each of these elements attributes are defined, with which the assessment is performed.

The figure 3 shows RADAR for Results, i.e. the first letter of the acronym. Unlike RADAR for Enablers, Relevance & Usability and Performance were defined as elements, for which attributes and hints have been added.

Analysis of Results

Elements	Attributes	Guidance
Relevance & Usability	Scope & Relevance	A coherent set of results, including key results, are identified that demonstrate the performance of the organisation in terms of its strategy, objectives and the needs and expectations of the relevant stakeholders.
	Integrity	Results are timely, reliable & accurate.
	Segmentation	Results are appropriately segmented to provide meaningful insights.
Performance	Trends	Positive trends or sustained good performance over at least 3 years.
	Targets	Relevant targets are set and consistently achieved for the key results, in line with the strategic goals.
	Comparisons	Relevant external comparisons are made and are favourable for the key results, in line with the strategic goals.
	Confidence	There is confidence that performance levels will be sustained into the future, based on established cause & effect relationships.

Fig. 3. Analysis of Results, source: EFQM model 2013.

The original assessment methodology assumes awarding points for obtaining individual attributes, as well as additional restrictive conditions. For the purposes of the designed study, they will not be used, and therefore the authors have abandoned their presentation in this text.

4. Methodology of planned research

The assessment of the organization's functioning using the EFQM model is usually implemented as a comprehensive project to which the entire organization is subject. This article presents the idea of using the RADAR tool to examine the level of implementation and achieved results of a selected organizational solution. The research project will be implemented in one of the factories of a global manufacturing company operating in the automotive industry and will be treated by the team of authors as a pilot study, which aims to answer the following research questions:

- is it possible to "use" the RADAR tool to evaluate selected organizational solutions without having to implement the entire EFQM model,

- what are the determinants of this approach affecting the assessment process,

- how the assessment procedure of the selected organizational solution will be perceived by the persons participating in the assessment and by the management of the plant.

Unlike the classical organization assessment methodology developed by EFQM and being the basis for awarding distinctions and EFQM AWARD, the authors of this work decided to use a different approach. First of all, the assessment does not apply to organizations, but concerns the project of implementing organizational solutions resulting from the Industry 4.0 concept, which was implemented in the researched factory. A project from the area of internal logistics, i.e. e-kanban optimization based on RFID solutions, was selected for evaluation. The selection of the project for evaluation resulted from the recommendations of the plant management and from the fact that the project has already been formally completed and the resulting solutions are already functioning. From the point of view of the assessment method, it does not matter which project would be selected, and the key here is the use of a non-classical organization assessment method.

Respondents will be managers involved in the implementation of the evaluated e-kanban optimization project, and will be selected in consultation with the top management of the factory.

The assessment will be carried out on the basis of a questionnaire, which will be based on the presented above elements and attributes of the RADAR tool, while the assessment under the given attribute will be carried out on a scale:

- attribute not achieved,

- attribute partially achieved,

- attribute fully achieved.

In order to clarify the tool, as well as to calibrate how to understand the scale, it is planned to conduct a workshop for the participants of the assessment, in which the framework of the evaluated project will also be reminded. The second element of the research will be to ask about the usefulness of the method used to assess the implementation and results of the project, which

aims to answer whether the non-classical use of the RADAR tool is valuable and can / should be used to assess other organizational solutions or projects for their implementation.

5. Summary

The idea of using the RADAR assessment tool for evaluation of a given project instead of assessing the organization as a whole is a key aspect in the article.

The methodology of using the RADAR tool is different than in the case of the classic implementation of the EFQM Model in an organization. The fact that RADAR is applied to only one approach significantly changes the assessment process and the depth of analysis of a given issue. In the classic approach, the assessors focus on the assessment of many organizational solutions, which, even with the greatest care, reduces the amount of time and thus reduces the insight of analyzing individual solutions.

Our proposed approach also reduces a significant disadvantage of the EFQM Model as a management tool, which is the very large complexity and scale of the Model. Focusing on RADAR as an evaluation tool, and then applying it to the organizational solution which is well-known to participants of an evaluation process, can be used to get familiar with the EFQM Model and to gain a specific desire to learn it in full. This particular approach can also be used to other self-assessment tools like the one specified in ISO 9004 or in other Business Excellence Models across the world.

Once the RADAR is checked in this context the organizations will have the next, well designed, and validated tool for evaluation of projects or organizational solutions, in the Industry 4.0 area but also in others managerial scopes.

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Innovation environment in the country and its importance in terms of business innovation

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Abstract

Innovation is discussed everywhere. Ads deceive us about innovative products and companies. Professors open the door to various funds with the word "innovation", the most talked about innovations and written where they have never been done - in European offices, universities and various food agencies. It is a pity, because only innovation moves the world forward and improves it. In general, we could say that innovation adds value or benefit to the customer (performance, health, well-being, safety, comfort, satisfaction, happiness, etc.) and removes harmful functions or problems (risk, nature pollution, consumption, control complexity, costs etc.).Companies that do not know how to innovate disappear so that companies can be created better. Products that have helped people in their lives are being replaced by innovative products, which are better and have less harmful functions. Take, for example, the tools that served us for various things then and today - e.g. razor, ink pen, parchment or storytelling, trowel for tillage, ax for woodworking, animal for transporting people and materials, etc.

Keywords: Innovation. Small and medium sized enterprises. Innovation. Support of innovation.

Introduction

If we look at the S curve of the product, then at the beginning it's like a small child - it doesn't work on its own and there are many things to learn, in the next phase its functionality improves, later performance, efficiency, effectiveness, reliability and at the end of life. cycle, the cost of the product is reduced and the product disappears. If I wanted to be cynical at this point, this also reminds us a bit of old age in Slovakia - people with poor pensions, who have to reduce their living costs in old age. The product is optimized in its first phase - it improves its useful functions (eg performance, range, reliability) and eliminates useless functions (eg consumption, weight, emissions, etc.), later it is dynamized (adapted to the environment and the user in different situations), integrates functions from the environment (see functions in a modern mobile phone) and finally switches to a supersystem (eg cloud services, GPS, music from the Internet, etc.). The evolution of products also shows an interesting pattern - first it is made from a monoblock of

material (eg letters on a typewriter or a knife), which is later segmented (dot matrix printer or saw), later passed into the field (laser printers or plasma cutting).

Professor Milan Zeleny defines innovation as follows: “Innovations are those quantitative or qualitative improvements of a product, process or business model that significantly add value to the customer, the company, preferably both parties at the same time. Since value added is realized only in a market transaction, innovation itself arises on the market, at the moment of sale. It is implemented by the customer. Therefore, innovations are fundamentally different from invention, invention, patent or improvement design - they can remain unrealized, in a safe, in a warehouse, in papers, at the patent office.

Innovation connects ideas with actions in which people look for new ways of doing things and create value for customers. The only one who decides on the innovation is the customer who buys the solution or rejects it.

INNOVATION

Examples from Linet, OMS Lighting, Bernard Family Brewery, Fosfa or Brano Group show how innovation results are measured - success in the market. Profitability, margins, market position, sales, enthusiastic customers - these are the main benchmarks of innovative projects. However, there are also innovative projects whose primary goal is, for example, to attract customers or test new technologies and solutions (eg the Multicare bed in the beginnings of Linet, cooperation with Giugiaro Design and Hella in LED technology at OMS Lighting).

The results of innovation are therefore reflected in three basic areas:

1. Company image on the market - design, technological sophistication, opening doors for demanding customers.
2. Development of knowledge in the company (we can measure the knowledge account of each employee - the added value it creates by transforming knowledge into innovation) and attracting the best talent on the market. No need to look for innovators, if you play in the Champions League, they will find you.
3. Business success - new markets, new customers, vitality index - the share of sales and profits from new solutions created in innovative projects, flexibility and speed of launching new solutions on the market. You might also be encouraged to be copied by others or by litigation caused by frustrated competitors who are beginning to worry about you. You are on the right path.

When discussing the financing of innovation, EU projects, grants, subsidies, incentives and various concessions are often mentioned. It is a language unworthy of entrepreneurs and is often used by those who have never done any innovation, but would like to improve on the fact that European officials support innovation, even if they do not know what exactly it is.

Innovation is the result of talent, freedom, sometimes even defiance of generally defined rules, striving to excel, diversity, experimentation and non-traditional solutions. Asked whether the European Union's programs to support innovation are enough to make Europe competitive with the United States and Asian countries, Professor Green answers: "I don't think so. Innovation takes place in the company, not in the ministry or in EU grant bureaucracies. Promoting innovation is not a question of money, but of motivation to excel. Innovation and quality do not arise on the basis of regulations, standards and norms, but on the basis of customer care. To do this, you need to know your customer, not just "your" bureaucrat. The USA and Asia (China, Japan, Taiwan, Korea, Singapore, India) have the great advantage of not having an EU. Therefore, they have no problems with competitiveness: because they can not only compete but also cooperate, create alliance networks in order to satisfy the customer as much as possible, not just the authorities.

Imagine that there are no European funds, no grants and no tax breaks - and we start acting like real entrepreneurs and innovators. The best solutions arise when two conditions are met:

1. Restrictions (limited resources and time).
2. Concentrate on the essentials (create an exceptional solution that will save us).

So where to get money for innovation?

Is there a better investment for a business owner than investing their own dividends in a functioning innovation process in their own company? He can create grants and thus support his own company and value money in it, similar to what investors do with venture capital funds. Definitely a better investment than saving money in a bank, building a guesthouse or buying diamonds. Similarly, other collaborators can contribute to the financing of innovative projects - if they do not have the capital, for example by participating in future revenues from innovation and reducing current costs (for example, by investing in their work). The same applies to business partners, customers or external collaborators - innovation consultants, project managers, designers, etc.

In startups, the first innovations are usually financed by angel investors, and later by venture capital and standard investors. Crowdfunding systems and other Internet tools, for example, are opening up new ways of raising funds.

Some companies create an innovation fund to support innovative ideas and prototypes. This fund is created from money that brings innovation - in some companies it is up to 75% of sales and profits. Such an "innovative EPA" can continuously fill the budget for new projects. However, time and people must also be assigned to money. There are companies that allow their co-workers to devote 15-20% of their working time to their own projects and ideas (eg 3M, Google). However, this means that 15-20% of people have to pay "extra". However, we should realize that using the word "cost" in innovation would be better replaced by the word "investment." We are not only investing in a new idea (even if it is risky) but also to people who, in any innovation project, regardless of its success, move further compared to competitors. The company innovates itself in this way.

Innovation does not mean inventing something revolutionary (and expensive), but it is usually a different way of applying and applying something that already exists. Thus, innovations arise in networking and cooperation at the borders of various disciplines and specializations. And so they can be co-financed.

There are companies where customers finance innovations and will have privileged opportunities to use the new solution (this method is used, for example, by the Slovak company GA Drilling, which develops revolutionary technologies for drilling into the ground using plasma).

Innovation teams

Innovation teams are quite different from production teams, mainly in that sometimes there is not just one leader who leads others, but several strong personalities meet there. In addition to pushing hard for their opinion, they have different specializations, knowledge and often speak different languages (trade, service, production, logistics, research and development, construction, technology, industrial design, marketing, purchasing, finance, informatics, etc.) We inspect the relevant literature on the decision-making logic of big data algorithmic analytics, providing both quantitative evidence on trends and numerous in-depth empirical examples [1].

Fig 1. The ten faces of innovation

In a team, we need experienced experts who often know very well what "will definitely not work" and inexperienced enthusiasts who will push for it to "work" because they know nothing about it. We need people from inside the company and from the outside environment, young and old, experts and laymen, specialists and generalists. But most importantly - the ability to listen, mutual respect and cooperation. Although Western Europe is a global leader in innovation activities among the OECD countries, these activities are not distributed evenly across NUTS 2 regions [2].

CULTURE OF INNOVATION

Once upon a time, breakthrough technologies and revolutionary changes came more slowly, the world was not so fast and changeable. Today, it is not possible to innovate without connecting to external experts and networks. Many top people cannot even be employed by companies, not for money, but for the need for freedom.

The company should develop in its culture six basic skills in the field of innovation:

1. Ability to identify and interpret opportunities correctly.
2. Ability to create, design, project and implement innovative changes.
3. Ability to learn.
4. Ability to network with external sources of knowledge and technology.
5. Ability to collaborate and cross departments and specializations.
6. Ability to develop an innovative culture.

Innovative management principles are a culture of delegating decision-making and responsibility downwards, supporting staff initiative and opportunities to find one's own way, a culture of accepting the mistakes that arise when people experiment and look for new solutions. Criticism of mistakes kills initiative and support for experimentation and invention, for which everyone should have 15% of their time at work (Google today uses a similar principle - 20%).

What mistakes to watch out for?

Be careful not to confuse innovation with brainstorming and generating ideas that make people have fun coming up but stay on the wall. According to the results, the most demanding job is that of couriers, followed by postal clerks and call center operators [3].

Don't get carried away by many interesting ideas and don't work on a large number of projects at the same time. Many kinds of research has suggested that innovation is positively linked to business performance and that it acts as an intermediary between organizational variables and financial performance measured by earnings achieved [4].

Don't let people on the team spend time and energy on negative discussions about how something isn't going and how difficult it is. Innovative activity is an important source of competitiveness, economic growth, as well as the image of each country [5].

Don't let an innovative project revolve around a technical solution, deal with all elements of the business model. n the era of industrial digitalization, companies are increasingly investing in tools and solutions that allow their processes, machines, employees, and even the products themselves, to be integrated into a single integrated network for data collection, data analysis, the evaluation of company development, and performance improvement [6].

Don't let people on the team talk instead of the customer, gather experiences and suggestions directly from customers, get to know their environment, work, problems and plans in detail.

Solve details, go deeper and deeper into the problem, do not avoid contradictions and "unsolvable" problems. The main objective of the contribution is to create the CRM (Customer Relationship Management) level and performance measurement model [7].

Simplify the customer's journey to purchase your solution - from their search, through selection, configuration, purchase, installation, use and service. Business management plays a vital role in building processes, structures, and the business environment to make the business innovative and to motivate individuals and teams to innovate [8].

Learn your customer's language and use it - define the value and quality of your solution in his words. Developments in data and communication systems provide massive prospects for supply

chain intelligence and self-determination setting up means of advancement for Industry 4.0 supply chains [9].

Accept the mistakes that arise from innovations, do not be afraid to go back, change the assignment or redesign the whole solution, if necessary. The article deals with the process of distribution of an innovative product using the Bass model [10].

Don't be influenced by impressive presentations, ask for prototypes, facts, real customer experiences and not abstract analyzes. An analysis of the results of empirical studies of the relationship between economic growth and income inequality shows that the results largely depend on the choice of the model specification and the quality of the data used [11].

In innovation, we must be fast and slow, bold and careful, creative and disciplined - innovation is about contradictions and contradictions. We need time for many solutions, many breakthrough technologies need to mature and need the right infrastructure to function. On the other hand, sometimes the time is important - to be the first on the market, to have the first feedback and customer experience, etc. When you come to the market with an interesting solution, "Run Forrest Run" yells at you and you have to run - faster than others. When no one is interested in your "amazing" solution, you have a chance to ask why and fix it. A consumer considers a large number of brands to meet their needs, one of which are private label brands. They became a part of the Slovak consumer market with the arrival of foreign retail chains, and the name of most private label products is closely related to the name of the given retail chain [12].

Innovation needs the right people, environment and conditions. Many companies are trying to give people creative offices, freedom to work, excellent infrastructure and financial resources - and yet, the results are not coming. Innovation requires motivation and the desire to change the world. The question is whether this energy is generated more in an environment of scarcity and obstacles or in a comfortable incubator, where people have a good time but do not innovate. Firms' innovation activities play an important role in fostering firms' competitiveness and enhancing economic growth of regions and countries. Regarding the significance of the issue, it is essential to explore indicators of firms' innovation activities [13].

People in high positions in companies sometimes argue that they do not have time for strategic things and innovations. It's nonsense. I think there are only three reasons why they don't do it - they are incompetent, they are scared or they are lazy. And then the question is whether they are sitting in the right places. They deal with operations and pettiness, instead of addressing issues that will secure the company's future.

Small businesses are usually innovative because they would not otherwise be able to survive. However, sometimes their problem is that they have to deal with many things at once and do not have enough people, money and knowledge to innovate. We are therefore looking for ways to connect smaller companies and innovate together. We meet at regular intervals, work on several projects and it turns out that the heterogeneity of the team and the diversity of views on the problem is an advantage. It also works out more financially, the only problem can be that some internal ideas and strategies can get out.

CONCLUSION

For companies that have chosen an innovation strategy, is characterized by the so-called innovative corporate culture, which is characterized by change, learning, flexibility, creativity, development. The business environment is a profound concern for the state and institutions to make it encouraging to boost entrepreneurship. Given such relevance of the business environment [14].

Not all companies that have a strategy have it planned and formulated in writing. There are also companies with a strategy that works, employees understand it and implement it, but there is no formal strategic plan. Such a strategy has not been purposefully developed and chosen, it was created unplanned in response to customer wishes, or as a support for the most profitable activities, or as a result of the activity of a leader who is charismatic and naturally innovative. In

order for this situation to occur, there must be a precondition in the company in the form of a certain content of organizational culture, favorable for the progress of the given strategic focus.

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Oscillators and Trend Indicators and Their Features in The Financial Asset Analysis Process to Maximize Earning from Trading

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Abstract

If we start to analyse the possibilities of using technical indicators of technical analysis, we come across two basic groups of these indicators. These two groups differ in part in their basic characteristics and possibilities of use. Our article will take a closer look at these two groups, which are the oscillator and the trend indicators of technical analysis. The aim of our article is to theoretically identify the basic characteristics of these two groups of indicators, their advantages and disadvantages and then verify them on the basis of real market data. In the element of the chapter of our paper, we will focus on the basic definitions and trend indicators and oscillators, an explanation of their operation and a detailed description of some indicators from these groups. In the following chapter, we identify the basic characteristics, advantages and disadvantages of these two groups of indicators. In the third chapter we present the obtained results of verification of these facts on real market data and in the last chapter we interpret the obtained results and findings and outline the next possible direction of research in this area.

Keywords: oscillators, trend indicators, trading

Introduction

If we decide to be interested in the issue of technical analysis, we will come across a wide range of mathematical indicators. In our article we will compare the basic characteristics of the two main groups of indicators of technical analysis, namely oscillators and trend indicators. The aim of our article is to theoretically identify the basic characteristics of these two groups of indicators, their advantages and disadvantages and then verify them on the basis of real market data. In the first chapter of the article, we elaborated in detail the theoretical basis of the problem. In the following chapter, we identified the basic characteristics of the two basic groups of indicators. In the third chapter, we then determined and described the rules of the application and the settings of individual indicators, saw the results of the application and interpreted them.

The theoretical basis

Currently with the development of various scientific mathematical and statistical methods there are an incredibly large number of indicators of technical analysis and each the trader can also create his own technical indicator according to his own requirements and his own trading approach. Today traders or researchers at universities use various complexities in the construction of technical indicators methods such as neural networks, linear programming, support vector machines, Bayesian statistics, fuzzy set theories, logistic regression (logit, probit) and many others. As there are currently a large number of technical indicators, it only depends on the preferences of the trader, which indicator he chooses for his needs, or what combination of which technical indicators he decides to use. It is not quite easy to choose the right indicators that a trader should incorporate into his trading system. The same indicator has a different explanatory power in different markets and for different assets in the same market. After studying several publications dealing with technical analysis, we can

say that there is no uniform classification of technical indicators that would be generally accepted. During the historical development of technical indicators, several divisions were gradually created and are still being created today. For the needs of this paper, we have chosen the following comprehensive structure of the division of technical indicators:

Table 1: Example of individual types of indicators

Technical indicators	
Trend indicators	**Oscillators**
• Moving averages	• Relative Strength Index (RSI)
• Bollinger bands	• Commodity Chanel Index (CCI)
• Moving Averages Convergence Divergence (MACD)	• Average True Range (ATR)

Source: Own processing

Trend Indicators

This type of indicators is designed primarily to identify the direction and strength of the trend. We can also identify them as delaying indicators. This means that trend indicators try to identify and confirm a trend that, of course, already exists on the market. It follows from their very nature that they are used in situations where the trader needs to find out whether a clear price trend has appeared on the market and also in the case of determining the strength of this already existing price trend. For a closer understanding of the essence of trend indicators, we will elaborate in detail the characteristics of some of them in the following subchapters.

Moving Average

Moving averages are among the most popular and most used indicators of technical analysis. They are based on the idea that they provide the trader with information on the average price of the monitored asset over a certain period of time from the past. The time interval always starts with the current, current price of the asset and continues into the past. The length of the selected time interval depends on the requirements of a specific trader (it is arbitrary). Also, the price of the monitored asset can be used opening, closing, maximum, or minimum in the selected time frame. As for the mathematical calculation of the indicator itself, we can choose from several different procedures. In general, Simple Moving Average (SMA), Exponential Moving Average (EMA) and Weighted Moving Average calculations are known and widely used. As its name implies, the moving average is the average that moves. Old data is dropped because new data is available [2,3]. This causes the average to move over time. If those prices are *PM, PM-1, PM-2, … , PM-(n-1)* then the calculation formula is:

$$\begin{aligned}\bar{p}_{\mathrm{SM}} &= \frac{p_M + p_{M-1} + \cdots + p_{M-(n-1)}}{n} \\ &= \frac{1}{n}\sum_{i=0}^{n-1} p_{M-i}.\end{aligned} \tag{1}$$

When calculating successive values, a new value comes into the sum, and the oldest value drops out, meaning that a full summation each time is unnecessary for this simple case:

$$\bar{p}_{\mathrm{SM}} = \bar{p}_{\mathrm{SM,prev}} + \frac{1}{n}(p_M - p_{M-n}) \tag{2}$$

The SMA calculation formula is as follows:

$$\mathrm{EMA}_{\mathrm{today}} = \mathrm{EMA}_{\mathrm{yesterday}} + \alpha\left[\mathrm{price}_{\mathrm{today}} - \mathrm{EMA}_{\mathrm{yesterday}}\right] \tag{3}$$

Expanding out $EMA_{yesterday}$ each time results in the following power series, showing how the weighting factor on each datum point p_1, p_2, etc., decreases exponentially:

$$\mathrm{EMA}_{\mathrm{today}} = \alpha\left[p_1 + (1-\alpha)p_2 + (1-\alpha)^2 p_3 + (1-\alpha)^3 p_4 + \cdots\right] \tag{4}$$

Where:

p_1 is price today,

p_2 is price yesterday,

and so on.

The weighted moving average calculation formula is as follows:

$$\mathrm{WMA}_M = \frac{np_M + (n-1)p_{M-1} + \cdots + 2p_{(M-n+2)} + p_{(M-n+1)}}{n + (n-1) + \cdots + 2 + 1} \tag{5}$$

Oscillators

The name oscillators is based on the fact that they oscillate (similar to a sine wave) around a horizontal line called the equilibrium line. This applies to price points and zero momentum, which is the point at which momentum does not increase or decrease. If this were the case, we can say that the market is stable and that the trend is still to be followed. To better understand the nature of oscillators, we will elaborate some of them in the following subchapters.

Relative Strength Index (RSI)

RSI is a technical momentum indicator that compares the extent of recent gains and recent losses to determine when an underlying asset is repurchased or resold. In general, it should signal when a potential correction of a recent movement may occur. RSI is probably the most common oscillator and is typically used for a period of 14 days. The RSI value, which falls in the range 0 to 30, signals that the market is oversold. Traders anticipate that the oversold currency pair indicates that the downward trend is likely to reverse and may be considered a buying opportunity. On the other hand, an RSI value falling in the range of 70-100 signals market overbought. This signal indicates that the resistance level for the instrument is close to or has been reached and the rate is likely to fall; traders would interpret this as a sales opportunity. For example, if you see that the RSI for EURUSD has risen above 70, a sell signal is generated and a currency pair can be sold. The calculation formula for calculating the RSI is as follows:

1. Calculation of the opening and closing price difference for each one rising candle (U) and for the falling candle (D).

$$U = CLOSE_i - CLOSE_{i-1} \ldots \textit{for each growing candle} \tag{5}$$

$$D = CLOSE_i - CLOSE_{i-1} \ldots \textit{for each falling candle} \quad (6)$$

2. Calculation of exponential moving averages from U and D values for a selected time period.

3. RS calculation.

$$RS = EMA\ (U) / EMA\ (D) \quad (7)$$

4. Quantification of RSI

$$RSI = 100 - 100\ x\ (1 / 1 + RS) \quad (8)$$

Theoretical comparison of basic characteristics

The main characteristics of oscillators include:

- Determines when the price is prone to correction (when the market is exhausted in the prevailing trend).
- Provides a signal to sell in the oversold zone and a signal to buy in the oversold zone.
- It shows the divergence between the oscillator and the price, which is useful in making trading decisions.

The main characteristics of oscillators include:

- Identifies the existence of a trend in price development or a trendless situation.
- Identifies the direction of the identified trend.
- Can determine the strength of an identified trend.

Technical indicators and oscillators are useful tools. They can show when it would be possible to open a store and in which direction it could go. However, it must be remembered that they are based on the past, not the future. This means that from time to time they can generate a false signal which can lead to loss. Therefore, the responsible trader should not always trust them 100%, but use them as confirmation or negation of his signal.

Results

For the purpose of verifying the identified basic characteristics of oscillators and trend indicators, we carried out the following research. From each group of indicators, we chose a typical representative of indicators, which is commonly used by traders. We chose a simple moving average for the group of trend indicators. For the calculation of the simple moving average, we chose the time period 25, because it is a common and basic setting of this indicator. We chose the Relative Strength Index (RSI) indicator for the group of oscillators. We used time period 5 to set the calculation of this indicator. The reason for setting this time period into the indicator calculation is that the indicator with this setting can respond more quickly and sharply to the price changes of the financial instrument. In the case of a moving average, we will consider the crossing of the indicator line with the price of the asset to be the signal of entry into the position. If the price breaks above the moving average, we will enter a long position, and if it does, and vice versa. The detailed rules for finding divergences are as follows:

- The divergence is only valid after the candle has been closed.
- The divergence that appears below the zero line on the indicator is always traded as a long position.
- We enter a long position to break through the high candle, where the divergence has been confirmed.
- The divergence that is created above the zero line on the indicator is always traded as a short position.
- We enter the short position to break through the low candle, where the divergence was confirmed.
- If we denote the vertices of the divergence in the graph and the indicator, their lines must always have a visible slope.

The application of the indicators will take place on the futures price chart for the S & P500. The reason for the choice is that it brings together and represents the 500 largest publicly traded joint-stock companies in the USA, is traded with a high volume and shows the direction of development of the entire sector of the economy. To collect the necessary data and apply the indicators, we chose the time interval from 1.1.2019 to 31.12.2019. The reason for the selection is that we consider this period to be long enough to collect a sufficient amount of data, it will reflect seasonality and also part of the economic cycle. We will apply the moving average to the candlestick price chart of this asset with a time frame of 1 day. The reason for the choice is that this time frame can filter out insignificant intraday price fluctuations and we can generate a sufficient amount of data with it. We will also apply the RSI indicator on the same interval of the candlestick price chart of this asset, but with a time frame of 4 hours. The primary intention was to implement the application on the same time frames, but RSI cannot generate a sufficient number of data for us with a time frame of 1 day. The results of applying the indicators with the given setting are as follows:

Table 2: SMA application results with predefined settings

A	B	C	D	E	F
1	2019.01.08.	2562,2	UP	2442,3	2820,8
2	2019.03.07.	2759,5	Down	2820,8	2721,3
3	2019.03.11.	2764	UP	2721,3	2865,3
4	2019.03.25.	2800,4	Down	2787,9	2834,2
5	2019.03.27.	2802,2	Down	2835	2791,5
6	2019.03.28.	2803,9	UP	2790,6	2960,9
7	2019.05.06.	2910,2	UP	2883,4	2937,8
8	2019.05.07.	2910,6	Down	2961,3	2727,9
9	2019.06.06.	2840,5	UP	2728,3	3029,5
10	2019.07.31.	2993,4	Down	3029,5	2776
11	2019.08.01.	2993,9	UP	2943,6	3014,1
12	2019.08.22.	2936,3	UP	2893,7	2939,7
13	2019.08.23.	2930,7	UP	2893,7	2936,3
14	2019.08.29.	2912,2	UP	2813,4	2946,6
15	2019.09.02.	2904,1	UP	2888,2	3023,9
16	2019.09.03.	2898,9	Down	2946,2	2889,9
17	2019.09.27.	2962,1	Down	3024,7	2945,7
18	2019.10.01.	2969,1	Down	3024,7	2854,5
19	2019.10.11.	2969,7	UP	2854,5	2993,7
20	2019.10.14.	2968,5	Down	2993,7	2953,3
21	2019.10.15.	2969,1	UP	2853,9	3157,5
22	2019.12.03.	3100,7	Down	3157,5	3068,6
23	2019.12.04.	3103,6	Up	3068,6	3253,2

Source: Own processing

A - number

B - date

C - crossing price

D- price routing

E- potential stop loss price (low or high of correction)

F- potential take profit price (low or high of price movement)

Table 3: SMA application results with predefined settings

Number	Date	Time	Price	Type	UP/DOWN	Movement (points)	Number of H4 candles
1	7.1.2019	20:05	2553,2	Classic	Down	4,5	1
2	11.1.2019	0:00	2591,4	Classic	Down	6,3	1
3	23.1.2019	16:05	2634,2	Classic	UP	765,2	1772
4	6.2.2019	8:05	2728,1	Classic	Down	50	14
5	8.2.2019	16:05	2693,7	Classic	UP	705,7	1699
6	14.2.2019	8:05	2757,4	Classic	Down	29	6
7	25.2.2019	16:05	2803,9	Classic	Down	28,9	13
8	4.3.2019	0:05	2816,1	Classic	Down	94,5	32
9	12.3.2019	16:05	2794,8	Classic	Down	11,4	4
10	13.3.2019	0:00	2819,2	Classic	Down	12,1	6
11	14.3.2019	8:05	2818,4	Classic	Down	11,4	4
12	15.3.2019	20:00	2829,2	Classic	Down	6	1
13	21.3.2019	12:00	2815,4	Classic	UP	49,5	5
14	25.3.2018	8:00	2797,8	Classic	UP	18,5	5
15	3.4.2019	12:05	2876,1	Classic	Down	3,4	1
16	9.4.2019	0:00	2897,7	Classic	Down	20,6	5
17	1.5.2019	4:05	2956,6	Classic	Down	228,2	148
18	2.5.2019	16:05	2916,8	Classic	UP	32,5	7
19	14.5.2019	4:05	2821,3	Classic	UP	72,4	19
20	29.5.2019	20:05	2780,1	Classic	UP	18,2	6
21	3.6.2019	20:05	2753,7	Classic	UP	642,8	1108
22	11.6.2019	12:05	2905	Classic	Down	37,9	12
23	21.6.2019	20:05	2954,4	Classic	Down	40,1	18
24	27.6.2019	0:05	2925,1	Classic	UP	104,7	129
25	5.7.2019	0:05	3000	Classic	Down	37,4	14
26	22.7.2019	0:05	2976,6	Classic	UP	54,8	29
27	26.7.2019	20:05	3027,6	Classic	Down	251,2	37
28	22.8.2019	0:05	2926,8	Classic	Down	9,6	4
29	23.8.2019	8:05	2932,7	Classic	Down	120,2	5
30	30.8.2019	8:05	2938,7	Classic	UP	49,8	8
31	9.9.2019	12:05	2982,6	Classic	Down	25,6	7
32	13.9.2019	12:05	3012,7	Classic	Down	32	3
33	25.9.2019	12:05	2963,5	Classic	UP	30,5	5
34	3.10.2019	16:05	2904,7	Classic	UP	501,5	579
35	7.10.2019	20:05	2934	Classic	Down	52,9	13
36	15.10.2019	20:05	2994,7	Classic	Down	20,8	17

37	23.10.2019	4:05	2990,5	Hidden	UP	406,3	500
38	29.10.2019	16:00	3034,4	Classic	Down	12	5
39	9.12.2019	16:05	3140,5	Classic	Down	24,8	5
40	13.12.2019	0:00	3180,6	Classic	Down	25.3	1
41	27.12.2019	0:00	3240,4	Classic	Down	28,2	12

Source: Own processing

Based on the research, we can state that during the specified time interval, we identified 23 entry signals on the basis of SMA on the selected market and 41 signals on the basis of RSI. During the period under review, we identified a strong and clear Up trend in this market. As there was a strong and clear trend in the market, we expected that the trend indicator would give better results, but it generated 18 input signals less than the RSI oscillator during the year. Of the inputs generated on the basis of SMA, 10 (which are 43.5% of the total number of signals) were sales signals. These signals are anti-trend in the long term. The question of the number of profit signals cannot be commented on in the case of a moving average. The reason is that in the case of crossing the price of the asset and the indicator line, there has always been a certain, albeit minimal, movement in the direction of the signal. In such a case, it depends on the setting of the trader's trading system, which then determines which trades would be profitable and which would be loss-making. However, the average point gain of the signal indicated based on the SMA is 84.74 points. The RSI indicator generated 41 valid signals for us, which is more than 78% more than the SMA indicator, despite the fact that a strong up trend was indicated on the market. Of these, 35% of the identified signals predicted a change of trend from UP to down trend and the other 65% of signals identified an inflection point after which the trend should have reversed towards UP. The average point gain per signal indicating a change in the UP direction was 313.91 points and the average gain per signal indicating a downward change was 30.9 points. This fact agrees with the fact that a strong up trend was indicated on the market during the year. Based on the above, we can conclude that signals generated based on RSI divergences have a potentially higher success rate, despite the fact that it is an oscillator, which according to its basic characteristics should show better results in the trendless market and show more false signals in case of trend. The reason for the greater efficiency of this oscillator than SMA may be the fact that the oscillator predicts the inflection point of the market and can indicate the reversal of the trend at the moment of its emergence, unlike SMA, which is significantly delayed and does not change the trend until some time after. We can state that despite the basic characteristics that result from the very nature of the indicator design, oscillators can show better results than trend indicators in a market with a strong long-term trend.

Conclusion

The aim of our article was to theoretically identify the basic characteristics of these two groups of indicators, their advantages and disadvantages and then verify them on the basis of real market data. In the first chapter, we elaborated on the theoretical basis needed for further research. We have presented in detail the mathematical procedures for calculating individual indicators. In the following chapter, we theoretically identified and defined the basic characteristics of two groups of indicators. In the last part, we determined the basic variables of the application of selected indicators, we defined the market, time interval and input variables. They then presented the measured data and interpreted our findings. We consider the goal of the paper to be fulfilled and we hope that our article will be a valuable contribution to research in this area.

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Innovative Approaches of Regional Policy of Rural Tourism Development

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Abstract

The present work intends to study Rural Tourism. More specifically: regional policy of Rural Tourism development. Purpose of this research is creation of innovative qualitative model of regional policy of Rural Tourism development. The results showed that the highest rural houses availability is in Western geographical region. Other regions have low level of rural houses availability. However, analysis of resources needed for successful Rural Tourism development showed, that all geographical regions are attractive for organizing Rural Tourism activity. Based on this information an innovative qualitative model of Rural Tourism development was created.

Keywords: Rural tourism, Innovative approaches, Innovative model.

Introduction

Nowadays, market of tourism services is one of the most intensive growing sectors of global economy. The rapid pace of branch development leads to search of new approaches of tourism services providing. As a result -new subtypes of tourism developing. One of the most specific and most rapidly grooving subtypes of tourism is Rural Tourism.

At the very beginning of development Rural Tourism was called to find out from economic depression and for revitalization of rural areas. Today Rural Tourism is a popular kind of tourism, which has in purpose rest from crowded urban areas, rural areas cognition, renovation and preservation of culture. That is why correct approach of its development can solve not only economic, but cultural and social problems as well.
In this regard, creation of innovative qualitative model of regional policy of Rural Tourism development for Ukraine become an aim of scientific research.

In question of creation of innovative qualitative model of development firstly is important to learn experience of creation of regional policy of Rural Tourism development in countries, where Rural Tourism has long development history and is an essential part of tourism industry. Moreover, it is important to study experience of countries, where Rural Tourism developed during short time, however has rapid growth dynamics. In total this data gives an opportunity to create a vision of Rural Tourism development opportunities in Ukraine and reach a purpose of research.

In section of research methodology was described the methodology of research. Analysis decided to make in three stages. On first stage was formed purpose, subject, object and methods of analysis. Second stage had in purpose collecting and analysis of data. Results of analysis of first group called to understand present

development level of Rural Tourism. Meanwhile, goal of second part's analysis was to find most attractive destinations for Rural Tourism development in Ukraine.

During research were used following methods of analysis: methods of statistical analysis, grouping, comparison method and mapping. Last stage of methodology is about creating of innovative qualitative model of regional policy of Rural Tourism development for Ukraine, basing on data, received from theoretical part and on results of analysis. Except theoretical justification of model, suggested structure of Rural Tourism services and designed examples of Rural Tourism networks based on innovative qualitative model of regional policy of Rural Tourism development for Ukraine. At the end conclusions were made about results of research.

Rural Tourism and its significance in development of region

World nowadays develops fast. Especially cities. Concentration of capitals in cities leads to theirs fast development. In the same time rural areas develops much slowly. It has negative aspects and positive as well. Negative aspects displays in absence of new work places in rural areas. As a result – citizens leaves rural areas and go to the cities. On other side, non-urban territory gives an opportunity to save authentic rural life, traditions, culture and nature of area. This is positive thing. At the same time questions appears: "What kind of preferences it gives? How it can be used? How to transform depressive rural territories in attractive for investment areas?" The only answer: "Share it with the world using tourism as a fast growing world economy's branch of services".

Rural areas as human built environment, is a form order of life, which contains the physical elements of spatial as an activity space and non-physical elements in form of values as well as the accumulation of community activities. There are three elements, which form a rural: region/territory, residents and life system (Vitasurya, 2016). Moreover, rural tourism depends on the natural, geographic and ethnological features of each country (Guzman-Parra et al., 2015).

It makes sense to transform unique rural areas with its advantages in unique touristic product, which cares inside itself cultural and historical heritage and going to attract the ones, who want to rest of urban territories. This kind of tourism named "Rural Tourism".

Question of development of Rural Tourism as a sector of Global Tourism attracts more and more attention of governments of different countries. With their active support, people in rural area can develop their own business in Rural Tourism sphere and develop a state market of Rural Tourism. In next turn, scientists, gives their support in branch development by describing processes, analysing market of Rural Tourism services and giving recommendations about future development opportunities. That is why it is important to review some of them.

Rural tourism can make full use of tourism resources in rural areas to adjust and optimize rural industrial structures, extend the agricultural industrial chain, develop rural tourism services, promote non-agricultural employment in rural areas, increase the incomes of farmers, and create a better economic base for the new rural construction, (Zhang, 2012).

Rural tourism, with its year after year increasing, is a significantly important asset for the European economy (Buhalis & Deimezi, 2004). Its evolution represents a key tool in sustainable economic development and an alternative to the traditional offer of sun, sea and sand, encouraging diversification towards new destinations, and redistributing demand to form sustainable rural tourism destinations (Polo Peña, Jamilena & Molina, 2012). Rural tourism has been promoted across several regions in Southern Europe as an alternative to the traditional mass tourism industry. For example, several programs, regulations and plans have been implemented in Spain (Barke, 2004), Portugal (Kastenholz et al., 2012), Lithuania (Barkauskas et al., 2015), Cyprus (Sharpley, 2002), Greece (Kizos & Iosifides, 2007) and others. Aside from pursuing the socioeconomic revitalization in rural areas, the diversification strategy of the industry is justified by tourism, environmental and economic reasons. Aims of this politic are:

-reduce seasonality in the tourist industry;

-look for higher-spending markets which leave a higher share of economic benefits to the local inland population;

-adapt the supply to an increasing demand for destinations with high environmental quality (Hernández et al., 2016).

From an environmental perspective, the promotion of new attractions (natural or cultural inland) also pursued to lessen pressure on the environment in the concentrated coastal areas (Sharpley, 2002).

In opinion of Roberts and Hall (2001), main characteristics of rural areas are: low population density; rural land usage; traditional rural culture. Rural tourists are different, but these characteristics forms the main goal to visit the destination.

During a short period of time, rural tourism managed to become very popular and actively used by the rural citizens. Although rural tourism occupies only a small part of the global tourism market, it is one of the most rapidly developing sectors. Rural tourism can serve as a tool for diversification of the local economy, helping to conquer new markets for local products, as well as an additional source of income for farmers and other agriculture-related people (Barkauskas et al., 2015). Moreover, rural tourism promotes rural development, thus contributing to the overall growth of economy of whole country (Irshad, 2010). Thus, it has influence on many areas. Rural Tourism benefits presented on Figure 1.

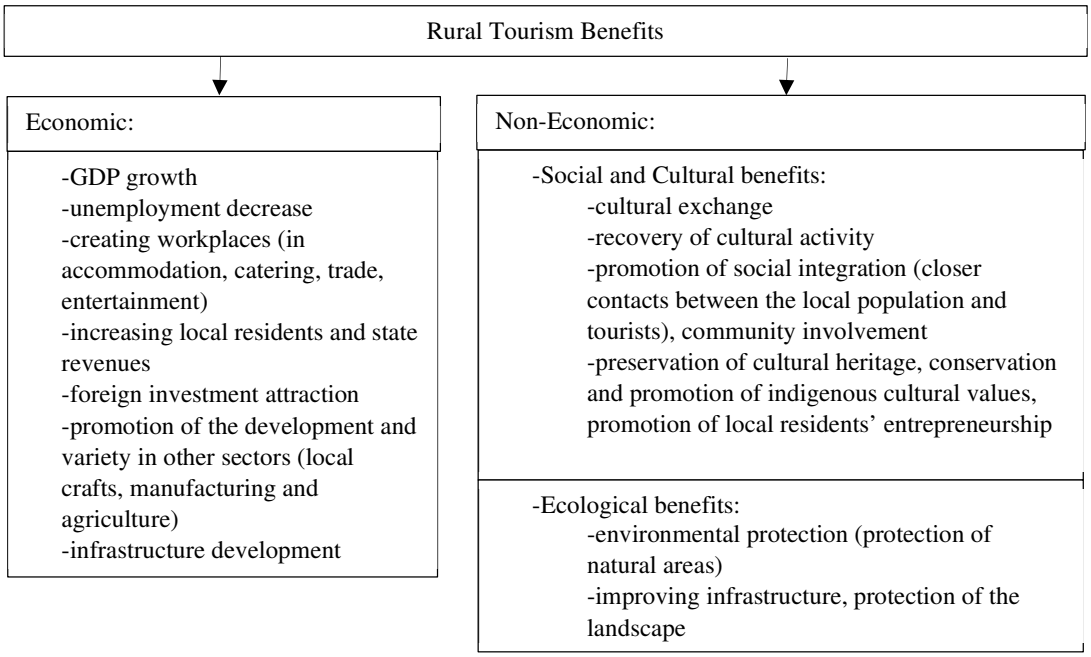

Figure 1. Rural Tourism benefits.
Source: Author's own elaboration based on Barkauskas et al. (2015, p. 168).

Research Methodology

Ukrainian Rural Tourism has low level of development. Reason hidden in absence of strategic vision on its development. There is no model developed and applied. Purpose of this research is to fill this gap and form an innovative qualitative model of regional policy of Rural Tourism development. Other goal is to create examples of Rural Tourism networks based on usage of developed model.

To answer the main objective of study we used statistical information about areas covered by agricultural lands, lands covered by forests, lands covered by water resources and quantity of cultural and historical resources by regions. Information collected from Statistical Yearbook of Ukraine, Statistical Digest "Regions of Ukraine" and analysed by author. For analysis was used data collection about rural houses availability by regions of Ukraine from Statistical Bulletin "Touristic Activity in Ukraine". This statistical data is important for understanding which regions started to develop Rural Tourism as separated tourism activity.

On first stage of analysis was decided to divide data from 25 administrative regions to 5 geographical regions, namely Western, Eastern, Northern, Southern and Central, with aim of achieving collaboration between administrative regions on way of developing successful Rural Tourism market. Map of geographical regions represented in Figure 2. To make it possible, was used grouping method. Different type of indicators forced to

use different types of analysis. For comparison of data of first group was used Gross Rate. This made it possible to see the changes in the structure of indicators.

For second part of analysis was used the same division on groups and as a result the same way to group data. However, for analysis of availability of resources needed for successful Rural Tourism activity was important to know a share of resource in total area of the region and share of resource in total area of Ukraine. That is why Share of the Total formula was used. List of formulas shown on table below.

Table 1. List of formulas.

Name	Formula	
Arithmetic mean	$A = \frac{1}{n}\sum_{i=1}^{n} a_i$	[1]
Gross Rate	$\frac{Gross\ Profit_{n-1} - Gross\ Profit_n}{Gross\ Profit_n}$	[2]
Share of the Total	$\frac{Part\ of\ Resource}{Total\ Resource} \cdot 100\%$	[3]

Figure 2. Map of geographical regions of Ukraine.

Analysis and Presentation of Results

Analysis of statistical information about rural houses availability

According to literature, accommodation is the most important services, which can be provided to visitors of Rural Tourism. Accommodation service provided in rural houses and from their quantity and capacity depended how many tourist can visit rural areas and gross of branch of Rural Tourism. That is why analysis begins from this case. It is quite important for research to understand how many rural houses, which provides services in Rural Tourism available in Ukraine, capacity of houses, their placement by regions and changes in structure during analysed period.

For analysis used data from period of 2012-2014 years. Statistical Bulletin "Touristic Activity in Ukraine" gives us data from everyone from 25 administrative regions of Ukraine. However, for analysis was decided to

group administrative regions in 5 geographical regions, namely Western, Eastern, Northern, Southern and Central. It is reasonable for aim of forming innovative model of Rural Tourism development and helps to deepen links between administrative regions. 4 indicators going to be analysed, such as number of rural houses, their average capacity, number of persons placed and area of rural houses. These indicators should help to understand situation with availability of rural houses in Ukraine in total and by geographical regions specifically. To see quantitative change in indicators used to analyse rural houses was used Gross Rate. Table 2 and

In 2014 took a place change in total number of rural houses (Table 3). This had reflection in decrease of rate (-0,1825 gross rate). Gross Rate for number of persons placed decreased as well and was (-0,2129). Reason was decreasing of number of rural houses at all geographical regions except Northern, where Gross Rate was 100%. Structure of location of rural houses by geographical regions almost has not changed, that is why big decrease of Gross Rate of number of rural houses at Western geographical region caused significant decrease of rate for indicator in total. As well, significant increase of rate of number of persons placed in Northern geographical region did not make big difference in total result of this indicator's rate. Decrease of Gross Rate in total number of persons placed was more significant as in previous year and was 21,29%.

Table 3 represents results. Results show, that Gross Rate of Number of rural houses is 0,2391, what in percentage means 23,91% gross or that 2013 year have 123,91% of 2012 houses. Average capacity of rural houses increased as well and this gross is 14,54%. Nevertheless, number of persons placed decreased on 1,53%. This changes caused by several reasons. As well as number of rural houses at Southern and Central geographical regions increased (Gross Rate for Southern region equal to 2,3(3) and gross rate for Central region equal to 1,2857), number of persons placed in these geographical regions increased (it shows by gross rate of 2,3901 and 2,4613). However, gross rate of number of persons placed in Western geographical region of (-0,0687) caused decrease in total gross rate for Ukraine of (-0,0152). The reason is, that general part of rural houses and, as a result, number of persons placed situated in Western geographical region, so small decrease of visiting of this region causes significant change gross rate for whole country.

Table 2. Gross Rate 2012/2013

Geographical Region	Number of rural houses, units	Average capacity of rural houses, places	Number of persons placed	Area of rural houses, m^2.	
				Total	Dwelling place
Ukraine	0,239130	0,145455	-0,015298	0,333855	0,442611
Western Region	0,163636	0,354545	-0,068768	0,224931	0,287463
Eastern Region	-	-	-	-	-
Northern Region	-	-	-	-	-
Southern Region	2,333333	0,420968	2,390152	2,258113	2,998354
Central Region	1,285714	1,800000	2,461326	0,372531	0,819869

Source: Author's own elaboration.

In 2014 took a place change in total number of rural houses (Table 3). This had reflection in decrease of rate (-0,1825 gross rate). Gross Rate for number of persons placed decreased as well and was (-0,2129). Reason was decreasing of number of rural houses at all geographical regions except Northern, where Gross Rate was 100%. Structure of location of rural houses by geographical regions almost has not changed, that is why big decrease of Gross Rate of number of rural houses at Western geographical region caused significant decrease of rate for indicator in total. As well, significant increase of rate of number of persons placed in Northern geographical region did not make big difference in total result of this indicator's rate. Decrease of Gross Rate in total number of persons placed was more significant as in previous year and was 21,29%.

Table 3. Gross Rate 2013/2014.

Geographical Region	Number of rural houses	Average capacity of rural houses	Number of persons placed	Area of rural houses	
				Total	Dwelling place
Ukraine	-0,182456	0,071429	-0,212961	0,080123	-0,214455
Western Region	-0,148438	0,041107	-0,217316	0,051093	-0,135617

Eastern Region	-1,000000	-1,000000	-1,000000	-1,000000	-1,000000
Northern Region	1,000000	0,850000	7,108333	33,333333	4,136250
Southern Region	-0,900000	-0,829739	-0,989385	-0,826268	-0,897077
Central Region	-0,250000	-0,069328	0,593775	-0,041948	-0,223405

Source: Author's own elaboration.

Based on results of this part of analysis can be made conclusions, that branch of Rural Tourism in Ukraine nowadays is low developed. General part of rural Houses situated in one geographical region. Smart regional policy of Rural Tourism development and development of innovative qualitative model of Rural Tourism development can change this situation and will help to expand Rural Tourism activity in all regions.

Analysis of resources needed for successful Rural Tourism activity

On first part of work was found, that rural area with its natural landscapes is one of the biggest motivators for tourists to take a part in Rural Tourism. Rural areas considered to be a destination for one's who want to rest away from crowded urban areas in calm and peace environment. Extrapolating these findings on Ukraine forces us to think about resources Ukraine have and can provide for usage of Rural Tourism needs. These resources are agricultural lands, lands covered by forests, lands covered by water and cultural and historical resources.

For analysis was used data collected from Statistical Yearbooks. Was decided to divide data from 25 administrative regions in 5 geographical regions, namely Western, Eastern, Northern, Southern and Central regions. It is possible to do because of similar climate and natural conditions. As well, such collaboration, as factor of success, contributes to economical connections between administrative regions and promote its common economic development. Such development is one of the main goals of regional policy of Rural Tourism development for Ukraine.

Other goal of analysis is to determine more attractive regions for Rural Tourism development by comparing them with each other. Moreover, it is crucial to have basis of analysis with average values for comparison analysis making. The average area of agricultural lands is 72790,8 km^2, what is equal to 60,45%. Quantity of area covered by forests is much lower and equal to 19147,8 km^2 and therefore, 15,814%. Share of lands covered by water is 8,85% and it results to 10 888 sq. km. Regions of Ukraine have 8 159,8 units of cultural and historical resources in average. This data needed for comparing values of regions with average values. Bigger values of resources in regions represents higher attractiveness of geographical region for organizing Rural Tourism activities.

Analysis of areas covered by agricultural lands and areas covered by forests followed by analysis of areas covered by water resources. Ukraine is rich in water resources. Network of rivers in country is highly developed. Biggest Ukrainian river is flowing through three geographical regions, namely Northern, Central and Southern in is important in historical aspect. Some regions have many lakes and swamps, especially Western and Northern. Moreover, two seas forms southern border of Ukrainian territory, but in context of Rural Tourism it is not crucial for development of this kind of tourism activity.

Analysed last, but not with lowest importance, cultural and historical resources closes a part of analysis of resources needed for successful Rural Tourism development. **Error! Reference source not found.**6 shows high availability of cultural and historical resources in Western region and consist 13769 units, what is equal to 33,75% of total quantity of resources in Ukraine. Northern region with its 7084 units of resource has the lowest quantity of resource in compare with other regions.

Summarizing results of analysis the Western and Central geographical regions are the most attractive destinations (leaders in three of four groups of resources analysed) followed by Northern geographical region. Less attractive are Eastern and Southern geographical regions. These results are useful for applying model, which will be formed in next part of research.

Creating an innovative qualitative model of regional policy of Rural Tourism development

Modelling a system of Rural Tourism services

Availability of services in tourism industry forces tourists to stay in place of refreshment for longer time. Providing of services depends on level of infrastructure development and desire of hosts to provide exclusive touristic services. As well it depends on specification of tourism branch. After studying of international approaches of regional policy of Rural Tourism development can be concluded, that Rural Tourism have specific structure of services. Moreover, exists some similarities in services structure in studied countries, but in general they are different and reflects specific of nation's rurality.
With the aim of creating an innovative qualitative model of regional policy of Rural Tourism development, such system of services can be useful as an additional case of specification of model. Such services as accommodation, catering and transportation represented in every studied countries, that is why they considered to be combined in group of 'Main Services'.

Other group of services cannot be specified easily, because it depends on level of infrastructure development and have to reflect national self-determination. It makes development of Rural Tourism easier, in one hand, and harder in other hand. Easier, because service's providers can use available infrastructure to provide self-developed structure of services. Harder, because opportunity to provide some kinds of services depends on availability of resources, such as one's, which considered to be crucial for Rural Tourism development: agricultural lands, lands covered by forests, lands covered by water resources and cultural and historical resources. However, combination of them with aim of usage for providing services of Rural Tourism gives an opportunity to provide a big amount of services and makes destination more attractive for visitors.

Group of 'Main Services' is more important, than group of 'Additional Services', because it forms environment for visitors and help to feel themselves as a part of rural area. To provide 'Main services' hosts need such resource as agricultural land and own rural house. Role of 'Additional Services' is to immerse visitors in the environment and open its beauty. To provide them more resources needed, such as lands covered by forests, lands covered by water resources and cultural and historical resources. Also, for organizing and providing them community support needed.

Structure of Rural Tourism services presented on Figure 3 and it includes groups of 'Main Services' and 'Additional services'. 'Main Services' are divided in accommodation, catering and transportation. 'Additional Services' are divided in subgroups of Refreshment which can be active and passive; Taking a part in cultural and entertainment events; Attracting in rural work (depended on vacation time) with work at houses, harvesting, gardening, stockbreeding and agriculture.

Developed structure is just an example of services, which can be provided by Ukrainian Rural Tourism hosts and it is not a full version. Approximately, it reflects services, which could be provided using resources needed. There is a place for expend by additional services in this scheme and it depends on region and desires of each services provider. As well, from recommended services provider can chose that one's, which in his opinion can meet the needs of most consumers. Their total providing is not relevant. Moreover, consumer always have a choice what services he want to try and this totally depended on his desire.

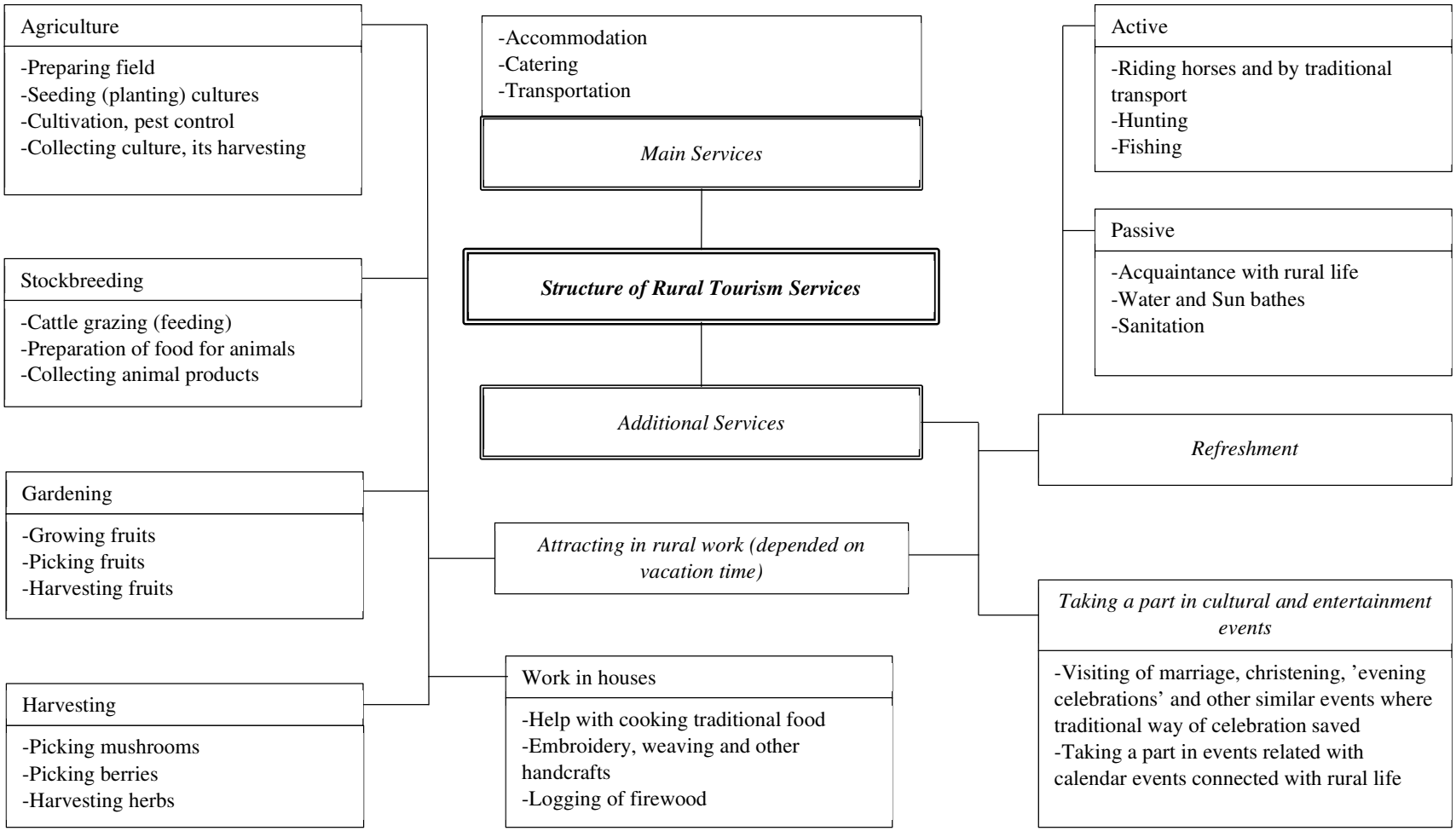

Figure 2. Structure of Rural Tourism services.
Source: Author's own elaboration.

Examples of Ukrainian Rural Tourism networks

Good model is good when it supported by examples. That is why in the end of chapter of analysis described a few networks of Rural Tourism, based on developed model, which is possible to organize.

Some example of Rural Tourism network:

- "Ukrainian village-Home of Poetry". There are many Ukrainian poets, which were born in villages, that is why was decided to organize such network. Main advantage of this network is its coverage of big area of Ukrainian territory. Contrary to the opinion, that this example of network is massive with its combination of 32 destination, it should be noted, that Ukraine is a big country (Biggest in Europe) with total number of 28441 villages. Moreover, for network was used just home villages of most significant Ukrainian poets. This network going to be interesting for ones, who like poetry and interested in beloved poet's biography. It will help to develop not only Rural Tourism network, but also repair or open new Museum-Estates of born in villages' poets;

- "Republic of Kholodnyi Yar". This network, as well as this region, can be interesting for ones, who like history. Originally Republic of Kholodnyi Yar is a name of territory where was organized rebel movement after collapse of Russian empire and one of the centres of struggle for independence of Ukraine. After defeat of the army of UNR, fight of rebels in this area continued. Republic of Kholodnyi Yar become a symbol of the indestructibility of the spirit of Ukrainian nation. Firstly, this network based on cultural and historical resources as resources needed for successful Rural Tourism activity. However, natural resources, namely forest, important as well for this network as a place where main battles took place. Advantages of this network are its small area of occupation; link to important historical events; beautiful natural landscapes; good communication system helps in transportation from one village to another;

- on Figure4 presented an example of organization of network in borders of one administrative region, namely Volyn' region. It is situated in Western geographical region and rich in natural resources such as water resources (general part of lakes situated in region, as well as swamps) and forests, so Rural Tourism network calls to promote Rural Tourism services connected with usage of these resources. As a result for network were used villages, which have both of these resources and beautiful natural landscapes. However, Rural Tourism aims to promote whole region as touristic destination, so it is important to represent in network all interesting places. That is why to network were added important not only for regional history places, but for national history as well, such as Berestechko, Zymne and Selets villages. Promotion of networks should be done on national level and be supported by state, its ministries and department of tourism and, as well, by Association of Promotion of Rural Tourism.

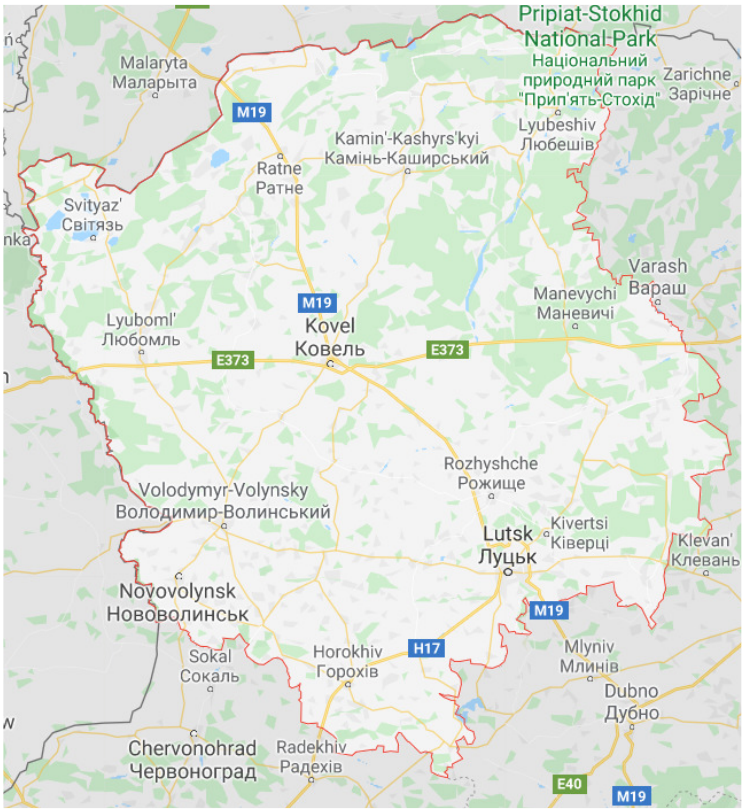

Figure 4. Example of Rural Tourism Network in borders of one administrative region.

Conclusions, Limitations and Future Research Lines

Summarising made research, can be concluded that purpose of study, namely creation of innovative qualitative model of regional policy of Rural Tourism development for Ukraine, was reached. Results of analysis of rural houses availability showed strong displacement in availability of this resource to Western geographical region. Received results confirmed idea of necessity to create an innovative qualitative model of regional policy of Rural Tourism development with purpose of finding approaches, which would help to develop Rural Tourism equally in every geographical region.

Analysis of resources needed for successful rural tourism development showed different availability of resources in different geographical regions. However, analysis did not show any region totally provided with all kind of resources with bigger than average value of indicators. Other words, some geographical regions have higher level of availability of one resource and some regions – of others. It gives an opportunity of development of different sets of Rural Tourism services in different geographical regions and be competitive. Particularly for supporting of this idea was created a structure of Rural Tourism services. On last stage of analysis, according with the results received from analytical part, was developed innovative qualitative model of regional policy of Rural Tourism development.

During research problem of collecting data appeared. Although statistical data about tourism in Ukraine is much specified, there is a lack of statistic data about Rural Tourism, caused by low level of development of this kind of tourism activity. The only data possible to collect was data about rural houses availability by regions of Ukraine. Collection of this data by State agency of statistics started only at 2012 and exists just for three years from 2012 to 2014. Nevertheless,

this data was useful for analysis and gave an opportunity to understand positioning of rural houses in regions of Ukraine.

This research was called to create an innovative qualitative model of regional policy of Rural Tourism and as a result basing on international approaches of regional policy of Rural Tourism development was selected key approaches, which determines the framework of development. Moreover, in addition to qualitative model was developed structure of Rural Tourism services according to national Ukrainian characteristics and exemplified by developed, in accordance to model, Rural Tourism networks. Despite the fact, that made research gives clearly image of qualitative model of development, it is not specified and has many gaps, such as: legislative regulation of the branch and role of state in process of development, level of participation in process and functions of state; ways of promotion of Rural Tourism as national touristic product among citizens and foreigners and used in this purpose instruments etc. This work has big impact on development of regional policy of Rural Tourism development in Ukraine and gives wide field for future research in sphere of regional policy of Rural Tourism development.

Acknowledgment

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Security Challenges in The Context of Technology Development - An Outline of The Problem

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Abstract:

This article covers reflection and constitute a synthetic analysis in the area of security challenges in the context of technology development. The paper presents results of a research which are of a reflective nature due to the changes of selected aspects of security resulting from the industrial revolution known as Industry 4.0. with examples of selected challenges and threats arising from the development of technology. In the research process, was made extensive use of qualitative research methods, including analyses and methods: analysis and logical construction, generalization and implication. In turn, among quantitative research methods, intensively was used statistical analysis. A systematic literature of open access studies and specialist journals papers was the key method applied in the research.

Keywords: Industry 4.0, technological threats, artificial intelligence, big data, technological challenges.

Method

A systematic review and analysis of literature and analysis of statistic of IT and ICT threats was the key method applied in the research. There are mainly institutions research results referenced to the specificity of the research problem of this article. The paper contains a broad review of scientific literature relating to the following thesis: development range of industry 4.0. determines the emergence of new types of threats. Conducted research allowed to examine the outline of the scope of the impact of development of Industry 4.0, identify selected types of threats and challenges related to the use of this industry.

Introduction - new technological revolution

The beginning of the 2020s abounds in evidence of the beginning of another industrial revolution. After technological revolutions related to the development of technology based on steam,

electric current, and then computer technology, the factor determining the competitive advantage is the efficiency and speed of information flow. This observation prompts the authors of the paper to try to take a broad look at the challenges and threats that arise from the development of technology in the context of security and defense of countries at a global level. Sources of a compatible, new revolution called "Revolution 4.0" - "Industry 4.0" are increasingly effective ways of using the possibilities of the Internet and computing centers, co-creating the so-called clouds (Kodym, O. Kubac L.et al. 2020). Until now, for the first 40 years of the Internet's existence, its functionality was rather limited to connected personal computers, servers or other large systems connected to the telecommunications infrastructure and connections for data exchange between them, the so-called communication protocols.

This gave the opportunity to develop an idea in which soon any utility object in the manufacturing process will be equipped with appropriate micro-chips having the functionality of a wireless network adapter connecting to the Internet. It is strived for such devices to make connections autonomously and, if necessary, to communicate with other "machines-to-machine (M2M)". This concept is called "Internet of Things" (IoT) (Miller, M. 2016). At this point, it should be emphasized that IoT alone is not enough to trigger another revolutionary technological leap. Currently, intensive work is underway on the development of new tools. Budgets for the development of tools for processing large amounts of data (BDA), which are already achieving their first successes, are growing significantly. An example here is the controversy related to the use of BDA to influence voter preferences in the United States in the last presidential election in 2016 (election staffs used the services of a specialized company Cambridge Analytica, which based in its studies on data from about 87 million Facebook user accounts'). It is also worth adding that a particularly important part in the BDA are issues related to the so-called artificial intelligence (AI) (Walsh, T. 2018). To a large simplification, it consists in extending the existing possibilities of electronics and the software that controls it with selected cognitive functions, i.e. those that are (or were) so far only available to living organisms, e.g. related to learning. Contemporary types of self-learning AI are based, among others for analysis and synthesis of natural languages (e.g. speech synthesizers and translators, including some functions currently being developed so-called virtual assistants); logical reasoning (inference based on knowledge and reasoning algorithms, and thus the processing of information from the database); neural networks and broadly understood machine learning involving independent decision making based on a knowledge base and algorithms. There are more and more companies earning from BDA processing, and the estimated total value of the global AI market is expected to exceed USD 10 billion in 2020 (Markets and Markets, 2018).

According to Forrester Research, the vast majority of business leaders in the European region agree that the Internet of Things (IoT) will revolutionize business. The trend report estimates that 50 billion devices will be connected to the Internet by the end of 2020, compared to 15 billion today. The third key element affecting the dynamics and scope of the impact of the 4.0 revolution is progress in miniaturization and automation. The flagship example of progress in this area is the

MEMS (Micro-electromechanical Systems) technology, which boils down to the integration of mechanics, sensors, actuators and generally electronics in one sub-millimeter system. The rapid development of technology therefore already applies to all components of the Revolution 4.0, ranging from miniaturization and Internet infrastructure, to the most advanced methods of data processing. They are gaining an increasing share of the global market for goods and services, giving countries that have decided to take part in this race to raise their position in the global economic system (Angelopoulos, A. Michailidis E.T. et al. 2020).

Threats

Each new solution brings new challenges and threats. The ecosystem in which objects equipped with sensors communicate with computers is also subject to such laws. The scale of application of IoT solutions (from miniature clothing accessories, through intelligent home appliances, building automation and intelligent cities to defense systems) - allows you to visualize the scale of challenges at the same time and the risks associated with them. In general, digital threats will be the dominant threats to IoT. Although the nature of digital threats may not be noticeable in the entry phase - its effects can have a measurable and very real nature in the initial phase (from financial losses to destabilization or shutdown of specific systems, e.g. energy distribution). Threats will therefore be any destructive (intentional and unintentional) actions in the form of undesirable: disclosure, distortion, modification, damage, destruction or preventing the processing of information functioning in a given system / information flow that may result in loss. The main threats to data processed in ICT systems will be: threats to the security of data processing devices and systems, threats to electronic data, and threats to data transmission in ICT networks (devices and media, etc.) (Yu,W.J. Dillon T. et al. 2020).

In turn, the threats to the systems:

- disruption of systems / disruption of data flows,
- disabling: sending, processing / storing information,
- system damage,
- taking control of systems,
- destruction of systems.

However, threats to digitized data:

- disturbance,
- interception,
- theft - manipulation,
- damage, deformation,
- destruction.

The consequences of the above threats may be e.g. loss of control over devices, their destruction or use for destructive purposes, the use of data / information to demand cyber-purchase or to take total control. According to a study conducted in 2016, as many as 42% of entities were attacked within 12 months, of which 32% paid cyber-coup, but 1/5 of them did not recover data, while 67% of infected

entities lost some or all of their data - and ¼ spent several weeks restoring access to blocked resources (Security Bulletin, 2016). It is worth noting that the scope of use of devices connected to smart-systems - apart from the undoubted benefits and improvements that increase daily efficiency, also bring measurable threats in the context of privacy. The so-called: *Information sensitivity* is a measure of the importance attached to information / given by the decision maker or owner / holder - to indicate the need to protect it. Increasingly frequent events (incidents) related to the transfer and use of users' data without their consent and knowledge, whether the unlawful processing of these data have become the regulatory basis of Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 *on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46 / EC* (General Data Protection Regulation). The issue of control and its lack of data applies not only to services processed in the cloud, but to all types of services and applications - in particular those installed in mobile devices, e.g. mobile phones. Currently, the manufacturer is free to consider and evaluate information as "important" or "critical" that the device must send, and the user has absolutely no control over his device in this regard. It is also not able to determine at what moment and which data is transmitted by the device owned and used by it. This problem applies to any utility tool equipped with an operating system and applications / utilities that have technical networking capabilities. The problem of privacy and data processing is also associated with the awareness and operation of the users themselves - both by the fact of sharing information about themselves, including in social media, as well as consenting to data processing and profiling for received profits (e.g. discounts on purchases or additional discounts). Statistics on the loss of identity or access to accounts (electronic banking, social media, etc.) illustrate the scale of challenges and potential threats also for individual users. An example would be related controversy with Samsung Smart TVs, which according to reports include British The Telegraph were to have implemented code fragments, allowing the capture of audio-video stream from built-in cameras and microphones, also when the TV is in sleep mode (Singh, M. 2015). Statistics of companies specializing in IT systems security programs indicate that criminals are increasingly using social engineering methods instead of complex algorithms and scripts, using the users' ignorance (in terms of digital security and based on human behavior, e.g. rush). In the EY20 report: in the area of vulnerability and threats, the most serious were: carelessness or lack of awareness employees (55%), malware (52%), phishing (51%). Examples of employee / user activities and behavior include:

a.) opening a dangerous link or file received in an e-mail - resulting in the encryption of data on the computer / network / or preventing the use of from the system;

b.) transfer to a fake bank account sent in a crafted message by people impersonating an existing contractor;

c.) providing sensitive information about the company in publicly available places (e.g. social networking site).

The most common social engineering methods include:

a.) providing dangerous content of the attachment under the pretext of relevant information (e.g. courier service, alleged call to cease unfair competition, call or request for payment of invoice). The effect of this action is most often blocking access to the resources of the device on which the malware was installed along with a ransom payment request (so-called cyber- extortion) for unblocking the access (often payment does not restore functionality);

b.) false impersonation of an enterprise or institution, and then sending in a crafted message information about the alleged change of the existing business account, to which payments should be made (use of the entity's real data);

c.) swindling money for allegedly blocking a user's account and requesting payment of a certain amount for unblocking access.

It is worth noting that the more frequent attacks are the so-called spear-phishing attacks (personalized attacks aimed at a specific person, e.g. an employee of the company, preceded by careful network intelligence). In 2017, as much as 48.2% of phishing emails were opened by the user-target (recipient of the message), 31.5% clicked on the malicious attachment or link to the infected site, and 7.9% provided information, making the attack successful. According to the SANS Institute, 95% of all attacks on enterprise networks are the result of successful spear phishing.

Examples of social engineering methods used in the titles of electronic messages:

- Re: official,
- Re: invoice,
- *Re: document scan,*
- *Re: photos,*
- *PD (or Fwd): invoice payment,*
- *demand for payment.*

According to the Webroot Threat Report, nearly 1.5 million new phishing sites are created each month. The number of phishing emails containing a form of ransomware grew to 97.25% since 2016. According to FAU researchers, 78% of people claim to be aware of the risks of unknown links in emails. And yet they click anyway.

Referring to the mainstream considerations, it is worth pointing out that as much as 57% of IoT devices are vulnerable to medium- or high-severity attacks, 41% of attacks exploit device vulnerabilities, as IT-borne attacks scan through network-connected devices in an attempt to exploit known weaknesses. At the end of 2016, the Mirai worm attacked Internet of Things (IoT) devices. Its propagation was based on guessing the default passwords in these devices and - after correct logging and infection - scanning the network for more potential victims. The attack disrupted many large global Internet services: services such as Twitter, Netflix, Spotify, Airbnb, Reddit, Etsy and SoundCloud. The main problem and the reason for the effectiveness of the attacks was the lack of change in the default logins and passwords of devices assigned by manufacturers, but the history of Mirai proves that the Internet of Things can become a threat on a large scale. It is enough to point out the attack on March 13 in Brno, which not only delayed the operation of the hospital, but also the

examination of COVID-19 samples. Director of the hospital Štěrba said: "There are laboratories, hematology, microbiology, biochemistry and more sophisticated laboratories for tumor diagnostics, radiological systems work, but there is no possibility of transferring information from these laboratories to the database system". “We are able to investigate patients, but we are not yet able to store data. Patient care is maintained, and we are working to be able to store data in hours” he added. Leaving without comment the moral issues of this type of attack during the global fight against COVID-19 disease, the attack shows a wider scale of the problem in the future, even in the field of medicine. Potentially more threat in the future may be the use of AI in conflict / war. If a high level of sophistication is achieved in this technology, it would be possible to use systems without any ethical barriers to control people by precisely applying crowd psychology based on individual personality profiles constantly updated via the Internet. If in this type of attack, the algorithms would have access to a huge amount of information from every moment of the life of the attacked people collected through IoT technology and the constantly updated psychological profile, one could speak of perfect mass-scale manipulation. At this point, it is worth recalling that the previously mentioned problems related to the illegal collection of sensitive data by consumer electronics already occur (Fernandez, G.P. and Brito, A. 2019).

Challenges

The development of technology is most often caused by the stimulus for some market needs or its artificial creation. It brings some improvement, improvement of the technical fragment of our reality, while affecting the modification of other aspects of it. In other words, it can be said that the process of technological change causes an avalanche of changes in as many areas of reality as there are numerous aspects of human life and the environment that it affects. Because any such modification introduces a change in the balance of power and capabilities at various levels - it can be seen as both an opportunity and a threat. Since the first chance to become a real beneficiary of such a change is the one who first introduces it in a "thoughtful" way, the desire to take a privileged position provokes competition, manifested in the so-called "Technological race" (Bostrom, N. 2019).

Therefore, security challenges in the context of having technology should be viewed from the perspective of what areas of technology we have currently mastered. The problem therefore concerns not only raw materials or access to factories, but more and more often the availability of highly qualified personnel. This issue is one of the most critical because without specialized human resources with expert knowledge and experience, vulnerability to future threats may turn out to be much higher. In the technical layer, therefore, the challenges will undoubtedly also include: design based on accepted standards and protection of user data, but above all - product protection and safety.

Conclusions

The above examples do not even exhaust the huge range of various threats related to the development of technique and technology. One could, however, be tempted to generalize to the Fourth Industrial Revolution, the beginning of which we are experiencing. Namely, almost every

field today has received powerful tools in the form of supercomputers, the Internet, BDA and other innovative solutions, and the security of countries or organizations increasingly depends on the technological potential. This means that the development possibilities of the potential of states or organizations decide on the position and actual defense capabilities against the challenges of the future. Referring to the modern phenomenon of Big Data, it can be said that not only humans, but also information generates information. Therefore, it can also be assumed that not only humans, but also technology will potentially be able to generate technology, hence "keeping pace" and implementation of modern solutions becomes an exponent of the possibility of ensuring security of functioning and development. Thus, it may turn out that "human intelligence, the driving force of which is creativity and the ability to logically describe the environment, has led us to a stage that can be a dead end of evolution - with all the accompanying consequences" (Pasieka,T. 2018). This statement becomes the main challenge for the security of modern human civilization.

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A Process of Investigating ToRepublic Hacker Forum

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Abstract

The article discusses the analysis of the *ToRepublic* hacker forum as an example of the practical application of graph and network theory and *BigData* tools. The issue of analyzing data on criminals' activities in cyberspace is extremely in good standing. Recently, we can see the "arms race in cyberspace", which requires not only very specialized technical knowledge, but also knowledge in the field of operational research and experience in the construction of IT systems used for advanced analytics.

Keywords: criminal organizations, *DarkNet*, graph and network theory, *Big Data*

Introduction

There is a growing interest in the research on the systems that may be modeled using the theory of graphs and networks (Korzan, 1978). In the surrounding reality, the networks understood as sets of nodes and branches (edges, arcs and loops) representing various relations between such nodes are omnipresent. Some of the examples of the network-modeled systems include, among other things, the Internet, WWW network of pages, transport networks, telecommunications networks, power networks or, at last, social groups, including criminal and terrorist networks. Due to the number of nodes and links in the above-mentioned systems, they are referred to as complex, large scale or broad networks. An apparent increase in the interest of the systems that may be modeled using the theory of graphs and networks results from the growing importance of the actual large-scale networks (Kasprzyk, 2012).

ToRepublic dataset

ToRepublic is a Polish hacker forum, which was launched on June 8, 2013 and remained active almost by the end of 2015. Due to unknown reasons, the *database dump* (also known as SQL *dump* which means data that can be used for either backing up or duplicating a database) of the forum was created on December 19, 2015 and allowed competent authorities to identify key forum users, many of whom were taken into custody and charged in connection with a number of allegations (Ed. Niebezpiecznik.pl, 2015a; Ed. Niebezpiecznik.pl, 2015b; Haertle, 2015). The *Hydra* forum replaced *ToRepublic* in the *Polish DarkNet* for some period of time. The forum was created by the user under the nickname Mbank_konsultant, who first logged in on June 8, 2013, at 09:31:49 PM. The last login was by the user under the nickname ay79 on December 16, 2015 at 10:38:25 PM. The database dump of *ToRepublic* include 35 tables, which are shown in figure no. 1.

The approach outlined in this paper consists in the analysis (exploration, including visualization) of the *ToRepublic* hacker forum, using models and methods related to the theory of graphs and networks, for the purpose of investigating the role of individual forum users in the hacking activities.

Fig 1. Dump of *ToRepublic* database. Source: Own elaboration.

The concept of analysis of *ToRepublic* forum

The concept of analysis of *ToRepublic* is based on using the models of methods related to the theory of graphs and networks for the purpose of quantitative evaluation of the role of individual forum users in the hacking activity. Additionally, the article describes an expert method allowing interactive visualization of the network's topology. Nowadays, such interactive visualization of the network system is considered an important element of its analysis. It is of great practical importance, as the lack of graphic illustration of the results makes it difficult or even impossible to draw the correct conclusions.

The concept of the network visualization, i.e. "the technique of creating graphs, figures, diagrams or animation of the network systems" is currently inherently connected with the collection, storage and processing of often very large data sets, thus, it is entirely consistent with the area of *Big Data* and *Data Science*. The process of visualization of the network data may be divided into the following three fundamental stages:

- import of **abstract data** into the application;
- transformation of abstract data into their **visual equivalents**;

- presentation of the final picture (**interactive visualization** is preferred instead of static pictures).

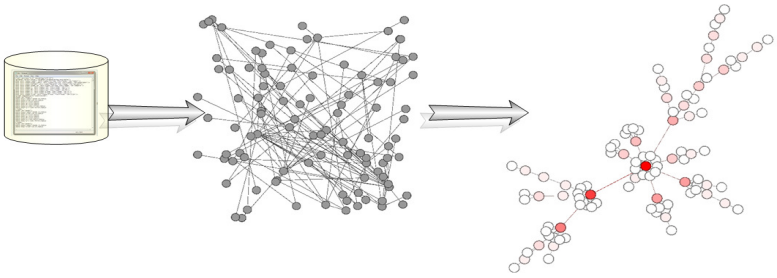

Fig 2. Process of data visualization. *Source: Own elaboration.*

Even though the technologies used for the visualization of information have actually proven indispensable to analyze large sets of data, their application is not common. It is due to the fact that successful applications in the area of the network data visualization are not easy. The purpose of such visualization of information is to increase learning possibilities of an analyst. Therefore, on the basis of abstract data, the analyst may reach interesting conclusions. The visualization of data extends the range of perception by allowing to "control" larger amounts of such data. The above-mentioned analyses make it possible to study the structure of the examined networks in a truly intuitive manner. On the basis thereof, it is easier to identify key nodes, analyze potential means of communication across the network and perform many more activities. The relationships diagrams may be also used to present and analyze large amounts of data concerning, among other things, telephone conversations, transactions on bank accounts or network traffic. In such cases, the diagrams may be implemented to easily identify common elements, groups of closely interrelated elements or indirect links. Apart from explicit learning opportunities, the visualization of complex networks may be also seen as a form of art.

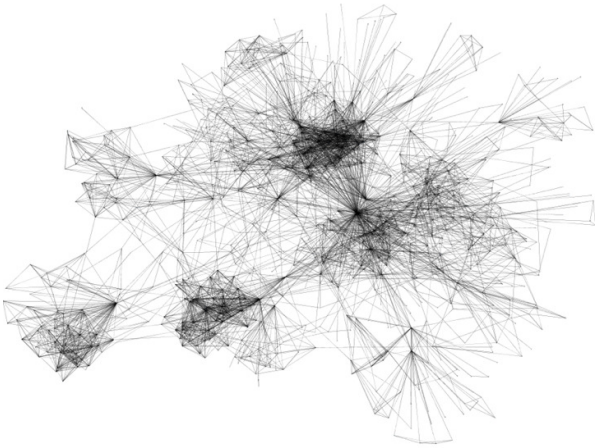

Fig 3. "Art" of network – visualization of a part of a virtual network. *Source: Own elaboration.*

Description of ETL (*Extract*, *Transform* and *Load*)

The ETL process - starting from the dump of *ToRepublic* database, through ***Neo4j*** graph database used for quantitative analysis of network data, and ending with *GraphML* files, i.e. input data for the network visualization - is shown in figure no. 4.

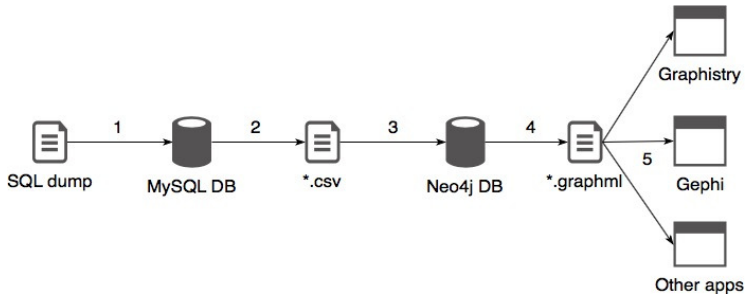

Fig 4. ETL process for *ToRepublic* forum data. *Source: Own elaboration.*

The key *BigData* technology in the described process is *Neo4j* graph database, which is considered one of the most popular and mature solutions among graph databases. *Neo4j* constitutes the database used to implement a transaction model ACID (*Atomicity*, *Consistency*, *Isolation*, *Durability*). The data are stored as nodes and relations between them. The database has its own declarative and intuitive DML (*Data Manipulation Language*) called *Cypher*, which has been developed to process graph data. To analyze substantial sets of network data in the aforesaid process, the *Mazerunner* tool was used, which extends *Neo4j* by allowing queries in the form of tasks executed by *Apache Spark*. The location of *Mazerunner* is shown in figure 5.

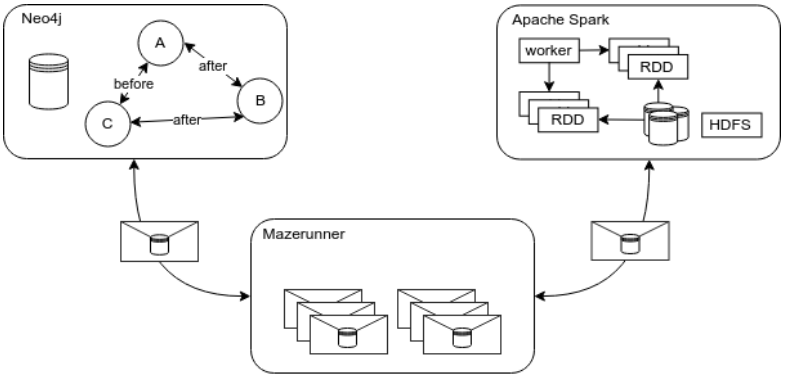

Fig 5. Location of *Mazerunner* in the analysis of substantial network data. *Source: Own elaboration based on (Boyd, 2016).*

In the ETL process, the data of the *ToRepublic* databases are in the following three formats:

- source data – *dump* (copy) of the *ToRepublic* forum database (*forum.sql* file, type of database: MySQL). The forum was running on the *punBB script*;
- intermediate data– *.csv files including processed data from the selected tables (e.g. *posts*, *pun_karma*, *pun_pm_messages*, *topics*, *users_reputation*);
- output data – **.graphml* files with graphs representing structures of the selected networks generated by user activities on the *ToRepublic* forum, including quantitative characteristics of individual nodes.

The ETL process of the *ToRepublic* database consists of the following five basic stages:

1) Import of the *ToRepublic* forum dump to relational database

The file including the forum *dump* constitutes the set of SQL queries, which create the structure of the database and supplement it with relevant data. The "raw" file is difficult to "read" by the analyst. To facilitate quick review of the file, the file was imported to the relational database. The data were accessed using *PhpMyAdmin* and *MySQL Workbench*. On the basis of data from the *ToRepublic* forum *dump*, the "candidates" for nodes and relations between them in the form of arcs for the graph model – representing the network structures created by user activities on the *ToRepublic* forum – have been identified:

- Nodes:
  - *User* (1972 – number of accounts on the *ToRepublic* forum);
  - *Post* (31044 – number of posts on the *ToRepublic* forum);
  - *Topic* (4643 – number of topics on the *ToRepublic* forum).
- Arcs:
  - INVITES (*User->User*);
  - MESSAGED (*User->User*);
  - RATED (*User->User*);
  - POSTED (*User->Post*);
  - GIVES_KARMA (*User->Post*);
  - CREATED (*User->Topic*);
  - POSTED_IN (*Post->Topic*).

2) Export of selected tables to CSV files

After analyzing the data, the selected tables, which constitute the grounds for subsequent generation of the network structures created by the user activities on the *ToRepublic* forum were exported to CSV files. The tables included i.a.: posts and topics, karma (user ratings), direct messages and reputations (set per *Post* by users).

3) Import of CSV files to *Neo4j* database to build graph model

Another step was the import of data to *Neo4j* to build the graph model of the database on the *ToRepublic* forum. The task was executed through a database command line interface (*neo4j-shell*) by subsequently importing CSV files exported in the previous step. For instance, by importing users, the following command was launched:

```
using periodic commit
load csv with headers from "file:///users.csv" as csvLine
create (u:User
        { userId: toInt(csvLine.id),
          username: csvLine.username,
          email: csvLine.email,
          registered: toInt(csvLine.registered),
          invitedBy: csvLine.invitedBy,
          pgpKey: csvLine.pubkey })
match (a:User), (b:User {invitedBy: a.username}) create (a) - [:INVITES] -> (b)
```

First, the CSV file was loaded with headers, and then a *User*-type node including specific attributes was created for each line. Second, the INVITES relation, joining two nodes when a given user invited another user to the forum, and the MESSAGED relation, joining two nodes when a given user wrote to another user on the forum.

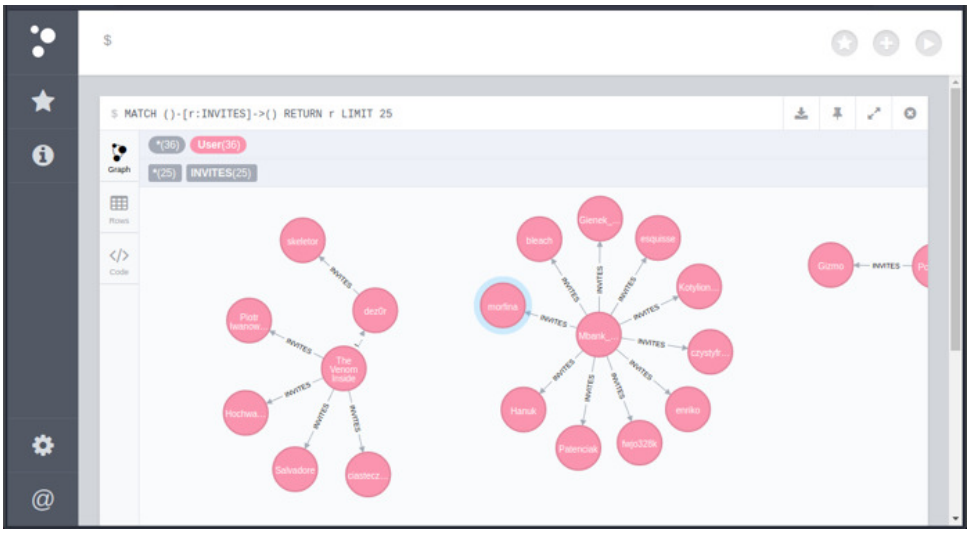

Fig 6. INVITES (*User→User*). *Source: Own elaboration.*

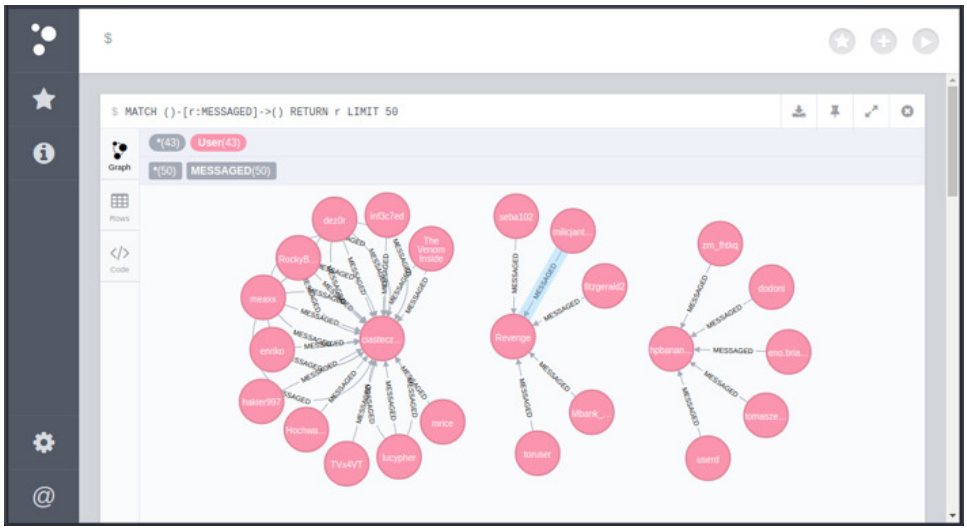

Fig 7. MESSAGED (*User→User*). *Source: Own elaboration.*

The above-mentioned form of data allows to observe certain correlations, such as "sequence of invites", or the users who send each other messages most often. The data loaded to *Neo4j* were subject to quantitative analysis, using the *Cypher* language and *Mazerunner* tool, with the aim to show a possibility of analyzing large sets of network data (*Big Data*). The results of such quantitative analyses were presented in the subsequent part of this paper, in the section entitled: "Selected quantitative analyses and visualization of *ToRepublic* network".

4) Export of data from *Neo4j* to **.graphml* files

For the purpose of further and often easier analysis of network data, the graphs selected from the *Neo4j* database were converted into the *GraphML* format, which is one of the standard formats used for storing

network data. Such files may be downloaded to many analytical tools or easily used in own applications. Due to the implemented version of *Neo4j* (2.3.3), it was necessary to use the database extension called *neo4j-shell-tools*, which allowed to export the results of queries in the *Cypher* language to *GraphML*. Examples of queries:

- export of entire database:

export-graphml -t -r -o full.graphml

- export of users and INVITES relations between them:

export-graphml -t -r -o invites.graphml match ()-[r:INVITES]->() return r

- export of users and MESSAGED relations between them:

export-graphml -t -r -o messages.graphml match ()-[r:MESSAGED]->() return r

5) Exploration of data in third party programs

The processed *GraphML* files formed basis for additional exploration of network data, including their visualization in specialist analytical tools. The *Gephi* platform was used, which is an interactive modular framework for exploration of graphs and networks, available as *open source* (Bastian, Heymann and Jacomy, 2009).

Selected quantitative analysis and visualization of *ToRepublic* network

From the point of view of analysts in the units responsible for cyber security in the police force for the purpose for which the analysis of *ToRepublic* described in this chapter was performed, the most interesting was the visualization of evolution of the following graphs over time. However, it is impossible to present this part in a synthetic manner in the chapter of the standard (paper) monograph.

In the first week of the activity of the forum, 107 accounts were created. The Venom Inside invited dez0r and lucypher. dez0r invited several other users, whereas lucypher invited Pocket, who then invited 22 users. There were also smaller clots around Mala_Mi, OneAnother, krang, dez0r, gonzobonanza, okp, …

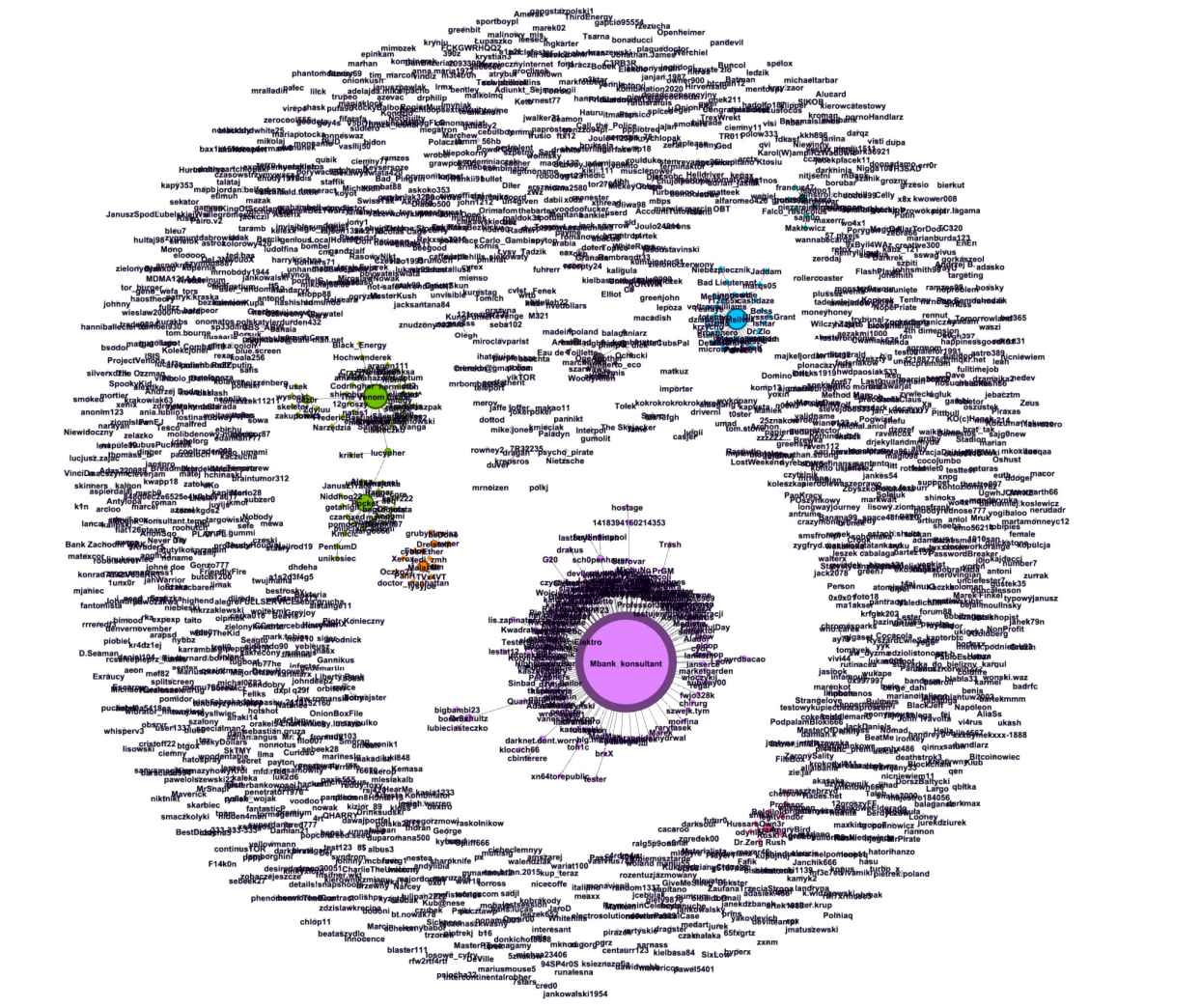

Fig 8. Graph of invitations – INVITES (*User→User*). *Source: Own elaboration.*

Table 1: Users sorted according to the number of invitations sent

No.	User	Number of invitations
1.	Mbank_konsultant	172
2.	The Venom Inside	36
3.	Polsilver	30
4.	Pocket	22
5.	Mala_Mi	11
6.	OneAnother	9
7.	krang	7
8.	dez0r	7
9.	gonzobonanza	5
10.	okp	5
…		

Summary

Big Data significantly changed the approach to the management of companies of any size - both at strategic and operational level. Currently, analytics constitutes the area without which it is difficult to imagine an efficiently operating enterprise. It is something that supports the decision-making process at any level in the organizational hierarchy of the company in a manner not seen before. In case of the decision-making process, it is worth mentioning the potential of *Big Data* in the field of national security and defense. The above-mentioned area is especially interesting for employees at the Institute of Computer and Information Systems, Military University of Technology in Warsaw. Different entities responsible for national security in each of the critical areas thereof, such as, among other things, armed forces, police, fire services, border guards collect substantial amounts of data, whose analysis using the *Big Data* revolution may prove beneficial to the country and its citizens. The *Big Data* technologies are of key importance to create the so-called *Situation Awareness* and *Common Operational Picture* for cyberspace.

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An Overview of Information Warfare Models

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Abstract

The article presents different models to be used while describing the information warfare. The author focused on quantitative models and methods to draw attention to a possibility of applying operations research in the field which has been dominated by the qualitative studies. In the paper, emphasis is put on discussing mathematical models of information warfare (or information operations) seeing that: game theory, hypergame theory, information theory, theory of reflexive control and last but not least theory of disinformation complete with models of information diffusion.

Keywords: information warfare, game theory, hypergame theory, information theory, reflexive control, theory of disinformation, information diffusion

Introduction

The "*wars of the future*" will be mainly carried out in cyberspace, which constitutes a key element of the modern information environment. Additionally, the "traditional" cybernetic operations – *CyberOps* (Joint Publication 3-12, 2018) will be more and more often synchronized with the information operations – *InfoOps* (Joint Publication 3-13, 2014), creating *de facto* one collective operation in cyberspace. The battlefield will be information and data processing systems, thus, not only hard ICT infrastructure (*CyberOps*), but everything that is "connected" thereto, including people – i.e. "*brains performing cognitive processes*" (*InfoOps*). While awareness of technical threats is consistently increasing and being managed, the awareness of the seriousness of threats at the information level is still insufficient. Due to wide availability of the Internet, social media started to play more significant role in the shaping of public opinion on basically every topic and have broad impact on the way the world is perceived by people, social groups or whole societies. Therefore, the paper centers around this burning issue, focusing on formal models suitable for describing this phenomenon.

Models of information warfare

Game theory

One of the methods for describing the phenomenon of information warfare is game theory (Ameljańczyk, 1987; Jormakka and Mölsä, 2005; Von Neumann and Morgenstern, 1944). The traditional game theory is based on a number of assumptions, which make it difficult to use the game-theory model while analyzing the actual scenarios of information operations. Basically, the arbitrary assumption that all conflict participants (players) are reasonable and "play the same game" is accepted. On the other hand, the game models are classified using different criteria, e.g. the number of conflict participants (players), the count

of the set of strategies, competitiveness (zero-sum or non-zero sum), possibility of cooperation, completeness of information, etc. The game theory, despite some assumptions that may be at times really difficult to achieve, provides a lot of interesting and practical concepts and conclusions, e.g. the concept of dominant and dominated strategies, pure and mixed strategies, reasons for constant domination of one of the players, benefits from using mixed strategies in both offensive and defensive.

The assumptions of traditional game theory that are difficult to make are modified for the purposes of modeling the information warfare, for example, by introducing the concept of meta-strategy (Jormakka and Mölsä, 2005), which allows to describe the impact on the perception of game rules (e.g. list of strategies, payments for particular players in different situations) by the opponent and hence the course of the decision-making process by individual players. Therefore, the aforementioned meta-strategies allow to include the process of manipulating the situational awareness of the opponent in the conflict situation model, which may be treated as the modeling of impact of disinformation on the adaptive decision-making model, i.e. OODA-*loop* (*Observe-Orient-Decide-Act-loop*).

Hypergame theory

One of the theories allowing to model the conflict situations with incomplete information, thus, in particular, the information warfare, is the hypergame theory. The theory assumes that the players may see the game rules and course in a different manner (Bennett, 1977; Kopp, 2003; Kovach, Gibson and Lamont, 2015; Mateski, Mazzuchi and Sarkani, 2010). Additionally, their knowledge and opinions may also differ, which has impact on their choices. In other words, the reasonable choice of one player may seem completely unreasonable to the other. Such differences may cause, for example, misunderstanding of the intentions and goals of other players, lack of information about all of the potential moves to be used by other players, lack of knowledge regarding the participation of all conflict participants (players) in the game.

The hypergame theory assumes that the players make reasonable decisions to maximize their payments (benefits), however, not on the basis of the common picture of the conflict situation, but subjective opinions resulting from the aforementioned differences between the players. Therefore, the hypergame theory allows to model the process of manipulating the situational awareness of the opponent in a far more precise manner than meta-strategies, which occur in the models based on the traditional game theory. With the above in mind, it may be stated that the hypergame theory is a very promising approach to the modeling of the impact of disinformation on the adaptive decision-making model, i.e. OODA-*loop* (*Observe-Orient-Decide-Act-loop*). The first two stages of the OODA-*loop* model are related to the creation of the subjective picture of the situation by the player, whereas the other two concern the choice of the strategy, which allows the player to maximize their benefits based on the created picture of the situation. Figure 1 shows basic differences in the modeling of the conflict situation on the basis of the game theory and hypergame theory.

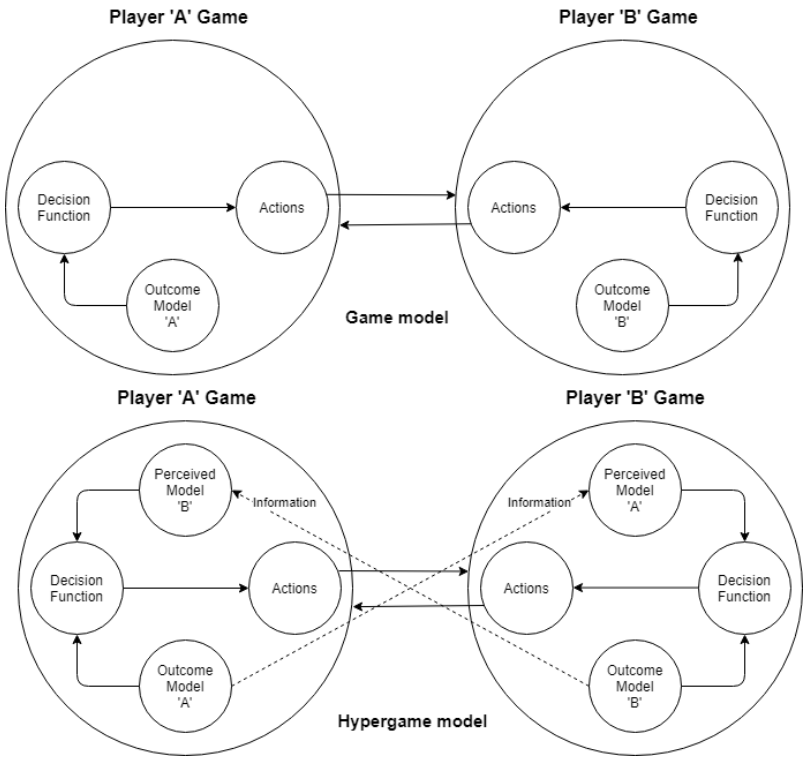

Fig 1. Comparison of theories and hypergame theories. *Source: Own elaboration based on (Kopp, 2003).*

Information theory

Another approach to the modeling of the information warfare is to use the Shannon–Weaver model of communication channel. In the most fundamental context, the information warfare means the manipulation of the communication channel to achieve a certain purpose (Kopp, 2003). Figure 2 shows the aforesaid model.

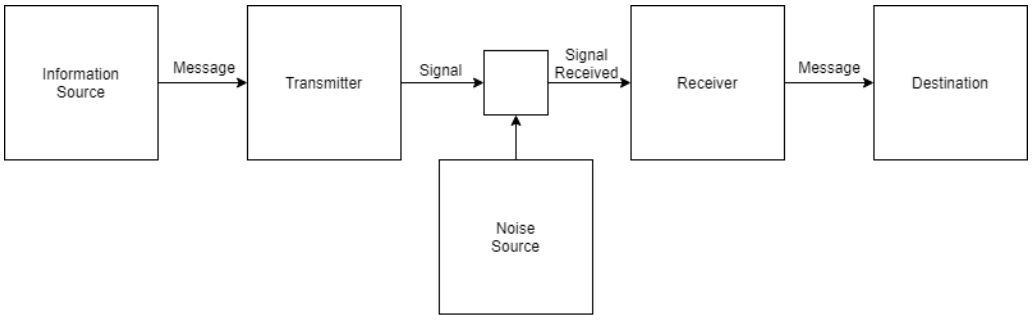

Fig 2. The Shannon–Weaver model of communication channel. *Source: Own elaboration based on (Kopp, 2003).*

Four basic methods of attack on the model of communication channel are distinguished in the described approach to the modeling of the offensive information warfare (Kopp, 2003): 1) adding the additional source of controlled noise to the model by the attacker; 2) adding the additional source of information and transmitter controlled by the attacker to the communication channel, which facilitates the insertion (injection) of disinformation to the channel for the purpose of misleading the recipient; 3) disruption or damage of the receiver; 4) adding the additional source of information and transmitter controlled by the attacker to the communication model, which facilitates the insertion (injection) of disinformation to the channel for the purpose of initiating self-destructive processes at the recipient.

Apart from the four above-mentioned methods of attack, which affect the availability or integrity of information, the attack on the information confidentiality should also be mentioned at this point. The method means that additional receiver controlled by the attacker is introduced to collect information. The modeling of the information warfare, using the information theory, allows to describe the manipulation of the information attributes (availability, integrity, confidentiality) by the opponent in a relatively precise manner. However, the information theory does not give a direct answer to the question how the said manipulation of the information affects the behavior of both parties to the conflict.

Theory of reflexive control

Another way of modeling the information warfare is the theory of reflexive control developed in the USSR by Vladimir Levebvre (Lefebvre, 1965; Lefebvre, Baranov and Lepsky, 2969; Lefebvre, 2001; Lefebvre, 2010) in the 1960s. The concept is similar to the hypergame theory, however, with a much more developed formal apparatus and suggested taxonomy of manipulation techniques allowing the process of having control over the opponent. The starting point of the reflexive control process is to build a specific model for the object to be controlled. The object is usually a person, i.e. the object that thinks (is reflexive), hence, creates subjective images (models) describing the world. The foundations of the construction of such a specific model are connected with the concept of ***reflexion*** understood as the ability to adopt a perspective of an observer of one's own knowledge, beliefs, desires and intentions. The so defined *reflexion* is the ***reflexion of the first kind*** or ***self-reflexion***. The core of *reflexion* is its recursive character. The concept of *reflexion* was generalized by Lefebvre and, in the context of the ***reflexive control***, it is understood as the ability to adopt the perspective of the observer of one's own and another reflective object's knowledge, beliefs, desires and intentions. The so defined *reflexion* is the ***reflexion of the second kind***, which leads to the concept of the ***hierarchy of realities***.

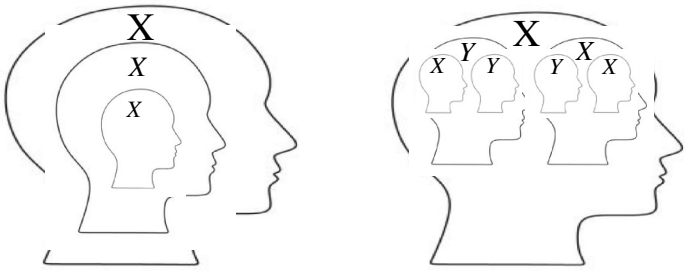

Fig 3. ***Reflexion of the first kind*** **(left);** ***Reflexion of the second kind*** **(right).** *Source: Own elaboration.*

When building the model of the object subject to the reflexive control process, it is of key importance to include the aforesaid concept of *reflexion* of the modeled object. Object X that wants to control object Y constructs the model of the world image (model), which is built by object Y at a specific level of the

hierarchy of realities. On the basis of such a model, object X prepares ***information disorders*** (any kind of information used in the process of manipulation) dedicated to object Y, aimed at encouraging object Y to make the decision as expected by object X and in such a manner so that object Y is convinced that they make this decision independently and that the decision will be the best possible choice for object Y. **The essence of reflexive control is to change the approach from an attempt to predict the decision-making processes of the opponent to influence the decision-making processes of the opponent by using *information disorders*** (Kasprzyk, 2019; Kasprzyk, 2020; Thomas, 2004).

If the process of *reflexive control* is executed secretly and object X properly "read" the subjective world image of object Y, then each portion of *information disorders* (Wardle and Derakhshan, 2017), marked as *id* in Fig. 4, sent from object X to object Y constitutes additional information for object X about object Y. It is also interesting that object Y may reverse the process so that it is possible to abandon the role of the controlled object and assume the role of the object controlling object X, while still confirming object X in its belief that it has control of the *reflexive control* process.

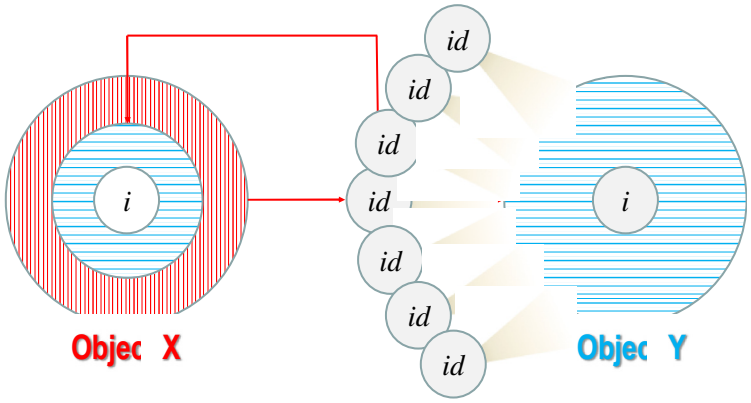

Fig 4. The concept of *reflexive control* process.

Theory of disinformation and models of information diffusion

The information warfare may be carried out by using different communication channels, among other things, through physical contact between people, traditional media or social media. Potential communication channels create a complex information environment, in which every player (aware or unaware of this fact) may be both the recipient and creator of information disorders, thus, play the role of both the controlled and controlling object (in line with the theory of reflexive control). In such case, it is helpful to use the ***theory of disinformation*** developed by Vladimir Volkoff (Volkoff, 1999), according to which different actors play certain roles in the disinformation process:

- *Commissioning Party* (*Client*) – a person or a group of persons that derives benefits from the disinformation process;
- *Agent of Influence* – an entity executing the commissioned disinformation process;
- *Theme* (*Leitmotif*) – the main *idée fixe* being a specific narrative for the purpose of the disinformation process;
- *Supports* (*Props*) – events (true or false) that are "fuel" for the disinformation process;

- *Transmitters* (*Carriers*) – objects (including media) connected with the *Commissioning Party* or the *Agent of Influence* and intentionally propagating *information disorders*;

- *Resonators* – objects (including media) not connected with the *Commissioning Party* or the *Agent of Influence* and unintentionally propagating *information disorders*;

- *Target Group* (*Intended Audience*) – a person or a group of persons being the target of the disinformation process.

In case of *Social Media*, many objects playing different roles participate in the disinformation process. What is also important is the fact that in this information environment, it is very easy to reach people who propagate *information disorders* on the basis of the *Resonators*. It is equally easy to obtain *Transmitters* via ***social bots*** and whole ***social botnets***, which may be constructed in a relatively easy manner, with little technical knowledge, or which may be bought in the form of a service. Due to the *Web3.0* "culture", the so-called *Resonators* are widely available and have actual impact on the disinformation process - due to their number, they may often completely take over the role of *Transmitters*.

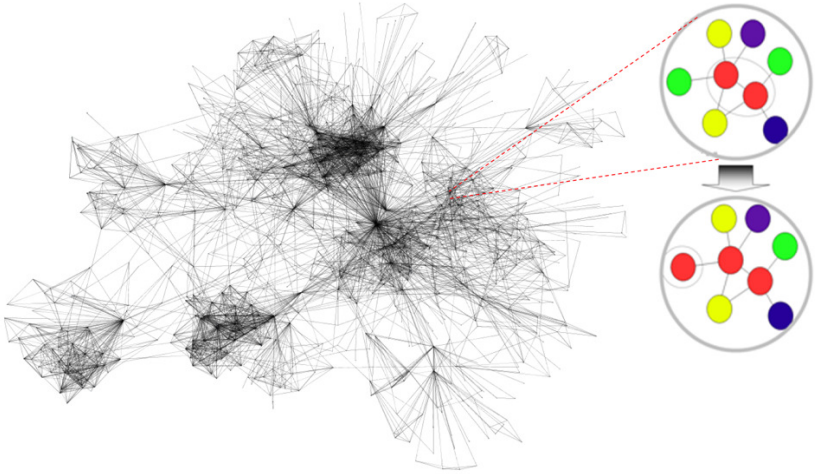

Fig 5. Diffusion of *information disorders* in *Social Media*.

The main issue in case of the modeling of information warfare is to understand the dissemination (diffusion) process of the information disorders (Kasprzyk, 2012; Kasprzyk, 2019; Kasprzyk, 2020) including assessment of the role and significance of particular "nodes" in the network (creating the information environment) and forecast of diffusion dynamics and reach of the information disorders. It is also contemplated issues how two or more opposing views (contrary beliefs) diffuse in the information environment, i.e. the information confrontation concept (Mikhailov and Marevtseva, 2012), including the position adopted by particular persons (Petrov, Maslov and Tsaplin, 2016).

Summary

The reality at the information level is more and more difficult to verify and easier to manipulate because of cyberspace. Due to wide availability of the Internet, social media started to play more significant role in the shaping of public opinion on basically every topic and have broad impact on the way the world is perceived by people, social groups or whole societies. The awareness of risks at the information level is still limited. The character of information wars will be strictly dependent on the development of science

and technologies. This is an interdisciplinary and multi-faceted issue, which further complicates its effective analysis. The studies of this phenomenon are essential to understand, identify related threats and establish methods of prevention.

The theory of reflexive control facilitates the analysis of the decision-making process with respect to both own and the opponent's decisions due to a possibility of manipulating the situation awareness. The theory enjoys quite a rich history and strong position among analysts of national security both in Russia and the United States. Many Western analysts see theory of reflexive control as the Russian alternative to game theory. At this point, it should be noted that the hypergame theory also referred to as metagames or higher-order games, which first appeared in the 1970s, may be perceived as the Western response to the theory of reflexive control. Nowadays, the theory of reflexive control is being developed - to a certain degree - independently by several research groups that propose a different formal apparatus to describe and analyze reflexive control (Novikov and Chkhartishvili, 2014; Shreider, 1999; Taran, 1998). One of the branches may be the aforementioned hypergame theory. At the same time, information operations are also modeling using the traditional game theory.

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Analysis of Possibilities of Business Analytics Systems for Healthcare

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Abstract

Rapid development of information technologies determines the need in usage of various digital solutions in order to conduct operational analysis and processing of large amounts of information. In today's age, the introduction of digital solutions is especially relevant in the healthcare system. The development of conditions for such analysis of information is one of the main tasks of digitalization of the healthcare system. Nowadays, there is no significant experience in conducting digital data analysis in the field of healthcare. Because of that, it is highly beneficial to study the experience of various non-medical organizations in this field, including the ones that effectively use Business Intelligence technologies for such tasks.
Thus, this article explores data storage and analysis tools, as well as the market of existing BI-systems and the specifics of the application of these systems in the healthcare sector are examined.

Keywords: Business Intelligence, Healthcare, Business Analytics, Digital Technologies, Data Analysis

Introduction

Nowadays, the Russian Federation has adopted and is implementing the federal project "Digital Technologies", which is a part of the state program "Digital Economy of the Russian Federation" (until 2024), as well as the state program "Development of Health Care" (until 2020) [1]. These programs determine the development and digital transformation of priority sectors of the economy based on end-to-end digital technologies.

Main goals of the Digital Technology project are following:

- "providing support to the leading high-tech companies on the Russian market, the ones developing products, services and platform solutions based on end-to-end digital technologies aimed at digital transformation of priority sectors of the economy and social sphere, with focus on domestic developments";
- "providing support for projects aimed at scaling technological solutions based on "end-to-end" digital technologies used in priority sectors of the economy and social sphere" [2].

Implementation of a unified state healthcare information system provides a solid basis for the creation of a system intended to collect and sort indicators of regional healthcare systems. However, it is necessary to develop the means of effective support in managerial decision-making in the healthcare sector both at the level of individual medical organizations and at the regional and country-wide levels [3]. Business Intelligence (BI) systems provide said means of effective support in managerial decision-making and present an ideal tool for the health indicators analysis of Russia's federal subjects. One of the main advantages of such systems is the ability to create visual tools for making both strategic and operational decisions at various levels of the medical structures.

This article explores the concept of the term Business Intelligence from the point of view of various authors and research organizations, highlights the key features of Business Intelligence, and also presents the advantages and disadvantages of using Business Intelligence technology. In addition to that, the article discusses data storage and analysis tools and examines the market of existing BI-systems and the specifics of the application of these systems in the healthcare sector.

Materials and Methods

The rapid development of technologies, including the ones used in the healthcare system, determines the need for the usage of various IT-solutions for conducting multi-aspect operational analysis of the available information.

One of the main goals of digitalization of the healthcare system is the development of proper conditions required for such analysis. Active implementation of the National Healthcare Project and the "Creating a Unified Digital Circuit Based on EHISS" Federal Project allows to create a convenient environment for analytics but the current level of experience of medical staff and executive authorities in the healthcare sector highlights the lack of ready-made, well-established IT-solutions and significant experience in conducting digital data analysis [4][5].

Consequently, it is highly beneficial to study the experience in the field of data analysis and the creation of proper conditions for decision-making in organizations of various non-medical areas of activity. Most organizations effectively use Business Intelligence (BI) technologies to solve such problems.

The term Business Intelligence was first used by Hans Peter Lun in 1958 in the article "A Business Intelligence System", published in IBM System Journal. The author divided this term into components and characterized them separately. Lun described Business as a set of various activities undertaken in science, technology, commerce, industry, legislative activity, defense, etc. Various communication systems that provided and supported these types of activities he called "intelligence system". In general, term "intelligence" Lun defined as the ability to establish a relationship between the representations of individual facts in order to better solve the goals and objectives.

Late in the 1980s, Gartner analysts under the leadership of Howard Dresner gave a broader definition of the term – "user-oriented process, which allows access and research of information, its analysis, development of an understanding, which, in turn, leads to improved and informed decision-making". Later in 1996, Dresner added the following to the definition: "Business Intelligence is a tool for analyzing data, creating reports and queries that can help business users to overcome the large quantities of data in order to synthesize meaningful information from it" [6].

There are other interpretations of this term. The Data Warehousin Institute, an organization that studies the analysis and storage of data, gives the following definition: "Business intelligence allows to turn data into knowledge, and then that knowledge is used to formulate business actions ensuring profit." Forrester Research defines Business Intelligence as "a set of methodologies, processes, architectures and technologies for processing primary data into meaningful and useful information used by management teams to better understand business processes and make informed decisions at the strategic, tactical and operational levels" [7].

So, despite slight differences in definitions, a number of common attributes of Business Intelligence can be distinguished. Today BI-solutions are not only used for to conduct analytics and form reports, but also for data collection and quality management.

Based on previous statements, it can be concluded that business analytics, in the broad sense of the word, means:

1. The process of turning data into information and knowledge about the business in order to ensure improved decision-making;
2. Information technologies, methods and tools for data collection and information consolidation;
3. Business knowledge gained from in-depth data analysis.

The presented technology is based on the principles of end-user access to the analysis of structured data. This creates an integration process, allows end users to interprete transactional business information in the most simple, understandable way suitable to be the basis for business analysis and development of an effective strategy for changing the organization. Business Intelligence has a wide range of users, including both ordinary employees, as well as analysts and managers at various levels. In relation to medical organizations, it should be noted that Business Intelligence technologies are of interest both to doctors of various departments, as well as to heads of departments, statisticians and heads of organization [8].

Nowadays, the categories of BI-products are usually divided into: BI-tools and BI-applications. BI-tools, in turn, are classified into the following types:

1. Query and report generators – desktop tools that provide users with access to databases, perform analysis and generate reports;
2. Developed BI-tools (most impotantly, OLAP analytical processing tools);
3. Enterprise BI Sets (EBIS) – a set of BI-tools that were previously presented as separate products;
4. BI-platforms – sets of tools for creating, implementing, supporting and maintaining BI-applications [6].

Given the diversity of various types of BI-solutions used for working with typical tasks, it is easier to talk about the typical blocks of modern BI-systems. The main capabilities of Business Intelligence systems are focused in the following directions: storage, integration, analysis and presentation of data.

Data Storage

To store the data used by BI-systems throuout their work, special storages called data warehouse are organized. The stored information should present a valid, real and comprehensive view of the organization because of that the data is collected from various operating systems. For a more efficient analysis, the data storage structure is formed in a way most suited for creating and processing various requests, while in ordinary databases, optimization of the execution time of transactions is often more important.

It should be noted that if the data size is too large, specific subsets of information can be formed, called data marts, in order to solve narrow, specific tasks.

There are several different approaches to data integration. The so-called data warehouse management tools, ETL tools, are used to form and maintain the data warehouse. The ETL abbreviation itself stands for Extract, Transform, Load, which is a brief description of the function of these tools. Thus, ETL tools are tools that allow to extract, transform and convert data to a specific required format. These tools are used for uploading data to the repository or another database.

Alongside ETL tools, BI-systems include tools that allow to wotk with a programming language used to manage real-life databases in database management systems (DBMS). One of the most common ones is the Microsoft DBMS – SQL Server. The abbreviation "SQL" stands for structured query language, which means that is allows users to directly access the data.

It should be noted that recently the tools for generating and processing requests have become more geared towards unprepared users, rather than on qualified IT specialists [9].

Data analysis and visualization

Modern BI systems cannot be imagined without using OLAP (Online Analytical Processing) technologies for data analysis. This technology involves the acceleration of the processing speed of large data arrays by structuring information according to a multidimensional principle. Storing information in separate database tables often leads to an increase in the complexity of processing multi-table queries. Because of this an OLAP structure of joining tables in the "star pattern" or "snowflake pattern" is currently used in BI systems.

The presented tools allow to quickly generate the required data slices, and then visualize the given information in a numder of different ways such as graphs, charts, reports, all customizable according to various parameters. Using the OLAP structure allows to quickly make changes to the presented data [9].

It should also be noted that a number of the most developed BI-solutions support the data mining technology. This usually means as a group of tools designed to facilitate the search for hidden, unknown and non-trivial patterns. This group of tools includes various modeling and forecasting methods based on neural networks, the decision tree, Bayesian networks, regression and correlation analysis, and various other methods. Data mining technologies are designed to facilitate the analysis of huge amounts of information, as well as to ensure the competence of strategic decision-making by using the analysis of various event scenarios.

Dashboards and scorecards are the most widespread and generally accepted means of displaying data in modern BI-systems. Information panels are visual solutions on which the main parameters are displayed in the form of charts, scales and indicators. These tools allow users to both evaluate and monitor the current values of the parameters, as well as making the comparisons with the various values of the indicator and, as a result, identifying the existing risks and threats.

Scorecards are a visual solution directly related to the analysis of key indicators (KPI – key performance indicator). In this case, we are talking about a comparison with the target indicator values. These cards are the simplest and most convenient form of studying and preventing the risk of not achieving the planned values of indicators [10].

Benefits of using Business Intelligence Technology

The usage of BI-systems makes it possible to solve a very wide range of tasks, including monitoring and analysis of the current values of indicators, as well as determining strategic and operational goals of the organization's development. Among the advantages of using BI-systems there are:

1. creation of a support system for the development of existing business processes and structural changes in the organization;
2. the emergence of opportunities for modeling business cases;
3. creation of conditions for operational analysis and work with non-standard query forms;
4. redirection of human resources from routine analytical activities and filling out reporting documentation to deeper analytical work;
5. the growth in the volume of processed and analyzed information due to the possibility of scaling the system.

Also, the use of BI-solutions provides some additional opportunities in the field of strategic development. They include:

1. evaluation of the effectiveness of various activities;
2. operational and continuous monitoring of the attainability of key goals and objectives;
3. the formation of a method for assessing the effectiveness of the use of available resources;
4. calculation of the effectiveness of financial activities;
5. cost and investment management [6].

According to experts from MiPro Consulting, the use of a BI-system in the organization has a number of significant advantages compared to the use of standard analytical tools integrated into the organization's existing information systems. These benefits include:

1. improving the visibility and increasing the convenience of working with data;
2. the possibility of using several analytical solutions, depending on the nature of the problem and the direction of activity of a particular unit of the organization;
3. the ability to work with various data sources and data types;
4. continuous development and improvement of existing BI-platforms;
5. high level of scalability, performance and efficiency of the analysis of indicators;
6. the emergence of conditions for building and supporting end-to-end procedures throughout the organization;
7. the possibility of creating analytical centers responsible for studying information about the organization's activities;
8. variety and flexibility of analytical tools for solving tasks;
9. the ability to provide users with data and analytical tools in accordance with their access rights.

It is important to note that the use of analytical tools integrated into the other information systems that are not directly intended for analytical activities usually has a number of limitations:

1. the lack of differentiation of user access rights to analytical tools;
2. extremely limited set of analytical tools;
3. the necessity to export and analyze data in other software products, for example, in the Microsoft Office Excel package because of disadvantages of the built-in tools for visualization and analysis of the information;
4. inability to work with external data sources is not available;
5. the limit on the number of users using the analytical extension of the information system, due to the fact that the widespread use of this product can significantly impair the work of the application for other employees of the organization;
6. limitations on the formation of flexible, non-standard queries;
7. the use of large amounts of historical information is limited [11].

Disadvantages of using Business Intelligence Technology

In practice, in the process of forming a BI solution, the first task is to organize a scheme for collecting information and creating a unified database of the organization as the main information space of the institution. The storage of the BI-system should provide for the possibility of the receipt of information from any available, including external sources. In reality, the tasks of implementing an immediate solution fade compared with the tasks of creating a integrated digital space within the organization.

Standard reports are only a small part of the capabilities of BI-systems. These solutions have significant potential for creating a powerful analytical tool that will provide an opportunity to analyze all the activities of the company. And it does not even require the implementation of new independent programs to solve individual problems. However, the presented positive side carries a number of dis-

advantages. BI-systems are tools built on rapidly changing technologies. Significant pace of development and improvement of existing solutions require constant monitoring of existing BI-systems.

Another important risk of the practical use of BI-systems is the performance degradation with insufficient data quality. If the data are not properly processed and cleared, then none of the possible BI-tools will not achieve significant results in the analysis of information. This situation is not always clearly presented to the main stakeholders, and BI-solutions are often associated with inefficient work of the analytical group, and not with problems with the data collection structure. BI-technology itself is not able to comprehensively solve these problems, and neglect of them returns to information anarchy [6].

Result

Market overview of existing BI-systems

According to Gartner, in 2018, the explosive development of the business analytics industry was recorded, which was largely due to the development of machine learning technologies and neural networks. Today, there is every reason to argue that the trend of increasing influence of the new generation BI-platforms continues.

Gartner analysts urge suppliers of all BI-systems to pay attention to the realities of the information space and radically revise their point of view on working with data: BI-systems can no longer rely on standard data mining methods. The rest of the technology world is moving to bring machine learning, NLP and AI to customers, so BI-industry must do the same.

One of the easiest ways to form an idea of market leaders is to present the magic square of market leaders used by the Gartner analytical agency. So, at the beginning of 2018, there are three main leaders on the market: Qlik, Tableu and Microsoft with its Power BI solution [8].

Market overview of BI-systems in healthcare

According to Marketsand Markets, the global healthcare BI market amounted to about $ 2.38 billion in 2013. And in 2019, it is expected to reach $ 4.74 billion (average annual growth of 14.8%). In the medical market, technology is dominated by traditional Business Intelligence, while cloud-based BI and mobile BI represent great potential for growth: on the one hand, hospitals, in the face of limited economic resources, need more accessible, flexible, transformable and scalable forms of business intelligence, and on the other hand, the demand of medical institutions for mobile solutions is growing [12].

The further market growth can go mainly due to the implementation of BI solutions directly in medical organizations. However, it should be noted the importance of using BI systems in executive bodies in the field of healthcare management.

There are a lot of vendors of analytical solutions in the healthcare sector. Among them, the largest include IBM, Information Builders, Microsoft, MicroStrategy, Oracle, Qlik Technologies, SAP, SAS, TIBCO Software, Tableau Software, Computer Sciences Corporation, Dimensional Insight, Jaspersoft, Klipfolio, Perficient, Agilum Healthcare Intelligence, Siemens Healthcare, Tata Consultancy Services, Infosys, Wipro Limited, Hexaware Technologies Limited and others [13].

Let's take a closer look at the solutions that are recognized as market leaders.

1. QlikView from Qlik company

This platform focuses on the needs of the user as the ultimate recipient of data. There is a high flexibility to study and visualize data, as well as the presence of a relationship between the data and the

dip function, which allows obtaining detailed information about each studied parameter. Key product features are:

1. opportunities to create advanced dashboards based on data from a variety of sources;
2. the presence of a tool for automatic recognition of relationships between data, which can significantly simplify the work of the end user in the process of creating reports and dashboards;
3. data storage in the server RAM, which speeds up the process of query execution when working with a large data array;
4. QlikView reports and dashboards have a low entry threshold, which allows even beginners to use these functions. However, the process of creating dashboards itself requires advanced development and SQL skills, as well as the presence of certain practices in the QlikView programming language.

It should be noted that when using QlikView, the main thing is a clear understanding of current goals and objectives, as well as a vision of the final result. This solution allows to demonstrate amazing results with a clear consistent course and its implementation.

2. Tableau

As a BI solution, Tableau's main focus is the presentation of data through visualization. The system makes it easy to create interactive dashboards, with a dip function and transitions to trend indicators. It should be noted the wide possibilities of the visual library, which includes word clouds, bubble and tree diagrams, and other tools. Also there is a function of combining elements, which allows you to reduce and overlap various visual solutions, which is especially important in view of the need to save work space in the monitor space.

The main difference between this solution and competitors is the ability to mix data from different databases and sources, as well as the ability to work with a significant number of different types of data.

It should also be noted that the functionality of the program allows simultaneous use by several users in real time.

It is important to note that Tableau is relatively loyal to beginners who were not previously interested in data visualization issues. There is an intuitive interface, well-described technical guidance and assistance. It is convenient to work with the program both from the side of the user creating the report, and from the end-user studying the result and making strategic decisions.

3. Power BI by Microsoft

A service developed by Microsoft as an extension of the existing functionality of Microsoft Office Excel. The solution is characterized by a relatively simple and intuitive interface, as well as the presence of many functions similar to the apparatus of the latest version of Microsoft Office Excel. In addition, the system is as friendly and compatible with another development of Microsoft – the SQL Server hardware product.

However, it should be noted that there are certain limitations in the examples of data visualization, and the program also notes a relatively small number of tools for cleaning and processing data [13].

The specifics of BI-systems in healthcare

It should be noted that the use of Business Intelligence technologies in healthcare has a number of features.

Medical organizations operate with various layers of data: personal information about patients, test results, radiological and computer images, video recordings of studies, as well as information from management systems and others. For quick and timely decision-making in the presence of such an array of data, careful collection and analysis of information is necessary. Automation of medical analytics requires taking this feature into account [14].

It is also important to remember that medical activity is associated with the concept of medical confidentiality. So, according to Article 13 of the Federal Law of November 21, 2011 No. 323-FL (as amended on May 29, 2019) "On the Basics of Protecting the Health of Citizens in the Russian Federation" [15] information about a citizen's appeal for medical assistance, his state of health and diagnosis, or other information obtained during his medical examination and treatment, constitutes medical confidentiality and it is not allowed to disclose information constituting medical confidentiality, with the exception of cases established by parts 3 and 4 of this article. It should also be noted that there is a significant amount of depersonalized data that is not a medical confidentiality, but has a limited level of access, since its wide dissemination can influence on the security of the Russian Federation [16].

An essential feature of medical organizations is that usually two types of BI are required by healthcare institutions. Firstly, this is analytics aimed at supporting the healing process, and secondly, managerial analytics. These two systems solve different problems, determined during the treatment process at various levels and practically do not intersect. It should also be noted that organizations responsible for studying existing health systems can be is interested in a separate type of management analytics [17].

Conclusion

The quality of decisions made by the management of medical organizations and state bodies of the healthcare system depends on the corresponding information support, which is directly related to BI-systems. Today, BI technology allows to better understand the structure of medical care and increase the speed of informed decisions. BI is not only a business analysis of information, but also work with big data from different sources, their processing, testing, presentation and servicing of requests for this information. It is important to automate the processing of information, because it will reduce the time to perform routine operations and receive relevant quality information.

The article discusses market leaders. It is a QlikView platform that focuses on the needs of the user as the ultimate recipient of data. The platform has high flexibility to study and visualize data, as well as the presence of a relationship between data and a dip function. The Tableau system is characterized by the presentation of data through visualization and the ability to work with a significant number of different types of data. Power BI service is characterized by a relatively simple and intuitive interface, as well as the presence of many features similar to the apparatus of the latest version of Microsoft Office Excel.

The article also considered a number of features in the healthcare system when using Business Intelligence technologies. Thus, medical organizations work with large amounts of data, which require careful collection and analysis of information presented in the form of reports and forecast models. Often, such data is the personal information of patients and is not subject to disclosure. An essential feature of medical organizations is that healthcare institutions require two types of BI - analytics aimed at supporting the treatment process, and managerial analytics. These two systems solve different problems that are determined during the treatment process at different levels and practically do not intersect.

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Features and Benefits of Multi-Agent Technology in Production Planning

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Abstract

Any economic activity is inextricably linked with its information support. One of the key indicators of the efficiency of the economic system is the decision-making and information processing time, which reflects the effectiveness of the company. Characteristics of information systems have a significant effect on management of technologies and business processes of business entities. Production is one of the most complex spheres in terms of the volume of information and the requirements for the speed of decision-making. Any production process is implemented within the framework of resource, time and technical limitations, which imposes its requirements on its planning and management.

This article presents the features of application of multi-agent technologies for performing the tasks of operational production planning and draws a comparison between the basic production planning methodologies. The present study highlights problems faced by companies implementing automated operational production planning and indicates the key advantages of using multi-agent technologies for meeting the tasks of planning and production dispatching.

Keywords: Production, operational planning, multi-agent technologies, APS, MRP2

Introduction

At the end of the 20th century, many mathematically sound models and methods of information processing originated, which have just begun to be applied in various fields, such as finance, manufacturing, the service sector, etc [4]. Recently there has been a significant amount of interest in models that allow building long-term and medium-term economic forecasts, use historical and operational data on the activities of the company for self-training and, as a result, make effective management decisions, as well as solve complex tasks for a limited amount of time.[3]

A multi-agent approach to managing company resources is the main driver for the development of adaptive information systems that can adapt to the rapidly changing external environment as quickly as possible. Multi-agent technologies make it possible to solve problems in such technologically challenging areas as production, logistics [26], e-commerce, etc. Production is one of the most complex spheres in terms of the volume of information and the requirements for the speed of decision-making. Any production process is implemented within the framework of resource, time and technical limitations, which imposes its requirements on its planning and management. The work of planning and operation management departments is faced with such tasks as effective planning of execution of orders for delivery in the shortest possible time using the optimum amount of material within the technological process [5]. Moreover, as a rule, there are several technological processes for manufacturing the same product, and each of them is effective depending on the current capacity of work centers or priorities for a specific order. Large and medium-sized industrial holdings can receive several thousand orders a day and each of them must be completed by the due date. The multi-agent approach allows to search in real-time mode for solutions that are close enough to optimal within the framework of the task of planning production orders.

The conflict of interests of participants and elements of the production planning process, the high complexity of technological processes, the large number of orders and the need for real-time decision making determine the relevance of the multi-agent approach in production planning.

Setting the objective of operational planning and supervision of production

The main objective of operational planning in production is to ensure the output of products in specified quantities, within the specified time, in compliance with the production procedures and with optimal use of workcenters.

To solve this problem, coordinated work of all production sites is necessary, which systems and methods of operational planning and dispatching are called upon to ensure. Different enterprises use operational planning processes based on various methods or groups of methods, such as: volumetric method, calendar method, volumetric-calendar method, volumetric-dynamic method, etc., which directly depends on the needs for a certain type of operational planning: operational-calendar one, intershop, intrashop, etc. The need for a particular type of operational planning is associated with the type of production and the form of the production process. The algorithm for operational production planning can be outlined as follows:

1) Annual plan break down with determining the start-up and release dates by product type. Annual plan division into quarterly or monthly ones. Distribution of scheduled tasks by division.

2) Operational planning with a horizon defined at the first stage. The input is a set of production orders with specified deadlines within the horizon: month, decade, weeks, days, and shifts.

3) The ongoing planning or supervision, which consists in monitoring and control of the production process, is carried out at the intershop and intrashop levels.

Effective operational planning and supervision is necessary to meet the following objectives:

1) Define the annual production program. Distribute efficiently the work between own production facilities and the external ones.

2) Optimize the distribution of operations across workcenters, taking into account sets of criteria for optimization and restrictions in order to use them effectively

3) Timely respond to external and internal events, fast schedule changeover for the purpose of maintaining the progress of the production process

4) Achieve coordinated work of all parts of production

Depending on the type of production, large-scale, medium-scale, small-scale, single-unit, approaches to operational planning may differ significantly. In case of a large-scale production, the production plan development is a linear function that implements, for instance, the 'planning by tact' approach, which relies upon the availability of a complete group of orders by the beginning of the planning and the assumption of their guaranteed sales. However, in the case of medium-scale, small-scale and single-unit production, the orders may be received after the production plan is formed, which forces the responsible departments to revise the schedule upon the arrival of each new order. Each new order can lead to conflicts, uneven equipment loads, and more expenses for the changeovers and transportation. The operational planning system should meet the needs of the operations control department in terms of rescheduling, as well as build a reliable and efficient schedule in terms of allocating operations to workcenters. There are various optimization criteria to distribute operations across the workcenters effectively. For various types of productions, certain optimization criteria may be prioritized. In this paper, we will consider quite common criteria that are used in both medium-scale and small-scale productions:

1) Minimization of the number of changeover operations
2) Minimization of the maximum interoperability stay of the part with the guaranteed level of interoperability stay specified
3) Minimization of the risk to not fulfil the production order

Problem statement

We are given a set of resources:$\{r_1,\dots,r_n\} \in R$ set of products: $\{p_1,\dots,p_n\} \in P$, set of process operations: $\{o_1,\dots,o_n\} \in O$, set of types of operations$\{ot_1,\dots,ot_n\} \in OT$, set of processes: $\{tp_1,\dots,tp_n\} \in TP$ and a set of orders:$\{po,\dots,po_n\} \in PO$. Resources $\{r_1,\dots,r_n\}$provide their capacity for production of the orders from the set PO according to the range of manufactured items (products) from the set P by performing process operations$\{o_1,\dots,o_n\}$. The order production po_i implies that resources of R perform a finite number of operations (>0) of O in a certain sequence determined by the specific process tp_i according to which the product p_i is manufactured. A single resource r_i can only execute one operation o_i at a time $t > 0$, just as a single operation o_i at a time can only be performed by a single resource r_i. Each resource r_i can only perform operations of a certain type from OT, which is determined by the type of equipment. The ratio of transitions from the operation o_i of type ot_i to operation o_j of type ot_j is expressed duration $\square t$ and cost c. Each such ratio forms a new operation $oc_i \in OC$- a set of changeover procedures. It is required to find such a distribution of operations$\{o_1,\dots,o_n\}$ across the resources$\{r_1,\dots,r_n\}$ in order to plan the orders $\{po,\dots,po_n\}$ based on the product range $\{p_1,\dots,p_n\}$ according to the process map $\{tp_1,\dots,tp_n\}$, where:

$$\left\{\begin{array}{l} \sum_{i=1}^{n}(po_i^{due} - po_i^{end}) -> \max, \mathrm{n} \in \mathrm{N} \\ \sum_{i=1}^{n}\sum_{j=1}^{m}(\mathrm{o}_{i,j}^{start} - \mathrm{o}_{i,j-1}^{end}) -> \max, \mathrm{n} \in \mathrm{N}, m \in \mathrm{N} \\ \sum_{i=1}^{n}(oc_i^{dur}) -> \min, \mathrm{n} \in \mathrm{N} \end{array}\right\}$$

$$\text{constrained:} \left\{\begin{array}{l} po_i^{due} - po_i^{end} \geq 0 \\ o_{i,j}^{start} - \mathrm{o}_{i,j-1}^{end} > 0 \\ oc_i^{dur} > 0 \\ o_i^{dur} > 0 \\ \sum_{j=1}^{m} o_j^{start} - \mathrm{o}_{j-1}^{end} \leq mis \end{array}\right\}$$

Where: R – a set of resources, P – a set of products, O – a set of process operations, OT– a set of types of process operations, TP – a set of processes, PO– a set of production orders, OC – a set of changeover operations,

po_i^{due} - date of order i transfer to production, po_i^{end} - actual execution period of the order i, $\mathrm{o}_{i,j}^{start}$ - start time of the operation j of the order i, $\mathrm{o}_{i,j-1}^{end}$ - end time of the operation (j-1) of the order i, oc_i^{dur} - duration of the changeover operation i, o_i^{dur} - duration of the process i, mis - maximum interoperability stay for each of the orders of m.

Optimization criteria:

$\sum_{i=1}^{n}(po_i^{due} - po_i^{end}) -> \max$ - increase of the period between the orders production date and the orders delivery dates.

$\sum_{i=1}^{n}\sum_{j=1}^{m}(o_{i,j}^{start} - o_{i,j-1}^{end}) -> \max$ - increase of the maximum interoperability stay of the part

$\sum_{i=1}^{n}(oc_i^{dur}) -> \min$ - minimization of total time of changeover operations

Restrictions:

$po_i^{due} - po_i^{end} \geq 0$ - production order shall be completed no later than by the deadline po_i^{due} for delivery of the order

$o_{i,j}^{start} - o_{i,j-1}^{end} > 0$ - process operations during the product fabrication as per the production order cannot overlap in time

$oc_i^{dur} > 0$ - time of the changeover operation i is strictly greater than 0

$o_i^{dur} > 0$ - time of the process operation i is strictly greater than 0

$\sum_{j=1}^{m} o_j^{start} - o_{j-1}^{end} \leq mis$ - time of the maximum interoperability stay of one part should not exceed the setting mis - (maximum interoperability stay)

The problem is a multi-criteria type, NP-hard problem of finding a route for the production of the order po_i of the product p_i according to the process tp_iagainst competition for resources with the other orders. Obviously, due to the multi-criteria nature of the problem, there is not only one optimal solution for distributing operations among the workcenters. It is also worth noting that it is almost impossible to solve this problem using the exhaustive method, simplex method, branch and bound method, if one of the convolution methods is used, using the Pareto set, or the global criterion method, for the case when the potency of sets$|R|,|P|,|O|,|TP|,|PO|$ is comparable to the actual parameters of production, that is, is quite large. It is important to emphasize that each order po_i can be manufactured using different production routes. Production route is a route of the part across the workcenters with the time intervals specified for the operations. To determine all possible routes, it is essential to formulate the Cartesian product of sets of possibilities for performing the $o_i$operation. The number of such sets of possibilities depends on the number of process operations that need to be performed to manufacture the product p_i.
Let us assume that tp_i consist of 2 consecutive operations o_i, $o_{i+1}$of different resources of R. Then there are 2 sets: A and B, where A is all options of performing operation i, and B is all options of performing operation (i+1).We get an ordered pair that allows us to define the Cartesian product of sets: $A \times B = \{(a; b) \mid a \in A, b \in B\}$. By filtering out routes that do not match the production processtp_i, we get a final set of routes, each of which can be evaluated separately. Let us assume that duration of all operations for the product p_i is 1 minute and each operation o_i is performed by only one, yet any resource r_i. Let us assume that the parameters of the problem are as follows:$|R| = 4$, $|P|=1$, $|O|$

=4, $|TP|$ =1, $|PO|$ =1, Δt =24*60 = 1440, where Δt is the planning horizon in minutes. Then the total number of routes is described as ~ $\Delta t^{|R|}$ or $1440^4 \approx 4\ 299\ 816\ 960\ 000$ options. It is obvious that some of these routes do not correspond to any of the processes of TP, since they break the time limits of the operations, but the order of the existing number of options remains significant. If we assume that the time to evaluate a single route according to the optimization criteria and restrictions is 1 millisecond, then the total time for the optimum search using the exhaustive method would take about 1194393.6 hours $\approx$ 136 years. It is also worth noting that the RAM in this example is assumed to be unlimited, and the search is carried out without parallel processing, within a single physical flow. Exhaustive search is not the most effective method of finding the optimal solution. However, for instance, in case of the branch and bound method, we would first need to solve a linearized problem using a greedy algorithm to discard the known "bad" options, and then solve a block problem using the exhaustive schemes to correct some variables. At that, each step would require the upper bounds to be calculated, which requires solving a linearized block problem with new initial conditions. The second stage needs be repeated multiple times, which leads to pseudopolynomial complexity. It is also possible to use dynamic programming by means of the so-called breadth-first search (BFS) [18]. However, while it is possible to reduce the search time for a solution using exhaustive search, the order will remain substantial, less and less deviating from the time spent on exhaustive search as the complexity of the problem increases. As per the needs of the management of the production complex, development of the work plan should be carried out in a fairly short time, which cannot be achieved using the above methods without introducing permissible errors and simplifying the problem, which ultimately can adversely affect the schedule.

Furthermore, it shall be noted that in case a new order is received, equipment breaks down, or other events occur that may affect the plan, with the schedule already in place, the operator should provide complete re-adjustments or make re-adjustments manually. This allows two conclusions about the possibility of solving the problem using "standard" methods:

1) The search for an optimal or a set of suboptimal placement solutions can lead to a combinatorial explosion; the search for solution can take such a long time that by the time it is completed, this solution will no longer be reasonable. Furthermore, a lot of computing resources are required to perform the calculation.

2) The obtained schedule is not adaptive in a sense that in order to correct it, it is necessary to solve the problem once more with an account for the new input data.

To solve the first problem, heuristic algorithms based on informed search methods can be used. A heuristic algorithm is a problem-solving algorithm that includes a practical method and which is not guaranteed to be accurate or optimal, but is sufficient to solve the problem. [23]

From a business point of view, management does not always require to determine the optimal plan. More often, a search for a schedule close to the optimal one is required, with the possibility of further optimization. Heuristic algorithms allow us to search for such solutions in a short time, however sacrificing the search for the optimal solution, although theoretically the latter could also be found. Since the operator works with the operational plan and is personally responsible for its correctness, the resulting schedule is anyway passed through its filter, and situations when the developed schedule is automatically used for generating tasks are rarely practically possible.

At its core, these algorithms apply the knowledge of the problem being solved, which allows solving it more “directionally” than using a universal method, such as the method of branch and bound. There are the following types of heuristic algorithms: greedy algorithms, local search, restricted search, random search, A* algorithm, etc.

To solve the second problem related to the non-adaptability of the schedule, we need to look at the original problem statement from a different angle. It may be assumed that there is a developed work schedule. In case of a new order, the operator of the supervision department can manually add this order to the schedule, while resolving all local conflicts between the planned operations. The operator can re-arrange the schedule by making local changes, having sufficient knowledge to do so. In fact, to

get an adaptive schedule, we need to build a system where a new order will be self-included in the existing schedule and resolving conflicts with the other orders, similar to how the supervision department operator does it. To be able to implement such self-sufficient control, each element in the system, including the controller, needs to have sufficient knowledge and restrictions according to which the interaction will be performed. Systems of this kind can be implemented by means of simulation modeling methods (agent-based approach in particular), which allow to describe the actual system with sufficient accuracy. From the perspective of operational planning, a production, a group of workshops, or a specific shop, depending on the objectives set by management, can be the actual system.

Features of production planning by means of multi-agent approach

To this date, most operational planning tasks are solved using approaches that focus on any one optimization criteria, for example: forward in time, back in time, right on time, as cheap as possible of others. These approaches are based on various kinds of methods: exhaustive search, ant colony algorithm, local search method, branch and bound method, and other "greedy" algorithms [2]. These algorithms are quite demanding of technical resources on the basis of which planning is carried out, and also take a significant amount of time when calculating a schedule within a large number of work centers, equipment, technological processes and orders. It is also worth noting that any drawn up plan loses its accuracy in direct proportion to the planning horizon, which requires constant re-calculation of the entire schedule or its parts with manual control of interfacing. The number of possible options for planning a specific order with a large number of work centers, technological processes, equipment and product complexity can reach several million combinations, not to mention the fact that there are many orders and they all compete for resources. The requirements for modern planning systems reside in the fact that a correctly calculated schedule is required at any given time and the business depends on it, since errors in operational planning can lead to delays in order fulfillment, to an incorrectly planned amount of materials for its execution, as well as to a conflict of the whole schedule, which can affect the production process and the image of the company [7]. Commonly the use of standard heuristics for operational planning in large-scale production leads to the fact that the calculation of the annual production plan can take several weeks and any operational interventions in the constructed plan require either full re-planning or manual adjustments, which can negatively affect the overall picture, and sometimes lead to collapse in production.

In turn, multi-agent systems offer a completely new approach to operational planning of production, which is based not on clearly determined algorithms that allow you to find the optimal solution to the problem, but on finding one of the solutions satisfying the conditions which results from the interaction of many intelligent system elements - agents [6]. A graphical representation of the discrete algorithm and multi-agent system can be seen in Fig. 1. In the past ten years, the agent paradigm has received a huge boost in its development, which affected the publication of many scientific works and various projects implementation.

Discrete algorithm	Multi agent system
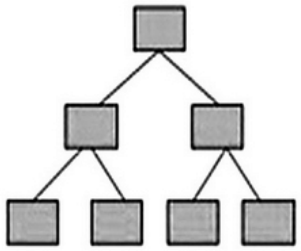	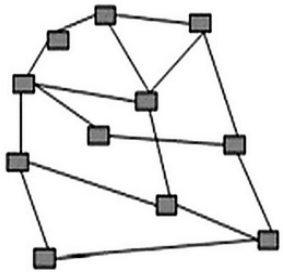

Fig 1. Graphic representation of a discrete algorithm and multi-agent system

Multi-agent system is a set of intelligent agents having such properties as self-sufficiency, reactivity, proactivity, and sociality. Each agent has a goal, its intentions, obligations and restrictions. Each agent has a communication tool, which allows him to aim at solving a specific problem, interacting both with the outside world and with other agents. Within the entire system, there is one or several global tasks that are decomposed into many sub-tasks each of which is solved by an agent [7]. The main form of interaction between agents is cooperation, which consists of a set of messages, a communication protocol and direct agent relationships. The enlarged structure of the agent is shown in Figure 2

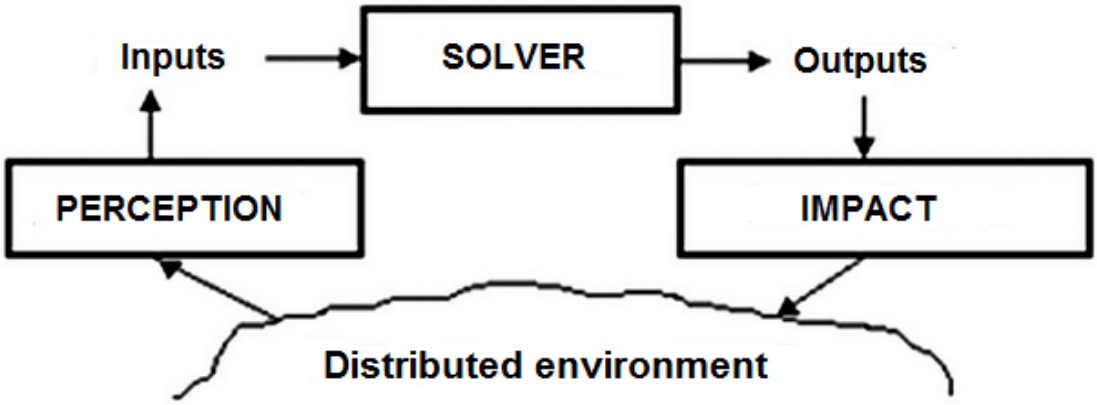

Fig 2. Enlarged Agent Structure

Multi-agent systems can be distributed: different agent communities can be based on its own virtual or physical servers, which allows building a cluster architecture, balancing the capacity and allocating significant and similar subtasks into the framework of one subsystem, thereby reducing the cost of task solution [9]. The agent system identifies each agent with a unique key, which allows disabling selected program units. At the same time, agents can clone each other for an unlimited number of times and therefore form their own resources to solve new problems if necessary, which allows them to adapt to the external environment. Figure 3 shows the enlarged architecture of the core of a multi-agent system.

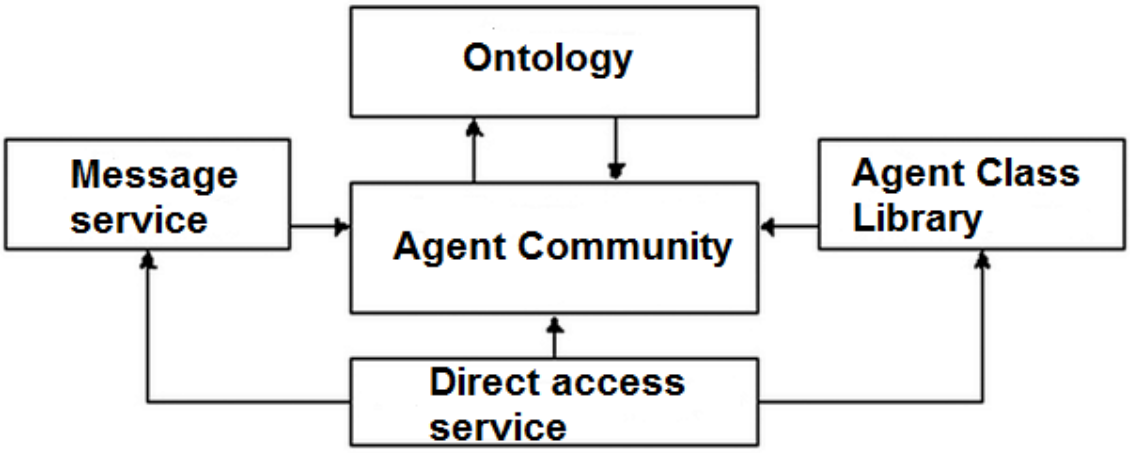

Fig 3. Integrated multi-agent system core architecture

The high adaptability of multi-agent systems allows them to be effectively used in the operational planning of production. Such events as equipment failure, the arrival of a priority order, the delay in the delivery of materials and the cancellation of an order are frequent within the production process.

The agent approach allows you to respond to such events instantly, realigning the plan in real time mode, taking into account the current stage of production, workloads of work centers, equipment work schedules and many other restrictions. This happens due to the fact that each resource and operation within the framework of the technological process receives its own intelligent agents who build private schedules that are included into the global one. Instead of trying to find a solution to the problem using one of the types of "greedy" algorithms, agents interact with each other in order to reach a compromise solution, which, in turn, satisfies general restrictions in terms of delivery dates, material requirements, etc. As a result of agent interaction, the schedule is constantly being rebuilt, adapting to changes in external factors [1].

For the multi-agent approach to work efficiently for operational production planning, it is necessary to have a formalized principle of event notification, integration with PDM systems and instructions for managing such system.

Thus, the differentiating features of multi-agent systems are:

- reactivity: the ability of the system to adaptively perceive the state of the external environment and timely respond to changes;
- activity: the ability of the system to independently generate goals and act rationally to achieve them, and not just passively respond to external events;
- self-learning: the system is able to use its experience in solving emerging problems;
- productivity: instead of combinatorial search, the system uses many intelligent agents who jointly look for solutions close to optimal using a minimum amount of time.

Comparison of MRP2, APS and multi-agent approach in terms of the effectiveness of solving production-planning problems

To this day, most of the production planning modules that make up ERP solutions are based on MRP2 methodologies and APS class systems. Within the framework of the MRP2 methodology, iterative volume-calendar production planning is carried out by processing incoming information about the needs for finished products and planning requirements for semi-finished products and materials, which ultimately forms a work center loading plan. This approach to production planning has several disadvantages, the severity of which increases with the complexity of production processes. First of all, it is worth noting the following problems:

- Production planning without a deep understanding of technological processes;
- Focusing on production and procurement planning without understanding the entire supply chain;
- Significant amounts of time spent on planning process, which does not allow to flexibly respond to external changes;
- Focusing on discrete production without the possibility of planning continuously running production.

Working in a highly competitive market, the company must keep a high level of service maintenance, which affects information systems that provide support in decision-making. Today, the systems based on the MRP2 methodology are being replaced by APS class systems, which take into account the entire supply chain when planning, not just the production itself, and also allow to conduct the detailed planning, taking into account the features of equipment operation, the operation hours of the enterprise and the priority of customer orders.

APS class systems are focused on the integration of planning of all parts of the supply chain, taking into account all factors and production details, which can be achieved by building models that reflect all the capabilities and limitations of work centers. The main distinguishing features of APS systems is the ability to flexibly configure the models on the basis of which planning will be carried out, as well as the flexibility of the planning stage itself. In case of planning within the framework of the MRP2 methodology, a human cannot influence the planning stage. In the case of working with an APS class system, it becomes possible to partially re-plan both a single order and an order portfolio.

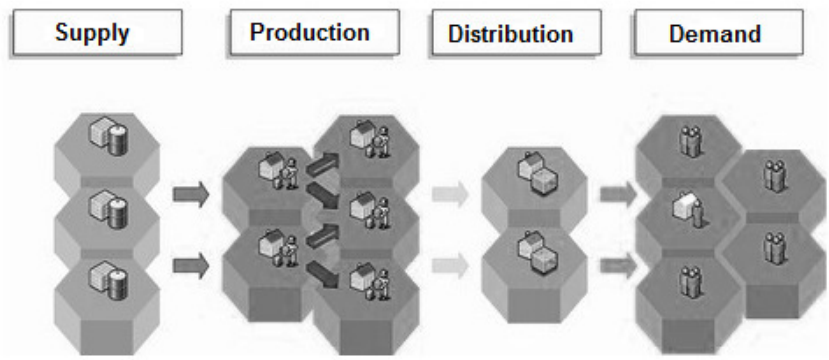

Fig 4. Supply chains of the enterprise with which the APS system works

Preactor, Ortems, Adexa eGPS are the key players in the market of industrial APS systems. Each of the systems integrates with the ERP solution and replaces standard planning tools based on the MRP2 methodology.

Despite the fact that APS class systems are a breakthrough in terms of continuity and speed of production planning, they have several disadvantages:

- The need to reschedule the entire planning schedule when receiving a new order, the terms of which affect the area of high workload of work centers
- Low adaptability and scalability of the system. Planning heuristics have to constantly be revised and refined, which takes up a significant amount of time
- Low planning speed at a large number of parts and assembly units and complex production relationships. It results in appearance of the excessive decomposition in the modeling process, which does not always positively affect the planning results.

In terms of planning with the use of APS, the human factor impact is lower than in the framework of the MRP2 methodology, however, it remains quite high, as it is impossible to define all the possible scenarios of the impact of a single order on the entire plan in the framework of the planning heuristic. It is also worth noting that heuristics rely on solving massive integer linear programming problems, which results from planning from the top approach and can take up a significant amount of time.

The multi-agent approach to production planning, unlike MRP2 and APS, allows you to separate a specific element of the system, whether it is a work center, technological operation, or material, from knowledge of the entire system as a whole. Each element of the system can be represented as an intelligent agent that solves its own local problem within its scope, which ultimately affects the entire schedule. Each agent or group of agents can change over time depending on the new data that the system receives, as well as quickly adapt to changes due to the interaction of agents. In this case planning is carried out in real time mode and each new production order, in the event of a conflict, will itself find out from other already planned orders, whether they can reconsider their priorities, as well as interview agents of work centers of the possibility of allocating resources to them for a certain time at specified deadlines. This approach determines the reactivity of the system and at every moment in time the system is active, agents are negotiating about the possibility of improving their own time and cost characteristics. If the newly prepared plan suits the planning department, it is fixed and becomes basic. Further changes to the basic plan are only possible with the approval of the dispatcher.

Applying the multi-agent approach to form schedules as a part of operational planning and supervision of production

To solve the stated problem with an account for a possible extension or change of the optimization criteria, it is possible to use the architecture of the agent-based environment: agent-metaagent-agent, designed by the authors using the principles of Gaia and MAS-Common KADS methodologies.

Table 1: agent-metaagent-agent model

Component	Objectives	Required set of knowledge
Resource agent	• Maximizing capacity utilization of the resource • Minimizing the number of changeovers • Minimizing the risk of underutilization of the resource capacity	• Algorithm determining the cost of the operation booking and the penalty charged for cancelling the booking for a period of time T, taking into account the current resource load and operation parameters • Data about the resource and its restrictions • Data on the cost of changeover operations • Data on shifts
Order agent	• Minimizing the cost of the order completion • Minimizing the risk of the order non-fulfilment • Minimizing the time dependence of operations in the sequence (achieving a guaranteed level of interoperability stay of the part)	• Algorithm for searching for a route close to the optimal order completion route • Algorithm for determining the cost and penalty for reassignment • Information about the order and its restrictions • Process chart
Scene	• Achieving an equilibrium state in the system	• Data about all agents in the system • Agents interaction protocol • Macro-parameters of environment

The multi-agent problem statement as a part of the presented model is as follows: a set of resources is given:$\{r_1, \ldots, r_n\} \in R$ as well as a set of orders: $\{po, \ldots, po_n\} \in PO$. Resources$\{r_1, \ldots, r_n\}$provide their capacities, which are time intervals $\square t$ within the scope of the model, for producing the orders from the set PO according to the range of the manufactured items (products). An agent ra_i is assigned to each resource r_i , and an agent apo_i is assigned to each order po_i.

The problem involves finding such a placement of process operations in the resources´ time intervals that will maximize or minimize the specified optimization criteria for each of the agents.

In this paper we will consider the order agent in more detail. The agent's lifetime in the system can be divided into 3 stages:

- Emerging of a new order and initial planning
- Optimization of current booking, interaction with other agents and the scene, etc.
- Recording the results of the agent's operations after the work time has started

The agent appears in the system when a new order emerges. The agent interacts with a scene component for the purpose of initial planning of process operations defined according to the process of product manufacture, in order to produce the order taking into account its parameters and restrictions. After the initial planning, the agent goes into the search mode for a more optimal placement of process operations, and is also in a waiting mode for notifications, for example, on the impossibility to carry out a controlled operation or the request of another order agent on the possibility of rebooking with a obtaining a premium. After the order delivery due date, the scene informs the order agent on the successful implementation of the order, records the results of its own activities and is destroyed.

After appearing in the system, the agent has data on process operations that shall be performed to complete the order. The agent receives these data from the process map depending on the item that needs to be produced.The process is a set of stages of the part processing in a certain sequence, which has to be performed. Each stage is a process operation. Each operation can be performed using either only one possible workcenter, or several. This data is the identification type within the scope of which each type of workcenter is associated with many operations it can perform, with a given cost per minute of work. The order agent has access to the current work schedule of each of the resource agents. The set of free time intervals of the workcenter at each of the process stages forms the set of possible options for planning an order or routes. Let us put the case that there are many sets of possibilities in the form of a directed acyclic graph (V^n, C^n), where the vertices are time intervals within which it is possible to perform a given process operation of a certain stage, and the edges are the connections between them. The number of levels of vertices corresponds to the number of operations within the process, and the number of vertices within one level corresponds to the set of possibilities for the implementation of a certain operation.

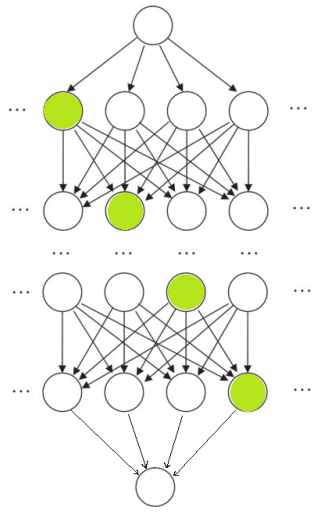

Fig 5. Set of possibilities for the order implementation

Objective function of the order agent:

$$\left\{\begin{array}{l} po_i^{due} - o_{last}^{end} -> \max \\ \sum_{i=1}^{n}(\mathrm{o}_i^{start} - \mathrm{o}_{\mathrm{i-1}}^{end}) -> \max, \mathrm{n} \in \mathrm{N} \\ \sum_{i=1}^{n}(o_i^{\cos t}) -> \min, \mathrm{n} \in \mathrm{N} \end{array}\right\}$$

Subject to the constraints: $$\left\{\begin{array}{l} po_i^{due} - o_{last}^{end} \geq 0 \\ o_i^{start} - \mathrm{o}_{\mathrm{i-1}}^{end} > 0 \\ o_i^{dur} > 0 \\ o_i^{\cos t} \geq 0 \\ \sum_{i=1}^{m} o_i^{start} - \mathrm{o}_{i-1}^{end} \leq mis \end{array}\right\}$$

Where po_i^{due} - is the due date of order i putting into production, o_{last}^{end} - actual date of the last production operation as per the process flow chart, o_i^{start} - start of operation i, $\mathrm{o}_{\mathrm{i-1}}^{end}$ - end of preceding (i-1) operation, $o_i^{\cos t}$ - cost of operation i, o_i^{dur} - duration of operation i, mis - maximum interoperability stay for any order of m.

Optimization criteria:

$po_i^{due} - o_{last}^{end} -> \max$ - increase to the maximum extent the period between the planned orders production date and the orders delivery dates.

$\sum_{i=1}^{n}(\mathrm{o}_i^{start} - \mathrm{o}_{\mathrm{i-1}}^{end}) -> \max$ - increase in the maximum interoperability stay of the part.

$\sum_{i=1}^{n}(o_i^{\cos t}) -> \min$ - minimize the cost of process operations

Restrictions:

$po_i^{due} - o_{last}^{end} \geq 0$ - production order shall be completed no later than by the deadline po_i^{due} for delivery of the order

$o_i^{start} - o_{i-1}^{end} > 0$ - process operations during the product fabrication as per the production order cannot overlap in time

$o_i^{dur} > 0$ - time of the changeover operation i is strictly greater than 0

$o_i^{\cos t} \geq 0$ - the cost of implementing process operation i is greater or equal to 0

$\sum_{i=1}^{m} o_i^{start} - o_{i-1}^{end} \leq mis$ - time of the maximum interoperability stay of one part should not exceed the setting mis - (maximum interoperability stay)

$o_i^{\cos t}$ - is a pre-defined value for the order agent. It appears only when a request to the resource agent is processed.

The principles of its definition are defined within the framework of the resource agent architecture; this is an external information for the order agent.

Life cycle of the agent is represented by the set of possible statuses of the agent at time *t* defined by the following list: $\{\text{new}; \text{opitimizes}, \text{sleep}\}$. Each of the listing items represents the current status of the agent. At the time of occurrence the agent has the status '*new'*. After the initial booking of operations, the agent moves to the status '*optimizes'*. After exceeding the specified number of attempts to optimize the current placement, the agent enters the '*sleep'* status. Each action of the agent is initiated by the scene. As part of the definition of the action, the current status and the actions to be performed within the current iteration are determined. When the agent has the status '*optimizes'*, a search is made for a new agent placement, which correlates to the basic one. The search for a new placement consists in starting the main search algorithm for the route for the order implementation with a shifted primary operation start date in the framework of the process.

The features of the problem being solved are as follows:

1) The graph has a large number of vertices, which makes the search using algorithms based on sequential vertex search difficult.
2) The length of the route of the order implementation is characterized not only by the length (time), but also by the cost, the coefficient of in-process queue, which requires expressing the weight of the edges not through scalar values, but through some vector indicator.
3) The weights of the edges are not determined, which is associated with a large number of calculations necessary to define it.
4) Due to the multi-criteria nature of the problem, there is not only one route

Search algorithm for the order production route is presented in Appendix 1.

An example of solving a scheduling problem using a multi-agent model

Let us define the global production parameters to build a multi-agent model of operational planning of the parts machining workshop:

Table 2: global production parameters

Type of production	Single-unit and serial
Types of machines	General-purpose, special, automated
Principles of design of processes	Concentrated and differentiated
Form of work organization	Single unit and multiproduct
Main types of works performed	Turning, milling, grinding, cutting, planing, etc.
Manufactured parts	Shafts, bearings, gears, cutting tools
Working hours (shifts per day)	2 shifts
Duration of work shift	3 hours

For the purpose of modeling the process of operational planning of production we will define the following set of the processes:

Table 3: Technical processes

Detail A		**Detail B**		**Detail C**	
Operation name	**Operation number**	**Operation name**	**Operation number**	**Operation name**	**Operation number**
Lathe	005	Cutting	005	Detachable	005
Boring	010	Drilling	010	Milling	010
Boring	015	Drilling	015	Milling	015
Milling	020	Core-drilling	020	Lathe	020
Milling	025	Lathe	025	Lathe	025
Drilling	030	Broaching	030	Lathe	030
Drilling	035	Broaching	035	Lathe	035
Sanding	040	Lathe	040	Thread-cutting	040
Sanding	045	Lathe	045	Thread-cutting	045
Sanding	050	Sanding	050	Lathe	050

According to the process, operations are carried out using special equipment:

Table 4: equipment

Process operation	Time of operation (min)	Cost of the operation (RUB)	Machine
Lathe	5	110	Engine lathe 16K20
Boring	3	42	Radial-drilling 2A55, 2m55
Milling	4	56	Milling CM 1325
Drilling	3	42	Radial-drilling 2A55, 2m55
Sanding	3	54	Sanding machine STUDER S33
Core-drilling	7	98	Radial-drilling 2A55, 2m55
Cutting	3	21	Grinding machine SM300
Broaching	5	80	Horizontal-broaching 7B55
Detachable	3	27	Sanding machine STUDER S33
Thread-cutting	4	20	Thread-cutting Rothenberger 50R

If there are several resources of the same type, they are grouped together:

Table 5: equipment groups

Set of operations	Group	Resources, Pcs.
Boring, Drilling, Core-drilling	Radial-drilling machines	2
Lathe	Screw-cutting lathes	2
Milling	Milling machines	2
Broaching	Horizontal broaching machines	2
Thread-cutting	Thread-cutting machine	2

Thus, there are 5 groups of equipment from a perspective of the ability to perform certain process operations. The shift and duration of one shift are determined by the general production parameters, which are identical for all equipment groups: from 09:00 to 12:00 and from 13:00 to 16:00.

Generation and planning of orders

1) Generating the set number of production orders and their scheduling

a. Create five production orders for each type of product. Delivery deadline - 10.01.2000.

A* - orders for the production of item A, B* - orders for the production of item B, C* - orders for the production of item C. Total: 15 orders.

b. Transfer created orders to the component: "Scene", which creates agents for each order

c. Initiate the start of the "Scene" component operation: start of interaction between agents for the purpose of developing the schedule. Expecting the signal when the schedule is ready.

d. Obtain results in a form of Gantt's chart:

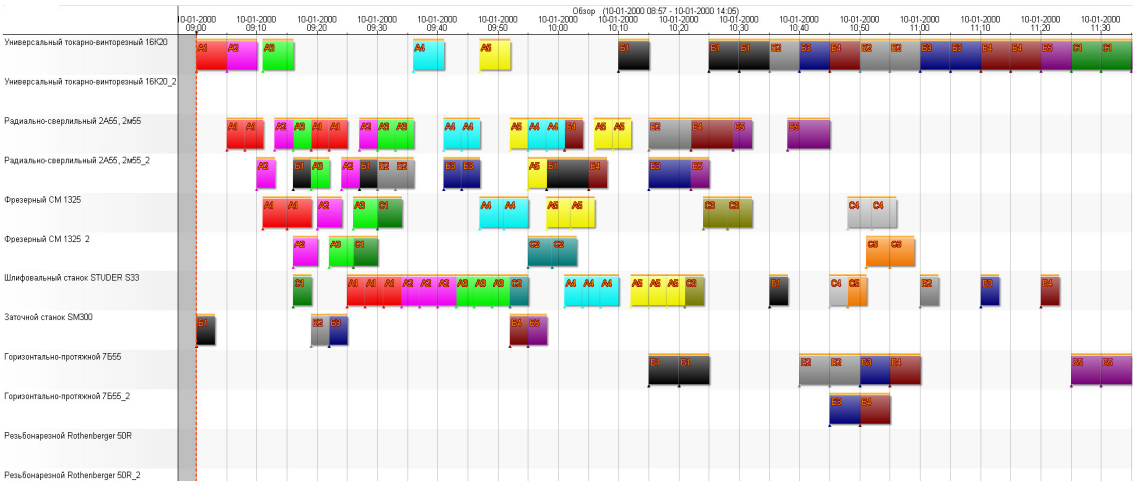

Fig 6. orders planning result

The sequence of operations can be seen as exemplified by one specific order.

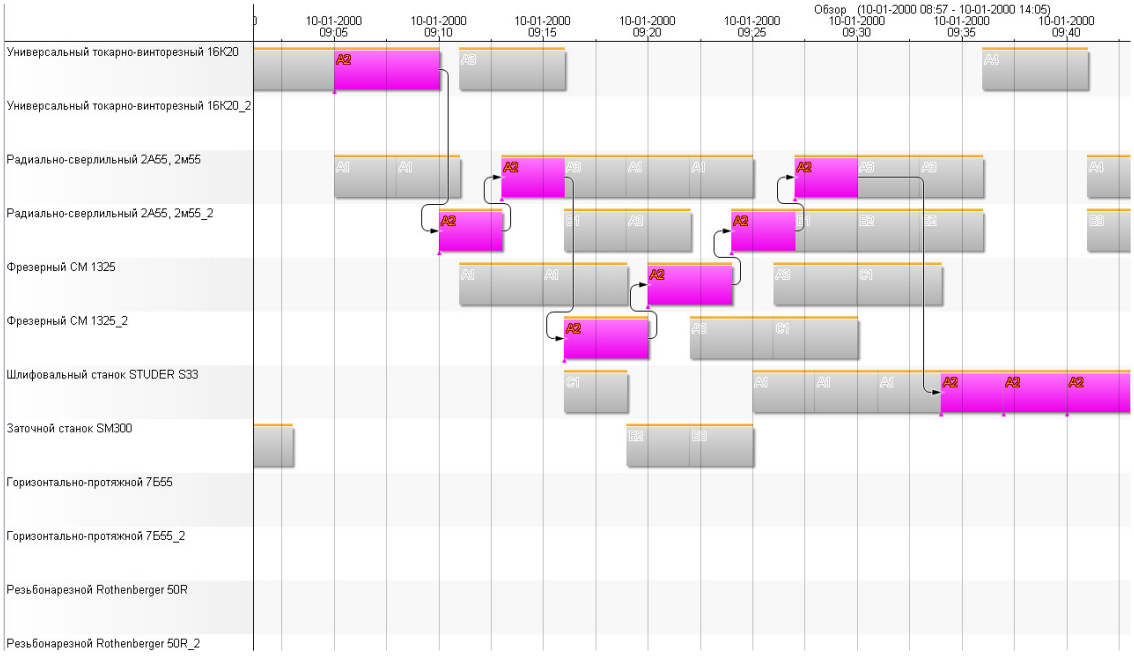

Fig 7. orders planning result: specific order route

Results of generating and planning of 15 orders:

- Deadline for completion of the last order: 14:00
- Time spent formulating the Gantt chart: 3.284 seconds.
- Number of interactions between agents: 54
- Average maximum interoperability stay of the part: 6 minutes

Simulation of a breakdown in one of the workcenters, automatic resetting of the schedule based on this failure

Using the schedule obtained after modeling at stage 1, we will conduct an experiment to simulate the failure of the resource "Radial-drilling 2A55, 2m55_2". After the hardware is disabled, the diagram representation is as follows:

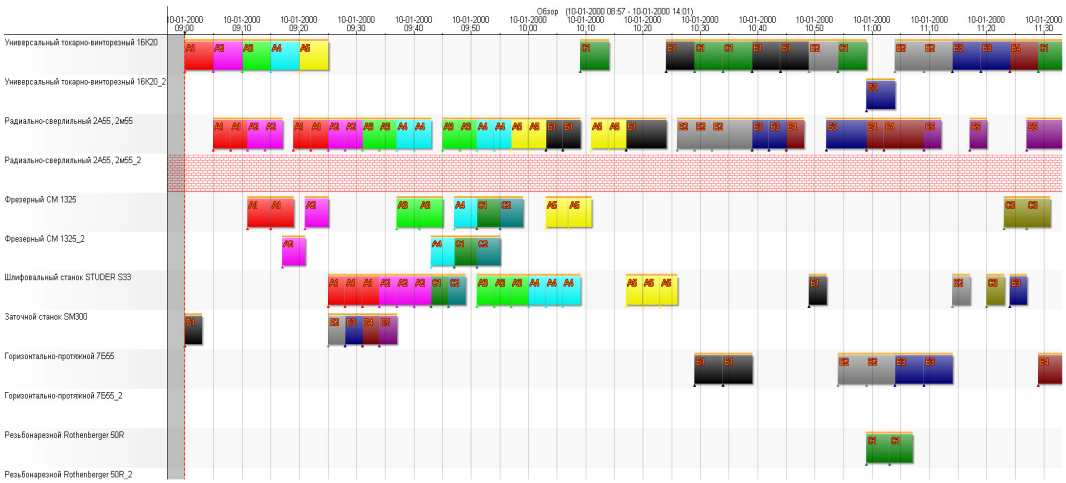

Fig 8. orders planning result: schedule after rebuilding

As seen from the diagram, all operations from the resource "Radial-drilling 2A55, 2m55_2" were moved to the resource Radial-drilling 2A55, 2m55.

Results of simulation of resource 1 failure:

- Deadline for completion of the last order: 15:21
- Time spent formulating the Gantt chart: 4.674 seconds.
- Number of interactions between agents: 22
- Average maximum interoperability stay of the part: 8 minutes

In can be noted that the latest order fabrication period has increased, as well as the average time of interoperability stay, which is associated with a serious rearrangement of the schedule, due to the breakdown.

The resulting multi-agent model is adaptive, and the generated schedule can be used for tasks issuing to the production.

Conclusion

The application of the ideas of artificial intelligence has proven its practical value in solving a number of economic problems. This article examined the use of multi-agent technologies as a new approach to operational production planning.

The paper is dedicated to the study of the history of the creation of multi-agent technologies and their application in industry, which allows us to understand how this type of artificial intelligence will develop in the future. The analysis of the multi-agent approach in the context of its application in operational-production planning was conducted. The main elements of the system construction were reflected.

The use of an agent-based approach to production planning allows achieving high results from both technical and economic points of view. From a technical point of view, multi-agent technologies can increase the speed of operational planning, increase the adaptability of the system, and reduce the influence of the human factor in the formation of the plan. From an economic point of view, the multi-agent approach allows to increase production efficiency, which is reflected in the fulfillment of a larger number of orders with the involvement of fewer resources, it allows to reduce production costs of non-optimal use of materials and non-optimal planning of such expensive operations as readjustment, it also allows to increase control over operational planning and to reduce the cost of developing an integrated planning system.

An important advantage of the multi-agent approach is its event-significant component, which allows you to respond to the most serious changes in terms of the operational plan in the shortest possible time. If a client submits an application for a priority order, the company should be able to include this order in the current operational plan with minimal costs for other orders and maintaining the structure of the annual plan. In the event of equipment failure, the company's management should be able to immediately estimate how critical this is for the group of orders that was using this work center as part of its production technology[10]. In case of cancellation of the order, operational re-planning is necessary, which should optimally load the freed up resources

It can be concluded that the multi-agent paradigm is at the source of the further development and application for solving problems of operational production planning.

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Appendix 1. Search algorithm of the production route of the order

Search algorithm of the production route of the order

It is suggested to use a step-by-step search with optimization criteria sorted by priority. To minimize the route search time, it is suggested to define a subgraph from the given graph of possibilities. It is assumed that within the scope of the operational planning of production, the highest priority is to determine the possibility of building a plan, which is expressed by the ability to perform the operation o_{last}^{end} within the due dates po_i^{due}. The maximization criterion of interoperability stay time (elasticity) with a restriction is a further approximation to the optimum for any of the rt_i routes, provided that the value of each possibility at the graph level i is the same, and therefore we can assume that any rt_i route without prior optimization with the elasticity criterion can be improved by finding a new route from the basic one. Therefore we will specify the priority of each of the optimization criteria:

1) $po_i^{due} - o_{last}^{end} -> \max$

2) $\sum_{i=1}^{n}(o_i^{\cos t}) -> \min$

3) $\sum_{i=1}^{n}(\mathrm{o}_i^{start} - \mathrm{o}_{\mathrm{i}-1}^{end}) -> \max$

The algorithm consists of initially determination of the basic route rt_i^{basis} and further attempts to improve it. After finding the best of the limited set of routes rt_i^{best} in the specified search area, this route is gradually changed in order to maximize the time of interoperability stay with the specified restriction.

The graph of possibilities (V, C) is represented as a set of subsets of vertices $V = \{V^1, V^2, ..., V^n\}$, where each subset is a set of possibilities (time intervals t) to implement operation o_i from the set of operations O. Time intervals $\{\mathrm{t}_1, ..., \mathrm{t}_n\}$ are arranged in ascending order. No additional graph transformation is required, since the original graph is already presented as a set of subsets or levels If the time interval is taken or partly taken, it is marked by 1, if it is not occupied – by 0.

The algorithm can be represented as follows:

1) Find the basis route rt^{basis} using algorithm **AlgoSearchBasisRoute,** the most distant in time from po_i^{due}

2) If the basis route is found, we follow the point 3. Otherwise the order po_i cannot be planned.
Go to point 10.

3) At each level of the graph, select all the vertices marked with "transition". This marking indicates that this vertex is transitional, that is, a previously performed operation of a certain type was replaced by an operation of a different type, and therefore the equipment had to be readjusted. Denote the set of vertices found by X^i, where i is the current level of the graph.

4) Go sequentially through each of the points within the set X^i. Find the vertex closest in time to the transition point, request the implementation cost from the resource agent and evaluate it using the criterion that combines the first and second optimization criteria with the given weights. (**EstimateRoute** weighting algorithm).

5) At each level of the graph, select the points with the highest estimate in the quantity determined by the system operator. Denote this number of points as m. Set of sets of capacity possibilities | m | obtained.

6) Using sets of possibilities develop routes formulating them as the Cartesian product. Exclude technologically impossible routes, when operation with number i + 1 in a sequence is performed earlier than the operation i. The set of routes is a subgraph of the original possibility graph (V, C).

   Using the algorithm **EstimateRoute** find the route rt^{best} with the highest estimates.

7) Compare rt^{best} and rt^{basis}: evaluate the route rt^{basis} using **EstimateRoute**. If $rt^{basis}_{weight} \geq rt^{best}_{weight}$, then $rt^{best} = rt^{basis}$

8) Using the **GetElongatedRoute** algorithm, get the modified route $rt^{best}_{elongated}$. Revised route will be obtained only if its estimates as per **EstimateRoute** are better than the estimates of the current route rt^{best}

9) Route rt^{best} is accepted as the basis. End.

10) Determine the number of the operation in the sequence for which no booking opportunities could be found. Denote it as U. If the operation U is the first in the sequence, then L = CurrentModelTime (current time within the model), thus, go to step 12. Otherwise, go to step 11.

11) Find the route using the **AlgoSearchBasisRoute** algorithm excluding all subsequent operations,
including U. The end time of the last operation in the shortened sequence is to be denoted as L.

12) If the number of the rebooking attempts exceeds maximum permitted one, rebookingAttempts $\geq$ maxRebookingAttempts – order failed to be booked, the end. Otherwise: rebookingAttempts = rebookingAttempts+1.

    Request the scene for the ID of the agent that booked the interval from (L; L+ $o^{duration}$). Denote the agent having the booking of the interval of interest as ao^{reserv} .

13) Addressing the ao^{reserv} and requesting the possibility to free the occupied time interval and the amount of the premium that ao^{reserv} is expecting to receive for rebooking

14) If ao^{reserv} agrees with rebooking (the algorithm for determining whether an operation can be rebooked - **contract Algorithm**), determine the possibility of paying the premium. If the payment is within the range of a certain order budget - accept the rebooking. ao^{reserv} frees the operation. Go to point 1. Otherwise – L = L+ $o^{duration}$, go to step 12.

Basis route search algorithm AlgoSearchBasisRoute:

Input data: set of possibilities: $\{V^1, V^2, \ldots, V^n\}$. i=1, $i \in \{1, 2, \ldots \mathrm{n}\}$, where n= $|\mathrm{V}|$, t $\in \{1, 2, \ldots \mathrm{m}\}$, where m = $|V^i|$. rt^{basis} = $\{\mathrm{o}_1, \ldots, \mathrm{o}_n\}$, o^{end}_{last} =0 (end time of last operation of the process). There may be several alternative sets of possibilities for each level, which is associated with the possibilities of various resources to perform the operation. The number of subsets at one level denotes as V^iC .

1) Find such a vertex at the level i of the graph of opportunities, within which the time interval for the period $\square t$ = 0 (is free (unoccupied)) and

FOR (i=0; i$\leq$n; i=i+1)

FOR (k=0; k$\leq$ V^iC ; k=k+1)

i. FOR (j=0;j$\leq$m;j=j+1)

1. If $V^i_k[\mathrm{j}]$=0 and $V^i_k[\mathrm{j}]^{start} \geq rt^{current}[\mathrm{i}-1]$, then $rt^{current}[\mathrm{i}]$ = $V^i_k[\mathrm{j}]$, go to point ii

2. Otherwise, if j=m and k= V^iC - go to point 2

ii. If i=n, go to point c, otherwise - go to point b

b. Moving to the next level of the graph, go to point 1 (i=i+1).

2) rt^{basis} = $rt^{current}$,

Output data: route rt^{basis}.

Route estimation algorithm EstimateRoute

Input data: set of operations: $\{o_1, \ldots, o_n\}$, defining the route to be estimated, po_i^{due} - order due date.

The evaluation function is a combination of optimization criteria 1 and 2 with given weights. Weight is an expert estimate. To combine two criteria into one, let us bring the criterion

$\sum_{i=1}^{n}(o_i^{\cos t}) -> \min$ to the maximization problem.

$$routeWeight = w_1(po_i^{due} - o_{last}^{end}) - w_2 \sum_{i=1}^{n}(o_i^{\cos t})$$

Where w_1 - weight of criterion 1; w_2 - weight of criterion 2.

Output data: **routeWeight**

Search algorithm of the elongated route GetElongatedRoute

Input data: set of operations: $\{o_1, \ldots, o_n\}$ route rt^{basis} to be changed, mip – maximum number (in minutes) of mip $\in$ N interoperability stay, n – number of operations within the route rt^{basis}, shift – size of the shift within a single iteration.

CurrentRouteWeight = rt_{weight}^{basis}, $rt^{current}$ = rt^{basis}

FOR (j=0; j$\leq$mip; j=j+1)

FOR (i=0; i$\leq$n; i=i+1)

If i=0, then $rt^{current}$ [i] = rt^{basis} [i]

If i = n-1, then $rt^{current}$ [i] = rt^{basis} [i] + shift

Otherwise, $rt^{current}$ [i] = $rt^{current}$ [i-1] * (rt^{basis} [i]*100/ rt^{basis} [i+1])

END FOR

CurrentWeight = **EstimateRoute** ($rt^{current}$, po_i^{due}).

If CurrentWeight > CurrentRouteWeight, then CurrentRouteWeight= CurrentWeight

Otherwise - exit the loop

END FOR

Output data: $rt^{current}$

Algorithm for determining the possibility of the time interval transference: contract Algorithm

Input data: time interval t : $\{t^{start}; t^{end}\}$, n – number of operations within the planned route, set of operations: $\{o_1, \ldots, o_n\}$ of the route rt^{basis} , premium – premium rate paid by the initiator agent in case of the agreement is reached, w – the weight with which the premium rate affects the route estimation

Rescheduling = false

1) Let us define the time interval within which the new location should be found. Let us define the desired interval as: $\{f^{start}; f^{end}\}$

   LeftBorder = CurrentTime;
   FOR (i=0; i $\leq$ n; i=i+1)

   If $t^{start} \geq o_i^{start}$ or $t^{end} \leq o_i^{end}$, then:

   f^{start} = LeftBorder

   $f^{end} = o_i^{start}$

   Otherwise, LeftBorder = o_i^{end}

   END FOR

2) Form the virtual process $rt^{contract}$ from one operation. Start general route search algorithm for a virtual order. If the route is not determined – end. No rebooking possible.

3) Route for $rt^{contract}$ obtained. Form the new route consisting of previously planned operations and new operation. Name the route: rt^{new}

4) Let us determine the efficiency of a possible rebooking, taking into account the amount of premium that can be received by the agent.

If $rt_{weight}^{current} \leq w * premium$ + **EstimateRoute** (rt^{new} , po_i^{due}), then:

Rescheduling = true

Output data: Rescheduling

Implementation of Project and Process Management In Mining Enterprises

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Abstract

The article considers and justifies the necessity of project and process approach in development of mineral deposits. Each approach has a number of advantages and disadvantages, and in practice is applied separately. This often leads to the fact that they not only do not complement each other, but in the case of illiterate use, thereby reducing the efficiency of both the mine development and the management of the mining enterprise as a whole. The authors propose to change this situation by combining the project and process approach and considering these approaches as a single management system. The proposed approach (model) allows to build a management system in real conditions for a mining enterprise consisting of both a single mine and a system of deposits (hub). Its universality is that it is applicable to all stages of its development: preparatory, construction and operation. In addition, the methodology allows to assess the contribution of mineral reserves and resources to the total market value of the mining enterprise.

Keywords: Mine Development; Investment; Project Approach; Process Approach.

Introduction

The development of mineral deposits is an organizationally complex and costly activity. This imposes a certain responsibility on the subsoil user and requires him, on the one hand, to invest significantly in launching and on the other hand, to be flexible and appropriate to the time and nature of the management system. Increasing competition caused by rising prices for mining products, development of complex and hard-to-reach deposits, resulting in an increase in unit capital costs, is a powerful incentive to improve the management system.

The development of an approach (model) of the management of the mine individually and of a mining enterprise, which would allow a potential investor to effectively manage all resources, is of great importance both in our country and abroad.

Existing hierarchical practices tend to try to interact and resolve issues through reports and letters to management, committees and meetings, without trying to establish a clear system and algorithms of decision-making. This approach, based primarily on the functions of the division and performer, is suitable for a small organization. But over time, an organization can grow and grow organizationally, and therefore needs a systematic approach to management. These are two approaches: project and process management. This raises the question: Which of the approaches to be applied at the mining enterprise, which one is preferred given the stages of development of the mine.
The mining enterprise is a complex and dynamic system. As a rule, it may include several mines implemented within the framework of projects, and in turn several sites where repetitive processes occur continuously: extraction, transportation, processing. At the same time, mining operations change

in time and space, so the activity of the operating enterprise can be characterized by two types of activity:

- recurring processes.
- single processes that will no longer repeat in this form.

The first type of activity is a process, the second one is a project. That is, the business process, unlike the project, is a certain kind of conveyor to perform certain functions, whereas the project is repeated only once. Thus, managing a company's activity means managing its processes (Process Management) within the project. In practice, it is quite common for project activities to become project activities and vice versa.

Thus, for the effective management of the mining enterprise in the implementation of projects, clearly defined processes are necessary. This work is devoted to finding the optimal combination of process and project management approaches in the implementation of mining projects.

Methodology

In order to understand project and process management, it is necessary to define their definitions.
The concept of a business process, like a project, is interpreted differently, but in this case it can be based on the definition given in ISO 9000: Process - a set of interconnected and interacting operations (actions) that transform inputs into outputs. Processes can be standardized because any methodology contains the following controls: initiation, planning, execution, analysis, management, completion. The approach, when the resources and activities of an organization are managed as a process, is called a process. In practice, a functional approach is most often used when the functions of the entity are the objects of control. However, in the case of a process approach, the objects of control are processes that focus on achieving intermediate results. The most commonly used standardized methodologies, including project management processes, include: PMI PMBOK, OGC PRINCE2 and APM APMBOK.

There are several definitions of the concept of the project, but the most comprehensive is the following: The project is a set of measures and activities aimed at changing a system by achieving certain goals, under resource and time constraints. [2,3,5]. In other words, the project is a unique process, consisting of a set of one-time activities, as a result of which a unique product is created. Projects can be divided into two categories: development projects and ongoing projects. The projects of the first category are aimed at the creation of new assets, which can include the construction of processing facilities and the development of new mines. In turn, the projects in the second category are aimed at modernization and reconstruction of already existing assets as well as active processes of the management system. In essence, each project is a unique activity and can differ in the scale, complexity, composition and number of participants, terms of implementation, goals and tasks, object of investment activity, requirements for quality and ways of its provision. When the project is managed, it is a project approach.

For some elements, the project and the business process are similar:

Table 1: Compare common project and process elements

Element	Process	Project
activity	repeating	one-time
term	unlimited	limited
content	implementation	planning, implementation, control, completion
assignment	converting resources to a product	creation of new assets, development of existing projects and functions, converting resources to a product
uniqueness	missing	present

Conclusion: Process management focuses on the implementation stage and project management at all stages of the life cycle.

The composition of the organization's processes and projects depends on the nature of its activities. A trade organization, for example, is process-oriented because its activities are based on purchase-sale processes. And it may not change for years. At the same time, the construction organization, rather in its activity, is guided by the project approach. As a rule, a new construction facility may differ in its location and complexity. But there are organizations where the project and process approach will work together. Such organizations include mining enterprises. This enterprise is a unique project by definition, as each mine is created by nature itself and cannot be repeated. The mines or group of mines form a project, the management and development of which is based on a process basis. In this case, the mining management model can be considered as a process-based project model. In terms of the tasks to be solved, the project defines the development strategy of the organization, while the process is a tactical tool for its implementation. Thus, processes are a project component and the process approach complements the project approach. In this case, we can see the addition and promotion of two approaches. A well-built management system can create synergies.

Many researchers ([Lankhorst], [Kalyanov], [TOGAF]) more or less explicitly note the need to include in the enterprise architecture a component responsible for working with changes and transformations. The [TOGAF] emphasizes that the enterprise architecture among other elements should include "transition processes to implement new technologies in response to changing business needs." Because the enterprise architecture is a dynamic management tool, it requires a built-in mechanism for change management that differs from routine operating processes. These arguments prove the necessity of introducing the project slice into the model of the business architecture of the enterprise.

Results

The efficiency of any enterprise is based on the choice of its process management tools. One such management tool is the value chain. The value chain is a strategic analysis tool aimed at detailed analysis of the business for strategic planning purposes. The author of the concept is Professor Michael Porter, who has determined that it is the value chain that is the best helper in the choice of the strategy of enterprise development. This is because the concept allows us to understand what is happening in the organization, who is responsible for it, and what is the final product. Analysis and reorganization of the value chain allows to determine the efficiency of the business model of the enterprise/project as a whole, to analyze the processes separately, to highlight the necessary modernization, to increase the competitiveness of the enterprise, its profit, and return on capital. Based on the results of the analysis, the decision can be made to create additional value chains as well as to make changes to the organizational structure of the enterprise.

The process of development of the mine involves the following value chain based on the stages of its industrial development:

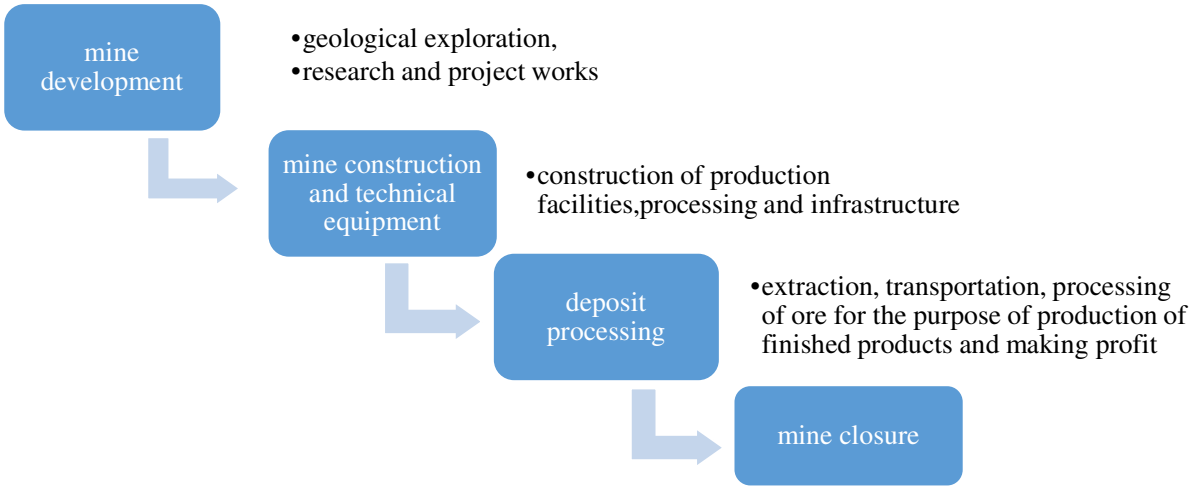

Scheme 1- Industrial development stages

The scheme is a process of four stages, each of which can be considered separately. This is a simplified scheme, since during the mine's processing, the processes specified in the scheme can be carried out, for example, at one of its sites. Each step is independent but not independent. The fact is that without exploration it is impossible to determine the value and value of the mine itself. The absence of reliable information on reserves and potential resources of the deposit, mining-geological, mining and technical conditions and other conditions, it is impossible to make decisions on its industrial development, to start designing, construction, extraction and processing. Each of these processes has a responsible functional manager, thus it directly influences the result of the organization's activity as a whole. On the one hand, the area of his responsibility ends where his business process ends, on the other hand, the activity of one unit can affect the other, and lead to the reduction of its performance. In this regard, in the mining enterprise it is particularly necessary to coordinate the actions of all the participants of the process. In the project approach, each project has a manager who is responsible for the final result. At the same time, not only the functional units responsible for the main processes under the scheme 1, but also the units supporting the activities of the enterprise in the areas of personnel management, logistics, technology development and infrastructure can participate in the project.

Analysis of investment projects shows that these are complex and long-term projects, implementation of which requires management in order to be effective implementation Business project management methodology can be considered at the main stages of the project life cycle:

- Development of project proposal;
- Project planning and preparation;
- Project implementation;
- Close the project.

Thus, the life cycle stages fully reflect the development stages of the mine. The lifecycle involves tracking and directing the project at all stages of the life cycle before its completion to achieve the intended outcome.

In addition to the current activities the company regularly implements development projects, it seems advisable to create a permanent unit in the organizational structure responsible for the implementation of project activities - a project office. To manage such projects, it may be much easier to apply the appropriate project office model.

A team of project executives led by the project manager is formed by the project office from among the company's employees or external specialists depending on the directions and competences required for project implementation.

The supervisor of the project office is the person responsible for allocating resources for the project implementation. These powers are vested in the head of the company.

The head of the project office is the person who manages its activities in the interests of society in the part of:

- project activity administration - workflow,
- project competences management-methodical support.
-analysis of projects for feasibility of implementation and formation of a balanced portfolio of projects;
- Resource management-planning, allocation, monitoring, monitoring and analysis of the use of resources for current and potential projects;
- interaction with performers (design, expert analysis), contractors (construction, outsourcing services), representatives of authorities, including when receiving tax benefits within the framework of the project being implemented, for example, TOSER, RIP.

The functional model of the company's project office is as follows:

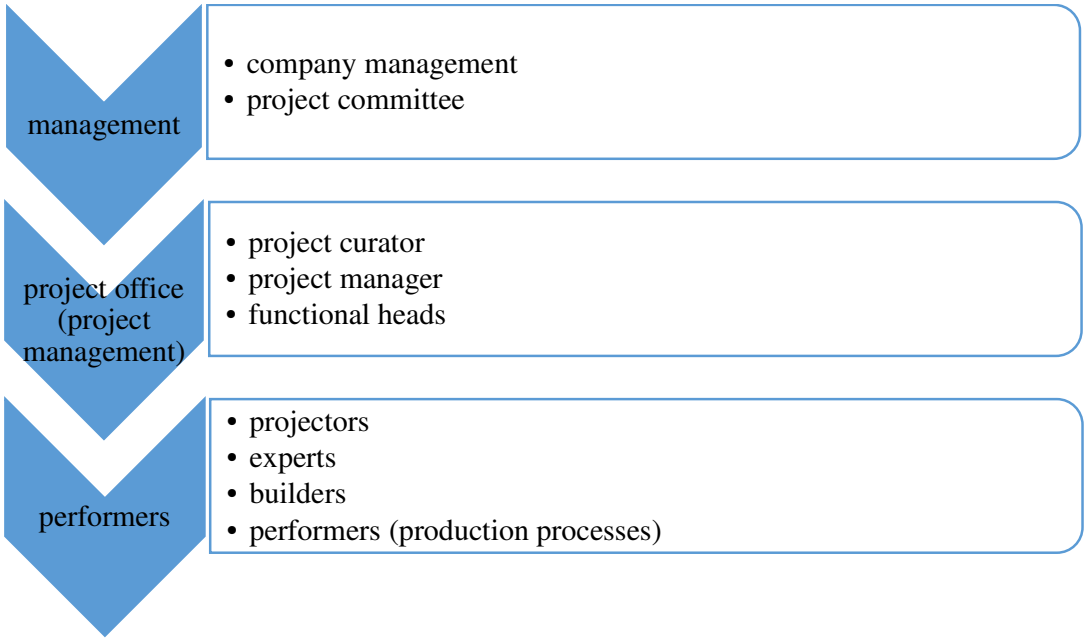

Scheme 2: The functional model of the company's project office.

The project office will allow to manage individual projects, portfolio of projects (project programs) in the company. Depending on the size and complexity of the projects, the project office may create project management units of a particular type, such as IT projects. The listed functions must be presented in the project (software) office.

The creation of a process office should help to increase the operational efficiency of the business, as well as for the successful implementation of projects and programs. The main objective of the office is to improve processes, as well as to monitor and build business process performance reports for the relevant process owners and senior management. The process office can be located inside and outside the company, working on outsourcing, which is determined by the scale of the company's organizational structure. In practice, however, there is more often a mixed method of organization, where there is a small internal division that knows the specifics of the enterprise, and external expertise and resources are used to solve certain tasks.

Conclusion: Project approach combined with process management is the most

suitable for a mining enterprise.

Conclusion

In previous decades, the project's success has been linked to three variables: cost, time and quality. However, the modern world is not standing still and new variables related to governance are beginning to appear in the projects. They are mainly the result of model studies that have yet to be tested in various organizational and cultural settings. In this regard, it can be argued that in order to achieve the necessary results and sustainable development the enterprise needs to form an effective management system. In this regard, it is most appropriate to organize operational activities as well as ongoing mining projects based on business processes within the project (mines). The development of the enterprise, connected with the development of new mines and construction of processing capacities, is more convenient to build on the project approach. All this in the complex will allow faster development and commissioning of deposits.

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"Personal" Business Model of Human Resource Management in The Formation of An Enterprise Development Strategy in The Context of Digital Business Transformation

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Abstract

In the era of business digital transformation and the implementation of information and communication technologies in both production and management processes the role of the human factor in the formation of an enterprise's development strategy significantly changes. The personal staff characteristics which are reflecting the teamwork skills, creativity and the ability to think out of box while solving management tasks are becoming increasingly important.
The article talks about the role of human capital management in a modern organization and sets the personal and professional competencies for the personnel that are necessary in the formation and implementation of the enterprise development strategy in the digital business transformation. The result of the work was the development of a "personal" business model based on the transformation of the classic business model of A. Osterwalder and Y. Pigneur where the main factor in the transformation is human capital, its multifunctional adaptability to changing business conditions and personalization. The proposed "personal" business model has a wide range of practical applications both in the formation and implementation of an enterprise development strategy and in the human resource management, in particular in the recruiting and development of new information and communication technologies and platforms for increasing the synergistic effect of working in cross-functional teams by finding new opportunities for cooperation and achieving effective results.

Keywords: Business model, Osterwalder, enterprise development strategy, digitalization, human resource management

Introduction

The second half of the XX and the beginning of the XXI century was marked by various changes and targeted reactive actions in the face of uncertainty in the external and internal environment, which served as a change in the views of scientists, futurologists, public figures, entrepreneurs, heads of organizations and industrial enterprises on the role of personnel in organizational and economic activities, which is based on the human factor with given professional skills and personal skills. The traditional concept of "personnel" is collective, an individual person in the enterprise was considered as a resource involved in production, while in the 21st century a person with his intensified evolution

of moral, intellectual and spiritual development, as well as taking into account the introduction of a corporate code in a number of organizations, began to synthesize in such subject areas as human resource management, strategic management, emotional intelligence, goal setting and the formation of a vision for the future organization, including After that, it has become a significant element in the digital transformation.

Modern management is focused not so much on the creation of values and meanings in the field of science and education, the practice of making and implementing managerial decisions, but how to master the art of human resource management. The human factor and its role in forming a development strategy in the context of digital business transformation is considered paramount, where human resources management needs advanced methods and tools that would ensure the transition from reactive management to proactive (program-targeted) management of an organization from -for the rapid development of the scientific and technological revolution in relation to the nature, content and division of human labor. Human labor, to a greater extent, requires a person to have high soft-skills rather than hard-skills, since working conditions change and cease to be mechanical, i.e. routine, which leads to the need for quick adaptation to changing environmental conditions. Modern gadgets, information technology, lifestyle makes you consider a person not only and not so much from the point of view of technocracy, but also with the possibility of having a high share of intellectual training in him and operating with a large amount of data, thereby personifying him more and more in a digital environment.

The importance of the human factor in the current conditions plays an important role in shaping a development strategy, where the leadership of the organization changes the ability to control employees in order to increase the importance of self-control due to established performance indicators for each employee. Therefore, the role of each employee in the implementation of the organization's strategy is growing significantly due to the constant search for new, non-trivial and effective solutions, the implementation of performance indicators in achieving strategic goals through the synthesis of intra-company entrepreneurship and creativity, i.e. Constant creation of the birth of an idea that can strengthen the organization's competitive position. In dynamically changing conditions, it is necessary to constantly monitor emerging technologies, consumer preferences, social trends, which directly affect the competition and become decisive in choosing the right business model for the organization. The analysis of sources on the features of construction, the possibilities of applying and adapting business models to solve socio-economic problems showed that the most convenient, universal and popular business model is the model of A. Osterwalder and I. Pigne, since this model contributes to the idea of how the organization intends to act and generate ideas, increase the value of its product, reflect the organization's abilities, the list of partners required to create, promote and transfer this value are finite m consumers, correlate the capital necessary to obtain sustainable financial flows, as well as assist in the formation and development of personal and business qualities, determine the positioning, skills, competencies, potential of the entire staff and each individually by conducting a timely assessment and analysis of verbal, numerical and abstract abilities. The choice of this business model is due to the fact that successfully created technological products in the conditions of digital business transformation are no longer a guarantee of stability and long-term success in the market, as they undergo permanent changes in the external and internal environment, therefore the use of monitoring, analysis and subsequent design of an improved version of the product is relevant and binding.

Changes occur in the operational activities of the product, in terms of resource optimization and staff rotation due to the development of human, information and organizational capital, which are associated with the agile philosophy, where, on the one hand, there is awareness of future requests and active adaptation of products and services under the uncertainty of the macro and micro environment, on the other hand, the need to attract talented, entrepreneurial and creative employees who are able to build organizational activities with elements of decentral called control, i.e. the formation of a horizontal management structure, based on self-organizing teams, in which all significant professions, the necessary competencies and skills to achieve the final result are concentrated. The most common case of a horizontal control structure is the Zappos shoe online store. In 2013, the company introduced holacracy - a horizontal management structure where there are no middle managers, that is, the entire company has areas of responsibility in the form of "circles" that exchange ideas, tasks and information about their implementation. Organizational management is carried out not through managers, but

through selected reputable employees within the "circle", which colleagues have chosen as leaders of their groups. The main idea of the CEO, Tony Shea, was that all employees show high involvement and effectiveness, work as entrepreneurs - independently generate ideas and make various decisions with a collective mind.

In order to be a highly qualified, significant and progressive employee, you must be able to work in a team, find your weaknesses, strengthen your strengths, assess opportunities and mitigate emerging risks, and, as a conclusion, join the idea that work is not only a source of everyday life On the contrary, it is an instrument of personal and professional development in solving complex problems.

It is necessary to summarize that, at present, it's not only the choice and effective implementation of the business model that is important, now it is especially important to constantly monitor the level of development or degradation of the public masses, the validity of the human factor to changing environmental conditions, which goes into a stage of unique self-expression when objective career factors (social status, welfare) are increasingly giving way to subjective factors (satisfaction from work done).

Materials and Methods

The first steps in designing a business model were considered as a step-by-step tool for strategic and innovative management, which appeared in the 70s, when project management needed a structural analysis and design methodology SADT (Structured Analysis and Design Technique). Then, programs and projects aimed at medium and long-term development within the framework of strengthening and increasing the competitiveness of the organization's strategies, designed to solve organizational issues of management or business modeling, were singled out in a separate segment, which was called BMS (Business Modeling Software) in the international community. Since the 90s. of the last century, a certain trajectory of the development of research on the concept of business modeling is traced - from the definition of the conceptual apparatus "business model" to the application of the concept of a business model to study various trends, characteristics and phenomena. Using the approaches proposed by A. Osterwalder and I. Pigne, in which it is proposed to determine the stages of the concept of a "business model" and to identify five stages of the evolution of cognition of the concept of a business model:

1. definition and classification of a business model;

2. highlighting the elements of a business model;

3. study of the elements of the general system;

4. development of basic models and categories;

5. development of tools for analysis and application of the concept of a business model.

It should be noted that the authors did the theoretical and instrumental work on the construction of the sixth stage, which is characterized by the adaptation of the business model and its transformation into a more progressive form of development associated with the identification of human capital in the organization.

Business models have become widely popular in the era of the formation and development of technological entrepreneurship and venture financing, since this tool provides an opportunity for a certain period of time to form, evaluate and select the proposed initiatives or subject of the study area. This tool is a tool for rethinking the traditional business paradigm in the research branch, filled with a wide range of tasks, among which are: understanding the logic of the subject under study and its scope; designing an instrumental form for adapting an organization to functional changes; basis for strategic planning and development; business process modeling; assessment and selection of strategic alternatives; creation of a single communication platform in the context of the mission, organization goals and digital business transformation. Thus, the modern practice of applying business models extends to many areas of activity and extends far beyond the boundaries of the business environment.

The business model, initiated by A. Osterwalder and I. Pigne, is modern, used by leading companies in the USA and Europe, including IBM, Ericsson, Deloitte, which have established themselves as winners in the competition. This business model in these organizations has a conceptual approach and is a tool in creating values for consumers, employees, partners and shareholders. The authors conducted research to identify experimental hypotheses and established themselves that the business model of A. Osterwalder and I. Pigne has a number of transformational changes, one of which is the separation of the business model in order to form more efficient activities of the head and functional units, using the example changes in the practical value of the use of human capital in the organization. The application of the business model of A. Osterwalder and I. Pigne can also be applied to an individual person, because a person with his set of knowledge, skills and competencies is a representative of the organization, provides services and goods to customers, therefore, forms the organization's profit and own income. Using the business model of A. Osterwalder and I. Pigne as an example of a person, one can find points of concentrated growth, and, conversely, abandon destructive attitudes and habits that do not bring moral satisfaction and success in the organization. This approach allows you to define and transform a business model into a functional (personal), i.e. how to more effectively use your skills, competencies and talents for personal and professional development. The ability to reflect on one's own experience, characterization of retrospective, current and perspective areas of a person will reveal causal relationships between events, namely, will lead to the establishment of how to remain a sought-after, unique and competitive employee in dynamically changing environmental conditions. The fact is that in the modern world there is a frequent change in the context of events, and organizations, like employees, are aimed at long-term improvement in order to remain as competitive as possible in their type of activity.

To continue further research and its significance, it is necessary to compare the traditional business model, in which the human factor influences the organization's operational processes, with a functional (personal) model that includes the practical value of using a person's knowledge, skills and competencies in favor of the organization. A graphical interpretation of the template of the business model of A. Osterwalder and I. Pigne, consisting of nine structural blocks, is presented in Fig. 1. A graphical interpretation of the "personal business model" is presented in Fig. 2. It should be noted that all elements and parts are in interaction with each other, establish causal relationships and dependencies of the analyzed object and subject. These templates represent a universal language for describing, presenting, analyzing and transforming business models for special tasks. The business model has nine blocks that allow systematically and centrally presenting the organization's activities and the practical value of a person on one sheet.

The Customer segments block in the organization exists thanks to customers. Each organization is able to serve different types of customers. An example is an online store that focuses on working with individuals and legal entities, providing corporate packages of services and goods. If we are talking about a person and hired work, then the same people in the organization can be clients. That in one, that in another case, services are provided.

The "Value Proposition" block in the organization is to provide unique value - this is the main reason why customers express their preference for a company that is focused on such an offer. Examples of unique value range from novelty, low price and performance to privileged status, brand positioning, and lower investment risks. In a personal business model, this is the answer to the question of how to provide assistance in performing work for the organization's clients.

The "Channels" block in the organization is focused on the value propositions of the organization that come to the client through a combination of information and communication sales channels. Public distribution channels may include personal and business contacts, a website, social networks, digital instant messengers, etc. With this approach, this increases the client's awareness of the organization's goods and services, evaluates the organization's value propositions, allows the consumer to purchase goods and services, etc. Promotion channels represent five stages of goods receipt to a client:

– Informational (how does the client's awareness of the goods and services of the organization increase?)
– Evaluation (how is the help to clients arranged in evaluating the value propositions of the organization?

- Sales (how is the customer provided with the opportunity to purchase certain goods and services?)
- Delivery (how is the delivery of our value propositions to the client?)
- After-sales (how is the after-sales service provided to the customer?)

In a personalized business model, "Distribution Channels" refers to positioning regarding how unique value is delivered to a customer.

The "Customer relationships" block describes the types of relationships that an organization establishes based on consumer segments. The organization clearly defines what type of relationship it intends to establish in relation to a particular consumer segment, in addition, they can vary from personal to automated. There are several types of customer relationships that exist within the framework of several consumer segments: personal support, privileged support, self-service, online communities and co-creation of a product like "seller-buyer", for example, involving customers in creating product designs or producing content. This gives the right to believe on the basis of which methods and approaches new customers are acquired, how existing products are held and how products can be diversified. The data block in the personal business model shows exactly how the employee needs to interact with customers.

The Revenue streams block in the organization arises as a result of the successful implementation of value propositions to various consumer segments. This block includes the profit that the organization receives from various consumer sources. The organization must know for sure why the client is ready to give money and provide a convenient payment method that will be preferable to the client. There are a number of ways to create cash flows: selling assets, usage fees, subscription fees, licenses, brokerage, advertising. A distinctive feature of the personal business model will be the entry into the incomes of an individual not only material income, but also intangible, in which such concepts as job satisfaction, recognition, social and social contribution are concentrated.

The Business Model Canvas

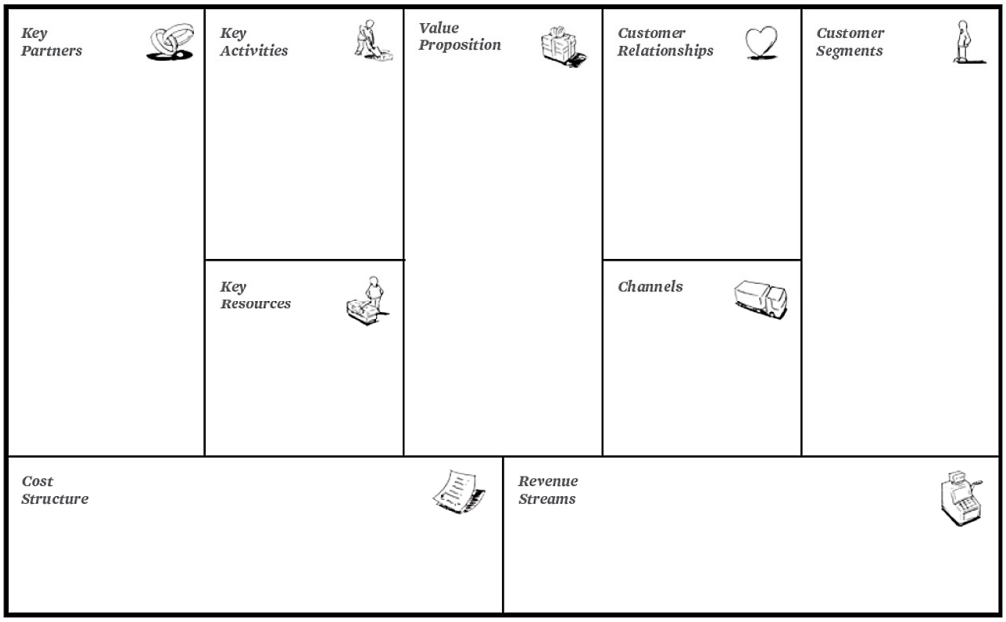

Fig. 1: Template of the traditional business model of A. Ostervalder and I. Pigne

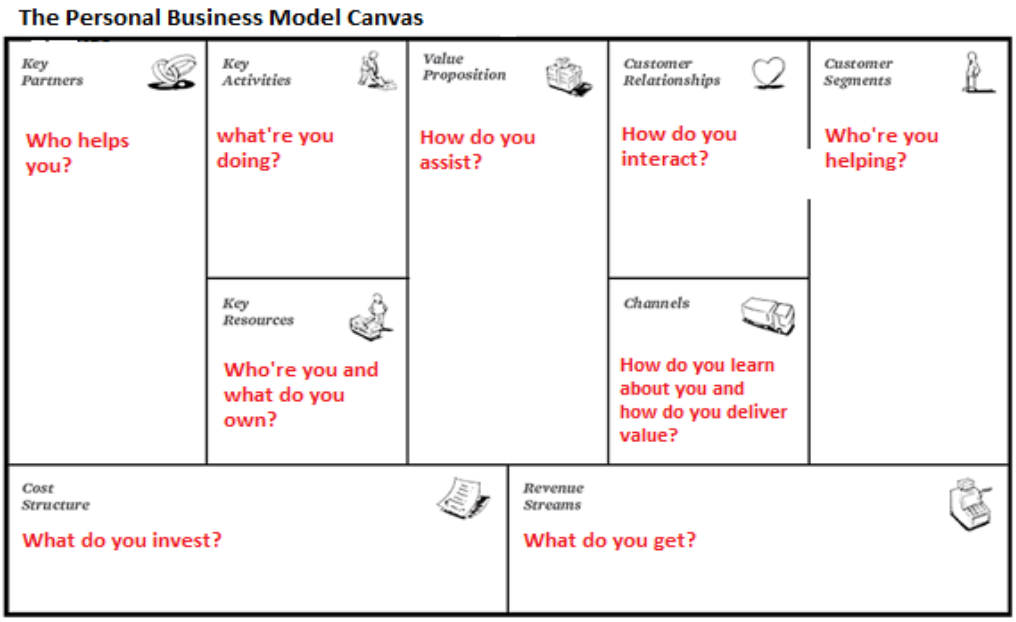

Fig. 2: Template for the "personal" business model of A. Ostervalder and I. Pigne

The Key Resources block in the organization is represented by the most important assets necessary for the functioning of the business model. Key assets can be expressed in the form of value propositions, have a market position, maintain contact with consumers and generate profit. Key resources can be characterized by the following classification: production resources, intellectual property, human resources, financial resources. In a personal business model, a person's key resources are his interests, knowledge, competencies, skills, personal qualities, experience, business contacts, and other intangible or material resources.

The Key Activities block is focused on the practical actions that are necessary to implement a business model. Key activities can be classified as follows: product architecture, problem solving, product placement platform. In other words, the key activity is that with the help of which value propositions of the organization are created and implemented for certain consumer segments. In a personal business model, key activities project the work and benefit of a person, i.e., actions performed in the interests of the organization's client.

The Key Partners block describes the base of suppliers and partners, thanks to which the business model functions. The organization is interested in building partnerships to optimize the business model, mitigate risks and obtain appropriate resources. There are several types of partnerships: strategic cooperation, joint ventures in the form of a manufacturer and a lead supplier. The motive for such synergy may be, for example, optimization of production, reduction of risks and uncertainty conditions, and supply of resources below the market price. In the personal business model, this block is one of the fundamental, since it is important to have like-minded people to successfully carry out joint work and aspirations. This category includes professional mentor, organization employee, family, friends.

The Cost Structure block shows the most significant expenses incurred as part of the business model. Expenses are easy to predict if you identify key resources, activities and key partners. In contrast to the organization's business model, the costs of a single person are presented in material and intangible aspects, i.e. stress, time, energy and money.

Results

Thus, the development of a traditional and functional (personal) business model should be considered as the first step towards transforming the organization into an innovative concept for creating practice-oriented solutions and proposals based on self-organizing personnel. In the table. Figures 3 and 4 show the traditional and functional (personal) business models created and proposed by the authors in the framework of this study.

In the formation of a number of requirements for personnel (person) on the basis of a professional team, the choice is associated with the appearance of the following features, which must be taken into account:

1. A disciplinary, synthesizing, or creative type of thinking may be established in an employee's activity that requires certain knowledge and skills to collect, analyze, and master cross-sectional data.

2. Knowledge has its practical relevance and belonging only if it corresponds to the level of development of the economic system, and therefore, it is necessary to constantly update and increase through the collection of alternative opinions, facts and suggestions to ensure a high level of personality development.

3. The quality of acquired knowledge of a modern employee has its own value and time, but in order for knowledge not to lose its relevance and reality, it is necessary to monitor emerging trends and development programs at an interdisciplinary level, that is, to establish causal relationships between the studied disciplines, to conduct a multifaceted analysis and assessment of the practical reliability of information to ensure a new influx of knowledge and competencies.

Table 3: The traditional business model of A. Osterwalder and I. Pigne on the example of the development of the practical value of human capital in an organization

Key Partners	*Key competencies*	*Value Proposals-*	*Employee Relations*	*Consumer segments*
- founders; - leaders; - professional teams; - specialists.	- instrumental (cognitive, methodological, technological, communicative abilities); - interpersonal (individual abilities as social skills (social interactions and cooperation); - systemic (abilities and skills).	advanced education; corporate university; -health and nutrition; - flexible form of employment; - motivation to work (the possibility of self-realization, option program, job satisfaction, the implementation of their own initiatives and projects); - culture and leisure; - providing staff with business literature, valuable contacts and resources; - ecology and healthy lifestyle.	-internal communication (involvement in the labor process, teamwork, team-building); - establishing long-term relationships ("Declaration of values"); - issue of a monthly newsletter, which indicates the latest company news and development prospects; - corporate identification (personal approach).	- scientific staff; - technical staff; - technological staff; -management staff (specialists, managers, administrators).

	Key resources - the effectiveness of the system of interaction between shareholders, management and structural divisions; (professional teams, informal leaders, agile, scrum methodology, remote workstations, use of artificial intelligence) - motivation to work; -qualified management.		*Sales channels* - information systems (ERP, CRM); - instant messengers; - platforms; - mobile applications; - social networks.	
Cost structure -HR resources (selection, training, social programs, improving internal communications); - financing of scientific research of educational institutions.		*Revenue streams* - contribution to the development of new research areas; - contribution to the increase in company revenues; - contribution to the development of relations with customers; - contribution to the coordination of activities of units; - contribution to the successful development of a horizontal management structure; - contribution to the development of informal relationships between structural divisions.		

Table 4: Functional (personal) business model of A. Ostervalder and I. Pigne on the example of the informal leader of a professional team

Who helps you *(key partners)* *-a family;* *- managers;* *-specialists;* *-other professional teams*	**What are your responsibilities** *(key activities)* *-management of team business processes;* *-Human resources management;* *-initiation;* *-planning;* *-realization; monitoring;* *-the control;* *-analysis.*	**How do you help** *(value propositions)* - providing team members with the necessary literature, valuable contacts and resources to create a product; - the ability to listen to a team to implement their needs and needs; -motivation;	**How do you interact with employees** *(customer relationship)* -informal communication in a team (involvement in the process, team approach); -establishing friendships; - corporate identification (personal approach).	**Who do you help** *(consumer segments)* -organizations; - members of a professional team; - to other specialists;

	Who you are and what skills, competencies you own *(key resources)* *Soft skills* - verbal communication; - ability to manage time and stress; - the ability to make decisions; - identification, definition and resolution of problems; - stimulation and motivation of other team members; - delegation of authority; - setting goals and formulating a vision of the future organization; - introspection; - Creation of teams for relevant goals and objectives; - Conflict Management.	- mentoring (mentoring, coaching); - situational leadership.	**How you spread yourself and how you deliver value** *(sales channels)* - information systems (ERP, CRM); - instant messengers; - platforms; - mobile applications; - social networks.	
What do you invest *(cost structure)* - personal qualities (extraversion - a warm attitude towards others, sociability, self-confidence, activity, a sense of joy, optimism and positive emotions); - moral beliefs; - foundations and values; - time.		**What are you getting** *(revenue streams)* - realized idea; - achievement of the result; - increase the synergistic effect of structural units, professional teams that provide organizational and economic development of the organization; - material incentives for the leader and team;		

Conclusion

Thus, the authors found that the development of a traditional and functional (personal) business model has a positive tendency to develop a wide range of innovative solutions that form the basis of the organization for strategic planning and development. The art of human resource management has a high development potential and forms new information and communication technologies and platforms that are verified on traditional and functional business models in specialized organizations, where industry units based serving one or more types of activities are based. Such companies have a certain organizational structure, consisting of professional teams that are constantly generating options, tacking between creativity and decision-making speed in conditions of rapid adaptability, moving between other teams and ongoing projects, increasing the role of the human factor for creating new opportunities and effective results.

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The Development of The Methodology of The Capitalisation Ratio In the Real Estate Appraisal

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Abstract

A precise and justified assessment of assets plays an important role for successful investments in the real estate market. A significant influence on the result of the market cost is provided by the capitalisation ratio, which is used in the direct capitalisation method and to determine the cost of reversion in the method of discounting cash flows. The article considers the hypothesis about the possibility of predicting the capitalisation ratio, which is topical for reducing uncertainty in making managerial decisions. Authors developed a model that allows effectively predict the capitalisation ratio. The study has the inspection of the received model using objects of office real estate of St. Petersburg and a simulation modelling. Moreover, the article has comparison of the market capitalisation ratio of St. Petersburg and other major cities of the world. Next, the study analysed the influence of the chosen model technique of calculating the capitalisation ratio on the result of the valuation with a review of the main advantages and disadvantages of such model techniques. In order to determine the validity of using model techniques for real estate appraisal the cost of a hypothetical office building based on retrospective data of the St. Petersburg market in accordance with each model was calculated. The study presents comparison of the obtained results with a real dynamic row of the cost. In addition, it provides an alternative model for the calculation of value within the income approach to valuation, which gives results that are more accurate. The results of the study are the model for predicting the capitalisation ratio with a probability of 95% and recommendations for the effective use of model techniques for calculating the capitalisation ratio.

Keywords: Real Estate Appraisal; Income Approach To Evaluation; Capitalisation Ratio; Forecast Model; Model Techniques For Calculation Of The Capitalisation Ratio.

Introduction

Decision-making in the real estate market is hampered by the limited information on actual transactions of rent and sale of properties, as well as the lack of statistical data. In particular, the generally accepted capitalisation ratio is used to make decisions about investments in the market. It characterises the ratio of annual income to the initially invested capital. This ratio is used in the direct capitalisation method for the real estate appraisal.

The income direct capitalisation method converts the net (annual) operating income I_o into the market value V_o of the property by dividing this income onto the corresponding market rate of return (cap rate or total capitalisation ratio) R_o. Capitalisation ratio is a critical variable in commercial real estate valuations (Alesinskaya et al., 2017; An & Deng, 2009; Clayton et al., 2009). The income capitalisation formula is as follows:

$$V_o = \frac{I_o}{R_o}. \quad (1)$$

This method is most often used for the approximate assessment of the property's market value on the valuation date or to estimate the value of reversion (return of the invested capital) at the end of the forecast period when building cash flows in the income capitalisation method. In this case, the projected change in income by periods is approximately taken into account by the structure of the overall capitalisation ratio within the framework of model techniques, which will be discussed below. In (Glascock & Cunningham, 1983; Ellerman, 1994; Artemenkov et al., 2018; Atanasov et al., 2017; Battisti & Campo, 2019; Bril et al., 2018; Gribovsky, 2001 & 2007; Gribovsky et al., 2005; Kucharska – Stasiak, 2019; Ilin et al., 2014) the following models are proposed to use for determining the capitalisation ratio:

- Ellwood's model: $R_O = Y_O - \Delta \bullet \frac{Y_O}{(1+Y_O)^k - 1}$, (2)
- Inwood's model: $R_O = Y_O + \frac{Y_O}{(1+Y_O)^k - 1}$, (3)
- Hoskold's model: $R_O = Y_O + \frac{Y_{rf}}{(1+Y_{rf})^k - 1}$, (4)
- Ring's model: $R_o = Y_o - \Delta/k$, (5)
- Gordon's model: $R_o = Y_o - q$, (6)

Where

R_o – the reversion capitalisation ratio,
Y_o – the rate of return on capital corresponding to the return on the investment in similar real estate,
Y_{rf} – the risk-free rate of return on capital,
k – the period after which the wear level of the improvement will be 100%,
q – the growth rate of annual income in the post-forecast period,
Δ – the change in total property value for the forecast period.

Note that full depreciation techniques are rarely used in real estate valuation, although they have their supporters. Here, one should keep in mind the internal inconsistency of the Inwood's and Hoskold's models noted in (Ozerov, 2007; Laskin et al., 2016): they use the basic assumption of the Ellwood's model (2) about the immutability of income, which is difficult to agree with the assumption of the full depreciation of the object. The Ring's model (5) is formally free from this inconsistency because it suggests linear depreciation. The Gordon's model (6) is strictly implemented if incomes and prices for real estate grow with a constant inflation rate equal to q. There is no doubt that this model can be used in the valuation of land as an asset that is not physically depreciated. However, when choosing a model for estimating the value of improvements, one must take into account physical, functional and economic depreciation, which may not necessarily be less than inflation or other cost increases (Lee et al., 2014).

In the practice of assessment with the income approach, it is more appropriate to use the discounted cash flow model (DCF model), which assumes that the value of reversion at the end of the forecast period is determined by the capitalisation of income of the first post-forecast period. That is, the value of reversion is determined by the model techniques by capitalising the income of a post-forecast period using the accepted capitalisation ratio. Thus, in the DCF model, the result of the real estate market value depends on:

- the level of market income;
- the accepted dynamics of changes in income;
- the accepted discount rate (rate of return on capital);
- the selected reversion value calculation model (Leifer, 2006).

Additionally, to the above models, the value of the real estate object at the valuation date can be determined "model" without determining the reversion by the formula (7) presented in (Leifer, 2010; Gribovskiy et al., 2005):

$$V_O = \sum_{i=1}^{n} \frac{I_{oi}}{(1+Y_O)^i} \Bigg/ \left(1 - \frac{(1+\Delta)}{(1+Y_O)^i}\right), \tag{7}$$

Where

n – the period of operation,
V_o – the current value of the object,
Y_o – the rate of return on capital,
I_o – the net operating income,
Δ – the change in value for the forecast period.

The analysis of existing model techniques shows that the issue of justification the rationale capitalisation ratio and the choice of the model technique for the reversion assessment is relevant for appraisers, since the resulting value of this coefficient significantly affects the determined value of the object. Taking into consideration the lack of information and the importance of overcoming the uncertainty for making certain decisions it is necessary to continue the research works of the authors (Ilin et al., 2018; Kozlov et al., 2017; Leifer, 2010; Mochulaev, 2010; Sivitanides, 2003; Bril et al., 2017), and to provide the ability to predict the capitalisation rate.

The purpose of the presented paper is to provide a model allowing to forecast capitalisation ratio and to determine depending of the object's market value on the chosen assessment model technique for cap rate calculation when evaluating reversion.

Methodology

The indicators characterising the office real estate market of St. Petersburg were used as initial data for building the model (Ozerov et al., 2017). Based on the available information on rental prices and sales of office property in St. Petersburg over the eighteen-year period, the corresponding time-series data were constructed. To implement the forecasting, the main trend of each series was identified by alignment using analytical formulas. The tendency of development of indicators in both cases is characterised by power dependence:

- for rental market: $A_m = 2259 \times t^{0,53}$;
- for the app price market: $P = 4233 \times t^{1,13}$,

Where

A_m – the average market rental rate of the office real estate (roubles per sq. m per year),
P – average market price of the offer on the real estate market (roubles per sq. m),
t – serial number of the year (t = 1 for 2002, t = 19 for 2020).

The existing values of the price characteristics of office real estate in the rental and sale markets in St. Petersburg, as well as the underutilisation coefficient (K_v) adopted at the average market level of 5%, and the ratio of operating expenses (K_{oe}) equalled to 35 % were taking into account. Capitalisation rate was calculated using the formula (Ozerov, 2007, p. 217; Rusakov et al., 2016):

$$R_o = (1 - K_{oe}) / M_{eg}, \tag{8}$$

where M_{eg} is the effective gross income multiplier obtained as the ratio of the price of real estate to the income from the lease minus underloading. The derived values of R_o over a long period create a dynamic range, which also has a power form of the trend:

$$R_o = 0.302 \times t^{-0.604}, \quad (9)$$

where t is a serial number of the year (t = 1 for 2002, t = 19 for 2020).

In order to take into account the uncertainty in the source data as possible deviations in the values of underload coefficient and operating expenses ratio, rental payment rates and cost of facilities, it is necessary to investigate the influence of these factors on the predicted values of the capitalisation ratio. Such deviations can be estimated by applying the Monte-Carlo simulation method (Gribovskiy et al., 2005; Poljanskihh et al., 2018; Saveliev, 2013; Zaychenko et al., 2018). This method is based on the opportunities of obtaining a distribution of indicator values for a large number of combinations of determining factors. In each such combination, the values of the factors are randomly selected from the predetermined ranges (see Table 1).

In this case, the total capitalisation ratio acts as the resulting variable, and the above model (1) describes the relationship between the source data and the result. A uniform distribution was chosen for all key factors. The number of tests (simulated scenarios) is assumed to be 10,000. Multicollinearity between factors is absent. Corresponding capitalisation ratio is defined for each scenario. Its average value and statistical indicators characterising the degree of the individual deviations from the mean values are calculated (see Table 1).

Table 1: The results of the risk analysis

Indicator (factor)	**Minimum**	**Maximum**
Rental payment rate, roubles per sq. m per year	9490	12323
Underload coefficient	5%	10%
Operating expenses ratio	30%	40%
Value, roubles per sq. m	95,493	165,967
Average capitalisation ratio	0.051	
Standard deviation	0.009	
The coefficient of variation	0.182	

Possible values of R_o can be represented graphically (see fig. 1). According to the results of 10,000 tests it was revealed that the most common value is $R_o = 5\%$, which corresponds to the previously predicted value of the coefficient. It also can be seen that the calculated values of the capitalisation ratio for chosen business centres “SetlCentre” and “Obvodny Dvor” fall within the range of possible values of the studied indicator.

Thus, the model (1) with a probability of 95% allows predicting the market capitalisation ratio based on the multiplier values obtained from monitoring and the operating expenses ratio.

The obtained market capitalisation ratio can be used in the future for management purposes.

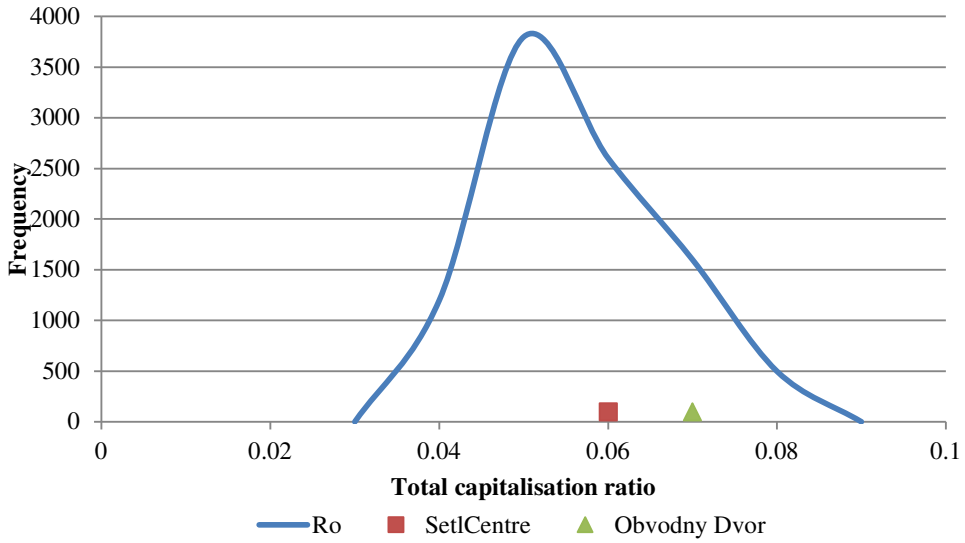

Fig. 1: The distribution of the capitalisation ratio values

Discussion of results

Such a forecast allows taking into account various options for changing market conditions; in particular, some future risks associated with price changes in real estate market. In addition, it simplifies the process of adjusting the expected values of the cap rate.

It is worth noting that the capitalisation ratio acts as a characteristic of the profitability of the property, and therefore, the desired level of the indicator should be higher. However, at equal prices preferable object should be with a smaller cap rate, since, despite the lower revenue, the object is estimated as high as bringing more income. This means that at a lower capitalisation ratio in the present case the object value management will be more effective. These findings are supported by the comparison of cap rate values in developing and developed countries (for the latter – ratio is usually lower). Thus, a comparison of the obtained indicators with world values in this case allows us more fully assess the tendency of the indicator under consideration.

To achieve this goal, a hypothetical office property with an average rental rate was chosen. Value of the project is known to calculate, as of June 2018 years, so as to have the actual data changes in rental rates and the property value over the forecast period (when writing the paper the retro-period is taken from 2012 to 2018). For the calculation of model, it is noted:

- The rental rate of the object of study at the average market level equal to 8273 roubles for the sq. m per year;
- A period of operation is 6 years (retro-period is from 2012 to 2018);
- A change in income dynamics equal to the actual change in rental income for the analysed period 2012-2018 (see fig. 2);
- The forecast of rental rate increase according to the trend shown in fig. 2;
- The underload coefficient is at the average market level of 5%;
- The rate of return on capital is at a minimum level of 11%, proposed for member banks of the Association of Banks of the North West in (Pupentsova and Livintsova, 2018).

Therefore, in the DCF model all indicators including changes in cash flows were taken as actual for the period under review. The result of the object value can only vary depending on the selected model for calculating the reversion. The object area is not used in the model. The calculation is made for 1 sq. m of the office real estate. The assumption is accepted that physical and functional obsolescence will not be able to affect either annual revenues or the reversion value, since timely scheduled repairs

are taken into account in the reserve for replacement. For model (7), the actual change in value (Δ) for the analysed period was taken at the level of 39% (see Fig. 2). The trend is transferred to the post-forecast period, so the change in value (Δ) for models (2) and (5) is also taken at the level of 39%.

The results obtained are compared with the average values aligning them with the actual value of a number of dynamic office real estate for the analysed period 2012-2018 years (see Fig. 2).

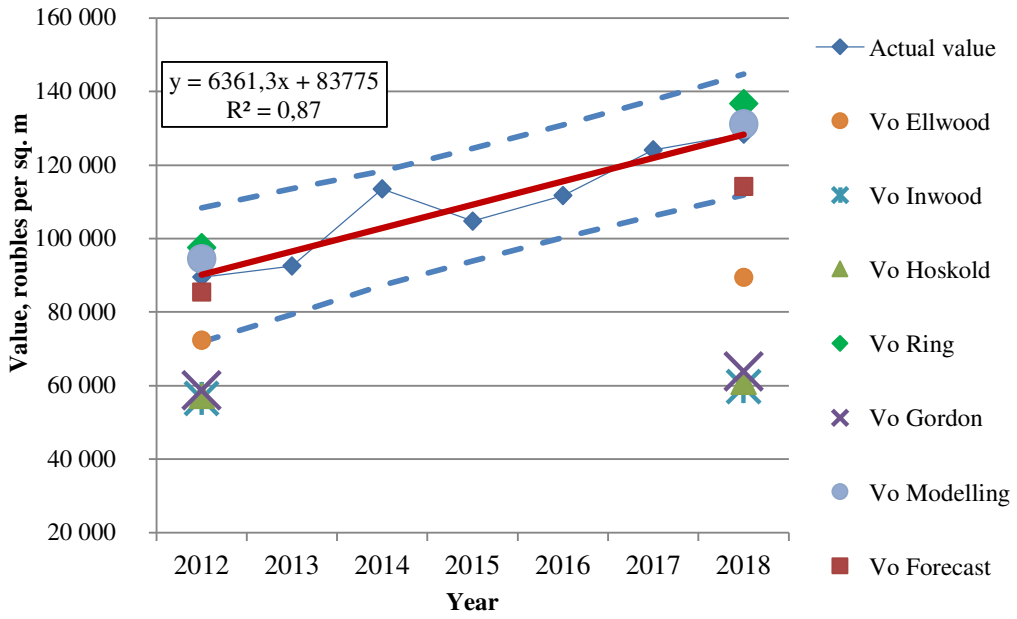

Fig. 2: The influence of the chosen modelling technique for calculating the reversal capitalisation ratio on the object value

Dynamic range based on market data for the indicated period with the application of the value of the object as of the estimated valuation date 2012 and the value of reversion, obtained by model techniques for 2018 is smoothed by a linear trend. The equation of this trend is shown in Figure 2.

Analysis of the current situation and the above calculations allow to conclude that with a 95% probability the market value of the object at the valuation date is in the range of 72,000–108,000 roubles per sq. m. Value of the object obtained by the DCF method using the formula (7) is inside confidence interval. Comparable results were obtained by the DCF method, where the capitalisation ratio for reversion was determined according to the Ring's model (5) and the "forecast" model using the operating expenses ratio and the market multiplier (8). Other reversion models led to an underestimation of the value and falling out of the confidence interval of the estimated value. It should be noted that in this paper the derived market trends for the rental rate were used for modelling the net operating income, while the losses, underload and operating expenses were given by market average coefficients. More accurate results would have been obtained by collecting retro statistics and forecasting changes for each item of operating expenses.

Conclusion

The results of this research show that the ready model (1) has been obtained from the above analysis. This model allows to predict the possible capitalisation ratio value with probability of 95% and to use it further for management purposes.

The calculations presented in this paper suggest that today due to the lack of stable prerequisites for long-term forecasting and stagnation in the rental market of the real estate it is illogical to use

Inwood's model (3), Hoskold's model (4) and Gordon's model (6) to calculate the reversion value in the method of discounted cash flows. The use of the Ellwood's model (2) for calculating the reversion allows obtaining objects value comparable to the lower limit of the confidence interval.

The coincidence of the estimated object value with the actual market data demonstrated following modelling techniques of the capitalisation ratio calculation for reversion:

- The "forecast" using the operating expenses ratio and market multiplier (1);
- Ring's model (5).

The analysis allows to recommend to appraisers using the model (7) at the income approach without defining reversion focusing on the justification of the market changes of the object value (Δ) over the forecast period.

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The Method of The Digital Potential of Industrial Enterprise Assessment

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Abstract

In modern conditions, enterprises even in traditional industries are faced with the need to maintain competitiveness based on the use of information technologies not only in the processes of organizing economic activities, but also with the need to transform the entire business model. This determines the real topicality of developing an indicator reflecting the company's readiness for a digital transformation. The authors propose a definition of the term "digital potential" and an approach to quantifying the digital potential of an industrial enterprise as an integrated indicator that allows assessing the resources and capabilities of the enterprise to transform business processes, taking into account the action of environmental factors in the process of digitization of the economy. The integrated indicator includes two groups of characteristics that reflect the state of the external and internal business environment of the enterprise. The list of indicators is proposed. All indicators can be quantified from the company's official reports. The article offers a formula for determining the integral indicator of the digital potential as a convolution of separate indicators. The proposed approach allows us to analyze not only the current level of digitalization of business processes in the enterprise, but also the possibilities of increasing the digital potential.

Keywords: Digital Transformation, Digital Potential, Industrial Enterprise, Assessment Method

Introduction

The competitiveness of modern industrial enterprises is mostly defined by the level of digitalization of all business processes. Moreover, the concept of Industry 4.0 (www.plattform-i40.de, 2020) implies not only an end-to-end digital transformation of all stages of product value creation, but also further integration of the enterprise's digital environment together with contractors participating in the value chain into a single "digital ecosystem". Results of the researches show that the development of digital technologies requires the transformation of the business model even in traditional industries (Andal-Ancion et al 2003). Thus, an industrial enterprise aimed at successful activity in the long term is forced to restructure its activities in all areas, including the processes of development and promotion of the company's products, the production process itself, the procurement process, logistics, and management accounting. The result may be an additional economic effect from increasing the effectiveness of interaction with stakeholders.

Adaptation of the company to the emerging new conditions and requirements of economic activity requires the selection of indicators allowing to evaluate the effectiveness of activities. This assessment can take place in two ways, each of which has its own advantages and disadvantages:

- the formation of a balanced system of indicators (BSC) that allows you to collectively analyze the results achieved (Kaplan and Norton, 2004);
- defining an integrated indicator that can be used as a digital potential of economic system (region, enterprise, corporation, etc.).

The issues of building BSC of various economic systems are widely and in detail discussed by the scientific community, including the inclusion of indicators that reflect the level of their digitalization (Kozlov et al, 2016) .The concept of "digital potential" and methods of its definition in relation to economic systems attract much less attention of researchers at the present time. Therefore, the problem of determining the digital potential as an integral indicator that allows you to assess the ability of an enterprise to transform business processes in the digitization of the economy becomes relevant. The digital potential of an enterprise is a relatively new concept for both Russian and foreign scientific society. Until now, scientists ' interest has focused on the concept of "Innovative potential", for example, publications Erygin Y.V. et al, (2019) and Kalenov O. et al (2019). This is partly due to the fact that the concept of "digital economy" was introduced into scientific circulation relatively recently, at the end of the 20th century (Negroponte, N. 1995). The problems of company digitalization are relevant in various industries (Maydanova et al, 2019; Zaychenko et al, 2018).

The information and innovation potential of an enterprise is not a substitute for digital potential. Information potential characterizes the processes of information interaction in the enterprise, not fully taking into account one of the important factors that is noted in all methods - the qualification of employees of the enterprise. In addition, digitalization involves not only the introduction of information technologies in management processes, but also changing the business development strategy. Innovation potential involves evaluating the company's ability to implement innovations, including those that are not related to the digitization of business processes. It means the digital potential is an indicator that reflects the new challenges and opportunities that have appeared in the company in the conditions of intensive digitalization of business processes.

Thus, the article goal is to improve methodology of the digital potential of industrial enterprise valuing.

There are definite tasks to be done to achieve the goal.

1. To develop the advanced approach to formulation of the term “digital potential of industrial enterprise”.
2. To propose the method for the digital potential of industrial enterprise calculation based on the performance indicators of that specific type of enterprises.
3. To identify the industrial enterprise performance indicators presented in official reports
4. To propose the formula for the digital potential of industrial enterprise calculation.
5. To verify the workability of the formula for the digital potential of industrial enterprise calculation

Literature Review

The term “digital potential” is used in the scientific literature, but it is not defined clearly enough and is interpreted in two senses. The most common approach is to define the concept of "digital potential" as a characteristic of the capabilities of economic systems to use digital technologies, and it is used to describe the situation with the use of digital technologies in regional markets and territories (Tsukerman et al, 2017) or industries, i.e. chemical (Porter et al, 2016), or agricultural (Fabregas et al, 2019). The most advanced approaches are developed for valuating of the level of development of digital technologies in individual countries. To assess the readiness of individual countries ' economies for digital transformation, a number of indicators (indexes) are used to assess the level of development of digital technologies in individual countries. The most relevant ones are:

- Networked Readiness Index (NRI), published since 2002 by the world economic forum and INSEAD international business school (Baller, S. et al, 2016).
- ICT Development Index (IDI), proposed by the International Telecommunication Union (ITU) in 2007. The index is calculated based on 11 indicators grouped into 3 large groups: access, usage, and skills (www.itu.int).
- Information Society Index (ISI) calculated by World Times and IDC (international data Corporation), describes the level of development of information technologies and availability of

information in individual countries (https://www.idc.com). The index is calculated based on 15 indicators grouped into 4 groups: computers; telecommunications; Internet; social development.

There are also known methods for evaluating the potential of business digitalization in various industries. The most interesting indicator is the Industry Digitalization Index (IDI), proposed by McKinsey & Company, which allows us to assess changes in the field of digitalization of individual industries, digitization of processes of general business activity. The index includes the list of indicators grouped into 4 groups: input, processing, output, and underlying infrastructure (strategyand.pwc.com, 2020).

Among Russian studies in this area, we highlight the rating of readiness of industries for the digital economy (Popov and Semyachkov, 2017). The rating assumes the calculation of 22 indicators that are combined into 3 sub-indices: equipment availability; software; human resources potential of industries. The overall rating is defined as the weighted average of the three sub-indices.

The method fully corresponds to the authors 'interpretation of the concept of "digital potential of the enterprise", given above, i.e. it takes into account only resources, but not opportunities.
Note that the considered indicators differ significantly in the structure and number of their components (both quantitative and qualitative), as well as in the calculation method. They provide an opportunity to analyze cross-country, regional, or cross-industry digital development. However, despite the completeness of the presented approaches and their testing in determining the digital potential of industries and other economic systems, they cannot be fully used to assess the digital potential of an individual enterprise, because, firstly, they do not take into account the specifics of the individual enterprise, as well as its ability to implement and apply information technologies.

Secondly, it is not possible to determine the potential as the level of development of digital and information and communication technologies, and in this sense, the digital potential indicator can serve as a tool for managing the innovative development of an enterprise.

In relation to an enterprise, the concept of digital potential in the first sense is used to describe the possibility of building a more effective information management system by expanding the use of computer programs, improving the information literacy of personnel (Granado, Romero and Rodríguez, 2015) or introducing digital technologies into the production process (Scrimshaw, 2009). The authors Popov E.V., Semyachkov K.A. and Moskalenko J.A. (2019) proposed the method of digital potential of enterprise assessment based on two indices , namely the Networked Readiness Index and the global ICT Development Index for mini-economic level of management. Kozlov A. and Teslya A. (2019) present the approach and the method of digital potential of industrial enterprise calculation as an integrated indicator. The method is based on including of te two groups of characteristics reflecting the state of the external and internal business environment of the enterprise. The authors figured the characteristics of the external and internal environment out. However the study doesn't propose the justified formula for integrated indicator calculation, presenting some options for the readers.

Results

The idea of taking into account two groups of indicators for calculating of the digital potential of an enterprise reflecting internal and external factors seems the most justified. However the factors of the first group are not homogenous. It is reasonable to distinguish firstly, factors and corresponding indicators characterizing the company's current resources, secondly, the factors and corresponding indicators characterizing the capabilities of an enterprise to implement digital technologies.

All this allows us to identify the main groups of indicators that can be used to assess the digital potential of the enterprise.

1. The state of a business environment.
1.1 A group of indicators that reflect the industry's objective readiness to form a digital economy.

An integral indicator, such as McKinsey & Company, can be used here, or a Rating of industry readiness for the digital economy that takes into account Russian specifics.

1.2 Indicators taking into account the readiness of specific key stakeholders of the company to interact when implementing digital technologies.
This section may contain indicators that reflect the readiness of resource and service providers to use new digital technologies, and their readiness to interact in new conditions. You can also add indicators that take into account the ability of the company to find new suppliers and contractors in the absence of readiness for interaction.

1.3 The indicators reflecting the goodwill of consumers of the company's products when using the interaction options offered by digital technologies.
Indicators should reflect the level of digital literacy of consumers, their skills in using digital technologies, their loyalty to changes, and the ability to form feedback in order to adapt products for specific consumers and ability of interaction of the enterprise with new groups of consumers.

1.4. State activity.
The state can influence the growth rate of digitalization of the industry. For example, the high level of digital potential in the field of education in the Russian Federation is largely due to the purposeful actions of the state that encourage educational institutions to introduce digital technologies in the organization of the educational process. This section may contain indicators that reflect the level of state activity in the field of lawmaking to enhance the digitalization of the industry, as well as the possibility of obtaining additional funding for the development and implementation of new technologies.

Indicators of the internal environment of the enterprise

2.1 The indicators reflecting the company's current resources
2.1.1 Indicators of enterprise ICT security.
There can be indicators that reflect the cost of it assets of the enterprise (computers, servers), the share of expenses for ICT equipment in the total expenses of the enterprise.

2.1.2 Indicators of information technology security of the enterprise (indicators that characterize the cost of software in the enterprise, as well as the share of total expenses for software or IT services.

2.1.3 The indicators reflecting reflect the level of use of digital technologies in various areas of internal activity of the enterprise (when planning, organizing accounting, organizing interaction of departments for large companies, when organizing the production process).

2.1.4 Indicators that reflect the level of use of digital technologies in the organization of interaction with stakeholders (when organizing purchases, conducting calculations, etc.).

2.1.5 The indicators reflecting the level of use of digital technologies for interaction with consumers (share of online sales in total revenue of the enterprise, the process of the feedback with consumers through social networks and other services, the level of use of information for marketing).
2.1.6 The indicators reflecting the level of digitalization of labor activity. For example, the share of employees employed in the field of information technology (programmers, developers) engaged in the analysis of information obtained through the use of IT technologies in the enterprise, the share of employees who use IT technologies in performing their functions, the share of costs for IT technologies and ICT equipment per employee.

2.1.7 The indicators reflecting the financial stability of the company (indicators of financial stability and liquidity of the company's assets).

2.2 The indicators reflecting the capabilities of an enterprise to implement digital technologies.

2.2.1 Indicators of the possibility of implementing information technologies in the company's activities. This section may include indicators that characterize the share of new information programs and equipment implemented by the company's employees during the reporting period.

2.2.2 The indicators reflecting the possibilities of creating your own information technologies. This section may include indicators that characterize the share of new information systems created or modified by the enterprise. As well as indicators reflecting the integration of information technologies with systems already used.

2.2.3 The indicators reflecting the possibilities of promoting information technologies for interaction with stakeholders. This section may include indicators that characterize the number of information technologies implemented when interacting with suppliers, contractors, and consumers. As well as the company's ability to further support the technologies used.

2.2.4 The indicators reflecting the readiness of the company's staff to further implement digital technologies in the enterprise. Indicators in this section may reflect the ability of the company's staff to train or the ability to attract new staff with the required level of digital competences development, as well as indicators of the staff's ability to ensure information security of the company's activities.

2.2.5 The indicators reflecting the financial capabilities of the company. Here it is advisable to present indicators that reflect the growth rate of key performance indicators (profit, revenue, etc.) depending on the industry, as well as the company's ability to attract external financial resources.
Thus, section 2.1 is represented by stock indicators that are determined at the time of evaluating the enterprise's digital potential. Indicators in section 2.2 are flow indicators that can be determined based on the company's current reporting and development plans. Indicators can be supplemented for each individual enterprise, taking into account the specifics of the industry, the specific conditions of the enterprise. A different set of indicators for assessing the digital potential of individual enterprises in different industries is not a problem, since it is not about comparing the performance of individual enterprises, but about the dynamics of the development of an individual enterprise.

The digital potential of the enterprise, formed according to the proposed method, reflects various aspects of the enterprise's activity and requires taking into account various indicators that have different dimensions. To obtain a single integral indicator, they must be brought to a single scale of measurement, which can be achieved by normalizing.

Since the significance of each group of indicators in the development of the enterprise's digital potential may differ significantly, it is necessary to take into account the priority (weight) of indicators. Coefficients of importance of criteria can be obtained using formal procedures or using expert assessments. The digital potential (*DP*) using the additive approach can be calculated as

$$DP = \alpha \sum_1^{n_1} {P_{1i}}/{n_1} + \beta \sum_1^{n_2} {P_{2i}}/{n_2} + \gamma \sum_1^{n_3} {P_{3i}}/{n_3} \quad ,$$

where: P_{ji} - the normalized values of individual indicator *i* of the group *j* (*j*=1, 2, 3);
n_j – the number of indicators of the group j;
α , β, γ - coefficients of the significance (weight) of the 1st , 2nd and 3rd group of indicators, correspondingly.
Within each group, indicators can be taken equal or ranked based on their significance.

Some other more complicated models, such as the parametric entropy method, the Saati method, and the principal component method, can also be used to obtain a numerical assessment of the integral indicator - the digital potential. In this case, the absolute value of the obtained indicator is not significant. However, the calculation of the digital potential over several periods will allow you to track the dynamics of changes in the level of use of digital technologies in the enterprise, as well as the effectiveness and expediency of the activities carried out. It is possible to perform a numerical assessment using several methods to confirm the reliability of the changes obtained based on the results of the activities carried out.

Conclusions

The further development of the digital economy will affect all aspects of the company's activity, its competitiveness, and relationships with suppliers, contractors, and consumers. The readiness of the enterprise to accept new transformational changes requires not the introduction of information technologies in the organization of economic activity of the enterprise, but changes in the entire business model. This, in turn, requires the formation of a criterion that allows you to track these changes, as well as evaluate their feasibility. This indicator can be the digital potential of the enterprise.

The proposed approach to assessing the digital potential allows the top managers to analyze not only the current level of digitalization of business processes in the enterprise, but also the possibilities of increasing the digital potential. The proposed approach took into account different levels of readiness of economic sectors to use digital technologies when including indicators that reflect the degree of benevolence of the external environment of the enterprise to digital changes, as well as their demand by external stakeholders of the enterprise. Thus, the authors included indicators that reflect the industry's readiness to form a digital environment, indicators taking into account the readiness of specific key stakeholders of the enterprise to interact, characteristics of the level of goodwill of consumers of the company's products when using the interaction options offered by digital technologies, as well as the degree of state support for digitalization processes in this industry. The indicators of the internal environment include two groups of characteristics that reflect, first, the resources of the enterprise at the moment, and secondly, indicators that reflect the future capabilities of the enterprise to implement digital technologies, in particular, indicators of the possibility of introducing information technologies in the enterprise's activities, that is, indicators that characterize the share of new information programs and equipment introduced by employees of the enterprise during the reporting period, further indicators that reflect the possibility of creating their own information technologies, promotion of information technologies for interaction with stakeholders, readiness of the company's personnel for further implementation of digital technologies in the enterprise and indicators that reflect the financial capabilities of the enterprise. A formula for determining the integral indicator of the digital potential as a convolution of separate indicators is presented.

In the future, the study will be aimed at adapting the proposed methodology for enterprises of individual industries or regions. Indicators that form separate groups can be updated or changed; workability of the methods is to be proved. The article does not regard the issues of forming a strategy for managing the development of the enterprise's digital potential, which may be a separate area for further research.

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The Perceptions and Approaches of The Russian Universities' Students to The Channels of Communication with Teachers

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Abstract

The goal of the study is figuring out the perceptions and approaches of the Russian universities' students regarding the preferable channels of communication with their teachers in study process: based on modern digital technologies or face to face direct communications and tracing the dynamics of these perceptions and approaches in the period of 2017-2019. The target group of the study is students of Peter the Great St. Petersburg Polytechnic University. For the comparative analysis were used results of the previous researches conducted in Murmansk region and Krasnodar Territory of the Russian Federation. The questionnaire developed for interviewing consists of 4 sections and 21 questions and was presented in hard copies and in on-line version in Google Forms. The total number of respondents was 243 students of Peter the Great St. Petersburg Polytechnic University (276 in the year 2017 and 67 in the year 2019. The study reveals the positive dynamics in use of the modern educational platforms and electronic databases by the students. The main influencing factor is recommendations of their teachers. However, the research discovers the fact that an essential part of students can be described as rather conservative creatures in their approach to usage of e-learning, information and digital technologies in studying. The percentage of these conservators can be valuated as app. 30-35 % of the whole sample. Finally the authors indicate the study limitations and directions of the future investigations.

Keywords: University Students, Communication Channels, Information And Communication Technologies In Education, Digital Learning

Introduction

The prosperity of human society, the effectiveness and productivity of workforce in the digital future depends on quality of education provided by modern universities (Ilin et al, 2016). The key subject of educational process in universities is a teacher. The ability of the university teachers to communicate with students sharing their knowledge and developing skills is a crucial factor for successful educational process and formation of necessary competences of universities' graduates. The new channels of communication between teachers and students presented by modern information and communication technologies (ICT) give opportunities for both actors of an educational process to choose the most appropriate tools of communication. This situation generates the raw of questions which are as follows.

- What are the students' perceptions and preferences in using of communication channels with their teachers?
- What are the most comfortable and attractive from students' point of view tools for bridging students and teachers?
- In what extend modern information and communication technologies are able to replace traditional lectures, seminars and practical class exercises?
- Do the students prefer face to face classroom sessions or online ways of communication?
- What is the dynamics of the students' perceptions and preferences in using of communication channels with their teachers in the course of time (2017-2019)?

These questions are applicable to the most of the countries of the world. However the due to current social and economic problems in Russia, low level of economic growth (average +0,75% annual GDP growth for the last four years (and vital necessity of digital transformation of Russian economy the problem has a particular importance for the Russian Federation.

Thus, the goal of the article is figuring out the perceptions and approaches of the Russian universities' students regarding the preferable channels of communication with their teachers in study process: based on modern digital technologies or face to face direct communications and tracing the dynamics of these perceptions and approaches during the period of 2017-2019.

To achieve the goal the following tasks are to be realized.

1. Development of questionnaire focused on the identification of the perceptions and approaches of the Russian universities' students regarding the preferable channels of communication with their teachers
2. The determination of the target groups for interviewing (location, sample of respondents, etc.).
3. Organizing the interviewing process in university located in different regions of Russian Federation.
4. Analysis of the interviewing results, interpretation, and comparison of the results obtained in different regions.
5. Formulation of recommendations regarding the communications of Russian university students with their teachers.

Literature Review

The approach to education at Russian universities is changing; there is an ever closer relationship between universities and real business (Kankovskaya et al, 2018). The requirements for digital competencies of university graduates are growing at enterprises of various industries (Iljashenko et al, 2019; Zaychenko et al, 2019). The development of digital technologies has identified modern opportunities for universities to access to information sources and knowledge bases, including global best practices. One of the trends of modern Russian higher education has been the reduction of hours for face to face classroom sessions, which are to be replaced by distance education using ICT. Despite the fact that this trend is actively supported by the administration of universities, students are not always satisfied with the inability to use traditional formats of interaction with teachers, including: lectures, consultations, and practical classes since ICTs violate the traditional teaching methods. Undoubtedly, the technologies of knowledge sharing (KS) have become an important research area especially in the context of knowledge management (KM) (Salloum et al, 2016).

What communication channels do students prefer? According to a study Tan and McWilliam (2013), presenting the results of students interacting with digital technologies in an institutional school environment, new opportunities are more attractive for students who are internally focused on learning new things, acquiring qualitatively new skills. At the same time, students primarily focused on getting the right answer and an external positive assessment from the teacher, they are more likely to resist the use of new technologies.

The search for communication channels between students and lecturers is a new problem for Russian universities, so we will pay most attention to the analysis of foreign experience. Consider a study Santos et al (2019.) to find out for what tasks and situations students and teachers use ICT and also whether the expectations regarding the use of ICT for teachers and students coincide. A large-scale questionnaire survey covered 570 responses of students (and 172 responses from lecturers. It showed that communication through e-mail and collaborative technologies remain the preferred forms of interaction, while institutional support for the availability of communication tools is important. We also note that, despite the fact that expectations from the use of ICT are the same, lecturers more often recognize the presence of information and communication overload.

Researchers from both developed and developing countries, including such as United Kingdom, Turkey, Jordan (Al-Gamal et al, 2016), Malaysia (Yussiff et al, 2013), Nigeria (Omekwu et al, 2014), Australia (Romeo et al, 2012) share the experience of using ICT in education. Work on this topic is often based on targeted surveys of students. Many articles are devoted to the analysis of the positive experience of using social networks, including the study of a foreign language, as it allows you to stimulate interaction between students, communication in the target language (Baföz, 2016; Aydin, 2013).

A large number of articles are devoted to the role of social media in higher education (Tess, 2013), the possibilities and limitations (Al-Qaysi et al, 2018) of using social networks to improve interaction between students, as well as students and teachers. This trend is also observed in Russia, where professors turn to modern technologies to mediate and improve their learning, as well as to stimulate active student learning. Most students recognize the importance of social networks and their impact on their daily lives (Mahadi et al, 2016).

Ambika P. et al (2016) note that microblogging, implemented on Twitter and Facebook, is an important channel for students to interact. At universities, microblogging can be used as a back channel during lectures, creating the feeling of online learning on the forum. Facebook is one of the popular platforms, and a large number of studies are devoted to its role in the organization of training. (Habes et al, 2018; Roblyer et al, 2010). According to Roblyer et al (2010), students more likely than professors prefer to use Facebook and significantly more open to using Facebook and similar technologies to support classroom work. Professors have a predisposition to use more “traditional" technologies, such as email.

But positive reviews are not unambiguous. Selwyn N. (2009) examined the Facebook “wall” using in-depth qualitative analysis. More than 900 students were anonymously interviewed, the analysis of the records showed that the use of the application was mainly based on either retrospective criticism of the educational experience and events, the exchange of information about the teaching and assessment requirements, requests and moral support regarding assessment or training, etc. Thus, the use of Facebook seems more like a tool for solving everyday problems or conflicts in the learning process than a source of additional knowledge.

Conducted in Balakrishnan (2017), the analysis revealed six factors that affect intention to use social media for learning. These are: personality, information and communication technology facility, collectivism, communication functionality, effort / influence and performance). The impact of ICT facility and collectivism is negligible. The results also showed that, although their intention to use learning on social networks is the most important factor. Students do not actually use networks for learning unless they are encouraged or implemented policies that use social networks as part of teaching and learning.

The notable is the study of the prevalence of internet addiction (IA) and its association with psychological distress and coping strategies among university students in Jordan (Al-Gamal et al, 2016). The prevalence of Internet addiction was 40% among students, which is associated with a high level of student stress. The authors note that IA is a potential problem for this population.

Omekwu C.O., Eke H.N. and Odoh N.J. (2014) focused on the negative aspects of the use of social networks by students. According to the recommendations, universities should organize seminars to educate students about the negative aspects of using social networking sites as a means of interaction. Emphasis is placed on the importance of face-to-face communication, including at the workshops.

Thus, the problem of choosing forms of interaction between professors and students is relevant for universities in different countries. Despite the fact that the most of researchers have a positive attitude to the use of modern information and communication technologies, questions are raised about the limitations and negative consequences of their use, in particular social networks, in the learning process. Note that the work does not fully disclose the question of students' preferences when choosing one form or another of interaction with a lecturer in the process of studying a given course. And also, we are not talking about a complete rejection of direct face-to-face interaction and the transition only to distance learning.

Some differences in the work of researchers led to the conclusion that it is advisable to take into account country and regional specifics (which is relevant for such a large country as Russia, with high level of regional diversity). The foregoing makes the proposed study below relevant. Hence, the literature review confirmed the topicality of the study its goal of the article.

Methodology

This study is a continuation of the research started in spring of 2018 with students of Peter the Great St.Petersburg Polytechnic University as a target group. The first results were presented in the article (Kozlov et al, 2019a) with focus on the problems of the digital competences formation for Industry 4.0 workforce. The next phase of the study conducted in 2019 has covered more students of Peter the Great St.Petersburg Polytechnic University, students of the Murmansk Arctic State University (branch in the town of Apatity) and Kuban State Technological University Krasnodar and some other universities of Krasnodar Territory (Sothern Federal District of Russian Federation). All the studies are using the same research methods which are based on classical interviewing technology with survey developed and following analysis of the results. The analysis is based on usage of general qualitative scientific methods, such as comparative, content, and systemic analysis, and quantitative ones typical for empirical data analysis.

Thus, the study's process consists of the following steps.

1. Formulating of the purpose of the study.
2. Identification of the target groups, in our particular study, students of Peter the Great St. Petersburg Polytechnic University.
3. Adaptation of the survey to the study purpose.
4. Printing of hard copies for face to face interviewing and publishing the online version of the survey via Google Forms.
5. Interviewing of representatives of the target group using the combination of on line and face to face techniques. The total number of respondents was 243 students of Peter the Great St. Petersburg Polytechnic University (276 in the year 2017 and 67 in the year 2019).
6. Conducting the comparative analysis of the results obtained. Comparison with results of studies conducted earlier in Murmansk region, and Krasnodar Territory.
7. Formulation of conclusions and recommendations.

Results

The investigation was conducted at Peter the Great St. Petersburg Polytechnic University during three academic years among students of the Institute of Industrial Management, Economics and Trade. The sample design corresponds to the structure of the general set of students of the Institute of Industrial Management, Economics and Trade: 70% of them are students of the bachelor programs, 30% are studying at the master level. Gender distribution is as follows: 40% of interviewees are males, 60%

are females. The majority of respondents are citizens of the Russian Federation (68% in 2017, 80% in 2019), the rest are foreign students. The total number of respondents was 250.

The most important results of interviewing are the following.

In 2017 only 63% of respondents used educational platforms (EP) in the educational process, but in 2019 their share increased to 91% (Fig.1).

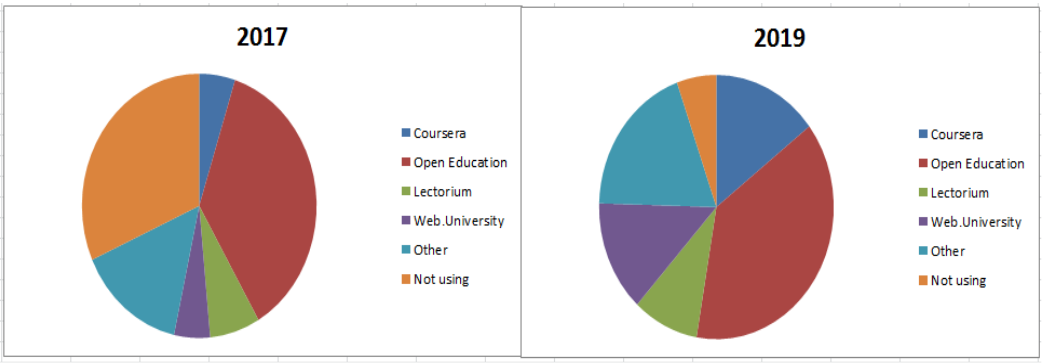

Fig.1: The use of educational platforms

The most popular educational platform is OpenEdu (43,2% in 2017, 62,69% in 2019) – the Russian educational platform that offers MOOC of leading Russian universities. Peter the Great St. Petersburg Polytechnic University is one of the leaders of open education in Russia with an active MOOC implementation strategy. Teachers actively participate in the development of MOOCs, actively use them in the educational process and popularize them among students. Coursera, whose share was only 5.81% in 2017, has 23.88% in 2019. The university's active policy to attract foreign teachers and integrate the university into international open education explains such a sharp increase. Studies Kozlov, (2019b) of digital competencies of students conducted in universities of the Murmansk region [1] and the Krasnodar Territory (Kozlov, 2019c) confirm the hypothesis about the impact of the university's strategy and the activity of teachers on student involvement in the use of educational platforms: in the case of the university's passive e-learning policy, the share of students using educational platforms does not exceed 55%.

The modern educational process presupposes the active use of databases. For the period 2017-2019 noticeable changes were found in the choice of databases. Google Books are the most popular for self-study. This fact can be explained by the opportunity to get acquainted with a large number of publications and choose the most relevant to their interests and research field (Fig.2).

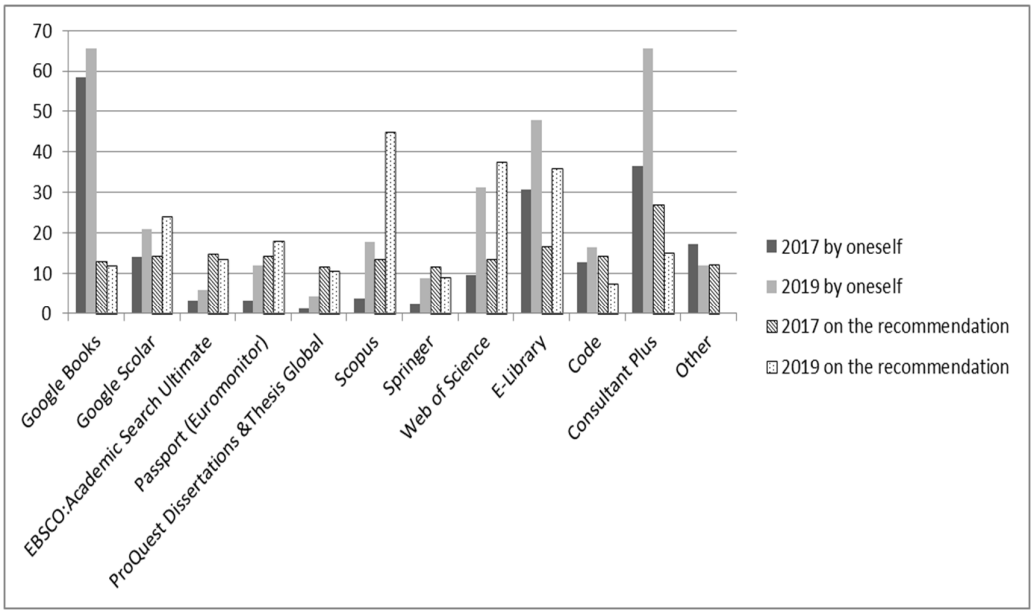

Fig.2: The use of databases

Consultant Plus is a Russian legislative database, structured and updated daily. E-Library (the Scientific Electronic Library) is a bibliographic database of scientific publications in Russia. Students note the use of these databases for self-study; however, the choice of these bases is done by them due to previously received recommendations from teachers.

It should be noted that the competence of teachers in the use of foreign databases has grown for two years. They began to recommend them more often: for example, Scopus in 2017 was recommended by 13.46%, in 2019 - 44.78%. This led to a corresponding increase in student awareness from 3, 85% in 2017 to 17.91 in 2019. The situation with WoS is close to be the same.

For 3 years the same changes happened in the students' assessment of the teacher's role: 85% (the close percentage, 79% was in 2017) consider it necessary to have a personal communication with the lecturer for the performance of practical tasks and term papers; 34% in 2019 (for comparison – 43% in 2017) consider it necessary in lectures and only a few consider that a personal communication with the lecturer is not needed. The importance of face-to-face communication for students was confirmed by the highest valuation of this communication channel (3,2 from 5 in 2017 and 3,33 from 5 in 2019) among others (emails, messengers and social networks). Studies Kozlov et al (2019bc) show a similar percentage of those who need in contact with a teacher in practice, but the percentage of those who need it in lectures exceeds 50%. This decrease in the percentage of students who need teachers in a lecture may be associated with an increase in the opportunity to work with the material of lectures themselves in MOOC and other e-courses.

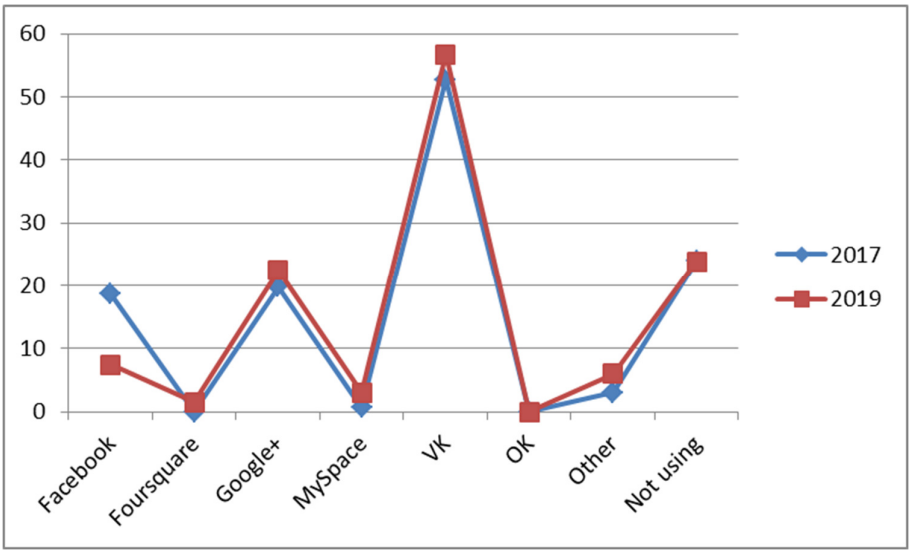

Fig.3: The use of social networks.

VK is the most popular social network in Russia, and the proportion of those who prefer communication in VK does not change - 52-56% of the total (Fig.3). The proportion of those who do not use social networks to communicate with teachers is practically unchanged at 24%.

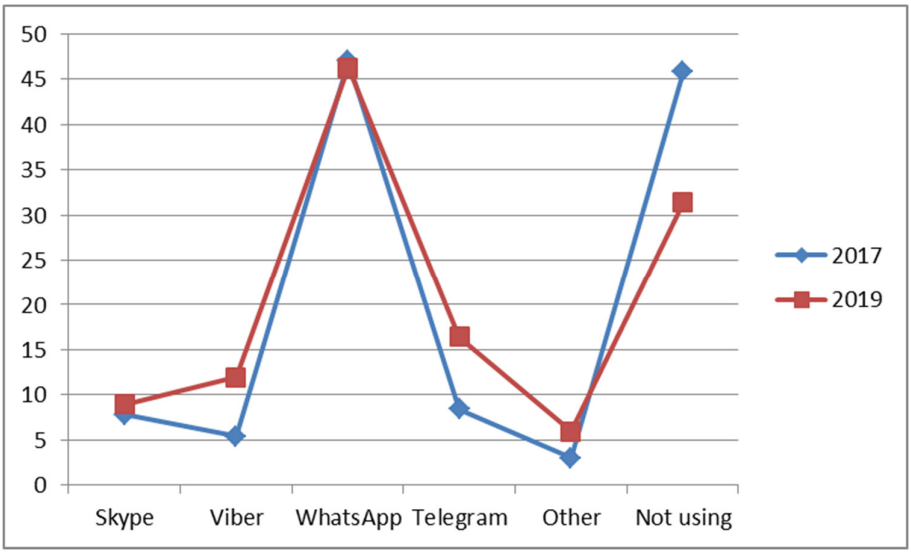

Fig.4: The use of messengers

WhatsApp is the most popular messenger (nearby 46%), the proportion of those who do not use messengers decreased from 45% to 31% (Fig.4). Since students actively use instant messengers for personal purposes, we can explain this dynamic by the growth of digital competencies of teachers.

However, the research discovers the fact that an essential part of students can be described as rather conservative creatures in their approach to usage of e-learning, information and digital technologies in studying. The percentage of these conservators can be valuated as app. 30-35 % of the whole sample. They don't use modern tools in the educational process and prefer to communicate with teachers directly and use social networks at the first rate for private personal communication not for

educational purposes. They prefer to communicate with lecturers on the issues of study by e-mail or in person.

The study revealed, on the one hand, a very high conservativeness of students in the use of distance education, and on the other hand, a noticeable role of teachers in the formation of digital competencies of students. Russian universities, including SPbPU, are at the beginning of the y-e-education process, but an active policy and true goal-setting will allow them to proceed this way further.

The most important recommendation for increasing of students' involvement into usage of digital technologies in educational process is training, developing and motivating of university teachers in ICT, since teachers influence was distinguished as a really important stimulating factor.

Conclusions

Thus, the results of study revealed some dynamics in students' perceptions and approaches towards of ICT usage in educational process. For example only 63% of respondents used educational platforms (EP) in the educational process in 2017, but in 2019 their share increased to 91%. The main factor of this phenomena identified by the study is influence of university teachers and their recommendations regarding usage of some definite ICT tools. It confirmed the fact that the competence of teachers in the use of foreign databases, educational platforms and other digital tools has grown for two years essentially. They began to recommend them to their students more often.

Social networks are to be used by students for private communications mostly. The students are using social networks and messengers for communication with teachers, however they valuated these communication channels as not so appropriate (1,15-1,29 according 1, negative – 5, positive scale). The importance of face-to-face communication for students was confirmed by the highest valuation of this communication channel (3,2 from 5 in 2017 and 3,33 from 5 in 2019) among others (emails, messengers and social networks).

The presented in the article study and its results have some limitations. It is at the first rate the limitation of the study regarding dynamics of the students' perceptions and approaches since all the respondents are representatives of the same Peter the Great St. Petersburg Polytechnic University. Moreover the data covers the period of two years only. Secondly, the limitation is connected with the confined samples of the target groups for comparative study taken from Murmansk region and Krasnodar Territory while the Russian Federation consists of 85 federal regions.

The directions of the future research are defined by limitations mentioned above. It's firstly, the increasing of number of respondents through coverage of students of other universities located in other regions of Russian Federation, i.e. Siberia and Far East. It helps to receive more justified and substantiated results and conclusions. Moreover the continuation of the same study allows tracing a longer period of time for discovering of dynamics of the process.

The interesting direction of the future research may be comparative study of perception and approaches of students in different countries. It allows interpreting results taking into consideration cultural differences and peculiarities of national educational systems.

One more perspective direction of the future study may be research with focus at the other party of educational process, namely university teachers. What are their perceptions, preferences and approaches to ways of communications with their students? However the implementation of this idea needs in development of a new questionnaire and organizing the process of interviewing of teachers.

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Implementing Electronic Health Records on Blockchain Based Architecture of Medical Organizations

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Abstract

Today, blockchain is one of the most promising technologies with great potential. The possibilities of the blockchain in the future are quite extensive and are able to solve a number of tasks facing a person in a modern rapidly developing society. This is especially relevant for the medical sector, which is faced primarily with the problems of Big Data managing, processing and security. The article is devoted to the review of changes in the IT architecture of the clinic in the interactions between the patient and the employee of a medical organization when introducing an electronic medical record based on blockchain technology. The article also provides a brief overview of the possibilities and challenges of using blockchain technology in documented medical support, as well as an overview of currently existing projects.

Keywords: blockchain-based architecture, electronic health records, medical organization, digital transformation.

1. Introduction

Our century was marked by the beginning of the transition of society to the era of digitalization. Such a transformation represents a transition from the traditional to the computerized industry, characterized by a more flexible personalized approach to each person, at the same time adapting to and forming a certain lifestyle of both the individual and the whole of humanity. This is made possible thanks to the rapid development of various technologies that provide wide and comprehensive access to information. At present, the success of any organization in the most significant way depends on the technologies used, primarily digital technologies. Blockchain technology is one of 9 cross-cutting strategic digital technologies for digital economy development in Russia. In this case, the choice of a technological solution is usually carried out in one of two ways: either a practical problem is formulated and a way to solve it is found, or the potential of already developed technologies is identified in solving current problems. It is the second path that is characteristic of blockchain technology. Created initially for decentralized generation of currencies, over the 10 years of its existence it has spread to many areas of activity: government, intellectual property protection, etc. Today we are talking about blockchain 3.0. If blockchain 1.0 is cryptocurrencies, 2.0 is smart contracts, then 3.0 are the most diverse applications. The use of this technology in the activities of medical organizations is seen as especially large-scale, since it is capable of solving the problems of document support of the industry at a new level.

At the moment, in medical organizations there is a wide variety of medical information systems, including the implementation of various modules: registry, admissions department, statistics, medical records, etc. The latter is one of the most important aspects of providing quality medical care. However, local MISs are not able to ensure the integrity of patient data due to the lack of integration of IP at the level of medical facilities and the possibility of malfunctions in the system or the introduction of corrections [1], [2]. Also, the confidentiality of data that is personal or constituting a medical secret is called into question. The emerging problems can be solved by a distributed database built on the basis of blockchain technology. A blockchain is a connected chain of blocks, each of which contains information about sequentially executed transactions. This information is decentralized and open, and the transmitted message is encrypted. Thus, a patient with a unique key can provide temporary access to his medical record to the attending physician, who, in turn, can get acquainted with the patient's entire medical history in chronological order, the results of tests ever done, heredity, etc. regardless of

the territorial location of the medical facility. Entered records cannot be changed or falsified. It is precisely such aspects of blockchain technology as reliability, transparency and decentralization that can improve the quality of services provided in the medical field.
In some countries, projects are already being implemented that develop the possibilities of applying this technology, including in medical documents.
In Russia, so far, only the conditions for the future transformation of the methods of organizing the healthcare sector and the provision of medical care using modern technologies within the framework of the state project "Digital Health" [3] are being created.

2. Methods

During the study, the following methods were applied:
1. Analysis. An analysis was made of the existing process of interaction with a medical record in a medical institution and identified changes in this process that could entail the introduction of blockchain technology. The article also analyzes the barriers that currently impede the widespread adoption of this technology in medical institutions.
2. The architectural approach. This method is the basis of the study. It is this approach that allows us to trace the relationship between business processes and IT architecture within a given enterprise. This is especially important in the context of rapidly developing technologies, which are able to find their application in the context of improving the business and ensuring competitive advantages. A feature of the architectural approach is the ability to consider business processes at the level of functions and organizational units, and the technological layer in the form of supporting applications, an interface, etc. Currently, there are four main approaches to the development of enterprise architecture, one of which is TOGAF, proposed in 1995 by the Open Group. Originally focusing on IT architecture, TOGAF now offers a wide range of models, standards, reference models and diagrams and is one of the most common framework in the world. In the research framework, TOGAF was chosen as a tool for building the architecture "AS IS" and "TO BE ", reflecting changes in the architecture of the medical institution with the introduction of electronic medical records based on blockchain technology [4].

3. Results and Discussion

Blockchain technology has become attractive to the healthcare industry due to its ability to ensure the safety of patient medical data. The issue of data security is one of the most important in this area, as every year the number of hacker attacks on medical data is growing [5]. The ability of the blockchain to maintain a decentralized, transparent journal of patient data, while at the same time ensuring their confidentiality thanks to sophisticated secure codes. The decentralized nature of the system allows the transfer of medical data between the patient and representatives of the healthcare sector. All this led to the idea of creating electronic medical records based on blockchain technology.

3.1. Overview of existing projects using blockchain to create EMC sphere

At the moment, there are not so many projects aimed at using the blockchain as a technology for storing and managing data in medicine. Conventionally, they can be divided into independent startups, which for the most part are applications that implement limited functionality and large-scale projects developed by large companies and / or the state. Below we will consider some significant projects that are currently being implemented or are being implemented.

eHealth

The program, launched in Estonia back in 2005, provided citizens with an electronic medical card, and after the conclusion of the government’s cooperation with Simply Vital HealthInc, a recognized technology leader and operating applications based on blockchain technology. One of their developments is the Health Nexus blockchain protocol, which provides an exchange process between authorized users. In the future, it is also considered the possibility for patients to sell their medical data

to research institutes and other medical institutions [6]. Thus, this cooperation will allow in the future not only to protect the medical data of citizens, due to the transparency of updating and access to data, but also to create some platform for the sale of medical information. To date, the eHealth system is the most global project in which blockchain technology is being introduced to protect patients' medical records [7].

Medicalchain

In 2018, MedicalChain, a company developing blockchain-based solutions, began to collaborate with a large American clinic Mayo Clinic to implement a number of projects based on this technology. One of them is the creation of a decentralized patient data distribution system. The blockchain solution involves the use of Ethereum and Hyperledger structures that provide multi-level data access and transactions.
The software will be able to work via the Internet on various platforms, and will also become a platform for its own services such as telemedicine [8].

Longenesis

In 2019, several South Korean medical centers entered into a partnership with Longenesis, providing modular blockchain-based solutions. The main required functionality is the ability to obtain patient consent for medical intervention, as well as the ability of pharmaceutical companies and research institutes to request patient data or invite them to participate in research, tests [9].

MediBond

The system was created with the aim of changing the traditional interaction between medical institutions, insurance and patients by creating a secure encrypted data stream. Also, in this project, the involvement of the neural network, which analyzes patient data and provides medical personnel with more accurate information for diagnosing and determining treatment methods, is noteworthy [10].

In Russia, in 2017, a decree was signed on digitalization of the healthcare sector and the transition to electronic medical records based on blockchain. By 2020, only 4% of medical facilities switched to electronic medical records due to various barriers. Thus, we can judge the impossibility at the moment of using blockchain in this area at the global level.

3.2. Medical Organization Architecture Model

The introduction of any new technology requires changes at various levels of enterprise architecture. The introduction of blockchain technology for the transfer and storage of medical data of patients in the form of electronic cards also requires transformations both at the IT level and at the business layer. At the moment, there is a blockchain based architecture model, which is used as a reference for Western realities and reflects the features of the use of blockchain technology in E-health [11]. However, now such a model is not applicable in the framework of Russian healthcare due to the specifics of Russian legislation, the level of digitalization and technological capabilities. Prior to the possibility of implementing the reference model, intermediate steps, such architectural models that will work in the Russian healthcare sector, will be needed. Consideration of such a possible model is made further.
To depict the situation of “AS-IS”, a city polyclinic was analyzed, which has information systems that allow you to create and use electronic medical records and built a model using the TOGAF methodology. Below Figure 1 shows simplified model of IT-architecture. Bbusiness layer that reflects the main stages of the interaction between the patient and the staff of the medical institution. The application layer provides the functionality displayed on the business layer. Here are indicated the implemented services based on two integrated information systems ArchiMed + and 1C: ECM. The technical layer displays the servers and databases that ensure the operation of the earlier systems.

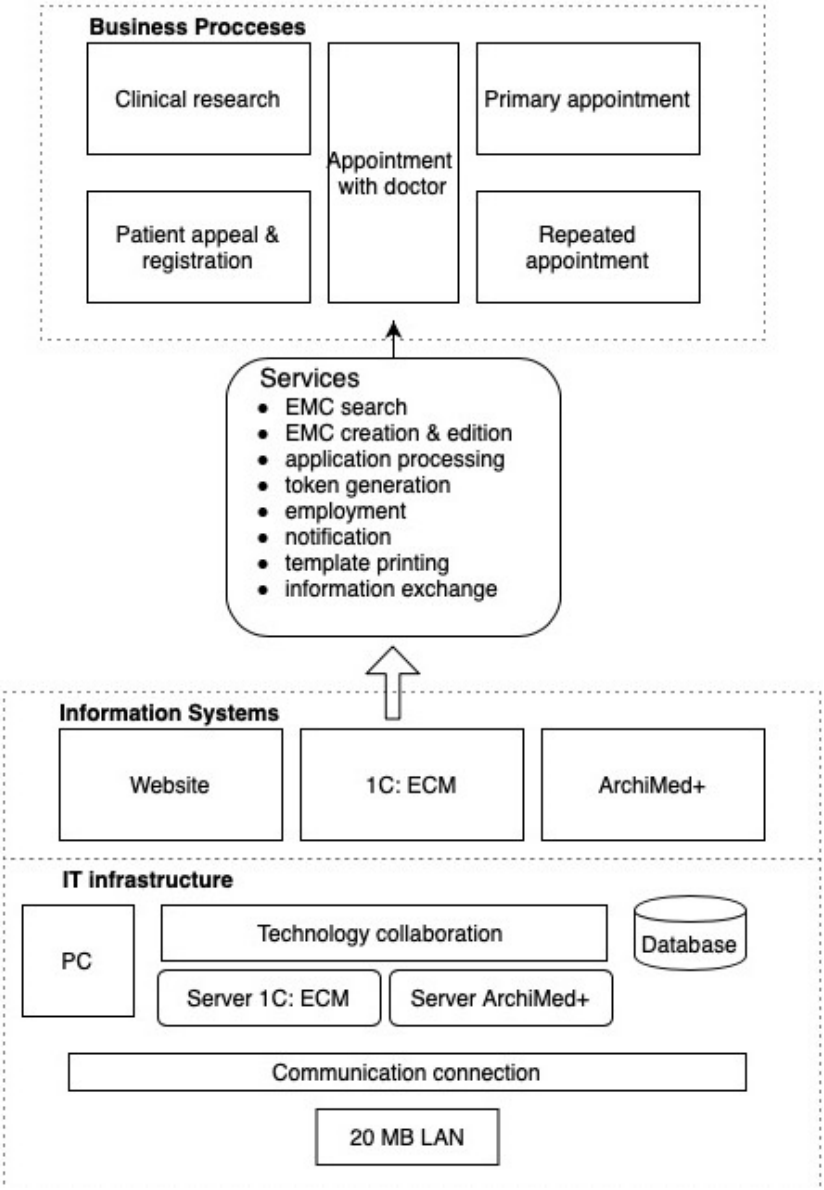

Figure 1 – Architecture AS-IS

The TO-BE architectural model is significantly different from the previous model, although it considers the same processes of circulation, primary and secondary circulation, and clinical research (Figure 2). An application built on blockchain technology will simplify a number of processes by reducing the number of unnecessary actions. An application based on blockchain technology allows the patient to register for an appointment through their personal account, after coordinating the time, the patient receives an electronic coupon. Further, when visiting a doctor, the patient provides access to his electronic medical record through the use of a unique cryptographic key as a confirmation of data transfer; for his part, the doctor also uses a cryptographic key to confirm the transfer. Access is provided for a certain period of time for the doctor to make the necessary entries. It is also possible to provide access only to certain parts of the medical data necessary in a particular case for examination and diagnosis. The entries are stored on distributed servers using blockchain technology, so they cannot be

changed or deleted [12]. When you visit again, the algorithm repeats, while the doctor can also write out electronic sick leave, certificates, etc. Thus, the patient's data remains protected, and a single database is created containing the entire patient's medical history, which can be presented to any medical institution at the request of the patient.

When conducting clinical trials, access to a medical electronic chart is also requested, which includes the doctor's opinion and referral for tests, and the test results are also entered there. Also, as part of expanding the capabilities of the interaction platform between medical institutions and patients, it is possible to sell personal medical data to research institutes.

However, such a system requires access to the Internet and appropriate software that supports the work required by the service for all participants in this process.

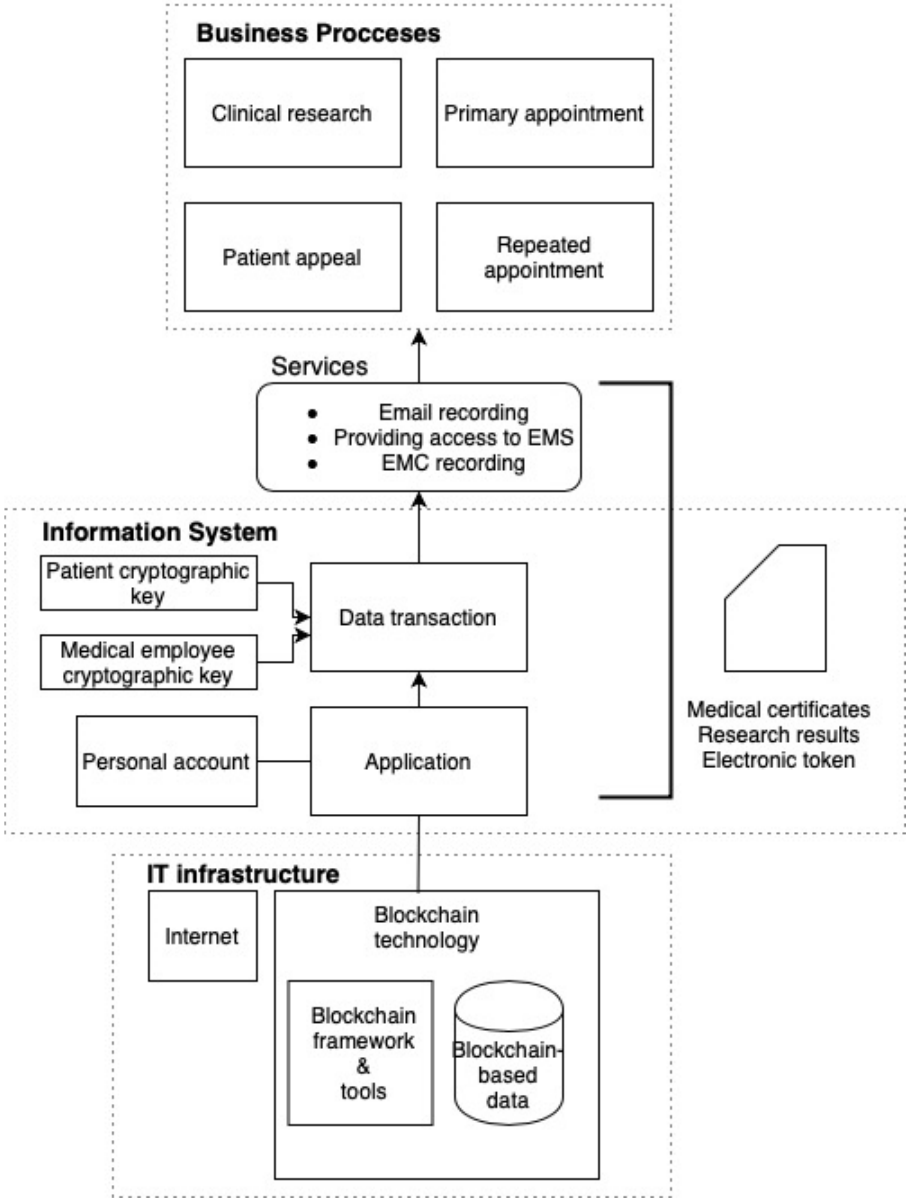

Figure 2– Architecture TO-BE

3.3. Blockchain-based electronical medical cards barriers

At the moment, the technology is still far from the possibilities of its widespread use in connection with a certain number of barriers that can be divided into the following areas [13]:
1. Technical and economic
Creating a global scalable system will require a large investment in hardware. Also, the introduction of a new technology will lead to the need for reengineering business processes at the level of all medical institutions included in a single system, which is a laborious and lengthy process. Moreover, the lack of experience in introducing the technology itself in this area raises a number of questions regarding its application, namely the issue of data protection, in connection with the possible leakage of information or their interception, key management problems in a patient incapacity situation, etc.
2. Social
In connection with the relative "youth" of this technology, society treats it with distrust, associating it with illegal activities. Also, the introduction of a blockchain-based system will require the adaptation of users: both patients and employees of medical institutions and insurance organizations.
3. Legal
At present, a structural legal approach has not yet been developed with respect to blockchain technology, there are no prescribed rules defining the parameters of records in the blockchain, and the question remains of the legal significance of blockchain records, which is critical in connection with the legal responsibility of doctors for the patient's life.

3.4. Steps to Overcome Barriers

From innovation to its widespread adoption lies a long way. The transition to the use of electronic medical records based on blockchain technology requires the implementation of large, working private projects that can prove themselves and fully show their advantages and disadvantages using private clinics as an example. Further, investments and stimulation by the state are necessary, first of all, to provide technical capabilities for digitalization of processes in medical institutions at all levels and to carry out comprehensive reengineering of processes at all levels of the healthcare sector, as well as training necessary specialists in the IT field and advanced training of health workers with the aim of their familiarization and training on the use of new platforms. Moreover, it will be necessary to develop a motivation system to attract and adapt citizens to the new system. Equally important is the consolidation of the legal status of this technology. All this requires the development of detailed and long-term government programs that can gradually make the transition from complex architectural solutions with the integration of various systems or paperwork to a laconic unified healthcare system, where the patient is an equal participant in the system like insurance companies, medical institutions, research institutions.

4. Conclusion

1. A review of significant existing projects for the application of blockchain technology in healthcare was carried out, as well as barriers to the development of this technology on a global scale were identified and actions to overcome them were proposed.
2. The process of interaction between the patient and the medical institution on the platform using blockchain technology to protect the personal medical data of patients was considered. To do this, IT architecture models were developed according to the TOGAF methodology, reflecting the transformation into the business, service and technological layer in connection with the introduction of electronic medical records based on the blockchain.

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Information Security Audit Project for a Service Sector Company

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Abstract

The paper is based on a project of an information system security audit for a service company when identifying existing threats to information security. Assessments of the information system's compliance with information security standards are given. The company's activities were analyzed, the necessary information was collected for conducting a security audit of the information system, and the data obtained was analyzed. Recommendations were developed to reduce the risks of information security threats. Implementation of the developed countermeasures to eliminate information security vulnerabilities will help the company reduce the risks of information security threats to protect important data stored in the information system, as well as to prevent possible financial losses and damage to the company's reputation.

Keywords: Digital transformation, the security of information systems, project, business process.

Introduction

Currently, information systems play a key role in ensuring the efficiency of the enterprises, especially those who has chosen the path of digital transformation. The widespread use of information systems for storing, processing and transmitting information makes the problems of their protection urgent, especially taking into account the global trend towards an increase in the number of information attacks, which lead to significant financial and reputational losses (Amirova et al., 2019). To effectively protect against attacks, companies need an objective assessment of the security level of the information system, especially in view of ongoing digital transformation (Dubgorn et al., 2019). This is exactly what security audits are used for.

Currently, there is no single standard for organizing and conducting an information system security audit. Drawing up an audit plan is not a trivial task, since it requires the auditor to have experience in the methods of building such plans, and also depends on the objectives of the audit and the characteristics of the information system being examined.

For a company (for example, a medical organization), it is necessary to identify existing vulnerabilities and possible security threats against information system resources, as well as suggest appropriate countermeasures to improve the current level of information system security.

To achieve this goal, you need to solve the following tasks (Bolsunovskaya et al., 2019):

1. Collect all necessary information about the company, the information system used, important business processes, and the current information security system.

2. Analyze the existing types of information systems audit, the methods used to identify threats and countermeasures. Compare them and choose the most suitable ones.
3. conduct a security audit of the company's information system, taking into account the selected methods. Identify and analyze existing threats to information security.
4. Develop recommendations to eliminate existing threats to information security for the company.

The security audit of the company's information assets allows you to get an idea of the security status of the infrastructure and information security management processes. Information security audit is a test of the ability to successfully resist threats to information security.

Conducting an independent audit allows you to identify threats to information security in a timely manner and objectively assess the compliance of parameters that characterize the information security regime with the required level.

There are a number of treats to information security:

1. This can be a privacy risk (unauthorized access to information). In this case, the information becomes known to someone who does not have access rights to this information.
2. Threats of illegal data changes. They are related to the probability of changing the information stored in the information system. This can be, for example, deliberate actions of personnel, equipment failure.

We can define 2 types of threats – natural (the impact of physical processes that do not depend on the human will) and artificial ones. Among the artificial threats, in turn, there are:

- Unintentional (accidental) threats — software and personnel errors, system failures, computer and communication equipment failures;
- Deliberate (deliberate) threats that are caused by the actions of people.

The carriers of threats to information security are the sources of threats. All sources of information security threats are divided into three main groups:

- Caused by the actions of the subject. These sources can be predicted and appropriate measures can be taken.
- Caused by technical means (technogenic sources).
- Natural sources. Such sources of threats are completely unpredictable and, therefore, measures against them should always be applied.

Let's look at the goals of conducting a security audit. These include:

- analysis of risks related to the possibility of security threats against information system resources;
- assessment of the current level of security of the information system;
- localization of bottlenecks in the information system security system;
- assessment of compliance of the information system with existing standards in the field of information security;
- development of recommendations for implementing new and improving the effectiveness of existing information system security mechanisms.

Justification of the need to conduct an information system security audit

The company uses a CRM system in its activities. Since the CRM system was recently implemented, it is necessary to analyze possible security threats to the information system.

Conducting a comprehensive information security audit includes:

- Research of the information system and business processes of the company (as objects of protection), analysis and construction of a model of interaction of components of information systems used in providing business processes of the organization;
- Determining the value and identifying the most important components and nodes of information systems to ensure the operation of business processes;
- Identification of requirements to the existing information security system, analysis of the structure, functions and features of the existing information security system in the company's automated system, analysis of settings of standard security tools, operating systems of servers and communication equipment;
- Conducting penetration tests for the company's information environment;
- Assessment of risks associated with the implementation of information security threats aimed at the most significant assets;
- Analysis of the existing information security system for the identified requirements and preparation of a conclusion.

Development of recommendations aimed at improving the current level of information security of the organization in accordance with the requirements and development of proposals to reduce information security risks.

In this paper, based on the task of auditing the security of information systems, was selected as a comprehensive audit, since it allows to obtain an integrated vision of security of the information system of the company and also combines the benefits of other types of audit, such as the basic requirements of information security has been taken from standards and additional was identified during the risk analysis it security, given the unique structure of the system and the point of view of the company's management on critical assets and threats.

Regardless of the type of audit used, in General, the information system security audit process consists of the following stages:

- initiating the audit procedure;
- collecting information for an audit;
- data analysis;
- making recommendations and preparing an audit report.

Based on the results of the analysis, at the last stage, recommendations are being developed to improve the level of protection of the information system from information security threats. Recommendations are determined by the approach used, the characteristics of the information system under review, the state of information security, and the level of detail used during the audit.

The company uses a CRM system, namely vTiger CRM-an open source customer relationship management system. The vTiger CRM system has been specially modified to meet the company's requirements and tasks.it has added modules, reports, and functions that are not provided in the standard system solution.

In order for each employee to have access only to the information that they need to perform their duties, roles are created in the information system (I. Ilin et al., 2018). For each role, the available modules and available actions with the records of these modules are set.

The main business processes of the company according to the company's management include the following business processes:

- selling a product to a customer;
- providing services to the client;

- make an appointment with a specialist for clients;
- purchase of consumables for professionals (Levina et al., 2018).

For the company to work effectively, it is necessary that data from the information system is available to employees who have access to it, so that this data is reliable, not distorted and confidential. For this purpose, it is necessary to ensure the security of the company's information system.

Research Methodology

In service-oriented architecture, an important role is played by the analysis of the architecture, which allows to Depending on the selected audit approach, different methods or approaches are used to identify threats and countermeasures. Here is a comparison in table 1.

Table 1: Comparison of the types of audit Criterion Type of audit Tools and methods of verification Result of checking

Criterion / Type of audit	Verification tools and methods	Result of the test	The ideal with which the result of the test is compared
Active audit	Conducting real attacks on the information system by experts using special software and special methods	It is aimed at identifying and fixing the vulnerabilities of the system's software and hardware	Set of known vulnerabilities in the software and the expected test result
Expert audit	Collection and analysis of information on IS, analysis of organizational and administrative documents and information flows of the enterprise	Identifying global errors in the corporate network topology, using security tools, identifying vulnerabilities of information system (I. V. Ilin, Iliashenko, et al., 2017)	Requirements of the company's management for protection, as well as the auditor's own experience
Audit of compliance with standards	Collection and analysis of information on IS and subsequent comparison with the description of the standard (Khudyakova & Shmidt, 2019)	The degree of compliance of the tested IS with the selected standards, as well as recommendations for bringing the security of the IS in accordance with standards	Abstract description of the state of information security which given in the standards
Complex audit	Depends on the set of procedures that will be implemented during this audit		

We will describe in more detail each of the approaches:

- The approach based on risk analysis. This approach uses risk analysis methods, and the auditor determines an individual set of security requirements for the information system.
- An approach based on the use of information security standards. As part of this approach, an information security standard is selected for compliance with which the information system will be checked.
- Combined approach (combining the first two approaches). The basic set of security requirements that apply to an information system is defined by the standard. Additional requirements that take

into account the specifics of the functioning of this information system are formed on the basis of risk analysis.

In this work, we used a combined approach of data analysis during the audit, because this approach is simpler than the first, because most of the requirements for information security are defined by the standard, but it does not have the disadvantages of the second approach, because the features of the information system are taken into account.

Results

Based on the information security standards, a basic set of requirements for the information system was identified. These requirements were divided into the following groups:

1. Physical access control and monitoring of premises;
2. Hardware information system;
3. Network support of the information system;
4. System software;
5. Application software;
6. Organizational support (I. V. Ilin et al., 2017; I. Ilin et al., 2019; Krasnov et al., 2019).

This approach is based on risk analysis methods and the chosen method for data analysis will affect the final result and its quality. When choosing a risk analysis method, it is necessary to take into account the features of the information system, the environment in which it operates, the applicability of this method to the information system under consideration, and other aspects (Zharova et al., 2019).

This approach is quite time-consuming and requires a high level of qualification from the auditor. In the course of using this method, an individual set of information system security requirements is identified.

Risk analysis is a study of the security of an information system, in order to determine the assets that are important to the company, from which threats it is necessary to protect them, if necessary. The development of adequate countermeasures to protect these assets takes place in the course of risk management. At the same time, you need to understand which resources need to be protected and which do not, and also take into account the fact that the cost of the information security system should not exceed the cost of the protected information (Schepinin & Bataev, 2019).

When conducting an audit, it is not enough to simply assess the risks; it is necessary to analyze the result and, if necessary, take appropriate measures to reduce them, for example.

During the risk assessment and analysis, the following steps are highlighted:

1. Defining the organization's key assets;
2. Analysis of which key assets need to be protected;
3. Forming a set of possible threats to information security and vulnerabilities that may cause these threats to occur;
4. Assessing the likelihood of realization of threats to security;
5. Evaluation of impact level with the involvement of employees (business units);
6. Calculation of risk (qualitatively or quantitatively);
7. Analysis of the results obtained.

Risk management is the next necessary step after the risk analysis, during which recommendations are made to eliminate risks, reduce them, or transfer them to third-party organizations (Maydanova & Ilin, 2018).

This can be:

- information resources that ensure the execution of business processes;
- system and application software;
- hardware (servers, workstations, active network equipment, etc.);
- premises where information is stored and processed;
- paper media;
- electronic information carriers.

At the same time, employees of the audited company help the auditor identify risks.

The importance or value of an asset is determined by the amount of damage that will be caused if the confidentiality, availability, or integrity of the asset is violated. Generally, the following types of damage are considered:

- Disclosure, deletion, modification, or unavailability of data;
- Damage or destruction of equipment;
- Violation of the integrity of the software.

It is also worth noting that the risk assessment can be performed:

- quality;
- quantitatively.

At the same time, most companies usually choose a qualitative risk assessment, since this is an easier way to assess risks. In this case, the damage levels from the implementation of the attack, as well as the level of probability of the threat of the attack itself, are also qualitatively evaluated. An example of a qualitative scale for assessing the level of damage (depending on the damage to the company's reputation and loss of tangible assets) (Chernikova et al., 2019).

Now let's look at ways to manage risks. The most common are:

- reducing the risk to the level acceptable by the company's management through the use of various technical and organizational means;
- accepting risk if it has an acceptable level;
- transfer of risk to a third-party company.

The most widely used methods of risk analysis are the following:

- CRAMM;
- RiskWatch
- FRAP;
- OCTAVE.

This list presents methods that perform qualitative, quantitative, and comprehensive risk assessment. It will also describe one method that is used only in the framework of internal audit.

Based on the analysis of existing risk analysis methods, FRAP was chosen because IT is suitable for external audit (as opposed to OCTAVE), and because it is based on a qualitative risk assessment (as opposed to RiskWatch and CRAMM), which is easier to use, and because in this case a qualitative risk assessment is sufficient.

Identify possible threats

Possible threats to information security for previously defined resources were identified by brainstorming the company's employees. As a result of the discussion, possible threats to each of the resources were identified. Let's look at them in more detail.

Possible threats to servers where information is stored and processed:

- malicious server damage or destruction;
- server failure due to technical reasons;
- destruction of the server by a natural disaster, such as fire.

Possible threats to the database where all the information necessary for the organization's operation is stored:

- unintentional modification or deletion of information from the database by company employees;
- leakage of confidential information as a result of copying information from a database using an external electronic medium.

Possible threats to electronic media that store copies of contracts and agreements with customers and suppliers:

- destruction or damage of electronic media by an attacker, resulting in data loss;
- destruction of electronic media due to fire.

To reduce the risk associated with the destruction of electronic media that stores copies of contracts and agreements with customers and suppliers, you can use the same information security tools as to protect servers from fire, but this is not mandatory, because the damage from the threat is estimated as low and most likely the cost of implementing protection will be higher than the damage caused.

The risk of destruction or damage to electronic media by an attacker, resulting in data loss, is low. The damage is also assessed as low, so there is no need to take any measures to manage this risk at this time.

Recommendations

After the audit of the company's information security, a list of recommendations was compiled:

- Recommended organizational level measures;
- Recommended measures of the software and technical level.

Organizational measures are administrative and procedural measures that regulate the functioning of the data processing system, the use of its resources, and the activities of service personnel. Organizational measures determine how users and service personnel interact with the system in such a way as to make it more difficult or impossible to implement security threats or reduce the amount of losses if they are implemented.

The recommended measures of the organizational level include:

- Regularly review the security policy when making changes to the company's system;
- Assign responsibility for ensuring the security of the company's valuable information resources;
- Include responsibility for ensuring information security in the job responsibilities of managers;
- Include in the job responsibilities of all employees the task of ensuring information security;
- The IT service checks the personnel being hired;
- Remind an employee of the company that they have signed an agreement to comply with the trade secret regime;
- Regularly send information about incidents and viruses to all employees of the company;
- Create a forum to discuss various issues related to information security;
- Conduct training on information security issues for all employees of the company every six months;
- When creating a company's information security system, you need to consider the option that the company's employees have sufficient knowledge to perform unauthorized access to information when they have the opportunity;
- Place the equipment in rooms that cannot be accessed by persons who are not connected with the maintenance of this room;
- In the event of a hard disk failure, call a representative of the supplier and inspect the damage in the presence of responsible representatives of the company;
- Update antivirus databases every day;
- As often as possible to keep track of new vulnerabilities in the software you use;
- Regularly monitor the integrity of critical data and the software that processes this data;
- Organizational and physical protection measures for backups must match the level of protection of the main storage media;
- Keep system event logs on computers with critical information;
- Update the software and install security update packages as often as possible;
- Document user rights that correspond to the business tasks assigned to them;
- Regularly check the adequacy of the rights assigned to the user;
- Conduct regular third-party security audits of the company, as well as penetration tests performed by independent experts
- Regularly use the vulnerability scanner to track changes in the security of the company's information system;
- Ensure that the company's information system meets any published security standard;
- Use only certified local and network security tools in the company;
- Exclude the presence of service personnel in the company's office without the presence of controlling persons;
- Develop a list of documents and recommendations on non-disclosure of confidential information by employees.

Conclusions and Discussions

To assess the course of the work, the following goals were achieved:

1. Collected and analyzed information about the company. Important business processes of the company include the processes of selling products to customers, providing services to customers. For effective operation of these business processes, up-to-date information from the information system is necessary, access to which should not be difficult for authorized persons. Also, the information must be securely protected from access by unauthorized persons. To ensure these requirements, it is necessary to conduct a security audit of the information system.
2. Possible types of information system security audits are analyzed. A review of methods for identifying threats and countermeasures is made: an approach based on risk analysis, an approach based on information security standards, and a combined approach. We selected a comprehensive audit with a combined approach to identifying threats and countermeasures. The ISO/IEC 27001 standard was chosen as the information security standard, which describes the requirements for information security. FRAP was chosen as the risk analysis method.
3. The company's information system security audit was conducted taking into account the selected procedure. Existing threats to information security were identified and analyzed. The most important of them are: overheating of important server elements due to the lack of air conditioning, as well as copying information to external removable media for further disclosure.
4. Developed recommendations to eliminate existing threats to information security for the company. The most important implementation recommendations are the purchase and installation of an air conditioning and fire alarm system in the server room, as well as the implementation of a DLP system designed to prevent leaks of confidential information outside the corporate network. In addition, the cost of all recommended information security measures for threats found was 183,000 rubles, which is included in the company's acceptable information security budget of 210,000 rubles. If these recommendations are implemented (organizational and software-technical), the security of the information system will increase, and the risks of threats found will decrease, which will allow the company to avoid financial and reputational losses in the future.

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Possibilities and Challenges of Leading BI Platforms Application in The Medical Sector Companies

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Abstract.

The article describes the existing BI systems that allow solving data analytics issues, making forecasts based on the analysis of the main KPI companies, and developing business process systems in a single information environment. The article provides an analysis of the market for BI platforms, a review of implemented analytical solutions in foreign and Russian companies in the medical sector. The article presents the system architectures of BI platforms, as well as their comparative characteristics. Models of healthcare solutions are presented using the Qlik platform as an example. The main research methods in the article are an overview of modern BI platforms with the further goal of analyzing the main advantages and disadvantages of each of them, and an architectural approach as well. The result of the study is the formed requirements for business platforms for the analysis of the main KPI of a medical company.

Keywords: BI-platforms, medical organizations, system architecture, key performance indicators.

1. Introduction

At the present stage of information-analytical systems development, companies, in particular medical organizations, have an urgent need to introduce modern BI-platforms for the analysis of key performance indicators of their activities. Analytical solutions allow you to perform data analysis in various sections in real time, build KPI systems for each of the company's departments, make a forecast based on current values of indicators. One of the main advantages of analytical platforms is the ability to aggregate data of various formats from various sources of information that characterize the work of the organization as a whole. Companies can build visual statistical and dynamic reports, graphs, charts, and other data visualization elements with business analysis systems. The basic component of business analysis technologies is the ability to analyze structured end data in a visual form to end users. This aspect is one of the main criteria for end users when working with analytical reporting systems.

The key advantages of implementing business analysis systems in enterprises are [1, 2]:

- the accuracy of the performance indicators values of the company in reporting systems;
- real-time data analysis and forecasting;
- support for the development of business processes and structural changes of the enterprise;
- ability to simulate various business situations in a single information environment;
- operational analysis of non-standard user requests;
- reducing the routine load on staff;
- increasing the amount of time for deeper analytical work;
- stable operation with a large amount of data entering the system.

In addition to the key advantages described above for using BI systems, in particular in the healthcare sector, it should be noted that the developed analytical system should combine information from various sources in its database, including remote regional medical systems, information systems at the level of a medical organization, various data sources in electronic format [3].

2. Methods

The research methods, which we use in this article are:

1. Analysis. It is the methodological basis of the study. The article analyzes the system architectures of BI platforms, as well as their comparative characteristics. Also, the article analyzed existing practices of using business analysis platforms in medical companies, Qlik Healthcare Solution Models. We use analysis for developing a system of indicators for assessing the performance of a medical organization
2. Architectural approach. This approach is a methodological basis for the designing of BI platform architecture model. The use of this approach is relevant in connection with the rapidly growing dependence of doing business with implemented IT support. It allows to make an alignment between the business and IT development strategies of medical companies. The architectural approach allows us to reflect in detail various elements such as business processes, functional and organizational structure, the level of information services and applications, as well as the technological layer [4, 5]. Moreover, this approach is flexible in relation to changes in the external and internal business environment. Using this approach, we formulate requirements for business platforms for the analysis of the main KPI of a medical company.

3. Results and Discussion

To formulate the requirements for the BI platform, we review the most popular BI systems, consider pactices of using business analysis platforms in medical companies, and compile performance indicators of medical companies that we plan to analyze using BI platforms.

3.1. Overview of system architectures for BI platforms

Consider the leading analytical reporting systems: QlikView / QlikSence, Tableau, PowerBI.

Solutions on the Qlik platform are the most popular in the Russian Federation in various fields of activity - financial, industrial, oil and gas. Medical companies are no exception. The QlikView platform is one of the most powerful tools for data visualization, which does not require additional installation of a set of software products at a high price, as with traditional BI solutions. QlikView system allows you to build business solutions based on a simple data architecture, the integrity of which stabilizes the work of all components of the Qlik platform. The main advantage of the platform is its customer focus. QlikView analytics is customizable, not the other way around.

Figure 1 shows the architecture of the QlikView platform. It includes three main blocks: QlikView Developer, QlikView Server, QlikView Publisher.

The QlikView Developer block includes tools for uploading, transforming, and loading data (ETL process), which allows you to perform complex operations on data to load it from various sources of information: BW, ERP databases, data marts, corporate portals, XML and Excel files.

The QlikView Server block is responsible for the integrity of the data, ensures the security of its storage, and allows updating data in all reports of the QlikView system.

The QlikPublisher block is a specialized tool for administering data for analytical applications that are available to the end user. The advantage of this unit is the ability to split access to applications by categories of user groups, as well as the ability to deliver analytical reports to personal emails in PDF format.

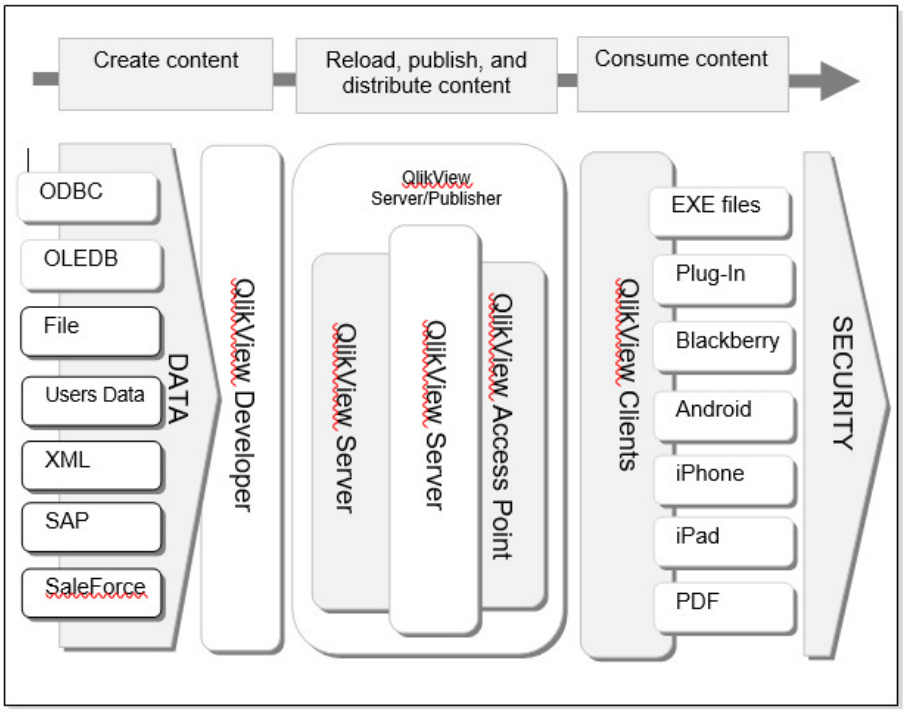

Figure 1 – Architecture of the QlikView platform (FB Consult. QlikView Architecture [Electronic resource], [6]).

The Tableau analytic platform is a fast and powerful data visualization tool that does not require training of business users and does not include costly implementation at the enterprise. The main advantage of the system is the ability to process data of any format together with a high speed of obtaining the result. Tableau is based on two main technologies [7]:

- VizQL (allows you to create high-level data visualizations);
- Data Engine (provides second analysis of a large number of rows).

Figure 2 shows the architecture of the Tableau interactive business intelligence system. It includes 5 main components:

- a data server that allows the Tableau system to connect to multiple data sources;
- data connector, which is an interface for connecting external data sources to the Tableau data server;
- Tableau server components;
- network gateway designed to send requests from users to Tableau components;
- platforms with which you can edit and view visualizations and dashboards on the Tableau server. The platforms are a web browser, mobile applications and a desktop version of Tableau.

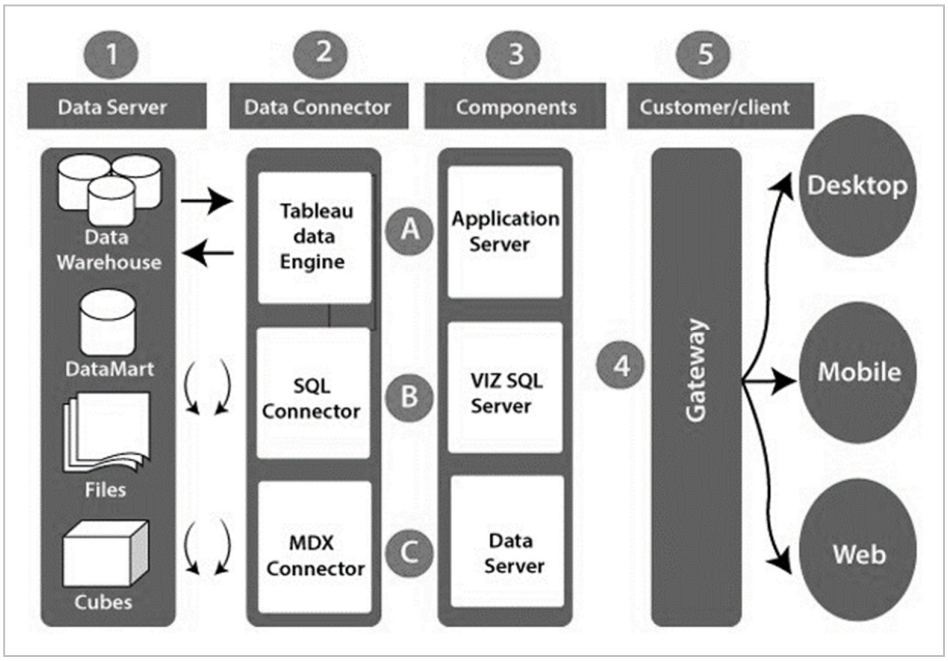

Figure 2 – Architecture of the Tableau platform (Tableau Architecture [Electronic resource], [8]).

Microsoft's Power BI analytic platform is designed for business intelligence with the ability to connect a variety of data sources and third-party applications. One of the advantages of the Power BI platform is the ability to support many ways to import data (for example, cloud services, streaming data, Excel documents and external applications). The architecture of the Power BI platform is shown in Figure 3.

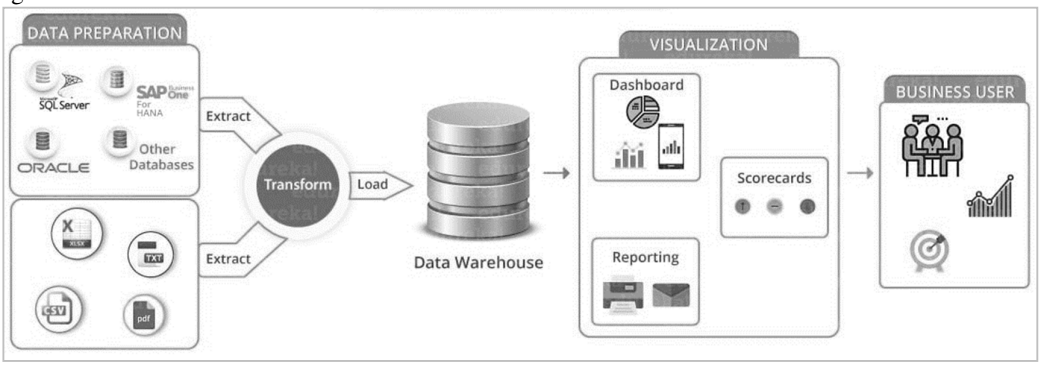

Figure 2 – Architecture of the Microsoft Power BI platform (Allison Fisher. How the Interns Hacked Power BI: A New Tool for Versatile Real- Time Dashboards [Electronic resource], [9]).

The Power BI architecture consists of three phases. The first two phases partially use ETL (extraction, transformation and loading) for data processing.

1. Data Integration. This phase includes the processing of data from various sources of information in order to further combine them into a standard format and save them in the intermediate area.
2. Data processing. The data processing phase includes the processing and purification of data, after which business rules are applied to them and they are converted into presentable data. Then the data is loaded into the data warehouse (CD).

3. Data presentation. The phase of data presentation is necessary for data visualization using various interface toolbars for visual presentation of reports.

3.2. Practices of using business analysis platforms in medical companies

The use of business analysis platforms as a tool for data analytics in medical companies is valuable in terms of studying clinical, financial and operational data. In turn, this helps to improve the quality of medical care and reduce costs. For example, the QlikView and QlikSence platforms allow hospitals to support three basic data types:

- clinical data;
- corporate data;
- transaction data.

In the United States, some medical organizations have up to fifty Qlik reports to visualize the necessary data. The main tasks that the Qlik platform helps hospitals cope with are:

- analysis of the use of operating rooms;
- quantitative analysis of ambulance calls;
- identification and elimination of bottlenecks;
- identification of clinical changes.

In the UK, one of the medical institutions using the analytical system helped to identify how an increase in the chamber load (by 1%) will increase the weekly income (up to $ 15,000). Also in the UK, a government order has been issued that says that it takes less than four hours to examine and treat each patient. Qlik shows how often a medical institution violates this decree. Moreover, the system gives an idea of the peak time when the largest number of patients enters the emergency department. Also, the visualization panel shows the number of patients that goes to the hospital.

Atlanta hospitals, including Children's Healthsouth Rehabilitation and Allina Health, use analytical systems to measure HCAHPS, CGCAHPS, outpatient quality assurance, and the number of potentially preventable rehospitalizations. Business intelligence systems offer users to see visualized information on patients, their age, attending physicians, time of arrival at a medical institution.

Table 1 presents models of healthcare solutions using the Qlik platform as an example.

Table 1. Decision models in healthcare based on the Qlik platform.

	Model of the solution	Functionality	Solution options
Value-Based Healthcare Delivery	Clincal Domain	Operating Room	The ability to make decisions throughout the entire operational process
		Emergency Department	Real-time operational management of ambulance processes
		Clinical Benchmarking	Comparison of large volumes of diverse data for making decisions about the choice of treatment methods for patients
	Healthcare Operations	Workforce Optimisation	Improving the efficiency of personnel management based on monitoring staff load
		Supply chain	Analysis of the results of the implementation of the end-to-end supply chain management process
	Corporate Domain	Financial Management	Compilation of comprehensive financial statements for various indicators
		Performance Visualization	Visualization of cross-system analysis of indicators on various aspects of the medical organization

3.3. Formation of a system of indicators for assessing the performance of a medical organization.

Some indicators are common to most medical organizations, others are specific to various health care profiles. Based on the analysis of the activities of large Russian medical centers, we identified the following general indicators that are important when evaluating the activities of a medical organization.

General indicators:

- berth turnover;
- implementation of the bed work plan for the period (%);
- average duration (median) of the patient's stay in the department (days)
- bed downtime (time between discharge and hospitalization per bed (in days);
- the number of complications by nosology (acute myocardial infarction, stroke, community-acquired pneumonia, femoral neck fracture, coronary artery bypass grafting, asthma, diabetes mellitus, etc.);
- the proportion of patients with complications in nosology (acute myocardial infarction, stroke, community-acquired pneumonia, femoral neck fracture, coronary artery bypass grafting, asthma, diabetes mellitus, etc.) (%);
- the proportion of patients with an unplanned return to the operating room (within 48, 72 hours) (%);
- the proportion of patients with an unplanned return to OARIT (within 48, 72 hours) (%);
- average waiting time (median) from the moment of diagnosis to the first nosology treatment (acute myocardial infarction, stroke, community-acquired pneumonia, femoral neck fracture, coronary artery bypass grafting, asthma, diabetes mellitus, etc.) (min.);
- the number of transfers to other departments;
- load of the doctor in the department (bed);
- result of hospitalization;
- frequency of re-hospitalization (%);
- hospital mortality by nosology (%) (acute myocardial infarction, stroke, community-acquired pneumonia, femoral neck fracture, coronary artery bypass grafting, asthma, diabetes mellitus, etc.);
- specific gravity of emergency hospitalization (%);
- the share of acquired hospital infections (by type);
- the number of discrepancies between clinical diagnoses and pathological anatomical.

We also give an example of specific indicators (depending on the profile):

- the number of patients with a certain type of nosology, for example, with arterial hypertension, having reached the target blood pressure level <= 140/90 mm per episode of inpatient treatment;
- the number of patients with a certain type of pathology who died on the first day of admission to the hospital;
- the number of discrepancies in diagnoses in pathological and forensic autopsies of patients with a certain type of pathology who died on the first day of admission to the hospital;
- 30-day hospital mortality with a certain type of pathology (%);
- hospital mortality in a certain pathology in patients of working age (%).

Monitoring the values of these indicators is important for assessing the performance of a medical organization. Using specialized software allows to reduce time costs and increase the efficiency and quality of work performed.

3.4. Development of requirements and design of BI solutions.

The development of requirements for a BI solution involves:

- analysis of the situation in the medical company. The introduction of the BI platform involves preliminary preparation. It is necessary to conduct an analysis of the business processes of the medical company, to determine the principles for making managerial decisions. These data will allow an analysis of the current situation in the company.

- development of requirements for a BI solution, which ends with the formation of a technical task [10].
- Choice of BI system.
- Designing.

To choose the right BI system, we have to:

- determine the goals and objectives of the implementation of BI systems;
- formulate requirements for the structure of data storage, determine the possibilities of data manipulation [11];
- define data integration functions [12];
- identify visualization capabilities. For each person, ideal BI analytics looks different, and the system should satisfy the needs of each user;
- versatility or narrow specialization. In the world there are systems aimed at a specific industry, as well as universal solutions that allow you to collect information in any context;
- determine the requirements for computing resources;
- identify financial opportunities for investment in the development of BI platform. The choice of a BI system depends on the capabilities of the company.

Successful implementation of BI systems in any area is based on the following rules:

- correctness of data. If the data for the analysis are incorrect, then there is the possibility of a serious system error;
- full training for each user;
- quick implementation. It is necessary to focus on the correct formation of the necessary reports at all key places, and not on the ideal service of one user. You can always adjust the appearance of the report or add another section for convenience after implementation;
- be aware of the return on investment in the BI system. The effect depends on many factors and in some cases is visible only after a few months;
- equipment should be designed not only for the current situation, but also for the near future;
- be aware of why the implementation of the BI system was started and do not require the impossible from the software.

During the examination it is necessary:

- finding out the number of actual and potential users of the BI system;
- collection and analysis of requirements for a business analysis system;
- indicate the frequency of use of the formation of various requests and reports;
- identify data sources, related business applications, data formats (as they are and how they will be);
- agree on the requirements for synchronization, cleaning and granularity of data;
- analysis of the current infrastructure of the company;
- harmonization of functional requirements.

Based on the data obtained, the formation of customer requirements for the BI system is carried out. The result of the survey stage is the creation of a technical task, which defines the requirements, the procedure for creating a BI system. The terms of reference are used to establish requirements, clarify time costs and labor costs.

In accordance with the terms of reference, the design and development of the BI system is carried out, as well as the acceptance of the system at the time of commissioning.

Design phase:

After the development and approval of the terms of reference, the development of a technical project for the implementation of the BI system is carried out.

During the design phase, the following applies:

- study of the terms of reference;
- for each requirement of the technical specifications is determined:
  - specification for system modules;
  - a detailed implementation project for each requirement;
  - a list of improvements to the components of the BI system to implement the requirements of the technical specifications;
  - the ability to implement the requirements for the functionality of the finished system components.

- establishing interdependencies among the functional modules of the BI system;
- designing safety rules;
- creation of provisions on access to the BI system;
- architecture design:
  - analysis of information flows and data sources;
  - designing the interaction of information flows between systems;
  - definition of integration links;
  - development of regulations for interaction between systems;
  - designing data integration from existing systems;
  - definition of common data formats and schemes for converting source data into a single format.
- database design;
- designing interfaces of the BI system.

When working on a technical project, it is necessary to determine the architecture and develop in detail the configuration of the future BI system, including:

- designing the architecture of relationships with data from external sources, the rules for unloading and processing information;
- provision of data storage;
- development of data marts;
- development of reports and regulated applications;
- development of unregulated requests;
- architectural design for multidimensional analysis;
- design of control panels;
- organization of mobile access to information;
- organization of a notification system;
- BI system design interface;
- determination of hardware and software requirements for the future system.

The technical project defines the main methods used to develop the BI system for the final determination of the estimated cost of the system. The technical project identifies the most important methods for developing a BI system and determines the estimated costs.

In order to exclude the creation of isolated BI applications and create a single information structure that allows working with holistic and reliable information when building a distributed BI system, the solution architecture should rely on the use of common data and an object model, as well as a single security and management model.

According to statistics (the opinion of analysts at Technology Evaluation Centers (TEC)), only 30% of company executives are satisfied with the implementation of BI systems. Over the long years of the existence of business analysis software, key errors have been formulated that can reduce efficiency to a minimum:

- non-obviousness of the purpose of implementation for leadership. Often a project is created by the IT department without the close involvement of managers. In most cases, in the process of implementation and operation, questions arise regarding the goals and objectives of the BI system, the benefits and ease of use;
- lack of transparency in management, work of employees and decision-making. Managers may not know the work algorithms of field employees, and management decisions can be made not only on the basis of dry facts. This will lead to the inability to maintain the existing paradigm as a result of the implementation of the BI system. And it is often impossible to break the corporate governance culture that has developed over the years;
- insufficient data reliability. Getting false information into the business analysis system is unacceptable, otherwise employees will not be able to trust it and use it;
- wrong choice of a professional business intelligence system. Many examples in the history when the management hires a third-party organization to implement the BI system and does not take part in its selection speak for themselves. As a result, a system is introduced that does not allow obtaining the necessary report or with which it is impossible to integrate one of the existing software in the company;

- lack of a plan for the future. The peculiarity of BI systems is that it is not static software. It is impossible to complete the implementation project and not recall it. There are many requirements from users and management regarding improvements; management requirements;
- desire to save. In the business sphere, this is normal, but BI analytics only works if it takes into account all aspects of the company. That is why deep analytical systems with high cost are most effective. The desire to receive several reports on areas of interest leads to frequent data errors and a great dependence on the qualifications of IT specialists;
- different terminology in the company. It is important that all users understand the basic terms and their meaning. A simple misunderstanding can lead to an incorrect interpretation of reports and indicators of the BI system;
- lack of a unified business analysis strategy for the enterprise. Without a single course chosen for all employees, any BI-class system will be just a set of scattered reports that satisfy the requirements of individual managers.

From the programmer point of view, one of the main tasks of implementing an analytical information system is integration into an existing architectural solution of a company. Data integration involves combining data from different sources to provide the user with a unified form. During this process, a number of problems often arise, mainly related to ensuring high quality data to be analyzed. Difficulties arise at the stage of obtaining data. The difficulties include the lack of information sources, the need to "clean" the data, it is necessary to present them in the form required by the system. In addition, the quality of the information may not meet the requirements due to the inaccessibility of the future system infrastructure or IT architecture.

For this reason, at the time of data exchange between the systems, a violation of their integrity may occur, and this may be a critical factor in the incorrect operation of the enterprise information system. Also, the problem may not be the quality of information, but the state of the directories on the basis of which the analysis in BI takes place. In different information systems, the same objects of an institution may have different descriptions (if data exchange between them had not previously been ensured, and this information was not standardized within the same system).

However, these problems can be solved by first of all paying attention to the following tasks:

- implement the “cleaning” and “enrichment” of the data at the stage of their uploading in order to achieve the required quality;
- ensure the security of the transmitted data by automating the process of obtaining it from sources and, thus, preventing information leaks;
- establish a reliable data exchange process to ensure its integrity and completeness.

Implementation of BI systems is an important step that can help bring business to a new level. But this will require not only a sufficiently large infusion of finances, but also the time and effort of each employee of the company. Not every business is ready to competently complete the project of introducing a business analysis system.

4. Conclusion

To perform medical data analyzes, users, for example, in SQL, would require significantly more time than in BI systems. During the analysis of key performance indicators of hospitals, it was revealed that the main expenses of the organization are related to the patient's stay in the ward. Using visualized data in the analytical system, users can use this information for future focus on the strategy of reducing the amount of time spent by the patient in the ward. Such a solution will allow organizations to consider a new model of patient care at home, which will be cost-effective for the hospital. Using analytical systems, medical organizations can analyze and identify the relationships between various electronic patient records, clinical information systems and financial systems to improve the quality of patient care and reduce costs for certain items of expenditure.

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Study of Digital Skills of Generation Y as the Future Workforce for Industry 4.0 In Russia

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Abstract

The crucial factor of the future sustainable industrial development in Russia is ability of workforce to cope with challenges of emerging Industry 4.0 presenting the new requirements for employees' digital skills. The goal of the study is identification of the digital skills in communication, study and research for Generation Y entering soon at the labor market of Russia when the Industry 4.0 will be a dominating concept. The target group of the study is students of Peter the Great St. Petersburg Polytechnic University. The target group belongs to the last wave of Generation Y cohort expected soon to enter labor force of Industry 4.0. The tool for data gathering was questionnaire consisting of 21 questions. The study was conducted in period of 2017-2019, and the total number of responses was 144. The study findings revealed the state of the art and dynamics in digital skills development and preferable ways of students to use digital technologies in communication, study and research.

Keywords: Digital skills; Industry 4.0, information and communication technology, Generation Y, university students.

Introduction

Sustainable development of every national economy is defined by various internal and external factors. The combination of these factors is specific for every country. Russian economy is too much dependent on prices at the volatile market of hydro carbonic resources. The mineral resources contain 53,4 % of the total Russian export in 2019 (Tsukerman V. et al, 2019). This dependence may be mitigated through strengthening of innovative industrial development (Dubgorn A. et al, 2019; Zharov V. and Tsukerman V., 2019). That means sustainable development and the growth of Russian economy depend on success of reindustrialization based on the modern concept of Industry 4.0 (Ilin, I.V. et al., (2017); Kozlov A. et al, 2019). However, there are a few barriers on Industry 4.0 introducing in Russia, connected with technical, juridical, bureaucratic and social limitations (Bagaeva, I. et al., 2018). The most crucial among these constraints is ability of workforce to cope with new challenges and requirements emerged by the

Industry 4.0. The new digital skills are needed to operate in modern working places. The basis for digital skills mastering is to be developed in universities. The current wave of the nearest year's university graduates coming soon into workforce of Industry 4.0 belongs to the Generation Y (Millennials). (Iapichino A., De Rosa A. and Liberace P., 2018; Kolnhofer-Derecskei A., Reicher, R.Z. and Szeghegyi, A., 2017). According to studies (Zemke R., Raines C. and Filipczak B., 1999; Ng E.S.W., Schweitzer L. and Lyons S.T., 2010) the representatives of Millennials are distinguishing from other generations by some specific features. They are seeking much more in return for their hard work than a paycheck. Millennials pay the greatest importance on individualistic aspects of a job. They had realistic expectations of their first job and salary but were seeking rapid advancement and the development of new skills, while also ensuring a meaningful and satisfying life outside of work (Ng E.S.W., Schweitzer L. and Lyons S.T., 2010) . Millenials are the first generation grown up during the digital era (Tapscott D., 1998; Terjesen S., Vinnicombe S. and Freeman C., 2007). They started to use computers, tablets, smartphones and other gadgets in primary or secondary school; to live in virtual reality of the global net is normal for them. However, their approaches, perceptions and preferences to digital tools of studying, investigating and communicating which is reasonable to extend on working are not researched properly and still unclear. Thus, the goal of the present investigation is identification of the digital skills and preferable ICT tools of communication, study and research for the last cohort of Generation Y entering soon at the labor market of Russia when the Industry 4.0 will be a dominating concept.

To achieve the goal, it is necessary to fulfill the following tasks:

- To adapt existing questionnaire for study purposes.
- To organize the interviewing process of representatives of the target group, students of Russian universities based on questionnaire.
- To handle the materials gathered during the interviewing process.
- To analyze and construe the results of handling and processing of materials gthered iden in.
- To reveal the state of the art and dynamics in approaches, perceptions and preferable ways of students to use digital technologies in communication, study and research.

Literature review

The fundamental values change during the time and depend on common global events (political, economic, social, and technological) and the principles of education (Howe N. and Strauss W, 1991; Ilin, I., Shirokova, S. and Lepekhin, A., 2018). The values formed in childhood may be implicit to the people while the difference in the values of generations creates difficulties in communication in society such as the organization of the learning process since there is one or two generations gap between students and teachers.

The difference in the preferred approaches to education process works for both Russia and other countries, which is described, for example, in the study (Hills C. M. et al, 2017). Studies by Turner T. L., Thammasitboon S., Ward M. A. (Turner T. L. et al., 2012) showed the difference in teaching styles for medical students of different generations. Differences in the learning styles of students of different generations are also noted in (Borges N.J. et al., 2006). The (Hills C. M. et al., 2017) notes a decrease in preference for reading and thinking among students of generation G. Thus, we see how the difference in the values of generations creates communication difficulties in organizing the learning process and reduces its effectiveness. It requires also the search for new comfortable for different generations' ways of interaction in the learning process.

Thus, the analysis of the introduction of the "flipped classroom" model (Gillispie V., 2016) allowed us to coordinate the tendency toward orderliness of generation X and the need for creative self-expression and solving collective problems of generation Y providing good results. However, the topicality of finding comfortable tools for the interaction of different generations in the learning process is not covered enough in the scientific literature. The new opportunities that the development of digital technologies also provides are not fully disclosed.

The studies are mainly devoted to the problem of organizing the labor process attracting and retaining employees of the new generation Y, taking into account their specific goals of motivation and behavior (Wong I.K.A., Wan Y.K.P. and Gao J.H. 2017). It is very different behavior for the generation Y from other generations, (Pînzaru F. et al., 2016; Naim MF et al., 2018), taking into consideration the specifics of generations in the management of corporate labor resources (Jiří B., 2016).

Another large group of articles is focused on the specifics of consumer behavior of generation Y (Valaei N. and Nikhashemi S.R. 2017; Soares R.R. et al., 2017), the difference from the behavior of buyers of previous generations (Lissitsa S. and Kol O., 2016.), their relation to the brands (Soh C.Q.Y. et al, 2017; Knittel Z., et al. 2016), an attempt to segment the online Generation Y shoppers by various characteristics (Ladhari R. et al, 2019).

Systematic research in Russia and the CIS countries starting in 2003 as part of "the RuGenerations - Generations Theory in Russia" project made it possible to adapt the generation theory to the country's specific development (Shamis E. and Antipov A., 2007; Miroshkina M.R, 2017; Nikonov E. and Shamis E., 2019). Russian research, mainly sociological, relies on this approach. We highlight some of the values of generations that are significant for the organization of the learning process taking into account Russian specifics (table 1).

Table 1 The difference in the values of generations in the learning process

Teachers	Students
The Baby Boomer Generation, 1943–1963 Values: optimism, high results achievement, interest in personal growth, collectivism and team spirit.	Generation Y 1983–2003. Values: responsibility, immediate reward, individualism and the importance of self-expression, indirect sociability, fashion, a wide range of interests, success, optimism
Generation X (unknown generation), 1963–1983. Values: readiness for change, opportunity to choose, global awareness, independence, informality of views, pragmatism, high level of material ambitions.	

According to (Khomyakova E. I., 2011), generation Y has developed social skills, a need for a high level of sociability, but they prefer to communicate using technical devices (telephone, social platforms and networks). It is so because of the possibility of access to digital technologies, which are an integral part of everyday life since childhood for generation Y, including social life. On the average, there is a relatively higher level of digital skills for generation Y in Russia than for previous generations. This problem was formulated by M. Prensky, (Prensky M., 2001; Prensky M.,2006), using the terms "digital native" and "digital immigrant". This generation Y trait is favorable for the use of digital technology in the learning process. At the same time, people whose

generation was not digital are engaged in the formation of digital competencies of "digital natives". For teachers - representatives of previous generations - the need to use digital technology in the learning process is not so simple and more labor-intensive.

They note that representatives of generation Y do not like to engage in one type of activity for a long time as prestigious work stopped being the main goal. Representatives of Y prefer not to plan events, careers, and learning process for a long time. Therefore, generation Y is aimed at gaining knowledge in various fields "horizontally" which will give them greater mobility in the future in the labor market. A significant part of generation Y does not plan to work long in one place and even in one profession. Many people prefer to work remotely.

The development of digital technology has contributed to the socialization of generation Y combining individuals with similar interests. Along with the importance of expressing their views the majority is also valuable that has led to the popularity of blogs and social networks. The generation X is characterized by the use of digital technologies to obtain information or new knowledge. Generation Y prefer personalized media with a high level of social service because of the desire for individualism, the high needs for self-realization, self-presentation and the seek for the comfort (Pazina L.O. and Zubareva S.S., 2015).

On the other hand, studies have shown that generation Y needs recommendations and approval from both its predecessors and contemporaries involved in cyberspace (Pazina L.O. and Zubareva S. S., 2015). Many authors argue that students in Generation Y have strong preferences in teaching and learning. However, studies have not confirmed this claim probably due to insufficient data.

Methodology

This study is the next step in chain of researches started in 2018 with students of Peter the Great St.Petersburg Polytechnic University as a target group. The first results were presented in the article (Kozlov et al, 2019) e. The next phase of the study conducted in 2019 has covered more students of the same university. All the studies are based on the classical interviewing techniques with survey developing and analysis of the results. The methodological basis for analysis was the general qualitative scientific methods, such as comparative, content, and systemic analysis, and quantitative ones typical for empirical data analysis.

Results

A comparison of the results of surveys conducted in 2017 and 2019 allows us to identify the dynamics of preferences in obtaining education and communication with teachers and students. The obtained results confirm some characteristics of generation Y.

Students were asked to evaluate ways of communicating with teachers on a scale of 0 – "not at all" to 4 "very often, almost always". Personal communication is most preferable (3.20 and 3.25, respectively). E-mail communication takes the second place but its attractiveness decreases from 2.63 in 2017 to 2.34 in 2019. Group communication in the social network in 2017 took the third place and had a score of 1.7 (very rare, sometimes) but in 2019 it sharply decreased its popularity (5th out of 6, estimated 1.32). The least popular is chatting in the electronic course chat (1.15 in 2017, 1.29 in 2019).

The generation of Millennials characterized by a higher level of common digital competencies is rather conservative in communication with teachers - half of the respondents consider its

importance to not only communicate at seminars and consultations on term papers but also at lectures (Table2).

Table 2. The need for personal communication with the teacher

Personal communication	% of the number of respondents in 2017	% of the number of respondents in 2019
a) necessary during lectures	42,77	49,82
b) necessary when performing practical tasks and term papers	79,19	80,92
c) necessary when performing practical tasks and term papers	2,89	4,95

Interviews with students showed that when answering a question about preferred ways of communicating with other students' young people hardly share educational and personal reasons. While the preferences in communication with teachers can be called traditional, the communication between students has changed significantly (Table 3). In 2019, communication in the social networks (chats) became most popular. Chats on electronic courses and e-mail are the least interesting for such communication. The results obtained allow us to conclude that the preferences in communication with other students change towards increasing the share of digital communication, however, personal communication still is very frequent. In digital communications, students prefer public social networks where their activity on educational issues is closely intertwined with the personal and public activity instead of specific educational channels.

Table 3. Preferences in communicating on academic occasions with other students

Not at all	Rarely	Sometimes	Often	Very often, almost always
0	1	2	3	4

Types of communications	2017	2019
A) in a group on a social network	2,67	2,35
B) in a conversation (chat) of a social network	3,19	3,12
C) in the messenger chat	1,89	1,98
D) in the chat / forum of the electronic course	0,69	1,04
E) by email	0,89	1,14
F) personally	3,24	2,99

Comparing distance and traditional education in 2019 students are more loyal to distance education (Table 4). The amount of people who consider it as a complement to traditional and find it more interesting is growing.

Table 4. Comparison of distance and traditional education

Distance education	2017	2019
A) more attractive than traditional	11,11	15,26
B) complements the traditional, expanding horizons and deepening knowledge in certain areas	37,43	45,13
C) forced to replace the traditional with low quality of the latter	9,94	6,17
D) cannot completely replace traditional education	42,11	31,17
E) other	3,51	2,27

Education requires the use of training materials. Students were asked to rate the attractiveness and comfort of use of the following types of training materials when working independently: a printed textbook, an electronic textbook and a video course on a scale of 1 (inconvenient) to 5 (most convenient). In 2017, priority was given to print media with a rating of 3.84, in 2019 - electronic publications with a rating of 3.77. By 2019, the attractiveness of video courses has grown - if in 2017 they were the least popular (3.29), then in 2019, their attractiveness was equal to the attractiveness of print media.

The study confirmed the high level of general digital competencies of students, their lack of significant barriers in using different gadgets and the contrast in relation to educational opportunities through various digital technologies. (Table 5). Comparing the preferences of 2017 and 2019, we note a decrease in interest in all types of digital applications, except for mobile educational platforms. Educational institutions stimulate the use of this type of digital educational resource; therefore, its share is naturally high. The share of those who do not use mobile educational applications at all is also growing (10.60% of all respondents in 2019).

Table 5. Types of mobile applications used for study (% of the number of respondents)

Types of mobile applications	2017	2019
Mobile educational platforms	33,33	40,64
Instant messengers	49,43	38,16
Event applications	11,49	5,65
Video Libraries	32,76	16,25
Textbook libraries	41,38	38,52
Ready-made libraries	24,14	12,37
Online tests	47,70	40,99
Not using	4,81	10,60

Our study confirmed the high level of ability and use by generation Y of general digital competencies for personal and social purposes, short-term interest in various new areas and forms of training. It also showed a high degree of conservatism in the development of the part of education that they consider fundamental.

Conclusion

Thus, the focus of the study was done at the representatives of the last wave of the Generation Y cohort, at discovering of their digital skills, perceptions, preferences and usage of on line learning

tools. Therefore, the target group was students of Peter the Great ST. Petersburg Polytechnic University who will join the ranks of Industry 4.0 in the nearest future. The study reveals some important facts regarding attitude and usage of ICT by students in educational process and distinctions between results of interviews done in 2017 and 2019. The results of the both studies confirmed the high level of general digital skills of students, the absence of significant barriers to the usage of various gadgets and on line tools. However, the last Millennials are quite conservative in their communication with teachers – half of the respondents consider it important and even necessary to communicate personally at seminars and consultations on term papers, and at lectures as well. It also shows a high degree of conservatism in the examination of the part of teaching materials that they consider fundamental. Nevertheless, there are some differences in students' perceptions and approaches in 2017 and 2019 highlighting important tendencies in moods of students in favour of on line educational tools. The study discovers that students in 2019 are more loyal to distance education and ICT in educational process, since the share of those who consider it as a supplement to traditional education has grown, as well as those for whom it is most attractive.

The limitations of the study are defined firstly, by not so wide samples of respondents in 2019, 67 interviews, secondly by focusing on the students of one university only.

The gathering of the data regarding the target group based on the same technique and survey in the current 2020 will be the important way of the future study. The other direction of the future investigation is spreading the study to other universities located in different parts of Russia and abroad.

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Automated Generation of Tasks for Product Range Analysis In Distant Learning

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Abstract

A practically proven and adjusted procedure of generating assignments related with product range analysis is suggested. The generated datasets can be used for ABC, XYZ analysis, BCG matrix and similar methods. In addition to generated datasets, analysis results of these variants are also generated. This can be used to create a flexible automated testing system. The results of this paper are suitable for mass distant learning courses of marketing orientation.

Keywords: distant learning, assignment generating, product range analysis, testing, assortment.

Introduction

In recent years, there has been a boom in online training courses. Students from almost any place of the Russian Federation and other countries can use them. The types of courses vary. One can find support for basic education, distance learning, and continuing education. The importance of this activity is emphasized in (Bril A.R., Kalinina O.V. and Ilin I.V., 2017), (Kozlov, A. and Teslya, A., 2017), (Ilin, I., Shirokova, S. and Lepekhin, A., 2018), (Kankovskaya, A., Kalinina, O. and Ilin, I., 2018), (Bagaeva, I., Iliashenko, O. and Borremans, A., 2018) and many others.

To improve the quality of training, courses must meet a number of requirements (Kurdi, G., Leo, J., Parsia, B. and Salam A., 2019), (Plevny, M. and Gladavsk'a, L., 2014), among which it is important to note the following:

● the ability to train a large number of participants, sometimes up to several thousand ● people; assignment checking in such courses cannot be performed manually;

● the proximity of training calculation examples to real situations;

● uniqueness of assignments; this requirement is due to the fact that, unfortunately, some students tend to copy each other's assignment results.

Thus, the problem arises of generating a variety of assignment variants that are close to reality and allow automated verification of the results of calculations performed by students.

This paper is devoted to the generator of sales volume data for assignments on product range analysis. This tool generates individual sets of initial data that are similar to real data, which will allow giving each student an individual task. The generated data can be used to perform ABC analysis, XYZ analysis, Boston consulting group matrix construction, and other similar methods of assortment analysis.

Similar approach of generating tasks can be found for the courses of mathematics (Gangur, Automatic generation of mathematic tasks, 2011), programming (Souza D.M., Felizardo K.R. and Barbosa E.F., 2016), and statistics (Gangur M. , 2018). In this work, we are talking about a complex: generating tasks, questions and correct answers. All the calculation formulae have been adjusted during practical usage. Thus, they are suitable for immediate implementation.

Methodology

In the version under consideration, data on annual sales volumes for **m=6** years are generated. Years are used to exclude seasonality. The model also contains **3** product lines of different depths, which expands the range of analysis. These limitations can be easy overcome, and the version under consideration is sufficient to demonstrate the specifics of the proposed procedure.
Signs of the formulae.
r is a random number evenly distributed from **0** to **1**. It is implemented with standard functions. In Excel, this is the **RAND ()** function.
R is a random number evenly distributed over a range of length **2**;

$$R=r*2-Kr.$$

If **Kr** is equal to **1**, **R** changes from **(-1)** to **1**, but by changing **Kr** between **0** and **2**, this range can be shifted to both higher and lower values.
n1, n2, n3 – the number of products in each product line. We highly recommend setting different values, such as **10**, **15**, and **20** items, respectively. This leads to the possibility of investigating the roles of product lines.
Generating of sales data is performed on Excel worksheet and consists of the following steps.
1. A table is made with the following columns: Product line number; Item number. Subsequent columns are formed as described below.
2. The role of the product line (its preliminary rank by sales: **1**, **2** or **3**) is defined. To do this, three random numbers (the **RAND()** function) are generated, and their ranks **Pi** are determined, **i** – is the product line number (Excel function **RANK(value, range)** is used). Thus, in various variants, each product line can play a different role.
3. Preliminary overall sales volumes of each product are determined:

$$Vj = \exp(r * Kv) * Pi,$$

where **j** is the number of product, **Pi** is the rank of the product line, **Kv** is selected empirically in order to set the cumulative sum of sales in ABC analysis close to the Pareto point (**20%** of the goods make up **80%** of sales). **Kv = 8** gives good results.
4. Slopes of sales volumes of each product are calculated.

$$Sj = R * Vj * Ks / m / 2.5,$$

Explanation:
● sales may undergo both growth and decline, so **R** is used. If **Kr = 1**, the numbers of products with an increasing and decreasing sales volumes are approximately equal. Decreasing **Kr** can enhance the role of commodities with increasing sales volumes and vice versa.
● there should not be negative value of sales, which is possible in the first or the last period due to the inclination sign, so **Ks** values should be less than **1**. In addition, large values of **Ks** gives little number of goods with **X** category, which has stable sales. Accordingly, the proposed value is **Ks = 0.5**.
● division by **m = 6** is performed to calculate the sales volume for one period from total value for all **6** periods;
● the change in sales volume for one period is determined. As long as the random component is not yet inserted and the growth is uniform, start and end points differ from the average one period value by **m / 2 – 0.5** (it should be recalled that in this version **m = 6**). Extreme values can be achieved either in the first or in the last period; that depends on the slope sign. The average value is in the middle of the considered time range, i.e. between the sales values of points **m / 2 = 3** and **m / 2 + 1 = 4**. The analysis is assumed to be short-term, that means that the stages of the product lifecycle do not change and it is possible to evaluate the sales volume dynamics with the help of linear trend.
5. The minimum sales volume in the presence of the slope, but without random variations is calculated:

$$Vj,min = Vj / 6-2.5 * abs (Sj).$$

6. Similarly, the maximum sales volume is calculated:

$$\mathbf{Vj,max = Vj / 6 + 2.5 * abs\ (Sj).}$$

7. The range of random fluctuations in sales is defined:

$$\mathbf{Dj = Vj,min * Kd.}$$

Since the sales volume cannot be less than zero, **Kd** cannot be greater than **1**. If it is close to **1**, a large oscillation occurs. In order to generate an assortment with some stable products of category **X**, **Kd** is set to **0.3**.
8. The random deviations from the ideal line with slope are calculated:

$$\mathbf{dij = Dj * R.}$$

9. The amount of each product sales for each period is set:

$$\mathbf{vij = Vj / 6 + Sj * Ai + dij.}$$

where **Ai (i = 1…m**; **m = 6)** is **{-2.5; -1.5; -0.5; 0.5; 1.5; 2.5}**.
The obtained values are rounded to two decimal places.
So, the resulting values sequentially appear by determining:
● total sales volumes;
● sloped sales volumes;
● random deviations of sales volumes.
This ensures data values for analysis being close to reality and admissible.
As a result, sales volumes are somewhat different from the initially defined, but deviations of **m** periods to some extent compensate each other, and the total amount of all goods is close to the original one.
10. Checks are performed. They are necessary to ensure the accuracy of the calculation formulas, proper selection of coefficients and for preparing desired (still somewhat simplified) data.
The importance of checks of automatically generated tasks is stated in (Abe, K., Cortez, R. and Vazhenin A., 2013).
10.1. The absence of equal sales volumes. If there are equal sales volumes, it can cause additional difficulties, which are unnecessary in case studies. This situation is possible even if all formulae are correct. In case this check fails, it is necessary to generate a new set of data.
10.2. The negativity of sales volumes is not possible. The situation can occur when coefficients are not correctly chosen.
10.3. The presence of all categories is necessary: **A**, **B**, **C** with standard boundaries of cumulative sales volumes of **80%** between categories **A** and **B**, and **95%** - between **B** and **C**. The lack of any category is undesirable for the analysis and this is practically impossible in real life situations.
10.4. The ratio of minimum to maximum sales among products should be less than **0.5**. Otherwise, analysis may appear useless.
10.5. The maximal absolute value of the slope of the linear trend should exceed **0.02**. Otherwise, there are no really growing and/or decreasing sales and analysis is also useless.
The training course developed by the authors uses the idea of building the BCG matrix, proposed in (I.V., 2000): the categorization is made within the internal secondary data of the product range. Products are divided into “dogs”, “cash cows”, “question marks” and “stars” by the average or median values of their sales volumes and sales volume growths. This provides analysis that is independent from external data. However, this analysis can become meaningless if it turns out that the sales volumes and the growth of these volumes are not significantly different.
10.6. The total number of A, B, C and the total number of X, Y, Z items should be equal to the total number of goods. This is the check of formulae correctness.
10.7. There should not be equal total sales volumes by product lines and equal average sales by product lines. This is not a requirement, but the violation of this condition makes the case study overcomplicated. The cause of this situation is sales rounding.

11. Further, each set of calculated sales volumes is saved in a separate Excel worksheet file, which is then given to the students for calculations in assignments. It is also possible to include some questions in this file. A wide range of test questions can be generated. They are aimed to check the students' calculations. For example:

- the number of items belonging to categories X, Y, Z, A, B, C, AX, BX, ..., CZ;
- recommendations for some randomly selected goods (withdraw from the market; develop);
- recommendations on product lines (expand, unify, not change);
- the category to which the product of some given number belongs.

In addition, a file version for the teacher or for automatic generation of test questions is also saved. It contains questions and correct answers obtained by proper calculations that students should do themselves.

Results

The suggested procedure fits the modern trend in IT called Synthetic data. Possible areas of its implementation are related with findings of (Iljashenko, O., Bagaeva, I. and Levina, A, 2019), (Zaychenko, I., Smirnova, A. and Kriukova, V., 2019), (Kalinina, O.V., Zaychenko, I.M. and Gutman, S.S., 2017), (Kozlov, A., Gutman, S., Rytova, E. and Zaychenko, I., 2017), (Zaychenko, I.M., Kalinina, O.V. and Gutman, S.S., 2016).

The process of files generating is performed by the simple Excel VBA macros, after passing all checks. This parallel generation of initial data, questions and answers allows easy automation of checking students' results.

This procedure has been implemented, adjusted and successfully tested in the course "Management of innovative products". Testing revealed additional recommendation: in order to avoid unnecessary complexity of report, the size of initial data table (i.e. the number of products) should fit one page of the report form.

Thus, the described system allows improving the studies of product range analysis, providing individual tasks with the parameters that are close to real data, as well as an automated check response of students. The adjusted formulae make it possible to use the suggested decisions directly.

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Digital Transformation of Business: Approaches and Definitions

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Abstract

The relevance of the work is due to the development and widespread introduction of digital technologies in almost all socio-economic processes and the inevitable digital transformation of most enterprises. Which, as a result, leads to the need for business leaders implementing the digitalization process to study this process in depth, including understanding and analyzing terminology. Therefore, the goal was to identify approaches to the definition of the terms “digital business transformation” and “digital economy”.

The object of research is Russian enterprises and the economy in general.

The subject of the research is the concepts of “digital transformation of business” and “digital economy”.

In accordance with this goal, a number of terms “digital economy” and “digital transformation” were studied, the differences between them were identified and formulated. The evolution of the terminal process “digital business transformation” is characterized, the reasons causing changes in the interpretation of these concepts are identified, the main approaches to the development of the digitalization process are considered, and the industry specifics of the digital business transformation are studied.

As a result of the study, it was found that the terms “digital transformation” and “digital economy” are interpreted differently. The digital economy can be defined as part of the GDP obtained through the use of digital means; digital transformation, in the narrow sense, represents the transition from analog to digital data, and in the broad sense, it is a business transformation through the use of new digital technologies, which leads to new competitive advantages in the digital economy.
In conclusion, an author's interpretation of the concept of "digital business transformation" is proposed.

Keywords: digital business transformation, digitalization, digital economy, digital maturity.

Introduction

Each year, the level of computerization of various sectors of the economy is increasing and the idea of digital transformation is reaching the whole world. As a result, most developed countries, including Russia, pay great attention to such terms as digitalization, digital transformation, digital economy, digital maturity, digital strategy to study in depth a new area of scientific and technological process.
Although the terms “digital transformation of business” and “digital economy” have been firmly established in our usage, it is not clear whether there is a generally accepted definition of these terms, and if so, what the differences between them are.

Thus, the purpose of the paper is to study and analyze approaches to the concept of business digital transformation terms.

Materials and Methods

Nowadays, there are many definitions of digital transformation. It should be clarified that within the concept of “digital transformation” there are several terms [1] with different interpretations:
- digitization - is the transformation of information from physical to digital media, with no changes in the quality and content of information, it is simply converted into electronic form for further processing in digital format- digitalization) – is the initial creation of a new product in digital form.

Thus, the digital transformation is simultaneously aimed at improving the existing business processes and at creating competitive advantages by changing and creating new business processes within the enterprise.

Most Russian companies are now focused on the digital transformation of key business processes, and digitalization is perceived by them as a new round of automation and informatization. In this regard, it is necessary to distinguish between «digitalization» and "digital transformation of business" as compared to production automation.

Automation of production is a branch of scientific and technological progress that aims at freeing people from participation in the processes of obtaining, transforming, transferring and using energy, materials, products or information, in whole or in part, through the use of technical means and mathematical methods.

Digital transformation ensures that the fullest possible potential of digital technologies is unlocked through their use in all aspects of management - processes, products and services, decision making approaches. In the report "Russia 2025: From Human Resources to Talents" The Boston Consulting Group specialists emphasize [2] that digitalization is the use of online and innovative digital technologies by all participants of the economic system - from individuals to large companies and states. It is important to emphasize that digital transformation is not only about the availability of technology per se. In order for the process of digital transformation to be complete, clearly defined business objectives and data are needed.

In order to form an author's definition, this paper will analyze the terminological differences between the concepts of "digital economy", "digital transformation", and peculiarities of industry digital transformation.

It is proposed to consider the principles of business engineering and enterprise architecture as a methodological basis for the implementation of digital transformation at the level of national economy [8,9]. In accordance with these principles, it is necessary first to identify the main stakeholders of digital transformation, their expectations and requirements for the new format of activities, which determine the drivers of digital transformation, and then on the basis of these requirements to form the architecture of the new economic space.

At formation of conceptual model of architecture of digital space of Russian business approaches of disciplines "Enterprise architecture" and "Business engineering", in particular, were used:

- service orientation of the model being formed: elements of the system interact on the principle of providing services to each other;
- structuring by layers: business layer - business entities, business processes, business functions; IT layer - information and digital systems and technologies, IT services, IT functions; technological layer - IT and digital infrastructure that provides the deployment of information and digital systems and technologies, technological services.

Results

The eMarketer Subscription Market Research Company [3] defines digital transformation as the process whereby business leaders take advantage of the opportunities and benefits of new technologies to digitize their companies: their operations, products, marketing, culture and goals for future growth. Technology is a means of transformation, not an end in itself. The focus should be on setting a goal for the future and then building a strategy based on that vision.

Also, to study the chosen topic, the definition of digital transformation, presented by V. Mesropyan, the head of the project "Digital Economy of the Russian Federation", is of interest [4]: these are revolutionary changes in business models based on the use of digital platforms, which lead to radical growth in market volumes and competitiveness of companies.

Thus, the digital transformation of business can only be considered at the intersection of all three dimensions: the formulated business objective, data availability and technology. Thus, the digital transformation of business involves a fundamental rethinking of how the organization works and how it interacts with the external environment.

Evolution of the concept of "digital transformation of business" and its features

Obviously, there are many definitions of "digital transformation" in open sources. It is worth noting that the more the authors of these definitions try to link the concept in question with a set of technologies, the more cumbersome the list they get. As an example, let us consider the definition of the digital transformation of Detlef La Grande [5], in which he mentions social networks, crowdfunding, and crowdsourcing, and cloud technology, and mobile Internet, and big data technology, and intelligence, and 3D printers, and augmented reality, and carried devices, and open source products. It is clear that with this approach, as new technologies emerge, the concept of digital transformation will be refined and supplemented. Clearly, the meaning of the term "digital transformation" is also changing, transforming as information and communication technologies and business evolve.

The original meaning of the term "digital transformation" meant a shift towards digital data instead of analogue data. Today, this process is commonly referred to as digitalization. Data Relish [6] made a forecast of data growth on different media, which is shown in Figure 1.

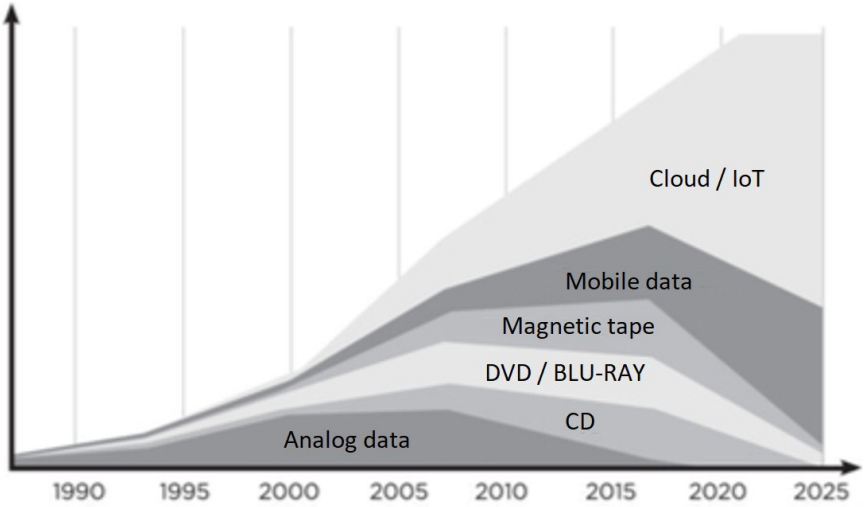

Fig. 1: Prediction of data growth on different media [6].

If we rely on the data presented in Figure 1, we can conclude that in 2020 the share of analogue data should reach zero, which means that the process of digitalization should be completed. However, it is obvious that the digitalization process is on the contrary. This, in turn, indicates a broader meaning of the term in question.

It should be noted that the term "digitalization" has different accents for specialists in different fields. For instance, for engineers, the center of the digital transformation of business will be technology, while business consultants will focus on rethinking the company's strategy rather than on the technology on which the transformation of business is based. Recruiters will challenge themselves to find people with new thinking and qualifications. This raises two questions: what is the essence of the digital transformation of business and how to measure it?

There are three main characteristics of the digital transformation of business [7]:

1. Digital technologies are used to automate production and enterprise as a whole. If we stick to this hypothesis, we can fairly note that the process of digital transformation has been going on for decades, and the appearance of each new technology only adds new stages.

2. Digital transformation is directly linked to the development of information and communication technology (ICT). A turning point in this case can be considered the emergence of a third platform, which has contributed to the emergence of digital companies - a new business model operating with the help of new digital technologies ("big data", Internet of things, cloud storage, social technologies and mobility).

3. Digital transformation is relevant for both digital companies and traditional resource corporations. The latter, in turn, focus not so much on new technologies as on the new economic conditions in which the enterprise finds itself. This situation forces them to transform their business model of organization and look for the necessary information and communication technologies for further successful development.

It should also be emphasized that the meaning of the term "digital transformation of business" will differ significantly and will have its own specifics for certain countries, cities or even enterprises.

Unfortunately, at the moment there are no countries in which there would be companies that have fully completed the digital transformation of business. However, it should be noted that most countries are

striving for this, and the set of technologies that determine the digital transformation of enterprises will obviously differ for different sectors of the economy.

Industry Specifics of Digital Business Transformation

Above, the most general approaches to the interpretation of the concept of "digital transformation of business" were considered. However, it is obvious that within the framework of the implementation of the concept of digital transformation of business within a particular sector of the economy, the spectrum of transforming technologies and organizational methods should be clarified, since the specifics of the influence of many factors that determine the conduct of business in this sector are manifested.

For example, for the telecommunications industry [8], such technologies as software-configurable data transmission network SDN (software-defined network) or such an approach to the provision of network services as NFV (network functions virtualization), which implies the replacement of standard equipment with virtual machines running on conventional servers, will be of paramount importance.

Thus, for telecom operators, the digital business transformation represents a move beyond traditional business management models, with a focus on both B2C and B2B. The goal, in turn, is to provide mass access to various services, as well as to provide broadband Internet access for home users, which provides fast download of heavy video content, will be able to provide and maintain the services of "smart home".

An important direction for the transformation of this area is also the reconstruction of the network architecture with the help of SDN and NFV technologies [9], which implies the transition from the specialized machine implementation of network functions to their software implementation in standard server equipment.

An important point for the transformation of the telecommunications industry is also the "Internet of Things" (IoT) technology, which contributes to a change in the concept of "user" as more and more connected devices fall into this category.

In turn, if we consider the digital transformation within the framework of financial markets, the most relevant technologies are Internet banking and block-chain [10,11], for production enterprises - industrial Internet things [12], for retail - electronic commerce [13], for logistics - drones [14] and so on.

Thus, it can be concluded that, along with the general technological trends related to digital transformation, each industry has its own set of technologies, which comes into focus when trying to define the essence of such a phenomenon as digital transformation.

Digital Economy

For the first time, the concept of the “digital economy” appeared in 1995. This term was coined by Nicholas Negroponte, a fellow at the University of Massachusetts. There are many interpretations and definitions of the concept of “digital economy”, but so far, they all remain quite blurred.

Most of the presented definitions that can be found in the scientific literature include a list of services, technologies, and devices that are somehow related to the concept of “digital economy”, while they do not report which specific part of the economy can be attributed to the digital one.

The most common definition of the term “digital economy” sounds like [10]: it is a set of economic and social activities, that are provided by informational and communication technologies, such as the Internet, mobile and sensor networks, including communications, financial transactions, education, entertainment, and others a type of business, that based on the use of computers, telephones and other devices.

Fig. 2 [11] presents a detailed three-level ecosystem of the digital economy, according to which the first level is the hardware-network; the second level is the level of software infrastructure and related elements, and the third level is the application level, which is specific for various sectors of the economy.

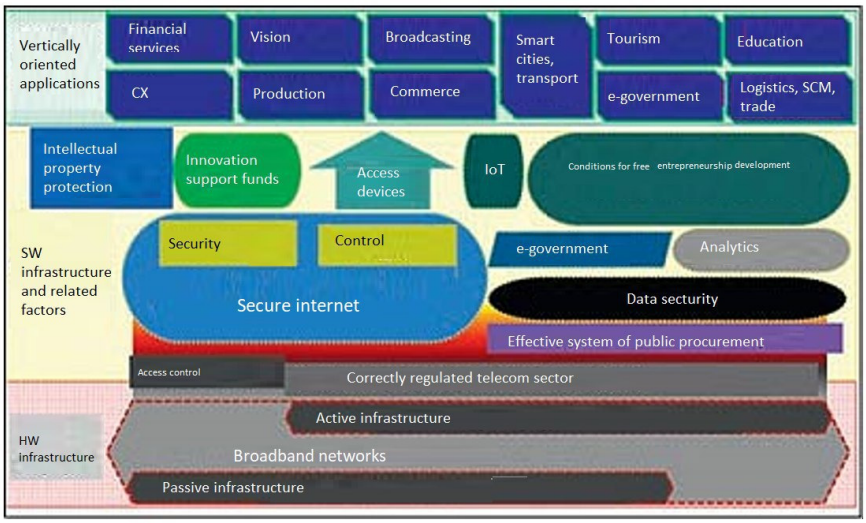

Fig. 2: Ecosystem of the digital economy [11]

In the publication, OCED (Organization for Economic Cooperation and Development) [12], the "digital economy" is introduced as a term used to describe markets that focus on digital technologies and belong to the spectrum of economic, social and cultural events supported by the Internet and other ICT technologies. It is noted that the digital economy is associated with "trading information products and services through e-commerce". Emphasize that it is proposed that the digital economy not include the entire e-commerce market, but only that part, that is specifically related with the trading digital goods.

However, this approach is not supported by all market participants. For example, if we turn to the methodology for calculating the contribution of the digital economy to GDP, which was proposed by BCG [13], we can find a completely different approach to the definition of the concept under consideration. According to this document, the volume of the digital economy is online consumption plus the cost of building the infrastructure of this consumption. This method (on the example of the Russian Federation) is shown in Fig. 3. The volume of the digital economy, estimated at 1,580 billion rubles in 2015, is calculated as the sum of online consumption + access costs + expenses on access devices + investments + government spending + exports and - imports.

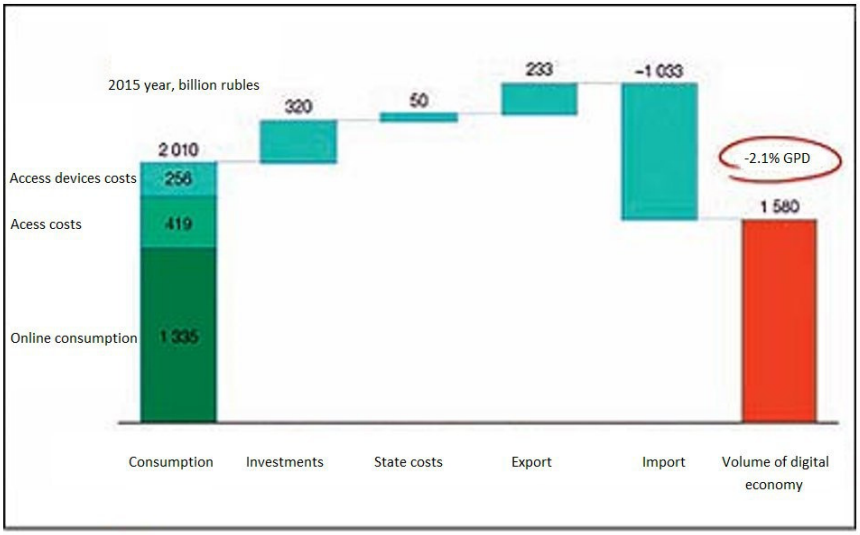

Figure 3: Assessment of the contribution to the digital economy by the BCG method [13]

Another study [14] emphasizes that the development of informational and communication technologies is ambiguous: on the one hand, this leads to an increase their value, and on the other hand, their mass promotion on the Internet leads to a decrease their value.

The authors of that work [14] propose to separate the “direct contribution to GDP” from the use of digital technologies: consumption of services from online companies, government agencies, export and import of online orders and services. "Indirect contribution to GDP," which is realized by providing more efficient search for information, by online services, by more efficient exchange of information on social networks, by being able to buy and sell goods more efficiently when using e-commerce and by optimizing costs when using cloud services. And also, the third category [15] — “contribution beyond the GDP” — the impact on the economy of using B2B e-commerce and online advertising platforms, benefits of using free services for the population, such as free search, communication in social networks, access to cultural values via on-line and others.

That makes clear, why the rates of the authors are so different. Thus, it can be concluded, that taking into account the size of the digital economy is impossible without taking into account the contribution to GDP.

An author 's definition of the term "digital business transformation" can be proposed.

The "digital transformation of business" is the transition from a traditional enterprise management system to an innovative one, that based on the introduction of relevant information and communication technologies into the enterprise’s activities, and aimed at conversion business and/or transforming it into a digital form to obtain and/or retain competitive advantages in modern society.

An architectural approach to the digital transformation of the national economy

The digital space of Russian business is proposed to be formed on the basis of the following principles:

- service orientation: one of the subjects sets the requirements for the services of the other. The latter provides the corresponding service in response to a request; [10]
- allocation of end-to-end technologies - for the state, market, industry;
- legal transparency and efficiency: the interaction of Russian business entities should take place in the legal field, in which the rules for conducting business activities and the rules for resolving disputes are established, brought to the attention of all entities, and equally take into

account the rights of all interacting parties and obligations arising during the implementation of business activities;

- symmetry of information: interacting entities should have equal access to sources of information about business entities, as well as business entities, to the extent that this is provided for by the rules for disclosing information about the activities of certain entities;
- information security: information provided by subjects of Russian business is correct, consistent, protected from unauthorized access, misuse; IT architecture and IT infrastructure of Russian business entities can provide information security requirements for Russian business entities;
- digital culture and human capital management: one of the subjects sets the requirements for the services of the other. The latter provides the corresponding service in response to a request;

The study revealed that the transition to a digital business basis has its own characteristics at different levels of the business ecosystem. From the above principles of the formation of the digital space of Russian business, the following principles of modeling its architecture were derived:

1. The multilevel architecture of Russian business (enterprise-level, industry level, region (state) level):
   1.1 Providing information interaction of subjects at each level;
   1.2 Providing a single information space within each level;
   1.3 Providing informative interaction between the different levels;
2. Assessment of the level of digital maturity of the object; [11]
3. Client-centricity: focus on and adapt to customer requirements;
4. The role of data in decision making and management;

The interaction of Russian business entities in accordance with the principle of service orientation provides that, entities (described in detail in [5]) provide each other the following services:

1. State:
   a. Rules for the implementation of business activities;
   b. Rules for resolving disputes and conflicts arising from the implementation of business activities;
   c. Ensuring compliance with the rules for the implementation of business activities;
2. Industry:
   a. Industry performance standards;
   b. Ensuring compliance with industry standards;
   c. Supporting industry professional community;
3. Market:
   a. Providing space for business activities;
   b. Support for business, regulatory mechanisms;
4. Legal entities and individual entrepreneurs:
   a. Business services in accordance with the agreements;
   b. Providing professional expertise and experience in the implementation of business activities;
   c. Charge for the opportunity to carry out activities.

Conclusion

The formation of an effective digital space of national business is a complex, multidimensional task, the implementation of which requires a systematic approach to the formation of a theoretical and methodological base for the transition to a new way of doing business. As a result of the work, approaches to the definition of "digital business transformation" were identified and studied. Important concepts such as “digital business transformation”, “digitalization” and “digital economy” were considered.

As a result of the study, it was revealed that the terms “digital business transformation” and “digital economy” are interpreted differently. It has been established that the digital economy can be expressed as part of the GDP obtained through the use of digital means. At the same time, there are a number of different methods for assessing the digital economy and, as a consequence, determining its essence. Estimating GDP is a prerequisite for assessing the level of the digital economy but calculating the indirect contribution to GDP can be difficult.

The term “digital business transformation” has evolved and will now include two important meanings: digital transformation, in the narrow sense, represents the transition from analog to digital data. And in the broad sense, it is a business transformation through the use of new digital technologies, which leads to an increase labor productivity in a particular period.

This work proposes to apply the architectural approach to the formation of the digital space of Russian business, based on the architectural approach to the design of socio-economic systems. The subjects described in the work, the principles of their interaction, the principles of forming a business space can become the basis for the formation of individual slices of the created business environment.

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Analysis of Healthcare IT Solutions Within Value-Based and Personalized Medicine Paradigms

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Abstract

In the modern world, in the conditions of the dynamic development of technologies, the focus of attention of enterprises is directed not only on technologies for the implementation of core activities, but also on management technologies. The leading ideological concepts, under the influence of which a modern healthcare system is being formed, are: value medicine, personalized medicine, Health 4.0 concept. This article analyzes the models of IT solutions for IT support of the medical organization, which implements the principles of value and personalized medicine and following the development trends of modern digital technologies. The analysis of the key characteristics and features of IT support for this type of medical organization.

Keywords: IT support, value-based medicine, IT solutions, technology.

Introduction

Today, a medical institution at any level needs modern management technologies. The culture of continuous improvement is one of the important factors for the successful growth of the institution.

In a world that is constantly evolving and facing strong competition, ensuring stability can no longer be a sufficient condition for the company to operate successfully for a long period of time. Continuous improvement with the use of modern technologies, the introduction of innovations and the encouragement of employee initiatives can be an impetus to advancement among competitors.

The main goal of healthcare management is to reduce social losses due to morbidity, disability and mortality. To achieve this goal, effective activity is required, both of the entire healthcare system, and of each medical organization, for which it is necessary to introduce other methods, principles, approaches and management models for absolutely all parts of the medical organization aimed at achieving the following interrelated goals:

- improving access to quality services and prompt medical care;
- improving the quality of life and public health;
- increase the profitability and profitability of the medical organization (Begkos et al., 2020).

However, not everyone understands and realizes the necessity and importance of economic efficiency and profitability for a public health organization. At the same time, practice shows that medical organizations that actively attract additional extra budgetary funds are the most effective.

Health management includes managing financial, labor and medical resources. In the healthcare sector, there is a tendency to increase the efficiency of healthcare institutions, therefore, it is necessary to introduce new modifications and ways to manage all elements of the organization (Siyam et al., 2019).

The leading concepts setting the development trend of the modern healthcare system are: value medicine, personalized medicine and the concept of healthcare digitalization Health 4.0 (Thuemmler and Bai, 2017).

Valuable medicine is a result-oriented approach to the organization of a medical care system, which involves the selection of a method of patient management, which at lower costs allows you to achieve better results.

The main goal of medicine within the framework of this approach is value from the point of view of the patient, and not just access to care, cost containment policy, convenience or service (Brown et al., 2003). With this approach, ideally, those who provide medical services are paid for actually helping the patient improve their health, reduce the incidence of chronic diseases and their complications, and also contribute to a better health of society as a whole. Of course, this approach should be used with extreme caution, since in medicine there is a huge share of uncertainty in the result, and often the most correct approaches and best techniques may be ineffective due to force majeure circumstances or unpredictability of the patient's reaction. Moreover, some experts believe that prioritizing some quality criteria will underestimate others and cause an imbalance in the provision of assistance. But, nevertheless, changing the wage system in medicine and avoiding increasing aid volumes today is considered a key point that can increase its effectiveness provided that resources are saved, the acute shortage of which worries health systems around the world.

In conditions of existing trends in the development of health care, the urgent task is to develop a model of the medical organization that implements the principles of value-based and personalized medicine, takes advantage of the technologies of the Health 4.0 concept, and allows for quick and flexible response to dynamically changing environmental conditions.

The requirements for compliance with the principles of value and personalized medicine should be reflected in the model of business processes of a medical organization. The possibilities for applying technologies of the Health 4.0 concept set requirements for the structure of IT support and the technological infrastructure that ensures the implementation of processes.

This makes it urgent to analyze models of IT solutions for IT support of a medical organization, which implements the principles of value and personalized medicine and follows the development trends of modern digital technologies.

Literature Review and Research Methodology

The concept of Health 4.0 implies the use of modern digital technologies (big data management, the Internet of things, blockchain, telemedicine, predictive analytics, etc.) to increase the economic and medical efficiency and accessibility of medical care. Modern medical organizations are not able to cope with the increasing flows of information, because the existing management architecture, including the architecture of information systems and applications, does not provide interfaces to interact with modern digital technologies. In addition, there is still patchwork automation of medical organizations, which absolutely does not imply an effective information exchange between the components of information technology architecture (Lee and Youn, 2015; Ilin et al., 2018; Borremans et al., 2019).

Ensuring accessibility requirements for medical care and compliance with the principles of value and personalized medicine are directly related to the possibility of increasing economic efficiency. The provision of medical care that is adequate, according to the patient, to a particular case, creates the prerequisites for the efficient use of the resources of medical organizations. Modern management technologies, including digital ones, have significant potential in solving a number of problems on the way to providing more affordable, cost-effective and high-quality medical care.

Health 4.0 is defined as a strategic concept for the healthcare industry based on the Industry 4.0 concept. The primary goal of Health 4.0 is to provide progressive virtualization to personalize patient health in real time. Personalization of healthcare will be achieved through the widespread use of cyber-physical systems, cloud computing, the Internet of things, predictive analytics, blockchain technology, streaming data from wearable devices, and various mobile systems (5G) (Cáceres et al., 2019). To understand the benefits of using the concept in the healthcare sector, it is necessary to precisely define the main advantages and goals of using the concept of the fourth industrial revolution as a whole (Mueschenich and Wamprecht, 2018). To date, the concept of "Industry 4.0" is one of the most significant organizational and technical systems. Such a solution provides for the end-to-end digitalization of all physical assets and their integration into the digital ecosystem, together with partners involved in the value chain (Hermann et al., 2016). The main strategy of the fourth industrial revolution is to expand the possibilities of relations between manufacturers and suppliers in various industries, which allows to increase the volume of individualization and personalization of customers.

The Industry 4.0 concept is defined by the following characteristics:

1. Digitalization and integration of vertical and horizontal value chains, from development and procurement to production, logistics and service. All existing data on the effectiveness of process control are available in real time in an integrated network. Horizontal integration allows you to reach suppliers, consumers and other key partners. Such integration uses a variety of technologies: from tracking and control devices to integrated planning integrated with real-time execution.

2. Digitalization of products and services, which includes the addition of existing products with various smart sensors or communication devices that are compatible with data analytics tools, as well as the creation of new digital products designed to provide comprehensive solutions. Due to the introduction of innovative methods of data collection and analysis, enterprises have the opportunity to obtain data on the use of products and modify these products in accordance with the new requirements of end users.

3. Digital business models and customer access, including comprehensive, personalized, data-driven services and integrated platforms. The main focus of new business models is to obtain additional profit from digital solutions, optimize interaction with the client and improve customer access (Kagermann et al., 2013).

This research paper will review technologies related to Health 4.0 from various global software and hardware vendors in order to analyze general trends in building the structure of IT support.

Results

The implementation of information systems and technologies at various types of enterprises, as a rule, is based on goals related to solving the most important business problems. An analysis of organizations in the healthcare sector showed that such tasks from the point of view of management include:

1. Improved diagnosis / treatment. The institution is not only a platform for the introduction of new technologies, but also achieves a significant improvement in the results of applying traditional approaches by using predictive modeling methods based on patients' medical data to select the optimal treatment depending on individual characteristics and organizational decisions.

2. Organization of “seamless” patient flows. Effective organization of patient flows means a reduction in waiting time and length of hospital stay, increasing the satisfaction of patients and doctors with the care process. The information system is configured to identify bottlenecks, analyze the causes and develop approaches to address them, which contributes to the optimal distribution of patient flows.

3. The active use of distance medical technologies and hospital to home technologies. One of the key tasks of remote monitoring methods is to expand the boundaries of the hospital with the possibility of further assistance to the patient at home. For these purposes, there are various medical devices - wearable, implantable, portable. But their main task is to provide information about certain vital functions of the patient (blood pressure level, electrical activity of the heart, oxygen saturation of the blood, glucose level, etc.) in real time to the clinic. Some devices are associated with additional therapeutic options, such as remote control of the dose of the drug. The most promising is the use of remote rehabilitation technologies, including during orthopedic operations, after a stroke, etc. This significantly reduces the need for patients to be hospitalized and, consequently, reduces the cost of providing care, along with an increase in patient satisfaction with the opportunity to receive the necessary help. at home. Data from wearable devices and applications originating from patients is medical information, a description of symptoms, biometric indicators, medical history, lifestyle indicators that are collected, recorded by the patient or his relatives. It is important to note that these data were collected outside the medical care process, because patients (not medical personnel) are responsible for collecting information and its quality, as well as maintaining its confidentiality (unless they are part of the services provided by the “smart clinic”) (Iljashenko et al., 2019). The advent of affordable wearable devices, sensors, and data transfer technologies, such as patient portals, provides a unique opportunity for long-term, continuous monitoring of daily activity and indicators of patients with chronic diseases. This promotes the involvement of patients and their relatives in the care process and the development of a continuously learning health system. Data from wearable devices can potentially fill many existing information gaps and provide a unique opportunity to track the patient’s condition and his adherence to treatment between visits to the clinic.

4. Improving patient safety. Improving the quality of care and the proper organization of patient flows leads to increased patient safety.

5. Reliability. A good reputation is a competitive advantage when choosing between different organizations. Reliability is also determined by the level of adherence to treatment and the creation of an integrative care system for patients, as this affects the results that a medical organization can achieve.

The world's largest software manufacturers, SAP, Microsoft, Oracle, etc., when developing IT solutions for the healthcare sector are guided, first of all, by the need to implement the ideas of value and personalized medicine. The main goal of modern IT solutions is to maintain a balance of medical and economic efficiency of the medical organization. The challenge is to provide cost-effective care, create a digital network for the new consumer-oriented healthcare ecosystem, and enable real-time information exchange between health care providers and patients. It is necessary to maintain a more personalized interaction between patients and a medical organization at all stages of the process, from prevention and diagnosis to treatment and postoperative care.

SAP IT-solutions

Digital technologies help the healthcare industry forecast the demand for medical services and provide real-time services, optimize the provision of preventive care and treatment, and give patients the opportunity to better control their health. Frequent changes in patient service quality standards require quick and constant adaptation by medical organizations, insurance companies, life sciences organizations, and software developers. There is a health ecosystem focused on the concept of Health 4.0, which goes beyond traditional management systems.

A modern consumer of medical services is informed, proactive, and is included in a single digital space for interaction with representatives of medical organizations. According to the CEO of SAP SE Healthcare Providers, SAP is developing digital solutions to bring patients and the healthcare industry closer together, using high technology to achieve more personalized care (SAP SE, 2020).

SAP's experience in digitally processing every aspect of the customer value chain is designed to help healthcare stakeholders improve their customer service delivery at an affordable price.

The SAP solution for the healthcare industry consists of 3 main modules:

1. patient care - the module for patient care is focused on solving many problems, such as organizing access to all patient data in real time, even on mobile devices; improving the overall health of patients while controlling costs.

2. Collaboration in the field of healthcare - ensuring collaboration between providers and consumers of health services contributes to the promotion of health and well-being and reduces the number of hospital visits. To ensure collaboration in the field of healthcare, this module helps to manage patient transitions from one healthcare provider to another when moving through the network, identify health problems before the patient needs to be in the hospital, and monitor patient redirection to maintain them within the network. This reduces the number of hospital visits, and collaboration between healthcare providers and consumers becomes more active. The healthcare collaboration module includes 2 submodules: patient involvement and patient relationship management.

3. health analytics and research - the main purpose of the application is to consolidate health data from various sources. The application includes 3 submodules: Healthcare Analytics, Medical Research Insights, Connected Health.

Thus, SAP IT solutions for healthcare include special solutions related to medical activities (Patient care, Care Collaboration, Healthcare Analytics and Research), and solutions supporting financial (Finance), human resources (Human Resources) and procurement (Procurement) activities. SAP provides IT architecture components with analytics solutions, application platform and infrastructure, information and database management, database and data management, IT management, and security software (Security Software), the Internet of Things and technology services (IoT Business and Technology Services).

Microsoft IT-solutions

Microsoft IT solutions implement the concept of Mental Health. The company provides Microsoft Digital Transformation for Health.

This solution allows you to improve patient care, allows them to receive medical care outside the home, anywhere in the world. With wearable sensors and service solutions, doctors can reduce the number of repeat visits and provide preventative care. Microsoft's solutions expand the power of the digital healthcare industry.

This is a single integrated platform that combines several solutions (Information Society, 2006):

• Health360 Care Coordination - coordination of patient care.

• Microsoft Dynamics 365 Sales and Field — A solution for field sales and service.

• Power BI - business intelligence.

• MS SharePoint - a platform for developing a corporate portal and managing corporate content.

• MS Azure - Microsoft's cloud platform.

The needs for the development of the health system are constantly growing with limited resources. In addressing issues of improving the quality of medical services, IT solutions in the field of e-health are an integral component of the digital transformation of a medical organization

Conclusions and Discussions

Thus, after analyzing the decisions of the world's largest software vendors, several key features of the structure of IT solutions were formed to support value-based and personalized medicine.

- Integration and connectivity to other products. Since the IT landscape of a medical organization consists of many different information systems, it is necessary to make sure that the selected systems will be able to use different databases (SQL, NoSQL), work with different standards for storing and transmitting data (XML, JSON) and have the ability to integrate with various software providers (SAP, IBM, Oracle);
- Performance. It is necessary to assess the amount of data that will be stored and transmitted in information systems, the number of users simultaneously using systems and peak loads on the entire IT landscape;
- Security. Since a huge amount of personal data is stored in the systems of a medical organization, protected by medical secrets and medical ethics, it is necessary in some parts of the landscape to use systems with clearly declared and customizable roles, as well as with the ability to isolate these systems from the "outside" world, without interrupting this interaction with other systems used in the landscape;
- Reporting. The doctor spends a large amount of working time on filling out and preparing reporting documents. Information systems of a medical organization should minimize this time in order to increase labor costs for direct duties of employees;
- Using cloud technology. The IT landscape of a medical organization should include systems that work fully or partially in the cloud, interacting with various equipment and sensors, for working with clients remotely, or for surgical treatment of inpatients, as well as for building telemedicine processes (Catarinucci et al., 2015; Meng et al., 2011; Piniewski et al., 2010).

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Social Motivation and Sustainable Competitive Advantage for the Informal Entrepreneur Existence: Postulating a Review of Literature

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Abstract

The Nigerian experience of practicing entrepreneurs with the survival tactics is not new in occurrence coupled with its instability in the business environment. It is in line with this that the existence and patronization of the informal employment is believed in curbing the mitigating effects of unemployment. This study adopted a conceptual review of empirical literature of social motivation and sustainable competitive advantage. Articles were selected within the span of seven years from the Elsevier database. The selected articles were empirically written, thus being a selection for the review. The study reflects that increase application of sustainable competitive advantage continues to implore the informal activity while creating an influx into the different informal markets. The conduct of an empirical study is further suggested for further validation.

Keywords*:* Sustainable competitive advantage, Social motivation, Informal entrepreneur.

Introduction

The Nigerian experience of practising entrepreneurs with the use survival tactics of informal employment, with relations to insincere policy coupled with its instability in the business environment and the dynamic government regulations makes unemployment thrive. This assertion positively support International Labour Organisation (2014) conjecture on the patronization of the informal employment in curbing the mitigating effects of unemployment. Thus, making ways to avoid mitigating effects of non-practice of business informality. This effects ranges from, anxiety, psychosomatic symptoms, low subjective well-being amongst many others (Moses and Olokundun, 2014). With the provided data that shows the various percentage contribution in the emerging nation's economy stated as thus; Brazil: 39.8%, Russia: 46.1%, India: 23.1%, and Nigeria: 57.9% (Schneider, 2002).

This study adopts Webb et al. (2012) definition of informal entrepreneurship as economic activities that are outside of formal institutional boundaries (i.e., illegal but lawful) yet fall within informal institutional boundaries (i.e., legitimate) (Webb et al., 2009 cited in Webb et al, 2012). The informal sector is generally regarded as an avenue, in which practising entrepreneurs use to boycott

the due process that has been laid down by existing framework by the government in ensuring smooth running and monitoring of business activities. In place of this, the way forward is for the entrepreneur/business owners to find his or her niche (Jugdev, 2008; Samila & Sorenson, 2011; Timmons, 2011). Therefore, in connection with of Knight (1927, 2012) says on the line of economic prosperity in a nation, the transcending agent is the entrepreneur or in the informal setting, referred to as business operators. Knight (2012) propounds on the levels of risk encountered which produces the profit/loss result via the rendered service(s) of scientific research and thus reduces the ills that uncertainty would have brought with it. It is pertinent to note that risk is associated with uncertainty which produces profit or loss (Knight,(1921); Aven, 2012; Huang & Pearce, 2015; Low & MacMillan, 1988). This insights on the sources of profit have been instrumental in shaping modern economic theory and to the development of a useful understanding of probability. This is a characteristic that is tied to business activities which are ventured into. Therefore, one tends to pounder that the activities in the informal sector are legitimate by the majority of the populace, and thus, should there not be a structure in place to make them legally acceptable and income generators in the economy, with focus on Nigeria.

A business entity is a burden with the need to survive with rivalry as its stake holds amongst its contenders. Kwame & Colin (2012) made the findings via evaluating informal entrepreneurs 'motives in sub-Saharan Africa by reconciling the developed and developing economies by reflecting on the women informal entrepreneurs who are predominantly necessity-driven as against, men, known to be principally intentional participants in informal entrepreneurship.

Furthermore, Palmer (2007) earlier noted informal entrepreneurs in third world nations was necessity-driven and as a result, informal entrepreneurship has been widely depicted as conducted by marginalized populations out of necessity with the last resort in the absence of alternative sources of livelihood (Hanson, 2005; Altman & Morrison, 2015).

The perceived competition leads to the need to adopt strategies that will help the business to survive and attain retainership with the societal drive adopted from the cultural values embedded in the informal operators; this is common amongst the Igbo tribe (Ayeni, 2019).

Thus, this study intends to establish a possible link between social motivation and sustainable competitive advantage in the business operation of informal entrepreneurs using existing literature. The selected articles were within a decade range of been published with over a fifty citation achieved.

Reviews

The work of Rey-Martí, Ribeiro-Soriano, Palacios-Marqués (2015) assessed the level of attention given to social entrepreneurship-related research, which caused by social motivation. This further brought into limelight the areas with the greatest research output, countries and languages responsible for most social entrepreneurship research. The study was tied to the countries and the year conducted. In doing this, it provided an orientation to new researchers about parameters and authors in the social entrepreneurship that ought to be consulted when studying the social entrepreneurship phenomenon. The study employed a bibliometric analysis on the Web of Science online database on the related literature as its methodology. The conducted analysis of 2984 social entrepreneurship research documents revealed that 1851 are scientific articles in the English language in the business economics line of research for socially induced entrepreneurs. An extension of the study, being empirical would have been an input that could spawn new researchers into the line of study.

Amir, Sahar and Mohammad (2016) examined how to achieve sustainability through the Schumpeterian social entrepreneurship. This was viewed from the role of social enterprises. In their study, they decided to enhance social entrepreneurship with the Schumpeter's perspective developed in his magnum opus "Theorie der wirtschaftlichen Entwicklung". The methodology adopted for the study was theoretical analysis. The analysis made use of social enterprise, an effect of social motivation in transforming a business into an engine for sustainable development. The concept of corporate citizenship, social entrepreneurship, corporate social responsibility, social

enterprise, and sustainable development were employed in the study. From the concept generated, the socio-economic ecosystem was hypothesised to work in alignment with sustainable development but the evidence of empirical data was absence in the study.

Furthermore, Aquino, Lück and Schänzel (2018) provided a conceptual framework of tourism social entrepreneurship for sustainable community development, an offshoot utilising competitive advantage. This was designed to address this gap in knowledge of the conceptualisation of tourism social entrepreneurship as a more holistic strategy for sustainable community development. The study critically analysed related literature by creating a conceptual framework. The framework incorporates community development concepts, generic social entrepreneurship, tourism social entrepreneurship principles and community capitals perspectives. From the study, the emerging literature on tourism social entrepreneurship that assists the socially motivated entrepreneurs in the system was established. This was a view of projecting the established new community-centric social enterprises. The intent drivers into the tourism sector was a vital point missed alongside with no empirical data in the study.

While looking at the negativity of social entrepreneurship, birthed from social motivation, Lundmark and Westelius (2019) examined antisocial entrepreneurship conceptually. It was posited that studies were conducted from the viewpoint of social entrepreneurship while neglecting antisocial entrepreneurship. This brought about the provision of a conceptual foundation for antisocial entrepreneurship. Thus, making up the methodology of the research with illegal and destructive entrepreneurship serving as the constructs. The findings of the study brought to fore a suggestion for future research on antisocial entrepreneurship. These are entrepreneurs who are not socially motivated. The exclusion of empirical evidence limited the study strength.

Muñoz and Kimmittb (2019) explored the complex interactions between the strategic conditions of social entrepreneurs, birthed from drivers of social commitment. This was in relations to the development of market-oriented social missions. The qualitative method was qualitative comparative analysis (fsQCA) to analyse and explain the complex strategic conditions of social entrepreneurship. The findings from the study contributed to the already existing complex understanding between social and economic mission in social entrepreneurship. This further queried the postulation underlying the bindery of social entrepreneurs, who improve their social status and that of the people around them into the social mission. The exclusion of a quantitative method of analysis in the study relapsed the strength of the study.

Shedding more light on the motivational factors in social entrepreneurship, Dwivedia and Weerawardena (2018) saw the need to operationalise and conceptualise constructs by proposing a behavioural measure of social entrepreneurship orientation (SEO). These constructs were offered in five dimensions, namely; innovativeness, proactiveness, risk management, effectual orientation, and social mission orientation. With the use of descriptive statistics, chi-square and correlation, they were assessed methodologically to be fit. In the course of the study, an adoptable parameter for measurement was drafted to measure socially driven entrepreneurs, though with the marginalisation of a qualitative validation.

In creating an adaptable theory for social entrepreneurship-related research, entailing social entrepreneurship initiatives, development process and social value, Sekliuckiene and Kisielius (2015) developed a conceptual framework. The gap was filled using the analysis and synthesis of scientific literature. From the conducted research, a conceptual model was developed. It consisted of social entrepreneurship development initiatives; connecting contextual and entrepreneurial individual factors, social opportunities recognition factors and results gotten from nascent values from the social entrepreneurship development process. In relations to the social entrepreneurs' improvement of those around them and themselves, the findings birthed social entrepreneurship initiative, opportunity exploitation, opportunity identification and evaluation, opportunity formalization. Empirical evidence to the stated construct was missing in the study.

Douglas and Prentice (2019) explored innovation and profit motivations for social entrepreneurship by considering all three main pillars of social entrepreneurship. The pillars consisted of the role of prosocial, profit, and innovation motivations in the individual's decision to

become a social entrepreneur. Otherwise regarded as his intention of becoming an entrepreneur being motivated socially. With the adoption of qualitative comparative analysis (fsQCA) as the methodology in the study, configurations of motives, self-efficacies, and personal conditions were identified in the culmination of social entrepreneurial intention. Thus, revealing some asymmetric relationships between social entrepreneurial intention and prosocial attitude, innovation attitude, and entrepreneurial self-efficacy for socially motivated entrepreneurs with lapses of empirical qualitative analysis.

Establishing the diversity of social entrepreneurship, Langa and Finka (2018) developed a more nuanced and multilevel understanding of the social network arena in which the rural social entrepreneur operates. The study brought to fore the expansion of correlated social drivers in line with the causal effect and operations of social entrepreneurship in the rural setting. Qualitative content analysis was adopted as the methodology of the study. This was done by gathering materials in the narratives, alongside the semi-structured and expert interviews. The study informed future studies about the identification of the formation and configuration of the different types of social capital displayed in the proposed framework of social entrepreneurship and rural development as the lives of socially inept individuals were improved. The absence of quantitative information would have strengthened the finding from the research.

In instituting the importance of social entrepreneurship, which sprung from social motivation, Palacios-Marqués, García, Sánchez and Mari (2019) linked it with the organizational performance of a company. This was also aimed at showing a positive relationship between the extent to which social entrepreneurship is implemented via socially motivated scenarios while creating distinctive marketing competences. The stated competences served as the mediating role between social entrepreneurship and organizational performance. Descriptive statistics and chi-square were employed as the methodology in the study. The findings of the study reflected a positive relationship between the extent to which an organization introduces social entrepreneurship to socially motivated entrepreneurs and its organizational performance while the prove of qualitative evidence was omitted.

Cherrier, Goswami, and Ray (2018) examined the possibility of institutional complexity to provide opportunities for social entrepreneurship. Thus, providing the arising relationship from social motivation on entrepreneurial attainment to institutional complexity. The study employed a mixed-methods approach. The approach consisted of observations, in-depth, unstructured and semi-structured interviews and document analysis. From the findings, it was identified that the social venture's responses to institutional complexity in the forms of appropriation, integration, differentiation, and working-through have a valid interaction with the provided opportunities earned from social entrepreneurship. The use of quantitative measurement in the study would have strengthened the provided views of the researchers

Also from the study of Adele, Oyedokun, Adewoye and Afolabi (2015), factors motivating informal entrepreneurship in developing countries were examined. This was done to determine how peculiarities stimulate the choice to operate formally or informally by owners of businesses. The test was done to determine the socially related parameters that swing informal entrepreneurship into action. The study adopted the inferential statistical tool of multiple regression as the methodology to determine the conformity of informal entrepreneurship to socially related motivation parameters. These parameters include traditional culture, norms and values. The study revealed that informal entrepreneurship, who are socially motivated, adapts to the traditional culture, norms and values with the perception of the imposition of formal rules/principles. The researchers' position on the premise defined in the study was undermined with the lack of qualitative evidence.

Anetor (2015) made an investigation into the value of street vending, a common scene of an informal trade practised in Nigeria. Though commonly assumed as a result of socially related motives, the study considered the value of the street vending activity in Nigeria. This was done to stop the belief of the assumed negativity of street vending. In postulating this, the study adopted a descriptive analysis to test the collated responses to the study. The findings of the study revealed that the existence of street vending aids government and business communities capsuled on the

realisable benefits. It also immensely contributed to the economic, social, and economic life of Nigerians. The oversight of utilising qualitative analysis weakened the provided revelation from the study.

The usage of competitive advantage as a tool of product differentiation was understudied by Dirisu, Iyiola, and Ibidunni, (2013). It was researched to attain evidence of optimal performance relationship in businesses organisation. Business organisation are the products of an entrepreneur's business establishment. The researchers postulated that competitive advantage influences the performance of the organization. To test the stated assumption, simple linear regression and correlation analysis were adopted for the research's methodology. The findings revealed a positive significant relationship between new product innovation and customer satisfaction of an entrepreneurial organization. The study was limited to the quantitative method adopted.

Sołoducho-Pelc (2014) examined the relationships between competitive advantage and courage when formulating objectives for the business organisation. The study made use of correlation for the methodology. This was based on the analysed assumptions regarding sources and evaluation of a business competitive advantage concerning the courage in formulating key objectives. The study adopted a correlation methodology. The findings from the study sort to building and developing the advantage over competitors, as it is required to implement offensive strategies, in which the risk level is much higher and difficult to assess unambiguously. It further posited the importance of the implementation of risky strategies, a reflection of success in the domination over competitors. The non-qualitative assessment of the risky strategies was the gap of the literature.

The work of Block, Kohn, Miller and Ullrich (2014) expressed the relationship between the compulsorily engaged type of entrepreneurship and competitive strategy, also regarded as a competitive advantage. In their opinion, it was posited that entrepreneurial start-ups chose to contend with existing entrepreneurial firms using a particular generic strategy; the cost leadership or differentiation strategy. With the objective of the study was the assessment of how the choice made was depended on necessity. A dataset of 4,568 German start-ups was qualitatively collected and descriptively analysed alongside Blinder-Oaxaca-type decompositions adapted to the non-linear were adopted for the study's methodology. The study showed necessity entrepreneurs are more likely to pursue a cost leadership strategy than a differentiation strategy. This was correlated and attributed to distinct endowments of human capital, socioeconomic attributes (a reflection of social motivational features exhibited by social entrepreneurs), and start-up project characteristics. The omission empirical qualitative analysis was needed to buttress the posited view of the researchers.

Studies on competitive advantage being related to entrepreneurship were further undertaken by Badenhorst-Weiss and Cilliers (2014). The study explored the various sources of competitive advantage with focus placed on differentiation and a unique value packaging. This was engaged as a market strategy to ensure competitiveness and sustainability for formal independent small businesses in Soweto. The study made use of descriptive and inferential statistical methods to analyse the data. Parametric (Anova being utilized) and nonparametric tests statistically certified significant differences between mean scores of the different business. The study reported that sustainable formal independent small businesses, who were socially motivated into the business activities, retained their competitive nature via the respective differentiation made on the elements of the unique value package they offer to customers. They also posited that sustainable businesses regard price, shopping hours, personal attention and close relationships as important differentiating elements. The excluding of informal entrepreneurs limited the study.

Greenidge (2015) conducted a study on competitive advantage, entrepreneurship and strategy using Trinidad and Tobago's steelpan Industry as a case study. The study investigated the causes of this decline, and to outline possible strategies for addressing the loss of competitive advantage in one of the country's first indigenous industries. It also explored the structure and trajectory of the global steelpan industry. The method adopted for the research was an interview, which was analysed. The findings revealed that the current trajectory of the industry continues over the next 7-10 years, Trinidad and Tobago will not possess a significantly greater degree of access to the

main sources of its competitive advantage, i.e. human capital and technological know-how, than its nearest competitors. The study was not substantiated with empirical qualitative evidence.

Table 1: Summary Table of Literature on Social Motivations and Sustainable Competitive Advantage

S/N	Author/Year	Topics	The objective of the study	Methodology	Findings	Gaps
1	Rey-Martí, Ribeiro-Soriano and Palacios-Marqués (2015)	A bibliometric analysis of social entrepreneurship	The study accessed the level of attention given to social entrepreneurship-related research	Bibliometric analysis of literature from World of science (W.O.S)	It was revealed that 1851 are scientific articles in the English language in the business economics line of research for socially induced entrepreneurs	There was no empirical analysis conducted not all the motivations were considered.
2	Amir, Sahar and Mohammad (2016)	Achieving sustainability through Schumpeterian social entrepreneurship: The role of social enterprises.	The study enhances social entrepreneurship with the Schumpeter's perspective developed in his magnum opus "Theorie der wirtschaftlichen Entwicklung"	Theoretical analysis	The socio-economic ecosystem was hypothesised to work in alignment with sustainable development	Empirical data was absence in the study, not all the motivations were considered.
3	Aquino, Lück and Schänzel (2018)	A conceptual framework of tourism social entrepreneurship for sustainable community development	The study Created a conceptualisation of tourism social entrepreneurship as a more holistic strategy for sustainable community development	It critically analysed related literature by creating a conceptual framework analysis	Emerging literature on tourism social entrepreneurship that assists the socially motivated entrepreneurs in the system was established	Drivers into the sectors were not stated and no empirical data and not all the motivations were considered in the study
4	Lundmarka, E. and Westelius A. (2019)	Antisocial entrepreneurship: Conceptual foundations and a research agenda	The study examined from the viewpoint of social entrepreneurship while neglecting antisocial entrepreneurship.	Conceptual framework analysis foundation for making sense of antisocial entrepreneurship	The findings of the study brought to fore a suggestion for future research on antisocial entrepreneurship, being offset of entrepreneurs who are not socially motivated.	The exclusion of empirical evidence and not all the motives were considered.
5	Muñoz, P. and Kimmittb, J. (2019)	Social mission as competitive advantage: A configurational analysis of the strategic conditions of social entrepreneurship	The study explores the complex interactions between the strategic conditions of social entrepreneurs in the development of market-oriented social missions	A qualitative method of analysis using the fsQCA	The findings from the study contributed to the already existing complex understanding between social and economic mission in social entrepreneurship. This further queried the	The exclusion of a quantitative method of analysis in the study relapsed the strength of the findings from the study

					postulation underlying the bindery of social entrepreneurs, who improve their social status and that of the people around them into a social mission.	
6	Dwivedia A. and Weerawardena, J. (2018)	Conceptualizing and operationalizing the social entrepreneurship construct	The study addressed the need for conceptualization and operationalization of the social entrepreneurship orientation (SEO) construct.	Descriptive statistics, chi-square and correlation analysis	It provided an adaptable parameter of measurement for five dimensions of SEO; innovativeness, proactiveness, risk management, effectual orientation, and social mission orientation for measurement of socially-driven entrepreneurs	Absence of a qualitative related evidence
7	Sekliuckienea, J. and Kisieliusb, E. (2015)	Development of social entrepreneurship initiatives: a theoretical framework	The study Created an adoptable theory for social entrepreneurship-related research, entailing social entrepreneurship initiatives, development process and social value,	The analysis and synthesis of scientific literature	In relations to the social entrepreneurs' improvement of those around them and themselves, the findings birthed social entrepreneurship initiative, opportunity exploitation, opportunity identification and evaluation, opportunity formalization	Empirical evidence to the stated construct was missing in the study.
8	Douglas, E. and Prentice, C. (2019)	Innovation and profit motivations for social entrepreneurship: A fuzzy-set analysis	The study explored innovation and profit motivations for social entrepreneurship by considering all three main pillars of social entrepreneurship; the role of prosocial, profit, and innovation motivations in the individual's decision to become a social entrepreneur	Qualitative comparative analysis (fsQCA)	It revealed some asymmetric relationships between social entrepreneurial intention and prosocial attitude, innovation attitude, and entrepreneurial self-efficacy for socially motivated entrepreneurs	Lapses of empirical qualitative analysis and no-consideration of all motives into the informal sector.
9	Langa, R. and Finka, M. (2018)	Rural social entrepreneurship: The role of social capital within and across	Developed a more nuanced and multilevel understanding of the social network arena in which the	Qualitative comparative analysis (fsQCA)	The study informed future studies about the identification of the formation and configuration of the different types of	Absence of quantitative analysis and not all the motivations

		institutional levels	rural social entrepreneur operates		social capital displayed in the proposed framework of social entrepreneurship and rural development as the lives of socially inept individuals were improved.	were considered
10	Palacios-Marqués, D., García, M. G., Sánchez, M. M., and Mari, M. P. A. (2019).	Social entrepreneurship and organizational performance: A study of the the mediating role of distinctive competencies in marketing	The study aimed at showing a positive relationship between the extent to which social entrepreneurship is implemented while creating distinctive marketing competences	Descriptive statistics and Chi-Square.	The findings of the study reflected a positive relationship between the extent to which an organization introduces social entrepreneurship to socially motivated entrepreneurs and its organizational performance	A prove of qualitative pieces of evidence and total motivational drive into the informal sector was omitted
11	Cherrier, H., Goswami P. and Ray S. (2018)	Social entrepreneurship: Creating value in the context of institutional Complexity	The study examined the possibility of institutional complexity to provide opportunities for social entrepreneurship.	A qualitative mixed method consisting of observations, in-depth, unstructured and semi-structured interviews and document analysis was used.	The finding identified that the social venture's responses to institutional complexity in the forms of appropriation, integration, differentiation, and working-through have a valid interaction with the provided opportunities earned from social entrepreneurship.	Use of a quantitative measurement was not done and not all the motivations were considered.
12	Adele, H.A, Oyedokun, J. A. Adewoye J. O. Afolabi Y. A. (2015)	An Examination of Factors Motivating Informal Entrepreneurship in Ibadan, South-West Nigeria	The study was done to determine the socially related parameters that swing informal entrepreneurship into action to operate formally or informally	An inferential statistical tool of multiple regression	revealed that informal entrepreneurship, who are socially motivated, adapts to the traditional culture, norms and values with the perception of the imposition of formal rules/principles.	Lack of qualitative evidence and not all the motivation were considered.
13	Anetor, F. O (2015)	An Investigation into the Value of Street Vending in Nigeria: A Case of Lagos State	Research has not been conducted to understand the value of street vending in Nigeria. This study aims to investigate the value of street vending in Nigeria to help the government and business	Descriptive analysis	The findings of the study revealed that the existence of street vending aids government and business communities capsuled on the realisable benefits. It also immensely contributed to the economic, social, and economic life of	The oversight of utilising qualitative analysis and partial consideration of motivation into the informal activity.

			communities to capitalize on its benefits		Nigerians, birthing socially motivated entrepreneurs.	
14	Dirisu, J.I., Iyiola, O. and Ibidunni, O. S. (2013)	Product differentiation: a tool of Competitive advantage and optimal Organizational performance (a study of Unilever Nigeria plc	It was researched to attain evidence of optimal performance relationship in businesses organisation. Business organisation are the products of an entrepreneur's business establishment.	Simple Linear Regression and correlation analysis	The study revealed a positive significant relationship between new product innovation and customer satisfaction of an entrepreneurial organization	Qualitative shreds of evidence were not available and not all the motivations were considered.
15	Sołoducho-Pelc L. (2014)	Competitive advantage: the courage in formulating objectives and the expansiveness of a strategy	The study examined the relationships between the competitive advantage and courage when formulating objectives for a business organisation.	Correlation	The findings from the study sort to building and developing the advantage over competitors, as it is required to implement offensive strategies, in which the risk level is much higher and difficult to assess unambiguously	Absence of qualitative evidence and not all the motivations were considered.
16	Block, J. H., Kohn, K., Miller , D. and Ullrich, K. (2014)	Necessity Entrepreneurship and Competitive Strategy	The study expressed the relationship between the compulsorily engaged type of entrepreneurship and competitive strategy.	Descriptive analysis alongside Blinder-Oaxaca-type decompositions	The study showed necessity entrepreneurs are more likely to pursue a cost leadership strategy than a differentiation strategy. This was correlated and attributed to distinct endowments of human capital, socioeconomic attributes (a reflection of social motivational features exhibited by social entrepreneurs), and start-up project characteristics	The omission empirical qualitative analysis
17	Badenhorst-Weiss, J.A. and Cilliers, J.O. (2014)	The competitive advantage of independent small businesses in Soweto	The study explored the various sources of competitive advantage with the focus placed on differentiation and a unique value packaging	The study made use of descriptive and inferential statistical methods to analyse the data.	The study reported that sustainable formal independent small businesses, who were socially motivated into the business activities, retained their competitive nature via the respective	It did not consider the informal sector of the market and not all the motivations were examined

					differentiation made on the elements of the unique value package they offer to customers.	
18	Greenidge, C.O. (2015)	Competitive advantage, entrepreneurship and strategy in the global south: A case study of Trinidad and Tobago's steelpan industry	The study went on to investigate the causes of this decline and to outline possible strategies for addressing the loss of competitive advantage in one of the country's first indigenous industries.	Analysed Interview	The findings revealed that the current trajectory of the industry continues over the next 7-10 years, Trinidad and Tobago will not possess a significantly greater degree of access to the main sources of its competitive advantage, i.e. human capital and technological know-how, than its nearest competitors	There was an absence of an empirical quantitative assessment and partial consideration of the motivation into informal business activities.

Conclusion

The incongruous findings across different scholarly works make social motivation and sustainable competitive advantage concepts intellectually thought-provoking but demands hypothetical fusions' towards critiquing existing works.

The motivation was earned via the need to meet the social demands of entrepreneurs. However, the actions poised by informal entrepreneurs, regarded as social entrepreneurs because of their drive to improve their social status and that of the people around them in relations to the engaging activities has not been understudied.

Therefore, the study establishes the need for an empirical study to fill the void of social motivation linked with the usability of sustainable competitive advantage in the informal market for its business operation continuity. The understudied research which attempts to validate the existence of such linkage was with the omission of empirical stance. This comes as a result of a literature absence to that fully link the two parameters with the required evidence. The increasing application of sustainable competitive advantage continues to implore the informal activity while creating an influx into different informal markets. The conduct of an empirical study is further suggested to attest a concrete validation.

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Include any acknowledgement right before the references section (if applicable). Also, if research was funded by an organization / institution, please write the acknowledgement here

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Critical Infrastructure and Its Strategic Importance to National Development: The Nigerian Scenario

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Abstract

Basic infrastructure consists of the fundamental physical and organizational structures and services required for the operation of a society. Some infrastructure are however deemed to be "critical" in nature due to their nature and their significance to the maintenance of normalcy in daily life within a country. Critical infrastructure has therefore received special attention in most countries in recent years due also to the changing dynamics in the international system necessitating the formulation and implementation of strategies in this regard. This paper assessed the importance and significance of critical infrastructure to national development in Nigeria and underscores the apparent neglect of this very important issue by Nigerian government. The paper employs the use of a theoretical framework to empirically explain and justify this study. Having studied critical infrastructure policies of some selected countries, the study concludes that the Nigerian government has continued to neglect this very significant aspect necessary for its socio-economic development.

Keywords: Infrastructure, Critical Infrastructure, Strategic, National Development, Socio-economic development

Introduction and Background of Study

Infrastructure as a concept is not new, it is very broad and has assumed changing connotations and definitions over the years (Oyedele, 2012). Fulmer (2009) opines that infrastructure consists of all physical assets that are deemed fundamental facilities and systems serving the country, city, or area. It typically refers to the technical structures that support a society, such as roads, water, electrical national grid, telecommunications and so forth (Na & Raksakulthai, 2006). Infrastructure can also be seen as "the physical components of interrelated systems providing commodities and services essential to enable sustain, or enhance societal living conditions" (Fulmer, 2009.30-32).

Furthermore, Nedozi, Obasanmi & Ighata (2014) considers Infrastructure as indeed intricately linked to development. Infrastructure therefore remains very critical to broad-based socio-economic development of any country as lack of adequate infrastructure remains one of the major constraints to

the economic growth of many African states, Nigeria inclusive. To quote renowned economist Dr. V.K.R.V. Rao, "infrastructure and development is a continuous process and progress in development, if we are to fulfill our declared objectives of a self-accelerating process of economic development" (Islahi, 1997). This perspective was also echoed by Ihembe, (2011: 504) when he opined that "Infrastructure as a critical form of development plays an important role in any country or region or state as it seriously constitutes the hub upon which socio-economic aspects of society revolve. The term "critical infrastructure" is however used in a more strategic sense to underscore those structures whose importance underpin the overall existence of a country.

The Federal Republic of Nigeria is often referred to as the "Giant of Africa", owing to its large population and economy (Holmes, 1987) with an estimated population of 206 million inhabitants, Nigeria is the most populous country in Africa and the seventh most populous country in the world (Bloomberg, 2020). Nigeria has the third-largest youth population in the world, after India and China, with more than 90 million of its population under the age of eighteen (Library of Congress Country Profile, 2018). Nigeria is also the world's 20th largest economy as of 2015, worth more than $500 billion and $1 trillion in terms of nominal GDP and purchasing power parity, respectively (The World Fact Book, 2018). Since Nigeria's return to Democracy in 1999, the country has continued to battle with severe shortfall in provision of modern infrastructure required to fast-track economic growth and development. The country's infrastructure challenge has become even more pathetic due to the increased demand and limited resources (Olanipekun, 2014; Oyedele, 2012). Considering the staggering volume of funds required for infrastructural development and the meagre annual budgetary allocations for infrastructure, the Nigerian infrastructure deficit is indeed a cause for alarm. Critical infrastructure in Nigeria include communications; emergency services; energy sector; dams; food; public services; industry; health; transport; gas; public communications, radio and television; and commercial facilities (Adigun, 2018).

Statement of the Problem

In spite of Nigeria's economic potentials and regional power, the country has serially suffered from absence or neglect of critical infrastructure, a very disturbing trend as infrastructure is the mainstay of Nigeria's economy, security, and health. In simple terms, the critical infrastructure that should provide the essential services that underpin Nigerian society are lacking and where they exist, these critical systems and structures are often taken for granted. While existing literature on Nigeria's critical infrastructure such as Iwendi and Allen (2011), Badiora and Obadiora (2011), Ofoegbu (2014) and Adigun (2018) all advocated for the protection of the existing critical infrastructure in Nigeria, there exist a lacuna as to the area of assessment of the strategic importance of critical infrastructure to the socio-economic development of the country.

The aforementioned therefore makes it pertinent to investigate how the availability of critical infrastructure can fast track socio-economic growth and development of Nigeria.

Objective of the Study

The main objective of the study is to make a case for the availability of sufficient critical infrastructure required to engender socio-economic growth and development of Nigeria.

Conceptualizing Critical Infrastructure

Even though there seem not to be a generally acceptable global definition of the term "Critical Infrastructure", existing literature have in several ways explained the concept. According to the Department of Homeland Security (DHS) Critical infrastructure includes the vast network of highways, connecting bridges and tunnels, railways, utilities and buildings necessary to maintain normalcy in daily life. Transportation, commerce, clean water and electricity all rely on these vital systems (DHS Critical Infrastructure Protection Report, 2019). Also, the Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act of 2001 (USA

PATRIOT Act) refers to systems and assets so vital to the United States that their incapacity or destruction would have a debilitating impact on security, national economic security, national public health or safety, or any combination of these matters. This means that it is the backbone of a country's economy, security, and health. In simple terms, it provides the essential services that underpin society.

In addition, the term has also been widely adopted to distinguish those infrastructure elements that, if significantly damaged or destroyed, would cause serious disruption of the dependent system or organization (American Heritage Dictionary, 2009). In other words, governments use the term to describe assets that are essential for the functioning of a society and economy. According to Meier (1995), Critical Infrastructure are such assets are identified as basic facilities, services and installations critical to the socio economic well-being of any state. The way and manner these physical assets function and upon which these services are delivered are considered critical infrastructure.

In strategic terms, Critical infrastructure refers to the body of systems, networks and assets that are so essential that their continued operation is required to ensure the security of a given nation, its economy, and the public's health and/or safety.

Critical Infrastructure divergence across the world

Although critical infrastructure is similar in all nations due to the basic requirements of life, the infrastructure deemed critical can vary according to a nation's needs, resources and development level. Sectors that are considered as "critical infrastructure" differ among different countries, but most would comprise: energy, water, food, transport, telecommunications, healthcare, as well as banking and finance. Since there is no universally agreed definition of the term "critical infrastructure", each country defines it based on national priorities, self-interest and power capabilities.

Globally however, the severity of critical infrastructures necessitates that deliberate policies be formulated and implemented to operationalize the strategic importance to national security and well-being. Many countries have national plans or strategies and these strategies generally define what nature of infrastructure are "critical". The table below indicates some selected states, the definitions given to the subject matter and the varying sectors that are deemed critical to the countries.

TABLE 1: Variations in Sectors and Number of Sectors of Critical Infrastructure in Selected Countries

Country	Definition of Critical Infrastructure	No of Sectors	Critical Infrastructure Sectors
CANADA	According to the Department of Public Safety-Canada, Critical infrastructure refers to processes, systems, facilities, technologies, networks, assets and services essential to the health, safety, security or economic well-being of Canadians and the effective functioning of government	**10 Sectors**	Health, Food, Finance, Water, Information and Communication Technology, Safety, Energy and Utilities, Manufacturing, Government and Transportation
USA	The Department of Homeland Security **(DHS)** defines Critical infrastructure to include the vast network of highways, connecting bridges and tunnels, railways, utilities and buildings necessary to maintain normalcy in daily life. Transportation, commerce, clean water and electricity all rely on these vital systems. Also, the Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act of 2001 (USA PATRIOT Act) refers to systems and assets so vital to the United States that their incapacity or destruction would have a debilitating impact on security, national economic security, national public health or safety, or any combination of these matters	**16 Sectors**	Chemical, Commercial Facilities, Communications, Critical Manufacturing, Dams, Defense Industrial Base, Emergency Services, Energy, Financial Services, Food and Agriculture, Government Facilities, Health Care and Public Health, Information Technology, Nuclear Reactors, Materials and Waste, Transportation Systems, Water and Waste Water Systems
UNITED KINGDOM	According to the Centre for the Protection of National Infrastructure, Critical Infrastructure are those facilities, systems, sites, information, people, networks and processes, necessary for a country to function and upon which daily life depends. It also includes some functions, sites and organisations which are not critical to the maintenance of essential services, but which need protection due to the potential danger to the public	**13 Sectors**	Chemicals, Civil Nuclear Communications, Defence, Emergency Services, Energy, Finance, Food, Government, Health, Space, Transport and Water
EUROPEAN UNION	The European Programme for Critical Infrastructure Protection (EPCIP) defines Critical infrastructure to mean an asset, system or part thereof located in Member States which is essential for the maintenance of vital societal functions, health, safety, security, economic or social well-being of people, and the disruption or destruction of which would have a significant impact in a Member State as a result of the failure to maintain those functions.	**8 Sectors**	Electricity, Oil, Gas, Road transport, Rail transport, Air transport, Inland waterways transport, Ocean and short-sea shipping and ports
SOUTH AFRICA	Critical Infrastructure Protection Act, 2019 ("the **CIP Act**") recognises that certain infrastructure is critical for public safety, national security and the continuous provision of basic public services.	**11 Sectors**	Government Facilities, Defence industry, Critical manufacturing, Energy, Water supply, Food and agriculture, Healthcare & Emergency, Information & communication technology, Transportation, Financial, Chemical, Atomic energy

Sources: *US Department of Homeland Security (DHS)*
South African Police Secretariat
Public Safety Canada (www.ps-sp.gc.ca)
United Kingdom Home Office Security. Counter Terrorism Strategy

The second table indicates the various policies enacted and implemented by the aforementioned selected countries in the area of Critical Infrastructure, underlining their recognition of its strategic importance to national development.

TABLE 2: Critical Infrastructure Policies in Selected Countries

Country	Strategic Policies
CANADA	National Strategy and Action Plan for Critical Infrastructure
USA	Homeland Security Presidential Directive HSPD-7 for Critical Infrastructure Identification, Prioritization, and Protection, Cybersecurity and Infrastructure Security Agency Act of 2018, Presidential Policy Directive 21 (PPD-21)
UNITED KINGDOM	National Security Strategy sets out the strategic objectives establishing the Centre for Protection of National Infrastructure
EUROPEAN UNION	The European Programme for Critical Infrastructure Protection (EPCIP)
SOUTH AFRICA	The South African Critical Infrastructure Protection Act 2019

Sources: *US Department of Homeland Security (DHS)*
South African Police Secretariat
Public Safety Canada (www.ps-sp.gc.ca)
United Kingdom Home Office Security. Counter Terrorism Strategy

Theoretical Framework

The Structural Functional Analysis theory by Gabriel Almond is engaged in this work to empirically explain and justify this study. In his theory, Almond's mode of analysis is fundamentally concerned with the phenomenon of system maintenance and regulation. The basic theoretical proposition is that in all social systems, certain basic functions have to be performed. Almond provided a model for structural functional analysis, which identified the functional requirements of the political system and explained the contribution of these functions toward the maintenance of stability of the system. In this study, we are more concerned about how the maintenance and stability of our critical infrastructure can enhance sustainable development in Nigeria. He further noted that every political system has some structures and these structures perform certain functions meant for it. These structures in this study represent critical infrastructures and their functions in society.

The Nigerian Scenario

In Nigeria, critical national infrastructure includes transport, emergency services, water and telecommunications and other critical assets, systems and functions that are integral to a her capacity to function as a sovereign nation. According to Ihembe (2011: 504) critical infrastructure plays a significant role in the development of any country or region or state as it constitutes the hub upon which socio-economic aspects of society revolve. Despite this foregoing, the government of Nigeria is yet to underscore the significance of critical infrastructure to National development as Nigeria remains one of the countries yet to formulate and implement a deliberate strategy for the development and eventual protection of critical infrastructure across the country. While most developed countries are far ahead of the developing economies in formulating and implementing policies regarding to the critical infrastructure so that they can deliver both economic and social benefits for individuals and for the society as a whole (Case, 2010), Nigeria and most developing states still lag behind (Gabriel, 2014).

The services and systems provided by critical infrastructures are so intertwined into the fabric of our everyday life that a small failure or down time can cause far reaching effects. Persistent downtime of any critical service can grind a country to halt, stopping economic activities, coordinated security and emergency services and many every day services whose importance in our lives we underestimate. This

has been the Nigerian experience over time as several challenges beset the country's critical infrastructure in diverse ways first of which is the issue of gross underfunding of infrastructure. In a December 2nd interview in The PUNCH Newspapers, the Federal Roads Maintenance Agency (FERMA) Managing Director/CEO Engr. Nurudeen Rafindadi blamed the bad state of Nigeria roads to poor funding, hindering the agency's capacity in proper road maintenance nationwide (Punch news, 2019). This statement further confirms the big issue of infrastructure funding in Nigeria, for new infrastructure and maintenance of existing ones. It is bad enough that the amount budgeted for capital projects is inadequate (averagely 27% over the last 12 years), the amount that finally gets into actual project implementation equally faces huge challenges. These includes delay in fund release or outright insufficient release, fund diversion, loopholes in the procurement processes, failure of citizens to involve themselves in project execution process, etc. In the end, the actual spending on capital projects is barely 17-20% of budgeted amount (Ausick, 2019; NBS, 2019). Corruption is also a very visible factor that has affected critical infrastructure in Nigeria. The case of corruption is visible in the prevalence of inflated government contracts for capital projects which end up poorly executed and funds allocated for human capital development diverted (Hope, 2019).

Conclusions and Recommendations

The Role of critical infrastructure in the socio-economic development of Nigeria cannot be over-emphasized as it is intricately linked to development. Nigeria's broad-based socio-economic development is obviously being hampered as lack of adequate critical infrastructure. The study revealed that poor funding, corruption, lack of maintenance and absence of a deliberate strategic policy on infrastructure as the main challenges of critical infrastructure in Nigeria.

To forestall this trend and put the country back on the path of socio-economic growth, the study hereby recommends that Nigeria as a matter of urgency, sign into law the Critical Infrastructure Protection Bill already passed by the 7th National Assembly but yet to be assented to by the President. This will ensure the proper protection and maintenance of critical and essential facilities that affects daily living in the country. Furthermore, anti-corruption efforts should be intensified by the government to forestall the diversion of public funds meant for critical infrastructure. Also, more funding opportunities should be explored by the government in order to have additional infrastructure funding required to enhance the socio-economic development of the country.

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Conceptualizing the Federal-State Interface and The Minimum Wage Debacle in Nigeria

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Introduction

Every created State has a major responsibility to satisfy and improve her populace socio-economic wellbeing (Shuaib, 2018). These responsibilities are largely seen in wage policies with the improvement of citizen lifestyle. Furthermore, a clear documentation in respect to this, is reflected in the Constitution of Nigeria having security and welfare at heart. Olatunji (2014) opines that salaries and wages are great motivating factors as it is a reward for labour or work. Hence reasonable wages must be fixed and paid on time.

Wages deals basically with all forms of remunerations, allowances, earnings paid to employees as a form of reward to labour or hours put in work. The International Labour Organization (ILO) (1996, 2008 and 2009) explained that the major purpose of Minimum wage is to protect against low pay for workers. Thus, it does by ensuring the protection of workers right to a fair and substantial wage. Eme (2009) defined minimum wage as the payment made to an employee to provide for himself and his family and to get the essentials, carter for the children and to save for the future. At no point was reference made to the inclusion of a possible transition of his standard of living. This therefore insinuate that the wage paid is targeted at a survival stipend to keep the employee in use for the designated labour.

According to Nwude (2013), In 1894 by the government of New Zealand the minimum wage legislation came to be, the minimum wage law in 1896 of Victoria State of Australia was next. The amendment led to the creation of a wage. The wages board was deficient in some ways as it did not set a commonly acceptable minimum wage standard that is universal rather it brought about low wages because of the basic wages for six industries that was set up. In the history of the USA industrial relations system, in 1912 the Massachusetts enacted its minimum wage law. The practice of wage fixation is very old but its nature and practice varies from country to country (Eme, 2009).

The Nigerian history of minimum wage dates back to the colonization. Though, there were past undocumented payment of when workers are paid their dues after being engaged in labour before the arrival of the colonizers. The constant agitations for better working conditions for workers have always been a matter of concern to governments. Eme (2010) stated that, the Nigeria's independence era both

before and after, experienced situations where, workers have always taken the hit of the policy enacted as they are paid lower wages and benefits. Actions have been taken by various regimes which led to the setting up of several panels, commissions or tribunals and series of reforms since 1934 to address wage challenges.

This has always been the trend, with state government claiming to not have the capacity needed to pay the required sum. Uncoincidentally, it was noted that an increase in wage negotiated on is usually met by an increase of price commodities in the market. This vis-à-vis leads to a general rise in cost of living rendering such newly agreed wage increases a little worth after being enacted (Okeke, Nwele and Achilike, 2017).

For the increase in wage, the role of demand and supply cannot be undermined. The forces of demand and supply analyzes how the government and labor unions interact to determine wage levels as well as see that these wages reflect the value of work put in any area. Understanding these interactions will help us understand the foundations of demand and supply and how they determine wage levels. In the course of this study, Demand, refers to the clamor of labor unions for the increase of wages so as to meet the increasing cost and standard of living. The willingness and the ability for labor unions to take up this responsibility is the vital reason it was established.

The supply therefore relates to the requirements that needs to be in place to meet the unrelating demands. This cannot be shorted as it will lead to tension neither must it be relaxed as waste will occur. Therefore, the negotiated wage increase needs to consider the impact of the demand and supply paradigm. The process by which the forces of demand and supply play a great role is in collective bargaining.

The collective bargaining process deals with negotiations between parties. This parties refers to the employees under the umbrella of the labor unions and the Government. This is done in other for employees to put into higher consideration the set of demands for their employer or government. In the case of the wage increase scenario, the bargaining committee comprises of Union representatives and the government at the "bargaining table,". The involved parties present various intended outcome which is in document form that should explain the intent behind them which should be clear and concise. Agreements are to be reached on such proposals and counter offers over the upcoming unresolved issues. The duration of such deliberations varies depending on the strength of the bargaining proposals. (Johasson, 2016). To this end, wage determination needs to be conceptualized. it is the outcome of interactions between the tripartite partners in industrial relations, namely, the government, employers and workers represented by their unions (Armstrong, 2009).

A developing nation such as Nigeria, has the federal government of Nigeria responsible for wage determination, making sure that its decisions are implemented both by the state and local government. Akinwale and Elegbede (2017), said that some states lack the financial strength and capacity to implement the federal government wage policy, this accounts to wage differential in the sectors as both federal and state government workers do not earn the same.

The recently negotiated and yet to be fully implemented N30,000 minimum wage on April 18 2019 has been the joy of workers but the implemtnation of this new wage by the state government is yet to be indetified. This stalling reflexs a negative impoulse in thew Nigerian state as federal government workers have started enjoying the this new wage. In same vien, states like Lagos state has commenced payment. The argument by those in denial hjas been the non consultation before the implementation, leading to the unawareness of the template used for the payment (PM News, 2019).

To this end, the research calls for need to understand the paragdym for having a minimum wage reflecting the standard of living at all level of governemt with reduced or emiminated conflits of going back to the bargaining board within a short span of years.

Minimum Wage Laws in Nigeria

The first well established National minimum Wage Act prescribed a minimum wage of N125 per month (FGN Official Gazette 1981) which was in 1981. Then it became N250 in 1991 and N5, 500 in 2000 through the Minimum wage Act of 2000. The effect of this was that the lowest paid worker in the

formal sector and state governments employment pay was N5, 500 monthly while the federal workers were N7500 per month (Aminu, 2008).

Generally, it has been observed that poor pay has been in prevalence in the public sector, becoming a stigma leading to the pay structure of the public sector being inferior as opposed to the private sector, leading to further agitations and an upward revision of the wage to N18, 000 through a well negotiated tripate structure under President Goodluck Johnathan, exclusive of all deductions. This was with exception of the specification laid out in the law that issues such as pension, income tax and all other contributions. Notably, when prescribed by the law, in kind payments can be considered. To this end, it was signed into law by the National Assembly with a clear provision that there will be constant review of the National Minimum Wage every five years. It was also clarified in the document that the agreement reached is that it would be declared null and void if the wages agreed upon is less than what is stipulated (Fagbemi, 2018).

These recommendations were fully documented in the bill submitted by Justice Alfa Belgore Committee. It stated that the new minimum wage for both public and private sector with fifty workers and above will be meted with punishments or imprisonment or fines not more than a stipulated amount in the case where this offence still persist the fine N10, 000 per day during which the offence continues (Irughe, 2013). March 15, 2011 saw the bill being passed, it was also negotiated and signed August 16, 2011 which revised the wage to N18,900, which has recently been revised to 30,000.

The National Minimum wage bill (2019) main objective was to provide for a well detailed legal structure for an effortless review of the minimum wage within the period stated. It also stated that every worker except stated otherwise, be paid nothing less than the agreed barest monthly Minimum Wage of N30, 000. This amendment was affected throughout the Federal Republic of Nigeria without due consideration of the state capabilities the capabilities was in reference to the state revenue as well as expenses. It is in line with this that the federal government was noted to always be the dominant player in wage determination. This affirmation was in line with Abimbola (2014).

For issues that could arise in Nigeria, the Minimum Wage compliance is regulated by the Labour Inspectorate is saddled with the responsibility of making sure the agreed upon wage is complied with. This structure was put in place to forcibly bring about compliance but once again with the omission of the capabilities of the involved parties. With reference to the National Minimum Wage Act (1981) exempts were given to the following organizations from the obligation to pay the national minimum wage. They include;

i. A firm with less than 50 workers;
ii. A firm with part time workers working for less than an average of 40 hours a week.
iii. an establishment at which workers are paid on commission or on piece rate basis;
iv. occasional employment workers and
v. aircraft crew members.

(Official Gazette, 1981; Official Gazette, 2000; National Minimum Wage Act amendment of 2011; Wages Boards and Industrial Council Act, 1974)

The duration of wage payment is between a day to one month, depending on what is stated in the contract at the point or time of employment. The Labour Act,(2009) stipulates that the employer must provide every worker a statement clearly written to specify the following, among other things;

i. wage rates,
ii. the strategy for wage calculation,
iii. period and manner of wage payment.

The payment period should under no circumstance exceed a month except the written consent from the state authority has been obtained specifically for this purpose. The Labour Act states that wages are payable at the end of the duration as expressed in the contract provided that where it is more than a month, the wages become due and payable not exceeding a month

Furthermore, the designated places of wages were provided. If the worker is employed on the premises of the sale of liquor or goods then it is not subject that it should be paid. Wage advance can be taken with a three-month period of paying back. The Nigeria Labour Act (2009) is against the unnecessary deductions of employee's salary except when specified

An employer within the ambit of the law is allowed to deduct income tax and pension contribution from the wage with the full consent of the worker. Also, union contribution which can be deducted from workers' wages, such workers can decide to opt put of it with no form of penalty or punishments attached (Labour Act, 1990). In spite of these laws wage increase protest between workers and government, its final destination is far from being attained in Nigeria.

Agitations for The Review of Minimum Wage

According to Salawu et al. (2013), wage agitation history in Nigeria dates back 1941 COLA agitation. The nation had also experienced other protest before this, because of the economic difficulties created by the British government during their involvement in the second world war, which affected mostly the working class than any other class.

Thus, this led to the economic class demanding a substantial cost-of-living award in 1941 (Salawu et al., 2013). The request was not hidden to which led to full blown crises, the government had to create a committee, with this in place the government then provided for a cost – of - living allowance (COLA) to all its workers (Salawu et al., 2013). When this was done a host of other trade unions sprang up agitate for and get the COLA allowance.

Another prominent wage agitation that looked Nigeria in the face was the 1945 general strike which resulted in a huge wage movement. The issue that led to the strike was the poor economic conditions of the post war era, economic depressions, the unions took a strategic stand to capitalize on the prevailing success which was recorded in the earlier strike or agitation. To demand for a cost-of-living increase over the awards made by the government in 1942. The government also refused to their demands like it was done before during the 1941 COLA agitation, the railway unions also engineered the general strike of 1945.

In all the strike was successful in its approach. Uzoh (2016) forth-five days strike, was successful due to the fact that all economics activities were paralyzed and the government was forced to appoint the Tudor Davies commission. Government equally awarded substantial increases. As a result of this in 2000, there was the Campaign for living wage. Which lead to the June 2000-2007 the nationwide strikes against increases in fuel prices. These strikes or agitations has led to creation of committees or commissions to oversee wage increase and implementations.

Moyosore, (2018) made it clear that it is important to understand how the current agitation for a new national minimum wage came about. He posited the occurrence was during the 2016 May Day celebration with the NLC President calling for a press conference to inform the press-corps on the need for an upward review of the national minimum wage (Moyosore, 2018). This was with the reference with the last one been the 2011 minimum wage act. The NLC President called for a tripartite committee to the review the minimum wage, with the negotiation process at a roundtable.

According to Eme and Ogbochie (2017), these demands came up at a time where most states are unable pay workers' salaries as when due, been the major reason for the consistent visitation by the governors to President Muhammadu Buhari in Abuja for another lifeline bailout. This was the second within ten months.

Barely two months after the bailout was given, the governors, through their Chairman, Alhaji Abdulaziz Yari of Zamfara State, stated that the states could no longer pay the N18, 000 minimum wage because 24 out of the 36 states were unable pay workers' salaries (reference). The Federal Government and the Nigeria Labour Congress in their attempts to reach a common ground and as a prelude to maintaining industrial peace decided to set up a 15-man committee to work out palliative measures with the intent of fashioning out a new minimum wage in the public sector. This occurrence therefore insinuates the need for a difference in wage payment structure by the different levels of government.

Challenges to The National Minimum Wage

Fapohunda (2004) identified one major challenge as the Market Situation of labour. It was noted that in a seemingly competitive labour market, the relationship between supply and demand is the most important determinant of benefits. This was further to elucidated on about the function of the price mechanism being minimal especially in a developing country like Nigeria.

It was also stated that unemployment does not really mean that it is as a result of high pays, as employers can attract high caliber employees without necessarily giving the legal minimum wage which may be considered too much (Fapohunda, 2004). The labor market scarcity of skill will definitely witness high movements of wages as it provides market forces the allowance to sufficiently allocate wages and employment.

The Nigerian labour market situation is with the perception of many skilled labour pursing few jobs. With the presence of the wage system, which has some influence in the Nigeria industrial employment indicator. This was said that the presence of a determined wage unequivocally stated the worth of the employee. Therefore, better paying job are sorted after while meagre offers are overlooked, thus increasing unemployment. A conclusion was reached that increase in federal minimum wage causes unemployment.

Of a note,when it comes to payments is often not enforceable or implemented properly, thus calling for the legal framework. This is believed to enable the design of the minimum wage accomplishment. The enforcement capacity of the federal government agencies experiences various challenges as the presence of insufficient qualified personnel for the purpose of ensuring that the provisions of the labour laws is the norm in the society. International Labour Organisation (2008) observed that many countries labour inspections services are understaffed and penalties for non-compliance with minimum wage regulations are too weak and should be worked on if the situation is to handled properly or have any significant change. For example, a close examination of the number of officers working in the Federal Ministry of Labour and Productivity vis-à-vis the level of industrial activities tend to support this line of thinking.

Incessantly, Fapohunda (2004) highlighted other challenges to the implementation of minimum wage as economic factors constituting challenge to employers' capacity to pay a specified minimum wage. A quantitative assessment of this capacity may be difficult but would include measuring the level of wage payments relative to other payments.

Politics in Minimum Wage Issues

It is generally acknowledged that the reference of politics is assumed to be in line with the underlying issues of any phenomenon. Such that it acts as an interest achieve amidst all odds while maneuvering the required expectation. This is not far from the minimum wage occurrence in Nigeria coupled with the variation in state revenue. The problem of how resources are shared has generated a lot of heat. The federal government and its component unit has always been at longer heads due to the allocation formula.

The allocation formula design is such that all involved party states gets funds for being opart of the Nigerian state from the federal purse, vis-à-vis their contribution into the purse. To this end, it must be noted that the revenue shared between federal and state government are never the same. Federal government gets the chunk of the revenue leaving the rest to be shared between the state and local government. The federal government is entitled to 52 percent of the revenue while the state and local government grapple with the remaining 48 percent (Okeke, 2015). With this, the federal government does not find it difficult to pay its workers and in the case of a minimum wage increase it is easily implemented (Aniche, 2015).

There are states despite these allocations still have the capability to pay the proposed national minimum wage. Oil producing states such as Bayelsa, Delta receive allocations from the federal account due to the derivation principle which allows for 13 percent to be paid to states where natural resources are derived on the basis of the amount exploited. Oil producing States get different percentages depending on the volume of oil gotten (Oko, 2011). It was on this basis that Okeke (2015) stated that the

expenditure assignment and revenue sharing have been generally inadequate in addressing the needs and resource gaps in the nation.

Arowolo (2011) states that so long as states in Nigeria depend on the federal government economically, the controversy surrounding the issue of minimum wage will remain a recurring problem in Nigeria. This was on the basis that Labour does not buy into the idea of state variation in revenue. Thus, creating an argument of wage discrimination between workers at federal, state and local on the same grade levels and steps in the federation. In the real sense labour is requesting for a unified salary structure and equal pay for equal work.

Incessant and Differential Call for Wage Review:

Inflationary shocks associated with salaries increase include sudden increase in the general price of commodities and services, and reductions in the number of jobs availability. There is also the problem of various government agencies calling for differential wage benefits justified under the pretext of the nature of their job. There may be some justification in this call, it would also prompt other security agencies to make similar calls.

A parameter that is significantly the basis of the need for the increase is wage is the cost of living. Cost of living deals basically with the amount of money needed to sustain a certain standard of living. This amount should in no small way afford the populace to provide for basic expenses such as housing, medical, healthcare and others. In Nigeria, cost of living varies, as states such as Lagos, Abuja, Portharcourt have an increased cost of living when compared to Oyo, Kwara, Ekiti and others (Aniche, 2015).

Ogunna, (1999) stated that location determines how high or low the cost of living is. He further explained that the continuous rise in cost of living should meet with a continuous rise in wage rates. Wage Indicator (2019) estimated living wage for a single adult at N23,100 to N32,900 and a family at N74,200 to N104,200. Thus, making the minimum wage far below the living wage. Many believe that living wage should be adopted as living wage which is based on the idea that work should provide an adequate income to cover necessary living cost of a family.

A Possible Framework on Minimum Wage Interface

The continuous agitation for a new review of minimum wage coupled with the inability to pay as at when due calls for a new design. This structure is expected to meet the survival needs of the employees in the respective organization. This therefore calls for a union in the deliberation of what should be done to fix the incessant wage increment. The wage increment policy could be tailored to follow each state perceived standard of living minimum requirement. This will reduce its usage as a political tool as it will be engaged by technocrat in its conceptualization. The chosen of technocrat will be of immense usage based on experience and qualification. With the omission of political office holders in this determination, a swindling usage of minimum wage alongside its delay will be avoided. The provision of a qualitative study will be of immense quality to the stated view.

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Impact of Business Entrepreneurship Venture on Nigerian University Internally Generated Revenue: An Experience of Landmark University, Omu – Aran, Kwara State, Nigeria.

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Abstract

The study examines the impacts of business entrepreneurship venture on Nigerian University Internally Generated Revenue with reference to Landmark University Omu – Aran, Kwara State, Nigeria. The study adopts descriptive statistics to analyze the data and the use of Regression analysis to test the significant impact by ordinary least square analysis and vector auto-regression estimates. The study reveals that the impact of business entrepreneurship venture in University is positive for three business ventures of the four ventures undertaken by the university. Also, the findings show that the difference in guest house were caused by their seasoned patronage therefore, still have impact on the University revenue. The study revealed that Cafeteria, Shopping Mall, Commercial farm and Guest House proceeds had huge impact on the internally generated revenue of the University. There is no doubt that the above named business ventures contributed tremendously to the financial base of the University. It is also revealed that from the study that the source of revenue generated by the University can be maintained through improvement and new marketing strategies to attract the public to buy into its commercial and other revenue generation activities. Therefore, the study recommends that other Universities' Management are to look inward and emulate Landmark University Experience in generating funds and manage them effectively.

Keywords: Business entrepreneurship venture, Internally generated revenue, Landmark University, Financial base

Introduction

The global financial crisis which ravaged the various sectors of the country's economy has made it difficult for government to solely undertake essential services. Therefore, Public-Private partnership has been encouraged by the government and has extended to the educational sector of the economy. Having realized the reality of tertiary education in the country, the Nigerian government on May 10, 1999 issued certificate of registration to three private universities in Nigeria (Ajadi 2010). The universities include Babcock university, Igbinedion university, and Madonna university (Ajadi 2010). In Nigeria, private universities have been established to render services side by side the public universities. Private universities are set up to provide high-level manpower for the development of the country (Olawore 2013). The major challenge that faced private universities at creation was inadequate fund (Olawore 2013). Ajadi (2010) observes that the supply of education in Nigeria is limited by the amount of funds. One of the measures adopted by private universities to improve their internal revenue generation base was the setting up of Business Entrepreneurship Ventures (BEV). BEV creates high level of job satisfaction to the teeming youths and enhances life status (Martin 2006).

Higher levels of BEV accomplishments lead to higher income earnings which reduce the rate of unemployment within the society. Apart from generating revenue to the institution, it builds the mindsets

of students to environment, which nurture them for entrepreneurial skills. The impacts of the BEV are that it serves as a basis of producing young generation of Nigerians entrepreneurial oriented who could be employers of labour in the nearest future (Daniel 2010; Badariah, Abdul and Mariana 2016). According to Alexander (2014), BEV are equally crucial and very essential in any bad economy or recession situation. It could be the only alternative in changing the economic situation from the worst to a stable economy, by injecting new business ideas and innovation that turns to job opportunities as a means to reduce unemployment (Zalinaim, Firdaus and Azman 2016). The paper therefore seeks to unveil the impact BEV has on private universities development with particular reference to Landmark university. Also, it aims at ascertaining whether there is a relationship between their LMU ventures and the University revenue over the period of 5 years after operation.

Conceptual framework

The concepts that are central to this study are internally generated revenue and entrepreneurship.

Internally Generated Revenue: Internally generated revenue is the revenue that is generated within an organization. Within the university system, it is used to supplement their funding stream through the establishment of revenue yielding ventures or projects (Abosede and Akintola 2014). Such projects or ventures like bookshops, hotel and catering services, printing press, consultancy service, pure water factory and so on, are veritable means of raising funds needed to enhance their service delivery.

Adams (2002) is of different opinions, that government is to increase the universities subvention to 100% as the major source of funds to the institution. Governments are to safeguard the poor economy by means of increasing the tax rate and partner with non-governmental organizations (Bruno 2014). Revenue generated may not safeguard the university performance if the resources of revenue are not well protected from corrupt leaders, non-politicized and avoidance of misappropriation (Stella 2015). Generating revenue also requires adequate access to capital for potential investment which is the biggest hurdles to growing a business venture (William and Ramana 2009). An insufficient fund is a threat to an efficient innovator (William and Ramana 2009).

Therefore, Adeyemi (2011) posits that Universities are confronting many competitive challenges accompanied with poor funding and the only solution is to actively engage in entrepreneurship through the establishment of new funding stream and research investment.

Entrepreneurship: This is the practice of starting business from the scrap to meet customer needs to satisfy the entrepreneur either in profit maximization or status attained which can go in a long way to improve the economy strength of the nation by generating massive returns to the organization at all levels (IGR) (Vera 2012; Ilesanmi 2012). The word entrepreneurial came from entrepreneur. Entrepreneurial is therefore described as a person that makes money by starting business which involves identifying opportunity and able to take risk, an ability and willingness to take risks and focus on maximize profit (Vera 2012). The practice of starting business from the scrap to meet customer needs to satisfy the entrepreneur either in profit maximization or status attained which can go in a long way to improve the economy strength of the nation by generating massive returns to the organization at all levels (IGR) (Vera 2012; Ilesanmi 2012). The enterprises that are involved in the identification of business opportunities in Nigeria and undertaking the risks involved in bringing together all the factors of production to establish and run an enterprises for profit or non-profit intention (David 1995).

Literature Review

Entrepreneurship is the process of initiating, organizing and innovating business, with the sole aim of creating new market ideas and for making profit. It has been the driving force of internal generated revenue (IGR) mobilization for institutional growth. Onuoha (2013) observes that there should be alternative means or non - traditional way of sourcing for fund in the tertiary institution. Extant literature

presents the impact of business entrepreneurship programme on IGR at the level of university (Tax Payer Guide, 2015).

In the year 2016, it was declared by the National Bureau of Statistics (NBS) that the Nigerian economic growth dropped drastically into recession, which resulted to poor funding of the government owns institutions (National Bureau of Statistics 2016). Nigerian Government confirmed that the recent economic recession was responsible for the poor funding of educational public institutions in the Country (Vanguard Newspaper 26 September 2016).
Many universities workers have been agitating for their salary to be paid in full and workers in state like Bayelsa also clamoring for payment of their seven months' salary and related arrears which led to the closure of government owned tertiary institutions (News Agency of Nigeria, October 3 2016); while some State governors has openly made a commitment to restore the lost dignity of education in their State (News Agency of Nigeria, June 21 2016). These contributed to the battered educational system in the country with the poor funding. This therefore calls for urgent sustainable IGR source for the universities as supplement to the traditional means of allocation.

Entrepreneurship is considered to be the channel of economic growth in Nigeria due to its innovativeness, rebranding, product development and minimizing unemployment rate in the country (Adeoye 2015; Amir and Mohammad 2016). Alexander (2014) asserted that Entrepreneurship is very crucial in sustaining organization. The impact of entrepreneurship is to generate revenue to the organization (Carree and Thurik 2002). The undergraduate students are valuable assets that can contribute to the business development programme within the university context (Huub, Dugassa, and Alemfrie 2015).

Ajaero (2016) stipulated that standard BEV is the bedrock to national development. BEV is one way by which institutions generate the desired revenue to provide solution to funding crises and thereby reduce the rate of poverty in a community (Eze 2016; Ogueze and Orji 2015).

Internally generated revenue (IGR) is becoming essential in solidifying financing, and running education system in Nigeria. According to David, Yung-Chi, Benjamin and Chiyan (2015), successful IGR is a feasible means to improve funding of institution by enterprising, and to make the institution entrepreneurial become financial autonomous. With the recent trend of economic challenges in Nigeria, there is need for the University Management to look inward in funding the institution as a means of alternative channels (Ibeogu and Ulo 2015; Felicia and Hezekiah (2016). Famade, Omiyale, Grace and Adebola (2015) stated that to improve the financial stand in education, another approach of generating funds for institutions is required and institution management can supplement their funding stream by establishing business ventures or consultancy services to raise funds highly needed for the smooth running of the university. IGR is associated with many activities as means of generating alternate sources of revenue to enhance the financial condition for university education system (Gregory, Dave, Timothy, Robert, and Cora 2006),

Landmark University (LMU) has adopted revenue generated strategy as a private institution by running business ventures in order to generate revenue (Sani 2015). The BEV of Landmark includes LMU commercial farms, LMU Health Centre, Centre for System and Information Services (CSIS), Mechanical Workshops, LMU Bakery, LMU Pure Water Factory, LMU Guest House, Car Wash, Boutique, Shopping Mall, Bookshop and Unisex Saloon all a subsidiary of Landmark University Development Venture (LMDV) which has greatly boosted the University IGR.

Ogbogu (2011) stated that other means of generating funds in financing institutions can only be preferred through the universities business entrepreneurship activities like ventures and consultancy services. Although, conventional universities are directly funded by the State, as they are owned by government. However, many institutions have reformed themselves from being mainly for learning and research purposes to entrepreneurial universities with robust tie to business activities (Barbara and Bostjan 2014).

Entrepreneurial and Business Entrepreneurship Venture

The word entrepreneur refers to the prior taking initiatives, ideas to start a new business to bring new ideas and innovation to carry out business activities and act as a catalytic agent for a new project to maximize profit (Edwsaurd and Martin 2007). It is the creation of new venture and providing better ways of running the business (Jahangir and Zhiping 2016) providing innovations that confront the current market orders (Hamilton and Harper 1994). Schumpeter 1912, 1934, 1942 in his theory of Business Enterprise, stated that the entrepreneur is a promoter to an organization, endowed with characteristic of being a venture capitalist and profit driving (Alvaro and Salvador 2014). This is also an innovation as the commercialization of an invention (Alvaro and Salvador 2014). However, Kirzner (1973) stated that entrepreneur is person that is able to discover strength and opportunities to transform their competitive domain by engaging themselves in enterprises with intention of achieving large market share, cited in (Florian, Dominic, Mathew and Janic 2017).

According to Metcalfe and Ramlogan (2005), Hezelkorin (2013), and Didier and Fernadez (2016) stated entrepreneur education is the way of training and educating youths to be self-reliance to the reducing high rate unemployment in the labour market (Filippo et al., 2015). Societal transformation requires foundational learning (Mathias and Marco 2012); implementation of redesigned curriculum related to be self-reliance through academic teaching to increase productive capacity. Better development depends on institutional programme to meet demand for capacity building within a global knowledge economy (Maria, Joanne, Moria, Natalie and Roy 2016). The quality education services require reliability empathy responsiveness and assurance (Zhang et al., 2016). Providing a conceptual integration of the literature on business venture (Jonathan, Janice, Alain and Phillip, 2010), Joseph Tixier and Barbara Barone (2010):, Maria and Soumodip (2017) stated that strong impact (i.e. the activities that generate new ideas) could only be spawned by creating opportunities outside the organization.

Thus, Entrepreneurship Venture (EV) is a construct that has gained importance in the field of business and management by the extent to which managers are tending to engage in entrepreneurial related risks and active pursuit of new opportunities to sustain the organization (Florian 2017). Entrepreneurship Venture (EV) helps to increase the understanding of the youths towards the essence of the entrepreneurial experience (Florian Dominic, Mathew and Janice 2017) that educate the youths on why, when, and of how opportunity creation, recognition, and utilization emerged which help to access new technologies in accelerating economic growth (Adam and Micheline 2013).

Entrepreneurship Venture (EV) is much more than curriculum to university and skill tool (Dominic, Chang, and Dirk 2016). It has become a major hub as part of the mechanisms towards attaining poverty alleviation (Adebowale 2011). Judging from this approach, it can be added that EV is a required skill in engaging the teeming youths towards entrepreneurial ambition (Agu and Ayogu 2015; Wim 2013) .

Funding Universities from the Internally Generated Revenue (IGR) Perspective

The private owned universities in Nigeria are solely funded from their internally generated funds and serve as the reason for smooth running of private institutions. For this reason, government-owned-institutions in Nigeria should therefore wake-up and inculcate this attitude of alternative funding as another means of funding the university without depending on the Federal or State governments' subventions which is now facing challenges on meeting the funding of public universities (Ezekwesili 2016). Universities are founded on research purpose and non-funding pose threat on adequate research. Hence, money generated from other means can be used as a supplement in good time for research purpose. No doubt, policies such as business acquired policy, business theory on entrepreneurial programmes, Market and consumer theory, the demand and supply theory, PESTEL analysis and American and Japanese Keiretsu theory are many approaches to boost the revenue for tertiary institutions.

According to David (2015), institutions are graciously urged to sort for another means of educational funding like total commercialization of the university technology has been practiced in Taiwan to form better relieve to the government in other to address all the economic issues confronting the nation.

It is becoming progressively clearer that IGR has become a tradition and alternative means of funding in Landmark university. This is because the University is adequately engaging in business practices like University Medical Centre, Landmark University Development venture, and Commercial Farm outside of the regular tuition fee, students' subscription and other administrative charges which forms part of their innovative ideas. Considering the challenges confronting education in Nigeria, it is imperative to drive the revenue mobilization for the government owned institution not to endanger the future of our teeming youths by supporting revenue generation, (Adeyemi 2011).

Discussion and Results

The study used descriptive economic analytical tools in studying four business unit of the private university with 57 observations for the period of 2013 – 2017. Basically to examine the trend of revenue of these selected business ventures to the University. This was done by examining each venture using CMF, CFT, SHM and GTH as the independent and the dependent variable is represented by internally generated revenue (IGR). This ultimately led to the accomplishment of an important aim of the study which is to ascertain whether there is a relationship between their ventures and the University revenue over the period of 5 years after operation.

The Descriptive technique shows the summary of the information for a number of variables in a single table and computed the systemized values. Table 4.1 below shows the descriptive statistics. The Descriptive results disclose representation of data exists between dependent variable and each of the independent variables.

Hypothesis 1

$H_{0:}$ There is no significant relationship between LMU Cafeteria and the University IGR.

$H_{1:}$ There is significant relationship between LMU Cafeteria and the University IGR.

Table 4.1 Descriptive Statistics and Correlations

Descriptive Statistics

	Mean	Std. Deviation	N
CAFETERIA	18500078.09	6819224.753	57
INTERNAL GENERATED REVENUE	90599189.77	35714605.070	57

Correlations

			INTERNAL GENERATED REVENUE	CAFETERIA
Spearman's rho	INTERNAL GENERATED REVENUE	Correlation Coefficient	1.000	.468
		Sig. (2-tailed)	.	.000
		N	57	57
	CAFETERIA	Correlation Coefficient	.468	1.000
		Sig. (2-tailed)	.000	.
		N	57	57

Spearman's rho correlation of university IGR and LMU Cafeteria = 0.468

P-Value = 0.000

INTERPRETATION

The correlation coefficient of the university IGR and LMU Cafeteria is 0.468 which implies that the strength of relationship between the University IGR and the LMU Cafeteria is a moderate positive relationship.

The P-value is 0.000 (< 0.05) which implies that we will reject the null hypothesis and conclude that there is significant relationship between LMU Cafeteria and the University IGR.

We can also say that 23% (0.468^2) of the variation in the University IGR is explained by the LMU Cafeteria revenue.

Hypothesis 2
$H_{0:}$ There is no significant relationship between LMU Shopping mall and the University IGR.

Table 4.2: Descriptive Statistics showing dependent and independent variables
Correlations

			INTERNAL GENERATED REVENUE	SHOPPING MAIL
Spearman's rho	INTERNAL GENERATED REVENUE	Correlation Coefficient	1.000	.918
		Sig. (2-tailed)	.	.000
		N	57	57
	SHOPPING MALL	Correlation Coefficient	.918	1.000
		Sig. (2-tailed)	.000	.
		N	57	57

$H_{1:}$ There is significant relationship between LMU Shopping mall and the University IGR.

Table 4.2 below shows the descriptive statistics. The Descriptive results disclose representation of data exists between dependent variable and each of the independent variables.

Descriptive Statistics

	Mean	Std. Deviation	N
INTERNAL GENERATED REVENUE	90599189.77	35714605.070	57
SHOPPING MAIL	39091606.32	16558211.699	57

Spearman's rho correlation of university IGR and LMU shopping mall = 0.918

P-Value = 0.000

INTERPRETATION

The correlation coefficient of the University IGR and LMU shopping mall is 0.918 which implies that the strength of relationship between the university IGR and the LMU Shopping mall is a perfect positive relationship.

The P-value is 0.000 (< 0.05) which implies that we will reject the null hypothesis and conclude that there is significant relationship between LMU shopping mall and the University IGR.

We can also say that 84% (0.918^2) of the variation in the University IGR is explained by the LMU Shopping mall.

Hypothesis 3

$H_{0:}$ There is no significant relationship between LMU Commercial farm and the University IGR.

$H_{1:}$ There is significant relationship between LMU Commercial farm and the University IGR.

Table 4.3 below shows the descriptive statistics results that disclose representation of data exists between dependent variable and each of the independent variable.

Table 4.3: Descriptive Statistics showing dependent and independent variables

Descriptive Statistics

	Mean	Std. Deviation	N
INTERNAL GENERATED REVENUE	90599189.77	35714605.070	57
COMMERCIAL FARM	32406500.05	19303346.898	57

Correlations

			INTERNAL GENERATED REVENUE	COMMERCIAL FARM
Spearman's rho	INTERNAL GENERATED REVENUE	Correlation Coefficient	1.000	.881
		Sig. (2-tailed)	.	.000
		N	57	57
	COMMERCIAL FARM	Correlation Coefficient	.881	1.000
		Sig. (2-tailed)	.000	.
		N	57	57

Spearman's rho correlation of University IGR and LMU Commercial farm = 0.881

P-Value = 0.000.

INTERPRETATION

The correlation coefficient of the University IGR and LMU Commercial farm is 0.881 which implies that the strength of relationship between the University IGR and the LMU shopping mall is a strong positive relationship.

The P-value is 0.000 (< 0.05) which implies that we will reject the null hypothesis and conclude that there is significant relationship between LMU Commercial farm and the University IGR.

We can also say that 78% (0.881^2) of the variation in the University IGR is explained by the LMU Commercial farm.

Hypothesis 4

$H_{0:}$ There is no significant relationship between LMU Guest house and the University IGR.

$H_{1:}$ There is significant relationship between LMU Guest house and the University IGR.

Table 4.1 below shows the descriptive statistics which the results disclose representation of data exists between dependent variable and each of the independent variable.

Table 4.4: Descriptive Statistics showing dependent and independent variables

Descriptive Statistics

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
CMF	57	18500078.09	6819224.753	903228.383	16690694.21	20309461.96	9658446	52721907
SHM	57	39091606.32	16558211.699	2193188.717	34698121.37	43485091.26	5221000	68730863
CFT	57	32406500.05	19303346.898	2556790.757	27284632.70	37528367.41	7089975	67782226
GTH	57	601005.32	212500.725	28146.409	544621.28	657389.35	101999	982156
Total	228	22649797.44	19728791.981	1306571.167	20075238.79	25224356.09	101999	68730863

Descriptive Statistics

	Mean	Std. Deviation	N
INTERNAL GENERATED REVENUE	90599189.77	35714605.070	57
GUEST HOUSE	601005.32	212500.725	57

Correlations

		INTERNAL GENERATED REVENUE	GUEST HOUSE
INTERNAL GENERATED REVENUE	Pearson Correlation	1	.026
	Sig. (2-tailed)		.848
	N	57	57
GUEST HOUSE	Pearson Correlation	.026	1
	Sig. (2-tailed)	.848	
	N	57	57

Pearson correlation of university IGR and LMU Guest house = 0.026

Table 4.5: Descriptive Statistics showing dependent and independent variables

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
CMF	57	18500078.09	6819224.753	903228.383	16690694.21	20309461.96	9658446	52721907
SHM	57	39091606.32	16558211.699	2193188.717	34698121.37	43485091.26	5221000	68730863
CFT	57	32406500.05	19303346.898	2556790.757	27284632.70	37528367.41	7089975	67782226
GTH	57	601005.32	212500.725	28146.409	544621.28	657389.35	101999	982156
Total	228	22649797.44	19728791.981	1306571.167	20075238.79	25224356.09	101999	68730863

P-Value = 0.848

INTERPRETATION

The correlation coefficient of the University IGR and LMU Guest house is 0.026 which implies that the strength of relationship between the University IGR and the LMU Guest house is a weak positive relationship.

The P-value is 0.848(> 0.05) which implies that we do not reject the null hypothesis and conclude that there is no significant relationship between LMU Guest house and the University IGR.

We can also say that 0.068% (0.026^2) of the variation in the University IGR is explained by the LMU Guest house.

TEST 2

HYPOTHESIS 1

$H_{0:}$ $\mu_1 = \mu_2 = \mu_3 = \mu_4$

$H_{1:}$ The means are not equal (for at least one mean)

Table 4.6: The ANOVA table shows the hypotheses

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	49527056599663776.000	3	16509018866554590.000	95.243	.000
Within Groups	38827071299894696.000	224	173335139731672.780		
Total	88354127899558480.000	227			

INTERPRETATION

The ANOVA table above shows that P-Value = 0.000 which implies that we will reject the null hypothesis because P-value (0.000) is less than 0.05 and we then conclude that there is statistically significant difference between the means of LMU Cafeteria, LMU Shopping mall, LMU Commercial farm and LMU Guest house at 5% Level of significant.

GRAPHICAL REPRESENTATION

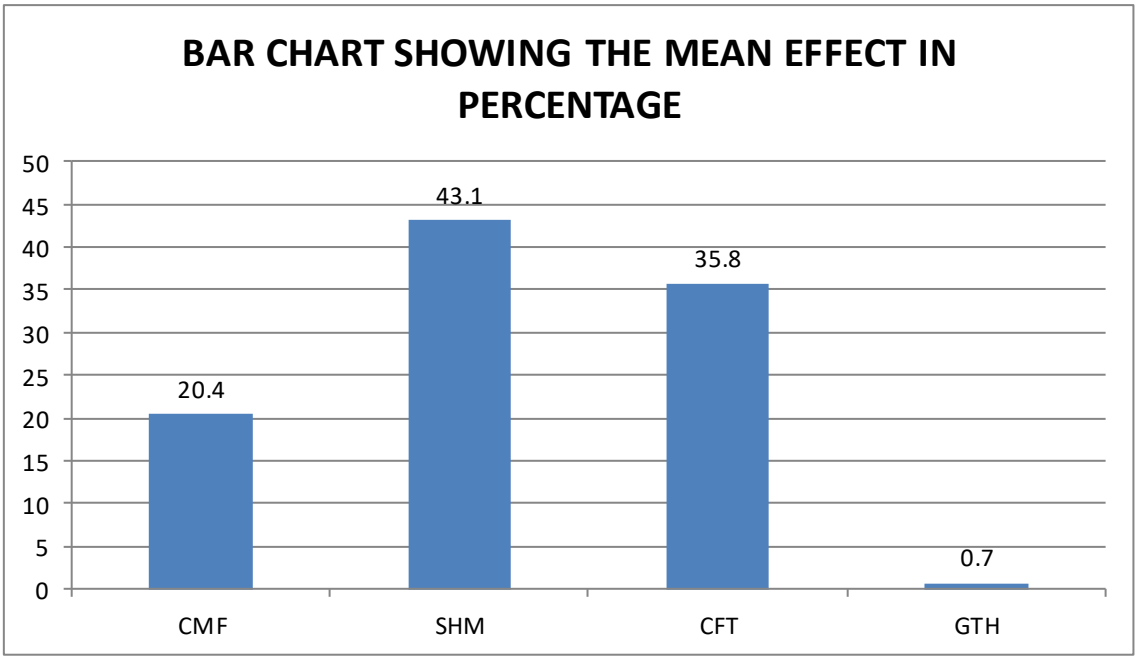

Fig. 4.1: Bar chart showing the mean effect in percentage of LMU Cafeteria, LMU Shopping Mall, LMU Commercial Farm and LMU Guest House on the University Internally Generated Revenue

INTERPRETATION

The bar chart above shows the mean effect of LMU Cafeteria, LMU Shopping mall, LMU Commercial farm and LMU Guest house on the University IGR in percentage. It further shows that LMU cafeteria contributes 20.4% on the University IGR, LMU Shopping mall contributes 43.1% on the University IGR, LMU Commercial farm contributes 35.8% on the University IGR while LMU Guest house contributes 0.7% on the University IGR respectively.

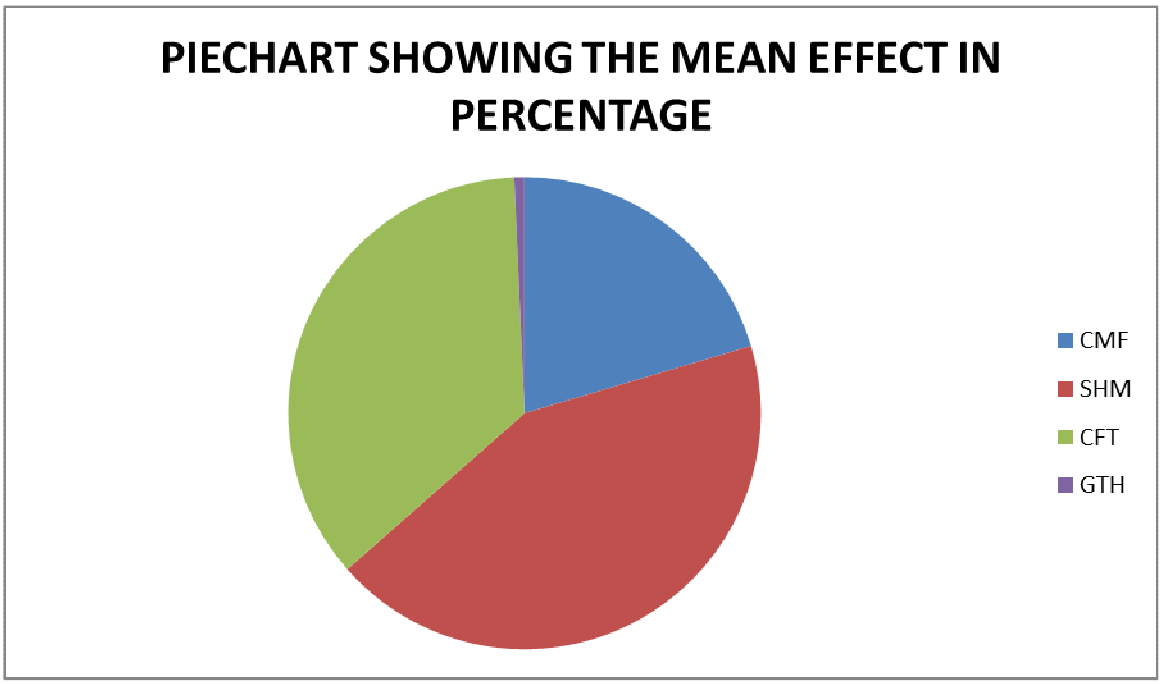

Fig 4.2: Piechart showing the mean effect in percentage of LMU Cafeteria, LMU Shopping Mall, LMU Commercial Farm and LMU Guest House on the University Internally Generated Revenue

INTERPRETATION

The pie chart above shows the mean effect of LMU Cafeteria, LMU Shopping mall, LMU Commercial farm and LMU Guest house on the University IGR in percentage. It further shows that LMU Cafeteria contributes 20.4% on the University IGR, LMU Shopping mall contributes 43.1% on the University IGR, LMU Commercial farm contributes 35.8% on the University IGR while LMU Guest house contributes 0.7% on the University IGR respectively.

Conclusion

Based on the findings from this research, the following conclusions are drawn:
Revenue sources like Sales of farm produce from the Commercial farm, establishing of the shopping mall for both students and staff for shopping, provision of hygienic cafeteria on the campus and accommodation facilities for the users contribute huge amount to the internally generated revenue of this young growing University.
Since the price of major resource in the country has been falling in the global market, and the universities are facing serious challenges of funding from the government and order for the universities to increase revenue, the university can come out with new marketing strategies to attract the public to buy into its commercial and other revenue generation activities.

RECOMMENDATIONS

Based on the findings earlier stated in this research work, the following recommendations are suggested:

i. The Management of University is to put in place effective measures that would ensure that those IGR sources that contributed huge amount of revenue on the activities of the University like Commercial farm, Cafeteria, and Shopping are much more improved upon and efficiently managed to ensure long-term sustainability.

ii. The findings also showed that the difference in guest house were caused by their seasonal patronage therefore, still have impact on the University revenue and therefore recommends for marketing strategies to attract more customers.
iii. By inference other Universities in Nigeria that are not yet involved in the IGR should buy into the strategy for additional funding.

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The Evolution of Women's Military Service in The Subsequent Decades of the 21st Century

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Abstract:

This article is dedicated to the evolution of the military service of women in the era of social and civilization changes. The status of women in the armed forces has changed with technological development and the shaping of the information society. Nowadays, the suitability of soldiers for military service depends on psychophysical features and intellectual competences. The gender differences between the soldiers are irrelevant. In the future, the ratio of men and women serving in the military will be equal, and the suitability of military structures will be determined by inborn abilities and previously acquired competences.

Keywords: military security, military service, woman soldiers

Introduction

The aim of this article is to predict the evolution of the military service of women in state defence systems in the 21st century. The forecast concerned mainly the period of the first three decades, from the 3rd to the 6th decade of this century. This perspective results from the 20-30 year cycle of replacing most of the equipment, weapons and personnel systems adopted in many armies of the world.

Methodology and research area

In the forecast, the author used an empirical method to collect initial data in the form of a literature query (mainly based on scientific studies with high reliability) and expert interviews conducted in the period 2019-2020 with people with specialist knowledge. Subsequently, the author used theoretical methods such as analysis and synthesis to develop a forecast. Thus, the paper adopts the following problem question: How will the military service of women evolve in the next decades of the 21st century? The aim of the study is to present the vision of this evolution, and above all the impact of this evolution on the change of the personnel process in the armies of developed countries in the 21st century.

Literature review & Discussion

Historically, nations have vied for control of strategically important geographic areas. These areas were characterized by a suitably favorable location and the topography ensuring safety and easier

access to resources. This guaranteed not only security, but also conditions ensuring that a given community could develop its own power. In a world where social groups competed with each other for attractive territory and resources, security was guaranteed in those communities that were the strongest. During the ancient and early medieval period, women often served shoulder to shoulder with men on the battlefield. This was due to numerically limited societies, so it also had an impact on the number of warriors. It is therefore not surprising that physically fit women who were willing to fight were welcome in the ranks of the fighting troops.[1] T. Szczurek – the author of the above considerations, introducing the reader to the considerations undertaken, referred to the achievements of many outstanding academics, among which it is worth mentioning, for example, Alvin Toffler, the author of the wavelength concept, which allows a better understanding of the wider context of the ongoing civilization changes affecting the nature of women's military service.

Alvin Toffler categorized these civilization changes and linked them to specific stages in the history of mankind. He referred to these stages as waves, which was to allow a better understanding of their fluid character manifested in the continuously successive social and civilization processes. These processes, at the time of their initiation, were no longer possible to stop. Along with the development of social structures and the increase in the number of members of the social group, the level of advancement of civilization increased. It was influenced by the growing number of group members, and therefore also the growing percentage of people with a higher intelligence quotient, who contributed to the faster and faster civilization development.

The first wave was called agrarian by Alvin Toffler. It began nearly ten thousand years ago with humanity mastering the skill of farming the land. This particular skill completely reorganized the hitherto functioning mode of human tribes. From the hunter-gatherer mode, a transition was made to the sedentary mode, which in turn allowed for a gradual increase in the number of people. The increasing number of people, influenced the higher professionalization of individuals, and later social groups. In small communities, any person, regardless of gender, could be involved in defense matters. With the increase in the number, only people with the best predispositions to fight were involved in the defense of the community, while the remaining residents were engaged in activities enabling the entire community to function and develop efficiently. Therefore, apart from social and economic life, also culture, art and intellectual life began to develop. It was possible thanks to free time for activities other than the struggle for survival. With the development of the intellectual level, military thought also began to develop, which led to the further professionalization of the group responsible for defending against assault or carrying out attacks on other communities.

[1] Szczurek T., (2019). Wyzwania dla bezpieczeństwa – niepewna przyszłość – między zagrożeniami a szansami, Wojskowa Akademia Techniczna, Warsaw, pp. 11–35.

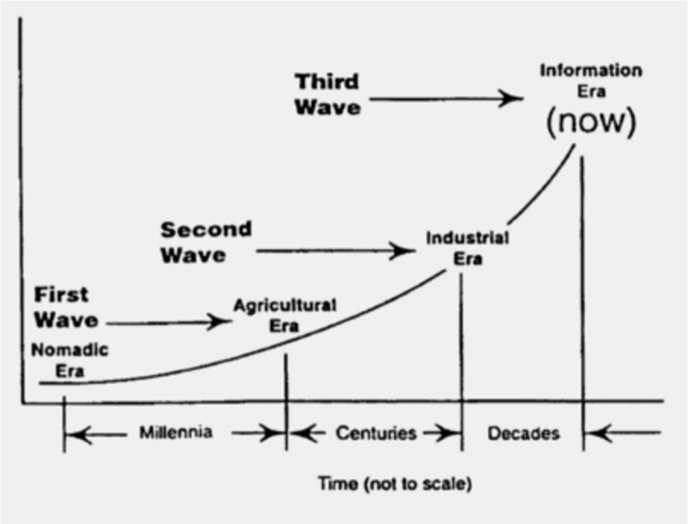

Fig. 1 Three Waves by Alvin Toffler

Source: https://www.timetoast.com/timelines/a-history-of-information-and-knowledge, 29.07.2020

The development of land cultivation techniques meant that communities began to settle permanently in areas with favorable geographic and spatial conditions. Therefore, it was necessary to defend this area, as opposed to a situation where a given community led an itinerant lifestyle and could always relatively easily change its current place of residence. Previously, all men were hunters, so from childhood they trained in tracking, masking and hunting. These skills proved useful in battles with other nomadic tribes for access to resources such as water and food. Caves offering a good shelter from weather conditions and wild animals, with a limited number of entrances, could also be temporarily attractive, allowing some of the tribe to sleep and recharge their batteries. A sedentary lifestyle eliminated the need for constant hunting to survive, but it also created new types of threats. The excess of food and the possibility of collecting it for the winter, in turn, influenced the dynamic increase in the number of people. This increased the importance of larger tribes among others with a worse demographic condition. Therefore, the aforementioned specializations appeared within a given, more and more numerous society.[2]

Humanity, along with the increase in population and the acceleration of civilization development, more and more quickly passed through the stages of technological advancement. In an industrial era characterized by the massive use of steam engines supported by the ever-broader electrification of industry and everyday life, the division into male and female roles in society began to blur.[3] Of course, in the nineteenth century women still occupied a lower social position than men, but nevertheless there were more and more educated women and taking up various jobs, even typically

[2] *United Nations*, 2011, World Population Prospects, 2010 Revision, t. 1, New York, p. 24.
[3] *The industrial revolution in national context: Europe and the USA*, red. M. Teich, R. Porter, Cambridge University Press, Cambridge 1996, pp. 36–63.

male. At that time, ladies often resorted to deception pretending to be men. At the same time, there were events with dramatic social overtones, such as uprisings in which women fought on an equal footing with men. An example is the famous Polish patriot and fighter for the freedom of the Polish nation, Emilia Plater. Of course, it was by no means a mass phenomenon, but women tried to emphasize their own value and equality towards men favored by social norms more and more at various levels of life. The 20th century brought the birth of democracy, which started back in the 19th century with the growing awareness of European societies, the speed of spreading information about the world, and the growing group of educated members of society not coming from the privileged classes.[4] It should be added that the ideological foundations of the later democratic, communist and national socialist movements were most often created by representatives of the impoverished aristocracy who received a good education and at the same time were characterized by an outstanding intellect. It can therefore be assumed that from the seventh decade of the eighteenth century to the twentieth century, there were gradual changes in the mentality of European societies, which were accelerated by the industrial revolution, the increasingly widely available press and thus the wide spread of printed and oral information. The situation of women also changed, because in the newly created democratic countries in the interwar period, the formal and legal position of women was almost equal to that of men, and the barriers that still existed at that time resulted from the system of social beliefs shaped for millennia, mainly among men. The explosion of National Socialism and Communism rapidly began to equalize even these social limitations in dealing with women and men, making women appear in the armed forces, something unthinkable a few decades earlier. Of course, most often female positions functioned in administration, logistics and military special services. In the case of, for example, the Soviet Union, women even appeared in special units, including taking sniper positions. After the end of World War II in democratic countries there were no doubts about the equal position of women and men, and all other manifestations of thinking resulted from still deeply rooted prejudices, and often from complexes. At the same time, no one had any doubts about the value of women in many "typically male" occupations of everyday life, as well as in uniformed services, including the armed forces. In practice, in many countries, despite the absence of official obstacles, women were still rarely seen, but the picture was gradually changing. At the end of the second decade of the 21st century, in the armed forces of European countries, women were still in the minority compared to men, but no one created artificial barriers anymore, and on the contrary, the armies of many European countries actively encouraged and encouraged women to enter the path of a military career.

Thus, from the agrarian wave, through the industrial wave, along with the development of civilization, the attitude to the internal differentiation of society members also changed through the use of various criteria of division, including gender. A. Toffler predicted that the changes would result, among others, in[5]:

[4] Hanley W. (2005). The Genesis of Napoleonic Propaganda 1796–1799, Columbia University Press, Nowy Jork, pp. 141–158.
[5] Toffler A. (2006). Trzecia fala, Wydawnictwo Kurpisz, Poznań, pp. 7–22.

- a completely new lifestyle resulting from the widespread use of energy sources currently considered alternative (for example, nowadays there is a trend of more and more installation of solar panels by owners of single-family houses);
- the widespread use in everyday life of more and more modern technological solutions that improve the quality of life (it can be seen on the example of both communication technologies using the Internet and the dynamically developing sector of the so-called smart home services, in the near future the AI technology in the form of home robots will probably become more popular);
- introducing new production methods;
- the new family model, which can be associated with universal mobility, now needs to be seen in an international dimension (you can work in one country and live in another) and the developing trend of working remotely from anywhere on the planet;
- a new way of organizing and functioning of the education system, taking into account differences between students and with greater emphasis on the development of not only intelligence, but also the social dimension resulting from properly developed interpersonal relations;
- the increase in the importance of individual people in social organizations, and thus a gradual abandonment of "mass" in favor of valuable individuals massively contributing to the general social development and welfare, and as a result, a completely new model of corporation functioning;
- valuing the different point of view of individuals who bring added value to numerous social groups functioning in the global society, special appreciation of creativity and individual (subjective) approach to the surrounding reality.

Conclusions

To sum up, the ongoing civilization evolution will be much more humanitarian, and its consequence will be the assessment of human value through the prism of contribution to the further development of civilization. Therefore, people endowed with the appropriate intellect, charisma and abilities (mental, manual), which through their daily activity will influence the higher potential of the social structure in which they will function, will be appreciated.[6] Taking the example of the armed forces, this means that it will not matter whether the soldier is male or female. It will be important what added value it brings by strengthening the potential of the unit in which it serves, and thus indirectly strengthening the potential of the entire armed forces. It can be presumed that the tedious and repetitive exercises will be increasingly carried out by machines, and therefore the value of a physically fit soldier

[6] Masuda Y. (1984). The information society as post-industrial society, Editorial Fundesco, Madrid, p. 171.

deprived of additional values will be lower over time, until it disappears completely, eliminating such a candidate as redundant in the tasks carried out by more and more automated armed forces.[7]

Therefore, when attempting to answer the problem question formulated at the beginning, it can be assumed that the number of women in uniform will increase, and with time the difference in the numbers of female and male servants will be leveled out. Recruited will be people with appropriate psychophysical and intellectual qualities, who at the time of recruitment will already have certain skills or abilities, and will be able to quickly learn new content and skills. It can therefore be presumed that the number of soldiers (men and women) with cybernetic, command-management, psychological, engineering and administrative-staff predispositions will systematically grow. Most of the tasks related to direct combat operations, the functioning of the logistics and reconnaissance and information facilities will be performed by autonomous systems, and therefore the demand for people with predispositions to perform such tasks will gradually decrease. On the other hand, scientific teams responsible for developing the existing technological solutions as well as creating innovations and implementing them for the needs of the armed forces may be developed[8]. Due to the growing demand for people with a high level of creativity, there will also be a growing demand for the creation of internally psychophysically and intellectually diverse teams, which will support the development of creativity, and therefore may translate into the creation of new solutions to old and only evolving problems. At the end of the 21st century, the armed forces of technologically advanced countries will probably consist of men and women with a high level of individualism, special psychophysical and intellectual predispositions. With the end of the industrial era and the advent of the information and post-industrial era, the mass character of the army of the past Second Wave will give way to the highly individualized, internally differentiated (also gender-specific) and expert military characteristic of the Third Wave.

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An Insight into The Key Resources in Business Models. What We Can Learn from High-Growth Enterprises.

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Abstract

The article covers important issues related to the business model and resources. The main scientific aim of this paper is to analyze the resource base, in a business model of high-growth enterprises. For this purpose, the theory of systems was used to visualize the resources at the input and output in the business model. The empirical research was carried out among managerial personnel of 150 high-growth enterprises in Poland. The research proves that human capital, organizational capital and intellectual property are crucial for a business model of those enterprises. Moreover, knowledge a resource purchased on the resource market.

Keywords: resources, business model, system approach, high-growth enterprises,

Introduction

High growth enterprises are an interesting challenge for researchers. Why some enterprises go bankrupt, others do well and others grow fast has always interested researchers. So far, research on high-growth enterprises (HGE) has focused on factors such as human capital (Holzl, 2009; Coad et al., 2014; Senderovitz et al., 2016), strategy (O'Regan et al., 2006; Parker et al., 2010) and innovation (Coad and Rao, 2008; Koski and Pajarinen, 2013). There are two reasons of interesting this topic: these companies create most jobs in the world economy and can maintain high growth rates for long periods of time (Barbero et al., 2011). One of the concepts describing the company's growth is resource based view. According to this theory, having strategic resources, properly configured and integrated should generate value for both the customer and the company. In the resource based view, an enterprise is treated as a set of assets (resources) and skills, whose configuration into key competences becomes a source of its success and competitive advantage (Obłój, 2007). Currently, in addition to the important role of strategy with business management, significant attention is paid to the business model. The proper configuration of individual elements of the business model contributes to market success. Therefore, since fast-growing enterprises are "business gazelles", according to the assumptions of the business model concept and resource based view, their resource base and business model should be configured carefully. The motivation for conducting this study is a closer look at what resources in creating business models use high-growth enterprises. This paper contributes to increasing knowledge of the resources in business model from the high-growth enterprises perspective. A look at the resources in business models has been based on systems theory, exposing resources at the input, transformation and output. The main objective of this study is to carry out an analysis of the whole process of transformation of resources in business models of high-growth enterprises.

Literature review

The Concept of Business Models

The concept of business models (BM) is known in the literature on the subject and is much more frequently presented from its practical side rather than focusing on the theoretical concepts. The development of BM began with the conceptualisation of this term and most publications present its definitions, classifications and components. The business model, initially perceived as an operative plan for creating a suitable information system, later developed into an integrated presentation of the company organisation the goal of which is such management in the decision-making process that the company is successful on the market (Writz et al., 2016). This paper, instead of reviewing the numerous definitions presented in the literature (see i.e. Zott et al., 2011; Nisa and Ravichandran, 2013; Writz et al., 2016; Foss and Saebi, 2017, Peric et al., 2017), focuses on the essence of the model, the purpose of its creation and its selected components. However, it is necessary to present the definition that is the most relevant to the scholarly deliberations in this paper. The author agrees with Afuah (2004, p.10) that the business model is a set of activities implemented by an enterprise by means of specific methods and in a specific timeframe, using resources in such a way as to create the benefits that a customer expects, while at the same time ensuring value for the enterprise. This broad definition makes it possible to observe the BM as a holistic and at the same time complex conceptualisation created for the purpose of designing and implementing a specific business activity. Accordingly, it is a specific logic of action of an enterprise (Casadesus-Masanell and Ricart, 2010; Zott et al., 2011). Meanwhile, the point of creating the business model of an enterprise is to generate profit, which today is frequently seen through the prism of the value, which in turn is the indicator of market success over competitors. Thus, it can be stated that the idea of the BM is to show the road of development for an enterprise. A fit business model should be a unique concept that will enable to maintain lasting competitive advantage. Thus, the question is how to create such a model. J. Magretta (2002) refers to the questions posed by P. Drucker (2011), which should be answered when telling the story of the enterprise. They are four basic questions: Who is the customer? What does the customer value? How does an enterprise earn money from its activity? How the value is delivered to the customer, taking into account its cost?

The literature on the subject presents many ways to construct business models, each of which is based on the components that the author of a given idea considers to be crucial. It may be noted that researchers present different structural elements of the BM, which, however, have some things in common. The research conducted by Falencikowski (2013), concerning both the definition and components of business models, leads to the following conclusions: An analysis of the definitions of the business model suggests that most of those definitions mention the creation/delivery of values and products and combination/configuration of resources. Meanwhile, the popular element of BM components is the value proposition. Other common elements are: the sources of income, the customer, the value chain, key resources, key activities, relationships. The most frequent terms used both in definitions and in components of the BM are the value and resources. Insofar as the value is the end effect of business models, resources are the initial element of their construction.

The most popular and the most often quoted BM is the 9-block construct, the Business Model Canvas, developed by Osterwalder. This model focuses on factors that are directly controlled by an enterprise and does not include factors linked to the environment (Fritscher and Pigneur, 2015). The components of the model may be grouped into four main pillars: product innovation (value proposition), customer management

(customer segments, distribution channel, customer relationship), infrastructure management (key resources, key activities, key partners), financials (revenue streams, cost structure).

The coherence of the respective elements is of key importance for the development of the BM. The respective components of the business model form a complete system, which means that its efficiency depends not only on the individual elements but also on the relationships between them (Leszczewska, 2016). It is also worth noting the method of designing the BM. Zott and Amit (2010) state that BM designing may be based on the activity system perspective, which includes such elements as: novelty, lock-in, complementarities and efficiency. The idea of developing the BM by means of the novelty-oriented activity system perspective is to depart from the established model and implement innovative content and/or means of action as well as modern management methods. Using the lock-in element is associated with creating a strong bond between an enterprise and a selected group of stakeholders who are treated as participants of the BM. Business model design based on complementarities is associated with the synergy effect, where mutual interaction and cooperation leads to greater effects than would be achieved by the individual BM components. Meanwhile, efficiency-oriented design concerns the method of increasing input in order to achieve the expected effects.

Resources in business models

Resources are in the centre of interest of numerous contemporary economic theories and management sciences that describe increasingly complex processes taking place within an enterprise and in its environment (Otola, 2018). The multiplicity of studies on resources, conducted from different perspectives, makes it impossible to construct a single, generally accepted definition of the term. In general, an enterprise, in order to create products and services, needs resources and, more specifically, a resource base (de Witt and Meyer, 2010).

The most classical division of resources identifies the tangible group and the non-tangible group (Grant, 1991; Barney, 1991). Although most researchers agree that tangible resources are all the assets of physical nature (Carmeli, 2004; de Wit and Meyer, 2010), the problem is how to define precisely what intangible resources are. There are many different classifications of intangible resources, but they include all the intangible assets whose value is hard to determine, such as, for example, culture, organisation, intellectual property, human capital, relationships, positioning resources, core competencies. Not all researchers agree that intangible resources should be understood so broadly. For example, human capital is not always identified as an intangible resource. Also, core competencies, which are often referred to as capabilities, are excluded from resources and identified as a separate category (Teece et al., 1997; Makadok, 2001). Leaving aside further polemics on the classification of resources, it is relevant in the context of this article to focus on their importance for an enterprise. The main role of resources is to achieve the goals of an enterprise. Each enterprise should have an own resource base, configured in such a way as to bring as many benefits as possible, this way ensuring a certain market position. Not all resources involved in the value creation process contribute equally to that value. The importance of resources in the development of an enterprise is particularly emphasised by the resource-based view, according to which they are seen as a strategic potential for an enterprise (Sopińska and Mierzejewska, 2017) with the specific attributes defined by the VRIN/VRIO acronym (valuable, rare, inimitable, non-substitutable, organised) (Barney, 1991; Barney, 2008). Thus, it is not important how many resources an enterprise has or controls, instead, what matters is how the resource base defined by the VRIN/VRIO framework is configured (Otola et al., 2018). The unique nature of

resources and their proper configuration make it possible to achieve the effect of synergy. Such effect may be achieved thanks to applying a business model to the operationalisation of activities in an enterprise.

Conceptualisaton

The business model may be analysed in a systemic approach: input – transformation – output. The theory of systems shows that the operation of every element of a whole affects the operation of all the other elements (von Bertalanffy, 1956). The systemic approach to the business model makes it possible to analyse every element of the system separately and to analyse the mutual couplings between those elements and their relationships with the environment. As previously highlighted, key resources and key activities are an essential component of the business model.

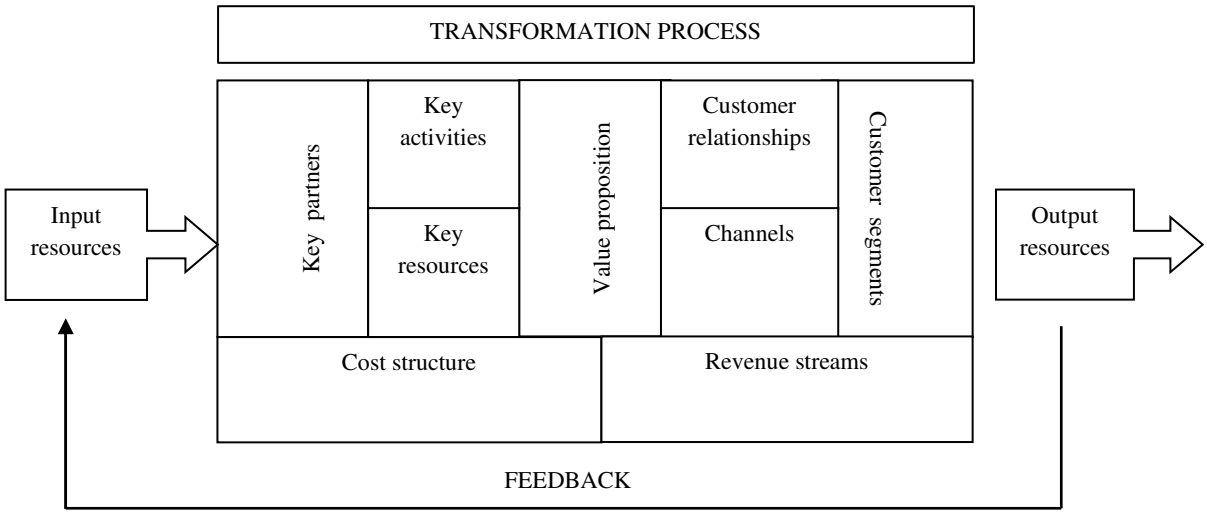

Fig 1. Systemic approach to resources in business model

Input resources may be created independently by an organisation, or they may be purchased in the resource market, e.g. from key suppliers. Not every enterprise is able to create products based on its own resource-base. Some enterprises will acquire resources in the form of raw materials, semi-finished products, components or infrastructure. There are also enterprises that use intellectual property, i.e. trademarks, licenses, copyright, databases. Finally, the most valuable resources as knowledge should be at the disposal of the enterprise. However, it may happen that none of the employees of an enterprise has the required knowledge and it is reasonable to use the knowledge resources of other enterprises. At the input stage, it is important to determine what resources an enterprise owns and what resources and how many of them it needs to buy in the resource market.

The process of transforming input elements into output elements is associated with management areas, such as: finance management, HR management, marketing, innovation and production processes as well as strategy and planning. The processes taking place during transformation are aimed at achieve the tasks implemented by an organisation and they are identified as output elements. However, it is possible to look at the transformation process in a different way. In this approach, the transformation process consists in the

way products/services are produced. Accordingly, it disregards the processes associated with enterprise management. Looking at the transformation process as a way of generating products/services makes it possible to identify several approaches to the activity of an enterprise. It can be distinguished the proprietary concept of generating a product/service or a contrary, license-based concept. Not all enterprises want to use licenses, even if they are not able to independently develop solutions to generate products/services. In such case, they decide to cooperate with other enterprises or scientific and research institutions. Such cooperation makes it possible to create a bond of social, economic, service-provision and technical nature with the aim of reducing total costs and increasing the value of enterprises, to mutual benefit of the parties involved (Lefaix-Durand et al., 2005). Another possible procedure in the transformation process is to take actions according to the customer's wishes. An idea, plan or design is fully developed by the customer and discussed with the manufacturer, and on its basis, a product/service is generated. It should be noted that most enterprises will not focus on a single possible method of generating products/services, but rather, they will offer several options.

Output resources are products/services that an enterprise delivers to its customers. On the one hand, resources are regarded in the context of the end products but, on the other hand, there are key activities for the customer. In this context, it may be examined how an enterprise satisfies the needs of its customers. Is the activity of an enterprise limited to generating and selling a product or does it also offer a number of other activities, beginning with consulting through designing, manufacture, sales and implementation, or even service? Output activities show how a value is delivered to the customer and how an enterprise differs from its competitors.

Methodology and research design

Data sample and method

The empirical research concerning the business models of high-growth enterprises was conducted by means of a survey among managerial personnel in early 2019. 150 Polish enterprises participated in the research. According to the OECD definition, high-growth enterprises are the enterprises where revenues from sales or employment are expected to grow by more than 20% on average annually over the next three years. Enterprises that satisfied one of these two conditions were qualified for the survey. The research focused only on the issue of resources in business models. The research results were analysed in the context of the entire research sample and broken down into the categories of the size of an enterprise (small, medium, large), based on the number of employees (see Fig 2).

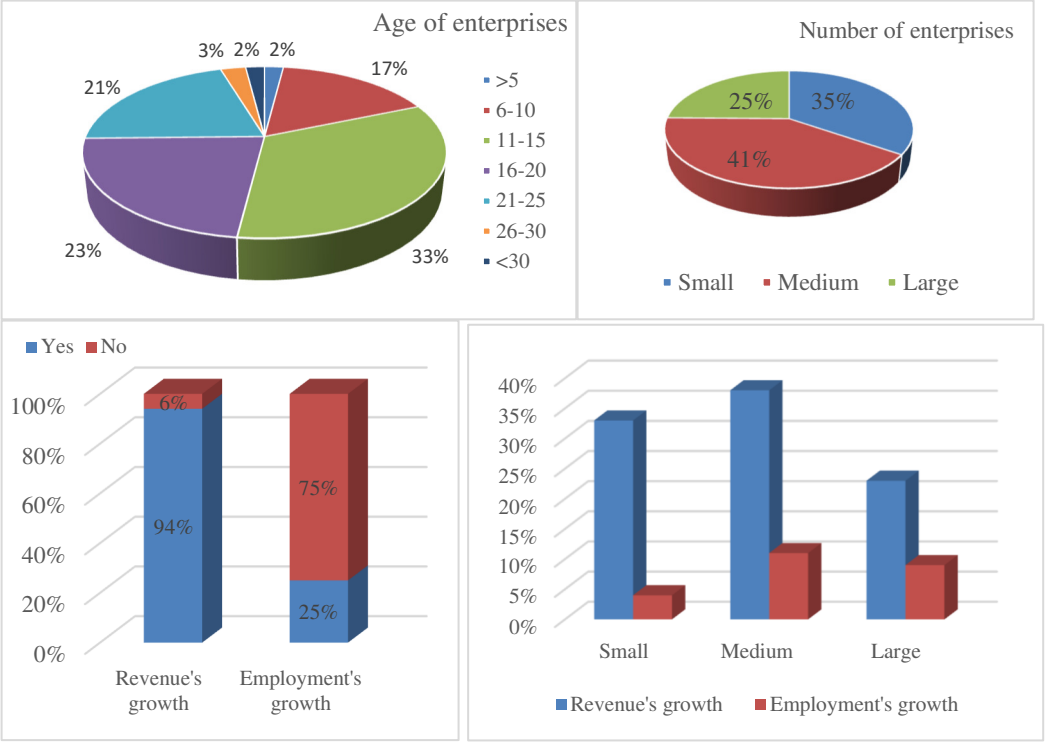

Fig 2. Basic statistics on the examined enterprises

Input resources

The respondents were asked what resources they acquired from their key and/or permanent suppliers. The possible responses included: i) knowledge and experience, ii) raw materials, semi-finished products, components, goods, iii) access to infrastructure, real property, iv) licensees, trademarks, copyright, v) data bases. All the enterprises acquired resources from key and/or permanent suppliers. Almost 63% of the examined enterprises acquired two types of resources, while 17% of the respondents stated they used one type of resources available on the market, or three types of resources, respectively. No enterprise reported acquiring resources from all of the above groups. Considering the volume of acquired resources with respect to the size of the enterprise, it should be noted that in every group, enterprises most frequently used two types of external resources. Also, small and medium-sized enterprises more frequently acquired one type of resources, while large enterprises used 3 types of resources (Table 1).

Table 1: The number of resources group acquired from key and/or permanent suppliers

Number of resources groups	Small	Medium	Large	Total
5	0,0%	0,0%	0,0%	0,0%
4	3,3%	7,7%	0,0%	2,7%
3	17,3%	9,6%	16,4%	29,7%
2	62,7%	67,3%	60,7%	59,5%
1	16,7%	15,4%	23,0%	8,1%

Almost all enterprises procured raw materials, semi-finished products, components and goods. It is surprising, however, that as many as 70% of the examined enterprises acquired knowledge as a necessary resource to operate, and the size of the enterprise was not relevant here. The other types of resources were not so frequently acquired. No more than 20% of the examined enterprises declared that they purchased on the market the following resources: iii) access to infrastructure, real property, iv) licensees, trademarks, copyright, v) databases (Table 2).

Table 2: Resources acquired from key and/or permanent suppliers

Type of resources	Small	Medium	Large	Total
Knowledge and experience	70,0%	73,1%	65,6%	73,0%
Raw materials, semi-finished products, components, goods	99,3%	98,1%	100,0%	100,0%
Access to infrastructure, real property	10,0%	13,5%	4,9%	13,5%
Licensees, trademarks, copyright	16,7%	19,2%	13,1%	18,9%
Databases	11,3%	5,8%	9,8%	21,6%

The next question addressed to the respondents concerned the percentage importance of selected four groups of resources (i.e. i. technological resources, ii. human resources, iii. other intangible resources, iv. financial resources) for generating key products/services (Fig 3). More than 40% of the respondents declared that, to generate key products, they needed approx. 31-40% of technological resources, while for 30% of the respondents, this ranged between 21 and 30%. Similar responses were given concerning the group of human resources. 31-40% of human resources were crucial do generate a product for 42% of the respondent, while 33% of them selected a lower range from 21 to 31%. Interestingly, 30% of the examined enterprises did not need any other intangible resources (this concerns only the group of small enterprises), while for 37%, their relevance was below 10%. Most (nearly 50%) respondents declared that their need for financial resources to generate key products ranged between 11 and 20%. An analysis of this issue regarding the size of the enterprise led to similar conclusions. The only differences are visible in the human resources group, which is more important in large enterprises. 40% of the respondents from the group of enterprises with more than 250 employees consider they need between 31 and 40% of human resources, while 38% of them chose the range from 41 to 50%. Financial resources are also important for large enterprises: for 43% of them, the need for those resources ranges from 31 to 40%.

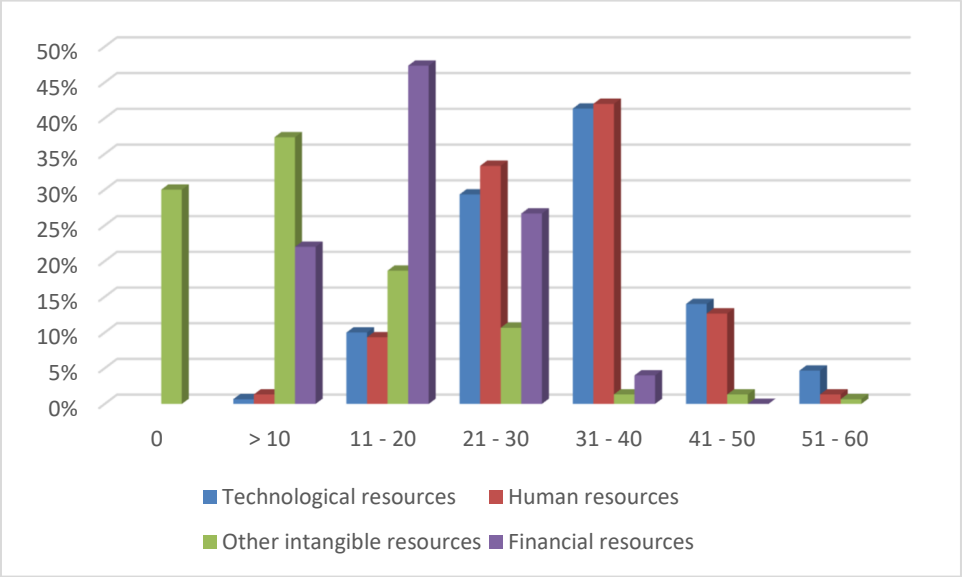

Fig 3. The share of resource groups in generating products/services

The respondents were asked to identify essential groups of intangible resources in their enterprises according to the typology presented in Table 3.

Table 3: Typology of intangible resources

Group of intangible resources	Components
Human capital	Employee skills; employee experience; employee intellectual potential; managerial skills of the managerial personnel; creativity
Organisational capital	Organisational structure, organisational culture, management methods, relationships within the enterprise
Intellectual property	Patents, licenses, trademarks, copyright, contacts, data bases
Core competencies	Know–how, knowledge, specialist knowledge, experience, skills and behaviours
Relationships	Formal, informal, with the environment, inside the organisation, with customers, with suppliers
Employee attitudes and behaviours	Loyalty, availability, motivation and commitment to work
Positioning resources	Commercial brand, customer loyalty, reputation, company image, knowledge about competitors

The least relevant groups of resources, according to the respondents, are employee attitudes and behaviours, positioning resources and relationships (Fig 4). For 33% of high-growth enterprises, the most valuable group of intangible resources are human resources. Another highly valued group is organisational capital,

considered to be the most valuable resource by 22% of the respondents and the second most valuable resource by 24% of the respondents. Intellectual value is perceived as very valuable by 10% of the respondents and as valuable by nearly 21% of them. The results for the core competencies category is surprising. Only above 3% of the respondents think it to be a very valuable resource, while more than 5% – to be valuable. This is unexpected, because the literature on the subject emphasises the great significance of core competencies in building the competitive advantage of an enterprise on the market (Hamel and Prahalad, 1990).

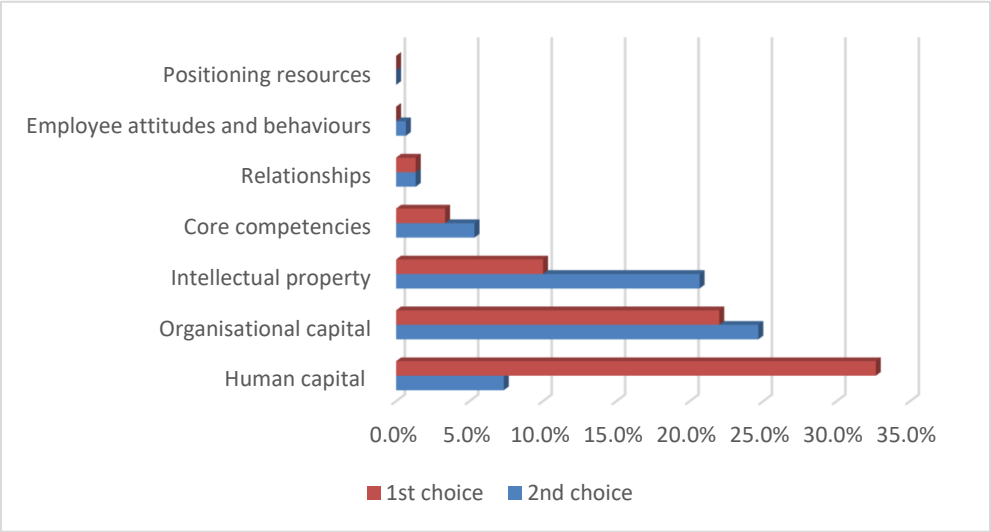

Fig 4. Significant groups of intangible resources

Resources in the transformation process

In the transformation process, the resources put into the system are transformed into output products. The transformation process is mainly linked with how the business model works, but in the context of resources, it is possible to focus on the way of the generation of products/services. The respondents were asked to declare how they generated their products/services, whether: i) they were their proprietary solution, ii) were made on the basis of a license; iii) were made on the basis of cooperation, iv) were made according to the customer's plans or projects, v) were associated with supply logistics.

Table 4: Methods of generating products/services

	Small	Medium	Large	Total
Proprietary solution	57,7%	63,9%	70,3%	63,3%
License	15,4%	24,6%	29,7%	22,7%
Cooperation	67,3%	60,7%	59,5%	62,7%
According to the customer's plans or projects	76,9%	54,1%	45,9%	60,0%
Supply logistics	30,8%	21,3%	16,2%	23,3%

An analysis of the responses shows that proprietary solutions, cooperation and generating products according to the customer's suggestions are crucial for more than 60% of the respondents (see Table 4). Meanwhile, more than 23% of the respondents declared that their products were associated with supply logistics and more than 22% – that they were generated on the basis of licenses. In the case of small enterprises, products are most often generated on the basis of plans (77%) and cooperation (67%), followed by proprietary solutions (58%). In medium-sized enterprises, proprietary solutions were selected by 64% of the respondents and cooperation – by 60% of the respondents. Products based on the customer's idea are generated by more than half of those enterprises. Similar is the case with large enterprises. Here, the dominant method of generating products are proprietary solutions (70%). 60% of the large entrepreneurs base their activity on cooperation, while 46% generate products/services according to the conditions determined by the customer. A quantitative analysis of this question shows that the respondents most often choose two methods of generating a product (36%), while 32% of the responding enterprises use three methods. Less than 1/4 of the respondents focus on one of the listed methods of product generation. Medium-sized and large enterprises are not different in this respect. Small enterprises most frequently selected three methods of product generation (38.5%), followed by two methods (28.5%).

Output resources

An analysis of the output resources is based on the respondents' declarations concerning what exactly they offered to their customers (Table 5). The respondents could choose several from the suggested options, i.e. i) consulting, ii) product/service designing, iii) product/service generation, iv) product/service sales, v) product/service implementation, vi) product/service training, vii) service. The examined enterprises focused especially on the production (99%) and sales (98%) of goods. More than half of them offered designing (56%), service (55%) and implementation, and 40% provide consulting. An analysis of the output resources through the prism of the size of the enterprise led to identical conclusions. It is also worth noting how many types of activities an enterprise performs for its customers. Not many, because only 3.3% of the responding enterprises perform one activity and less than 10% – two activities. 28% of the respondents declared that their enterprises performed three activities for their customers. More than 3 activities are performed in total by almost 50% of the examined enterprises. The same as in the case of the types of activities, an analysis taking into account the size of an enterprise led to the same conclusions.

Table 5: Activities for customers

	Small	Medium	Large	Total
Consulting	40,4%	41,0%	37,8%	40,0%
Product/service designing	42,3%	60,7%	67,6%	56,0%
Product/service generation	96,2%	100,0%	100,0%	98,7%
Product/service sales	90,4%	100,0%	91,9%	94,7%
Product/service implementation	55,8%	50,8%	45,9%	51,3%
Product/service training	32,7%	26,2%	16,2%	26,0%
Service	53,8%	59,0%	48,6%	54,7%

Conclusion

An important observation concerning the resource base in the business models of high-growth enterprises is the lack of significant differences depending on the size of the enterprise. This means that these enterprises construct and configure their resource base in a similar way. Currently, a lot is said in the literature about core competencies and their importance for enterprises. Competence determines how people should behave and what they should know to do their job properly. Nevertheless, the studies do not confirm that this is a key resource for high-growth enterprises. The components of core competencies are know-how, knowledge, specialist knowledge, experience, skills and behaviours. Taking into account that 70% of respondents indicate that they are acquiring knowledge on the resources market, the result of core competencies should not be surprising. So which resources are important in creating a business model of HGEs? The two most recognised groups of intangible resources are human capital and organisational capital. It is worth noting which components are in each group. The human capital includes employee skills, employee experience and intellectual potential, managerial skills. The components of organizational capital are organisational culture, management methods, relationships within the enterprise. From the conducted research it can be concluded that creating a fit business model is based on people who are provided with an appropriate system of standards, patterns, values in the enterprise. The combination of human capital with organizational capital and intellectual property makes that the business model will bring market success. The ways in which the products are manufactured are hardly dependent on the size of the enterprise. The activities for clients, the proprietary solution and cooperation are visible. Licensed activities do not contribute to the rapid growth of the enterprise. This is natural, since the purchase of a licence on the market can be made by any enterprise and therefore does not confer a competitive advantage in the form of generating resources characterised by the acronym VRIN/VRIO. Moreover, while constructing their business model, these enterprises focus on performing usually three activities for the clients. One or two key activities is not a solution that allows for a competitive business model of HGEs.

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Verification of A Particular Investment Strategy on The US Stock Market – Random Forest Algorithm and The Quality of Price Changes Forecasts

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Abstract

This paper studies the efficiency of investment strategies created by the machine learning algorithm for the 50 largest US companies. The Random Forest, as a representative of the algorithms based on decision trees, has many advantageous features for the time series analysis, in particular, for problems of regression and classification. The Random Forest was applied in the study to detect a signal whether to buy, sell, or hold a specific stock for one month. The decisions are based on the classification and consider multiple macro-economic and market variables. The case was analyzed for three classes that comply with investors' expectations regarding the forecast of price changes. It is desired to focus on the accuracy measure to verify how the presented algorithm will work, namely, how many times it may correctly predict a specific result among three investment decisions – to buy, hold or sell shares. The effectiveness of strategies' signals was translated into the verification of the hypothesis about market efficiency. The Matthews correlation coefficient was used as a synthetic measure of the forecasts quality. It is based on the concept of the confusion matrix. As it was expected, the results support the thesis that the market is becoming more and more efficient. Moreover, contrary to the imposed concepts, even utilizing a large data set and sophisticated deep machine learning tools does not lead to a satisfactory result in practice.

Keywords: Investment Strategies, Random Forest, Deep Learning, Forecasts, Confusion Matrix

Introduction

The aim of this study is to test the ability of the Random Forest algorithm to determine the signal for investment strategies for the most significant American listed companies. Such an approach may provide a beneficial tool for market participants, namely, for investors, economists, or policymakers. They also account for a good source for understanding the drivers of stock movements and may enhance the understanding of global capital markets relationships. The primary assumption for the creation of these strategies is the possible market dependencies and non-linear relationships, which may influence future price movements. In this paper, one month period for a stock is considered, which means that the strategy rebalancing is performed every month.

The importance of market relationships integration between stock markets across countries and global or regional economies might be justified by the rich body of evidence. Firstly, investors and funds benefit from the integrated market by fairly priced assets, which grants them a lower risk premium required to invest in the specific markets. Secondly, it also concerns the aspect of the market efficiency hypothesis since the integrated markets support the flows of information. Finally, the integration of the

markets enables economists and scientists to analyze and understand more deeply the global economic environment and its dependencies.

The most fundamental factors of stock prices' movements are supply and demand. The law of supply states that an increase in price results in an increase in quantity supplied, whereas the law of demand displays the inverse relationship. If the price rises, the quantity demanded decreases. According to these laws, the price is determined by supply and demand at the point of the equilibrium. It is the most common approach to determine the asset price on stock markets. However, both demand and supply are affected by many factors like the company's, industry's and country's performance, government policies, international economic situation, and many others. In such a case, factors like earnings, dividends, or volume of sales and costs are classified as microeconomic variables and remain specific to a particular asset or group of assets. Thus, the macro-economic factors are common for all kinds of assets and include such variables as inflation, commodity prices, economic indicators, exchange rates, or bond yields.

In this paper, the application of the Random Forest, a machine learning algorithm, is tackled differently to look into the macro- and micro-economic relationships among stock prices. Under this research, fifty currently largest American stocks were chosen from the S&P 500 aggregate. The additional criterion for the choice of stocks was the availability of quotations for at least twenty years. This assumption implies that the entire data set includes the data from the period between January 2000 and January 2020. Therefore, the total number of monthly observations amounted to 240.

The further part of this paper is divided into five sections. Section 2 depicts the general idea of investment strategy. The next section presents some characteristics of the Random Forest algorithm and how it can be used for the decision-making process. Section 4 describes the steps needed for correct data preparation for processing them with the algorithm, the methodology of model training with the data set, and the evaluation methods. The next section focuses on the Matthews correlation coefficient used to evaluate the quality of the forecasts. Finally, section 5 presents and summarizes the results of the research.

Quantitative approach in investment strategy

An investment strategy for any investor is a collection of principles or rules determining the time of investment and the financial instrument, which is the subject of investment (Basile 2016). Before the establishment of the rules, it is required to identify a purpose, a time horizon, and the risk aversion of an investor. Ferrari (2016) lists the general steps needed to be performed to create an investment strategy:

1. Identification of objectives and constraints,
2. Formalization of the investment strategy,
3. Implementation of the financial plan,
4. Periodic rebalancing of the portfolio,
5. Performance assessment and risk control

The author states that the level of detail and structure of each point may be different for various investor types, size of the portfolio, the complexity of management, and relevant regulations. The collection of principles allows the portfolio manager to detect a signal whether to buy an asset, hold it, or sell it in an appropriate time – the formalization step. The implementation becomes the next step. However, Pederson (2015) suggests that it should be preceded by the backtesting phase in which an assessment is made to determine if the chosen strategy achieved a specific outcome in the past. Followingly, periodic rebalancing should be performed. If the portfolio does not change over time, the active strategy is not needed as it would be equal for the buy-strategy and the passive hold-strategy. The last step is performance assessment and risk control, in which the appropriate measure is chosen to determine the efficiency and to keep the risk in bounds.

The paper is focused on the formalization of investment strategies. Nevertheless, the next steps are also tackled but not in such a detailed manner. In this research the signals are based on the outcomes of the Random Forest classification problem: if the next month price return is higher than four percent, the signal (class) is to buy (1), if the return is smaller than four percent – sell (-1), otherwise the signal is to hold, and the class is '0'.

The idea of using the machine learning algorithm was prompted by the main characteristic of the big data approach and the choice of variables for the model. The Random Forest algorithm enables it to use an extensive data set of features and may not be limited to the factors chosen by the economic logic. The most important conclusion from the literature review is that the scientists firstly investigate potential logical reasoning and then test this relationship, similar to internal and external factors (ex. Heins and Allison 1966, Garefalkis et al. 2013, Hartono 2004). Although such an approach is generally accepted, it does not concentrate on finding the determinants, but only on justifying the choice of the factors. The comparison of two approaches is presented by Breiman (2001) who states that the statistical modeling could be divided between the Data Modeling culture, where the inputs and outputs are known, and the model is the one to be chosen and tested, and the Algorithmic Modeling culture, where the model is left as 'black box' and is concentrated only on the relationship between inputs and outputs. According to Breiman, the Data Modeling Culture is used by 98% of all statisticians, whereas the Algorithmic Modeling Culture is applied only by 2%. This study is directed towards the algorithmic approach, which allows it to utilize a highly complex model, so-called 'black box,' in which the inputs are selected to fit the output variables most appropriately. The chosen 'black box' algorithm is the Random Forest.

Random Forest algorithm

The Random Forest is classified in the ensemble classification and regression algorithms of the Machine Learning and was first described by Breiman (2001). The name originated from the structure and fundamental elements of the algorithm. The basic elements are decision trees that serve as predictors. All the trees are structured with some extent of randomness, which means that each created tree should be unique in comparison to the other. In common decision trees, each tree is split in such a manner that all variables are considered. In the Random Forest, the trees are split differently; it applies only the random subset of input variables. There are two possible approaches to how the algorithm might be used. Firstly, it may be employed to solve a classification problem in which the majority of voting is conducted among all trees to derive the outcome class. Secondly, it may be utilized in the regression problem in which the result is obtained as an average value of all trees' results. Because of the random construction of all decision trees, the Random Forest is designed for large data sets where the relationships between inputs and output are not linear and obvious. It provides for the explanation why the Random Forest might serve as a 'black box' model in the Algorithmic Culture of statistical modeling, and thus the determinants of the stock prices do not need to be chosen before implementing the algorithm which may also enhance the possibilities to create an efficient investment strategy.

As an algorithm, the Radom Forest accounts for several advantages. This collection of decision trees may solve not only the classification problems but also the ones regarding regression. Both categorical and continuous inputs could be applied to the model. While working with empirical data, a common issue is to spot the outliers. The algorithm easily handles it as randomness ensures an outcome that always entails some trees not considering such values as needed. The same advantages tackle the problem of incomplete data sets and missing data points. Therefore, their impact is most likely to be diminished. It also implies that the algorithm is invulnerable to the minor changes in input data. The Random Forest could be classified as the 'black box' algorithm since deriving an impact of one variable may be very problematic. This characteristic could be treated as an advantage if the relationships between input and output variables are not significant. Still, it also might prove to be a disadvantage as these relationships could not be reasonably justified. Another advantage of the algorithm is it's insensitivity to the multi-collinearity issue since the variables are chosen randomly for each tree. This issue might have an impact on the interpretability of the importance, but it does not affect the accuracy of the model.

The most important feature of the Random Forest is its ability to hold non-linear relationships in decision trees. The reasoning behind the decision process is not evident and it may be much more complex in comparison to human reasoning, which, on the contrary, tends to capture often only linear dependencies.

The structure of the algorithm allows it to limit the number of external variables and to assess their importance. The importance of variables is used mainly in the process of variable selection, and the Random Forest provides the taxonomy of such calculations. The first calculation mode uses a metric called "Gini importance" or "mean decrease in impurity." The Gini importance score affords a relative order of the input variables and is also used in the process of splitting the nodes in decision trees. The score is determined by measuring how efficient the input variable remains in the attempt to reduce variance or uncertainty. The Gini importance, however, is criticized by Strobl (2007), who declares that this measure is not adequate for variables when they vary in the scale and the number of categories. The second calculation, which is also recommended, occurs while utilizing permutation. According to Gregorutti (2017), the permutation importance is measured as follows:

1. Fit the model and record the first score, ex. accuracy (for classifiers) or R^2 (for regression),
2. Permute all values of a single input variable,
3. Pass the whole dataset with permuted variable to the model,
4. Fit and evaluate the model,
5. The difference between the two scores is the permutation importance.

The permutation importance is characterized by its simplicity. It may be used not only with the 'black box' models but even with a simple OLS. A practical application of the methodology mentioned above is displayed in the further parts of the paper.

Data preparation

The monthly data from January 2000 to January 2020 were collected for the constituents of S&P500 from February 2020. The data set entails 240 observations of the single company. Since calculations and training process is very time-consuming, it has been decided to limit the number of stocks to fifty largest companies with a track record of at least twenty years – see Table 1A in the Appendix (with the list of the chosen companies). The input data includes the most popular global equity indices like MSCI World, Stoxx 600. It also captures prices of commodities such as oil or gold, some macro-economic variables, for instance, inflation, interest rates, unemployment rates, sovereign bond yields, and exchange rates. All of them have been gathered as a whole set of 224 macro-economic variables. These variables are listed in Table 2A in the Appendix.

According to Specht (1991), the input variables, which are derived from various scales, should be preliminarily normalized to keep similar variances among the chosen features. The normalization causes the model training to be more efficient over time and also may improve the results (Jayalakshmi 2011). There are numerous methods to deliver the normalization process, among which the most popular ones are to be found, namely, the Min-Max method or the Z-Score method.
The normalization of the observations concluded the data preparation step. All variables were normalized into 1-month changes – percentage or absolute depending on the data characteristics. Additionally, 5-year rolling z-scores were implemented. For every stock which has been chosen out of fifty above mentioned stocks, all input variables were taken into the training process, which is described in the following section.

Training the algorithm

The training is based on forecasting the next month's price movement of the stock. A classification problem is being investigated. Class '1' stands for next month raise in the price above 4%, '-1' stands for a decrease of more than 4%, and '0' otherwise. This training method of the algorithm is called supervised learning, and it requires an additional supervised time series. It is treated as a teacher in a

learning process. A common approach to validate a model is to split it between training and testing subsets, for example, 60% to 40%, respectively. However, such an approach does not explore the full information available in the data set. It also loses the ability of the algorithm to learn over time. Hart (1994) proposed a time series cross-validation, which enables the model to benefit from the time aspect of the data. Similarly to the rolling approach in the normalization process by z-scores, the time series cross-validation uses a rolling window over the data set. There are two ways of conducting it. The first approach imposes the starting point of the window to be fixed, and with a new observation, a new window is added. The second approach, however, uses a fixed horizon of the rolling window. Thus, it is more suitable for economic data as the influence of the inputs may vary over time. In the conducted empirical research, the rolling period includes 60 observations, and it implies that the window covers a collection of the data gathered within five years. Each time the window moves forward, the forecast is conducted solely for the following observation, which is not included in the window. Therefore, for a 5-year-long window with 60 observations, the forecast is performed only in the 61st observation. The rolling window moves forward and includes data from the second to the 61st observation. This methodology allows it to apply properties of analyzed time manners of the data. It also leads to a situation in which only the first 60 observations may be considered as a training set or an in-sample period.

The next step in the training process is the optimization of the hyperparameters, which are the parameters set before the training begins. Actual model parameters are optimized in the learning process. Multiple ways of adjusting the hyperparameters are available, for example, the manual search, grid search, or random search (Bergstra and Bengio 2012). The Random Forest algorithm is characterized by the following hyperparameters, namely, by the number of trees, the number of variables in each split inside a tree, or the maximum depth of a tree. There is no verified approach determining which set of hyperparameters is optimal to solve the specific problem. Therefore, the methods mentioned above depend on testing possible combinations bounded by previously established limits. In this research, the hyperparameters were determined by the grid search method.

When the hyperparameters are optimized, the variable selection process starts. As has been described in the previous parts of the paper, the Random Forest enables the permutation importance to be calculated, which allows it to rank the input variables (Genuer et al. 2010). And so, the process called Recursive Feature Elimination is applied. When the variables are ranked according to their importance, the last variable is removed from the series. Then the process repeats. The final variables could be chosen either by selecting the data set with the highest evaluation score or when the quantity of input variables is limited to a specific number. Reducing the number of variables is aimed at a potential decrease in overfitting and is likely to increase the model's effectiveness. In this empirical research, the chosen number of input variables is constant and equals 10 to limit the number of variables taken for each stock.

As the rolling approach is accepted, the steps are reiterated every time the rolling window moves forward. It means that all hyperparameters are optimized, the Recursive Feature Elimination is conducted each time. Thus, it results in more than one model utilized in the learning process in the entire data set, which means that repeated use of the Random Forest creates the outcome. Once the mechanism, as mentioned above, is determined, the predictions are collected and evaluated for each company.

The process was performed with the application of the Python language with the PyCharm environment. The main packages were 'pandas', 'numpy', and 'sklearn'.

Quality of the classifiers – evaluation of forecasts

The concept of the confusion matrix has been used to assess the quality of the forecasts. It analyses the number of compliant and non-compliant states for forecasts of price changes on the market (-1 for forecasts of decreases in the next period above the assumed level, 1 for forecasts of increases above the assumed level and 0 for other cases) with the states identified for actual price changes. It is the preferred

and widely used approach (Troiano, L., Bhandari, A., Villa E. (2020)) for evaluating deep learning techniques. Thus, for the three-state case, the confusion matrix took the form, which is presented in Table1.

Table 1: Confusion Matrix idea

	Confusion Matrix C	Actual states		
		-1	0	1
Predicted states	-1	$\mathbf{c_{(-1,-1)}}$	$c_{(-1,0)}$	$c_{(-1,1)}$
	0	$c_{(0,-1)}$	$\mathbf{c_{(0,0)}}$	$c_{(0,1)}$
	1	$c_{(1,-1)}$	$c_{(1,0)}$	$\mathbf{c_{(-1,-1)}}$

Source: own preparation.

The higher values of c(i,i) for i={-1,0,1} and the lower values of c(i,j) for i≠j and i,j= {-1,0,1}, the better investment signals generated by the investment algorithm and the better random forest classifiers. For example, the confusion matrix result [13,11,25;11,14,30;13,16,47] means that the price decrease (state -1) was correctly predicted in 13 cases and that the algorithm predicted a decrease (state -1) in 11 cases when in fact the prices did not change (state 0). There were 180 forecasts in total. The Matthews correlation coefficient was employed as a synthetic measure of the forecasts quality. It displays several advantages over other approaches (Chicco D, Jurman G. (2020)). The measure takes the value of 1 for the perfect classification (perfect forecast). The lower value, the worse the evaluation of the prognostic method. For K x K confusion matrix C, the value is estimated from the formula:

$$MCC = \frac{\sum_k \sum_l \sum_m (c_{kk} c_{lm} - c_{kl} c_{mk})}{\sqrt{\sum_k (\sum_l c_{kl})(\sum_{k' \vee k' \neq k} \sum_{l'} c_{k'l'})} \sqrt{\sum_k (\sum_l c_{lk})(\sum_{k' \vee k' \neq k} \sum_{l'} c_{l'k'})}}.$$

The quality of the algorithm throughout the entire available data history was examined, and the hypothesis of the financial market efficiency change was verified for the two sub-periods.

Therefore, the MCC(1:180) value has been estimated for the full range of historical data (180 months) and the first and second half of the sample – MCC(1:90) and MCC(91:180). The hypothesis MCC(1:90)>MCC(91:180) was verified with the application of the bootstrap method, in which two samples were drawn up with outcomes of 90 observations from the original 180 periods (sampling with replacement). On such a basis, the distribution of test statistics was estimated under H0, and the p-value was determined.

Empirical results conclusions

Table 2 presents the Confusion Matrix results for each company for the entire period (180 months) and two subperiods (both 90 months long).

The obtained results do not indicate the usefulness of a given method for building an investment strategy in practice, despite the use of large variables set and a quite flexible tool, i.e., random forests. A large number of non-zero values that lie out of the diagonal of confusion matrices account for a high forecasting error.

Table 2: Confusion Matrix results for companies

Company	Conf. Matrix (1:180)	Conf. Matrix (1:90)	Conf. Matrix (91:180)
3M	[13,11,25;11,14,30;13,16,47]	[11,4,13;7,7,12;11,4,21]	[2,7,12;4,7,18;2,12,26]
ABBOTT LABORATORIES	[6,15,23;11,15,37;16,23,34]	[4,10,11;7,5,17;10,12,14]	[2,5,12;4,10,20;6,11,20]
ADOBE (NAS)	[12,1,43;5,0,19;21,0,79]	[9,0,26;0,0,9;11,0,35]	[3,1,17;5,0,10;10,0,44]
AMAZON.COM	[13,4,40;3,0,25;27,4,64]	[11,2,20;1,0,9;19,0,28]	[2,2,20;2,0,16;8,4,36]
AMERICAN EXPRESS	[8,15,28;17,8,30;19,22,33]	[4,9,16;9,2,14;12,12,12]	[4,6,12;8,6,16;7,10,21]
AMGEN	[19,10,30;16,15,19;25,13,33]	[17,3,17;13,0,6;22,3,9]	[2,7,13;3,15,13;3,10,24]
APPLE	[6,5,38;9,1,24;13,11,73]	[4,0,19;4,0,10;8,2,43]	[2,5,19;5,1,14;5,9,30]
AT&T	[8,21,18;15,20,30;13,28,27]	[3,8,11;5,8,16;11,12,16]	[5,13,7;10,12,14;2,16,11]
BANK OF AMERICA	[19,8,40;7,13,15;32,10,36]	[15,6,20;2,12,4;11,8,12]	[4,2,20;5,1,11;21,2,24]
BOEING	[18,11,26;8,4,28;17,9,59]	[13,5,13;4,0,15;10,4,26]	[5,6,13;4,4,13;7,5,33]
BRISTOL MYERS SQUIBB	[8,10,34;12,17,21;19,20,39]	[7,3,13;6,9,14;10,8,20]	[1,7,21;6,8,7;9,12,19]
CHEVRON	[7,14,34;10,15,25;12,26,37]	[4,6,16;4,10,9;3,15,23]	[3,8,18;6,5,16;9,11,14]
CISCO SYSTEMS	[21,10,29;12,8,26;17,16,41]	[17,1,17;5,1,12;13,2,22]	[4,9,12;7,7,14;4,14,19]
CITIGROUP	[28,11,21;13,11,27;24,16,29]	[19,5,14;8,5,11;15,8,5]	[9,6,7;5,6,16;9,8,24]
COCA COLA	[5,22,17;6,33,30;11,34,22]	[4,14,7;3,15,12;7,20,8]	[1,8,10;3,18,18;4,14,14]
COMCAST A	[17,6,31;10,1,28;23,10,54]	[17,4,12;7,1,8;15,3,23]	[0,2,19;3,0,20;8,7,31]
COSTCO WHOLESALE	[1,13,31;9,17,28;10,26,45]	[1,7,17;4,10,13;8,14,16]	[0,6,14;5,7,15;2,12,29]
DANAHER	[11,9,21;9,16,34;14,29,37]	[8,3,11;4,10,17;6,20,11]	[3,6,10;5,6,17;8,9,26]
ELI LILLY	[24,14,16;24,10,24;24,19,25]	[22,6,5;19,6,3;15,9,5]	[2,8,11;5,4,21;9,10,20]
EXXON MOBIL	[11,16,25;7,30,27;8,27,29]	[5,7,14;3,9,17;3,12,20]	[6,9,11;4,21,10;5,15,9]
GENERAL ELECTRIC	[18,25,24;18,12,25;23,16,19]	[8,12,15;7,2,16;12,9,9]	[10,13,9;11,10,9;11,7,10]
HOME DEPOT	[21,10,24;11,10,27;19,15,43]	[21,2,15;11,1,5;14,4,17]	[0,8,9;0,9,22;5,11,26]
HONEYWELL INTL.	[14,11,20;10,9,34;15,18,49]	[12,5,11;6,1,14;12,6,23]	[2,6,9;4,8,20;3,12,26]
INTEL	[19,5,36;14,2,19;35,5,45]	[14,0,20;8,0,6;18,0,24]	[5,5,16;6,2,13;17,5,21]
INTERN. BUS.MCHS.	[6,22,18;14,28,23;13,36,20]	[3,8,7;7,13,15;8,22,7]	[3,14,11;7,15,8;5,14,13]
JOHNSON & JOHNSON	[5,17,17;11,27,35;4,31,33]	[3,8,12;8,18,11;3,13,14]	[2,9,5;3,9,24;1,18,19]
JP MORGAN CHASE & CO.	[7,8,39;12,4,27;20,10,53]	[7,7,19;9,2,10;14,6,16]	[0,1,20;3,2,17;6,4,37]
LINDE	[9,8,27;7,23,28;17,21,40]	[3,3,17;2,9,14;9,7,26]	[6,5,10;5,14,14;8,14,14]
LOCKHEED MARTIN	[4,12,22;4,16,41;5,28,48]	[4,6,14;4,5,18;5,10,24]	[0,6,8;0,11,23;0,18,24]
MCDONALDS	[5,7,24;3,25,40;8,27,41]	[4,0,15;2,6,21;8,8,26]	[1,7,9;1,19,19;0,19,15]
MEDTRONIC	[12,14,31;14,8,25;28,7,41]	[9,12,12;7,2,11;15,5,17]	[3,2,19;7,6,14;13,2,24]
MERCK & COMPANY	[16,15,22;13,7,33;24,15,35]	[14,7,10;11,3,9;19,5,12]	[2,8,12;2,4,24;5,10,23]
MICROSOFT	[16,9,26;6,4,33;28,10,48]	[11,4,19;2,0,13;21,1,19]	[5,5,7;4,4,20;7,9,29]
NEXTERA ENERGY	[8,12,16;6,22,32;9,31,44]	[5,7,7;2,15,13;6,19,16]	[3,5,9;4,7,19;3,12,28]
NIKE B	[8,10,31;6,11,32;12,14,56]	[6,6,16;2,4,17;5,6,28]	[2,4,15;4,7,15;7,8,28]
NVIDIA	[18,1,39;14,1,9;35,4,59]	[13,1,20;7,0,3;16,1,29]	[5,0,19;7,1,6;19,3,30]
ORACLE	[15,5,37;9,13,21;34,8,38]	[11,1,20;2,1,11;27,0,17]	[4,4,17;7,12,10;7,8,21]
PEPSICO	[4,22,12;6,38,30;6,35,27]	[3,9,9;4,14,15;5,17,14]	[1,13,3;2,24,15;1,18,13]
PFIZER	[24,13,24;17,7,25;27,12,31]	[19,6,9;9,1,8;21,3,14]	[5,7,15;8,6,17;6,9,17]
PROCTER & GAMBLE	[5,23,18;12,21,35;13,30,23]	[1,14,9;7,12,18;3,16,10]	[4,9,9;5,9,17;10,14,13]
STARBUCKS	[18,4,36;5,7,27;23,7,53]	[13,0,22;2,1,14;14,2,22]	[5,4,14;3,6,13;9,5,31]
TEXAS INSTRUMENTS	[24,5,31;11,3,21;27,5,53]	[18,1,19;6,0,6;15,0,25]	[6,4,12;5,3,15;12,5,28]
THERMO FISHER SCIEN.	[9,6,34;9,6,27;17,8,64]	[7,3,17;4,4,14;11,5,25]	[2,3,17;5,2,13;6,3,39]
UNION PACIFIC	[7,12,26;9,6,29;21,10,60]	[6,8,13;6,3,10;17,2,25]	[1,4,13;3,3,19;4,8,35]
UNITED TECHNOLOGIES	[12,13,24;7,16,31;15,19,43]	[4,9,11;2,12,15;5,11,21]	[8,4,13;5,4,16;10,8,22]
UNITEDHEALTH GROUP	[8,8,33;6,4,30;14,9,68]	[8,4,18;4,1,11;10,3,31]	[0,4,15;2,3,19;4,6,37]
VERIZON COMMUNIC.	[17,20,16;19,24,20;16,28,20]	[11,7,9;12,9,10;9,11,12]	[6,13,7;7,15,10;7,17,8]
WALMART	[14,25,16;22,20,19;22,24,18]	[10,13,5;14,10,7;9,15,7]	[4,12,11;8,10,12;13,9,11]
WALT DISNEY	[9,19,19;7,19,33;13,19,42]	[9,10,9;5,7,11;10,6,23]	[0,9,10;2,12,22;3,13,19]
WELLS FARGO & CO	[11,20,25;10,13,28;20,17,36]	[9,12,11;8,8,9;13,6,14]	[2,8,14;2,5,19;7,11,22]

Source: own preparation.

The summary results of the adopted synthetic forecast quality measure are presented in Table 3. In most cases, correlation values are statistically significant but too low to achieve satisfactory strategy results from a financial point of view. What is worth emphasizing, the compliance values of forecasts are lower in the second analyzed sub-period. The column "sign" presents the information if the MCC measure was higher for the first subperiod. The last column presents the p-value for testing the hypothesis that the MCC measure was higher for the first subperiods. It might be interpreted accordingly – the market efficiency was lower in the first subperiod, and the forecast tools worked better.

The empirical proof of the increasing market efficiency confirmed the intuitive assumptions delivered by the authors.

Table 3: Matthews correlation results

Company	MCC (1:180)	MCC (1:90)	MCC (91:90)	MCC(1:90)- -MCC(91:180)	sign	p-value
3M	0.07485	0.12718	-0.00256	0.12974	1	0.12224
ABBOTT LABORATORIES	-0.08592	-0.14282	-0.03194	-0.11088	0	0.85800
ADOBE (NAS)	0.00890	0.01105	0.00085	0.01020	1	0.46216
AMAZON.COM	-0.06538	-0.04960	-0.11803	0.06844	1	0.27808
AMERICAN EXPRESS	-0.12707	-0.22664	-0.02965	-0.19699	0	0.97952
AMGEN	0.03800	-0.16531	0.13760	-0.30291	0	0.99668
APPLE	-0.04042	0.00517	-0.09463	0.09980	1	0.16188
AT&T	-0.06549	-0.09209	-0.05919	-0.03291	0	0.61980
BANK OF AMERICA	0.00847	0.14853	-0.18578	0.33432	1	**0.00264**
BOEING	0.08775	0.07186	0.09312	-0.02125	0	0.57276
BRISTOL MYERS SQUIBB	-0.00929	0.06736	-0.07728	0.14464	1	**0.08788**
CHEVRON	-0.04565	0.07322	-0.16025	0.23347	1	**0.01384**
CISCO SYSTEMS	0.04580	0.08856	-0.03507	0.12363	1	0.13328
CITIGROUP	0.05157	-0.04958	0.10566	-0.15524	0	0.92224
COCA COLA	-0.04614	-0.06629	-0.01746	-0.04883	0	0.67460
COMCAST A	-0.01263	0.10523	-0.22388	0.32910	1	**0.00108**
COSTCO WHOLESALE	-0.05190	-0.09462	-0.01513	-0.07949	0	0.78284
DANAHER	-0.02064	-0.04822	-0.00434	-0.04389	0	0.65396
ELI LILLY	-0.00854	0.03242	-0.13851	0.17093	1	**0.05216**
EXXON MOBIL	0.06740	0.03568	0.07864	-0.04297	0	0.64928
GENERAL ELECTRIC	-0.09263	-0.19072	-0.00148	-0.18924	0	0.97072
HOME DEPOT	0.07818	0.07182	-0.04345	0.11527	1	0.15032
HONEYWELL INTL.	0.03761	0.03623	0.00000	0.03623	1	0.37296
INTEL	-0.05913	-0.00896	-0.12455	0.11559	1	0.15220
INTERNATIONAL BUS.MCHS.	-0.07701	-0.16206	0.01078	-0.17285	0	0.95288
JOHNSON & JOHNSON	-0.01673	0.05334	-0.10810	0.16144	1	**0.07432**
JP MORGAN CHASE & CO.	-0.07678	-0.13211	-0.08837	-0.04374	0	0.67268
LINDE	0.05334	0.04855	0.03893	0.00961	1	0.46332
LOCKHEED MARTIN	-0.03550	-0.01941	-0.07990	0.06049	1	0.30060
MCDONALDS	0.01109	-0.00808	-0.02169	0.01361	1	0.45720
MEDTRONIC	-0.04128	-0.06968	-0.01589	-0.05378	0	0.69696
MERCK & COMPANY	-0.04781	-0.04180	-0.10599	0.06419	1	0.27068
MICROSOFT	-0.02610	-0.13336	0.02648	-0.15984	0	0.92696
NEXTERA ENERGY	0.04363	0.05678	0.02619	0.03059	1	0.39816
NIKE B	0.04077	0.06772	0.01485	0.05287	1	0.31224
NVIDIA	-0.02705	0.03272	-0.09648	0.12921	1	0.14156
ORACLE	-0.01120	-0.17792	0.08920	-0.26712	0	0.98804
PEPSICO	0.00460	-0.02947	0.02295	-0.05243	0	0.67720
PFIZER	-0.00748	0.00735	-0.04753	0.05487	1	0.30420
PROCTER & GAMBLE	-0.12557	-0.16179	-0.09790	-0.06388	0	0.73520
STARBUCKS	0.05648	-0.00671	0.09712	-0.10384	0	0.80780
TEXAS INSTRUMENTS	0.06916	0.08401	0.01546	0.06855	1	0.27196
THERMO FISHER SCIENTIFIC	0.03078	0.01810	0.02867	-0.01057	0	0.54284
UNION PACIFIC	-0.01198	-0.01664	-0.03899	0.02235	1	0.41632
UNITED TECHNOLOGIES	0.04826	0.07945	0.00905	0.07041	1	0.26188
UNITEDHEALTH GROUP	0.01590	0.03866	-0.04335	0.08201	1	0.22856
VERIZON COMMUNICATIONS	0.00485	0.03472	-0.02879	0.06351	1	0.27500
WALMART	-0.06652	-0.04925	-0.08883	0.03957	1	0.34848
WALT DISNEY	0.04514	0.12141	-0.06615	0.18756	1	**0.04384**
WELLS FARGO & CO	-0.02609	0.01081	-0.09972	0.11053	1	0.14072

Source: own preparation.

In 30 out of 50 cases, a higher MCC was obtained in the first sub-period. Still, the analysis with the bootstrap techniques leads to the conclusion that the difference was statistically significant at the level of 10% in only seven cases. It allows deductions to be made that throughout the period under the analysis, no lack of information efficiency of the market to achieve satisfactory financial results was detected while employing a given strategy. Additionally, according to the current research, there is an increase in the efficiency of financial markets (Troiano, L., Bhandari, A., Villa E. (2020).

Conclusion

The values of the MCC correlation obtained by the authors (close to zero) indicate low compliance of forecasts with the actual changes in share prices. The proposed strategy with the use of the analyzed data set does not lead to satisfactory financial results. Thus, there are no grounds to reject the hypothesis that the market is efficient.

The results are in line with the authors' expectations that the markets, in particular, the American market, are information efficient, and the level of efficiency increases over time. The empirical proof of the increasing efficiency of markets confirmed the intuitive assumptions of the authors. The use of sophisticated machine learning algorithms and a broad set of input data does not guarantee satisfactory results of investment strategies. It does not preclude the need to construct and verify subsequent innovation strategies based on other data sets and algorithms (Troiano, L., Bhandari, A., Villa E. (2020)), particularly, for data with a different (higher) frequency which will be an area of the authors' further analysis.

Appendix

Table 1A: List of the chosen companies

Apple	AT&T	Wells Fargo & Co	Nvidia	Honeywell
Microsoft	Unitedhealth Group	Comcast	International Bus Mach	Texas Instruments
Amazon.com	Coca Cola	Pepsico	Bristol Myers Squibb	Union Pacific
Jp Morgan Chase & Co.	Walt Disney	Boeing	Amgen	Linde
Johnson & Johnson	Home Depot	Citigroup	Costco Wholesale	Lockheed Martin
Walmart	Verizon Communications	Oracle	Eli Lilly	American Express
Bank Of America	Pfizer	Adobe	Nike	Danaher
Procter & Gamble	Merck & Company	McDonald's	United Technologies	General Electric
Intel	Chevron	Abbott Laboratories	Nextera Energy	3M
Exxon Mobil	Cisco Systems	Medtronic	Thermo Fisher Scientific	Starbucks

Table 2A: List of input variables

Commodities and other	Economics
GBP TWI	Brazilian CPI
USD TWI	China CONSUMER CONFIDENCE INDEX
EUR TWI	CHINA CPI
Gold	China CPI YoY
Oil	China Exports
Copper	China Imports
Palladium	CHINA INDUSTRIAL PRODUCTION INDEX
Baltic Exchange Dry Index	CHINA RETAIL SALES
Aluminum	EM HICP - ALL ITEMS
Platinum	EU OECD CLI

Nickel	Eurozone CONSUMER CONFIDENCE INDICATOR
Wheat	Eurozone INDUSTRIAL CONFIDENCE INDICATOR
Lead	Eurozone INDUSTRIAL PRODUCTION EX CONSTRUCTION
Silver	Eurozone Unemployment Rate
Sugar	G7 OECD CLI
Soybeans	German CPI
Cotton	German Industry Production
Nickel 3m	German OECD CLI
Bond real yield	Japan CPI
US 10y bond yield	Japan INDUSTRIAL PRODUCTION
German 10y bond yield	UK BANK OF ENGLAND BASE RATE
UK 10y bond yield	UK CONSUMER CONFIDENCE INDICATOR
Japan 10y bond yield	UK CPI INDEX All Items
Italy 10y bond yield	UK CPI YoY
US 3m bond yield	US AHETPI
US 2y bond yield	US CAPACITY UTILIZATION RATE
French 10y bond yield	US CONSUMER CONFIDENCE INDEX
German 3y bond yield	US CPI - ALL URBAN
Spain 10y bond yield	US DOW JONES INDUSTRIALS SHARE PRICE INDEX
US 30y bond yield	US FEDERAL FUNDS TARGET RATE
German 2y bond yield	US INDUSTRIAL PRODUCTION
Euro 10y bond yield	US INDUSTRIAL PRODUCTION - MANUFACTURING
Greece 10y bond yield	US ISM PMI
Portugal 10y bond yield	US MONETARY BASE
UK 3y bond yield	US MONEY SUPPLY M2 CURA
US 1y bond yield	US NEW PRIVATE HOUSING UNITS STARTED
US 5y bond yield	US Nonfarm Payroll Employment
German 5y bond yield	US OECD CLI
Canadian 10y bond yield	US PCE LESS FOOD & ENERGY
Austrian 10y bond yield	US PERSONAL CONSUMPTION EXPENDITURE
Belgian 10y bond yield	US PERSONAL CONSUMPTION EXPENDITURES
Finland 10y bond yield	US THE CONFERENCE BOARD LEADING ECONOMIC INDICATORS INDEX
South African 10y bond yield	US TREASURY BILL RATE - 3 MONTH
Sweden 10y bond yield	US UNEMPLOYMENT - INITIAL CLAIMS
US 3y bond yield	US UNEMPLOYMENT RATE
French 3m bond yield	**FX**
German 1y bond yield	US $ TO EURO
Indian 10y bond yield	UK £ TO EURO
Irish 10y bond yield	JAPANESE YEN TO EURO
Japan 3m bond yield	SWISS FRANC TO EURO
Netherlands 10y bond yield	SWEDISH KRONA TO EURO
Polish 10y bond yield	NORWEGIAN KRONE TO EURO
French 5y bond yield	CHINESE YUAN TO EURO
German 30y bond yield	CANADIAN $ TO EURO
Swiss 10y bond yield	BRAZILIAN REAL TO EURO
US 6m bond yield	DANISH KRONE TO EURO
Equities & other indices	POLISH ZLOTY TO EURO
S&P 500	AUSTRALIAN $ TO EURO
MSCI World	CZECH KORUNA TO EURO
FTSE 100	HONG KONG $ EURO
DAX 30 Price Index	HUNGARIAN FORINT TO EURO
Stoxx 600	RUSSIAN ROUBLE TO EURO
Euro Stoxx 50	SINGAPORE $ TO EURO
Hang Seng	SOUTH AFRICA RAND EURO
SHANGHAI SE A SHARE	NEW TURKISH LIRA EURO
Topix	SOUTH KOREAN WON EURO
MSCI EM	ARGENTINE PESO TO EURO
CAC 40	INDIAN RUPEE TO EURO
FTSE All-Share	MEXICAN PESO TO EURO
Korea SE Kospi	THAI BAHT TO EURO

MSCI AC World	ISRAELI SHEKEL TO EURO
S&P/ASX 200	COLOMBIAN PESO TO EURO
FTSE 250	MALAYSIAN RINGGIT TO EURO
FTSE MIB	NEW ROMANIAN LEU TO EURO
S&P/TSX	TAIWAN NEW $ TO EURO
Euro Stoxx	INDONESIAN RUPIAH TO EURO
Swiss SMI	NEW ZEALAND $ TO EURO
MSCI Europe	PERUVIAN SOL TO EURO
Ibex 35	CHILEAN PESO TO EURO
AEX index	CROATIAN KUNA TO EURO
BEL 20	ICELANDIC KRONA TO EURO
OMX 30	QATARI RIAL TO EURO
S&P 500 Value	SAUDI RIYAL TO EURO
Straits Times Index	UKRAINE HRYVNIA TO EURO
TAIWAN SE WEIGHED TAIEX	ALBANIAN LEK TO EURO
SET index Bangkok	ALGERIAN DINAR TO EURO
Hang Seng China Enterprises	GBP TO USD
IDX	JAPANESE YEN TO USD
OMX Helsinki	CHINESE YUAN TO USD
ATX - AUSTRIAN TRADED INDEX	SOUTH AFRICA RAND TO USD
MDAX Frankfurt	CANADIAN $ TO USD
OMX Copenhagen	BRAZILIAN REAL TO USD
S&P 500 Growth	SOUTH KOREAN WON TO USD
SHENZHEN SE B Share	INDIAN RUPEE TO USD
SBF 120	MEXICAN PESO TO USD
STOXX EUROPE 50	RUSSIAN ROUBLE TO USD
AEX All Share	SWISS FRANC TO USD
Euronext 100	AUSTRALIAN $ TO USD
OSLO EXCHANGE ALL SHARE	INDONESIAN RUPIAH TO USD
BUDAPEST (BUX)	SWEDISH KRONA TO USD
ROMANIA BET	EUR TO USD
S&P/ASX 300	TAIWAN NEW $ TO USD
Next 150	THAI BAHT TO USD
MSCI EAFE	CHF TO USD
MSCI PACIFIC	HONG KONG $ TO USD
NIKKEI 225	NEW TURKISH LIRA TO USD
DOW JONES INDUSTRIALS	NORWEGIAN KRONE TO USD
NASDAQ 100	PHILIPPINE PESO TO USD
BRAZIL BOVESPA	
NASDAQ	
FTSE/JSE ALL SHARE	
RUSSELL 2000	
FTSE ALL WORLD	
FTSE BURSA MALAYSIA KLCI	
MOEX RUSSIA INDEX	
WIG	
IBOXX EURO CORPORATES	
IBOXX EURO EUROZONE	
IBOXX £ CORPORATES	

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Perfect Information - The Right Information, In the Right Place at The Right Time. Management of The Production Maintenance with Augmented Reality Tools - Research Study

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Abstract

Digitalization of production environment, also called Industry 4.0, the term invented by Prof. Wahlster in Germany, is now one of the hottest topics in the software/hardware engineering departments at universities and companies. It splits to many subtopics and technologies. One of the most interesting concerns Augmented Reality glasses – giving a very natural human-machine interface – possibility to present the needed information right in front of user's eyes and ability to communicate with the system by simple gestures and voice. To show the long-lasting need of convenient presentation of information, authors show different examples in different markets, but then, concentrate on one example around the production maintenance team. The point of this paper is the AR system usability evaluation – as noted by scientists around the world note, in-depth studies about the effects of AR applications are sparse. In the first part of this paper, authors recall the concept presented in 2018 about the new method of monitoring the production line with the AR glasses. In the second part, there is a description of conducted study for this concept, carried out in the real production environment on the real production process. Finally, authors deliberate about conclusions, technology imperfections, limitations and future development.

Keywords: Augmented Reality, industry, maintenance, AR glasses.

Introduction

From the research conducted by Digital Technology Poland and University of Zielona Gora team comes, that convenient presentation of the right information in the right place is now one of the biggest problems is many areas of our (information overloaded) lives. We often have the right information, but advanced optimization that is observed nowadays, requires to match it with other factors – like eg. the right place. Additionally, preferably, searched and displayed automatically.

In the researched health and beauty retailer and pharmacy chain the staff knows that the certain product gets low on the store's shelf, but where exactly is this shelf? In the researched food market chain, the staff have the list of products with the expired date. But the same problem – where are these products? How to quickly track the expired sausage, when there are 40 different ones one next to another. And there are 40 other product on the expired date list… Additionally, products rotate around the whole shop, cased by the strategy of the marketing department, to make people walk around the whole shop. This however make the life of the staff much harder when talking about normal, everyday duties. In the researched shoe and sportswear retail chain, one of the biggest problems is warehouse conveyor stops. The right information is written on the control cabinet, so the worker must go to this location,

read the information and go to the right place to fix the issue with the conveyor. This takes too much time. Could be reduced when matching the known, right information, with the right place.

Many more examples were observed and identified, and the result was that products were not refilled on time and part of the shelf was empty, although these products were at the shop warehouse. Or, the products with the expired date are not collected on time and the customers are able to buy them (if not perceptive enough, which is in most cases).

The same problem touches the production environment. Especially the traffic management and maintenance team, which is one of the most important, since it fights for smooth production without stops and downtimes. Where exactly is the machine, that is reported with the predictive maintenance system as the problematic one that could stop shortly? In such cases, the reaction time is crucial. Will the staff fix the problem on time or will the machine stop and make the whole production line stop, causing delays and painful losses.

In the above mention examples, one can see that each business has its own requirements. The better business, the more procedures and more sophisticated system of work. The more optimization, the better profits. However, there is a performance line which cannot be exceeded without extra help. The answer could be hiring more people, but this may mean that the whole profit from the optimization is used, or even surpassed by the extra worker. The staff work optimization is often state of the art now, so there is not much room for improvements. The only answer nowadays in technology.

Perfect Information

What means perfect information? Is it the information itself? From the mentioned examples we can conclude that the right information is not enough. The perfect information is needed. This means the right information + the right place + the right time. Preferably automatically shown. Staff provided with such perfect information is able to perform much better than today. Not only faster performance is the advantage. The perfect information makes the work easier and less annoying. The worker is actually more happy and relaxed, with better performance in the same time. Up till now, new, additional duties were causing more stress, so the perfect information seems to be a winner for everybody – the boss and the worker. A comparison to the navigation system comes to mind. Remember going to an unknown, big city with a paper map? How better is going to the certain location with the navi? How better than the regular, hard coded navi is the newest navi that shows the actual, real-time traffic, and is choosing the fastest route for the user? This is exactly the evolvement of the information towards the perfect information, that serves the best, gives the best performance and makes users actually more relaxed.

The following sections describe Augmented Reality (AR) technology as a tool that provides the user with the right information in the right place at the right time. The concept solution was widely described in 2018, together with a broad description of Augmented Reality technology by Szajna et al. (2018). The presented in this paper research is a form of continuation of the above mentioned one, enriched with the study of comparison and results of carrying out the production line inspection by the maintenance team with and without the AR glasses, giving clear usability evaluation for this specific application. As noted by scientists from the University of Oxford and Graz University of Technology presented by Vorraber et al. (2019)., in-depth studies about the effects of AR applications on key performance process indicators are sparse.

Providing the traffic maintenance team with the perfect information through Augmented Reality glasses – 2018 concept overview

Monitoring a production line is a daily and necessary task in every factory. In modern, “Industry 4.0” factories described by Gorecky et al. (2014), this is done with the use of advanced systems for automatic monitoring and warning, and more and more often, also intelligent response. Usually, however, daily inspection is performed by a human being - a qualified factory worker. In this case, it is necessary to provide him/her with IT systems providing the best possible support, perfect information with

transparent human/machine interfaces. Tablet devices are a great improvement for the employee performing the review, however they are still sub-optimal and cumbersome.

One of the most interesting and flexible for the user options of the natural human-machine interface are Augmented Reality projection glasses - in simplified terms, two miniaturized projectors mounted over each glass in a casing thus allowing them to be worn in front of the eyes in a manner analogous to traditional, eyeglasses or sunglasses as Cakmakci at al. (2006) notes.

The Augmented Reality technology is known from 1960's when firstly introduced in military segment as Helmet-Mounted Display described by Haller et al. (2006) and from 1990's when firstly named "Augmented Reality" by scientists working for Boeing on the system supporting identification of the beams and individual electric wires in the aircraft they were constructing recalled by Reifur (2010). The AR revolution, that spreads and is strongly seen in the last 3 years, when new glasses were introduced by world's biggest companies, opened new flexible and natural possibilities of the human-machine communication and interaction. The leading industry companies show increasing research in this topic with real life applications that can be observed during the biggest trade fairs, like CES or Hannover Messe.

Digital Technology Poland, together with the University of Zielona Gora are researching the Augmented Reality possibilities for production purposes. Many places were visited in our region in Poland and in selected German factories, that cooperate with our scientific or business partners. Surprisingly, although we live in the XXI century, at many visited older production lines, even the right information is often the problem. Manual, handheld meters or sensors, like for measuring vibrations, is often the reality. Real-time measurements, analytics and predictive maintenance is on a wish list, with no real action plan behind. In a research study by Saniuk et al (2019), Sąsiadek et al (2018), Nowicki et al (2019), many factories are far from the Industry 4.0 concept. At the newest factories, this is not the case, but providing the right information in the right place for the traffic maintenance team is not really covered.

Here the Augmented Reality glasses seem to be the right answer to natural human-machine interaction need. Advanced DTPoland-UZ works show that AR with installed sensors, proprietary software and connection to the cloud provides a very useful and ergonomic tool for maintenance team. Issues of uninterrupted production process, proper functioning and effective diagnostics are now supported with intuitive and user friendly system. The pre-defined, step by step maintenance instructions, connected to the flexible virtual advisor, based on real-time data from sensors and meters that analyze the current situation of eg. machine behavior, enhanced with hints and alerts based on historic behavior, potentially allow a user to do the job faster (first research results are the topic of this paper and will be presented in the following chapters), when talking about regular maintenance procedures. Additionally, reports are created instantly, visible to managers in real-time. All the data is gathered in the cloud, processed and directed to obtain noticeable trends and future valuable hints. This helps to constantly improve the system and even better support the operator. Based on carried maintenance inspection, the operator can add new comments to the machine's maintenance history by clicking virtual buttons, writing text notes or dictating a note with voice. All the necessary data are displayed to the user in front of his/her eyes, while all the control, making of notes and writing of reports are done using simple gestures and speech. Solutions of this type allow the life-span of individual parts to be utilized to their fullest extent by optimizing their replacement dates and controlling their operating processes; this, then translates into measurable financial savings and impacts, ultimately, on the financial condition of an enterprise.

The structure and operating principles of a support system using Augmented Reality technology

The developed system consists of edge computing devices connected to each of the machines or group of machines, sensors and meters (including energy meters), cloud resources for different data tasks (inc. analytics) and preparation of visualization, AR glasses, proprietary DTPoland-UZ image processing and analysis software and, optionally, a keypad. In a research study by Schmalstieg et al.

(2002), the AR glasses, depending on the requirements of the system operator, may be exchanged with a tablet or improved by physical manipulators, to develop the most user friendly supported system.
The system works in real time. The needed information is displayed on virtual screens (dashboards) or as other virtual elements and 3D models in front of user's eyes, notes Dugelay et al. (2008). The right info is automatically pulled out from the Cloud by proprietary DTPoland-UZ software and shown in the right place – where the user is standing, based on recognition of special physical (or virtual) markers (Sun et al., 2011; Uchiyama and Marchand, 2012), placed right next to the inspected machine. The navigation may be additionally influenced by the operator with the help of virtual menu and buttons or voice commands. The operator may see the exact service instructions, step by step, if pre-defined, or get to desired documentation of checked equipment, to see eg. normal working or edge parameters. In case when the machine is equipped with additional sensors (eg. measuring vibrations), is connected to the network and gathers historical operational logs, the technician can go through it to look for potential internal or external issues and potential sources of problems. The system is very intuitive and user friendly.

An important element of the system is the proprietary algorithm for enriching the real image with virtual objects. The challenge was to create a real-time module for calculating the delta from its original position when the user moves, so that virtual objects are displayed in the right place. In this case, the fault location can be highlighted using the virtual arrow, and then it is important for the arrow to stand still in the right place when the user is moving.

The system with the most important elements is shown below (Fig 1).

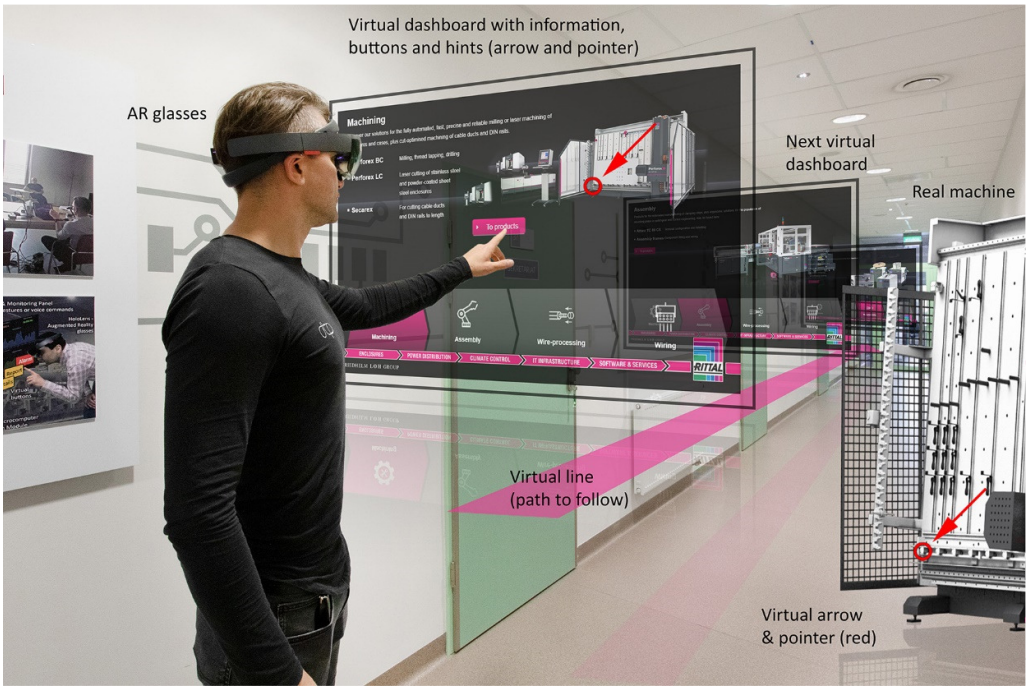

Fig. 1: Virtual objects, such as, displays, dashboards, buttons or suggested path to follow (symbolized with the pink line) and virtual arrows and pointers, embedded on the actual observed scene – a production line, with physical objects, eg. machines. Source: Own materials based on the DTPoland project.

The methodology also assumes application of the system in such areas as:

- repairs with the possibility of online video-call to the call center with qualified experts recommended by Baumann et al. (2016),

- support of assembly recommended by Wójcicki (2013) or conducting flexible, customized assembly recommended by Łunarski (2000),
- training of technical staff.

The use of an AR maintenance support system in the production line inspection process - case study

The authors state the following thesis: Automatic access to the right information, in the right place (3D space) at the right time, will shorten the time of performing activities at selected work stations. The subject of the conducted research are: information availability, information transfer method, time needed to perform selected activities, limitation of employee functionality. The research included the process of inspecting the production line by maintenance workers. Based on the definition by Apanowicz (2002), in the study, the authors used two leading research methods: experimental and statistical method. The results obtained so far have allowed to formulate the first research hypotheses and conclusions, although the entire scope of research has not yet been fully done at the time of writing this paper.

The same process of inspection of the production line was compared with and without the AR support system - the time needed to perform the same work in a traditional way was compared to work with the proposed AR support system. As Levitt (2004) notes, the case presented only involved regular inspections (checking of measured values, alarms and data stored; no issues; no additional documentation was searched, etc.).

Current production line control procedures were analyzed for three technological solutions that differed in time of putting into use:
for an older production line:

- Approach the machine
- Take the first manual meter (eg. for vibrations) from the bag
- Measure the value
- Look for the right page on the notepad corresponding to this machine or look for the machine on the list on the tablet
- Note
- Take the second meter (eg. for temperature)
- Measure the value
- Note
- Repeat at the next machine

for a newer production line:

- Approach the machine
- See the values on the info screen of the machine (values are stored locally for the period of 7-90 days depending on measuring frequency)
- Look for the right page on the notepad corresponding to this machine or look for the machine on the list on the tablet
- Note (values at the machine are overwritten after 7-90 day period)
- Repeat at the next machine

for the newest production line:

- Approach the machine
- See the values on the info screen of the machine (values are stored in the cloud, but one must approach the machine to see it)
- Repeat at the next machine.

Inspection procedure with the new AR system:

- Look at the machine without approaching
- See the values measured in real time that are automatically stored in the cloud (without approaching)
- Repeat at the next machine

The course of the study is shown below in Figure 2. The left side shows the inspection method currently used, without the AR support system. The right side presents an inspection with the system. In the first case, the maintenance worker is forced to physically approach each machine M and conduct a test with a manual meter or, if available, read information values on a given screen of the machine. In the second case, the employee does not have to approach the machines. When you look at a given machine, the software automatically recognizes the machine you are looking at and displays the desired values in front of your eyes.

The current control procedures were examined in older and newest facilities, without and using the AR support system. The times of inspections carried out using the method currently used, without AR, were calculated according to formula:

$$T = t_1 + t_2 + t_3(x,y,z) \qquad \text{(formula 1)}$$

where:

T - measured inspection time by the method currently used; t_1 – time to walk; t_2 - time to obtain information; t_3 – time to perform the selected process measurements (x, y, z - process parameters, e.g. vibration, temperature, noise).

and using the AR support system according to formula:

$$T' = t_1' + t_2' + t_3'(x,y,z) \qquad \text{(formula 2)}$$

where:

T'- measured inspection time using the AR support system. Other parameters are analogous to those defined in accordance with formula 1.

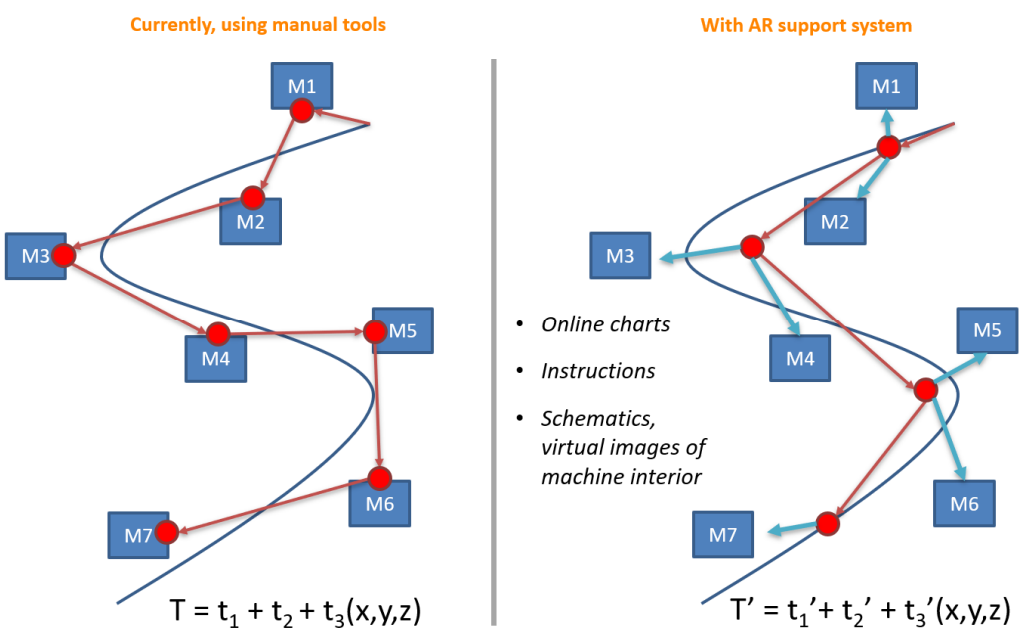

Fig. 2: The time study required to conduct the production line inspection process, between machines M, without and with the AR support system. Source: Own materials based on the DTPoland project.

Summary, conclusions, Directions of Total Practice

The right information is often available. However, to optimize the work, this information should be provided to the user in the most convenient way with the possibility of natural communication. Such possibility is given by Augmented Reality glasses. They display all the needed information right in front of the user's eyes and allow for gesture and voice communication. This creates a completely new, hands-free tool that supports the user with the perfect information – the right info in the right place at the right time. AR opens new way of working that can be significantly more efficient. Unfortunately, there are no ready glasses that can be used on a large scale in industry.

Based on the hypotheses and the first results obtained, preliminary conclusions were developed. Full results presented in the form of summary tables and further conclusions will be published and discussed when the entire scope of research will be finished.

Conclusion 1: it is possible to reduce the duration of specific inspection tasks by 10-30%. The first value applies to newest plants with machines equipped with sensors and status screens; time was saved mostly only on walking distance saved. The second, much higher value of 30% was observable in older plants, where the machines were not equipped with automatic measurement systems. Middle savings of around 20% were observed in plants where the machines were equipped with measuring systems, but the entire plant was not integrated into one network and one place aggregating data, so that the inspection employee was forced to physically approach the machine and search the needed information. In this case, he did not have to make manual measurements, but the time to obtain information saved on the machine screen was noticeable.

Conclusion 2: based on conclusion 1, the sensors installed (or not) on the machine give one factor of the optimization process, however, the way to pass the information and display it in the most convenient way is the other important factor. In other words, the information itself coming from the sensors is crucial but even when the sensors are available, the way to ergonomically (automatically) show the readings it is also very important.

Conclusion 3: Additional benefits from the use of the AR support system have been observed. Created reports are immediately visible in real time for managers of selected areas of production plant. All data is collected in the cloud, which allows you to easily view history. This feature, however, is not a differentiator in relation to other methods and market-available solutions.

Conclusion 4: AR technology makes users seem more relaxed, although thanks to time savings, they can be given more responsibilities at the same time. This is due to the automatic display of the desired information in the right place at the right time, and significant savings in searching and obtaining information. These observations require more research.

The quality of the support system is an important aspect. When creating proprietary software, great attention was put to the quality of information presentation on the glasses, so that it was legible and did not interfere with current human work activities. Stability and display quality has a significant impact on human feelings - prolonged use without a stabilizing module has allowed to observe eye fatigue and deterioration. The proprietary stabilization module eliminated negative feelings. However, visual feelings were not the goal of the study, so it is too early to draw final conclusions in this regard. It was an element noticed, but not very important. This is definitely an area for further research.

Among the tested AR: Meta, Epson and HoloLens glasses, the latter seem to be technologically most advanced and suitable for the proposed AR system due to the largest area of display of virtual image elements. After all, their design and technology does not yet meet industrial requirements. This is due to the delicate structure, weight, battery life, and still too small area of displaying virtual information compared to the area covered by the eyesight. It is planned to repeat the research on the latest HoloLens 2, which, according to manufacturer will have much better performance parameters. They should be available in the first half of 2020.

In the future, it is planned to replace markers (needed for AR glasses to recognize a particular machine) with advanced image recognition techniques that use the latest approach of artificial intelligence recommended by Hinton et al. (2006), Bengio et al. (2007), Le et al. (2012) i.e. deep neural networks currently under development by the research team. The second planned area of development of the AR support system, related to artificial intelligence, is advanced data analysis, thanks to which the virtual advisor will be even more effective and more flexible through the possibility of providing accurate guidance. Solutions of this type can allow maximum utilization of the life span of individual parts of the production line by optimizing their replacement dates and controlling operational processes; this approach translates into measurable financial savings and ultimately affects the financial situation of the enterprise.

Further research activities are planned to evaluate the AR support system in such areas as: repairs with the option of online video connection with a call center and qualified experts, assembly support or flexible, custom assembly, training of technical staff.

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The Possibility of Using Selected Diagnostic Signals of Machines in order to Increase the Stability of Manufacturing Processes

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Abstract

This article presents the possibility of applying a strategy for the construction of the diagnostic systems used, among other things, in order to increase the stability of the manufacturing processes. The experimental and statistical method was used for the research process. This means that the selection of the number of signals and the location of the measurement points responsible for the product's compliance with construction assumptions, was adopted on the basis of experience in the implementation of similar solutions in the past

Keywords: Diagnostic Systems, Manufacturing Process Stability, Hybrid Drives, SCADA, Machining Defects

Introduction

The term diagnostics comes from the Greek language, where *diagnosis* means recognising, distinguishing, judging and where *'diagnostike techne'* means the art of distinguishing and making a diagnosis, according in the interpretation Cempel (1898). In turn according Zółtowski (1996), technical diagnostics includes assessment of the technical condition of a disassembled machine by testing the properties of its working processes and testing the properties of machine products.

A common feature of diagnostic methods is the way information is obtained and processed. The process implemented by various methods comes down to:

- selecting a measurable physical quantity containing potential information about the state of the object;
- verification of the correlation between the selected quantity and events at which the condition of the object changes;
- processing signals to remove possible interference;
- the classification of signals;
- continuous monitoring of symptoms and the generating of diagnostic decisions.

The use of diagnostics in manufacturing processes, whose primary goal is to maintain continuity of production, applies to many technologies, starting with chemical processes and ending with machining technology which is still of significant use, in such as the automotive industry, where he conducted research Lipski (2013).

The Use of Diagnostic Signals to Maintain the Stability of the Manufacturing Process

Variability of production system parameters, caused by wear or random factors, may become a threat to the stability of manufacturing processes, as implemented. Loss of stability here is understood to mean exceeding the significant measurable parameters of acceptable limits. These limits are set by both the designer of the product manufactured by machining methods and the technologist. Lipski 2013 mentioned, that exceeding these limits causes an avalanche of unfavourable changes resulting in the production of deficiencies or a catastrophic event. Violation of the stability of machining processes can have significant effects on the economy and on the security of these processes. In this situation, the designer of manufacturing processes may adopt one of two strategies.

The first strategy is to significantly lower the process parameters used and increase the supervision of the machine operator. This means an increase in manufacturing costs due to reduced performance and the cancellation of the multi-user service, usually associated with the automated machining process. It is a strategy to reduce the risk of the instability of the cutting process, while assuming that human supervision over an automated process will be fast enough to eliminate catastrophic, random events, which unfortunately is not always possible.

The second strategy is the construction of diagnostic systems for manufacturing processes. If the overriding goal of the process is to produce a product having the features recorded in the construction documentation, with the help of production resources declared in technology, the efficiency of these resources can be continuously or discreetly confirmed by diagnostic systems. The correct implementation of diagnostic processes should significantly affect such production parameters as performance, costs and quality.

Information is collected from the diagnostic devices installed in selected places of the technological process and should be used to:

- permit the commencement or the continuation of the technological process at the diagnosed position;
- indicate the source of the malfunction of the position;
- indicate the reasons for not achieving the parameters of the product manufactured at the diagnosed position;
- predict future states of the diagnosed object.

The addressee of information on the basis of which actions may be taken to improve individual stages of the manufacturing process may be a human or an IT system. In the first case, the human *rôle* is to implement the procedures assigned to the results of the diagnosis. Legutko (2009) mentioned, that they must be formulated so that the man operating the machine easily identifies their content and method of implementation. Usually these are control lamps, codes or inscriptions on alpha-numeric displays. Such a system, called the ***Andon System***, can be found in Toyota factories around the world, Figure 1, previously published by Nawrocki (2019).

Figure 1: Table of the *Andon System* in Toyota factories in Poland Source: Own study based on [*Nawrocki 2019*]

The indication of the source of the malfunction makes it easier for the operator to detect the cause of the alarm and remove it. In order to use information from the diagnostic system to indicate the reasons for not achieving the set product parameters, the operator must confront two pieces of information, namely, the results of the measuring of given product features and the results of the diagnosis of the manufacturing system. In this case, specialist knowledge and experience are needed to draw conclusions. In the option of using diagnostic information, it is the human operator who undertakes the *rôles* both of regulator and executor of the control decisions made.

When diagnostic information is used by an IT system, this information complements other information related to automatic production control processes. Most automated technological processes take place in constant repetitive cycles. If the diagnostic system detects a collision or incorrect condition of the machine sub-assembly, it sends a signal to the machine control system with a request to interrupt the cycle. In most simple diagnostic systems, this ends their *rôle.* The control system should have built-in procedures for handling such an event, depending on the current state of the machine. These procedures may require additional diagnostic information to locate the cause, in order to check the possibilities for eliminating it. If the diagnosed reason is on the repair procedure list, then the control system attempts to execute the repair programme.

The correct or incorrect operation of some diagnostic systems may depend on the results of parameter control, which is significantly affected by the diagnosed machine, tool or instrumentation features. Cutting tools diagnostics can be a classic example of this relationship. In a research study by Akgerman and Frisch (1991)*, w*hen constructing diagnostic systems in this group, special attention is paid to the correlations between the selected signal measure, such as the values of the components of the cutting force and the measurable features of blade wear. However, in order to tune such a diagnostic system to make it useful, the practical relationship between the measured, diagnostic signal and the effects of the procedures carried out, in a given process, should be known. The tool, which, due to the state of the geometrical parameters (*estimated with the help of symptoms*), is recognised by the diagnostic system as sufficiently functional, can shape the incorrect roughness of some surfaces or exceed dimensional tolerance. This condition, without taking into account the support of additional diagnostic system information, generates a number of deficiencies. Since control systems-do not have the knowledge and experience of the operators, attempts are made to construct and apply expert systems. Such systems, after analysing the results of the implementation of technology and information on process parameters (*those set and those obtained from diagnostic systems)* are able to make correct decisions, controlling both the replacement of tools and undertaking corrective actions in order to stabilise the production process.

Corrective actions can also be taken at the level of the technological machine using the results of the periodic diagnosis of the differences in parameters from the nominal condition. An example of the above is the automatic introduction of the correction of control programmes based on the laser diagnosis of the geometry of the machine tool. Differences in temperature levels of various components of the machine tool may cause changes in its geometry, which may result in product faults. The measurement and compensation of deformations improve the stability of the parameters of the machined part. The space for the parameters, determining the condition of the product is very large, some of them are controllable while some can only be changed by replacing the entire instrument or tool. In addition, functional relationships between product parameters and process parameters are, to a large extent, non-linear. Therefore, according to Lipski (2013), any improvement in production parameters including diagnostic results, requires the use of learning systems.

This article presents the possibility of applying a strategy for the construction of the diagnostic systems used, among other things, in order to increase the stability of the manufacturing processes. The experimental and statistical method was used for the research process. This means that the selection of the number of signals and the location of the measurement points responsible for the product's compliance with construction assumptions, was adopted on the basis of experience in the implementation of similar solutions in the past; the correctness and accuracy of the solution, in terms of process, were verified using W.E. Deming's model, published by Deming (2012) and used by Woźniak (2017).

Case study - Signal Diagnostics in the Manufacturing Process of the e-CVT Hybrid Transmission

Research on the analysis and possibilities of using diagnostic signals to improve the stability of the manufacturing process are carried out at the Toyota factory in Poland, located in Lower Silesia. The main products of the factory are components for the passenger car drive system, such as:

- 1,0-litre, three-cylinder internal combustion engine;
- 5-speed and 6-speed manual gearbox;
- e-CVT 1.8 hybrid electric transmission (Continuously Variable Transmission), According to the operating principle presented by Korzeniowski (2020);
- hybrid engine on the TNGA platform (Toyota New Global Architecture) with a capacity of 2,0 L, according to the concept Toyota (2019-1).

Currently, along with the growing demand for hybrid vehicles (*cars with internal combustion and electric engines that can do their work at the same time or alternately, presented by Ockerblom (2015)),* an investment is underway that will allow the production of two new components:

- e-CVT 1,5 hybrid electric transmission;
- TNGA 1,5 L three-cylinder hybrid engine developed by Toyota (2019).

Considering the growing importance of alternative drives and the need to improve their production, in the first step the tests covered one of the production lines located in the area of the hybrid e-CVT 1.8 transmission. Aluminium housings for this gear are produced on this line. The e-CVT 1.8 transmission housing consists of two main components:

- electrical components housings;
- mechanical transmission housings, Figure 2.

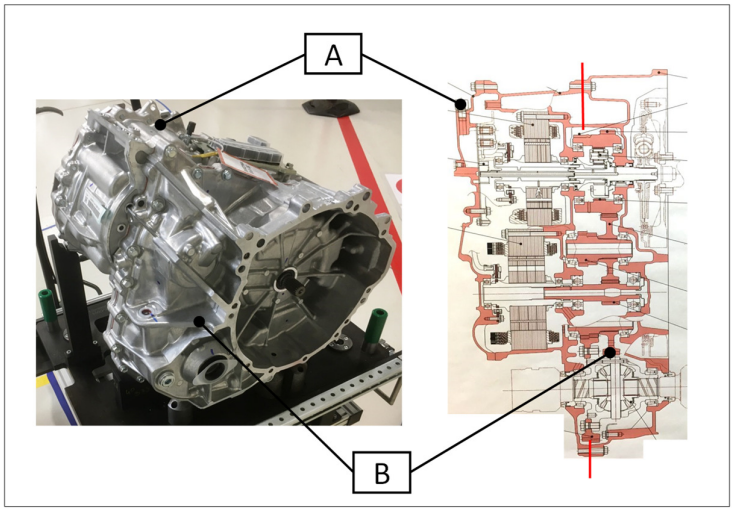

Figure 2: View of hybrid transmission construction: A - electrical components housing, B - mechanical transmission housing Source: Own work

The gearing is machined on four-axis, vertical CNC machining centres, manufactured by the Japanese company NTC Ltd. (*Nippei Toyama Corporation LTD.*), Figure 3.

Figure 3: Part of the processing line for e-CVT 1.8 transmission housings Source: Own work

In order to develop, diagnose and enable testing, the lines of the e-CVT 1.8 hybrid transmission housings are equipped with the proprietary SCADA diagnostic system (Supervisory Control and Data Acquisition), called TIS (Total Information System). The basic tasks of the system comprise:

- production management;
- collecting information on the current availability of the production line;
- reporting.

An additional functionality which is currently being studied and developed is the collection of diagnostic signals from numerical machine tools, such as:

- the position of the drive axes relative to the machine spindle;
- the temperature of the main components: propulsion engines, driving axles;
- the current loads on engines and driving axles;
- spindle vibration.

As a result of collecting and analysing the above signals, the TIS system becomes a tool, enabling the introduction of rules to improve the production process in terms of reducing interference thereto.

In order to select the appropriate diagnostic signals that can be correlated with occurring machining defects, an analysis was carried out of the percentage and quantitative share of deficiencies in the production of the e-CVT 1.8 transmission casing, Figure 4, Figure 5. The research covered the three-shift production period from February to November 2019.

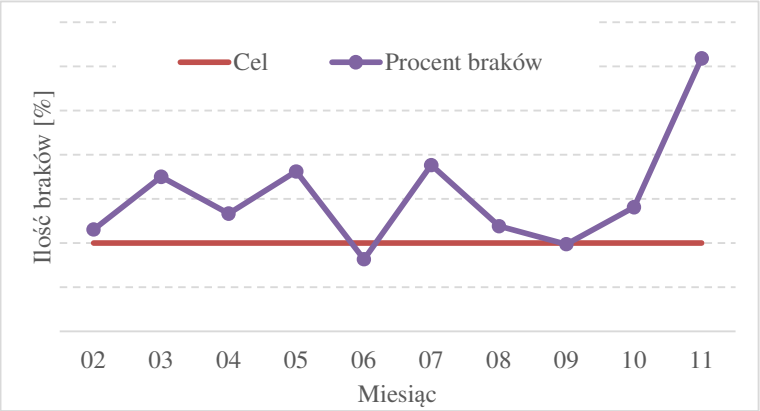

Figure 4: Quantitative share of deficiencies in the production of e-CVT 1.8 transmission housings Source: Own work

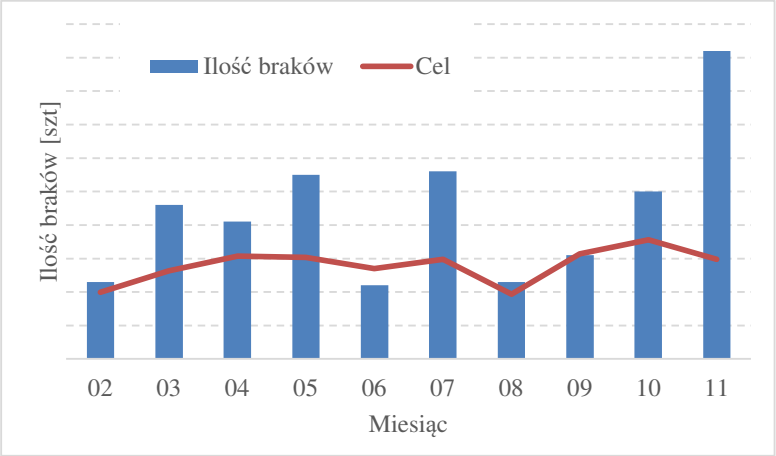

Figure 5: Quantitative share of deficiencies in the production of e-CVT 1.8 transmission housings Source: Own work

As can be seen, the assumed level of deficiencies set at X% was only achieved in June 2019. The remaining months showed the situation where the target was exceeded while showing an upward trend. In the next stage of the analysis, deficiencies resulting from errors occurring during the casting process were separated from deficiencies occurring in the machining process; these deficiencies included such as casing leaks due to porosity. In this case, the quantitative assessment of the defectiveness is shown in Figure 6. At the same time, the type of defect appearing is marked.

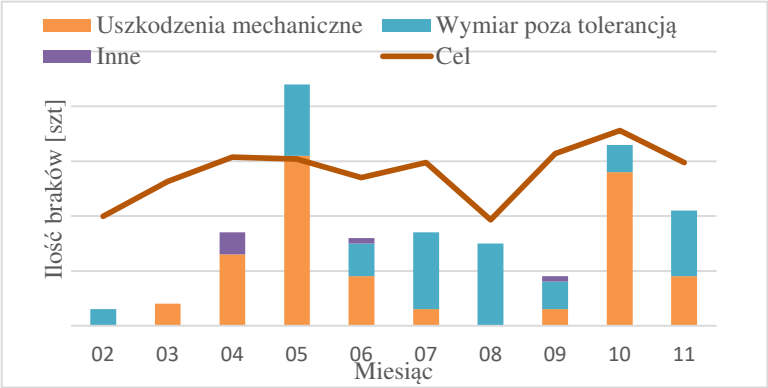

Figure 6: Deficiencies in the machining process of the e-CVT 1.8 transmission housings by type of defect Source: Own work

As can be seen in the chart, a significant number of deficiencies (approximately 40%) arises in the machining process, of which 55% is mechanical damage, such as broken threads, broken assembly holes, etc; they happen, among other things, as a result of fractures or by being chipped by cutting tools. One of the quality defects arising as a result of machining is the lack of the required

coaxiality of the diameters A and B (Figure 7) of the mounting holes for the rolling bearings of the drive shafts called MG1 and MG2 (Motor/Generator). The rollers connect the mechanical part to the electric gear. Shaft bearing holes must be made with a high precision of mutual axiality in order not to make the gearing dysfunctional.

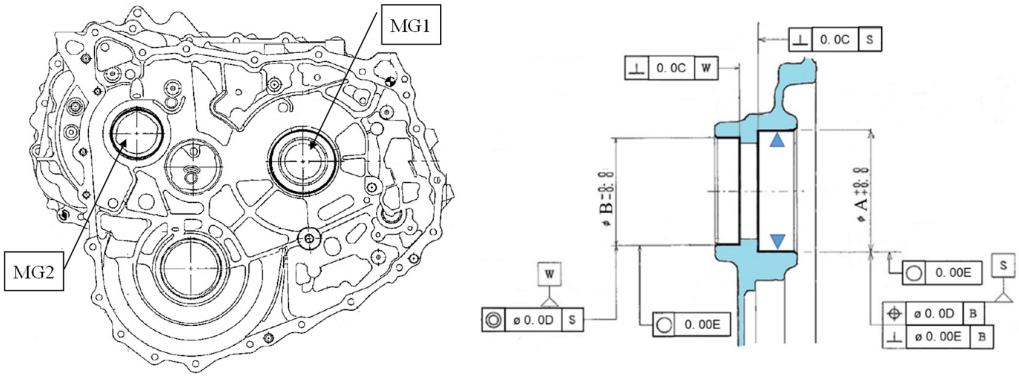

Figure 7: Schematic drawing showing the dimensional dependence of the diameters A and B of the MG1 and MG2 holes, and their location in the eCVT 1.8 transmission housing Source: Own work

An additional technological difficulty is the fact that the holes are made on two adjacent machine tools; moreover, diameter B is made after the gear housing turns some 180º. In order to avoid a potential quality error, a diagnostic system was used. The basis of the system is a diagnostic signal indicating the current location of the diameters A of the MG1 and MG2 holes relative to the set machine base point. The main tasks of the system are:

- to measure the position of the diameters A of the holes MG1 and MG2 made in the previous process, relative to the machine tool base point

- to send information with the measurement result for registration in the TIS system (Figure 8.)
- to correct the machining position of the diameters B (Figure 7) automatically, if the measurement of the position of the diameters A is within the range of +/- 0.04 mm relative to the machine base point
- to stop the process with the error display on the **Andon** array [*Nawrocki 2019*] in the case when the measurement of the diameter position A exceeds the limit of +/- 0.04 mm relative to the machine base point
- to register measurements of the position of the diameters A of the MG1 and MG2 boreholes to observe the pattern of deterioration quality in the manufacturing process (Figure 9).

Figure 8: Screenshot from the TIS system screen with the recorded result of the measuring of the position of the diameters A of the holes MG1 and MG2 Source: Own work

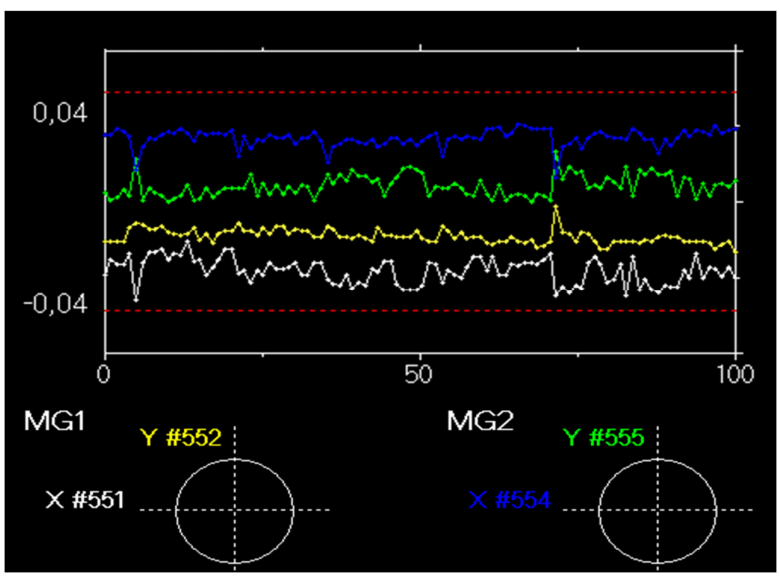

Figure 9: Trend in position measurements of the diameters A of MG1 and MG2 holes Source: Own work

The diagnostic system used has two recipients, depending on the value of the diagnostic signal. If the diagnostic signal does not exceed the warning threshold (+/- 0.04 mm), the addressee of the information is the machine tool control system, which automatically corrects the position of making the B diameters.

When the warning threshold has been exceeded, the addressee is the machine tool, which follows established procedures, in order to diagnose the occurrence of irregularities.

Summary

The article has shown that even the latest manufacturing processes used for production in the automotive industry are not free from interference, in the form of defective products, for example. There is still room for improvement and stabilisation. Currently the progress of automation in the computerisation of manufacturing processes creates a great opportunity to use selected diagnostic signals to improve the stability of these processes. Available signals include the temperature of machine components, spindle and bearing vibrations, current load and location of drive systems, etc. The example described shows how a diagnostic system, based on a selected signal, can independently control and correct the stability of the manufacturing process. It carries out its task by automatically checking and correcting the position of the holes made, or in extreme cases, by stopping the manufacturing process altogether, when it detects that the permissible dimensional deviation has been exceeded. By using an IT system (TIS), all data recorded by the diagnostic system is collected and analysed to further improve the manufacturing process. It is based on observing the trends of transmitted data and predicting the future potential behaviour of the process, which is to enable appropriate corrective measures to be taken before the process destabilises itself. Research into the correlation of selected diagnostic signals and disturbances, occurring in the production process to improve these processes, will be continued at Toyota factories in Poland.

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The Potential Harnessing of Globalization on the Example of The Trade War Between the United States and China

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Abstract

The global financial crisis of 2007-2009, which affected the most developed countries, revealed the negative consequences of globalisation. As a result of the crisis, discontent with the process began to grow and visions of stopping it appeared. The society's dissatisfaction was aroused, among others, by the relocation of production to developing countries, migrations that caused the loss of jobs for the middle class. These factors have resulted in the growth of international flows, which have benefited transnational corporations and the richest class. Examples of the retreat from globalisation are Brexit in the UK or the election of President Donald Trump in the United States and his protectionist actions. The aim of the article is to analyze theoretical knowledge about the trade war between the United States and China. The study uses an inductive approach. On the basis of the conducted observations, conclusions were drawn concerning the possibility of stopping the process of globalization and verification of the research hypothesis: the current stage of the globalization process is unstoppable, it can only be slowed down or modified.

Keywords: Trade War - Harnessing Globalisation - Delocalisation Of Production

Introduction

We can talk about the process of globalization from the very beginning of ancient civilizations, whose economic flows were based primarily on trade. Historical analysis of this process has made it possible to list three main stages of globalisation. The first one is related to geographical discoveries in the 14th century. The next phase is related to the industrial revolution in the 19th century. At the beginning of the 20th century, the process of globalisation was more advanced in some aspects than it is today. An example is the free passage of people. This process was stopped with the beginning of the First and then the Second World War. The consequence of these events was a bipolar world division: the Western world - capitalist and the Eastern socialist world. With the political slump in the block of states dependent on the Soviet Union in the 1980s, followed by the fall of the Iron Curtain, the current phase of globalisation has begun. We consider the turn of the 1980s and 1990s as its beginning.

In the literature exists a wide range of opportunities to defining globalisation, very often identified with internationalisation, westernisation or Americanisation depending on the dimension: economic, social or political (Scholte, 2005). For the analysis of the economic dimension, a definition that describes the globalisation as a process of acceleration, broadening and deepening of interconnections and interdependencies between regions, countries, corporations, companies or societies as a result of growing economic flows (trade, capital, investment, technology or labour) seems to be the most appropriate (Liberska, 2001). A number of definitions in the literature emphasize the increasing interdependence in the world economy (Kaldor, 1999), where the territory becomes irrelevant (Stiglitz, 2002).

The current stage of globalisation is much more intense than previous. As a result, more and more critics of this process have started to appear. They argued that globalisation is increasing inequality (Stiglitz, 2015). Over the past four decades, scientific interests have focused on the division of the world into developed countries known as the "wealthy North" and developing countries identified with the "poor South". These disparities in development have been presented as a negative effect of

the globalisation. Antiglobalists have argued that developing countries depend on developed economies. Transnational corporations from the "rich North" exploiting e.g. fuels, natural resources, and the established industrial plants maximise profits by not respecting labour rights or ecological norms and standards (Stiglitz, 2011).

Since the global financial crisis of 2007-2009 there have been shifts in the global economy. A group of emerging markets and the BRICS group (Brazil, Russia, India, China, South Africa) have emerged among developing countries. These countries are no longer economically dependent on the developed country, but rather are increasingly taking advantage of and indeed shaping the globalisation. This is reflected, for example, in the emergence of trade between developing countries (south-south trade), the implementation of the New Silk Road project, the establishment of the Asian Infrastructure Investment Bank or an increase in investment flows.

The benefits of globalisation are unequally distributed, not only between countries, but also within countries. In developed economies, globalisation has mainly benefited transnational corporations and the wealthiest class, while the middle class working in industry has lost. Migration also causes great social dissatisfaction with the loss of jobs. These changes have resulted in increased dissatisfaction with the process in developed countries. A sign of objection to globalisation is the election of President Trump in the United States and the exit of Great Britain from the European Union.

These issues are analysed in both national and English language literature. Considerations on the retreat from globalisation in the context of the global financial crisis 2007-2009 have been undertaken (A G van Bergeijk, 2018) and global challenges. A comprehensive view of the globalisation process and its possible containment includes, e.g. analysis of trade and investment flows and activities of transnational corporations (James, 2017). This problem is also widely discussed in the context of the global economy (Steenbergen, Siczek, 2017) in relation to individual countries such as China (Witt, 2019), the United States.

The aim of the paper is to discuss the problem of stopping globalisation on the example of the trade war between the United States and China. The following research questions have been posed for the purpose of this study:

1. What are the winners and losers of globalisation?
2. Why is the process of globalisation causing a growing discontent?
3. What are the dimensions of the trade war announced by President Trump?
3. Is it possible to stop the globalisation?

The research hypothesis, formulated on the basis of literature studies and research questions posed, is as follows: The current stage of globalization is impossible to stop, it can only be slowed down or adjusted.

Literature and theoretical background of research. General overview of globalization effect

At the turn of the 1980s and 1990s, developed countries (including the United States, Great Britain and other Western European countries) have began to enter the post-industrial stage. This was associated with the transition from manufacturing to services and high technologies. The consequence of these changes was the delocalisation of low-tech production, including footwear, clothing, textiles or toys, to developing countries with large resources of cheap, unskilled labour.

Using global resources, transnational corporations have also gradually increased the scale of global production. Thanks to new opportunities associated with the ICT revolution or the reduction of transport costs, they have completely eliminated warehousing by moving to a just-in-time production model. This involved creating a global supply chain, dividing the production of individual parts and components and then assembling them in countries that have comparative advantages (including cost or technology).

The greatest beneficiaries of globalization are transnational corporations, which have sought to increase the efficiency of their operations through relocation and fragmentation of production. The shifting of low-tech production to countries with large labour resources has made it possible to reduce labour costs. On the other hand, the creation of lean production based on the global supply chain has enabled final production with the lowest possible share of inventories, saving time and improving the quality of manufactured products (Łasak, 2013).

The consequence of these changes is ndustrialization and the integration of developing countries, in particular Asia with China, into global production and trade. Chart 1 shows the share of individual countries in global industrial output between 1990 and 2016. In 1990, developed countries of Europe and North America represented about 65% of global industrial output, while China and Asian developing countries contributed about 25%. In 2013, these disparities decreased as these developed economies decreased their share in global production to about 45%, while China increased its share to about 25%, and the other developing countries in Asia maintained a share of about 25% . China now accounts for about 28% of global industrial output.

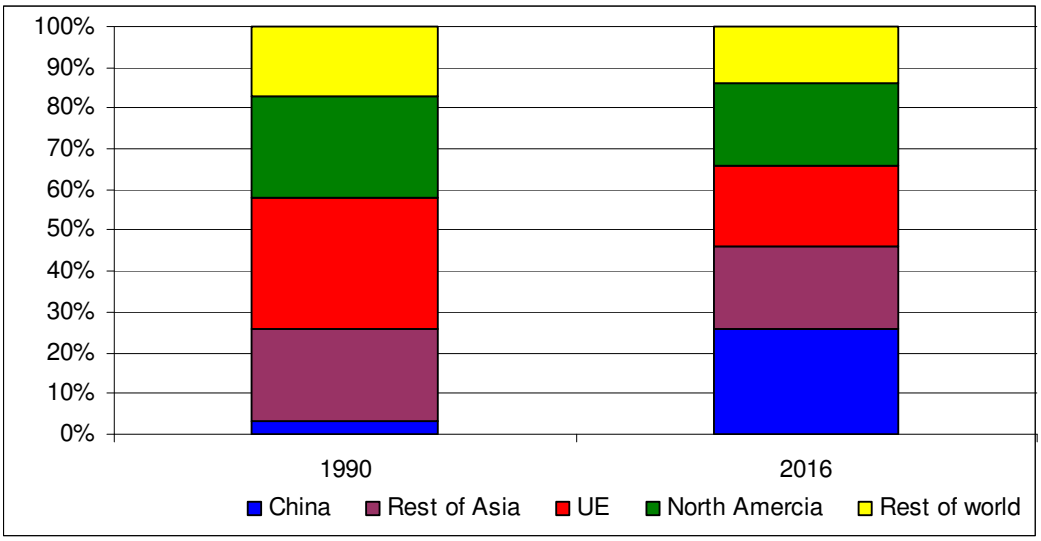

Chart 1. Share in industrial output in 1990 and 2016.

* Rest of Asia: developing and emerging industrial economies (excl. China) + Japan + South Korea.
** developing and emerging industrial economies: Afghanistan, Armenia, Azerbaijan, Bangladesh, Bhutan, Brunei, Cambodia, Cook Islands, South Korea, Fiji, India, Indonesia, Iran, Iraq, Jordan, Kazakhstan, Kiribati, Kirgizstan, Laos, Lebanon, Maladies, Marshall Islands, Burma, Mongolia, Nepal, Oman, Pakistan, Palau, Papua New Guinea, Philippines, Samoa, Saudi Arabia, Solomon Islands, Sir Lanka, Palestine, Syria, Tajikistan, Thailand, East Timor, Tonga, Turkmenistan, Tuvalu, Uzbekistan, Vanuatu, Vietnam, Yemen.
Source: *own work based on UNIDO database*.

Shifts in industrial output are also reflected in shifts in world trade. Chart 2 shows the share of individual countries and regions in world exports in 1990 and 2018. Over the analysed years, the share of developed countries represented by the European Union and North America decreased from about 60% in 1990 to about 45% in 2018. At the same time, the significance of Asian countries in world exports increased. This was due to an almost 7-fold increase in China's share of world exports, to 12.8% in 2018. Considering the role of other Asian countries, we can see a stable, about 20% share in global exports. It should be emphasized that in 1990 it was caused mainly by the high importance of Japan, which was responsible for over 8% of world exports, while in 2018 its share declined to less than 4%. The position of the other Asian countries was maintained thanks to the increase in exports

in India (1.7%), South Korea (3.1%), Malaysia (1.2%), Saudi Arabia (1.5%), Singapore (2.1%), Thailand (1.3%), the United Arab Emirates (1.6%) and Vietnam (1.2%).

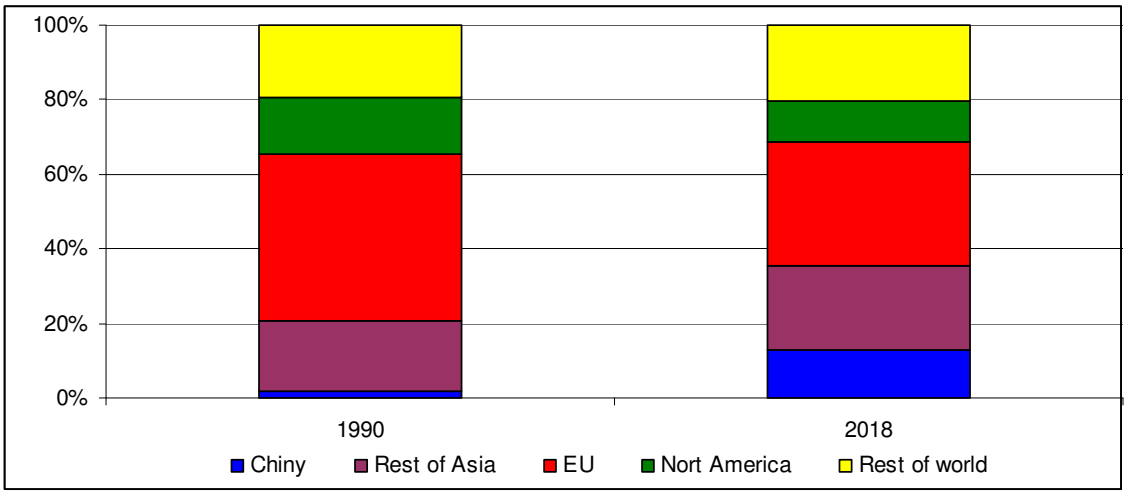

Chart 2. Share in global exports in 1990 and 2018.

* Rest of Asia: developing and emerging industrial economies (excl. China) + Japan + South Korea.
** developing and emerging industrial economies: Afghanistan, Armenia, Azerbaijan, Bangladesh, Bhutan, Brunei, Cambodia, Cook Islands, South Korea, Fiji, India, Indonesia, Iran, Iraq, Jordan, Kazakhstan, Kiribati, Kirgizstan, Laos, Lebanon, Maladies, Marshall Islands, Burma, Mongolia, Nepal, Oman, Pakistan, Palau, Papua New Guinea, Philippines, Samoa, Saudi Arabia, Solomon Islands, Sir Lanka, Palestine, Syria, Tajikistan, Thailand, East Timor, Tonga, Turkmenistan, Tuvalu, Uzbekistan, Vanuatu, Vietnam, Yemen.
Source: *own work based on UNCTAD database*.

As a consequence of ongoing globalisation, developing countries have experienced dynamic economic development. On the basis of the data presented in Table 1, it can be seen that over the period 1990-2018 the differences in nominal GDP between developing and developed countries have decreased. In 1990 the volume of GDP of developed countries was 4.5 times higher than that of developing countries (18 trillion dollars to 4 trillion), while in 2018 these disparities are 1,5 times higher (49 trillion dollars to 33 trillion). The high nominal GDP growth of developing countries is mainly associated with the developing countries in Asia, led by China. These countries account for 77% of the nominal GDP of developing countries, while China represents as much as 40% of this value.

Table 1: GDP and GDP per capita in selected years

GDP (billion dollars at current prices)									
	1990	**1995**	**2000**	**2005**	**2010**	**2015**	**2016**	**2017**	**2018**
China	395	734	1211	2286	6101	11065	11191	12238	13605
Developing economies	4015	6114	7286	11234	21881	29221	29287	31815	33829
Developing economies: Asia	2284	3590	4371	7307	14639	21504	21957	23901	25966
Developed economies	18081	24423	25908	35248	42143	43549	44715	46509	49200
EU28 (European Union)	7541	9622	8906	14435	17015	16451	16534	17313	18709
Northern America	6591	8291	11062	14297	16712	19884	20347	21246	22318

GDP per capita (dollars at current prices)									
	1990	**1995**	**2000**	**2005**	**2010**	**2015**	**2016**	**2017**	**2018**
China	335	592	939	1718	4457	7865	7914	8612	9530
Developing economies	978	1361	1496	2142	3888	4852	4800	5148	5405
Developing economies: Asia	754	1091	1236	1939	3665	5106	5162	5566	5990
Developed economies	19926	25770	26649	35280	41015	41488	42441	43988	46378
EU28 (European Union)	16268	19857	18263	29077	33697	32215	32309	33759	36408
Northern America	23267	27810	34984	43190	48167	55154	56067	58175	60740

Source: *own work based on UNCTAD database*.

Nominal GDP shows the process of catching up with developed countries by developing economies. This may lead to wrong conclusions, therefore GDP per capita should also be analysed. On the basis of the data presented in Table 1, it can be seen that these differences are very large. The gross domestic product per capita in developed countries is about 46 thousand dollars, while in developing countries it is 8,5 times lower and is only about 5,4 thousand dollars. It is important to mention that over the last 28 years developing countries have increased their GDP per capita by 5,5 times, Asian countries by 8 times and China by 28 times.

The delocalisation of production to developing countries has created new industrial jobs there. As a result, the middle class in these countries has also benefited from globalisation. In 2009, Europe and North America together accounted for 54% of the world's middle class, and Asia 28%. The centre of gravity of the world economy is shifting to the East (Pan, Xu, Wu, 2014). It is estimated that by 2020 these ratios will reverse and Asia will represent 54% of the world's middle class and Europe and North America 32%. These disparities will be continued to grow over the next decades. Projections indicate that by 2030 these proportions will be 66% to 21% (Kharas, 2010).

In China, as a consequence of economic reforms since 1978, more than 300 million citizens have been dragged out of poverty and moved from the countryside to the city, supplying a large resource of cheap labour force (Louçã, Ash, 2018). By 2020, it is estimated that the number of people living in cities will be 800 million, and will increase by another 300 million over the next three decades (China Development Research, 2014). According to McKinsey Institute calculations, in 2012 the middle class in China represented 68% of the population living in urban areas. It was classified into two groups. The first is the mass middle class, accounting for 54% of the urban population, and the second is the upper middle class, accounting for only 14% of the urban population. The projections for 2022 estimate that the middle class will account for 76% of the urban population, while the ratio between the first and second groups will reverse. It is expected that by 2022 the middle class with a higher statute will constitute 54% of the urban population, while the one with a lower statute will only 22%. The same calculations show that over the last decade the number of poor people living in cities will decrease from 29% in 2012 to 16% in 2022 (Barton, Chen, Jin, 2013).

It should be noted that globalisation also has the effect of increasing inequality within a country. Data presenting the growth of the middle class in China highlights that in 2012 87% of the middle class lived in the eastern, the most industrialised part of China, and only 13% of them lived inland. China's approach and management of globalisation begins with an increasing inequality. The reforms undertaken in 1978 were based on a Confucian philosophy. One of the key idea was given the opportunity to "enrichment themselves" and primarily made the inequalities deeper. However, estimates indicate that the imbalance in regional development is being reduced, by the year 2022 as much as 39% of the middle class will have been lived in inland areas (Barton, Chen, Jin, 2013).

Discussed changes represent the negative impact of globalisation on developed countries. There has been growing dissatisfaction with globalisation among those who have lost industrial jobs to developing countries. A consequence of deindustrialisation is the declining employment in industrial production over the last two decades. A negative phenomenon occurring in developed economies is

also a drop in real wage growth, despite the increase in labour productivity. In the United States, in the years 200-2007, the increase in labour productivity was 2,2%, while the rate of growth of the median hourly wage rate reached -0,1%. In 2006, the real hourly wage rate in the private sector (outside agriculture) was the same as in 1967. This resulted in the reduction of middle and working class income. The share of wages in GDP fell from 53% in 1970 to 46% in 2005 (Foster, McChesney, 2014). However, there was a concentration of household income among the richest class. The 1% of the richest households purchased about 21% of total income in 2014. Following the increase in inequality from the 1% of the richest households in recent years, the richest 0,01% emerged, which was as much as 5% (Seaz, 2015).

At the turn of the 20th and 21st century, these adjustments were desirable as highly developed countries moved to the service sector and high technology. Nowadays, over 60% of GDP in these countries is created in services. Figure 3 shows the volume of employment in industry, non-agricultural sector and services in the years 1990-2019. During this period, over 85% of employment in the non-agricultural sector was generated by services. The share of employment in services increased by about 65%, from about 86 thousand in 1990 to 130 thousand in 2019. The negative consequences of the transformation of the employment structure in the United States were exposed by the global financial crisis of 2007-2009. The burst of the speculative bubble in the real estate market resulted in the economic collapse and a drop in employment in the non-agricultural sector and in services in 2009-2012. Only from 2014 has there been a progressive increase in employment in these categories.

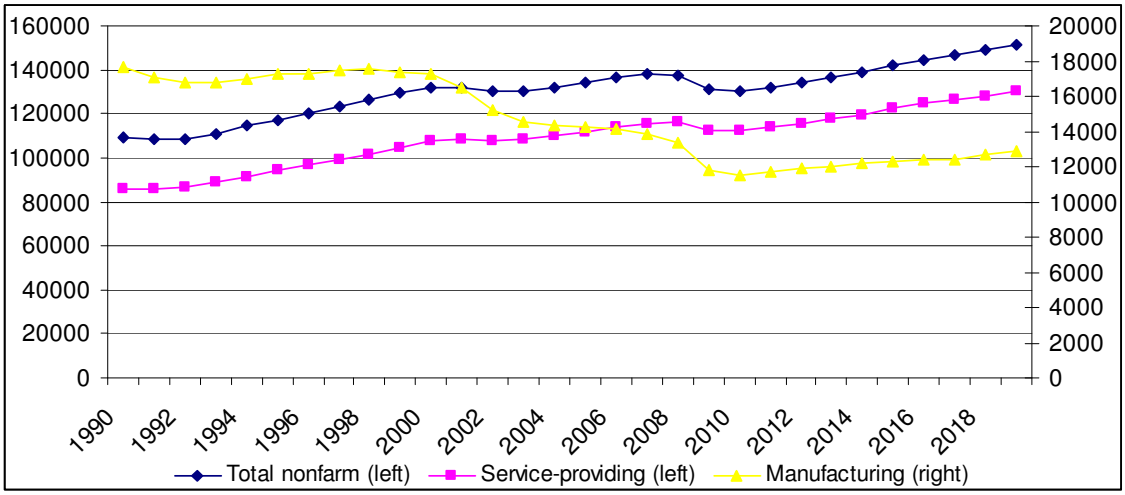

Chart 3. Employment in industrial production, non-agricultural sector and services in the United States in 1990-2019 (in thousands).

Source: own work based on U. S. Bureau of Labor Statistics database (www.bls.gov, 25.01.2020).

The main driver of economic growth in highly developed countries is no more manufacturing, but services, especially financial services. The lost workplaces in industry were created in a wide range of services, e.g. transport, hotels, catering, finance, insurance related to financial markets, e.g. real estate agency. Chart 3 shows the volume of employment in financial services and individual categories. In the years 1990-2019 the employment in financial services increased from about 6.5 million to about 8.5 million. It is important to note that as a result of the crisis, there was a decrease in employment, and the level of 2008 was achieved only in 2016. The bursting of the speculative bubble, the raising of the Federal Reserve System's interest rates and the limitation of lending have affected the credit intermediary sector the most. A detailed analysis of the individual service categories shows that their level has not returned during the last 10 years to the pre-crisis period.

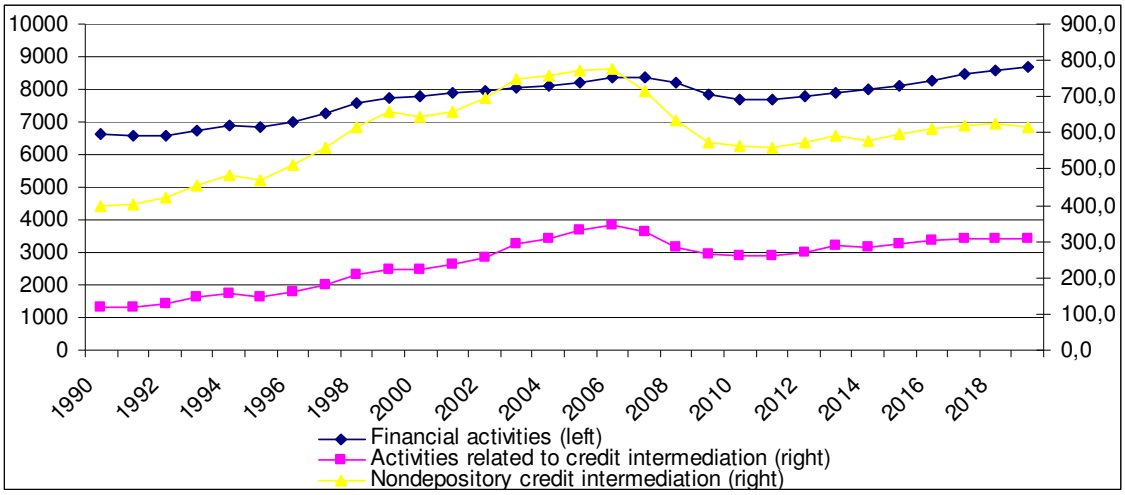

Chart. 4: Employment in particular service categories in the United States between 1990-2019.
Source: own worked based on Bureau of Labor Statistics database (www.bls.gov, 25.01.2020).

Chart 4 illustrates that the most significant fall in employment in the non-deposit category of credit intermediation was the fall in employment. This category consists of public (government sponsored) and private entities, which are involved in, e.g. issuing credit cards, granting consumer loans or mortgages. This decrease is visible in the first years of the collapse, i.e. 2006-2010, which reached as much as 33%, while in the whole period 2006-2010 it amounted to 20%. In the years 2014-2019, there was a slow increase in employment in this category, which currently reached the level of 1999. Another category is the activities related to financial intermediation undertaken by para-banks. This category also shows a decrease in employment over the last decade, and the level of employment is equal to the pre-crisis period, i.e. 2003.

Research approach and methods

The first stage of the research process was the assumption that globalization is a dynamic, multidimensional, cross-border process, with a global scope. In comparison with previous periods, the intensity of this phenomenon is stronger due to the increased links and interdependencies between countries, regions, markets, companies, societies as a result of growing economic flows (trade, investment, capital, technology, labour). Therefore, the contemporary stage of globalisation is becoming a challenge for nation states due to the gradual disappearance of borders, the growing importance of transnational corporations, the internationalisation of the production process, the dissemination of, for instance, patterns of organisation, the production system, data processing, legal norms and the harmonisation of norms and standards.

The research approach includes the inductive procedure. The methodology of academic research indicates that induction consists in moving from empirical observations to theoretical generalizations, however, conducting observations is closely related to understanding and analyzing theoretical knowledge (Lindström, 1998).

The research hypothesis of the possibility of halting globalisation is verified on the basis of a case study such as the trade war launched by the United States. The application of the case study enables a better understanding of the causes of the trade war and its successive stages. It will permit a comprehensive understanding of the process of globalization, the links and interdependencies that have arisen and the possible ways to stop it. This is particularly important in view of the political, economic and social dimensions of the demands to move away from globalisation.

The achievement of the aim of the study and the verification of the research hypothesis required conducting literature studies and collecting statistical data such as trade, production, economic

growth and balance of payments. The analysis of literature enabled to characterize the process of globalization, indicate its effects and develop a case study on trade war. The accumulation of empirical data was used to compare the impact of globalization on individual countries and groups of countries and to indicate the winners and losers of the process. On the grounds of expanded issues, collected statistical data and the case study, the answer was given to the question whether the globalisation process can be stopped.

US-China trade war: example of retreat from globalization

Over the past decades, globalisation has extended to all countries of the world. Since the 1980s, this process has mainly benefited developed countries, referred to as the "rich North". The dynamic nature of the globalisation process caused changes in the economic system. The developed countries began to take the place of developing countries. The countries referred to as the "poor South" have not only been included in this process in recent years, but have also started to benefit from it, and over the last decade they have also begun to shape globalisation. The shift in the position of countries in the structure of the world economy has resulted in increased dissatisfaction with globalisation. The election of President Donald Trump in the United States is a sign of this opposition. In his election campaign, he pointed out that the economic problems of the United States are a consequence of, for example, trade liberalisation, which caused a trade deficit.

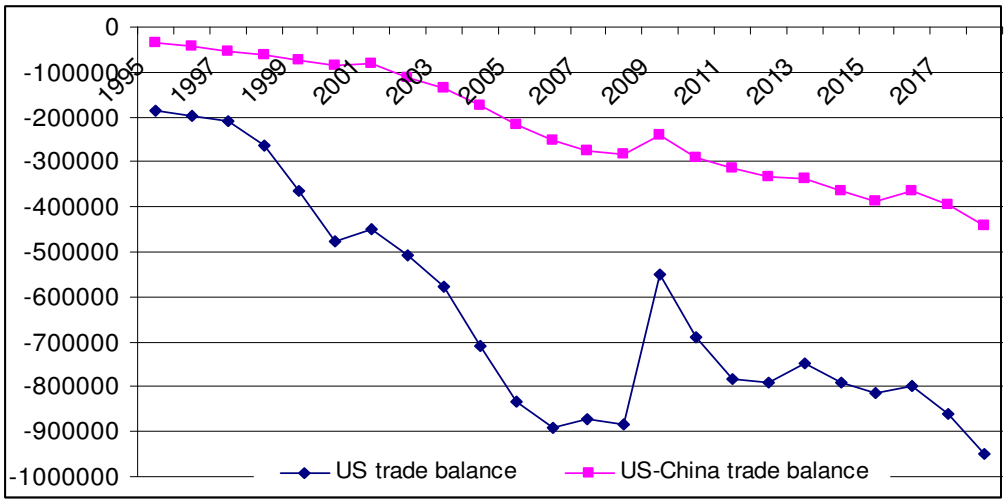

Chart. 5: United States trade balance and United States - China trade balance (million US dollars).

Source: own source based on UNCTAD database.

Chart 5 shows the US trade balance and the US and China trade balance. According to the data, the trade deficit was growing with the intensification of globalisation. Since the turn of the twentieth and twenty-first century, transnational corporations started to use global resources and relocate production to, for instance, developing countries in Asia, including China. In 2007-2009, the US trade deficit amounted to 900 billion USD. Analysis of US-China trade shows that China's exports to the United States began to boost after China acceded to the World Trade Organization in 2001. From 2015, the trade deficit with China is about 400 billion USD, which is 40%. These facts and accusations of protectionist practices against China have become the basis of the election campaign and the key to Trump's success in the presidential election.

At first the vision of a trade war, in the context of US participation in the World Trade Organisation (WTO), seemed impossible. With the assumption of the office of the President of the United States, D. Trump went on to implement his proposals for a trade war. This can be seen as the beginning of an investigation initiated by The US Trada Representative (USTR) in August 2017 into the Chinese government's practices of technology transfer, innovation and intellectual property that violate U.S.

interests (Office of the United States Trade Representative. Executive Office of the President, 18.08.2017). The investigation was concluded by an announcement on March 22, 2018. The USTR, citing Section 301 of the Trade Act of 1974, found that China is engaging in unfair practices of technology transfer, innovation, forcing the disclosure of sensitive information and violating respect for intellectual property. These practices threaten U.S. companies, deprive them of a fair remuneration for their innovations, inhibit exports, contribute to the trade deficit, weaken U.S. manufacturing, services and innovation (Office of the United States Trade Representative. Executive Office of the President, 22.03.2018).

The trade war initiated by President Trump can be divided into three main dimensions. The first dimension of the trade dispute concerns imports of solar panels and washing machines. The USTR considered that imports hurt US industries and recommended that the President impose trade restrictions (Office of the United States Trade Representative. Executive Office of the President, 22.01.2018). The final settlement was made on 22 February 2018, when D. Trump imposed global safeguard tariffs of $8,5 billion on imports of solar panels and $1,8 billion on imports of washing machines (Office of the United States Trade Representative. Executive Office of the President, 22.01.2018) .

This decision was not unavoidable for trade partners to react. On April 17, 2018 the Chinese government announced preliminary anti-dumping duties of 178.6% on imports of sorghum from the United States (The State Council The People's Republic of China, 17.04.2018). The next step taken by the Chinese government was to file a formal application at the WTO on 14 August 2018. The China's Commerce Ministry has justified this by stating that US tariffs on solar panels have harmed China's commercial interests (World Trade Organization, 2018).

The second dimension of the trade war concerns the impact of steel and aluminium imports on US national security. The Trade Secretary presented his opinion in February 2018, and on March 1, 2018 the United States announced the introduction of duties of 25% on steel and 10% on aluminum to all trading partners. The largest part of these imports include goods originating from Canada, the EU, Mexico and South Korea. Finally, the tariff barriers became effective on March 23, 2018 and covered steel products worth about 10 billion dollars and aluminum products worth about 8 billion dollars. In the beginning, tariff exemptions were granted to Canada, Mexico, the EU and Korea, and a permanent exemption or a specific quota was granted to Australia, Argentina and Brazil respectively. China was not included in the temporary tariff exemption period. In retaliation, on April 2, 2018, China imposed duties on American products, exported in 2017 to the amount of 2,4 billion dollars. The 25% tariffs were imposed on, e.g. aluminium waste and scrap, pork, fruit, nuts and 15% on other goods (Kerrigan, 2019). On April 2, 2018 China identified 128 American product categories which are subject to 15% and 25% tariffs (World Trade Organization, 29.03.2018).

The third dimension of the trade war concerns technology transfer and intellectual property. The main charges against China are technology theft through regulation of foreign direct investment. Foreign companies operating in China are required to enter into joint ventures with a domestic producer. The increase in the degree of innovation in China is achieved through the exchange of academic staff. China welcomes the most talented academic and specialist, mainly in the sciences, and sends the best students to foreign universities thereafter to expand their knowledge at home. These activities have resulted in an increasing level of technology in China. A third issue threatening the US technological hegemony is mergers and acquisitions of US technology enterprises by Chinese companies (White House, 14.08.2017) .

On March 22, 2018, Donald Trump's administration announced the introduction of tariff barriers for Chinese goods in the amount of 60 billion dollars and indicated the need to adjust the law on investments. On April 3, 2018 the administration published a list of 1333 Chinese products worth 50 billion dollars, which are subject to a 25% tariffs. The sectors most affected are machinery, mechanical appliances and electrical equipment. Approximately 85% of imports covered by tariffs concern intermediate products and capital goods, which would increase costs in the supply chains of American companies. In revange, China publishes a list of 106 products covered by future 25%

tariffs one day later, including 50 billion dollars of Chinese imports from the US. These are predominantly vehicles, aircraft, floating vehicles and plant products (soyabean) (Office of the United States Trade Representative. Executive Office of the President, 15.06.2018).

On June 15, 2018 China and the USA announced the introduction of the first phase of the tariffs effective as of 6th July. Both countries are announcing the introduction of 25% of the tariffs on goods worth 50 billion dollars respectively. The USA is updating the list of goods, which is extended even more parts and components imported by American companies from China. China, however, is extended to include mineral fuels, consumer goods and medical equipment and is removing planes from the list. Additionally, they announce that the introduction of tariffs is divided into two stages. As of July 6, duties on goods (including soyabean and vehicles) worth 34 billion dollars will start to apply (Ibidem) whereas the next stage will include the other goods worth 16 billion dollars. Finally, these duties were introduced on August 23, 2018 (Organization for Economic Cooperation and Development, 2018).

On July 10, 2018, the US Trade Administrative announced a list of goods imported from China to the amount of 200 billion dollars, which will be covered by 10% of the tariffs. This list includes intermediate goods such as computer and car components (47% of the list) and specified consumer goods such as telephones, computers, furniture, laptops, suitcases. Finally, on September 24, 2018, 10% tariffs on Chinese goods were introduced and it was announced that from January 1, 2019, they will increase to 25% (Office of the United States Trade Representative. Executive Office of the President, 18.09.2018).

The American side's efforts were not without the reaction of China. In response to the U.S. threats of July 2018, China has announced the establishment of tariffs from 5 to 25% on intermediate products, capital goods and consumer goods worth 60 billion dollars. These announcements were finalised on September 24, 2018, by the introduction of tariffs from 5% to 10% and then by raising the tariff to 25% on June 1, 2019 (International Monetary Fund, 2019).

Until now, the United States has announced two lists of 50 billion dollars worth of goods and 200 billion dollars worth of goods include about 50% of US imports from China, worth 563 billion dollars in 2017 (www 1). On July 20, 2018, D. Trump is jeopardising further tariffs on the rest of consumer and capital goods (mobile phones, laptops and clothing) worth 262 billion dollars. Following the G-20 meeting in Buenos Aires on December 1, 2018, Presidents Trump and Xi announced an agreement to end the escalation of tariffs. After several months of action on May 10, 2019, customs tariffs raised from 10 to 25% (Pauken II, 2020).

Due to the lack of agreement and successive tariffs introduced by China, on May 5, 2019, D. Trump announced the adoption of 25% tariffs on the rest of Chinese goods. These are mainly consumer products such as toys, footwear and electronics. On August 13, 2019, 10% duty became effective on imports from China worth 112 billion dollars, from September 1, 2019, on clothing and footwear products and from December 15, 2019, on toys and electronics worth 160 billion dollars. The escalation of the conflict intensified on August 23, 2019, when China announced the imposition of duties on American exports worth 74 billion dollars as of September 1 and December 15 (Office of the United States Trade Representative. Executive Office of the President, 13.08.2019).

In September, China announced the exemption of 16 products from tariffs imposed in 2018 on certain animal feed, chemicals, petroleum products. President Trump, meanwhile, announced a delay in the increase in customs duties on Chinese imports scheduled for October 1 and December 15 (Swanson, 2019). On January 15, 2020, the leaders sign an agreement according to which China agrees to purchase additional US exports worth 200 billion dollars. This agreement entered into force on February 14, 2020 (Bisio, Horne, Listerud, 2020). As a consequence of the trade war, U.S. tariffs on imports from China are more than 6 times higher than in early 2018. As a result of the agreement signed, Chinese customs tariffs have dropped marginally.

Research Results and Discussion

The introduction of the trade war by President Trump became the subject of a discussion on how to stop globalisation. Considering only the process of trade globalisation, this solution can be considered as one of the possibilities. This would have to be linked to the collapse of the World Trade Organization or its marginal importance in the liberalisation of flows of goods and services. Countries would reduce trade and increasingly reoffshoring would take place. This would lead to increases in production, employment and GDP. At first glance, it may seem that such a solution would be a remedy for the economic problems of developed countries.

Analysing the global economic conditions, it seems that the trade war between the US and China has resulted in reduced trade flows and slowed down economic growth. On the basis of the data presented in the graph, it can be seen that the slowdown in the growth of global exports has occurred since the beginning of the global financial crisis. The crisis was caused by a cyclical factor, according to which there was a dependence of global export growth and global GDP. During this period, the growth rate of global exports was at least double the GDP growth rate (World Trade Organisation, 2016). After the global financial crisis, this correlation has disappeared. Since 2012, the growth rate of global export and GDP is similar, and in 2015 the export rate is negative. Analysing the cyclical factors affecting international trade, it can be observed that the growth of international trade is less dependent on the GDP growth rate, and increasingly important are protectionist tendencies, leading to a reduction in trade dependence in response to the crisis.

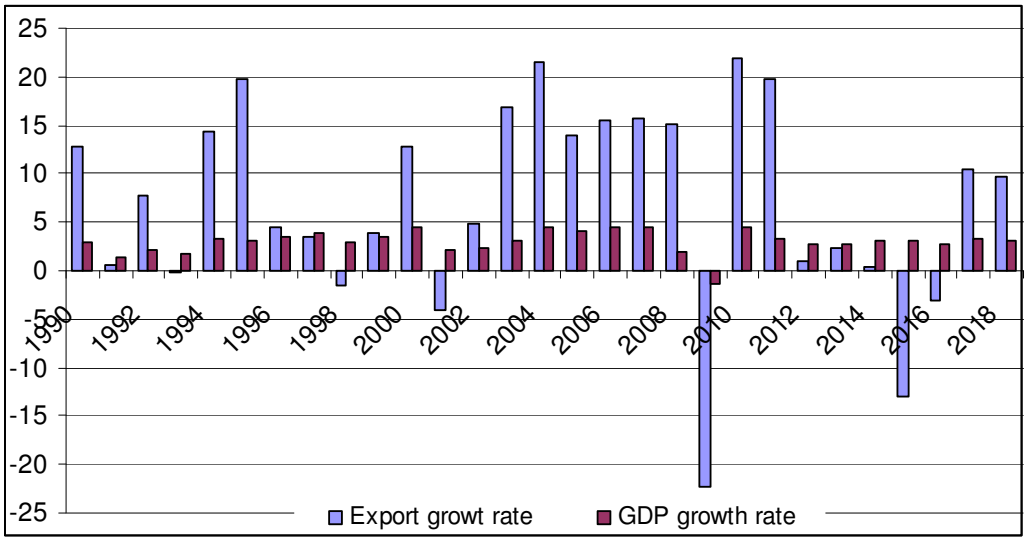

Chart 6. World merchandise trade growth and GDP growth, 1990-2018 (annual percentage change).

Source: own work based on UNCTAD database.

The slowdown in post-crisis trade flows is also caused to a large extent by structural factors, i.e. low commodity prices, currency depreciation to increase export competitiveness, the economic slowdown in China, fluctuations in demand in developing countries and changes in the global supply chain, where some of the previously imported components are produced by the countries where the final product is assembled (Constantinescu, Mattoo, Ruta,2015).

The way data is calculated is also important in measuring trade flows. Trade data include the value of goods leaving the port. Currently the data methodology does not cover the actual supply chain. Consequently, final products consist of parts and components from other countries, which in turn consist of materials or parts from other countries. The constant changes in global resources have

made it challenging to measure real trade relations and the added value must be taken into account (Organization for Economic Cooperation and Development, 2012).

An additional argument that the reasons for a trade war presented by President Trump are incorrect is the lack of incorporation of digital technologies into exports. The statistical data also do not reflect products that are not related to the flow of goods between countries, such as software installed on electronic equipment. The analyses show that including such data would reduce the trade deficit between the USA and China (McKinsey Global Institute, 2019) [1].

The trade war led by President Trump has highlighted even more the global expansion of transnational corporations. These entities are associated with specific countries, while their owners are investors from all over the world. International expansion is also the main source of income for these companies. Transnational corporations, because of the growing middle class and the increase in number of millionaires, perceive the Chinese market as the major market.

Conclusions

The analysis of shifts in the global economy and the trade war between the United States and China shows that it is impossible to stop the current stage of globalisation. Its consequence is an increase in interconnections and interdependencies between regions, countries, corporations or societies, which as a result of the digital revolution have taken on an extraordinary scale. These two major superpowers are characterised by the greatest global interdependencies.

Harnessing globalisation through tariffs is only an inept attempt. It should be stressed that the slowdown in trade growth occurred after the global financial crisis of 2007-2009. Raising tariffs is counterproductive, as other countries are integrating even more. China, in response to the Trump's administration, is reducing tariffs for other partners, which further exacerbates the problems of US companies. Assessing the phenomenon of globalisation through the perspective of the US-China trade war, it should be emphasised that globalisation is not slowing down, but evolving and changing its character.

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Russia And Russian-Speaking Separatism in Estonia: Economic, National and Social aspects

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Abstract

The aim of the article is to present a potential opportunity to involve the Russian and Russian-speaking diaspora, living permanently in Estonia, in separatist activities. Estonian statehood has relatively modest historical traditions. Its centuries-long subordination to its more powerful neighbours has led to drastic changes in its ethnic structure. The ethnic and ethno-linguistic structure is one of the most important elements of Estonia's national security policy. The restoration of independence has put the Estonian elite before the problem of addressing the Russian and Russian-speaking minorities. The process of change was initiated in 1987 by the so-called "Singing Revolution". During this period, Estonia made attempts to create, or rather recreate, its own ethnic policy based on pre-war patterns.

Currently, a potential source of threats is the significant Russian and Russian-speaking diaspora. Ethnic affiliation and the national identity that goes with it shape cohesion and at the same time, in certain cases, disintegrate modern states. This is an extremely important factor in the state's security policy, especially given the threat of the rebuilding of Russian neo-imperialism. Despite controversy over human rights, for example, Estonia's integration policy is producing the expected results, and the success of the integration policy will raise the security level of both Estonia itself and the subregion.

Keywords: Russia, Estonia, Separatism, Baltic States

Introduction

National identity and the nationalism that follows seems to be one of the most rooted elements in human consciousness today. Therefore, the thesis that the bloodiest and most dangerous conflicts take place between people belonging to different ethnic groups is not surprising. The ethnic factor remains one of the basic sources of conflicts. The reasons for this state of affairs can be found, among other things, in the increase in the sense of national consciousness of individual ethnic groups and the universality of the idea proclaiming the right of nations to self-determination. The ethnic and ethno-linguistic structure is one of the most important elements in the area of national security in Estonia. The regaining of independence put the Estonian elite before the problem of addressing the Russian-speaking minority.

Estonia has tried to create, or rather recreate, its own ethnic policy immediately after regaining independence. The restitution of Estonian legislation from before the period of "Soviet occupation", i.e. before 17 June 1940, was called for. The Citizenship Act of 1 July 1938 was restored by the Supreme Council of the ESRR on 26 February 1992. As a result of these changes, as many as 500,000 people (32% of the population) permanently residing in Estonia were deprived of Estonian citizenship, creating a sizeable group of apatrides. The Estonian

authorities, thus limiting the influence of the Russian population on the functioning of the country, aimed to create an ethnically uniform state as possible.

In connection with the large Russian-speaking and Russian-speaking minority in Estonia, tensions arise, inter alia, in the context of World War II. An example is the so-called "war of monuments" from 2004-2007. The impulse for the conflict were attempts to honour Estonian volunteers fighting in German troops. As a result, the state authorities did not grant this category of veterans the status of fighters for state freedom. Nevertheless, this problem was an impulse for discussion on the unequal treatment of Estonian veterans fighting on the German or Soviet sides.

A significant Russian and Russian-speaking diaspora remains a potential source of threats. Ethnic affiliation and the resulting national identity shape cohesion and, in certain cases, disintegrate modern states. For most local societies, national identity is of paramount importance. A very important element in this context is the subjective self-identification of individual individuals of a given community. Internally consolidated ethnic groups, such as the Russian and Russian-speaking population, are characterised by a strong sense of community. In order to maintain their individuality, they often enter into conflicts with the authorities of the countries in which they live, and Estonia in particular. This poses a direct threat to the security and cohesion of the country, and over time may also become a serious threat to the international order.

The aim of the article is to present a potential opportunity to involve the Russian and Russian-speaking diaspora, living permanently in Estonia, in separatist activities. The main research problem, in the light of this objective, has been formulated in the form of a question: What is the significance of Russian ethnic and linguistic separateness in the context of the security and integrity of Estonia? For further consideration, a hypothesis was adopted in connection with the research problem, which assumes that the Russian and Russian-speaking diasporas provide a convenient background and, at the same time, a basis for initiating and taking separatist actions against Estonia, at least in a propaganda and international dimension. The significant proportion of ethnic Russians, multiplied by the Russian-speaking population living permanently in Estonia, is particularly important in this respect. The article is of a study nature. To a large extent, it is an analysis of Estonian and Russian source materials and expert studies dealing with the issues defined in its title. The attempt to present the presented problem was connected with the necessity of a comprehensive reference to the Russian and Russian-speaking minority in the indicated area. Verification of the adopted working hypothesis required the examination of the ethnic and linguistic structure of Estonia and its position in the functional arrangement of the Estonian state.

Russian and Russian-speaking centrifugal tendencies

Since the beginning of its independence, Estonia has faced a problem of ethnic unity. It stems from the historical legacy of the Soviet Union. It is symbolised by the political and cultural divisions of society and the constantly present centrifugal tendencies. After independence, national minorities made up more than 38.5% of the total population of Estonia[1]. The most numerous were respectively: Russians - 474.8 thousand (30.2%), Ukrainians - 48.3 thousand (3.1%) and Belarusians - 27.7 thousand (1.8%). The total number of national minorities was over 602.4 thousand people. After twenty years of independence, at the beginning of the second decade of the XXI century, according to official data, 105.6 thousand permanent residents of Estonia had a different citizenship

[1] *Всесоюзная перепись населения 1989 года. Национальный состав населения по республикам СССР*, http://www.demoscope.ru/weekly/ssp/sng_nac_89.php?reg=15, (Accessed: 16 July 2020).

than Estonian[2]. The most numerous group - 90.5 thousand people - were citizens of the Russian Federation (including 79.4 thousand indigenous Russians). Persons who do not have Estonian citizenship are a serious problem. According to official data, this group comprises 86 thousand people. In total, persons with other than Estonian citizenship and stateless persons constitute 191.1 thousand residents of the state. Of these, ethnic Russians are 148.2 thousand people, i.e. 11.4% of the total population of Estonia.

The process of massive Russian colonization of the Estonian territory has particularly affected large urban centres such as Tallinn, Tartu and Narva[3]. In these cities, the Estonian/Russian ratio in 2011 was as follows (in thousands): Tallinn - 217.6/144.7 (53.3%/36.8%), Tartu - 79.7/14.3 (81.6%/14.6%) and Narva - 3/51.4 (5.1%/87.6). The overall ethnic ratio in urbanized areas is 523.1/299.6 (59.5%/34.1%) and rural areas 379.4/26.6 (91.3%/6.4%). The Russian population inhabits mainly four regions: Harjumaa, Ida-Viru, Tartumaa and Jagevâmaa. Outside the capital region, the largest percentage lives in the north-eastern part of the country, including the largest cities in the region: Narew, Kohtla-Jarve and Sillamäe. The post-war industrial development in the 1950s and 1960s changed the character of Estonia from agricultural to industrial-agricultural. This created a premise for a mass influx of Russian and Russian-speaking people into the emerging industrial centres.

The large Russian-speaking and Russian-speaking minority has a significant impact on Estonia's security. It provides a natural basis for the development of separatist and centrifugal trends. The majority of the Russian and Russian-speaking population is concentrated in industrial, more densely populated districts of Estonia. They live mainly in the northeast and in the capital (Fig. 2). In Estonia's third largest city, Narva, the Russian-speaking population, mainly indigenous Russians, accounts for about 97% of the total population, and in Tallinn about half of its population. Until the break-up of the Soviet Union, the higher living standards in the Estonian SSR were conducive to economic migration and, to a lesser extent through marriage, family ties. The significant influx of Russians and the Russian-speaking population was associated with the dislocation of the Soviet armed forces, whose professional staff consisted mostly of indigenous Russians, and with the filling of political-administrative posts, for which Russians or Russian-speaking citizens of the Soviet Union were usually appointed. The passive attitude or declared reluctance of Russian-speaking Estonian citizens to the naturalisation process has a negative impact on its security. It also creates, certainly in propaganda and media terms, the basis for the development of separatist movements of a centrifugal nature. These, in turn, are, or may soon become, a tool of the security policy of the Russian Federation.

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[2] *PC0428: POPULATION, 31. DECEMBER 2011 by Ethnic nationality, Place of residence and Sex*, http://pub.stat.ee/px-web.2001/Dialog/Saveshow.asp, (Accessed: 24 August 2020).

[3] *PC002: POPULATION BY PLACE OF RESIDENCE, SEX, AGE GROUP AND ETHNIC NATIONALITY, 31 DECEMBER 2011*, http://pub.stat.ee/px-web.2001/Dialog/varval.asp?ma=PC002&ti=POPULATION+BY+PLACE+OF+RESIDENCE%2C+SEX%2C+AGE+GROUP+AND+ETHNIC+NATIONALITY%2C+31+DECEMBER+2011&path=../I_Databas/Population_census/PHC2011/09Location_and_age-gender_distribution/02Place_of_residence/&lang=1, (Accessed: 24 August 2020).

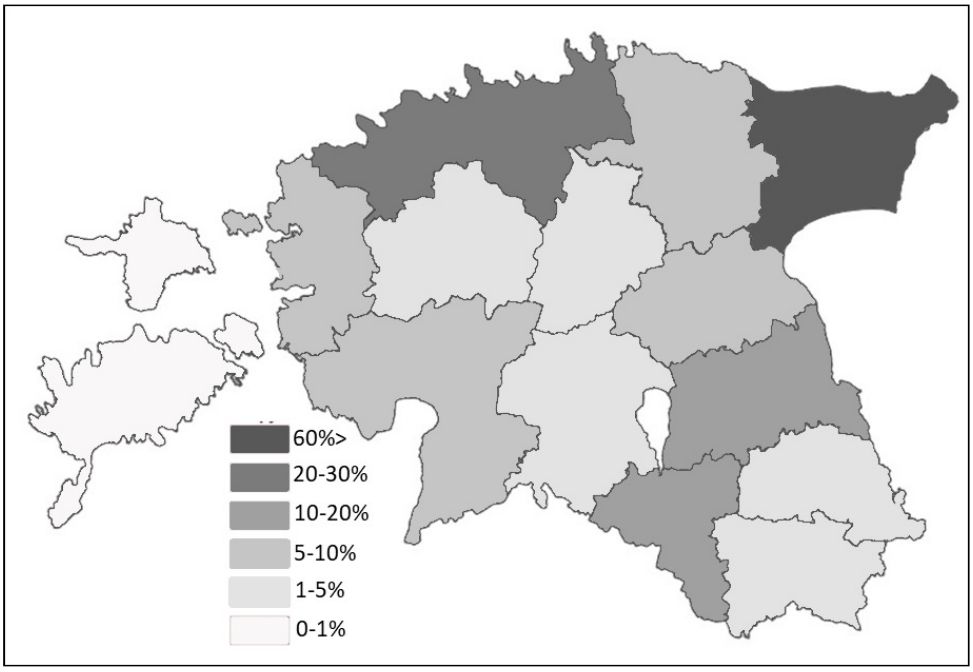

Source: Own compilation based on: *PC0431: POPULATION BY MOTHER TONGUE AND SEX, 31 DECEMBER 2011*, http://pub.stat.ee/px-web.2001/Dialog/varval.asp?ma=PC0431&ti=POPULATION+BY+MOTHER+TONGUE+AND+SEX%2C+31+DECEMBER+2011&path=../I_Databas/Population_census/PHC2011/01Demographic_and_ethno_cultural_characteristics/04Ethnic_nationality_Languages_Dialects/&lang=1, (Accessed: 16 July 2020).

Figure 1: Russian-speaking residents of Estonia by administrative division

The ethnic problem in the context of separatist movements is primarily related to the indigenous Russian and Russian-speaking population. The indigenous inhabitants of Estonia distinguish and at the same time divide almost everything from the Russians, a completely different language, non-Slavic ethnicity, Western cultural background, history, religion, mentality, customs, etc. The Russian-speaking population identifies poorly, or even at all, with the Estonian state. As a rule, they are pro-Russian-speaking, to which Estonian naturalisation policy makes a significant contribution. Those who have acquired citizenship declare loyalty to their new homeland in most cases. Such attitudes are fostered primarily by the difference in socio-economic standards between Russia and Estonia. The level of loyalty of the people who have not yet obtained citizenship is difficult to assess reliably. The postponement or boycott of naturalisation does not always result directly from disloyalty. The source of such attitudes is the expectation that this procedure will be simplified or that it will be convenient. It should be stressed that a certain group of Russian-speaking people do not fully identify with the Estonian state, focusing primarily on improving their own living conditions.

Despite the political and organisational fragmentation, the Russians and the Russian-speaking population are an important political pressure group, which the Kremlin supports in certain cases. Russian-language parties, associations and media focus their activities on two areas: citizenship and status of the Russian language. In the cultural sphere, the Russian minority has relatively greater rights than in political life and access to citizenship. As a result, Russians develop their own culture, education, press and religious and association activities. Furthermore, the Russian-speaking press is an important integrating element. There are fundamental restrictions in the economic

sphere. Only a person with Estonian citizenship can open up activity in certain sectors (e.g. media, banks). Despite these restrictions Russian citizens dominate the ownership structure of private companies[4].

The attitude of the authorities of the Russian Federation and Estonian-Russian bilateral relations are important for Estonia's internal situation. Since the break-up of the USSR, Estonia has sought to formally dissociate itself from the legacy of the former USSR and has been heading for a western European area of prosperity and security[5]. Russia has repeatedly protested against this course of policy in the international arena. Officially, it did so on behalf of the Russian-speaking and Russian-speaking minority, whose rights were being restricted or sought to be restricted. Moscow often inspired the protests of the Russian and Russian-speaking minorities in Estonia and influenced the negative message of international organisations' reports on respect for the rights of national minorities in the Baltic republics. Russian objections to national policy also served to oppose plans to expand the North Atlantic Alliance and the European Union to the east.

The Russians, also the Russian-speaking population, who consider themselves Russians, maintain ties with the Russian Federation. These are primarily cultural and business ties. Much stronger ties with the mother ties are maintained by a group of Russians living in Estonia, who have assumed Russian citizenship. They manifest themselves in participating in the Russian elections. This often concerns Russian politicians who are reluctant or even hostile towards Estonia. For economic reasons, these people do not think about re-emigration. Their main forms of contact with Russia are activities in organisations that maintain links with the matrix and widely available Russian-speaking television and radio programmes. The basic element of cultural ties with Russia is Russian-speaking education in Estonia and the fight to maintain it.

In general terms, it should be stressed that Russian culture continues to dominate the Russian-speaking population in Estonia. However, political, and social consciousness distinguishes the Estonian Russian-speaking population from Russians in the Russian Federation. Estonian Russians and the Russian-speaking population are a group that is fully aware of democracy and its civil rights. This is evidenced, among other things, by their approach to the issue of naturalisation, including their focus on personal interests rather than sentiment towards Russia. The practical ability to exercise citizens' rights is evidenced by numerous complaints against the Estonian state at the Court of Human Rights in Strasbourg and the raising of human rights violations in Estonia at international level. The main demands made by the representatives of the Russian-speaking minority include abolishing, or at least liberalising, the naturalisation procedure and granting citizenship to persons residing in Estonia. Another expectation is to maintain education in the Russian language and to grant those who do not have Estonian citizenship but who permanently reside there the right to participate in municipal elections. Other demands include: granting the right to use Russian in official matters in the areas inhabited by the Russian-speaking population, access to Russian-speaking information in state and local government institutions (including bilingual signs and inscriptions), and limiting the number of professions (posts) in which people who do not speak the state language cannot work.

Migration movements in the area of the former USSR have led to changes in the ethnic structure of local communities. A typical example of this is the contemporary ethnic structure of the Narew River, where Russians constitute the overwhelming majority of its inhabitants. Often seen in the streets of this city are symbols of past

[4] Sozański, J. (1998) Prawa mniejszości narodowych w niepodległej Litwie, Łotwie i Estonii (międzynarodowo-prawny zarys porównawczy sytuacji w latach 1918–1940 oraz 1990–1996. Warsaw, pp. 85–94.
[5] Webber, M. (1996) The International Politics of Russia and the Successor States, Manchester-New York, pp. 111.

belonging, such as monuments to the heroes of the Red Army. Due to the immediate vicinity of Russia and the local predominance of the Russian population, the northeastern part of Estonia should be regarded as an area of particular risk on an ethnic-Russian background. Another ethnically inflammable place is the capital city of Tallinn, where Russians and the Russian-speaking population make up a significant proportion of the overall population. The remaining national and ethnic minorities have little impact on state security, compared to indigenous Russians and the Russian-speaking population. In a single view, they constitute very small communities dissolving in the total population of the state.

Conclusions

Estonian statehood has relatively modest historical traditions. Its centuries-long subordination to its more powerful neighbours has led to drastic changes in its ethnic structure. The ethnic and cultural situation of Estonian society deteriorated with the occupation of Estonian lands by Moscow. The centuries-long subordination to tsarist and soviet Russia, which coincided with the awakening of the Estonian national consciousness, led to fundamental social changes. The tsarist authorities launched an intensive process of Russification. The next stage of the process was Sovietization, which was in principle only an ideologized form of the former, which lasted, with small interruptions, until the break-up of the Soviet Union. The Soviet authorities annihilated a large part of the nationally conscious intelligentsia and the Estonian bourgeoisie, thus depriving Estonian society of a large part of the elite.

Both Russification and the ethnic cleansing of the Soviet Union were accompanied by an influx of ethnic Russians into Estonia. It first took on a massive character at the turn of the 19th and 20th century, connected with the process of industrialisation of the Estonian lands. Its next stage was the period of the October Revolution, when its territory became a refuge for "white" Russians and other fugitives who feared the new Soviet power. Another large wave of Russian-speaking people appeared in Estonia after the end of World War II, supplementing the biological losses of war. The deliberate Russian-Soviet ethnic policy led to the national degeneration of ethnic Estonians and a significant decrease in the percentage of their population in the total population of the republic. The population of Russians and the Russian-speaking population (Russians not Russians) has increased rapidly, which is now mainly a serious problem and a source of potential internal conflicts. The problem of intra-state unity is closely related to the historical heritage, deep political and cultural divisions of society. It fosters centrifugal tendencies, which are reinforced by the Kremlin's neo-imperial policies. Stopping, and ultimately eliminating, ethnic disintegration processes and ensuring political unity is an important challenge for state stability. This factor is and will continue to be used by the Russian Federation. From Moscow's perspective, the large Russian-speaking and Russian-speaking minority in Estonia is one of the main tools to put pressure on Tallinn.

The national situation in Estonia is complex. This is due to the intensity of the depopulation processes that have affected the area twice in the last hundred years. The first one took place during the Soviet Union. As a result, the percentage share of the Estonian population in the total population of Estonia (Estonian SSR) decreased significantly. The effect of the second one is a reduction in the size of the Russian population, and more broadly the Russian-speaking population, which began after independence. However, the Russian-speaking population is still significant in size and as such has a significant impact on the functioning of the state. The second depopulation trend is clearly shaped and leads to a systematic decline in the share of Russians and the Russian-speaking population (mainly Belarusians and Ukrainians) in the overall population of the state. From the point of view of part of this population, loyalty to the local statehood is a guarantee of a conflict-free stay in a country belonging

to the European Union. This attitude is supported by economic issues and living standards that are significantly higher than in Russia. However, in several urban centres, the persistently high percentage of the Russian-speaking and Russian-speaking population still poses a certain threat. This may be a conflicting ground in relations between the state authorities and residents who cultivate the memory of Russia and the Soviet past. Current trends of changes in the ethnic structure are leading to the strengthening of the Estonian element. However, the issue of the Russian-speaking minority will continue to be a difficult one. From time to time, this will lead to confrontations that can be internationalised in certain circumstances. Until now, these have usually been rhetorical in nature and have created an atmosphere of mutual distrust. It should be stressed, however, that they may be a premise for more radical actions in the future.

Modern Estonia gained its independence within the borders of the Estonian Soviet Socialist Republic in December 1991 after the break-up of the Union of Soviet Socialist Republics. The centuries-old dependence on foreign political entities negatively affected the cohesion of society. It generates problems with the self-determination of national identity by a large part of the local population, which is commonly referred to as the Russian-speaking population. The movements of the population in the last century in the area of present-day Estonia have radically changed its ethnic structure. Modern Estonian society is largely immigrant in character, with strongly obliterated features of national identity. This fact deepens internal divisions, becoming a source of potential ethnic conflicts. Moreover, ethnic Russians and Russian-speaking Estonians are the largest minority in Estonia. The effects of long-term dependence make it difficult for the authorities in Tallinn to pursue a coherent prostate policy.

Estonia has been an area with a bilingual social structure for several decades. A significant part of its inhabitants, including those officially declaring their Estonian nationality, speak and write exclusively or usually Russian. Many, not being ethnic Russians, consider Russian as their mother tongue. Others, although they feel Estonian national-linguistic consciousness or belonging to another nation, treat Russian as their primary means of communication. When considering the language issues that fundamentally affect the sense of national and national belonging, it must be recognised that bilingualism is a serious problem in contemporary Estonia. Language is very important for the intellectual elite and nationalist circles, especially Russian. For them, language is an essential tool for expansion and ideological rule. Being a carrier of Russian culture and tradition, Russian has a negative impact on social - state consolidation. The Russian Federation treats language as a tool for far-reaching reintegration both in the spiritual (cultural-symbolical) and political sphere. This is particularly important in the context of pro-Russian separatist movements.

The ethnic and ethno-linguistic structure has its direct impact on the political life of the state. Districts with a significant percentage of ethnic Russians and the Russian language as a common tool for communication are the mother treasure troops for pro-Russian groups. Internal divisions are in no way mitigated by the religious factor. There are several churches and religious groups of different territorial scope in the country. Among the largest are the Orthodox Church of the Moscow Patriarchate, which is largely dependent on the Kremlin. The ethnic problem is exacerbated by the issue of stateless people, which continues to have negative social consequences. These are manifested in persistent ethnic divisions and the feeling of exclusion of the Russian-speaking part of society. They have negative political consequences, and above all divisions within the political elite, as well as pressure from Russia and stigmatisation of the policy towards stateless persons. To sum up, it must therefore be assumed that the

Russian-speaking and Russian-speaking minority living permanently in Estonia continues to be a potential source of separatist threats, at least in terms of propaganda and internationalism.

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Low-Cost Carrier's Domestic Flights and The Tourism Market: The Case of Selected Routes in Poland

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Abstract

The aim of the paper is to verify whether low-cost domestic flights in Poland offered by Ryanair contribute to the growth of tourism market and if yes – how they influence the tourism market and to what extent. Main research method used in this study is a questionnaire survey carried out at airports in the form of CAPI – Computer Assisted Personal Interview. Survey is complemented by desk research, statistical analysis and elements of counterfactual analysis.
Survey results allowed to conclude, that low-cost domestic flights in Poland offered by Ryanair contribute to the growth of tourism markets to a significant degree and in different ways. When it comes to the structure according to the purpose of the trip, the highest percentage belong to leisure tourists. In the case of Gdańsk they constitute vast majority of passengers incoming to the city by Ryanair flights (86%) while results for Wroclaw showed more balanced structure (34,5% - leisure, 29,5% - business, 27% - VFR; results for winter 2015 survey). 20% respondents in the case of Gdańsk and between 15% and 18% in the case of Wroclaw declared that they are travelling on a particular route for the first time (by any means of transport). Moreover 25% (Gdańsk) and between 15% and 19% (Wroclaw) of passengers visiting Gdańsk or Wroclaw (accordingly) declared that would not come to this city if there were no Ryanair flights.

Keywords: low-cost carriers, domestic flights, tourism market, relation between air transport and tourism, Poland

Introduction: interrelation between air transport and tourism

Tourism is a global phenomenon of one of the highest economic importance (Papatheodoru and Lei 2006, p. 1). According to the glossary of the World Tourism Organisation, 'tourism is a social, cultural and economic phenomenon which entails the movement of people to countries or places outside their *usual environment* for *personal* or *business/professional purposes*. These people are called *visitors* (which may be either *tourists* or *excursionists*; residents or non-residents) and tourism has to do with their activities, some of which involve *tourism expenditure'* (UNWTO, 2014). The movement to another countries or places outside the place of residence causes the need to use transport connections, what makes transport and particularly air transport indispensable element of the tourism market.

The interrelation between tourism and air transport is mutual. On one hand the desire to visit interesting places, spend holidays in a beautiful surrounding, visit friends or relatives living sometimes in another country or to do business with partners remote from our company generates demand for transport services and particularly air transport services (especially at long distance travel). On the other hand accessibility of the city, region or tourist attraction, determined by transport connections, facilitates the development of the tourism market in these places. The better accessibility, the higher potential number of tourists and excursionists (Graham, Papatheodorou and Forsyth, 2008, p. 1.).

Tourism, together with the impact on investment location decisions and economic activity, is considered to be one of the main areas of air transport catalytic impact on the regional economy. The impact of tourism on the regional economy is measured mainly through the estimation of expenditure made by tourists arriving to the region (Button and Taylor, 2000; Francis, Fidato and Humphreys, 2003). In the next step tourism multipliers are used to indicate the total increase in output, labour

earnings, and employment through inter-industry linkages in a region. The expenditure of visitors generates additional demand for goods and services in the region, influencing the growth of GDP (Eugenio-Martin and Inchausti-Sintes 2016).

There are many studies in the literature of the relationship between aviation, tourism and regional economies. Taking into consideration the topic of this paper, special emphasis should be given here to those research analyzing the significance of low cost carriers for the tourism market. Donzelli (2010) for example, using evidence from southern Italy, analyses the effect of low cost air transport on the local Italian economies through the tourist market. Other research focuses on Malta and the impact of low cost airline operations on the development of cultural heritage tourism and the tourism market in general (Graham and Dennis, 2010; Smith, 2009), the impact of low cost carriers on Korean Island tourism (Chung and Whang, 2011), the effect of low-cost airlines on tourism in Spain (Rey et al., 2011) and booming leisure air travel to Norway (Lian and Denstadli, 2010). Another paper devoted to Spanish market (Castillo-Manzano, López-Valpuesta and González-Laxe, 2011) analyzes results of the survey of almost 500 tourist establishment managers. It showed, that most of the tourism sector considers LCCs to be perfect substitutes for network carriers and even improvements on these in many cases. After literature review it seemed however, that there were not many research taking Poland and Polish regions as case studies and analyzing the relation between low-cost flights and tourism market in Poland. Empirical studies were missing particularly. Thus, the author became convinced that it cannot allow to consider this area as well described neither in English nor in Polish literature. It additionally encouraged the author to conduct this study.

Although there are relatively many research in the literature on the relation between LCCs and tourism market, they analyze only international connections or all LCCs routes without division into categories. It seems that none of studies focuses particularly on the significance of domestic flights of low-cost airlines on the tourism market and its development, thus the author believe, that this analysis fulfills important gap is the literature.

The aim of the paper is to verify whether low-cost domestic flights in Poland offered by Ryanair contribute to the growth of tourism market and if yes – how they influence the tourism market. Main research method used in this study is a questionnaire survey carried out at airports in the form of CAPI – Computer Assisted Personal Interview. Survey is complemented by literature review, desk research, elements of statistical analysis and elements of counterfactual analysis.

The article, along with some general and theoretical information which help to understand the relation between LCCs and tourism market, includes primarily original empirical data gathered through the survey and complemented by an analysis. Thus, the study gains also practical character and conclusions can be useful for regional policy makers as well as city and regional authorities. Very often low-cost carriers require financial support from public authorities when opening new routes claiming, that local and regional economies will benefit from growth of tourism and other economic activities resulting from higher number of incoming passengers and better accessibility of the region. Sometimes this support is unofficially a condition for opening a new routes and transfer of money has a form of so called 'marketing fees' paid to the airline for an advertising on the carriers' websites and in their magazines. Data obtained in the survey show real and just declared effects generated by these routes and can help to verify and analyze rationality of the decision on financial support for new LCCs domestic routes.

Development of Low-Cost Carriers in Europe and its domestic connections

Low-cost airlines grew fastest in Great Britain and on routes between the United Kingdom and Ireland due to lower labor costs, a huge London market and a relatively liberal regulatory environment (Doganis 2006, p. 88). Since 1999, after the expansion on the British and Irish markets, cheap airlines began the conquest of the whole of the European continent, increasing its market share each year. Market share of LCCs in Europe from increased 4,9% in 2001 to 36,3% of European seats in 2018 (European Commission, 2011, p. 97; ANNA, 2018). There were also nine markets in Europe (countries) where LCCs account for over 50% of seats (ANNA, 2018).

At initial stage of the development of LCCs European network their growth was focused on the Western European market, where they represented the most determining factor in the evolution of airline networks. They were offering point-to-point (mainly North-South) connections complementing those of full service network carriers (FSNCs) as well as charter routes. On some routes they were also directly competing with charters. The use of air freedoms beyond the fourth was limited, but exclusive routes were a frequent phenomenon linked to the option for secondary (urban or regional) airports and/or niches (Doruszkes, 2006). After European Union's enlargements in 2004 and 2007 and thus liberalization of the new member states aviation markets, the opportunity to open routes to/in these countries encouraged low-cost airlines to develop new routes in Central-East European countries. Although LCCs business has expanded to Central-East Europe, Marocco and a few remote areas, it remains mainly focused on the intra-Western market the share of which amounted in 2012 82% of 'low-cost seats' (Dobruszkes, 2009 and 2013; Pijet-Migoń, 2017).

Simultaneously cheap airlines have significantly entered many of the main European domestic routes and represent a significant part of the nationwide domestic air services. The share of domestic air service operated by LCCs in January 2012 in the UK, Italy, Norway and Spain amounted 37, 35, 34 and 29 per cent respectively and between 10 and 20 percent in 6 other European countries (Dobruszkes, 2013). Considerable part of these routes are a 'full cabotage' type of service, what means, that they are offered by carriers from another country (Pijet-Migoń, 2016). Pijet-Migoń (2016) notices also, that 'full cabotage' connections in Europe are operated mainly by low-cost airlines.

Low-cost domestic connections in Poland

It can be considered, that first attempt of the development of domestic LCCs network in Poland took place in April 2012. The airline OLT Express started operations in Poland offering charter and several international services as well as domestic connections between regional airports and Warsaw-Chopin Airport as well as directly between several regional airports. The experimental and brave concept of the expansion of domestic network and also the whole business concept of the OLT Express airlines was a total fiasco and resulted in bankruptcy already in July 2012, but brought a lot of knowledge about the potential of this market, mainly for those who are interested in its development (Serafin 2012 and 2013). Two years after OLT-experiment, in April 2014 Ryanair decided to open two domestic routes: Gdańsk-Warsaw-Modlin (GDN-WMI) and Wroclaw-Warsaw-Modlin (WRO-WMI) and in July 2014 another two from Kraków to Gdańsk and from Wrocław to Gdańsk. Details of new Ryanair domestic routes opened in 2014 are presented in the table 1 and on the figure 1. Research presented in this paper was carried out for the WRO-WMI and GDN-WMI routes and are marked on the figure.

Table 1: Ryanair domestic routes in Poland opened in 2014

Route	Date of the beginning of flights	Frequency
Wrocław – Warsaw-Modlin	2nd April 2014	1 flight per day, since the Autumn schedule – 2 flights per day
Gdańsk – Warsaw-Modlin	2nd April 2014	1 flight per day, since the Autumn schedule – 2 flights per day
Kraków – Gdańsk	1st July 2014	3 flights per week (only during summer)
Wrocław – Gdańsk	1st July 2014	3 flights per week (only during summer)

Source: own work.

Fig. 1: Ryanair domestic routes in Poland opened in 2014

Source: own work based on the map by Polish Civil Aviation Authority, (2017), [Online], [Retrieved April 15, 2018], http://www.ulc.gov.pl

The network of Ryanair domestic flights was constantly evolving. The airline was changing frequency of flights, cancelling some routes and opening new ones. One of the most important change was the move of connections from Wroclaw and Gdańsk to Warsaw-Chopin Airport from secondary Modlin what took place in October 2016. However already 1,5 year later Ryanair withdrew this routes from its schedule giving as a reason too high airport fees and discriminatory decisions of Chopin Airport authorities. The evolution of Ryanair domestic network in Poland has been presented in tables 2-3 and on the figures 2-3.

Table 2: Ryanair domestic routes in Poland since October 2016

Route	Date of the beginning of flights	Frequency
Wrocław – Warsaw-Chopin	1st October 2016	3 flights everyday
Gdańsk – Warsaw- Chopin	1st October 2016	3 flights everyday
Kraków – Gdańsk	1st July 2016	3 flights per week

Source: own work.

Fig. 2: Ryanair domestic routes in Poland since 2016

Source: own work based on the map by Polish Civil Aviation Authority, (2017), [Online], [Retrieved April 15, 2018], http://www.ulc.gov.pl

Table 3: Changes in the Ryanair domestic network in Poland since 2017 until current 2020

Route	Date of the beginning of flights	Frequency	Current status (March 2020)
Wrocław – Warsaw-Chopin	1st October 2016	3 flights everyday	Withdrew from the schedule on 31st of March 2018
Gdańsk – Warsaw-Chopin	1st October 2016	3 flights everyday	Withdrew from the schedule on 31st of March 2018
Szczecin – Warsaw-Chopin	27th of Mach 2017	1 flight per day, everyday	Withdrew from the schedule on 9th of January 2018
Kraków – Gdańsk	1st July 2016	3 flights per week	3 flights per week
Wrocław – Gdańsk	1st July 2016	3 flights per week	3 flights per week
Szczecin – Kraków	2nd April 2019	3 flights per week	3 flights per week

Source: own work.

Fig. 3: Ryanair domestic routes in Poland in the period 2017-2020

Source: own work based on the map by Polish Civil Aviation Authority, (2017), [Online], [Retrieved April 15, 2018], http://www.ulc.gov.pl

Classification of tourists and air transport passengers

The definition of tourism has been written above in the introduction. It is however also important to know categories of tourism. A tourism trip can be classified by the visitor's socio-economic characteristics or by specific features of the trip. One of attributes characterising tourism trips is the 'main purpose' of a trip, defined as the purpose in the absence of which the trip would not have taken place (UNWTO, 2010). The main purpose of a trip helps to determine whether it qualifies as a tourism trip and the traveller qualifies as a visitor. The classification of a trip according to its main purpose should be related to the main activities undertaken during the traveller's stay. In case of travel, during which individuals may have more than one purpose, the main purpose of the trip should be the one that is central to the decision to take the trip (UNWTO, 2010).

Classification of tourism trips according to the main purpose distinguish two main categories as well as eight sub-categories (UNWTO, 2010):

- Personal
    - Holidays, leisure and recreation
    - Visiting friends and relatives
    - Education and training
    - Health and medical care
    - Religion/pilgrimages
    - Shopping
    - Transit
    - Other
- Business and professional

Classification of tourists according to the purpose of the tourism trip overlaps with classification of air transport passengers. Three main categories of air transport passengers are: business passengers, leisure tourism passengers and VFR passengers (visiting friends and relatives). This three categories and groups of passengers appear also further in the study and are carefully analyzed for routes under consideration.

Methodology

The basic method of the research was a survey carried out among passengers departing from Wrocław Airport (WRO) and Gdańsk Airport (GDN) to Warsaw-Modlin Airport (WMI), which is the secondary airport for Warsaw – the capital of Poland. The survey was undertaken in four rounds in the period from May 2014 until September 2016. Three of them were carried out at Wroclaw Airport and one at Gdańsk Airport. Every survey was undertaken in different circumstances, namely: different seasons of the year and with different frequency of flights per day. Particular rounds with dates and circumstances are presented in the table below (table 4).

Table 4: Basic information about rounds of survey

No	Date of the survey	Place of the survey	Route	Frequency of flights and other information
1.	May – June 2014	Wrocław Airport (WRO)	WRO-WMI	1 flight per day: in the afternoon, about 6pm
2.	July – August 2014	Wrocław Airport (WRO)	WRO-WMI	1 flight per day: in the afternoon, about 6pm
3.	February – March 2015	Wrocław Airport (WRO)	WRO-WMI	2 flights per day, morning (about 7am) and afternoon, (about 6pm)
4.	September 2016	Gdańsk Airport (GDN)	GDN-WMI	2 flights per day, morning (about 7am) and afternoon, (about 6pm)

Source: own work.

The sample amounted from slightly less than 400 to 588 respondents and the percentage of passengers surveyed from 17 to 22 per cent. Statistical error amounted not more than 4% in each survey. Detailed information regarding surveys are presented in the table 5.

Table 5: The number and percentage of surveyed passengers

Round of the survey	1.		2.		3.		4.	
	WRO-WMI May-June 2014		WRO-WMI July-August 2014		WRO-WMI Feb.-March 2015		GDN-WMI September 2016	
Measure	No of answers	% of PAX	No of answers	% of PAX	No of answers	% of PAX	No of answers	% of PAX
Number and % of surveyed passengers	497	17%	396	18%	588	20%	389	22%
Statistical error	4%		4%		3%		4%	

Source: own work.

Table 6 includes basic information about respondents taking part in the survey. Vast majority of respondents are Poles living in Poland (more than 90% in each survey and in each category). For almost all respondents Warsaw-Modlin was final destination. However it should be noted, that after adding second flight per day to the schedule at both of these routes the percentage of passengers declaring transfer at Modlin Airport increased by ca. 10% at both connections.

Table 6: General characteristic of respondents

Round of the survey	1.		2.		3.		4.	
	WRO-WMI May-June 2014		WRO-WMI July-August 2014		WRO-WMI Feb.-March 2015		GDN-WMI September 2016	
Measure	No of answers	% of answers	No of answers	% of answers	No of answers	% of answers	No of answers	% of answers
Nationality								
Polish	470	94,6%	388	98%	565	96%	365	93,8%
Foreigner	27	5,4%	8	2%	23	3,9%	24	6,2%
Total	497	100%	396	100%	588	100%	389	100%
Place of residence								
Poland	459	92,4%	385	97,2%	560	95,2%	358	92%
Abroad	38	7,6%	11	2,8%	28	4,8%	31	8%
Total	497	100%	396	100%	588	100%	389	100%
Final destination								
I do not transfer	469	94,2%	384	97%	495	84,2%	337	86,6%
I transfer in WMI	28	5,84%	12	3,03%	93	15,8%	52	13,4%
Total	497	100%	396	100%	588	100%	389	100%

Source: own work.

Survey Results

At the initial stage of the analysis it is important to outline the structure of passengers according to the type of the trip, i.e. whether the passenger is at the beginning or start of their trip, whether they are returning to their place of residence, whether they are transferring at Wroclaw Airport or Gdańsk Airport, or maybe staying in the region as part of a longer trip. Taking into consideration the development of the tourism in Wroclaw and in Gdańsk a particular interest should be given to passengers declaring that they are going back home because they are coming to these cities for certain purpose and sometimes stay two or more days. The analysis below in some places focus only on this group of passengers. As it is presented in the table below (table 7), the share of this group of passengers varies depending on the location and season of the survey, but amounts not more than 53% and in the case of the survey carried out in Wroclaw in the winter time it falls to even 34%. We have to note also a relatively high percentage of travellers declaring other type of journey in the case survey in Gdańsk (8,2%). The reason for this can be the fact, that Gdańsk Airport has a very well developed network of connections with Scandinavia and for some group of passengers is used as a transfer airport during flights to Norway, Sweden or Finland.

Table 7: Type of journey (beginning, going back home, others)

Round of the survey	1.		2.		3.		4.	
	WRO-WMI May-June 2014		WRO-WMI July-August 2014		WRO-WMI Feb.-March 2015		GDN-WMI September 2016	
Measure	No of answers	% of answers	No of answers	% of answers	No of answers	% of answers	No of answers	% of answers
Beginning of the trip	262	52,8%	179	45,2%	375	63,8%	154	39,6%
Going back home	**224**	**45%**	**210**	**53%**	**200**	**34%**	**203**	**52,2%**
Other	11	2,2%	7	1,8%	13	2,2%	32	8,2%
Total	497	100%	396	100%	588	100%	389	100%

Source: own work.

In Table 8 and 9 the structure of passengers according to the purpose of journey is presented, however the reference group in each of these tables is different: all surveyed passengers in the Table 8 (all respondents = 100%) and only passengers declaring return to their place of residence in the Table 9 ('go back home' = 100%).

Table 8: The purpose of visit (all respondents = 100%)

Round of the survey	1.		2.		3.		4.	
	WRO-WMI May-June 2014		WRO-WMI July-August 2014		WRO-WMI Feb.-March 2015		GDN-WMI September 2016	
Measure	No of answers	% of answers	No of answers	% of answers	No of answers	% of answers	No of answers	% of answers
Business trip	**124**	**25%**	**57**	**14,4%**	**154**	**26,2%**	**11**	**2,8%**
Business trip/conference	52	10,5%	4	1%	48	8,2%	13	3,3%
Leisure tourism	**144**	**29%**	**150**	**37,9%**	**194**	**33%**	**287**	**73,8%**
VFR	**144**	**29%**	**137**	**34,6%**	**138**	**23,5%**	**57**	**14,6%**
Work	5	1,0%	7	1,8%	14	2,4%	10	2,6%
Studies	15	3,0%	3	0,8%	9	1,5%	1	0,3%
Other	13	2,6%	5	1,3%	31	5,3%	10	2,6%
Total	497	100%	396	100%	588	100%	389	100%

Source: own work.

Table 9: The purpose of visit of passengers who declare that they 'go back home' ('go back home' = 100%)

Round of the survey	1.		2.		3.		4.	
	WRO-WMI May-June 2014		WRO-WMI July-August 2014		WRO-WMI Feb.-March 2015		GDN-WMI September 2016	
Measure	No of answers	% of answers	No of answers	% of answers	No of answers	% of answers	No of answers	% of answers
Business trip	56	25%	31	14,8%	59	**29,5%**	4	2%
Business trip/ conference	17	7,6%	2	0,9%	5	2,5%	3	1,5%
Leisure tourism	74	**33%**	81	**38,6%**	69	**34,5%**	**175**	**86,2%**

VFR	60	**26,8%**	68	**32,4%**	54	**27%**	18	8,9%
Work	2	0,9%	3	1,4%	2	1%	0	0%
Studies	5	2,2%	1	0,5%	2	1%	0	0%
Other	10	4,5%	24	11,4%	9	4,5%	3	1,5%
Total	224	100%	210	100%	200	100%	203	100%

Source: own work.

Data in the above tables show a considerable difference between the structure of passengers in Gdańsk and in Wrocław. Vast majority of passengers departing from Gdańsk to Warsaw-Modlin declare themselves as leisure tourists. Leisure tourism as a purpose of the trip has been indicated by 73,8% of all passengers and 86,2% of those who were returning home. Other options has been indicated rarely. While in the case of Wroclaw the structure is more balanced. Most important group is also leisure tourists (from 33% to 38,6% of 'going back home' respondents) but they are followed by only a little smaller VFR group (from 26,8% to 32,4% respectively). In the case of Wroclaw the relative high share of business passengers, amounted over 25% (except the summer time), should also be noted.

When it comes to the length of stay (Table 10) over 85% of passengers in every of 4 surveys spend in their destination not more than 5 days and from 42% to 55% travelers even not more than 2 days (one night). After adding a second flight per day to the schedule by Ryanair we can also observe a considerable increase of passengers indicating one-day trip (same-day visitors or excursionists).

Table 10: Answers for the question about the length of stay

Round of the survey	1.		2.		3.		4.	
	WRO-WMI May-June 2014		WRO-WMI July-August 2014		WRO-WMI Feb.-March 2015		GDN-WMI September 2016	
Measure	No of answers	% of answers	No of answers	% of answers	No of answers	% of answers	No of answers	% of answers
One-day trip	**72**	**14,5%**	**43**	**10,9%**	**163**	**27,7%**	**103**	**26,5%**
Till 2 days	**173**	**34,8%**	**128**	**32,3%**	**168**	**28,6%**	**86**	**22,1%**
3-5 days	**189**	**38%**	**166**	**41,9%**	**173**	**29,4%**	**155**	**39,9%**
till 1 week (6-7 days)	39	7,85%	30	7,58%	47	7,99%	20	5,14%
till 2 weeks (8-14 days)	9	1,81%	16	4,04%	22	3,74%	23	5,91%
till 3 weeks (15-21 days)	5	1,01%	1	0,25%	3	0,51%	0	0,00%
till 4 weeks (22-28 days)	2	0,40%	2	0,51%	2	0,34%	0	0,00%
over 4 weeks (over 28 days)	8	1,61%	10	2,53%	10	1,70%	2	0,51%
No answer	0	0,00%	0	0,00%	0	0,00%	0	0,00%
Total	497	100%	396	100%	588	100%	389	100%

Source: own work.

Analysing the significance of LCCs domestic flights in Poland for the growth of tourism it seems very important to consider also data regarding frequency of travelling. They has been presented in the Table 11. Data reveal, that passengers using Ryanair domestic flights cannot be consider 'frequent travellers'. Again the difference between passengers in Gdańsk and those surveyed in Wroclaw is noticeable. While 46% respondents travel on the Gdańsk-Warsaw route (by any means of transport) once per year

or less frequently, this group in Wroclaw fluctuate only around 20%. We should focus more, however on the last possible option in the survey, namely "I travel on this route for the first time". The percentage of passengers who were travelling between Wroclaw and Warsaw for the first time amounted 15,1% in the winter 2015 survey, 18,9% in the spring 2014 survey and in the case of Gdańsk-Warsaw route even 20,1%.

Table 11: Frequency of travelling on the Wrocław-Warszawa/Gdańsk-Warszawa route (by any means of transport)

Round of the survey	1.		2.		3.		4.	
	WRO-WMI May-June 2014		WRO-WMI July-August 2014		WRO-WMI Feb.-March 2015		GDN-WMI September 2016	
Measure	No of answers	% of answers	No of answers	% of answers	No of answers	% of answers	No of answers	% of answers
Several times per week	24	4,83%	x	x	57	9,69%	6	1,54%
Several times per month	88	17,71%	x	x	77	13,10%	21	5,40%
On time per month	56	11,27%	x	x	67	11,39%	14	3,60%
At least once per 3 months	81	16,30%	x	x	92	15,65%	38	9,77%
At least one time per half a year	55	11,07%	x	x	76	12,93%	53	13,62%
Once per year	**37**	**7,4%**	**x**	**x**	**52**	**8,8%**	**75**	**19,3%**
Less frequently	**62**	**12,5%**	**x**	**x**	**78**	**13,3%**	**104**	**26,7%**
I travel on this route for the first time	**94**	**18,9%**	**x**	**x**	**89**	**15,1%**	**78**	**20,1%**
Total	**497**	**100,0%**	**x**	**x**	**588**	**100,0%**	**389**	**100,0%**

Source: own work.

The main aim of this study is to investigate the role of Ryanair domestic flights for tourism market. So, it would be desirable to distinguish between tourists (and other visitors) who would not have travelled to the region if there were no airport and those who would not have come anyway by some other form of transportation Butler and Kiernan (1992). Mainly the former are relevant for the assessment of the role of LCCs flights for the development and growth of tourism market. In order to identify these passengers and estimate the size of this group the elements of counterfactual analysis has been used and one of the questions in the survey has been formulated as follows: Would you come to Wrocław/Gdańsk if there were no Ryanair flight? The structure of answers for this question hase been presented in the Table 12.

Table 12: Answer for the question: "Would you come to Wrocław/Gdańsk if there were no Ryanair flight?" ('go back home' passengers only)

Round of the survey	1.		2.		3.		4.	
	WRO-WMI May-June 2014		WRO-WMI July-August 2014		WRO-WMI Feb.-March 2015		GDN-WMI September 2016	
Measure	No of answers	% of answers	No of answers	% of answers	No of answers	% of answers	No of answers	% of answers
Yes	185	82,6%	163	77,6%	153	76,5%	141	69,5%
No	**35**	**15,6%**	**39**	**18,6%**	**38**	**19,0%**	**51**	**25,1%**
I do not know/No answer	4	1,8%	4	1,9%	9	4,5%	11	5,4%
Total	224	100%	210	100%	200	100%	203	100%

Source: own work.

Based on data presented in the Table 12 we can conclude, that the role of Ryanair flights in the growth of tourism market in Gdańsk and in Wroclaw is considerable. One forth of respondents answered that if there were no Ryanair flights from Warsaw-Modlin to Gdańsk they would not come to Gdańsk at all. These shares for Wroclaw amounted 15,6%, 18,6% and 19% in the 1st, 2nd and 3rd rounds respectively. This question has been asked only to passengers declaring return to the place of residents, so we can draw conclusions precisely for these two cities and tourist markets.

Conclusions

Based on the results of the survey and analysis presented above we can conclude, that low-cost domestic flights in Poland contribute to the growth of tourism markets to a significant degree.

In the case of GDN-WMI route Ryanair domestic flights contribute mainly to the growth of leisure tourist traffic. Significance for VFR passengers is not so high and for business travelers is even very modest. In the case of WRO-WMI route significance of Ryanair domestic flights for business travels and VFR is at higher level than in the case of Gdańsk, the structure of passengers according to the purpose of the trip is more balanced, however still the biggest share of demand comes from leisure tourists.

Opportunity of fast and cheap travels by airplane encourage people to fly and to travel at all. Ryanair low-cost domestic flights attract new tourists who are visiting particular place for the first time and moreover declare, that in case that there were no Ryanair flights they would not visit Wrocław or Gdańsk at all. Adding second flight per day (in the morning) on these routes increased also the share of excursionists (same-day visitors), who can make one-day trip thanks to short travel time by air transport. New tourists attracted by cheap flights facilitate increase of demand for local products and services and thus contribute to the growth and development of tourism market at these destinations.

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